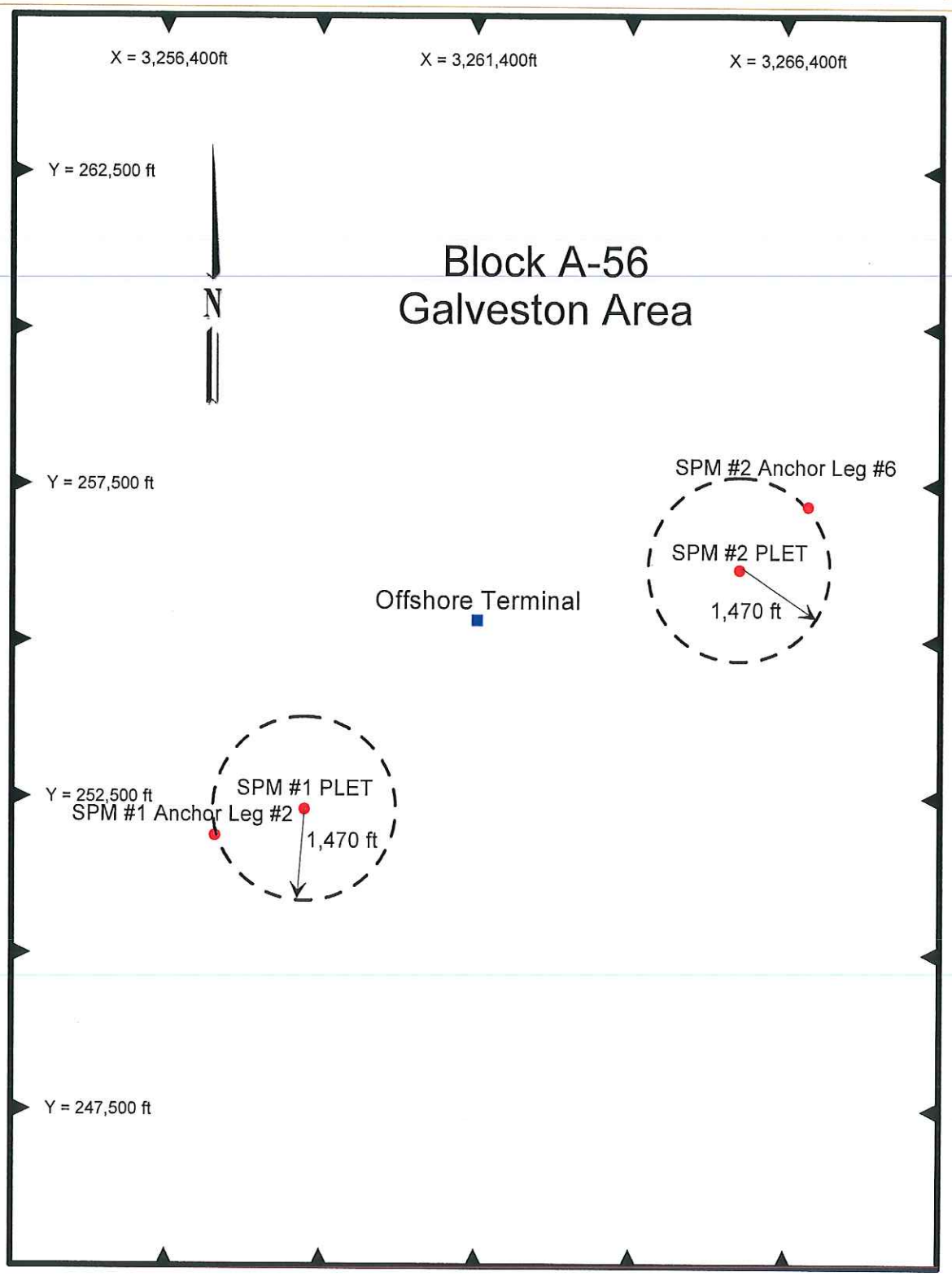
Date: 8/19/08
Drawn By: KW
Date: 8/19/08
Date: 8/19/12
Checked By: MB
Approved By: DL




Projection: Texas South Central Zone Coordinates

## PLAN OF BORINGS

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area

Checked By: AW Date: 8/18/08
Approved By: DM Date: 8/19/08

Drawn By: for TT Date: 8/15/08

Report No. 0201-6502

X = 3,261,424'
Y = 255,336'

Texas South Central Zone Coordinates
SEAFLOOR AT EL. - 118'

| Penetration Below Seafloor, [feet] | Soil Description | BLOW COUNT |
|---|---|---|
| 0 | I SOFT OLIVE GRAY TO GRAY CLAY TO CLAYEY SAND (9.0') | WOH |
| | | 5 |
| | | 10 |
| | SOFT TO FIRM GRAY CLAY | 10 |
| | II | 10 |
| | | 5 |
| | | 10 |
| 25 | (29.0') | PUSH |
| | | PUSH |
| | | PUSH |
| | III MEDIUM DENSE TO DENSE GRAY SILTY FINE SAND | PUSH |
| | | 20 |
| | | 10 |
| | (46.0') | 20 |
| | | 20 |
| 50 | FIRM TO VERY STIFF GRAY CLAY | 20 |
| | | 10 |
| | | PUSH |
| | | PUSH |
| 75 | Note: See PLATE 2b for detailed soil stratigraphy to 100-ft penetration | PUSH |
| | | PUSH |
| | | PUSH |
| 100 | | PUSH |
| | -with a few calcareous nodules and shell fragments, 115' to 127' | PUSH |
| 125 | -lean, mottled with yellowish red at 116' -olive gray, 125' to 147' | PUSH |
| | -with a few pockets of organic matter, 135' to 145' -blocky at 136' | PUSH |
| | IV -with reddish brown bands at 145' -fine sand layer, with silt, 146' to 153' | PUSH |
| 150 | -lean, with a few sand seams at 155' | PUSH |
| | -with a few pockets of organic matter, 165' to 187' -with silt pockets and partings, and a few light gray bands, 165' to 177' | 20 |
| 175 | -with a few silt seams at 166' -platy, 175' to 227' -expansive, 175' to 197' | PUSH |
| | -with gas blisters and a few cemented nodules at 176' | PUSH |
| | -with light gray bands at 186' -dark gray, with gray and light gray bands at 196' | PUSH |
| 200 | -with a few cemented nodules below 205' | PUSH |
| | -sandy silt layer at 223' -silty at 225' -with a few silt pockets at 227' | PUSH |
| 225 | -greenish gray and expansive, with gas blisters, gray bands, and many silt pockets and partings at 236' (242.0') | 20 |
| | | PUSH |
| | V DENSE GRAY FINE SAND -with silt at 245' | 30/18" |
| 250 | -with a few clay pockets at 255' | 30/18" |
| | -with a few pockets of organic matter at 265' (273.0') | 30/18" |
| 275 | VERY STIFF TO HARD OLIVE GRAY CLAY INTERLAYERED WITH MEDIUM DENSE TO DENSE SILTY FINE SAND | PUSH |
| | -with a few silt partings at 276' -cemented sand at 287' | PUSH 25/18" 30/18" |
| | -with a few clay pockets, 289' to 297' | 24 |
| 300 | -with a few shell fragments at 289' | |
| | VI -with many shell fragments and mica at 296' -lean, with many sand pockets and seams, and a few shell and wood fragments at 306' | PUSH |
| | -sandy silt layer, with clay seams at 316' -greenish gray and expansive, with gas blisters below 325' | PUSH |
| 325 | -lean and friable, with sand pockets and a few calcareous nodules at 325' -with a few silt pockets at 336' (341.0') | PUSH |
| | VII DENSE TO VERY DENSE OLIVE GRAY FINE SAND -with silt, a few wood fragments and pockets of organic matter at 345' (362.0') | 30/15" |
| 350 | | 30/18" 30/8" |
| | VERY STIFF TO HARD OLIVE GRAY CLAY -expansive, with gas blisters -platy, with pockets of organic matter at 366' | PUSH |
| | -with many silt pockets and partings at 376' | PUSH |
| 375 | -silty fine sand layer, 385' to 390' -with a few clay partings and wood fragments at 386' | PUSH |
| | -lean, laminated with sand at 396' | PUSH |
| 400 | VIII -with many silt partings at 406' | PUSH |
| | -platy, 415' to 450' -with silt partings and a few shell fragments at 416' | PUSH |
| 425 | -with a few silt partings at 426' -with a few shell fragments, 435' to 450' | PUSH |
| | -with sand pockets and a few silt partings at 435' -greenish gray shell fragment layer in a clay binder at 436' | PUSH |
| 450 | -dark gray, with silt pockets at 448' (450.0') | PUSH |
| 475 | | |
| 500 | | |

IDENTIFICATION TESTS, [%]
SUBMERGED UNIT WEIGHT, [kcf]
0.03 0.04 0.05 0.06
20 40 60 80

UNDRAINED SHEAR STRENGTH
[ksf]
1 2 3 4

(6.59, 325.5)
366.5)
(5.12, 449.0)

Note: NP - Non-plastic material

+ Strength exceeds capacity of measuring device.

**SAMPLING TECHNIQUES**

Number of blows of a 175-lb weight (hammer) dropped approximately 5 ft to produce a maximum of 24 in. of penetration of a 2.25-in.-OD, 2.125-in.-ID thin-walled tube sampler. "PUSH" denotes a 3.00-in.-OD, 2.83-in.-ID thin-walled tube sampler was advanced 24 in. with the weight of the drill string. "WOH" denotes a 2.50-in.-OD, 2.125-in.-ID liner sampler was advanced 24 in. with the weight of the hammer.

**CLASSIFICATION TESTS**

- ▼ SOLUBILITY IN HCL, [%]
- ■ PERCENT PASSING -200 SIEVE, [%]
- ● WATER CONTENT (W), [%]
- □ SUBMERGED UNIT WEIGHT (SUW)

PLASTIC LIMIT (PL) — LIQUID LIMIT (LL)

**STRENGTH TESTS**

- ⊗ POCKET PENETROMETER (PP)
- ⊕ TORVANE (TV)
- ◇ REMOTE VANE (RV)
- ◆ MINIATURE VANE (MV) (◇ RESIDUAL (MVres) VALUE)
- ▲ UNCONSOLIDATED UNDRAINED TRIAXIAL (UU)

(Open symbols indicate remolded (r) tests)

# LOG OF BORING AND TEST RESULTS

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area

PLATE 2a

Checked By: AM Date: 3/18/08
Approved By: AM Date: 8/19/08

Drawn By: [illegible] Date: 3/15/08
for TTonsol

Report No. 0201-6502

X = 3,261,424'
Y = 255,336'

Texas South Central Zone Coordinates
SEAFLOOR AT EL. - 118'

BLOW COUNT

IDENTIFICATION TESTS, [%]
20 40 60 80
SUBMERGED UNIT WEIGHT, [kcf]
0.03 0.04 0.05 0.06

UNDRAINED SHEAR STRENGTH
[ksf]
0.5 1.0 1.5 2.0

I

SOFT OLIVE GRAY TO GRAY CLAY TO CLAYEY SAND
-with shell fragments
-with a few silt pockets at mudline
-with silt pockets at 3'
-shell layer in a clay binder at 8'
(9.0')

WOH
5
10

II

SOFT TO FIRM GRAY CLAY
-with silt pockets to 17'
-lean to 11'
-with sand pockets, 12' to 17'
-with a few pockets of organic matter at 16'
-with a few sand pockets below 18'
(29.0')

10
10
5
10
PUSH
PUSH
PUSH

III

MEDIUM DENSE TO DENSE GRAY SILTY FINE SAND
-sandy silt layer, with a few clay seams to 32'
-with a few pockets of organic matter below 33'
-olive gray, with a few clay pockets and many shell fragments at 45'
(46.0')

PUSH
20
10
20
20
20
10

FIRM TO VERY STIFF GRAY CLAY
-with silt pockets and partings, and a few shell fragments to 47'
-with many silt pockets, partings, and seams, 48' to 67'
-with sand seams and mica, 48' to 57'
-lean at 49'
-with a few pockets of organic matter, 55' to 107'

PUSH

IV

-with silt pockets, partings, and seams, 75' to 87'
-with a few light gray bands at 76'

PUSH

PUSH

-with a few silt pockets, 95' to 137'
-with a few light gray bands at 96'

PUSH

+ Strength exceeds capacity of measuring device.

Penetration Below Seafloor, [feet]
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

SAMPLING TECHNIQUES

Number of blows of a 175-lb weight (hammer) dropped approximately 5 ft to produce a maximum of 24 in. of penetration of a 2.25-in.-OD, 2.125-in.-ID thin-walled tube sampler. "PUSH" denotes a 3.00-in.-OD, 2.83-in.-ID thin-walled tube sampler was advanced 24 in. with the weight of the drill string. "WOH" denotes a 2.50-in.-OD, 2.125-in.-ID liner sampler was advanced 24 in. with the weight of the hammer.

CLASSIFICATION TESTS

- ▼ SOLUBILITY IN HCL, [%]
- ■ PERCENT PASSING -200 SIEVE, [%]
- ● WATER CONTENT (W), [%]
- □ SUBMERGED UNIT WEIGHT (SUW)

PLASTIC LIMIT (PL) — LIQUID LIMIT (LL)

STRENGTH TESTS

- ⊗ POCKET PENETROMETER (PP)
- ⊕ TORVANE (TV)
- ◇ REMOTE VANE (RV)
- ◆ MINIATURE VANE (MV) (◈ RESIDUAL (MVres) VALUE)
- ▲ UNCONSOLIDATED UNDRAINED TRIAXIAL (UU)

(Open symbols indicate remolded (r) tests)

# LOG OF BORING AND TEST RESULTS

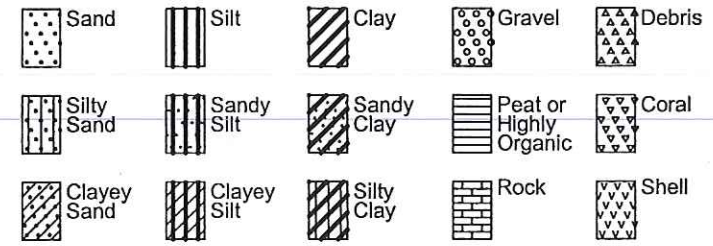
Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area

PLATE 2b

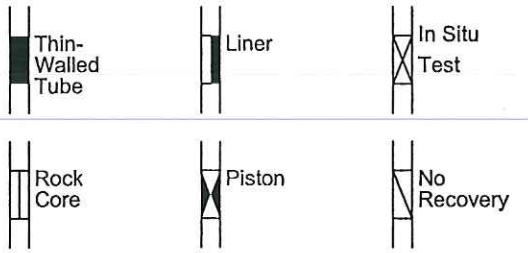
FUGRO

# TERMS AND SYMBOLS USED ON BORING LOG

## SOIL TYPES

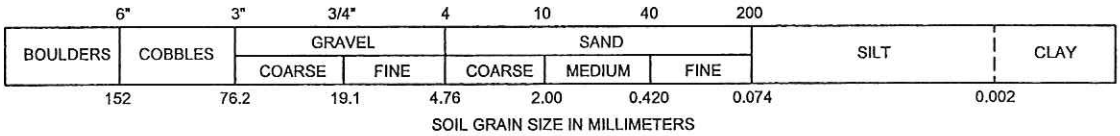



## SAMPLER TYPES




## SOIL GRAIN SIZE

U.S. STANDARD SIEVE




SOIL GRAIN SIZE IN MILLIMETERS

## STRENGTH OF COHESIVE SOILS[1]

| Consistency | Undrained Shear Strength, Kips Per Sq Ft |
|---|---|
| Very Soft | less than 0.25 |
| Soft | 0.25 to 0.50 |
| Firm | 0.50 to 1.00 |
| Stiff | 1.00 to 2.00 |
| Very Stiff | 2.00 to 4.00 |
| Hard | greater than 4.00 |

## DENSITY OF GRANULAR SOILS[2,3]

| Descriptive Term | *Relative Density, % |
|---|---|
| Very Loose | less than 15 |
| Loose | 15 to 35 |
| Medium Dense | 35 to 65 |
| Dense | 65 to 85 |
| Very Dense | greater than 85 |

*Estimated from sampler driving record

## SOIL STRUCTURE[1]

| | |
|---|---|
| Slickensided | Having planes of weakness that appear slick and glossy. The degree of slickensidedness depends upon the spacing of slickensides and the ease of breaking along these planes. |
| Fissured | Containing shrinkage or relief cracks, often filled with fine sand or silt, usually more or less vertical. |
| Pocket | Inclusion of material of different texture that is smaller than the diameter of the sample. |
| Parting | Inclusion less than 1/8 inch thick extending through the sample. |
| Seam | Inclusion 1/8 inch to 3 inches thick extending through the sample. |
| Layer | Inclusion greater than 3 inches thick extending through the sample. |
| Laminated | Soil sample composed of alternating partings or seams of different soil types. |
| Interlayered | Soil sample composed of alternating layers of different soil types. |
| Intermixed | Soil sample composed of pockets of different soil types and layered or laminated structure is not evident. |
| Calcareous | Having appreciable quantities of carbonate. |

**REFERENCES:**


(1) ASTM D 2488
(2) ASCE Manual 56 (1976)
(3) ASTM D 2049


Information on each boring log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as from laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines on the log may be transitional and approximate in nature. Water level measurements refer only to those observed at the times and places indicated in the text, and may vary with time, geologic condition or construction activity.

