ROCK ENGINEERING & TESTING LABORATORY INCORPORATED

· Geotechnical Engineering
· Construction Materials Testing

PROJECT NAME: Anchorage Basin Sand Source Investigation
CLIENT: HDR Engineering, Inc.
BORING ID.: AA-16
DESCRIPTION: Anchorage Basin Borrow Source Area

PERCENT SHELL BY WEIGHT (BASED ON #10 SIEVE)		
-28' to -29' NAVD	**-30' to -31' NAVD**	**-32' to -33' NAVD**
0.00	**0.17**	**0.49**

ASTM MESH	% FINER BY WEIGHT AFTER REMOVING SHELL		
	-28' to -29' NAVD	**-30' to -31' NAVD**	**-32' to -33' NAVD**
#10	100.00	100.00	100.00
#18	100.00	99.75	99.12
#35	99.97	99.66	98.82
#60	99.85	99.31	98.43
#70	99.68	98.65	97.75
#100	88.14	54.01	89.16
#120	48.85	34.65	80.28
#170	25.65	23.40	73.34
#200	18.71	20.79	72.13
STATISTICS (EXCLUDING SHELL)			
MEDIAN GRAIN SIZE (mm)	0.13	0.15	N/A
MEAN GRAIN SIZE (mm)	N/A	N/A	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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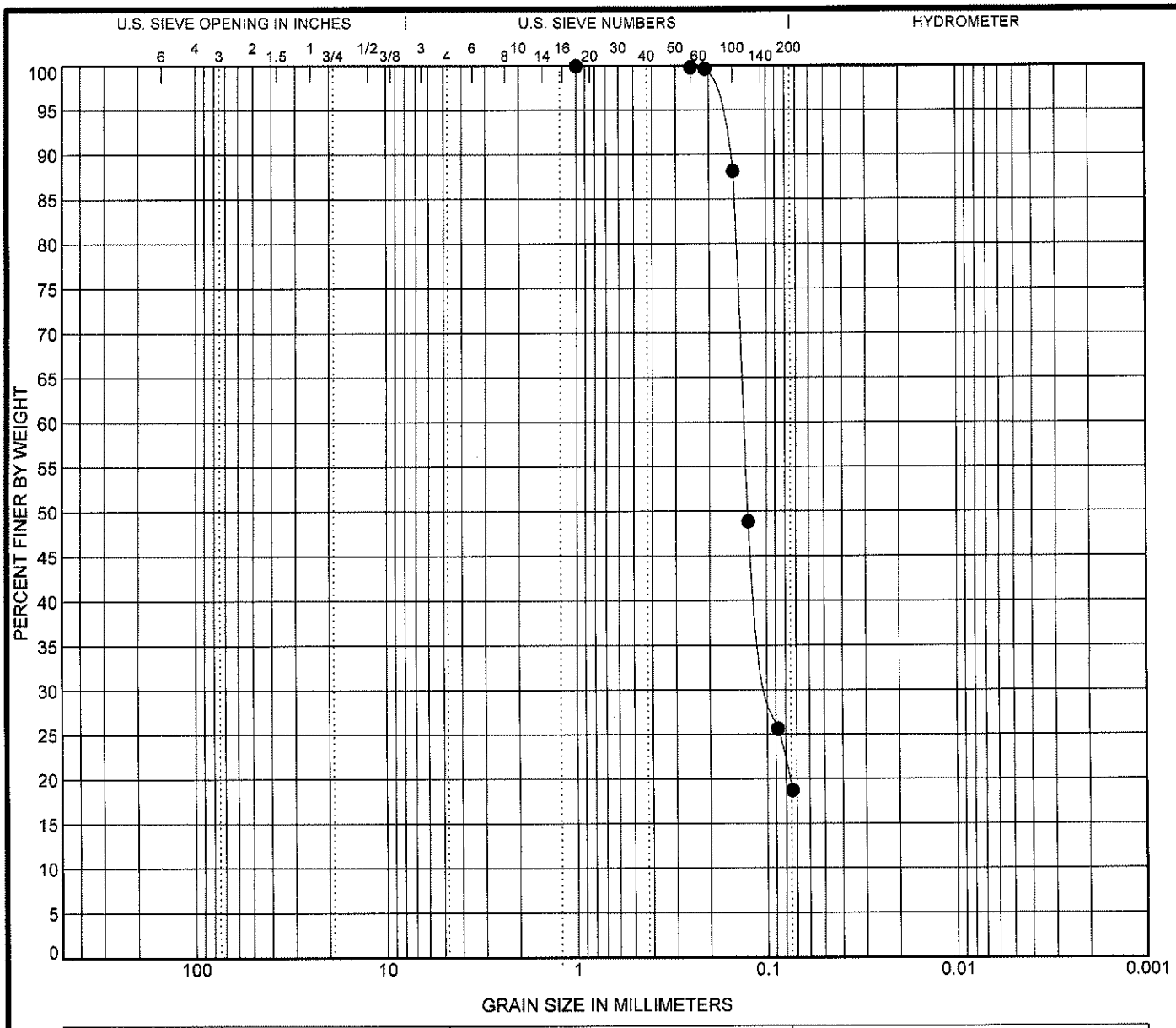
PERCENT SHELL BY WEIGHT (BASED ON #10 SIEVE)		
-34' to -35' NAVD	**-36' to -37' NAVD**	**-39' to -40' NAVD**
0.00	**0.07**	**6.50**

