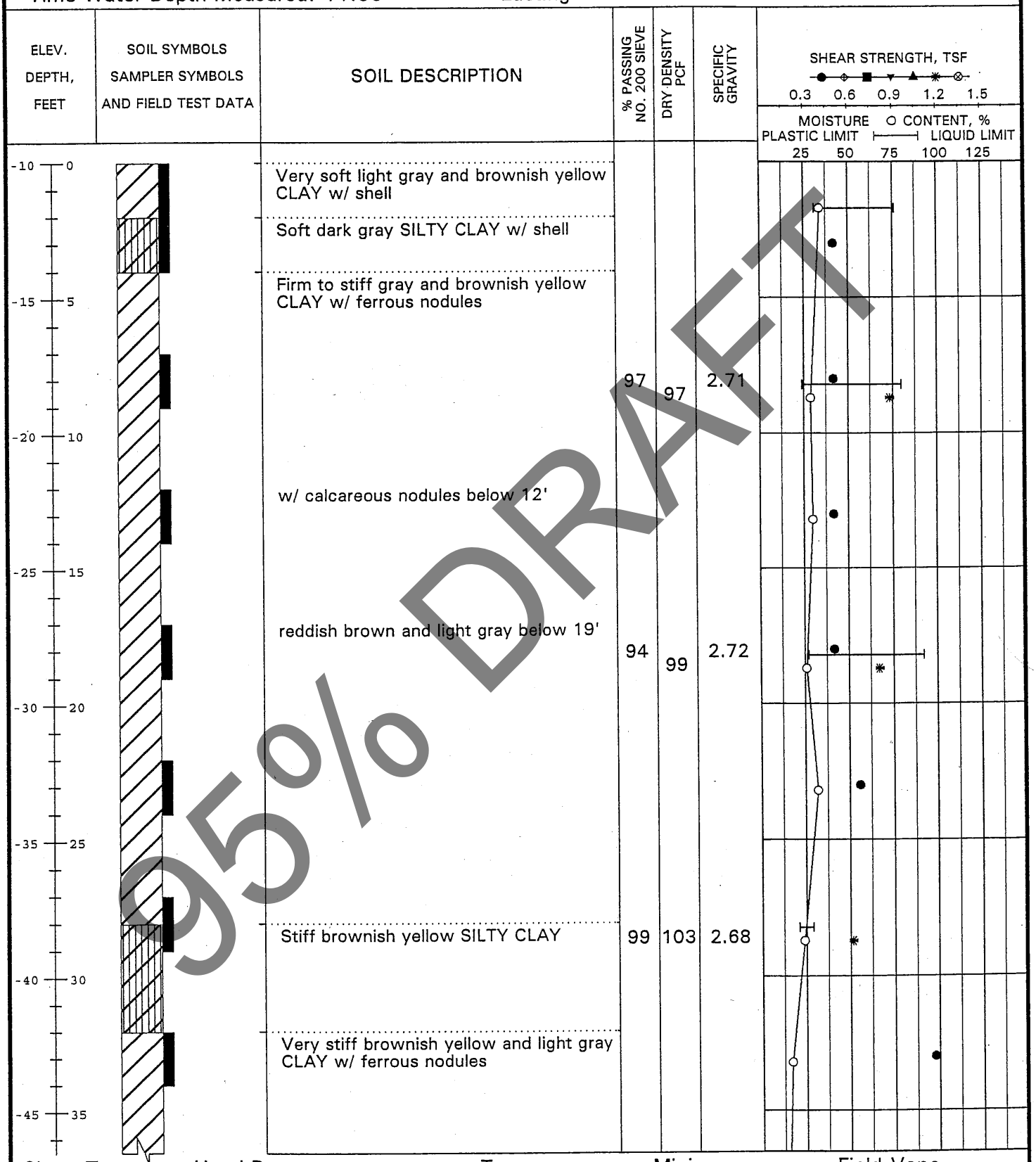
LOG OF SOIL BORING

Project Name: Atkinson Island Marsh
Boring No.: AM-13
Water Depth: 11 feet
Time Water Depth Measured: 11:55

Date: 04-23-98
Northing: 673784
Easting: 3283857

Project No. 97-196G-00
Approx. Elev.: -10.0 feet
Station: ≈22+000
Offset:



95% DRAFT

Shear Types: ● = Hand Penetrometer ⌖ = Torvane ■ = Minivane ▾ = Field Vane
▲ = Unconfined Compression ✱ = UU Triaxial Compression ⊗ = CU Triaxial Compression

See Appendix A for boring location.

Plate B-16A

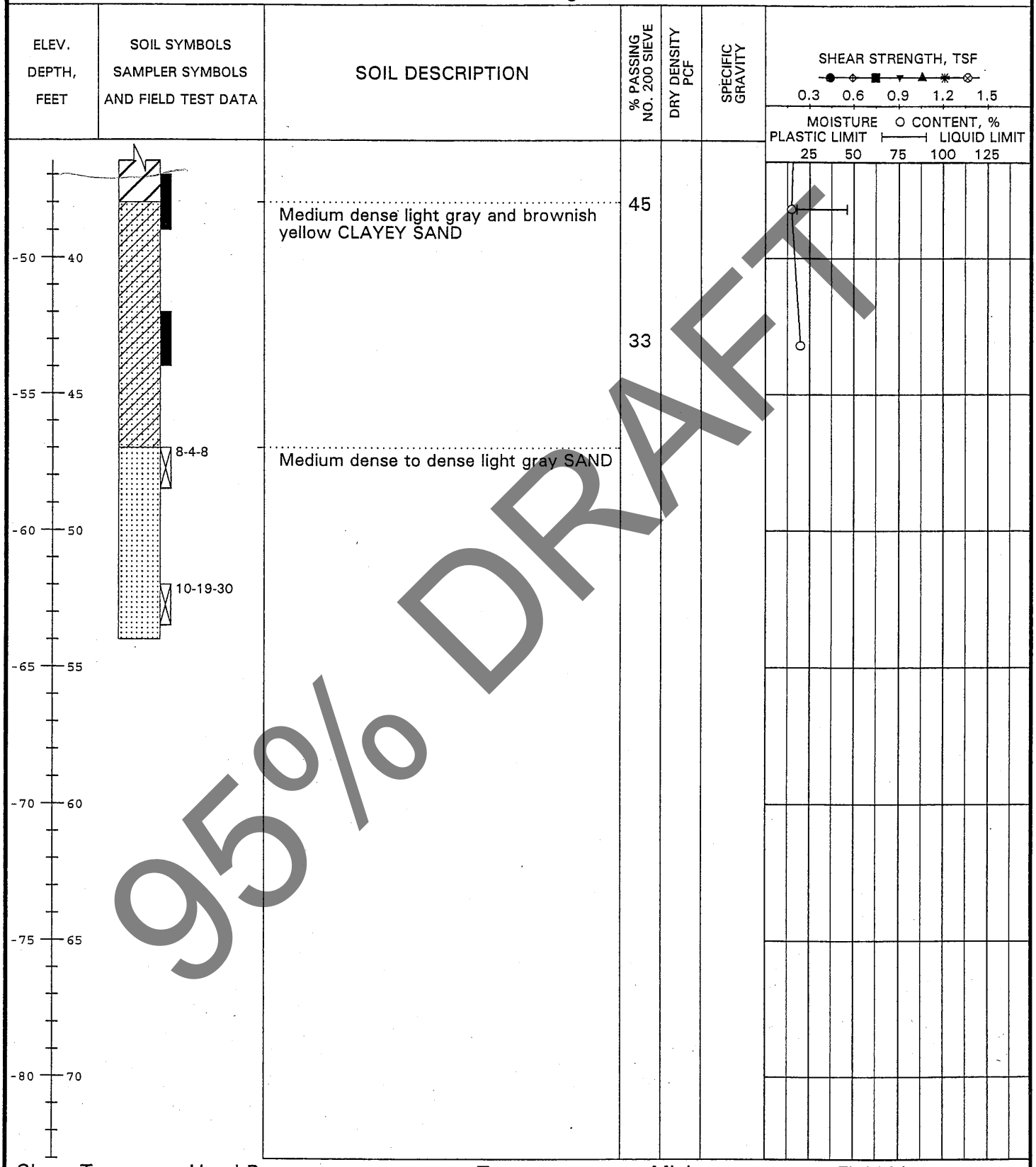
HVJ ASSOCIATES, INC.

LOG OF SOIL BORING

Project Name: Atkinson Island Marsh
Boring No.: AM-13
Water Depth: 11 feet
Time Water Depth Measured: 11:55

Date: 04-23-98
Northing: 673784
Easting: 3283857

Project No. 97-196G-00
Approx. Elev.: -10.0 feet
Station: ≈22+000
Offset:



95% DRAFT

Shear Types: ● = Hand Penetrometer ◆ = Torvane ■ = Minivane ▼ = Field Vane
▲ = Unconfined Compression ✱ = UU Triaxial Compression ⊗ = CU Triaxial Compression

See Appendix A for boring location.

Plate B-16B

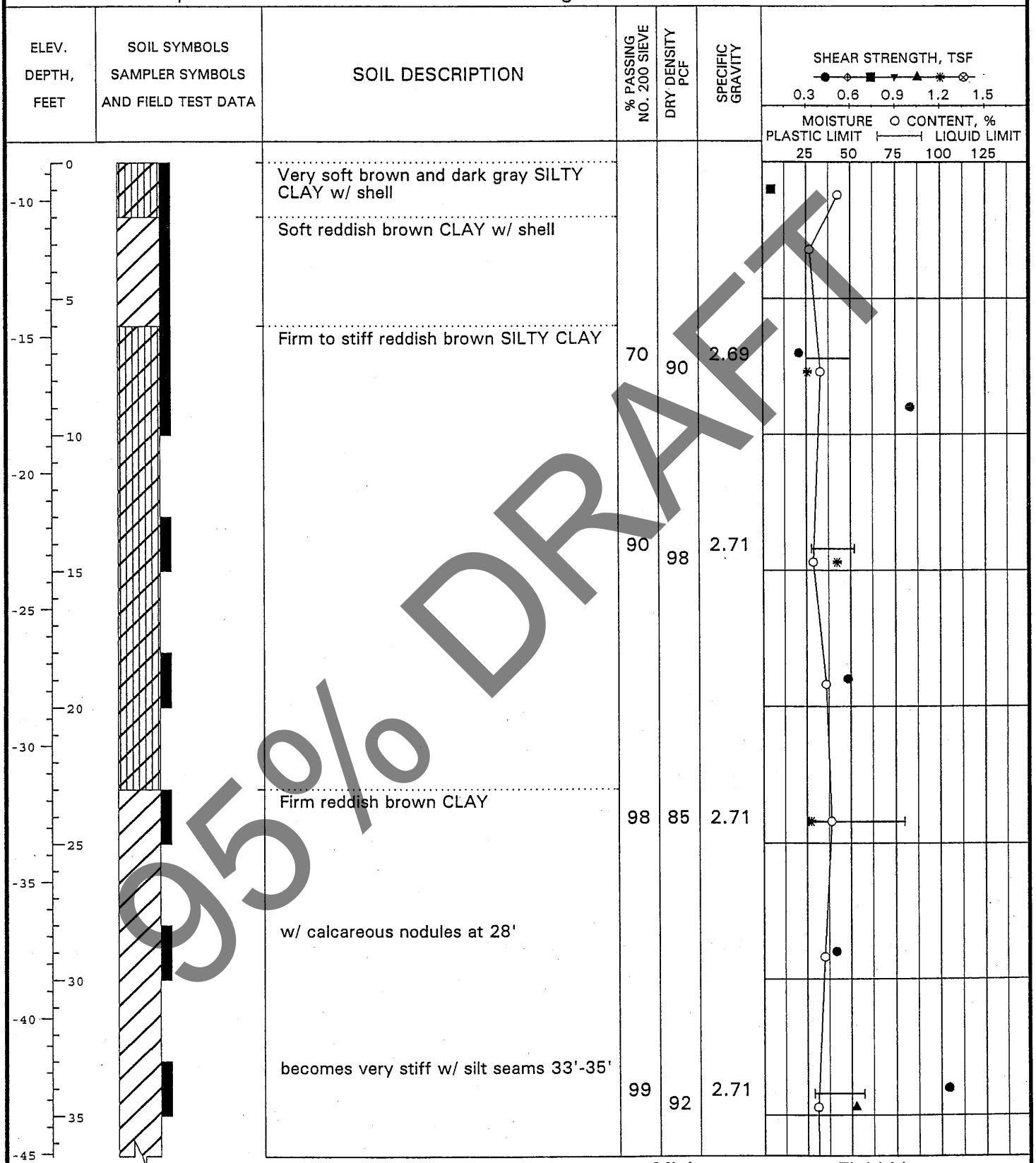
HVJ ASSOCIATES, INC.

LOG OF SOIL BORING

Project Name: Atkinson Island Marsh
Boring No.: AM-14
Water Depth: 10 feet
Time Water Depth Measured: 08:40

Date: 04-23-98
Northing: 670493
Easting: 3285137

Project No. 97-196G-00
Approx. Elev.: -8.6 feet
Station: ≈25+000
Offset:



95% DRAFT

Shear Types: ● = Hand Penetrometer ◆ = Torvane ■ = Minivane ▼ = Field Vane
▲ = Unconfined Compression ✱ = UU Triaxial Compression ⊗ = CU Triaxial Compression

See Appendix A for boring location.

Plate B-17A

HVJ ASSOCIATES, INC.

LOG OF SOIL BORING

Project Name: Atkinson Island Marsh
Boring No.: AM-14
Water Depth: 10 feet
Time Water Depth Measured: 08:40

Date: 04-23-98
Northing: 670493
Easting: 3285137

Project No. 97-196G-00
Approx. Elev.: -8.6 feet
Station: ≈25+000
Offset:

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL DESCRIPTION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF	SPECIFIC GRAVITY
-40		reddish brown and light gray		81	2.70
-50		light gray and brownish yellow w/ shell below 43'			
-55		Stiff light gray SANDY CLAY			
-60		Medium dense light gray and brown SAND			

SHEAR STRENGTH, TSF
0.3 0.6 0.9 1.2 1.5

MOISTURE ○ CONTENT, %
PLASTIC LIMIT ⊢—⊣ LIQUID LIMIT
25 50 75 100 125

95% DRAFT

Shear Types: ● = Hand Penetrometer ◈ = Torvane ■ = Minivane ▾ = Field Vane
▲ = Unconfined Compression ✱ = UU Triaxial Compression ⊗ = CU Triaxial Compression

See Appendix A for boring location.

Plate B-17B

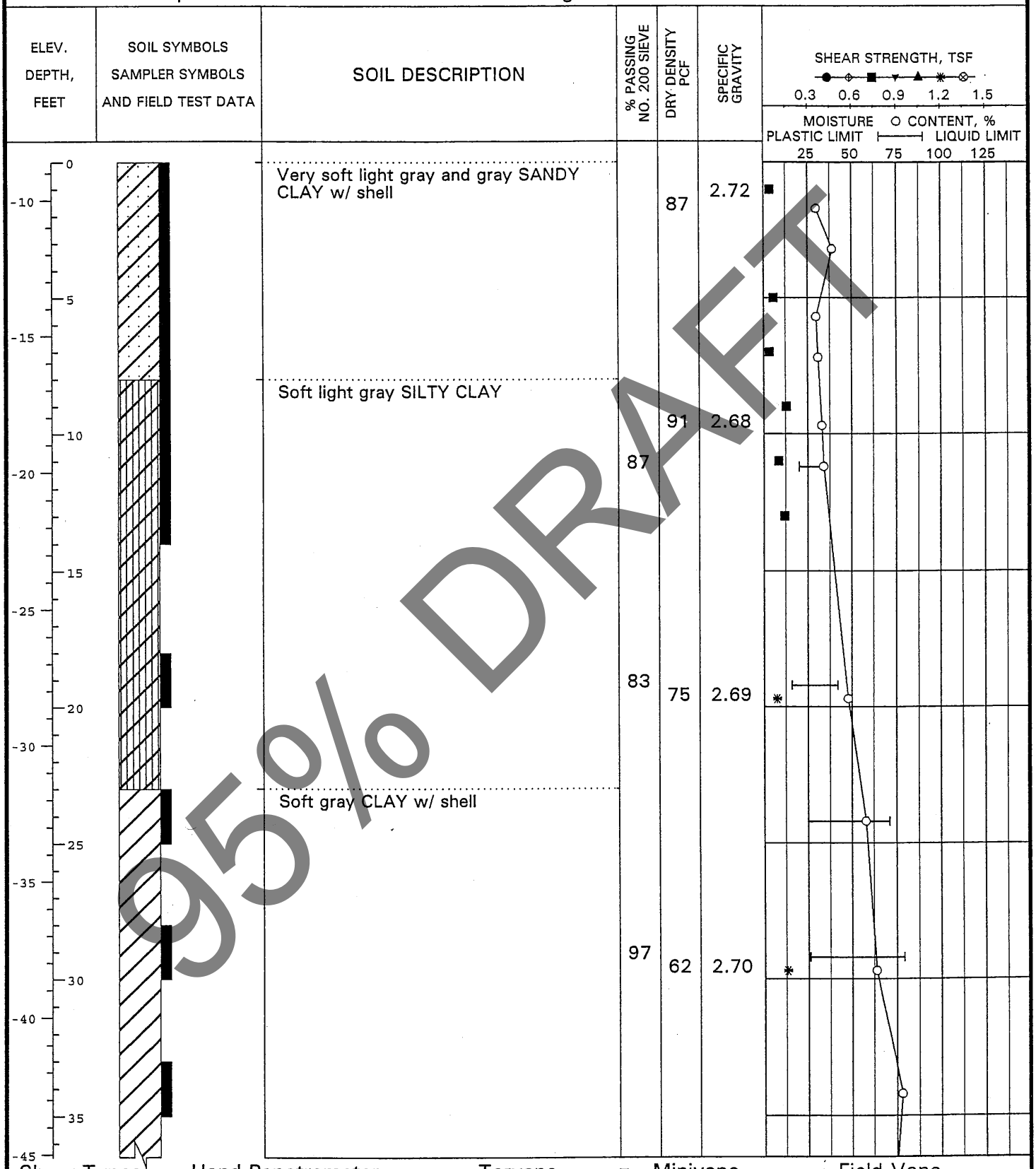
HVJ ASSOCIATES, INC.

LOG OF SOIL BORING

Project Name: Atkinson Island Marsh
Boring No.: AM-15
Water Depth: 10 feet
Time Water Depth Measured: 11:41

Date: 04-21-98
Northing: 667342
Easting: 3286275

Project No. 97-196G-00
Approx. Elev.: -8.6 feet
Station: ≈29+000
Offset:



95% DRAFT

Shear Types: ● = Hand Penetrometer ◈ = Torvane ■ = Minivane ▾ = Field Vane
▲ = Unconfined Compression ✱ = UU Triaxial Compression ⊗ = CU Triaxial Compression

See Appendix A for boring location.

Plate B-18A

HVJ ASSOCIATES, INC.

LOG OF SOIL BORING

Project Name: Atkinson Island Marsh
Boring No.: AM-15
Water Depth: 10 feet
Time Water Depth Measured: 11:41

Date: 04-21-98
Northing: 667342
Easting: 3286275

Project No. 97-196G-00
Approx. Elev.: -8.6 feet
Station: ≈29+000
Offset:

ELEV. DEPTH, FEET	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	SOIL DESCRIPTION	% PASSING NO. 200 SIEVE	DRY DENSITY PCF	SPECIFIC GRAVITY
-40				57	2.68
-45		Medium dense light gray and dark gray CLAYEY SAND w/ clay, sand seams and shell	9		
-50					
-55		Soft to firm gray CLAY			
-60					
-65					
-70					
-75					
-80					

SHEAR STRENGTH, TSF
0.3 0.6 0.9 1.2 1.5

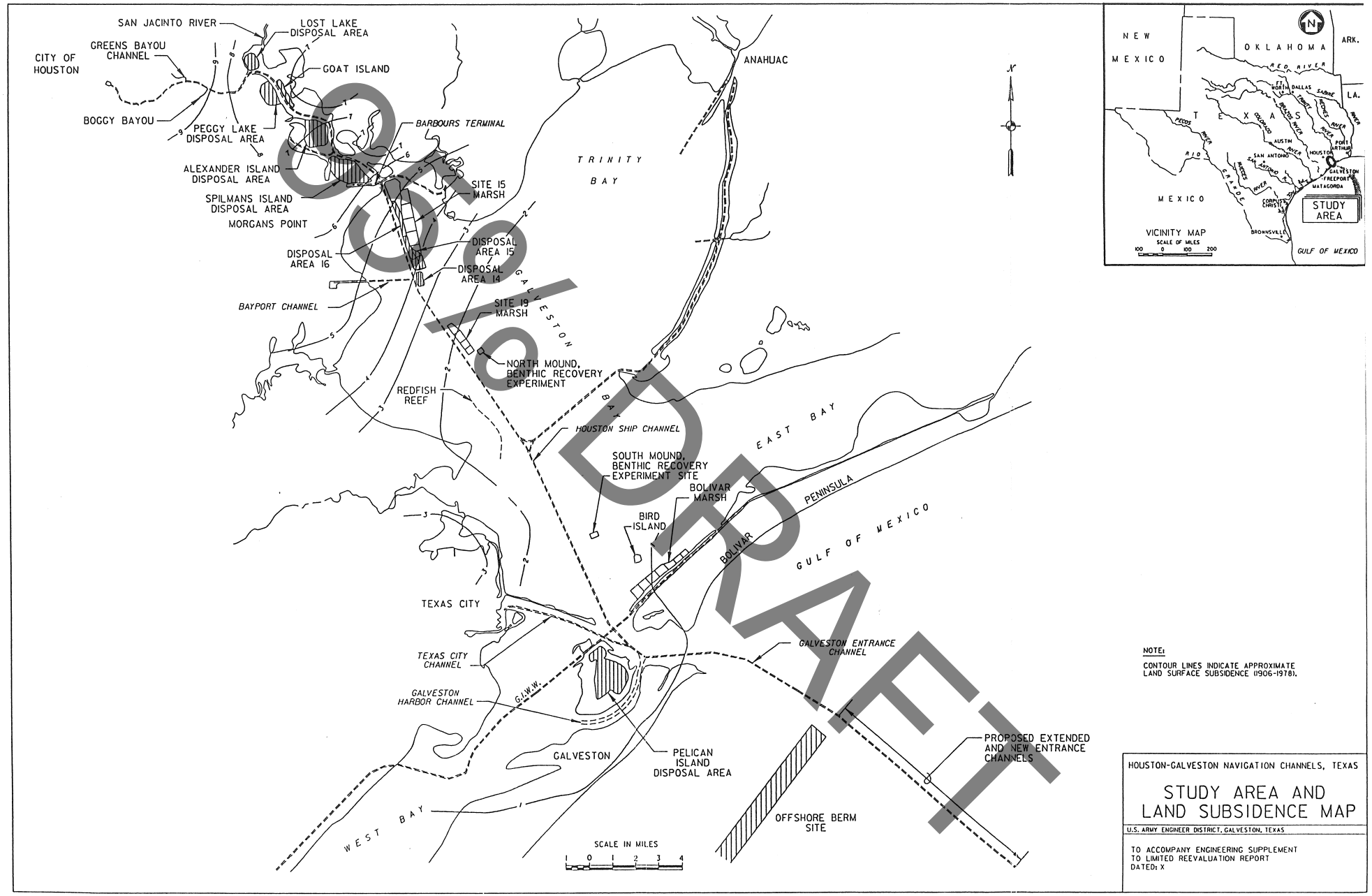
MOISTURE ○ CONTENT, %
PLASTIC LIMIT ⊢—⊣ LIQUID LIMIT
25 50 75 100 125

95% DRAFT

Shear Types: ● = Hand Penetrometer ◆ = Torvane ■ = Minivane ▼ = Field Vane
▲ = Unconfined Compression ✱ = UU Triaxial Compression ⊗ = CU Triaxial Compression

See Appendix A for boring location.

Plate B-18B



GOVT DRAFT

NOTE:

CONTOUR LINES INDICATE APPROXIMATE LAND SURFACE SUBSIDENCE (1906-1978).

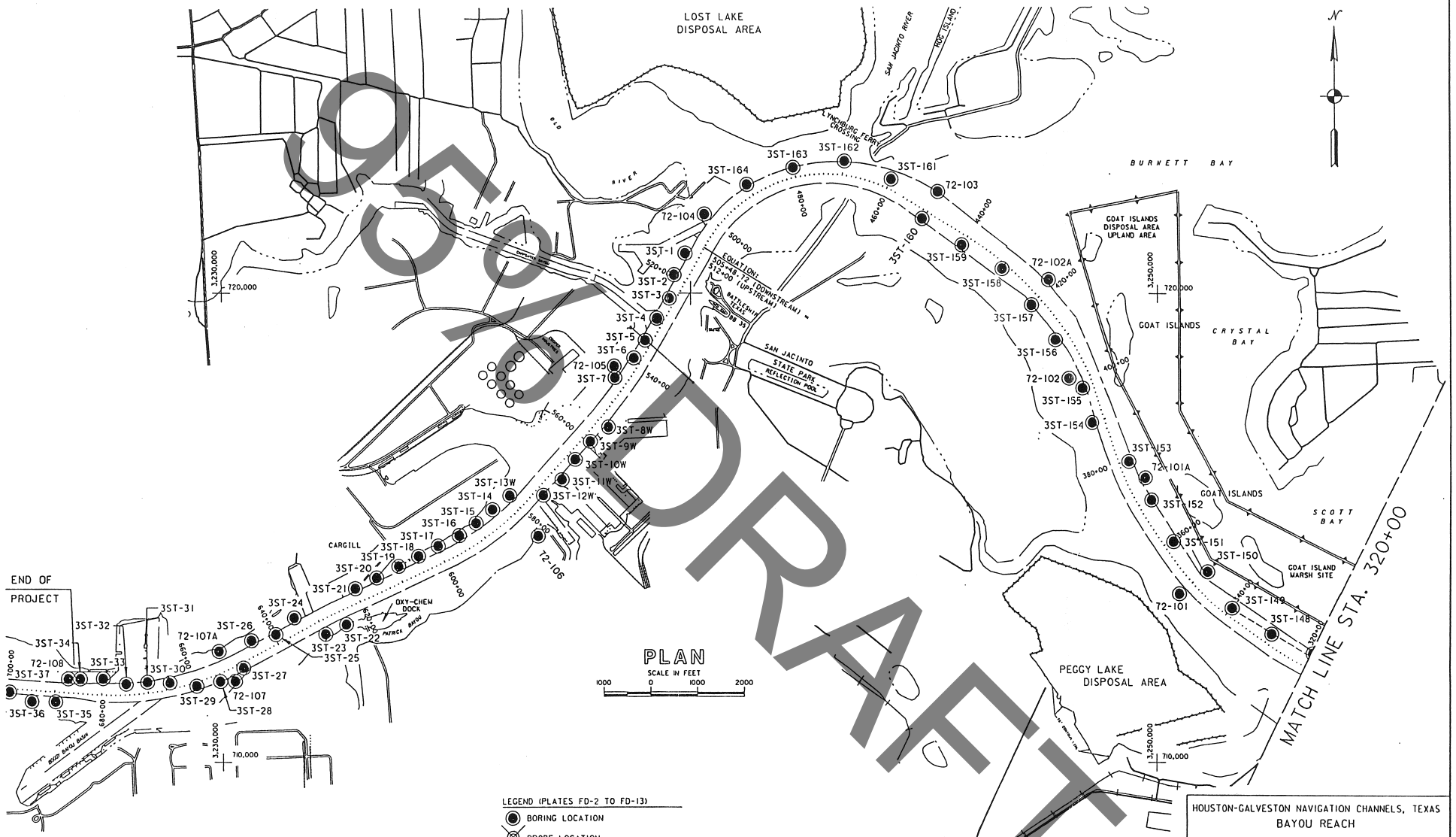
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

STUDY AREA AND LAND SUBSIDENCE MAP

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-1



LEGEND (PLATES FD-2 TO FD-13)

- BORING LOCATION
- PROBE LOCATION
- (OR) PROPOSED BENEFICIAL USE CONFINEMENT LEVEE

NOTES: (PLATES FD-2 TO FD-13)

SEE PLATES FD-14 TO FD-36 FOR LOGS OF BORINGS
SEE PLATE FD-81 FOR LOGS OF PROBES

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
BAYOU REACH

BORING LAYOUT

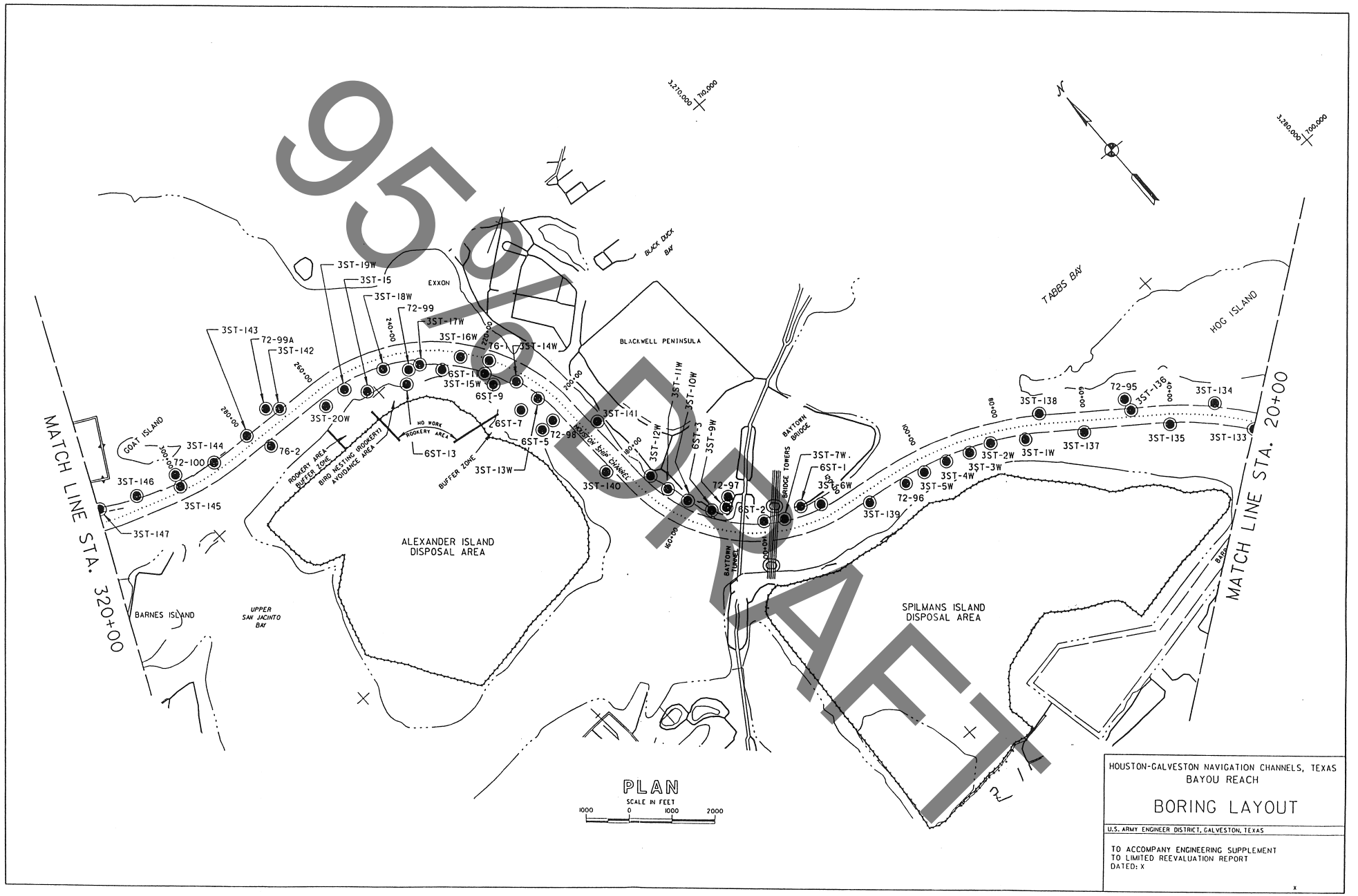
U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

x

PLATE FD-2

95% DRAFT



PLAN

SCALE IN FEET

1000 0 1000 2000

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
BAYOU REACH

BORING LAYOUT

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

x

PLATE FD-3

95% DRAFT

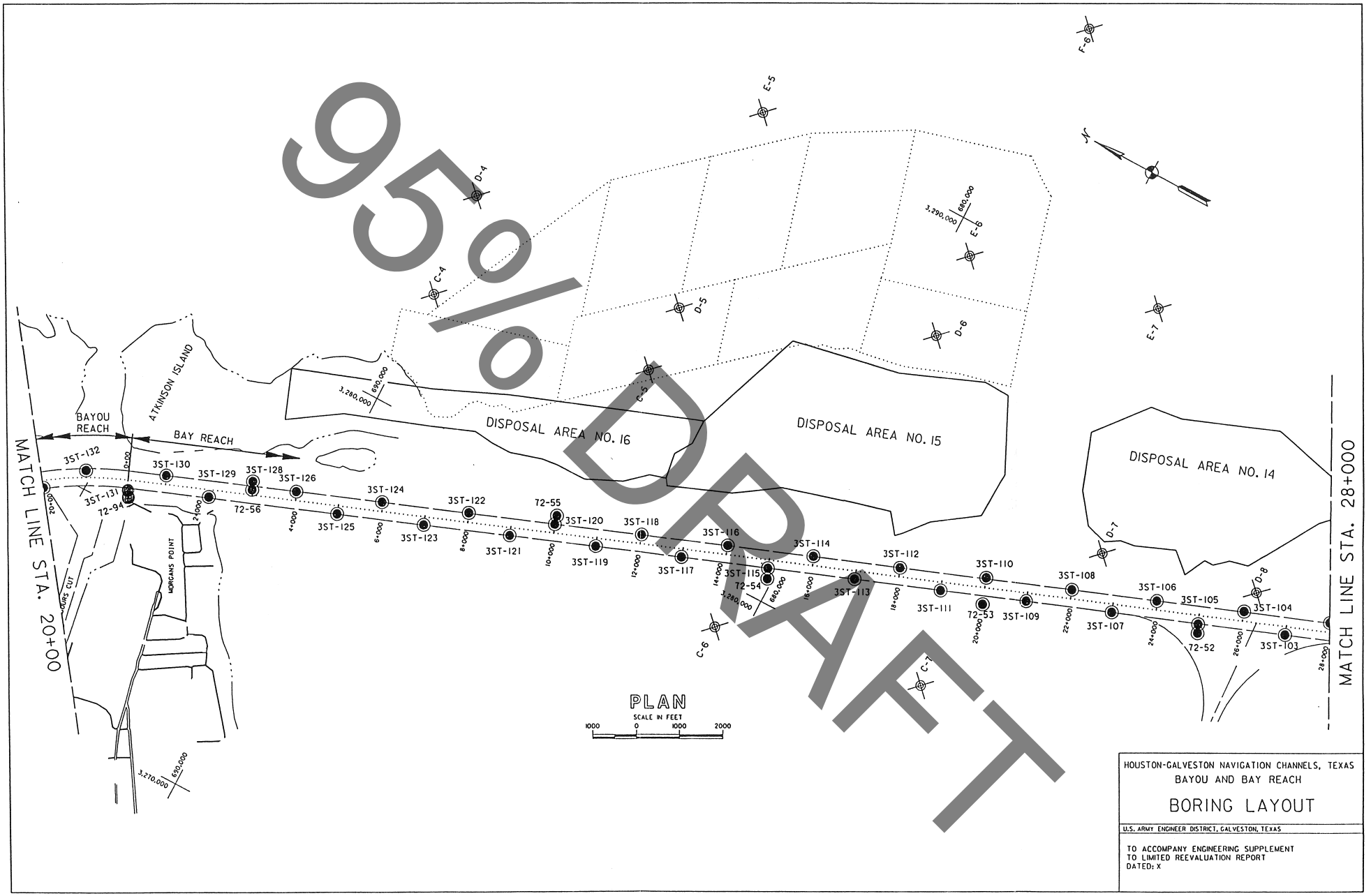
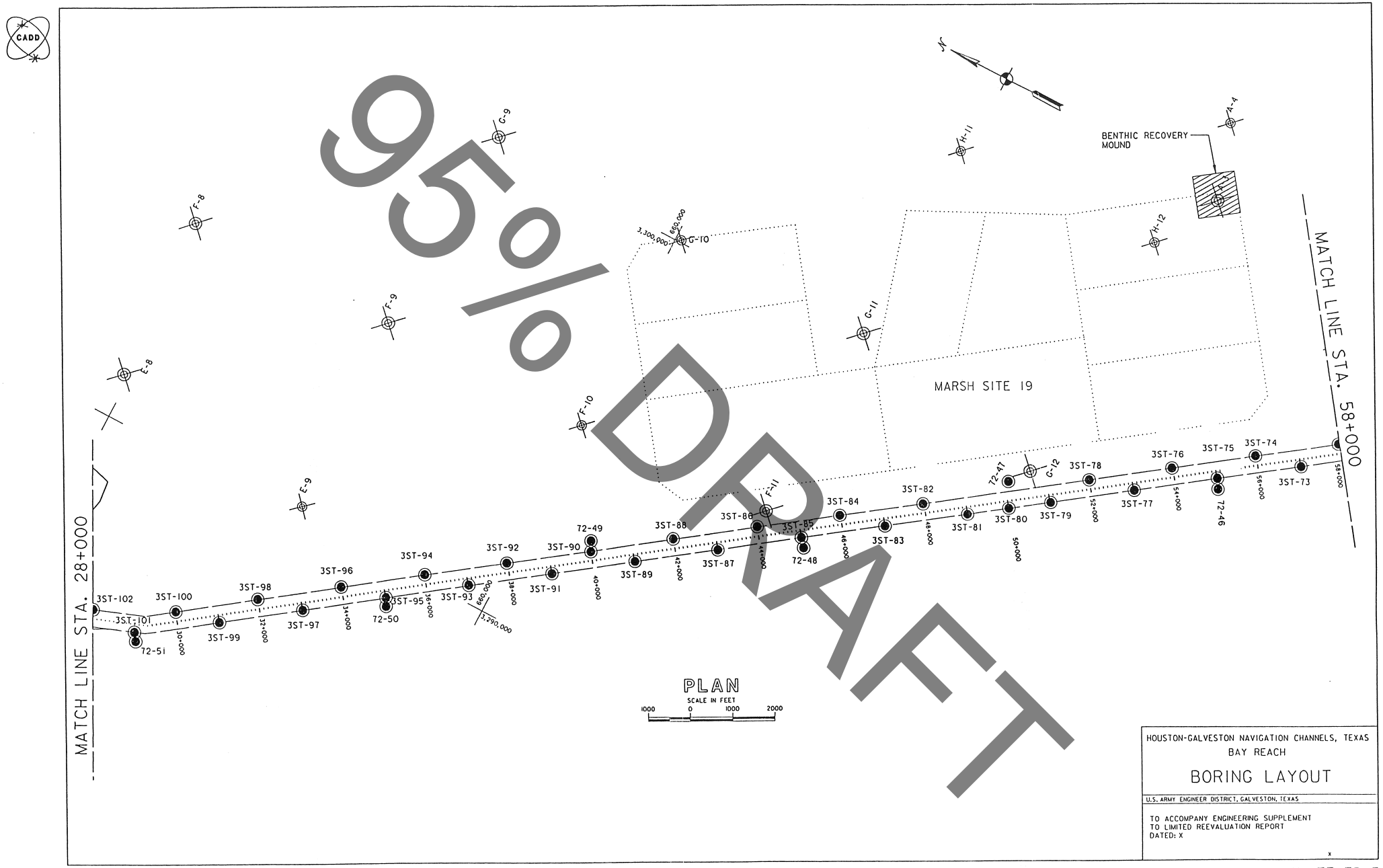

95% DRAFT
CADD
BAYOU REACH
BAY REACH
ATKINSON ISLAND
MORGANS POINT
CORPS CUT
MATCH LINE STA. 20+00
MATCH LINE STA. 28+000
DISPOSAL AREA NO. 16
DISPOSAL AREA NO. 15
DISPOSAL AREA NO. 14
3ST-132
3ST-131
3ST-130
3ST-129
3ST-128
3ST-126
3ST-125
3ST-124
3ST-123
3ST-122
3ST-121
3ST-120
3ST-119
3ST-118
3ST-117
3ST-116
3ST-115
3ST-114
3ST-113
3ST-112
3ST-111
3ST-110
3ST-109
3ST-108
3ST-107
3ST-106
3ST-105
3ST-104
3ST-103
72-94
72-56
72-55
72-54
72-53
72-52
C-4
C-5
C-6
C-7
D-4
D-5
D-6
D-7
D-8
E-5
E-6
E-7
F-8
3,290,000
680,000
3,280,000
3,210,000
650,000
PLAN
SCALE IN FEET
1000 0 1000 2000
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
BAYOU AND BAY REACH
BORING LAYOUT
U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS
TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-4



HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
BAY REACH

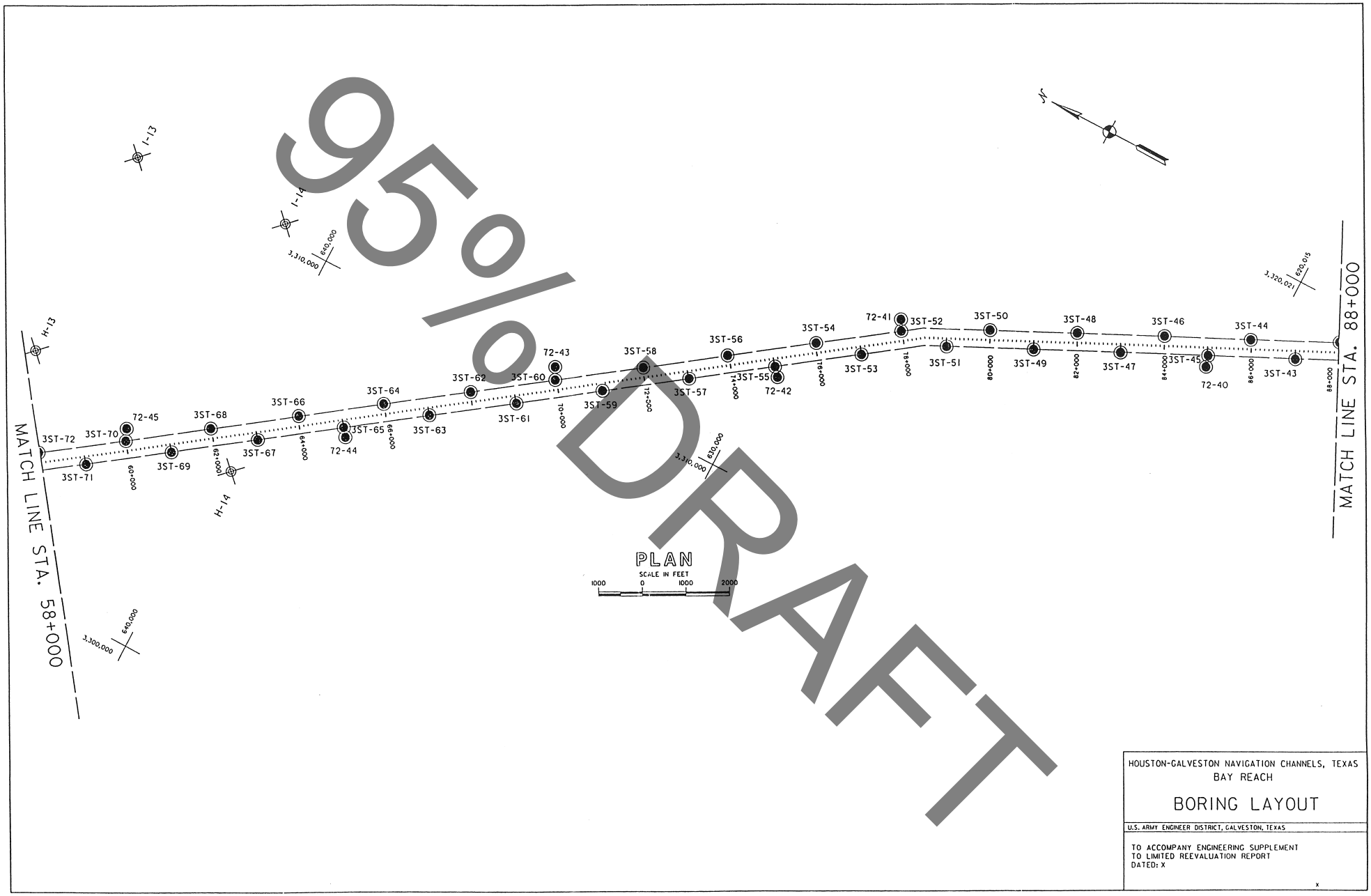
BORING LAYOUT

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

x

PLATE FD-5



HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
BAY REACH

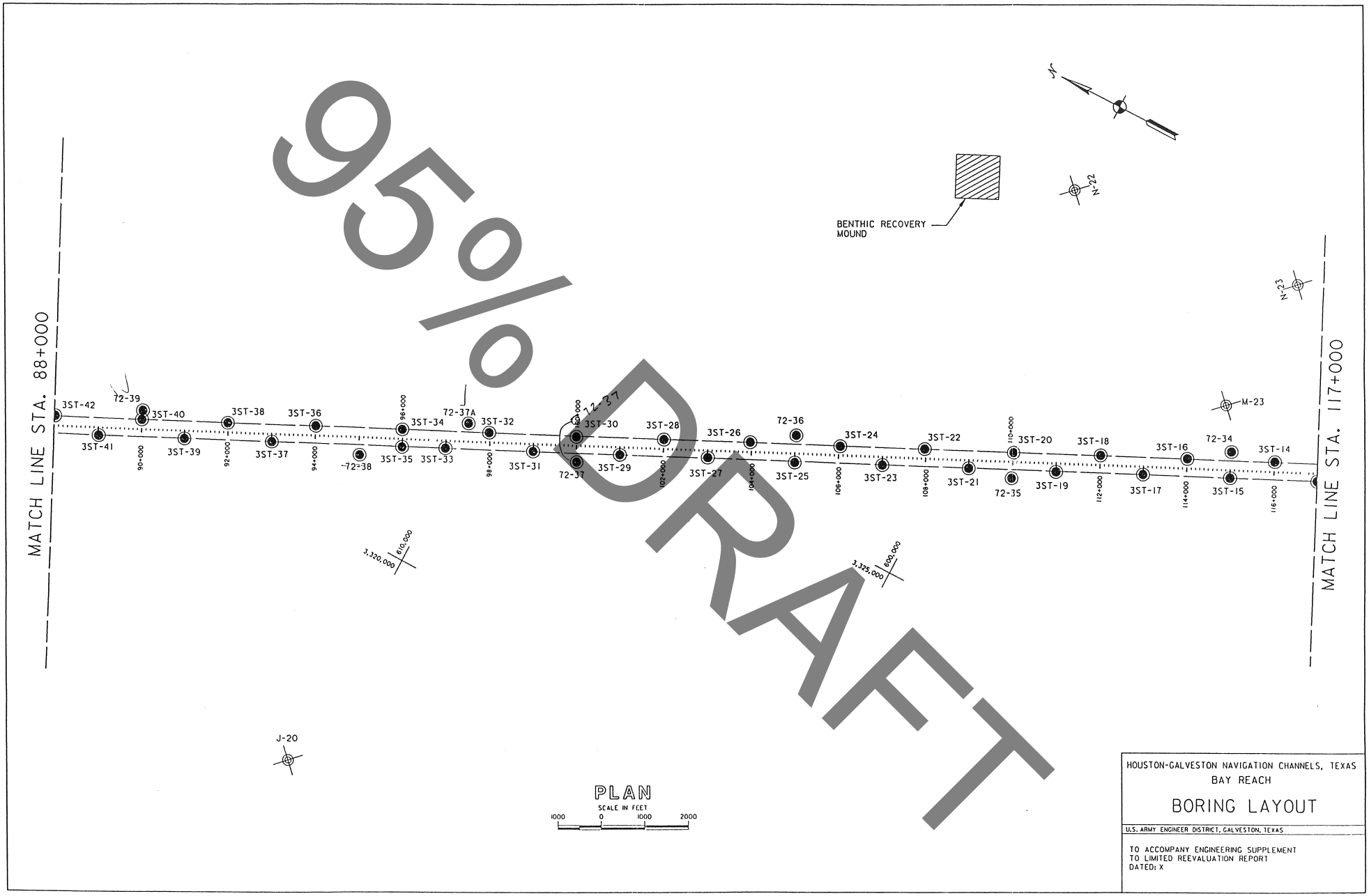
BORING LAYOUT

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

x

PLATE FD-6



95% DRAFT

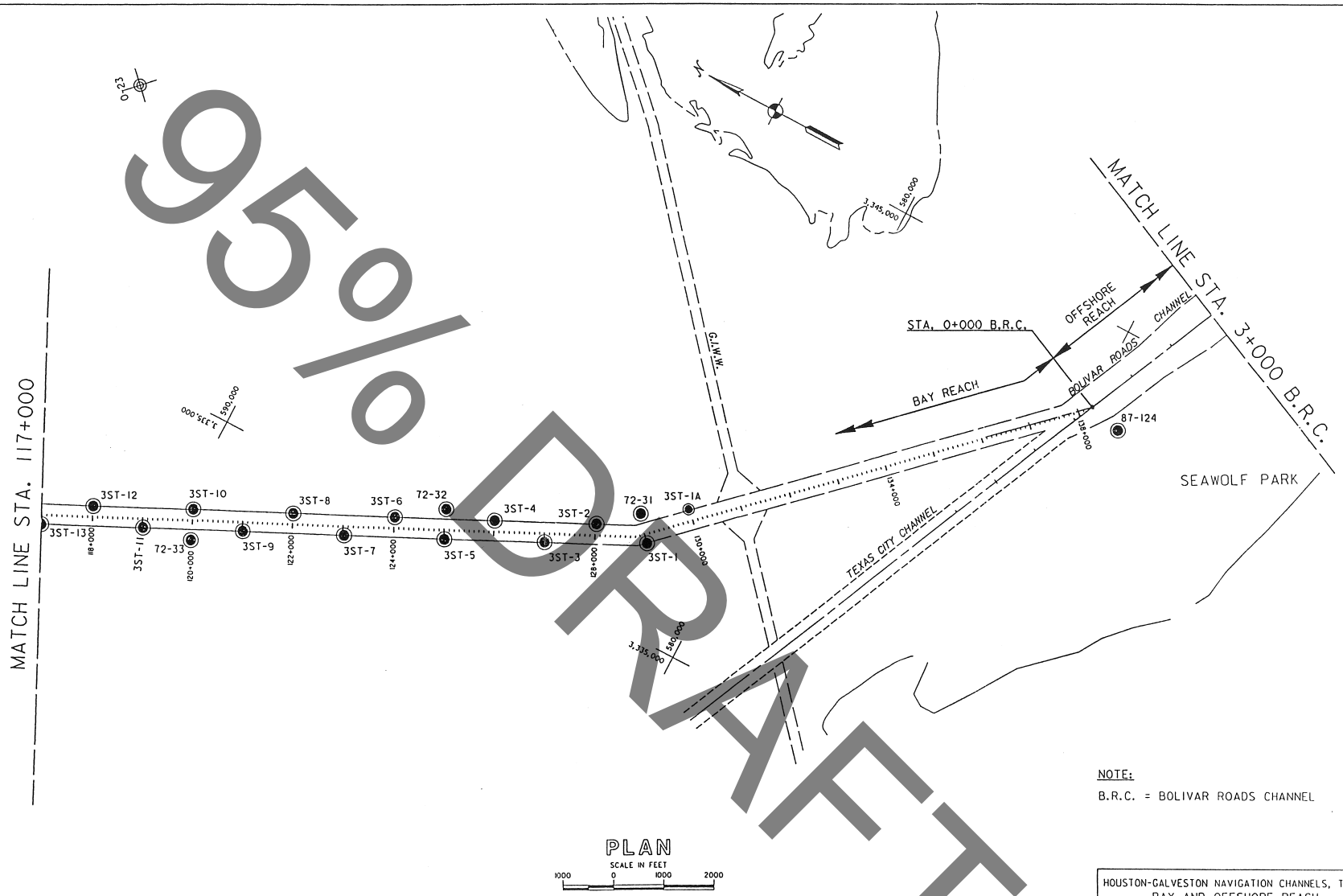
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
BAY REACH

BORING LAYOUT

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-7



NOTE:

B.R.C. = BOLIVAR ROADS CHANNEL

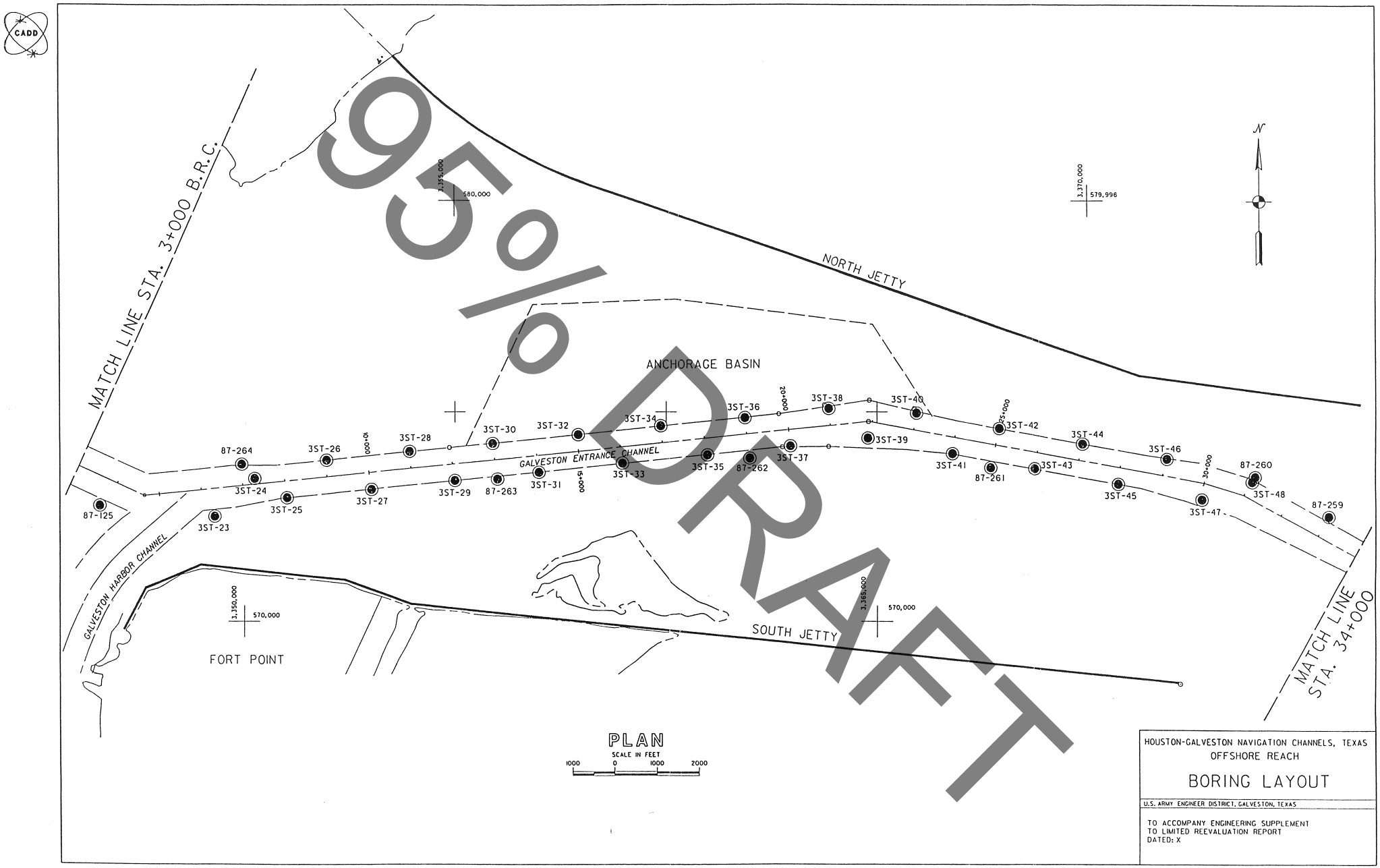
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
BAY AND OFFSHORE REACH

BORING LAYOUT

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: x

PLATE FD-8



PLAN

SCALE IN FEET

1000 0 1000 2000

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
OFFSHORE REACH

BORING LAYOUT

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-9

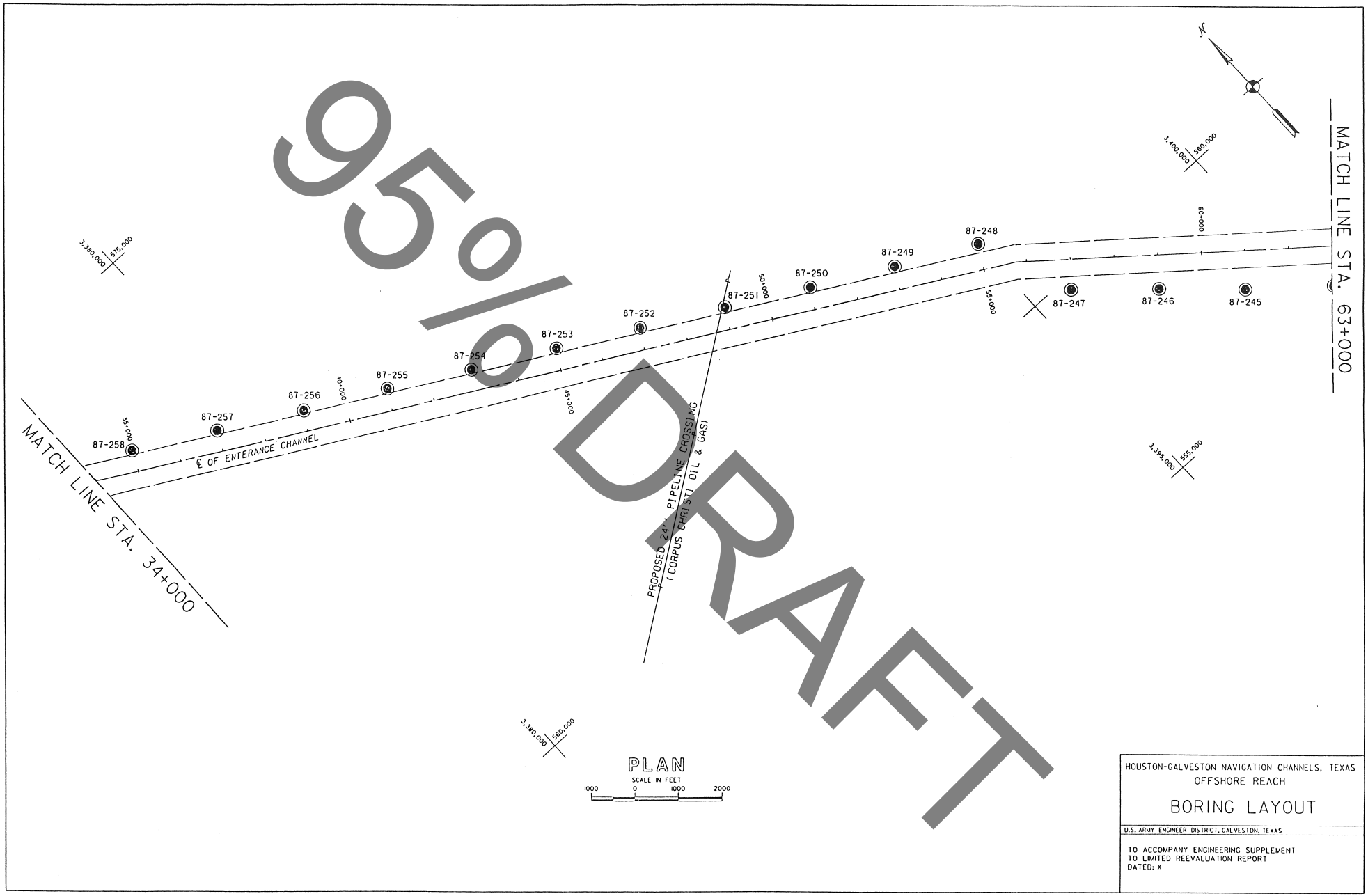
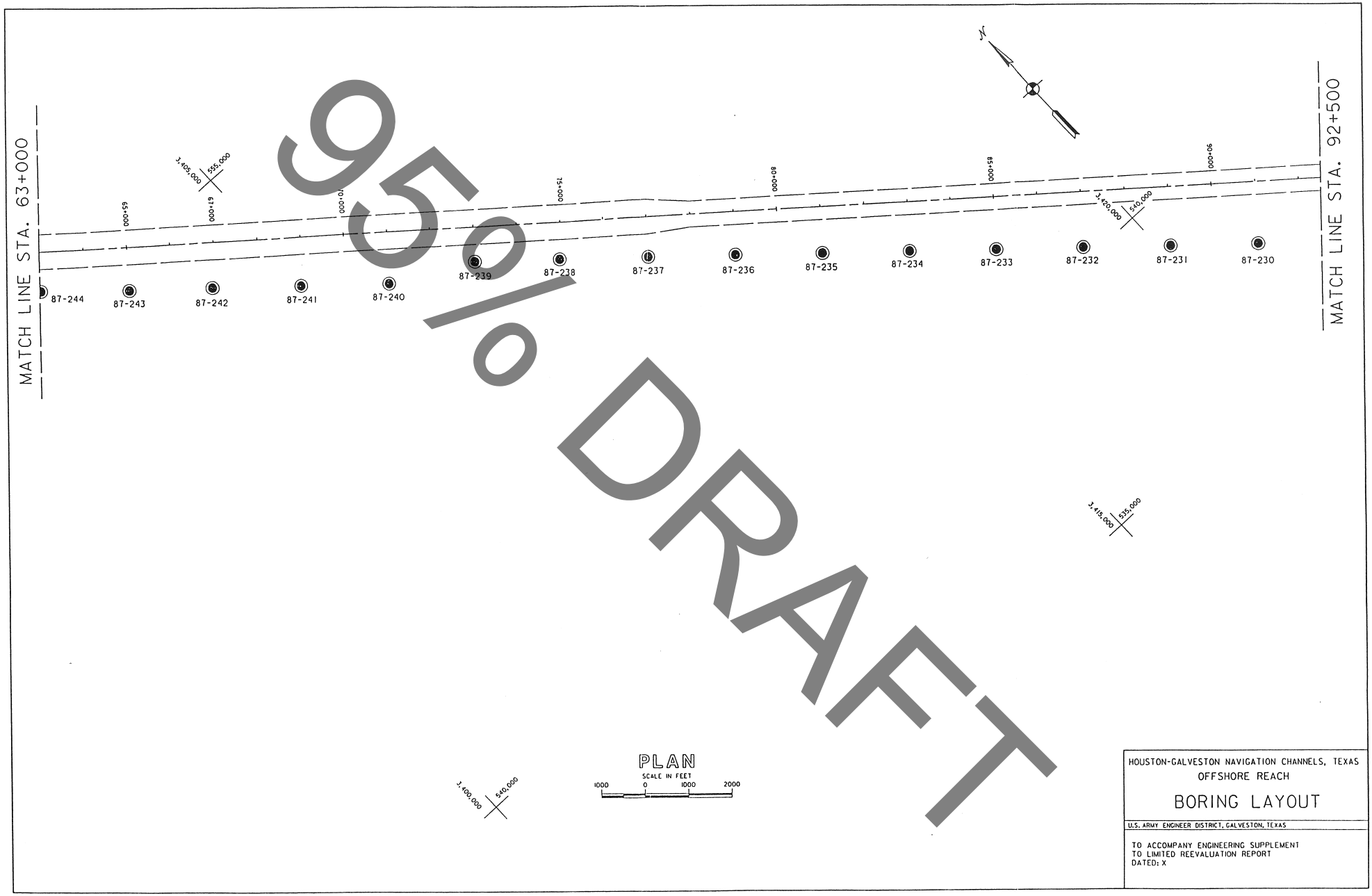

95% DRAFT
CADD
N
MATCH LINE STA. 63+000
MATCH LINE STA. 34+000
3,400,000
560,000
3,380,000
575,000
3,395,000
555,000
3,380,000
560,000
87-258
87-257
87-256
87-255
87-254
87-253
87-252
87-251
87-250
87-249
87-248
87-247
87-246
87-245
35+000
40+000
45+000
50+000
55+000
60+000
℄ OF ENTERANCE CHANNEL
PROPOSED 24" PIPELINE CROSSING
(CORPUS CHRISTI OIL & GAS)
PLAN
SCALE IN FEET
1000 0 1000 2000
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
OFFSHORE REACH
BORING LAYOUT
U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS
TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-10



95% DRAFT

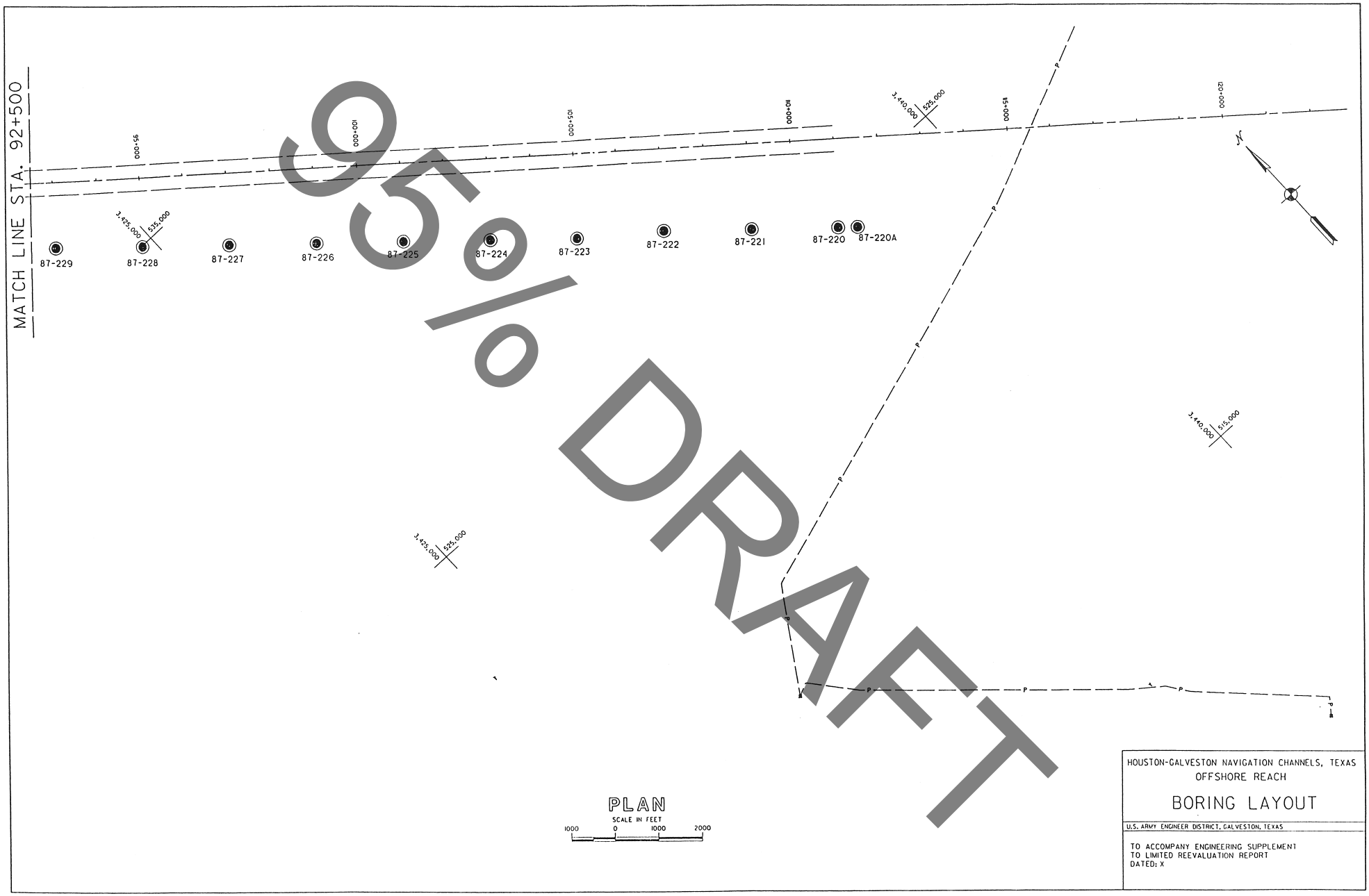
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
OFFSHORE REACH

BORING LAYOUT

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

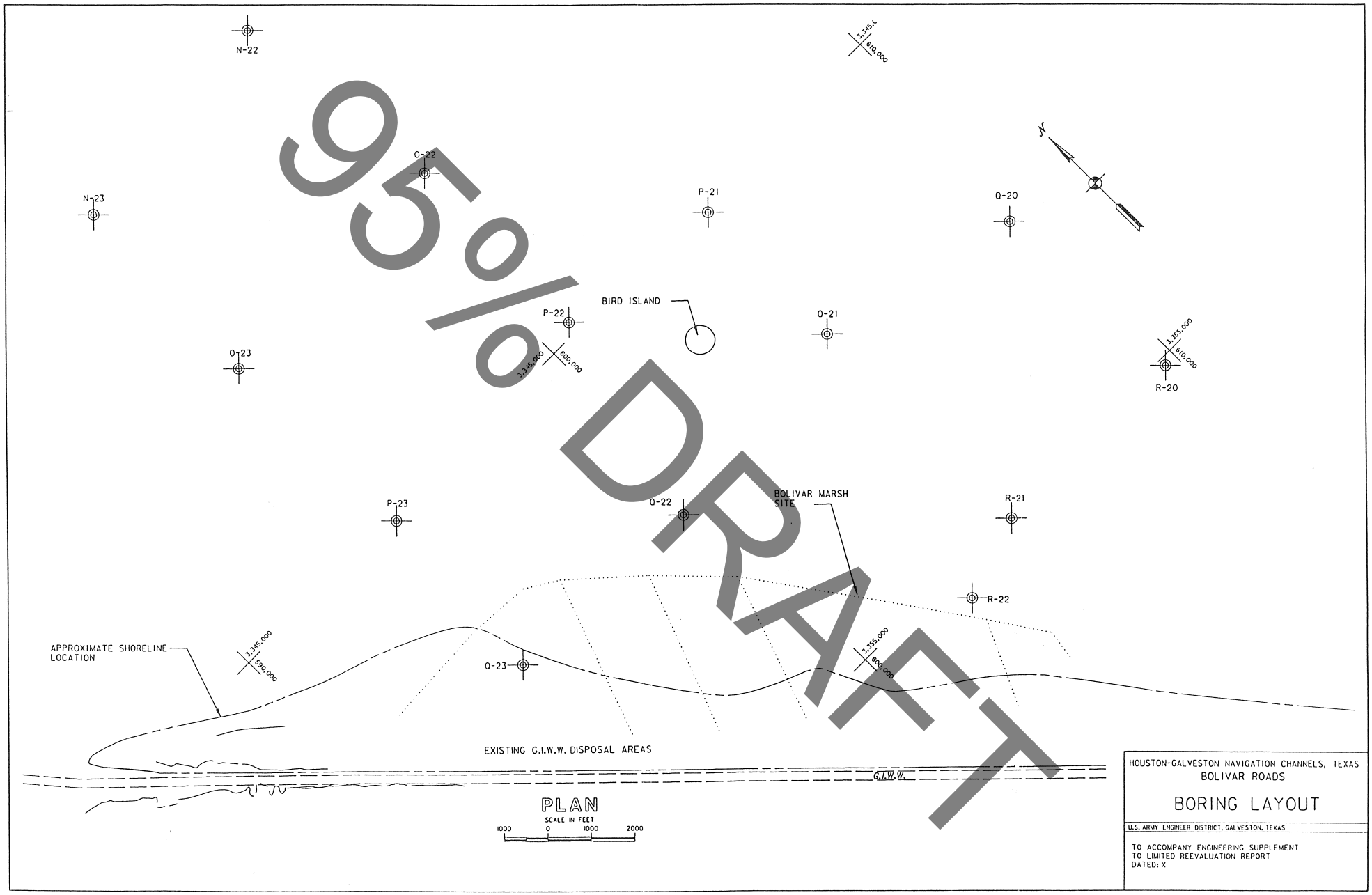
TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-11



