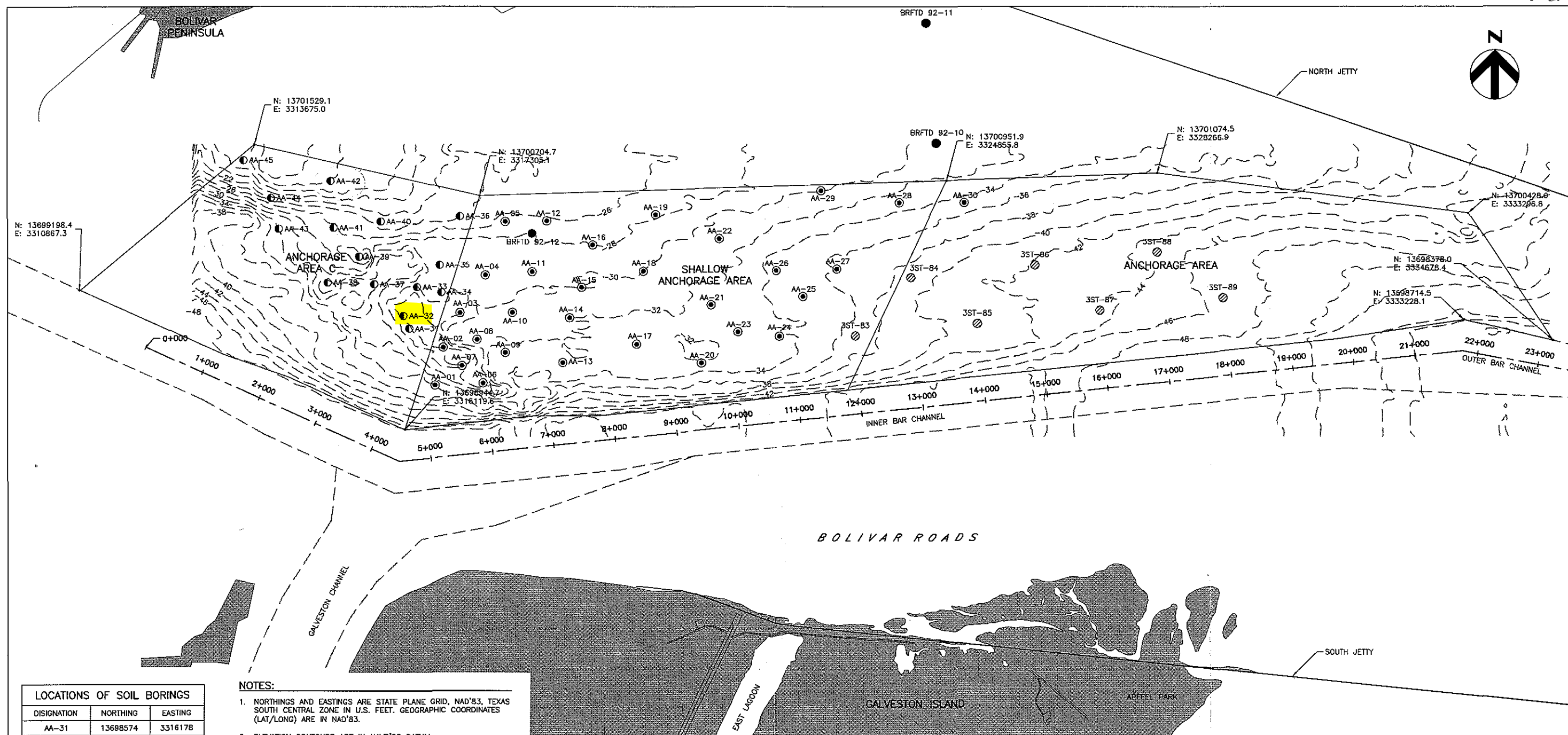


1391 Tech  
Downers



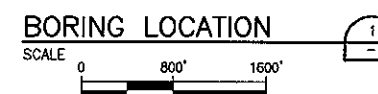
| LOCATIONS OF SOIL BORINGS |          |         |
|---------------------------|----------|---------|
| DISIGNATION               | NORTHING | EASTING |
| AA-31                     | 13698574 | 3316178 |
| AA-32                     | 13698778 | 3316085 |
| AA-33                     | 13699244 | 3316297 |
| AA-34                     | 13699156 | 3316692 |
| AA-35                     | 13699595 | 3316661 |
| AA-36                     | 13700379 | 3316989 |
| AA-37                     | 13699288 | 3315613 |
| AA-38                     | 13699316 | 3314867 |
| AA-39                     | 13699731 | 3315371 |
| AA-40                     | 13700296 | 3315711 |
| AA-41                     | 13700196 | 3314956 |
| AA-42                     | 13700944 | 3314910 |
| AA-43                     | 13700178 | 3314070 |
| AA-44                     | 13700672 | 3313951 |
| AA-45                     | 13701278 | 3313502 |

#### NOTES:

- NORTHINGS AND EASTINGS ARE STATE PLANE GRID, NAD'83, TEXAS SOUTH CENTRAL ZONE IN U.S. FEET. GEOGRAPHIC COORDINATES (LAT/LONG) ARE IN NAD'83.
- ELEVATION CONTOURS ARE IN NAVD'88 DATUM.
- ELEVATION CONTOURS BASED ON INFORMATION PROVIDED BY THE U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT. SURVEY DATE WAS JUNE 2009. ELEVATIONS WERE CONVERTED FROM USACE MLT TO NAVD '88 USING THE FOLLOWING CORRELATION:  
0 NAVD '88 = 1.42' MLT.
- VIBRACORES WERE PERFORMED BY ROCK ENGINEERING AND TESTING LABORATORY, INC (RETL) AND OCEAN SURVEYS, INC DURING MARCH 2009.
- SOIL BORINGS WERE PERFORMED BY RETL DURING OCTOBER 2009.

#### LEGEND:

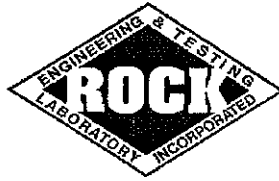
- HISTORICAL BORING LOCATIONS FROM USACE (1966)
- VIBRACORE LOCATIONS (SEE NOTE 4)
- VIBRACORE LOCATION FROM RICE UNIVERSITY
- BORING LOCATIONS (SEE NOTE 5)



