

MEMORANDUM THRU

EN-H
EN-GS

FOR OP-P

SUBJECT: Mobile Harbor - Dredged Material Disposal for Water Quality Recertification

1. This memorandum documents our findings for the subject evaluation. You verbally requested our determinations of the location, suitability, and quantity of dredged material from the subject project channel for disposal within the littoral zone.

2. Previous surveys and reports on monitoring of the shallow water berms in the vicinity of Sand Island were reviewed. The Sand Island Bar and Mound are located along the 19-foot contour about five miles south of the east end of Dauphin Island as shown in Enclosure 1, and are composed of fine-grained sand ($D_{50} = 0.2$ mm) suitable for littoral zone disposal. The bar was constructed as a test to return entrance channel maintenance material to the littoral zone, and the mound was a result of exploratory gas well operations. These berms have been monitored over a 56-month survey period between Mar 87 and Nov 91 to determine the fate of the material. The net displacement of the mound over this period was slightly west of north, or toward land and away from the navigation channel. It appears this movement included some spreading to the east in the direction of the channel, on the order of 125 feet. The bar material did not respond as a single unit, and had broken into three segments. The northernmost segment migrated northeastward, the middle segment gradually lost volume and disappeared, and part of the southern segment remained where placed initially. It is therefore recommended that the minimum distance from the channel for disposal of this type of material should be 200 feet, in order that the disposal material will not reenter the channel.

3. Boring records for three bay channel sump areas were also reviewed. These areas as shown in Enclosure 2 are located between stations 240+00 to 285+00 (upper), 717+00 to 782+00 (middle), and 870+00 to 925+00 (lower). The lower sump has already been dredged based on test plan recommendations for advance maintenance made by WES in 1993. The borings in the middle sump indicate no material suitable for littoral zone disposal would be encountered above elevation -53 feet MLLW, as shown in Enclosure 3. Since the recommended plan for this basin includes dredging only to -52 feet, no suitable material for disposal is available in this area, either. The plan recommended by WES for the upper sump area included a dredging quantity estimate of approximately 320,000 cubic yards for this 4,500-foot reach. However, the borings indicate suitable material is available only between stations 273+00 to 285+00. Therefore, the estimated quantity of material suitable for littoral zone disposal from this area is about 85,000 cubic yards.

CESAM-EN-HD

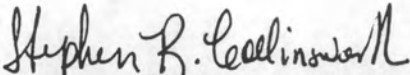
7 Jan 97

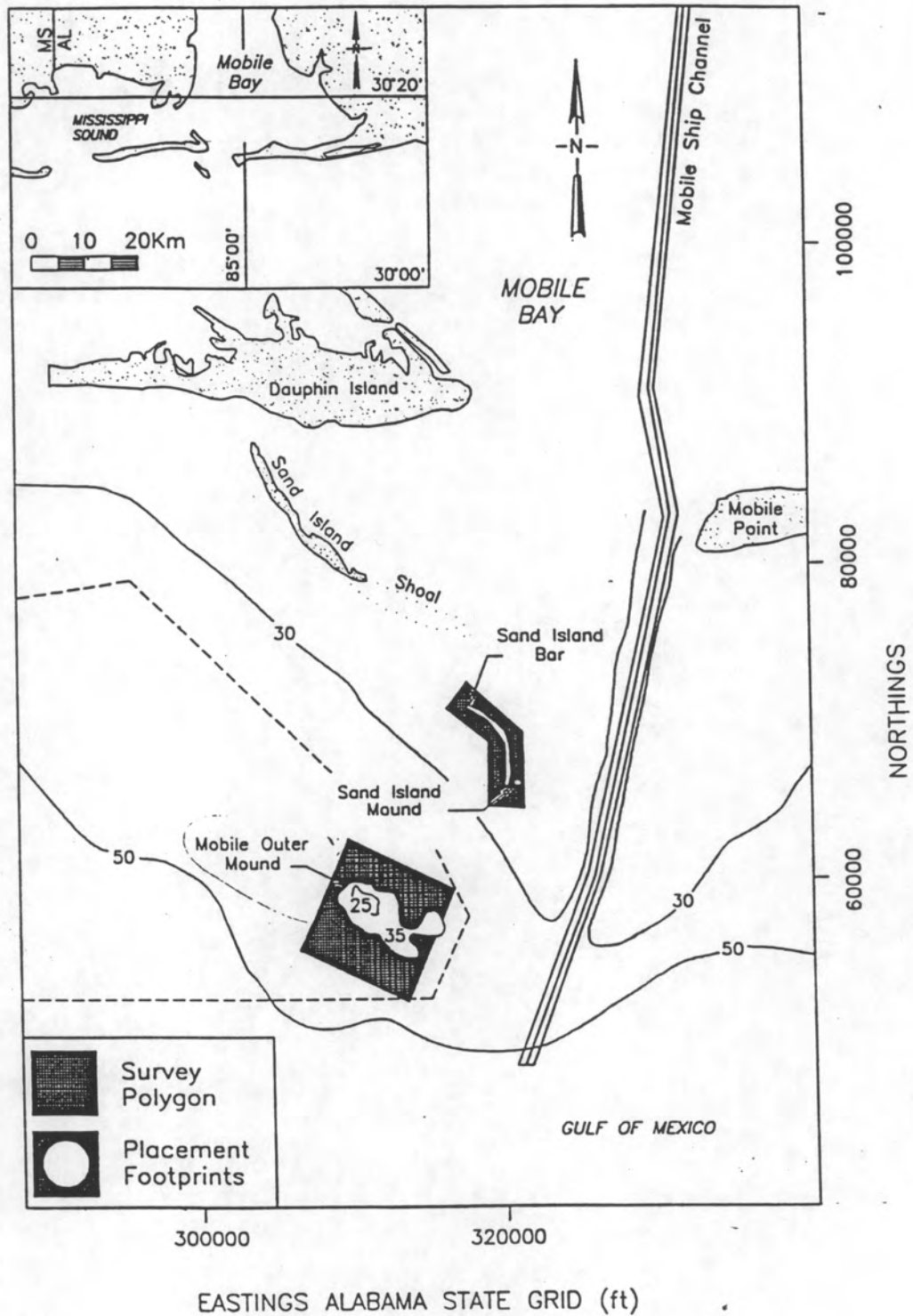
SUBJECT: Mobile Harbor - Dredged Material Disposal for Water Quality Recertification

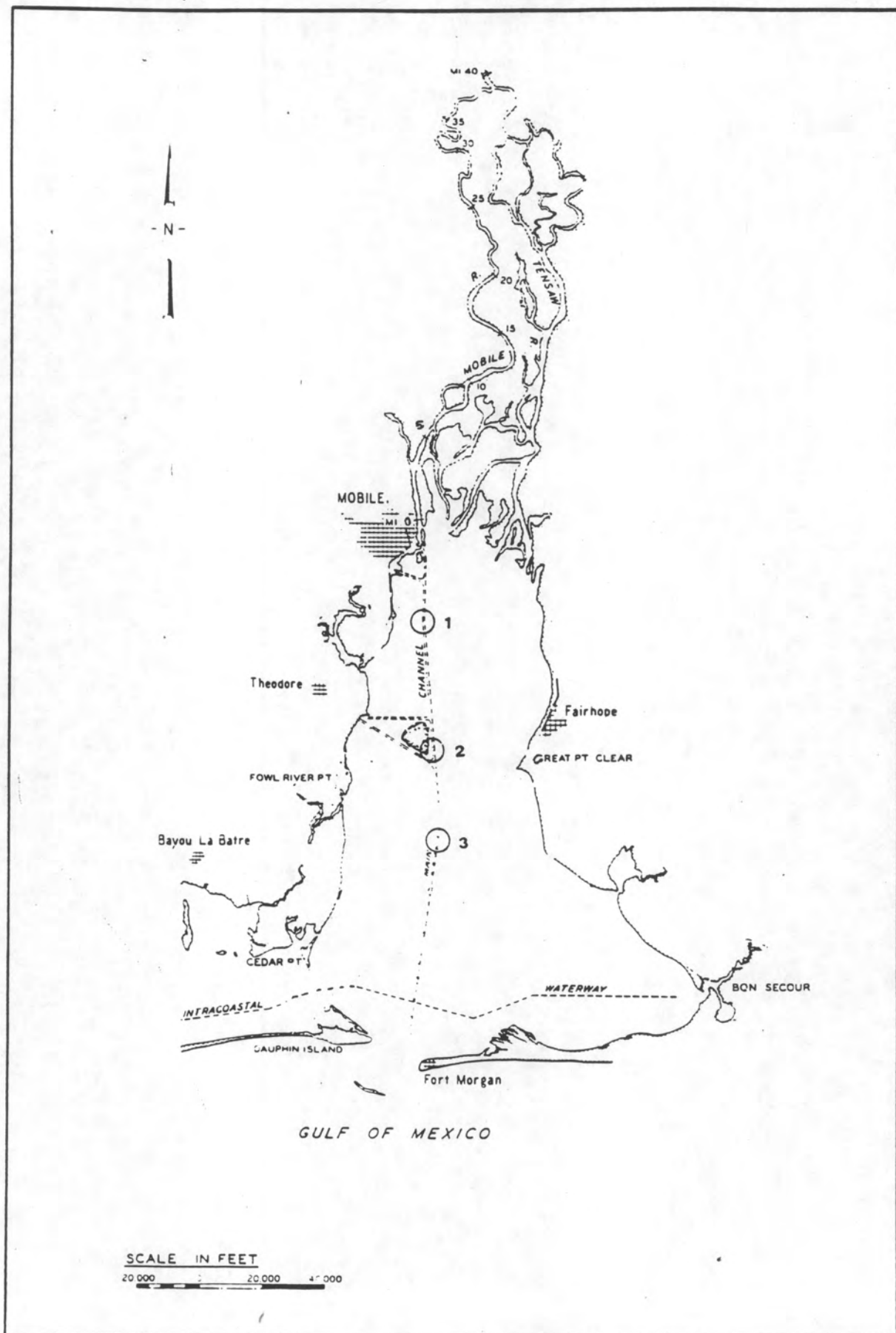
4. Twenty-four bottom surface samples indicative of typical maintenance material were obtained in two upper river channel basin (sump) areas. These areas are referred to as the north and south basins, as shown in Enclosure 4. Sieve analysis was conducted on each of these samples, and the results are also shown in this enclosure. The gradation curves indicate this material is predominantly silt or clay. None of the sampled material in the north or south basins would therefore be suitable for disposal within the littoral zone.