95% DRAFT

PLATE FD-12



95% DRAFT

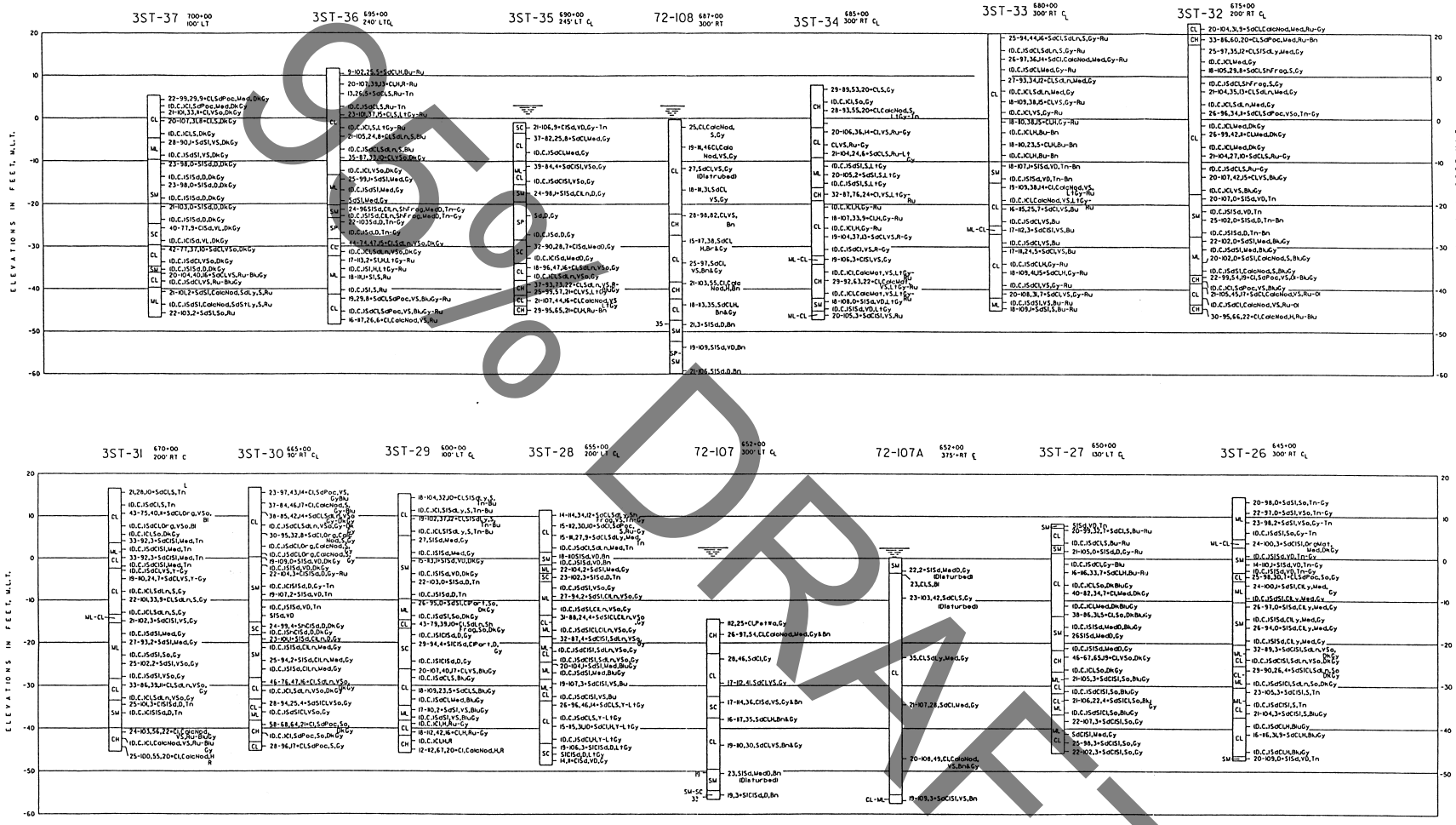
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
BOLIVAR ROADS

BORING LAYOUT

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-13



NOTES:

SEE PLATES FD-2 TO FD-4 FOR BORING LOCATIONS.
SEE PLATE FD-20 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAYOU REACH

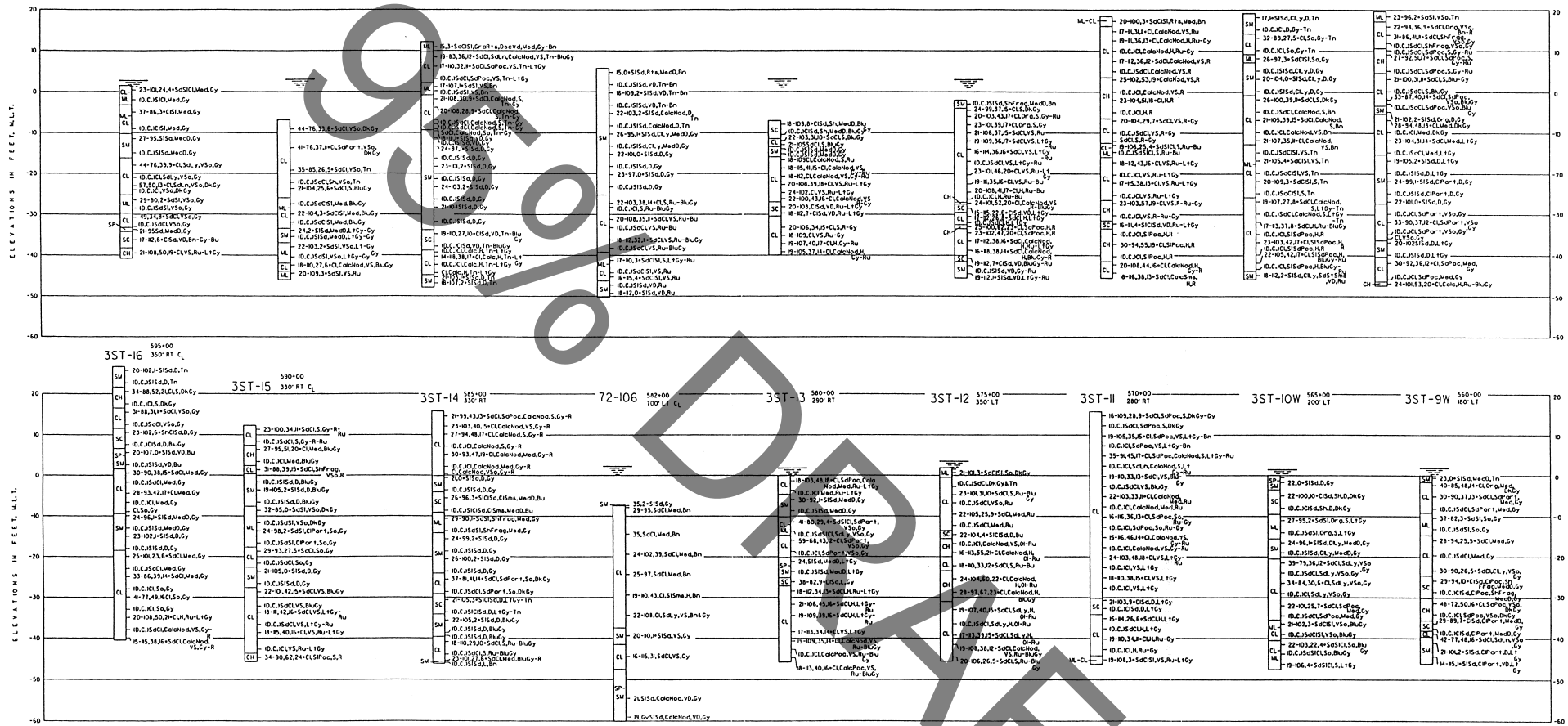
BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-14

95% DRAFT



90% DRAFT

NOTES:

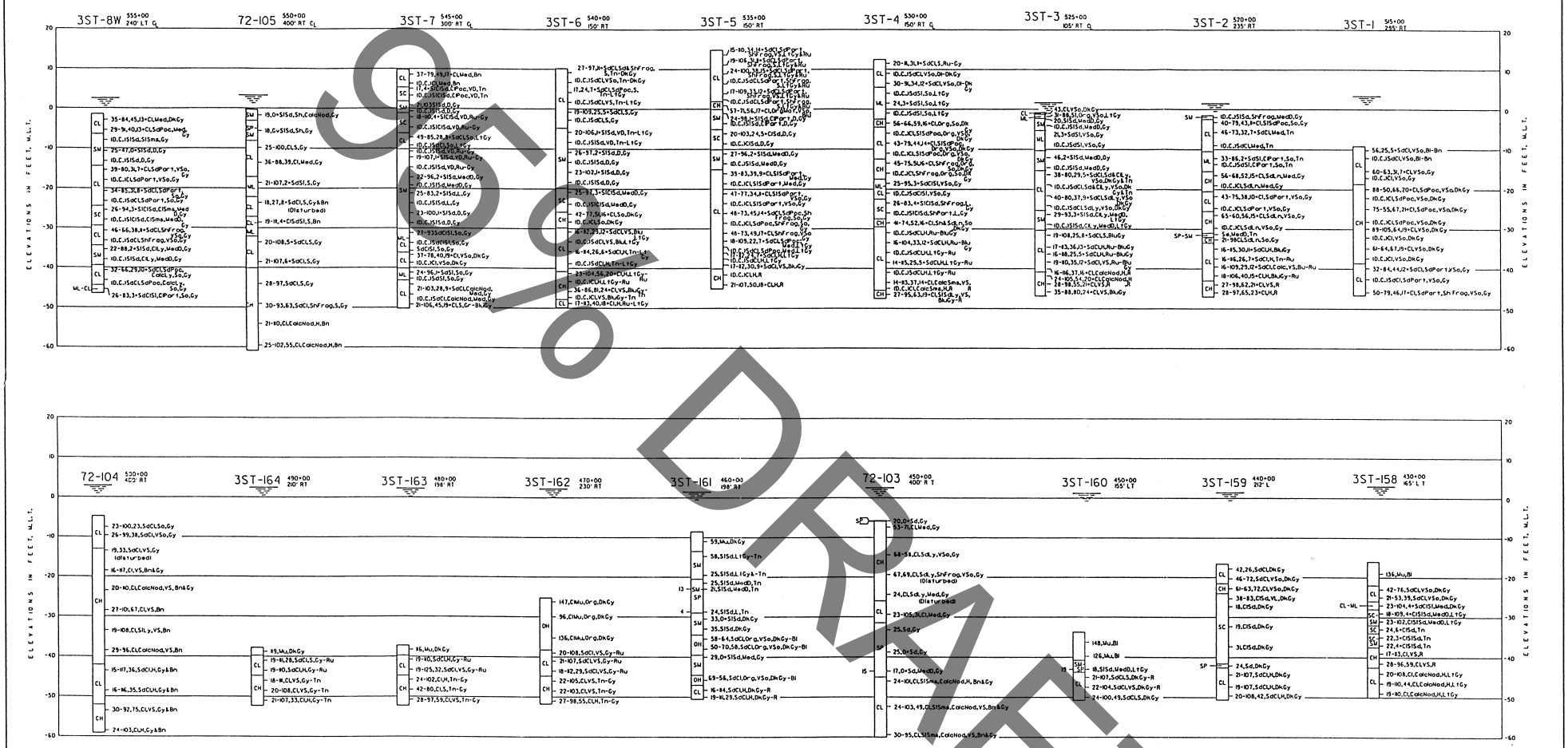
SEE PLATES FD-2 TO FD-4 FOR BORING LOCATIONS.
SEE PLATE FD-20 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAYOU REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



9510 DRAFT

NOTES:

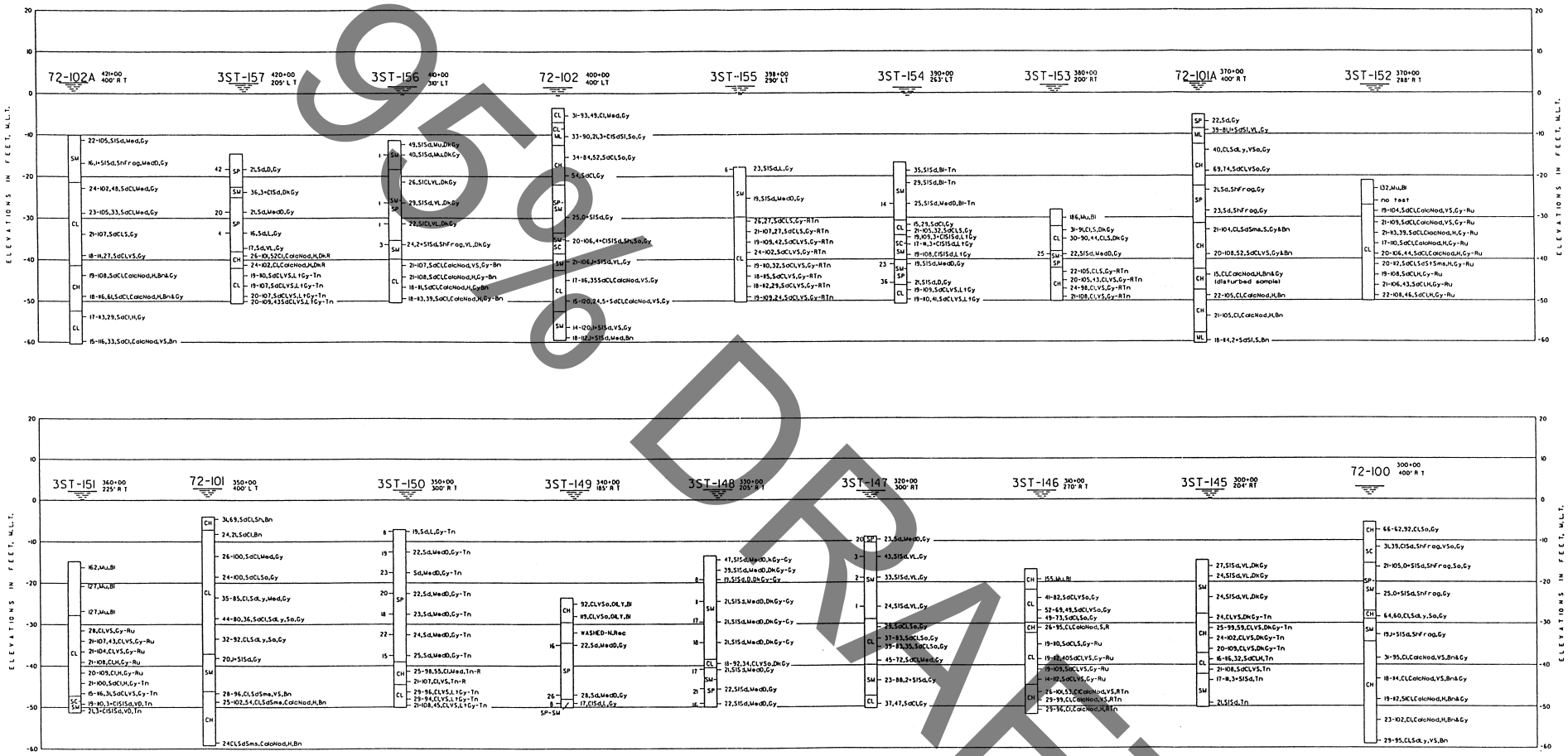
SEE PLATES FD-2 TO FD-4 FOR BORING LOCATIONS.
SEE PLATE FD-20 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAYOU REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



95% DRAFT

NOTES:

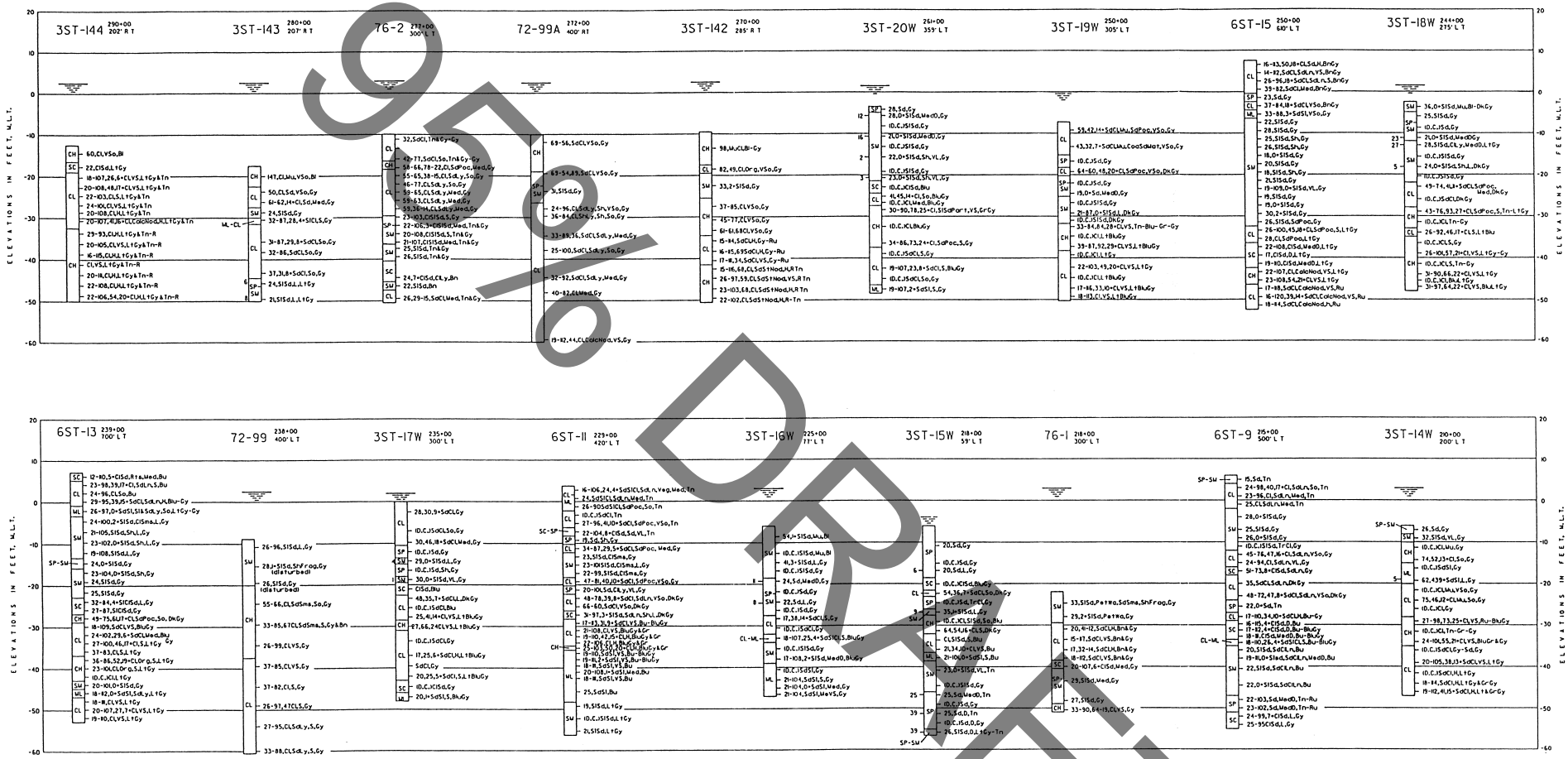
SEE PLATES FD-2 TO FD-4 FOR BORING LOCATIONS.
SEE PLATE FD-20 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAYOU REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



95% DRAFT

NOTES:

SEE PLATES FD-2 TO FD-4 FOR BORING LOCATIONS.
SEE PLATE FD-20 FOR BORING NOTES AND LEGEND.

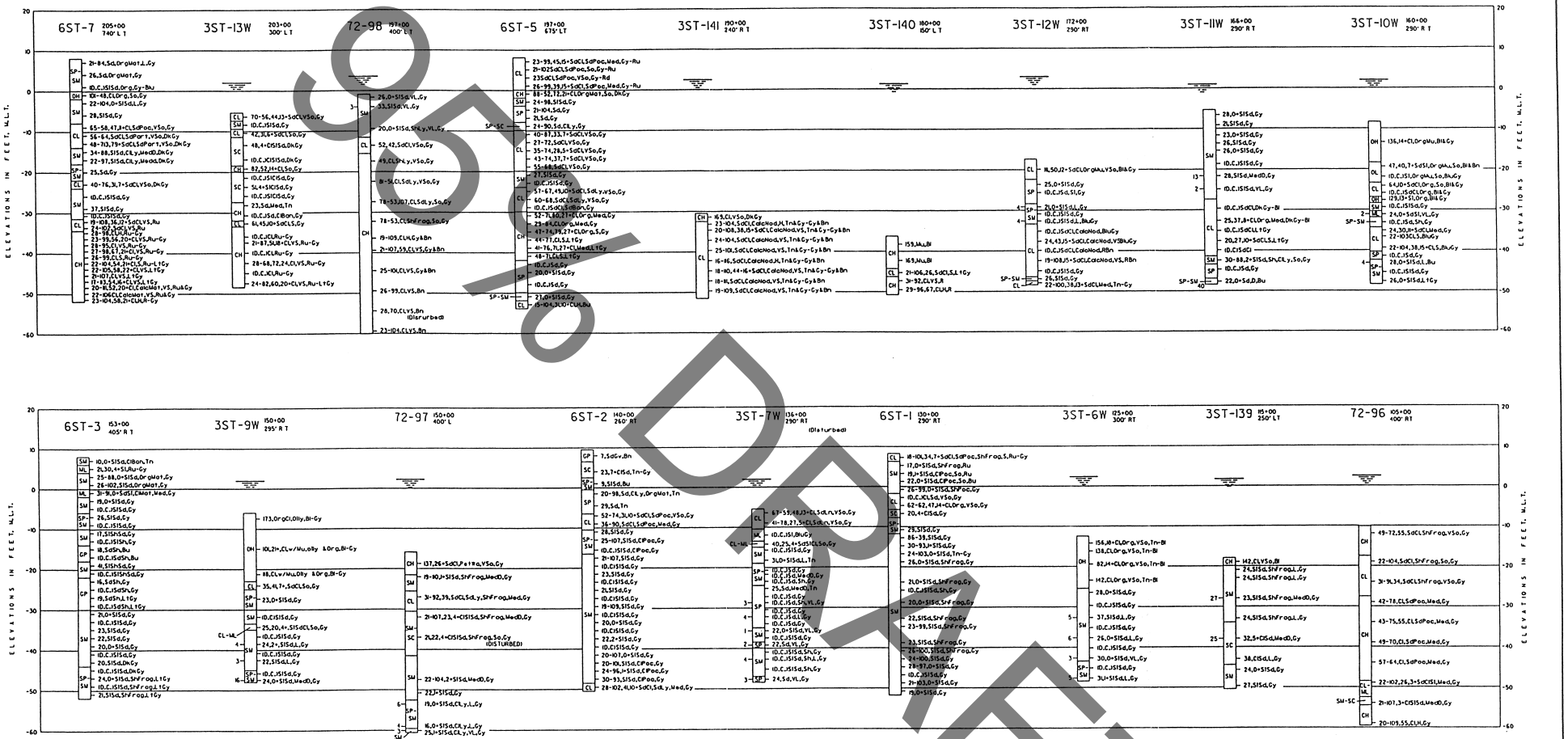
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAYOU REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-18



90% DRAFT

NOTES:

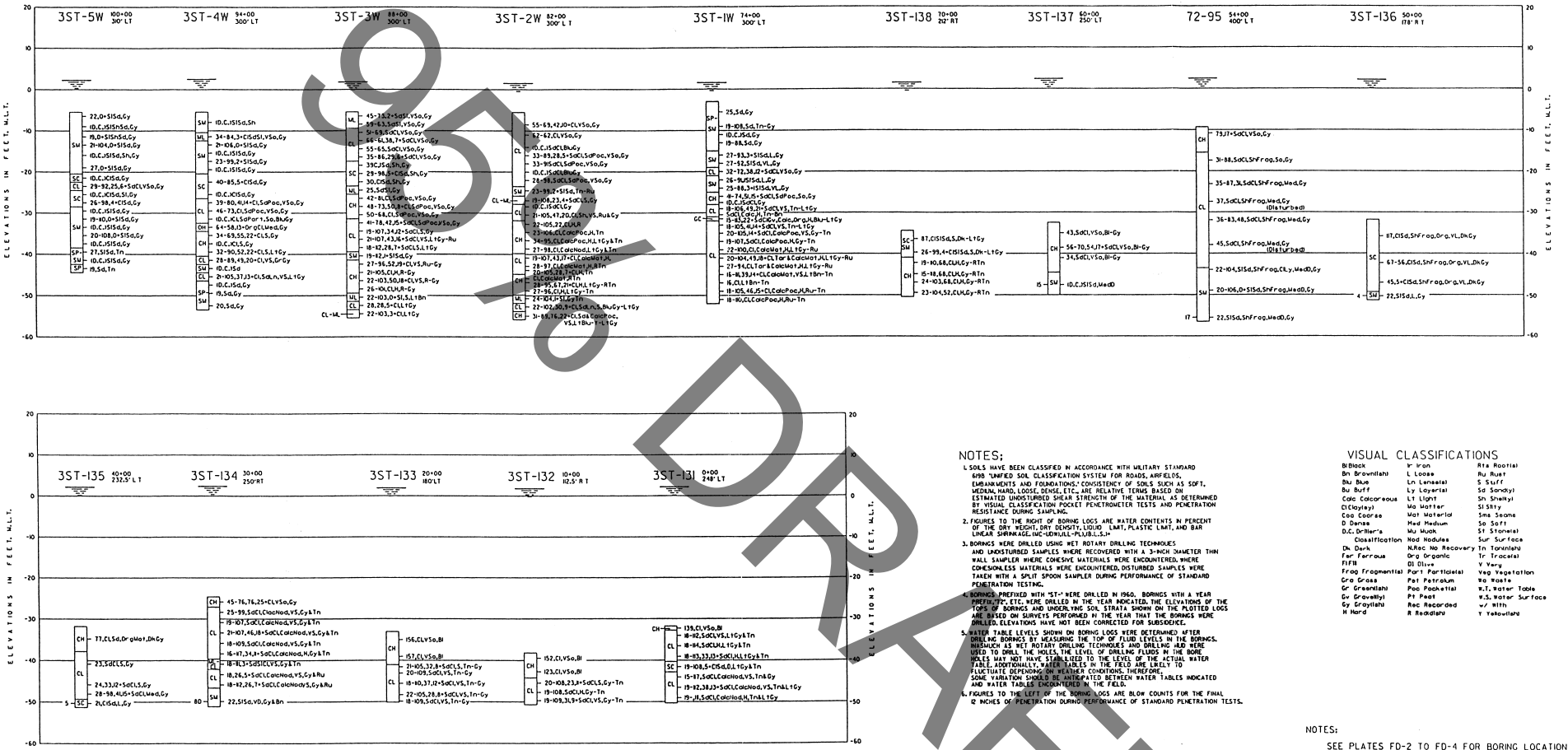
SEE PLATES FD-2 TO FD-4 FOR BORING LOCATIONS.
SEE PLATE FD-20 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAYOU REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



95% DRAFT

NOTES;

1. SOILS HAVE BEEN CLASSIFIED IN ACCORDANCE WITH MILITARY STANDARD 619B "UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS AND FOUNDATIONS." CONSISTENCY OF SOILS SUCH AS SOFT, MEDIUM, HARD, LOOSE, DENSE, ETC., ARE RELATIVE TERMS BASED ON ESTIMATED UNDISTURBED SHEAR STRENGTH OF THE MATERIAL AS DETERMINED BY VISUAL CLASSIFICATION POCKET PENETROMETER TESTS AND PENETRATION RESISTANCE DURING SAMPLING.
2. FIGURES TO THE RIGHT OF BORING LOGS ARE WATER CONTENTS IN PERCENT OF THE DRY WEIGHT, DRY DENSITY, LIQUID LIMIT, PLASTIC LIMIT, AND BAR LINEAR SHRINKAGE. (WC-WD%/LL-PL%/LL-LS-)*
3. BORINGS WERE DRILLED USING WET ROTARY DRILLING TECHNIQUES AND UNDISTURBED SAMPLES WHERE RECOVERED WITH A 3-INCH DIAMETER THIN WALL SAMPLER WHERE COHESIVE MATERIALS WERE ENCOUNTERED. WHERE COHESIONLESS MATERIALS WERE ENCOUNTERED, DISTURBED SAMPLES WERE TAKEN WITH A SPLIT SPOON SAMPLER DURING PERFORMANCE OF STANDARD PENETRATION TESTING.
4. BORINGS PREFIXED WITH "ST-" WERE DRILLED IN 1960. BORINGS WITH A YEAR PREFIX,"72", ETC. WERE DRILLED IN THE YEAR INDICATED. THE ELEVATIONS OF THE TOPS OF BORINGS AND UNDERLYING SOIL STRATA SHOWN ON THE PLOTTED LOGS ARE BASED ON SURVEYS PERFORMED IN THE YEAR THAT THE BORINGS WERE DRILLED. ELEVATIONS HAVE NOT BEEN CORRECTED FOR SUBSIDENCE.
5. WATER TABLE LEVELS SHOWN ON BORING LOGS WERE DETERMINED AFTER DRILLING BORINGS BY MEASURING THE TOP OF FLUID LEVELS IN THE BORINGS. INASMUCH AS WET ROTARY DRILLING TECHNIQUES AND DRILLING MUD WERE USED TO DRILL THE HOLES, THE LEVEL OF DRILLING FLUIDS IN THE BORE HOLES MAY NOT HAVE STABILIZED TO THE LEVEL OF THE ACTUAL WATER TABLE. ADDITIONALLY, WATER TABLES IN THE FIELD ARE LIKELY TO FLUCTUATE DEPENDING ON WEATHER CONDITIONS. THEREFORE, SOME VARIATION SHOULD BE ANTICIPATED BETWEEN WATER TABLES INDICATED AND WATER TABLES ENCOUNTERED IN THE FIELD.
6. FIGURES TO THE LEFT OF THE BORING LOGS ARE BLOW COUNTS FOR THE FINAL 12 INCHES OF PENETRATION DURING PERFORMANCE OF STANDARD PENETRATION TESTS.

VISUAL CLASSIFICATIONS

Bl Black	Ir Iron	Rts Rootlet
Bn Brown(ish)	L Loose	Ru Rust
Blu Blue	Ln Lense(s)	S Stiff
Bu Buff	Ly Layer(s)	Sd Sandy)
Calc Calcareous	Lt Light	Sh Shell(y)
Cl Clay(ey)	Wa Water	Si Silty
Coa Coarse	Wat Material	Sms Seams
D Dense	Med Medium	So Soft
D.C. Driller's	Wu Muck	St Stone(s)
Classification	Nod Nodules	Sur Surface
Dk Dark	N.Rec No Recovery	Tn Tan(ish)
Fer Ferrous	Org Organic	Tr Trace(s)
FIFTH	Ol Olive	V Very
Frag Fragmental	Part Particle(s)	Veg Vegetation
Gra Grass	Pet Petrolum	Wa Waste
Gr Green(ish)	Poc Pocket(s)	W.T. Water Table
Gv Gravel(ly)	Pt Peat	W.S. Water Surface
Gy Gray(ish)	Rec Recorded	w/ With
H Hard	R Reddish)	Y Yellow(ish)

LABORATORY CLASSIFICATIONS

GP POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.
GC CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES.
SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES.
SM SILTY SANDS, SAND-SILT MIXTURES.
SC CLAYEY SANDS, SAND-CLAY MIXTURES.
ML INORGANIC SILTS AND VERY FINE SANDS, WITH SLIGHT PLASTICITY.
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS.
CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
OH ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS.
Pt PEAT AND OTHER HIGHLY ORGANIC SOILS.
CL-ML OR ML-CL CLAY AND SILT MIXTURES WITH SLIGHT PLASTICITY
SP-SM OR SM-SP SLIGHTLY SILTY SANDS, SANDS WITH SOME SILTS
SM-SC OR SC-SM SLIGHTLY SILTY AND CLAYEY SANDS, SANDS WITH SOME SILTS AND CLAYS

NOTES:

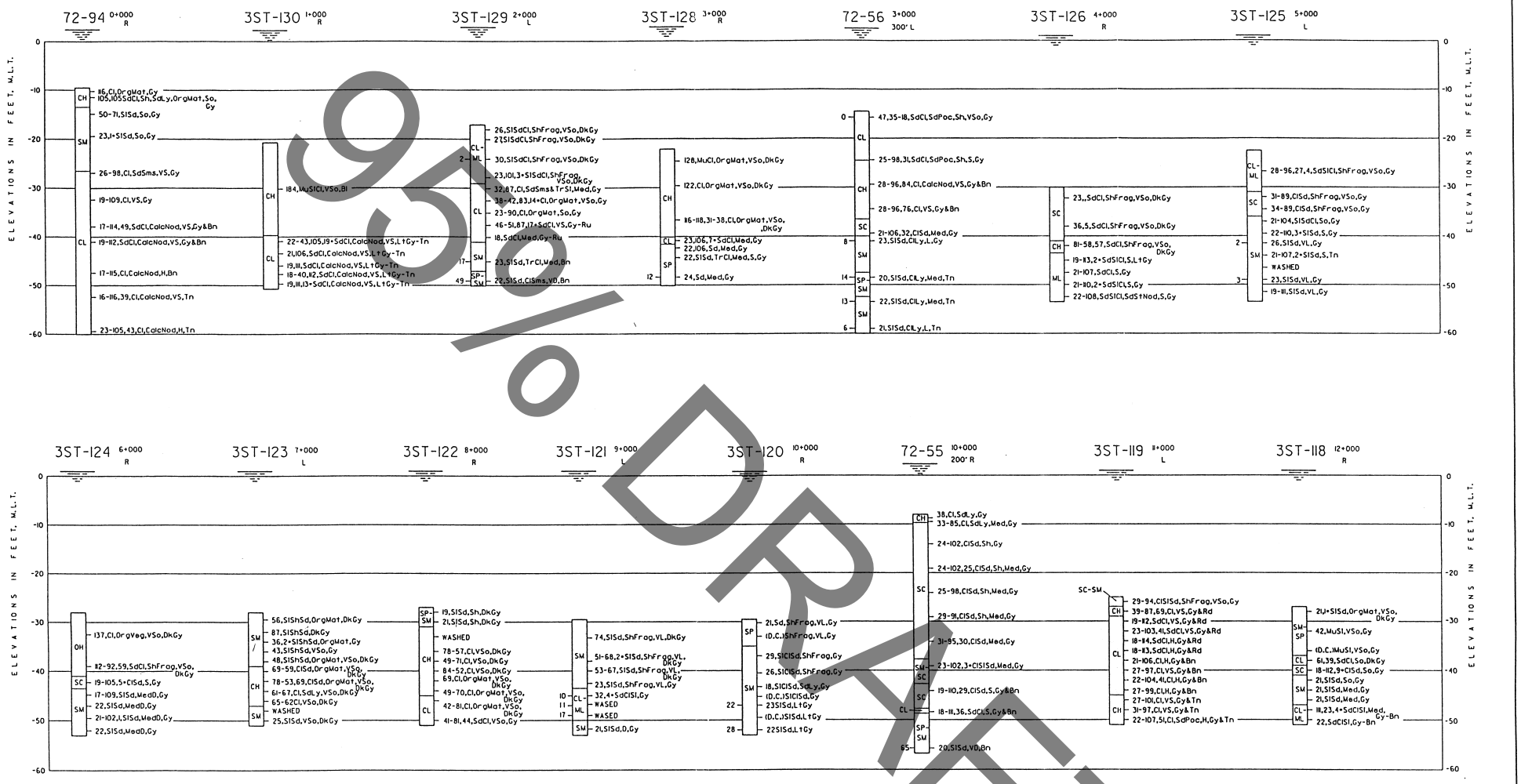
SEE PLATES FD-2 TO FD-4 FOR BORING LOCATIONS.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAYOU REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



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NOTES:

SEE PLATES FD-4 TO FD-8 FOR BORING LOCATIONS.
SEE PLATE FD-30 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAY REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
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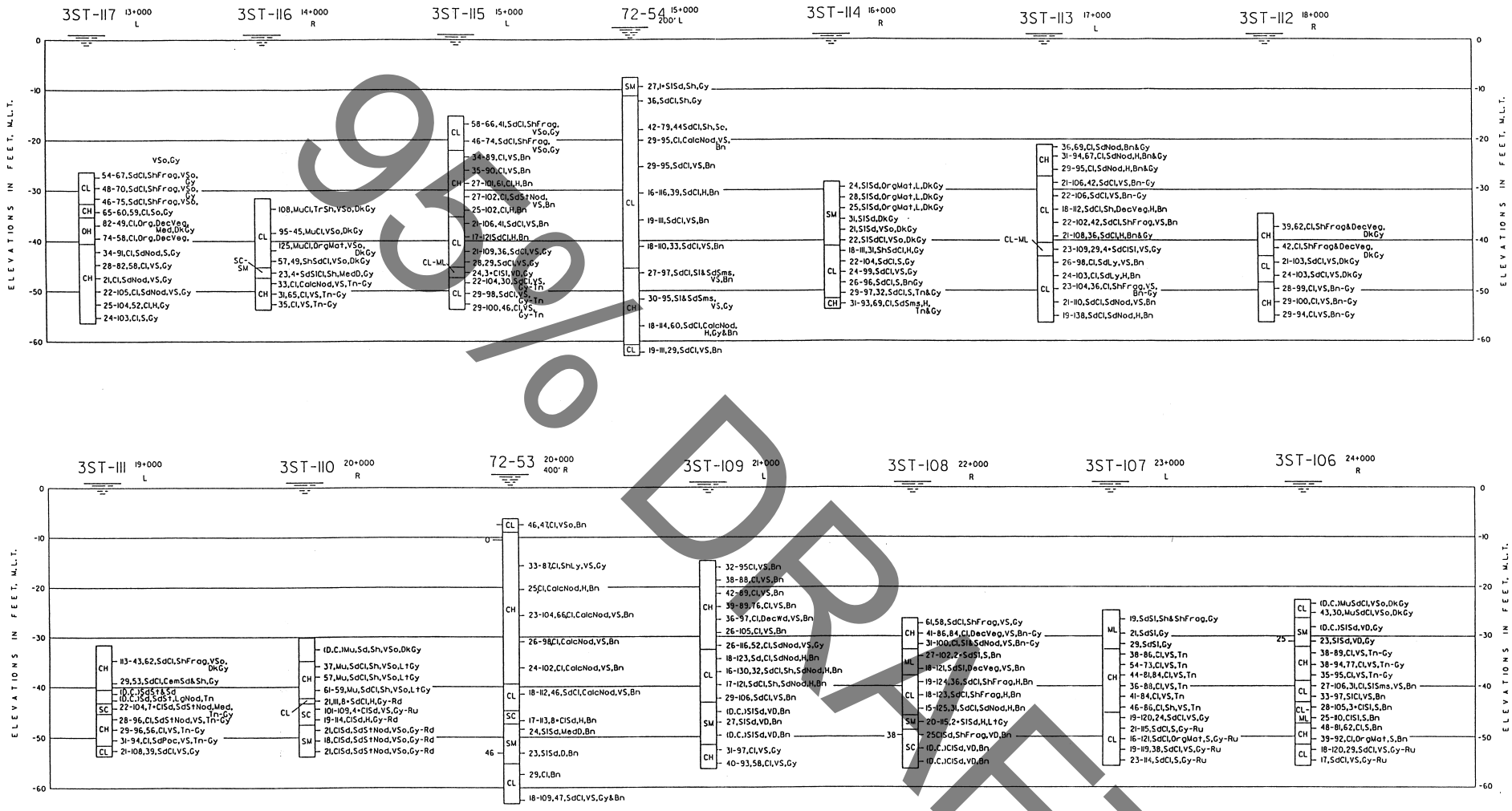

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NOTES:

SEE PLATES FD-4 TO FD-8 FOR BORING LOCATIONS.
SEE PLATE FD-30 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAY REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
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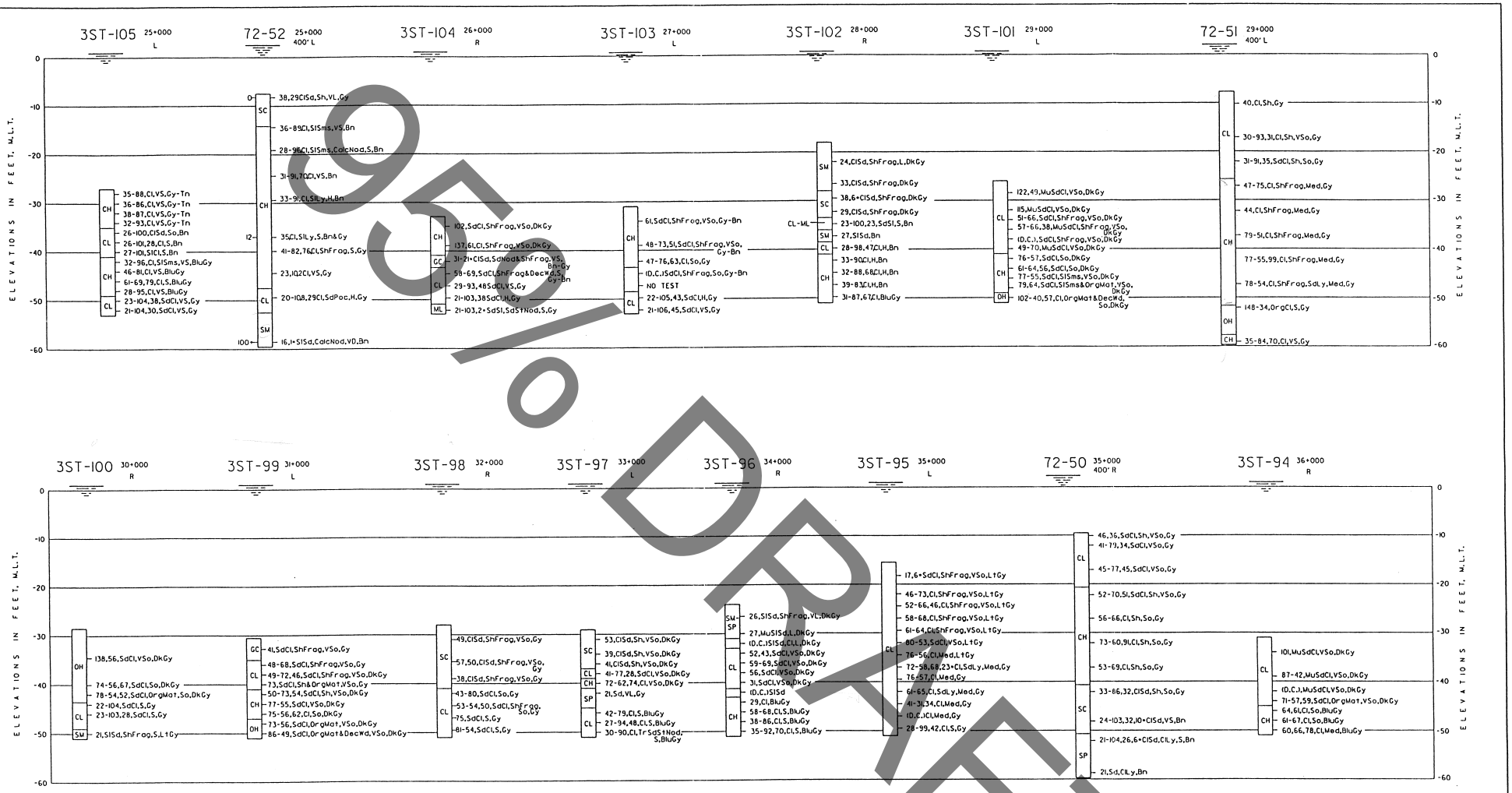

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NOTES:

SEE PLATES FD-4 TO FD-8 FOR BORING LOCATIONS.
SEE PLATE FD-30 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAY REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
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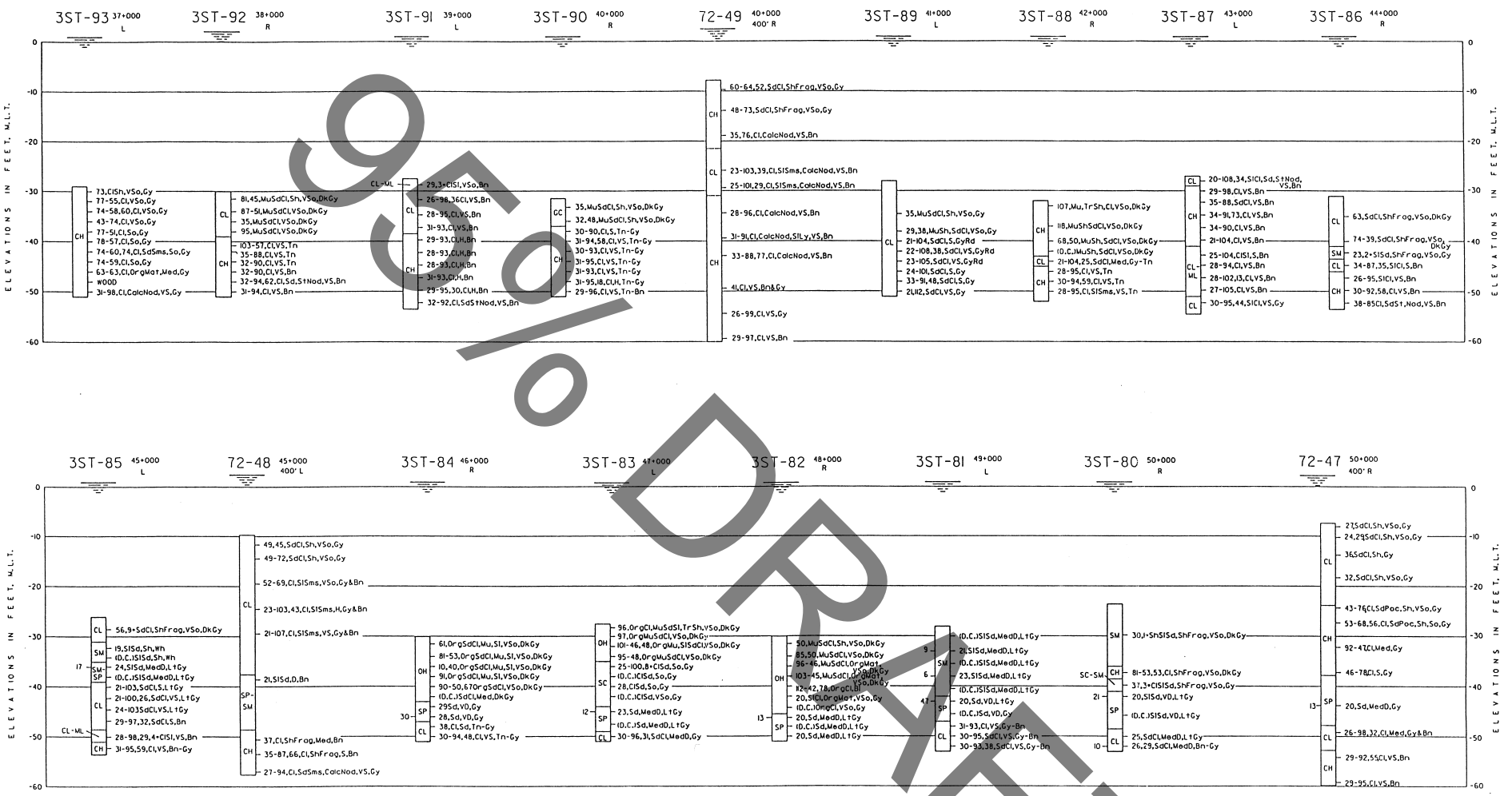

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NOTES:

SEE PLATES FD-4 TO FD-8 FOR BORING LOCATIONS.
SEE PLATE FD-30 FOR BORING NOTES AND LEGEND.

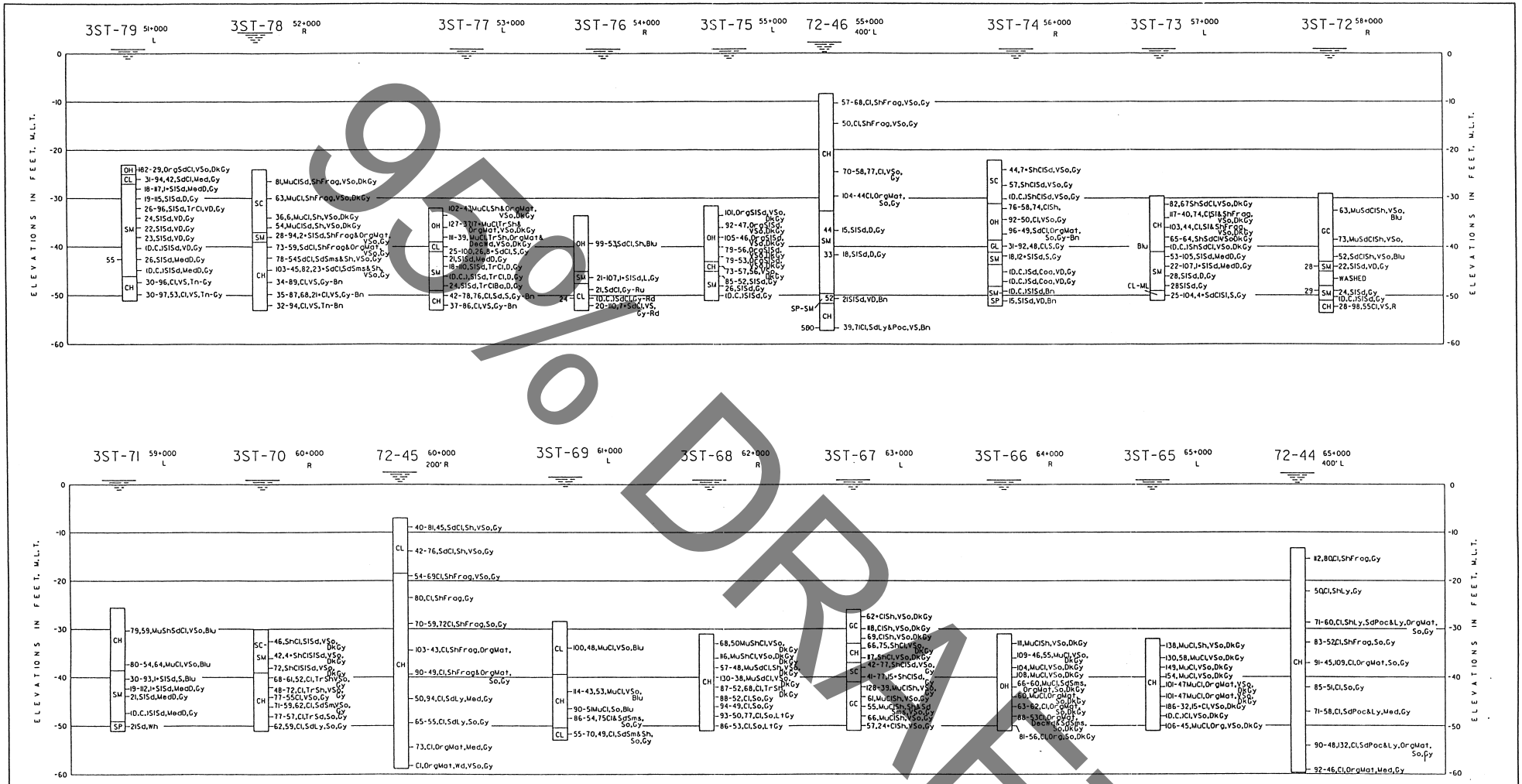
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAY REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: x

PLATE FD-24



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NOTES:

SEE PLATES FD-4 TO FD-8 FOR BORING LOCATIONS.
SEE PLATE FD-30 FOR BORING NOTES AND LEGEND.

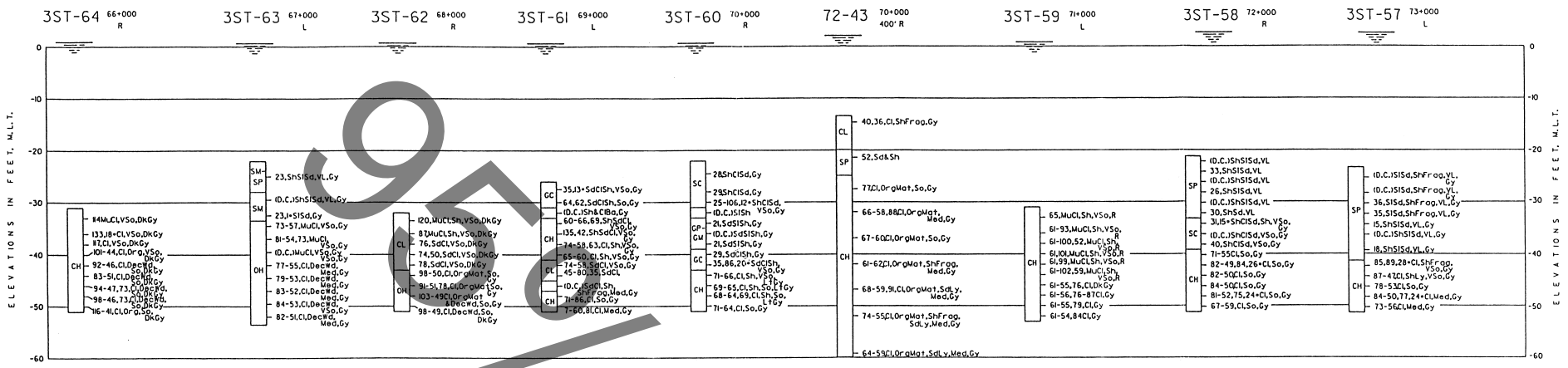
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAY REACH

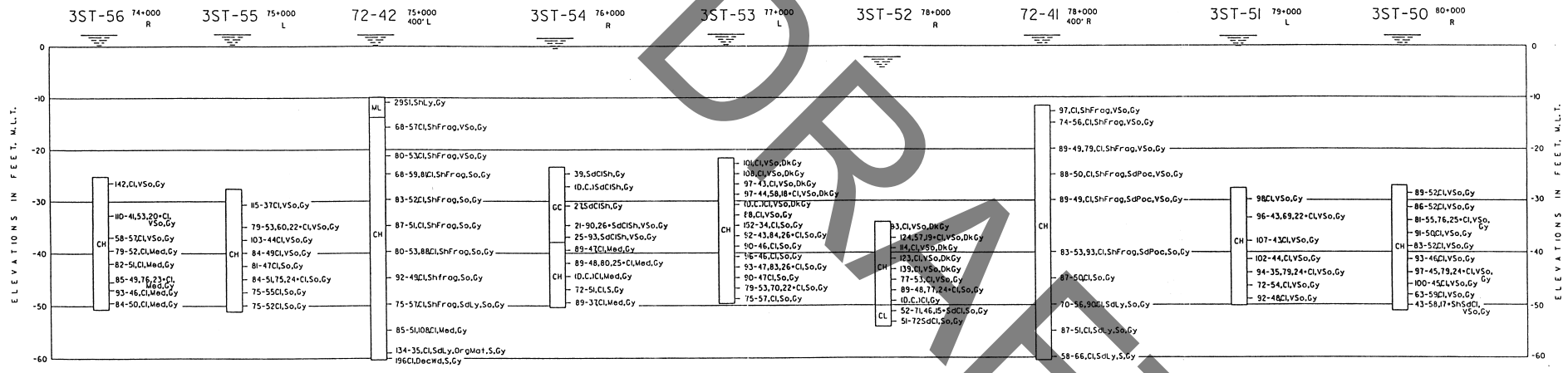
BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-25





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NOTES:

SEE PLATES FD-4 TO FD-8 FOR BORING LOCATIONS.
SEE PLATE FD-30 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAY REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
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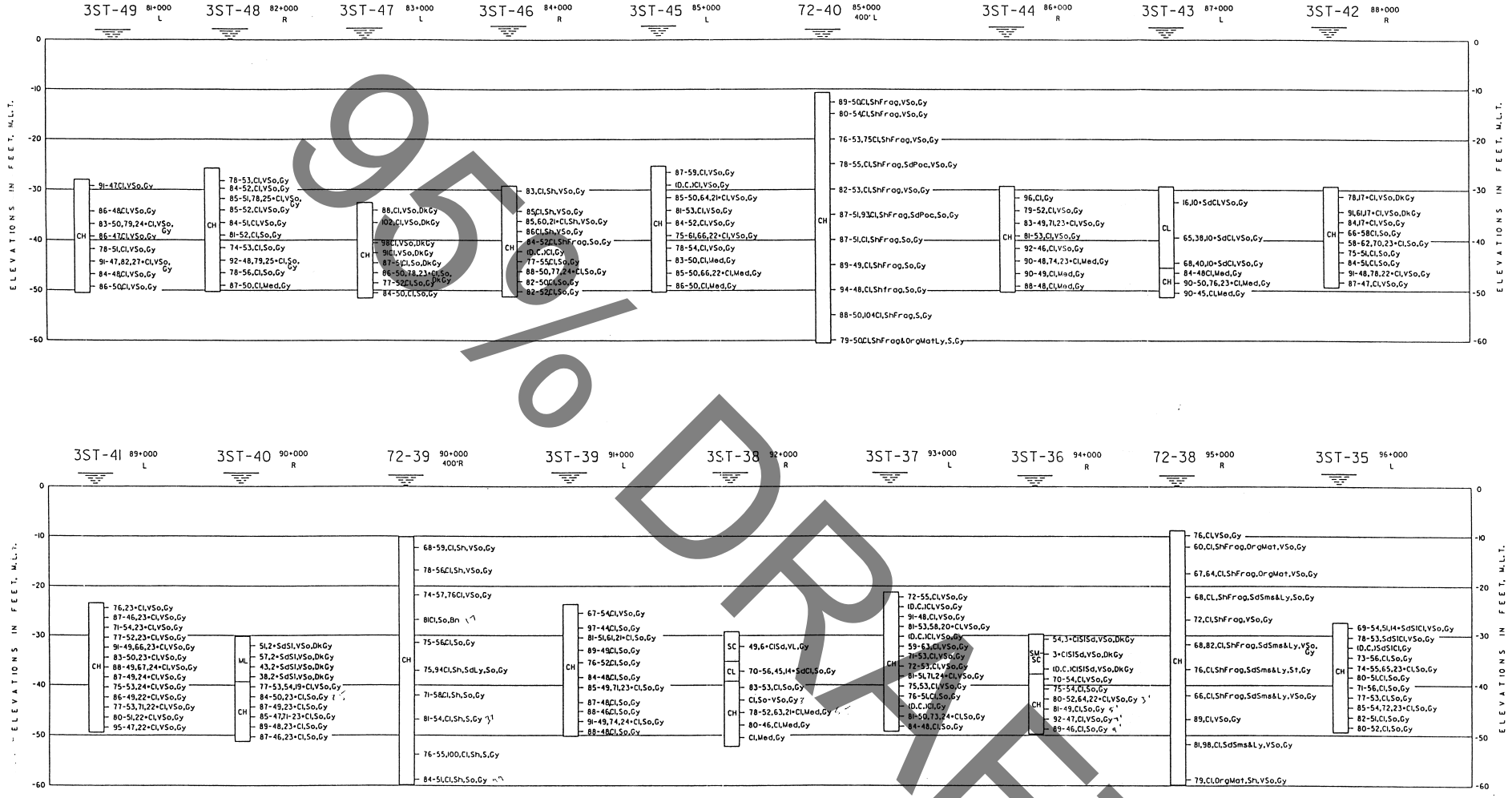

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NOTES:

SEE PLATES FD-4 TO FD-8 FOR BORING LOCATIONS.
SEE PLATE FD-30 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAY REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
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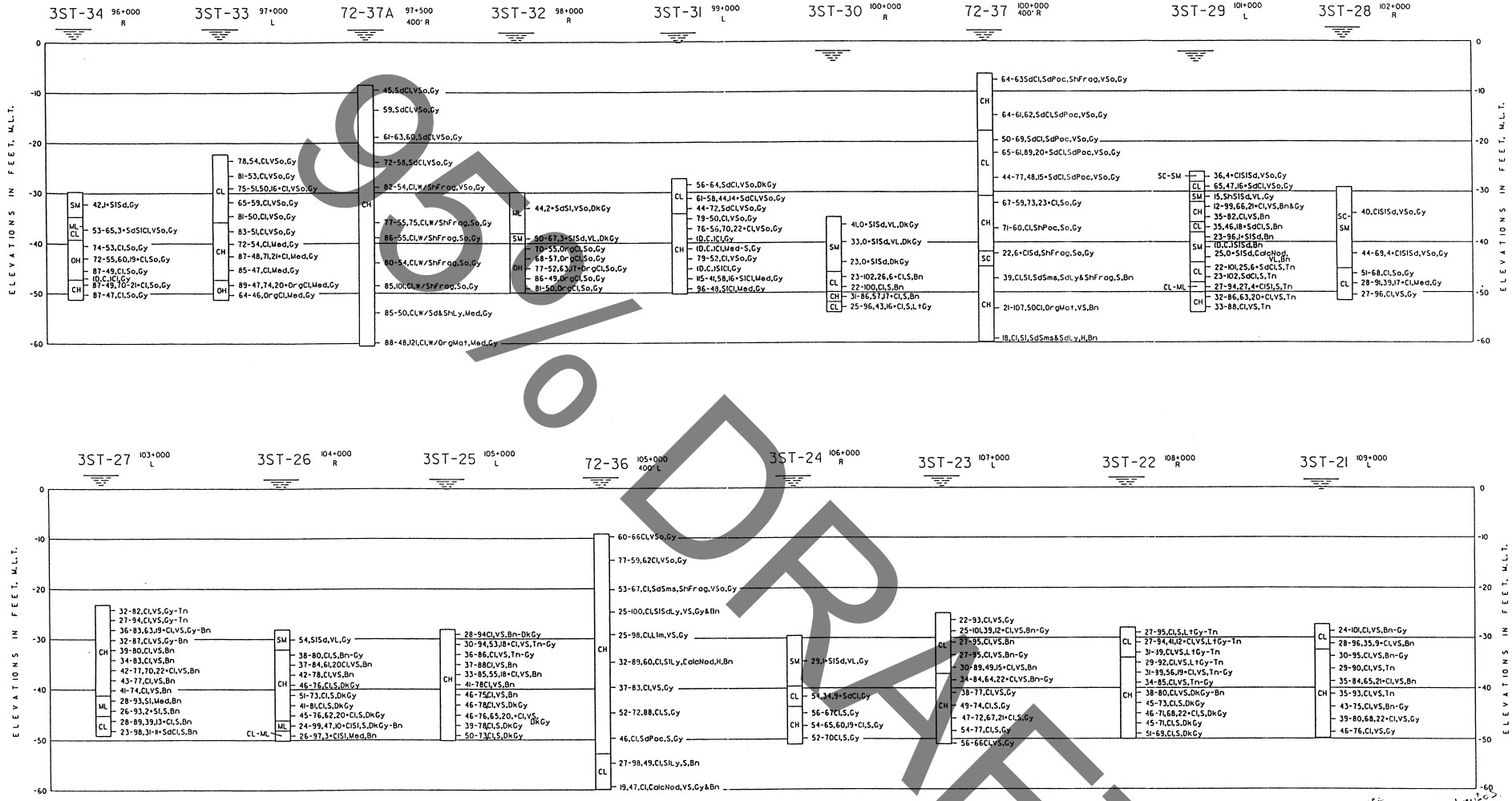


95% DRAFT

D DENSE
S STIFF
VS VERY STIFF
H HARD

L LOOSE
So SOFT
V VERY L

NOTES:

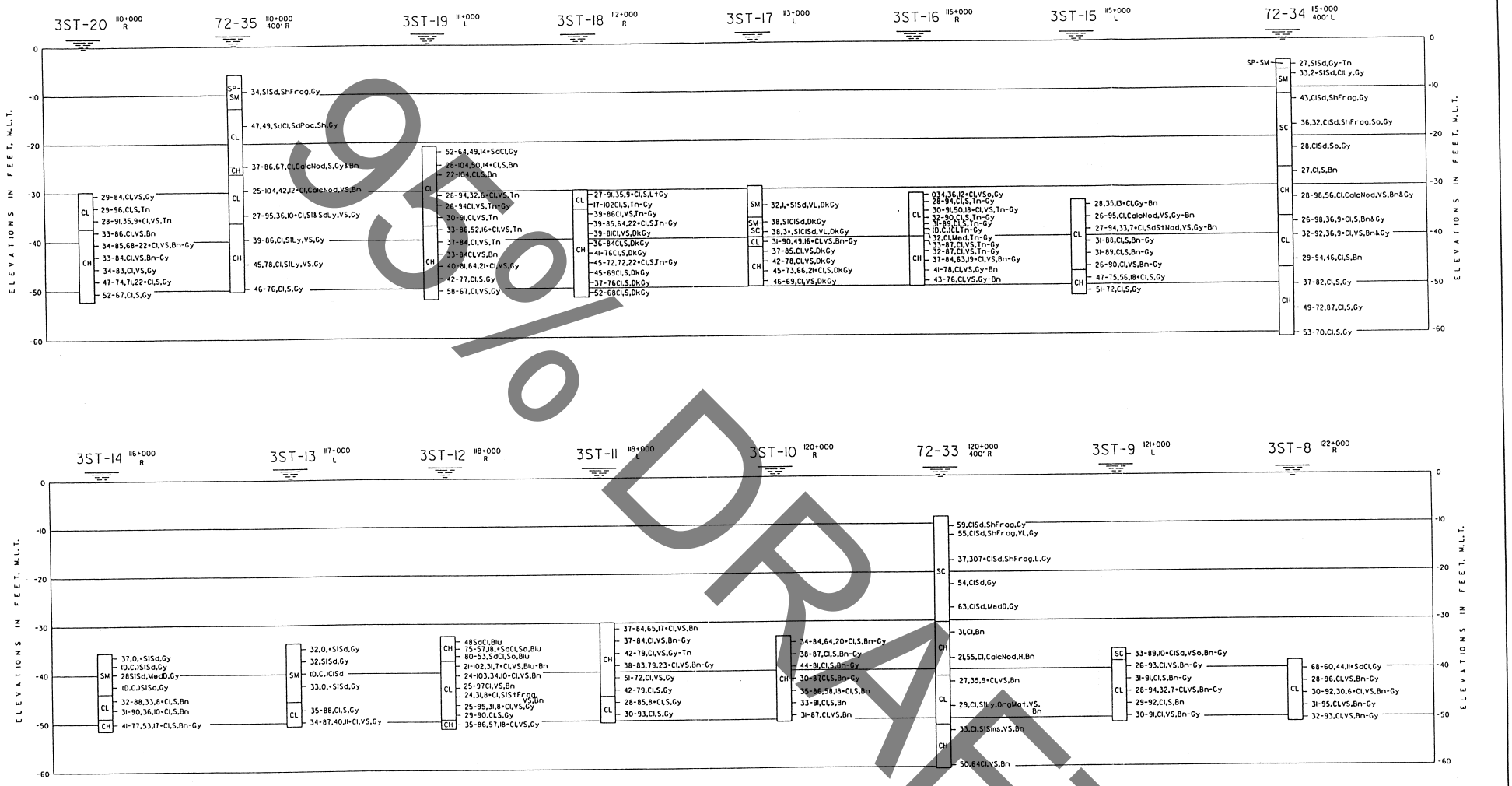
SEE PLATES FD-4 TO FD-8 FOR BORING LOCATIONS.
SEE PLATE FD-30 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAY REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



95% DRAFT

NOTES:

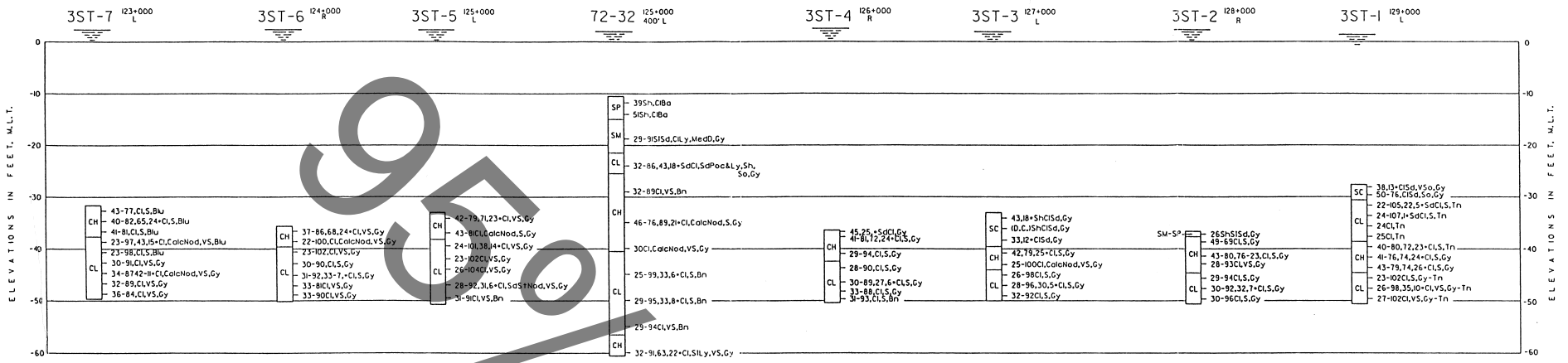
SEE PLATES FD-4 TO FD-8 FOR BORING LOCATIONS.
SEE PLATE FD-30 FOR BORING NOTES AND LEGEND.

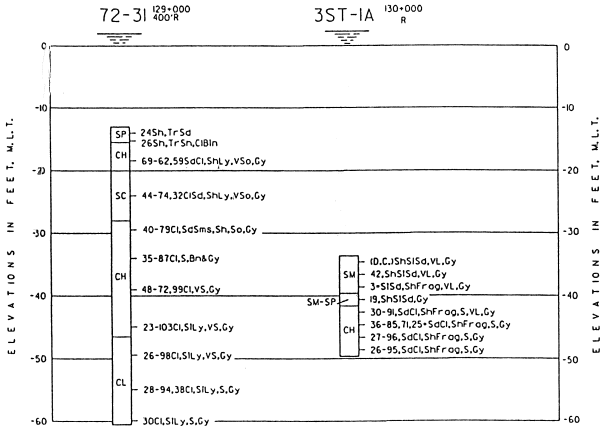
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAY REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X





NOTES;

1. SOILS HAVE BEEN CLASSIFIED IN ACCORDANCE WITH MILITARY STANDARD 619B "UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS AND FOUNDATIONS." CONSISTENCY OF SOILS SUCH AS SOFT, MEDIUM, HARD, LOOSE, DENSE, ETC., ARE RELATIVE TERMS BASED ON ESTIMATED UNDISTURBED SHEAR STRENGTH OF THE MATERIAL AS DETERMINED BY VISUAL CLASSIFICATION POCKET PENETROMETER TESTS AND PENETRATION RESISTANCE DURING SAMPLING.
2. FIGURES TO THE RIGHT OF BORING LOGS ARE WATER CONTENTS IN PERCENT OF THE DRY WEIGHT, DRY DENSITY, LIQUID LIMIT, PLASTIC LIMIT, AND BAR LINEAR SHRINKAGE. (WC-UDW),(LL-PL),(B.L.S.). FIGURES TO THE LEFT OF BORING LOGS ARE BLOWS PER FOOT OF PENETRATION FROM STANDARD PENETRATION TESTING.
3. BORINGS WERE DRILLED USING WET ROTARY DRILLING TECHNIQUES AND UNDISTURBED SAMPLES WHERE RECOVERED WITH A 3-INCH DIAMETER THIN WALL SAMPLER WHERE COHESIVE MATERIALS WERE ENCOUNTERED. WHERE COHESIONLESS MATERIALS WERE ENCOUNTERED, DISTURBED SAMPLES WERE TAKEN WITH A SPLIT SPOON SAMPLER DURING PERFORMANCE OF STANDARD PENETRATION TESTING.
4. WATER TABLE LEVELS SHOWN ON BORING LOGS WERE DETERMINED AFTER DRILLING BORINGS BY MEASURING THE TOP OF FLUID LEVELS IN THE BORINGS. INASMUCH AS WET ROTARY DRILLING TECHNIQUES AND DRILLING MUD WERE USED TO DRILL THE HOLES, THE LEVEL OF DRILLING FLUIDS IN THE BORE HOLES MAY NOT HAVE STABILIZED TO THE LEVEL OF THE ACTUAL WATER TABLE. ADDITIONALLY, WATER TABLES IN THE FIELD ARE LIKELY TO FLUCTUATE DEPENDING ON WEATHER CONDITIONS. THEREFORE, SOME VARIATION SHOULD BE ANTICIPATED BETWEEN WATER TABLES INDICATED AND WATER TABLES ENCOUNTERED IN THE FIELD.

VISUAL CLASSIFICATIONS

Asph Asphalt	Fl Fill	Mot Mottled	Sm Small
Agg Aggerate	Fk Flake(s)	Nod Nodules	Sms Seams
Ba Ball(s)	Frag Fragment(s)	N.T. No Test	So Soft
Bln Binder	Fri Friable	Nt Not	St Stone(s)
Bl Black	Gl Glass	N.Rec No Recovery	Sur Surface
Blu Blue(ish)	Gra Grass	Org Organic	T.D. Total Depth
Bn Brown(ish)	Gr Green(ish)	Ol Olive	Th Thin
Br Brick	Gv Gravel(ly)	Part Particle(s)	Tk Tick
Bs Base	Gy Gray(ish)	Peb Pebble(s)	Tn Tan(ish)
Bu Buff	Gyp Gypsum	Pet Petrolum	Tr Trace(s)
Calc Calcareous	H Hard	Pl Plant	Under Undetermined
Cem Cemented)	Hl Highly	Poc Pocket(s)	V Very
Chem Chemical	Ind Industrial	Pt Peat	Veg Vegetation
Cl Clay(ey)	Inor Inorganic	Rd Road	Wa Waste
Cl Caliche	Ir Iron	RdBd Road Bed	Wd Wood(en)
Coa Coarse	L Loose	Rec Recorded	Wh White
Conc Concrete	Lim Limonites	Rk Rock(s)	Wea Weathered
Coq Coquina	Ln Lense(s)	Rts Root(s)	W.T. Water Table
Ch Chert	Lp Lump(s)	Rub Rubble	W.S. Water Surface
D Dense	Ly Layer(s)	Ru Rust	Y Yellow(ish)
Db Debris	Lms Limestone	Ref Refinery	
D.C. Driller's Classification	Lt Light	S Stiff	
Dec Decay(ed)	Meas Measured	Sd Sand(y)	
Dep Deposit(s)	Wa Matter	Sl Shale	
Dk Dark	Mat Material	Sh Shell(y)	
F Firm	Med Medium	Sl Silty	
Fer Ferrous	Mu Muck	Sil Slighty	
Fl Fine(s)	Mar Marsh	Slks Slicken Sides	

LABORATORY CLASSIFICATION

GW WELL-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.
GP POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.
GM SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES.
GC CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES.
SW CLAYEY GRAVELS, GRAVEL-SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES.
SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES.
SM SILTY SANDS, SAND-SILT MIXTURES.
SC CLAYEY SANDS, SAND-CLAY MIXTURES.
ML INORGANIC SILTS AND VERY FINE SANDS, WITH SLIGHT PLASTICITY.
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS.
OL ORGANIC SILTS, AND ORGANIC SILT-CLAYS OF LOW PLASTICITY.
MH INORGANIC SILTS, MICACEOUS OR DISTOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS.
CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
OH ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS.
Pt PEAT AND OTHER HIGHLY ORGANIC SOILS.