ASTM MESH	% FINER BY WEIGHT AFTER REMOVING SHELL		
	-34' to -35' NAVD	**-36' to -37' NAVD**	**-39' to -40' NAVD**
#10	100.00	100.00	100.00
#18	100.00	99.85	90.86
#35	99.98	99.70	88.34
#60	99.80	99.44	80.20
#70	99.44	99.15	63.78
#100	74.51	78.63	20.33
#120	54.25	54.92	8.85
#170	38.84	39.20	2.99
#200	34.63	35.56	1.95
STATISTICS (EXCLUDING SHELL)			
MEDIAN GRAIN SIZE (mm)	0.13	0.12	0.19
MEAN GRAIN SIZE (mm)	N/A	N/A	0.20
SORTING (σ)	N/A	N/A	0.71

*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-16**	(-28' to-29' NAVD)	**Borrow Area (-28' to -29' NAVD)**					

	Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**AA-16**	(-28' to-29' NAVD)	**1**	**0.131**	**0.094**		**0.0**			

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

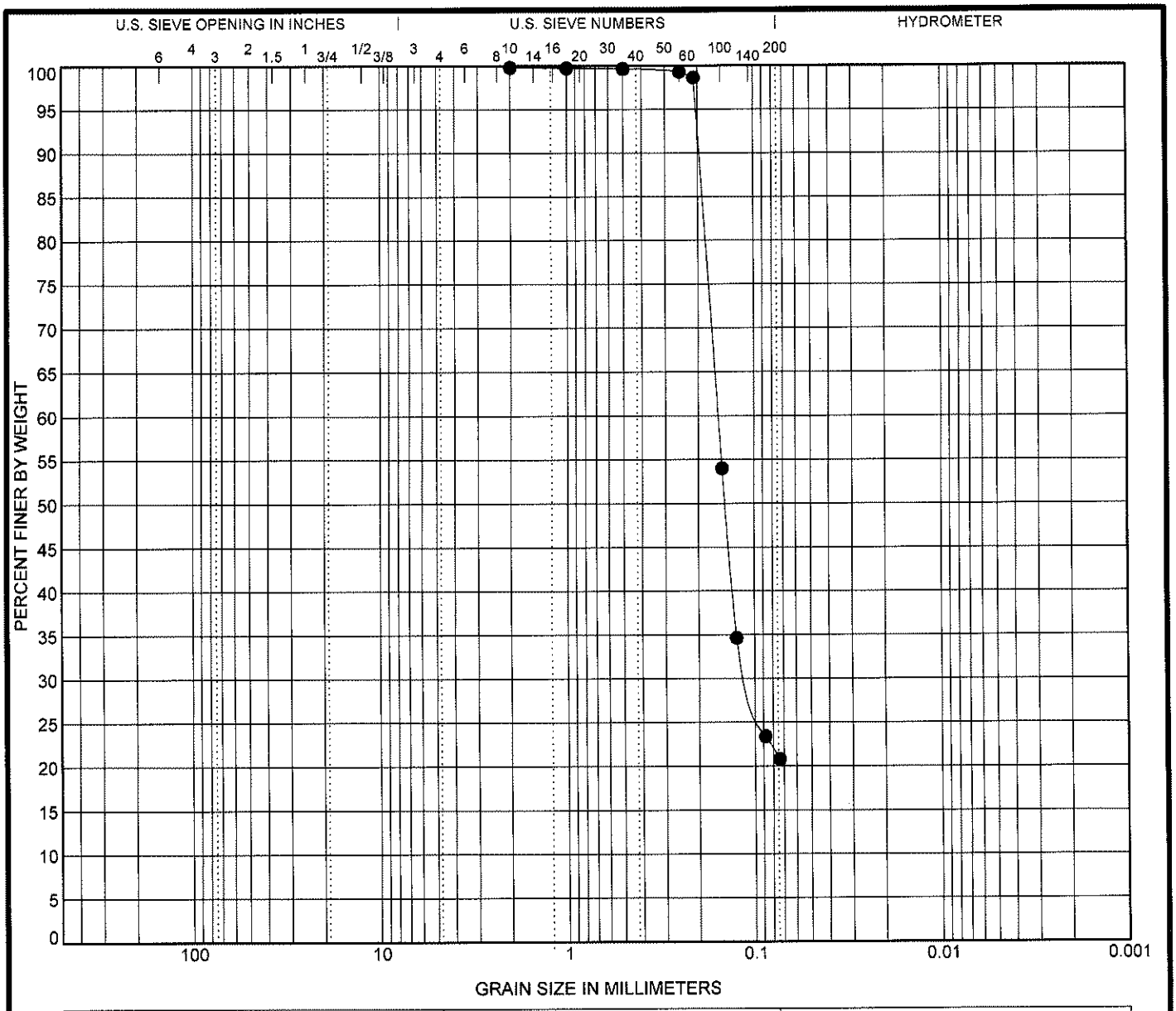
GRAIN SIZE DISTRIBUTION

Project: Anchorage Basin Sand Source Investigation

Location: Anchorage Basin; Galveston, Texas

Number: G109112

US_GRAIN_SIZE G109112 PROP. ANCHORAGE BASIN SAND SOURCE.GPJ US_LAB.GDT 4/9/09



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
●	**AA-16**	(-30' to -31' NAVD)	**Borrow Area (-30' to -31' NAVD)**					

	Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**AA-16**	(-30' to -31' NAVD)	**2**	**0.156**	**0.108**		**0.0**			