5. It should be noted that an acoustic impedance survey of the entire channel area would better define locations of new work and maintenance material suitable for littoral zone disposal. This type of survey would provide continuous information on material type throughout the project area, whereas borings and surface samples are only reliable for specific locations. Please contact us if you have questions or need additional information.

4 Encls
as


STEPHEN R. COLLINSWORTH
Chief, Coastal Engineering and
Hydraulic Design Section





Mobile Bay showing approximate locations for test reaches
 Stations (1) 240+00-285+00 (2) 717+00-782+00, and
 (3) 870+00-925+00

CESAM-EN-GS

Van Fleet/3435/22 November 1996

MEMORANDUM FOR EN-HD (Miller) *J6M 11/22/96*

SUBJECT: Mobile Harbor

Per your request EN-GS has reviewed the Mobile Harbor construction plans (1987) as well as appendix A, "Geology and Soils," of the GDM for soil characterization between specified channel stations. The table below lists the available boring logs grouped according to stationing, and evidence of sand strata encountered in the 1984 investigation.

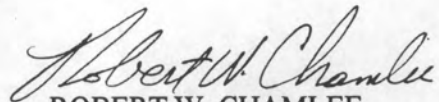
STATION RANGES	BORING	*NORTHING	*EASTING	SAND STRATA
240+00 - 285+00	VC-6-84	227270	332355	-55 to -70
	VC-7-84	224393	332590	-44 to -64
	SS-203-84	225200	332700	-44 to -56
	SS-203A-84	222482	333034	-48 to -65
717+00 - 782+00	VC-22-84	177900	33680	none
	VC-23-84	173500	337200	-53 to -68
870+00 - 925+00	VC-26-84	162200	338150	none
	VC-27-84	159300	338200	none
	SS-222-84	162100	338400	none

* Alabama West Zone Datum 1927

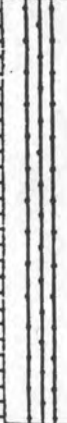
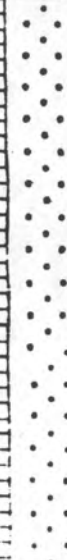
Copies of the above boring logs are attached for additional information.

For questions or comments please contact Mr. Steve Van Fleet at 690-3435.

Encls


ROBERT W. CHAMLEE
Chief, Dam Safety &
Soils Design Section

DRILLING LOG		DIVISION SAD	INSTALLATION MDO	SHEET 1 OF 2 SHEETS	
1. PROJECT MOBILE HARBOR CHANNEL DEEPENING			10. SIZE AND TYPE OF BIT 4" VIBRACORE		
2. LOCATION (Coordinates or Station) N 227,270 E 392,355			11. DATUM FOR ELEVATION SHOWN (TUN or MSL) MLLW ± 3 FT.		
3. DRILLING AGENCY MDO			12. MANUFACTURER'S DESIGNATION OF DRILL BARGE		
4. HOLE NO. (As shown on drawing title and 1:1a number) VC - 6 - 84			13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN		DISTURBED 4
5. NAME OF DRILLER C. FULLER			14. TOTAL NUMBER CORE BOXES		0
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.			15. ELEVATION GROUND WATER		
7. THICKNESS OF OVERBURDEN			16. DATE HOLE STARTED AUG. 1984		
8. DEPTH DRILLED INTO ROCK			17. ELEVATION TOP OF HOLE -42.0		
9. TOTAL DEPTH OF HOLE 28.0' (EL. - 70.0')			18. TOTAL CORE RECOVERY FOR BORING N/A		
			19. SIGNATURE OF INSPECTOR H. GATES		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	W-C e	SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-42.0	0		(CH) DARK GRAY FAT CLAY, VERY SOFT, WITH SOME ORGANIC MATERIAL			
	2					
	4				1	DEPTH 4.5'-5.0'
	6					
-49.0			(SM) LIGHT GRAY POORLY GRADED SILTY SAND, FINE GRAINED			
	8					
	10				2	DEPTH 9.5'-10.0'
	12					
-54.5			(SP) WHITE POORLY GRADED SAND, MEDIUM GRAINED			
	14					
	16				3	DEPTH 14.5'-15.0'
	18					
-62.0	20				4	DEPTH 19.5'-20.0'

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE

-42.0

Hole No. VC-6-84

PROJECT

MOBILE HARBOR CHANNEL DEEPENING

WATER-SATURATED

NDO

SHEET 2

OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	W-C	SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-62.0	20		(SP) WHITE POORLY GRADED SAND, MEDIUM GRAINED			
	22					
	24					
	26		WHITE, MEDIUM GRAINED, WITH GRAVEL, (1" MAX.)			
-70.0	28					

BOTTOM OF HOLE

LAB DATA :

SAM CLASS LL PL PI

#

2

CL

-

-

-

3

SP

NP

NP

NP

4

SP

NP

NP

NP

SAM LOI (%) -200 (%)

#

1

8.3

91.6

DRILLING LOG		DIVISION GAD	INSTALLATION MDO		SHEET 1 OF 2 SHEETS	
1. PROJECT MOBILE HARBOR CHANNEL DEEPENING			10. SIZE AND TYPE OF BIT 4" VIBRACORE			
2. LOCATION (Coordinates or Station) N 224,343 E 332,591			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLLW ± 3 FT.			
3. DRILLING AGENCY MDO			12. MANUFACTURER'S DESIGNATION OF DRILL BARGE			
4. HOLE NO. (As shown on drawing title and file number) VC-7-84			13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN		DISTURBED 4	UNDISTURBED 0
5. NAME OF DRILLER C. FULLER			14. TOTAL NUMBER CORE BOXES		0	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.			15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN			16. DATE HOLE		STARTED AUG. 1984	COMPLETED AUG. 1984
8. DEPTH DRILLED INTO ROCK			17. ELEVATION TOP OF HOLE		- 37.0	
9. TOTAL DEPTH OF HOLE 27.2' (EL. -64.2)			18. TOTAL CORE RECOVERY FOR BORING		N/A	
			19. SIGNATURE OF INSPECTOR H. GATES			

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE -37.0		Hole No. VC-7-84	
PROJECT MOBILE HARBOR CHANNEL DEEPENING		INSTALLATION MDO		SHEET 2 OF 2 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	W-C e	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) f
-57.0	20				
	22		(SP) WHITE POORLY GRADED SAND, MEDIUM GRAINED		
	24				
	26			4	DEPTH 24.5' - 25.0'
-64.2					
	28		BOTTOM OF HOLE		