NOTES:

SEE PLATES FD-4 TO FD-8 FOR BORING LOCATIONS.

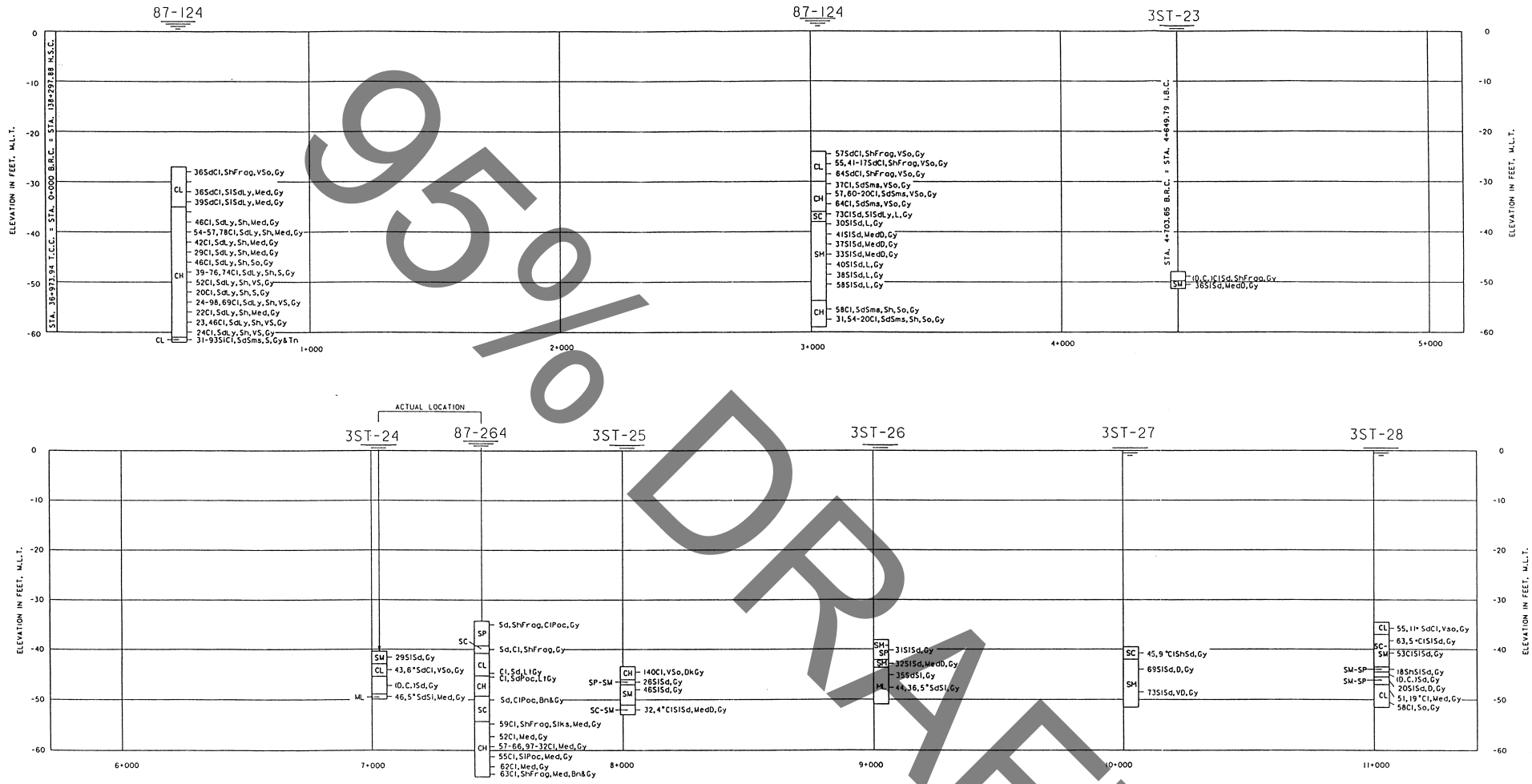
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
HOUSTON SHIP CHANNEL
BAY REACH

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

95% DRAFT



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LEGEND:

T.C.C. = TEXAS CITY CHANNEL
B.R.C. = BOLIVAR ROADS CHANNEL
H.S.C. = HOUSTON SHIP CHANNEL
I.B.C. = INNER BAR CHANNEL

NOTES:

SEE PLATES FD-8 TO FD-12 FOR BORING LOCATIONS.
SEE PLATE FD-36 FOR BORING NOTES AND LEGEND.

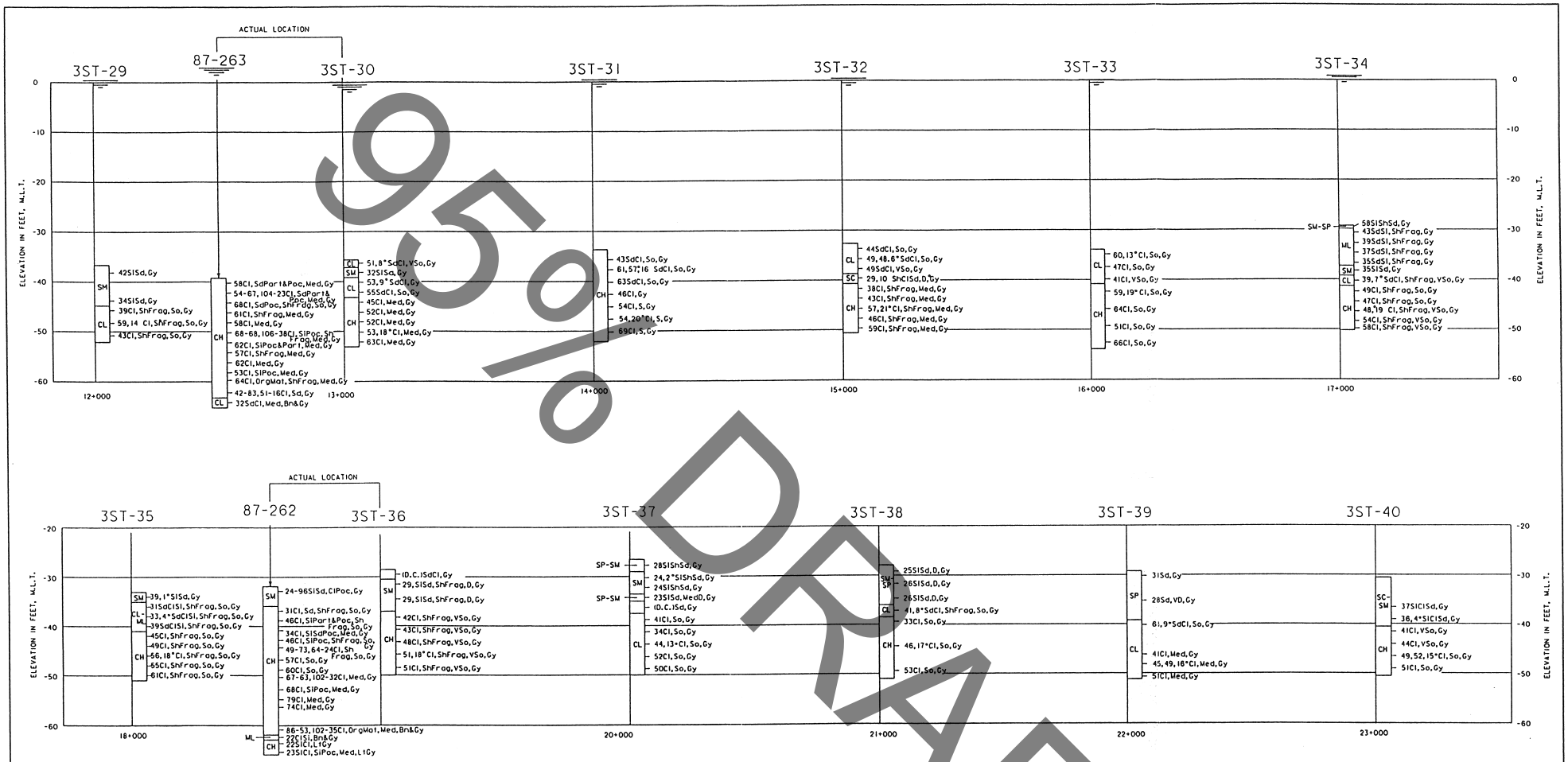
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
BOLIVAR ROADS CHANNEL THRU
INNER BAR CHANNEL

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-31



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NOTES:

SEE PLATES FD-8 TO FD-12 FOR BORING LOCATIONS.

SEE PLATE FD-36 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
INNER BAR CHANNEL THRU
ENTRANCE CHANNEL

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
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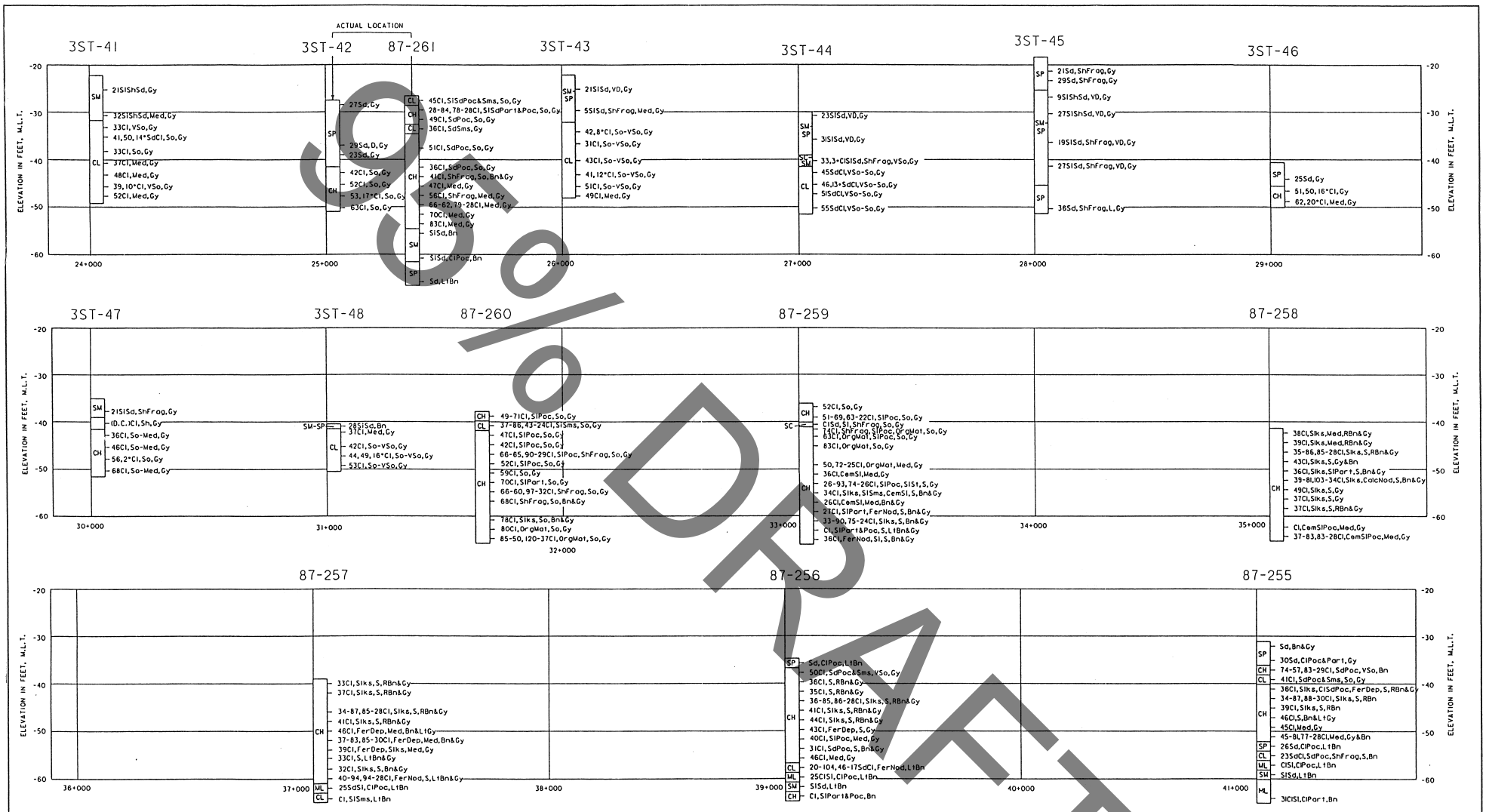


90% DRAFT

NOTES:

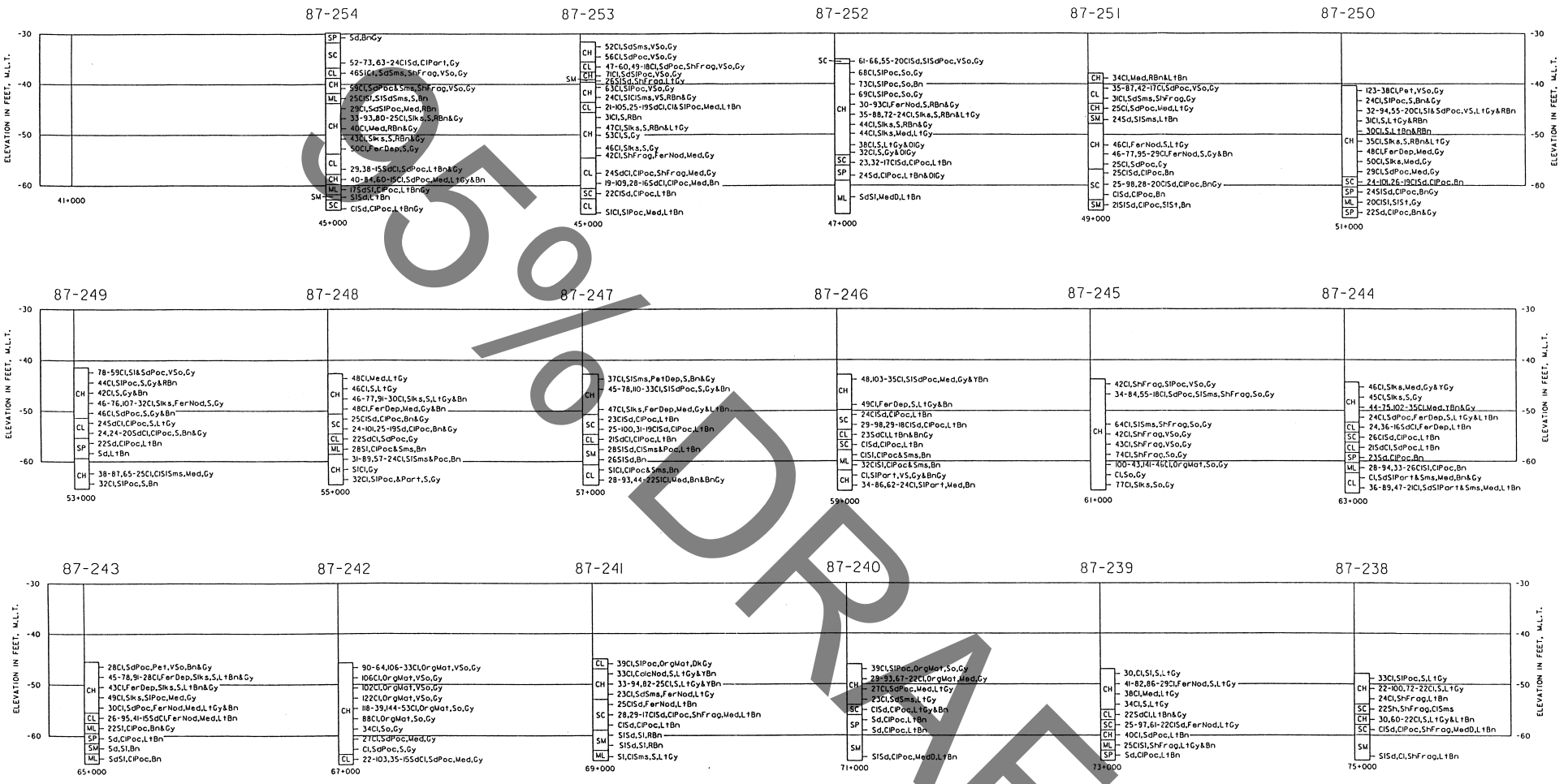
SEE PLATES FD-8 TO FD-12 FOR BORING LOCATIONS.
SEE PLATE FD-36 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
INNER BAR CHANNEL THRU
ENTRANCE CHANNEL

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



50% DRAFT

NOTES:

SEE PLATES FD-8 TO FD-12 FOR BORING LOCATIONS.

SEE PLATE FD-36 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
ENTRANCE CHANNEL THRU
NEW ENTRANCE CHANNEL

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
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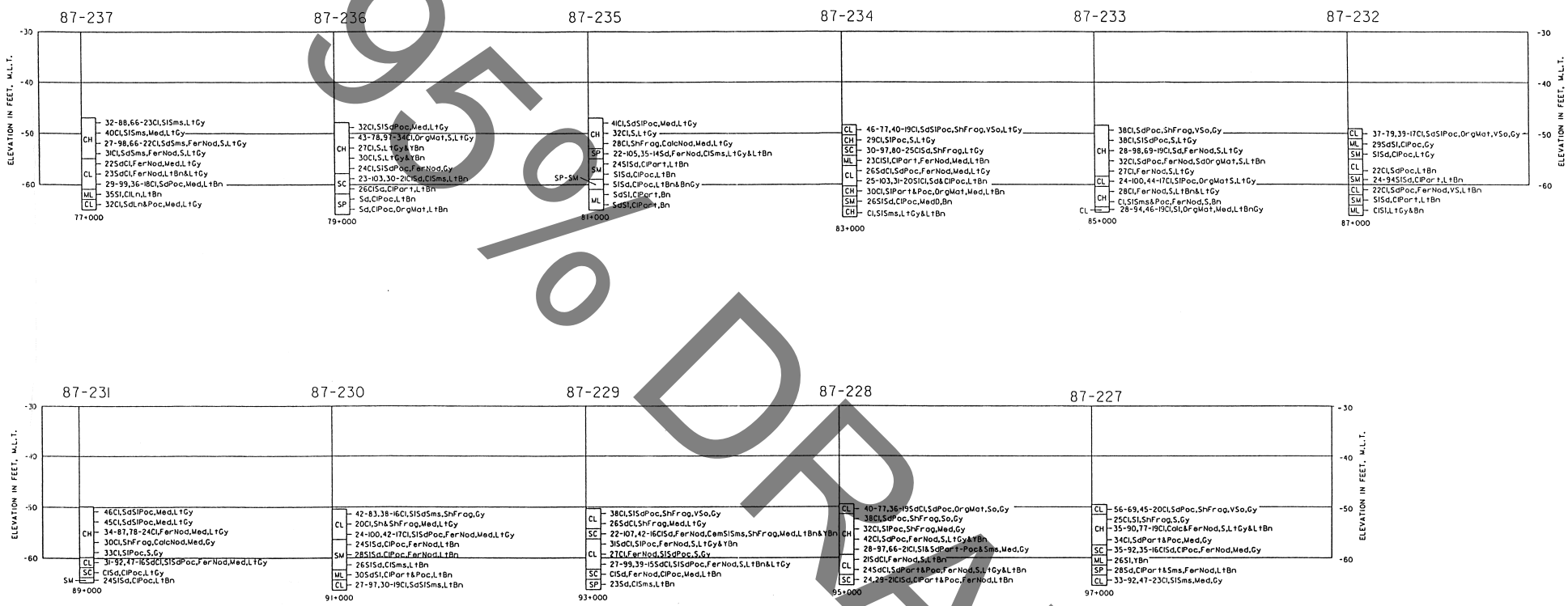


95% DRAFT

NOTES:

SEE PLATES FD-8 TO FD-12 FOR BORING LOCATIONS.

SEE PLATE FD-36 FOR BORING NOTES AND LEGEND.

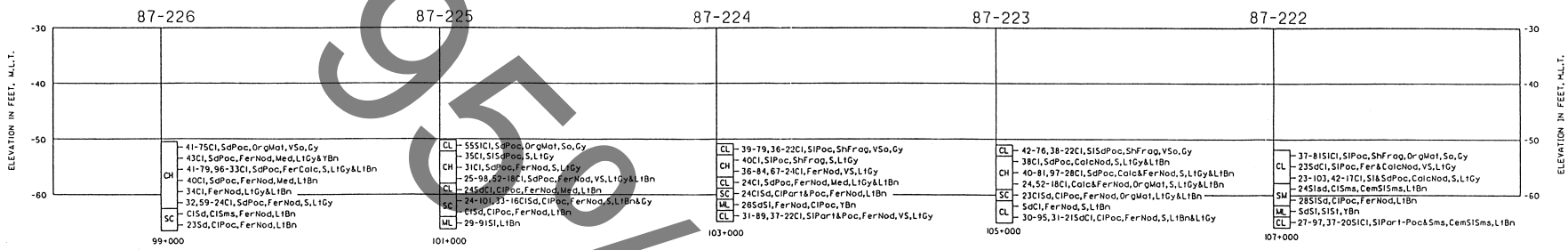
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

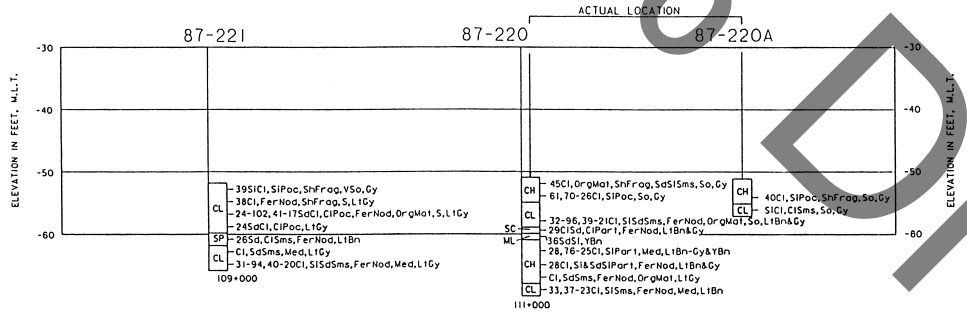
NEW ENTRANCE CHANNEL

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X





LABORATORY CLASSIFICATION

SP POORLY-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES.
SW SILTY SANDS, SAND-SILT MIXTURES.
SC CLAYEY SANDS, SAND-CLAY MIXTURES.
ML INORGANIC SILTS AND VERY FINE SANDS, WITH SLIGHT PLASTICITY.
CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASICITY, LEAN CLAYS.

VISUAL CLASSIFICATIONS

Bn Brown(ish)	Med Medium
Blu Blue(ish)	Nod Nodules
Calc Calcareous	Ol Olive
Cem Cemented	Org Organic
Cl Clay(ey)	Part Partings
Dk Dark	Pet Petroleum
D Dense	Poc Pockets
Dep Deposit(s)	R Red(dish)
D.C. Driller's Classification	S Stiff
Fer Ferrous	Sd Sand(y)
Frag Fragments	Sh Shell(y)
Gy Gray(ish)	Sl Silty
H Hard	Slks Silkened Sides
Ind Industrial	Sms Seams
L Loose	So Soft
Ln Lense(s)	St Stone
Lt Light	Tn Tan(ish)
Ly Layer(s)	V Very
Lim Limonites	Wa Waste
Mat Materials	Y Yellow(ish)

NOTES:

1. SOILS HAVE BEEN CLASSIFIED IN ACCORDANCE WITH MILITARY STANDARD 619B "UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS AND FOUNDATIONS." CONSISTENCY OF SOILS SUCH AS SOFT, MEDIUM, HARD, LOOSE, DENSE, ETC., ARE RELATIVE TERMS BASED ON ESTIMATED UNDISTURBED SHEAR STRENGTH OF THE MATERIAL AS DETERMINED BY VISUAL CLASSIFICATION POCKET PENETROMETER TESTS AND PENETRATION RESISTANCE DURING SAMPLING.
2. FIGURES TO THE RIGHT OF BORING LOGS ARE WATER CONTENTS IN PERCENT OF THE DRY WEIGHT, DRY DENSITY, LIQUID LIMIT, PLASTIC LIMIT, AND BAR LINEAR SHRINKAGE. (WC-DDWI,LL-PL,I.B.L.S.)
3. BORINGS WERE DRILLED USING WET ROTARY DRILLING TECHNIQUES AND UNDISTURBED SAMPLES WERE RECOVERED WITH A 3-INCH DIAMETER THIN WALL SAMPLER WHERE COHESIVE MATERIALS WERE ENCOUNTERED. WHERE CONCESIONLESS MATERIALS WERE ENCOUNTERED, DISTURBED SAMPLES WERE TAKEN WITH A SPLIT SPOON SAMPLER DURING PERFORMANCE OF STANDARD PENETRATION TESTING.
4. BAY WATER SURFACE IS APPROXIMATELY +2.0 MLT WHEN NOT SHOWN ON LOGS

NOTE:
SEE PLATES FD-8 TO FD-12 FOR BORING LOCATIONS.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
NEW ENTRANCE CHANNEL
BORING LOGS
U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

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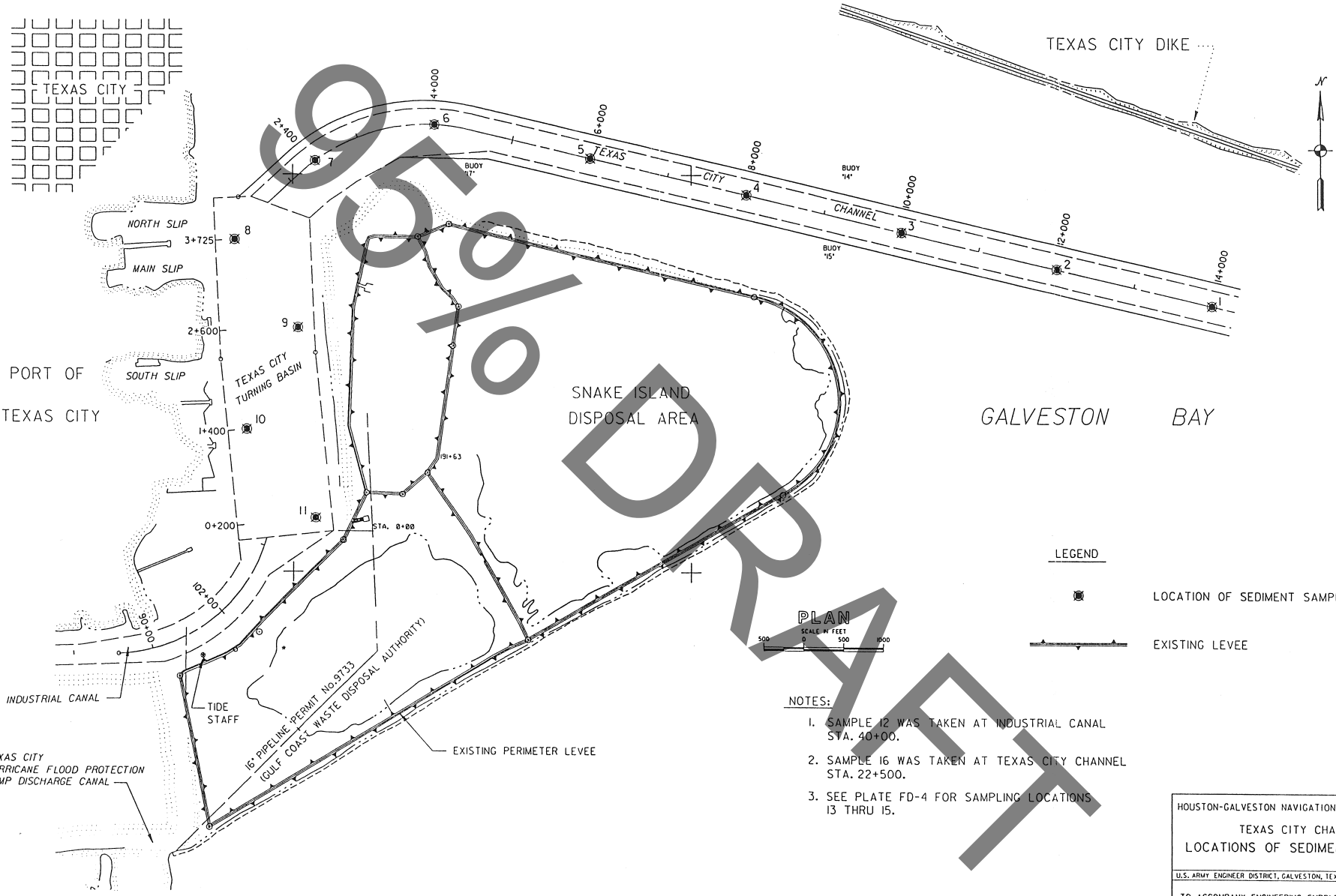

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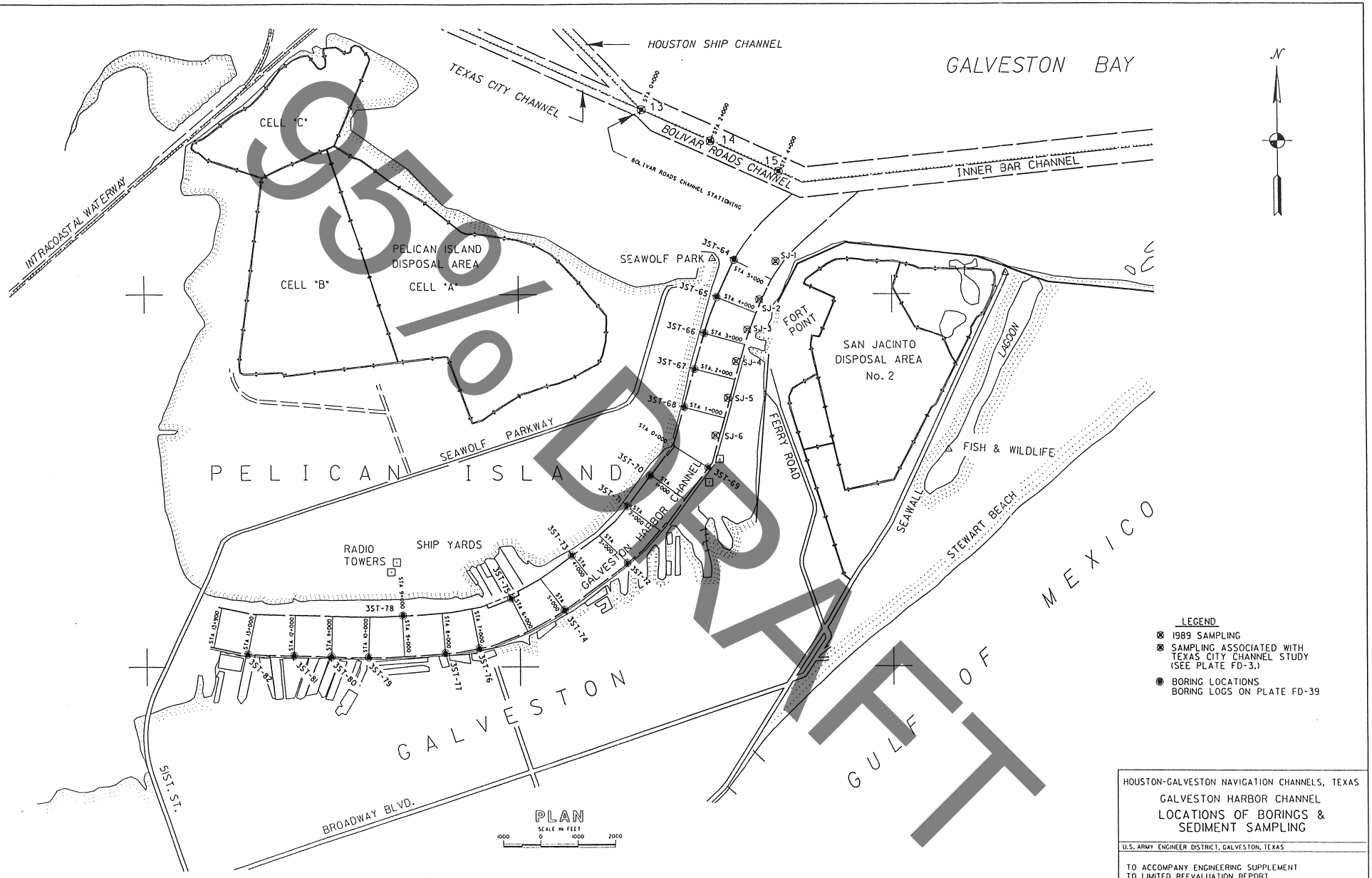
PLATE FD-37



LEGEND

- ⊠ 1989 SAMPLING
- ⊠ SAMPLING ASSOCIATED WITH TEXAS CITY CHANNEL STUDY (SEE PLATE FD-3.)
- ● BORING LOCATIONS BORING LOGS ON PLATE FD-39

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

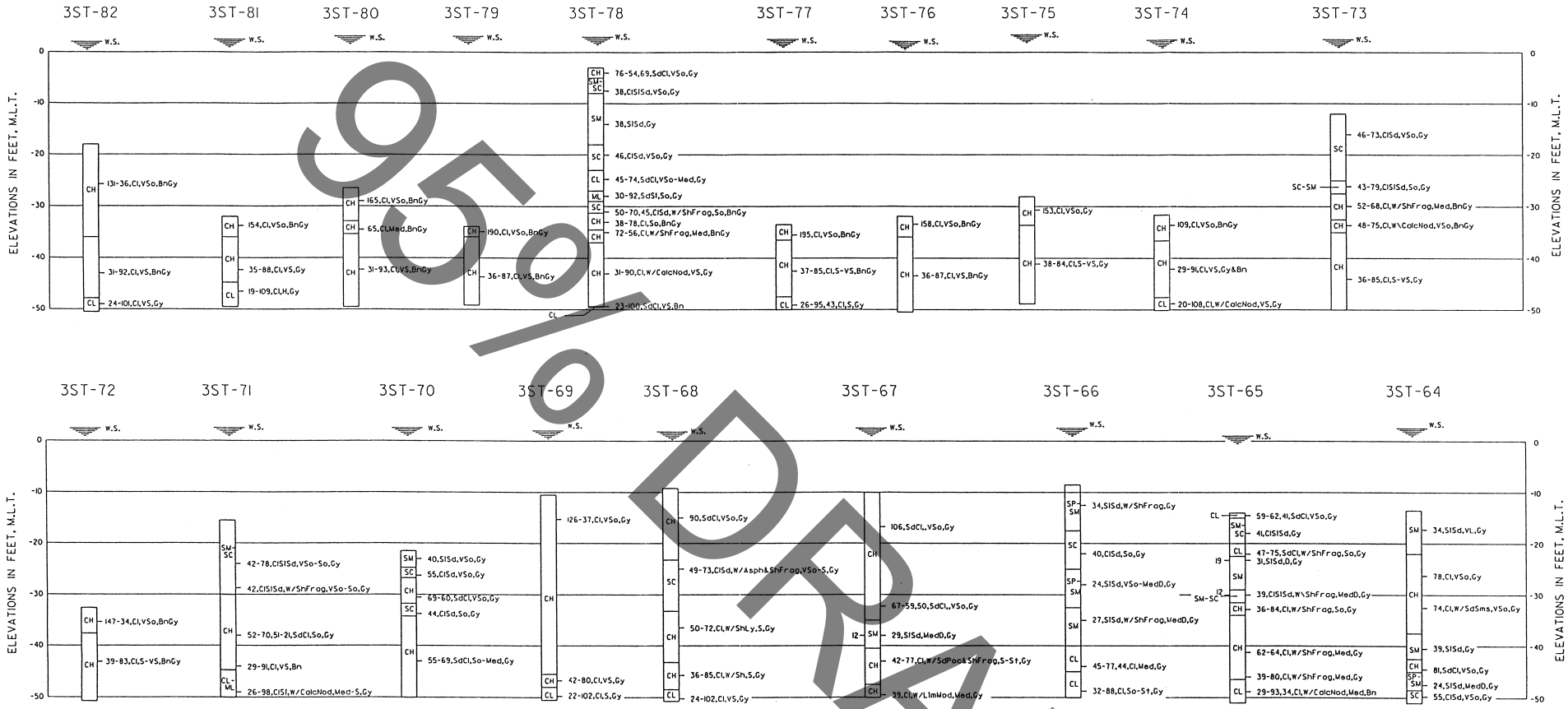
GALVESTON HARBOR CHANNEL

LOCATIONS OF BORINGS & SEDIMENT SAMPLING

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT TO LIMITED REEVALUATION REPORT DATED: X

PLATE FD-38



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NOTES;

1. SOILS HAVE BEEN CLASSIFIED IN ACCORDANCE WITH MILITARY STANDARD 6198 'UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS AND FOUNDATIONS.' CONSISTENCY OF SOILS SUCH AS SOFT, MEDIUM, HARD, LOOSE, DENSE, ETC., ARE RELATIVE TERMS BASED ON ESTIMATED UNDISTURBED SHEAR STRENGTH OF THE MATERIAL AS DETERMINED BY VISUAL CLASSIFICATION POCKET PENETROMETER TESTS AND PENETRATION RESISTANCE DURING SAMPLING.
2. FIGURES TO THE RIGHT OF BORING LOGS ARE WATER CONTENTS IN PERCENT OF THE DRY WEIGHT, DRY DENSITY, LIQUID LIMIT, PLASTIC LIMIT, AND BAR LINEAR SHRINKAGE. (MC-UDW),(LL-PL),(BL.S.)+ FIGURES TO THE LEFT OF BORING LOGS ARE BLOWS PER FOOT OF PENETRATION FROM STANDARD PENETRATION TESTING.
3. BORINGS WERE DRILLED USING WET ROTARY DRILLING TECHNIQUES AND UNDISTURBED SAMPLES WHERE RECOVERED WITH A 3-INCH DIAMETER THIN WALL SAMPLER WHERE COHESIVE MATERIALS WERE ENCOUNTERED. WHERE COHESIONLESS MATERIALS WERE ENCOUNTERED, DISTURBED SAMPLES WERE TAKEN WITH A SPLIT SPOON SAMPLER DURING PERFORMANCE OF STANDARD PENETRATION TESTING.

VISUAL CLASSIFICATIONS

Bn Brown(ish)	Med Medium
Calc Calcereous	S Stiff
Cl Clay(ey)	Sd Sand(y)
D Dense	Sh Shell(y)
Frag Fragment(s)	Sl Silty
Gy Gray(ish)	So Soft
H Hard	V Very
L Loose	w with
Nod Nodules	W.S. Water Surface

LABORATORY CLASSIFICATION

CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS.
ML INORGANIC SILTS AND VERY FINE SANDS, WITH SLIGHT PLASTICITY.
SC CLAYEY SANDS, SAND-CLAY MIXTURES.
SM SILTY SANDS, SAND-SILT MIXTURES.
SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES.

NOTE: BORINGS DRILLED DECEMBER 1965
LOCATIONS OF BORINGS SHOWN ON PLATE FD-38

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

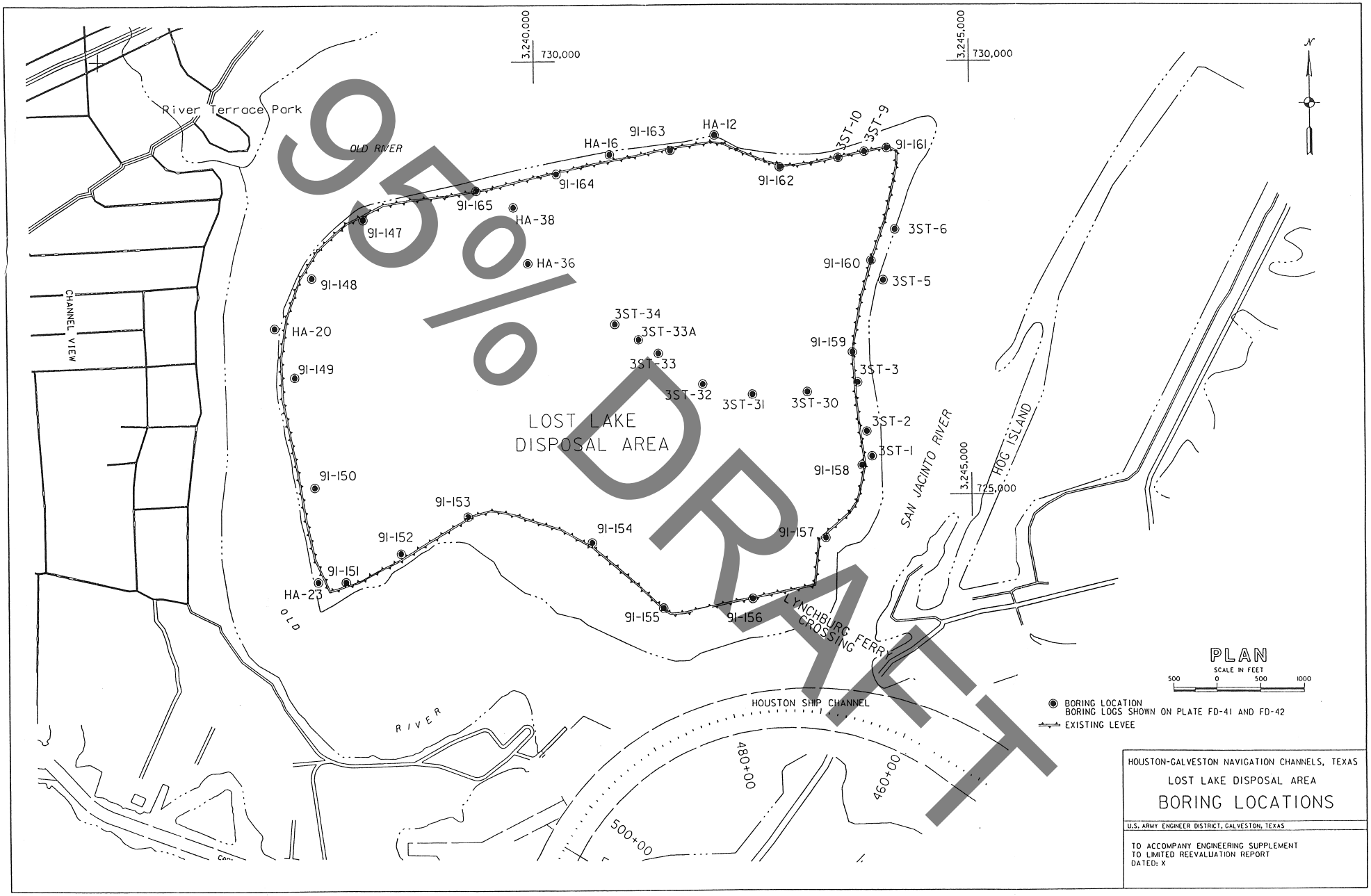
GALVESTON CHANNEL

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-39



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HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

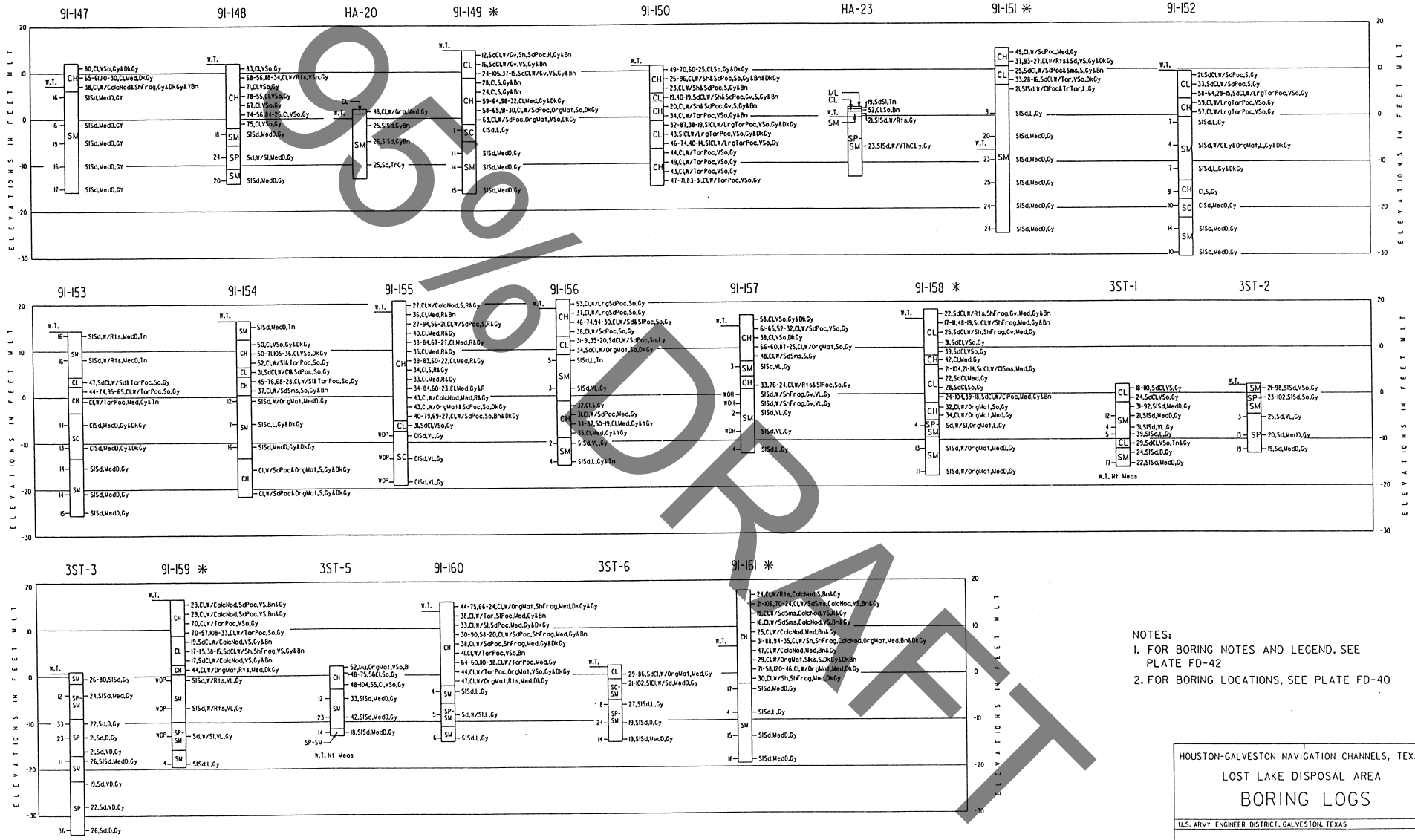
LOST LAKE DISPOSAL AREA

BORING LOCATIONS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-40



NOTES:

1. FOR BORING NOTES AND LEGEND, SEE PLATE FD-42
2. FOR BORING LOCATIONS, SEE PLATE FD-40

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

LOST LAKE DISPOSAL AREA

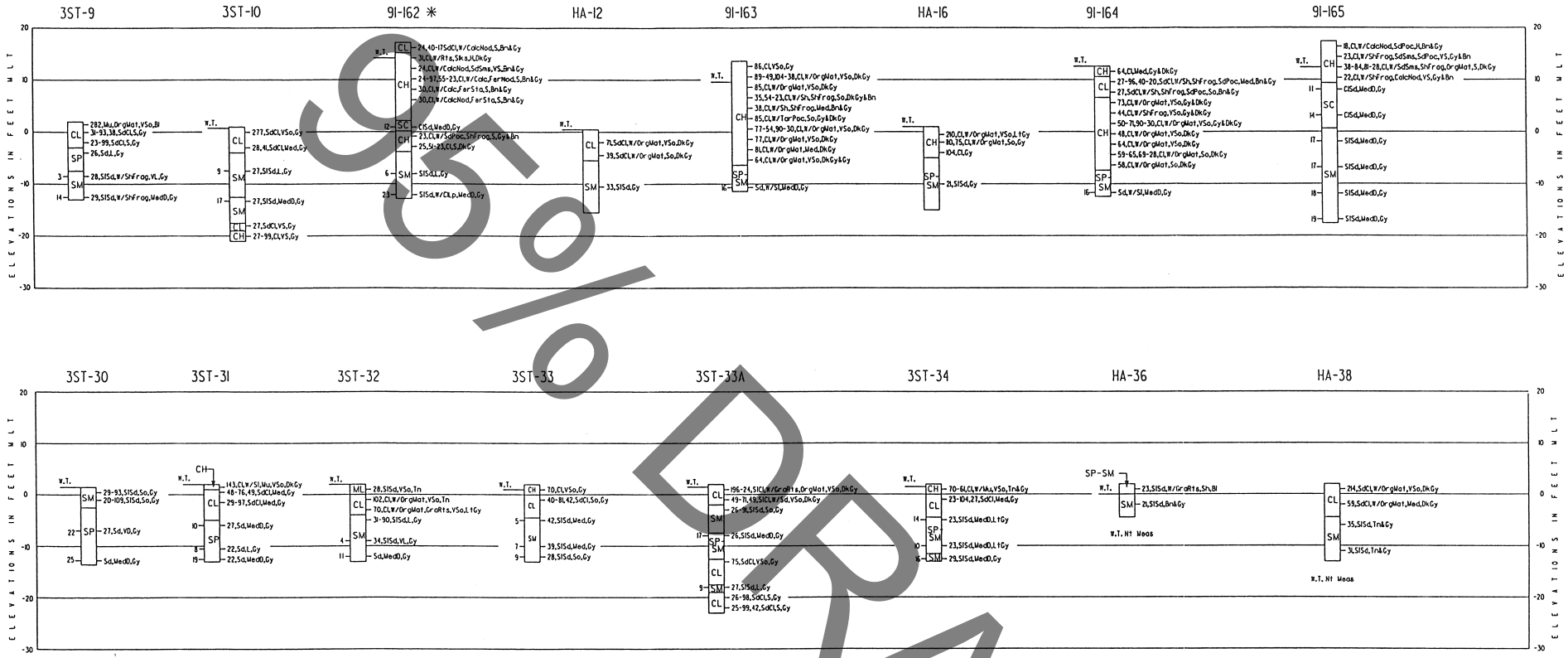
BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT TO LIMITED REEVALUATION REPORT DATED: X

PLATE FD-4

95% DRAFT



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NOTES:

1. SOILS HAVE BEEN CLASSIFIED IN ACCORDANCE WITH MILITARY STANDARD 619B "UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS AND FOUNDATIONS." CONSISTENCY OF SOILS SUCH AS SOFT, MEDIUM, HARD, LOOSE, DENSE, ETC., ARE RELATIVE TERMS BASED ON ESTIMATED UNDISTURBED SHEAR STRENGTH OF THE MATERIAL AS DETERMINED BY VISUAL CLASSIFICATION POCKET PENETROMETER TESTS AND PENETRATION RESISTANCE DURING SAMPLING.
2. FIGURES TO THE RIGHT OF BORING LOGS ARE WATER CONTENTS IN PERCENT OF THE DRY WEIGHT, DRY DENSITY, LIQUID LIMIT, PLASTIC LIMIT, AND BAR LINEAR SHRINKAGE. (MC-UDW1,LL-PL),(B.L.S.)* FIGURES TO THE LEFT OF BORING LOG ARE BLOWS PER FOOT OF PENETRATION FROM STANDARD PENETRATION TESTING.
3. BORINGS WERE DRILLED USING WET ROTARY DRILLING TECHNIQUES AND UNDISTURBED SAMPLES WHERE RECOVERED WITH A 3-INCH DIAMETER THIN WALL SAMPLER WHERE COHESIVE MATERIALS WERE ENCOUNTERED. WHERE COHESIONLESS MATERIALS WERE ENCOUNTERED, DISTURBED SAMPLES WERE TAKEN WITH A SPLIT SPOON SAMPLER DURING PERFORMANCE OF STANDARD PENETRATION TESTING.
4. WATER TABLE LEVELS SHOWN ON BORING LOGS WERE DETERMINED AFTER DRILLING BORINGS BY MEASURING THE TOP OF FLUID LEVELS IN THE BORINGS. INASMUCH AS WET ROTARY DRILLING TECHNIQUES AND DRILLING MUD WERE USED TO DRILL THE HOLES, THE LEVEL OF DRILLING FLUIDS IN THE BORE HOLES MAY NOT HAVE STABILIZED TO THE LEVEL OF THE ACTUAL WATER TABLE. ADDITIONALLY, WATER TABLES IN THE FIELD ARE LIKELY TO FLUCTUATE DEPENDING ON WEATHER CONDITIONS. THEREFORE, SOME VARIATION SHOULD BE ANTICIPATED BETWEEN WATER TABLES INDICATED AND WATER TABLES ENCOUNTERED IN THE FIELD.

VISUAL CLASSIFICATIONS

Bl Black	H Hard	Nt Not	So Soft
Bn Brown(ish)	L Loose	Org Organic	Sta Stains
Calc Calcareous	Lp Lump(s)	Poc Pocket(s)	Tar Tar
Cl Clay(ey)	Ly Layer(s)	R Red(dish)	Th Thin
D Dense	Lrg Large	Rts Root(s)	Tn Tan(ish)
Dk Dark	Lt Light	S Stiff	Tr Trace(s)
Fer Ferrous	Meas Measured	Sd Sand(y)	V Very
Frag Fragment(s)	Mat Material	Sh Shell(y)	W.T. Water Table
Gra Grass	Med Medium	Sl Silty	W/ With
Gv Gravel(ly)	Mu Muck	Slks Slickensides	WOP Weight of pipe
Gy Gray(ish)	Nod Nodules	Sms Seams	WOH Weight of hammer

LABORATORY CLASSIFICATION

CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS.
ML INORGANIC SILTS AND VERY FINE SANDS, WITH SLIGHT PLASTICITY.
SC CLAYEY SANDS, SAND-CLAY MIXTURES.
SM SILTY SANDS, SAND-SILT MIXTURES.
SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES.

NOTE:
FOR BORING LOCATIONS, SEE PLATE FD-40

* NOTE: BORINGS DRILLED ON PERIMETER LEVEE CROWN.

NOTE: BORINGS PREFIXED WITH "3ST" WERE DRILLED IN 1963. BORINGS PREFIXED WITH "85" WERE DRILLED IN 1985. BORINGS PREFIXED WITH "91" WERE DRILLED IN 1991. THE ELEVATIONS OF THE TOPS OF THE BORINGS, AND THE UNDERLYING SOIL STRATA, SHOWN ON THE PLOTTED LOGS, ARE ARE BASED ON SURVEYS PERFORMED DURING THE YEAR THAT THE BORINGS WERE DRILLED. ELEVATIONS HAVE NOT BEEN CORRECTED FOR SUBSIDENCE.

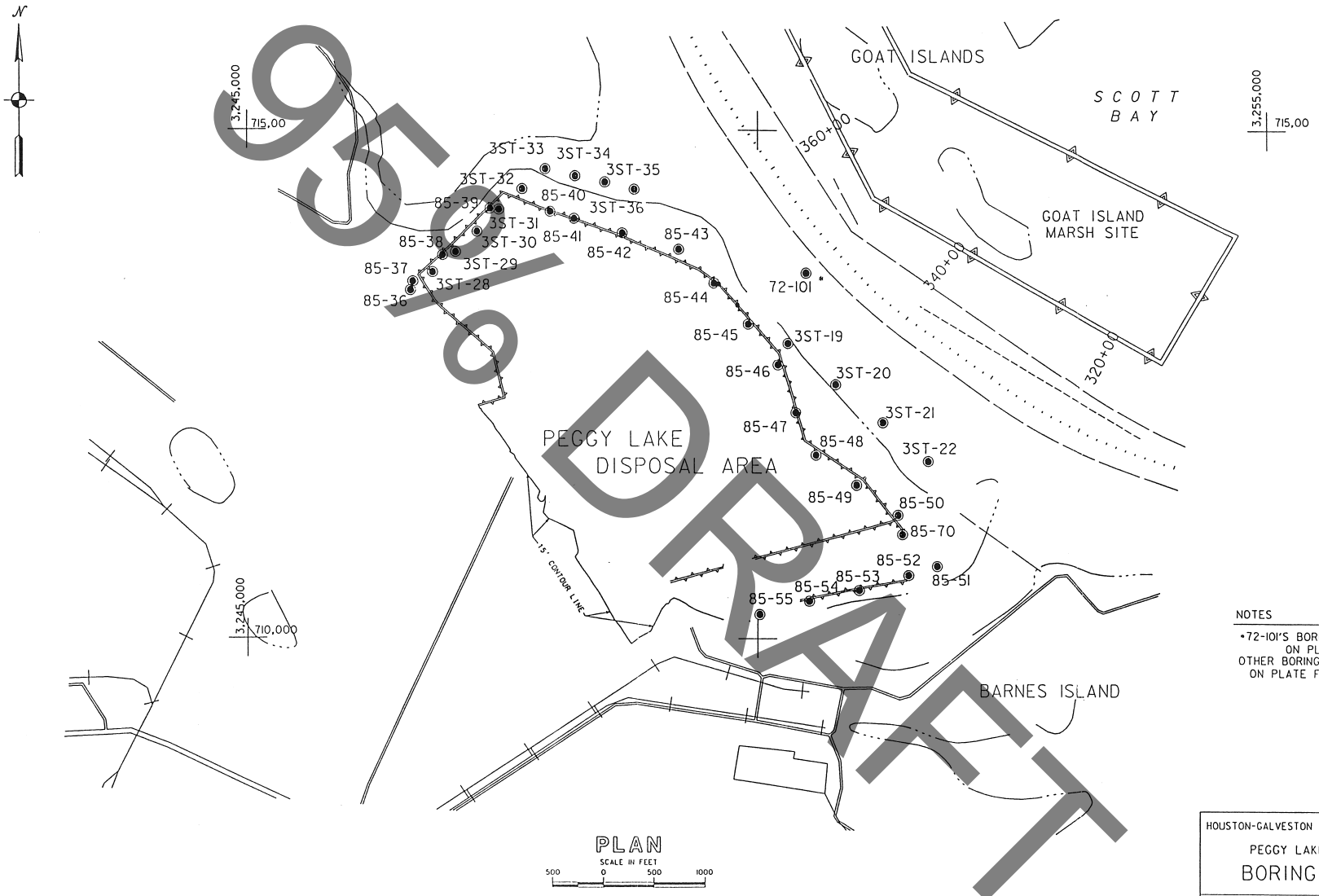
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

LOST LAKE DISPOSAL AREA

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



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NOTES

*72-101'S BORING LOG IS SHOWN ON PLATE FD-17
OTHER BORING LOGS ARE SHOWN ON PLATE FD-44 AND FD-45

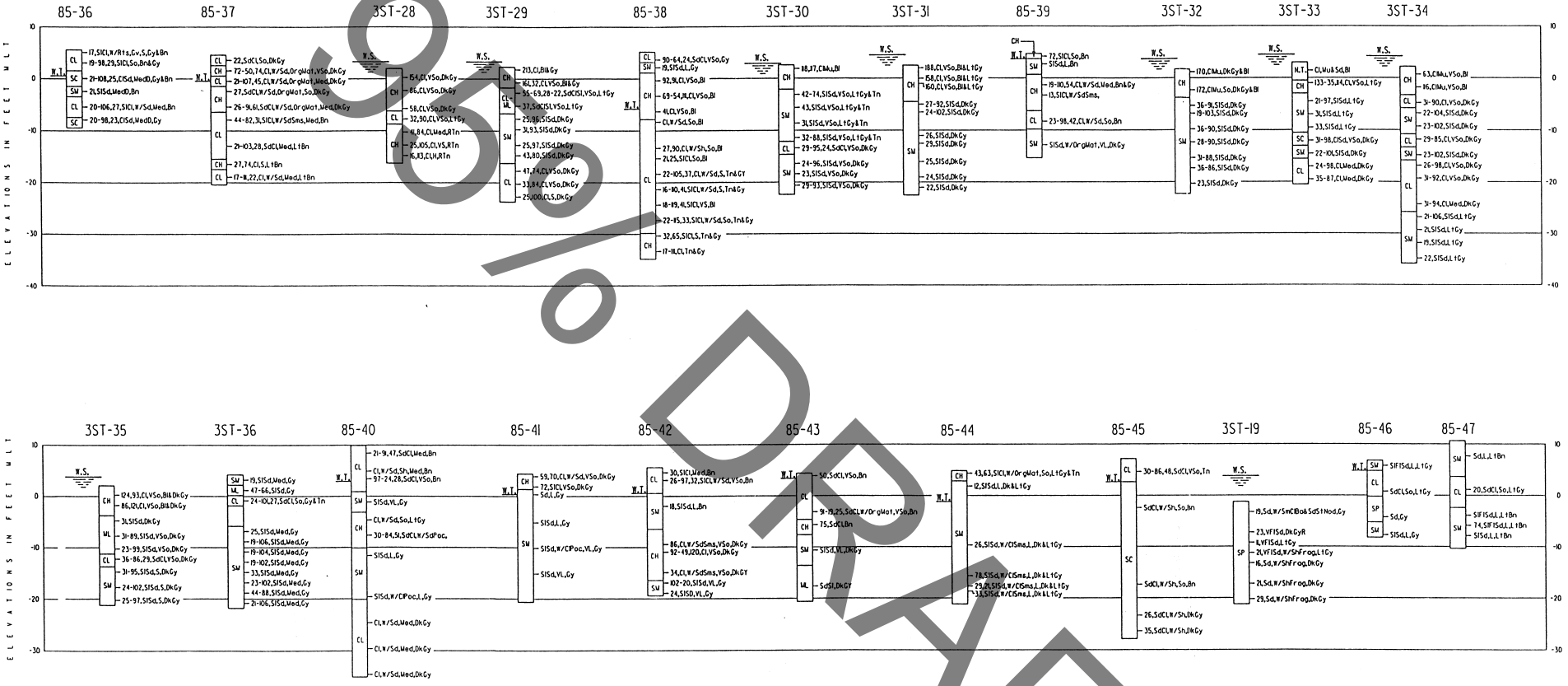
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

PEGGY LAKE DISPOSAL AREA

BORING LOCATIONS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



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NOTES:

SEE PLATE FD-43 FOR BORING LOCATIONS.
SEE PLATE FD-45 FOR BORING NOTES AND LEGEND.

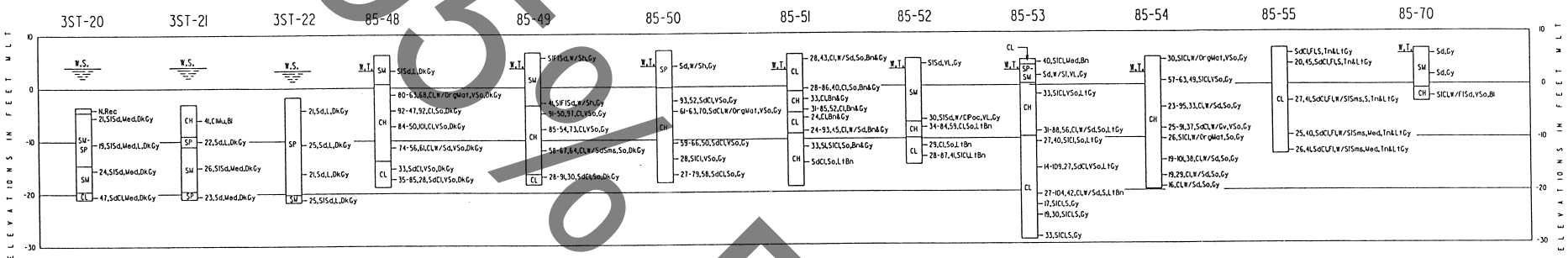
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

PEGGY LAKE DISPOSAL AREA

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



NOTES;

1. SOILS HAVE BEEN CLASSIFIED IN ACCORDANCE WITH MILITARY STANDARD 619B "UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS, AND FOUNDATIONS." CONSISTENCY OF SOILS SUCH AS SOFT, MEDIUM, HARD, LOOSE, DENSE, ETC., ARE RELATIVE TERMS BASED ON ESTIMATED UNDISTURBED SHEAR STRENGTH OF THE MATERIAL AS DETERMINED BY VISUAL CLASSIFICATION POCKET PENETROMETER TESTS AND PENETRATION RESISTANCE DURING SAMPLING.
2. FIGURES TO THE RIGHT OF BORING LOGS ARE WATER CONTENTS IN PERCENT OF THE DRY WEIGHT, DRY DENSITY, LIQUID LIMIT, PLASTIC LIMIT, AND BAR LINEAR SHRINKAGE, AS-LDW,LL,PL,BL,S,P+ FIGURES TO THE LEFT OF BORING LOGS ARE BLOWS PER FOOT OF PENETRATION FROM STANDARD PENETRATION TESTING.
3. BORINGS WERE DRILLED USING WET ROTARY DRILLING TECHNIQUES AND UNDISTURBED SAMPLES WERE RECOVERED WITH A 3-INCH DIAMETER THIN WALL SAMPLER WHERE COHESIVE MATERIALS WERE ENCOUNTERED. WHERE COHESIONLESS MATERIALS WERE ENCOUNTERED, DISTURBED SAMPLES WERE TAKEN WITH A SPLIT SPOON SAMPLER DURING PERFORMANCE OF STANDARD PENETRATION TESTING.
4. WATER TABLE LEVELS SHOWN ON BORING LOGS WERE DETERMINED AFTER DRILLING BORINGS BY MEASURING THE TOP OF FLUID LEVELS IN THE BORINGS. BECAUSE AS WET ROTARY DRILLING TECHNIQUES AND DRILLING MUD WERE USED TO DRILL THE HOLES, THE LEVEL OF DRILLING FLUIDS IN THE BORE HOLES MAY NOT HAVE STABILIZED TO THE LEVEL OF THE ACTUAL WATER TABLE. ADDITIONALLY, WATER TABLES IN THE FIELD ARE LIKELY TO FLUCTUATE DEPENDING ON WEATHER CONDITIONS, THEREFORE, SOME VARIATION SHOULD BE ANTICIPATED BETWEEN WATER TABLES INDICATED AND WATER TABLES ENCOUNTERED IN THE FIELD.

VISUAL CLASSIFICATIONS:

Ba Bottom
Bl Black
Bn Brown/ish
Cl Clay/ey
D Dense
Dk Dark
Fl Fine/s
Fi Fill
Frag Fragmental
Gr Gravel/y
Gy Gray/ish
H Hard
L Loose
Lt Light
Mst Water/d
Med Medium
Mv Marsh
Mod Moderate
N.T. No Test
Org Organic
Poc Pocketed
P Reddish
Rte Root/ed
S Stiff
Sd Sandy
Sh Shell/y
Sl Silty
Sm Small
Sms Seams
So Soft
St Stained
Tn Tan/ish
V Very
W.T. Water Table
W.S. Water Surface
w/ With

LABORATORY CLASSIFICATIONS:

CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS.
ML INORGANIC SILTS AND VERY FINE SANDS, WITH SLIGHT PLASTICITY.
SC CLAYEY SANDS, SAND-CLAY MIXTURES.
SM SILTY SANDS, SAND-SILT MIXTURES.
SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES.
CL-ML OR ML-CL CLAY AND SILT MIXTURES WITH SLIGHT PLASTICITY
SP-SM OR SW-SP SLIGHTLY SILTY SANDS, SANDS WITH SOME SILTS
SW-SC OR SC-SW SLIGHTLY SILTY AND CLAYEY SANDS, SANDS WITH SOME SILTS AND CLAYS

NOTE: BORINGS PREFIXED WITH '3ST' WERE DRILLED IN 1963. BORINGS PREFIXED WITH '85' WERE DRILLED IN 1985. THE ELEVATIONS OF THE TOPS OF THE BORINGS, AND THE UNDERLYING SOIL STRATA, SHOWN ON THE PLOTTED LOGS, ARE BASED ON SURVEYS PERFORMED DURING THE YEAR THAT THE BORINGS WERE DRILLED. ELEVATIONS HAVE NOT BEEN CORRECTED FOR SUBSIDENCE.

NOTES:
SEE PLATE FD-43 FOR BORING LOCATIONS.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
PEGGY LAKE DISPOSAL AREA
BORING LOGS
U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

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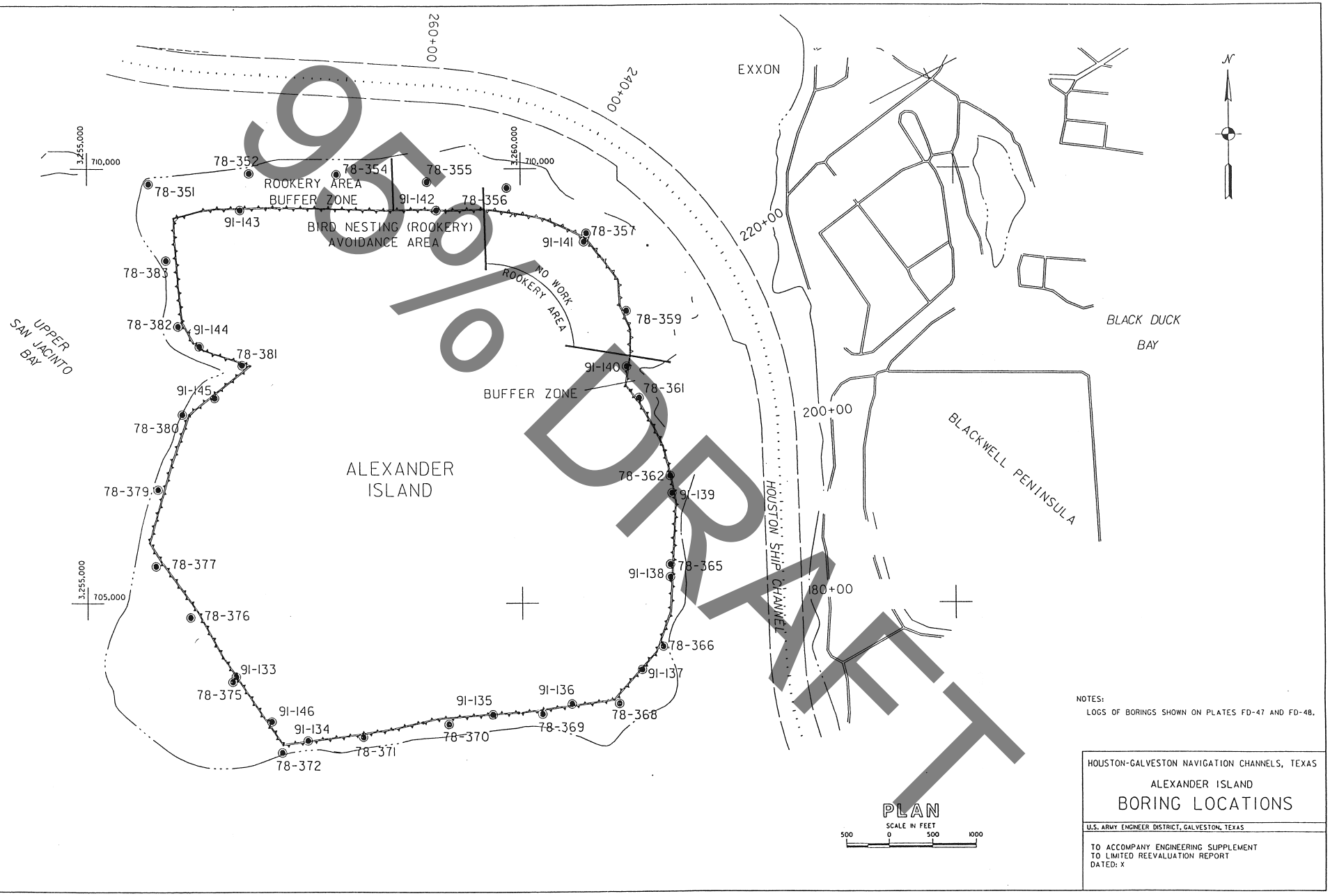

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SCALE IN FEET
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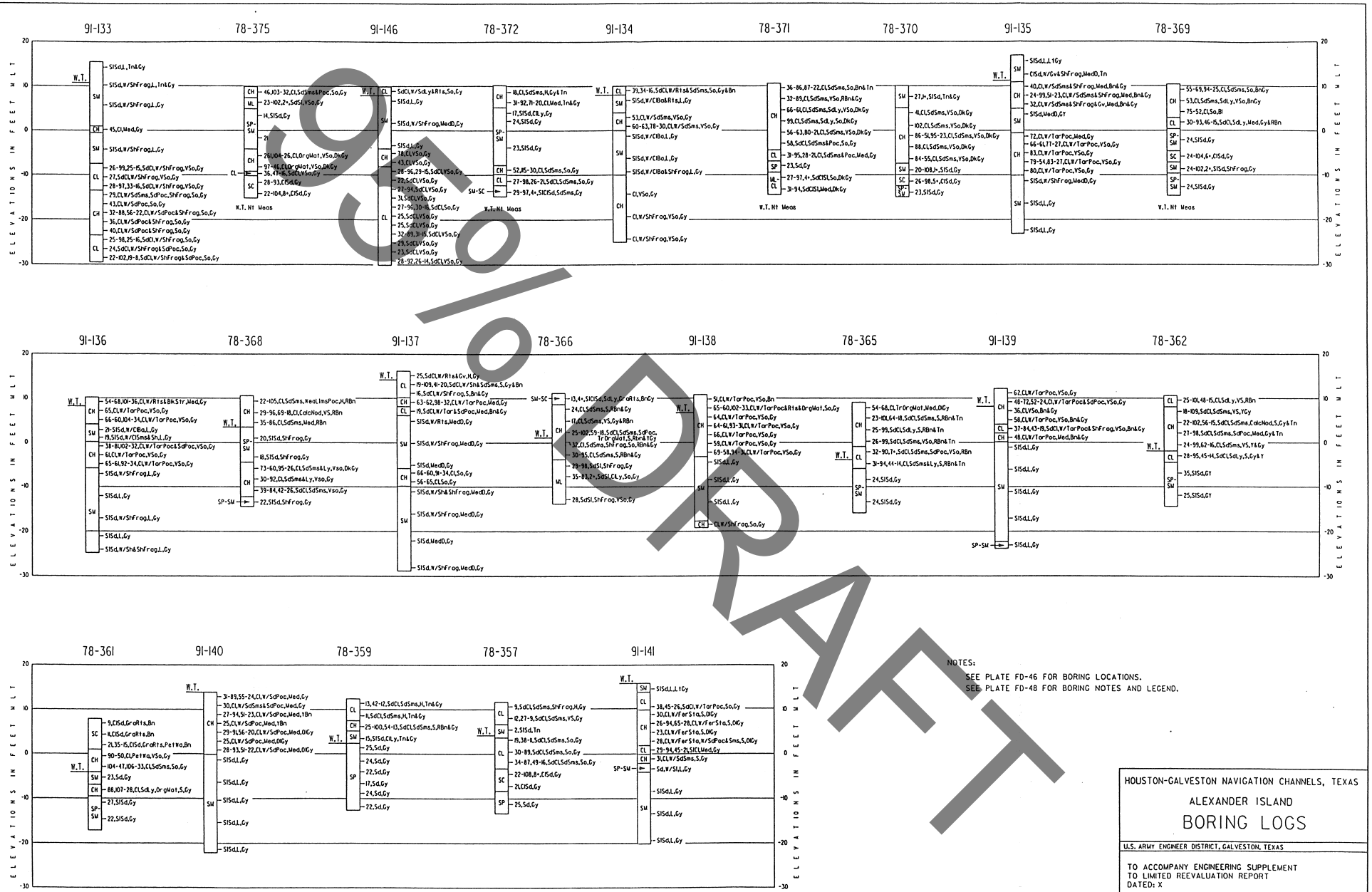
NOTES:
LOGS OF BORINGS SHOWN ON PLATES FD-47 AND FD-48.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
ALEXANDER ISLAND
BORING LOCATIONS
U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



91-16 DRAFT

NOTES:

SEE PLATE FD-46 FOR BORING LOCATIONS.
SEE PLATE FD-48 FOR BORING NOTES AND LEGEND.

