

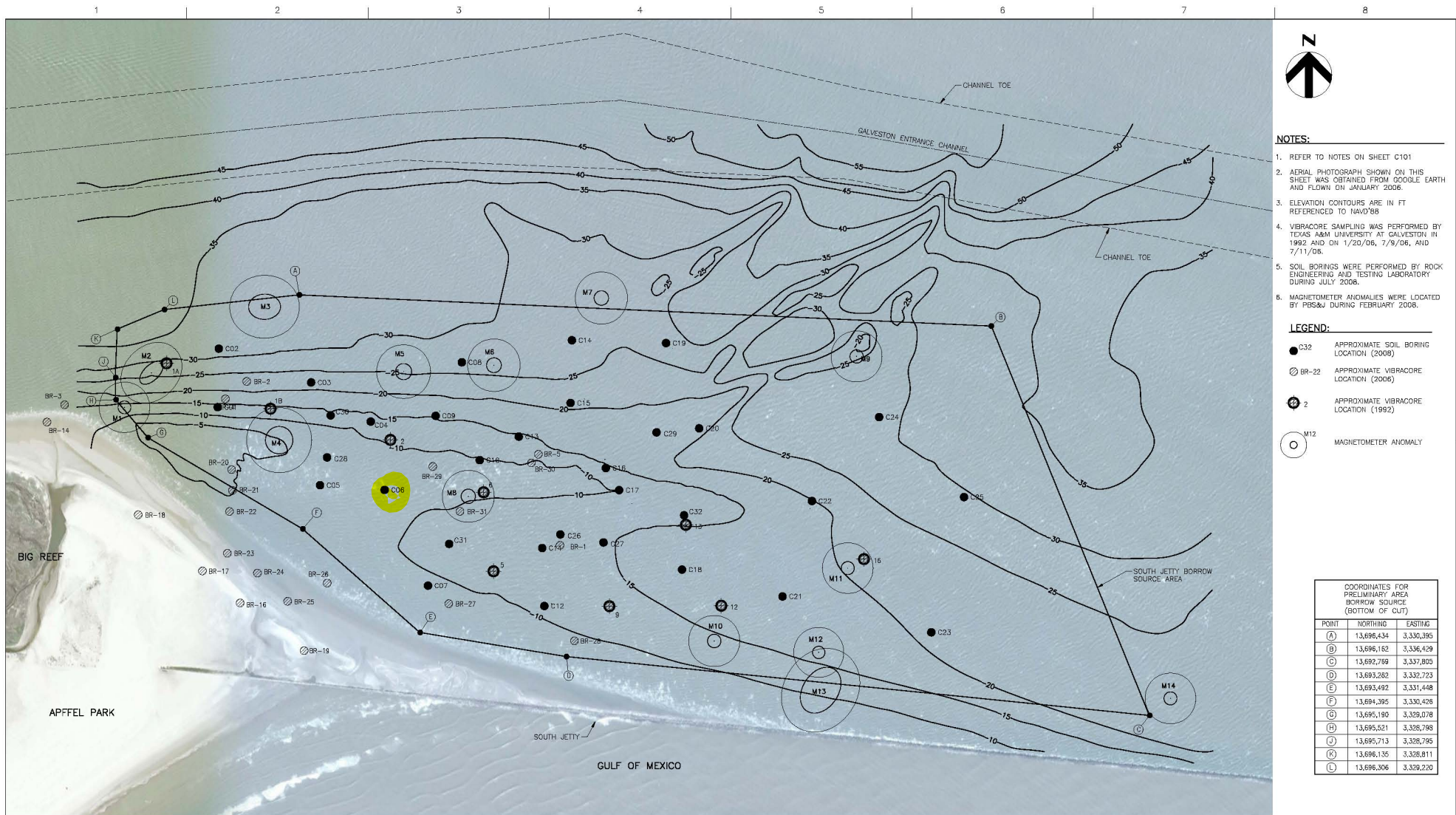
October 22, 2008
Attn.: Mr. Daniel Heilman, P.E.
RETL Job No.: G108558

WEST GALVESTON ISLAND LG. SCALE BEACH NOURISHMENT PROJECT
South Jetty Borrow Source Area
Galveston, Texas

