Beach and Borrow Area Sediment Compatibility Analysis, Summer Haven FEMA Dune Restoration Project

St. Johns County, FL

March 2010

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Beach and Borrow Area Sediment Compatibility Analysis
Summer Haven FEMA Dune Restoration Project

Prepared for

St. Johns County

by

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1.0 INTRODUCTION

To protect the environmental functions of Florida's beaches, beach restoration projects may only place beach compatible fill — material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system —on the beach or in any associated dune system. St. Johns County has conducted geotechnical investigations that provide adequate data concerning the character of the existing beach and borrow area sediment and the quantities available within the spatial limits of the permitted borrow area. This report provides the results of the geotechnical analyses and demonstrates the proposed borrow material's compatibility with the existing beach sediment in accordance with Fla. Admin. Code r. 62B-41.007(2)(j).

2.0 DATA COLLECTION

Universal Engineering Sciences, Inc. (UES), contracted by St. Johns County in 2008, collected 23 samples from the beach in Summer Haven between Florida Department of Environmental Protection (FDEP) reference monuments R-200 and R-208 and collected 3 core borings and 11 surface samples from the proposed borrow site, Florida Inland Navigation District (FIND) Dredge Material Management Area (DMMA) SJ-1. The collected beach samples represent the beach, the top of the dune (T Dune), and the county right-of-way (R/W). Figures 2.1 and 2.2 illustrate the sampling locations. UES sieved each sample, including 3 samples from each borrow site core boring, through mesh sizes 3/4", 5/8", and 3/8", and US Standard sieve sizes 4, 5, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200, and 230.

To determine the carbonate content of the existing beach samples, Taylor Engineering re-sampled the beach and borrow sites and subcontracted Ellis & Associates, Inc. (EA) to conduct carbonate tests. EA tested five beach samples — representing the dune vegetation, dune toe, mid-berm, intertidal, and wading depth locations — and four borrow area samples (approximately 30% of the total samples collected).

Appendix A contains summary tables of the Summer Haven beach and DMMA SJ-1 borrow area sediment characteristics. Appendix B and C contain gradation tables and curves for the beach and borrow area samples analyzed by UES. Appendix D contains gradation tables and curves of the pre- and post-carbonate removal analyses conduced by Ellis & Associates.

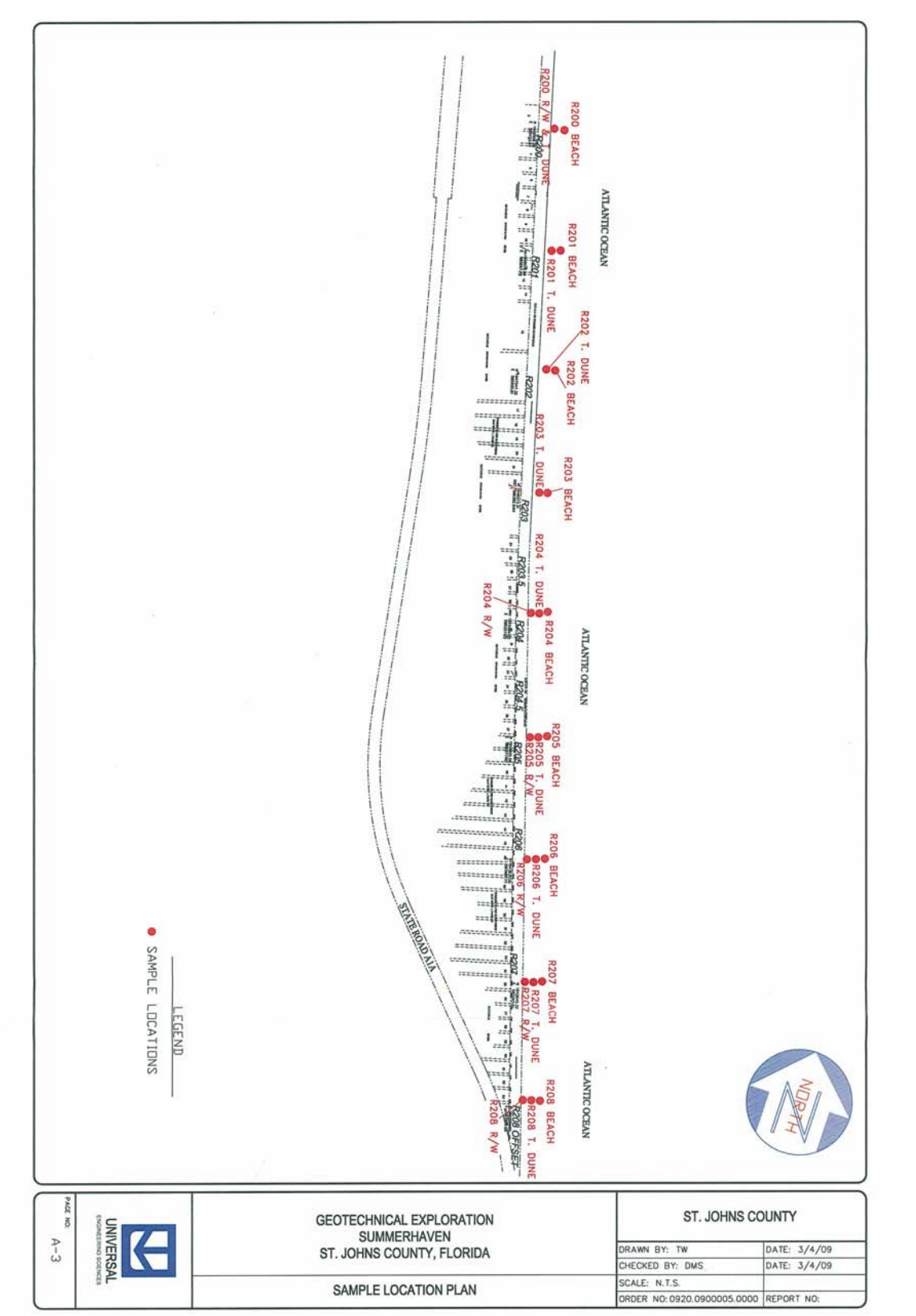


Figure 2.1 Summer Haven Beach Sampling Locations (Source: [UES, 2009])

Figure 2.2 Borrow Area (FIND DMMMA SJ-1) Sampling Locations (Source: [UES, 2009])

3.0 COMPATIBILITY ANALYSIS

3.1 Beach Sand Characteristics

Taylor Engineering calculated, using the moments method and UES' sieve results, a beach composite mean grain size of 1.73 phi (0.30 mm) and sorting of 0.91 phi. Figure 3.1 shows cumulative frequency curves for the coarsest beach sample, the finest beach sample, and the beach composite. None of the beach samples contain more than 1% silt (passing US Standard sieve number 230). The average carbonate content equals 20.2% and the Munsell color predominantly falls between 10YR 7/3 and 10YR 8/1 (see summary tables in Appendix A). Notably, the post-carbonate removal sieve results indicate an average mean grain size of 2.15 phi (0.22 mm) and sorting of 0.54 phi of the remaining non-carbonate material.

3.2 Borrow Area Sand Characteristics

Taylor Engineering combined the results of the borrow area surface sample and coring boring sample sieve tests to determine composite characteristics of various borrow area depths (0 – 5 ft, 5 – 10 ft, and 10 – 15 ft) and the borrow area as a whole. The above depth limits correspond with UES' core boring sampling locations. The 0 – 5 ft composite, 5 – 10 ft composite, and 10 – 15 ft composite have mean grain sizes of 0.19 mm, 0.19 mm, and 0.17 mm. The borrow area composite as a whole — representing a combination of the 0 – 5 ft, 5 – 10 ft, and 10 – 15 ft composites — has a mean grain size 2.46 phi (0.18 mm) and sorting of 0.85 phi. Notably, comparison of the grain size cumulative frequency distribution curves (Figure 3.2) indicates little variation in grain size with depth. Figure 3.3 shows cumulative frequency curves for the coarsest borrow area sample, the finest borrow area sample, and the borrow area composite. The sand throughout the borrow area has highly consistent grain size characteristics, with only 0.12 mm separating the coarsest mean grain size from the finest.

None of the borrow area samples contain more than 1% silt (passing US Standard sieve number 230). The borrow area carbonate content equals 6.2% and the Munsell color predominantly falls between 2.5YR 7/2 and 5Y 7/2(see summary tables in Appendix A).

3.3 Overfill Ratio

Differences in grain size distributions between the borrow material and the native beach sand can cause an initial short-term fill loss from the placement area, as beach fill sand with a grain size distribution finer than the native beach sand typically erodes rapidly. This study determined the required overfill volume based on Dean's equilibrium profile method (Dean, 2002) as follows.

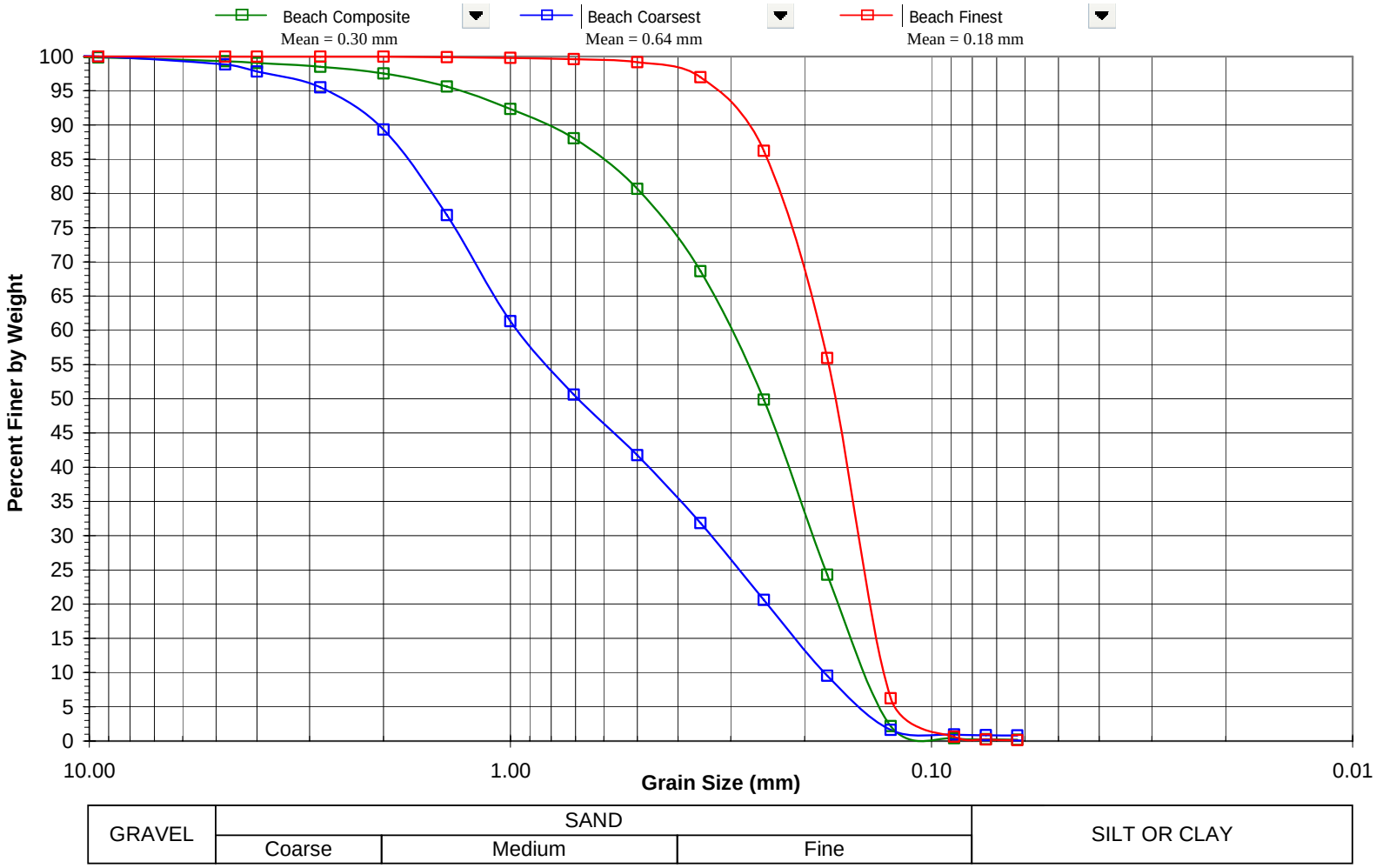


Figure 3.1 Grain Size Cumulative Frequency Curves for Beach Samples and Composite

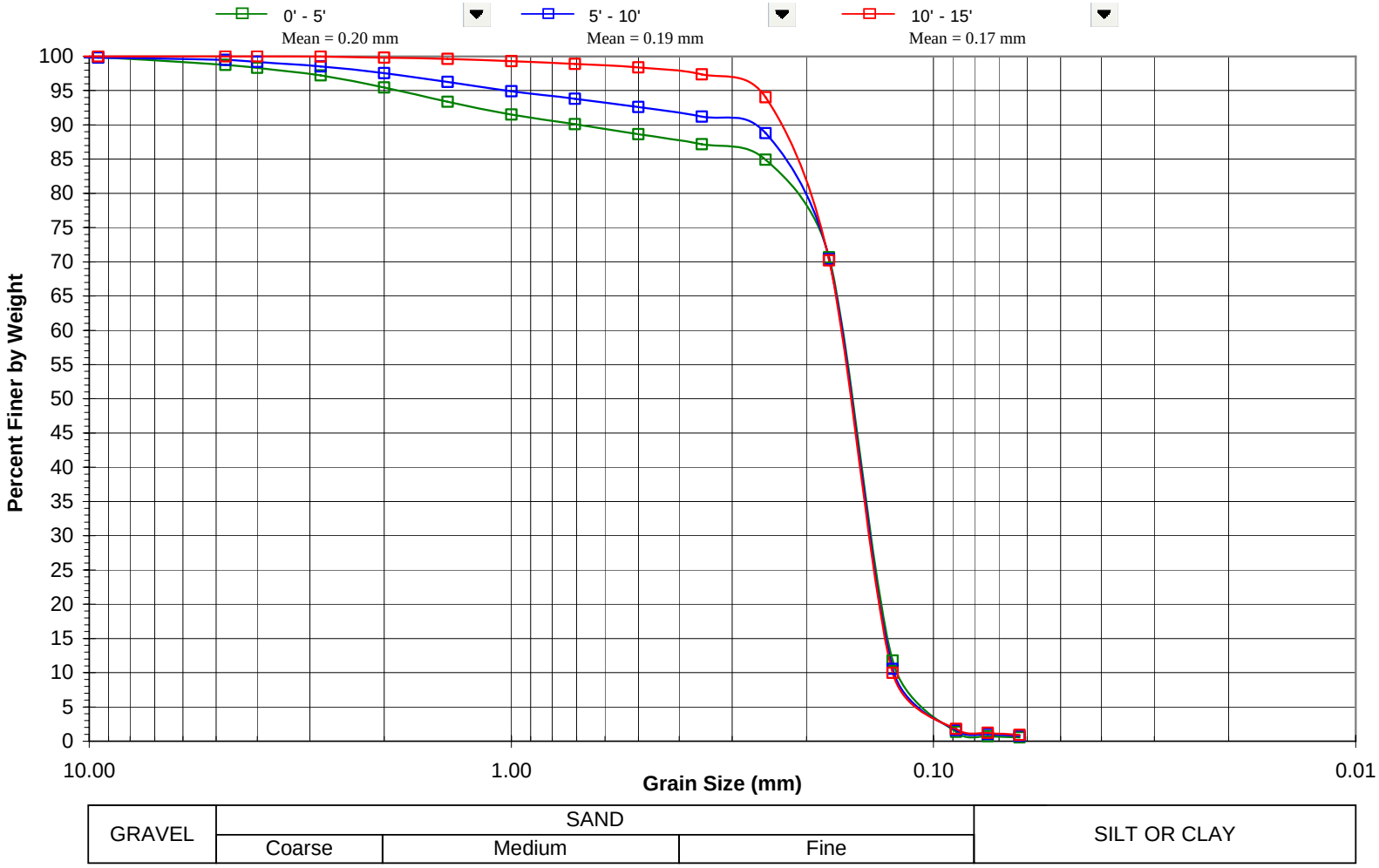


Figure 3.2 Grain Size Cumulative Frequency Curves at Different Borrow Area Depths

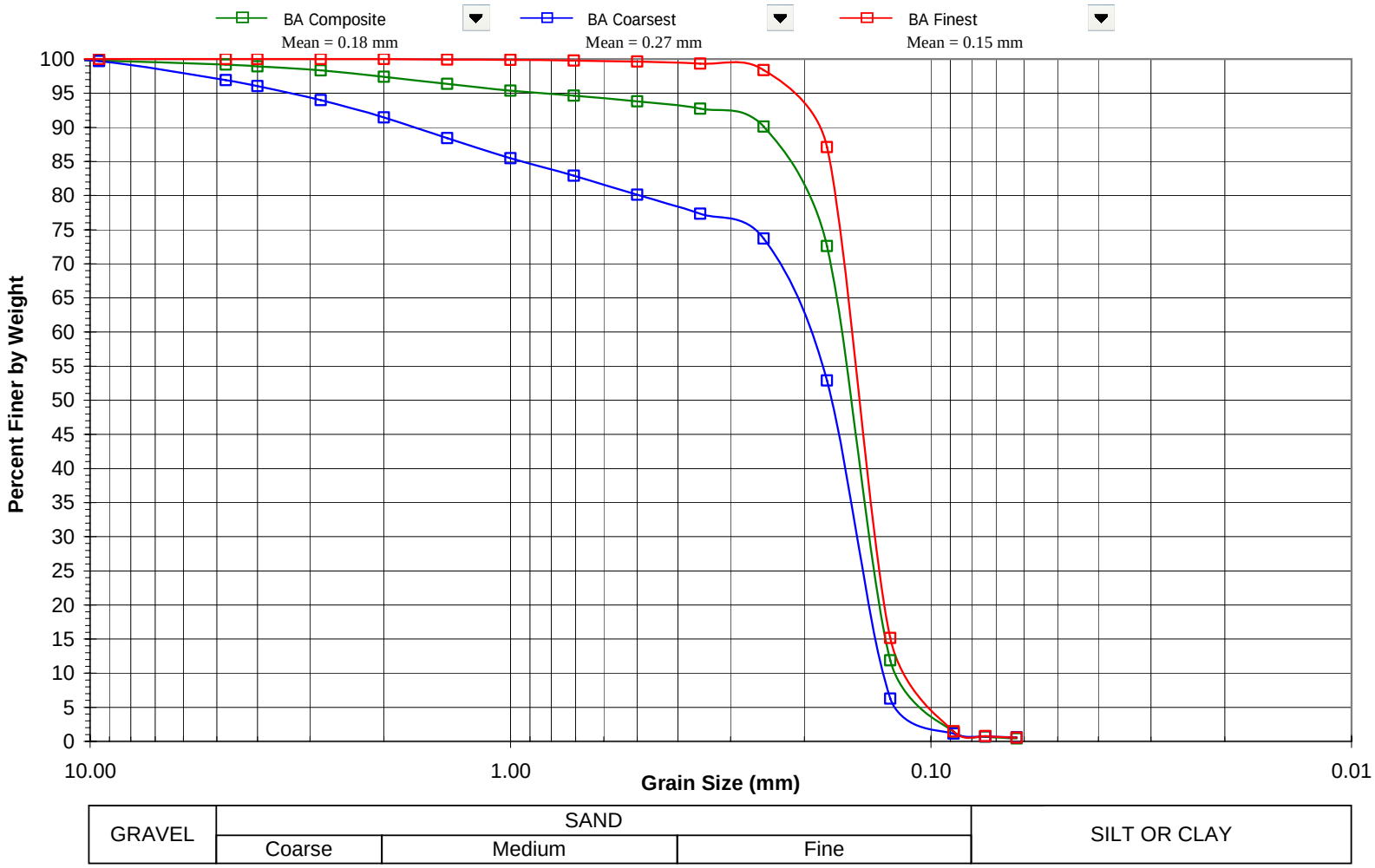


Figure 3.3 Grain Size Cumulative Frequency Curves for Borrow Area Samples and Composite

Dean's method determines the volume of beach fill (comprised of a given grain size) required to increase the dry beach width by a specified amount. A basic principle suggests that beach fills comprised of coarser and finer grain sizes than the native beach sand have steeper and milder slopes than the native beach. Thus, for a given beach fill volume density, finer sands would produce a smaller equilibrated shoreline displacement. In effect, finer sands require a larger volume to yield a specified shoreline displacement. The additional volume required for a borrow material to yield the same shoreline displacement that native beach sand would defines the overfill volume. A borrow source with sand coarser than or equal to the native beach sand requires no overfill volume.

Based on the beach and borrow area grain size statistics discussed above and the methodology presented in Dean (2002), the proposed borrow area has an overfill factor of 2.2. This result suggests that a beach constructed in the active littoral zone will rapidly decrease in width as finer sands erode from the fill during the equilibration process. However, with the fill placed in a dune feature as proposed, erosion will occur when elevated water levels, rather than typical conditions, scour the dune toe and cause slumping of the dune face.

3.4 Summary

Table 3.1 summarizes the composite sediment characteristics of the native beach and borrow area, and Appendix A contains summary tables of grain size and carbonate content statistics of the individual sediment samples. The borrow material composite is finer grained and contains fewer carbonates than the native beach. However, the borrow material carbonate content is similar to that of the existing dune sediment (11.1% – 12.9% carbonate content) where the proposed dune fill will occur. Additionally, the borrow material mean grain size is similar to the post-carbonate removal mean grain size of the existing beach (0.22 mm), suggesting the carbonate content comprises the coarsest fraction of material. Based on the available sediment data, the proposed borrow material appears compatible with the native beach.

Table 3.1 Comparison of Borrow Area and Native Beach Sediment Characteristics

Characteristic	Native Beach Composite	Borrow Area Composite
Mean Grain Size (mm)	0.30	0.18
Mean Grain Size (phi)	1.73	2.46
Sorting (phi)	0.91	0.85
Silt Content	0.0% – 0.9% (0.2% average)	0.0% – 1.0% (0.4% average)
Carbonate Content	11.1% – 29.8% (20.2% average)	1.6% – 18.3% (6.2% average)
Moist Munsell Color	10YR 7/3 - 10YR 8/1	5Y 7/1 – 2.5YR 7/2

REFERENCES

Dean, R.G. 2002. *Beach Nourishment Theory and Practice*. World Scientific. New Jersey.

Universal Engineering Services. 2009. Letter Report Submitted to St. Johns County Engineering Division. Jacksonville, FL.

APPENDIX A

Geotechnical Analysis Summary Tables

Table A.1 Summer Haven Beach Sediment Grain Size Data Table[1]

FDEP Monument	Location	Mean Grain Size		Median (d50)		St Dev (Sorting)		Moist Munsell Color	Silt Content	Carbonate Content
		(phi)	(mm)	(phi)	(mm)	(phi)	(mm)			
R-200	Beach	1.71	0.31	1.82	0.28	0.78	0.58	10YR 7/2	0.22%	*Not Tested*
	R/W & T Dune	0.61	0.66	0.53	0.69	1.35	0.39	10YR 7/3	0.81%	*Not Tested*
R-201	Beach	1.48	0.36	1.58	0.33	0.89	0.54	10YR 7/1	0.10%	*Not Tested*
	T Dune	1.82	0.28	1.99	0.25	0.79	0.58	10YR 7/2	0.03%	*Not Tested*
R-202	Beach	1.81	0.29	2.16	0.22	1.06	0.48	10YR 8/1	0.24%	*Not Tested*
	T Dune	1.97	0.26	1.87	0.27	0.60	0.66	10YR 8/1	0.10%	*Not Tested*
R-203	Beach	2.30	0.20	2.30	0.20	0.39	0.76	10YR 7/1	0.02%	*Not Tested*
	T Dune	2.47	0.18	2.56	0.17	0.48	0.72	10YR 7/2	0.10%	*Not Tested*
R-204	Beach	2.36	0.19	2.37	0.19	0.41	0.75	10YR 7/1	0.02%	*Not Tested*
	R/W	2.13	0.23	2.47	0.18	1.09	0.47	10YR 7/2	0.22%	*Not Tested*
	T Dune	1.65	0.32	2.17	0.22	1.38	0.38	10YR 7/3	0.90%	*Not Tested*
R-205	Beach	1.44	0.37	1.52	0.35	0.95	0.52	10YR 7/2	0.01%	*Not Tested*
	R/W	1.65	0.32	2.08	0.24	1.32	0.40	10YR 7/2	0.14%	*Not Tested*
	T Dune	1.63	0.32	2.52	0.17	1.86	0.28	10YR 7/1	0.17%	*Not Tested*
R-206	Beach	1.84	0.28	1.92	0.26	0.64	0.64	10YR 7/2	0.02%	*Not Tested*
	R/W	1.57	0.34	1.65	0.32	0.79	0.58	10YR 7/2	0.02%	*Not Tested*
	T Dune	1.19	0.44	1.41	0.38	1.47	0.36	10YR 5/3	0.80%	*Not Tested*
R-207	Beach	1.86	0.28	1.93	0.26	0.61	0.66	10YR 7/2	0.02%	*Not Tested*
	R/W	1.70	0.31	1.90	0.27	0.99	0.50	10YR 7/2	0.05%	*Not Tested*
	T Dune	1.95	0.26	2.14	0.23	0.90	0.54	10YR 8/2	0.11%	*Not Tested*
R-208	Beach	1.19	0.44	1.20	0.44	0.83	0.56	10YR 7/2	0.01%	*Not Tested*
	R/W	1.22	0.43	1.21	0.43	0.79	0.58	10YR 7/2	0.02%	*Not Tested*
	T Dune	2.15	0.23	2.27	0.21	0.66	0.63	10YR 8/1	0.04%	*Not Tested*
Minimum		2.47	0.18	2.56	0.17	1.86	0.28	-	0.01%	-
Maximum		0.61	0.66	0.53	0.69	0.39	0.76	-	0.90%	-
Average		1.73	0.30	1.89	0.27	0.91	0.53	-	0.18%	-

[1]Samples tested by Universal Engineering Services

Table A.3 Summer Haven Beach Sediment Pre- and Post-Carbonate Removal Analysis[1]

FDEP Monument	Location	Mean Grain Size		Median (d50)		St Dev (Sorting)		Silt Content	Carbonate Content
		(phi)	(mm)	(phi)	(mm)	(phi)	(mm)		
R-205	**Pre-Calcium Carbonate Removal**								
	Dune Toe	1.98	0.25	2.11	0.23	0.71	0.61	0.00%	11.1%
	Dune Veg	1.96	0.26	2.15	0.23	0.81	0.57	0.05%	12.9%
	Intertidal Zone	1.38	0.38	1.74	0.30	1.05	0.48	0.01%	24.7%
	Mid Berm	1.56	0.34	1.70	0.31	0.82	0.57	0.19%	22.6%
	Wading Depth	1.11	0.46	1.50	0.35	1.10	0.47	0.02%	29.8%
	Minimum	1.98	0.25	2.15	0.23	1.10	0.47	0.00%	11.1%
	Maximum	1.11	0.46	1.50	0.35	0.71	0.61	0.19%	29.8%
	Average	1.60	0.34	1.84	0.28	0.90	0.54	0.05%	20.2%
	Post-Calcium Carbonate Removal								
	Dune Toe	2.19	0.22	2.25	0.21	0.55	0.68	0.17%	0.00%
	Dune Veg	2.20	0.22	2.26	0.21	0.54	0.69	0.09%	0.00%
	Intertidal Zone	1.99	0.25	2.04	0.24	0.54	0.69	0.08%	0.00%
	Mid Berm	2.21	0.22	2.27	0.21	0.51	0.70	0.14%	0.00%
	Wading Depth	2.18	0.22	2.27	0.21	0.58	0.67	0.11%	0.00%
	Minimum	2.21	0.22	2.27	0.21	0.58	0.67	0.08%	0.00%
	Maximum	1.99	0.25	2.04	0.24	0.51	0.70	0.17%	0.00%
	Average	2.15	0.22	2.22	0.21	0.54	0.69	0.12%	0.00%

[1]Samples tested by Ellis & Associates

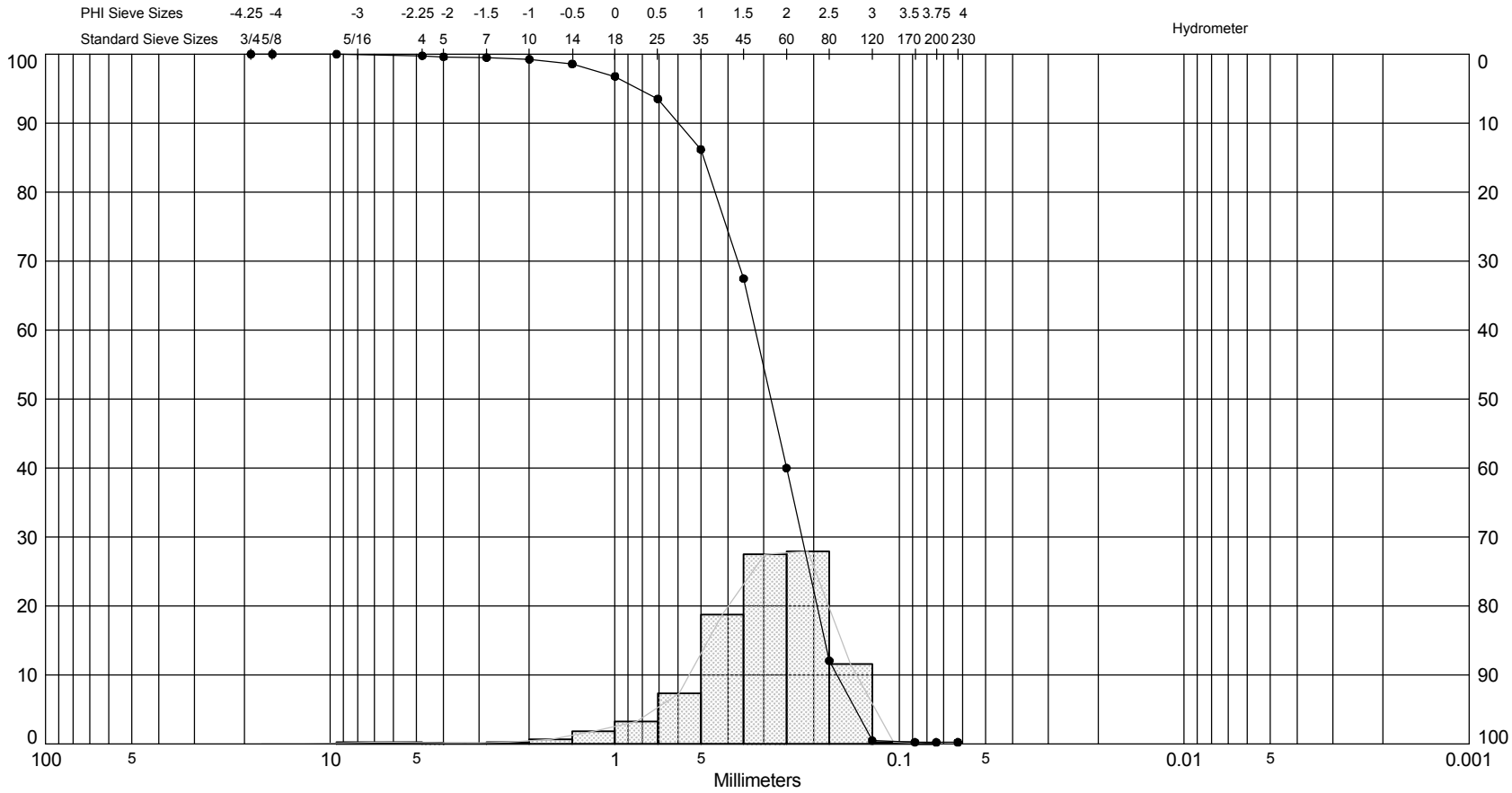
Table A.4 DMMA SJ-1 Sediment Carbonate Analysis[1]

Core ID	Location (ft-NAD83 FLN)		Depth (ft)	Carbonate Content
	Easting	Northing		
B-2	576,736	1,957,536	0.0	7.2%
S01	576,456	1,957,833	0.0	1.9%
S05	577,217	1,957,704	0.0	1.6%
S07	576,365	1,957,318	0.0	1.8%
S11	576,994	1,957,165	0.0	18.3%
Minimum				1.6%
Maximum				18.3%
Average				6.2%

[1]Samples tested by Ellis & Associates

APPENDIX B

Summer Haven Grain Size Tables and Curves (UES Data)



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-200 Beach	—●—	0.0	SP	#200 - 0.22 #230 - 0.22			1.82	1.71	-1.37	6.84	0.78

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	585,424
Northing (Y, ft):	1,949,506
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-200 Beach

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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fax (904) 731-9847

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
585,424	1,949,506	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10YR-7/2	

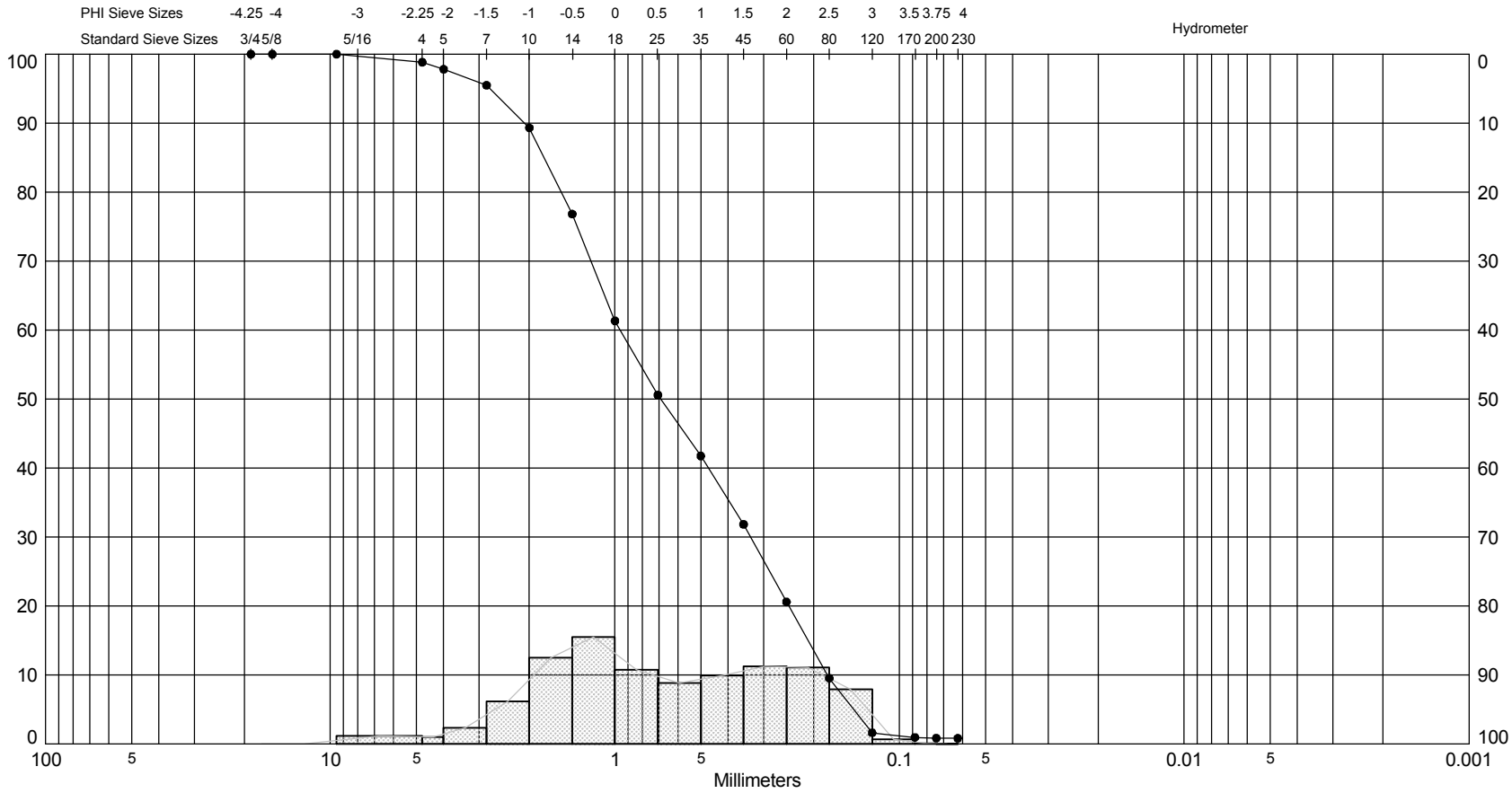
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
328.18	327.60	0.00	0.04	#200 - 0.22 #230 - 0.22			