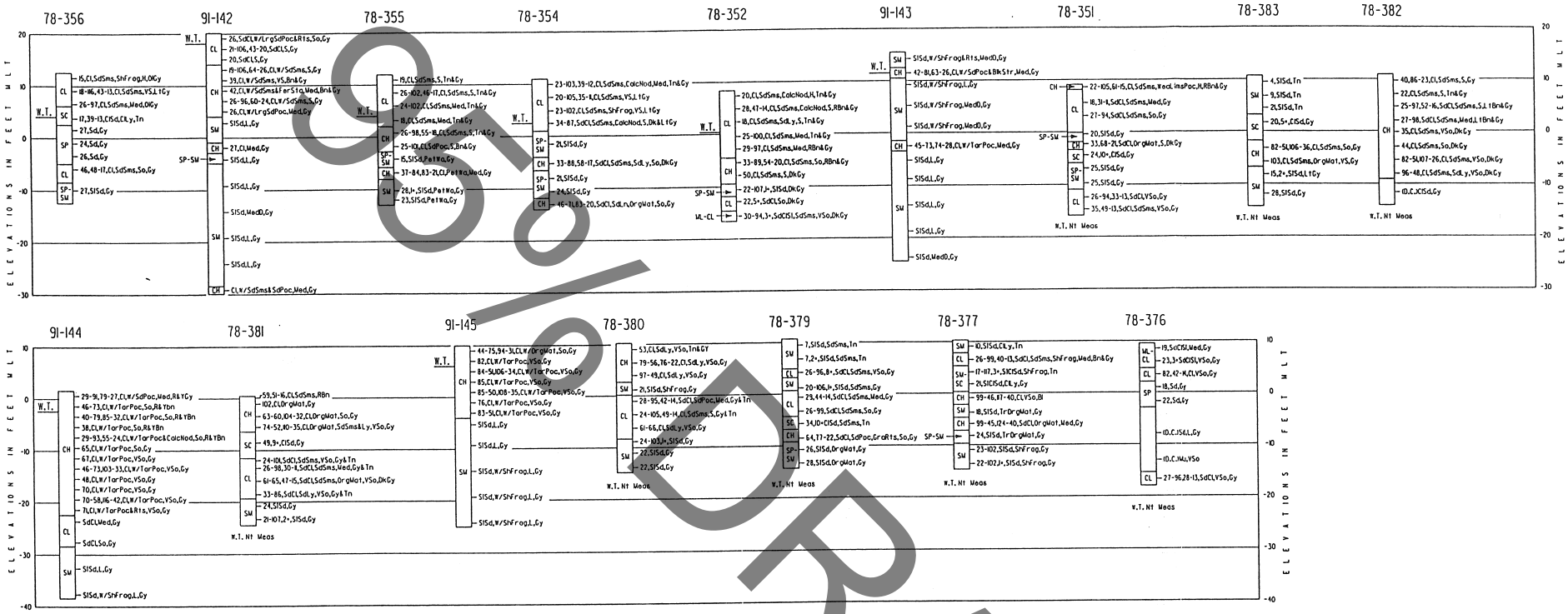
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

ALEXANDER ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



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NOTES;

1. SOILS HAVE BEEN CLASSIFIED IN ACCORDANCE WITH MILITARY STANDARD 619B "UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS AND FOUNDATIONS." CONSISTENCY OF SOILS SUCH AS SOFT, MEDIUM, HARD, LOOSE, DENSE, ETC., ARE RELATIVE TERMS BASED ON ESTIMATED UNDISTURBED SHEAR STRENGTH OF THE MATERIAL AS DETERMINED BY VISUAL CLASSIFICATION POCKET PENETROMETER TESTS AND PENETRATION RESISTANCE DURING SAMPLING.
2. FIGURES TO THE RIGHT OF BORING LOGS ARE WATER CONTENTS IN PERCENT OF THE DRY WEIGHT, DRY DENSITY, LIQUID LIMIT, PLASTIC LIMIT, AND BAR LINEAR SHRINKAGE. (MC-UDW),(LL-PL),(B.L.S.)= FIGURES TO THE LEFT OF BORING LOGS ARE BLOWS PER FOOT OF PENETRATION FROM STANDARD PENETRATION TESTING.
3. BORINGS WERE DRILLED USING WET ROTARY DRILLING TECHNIQUES AND UNDISTURBED SAMPLES WHERE RECOVERED WITH A 3-INCH DIAMETER THIN WALL SAMPLER WHERE COHESIVE MATERIALS WERE ENCOUNTERED. WHERE COHESIONLESS MATERIALS WERE ENCOUNTERED, DISTURBED SAMPLES WERE TAKEN WITH A SPLIT SPOON SAMPLER DURING PERFORMANCE OF STANDARD PENETRATION TESTING.
4. WATER TABLE LEVELS SHOWN ON BORING LOGS WERE DETERMINED AFTER DRILLING BORINGS BY MEASURING THE TOP OF FLUID LEVELS IN THE BORINGS. INASMUCH AS WET ROTARY DRILLING TECHNIQUES AND DRILLING MUD WERE USED TO DRILL THE HOLES, THE LEVEL OF DRILLING FLUIDS IN THE BORE HOLES MAY NOT HAVE STABILIZED TO THE LEVEL OF THE ACTUAL WATER TABLE. ADDITIONALLY, WATER TABLES IN THE FIELD ARE LIKELY TO FLUCTUATE DEPENDING ON WEATHER CONDITIONS. THEREFORE, SOME VARIATION SHOULD BE ANTICIPATED BETWEEN WATER TABLES INDICATED AND WATER TABLES ENCOUNTERED IN THE FIELD.

VISUAL CLASSIFICATIONS

Ba Ball(s)	Gra Grass	N.T. No Test	Sms Seams
Bl Black	Gv Gravel(ly)	Org Organic	So Soft
Blk Blocky	Gy Gray(ish)	Ol Olive	Str Structure
Bn Brown(ish)	H Hard	Pet Petroleum	Tar Tar
Calc Calcareous	L Loose	Poc Pocket(s)	Tn Tan(nish)
Cl Clay(ey)	Ly Layer(s)	R Red(dish)	V Very
D Dense	Lims Limestone	Rts Root(s)	Wa Waste
D.C. Driller's Classification	Lrg Large	S Stiff	Wea Weathered
	Lt Light	Sd Sand(y)	W.T. Water Table
Dk Dark	Mat Material	Sh Shell(y)	W/ With
Fer Ferrous	Med Medium	Sl Silty	Y Yellow(ish)
Frag Fragment(s)	Nod Nodules		

LABORATORY CLASSIFICATION

CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS.
ML INORGANIC SILTS AND VERY FINE SANDS, WITH SLIGHT PLASTICITY.
SC CLAYEY SANDS, SAND-CLAY MIXTURES.
SM SILTY SANDS, SAND-SILT MIXTURES.
SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES.

NOTES:

SEE PLATE FD-46 FOR BORING LOCATIONS.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

ALEXANDER ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

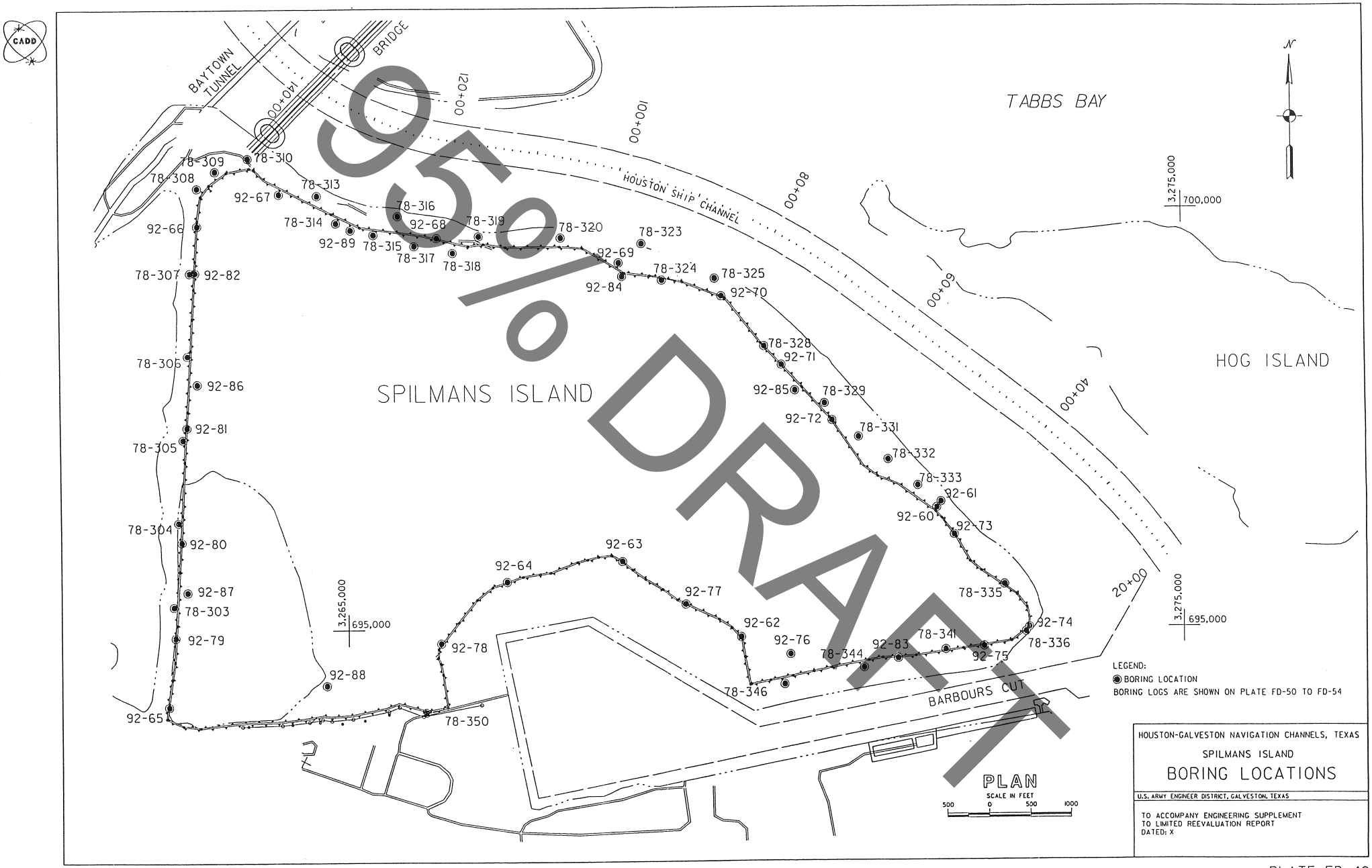

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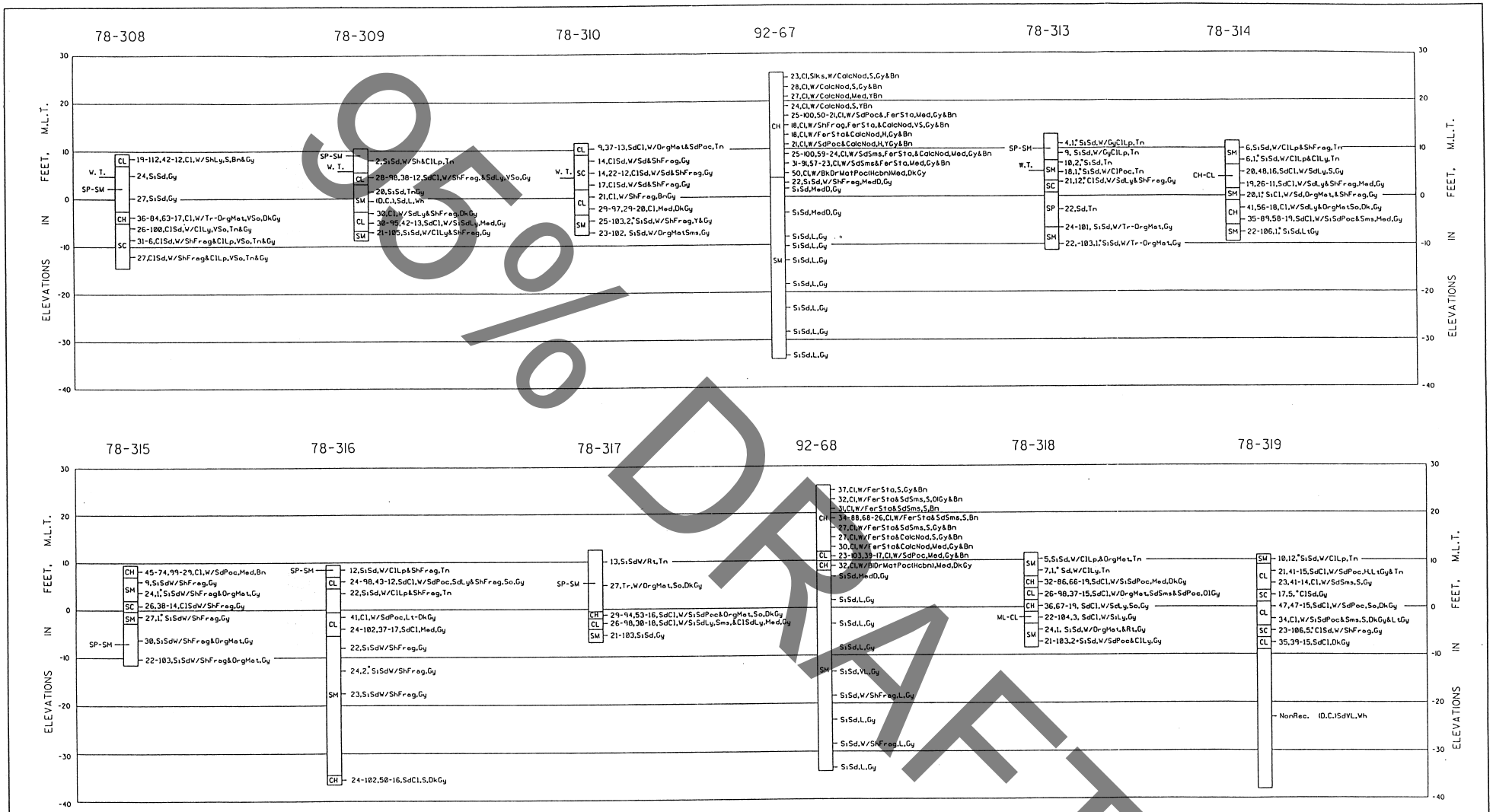
PLATE FD-49



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NOTES:

SEE PLATE FD-49 FOR BORING LOCATIONS.
SEE PLATE FD-54 FOR BORING NOTES AND LEGEND.

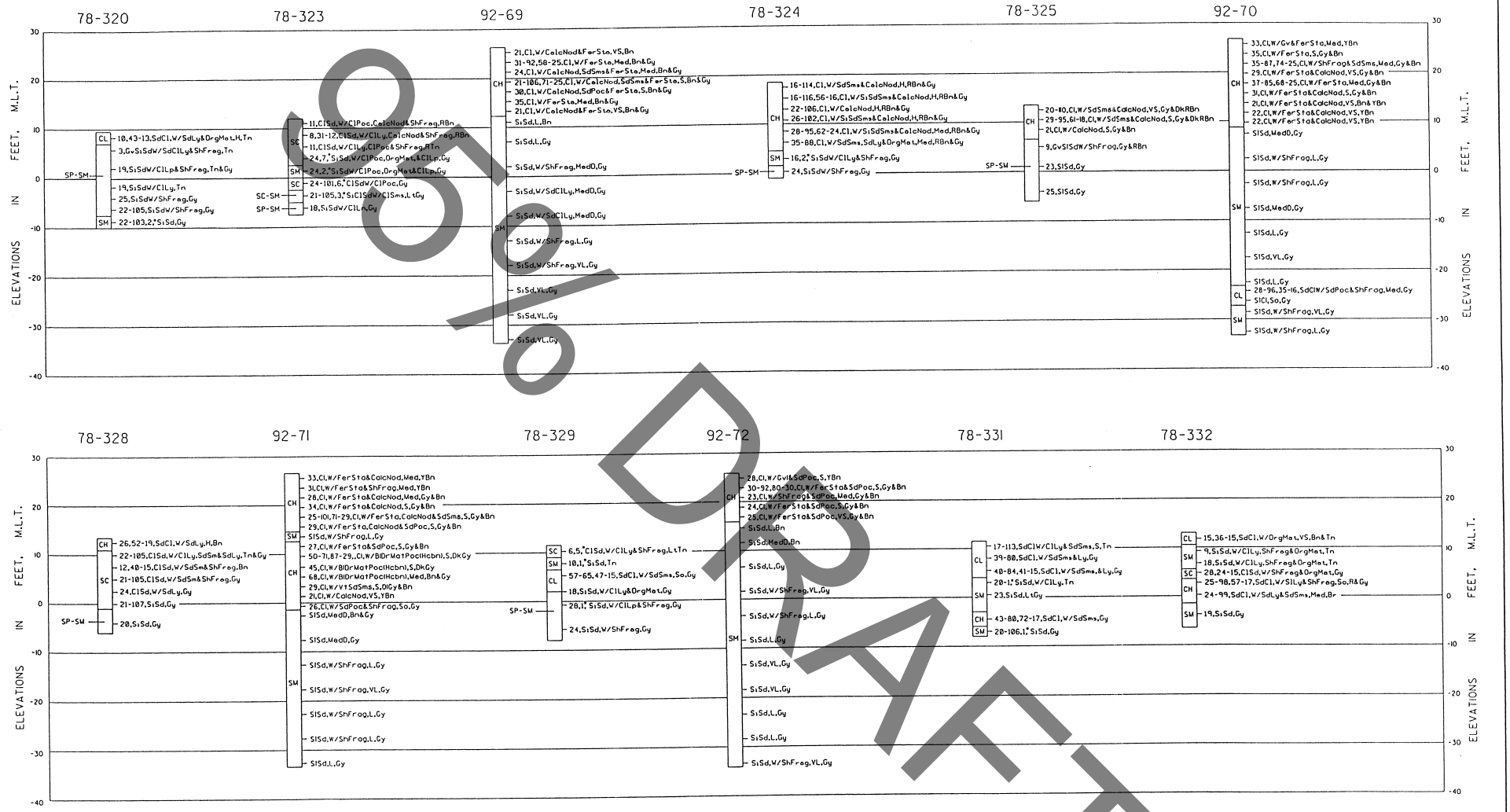
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

SPILMANS ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



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NOTES:

SEE PLATE FD-49 FOR BORING LOCATIONS.
SEE PLATE FD-54 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

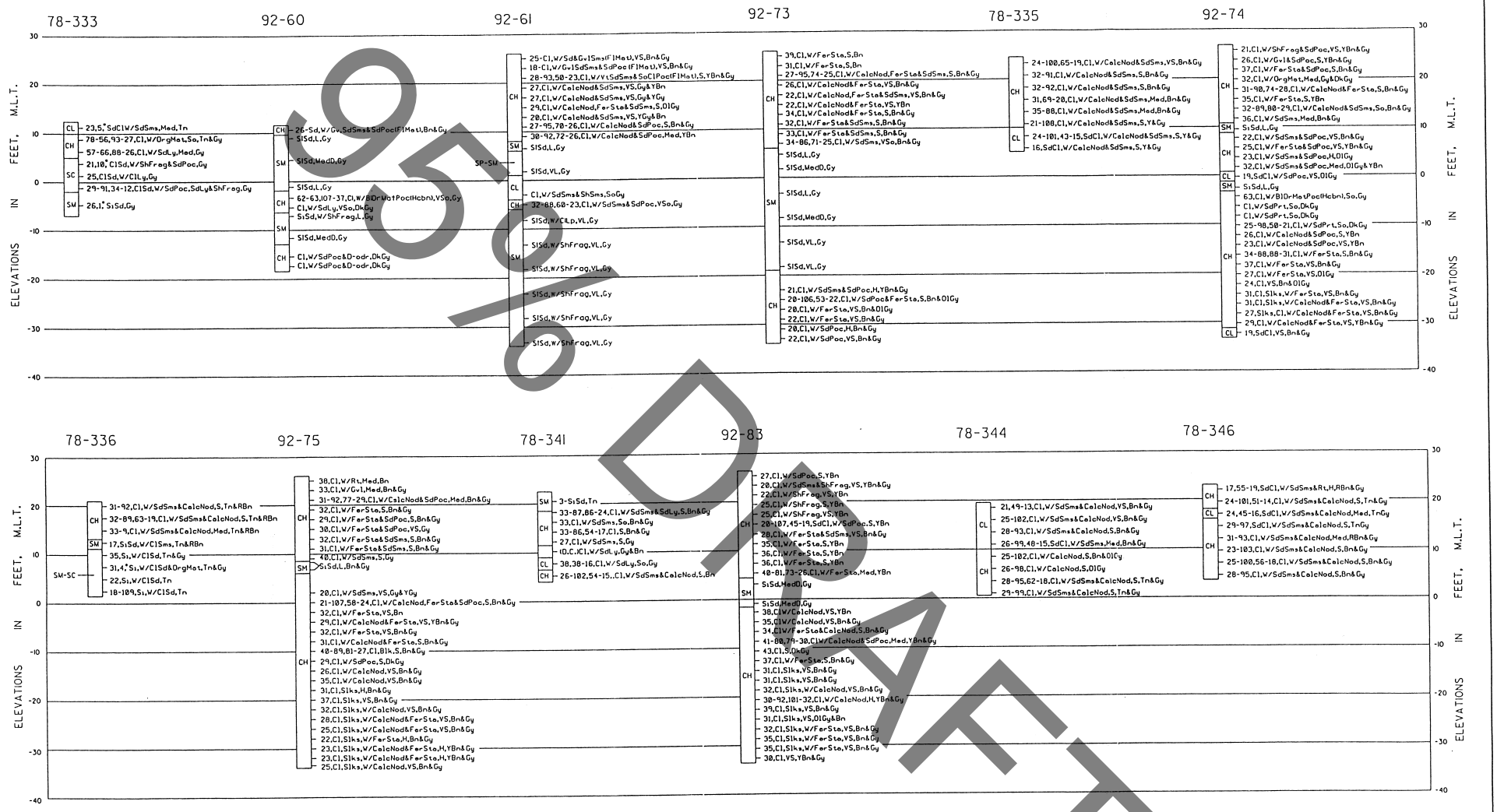
SPILMANS ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-51



95% DRAFT

NOTES:

SEE PLATE FD-49 FOR BORING LOCATIONS.
SEE PLATE FD-54 FOR BORING NOTES AND LEGEND.

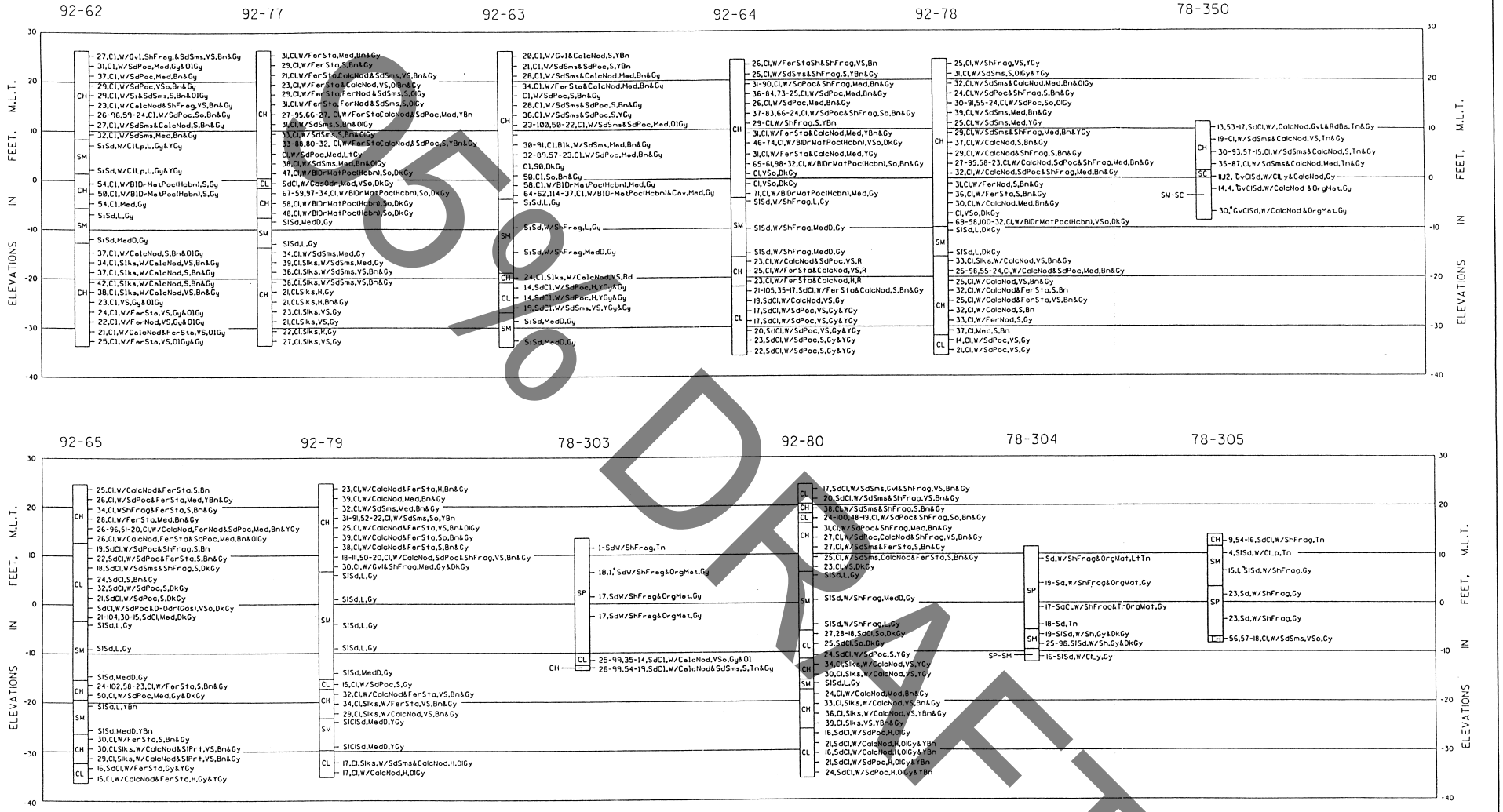
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

SPILMANS ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: x



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NOTES:

SEE PLATE FD-49 FOR BORING LOCATIONS.
SEE PLATE FD-54 FOR BORING NOTES AND LEGEND.

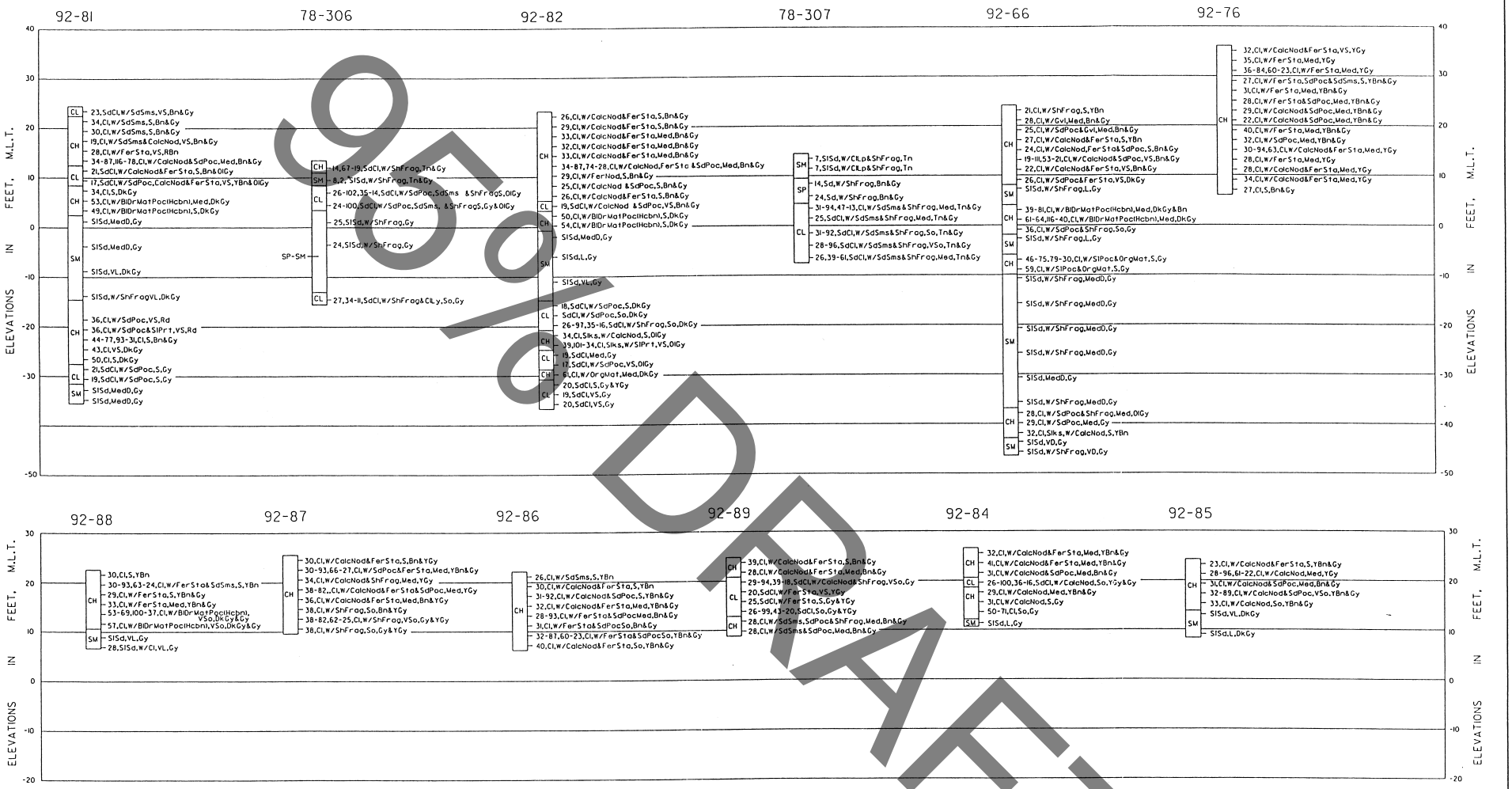
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

SPILMANS ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



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NOTES:

1. SEE PLATE FD-49 FOR BORINGS LOCATIONS.
2. SOILS HAVE BEEN CLASSIFIED IN ACCORDANCE WITH MILITARY STANDARD 6198 'UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS AND FOUNDATIONS'. CONSISTENCY OF SOILD SUCH AS SOFT, MEDIUM, HARD, LOOSE, DENSE, ETC., ARE RELATIVE TERMS BASED ON ESTIMATED UNDISTURBED SHEAR STRENGTHOF THE MATERIAL AS DETERMINED BY VISUAL CLASSIFICATION POCKET PENETROMETER TESTS AND PENETRATION RESISTANCE DURING SAMPLING.
3. FIGURES TO THE RIGHT OF BORING LOGS ARE WATER CONTENTS IN PERCENT OF THE DRY WEIGHT, DRY DENSITY, LIQUID LIMIT, PLASTIC LIMIT, AND BAR LINEAR SHRINKAGE. (MC-UDW),(LL-PL),(B.L.S.)+
4. BORINGS WERE DRILLED USING WET ROTARY DRILLING TECHNIQUES AND UNDISTURBED SAMPLES WERE RECOVERED WITH A 3-INCH DIAMETER THIN WALL SAMPLER WHERE COHESIVE MATERIALS WERE ENCOUNTERED. WHERE COHESIONLESS MATERIALS WERE ENCOUNTERED, DISTURBED SAMPLES WERE TAKEN WITH A SPLIT SPOON SAMPLER DURING PERFORMANCE OF STANDARD PENETRATION TESTING.
5. WATER TABLE LEVELS SHOWN ON BORING LOGS WERE DETERMINED AFTER DRILLING BORINGS BY MEASURING THE TOP OF FLUID LEVELS IN THE BORINGS. INASMUCH AS WET ROTARY DRILLING TECHNIQUES AND DRILLING MUD WERE USED TO DRILL THE HOLES, THE LEVEL OF DRILLING FLUIDS IN THE BORE HOLES MAY NOT HAVE STABILLIZED TO THE LEVEL OF THE ACTUAL WATER TABLE. ADDITIONALLY, WATER TABLES IN THE FIELD ARE LIKELY TO FLUCTUATE DEPENDING ON WEATHER CONDITIONS. THEREFORE, SOME VARIATION SHOULD BE ANTICIPATED BETWEEN WATER TABLES INDICATED AND WATER TABLES ENCOUNTERED IN THE FIELD.

LABORATORY CLASSIFICATION

CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS.
SC CLAYEY SANDS, SAND-CLAY MIXTURES.
SW SILTY SANDS, SAND-SILT MIXTURES.
SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES.

VISUAL CLASSIFICATIONS

Bl Black
Blk Blocky)
Bn Brown(ish)
Calc Calcareous
Cl Clay(ey)
D Dense
D.C. Driller's Classification
D-odor Distinct Odor
Dk Dark
Dr Dredge
Fer Ferrous
Frag Fragment(s)
Gas Gasoline
Gvl Gravel
Gy Gray(ish)
H Hard
(Hcbn) Hydrocarbon
L Loose
Lg Large
Lp Lump(s)
Lt Light
Ly Layer(s)
Mat Material
Med Medium
Nod Nodules
Non Rec Non Recorded
Org Organic
Ol Olive
Poc Pocket(s)
Prt Parting
R Reddish
Rts Roots)
S Stiff
Sd Sandy)
Sh Shelly)
Sl Silty
Slks Slickensides
Sms Seams
So Soft
Sta Stain(s)
Str Structure(s)
Tn Tan(ish)
Vt Vertical
V Very
W.T. Water Table
W With
Y Yellow(ish)

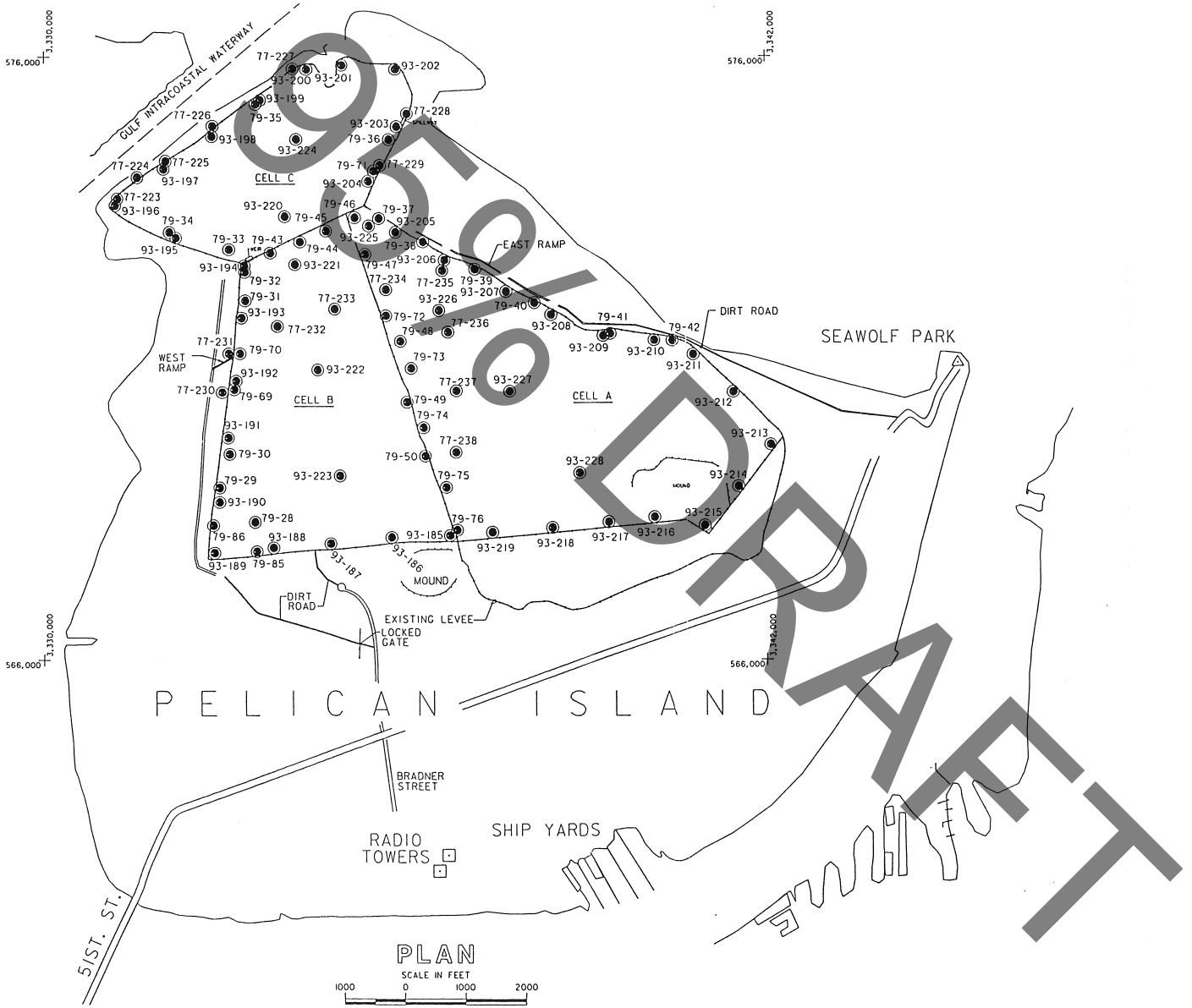
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

SPILMANS ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



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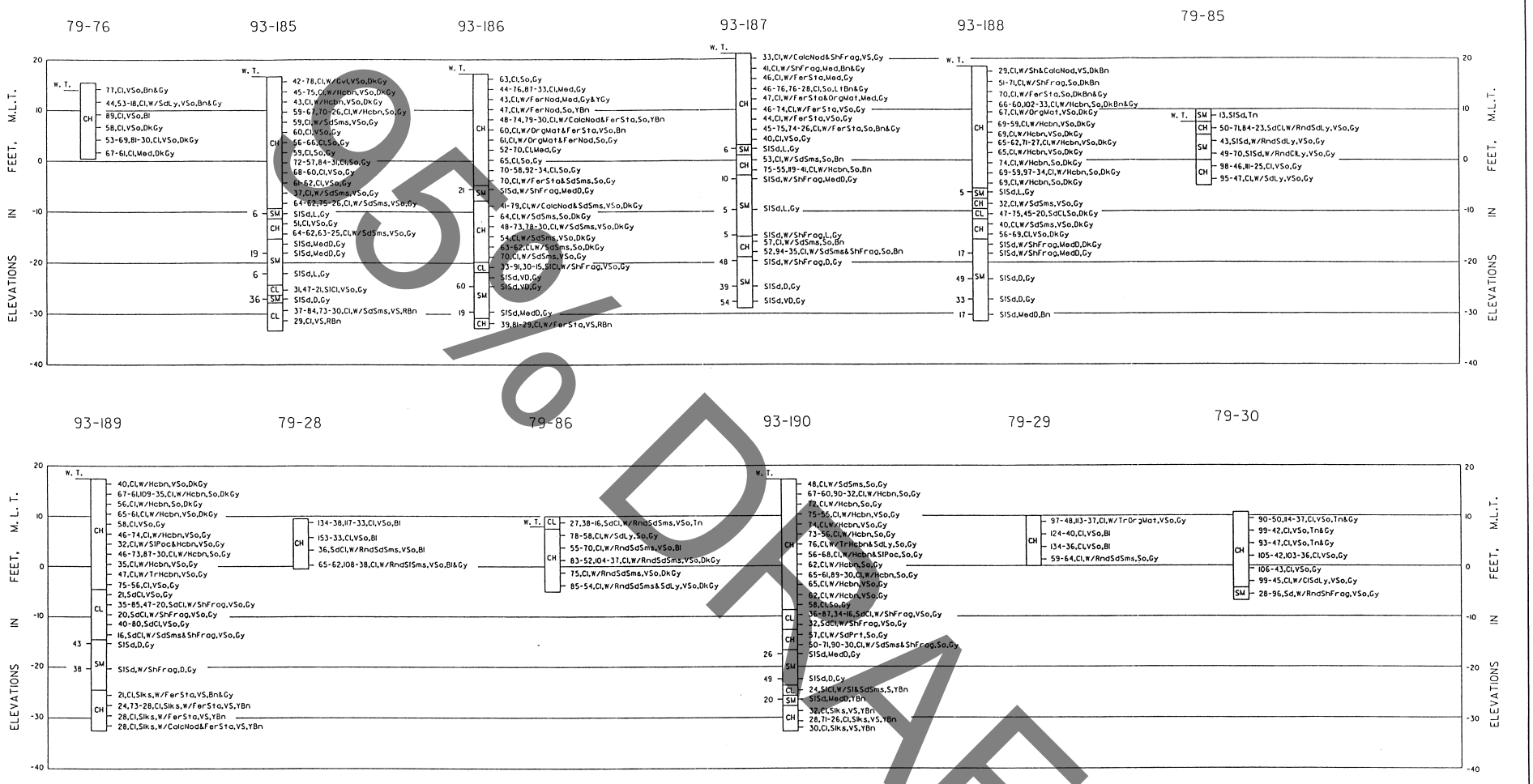
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

PELICAN ISLAND

BORING LOCATIONS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



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NOTES:

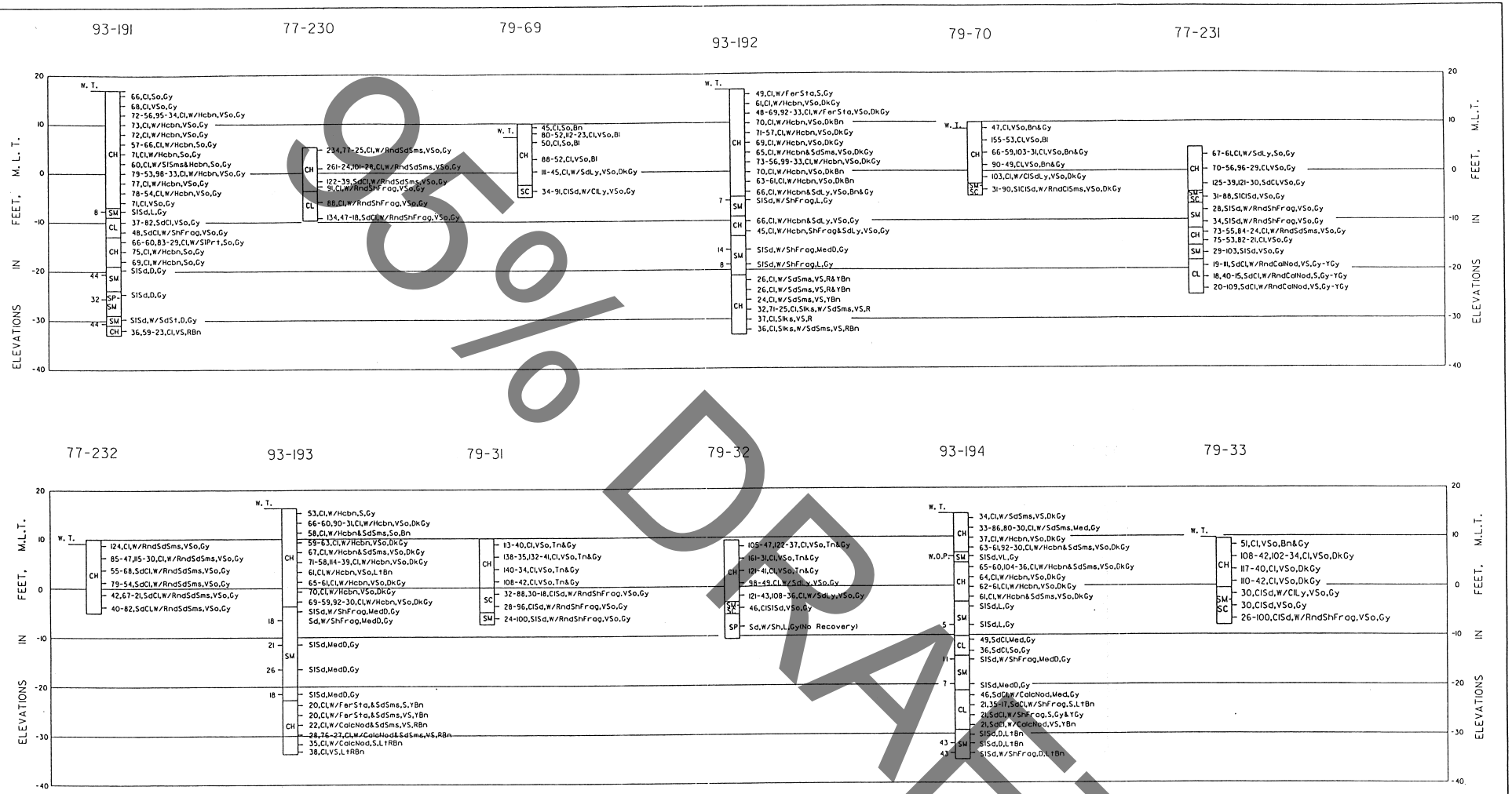
SEE PLATE FD-55 FOR BORING LOCATIONS.
SEE PLATE FD-63 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
PELICAN ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



95% DRAFT

NOTES:

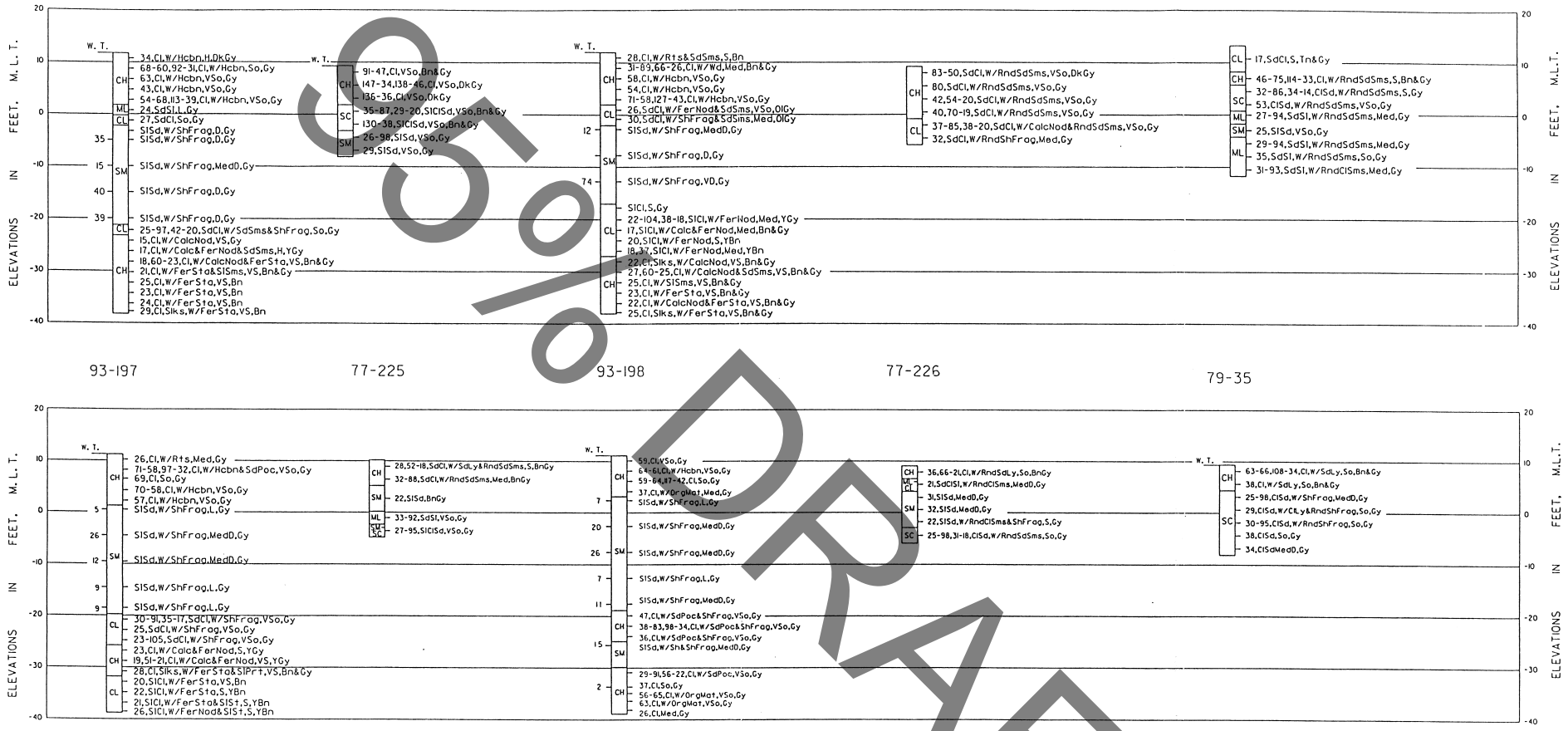
SEE PLATE FD-55 FOR BORING LOCATIONS.
SEE PLATE FD-63 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
PELICAN ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



50% DRAFT

NOTES:

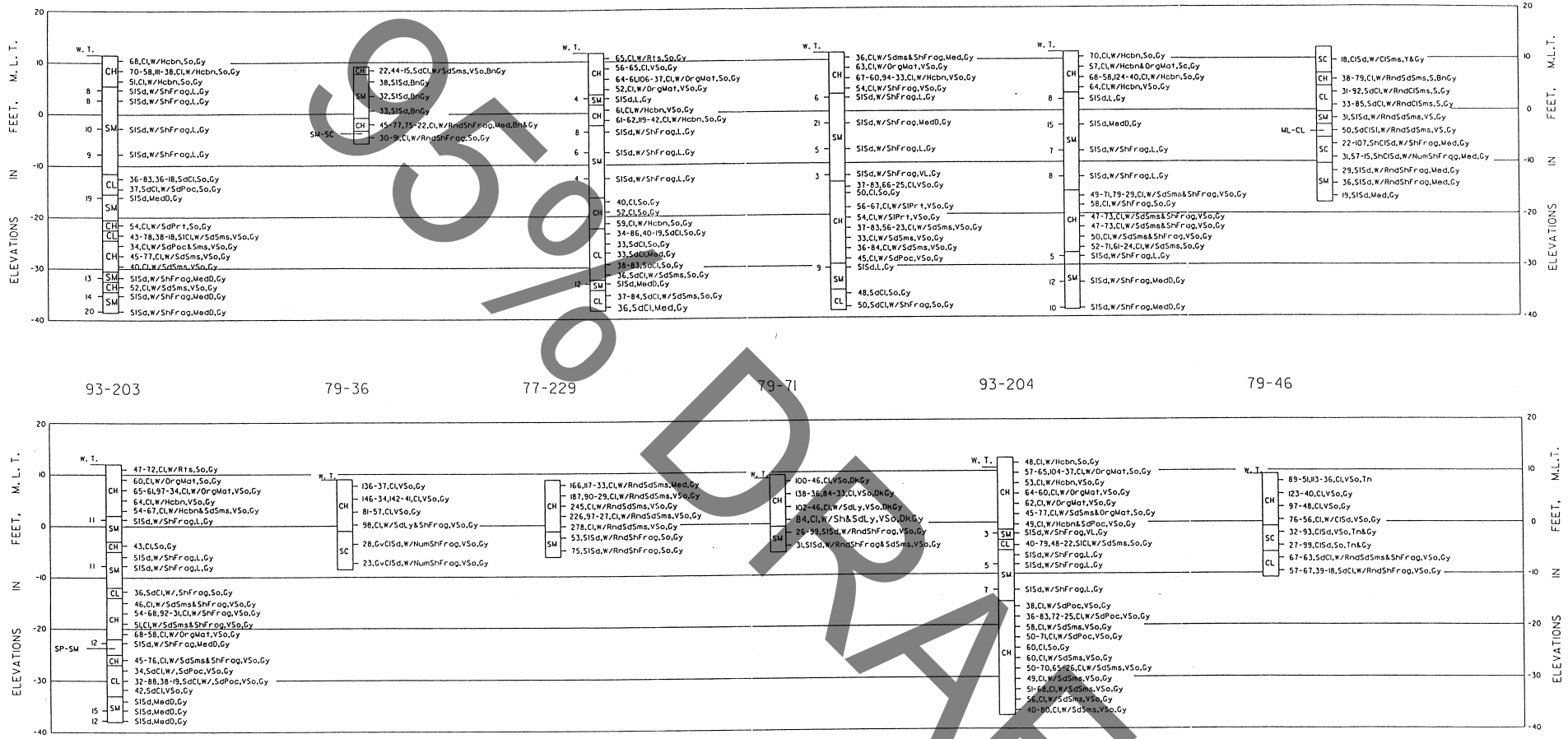
SEE PLATE FD-55 FOR BORING LOCATIONS.
SEE PLATE FD-63 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
PELICAN ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



50% DRAFT

NOTES:

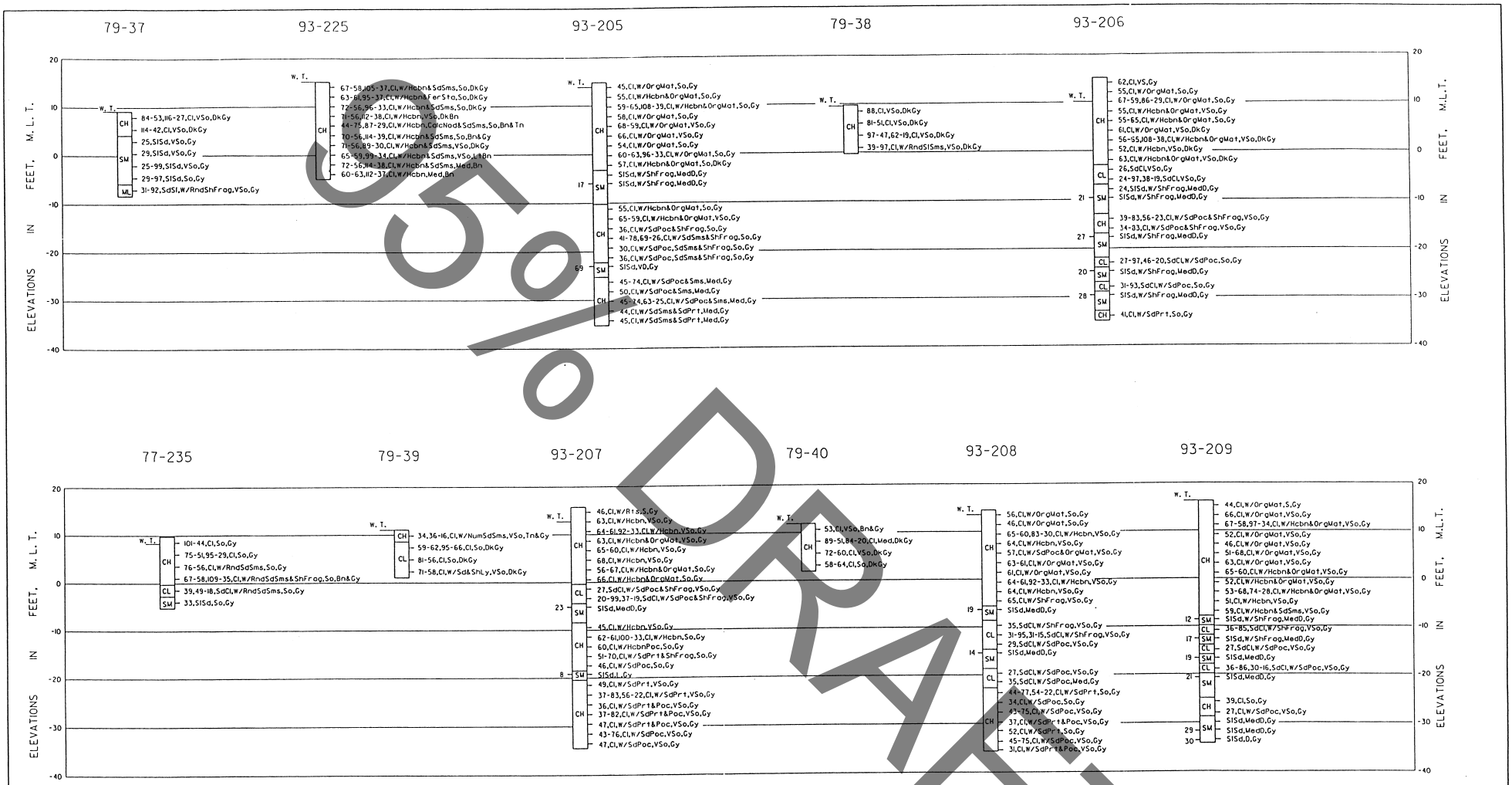
SEE PLATE FD-55 FOR BORING LOCATIONS.
SEE PLATE FD-63 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
PELICAN ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



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NOTES:

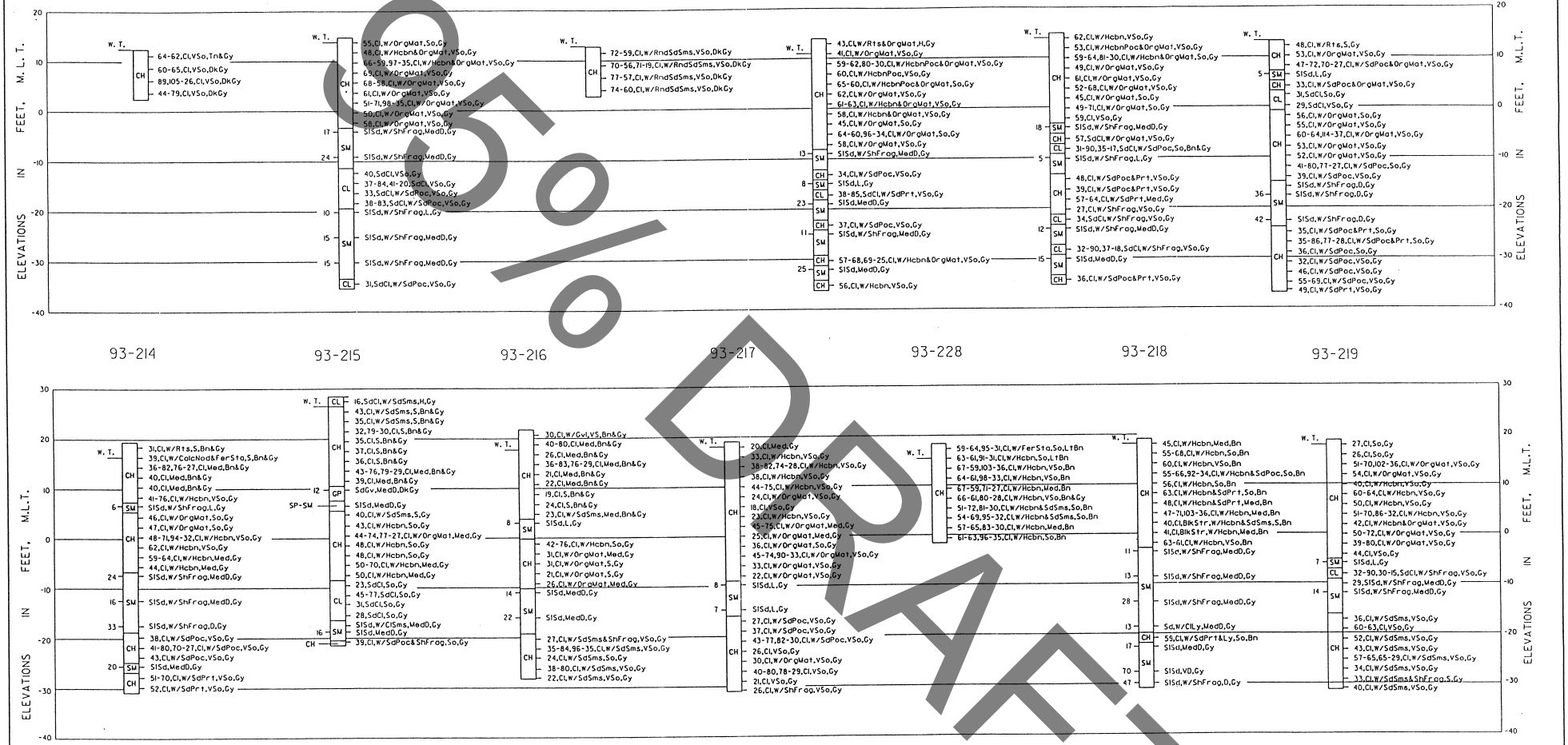
SEE PLATE FD-55 FOR BORING LOCATIONS.
SEE PLATE FD-63 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
PELICAN ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



50% DRAFT

NOTES:

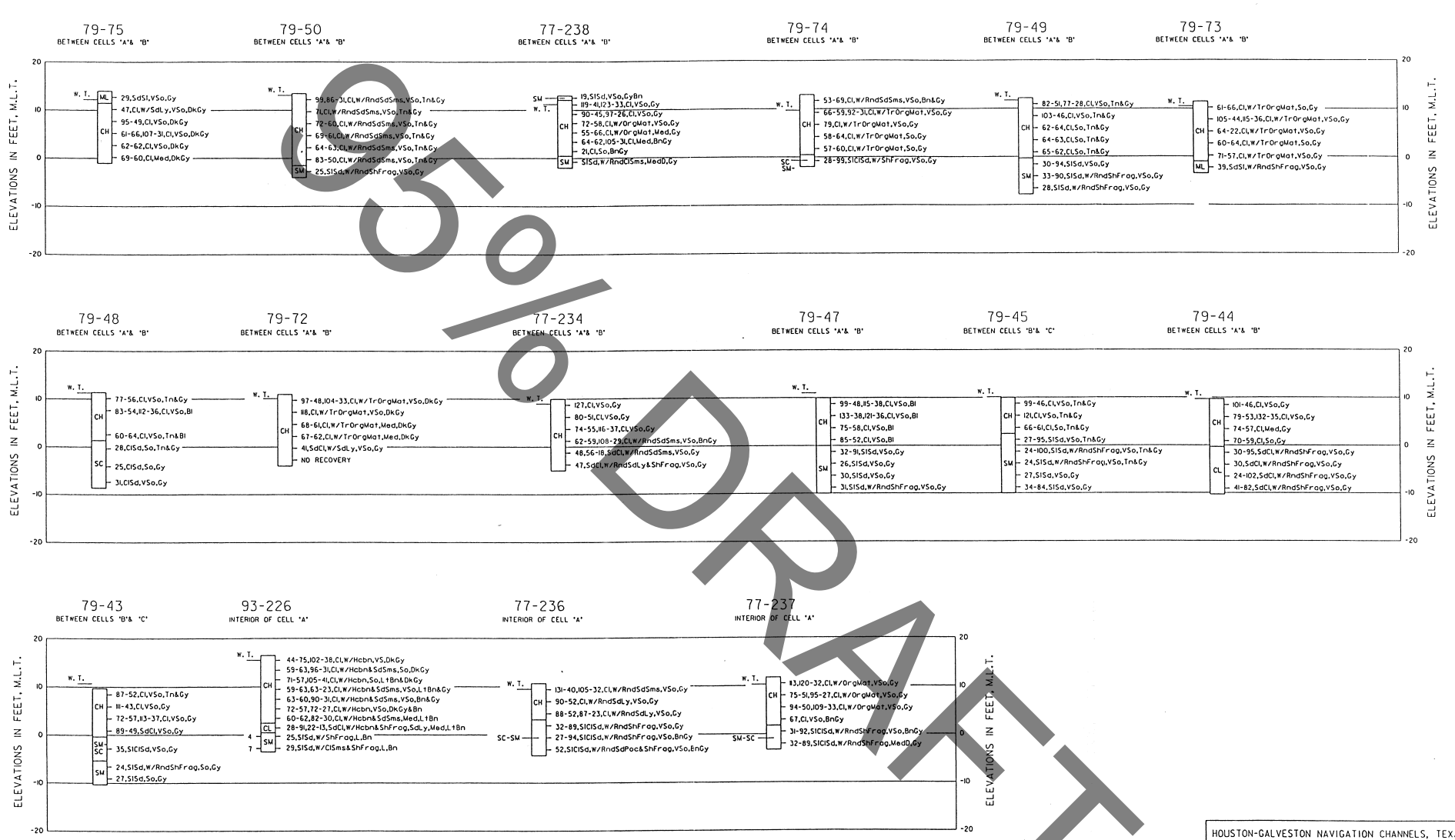
SEE PLATE FD-55 FOR BORING LOCATIONS.
SEE PLATE FD-63 FOR BORING NOTES AND LEGEND.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
PELICAN ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



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NOTES:

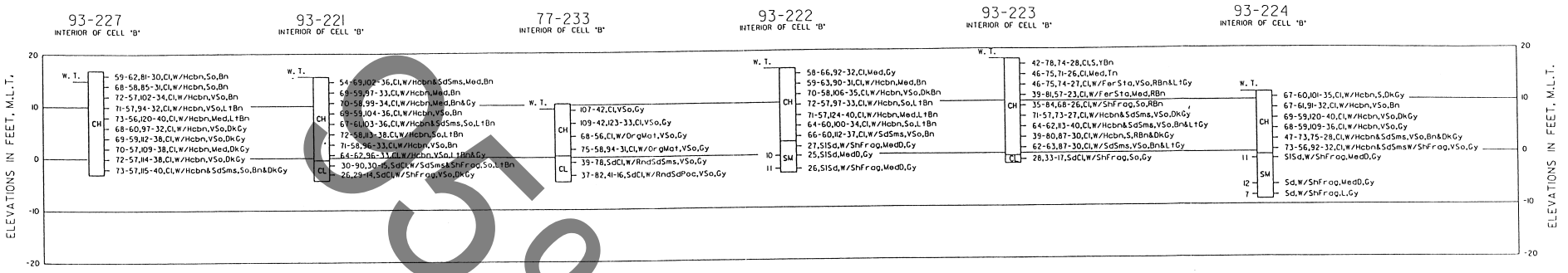
SEE PLATE FD-55 FOR BORING LOCATIONS.
SEE PLATE FD-63 FOR BORING NOTES AND LEGEND.

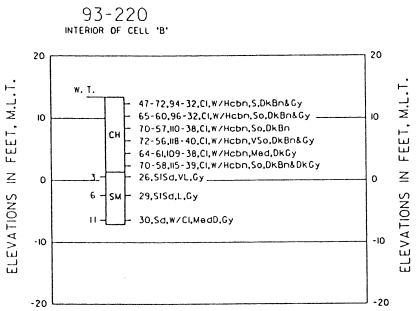
HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
PELICAN ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X





95% DRAFT

NOTES;

1. SOILS HAVE BEEN CLASSIFIED IN ACCORDANCE WITH MILITARY STANDARD 619B 'UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS, AND FOUNDATIONS.' CONSISTENCY OF SOILS SUCH AS SOFT, MEDIUM, HARD, LOOSE, DENSE, ETC., ARE RELATIVE TERMS BASED ON ESTIMATED UNDISTURBED SHEAR STRENGTH OF THE MATERIAL AS DETERMINED BY VISUAL CLASSIFICATION POCKET PENETROMETER TESTS AND PENETRATION RESISTANCE DURING SAMPLING.
2. FIGURES TO THE RIGHT OF BORING LOGS ARE WATER CONTENTS IN PERCENT OF THE DRY WEIGHT, DRY DENSITY, LIQUID LIMIT, PLASTIC LIMIT, AND BAR LINEAR SHRINKAGE. (MC-UDW),(LL-PL),(B.L.S.)• FIGURES TO THE LEFT OF BORING LOGS ARE BLOWS PER FOOT OF PENETRATION FROM STANDARD PENETRATION TESTING.
3. BORINGS WERE DRILLED USING WET ROTARY DRILLING TECHNIQUES AND UNDISTURBED SAMPLES WERE RECOVERED WITH A 3-INCH DIAMETER THIN WALL SAMPLER WHERE COHESIVE MATERIALS WERE ENCOUNTERED. WHERE COHESIONLESS MATERIALS WERE ENCOUNTERED, DISTURBED SAMPLES WERE TAKEN WITH A SPLIT SPOON SAMPLER DURING PERFORMANCE OF STANDARD PENETRATION TESTING.
4. ELEVATIONS OF THE TOP OF BORINGS ON 79 SERIES BORINGS ARE APPROXIMATE.