## TEXAS GENERAL LAND OFFICE ANCHORAGE AREA C SAND SOURCE INVESTIGATION

BORING LOCATION PLAN - GALVESTON ANCHORAGE AREA

|        |          |
|--------|----------|
| DATE   | 11/30/09 |
| FIGURE | EX A     |



- Geotechnical Engineering
- Construction Materials Testing

**PROJECT NAME:** Galveston Anchorage Area C Sand Source Investigation

**CLIENT:** HDR Engineering, Inc.

**BORING ID.:** AA-32

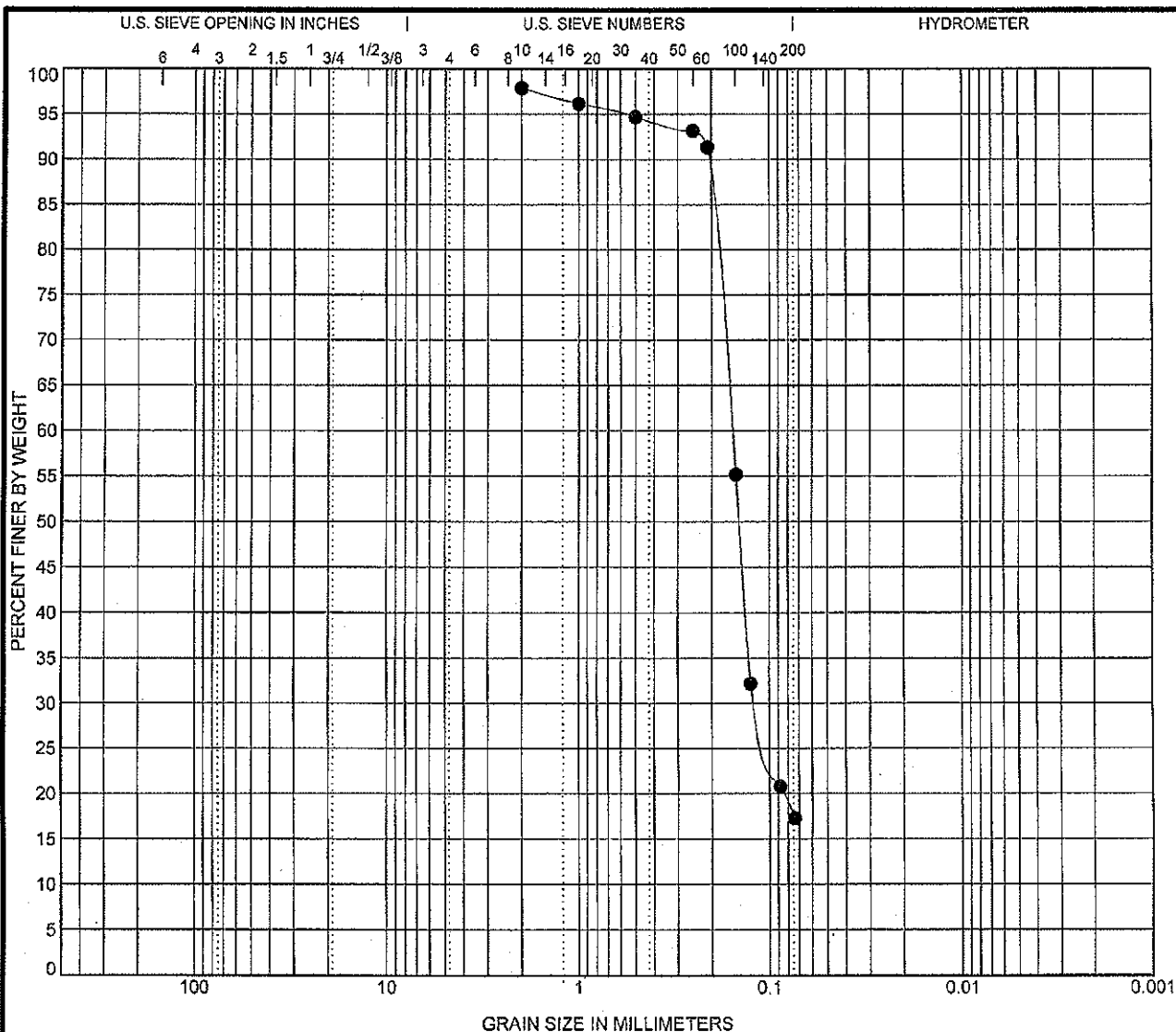
**DESCRIPTION:** Anchorage Area C Borrow Source Area

| PERCENT SHELL BY WEIGHT (BASED ON #10 SIEVE) |                            |                            |                            |                            |
|----------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| -25.62' to<br>-27.62' NAVD                   | -29.62' to<br>-31.62' NAVD | -31.62' to<br>-33.62' NAVD | -33.62' to<br>-35.62' NAVD | -35.62' to<br>-37.62' NAVD |
| 25.13                                        | 2.10                       | 3.25                       | 3.60                       | 2.50                       |