BORING NO.	GPS COORDINATES	
C-01	N. 29.33841	W. 94.72652
C-02	N. 29.33981	W. 94.72643
C-03	N. 29.33892	W. 94.72394
C-04	N. 29.33793	W. 94.72235
C-05	N. 29.33645	W. 94.72380
C-06	N. 29.33628	W. 94.72204
C-07	N. 29.33395	W. 94.72095
C-08	N. 29.33927	W. 94.71980
C-09	N. 29.33801	W. 94.72057
C-10	N. 29.33691	W. 94.71941
C-11	N. 29.33475	W. 94.71779
C-12	N. 29.33336	W. 94.71779
C-13	N. 29.33744	W. 94.71832
C-14	N. 29.33970	W. 94.71677
C-15	N. 29.33820	W. 94.71687
C-16	N. 29.33661	W. 94.71597
C-17	N. 29.33607	W. 94.71563
C-18	N. 29.33411	W. 94.71399
C-19	N. 29.33955	W. 94.71420
C-20	N. 29.33748	W. 94.71338
C-21	N. 29.33338	W. 94.71127
C-22	N. 29.33564	W. 94.71037
C-23	N. 29.33239	W. 94.70724
C-24	N. 29.33759	W. 94.70845
C-25	N. 29.33560	W. 94.70621
C-26	N. 29.33506	W. 94.71728
C-27	N. 29.33483	W. 94.71611
C-28	N. 29.33711	W. 94.72358
C-29	N. 29.33742	W. 94.71455
C-30	N. 29.33811	W. 94.72344
C-31	N. 29.33493	W. 94.72033
C-32	N. 29.33541	W. 94.73054

In addition, forty surface grab samples from onshore and offshore of the Gulf beach along west Galveston Island were obtained and delivered to RETL by a representative of HDR, Inc. The ground surface elevations at the offshore grab sample locations are provided in the table below:

C:\P\Working\DAL\dms93560\00V101.DWG, 10/20/2008 4:00:32 PM



- NOTES:**
1. REFER TO NOTES ON SHEET C101
 2. AERIAL PHOTOGRAPH SHOWN ON THIS SHEET WAS OBTAINED FROM GOOGLE EARTH AND FLOWN ON JANUARY 2006.
 3. ELEVATION CONTOURS ARE IN FT REFERENCED TO NAVD'88
 4. VIBRACORE SAMPLING WAS PERFORMED BY TEXAS A&M UNIVERSITY AT GALVESTON IN 1992 AND ON 1/20/06, 7/9/06, AND 7/11/06.
 5. SOIL BORINGS WERE PERFORMED BY ROCK ENGINEERING AND TESTING LABORATORY DURING JULY 2008.
 6. MAGNETOMETER ANOMALIES WERE LOCATED BY PGS&J DURING FEBRUARY 2008.
- LEGEND:**
- C32 APPROXIMATE SOIL BORING LOCATION (2008)
 - ⊗ BR-22 APPROXIMATE VIBRACORE LOCATION (2006)
 - ⊗ 2 APPROXIMATE VIBRACORE LOCATION (1992)
 - M12 MAGNETOMETER ANOMALY

COORDINATES FOR PRELIMINARY AREA BORROW SOURCE (BOTTOM OF CUT)		
POINT	NORTHING	EASTING
(A)	13,696,434	3,330,395
(B)	13,696,162	3,336,429
(C)	13,692,769	3,337,805
(D)	13,693,282	3,332,723
(E)	13,693,492	3,331,448
(F)	13,694,395	3,330,428
(G)	13,695,190	3,329,078
(H)	13,695,521	3,328,798
(J)	13,695,713	3,328,795
(K)	13,696,135	3,328,811
(L)	13,696,306	3,329,220

SOUTH JETTY BORROW SOURCE AREA

SCALE: 0 400' 800'

1
C101

		<table><tr><td>1</td><td>10/20/08</td><td>REVISED SOIL BORING LOCATIONS AND SCALE</td></tr><tr><td>0</td><td>10/17/08</td><td>ISSUED TO TOLG</td></tr><tr><td>ISSUE</td><td>DATE</td><td>DESCRIPTION</td></tr></table>	1	10/20/08	REVISED SOIL BORING LOCATIONS AND SCALE	0	10/17/08	ISSUED TO TOLG	ISSUE	DATE	DESCRIPTION	<table><tr><td>PROJECT MANAGER</td><td>DANIEL J. HELLMAN</td></tr><tr><td>DRAWN BY</td><td>BRUCE L. JACKSON</td></tr><tr><td>CHECKED BY</td><td>LAUREN AUGUSTIN</td></tr><tr><td>PROJECT NUMBER</td><td>88091</td></tr></table>	PROJECT MANAGER	DANIEL J. HELLMAN	DRAWN BY	BRUCE L. JACKSON	CHECKED BY	LAUREN AUGUSTIN	PROJECT NUMBER	88091	PRELIMINARY THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW AND IS NOT INTENDED TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.	WEST GALVESTON ISLAND END OF SEAWALL BEACH NOURISHMENT	BORROW SOURCE AREA <table><tr><td>FILENAME</td><td>00V101.DWG</td><td>SHEET</td></tr><tr><td>SCALE</td><td>AS SHOWN</td><td>V101</td></tr></table>	FILENAME	00V101.DWG	SHEET	SCALE	AS SHOWN	V101
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LOG OF BORING C-06