VISUAL CLASSIFICATIONS

Bl Black	Hcbn Hydrocarben	Rts Root(s)	Tn Tan(ish)
Blk Blocky(y)	L Loose	S Stiff	Tr Traces
Bn Brown(ish)	Lt Light	Sd Sand(y)	V Very
Calc Calcereous	Ly Layer(s)	Sh Shell(y)	Wd Wood
Cl Clay(ey)	Mat Material	Sl Silty	W/ With
D Dense	Med Medium	Slks Slicken Sides	W.O.P. Weight Of Pipe
Dk Dark	Nod Nodules	Sms Seams	W.T. Water Table
Fer Ferrous	Ol Olive	So Soft	Y Yellow(ish)
Frag Fragment(s)	Org Organic	S.N.S. Sample Not Submitted	
Gv Gravel(ly)	Poc Pocket(s)	Str Structure	
Gy Gray(ish)	Prt Parting	St Stone(s)	
H Hard	Rnd Random	Sta Stain(s)	

LABORATORY CLASSIFICATION

CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS.
GP POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.
SM SILTY SANDS, SAND-SILT MIXTURES.
SP-SM OR SM-SP SLIGHTLY SILTY SANDS, SANDS WITH SOME SILTS

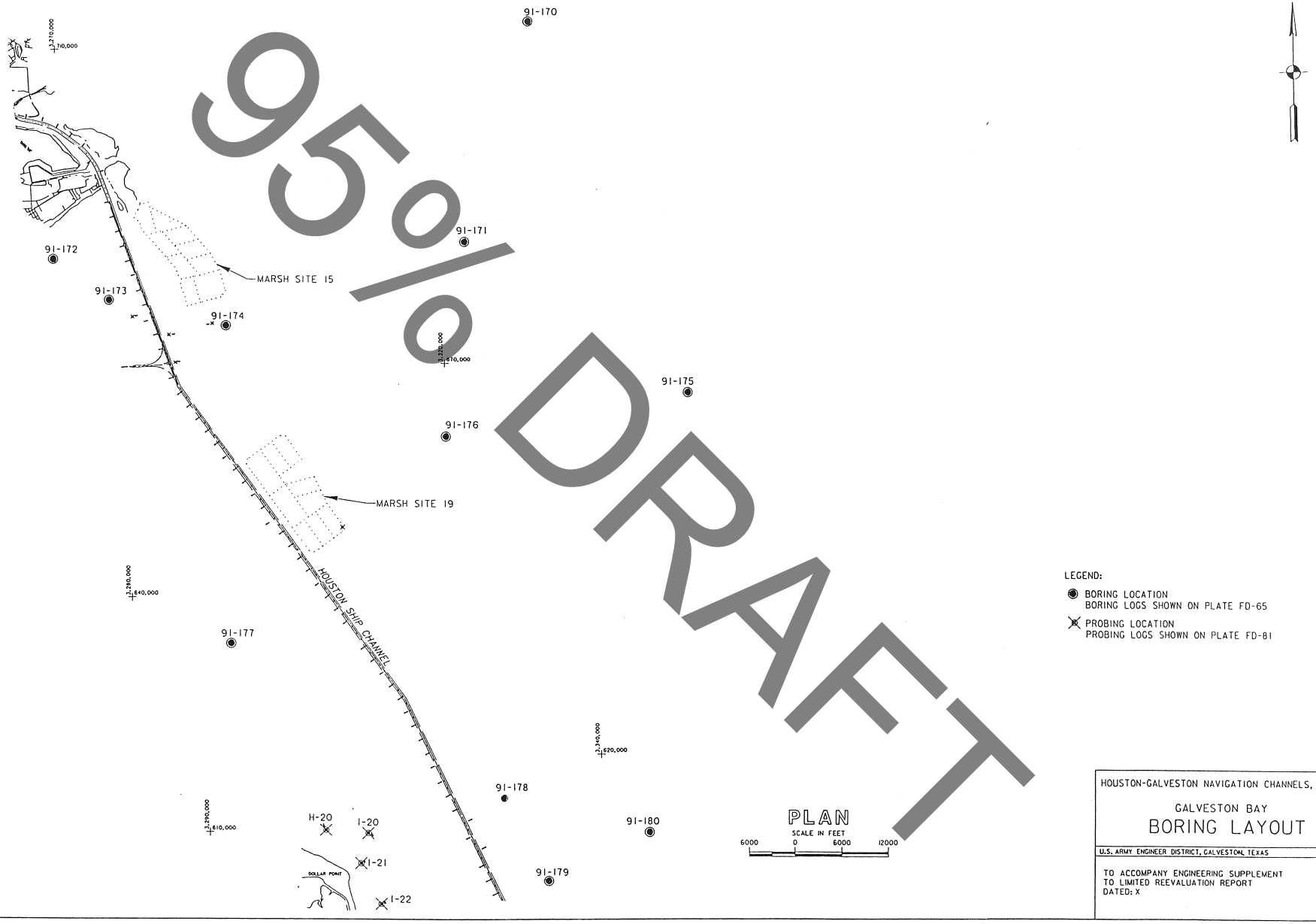
NOTES:
SEE PLATE FD-55 FOR BORING LOCATIONS.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS
PELICAN ISLAND

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X



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HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

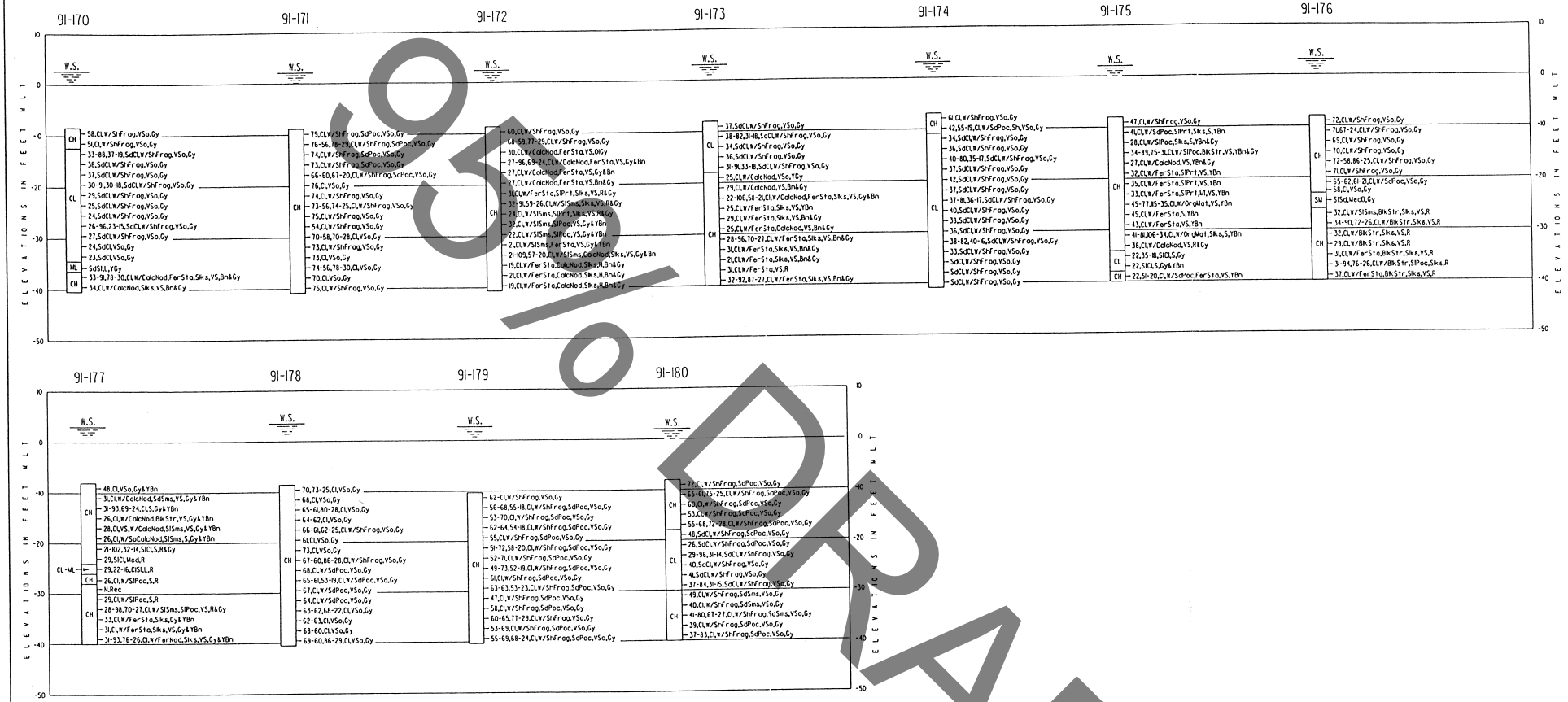
GALVESTON BAY

BORING LAYOUT

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-64



90% DRAFT

NOTES;

1. SOILS HAVE BEEN CLASSIFIED IN ACCORDANCE WITH MILITARY STANDARD 619B 'UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS AND FOUNDATIONS.' CONSISTENCY OF SOILS SUCH AS SOFT, MEDIUM, HARD, LOOSE, DENSE, ETC., ARE RELATIVE TERMS BASED ON ESTIMATED UNDISTURBED SHEAR STRENGTH OF THE MATERIAL AS DETERMINED BY VISUAL CLASSIFICATION POCKET PENETROMETER TESTS AND PENETRATION RESISTANCE DURING SAMPLING.
2. FIGURES TO THE RIGHT OF BORING LOGS ARE WATER CONTENTS IN PERCENT OF THE DRY WEIGHT, DRY DENSITY, LIQUID LIMIT, PLASTIC LIMIT, AND BAR LINEAR SHRINKAGE. (MC-UDW),(LL-PL),(B.L.S.).
3. BORINGS WERE DRILLED USING WET ROTARY DRILLING TECHNIQUES AND UNDISTURBED SAMPLES WHERE RECOVERED WITH A 3-INCH DIAMETER THIN WALL SAMPLER WHERE COHESIVE MATERIALS WERE ENCOUNTERED. WHERE COHESIONLESS MATERIALS WERE ENCOUNTERED, DISTURBED SAMPLES WERE TAKEN WITH A SPLIT SPOON SAMPLER DURING PERFORMANCE OF STANDARD PENETRATION TESTING.
4. ALL BORES ARE TAKEN BELOW THE WATER SURFACE.

VISUAL CLASSIFICATIONS

Blk Blocky(ish)	Med Medium	Sh Shelly(ish)
Bn Brown(ish)	Ml Mica	Sl Silty
Calc Calcareous	Nod Nodules	Slks Slicken Sides
Cl Clay(ey)	N.Rec No Recovery	Sms Seams
D Dense	Ol Olive	So Soft
Fer Ferrous	Poc Pocket(s)	Sta Stain(s)
Frag Fragment(s)	Prt Parting	Str Structure
Gy Gray(ish)	R Red(dish)	V Very
H Hard	S Stiff	W With
L Loose	Sd Sand(y)	Y Yellow(ish)

LABORATORY CLASSIFICATION

CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS.
ML INORGANIC SILTS AND VERY FINE SANDS, WITH SLIGHT PLASTICITY.
SW SILTY SANDS, SAND-SILT MIXTURES.

SEE PLATE FD-64 FOR BORING LOCATIONS.

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

GALVESTON BAY

BORING LOGS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

TO ACCOMPANY ENGINEERING SUPPLEMENT
TO LIMITED REEVALUATION REPORT
DATED: X

PLATE FD-65

Project: ...n-Galveston navigation channel

SUM... OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-24

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 2	0.00		Dark gray,Clay,Very soft,w/shell fragments	C H	53.6											
2	2 - 4	0.00		Dark gray,Clay,Very soft,w/shell fragments	C H	50.2											
3	4 - 6	0.00		Dark gray,Clay,Very soft,w/sand pockets	C H	54.4	68.2	105.2	59.0	21.0	100.0	100.0	99.9	99.7	86.5		0.12
4	6 - 8	0.00		Dark gray,Clay,Very soft,w/sand pockets	C H	64.2											
5	8 - 10	0.00		Dark gray,Clay,Very soft	C H	59.9											
6	10 - 12	0.00		Dark gray,Clay,Very soft,w/shell fragments	C H	60.8											
7	12 -13.5	0.00		Dark gray,Clay,Very soft	C H	70.3											
8	13.5 -14	0.00		Dark gray,Clay,Very soft	C H	56.3											
9	14 - 16	0.00		Dark gray,Clay,Very soft	C H	67.2	58.3	97.4	71.0	24.0	100.0	100.0	100.0	99.8	99.1		0.09
10	16 - 18	0.00		Dark gray,Clay,Very soft	C H	67.6											
11	18 - 20	0.00		Dark gray,Clay,Very soft	C H	77.0											
12	20 - 22	0.00		Dark gray,Clay,Very soft	C H	65.5	59.7	98.8	71.0	25.0	100.0	100.0	100.0	99.9	99.2		
13	22 - 23.5	0.00	W.O.P	Dark gray,Clay,Very soft	C H	67.1											
14	23.5 -24	0.00		Dark gray,Clay,Very soft	C H	68.2											
15	24 - 26	0.00		Dark gray,Clay,Very soft,w/shell fragments	C H	73.8											
16	26 -28	0.00		Dark gray,Clay,Very soft,w/shell fragments and organic material	C H	79.2	54.2	97.1	117.0	40.0	99.3*	98.9*	97.6*	94.4	93.2		0.14
17	28 - 30	0.00		Dark gray,Clay,Very soft,w/organic material	C H	80.3											
18	3 -31.5	0.00	W.O.P	Dark gray,Clay,Very soft,w/organic material	C H	88.5											
19	31.5 -32	0.00		Dark gray,Clay,Very soft,w/organic material	C H	84.8											
20	32 - 34	0.00		Dark gray,Clay,Very soft,w/shell fragments	C H	77.7											

S # : Sample Number, P P : Pocket Penetrometer Reading, U S C : Unified Soil Classifcation, M c : Moisture Content
q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
* : Material retained are shell fragments

95% DRAFT

Project: ...on-Galveston navigation channel

SUM... OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-24

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
21	34 - 36	0.00		Dark gray,Clay,Very soft,w/sand pockets	C H	23.0											
22	36 -37.5		41	Light gray,Sand,Dense,Silty	S M												
23	41 -42.5		58	Light gray,Sand,Very dense,Silty	S M						100.0	100.0	99.9	70.7	15.0		
24	46 -47.5		43	Light gray,Sand,Dense,Silty	S M												
25	51 -52.5		52	Light gray,Sand,Very dense,Silty	S M												

95% DRAFT

S # : Sample Number, P P : Pocket Penetrometer Reading, U S C : Unified Soil Classifcation, M c : Moisture Content
q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
* : Material retained are shell fragments

Project: [illegible]ston-Galveston navigation channel

SUMM[illegible] OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-25

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 2	0.00		Dark gray,Clay,Very soft,w/shell fragments	C H	51.4											
2	2 - 4	0.00		Dark gray,Clay,Very soft,w/shell fragments	C H	54.0											
3	4 - 6	0.00		Dark gray,Clay,Very soft,w/shell fragments	C H	70.1	57.2	97.3	71.0	27.0	99.8*	99.6*	99.0*	91.2	89.0		0.08
4	6 - 8	0.00		Gray,Clay,Very soft,w/shell fragments	C H	66.7											
5	8 - 10	0.00		Gray,Clay,Very soft,w/shell fragments	C H	71.1											
6	10 - 12	0.00		Gray,Clay,Very soft,w/shell fragments	C H	65.5											
7	12 - 14	0.00		Gray,Clay,Very soft	C H	67.7	58.9	98.8	72.0	27.0	100.0	100.0	100.0	99.8	98.8		0.11
8	14 -15	0.00		Gray,Clay,Very soft,w/shell fragments	C H	62.6											
9	15-16.5	0.00	W.O.P	Gray,Clay,Very soft,w/shell fragments	C H	64.5											
10	16.5-17	0.00		Gray,Clay,Very soft,w/shell fragments	C H	64.9											
11	17 - 19	0.00		Gray,Clay,Very soft Q-TEST See SWD report 16162	C H	58.4	63		65	18							
12	19 - 21	0.00		Gray,Clay,Very soft,w/shell fragments	C H	51.0	69.2	104.6	51.0	20.0	100.0	100.0	100.0	99.8	98.9		0.09
13	21 - 23	0.00		Gray,Clay,Very soft,w/shell fragments	C H	61.3											
14	23 -25	0.00		Gray,Clay,Very soft,w/organic material	C H	73.1											
15	25 -26.5	0.00	W.O.P	Gray,Clay,Very soft,w/organic material	C H	82.8											
16	26.5 -27	0.00		Gray,Clay,Very soft,w/shell fragments and shell fragments	C H	64.7											
17	17 - 29	0.00		Gray,Clay,Very soft,w/organic material	C H	90.2											
18	29 - 31	0.00		Gray,Clay,Very soft,w/organic material	C H	88.8	49.3	93.1	109.0	38.0	100.0	100.0	100.0	99.6	98.5		0.10
19	31 - 33			Gray,Sand,Medium dense,Silty	S M												–
20	33 -34.5		10	Gray,Sand,Medium dense,Silty w/Sh[illegible]	SP-SM						100.0	100.0	90.3*	26.9	10.5		

95% DRAFT

S # : Sample Number, P P : Pocket Penetrometer Reading, U S C : Unified Soil Classifcation, M c : Moisture Content
q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
* : Material retained are shell fragments

Geotest Engineering, Inc.

Project: .on-Galveston navigation channel

SUM. OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-25

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
21	35 -36.5		19	Gray,Sand,Medium dense,Silty	S M												
22	40-41.5		11	Gray,Sand,Medium dense,Silty	S M												
23	45-46.5		10	Gray,Sand,Medium dense,Silty	S M												
24	50-51.5		28	Gray,Sand,Medium dense,Silty	S M												
25	53-55	0.75		Reddish brown,Clay,Medium stiff,w/sand pockets	C H	38.3											

95% DRAFT

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q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
* : Material retained are shell fragments

Project: [illegible]on-Galveston navigation channel

Contract No. DACW64-94-C-0040

SUM[illegible] OF LABORATORY TEST RESULTS

Boring No. 93-26

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 1.5		W.O.H	Gray,Sand,Very loose,Silty,w/shell fragments	S M												
2	5 - 6.5		W.O.H	Gray,Sand,Very loose,Silty,w/shell fragments	S M												
3	8 - 10	0.00		Gray,Clay,Very soft,w/organic material	C H	74.6											
4	10 - 12			Gray,Sand,Medium dense,Silty	S M						99.8	99.7	99.3	57.5	26.2		
5	12 -13.5		26	Gray,Sand,Medium dense,Silty	S M												
6	17 - 18.5		32	Gray,Sand,Dense,Silty	S M												
7	22 -23.5		14	Gray,Sand,Medium dense,Silty	S M												
8	24 -25.5		21	Gray,Sand,Medium dense,Silty	SP-SM						100.0	100.0	99.8	61.2	6.1		
8A	28 -29.5		24	Gray,Sand,Medium dense,Silty	S M												
9	30 -31.5		22	Gray,Sand,Medium dense,Silty	S M												
10	32 -33.5		26	Gray,Sand,Medium dense,Silty	S M						100.0	99.7	98.7	33.2	12.5		
11	37 -38.5		46	Gray,Sand,Dense,Silty	S M												
12	42 -43.5		42	Gray,Sand,Dense,Silty	S M												
13	47 -48.5		37	Gray,Sand,Dense,Silty	S M												
14	48.5 -50	4.25		Brown,Clay,Hard,Slickensided	C H	28.6											
15	50 - 52	1.25		Brown,Clay,Stiff,Slickensided	C H	28.4											

95% DRAFT

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Geotest Engineering, Inc.

Project: [illegible]n-Galveston navigation channel

SUMM[illegible] OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-27

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 -1.5		W.O.P.	Gray,Sand,Very loose,Silty,w/shell fragments	S M												
2	5 -6.5	0.00	1/1-12"	Gray,Clay,Very soft,w/shell fragments	C H	49.8											
3	6.5 -8	0.00		Gray,Clay,Very soft,w/shell fragments	C H	46.1											
4	8 - 10	0.00		Gray,Clay,Very soft,w/shell fragments	C H	56.3	65.0	101.5	50.0	20.0	100.0	99.9	99.3	98.9	97.9		0.21
5	10 - 12	0.00		Gray,Clay,Very soft,w/shell fragments	C H	46.2											
6	12 - 14	0.00		Gray,Clay,Very soft,w/shell fragments	C H	62.4											
7	14 - 16	0.00		Gray,Clay,Very soft,w/shell fragments	C H	60.0	62.8	100.5	58.0	24.0	100.0	99.6	99.0	98.8	97.8		0.22
8	16 -17.5	0.00		Gray,Clay,Very soft,w/shell fragments	C H	45.2											
9	17.5 -19	0.00		Gray,Clay,Very soft,w/shell fragments	C H	42.1											
10	19 - 21	0.00		Gray,Clay,Very soft	C H	54.9											
11	21 - 23	0.00		Gray,Clay,Very soft	C H	49.4											
12	23 - 25	0.00		Gray,Clay,Very soft	C H	60.9	62.6	100.8	57.0	24.0	100.0	100.0	99.3	99.0	98.5		0.18
13	25 - 26	0.00		Gray,Clay,Very soft	C H	49.7											
14	26 -27.5	0.00	W.O.P.	Gray,Clay,Very soft,w/shell fragments	C H	40.9											
15	27.5 -28	0.00		Gray,Clay,Very soft,w/shell fragments	C H	53.9											
16	28 - 30	0.00		Gray,Clay,Very soft,w/organic material	C H	57.9	66.3	104.7	75.0	29.0	100.0	100.0	99.8	99.7	99.7		
17	30 -31.5		27	Gray,Sand,Medium dense,Silty	SP-SM						100.0	100.0	88.8	12.4	8.5		
18	34 -35.5		23	Gray,Sand,Medium dense,Silty	S M												
19	36 -37.5		26	Gray,Sand,Medium dense,Silty	S M						100.0	100.0	90.9	22.9	18.9		
20	41 -42.5		28	Gray,Sand,Medium dense,Silty	S M												

95% DRAFT

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Project: on-Galveston navigation channel

SUM. . OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-27

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
21	46 -47.5		32	Gray,Sand,Dense,Silty	S M												
22	51 -52.5		35	Gray,Sand,Dense,Silty	S M												
23	54.5- 56		51	Gray,Sand,Very dense,Silty	S M												

95% DRAFT

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q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
* : Material retained are shell fragments

Project: on-Galveston navigation channel

SUM. OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-28

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 2	0.00		Gray,Clay,Very soft	C H	56.7											
2	2 - 4	0.00		Gray,Clay,Very soft	C H	41.2											
3	4 - 6	0.00		Gray,Clay,Very soft	C H	53.6	69.6	106.9	57.0	24.0	100.0	100.0	100.0	99.9	99.4		0.20
4	6 - 8	0.00		Gray,Clay,Very soft,w/shell fragments	C H	48.0											
5	8 - 10	0.00		Gray,Clay,Very soft,w/shell fragments	C H	48.9											
6	10 - 12	0.00		Gray,Clay,Very soft,w/shell fragments	C H	48.2											
7	12 - 13.5	0.00	W.O.P.	Gray,Clay,Very soft	C H	76.7											
8	13.5 -14	0.00		Gray,Clay,Very soft,w/sand pockets	C H	46.2											
9	14 - 16	0.00		Gray,Clay,Very soft	C H	63.3	62.9	102.7	63.0	25.0	100.0	100.0	100.0	100.0	100.0		0.14
10	16 - 18	0.00		Gray,Clay,Very soft,w/sand pockets	C H	41.3											
11	18 - 20	0.00		Gray,Clay,Very soft,w/sand pockets	C H	57.1											
12	20 - 22	0.00		Gray,Clay,Very soft,w/organic material	C H	75.7											
13	22 -23.5		66	Gray,Sand,Very dense,Silty	S M												
14	24 -25.5		47	Gray,Sand,Dense,Silty	SP-SM						100.0	100.0	96.3	10.9	6.2		
15	28 -29.5		33	Gray,Sand,Dense,Silty	S M												
16	30 -31.5		34	Gray,Sand,Dense,Silty	S M												
17	32 -33.5		31	Gray,Sand,Dense,Silty	S P						100.0	100.0	80.9	6.6	4.1		
18	37 -38.5		36	Gray,Sand,Dense,Silty	S M												
19	42 - 44	1.75		Gray,Clay,Stiff,Slickensided	C H	28.8											
20	44 - 46	1.75		Gray,Clay,Stiff,Slickensided	C H	27.6											

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Project: ı .on-Galveston navigation channel

SUM.. .. OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-28

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
21	46 - 48	0.75		Yellowish gray,Clay,Medium stiff,w/sand pockets	C H	25.2											
22	48 - 50	1.75		Yellowish gray,Clay,Stiff,Sandy,w/sand pockets	C L	22.1											
23	50 -52	3.25		Yellowish gray,Clay,Very stiff,Sandy,w/sand pockets	C L	20.6											

95% DRAFT

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q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
* : Material retained are shell fragments

Project: ı ɔn-Galveston navigation channel

SUM. OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-29

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 2	0.00		Dark gray,Clay,Very soft	C H	41.2											
2	2 - 4	0.00		Dark gray,Clay,Very soft,w/shell fragments	C H	50.0											
3	4 - 6	1.00		Yellowish gray,Clay,Stiff,w/sand pockets	C H	44.4	74.3	107.2	84.0	31.0	100.0	100.0	99.8	93.5	89.1		1.31
4	6 - 8	2.00		Yellowish gray,Clay,Very stiff,w/sand pockets	C H	42.8											
5	8 -10	2.00		Reddish brown,Clay,Very stiff	C H	33											
6	10 -11.5	2.00		Reddish brown,Clay,Very stiff	C H	29.8											
7	11.5 -13	2.25	17	Reddish brown,Clay,Very stiff	C H	31.8											
8	13 - 15	2.75		Reddish brown,Clay,Very stiff,w/silt pockets	C H	28.8	95.7	123.3	69.0	27.0	100.0	99.8	98.9	98.5	98.3		2.36
9	15 - 17	2.75		Reddish brown,Clay,Very stiff,w/silt pockets	C H	24											
10	17 - 19	0.75		Reddish brown,Clay,Medium stiff,Silty,w/ clay layer	C L	25											
11	19 - 21			Reddish brown,Silt,Dense,Sandy	M L												
12	21.5 - 23		31	Reddish brown,Silt,Dense,Sandy	M L						100.0	100.0	99.5	87.3	68.0		
13	23.5-25.5	2.50		Reddish brown,Clay,Very stiff	C H												
14	25.5-26	1.00		Reddish brown,Clay,Stiff,Silty	C L	27											
15	26-27.5			Reddish brown,Sand,Medium dense,Silty	S M												
16	27.5-29		20	Reddish brown,Sand,Medium dense,Silty	S M												
17	29.5-31		24	Reddish brown,Sand,Medium dense,Silty	S M												
18	31.5-33		25	Reddish brown,Sand,Medium dense	S P						100.0	100.0	62.4	4.2	2.1		
19	35 - 37	1.50		Reddish brown,Clay,Stiff,w/ferrous stains	C H	31.3											
20	37 - 39	2.00		Dark brown,Clay,Very sstiff,w/ferrous stains	C H	30.1											

95% DRAFT

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q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
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Project: Houston-Galveston navigation channel

SUMMARY OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-29

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
21	39 - 41	1.75		Dark brown,Clay,Stiff	C H	32.6	89.2	118.3	74.0	28.0	100.0	100.0	100.0	99.8	99.0		1.72
22	41 - 43	1.75		Gray,Clay,Stiff,w/ferrous nodules	C H	32.3											
23	43 - 45	1.75		Gray,Clay,Stiff,w/ferrous nodules	C H	26.2											
24	45 - 47	2.00		Gray,Clay,Very stiff,w/sand seams	C H	26.4											
25	47 - 49	2.00		Gray,Clay,Very stiff,w/sand pockets	C H	24.7											
26	49 - 51	2.25		Gray,Clay,Very stiff,w/calcareous nodules& sand pockets	C H	25.3											
27	51 - 52	3.00		Gray,Clay,Very stiff,w/calcareous nodules and sand pockets	C H	20.4											

95% DRAFT

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q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
* : Material retained are shell fragments

Project: [illegible]on-Galveston navigation channel

SUMM[illegible] OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-30

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 1.5		5	Gray,Shell,Loose,shell fragments,w/sand	G P												
2	1.5 - 3	1.50		Yellowish gray,Clay,Stiff,w/silt pockets	C H	42.3											
3	3 - 5.5	1.75		Yellowish brown,Clay,Stiff,w/calcareous nodules	C H	37.9	80.9	111.5	75.0	29.0	100.0	100.0	100.0	99.6	98.8		
4	5.5 -7.5	2.75		Reddish brown,Clay,Very stiff	C H	32											
5	7.5 -9.5			Brown,Sand,Medium dense,Silty	S M												
6	9.5-11		28	Brown,Sand,Medium dense,Silty	S M						100.0	100.0	100.0	72.4	43.4		
7	12.5- 14		32	Brown,Sand,Dense,Silty	S M												
8	17.5 -19		16	Brown,Sand,Medium dense,Silty	S M						100.0	99.9	99.6	73.3	46.9		
10	19 - 21	1.75		Reddish brown,Clay,Stiff,w/calcareous nodules & sand pockets	C H	34.3	86.9	116.7	76.0	28.0	100.0	100.0	100.0	99.9	99.6		1.77
11	21 -22.5	2.50		Reddish brown,Clay,Very stiff	C H	26											
12	22.5 -24	3.75	25	Dark brown,Clay,Very stiff	C H	28.5											
12A	24 -24.5	3.75		Brown,Clay,Very stiff,w/silt pockets & silt parting	C H	29.2											
13	24.5-26.5	3.75		Reddish brown,Clay,Very stiff	C H												
14	26.5-28.5	1.75		Reddish brown,Clay,Stiff	C H	26											
15	28.5-30.5	1.75		Brown,Clay,Stiff,w/silt parting & silt seams	C H	27.7	94.7	120.9	59.0	25.0	100.0	100.0	99.9	99.6	99.1		1.48
16	30.5-32	2.00	16	Brown,Clay,Very stiff	C H	28.7											
16A	32-32.5	1.50		Reddish brown,Clay,Stiff	C H	37.4											
17	32.5-34.5	2.75		Reddish brown,Clay,Very stiff	C H												
18	34.5-36.5	2.75		Reddish brown,Clay,Very stiff	C H	30											
19	36.5-38.5	2.25		Dark brown,Clay,Very stiff,w/ferrous nodule	C H	31.7											

95% DRAFT

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* : Material retained are shell fragments

Geotest Engineering, Inc.

Project: H. .on-Galveston navigation channel

Contract No. DACW64-94-C-0040

SUMM... OF LABORATORY TEST RESULTS

Boring No. 93-31

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing #4	#10	#40	#100	#200	Torvane Shear Strength (tsf)	q u (tsf)
1	0 - 2	0.00		Gray,Caly,Very soft,Silty	C L	58.3											
2	2 - 4	0.00		Gray,Clay,Very soft,Silty	C L	44.9	74.0	107.2	44.0	21.0	100.0	100.0	99.1	98.6	97.0		
3	4 - 6	1.50		Gray&brown,Clay,Stiff,w/shell fragments	C H	38.1	82.8	114.4	83.0	31.0	99.1*	97.5*	97.0*	96.8	96.3		1.07
4	6 - 8	2.25		Reddish brown,Clay,Very stiff,w/calcareous nodules,Slickensided	C H	34.9											
5	8 - 10	2.25		Reddish brown,Clay,Very stiff,w/clay stone 9-10'	C H	28											
6	10 - 12	1.25		Reddish brown,Clay,Stiff,Silty	C L	26											
7	12-13.5		11	Reddish brown,Silt,Medium dense	M L						100.0	100.0	100.0	99.9	94.7		
8	14.5-16		14	Reddish brown,Silt,Medium dense	M L												
9	16 - 18	1.50		Reddish brown,Clay,Stiff,Silty,w/silt layer	C L	23											
10	18 - 20	2.00		Reddish brown,Clay,Very stiff,Silty	C L	27.3	99.3	126.5	36.0	18.0	100.0	100.0	100.0	99.4	99.3		2.09
11	20 - 22	2.75		Reddish brown,Clay,Very stiff DS See SUSD report 16162	C H	30.4	92		70	24							
12	22 - 24	3.50		Reddish brown,Clay,Very stiff	C H	30											
13	24-24.5	3.50		Reddish brown,Clay,Very stiff,Slickensided	C H	33.0											
14	24.5-26	2.75	25	Reddish brown,Clay,Very stiff,Slickensided	C H	31.4											
15	26-26.5	3.00		Reddish brown,Clay,Very stiff,Slickensided	C H	30.1											
16	26.5-28.5	3.00		Reddish brown,Clay,Very stiff	C H												
17	28.5-30.5	2.50		Reddish brown,Clay,Very stiff	C H	32											
18	30.5-32.5	2.50		Reddish brown,Clay,Very stiff	C H	29.8	92.4	119.9	71.0	27.0	100.0	100.0	100.0	100.0	100.0		3.18
19	32.5-34	2.50	20	Reddish brown,Clay,Very stiff	C H	28.3											
20	34-34.5	2.50		Gray,Clay,Very stiff,w/organic material	C H	35.3											

S # : Sample Number, P P : Pocket Penetrometer Reading, U S C : Unified Soil Classifcation, M c : Moisture Content
q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
* : Material retained are shell fragments

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Geotest Engineering, Inc.

Project: i on-Galveston navigation channel

SUM. . OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-31

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
21	34.5-36.5	1.75		Reddish brown,Clay,Stiff	C H												
22	36.5-38	1.75		Brown,CLay,Stiff	C H	34											
23	38-40	1.75		Gray,Clay,Stiff	C H	25			44	15							
24	40-42	0.75		Olive gray,Clay,Medium stiff,Silty	C L	28.3	94.1	120.8	35.0	17.0	100.0	100.0	100.0	99.1	99.0		
25	42-44	1.75		Olive gray,Clay,Stiff,Silty	C L	29.6											
26	44-46	2.25		Olive gray,Clay,Very stiff,w/calcareous nodules,Slickensided	C H	38.6											
27	46-48	2.25		Olive gray,Clay,Very stiff,w/calcareous noduels,Slickensided	C H	36.8											
28	48-50	2.50		Olive gray,Clay,Very stiff,w/ferrous stains, Slickensided	C H	35.9											
29	50-52	2.50		Olive gray,Clay,Very stiff,w/ferrous stains, Slickensided	C H	34.3											
30	52-54	2.25		Olive gray,Clay,Very stiff,w/calcareous nodules,Slickensided	C H	28.8											
31	54-55	1.75		Gray,Clay,Stiff,w/organic material	C H	46.4											

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q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
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Project: H. on-Galveston navigation channel

SUM. OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-32

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 2	0.00		Gray,Clay,Very soft,Silty,w/shell fragments	C L	36.4											
2	2 - 4	0.00		Gray,Clay,Very soft,Silty,w/shell fragments	C L	36.9											
3	4 - 6	0.00		Gray,Clay,Very soft,Silty	C L	34.8	82.3	110.9	35.0	18.0	100.0	100.0	99.6	99.1	98.7		0.11
4	6 - 8	0.00		Gray,Clay,Very soft,Silty,w/sand pockets	C L	33.3											
5	8 - 10	0.00		Gray,Clay,Very soft,Silty,w/shell fragments	C L	38.1											
6	10 - 12	0.00		Gray,Clay,Very soft,Silty,w/shell fragments	C L	34.7	84.3	113.7	39.0	19.0	100.0	100.0	99.6	98.5	98.0		0.12
7 SWD	12 - 14	0.00		Gray,Clay,Very soft Q-TEST See SWD report # 16162	CH CL	41.9	80		47	14							
8	14-14.5	0.00		Gray,Clay,Very soft	C H	43.5											
9	14.5-16	0.00	W.O.H.	Gray,Clay,Very soft	C H	49.9											
10	16-18	0.00		Gray,Clay,Very soft DS See SWD report # 16162	CH CL	52.4	70		49	15							
11	18-20	0.00		Gray,Clay,Very soft,w/shell fragments	C H	43.7	75.6	108.5	74.0	29.0	99.1*	98.0*	97.4*	97.3	96.7		0.12
12	20-22	0.00		Gray,Clay,Very soft,w/shell fragments	C H	56.5											
13	22-24	0.00		Gray,Clay,Very soft,w/sand seams Q-TEST See SWD report # 16162	C H	58.6	63		73	19							
14	24-24.5	0.00		Gray,Caly,Very soft	C H	42.3											
15	24.5-26	0.00	W.O.H	Gray,Clay,Very soft	C H	44.9											
16	26-26.5	0.00		Gray,Clay,Very soft,w/sand pockets	C H	45.1											
17	26.5-28.5	0.00		Gray,Clay,Very soft,w/organic material	C H	55.9											
18	28.5-30.5	0.00		Gray,Clay,Very soft,w/organic material	C H	64.2	61.9	101.7	74.0	28.0	100.0	100.0	100.0	99.9	99.4		0.22
19	30.5-32.5	0.00		Gray,Clay,Very soft,w/sand pocklets	C H	48.1											
20	32.5-34	0.00	W.O.H.	Gray,Clay,Very soft,w/sand pockets	C H	38.6											

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q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
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Project: H... ...n-Galveston navigation channel

SUMM... OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-32

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
21	34-34.5	0.00		Gray,Clay,Very soft,w/sand pockets	C H	36.1											
22	34.5-36.5	0.00		Gray,Clay,Very soft,w/sand pockets	C H	46.0	74.1	108.2	78.0	30.0	100.0	100.0	99.6	98.6	97.0		
23	36.5-38.5	0.25		Gray,Clay,Soft,w/sand pockets	C H	37.0											
24	38.5-40.5	0.00		Gray,Clay,Very soft,w/sand seams	C H	48.4											
25	40.5-42.5	0.50		Gray,Clay,Medium stiff,w/sand parting& organic material	C H	64.7											
26	42.5-44.5	0.50		Gray,Clay,Medium stiff	C H	38.2	82.1	113.4	78.0	29.0	100.0	100.0	100.0	99.8	99.3		
27	44.5-46.5	1.25		Yellowish brown,Clay,Stiff,Slickensided	C H	38.2											
28	46.5-48.5	1.25		Yellowish brown,Clay,Stiff,slickensided	C H	42.7											
29	48.5-50.5	0.75		Yellowish brown,Clay,Medium stiff,Slickensided	C H	39.6											
30	50.5-52.5	0.50		Yellowish Brown,Clay,Medium stiff,w/organic material,slickensided	C H	45.1											
31	52.5-54.5	0.50		Gray,Clay,Medium stiff	C H	30.4											

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Project: ...ston-Galveston navigation channel

SUMMA... OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-33

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 -1.5		2	Gray,Sand,Very loose,Silty,w/shell fragment	S M												
2	2 - 4	0.00		Gray,Clay,Very soft,Sandy,w/sand pockets & shell fragments	C L	34.7											
3	4 - 6	0.00		Gray,Clay,Very soft,,Silty,w/sand pockets&shell fragments	C L	44.4											
4	6 - 8	0.00		Gray,Clay,Very soft,Silty,w/sand pockets&shell fragments	C L	32.7											
5	8 - 10	0.00		Gray,Clay,Very soft,Silty,w/shell fragments	C L	30.7	90.4	118.2	35.0	18.0	100.0	100.0	99.9	98.9	98.0		0.18
6	10 - 12	0.00		Gray,Clay,Very soft,Silty,w/shell fragments	C L	29.0											
7	12 - 14	0.00		Gray,Clay,Very soft,w/shell fragments	C H	39.7											
8	14 - 16	0.00		Gray,Clay,Very soft,w/organic material	C H	60.5											
9	16-16.5	0.00		Gray,Clay,Very soft,w/sand pockets & shell fragments	C H	53.4											
11	16.5-18	0.00	W.O.H.	Gray,Clay,Very soft,w/sand pockets & shell fragments	C H	38.9											
12	18-20	0.00		Gray,Clay,Very soft,w/shell fragments	C H	59.0	63.8	101.5	80.0	30.0	100.0	99.0	98.7	97.7	96.7		0.15
13	20-22	0.00		Gray,Clay,Very soft,w/shell fragments	C H	57.8											
14	22-23.5		20	Gray,Sand,Medium dense,Silty,w/shell fragments	S M						97.9*	95.9*	93.4*	28.5	14.3		
15	26.5-28		27	Gray,Sand,Medium dense,Silty,w/shell fragments	S M												
16	28.5-30		29	Gray,Sand,Medium dense,Silty,w/shell fragments	SP-SM						98.4*	97.6*	97.8*	27.1	10.6		
17	33-34.5		35	Gray,Sand,Dense,Silty,w/shell fragments	S M												
18	34.5-36		34	Gray,Sand,Dense,Silty,w/shell fragments	S M												
19	36.5-38		33	Gray,Sand,Dense,Silty,w/shell fragments	SP-SM						98.8*	98.3*	95.5*	22.7	8.7		
20	41.5-43		26	Gray,Sand,Medium dense,Silty,w/shell fragments	S M												
21	46.5-48		59	Gray,Sand,Very dense,Silty,w/shell fragments	S M												

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Project: .on-Galveston navigation channel

SUM..... OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-33

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
22	51.5-53		55	Gray,Sand,Very dense,Silty	S M												
23	55-57	1.50		Brown,Clay,Stiff	C H	35.3											

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Project: ...on-Galveston navigation channel

SU... ...OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-34

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 2	0.00		Gray,Clay,Very soft,Sandy,w/shell fragment	C L	25.7											
2	2 - 4	0.00		Gray,Clay,Very soft,Sandy,w/shell fragment	C L	33.0											
3	4 - 6			Gray,Sand,Very loose,Silty,w/shell fragments	S M						94.6*	92.4*	90.3*	59.7	33.8		
4	6-7.5		3	Gray,Sand,Very loose,Silty,w/shell fragments	S M												
5	7.5-9.5	0.00		Gray,Clay,Very soft,Silty,w/shell fragments& sand pockets	C L	28.7											
6	9.5-11.5	0.00		Gray,Clay,Very soft,Silty,w/shell fragments& sand pockets	C L	31.2	88.0	115.5	33.0	17.0	100.0	98.9*	98.0*	97.5	96.5		0.21
7	11.5-13.5	0.00		Gray,Clay,Very soft,Silty,w/shell fragments& sand pockets	C L	30.8											
8	13.5-15.5	0.00		Gray,Clay,Very soft,Silty,w/shell fragments& sand pockets	C L	29.1											
9	15.5-17.5	0.00		Gray,Clay,Very soft,Silty,w/shell fragments& sand pockets	C L	30.1											
10	17.5-19	0.00		Gray,Clay,Very soft,Silty,w/shell fragments& sand pockets	C L	35.4	86.2	116.7	46.0	21.0	100.0	99.6*	99.1*	98.0	97.3		0.22
11	19-20.5	0.00	1/1-12"	Gray,Clay,Very soft,w/shell fragments	C H	35.8											
12	20.5-22.5 SWQ	0.00		Gray,Clay,Very soft,w/shell fragments DS See SWD report 16167	C H	42.1	76		59	16							
13	22.5-24.5	0.00		Gray,Clay,Very soft,w/shell fragments	C H	43.5											
14	24.5-26.5	0.00		Gray,Clay,Very soft,w/shell fragments	C H	44.1	75.2	108.4	77.0	28.0	100.0	99.3*	99.0	97.4	96.4		0.17
15	26.5-28.5	0.00		Gray,Clay,Very soft,w/shell Q-TEST See SWD Report 16167	C H	57.2	67		78	20							
16	28.5-29	0.00		Gray,Clay,Very soft,w/shell fragments	C H	56.6											
17	29-30.5	0.00	1/ W.O.H	Gray,Clay,Very soft,w/shell fragments	C H	55.4											
18	30.5-31	0.00		Gray,Clay,Very soft,w/shell fragments&sand pockets	C H	67.1											
19	31-33	0.00		Gray,Clay,Very soft,w/shell&silt partings	C H												
20	33-35	0.00		Gray,Clay,Very soft,w/sand pockets w/shrimp	C H	56.7	65.1	102.0	86.0	30.0	99.9*	99.1*	96.6*	92.4	91.8		

95% DRAFT

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Geotest Engineering, Inc.

Project: ...on-Galveston navigation channel

SUM... OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-34

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
21	35-37	0.00		Gray,Clay,Very soft,w/sand pockets	C H	60.7											
22	37-38.5	0.00	W.O.H	Gray,Clay,Very soft,w/sand pockets	C H	52.9											
23	38.5-39	0.00		Gray,Clay,Very soft,w/sand pockets	C H	68.7											
24	39-41	0.00		Gray,Clay,Very soft	C H												
25	41-42.5		29	Gray,Sand,Medium dense,Silty	S M												
26	46-47.5		52	Gray,Sand,Very dense,Silty	SP-SM						100.0	99.9	81.0	18.0	10.5		
27	51-52.5		41	Gray,Sand,Dense,Silty	S M												
28	52.5-54.5	0.00		Dark gray,Clay,Very soft,w/organic material	C H	57.2											
29	54.5-56		45	Gray,Sand,Dense,Silty	S M												
30	57.5-59		35	Gray,Sand,Dense,Silty	S M												

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Geotest Engineering, Inc.

Project: Houston-Galveston navigation channel

SUMMARY OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-35

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 2	0.25		Brown,Clay,Soft,Silty	C L	34.0											
2	2 - 4	0.50		Brown,Clay,Medium stiff,Silty	C L	35.1	85.7	115.8	46.0	21.0	100.0	100.0	99.9	99.8	99.2		
3	4 - 6	1.50		Reddish brown,Clay,Stiff,Silty	C L	30.2											
4	6 - 8	3.25		Reddish brown,Clay,Very stiff	C H	28											
5	8 - 10	2.75		Reddish brown,Clay,Very stiff	C H	28.7	94.4	121.7	69.0	26.0	100.0	100.0	100.0	100.0	100.0		2.22
6	10 - 12	3.75		Reddish brown,Clay,Very stiff,w/silt pockets& silt partings	C H	29.1											
7	12 - 14	3.25		Reddish brown,Clay,Very stiff	C H	32 WF			82	27							
8	14.5-15	2.25	19	Reddish brown,Clay,Very stiff,Slickensided	C H	32.6											
9	15.5-17.5	3.50		Reddish brown,Clay,Very stiff,w/sand seams	C H	31											
10	17.5-19.5	2.25		Reddish brown,Clay,Very stiff,Slickensided	C H	33.8	87.3	116.8	73.0	26.0	100.0	100.0	100.0	100.0	100.0		1.31
11	19.5-21.5	3.00		Reddish brown,Clay,Very stiff	C H	29											
12	21.5-23		21	Reddish brown,Silt,Medium dense,Sandy	M L						100.0	99.5	98.9	98.5	82.6		
13	24-25.5		38	Reddish brown,Sand,Dense,Silty	S M												
14	26-26.5		38	Reddish brown,Sand,Dense,Silty	S M						99.9	99.9	99.9	97.4	44.1		
15	30-31.5		33	Brown,Sand,Dense,Silty	S M												
16	32-33.5		37	Brown,Sand,Dense,Silty	S M												
17	34-35.5		32	Brown,Sand,Dense,Silty	S M						100.0	99.8	99.6	50.6	18.6		
18	36.5-38	1.50		Gray,Clay,Stiff,w/organic material	C H	35.7	84.5	114.7	90.0	33.0	100.0	100.0	100.0	100.0	100.0		
19	38-40	1.75		Gray,Clay,Stiff,w/organic material	C H	34.9											
20	40-42	2.50		Yellowish gray,Clay,Very stiff,Sandy	C L	16.6											

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Project: .on-Galveston navigation channel

SUM. OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-35

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
21	42-44	2.75		Yellowish gray,Clay,Very stiff,Sandy,w/ ferrous stains	C L	20.1	107.8	129.6	41.0	20.0	100.0	99.8	97.2	75.5	62.7		
22	44-46	2.75		Yellowish gray,Clay,Very stiff,Sandy,w/ ferrous stains	C L	17.0											
23	46-48	2.75		Yellowish gray,Clay,Very stiff,Sandy,w/ ferrous stains	C L	17.9											
24	48-49.5		24	Gray,Sand,Medium dense,Silty	S M												
25	52.5-54		51	Gray,Sand,Very dense,Silty	S M												

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Project: ...on-Galveston navigation channel

SUM... OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-36

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 2			Gray,Sand,Loose,Silty	S M												
2	2-3.5		5	Gray,Sand,Loose,Silty	S M												
3	4 - 6	0.00		Gray,Clay,Very soft,Silty,w/shell fragments	C L	35.1											
4	6 - 8	0.00		Gray,Clay,Very soft,Silty,w/sand pockets & shell fragments	C L	32.6	87.1	115.3	31.0	17.0	98.8*	98.5*	98.2*	97.1	91.5		
5	8 - 10	0.00		Gray,Clay,Very soft,Silty,w/sand pockets & shell fragments	C L	31.6											
6	10 - 12	0.00		Gray,Clay,Very soft,Silty,w/sand pockets & shell fragments	C L	32.1											
7	12-13.5		18	Brown,Sand,Medium dense,Silty	S M						100.0	100.0	99.7	95.5	44.1		
8	17-18.5		19	Brown,Sand, Medium dense,Silty	S M												
9	22-23.5		20/50-5" >70	Brown,Sand,Very dense,Silty	S M												
10	25-27	1.75		Reddish brown,Clay,Stiff,w/calcareous nodules	C H	34.3	88.6	118.9	65.0	26.0	100.0	100.0	99.9	99.0	98.5		
11	27-28.5		23	Reddish brown,Silt,Medium dense,Sandy	M L						100.0	100.0	98.7	89.5	60.3		
12	29-30.5		24	Reddish brown,Silt,Medium dense,Sandy	M L												
13	33.5-35		27	Reddish brown,Sand,Medium dense,Silty	S M												
14	35-36.5		32	Reddish brown,Sand,Dense,Silty	S M												
15	37-38.5		44 (134)	Reddish brown,Sand,Dense,Silty	S M						100.0	100.0	99.7	83.2	42.5		
16	40-42	1.75		Gray,Clay,stiff,w/ferrous stains & sand seams	C H	22.8	101.1	124.2	59.0	19.0	100.0	100.0	99.6	95.4	94.3		
17	42-44	1.75		Gray,Clay,Stiff,w/ferrous stains	C H	26.1											
18	44-45.5		46	Brown,Sand,Dense,Silty	S M												
19	49-50.5		48/50-2"	Brown,Sand,Very dense,Silty	S M												
20	54-55.5		47	Brown,Sand,Dense,Silty	S M												

95% DRAFT

S # : Sample Number, P P : Pocket Penetrometer Reading, U S C : Unified Soil Classifcation, M c : Moisture Content
q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
* : Material retained are shell fragments

Project: .on-Galveston navigation channel

SUI JF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-36

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
21	55.5-57		49	Brown,Sand,Dense,Silty	S M												

95% DRAFT

S # : Sample Number, P P : Pocket Penetrometer Reading, U S C : Unified Soil Classifcation, M c : Moisture Content
q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
* : Material retained are shell fragments

Project: ...on-Galveston navigation channel

SUM... OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-37

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 2	0.00		Gray,Clay,Very soft,Silty,w/shell fragments	C L	38.7											
2	2 - 4	1.50		Reddish brown,Clay,Stiff	C H	32.4											
3	4 - 6	1.75		Reddish brown,Clay,Stiff,w/silt partings	C H	33.1											
4	6 - 8	1.75		Reddish brown,Clay,Stiff,w/silt pockets	C H	37											
5	8 - 10	2.00		Reddish brown,Clay,Very stiff,w/silt pockets	C H	36.0	84.8	115.4	81.0	33.0	100.0	100.0	100.0	99.4	98.8		2.01
6	10 - 12	3.25		Reddish brown,Clay,Very stiff,w/silt pockets	C H	34											
7	12 - 14	3.25		Reddish brown,Clay,Very stiff,w/silt pockets	C H	34											
8	14 - 15	3.00		Yellowish brown,Clay,Very stiff,w/ferrous stains,Slickensided	C H	33.4											
9	15-16.5	2.25	16	Gray,Clay,Very stiff,w/silt partings	C H	36.6											
10	16.5-18.5	1.75		Gray,Clay,Stiff,w/organic materials	C H	42.0	76.9	109.1	93.0	33.0	100.0	100.0	100.0	100.0	100.0		?
11	18.5-20.5	2.25		Gray,Clay,Very stiff	C H	31											
12	20.5-22.5	2.25		Gray,Clay,Very stiff,w/organic material	C H	30											
13	22.5-24.5	1.75		Gray,Clay,Stiff,w/organic material	C H	30											
14	24.5-25	1.25		Gray&yellowish gray,Clay,Stiff,Sandy,w/sand layer	C L	22.6											
15	25-26.5		24	Gray,Sand,Medium dense,Silty	S M												
16	27-28.5		36	Gray,Sand,Dense,Silty	S M						100.0	10.0	100.0	43.8	31.5		
17	31.5-33		57	Gray,Sand,Very dense,Silty	S M												
18	33-34.5		57	Gray,Sand,Very dense,Silty	S M												
19	35-36.5		47	Gray,Sand,Dense,Silty	S M						100.0	100.0	99.9	46.0	18.6		
20	40-42	2.25		Gray,Clay,Very stiff,w/organic material	C H	45.1											

95% DRAFT

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q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
* : Material retained are shell fragments

Project: on-Galveston navigation channel

SUM. OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-37

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
21	42-44	2.00		Olive gray,Clay,Very stiff	C H	25.3	96.3	120.6	58.0	24.0	100.0	100.0	100.0	98.7	98.3		2.04
22	44-46	2.75		Olive gray,Clay,Very stiff,w/sand seams	C H	24.7											
23	46-48	2.50		Olice gray,Clay,Very stiff,w/sand seams	C H	25.8											
24	48-50	1.75		Yellowish gray,Clay,Stiff,w/sand seams & calcareous nodules	C H	19.7											
25	50-52	4.5+		Yellowish gray,Clay,Hard,w/calcareous nodules	C H	18.0											
26	52-54	4.5+		Yellowish gray,Clay,Hard,w/calcareous nodules	C H	17.2											
27	54-55	4.25		Red,Clay,Hard,Slickensided	C H	27.9											

95% DRAFT

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q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
* : Material retained are shell fragments

Project: .on-Galveston navigation channel

SUM..... OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-38

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 2	0.00		Gray,Clay,Very soft,Sandy,w/shell fragment	C L	25.9											
2	2 - 4	3.00		Olive gray,Clay,Very stiff,w/sand seams & blocky structure	C H	25.2											
3	4 - 6	2.25		Olive gray&brown,Clay,Very stiff,w/sand seams&calcareous nodules	C H	23.2											
4	6 - 8	4.50		Reddish brown,Clay,Hard,w/calcareous nodules	C H	20.5											
5	8 - 10	4.50		Reddish brown,Clay,Hard,w/silt seams	C H	21											
6	10 - 12	4.50		Yellowish brown,Clay,Hard,Silty,w/calcareous nodules	C L	21.0	106.8	129.2	39.0	19.0	100.0	100.0	99.6	98.6	98.5		4.41
7	12 - 14	3.00		Brown,Clay,Very stiff,w/silt seams,Slickensided	C H	24											
8	14 - 16	3.25		Brown,Clay,Very stiff,Slickensided SWD - See Report 16250	C H	28.6	95		75	19							
9	16-16.5	3.25		Brown,Clay,Very stiff,Slickensided	C H	32											
10	16.5-18	1.75	13	Brown,Clay,Stiff,w/calcareous nodules	C H	29.0											
11	18-20	3.00		Gray&yellowish brown,Clay,Very stiff,w/calc-areous nodules,Slickensided	C H	23.7	101.4	125.5	57.0	24.0	100.0	100.0	99.9	99.4	98.9		
12	20-21	2.50		Gray,Clay,Very stiff	C H	21											
12A	21-22	2.00		Gray,Clay,Very stiff,w/silt layer&silt seams SWD - report 16250	~~C H~~ C L												
13	22-24	3.00		Gray,Clay,Very stiff,w/sand seams SWD - report 16250	~~C H~~ C L	18.8	107		37	13							
14	24-26	3.25		Gray,Clay,Very stiff,w/silt seams	C H	16											
15	26-26.5	3.25		Gray,Clay,Very stiff,w/silt seams	C H	20											
16	26.5-28	2.00	15	Brown&gray,Clay,Very stiff,w/sand pockets	C H	21.4											
17	28-28.5	2.75		Gray,Clay,Very stiff	C H	18											
18	28.5-30.5	2.00		Light gray,Clay,Very stiff,Sandy	C L												
19	30.5-32.5	3.50		Yellowish brown,Clay,Very stiff,Sandy,w/ sand seams&ferrous stains	C L	21.7	105.4	128.3	44.0	17.0	100.0	99.5	97.9	93.7	80.1		2.02

95% DRAFT

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Project: ...ston-Galveston navigation channel

SUM... OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-38

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
20	32.5-34.5	3.75		Light gray,Clay,Very stiff	C H	19											
21	34.5-36	4.50	42	Gray & yellowish gray,Clay,Hard,Sandy,w/ sand seams	C L	18.7											
22	36-36.5	2.25		Gray & yellowish gray,Clay,Very stiff,Sandy,w/ sand seams	C L	16.1											
23	36.5-38		36	Brown,Sand,Dense,Silty	S M						100.0	100.0	89.3	36.9	28.4		
24	41-43	3.25		Gray,Clay,Very stiff	C H	31											
25	43-45	2.75		Gray & yellowish brown,Clay,Very stiff,w/ferr-ous stains& sand seams	C H	33.4											
26	45-47	3.25		Gray,Clay,Very stiff,w/sand seams	C H	32											
27	47-49	2.50		Gray,Clay,Very stiff,w/ferrous nodules	C H	47											
28	49-50	1.25		Gray,Clay,Stiff,w/ferrous stains	C H	31											
29	50-51	1.75		Gray,Clay,Stiff,Silty,w/sand seams	C L	23.7											
30	51-53	1.75		Gray,Clay,Stiff,Silty	C L	20											
31	53-55	4.25		Olive gray,Clay,Hard,Silty,w/sand seams & calcareous nodules	C L	17.8											
32	55-57	3.75		Red & gray,Clay,Very siff/calcareous nodules ,Slickensided	C H	25.8											

95% DRAFT

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Project: ...on-Galveston navigation channel

SU... OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-39

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
1	0 - 2	1.50		Gray&brown,Clay,Stiff,w/blocky structure	C H	26.8											
2	2 - 4	2.50		Gray&brown,Clay,Very stiff,w/ferrous stains &calcareous nodules	C H	23.7											
3	4 - 6	3.00		Yellowish gray,Clay,Very stiff,w/sand seams &blocky structure	C H	22.4											
4	6 - 8	4.25		Brown&gray,Clay,Hard,w/calcareous nodules&ferrous stains	C H	21.6											
5	8 - 10	3.50		Brown&gray,Clay,Very stiff,w/ferrous stains	C H	27.8	95.4	121.9	62.0	25.0	100.0	100.0	100.0	99.4	98.3		2.05
6	10 - 12	3.50		Yellowish brown,Clay,Very stiff,w/calcareous nodules,Slickensided	C H	23.0											
7	12 - 14	2.00		Gray,Clay,Very stiff	C H	32											
8	14-15.5	3.75	29	Yellowish brown,Clay,Very stiff,w/calcareous nodules,Slickensided	C H	25.5											
9	15.5-17.5	3.50		Gray,Clay,Very stiff,w/ferrous nodules&sand pockets	C H	20											
10	17.5-19.5	3.75		Yellowish brown&gray,Clay,Very stiff,w/sand seams calcareous&ferrous nodules,Slickensided	C H	20.1											
11	19.5-21.5	3.75		Gray,Clay,Very stiff,Sandy,w/calcareous nodules & sand seams	C L	22											
12	21.5-23.5	2.75		Yellowish gray,Clay,Very stiff,w/ferrous nodules	C H	18.0	111.0	130.9	53.0	22.0	99.8	99.4	96.1	94.8	93.0		2.13
13	23.5-24	3.50		Light gray,Clay,Very stiff	C H	19											
14	24-25.5	3.25	25	Yellowish gray,Clay,Very stiff,Sandy,w/sand seams	C L	22.4											
15	26-27.5		47	Yellowish gray,Sand,Dense,Silty	S M						100.0	100.0	99.7	85.0	47.0		
16	30.5-32		69	Yellowish gray,Sand,Very dense,Silty	S M												
17	32-33.5		45	Yellowish gray,Sand,Dense,Silty	S M												
18	34 - 36	3.50		Gray,Clay,Very stiff	C H	22											
19	36 - 38	3.25		Light gray,Clay,Very stiff,w/sand pockets	C H	24											
20	38 - 40	3.50		Light gray,Clay,Very stiff,w/sand pockets	C H	21											

95% DRAFT

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* : Material retained are shell fragments

Project: ...ton-Galveston navigation channel

SUM... OF LABORATORY TEST RESULTS

Contract No. DACW64-94-C-0040

Boring No. 93-39

S #	Depth (ft)	P P (tsf)	SPT Blows per Foot	Visual Classification	U S C	Mc (%)	Dry Unit Wt (pcf)	Wet Unit Wt (pcf)	L L (%)	PL (%)	Mechanical Analysis % Passing					Torvane Shear Strength (tsf)	q u (tsf)
											#4	#10	#40	#100	#200		
21	40-42	3.50		Yellowish brown,Clay,Very stiff,w/sand seams&ferrous stains	C H	21.8	104.9	127.7	58.0	24.0	100.0	100.0	99.9	95.1	85.4		3.07
22	42-44	3.25		Reddish brown,Clay,Very stiff,Slickensided w/shell	C H	25											
23	44-46	3.75		Reddish brown,Clay,Very stiff,w/calcareous nodules,Slickensided	C H	26											
24	46-48	4.25		Reddish brown,Clay,Hard,w/calcareous nodules,Slickensided	C H	28											
25	48-50	4.25		Reddish brown,Clay,Hard,w/calcareous nodules,Slickensided	C H	27.6											
26	50-52	4.5		Reddish brown,Clay,Hard,w/calcareous nodules,Slickensided	C H	27.7											
27	52-54	4.25		Reddish brown,Clay,Hard,w/calcareous nodules,Slickensided	C H	28.0											

95% DRAFT

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q u : Uncogined Compressive Strength, W O H : Weight of hammer, W O P : Weight of Pipe
* : Material retained are shell fragments

M_c, LL, PL Performed by WES for clay ball experiment.

00 4 4 H3

Project : Houston - Galveston Navigation Channel
Contract No. DACW64-94-C-0040
Reference: Soil Samples Delivered to Waterways Experiment Station

Boring No.	Sample No.
93-01	6,8,9,11,12
93-02	6,8,10,12
93-04	
93-05	
93-06	
93-07	
93-08	9,11,[illegible],18,[illegible],18,20,22,24,25
93-09	3,5,[illegible],8,[illegible],12,14,16,18,20
93-10	5,7,9,[illegible],14,16,18,18,20,22,24,26
93-11	[illegible]
93-12	[illegible]
93-13	[illegible]
93-14	[illegible]
93-15	[illegible]
93-21	[illegible]
93-29	5,9,10,13,14
93-30	4,11,[illegible],14,16A,[illegible],18
93-31	5,8,9,12,[illegible],17,[illegible],22,28
93-34	[illegible]
93-35	4,7,8,11
93-37	4,6,7,11,12,13
93-38	5,7,9,12,14,15,17,[illegible],20,24,26,27,28,30
93-39	7,9,11,13,18,19,20,22,23,24
93-40	6,8,10,11,14,16,17,20,22,23
93-41	7,8,11,12,14,17,[illegible],21,22,24,26,27
93-42	17,18,19,21
93-43	16,19,20
93-45	8,9,10,13,14,15,16,18
93-46	11,14,16,20
93-47	6,10,12,15,16
93-48	10,13,14,18,20

Note : also 41 quart jar water samples from S-1 through S-41 were deliverd

Paul Gilbert
Received by.

Jay Montemarano
Delivered by.

95% DRAFT

LIQUID AND PLASTIC LIMIT TESTS

For use of this form, see EM 1110-2-1906.

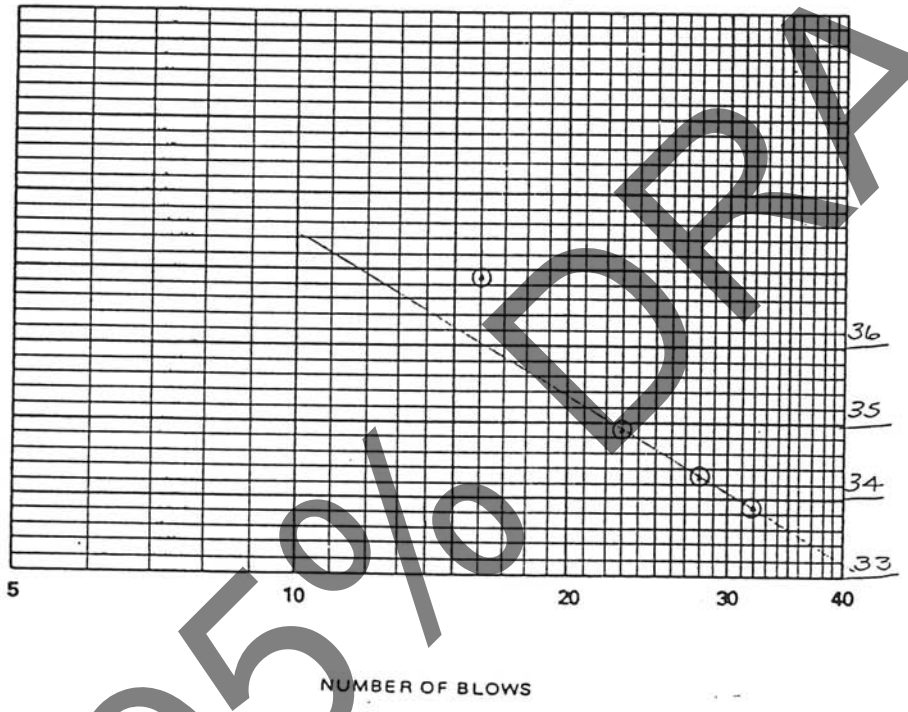
PROJECT HOUSTON - GALVESTON NAVIGATION CHANNEL DATE

BORING NO. 93-01 SAMPLE NO. 8

LIQUID LIMIT

	RUN NO.	1	2	3	4	5	6
	TARE NO.	24	40	51	15		
WEIGHT IN GRAMS	TARE PLUS WET SOIL	44.02	47.25	46.02	46.22		
	TARE PLUS DRY SOIL	41.57	44.61	43.60	43.62		
	WATER W_w	2.45	2.64	2.42	2.60		
	TARE	34.83	37.05	36.55	35.95		
	DRY SOIL W_s	6.64	7.56	7.05	7.67		
	WATER CONTENT, % w	36.9	34.9	34.3	32.9		
	NUMBER OF BLOWS	16	23	27	32		

N-41



LL 35.0

PL 20.0

PI 15.0

Symbol from plasticity chart CL

PLASTIC LIMIT

	RUN NO.	1	2	3	4	5	NATURAL WATER CONTENT
	TARE NO.	illegible	illegible				
WEIGHT IN GRAMS	TARE PLUS WET SOIL	illegible	illegible				
	TARE PLUS DRY SOIL	illegible	illegible				
	WATER W_w	illegible	1.31				
	TARE	illegible	15.33				
	DRY SOIL W_s	6.3	6.38				
	WATER CONTENT, % w	illegible	illegible				
	PLASTIC LIMIT		illegible				

REMARKS CLAY (CL) illegible

TECHNICIAN CEC COMPUTED BY illegible CHECKED BY

ENG FORM 1 JUN 65 3838

☆ U.S.GPO:1984-0-452-954/18650

PLATE III-1

95% DRAFT

LIQUID AND PLASTIC LIMIT TESTS

For use of this form, see EM 1110-2-1906.

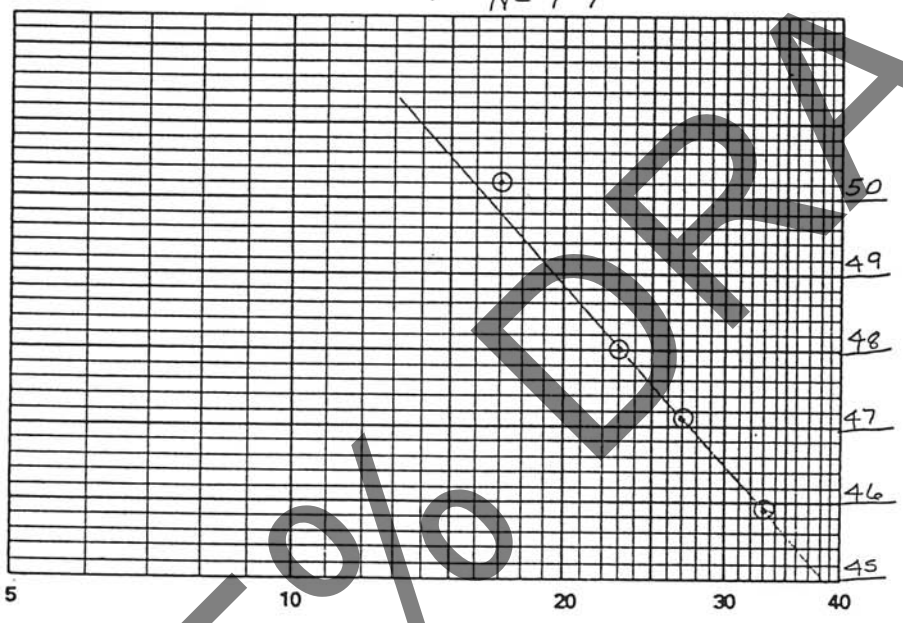
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL DATE

BORING NO. 93-01 SAMPLE NO. 11

LIQUID LIMIT

	RUN NO.	1	2	3	4	5	6
	TARE NO.	89	50A	284	459		
WEIGHT IN GRAMS	TARE PLUS WET SOIL	27.54	18.92	23.39	25.48		
	TARE PLUS DRY SOIL	24.53	16.32	20.75	22.49		
	WATER W_w	3.01	2.60	2.64	2.99		
	TARE	18.54	10.90	15.14	15.98		
	DRY SOIL W_s	5.99	5.42	5.61	6.51		
	WATER CONTENT, % w	50.2	48.0	47.1	45.9		
	NUMBER OF BLOWS	17	23	27	33		

N-77



LL 48.0

PL 20.0

PI 28.0

Symbol from plasticity chart CL

95% DRAFT

PLASTIC LIMIT

	RUN NO.	1	2	3	4	5	NATURAL WATER CONTENT
	TARE NO.	475	483				
WEIGHT IN GRAMS	TARE PLUS WET SOIL	22.40	22.88				
	TARE PLUS DRY SOIL	21.32	21.73				
	WATER W_w	1.08	1.15				
	TARE	15.92	15.85				
	DRY SOIL W_s	5.40	5.88				
	WATER CONTENT, % w	20.0	19.6				
	PLASTIC LIMIT		19.8				

REMARKS CLAY (CL) BROWN

TECHNICIAN COMPUTED BY CHECKED BY

LIQUID AND PLASTIC LIMIT TESTS

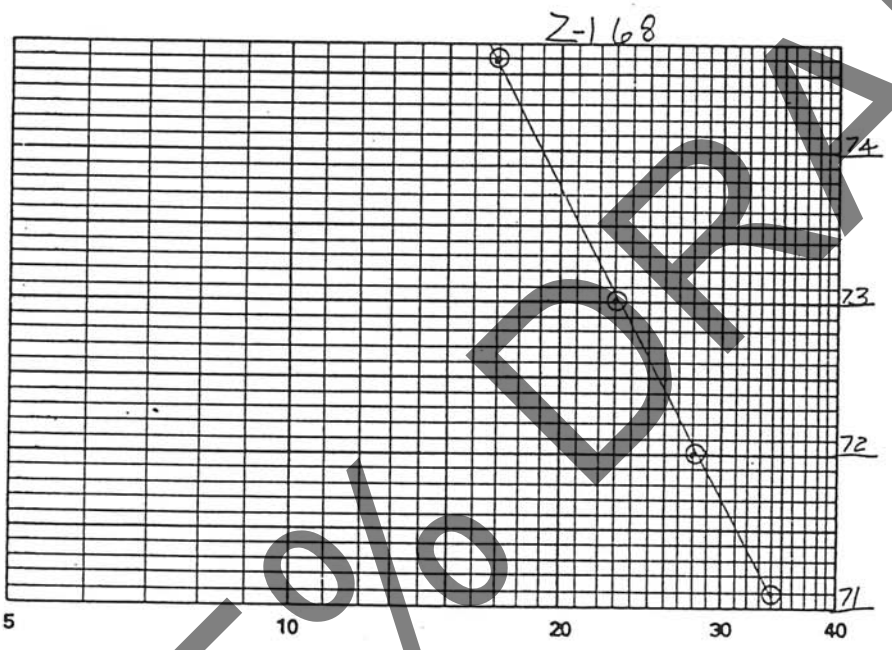
For use of this form, see EM 1110-2-1906.

PROJECT HOUSTON-GALVESTON NAVIGATION CHANNEL DATE

BORING NO. 93-02 SAMPLE NO. 12

LIQUID LIMIT

	RUN NO.	1	2	3	4	5	6
	TARE NO.	462	490	455	441		
WEIGHT IN GRAMS	TARE PLUS WET SOIL	23.49	23.21	24.83	24.01		
	TARE PLUS DRY SOIL	20.23	19.88	21.25	20.59		
	WATER W_w	3.36	3.33	3.58	3.42		
	TARE	15.86	15.32	16.28	15.78		
	DRY SOIL W_s	4.37	4.56	4.97	4.81		
	WATER CONTENT, % w	74.6	73.0	72.0	71.1		
	NUMBER OF BLOWS	17	23	28	34		



LL 73.0

PL 21.0

PI 52.0

Symbol from plasticity chart CH

95% DRAFT

PLASTIC LIMIT

	RUN NO.	1	2	3	4	5	NATURAL WATER CONTENT
	TARE NO.	391	405				
WEIGHT IN GRAMS	TARE PLUS WET SOIL	22.26	20.82				
	TARE PLUS DRY SOIL	21.16	19.95				
	WATER W_w	1.10	0.87				
	TARE	15.91	15.71				
	DRY SOIL W_s	5.25	4.25				
	WATER CONTENT, % w	21.0	20.5				
	PLASTIC LIMIT		20.8				

REMARKS CLAY (CH) GR. 4

TECHNICIAN CEC COMPUTED BY CEC CHECKED BY

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LIQUID AND PLASTIC LIMIT TESTS

For use of this form, see EM 1110-2-1906.