Date: 8/11/08

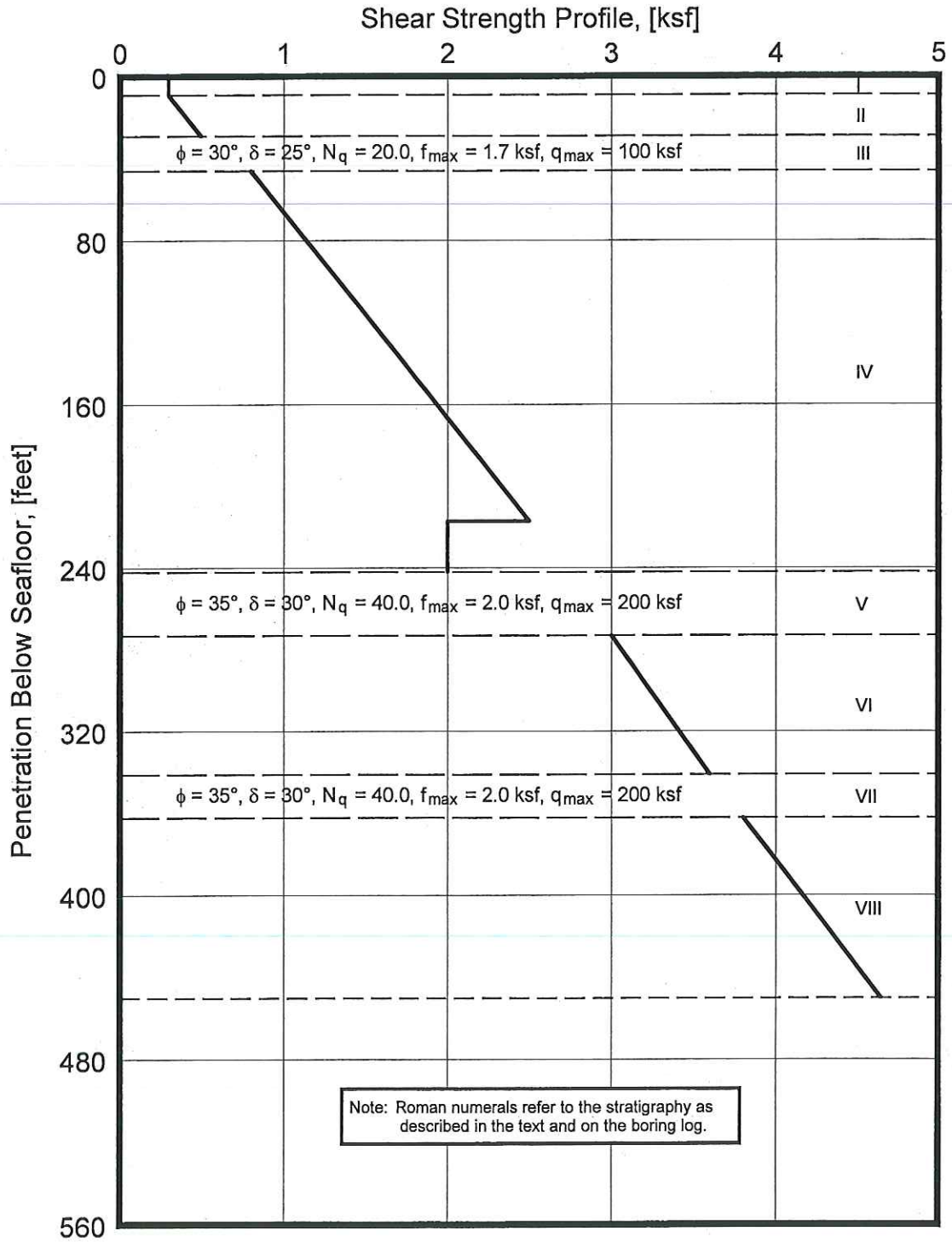
Drawn By: MWJ

Date: 8/14/08

Date: 8/15/08

Checked By: HB

Approved By:




**DESIGN STRENGTH PARAMETERS**

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area

Date: 2/11/02

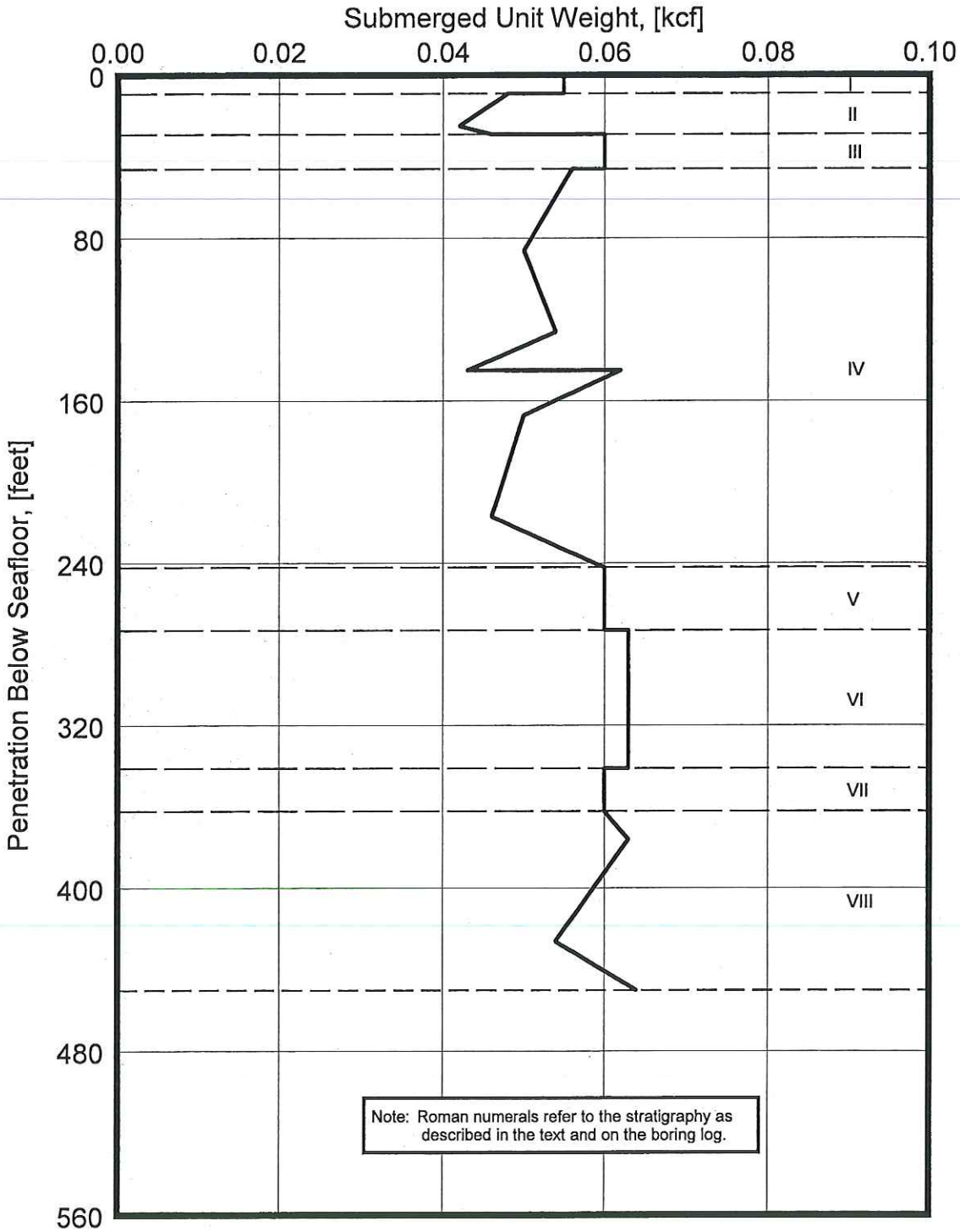
Drawn By: MW

Date: 8/14/08

Date: 8/15/08

Checked By: MB

Approved By: DH




**DESIGN SUBMERGED UNIT WEIGHT**

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area

Date: 8/14/08

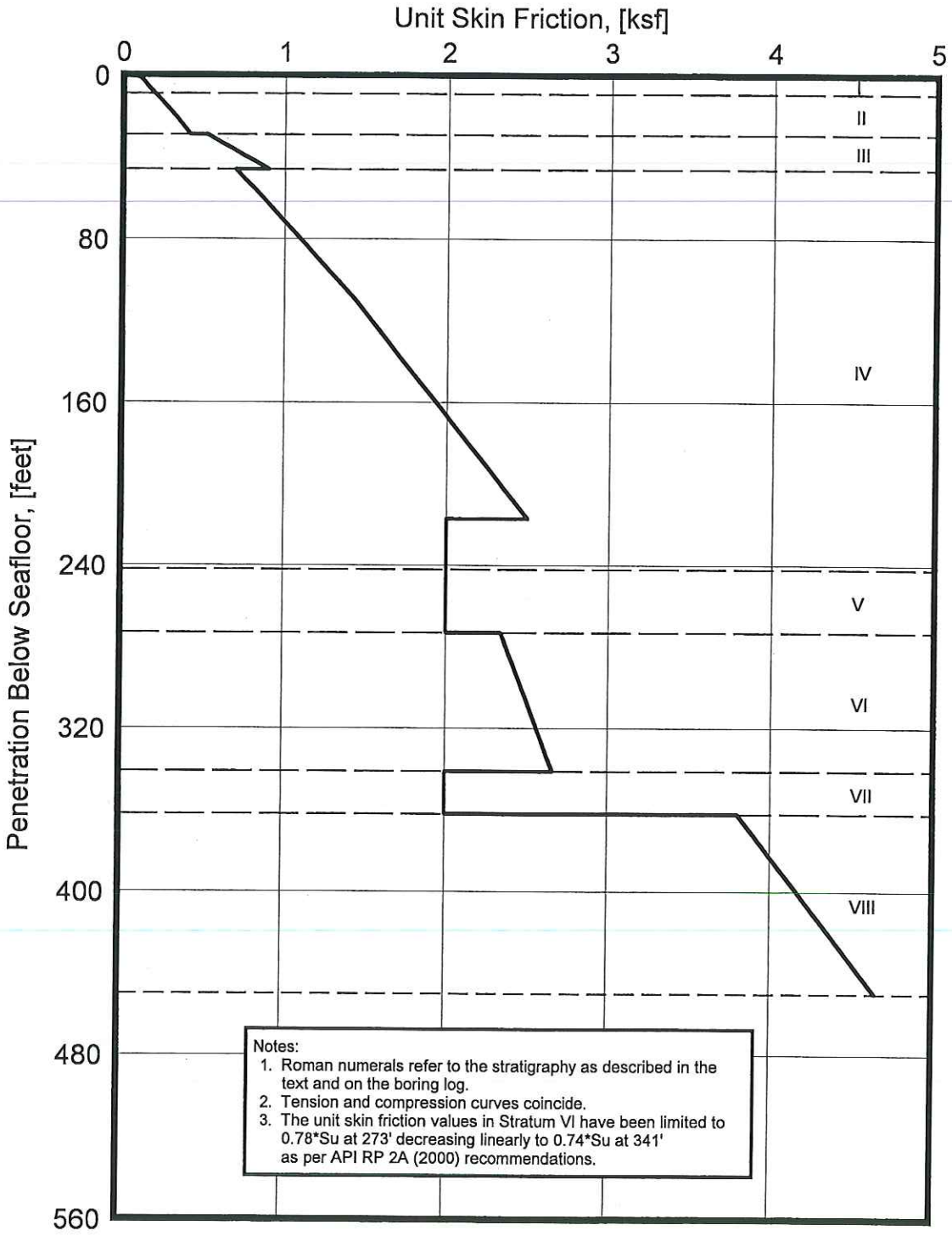
Drawn By: MMS

Date: 8/15/08

Date: 8/19/08

Checked By: MB

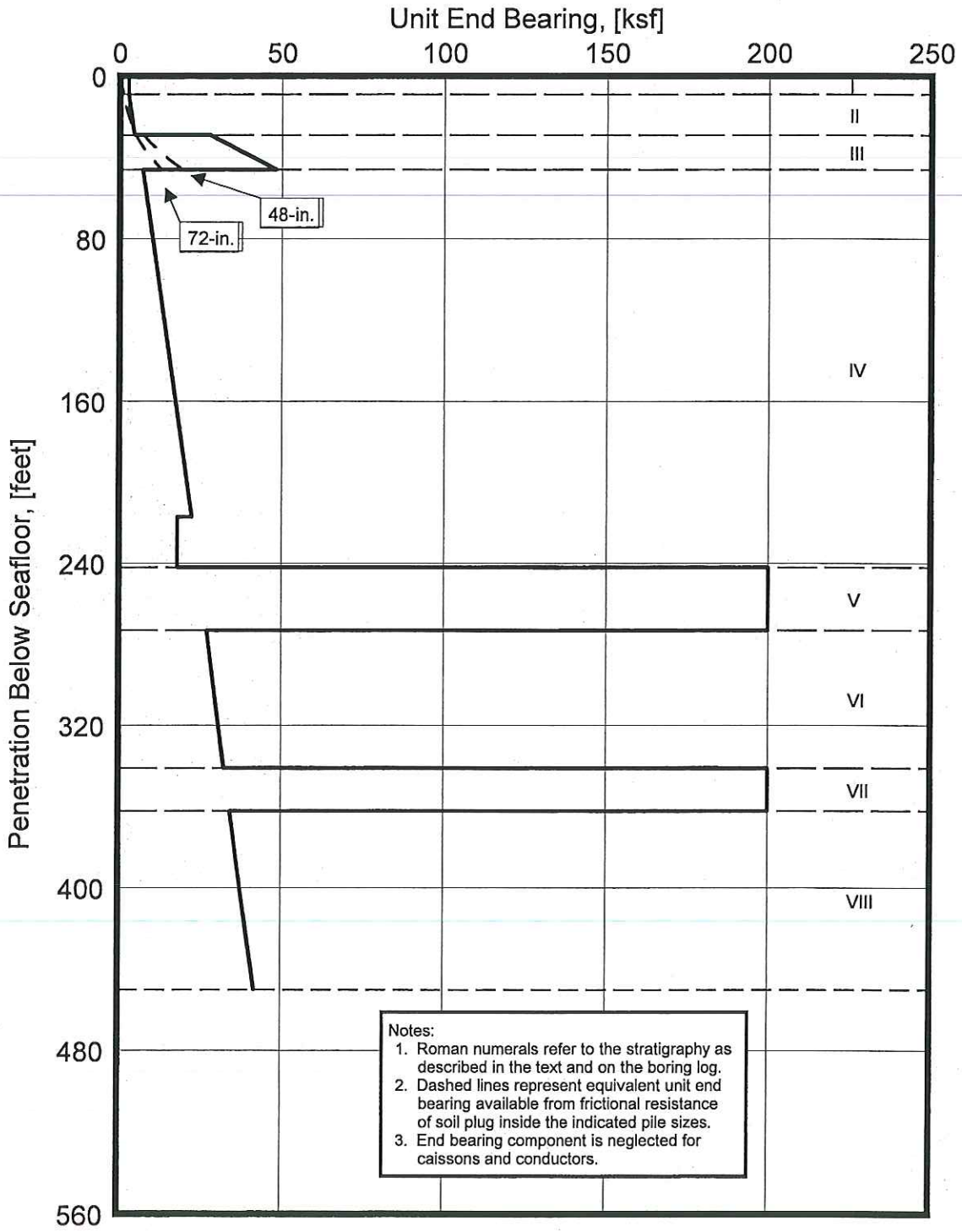
Approved By: CL




**UNIT SKIN FRICTION**
API RP 2A (2000) Method

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area

Date: 8/11/08
Drawn By: MWS
Date: 8/14/08
Date: 8/15/08
Checked By: MB
Approved By: DR



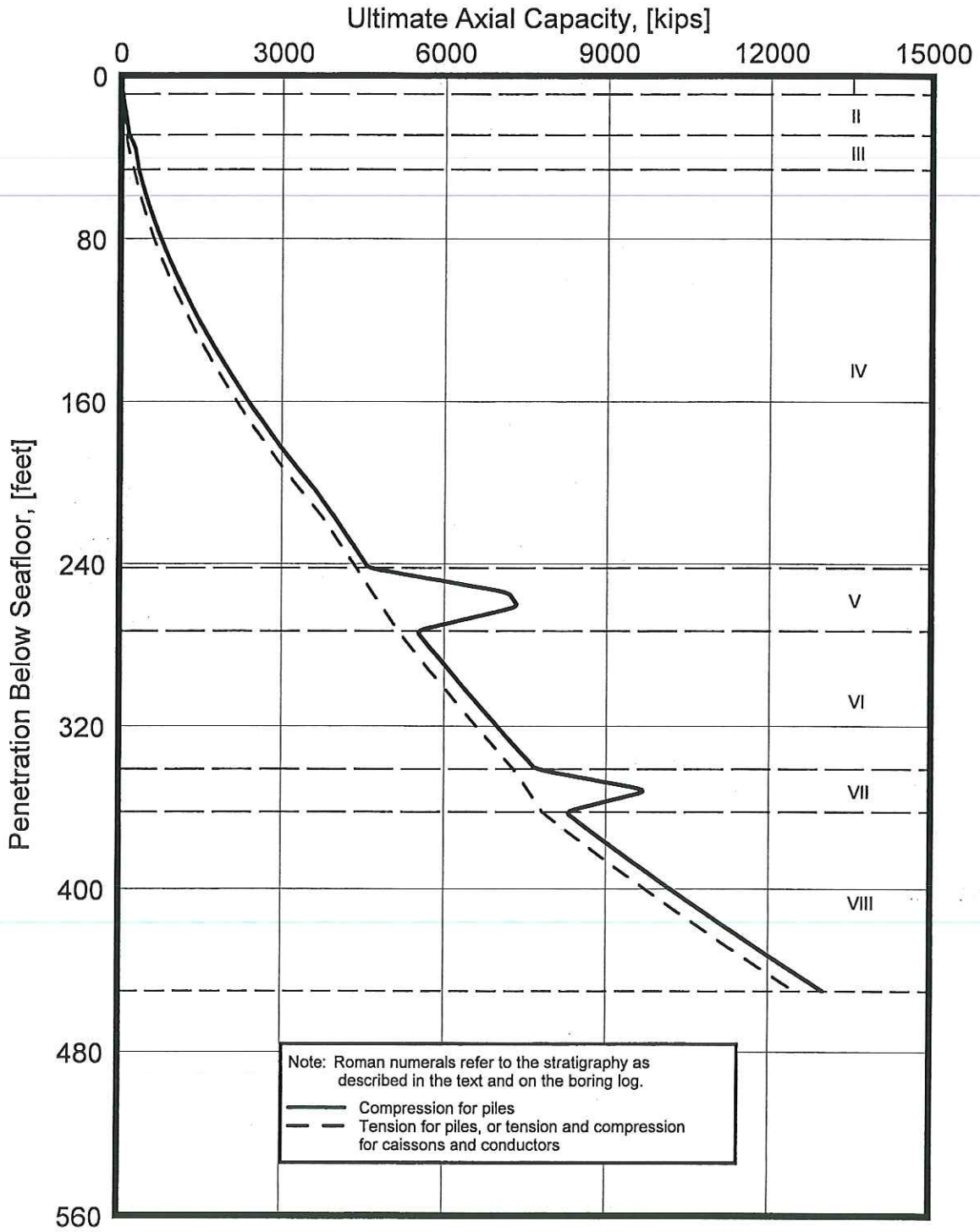

**UNIT END BEARING**
API RP 2A (2000) Method

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area

Drawn By: MMS Date: 8/11/08

Checked By: MB Date: 8/14/08

Approved By: JR Date: 8/19/08




**ULTIMATE AXIAL CAPACITY**
API RP 2A (2000) Method
48-in.-Diameter Driven Pipe Piles
Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area