SHEET 1 of 1



Rock Engineering & Testing Lab., Inc.
6817 Leopard St.
Corpus Christi, TX 78409
Telephone: (361) 883-4555
Fax: (361) 883-4711

CLIENT: HDR, Inc.

PROJECT: Prop. Large Scale Beach Nourishment Project

LOCATION: S. Jetty Borrow Source Area; Galveston, TX

NUMBER: G108558

DATE(S) DRILLED: 08/01/08 - 08/01/08

DRILLING METHOD(S):

Hollow Stem Auger

GROUNDWATER INFORMATION:

SURFACE ELEVATION: -8.5' NAVD

DESCRIPTION OF STRATUM

LOG OF BORING G108558B PROP. LARGE SCALE BEACH NOURISHMENT PROJECT GPJ ROCK ETL GDT 10/21/08

FIELD DATA										LABORATORY DATA				DRILLING METHOD(S): Hollow Stem Auger	
SOIL SYMBOL	Elevation, Ft. [NAVD]	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T: TONS/SQ FT PERCENT RECOVERY/ ROCK QUALITY DESIGNATION	MOISTURE CONTENT (%)	ATTERBERG LIMITS			DRY DENSITY POUNDS/CU.FT	COMPRESSION STRENGTH (TONS/SQ.FT)	MINUS NO. 200 SIEVE (%)	GROUNDWATER INFORMATION:			
						LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI				SURFACE ELEVATION: -8.5' NAVD DESCRIPTION OF STRATUM			
	5														
	10	SS S-1	N= 14	25							5	<u>POORLY GRADED SAND</u> , with clay and shell, brown and gray, moist, medium. Same as above, gray.			
		SS S-2	N= 10									Same as above, loose.			
		SS S-3	N= 8	25							5	<u>POORLY GRADED SAND</u> , with clay and shell, gray, moist, dense.			
	15	SS S-4	N= 33									<u>SILTY CLAYEY SAND</u> , with shell, gray, moist, loose.			
		SS S-5	N= 7	26							16	<u>POORLY GRADED SAND</u> , with clay and shell, gray, moist, medium.			
	20	SS S-6	N= 22									Same as above, loose.			
		SS S-7	N= 6	25							8	<u>SILTY CLAYEY SAND</u> , with shell, gray, moist, loose.			
		SS S-8	N= 7	29							20	<u>SANDY CLAY</u> , with shell, gray, very moist, very soft.			
	25	SS S-9	N= WOH	46							61	Same as above.			
		SS S-10	N= WOH									Same as above, soft.			
	30	SS S-11	N= 4									<u>SANDY CLAY</u> , with shell, gray, moist, very soft.			
		SS S-12	N= 1									Same as above, soft.			
		SS S-13	N= 4									Boring was extended to an elevation of -33.5-feet NAVD during the drilling operations.			

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
T - POCKET TORVANE SHEAR STRENGTH

REMARKS:

Boring depth and location was determined by HDR, Inc. Boring operations were performed by RETL.
GPS Coord. N. 29.33628 W. 94.72204



- Geotechnical Engineering
- Construction Materials Testing

PROJECT NAME: West Galveston Island Large Scale Beach Nourishment Project

CLIENT: HDR, Inc.

BORING ID.: C-06

DESCRIPTION: South Jetty Borrow Source Area

PERCENT SHELL BY WEIGHT (BASED ON #10 SIEVE)			
-8.5' TO -10.5' NAVD	-12.5' TO -14.5' NAVD	-16.5' TO -18.5' NAVD	-20.5' TO -22.5' NAVD
1.15	1.50	0.63	1.09

ASTM MESH	% FINER BY WEIGHT AFTER REMOVING SHELL			
	-8.5' TO -10.5' NAVD	-12.5' TO -14.5' NAVD	-16.5' TO -18.5' NAVD	-20.5' TO -22.5' NAVD
#10	100.00	100.00	100.00	100.00
#18	98.53	98.71	99.22	98.15
#35	97.20	97.50	98.46	96.43
#60	95.75	95.88	97.56	94.15
#70	91.18	93.05	N/A	N/A
#120	44.38	51.70	N/A	N/A
#120	15.88	15.60	34.89	18.78
#170	6.52	6.59	22.74	9.46
#200	5.31	5.18	16.30	7.74
STATISTICS (EXCLUDING SHELL)				
MEDIAN GRAIN SIZE (mm)	0.16	0.16	0.16	0.18
MEAN GRAIN SIZE (mm)	0.16	0.16	0.14	0.17
SORTING (σ)	0.39	0.36	N/A	N/A

*The -#10 material was utilized as the total sample for Grain Size Distribution Curve calculations.