| ASTM<br>MESH                 | % FINER BY WEIGHT AFTER REMOVING SHELL |                            |                            |                            |                            |
|------------------------------|----------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|                              | -25.62' to<br>-27.62' NAVD             | -29.62' to<br>-31.62' NAVD | -31.62' to<br>-33.62' NAVD | -33.62' to<br>-35.62' NAVD | -35.62' to<br>-37.62' NAVD |
| #10                          | 100.00                                 | 100.00                     | 100.00                     | 100.00                     | 100.00                     |
| #18                          | 51.20                                  | 96.20                      | 92.50                      | 91.60                      | 94.80                      |
| #35                          | 30.20                                  | 94.70                      | 88.20                      | 85.50                      | 91.80                      |
| #60                          | 18.20                                  | 93.20                      | 84.30                      | 80.10                      | 89.10                      |
| #70                          | 14.80                                  | 91.40                      | 81.70                      | 77.50                      | 87.10                      |
| #100                         | 8.40                                   | 55.20                      | 63.30                      | 49.80                      | 47.00                      |
| #120                         | 5.90                                   | 32.20                      | 35.20                      | 32.40                      | 27.40                      |
| #170                         | 4.10                                   | 20.80                      | 14.20                      | 18.60                      | 15.60                      |
| #200                         | 3.60                                   | 17.30                      | 10.90                      | 15.50                      | 12.70                      |
| STATISTICS (EXCLUDING SHELL) |                                        |                            |                            |                            |                            |
| MEDIAN GRAIN<br>SIZE (mm)    | 0.95                                   | 0.15                       | 0.15                       | 0.16                       | 0.16                       |
| MEAN GRAIN SIZE<br>(mm)      | 0.59                                   | N/A                        | 0.15                       | 0.18                       | 0.14                       |
| SORTING ( $\sigma$ )         | 1.01                                   | N/A                        | N/A                        | N/A                        | 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-32     | 29.6' | AA-32 (-29.6' to -31.6' NAVD) |    |    |    |    |    |
|             |       |                               |    |    |    |    |    |
|             |       |                               |    |    |    |    |    |
|             |       |                               |    |    |    |    |    |

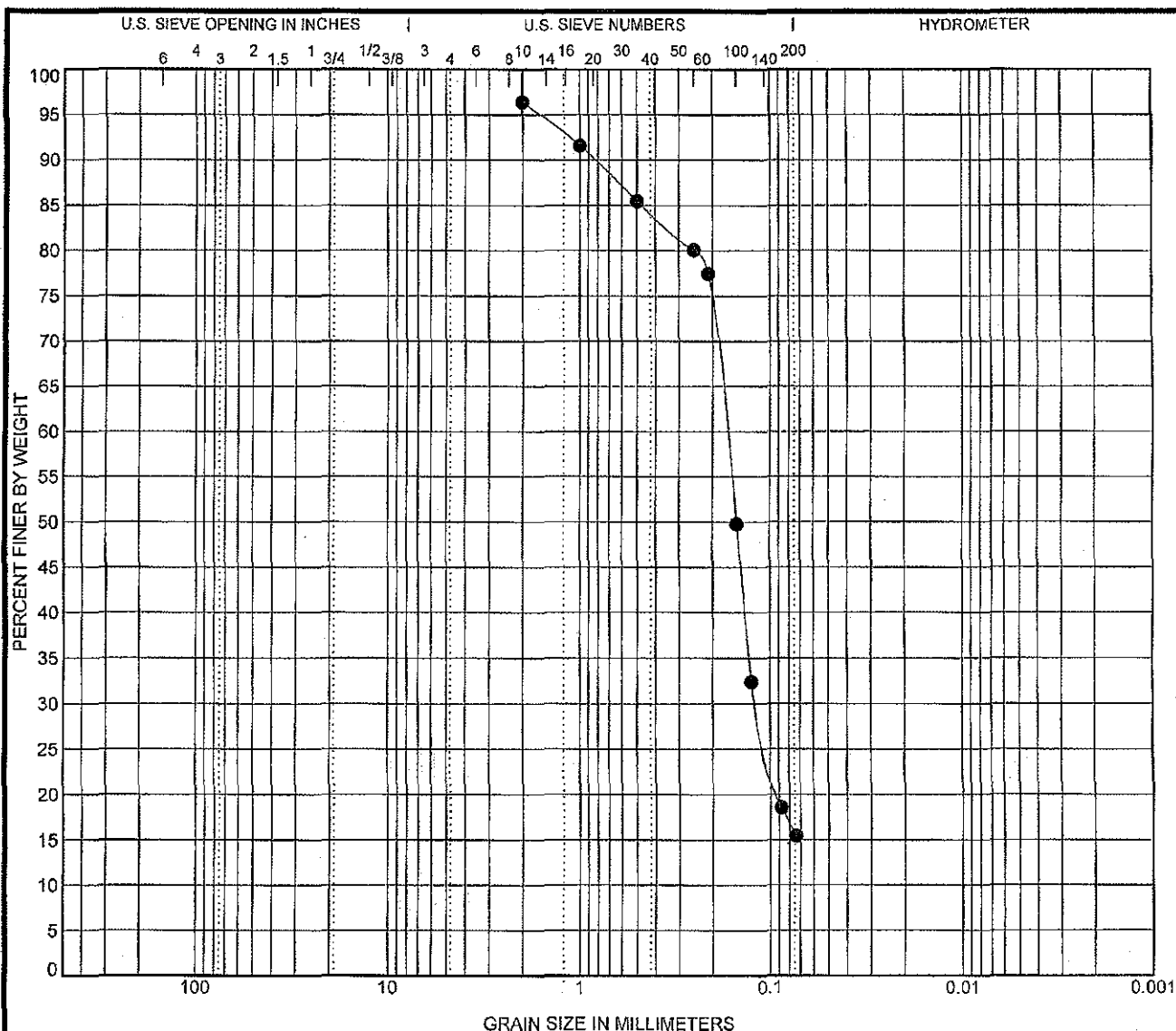
| Specimen ID | Depth | D100 | D60   | D30   | D10 | %Gravel | %Sand | %Silt | %Clay |
|-------------|-------|------|-------|-------|-----|---------|-------|-------|-------|
| ● AA-32     | 29.6' | 2    | 0.156 | 0.117 |     | 0.0     |       |       |       |
|             |       |      |       |       |     |         |       |       |       |
|             |       |      |       |       |     |         |       |       |       |
|             |       |      |       |       |     |         |       |       |       |