Date: 8/11/08

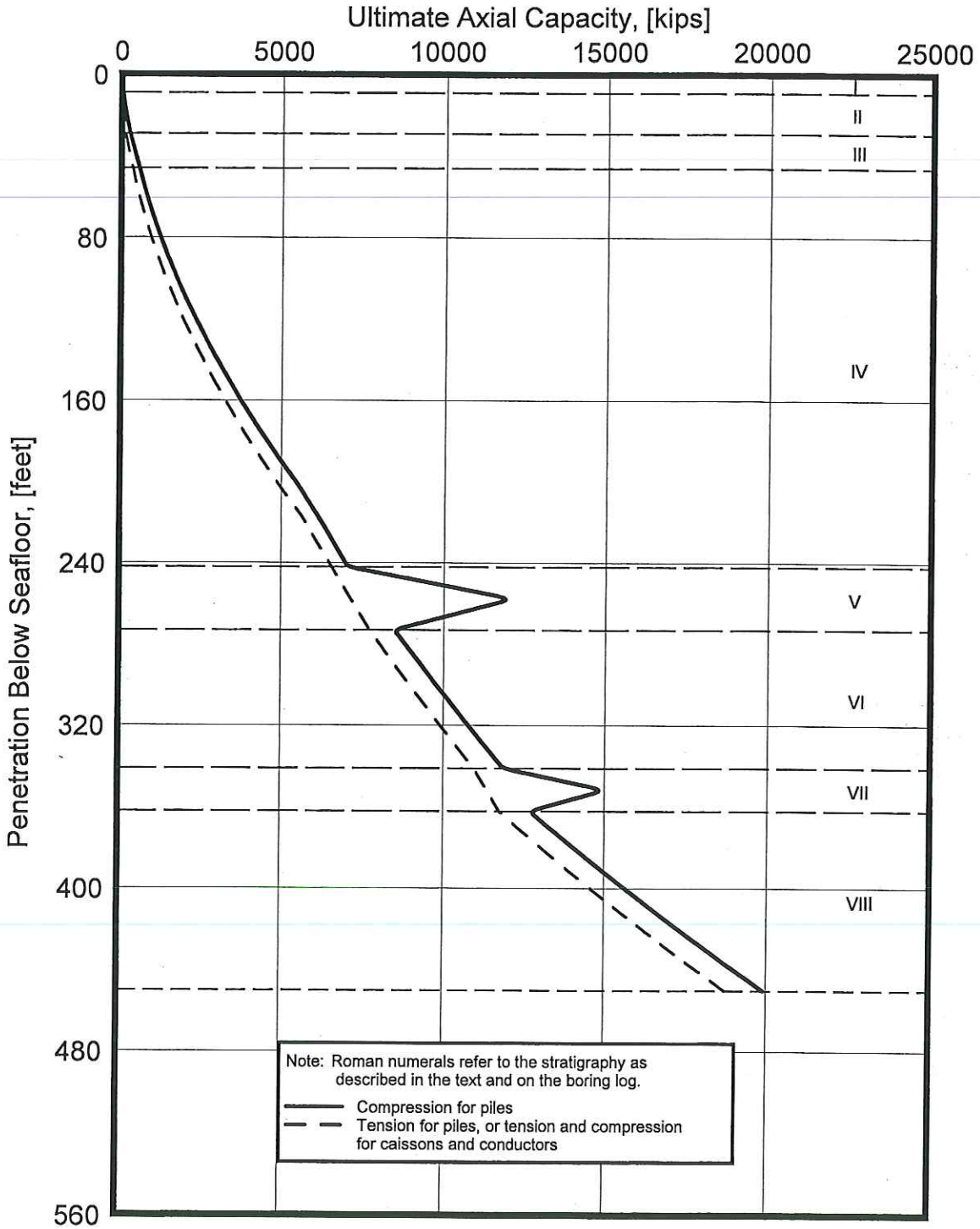
Drawn By: MWS

Date: 8/14/08

Date: 8/19/08

Checked By: HR

Approved By: DL




**ULTIMATE AXIAL CAPACITY**
API RP 2A (2000) Method
72-in.-Diameter Driven Pipe Piles
Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area

Date: 8/14/08
Drawn By: bmc
Date: 8/15/08
Date: 8/19/08
Checked By: MB
Approved By: MC

| PENETRATION BELOW MUDLINE (feet) | | CURVE POINTS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 0.0 | t | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |
| 1.0 | t | 0.00 | 0.03 | 0.05 | 0.07 | 0.09 | 0.10 | 0.09 | 0.09 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |
| 6.0 | t | 0.00 | 0.05 | 0.08 | 0.12 | 0.14 | 0.16 | 0.14 | 0.14 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |
| 9.0 | t | 0.00 | 0.06 | 0.10 | 0.14 | 0.17 | 0.19 | 0.17 | 0.17 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |
| 29.0 | t | 0.00 | 0.13 | 0.21 | 0.31 | 0.38 | 0.42 | 0.38 | 0.38 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |
| 29.0 | t | 0.00 | 0.52 | 0.52 | | | | | |
| | z | 0.00 | 0.10 | 48.00 | | | | | |
| 46.0 | t | 0.00 | 0.90 | 0.90 | | | | | |
| | z | 0.00 | 0.10 | 48.00 | | | | | |
| 46.0 | t | 0.00 | 0.21 | 0.35 | 0.52 | 0.62 | 0.69 | 0.62 | 0.62 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |
| 109.0 | t | 0.00 | 0.43 | 0.71 | 1.07 | 1.28 | 1.43 | 1.28 | 1.28 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |
| 217.0 | t | 0.00 | 0.75 | 1.25 | 1.87 | 2.25 | 2.50 | 2.25 | 2.25 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |
| 217.0 | t | 0.00 | 0.60 | 1.00 | 1.50 | 1.80 | 2.00 | 1.80 | 1.80 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |
| 242.0 | t | 0.00 | 0.60 | 1.00 | 1.50 | 1.80 | 2.00 | 1.80 | 1.80 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |
| 242.0 | t | 0.00 | 2.00 | 2.00 | | | | | |
| | z | 0.00 | 0.10 | 48.00 | | | | | |
| 273.0 | t | 0.00 | 2.00 | 2.00 | | | | | |
| | z | 0.00 | 0.10 | 48.00 | | | | | |
| 273.0 | t | 0.00 | 0.70 | 1.17 | 1.76 | 2.11 | 2.34 | 2.34 | 2.34 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |
| 341.0 | t | 0.00 | 0.80 | 1.33 | 2.00 | 2.40 | 2.66 | 2.66 | 2.66 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |
| 341.0 | t | 0.00 | 2.00 | 2.00 | | | | | |
| | z | 0.00 | 0.10 | 48.00 | | | | | |
| 362.0 | t | 0.00 | 2.00 | 2.00 | | | | | |
| | z | 0.00 | 0.10 | 48.00 | | | | | |
| 362.0 | t | 0.00 | 1.14 | 1.90 | 2.85 | 3.42 | 3.80 | 3.42 | 3.42 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |
| 450.0 | t | 0.00 | 1.39 | 2.32 | 3.49 | 4.18 | 4.65 | 4.18 | 4.18 |
| | z | 0.00 | 0.08 | 0.15 | 0.27 | 0.38 | 0.48 | 0.96 | 48.00 |

Notes: 1. "t" is mobilized soil-pile adhesion, [ksf].
2. "z" is axial pile displacement, [in.].
3. Data for tension and compression coincide.

## AXIAL LOAD TRANSFER DATA

(T-Z DATA)

API RP 2A (2000) Method

48-in.-Diameter Driven Pipe Piles

Texas Offshore Port System, Offshore Terminal Location

Block A-56, Galveston Area

| PENETRATION BELOW MUDLINE (feet) | | CURVE POINTS | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 100.0 | Q | 0 | 38 | 76 | 113 | 136 | 151 | 151 |
| | z | 0.00 | 0.10 | 0.62 | 2.02 | 3.50 | 4.80 | 48.00 |
| 205.0 | Q | 0 | 67 | 135 | 202 | 242 | 269 | 269 |
| | z | 0.00 | 0.10 | 0.62 | 2.02 | 3.50 | 4.80 | 48.00 |
| 217.0 | Q | 0 | 57 | 113 | 170 | 204 | 226 | 226 |
| | z | 0.00 | 0.10 | 0.62 | 2.02 | 3.50 | 4.80 | 48.00 |
| 242.0 | Q | 0 | 57 | 113 | 170 | 204 | 226 | 226 |
| | z | 0.00 | 0.10 | 0.62 | 2.02 | 3.50 | 4.80 | 48.00 |
| 254.0 | Q | 0 | 628 | 1257 | 1885 | 2262 | 2513 | 2513 |
| | z | 0.00 | 0.10 | 0.62 | 2.02 | 3.50 | 4.80 | 48.00 |
| 261.0 | Q | 0 | 628 | 1257 | 1885 | 2262 | 2513 | 2513 |
| | z | 0.00 | 0.10 | 0.62 | 2.02 | 3.50 | 4.80 | 48.00 |
| 273.0 | Q | 0 | 85 | 170 | 254 | 305 | 339 | 339 |
| | z | 0.00 | 0.10 | 0.62 | 2.02 | 3.50 | 4.80 | 48.00 |
| 341.0 | Q | 0 | 102 | 204 | 305 | 366 | 407 | 407 |
| | z | 0.00 | 0.10 | 0.62 | 2.02 | 3.50 | 4.80 | 48.00 |
| 352.0 | Q | 0 | 542 | 1083 | 1625 | 1949 | 2166 | 2166 |
| | z | 0.00 | 0.10 | 0.62 | 2.02 | 3.50 | 4.80 | 48.00 |
| 362.0 | Q | 0 | 107 | 215 | 322 | 387 | 430 | 430 |
| | z | 0.00 | 0.10 | 0.62 | 2.02 | 3.50 | 4.80 | 48.00 |
| 450.0 | Q | 0 | 131 | 263 | 394 | 473 | 526 | 526 |
| | z | 0.00 | 0.10 | 0.62 | 2.02 | 3.50 | 4.80 | 48.00 |

Notes: 1. "Q" is mobilized end bearing capacity, [kips].
2. "z" is axial tip displacement, [in.].

Drawn By: [illegible] Date: 8/11/08

Checked By: HB Date: 8/11/08

Approved By: [illegible] Date: 8/11/08

## AXIAL LOAD TRANSFER DATA

(Q-Z DATA)

API RP 2A (2000) Method

48-in.-Diameter Driven Pipe Piles

Texas Offshore Port System, Offshore Terminal Location

Block A-56, Galveston Area

| PENETRATION BELOW MUDLINE (feet) | | CURVE POINTS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 0.0 | t | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |
| 1.0 | t | 0.00 | 0.03 | 0.05 | 0.07 | 0.09 | 0.10 | 0.09 | 0.09 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |
| 6.0 | t | 0.00 | 0.05 | 0.08 | 0.12 | 0.14 | 0.16 | 0.14 | 0.14 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |
| 9.0 | t | 0.00 | 0.06 | 0.10 | 0.14 | 0.17 | 0.19 | 0.17 | 0.17 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |
| 29.0 | t | 0.00 | 0.13 | 0.21 | 0.31 | 0.38 | 0.42 | 0.38 | 0.38 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |
| 29.0 | t | 0.00 | 0.52 | 0.52 | | | | | |
| | z | 0.00 | 0.10 | 72.00 | | | | | |
| 46.0 | t | 0.00 | 0.90 | 0.90 | | | | | |
| | z | 0.00 | 0.10 | 72.00 | | | | | |
| 46.0 | t | 0.00 | 0.21 | 0.35 | 0.52 | 0.62 | 0.69 | 0.62 | 0.62 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |
| 109.0 | t | 0.00 | 0.43 | 0.71 | 1.07 | 1.28 | 1.43 | 1.28 | 1.28 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |
| 217.0 | t | 0.00 | 0.75 | 1.25 | 1.87 | 2.25 | 2.50 | 2.25 | 2.25 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |
| 217.0 | t | 0.00 | 0.60 | 1.00 | 1.50 | 1.80 | 2.00 | 1.80 | 1.80 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |
| 242.0 | t | 0.00 | 0.60 | 1.00 | 1.50 | 1.80 | 2.00 | 1.80 | 1.80 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |
| 242.0 | t | 0.00 | 2.00 | 2.00 | | | | | |
| | z | 0.00 | 0.10 | 72.00 | | | | | |
| 273.0 | t | 0.00 | 2.00 | 2.00 | | | | | |
| | z | 0.00 | 0.10 | 72.00 | | | | | |
| 273.0 | t | 0.00 | 0.70 | 1.17 | 1.76 | 2.11 | 2.34 | 2.34 | 2.34 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |
| 341.0 | t | 0.00 | 0.80 | 1.33 | 2.00 | 2.40 | 2.66 | 2.66 | 2.66 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |
| 341.0 | t | 0.00 | 2.00 | 2.00 | | | | | |
| | z | 0.00 | 0.10 | 72.00 | | | | | |
| 362.0 | t | 0.00 | 2.00 | 2.00 | | | | | |
| | z | 0.00 | 0.10 | 72.00 | | | | | |
| 362.0 | t | 0.00 | 1.14 | 1.90 | 2.85 | 3.42 | 3.80 | 3.42 | 3.42 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |
| 450.0 | t | 0.00 | 1.39 | 2.32 | 3.49 | 4.18 | 4.65 | 4.18 | 4.18 |
| | z | 0.00 | 0.12 | 0.22 | 0.41 | 0.58 | 0.72 | 1.44 | 72.00 |

Notes: 1. "t" is mobilized soil-pile adhesion, [ksf].
2. "z" is axial pile displacement, [in.].
3. Data for tension and compression coincide.

Date: 8/14/02
Drawn By: MWS
Date: 8/15/02
Checked By: MB
Date: 8/19/02
Approved By: MR

# AXIAL LOAD TRANSFER DATA

(T-Z DATA)

API RP 2A (2000) Method

72-in.-Diameter Driven Pipe Piles

Texas Offshore Port System, Offshore Terminal Location

Block A-56, Galveston Area

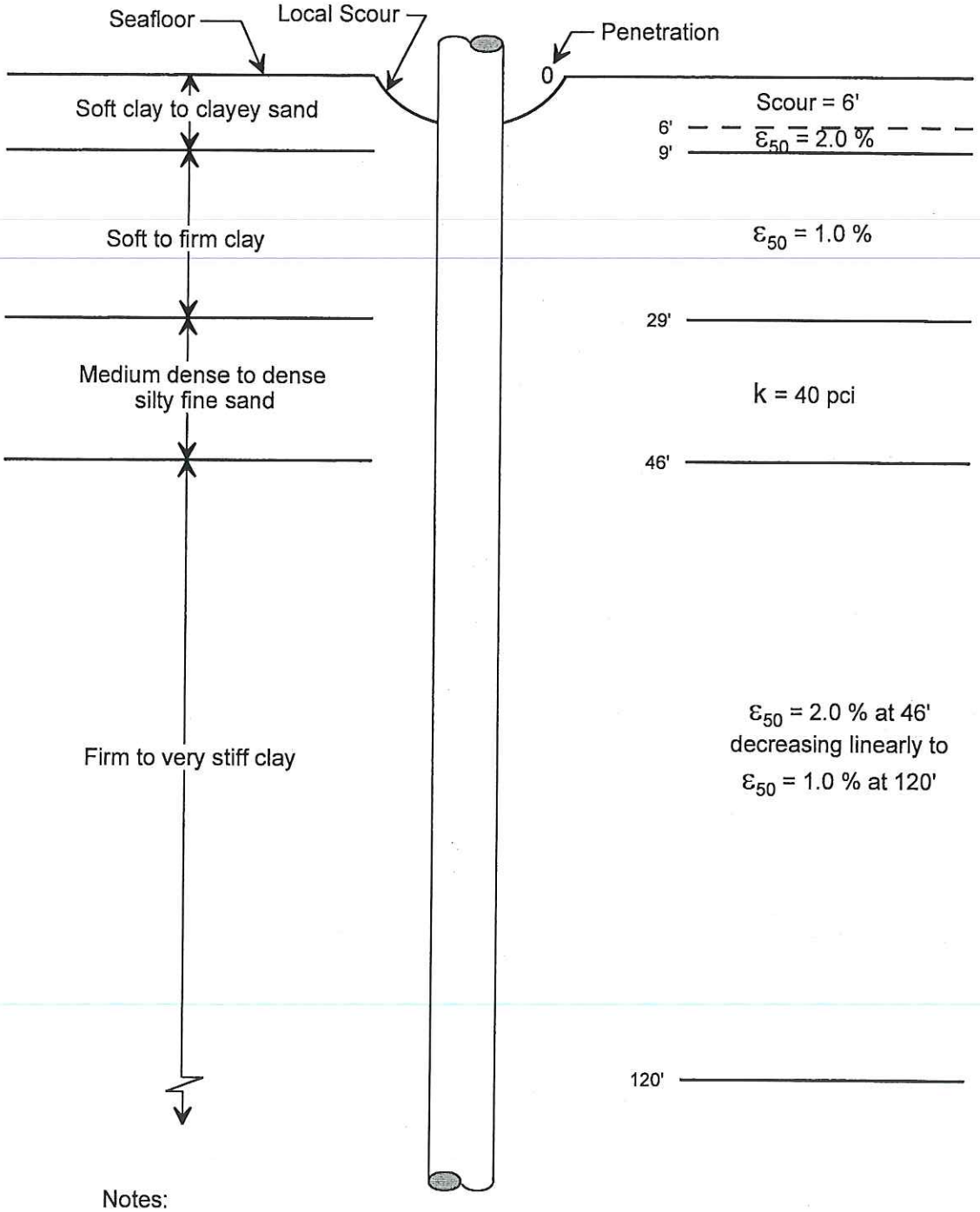
| PENETRATION BELOW MUDLINE (feet) | | CURVE POINTS | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 120.0 | Q | 0 | 98 | 195 | 293 | 352 | 391 | 391 |
| | z | 0.00 | 0.14 | 0.94 | 3.02 | 5.26 | 7.20 | 72.00 |
| 199.0 | Q | 0 | 148 | 295 | 443 | 532 | 591 | 591 |
| | z | 0.00 | 0.14 | 0.94 | 3.02 | 5.26 | 7.20 | 72.00 |
| 217.0 | Q | 0 | 127 | 254 | 382 | 458 | 509 | 509 |
| | z | 0.00 | 0.14 | 0.94 | 3.02 | 5.26 | 7.20 | 72.00 |
| 242.0 | Q | 0 | 127 | 254 | 382 | 458 | 509 | 509 |
| | z | 0.00 | 0.14 | 0.94 | 3.02 | 5.26 | 7.20 | 72.00 |
| 258.0 | Q | 0 | 1210 | 2420 | 3630 | 4356 | 4840 | 4840 |
| | z | 0.00 | 0.14 | 0.94 | 3.02 | 5.26 | 7.20 | 72.00 |
| 273.0 | Q | 0 | 191 | 382 | 573 | 687 | 763 | 763 |
| | z | 0.00 | 0.14 | 0.94 | 3.02 | 5.26 | 7.20 | 72.00 |
| 341.0 | Q | 0 | 229 | 458 | 687 | 824 | 916 | 916 |
| | z | 0.00 | 0.14 | 0.94 | 3.02 | 5.26 | 7.20 | 72.00 |
| 352.0 | Q | 0 | 893 | 1786 | 2679 | 3214 | 3571 | 3571 |
| | z | 0.00 | 0.14 | 0.94 | 3.02 | 5.26 | 7.20 | 72.00 |
| 362.0 | Q | 0 | 242 | 483 | 725 | 870 | 967 | 967 |
| | z | 0.00 | 0.14 | 0.94 | 3.02 | 5.26 | 7.20 | 72.00 |
| 450.0 | Q | 0 | 296 | 592 | 887 | 1065 | 1183 | 1183 |
| | z | 0.00 | 0.14 | 0.94 | 3.02 | 5.26 | 7.20 | 72.00 |

Notes: 1. "Q" is mobilized end bearing capacity, [kips].
2. "z" is axial tip displacement, [in.].

