

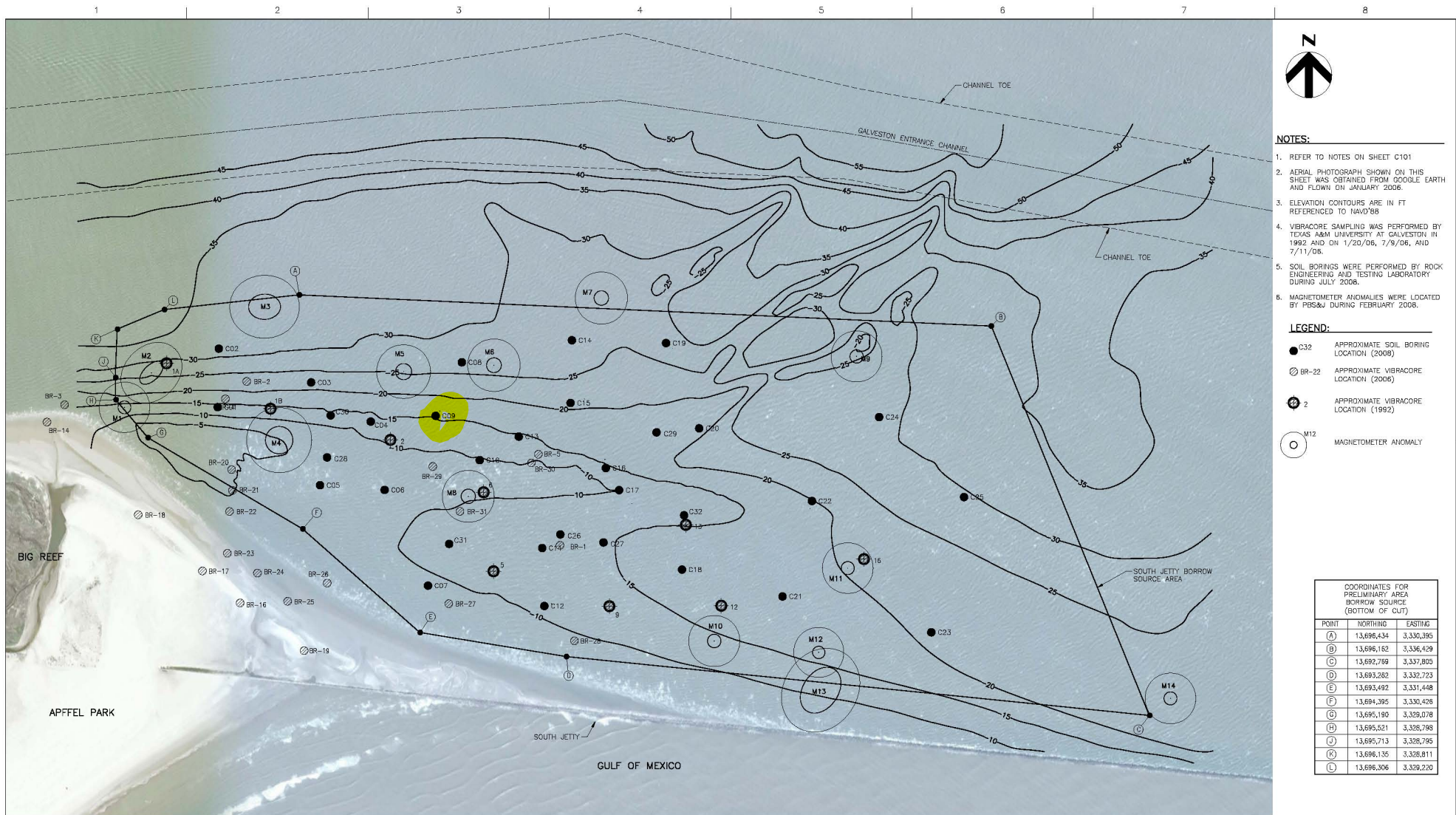
October 22, 2008
Attn.: Mr. Daniel Heilman, P.E.
RETL Job No.: G108558

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'