LAB DATA :				
SAM #	CLASS	LL	PL	PI
1	CH	82	26	56
3	SP	NP	NP	NP

SAND LOI (%) - 200 (%)		
SAM #	LOI (%)	200 (%)
1	9.2	82.3

DRILLING LOG		DIVISION SAD	INSTALLATION MDO	SHEET 1 OF 3 SHEETS
1. PROJECT MOBILE HARBOR DEEPENING			10. SIZE AND TYPE OF PIT (28" I.D.) SPLITSPOON	
2. LOCATION (Coordinates or Station) N-225,200 E 332,700			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY MDO 200' E. BN. 74			12. MANUFACTURER'S DESIGNATION OF DRILL FALLING 314	
4. HOLE NO. (As shown on drawing title and file number) 55-203-84			13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 19 UNDISTURBED 0	
5. NAME OF DRILLER L. LAGRONE			14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.			15. ELEVATION-GROUND WATER DEPTH 17.0'	
7. THICKNESS OF OVERBURDEN			16. DATE HOLE STARTED 19 APR 84 COMPLETED 19 APR 84	
8. DEPTH DRILLED INTO ROCK			17. ELEVATION TOP OF HOLE -15.7 MSL	
9. TOTAL DEPTH OF HOLE 48.0' (EL. -63.7)			18. TOTAL CORE RECOVERY FOR BORING NA %	
			19. SIGNATURE OF INSPECTOR D. HODGES <i>DA</i>	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	3-CORE- WEC- NO. e	BOX-OR- SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g BLOWS/FT.
-15.7	0					NOTES: FISHTAILED TO ELEV. -28.7 MSL AFTER SETTING 36' OF 6" CASING W/ 4' OF STICK-UP FROM WATER SURFACE. BEGAN SPLITSPOONING @ ELEV. -28.7, USE 2 BAGS OF REVERT DRL. FLUID. SOUPY CLY SILT TO -25. LARGE CHUNKS OF SOFT FAT CLAY EXTRACTED -25 to -30 **SAMPLED CUTTINGS 25'-27'
	2					
	4					
	6					
	8					
	10					
	12					
	14			63		
-28.7						
	14			77	1	
	16			75	2	
	18				3	
	20				4	
	22			87	5	

NO SAMPLES**
(FISHTAILED)

(CH) GR. FAT CLAY
CH 11.4

FISHTAILED

WR

WR

VH

VH

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE - 15.7 MSL		Hole No. 55-203-84		
PROJECT MOBILE HARBOR DEEPENING			INSTALLATION MDO		SHEET 2 OF 3 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	W-CORE NO. WeC	SOX-OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g BLOWS/FT.
-35.7	20		(CH) GR. FAT CLAY CHUNKY	87	5	WR
	22			72	6	WR
			HD. 1/2 STIF.	42	7	WH
	24		"		8	21
	26		LT. GR.	38	9	31
			"	30	10	31
-43.7	28		(SP) WHT. PR. GRAD. SAND, MED. - C. GRA.		11	31
	30				12	47
	32				13	47
					14	46
	34				15	44
	36				16	36
	38				17	40
					18	37
-45.7	40		NO SAMPLES (FISHTAILED)			37
	42					
-47.7	44					

DRILLING LOG (Cont Sheet)			ELEVATION TOP OF HOLE - 15.7 MSL		Hole No. 55-203-84																																																																																																																	
PROJECT MOBILE HARBOR DEEPENING			INSTALLATION MDO		SHEET 3 OF 3 SHEETS																																																																																																																	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	AL-CORE- RECON- ERY- WeC	BOX-OR- SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g BLOWS/PT.																																																																																																																
-59.7	44	X	NO SAMPLES (FISHTAILED)			FISHTAILED																																																																																																																
-61.7	46																																																																																																																					
-63.7	48	•••••	(SP) WHT. PR. GRAD. SAND, MED. - C. GRA.		23	63																																																																																																																
			B.O.H.			NOTE: THE LAST SPLITSPOON DRIVE WAS 2.0'. FINISHED HOLE 1625 hrs. WATER DEPTH 16.3'. HIGH TIDE @ 1421 hrs LOW TIDE @ 0050																																																																																																																
				LAB. CLASSIFICATION <table border="1"> <thead> <tr> <th>JAR</th> <th>+200</th> <th>+40</th> <th>CLASS.</th> <th>LL</th> <th>PL</th> <th>PI</th> </tr> </thead> <tbody> <tr><td>1</td><td>-</td><td>-</td><td>CH</td><td>77</td><td>24</td><td>53</td></tr> <tr><td>6</td><td>-</td><td>-</td><td>CH</td><td>77</td><td>25</td><td>52</td></tr> <tr><td>10</td><td>-</td><td>-</td><td>CL</td><td>45</td><td>15</td><td>30</td></tr> <tr><td>13</td><td>-</td><td>-</td><td>SP</td><td>NP</td><td>NP</td><td>NP</td></tr> <tr><td>18</td><td>-</td><td>-</td><td>SP</td><td>NP</td><td>NP</td><td>NP</td></tr> <tr><td>2</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>3</td><td>5.2</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>5</td><td>4.5</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>7</td><td>4.9</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>9</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>12</td><td>-</td><td>22.1</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>15</td><td>-</td><td>2.7</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>16</td><td>-</td><td>2.0</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>23</td><td>-</td><td>44.4</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>F/T</td><td>19.8</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>			JAR	+200	+40	CLASS.	LL	PL	PI	1	-	-	CH	77	24	53	6	-	-	CH	77	25	52	10	-	-	CL	45	15	30	13	-	-	SP	NP	NP	NP	18	-	-	SP	NP	NP	NP	2	-	-	-	-	-	-	3	5.2	-	-	-	-	-	5	4.5	-	-	-	-	-	7	4.9	-	-	-	-	-	9	-	-	-	-	-	-	12	-	22.1	-	-	-	-	15	-	2.7	-	-	-	-	16	-	2.0	-	-	-	-	23	-	44.4	-	-	-	-	F/T	19.8	-	-	-	-	-
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DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE - 13.6 MSL		Hole No. 55-203A-84				
PROJECT MOBILE HARBOR DEEPENING			INSTALLATION MDO		SHEET 2 OF 3 SHEETS			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	4-CORE REC'D -84- WeC	8-GR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g BLOWS/FT.		
-33.6	20		(CH) GR. FAT CLAY SO-FIRM " HD, V/STIF " LT. GRAY " " SP, Co.		3	WR		
	22			81	4	WR		
	24				5	WR		
	26				6	WR		
	28			41	7	2		
	30			34	8	2		
	32				9	4		
	34			36	10	7		
-46.5	36				28	11	12	
-48.0	38				(SC) LT. GR. CLY. SAND, F. GRA.	20	12	15
	40				(SP) GR. & YEL. PR. GRAD. SAND, MED.- C. GRA.		13	50
	42				14	51		
	44				15	26		
-54.0	46		GR. & WHT., MED.- C. GRA.			16	30	
-55.5	48		NO SAMPLE (FISHTAILED)			FISHTAILED		
-57.0	50		(SP) WHT. PR. GRAD. SAND, MED.- C. GRA.		18			
	52		NO SAMPLES (FISHTAILED)			FISHTAILED		

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE - 13.6 MSL		Hole No. 55-203A-84	
PROJECT MOBILE HARBOR DEEPENING			INSTALLATION MDO		SHEET 3 OF 3 SHEETS
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	W-CORR RECOV -BY- WeC	BOX-OR SAMPLE NO. f
-57.6	44	X	NO SAMPLE (FISHTAILED)		
-58.5					
	46	•••••	(SP) WHT. PR. GRAD. SAND, C. GRA.		20
-60.0					
	48	X	NO SAMPLE (FISHTAILED)		
-61.5					
	50	•••••	(SP) WHT. PR. GRAD. SAND, C. GRA., W/ TR. OF GVL., (1/2" MAX.)		22
	52	•••••	WHT., C. GRA., W/ A LIT. GVL., (3/4" MAX.)		23
-65.0					
	54		B.O.H.		
	56				
	58				
	60				
	62				
	64				
	66				
	68				
	70				
	72				
	74				
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	190				
	192				
	194				
	196				
	198				
	200				

REMARKS
 (Drilling time, water loss, depth of
weathering, etc., if significant)
 8 BLOWS/FT.

FISHTAILED

28

FISHTAILED

35

39

NOTE:
 THE LAST SPLITSPOON
 DRIVE WAS 20'.

