ROCK ENGINEERING & TESTING LABORATORY INCORPORATED

· Geotechnical Engineering
· Construction Materials Testing

PROJECT NAME: Anchorage Basin Sand Source Investigation
CLIENT: HDR Engineering, Inc.
BORING ID.: AA-10
DESCRIPTION: Anchorage Basin Borrow Source Area

PERCENT SHELL BY WEIGHT (BASED ON #10 SIEVE)		
-30' to -31' NAVD	**-31' to -32' NAVD**	**-32' to -33' NAVD**
4.57	**3.02**	**0.74**

ASTM MESH	% FINER BY WEIGHT AFTER REMOVING SHELL		
	-30' to -31' NAVD	**-31' to -32' NAVD**	**-32' to -33' NAVD**
#10	100.00	100.00	100.00
#18	89.98	94.89	98.87
#35	80.49	91.89	98.50
#60	60.45	78.96	98.02
#70	49.21	64.95	97.48
#100	40.92	24.44	86.43
#120	39.07	14.50	56.19
#170	37.96	11.10	39.17
#200	37.79	10.81	35.96
STATISTICS (EXCLUDING SHELL)			
MEDIAN GRAIN SIZE (mm)	0.16	0.18	0.12
MEAN GRAIN SIZE (mm)	N/A	0.19	N/A
SORTING (σ)	N/A	N/A	N/A

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

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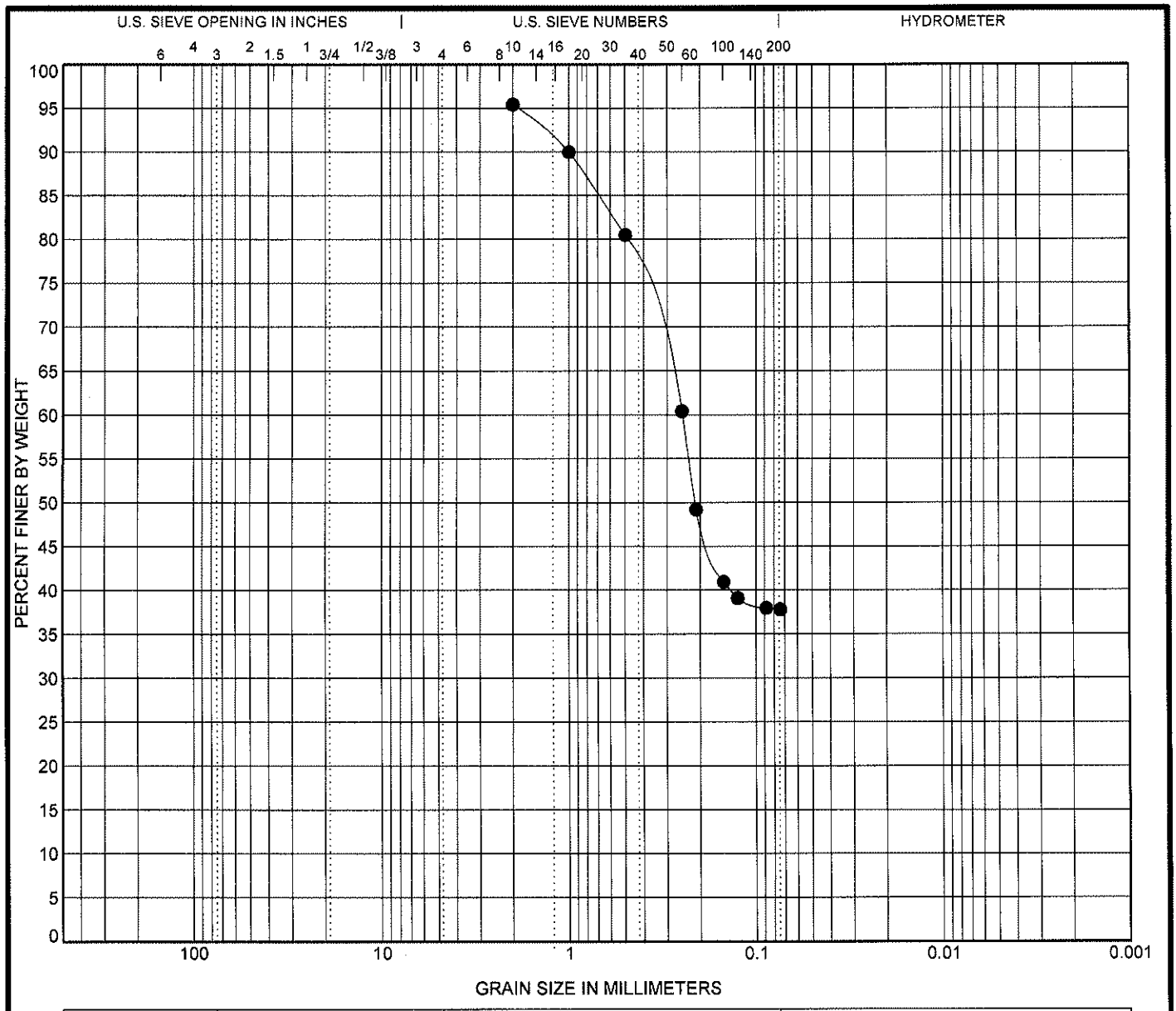
PERCENT SHELL BY WEIGHT (BASED ON #10 SIEVE)		
-34' to -35' NAVD	**-35' to -36' NAVD**	**-38' to -39' NAVD**
0.25	**3.71**	**0.43**

