EUSTIS ENGINEERING
GEOTECHNICAL ENGINEERS
3011 28th Street · Metairie, Louisiana 70002 · 504-834-0157

31 August 1988

Modjeski and Masters
Consulting Engineers
Room 510
1055 St. Charles Avenue
New Orleans, Louisiana 70113

Attention Mr. Barney T. Martin, Jr

Gentlemen:

Geotechnical Analyses
Metairie Relief Canal
(17th Street Canal)
OLB Project No. 2043-0222
New Orleans, Louisiana

This report contains the results of revised cantilever floodwall analyses and revised slope stability analyses for the proposed modifications along the Orleans side of the Metairie Relief Canal between Stations 553+70 and 670+00. These analyses were authorized by letter dated 23 March 1988 from Mr. Alan J. Francingues, Assistant Chief Engineer for the Board of Levee Commissioners of the Orleans Levee District. The analyses were based on the following information.

1 Soil stratification and parameters contained in Eustis Engineering's report for the subject project dated 2 November 1981.

2) Cross-sections of the proposed modifications furnished by Modjeski and Masters.

3) Revised design criteria for cantilever sheetpile analyses furnished in a copy of a letter dated 4 January 1988 from the Department of the Army, Mississippi River Commission to the New Orleans District, Corps of Engineers.

4) A minimum acceptable factor of safety of 1.3 for landside and floodside slope stability analyses.

Based on soil parameters, cross-sections and flowline elevation, the project alignment was divided into eight (8) reaches for performance of the analyses, and these are shown on Enclosures 1 through 8 along with the results of the computations. Results of the cantilever sheetpile analyses are tabulated below.

Reach	Recommended Tip Elevation NGVD	Maximum Bending Moment Ft-Kips/Linear Foot Factor of Safety = 1.5
553+70 to 568+00	-12.8	13.1
568+00 to 589+00	-12.8	13.1
589+00 to 614+00	-7.9	7.3
614+00 to 625+00	-6.8	5.1
625+00 to 635+00	-4.9	5.2
635+00 to 643+00	0.6	1.9
643+00 to 663+00	0.0*	**
663+00 to 670+00	0.0*	**

*Based on seepage
**Negligible.

It should be noted that a very small penetration and bending moment would be required in the reaches extending between Stations 643+00 to 663+00 and Stations 663+00 to 670+00 due to a flowline at el 12.6 and a levee crown at el 12.5. However, information furnished by the Corps of Engineers indicates that a minimum penetration to el 0.0 will be required for seepage.

According to Mr. George Romero of the Corps of Engineers during a recent meeting, sheetpile stress must be determined using the maximum bending moment computed from the loading condition resulting in the deepest sheetpile tip embedment. After the sheetpile has been selected to satisfy the bending moment criteria, it should be checked for deflection using the lateral pressure diagram resulting from a factor of safety of 1.0 applied to the Q-case soil strengths and a high water level 2 feet above SWL.

Analyses utilizing the Method of Planes analysis indicate a minimum factor of safety of at least 1.3 against potential landside and floodside slope stability failures in all eight reaches.

Critical active and passive wedge locations and typical computations are shown on the enclosures.

If you have any questions regarding these analyses, please call us.

Yours very truly

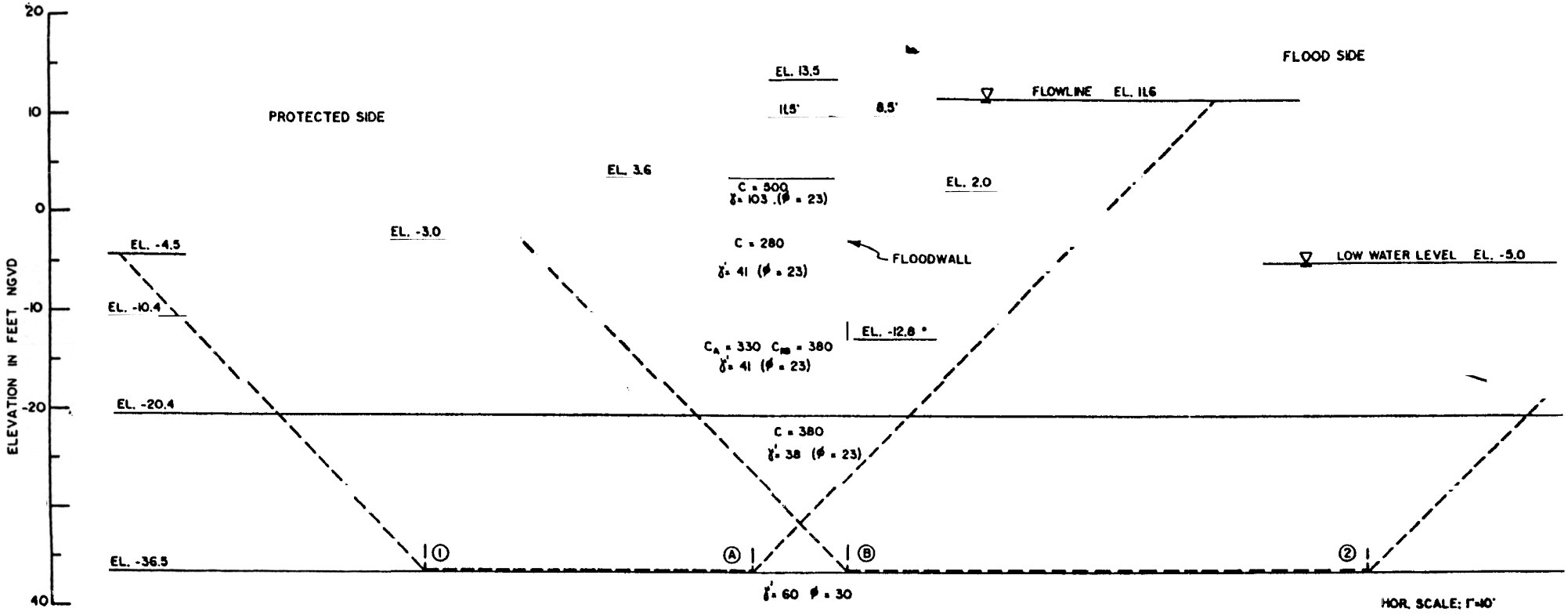
EUSTIS ENGINEERING

Lloyd A. Held, Jr.

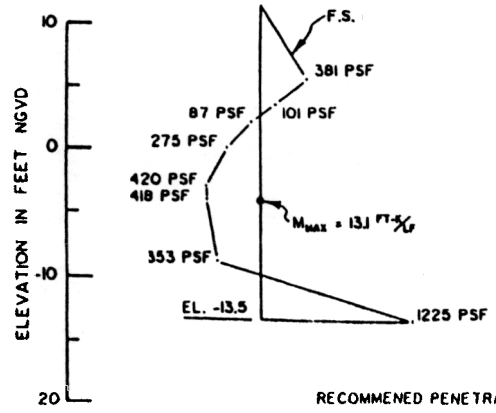
L. J. Napolitano:bh

Enclosures 1 through 8

EE 10214



FLOODWALL ANALYSES



SEE ENCLOSURE 2

RECOMMENED PENETRATION BASED ON 3 ON 1 RATIO

STABILITY ANALYSES

FAIL PLANE	DRIVING FORCE		RESISTING FORCE			FACTOR OF SAFETY
	D_A	D_P	R_A	R_B	R_P	
A - 1	76551	31977	22902	12920	22140	1.300
B - 2	48482	8134	23133	20330	13490	1.412

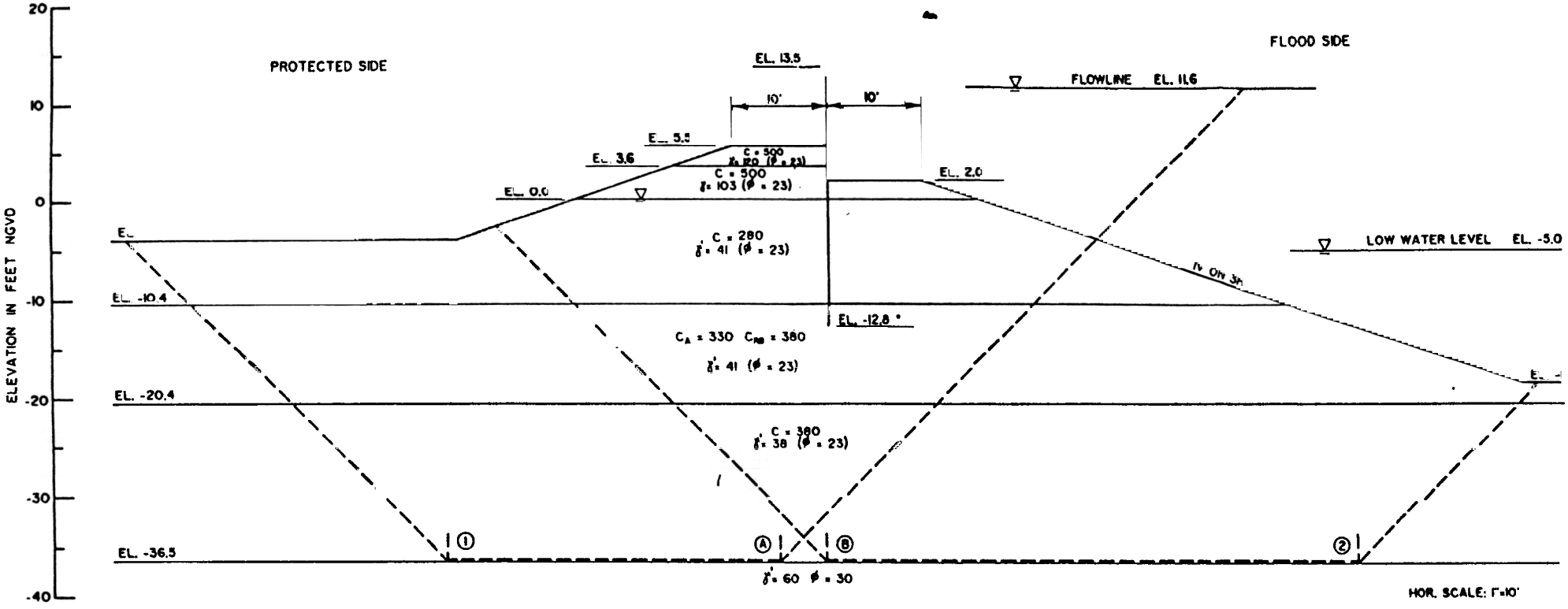
LEGEND

SEE ENCLOSURE 7

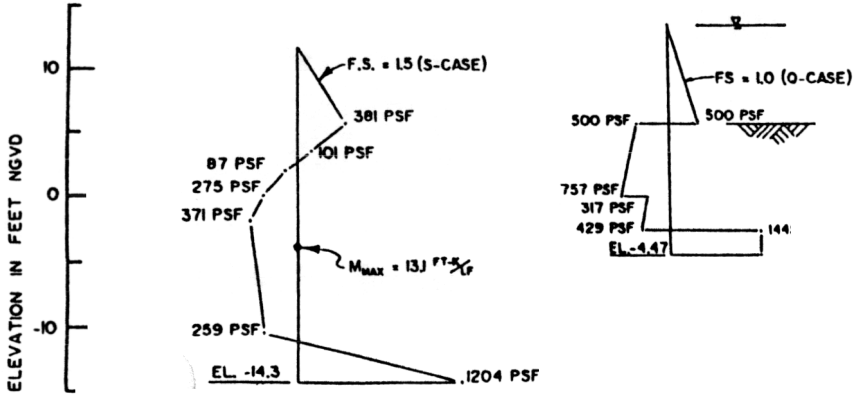
STA. 553+70 TO 568+00

METAIRIE RELIEF CANAL

NEW ORLEANS, LOUISIANA



FLOODWALL ANALYSES



* RECOMMENED PENETRATION BASED ON 3 ON 1 RATIO

STABILITY ANALYSES

FAIL PLANE	DRIVING FORCE		RESISTING FORCE			FACTOR OF SAFETY
	D_A	D_P	R_A	R_B	R_P	
A - 1	76784	32884	22479	12920	22420	1.317
B - 2	46802	8134	23190	20900	13490	1.489

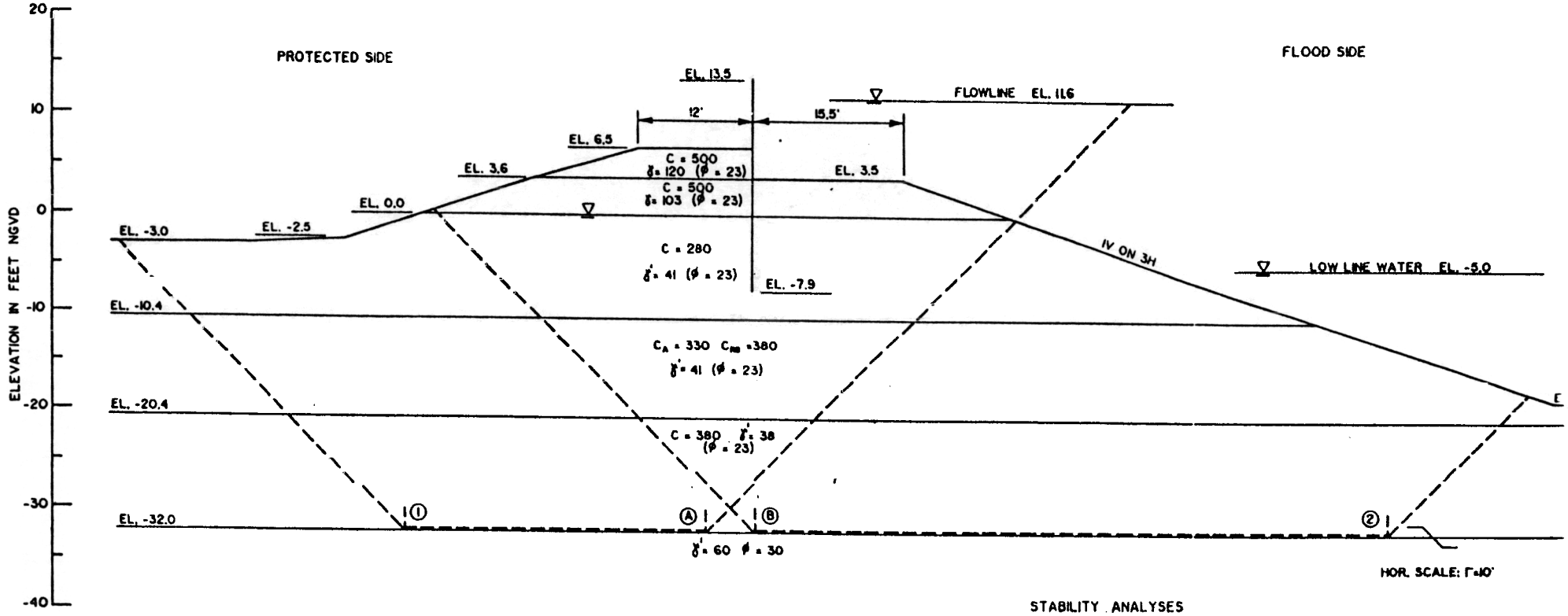
LEGEND

SEE ENCLOSURE 7

STA. 568+00 TO 589+

METAIRIE RELIEF CAN

NEW ORLEANS, LOUISIA



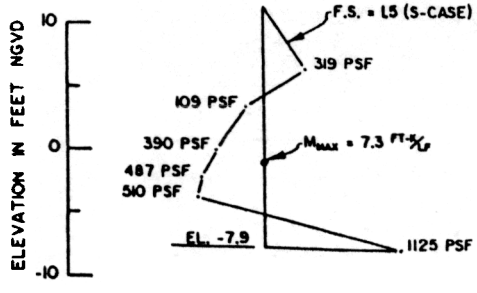
STABILITY ANALYSES

FAIL PLANE	DRIVING FORCE		RESISTING FORCE			FACTOR OF SAFETY
	D_A	D_P	R_A	R_B	R_P	
A - 1	69206	28940	22261	11780	19560	1.331
B - 2	46555	5367	21733	24700	10570	1.384

LEGEND

SEE ENCLOSURE 7

FLOODWALL ANALYSES



SEE ENCLOSURE 4

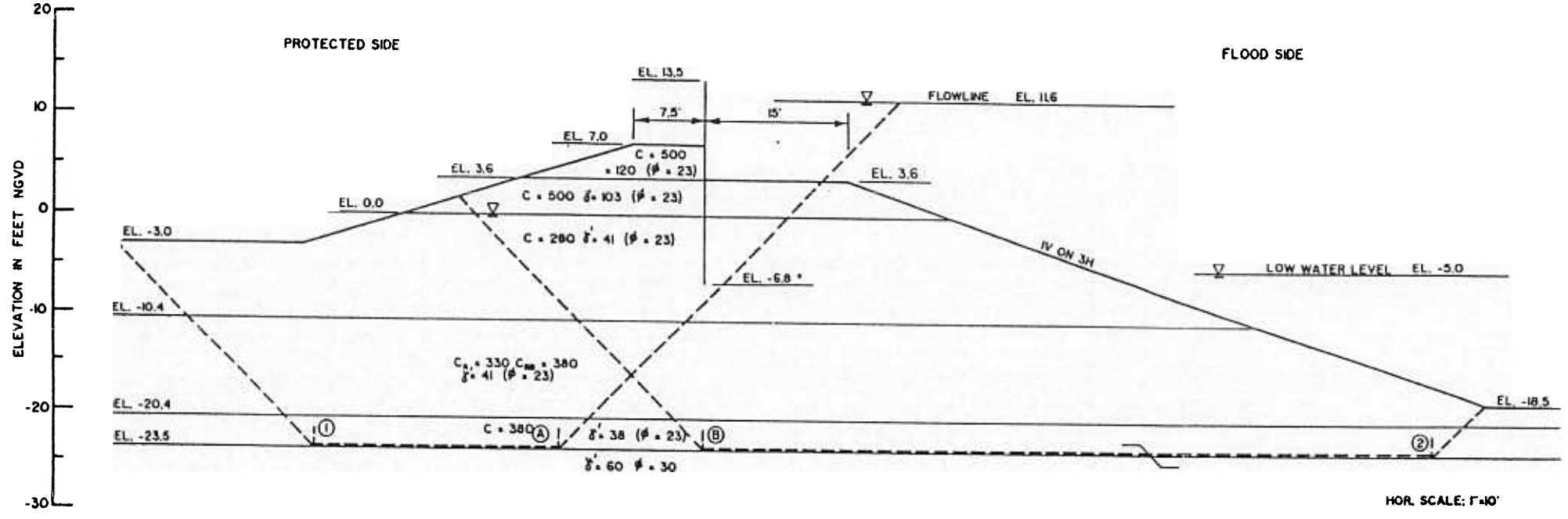
STA. 589+00 TO 614+0

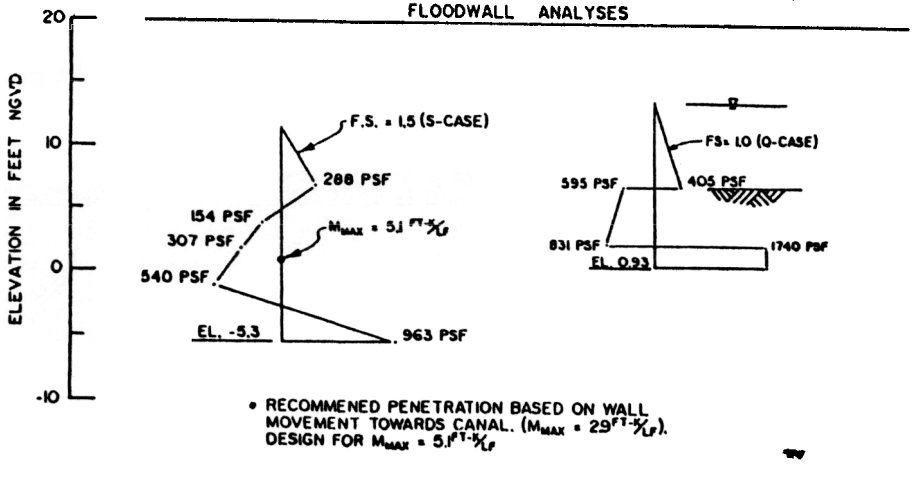
METAIRIE RELIEF CANA

NEW ORLEANS, LOUISIAN

EUSTIS ENGINEERING

ENCLOSURE





* RECOMMENED PENETRATION BASED ON WALL MOVEMENT TOWARDS CANAL. (M_{MAX} = 2.9 FT-K/LF). DESIGN FOR M_{MAX} = 5.1 FT-K/LF

STABILITY ANALYSES

FAIL PLANE	DRIVING FORCE		RESISTING FORCE			FARTOR OF SAFETY
	D_A	D_P	R_A	R_B	R_P	
A - 1	47018	16859	17824	9500	13100	1.340
B - 2	34626	735	18640	25402	3774	1.411

LEGEND

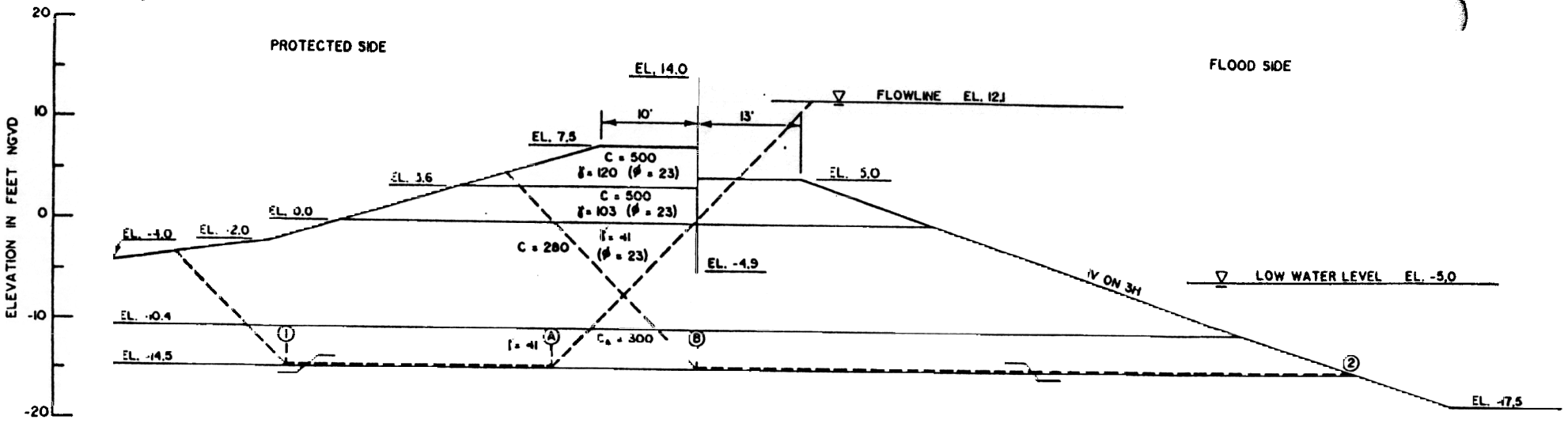
SEE ENCLOSURE 7

STA. 614+00 TO 625+00

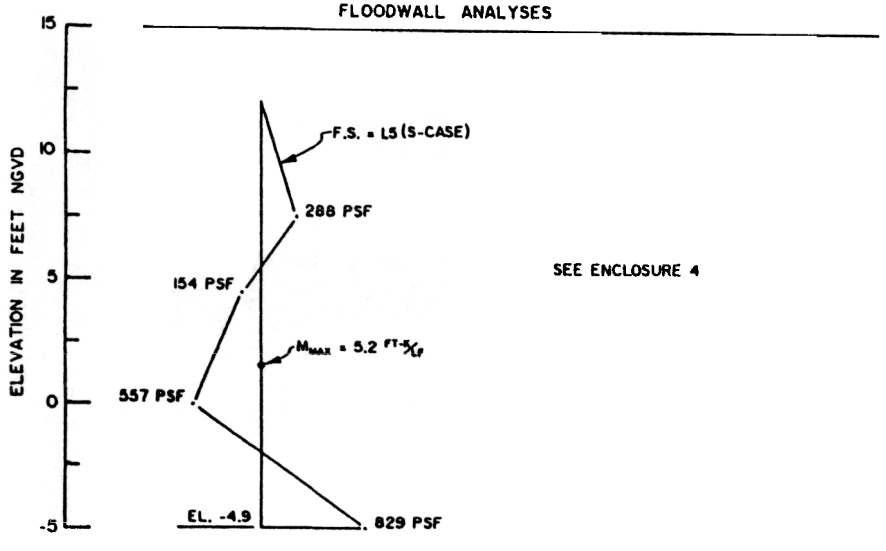
METAIRIE RELIEF CANAL
NEW ORLEANS, LOUISIANA

ENCLOSURE 1

EUSTIS ENGINEERING



HOR. SCALE: 1"=10'



SEE ENCLOSURE 4

STABILITY ANALYSES

FAIL PLANE	DRIVING FORCE		RESISTING FORCE			FACTOR OF SAFETY
	D_A	D_P	R_A	R_B	R_P	
A - 1	27024	6948	12784	8640	6511	1.391
B - 2	21582	0	13169	15489	0	1.328

LEGEND

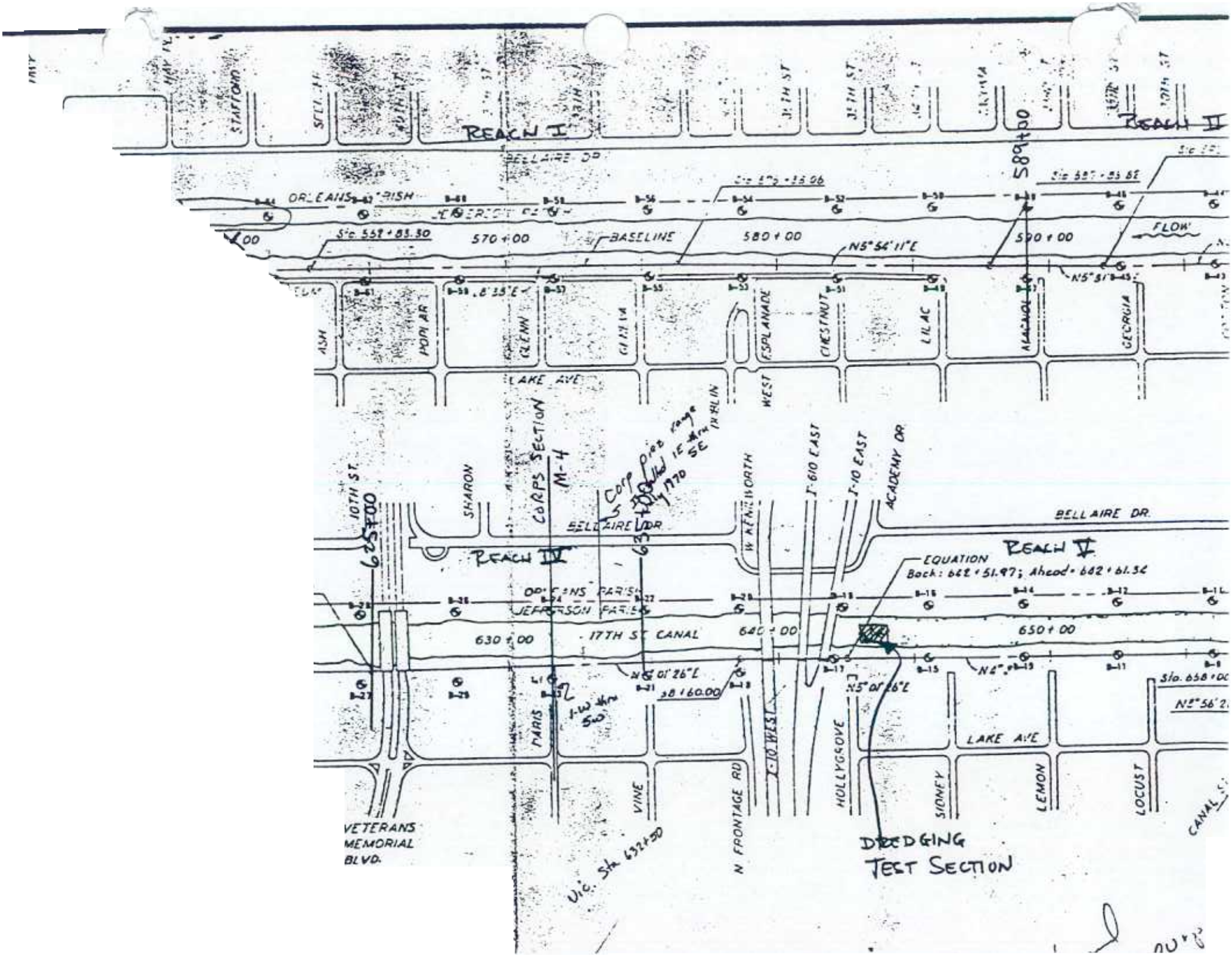
SEE ENCLOSURE 7

STA. 625+00 TO 635+00

METAIRIE RELIEF CANAL
NEW ORLEANS, LOUISIANA

ENCLOSURE

EUSTIS ENGINEERING


REACH I
REACH II
REACH IV
REACH V
BELLAIRE DR
ORLEANS PARISH
JEFFERSON PARISH
BASELINE
570+00
580+00
590+00
600+00
630+00
640+00
650+00
Sta 558+83.50
N5°54'11"E
N5°01'26"E
38160.00
LAKE AVE
17TH ST CANAL
ASH
POPLAR
GLENN
CLAIRA
ESPLANADE
CHESTNUT
LILAC
ACACIA
GEORGIA
SHARON
CORPS SECTION
M-4
WEST
W KENILWORTH
I-610 EAST
ACADEMY DR
10TH ST
PARIS
VINE
N FRONTAGE RD
I-10 WEST
HOLLYGROVE
SIDNEY
LEMON
LOCUST
CANAL
VETERANS MEMORIAL BLVD.
Sta 632+50
EQUATION
Back: 642+51.97; Ahead = 642+61.56
DREDGING TEST SECTION

Subsoil Investigation
Sewerage & Water Board of New Orleans
Metairie Relief Canal
Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

Boring No.	Station No.	Estimated Ground Surface Elev. in Feet (Cairo Datum)	Depth of Boring In Feet
41	Westside of canal @ 599+50	30.5	50
42	Eastside of canal @ 599+50	27	50
43	Westside of canal @ 596+00	30.5	50
44	Eastside of canal @ 596+00	27.5	50
45	Westside of canal @ 592+50	30.5	50
46	Eastside of canal @ 592+50	27	50
47	Westside of canal @ 589+00*	21	40
48	Eastside of canal @ 589+00	27	50
49	Westside of canal @ 585+50*	19.5	40
50	Eastside of canal @ 585+50	28	50
51	Westside of canal @ 582+00*	20.5	40
52	Eastside of canal @ 582+00	27	50
53	Westside of canal @ 578+50*	19	40
54	Eastside of canal @ 578+50	27	50
55	Westside of canal @ 575+00*	19	40
56	Eastside of canal @ 575+00	27	50
57	Westside of canal @ 571+50*	19	40
58	Eastside of canal @ 571+50	27	50
59	Westside of canal @ 568+00*	19	40
60	Eastside of canal @ 568+00	27.5	50
61	Westside of canal @ 564+50*	20	40
62	Eastside of canal @ 564+50	27	50
63	Westside of canal @ 561+00*	20	40
64	Eastside of canal @ 561+00	27	51.5
65	Westside of canal @ 557+50*	20	40
66	Eastside of canal @ 557+50	27	50
67	Westside of canal @ 554+00	30	50
68	Eastside of canal @ 554+00	27.5	50

3-62-90

*Boring drilled at toe of levee instead of crown

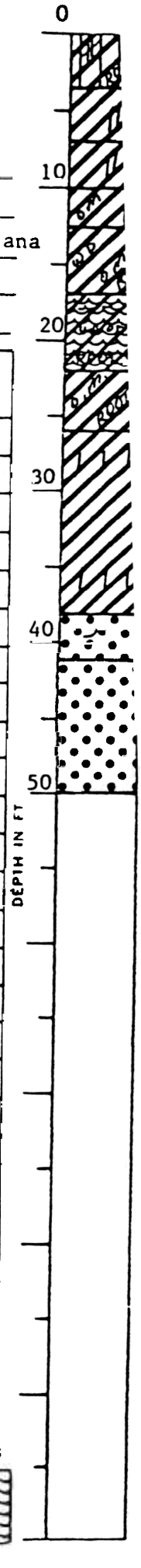
LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

ne of Project: Sewerage & Water Board of New Orleans
Metairie Relief Canal, Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana
For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

Boring No. 46 Soil Technician A. J. Mayeux Date 13 July 1981
Ground Elev. 27 (Est.) Datum Cairo Gr. Water Depth See Text

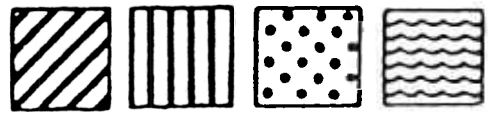
Sample No.	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	3.5	Medium stiff brown & gray silty clay w/clayey silt pockets & roots		
2	5.0	5.5	3.5	7.0	Soft gray & tan clay w/silt pockets		
3	8.0	8.5	7.0	10.0	Medium stiff gray & tan clay w/silt pockets		
4	11.0	11.5	10.0	12.5	Medium stiff gray clay w/organic matter & silt pockets		
5	14.0	14.5	12.5	17.0	Very soft gray clay w/wood, organic matter & roots		
	19.0	19.5	17.0	22.0	Soft gray organic clay w/humus layers, wood & roots		
7	24.0	24.5	22.0	26.0	Very soft gray clay w/organic matter & roots		
8	29.0	29.5	26.0		Soft gray clay w/silt lenses		
9	34.0	34.5		38.0	Ditto		
10	38.5	40.0	38.0	41.0	Loose gray sand w/shell fragments	3	8
11	41.0	42.5	41.0		Medium dense gray sand	5	16
12	43.5	45.0			Ditto	7	26
13	48.5	50.0		50.0	Ditto	8	27



*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CLAY SILT SAND HUMUS



Remarks: Boring located Eastside of canal @ Sta. No. 592+50 in crown of levee.

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

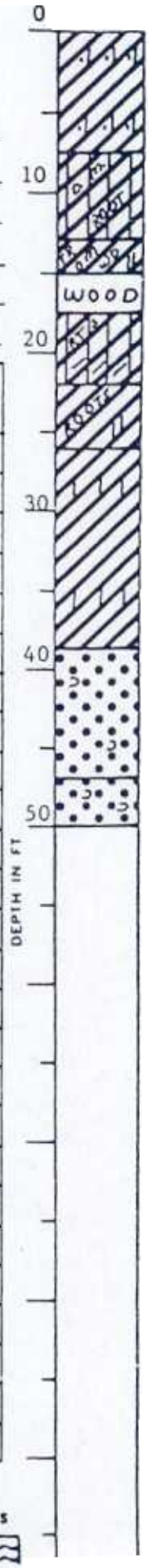
Name of Project: Sewerage & Water Board of New Orleans
Metairie Relief Canal, Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

Boring No. 48 Soil Technician A. J. Mayeux Date 14 July 1981

Ground Elev. 27 (Est.) Datum Cairo Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0		Soft gray & tan clay w/sandy silt layers		
2	5.0	5.5		7.5	Ditto		
3	8.0	8.5	7.5		Medium stiff gray & tan silty clay w/organic matter & roots		
4	11.0	11.5		13.0	Ditto		
5	14.0	14.5	13.0	15.0	Very soft gray clay w/trace of organic matter, wood & silt pockets		
			15.0	17.5	Wood w/organic matter, humus & clay		
6	19.0	19.5	17.5	22.0	Soft gray silty clay w/roots & clay layers		
7	24.0	24.5	22.0	26.0	Very soft gray clay w/roots & silt pockets		
8	29.0	29.5	20.0		Soft gray clay w/silt lenses		
9	34.0	34.5		38.5	Ditto		
10	38.5	40.0	38.5		Dense gray sand w/shell fragments	7	35
11	43.5	45.0		47.0	Ditto	10	36
12	48.5	50.0	47.0	50.0	Medium dense gray sand w/shell fragments	4	12



*Number in first-column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CLAY SILT SAND HUMUS

Boring located on Eastside of

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA

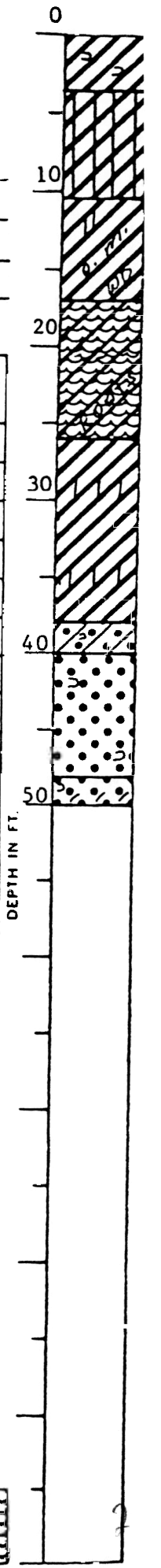
of Project: Sewerage & Water Board of New Orleans
Metairie Relief Canal, Station 554+00 to Station 670+00

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

Boring No. 50 Soil Technician A. J. Mayeux Date 14 July 1981

Ground Elev. 28 (Est.) Datum Cairo Gr. Water Depth

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	3.5	Medium stiff gray & brown clay w/shells		
2	5.0	5.5	3.5		Medium stiff brown & gray silty clay		
3	8.0	8.5		10.5	Ditto		
4	11.0	11.5	10.5		Soft gray clay w/silt pockets, organic matter & wood		
5	14.0	14.5		17.0	Ditto		
6	19.0	19.5	17.0		Soft dark gray organic clay w/humus layers & roots		
	24.0	24.5		26.0	Ditto		
	29.0	29.5	26.0		Very soft gray clay w/silt lenses		
9	34.0	34.5		38.0	Ditto		
10	38.5	39.0	38.0	40.0	Loose gray clayey sand w/shell fragments		
11	40.0	41.5	40.0		Medium dense gray sand w/shell fragments	6	18
12	43.5	45.0		48.0	Ditto	8	24
13	48.5	50.0	48.0	50.0	Loose gray sand w/shell fragments & clay layers	4	9



*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

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CLAY SILT SAND HUMUS

Remarks: Boring located on Eastside of canal @ Sta. No. 585+50 in crown of levee.