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

## GRAIN SIZE DISTRIBUTION

Project: Prop. Anchorage Area "C" Sand Source Inv.  
Location: Galveston Island, Texas  
Number: G109233



| COBBLES | GRAVEL |      | SAND   |        |      | SILT OR CLAY |
|---------|--------|------|--------|--------|------|--------------|
|         | coarse | fine | coarse | medium | fine |              |

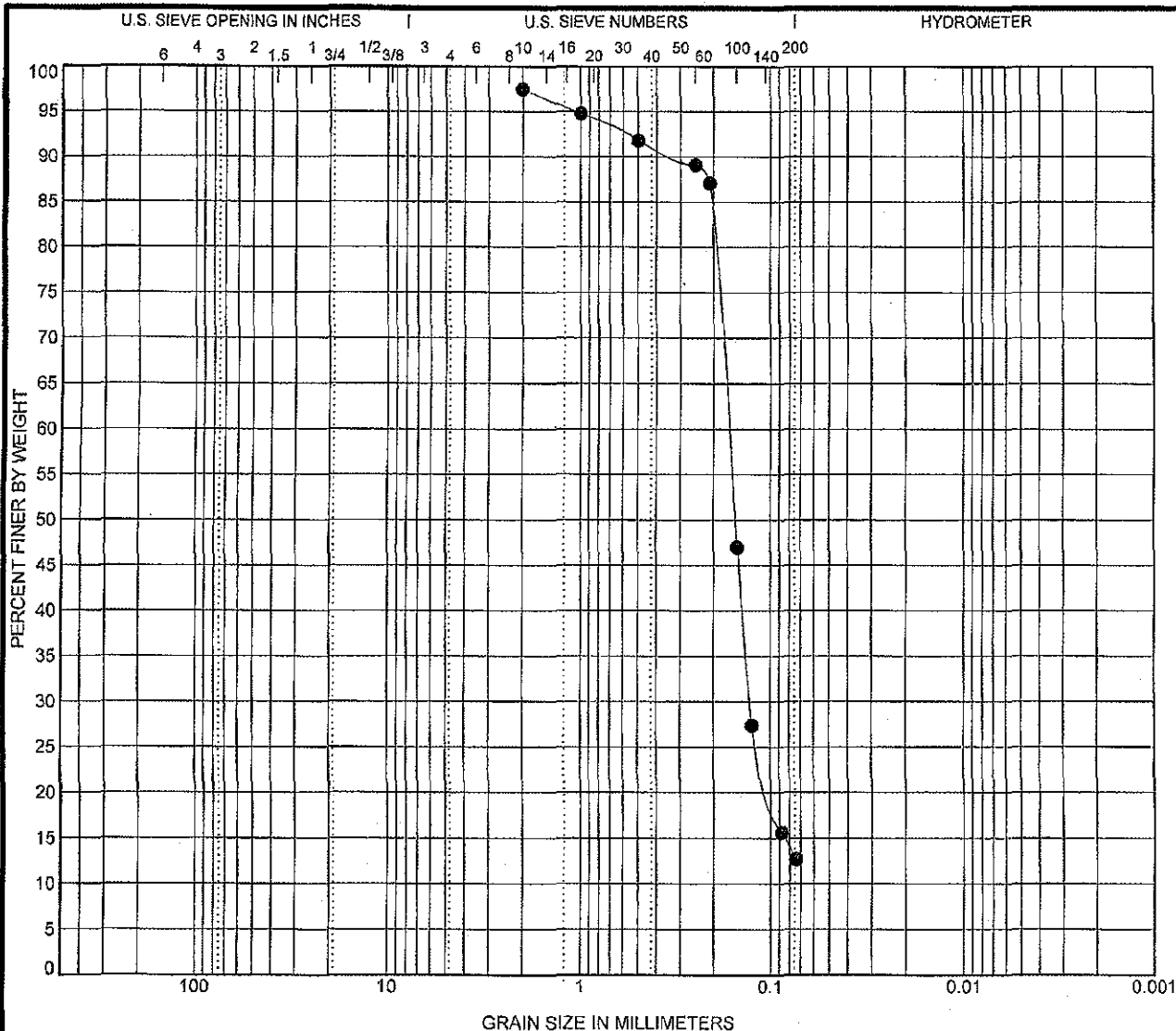
| Specimen ID | Depth | Classification                |       |       |     | LL      | PL    | PI    | Cc    | Cu |
|-------------|-------|-------------------------------|-------|-------|-----|---------|-------|-------|-------|----|
| ● AA-32     | 33.6' | AA-32 (-33.6' to -35.6' NAVD) |       |       |     |         |       |       |       |    |
|             |       |                               |       |       |     |         |       |       |       |    |
|             |       |                               |       |       |     |         |       |       |       |    |
|             |       |                               |       |       |     |         |       |       |       |    |
| Specimen ID | Depth | D100                          | D60   | D30   | D10 | %Gravel | %Sand | %Silt | %Clay |    |
| ● AA-32     | 33.6' | 2                             | 0.169 | 0.118 |     | 0.0     |       |       |       |    |
|             |       |                               |       |       |     |         |       |       |       |    |
|             |       |                               |       |       |     |         |       |       |       |    |