ASTM MESH	% FINER BY WEIGHT AFTER REMOVING SHELL		
	-34' to -35' NAVD	**-35' to -36' NAVD**	**-38' to -39' NAVD**
#10	100.00	100.00	100.00
#18	99.56	93.91	99.40
#35	99.40	92.34	99.36
#60	98.96	90.75	99.21
#70	97.96	88.52	98.76
#100	63.78	37.68	85.96
#120	47.05	14.96	74.57
#170	37.91	2.47	67.53
#200	36.11	0.40	66.81
STATISTICS (EXCLUDING SHELL)			
MEDIAN GRAIN SIZE (mm)	0.14	0.18	N/A
MEAN GRAIN SIZE (mm)	N/A	0.17	N/A
SORTING (σ)	N/A	0.81	N/A

*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
●	**AA-10**	(-30' to -31' NAVD)	**Borrow Area (-30' to -31' NAVD)**					

	Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**AA-10**	(-30' to -31' NAVD)	**2**	**0.248**			**0.0**			

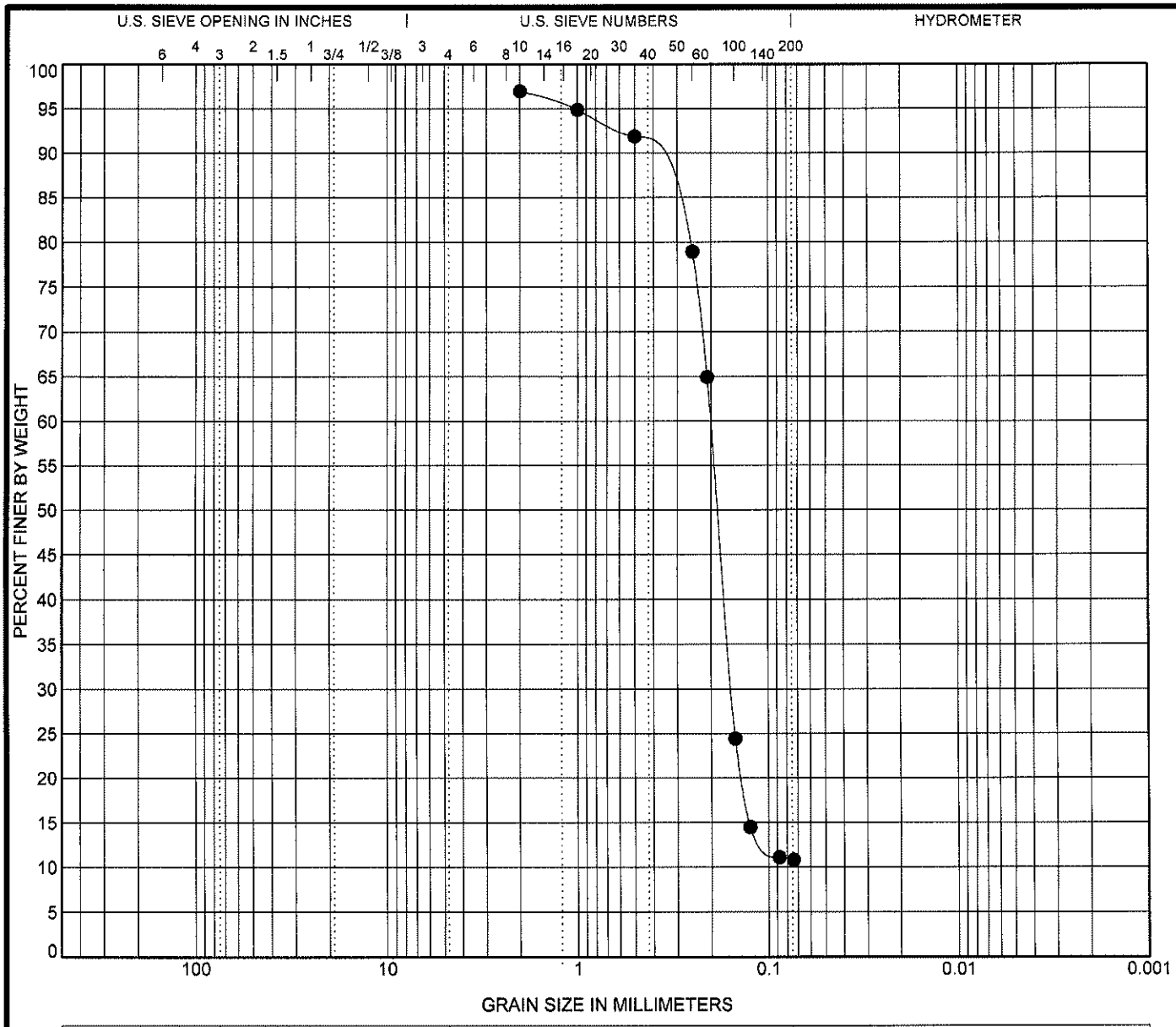
Rock Engineering & Testing Lab., Inc.
6817 Leopard St.
Corpus Christi, TX 78409
Telephone: (361) 883-4555
Fax: (361) 883-4711