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

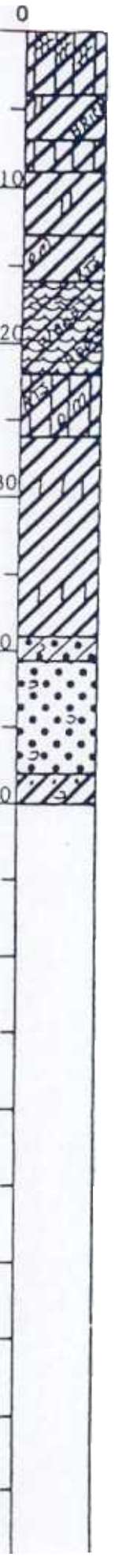
of Project: Sewerage & Water Board of New Orleans
Metairie Relief Canal, Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

Boring No. 52 Soil Technician A. J. Mayeux Date 21 July 1981

Ground Elev. 27 (Est.) Datum Cairo Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	3.0	0.0	4.0	Stiff gray & brown silty clay w/clayey silt layers		
2	5.0	6.0	4.0	7.0	Soft gray & tan clay w/silt pockets & brick fragments		
3	8.0	9.0	7.0	9.0	Soft gray & tan silty clay		
4	11.0	12.0	9.0	13.0	Medium stiff gray clay w/silt pockets		
5	14.0	15.0	13.0	16.0	Soft gray clay w/organic matter & roots		
6	19.0	20.0	16.0	22.0	Soft gray organic clay w/humus layers, wood & roots		
7	24.0	25.0	22.0	26.0	Very soft gray silty clay w/roots & organic matter		
8	29.0	30.0	26.0		Very soft gray clay w/silt lenses		
9	34.0	35.0		39.0	Ditto		
10	39.0	40.5	39.0	40.5	Loose gray clayey sand w/shell fragments	2	7
11	43.5	45.0	40.5	48.0	Medium dense gray sand w/shell fragments	6	20
12	48.5	50.0	48.0	50.0	Soft gray clay w/sand layers & shell fragments	2	6



Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CLAY SILT SAND HUMUS

Remarks: Boring located on Eastside of canal @ Sta. No. 582+00 in area of [illegible]

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

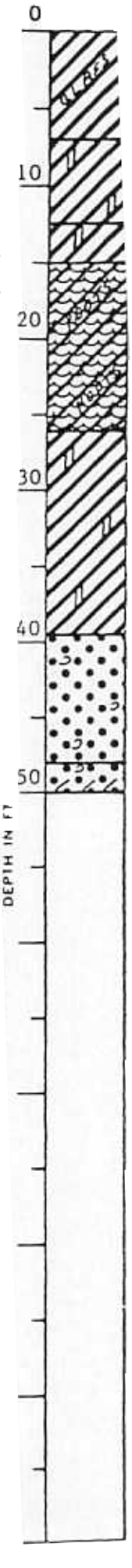
of Project Sewerage & Water Board of New Orleans
Metairie Relief Canal, Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

Boring No. 54 Soil Technician A. J. Mayeux Date 15 July 1981

Ground Elev. 27 (Est.) Datum Cairo Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0		Stiff gray & tan clay w/glass		
2	5.0	5.5		7.0	Ditto		
3	8.0	8.5	7.0		Medium stiff gray clay w/silt pockets		
4	11.0	11.5		12.5	Ditto		
5	14.0	14.5	12.5	15.0	Soft gray clay w/silt pockets		
6	19.0	19.5	15.0		Very soft brown & gray organic clay		
					w/roots		
7	24.0	24.5		26.0	Ditto		
	29.0	29.5	26.0		Soft gray clay w/silt pockets		
	34.0	34.5			Ditto		
10	39.0	39.5		39.5	Ditto		
11	40.0	41.5	39.5		Medium dense gray sand w/shell fragments	4	18
12	43.5	45.0		48.0	Ditto	8	24
13	48.5	50.0	48.0	50.0	Loose gray sand w/shell fragments	4	9
					& clay layers		



Sewerage & Water Board of New Orleans

Metairie Relief Canal, Station 554+00 to Station 670+00

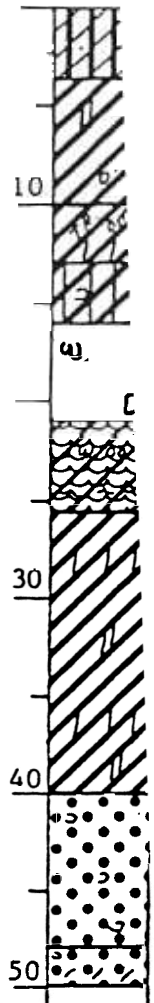
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

Boring No. 56 Soil Technician A. J. Mayeux Date 15 July 1981

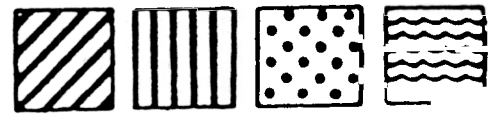
Ground Elev. 27 (Est.) Datum Cairo Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL-CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	3.5	Medium compact tan clayey silt		
2	5.0	5.5	3.5		Soft gray & brown clay w/silt pockets &		
					organic matter		
3	8.0	8.5		10.0	Ditto		
4	11.0	11.5	10.0	13.0	Soft gray clay w/trace of organic matter		
					& silt lenses		
5	14.0	14.5	13.0	16.0	Soft gray silty clay w/shell fragments		
6	19.0	19.5	16.0	21.0	Wood w/humus, organic matter & clay		
7	24.0	24.5	21.0	25.5	Medium stiff gray & black organic clay		
					w/humus layers & wood		
8	29.0	29.5	25.5		Soft gray clay w/silt lenses & pockets		
9	34.0	34.5			Ditto		
10	39.0	39.5		40.0	Ditto		
11	40.0	41.5	40.0	-13 -33.5	Medium dense gray sand w/shell fragments	3	17
12	43.5	45.0		48.0	Ditto	4	15
13	48.5	50.0	48.0	50.0	Loose gray sand w/shell fragments &	7	8
					clay layers		



*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.



Predominant type shown heavy. Modifying type shown light.

Remarks: Boring located on Eastside of canal @ Sta. No. 575+00 in crown of levee.

Fig 61

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

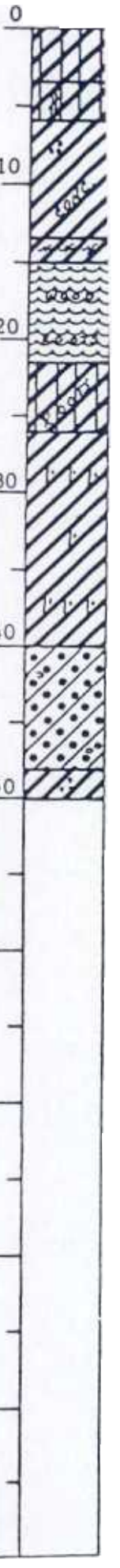
of Project: Sewerage & Water Board of New Orleans
Metairie Relief Canal,. Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

Boring No. 58 Soil Technician A. J. Mayeux Date 16 July 1981

Ground Elev. 27 (Est.) Datum Cairo Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	3.5	Stiff brown & gray silty clay		
2	5.0	5.5	3.5	6.0	Very stiff gray & tan silty clay with large clayey silt pockets		
3	8.0	8.5	6.0		Soft gray & tan clay w/sand pockets & concretions		
4	11.0	11.5		13.5	Ditto		
5	14.0	14.5	13.5	15.0	Soft black & gray clay w/organic clay layers & pockets		
	19.0	19.5	15.0	21.5	Soft brown humus w/wood & roots		
	24.0	24.5	21.5	26.0	Very soft gray silty clay w/roots		
8	29.0	29.5	26.0		Soft gray clay w/silty sand lenses & pockets		
9	34.0	34.5			Ditto		
10	39.0	39.5		40.0	Ditto		
11	44.0	44.5	40.0	48.0	Very loose gray clayey sand w/shell fragments		
			-13 CD -33.4 NGVD				
12	49.0	49.5	48.0	50.0	Soft gray clay w/sand pockets		



*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

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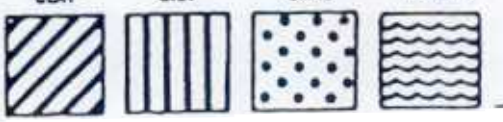

Remarks: Boring located on Eastside of canal @ Sta. No. 571+50 in crown of levee.

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

of Project: Sewerage & Water Board of New Orleans
Metairie Relief Canal, Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

Boring No. 60 Soil Technician Jack Pratt Date 22 July 1981

Ground Elev. 27.5 (Est.) Datum Cairo Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	3.0	Medium compact gray & tan clayey silt		
					w/clay pockets		
2	5.0	5.5	3.0	6.5	Medium compact brown & tan clayey silt		
					w/clay layers		
3	8.0	8.5	6.5	10.0	Medium stiff gray clay w/humus layers		
					& silt pockets		
4	11.0	11.5	10.0		Soft gray silty clay w/clayey silt		
					lenses & trace of shells		
	14.0	14.5		17.0	Soft gray silty clay w/clayey silt		
					lenses & humus layers		
6	19.0	19.5	17.0	22.0	Very soft dark brown humus w/roots &		
					clay layers		
7	24.0	24.5	22.0	27.0	Very soft gray clay w/silt pockets,		
					lenses & roots		
8	29.0	29.5	27.0		Soft gray clay w/silt lenses		
9	34.0	34.5			Ditto		
10	39.0	39.5		41.0	Ditto		
11	44.0	44.5	41.0	45.0	Loose gray clayey sand w/clay layers &		
			-13.5 C.D. -33.8 NGVD		shell fragments		
12	45.5	47.0	45.0	48.0	Loose gray fine sand w/clay layers	4	8
13	48.5	50.0	48.0	50.0	Very soft gray clay w/sand pockets	1	2
					-70.5		

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

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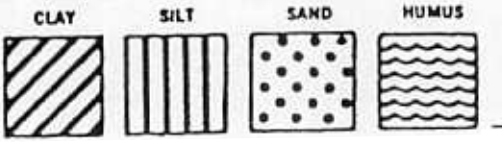
Remarks: Boring located on Eastside of canal @ Sta. No. 568+00 in crown of levee.



METAIRIE LA

e of Project: Sewerage & Water Board of New Orleans

Metairie Relief Canal, Station 554+00 to Station 670+00

Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

Boring No. 62 Soil Technician A. J. Mayeux Date 16 July 1981

Ground Elev. 27 (Est.) Datum Cairo Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	3.0	Stiff brown & gray silty clay w/roots		
2	5.0	5.5	3.0	6.0	Compact tan clayey silt		
3	8.0	8.5	6.0		Soft gray clay w/organic matter & roots		
4	11.0	11.5		12.0	Ditto		
5	14.0	14.5	12.0	15.0	Medium stiff gray clay w/organic		
					matter, wood & silt pockets		
6	19.0	19.5	15.0	21.0	Soft black humus w/wood		
7	24.0	24.5	21.0	26.0	Soft gray silty clay		
	29.0	29.5	26.0		Soft gray clay w/silt lenses		
	34.0	34.5			Ditto		
10	39.0	39.5		41.5	Ditto		
11	42.0	42.5	41.5	44.0	Very loose gray clayey sand w/shell		
			-14.5 -34.9		fragments		
12	44.5	46.0	44.0	48.0	Medium dense gray sand w/shell	5	16
					fragments		
13	48.5	50.0	48.0	50.0	Loose gray clayey sand w/shell	2	6
					fragments & clay layers		

DEPTH IN FT.

Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

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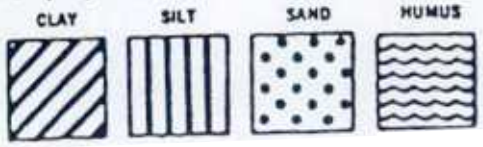
CLAY SILT SAND HUMUS



Remarks: Boring located on Eastside of canal @ Sta. No. 564+50 in crown of levee.

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LA.

Sewerage & Water Board of New Orleans

Metairie Relief Canal, Station 554+00 to Station 670+00

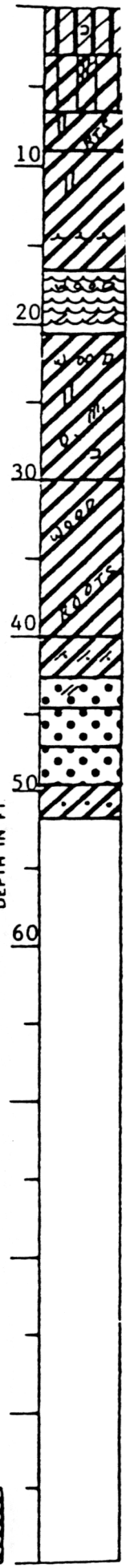
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

Boring No. 64 Soil Technician A. J. Mayeux Date 15 July 1981

Ground Elev. 27 (Est.) Datum Cairo Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	1.5	2.0	0.0	3.0	Medium compact gray & tan clayey silt w/shell fragments		
2	5.0	5.5	3.0	6.5	Stiff brown & gray silty clay w/clayey silt pockets		
3	8.0	8.5	6.5	9.0	Stiff gray clay w/silt pockets & small roots		
4	11.0	11.5	9.0		Soft gray clay w/silt pockets & humus layers		
	14.0	14.5		16.5	Ditto		
	18.5	19.0	16.5	20.5	Soft brown humus w/wood & clay layers		
7	22.0	22.5	20.5		Extremely soft gray clay w/wood layers, silt pockets, organic matter & shell fragments		
8	27.5	28.0		30.0	Ditto		
9	33.5	34.0	30.0		Soft gray clay w/wood		
10	38.5			40.0	Soft gray clay w/wood & roots		
	41.5		40.0	42.5	Very soft gray clay w/clayey sand layers		
			-35.9				
12	42.5	44.0	42.5	44.5	Medium dense gray sand w/clay pockets	5	15
13	45.0	46.5	44.5	47.0	Very dense gray sand	20	50=11"
14	47.5	49.0	47.0	49.5	Dense gray sand	12	45
15	50.0	51.5	49.5	51.5	Soft gray clay w/sand lenses		



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CLAY SILT SAND HUMUS

Remarks: Boring located on Eastside of canal @ Sta. No. 561+00 in crown of levee.

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

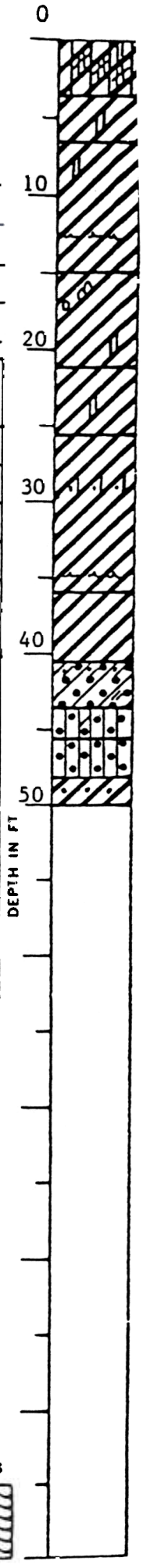
Name of Project: Sewerage & Water Board of New Orleans
Metairie Relief Canal, Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

Boring No. 66 Soil Technician A. J. Mayeux Date 15 July 1981

Ground Elev. 27 (Est.) Datum Cairo Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	3.5	Stiff gray & tan silty clay w/clayey silt layers & silt pockets		
2	5.0	5.5	3.5	6.5	Stiff brown & gray clay w/silt pockets		
3	8.0	8.5	6.5		Medium stiff gray clay w/silt pockets & humus layers		
4	11.0	11.5			Ditto		
5	14.0	14.5		15.0	Ditto		
6	18.5	19.0	15.0	21.0	Soft gray clay w/organic matter & silt pockets		
7	23.5	24.0	21.0	25.5	Very soft gray clay w/silt pockets		
8	28.5	29.0	25.5	-33.9	Very soft gray clay w/sandy silt lenses		
9	33.5	34.0		36.0	Very soft gray clay w/humus layers		
10	38.5	39.0	36.0	40.5	Soft gray clay		
11	41.0	41.5	40.5	-36.9	Loose gray clayey sand w/sandy clay layers & clay pockets		
12	43.5	45.0	43.5	45.5	Dense gray silty sand w/trace of clay	7	39
13	46.0	47.5	45.5	48.0	Very dense gray silty sand	15	50=10"
		50.0	48.0	50.0	Soft gray clay w/sand lenses	1	2



Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

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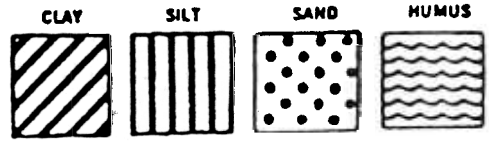


Predominant type shown heavy. Modifying type shown light.

Remarks: Boring located on Eastside of canal @ Sta. No. 557+50 in crown of levee.

Fig 71

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

+7.1
-7

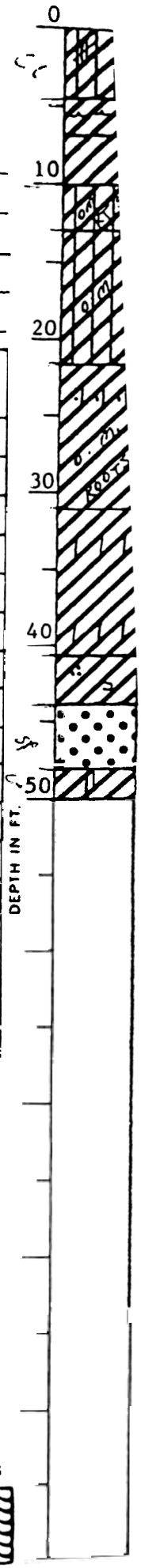
Name of Project: Sewerage & Water Board of New Orleans
Metairie Relief Canal, Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

Boring No. 68 . Soil Technician Jack Pratt Date 22 July 1981

Ground Elev. 27.5 (Est.) Datum Cairo Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	4.5	Very stiff brown silty clay w/clayey silt pockets		
2	5.0	5.5	4.5	7.0	Medium stiff gray & black clay with humus layers		
3	8.0	8.5	7.0	10.0	Soft gray & tan clay		
4	11.0	11.5	10.0	13.0	Soft gray silty clay w/organic matter, roots & trace of sand		
5	14.0	14.5	13.0		Medium stiff gray silty clay w/organic matter		
	19.0	19.5		21.5	Ditto		
7	24.0	24.5	21.5		Very soft gray clay w/sandy silt lenses, organic matter & roots		
8	29.0	29.5		31.0	Ditto		
9	33.0	33.5	31.0		Soft gray clay w/silt lenses		
10	39.0	39.5		40.5	Ditto		
11	42.5	43.0	40.5	44.0	Soft gray clay w/many sand pockets & shell fragments		
			-38 NGVD				
12	44.0	45.5	44.0	48.0	Medium dense gray fine sand	5	14
13		50.0	48.0	50.0	Very soft gray clay w/silt pockets	1	2
					27.5		
					48		
					-20.5		
					20.43		
					-41		



*N... in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

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CLAY SILT SAND HUMUS

Remarks: Boring located on Eastside of canal @ Sta. No. 554+00 in crown of levee.

Predominant type shown here

Subsoil Investigation
Sewerage & Water Board of New Orleans
Metairie Relief Canal
Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

27

BORING 46

6.6

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft
1	2.0	Medium stiff brown & gray silty clay w/clayey silt pockets & roots	27.0	93.0	118.2	1415*
2	5.0	Soft gray & tan clay w/silt pockets	40.5	73.8	103.6	975*
3	8.0	Medium stiff gray & tan clay w/silt pockets	44.9	71.2	103.2	1650*
4	11.0	Medium stiff gray clay w/silt pockets & organic matter	106.7	40.4	83.6	1900
5	14.0	Very soft gray clay w/roots & organic matter	114.8	39.7	85.3	470
6	19.0	Soft gray organic clay w/humus layers & roots	192.3	----	----	----
7	24.0	Very soft gray clay with roots & organic matter	64.7	58.4	96.2	355
8	29.0	Soft gray clay w/silt lenses	63.4	61.3	100.2	705

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

Fig. 98

Subsoil Investigation
Sewerage & Water Board of New Orleans
Metairie Relief Canal
Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 48

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft
2		Soft gray & tan clay w/sandy silt layers	35.7	78.7	106.8	510*
4	11.0	Medium stiff gray silty clay w/organic matter & roots	33.4	85.3	113.7	1480
5	14.0	Very soft gray clay w/silt pockets & trace of organic matter	67.4	58.1	97.2	425
6	19.0	Soft gray silty clay w/roots & clay layers	37.7	78.2	107.6	885
7	24.0	Very soft gray clay w/roots & silt pockets	58.3	64.6	102.2	390
8	29.0	Soft gray clay w/silt lenses	64.6	60.0	98.8	550
9	34.0	Soft gray clay	67.2	57.8	96.7	540

BORING 49

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft
1	2.0	Medium compact gray clayey silt w/clay layers	23.7	99.1	122.6	1685*
2	5.0	Medium stiff dark gray clay w/silt pockets & organic matter	75.3	----	----	----
3	11.0	Very soft gray organic clay w/clay layers & decayed wood	134.3	35.0	82.0	380
4	14.0	Very soft dark brown humus w/roots	249.4	20.8	72.5	315
5	19.0	Very soft gray clay	65.5	60.0	99.2	450
6	24.0	Soft gray clay	69.5	58.1	98.4	635
7	29.0	Ditto	70.9	56.6	96.7	900

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

Fig. 100

Subsoil Investigation
Sewerage & Water Board of New Orleans
Metairie Relief Canal
Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

28
BORING 50
+7.6

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft
2	5.0	Medium stiff gray & brown clay	46.9	69.3	101.8	1835*
4	11.0	Soft gray clay w/silt pockets	52.3	69.3	105.5	605
5	14.0	Soft gray clay w/silt pockets, organic matter & decayed wood	66.5	59.3	98.7	520
6	19.0	Soft gray organic clay with humus layers & roots	183.4	----	----	----
7	24.0	Ditto	194.7	24.8	73.1	710*
8	29.0	Very soft gray clay w/silt lenses	53.7	66.7	102.5	375
9	34.0	Very soft gray clay	74.5	59.0	103.0	415
10	38.5	Loose gray clayey sand with shells	28.7	90.1	115.9	600*

20.5
BORING 51 +.1

1	2.0	Medium stiff gray silty clay w/shell fragments	17.3		----	----
2	5.0	Medium stiff gray clay w/clayey silt layers & lenses	26.6	----		----
3	8.0	Very soft gray clay w/many shells	31.2		----	
4	14.0	Very soft gray clay w/silt pockets	41.8	78.9	111.9	320
5	19.0	Ditto	52.3	67.1	102.1	455
6	24.0	Very soft gray clay w/roots	65.5	60.9	100.7	390
7	29.0	Soft gray clay	70.1	58.3	99.2	665

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

Fig. 101

Subsoil Investigation
Sewerage & Water Board of New Orleans
Metairie Relief Canal
Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

27
BORING 52
+6.6

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI
1	2.0	Stiff gray & brown silty clay w/clayey silt layers		97.3	117.5	3160*			
2	5.0	Soft gray & tan clay w/many silt pockets & brick fragments	35.8	68.1	92.5	820*			
3	8.0	Soft gray & tan silty clay	28.8	85.6	110.2	500*	47	16	31
4	11.0	Medium stiff gray clay w/silt pockets	43.0	76.7	109.7	1120			
5	14.0	Soft gray clay with organic matter & roots	71.3	54.2	92.8	585			
6	19.0	Soft gray organic clay w/humus layers & roots	147.0	30.8	76.0	925			
7	24.0	Very soft gray silty clay w/roots & organic matter	43.9	74.7	107.5	460*	48	22	26
8	29.0	Very soft gray clay w/silt lenses	63.1	61.2	99.8	475			
9	34.0	Soft gray clay	69.6	58.3	98.9	585			

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

Fig. 102

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LOUISIANA

Subsoil Investigation
Sewerage & Water Board of New Orleans
Metairie Relief Canal
Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

19
BORING 53
- 1.4

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft
1	2.0	Stiff gray & tan clay w/shells & roots	29.6	81.8	106.0	2310*
2	5.0	Medium stiff gray & tan clay w/shells & gravel	24.8	----	----	----
3	8.0	Soft dark gray organic clay w/humus layers & decayed wood	267.7	----	----	----
4	11.0	Very soft dark brown humus w/roots	334.0	15.5	67.5	470
5	14.0	Very soft gray clay w/sand pockets & shell fragments	42.7	77.0	109.9	260
6	19.0	Very soft gray clay w/silt lenses	65.0	61.1	100.8	395
7	24.0	Very soft gray clay	69.2	58.2	98.5	475
8	29.0	Very soft gray clay w/sand pockets	56.1	65.3	102.0	655

27
BORING 54
+6.6

2	5.0	Stiff gray & tan clay w/glass	30.1	87.6	113.9	2445*
4	11.0	Medium stiff gray clay w/silt pockets	35.6	84.0	113.9	1025
5	14.0	Soft gray clay w/silt pockets & roots	46.0	74.2	108.3	805
6	19.0	Very soft brown & gray organic clay w/roots	174.8	27.9	76.6	490
8	29.0	Soft gray clay w/silt pockets	61.1	62.5	100.7	545
10	39.0	Ditto	65.2	60.1	99.3	715

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

Fig. 103

Subsoil Investigation
Sewerage & Water Board of New Orleans
Metairie Relief Canal
Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

27

BORING 56

6.6

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI
2	5.0	Soft gray & brown clay w/silt pockets	32.4	77.9	103.1	785*			
4	11.0	Soft gray clay w/silt lenses & trace of organic matter	49.2	71.0	106.0	610			
5	14.0	Soft gray silty clay w/shell fragments	34.1	85.3	114.4	665			
7	24.0	Medium stiff gray & black organic clay w/humus layers	243.3	20.3	69.6	1120			
8	29.0	Soft gray clay with silt lenses	55.5	66.3	103.1	590			
10	39.0	Soft gray clay w/silt pockets	65.2	60.2	99.5	630			

19

BORING 57 -1.4

1	2.0	Stiff gray & tan clay w/silt pockets	27.4	93.2	118.7	3540			
2	5.0	Soft gray silty clay w/clay layers & shells	27.2	----	----	----			
3	15.0	Very soft gray clay w/silty clay layers	56.8	65.3	102.4	340			
4	19.0	Very soft gray clay w/silt lenses	62.7	61.6	100.2	395	71	27	44
5	24.0	Soft gray clay with silt lenses	63.6	61.2	100.1	575			
6	29.0	Ditto	63.6	60.0	98.1	755	81	28	53
7	34.0	Ditto	69.0	57.1	96.4	955			

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

Fig. 105

Subsoil Investigation
Sewerage & Water Board of New Orleans
Metairie Relief Canal
Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

27
BORING 58
+6.6

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft
2	5.0	Very stiff gray silty clay w/large clayey silt pockets	18.9	89.2	106.1	7100*
4	11.0	Soft gray & tan clay w/sand pockets & concretions	46.4	72.9	106.8	800
5	14.0	Soft black & gray clay with organic clay layers & pockets	97.6	44.6	88.1	565
6	19.0	Soft brown humus w/roots & wood	337.5	15.2	66.6	620
7	24.0	Very soft gray silty clay w/roots	41.2	76.2	107.7	365
8	29.0	Soft gray clay w/silty sand lenses	68.2	58.2	97.9	625
10	39.0	Soft gray clay w/silty sand pockets	69.6	57.1	96.9	950
~~11~~	~~44.0~~	~~Very loose gray clayey sand w/shell fragments~~	~~33.3~~	~~86.9~~	~~115.9~~	~~305*~~
12	49.0	Soft gray clay w/sand pockets	51.6	69.1	104.7	830

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

Fig. 106

Subsoil Investigation
Sewerage & Water Board of New Orleans
Metairie Relief Canal
Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 60 27.5 + 7.1

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI
1	2.0	Medium compact gray & tan clayey silt w/clay pockets	24.8	90.8	113.3	1260*			
2	5.0	Medium compact brown & tan clayey silt w/clay layers	22.2	96.8	118.3	1120*			
3	8.0	Medium stiff gray clay w/silt pockets & humus layers	55.7	59.2	92.2	1275*			
4	11.0	Soft gray silty clay w/clayey silt lenses & trace of shells	38.8	81.0	112.5	830*	43	20	23
6	19.0	Very soft dark brown humus w/roots	405.1	12.9	65.2	----			
7	24.0	Very soft gray clay w/silt pockets, lenses & roots	57.5	64.0	100.8	400			
8	29.0	Soft gray clay with silt lenses	62.7	62.1	101.0	730	66	20	46
9	34.0	Soft gray clay	65.0	60.5	99.7	770			
10	39.0	Ditto	67.6	58.2	97.6	645			
11	44.0	Loose gray clayey sand w/clay layers & shell fragments	31.2	87.0	114.1	485*	26	14	12

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

Fig. 108

Subsoil Investigation
Sewerage & Water Board of New Orleans
Metairie Relief Canal
Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

20
BORING 61 -0.4

Sample No.	Depth in Feet	Classification	Wat Cont Perc	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft
1	2.0	Medium stiff gray silty clay w/clayey silt layers	22.6	98.2	120.5	1685*
2	5.0	Very soft gray clay w/organic clay layers & silt pockets	66.4	56.2	93.4	385*
3	14.0	Very soft dark brown humus w/roots	294.7	17.1	67.6	400
4	19.0	Very soft gray clay w/clayey silt layers	50.4	70.0	105.2	450
5	24.0	Very soft gray clay w/silt lenses	59.0	63.5	101.0	475
6	29.0	Soft gray clay w/silt lenses	74.0	54.1	94.1	700*
7	34.0	Soft gray clay w/sand pockets & shell fragments	36.4	80.5	109.8	----
		27 BORING 62 +6.6				
1	2.0	Stiff brown & gray silty clay w/roots	22.6	98.0	120.1	3770*
3	8.0	Soft gray clay w/roots & organic matter	51.3	59.2	89.6	765*
5	14.0	Medium stiff gray clay with silt pockets, decayed wood & organic matter	51.9	65.5	99.5	1060
6	19.0	Soft black humus	238.5	20.4	69.1	565
7	24.0	Soft gray silty clay	34.7	84.9	114.4	610
9	34.0	Soft gray clay w/silt lenses	63.6	61.2	100.1	520
~~11~~	~~42.0~~	~~Very loose gray clayey sand w/shell fragments~~	~~30.2~~	~~89.9~~	~~117.0~~	~~355*~~

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

Fig. 109

Subsoil Investigation
Sewerage & Water Board of New Orleans
Metairie Relief Canal
Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 63 G.S.E. 20 -0.4

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft		Atterberg Limits LL	PL	PI
1	5.0	Soft gray clay w/brick fragments, shells & organic matter	43.4	----	--	----				
2	10.0	Soft gray & black organic clay with humus layers	174.9	28.0	77.0	545	270			
3	14.0	Soft dark gray organic clay w/humus pockets & decayed wood	147.0	31.8	78.5	695	350	210	77	133
4	18.0	Very soft gray clay w/shell fragments & trace of organic matter	73.0	56.2	97.1	395	200			
5	23.0	Soft gray clay	63.7	60.9	99.6	690	345	78	23	55
		BORING 64 G.S.E. 27 +6.6								
2	5.0	Stiff brown & gray silty clay w/clayey silt pockets	19.6	99.2	118.6	2950*	1475			
4	11.0	Soft gray clay w/silt pockets	40.4	78.3	110.0	705	350			
6	18.5	Soft brown humus w/clay layers & wood	246.6		----					
7	22.0	Extremely soft gray clay w/silt pockets, organic matter & shell fragments	61.2	63.1	101.7	205	100			
9	33.5	Soft gray clay	65.9	62.1	103.0	765	380			
11	41.5	Very soft gray clay	71.4	57.2	98.1	335	170			

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.

Fig. 110

Subsoil Investigation
Sewerage & Water Board of New Orleans
Metairie Relief Canal
Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 65 G.S.E. 20 -0.4

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft	
1	3.0	Stiff gray clay w/silt pockets	31.9	89.3	117.8	2540	1270
2	5.0	Soft gray clay w/roots & silt pockets	42.5	78.2	111.5	715	355
3	8.0	Extremely soft dark brown humus w/roots	294.0	17.9	70.7	175	85
4	11.0	Very soft gray clay with organic matter	116.5	39.6	85.8	475	235
5	14.0	Very soft gray clay w/roots & trace of organic matter	74.7	56.0	97.8	325	160
6	19.0	Very soft gray clay w/sand lenses	68.8	58.2	98.3	400	200
7	24.0	Soft gray clay w/silt lenses	64.2	61.7	101.3	525	260
8	29.0	Soft gray clay	74.8	54.7	95.7	740	370
9	34.0	Soft gray clay w/trace of sand & shell fragments	65.0	59.7	98.5	850	425

BORING 66 G.S.E. 27 +6.6

2	5.0	Stiff brown & gray clay w/silt pockets	32.1	86.2	113.8	3165	1580
4	11.0	Medium stiff gray clay w/humus layers & silt pockets	44.2	75.7	109.1	1025	510
6	18.5	Soft gray clay w/organic matter & silt pockets	96.2	43.4	85.2	950	475
7	23.5	Very soft gray clay with silt pockets & organic matter	73.9	54.7	95.2	335	165
8	28.5	Very soft gray clay w/sandy silt lenses	59.9	65.2	104.2	470	235
10	38.5	Soft gray clay	75.7	54.4	95.6	795	400

Fig. 111

Subsoil Investigation
Sewerage & Water Board of New Orleans
Metairie Relief Canal
Station 554+00 to Station 670+00
Orleans and Jefferson Parishes, Louisiana

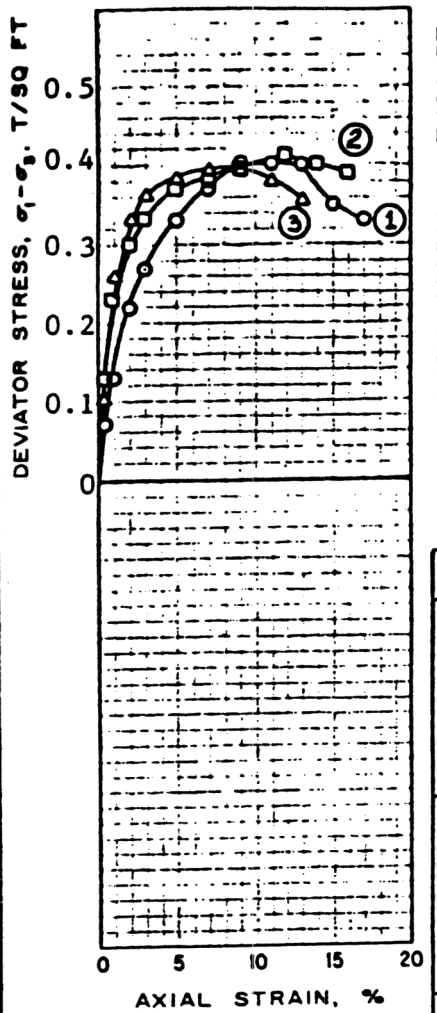
For: Modjeski and Masters, Inc., Consulting Engineers, New Orleans, Louisiana

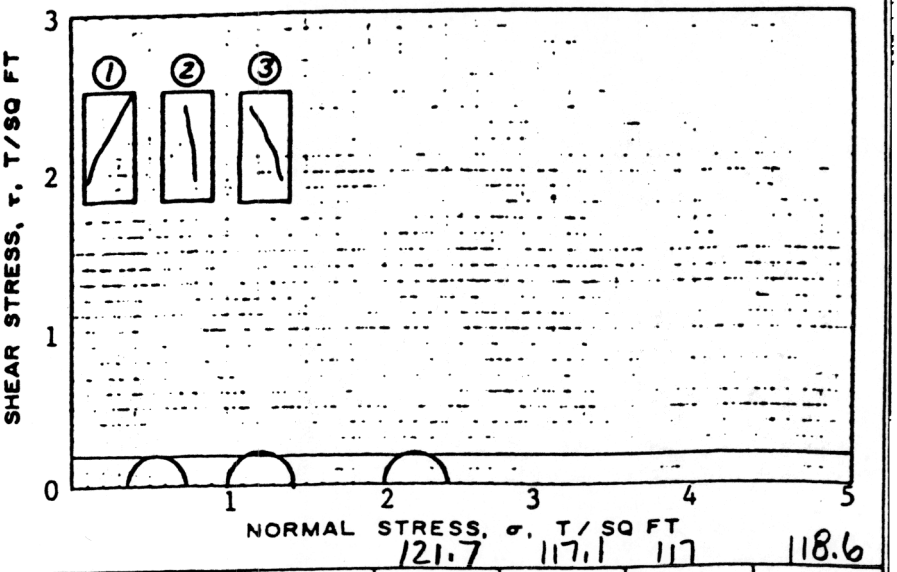
SUMMARY OF LABORATORY TEST RESULTS

BORING 68 G.S.E. 27.5 +7.1

Sample No.	Depth in Feet	Classification	Water Content Percent	Density Lb/cu ft Dry	Density Lb/cu ft Wet	Unconfined Compressive Strength Lb/sq ft	Atterberg Limits LL	PL	PI
1	2.0	Very stiff brown silty clay w/clayey silt pockets	21.2	104.5	126.7	5150* 2575			
2	5.0	Medium stiff gray & black clay w/humus layers	57.5	58.1	91.6	1400* 700	96	28	68
3	8.0	Soft gray & tan clay	45.9	71.5	104.4	860* 430			
4	11.0	Soft gray silty clay w/organic matter, decayed wood & trace of sand	78.5	49.3	88.0	995* 450			
5	14.0	Medium stiff gray silty clay w/organic matter	45.2	70.4	102.2	1595* 800	38	18	20
7	24.0	Very soft gray clay w/sandy silt lenses, roots & organic matter	92.0	43.6	83.7	485* 242			
9	33.0	Soft gray clay w/silt lenses	56.2	65.9	103.0	680 340	69	17	52
11	42.5	Soft gray clay w/many sand pockets & shells	38.1	79.7	110.1	500* 250			

*Unconsolidated-Undrained Triaxial Compression Test - One Specimen. Confined at the approximate overburden pressure.