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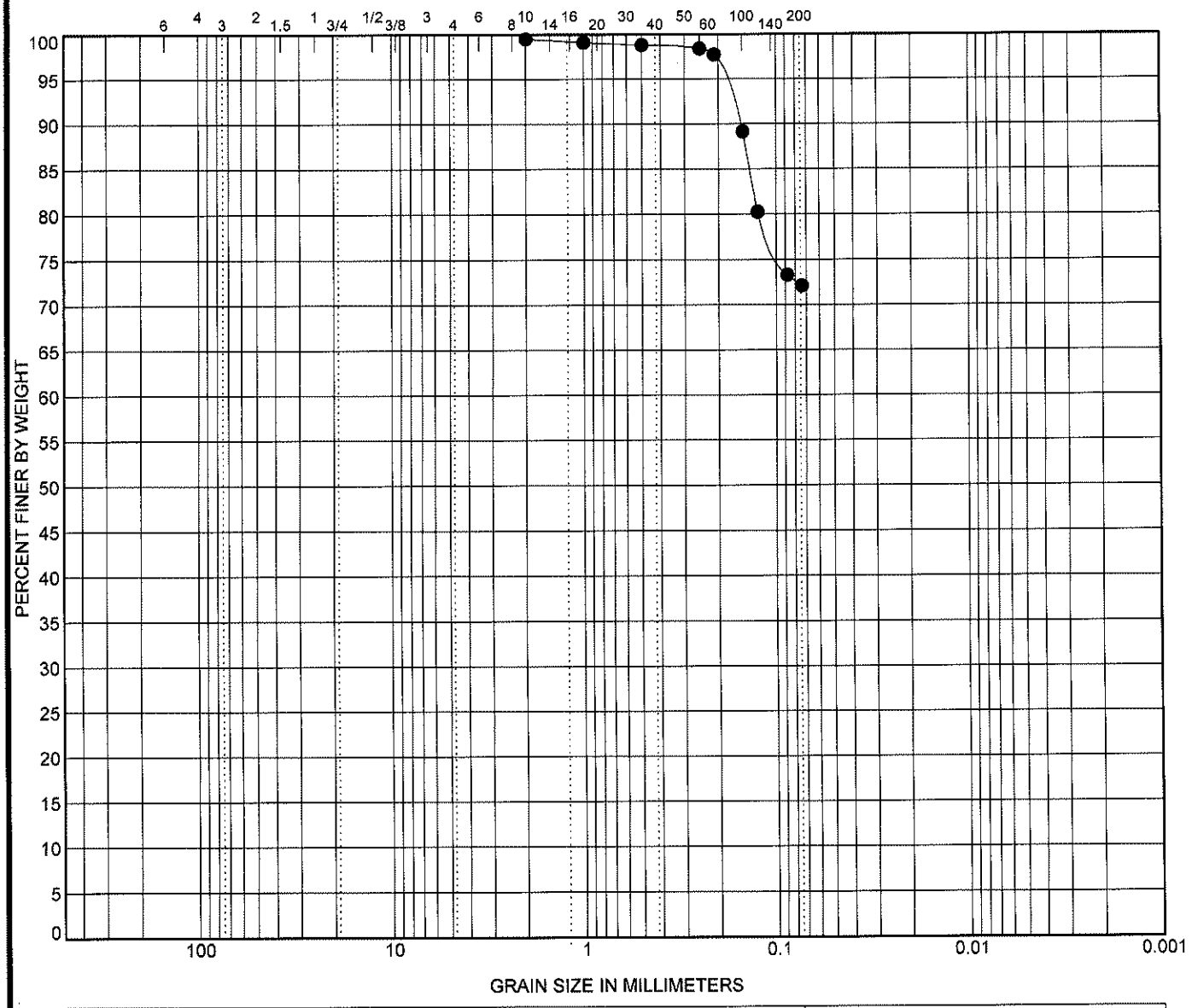

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
●	**AA-16**	(-32' to -33' NAVD)	**Borrow Area (-32' to -33' NAVD)**					

	Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**AA-16**	(-32' to -33' NAVD)	**2**				**0.0**			