Date: 8/11/08
Drawn By: MVS
Date: 8/14/08
Checked By: MB
Date: 8/15/08
Approved By: JM

## AXIAL LOAD TRANSFER DATA

(Q-Z DATA)
API RP 2A (2000) Method
72-in.-Diameter Driven Pipe Piles
Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area




Notes:

1. $\varepsilon_{50}$ is axial strain at half of peak deviator stress for cohesive soils.
2. Soil strength parameters are shown on Plate 4.
3. Submerged unit weight profile is shown on Plate 5.
4. k is the modulus of horizontal subgrade reaction for granular soils.

## STRATIGRAPHY AND PARAMETERS FOR P-Y DATA

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area

| PENETRATION BELOW MUDLINE (feet) | | CURVE POINTS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 0.0 | p | 0 | 0 | | | | | | |
| | y | 0.00 | 48.00 | | | | | | |
| 6.0 | p | 0 | 0 | | | | | | |
| | y | 0.00 | 48.00 | | | | | | |
| 6.0 | p | 0 | 45 | 69 | 102 | 150 | 216 | 0 | 0 |
| | y | 0.00 | 0.06 | 0.24 | 0.72 | 2.40 | 7.20 | 36.00 | 48.00 |
| 9.0 | p | 0 | 66 | 101 | 149 | 219 | 316 | 73 | 73 |
| | y | 0.00 | 0.06 | 0.24 | 0.72 | 2.40 | 7.20 | 36.00 | 48.00 |
| 9.0 | p | 0 | 66 | 101 | 149 | 219 | 316 | 73 | 73 |
| | y | 0.00 | 0.03 | 0.12 | 0.36 | 1.20 | 3.60 | 18.00 | 48.00 |
| 13.0 | p | 0 | 100 | 154 | 228 | 335 | 482 | 233 | 233 |
| | y | 0.00 | 0.03 | 0.12 | 0.36 | 1.20 | 3.60 | 18.00 | 48.00 |
| 17.0 | p | 0 | 138 | 212 | 313 | 460 | 663 | 471 | 471 |
| | y | 0.00 | 0.03 | 0.12 | 0.36 | 1.20 | 3.60 | 18.00 | 48.00 |
| 21.0 | p | 0 | 170 | 261 | 386 | 568 | 818 | 696 | 696 |
| | y | 0.00 | 0.03 | 0.12 | 0.36 | 1.20 | 3.60 | 18.00 | 48.00 |
| 25.0 | p | 0 | 202 | 309 | 457 | 672 | 968 | 930 | 930 |
| | y | 0.00 | 0.03 | 0.12 | 0.36 | 1.20 | 3.60 | 18.00 | 48.00 |
| 27.0 | p | 0 | 216 | 331 | 490 | 720 | 1037 | 1037 | |
| | y | 0.00 | 0.03 | 0.12 | 0.36 | 1.20 | 3.60 | 48.00 | |
| 29.0 | p | 0 | 225 | 345 | 510 | 750 | 1080 | 1080 | |
| | y | 0.00 | 0.03 | 0.12 | 0.36 | 1.20 | 3.60 | 48.00 | |
| 29.0 | p | 0 | 2069 | 3448 | 4552 | 5724 | 6552 | 6828 | 6897 |
| | y | 0.00 | 0.15 | 0.27 | 0.39 | 0.59 | 0.91 | 1.31 | 48.00 |
| 37.0 | p | 0 | 3427 | 5711 | 7539 | 9481 | 10851 | 11308 | 11422 |
| | y | 0.00 | 0.20 | 0.35 | 0.51 | 0.76 | 1.18 | 1.70 | 48.00 |
| 46.0 | p | 0 | 5349 | 8915 | 11768 | 14799 | 16939 | 17652 | 17830 |
| | y | 0.00 | 0.25 | 0.44 | 0.64 | 0.96 | 1.48 | 2.14 | 48.00 |
| 46.0 | p | 0 | 360 | 552 | 816 | 1200 | 1728 | 1728 | |
| | y | 0.00 | 0.06 | 0.24 | 0.72 | 2.40 | 7.20 | 48.00 | |
| 120.0 (and below) | p | 0 | 691 | 1060 | 1567 | 2304 | 3318 | 3318 | |
| | y | 0.00 | 0.03 | 0.12 | 0.36 | 1.20 | 3.60 | 48.00 | |

Notes: 1. "p" is soil resistance, [lb/in.].
2. "y" is lateral deflection, [in.].

Date: 8/15/02
Drawn By: MWS
Date: 8/15/02
Checked By: MB
Approved By: DR

## P-Y DATA
(CYCLIC LOADING)
API RP 2A (2000) Method
48-in.-Diameter Driven Pipe Piles
Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area

| PENETRATION BELOW MUDLINE (feet) | | CURVE POINTS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 0.0 | p | 0 | 0 | | | | | | |
| | y | 0.00 | 72.00 | | | | | | |
| 6.0 | p | 0 | 0 | | | | | | |
| | y | 0.00 | 72.00 | | | | | | |
| 6.0 | p | 0 | 67 | 103 | 153 | 225 | 324 | 0 | 0 |
| | y | 0.00 | 0.10 | 0.36 | 1.08 | 3.60 | 10.80 | 54.00 | 72.00 |
| 9.0 | p | 0 | 91 | 140 | 207 | 305 | 439 | 78 | 78 |
| | y | 0.00 | 0.10 | 0.36 | 1.08 | 3.60 | 10.80 | 54.00 | 72.00 |
| 9.0 | p | 0 | 91 | 140 | 207 | 305 | 439 | 78 | 78 |
| | y | 0.00 | 0.05 | 0.18 | 0.54 | 1.80 | 5.40 | 27.00 | 72.00 |
| 15.0 | p | 0 | 153 | 235 | 348 | 511 | 736 | 329 | 329 |
| | y | 0.00 | 0.05 | 0.18 | 0.54 | 1.80 | 5.40 | 27.00 | 72.00 |
| 21.0 | p | 0 | 221 | 339 | 501 | 736 | 1060 | 709 | 709 |
| | y | 0.00 | 0.05 | 0.18 | 0.54 | 1.80 | 5.40 | 27.00 | 72.00 |
| 25.0 | p | 0 | 266 | 409 | 604 | 888 | 1279 | 1007 | 1007 |
| | y | 0.00 | 0.05 | 0.18 | 0.54 | 1.80 | 5.40 | 27.00 | 72.00 |
| 29.0 | p | 0 | 307 | 471 | 697 | 1025 | 1476 | 1279 | 1279 |
| | y | 0.00 | 0.05 | 0.18 | 0.54 | 1.80 | 5.40 | 27.00 | 72.00 |
| 29.0 | p | 0 | 2236 | 3726 | 4919 | 6186 | 7080 | 7378 | 7453 |
| | y | 0.00 | 0.17 | 0.29 | 0.42 | 0.64 | 0.98 | 1.42 | 72.00 |
| 35.0 | p | 0 | 3266 | 5444 | 7186 | 9037 | 10344 | 10779 | 10888 |
| | y | 0.00 | 0.20 | 0.36 | 0.51 | 0.77 | 1.19 | 1.72 | 72.00 |
| 41.0 | p | 0 | 4483 | 7471 | 9862 | 12402 | 14196 | 14793 | 14943 |
| | y | 0.00 | 0.24 | 0.42 | 0.60 | 0.90 | 1.39 | 2.01 | 72.00 |
| 46.0 | p | 0 | 5638 | 9397 | 12404 | 15600 | 17855 | 18607 | 18795 |
| | y | 0.00 | 0.26 | 0.47 | 0.67 | 1.01 | 1.56 | 2.25 | 72.00 |
| 46.0 | p | 0 | 540 | 828 | 1224 | 1800 | 2592 | 2592 | |
| | y | 0.00 | 0.10 | 0.36 | 1.08 | 3.60 | 10.80 | 72.00 | |
| 120.0 (and below) | p | 0 | 1037 | 1590 | 2350 | 3456 | 4977 | 4977 | |
| | y | 0.00 | 0.05 | 0.18 | 0.54 | 1.80 | 5.40 | 72.00 | |

Notes: 1. "p" is soil resistance, [lb/in.].
2. "y" is lateral deflection, [in.].

Date: 8/11/08
Drawn By: MWJ
Checked By: HB Date: 8/14/08
Approved By: DM Date: 8/19/08

## P-Y DATA
(CYCLIC LOADING)
API RP 2A (2000) Method
72-in.-Diameter Driven Pipe Piles
Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area

Checked By: AW Date: 8/18/08
Approved By: ar Date: 8/19/08

Drawn By: ~~ Date: 8/15/08

Report No. 0201-6502

# Summary of Test Results

**Job No.:** 0201-6502 15-Aug-2008 (Ver. #4)
**Boring:** Texas Offshore Port System, Offshore Terminal Location
**Block:** A-56
**Area:** Galveston

| | | Identification Tests | | | | | | Strength Estimate (ksf) | | Miniature Vane Tests (ksf) | | | Compression Tests | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Depth (ft) | Liquidity Index | Liquid Limit (%) | Plastic Limit (%) | Moisture Content (%) | Submerged Unit Weight (pcf) | Passing No. 200 Sieve | Penetrometer | Torvane | Undisturbed | Remolded | Residual | Type Test | Moisture Content (%) | Confining Pressure (psi) | Undisturbed Strength (ksf) | Remolded Strength (ksf) | $\varepsilon_{50}$ Strain (%) | Submerged Unit Weight (pcf) | Failure Strain (%) | Type of Failure |
| 1 | 1.00 | | | | | 49 | | | | 0.22 | | 0.07 | | | | | | | | | |
| 2 | 1.50 | | | | 33 | | 48 | | 0.48 | 0.41 + | | | | | | | | | | | |
| 2 | 1.50 | | | | 30 | | | | | | 0.12 | | | | | | | | | | |
| 2 | 1.50 | 1.02 | 29 | 16 | 29 | | | | | | | | | | | | | | | | |
| 3 | 4.00 | | | | 47 | 38 | | | 0.32 | | | | | | | | | | | | |
| 4 | 4.50 | | | | | | | | | | | | UU | 26 | 40 | 0.28 | | 1.9 | 52 | 18 | A |
| 4 | 4.50 | | | | | | | | | | 0.11 | | | | | | | | | | |
| 5 | 5.00 | 1.03 | 31 | 15 | 32 | | | | 0.44 | | | | | | | | | | | | |
| 6 | 6.50 | | | | 30 | | | | | 0.20 | | | | | | | | | | | |
| 6 | 6.50 | .87 | 33 | 15 | 30 | | 47 | | 0.40 | | | | | | | | | | | | |
| 7 | 7.00 | | | | 33 | 52 | | | | | | | | | | | | | | | |
| 8 | 7.50 | | | | | | | | | 0.36 | | | | | | | | | | | |
| 9 | 10.00 | | | | | | | | 0.44 | | | | | | | | | | | | |
| 10 | 10.50 | | | | 42 | 45 | | | | 0.45 | | | | | | | | | | | |
| 11 | 11.00 | .86 | 47 | 14 | 42 | | | | 0.44 | | | | | | | | | | | | |
| 11 | 11.00 | | | | | | | | | | 0.12 | | | | | | | | | | |
| 12 | 13.00 | | | | | | | | | | | | | | | | | | | | |
| 13 | 13.50 | | | | 43 | 47 | | | | 0.17 | | 0.09 | UU | 39 | 120 | 0.20 | | 0.8 | 47 | 9 | A |
| 14 | 14.00 | | | | 39 | | | | | 0.31 | | | | | | | | | | | |
| 15 | 16.00 | | | | | | | | 0.50 | | | | | | | | | | | | |
| 16 | 16.50 | | | | | | | | | | 0.16 | | | | | | | | | | |
| 16 | 16.50 | | | | | | | | | 0.67 | | 0.22 | UU | 47 | 40 | 0.18 | | 1.1 | 45 | 12 | A |

**NOTES:**

TYPE OF TEST
U - Unconfined Compression
UU- Unconsolidated-Undrained Triaxial
CU- Consolidated-Undrained Triaxial

TYPE OF FAILURE
A - Bulge
B - Single Shear Plane
C - Multiple Shear Plane
D - Vertical Fracture

Plus Signs [+] denote tests which exceeded the capacity of the measuring device.

NP = Non Plastic Material

PLATE A-2a

FUGRO

Checked By: AW Date: 8/18/08
Approved By: AR Date: 8/18/08

Drawn By: mm Date: 8/15/08

Report No. 0201-6502

# Summary of Test Results

**Job No.:** 0201-6502 15-Aug-2008 (Ver. #4)
**Boring:** Texas Offshore Port System, Offshore Terminal Location
**Block:** A-56
**Area:** Galveston

| | | Identification Tests | | | | | | Strength Estimate (ksf) | | Miniature Vane Tests (ksf) | | | Compression Tests | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Depth (ft) | Liquidity Index | Liquid Limit (%) | Plastic Limit (%) | Moisture Content (%) | Submerged Unit Weight, (pcf) | Passing No. 200 Sieve | Penetrometer | Torvane | Undisturbed | Remolded | Residual | Type Test | Moisture Content (%) | Confining Pressure (psi) | Undisturbed Strength (ksf) | Remolded Strength (ksf) | $\varepsilon_{50}$ Strain (%) | Submerged Unit Weight (pcf) | Failure Strain (%) | Type of Failure |
| 17 | 17.00 | | | | 42 | | | | 0.52 | 0.35 | | | | | | | | | | | |
| 18 | 19.00 | | | | | | | | 0.50 | | | | | | | | | | | | |
| 19 | 19.50 | | | | 49 | 46 | | | | | | | UU | 50 | 120 | 0.42 | | 2.0 | 45 | 16 | A |
| 20 | 20.00 | .72 | 61 | 15 | 48 | | | | 0.48 | 0.40 | | | | | | | | | | | |
| 21 | 22.00 | | | | | | | | 0.60 | | | | | | | | | | | | |
| 22 | 22.50 | | | | 52 | 39 | | | | | | | | | | | | | | | |
| 23 | 23.00 | | | | 52 | | | | 0.60 | 0.91 | | | | | | | | | | | |
| 24 | 25.00 | | | | | | | | 0.40 | | | | UU | 50 | 40 | 0.57 | | 1.0 | 42 | 6 | A |
| 24 | 25.00 | | | | | | | | | | 0.21 | | | | | | | | | | |
| 25 | 25.50 | .67 | 66 | 17 | 50 | | | | 0.50 | 0.59 | | | | | | | | | | | |
| 26 | 27.50 | | | | 46 | 44 | | | 0.60 | | | | | | | | | | | | |
| 27 | 28.00 | | | | 44 | | | | 0.64 | 0.86 | | | | | | | | | | | |
| 28 | 32.00 | | | | 29 | 51 | 54 | | | | | | | | | | | | | | |
| 29 | 35.00 | | | | 26 | 54 | 27 | | | | | | | | | | | | | | |
| 30 | 38.00 | | | | 27 | 55 | 41 | | | | | | | | | | | | | | |
| 31 | 41.00 | | | | 28 | 57 | 46 | | | | | | | | | | | | | | |
| 32 | 44.00 | | | | 28 | 53 | 36 | | | | | | | | | | | | | | |
| 33 | 46.00 | | | | 21 | 61 | | | | | | | | | | | | | | | |
| 34 | 46.50 | | | | | | | | 0.96 | | | | UU | 30 | 60 | 0.69 | | 2.8 | 58 | 17 | A |
| 34 | 46.50 | | | | | | | | | | 0.29 | | | | | | | | | | |
| 35 | 47.00 | | | | 28 | | | | 0.90 | 0.68 | | | | | | | | | | | |
| 36 | 49.00 | | | | | | | | 0.52 | | | | | | | | | | | | |

**NOTES:**

TYPE OF TEST
U - Unconfined Compression
UU- Unconsolidated-Undrained Triaxial
CU- Consolidated-Undrained Triaxial

TYPE OF FAILURE
A - Bulge
B - Single Shear Plane
C - Multiple Shear Plane
D - Vertical Fracture

Plus Signs [+] denote tests which exceeded the capacity of the measuring device.