121.7 117.1 117 118.6

TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	29.0	29.2	29.6	
	VOID RATIO	e_o	0.791	0.938	0.941	
	SATURATION %	S_o	99	84	85	
	DRY DENSITY, LB/CU FT	γ_d	94.1	86.9	86.8	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
FINAL	WATER CONTENT %	w_f	29.0	29.2	29.6	
	VOID RATIO	e_f	0.791	0.938	0.941	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.36	1.0	2.0	
MAX DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{max}$		0.40	0.41	0.39	
TIME TO FAILURE, MIN		t_f	9.0	12.0	7.0	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{ult}$					
INITIAL DIAMETER, IN.		D_o	1.39	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ = _____

c = 0.20 T/SQ FT

METHOD OF SATURATION _____

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU | TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Soft gray & tan silty clay

LL 47 | PL 16 | PI 31 | G_s 2.70

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans

Metairie Relief Canal

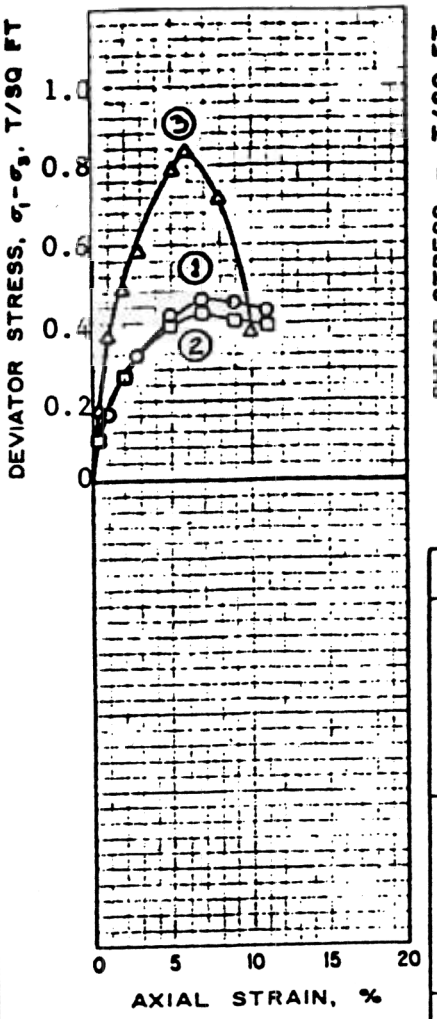
AREA Sta. 554+00 to Sta. 670+00

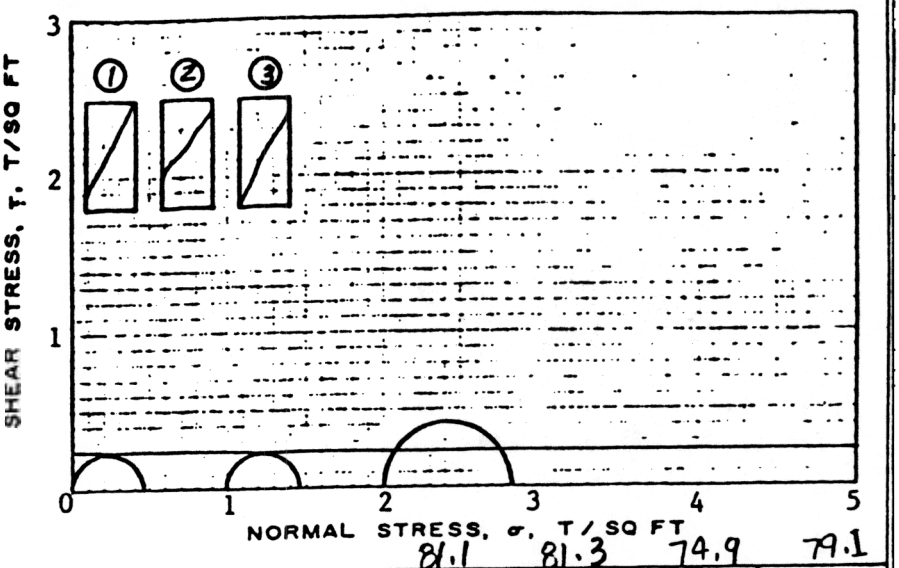
BORING NO. 52 | SAMPLE NO. 3

DEPTH 8.0' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS





81.1 81.3 74.9 79.1

TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	147.0	149.0	244.7	186.2
	VOID RATIO	e_o	4.27	4.34	6.97	
	SATURATION %	S_o	90	89	91	
	DRY DENSITY, LB/CU FT	γ_d	30.8	30.4	20.3	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_c				
FINAL	WATER CONTENT %	w_f	147.0	149.0	244.7	
	VOID RATIO	e_f	4.27	4.34	6.97	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0	1.0	2.0	
MAX DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{max}$		0.46	0.42	0.83	.57 .41
TIME TO FAILURE, MIN		t_f	7.0	7.0	6.0	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{ult}$					
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ =

c = 0.23 T/SQ FT

METHOD OF SATURATION

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU

TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Soft gray organic clay w/humus layers & roots

LL | PL | PI | G_s 2.60

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans

Metairie Relief Canal

AREA Sta. 554+00 to Sta. 670+00

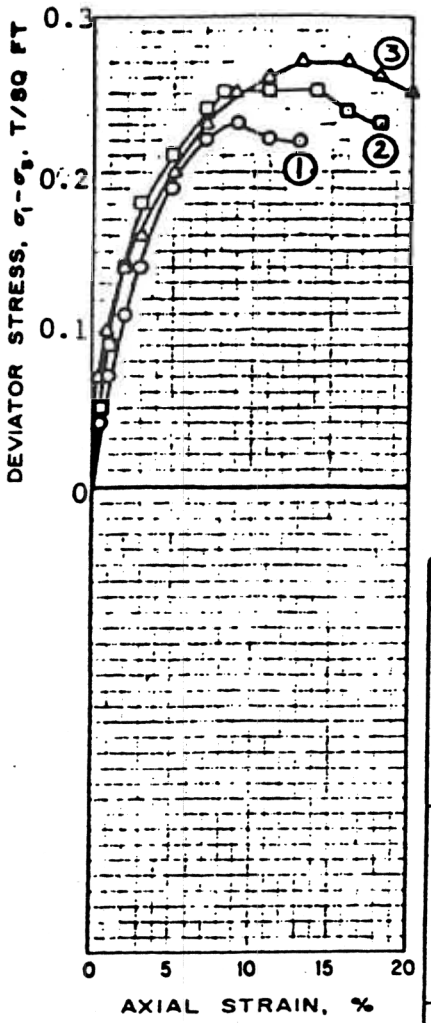
BORING NO. 52 SAMPLE NO. 6

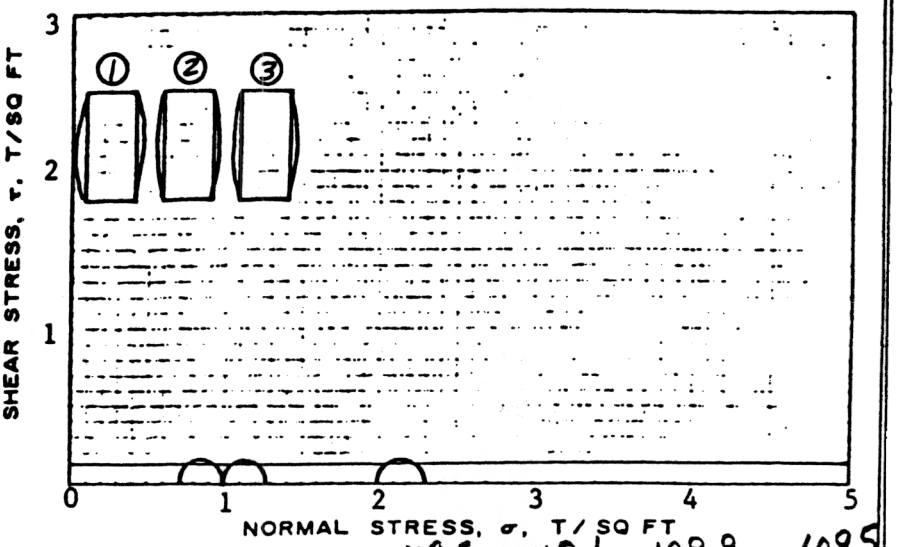
DEPTH 19.0' DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LOUISIANA

Fig. 145





109.6 110.1 108.8 109.5

TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	43.9	41.4	43.4	
	VOID RATIO	e_o	1.26	1.21	1.28	
	SATURATION %	S_o	94	93	92	
	DRY DENSITY, LB/CU FT	γ_d	74.7	76.2	73.9	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
FINAL	WATER CONTENT %	w_f	43.9	41.4	43.4	
	VOID RATIO	e_f	1.26	1.21	1.28	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.72	1.0	2.0	
MAX DEVIATOR STRESS, T/SQ FT		$(\sigma_1-\sigma_3)_{max}$	0.23	0.25	0.27	
TIME TO FAILURE, MIN		t_f	9.0	8.0	13.0	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT		$(\sigma_1-\sigma_3)_{ult}$				
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

.2

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ = ~~0.13~~

c = 1125 T/SQ FT

METHOD OF SATURATION

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU | TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Soft gray silty clay w/roots

LL 48 | PL 22 | PI 26 | G_s 2.70

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans

Metairie Relief Canal

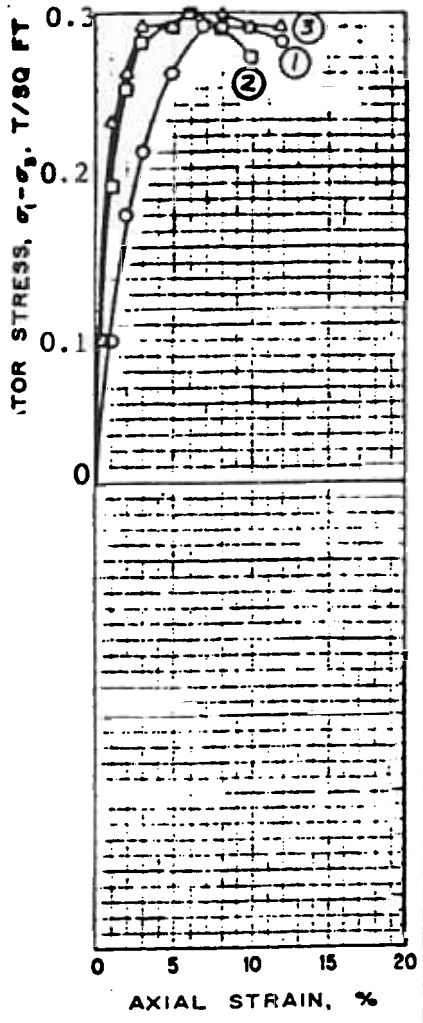
AREA Sta. 554+00 to Sta. 670+00

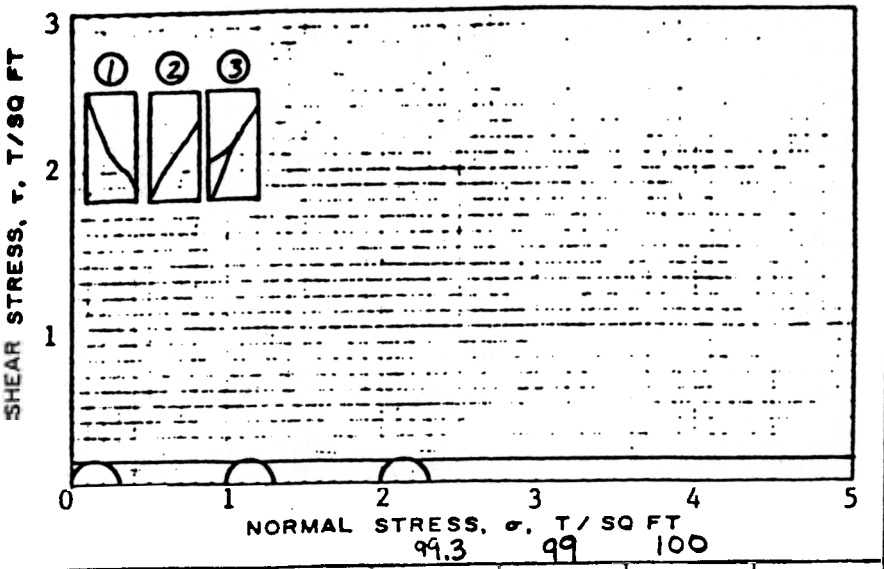
BORING NO. 52 | SAMPLE NO. 7

DEPTH 24.0' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS





99.3 99 100

TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	69.6	68.2	66.0	67.9
INITIAL	VOID RATIO	e_o	1.93	1.97	1.89	
INITIAL	SATURATION %	S_o	99	95	95	
INITIAL	DRY DENSITY, LB/CU FT	γ_d	58.3	57.6	59.0	
BEFORE SHEAR	WATER CONTENT %	w_c				
BEFORE SHEAR	VOID RATIO	e_c				
BEFORE SHEAR	SATURATION %	S_c				
BEFORE SHEAR	FINAL BACK PRESSURE, T/SQ FT	u_o				
FINAL	WATER CONTENT %	w_f	69.6	68.2	66.0	
FINAL	VOID RATIO	e_f	1.93	1.97	1.89	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0	1.0	2.0	
MAX DEVIATOR STRESS, T/SQ FT		$(\sigma_1-\sigma_3)_{max}$	0.29	0.30	0.30	
TIME TO FAILURE, MIN		t_f	8.0	6.0	6.0	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT		$(\sigma_1-\sigma_3)_{ult}$				
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ = ____

c = 0.15 T/SQ FT

METHOD OF SATURATION

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU

TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Soft gray clay

LL | PL | PI | | G_s 2.74

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans

Metairie Relief Canal

AREA Sat. 554+00 to Sta. 670+00

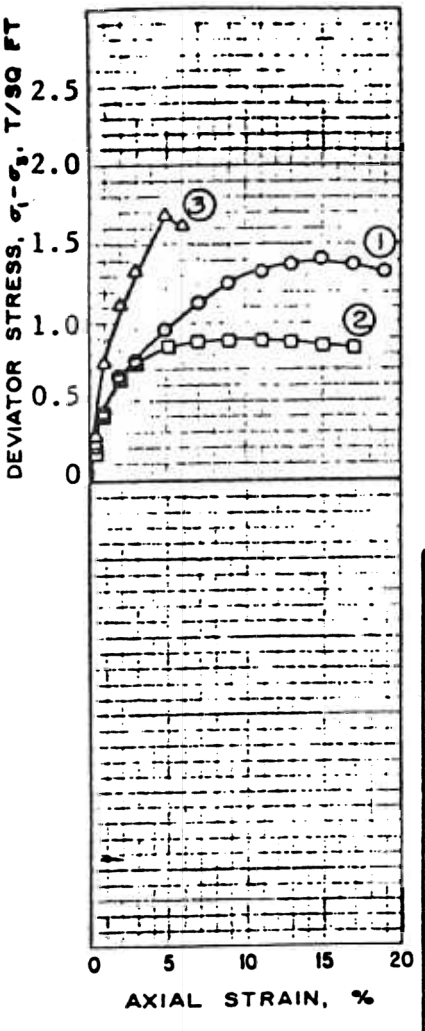
BORING NO. 52 | SAMPLE NO. 9

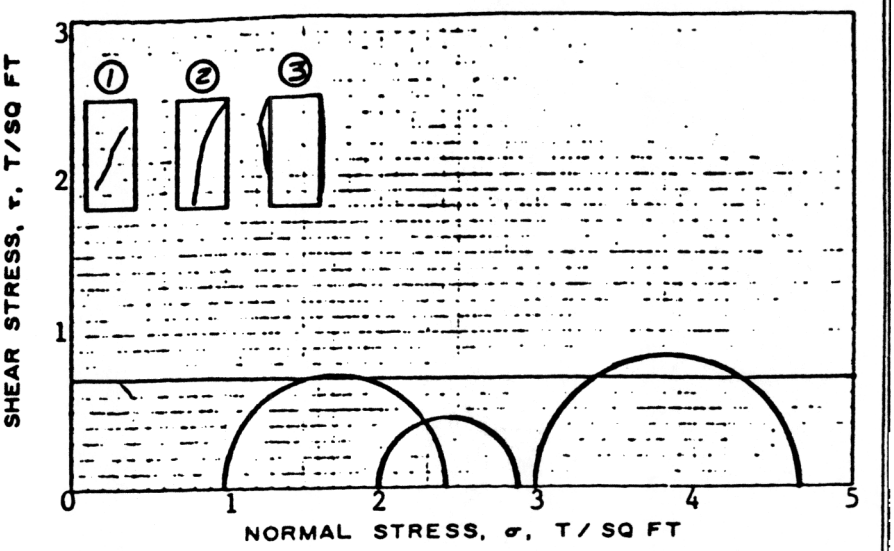
DEPTH 34.0' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LOUISIANA

60/1





TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	26.3	25.9	23.4	
	VOID RATIO	e_o	0.964	0.914	0.794	
	SATURATION %	S_o	75	78	81	
	DRY DENSITY, LB/CU FT	γ_d	87.0	89.3	95.3	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
FINAL	WATER CONTENT %	w_f	26.3	25.9	23.4	
	VOID RATIO	e_f	0.964	0.914	0.794	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	1.0	2.0	3.0	
MAX DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{max}$		1.41	0.89	1.68	
TIME TO FAILURE, MIN		t_f	15.0	11.0	5.0	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{ult}$					
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ = ____

c = 0.70 T/SQ FT

METHOD OF SATURATION ____

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU | TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Medium compact gray & brown clayey silt w/roots

LL | PL | PI | e_s 2.74

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans

Metairie Relief Canal

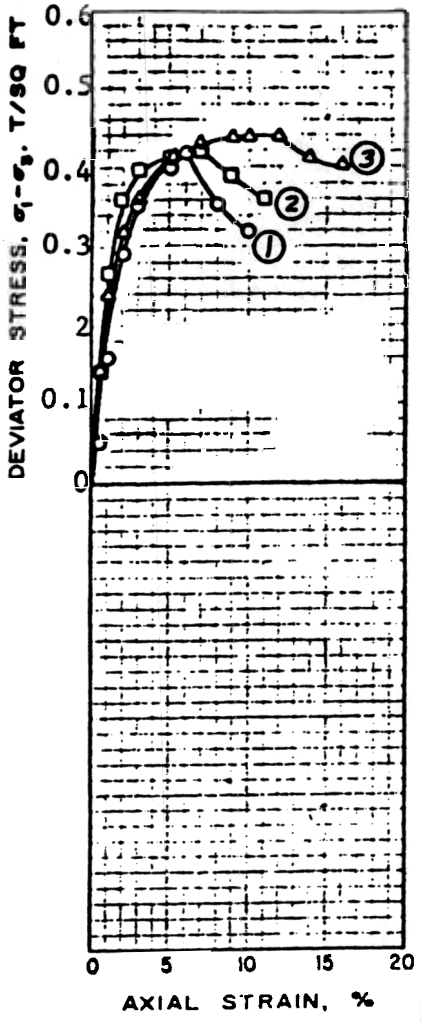
AREA Sta. 554+00 to Sta. 670+00

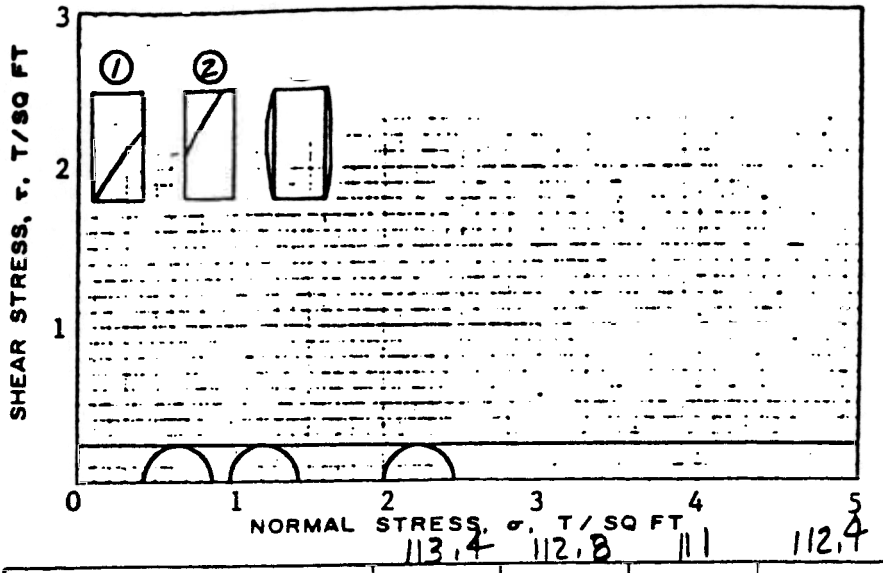
BORING NO. 60 | SAMPLE NO. 1

DEPTH 2.0' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LOUISIANA





113.4 112.8 111 112.4

TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	38.8	39.2	42.8	40.3
	VOID RATIO	e_o	1.08	1.15	1.23	
	SATURATION %	S_o	97	94	95	
	DRY DENSITY, LB/CU FT	γ_d	81.0	79.6	76.5	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
FINAL	WATER CONTENT %	w_f	38.8	39.2	42.8	
	VOID RATIO	e_f	1.08	1.15	1.23	
		σ_3	0.43	1.0	2.0	
		$(\sigma_1-\sigma_3)_{max}$	0.42	0.42	0.44	
TIME TO FAILURE, MIN		t_f	6.0	7.0	9.0	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT		$(\sigma_1-\sigma_3)_{ult}$				
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ =

c = 0.21 T/SQ FT

METHOD OF SATURATION

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU | TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Soft gray silty clay w/sandy silt layers & lenses

LL 43 | PL 20 | PI 23 | e_s 2.70

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans
Metairie Relief Canal

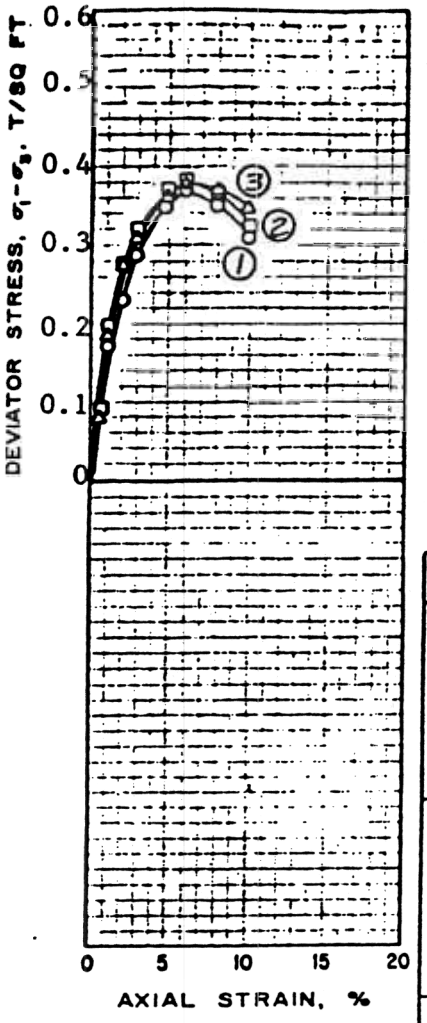
AREA Sta. 554+00 to Sta. 670+00

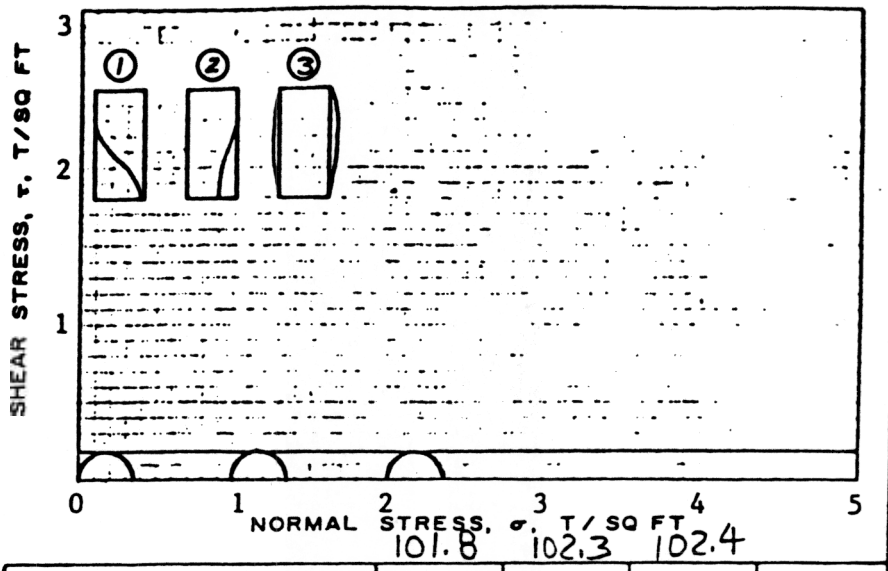
BORING NO. 60 | SAMPLE NO. 4

DEPTH 11.0' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

60/8





101.8 102.3 102.4

TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	62.7	60.7	59.1	60.8
	VOID RATIO	e_o	1.75	1.73	1.69	
	SATURATION %	S_o	98	96	96	
	DRY DENSITY, LB/CU FT	γ_d	62.1	62.7	63.4	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
FINAL	WATER CONTENT %	w_f	62.7	60.7	59.1	
	VOID RATIO	e_f	1.75	1.73	1.69	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0	1.0	2.0	
MAX DEVIATOR STRESS, T/SQ FT		$(\sigma_1-\sigma_3)_{max}$	0.37	0.38	0.38	
TIME TO FAILURE, MIN		t_f	6.0	6.0	6.0	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT		$(\sigma_1-\sigma_3)_{ult}$				
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ = _____

c = 0.19 T/SQ FT

METHOD OF SATURATION _____

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU | TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Soft gray clay w/silt lenses

LL 66 | PL 20 | PI 46 | | G_s 2.74

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans
Metairie Relief Canal

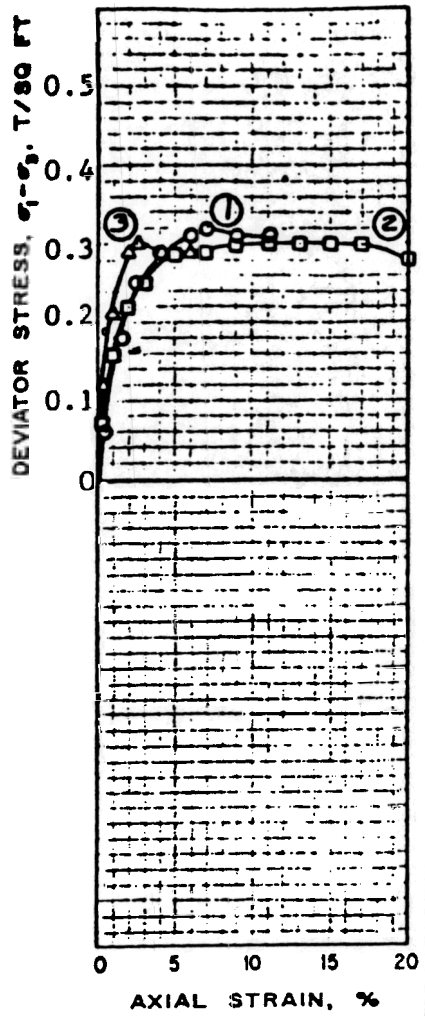
AREA Sta. 554+00 to Sta. 670+00

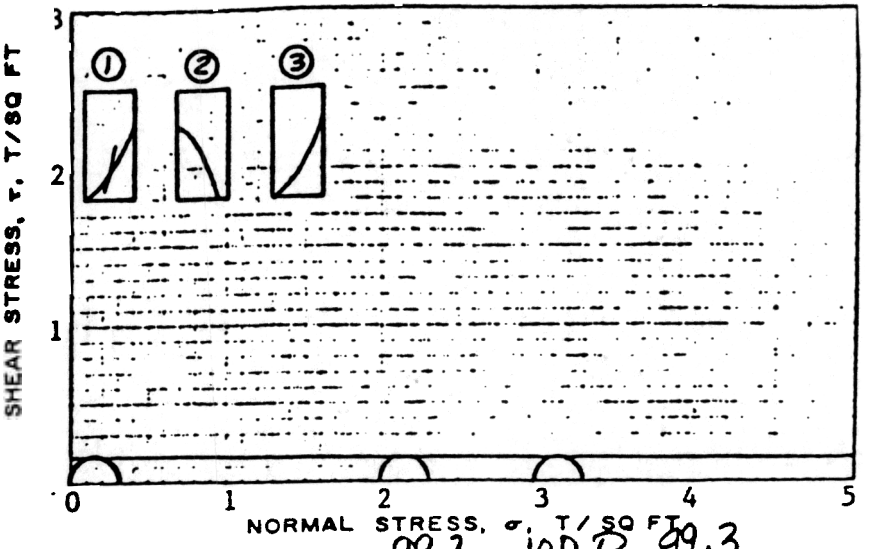
BORING NO. 60 | SAMPLE NO. 8

DEPTH 29.0' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS





99.2 100.0 99.3

TEST NO.			1	2	3	100
INITIAL	WATER CONTENT %	w_o	67.6	64.1	67.3	66.3
	VOID RATIO	e_o	1.94	1.89	1.94	
	SATURATION %	S_o	96	93	95	
	DRY DENSITY, LB/CU FT	γ_d	58.2	59.2	58.1	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
FINAL	WATER CONTENT %	w_f	67.4	64.1	67.3	
	VOID RATIO	e_f	1.94	1.89	1.94	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0	2.0	3.0	
MAX DEVIATOR STRESS, T/SQ FT		$(\sigma_1-\sigma_3)_{max}$	0.32	0.30	0.30	
TIME TO FAILURE, MIN		t_f	7.0	9.0	2.5	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT		$(\sigma_1-\sigma_3)_{ult}$				
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ = _____

c = 0.15 T/SQ FT

METHOD OF SATURATION _____

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU | TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Soft gray clay

LL | PL | PI | | G_s 2.74

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans
Metairie Relief Canal

AREA Sta. 554+00 to Sta. 670+00

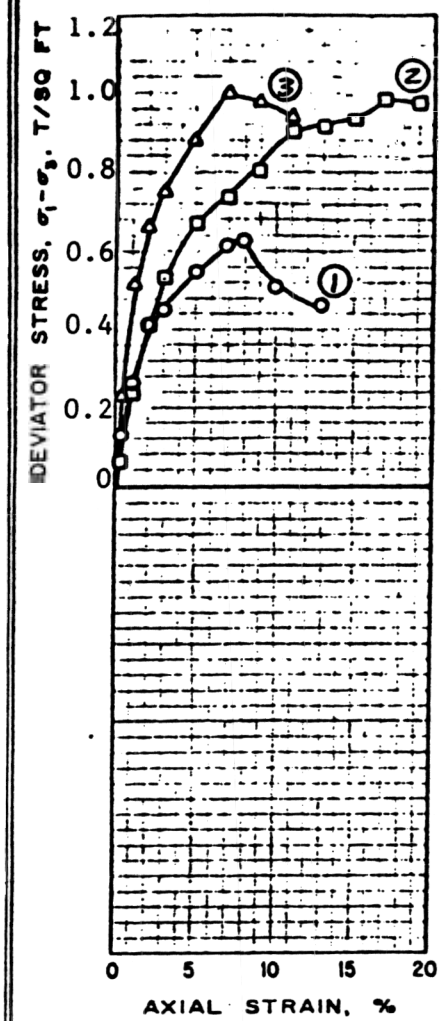
BORING NO. 60 | SAMPLE NO. 10

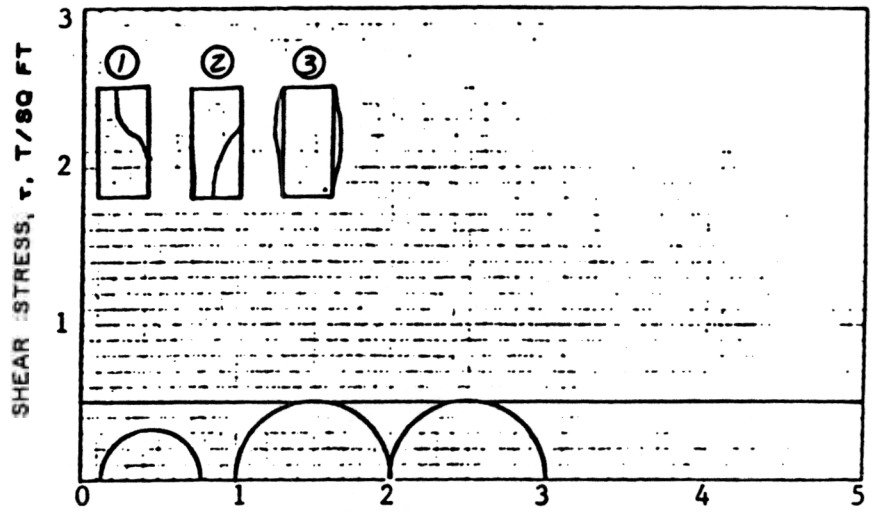
DEPTH 39.0' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LOUISIANA

Fig. 154





119.0 118.4 118.0 118.5

TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	28.6	29.9	27.8	28.8
	VOID RATIO	e_o	0.867	0.891	0.905	
	SATURATION %	S_o	89	91	83	
	DRY DENSITY, LB/CU FT	γ_d	90.1	89.1	88.4	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
FINAL	WATER CONTENT %	w_f	28.6	29.9	27.8	
	VOID RATIO	e_f	0.867	0.891	0.905	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.14	1.0	2.0	
MAX DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{max}$		0.62	0.99	1.00	.435
TIME TO FAILURE, MIN		t_f	8.0	17.0	7.0	.495
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{ult}$					
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ = ____

c = ~~0.50~~ .495 T/SQ FT

METHOD OF SATURATION ____

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU | TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Medium stiff gray & black clay w/silt pockets & trace of organic matter

LL 96 | PL 28 | PI 68 | | G_s 2.70

REMARKS Shear values were taken from large scale plot.

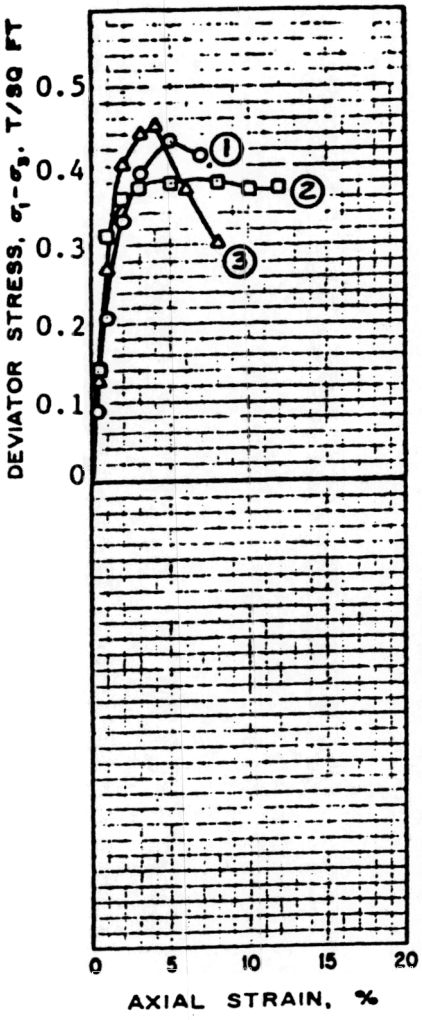
PROJECT Sewerage & Water Board of New Orleans
Metairie Relief Canal

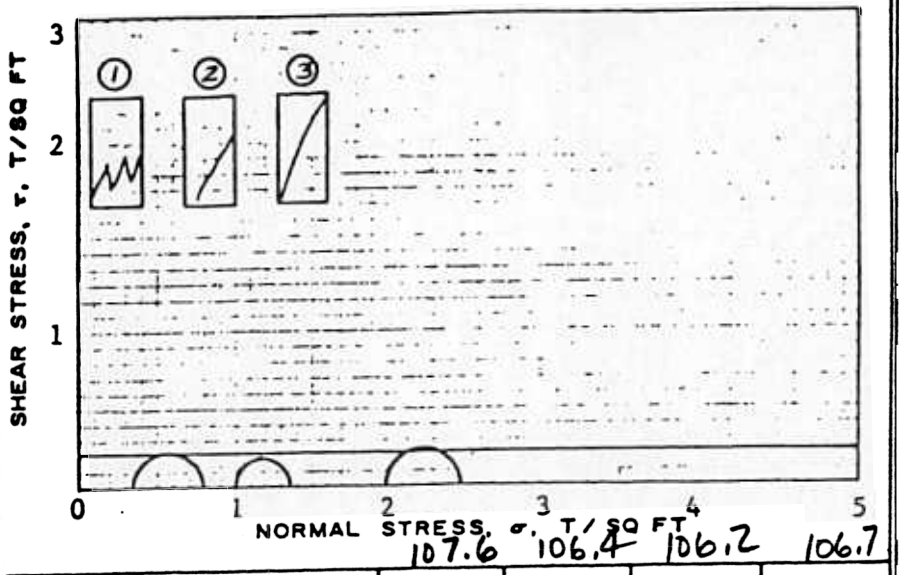
AREA Sta. 554+00 to Sta. 670+00

BORING NO. 68 | SAMPLE NO. 2

DEPTH 5.0' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT





107.6 106.4 106.2 106.7

TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	45.9	45.5	46.6	46.0
	VOID RATIO	e_o	1.39	1.47	1.49	
	SATURATION %	S_o	91	85	85	
	DRY DENSITY, LB/CU FT	γ_d	71.5	69.3	68.6	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_c				
FINAL	WATER CONTENT %	w_f	45.9	45.5	46.6	
	VOID RATIO	e_f	1.39	1.47	1.49	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.36	1.0	2.0	
MAX DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{max}$		0.43	0.38	0.45	
TIME TO FAILURE, MIN		t_f	5.0	5.0	4.0	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{ult}$					
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

.4
.2

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ =

c = 0.22 (.215) T/SQ FT

METHOD OF SATURATION

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU | TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Soft gray & tan clay

LL | PL | PI | | e_s 2.74

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans
Metairie Relief Canal

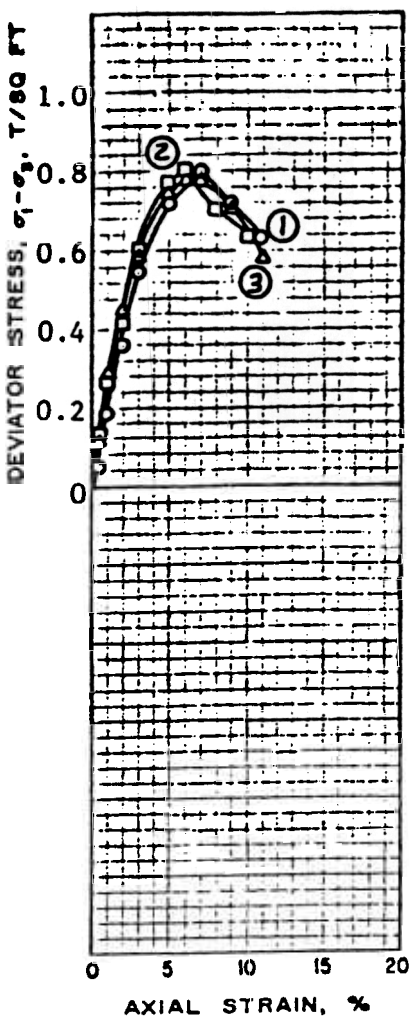
AREA Sta. 554+00 to Sta. 670+00

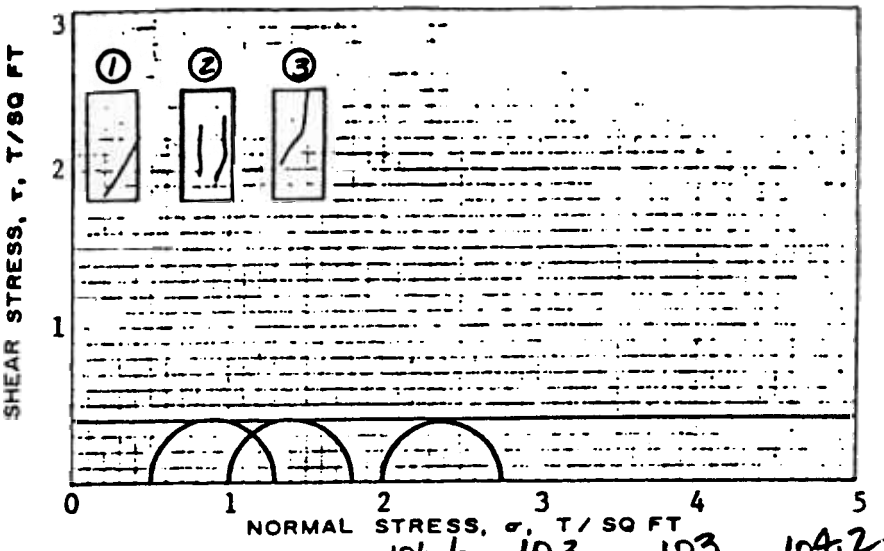
BORING NO. 68 | SAMPLE NO. 3

DEPTH 8.0' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS





106.6 103 103 104.2

TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	45.2	52.3	51.2	49.6
	VOID RATIO	e_o	1.39	1.62	1.62	
	SATURATION %	S_o	88	87	85	
	DRY DENSITY, LB/CU FT	γ_d	70.4	64.3	64.3	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
FINAL	WATER CONTENT %	w_f	45.2	52.3	51.2	
	VOID RATIO	e_f	1.39	1.62	1.62	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.5	1.0	2.0	
MAX DEVIATOR STRESS, T/SQ FT		$(\sigma_1-\sigma_3)_{max}$	0.80	0.80	0.78	
TIME TO FAILURE, MIN		t_f	7.0	6.0	6.0	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT		$(\sigma_1-\sigma_3)_{ult}$				
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ =

c = 0.40 T/SQ FT

METHOD OF SATURATION

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU | TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Medium stiff gray silty clay w/trace or organic matter

LL 38 | PL 18 | PI 20 | G_s 2.70

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans

Metairie Relief Canal

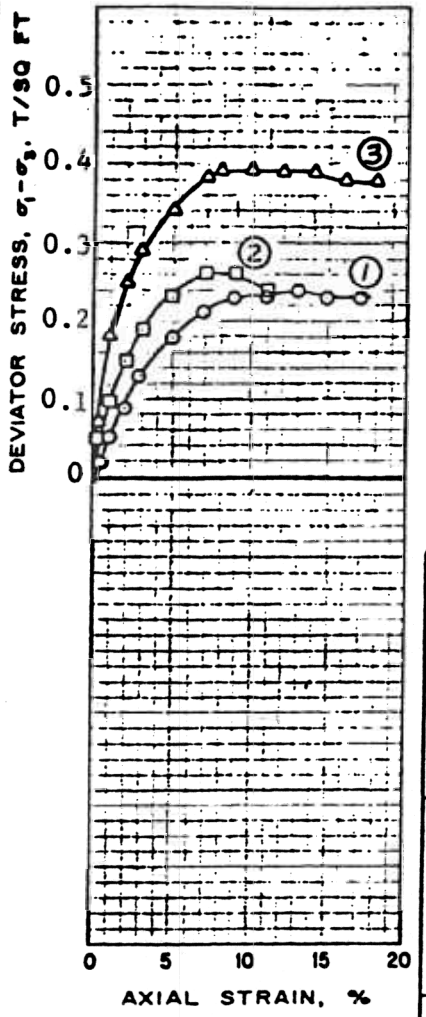
AREA Sta. 554+00 to Sta. 670+00

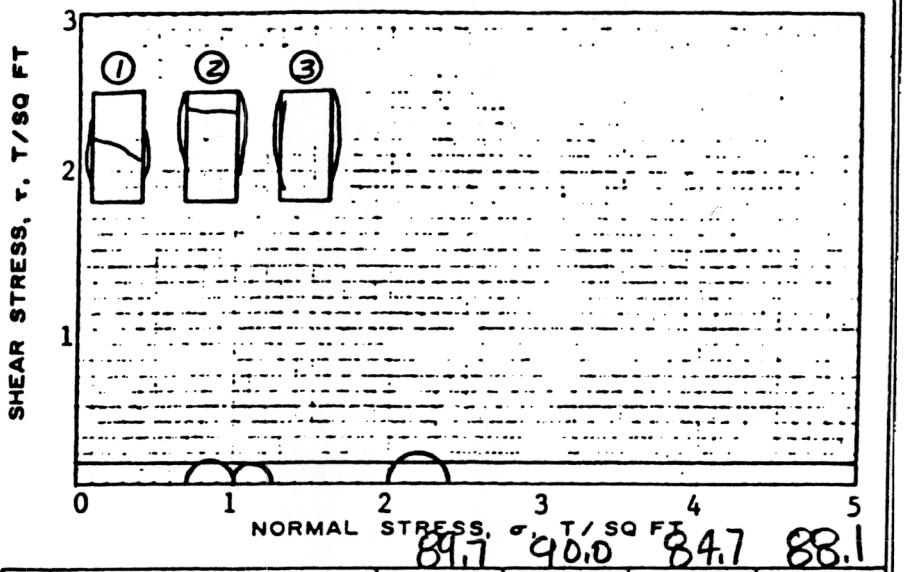
BORING NO. 68 | SAMPLE NO. 5

DEPTH 14.0' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

EUSTIS ENGINEERING COMPANY





89.7 90.0 84.7 88.1

TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	92.0	91.8	113.9	99.2
	VOID RATIO	e_o	2.79	2.73	3.63	
	SATURATION %	S_o	87	89	83	
	DRY DENSITY, LB/CU FT	γ_d	43.6	44.3	35.7	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
FINAL	WATER CONTENT %	w_f	92.0	91.8	113.9	
	VOID RATIO	e_f	2.79	27.3 --	3.63	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.73	1.0	2.0	
MAX DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{max}$		0.24	0.26	0.39	
TIME TO FAILURE, MIN		t_f	13.0	7.0	8.0	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{ult}$					
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ = _____

c = 0.13 T/SQ FT

METHOD OF SATURATION _____

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU | TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Soft gray clay w/sandy silt lenses, roots & trace of organic matter