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
3/8"	-3.25	9.51	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.75	0.23	0.75	0.23
5	-2.00	4.00	0.49	0.15	1.24	0.38
7	-1.50	2.83	0.36	0.11	1.60	0.49
10	-1.00	2.00	0.84	0.26	2.44	0.74
14	-0.50	1.41	2.19	0.67	4.63	1.41
18	0.00	1.00	5.93	1.81	10.56	3.22
25	0.50	0.71	10.74	3.27	21.30	6.49
35	1.00	0.50	24.01	7.32	45.31	13.81
45	1.50	0.35	61.48	18.73	106.79	32.54
60	2.00	0.25	90.17	27.48	196.96	60.02
80	2.50	0.18	91.69	27.94	288.65	87.95
120	3.00	0.13	37.96	11.57	326.61	99.52
170	3.50	0.09	0.83	0.25	327.44	99.77
200	3.75	0.07	0.02	0.01	327.46	99.78
230	4.00	0.06	0.00	0.00	327.46	99.78

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.80	2.43	2.27	1.82	1.30	1.06	0.27

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.71	0.31	0.78	-1.37	6.84

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-200 R/W & T Dune	—●—	0.0	SW	#200 - 0.83 #230 - 0.81			0.53	0.61	-0.06	2.14	1.35

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	585,424
Northing (Y, ft):	1,949,506
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-200 R/W & T Dune

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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10151 Deerwood Park Blvd., Bldg. 300, Suite 300
Jacksonville, FL 32256
ph (904) 731-7040
fax (904) 731-9847

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
585,424	1,949,506	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10YR-7/3	

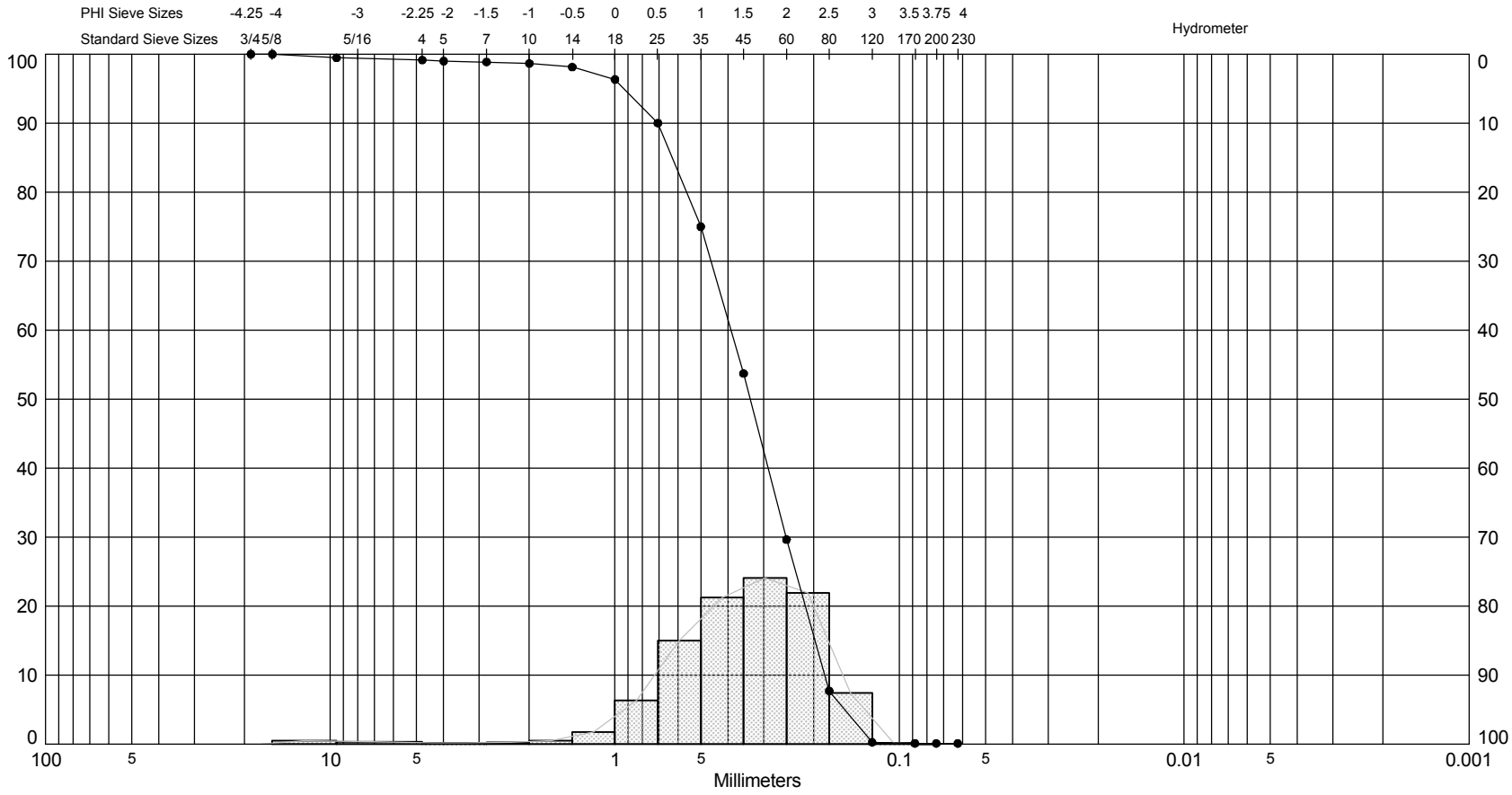
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
332.73	330.02	0.00	0.00	#200 - 0.83 #230 - 0.81			

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
3/8"	-3.25	9.51	0.00	0.00	0.00	0.00
4	-2.25	4.76	3.88	1.17	3.88	1.17
5	-2.00	4.00	3.41	1.02	7.29	2.19
7	-1.50	2.83	7.73	2.32	15.02	4.51
10	-1.00	2.00	20.50	6.16	35.52	10.68
14	-0.50	1.41	41.60	12.50	77.12	23.18
18	0.00	1.00	51.50	15.48	128.62	38.66
25	0.50	0.71	35.81	10.76	164.43	49.42
35	1.00	0.50	29.37	8.83	193.80	58.25
45	1.50	0.35	33.03	9.93	226.83	68.17
60	2.00	0.25	37.36	11.23	264.19	79.40
80	2.50	0.18	36.84	11.07	301.03	90.47
120	3.00	0.13	26.30	7.90	327.33	98.38
170	3.50	0.09	2.24	0.67	329.57	99.05
200	3.75	0.07	0.39	0.12	329.96	99.17
230	4.00	0.06	0.06	0.02	330.02	99.19

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.79	2.21	1.80	0.53	-0.44	-0.79	-1.46

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.61	0.66	1.35	-0.06	2.14

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-201 Beach	—●—	0.0	SW	#200 - 0.10 #230 - 0.10			1.58	1.48	-1.67	9.59	0.89

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	585,699
Northing (Y, ft):	1,948,519
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

TAYLOR ENGINEERING, INC.

Taylor Engineering, Inc.
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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-201 Beach

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
585,699	1,948,519	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10YR-7/1	

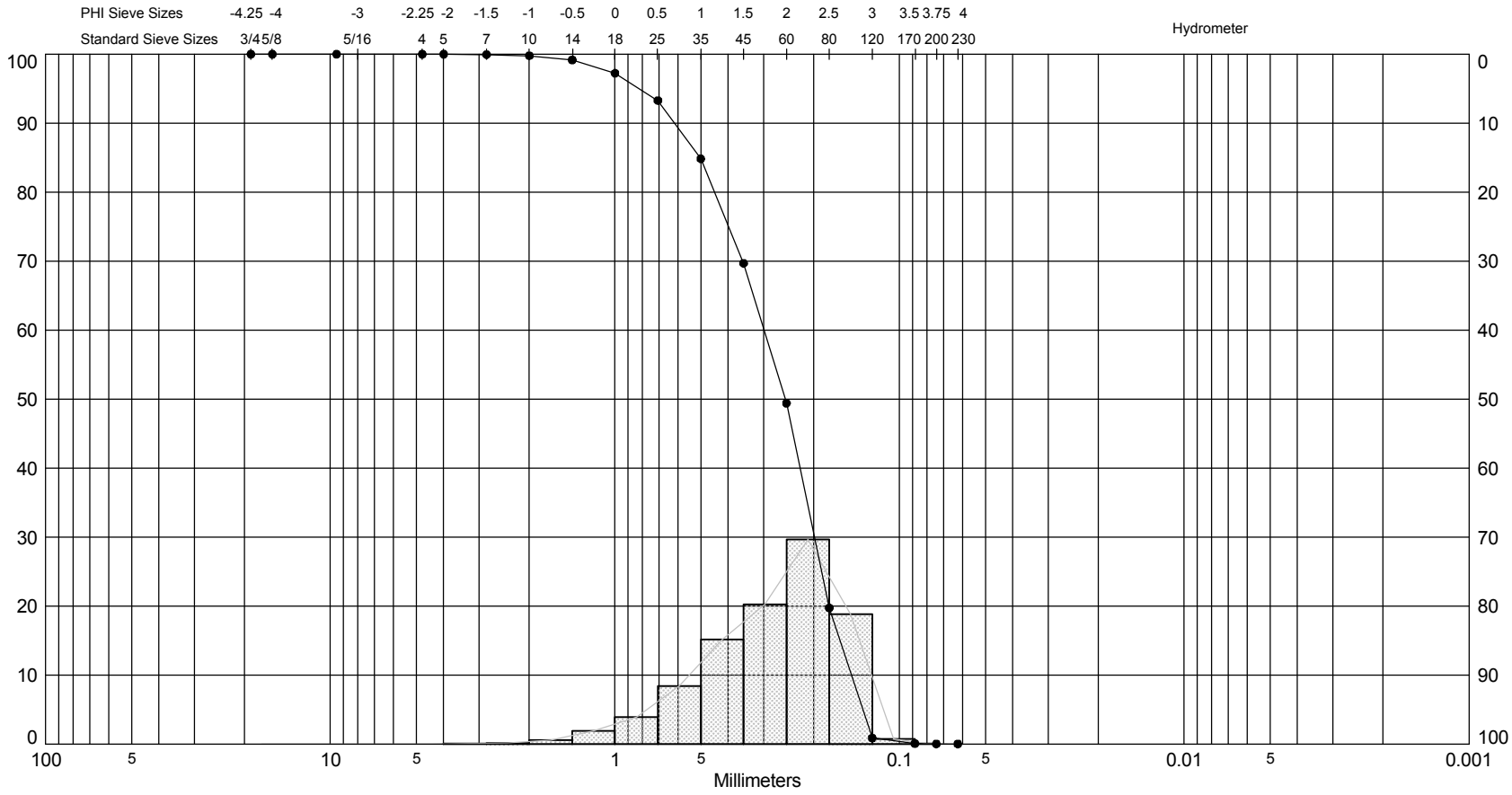
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
329.52	329.23	0.00	0.01	#200 - 0.10 #230 - 0.10			

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
3/8"	-3.25	9.51	1.77	0.54	1.77	0.54
4	-2.25	4.76	1.02	0.31	2.79	0.85
5	-2.00	4.00	0.50	0.15	3.29	1.00
7	-1.50	2.83	0.45	0.14	3.74	1.13
10	-1.00	2.00	0.72	0.22	4.46	1.35
14	-0.50	1.41	1.70	0.52	6.16	1.87
18	0.00	1.00	5.91	1.79	12.07	3.66
25	0.50	0.71	20.82	6.32	32.89	9.98
35	1.00	0.50	49.52	15.03	82.41	25.01
45	1.50	0.35	70.12	21.28	152.53	46.29
60	2.00	0.25	79.31	24.07	231.84	70.36
80	2.50	0.18	72.30	21.94	304.14	92.30
120	3.00	0.13	24.49	7.43	328.63	99.73
170	3.50	0.09	0.53	0.16	329.16	99.89
200	3.75	0.07	0.03	0.01	329.19	99.90
230	4.00	0.06	0.00	0.00	329.19	99.90

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.68	2.31	2.11	1.58	1.00	0.70	0.11

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.48	0.36	0.89	-1.67	9.59

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-201 T Dune	—●—	0.0	SP	#200 - 0.03 #230 - 0.03			1.99	1.82	-0.87	3.59	0.79

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	585,699
Northing (Y, ft):	1,948,519
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-201 T Dune

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
585,699	1,948,519	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10YR-7/2	

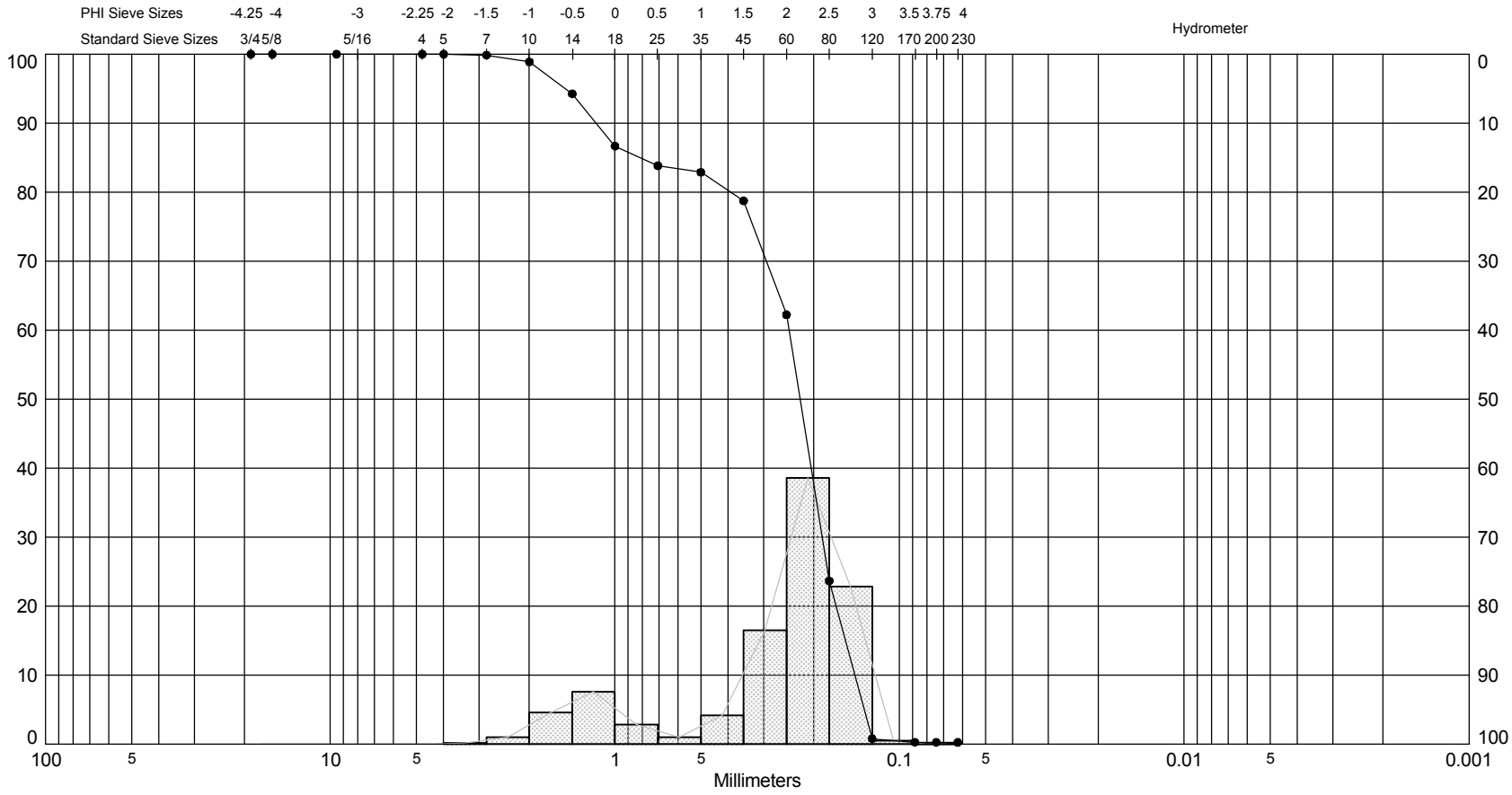
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
344.97	344.86	0.00	0.00	#200 - 0.03 #230 - 0.03			

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
3/8"	-3.25	9.51	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	0.17	0.05	0.17	0.05
10	-1.00	2.00	0.57	0.17	0.74	0.21
14	-0.50	1.41	2.12	0.61	2.86	0.83
18	0.00	1.00	6.69	1.94	9.55	2.77
25	0.50	0.71	13.61	3.95	23.16	6.71
35	1.00	0.50	29.11	8.44	52.27	15.15
45	1.50	0.35	52.26	15.15	104.53	30.30
60	2.00	0.25	69.94	20.27	174.47	50.58
80	2.50	0.18	102.40	29.68	276.87	80.26
120	3.00	0.13	65.08	18.87	341.95	99.12
170	3.50	0.09	2.70	0.78	344.65	99.91
200	3.75	0.07	0.20	0.06	344.85	99.97
230	4.00	0.06	0.01	0.00	344.86	99.97

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.89	2.60	2.41	1.99	1.33	1.03	0.28

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.82	0.28	0.79	-0.87	3.59

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-202 Beach	—●—	0.0	SW	#200 - 0.26 #230 - 0.24			2.16	1.81	-1.4	3.85	1.06

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	585,951
Northing (Y, ft):	1,947,547
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-202 Beach

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
585,951	1,947,547	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10YR-8/1	

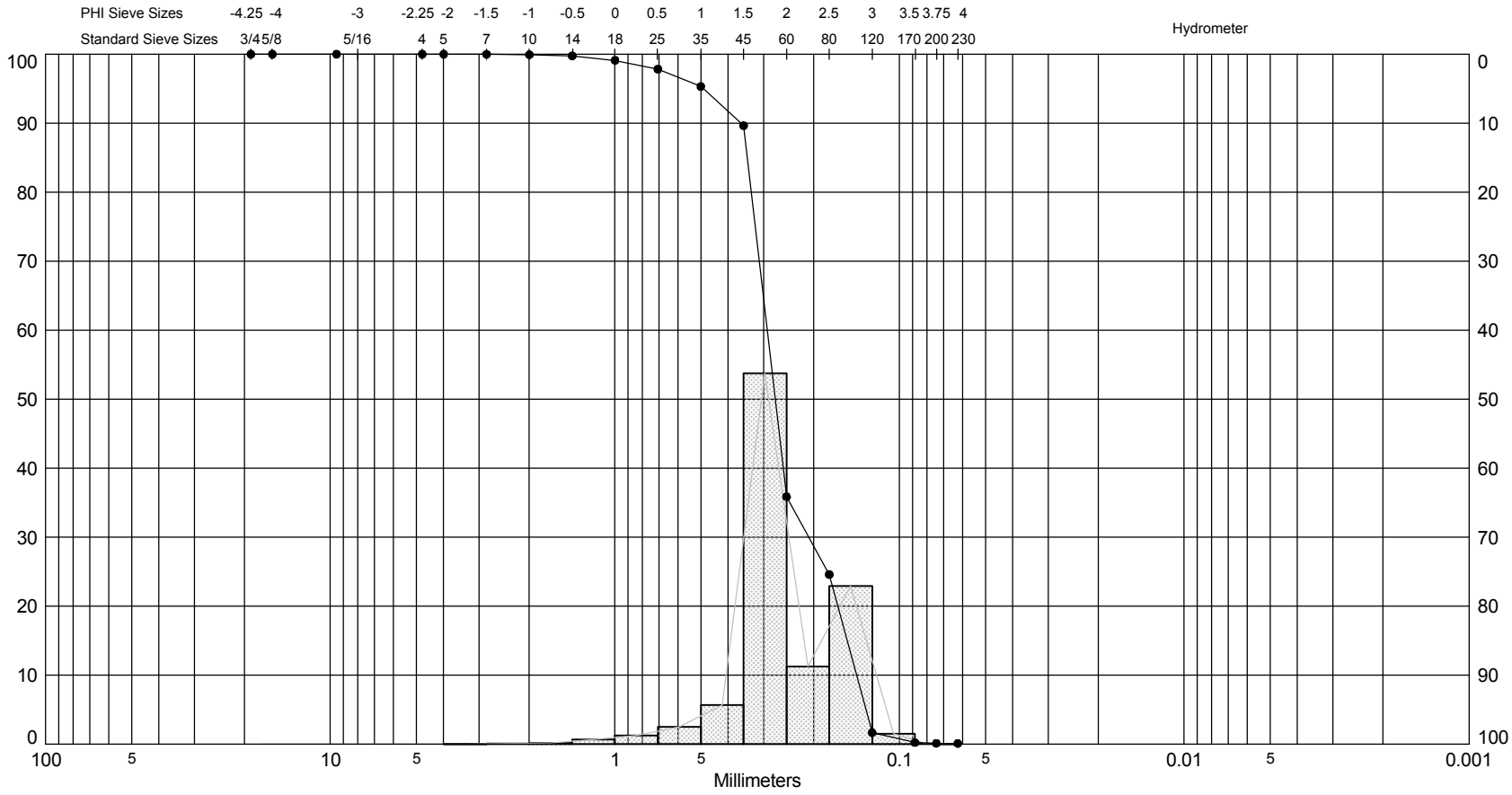
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
337.73	336.95	0.04	0.00	#200 - 0.26 #230 - 0.24			

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
3/8"	-3.25	9.51	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	0.45	0.13	0.45	0.13
10	-1.00	2.00	3.32	0.98	3.77	1.12
14	-0.50	1.41	15.57	4.61	19.34	5.73
18	0.00	1.00	25.65	7.59	44.99	13.32
25	0.50	0.71	9.60	2.84	54.59	16.16
35	1.00	0.50	3.22	0.95	57.81	17.12
45	1.50	0.35	13.99	4.14	71.80	21.26
60	2.00	0.25	55.80	16.52	127.60	37.78
80	2.50	0.18	130.26	38.57	257.86	76.35
120	3.00	0.13	77.20	22.86	335.06	99.21
170	3.50	0.09	1.75	0.52	336.81	99.73
200	3.75	0.07	0.04	0.01	336.85	99.74
230	4.00	0.06	0.06	0.02	336.91	99.76

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.91	2.67	2.48	2.16	1.61	0.47	-0.58

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.81	0.29	1.06	-1.4	3.85

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-202 T Dune	—●—	0.0	SP	#200 - 0.12 #230 - 0.10			1.87	1.97	-0.56	5.11	0.6

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	585,951
Northing (Y, ft):	1,947,547
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-202 T Dune

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
585,951	1,947,547	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10YR-8/1	

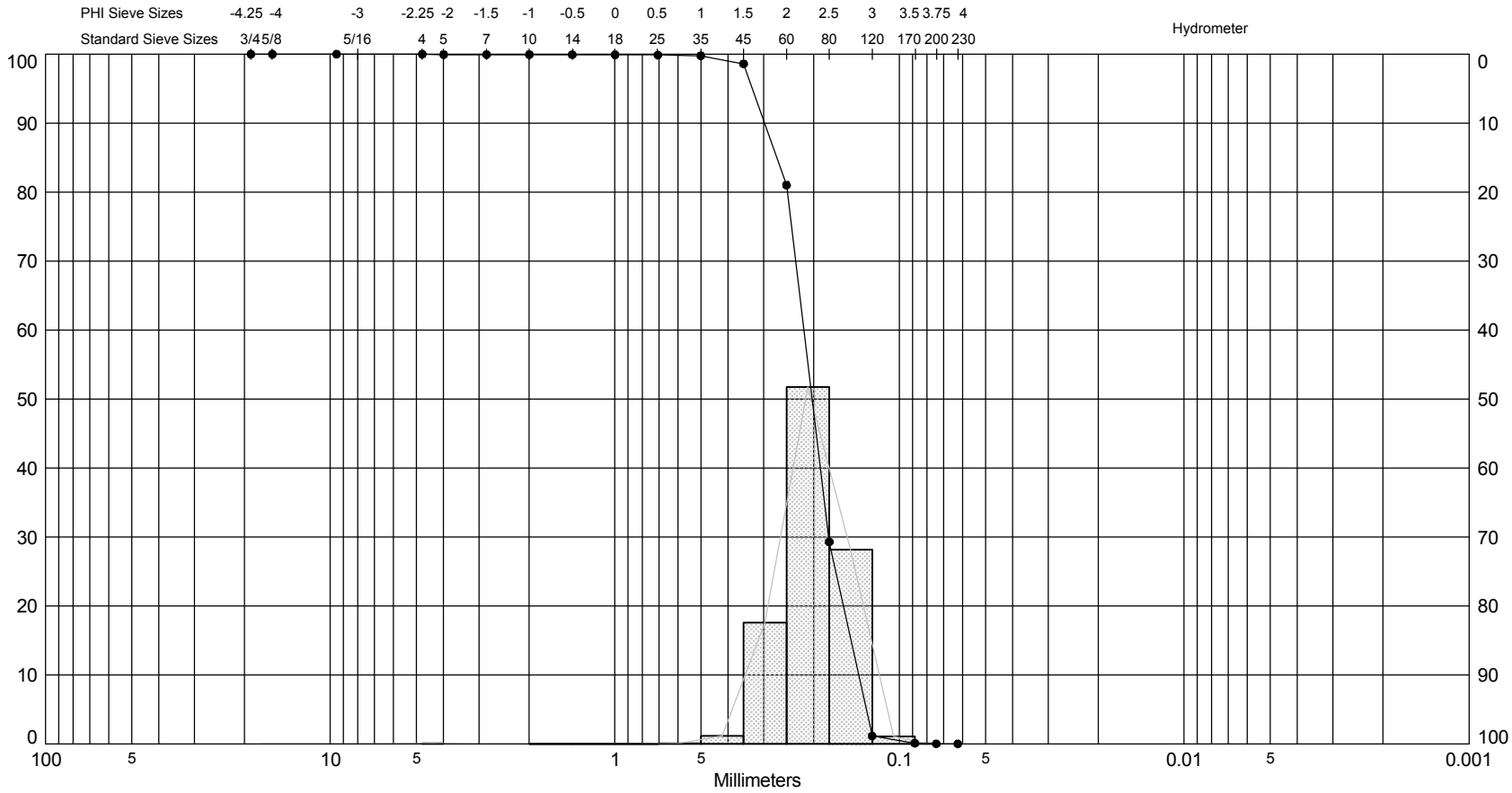
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
331.08	330.77	0.03	0.00	#200 - 0.12 #230 - 0.10			

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
3/8"	-3.25	9.51	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	0.02	0.05	0.02
10	-1.00	2.00	0.19	0.06	0.24	0.07
14	-0.50	1.41	0.56	0.17	0.80	0.24
18	0.00	1.00	2.14	0.65	2.94	0.89
25	0.50	0.71	4.25	1.28	7.19	2.17
35	1.00	0.50	8.29	2.50	15.48	4.68
45	1.50	0.35	18.81	5.68	34.29	10.36
60	2.00	0.25	178.02	53.77	212.31	64.13
80	2.50	0.18	37.38	11.29	249.69	75.42
120	3.00	0.13	75.86	22.91	325.55	98.33
170	3.50	0.09	4.83	1.46	330.38	99.79
200	3.75	0.07	0.29	0.09	330.67	99.88
230	4.00	0.06	0.07	0.02	330.74	99.90

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.93	2.69	2.48	1.87	1.64	1.55	1.03

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.97	0.26	0.6	-0.56	5.11

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-203 Beach	—●—	0.0	SP	#200 - 0.02 #230 - 0.02			2.3	2.3	-1.06	11.99	0.39

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	586,284
Northing (Y, ft):	1,946,573
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-203 Beach

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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fax (904) 731-9847

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
586,284	1,946,573	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10YR-7/1	

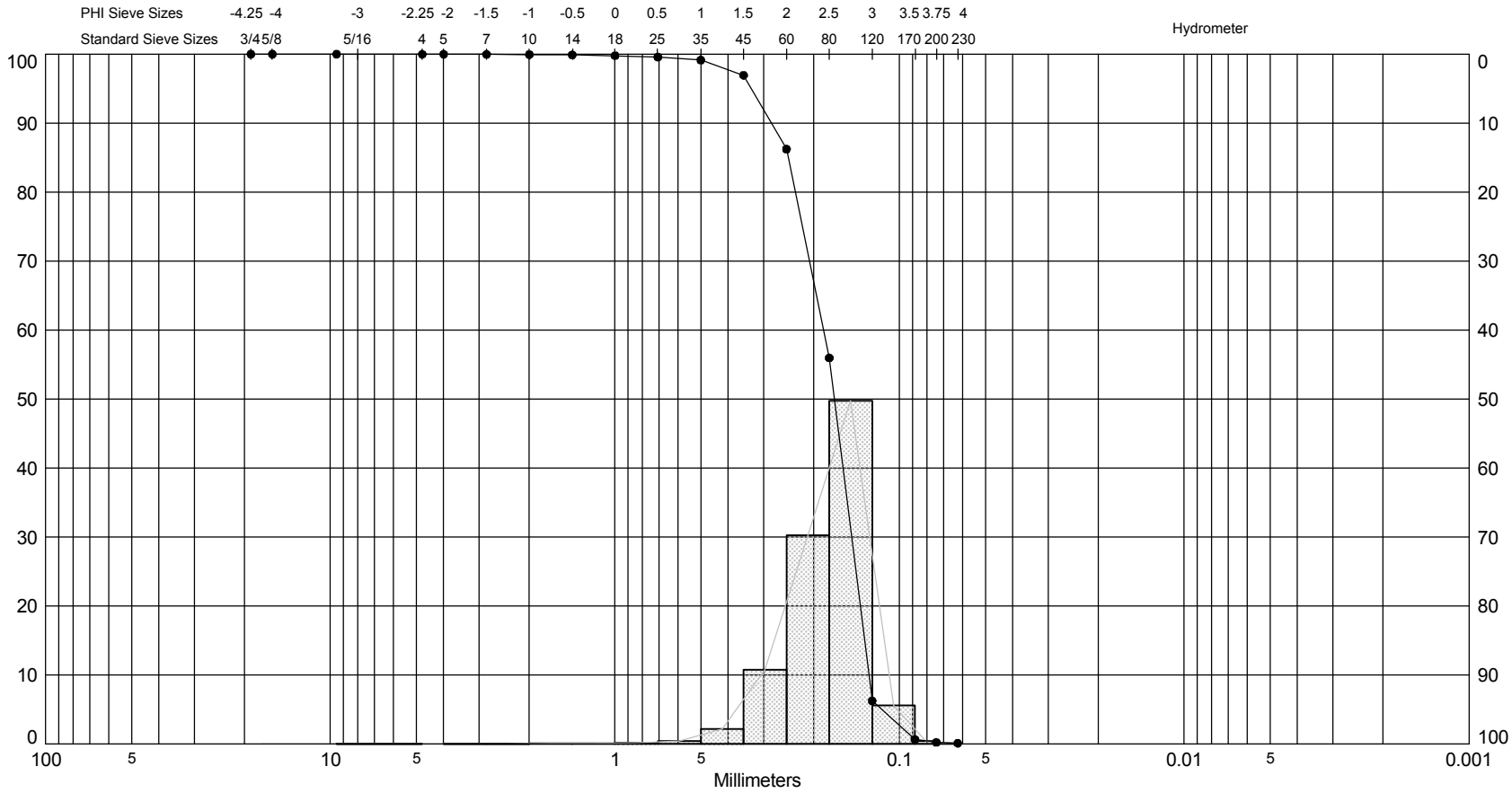
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
328.96	328.91	0.00	0.01	#200 - 0.02 #230 - 0.02			

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
3/8"	-3.25	9.51	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	0.05	0.16	0.05
7	-1.50	2.83	0.00	0.00	0.16	0.05
10	-1.00	2.00	0.02	0.01	0.18	0.05
14	-0.50	1.41	0.01	0.00	0.19	0.06
18	0.00	1.00	0.10	0.03	0.29	0.09
25	0.50	0.71	0.12	0.04	0.41	0.12
35	1.00	0.50	0.32	0.10	0.73	0.22
45	1.50	0.35	3.86	1.17	4.59	1.40
60	2.00	0.25	57.83	17.58	62.42	18.97
80	2.50	0.18	170.20	51.74	232.62	70.71
120	3.00	0.13	92.56	28.14	325.18	98.85
170	3.50	0.09	3.45	1.05	328.63	99.90
200	3.75	0.07	0.26	0.08	328.89	99.98
230	4.00	0.06	0.00	0.00	328.89	99.98

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.93	2.74	2.58	2.30	2.06	1.92	1.60

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.3	0.20	0.39	-1.06	11.99

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-203 T Dune	—●—	0.0	SP	#200 - 0.21 #230 - 0.10			2.56	2.47	-1.53	10.46	0.48

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	586,284
Northing (Y, ft):	1,946,573
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-203 T Dune

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
586,284	1,946,573	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10YR-7/2	

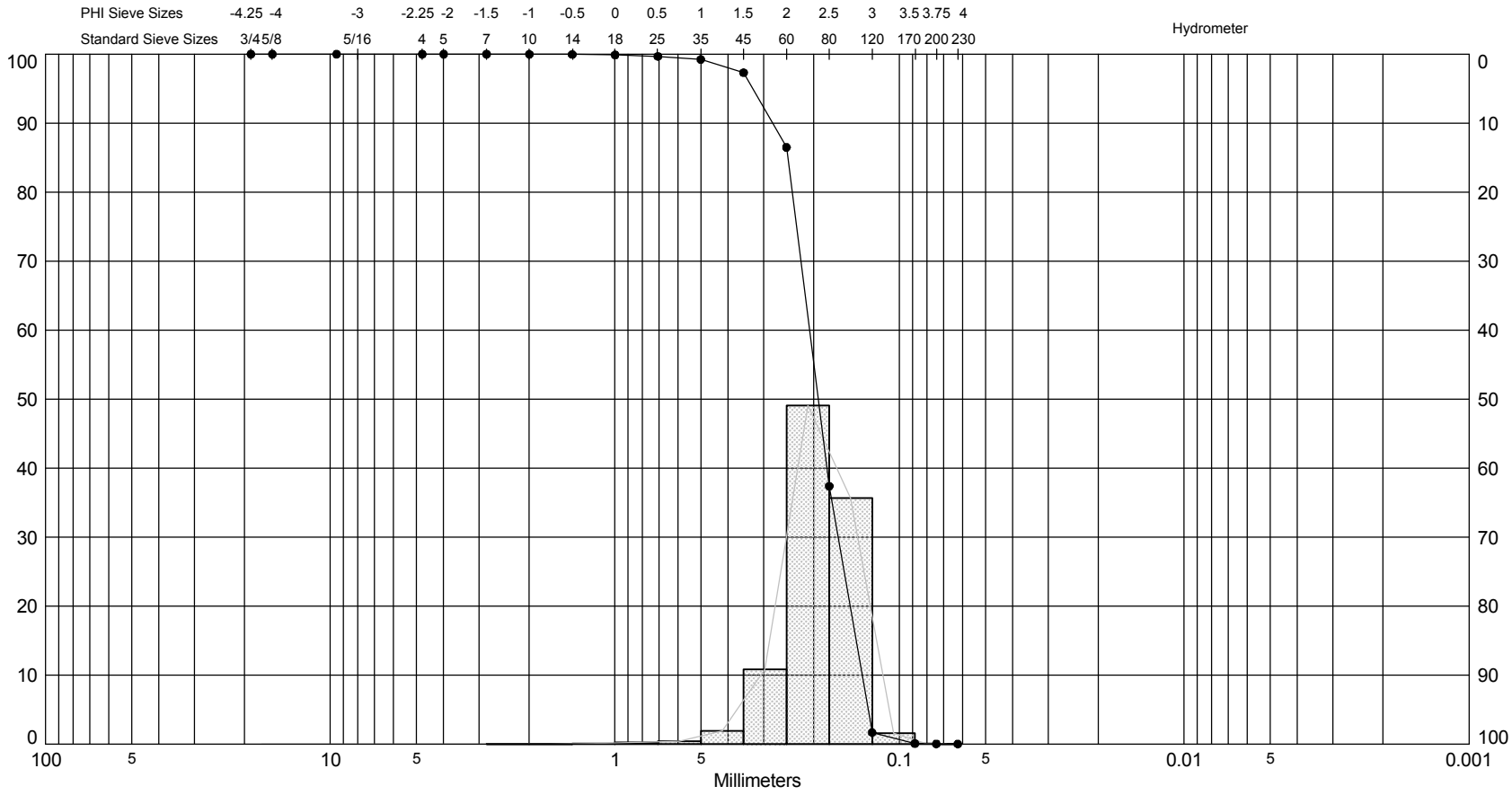
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
324.71	324.39	0.00	0.01	#200 - 0.21 #230 - 0.10			

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
3/8"	-3.25	9.51	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.08	0.02	0.08	0.02
5	-2.00	4.00	0.00	0.00	0.08	0.02
7	-1.50	2.83	0.02	0.01	0.10	0.03
10	-1.00	2.00	0.06	0.02	0.16	0.05
14	-0.50	1.41	0.19	0.06	0.35	0.11
18	0.00	1.00	0.33	0.10	0.68	0.21
25	0.50	0.71	0.65	0.20	1.33	0.41
35	1.00	0.50	1.46	0.45	2.79	0.86
45	1.50	0.35	7.12	2.19	9.91	3.05
60	2.00	0.25	34.84	10.73	44.75	13.78
80	2.50	0.18	98.26	30.26	143.01	44.04
120	3.00	0.13	161.48	49.73	304.49	93.77
170	3.50	0.09	18.15	5.59	322.64	99.36
200	3.75	0.07	1.40	0.43	324.04	99.79
230	4.00	0.06	0.33	0.10	324.37	99.90

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.11	2.90	2.81	2.56	2.19	2.04	1.59

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.47	0.18	0.48	-1.53	10.46

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-204 Beach	—●—	0.0	SP	#200 - 0.03 #230 - 0.02			2.37	2.36	-1.2	7.79	0.41

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	586,557
Northing (Y, ft):	1,945,584
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

TAYLOR ENGINEERING, INC.