NP = Non Plastic Material

PLATE A-2b

Checked By: AW Date: 8/18/08
Approved By: DA Date: 8/19/08

Drawn By: [illegible] Date: 8/15/08

Report No. 0201-6502

# Summary of Test Results

**Job No.:** 0201-6502 15-Aug-2008 (Ver. #4)
**Boring:** Texas Offshore Port System, Offshore Terminal Location
**Block:** A-56
**Area:** Galveston

| Sample No. | Depth (ft) | Identification Tests | | | | | | Strength Estimate (ksf) | | Miniature Vane Tests (ksf) | | | Compression Tests | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Liquidity Index | Liquid Limit (%) | Plastic Limit (%) | Moisture Content (%) | Submerged Unit Weight (pcf) | Passing No. 200 Sieve | Penetrometer | Torvane | Undisturbed | Remolded | Residual | Type Test | Moisture Content (%) | Confining Pressure (psi) | Undisturbed Strength (ksf) | Remolded Strength (ksf) | $\varepsilon_{50}$ Strain (%) | Submerged Unit Weight (pcf) | Failure Strain (%) | Type of Failure |
| 37 | 49.50 | | | | 32 | 56 | | | | | | | | | | | | | | | |
| 38 | 50.00 | 1.32 | 31 | 17 | 35 | | | | 0.58 | | | | | | | | | | | | |
| 39 | 56.00 | | | | | | | | | | | | | | | | | | | | |
| 40 | 56.50 | | | | | | | | | | 0.08 | | | | | | | | | | |
| 40 | 56.50 | | | | | | | | | | | | UU | 37 | 82 | 0.76 | | 2.2 | 52 | 7 | A |
| 40 | 56.50 | | | | 33 | | | | | | 0.11 | | | | | | | | | | |
| 41 | 57.00 | | | | | | | | | 1.30 | | | | | | | | | | | |
| 42 | 66.00 | | | | | | | | 0.88 | | | | | | | | | | | | |
| 43 | 66.50 | | | | 37 | 54 | | | | | | | | | | | | | | | |
| 44 | 67.00 | | | | 37 | | | | 1.00 | 1.41 | | | | | | | | | | | |
| 45 | 76.00 | | | | | | | | 0.88 | | | | | | | | | | | | |
| 46 | 76.50 | | | | | | | | | | | | UU | | 121 | | 0.33 | | 53 | | |
| 46 | 76.50 | | | | | | | | | | | | UU | 36 | 118 | 1.27 | | 1.4 | 51 | 4 | B |
| 47 | 77.00 | .61 | 54 | 17 | 39 | | | 1.00 | 1.10 | 1.64 | | | | | | | | | | | |
| 48 | 86.00 | | | | | | | 1.00 | 1.20 | | | | | | | | | | | | |
| 49 | 86.50 | | | | 35 | 52 | | | | | | | | | | | | | | | |
| 50 | 87.00 | | | | 45 | | | 1.50 | 1.20 | 1.08 | | | | | | | | | | | |
| 51 | 96.00 | | | | | | | 1.25 | 1.75 | | | | | | | | | | | | |
| 52 | 96.50 | | | | | | | | | | | | UU | | 121 | | 0.49 | | 53 | | |
| 52 | 96.50 | | | | | | | | | | | | UU | 40 | 120 | 1.75 | | 1.0 | 51 | 6 | B |
| 53 | 97.00 | | | | 37 | | | 1.25 | 1.55 | 1.72 | | | | | | | | | | | |
| 54 | 106.00 | | | | | | | 1.25 | 1.50 | | | | | | | | | | | | |

**NOTES:**

TYPE OF TEST
U - Unconfined Compression
UU- Unconsolidated-Undrained Triaxial
CU- Consolidated-Undrained Triaxial

TYPE OF FAILURE
A - Bulge
B - Single Shear Plane
C - Multiple Shear Plane
D - Vertical Fracture

Plus Signs [+] denote tests which exceeded the capacity of the measuring device.

NP = Non Plastic Material

PLATE A-2c

Checked By: AW Date: 8/18/08
Approved By: DM Date: 8/19/08

Drawn By: mm Date: 8/15/08

Report No. 0201-6502

# Summary of Test Results

**Job No.:** 0201-6502 15-Aug-2008 (Ver. #4)
**Boring:** Texas Offshore Port System, Offshore Terminal Location
**Block:** A-56
**Area:** Galveston

| Sample No. | Depth (ft) | Identification Tests | | | | | | Strength Estimate (ksf) | | Miniature Vane Tests (ksf) | | | Compression Tests | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Liquidity Index | Liquid Limit (%) | Plastic Limit (%) | Moisture Content (%) | Submerged Unit Weight (pcf) | Passing No. 200 Sieve | Penetrometer | Torvane | Undisturbed | Remolded | Residual | Type Test | Moisture Content (%) | Confining Pressure (psi) | Undisturbed Strength (ksf) | Remolded Strength (ksf) | $\varepsilon_{50}$ Strain (%) | Submerged Unit Weight (pcf) | Failure Strain (%) | Type of Failure |
| 55 | 106.50 | | | | 44 | 44 | | | | | | | | | | | | | | | |
| 56 | 107.00 | | | | 45 | | | 1.50 | 1.75 | 2.04 | | | | | | | | | | | |
| 57 | 116.00 | | | | | | | 1.50 | 1.50 | | | | | | | | | | | | |
| 58 | 116.50 | | | | | | | | | | | | UU | 33 | 120 | 1.22 | | 1.6 | 55 | 7 | AB |
| 59 | 117.00 | .54 | 48 | 14 | 32 | | | 1.50 | 1.50 | 1.40 | | | | | | | | | | | |
| 60 | 126.00 | | | | | | | 1.75 | 1.75 | | | | | | | | | | | | |
| 61 | 126.50 | | | | 36 | 52 | | | | | | | | | | | | | | | |
| 62 | 127.00 | | | | 34 | | | 1.75 | 1.85 | 2.49 | | | | | | | | | | | |
| 63 | 136.00 | | | | | | | 1.50 | 1.75 | | | | | | | | | | | | |
| 64 | 136.50 | | | | | | | | | | | | UU | 45 | 120 | 1.94 | | 2.2 | 46 | 6 | B |
| 64 | 136.50 | | | | | | | | | | | | UU | | 122 | | 0.61 | | 45 | | |
| 65 | 137.00 | | | | 46 | | | 2.00 | 1.75 | 1.64 | | | | | | | | | | | |
| 66 | 145.30 | | | | 47 | | | | | | | | | | | | | | | | |
| 67 | 147.00 | | | NP | 21 | | | | | | | | | | | | | | | | |
| 67 | 147.00 | | | | 25 | 54 | 8 | | | | | | | | | | | | | | |
| 68 | 155.50 | | | | 29 | 49 | 87 | | | | | | UU | 29 | 120 | 1.74 | | 3.3 | 57 | 19 | AB |
| 69 | 166.00 | | | | | | | 1.50 | 1.50 | | | | | | | | | | | | |
| 70 | 166.50 | | | | | 45 | | | | | | | UU | 35 | 121 | 1.58 | | 2.9 | 45 | 11 | B |
| 70 | 166.50 | | | | | | | | | | | | UU | | 123 | | 0.82 | | 50 | | |
| 71 | 167.00 | | | | 38 | | | 2.00 | 1.75 | 2.19 | | | | | | | | | | | |
| 72 | 176.00 | | | | | | | 2.00 | 2.00 | | | | | | | | | | | | |
| 73 | 176.50 | | | | 41 | 46 | | | | | | | | | | | | | | | |

**NOTES:**

TYPE OF TEST
U - Unconfined Compression
UU- Unconsolidated-Undrained Triaxial
CU- Consolidated-Undrained Triaxial

TYPE OF FAILURE
A - Bulge
B - Single Shear Plane
C - Multiple Shear Plane
D - Vertical Fracture

Plus Signs [+] denote tests which exceeded the capacity of the measuring device.

NP = Non Plastic Material

PLATE A-2d

Checked By: AW Date: 8/18/08
Approved By: [illegible] Date: 8/19/08

Drawn By: [illegible] Date: 8/15/08

Report No. 0201-6502

# Summary of Test Results

**Job No.:** 0201-6502 15-Aug-2008 (Ver. #4)
**Boring:** Texas Offshore Port System, Offshore Terminal Location
**Block:** A-56
**Area:** Galveston

| | | Identification Tests | | | | | | Strength Estimate (ksf) | | Miniature Vane Tests (ksf) | | | Compression Tests | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Depth (ft) | Liquidity Index | Liquid Limit (%) | Plastic Limit (%) | Moisture Content (%) | Submerged Unit Weight (pcf) | Passing No. 200 Sieve | Penetrometer | Torvane | Undisturbed | Remolded | Residual | Type Test | Moisture Content (%) | Confining Pressure (psi) | Undisturbed Strength (ksf) | Remolded Strength (ksf) | $\varepsilon_{50}$ Strain (%) | Submerged Unit Weight (pcf) | Failure Strain (%) | Type of Failure |
| 74 | 177.00 | .35 | 66 | 18 | 35 | | | 2.25 | 1.90 | 1.98 | | | | | | | | | | | |
| 75 | 186.00 | | | | | | | 2.25 | 2.20 | | | | | | | | | | | | |
| 76 | 186.50 | | | | | | | | | | | | UU | 35 | 120 | 3.28 | | 1.0 | 43 | 3 | C |
| 76 | 186.50 | | | | | | | | | | | | UU | | 120 | | 1.40 | | 48 | | |
| 77 | 187.00 | | | | 45 | | | 2.50 | 2.20 | 3.02 | | | | | | | | | | | |
| 78 | 196.00 | | | | | | | 2.00 | 2.25 | | | | | | | | | | | | |
| 79 | 196.50 | | | | 43 | 45 | | | | | | | | | | | | | | | |
| 80 | 197.00 | | | | 46 | | | 2.00 | 2.30 | 3.32 | | | | | | | | | | | |
| 81 | 206.00 | | | | | | | 2.25 | 2.50 | | | | | | | | | | | | |
| 82 | 206.50 | | | | | | | | | | | | UU | 44 | 120 | 3.42 | | 0.9 | 45 | 2 | C |
| 82 | 206.50 | | | | | | | | | | | | UU | | 122 | | 1.23 | | 47 | | |
| 83 | 207.00 | .30 | 87 | 22 | 42 | | | 2.75 | 2.25 | 3.06 | | | | | | | | | | | |
| 84 | 216.00 | | | | | | | 2.25 | 2.30 | | | | | | | | | | | | |
| 85 | 216.50 | | | | 45 | 45 | | | | | | | | | | | | | | | |
| 86 | 217.00 | | | | 47 | | | 2.50 | 2.45 | 3.08 | | | | | | | | | | | |
| 87 | 226.00 | | | | 27 | | | | | | | | | | | | | | | | |
| 88 | 226.50 | | | | | | | | | | | | UU | 33 | 121 | 1.83 | | 1.8 | 51 | 11 | A |
| 89 | 227.00 | | | | 33 | | | | 2.00 | 2.04 | | | | | | | | | | | |
| 90 | 236.00 | | | | | | | | 1.75 | | | | | | | | | | | | |
| 91 | 236.50 | | | | | | | | | | | | UU | 24 | 122 | 2.59 | | 1.9 | 58 | 19 | AB |
| 91 | 236.50 | | | | | | | | | | | | UU | 24 | 122 | | 1.41 | | 59 | | |
| 92 | 237.00 | .27 | 54 | 15 | 25 | | | 1.75 | 1.75 | 1.74 | | | | | | | | | | | |

**NOTES:**

TYPE OF TEST
U - Unconfined Compression
UU- Unconsolidated-Undrained Triaxial
CU- Consolidated-Undrained Triaxial

TYPE OF FAILURE
A - Bulge
B - Single Shear Plane
C - Multiple Shear Plane
D - Vertical Fracture

Plus Signs [+] denote tests which exceeded the capacity of the measuring device.

NP = Non Plastic Material

PLATE A-2e

Checked By: AW Date: 8/18/08
Approved By: DM Date: 8/19/08

Drawn By: mm Date: 8/15/08

Report No. 0201-6502

# Summary of Test Results

**Job No.:** 0201-6502 15-Aug-2008 (Ver. #4)
**Boring:** Texas Offshore Port System, Offshore Terminal Location
**Block:** A-56
**Area:** Galveston

| Sample No. | Depth (ft) | Identification Tests | | | | | | Strength Estimate (ksf) | | Miniature Vane Tests (ksf) | | | Compression Tests | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Liquidity Index | Liquid Limit (%) | Plastic Limit (%) | Moisture Content (%) | Submerged Unit Weight (pcf) | Passing No. 200 Sieve | Penetrometer | Torvane | Undisturbed | Remolded | Residual | Type Test | Moisture Content (%) | Confining Pressure (psi) | Undisturbed Strength (ksf) | Remolded Strength (ksf) | $\varepsilon_{50}$ Strain (%) | Submerged Unit Weight (pcf) | Failure Strain (%) | Type of Failure |
| 93 | 245.50 | | | | 23 | 62 | 13 | | | | | | | | | | | | | | |
| 94 | 256.50 | | | | 21 | 54 | 8 | | | | | | | | | | | | | | |
| 95 | 265.50 | | | | 25 | 55 | 4 | | | | | | | | | | | | | | |
| 96 | 276.00 | | | | | | | 3.50 | | | | | | | | | | | | | |
| 97 | 276.50 | | | | | | | | | | | | UU | 42 | 123 | 3.65 | | 0.7 | 49 | 2 | B |
| 97 | 276.50 | | | | | | | | | | | | UU | | 123 | | 1.92 | | 49 | | |
| 98 | 277.00 | .33 | 80 | 21 | 41 | | | 3.50 | | 3.78 | | | | | | | | | | | |
| 99 | 287.10 | | | | | | | | | | | | | | | | | | | | |
| 100 | 290.00 | | | | 23 | 66 | 17 | | | | | | | | | | | | | | |
| 101 | 297.00 | | | | 25 | 59 | 23 | | | | | | | | | | | | | | |
| 102 | 305.50 | | | | | | | | | | | | UU | 23 | 120 | 2.22 | | 2.8 | 55 | 10 | AB |
| 102 | 305.50 | | | | | | | | | | | | UU | | 122 | | 0.93 | | 62 | | |
| 103 | 306.00 | | | | | | | | | | | | | | | | | | | | |
| 104 | 306.50 | .55 | 29 | 11 | 21 | | | 1.75 | | | | | | | | | | | | | |
| 105 | 316.00 | | | | | 56 | | | | | | | | | | | | | | | |
| 106 | 317.00 | | | | 22 | 57 | 76 | | | | | | | | | | | | | | |
| 107 | 325.50 | | | | | | | 6.59 | | | | | | | | | | | | | |
| 108 | 326.00 | | | | | | | | | | | | UU | | 121 | | 3.82 | | 69 | | |
| 108 | 326.00 | | | | | | | | | | | | UU | 20 | 123 | 4.66 | | 2.0 | 65 | 10 | AB |
| 108 | 326.00 | | | | | | | | | | | | UU | | 123 | | 3.37 | | 69 | | |
| 109 | 326.50 | .22 | 44 | 14 | 20 | | | | | 3.83 + | | | | | | | | | | | |
| 110 | 336.00 | | | | | | | | | | | | | | | | | | | | |

**NOTES:**

TYPE OF TEST
U - Unconfined Compression
UU- Unconsolidated-Undrained Triaxial
CU- Consolidated-Undrained Triaxial

TYPE OF FAILURE
A - Bulge
B - Single Shear Plane
C - Multiple Shear Plane
D - Vertical Fracture

Plus Signs [+] denote tests which exceeded the capacity of the measuring device.

NP = Non Plastic Material

PLATE A-2f

Checked By: AW Date: 8/18/08
Approved By: DM Date: 8/19/08

Drawn By: mm Date: 8/15/08

Report No. 0201-6502

# Summary of Test Results

**Job No.:** 0201-6502 15-Aug-2008 (Ver. #4)
**Boring:** Texas Offshore Port System, Offshore Terminal Location
**Block:** A-56
**Area:** Galveston

| | | Identification Tests | | | | | | Strength Estimate (ksf) | | Miniature Vane Tests (ksf) | | | Compression Tests | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Depth (ft) | Liquidity Index | Liquid Limit (%) | Plastic Limit (%) | Moisture Content (%) | Submerged Unit Weight (pcf) | Passing No. 200 Sieve | Penetrometer | Torvane | Undisturbed | Remolded | Residual | Type Test | Moisture Content (%) | Confining Pressure (psi) | Undisturbed Strength (ksf) | Remolded Strength (ksf) | $\varepsilon_{50}$ Strain (%) | Submerged Unit Weight (pcf) | Failure Strain (%) | Type of Failure |
| 111 | 336.50 | | | | | | | | | 3.83 + | | | UU | 23 | 122 | 3.43 | | 1.8 | 57 | 11 | AC |
| 112 | 337.00 | | | | 25 | | | 4.64 | | | | | | | | | | | | | |
| 113 | 345.80 | | | | 23 | 56 | 9 | | | | | | | | | | | | | | |
| 115 | 358.00 | | | | 24 | 57 | 4 | | | | | | | | | | | | | | |
| 116 | 366.00 | | | | | | | 3.90 | | | | | | | | | | | | | |
| 117 | 366.50 | | | | | | | | | | | | UU | | 122 | | 2.37 | | 55 | | |
| 117 | 366.50 | | | | | | | | | | | | UU | 28 | 121 | 5.50 | | 1.7 | 47 | 4 | C |
| 118 | 367.00 | .40 | 55 | 18 | 33 | | | 3.66 | | 3.83 + | | | | | | | | | | | |
| 119 | 376.00 | | | | | | | 3.75 | | | | | | | | | | | | | |
| 120 | 376.50 | | | | | | | | | | | | UU | 23 | 120 | | 1.64 | | 63 | | |
| 120 | 376.50 | | | | | 58 | | | | | | | UU | 24 | 120 | 2.99 | | 2.9 | 60 | 16 | A |
| 121 | 377.00 | | | | 25 | | | | | | | | | | | | | | | | |
| 121 | 377.00 | | | | 22 | | | | | 2.61 | | | | | | | | | | | |
| 122 | 386.00 | | | | 21 | 51 | 24 | | | | | | | | | | | | | | |
| 123 | 396.00 | | | | | | | 2.75 | | | | | | | | | | | | | |
| 124 | 396.50 | | | | | | | | | | | | UU | 26 | 120 | 4.07 | | 3.2 | 57 | 14 | AC |
| 124 | 396.50 | | | | | | | | | | | | UU | | 122 | | 1.40 | | 61 | | |
| 125 | 397.00 | .38 | 41 | 15 | 25 | | | | | | | | | | | | | | | | |
| 126 | 406.00 | | | | | | | 3.20 | | | | | | | | | | | | | |
| 127 | 406.50 | | | | | | | | | | | | UU | 29 | 123 | 4.77 | | 2.5 | 49 | 7 | B |
| 128 | 407.00 | | | | 30 | | | 4.00 | | 3.83 + | | | | | | | | | | | |
| 129 | 416.00 | | | | | | | 4.00 | | | | | | | | | | | | | |

**NOTES:**

TYPE OF TEST
U - Unconfined Compression
UU- Unconsolidated-Undrained Triaxial
CU- Consolidated-Undrained Triaxial

TYPE OF FAILURE
A - Bulge
B - Single Shear Plane
C - Multiple Shear Plane
D - Vertical Fracture

Plus Signs [+] denote tests which exceeded the capacity of the measuring device.