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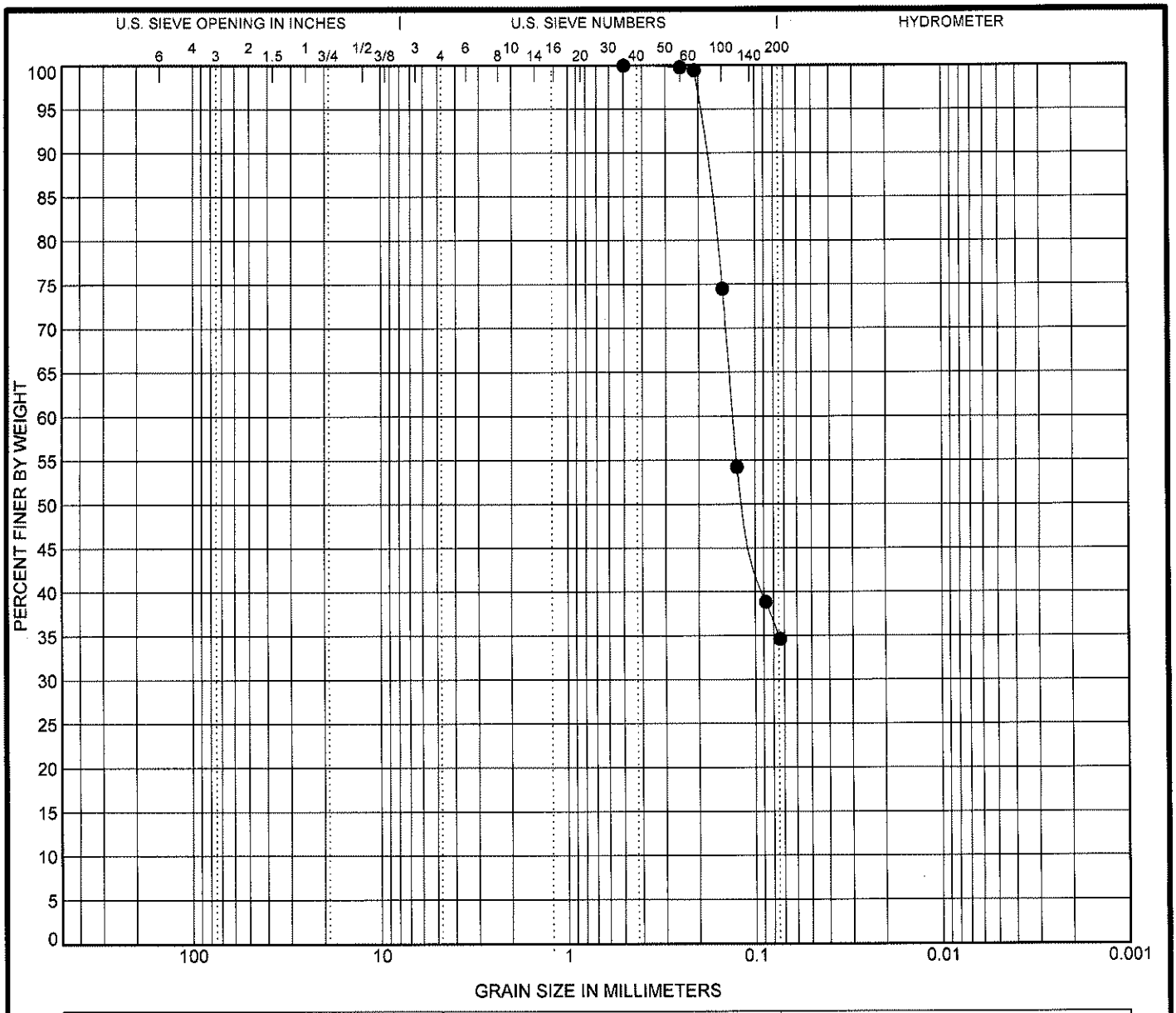

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
●	**AA-16**	(-34' to -35' NAVD)	**Borrow Area (-34' to -35' NAVD)**					

	Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**AA-16**	(-34' to -35' NAVD)	**0.5**	**0.131**			**0.0**			