FINISHED HOLE 1200hrs
 WATER DEPTH 13.4'.
 HIGH TIDE: 1507
 LOW TIDE: 0216

LAB CLASSIFICATION:

SPG.	+200	SAMP	CLASS.	LL	PL	PI
—	—	1	(CH)	81	27	54
—	—	5	(CH)	76	25	51
—	—	10	(CH)	52	18	34
—	—	13	(SM)			
—	—	15	(SC)			
—	—	20	(SP)	NP	NP	NP
—	—	23	(SP-SM)	NP	NP	NP
—	14.5	2				
—	6.4	3				
—	9.3	4				
—	13.4	7				
—	13.2	8				
2.67	31.2	11				
2.51	77.5	12				

DRILLING LOG		DIVISION SAD	INSTALLATION MDO	SHEET 1 OF 2 SHEETS	
1. PROJECT MOBILE HARBOR CHANNEL DEEPENING			10. SIZE AND TYPE OF BIT 4" VIBRACORE		
2. LOCATION (Coordinates or Station) DUE WEST BN 56, C/L CHANNEL			11. DATUM FOR ELEVATION SHOWN (FIM or MSL) MLLW ± 3 FT.		
3. DRILLING AGENCY MDO			12. MANUFACTURER'S DESIGNATION OF DRILL BARGE		
4. HOLE NO. (As shown on drawing title and file number) VC-22-84			13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN 5		
5. NAME OF DRILLER C. FULLER			14. TOTAL NUMBER CORE BOXES 0		
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.			15. ELEVATION GROUND WATER		
7. THICKNESS OF OVERBURDEN			16. DATE HOLE AUG. 1984		
8. DEPTH DRILLED INTO ROCK			17. ELEVATION TOP OF HOLE -43.0		
9. TOTAL DEPTH OF HOLE 30.0' (EL. -73.0')			18. TOTAL CORE RECOVERY FOR BORING N/A		
			19. SIGNATURE OF INSPECTOR H. GATES		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	W-C e	SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-43.0	0		(CH) BLACK FAT CLAY WITH ORGANIC MATERIAL			DEPTH 2.5'-3.0'
	2			173	1	
	4					
	6					
	8					
	10					
	12					
	14					
	16					
	18					
	20		GRAY, SOFT	67	2	DEPTH 8.5'-9.0'
	22					
	24					
	26					
	28					
	30					
	32					
	34					
	36					
	38					
	40			49	3	DEPTH 14.5'-15.0'
	42					
	44					
	46					
	48					
	50					
	52					
	54					
	56					
	58					
	60			93	4	DEPTH 19.5'-21.0'
	62					
	64					
	66					
	68					
	70					
	72					
	74					
	76					
	78					
	80					
	82					
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	738					
	740					
	74					

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF PILE - 43.0		Hole No. VC-22- 84	
PROJECT MOBILE HARBOR CHANNEL DEEPENING		INSTALLATION MDO		SHEET 2 OF 2 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	WcC	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) e
-63.0	20		(CH) GRAY FAT CLAY, SOFT		
	22				
	24				
	26				
-70.0				202	5 DEPTH 27.0' - 27.5'
	28		(OL) BROWN & GRAY ORGANIC SILT		
-73.0	30				
			BOTTOM OF HOLE		

LAB DATA :			
SAM #	CLASS	LL	PL PI
2	CH	56	23 33

SAM #	LOI (%)	-200 (%)
1	11.1	98.8
3	-	84.7
5	40.3	81.4

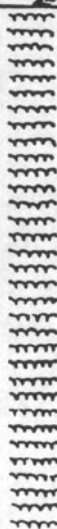
PROJECT		ELEVATION 2.0 CM HWT		Hole No. VC-23- 84	
MOBILE HARBOR CHANNEL DEEPENING		-38.0		SHEET 2 OF 2 SHEETS	
INSTALLATION		MDO		REMARKS	
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	W.C.	SAMPLE NO.
-58.0	20				1
	22				
	24		(SM) GRAY & WHITE POORLY GRADED SILTY SAND		
	26				4
	28				
-68.0	30				5
			BOTTOM OF HOLE		
				LAB DATA : SAM CLASS LL PL PI # 3 SM-SC - - - 4 SP-SM NP NP NP 5 SP-SM NP NP NP SAM LOI (%) -200 () # 2 - 62.8	

DRILLING LOG		DIVISION SAD	INSTALLATION MDO	SHEET 1 OF 2 SHEETS
1. PROJECT MOBILE HARBOR CHANNEL DEEPENING			10. SIZE AND TYPE OF BIT 4" VIBRACORE	
2. LOCATION (Coordinates or Station) BETWEEN BN 50 & BN 49, C/L CHANNEL			11. DATUM FOR ELEVATION SHOWN (THM = MSL) MLLW ± 3 FT.	
3. DRILLING AGENCY MDO			12. MANUFACTURER'S DESIGNATION OF DRILL BARGE	
4. HOLE NO. (As shown on drawing title and file number) VC - 26 - 84			13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 4 UNDISTURBED 0	
5. NAME OF DRILLER C. FULLER			14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE DE VERTICAL ☐ INCLINED _____ DEG. FROM VERT.			15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN			16. DATE HOLE STARTED AUG. 1984 COMPLETED AUG. 1984	
8. DEPTH DRILLED INTO ROCK			17. ELEVATION TOP OF HOLE -43.0	
9. TOTAL DEPTH OF HOLE 25.0' (EL. - 68.0)			18. TOTAL CORE RECOVERY FOR BORING N/A	
			19. SIGNATURE OF INSPECTOR H. GATES	

ELEVATION e	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	W.C. e	SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-43.0	0					
	2					
	4		(CH) GRAY FAT CLAY, SOFT			
	6			87	1	DEPTH 4.5'-5.0'
	8					
	10			81	2	DEPTH 9.5'-10.0'
	12					
	14			87	3	DEPTH 14.5'-15.0'
	16					
	18			63	4	DEPTH 17.5'-18.0'
-68.0	20					

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE - 49.0		Hole No. VC-26- 84		
PROJECT MOBILE HARBOR CHANNEL DEEPENING		INSTALLATION MDO		SHEET 2 OF 2 SHEETS		
ELEVATION a	DEPTH h	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	W & C e	SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-67.0	20		(CH) GRAY FAT CLAY, SOFT			
	22					
	24					
-68.0					5	DEPTH 24.5' - 25.0'
	26		BOTTOM OF HOLE			LAB DATA : SAM CLASS LL PL PI # 2 CH - - -

DRILLING LOG		DIVISION SAD		INSTALLATION MDO		SHEET 1 OF 2 SHEETS	
1. PROJECT MOBILE HARBOR CHANNEL DEEPENING				10. SIZE AND TYPE OF BIT 4" VIBRACORE			
2. LOCATION (Coordinates or Station) DUE EAST OF BN 47, C/L CHANNEL				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLLW ± 3 FT.			
3. DRILLING AGENCY MDO		N. 159,300 E. 338,200		12. MANUFACTURER'S DESIGNATION OF DRILL BARGE			
4. HOLE NO. (As shown on drawing title and file number) VC-27-84				13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN 4		DISTURBED 0	
5. NAME OF DRILLER C. FULLER				14. TOTAL NUMBER CORE BOXES 0			
6. DIRECTION OF HOLE VERTICAL ☒ INCLINED ☐ DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN				16. DATE HOLE AUG. 1984			
8. DEPTH DRILLED INTO ROCK				17. ELEVATION TOP OF HOLE - 38.0			
9. TOTAL DEPTH OF HOLE 22.0' (EL. -60.0')				18. TOTAL CORE RECOVERY FOR BORING N/A		19. SIGNATURE OF INSPECTOR H. GATES	
DY							

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	LOG W-C	SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-38.0	0		(CH) GRAY FAT CLAY, VERY SOFT, WITH ORGANIC MATERIAL			
	2					
	4					
	6					
	8					
	10					
	12					
	14					
	16					
	18					
-51.2	14		(PT) DARK BROWN & GRAY CLAYEY PEAT			
	16					
	18					
	20					
	22					
-58.0	20					

97	1	DEPTH 4.5'-5.0'
39	2	DEPTH 9.5'-10.0'
179	3	DEPTH 14.5'-15.0'
117	4	DEPTH 19.5'-20.0'

DRILLING LOG (Cont Sheet)		ELEVATION T. OF HOLE - 38.0		Hole No. VC-27- 84										
PROJECT MOBILE HARBOR CHANNEL DEEPENING			INSTALLATION MDO		SHEET 2 OF 2 SHEETS									
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	W.C. e	SAMPLE NO. f									
-58.0	20	     	(PT) DARK BROWN & GRAY CLAYEY PEAT											
-60.0	22		BOTTOM OF HOLE											
				LAB DATA : <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>SAM #</th> <th>LOI (%)</th> <th>-200 (%)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-</td> <td>97.2</td> </tr> <tr> <td>3</td> <td>21.7</td> <td>91.0</td> </tr> </tbody> </table>		SAM #	LOI (%)	-200 (%)	1	-	97.2	3	21.7	91.0
SAM #	LOI (%)	-200 (%)												
1	-	97.2												
3	21.7	91.0												