- Geotechnical Engineering
- Construction Materials Testing

PROJECT NAME: West Galveston Island Large Scale Beach Nourishment Project

CLIENT: HDR, Inc.

BORING ID.: C-06

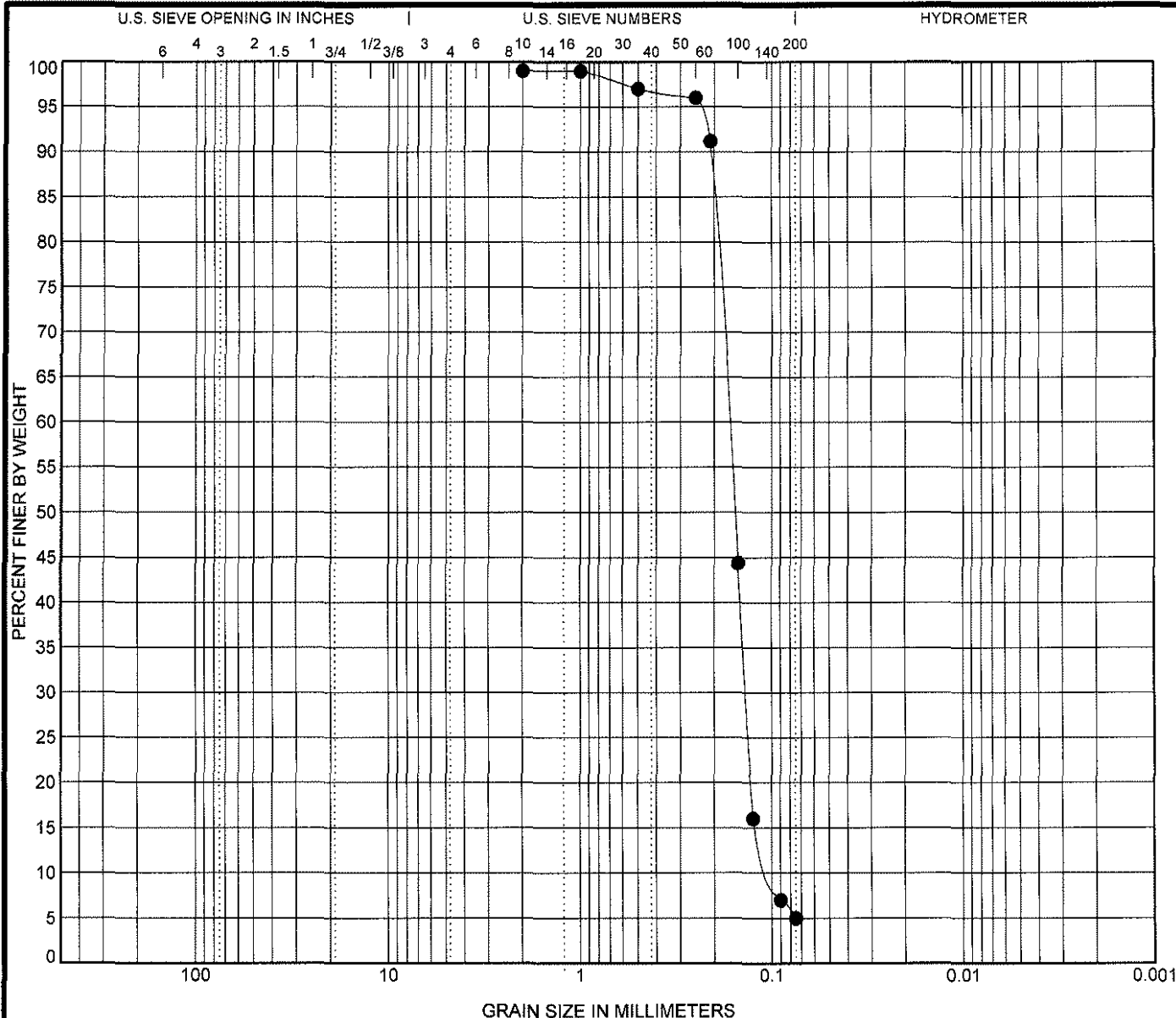
DESCRIPTION: South Jetty Borrow Source Area