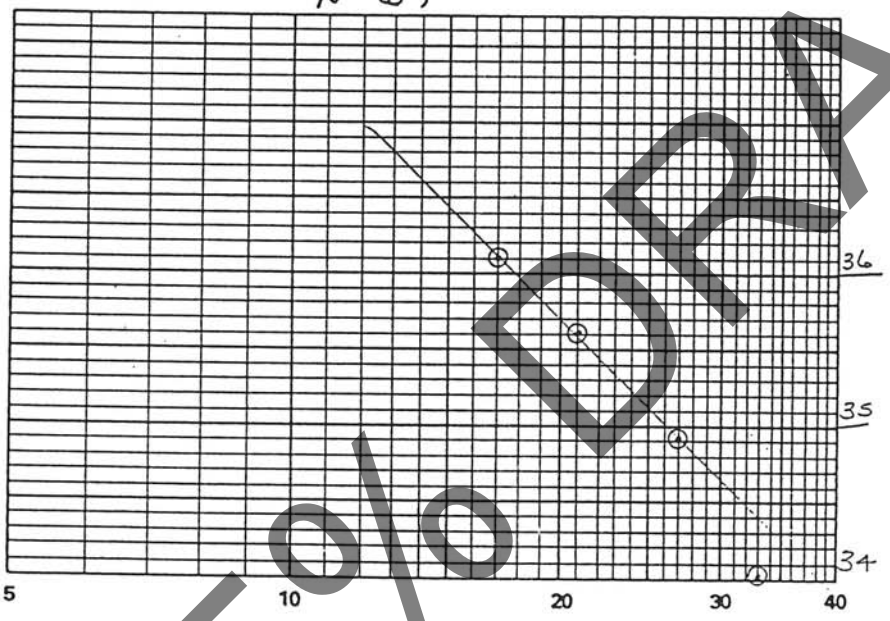
PROJECT HOUSTON-GALVESTON NAVIGATION CHANNEL DATE

BORING NO. 93-08 SAMPLE NO. 13

LIQUID LIMIT

	RUN NO.	1	2	3	4	5	6
	TARE NO.	329	432	430	500		
WEIGHT IN GRAMS	TARE PLUS WET SOIL	24.87	25.45	26.57	23.94		
	TARE PLUS DRY SOIL	22.46	22.90	23.81	21.78		
	WATER W_w	2.41	2.55	2.76	2.16		
	TARE	15.80	15.73	15.89	15.42		
	DRY SOIL W_s	6.66	7.17	7.92	6.36		
	WATER CONTENT, % w	36.1	35.6	34.8	34.0		
	NUMBER OF BLOWS	17	21	27	33		

N-69



LL 35.0

PL 22.0

PI 13.0

Symbol from plasticity chart

95% DRAFT

PLASTIC LIMIT

	RUN NO.	1	2	3	4	5	NATURAL WATER CONTENT
	TARE NO.	325	330				
WEIGHT IN GRAMS	TARE PLUS WET SOIL	24.07	24.26				
	TARE PLUS DRY SOIL	22.57	23.30				
	WATER W_w		1.46				
	TARE	15.78	15.19				
	DRY SOIL W_s	6.79	6.61				
	WATER CONTENT, % w	22.2	22.1				
	PLASTIC LIMIT		22.2				

REMARKS CLAY (CL) BROWN

TECHNICIAN CEC COMPUTED BY [illegible] CHECKED BY

LIQUID AND PLASTIC LIMIT TESTS

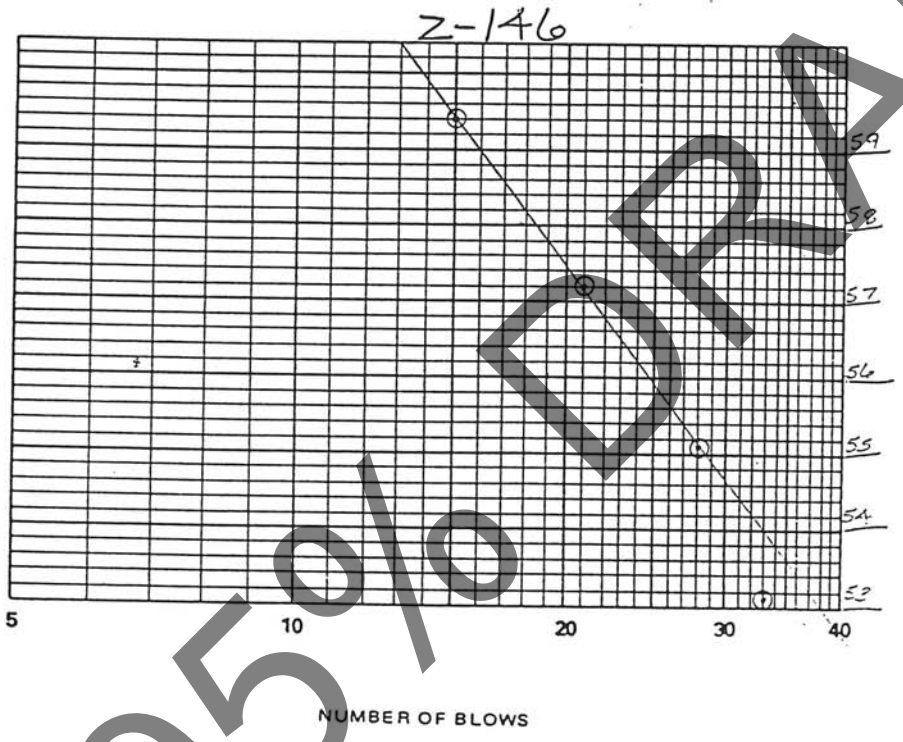
For use of this form, see EM 1110-2-1906.

PROJECT HOUSTON-GALVESTON NAVIGATION CHANNEL DATE

BORING NO. 93-08 SAMPLE NO. 18

LIQUID LIMIT

	RUN NO.	1	2	3	4	5	6
	TARE NO.	54A	314	469	322		
WEIGHT IN GRAMS	TARE PLUS WET SOIL	18.88	24.93	24.32	22.73		
	TARE PLUS DRY SOIL	15.93	21.66	21.33	20.28		
	WATER W_w	2.95	3.27	2.99	2.45		
	TARE	10.96	15.94	15.90	15.67		
	DRY SOIL W_s	4.97	5.72	5.43	4.61		
	WATER CONTENT, % w	59.4	57.2	55.1	53.1		
	NUMBER OF BLOWS	15	21	28	33		



LL 56.0

PL 22.0

PI 34.0

Symbol from plasticity chart CH

PLASTIC LIMIT

	RUN NO.	1	2	3	4	5	NATURAL WATER CONTENT
	TARE NO.	336	452				
WEIGHT IN GRAMS	TARE PLUS WET SOIL	22.59	23.00				
	TARE PLUS DRY SOIL	21.39	21.67				
	WATER W_w	1.20	1.33				
	TARE	16.01	15.69				
	DRY SOIL W_s	5.38	5.98				
	WATER CONTENT, % w	22.3	22.2				
	PLASTIC LIMIT	—	22.2				

REMARKS CLAY (CH) GRAY

TECHNICIAN CSC COMPUTED BY CSC CHECKED BY

95% DRAFT

LIQUID AND PLASTIC LIMIT TESTS

For use of this form, see EM 1110-2-1906.

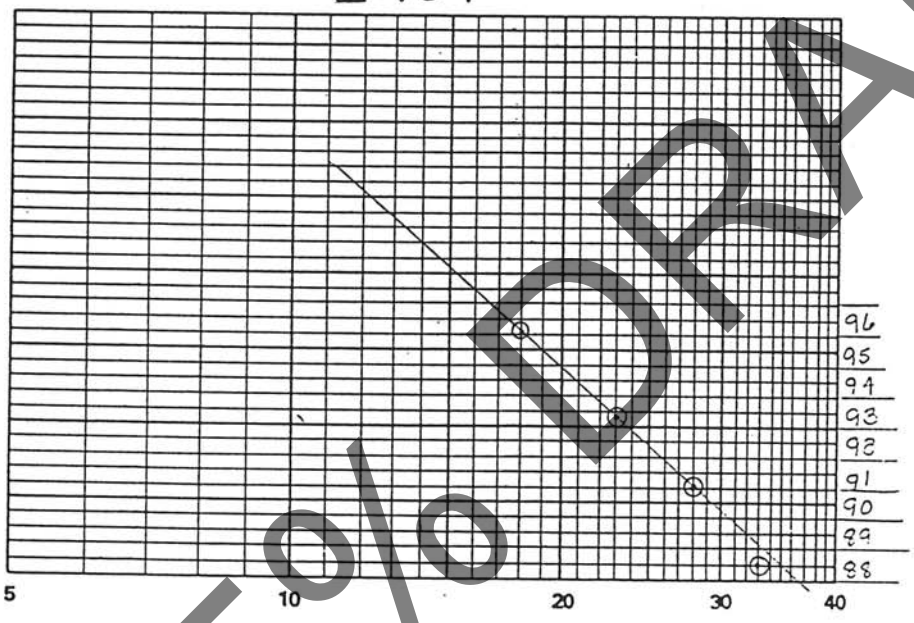
PROJECT HOUSTON-GALVESTON NAVIGATION CHANNEL DATE

BORING NO. 93-09 SAMPLE NO. 20

LIQUID LIMIT

	RUN NO.	1	2	3	4	5	6
	TARE NO.	456	497	475	483		
WEIGHT IN GRAMS	TARE PLUS WET SOIL	24.03	23.11	23.60	24.39		
	TARE PLUS DRY SOIL	20.05	19.36	19.94	20.38		
	WATER W_w	3.98	3.75	3.66	4.01		
	TARE	15.91	15.32	15.92	15.85		
	DRY SOIL W_s	4.14	4.04	4.02	4.53		
	WATER CONTENT, % w	96.1	92.8	91.0	88.5		
	NUMBER OF BLOWS	18	23	28	33		

Z-139



LL 92.0

PL 27.0

PI 65.0

Symbol from plasticity chart CH

95% DRAFT

PLASTIC LIMIT

	RUN NO.	1	2	3	4	5	NATURAL WATER CONTENT
	TARE NO.	367	411				
WEIGHT IN GRAMS	TARE PLUS WET SOIL	21.66	22.83				
	TARE PLUS DRY SOIL	20.40	21.30				
	WATER W_w	1.26	1.53				
	TARE	15.69	15.74				
	DRY SOIL W_s	4.71	5.56				
	WATER CONTENT, % w	26.8	27.5				
	PLASTIC LIMIT		27.2				

REMARKS OLIVE (5Y 4/3) GRAY

TECHNICIAN COMPUTED BY CHECKED BY

LIQUID AND PLASTIC LIMIT TESTS

For Use of this form, see EM 1110-2-1906.

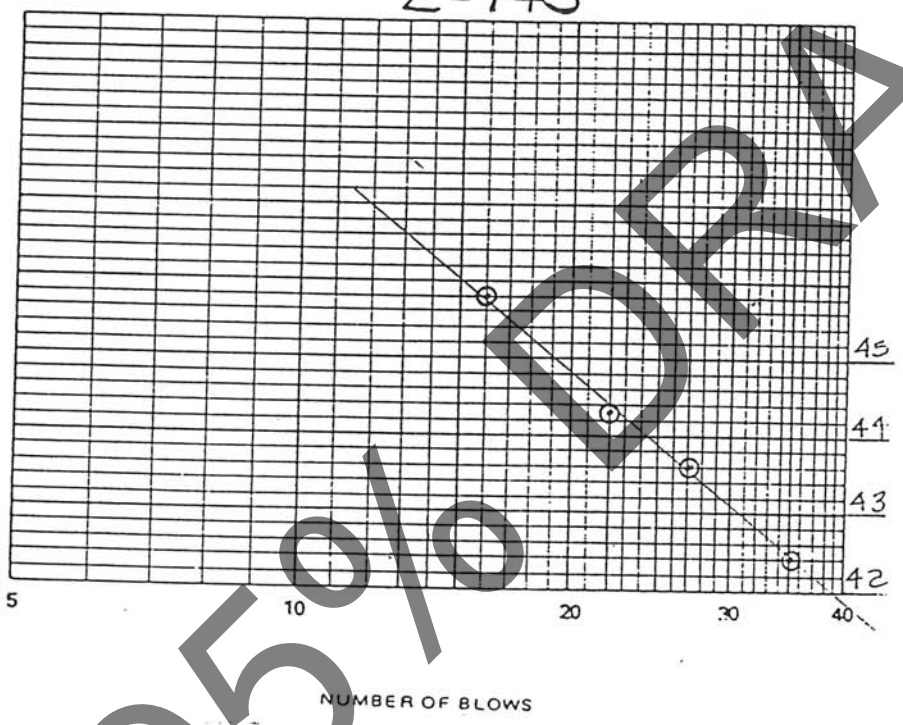
PROJECT HOUSTON-GALVESTON NAVIGATION CHANNEL DATE

BORING NO. 9331 SAMPLE NO. 23

LIQUID LIMIT

	RUN NO.	1	2	3	4	5	6
	TARE NO.	325	330	391	405		
WEIGHT IN GRAMS	TARE PLUS WET SOIL	24.28	24.59	24.70	25.38		
	TARE PLUS DRY SOIL	21.61	21.70	22.03	22.50		
	WATER W_w	2.67	2.89	2.67	2.88		
	TARE	15.78	15.19	15.91	15.71		
	DRY SOIL W_s	5.83	6.51	6.12	6.79		
	WATER CONTENT, % w	45.8	44.3	43.6	42.4		
	NUMBER OF BLOWS	16	22	27	35		

Z-143



LL 44.0

PL 15.0

PI 29.0

Symbol from plasticity chart CL

95% DRAFT

PLASTIC LIMIT

	RUN NO.	1	2	3	4	5	NATURAL WATER CONTENT
	TARE NO.	207	287				
WEIGHT IN GRAMS	TARE PLUS WET SOIL	23.45	22.52				
	TARE PLUS DRY SOIL	22.35	21.53				
	WATER W_w	1.10	0.99				
	TARE	15.27	14.99				
	DRY SOIL W_s	7.08	6.54				
	WATER CONTENT, % w	15.5	15.1				
	PLASTIC LIMIT		15.3				

REMARKS CLAY (CL) GRAY

TECHNICIAN COMPUTED BY CHECKED BY

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PLATE III-1

LIQUID AND PLASTIC LIMIT TESTS

For use of this form, see EM 1110-2-1906.

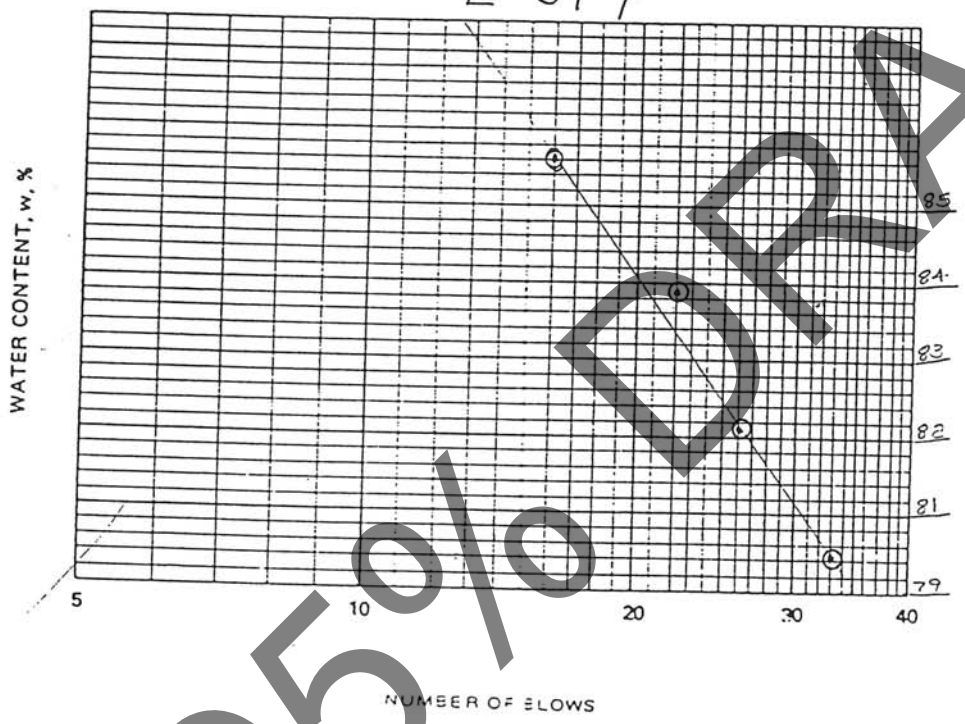
PROJECT HOUSTON-GALVESTON NAVIGATION CHANNEL DATE

BORING NO. 9335 SAMPLE NO. 7

LIQUID LIMIT

	RUN NO.	1	2	3	4	5	6
	TARE NO.	207	336	367	416		
WEIGHT IN GRAMS	TARE PLUS WET SOIL	22.60	24.03	22.72	23.49		
	TARE PLUS DRY SOIL	19.22	20.37	19.55	20.06		
	WATER W_w	3.38	3.66	3.17	3.43		
	TARE	15.27	16.01	15.69	15.74		
	DRY SOIL W_s	3.95	4.36	3.86	4.32		
	WATER CONTENT, % w	85.6	83.9	82.1	79.4		
	NUMBER OF BLOWS	16	22	27	33		

L-519



LL 82.0

PL 27.0

PI 55.0

Symbol from plasticity chart

95% DRAFT

PLASTIC LIMIT

	RUN NO.	1	2	3	4	5	NATURAL WATER CONTENT
	TARE NO.		414				
WEIGHT IN GRAMS	TARE PLUS WET SOIL	[illegible]	21.17				
	TARE PLUS DRY SOIL	[illegible]	20.10				
	WATER W_w	[illegible]	1.07				
	TARE	[illegible]	16.12				
	DRY SOIL W_s	[illegible]	3.98				
	WATER CONTENT, % w	26.8	26.9				
	PLASTIC LIMIT		26.6				

REMARKS CLAY (CH)

TECHNICIAN [illegible] COMPUTED BY [illegible] CHECKED BY

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PLATE III-1

WATER CONTENT - GENERAL

DATE _____

PROJECT HOUSTON - GALVESTON NAVIGATION CHANNEL

BORING NO. _____

Sample or Specimen No.			9301 (8)	9301 (9)	9301 (11)	9301 (12)	9302 (9)	9302 7
Tare No.			29	33	61	21	89	34
Weight in grams	Tare plus wet soil		146.93	163.08	126.48	136.87	146.77	158.80
	Tare plus dry soil		122.53	132.90	105.43	115.23	113.73	127.24
	Water	W_w	24.40	30.18	21.05	21.64	33.04	31.56
	Tare		39.26	38.62	38.82	38.88	38.99	38.53
	Dry soil	W_s	83.27	94.28	66.61	76.34	74.74	88.71
Water content		w	29.30%	32.01%	31.60%	28.35%	44.21%	35.58%

Sample or Specimen No.			9302 (12)	93-08 (9)	9308 (11)	9308 (13)	9308 (18)	9308 (20)
Tare No.			65	42	70	12	43	51
Weight in grams	Tare plus wet soil		129.99	119.28	144.05	124.39	96.73	111.14
	Tare plus dry soil		106.54	98.17	117.08	106.57	81.07	89.68
	Water	W_w	23.45	21.11	26.97	17.82	15.66	21.46
	Tare		38.79	38.67	38.50	38.85	38.91	38.59
	Dry soil	W_s	67.75	59.50	78.58	67.72	42.16	51.09
Water content		w	34.61%	35.48%	34.32%	26.35%	37.14%	42.00%

Sample or Specimen No.			9308 (22)	9309 (24)	9309 (30)	9309 (3)	9309 (5)	9309 (8)
Tare No.			53	62	41	3	17	6
Weight in grams	Tare plus wet soil		114.82	138.24	181.71	151.35	133.60	185.71
	Tare plus dry soil		90.41	107.32	138.79	121.78	113.44	153.41
	Water	W_w	24.41	31.42	42.92	29.57	19.16	32.30
	Tare		38.56	38.52	38.41	32.46	32.76	38.53
	Dry soil	W_s	51.85	68.80	100.38	89.32	74.68	114.86
Water content		w	47.10%	45.75%	42.76%	33.15%	25.66%	28.12%

$$w\% = \frac{\text{(tare plus wet soil)} - \text{(tare plus dry soil)}}{\text{(tare plus dry soil)} - \text{(tare)}} \times 100 = \frac{W_w}{W_s} \times 100$$

Remarks _____

_____

Technician _____ Computed by _____ Checked by _____

ENG FORM 3835
1 JUN 65

95% DRAFT

WATER CONTENT - GENERAL

DATE _____

PROJECT HOUSTON-GALVESTON NAVIGATION CHANNEL

BORING NO. _____

Sample or Specimen No.			9309 (12)	9309 (14)	9309 (16)	9309 (18)	9309 (20)	9310 (5)
Tare No.			26	8	50	29	33	37
Weight in grams	Tare plus wet soil		185.61	180.95	153.62	182.55	120.22	151.58
	Tare plus dry soil		150.72	143.11	118.26	138.45	92.05	126.67
	Water	W_w	34.89	37.84	35.36	44.10	28.17	25.31
	Tare		38.59	38.94	38.41	39.25	38.61	39.08
	Dry soil	W_s	112.13	104.17	79.85	99.20	53.44	87.12
Water content		w	31.12 %	36.32 %	44.28 %	44.46%	52.71%	29.05 %

Sample or Specimen No.			9310 (7)	9310 (9)	9310 (14)	9310 (16)	9310 (18)	9310 (19)
Tare No.			64	19	65	34	89	59
Weight in grams	Tare plus wet soil		135.92	177.45	180.28	162.25	199.24	168.12
	Tare plus dry soil		117.19	145.83	147.04	132.15	160.44	130.84
	Water	W_w	18.73	31.62	33.24	30.10	38.80	37.28
	Tare		39.07	38.49	38.78	38.53	39.00	39.08
	Dry soil	W_s	78.12	107.34	108.26	93.62	121.44	91.76
Water content		w	23.98 %	29.46%	30.70 %	32.15%	31.95 %	40.63 %

Sample or Specimen No.			9310 (20)	9310 (22)	9310 (24)	9310 (26)	9329 (5)	9329 (9)
Tare No.			31	53	61	57	38	46
Weight in grams	Tare plus wet soil		131.12	186.57	183.56	169.13	153.54	177.79
	Tare plus dry soil		101.31	142.63	135.27	126.97	124.76	150.46
	Water	W_w	29.81	43.94	47.47	42.16	28.78	27.33
	Tare		39.31	38.52	39.11	39.12	38.89	38.82
	Dry soil	W_s	62.43	104.10	97.07	87.85	85.97	111.64
Water content		w	47.75 %	42.21 %	49.11 %	48.00%	33.48 %	24.48 %

$$w\% = \frac{\text{(tare plus wet soil)} - \text{(tare plus dry soil)}}{\text{(tare plus dry soil)} - \text{(tare)}} \times 100 = \frac{W_w}{W_s} \times 100$$

Remarks _____

Technician _____ Computed by _____ Checked by _____

ENG FORM 1 JUN 65 3835

95% DRAFT

WATER CONTENT - GENERAL

DATE _____

PROJECT HOUSTON-GALVESTON NAVIGATION CHANNEL

BORING NO. _____

Sample or Specimen No.			9329 (10)	9329 (14)	9330 (4)	9330 (11)	9330 (14)	9330 (16A)
Tare No.			20	17	62	41	53	26
Weight in grams	Tare plus wet soil		123.67	120.50	111.40	178.98	175.52	191.64
	Tare plus dry soil		106.69	103.00	93.68	149.70	147.30	149.96
	Water	W_w	16.98	17.50	17.72	29.28	28.22	41.68
	Tare		38.85	38.76	38.52	38.41	38.56	38.58
	Dry soil	W_s	67.84	64.24	55.16	111.29	108.74	111.38
Water content		w	25.03%	27.24%	32.12%	26.31%	25.95%	37.42%

Sample or Specimen No.			9330 (18)	9331 (5)	9331 (6)	9331 (9)	9331 (12)	9331 (17)
Tare No.			8	51	43	9	50	12
Weight in grams	Tare plus wet soil		140.76	124.12	135.17	125.14	134.65	120.47
	Tare plus dry soil		117.33	105.47	115.15	109.05	112.21	100.53
	Water	W_w	23.43	18.65	20.02	16.09	22.44	19.94
	Tare		39.94	38.58	38.91	38.55	38.40	38.85
	Dry soil	W_s	77.39	66.89	76.24	70.50	73.81	61.68
Water content		w	30.28%	27.88%	26.26%	22.82%	30.40%	32.33%

Sample or Specimen No.			9331 (22)	9331 (23)	9335 (4)	9335 (7)	9335 (9)	9335 (11)
Tare No.			70	3	42	17	33	29
Weight in grams	Tare plus wet soil		146.37	106.00	136.68	115.56	178.38	127.50
	Tare plus dry soil		119.06	92.67	115.03	97.12	145.20	107.78
	Water	W_w	27.31	13.33	21.65	18.44	33.18	19.72
	Tare		38.50	38.46	38.66	38.74	38.60	39.36
	Dry soil	W_s	80.56	54.21	76.37	58.38	106.60	68.52
Water content		w	33.90%	24.59%	28.35%	31.57%	31.12%	28.78%

$$w\% = \frac{\text{(tare plus wet soil)} - \text{(tare plus dry soil)}}{\text{(tare plus dry soil)} - \text{(tare)}} \times 100 = \frac{W_w}{W_s} \times 100$$

Remarks _____

Technician _____ Computed by _____ Checked by _____

ENG FORM 1 JUN 65 3835

95% DRAFT

WATER CONTENT - GENERAL

DATE _____

PROJECT HOUSTON-GALVESTON NAVIGATION CHANNEL

BORING NO. _____

Sample or Specimen No.			9337 (4)	9337 (6)	9337 (7)	9337 (11) *	9337 (12)	9337 (13)
Tare No.			37	20	65	19	64	34
Weight in grams	Tare plus wet soil		159.50	133.88	165.77	132.17	129.43	165.30
	Tare plus dry soil		127.12	109.66	133.37	109.74	108.57	136.16
	Water	W_w	32.38	24.22	32.40	22.43	20.86	29.14
	Tare		39.09	38.85	38.78	38.49	39.08	38.53
	Dry soil	W_s	88.03	70.81	94.59	71.25	69.49	97.63
Water content		w	36.78 %	34.20 %	34.25 %	31.48 %	30.02 %	29.85 %

Sample or Specimen No.			9338 (5)	9338 (7)	9338 (9)	9338 (12)	9338 (14)	9338 (15)
Tare No.			68	59	52	21	61	48
Weight in grams	Tare plus wet soil		124.28	167.34	152.28	131.56	132.58	182.04
	Tare plus dry soil		109.19	142.75	124.83	115.60	119.66	158.44
	Water	W_w	15.09	24.59	27.45	15.96	12.92	23.60
	Tare		39.00	39.08	38.53	38.88	38.82	38.82
	Dry soil	W_s	70.19	103.67	86.30	76.72	80.84	119.62
Water content		w	21.50 %	23.72 %	31.81 %	20.80 %	15.98 %	19.73 %

Sample or Specimen No.			9338 (17)	9338 (20)	9338 (24)	9338 (26)	9338 (27)	9338 (28)
Tare No.			32	57	62	26	3	12
Weight in grams	Tare plus wet soil		135.26	165.18	143.04	163.19	148.75	152.66
	Tare plus dry soil		120.66	145.24	118.46	132.95	116.26	125.45
	Water	W_w	14.60	19.94	24.58	30.24	32.49	27.21
	Tare		38.89	39.12	38.52	38.57	38.46	38.85
	Dry soil	W_s	81.77	106.12	79.94	94.36	77.80	86.60
Water content		w	17.85 %	18.79 %	30.75 %	32.05 %	41.76 %	31.42 %

$$w\% = \frac{(\text{tare plus wet soil}) - (\text{tare plus dry soil})}{(\text{tare plus dry soil}) - (\text{tare})} \times 100 = \frac{W_w}{W_s} \times 100$$

Remarks * 9337 - S-11 HAS A 1 1/2 OF SHELL 18.5 - 20.5

Technician [illegible] Computed by [illegible] Checked by _____

ENG FORM 1 JUN 65 3835

95% DRAFT

WATER CONTENT - GENERAL

DATE _____

PROJECT HOUSTON-GALVESTON NAVIGATION CHANNEL

BORING NO. _____

Sample or Specimen No.		9338 (30)	9339 (7)	9339 (9)	9339 (11)	9339 (13)	9339 (18)
Tare No.		43	41	53	51	50	6
Weight in grams: Tare plus wet soil		165.25	120.88	167.33	196.58	148.85	181.11
Tare plus dry soil		143.90	100.61	146.73	168.39	131.42	155.06
Water	W_w	21.25	20.27	21.60	28.19	17.43	26.05
Tare		38.91	38.41	38.56	38.58	38.40	38.55
Dry soil	W_s	104.99	62.20	107.17	129.81	93.02	116.51
Water content	w	20.43 %	32.49 %	20.15 %	21.72 %	18.74 %	22.36 %

Sample or Specimen No.		9339 (19)	9339 (20)	9339 (22) *	9339 (23)	9339 (24)	9340 (6) **
Tare No.		8	70	48	38	37	3
Weight in grams: Tare plus wet soil		190.18	180.63	120.18	179.63	138.64	163.78
Tare plus dry soil		161.31	155.53	104.12	150.23	116.72	127.61
Water	W_w	28.87	25.10	16.06	29.40	21.92	36.17
Tare		38.94	38.50	38.83	38.29	39.09	38.47
Dry soil	W_s	122.37	117.03	65.29	111.34	77.63	89.14
Water content	w	23.59 %	21.45 %	24.60 %	26.40%	28.24 %	40.58 %

Sample or Specimen No.		9340 (8)	9340 (10)	9340 (11)	9340 (14)	9340 (16)	9340 (17)
Tare No.		12	26	62	5[illegible]	[illegible]	17
Weight in grams: Tare plus wet soil		141.56	176.36	158.75	[illegible]	[illegible]	154.65
Tare plus dry soil		118.96	149.90	135.88	150.82	[illegible]	133.90
Water	W_w	22.60	26.46	22.87	17.76	15.51	20.75
Tare		38.85	38.60	[illegible]	[illegible]	[illegible]	38.[illegible]
Dry soil	W_s	80.38	111.30	100.36	111.70	89.78	95.14
Water content	w	28.12 %	23.77 %	22.79 %	15.90 %	17.[illegible] %	21.81 %

$$w\% = \frac{(\text{tare plus wet soil}) - (\text{tare plus dry soil})}{(\text{tare plus dry soil}) - (\text{tare})} \times 100 = \frac{W_w}{W_s} \times 100$$

Remarks * 9339 S-22 (42-44) [illegible]

** 9340 S-6 (16-18)

Technician _____ Computed by _____ Checked by _____

ENG FORM 1 JUN 65 3835

95% DRAFT

WATER CONTENT - GENERAL

DATE _____

PROJECT HOUSTON-GALVESTON NAVIGATION CHANNEL

BORING NO. _____

Sample or Specimen No.		9340 (20)	9340 (22)	9340 (23)	9341 (7)	9341 (8)	9341 (11)
Tare No.		42	33	29	42	17	29
Weight in grams: Tare plus wet soil		151.40	118.29	139.42	127.43	144.46	138.38
Tare plus dry soil		131.16	103.68	121.10	106.83	120.60	115.78
Water	W_w	20.24	14.61	18.62	20.60	23.86	22.60
Tare		38.66	38.62	39.26	38.67	38.76	39.27
Dry soil	W_s	92.50	65.06	81.84	68.16	61.84	76.51
Water content	w	21.88 %	22.46 %	22.75 %	30.22 %	38.58 %	29.54 %

Sample or Specimen No.		9341 (12)	9341 (14)	9341 (18)	9341 (21)	9341 (24)	9341 (26)
Tare No.		20	65	19	64	34	68
Weight in grams: Tare plus wet soil		174.00	126.59	137.30	132.53	138.41	185.88
Tare plus dry soil		143.91	106.40	122.04	115.34	120.80	161.33
Water	W_w	30.09	20.19	15.26	17.19	17.61	24.55
Tare		38.86	38.79	38.50	39.08	38.53	39.00
Dry soil	W_s	105.05	67.61	83.54	76.26	62.27	122.33
Water content	w	28.64 %	29.86 %	18.27 %	22.54 %	28.28 %	20.07 %

Sample or Specimen No.		9341 (27)	9342 (17)	9342 (18)	9342 (19)	9342 (21)	9342 (18)
Tare No.		59	52	21	61	37	33
Weight in grams: Tare plus wet soil		201.6[illegible]	167.10	169.34	182.51	144.83	184.9[illegible]
Tare plus dry soil		178.68	134.[illegible]	147.37	155.22	121.05	152.8[illegible]
Water	W_w	23.01	[illegible]	21.97	27.29	23.78	32.[illegible]
Tare		39.0[illegible]	38.54	38.8[illegible]	38.8[illegible]	39.0[illegible]	38.63
Dry soil	W_s	139.60	[illegible]	108.48	116.39	81.96	[illegible]
Water content	w	16.4[illegible] %	33.[illegible] %	20.[illegible] %	23.45 %	29.0[illegible] %	28.1[illegible] %

$$w\% = \frac{(\text{tare plus wet soil}) - (\text{tare plus dry soil})}{(\text{tare plus dry soil}) - (\text{tare})} \times 100 = \frac{W_w}{W_s} \times 100$$

Remarks _____

Technician _____ Computed by _____ Checked by _____

ENG FORM 1 JUN 65 3835

95% DRAFT

WATER CONTENT - GENERAL

DATE _____

PROJECT HOUSTON-GALVESTON NAVIGATION CHANNEL

BORING NO. _____

Sample or Specimen No.			9343 (19)	9343 (20)	9345 (9)	9345 (10)	9345 (14)	9345 (15)
Tare No.			42	17	29	20	65	19
Weight in grams	Tare plus wet soil		162.51	198.28	183.08	189.96	181.52	137.99
	Tare plus dry soil		128.81	161.17	161.52	166.55	159.92	124.40
	Water	W_w	33.70	37.11	21.56	23.41	21.60	13.49
	Tare		38.67	38.77	39.26	38.87	38.79	38.50
	Dry soil	W_s	90.14	122.40	122.26	127.68	121.13	85.90
Water content		w	37.39 %	30.32 %	17.63 %	18.33%	17.83 %	15.82 %

Sample or Specimen No.			9345 (16)	9345 (18)	9346 (11)	9346 (14)	9346 (16)	9346 (20)
Tare No.			64	34	68	59	43	57
Weight in grams	Tare plus wet soil		167.20	158.11	196.38	194.32	185.42	189.24
	Tare plus dry soil		149.61	135.20	176.27	171.65	164.95	165.71
	Water	W_w	17.59	22.91	20.11	22.67	20.47	23.53
	Tare		39.08	38.54	39.01	39.08	38.92	39.12
	Dry soil	W_s	110.53	96.66	137.26	132.57	126.03	126.58
Water content		w	15.91 %	23.70%	14.65 %	17.10 %	16.24 %	18.59 %

Sample or Specimen No.			9347 (6)	9347 (10)	9347 (12)	9347 (15)	[illegible] 16	[illegible] 19
Tare No.			63	26	13	3	28	41
Weight in grams	Tare plus wet soil		160.50	179.11	185.34	198.33	153.20	131.45
	Tare plus dry soil		131.34	159.10	163.07	184.13	137.84	117.48
	Water	W_w	31.26	20.01	22.27	14.10	15.36	13.97
	Tare		38.74	38.60	38.86	39.17	39.70	39.53
	Dry soil	W_s	93.80	120.50	124.21	145.66	98.34	74.53
Water content		w	33.33 %	16.60 %	17.93 %	9.68 %	15.62 %	18.71 %

$$w\% = \frac{\text{(tare plus wet soil)} - \text{(tare plus dry soil)}}{\text{(tare plus dry soil)} - \text{(tare)}} \times 100 = \frac{W_w}{W_s} \times 100$$

Remarks 9347 - S 10, 13, 15, 16 + 10 HAD SAND STONE

Technician _____ Computed by _____ Checked by _____

ENG FORM 1 JUN 65 3835

95% DRAFT

WATER CONTENT - GENERAL

DATE _____

PROJECT HOUSTON-GALVESTON NAVIGATION CHANNEL

BORING NO. _____

Sample or Specimen No.			9348 (13)	9348 (14)	9348 (18)	9348 (20)		
Tare No.			70	8	9	50	51	53
Weight in grams	Tare plus wet soil		131.32	148.69	197.26	173.12		
	Tare plus dry soil		112.45	127.59	170.38	142.85		
	Water	W_w	18.87	21.10	26.88	30.27		
	Tare		38.51	38.95	38.56	38.41	38.60	38.58
	Dry soil	W_s	73.94	88.64	131.82	104.44		
Water content		w	25.52 %	23.80 %	20.39 %	28.98 %	%	%

Sample or Specimen No.								
Tare No.			41					
Weight in grams	Tare plus wet soil							
	Tare plus dry soil							
	Water	W_w						
	Tare		38.43					
	Dry soil	W_s						
Water content		w	%	%	%	%	%	%

Sample or Specimen No.								
Tare No.								
Weight in grams	Tare plus wet soil							
	Tare plus dry soil							
	Water	W_w						
	Tare							
	Dry soil	W_s						
Water content		w	%	%	%	%	%	%

$$w\% = \frac{\text{(tare plus wet soil)} - \text{(tare plus dry soil)}}{\text{(tare plus dry soil)} - \text{(tare)}} \times 100 = \frac{W_w}{W_s} \times 100$$

Remarks _____

Technician _____ Computed by _____ Checked by _____

ENG FORM 1 JUN 65 3835

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME Houston-Galveston Navigation Channel

LOG OF BORING NO. 93-24

LOCATION/STATION Sta. 57+500, 500 R

DATE/TIME STARTED 7/23/94 1400 hrs
DATE/TIME COMPLETED 7/23/94 16:45

TIDE ELEVATION 2 MLT DATUM, TIME 1330 LOCATION LT. BKN.# 1

WATER DEPTH 22 - 7' (Deck) = 15

DEPTH FROM WATER SURFACE
TO BOTTOM OF BORING 67.5

WEATHER Sunny / HOT

DRILL RIG MANUFACTURE
MODEL NO. Mayhew 200

DRILLER Jim Turner
LOGGER Robert Arnold / Iraj Mostamand

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-24 DATE: BEGIN 7/23/94 PAGE 2 13
JOB NO. 946783.3 COMPLETE 7/23/94 Thin Walled Tube
PROJECT Houston-Galveston Navigation Channel ■ 3" * □ 6"
LOCATION Sta 57+500 ↑ 500 R
ELEVATION OF HOLE -13 MLT (Mud line)
MANUFACTURER'S DESIGNATION OF DRILL RIG Mayhue 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER Sunny / HOT
DRILLER Jim Turner LOGGER Robert Arnold

Torvane Reading	DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
0.0	0		1	0.0 / 0.00	Gray	Clay	Very soft	Silt	Set 22' of casing Sample Bulge on extrusion 0-2'
0.0			2	0.0 / 0.00	Gray	Clay	Very Soft	Silt	Sample Bulge on extrusion 2-4'
0.1			3	0.0 / 0.02	Gray	Clay	Very soft	Silt	
0.1			4	0.0 / 0.02	Gray	Clay	Very soft	Silt	
0.2	10		5	0.0 / 0.04	Gray	Clay	Very soft		
0.1			6	0.0 / 0.02	Gray	Clay	Very soft		
		X	7	W.O.P	Gray	Clay	Very soft		
0.1			8	0.0 / 0.02	Gray	Clay	Very soft		
0.2	15		9	0.0 / 0.04	Gray	Clay	Very soft		- Set 10' of casing (Total 32')
0.2			10	0.0 / 0.04	Gray	Clay	Very soft		
0.2			11	0.0 / 0.04	Gray	Clay	Very soft		- Sample Bulge on extrusion 18-20'
0.1	20		12	0.0 / 0.02	Gray	Clay	Very soft		- Sample Bulge on extrusion 20-22'
		X	13	W.O.P	Gray	Clay	Very soft		
0.0			14	0.0 / 0.00	Gray	Clay	Very soft		- Sample Bulge on extrusion 23.5-24'
0.0	25		15	0.0 / 0.00	Gray	Clay	Very soft		* Pushed 6"-Tube NO Recovery Used Liner Sampler Recovered 3 (2 1/2 x 6") Liner 24'-26'
0.1			16	0.0 / 0.02	Gray	Clay	Very soft		
0.2			17	0.0 / 0.04	Gray	Clay	Very soft		
	30	X	18	W.O.P	Gray	Clay	Very soft		
0.1			19	0.0 / 0.02	Gray	Clay	Very soft		
0.0			20	0.0 / 0.00	Gray	Clay	Very soft		* Pushed 6"-Tube NO Recovery Used liner Sampler Recovered 3 (2 1/2 x 6") Liner 32'-34'
0.05	35		21	0.0 / 0.01	Gray	Clay	Very soft		Sand at bottom of Sample

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-24 DATE: BEGIN 7/23/94 PAGE 3 13
JOB NO. 946783.3 COMPLETE 7/23/94 Thin Walled Tube
PROJECT Horston-Galveston Navigation channel ■ 3" □ 6"
LOCATION Sta 57+500 500' R
ELEVATION OF HOLE -13 MLT (Mud line)
MANUFACTURER'S DESIGNATION OF DRILL RIG Mylme 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER Sunny / Hot
DRILLER Jim Turner LOGGER Robert Arnold

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSIS-TENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35				Gray	Clay	Very Soft		Sand @ 36'
	X	22	13 18 23	Gray	Sand	dense	Silt	
40	X	23	16 18 40	Gray	Sand	very dense	Silt	
45	X	24	8 15 28	Gray	Sand	Dense	Silt	
50	X	25	11 20 32	Gray	Sand	Very Dense	Silt	
								-15' of water
55								W.O.P: Weight of Pipe
								Torvane Multiplier 0.2
60								
65								
70								

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME Houston - Galveston Navigation channel

LOG OF BORING NO. 93-25

LOCATION/STATION Sta, 53+400, 500L

DATE/TIME STARTED 7-24-94 : 7:40
DATE/TIME COMPLETED 7-24-94 10:30

TIDE ELEVATION 1.5 MLT DATUM, TIME ~~7:30~~ LOCATION LT. BKN.# 1

WATER DEPTH ~~18.5~~ 7 (Dock) = 11.5

DEPTH FROM WATER SURFACE
TO BOTTOM OF BORING 66.5

WEATHER cloudy

DRILL RIG MANUFACTURE
MODEL NO. Mythe 200

DRILLER Jim Turner
LOGGER Ivy Mostamand / Robert Arnold

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-25 DATE: BEGIN 7-24-94 PAGE 2 13
JOB NO. 96783.3 COMPLETE 7-24-94 Thin Walled Tube
PROJECT Houston Galveston Navigation Channel ■ 3" ☐ 6"
LOCATION Sta 53+400, 500L
ELEVATION OF HOLE -10 MLT (Mud line)
MANUFACTURER'S DESIGNATION OF DRILL RIG Mythic 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER cloudy
DRILLER Jim Turner LOGGER Iraj Mostanan / Robert Arnold

Torvane Reading	DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
	0								
0.0			1	0.0/0.00	Gray	Clay	very soft	Silt	* Set 23' of casing Sample Fell out of Tube 0-2' Shell Fragments 0-15'
0.0			2	0.0/0.00	Gray	clay	very soft	Silt	
0.2			3	0.0/0.04	Gray	clay	very soft	Silt	
0.0			4	0.0/0.00	Gray	clay	very soft	Silt	
0.2			5	0.0/0.04	Gray	clay	very soft		
	10								
0.2			6	0.0/0.04	Gray	clay	very soft		
0.3			7	0.0/0.06	Gray	clay	very soft		
0.2			8	0.0/0.04	Gray	clay	very soft		- Set 10' of casing (Total 33')
	15								
0.1			9	WOP	Gray	clay	very soft		
			10	0.0/0.02	Gray	clay	very soft		
0.1			11	0.0/0.02	Gray	clay	very soft		
0.2			12	0.0/0.04	Gray	clay	very soft		
0.0			13	0.0/0.00	Gray	clay	very soft		
0.0			14	0.0/0.00	Gray	clay	very soft		- sample bulged on extrusion 21-25' - with organic material 25'-31'
	25								
			15	WOP	Gray	clay	very soft		
0.0			16	0.0/0.00	Gray	clay	very soft		
0.1			17	0.0/0.02	Gray	clay	very soft		* Pushed 6" - sample fell out at tube (Jar Sample)
0.0	30		18	0.0/0.00	Gray	clay	very soft		
			19		Gray	Sand	med dense	Silt	- Sand @ 31'-1
			20	3/4/6	Gray	Sand	med dense	Silt	
	35								* Pushed 6" tube NO Recovery 35-37' (Sand), Took Split-Spoon Sample
			21	4/8/11	Gray	Sand	med dense	Silt	

95% DRAFT

BORING NO. 93-25 DATE: BEGIN 7-24-94 PAGE 3 13
JOB NO. 946783.3 COMPLETE 7-24-94 Thin Walled Tube
PROJECT Houston Galveston Navigation Channel ■ 3" □ 6"
LOCATION Sta. 53+400, 500L
ELEVATION OF HOLE -10 MLT (Mud line)
MANUFACTURER'S DESIGNATION OF DRILL RIG Mylue 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER Cloudy
DRILLER Jim Turner LOGGER Iraj Nastamand / Robert Pernold

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE / SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35								
40	X	22	4 5 6	Gray	Sand	med dense	silt	
45	X	23	2 4 6	Gray	Sand	med dense	Silt	* with clay seams
50	X	24	6 12 16	Gray	Sand	med dense	silt	
		25	0.75	Brown	Clay	med stiff		* clay @ 53'
55								-11.5' of water -W.O.P: Weight of Pipe, Multiplier for Torvane Reading is 0.2
60								
65								
70								

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

ROJECT NAME HOUSTON GALVESTON NAVIGATION CHANNEL

OG OF BORING NO. 93-26.

OCATION/STATION Sta 51 + 60.0, 500R

ATE/TIME STARTED 7-29-94 9:50
DATE/TIME COMPLETED 7-29-94 1:50

IDE ELEVATION 2 MLT DATUM, TIME 6:30 LOCATION LT. BKN.# 1

WATER DEPTH 22 - 7 (DECK) = 15

DEPTH FROM WATER SURFACE
BOTTOM OF BORING 67

EATHER PARTLY CLOUDY SUNNY + HOT

RILL RIG MANUFACTURE
MODEL NO. MAYHEW 20

RILLER JIM TURNER
LOGGER JOHN A. GENTRY ROBERT ARNOLD, KRISHNA GOPARAJU

DRILLER'S/LOGGER'S COMMENTS LOST CIRCULATION ~10 FT USED 7 RACS OF GEL

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS

BORING NO. 9326 DATE: BEGIN 7-29-94 PAGE 2 / 3
JOB NO. 94G783.3 COMPLETE 7-29-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ■ 3" * □ 6"
LOCATION STA 51 +600, 500 R
ELEVATION OF HOLE -13 MLT (Mud line)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY & HOT
DRILLER JIM TURNER LOGGER JOHN AGENTRY / ROBERT ARNOLD

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
or one Reading 0	X	1	W.O.H	GRAY	SAND	Very loose	SILTY	-w/Shell Fragments SET 28 FT OF CASING
5	X	2	W.O.H	GRAY	SAND	Very loose	SILTY	-w/Shell Fragments
0.3	■	3	0/0.06	GRAY	CLAY	VERY SOFT		-w/ ORGANICS 8'-10
10	J	4		GRAY	SAND	MEDIUM DENSE	SILTY	Jar Sample 10-12' -w/Shell Fragments 10-12'
25	X	5	12 12 14	GRAY	SAND	MEDIUM DENSE	SILTY	
-26.5								
15								
	X	6	9 14 18	GRAY	SAND	DENSE	SILTY	
20								
-36								
	X	7	3 5 9	GRAY	SAND	MEDIUM DENSE	SILTY	
-36.5								
-37	X	8	8 10 11	GRAY	SAND	MEDIUM DENSE	SILTY	* Pushed 6" Tube @ 24' No Recovery Due to Sand -split spoon @ 24'
-38.5 25								
	X	8A	6 11 13	Gray	Sand	Medium Dense	Silty	
-43 30	X	9	9 10 12	GRAY	SAND	MEDIUM DENSE	SILTY	
-44.5								
-45	X	10	10 12 14	GRAY	SAND	MEDIUM DENSE	SILTY	* Pushed 6" Tube @ 32' No Recovery Due to Sand split spoon
45.5								
35								

95% DRAFT

GEOTEST ENGINEERING INC

U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-36 DATE: BEGIN 7-29-94 PAGE 3 / 3
JOB NO. 94G 783.3 COMPLETE 7-29-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ■ 3"ϕ ☐ 6"
LOCATION 37a 517600 506R
ELEVATION OF HOLE -13 MLT (Mud line)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY & HOT
DRILLER JIM TURNER LOGGER JOANA GENTRY / ROBERT ARNOLD

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35	X	11	19 18 28	GRAY	SAND	DENSE	SILTY	COARSE 37 - 47.5
40	X	12	12 15 27	GRAY	SAND	DENSE	SILTY	
45	X	13	10 14 23	GRAY	SAND	DENSE	SILTY	clay at 48.5'
50		14	4.25	BROWN	CLAY	HARD		
		15	1.25	BROWN	CLAY	STIFF		w/calc nod 50-52'
55								Torvane Multiplier 0.2 W.O.H: Weight of Hammer J: Jar sample
60								
65								
70								

95% DRAFT

GEOTEST ENGINEERING, INC.

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME HOUSTON GALVESTON NAVIGATION CHANNEL

LOG OF BORING NO. 93-27

LOCATION/STATION STA. 48+400, 500L

DATE/TIME STARTED 7-29-94 2:05
DATE/TIME COMPLETED 7-29-94 5:30

TIDE ELEVATION 2 MLT DATUM, TIME 2:00 LOCATION LT. BKN.# 1

WATER DEPTH 18 - 7(DECK) = 11

DEPTH FROM WATER SURFACE TO BOTTOM OF BORING 67

WEATHER PARTLY CLOUDY SUNNY & HOT

DRILL RIG MANUFACTURER MODEL NO. MAYHEW 200

DRILLER JIM TURNER
LOGGER JOHN A. CENTRY, KRISHNA GOPARAJU, ROBERT ARNOLD

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

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U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-27 DATE: BEGIN 7-29-94 PAGE 2 13
JOB NO. 94G783.3 COMPLETE 7-29-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNELS ☐ 3" ★ ☐ 6"
LOCATION Sta 487+00, 500L
ELEVATION OF HOLE -9' MLT (Mudline)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY & HOT
DRILLER JIM TURNER LOGGER JOHN AGENTRY ROBERT ARNOLD

Pocket Pen. Reading	DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
	0	X	1	WOP	GRAY	SAND	VERY loose	SILTY	-w SHELL 0'-5' SET 28FT of CASING
	5	X	2	1/1-12"	GRAY	CLAY	VERY SOFT		-w/shell Fragments 5-6.5' -w/ SAND SEAMS 5'-23'
0.1			3	0/0.02	GRAY	CLAY	VERY SOFT		
0.2	U		4	0/0.04	GRAY	CLAY	VERY SOFT		
0.3	10		5	0/0.06	GRAY	CLAY	VERY SOFT		
0.3			6	0/0.04	GRAY	CLAY	VERY SOFT		
0.2	U 15		7	0/0.04	GRAY	CLAY	VERY SOFT		
		X	8	WOP	GRAY	CLAY	VERY SOFT		Jar sample (Pocket Pen. Reading 0.00)
0.1			9	0/0.02	GRAY	CLAY	VERY SOFT		
0.1	20		10	0/0.02	GRAY	CLAY	VERY SOFT		
0.1			11	0/0.02	GRAY	CLAY	VERY SOFT		Sample Bulge on Extrusion 21'-23' -w/ ORGANICS 23'-26'
0.2	U		12	0/0.04	GRAY	CLAY	VERY SOFT		
0.2	25		13	0/0.04	GRAY	CLAY	VERY SOFT		
		X	14	WOP	GRAY	CLAY	VERY SOFT		(Pocket Pen. Reading 0.00)
0.2			15	0/0.04	GRAY	CLAY	VERY SOFT		Sample Bulge on Extrusion 26.5-27'
0			16	0/0	GRAY	CLAY	VERY SOFT		★ Pushed 6" Tube No recovery Used liner Sampler Recovered... 3 (2½x6") liner
	30	X	17	9/18	GRAY	SAND	MEDIUM DENSE	SILTY	COARSE 30': JS.S.
	35	X	18	9/14	GRAY	SAND	MEDIUM DENSE	SILTY	

95% DRAFT

BORING NO. 93-27 DATE: BEGIN 7-24-94 PAGE 3 / 3
JOB NO. 94G783.3 COMPLETE 7-29-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ■ 3" * □ 6"
LOCATION Sta. 481+00 500L
ELEVATION OF HOLE -9' MLT (MUD line)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY & HOT
DRILLER JIM TURNER LOGGER JOHN A. CANTRY ROBERT ARNOLD

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35	X	19	9, 12, 14	GRAY	SAND	Medium DENSE	SILTY	* Pushed 6" Tube NO Recovery Due to Sand @ 36', Split spoon
40	X	20	9, 13, 15	Gray	Sand	Med. Dense	SILTY	
45	X	21	10, 14, 18	Gray	Sand	Dense	SILTY	
50	X	22	10, 15, 20	Gray	Sand	DENSE	SILTY	
55	X	23	14, 22, 31	Gray	Sand	VERY DENSE	SILTY	
60								Torvane Multiplier 0.2 W.O.P: weight of Pipe
65								
70								

95% DRAFT

GEOTEST ENGINEERING, INC.

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME HOUSTON GALVESTON NAVIGATION CHANNEL

LOG OF BORING NO. 93-98

LOCATION/STATION 46+600, 500R

DATE/TIME STARTED 7-30-94 9:10
DATE/TIME COMPLETED 7-30-94 11:40

TIDE ELEVATION 2 MLT DATUM, TIME 8:20 LOCATION LT. BKN.# 1

WATER DEPTH 22 - 7 (DECK) = 15

DEPTH FROM WATER SURFACE TO BOTTOM OF BORING 67

WEATHER PARTLY CLOUDY SUNNY, HOT + WINDY

DRILL RIG MANUFACTURE
MODEL NO. MAYHEW 200

DRILLER JIM TURNER
LOGGER JOHN A. CENTRY

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-28 DATE: BEGIN 7-30-94 PAGE 2 / 3
JOB NO. 94C 783.3 COMPLETE 7-30-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ■ 3"* □ 6"
LOCATION 46+600 500R
ELEVATION OF HOLE -13 MLT (MUD LINE)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHE 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNN + HOT + WINDY
DRILLER JIM TURNER LOGGER JOHN A. GENTRY

Torvane Reading	DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE / SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
0	0	J	1	0/0.0	GRAY	CLAY	VERY SOFT	SILTY	-Sample Fell out of Tube Jar sample 0-2' SET 28 FT OF CASING -w/ Shell 0-4'
0.25			2	0/0.05	GRAY	CLAY	VERY SOFT		
0.2	5		3	0/0.04	GRAY	CLAY	VERY SOFT		
0.3			4	0/0.06	GRAY	CLAY	VERY SOFT		
0.3			5	0/0.06	GRAY	CLAY	VERY SOFT		
0.2	10		6	0/0.04	GRAY	CLAY	VERY SOFT		
		X	7	WOP	GRAY	CLAY	VERY SOFT		(Pocket Pen. Reading 0.00).
0.5			8	0/0.10	GRAY	CLAY	VERY SOFT		
0.3	15		9	0/0.06	GRAY	CLAY	VERY SOFT		
0.3			10	0/0.06	GRAY	CLAY	VERY SOFT		
0.4			11	0/0.08	GRAY	CLAY	VERY SOFT		-w/ ORGANIC material 18'-21
0.5	20		12	6/0.30	GRAY	CLAY	VERY SOFT		-w/ SAND LAYER 21.5-22'
		X	13	13 28 38	GRAY	SAND	VERY DENSE	SILTY	FINE
	25	X	14	8 19 28	GRAY	SAND	DENSE	SILTY	*Pushed 6" tube NO Recovery Due to Sand split spoon @ 24' ADD 10 FT OF CASING TOTAL 38 FT OF CASING
		X	15	12 14 19	GRAY	SAND	DENSE	SILTY	
	30	X	16	10 14 20	GRAY	SAND	DENSE	SILTY	
		X	17	9 13 18	GRAY	SAND	DENSE	SILTY	* Pushed 6" Tube No recovery Due to Sand, split spoon @ 32'
	35								

95% DRAFT

GEOTEST ENGINEERING, INC.

BORING NO. 93-28 DATE: BEGIN 7-30-94 PAGE 2 of 3
JOB NO. 94C 783.3 COMPLETE 7-30-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ☒ 3" ☐ 6"
LOCATION Sta 46+600 500R
ELEVATION OF HOLE -13 MLT (MUD LINE)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY & HOT
DRILLER JIM TURNER LOGGER JOHN A. GENTRY

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35				GRAY	SAND	DENSE	SILTY	COARSE 35'-42'
	X	18	10 16 20	GRAY	SAND	DENSE	SILTY	W/GRAVEL 36-42'
40								CLAY AT 42'
		19	1.75	GRAY	CLAY	STIFF		
45		20	1.75	GRAY	CLAY	STIFF		+BROWN 44'-46'
		21	0.75	GRAY	CLAY	MEDIUM STIFF	SANDY	+BROWN 46'-52'
		22	1.75	GRAY	CLAY	STIFF	SANDY	
50		23	3.25	GRAY	CLAY	VERY STIFF		
55								Torvane Multiplier 0.2
								W.O.P: Weight of Pipe
								J: Jar Sample
60								
65								
70								

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME HOUSTON GALVESTON NAVIGATION CHANNEL

LOG OF BORING NO. 93-29

LOCATION/STATION Sta 437400, 500L

DATE/TIME STARTED 7-30-94 12:55
DATE/TIME COMPLETED 7-30-94 4:00

TIDE ELEVATION 1.5 MLT DATUM, TIME 12:29 LOCATION LT. BKN.# 68

WATER DEPTH 22 - 7(DECK) = 15

DEPTH FROM WATER SURFACE
BOTTOM OF BORING 66.5

WEATHER PARTLY CLOUDY/SUNNY HOT & WINDY

DRILL RIG MANUFACTURE
MODEL NO. MAYHEW 200

DRILLER JIM TURNER
LOGGER JOHN A. GENTRY

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-29 DATE: BEGIN 7-30-94 PAGE 2 13
JOB NO. 94G7B3 3 COMPLETE 7-30 94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ☒ 3" * ☐ 6"
LOCATION Stg 437400, 500L
ELEVATION OF HOLE -13.5' MLT (Mud line)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY HOT & WINDY
DRILLER JIM TURNER LOGGER JOHN ACENTRY

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
ne Readings 0								
0	J	1	0%/0.00	GRAY	CLAY	VERY SOFT		Sample Fell out of Tube Jar Sample 0-2'
B.1		2	P/0.02	GRAY	CLAY	VERY SOFT		SET 28 FT OF CASING
	U	3	1.0	GRAY	CLAY	STIFF		+ BROWN 4'-6
		4	2.0	GRAY	CLAY	VERY STIFF		+ REDISH BROWN 6'-8
	WFC	5	2.0	REDISH BROWN	CLAY	VERY STIFF		
10		6	2.0	REDISH BROWN	CLAY	VERY STIFF		- W/Calcarous nodules 10'-12'
	X	7	6, 7/10	REDISH BROWN	CLAY	VERY STIFF		(Pocket Pen. Reading 2.25.)
	U	8	2.75	REDISH BROWN	CLAY	VERY STIFF		
15								
	WFC	9	2.75	REDISH BROWN	CLAY	VERY STIFF		- W/Silt POCKETS 15'-17
	WFC	10	0.75	REDISH BROWN	CLAY	MEDIUM STIFF	SILTY	- W/CLAY LAYER 17-17.5
20	J	11		REDDISH BROWN	SILT	DENSE	SANDY	Jar Sample 19-21'
	X	12	10, 14, 17	REDDISH BROWN	SILT	DENSE	SANDY	CLAY AT 23.5'
	WFC	13	2.5	Reddish BROWN	CLAY	VERY STIFF		* 6"-Diameter Sample 23.5-25.5'
25		14	1.00	Reddish Brown	CLAY	STIFF	SILTY	Pushed Tube 25.5-27.5 Sand layer 26-27.5' S#15
	J	15		Reddish Brown	SAND	MEDIUM DENSE	SILTY	Jar Sample 26-27.5'
	X	16	7, 9, 11	Reddish Brown	SAND	MEDIUM DENSE	SILTY	
30	X	17	9, 10, 14	GRAY	SAND	MEDIUM DENSE	SILTY	
	X	18	8, 10, 15	GRAY	SAND	MEDIUM DENSE	SILTY	* Pushed 6"-Tube NO Recovery Due to Sand, Split Spoon @ 31.5'
								CLAY AT 35'
35								

95% DRAFT

BORING NO. 93-29 DATE: BEGIN 7-30-94 PAGE 3 13
JOB NO. 946783.3 COMPLETE 7-30-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ☒ 3" ☐ 6"
LOCATION STA 437+60 500 L
ELEVATION OF HOLE -13.5' MLT (Mud line)
MANUFACTURER'S DESIGNATION OF DRILL RIG
GROUNDWATER: DEPTH ft., ELEV. ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY HOT & WINDY
DRILLER JIM TURNER LOGGER JOHN A. GENTRY

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35		19	1.5	REDISH BROWN	CLAY	STIFF		GRAY 35'-43' -W/SILTY SEAM @ 35-37'
		20	2.0	REDISH BROWN	CLAY	VERY STIFF		
40		21	1.75	BROWN	CLAY	STIFF		
		22	1.75	BROWN	CLAY	STIFF		
		23	1.75	GRAY	CLAY	STIFF		
45		24	2.0	GRAY	CLAY	VERY STIFF		
		25	2.0	GRAY	CLAY	VERY STIFF		
50		26	2.25	GRAY	CLAY	VERY STIFF		-W/SHELL FRAGMENTS
		27	3.0	GRAY	CLAY	VERY STIFF		
55								Torvane multiplier 0.2 J: Jar Sample
60								
65								
70								

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME HOUSTON GALVESTON NAVIGATION CHANNEL

LOG OF BORING NO. 93-30

LOCATION/STATION Sta 41+600 500R

DATE/TIME STARTED 8-1-94 8:05
DATE/TIME COMPLETED 8-1-94 11:05

TIDE ELEVATION 2.5 MLT DATUM, TIME 7:15 LOCATION LT. BKN.# 68

WATER DEPTH 22 - 7(DECK) = 15

DEPTH FROM WATER SURFACE
BOTTOM OF BORING 67.5

WEATHER PARTLY CLOUDY SUNNY & HOT

DRILL RIG MANUFACTURE
MODEL NO. MAYHEW 200

DRILLER JIM TURNER
LOGGER JOHN A. GENTRY

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

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U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-30 DATE: BEGIN 8-1-94 PAGE 2 13
JOB NO. 94G783.3 COMPLETE 8-1-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNA ☒ 3"* ☐ 6"
LOCATION STA 41+600, 500R
ELEVATION OF HOLE -12.5' MLT (Mud line)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW-200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY CHOPPY WINDY
DRILLER JIM TURNER LOGGER JOHN A GENTRY

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSIS-TENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
0	X	1	P 33	GRAY	Shells & shell Frags	loose	sand	-W/ SHELL 0-1.5, SET CASING 28'
		2	1.5	GRAY	CLAY	STIFF		↓BROWN 0'-5.5'
5		3	1.75	GRAY	CLAY	STIFF		↓REDISH BROWN 3.5-5.5
	WES	4	2.25	REDISH BROWN	CLAY	VERY STIFF		
		5		REDISH BROWN	SAND	MEDIUM DENSE	SILTY	*FINE 7.5-12.5 Jar Sample 7.5-9.5'
10	X	6	9 11 17	REDISH BROWN	SAND	MEDIUM DENSE		
	X	7	8 13 19	REDISH BROWN	SAND	DENSE	SILTY	
15								
	X	8	5 7 9	REDISH BROWN	SAND	MEDIUM DENSE	SILTY	-W/SHELL FRAGMENTS clay @ 19'
20		10	1.75	REDISH BROWN	CLAY	STIFF		
		11	2.5	REDISH BROWN	CLAY	VERY STIFF		
	X	12	8 10 15	REDISH BROWN	CLAY	VERY STIFF		(Pocket Pen. 3.75)
			3.75	Redish Brown	CLAY	VERY STIFF		SET 2FT CASING TOTAL 30'
25		13	3.75	REDISH BROWN	CLAY	very stiff		↓GRAY 24.5--36.5
	WES	14	1.75	REDISH BROWN	CLAY	STIFF		* 6"-Diameter Sample 24.5-26.5'
		15	1.75	REDISH BROWN	CLAY	STIFF		-W/SILTY SEAMS 29-33'
30	X	16	5 8 8	REDISH BROWN	CLAY	VERY STIFF		(Pocket Pen. 2.00)
			1.5	REDISH BROWN	CLAY	STIFF		
		17	2.75	REDISH BROWN	CLAY	VERY STIFF		* 6"-Diameter Sample 32.5-34.5
35		18	2.75	REDISH BROWN	CLAY	VERY STIFF		

95% DRAFT

BORING NO. 93-30 DATE: BEGIN 8-1-94 PAGE 3 13
JOB NO. 94G783.3 COMPLETE 8-1-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANN ■ 3" ✗ □ 6"
LOCATION STG 417600,5001
ELEVATION OF HOLE -12.5' MLT (MUD LINE)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY ; CHOPPY & WINDY
DRILLER JIM TURNER LOGGER JOHN A. CENTER

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35								
		19	2.25	REDISH BROWN	CLAY	VERY STIFF		& GRAY 36-52 J
40		20	2.25	REDISH BROWN	CLAY	VERY STIFF		
		21	2.25	REDISH BROWN	CLAY	VERY STIFF		
		22	2.25	REDISH BROWN	CLAY	VERY STIFF		
45		23	2.25	REDISH BROWN	CLAY	VERY STIFF		
		24	2.25	REDISH BROWN	CLAY	VERY STIFF		
50		25	1.75	REDISH BROWN	CLAY	STIFF		
		26	2.0	REDISH BROWN	CLAY	VERY STIFF		
55								J: Jar Sample
60								
65								
70								

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME HOUSTON GALVESTON NAVIGATION CHANNEL

LOG OF BORING NO. 93-31

LOCATION/STATION STA 387+00 500L

DATE/TIME STARTED 8-1-94 11:45
DATE/TIME COMPLETED 8-1-94

TIDE ELEVATION 2.5 MLT DATUM, TIME 1120 LOCATION LT. BKN.# 68

WATER DEPTH 20 - 7 (DECK) = 13

DEPTH FROM WATER SURFACE
BOTTOM OF BORING 68

WEATHER PARTLY CLOUDY SUNNY & HOT

DRILL RIG MANUFACTURE
MODEL NO. MAYHEW 20V

DRILLER JIM TURNER
LOGGER JOHN A. CANTEY

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-31 DATE: BEGIN 8-1-94 PAGE 2 / 3
JOB NO. 94G 783.3 COMPLETE 8-1-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ☑ 3" * ☐ 6"
LOCATION Sta 38+400, 500 L
ELEVATION OF HOLE -10.5' MLT (Mudline)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNN + HOT
DRILLER JIM TURNER LOGGER JOHN AGENTRY

Torvane Reading	DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE / SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
0.05	0		1	0.00/0.01	GRAY	CLAY	VERY SOFT		Sample Bulge on extrudsion 0-2' Set 28' ft of casing
0.1			2	0/0.02	GRAY	CLAY	VERY SOFT		+ BROWN 0'-2 SET 28 FT OF CASING - W/SAND SEAMS 2'-5'
	5		3	1.5	BROWN	CLAY	STIFF		GRAY 4'-10
			4	2.25	REDISH BROWN	CLAY	VERY STIFF		
	WES		5	2.25	REDISH BROWN	CLAY	VERY STIFF		- W/CLAY STONE 9'-10'
	10 WES		6	1.25	REDISH BROWN	CLAY	STIFF	SILTY	Sand at Bottom of Sample
		X	7	3 4 7	REDISH BROWN	SAND	MEDIUM DENSE	SILTY	FINEY 2'-12
	15	X	8	4 6 8	REDISH BROWN	SAND	MEDIUM DENSE	SILTY	Clay AT 16'
	WES		9	1.5	REDISH BROWN	CLAY	STIFF	SILTY	- W/SILT LAYER 16.5-17.5
	U		10	2.0	REDISH BROWN	CLAY	VERY STIFF		- W/SILT - SEAMS 18'-19'
	20 DS		11	2.75	REDISH BROWN	CLAY	VERY STIFF		
	WES		12	3.5	REDISH BROWN	CLAY	VERY STIFF		
			13	3.5	REDISH BROWN	CLAY	VERY STIFF		
	25	X	14	5 10 15	REDISH BROWN	CLAY	VERY STIFF		(Pocket Pen. 2.75)
			15	3.0	REDISH BROWN	CLAY	VERY STIFF		APP 2 FT OF CASING TOTAL 30 FT.
	WES		16	3.0	REDISH BROWN	CLAY	VERY STIFF		* 6" - Diameter Sample 26.5-28.5
	WES 30		17	2.5	REDISH BROWN	CLAY	VERY STIFF		
			18	2.5	REDISH BROWN	CLAY	VERY STIFF		
		X	19	6 8 12	REDISH BROWN	CLAY	VERY STIFF		(Pocket Pen. 2.5)
			20	2.5	REDISH BROWN	CLAY	VERY STIFF		
	35 WES		21	1.75	REDISH BROWN	CLAY	STIFF		* 6" - Diameter Sample 34.5-36.5

95% DRAFT

GEOTEST ENGINEERING, INC.

BORING NO. 93-31 DATE: BEGIN 8-1-94 PAGE 3 13
JOB NO. 94G 783.3 COMPLETE _____ Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ■ 3" ★ □ 6"
LOCATION STG 387400 5002
ELEVATION OF HOLE -10.5' MLT (MUD LINE)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH _____ ft., ELEV. _____ ft., at end of Drilling
WEATHER PARTLY CLOUD SUNNY, HOT, WINDY
DRILLER JIM TURNER LOGGER JOHN A. CENTER

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35								
	WES	22	1.75	BROWN	CLAY	STIFF		+ GRAY 36'-38'
	WES	23	1.75	GRAY	CLAY	STIFF		
40		24	0.75	GRAY	CLAY	MEDIUM STIFF	SILTY	
		25	0.75	GRAY	CLAY	MEDIUM STIFF	SILTY	
45		26	1.75	GRAY	CLAY	STIFF		
		27	2.25	GRAY	CLAY	VERY STIFF		
		28	2.25	GRAY	CLAY	VERY STIFF		+ BROWN 48'-54.5
50		29	2.5	GRAY	CLAY	VERY STIFF		
		30	2.25	GRAY	CLAY	VERY STIFF		
	M	31	1.75	GRAY	CLAY	STIFF		
55								Torvane Multiplier 0.2
60								
65								
70								

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME HOUSTON GALVESTON NAVIGATION CHANNEL

LOG OF BORING NO. 93-32

LOCATION/STATION Sta 361+600 500R

DATE/TIME STARTED 8-2-94 9:40
DATE/TIME COMPLETED 8-2-94 12:50

TIDE ELEVATION 2.5 MLT DATUM, TIME 8:25 LOCATION LT. BKN.# 68

WATER DEPTH 20 - 7 (TOECK) = 13

DEPTH FROM WATER SURFACE
BOTTOM OF BORING 67.5

WEATHER PARTLY CLOUDY SUNNY HOT & WINDY

DRILL RIG MANUFACTURE
MODEL NO. MAYHEW 20

DRILLER JIM TURNER
LOGGER JOHN A. GENTRY

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-32 DATE: BEGIN 8-2 94 PAGE 2 13

JOB NO. 94G7833 COMPLETE 8-2-94 Thin Walled Tube

PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ☒ 3"* ☐ 6"

LOCATION Sta 36+600, 500R

ELEVATION OF HOLE -10.5' MLT (MUD LINE)

MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200

GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling

WEATHER PARTLY CLOUDY SUNNY HOT + WINDY

DRILLER JIM TURNER LOGGER JOHN A. GENTRY

Torvane Readings	DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE / SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
	0								
0.05			1	0.00/0.01	GRAY	CLAY	VERY SOFT		-w/shell Fragments 0-2' -Sample Bulge on extrusion 0-4' SET 23 FT OF CASING
0.10			2	0.0/0.02	GRAY	CLAY	VERY SOFT		+ BROWN 3'-4'
0.1	5		3	0/0.02	GRAY	CLAY	VERY SOFT		
0.2			4	0/0.04	GRAY	CLAY	VERY SOFT		
0.3			5	0/0.06	GRAY	CLAY	VERY SOFT		
0.3	10		6	0/0.06	GRAY	CLAY	VERY SOFT		
0.4			7	0/0.08	GRAY	CLAY	VERY SOFT		
0.5			8	0/0.10	GRAY	CLAY	VERY SOFT		
	15	X	9	W.O.H	GRAY	CLAY	VERY SOFT		ADD 10 FT of casing TOTAL 33 FT. OF CASING
0.5			10	0/0.10	GRAY	CLAY	VERY SOFT		
0.6			11	0/0.12	GRAY	CLAY	VERY SOFT		
0.6	20		12	0/0.12	GRAY	CLAY	VERY SOFT		
0.4			13	0/0.08	GRAY	CLAY	VERY SOFT		-W/SAND SEAMS 22'-30.5
0.4			14	0/0.08	GRAY	CLAY	VERY SOFT		
	25	X	15	W.O.H	GRAY	CLAY	VERY SOFT		
0.45			16	0/0.09	GRAY	CLAY	VERY SOFT		
0.5			17	0/0.10	GRAY	CLAY	VERY SOFT		* PUSH 6" TUBE NO RECOVERY PUSH LINER SAMPLER 26.5-28.5 4 LINERS RECOVERY
0.4	30		18	0/0.08	GRAY	CLAY	VERY SOFT		
0.3			19	0/0.06	GRAY	CLAY	VERY SOFT	SANDY	
		X	20	W.O.H	GRAY	CLAY	VERY SOFT	SANDY	
0.1			21	0/0.02	GRAY	CLAY	VERY SOFT	SANDY	SAMPLE BULGE WHILE EXTRUDING 34-35.5 -WSHELL 34-35.5
0.1	35		22	0/0.02	GRAY	CLAY	VERY SOFT	SANDY	* PUSH 6" TUBE NO RECOVERY PUSH LINER SAMPLER 34.5-36.5 3 LINER RECOVERY

95% DRAFT

GEOTEST ENGINEERING, INC.