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-204 Beach

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
586,557	1,945,584	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10YR-7/1	

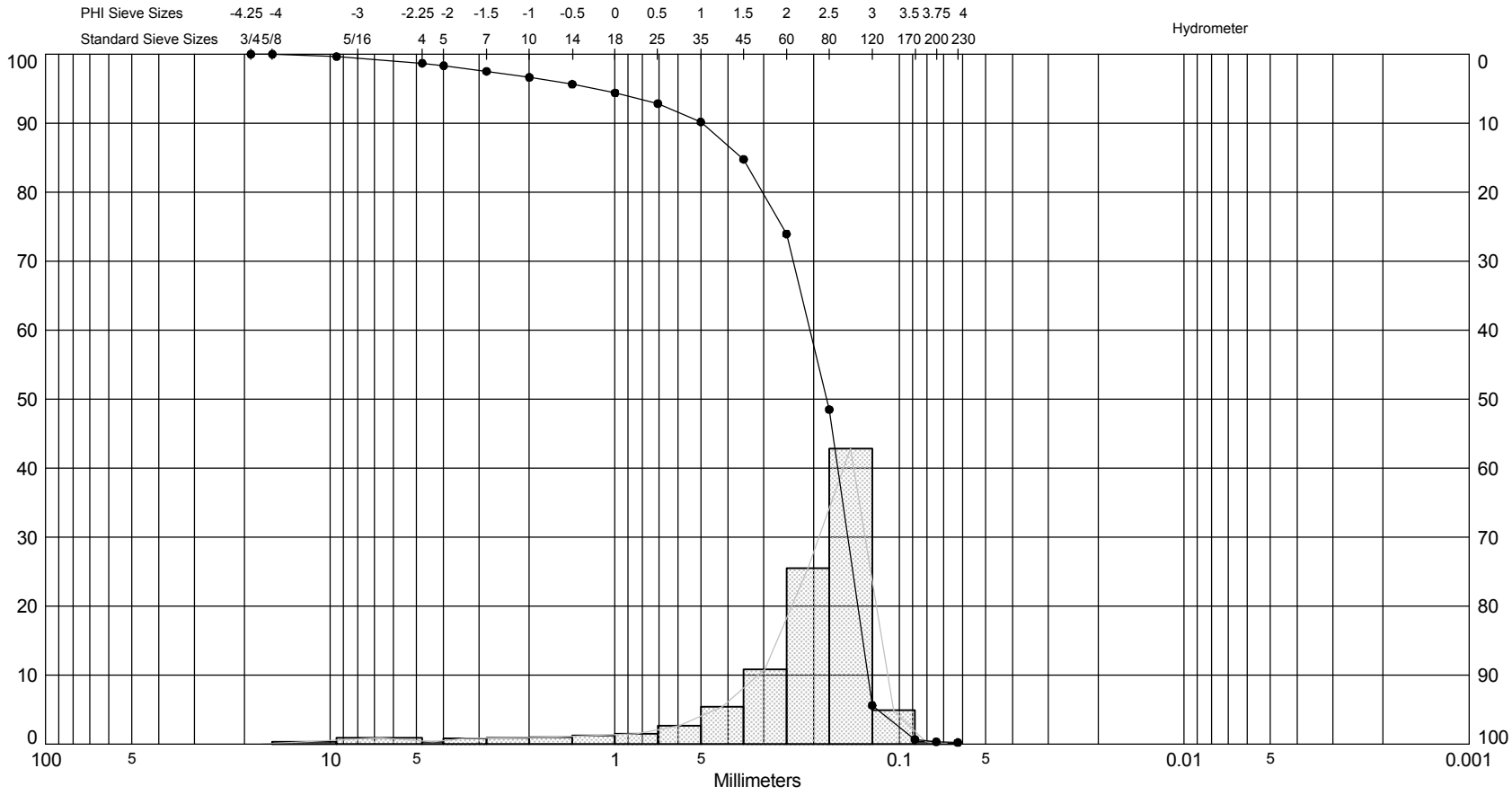
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
330.74	330.67	0.00	0.00	#200 - 0.03 #230 - 0.02			

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
3/8"	-3.25	9.51	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	0.02	0.06	0.02
14	-0.50	1.41	0.07	0.02	0.13	0.04
18	0.00	1.00	0.25	0.08	0.38	0.11
25	0.50	0.71	0.68	0.21	1.06	0.32
35	1.00	0.50	1.48	0.45	2.54	0.77
45	1.50	0.35	6.31	1.91	8.85	2.68
60	2.00	0.25	35.81	10.83	44.66	13.50
80	2.50	0.18	162.46	49.12	207.12	62.62
120	3.00	0.13	118.07	35.70	325.19	98.32
170	3.50	0.09	5.24	1.58	330.43	99.91
200	3.75	0.07	0.22	0.07	330.65	99.97
230	4.00	0.06	0.02	0.01	330.67	99.98

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.95	2.80	2.67	2.37	2.12	2.03	1.61

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.36	0.19	0.41	-1.2	7.79

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-204 R/W	—●—	0.0	SW	#200 - 0.34 #230 - 0.22			2.47	2.13	-2.55	10.59	1.09

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	586,557
Northing (Y, ft):	1,945,584
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-204 R/W

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
586,557	1,945,584	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10YR-7/2	

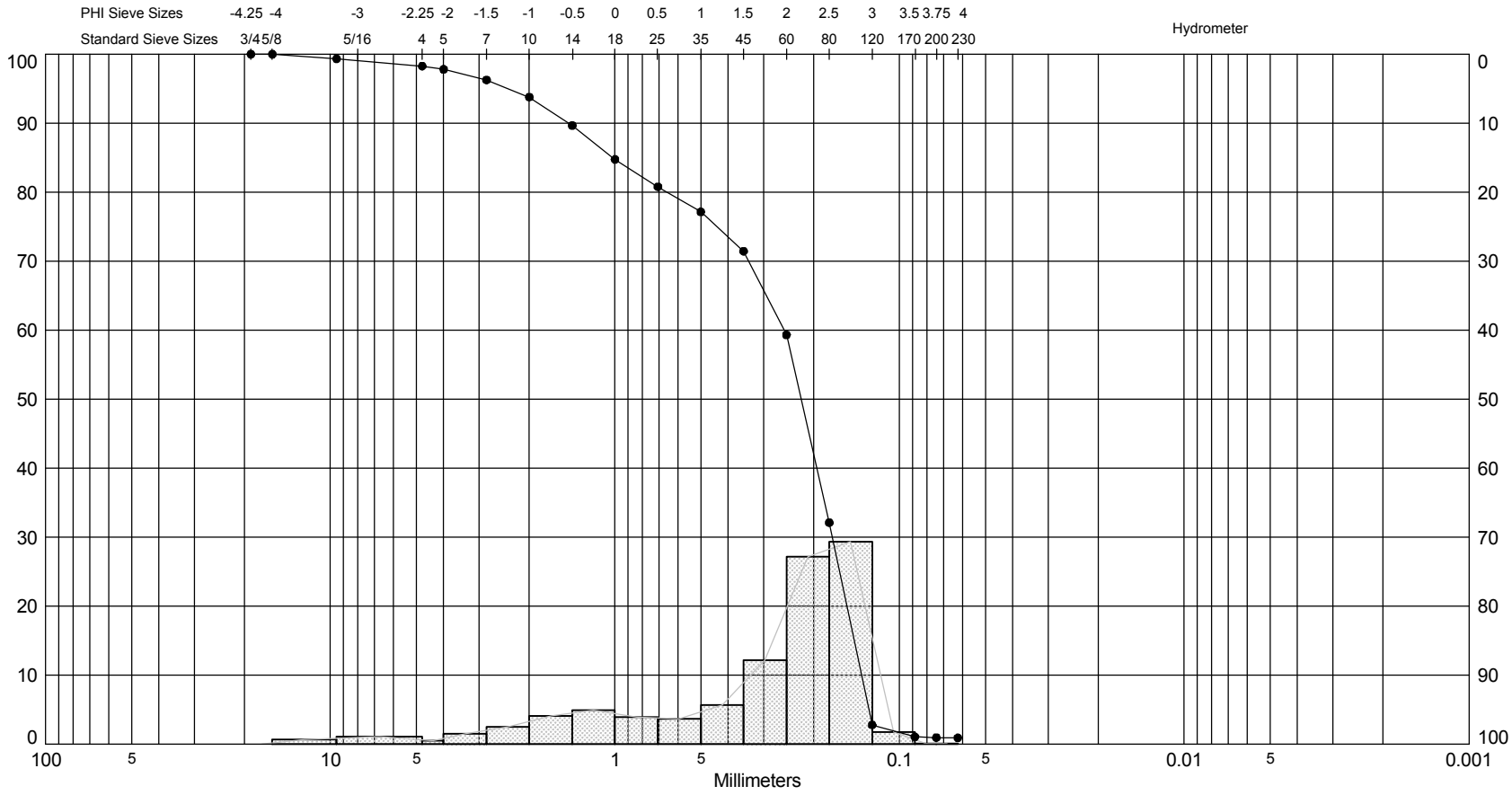
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
327.34	326.71	0.09	0.00	#200 - 0.34 #230 - 0.22			

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
3/8"	-3.25	9.51	1.15	0.35	1.15	0.35
4	-2.25	4.76	3.11	0.95	4.26	1.30
5	-2.00	4.00	1.21	0.37	5.47	1.67
7	-1.50	2.83	2.64	0.81	8.11	2.48
10	-1.00	2.00	2.89	0.88	11.00	3.36
14	-0.50	1.41	3.27	1.00	14.27	4.36
18	0.00	1.00	4.14	1.26	18.41	5.62
25	0.50	0.71	5.03	1.54	23.44	7.16
35	1.00	0.50	8.72	2.66	32.16	9.82
45	1.50	0.35	17.70	5.41	49.86	15.23
60	2.00	0.25	35.42	10.82	85.28	26.05
80	2.50	0.18	83.36	25.47	168.64	51.52
120	3.00	0.13	140.32	42.87	308.96	94.39
170	3.50	0.09	16.13	4.93	325.09	99.31
200	3.75	0.07	1.14	0.35	326.23	99.66
230	4.00	0.06	0.38	0.12	326.61	99.78

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.06	2.88	2.77	2.47	1.95	1.54	-0.25

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.13	0.23	1.09	-2.55	10.59

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-204 T Dune	—●—	0.0	SW	#200 - 0.95 #230 - 0.90			2.17	1.65	-1.49	4.68	1.38

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	586,557
Northing (Y, ft):	1,945,584
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-204 T Dune

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
586,557	1,945,584	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10YR-7/3	

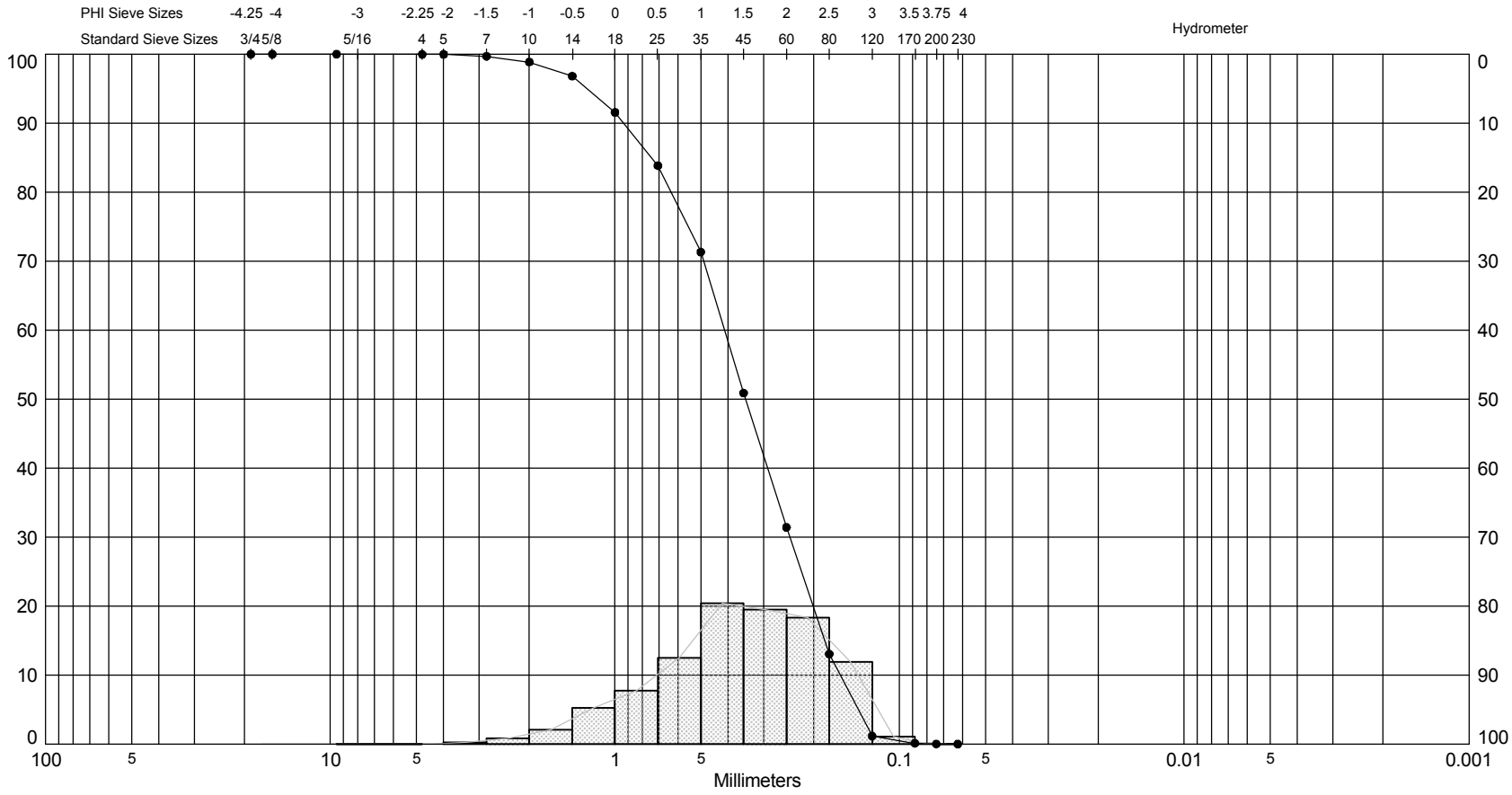
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
330.98	328.06	0.07	0.00	#200 - 0.95 #230 - 0.90			

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
3/8"	-3.25	9.51	2.20	0.66	2.20	0.66
4	-2.25	4.76	3.50	1.06	5.70	1.72
5	-2.00	4.00	1.57	0.47	7.27	2.20
7	-1.50	2.83	5.09	1.54	12.36	3.73
10	-1.00	2.00	8.19	2.47	20.55	6.21
14	-0.50	1.41	13.63	4.12	34.18	10.33
18	0.00	1.00	16.33	4.93	50.51	15.26
25	0.50	0.71	13.08	3.95	63.59	19.21
35	1.00	0.50	12.07	3.65	75.66	22.86
45	1.50	0.35	18.84	5.69	94.50	28.55
60	2.00	0.25	40.18	12.14	134.68	40.69
80	2.50	0.18	90.01	27.19	224.69	67.89
120	3.00	0.13	97.05	29.32	321.74	97.21
170	3.50	0.09	5.77	1.74	327.51	98.95
200	3.75	0.07	0.32	0.10	327.83	99.05
230	4.00	0.06	0.16	0.05	327.99	99.10

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.96	2.77	2.62	2.17	1.19	0.09	-1.24

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.65	0.32	1.38	-1.49	4.68

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-205 Beach	—●—	0.0	SW	#200 - 0.02 #230 - 0.01			1.52	1.44	-0.56	3.04	0.95

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	586,876
Northing (Y, ft):	1,944,606
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-205 Beach

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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fax (904) 731-9847

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
586,876	1,944,606	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10YR-7/2	

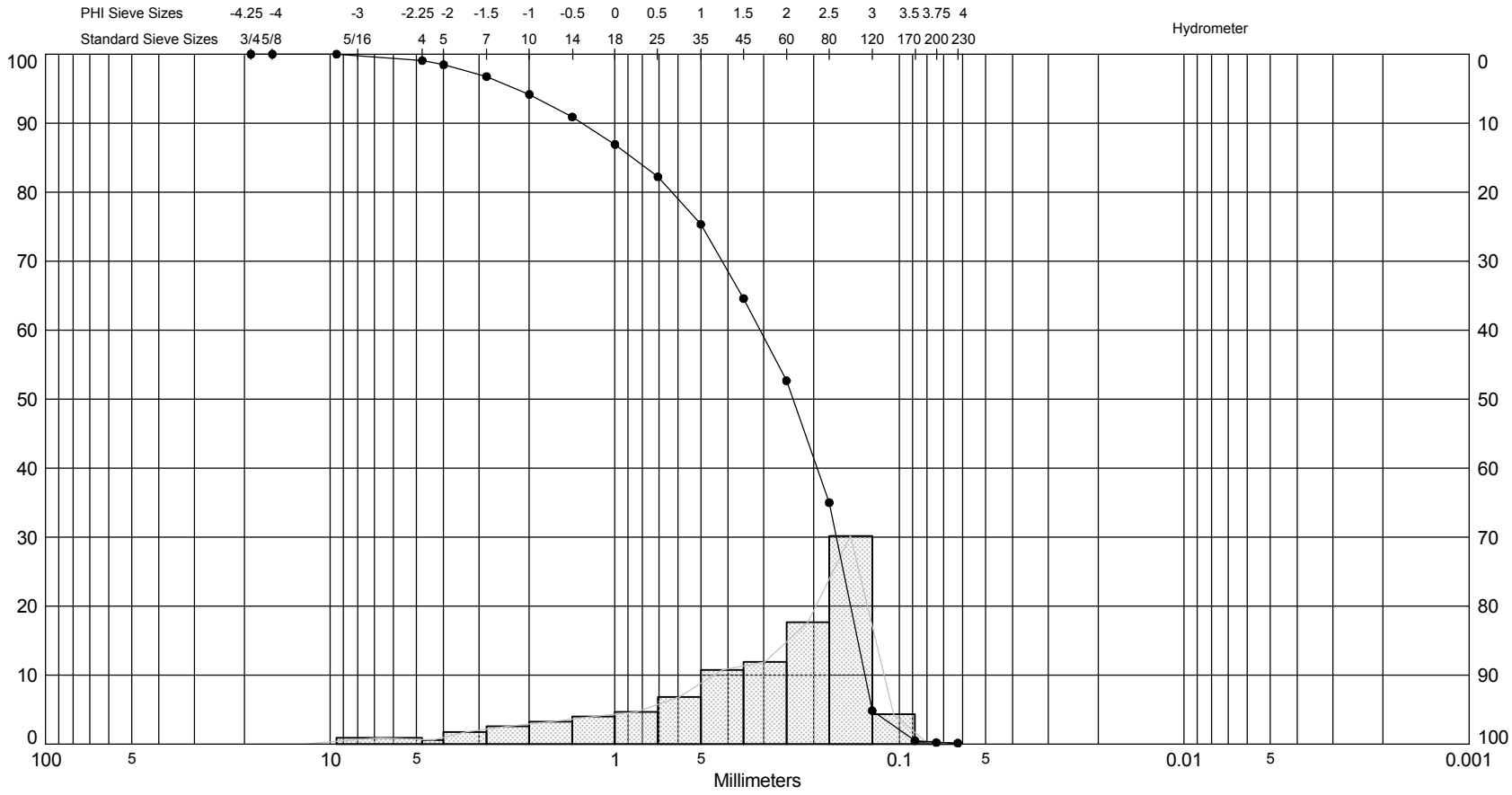
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
334.41	334.37	0.00	0.00	#200 - 0.02 #230 - 0.01			

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
3/8"	-3.25	9.51	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.09	0.03	0.09	0.03
5	-2.00	4.00	0.01	0.00	0.10	0.03
7	-1.50	2.83	0.90	0.27	1.00	0.30
10	-1.00	2.00	2.78	0.83	3.78	1.13
14	-0.50	1.41	6.87	2.05	10.65	3.18
18	0.00	1.00	17.57	5.25	28.22	8.44
25	0.50	0.71	25.80	7.72	54.02	16.15
35	1.00	0.50	41.88	12.52	95.90	28.68
45	1.50	0.35	68.37	20.44	164.27	49.12
60	2.00	0.25	65.07	19.46	229.34	68.58
80	2.50	0.18	61.43	18.37	290.77	86.95
120	3.00	0.13	39.74	11.88	330.51	98.83
170	3.50	0.09	3.50	1.05	334.01	99.88
200	3.75	0.07	0.34	0.10	334.35	99.98
230	4.00	0.06	0.02	0.01	334.37	99.99

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.84	2.42	2.17	1.52	0.85	0.49	-0.33

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.44	0.37	0.95	-0.56	3.04

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-205 R/W	—●—	0.0	SW	#200 - 0.21 #230 - 0.14			2.08	1.65	-1.19	3.83	1.32

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	586,876
Northing (Y, ft):	1,944,606
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-205 R/W

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
586,876	1,944,606	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10YR-7/2	

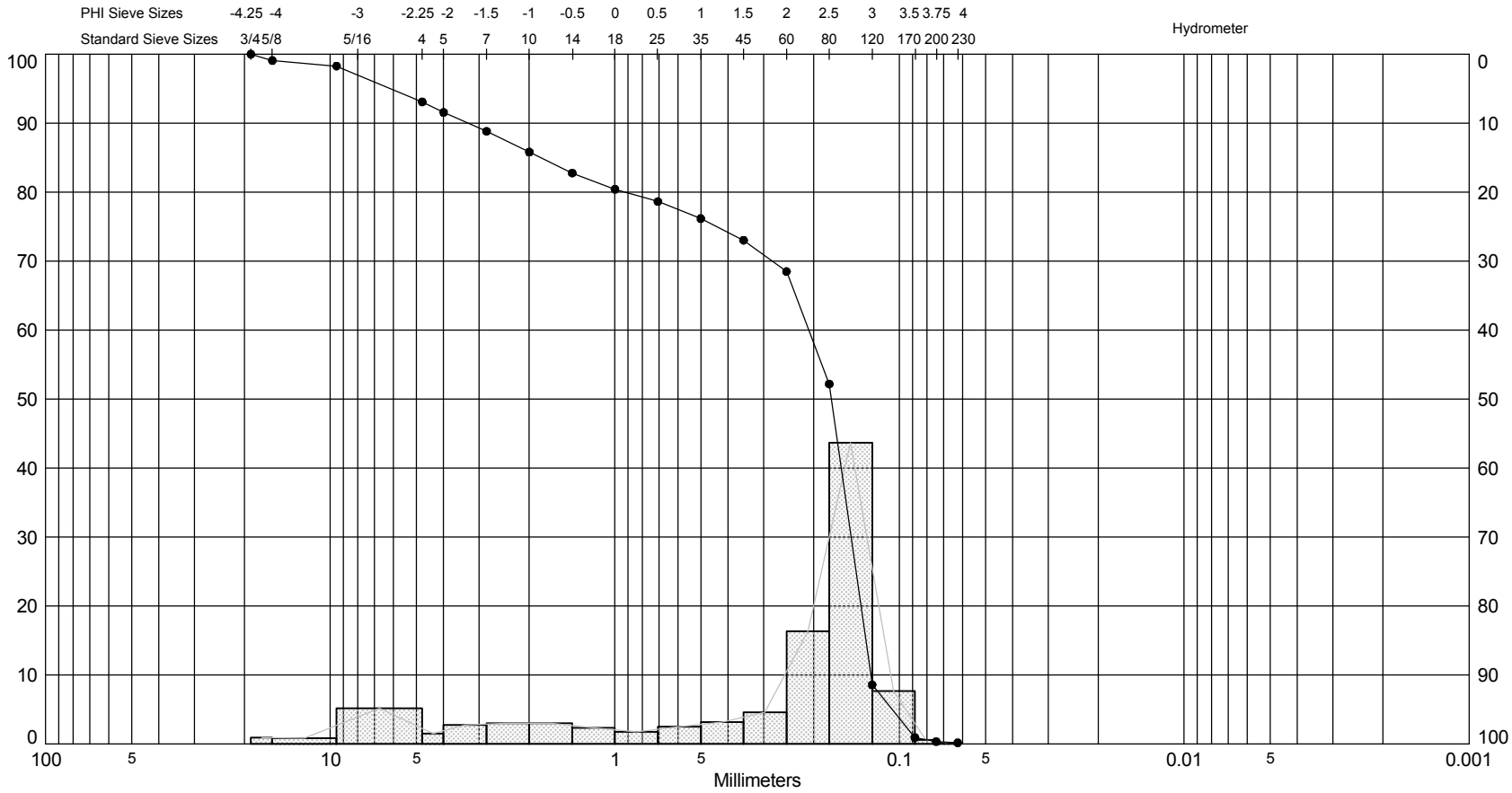
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
330.37	330.06	0.13	0.01	#200 - 0.21 #230 - 0.14			

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
3/8"	-3.25	9.51	0.00	0.00	0.00	0.00
4	-2.25	4.76	3.12	0.94	3.12	0.94
5	-2.00	4.00	1.94	0.59	5.06	1.53
7	-1.50	2.83	5.65	1.71	10.71	3.24
10	-1.00	2.00	8.60	2.60	19.31	5.84
14	-0.50	1.41	10.75	3.25	30.06	9.10
18	0.00	1.00	13.18	3.99	43.24	13.09
25	0.50	0.71	15.49	4.69	58.73	17.78
35	1.00	0.50	22.71	6.87	81.44	24.65
45	1.50	0.35	35.57	10.77	117.01	35.42
60	2.00	0.25	39.38	11.92	156.39	47.34
80	2.50	0.18	58.35	17.66	214.74	65.00
120	3.00	0.13	99.61	30.15	314.35	95.15
170	3.50	0.09	14.33	4.34	328.68	99.49
200	3.75	0.07	0.99	0.30	329.67	99.79
230	4.00	0.06	0.23	0.07	329.90	99.86

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.00	2.82	2.67	2.08	1.02	0.31	-1.16

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.65	0.32	1.32	-1.19	3.83

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-205 T Dune	—●—	0.0	SW	#200 - 0.34 #230 - 0.17			2.52	1.63	-1.47	3.91	1.86

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	586,876
Northing (Y, ft):	1,944,606
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-205 T Dune

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
586,876	1,944,606	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10YR-7/1	

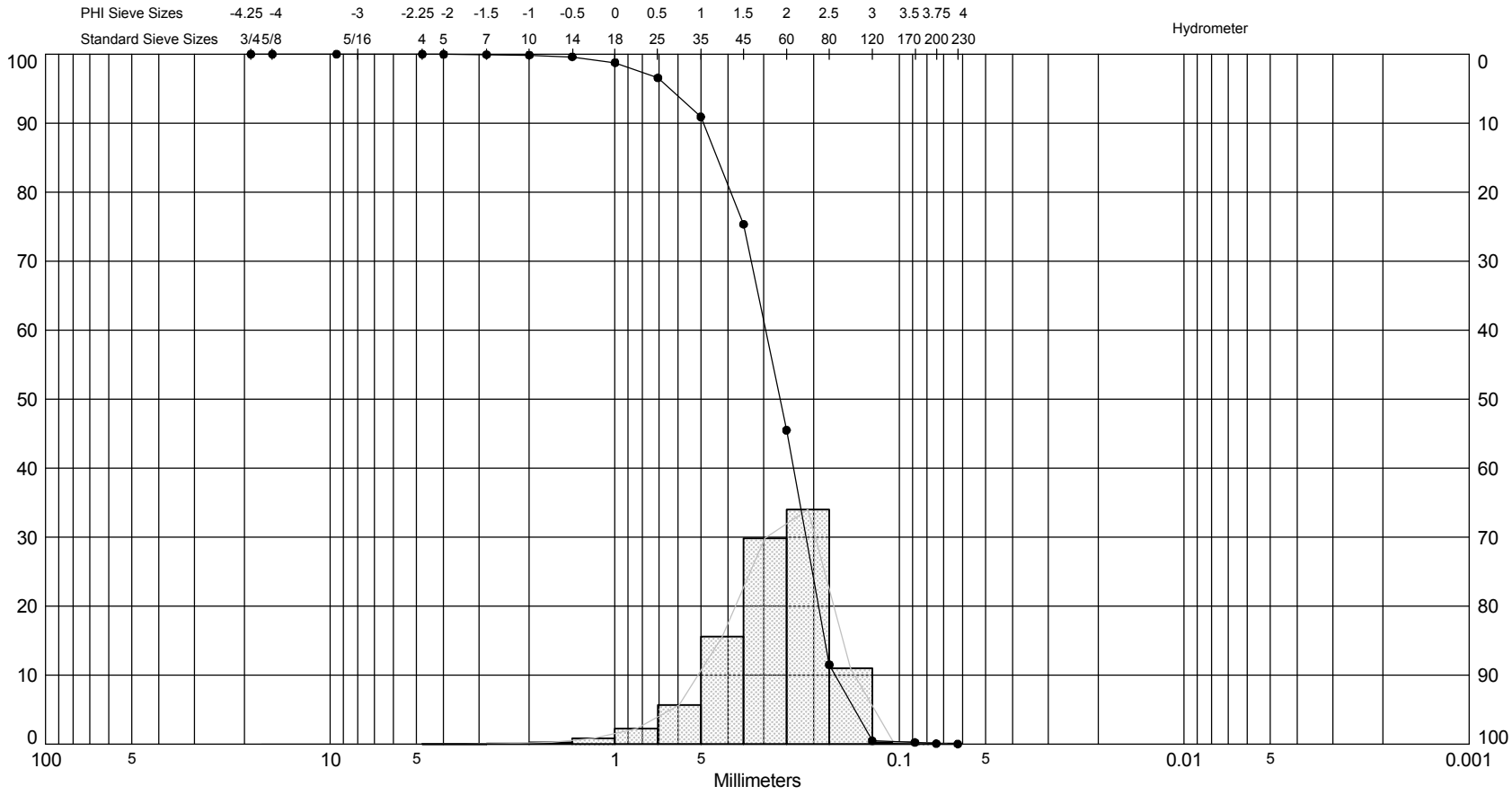
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
334.82	334.26	0.02	0.00	#200 - 0.34 #230 - 0.17			

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	3.06	0.91	3.06	0.91
3/8"	-3.25	9.51	2.71	0.81	5.77	1.72
4	-2.25	4.76	17.41	5.20	23.18	6.92
5	-2.00	4.00	5.11	1.53	28.29	8.45
7	-1.50	2.83	9.18	2.74	37.47	11.19
10	-1.00	2.00	10.07	3.01	47.54	14.20
14	-0.50	1.41	10.14	3.03	57.68	17.23
18	0.00	1.00	7.88	2.35	65.56	19.58
25	0.50	0.71	6.00	1.79	71.56	21.37
35	1.00	0.50	8.23	2.46	79.79	23.83
45	1.50	0.35	10.50	3.14	90.29	26.97
60	2.00	0.25	15.24	4.55	105.53	31.52
80	2.50	0.18	54.58	16.30	160.11	47.82
120	3.00	0.13	146.08	43.63	306.19	91.45
170	3.50	0.09	25.56	7.63	331.75	99.08
200	3.75	0.07	1.94	0.58	333.69	99.66
230	4.00	0.06	0.55	0.16	334.24	99.83

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.23	2.91	2.81	2.52	1.19	-0.70	-2.62

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.63	0.32	1.86	-1.47	3.91

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-206 Beach	—●—	0.0	SP	#200 - 0.07 #230 - 0.02			1.92	1.84	-0.93	4.92	0.64

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	587,188
Northing (Y, ft):	1,943,631
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-206 Beach

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
587,188	1,943,631	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10YR-7/2	

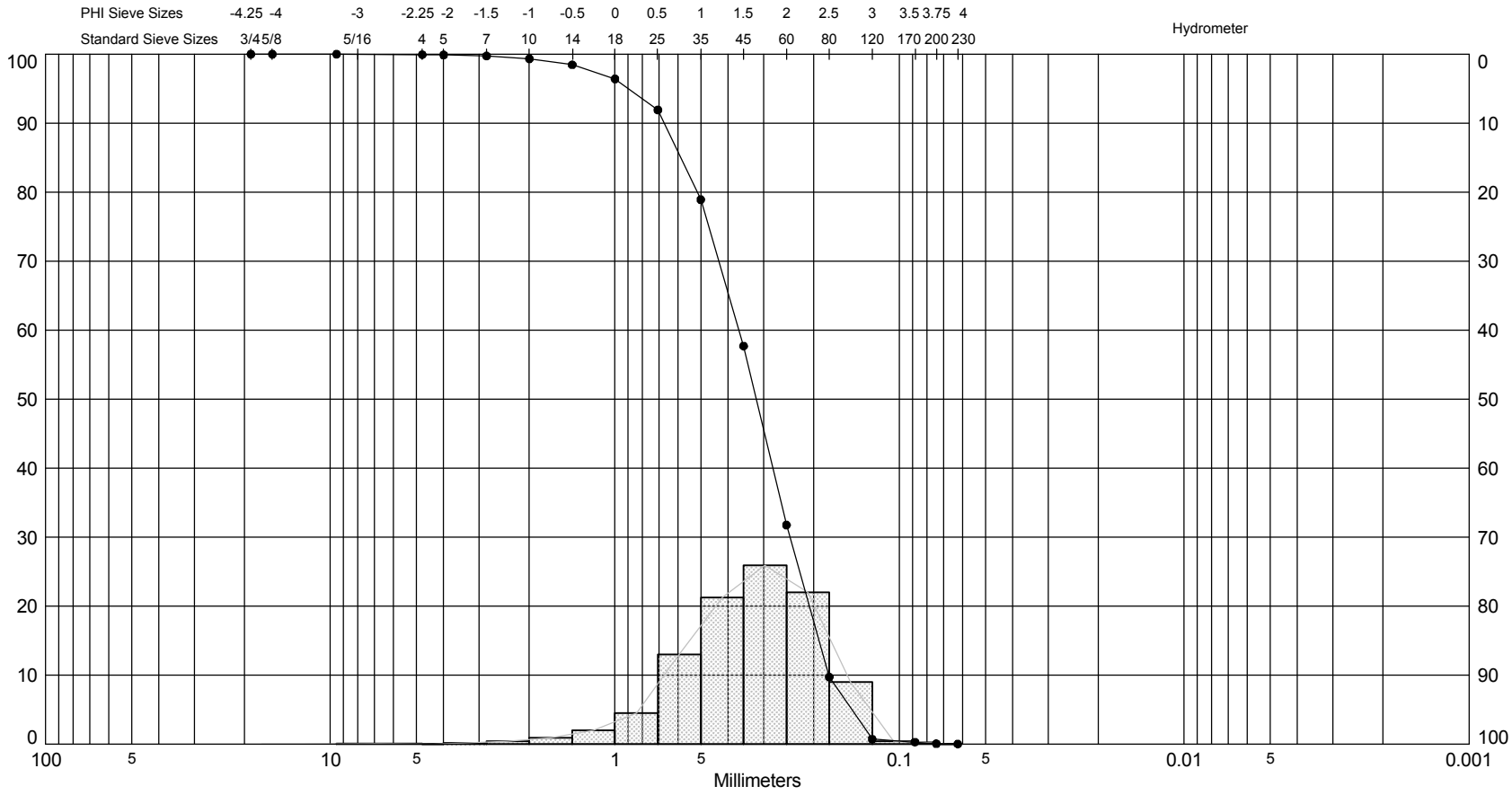
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
326.74	326.72	0.03	0.00	#200 - 0.07 #230 - 0.02			