LL | PL | PI | | e_s 2.65

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans

Metairie Relief Canal

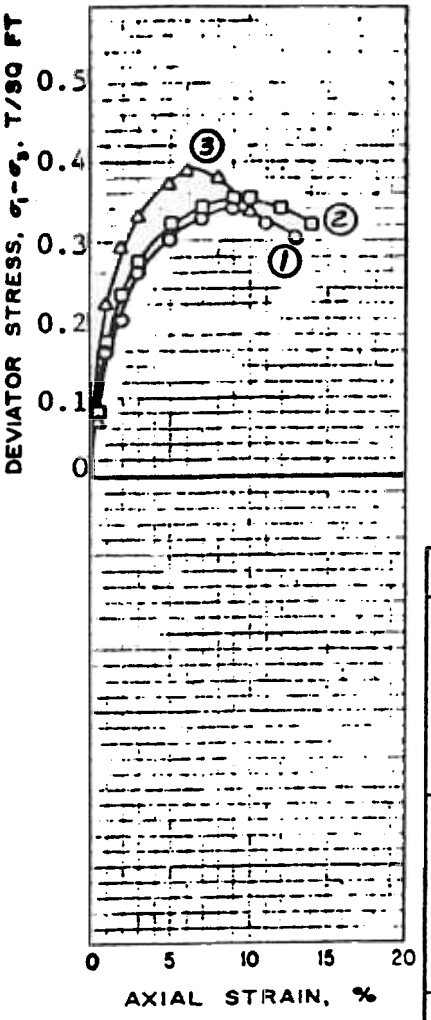
AREA Sta. 554+00 to Sta. 670+00

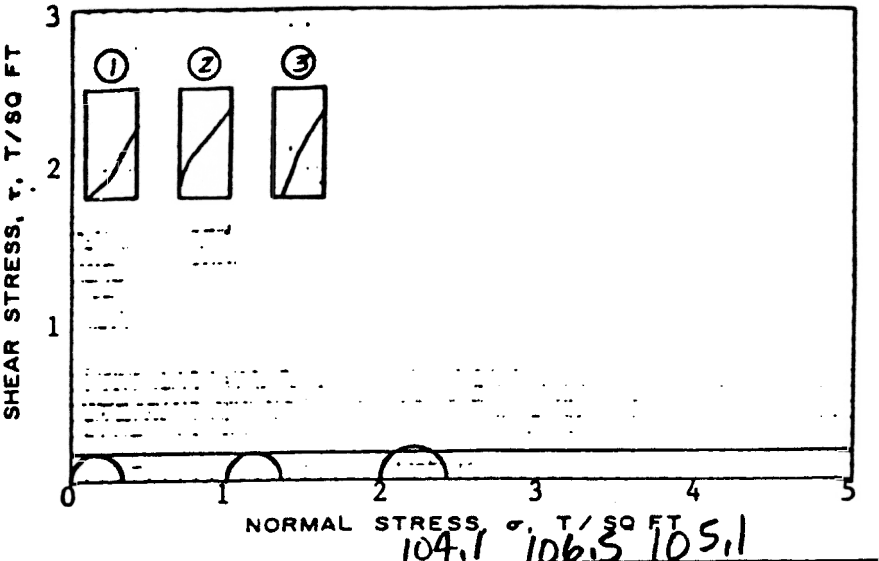
BORING NO. 68 | SAMPLE NO. 7

DEPTH 24.0' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

EUSTIS ENGINEERING COMPANY





104.1 106.3 105.1 105.2

TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	56.2	48.6	53.1	53
	VOID RATIO	e_o	1.59	1.46	1.54	
	SATURATION %	S_o	97	91	95	
	DRY DENSITY, LB/CU FT	γ_d	65.9	69.4	67.4	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_c				
FINAL	WATER CONTENT %	w_f	56.2	48.6	53.1	
	VOID RATIO	e_f	1.59	1.46	1.54	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0	1.0	2.0	
MAX DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{max}$		0.34	0.35	0.39	
TIME TO FAILURE, MIN		t_f	9.0	8.0	6.0	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{ult}$					
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ = 0.18 / 175

c = 0.18 T/SQ FT

METHOD OF SATURATION

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU | TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Soft gray clay w/silt lenses

LL 69 | PL 17 | PI 52 | e_s 2.74

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans

Metairie Relief Canal

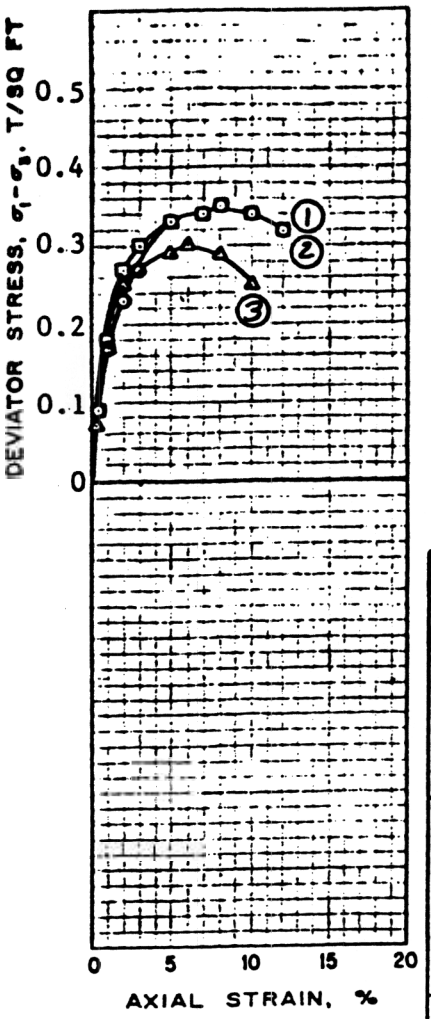
AREA Sta. 554+00 to Sta. 670+00

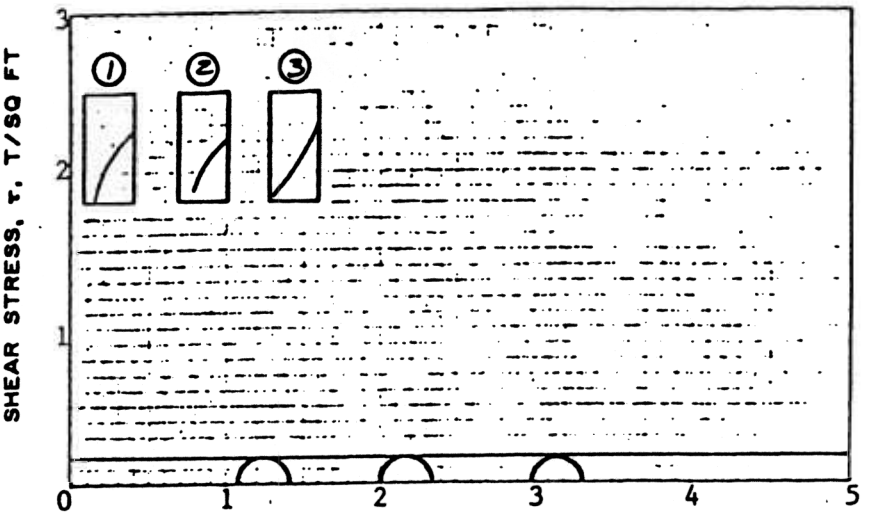
BORING NO. 68 | SAMPLE NO. 9

DEPTH 33.0' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE LOUISIANA





98.5 98.0 98.2

TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	70.4	71.3	69.9	70.5
	VOID RATIO	e_o	1.98	2.04	2.01	
	SATURATION %	S_o	97	95	95	
	DRY DENSITY, LB/CU FT	γ_d	57.1	56.0	56.6	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
FINAL	WATER CONTENT %	w_f	70.4	71.3	69.9	
	VOID RATIO	e_f	1.98	2.04	2.01	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	1.08	2.0	3.0	
MAX DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{max}$		0.35	0.35	0.30	
TIME TO FAILURE, MIN		t_f	8.0	8.0	6:0	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{ult}$					
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

.16

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ = ~~0.18~~ 0.15

c = ~~0.18~~ 0.15 T/SQ FT

METHOD OF SATURATION

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU | TYPE OF SPECIMEN Undistrubed

CLASSIFICATION Very soft gray clay w/silt lenses

LL | PL | PI | | G_s 2.73

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans

Metairie Relief Canal

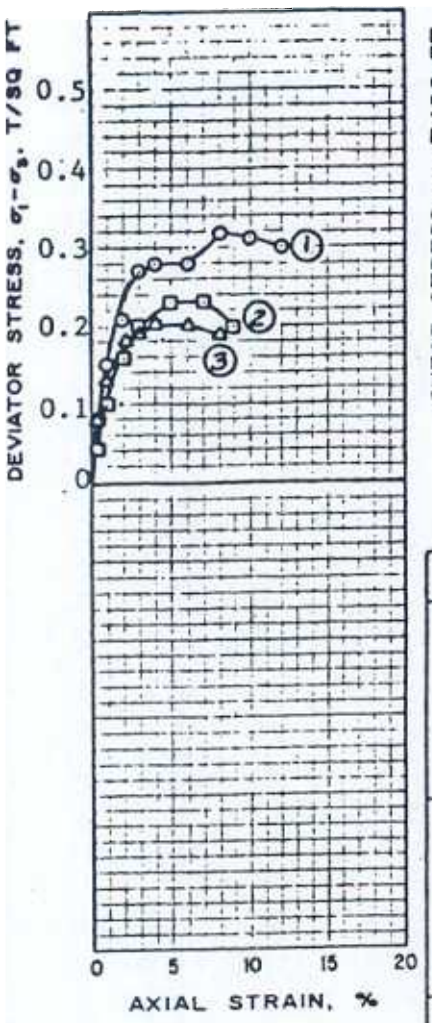
AREA Sta. 554+00 to Sta. 670+00

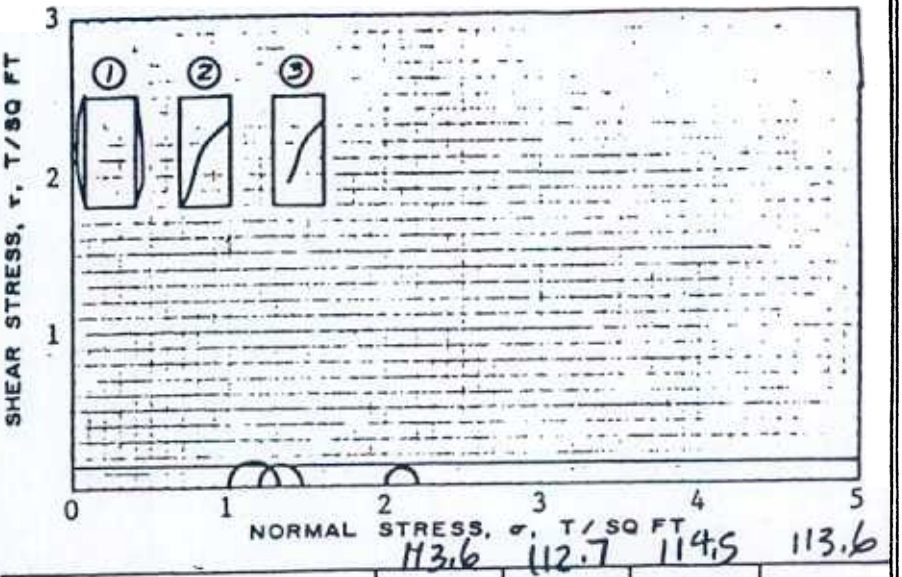
BORING NO. 68 | SAMPLE NO. 10

DEPTH 39.0' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS





113.6 112.7 114.5 113.6

TEST NO.			1	2	3	
INITIAL	WATER CONTENT %	w_o	35.5	38.1	35.3	36.3
	VOID RATIO	e_o	1.07	1.11	1.04	
	SATURATION %	S_o	90	92	91	
	DRY DENSITY, LB/CU FT	γ_d	81.5	79.7	82.5	
BEFORE SHEAR	WATER CONTENT %	w_c				
	VOID RATIO	e_c				
	SATURATION %	S_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
FINAL	WATER CONTENT %	w_f	35.5	38.1	35.3	
	VOID RATIO	e_f	1.07	1.11	1.04	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	1.0	1.19	2.0	
MAX DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{max}$		0.32	0.23	0.20	
TIME TO FAILURE, MIN		t_f	8.0	5.0	4.0	
RATE OF STRAIN, PERCENT/MIN			0.5	0.5	0.5	
EFFECTIVE NORMAL STRESS, T SQ FT						
ULT DEVIATOR STRESS, T/SQ FT	$(\sigma_1-\sigma_3)_{ult}$					
INITIAL DIAMETER, IN.		D_o	1.40	1.40	1.40	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

SHEAR STRENGTH PARAMETERS

ϕ = 0

TAN ϕ = _____

c = 0.12 / 1.15 T/SQ FT

METHOD OF SATURATION _____

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF TEST UU | TYPE OF SPECIMEN Undisturbed

CLASSIFICATION Very soft gray clay w/many sand pockets & shells

LL | PL | PI | | G_s 2.70

REMARKS Shear values were taken from large scale plot.

PROJECT Sewerage & Water Board of New Orleans

Metairie Relief Canal

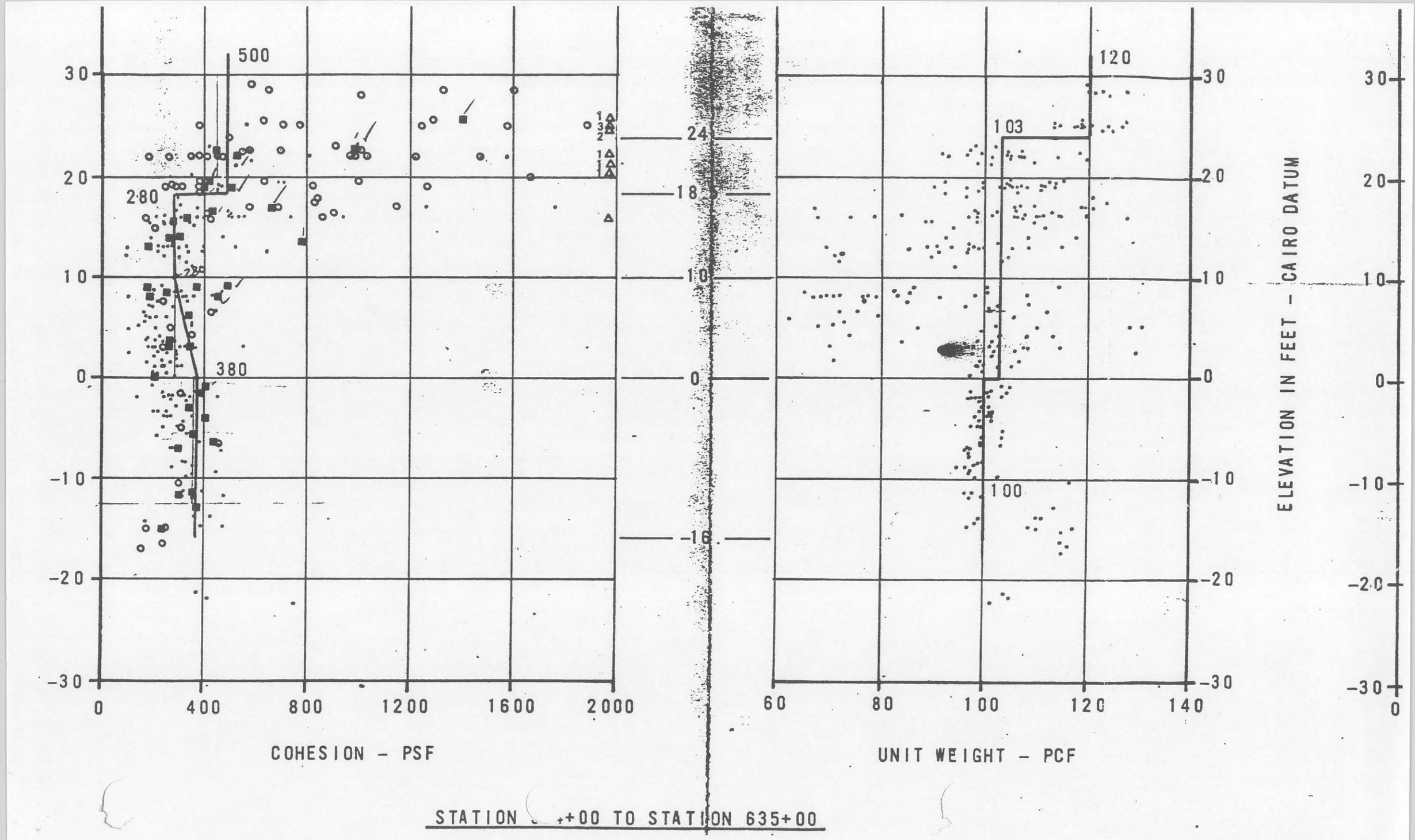
AREA Sta. 554+00 to Sta. 670+00

BORING NO. 68 | SAMPLE NO. 11

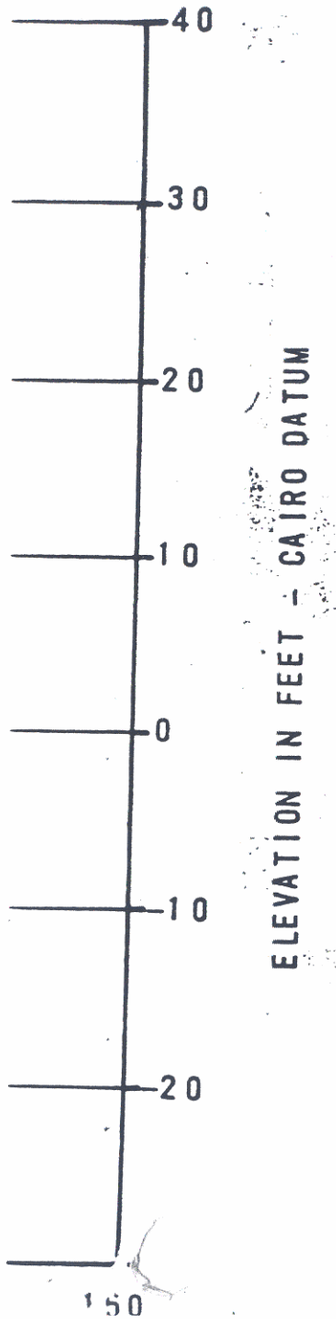
DEPTH 42.5' | DATE 20 August 1981

TRIAXIAL COMPRESSION TEST REPORT

EUSTIS ENGINEERING COMPANY



STATION [illegible]+00 TO STATION 635+00



ELEVATION IN FEET - CAIRO DATUM

LEGEND

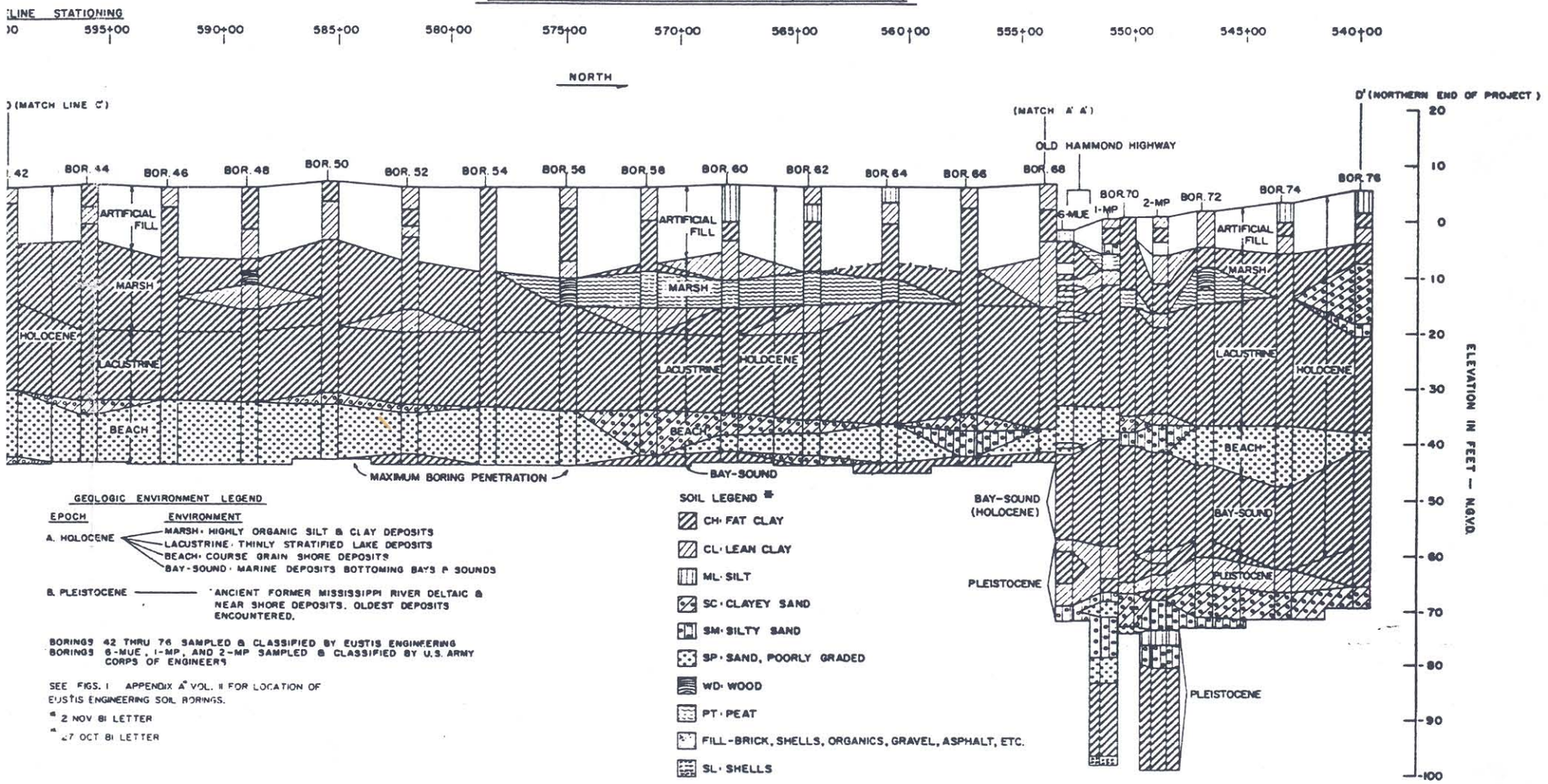
- • UNCONFINED COMPRESSION TESTS
- ○ ONE POINT U-U TRIAXIAL TESTS
- ■ THREE POINT U-U TRIAXIAL TESTS
- △ NUMBER OF TEST OVER 2000 PSF

NOTE:

① AN "S" STRENGTH OF C = 0; ϕ = 23° WAS ASSIGNED TO ALL CLAY SOILS.

② A "Q" AND "S" STRENGTH OF C = 0; ϕ = 30° WAS ASSIGNED TO ALL SANDS

17TH STREET OUTFALL CANAL — EAST LEVEE (NORTHERN HALF)



GEOLOGIC ENVIRONMENT LEGEND

EPOCH	ENVIRONMENT
A. HOLOCENE	MARSH - HIGHLY ORGANIC SILT & CLAY DEPOSITS
	LACUSTRINE - THINLY STRATIFIED LAKE DEPOSITS
	BEACH - COURSE GRAIN SHORE DEPOSITS
	BAY-SOUND - MARINE DEPOSITS BOTTOMING BAYS & SOUNDS
B. PLEISTOCENE	ANCIENT FORMER MISSISSIPPI RIVER DELTAIC & NEAR SHORE DEPOSITS. OLDEST DEPOSITS ENCOUNTERED.

BORINGS 42 THRU 76 SAMPLED & CLASSIFIED BY EUSTIS ENGINEERING
BORINGS 6-MUE, 1-MP, AND 2-MP SAMPLED & CLASSIFIED BY U.S. ARMY CORPS OF ENGINEERS

SEE FIGS. 1 APPENDIX A VOL. II FOR LOCATION OF EUSTIS ENGINEERING SOIL BORINGS.

* 2 NOV 81 LETTER
* 27 OCT 81 LETTER

SOIL LEGEND *

- CH - FAT CLAY
- CL - LEAN CLAY
- ML - SILT
- SC - CLAYEY SAND
- SM - SILTY SAND
- SP - SAND, POORLY GRADED
- WD - WOOD
- PT - PEAT
- FILL - BRICK, SHELLS, ORGANICS, GRAVEL, ASPHALT, ETC.
- SL - SHELLS
- NO SAMPLE

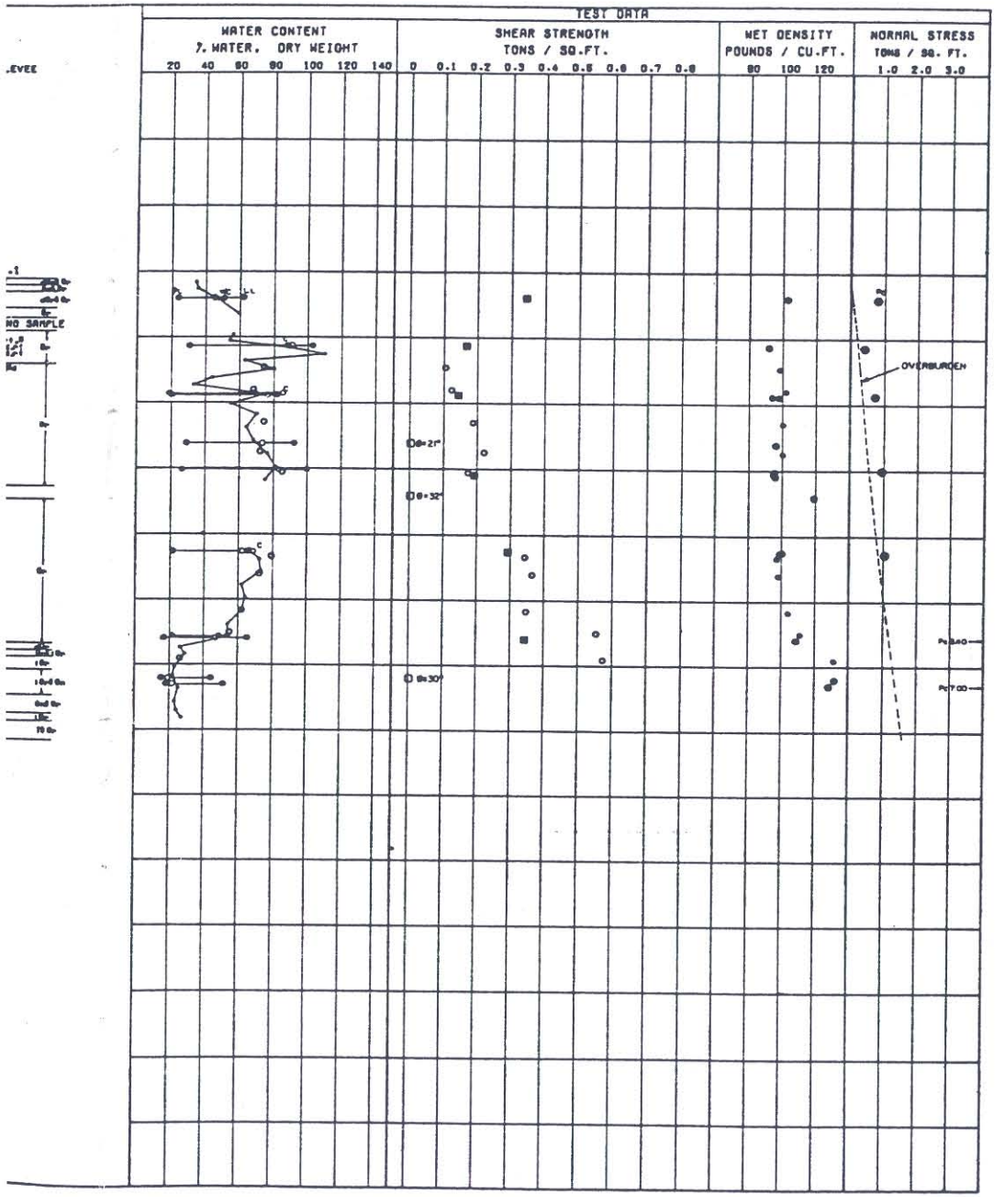
* EUSTIS ENGINEERING COMBINED SOIL SYMBOLS WERE MODIFIED TO ACCOMMODATE THE PREDOMINANT SOIL TYPE

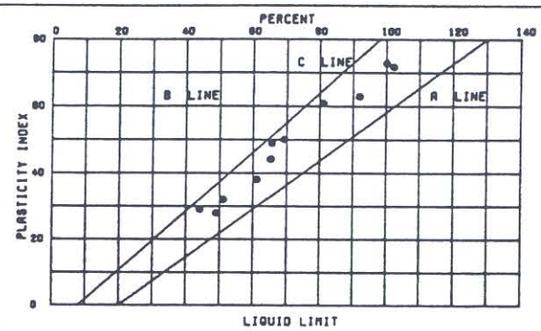
HORIZONTAL SCALE: 1" = 250'
250' 125' 0 250' 500' 750' 1000'
VERTICAL SCALE: 1" = 10'

LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT
DESIGN MEMORANDUM NO. 30 GENERAL DESIGN
ORLEANS PARISH - JEFFERSON PARISH
17 TH. STREET OUTFALL CANAL
(METAIRIE RELIEF)

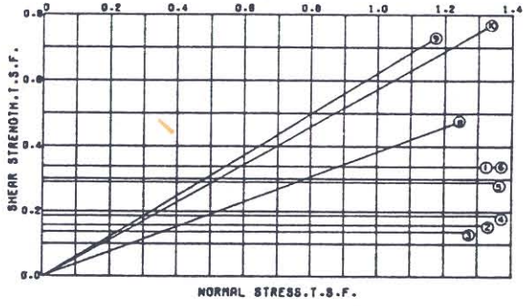
SOIL AND GEOLOGICAL PLATE

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS



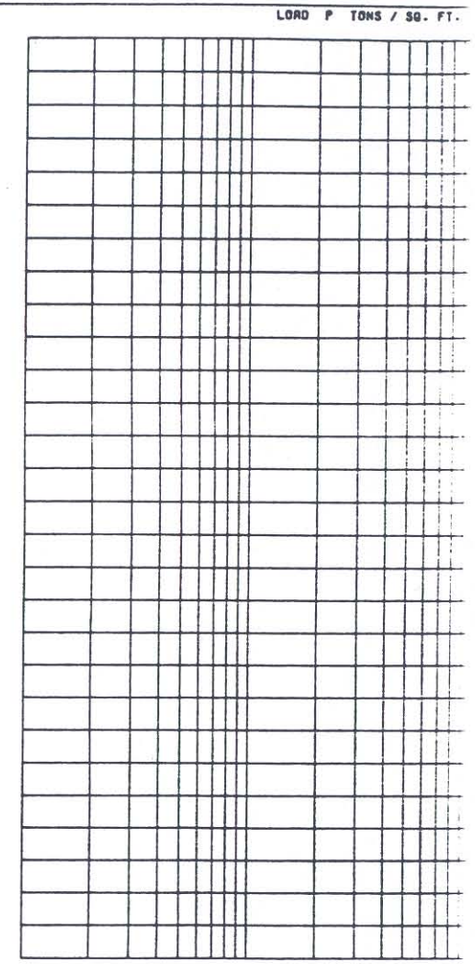


PLASTICITY CHART



SHEAR STRENGTH DATA

ENVELOPE NO.	ENVELOPE EL.	TYPE	STRENGTH Φ	STRENGTH C - TSF	CLASS
1	-3.9	Q	0	0.34	CH
2	-11.2	Q	0	0.16	CH
3	-18.9	Q	0	0.14	CH
4	-31.0	Q	0	0.19	CH
5	-42.7	Q	0	0.29	CH
6	-55.9	Q	0	0.34	CH
7	-62.9	Q	0	1.68	CH
8	-26.3	S	21°	0	CH
9	-34.3	S	32°	0	SM
10	-62.0	S	30°	0	CL



CONSOLIDATION DA

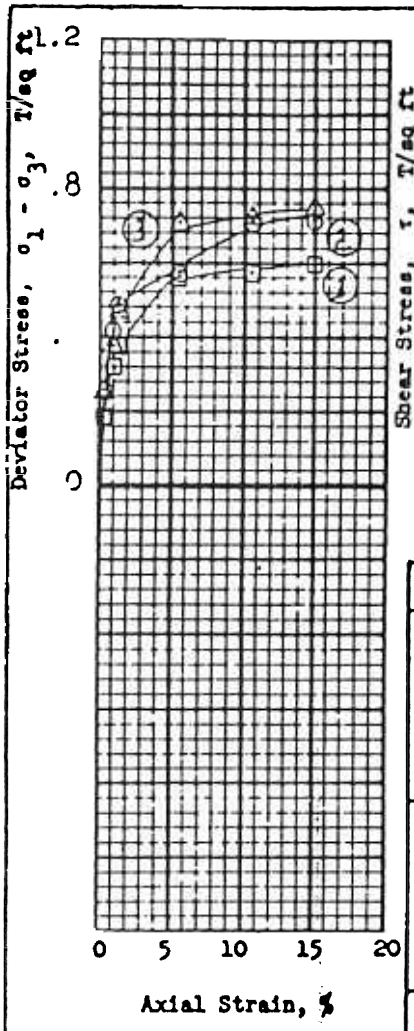
○ - (UC) UNCONFINED COMPRESSION TEST
■ - (Q) UNCONSOLIDATED - UNDRAINED SHEAR TEST
▲ - (R) CONSOLIDATED - UNDRAINED SHEAR TEST
□ - (S) CONSOLIDATED - DRAINED SHEAR TEST

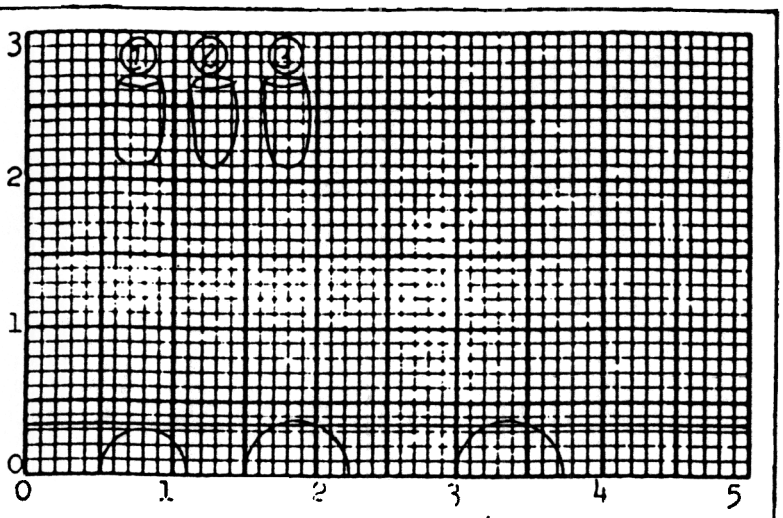
BORINGS WERE TAKEN WITH A 6 INCH DIAMETER STEEL TUBE PISTON TYPE SAMPLER

FOR SOIL BORING LEGEND SEE PLATE A

FOR LOCATION OF BORINGS SEE PLATE 2

LAKE PON
DESIGN MEMOR
ORLEANS
17 TH
UNDISTUF
U S ARMY E
C
DATE MARCH 1960





$\gamma_{sat.} = 106$

Test No.			1	2	3	Avg.
Initial	Water content	w_o	46.4 %	44.8 %	46.3 %	45.8 %
	Void ratio	e_o	1.30	1.23	1.23	
	Saturation	S_o	90.3 %	92.1 %	95.2 %	%
	Dry density, lb/cu ft	γ_d	68.7	70.8	70.7	
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft		σ_3	0.5	1.5	3.0	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.60	0.72	0.74	
Time to failure, min		t_f	76	76	76	
Rate of strain, percent/min			0.197	0.197	0.197	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o	1.39	1.40	1.39	
Initial height, in.		H_o	3.00	3.00	3.00	

Shear Strength Parameters

ϕ = 0 °

tan ϕ = 0

c = 0.34 T/sq ft

Method of saturation _____

☐ Controlled stress

☒ Controlled strain

Type of test Q | Type of specimen UNDISTURBED

Classification PLASTIC CLAY(CH),gray, contains numerous rootlets and large*

LL 61 | PL 23 | PI 38 | | G_s 2.53

F 13

Project LK.PONT.LA.&VIC.-HURR. PROT.'71

ORLEANS PARISH L.F. LEVEE WEST OF IHNC(OUT-

Area FALL CANALS)ALONG 17th ST.CANAL(GDM#2SUPP.