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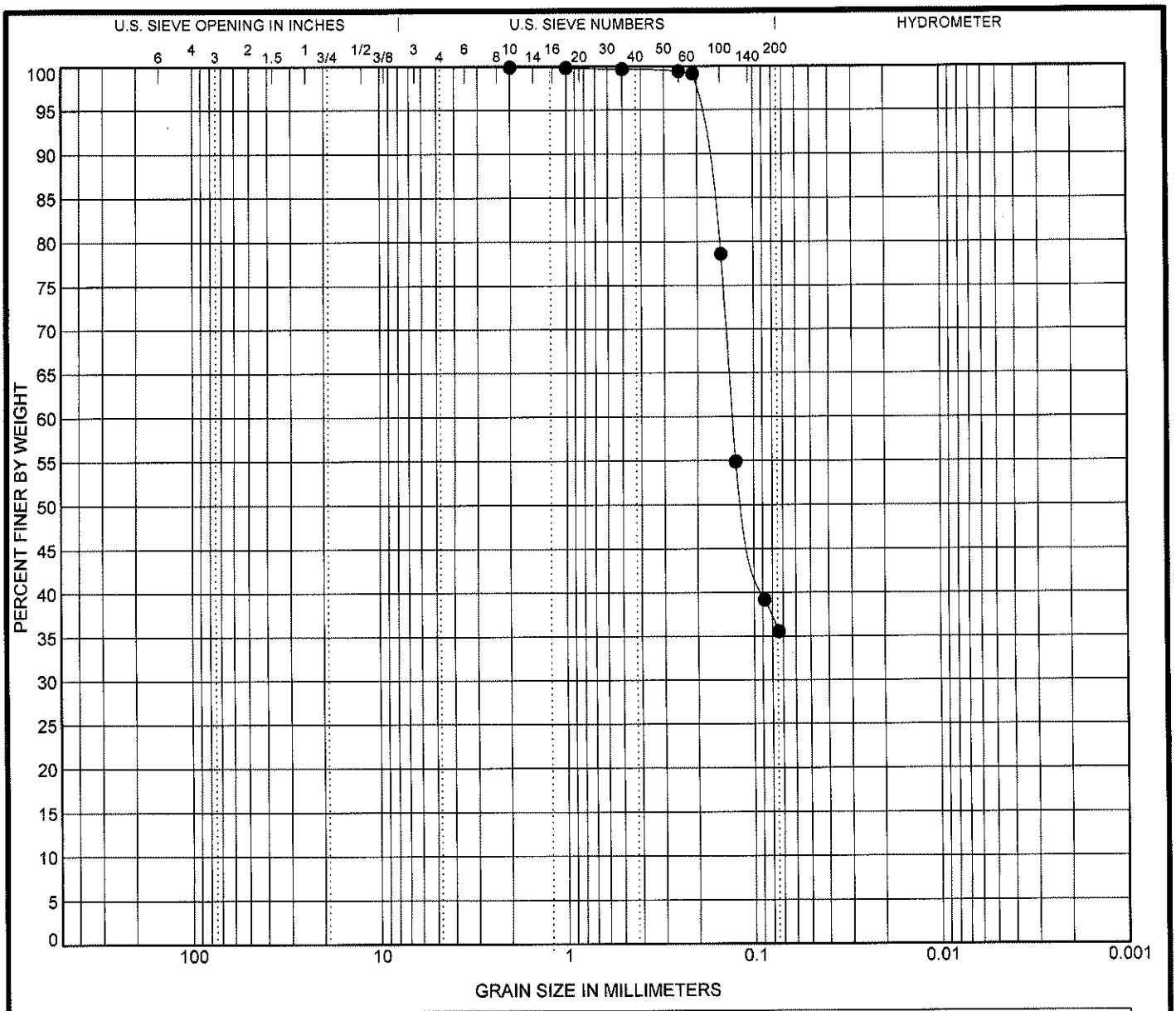

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
●	**AA-16**	(-36' to -37' NAVD)	**Borrow Area (-36' to -37' NAVD)**					

	Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**AA-16**	(-36' to -37' NAVD)	**2**	**0.13**			**0.0**			