GRAIN SIZE DISTRIBUTION

Project: Anchorage Basin Sand Source Investigation

Location: Anchorage Basin; Galveston, Texas

Number: G109112



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
●	**AA-10**	(-31' to -32' NAVD)	**Borrow Area (-31' to -32' NAVD)**				**2.66**	**4.42**

	Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**AA-10**	(-31' to -32' NAVD)	**2**	**0.201**	**0.156**		**0.0**			

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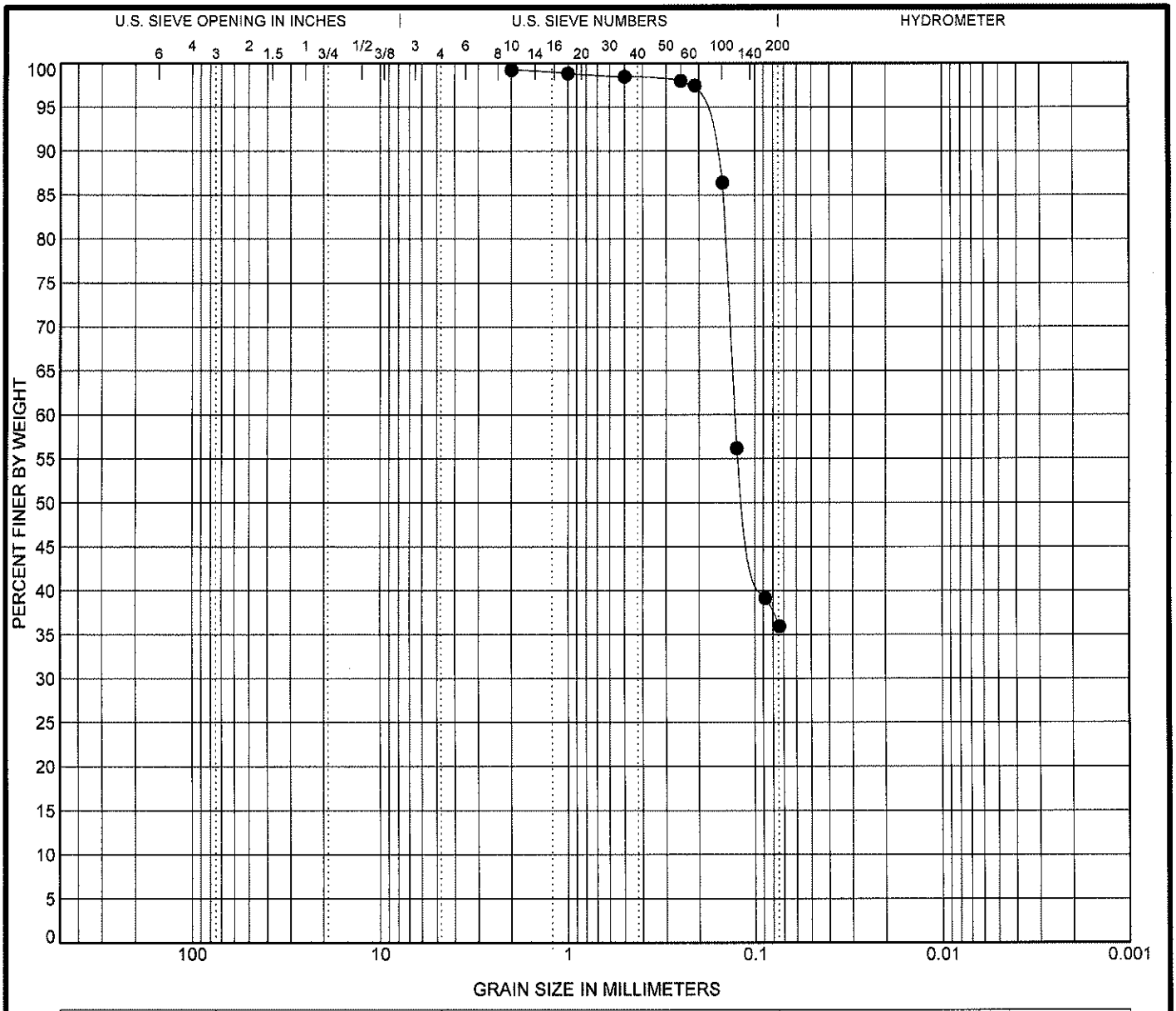
Project: Anchorage Basin Sand Source Investigation