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
3/8"	-3.25	9.51	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	0.09	0.03	0.09	0.03
7	-1.50	2.83	0.10	0.03	0.19	0.06
10	-1.00	2.00	0.25	0.08	0.44	0.13
14	-0.50	1.41	0.80	0.24	1.24	0.38
18	0.00	1.00	2.73	0.84	3.97	1.22
25	0.50	0.71	7.23	2.21	11.20	3.43
35	1.00	0.50	18.46	5.65	29.66	9.08
45	1.50	0.35	50.88	15.57	80.54	24.65
60	2.00	0.25	97.57	29.86	178.11	54.51
80	2.50	0.18	111.04	33.98	289.15	88.50
120	3.00	0.13	36.07	11.04	325.22	99.53
170	3.50	0.09	0.77	0.24	325.99	99.77
200	3.75	0.07	0.52	0.16	326.51	99.93
230	4.00	0.06	0.18	0.06	326.69	99.98

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.79	2.43	2.30	1.92	1.51	1.22	0.64

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.84	0.28	0.64	-0.93	4.92

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-206 R/W	—●—	0.0	SP	#200 - 0.05 #230 - 0.02			1.65	1.57	-0.76	4.41	0.79

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	587,188
Northing (Y, ft):	1,943,631
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-206 R/W

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
587,188	1,943,631	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10YR-7/2	

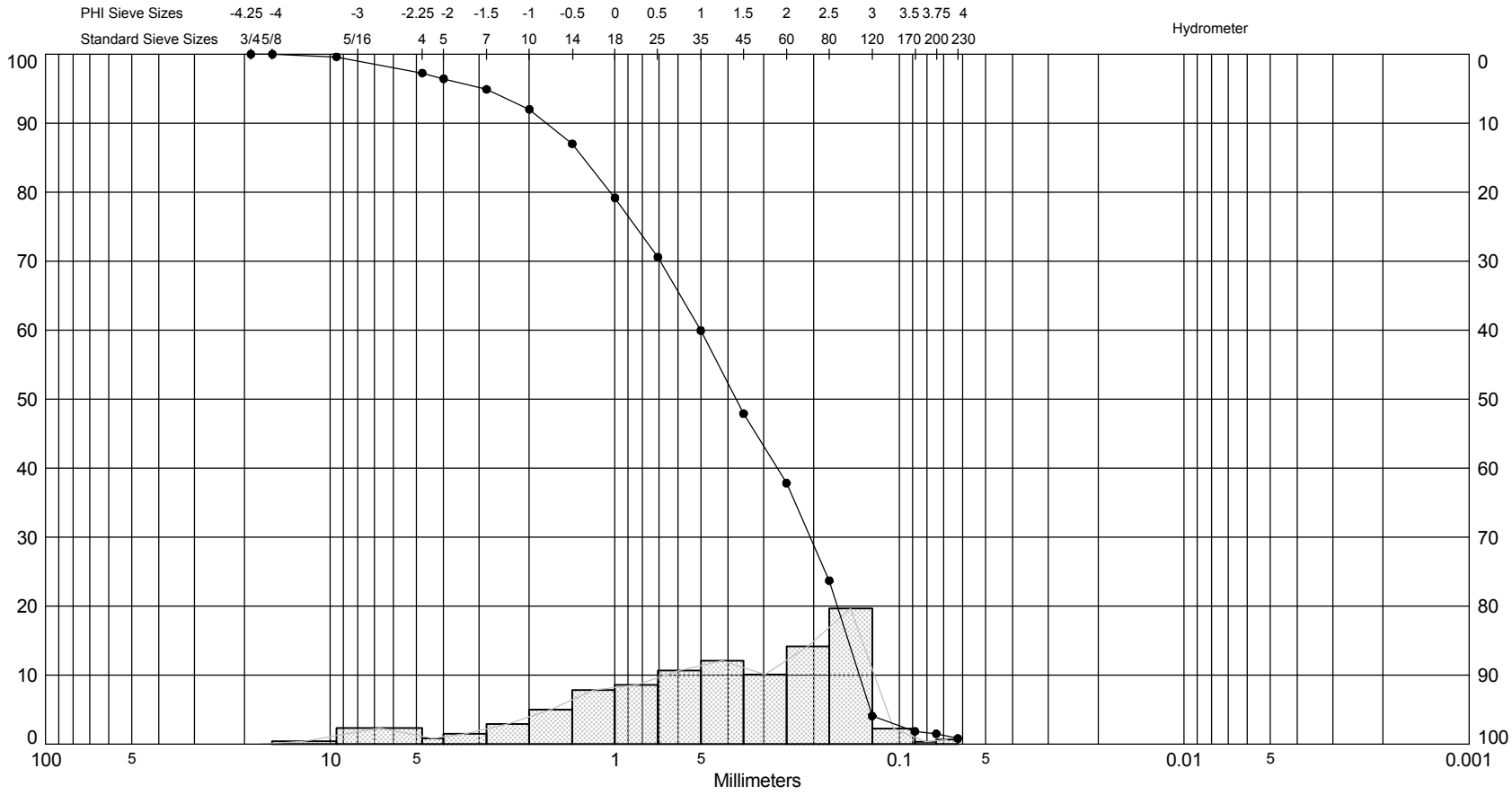
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
324.89	324.87	0.04	0.00	#200 - 0.05 #230 - 0.02			

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
3/8"	-3.25	9.51	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.23	0.07	0.23	0.07
5	-2.00	4.00	0.14	0.04	0.37	0.11
7	-1.50	2.83	0.47	0.14	0.84	0.26
10	-1.00	2.00	1.29	0.40	2.13	0.66
14	-0.50	1.41	2.86	0.88	4.99	1.54
18	0.00	1.00	6.64	2.04	11.63	3.58
25	0.50	0.71	14.63	4.50	26.26	8.08
35	1.00	0.50	42.25	13.00	68.51	21.09
45	1.50	0.35	68.93	21.22	137.44	42.30
60	2.00	0.25	84.30	25.95	221.74	68.25
80	2.50	0.18	71.58	22.03	293.32	90.28
120	3.00	0.13	29.25	9.00	322.57	99.29
170	3.50	0.09	1.37	0.42	323.94	99.71
200	3.75	0.07	0.80	0.25	324.74	99.95
230	4.00	0.06	0.08	0.02	324.82	99.98

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.76	2.36	2.15	1.65	1.09	0.80	0.16

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.57	0.34	0.79	-0.76	4.41

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-206 T Dune	—●—	0.0	SW	#200 - 1.49 #230 - 0.80			1.41	1.19	-0.75	3.12	1.47

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	587,188
Northing (Y, ft):	1,943,631
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-206 T Dune

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
587,188	1,943,631	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10YR-5/3	

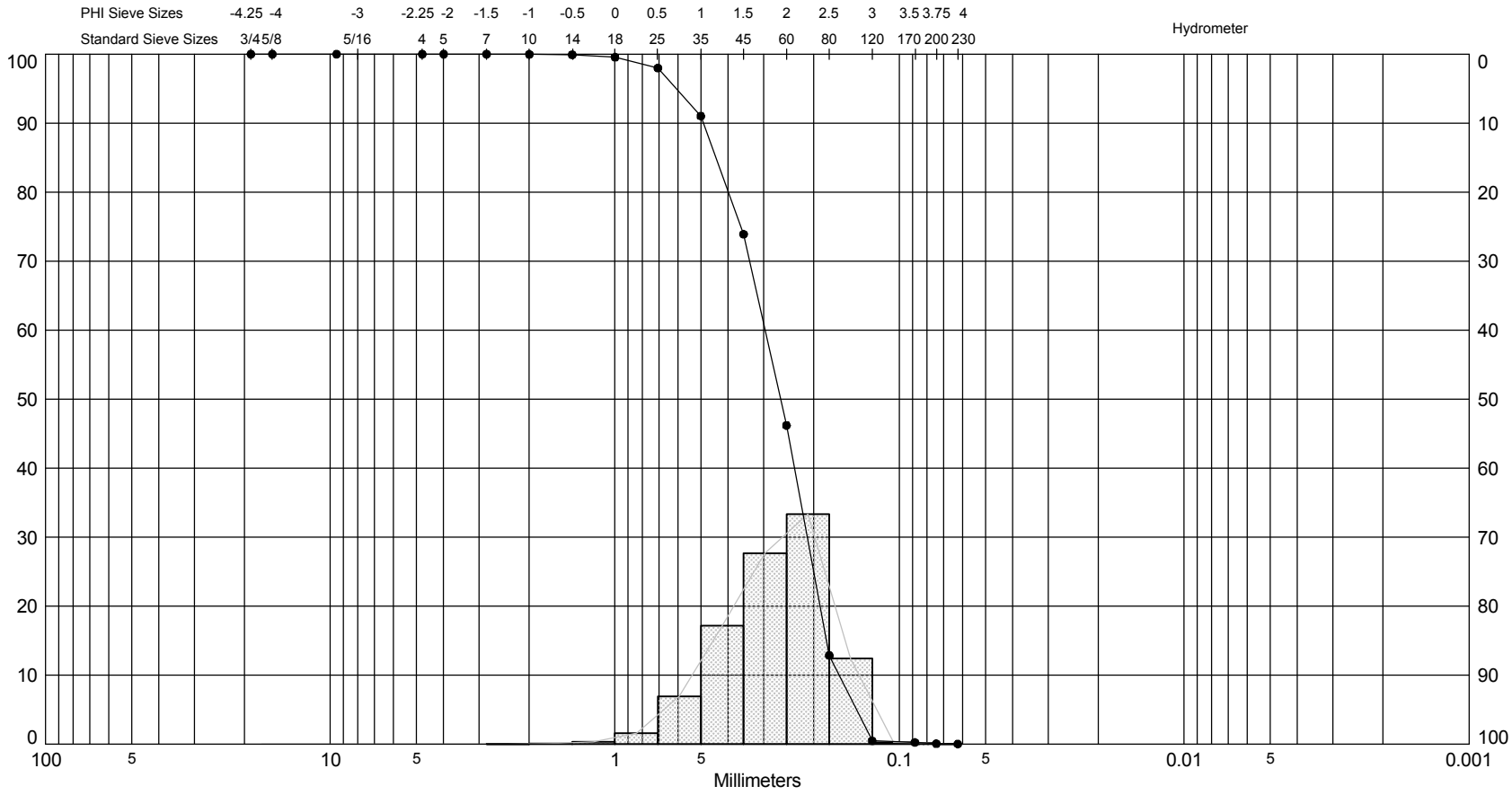
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
327.56	325.32	0.37	0.00	#200 - 1.49 #230 - 0.80			

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
3/8"	-3.25	9.51	1.26	0.38	1.26	0.38
4	-2.25	4.76	7.69	2.35	8.95	2.73
5	-2.00	4.00	2.71	0.83	11.66	3.56
7	-1.50	2.83	5.05	1.54	16.71	5.10
10	-1.00	2.00	9.44	2.88	26.15	7.98
14	-0.50	1.41	16.36	4.99	42.51	12.98
18	0.00	1.00	25.73	7.86	68.24	20.83
25	0.50	0.71	28.06	8.57	96.30	29.40
35	1.00	0.50	34.90	10.65	131.20	40.05
45	1.50	0.35	39.48	12.05	170.68	52.11
60	2.00	0.25	32.96	10.06	203.64	62.17
80	2.50	0.18	46.29	14.13	249.93	76.30
120	3.00	0.13	64.31	19.63	314.24	95.93
170	3.50	0.09	7.23	2.21	321.47	98.14
200	3.75	0.07	1.22	0.37	322.69	98.51
230	4.00	0.06	2.26	0.69	324.95	99.20

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.70	2.45	1.41	0.24	-0.31	-1.53

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.19	0.44	1.47	-0.75	3.12

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-207 Beach	—●—	0.0	SP	#200 - 0.05 #230 - 0.02			1.93	1.86	-0.55	3.34	0.61

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	587,494
Northing (Y, ft):	1,942,645
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-207 Beach

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
587,494	1,942,645	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10YR-7/2	

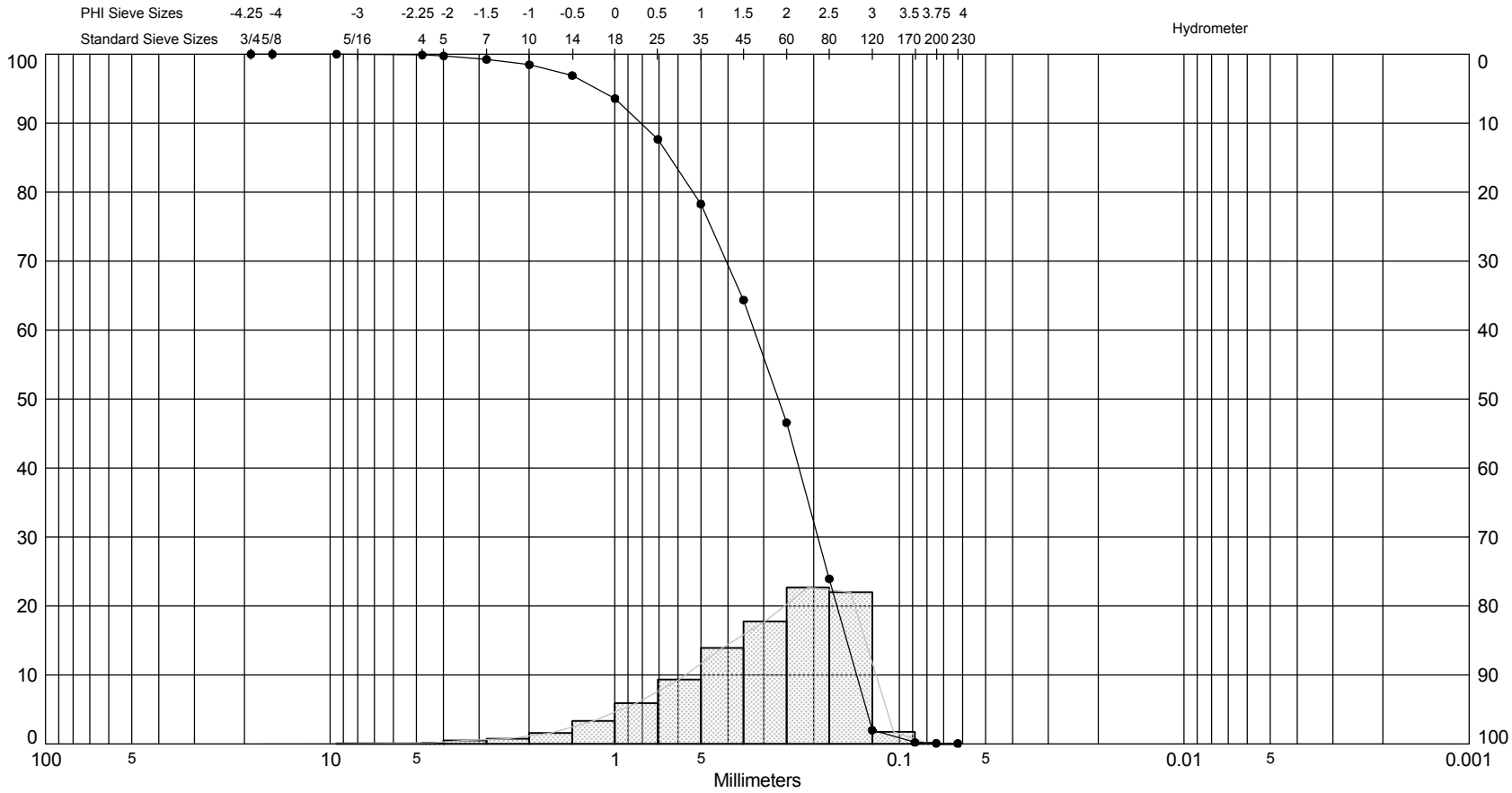
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%): #200 - 0.05 #230 - 0.02	Organics (%):	Carbonates (%):	Shells (%):
341.66	341.58	0.00	0.00				

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
3/8"	-3.25	9.51	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	0.03	0.09	0.03
14	-0.50	1.41	0.18	0.05	0.27	0.08
18	0.00	1.00	1.26	0.37	1.53	0.45
25	0.50	0.71	5.35	1.57	6.88	2.01
35	1.00	0.50	23.74	6.95	30.62	8.96
45	1.50	0.35	58.57	17.14	89.19	26.10
60	2.00	0.25	94.62	27.69	183.81	53.80
80	2.50	0.18	113.90	33.34	297.71	87.14
120	3.00	0.13	42.38	12.40	340.09	99.54
170	3.50	0.09	0.80	0.23	340.89	99.77
200	3.75	0.07	0.59	0.17	341.48	99.95
230	4.00	0.06	0.10	0.03	341.58	99.98

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.82	2.45	2.32	1.93	1.47	1.21	0.72

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.86	0.28	0.61	-0.55	3.34

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-207 R/W	—●—	0.0	SW	#200 - 0.08 #230 - 0.05			1.9	1.7	-1	3.97	0.99

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	587,494
Northing (Y, ft):	1,942,645
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-207 R/W

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
587,494	1,942,645	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10YR-7/2	

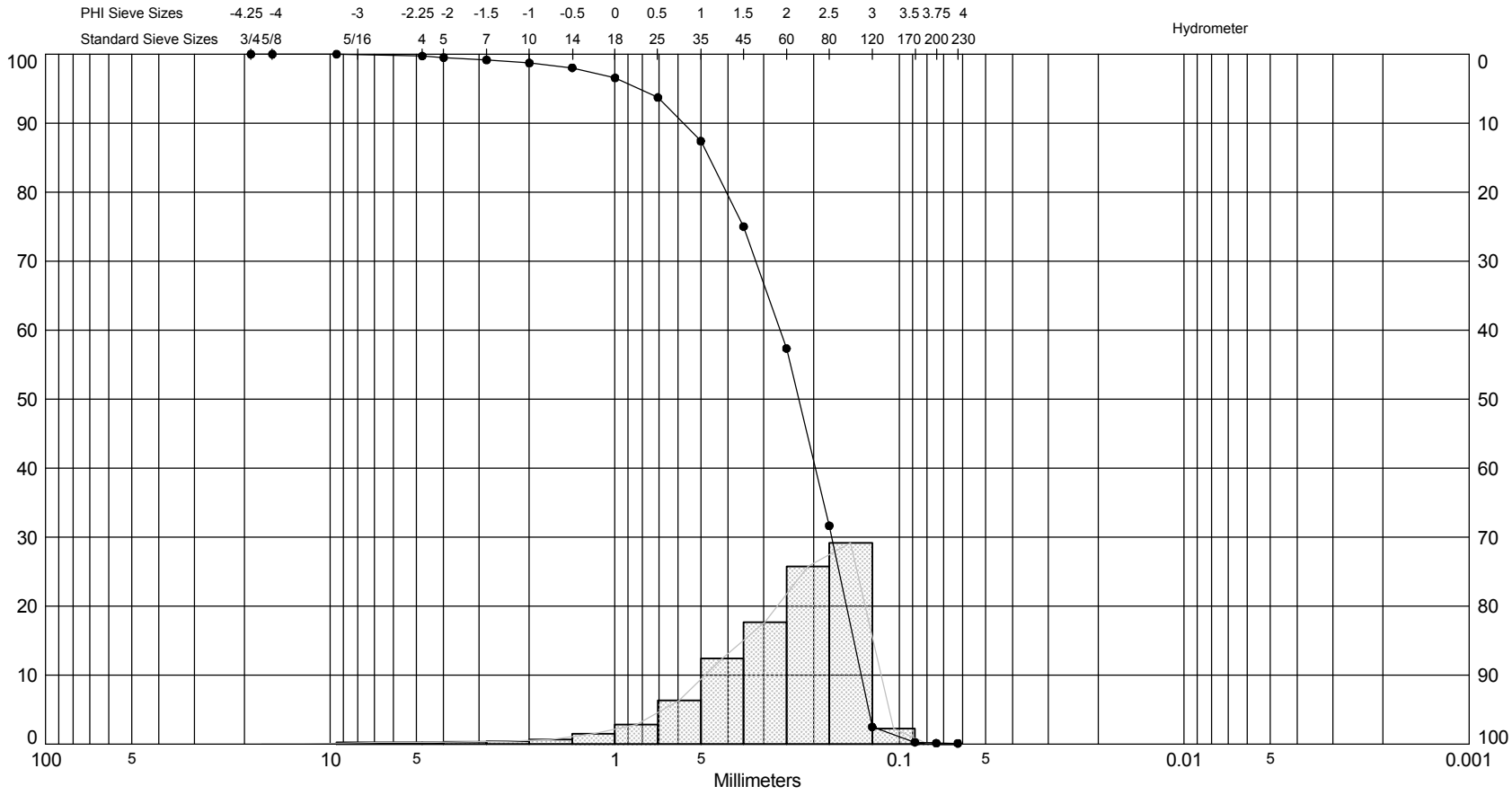
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
327.98	327.86	0.04	0.00	#200 - 0.08 #230 - 0.05			

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
3/8"	-3.25	9.51	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.39	0.12	0.39	0.12
5	-2.00	4.00	0.50	0.15	0.89	0.27
7	-1.50	2.83	1.60	0.49	2.49	0.76
10	-1.00	2.00	2.57	0.78	5.06	1.54
14	-0.50	1.41	5.11	1.56	10.17	3.10
18	0.00	1.00	10.97	3.34	21.14	6.45
25	0.50	0.71	19.35	5.90	40.49	12.35
35	1.00	0.50	30.75	9.38	71.24	21.72
45	1.50	0.35	45.70	13.93	116.94	35.65
60	2.00	0.25	58.30	17.78	175.24	53.43
80	2.50	0.18	74.21	22.63	249.45	76.06
120	3.00	0.13	72.04	21.96	321.49	98.02
170	3.50	0.09	5.81	1.77	327.30	99.79
200	3.75	0.07	0.41	0.13	327.71	99.92
230	4.00	0.06	0.10	0.03	327.81	99.95

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.93	2.68	2.48	1.90	1.12	0.69	-0.22

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.7	0.31	0.99	-1	3.97

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-207 T Dune	—●—	0.0	SW	#200 - 0.13 #230 - 0.11			2.14	1.95	-1.55	6.71	0.9

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	587,494
Northing (Y, ft):	1,942,645
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-207 T Dune

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
587,494	1,942,645	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10YR-8/2	

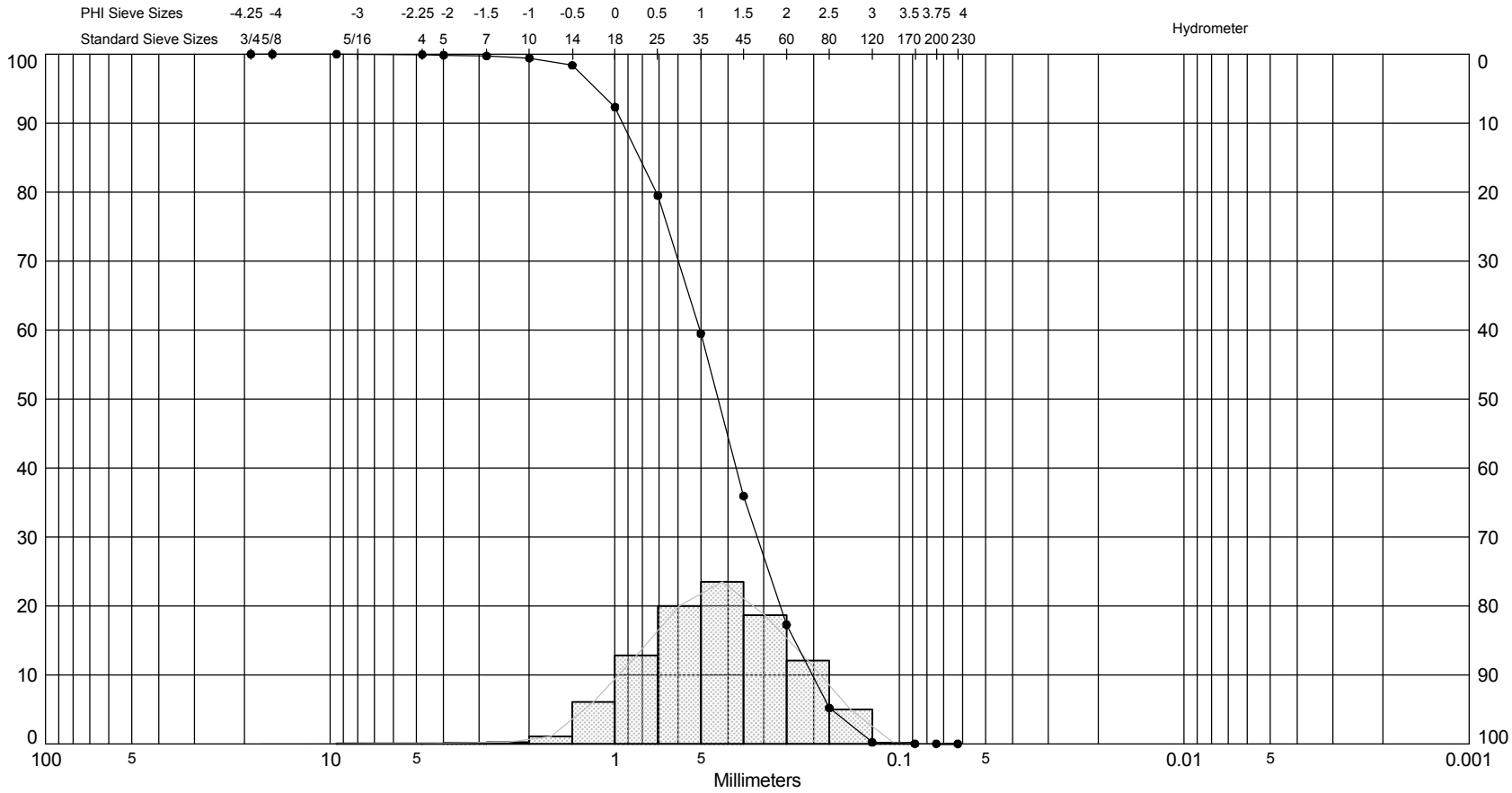
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
352.92	352.71	0.18	0.00	#200 - 0.13 #230 - 0.11			

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
3/8"	-3.25	9.51	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.97	0.27	0.97	0.27
5	-2.00	4.00	0.75	0.21	1.72	0.49
7	-1.50	2.83	1.23	0.35	2.95	0.84
10	-1.00	2.00	1.56	0.44	4.51	1.28
14	-0.50	1.41	2.43	0.69	6.94	1.97
18	0.00	1.00	5.20	1.47	12.14	3.44
25	0.50	0.71	10.04	2.84	22.18	6.28
35	1.00	0.50	22.34	6.33	44.52	12.61
45	1.50	0.35	43.69	12.38	88.21	24.99
60	2.00	0.25	62.30	17.65	150.51	42.65
80	2.50	0.18	90.73	25.71	241.24	68.36
120	3.00	0.13	102.94	29.17	344.18	97.52
170	3.50	0.09	7.80	2.21	351.98	99.73
200	3.75	0.07	0.49	0.14	352.47	99.87
230	4.00	0.06	0.06	0.02	352.53	99.89

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.96	2.77	2.61	2.14	1.50	1.14	0.27

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.95	0.26	0.9	-1.55	6.71

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-208 Beach	—●—	0.0	SP	#200 - 0.02 #230 - 0.01			1.2	1.19	-0.22	3.06	0.83

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	587,863
Northing (Y, ft):	1,941,694
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

TAYLOR ENGINEERING, INC.

Taylor Engineering, Inc.
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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-208 Beach

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
587,863	1,941,694	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10YR-7/2	

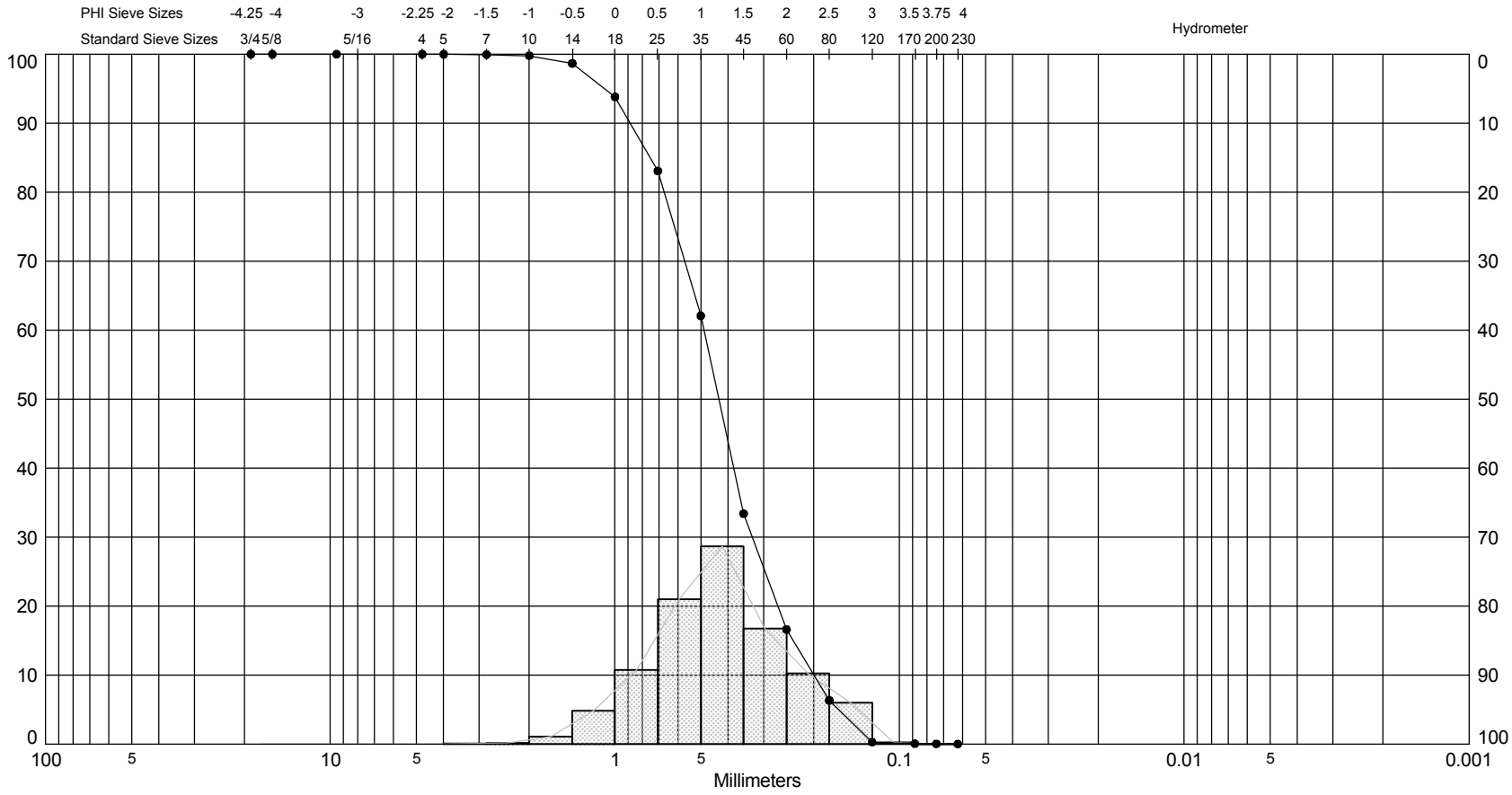
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
331.84	331.81	0.00	0.00	#200 - 0.02 #230 - 0.01			

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
3/8"	-3.25	9.51	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.17	0.05	0.17	0.05
5	-2.00	4.00	0.28	0.08	0.45	0.14
7	-1.50	2.83	0.44	0.13	0.89	0.27
10	-1.00	2.00	0.97	0.29	1.86	0.56
14	-0.50	1.41	3.53	1.06	5.39	1.62
18	0.00	1.00	20.15	6.07	25.54	7.70
25	0.50	0.71	42.48	12.80	68.02	20.50
35	1.00	0.50	66.47	20.03	134.49	40.53
45	1.50	0.35	78.12	23.54	212.61	64.07
60	2.00	0.25	61.88	18.65	274.49	82.72
80	2.50	0.18	40.06	12.07	314.55	94.79
120	3.00	0.13	16.56	4.99	331.11	99.78
170	3.50	0.09	0.65	0.20	331.76	99.98
200	3.75	0.07	0.03	0.01	331.79	99.98
230	4.00	0.06	0.02	0.01	331.81	99.99

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.52	2.05	1.79	1.20	0.61	0.32	-0.22

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.19	0.44	0.83	-0.22	3.06

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-208 R/W	—●—	0.0	SP	#200 - 0.04 #230 - 0.02			1.21	1.22	-0.03	2.9	0.79

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	587,863
Northing (Y, ft):	1,941,694
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-208 R/W

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
587,863	1,941,694	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10YR-7/2	

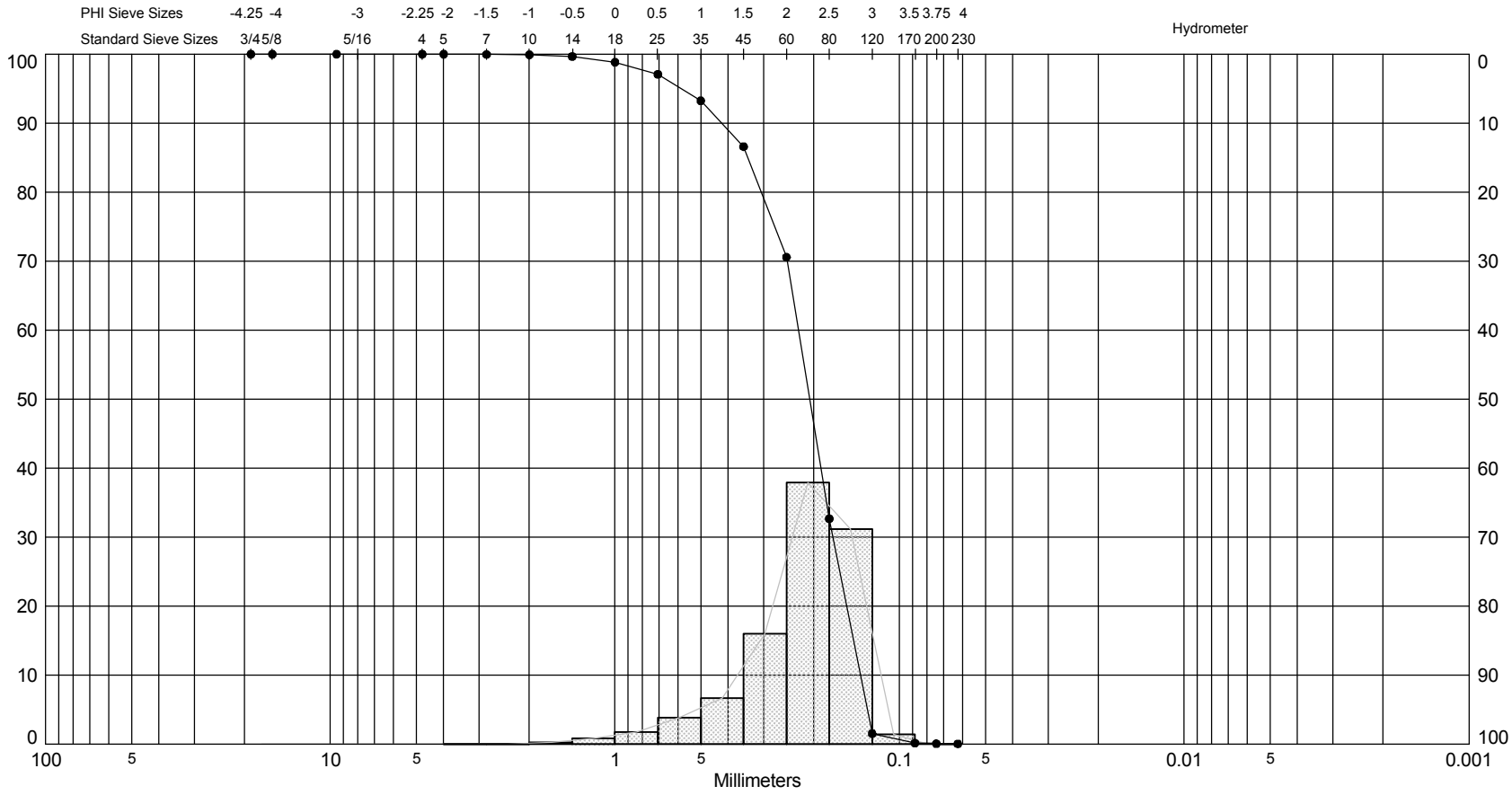
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%): #200 - 0.04 #230 - 0.02	Organics (%):	Carbonates (%):	Shells (%):
309.62	309.57	0.00	0.00				