|             |       |                               |       |       |     |         |       |       |       |    |



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### GRAIN SIZE DISTRIBUTION

Project: Prop. Anchorage Area "C" Sand Source Inv.  
 Location: Galveston Island, Texas  
 Number: G109233



| COBBLES | GRAVEL |      | SAND   |        |      | SILT OR CLAY |
|---------|--------|------|--------|--------|------|--------------|
|         | coarse | fine | coarse | medium | fine |              |

| Specimen ID | Depth | Classification                | LL | PL | PI | Cc | Cu |
|-------------|-------|-------------------------------|----|----|----|----|----|
| ● AA-32     | 35.6' | AA-32 (-35.6' to -37.6' NAVD) |    |    |    |    |    |
|             |       |                               |    |    |    |    |    |
|             |       |                               |    |    |    |    |    |
|             |       |                               |    |    |    |    |    |

| Specimen ID | Depth | D100 | D60   | D30   | D10 | %Gravel | %Sand | %Silt | %Clay |
|-------------|-------|------|-------|-------|-----|---------|-------|-------|-------|
| ● AA-32     | 35.6' | 2    | 0.167 | 0.128 |     | 0.0     |       |       |       |
|             |       |      |       |       |     |         |       |       |       |
|             |       |      |       |       |     |         |       |       |       |
|             |       |      |       |       |     |         |       |       |       |