HDR
SHINER
MOSELEY

ISSUE	DATE	DESCRIPTION
1	10/20/08	REVISED SOIL BORING LOCATIONS AND SCALE
0	10/17/08	ISSUED TO TOLG

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**

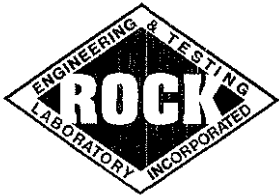


BORROW SOURCE AREA

FILENAME	00V101.DWG	SHEET
SCALE	AS SHOWN	V101

LOG OF BORING C-09

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: 07/31/08 - 07/31/08

DRILLING METHOD(S):

Hollow Stem Auger

GROUNDWATER INFORMATION:

SURFACE ELEVATION: -16.0' NAVD

DESCRIPTION OF STRATUM

SOIL SYMBOL	FIELD DATA				LABORATORY DATA						
	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	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)
						LL	PL	PI			
	5										
	10										
	15										
	20	SS S-1	N= 1		24						4
		SS S-2	N= 2		23						4
		SS S-3	N= 3								
		SS S-4	N= 13		21						3
	25	SS S-5	N= 1		27						18
		SS S-6	N= WOH								
	30	SS S-7	N= 4		41						48
		SS S-8	N= 3		38						42
		SS S-9	N= 4								
	35	SS S-10	N= 2								

POORLY GRADED SAND, with shell, gray, moist, very loose.

Same as above.

Same as above.

POORLY GRADED SAND, with shell, gray, moist, medium.**SILTY CLAYEY SAND**, with shell, dark gray, moist, very loose.

Same as above.

CLAYEY SAND, with shell, dark gray, very moist, firm.

Same as above, soft.

Same as above, firm.

CLAYEY SAND, with shell, gray, moist, soft.

Boring was extended to an elevation of -36-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. 29.33801 W. 94.72057

LOG OF BORING G108558B PROP. LARGE SCALE BEACH NOURISHMENT PROJECT GPJ ROCK ETL GDT 10/2/08



- Geotechnical Engineering
- Construction Materials Testing

PROJECT NAME: West Galveston Island Large Scale Beach Nourishment Project

CLIENT: HDR, Inc.

BORING ID.: C-09

DESCRIPTION: South Jetty Borrow Source Area

PERCENT SHELL BY WEIGHT (BASED ON #10 SIEVE)		
-16' TO -18' NAVD	-18' TO -20' NAVD	-22' TO -24' NAVD
4.75	14.50	8.49

ASTM MESH	% FINER BY WEIGHT AFTER REMOVING SHELL		
	-16' TO -18' NAVD	-18' TO -20' NAVD	-22' TO -24' NAVD
#10	100.00	100.00	100.00
#18	93.80	79.60	87.10
#35	88.60	65.20	75.50
#60	83.00	55.60	65.30
#70	74.16	51.83	64.64
#100	27.77	21.08	26.28
#120	9.90	11.80	11.10
#170	4.40	4.50	3.90
#200	4.40	3.60	3.20
STATISTICS (EXCLUDING SHELL)			
MEDIAN GRAIN SIZE (mm)	0.19	0.20	0.19
MEAN GRAIN SIZE (mm)	0.19	0.36	0.29
SORTING (σ)	0.85	1.41	1.23