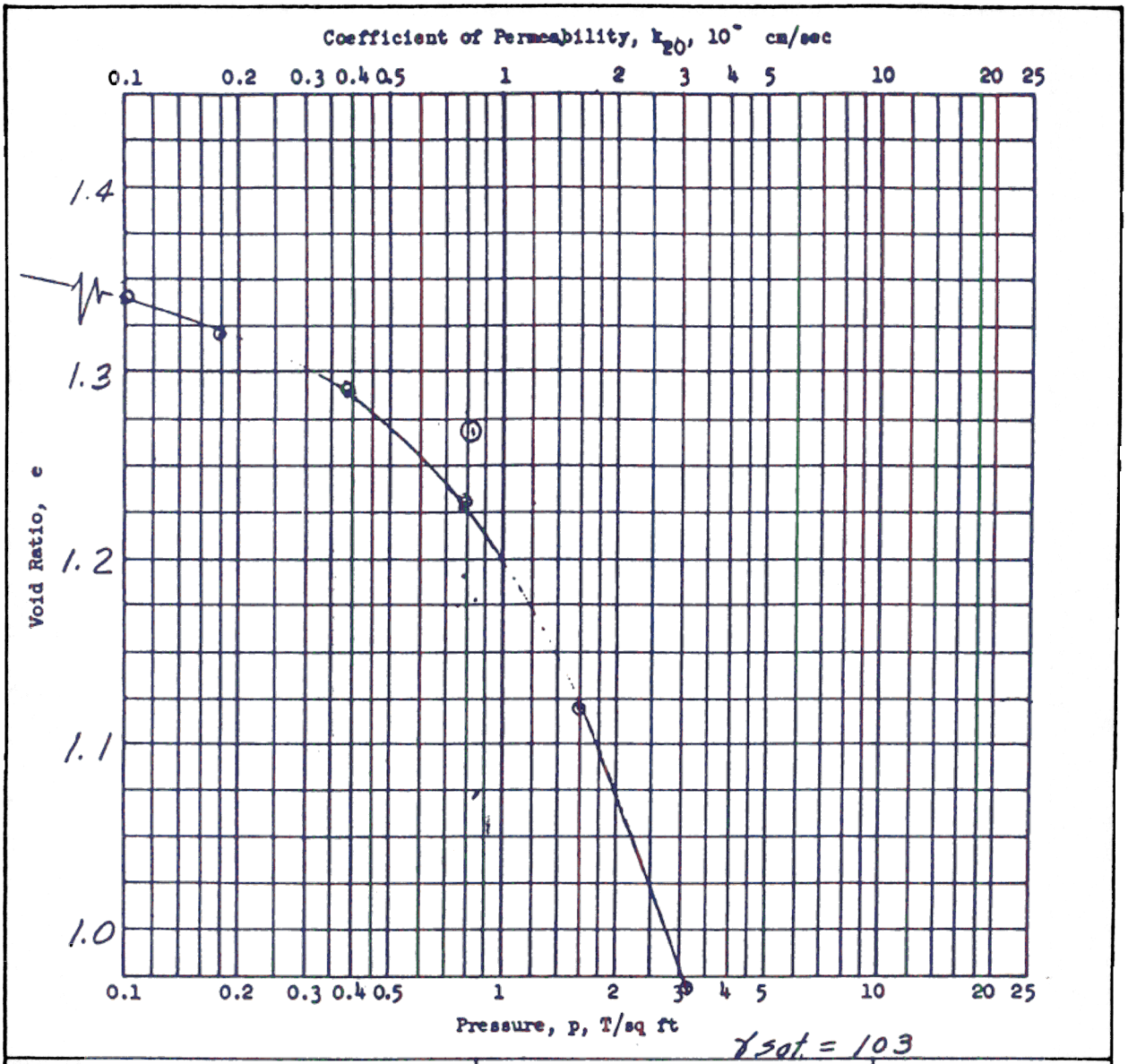
Boring No. 6-MUE | Sample No. 1-D #5

Depth El -3.9 | Date 8 March 1971

TES TRIAXIAL COMPRESSION TEST REPORT

ENG FORM 2089 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE

...T.3 TEST STATION

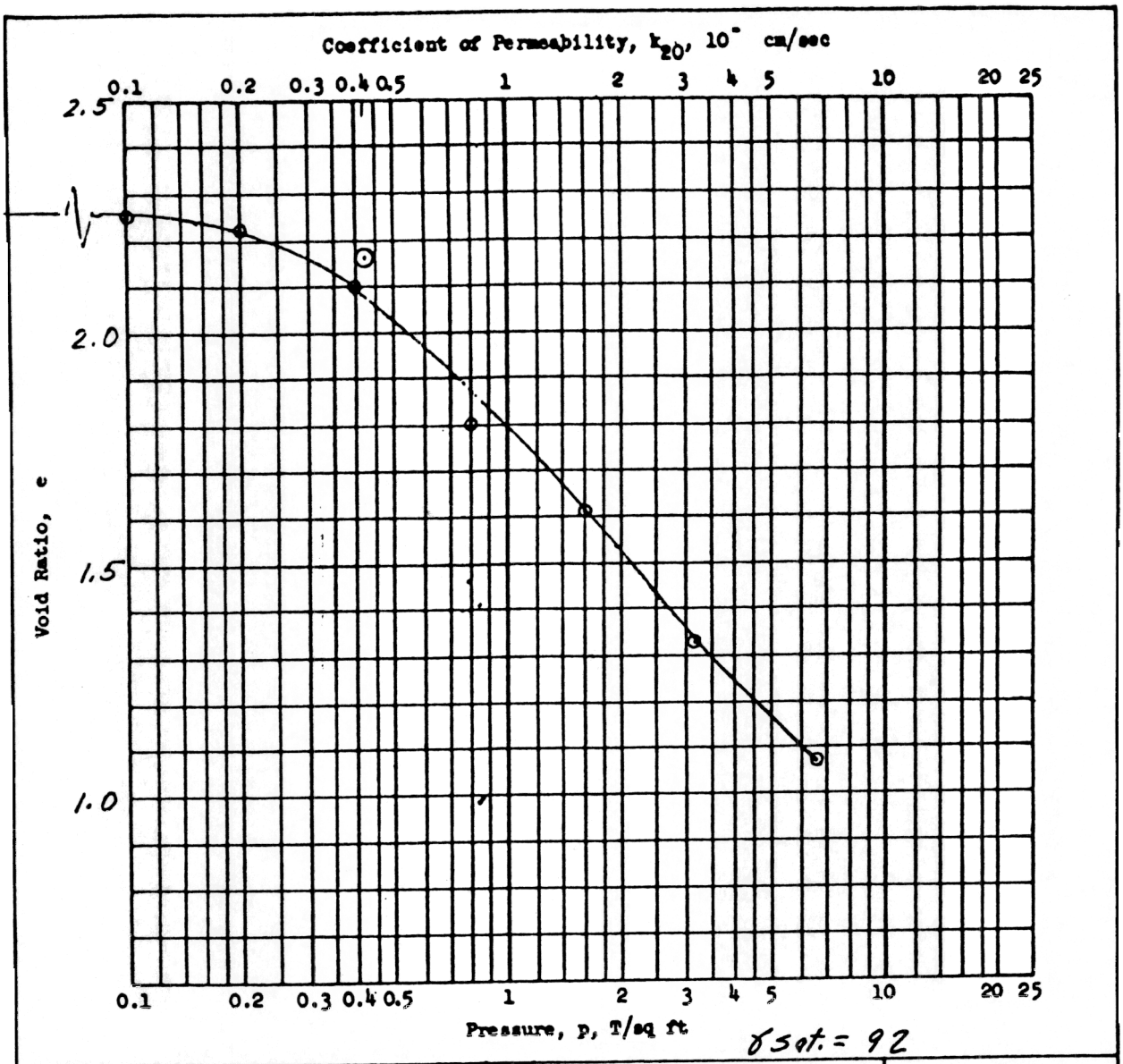


Type of Specimen UNDISTURBED		Before Test		After Test	
Diam 4.25 in.	Ht 1.166 in.	Water Content, w_o	51.3 %	w_f	%
Overburden Pressure, p_o T/sq ft		Void Ratio, e_o	1.36	e_f	
Preconsol. Pressure, p_c .81 T/sq ft		Saturation, S_o	95.5 %	S_f	%
Compression Index, C_c .1884		Dry Density, γ_d	66.9 lb/ft^3		
Classification PLASTIC CLAY(CH), dark*		k_{20} at e_o =	x 10^{-} cm/sec		
LL -	G_s 2.53 From C	Project LK.PONT.,LA.&VIC.-HURR. PORT.'71			
PL -	D_{10}	ORLEANS PAR.L.F.LEV.WEST OF IHNC(OUTFALL			
Remarks See attached pressure		Area CANALS)ALONG 17th ST.CANAL(GDM#2,SUPP.#5)			
versus void ratio curve		Boring No. 6-MUE	Sample No. 1-D		
*brown		Depth El -3.9	Date 16 March 1971		
		CONSOLIDATION TEST REPORT			

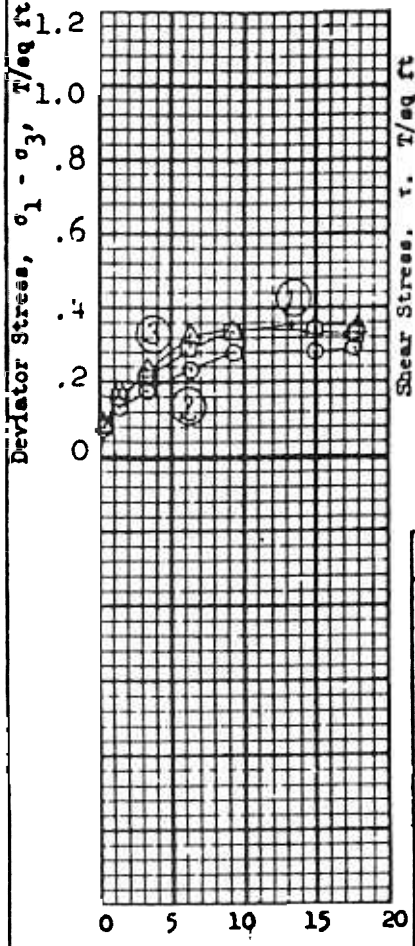
ENG FORM
M Y 71

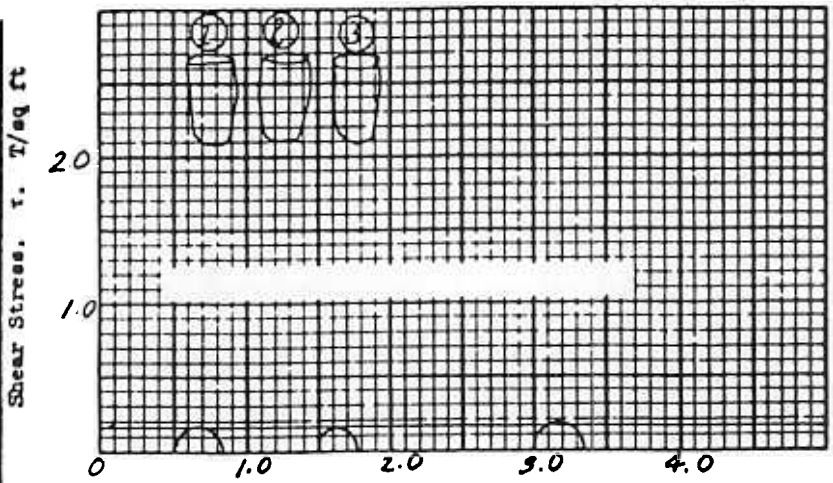
TRANSLUCENT
F14

[illegible] SOILS TES SECTION



Type of Specimen UNDISTURBED		Before Test		After Test	
Diam 4.25 in.	Ht 1.162 in.	Water Content, w_o	87.9 %	w_f	%
Overburden Pressure, Po T/sq ft		Void Ratio, e_o	2.33	e_f	
Preconsol. Pressure, p_c .42 T/sq ft		Saturation, S_o	96.6 %	S_f	%
Compression Index, C_c .3751		Dry Density, γ_d	48.0 lb/ft^3		
Classification PLASTIC CLAY(CH),*		k_{20} at e_o =	$\times 10^{-}$ cm/sec		
LL -	G_s 2.56 From Q	Project LK.PONT.,LA.& VIC.-HURR. PROT. '71			
PL -	D_{10}	ORLEANS PARISH LAKEFRONT LEVEE,WEST OF IHNC			
Remarks See attached plot for		(OUTFALL CANALS)ALONG 17th.ST.(GDM#2;SUPP.#5)			
pressure vs void ratio curve		Boring No. 6-MUE		Sample No. 3-C	
*brown, contains 1/16" to 3/8"		Depth El -11.2		Date 16 March,1971	
dia. roots		JDB CONSOLIDATION TEST REPORT			





$\gamma_{sat} = 92$

Test No.			1	2	3	Avg.
Initial	Water content	w_o	89.0 %	91.0 %	89.7 %	89.9 %
	Void ratio	e_o	2.30	2.30	2.32	
	Saturation	S_o	99.1 %	100+ %	99.0 %	%
	Dry density, lb/cu ft	γ_d	48.4	48.5	48.1	
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft		σ_3	0.5	1.5	3.0	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.34	0.28	0.35	
Time to failure, min		t_f	55	55	88	
Rate of strain, percent/min			0.170	0.170	0.170	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o	1.39	1.39	1.40	
Initial height, in.		H_o	3.00	3.00	3.00	

Shear Strength Parameters

ϕ = 0 °

$\tan \phi$ = 0

c = 0.16 T/sq ft

Method of saturation

☐ Controlled stress

☒ Controlled strain

Type of test Q | Type of specimen UNDISTURBED

Classification PLASTIC CLAY(CH), gray, contains rootlets and decayed large roots

LL 102 | PL 30 | PI 72 | | G_s 2.56

Remarks

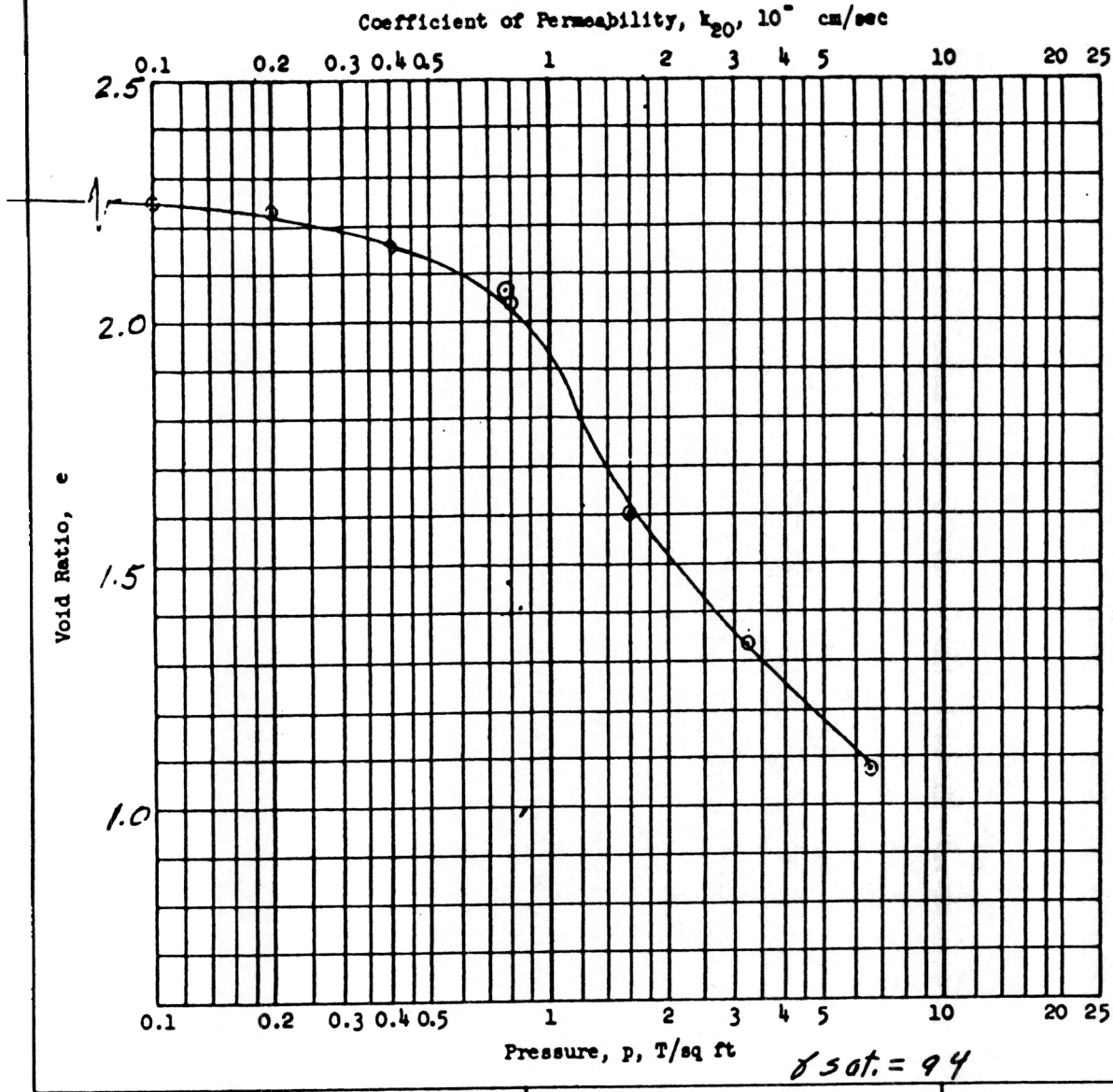
Project LK. PONT. LA. & VIC. -HURR. PROT. '71

Area ORLEANS PARISH L.F. LEVEE WEST OF IHNC, (OUT-FALL CANALS) ALONG 17th ST. CANAL (GDM#2, SUPP. #5)

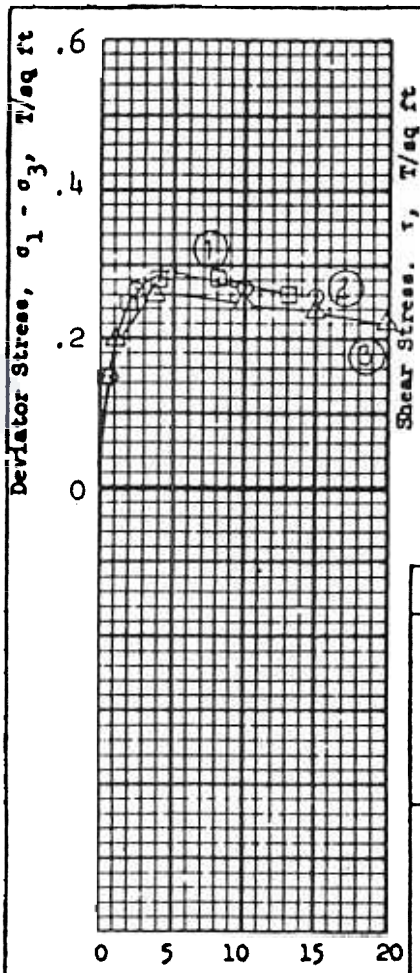
Boring No. 6-MUE | Sample No. 3-C

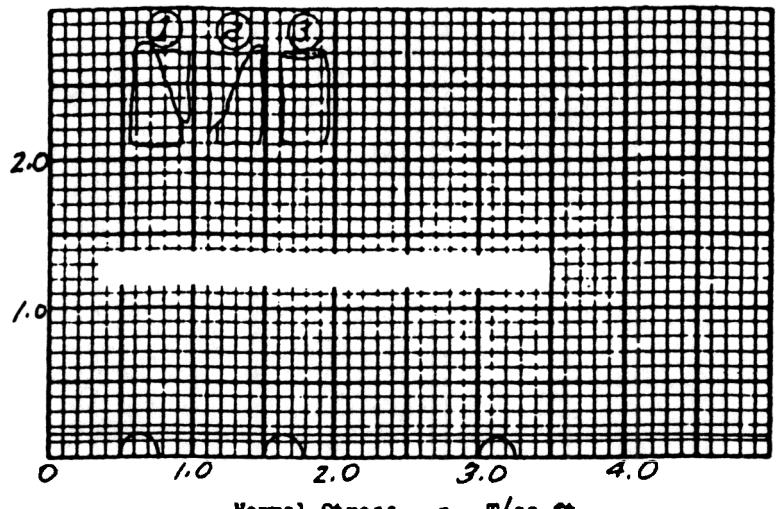
Depth El -11.2 | Date 8 March 1971

TES TRIAXIAL COMPRESSION TEST REPORT



Type of Specimen UNDISTURBED		Before Test		After Test	
Diam 4.25 in.	Ht 1.152 in.	Water Content, w_o	85.0 %	w_f	%
Overburden Pressure, p_o T/sq ft		Void Ratio, e_o	2.28	e_f	
Preconsol. Pressure, p_c .78 T/sq ft		Saturation, S_o	99.8 %	S_f	%
Compression Index, C_c .7008		Dry Density, γ_d	51.0 lb/ft^3		
Classification PLASTIC CLAY(CH),*		k_{20} at e_o =	x 10^{-} cm/sec		
LL 69	G_s 2.68	Project LK.PONT.,LA.& VIC.-HURR. PROT.-1971			
PL 19	D_{10}	ORLEANS PARISH LAKEFRONT LEVEE WEST OF IHNC			
* Remarks gray		(OUTFALL CANALS) ALONG 17th.ST.(GDM#2;SUPP.#5)			
See attached plot for pressure		Boring No. 6-MUE		Sample No. 5-B	
vs void ratio curve		Depth El -18.5		Date 17 March,1971	
		JDB CONSOLIDATION TEST REPORT			





$\gamma_{sat.} = 98$

Test No.			1	2	3	Avg.
Initial	Water content	w_o	76.8 %	76.1 %	76.5 %	76.5 %
	Void ratio	e_o	2.09	2.03	2.08	
	Saturation	S_o	100+ %	100+ %	100+ %	%
	Dry density, lb/cu ft	γ_d	55.1	56.3	55.3	
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft		σ_3	0.5	1.5	3.0	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.28	0.29	0.26	
Time to failure, min		t_f	7	25	18	
Rate of strain, percent/min			0.542	0.192	0.196	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o	1.41	1.40	1.40	
Initial height, in.		H_o	3.00	3.00	3.00	

Shear Strength Parameters

ϕ = 0 °

tan ϕ = 0

c = 0.14 T/sq ft

Method of saturation

☐ Controlled stress

☒ Controlled strain

Type of test Q | Type of specimen UNDISTURBED

Classification PLASTIC CLAY(CH), gray, contains silt seams

LL 81 | PL 20 | PI 61 | | G_s 2.73

Remarks

F 17

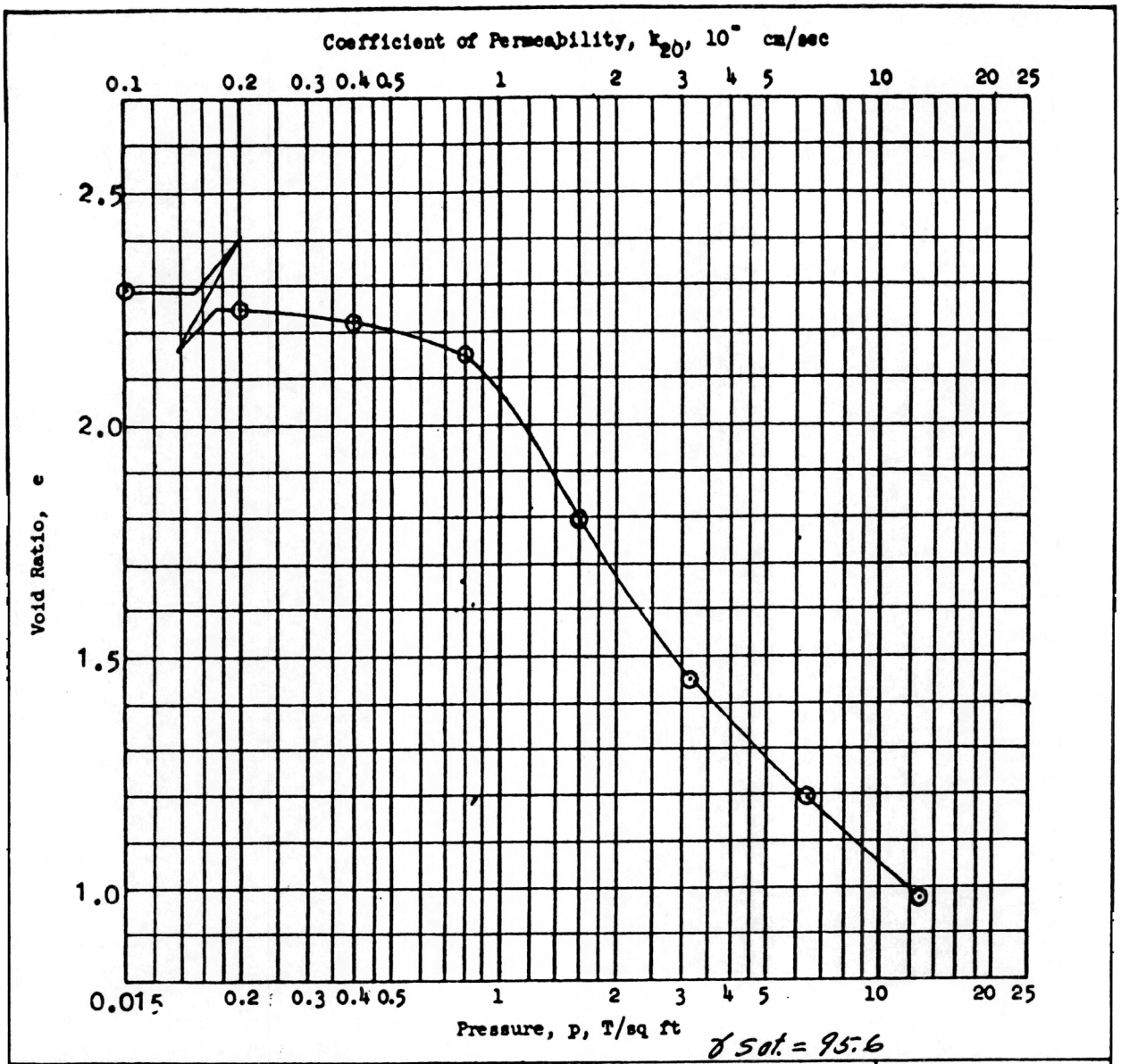
Project LK. PONT. LA. & VIC. - HURR. PROT. '71 (OUT-FALL CANALS) ALONG 17th ST. CANAL (GDM #2, SUPP. #6)

Area ORLEANS PARISH L.F. LEVEE WEST OF IHNC

Boring No. 6-MUE | Sample No. 5-C

Depth El -18.9 | Date 9 March 1971

OHR TRIAXIAL COMPRESSION TEST REPORT



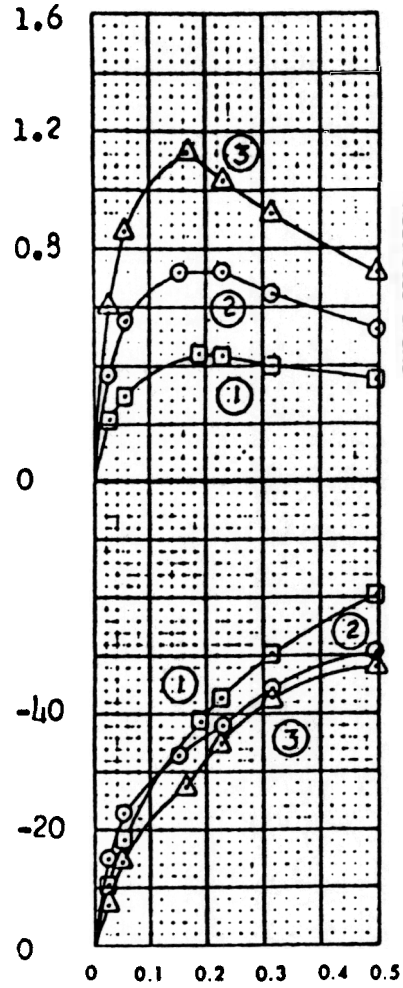
γ sat. = 95.6

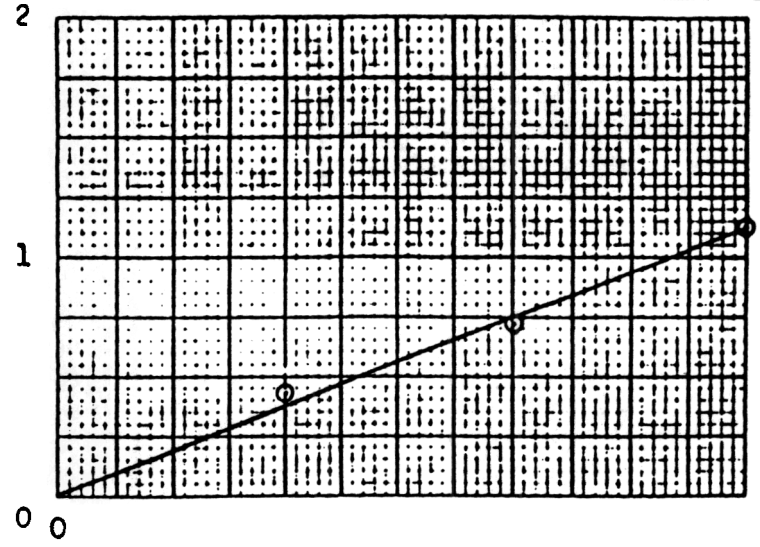
Type of Specimen UNDISTURBED		Before Test		After Test	
Diam 4.25 in.	Ht 1.160 in.	Water Content, w_o	83.2 %	w_f	%
Overburden Pressure, Po T/sq ft		Void Ratio, e_o	2.28	e_f	
Preconsol. Pressure, Pc .94 T/sq ft		Saturation, S_o	100 %	S_f	%
Compression Index, C_c .6089		Dry Density, γ_d	52.2 lb/ft^3		
Classification PLASTIC CLAY(CH)*		k_{20} at e_o =	x 10^{-} cm/sec		
LL 100	G_s 2.74	Project LK.PONT.,LA.& VIC.-HURR. PROT. '71			
PL 27	D_{10}	ORLEANS PARISH LAKEFRONT LEVEE WEST OF IHNC			
Remarks * gray		(OUTFALL CANALS) ALONG 17th.ST.(GDM #2;SUPP.#			
		Boring No. 6-MUE	Sample No. 8-B		
		~~Depth~~ El -30.1	Date 17 March,1971		
		UDB CONSOLIDATION TEST REPORT			

ENG FORM 190 [illegible]

F 9

[illegible] SOILS TEST SET





TEST NO.			1	2	3	
INITIAL	WATER CONTENT	w_o	70.8 %	74.7 %	73.7 %	
	VOID RATIO	e_o	2.02	2.08	2.08	
	SATURATION	S_o	95.4 %	98.0 %	96.7 %	%
	DRY DENSITY, LB/CU FT	γ_d	56.5	55.4	55.4	
VOID RATIO AFTER CONSOLIDATION		e_c				
TIME FOR 50 PERCENT CONSOLIDATION, MIN		t_{50}	4	11	9	
FINAL	WATER CONTENT	w_f	57.4 %	49.4 %	44.6 %	%
	VOID RATIO	e_f				
	SATURATION	S_f	%	%	%	%
NORMAL STRESS, T/SQ FT		σ	1.0	2.0	3.0	
MAXIMUM SHEAR STRESS, T/SQ FT		τ_{max}	0.44	0.72	1.13	
ACTUAL TIME TO FAILURE, MIN		t_f	1110	900	960	
RATE OF STRAIN, IN./MIN			.00018	.00018	.00018	
ULTIMATE SHEAR STRESS, T/SQ FT		τ_{ult}				

SHEAR STRENGTH PARAMETERS

$\phi' = 21^0$

TAN $\phi' = \frac{0.383}{0}$

$c' =$ .T/SQ FT

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF SPECIMEN UNDISTURBED 3.00 IN. SQUARE 1= 0.550 2&3= 0.625 IN. THICK

CLASSIFICATION PLASTIC CLAY(CH),dark gray, contains a trace of organic matter,*

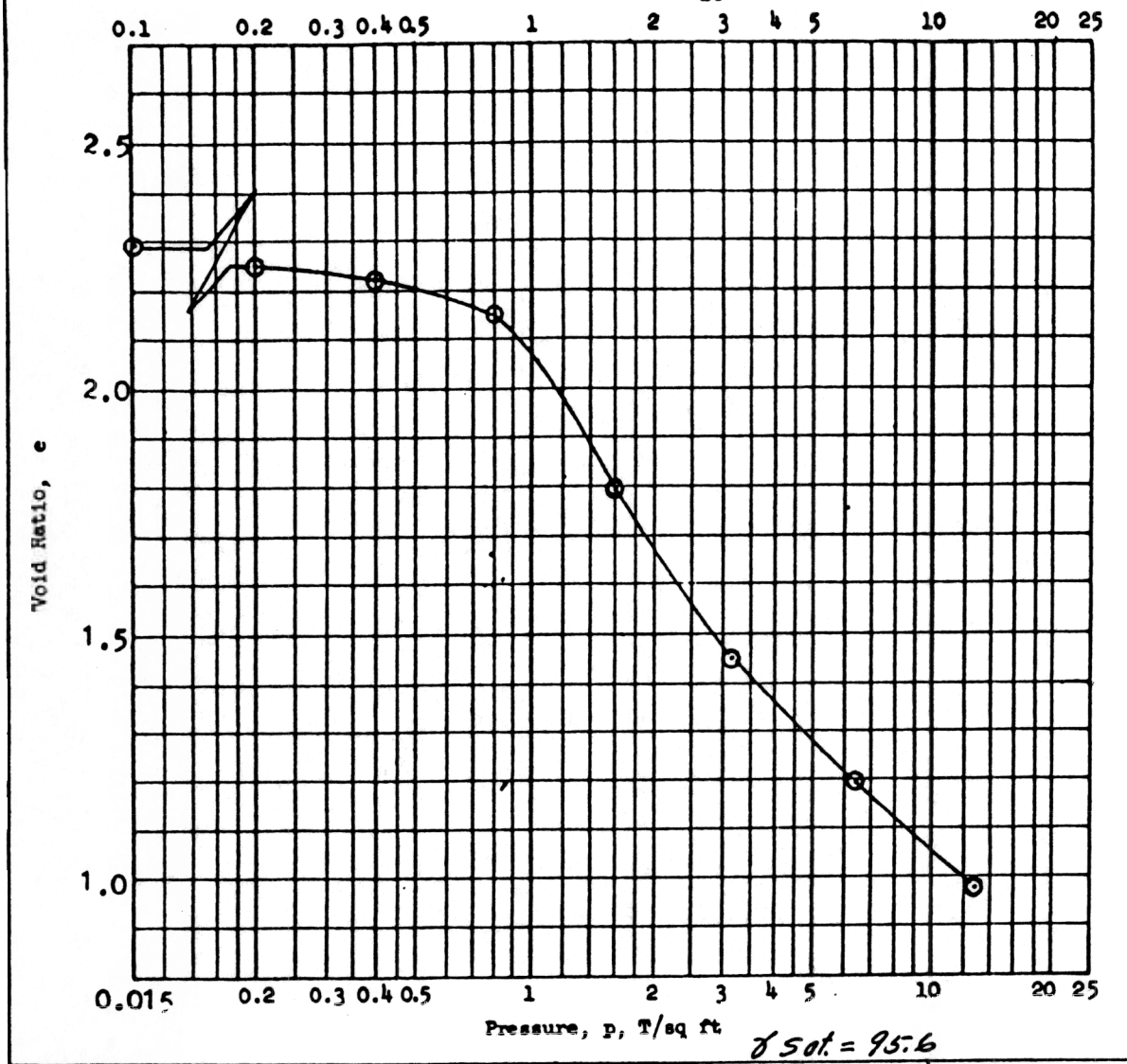
LL 92	PL 29	PI 63		G. 2.73

REMARKS *slickensided

PROJECT LK.PONT.LA.,&VIC.-HURR.PROT.- 1971

ORLEANS PARISH LK.FT.LEVEE,WEST OF IHNC(OUT-

AREA FALL CANALS)ALONG 17TH ST CANAL(GDM#2SUPP#1)



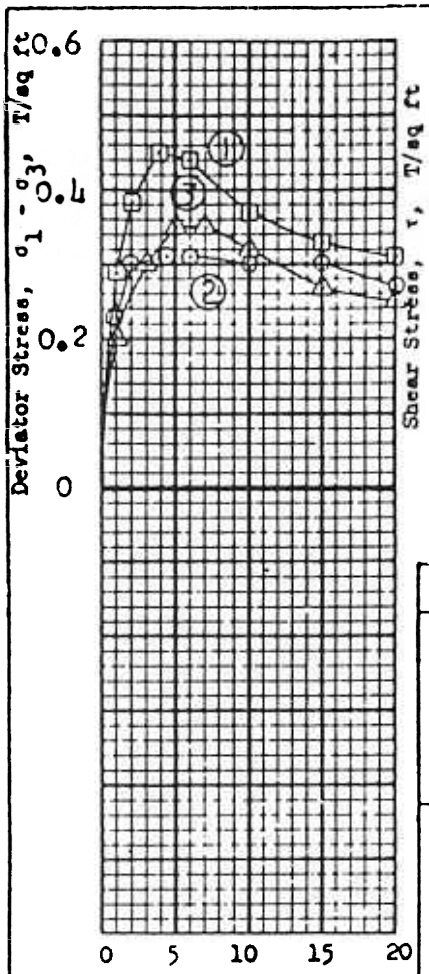
γ Sat. = 95.6

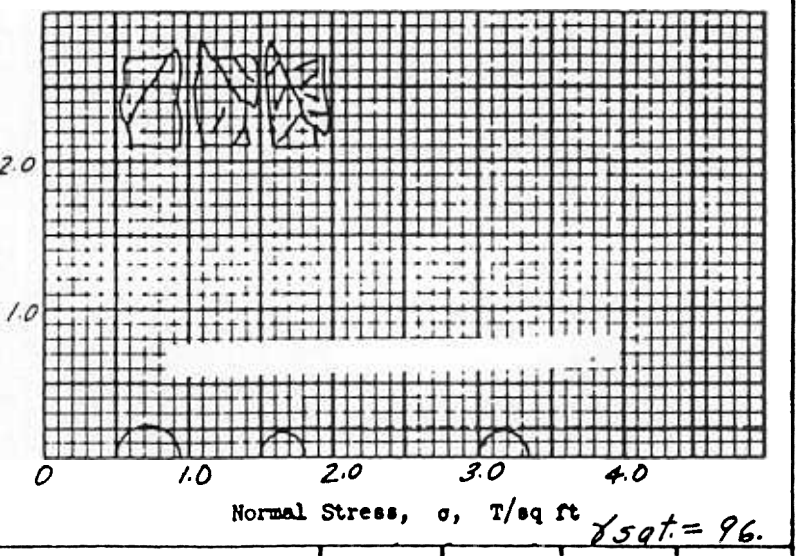
Type of Specimen UNDISTURBED		Before Test		After Test	
Diam 4.25 in.	Ht 1.160 in.	Water Content, w_o	83.2 %	w_f	%
Overburden Pressure, p_o	T/sq ft	Void Ratio, e_o	2.28	e_f	
Preconsol. Pressure, p_c .94	T/sq ft	Saturation, S_o	100 %	S_f	%
Compression Index, C_c .6089		Dry Density, γ_d	52.2 lb/ft^3		
Classification PLASTIC CLAY(CH)*		k_{20} at e_o =	x 10^{-} cm/sec		
LL 100	G_s 2.74	Project LK.PONT.,LA.& VIC.-HURR. PROT. '71			
PL 27	D_{10}	ORLEANS PARISH LAKEFRONT LEVEE WEST OF IHNC			
Remarks * gray		(OUTFALL CANALS) ALONG 17th.ST.(GDM #2;SUPP.#			
		Boring No. 6-MUE		Sample No. 8-B	
		~~Depth~~ El -30.1		Date 17 March,1971	
		UDB CONSOLIDATION TEST REPORT			

ENG FORM 2090 TIONS ARE OBSOL (TRANSLUCENT)

F19

WATERWAYS SOILS TEST SECT





$\gamma_{sat.} = 96.$

Test No.			1	2	3	Avg.
Initial	Water content	w_o	79.3 %	80.5 %	77.9 %	79.2 %
	Void ratio	e_o	2.20	2.21	2.16	
	Saturation	S_o	98.8 %	99.8 %	98.8 %	%
	Dry density, lb/cu ft	γ_d	53.4	53.3	54.2	
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft		σ_3	0.5	1.5	3.0	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.45	0.31	0.35	
Time to failure, min		t_f	24	28	27	
Rate of strain, percent/min			0.155	0.160	0.185	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o	1.41	1.40	1.40	
Initial height, in.		H_o	3.00	3.00	3.00	

Shear Strength Parameters

ϕ = 0 °

tan ϕ = 0

c = 0.19 T/sq ft

Method of saturation

☐ Controlled stress

☒ Controlled strain

Type of test Q | Type of specimen UNDISTURBED

Classification PLASTIC CLAY(CH), gray

LL - | PL - | PI - | | G_s 2.74 From 8-B Co.