DRILLING LOG		DIVISION SAD	INSTALLATION MDO	SHEET 1 OF 2 SHEETS	
1. PROJECT MOBILE HARBOR CHANNEL DEEPENING			10. SIZE AND TYPE OF BIT 4" VIBRACORE		
2. LOCATION (Coordinates or Station) BETWEEN BU 45 & BU 46, C/L CHANNEL			11. DATUM FOR ELEVATION SHOWN (TUM or MLL) MLLW ± 3 FT.		
3. DRILLING AGENCY MDO			12. MANUFACTURER'S DESIGNATION OF DRILL BARGE		
4. HOLE NO. (As shown on drawing title and file number) VC-28-84			13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN		DISTURBED 4
					UNDISTURBED 0
5. NAME OF DRILLER C. FULLER			14. TOTAL NUMBER CORE BOXES 0		
6. DIRECTION OF HOLE VERTICAL ☒ INCLINED ☐ DEG. FROM VERT.			15. ELEVATION GROUND WATER		
7. THICKNESS OF OVERBURDEN			16. DATE HOLE AUG. 1984		
8. DEPTH DRILLED INTO ROCK			17. ELEVATION TOP OF HOLE - 43.0		
9. TOTAL DEPTH OF HOLE 30.0' (EL. - 73.0')			18. TOTAL CORE RECOVERY FOR BORING N/A		
			19. SIGNATURE OF INSPECTOR H. GATES		

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	W-C e	SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-43.0	0					
	2		(CH) BLACK FAT CLAY, VERY SOFT			
	4					
	6			142	1	DEPTH 4.5'-5.0'
	8					
	10			78	2	DEPTH 9.5'-10.0'
	12		GRAY, VERY SOFT			
	14					
-58.5	16					
	18		(SP) GRAY POORLY GRADED SAND		3	DEPTH 17.5'-18.0'
-63.0	20					

DRILLING LOG		DIVISION SAD	INSTALLATION MDO	SHEET 1 OF 3 SHEETS
1. PROJECT MOBILE HARBOR DEEPENING			10. SIZE AND TYPE OF BIT 1 3/4" I.D. SPLIT-POON	
2. LOCATION (Coordinates or Station) N 162 100 E 338400			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY MDO 100' W. BN. 50			12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 314	
4. HOLE NO. (As shown on drawing title and file number) 35-222-84			13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 8 UNDISTURBED 0
5. NAME OF DRILLER S. BOWDEN			14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.			15. ELEVATION-GROUND-WATER DEPTH 13.0'	
7. THICKNESS OF OVERBURDEN			16. DATE HOLE STARTED 10 MAY 84 COMPLETED 10 MAY 84	
8. DEPTH DRILLED INTO ROCK			17. ELEVATION TOP OF HOLE - 12.4 MSL	
9. TOTAL DEPTH OF HOLE 52.0' (EL. - 64.4)			18. TOTAL CORE RECOVERY FOR BORING NA	
			19. SIGNATURE OF INSPECTOR D. HODGES	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY % W-C	BOX-OR- SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g BLOWS / FT.
-12.4	0					NOTES: FISHTAILED TO ELEV. -29.4 MSL AFTER SETTING 30' OF 6" CASING W/ 4' OF STICK-UP FROM WATER SURFACE. BEGAN SPLITSPOONING @ ELEV. -29.4 MSL, USED ONE BAG OF REVERT DRL. FLUID.
	2					
	4					
	6					
	8					
	10					
	12					
	14					
	16					
-29.4						FISHTAILED
-30.1	18		(CH) GR. FAT CLAY	116	1	WL
-30.4	20		NO SAMPLES (FISHTAILED)			FISHTAILED

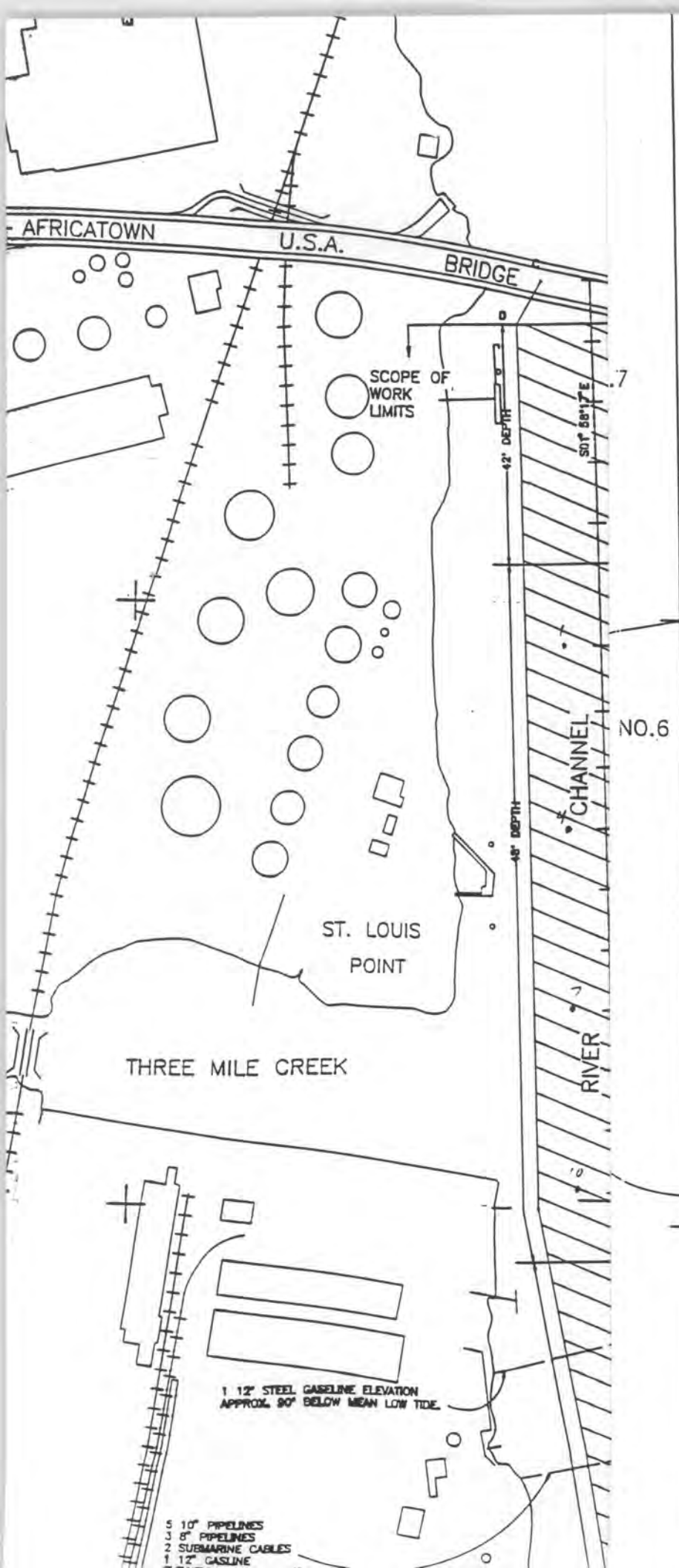
DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE - 12.4 MSL		Hole No. 55-222-134		
PROJECT MOBILE HARBOR DEEPENING			INSTALLATION MDO		SHEET 2 OF 3 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	W-CORE SECTION W/C	BOX-CORE SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g BLOWS/ FT.
-32.4	20		NO SAMPLE (FISHTAILED)			
-34.4	22					FISHTAILED
-35.9			(CH) GR. FAT CLAY V/SO	105	2	WR
	24					
			NO SAMPLES (FISHTAILED)			
	26					
-39.4						FISHTAILED
	28		(CH) GR. FAT CLAY V/SO	106	3	WR
-40.9						
	30		NO SAMPLES (FISHTAILED)			
-44.4	32		(CH) GR. FAT CLAY V/SO	92	4	WR
-45.9						
	34		NO SAMPLES (FISHTAILED)			
	36					
-49.4						FISHTAILED
	38		(CH) GR. FAT CLAY V/SO	90	5	WR
-50.9						
	40		NO SAMPLES (FISHTAILED)			
-54.4	42		(CH) GR. FAT CLAY W/ TR. OF SD.	80	6	WR
-56.4						
	44		NO SAMPLES (FISHTAILED)			FISHTAILED

ELEVATION
 DEPTH
 LEGEND
 CLASSIFICATION OF MATERIALS (Description)
 NO. CORE RECOVERED WeC
 BOX-OR SAMPLE NO. f
 REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
 B BLOWS/FT.