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



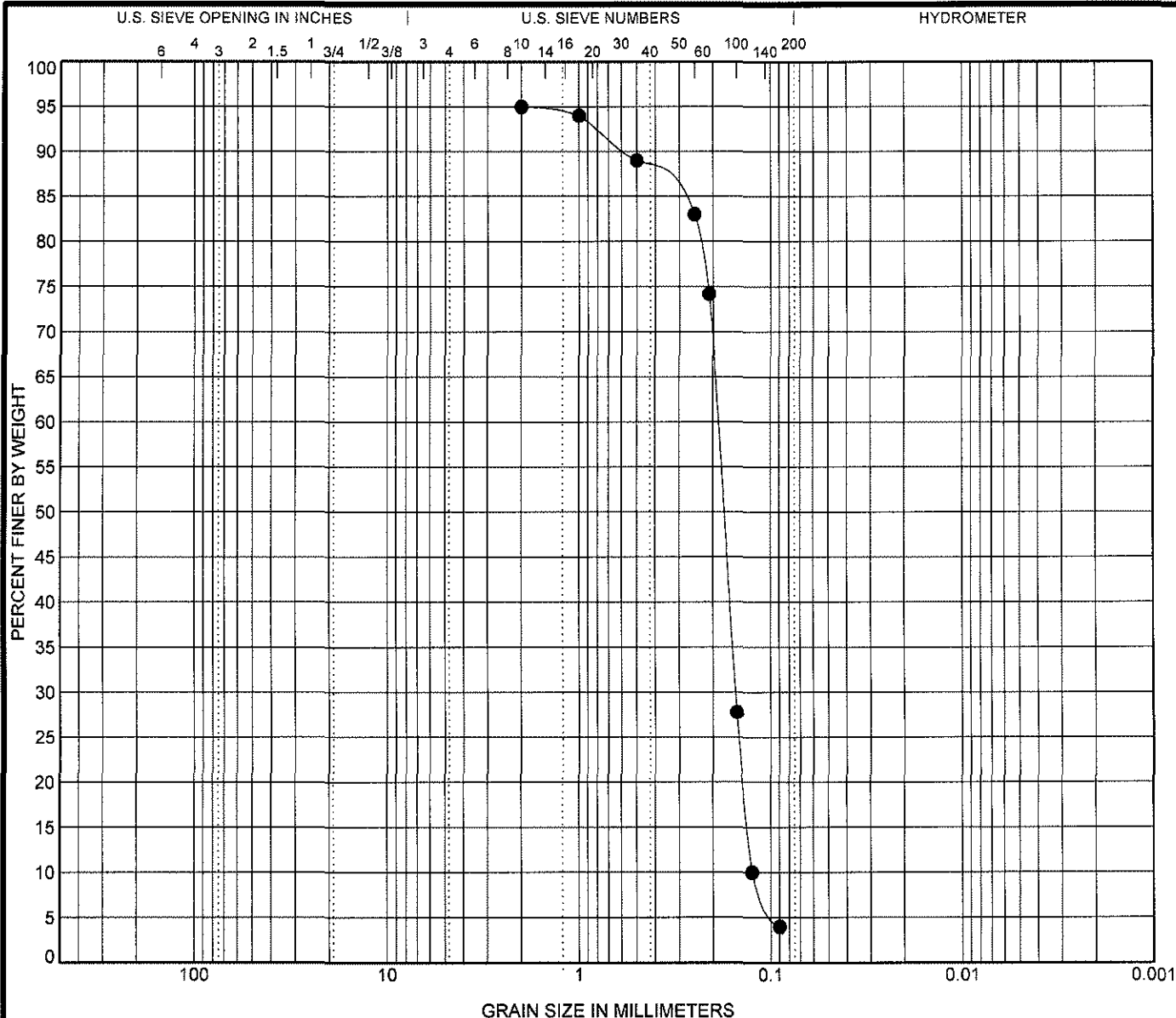
- Geotechnical Engineering
- Construction Materials Testing

PROJECT NAME: West Galveston Island Large Scale Beach Nourishment Project
CLIENT: HDR, Inc.
BORING ID.: C-09
DESCRIPTION: South Jetty Borrow Source Area

PERCENT SHELL BY WEIGHT (BASED ON #10 SIEVE)		
-24' TO -26' NAVD	-28' TO -30' NAVD	-30' TO -32' NAVD
N/A	N/A	N/A

ASTM MESH	% FINER BY WEIGHT AFTER REMOVING SHELL		
	-24' TO -26' NAVD	-28' TO -30' NAVD	-30' TO -32' NAVD
#10	N/A	N/A	N/A
#18	N/A	N/A	N/A
#35	N/A	N/A	N/A
#60	N/A	N/A	N/A
#120	N/A	N/A	N/A
#170	N/A	N/A	N/A
#200	17.90	47.80	42.40
STATISTICS (EXCLUDING SHELL)			
MEDIAN GRAIN SIZE (mm)	N/A	N/A	N/A
MEAN GRAIN SIZE (mm)	N/A	N/A	N/A
SORTING (σ)	N/A	N/A	N/A

*C-09; -24' to -26' NAVD and C-09; -28' to -32' NAVD were only passed through the -#200 sieve.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
● C-09	(-16' to -18' NAVD)	Borrow Area (-16' to -18' NAVD)				0.98	1.52