Location: Anchorage Basin; Galveston, Texas

Number: G109112

US_GRAIN_SIZE_G109112 PROP. ANCHORAGE BASIN SAND SOURCE.GPJ US_LAB.GDT 4/6/09



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
●	**AA-10**	(-32' to -33' NAVD)	**Borrow Area (-32' to -33' NAVD)**					

	Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**AA-10**	(-32' to -33' NAVD)	**2**	**0.128**			**0.0**			

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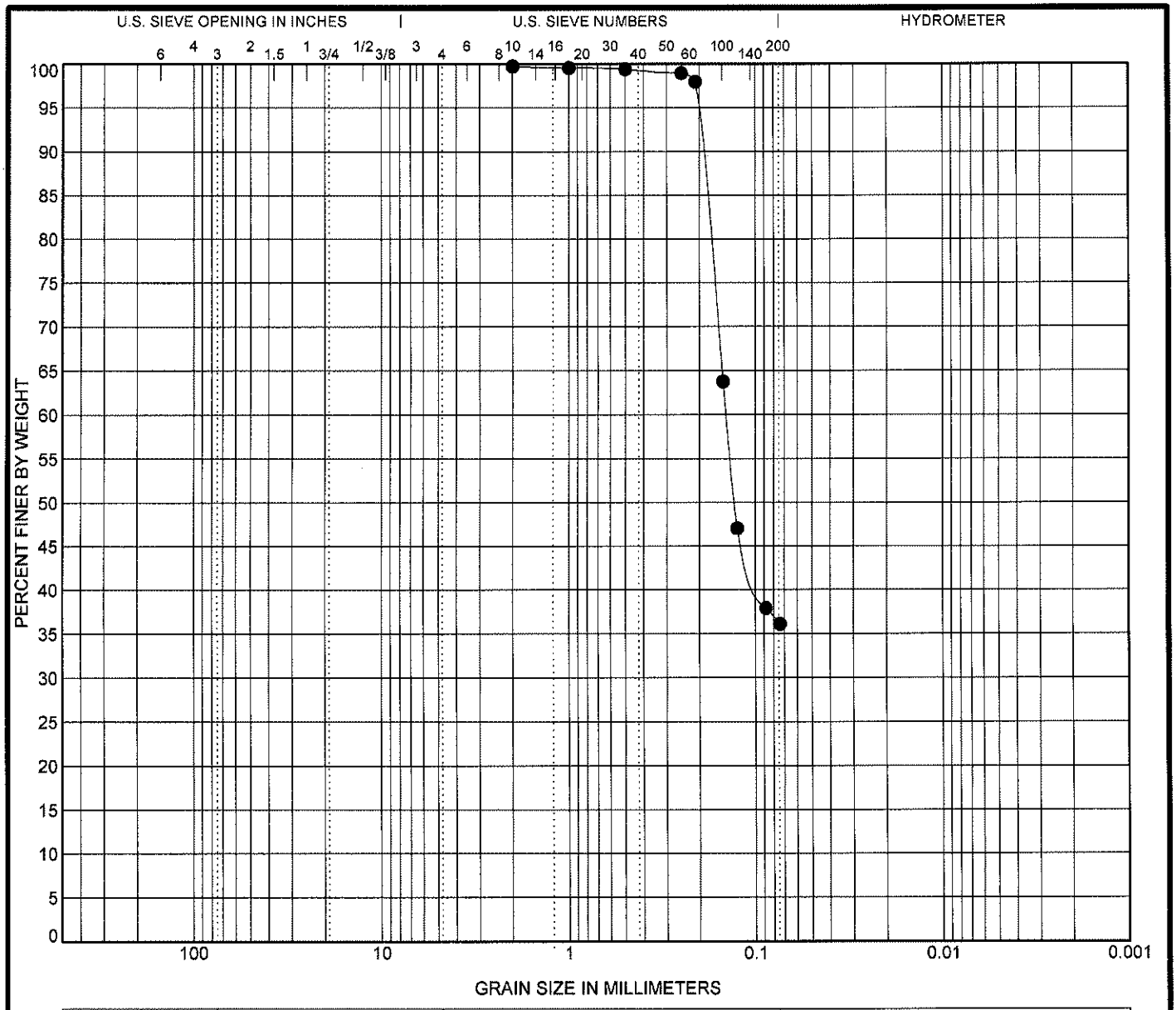