PERCENT SHELL BY WEIGHT (BASED ON #10 SIEVE)	
-22.5' TO -24.5' NAVD	-24.5' TO -26.5' NAVD
0.70	N/A

ASTM MESH	% FINER BY WEIGHT AFTER REMOVING SHELL	
	-22.5' TO -24.5' NAVD	-24.5' TO -26.5' NAVD
#10	100.00	N/A
#18	98.95	N/A
#35	98.21	N/A
#60	97.22	N/A
#120	33.51	N/A
#170	21.64	N/A
#200	19.56	61.40
STATISTICS (EXCLUDING SHELL)		
MEDIAN GRAIN SIZE (mm)	0.17	N/A
MEAN GRAIN SIZE (mm)	N/A	N/A
SORTING (σ)	N/A	N/A

*C-06; -24.5' to -26.5' NAVD was only passed through the -#200 sieve.

*The -#10 material was utilized as the total sample for Grain Size Distribution Curve calculations.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
● C-06 (-8.5' to -10.5' NAVD)		Borrow Area (-8.5' to -10.5' NAVD)				1.11	1.67

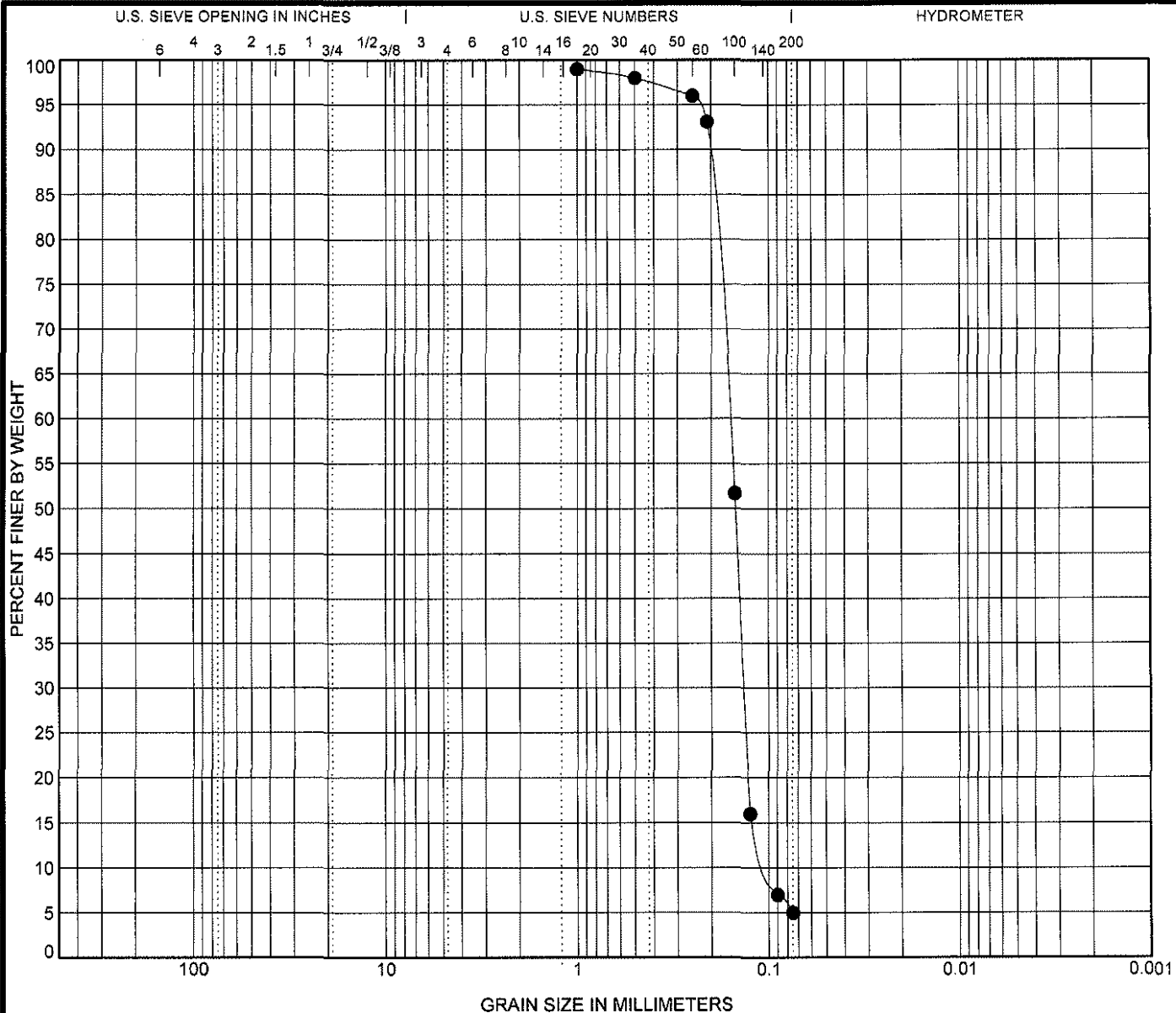
Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● C-06 (-8.5' to -10.5' NAVD)		2	0.168	0.137	0.1	0.0	94.0	5.0	