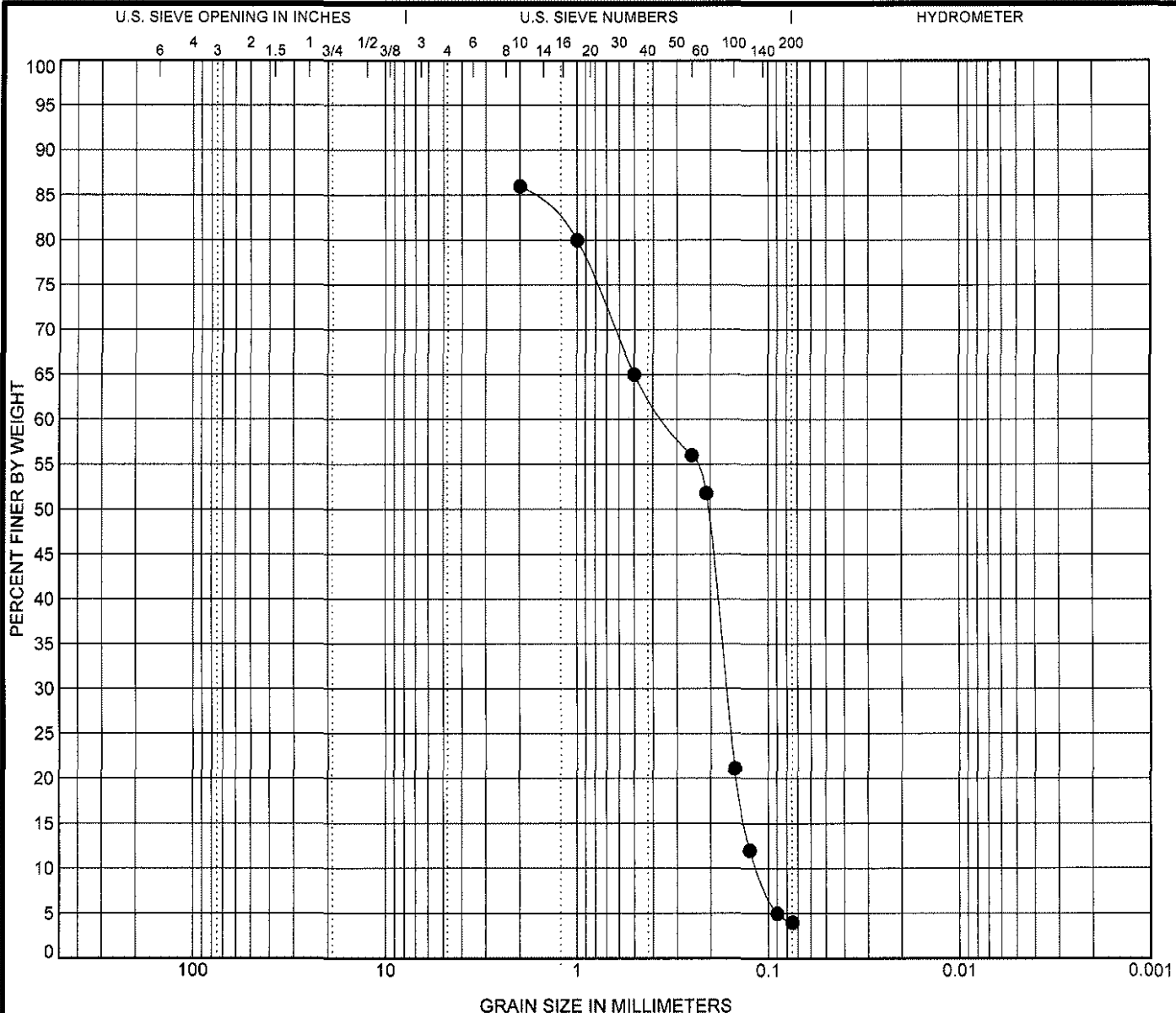
Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● C-09	(-16' to -18' NAVD)	2	0.189	0.152	0.125	0.0			



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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-09	(-18' to -20' NAVD)	Borrow Area (-18' to -20' NAVD)				0.71	2.99