NP = Non Plastic Material

PLATE A-2g

Checked By: AW Date: 8/18/08
Approved By: DL Date: 8/19/08

Drawn By: MM Date: 8/15/08

Report No. 0201-6502

# Summary of Test Results

**Job No.:** 0201-6502 15-Aug-2008 (Ver. #4)
**Boring:** Texas Offshore Port System, Offshore Terminal Location
**Block:** A-56
**Area:** Galveston

| | | Identification Tests | | | | | | Strength Estimate (ksf) | | Miniature Vane Tests (ksf) | | | Compression Tests | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Depth (ft) | Liquidity Index | Liquid Limit (%) | Plastic Limit (%) | Moisture Content (%) | Submerged Unit Weight (pcf) | Passing No. 200 Sieve | Penetrometer | Torvane | Undisturbed | Remolded | Residual | Type Test | Moisture Content (%) | Confining Pressure (psi) | Undisturbed Strength (ksf) | Remolded Strength (ksf) | $\varepsilon_{50}$ Strain (%) | Submerged Unit Weight (pcf) | Failure Strain (%) | Type of Failure |
| 130 | 416.50 | | | | | | | | | | | | UU | 30 | 120 | 4.67 | | 2.4 | 48 | 7 | B |
| 131 | 417.00 | | | | 32 | | | 3.75 | | 3.83 + | | | | | | | | | | | |
| 132 | 426.00 | | | | | | | 4.39 | | | | | UU | | 121 | | 1.59 | | 54 | | |
| 132 | 426.00 | | | | | | | | | | | | UU | 24 | 122 | 5.30 | | 2.4 | 47 | 7 | B |
| 133 | 426.50 | | | | | | | | | | | | | | | | | | | | |
| 134 | 427.00 | .31 | 71 | 19 | 35 | | | 4.88 | | 3.83 + | | | | | | | | | | | |
| 135 | 436.00 | | | | | 55 | | | | | | | | | | | | | | | |
| 136 | 436.30 | | | | 28 | 62 | | 3.25 | | 3.76 | | | | | | | | | | | |
| 137 | 437.00 | | | | 16 | | | | | | | | | | | | | | | | |
| 138 | 449.00 | | | | | | | 5.12 | | | | | | | | | | | | | |
| 139 | 449.50 | | | | | | | | | | | | UU | 19 | 120 | | 1.81 | | 66 | | |
| 139 | 449.50 | | | | | | | | | | | | UU | 21 | 123 | 4.99 | | 1.9 | 60 | 8 | C |
| 140 | 450.00 | | | | 24 | | | 3.75 | | 3.83 + | | | | | | | | | | | |

**NOTES:**

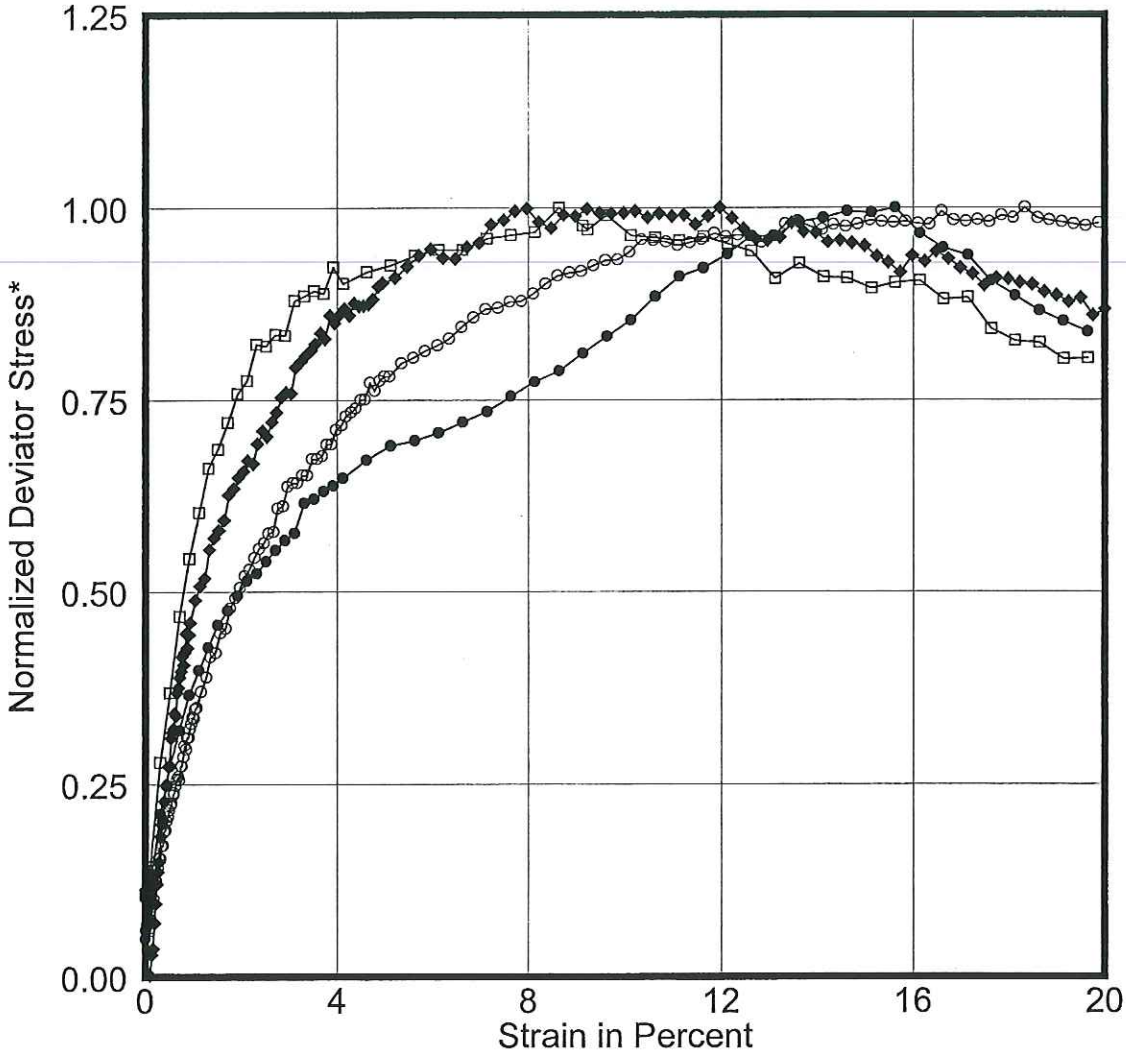
TYPE OF TEST
U - Unconfined Compression
UU- Unconsolidated-Undrained Triaxial
CU- Consolidated-Undrained Triaxial

TYPE OF FAILURE
A - Bulge
B - Single Shear Plane
C - Multiple Shear Plane
D - Vertical Fracture

Plus Signs [+] denote tests which exceeded the capacity of the measuring device.

NP = Non Plastic Material

PLATE A-2h




| Curve | Sample No. | Depth [ft] | Test Type | Confining Pressure [psi] | Maximum Deviator Stress [ksf] | ε50 [%] |
|---|---|---|---|---|---|---|
| ○—○ | 4 | 4.50 | UU | 40.3 | 0.55 | 1.9 |
| □—□ | 13 | 13.50 | UU | 120.2 | 0.39 | 0.8 |
| ◆—◆ | 16 | 16.50 | UU | 40.4 | 0.35 | 1.1 |
| ●—● | 19 | 19.50 | UU | 119.7 | 0.84 | 2.0 |

* Normalized with respect to maximum deviator stress.

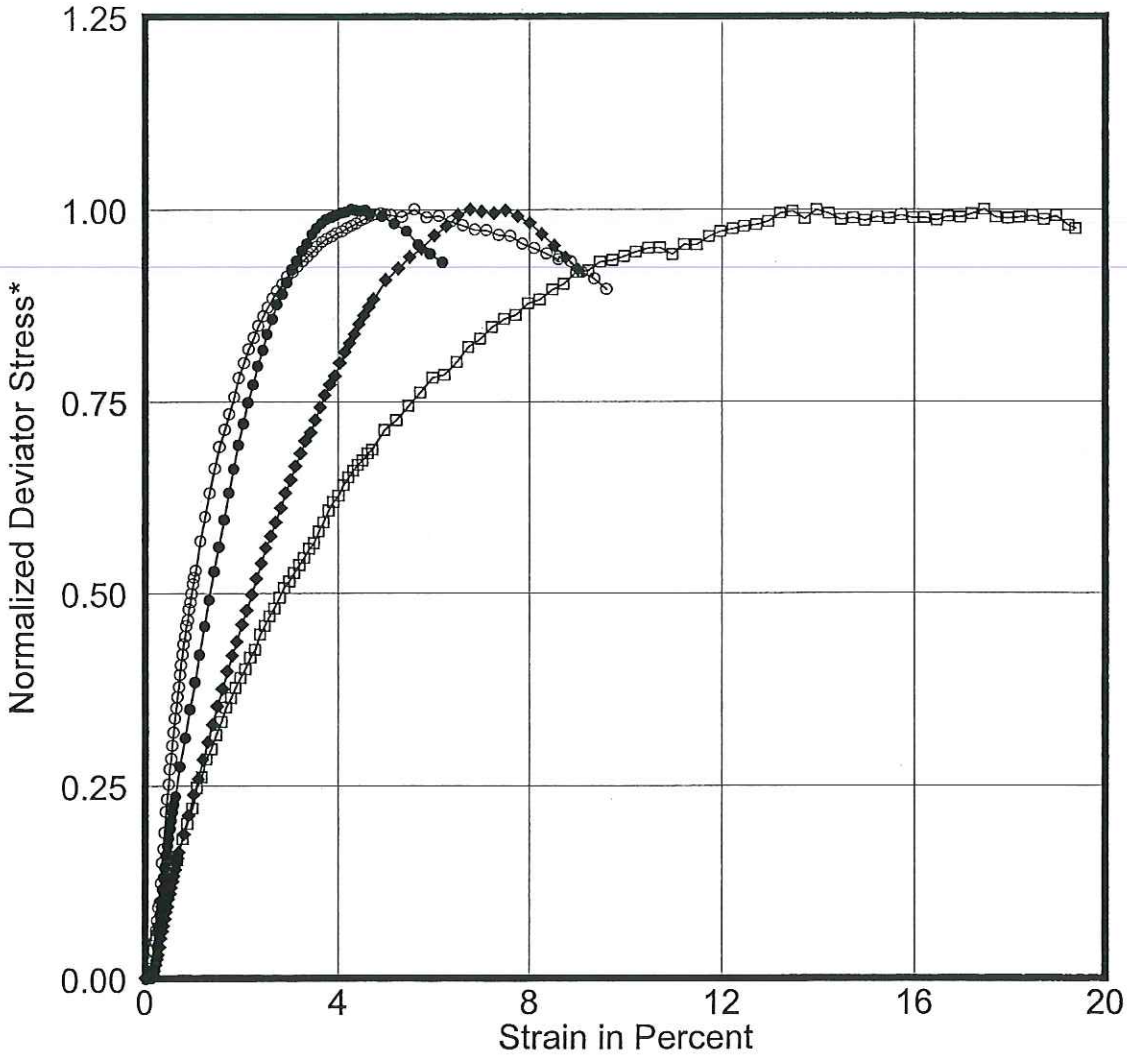
Drawn By: [illegible] Date: 8/10/08

Checked By: HW Date: 8/10/08

Approved By: [illegible] Date: 8/19/08

## STRESS-STRAIN CURVES
Unconsolidated-Undrained Triaxial Compression Test

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area




| Curve | Sample No. | Depth [ft] | Test Type | Confining Pressure [psi] | Maximum Deviator Stress [ksf] | ε50 [%] |
|---|---|---|---|---|---|---|
| ○—○ | 24 | 25.00 | UU | 40.4 | 1.14 | 1.0 |
| □—□ | 34 | 46.50 | UU | 60.5 | 1.39 | 2.8 |
| ◆—◆ | 40 | 56.50 | UU | 82.0 | 1.52 | 2.2 |
| ●—● | 46 | 76.50 | UU | 118.5 | 2.54 | 1.4 |

* Normalized with respect to maximum deviator stress.

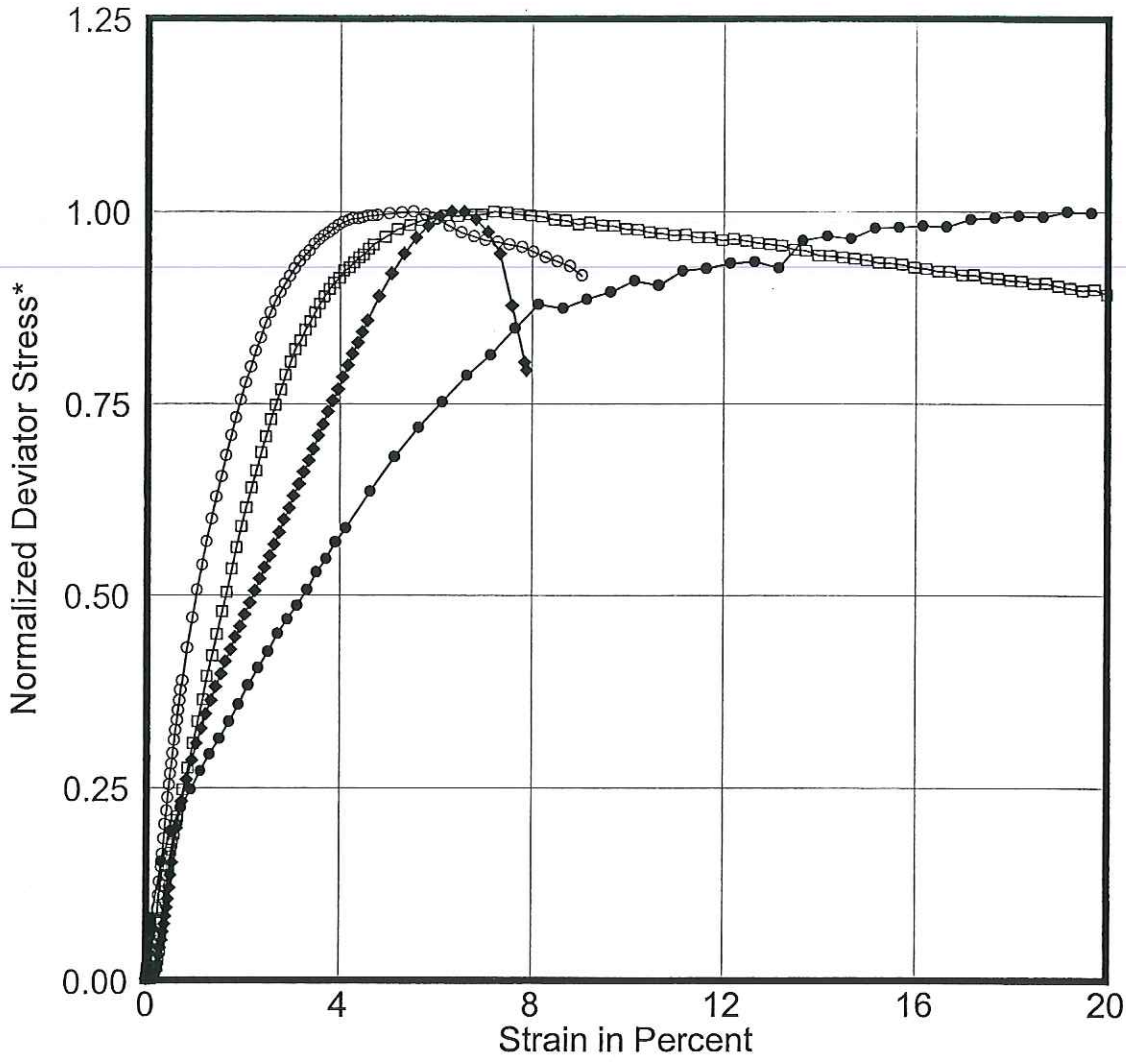
Drawn By: [illegible] Date: 8/15/08

Checked By: [illegible] Date: 8/17/08

Approved By: [illegible] Date: 8/19/08

## STRESS-STRAIN CURVES
Unconsolidated-Undrained Triaxial Compression Test

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area




| Curve | Sample No. | Depth [ft] | Test Type | Confining Pressure [psi] | Maximum Deviator Stress [ksf] | ε50 [%] |
|---|---|---|---|---|---|---|
| ○—○ | 52 | 96.50 | UU | 120.3 | 3.50 | 1.0 |
| □—□ | 58 | 116.50 | UU | 120.4 | 2.45 | 1.6 |
| ◆—◆ | 64 | 136.50 | UU | 119.8 | 3.88 | 2.2 |
| ●—● | 68 | 155.50 | UU | 120.1 | 3.47 | 3.3 |

* Normalized with respect to maximum deviator stress.