BORING NO. 93-32 DATE: BEGIN 8-2-94 PAGE 3 13
JOB NO. 94C783.3 COMPLETE 8-2-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION ■ 5" ✱ □ 6"
LOCATION STA 367+00 500R
ELEVATION OF HOLE -10.5' MLT (MUD line)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUD SUNNY WINDY HOT
DRILLER JIM TURNER LOGGER JOHN A. GENTRY

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35								
08		23	0.25 / 0.16	GRAY	CLAY	SOFT		-W/SAND SEAMS 36.5-40.5
0.6		24	0 / 0.12	GRAY	CLAY	VERY SOFT		-W/SAND LAYER 38.5-40.5
40		25	0.5	GRAY	CLAY	MEDIUM STIFF		
		26	0.5	GRAY	CLAY	MEDIUM STIFF		
45		27	1.25	GRAY	CLAY	STIFF		
		28	1.25	GRAY	CLAY	STIFF		
		29	0.75	GRAY	CLAY	MEDIUM STIFF		
50		30	0.5	GRAY	CLAY	MEDIUM STIFF		
		31	0.5	GRAY	CLAY	MEDIUM STIFF		
55								Torvane Multiplier 0.2
								W.O.H: Weight of Hammer
60								
65								
70								

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

.OJECT NAME HOUSTON GALVESTON NAVIGATION CHANNEL

LOG OF BORING NO. 93-33

LOCATION/STATION Sta 33 +400 500L

DATE/TIME STARTED 8-2-94 1 :25
DATE/TIME COMPLETED 8- -94 3 :00

TIDE ELEVATION 2.5 MLT DATUM, TIME 1.00 LOCATION LT. BKN.# 68

WATER DEPTH 18 - 7 (DRC/C) = 11'

DEPTH FROM WATER SURFACE
BOTTOM OF BORING 68'

WEATHER PARTLY CLOUDY SUNNY & HOT

DRILL RIG MANUFACTURE
MODEL NO. MAYHEW 20°

DRILLER JIM TURNER
LOGGER JOHN A CENTEY

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

BORING NO. 93-33 DATE: BEGIN 8.2.94 PAGE 2 13
JOB NO. 946783.3 COMPLETE 8.2.94/ Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ■ 3" ✱ □ 6"
LOCATION Sta. 33+400 500L
ELEVATION OF HOLE -8.5' MLT (Mudline
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 900
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY & HOT
DRILLER JIM TURNER LOGGER JOHN A GENTRY

Vane Readings	DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
	0	X	1	1'/1'	GRAY	SAND	VERY LOOSE	SILTY	-W/SHELL 0'-2'
0.3			2	0/0.06	GRAY	CLAY	VERY SOFT		Set 28' casing -W/SHELL 2'-22'
0.45	5		3	0/0.09	GRAY	CLAY	VERY SOFT		-W/SAND 2'-22' SET CASING 28'
0.5			4	6/2.10	GRAY	CLAY	VERY SOFT		
0.55	U		5	0/0.11	GRAY	CLAY	VERY SOFT		
0.5	10		6	0/0.10	GRAY	CLAY	VERY SOFT		
Q4			7	8.9/0.08	GRAY	CLAY	VERY SOFT		SAMPLE BULGE WHILE PUSHING 12'-14'
0.5	15		8	0/0.10	GRAY	CLAY	VERY SOFT		
0.6			9	0/0.12	GRAY	CLAY	VERY SOFT		
		X	11	W.O.H	GRAY	CLAY	VERY SOFT		
0.6	U		12	0/0.12	GRAY	CLAY	VERY SOFT		
0.4	20		13	0/0.08	GRAY	CLAY	VERY SOFT		Sand at Bottom of sample
		X	14	8.9/1.1	GRAY	SAND	MEDIUM DENSE	SILTY	-W/SHELL 22'-23.5' COARSE 22'-36'
	25								
		X	15	19/12-15	GRAY	SAND	MEDIUM DENSE	SILTY	
		X	16	11/13/16	GRAY	SAND	MEDIUM DENSE	SILTY	✱ Pushed 6" Tube NO Recovery Due to Sand Split Spoon @ 28.5'
	30								
		X	17	10/15/20	GRAY	SAND	DENSE	SILTY	
	35	X	18	8/13/21	GRAY	SAND	DENSE	SILTY	

95% DRAFT

BORING NO. 93-33 DATE: BEGIN 8-2-94 PAGE 3 13
JOB NO. 94C783.3 COMPLETE 8-2 94 Thin Walled Tube
PROJECT HOUSTON GALVESTON ■ 3" ☐ 6"
LOCATION Sta. 337+00 500L
ELEVATION OF HOLE -8.5' MLT (Mudline)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY & HOT
DRILLER JIM TURNER LOGGER JOHN A. CENTRY

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35	X	19	15 18	GRAY	SAND	DENSE	SILTY	COARSE 36.5-55' * Pushed 6" Tube NO Recovery Due to Sand, split spoon @ 36.5'
40	X	20	8 10 16	GRAY	SAND	MEDIUM DENSE	SILTY	
45	X	21	13 25 34	GRAY	SAND	VERY DENSE	SILTY	
50	X	22	12 20 35	Gray	Sand	very Dense	SILTY	Silty Clay @ 55'
55	■	23	1.5	Gray	Clay	STIFF	Silty	W/clay pocket, 55-57'
60								Torvane Multiplier 0.2
								W.O.H: Weight of Hammer
65								
70								

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME HOUSTON GALVESTON NAVIGATION CHANNEL

LOG OF BORING NO. 93-34

LOCATION/STATION Stg 31+000 500L

DATE/TIME STARTED 8-3-94 8:38
DATE/TIME COMPLETED 8-3-94 12:25

TIDE ELEVATION 3 MLT DATUM, TIME 7:30 LOCATION LT. BKN.# 68

WATER DEPTH 16 -7(DECK) = 9

DEPTH FROM WATER SURFACE
BOTTOM OF BORING 68

WEATHER PARTLY CLOUDY SUNNY & HOT

DRILL RIG MANUFACTURE
MODEL NO. MAYHEW 200

DRILLER JIM TURNER
LOGGER JOHN A GENTRY

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

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U.S. ARMY CORPS OF ENGINEERS

BORING NO. 9334 DATE: BEGIN 8-3-94 PAGE 2 13
JOB NO. 94C783.3 COMPLETE 8-3-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNAL ☒ 3" ★ ☐ 6"
LOCATION Sta. 3/+0 00 5001
ELEVATION OF HOLE -6' MLT Mud line
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY & HOT
DRILLER JIM TURNER LOGGER J Gentry / R. Arnold

Torvane Reading	DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
	0		1	C	GRAY	CLAY	VERY SOFT		- w/ SAND LAYERS + SHELL Sample bulged upon extrusion 0-2'
0.1			2	0/0.02	GRAY	CLAY	VERY SOFT		SET 23' OF CASING
	5	J	3		GRAY	SAND	VERY LOOSE	SILTY	Jar sample 4-6'
		X	4	1 1/2	Gray	Sand	VERY LOOSE	SILTY	
0.3			5	0/0.06	Gray	clay	very Soft		w/ sand seams 7.5'-20.5'
0.4	10	U	6	0/0.08	Gray	clay	very Soft		
0.3			7	0/0.06	Gray	clay	very Soft		w/ shell 11.5'-37'
0.3	15		8	0/0.06	Gray	clay	very Soft		
0.5			9	0/0.10	Gray	clay	very Soft		
0.5		U	10	0/0.10	Gray	clay	very Soft		
	20	X	11	1 1/2"	Gray	clay	very Soft		(Pocket Pen 0.00)
0.3		U	12	0/0.06	Gray	clay	very Soft		
0.35			13	0/0.07	Gray	clay	very Soft		
0.6	25	U	14	0/0.12	Gray	clay	very Soft		
0.5		Q	15	0/0.10	Gray	clay	very Soft		
0.5			16	0/0.10	Gray	clay	very soft		
	30	X	17	1/4"	Gray	clay	Very Soft		(Pocket Pen 0.00)
0.4			18	0/0.08	Gray	clay	very Soft		★ 6" Diameter Sample 31-33'
0.5		W	19	0.0/0.10	Gray	clay	very Soft		w/ Silt parting @ 31'-33'
0.5			20	0.0/0.10	Gray	clay	very soft		w/ sand seams 35'-37'
	35								
0.5			21	0.0/0.16	Gray	clay	Very Soft		

95% DRAFT

BORING NO. 93-34 DATE: BEGIN 8-3-94 PAGE 3 13
JOB NO. 94G783.3 COMPLETE 8-3-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ☒ 3" ☐ 6"
LOCATION Sta 317000 500L
ELEVATION OF HOLE -6' MLT (Mud Line)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY + HOT
DRILLER JIM TURNER LOGGER JOHN Gentry / Robert Arnold

Torvane Reading

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
-35								
	X	22	W.O.H	Gray	clay	very soft		Pocket Pen 0.00
0.3		23	0.0/0.10	Gray	clay	very soft		Sample bulged on extrusion
0.5		24	0.0/0.10	Gray	clay	very soft		6"-Diameter Sample 39'-41'
-40	WES							Sand @ Bottom of Sample
	X	25	6/11/18	Gray	Sand	medium dense	SILTY	Coarse 41'-51.5'
								lost circulation at 42'
-45								
	X	26	8/20/32	Gray	Sand	VERY DENSE	SILTY	
-50								
	X	27	6/18/23	Gray	Sand	DENSE	SILTY	w/clay layer 52'-52.5'
0.5		28	0/0.10	GRAY	CLAY	VERY SOFT		-w/SAND LAYER 54-54.5
-55	X	29	10/17/36	GRAY	SAND	DENSE	SILTY	COARSE 54-59'
	X	30	11/15/20	GRAY	SAND	DENSE	SILTY	
-60								Torvane Multiplier 0.2
								W.O.H: Weight of Hammer
-65								
-70								

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME HOUSTON GALVESTON NAVIGATION CHANNEL

LOG OF BORING NO. 93-35

LOCATION/STATION Sta 27+000 500L

DATE/TIME STARTED 8-3-94 1:15
DATE/TIME COMPLETED 8- -94 3:45

TIDE ELEVATION 3 MLT DATUM, TIME 12:30 LOCATION LT. BKN.# 68

WATER DEPTH 21 - 7 (DECK) = 14

DEPTH FROM WATER SURFACE
TO BOTTOM OF BORING 68

WEATHER PARTLY CLOUDY SUNNY HOT + WINDY

DRILL RIG MANUFACTURE
MODEL NO. MAYHEW 200

DRILLER JIM TURNER
LOGGER JOHN A. GENTRY

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

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U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-35 DATE: BEGIN 8-3-94 PAGE 2 1 3
JOB NO. 94C783.3 COMPLETE 8.3-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ☐ 3" ☐ 6"
LOCATION Sta. 274+00 500L
ELEVATION OF HOLE -11'MLT (MUD Line)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 20
GROUNDWATER: DEPTH ___ ft., ELEV. ___ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY HOT & WINDY
DRILLER JIM TURNER LOGGER JOHN A. GENTRY

Tor vane reading 0.85

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
0		1	0.25/0.17	Brown	Clay	Soft		Silt seams 0'–9' SET 28' OF CASING
		2	0.50	Brown	Clay	medium stiff		
5		3	1.50	Brown	clay	stiff		
	WES	4	3.25	Reddish Brown	clay	Very stiff		
	U	5	2.75	Reddish Brown	clay	Very stiff		
10		6	3.75	Reddish Brown	clay	Very stiff		
	WES	7	3.25	Reddish Brown	clay	Very stiff		
15	X	8	4 1/2	Reddish Brown	clay	Very stiff		pocket Pen 2.25
	WES	9	3.50	Reddish Brown	clay	Very stiff		Silt seams
	U	10	2.25	Reddish Brown	clay	Very stiff		
20	WES	11	3.0	Reddish Brown	clay	Very Stiff		Sand at Bottom of Sample
	X	12	4 8 13	Reddish Brown	Silt	medium Dense	Sandy	w/ Silt stones 22 – 23'
25	X	13	10 14 24	Redish Brown	Sand	Dense	silty	
	X	14	11 16 22	Reddish Brown	Sand	Dense	Silty	* pushed 6" – tube NO Recovery Due to Sand split spoon @ 26'
30	X	15	8 13 20	Redish Brown	Sand	Dense	silty	
	X	16	10 15 22	Reddish Brown	Sand	Dense	Silty	
35	X	17	9 13 19	REDDISH BROWN	Sand	Dense	silty	* pushed 6" Tube NO Recovery Due to Sand, spl. spoon @ 34'

95% DRAFT

BORING NO. 93-35 DATE: BEGIN 8-3-94 PAGE 2 / 3
JOB NO. 94G783.3 COMPLETE 8-3-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ☑ 3" ☐ 6"
LOCATION STA 27+000 500L
ELEVATION OF HOLE -11' MLT (MUDLINE)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY - HOT & WINDY
DRILLER JIM TURNER LOGGER JOHN A. GENTRY

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35								clay @ 36.5'
		18	1.5	GRAY	CLAY	STIFF		
		19	1.75	GRAY	CLAY	STIFF		
40		20	2.5	GRAY	CLAY	VERY STIFF	SANDY	& BROWN 40'-
		21	2.75	GRAY	CLAY	VERY STIFF		
45		22	2.75	GRAY	CLAY	VERY STIFF		
		23	2.75	GRAY	CLAY	VERY STIFF		W/ SAND LAYER 47-48
	X	24	8 10 14	LIGHT GRAY	SAND	MEDIUM DENSE	SILTY	& LIGHT BROWN FINE 48-52
50	X	25	13 24 27	LIGHT GRAY	SAND	Very DENSE	SILTY	CLAYEY 52'- 54'
55								Torvane Multiplier 0.2
								W.O.H: Weight of Hammer
60								
65								
70								

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME HOUSTON GALVESTON NAVIGATION CHANNEL

LOG OF BORING NO. 93-36

LOCATION/STATION STA 237+400 500L

DATE/TIME STARTED 8-10-94 7:00
DATE/TIME COMPLETED 8-10-94 8:45

TIDE ELEVATION 3 MLT DATUM, TIME 6:00 LOCATION LT. BKN.# PIER 10 MORGAN POINT

WATER DEPTH 18-7 (DECK) = 11

DEPTH FROM WATER SURFACE TO BOTTOM OF BORING 68

WEATHER PARTLY CLOUDY

DRILL RIG MANUFACTURER
MODEL NO. MAYHEW 500

DRILLER JACKIE SMITH
LOGGER JOHN A. GENTRY

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

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U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-36 DATE: BEGIN 8-10-94 PAGE 2 / 3
JOB NO. 94C7833 COMPLETE 8-10-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION ☒ 3"* ☐ 6"
LOCATION Sta. 23+400 500L
ELEVATION OF HOLE -8 MLT (Mudline)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER MOSTLY CLOUDY + WINDY RAIN
DRILLER JIM TURNER LOGGER JOHN A. GENTRY

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE / SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
0	J	1		GRAY	SAND	LOOSE	SILTY	*FINE 0'-4' JAR SAMPLE 0'-2'
	X	2	1 2 3	GRAY	SAND	LOOSE	SILTY	-w/SHELL 0'-2' SET 23 FT OF CASING Clay @ 4'
5		3	0/0.06	GRAY	CLAY	VERY SOFT		-w/SAND SEAMS 4'-12'
		4	0/0.06	GRAY	CLAY	VERY SOFT		-w/SHELL 6'-12
		5	0/0.04	GRAY	CLAY	VERY SOFT		
10		6	0/0.02	GRAY	CLAY	VERY SOFT		Sand @ Bottom of Sample
	X	7	4 8 10	BROWN	SAND	MEDIUM DENSE	SILTY	*FINE 12'-25'
15								
	X	8	5 7 12	BROWN	SAND	MEDIUM DENSE	SILTY	
20								
	X	9	10 20 50/5"	BROWN	SAND	VERY DENSE	SILTY	
25		10	1.75	REDISH BROWN	CLAY	STIFF		-w/SAND SILT LAYER @ 25.5
	X	11	7 8 15	REDISH BROWN	SAND	MEDIUM DENSE	SILTY	*FINE 27'-36.5
30	X	12	6 10 14	REDISH BROWN	SAND	MEDIUM DENSE	SILTY	*PUSH 6" TUBE NO RECOVERY Due To Sand, split spoon @ 29'
	X	13	8 12 15	REDISH BROWN	SAND	MEDIUM DENSE	SILTY	
35	X	14	10 15 17	REDISH BROWN	SAND	DENSE	SILTY	

Crane Readin
0.3
0.3
0.2
.1

95% DRAFT

GEOTEST ENGINEERING, INC.

U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-36 DATE: BEGIN 8-10 94 PAGE 3 13
JOB NO. 94C 7833 COMPLETE 8-10-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ■ 3" ★ □ 6"
LOCATION STA 237+400 500L
ELEVATION OF HOLE -8 MLT (Mud line)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY
DRILLER JIM TURNER LOGGER JOHN A. GENTRY

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSIS-TENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35	X	15	11 13 21	REDISH BROWN	SAND	DENSE	SILTY	★ PUSH 6" TUBE @ 37' NO RECOVERY Due to sand split spoon @ 37'
								- clay @ 40
40		16	1.75	GRAY	CLAY	STIFF		
		17	1.75	GRAY	CLAY	STIFF		Sand at bottom of sample
45	X	18	14 20 36	GRAY	SAND	DENSE	SILTY	COARSE 44-57
50	X	19	16 48 50/2"	GRAY	SAND	VERY DENSE	SILTY	
55	X	20	13 31 26	GRAY	SAND	DENSE	SILTY	
	X	21	14 33 37	GRAY	SAND	DENSE	SILTY	
								Torvane Multiplier 0.2
60								J: Jar Sample
65								
70								

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME HOUSTON GALVESTON NAVIGATION channel

LOG OF BORING NO. 93-37

LOCATION/STATION Stg. 217600, 500R

DATE/TIME STARTED 8-10-94 9:15
DATE/TIME COMPLETED 8-10-94 1:20

TIDE ELEVATION 3 MLT DATUM, TIME 9:05 LOCATION LT. BKN.# PIER @ MORGANS POINT

WATER DEPTH 20 -7(DECK) = 13.

DEPTH FROM WATER SURFACE
BOTTOM OF BORING 68

WEATHER CLOUDY & WINDY

DRILL RIG MANUFACTURE
MODEL NO. MAYHEW 200

DRILLER JACKIE SMITH
LOGGER JOHN A. GENTRY

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-37 DATE: BEGIN 8-10-94 PAGE 2 / 2
JOB NO. 94C783.3 COMPLETE 8-10-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNELS ■ 3" ✱ □ 6"
LOCATION Stg 217+00, 500R
ELEVATION OF HOLE -10 MLT (Mud line
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER CLOUDY & WINDY
DRILLER JIM TURNER LOGGER JOHN A. GENTRY

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
0		1	0	GRAY	CLAY	VERY SOFT		-w/shell Fragments, 0-4' Set 28 ft of casing
		2	1.5	REDISH BROWN	CLAY	STIFF		
5		3	1.75	REDISH BROWN	CLAY	STIFF		-w/SILT POCKETS 4'-15'
	WES	4	1.75	REDISH BROWN	CLAY	STIFF		
	U	5	2.0	REDISH BROWN	CLAY	VERY STIFF		+GRAY 8'-15'
10	WES	6	3.25	REDISH BROWN	CLAY	VERY STIFF		
	WES	7	3.25	REDISH BROWN	CLAY	VERY STIFF		
		8	3.0	REDISH BROWN	CLAY	VERY STIFF		
15	X	9	4 7 9	REDISH BROWN	CLAY	VERY STIFF		(Pocket Pen. 2.25)
	U	10	1.75	GRAY	CLAY	STIFF		+BROWN ~ 16.5-21.5
	WES	11	2.25	GRAY	CLAY	VERY STIFF		
20	WES	12	2.25	GRAY	CLAY	VERY STIFF		-w/ORGANICS 21.5-24
	WES	13	1.75	GRAY	CLAY	STIFF		
		14	1.25	GRAY	CLAY	STIFF	SANDY	+BROWN -w/SAND @ 25
25	X	15	5 9 18	GRAY	SAND	MEDIUM DENSE	SILTY	+YELLOWISH BROWN 25'-30' FINE 25'-40'
	X	16	6 16 20	GRAY	SAND	DENSE	SILTY	*Pushed 6" Tube NO Recovery Due to sand, split spoon @ 27'
30								
	X	17	8 23 34	GRAY	SAND	VERY DENSE	SILTY	+BROWN ~ 30'-36.5
	X	18	9 21 36	GRAY	SAND	VERY DENSE	SILTY	
35	X	19	6 18 29	GRAY	SAND	DENSE	SILTY	*Pushed 6" Tube NO Recovery Due to sand, split spoon @ 35'

90% DRAFT

BORING NO. 93-37 DATE: BEGIN 8-10-94 PAGE 2 / 3
JOB NO. 9467833 COMPLETE 8-10-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ☒ 3" ☐ 6"
LOCATION STA 2176065.00R
ELEVATION OF HOLE -10 MLT (MUD line)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY & HOT
DRILLER JIM TURNER LOGGER JOHN A. GENTRY

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35				GRAY	SAND	DENSE		36.5-40
40								clay @ 40'
		20	2.25	GRAY	CLAY	VERY STIFF		
		21	2.0	GRAY	CLAY	VERY STIFF		
45		22	2.75	GRAY	CLAY	VERY STIFF		+ BROWN 46'-
		23	2.5	GRAY	CLAY	VERY STIFF		
		24	1.75	GRAY	CLAY	STIFF	SANDY	+ YELLOWISH BROWN 48'-54'
50		25	4.5+	GRAY	CLAY	HARD	SANDY	w/ CALCAREOUS NODULES 48'-54'
		26	4.5+	GRAY	CLAY	HARD	SANDY	
		27	4.5+	GRAY	CLAY	HARD		
55								
60								
65								
70								

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME HOUSTON GALVESTON NAVIGATION CHANNEL

LOG OF BORING NO. 93-38

LOCATION/STATION Sta 20+000, 500L

DATE/TIME STARTED 8-10-94 1:50
DATE/TIME COMPLETED 8-11-94 5:00

TIDE ELEVATION 2.5 MLT DATUM, TIME 1:30 LOCATION LT. BKN.# PIER @ MORGAN POT

WATER DEPTH 18 - 7(DECK) = 11

DEPTH FROM WATER SURFACE TO BOTTOM OF BORING 68

WEATHER PARTLY CLOUDY SUNNY + HOT

DRILL RIG MANUFACTURE
MODEL NO. MAYEW 200

DRILLER JACKIE SMITH
LOGGER JOHN A. GENTRY

DRILLER'S/LOGGER'S COMMENTS Cable Broke on (PULL down) stop Drilling @ 28.5'

95% DRAFT

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U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME HOUSTON GALVESTON NAVIGATION

LOG OF BORING NO. 93-38

LOCATION/STATION Stg. 20.+000.500L

DATE/TIME STARTED 8-11-94 8:00
DATE/TIME COMPLETED 8-11-94 11'20

TIDE ELEVATION 2.5 MLT DATUM, TIME 6:00 LOCATION LT. BKN.# PIER @ MORGAN POINT

WATER DEPTH 18.7 (DECK) - 11

DEPTH FROM WATER SURFACE TO BOTTOM OF BORING 68'

WEATHER PARTLY CLOUDY SUNNY & HOT

DRILL RIG MANUFACTURE
MODEL NO. MAYHEW 900

DRILLER JACKIE SMITH
LOGGER JOHN A. GENTRY

DRILLER'S/LOGGER'S COMMENTS Set 23' of casing Resum Drilling

95% DRAFT

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U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-38 DATE: BEGIN 8-10-94 PAGE 3 14
JOB NO. 946783.3 COMPLETE 8-11-94 Thin Walled Tube
PROJECT HOUSTON GALV. NAVIGATION CHANNEL ■ 3" ★ □ 6"
LOCATION STA 20 + 000 SOUTH
ELEVATION OF HOLE- 8.5' MLT (Mudline)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY & HOT
DRILLER JACKIE SMITH LOGGER JOHN A. GENTRY / ROBERT ARNOLD

Torvane Reads 0.2

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
0		1	0/0.04	Gray	Clay	very soft	Silty	with shell 0'-2'
		2	3.0	Light Gray	clay	very stiff		Set 23' of casing
5		3	2.25	Light Gray	clay	very stiff		Reddish brown with calcarious nodules 4'-6'
		4	4.5	Reddish Brown	clay	Hard		
WES 7		5	4.5	Reddish Brown	clay	Hard		with silt seams 8'-14'
10		6	4.5	BROWN	clay	Hard		with calcarious nodules 10'-20'
		7	3.0	BROWN	clay	very stiff		Light Gray 12'-18' -w/SLICKEN SIDE @ 12'-20'
DS		8	3.25	BROWN	clay	very stiff		
WES		9	3.25	BROWN	CLAY	VERY STIFF		
	X	10	3.67	BROWN	CLAY	STIFF		(Pocket Pen. 1.75)
		11	3.0	GRAY	CLAY	VERY STIFF		+ BROWN 18'-26.5'
WES 20		12	2.5	Gray	clay	very stiff		
		12	2.00	Gray	clay	very stiff		- w/silt layers silt seams @ 21'-21.5'
DS		13	2.0	GRAY	CLAY	VERY STIFF		- w/SAND seams 22'-24'
WES		14	3.25	GRAY	CLAY	VERY STIFF		Set 28' of casing - w/SILT SEAMS 24'
WES		15	3.25	GRAY	CLAY	VERY STIFF		
	X	16	5.78	GRAY	CLAY	VERY STIFF		Pocket Pen R-pg
WES		17	2.75	GRAY	CLAY	VERY STIFF		
WES 30		18	2.0	LIGHT GRAY	CLAY	VERY STIFF	SILTY	★ 6" Diameter Sample @ 28.5'-30.5'
		19	3.5	LIGHT GRAY	CLAY	VERY STIFF		+ BROWN 30.5-36'
WES		20	3.75	LIGHT GRAY	CLAY	VERY STIFF		
35	X	21	12, 18, 24	LIGHT GRAY	CLAY	HARD		Pocket Pen. 4.5+

95% DRAFT

BORING NO. 93-38 DATE: BEGIN 8-10-94 PAGE 4 1.4
JOB NO. 946 783.3 COMPLETE 8-11-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNELS ☒ 3" ☐ 6"
LOCATION S/O 207000 5001
ELEVATION OF HOLE -8.5 MLT (Mud line)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUD SUNNY & HOT
DRILLER JACKIE SMITH LOGGER JOHN A. GENTRY

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35		22	2.25	LIGHT GRAY	CLAY	VERY STIFF	SANDY	w/Sand @ Bottom of Sample
	X	23	6 12 34	LIGHT GRAY	SAND	DENSE	SILTY	* Pushed 6" Tube NO Recovery Due to Sand, Split spoon @ 36.5'
40								clay @ 41'
		24	3.25	GRAY	CLAY	VERY STIFF		+ BROWN 41'-49'
		25	2.75	GRAY	CLAY	VERY STIFF		** PAUL GILBERT FROM C.O.E. TOOK EXTRA PART OF SAMPLE 43'-45'
45		26	3.25	GRAY	CLAY	VERY STIFF		- W/SAND SEAMS 45'-47'
		27	2.5	GRAY	CLAY	VERY STIFF		- W/Ferrous Nodules 47'-49'
	WF?	28	1.25	Gray	CLAY	STIFF		- W/Ferrous stains 49'-50'
50		29	1.75	Yellowish Gray	Clay	STIFF		- W/Sand Seam & Sand Pkt @ 50'-51'
		30	1.75	GRAY	CLAY	STIFF	SILTY	+ BROWN
		31	4.25	GRAY	CLAY	HARD		+ REDISH BROWN - W/SAND POCKETS
55		32	3.75	GRAY	CLAY	VERY STIFF		
								Torvane Multiplier 0.2
60								
65								
70								

95% DRAFT

U.S. ARMY CORPS OF ENGINEERS
GEOTECHNICAL BORING DATA

PROJECT NAME HOUSTON GALVESTON NAVIGATION CHANNEL

LOG OF BORING NO. 93-39

LOCATION/STATION Sta 18+400 500R

DATE/TIME STARTED 8-11-94 11:50
DATE/TIME COMPLETED 8-11-94 4:44

TIDE ELEVATION 2 MLT DATUM, TIME 11:30 LOCATION LT. BKN.# PIER 00 MORGAN POIN

WATER DEPTH 20 -7(DECK) = 13

DEPTH FROM WATER SURFACE
TO BOTTOM OF BORING 67

WEATHER PARTLY CLOUDY SUNNY & HOT

DRILL RIG MANUFACTURE
MODEL NO. MAYHEW 200

DRILLER JIM TURNER
LOGGER JOHN A. GENTRY / Robert Arnold

DRILLER'S/LOGGER'S COMMENTS

95% DRAFT

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U.S. ARMY CORPS OF ENGINEERS

BORING NO. 93-39 DATE: BEGIN 8-1-94 PAGE 2 13
JOB NO. 946783.3 COMPLETE 8-1-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL ☒ 3" ☐ 6"
LOCATION STA 18+400.500R
ELEVATION OF HOLE -11 MLT (Mud line)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW-200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY SUNNY & HOT
DRILLER Jim Turner LOGGER JOHN A. GENTRY/Robert Arnold

DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
0		1	1.5	Light Gray	Clay	Stiff		With Brown 0'-4' Set 23' of casing
		2	2.5	Light Gray	Clay	very stiff		
5		3	3.0	Brown	clay	very St. ff.		with gray 4'-12
		4	4.25	Reddish Brown	Clay	Hard		
		5	3.5	Reddish Brown	clay	very Stiff		
10		6	3.5	REDDISH BROWN	CLAY	VERY STIFF		- w/Calcareous Nodules 10'-15.5
	WSS	7	2.0	GRAY	CLAY	VERY STIFF		+ BROWN 12'-17.5
15		8	1.0 3.9	GRAY	CLAY	VERY STIFF		(Pocket Pen 3.75)
	WSS	9	3.5	GRAY	CLAY	VERY STIFF		- w/FERROUS Nodules 15.5-1 - w/SAND POCKETS 15.5-17.5
		10	3.75	GRAY	CLAY	VERY STIFF	SANDY	+ BROWN 17.5- - w/FERROUS Nodules 17.5-19
20	WSS	11	3.75	GRAY	CLAY	VERY STIFF	SANDY	- w/sand seams 19.5-23.5 - w/cale & ferrous nodules 19.5-23.5'
		12	2.75	LIGHT GRAY	CLAY	VERY STIFF	SANDY	
	WSS	13	2.5	LIGHT GRAY	CLAY	VERY STIFF	SANDY	
25		14	1.0 1.5	LIGHT GRAY	CLAY	VERY STIFF	SANDY	w/sand layer @ 25-25.5'
		15	11 19 28	Yellowish BROWN	Sand	Dense	silty	* Pushed 6" Tube No Recovery Due to Sand, split spoon @ 26' + GRAY 26'-34'
30		16	12 21 42	Yellowish BROWN	SAND	VERY DENSE	SILTY	- w/SAND STONE 30.5-32'
		17	9 19 26	Yellowish Brown	Sand	Dense	silty	- clay @ 34'
	WSS	18	3.5	GRAY	CLAY	VERY STIFF		* 6" Diameter Sample 34'-36' + BROWN

95% DRAFT

BORING NO. 93-39 DATE: BEGIN 8-11-94 PAGE 3 13
JOB NO. 94C783.3 COMPLETE 8-11-94 Thin Walled Tube
PROJECT HOUSTON GALVESTON NAVIGATION CHANNEL 3" 6"
LOCATION STA 187 400, 560R
ELEVATION OF HOLE -11' MLT (MUDline)
MANUFACTURER'S DESIGNATION OF DRILL RIG MAYHEW 200
GROUNDWATER: DEPTH ____ ft., ELEV. ____ ft., at end of Drilling
WEATHER PARTLY CLOUDY SUNNY & HOT
DRILLER JIM TURNER LOGGER JOHN AGENTRY / Robert Arnold

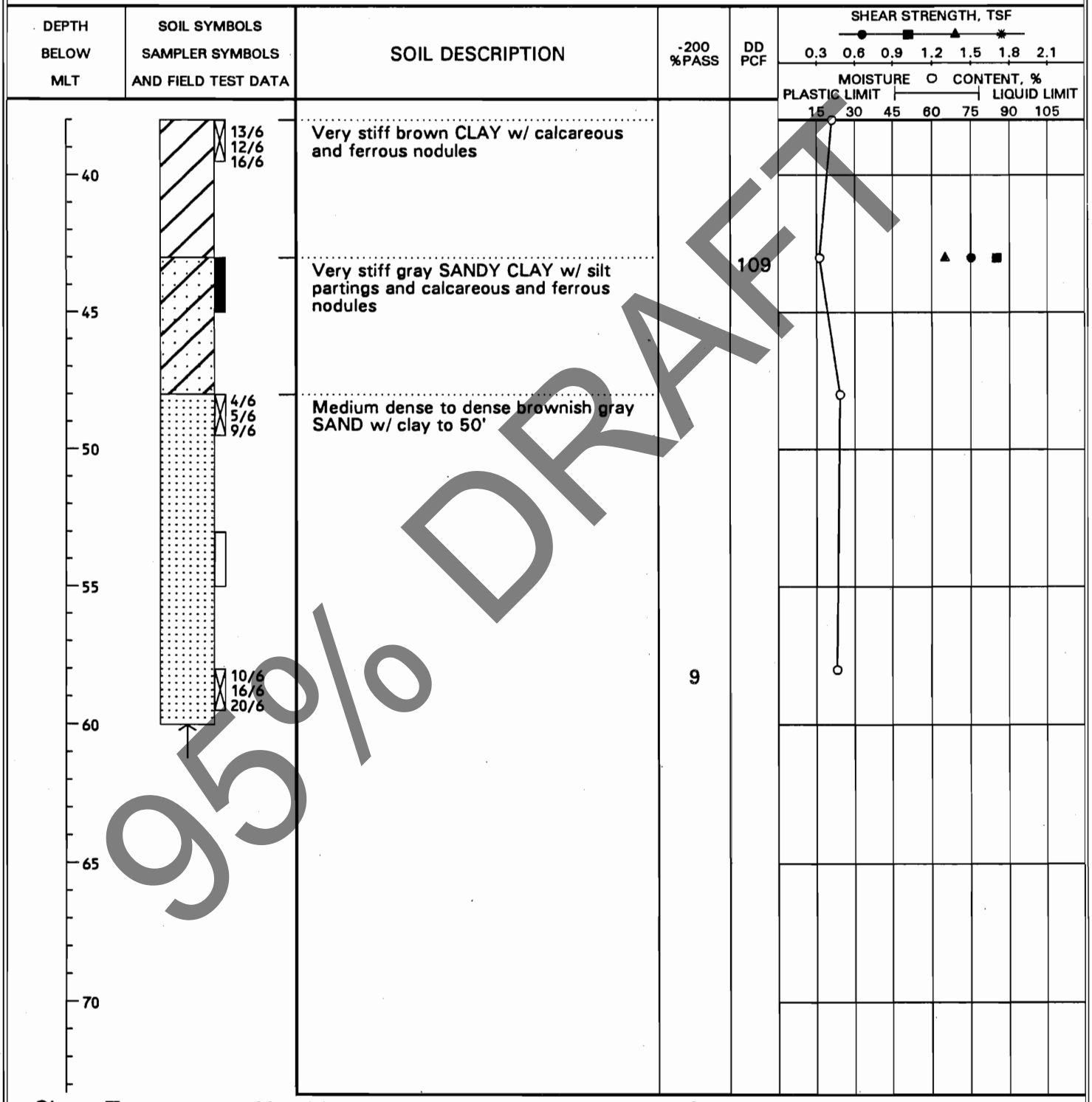
DEPTH, FEET	SAMPLE	SAMPLE NO.	PEN./TORVANE SPT.-BLOW COUNT	COLOR	MATERIAL TYPE	CONSISTENCY	SECONDARY CONSTITUENTS	STRUCTURAL FEATURES AND COMMENTS
35	WSS	19	3.25	LIGHT GRAY	CLAY	VERY STIFF		+ YELLOWISH BROWN 36'-42'
	VSS	20	3.5	LIGHT GRAY	CLAY	VERY STIFF		-W/SAND POCKETS 36'-42'
40	U	21	3.5	LIGHT GRAY	CLAY	VERY STIFF		
	VSS	22	3.25	REDISH BROWN	CLAY	VERY STIFF		-W/SLICKENSIDED 42'-54'
	VSS	23	3.75	Reddish Brown	clay	very stiff		+ LIGHT GRAY 42'-54'
	WSS	24	4.25	REDISH BROWN	CLAY	HARD		-W/Calcareous Nodules 44'-54'
		25	4.25	REDISH BROWN	CLAY	HARD		
50		26	4.5	REDISH BROWN	CLAY	HARD		
		27	4.25	REDISH BROWN	CLAY	HARD		
55								
60								
65								
70								

95% DRAFT

LOG OF SOIL BORING
Boring No. SC13

Project Name: Marsh Demonstration Project
Date: November 12, 1992
Water Depth: 18 feet
Northing: 675,467 feet

Project No. 92-217G3
Sea Floor Elevation: -15 feet
Time of Measurement: 2:07 PM
Easting: 3,282,406 feet



95% DRAFT

Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✸ = UU Triaxial

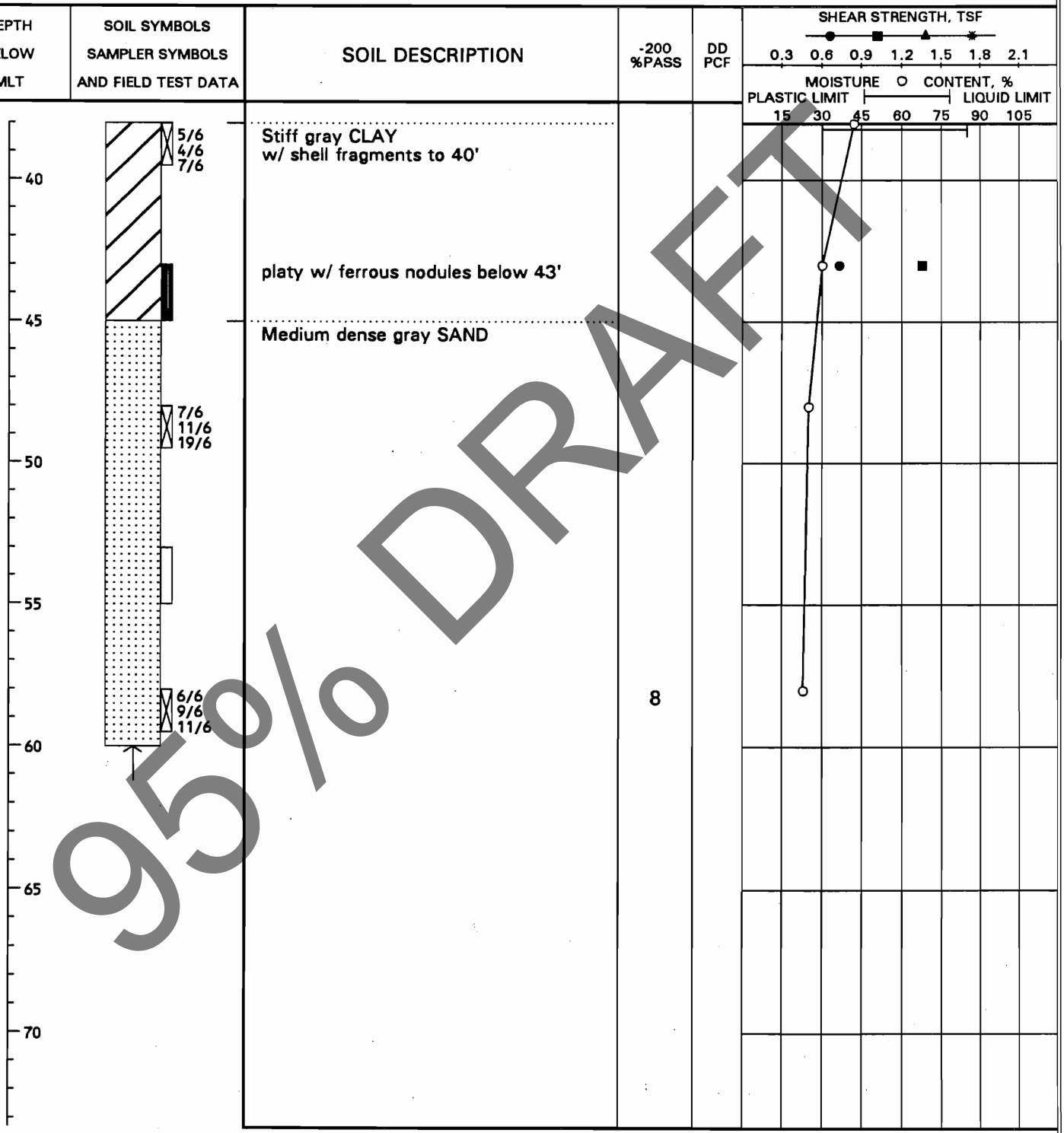
See Plate 2 for boring location.

Plate 15

LOG OF SOIL BORING
Boring No. SC14

Project Name: Marsh Demonstration Project
Date: November 7, 1992
Water Depth: 22 feet
Northing: 673,622 feet

Project No. 92-217G3
Sea Floor Elevation: -20 feet
Time of Measurement: 2:23 PM
Easting: 3,283,108 feet



95% DRAFT

Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✱ = UU Triaxial

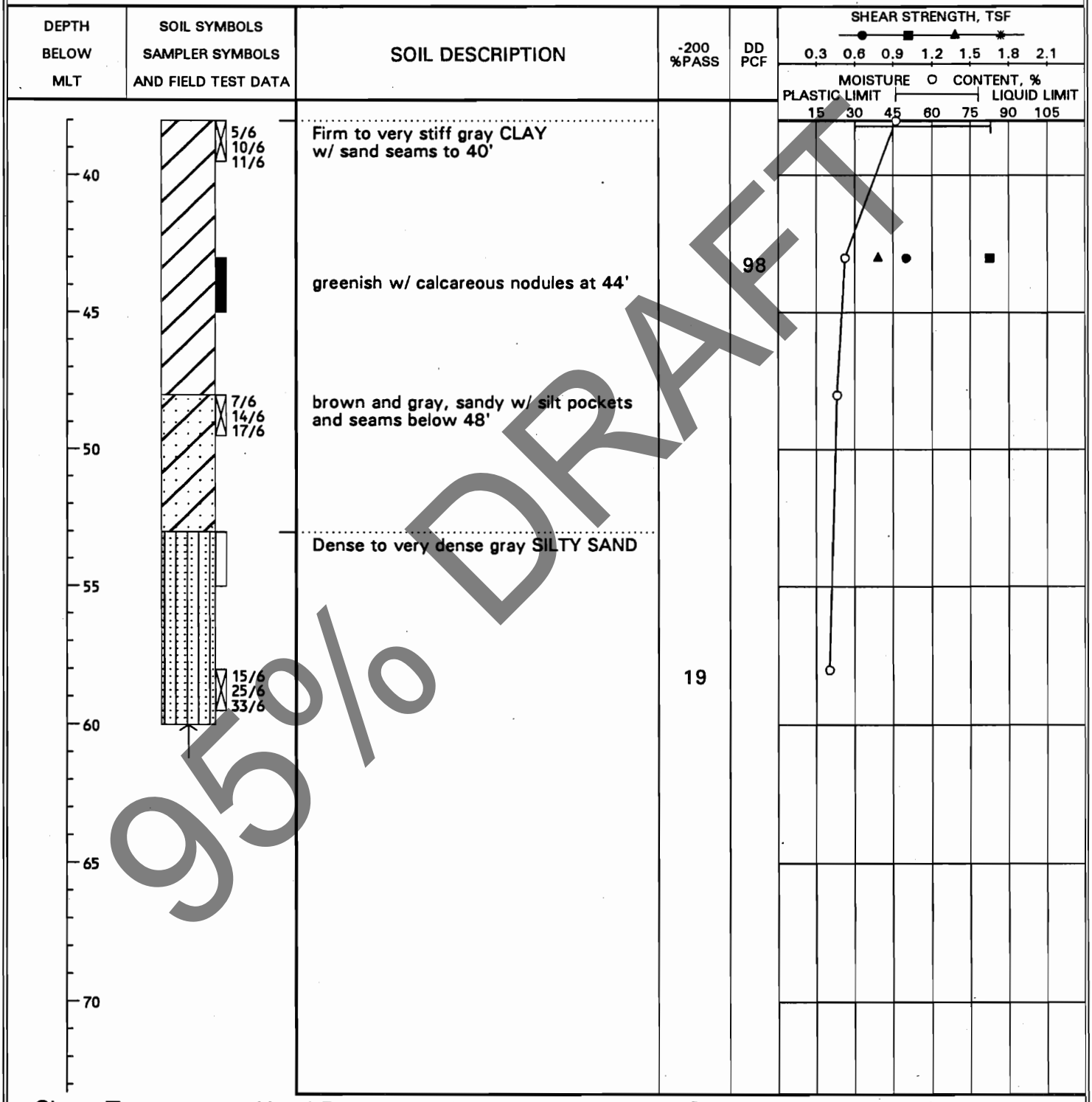
See Plate 2 for boring location.

Plate 16

LOG OF SOIL BORING
Boring No. SC15

Project Name: Marsh Demonstration Project
Date: November 12, 1992
Water Depth: 20 feet
Northing: 674,751 feet

Project No. 92-217G3
Sea Floor Elevation: -17 feet
Time of Measurement: 12:00 PM
Easting: 3,283,466 feet



95% DRAFT

Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✱ = UU Triaxial

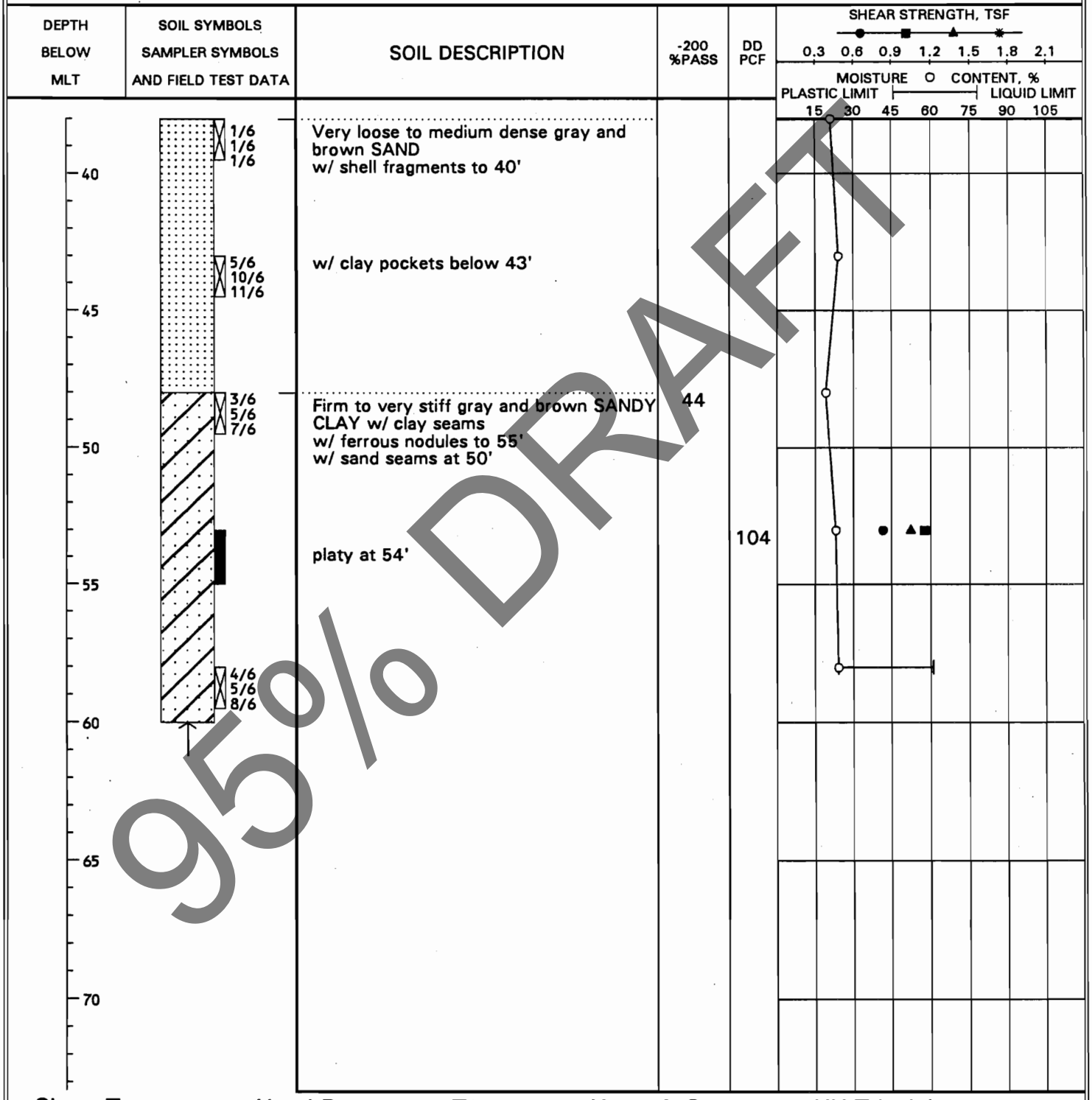
See Plate 2 for boring location.

Plate 17

LOG OF SOIL BORING
Boring No. SC16

Project Name: Marsh Demonstration Project
Date: November 7, 1992
Water Depth: 28 feet
Northing: 671,717 feet

Project No. 92-217G3
Sea Floor Elevation: -26 feet
Time of Measurement: 11:55 AM
Easting: 3,283,794 feet



95% DRAFT

Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✱ = UU Triaxial

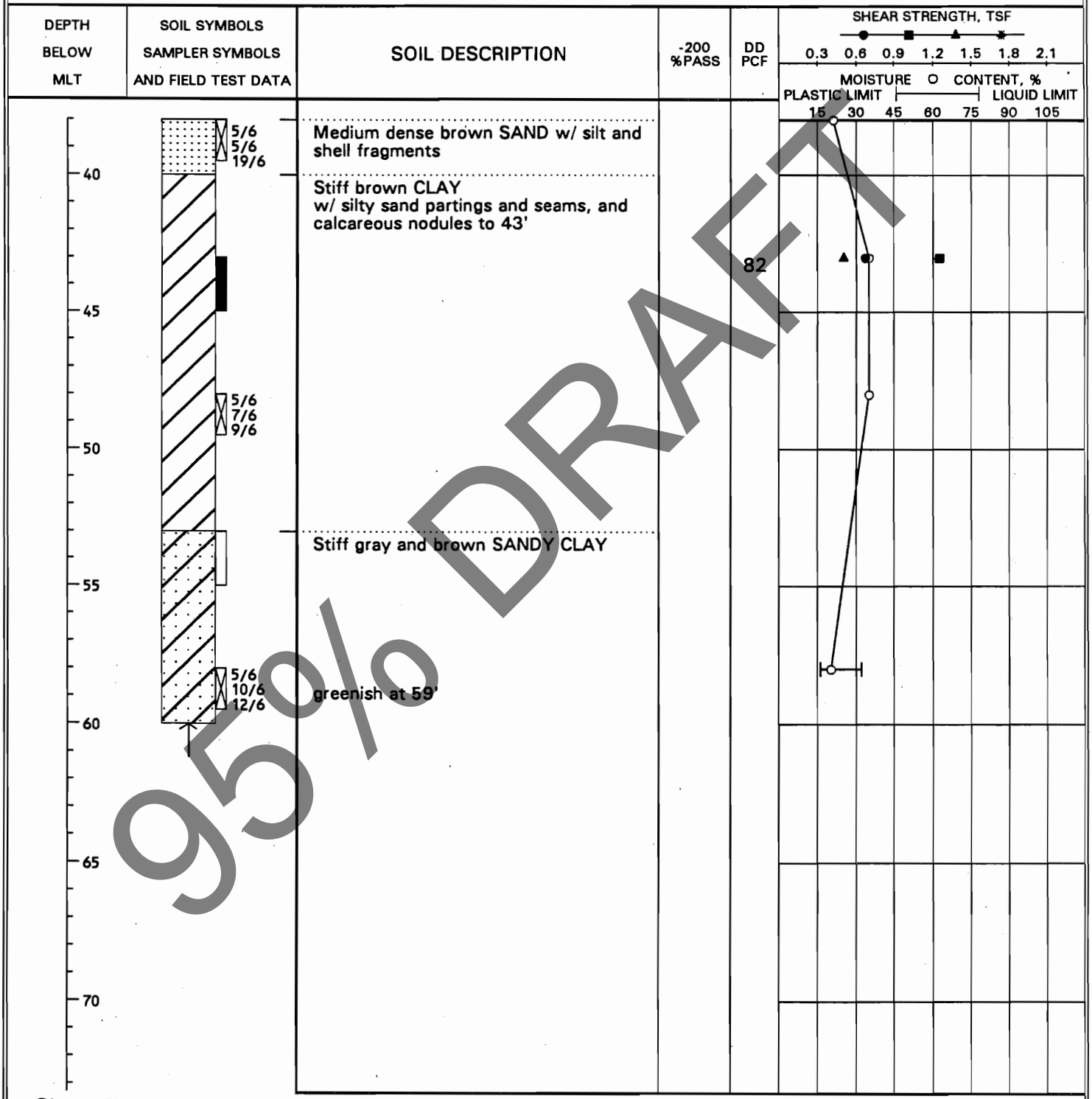
See Plate 2 for boring location.

Plate 18

LOG OF SOIL BORING
Boring No. SC17

Project Name: Marsh Demonstration Project
Date: November 12, 1992
Water Depth: 25 feet
Northing: 672,910 feet

Project No. 92-217G3
Sea Floor Elevation: -21 feet
Time of Measurement: 9:25 AM
Easting: 3,284,049 feet



95% DRAFT

Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✱ = UU Triaxial

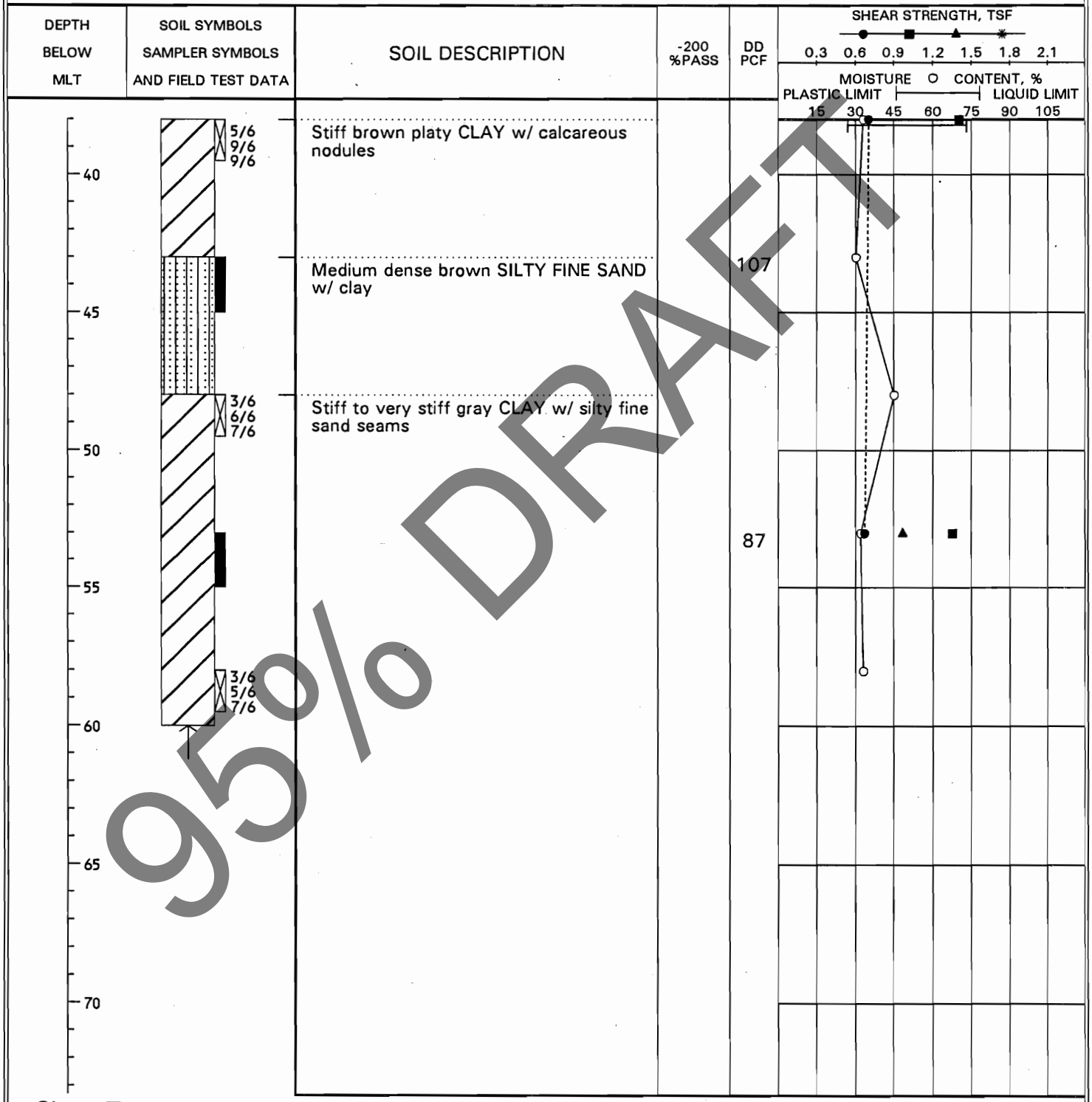
See Plate 2 for boring location.

Plate 19

LOG OF SOIL BORING
Boring No. SC18

Project Name: Marsh Demonstration Project
Date: November 10, 1992
Water Depth: 18 feet
Northing: 671,040 feet

Project No. 92-217G3
Sea Floor Elevation: -15 feet
Time of Measurement: 9:46 AM
Easting: 3,284,796 feet



95% DRAFT

Shear Types: ● = Hand Penet. ■ = Torvane ▲ = Unconf. Comp. ✱ = UU Triaxial

See Plate 2 for boring location.

Plate 20

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL — Location STATION 60+000 RIGHT — Date 29 MAY 1972
Drill Rig ARCO 550 HD — Inspector LANGFORD — Operator ECK — Surface elev TIDE +2.5
Levee District GALVESTON — Job No. — Boring No. 72-45

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
	29 MAY	0.0	9.5								WATER DEPTH @ 2100 HOURS
1		9.5		9.5	12.0	10.8	12.0	3" SHELBY TUBE	TUBE	0.0	GRAY SANDY CLAY WITH SHELL,
											VERY SOFT
				12.0	15.0			FISHTAIL			WASHED
2			17.0	15.0	17.0	15.8	17.0	3" SHELBY TUBE	TUBE	0.0	
		17.0	21.0	17.0	20.0			FISHTAIL			SHELL WITH CLAY, WASHED
3		21.0		20.0	22.0	21.0	22.0	3" SHELBY TUBE	TUBE	0.0	GRAY SANDY CLAY WITH SHELL
											FRAGMENTS, VERY SOFT
			25.0	22.0	25.0			FISHTAIL			WASHED
4		25.0		25.0	27.0			3" SHELBY TUBE	JAR	0.0	GRAY SANDY CLAY, VERY SOFT,
	25 MAY										
				27.0	30.0						WASHED
5	"		30.0	30.0	32.5			3" SHELBY TUBE	CONT	0.00	GRAY SILTY CLAY, VERY SOFT
				32.5	35.0						WASHED
6	"			35.0	37.5	36.3	37.5	3" SHELBY TUBE	CONT	0.00	WITH ORGANIC MATTER, SAND SEAMS
				37.5	40.0						
7	"			40.0	42.5	41.3	42.5	3" SHELBY TUBE	CONT	0.00	

LARGE LOG

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL Location STA 604000 200' R Date 5-25-72
Drill Rig ARCO 550 HD Inspector MINOR Operator SMITH Surface elev TIDE + 2.5
Levee District GALVESTON Job No. Boring No. 72-45

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
	25 MAY			42.5	45.0						WASHED
8				45.0	47.5	46.3	47.5	3" SHELBY TUBE	CONT	0.00	
				47.5	50.0						WASHED
9	25 MAY			50.0	52.5	51.3	52.5	3" SHELBY TUBE	CONT.	0.25	
				52.5	55.0						WASHED
10	25 MAY			55.0	57.5	56.3	57.5	3" SHELBY TUBE	CONT	0.25	
				57.5	60.0						WASHED
11	25 MAY		61.5	60.0	62.5	60.1	61.3	3" SHELBY TUBE	CONT		
		61.5									PARTIALLY DECAYED WOOD
								BOTTOMED AT		62.5	
								COMPLETED @		0750	

LEVEE DISTRICT

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL Location STA 557000 400' LEFT ℄ Date 5-25-72
Drill Rig ARCO-550 HD Inspector MINDIC Operator SMITH Surface elev TIDE + 2.3
Levee District GALVESTON Job No. Boring No. 72-46

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
	25 MAY	0.0	10.7								WATER
1	"	10.7		10.7	13.2	12.1	13.2	3" SHELBY TUBE	CAST	0.00	GRAY SANDY SILTY CLAY. WITH SHELL DETRITUS
											WEIGHT KELLY, 1 ROD, TUBE PENETRATED
											TO 13.2. PENETRATION BROKEN
2	"		14.5	13.2	17.5	16.3	17.5	3" SHELBY TUBE	CAST	0.00	
		14.5									GRAY SANDY SILTY CLAY. VERY SOFT
				17.5	22.5	—	—	3" SHELBY TUBE	—		MISSED. STUCK AS BROKE
				22.5	25.0						WASHED
3	"			25.0	27.5	26.3	27.5	3" SHELBY TUBE	CAST	0.00	WITH DRILLING WATER
				27.5	30.0						WASHED
4	"			30.0	32.5	31.3	32.5	3" SHELBY TUBE	CAST	0.00	
			35.0	32.5	35.0						GRAY SAND
		35.0		35.0	38.0	35.0	38.0				GRAY SAND WASH SAMPLE
5				38.0	38.5			DRIVE HAMMER	JAY		SEAT PENETROMETER
				38.5	39.0			"			21 BLOWS - GRAY SAND
				39.0	39.5			"			23 BLOWS GRAY SAND
				39.5	40.0			"			RETAIN SAMPLE

LARGE FILE

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL
Drill Rig ARCO 550 HD Inspector MINOR
Levee District GALVESTON
Location STA. 55+000 400' LEFT ℄ Date 5-25-72
Operator SMITH Surface elev TIDE + 2.3 1300 HOURS
Job No. Boring No. 72-46

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
	25 MAY			40.0	43.0						WASH
6				43.0	43.5			DRIVE HAMMER	JAR		SEAT PENETROMETER
				43.5	44.0			"			16 BLOWS
				44.0	44.5			"			17 BLOWS
				44.5	45.0			"			RETAIN SAMPLE
				45.0	50.0						WASHED TO 50.0. HINGE HOSE
											RUPTURED. CASED TO 43.0'
				50.0	52.0			FISHTAIL			WASHED
7				52.0	52.5	52.0	54.0	DRIVE SAMPLER	JAR		
				52.5	53.0						19 BLOWS
				53.0	53.5						33 BLOWS
				53.5	54.0						
			58.0	54.0	58.0						WASHED
8		58.0		58.0	58.5	58.5	59.5	DRIVE SAMPLER	JAR	2.75	BROWN GRAY CLAY, VERY STIFF,
				58.5	59.0						23 BLOWS
			59.5	59.0	59.5						27 BLOWS
DRIVE SAMPLER			2"x1 3/8"x 24"								TOTAL DEPTH 59.5'

NO/WATER TABLE/AT
WEIGHT OF HAMMER 140#
DROP DISTANCE 30"

WES FORM NO. 819 PREVIOUS EDITION IS OBSOLETE
REV NOV 1971

Sheet 2 of 2 Sheets

DRAFT 95% DRAFT

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL — Location STATION 504000 400' RIGHT ℄ — Date 25 MAY 1972
Drill Rig ARCO 550 HD — Inspector LANGFORD — Operator ECK — Surface elev TIDE +2.2
Levee District GALVESTON — Job No. — Boring No. 72-47

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
	25 MAY	0.0	9.6								WATER DEPTH 9.6' 1730 HOURS
1		9.6		9.6	11.0			3" SHELBY TUBE	JAR	0.0	DARK GRAY CLAY WITH SHELL,
			11.0								VERY SOFT
2		11.0		11.0	13.0	11.9	13.0		TUBE	0.0	GRAY SANDY CLAY, VERY SOFT
				13.0	15.0			FISHTAIL			WASHED
3				15.0	17.0	15.0	17.0	3" SHELBY TUBE	JAR		
				17.0	20.0			FISHTAIL			WASHED
4				20.0	22.0	20.0	21.0	3" SHELBY TUBE	TUBE	0.0	
				22.0	23.0			FISHTAIL			WASHED
				23.0	25.0	—	—	3" SHELBY TUBE			NO RECOVERY
			26.0	25.0	26.0			FISHTAIL			WASHED
5		26.0		26.0	28.0	26.0	27.0	3" SHELBY TUBE	TUBE	0.0	GRAY SANDY CLAY WITH SHELL,
6				28.0	30.0	29.0	30.0		TUBE	0.0	VERY SOFT.
			33.0	30.0	33.0			FISHTAIL			WASHED
7		33.0		33.0	35.0	33.8	35.0	3" SHELBY TUBE	TUBE	.25	GRAY SANDY ORGANIC CLAY, SOFT.
				35.0	38.0			FISHTAIL			
8			40.0	38.0	40.0	38.8	40.0	3" SHELBY TUBE	TUBE	0.0	MIXED MUD

EXAMPLE

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL Location STATION 507+000 400' RIGHT Date

Drill Rig Inspector Operator Surface elev

Levee District Job No. Boring No. 72-47

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
			-38	40.0	40.5			DRIVE SAMPLER			GRAY SAND NO RECOVERY
				40.5	41.0						19 BLOWS
				41.0	41.5						23 BLOWS
				41.5	45.0			FISHTAIL			
9				45.0	45.5	45.0	47.0	DRIVE SAMPLER	JAR		
				45.5	46.0						6 BLOWS
				46.0	46.5						7 BLOWS
				46.5	47.0						
			50.0	47.0	50.0			FISHTAIL			WASHED
10		50.0		50.0	52.0	50.8	52.0	3" SHELBY TUBE	TUBE	.50	GRAY SILTY SAND WITH CLAY LAYERS, MEDIUM
			55.0								
		55.0	56.0	52.0	55.0			FISHTAIL			WASHED, GRAY CLAYEY SILT, MEDIUM.
11		56.0		55.0	57.0	55.8	57.0	3" DRIVE SAMPLER	TUBE	3.25	BROWN SANDY CLAY, VERY STIFF
				57.0	60.0			FISHTAIL			WASHED
12			62.0	60.0	62.0	60.8	62.0	3" SHELBY TUBE	TUBE	2.25	
DRIVE	SAMPLER		2" X	1 3/8"	X 24"	NO/WATER TABLE/AT					TOTAL DEPTH 62.0

WES FORM NO. 819 REV NOV 1971 PREVIOUS EDITION IS OBSOLETE

WEIGHT OF HAMMER 140 #

DROP DISTANCE 30"

Sheet 2 of 2 Sheets

EXHIBIT 16

10.7
2.5

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL Location STA 471+500, 400' RIGHT ℄ Date 8 JUNE 1972
Drill Rig ARCO 550 HD Inspector MINOR Operator SMITH Surface elev TIDE +2.5
Levee District GALVESTON Job No. Boring No. 72-47A

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
		0.0	10.7								WATER
1	8 JUNE	10.7		10.7	15.0	12.2	13.2	3" SHELBY TUBE	CONT	0.00	GRAY SILTY SANDY CLAY VERY SOFT.
											WEIGHT 1 ROD, KELLY, SAMPLE TUBE
											PENETRATED TO 15.0. PENETRATION
											BRAKED.
2	8 JUNE			15.0	20.0	16.3	17.5	3" SHELBY TUBE	CONT.	0.00	ABOVE WEIGHT PENETRATED TO
											20.0, THEN BRAKED
3	8 JUNE			20.0	22.5	21.3	22.5	3" SHELBY TUBE	CONT	0.00	LESS SAND. PENETRATION AS ABOVE
											PLUS 1 ROD.
			21.0	22.5	25.0						WASHED
4	8 JUNE	21.0		25.0	27.5	26.3	27.5	3" SHELBY TUBE	CONT	0.25	GRAY GREEN SLIGHTLY SANDY CLAY
											WITH ORGANIC MATTER VERY SOFT
											PENETRATION PRESSURE REQUIRED
			30.0	27.5	30.0						WASHED
5		29.0	-27.5	30.5	31.5	30.3	31.5	3" SHELBY TUBE	CONT		GRAY MEDIUM CAVING SAND
				31.5	32.0						WASHED

LPRDD 10-16

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BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL
Location STA 471+500, 400' RIGHT ℄
Date 8 JUNE 1972
Drill Rig ARCO 550 HD
Inspector [illegible]
Operator SMITH
Surface elev TIDE + 2.5
Levee District GALVESTON
Job No.
Boring No. 72-47A

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
6	8 JUNE			32.0	32.5	32.0	34.0	SPLIT SPOON	JAR	–	SEAT SPOON
				32.5	33.0						1 BLOW
				33.0	33.5						1 BLOW
				33.5	34.0						RETAIN SAMPLE
				34.0	36.0						WASHED
7	"			36.0	38.0	36.0	38.0	3" SHELBY TUBE	JAR	–	GRAY SAND WITH CLAY LAYERS
				38.0	42.0						WASHED
8	"			42.0	42.5	42.0	44.0	SPLIT SPOON	JAR	–	SEAT SPOON
				42.5	43.0						12 BLOWS
				43.0	43.5						14 BLOWS
				43.5	44.0						RETAIN SAMPLE
				44.0	49.5						WASHED
9			51.2	49.5	52.0	50°	51.1	3" SHELBY TUBE	JAR	–	WITH SMALL GRAVEL
10		51.1				51.1	52.0		CONT	0.50	GRAY BROWN CLAY, MEDIUM
			53.0	52.0	55.0						WASHED
11		53.0		55.0	57.5	56.3	57.5	3" SHELBY TUBE	CONT	2.00	GRAY GREEN CLAY, WITH ORGANIC MATTER,
											FERRUGINOUS NODULES VERY STIFF

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REV NOV 1971

Sheet 2 of 3 Sheets

Ofo DRAFT

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BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL Location STA 471500, 900' RIGHT ℄ Date 8 JUNE 1972
Drill Rig ARCO 550 HD Inspector MINOR Operator SMITH Surface elev TIDE +2.5
Levee District GALVESTON Job No. Boring No. 72-47A

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
				57.5	60.0						WASHED
12	8 JUNE			60.0	62.5	61.3	62.5	3" SHELBY TUBE	CONT.	2.25	WITH CALCAREOUS NODULES AND
											SAND LAMINAE, VERY STIFF

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Sheet 3 of 3 Sheets

LAR Disc

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL — Location STA 45+00 400' LEFT ℄ — Date 5-25-72
Drill Rig AKCO 550 HD — Inspector MINOR — Operator SMITH — Surface elev TIDE +2.4
Levee District GALVESTON — Job No. — Boring No. 72-48