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GRAIN SIZE DISTRIBUTION

Project: Prop. Large Scale Beach Nourishment Project
Location: South Jetty Borrow Source Area; Galveston, Texas
Number: G108558



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
● C-06 (-12.5' to 14.5' NAVD)		Borrow Area (-12.5' to -14.5' NAVD)				1.12	1.60

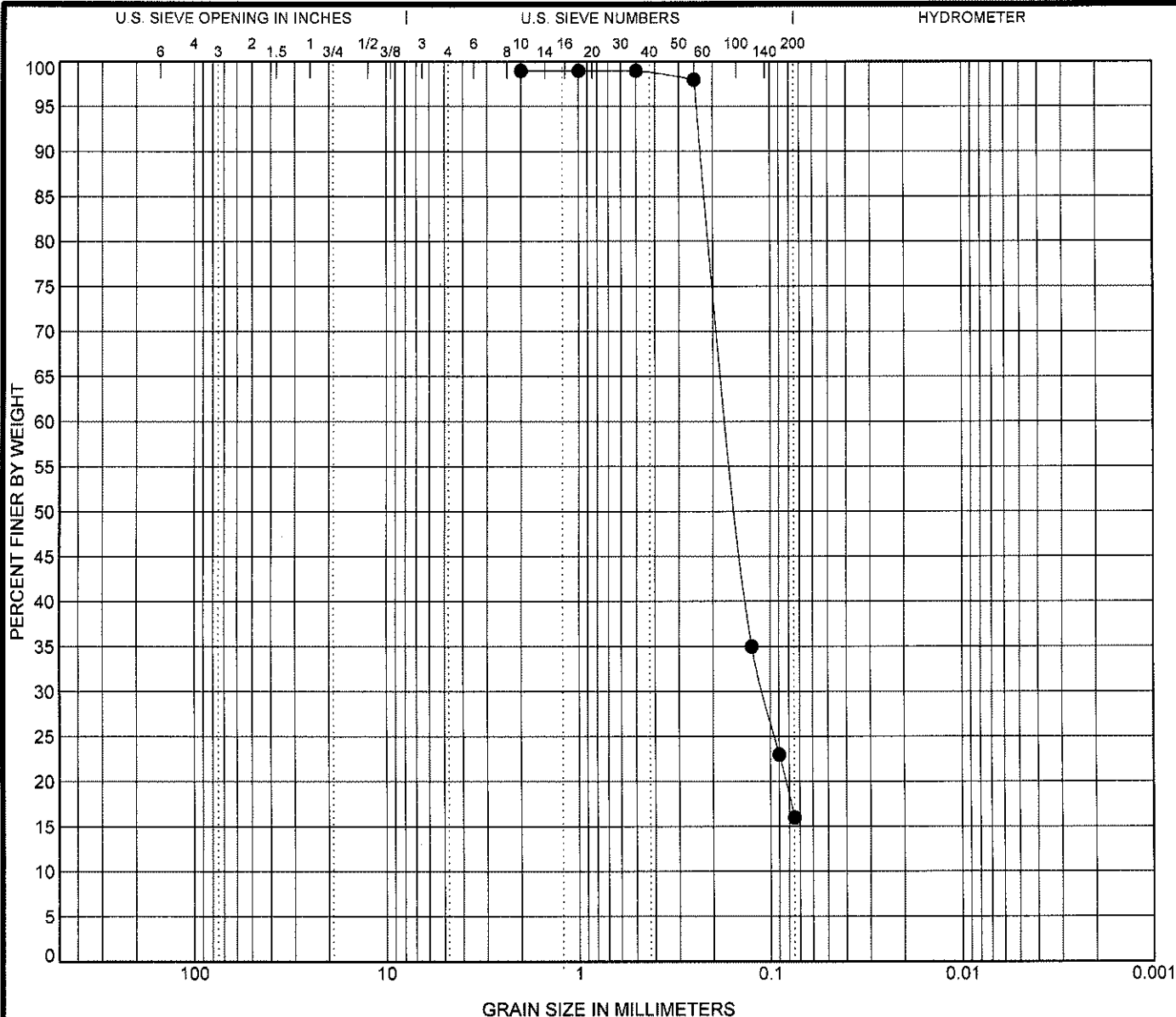
Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● C-06 (-12.5' to 14.5' NAVD)		1	0.16	0.134	0.1	0.0	94.0	5.0	