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
3/8"	-3.25	9.51	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	0.14	0.05	0.14	0.05
10	-1.00	2.00	0.52	0.17	0.66	0.21
14	-0.50	1.41	3.45	1.11	4.11	1.33
18	0.00	1.00	15.04	4.86	19.15	6.19
25	0.50	0.71	33.26	10.74	52.41	16.93
35	1.00	0.50	64.98	20.99	117.39	37.91
45	1.50	0.35	88.86	28.70	206.25	66.61
60	2.00	0.25	51.95	16.78	258.20	83.39
80	2.50	0.18	31.81	10.27	290.01	93.67
120	3.00	0.13	18.71	6.04	308.72	99.71
170	3.50	0.09	0.76	0.25	309.48	99.95
200	3.75	0.07	0.03	0.01	309.51	99.96
230	4.00	0.06	0.06	0.02	309.57	99.98

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.61	2.03	1.75	1.21	0.69	0.46	-0.12

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.22	0.43	0.79	-0.03	2.9

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
R-208 T Dune	—●—	0.0	SP	#200 - 0.05 #230 - 0.04			2.27	2.15	-1.44	5.82	0.66

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	587,863
Northing (Y, ft):	1,941,694
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: R-208 T Dune

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
587,863	1,941,694	Florida State Plane East	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10YR-8/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
320.78	320.70	0.05	0.00	#200 - 0.05 #230 - 0.04			

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
3/8"	-3.25	9.51	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	0.13	0.04	0.13	0.04
10	-1.00	2.00	0.13	0.04	0.26	0.08
14	-0.50	1.41	0.79	0.25	1.05	0.33
18	0.00	1.00	2.66	0.83	3.71	1.16
25	0.50	0.71	5.63	1.76	9.34	2.91
35	1.00	0.50	12.30	3.83	21.64	6.75
45	1.50	0.35	21.32	6.65	42.96	13.39
60	2.00	0.25	51.46	16.04	94.42	29.43
80	2.50	0.18	121.56	37.90	215.98	67.33
120	3.00	0.13	99.89	31.14	315.87	98.47
170	3.50	0.09	4.47	1.39	320.34	99.86
200	3.75	0.07	0.28	0.09	320.62	99.95
230	4.00	0.06	0.03	0.01	320.65	99.96

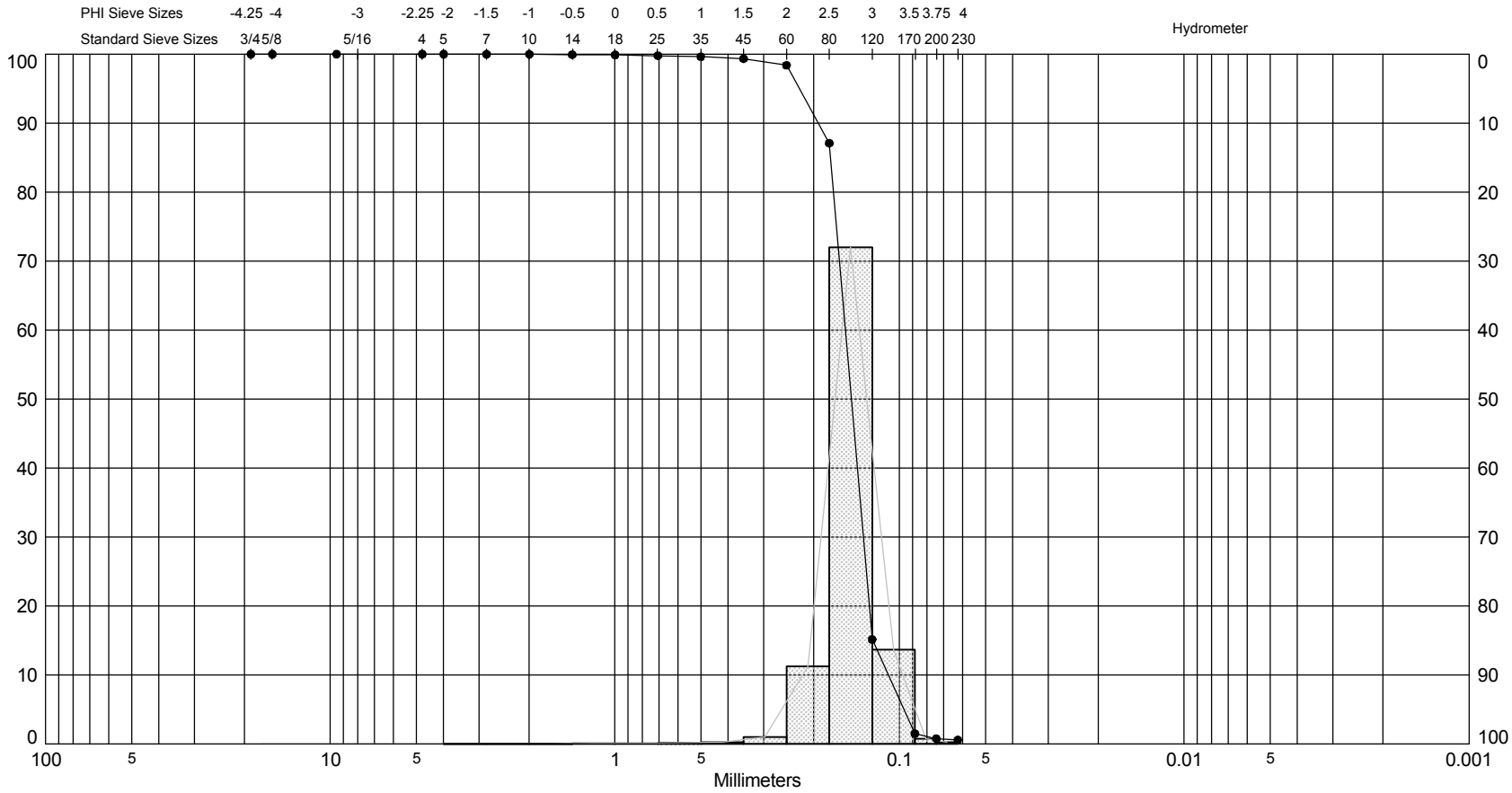
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.94	2.77	2.62	2.27	1.86	1.58	0.77

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.15	0.23	0.66	-1.44	5.82

GRANULARMETRIC REPORT SUMMER HAVEN BEACH SAMPLES.GPJ FL DEP ROSS.GDT 3/2/10

APPENDIX C

FIND DMMA SJ-1 Grain Size Tables and Curves (UES Data)



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
B-1 #0' - 5'	—●—		SP	#200 - 0.77 #230 - 0.56			2.76	2.75	-2.16	21.64	0.34

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,392
Northing (Y, ft):	1,957,615
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: B-1 #0' - 5'

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,392	1,957,615	Florida State Plane East	

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

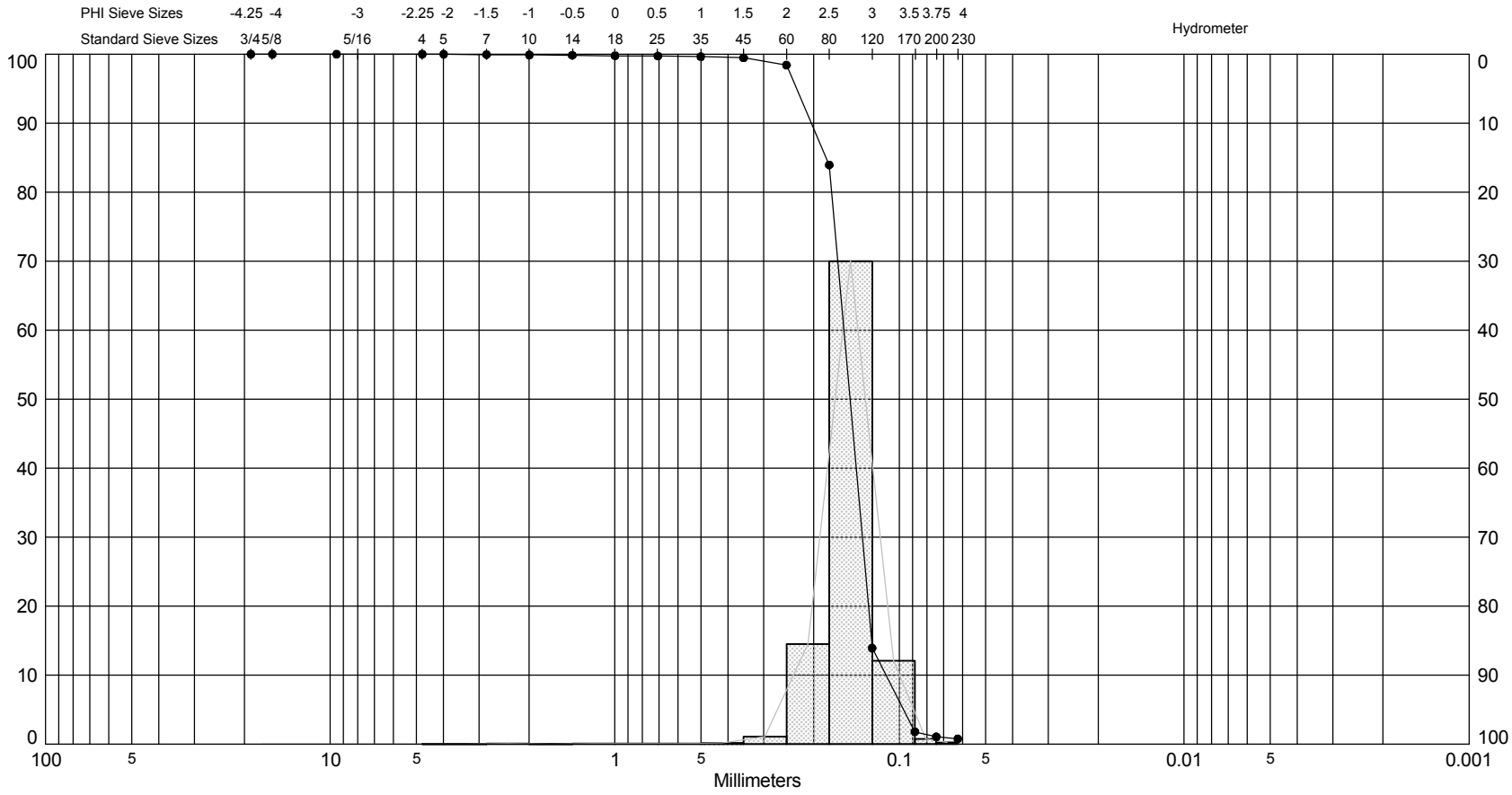
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
329.24	327.45	0.07	0.00	#200 - 0.77 #230 - 0.56			

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
3/8"	-3.25	9.51	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	0.01	0.02	0.01
10	-1.00	2.00	0.04	0.01	0.06	0.02
14	-0.50	1.41	0.15	0.05	0.21	0.06
18	0.00	1.00	0.16	0.05	0.37	0.11
25	0.50	0.71	0.31	0.09	0.68	0.21
35	1.00	0.50	0.54	0.16	1.22	0.37
45	1.50	0.35	0.93	0.28	2.15	0.65
60	2.00	0.25	3.18	0.97	5.33	1.62
80	2.50	0.18	37.15	11.28	42.48	12.90
120	3.00	0.13	236.92	71.96	279.40	84.86
170	3.50	0.09	44.97	13.66	324.37	98.52
200	3.75	0.07	2.33	0.71	326.70	99.23
230	4.00	0.06	0.68	0.21	327.38	99.44

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.37	2.99	2.93	2.76	2.58	2.52	2.15

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.75	0.15	0.34	-2.16	21.64

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
B-1 #5' - 10'	—●—		SP	#200 - 1.05 #230 - 0.77			2.74	2.72	-3.07	34.67	0.36

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,392
Northing (Y, ft):	1,957,615
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: B-1 #5' - 10'

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,392	1,957,615	Florida State Plane East	

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

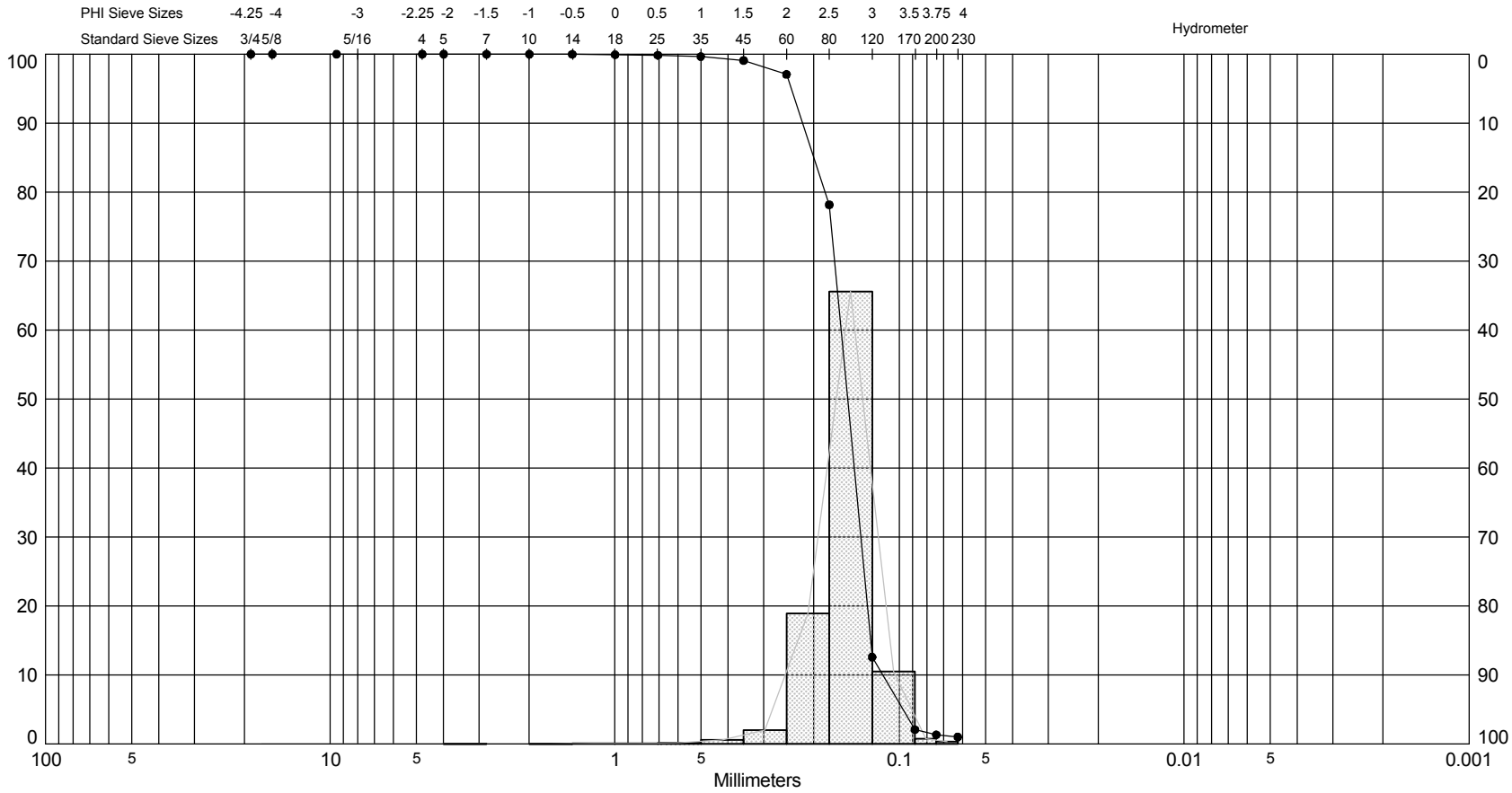
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
499.12	496.16	0.86	0.00	#200 - 1.05 #230 - 0.77			

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
3/8"	-3.25	9.51	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	0.01	0.07	0.01
7	-1.50	2.83	0.20	0.04	0.27	0.05
10	-1.00	2.00	0.30	0.06	0.57	0.11
14	-0.50	1.41	0.20	0.04	0.77	0.15
18	0.00	1.00	0.31	0.06	1.08	0.22
25	0.50	0.71	0.27	0.05	1.35	0.27
35	1.00	0.50	0.45	0.09	1.80	0.36
45	1.50	0.35	0.91	0.18	2.71	0.54
60	2.00	0.25	5.21	1.04	7.92	1.59
80	2.50	0.18	72.17	14.46	80.09	16.05
120	3.00	0.13	349.61	70.05	429.70	86.09
170	3.50	0.09	60.50	12.12	490.20	98.21
200	3.75	0.07	3.70	0.74	493.90	98.95
230	4.00	0.06	1.40	0.28	495.30	99.23

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.37	2.99	2.92	2.74	2.56	2.50	2.12

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.72	0.15	0.36	-3.07	34.67

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
B-1 #10' - 15'	—●—		SP	#200 - 1.32 #230 - 1.01			2.71	2.68	-1.4	12.11	0.37

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,392
Northing (Y, ft):	1,957,615
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: B-1 #10' - 15'

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

TAYLOR ENGINEERING, INC.

Taylor Engineering, Inc.
10151 Deerwood Park Blvd., Bldg. 300, Suite 300
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ph (904) 731-7040
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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,392	1,957,615	Florida State Plane East	

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

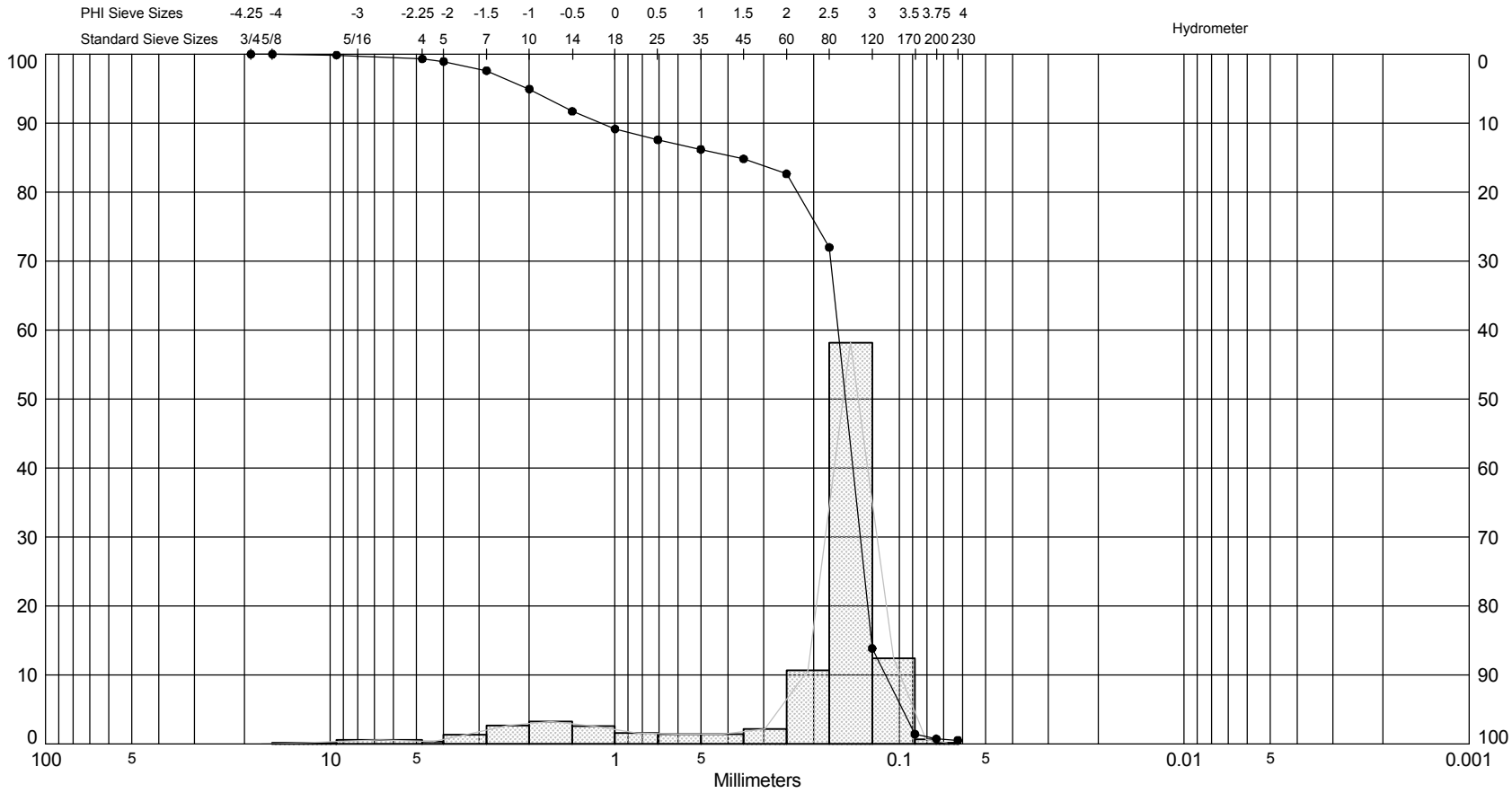
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
333.17	330.54	0.72	0.00	#200 - 1.32 #230 - 1.01			

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
3/8"	-3.25	9.51	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	0.01	0.03	0.01
10	-1.00	2.00	0.01	0.00	0.04	0.01
14	-0.50	1.41	0.03	0.01	0.07	0.02
18	0.00	1.00	0.16	0.05	0.23	0.07
25	0.50	0.71	0.26	0.08	0.49	0.15
35	1.00	0.50	0.66	0.20	1.15	0.35
45	1.50	0.35	1.93	0.58	3.08	0.92
60	2.00	0.25	6.74	2.02	9.82	2.95
80	2.50	0.18	62.93	18.89	72.75	21.84
120	3.00	0.13	218.48	65.58	291.23	87.41
170	3.50	0.09	35.07	10.53	326.30	97.94
200	3.75	0.07	2.48	0.74	328.78	98.68
230	4.00	0.06	1.04	0.31	329.82	98.99

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.36	2.97	2.91	2.71	2.52	2.35	2.05

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.68	0.16	0.37	-1.4	12.11

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
B-2 #0' - 5'	—●—		SW	#200 - 0.73 #230 - 0.53			2.69	2.24	-2.11	6.53	1.29

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,736
Northing (Y, ft):	1,957,536
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: B-2 #0' - 5'

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,736	1,957,536	Florida State Plane East	

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

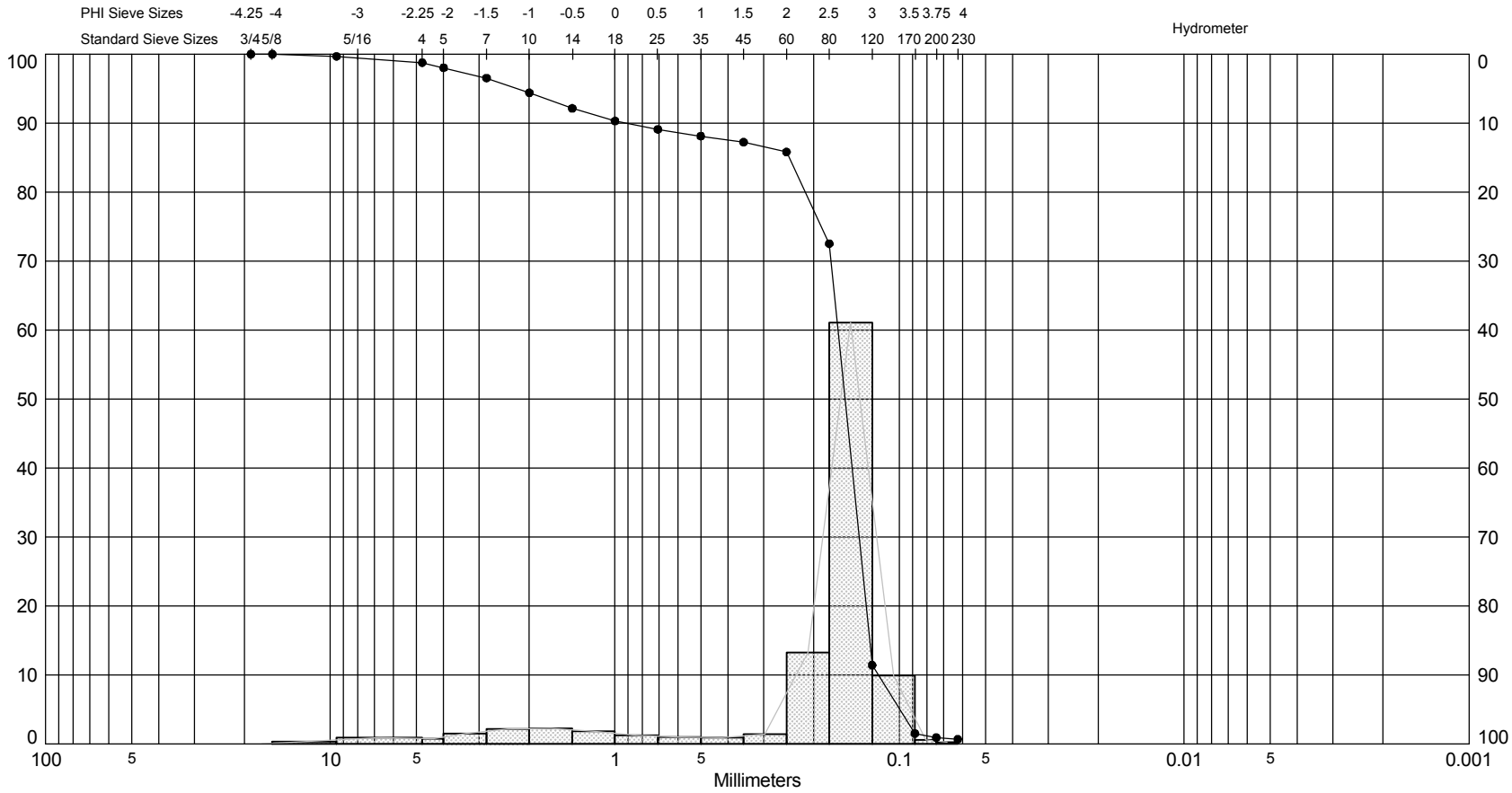
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
327.04	325.67	0.37	0.00	#200 - 0.73 #230 - 0.53			

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
3/8"	-3.25	9.51	0.44	0.13	0.44	0.13
4	-2.25	4.76	1.80	0.55	2.24	0.68
5	-2.00	4.00	1.21	0.37	3.45	1.05
7	-1.50	2.83	4.35	1.33	7.80	2.39
10	-1.00	2.00	8.74	2.67	16.54	5.06
14	-0.50	1.41	10.56	3.23	27.10	8.29
18	0.00	1.00	8.40	2.57	35.50	10.85
25	0.50	0.71	5.10	1.56	40.60	12.41
35	1.00	0.50	4.53	1.39	45.13	13.80
45	1.50	0.35	4.55	1.39	49.68	15.19
60	2.00	0.25	7.11	2.17	56.79	17.36
80	2.50	0.18	34.84	10.65	91.63	28.02
120	3.00	0.13	190.12	58.13	281.75	86.15
170	3.50	0.09	40.63	12.42	322.38	98.58
200	3.75	0.07	2.27	0.69	324.65	99.27
230	4.00	0.06	0.65	0.20	325.30	99.47

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.36	2.98	2.90	2.69	2.36	1.69	-1.01

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.24	0.21	1.29	-2.11	6.53

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
B-2 #5' - 10'	—●—		SW	#200 - 0.91 #230 - 0.68			2.68	2.27	-2.44	8.21	1.29

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,736
Northing (Y, ft):	1,957,536
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: B-2 #5' - 10'

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,736	1,957,536	Florida State Plane East	

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

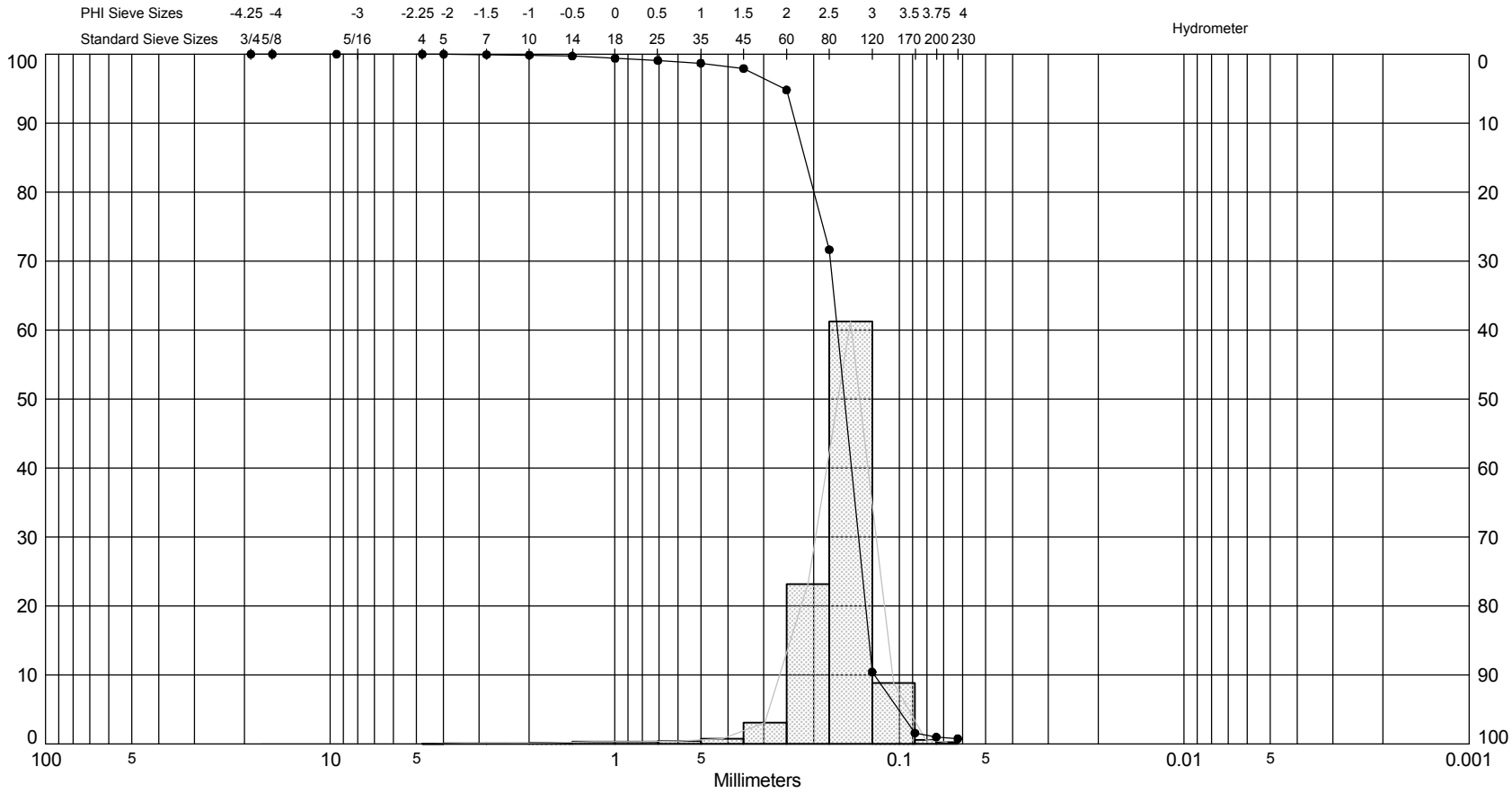
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
363.84	361.72	0.37	0.00	#200 - 0.91 #230 - 0.68			

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
3/8"	-3.25	9.51	1.11	0.31	1.11	0.31
4	-2.25	4.76	3.33	0.92	4.44	1.22
5	-2.00	4.00	2.69	0.74	7.13	1.96
7	-1.50	2.83	5.46	1.50	12.59	3.46
10	-1.00	2.00	7.79	2.14	20.38	5.60
14	-0.50	1.41	8.21	2.26	28.59	7.86
18	0.00	1.00	6.67	1.83	35.26	9.69
25	0.50	0.71	4.41	1.21	39.67	10.90
35	1.00	0.50	3.54	0.97	43.21	11.88
45	1.50	0.35	3.23	0.89	46.44	12.76
60	2.00	0.25	5.15	1.42	51.59	14.18
80	2.50	0.18	48.34	13.29	99.93	27.47
120	3.00	0.13	222.37	61.12	322.30	88.58
170	3.50	0.09	36.04	9.91	358.34	98.49
200	3.75	0.07	2.19	0.60	360.53	99.09
230	4.00	0.06	0.82	0.23	361.35	99.32

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.32	2.96	2.89	2.68	2.41	2.07	-1.14

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.27	0.21	1.29	-2.44	8.21

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
B-2 #10' - 15'	—●—		SP	#200 - 0.99 #230 - 0.75			2.68	2.61	-2.91	20.55	0.47

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,736
Northing (Y, ft):	1,957,536
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: B-2 #10' - 15'

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,736	1,957,536	Florida State Plane East	

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

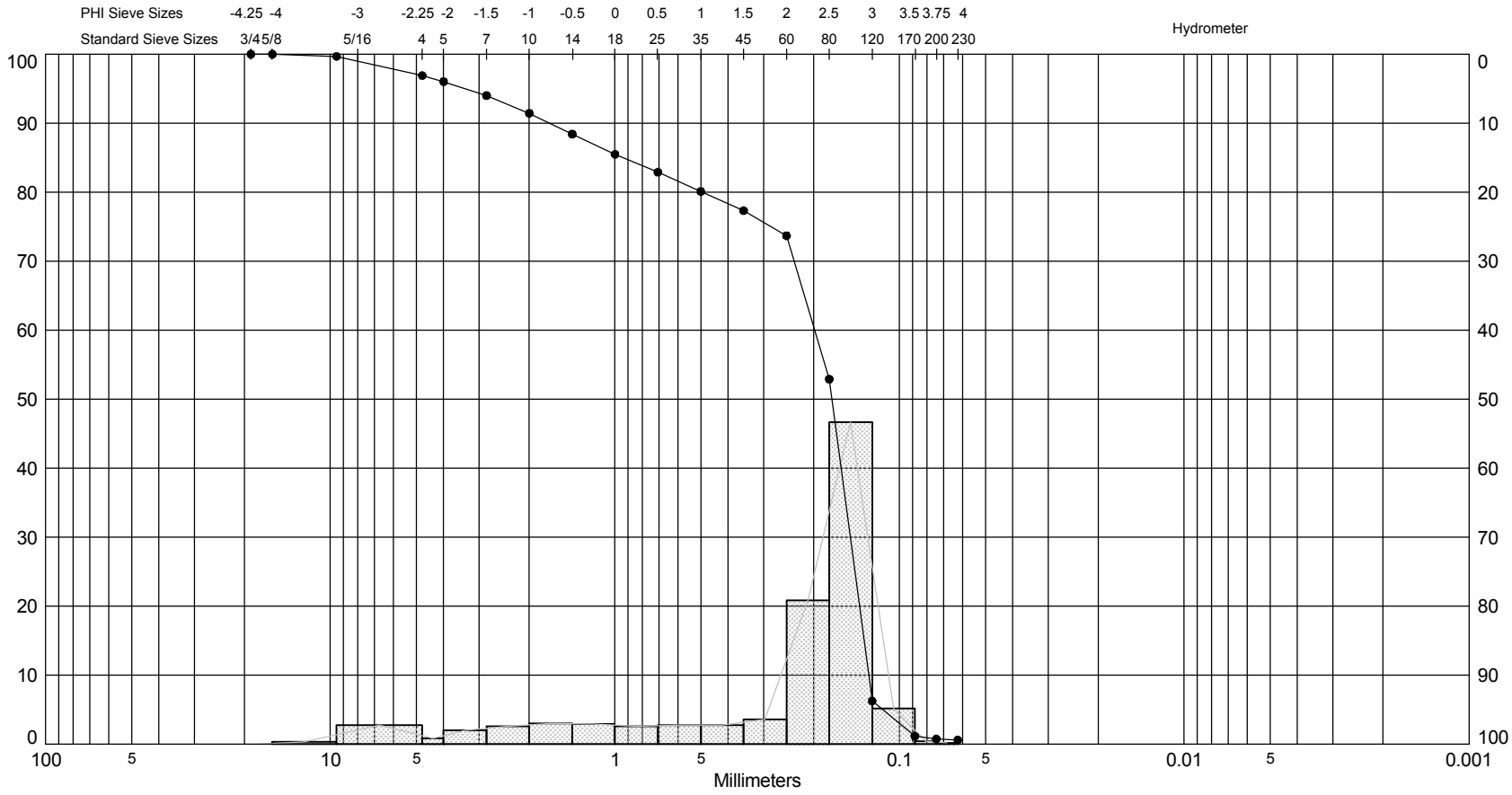
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
326.47	324.50	0.49	0.00	#200 - 0.99 #230 - 0.75			