Remarks

Project LK. PONT. LA., & VIC. - HURR. PROT. - 1971

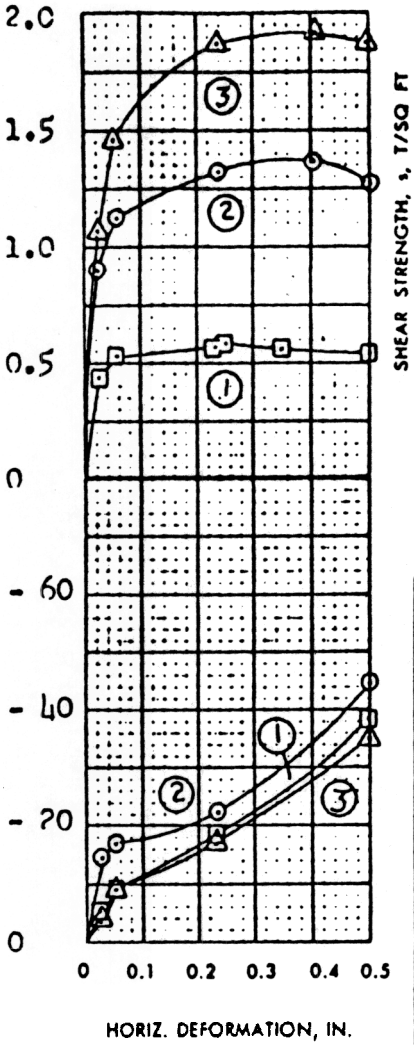
ORLEANS PARISH LK. FT. LEVEE, WEST OF IHNC, (OUT-

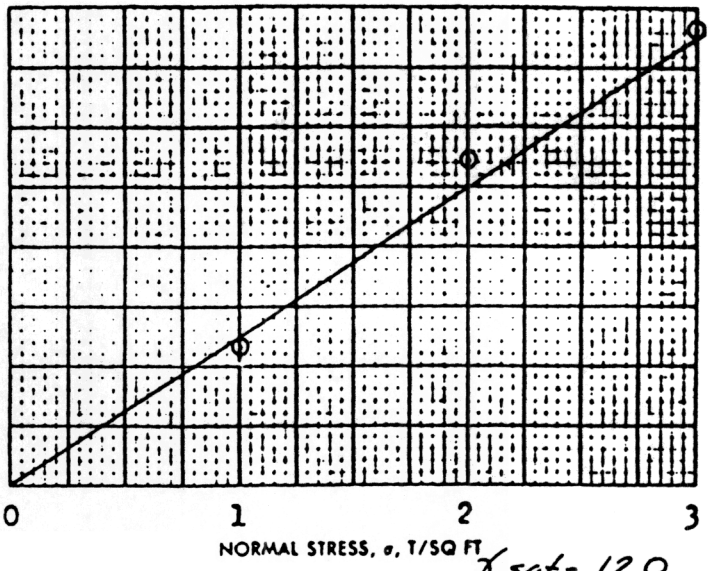
Area FALL CANALS) ALONG 17th ST. CANAL (GDM#2, SUPP.#

Boring No. 6-MUE | Sample No. 8-C

~~Depth~~ El - 31.0 | Date 9 March, 1971

FAM TRIAXIAL COMPRESSION TEST REPORT





$\gamma_{sat.} = 120$

TEST NO.			1	2	3	Avg.
INITIAL	WATER CONTENT	w_o	29.0 %	30.1 %	31.4 %	30.2 %
	VOID RATIO	e_o	0.817	0.819	0.820	
	SATURATION	S_o	95.1 %	98.5 %	100+ %	%
	DRY DENSITY, LB/CU FT	γ_d	92.1	92.0	91.9	
VOID RATIO AFTER CONSOLIDATION		e_c				
TIME FOR 50 PERCENT CONSOLIDATION, MIN		t_{50}				
FINAL	WATER CONTENT	w_f	29.4 %	27.4 %	26.6 %	%
	VOID RATIO	e_f				
	SATURATION	S_f	%	%	%	%
NORMAL STRESS, T/SQ FT		σ	1.0	2.0	3.0	
MAXIMUM SHEAR STRESS, T/SQ FT		τ_{max}	0.58	1.36	1.92	
ACTUAL TIME TO FAILURE, MIN		t_f	1380	2190	2190	
RATE OF STRAIN, IN./MIN			.00018	.00018	.00018	
ULTIMATE SHEAR STRESS, T/SQ FT		τ_{ult}				

SHEAR STRENGTH PARAMETERS

$\phi' = \frac{32^0}{}$

TAN $\phi' = \frac{0.625}{}$

$c' = \frac{0}{}$ T/SQ FT

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF SPECIMEN UNDISTURBED — 3.00 IN. SQUARE — 0.550 IN. THICK

CLASSIFICATION SILTY SAND(SM),gray, contains CLAY(CH) lenses and shell fragments

LL	PL	PI		G_s
-	-	-		2.68

REMARKS

F21

PROJECT LK. PONT. LA., &VIC.-HURR. PROT.-1971

ORLEANS PARISH LK.FRNT. LEVEE, WEST OF IHNC

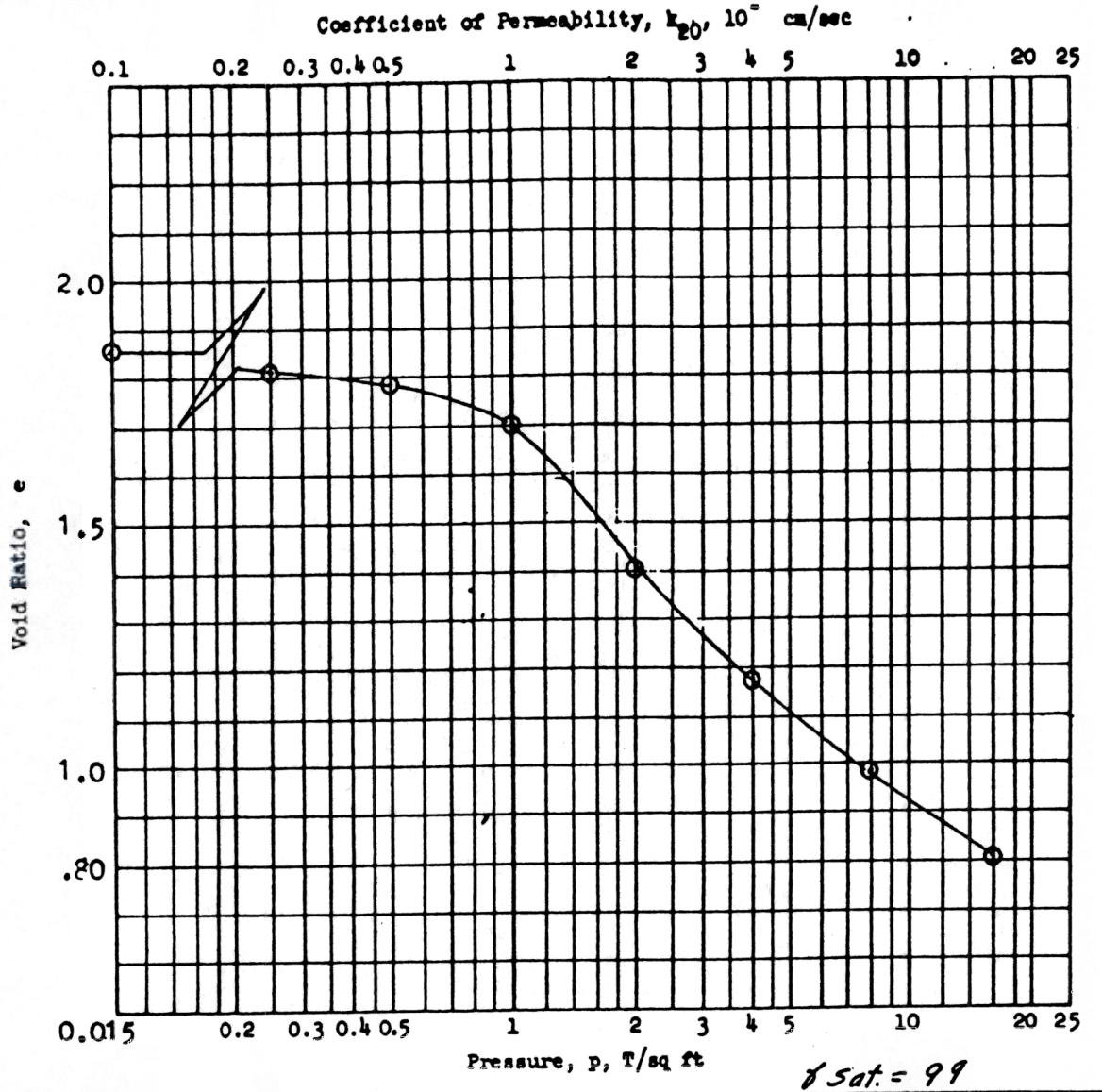
AREA (OUTFALL CANALS)ALONG 17th ST CANAL

BORING NO. 6-MUE — SAMPLE NO. 9-H

~~DEPTH~~ EL -34.3 — DATE 22 March 1971

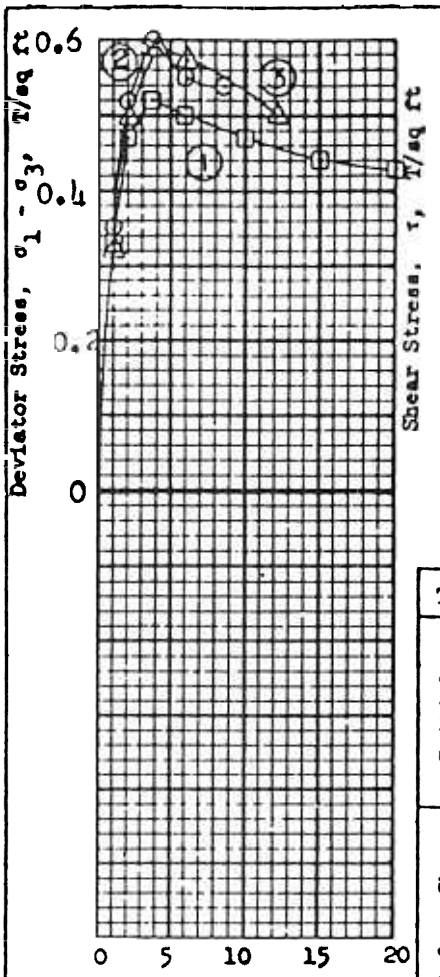
BWG

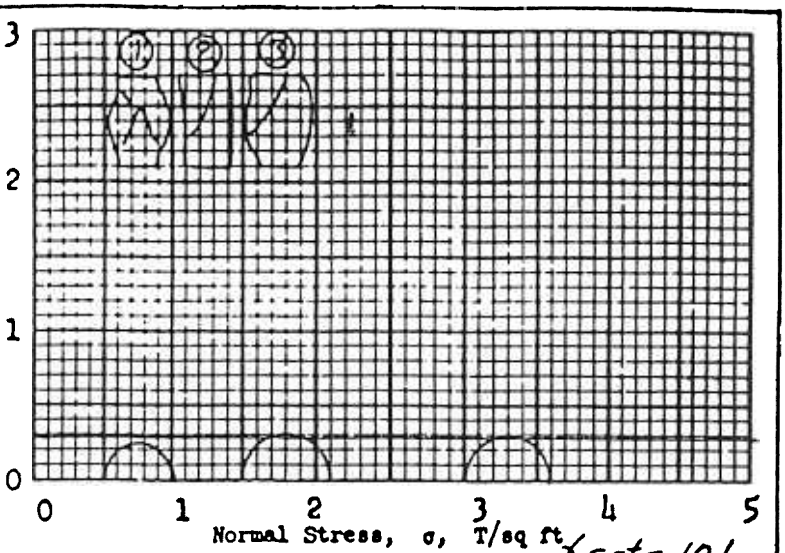
DIRECT SHEAR TEST REPORT



γ sat. = 99

Type of Specimen UNDISTURBED		Before Test		After Test	
Diam 4.25 in.	Ht 1.162 in.	Water Content, w_o	68.9 %	w_f	%
Overburden Pressure, p_o T/sq ft		Void Ratio, e_o	1.86	e_f	
Preconsol. Pressure, p_c 1.04 T/sq ft		Saturation, S_o	98.6 %	S_f	%
Compression Index, C_c .4535		Dry Density, γ_d	58.2 lb/ft^3		
Classification PLASTIC CLAY(CH),*		k_{20} at e_o =	x 10^{-} cm/sec		
LL -	G_s 2.67 From Q	Project. LK. FCNT., LA. & VIC.-HURR. PROT.-1971			
PL -	D_{10}	ORLEANS PARISH LAKFFRONT LEVEE WEST OF IHNC			
Remarks * gray, contains 1" dia.		(OUTFALL CANALS) ALONG 17th. ST. (GDM#2, SUPP.#5)			
sand pockets		Boring No. 6-MUE		Sample No. 11-C	
		~~Depth~~ El -42.7		Date 17 March, 1971	
		JDB CONSOLIDATION TEST REPORT			





$\gamma_{sat.} = 101$

Test No.			1	2	3	Avg.
Initial	Water content	w_o	65.0 %	61.9 %	59.3 %	62.1 %
	Void ratio	e_o	1.76	1.69	1.60	
	Saturation	S_o	98.6 %	97.8 %	99.0 %	%
	Dry density, lb/cu ft	γ_d	60.4	61.9	64.2	
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft		σ_3	0.5	1.5	3.0	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.52	0.60	0.59	
Time to failure, min		t_f	15	23	33	
Rate of strain, percent/min			0.253	0.164	0.120	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o	1.40	1.40	1.41	
Initial height, in.		H_o	3.00	3.00	3.00	

Shear Strength Parameters

ϕ = 0 °

tan ϕ = 0

c = 0.29 T/sq ft

Method of saturation

☐ Controlled stress

☒ Controlled strain

Type of test Q | Type of specimen UNDISTURBED

Classification PLASTIC CLAY(CH),gray, contains 1/4" silty sand seam

LL 65 | PL 21 | PI 44 | | G_s 2.67

Remarks Specimens trimmed from 2nd level-top portion of sample contained 1/2" seam of sand(SP)

F22

Project LK.PONT.LA.,&VIC.-HURR.PROT.-1971

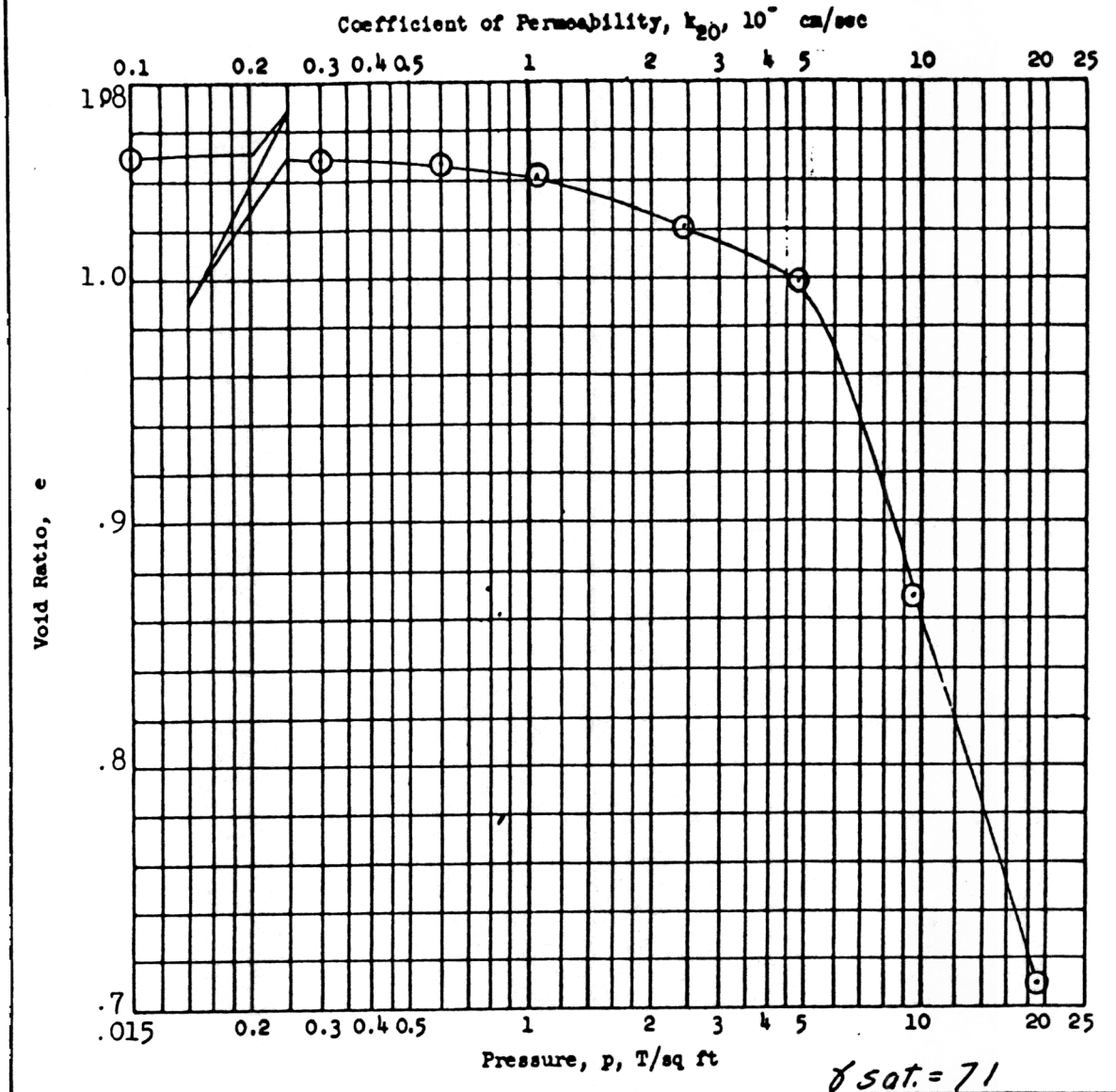
ORLEANS PARISH LK.FT.LEVEE,WEST OF IHNC,(OUT&

Area FALL CANALS)ALONG 17TH.ST. CANAL(GDM#2SUP

Boring No. 6-MUE | Sample No. 11-C

~~Depth~~ El -42.7 | Date 10 March 1971

JMS TRIAXIAL COMPRESSION TEST REPORT

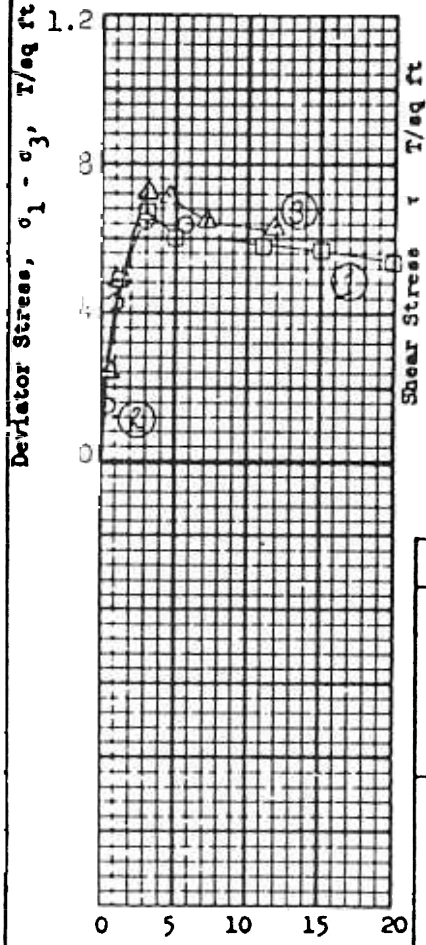


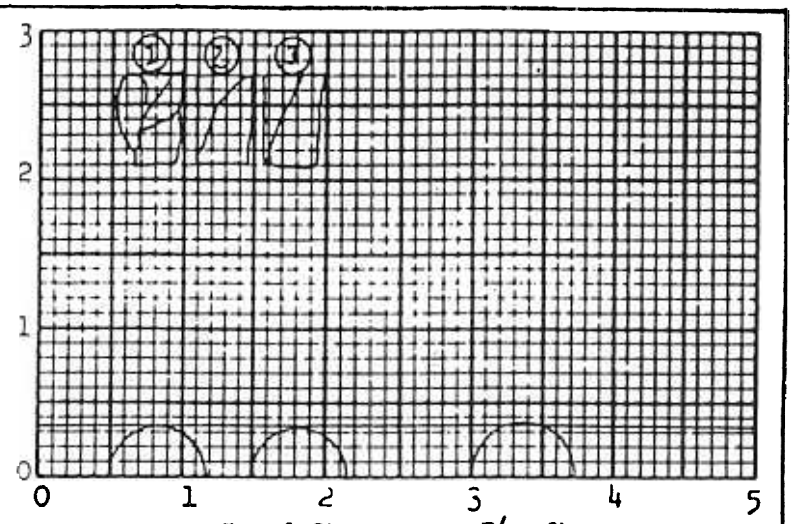
γ sat. = 71

Type of Specimen Undisturbed		Before Test		After Test	
Diam 4.25 in.	Ht 1.165 in.	Water Content, w_o	54.5 %	w_f	%
Overburden Pressure, Po T/sq ft		Void Ratio, e_o	1.53	e_f	
Preconsol. Pressure, p_c 5.40 T/sq ft		Saturation, S_o	98.2 %	S_f	%
Compression Index, C_c .2217		Dry Density, γ_d	68.0 lb/ft^3		
Classification LEAN CLAY(CL),gray		k_{20} at e_o =	x 10^{-} cm/sec		
LL 49	G_s 2.76	Project LK.PONT.,LA.&VIC.-HURR. PROT.'71			
PL 21	D_{10}	ORLEANS PAR. L.F. LEV.WEST OF IHNC(OUTFALL			
Remarks		Area CANALS)ALONG 17th ST.CANAL(GDM#2,SUPP.#5)			
		Boring No. 6-MUE		Sample No. 14-C	
		Depth El -55.5		Date 15 March 1971	

CONSOLIDATION TEST REPORT

ENG FORM 2090 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) 0 3424





$\gamma_{sat.} = 109$

Test No.			1	2	3	Avg.
Initial	Water content	w_o	48.6 %	45.9 %	46.3 %	46.9 %
	Void ratio	e_o	1.34	1.26	1.28	
	Saturation	S_o	98.3 %	98.7 %	98.0 %	%
	Dry density, lb/cu ft	γ_d	72.2	74.8	74.3	
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft		σ_3	0.5	1.5	3.0	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	0.67	0.65	0.73	
Time to failure, min		t_f	16	30	27	
Rate of strain, percent/min			0.180	0.100	0.111	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o	1.41	1.41	1.41	
Initial height, in.		H_o	3.00	3.00	3.00	

Shear Strength Parameters

ϕ = 0 °

tan ϕ = 0

c = 0.34 T/sq ft

Method of saturation

☐ Controlled stress

☒ Controlled strain

Type of test Q | Type of specimen UNDISTURBED

Classification PLASTIC CLAY(CH), gray

LL 65 | PL 16 | PI 49 | | G_s 2.71

Remarks

Project LK. PONT. LA. & VIC.-HURR. PROT-'71

ORLEANS PARISH L.F. LEVEE WEST OF IHNC(OUT-

Area FALL CANALS) ALONG 17th ST. (GDM#2, SUPP. #5

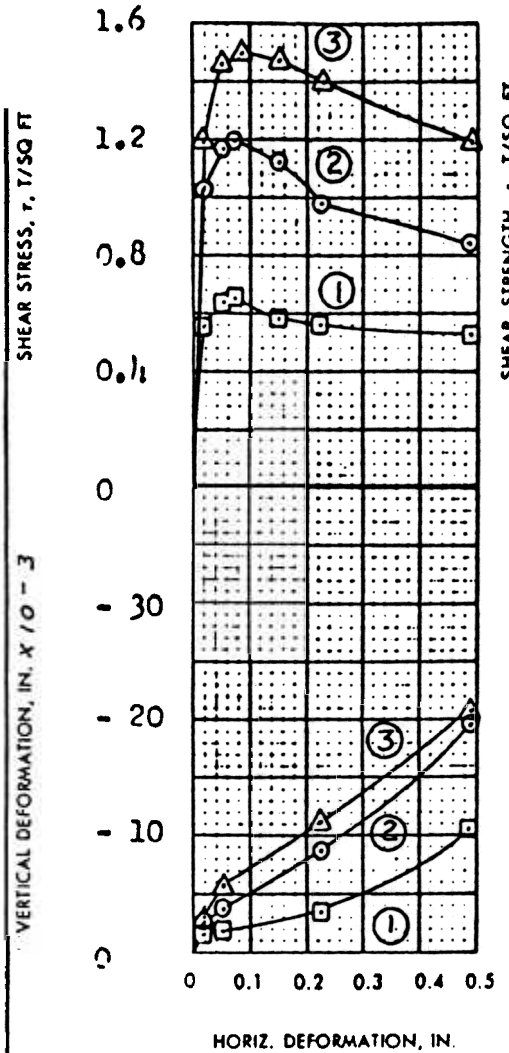
Boring No. 6-MUE | Sample No. 14-D

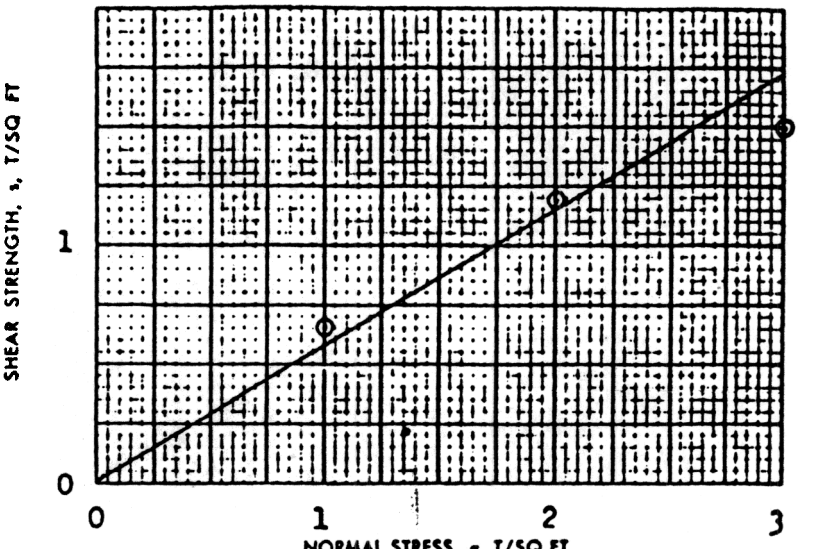
Depth El -55.9 | Date 9 March 1971

JMS TRIAXIAL COMPRESSION TEST REPORT

F25

ENG FORM 2089 (EM 1110-2-1902) PREVIOUS EDITIONS ARE OBSOLETE





$\delta_{sat.} = 132$

TEST NO.			1	2	3	Avg.
INITIAL	WATER CONTENT	w_o	19.0 %	18.9 %	18.8 %	18.9 %
	VOID RATIO	e_o	0.537	0.525	0.537	
	SATURATION	S_o	95.9 %	97.6 %	94.9 %	%
	DRY DENSITY, LB/CU FT	γ_d	110.1	110.9	110.1	
VOID RATIO AFTER CONSOLIDATION		e_c				
TIME FOR 50 PERCENT CONSOLIDATION, MIN		t_{50}	1	1	2	
FINAL	WATER CONTENT	w_f	21.0 %	19.6 %	19.3 %	%
	VOID RATIO	e_f				
	SATURATION	S_f	%	%	%	%
NORMAL STRESS, T/SQ FT		σ	1.0	2.0	3.0	
MAXIMUM SHEAR STRESS, T/SQ FT		τ_{max}	0.65	1.19	1.50	
ACTUAL TIME TO FAILURE, MIN		t_f	480	480	540	
RATE OF STRAIN, IN./MIN			.00018	.00018	.00018	
ULTIMATE SHEAR STRESS, T/SQ FT		τ_{ult}				

SHEAR STRENGTH PARAMETERS

$\phi' = 30^0$

TAN $\phi' = 0.577$

$c' = 0$ T/SQ FT

☐ CONTROLLED STRESS

☒ CONTROLLED STRAIN

TYPE OF SPECIMEN UNDISTURBED — 3.00 IN. SQUARE — 0.540 IN. THICK

CLASSIFICATION SANDY CLAY(CL),gray, fissured

LL 44 | PL 15 | PI 29 | | G. 2.71

REMARKS

F26

PROJECT LK.PONT.LA.,&VIC.-HURR.PROT.-1971

ORLEANS PARISH LK.FT.LEVEE WEST OF IHNC(OUT-

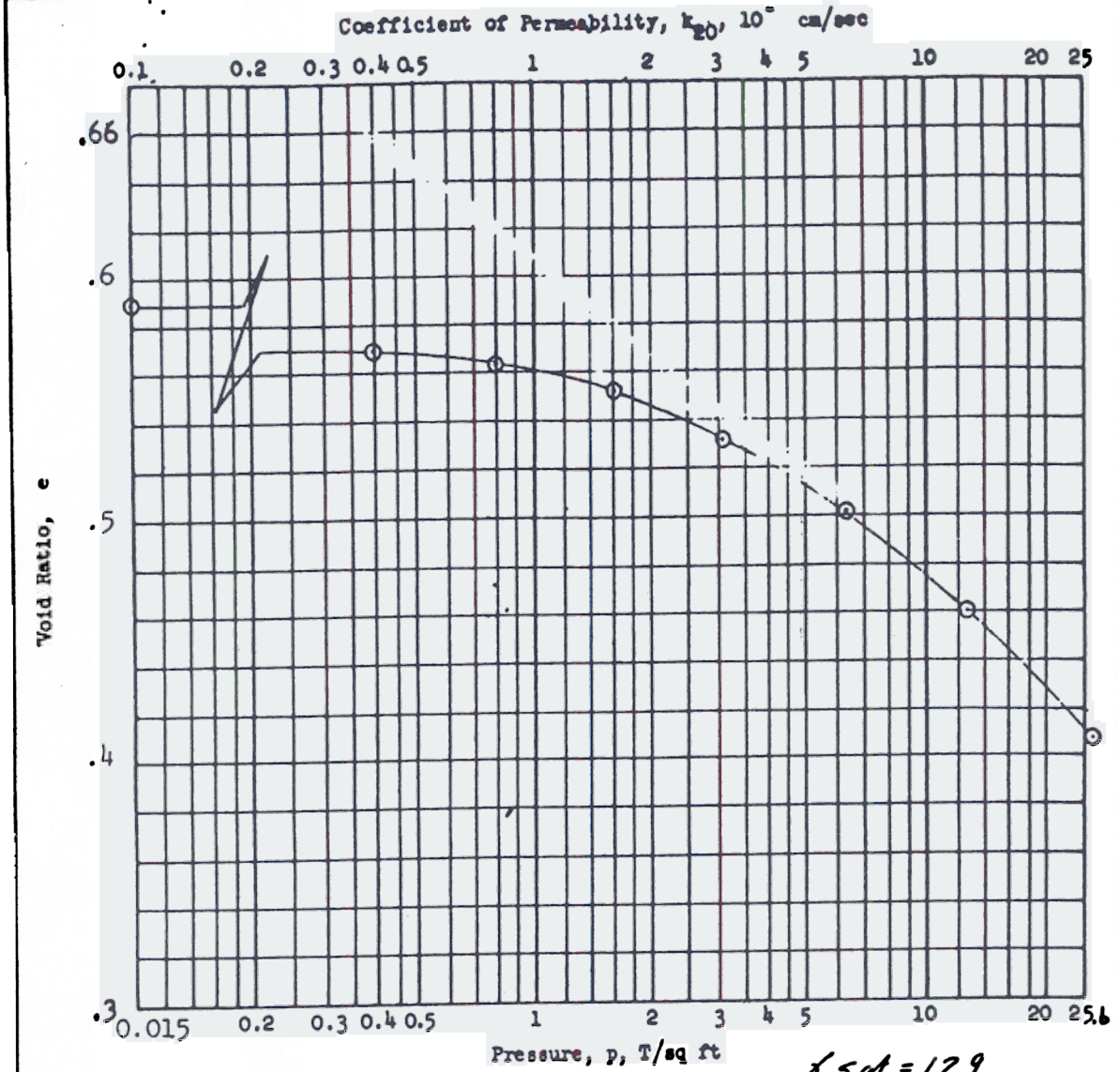
AREA FALL CANALS) ALONG 17THSTCANAL(CDM#2,SUPP)5

BORING NO. 6-MUE | SAMPLE NO. 16-B

~~DEPTH~~ EL - 62.0 | DATE 17 March 1971

GDA DIRECT SHEAR TEST REPORT

ENG FORM



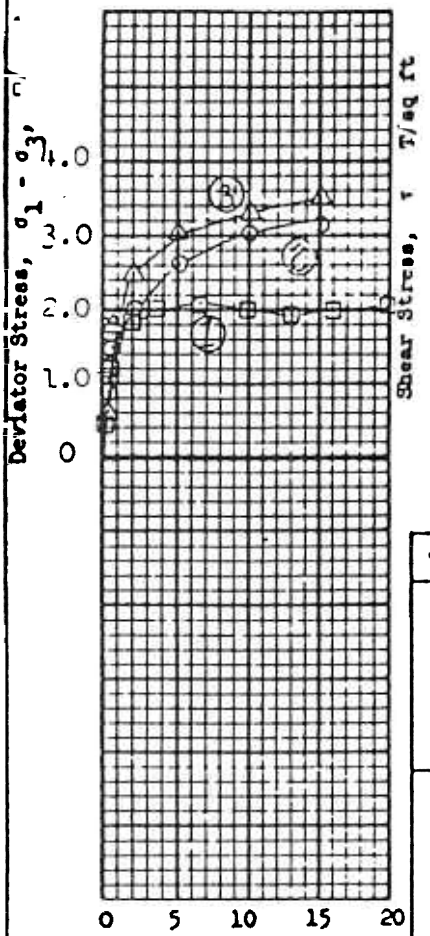
$\phi_{sat.} = 12.9$

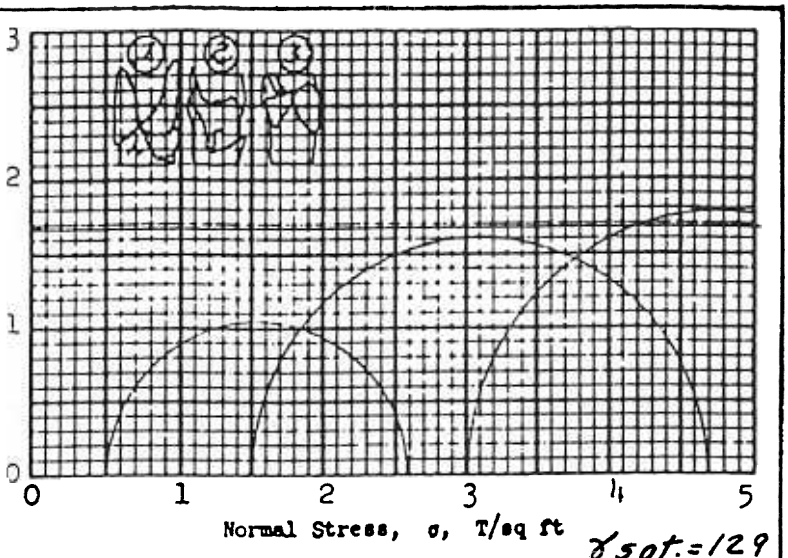
Type of Specimen UNDISTURBED		Before Test		After Test	
Diam 4.25 in.	Ht 1.159 in.	Water Content, w_o	21.0 %	w_f	%
Overburden Pressure, Po T/sq ft		Void Ratio, e_o	0.590	e_f	
Preconsol. Pressure, p_c 7.00 T/sq ft		Saturation, S_o	95.7 %	S_f	%
Compression Index, C_c .0721		Dry Density, γ_d	105.9 lb/ft^3		
Classification PLASTIC CLAY(CH),*		k_{20} at e_o =	x 10^{-} cm/sec		
LL -	G_s 2.70 From Q	Project LK.PONT.,LA.&VIC.-HURR. PROT.-'71			
PL -	D_{10}	ORLEANS PAR. LF. LEVEE WEST OF IHNC(OUTFALL			
Remarks *greenish gray		Area CANALS)ALONG 17th ST.CANAL(GDM#2,SUPP.#5			
		Boring No. 6-MUE	Sample No. 16-C		
		Depth-El -62.9	Date 19 March 1971		

CONSOLIDATION TEST REPORT

ENG FORM MAY 69 ...IOUS ...IONS ...TE. (TRANSLUCENT)

28





$\gamma_{sat.} = 129$

Test No.			1	2	3	Avg.
Initial	Water content	w_o	22.3 %	19.8 %	20.8 %	21.0 %
	Void ratio	e_o	0.621	0.567	0.592	
	Saturation	S_o	97.0 %	94.3 %	94.9 %	%
	Dry density, lb/cu ft	γ_d	104.0	107.6	105.9	
Before Shear	Water content	w_c	%	%	%	%
	Void ratio	e_c				
	Saturation	S_c	%	%	%	%
	Final back pressure, T/sq ft	u_o				
Final	Water content	w_f	%	%	%	%
	Void ratio	e_f				
Minor principal stress, T/sq ft		σ_3	0.5	1.5	3.0	
Max deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{max}$	2.08	3.19	3.53	
Time to failure, min		t_f	42	68	30	
Rate of strain, percent/min			0.154	0.221	0.500	
Ult deviator stress, T/sq ft		$(\sigma_1-\sigma_3)_{ult}$				
Initial diameter, in.		D_o	1.40	1.40	1.40	
Initial height, in.		H_o	3.00	3.00	3.00	

Shear Strength Parameters

ϕ = 0 °

tan ϕ = 0

c = 1.68 T/sq ft

Method of saturation

☐ Controlled stress

☒ Controlled strain

Type of test Q | Type of specimen UNDISTURBED

Classification PLASTIC CLAY(CH),gray, contains iron oxide concretions

LL 51 | PL 18 | PI 33 | G_s 2.70

Remarks Insufficient material to perform check test

F27

Project LK.PONT.LA.&VIC.-HURR. PROT.-'71

Area ORLEANS PARISH L.F. LEVEE WEST OF IHNC(OUT-FALL CANALS)ALONG 17thST. CANAL(GDM#2,SUPP.#5)

Boring No. 6-MUE | Sample No. 16-C

Depth El -62.9 | Date 10 March 1971

OHR TRIAXIAL COMPRESSION TEST REPORT

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July 10, 1989

Mr. Frederick M. Chatry
Chief of Engineering Division
New Orleans District
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, LA 70160

Jn-0908A

RE: 17TH STREET CANAL PARALLEL FLOOD PROTECTION
PHASE 1B - HAMMOND HIGHWAY TO SOUTHERN RAILWAY
OLB PROJECT NO. 2043-0207

Dear Mr. Chatry:

Please find transmitted herewith three final review sets of plans for the above referenced project. Specifications, which are still being typed, will be transmitted in another week to ten days.

All comments made in your letter of April 25, 1989, have been addressed and the plans modified accordingly. The revised slope stability and sheet pile design calculations are attached.

If you have any questions regarding this submission, please contact us. Your timely review and comments are appreciated.

Very truly yours,

MODJESKI AND MASTERS
Engineers

Barney T. Martin

BTM:jrb
cc: Mr. Ed Bailey - Orleans Levee Board
Mr. G. J. Sullivan - Sewerage & Water Board of N.O.
Mr. John Holtgreve - Design Engineering Inc.

17TH STREET CANAL - PHASE 1B

HAMMOND HIGHWAY TO SOUTHERN RAILWAY

The following revised slope stability and sheet pile design calculations address all comments made in the Corps' letter of April 25, 1989. A brief description of the revisions made to the cross-sections since the last submittal of April 10, 1989, is given for each of the eight reaches. Also given for each of the reaches is a listing of new submittals, stating which of the Corps' comments were addressed.

In a previous submittal of September 21, 1988, pressure diagrams for the Q-case, factor of safety = 1.0 were given in the report prepared by Eustis Engineering dated 31 August 1988. The maximum deflection calculated for the reaches using PZ 22 sheet pile was 0.56", and for the reaches using PMA 22 sheet pile was 0.75". Although there has been a 0.5' drop in the step elevation for the cross-sections which generated the maximum PZ 22 deflection of 0.56", it is obvious the this change will not increase the deflection to more than the allowable 1 1/2". The maximum deflection for the PMA 22 of 0.75" is still valid.

REACH 1

Revisions :

1. Entire sheet pile wall moved 0.5' closer to the canal thus increasing the crown width 0.5' along the entire reach.
2. Step elevation lowered from El. 2.0 to El. 1.5.

Submittals :

1. New canalside stability analyses taking into account the above revisions and the correction to the soil shear strength from El. 0.0 to El. -2.0.
2. New landside stabiliy analyses taking into account the above revisions and including calculations at El. -20.5.
2. New sheet pile analyses taking into account the above revisions and the submerged canalside soil weight.

REACH 1
STA. 553+70 TO STA. 568+00

	OFFSET TO EL. 5.5 ON EXISTING BACKSLOPE (FT)	OFFSET TO SHEET PILE (FT)	CROWN WIDTH (FT)	EXISTING BACKSLOPE (H : V)	EXISTING LANDSIDE TOE EL.	DIST. FROM TOE TO GROUND PT. (FT)	EXISTING LANDSIDE GROUND EL.
554+00	219.5	210.5	9.0	3.1 : 1	-1.77 (31.5)	10.0 41.5	-2.17
	219.6	209.9	9.7	2.9 : 1	-2.37 (32.5)	10.0	-3.27 42.5
558+00	219.8	209.3	10.5	3.1 : 1	-3.04	10.0	-3.24
560+00	218.2	208.7	9.5	3.0 : 1	-3.64 36.9	10.0	-4.04 → 46.9 *
	216.9	208.0	8.9	4.4 : 1	-2.43 (43.8)	10.0	-3.59 → 53.8
	221.4	207.8	13.6	3.6 : 1	-2.83 (40.7)	7.3	-2.83 48
566+00 (¼ Pt.)	219.3	207.8	11.5	3.8 : 1	-0.43 (34.0)	10.0	-1.44 44
568+00	218.4	207.7	10.7	3.5 : 1	-3.32 (41.6)	10.0	-3.62 51.5

Cross-Section Geometry — Crown El. 5.5 — Crown Width Varies
Step El. 1.5 — Step Width = 12.0'

Slope Stability Analysis :

The following cross-sections were checked to determine the minimum factor of safety :

Canalside Failure - 562+00, 564+00 and 566+00. The section at Sta. 564+00 governs.
*** Minimum Factor of Safety = 1.32 at El. -36.5 ***

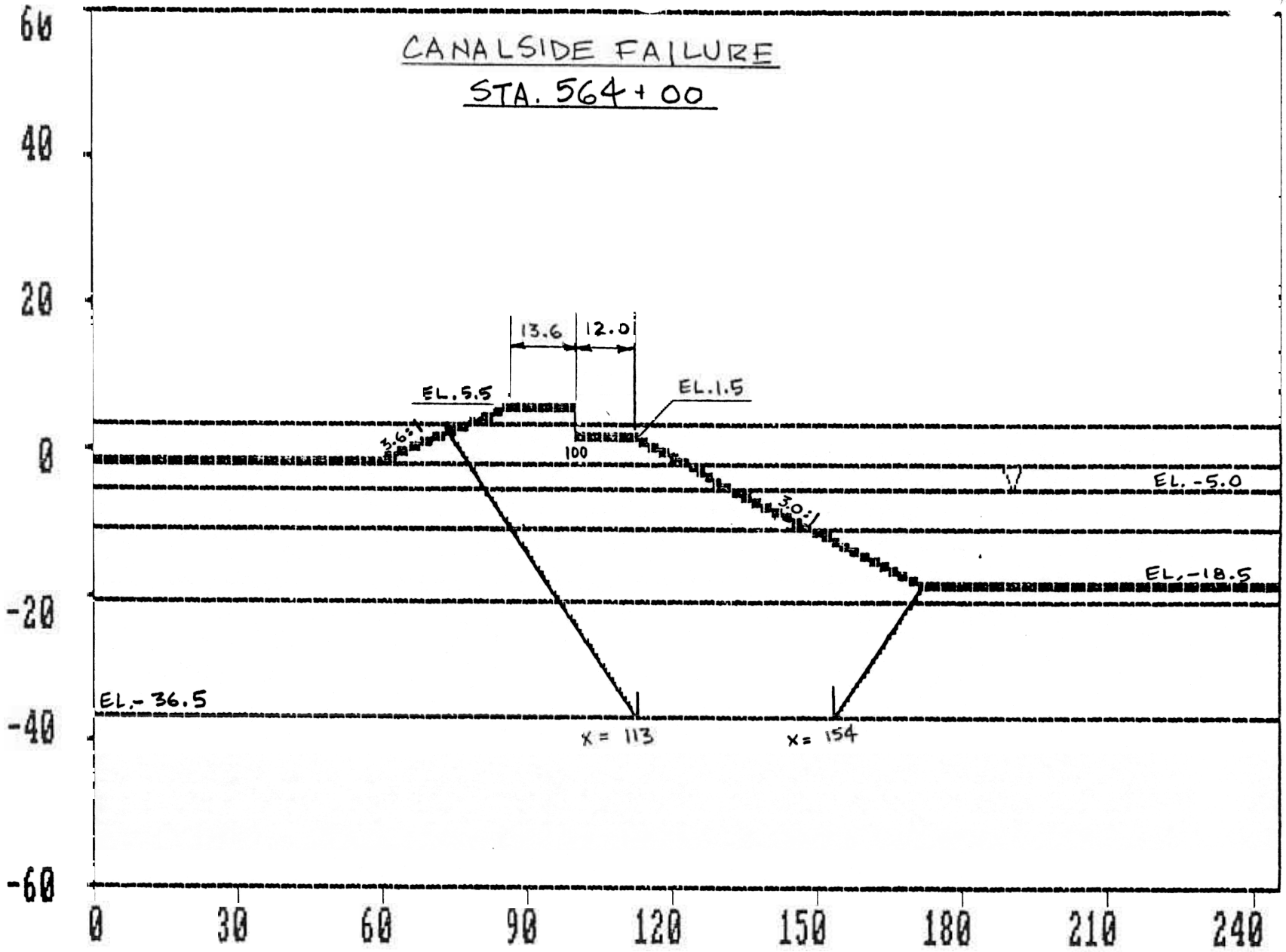
Landside Failure - 554+00, 556+00, 560+00 and 562+00. The section at Sta. 560+00 governs.
*** Minimum Factor of Safety = 1.38 at El. -28.5 ***

Sheet Pile Analysis :

The following cross-sections were checked to determine the required penetration, design bending moment and maximum deflection :

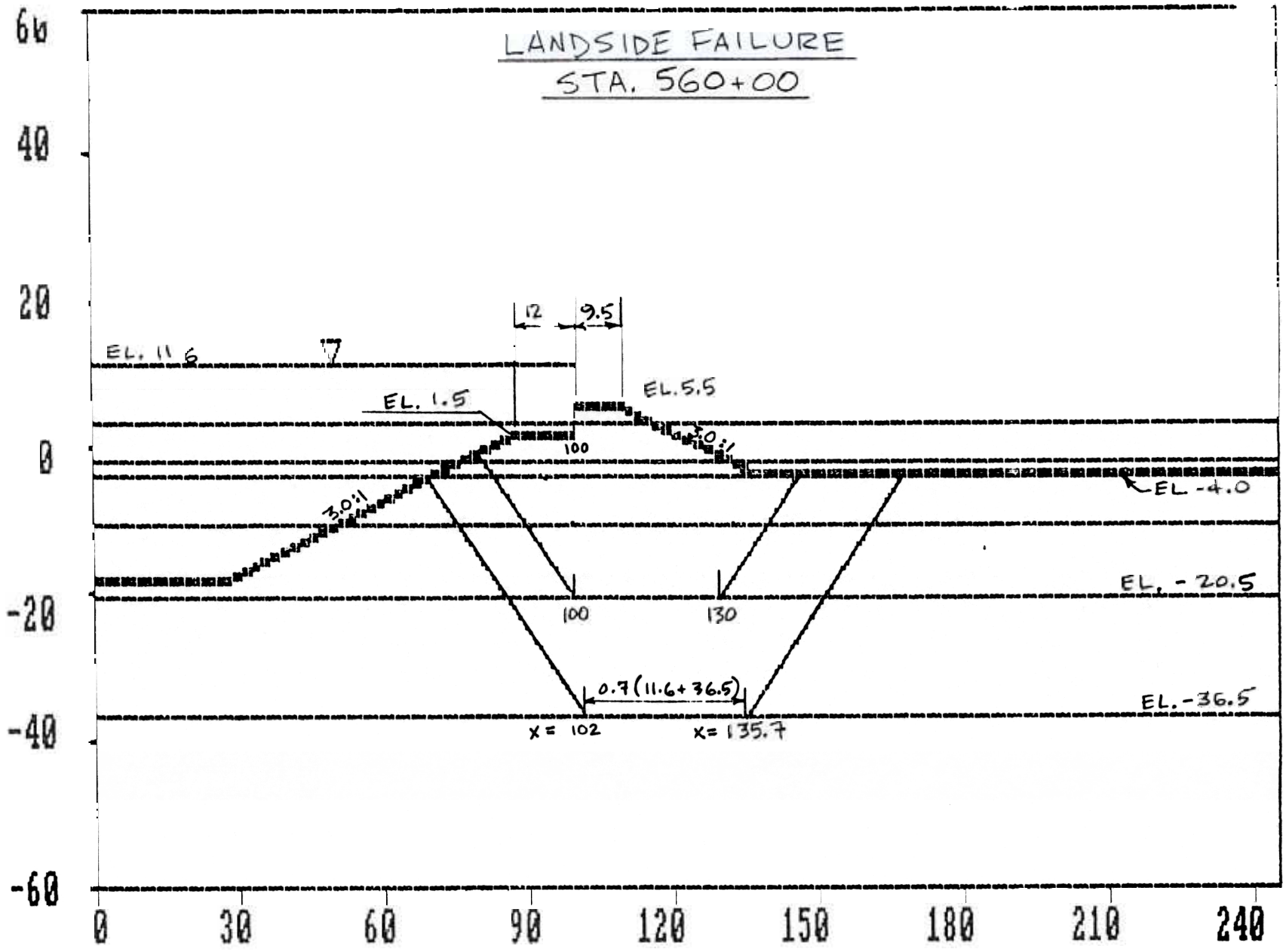
Canalside Failure - 562+00, 564+00 and 566+00.
Landside Failure - 554+00, 556+00, 560+00 and 562+00.