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENEHROMETER VALUE	CLASSIFICATION AND REMARKS
	25MAY	0.0	12.1								WATER
1		12.1		12.1	15.0	13.6	14.6	3" SHELBY TUBE	CONT	0.00	GRAY CLAY WITH SAND AND SHELL, VERY
				"							SOFT. KELLY, IROD, TUBE PENETRATED
											TO 15.0, PENETRATION BRAKED
2	"			15.0	17.5	16.3	17.5	3" SHELBY TUBE	CONT	0.00	SHELL MARL ABUNDANT, PENETRATION
											AS ABOVE
			20	17.5	20.0						WASHED
3	"	SAC	22.0	20.0	22.5	21.3	22.5	3" SHELBY TUBE	CONT	0.00	
		22.0								1.00	DARK GRAY CLAY STIFF (BOTTOM
											OF SAMPLE 3)
			-22.5	22.5	25.0						WASHED
4	"	SAC	26.0	25.0	27.5	26.3	27.5	3" SHELBY TUBE	CONT	1.25	GRAY TAN SILTY CLAY PARTINGS OF SILTS
		26.0									VERY STIFF (BEAUMONT) STIFF ON TOP
				27.5	30.0						WASHED
5	"			30.0	32.5	31.3	32.5	3" SHELBY TUBE	CONT	1.75	WITH SAND LAMINAE VERY STIFF
			-32.5	32.5	35.0						WASHED
	"		35.0	35.0	40.0						SALT & PEPPER SAND WASHED

LARGE Disp 16

BORING LOG
FIELD DATA

Project: HOUSTON SHIP CHANNEL
Location: STA 45+000 400' LEFT ℄
Date: 5-25-72
Drill Rig: ARCO 550 HD
Inspector: MINOR
Operator: SMITH
Surface elev: TIDE +2.5
Levee District: GALVESTON
Job No.:
Boring No.: 72-48

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
6	25 MAY			40.5	41.0	40.0	42.0	SPLIT SPOON	JAR		WHITE SAND SEAT PENETROMETER
				41.0	41.5						8 BLOWS
				41.5	42.0						10 BLOWS
											RETAIN SAMPLE
				42.0	50.0	42.5					WASHED WITH THIN CLAY SEAMS
			51.0	50	52.0	49.5					WASHED
7	"	51.0		52.0	52.5	52.0	54.0	SPLIT SPOON	JAR		SEAT SPOON - RED CLAY VERY STIFF
				52.5	53.0						5 BLOWS
				53.0	53.5						5 BLOWS
				53.5	54.0	51.5					RETAIN SAMPLE
8	"			54.0	56.5	55.3	56.5	3" SHELBY TUBE	CONT	1.50	BROWN WITH ORGANIC MATTER VERY
											STIFF
			57.0	56.5	58.0						WASHED
9		57.0		58.0	60.0	58.8	57.5 60.0	3" SHELBY TUBE	CONT	2.25	GRAY GREEN CLAY, WITH CALCAREOUS NODULES
											AND INDURATED PARTS VERY STIFF
					BOTTOMED AT		60.0				
DRIVE SAMPLER 2" X 1 3/8" X 24"					COMPLETED AT		11.0				

NO/WATER TABLE/AT

WEIGHT OF HAMMER 140 #

Sheet 2 of 2 Sheets

DROP DISTANCE 30"

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REV NOV 1971

DRAFT

17.2 2.5

BORING LOG
FIELD DATA

Project Houston Ship Channel Location 40+000 400' Right ℄ Date 5-25-72
Drill Rig ARCO 550 HD Inspector MINOR Operator SMITH Surface elev TIDE +2.5
Levee District GALVESTON Job No. Boring No. 72-49

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
		0.0	10.3								WATER
1	25 MAY	11.6		10.3	15.0	11.6	12.8	3" Shelby Tube	Cont	0.00	GRAY CLAY AND SHELL. VERY SOFT
											WEIGHT KELLY, IRON, TUBE PENETRATED
											TO 12.8. PENETRATION BRAKED
2	"		17.0	15.0	17.5	15.8	17.0	3" Shelby Tube	Cont	0.00	RUSTY BROWN ORGANIC CLAY CRUMBLY
		17.0									PENETRATION AS ABOVE TO 17.0 THEN
											PRESSURE REQUIRED
			18.0	17.5	20.0						WASHED
3	"	18.0		20.0	22.5	20.8	22.5	3" Shelby Tube	Cont	2.50	RED BROWN CLAY, CALCAREOUS NODULES
											VERY STIFF. (BEAUMONT)
				22.5	27.0						WASHED
4	"			27.0	29.0	27.8	29.0	3" Shelby Tube	Cont	1.00 TO 3.00	WITH SILT LAYERS. CLAY
											PARTS VERY STIFF, SILT
											STIFF
			29.5	29.0	30.0						WASHED
5		29.5		30.0	32.5	31.3	32.5	3" Shelby Tube	Cont	2.50	RED SILT, WITH THIN CLAYEY
											LAMINAE

WES FORM NO. 819 REV NOV 1971 PREVIOUS EDITION IS OBSOLETE

Sheet 1 of 2 Sheets

DRAFT

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL — Location 40+000 900' RIGHT ℄ — Date 5-25-72
Drill Rig ARCO 550 HD — Inspector MINOR — Operator SMITH — Surface elev TIDE +2.5
Levee District GALVESTON — Job No. — Boring No. 72-49

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
			33.5	32.5	35.0						WASHED
6	25 MAY	33.5		35.0	37.5	36.3	37.5	3" SHELBY TUBE	COUT	3.50	RED TAN MOTTLED CLAY WITH CALCAREOUS NODULES AND SILT LAYERS VERY STIFF
				37.5	40.0						WASHED
7	"			40.0	42.5	41.3	42.5	3" SHELBY TUBE	COUT	4.00	
				42.5	45.0						WASHED
8	"			45.0	47.5	44.8	46.7	3" SHELBY TUBE	COUT	3.25	
				47.5	50.0						
9				50.0	52.5	51.3	52.5	3" SHELBY TUBE	COUT	2.75	BECOMING DARK GRAY BROWN.
				52.5	55.0						
10				55.0	57.5	56.3	57.5	3" SHELBY TUBE	COUT	1.75	
				57.5	60.0						WASHED
11				60.0	62.5	61.3	62.5	3" SHELBY TUBE	COUT	3.25	BECOMING GREEN GRAY
NO WATER TABLE AT											
WEIGHT OF HAMMER				140 #			BOTTOMED AT		62.5		
DROP DISTANCE				30 "			COMPLETED		1355		

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Sheet 2 of 2 Sheets

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BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL Location STATION 35+000 400' LEFT ℄ Date 26 MAY 1972
Drill Rig ARCO 550 HD Inspector LANGFORD Operator ECK Surface elev TIDE +2.3 @ 1300
Levee District GALVESTON Job No. Boring No. 72-50

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
	26 MAY	0.0	11.8								WATER DEPTH @ 1500 HOURS
1		11.8		11.8	13.0	11.8	13.0	3" SHELBY TUBE	JAR	0.0	GRAY SANDY CLAY, VERY SOFT.
2				13.0	15.0	13.8	15.0		TUBE	0.0	
			19.0	15.0	18.0			FISHTAIL			WASHED
3		19.0		18.0	20.0	18.8	20.0	3" SHELBY TUBE	TUBE	0.0	GRAY SANDY CLAY WITH SHELL,
											VERY SOFT.
				20.0	23.0			FISHTAIL			WASHED
4			25.0	23.0	25.0	24.1	25.0	3" SHELBY TUBE	TUBE	0.0	
		25.0		25.0	28.0			FISHTAIL			WASHED. GRAY SANDY CLAY, VERY SOFT
5				28.0	30.0	28.8	30.0	3" SHELBY TUBE	TUBE	0.0	
				30.0	33.0			FISHTAIL			WASHED
6				33.0	35.0	33.8	35.0	3" SHELBY TUBE	TUBE	0.0	WITH SHELL LAYER.
				35.0	38.0			FISHTAIL			WASHED
7				38.0	40.0	38.8	40.0	3" SHELBY TUBE	TUBE	.25	SOFT, SAND LAYERS
			43.0	40.0	43.0			FISHTAIL			WASHED
8		43.0		43.0	45.0	43.8	45.0	3" SHELBY TUBE	TUBE	.25	GRAY SANDY ORGANIC CLAY, SOFT.
				45.0	48.0			FISHTAIL			WASHED

WES FORM NO. 819 REV NOV 1971 PREVIOUS EDITION IS OBSOLETE

Sheet 1 of 2 Sheets

DRAFT

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL Location STATION 35+000 400' LEFT ℄ Date 26 MAY 1972
Drill Rig ARCO 550 HD Inspector LANGFORD Operator ECK Surface elev 28
Levee District GALVESTON Job No. Boring No. 72-50

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
9				48.0 46	50.0 48	49.2	50.0	3" SHELBY TUBE	TUBE	1.25	STIFF.
			53.0	50.0	53.0			FISHTAIL			WASHED
10		53.0		53.0	55.0	53.8	55.0	3" SHELBY TUBE	TUBE		GRAY MEDIUM SAND 51.5-
				55.0	58.0			FISHTAIL			WASHED
				58.0	60.0			3" SHELBY TUBE			NO RECOVERY LS
11				60.0	60.5	60.0	62.0	DRIVE SAMPLER	JAR		
				60.5	61.0						22 BLOWS
				61.0	61.5						28 BLOWS 59
			62.0	61.5	62.0						
											TOTAL DEPTH 62.0'
											NO/WATER TABLE/AT
											WEIGHT OF HAMMER 140#
											DROP DISTANCE 30"
		DRIVE SAMPLER 2" X 1 3/4" X 24"									

WES FORM NO. 819 REV NOV 1971 PREVIOUS EDITION IS OBSOLETE

Sheet 2 of 2 Sheets

DRAFT

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL Location STATION 29+000 400' LEFT ℄ Date 26 MAY 1972
Drill Rig ARCO 550 HD Inspector LANGFORD Operator ECK Surface elev TIDE +2.3 @1300
Levee District GALVESTON Job No. Boring No. 72-51

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
	26 MAY	0.0	10.0	-7.5							WATER DEPTH 1815
1		10.0		10.0	15.0	10.0	15.0	3" SHELBY TUBE	JAR		GRAY SANDY CLAY WITH SHELL,
											VERY SOFT.
			18.0	15.0	18.0			FISHTAIL			WASHED
2		18.0		18.0	20.0	18.8	20.0	3" SHELBY TUBE	TUBE	0.0	GRAY CLAY WITH SAND POCKETS,
											VERY SOFT.
	20.?		23.0	20.0	23.0			FISHTAIL			WASHED
3		23.0		23.0	25.0	23.8	25.0	3" SHELBY TUBE	TUBE	0.0	GRAY SANDY CLAY WITH SHELL,
											VERY SOFT.
			28.0	25.0	28.0			FISHTAIL			WASHED
4		28.0		28.0	30.0	28.8	30.0	3" SHELBY TUBE	TUBE	.25	GRAY SANDY CLAY, SOFT,
			34.0	30.0	33.0			FISHTAIL			WASHED
5		34.0		33.0	35.0	33.8	35.0	3" SHELBY TUBE	TUBE	.25	GRAY SANDY ORGANIC CLAY, SOFT,
				35.0	38.0			FISHTAIL			WASHED
				38.0	40.0	—	—	3" SHELBY TUBE			NO RECOVERY
6				38.0	40.0	38.8	40.0		TUBE	.25	
				40.0	43.0			FISHTAIL			WASHED

WES FORM NO. 819 REV NOV 1971 PREVIOUS EDITION IS OBSOLETE

Sheet 1 of 2 Sheets

DRAFT

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL Location STATION 29+000 400' LEFT Date 26 May 1972
Drill Rig ARCO 550 HD Inspector LANGFORD Operator ECE Surface elev
Levee District GALVESTON Job No. Boring No. 72-51

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
7				43.0	45.0	43.8	45.0	3" SHELBY TUBE	TUBE	.25	
			48.0	45.0	48.0			FISHTAIL			WASHED
8		48.0		48.0	50.0	48.8	50.0	3" SHELBY TUBE	TUBE	.25	GRAY CLAY, WITH SAND POCKETS, SOFT.
			54.0	50.0	53.0			FISHTAIL			WASHED
9		54.0		53.0	55.0	53.8	55.0	3" SHELBY TUBE	TUBE	.75	GRAY, DARK GRAY ORGANIC CLAY, MEDIUM.
		55	60.0	55.0	60.0			FISHTAIL			WASHED
10		60.0	62.0	60.0	62.0	60.8	62.0	3" SHELBY TUBE	TUBE	2.00	GRAY CLAY, VERY STIFF
											TOTAL DEPTH 62.0'
											NO WATER TABLE AT
											WEIGHT OF HAMMER 140#
											DROP DISTANCE 30"

WES FORM NO. 819 REV NOV 1971 PREVIOUS EDITION IS OBSOLETE

Sheet 2 of 2 Sheets

LOG

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL Location STA 25+000, 400' LEFT ℄ Date 5-30-72
Drill Rig ARCO 550 HD Inspector MINOR Operator SMITH Surface elev TIDE + 2.5
Levee District GALVESTON Job No. Boring No. 72-52

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
	30 MAY	0.0	10.0								WATER
1	"	10.0		10.0	14.0	10°	11.5	3" SHELBY TUBE	JAR		GRAY CLAY WITH SHELL, VERY SOFT
											KELLY, IROD, TUBE PENETRATED
											TO 14.0. PENETRATION BRAKED
				14.0	15.0						WASHED
2	"		-14 16.5	15.0	17.5	16.3	17.5	3" SHELBY TUBE	CONT	3.25	BROWN CLAY VERY STIFF
		16.5									
				17.5	20.0						WASHED
3	"			20.0	22.5	21.2	22.4	3" SHELBY TUBE	CONT	2.00	WITH SILT LAYERS
				22.5	25.0						WASHED
4	"			25.0	27.5	26.3	27.5	3" SHELBY TUBE	CONT	3.50	
				27.5	30.0						WASHED
5	"			30.0	32.5	31.8	32.5	3" SHELBY TUBE	CONT	3.25	
			-31 33.5	32.5	38.5						WASHED. PROBABLY BROWN SILT
6		33.5	-36.5 39.0	38.5	39.0	38.5		SPLIT SPOON	JAR		SEAT SPOON .5 BROWN SILT, 1.5' BROWN CLAY
		39.0		39.0	39.5						6 BLOWS. RUSTY BROWN CLAY VERY STIFF
				39.5	40.0		40.0				6 BLOWS

WES FORM NO. 819 PREVIOUS EDITION IS OBSOLETE
REV NOV 1971

Sheet 1 of 2 Sheets

DRAFT

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL Location STA 25+000, 400' LEFT ℄ Date 5-30-72
Drill Rig ARCO 550 HD Inspector MINOR Operator SMITH Surface elev TIDE +2.5
Levee District GALVESTON Job No. Boring No. 72-52

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
	30 MAY			40.0	40.5						RETAIN SAMPLE
7	"			40.5	43.0	41.8	43.0	3" SHELBY TUBE	CONT.	1.25	WITH SILT LAYERS. BECOMING DARK GRAY
				43.0	45.0						WASHED
8				45.0	47.5	46.3	47.5	3" SHELBY TUBE	CONT	1.75	BECOMING MORE SANDY. WITH ORGANIC MATTER
				47.5	50.0						WASHED
9			47.5 50.0	50.0	52.5	51.3	52.5	3" SHELBY TUBE	CONT.	3.75	GRAY GREEN SILTY CLAYEY SAND
											VERY STIFF
		50.0	55.0	52.5	60.0						WASHED ADDITIONAL 55.0-60.0
											AFTER SAMPLE MISSED
10		55.0		60.0	60.5	60.0		SPLIT SPOON	JAR		SPLIT SPOON. BROWN MEDIUM SAND. WITH SILTSTONE
											AND CLAYEY SEAMS.
				60.5	61.0						32 BLOWS -
				61.0	61.5						REFUSAL
				61.5	62.0		62.0				RETAIN SAMPLE
NO/WATER TABLE/AT							BOTTOMED AT 62.0'				
WEIGHT OF HAMMER			140 #				COMPLETED AT 1100				
DROP DISTANCE			30 "					DRIVE SAMPLER			2" x 1 3/8" x 24"

WES FORM NO. 819 REV NOV 1971 PREVIOUS EDITION IS OBSOLETE

Sheet 2 of 2 Sheets

DRAFT

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL Location STA. 20+000 400' RIGHT ℄ Date 5-30-72
Drill Rig ARCO 550 HD Inspector MINOR Operator SMITH Surface elev TIDE +2.5
Levee District GALVESTON Job No. Boring No. 72-53

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
		0.0	8.4								WATER
1	30 MAY	8.4	9.5	8.2	9.5	8.4	10.0	3" SHELBY TUBE	JAR		DARK GRAY CLAY. WITH SHELL. VERY SOFT
											KELLY, IROD, TUBE PENETRATED
											TO 9.5
		9.5									BROWN GRAY CLAYEY SAND. PROBABLY
											SPOIL FROM CLOSE BY SPOIL MOUND
			11.0	10.0	15.0						WASHED
		11.0									GRAY CLAY WITH SHELL. VERY SOFT
2	30 MAY		17.0	15.0	17.5	16.3	17.5	3" SHELBY TUBE	CONT	2.50	GRAY-TAN MOTTLED CLAY WITH
											CALCAREOUS NODULES VERY
											STIFF
				17.5	20.0						WASHED
3	"			20.0	22.5	21.3	22.5	3" SHELBY TUBE	CONT	4.50	ALSO WITH FERRUGINOUS NODULES
				22.5	25.0						WASHED
4	"			25.0	27.5	26.3	27.5	3" SHELBY TUBE	CONT	3.50	
				27.5	30.0						WASHED
5	"			30.0	32.5	31.3	32.5	3" SHELBY TUBE	CONT	2.75	FEWER FERRUGINOUS AND CALCAREOUS NODULES

WES FORM NO. 819 REV NOV 1971 PREVIOUS EDITION IS OBSOLETE

Sheet 1 of 2 Sheets

DRAFT 05/06

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL — Location STA 20+000 400 RIGHT ℄ — Date 5-30-72
Drill Rig ARCO 550 HD — Inspector MINOR — Operator SMITH — Surface elev TIDE +2.5
Levee District GALVESTON — Job No. — Boring No. 72-53

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
				32.5	35.0						WASHED
6	30 MAY			35.0	37.5	36.3	37.5	3" SHELBY TUBE	CONT	3.75	
				37.5	40.0						WASHED
7				40.0	42.5	41.3	42.5	3" SHELBY TUBE	CONT	4.00	SAND'Y
				42.5	45.0						WASHED
8			45.0	45.0	47.5	~~46.3~~ 47.5	47.5	3" SHELBY TUBE	CONT	4.50+	TAN-BROWN VERY SANDY CLAY HARD
9		45.0		47.5	48.0	~~47.5~~		SPLIT SPOON	JAR		SEAT SPOON
				48.0	48.5						14.0 BLOWS
			49.0	48.5	49.0						8.0 BLOWS
		49.0		49.0	49.5		99.5				RETAIN SAMPLE BROWN-WHITE SAND
				47.5	52.0						WASHED
10				52.0	52.5	52.0		SPLIT SPOON	JAR		SEAT SPOON - TAN-WHITE MOTTLED SAND
				52.5	53.0						21 BLOWS
				53.0	53.5						25 BLOWS
				53.5	54.0		54.0				RETAIN SAMPLE
				54.0	59.0						WASHED

LTRDIS 1969

BORING LOG
FIELD DATA

Project HOUSTON SHIP CHANNEL — Location STA 20+000 400' RIGHT ℄ — Date 5-30-72
Drill Rig ARCO 550 HD — Inspector MINOR — Operator SMITH — Surface elev TIDE +2.0
Levee District GALVESTON — Job No. — Boring No. 72-53

SAMPLE NUMBER	DATE TAKEN 1972	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER	CONTAINER	POCKET PENETROMETER VALUE	CLASSIFICATION AND REMARKS
11	30 MAY		52.5 55.0	54.0	56.0						WASHED
		55.0		56.0	58.0	56.0	58.0	SPLIT SPOON	JAR		GRAY TAN MOTTLED CLAY, VERY STIFF
											WASHING PROGRESS INDICATED BOTTOM
											SAND STRATUM. PUSHED WITH
											SPLIT SPOON
				58.0	60.0						WASHED
12				60.0	62.5	61.3	62.5	3" SHELBY TUBE	CONT	2.25	BECOMING SANDY
											BOTTOMED AT 62.5'
											COMPLETED AT 1455
											NO WATER TABLE AT
											WEIGHT OF HAMMER 140#
											DROP DISTANCE 30"
DRIVE SAMPLER			2" X 1 3/8" X 24"								

USED 1976

BIRD ISLAND MARSH BORING LOGS

95% DRAFT

LOG OF BORING ECP-1009A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13794115.65; E: 3274221.61
DEPTH OF WATER:11.2 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -10.54 FT
DATE: 1/5/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0	Very soft to soft, gray, FAT CLAY (CH) -w/ sand seams at 0'-2' -w/ silt seams at 2'-4' -w/ shells at 3.5'-4'		96.1		75	60	22	38
-15	5	Stiff to very stiff, reddish brown and gray, FAT CLAY (CH) -w/ shells at 4'-5'			89	37			
				98.9		33	82	33	49
-20	10	-w/ shells at 8'-10' -w/ ferrous stains at 10'-40'				42			
-25	15			99.8		36	74	30	44
-30	20	-w/ silt seams at 18'-20'				33			
-35	25			97.1	90	37	82	35	47
-40	30					34			
-45	35	-w/ calcareous nodules at 34'-35'		94.3	91	38	81	33	48
-50	40					33			

1.25

95% DRAFT

Remarks: Mudline was encountered at 11.2' below the water level during drilling operations.

Drilled By: Fugro Logged By: MP

HVJ Associates, Inc.

PLATE A-96

LOG OF BORING ECP-1010A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13794604.61; E: 3274021.29
DEPTH OF WATER:8.9 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -9.66 FT
DATE: 1/7/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0								
-10		Very soft to soft, gray, SANDY FAT CLAY (CH)				117			
		-w/ silt seams at 0'-4'							
		-w/ sand seams at 2'-4'		65.3		62	60	22	38
	5	-w/ shells at 2'-4'							
-15		Stiff to very stiff, reddish brown and gray, FAT CLAY (CH)							
				98.9		35	92	36	56
	10								
-20					92	33			
	15								
-25		-w/ silt seams at 16'-18'							
				99.4		28	79	32	47
	20				91	32			
-30									
	25					33			
-35									
	30				87	37			
-40		Stiff, reddish brown and gray, ORGANIC CLAY (OH)							
	35	-w/ sand seams at 33'-35'		93.5		43	404	38	366
-45									
	40								

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 8.9' below the water level during drilling operations.

COH HG1910092.1.1 - BIRD ISLAND MARSH.GPJ 4/27/20

Drilled By: Fugro Logged By: EE

HVJ Associates, Inc.

PLATE A-97

LOG OF BORING ECP-1011A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13795626.87; E: 3273989.63
DEPTH OF WATER:10.7 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -10.5 FT
DATE: 1/7/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0										
				Very soft, gray, FAT CLAY WITH SAND (CH)				85			
				-w/ silt seams and sand seams at 0'-4'							
				-w/ shells at 0'-4'		73.6		76	68	25	43
-15	5			Soft to very stiff, reddish brown and gray, FAT CLAY (CH)			79	47			
				-w/ shells at 6'-10'		98.9		31	78	32	46
-20	10						87	36			
				-w/ silt seams at 12'-14'							
-25	15			Stiff, reddish brown, LEAN CLAY (CL)							
				-w/ sand and silt seams at 14'-16'		94.1		26	40	22	18
				Stiff to very stiff, reddish brown and gray, FAT CLAY (CH)		98.9		32	77	33	44
-30	20			-w/ silt seams at 18'-20'			93	32			
-35	25					99.9	95	32	66	24	42
				-w/ ferrous stains at 28'-30'							
-40	30							39			
				Firm to stiff, gray, ORGANIC CLAY (OH)							
-45	35					96.3	83	40	404	36	368
				-w/ shells at 38'-40'							
-50	40							56			

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

1.25
1.33

95% DRAFT

Remarks: Mudline was encountered at 10.7' below the water level during drilling operations.

Drilled By: Fugro Logged By: MP

HVJ Associates, Inc.

PLATE A-98

LOG OF BORING ECP-1012A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13796612.99; E: 3274156.01
DEPTH OF WATER: 10.9 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -10.16 FT
DATE: 1/8/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

UNDRAINED SHEAR STRENGTH, TSF
HAND PENETROMETER
UNCONFINED COMPRESSION
UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
TORVANE
0.2 0.4 0.6 0.8 1.0

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0	Very soft, gray, FAT CLAY WITH SAND (CH)		75.6		90	84	29	55
		-w/ silt and sand seams at 0'-2'				43			
		-w/ shells at 0'-2'							
-15	5	Firm to very stiff, reddish brown and gray, FAT CLAY (CH)			84	41	95	37	58
		-w/ shells at 8'-10'				35			
-20	10				98	29			
		-w/ silt seams at 12'-16'		99.8	99	28	54	21	33
-25	15				93	31			
						37			
-30	20								
		-w/ ferrous stains at 23'-30'		96.8		38	82	35	47
-35	25								
					87	34			
-40	30								
						30			
-45	35								
-50	40								

95% DRAFT

Remarks: Mudline was encountered at 10.9' below the water level during drilling operations.

Drilled By: Fugro Logged By: MP

HVJ Associates, Inc.

PLATE A-99

LOG OF BORING ECP-1013A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13797557.3; E: 3274515.49
DEPTH OF WATER: 10.2 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -9.97 FT
DATE: 1/8/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽ -10	0	Very soft, gray, SANDY FAT CLAY (CH) -w/ silt seams at 0'-4' -w/ shells at 0'-4'		49.9		50	50	23	27
-15	5	Stiff to very stiff, reddish brown and gray, FAT CLAY (CH)			90	33			
-20	10	-w/ claystone seams at 12'-14'		98.6		33	73	32	41
-25	15				100	26			
						25			
	20			89.7	90	35	81	34	47
-30						35			
-35	25			90.1	90	35	84	25	59
-40	30					39			
-45	35	-w/ shells at 33'-35'		96.7	79	43	104	30	74
	40					29			

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

1.13
1.33
1.35

95% DRAFT

COH HG1910092.1.1 - BIRD ISLAND MARSH.GPJ 4/27/20

Remarks: Mudline was encountered at 10.2' below the water level during drilling operations.

LOG OF BORING ECP-1014A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13797985.81; E: 3274872.72
DEPTH OF WATER:12 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -11.19 FT
DATE: 1/6/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0								
		Very soft to soft, gray, FAT CLAY WITH SAND (CH)				83			
		-w/ silt and sand seams at 0'-6'							
		-w/ shells at 0'-2' and 4'-6'		79.9		81	73	27	46
-15	5								
		Firm to very stiff, brown and reddish brown, LEAN CLAY (CL)		96.8	97	30	45	19	26
		-w/ sand seams at 6'-12'							
-20	10	-w/ shells at 6'-10'							
						32			
		-w/ silt seams at 12'-16'		98.2	98	26	34	16	18
-25	15								
		-w/ sand seams at 16'-18'				29			
		Stiff to very stiff, reddish brown and gray, FAT CLAY (CH)		99.7	101	25	61	23	38
-30	20								
						25			
-35	25	-w/ silt seams at 23'-25'							
		-w/ sand seams at 28'-35'			90	35			
-40	30								
				89.7	90	35	91	34	57
-45	35								
				98.7		33	80	31	49
-50	40								

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

1.41
17

95% DRAFT

Remarks: Mudline was encountered at 12' below the water level during drilling operations.

Drilled By: Fugro Logged By: EE/MP

HVJ Associates, Inc.

PLATE A-101

LOG OF BORING ECP-1015A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13797888.17; E: 3275391.74
DEPTH OF WATER: 10.2 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -10.82 FT
DATE: 1/8/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
0	0	Very soft to soft, gray and brown, FAT CLAY (CH) -w/ sand seams at 0'-6' -w/ silt seams at 0'-10'	WOP						
-15	5		WOP	86.5		107	71	27	44
				94.8		32	52	25	27
-20	10	Firm to very stiff, brown, reddish brown and gray, LEAN CLAY (CL) -w/ silt seams at 10'-20'				28	43	22	21
-25	15		4	99.5		28	38	21	17
-30	20			98.3		26	29	22	7
-35	25	Stiff to very stiff, reddish brown, brown and gray, FAT CLAY (CH)		100	84	37	104	32	72
-40	30						107	34	73
-45	35			93.3		30	62	25	37
-50	40	-w/ sand seams at 38'-40'			105	23	52	22	30

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

1.17
1.83

95% DRAFT

Remarks: Mudline was encountered at 10.2' below the water level during drilling operations.

Drilled By: Fugro Logged By: EE

HVJ Associates, Inc.

PLATE A-102

LOG OF BORING ECP-1016A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13797430.98; E: 3276300.99
DEPTH OF WATER: 10.9 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -10.62 FT
DATE: 1/8/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	0	Very soft, gray, FAT CLAY WITH SAND (CH) -w/ silt seams at 0'-4' -w/ sand seams at 2'-4'		72.8		71	62	24	38
-15	5	-w/ shells at 2'-4'				36	72	32	40
		Firm to very stiff, brown, gray and reddish brown, FAT CLAY (CH)		99.4		36	100	36	64
-20	10								
				99.6		34	72	30	42
-25	15					36			
-30	20				87	37			
-35	25					36			
-40	30	-w/ silt seams at 28'-38'			102	25			
		Firm to stiff, gray and reddish brown, LEAN CLAY (CL)							
-45	35	-w/ silt seams at 33'-35'		95.4		25	41	21	20
-50	40	-w/ ferrous stains at 38'-40'				53			

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 10.9' below the water level during drilling operations.

Drilled By: Fugro Logged By: EE/MP

HVJ Associates, Inc.

PLATE A-103

LOG OF BORING ECP-1017A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13796779.75; E: 3277067.32
DEPTH OF WATER: 12.4 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -10.63 FT
DATE: 1/8/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0								
		Very soft, gray, FAT CLAY WITH SAND (CH) -w/ silt seams at 0'-8' -w/ shells at 0'-6'				53			
						68			
-15	5								
		Stiff to very stiff, reddish brown and gray, FAT CLAY (CH) -w/ ferrous stains at 10'-25'			89	36			
-20	10			99.2		36	94	33	61
-25	15								
						39			
-30	20				87	38			
-35	25			98.9		39	87	37	50
-40	30					35			
-45	35	-w/ ferrous stains at 33'-35'		98.6		35	86	38	48
-50	40	-w/ silt seams at 38.5'-39.5'			90	33			

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at below the water level during drilling operations.

Drilled By: Fugro Logged By: MP

HVJ Associates, Inc.

PLATE A-104

LOG OF BORING ECP-1018A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13795946.31; E: 3277707.67
DEPTH OF WATER: 10.7 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -9.9 FT
DATE: 1/9/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

UNDRAINED SHEAR STRENGTH, TSF
HAND PENETROMETER
UNCONFINED COMPRESSION
UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
TORVANE
0.2 0.4 0.6 0.8 1.0

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
-10	0	Very soft, gray, SANDY FAT CLAY (CH) -w/ silt seams at 0'-10' -w/ shells at 0'-10'		57.5		78	64	22	42
-15	5					53			
		-w/ sand seams at 8'-10'							
-20	10			57.6		48	56	25	31
		Firm to stiff, reddish brown and gray, FAT CLAY (CH)							
-25	15				82	42	99	30	69
-30	20					38			
-35	25				87	37			
-40	30					43	71	31	40
-45	35	-w/ roots at 33'-35'		99.5	83	38	94	31	63
	40					13			

95% DRAFT

Remarks: Mudline was encountered at 10.7' below the water level during drilling operations.

Drilled By: Fugro Logged By: EE

HVJ Associates, Inc.

PLATE A-105

LOG OF BORING ECP-1019A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13795482.19; E: 3277903.8
DEPTH OF WATER: 10 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -10.23 FT
DATE: 1/6/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0								
		Very soft, gray, CLAYEY SAND (SC) -w/ silt and sand seams at 0'-8' -w/ shells at 0'-8'				65			
				39.7		43	54	21	33
-15	5								
						44			
		Stiff to very stiff, reddish brown, brown and gray, FAT CLAY (CH)		98.8		47	108	36	72
-20	10				83	44			
						28			
-25	15								
				99.5		32	55	25	30
-30	20				93	31			
						43			
-35	25								
				98.9		37	88	34	54
-40	30								
					93	32			
-45	35								
		-w/ sand seams at 38'-40'				35			
-50	40								

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

1.33

95% DRAFT

COH HG1910092.1.1 - BIRD ISLAND MARSH.GPJ 4/27/20

Remarks: Mudline was encountered at 10' below the water level during drilling operations.

LOG OF BORING ECP-1021B

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13794645.73; E: 3276961.4
DEPTH OF WATER:12.8 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -10.69 FT
DATE: 1/9/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0								
		Very soft, gray, SANDY FAT CLAY (CH) -w/ silt and sand seams at 0'-8' -w/ shells at 2'-6'				66			
						58			
-15	5			58.2		61	52	21	31
						45			
		Stiff to very stiff, reddish brown and gray, FAT CLAY (CH) -w/ calcareous nodules at 10'-12' -w/ ferrous stains at 10'-14'							
-20	10			99.2		34	71	29	42
					85	37			
-25	15					48			
		-w/ silt seams at 16'-18'			86	35			
-30	20								
-35	25			99.7		34	71	31	40
-40	30				87	37			
		-w/ ferrous stains at 33'-35' -w/ shells at 33'-35'		97.8		43	104	40	64
-45	35								
-50	40				86	37			

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

1.33
1.33

95% DRAFT

COH HG1910092.1.1 - BIRD ISLAND MARSH.GPJ 4/27/20

Remarks: Mudline was encountered at 12.8' below the water level during drilling operations.

LOG OF BORING ECP-1022A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13794163.12; E: 3275752.34
DEPTH OF WATER:12.2 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -10.73 FT
DATE: 1/9/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0	Very soft, gray, SANDY LEAN CLAY (CL) -w/ silt and sand seams at 0'-8' -w/ shells at 0'-2' -w/ shells at 4'-10'	WOP	58.7		59	47	18	29
-15	5					49			
						66			
		Firm to very stiff, reddish brown and gray, FAT CLAY (CH) -w/ ferrous stains at 12'-20'		94.4		36	70	34	36
-20	10				90	33			
				99.2		38	88	33	55
-25	15				85	39			
		-w/ silt seams at 16'-20'		99.9		34	75	33	42
-30	20								
		-w/ shells at 23'-25'			85	38			
-35	25								
		-w/ ferrous stains at 28'-35'		97.8		38	86	36	50
-40	30								
-45	35					27			
-50	40				91	33			

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 12.2' below the water level during drilling operations.

COH HG1910092.1.1 - BIRD ISLAND MARSH.GPJ 4/27/20

Drilled By: Fugro Logged By: MP

HVJ Associates, Inc.

PLATE A-108

LOG OF BORING ECP-1024A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13795159.74; E: 3275033.32
DEPTH OF WATER:9.4 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -10.22 FT
DATE: 1/7/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0								
		Very soft, gray, FAT CLAY WITH SAND (CH) -w/ silt and sand seams at 0'-4' -w/ shells at 0'-4'		70.7		66	58	21	37
						63			
-15	5			83.4		65	46	28	18
		Stiff to very stiff, brown, reddish brown and gray, FAT CLAY (CH)		100	96	31	69	24	45
-20	10								
				99.5		39	91	36	55
-25	15				89	35			
						32			
-30	20								
						33			
-35	25								
				99.8	90	36	82	28	54
-40	30								
						33			
-45	35								
				97.1		30	75	31	44
-50	40								

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

1.33
1.25
1.41

95% DRAFT

Remarks: Mudline was encountered at 9.4' below the water level during drilling operations.

Drilled By: Fugro Logged By: EE

HVJ Associates, Inc.

LOG OF BORING ECP-1025A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13796621.91; E: 3275368
DEPTH OF WATER:11.2 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -10.77 FT
DATE: 1/7/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0			Very soft, gray, FAT CLAY WITH SAND (CH) -w/ silt and sand seams at 0'-4' -w/ shells at 0'-4'		71.2		83	71	26	45
								64			
-15	5			Firm to very stiff, reddish brown and gray, FAT CLAY (CH)		99.1		36	84	21	63
						99.6		33	85	32	53
				-w/ ferrous stains at 8'-10'							
-20	10							35			
						99.8		39	92	36	56
-25	15			-w/ ferrous stains at 14'-16'			94	31			
								36			
				-w/ ferrous stains at 18'-20'							
-30	20							36			
				-w/ calcareous nodules at 23'-25'							
-35	25						95	29			
				-w/ ferrous stains at 28'-30'							
-40	30							39	91	36	55
				Brown, CLAYEY SAND (SC)							
-45	35					57.0		24			
				Stiff, reddish brown and gray, FAT CLAY (CH)							
-50	40				11	99.5		41	85	36	49

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 11.2' below the water level during drilling operations.

Drilled By: Fugro Logged By: MP

HVJ Associates, Inc.

LOG OF BORING ECP-1026A

PROJECT: Houston Ship Channel Expansion - Bird Island Marsh
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13795722.58; E: 3276528.09
DEPTH OF WATER: 10.4 FT
COMPLETION DEPTH: 40 FT
OFFSET: N/A
SURFACE ELEVATION: -9.53 FT
DATE: 1/6/2020

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 40 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽ 0	0								
-10		Very soft, gray, FAT CLAY (CH) -w/ sand seams at 0'-6' -w/ silt seams at 0'-8'				78			
				53.4		66	60	22	38
	5								
-15				98.0		38	90	23	67
		-w/ shells at 6'-8'				55			
		Stiff to very stiff, reddish brown and gray, FAT CLAY (CH) -w/ sand seams at 8'-10' -w/ calcareous nodules at 10'-12' -w/ ferrous stains at 10'-25'				47	99	28	71
	10								
-20									
				99.9	87	35	94	32	62
	15								
-25		-w/ shells at 16'-20'				41			
					87	39			
	20								
-30									
				99.4		41	79	33	46
	25								
-35									
					88	39			
	30								
-40		-w/ ferrous stains at 33'-35'							
				98.9		35	85	35	50
	35								
-45									
						32			
	40								

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 10.4' below the water level during drilling operations.

Drilled By: Fugro Logged By: MP

HVJ Associates, Inc.

PLATE A-111

DOLLAR POINT OYSTER REEF BORING LOGS

95% DRAFT

LOG OF BORING ECP- 1067

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13734233.68; E: 3273320.9
DEPTH OF WATER:8 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -6.36 FT
DATE: 11/19/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0	Very loose, gray, CLAYEY SAND (SC)		40.1		38	33	15	18
-10			WOH						
	5	Stiff, reddish brown and gray, LEAN CLAY WITH SAND (CL) -w/ shells at 6'-10'	13	83.3		23	45	19	26
					85	37			
-15									
	10	Soft to stiff, reddish brown and gray, LEAN CLAY (CL)		91.3		23	26	14	12
-20			12						
	15	-w/ shells at 14'-16'		99.8		31	44	18	26
-25		-w/ ferrous stains at 18'-20'				25			
	20								

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 8' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-148

LOG OF BORING ECP- 1068

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13733623.73; E: 3274663.84
DEPTH OF WATER:8 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -6.88 FT
DATE: 11/19/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	0	Gray, CLAYEY SAND (SC)				40			
-10	5	Stiff to very stiff, reddish brown and gray, FAT CLAY (CH) -w/ shells at 4'-16'	12		104	18 24	50	20	30
-15	10			97.7		29	59	21	38
-20	15				91	34			
-25	20	Stiff, gray and brown, LEAN CLAY (CL) -w/ sand seams at 16'-18'		87.0		22 23	37	18	19

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 8' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-149

LOG OF BORING ECP- 1069

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13735576.45; E: 3273026.38
DEPTH OF WATER:8 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -7.09 FT
DATE: 11/19/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	0	Gray, CLAYEY SAND (SC)		29.1		36	30	15	15
-10		Stiff to very stiff, reddish brown and gray, LEAN CLAY WITH SAND (CL)	10			21			
	5	-w/ shells layer at 4'-6'	30						
				84.9	101	26	49	20	29
-15									
	10								
						28			
-20									
	15	Stiff, gray and brown, FAT CLAY (CH) -w/ ferrous stains at 14'-16'		98.4		46	81	24	57
-25									
					89	36			
	20								

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

1.33

95% DRAFT

Remarks: Mudline was encountered at 8' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-150

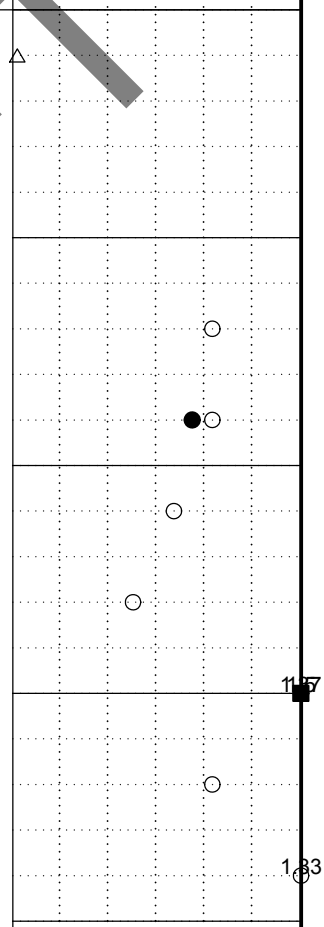
LOG OF BORING ECP- 1070

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13734962.68; E: 3274343.61
DEPTH OF WATER:8 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -7.52 FT
DATE: 11/19/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	0	Gray, CLAYEY SAND (SC)				32			
-10		Stiff, reddish brown and gray, SANDY FAT CLAY (CH) -w/ shells at 2'-6'	11	56.2		24	53	20	33
	5		16						
-15						27			
	10				102	25			
		Stiff to very stiff, reddish brown and gray, LEAN CLAY (CL)		91.0		23	49	19	30
-20									
	15				106	22			
-25									
	20	Very stiff, reddish brown and gray, FAT CLAY (CH) -w/ ferrous stains at 18'-20'		99.0		42	79	23	56

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0



95% DRAFT

Remarks: Mudline was encountered at 8' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-151

LOG OF BORING ECP- 1071

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13735956.09; E: 3274565.38
DEPTH OF WATER:8 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -6.07 FT
DATE: 11/20/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0			Gray, CLAYEY SAND (SC)		34.1		42	33	15	18
				Stiff to very stiff, brown and gray, SANDY LEAN CLAY (CL)	9						
-10	5			-w/ shells at 4'-8'	19	60.0		21	41	18	23
-15	10			-w/ sand seams at 12'-14'			97	25			
								28			
-20	15			Medium dense to dense, brown, CLAYEY SAND (SC) -w/ shells at 14'-16'	25	42.1		22			
					34						
-25	20				14			38			

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 8' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-152

LOG OF BORING ECP- 1072

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13735354.11; E: 3275906.09
DEPTH OF WATER:8 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -6.99 FT
DATE: 11/24/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	0	No Recovery							
-10	5	Stiff to very stiff, brown and gray, SANDY LEAN CLAY (CL) -w/ shells and ferrous stains at 4'-6'	9	59.2	90	32	37	17	20
			18			32			
-15	10	Stiff, reddish brown, LEAN CLAY WITH SAND (CL) -w/ sand seams at 10'-14'		82.3	102	24	47	19	28
-20	15	-w/ sand layer at 14'-16'	15			23			
-25	20	Stiff, gray and brown, FAT CLAY (CH) -w/ shells at 16'-18'		96.6	92	34	72	30	42
						31			

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 8' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-153

LOG OF BORING ECP- 1073

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13731987.63; E: 3276653.38
DEPTH OF WATER:8 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -7.12 FT
DATE: 11/24/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	0	Gray, CLAYEY SAND (SC) -w/ shells at 0'-2'		32.6		32	34	16	18
-10	5	Stiff, brown and gray, FAT CLAY WITH SAND (CH)		84.2		26	58	21	37
-15	10				104	25			
-20		Medium dense, brown, SILT	25 12			23			
-25	15	Firm to stiff, reddish brown, LEAN CLAY (CL) -w/ shells at 14'-16'		93.1		25	22	14	8
	20					23			

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 8' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-154

LOG OF BORING ECP- 1074

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13732770.58; E: 3277655.72
DEPTH OF WATER:8 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -6.98 FT
DATE: 11/24/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	0	Gray, CLAYEY SAND (SC)		32.7		35	32	15	17
-10		Stiff to very stiff, reddish brown, LEAN CLAY (CL) -w/ shells at 2'-4'				19			
	5	-w/ calcareous nodules at 6'-8'		87.1	102	23	46	17	29
-15		Stiff to very stiff, reddish brown and gray, FAT CLAY (CH)				34			
	10				93	32			
-20				91.0		31	58	21	37
	15	Medium dense, reddish brown, SILTY SAND (SM)	28	33.2		25			
-25			21			26			
	20								

UNDRAINED SHEAR STRENGTH, TSF
HAND PENETROMETER
UNCONFINED COMPRESSION
UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
TORVANE
0.2 0.4 0.6 0.8 1.0

15

95% DRAFT

Remarks: Mudline was encountered at 8' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-155

LOG OF BORING ECP- 1075

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13733655.94; E: 3278135.66
DEPTH OF WATER:9 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -7.9 FT
DATE: 11/24/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
0	0	Gray, CLAYEY SAND (SC) -w/ shells at 0'-2'		29.1		40	36	17	19
-10		Firm to very stiff, reddish brown and gray, SANDY LEAN CLAY (CL) -w/ shells at 2'-6'				22	39	18	21
	5								
-15					100	23			
		Stiff, brown and gray, FAT CLAY (CH)		95.8		27	69	22	47
	10								
-20		Stiff to very stiff, reddish brown, LEAN CLAY (CL)				25			
	15								
-25			22	97.4		24	38	18	20
			32			22			
	20								

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 9' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-156

LOG OF BORING ECP- 1077

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13735749.74; E: 3278887.63
DEPTH OF WATER: 10 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -9.01 FT
DATE: 11/25/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0			No Recovery							
-10				Firm to stiff, reddish brown and gray, LEAN CLAY (CL) -w/ shells at 2'-4'	7			25			
	5					91.8		25	46	19	27
-15							92	31			
	10					89.0		23	44	17	27
-20				-w/ shells at 12'-14'							
	15			Stiff to very stiff, reddish brown, FAT CLAY (CH)			87	39			
-25						99.8		31	65	22	43
	20										

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 10' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-157

LOG OF BORING ECP- 1078

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13736386.68; E: 3279028.54
DEPTH OF WATER:10 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -8.03 FT
DATE: 11/25/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
	0	-No Recovery							
-10	5								
-15		Very loose, gray, CLAYEY SAND (SC)	1	33.4		33	40	18	22
	10	Loose, gray, SILT (ML) -w/ shells and gravel at 8'-10'	7			15			
-20			5						
			8			25			
	15	Stiff to very stiff, reddish brown and gray, LEAN CLAY (CL)		91.6	109	19	36	19	17
-25									
	20					26			

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

1.33
1.33

95% DRAFT

Remarks: Mudline was encountered at 10' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-158

SAN LEON OYSTER REEF BORING LOGS

95% DRAFT

LOG OF BORING ECP- 1079

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13758185.87; E: 3247584.96
DEPTH OF WATER:11 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -9.97 FT
DATE: 11/13/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
-10	0	Very soft, gray, LEAN CLAY WITH SAND (CL)	WOH	83.6		71	49	20	29
		Firm to stiff, reddish brown and gray, FAT CLAY (CH) -w/ shells at 2'-4' -w/ ferrous stains at 4'-6'							
-15	5	-w/ shells at 6'-8'		96.4		23	52	21	31
-20	10	Firm, reddish brown, SILTY CLAY WITH SAND (CL-ML)		84.9	113	20	23	19	4
		Very loose, SHELLS	WOH			33			
-25	15	Stiff, reddish brown, FAT CLAY WITH SAND (CH)	9						
			13						
		-w/ shells and ferrous stains at 18'-20'		81.8		19	53	22	31
	20								

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 11' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-159

LOG OF BORING ECP- 1080

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13759601.8; E: 3248554.5
DEPTH OF WATER:11 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -9.76 FT
DATE: 11/13/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0										
-10				Very soft, gray, FAT CLAY (CH)	WOH						
					WOH	85.6		72	67	23	44
	5				WOH						
-15				Stiff, reddish brown and gray, FAT CLAY (CH) -w/ shells at 6'-10'			92	28			
						91.7		26	51	20	31
	10										
-20				Very soft to soft, reddish brown and gray, SILTY CLAY (CL-ML)				21			
					WOH						
	15			Firm to stiff, reddish brown, SANDY LEAN CLAY (CL)	15	65.7		23	27	13	14
-25					7						
					8			30			
	20										

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 11' below the water level during drilling operations.

Drilled By: DAS Logged By: MP

HVJ Associates, Inc.

PLATE A-160

LOG OF BORING ECP- 1081

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13760927.8; E: 3246773.72
DEPTH OF WATER:10 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -8.38 FT
DATE: 11/17/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

UNDRAINED SHEAR STRENGTH, TSF
HAND PENETROMETER
UNCONFINED COMPRESSION
UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
TORVANE
0.2 0.4 0.6 0.8 1.0

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0			Very soft to soft, gray and brown, FAT CLAY (CH)	WOH	88.2		94	55	20	35
-10					WOH						
	5			-w/ ferrous stains at 4'-6'		94.8		27	53	20	33
-15											
	10			Stiff to very stiff, reddish brown, FAT CLAY (CH) -w/ calcareous nodules at 8'-10'		100	95	29	71	28	43
-20				-w/ sand seams at 12'-14'				24			
	15				24						
-25						99.8		28	56	21	35
	20										

1.33

95% DRAFT

Remarks: Mudline was encountered at 10' below the water level during drilling operations.

Drilled By: DAS Logged By: MP

HVJ Associates, Inc.

PLATE A-161

LOG OF BORING ECP- 1082

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13761318.27; E: 3250578.91
DEPTH OF WATER: 10 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -8.78 FT
DATE: 11/17/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0			Very soft, gray, FAT CLAY WITH SAND (CH)	WOH						
-10					WOH	82.6		70	54	21	33
	5			Soft to firm, gray and reddish brown, LEAN CLAY (CL)							
-15						91.0		22	48	19	29
				-w/ calcareous nodules at 8'-10'							
	10			Soft to stiff, gray to reddish brown, LEAN CLAY WITH SAND (CL)							
-20						80.7	104	23	42	19	23
				Stiff to very stiff, gray and brown, FAT CLAY (CH) -w/ ferrous stains at 12'-14'							
	15					97.6		31	71	23	48
-25				-w/ sand seams at 16'-18'							
								34			
	20										

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 10' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-162

LOG OF BORING ECP- 1083

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13762635.2; E: 3250543.35
DEPTH OF WATER:10 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -9.02 FT
DATE: 11/17/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0			Very soft, gray, FAT CLAY (CH)	WOH	91.4		115	60	23	37
-10					WOH						
	5				WOH			39			
-15				Very soft to soft, brown and gray, SILTY CLAY (CL-ML)		83.1		25			
	10				WOH						
-20				Firm to stiff, gray and brown, LEAN CLAY WITH SAND (CL)	5	83.1		26	35	16	19
					15						
	15			Firm to stiff, gray and brown, FAT CLAY (CH) -w/ ferrous stains at 14'-16'		93.2	90	31	63	25	38
-25											
	20							29			

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 10' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-163

LOG OF BORING ECP- 1084

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13762614.36; E: 3258332.57
DEPTH OF WATER:11 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -9.65 FT
DATE: 11/18/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽ 0	0										
-10				Very soft, gray, FAT CLAY WITH SAND (CH)	WOH	81.3		102	67	22	45
	5			Stiff to very stiff, brown and gray, FAT CLAY (CH)							
-15						100	92	32	74	29	45
	10										
-20								25			
	15			Soft to stiff, brown and gray, LEAN CLAY (CH) -w/ sand seams at 12'-16'				27			
-25					12	99.8		26	42	18	24
	20										

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

1.33

95% DRAFT

Remarks: Mudline was encountered at 11' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-164

LOG OF BORING ECP- 1085

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13763522.1; E: 3257356.4
DEPTH OF WATER:11 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -10.06 FT
DATE: 11/18/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽ 0	0			Very soft to soft, gray, SANDY LEAN CLAY (CL)	WOH			81			
						68.6		56	49	20	29
-15	5			Firm to very stiff, brown and gray, FAT CLAY (CH)	17						
						96.5	95	26	83	33	50
-20	10			-w/ sand seams at 10'-12'							
				Stiff, reddish brown, LEAN CLAY (CL)	11	95.8		25	26	14	12
-25	15				12						
				Stiff, reddish brown, FAT CLAY (CH)		100		29	71	24	47
-30	20										

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 11' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-165

LOG OF BORING ECP- 1086

PROJECT: Houston Ship Channel Expansion - Oyster Reef
PROJECT NO.: HG1910092.1.1
LOCATION: N: 13764407.16; E: 3256386.79
DEPTH OF WATER:11 FT
COMPLETION DEPTH: 20 FT
OFFSET: N/A
SURFACE ELEVATION: -10.24 FT
DATE: 11/18/2019

SAMPLER: Shelby Tube/Split Spoon
DRY AUGER: N/A TO N/A FT
WET ROTARY: 0 TO 20 FT

ELEVATION, FT	DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	STANDARD PENETRATION TEST, BLOWS PER FOOT	PERCENT PASSING NO. 200 SIEVE	DRY UNIT WEIGHT, PCF	MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %
▽	0			Very soft, gray, LEAN CLAY WITH SAND (CL)	WOH	80.8		85	49	19	30
-15	5			Stiff, brown and gray, FAT CLAY (CH)		99.7	104	34 28	78	23	55
-20	10			-w/ sand seams at 12'-14'				32			
-25	15			Stiff, brown and gray, LEAN CLAY (CL)	15	86.6		26	31	15	16
-30	20			Stiff to very stiff, reddish brown, FAT CLAY (CH)		100	100	27 28	62	22	40

UNDRAINED SHEAR STRENGTH, TSF
○ HAND PENETROMETER
● UNCONFINED COMPRESSION
■ UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION
△ TORVANE
0.2 0.4 0.6 0.8 1.0

95% DRAFT

Remarks: Mudline was encountered at 11' below the water level during drilling operations.

Drilled By: DAS Logged By: AH

HVJ Associates, Inc.

PLATE A-166

Appendix C – Coast Chart No. 204 Galveston Bay, Texas

95% DRAFT

PORT HOUSTON
THE INTERNATIONAL PORT OF TEXAS

Turner Collie & Braden Inc.
GAHAGAN & BRYANT ASSOCIATES, INC
5444 WESTHEIMER ROAD, SUITE 400
HOUSTON, TEXAS 77056
TBPE NO. F-10788

Project 11

Houston Ship Channel Expansion Channel Improvement Project

Coast Chart No. 204 Galveston Bay, Texas

95% DRAFT

PORT HOUSTON℠
THE INTERNATIONAL PORT OF TEXAS

December 9, 2020

95% PRELIMINARY

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW AND IS NOT INTENDED TO BE USED FOR CONSTRUCTION, BIDDING, OR PERMITTING PURPOSES.

ENGINEER: ASHLEY P. JUDITH
LICENSE NO: TX# 112988
DATE: DECEMBER 09, 2020

ENGINEER: CHESTER HEDDERMAN
LICENSE NO: TX# 100209
DATE: DECEMBER 09, 2020

Turner Collie & Braden, Inc.
JOINT VENTURE - PORT DEVELOPMENT AND ENVIRONMENTAL SERVICES
Gahagan & Bryant Associates, Inc.

TREASURY DEPARTMENT

COAST CHART No. 204

GALVESTON BAY

TEXAS

Scale 1:80,000

(Polyconic Projection)

Published at Washington, D.C.
January 1916
BY THE U.S. COAST AND GEODETIC SURVEY
O.H. Tittmann, Superintendent

(Date of first publication 1900.)

TIDES

The planes of reference is Mean Daily Low Water	Galveston Bay Entrance	Galveston Bay Entrance Texas City	Christmas Bluff
Tropic High Water (interval)	4h 58m	4h 54m	5h 10m
Tropic Low Water (interval)	5 04 s	5 07 s	5 23 s
Tropic High Water (height)	1.4 ft.	1.2 ft.	0.4 ft.
Tropic Low Water (height)	0.1 -	-0.2 -	0.1 -
Mean Daily High Water (height)	1.1 -	1.1 -	0.4 -
Mean Daily Low Water (height)	0.0 -	0.0 -	0.0 -

Tropic tides occur when the moon is near either tropic, that is, furthest north or south of the equator. The tropic intervals (intervals are marked h m) When marked s the interval is to be added to the time of the moon's upper transit for the place when the moon is in north declination, and to the lower transit for south declination. When marked) for a given declination reverse the (minus) and the s.

Both the times and heights of the tides are greatly modified by the winds, the effects of which are often greater than the mail tide.

The predicted time and height of the tide can be obtained from the TIDE TABLES published annually by the United States Coast and Geodetic Survey.

LIFE SAVING STATIONS

Life Saving Stations are designated thus ⊕ L.S.S.

LIGHTS

(The visibility of Lights is given for an elevation of 15 feet above the level of the sea.)

Name	Latitude	Longitude West from Greenwich	Character	Intensity Int. Flashes	Color of Structure	Height above Ground	Visibility nautical miles	Fog Signal
Bolivar Point	29° 22' 19"	94° 45' 40"	Fixed White		White	117 ft.	16	
Red Fixed	29° 20' 18"	94° 46' 09"	18 Fl. 0	Dark Sec.	White	46 -	12½	
Galveston Shoal	29° 21' 3½	94° 50' 22"	15 Fl. 0	Dark Sec.	Black	52 -		
Red Fish Bar Cut			Fixed White		White	19 -	11½	Bell
Light Vessel Galveston Bar			Fixed Red		Green	45 -	12½	Bell

BUOYS

Red Buoys to be left in entering, on Starboard hand.
Black Buoys to be left, in entering, on Port hand.
Black and Red horizontal stripes...Danger Buoy.
Black and White perpendicular stripes...Channel Buoy.
C. & G. or S. signifies Can, Nun or Spar.

TIDE BALL

A time ball is designed daily (Sundays excepted) from the Levy building, Galveston, at eleven A.M. of the 105th meridian. 5h 21m 00s Greenwich time.

STORM WARNING DISPLAY

Storm warning displays are made by the U.S Weather Bureau at Galveston, cor. of Center and Mechanic Streets.

SOUNDINGS

The soundings are expressed in fathoms except on the dotted sections and inside the Coast line where they are given in feet

ABBREVIATIONS

Materials in Capitals	Colors in Shades (see each letter)	Other Qualities (see each letter)
M - Pre-Shell	bu - blue	brd - hard, broad
S. - Sand		crs - coarse
Sh. - Shells		fn - fine
		stk - stocky

Projection and triangulation executed ..... between 1846 and 1847
Topography executed ..... between 1880 and 1887
Hydrography executed ..... between 1864 and 1906
Astronomical observations ..... in 1846
Magnetic observations ..... between 1846 and 1906
Corrected from surveys by the Corps of Engineers, U.S.A. ..... to Sept. 1907

Statute Miles
Nautical Miles
Kilometers

Lines Dividing the High Seas from Inland Waters

Galveston Harbor ..... (Points outer end of N. Jetty to Bolivar Lighthouse, thence N.W. by W. ½ W. Westerly (mag.) to shore

DRAFT
96 to

from the Image Archives of the Historical Map & Chart Collection
Office of Coast Survey/National Ocean Service/NOAA

Appendix D – NOAA Chart 11327

95% DRAFT

PORT HOUSTON
THE INTERNATIONAL PORT OF TEXAS

Turner Collie & Braden Inc.
GAHAGAN & BRYANT ASSOCIATES, INC
5444 WESTHEIMER ROAD, SUITE 400
HOUSTON, TEXAS 77056
TBPE NO. F-10788

Project 11

Houston Ship Channel Expansion Channel Improvement Project

NOAA Chart 11327

95% DRAFT

PORT HOUSTON℠
THE INTERNATIONAL PORT OF TEXAS

December 9, 2020

95% PRELIMINARY

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ENGINEER: ASHLEY P. JUDITH
LICENSE NO: TX# 112988
DATE: DECEMBER 09, 2020

ENGINEER: CHESTER HEDDERMAN
LICENSE NO: TX# 100209
DATE: DECEMBER 09, 2020

Turner Collie & Braden, Inc.
JOINT VENTURE - PORT DEVELOPMENT AND ENVIRONMENTAL SERVICES
Gahagan & Bryant Associates, Inc.

NOAA encourages users to submit inquiries, discrepancies or comments about this chart at http://www.nauticalcharts.noaa.gov/staff/contact.htm.

SCALE 1:25,000
Nautical Miles 1 ½ 0 1
Yards 1000 500 0 1000 2000
Meters 1000 500 0 1000 2000

Formerly C&GS 519, 1st Ed., Jan 1966 KAPP 88

SOUNDINGS IN FEET

11327

01' 95°00'W 59' 58' 57' 56' 55' 54' 53' 52' 94°50'W 51' 49'

29°40' 39' 38' 37' 36' 35' 34' 33' 32' 31' 30' 29°25'N

CONTINUED ON CHART 11328 (NW) CONTINUED ON CHART 11326 (NE) CONTINUED ON CHART 11326 (E) CONTINUED ON CHART 11326 (SE) JOINS CHART 11324 (S) CONTINUED ON CHART 11326 (SW) CONTINUED ON CHART 11326 (W)

La Porte · Bayridge Park · Bay Shore Park · Sylvan Beach · Little Cedar Bayou · Bayside Terrace · Shoreacres · Red Bluff · El Jardin del Mar · Surf Oaks · Todville · Seabrook · Kemah · Clear C. · Bayview · Clifton Beach · Baycliff · Humble Camp · Galveston County Industrial Water Reservoir · Moses Lake · San Leon · Dickinson Bayou · Camp Allen · Beach City · Marsh · Mesquite Knot · Houston Pt · Fisher Shoals (Shoalins to 1 fect reported 1978) · Dow Reef · Sunkhead Reef · Red Fish Island · Red Fish Island Shoal · Dollar Reef · Dollar Pt · Shell Bank · Red Fish Bar · ATKINSON ISLAND · BEACON '76 TO LOWER END MORGANS POINT CUT · BAYPORT SHIP CHANNEL · SOUTH BOAT CUT · RED FISH LIGHT 1 TO BEACON 76 (TURN) · BOLIVAR ROADS TO RED FISH LIGHT 1 · TRINITY BAY · UPPER GALVESTON BAY · DICKINSON BAY · GALVESTON BAY

Obstructions Gas and Oil Well Structures (see note)

Platforms PA · Platform PA · Pile PA · Piles PA · Subm pile PA · Subm piles PA · Subm pipe PA · Subm platform (ruins) PA · Subm platforms (ruins) PA · Subm dols PA · Dols PA · Pipe PA · Pipes PA · Marker PA · Sign PA · Obstn PA · Well PA · Stake PA · Stakes PA · Subm stake PA · Subm stakes PA · Pile rep PA · Platform rep PA · Subm piles rep PA · Subm pipe rep PA · Platforms rep PA · Masts PA · Ruins PA · Wks PA · Tanks · Tower · Towers · Church · Tank · Water Tower · Radio Tower · Windmill · Boat Barrier · Pipeline Area · Spoil Area · Disposal Area · Foul Area · Anch · Prohibited Anch · Restricted Area · Seaplane Area · Cable Area · Fish Haven (auth min 7 ft) · Oyster Beds, numerous private markers, use caution when transiting this area · Shell Bank · Shoal · Rock · Grs · Marsh · Mangrove · Snag · Wreck · Mast PA · Exposed Pipeline PA · Submerged Pipeline PA · Submerged Cable PA · Submerged Cable Area · Submerged Pipeline Area · Submerged Cable and Pipeline Area · Submerged Pipeline and Cable Area · Submerged Pipeline and Cable PA · Submerged Cable and Pipeline PA · Submerged Pipeline and Cable Area · Submerged Cable and Pipeline Area · Submerged Pipeline and Cable PA · Submerged Cable and Pipeline PA

F RWG 162ft Priv DIRECTIONAL (see note) · Fl R 2.5s 17ft 5M "67" Ra Ref · Fl G 2.5s 17ft 4M "65" Ra Ref · Fl G 6s 17ft 4M "66" Ra Ref · Iso 6s 65ft · Fl R 2.5s 17ft 4M "82" Ra Ref · Fl G 2.5s 17ft 4M "81" Ra Ref · Fl R 4s 17ft 4M "84" · Fl G 4s 17ft 4M "83" · Fl R 4s 17ft 3M "78" · Fl R 2.5s 17ft 4M "76" Ra Ref · Fl R 2.5s 17ft 4M "74" Ra Ref · Fl R 2.5s 17ft 4M "72" Ra Ref · Fl G 2.5s 17ft 4M "71" Ra Ref · Fl R 4s 17ft 3M "74" Ra Ref · Fl G 4s 17ft 3M "73" Ra Ref · Fl R 2.5s 17ft 4M "70" Ra Ref · Fl (2) G 6s 17ft 4M "69" Ra Ref · Fl G 2.5s 17ft 4M "67" Ra Ref · Fl R 2.5s 17ft 3M "68" Ra Ref · Fl R 6s 17ft 4M "66" Ra Ref · Fl G 6s 17ft 4M "65" · Fl R 4s 17ft 4M "64" Ra Ref · Fl G 4s 17ft 3M "63" · Fl R 6s 17ft 4M "62" Ra Ref · Fl G 4s 17ft 4M "61" Ra Ref · Fl R 2.5s 17ft 4M "60" Ra Ref · Fl (2) G 6s 17ft 4M "59" Ra Ref · Fl R 2.5s 17ft 4M "58" Ra Ref · Fl G 2.5s 17ft 4M "57" Ra Ref · Fl R 2.5s 17ft 3M "54" Ra Ref · Fl G 4s 17ft 4M "55" Ra Ref · Fl R 4s 17ft 4M "56" Ra Ref · Fl G 4s 17ft 3M "51" Ra Ref · Fl R 2.5s 17ft 3M "52" Ra Ref · Fl G 2.5s 17ft 3M "53" Ra Ref · Fl R 4s 17ft 3M "50" Ra Ref · Fl G 4s 17ft 4M "49" Ra Ref · Fl R 2.5s 17ft 4M "48" Ra Ref · Fl G 2.5s 17ft 4M "47" Ra Ref · Fl R 6s 17ft 4M "46" Ra Ref · Fl G 6s 17ft 4M "45" Ra Ref · Fl R 4s 17ft 4M "44" Ra Ref · Fl G 4s 17ft 4M "43" Ra Ref · Fl R 2.5s 17ft 3M "42" Ra Ref · Fl G 2.5s 17ft 4M "41" Ra Ref · Fl (2) R 6s 17ft 3M "40" Ra Ref · Fl (2) G 6s 17ft 4M "39" Ra Ref · Fl R 2.5s 17ft 3M "38" Ra Ref · Fl G 2.5s 17ft 4M "37" Ra Ref · Fl G 4s 17ft 4M "35A" Ra Ref · Fl R 6s 17ft 4M "36" Ra Ref · Fl G 6s 17ft 4M "35" Ra Ref · Fl R 2.5s 17ft 4M "34" Ra Ref · Fl G 2.5s 17ft 3M "11" Ra Ref · Fl R 6s 17ft 4M "48" · Fl G 6s 65ft · Fl R 2.5s 10ft Priv · Fl G 2.5s 10ft "11" Priv · Fl G 6s 17ft 4M "85" Ra Ref · Fl R 6s 17ft 4M "86" Ra Ref · Fl R 2.5s 17ft 4M "2" · Fl R 2.5s 17ft 4M "3" · Fl R 2.5s 17ft 4M "4" · Fl R 2.5s 17ft 4M "5" Ra Ref · Fl R 4s 17ft 4M "6" · Fl G 4s 17ft 4M "7" · Fl G 6s 17ft 4M "8" Ra Ref · Fl G 6s 17ft 4M "9" Ra Ref · Fl R 6s 17ft 4M "10" Ra Ref · Fl G 4s 17ft 4M "11" Ra Ref · Fl R 6s 17ft 4M "12" Ra Ref · Fl R 4s 17ft 3M "13" Ra Ref · Fl R 6s 17ft 4M "14" Ra Ref · Fl G 6s 17ft 4M "15" Ra Ref · Fl R 6s 17ft 4M "16" Ra Ref · Fl G 6s 17ft 4M "17" Ra Ref · Fl R 6s 17ft 4M "18" Ra Ref · Fl G 6s 17ft 4M "19" Ra Ref · Fl R 6s 17ft 4M "20" Ra Ref · Fl G 6s 17ft 4M "21" Ra Ref · Fl R 6s 17ft 4M "22" Ra Ref · Fl G 6s 17ft 4M "23" Ra Ref · Fl R 6s 17ft 4M "24" Ra Ref · Fl G 6s 17ft 4M "25" Ra Ref · Fl R 6s 17ft 4M "26" Ra Ref · Fl G 6s 17ft 4M "27" Ra Ref · Fl R 6s 17ft 4M "28" Ra Ref · Fl G 6s 17ft 4M "29" Ra Ref · Fl R 6s 17ft 4M "30" Ra Ref · Fl G 6s 17ft 4M "31" Ra Ref · Fl R 6s 17ft 4M "32" Ra Ref · Fl G 6s 17ft 4M "33" Ra Ref · Fl R 6s 17ft 4M "34" Ra Ref · Fl G 6s 17ft 4M "35" Ra Ref · Fl R 6s 17ft 4M "36" Ra Ref · Fl G 6s 17ft 4M "37" Ra Ref · Fl R 6s 17ft 4M "38" Ra Ref · Fl G 6s 17ft 4M "39" Ra Ref · Fl R 6s 17ft 4M "40" Ra Ref · Fl G 6s 17ft 4M "41" Ra Ref · Fl R 6s 17ft 4M "42" Ra Ref · Fl G 6s 17ft 4M "43" Ra Ref · Fl R 6s 17ft 4M "44" Ra Ref · Fl G 6s 17ft 4M "45" Ra Ref · Fl R 6s 17ft 4M "46" Ra Ref · Fl G 6s 17ft 4M "47" Ra Ref · Fl R 6s 17ft 4M "48" Ra Ref · Fl G 6s 17ft 4M "49" Ra Ref · Fl R 6s 17ft 4M "50" Ra Ref · Fl G 6s 17ft 4M "51" Ra Ref · Fl R 6s 17ft 4M "52" Ra Ref · Fl G 6s 17ft 4M "53" Ra Ref · Fl R 6s 17ft 4M "54" Ra Ref · Fl G 6s 17ft 4M "55" Ra Ref · Fl R 6s 17ft 4M "56" Ra Ref · Fl G 6s 17ft 4M "57" Ra Ref · Fl R 6s 17ft 4M "58" Ra Ref · Fl G 6s 17ft 4M "59" Ra Ref · Fl R 6s 17ft 4M "60" Ra Ref · Fl G 6s 17ft 4M "61" Ra Ref · Fl R 6s 17ft 4M "62" Ra Ref · Fl G 6s 17ft 4M "63" Ra Ref · Fl R 6s 17ft 4M "64" Ra Ref · Fl G 6s 17ft 4M "65" · Fl R 6s 17ft 4M "66" Ra Ref · Fl G 6s 17ft 4M "67" Ra Ref · Fl R 6s 17ft 4M "68" Ra Ref · Fl G 6s 17ft 4M "69" Ra Ref · Fl (2) R 6s 17ft 4M "70" Ra Ref · Fl R 2.5s 17ft 4M "72" Ra Ref · Fl G 2.5s 17ft 4M "71" Ra Ref · Fl R 2.5s 17ft 3M "74" Ra Ref · Fl G 4s 17ft 3M "73" Ra Ref · Fl R 2.5s 17ft 3M "76" Ra Ref · Fl G 2.5s 17ft 4M "75" Ra Ref · Fl R 2.5s 17ft 4M "76" Ra Ref · Fl R 4s 17ft 3M "78" · Fl G 2.5s 17ft 4M "81" Ra Ref · Fl R 2.5s 17ft 4M "82" Ra Ref · Fl R 4s 17ft 4M "84" · Fl G 4s 17ft 4M "83" · Fl G 6s 17ft 4M "85" Ra Ref · Fl R 6s 17ft 4M "86" Ra Ref · Fl G 2.5s 17ft 4M "1" · Fl G 2.5s 17ft 4M "2" · Fl R 2.5s 17ft 4M "3" · Fl R 2.5s 17ft 4M "4" · Fl R 2.5s 17ft 4M "5" Ra Ref · Fl R 4s 17ft 4M "6" · Fl G 4s 17ft 4M "7" · Fl G 6s 17ft 4M "8" Ra Ref · Fl G 6s 17ft 4M "9" Ra Ref · Fl R 6s 17ft 4M "10" Ra Ref · Fl G 6