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
3/8"	-3.25	9.51	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	0.04	0.01	0.04	0.01
7	-1.50	2.83	0.15	0.05	0.19	0.06
10	-1.00	2.00	0.28	0.09	0.47	0.14
14	-0.50	1.41	0.46	0.14	0.93	0.28
18	0.00	1.00	1.07	0.33	2.00	0.61
25	0.50	0.71	0.97	0.30	2.97	0.91
35	1.00	0.50	1.29	0.40	4.26	1.30
45	1.50	0.35	2.56	0.78	6.82	2.09
60	2.00	0.25	10.16	3.11	16.98	5.20
80	2.50	0.18	75.58	23.15	92.56	28.35
120	3.00	0.13	199.93	61.24	292.49	89.59
170	3.50	0.09	28.89	8.85	321.38	98.44
200	3.75	0.07	1.85	0.57	323.23	99.01
230	4.00	0.06	0.78	0.24	324.01	99.25

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.31	2.95	2.88	2.68	2.43	2.23	1.97

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.61	0.16	0.47	-2.91	20.55

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
B-3 #0' - 5'	—●—		SW	#200 - 0.74 #230 - 0.58			2.53	1.87	-1.72	4.95	1.52

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	577,048
Northing (Y, ft):	1,957,468
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: B-3 #0' - 5'

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
577,048	1,957,468	Florida State Plane East	

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

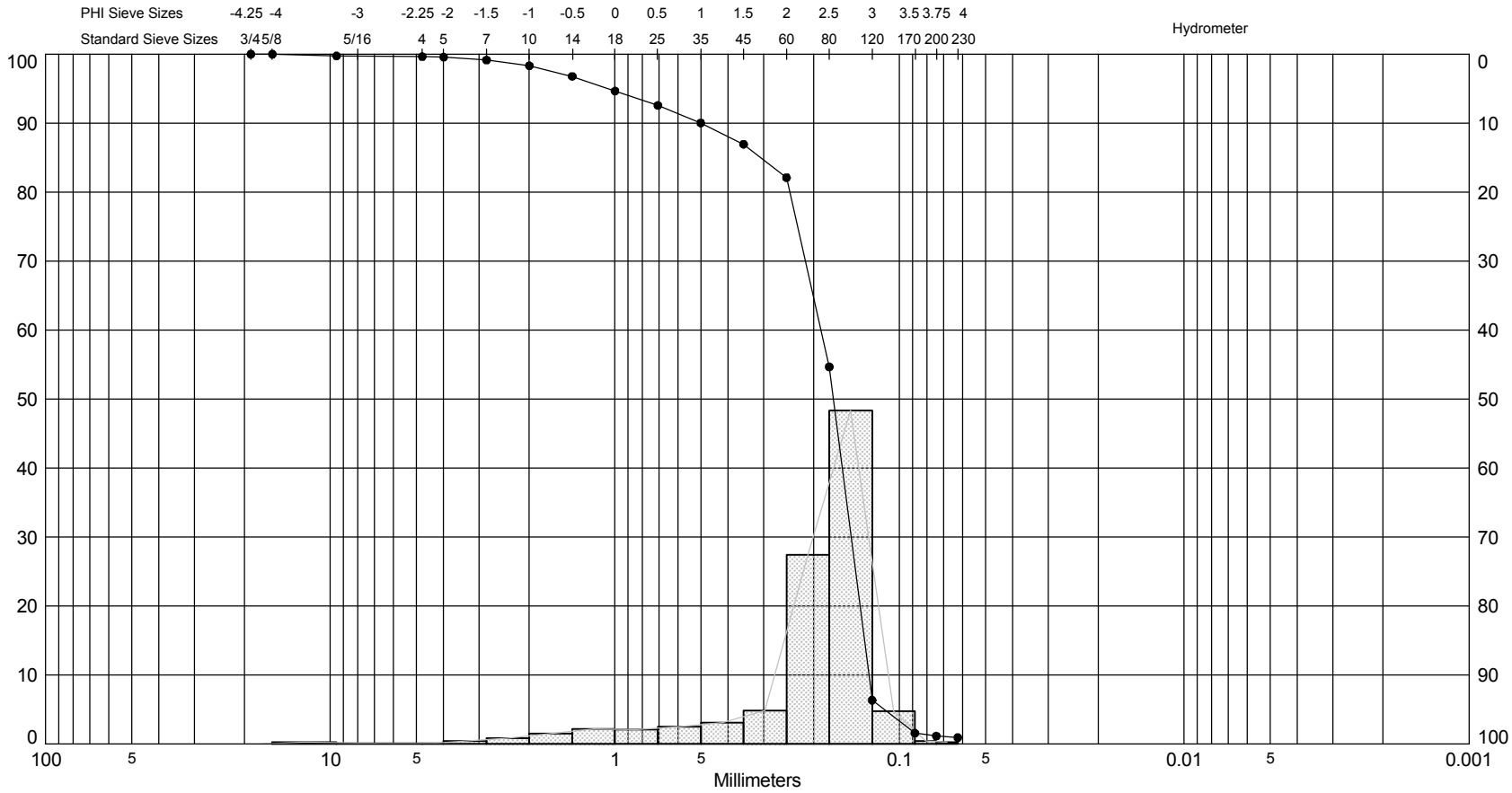
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
330.45	328.93	0.41	0.00	#200 - 0.74 #230 - 0.58			

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
3/8"	-3.25	9.51	1.03	0.31	1.03	0.31
4	-2.25	4.76	9.20	2.78	10.23	3.10
5	-2.00	4.00	2.88	0.87	13.11	3.97
7	-1.50	2.83	6.71	2.03	19.82	6.00
10	-1.00	2.00	8.47	2.56	28.29	8.56
14	-0.50	1.41	10.02	3.03	38.31	11.59
18	0.00	1.00	9.68	2.93	47.99	14.52
25	0.50	0.71	8.55	2.59	56.54	17.11
35	1.00	0.50	9.18	2.78	65.72	19.89
45	1.50	0.35	9.23	2.79	74.95	22.68
60	2.00	0.25	11.95	3.62	86.90	26.30
80	2.50	0.18	68.77	20.81	155.67	47.11
120	3.00	0.13	154.08	46.63	309.75	93.74
170	3.50	0.09	16.97	5.14	326.72	98.87
200	3.75	0.07	1.27	0.38	327.99	99.26
230	4.00	0.06	0.53	0.16	328.52	99.42

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.12	2.90	2.80	2.53	1.82	0.29	-1.75

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.87	0.27	1.52	-1.72	4.95

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
B-3 #5' - 10'	—●—		SW	#200 - 1.13 #230 - 0.91			2.55	2.25	-2.46	10.14	0.97

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	577,048
Northing (Y, ft):	1,957,468
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: B-3 #5' - 10'

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
577,048	1,957,468	Florida State Plane East	

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

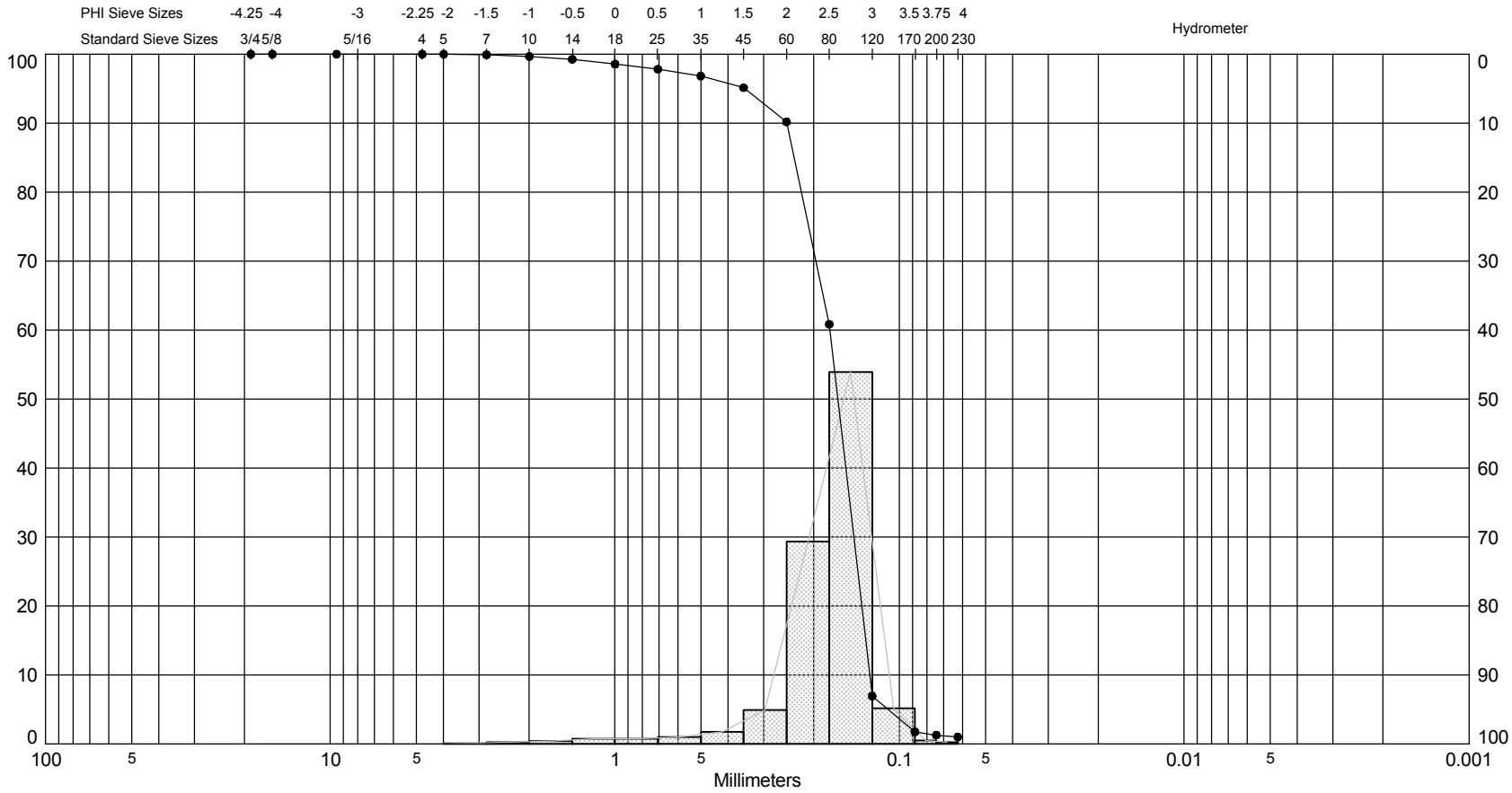
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
332.28	329.52	0.26	0.00	#200 - 1.13 #230 - 0.91			

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
3/8"	-3.25	9.51	0.85	0.26	0.85	0.26
4	-2.25	4.76	0.36	0.11	1.21	0.36
5	-2.00	4.00	0.23	0.07	1.44	0.43
7	-1.50	2.83	1.42	0.43	2.86	0.86
10	-1.00	2.00	2.73	0.82	5.59	1.68
14	-0.50	1.41	5.07	1.53	10.66	3.21
18	0.00	1.00	7.13	2.15	17.79	5.35
25	0.50	0.71	6.94	2.09	24.73	7.44
35	1.00	0.50	8.41	2.53	33.14	9.97
45	1.50	0.35	10.21	3.07	43.35	13.05
60	2.00	0.25	16.08	4.84	59.43	17.89
80	2.50	0.18	91.18	27.44	150.61	45.33
120	3.00	0.13	160.59	48.33	311.20	93.66
170	3.50	0.09	15.93	4.79	327.13	98.45
200	3.75	0.07	1.40	0.42	328.53	98.87
230	4.00	0.06	0.73	0.22	329.26	99.09

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.14	2.90	2.81	2.55	2.13	1.80	-0.08

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.25	0.21	0.97	-2.46	10.14

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
B-3 #10' - 15'	—●—		SP	#200 - 1.28 #230 - 1.01			2.6	2.47	-2.79	14.82	0.6

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	577,048
Northing (Y, ft):	1,957,468
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

TAYLOR ENGINEERING, INC.

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: B-3 #10' - 15'

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
577,048	1,957,468	Florida State Plane East	

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

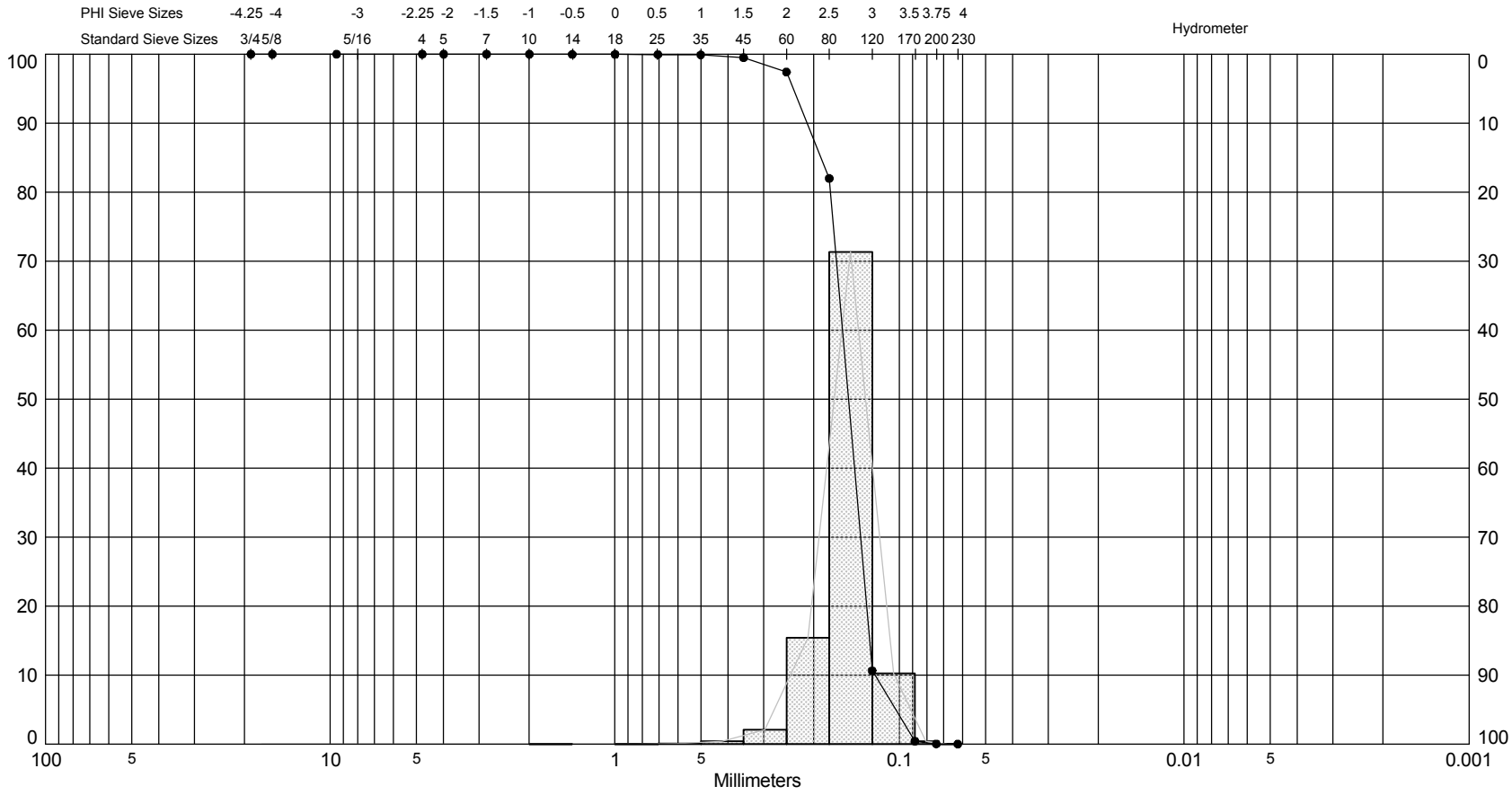
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
332.78	329.81	0.39	0.00	#200 - 1.28 #230 - 1.01			

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
3/8"	-3.25	9.51	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	0.09	0.30	0.09
10	-1.00	2.00	0.84	0.25	1.14	0.34
14	-0.50	1.41	1.33	0.40	2.47	0.74
18	0.00	1.00	2.34	0.70	4.81	1.45
25	0.50	0.71	2.47	0.74	7.28	2.19
35	1.00	0.50	3.24	0.97	10.52	3.16
45	1.50	0.35	5.68	1.71	16.20	4.87
60	2.00	0.25	16.40	4.93	32.60	9.80
80	2.50	0.18	97.67	29.35	130.27	39.15
120	3.00	0.13	179.39	53.91	309.66	93.05
170	3.50	0.09	17.28	5.19	326.94	98.25
200	3.75	0.07	1.58	0.47	328.52	98.72
230	4.00	0.06	0.90	0.27	329.42	98.99

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.19	2.92	2.83	2.60	2.26	2.11	1.51

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.47	0.18	0.6	-2.79	14.82

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
S01	—●—		SP	#200 - 0.03 #230 - 0.01			2.72	2.7	-1.29	10.42	0.32

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,456
Northing (Y, ft):	1,957,833
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: S01

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,456	1,957,833	Florida State Plane East	

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

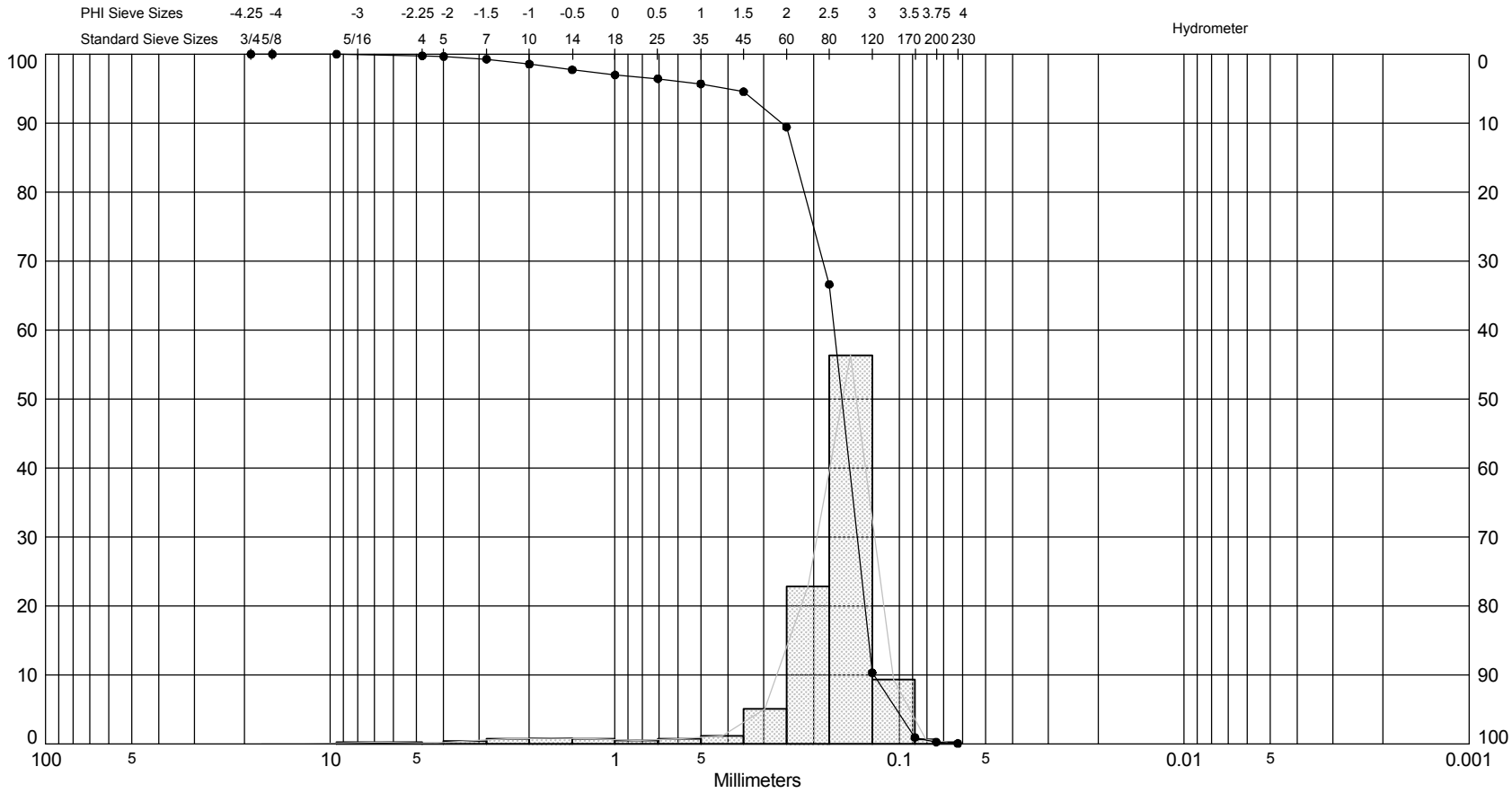
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
317.71	317.68	0.00	0.00	#200 - 0.03 #230 - 0.01			

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
3/8"	-3.25	9.51	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	0.08	0.03	0.08	0.03
18	0.00	1.00	0.01	0.00	0.09	0.03
25	0.50	0.71	0.07	0.02	0.16	0.05
35	1.00	0.50	0.17	0.05	0.33	0.10
45	1.50	0.35	1.30	0.41	1.63	0.51
60	2.00	0.25	6.61	2.08	8.24	2.59
80	2.50	0.18	48.98	15.42	57.22	18.01
120	3.00	0.13	226.72	71.36	283.94	89.37
170	3.50	0.09	32.45	10.21	316.39	99.58
200	3.75	0.07	1.22	0.38	317.61	99.97
230	4.00	0.06	0.07	0.02	317.68	99.99

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.28	2.96	2.90	2.72	2.55	2.43	2.08

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.7	0.15	0.32	-1.29	10.42

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
S02	—●—		SP	#200 - 0.26 #230 - 0.05			2.65	2.48	-3.35	17.21	0.78

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,652
Northing (Y, ft):	1,957,809
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

TAYLOR ENGINEERING, INC.

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: S02

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,652	1,957,809	Florida State Plane East	

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-7/1	

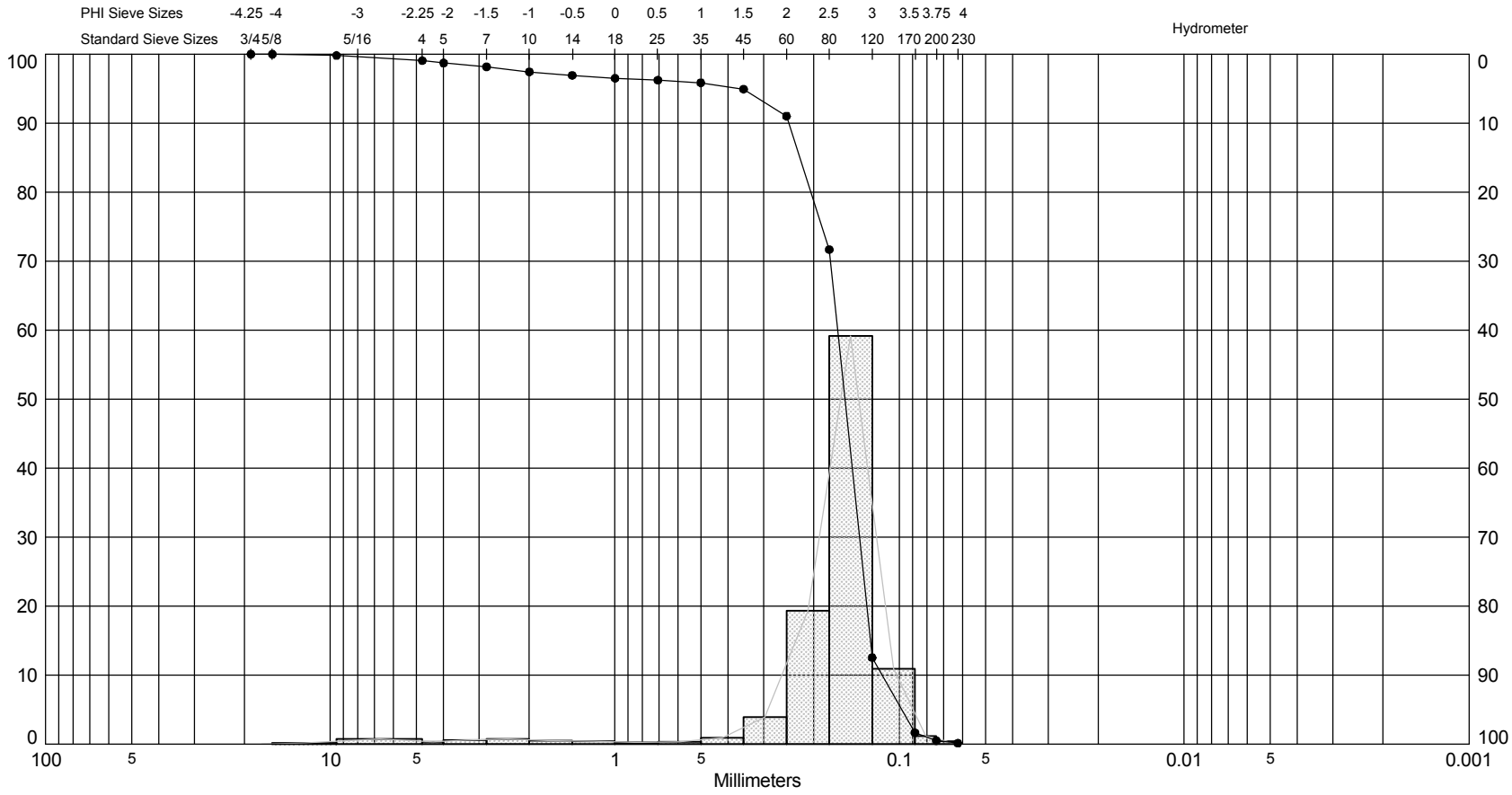
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
327.77	327.65	0.05	0.00	#200 - 0.26 #230 - 0.05			

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
3/8"	-3.25	9.51	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.79	0.24	0.79	0.24
5	-2.00	4.00	0.30	0.09	1.09	0.33
7	-1.50	2.83	1.27	0.39	2.36	0.72
10	-1.00	2.00	2.39	0.73	4.75	1.45
14	-0.50	1.41	2.70	0.82	7.45	2.27
18	0.00	1.00	2.44	0.74	9.89	3.02
25	0.50	0.71	1.76	0.54	11.65	3.55
35	1.00	0.50	2.46	0.75	14.11	4.30
45	1.50	0.35	3.76	1.15	17.87	5.45
60	2.00	0.25	16.72	5.10	34.59	10.55
80	2.50	0.18	74.82	22.83	109.41	33.38
120	3.00	0.13	184.60	56.32	294.01	89.70
170	3.50	0.09	30.70	9.37	324.71	99.07
200	3.75	0.07	2.20	0.67	326.91	99.74
230	4.00	0.06	0.68	0.21	327.59	99.95

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.28	2.95	2.87	2.65	2.32	2.12	1.30

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.48	0.18	0.78	-3.35	17.21

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
S03	—●—		SW	#200 - 0.51 #230 - 0.13			2.68	2.5	-3.87	20.52	0.91

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,837
Northing (Y, ft):	1,957,772
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: S03

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,837	1,957,772	Florida State Plane East	

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

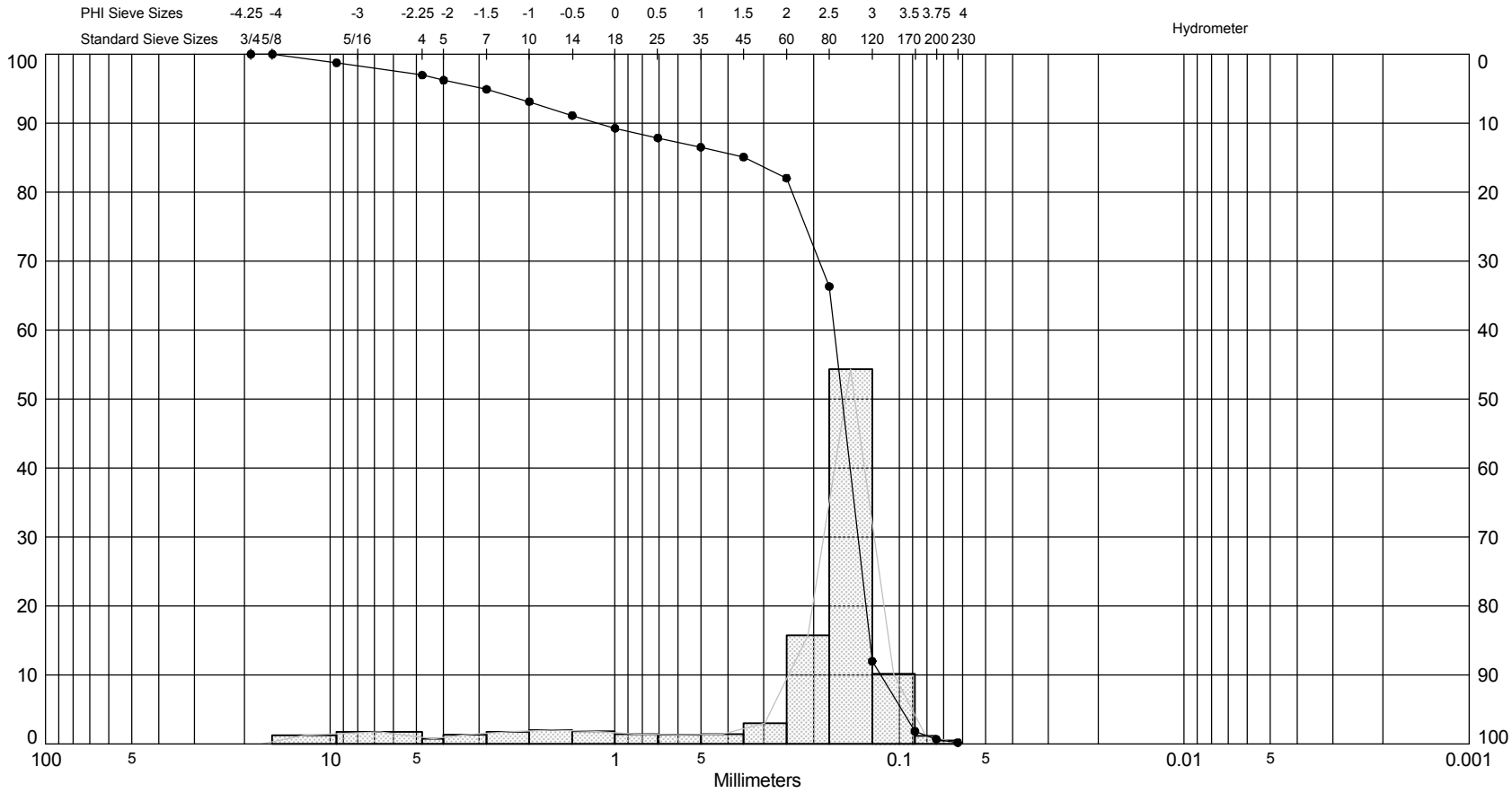
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
316.71	316.48	0.19	0.00	#200 - 0.51 #230 - 0.13			

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
3/8"	-3.25	9.51	0.64	0.20	0.64	0.20
4	-2.25	4.76	2.32	0.73	2.96	0.93
5	-2.00	4.00	1.09	0.34	4.05	1.28
7	-1.50	2.83	1.79	0.57	5.84	1.84
10	-1.00	2.00	2.28	0.72	8.12	2.56
14	-0.50	1.41	1.59	0.50	9.71	3.07
18	0.00	1.00	1.30	0.41	11.01	3.48
25	0.50	0.71	0.92	0.29	11.93	3.77
35	1.00	0.50	1.18	0.37	13.11	4.14
45	1.50	0.35	2.90	0.92	16.01	5.06
60	2.00	0.25	12.40	3.92	28.41	8.97
80	2.50	0.18	61.24	19.34	89.65	28.31
120	3.00	0.13	187.36	59.16	277.01	87.46
170	3.50	0.09	34.50	10.89	311.51	98.36
200	3.75	0.07	3.58	1.13	315.09	99.49
230	4.00	0.06	1.20	0.38	316.29	99.87

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.35	2.97	2.89	2.68	2.41	2.18	1.47

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.5	0.18	0.91	-3.87	20.52

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
S04	—●—		SW	#200 - 0.68 #230 - 0.20			2.65	2.15	-2.32	7.75	1.46

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	577,038
Northing (Y, ft):	1,957,735
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: S04

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
577,038	1,957,735	Florida State Plane East	

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

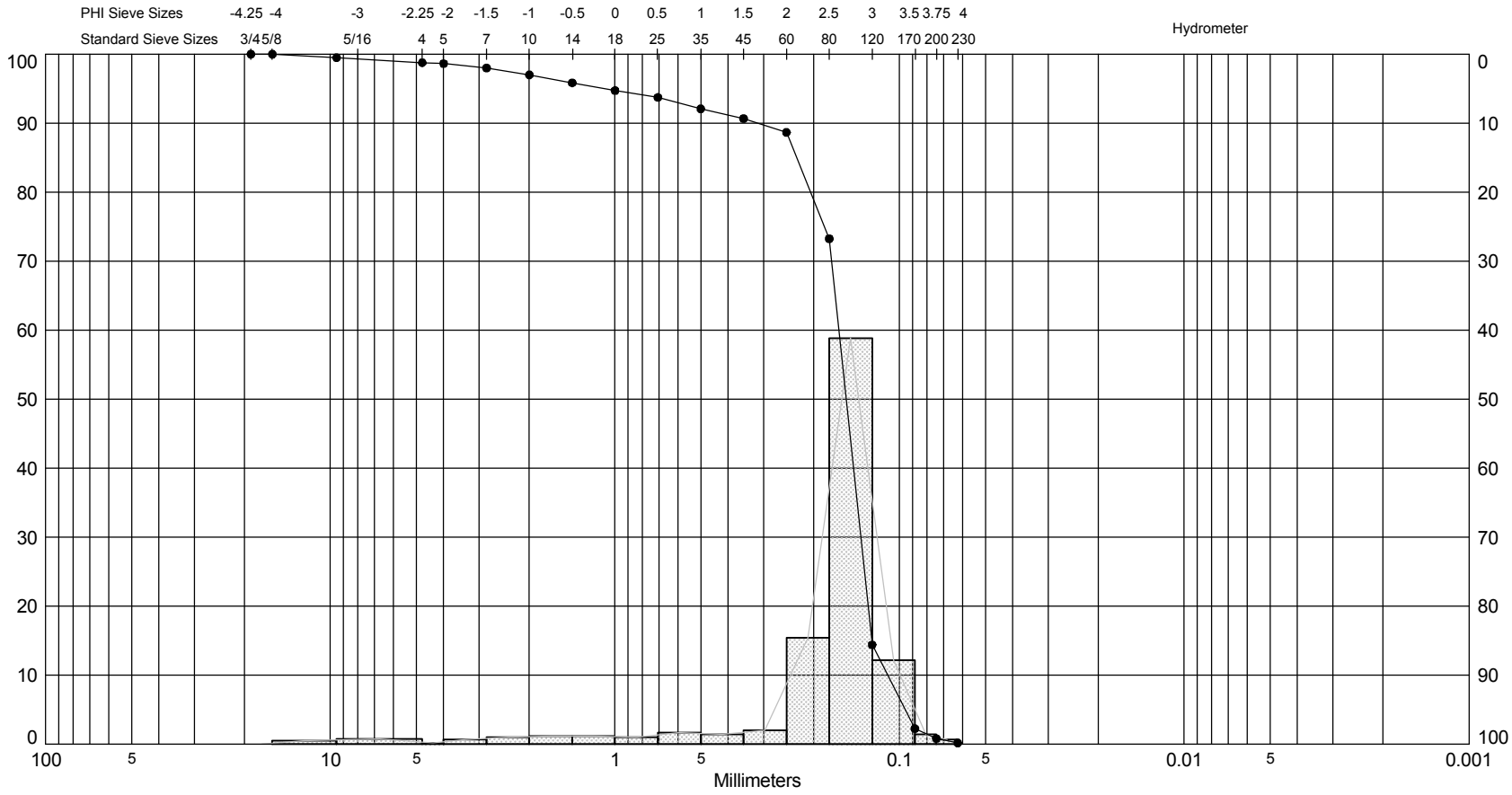
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
325.97	325.70	0.37	0.01	#200 - 0.68 #230 - 0.20			