Required Penetration : -12.8 (Landside Failure 3:1 Ratio; S-Case F.S. = 1.37)
Design Bending Moment : 11.9 Ft-K/Ft @ El. -2.9 (Landside Failure 3:1 Ratio; S-Case F.S. = 1.37)



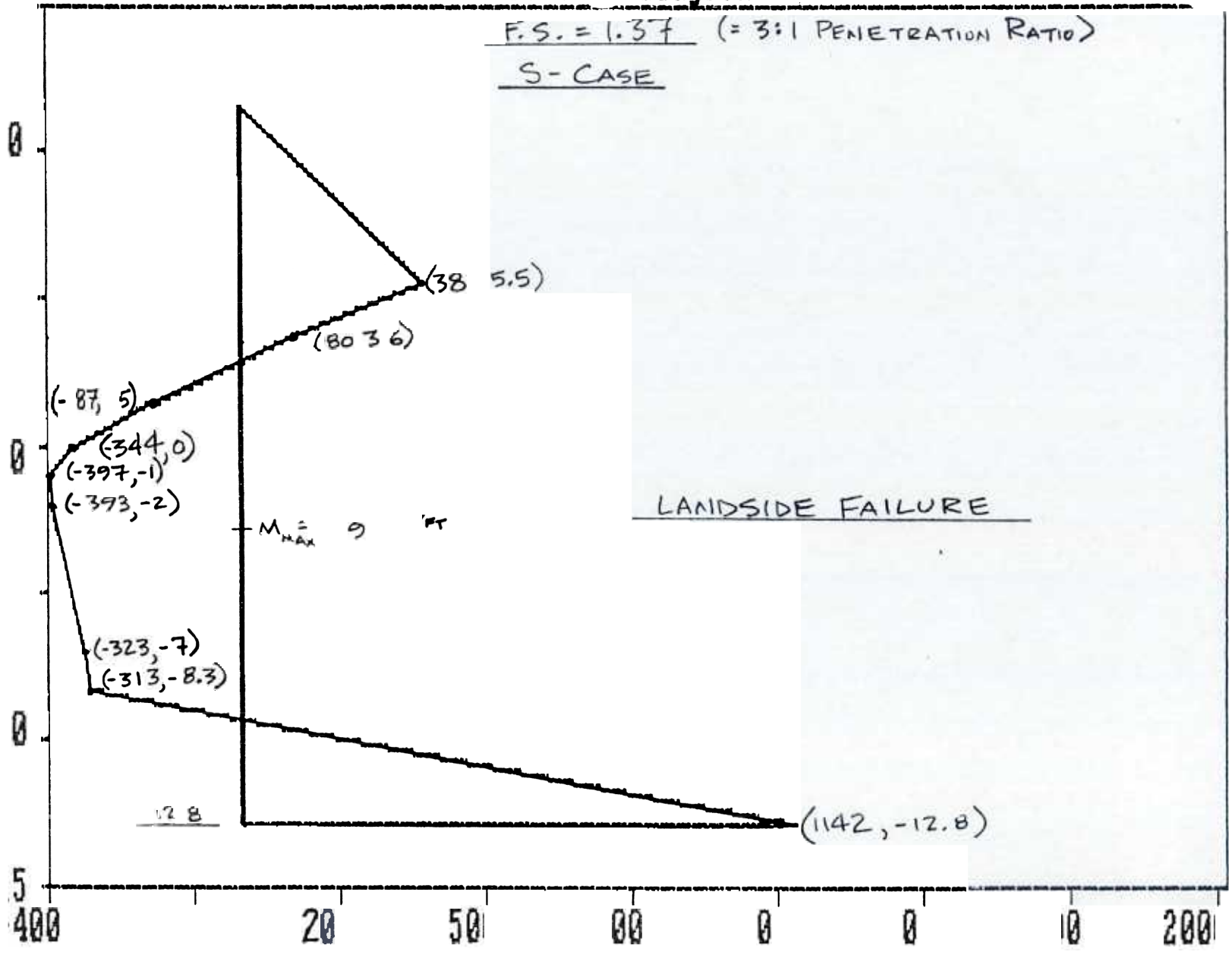
ELEV.	R_A	R_B	R_P	D_A	D_P	F. S.
-36.5	27,668	15,580	13,640	82,429	39,344	1.32

1.2965



ELEV.	R_A	R_B	R_P	D_A	D_P	F.S.
-20.5	12,361	11,400	10,228	41,468	15,263	1.30
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Press Diagram



REACH 2

Revisions :

1. Entire sheet pile wall moved 0.5' closer to the canal thus increasing the crown width 0.5' along the entire reach.
2. Step elevation lowered from El. 2.0 to El. 1.5.
3. Step width increased from 9.0' to 12.0'.

Submittals :

1. New canalside stability analyses taking into account the above revisions and the correction to the soil shear strength from El. 0.0 to El. -2.0.
2. New landside stabiliy analyses taking into account the above revisions and including calculations at El. -20.5.
2. New sheet pile analyses taking into account the above revisions and the submerged canalside soil weight.

REACH 2
STA. 568+00 TO STA. 589+00

STA.	OFFSET TO EL. 5.5 ON EXISTING BACKSLOPE (FT)	OFFSET TO SHEET PILE (FT)	CROWN WIDTH (FT)	EXISTING BACKSLOPE (H : V)	EXISTING LANDSIDE TOE EL.	DIST. FROM TOE TO GROUND PT. (FT)	EXISTING LANDSIDE GROUND EL.	
568+00	218.4	207.7	10.7	3.5 : 1	-3.32	10.0	-3.62	
570+00	220.5	207.6	12.9	4.2 : 1	-1.01 (38.1)	10.0	-1.77	48.1
572+00	219.1	207.4	11.7	3.6 : 1	-1.88	10.0	-1.48	
574+00	218.8	207.3	11.5	3.1 : 1	-2.88	10.0	-2.18	
576+00	216.9	207.2	9.7	3.0 : 1	-3.79 (37.6)	6.0	-3.99	43.6
578+00	220.7	211.2	9.5	3.1 : 1	-2.79 (35.2)	10.0	-2.99	45.2
580+00	225.9	216.1	9.8	3.1 : 1	-2.57	10.0	-2.67	
582+00	231.4	220.9	10.5	2.9 : 1	-1.97	10.0	-2.37	
584+00	235.6	225.8	9.8	2.6 : 1	-2.46 (30.5)	10.0	-2.86	40.5
586+00	242.1	230.7	11.4	2.9 : 1	-1.56	2.0	-1.96	
588+00	245.8	235.4	10.4	2.5 : 1	-2.44 (30.25)	10.3	-2.64	40.55

Cross-Section Geometry : Crown El. 5.5 Crown Width Varies
Step El. 1.5 Step Width = 12.0'

Slope Stability Analysis :

The following cross-sections were checked to determine the minimum factor of safety :

Canalside Failure - 570+00.
*** Minimum Factor of Safety = 1.35 at El. -34.0 ***

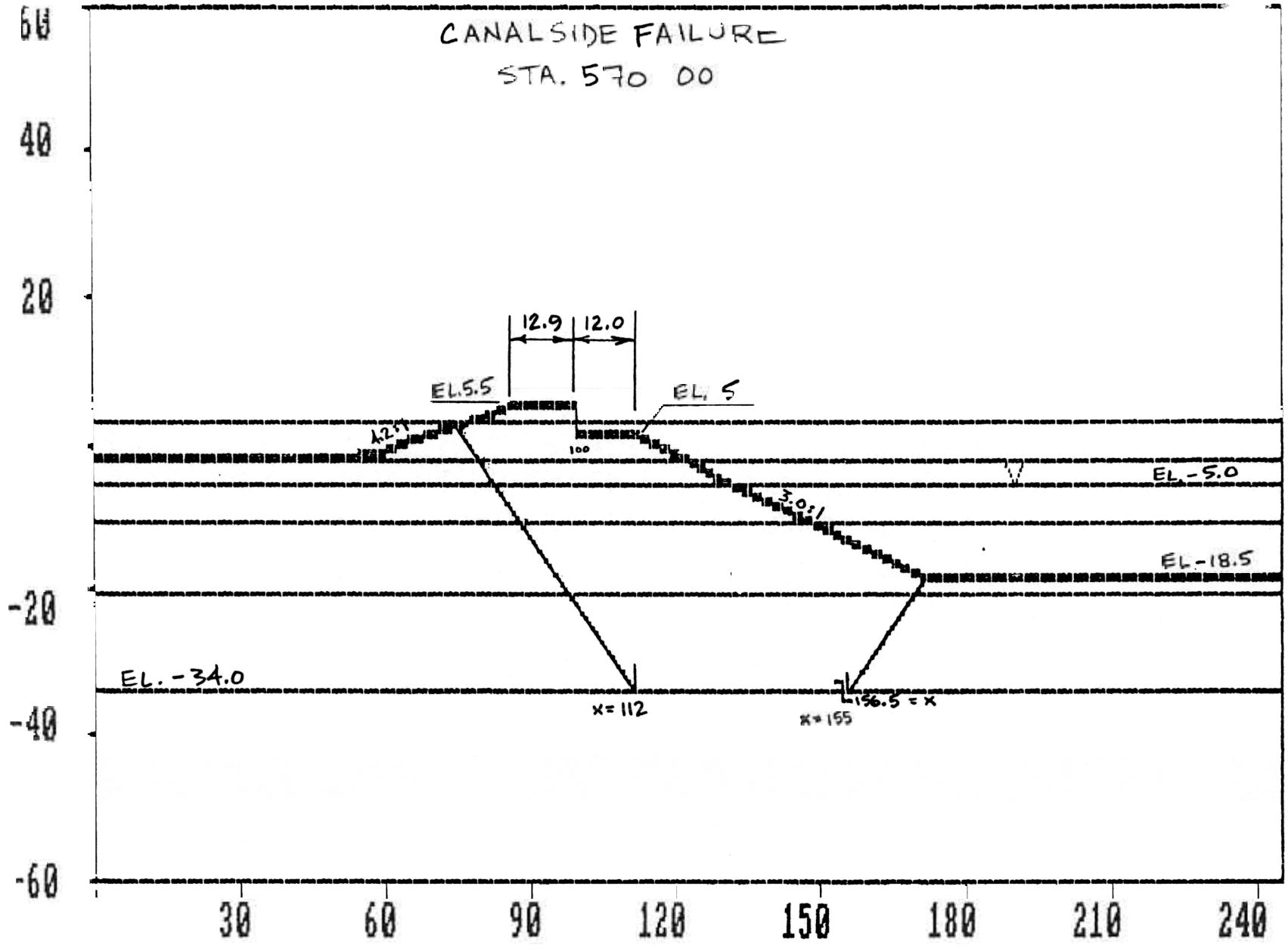
Landside Failure - 576+00, 578+00, 584+00 and 588+00. The section at Sta. 576+00 governs.
*** Minimum Factor of Safety = 1.30 at El. -34.0 ***

Sheet Pile Analysis :

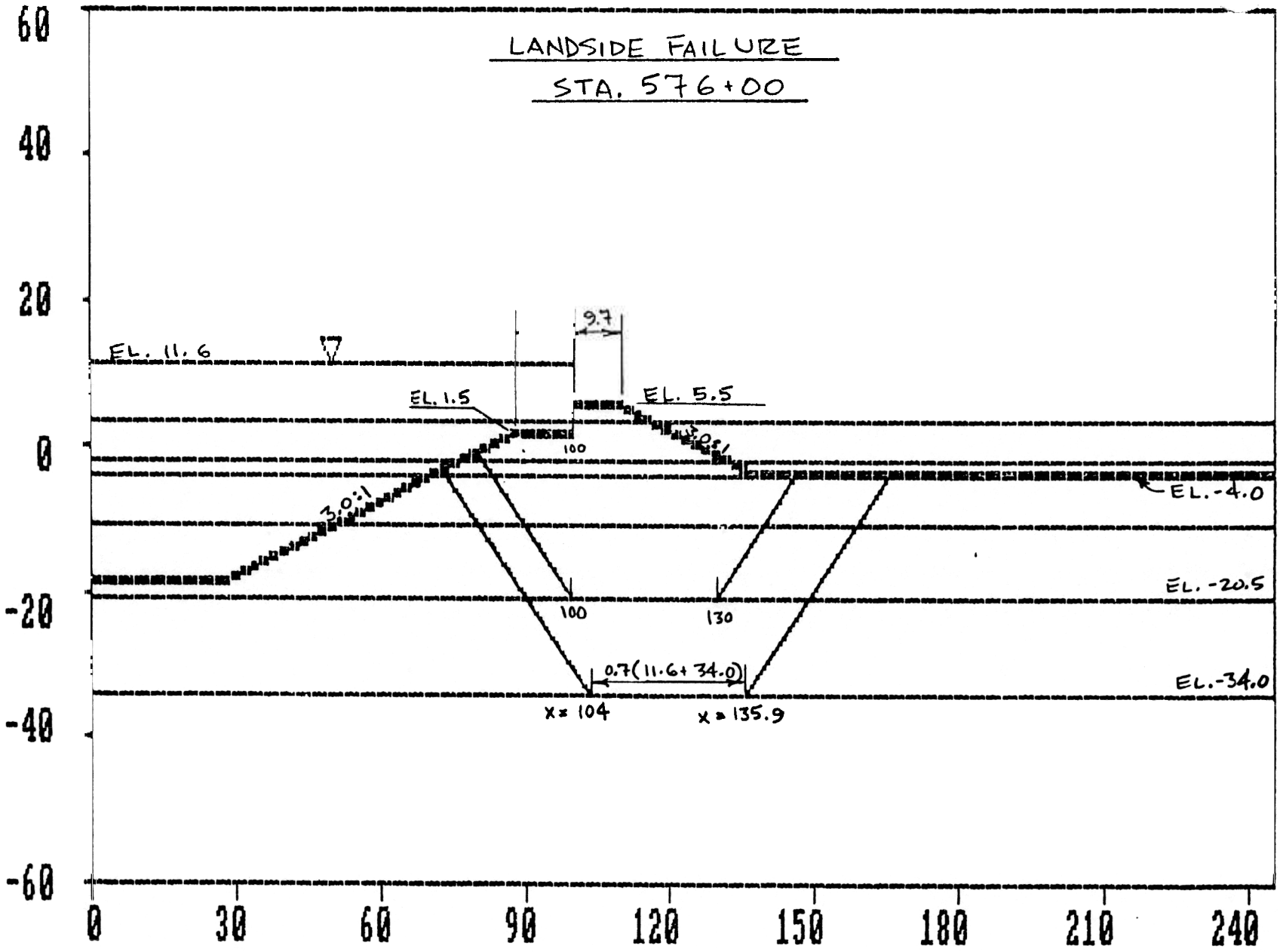
The following cross-sections were checked to determine the required penetration, design bending moment and maximum deflection :

Canalside Failure - 570+00.
Landside Failure - 576+00, 578+00, 584+00 and 588+00.

Required Penetration : -12.8 (Landside Failure 3:1 Ratio; S-Case F.S. = 1.39)
Design Bending Moment : 12.8 Ft-K/Ft @ El. -2.8 (Landside Failure 3:1 Ratio; S-Case F.S. = 1.39)

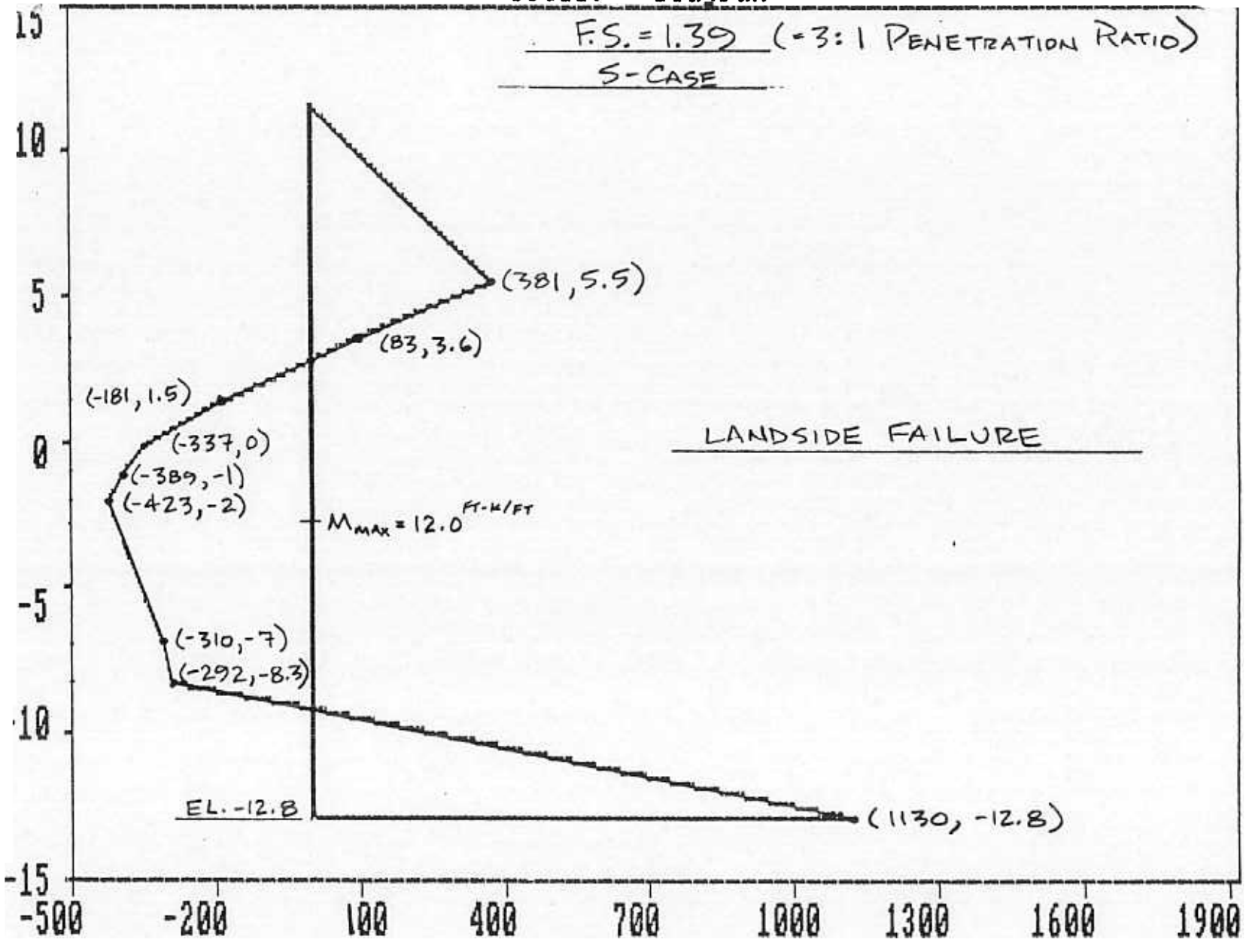


ELEV	R_A	R_B	R_P	D_A	D_P	F.S.
-34.0	26.316	16.899	11.740	73.032	32.469	1.35



ELEV.	R_A	R_B	R_P	D_A	D_P	F.S.
-20.5	12,361	11,400	10,247	41,468	15,243	1.30
-34.0	20,854	12,122	20,506	87,514	46,254	1.30

Press Diagram



REACH 3

Revisions :

1. Entire sheet pile wall moved 0.5' closer to the canal thus increasing the crown width 0.5' along the entire reach.
2. Step elevation lowered from El. 2.0 to El. 1.5.
3. Step width increased from 9.0' to 12.0'.
4. Add 6" of fill from the levee toe to a distance 30' from the levee toe in the vacant lot referenced.

Submittals :

1. New canalside stability analyses taking into account the above revisions and the correction to the soil shear strength from El. 0.0 to El. -2.0.
2. New landside stabiliy analyses taking into account the above revisions and including calculations at El. -10.5 and El. -20.5.
2. New sheet pile analyses taking into account the above revisions and the submerged canalside soil weight.

Note :

Reach 3 landside stability analysis at El. -32.0 with the active wedge at x=110 and the passive wedge at x=140.5 does yield a lower factor of safety than with the wedges at x=111 and 144.5 respectively, as previously submitted. However, it has since been discovered, that placing the active wedge at x=103 and the passive wedge at x=133.5 yields the lowest factor of safety. Therefore these calculations are being submitted in lieu of the requested location.

REACH 3
STA. 589+00 TO STA. 614+00

STA.	OFFSET TO EL. 5.5 ON EXISTING BACKSLOPE (FT)	OFFSET TO SHEET PILE (FT)	CROWN WIDTH (FT)	EXISTING BACKSLOPE (H : V)	EXISTING LANDSIDE TOE EL.	DIST. FROM TOE TO GROUND PT. (FT)	EXISTING LANDSIDE GROUND EL.	
598+00	248.6	239.0	9.6	2.5 : 1	-2.34	9.8	-2.64	
	252.6	242.5	10.1	2.7 : 1	-2.59	10.0	-2.99	
	250.5	241.0	9.5	1.8 : 1	-1.29	(21.7) 16.5	-1.79	38.2
	250.5	239.3	11.2	2.4 : 1	-2.11	9.9	-1.81	
	249.3	237.6	11.7	3.0 : 1	-3.01	9.9	-3.41	
	246.9	235.9	11.0	3.1 : 1	-2.87	9.5	-3.77	
602+00	244.4	234.2	10.2	3.1 : 1	-1.97	9.2	-2.47	
604+00 (℄ Pt.)	243.9	232.5	11.4	2.7 : 1	-3.96	10.0	-4.26	
606+00	241.8	230.9	10.9	2.7 : 1	-2.86	10.0	-3.56	
608+00	243.2	229.3	13.9	3.2 : 1	-2.10	9.9	-3.20	
610+00	242.4	228.6	13.8	3.1 : 1	-1.40	? 10.0	-2.20	?
612+00	244.0	227.9	16.1	3.6 : 1	-0.89	(39.1) 10.0	-2.09	49.1
614+00	242.0	227.2	14.8	3.6 : 1	-0.79	11.5	-2.49	

Cross-Section Geometry : Crown El. 5.5 Crown Width Varies
Step El. 1.5 Step Width = 12.0'

Slope Stability Analysis :

The following cross-sections were checked to determine the minimum factor of safety :

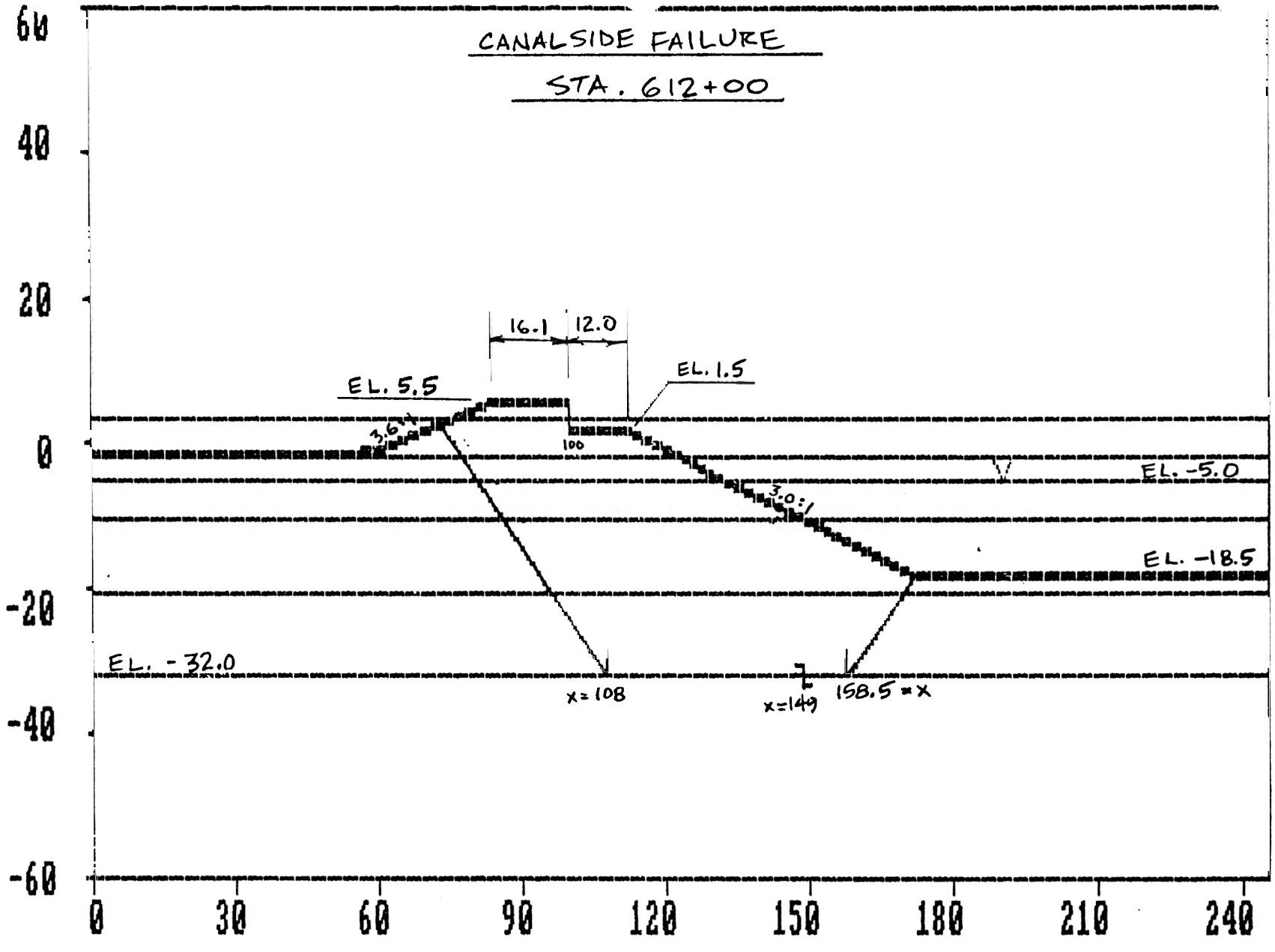
Canalside Failure - 612+00. *** Minimum Factor of Safety = 1.36 at El. -32.0 ***

Landside Failure - 598+00, 592+00, 594+00, 596+00, 600+00, 604+00 and 606+00. The section at Sta. 604+00 governs. *** Minimum Factor of Safety = 1.38 at El. -20.5 ***

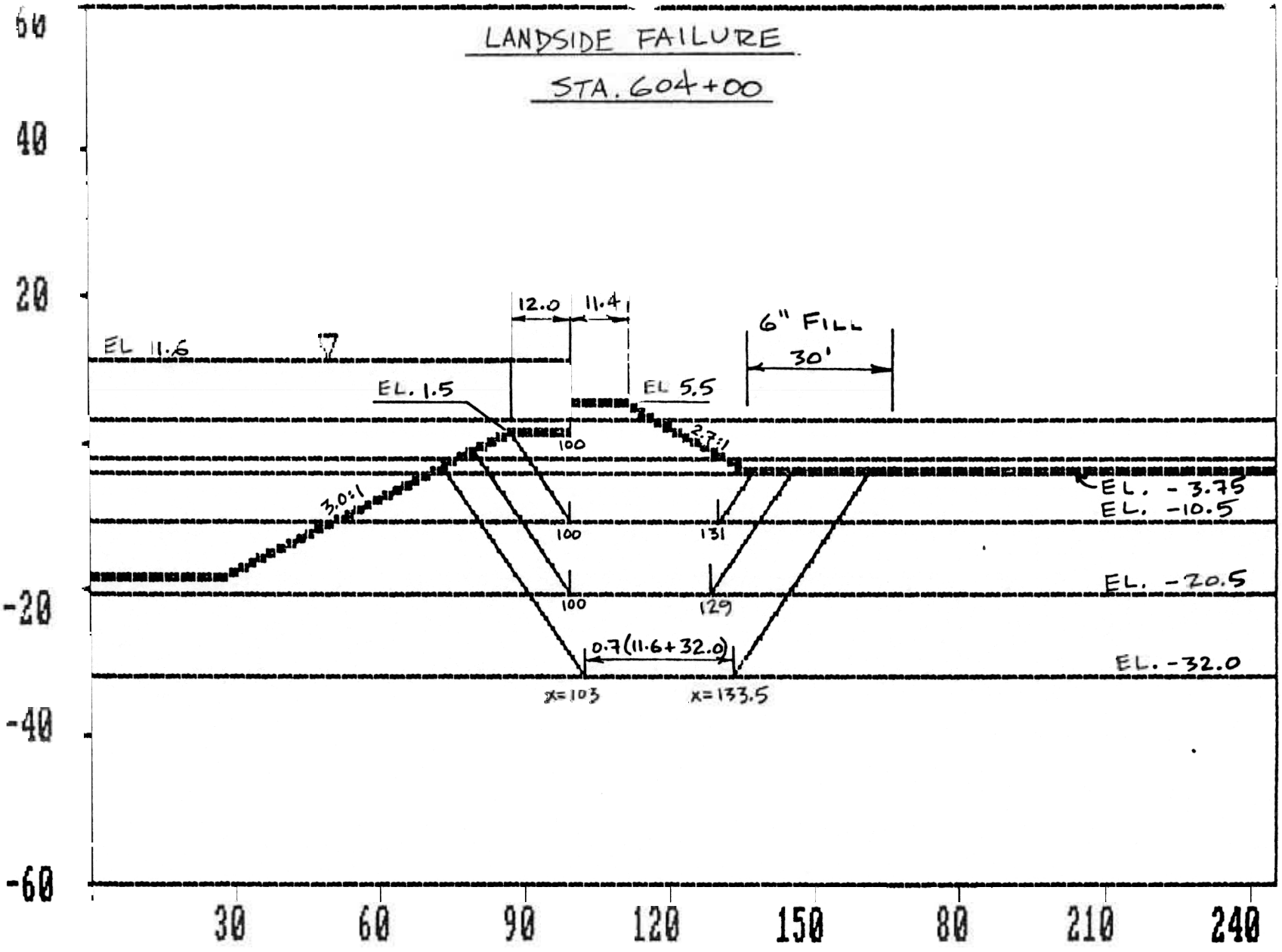
Sheet Pile Analysis :

The following cross-sections were checked to determine the required penetration, design bending moment and maximum deflection : Canalside Failure - 612+00.
Landside Failure - 594+00.

Required Penetration : -12.8 (Landside Failure 3:1 Ratio; S-Case F.S.=1.33)
Design Bending Moment : 11.6 Ft-K/Ft @ El. -2.5 (Landside Failure 3:1 Ratio; S-Case F.S.=1.33)

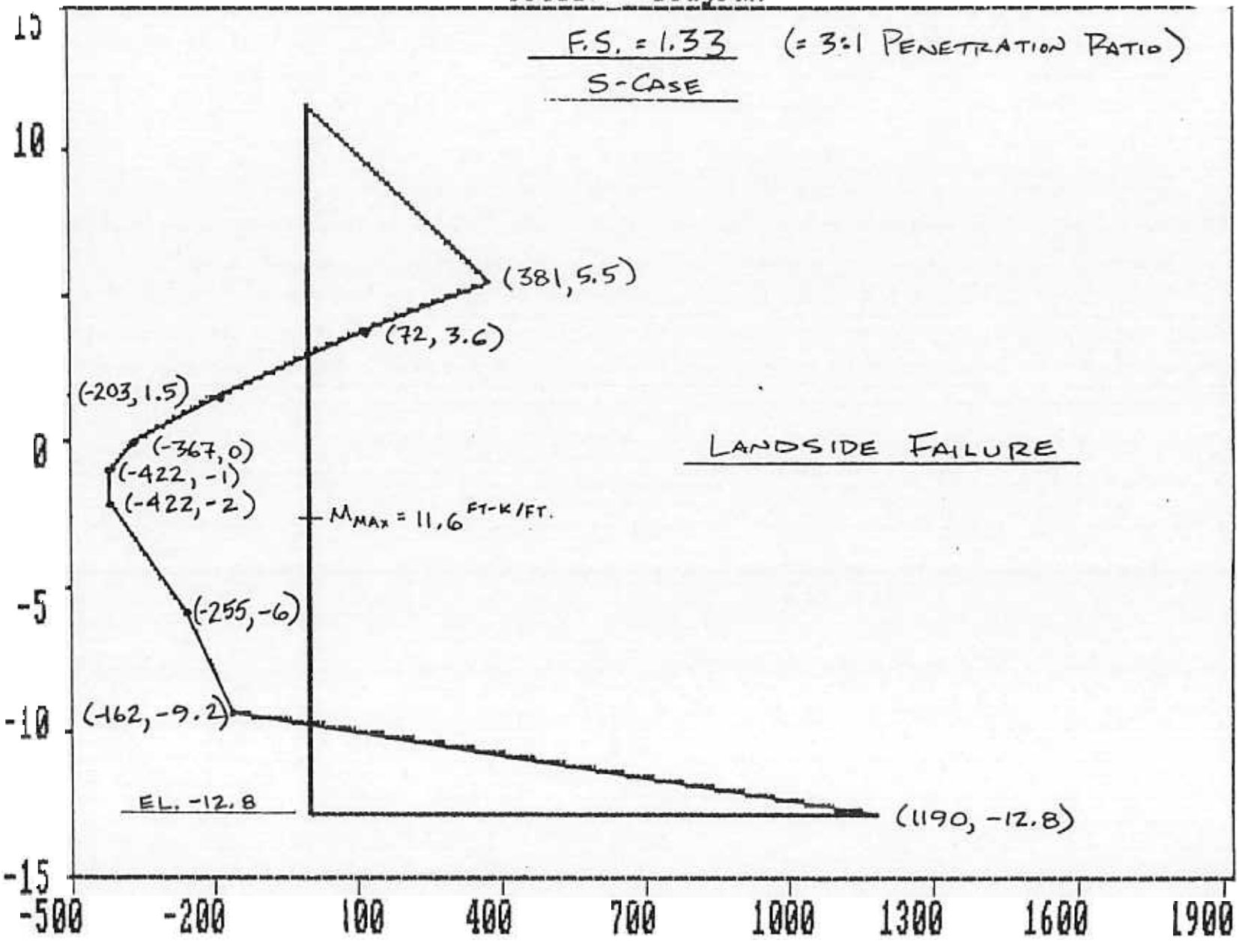


ELEV.	R_A	R_B	R_P	D_A	D_P	F.S.
-32.0	24,681	18,864	10,220	66,914	27,479	1.36



ELEV.	R_A	R_B	R_P	D_A	D_P	F.S.
-10.5	8,260	8,680	3,780	18,163	2,906	1.36
-20.5	12,361	11,020	10,381	41,468	15,498	1.30
-32.0	19471	11,590	19.121	79.600	41.063	1.30

Press Diagram



REACH 4

Revisions

1. Entire sheet pile wall moved 0.5' closer to the canal thus increasing the crown width 0.5' along the entire reach.
2. Crown elevation lowered from El. 7.0 to El. 6.5 thus increasing the crown width an additional amount which depends on the backslope at each station.
3. Step elevation lowered from 3.6 to 3.5.
4. Step width increased from 9.0' to 12.0'.

Submittals :

1. New canalside stability analyses taking into account the above revisions, the correction to the soil shear strength from El. 0.0 to El. -2.0, and the piezometric headline of El. -2.4 in the sand.
2. New landside stabiliy analyses taking into account the above revisions.
3. New sheet pile analyses taking into account the above revisions and the submerged canalside soil weight.