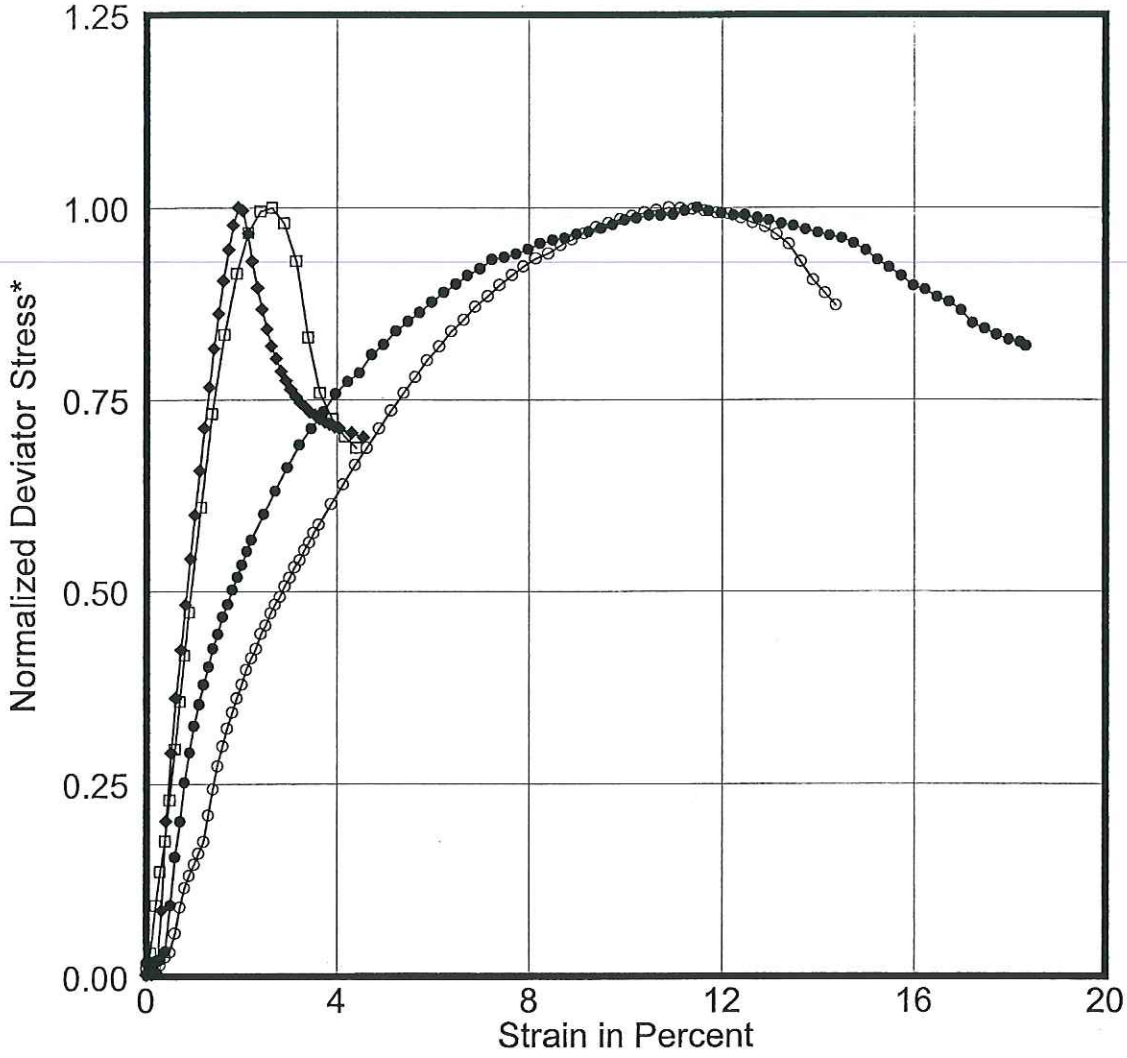
Drawn By: [illegible] Date: 8/15/08

Checked By: [illegible] Date: 8/15/08

Approved By: [illegible] Date: 8/19/08

## STRESS-STRAIN CURVES
Unconsolidated-Undrained Triaxial Compression Test

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area




| Curve | Sample No. | Depth [ft] | Test Type | Confining Pressure [psi] | Maximum Deviator Stress [ksf] | ε50 [%] |
|---|---|---|---|---|---|---|
| ○—○ | 70 | 166.50 | UU | 120.8 | 3.15 | 2.9 |
| □—□ | 76 | 186.50 | UU | 120.4 | 6.55 | 1.0 |
| ◆—◆ | 82 | 206.50 | UU | 120.0 | 6.85 | 0.9 |
| ●—● | 88 | 226.50 | UU | 121.2 | 3.66 | 1.8 |

* Normalized with respect to maximum deviator stress.

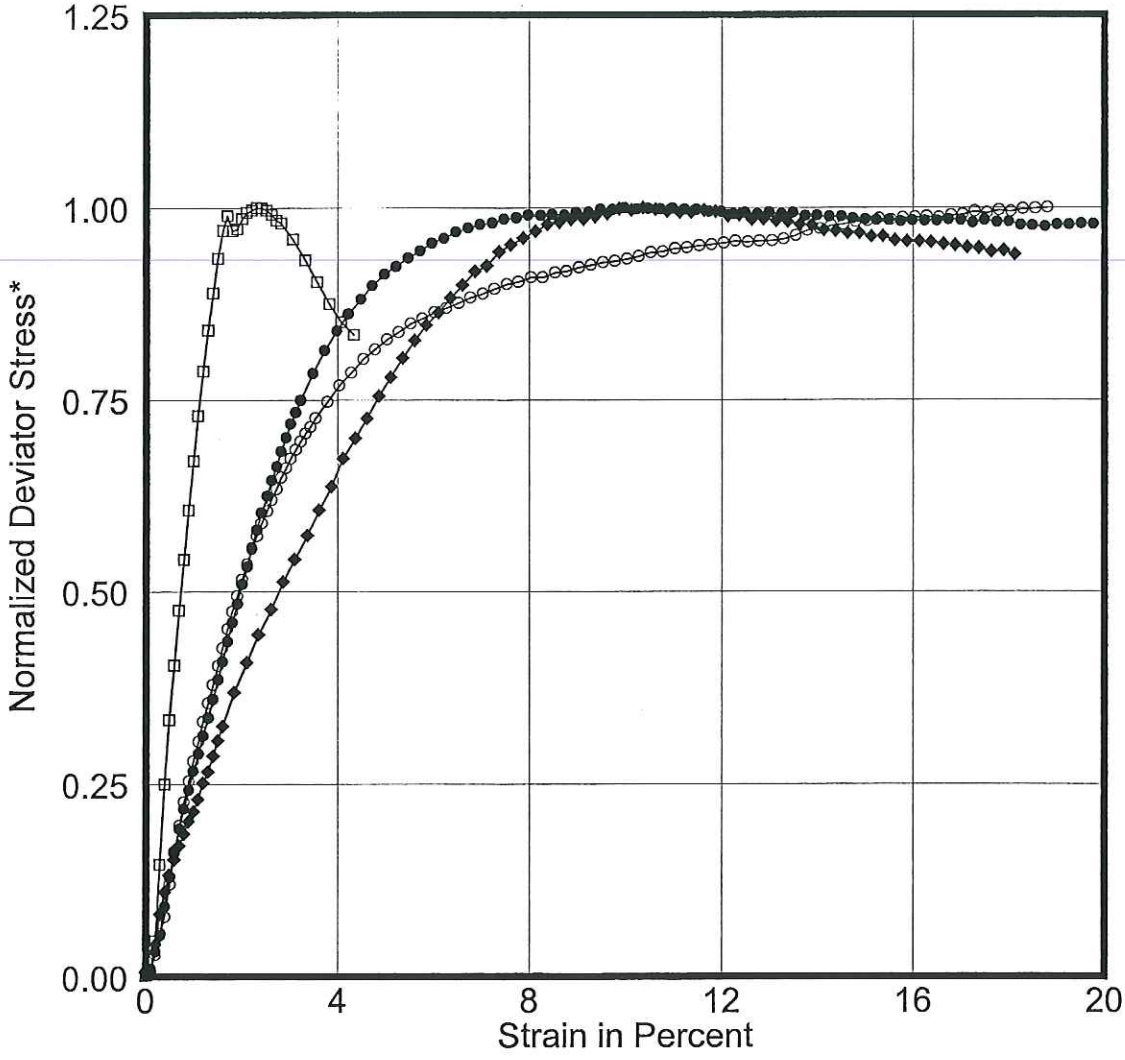
Drawn By: [illegible] Date: 8/15/08

Checked By: [illegible] Date: 8/15/08

Approved By: [illegible] Date: 8/19/08

## STRESS-STRAIN CURVES
Unconsolidated-Undrained Triaxial Compression Test

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area




| Curve | Sample No. | Depth [ft] | Test Type | Confining Pressure [psi] | Maximum Deviator Stress [ksf] | ε50 [%] |
|---|---|---|---|---|---|---|
| ○—○ | 91 | 236.50 | UU | 122.1 | 5.17 | 1.9 |
| □—□ | 97 | 276.50 | UU | 123.2 | 7.30 | 0.7 |
| ◆—◆ | 102 | 305.50 | UU | 120.2 | 4.45 | 2.8 |
| ●—● | 108 | 326.00 | UU | 123.1 | 9.32 | 2.0 |

* Normalized with respect to maximum deviator stress.

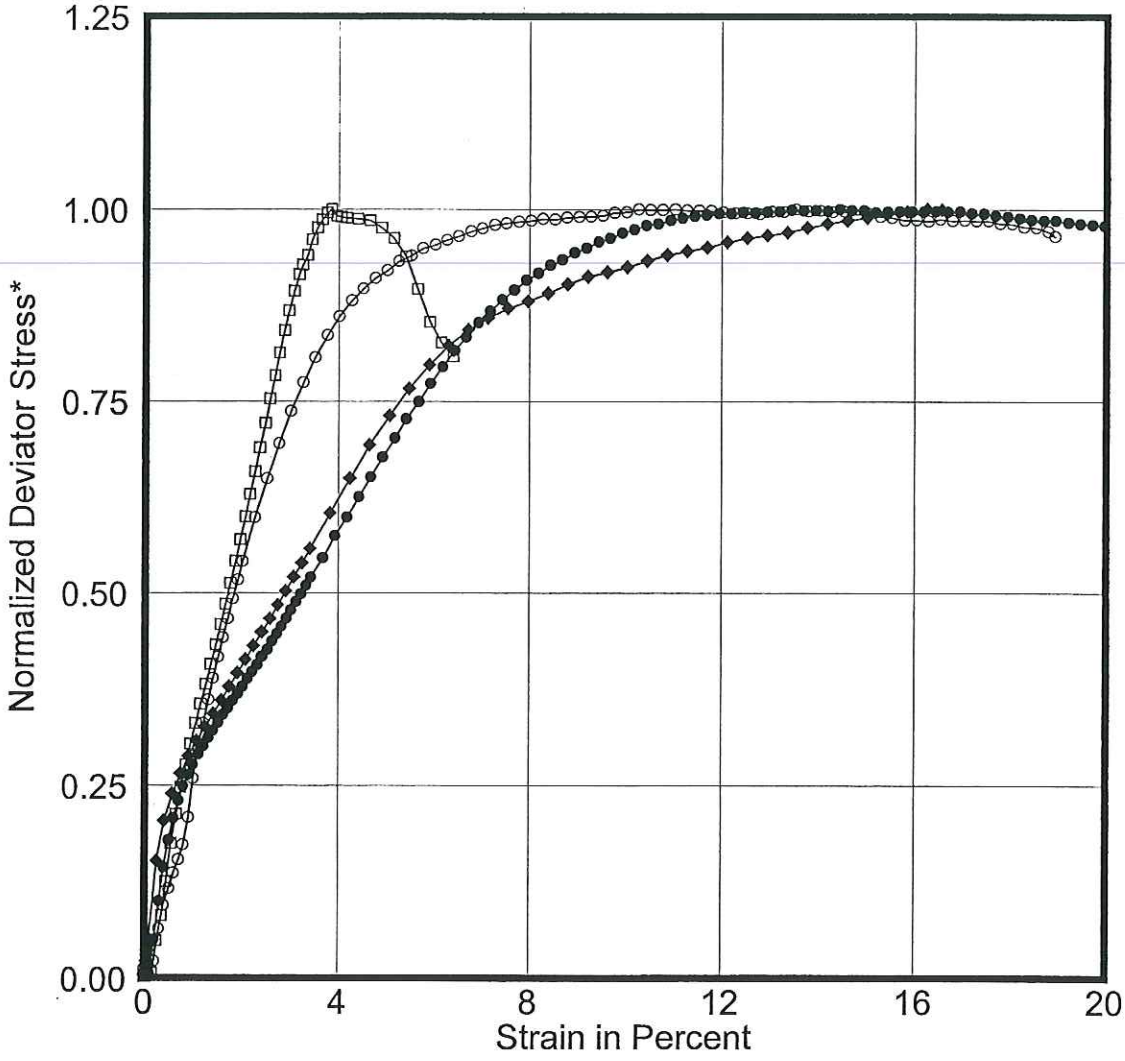
Drawn By: [illegible] for TT Date: 8/13/08

Checked By: [illegible] Date: 8/14/08

Approved By: [illegible] Date: 8/18/08

## STRESS-STRAIN CURVES
Unconsolidated-Undrained Triaxial Compression Test

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area




| Curve | Sample No. | Depth [ft] | Test Type | Confining Pressure [psi] | Maximum Deviator Stress [ksf] | ε50 [%] |
|---|---|---|---|---|---|---|
| ○—○ | 111 | 336.50 | UU | 121.5 | 6.85 | 1.8 |
| □—□ | 117 | 366.50 | UU | 120.5 | 10.99 | 1.7 |
| ◆—◆ | 120 | 376.50 | UU | 120.1 | 5.98 | 2.9 |
| ●—● | 124 | 396.50 | UU | 120.1 | 8.15 | 3.2 |

* Normalized with respect to maximum deviator stress.

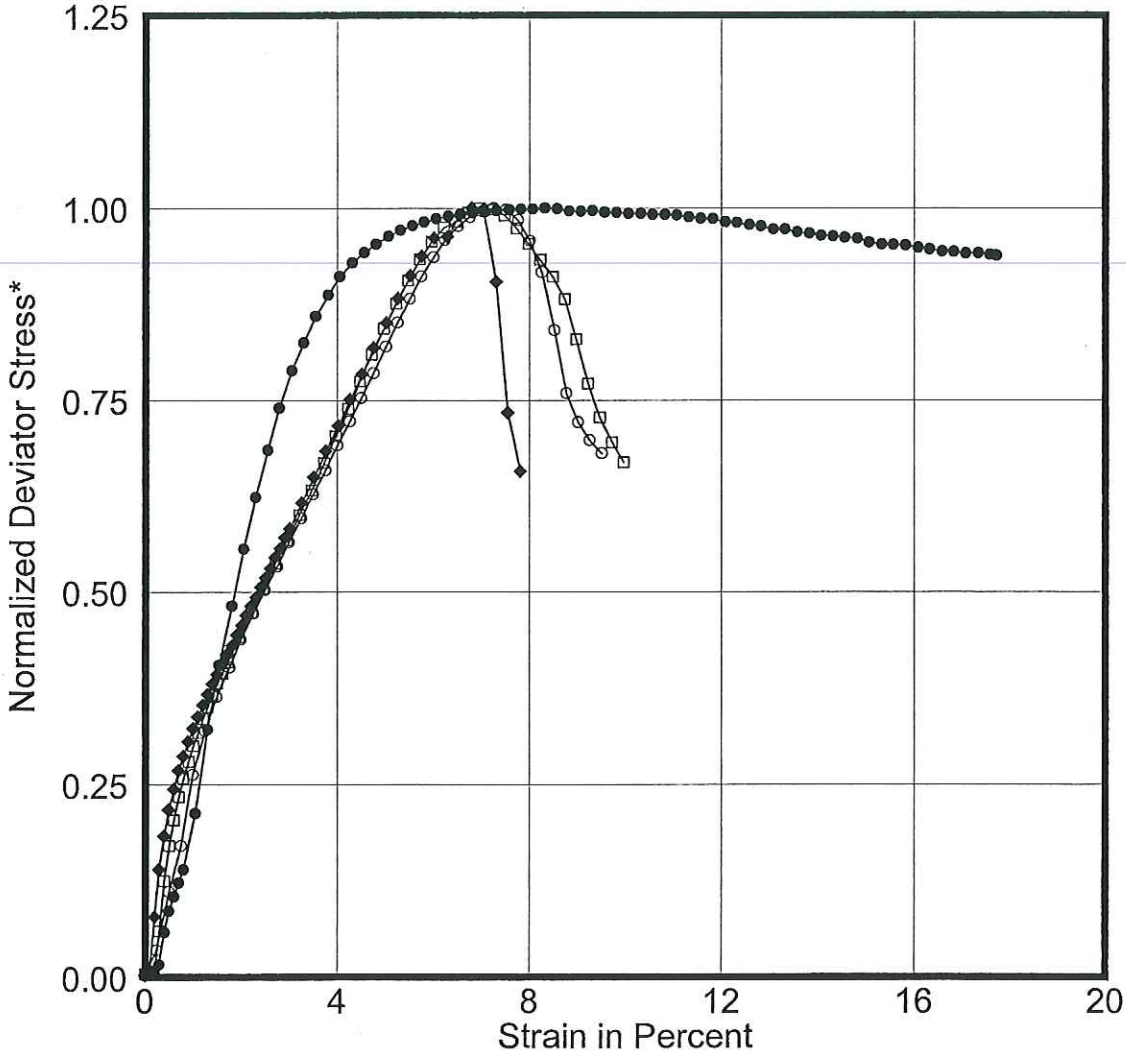
Drawn By: [illegible] Date: 2/15/08 for TTD

Checked By: TTD Date: 2/15/08

Approved By: [illegible] Date: 2/15/08

## STRESS-STRAIN CURVES
Unconsolidated-Undrained Triaxial Compression Test

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area




| Curve | Sample No. | Depth [ft] | Test Type | Confining Pressure [psi] | Maximum Deviator Stress [ksf] | ε50 [%] |
|---|---|---|---|---|---|---|
| ○——○ | 127 | 406.50 | UU | 122.8 | 9.55 | 2.5 |
| □——□ | 130 | 416.50 | UU | 120.3 | 9.35 | 2.4 |
| ◆——◆ | 132 | 426.00 | UU | 121.7 | 10.60 | 2.4 |
| ●——● | 139 | 449.50 | UU | 122.8 | 9.98 | 1.9 |

* Normalized with respect to maximum deviator stress.

Drawn By: [illegible] Date: 8/7/08
for TTBoard

Checked By: [illegible] Date: 8/7/08

Approved By: [illegible] Date: 8/8/08

## STRESS-STRAIN CURVES
Unconsolidated-Undrained Triaxial Compression Test

Texas Offshore Port System, Offshore Terminal Location
Block A-56, Galveston Area

| Density | Soil Description | Soil-Pile Friction Angle, δ Degrees | Limiting Skin Friction Values kips/ft$^2$ (kPa) | $N_q$ | Limiting Unit End Bearing Values kips/ft$^2$ (MPa) |
|---|---|---|---|---|---|
| Very Loose<br>Loose<br>Medium | Sand<br>Sand-Silt*<br>Silt | 15 | 1.0 (47.8) | 8 | 40 (1.9) |
| Loose<br>Medium<br>Dense | Sand<br>Sand-Silt*<br>Silt | 20 | 1.4 (67.0) | 12 | 60 (2.9) |
| Medium<br>Dense | Sand<br>Sand-Silt* | 25 | 1.7 (81.3) | 20 | 100 (4.8) |
| Dense<br>Very Dense | Sand<br>Sand-Silt* | 30 | 2.0 (95.7) | 40 | 200 (9.6) |
| Dense<br>Very Dense | Gravel<br>Sand | 35 | 2.4 (114.8) | 50 | 250 (12.0) |

* Sand-Silt includes those soils with significant fractions of both sand and silt. Strength values generally increase with increasing sand fractions and decrease with increasing silt fractions.