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COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

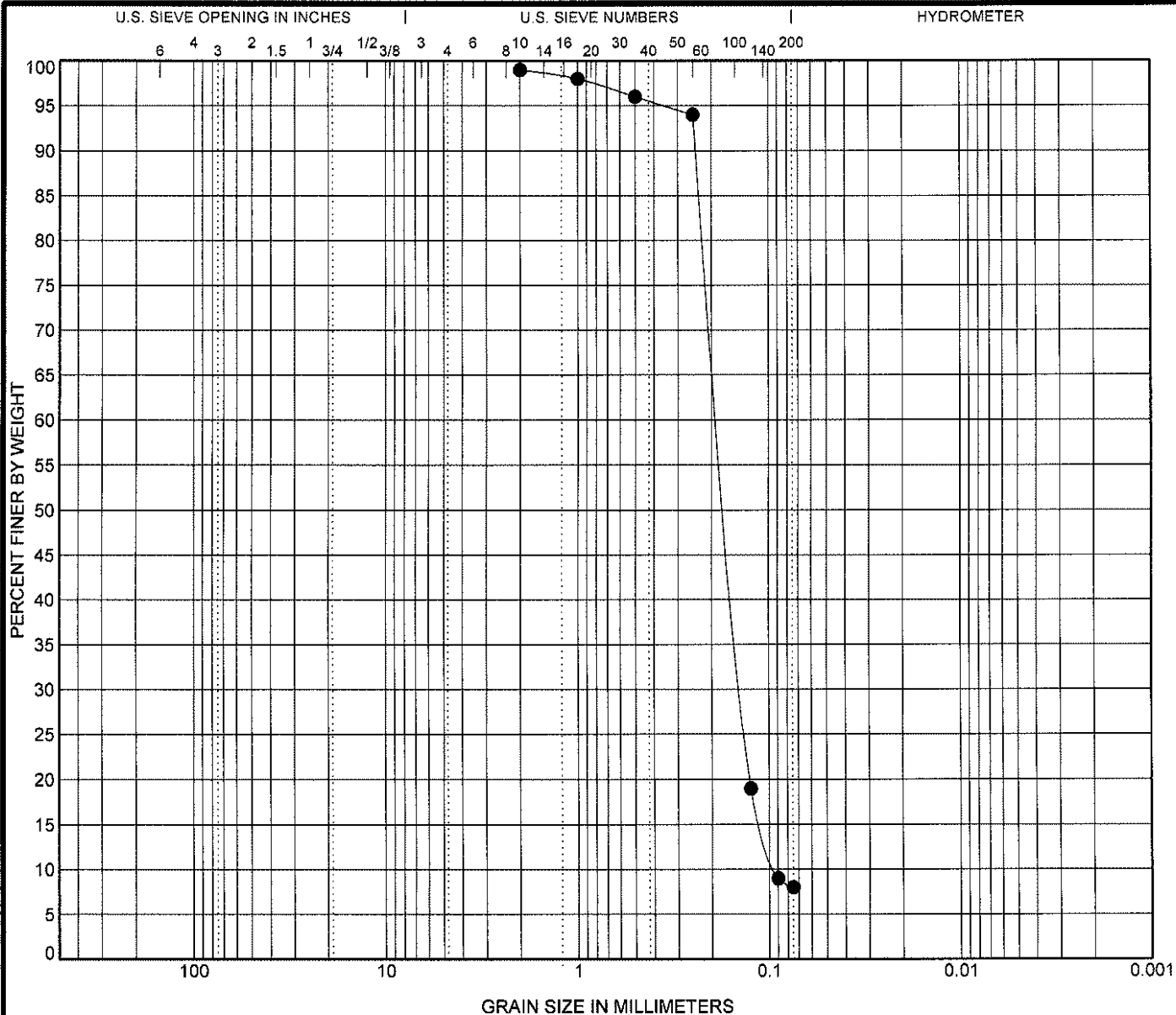
Specimen ID	Depth	Classification					LL	PL	PI	Cc	Cu
● C-06 (-16.5' to -18.5' NAVD)		Borrow Area (-16.5' to -18.5' NAVD)									
Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
● C-06 (-16.5' to -18.5' NAVD)		2	0.165	0.109		0.0	83.0	16.0			