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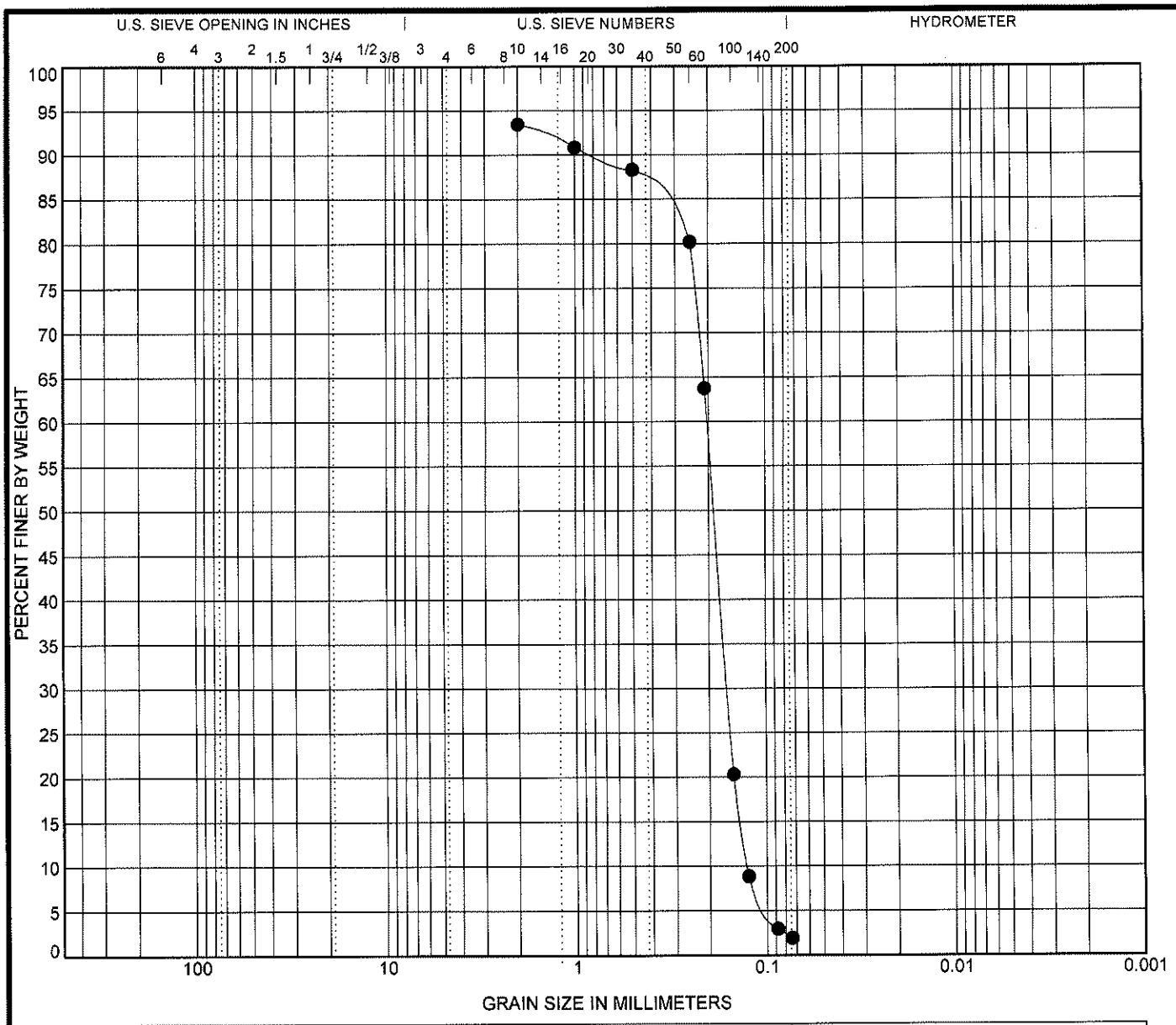

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen ID	Depth	Classification	LL	PL	PI	Cc	Cu
●	**AA-16**	(-39' to -40' NAVD)	**Borrow Area (-39' to -40' NAVD)**				**1.00**	**1.60**

	Specimen ID	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**AA-16**	(-39' to -40' NAVD)	**2**	**0.204**	**0.161**	**0.127**	**0.0**			

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GRAIN SIZE DISTRIBUTION

Project: Anchorage Basin Sand Source Investigation

Location: Anchorage Basin; Galveston, Texas

Number: G109112

LOG OF BORING AA-16

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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: -28' NAVD

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 (%)	DESCRIPTION OF STRATUM
	19											
	20											
	21											
	22											
	23											
	24											
	25											
	26											
	27											
	28	S-1									19	**SILTY CLAYEY SAND**, gray.
	29	S-2										Same as above.
	30	S-3									21	Same as above.
	31	S-4										**SANDY CLAY**, with shell fragments, gray.
	32	S-5									72	Same as above.
	33	S-6										Same as above.
	34	S-7									35	**CLAYEY SAND**, gray.
	35	S-8										Same as above.
	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. 13,699,918' E. 3,319,141'

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

LOG OF BORING AA-16

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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: -28' 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	 PLASTIC LIMIT PL	 PLASTICITY INDEX PI	DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	
		S-9									36	Same as above.
	37											**POORLY GRADED SAND**, gray.
	38	S-10										Same as above.
	39	S-11										Same as above.
	40	S-12									2	Boring was extended to an elevation of -40-feet NAVD during the drilling operations.

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

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