Note: API RP 2A notes that the parameters listed above are intended as guidelines only. Where detailed information, such as in situ cone tests, strength tests on high quality samples, model tests, or pile driving performance is available, other values may be justified.

Drawn By: [illegible] Date: 7/11/08

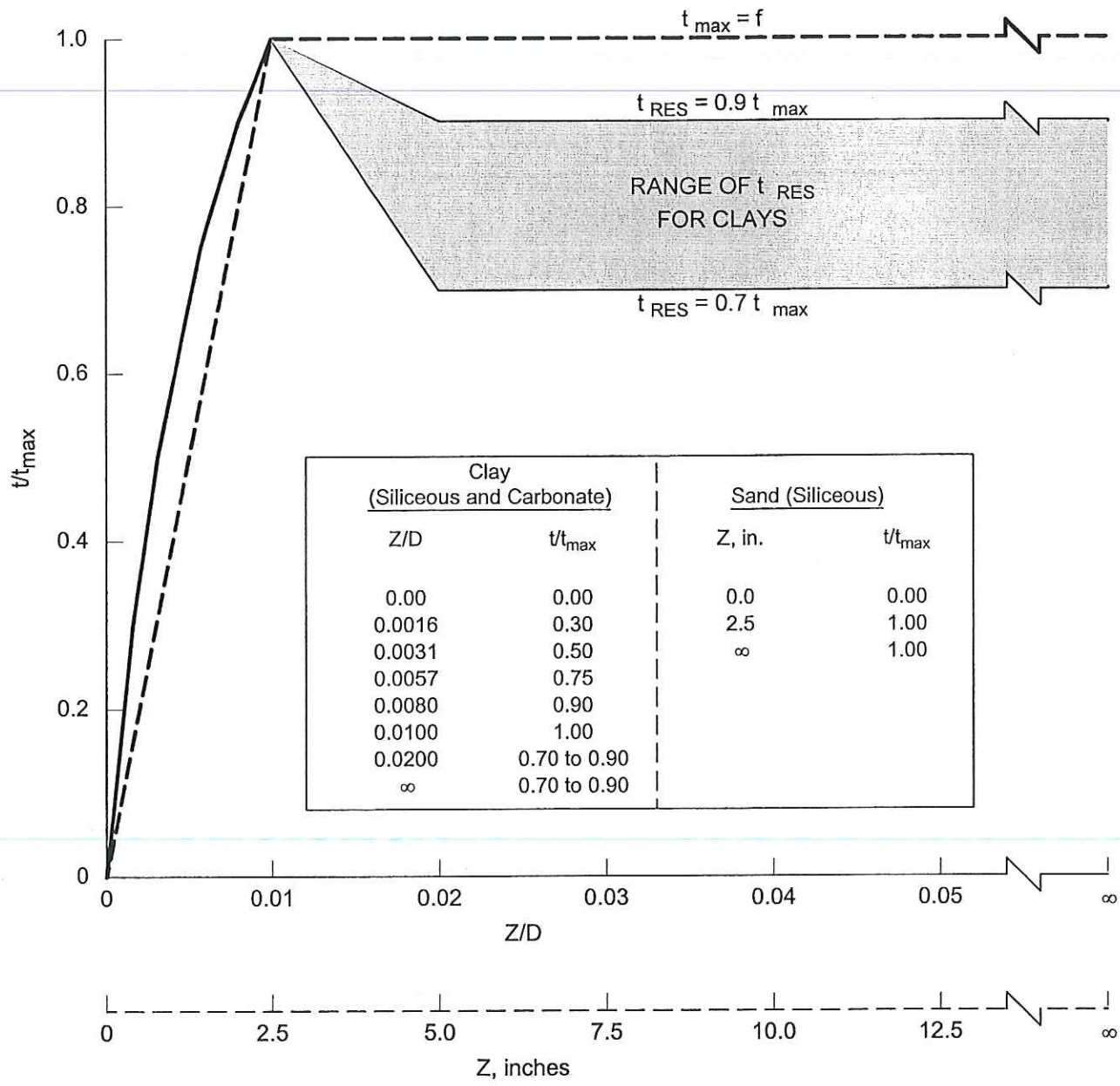
Date: 8/15/08

Checked By: [illegible]

Date: 8/15/08

Approved By: [illegible]

## SUMMARY OF RECOMMENDED DESIGN PARAMETERS (API RP 2A, 2000) FOR COHESIONLESS SILICEOUS SOILS




| Clay (Siliceous and Carbonate) | | Sand (Siliceous) | |
|---|---|---|---|
| Z/D | $t/t_{max}$ | Z, in. | $t/t_{max}$ |
| 0.00 | 0.00 | 0.0 | 0.00 |
| 0.0016 | 0.30 | 2.5 | 1.00 |
| 0.0031 | 0.50 | ∞ | 1.00 |
| 0.0057 | 0.75 | | |
| 0.0080 | 0.90 | | |
| 0.0100 | 1.00 | | |
| 0.0200 | 0.70 to 0.90 | | |
| ∞ | 0.70 to 0.90 | | |

Drawn By: Tomas Date: 7/25/08

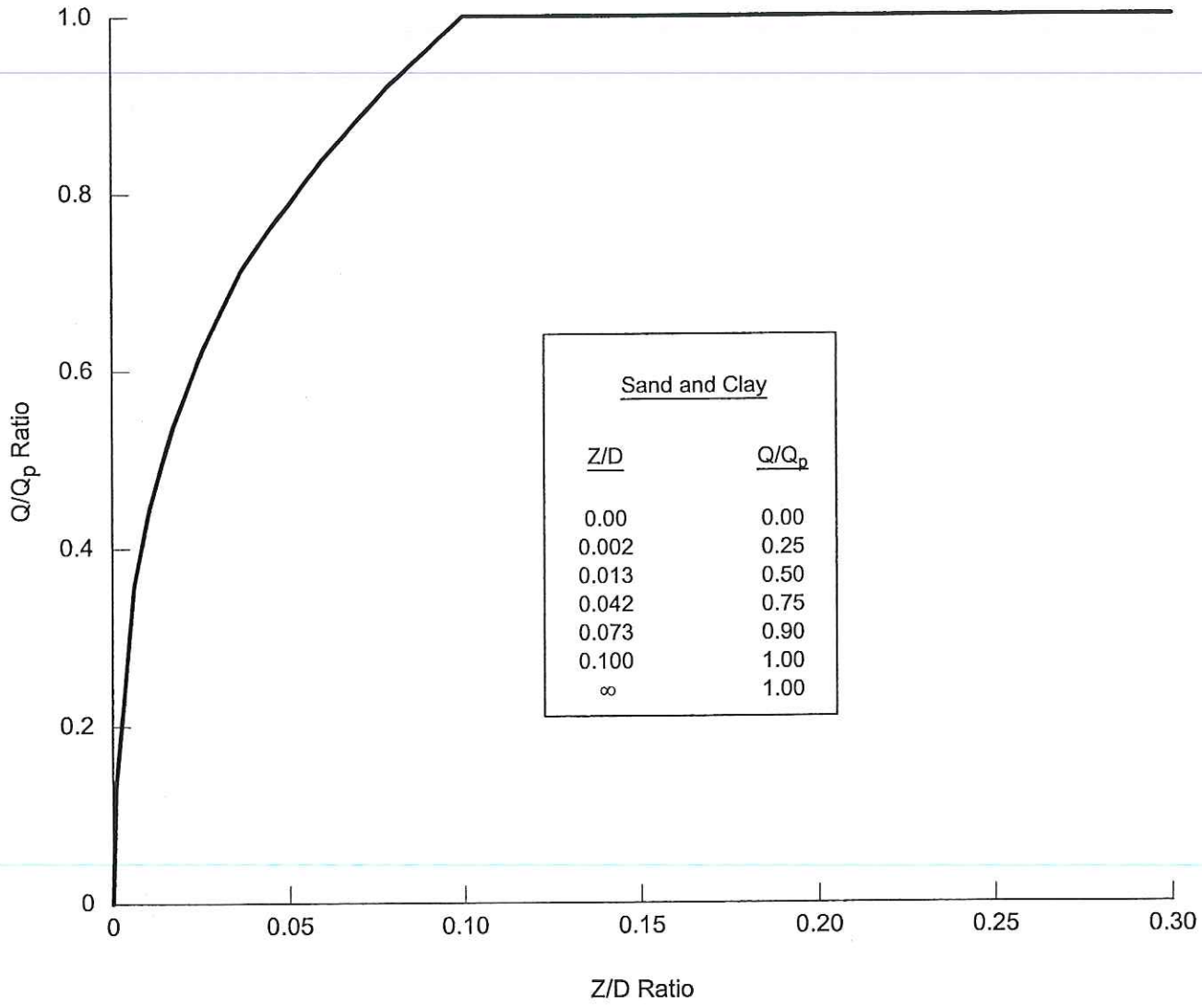
Date: 8/15/08

Checked By: Date:

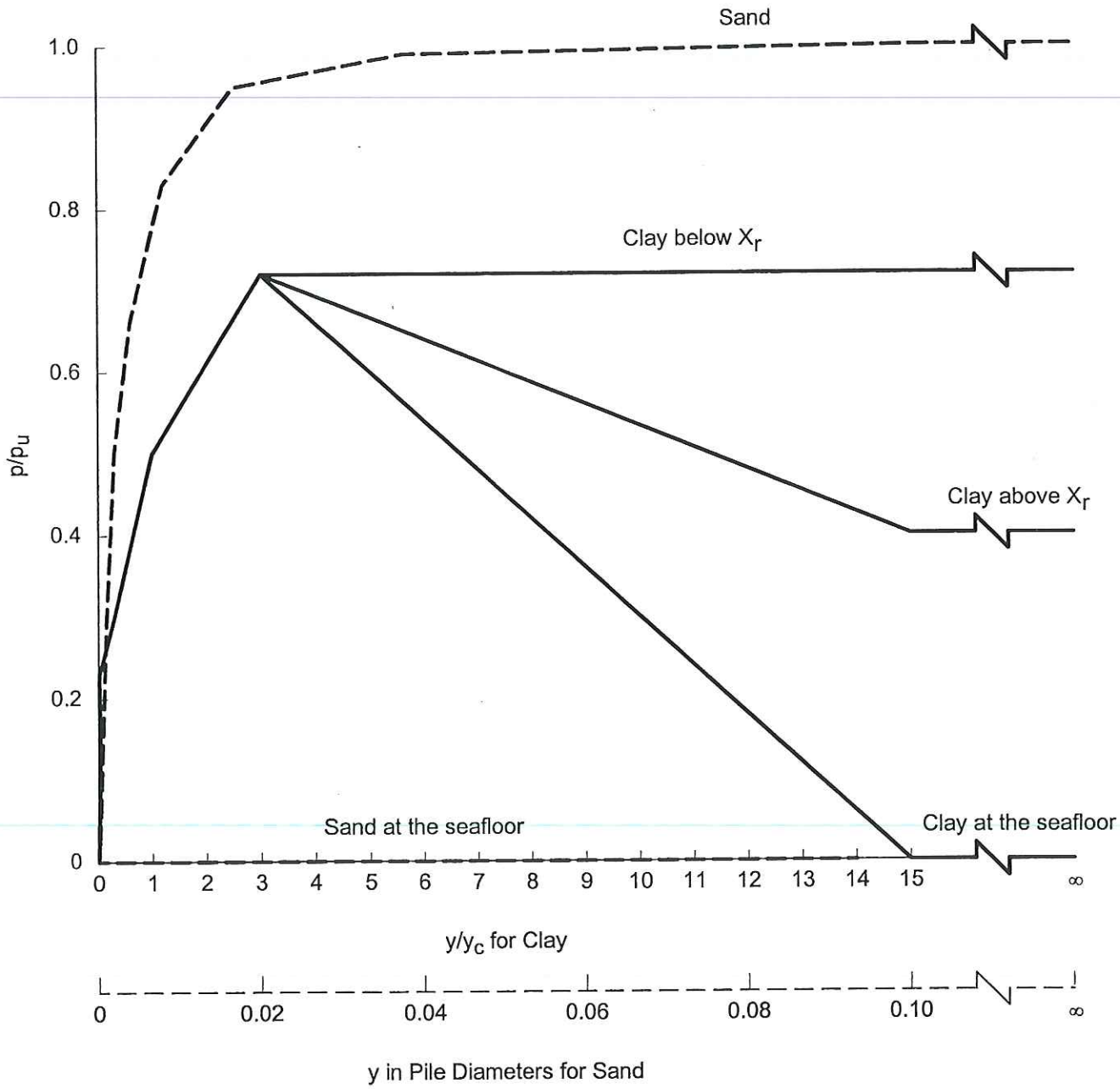
Approved By:

## TYPICAL SIDE LOAD TRANSFER (t-z) CURVES

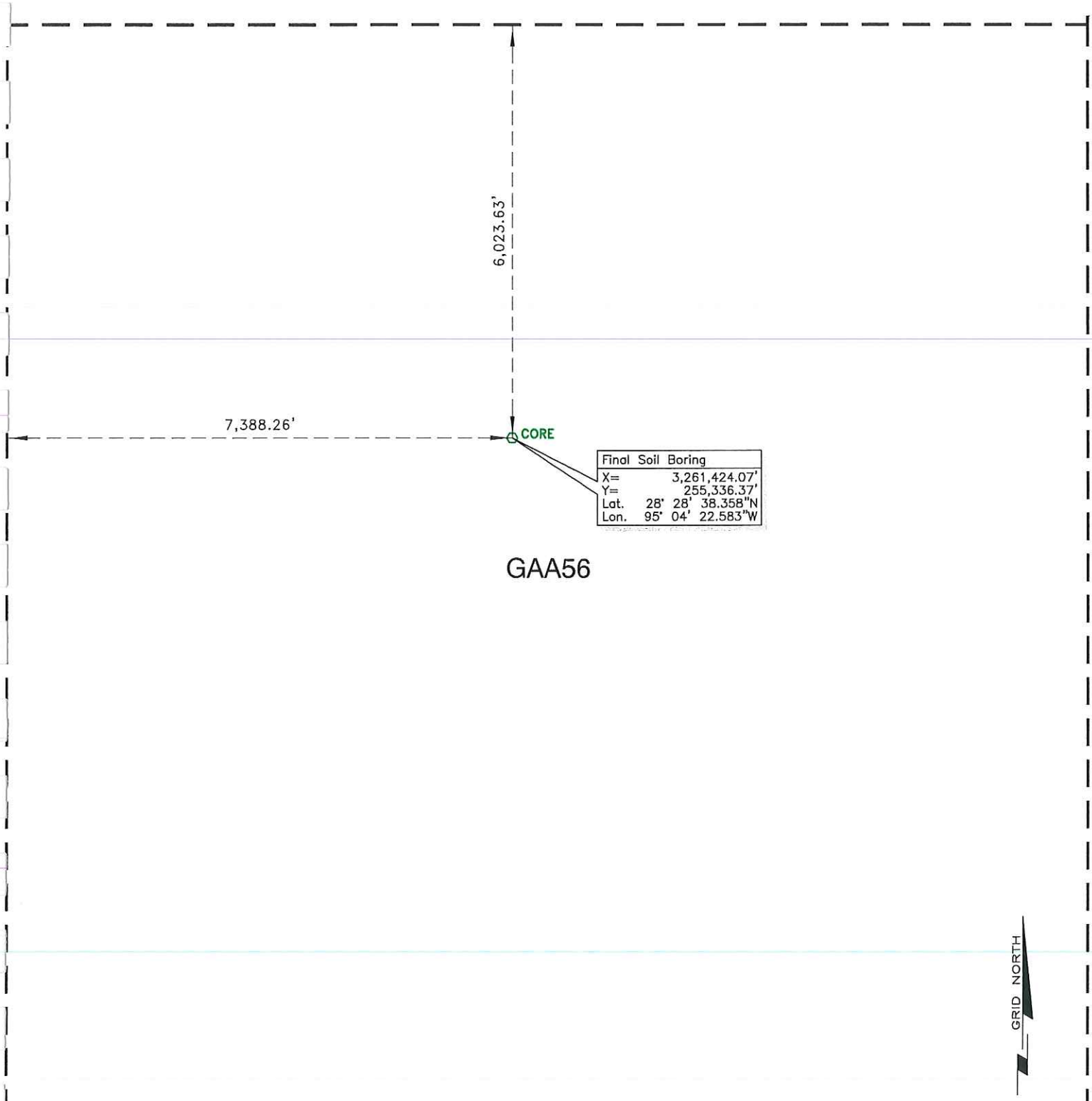
Date: 7/25/08
Drawn By: Temol
Date: 8/15/08
Date: 8/15/08
Checked By: MW
Approved By: MR




## TYPICAL PILE TIP LOAD TRANSFER (Q-z) CURVES




**TYPICAL LATERAL LOAD - PILE DEFLECTION (p-y) CURVES**




I HEREBY CERTIFY THAT THE ABOVE FINAL SOIL BORING POSITION IS CORRECT.

STATE OF LOUISIANA
STEPHEN R. HENRY
REG. No. 4903
REGISTERED PROFESSIONAL LAND SURVEYOR

Stephen Henry
REG. PROFESSIONAL LAND SURVEYOR NO. 4903
STATE OF LOUISIANA 7-7-08

NOTES:

1) SURVEYED COORDINATES TRANSFORMED FROM NAD83 (GPS DATUM) TO NAD27 (CHART DATUM) USING NADCON VERSION 2.1.

Printed: 7/7/08

# ENTERPRISE FIELD SERVICES, LLC

## FINAL SOIL BORING
## NO LEASE NUMBER (PLATFORM CENTER)

BLOCK A56
GALVESTON AREA
GULF OF MEXICO

**FUGRO CHANCE INC.**
200 Dulles Dr. Lafayette, Louisiana 70506-3001 (337) 237-1300

| | | | |
|---|---|---|---|
| GEODETIC DATUM: NAD27<br>PROJECTION: TEXAS SOUTH CENTRAL<br>GRID UNITS: US SURVEY FEET | | SCALE IN FEET 0 — 2,000' | |
| Job No.: 08-01932 | Date: 7/7/08 | Drwn: TCG | Chart: 1 Of: 1 |
| Dwgfile: O:\WellPermit\TXsc\GA\Permit\A56_CORE_NoLease_0801932 | | | |