-56.4	44		NO SAMPLES (FISHTAILED)				
-59.4	46						FISHTAILED
-60.9	48		(CH) GR. FAT CLAY V/SO	75	7		WH
-62.9	50		NO SAMPLES (FISHTAILED)				FISHTAILED
-64.4	52		(CH) GR. FAT CLAY V/SO	76	8		WH

B.O.H.
 LAB. CLASSIFICATION

L.O.I.	SPG	+200	SAMP	CLASS.	LL	PL	PI
—	—	2.1	1	(CH)	93	32	61
—	2.68	—	4	(CH)	77	31	46
—	—	5.4	7	(CH)	67	26	41
—	2.69	2.0	2				
—	—	4.0	5				
—	—	5.4	7				
8.5	2.59	3.6	8				



LEGEND	
	SWAMP
	TRANSMISSION TOWER
	LIGHT
	POWER POLE
	CONCRETE MONUMENT
	PILING
	TREES
	STREAM
	SUPPORT POLE/SIGN

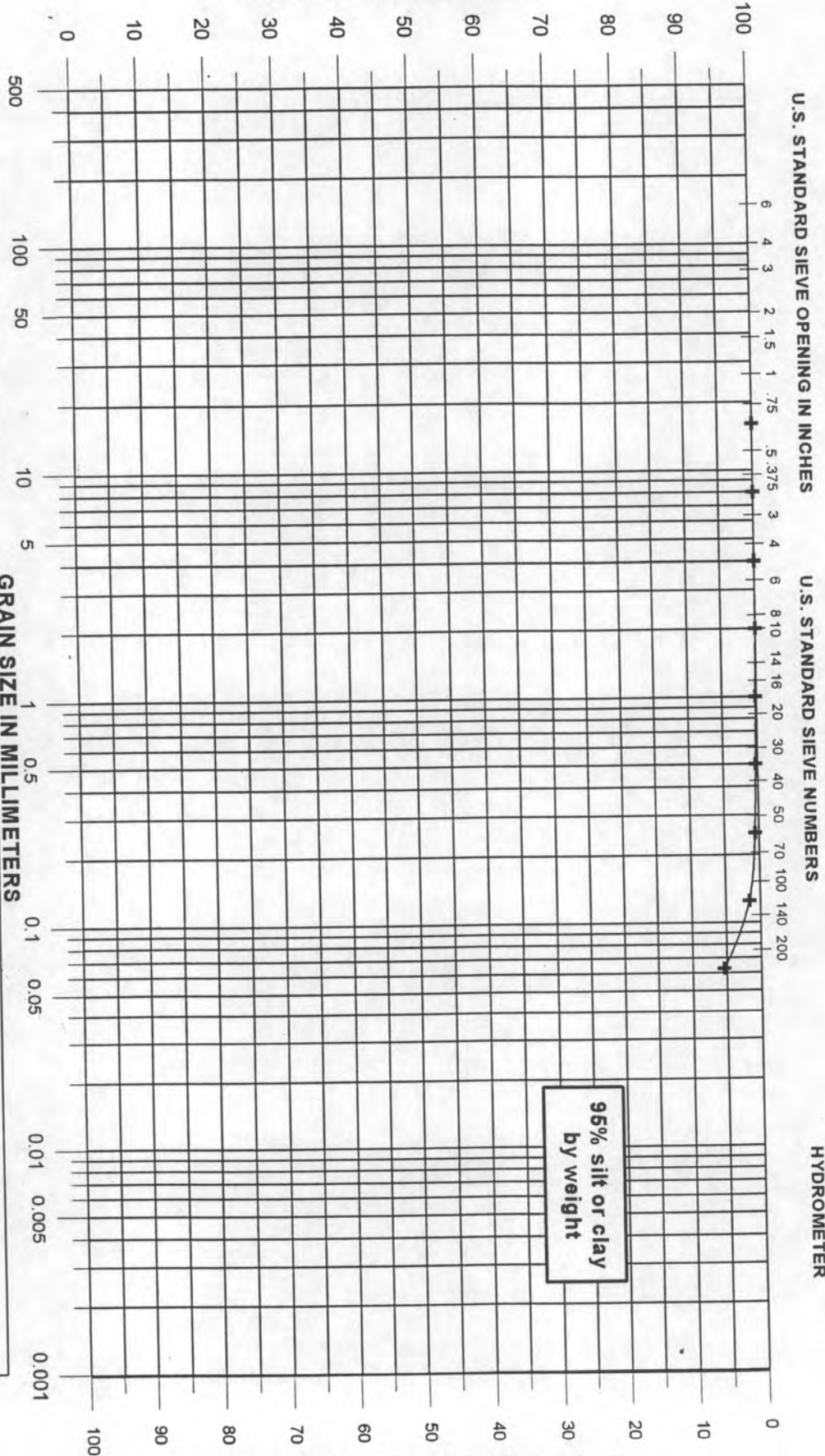
CHANNEL TOES	NORTHING	EASTING
A	288938.07	329771.28
B	287072.88	329675.99
C	287081.80	329354.19
D	288918.87	329271.54
E	288149.28	329798.33
F	285679.03	330314.82
G	283803.31	330168.68
H	284084.97	330369.69
I	284000.81	329372.00
J	282501.38	330197.00

C/L STA.	NORTHING	EASTING
0+00 TANG.1	287087.39	329518.59
30+38 TANG.1	284030.78	329621.11
0+00 TANG.2		
41+70 TANG.2	288948.78	330478.42
0+00 TANG.2A		
28+04 TANG.2A	287083.39	330811.93
0+00 TANG.3		
88+03 TANG.3	281511.81	331572.35
0+00 TANG.4		
41+58 TANG.4	247381.77	331292.93
0+00 TANG.4A		
14+28 TANG.4A	246987.09	331800.55
0+00 TANG.5		
31+81 TANG.5	243141.20	333018.27

NORTH BASIN

2 DENOTES SAMPLE LOCATION

PERCENT FINER BY WEIGHT



U.S. STANDARD SIEVE OPENING IN INCHES

U.S. STANDARD SIEVE NUMBERS

HYDROMETER

96% silt or clay
by weight

PERCENT COARSER BY WEIGHT

COBBLES

GRAVEL

SAND

SILT OR CLAY

COARSE

FINE

COARSE

MEDIUM

FINE

Sample No

#1

Elev or Depth
Depth 42.5 feet

Classification

Net w %

LL

PL

PI

Mobile River

Station North #1

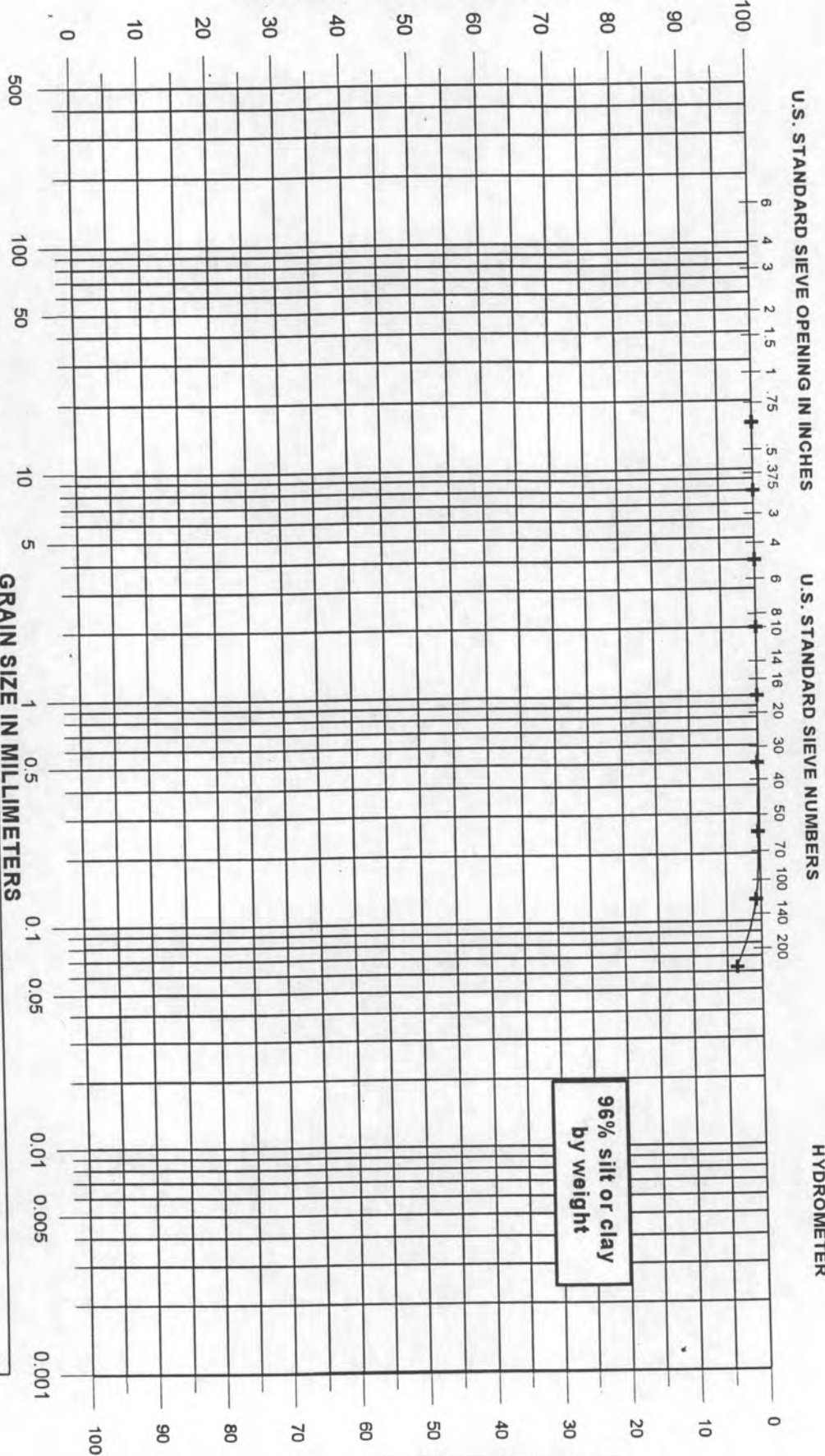
Lat. 30°43'47"