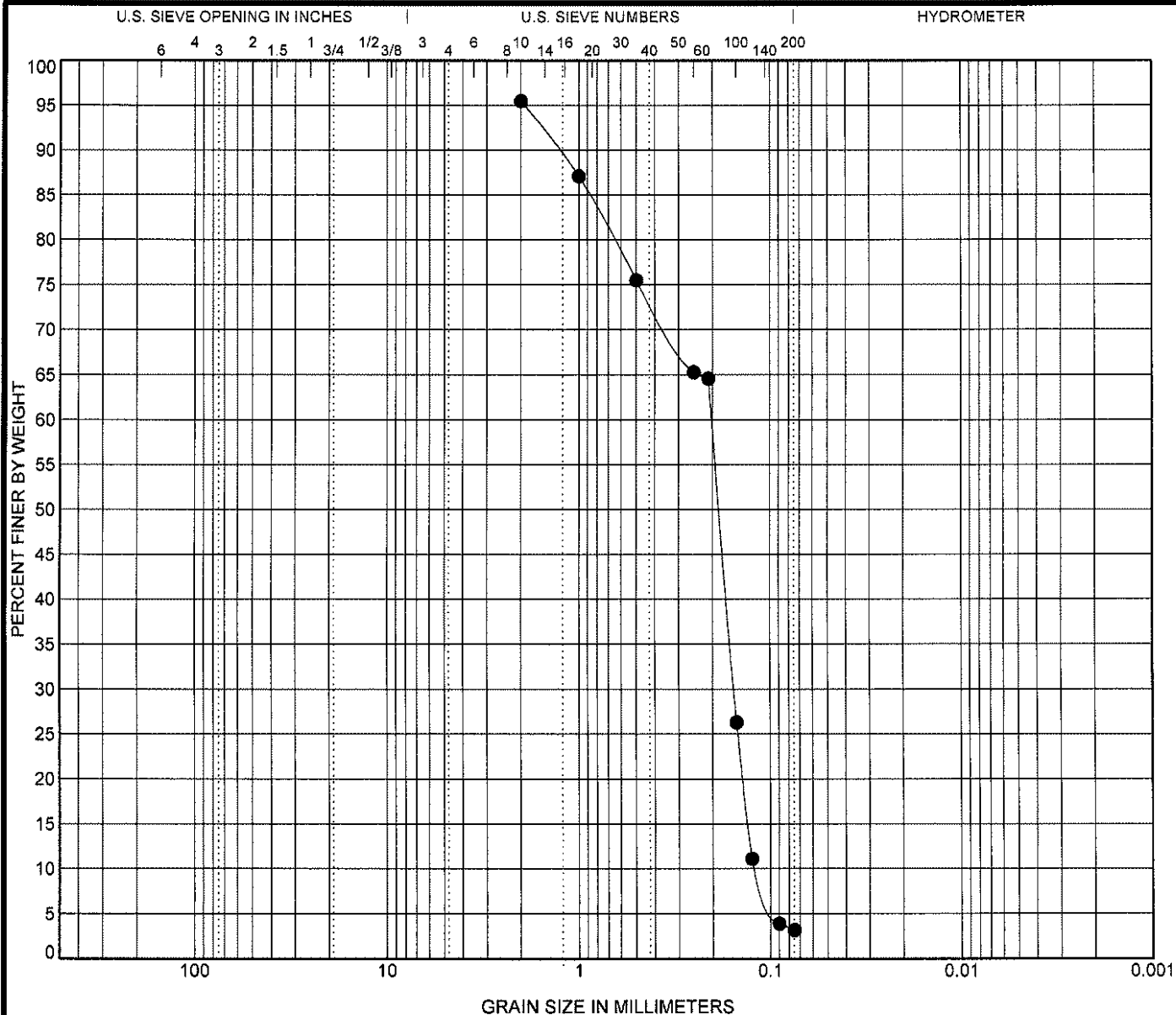
Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● C-09	(-18' to -20' NAVD)	2	0.34	0.165	0.114	0.0	82.0	4.0	



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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-09	(-22' to -24' NAVD)	Borrow Area (-22' to -24' NAVD)				1.00	1.70

Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● C-09	(-22' to -24' NAVD)	2	0.202	0.155	0.119	0.0	92.3	3.2	



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