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
3/8"	-3.25	9.51	4.08	1.25	4.08	1.25
4	-2.25	4.76	5.84	1.79	9.92	3.04
5	-2.00	4.00	2.39	0.73	12.31	3.78
7	-1.50	2.83	4.30	1.32	16.61	5.10
10	-1.00	2.00	5.81	1.78	22.42	6.88
14	-0.50	1.41	6.55	2.01	28.97	8.89
18	0.00	1.00	6.02	1.85	34.99	10.73
25	0.50	0.71	4.57	1.40	39.56	12.14
35	1.00	0.50	4.39	1.35	43.95	13.48
45	1.50	0.35	4.70	1.44	48.65	14.92
60	2.00	0.25	9.90	3.04	58.55	17.96
80	2.50	0.18	51.28	15.73	109.83	33.69
120	3.00	0.13	177.09	54.33	286.92	88.02
170	3.50	0.09	33.05	10.14	319.97	98.16
200	3.75	0.07	3.78	1.16	323.75	99.32
230	4.00	0.06	1.56	0.48	325.31	99.80

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.34	2.96	2.88	2.65	2.22	1.68	-1.54

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.15	0.23	1.46	-2.32	7.75

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
S05	—●—		SW	#200 - 0.80 #230 - 0.16			2.7	2.43	-3.13	13.95	1.07

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	577,217
Northing (Y, ft):	1,957,704
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: S05

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
577,217	1,957,704	Florida State Plane East	

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

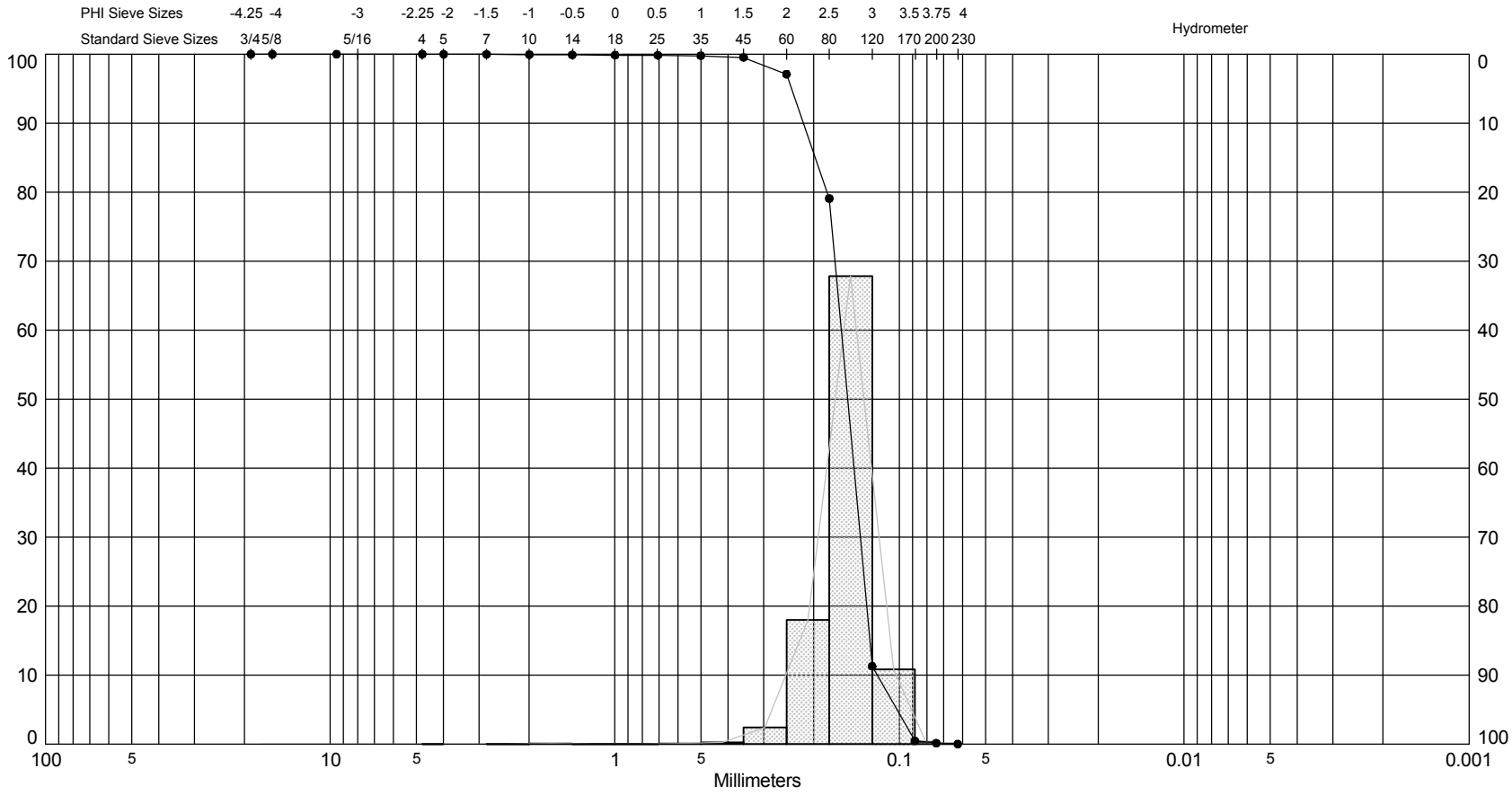
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
322.52	322.03	0.04	0.00	#200 - 0.80 #230 - 0.16			

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
3/8"	-3.25	9.51	1.60	0.50	1.60	0.50
4	-2.25	4.76	2.34	0.73	3.94	1.22
5	-2.00	4.00	0.47	0.15	4.41	1.37
7	-1.50	2.83	2.03	0.63	6.44	2.00
10	-1.00	2.00	3.21	1.00	9.65	2.99
14	-0.50	1.41	3.74	1.16	13.39	4.15
18	0.00	1.00	3.65	1.13	17.04	5.28
25	0.50	0.71	3.19	0.99	20.23	6.27
35	1.00	0.50	5.30	1.64	25.53	7.92
45	1.50	0.35	4.58	1.42	30.11	9.34
60	2.00	0.25	6.43	1.99	36.54	11.33
80	2.50	0.18	49.75	15.43	86.29	26.75
120	3.00	0.13	189.85	58.86	276.14	85.62
170	3.50	0.09	39.16	12.14	315.30	97.76
200	3.75	0.07	4.63	1.44	319.93	99.20
230	4.00	0.06	2.06	0.64	321.99	99.84

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.39	2.99	2.91	2.70	2.44	2.15	-0.12

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.43	0.19	1.07	-3.13	13.95

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
S06	—●—		SP	#200 - 0.13 #230 - 0.01			2.71	2.68	-2.12	21.78	0.35

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,217
Northing (Y, ft):	1,957,361
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

TAYLOR ENGINEERING, INC.

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

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Project Name: Summer Haven Beach Sand

Sample Name: S06

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,217	1,957,361	Florida State Plane East	

USCS:	Munsell:	Comments:
SP	Wet - 2.5YR-7/2	

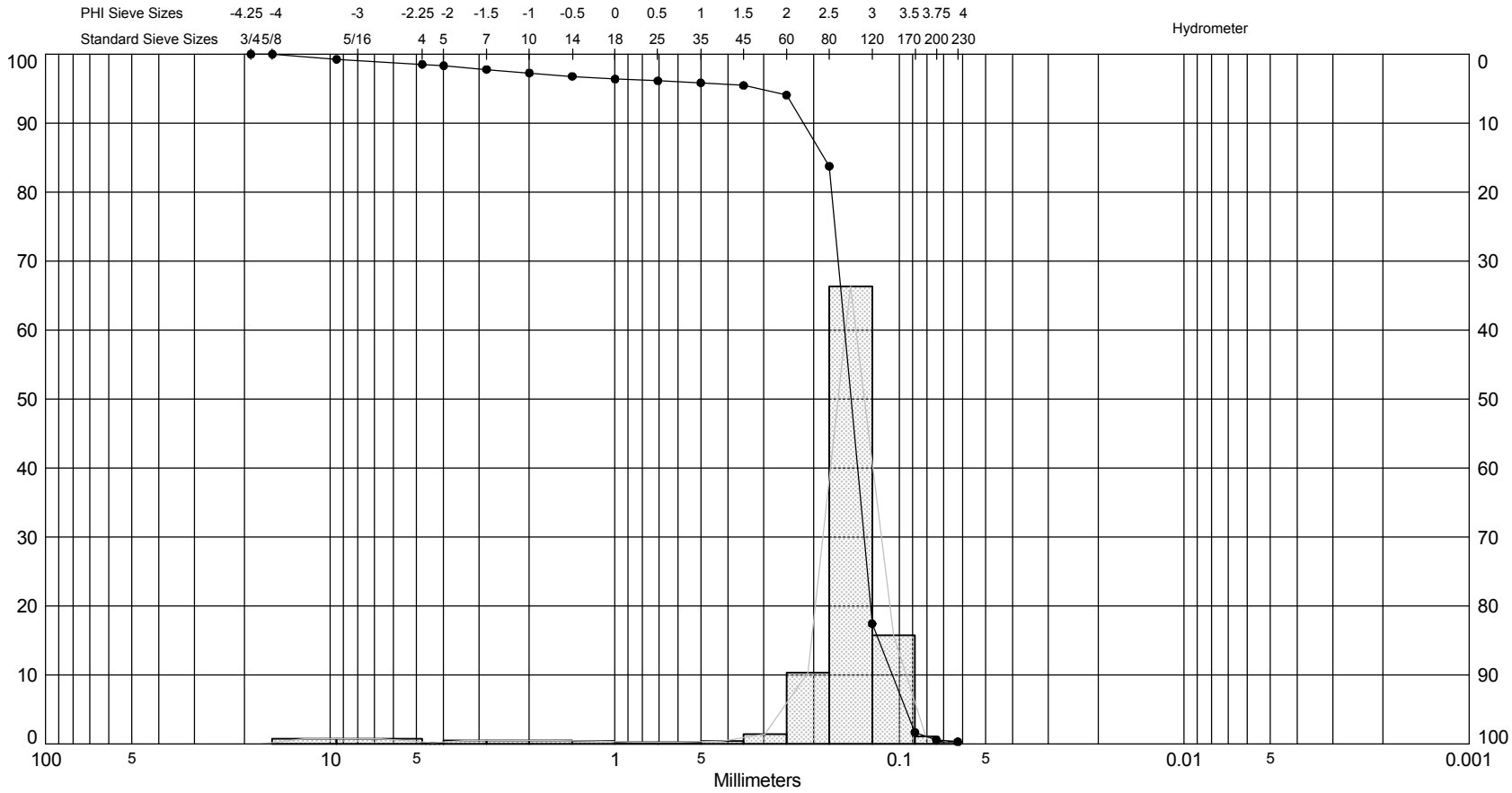
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
321.42	321.39	0.00	0.00	#200 - 0.13 #230 - 0.01			

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
3/8"	-3.25	9.51	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	0.02	0.05	0.02
7	-1.50	2.83	0.02	0.01	0.07	0.02
10	-1.00	2.00	0.09	0.03	0.16	0.05
14	-0.50	1.41	0.16	0.05	0.32	0.10
18	0.00	1.00	0.10	0.03	0.42	0.13
25	0.50	0.71	0.06	0.02	0.48	0.15
35	1.00	0.50	0.20	0.06	0.68	0.21
45	1.50	0.35	0.81	0.25	1.49	0.46
60	2.00	0.25	7.79	2.42	9.28	2.89
80	2.50	0.18	57.93	18.02	67.21	20.91
120	3.00	0.13	217.91	67.80	285.12	88.71
170	3.50	0.09	34.81	10.83	319.93	99.54
200	3.75	0.07	1.08	0.34	321.01	99.87
230	4.00	0.06	0.38	0.12	321.39	99.99

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.29	2.97	2.90	2.71	2.53	2.36	2.06

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.68	0.16	0.35	-2.12	21.78

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
S07	—●—		SW	#200 - 0.62 #230 - 0.30			2.75	2.59	-4.37	23.95	0.98

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,365
Northing (Y, ft):	1,957,318
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: S07

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,365	1,957,318	Florida State Plane East	

USCS:	Munsell:	Comments:
SW	Wet - 2.5YR-7/2	

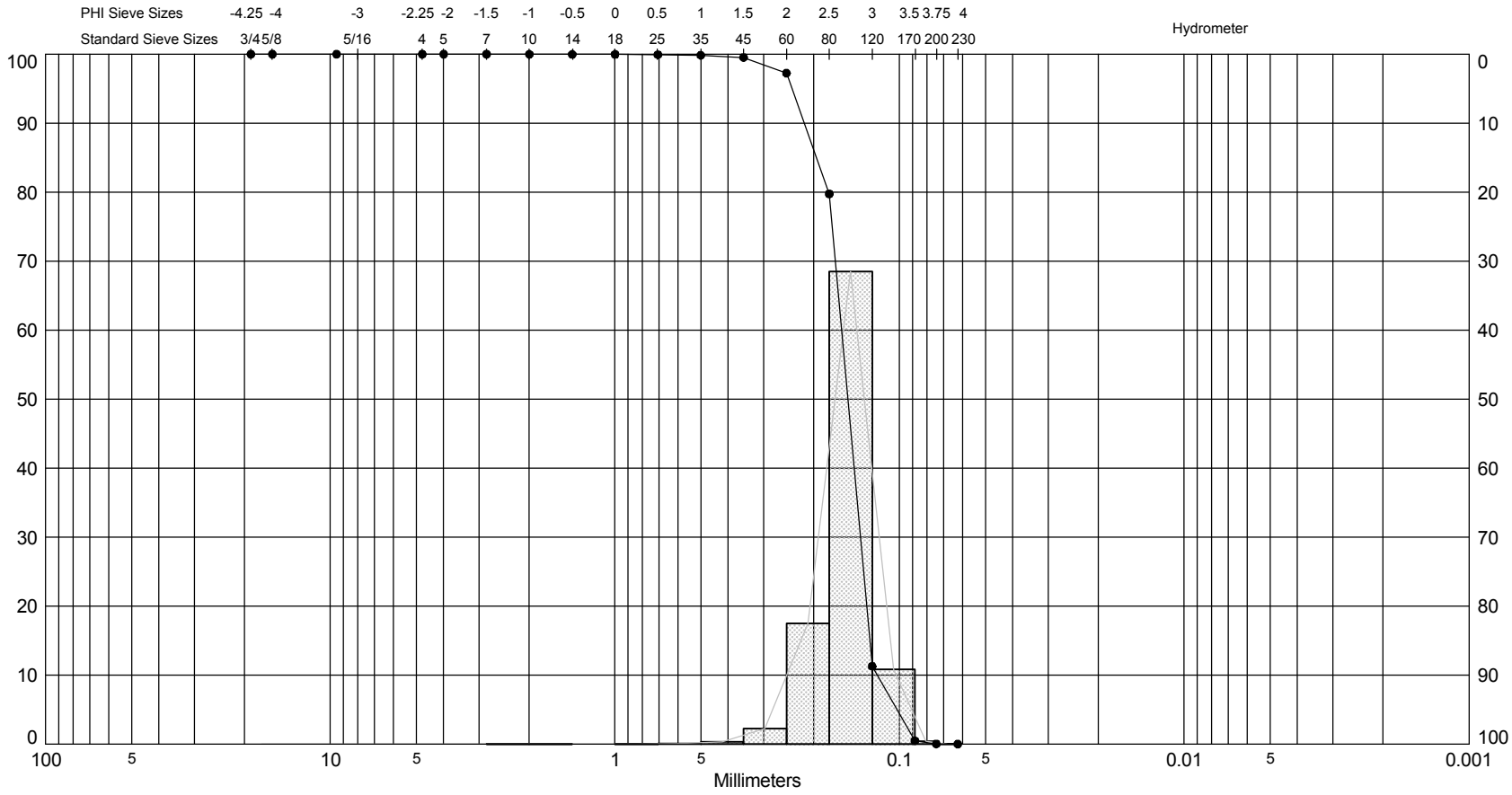
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
324.98	324.27	0.28	0.00	#200 - 0.62 #230 - 0.30			

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
3/8"	-3.25	9.51	2.41	0.74	2.41	0.74
4	-2.25	4.76	2.38	0.73	4.79	1.47
5	-2.00	4.00	0.64	0.20	5.43	1.67
7	-1.50	2.83	1.74	0.54	7.17	2.21
10	-1.00	2.00	1.67	0.51	8.84	2.72
14	-0.50	1.41	1.60	0.49	10.44	3.21
18	0.00	1.00	1.29	0.40	11.73	3.61
25	0.50	0.71	0.84	0.26	12.57	3.87
35	1.00	0.50	0.91	0.28	13.48	4.15
45	1.50	0.35	1.26	0.39	14.74	4.54
60	2.00	0.25	4.52	1.39	19.26	5.93
80	2.50	0.18	33.52	10.31	52.78	16.24
120	3.00	0.13	215.54	66.32	268.32	82.57
170	3.50	0.09	51.19	15.75	319.51	98.32
200	3.75	0.07	3.45	1.06	322.96	99.38
230	4.00	0.06	1.03	0.32	323.99	99.70

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.39	3.05	2.94	2.75	2.57	2.49	1.67

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.59	0.17	0.98	-4.37	23.95

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
S08	—●—		SP	#200 - 0.03 #230 - 0.01			2.72	2.69	-1.29	11.24	0.33

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,502
Northing (Y, ft):	1,957,276
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

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Project Name: Summer Haven Beach Sand

Sample Name: S08

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,502	1,957,276	Florida State Plane East	

USCS:	Munsell:	Comments:
SP	Wet - 2.5YR-7/2	

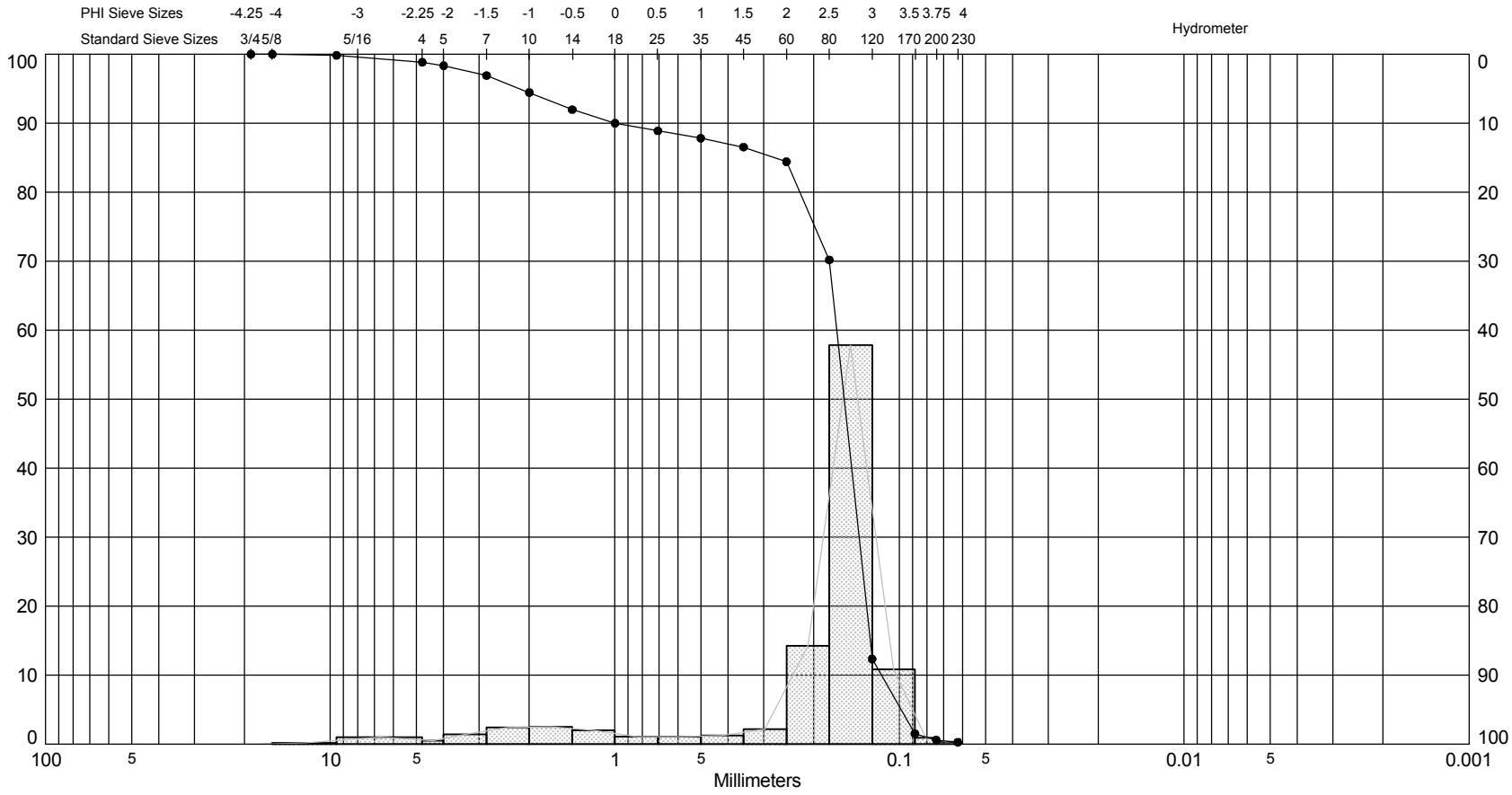
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
315.57	315.55	0.00	0.00	#200 - 0.03 #230 - 0.01			

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
3/8"	-3.25	9.51	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	0.02	0.06	0.02
14	-0.50	1.41	0.02	0.01	0.08	0.03
18	0.00	1.00	0.03	0.01	0.11	0.03
25	0.50	0.71	0.11	0.03	0.22	0.07
35	1.00	0.50	0.26	0.08	0.48	0.15
45	1.50	0.35	0.99	0.31	1.47	0.47
60	2.00	0.25	7.19	2.28	8.66	2.74
80	2.50	0.18	55.25	17.51	63.91	20.25
120	3.00	0.13	216.03	68.46	279.94	88.71
170	3.50	0.09	34.13	10.82	314.07	99.52
200	3.75	0.07	1.41	0.45	315.48	99.97
230	4.00	0.06	0.07	0.02	315.55	99.99

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.29	2.97	2.90	2.72	2.53	2.38	2.06

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.69	0.15	0.33	-1.29	11.24

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
S09	—●—		SW	#200 - 0.58 #230 - 0.28			2.67	2.26	-2.32	7.65	1.28

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,661
Northing (Y, ft):	1,957,239
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: S09

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,661	1,957,239	Florida State Plane East	

USCS:	Munsell:	Comments:
SW	Wet - 2.5YR-7/2	

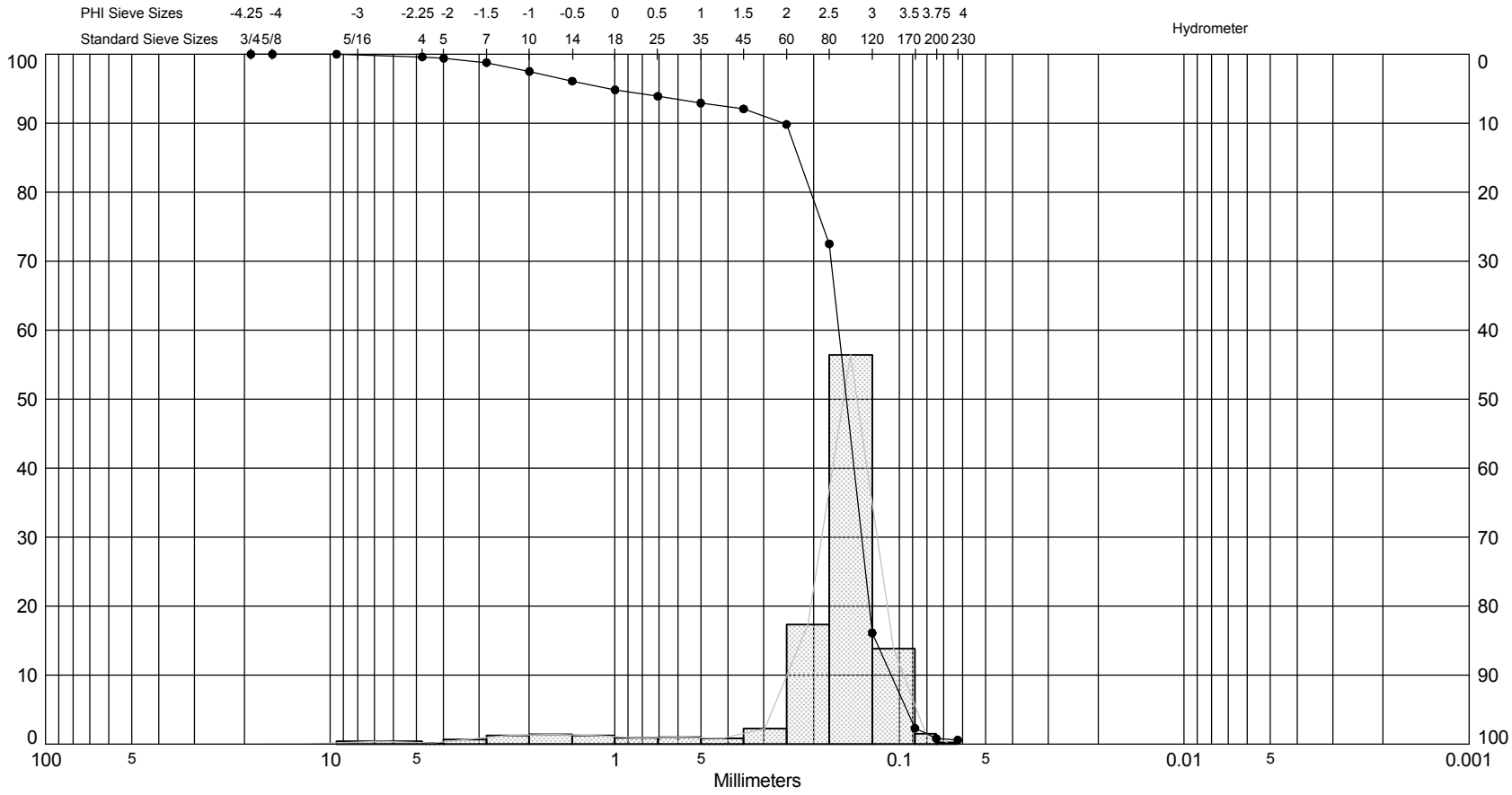
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
331.07	330.31	0.16	0.00	#200 - 0.58 #230 - 0.28			

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
3/8"	-3.25	9.51	0.55	0.17	0.55	0.17
4	-2.25	4.76	3.33	1.01	3.88	1.17
5	-2.00	4.00	1.62	0.49	5.50	1.66
7	-1.50	2.83	4.77	1.44	10.27	3.10
10	-1.00	2.00	8.09	2.44	18.36	5.55
14	-0.50	1.41	8.25	2.49	26.61	8.04
18	0.00	1.00	6.50	1.96	33.11	10.00
25	0.50	0.71	3.70	1.12	36.81	11.12
35	1.00	0.50	3.50	1.06	40.31	12.18
45	1.50	0.35	4.24	1.28	44.55	13.46
60	2.00	0.25	7.07	2.14	51.62	15.59
80	2.50	0.18	47.07	14.22	98.69	29.81
120	3.00	0.13	191.55	57.86	290.24	87.67
170	3.50	0.09	35.81	10.82	326.05	98.48
200	3.75	0.07	3.10	0.94	329.15	99.42
230	4.00	0.06	1.00	0.30	330.15	99.72

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.34	2.97	2.89	2.67	2.33	2.01	-1.11

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.26	0.21	1.28	-2.32	7.65

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
S10	—●—		SW	#200 - 0.81 #230 - 0.59			2.7	2.47	-2.94	12.3	0.97

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,835
Northing (Y, ft):	1,957,196
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: S10

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,835	1,957,196	Florida State Plane East	

USCS:	Munsell:	Comments:
SW	Wet - 2.5YR-7/2	

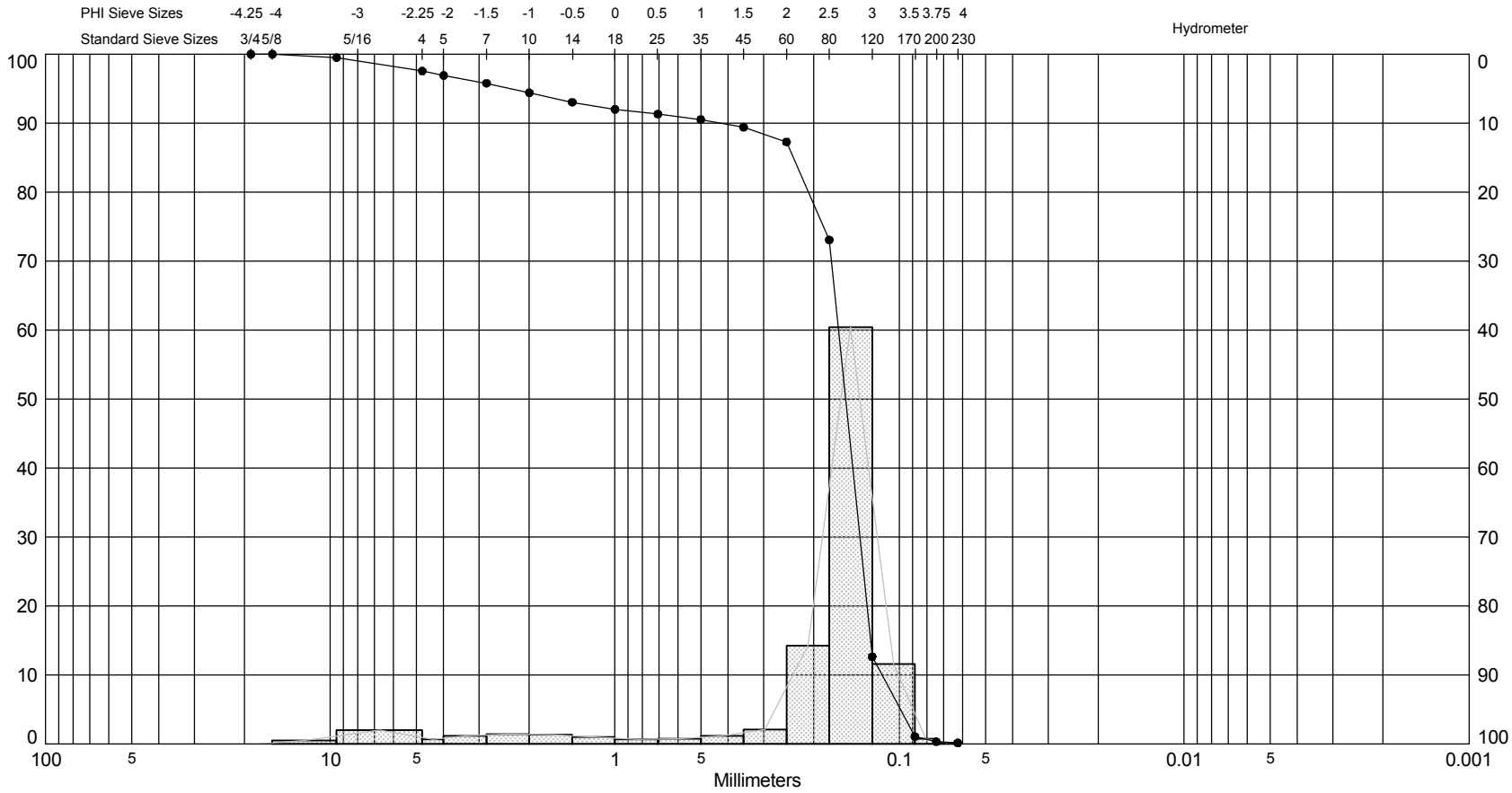
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
328.61	326.76	0.09	0.00	#200 - 0.81 #230 - 0.59			

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
3/8"	-3.25	9.51	0.00	0.00	0.00	0.00
4	-2.25	4.76	1.27	0.39	1.27	0.39
5	-2.00	4.00	0.68	0.21	1.95	0.59
7	-1.50	2.83	2.06	0.63	4.01	1.22
10	-1.00	2.00	4.21	1.28	8.22	2.50
14	-0.50	1.41	4.59	1.40	12.81	3.90
18	0.00	1.00	4.14	1.26	16.95	5.16
25	0.50	0.71	3.10	0.94	20.05	6.10
35	1.00	0.50	3.26	0.99	23.31	7.09
45	1.50	0.35	2.78	0.85	26.09	7.94
60	2.00	0.25	7.35	2.24	33.44	10.18
80	2.50	0.18	56.90	17.32	90.34	27.49
120	3.00	0.13	185.33	56.40	275.67	83.89
170	3.50	0.09	45.39	13.81	321.06	97.70
200	3.75	0.07	4.90	1.49	325.96	99.19
230	4.00	0.06	0.71	0.22	326.67	99.41

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.40	3.00	2.92	2.70	2.43	2.17	-0.06

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.47	0.18	0.97	-2.94	12.3

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
S11	—●—		SW	#200 - 0.32 #230 - 0.14			2.69	2.32	-2.82	10.45	1.29

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Summer Haven Beach Sand
Analysis Date:	12-31-08
Analyzed By:	Universal Engineering Sciences
Easting (X, ft):	576,994
Northing (Y, ft):	1,957,165
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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SIEVE ANALYSIS DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

Granularmetric Report

Depths and elevations based on measured values

Project Name: Summer Haven Beach Sand

Sample Name: S11

Analysis Date: 12-31-08

Analyzed By: Universal Engineering Sciences

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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
576,994	1,957,165	Florida State Plane East	

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

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
330.68	330.46	0.23	0.00	#200 - 0.32 #230 - 0.14			

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
3/8"	-3.25	9.51	1.61	0.49	1.61	0.49
4	-2.25	4.76	6.48	1.96	8.09	2.45
5	-2.00	4.00	2.08	0.63	10.17	3.08
7	-1.50	2.83	3.75	1.13	13.92	4.21
10	-1.00	2.00	4.59	1.39	18.51	5.60
14	-0.50	1.41	4.50	1.36	23.01	6.96
18	0.00	1.00	3.45	1.04	26.46	8.00
25	0.50	0.71	2.25	0.68	28.71	8.68
35	1.00	0.50	2.57	0.78	31.28	9.46
45	1.50	0.35	3.76	1.14	35.04	10.60
60	2.00	0.25	6.98	2.11	42.02	12.71
80	2.50	0.18	47.05	14.23	89.07	26.94
120	3.00	0.13	199.84	60.43	288.91	87.37
170	3.50	0.09	38.27	11.57	327.18	98.94
200	3.75	0.07	2.45	0.74	329.63	99.68
230	4.00	0.06	0.59	0.18	330.22	99.86

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.33	2.97	2.90	2.69	2.43	2.12	-1.22

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.32	0.20	1.29	-2.82	10.45

GRANULARMETRIC REPORT DMMA SJ-1 SAMPLES.GPJ FL DEP ROSS.GDT 3/1/10

APPENDIX D

Beach and Borrow Area Pre and Post Carbonate Removal Tables and Curves (Ellis & Associates)

Ellis & Associates Inc.