REACH 4
STA. 614+00 TO STA. 625+00

STA.	OFFSET TO EL. 6.5 ON EXISTING BACKSLOPE (FT)	OFFSET TO SHEET PILE (FT)	CROWN WIDTH (FT)	EXISTING BACKSLOPE (H : V)	EXISTING LANDSIDE TOE EL.	DIST. FROM TOE TO GROUND PT. (FT)	EXISTING LANDSIDE GROUND EL.
614+00	~~236.6~~ 238.4	227.2	11.2	3.6 : 1	-0.79 (37.4)	11.5 48.9	-2.49
616+00	~~233.9~~ 235.5	226.5	9.8	3.9 : 1	-0.55 (36.5)	10.8 46.5	-1.65
618+00	~~234.2~~ 235.8	225.8	10.8	3.4 : 1	-1.25 (36.4)	10.8 46.4	-3.85
620+00	~~234.3~~ 235.9	225.8	10.9	3.2 : 1	-2.62	10.8	-3.12
622+00	~~233.3~~ 234.9	224.3	10.6	3.1 : 1	-2.62 (38.9)	10.2 49.1	-3.82
624+27	~~232.1~~ 233.7	223.5	10.2	3.3 : 1	-1.52 (36.7)	14.5 51.2	-2.62

Cross-Section Geometry : Crown El. 6.5 Crown Width Varies
Step El. 3.5 Step Width = 12.8'

Slope Stability Analysis :

The following cross-sections were checked to determine the minimum factor of safety :

Canalside Failure - 614+00 and 616+00. The section at Sta. 614+00 governs.
*** Minimum Factor of Safety = 1.30 at El. -23.5 ***

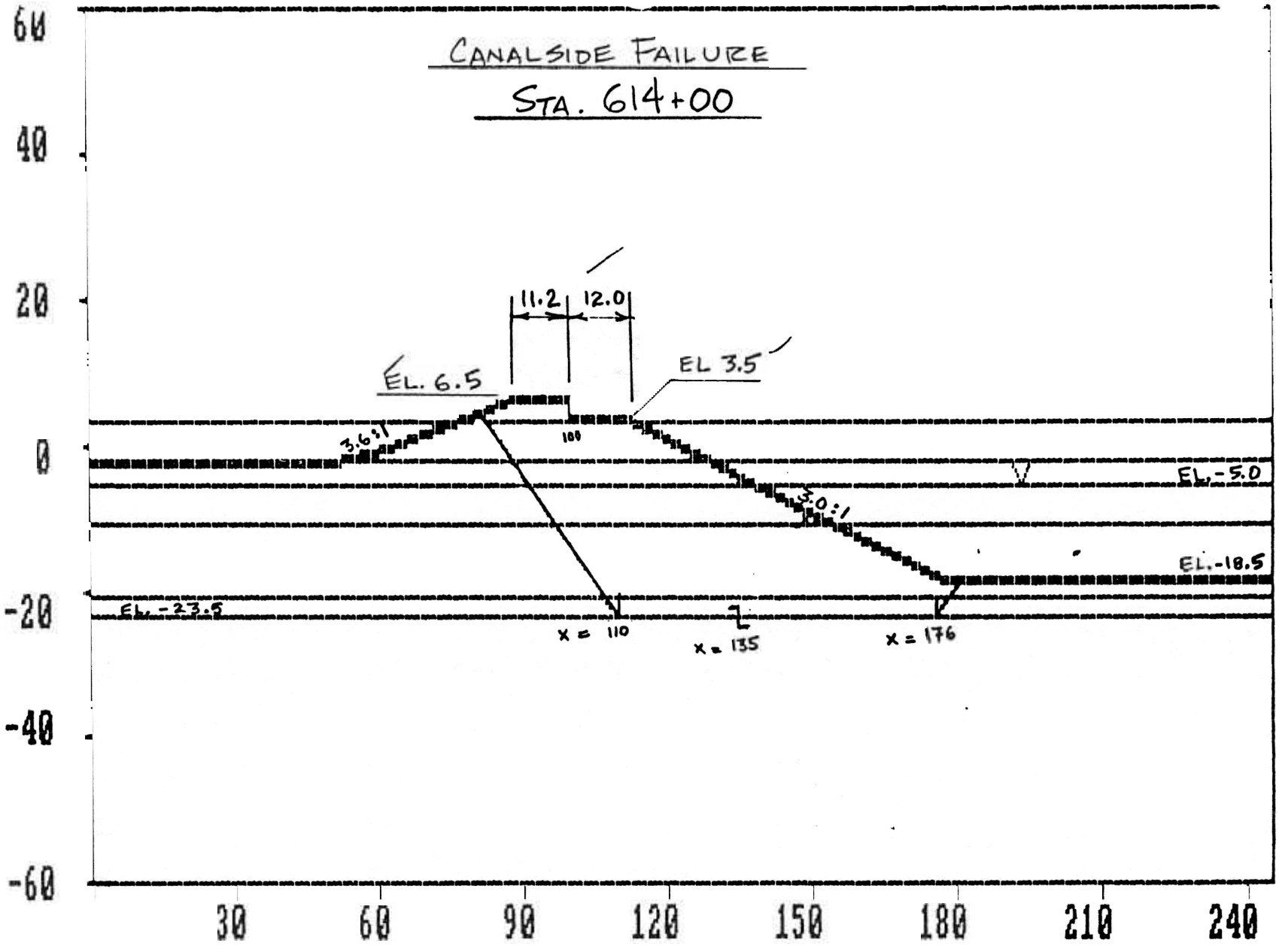
Landside Failure - 616+00, 618+00, 620+00, 622+00 and 624+27. The section at Sta. 622+00 governs.
*** Minimum Factor of Safety = 1.37 at El. -23.5 ***

Sheet Pile Analysis :

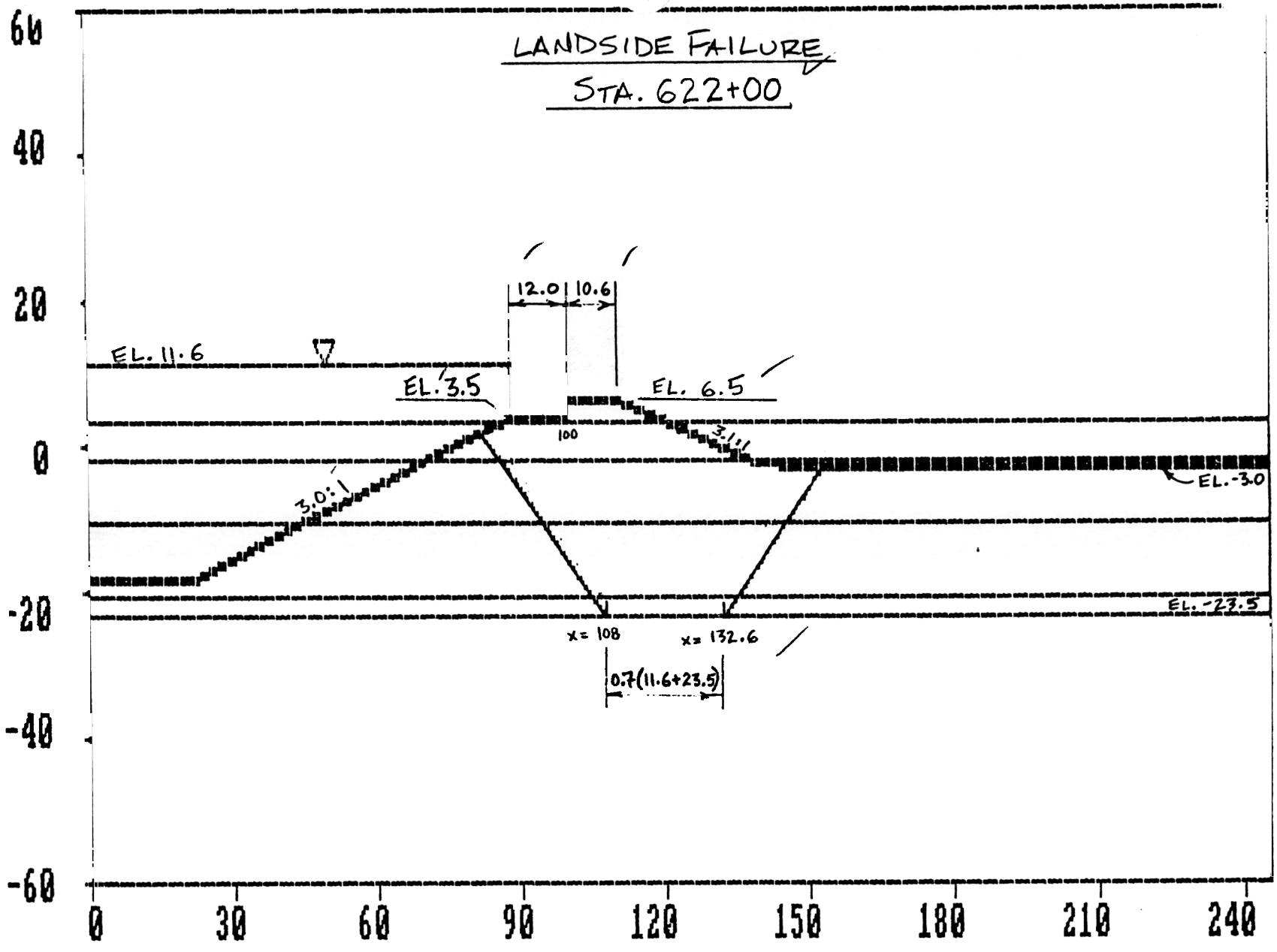
The following cross-sections were checked to determine the required penetration, design bending moment and maximum deflection :

Canalside Failure - 614+00 and 616+00.
Landside Failure - 616+00, 618+00, 622+00 and 624+27.

Required Penetration : -7.7 (Landside Failure Sta. 616+00; S-Case F.S.=1.5)
Design Bending Moment : 7.0 Ft-K/Ft @ El. -8.2 (Landside Failure Sta. 616+00; S-Case F.S.=1.5)

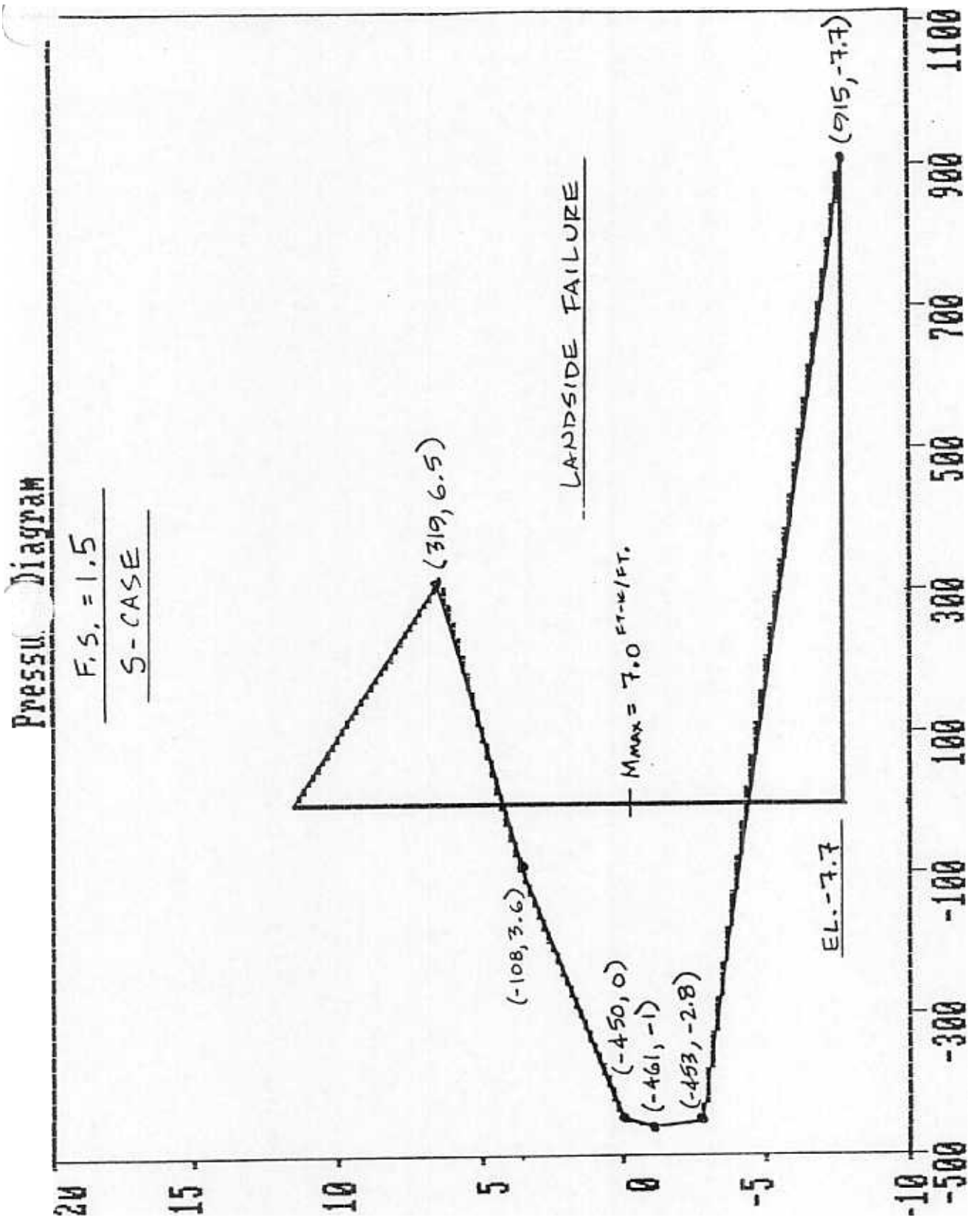


ELEV.	R_A	R_B	R_P	D_A	D_P	F.S
-23.5	20.221	17.497	3.760	43.150	11.199	1.30



ELEV	R_A	R_B	R_P	D_A	D_P	F.S.
-23.5	17,391	9,348	13,070	51,799	22,719	1.37

RUN COMPLETED
Stop - Program terminated



REACH 5 ✓

Revisions :

1. Step elevation lowered from 5.5 to 4.5.
2. Step width increased from 8.5' to 14.5'.

Submittals :

1. New canalside stability analyses taking into account the above revisions, the correction to the soil shear strength from El. 0.0 to El. -2.0, and the piezometric headline of El. -2.4 in the sand.
2. New sheet pile analyses taking into account the above revisions and the submerged canalside soil weight.

REACH 5
STA. 625+00 TO STA. 635+00

STA.	OFFSET TO EL. 7.5 ON EXISTING BACKSLOPE (FT)	OFFSET TO SHEET PILE (FT)	CROWN WIDTH (FT)	EXISTING BACKSLOPE (H : V)	EXISTING LANDSIDE TOE EL.	DIST. FROM TOE TO GROUND PT. (FT)	EXISTING LANDSIDE GROUND EL.
627+28	229.9	220.7	9.2	3.9 : 1	-0.72	(41.3) 13.6	54.8 -1.62
	227.3	219.4	7.9	3.5 : 1	-1.92	13.7	-3.82
	224.4	215.9	8.5	3.4 : 1	-1.72	14.4	-3.32
632+00	219.9	212.4	7.5	3.4 : 1	-2.23	(40.6) 13.5	54.1 -3.73
634+00 (4 Pt.)	215.1	206.9	6.2	3.7 : 1	-0.53	(35.9) 17.4	53.3 -1.23

Cross-Section Geometry : Crown El. 7.5 Crown Width Varies
Step El. 4.5 Step Width = 14.5'

Slope Stability Analysis :

The following cross-sections were checked to determine the minimum factor of safety :

Canalside Failure - 627+28.
*** Minimum Factor of Safety = 1.30 at El. -14.5 ***

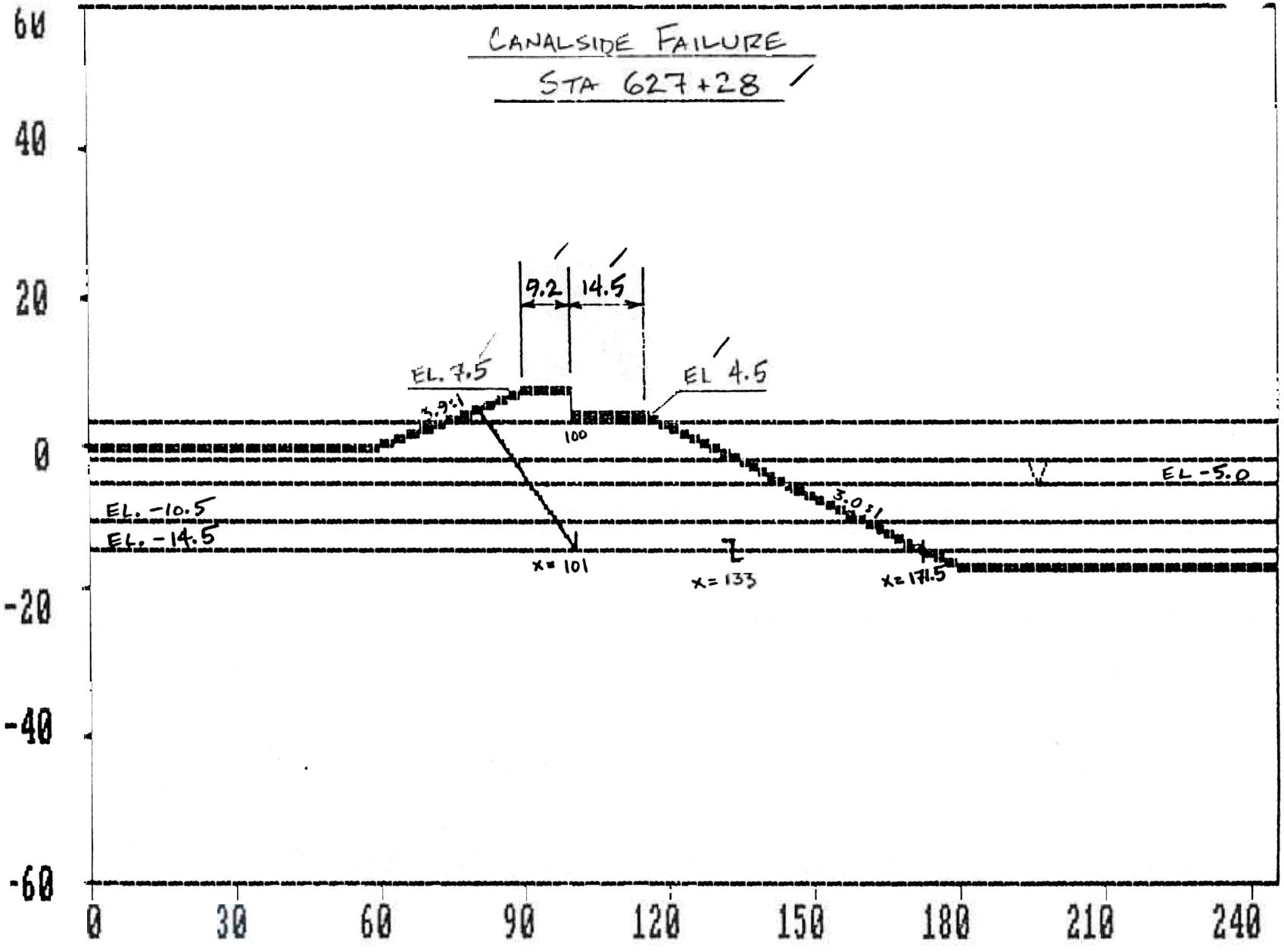
Landside Failure - No additional landside failure analysis was done.

Sheet Pile Analysis :

The following cross-sections were checked to determine the required penetration, design bending moment and maximum deflection :

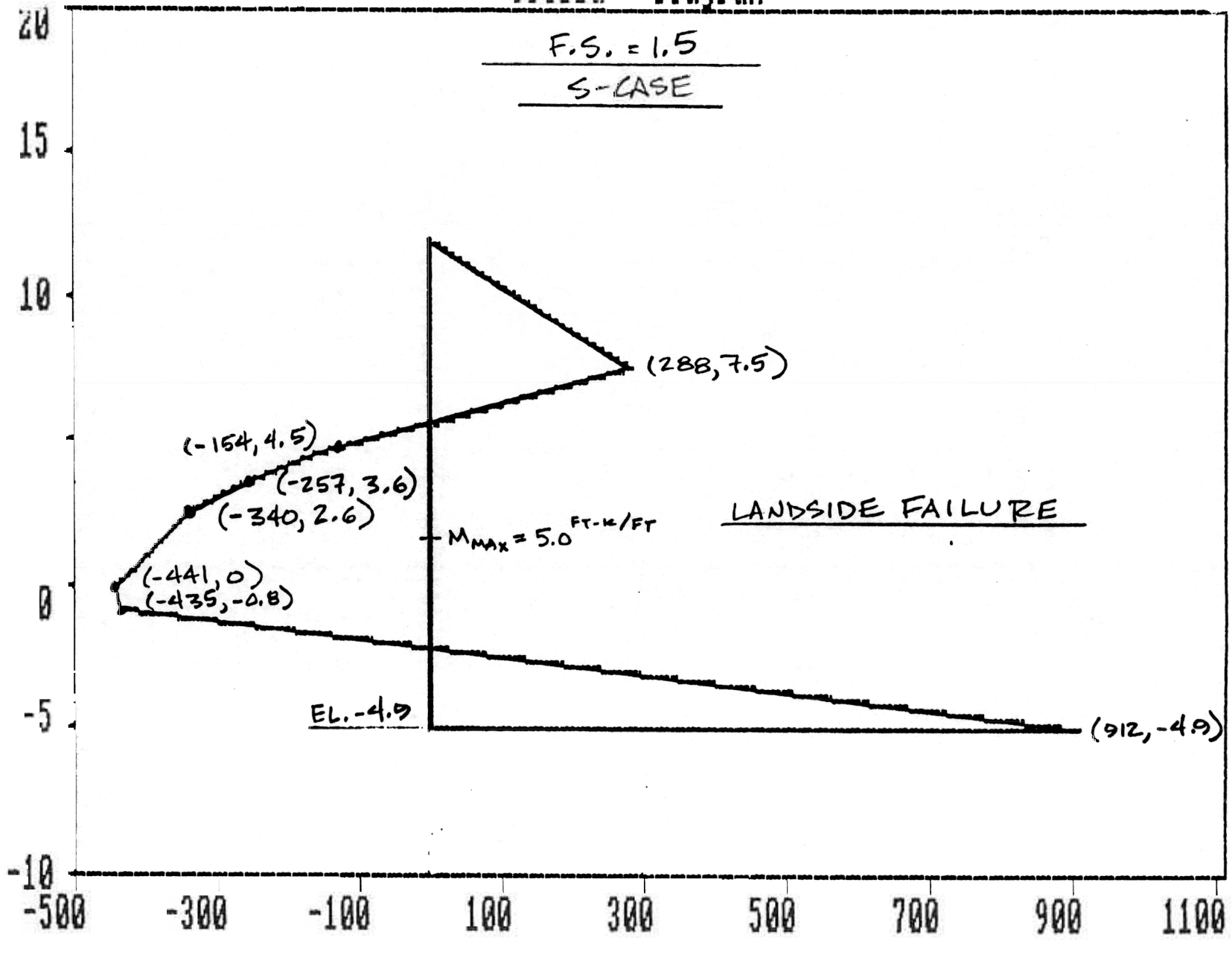
Canalside Failure - 627+28.
Landside Failure - 632+00 and 634+00.

Required Penetration : -4.9 (Landside Failure Sta. 634+00; S-Case F.S.=1.5)
Design Bending Moment : 5.8 Ft-K/Ft @ El. 1.6 (Landside Failure Sta. 634+00; S-Case F.S.=1.5)



ELEV.	R_A	R_B	R_P	D_A	D_P	F.S.
-14.5	14,251	13,588	0	24,191	2816	1.30

Pressl. Diagram



REACH 6

Revisions :

None

Submittals :

1. New sheet pile analyses taking into account the submerged canalside soil weight.

REACH 6
STA. 635+00 TO STA. 643+00

STA.	OFFSET TO EL. 9.5 ON EXISTING BACKSLOPE (FT)	OFFSET TO SHEET PILE (FT)	TOTAL CROWN WIDTH (FT)	EXISTING BACKSLOPE (H : V)	EXISTING LANDSIDE TOE EL.	DIST. FROM TOE TO GROUND EL. (FT)	EXISTING LANDSIDE GROUND EL.
636+00	224.3	213.1	13.2	3.8 : 1	-1.64	10.0	-1.64
638+31	226.6	217.9	10.7	3.9 : 1	-8.64	10.0	-1.54

Cross-Section Geometry : Crown El. 9.5 Crown Width on Land Side of Wall Varies
Crown Width on Canal Side of Wall = 2.0'

Slope Stability Analysis :

No additional stability analysis was done.

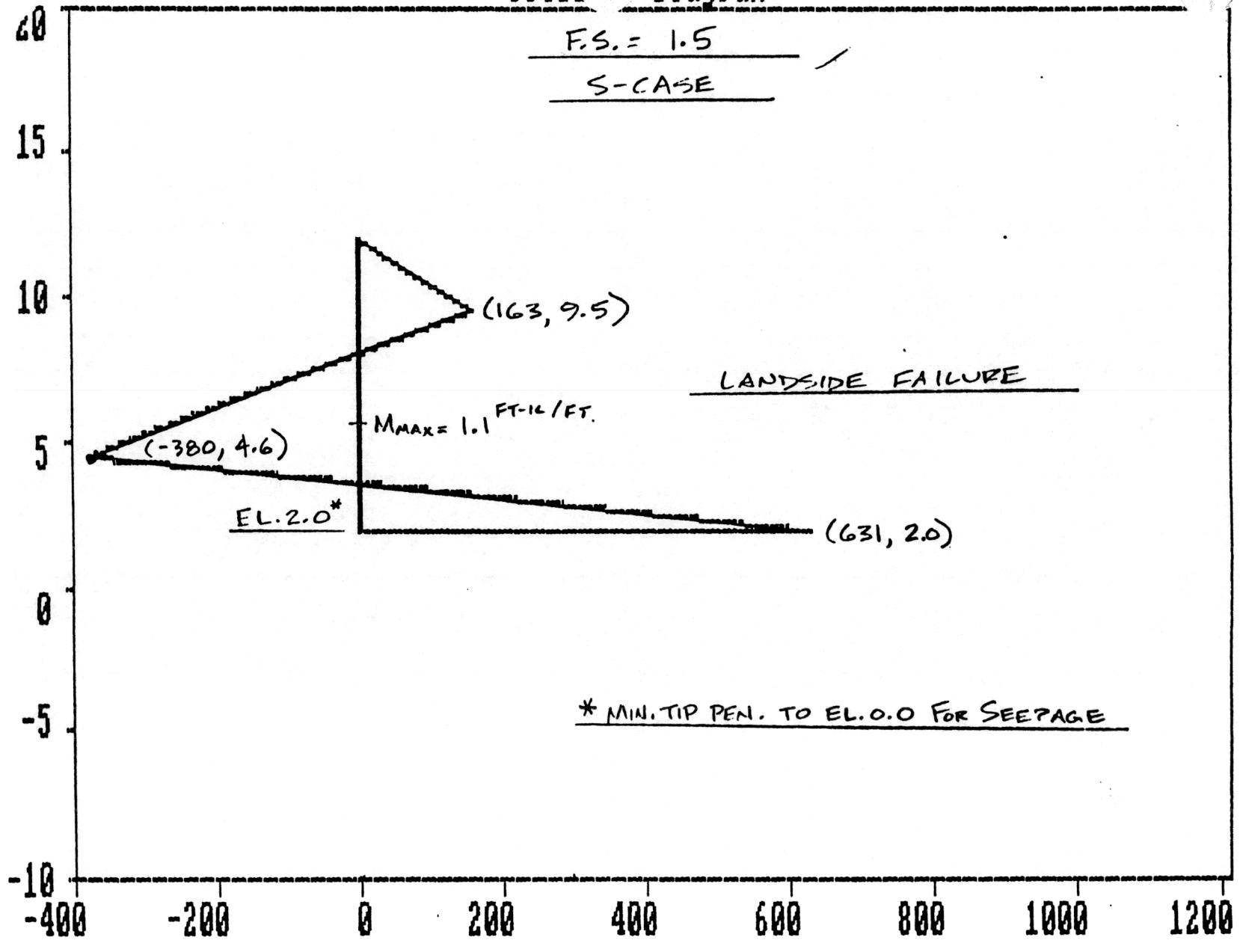
Sheet Pile Analysis :

Required Penetration : 8.0 (Governed by Seepage)
Design Bending Moment : 1.1 Ft-K/Ft @ El. 5.6 (Landside Failure Sta. 638+31; S-Case F.S.=1.5)
Maximum Deflection :

Pres[illegible] Diagram

F.S. = 1.5

S-CASE



LANDSIDE FAILURE

* MIN. TIP PEN. TO EL. 0.0 FOR SEEPAGE

REACH 7

Revisions :

1. Sheet pile alignment changed. (Maximum change in baseline offset is 1.3')

Submittals :

None

REACH 7
STA. 643+00 TO STA. 663+00

STA.	OFFSET TO EL. 12.0 ON EXISTING BACKSLOPE (FT)	OFFSET TO SHEET PILE (FT)	OFFSET TO EL. 12.0 ON CANALSLOPE (FT)	TOTAL CROWN WIDTH (FT)	EXISTING BACKSLOPE (H : V)
643+00	235.9	224.8	221.3	14.6	3.3 : 1
645+00	233.8	223.4	218.6	15.2	2.1 : 1
	233.8	222.9	219.6	14.2	2.7 : 1
	235.1	222.3	220.1	13.8	4.8 : 1
	233.2	221.7	217.1	16.1	3.8 : 1
	230.8	221.1	214.8	15.2	6.6 : 1
	231.6	220.6	215.4	16.2	3.3 : 1
657+00	(4 Pt.) 231.7	220.8	215.6	16.1	3.5 : 1
659+00	234.6	224.8	218.8	15.8	2.9 : 1
661+00	238.8	227.8	223.2	14.8	2.1 : 1
63+00	(See Reach 8)				

Cross-Section Geometry : Crown El. 12.8 Crown Width on Land Side of Wall Varies
Crown Width on Canal Side of Wall Varies

Slope Stability Analysis :

No additional stability analysis was done.

* Total Crown Width Includes Width on Canal Side of Sheet Pile Wall.

REACH 8

Revisions :

1. Sheet pile alignment changed.
2. Crown elevation lowered from El. 12.0 to El. 11.0.
3. Crown width behind the sheet pile wall changed from a constant 8.0' to a varying width between the sheet pile wall and El. 11.0 on the existing backslope.
4. Step elevation raised from El. 2.0 to El. 7.0.
5. Step width changed based on the above revisions.

Submittals :

1. New canalside stability analyses taking into account the above revisions and the piezometric headline of El. -2.4 in the sand.

REACH 8
STA. 663+00 TO STA. 670+00

STA.	OFFSET TO EL. 11.0 ON EXISTING BACKSLOPE (FT)	OFFSET TO SHEET PILE (FT)	OFFSET TO TOP OF SLOPE (FT)	TOTAL CROWN WIDTH* (FT)	STEP WIDTH (FT)	EXISTING BACKSLOPE (H : V)
663+00 (℄ Pt.)	244.6	238.0	228.0	16.6	4.3	2.8 : 1
665+00	242.1	238.0	228.0	14.1	5.6	2.8 : 1
667+00	237.1	238.0	228.0	9.1	12.3	4.2 : 1
669+87	237.5	238.0	228.0	9.5	16.2	15.6 : 1

Cross-Section Geometry :

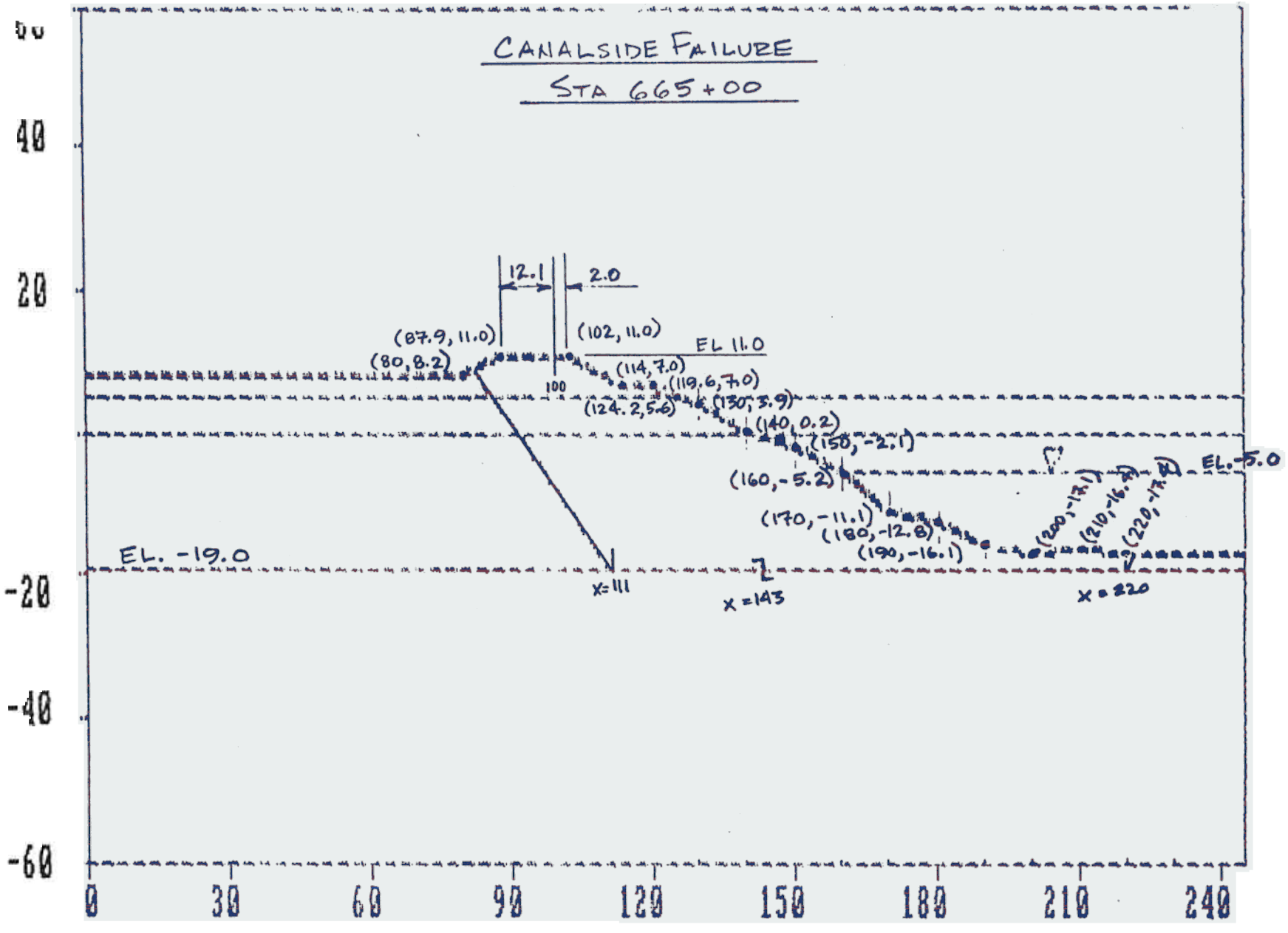
Crown El. 11.0 — Crown Width on Land Side of Wall Varies
Crown Width on Canal Side of Wall = 2.0'
Step El. 7.0 — Step Width Varies

Slope Stability Analysis :

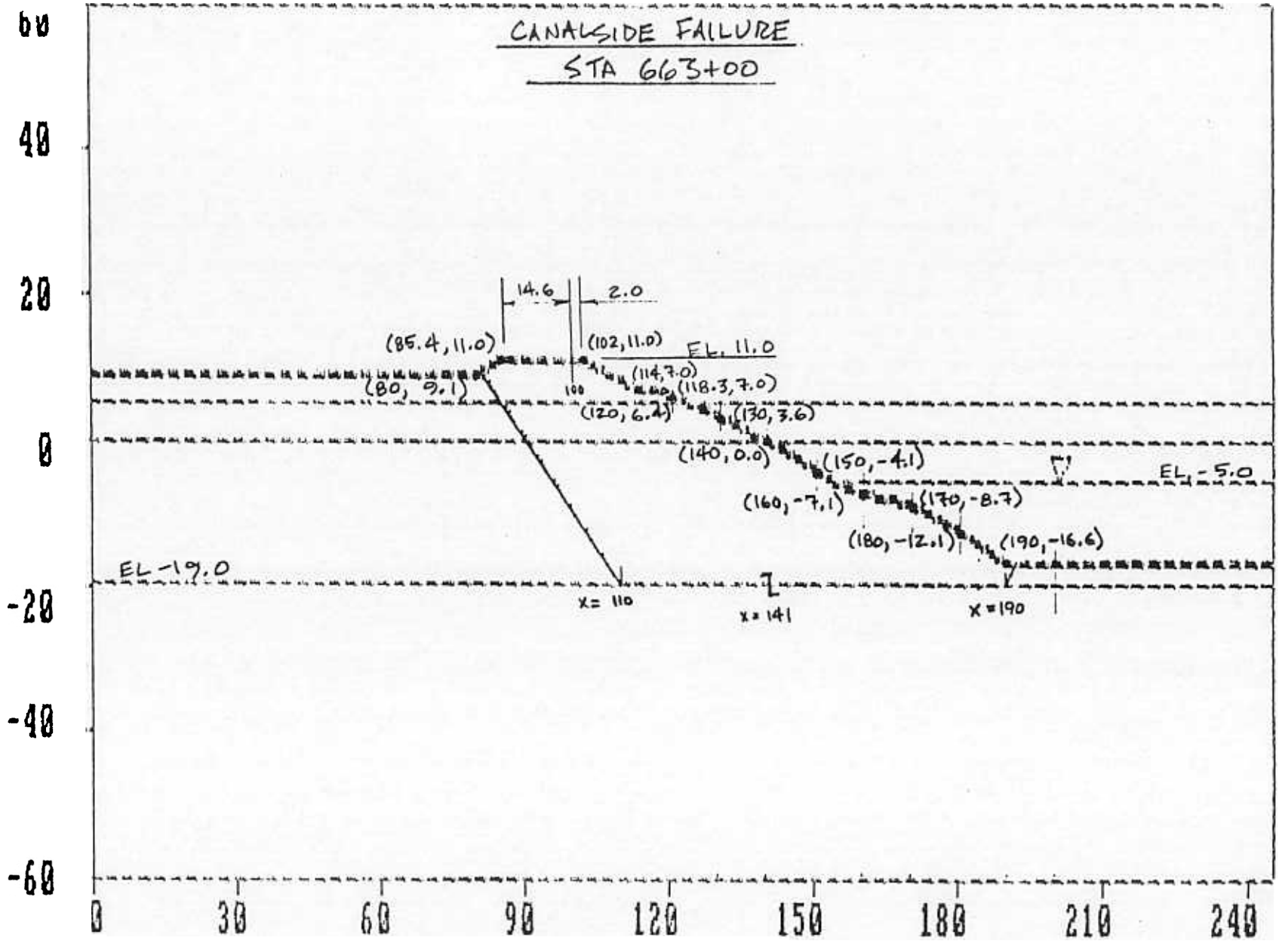
Canalside Failure - All cross-sections were checked. The section at Sta. 665+00 governs.
*** Minimum Factor of Safety = 1.32 at El. -19.0 ***

Landside Failure - No additional landside failure analysis was done.

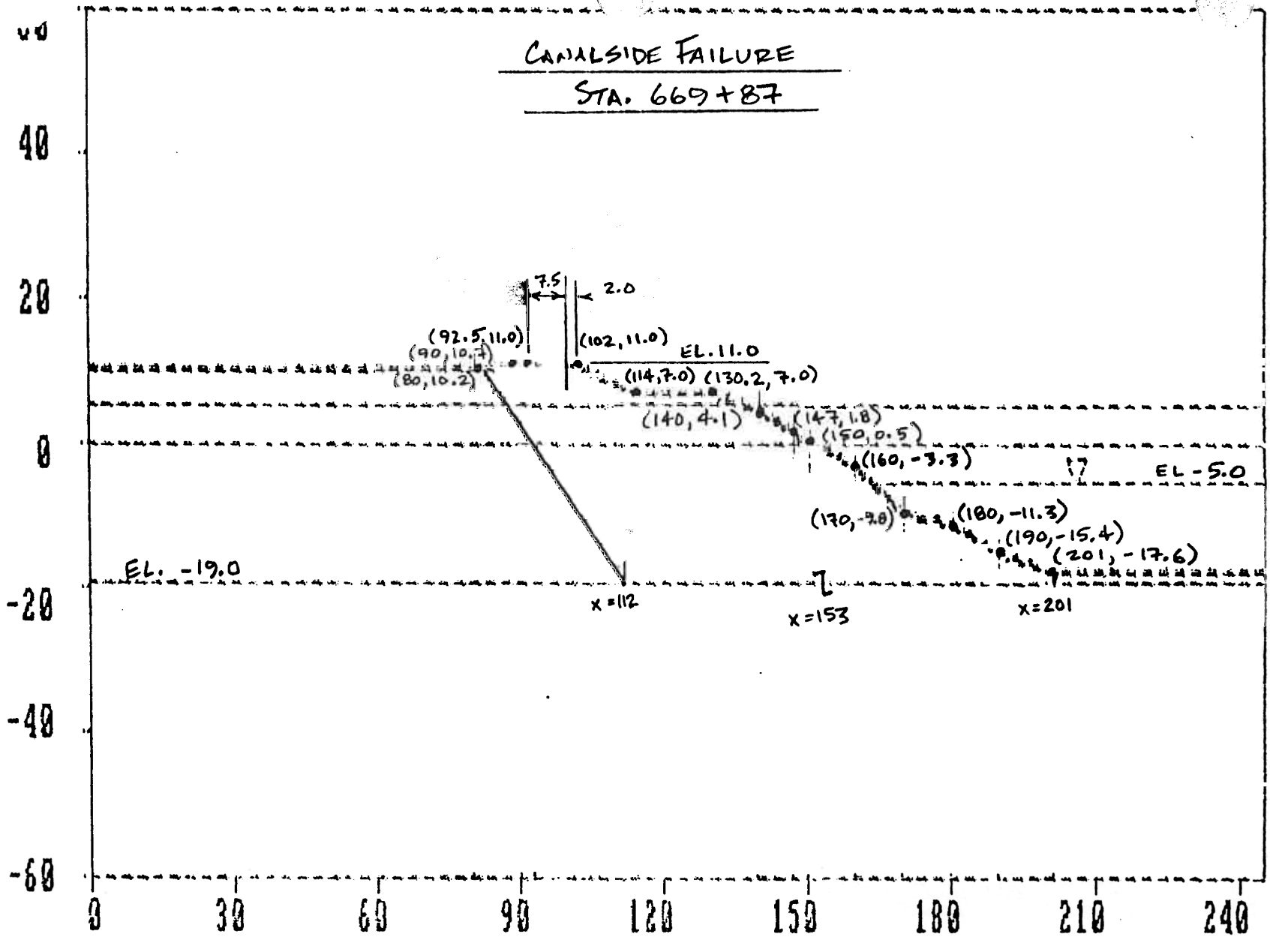
* Total Crown Width Includes Width on Canal Side of Sheet Pile Wall.



ELEV.	R_A	R_B	R_P	D_A	D_P	F.S. ✓
-19.0	25,071	27,446	1,722	47,316	6,172	1.32



ELEV	R_A	R_B	R_P	D_A	D_P	F.S. ✓
-19.0	25,551	26,925	2,563	47,932	6,244	1.32



ELEV.	P_A	P_B	P_P	D_A	D_P	F.S.
-19.0	26,438		.509	47,194	6,159	1.40