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### GRAIN SIZE DISTRIBUTION

Project: Prop. Anchorage Area "C" Sand Source Inv.  
 Location: Galveston Island, Texas  
 Number: G109233

| BORING LOG                               |        |                             |                               |                               |                                                                           |
|------------------------------------------|--------|-----------------------------|-------------------------------|-------------------------------|---------------------------------------------------------------------------|
| Date: 10-15-09                           |        | Project Location: GALVESTON |                               | Boring No.: AA-32             |                                                                           |
|                                          |        | Type: HSA                   |                               | Location:                     |                                                                           |
| Depth<br>Feet                            | Symbol | Sample                      | N-Blows<br>Per Foot           | MATERIAL DESCRIPTION          | H <sub>2</sub> O on Rod<br>H <sub>2</sub> O Upon Comp.<br>Cave Upon Comp. |
| <del>1.0</del><br>2.5 26<br>28           |        | 1                           | 1 1/1                         | shell frag                    | G.P.S. 29,34890<br>94,76881                                               |
| <del>3.5</del> 28<br><del>5.0</del> 30   |        | 2                           | 3 3/3<br>1/3                  | same                          | W = 26'                                                                   |
| <del>6.0</del> 30<br><del>7.5</del> 32   |        | 3                           | 1 1/1<br>1/10                 | same                          |                                                                           |
| <del>8.5</del> 32<br><del>10.0</del> 34  |        | 4                           | 2 3/3<br>0/0                  | Gray silty sand w shell frag. |                                                                           |
| <del>11.0</del> 34<br><del>12.5</del> 36 |        | 5                           | 4 4/3<br>0/0                  | same (more shells)            |                                                                           |
| <del>13.5</del> 36<br><del>15.0</del> 38 |        | 6                           | 1 1/1<br>0/0                  | same (silty on bottom)        |                                                                           |
| <del>18.5</del> 38<br><del>20.0</del> 40 |        | 7                           | <del>1 1/1</del> 1 1/1<br>0/0 | same (sand on bottom)         |                                                                           |
| <del>23.5</del><br><del>25.0</del>       |        | 8                           |                               |                               |                                                                           |
| <del>28.5</del><br><del>30.0</del>       |        | 9                           |                               |                               |                                                                           |
| <del>33.5</del><br><del>35.0</del>       |        | 10                          |                               |                               |                                                                           |
| <del>38.5</del><br><del>40.0</del>       |        | 11                          |                               |                               |                                                                           |
| <del>43.5</del><br><del>45.0</del>       |        | 12                          |                               |                               |                                                                           |
| <del>48.5</del><br><del>50.0</del>       |        | 13                          |                               |                               |                                                                           |

## LOG OF BORING AA-32

SHEET 1 of 1



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

CLIENT: HDR Engineering, Inc.  
PROJECT: Galveston Anchorage Area C Sand Source Inv.  
LOCATION: Anchorage Area C, Galveston, Texas  
NUMBER: G109233

DATE(S) DRILLED: 10/15/09 - 10/15/09

## FIELD DATA

## LABORATORY DATA

## DRILLING METHOD(S):

Hollow Stem Auger

## GROUNDWATER INFORMATION:

SURFACE ELEVATION: -23.62' NAVD

## DESCRIPTION OF STRATUM

14' with less than 20%  
fines (AA-31)

12' w/ < 20% fines

POORLY GRADED SAND, with shell fragments, dark gray,  
very loose.  
Same as above, loose.

SILTY CLAYEY SAND, with shell fragments, dark gray,  
medium.

Same as above, very loose.

POORLY GRADED SAND, with clay and shell fragments,  
gray, very loose.

SILTY CLAYEY SAND, with shell fragments, gray, very loose.

Same as above, loose.

Boring was extended to an elevation of -37.6-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 Engineering, Inc. Boring operations  
were performed by RETL at GPS Coord. N. 29.34890 W. 94.76881.

LOG OF BORING G109233 ANCHORAGE BASIN C.GPJ ROCK ETL.GDT 11/30/09