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
●	**AA-10**	(-34' to -35' NAVD)	**Borrow Area (-34' to -35' NAVD)**					

	Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**AA-10**	(-34' to -35' NAVD)	**2**	**0.143**			**0.0**			

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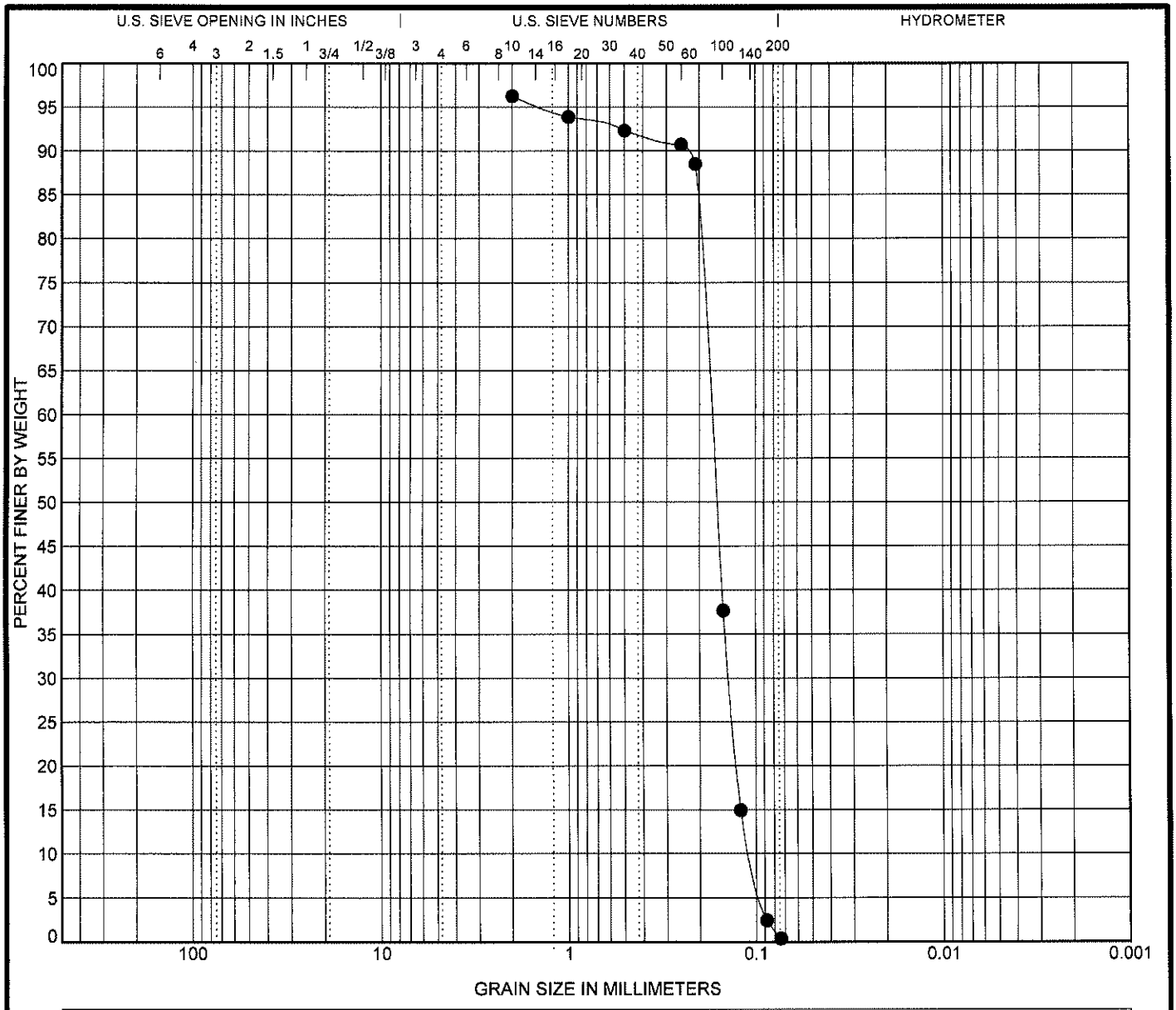