Long. 88°03'08"

Nov 1996

GRADATION CURVES

PERCENT FINER BY WEIGHT



96% silt or clay
by weight

COBBLES

GRAVEL

SAND

SILT OR CLAY

Sample No
#2

Elev or Depth
Depth 43.0 feet

Classification

Net w %

LL

PL

PI

Mobile River
Station North #2

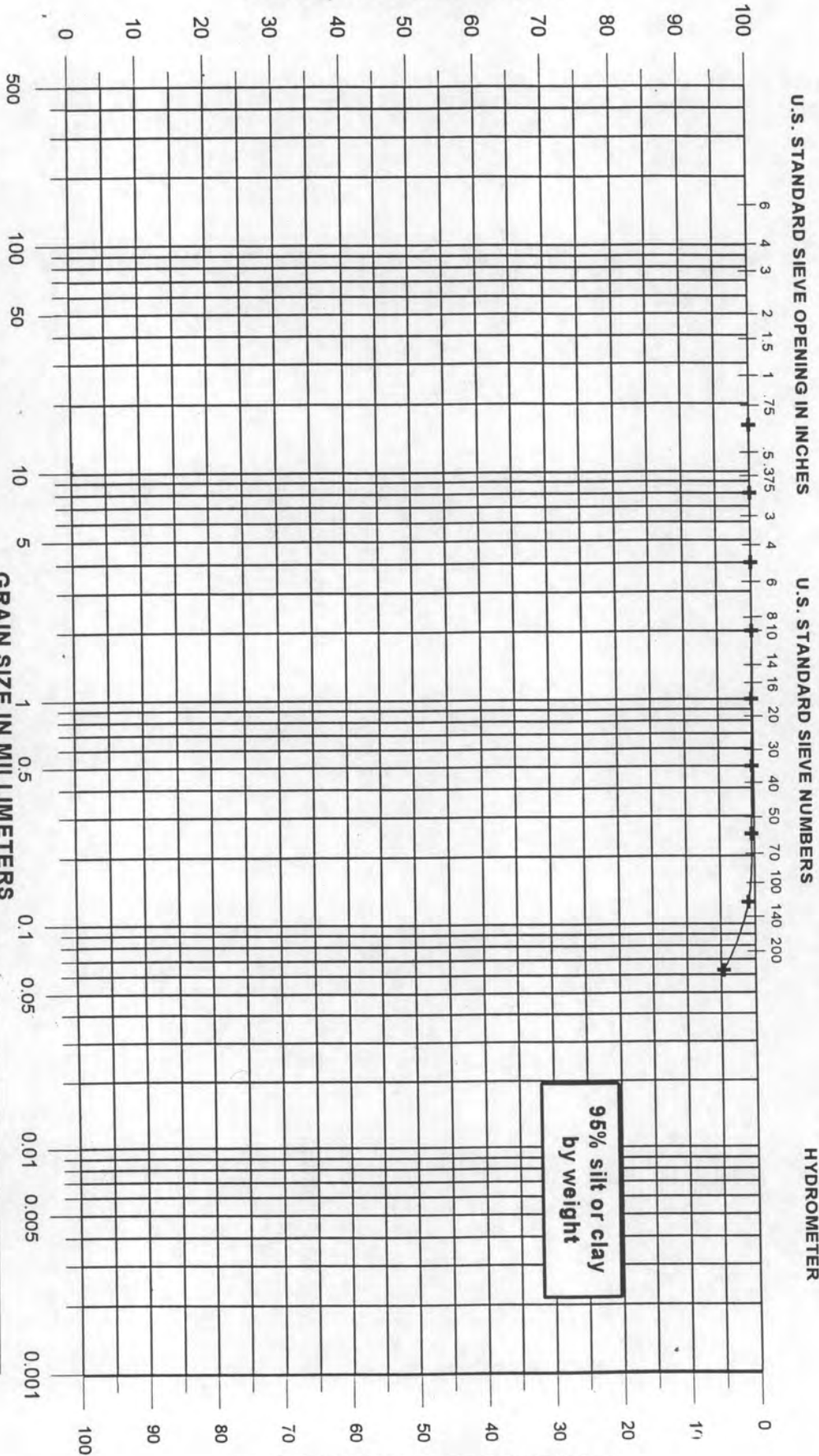
Lat. 30°43' 48"

Long. 88° 02' 31"

Nov 1996

GRADATION CURVES

PERCENT FINER BY WEIGHT



COBBLES

GRAVEL

SAND

SILT OR CLAY

Sample No
3

Elev or Depth
Depth 44.5 feet

Classification

Net w %

LL

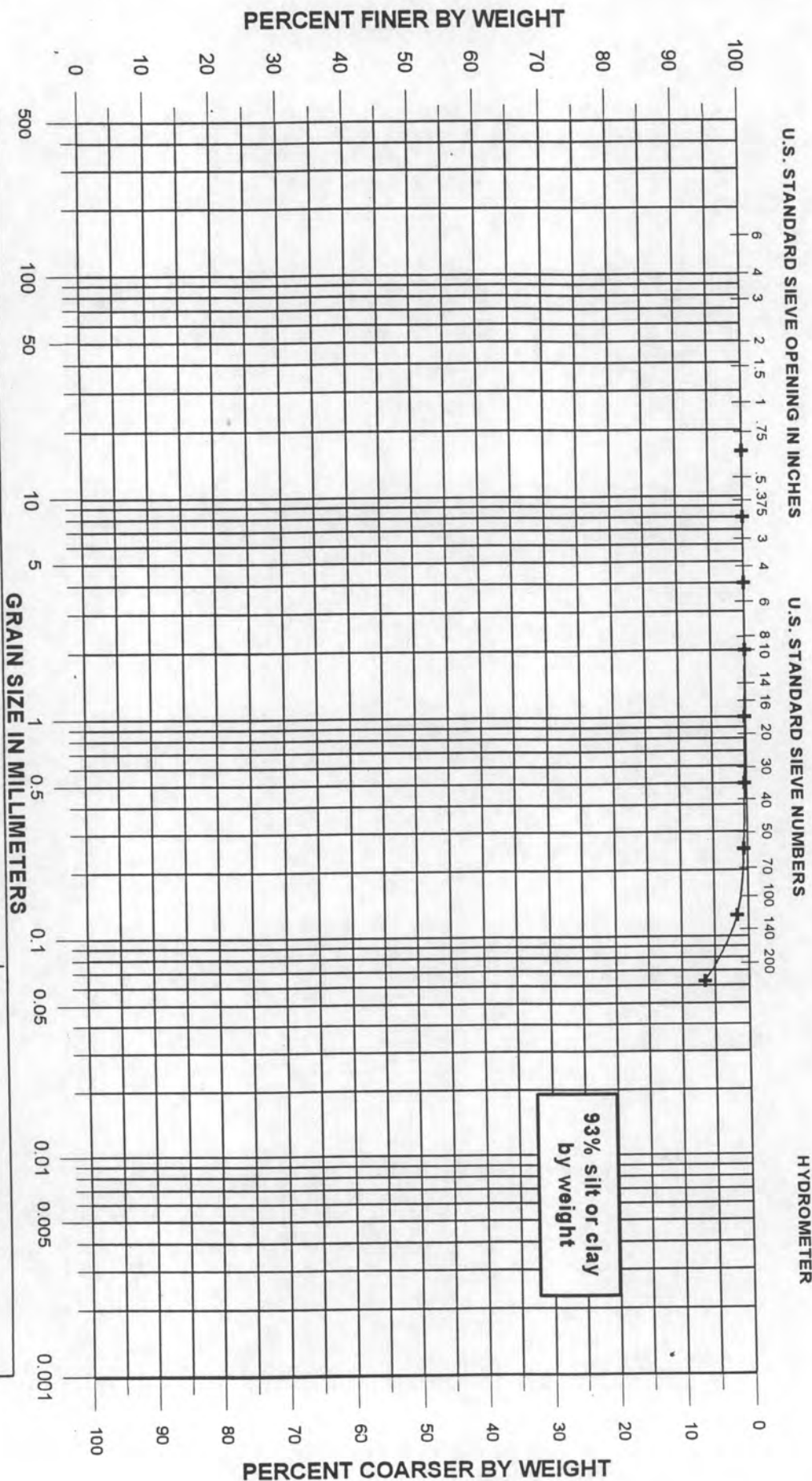
PL

PI

GRADATION CURVES

Mobile River
Station North #3
Lat. 30°43' 48"
Long. 88° 02' 29"