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COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
● C-06 (-20.5' to -22.5' NAVD)		Borrow Area (-20.5' to -22.5' NAVD)				1.13	1.96

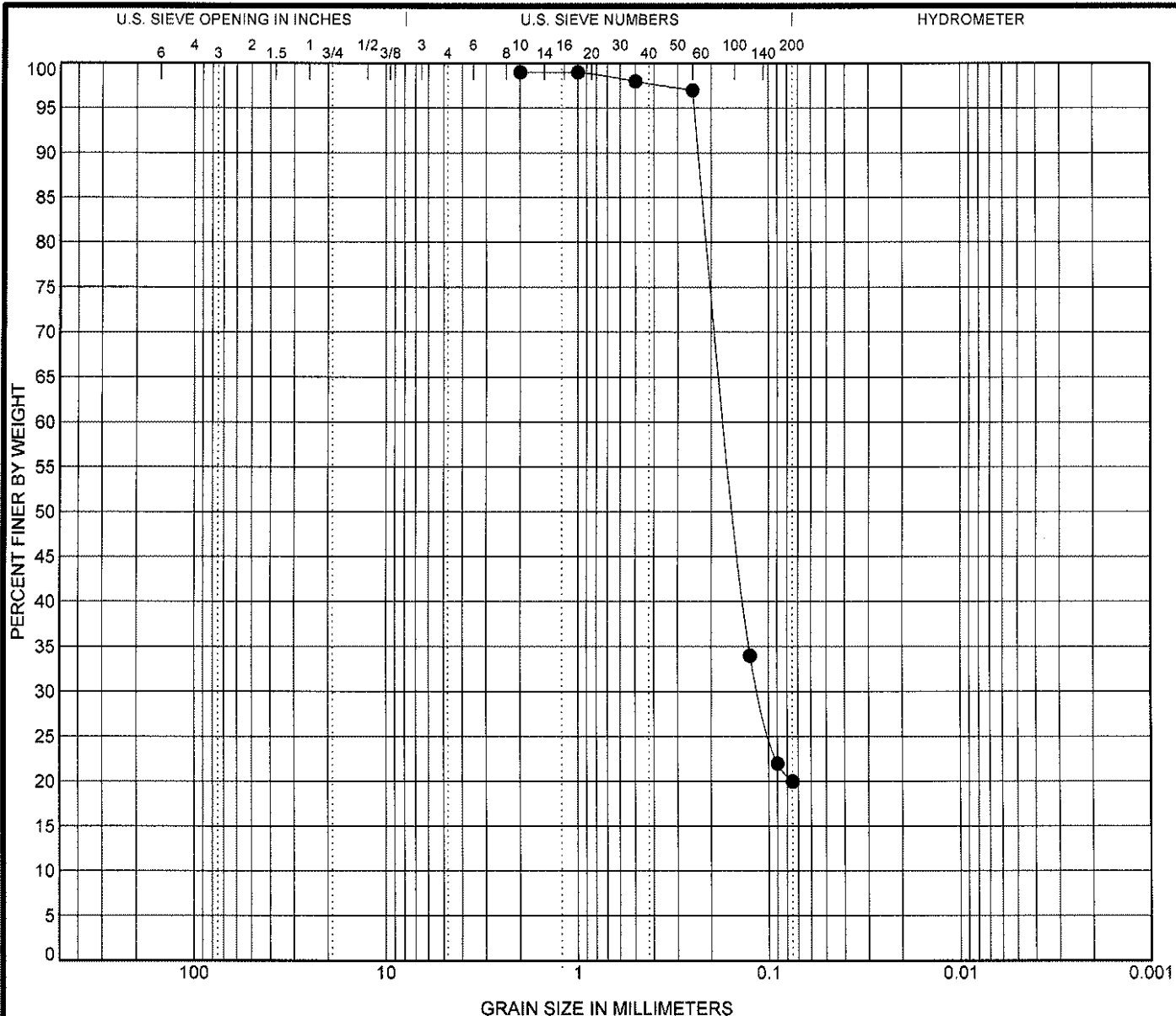
Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● C-06 (-20.5' to -22.5' NAVD)		2	0.183	0.138	0.093	0.0	91.0	8.0	



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COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
● C-06 (-22.5' to -24.5' NAVD)		Borrow Area (-22.5' to -24.5' NAVD)					

Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● C-06 (-22.5' to -24.5' NAVD)		2	0.166	0.112		0.0	79.0	20.0	



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