SUMMARY OF GRADATION TEST RESULTS
(Pre-Calcium Carbonate Removed)

Project: Summer Haven
Client: Taylor Engineering, Inc.
Project No.: 0405-0020

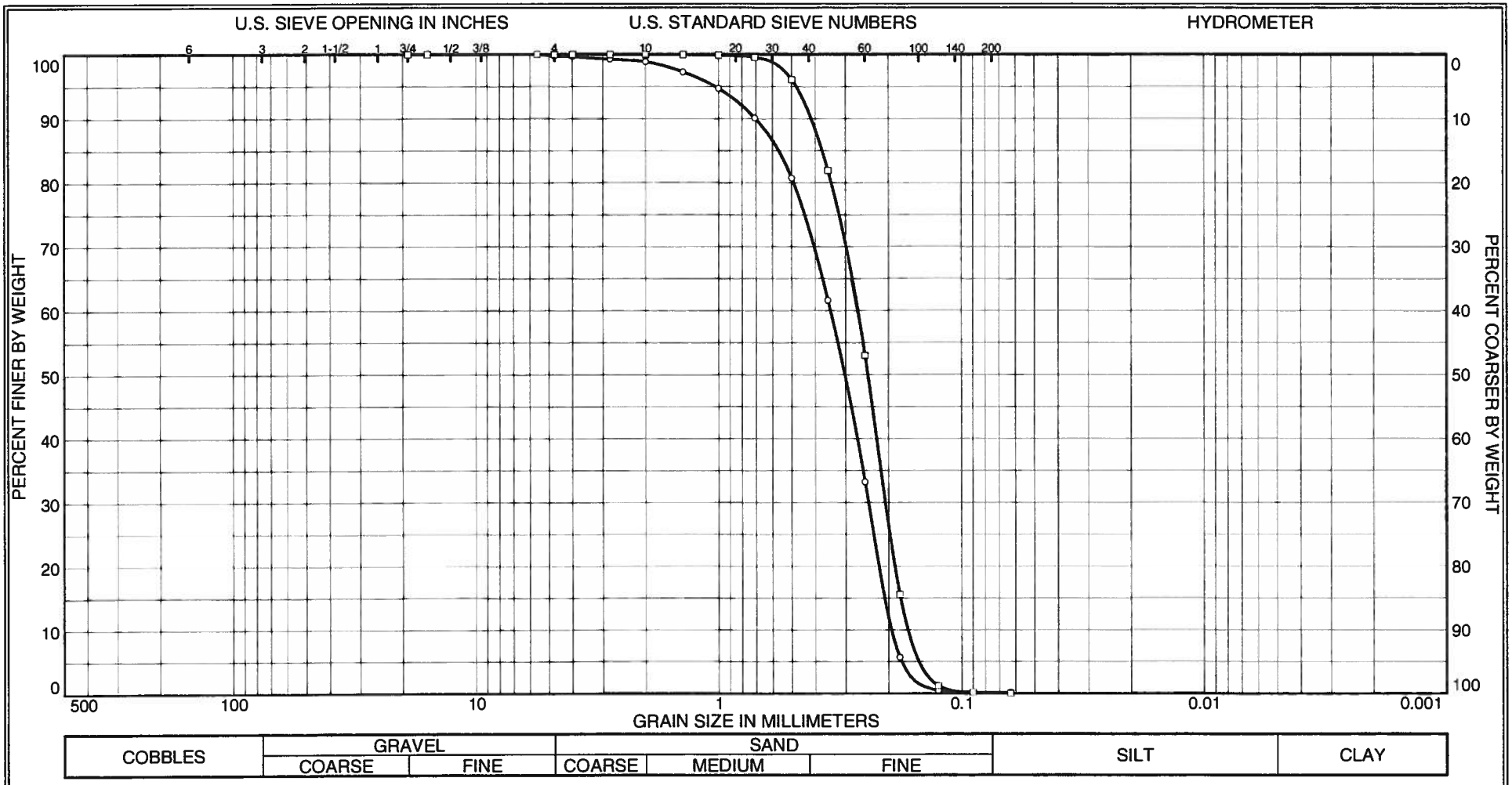
Sample No.	GRADATION TESTS Percent Passing , %																	Calcium Carbonate
	3/4"	5/8"	No. 3.5	No. 4	No. 5	No. 7	No. 10	No. 14	No. 18	No. 25	No. 35	No. 45	No. 60	No. 80	No. 120	No. 170	No. 230	Content, %
R205 Mid Berm	100.0	100.0	100.0	99.8	99.7	99.3	98.9	97.3	94.7	90.1	80.7	61.6	33.2	5.7	0.47	0.19	0.19	22.6
R205 Dune Toe	100.0	100.0	100.0	100.0	100.0	99.9	99.7	99.1	98.0	95.9	91.2	80.5	58.2	21.5	1.5	0.01	0.00	11.1
R205 Dune Veg	100.0	100.0	99.8	99.8	99.7	99.6	99.3	98.7	97.1	94.4	88.6	78.4	61.5	22.5	2.2	0.19	0.05	12.9
R205 Intertidal Zone	100.0	100.0	99.7	99.5	99.2	98.4	96.4	92.3	86.6	80.1	73.9	67.5	30.6	2.0	0.14	0.02	0.01	24.7
R205 Wading Depth	100.0	100.0	98.5	98.5	98.1	97.4	95.2	90.5	83.8	76.1	68.2	50.3	14.9	1.2	0.07	0.04	0.02	29.8
S01	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.9
S11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18.3
B2	100.0	100.0	99.7	99.4	99.2	98.5	97.6	96.7	96.2	95.6	95.0	94.4	92.2	55.4	12.4	1.6	0.40	7.2
S05	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.4	97.6	47.3	10.5	0.7	0.09	1.6
S07	100.0	100.0	100.0	100.0	99.9	99.8	99.6	99.4	99.3	99.1	99.0	98.9	98.3	76.4	13.7	0.9	0.13	1.8

Ellis & Associates Inc.

SUMMARY OF GRADATION TEST RESULTS
(Post-Calcium Carbonate Removed)

Project: Summer Haven
Client: Taylor Engineering, Inc.
Project No.: 0405-0020

Sample No.	GRADATION TESTS Percent Passing , %																
	3/4"	5/8"	No. 3.5	No. 4	No. 5	No. 7	No. 10	No. 14	No. 18	No. 25	No. 35	No. 45	No. 60	No. 80	No. 120	No. 170	No. 230
R205 Mid Berm	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.6	96.1	81.9	53.0	15.6	1.23	0.18	0.08
R205 Dune Toe	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.6	97.5	89.5	70.4	31.0	2.8	0.18	0.09
R205 Dune Veg	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.5	96.8	88.2	70.4	30.3	2.5	0.28	0.17
R205 Intertidal Zone	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	99.0	96.1	91.5	78.9	25.3	1.67	0.26	0.14
R205 Wading Depth	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.0	94.9	87.5	73.3	30.1	2.24	0.13	0.11
B2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	99.3	97.5	73.5	13.9	1.45	0.24
S05	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.7	97.9	58.2	10.8	0.62	0.05
S07	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.8	99.0	82.5	13.2	0.75	0.01



COBBLES	GRAVEL		SAND			SILT	CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE		

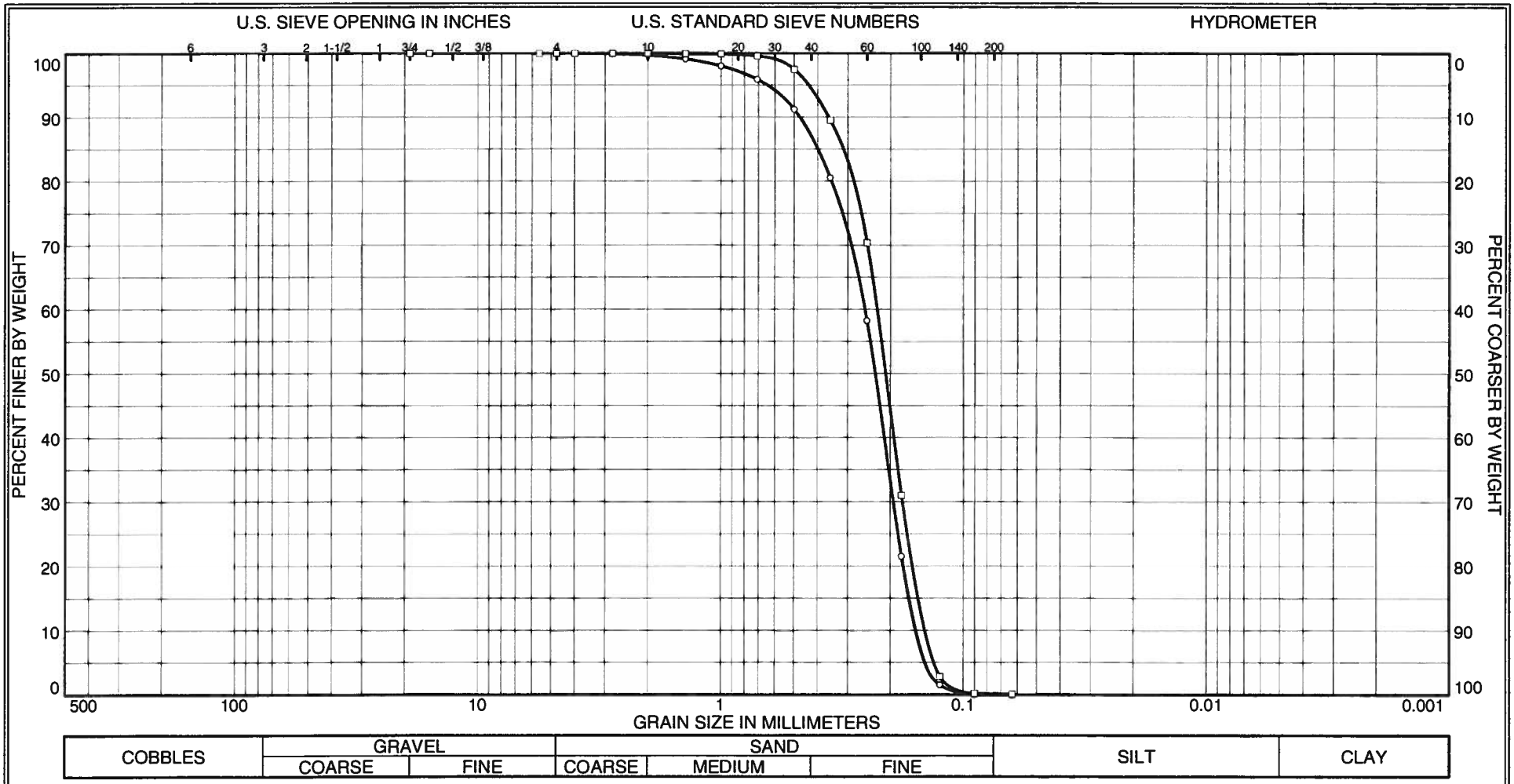
	LOCATION	SOURCE	SAMPLE #	DEPTH/ELEV.	MATERIAL DESCRIPTION
○	R205 Mid Berm, Pre-Calcium Carbonate Removed				Calcium Carbonate Content = 22.6%
□	R205 Mid Berm, Post-Calcium Carbonate Removed				

Project No. 0405-0020 **Client** Taylor Engineering, Inc.

Particle Size Distribution Report

Summer Haven

Ellis & Associates, Inc.



COBBLES	GRAVEL		SAND			SILT	CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE		

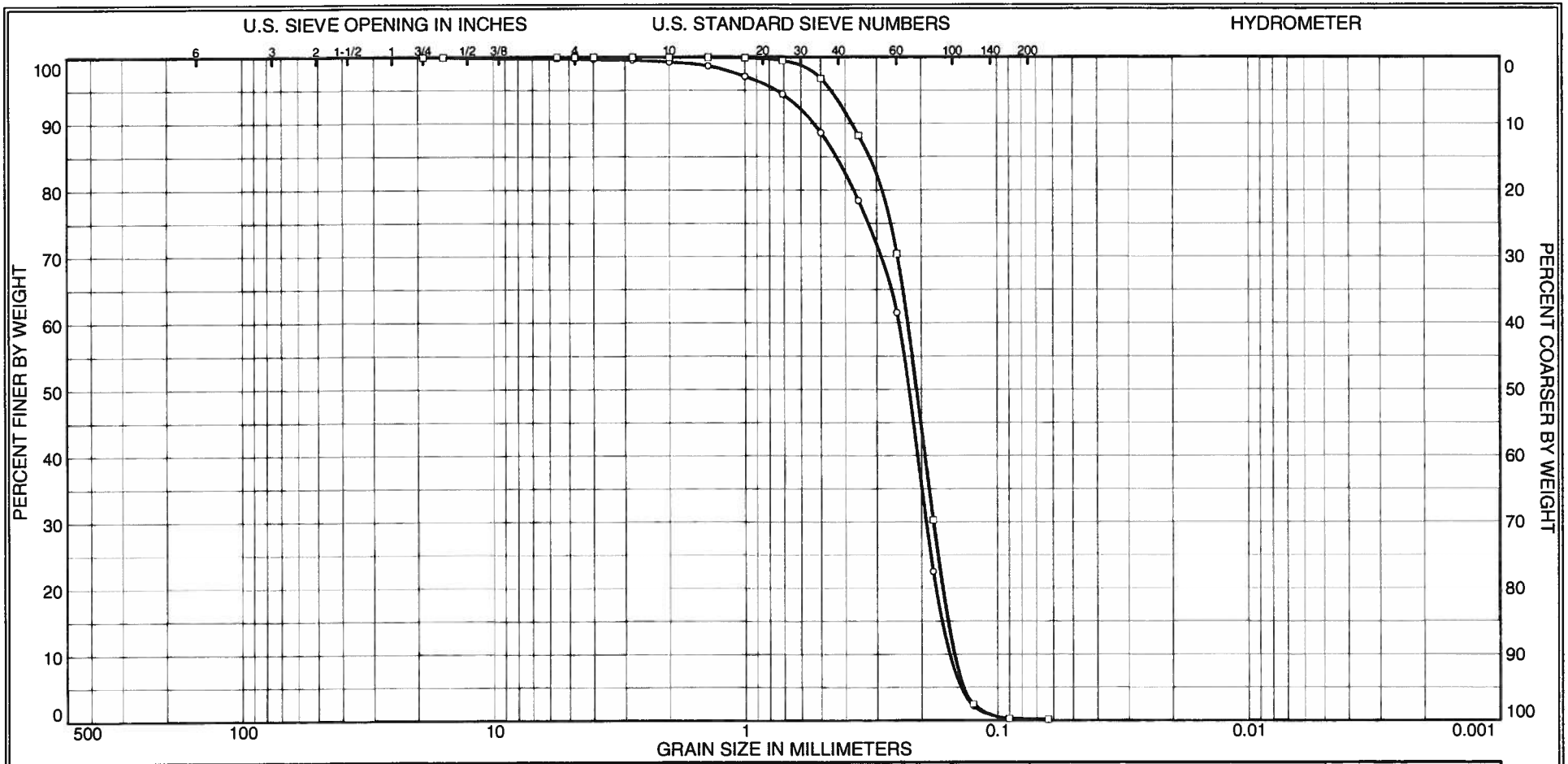
	LOCATION	SOURCE	SAMPLE #	DEPTH/ELEV.	MATERIAL DESCRIPTION
○	R205 Dune Toe, Pre-Calcium Carbonate Removed				Calcium Carbonate Content = 11.1%
□	R205 Dune Toe, Post-Calcium Carbonate Removed				

Project No. 0405-0020 **Client** Taylor Engineering, Inc.

Particle Size Distribution Report

Summer Haven

Ellis & Associates, Inc.



COBBLES	GRAVEL		SAND			SILT	CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE		

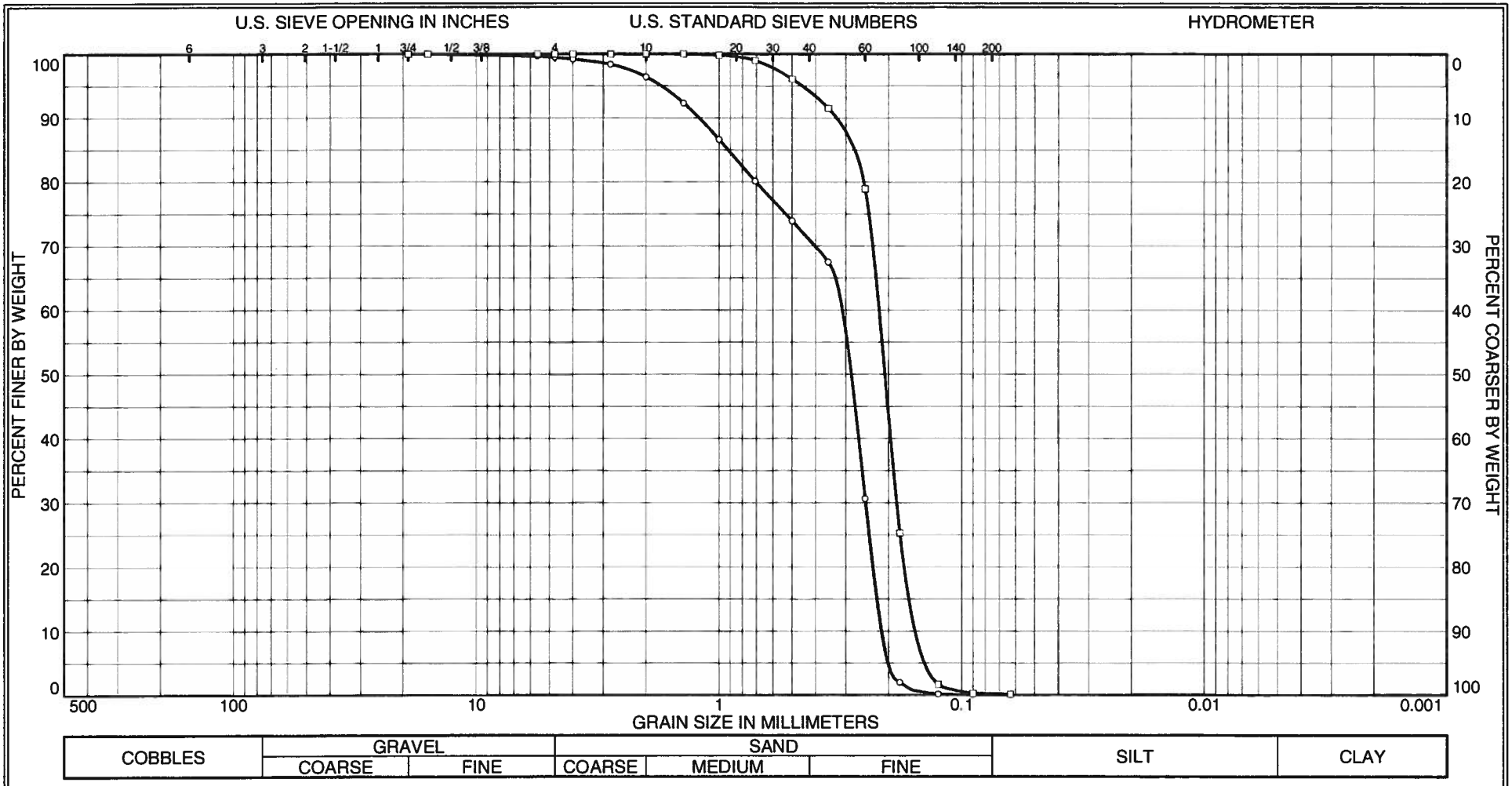
	LOCATION	SOURCE	SAMPLE #	DEPTH/ELEV.	MATERIAL DESCRIPTION
○	R205 Dune Veg, Pre-Calcium Carbonate Removed				Calcium Carbonate Content = 12.9%
□	R205 Dune Veg, Post-Calcium Carbonate Removed				

Project No. 0405-0020 **Client** Taylor Engineering, Inc.

Particle Size Distribution Report

Summer Haven

Ellis & Associates, Inc.



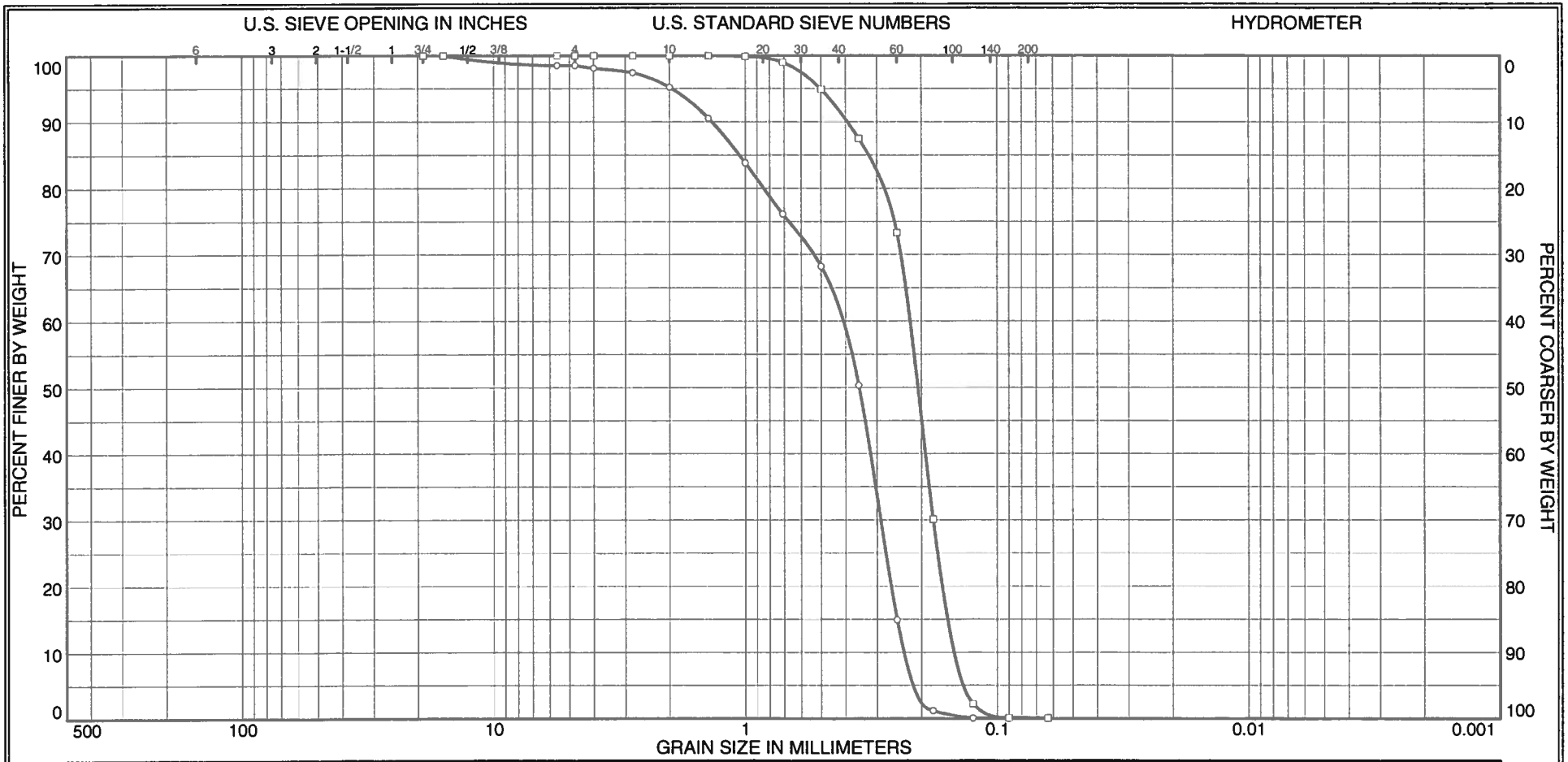
	LOCATION	SOURCE	SAMPLE #	DEPTH/ELEV.	MATERIAL DESCRIPTION
○	R205 Intertidal Zone, Pre-Calcium Carbonate				Calcium Carbonate Content = 24.7%
□	R205 Intertidal Zone, Post-Calcium Carbonate				

Project No. 0405-0020 **Client** Taylor Engineering, Inc.

Particle Size Distribution Report

Summer Haven

Ellis & Associates, Inc.



COBBLES	GRAVEL		SAND			SILT	CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE		

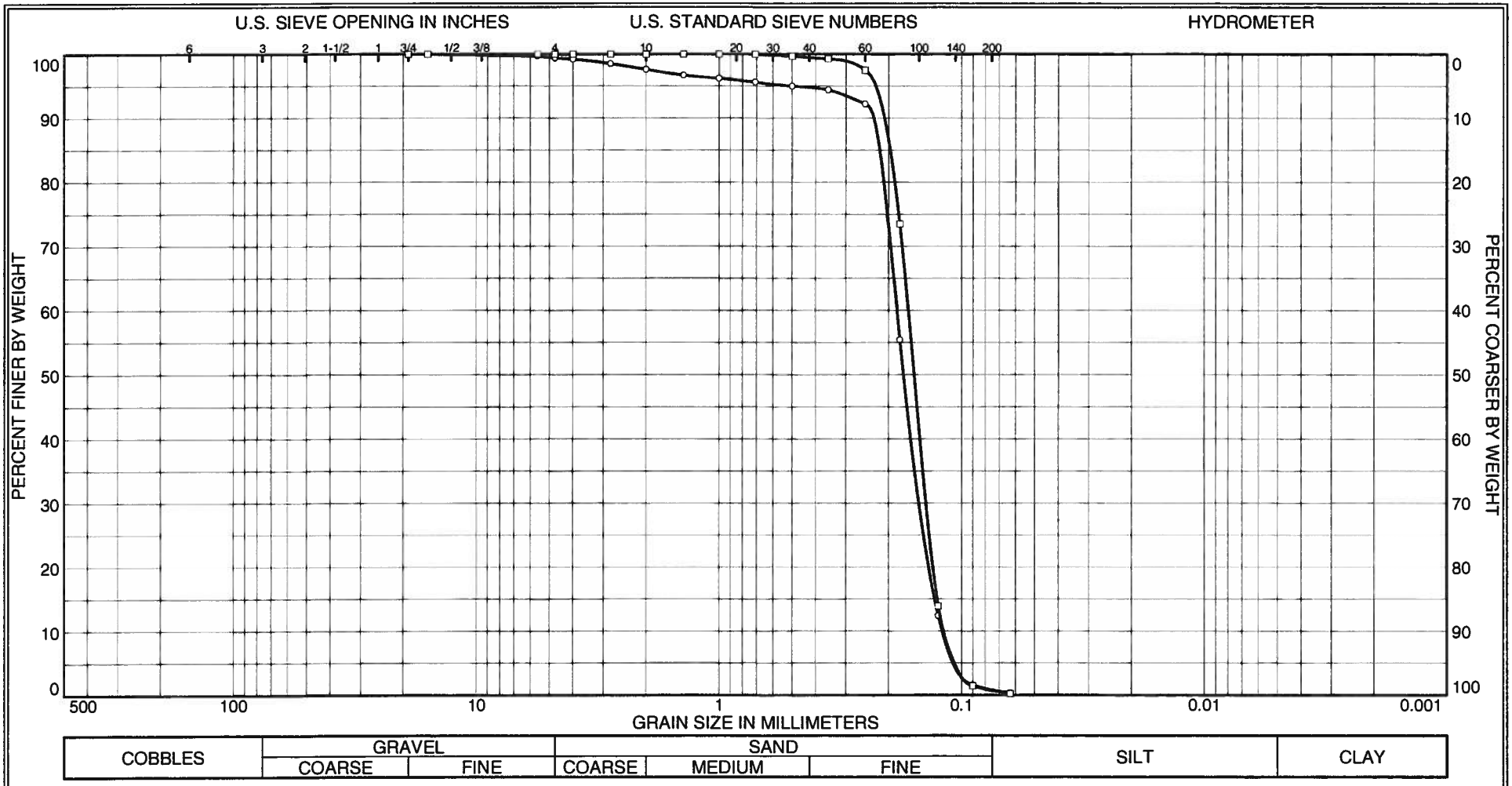
	LOCATION	SOURCE	SAMPLE #	DEPTH/ELEV.	MATERIAL DESCRIPTION
○	R205 Wading Depth, Pre-Calcium Carbonate				Calcium Carbonate Content = 29.8%
□	R205 Wading Depth, Post-Calcium Carbonate				

Project No. 0405-0020 **Client** Taylor Engineering, Inc.

Particle Size Distribution Report

Summer Haven

Ellis & Associates, Inc.



COBBLES	GRAVEL		SAND			SILT	CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE		

	LOCATION	SOURCE	SAMPLE #	DEPTH/ELEV.	MATERIAL DESCRIPTION
○	B2 Pre-Calcium Carbonate Removed				Calcium Carbonate Content = 7.2%
□	B2 Post-Calcium Carbonate Removed				

Project No. 0405-0020 **Client** Taylor Engineering, Inc.

Particle Size Distribution Report

Summer Haven

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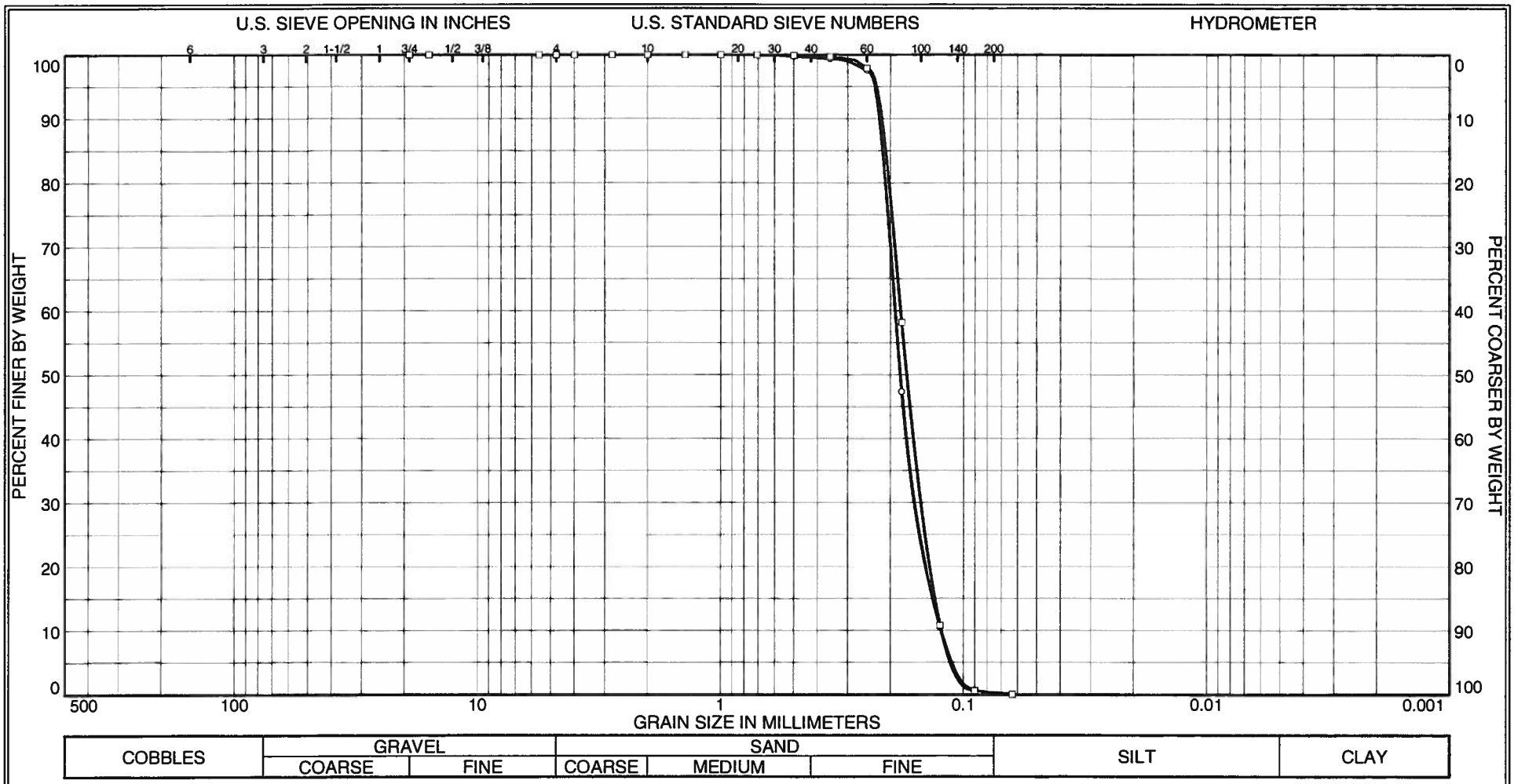


COBBLES	GRAVEL		SAND			SILT	CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE		

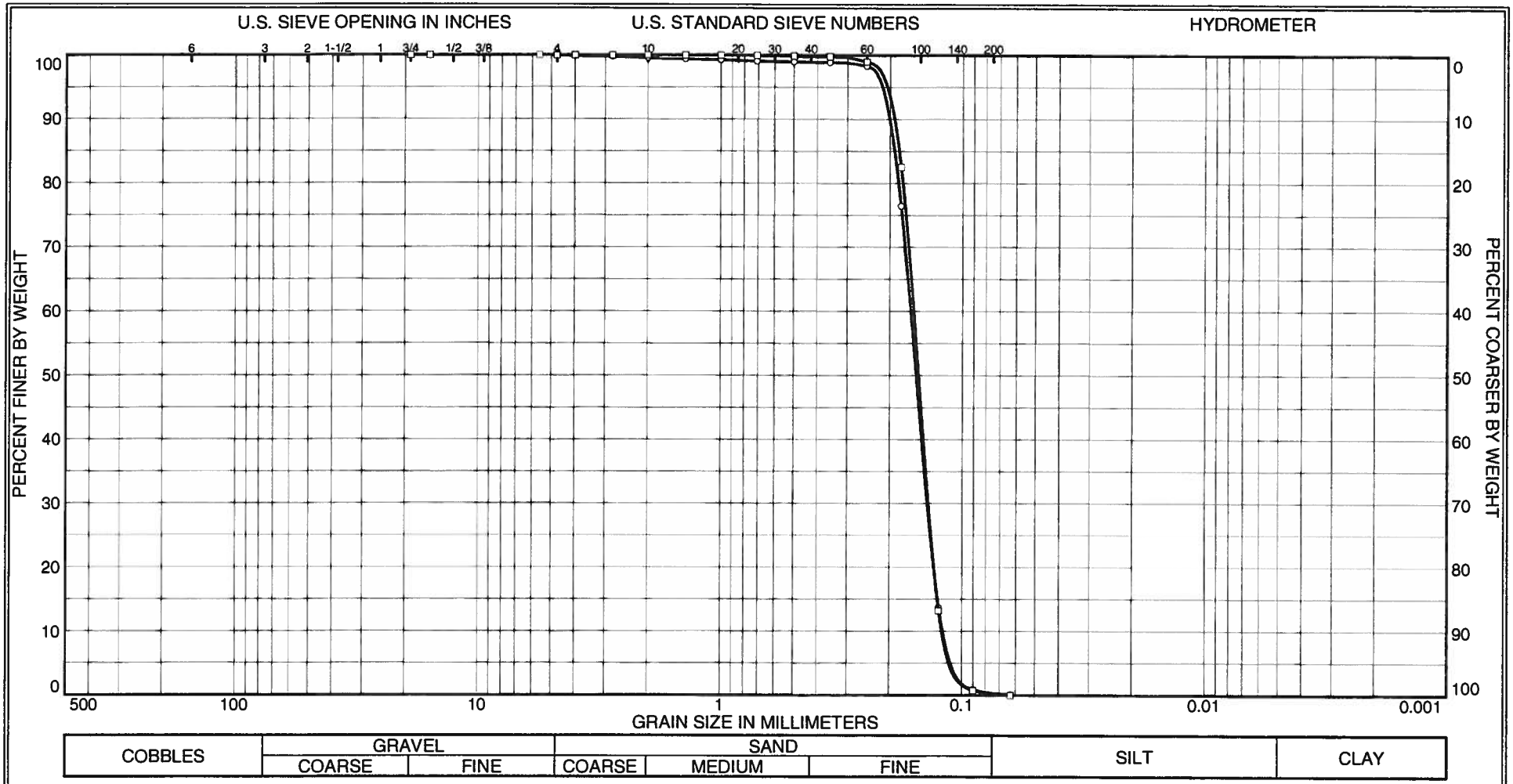
	LOCATION	SOURCE	SAMPLE #	DEPTH/ELEV.	MATERIAL DESCRIPTION
○	S05 Pre-Calcium Carbonate Removed				Calcium Carbonate Content = 1.6%
□	S05 Post-Calcium Carbonate Removed				

Project No. 0405-0020 **Client** Taylor Engineering, Inc.

Particle Size Distribution Report

Summer Haven

Ellis & Associates, Inc.



COBBLES	GRAVEL		SAND			SILT	CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE		

	LOCATION	SOURCE	SAMPLE #	DEPTH/ELEV.	MATERIAL DESCRIPTION
○	S07 Pre-Calcium Carbonate Removed				Calcium Carbonate Content = 1.8%
□	S07 Post-Calcium Carbonate Removed				

Project No. 0405-0020 **Client** Taylor Engineering, Inc.

Particle Size Distribution Report

Summer Haven

Ellis & Associates, Inc.