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
●	**AA-10**	(-35' to -36' NAVD)	**Borrow Area (-35' to -36' NAVD)**				**1.04**	**1.62**

	Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**AA-10**	(-35' to -36' NAVD)	**2**	**0.173**	**0.139**	**0.107**	**0.0**			

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Number: G109112

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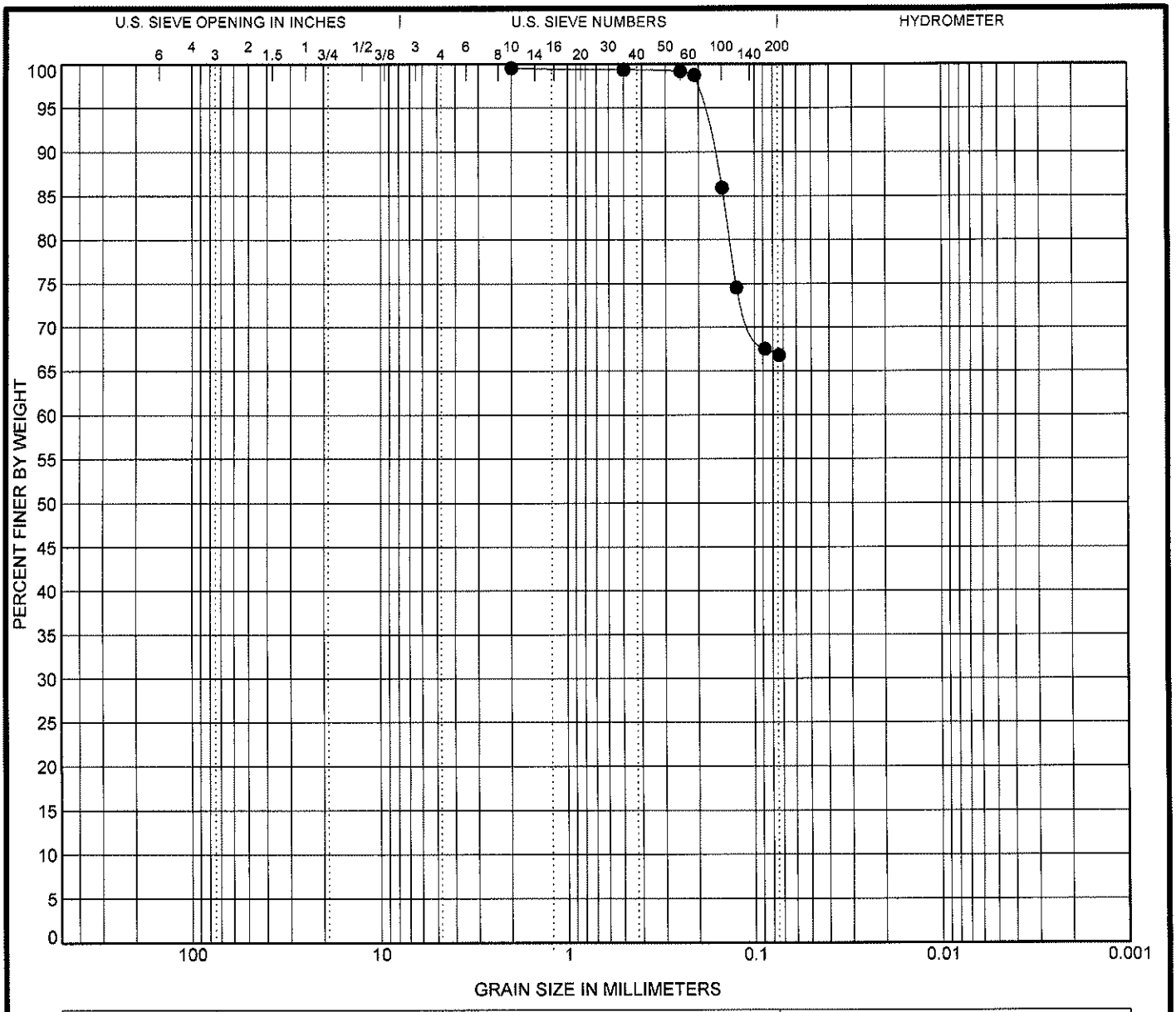

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
●	**AA-10**	(-38' to -39' NAVD)	**Borrow Area (-38' to -39' NAVD)**					

	Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**AA-10**	(-38' to -39' NAVD)	**2**				**0.0**			

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GRAIN SIZE DISTRIBUTION

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US_GRAIN_SIZE_G109112 PROP_ANCHORAGE BASIN SAND SOURCE.GPJ US_LAB.GDT 4/6/09

LOG OF BORING AA-10

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Telephone: (361) 883-4555
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CLIENT: HDR Engineering, Inc.
PROJECT: Anchorage Basin Sand Source Investigation
LOCATION: Anchorage Basin; Galveston, Texas
NUMBER: G109112
DATE(S) DRILLED: 03/12/09 - 03/12/09

DRILLING METHOD(S):
Vibracore

GROUNDWATER INFORMATION:

SURFACE ELEVATION: -30' NAVD

FIELD DATA					LABORATORY DATA							
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 LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	DESCRIPTION OF STRATUM
	19											
	20											
	21											
	22											
	23											
	24											
	25											
	26											
	27											
	28											
	29											
	30	S-1									38	**CLAYEY SAND**, with shell fragments, gray.
	31	S-2									11	**POORLY GRADED SAND**, with clay and shell fragments, gray.
	32	S-3									36	**CLAYEY SAND**, gray.
	33	S-4										Same as above.
	34	S-5									36	Same as above.
	35	S-6										**POORLY GRADED SAND**, gray.
	36											

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

REMARKS:
Boring depth and location was determined by HDR Engineering, Inc. Boring operations were performed by Ocean Surveys, Inc.
GPS Coord. N. 13,698,835' E. 3,317,844'

LOG_OF_BORING G109112 PROP_ANCHORAGE BASIN SAND SOURCE.GPJ ROCK_ETL.GDT 4/28/09

LOG OF BORING AA-10

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CLIENT: HDR Engineering, Inc.
PROJECT: Anchorage Basin Sand Source Investigation
LOCATION: Anchorage Basin; Galveston, Texas
NUMBER: G109112
DATE(S) DRILLED: 03/12/09 - 03/12/09

DRILLING METHOD(S):
Vibracore

GROUNDWATER INFORMATION:

SURFACE ELEVATION: -30' NAVD

FIELD DATA					LABORATORY DATA								DESCRIPTION OF STRATUM
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 LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC LIMIT PL	ATTERBERG LIMITS PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)		
	37	S-7											Same as above.
		S-8											Same as above.
	38	S-9									67		**SANDY CLAY**, gray.
	39	S-10											Same as above.
	40												Boring was extended to an elevation of -40-feet NAVD during the drilling operations.

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P - POCKET PENETROMETER RESISTANCE
T - POCKET TORVANE SHEAR STRENGTH

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