Nov 1996



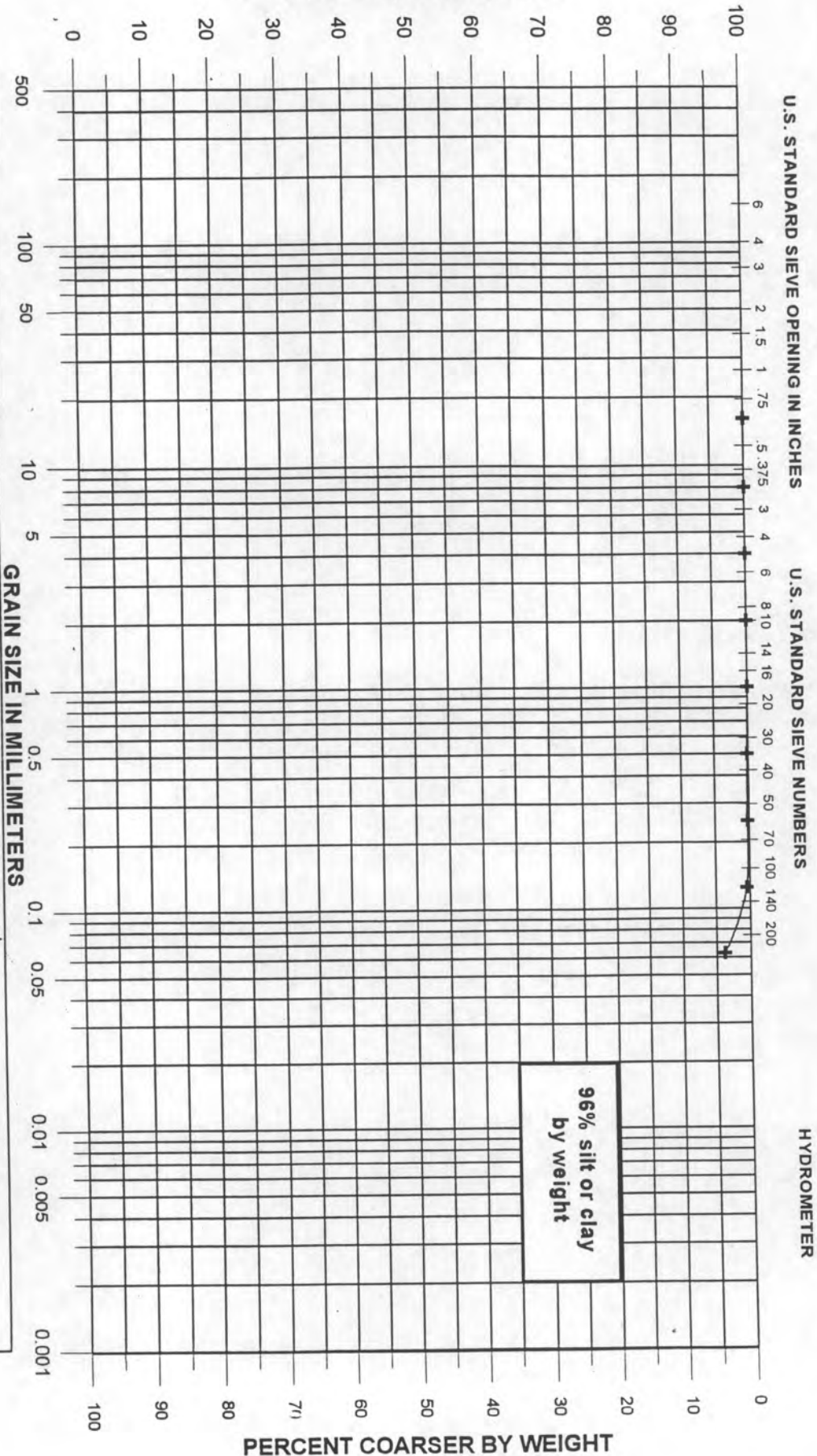
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No	Elev or Depth	Classification	Net w %	LL	PL	PI
# 4	Depth 40.0 feet					

GRADATION CURVES

Mobile River
Station North #4
Lat. 30°43' 42"
Long. 88° 02' 34"
Nov 1996

PERCENT FINER BY WEIGHT



U.S. STANDARD SIEVE OPENING IN INCHES

U.S. STANDARD SIEVE NUMBERS

HYDROMETER

COBBLES

GRAVEL

SAND

SILT OR CLAY

COARSE

FINE

COARSE

MEDIUM

FINE

Sample No

#5

Elev or Depth

Depth 47.0 feet

Classification

Net w %

LL

PL

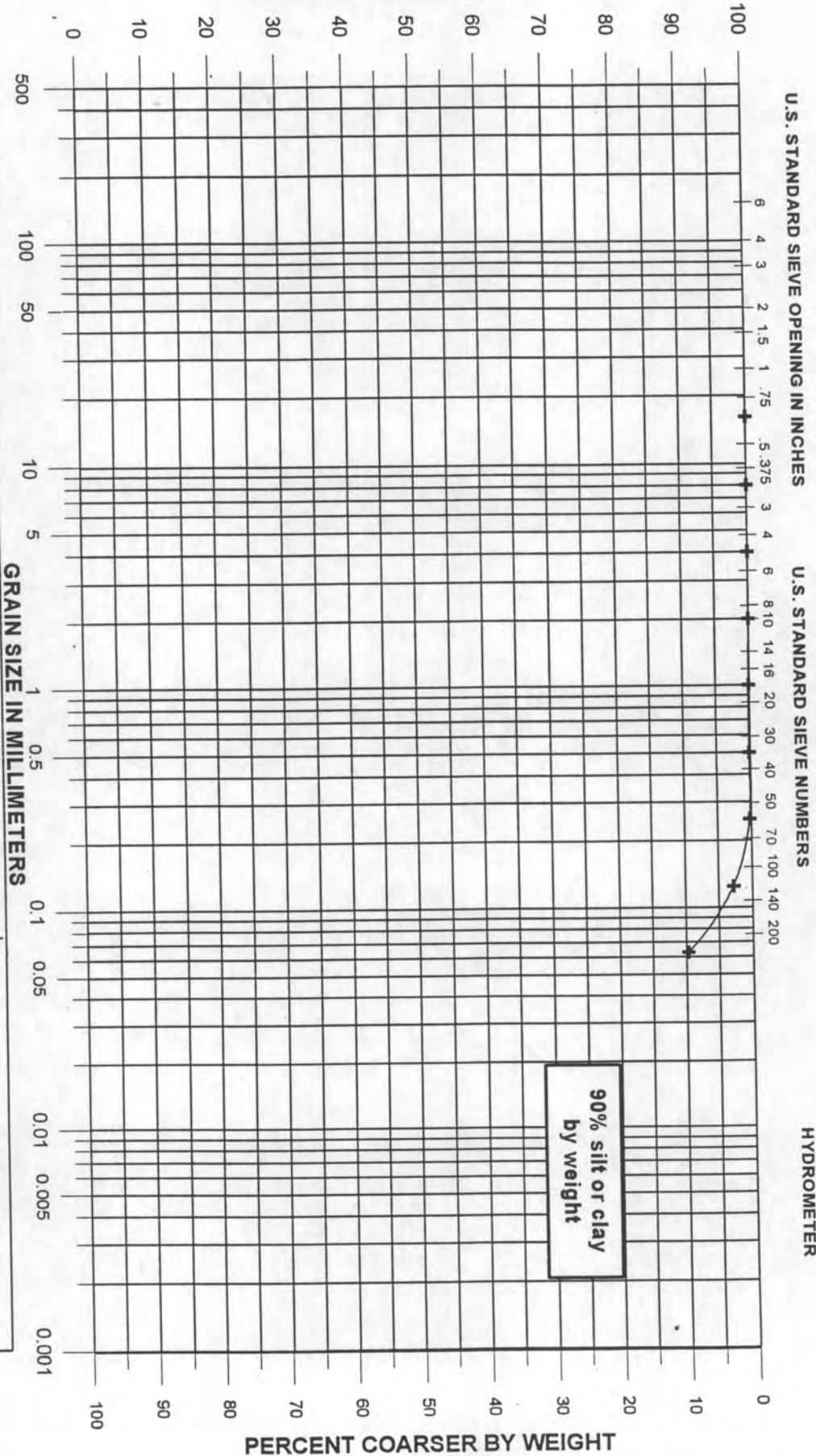
PI

Mobile River
Station North #5
Lat. 30°43' 42"
Long. 88° 02' 30"

GRADATION CURVES

Nov 1996

PERCENT FINER BY WEIGHT



90% silt or clay
by weight

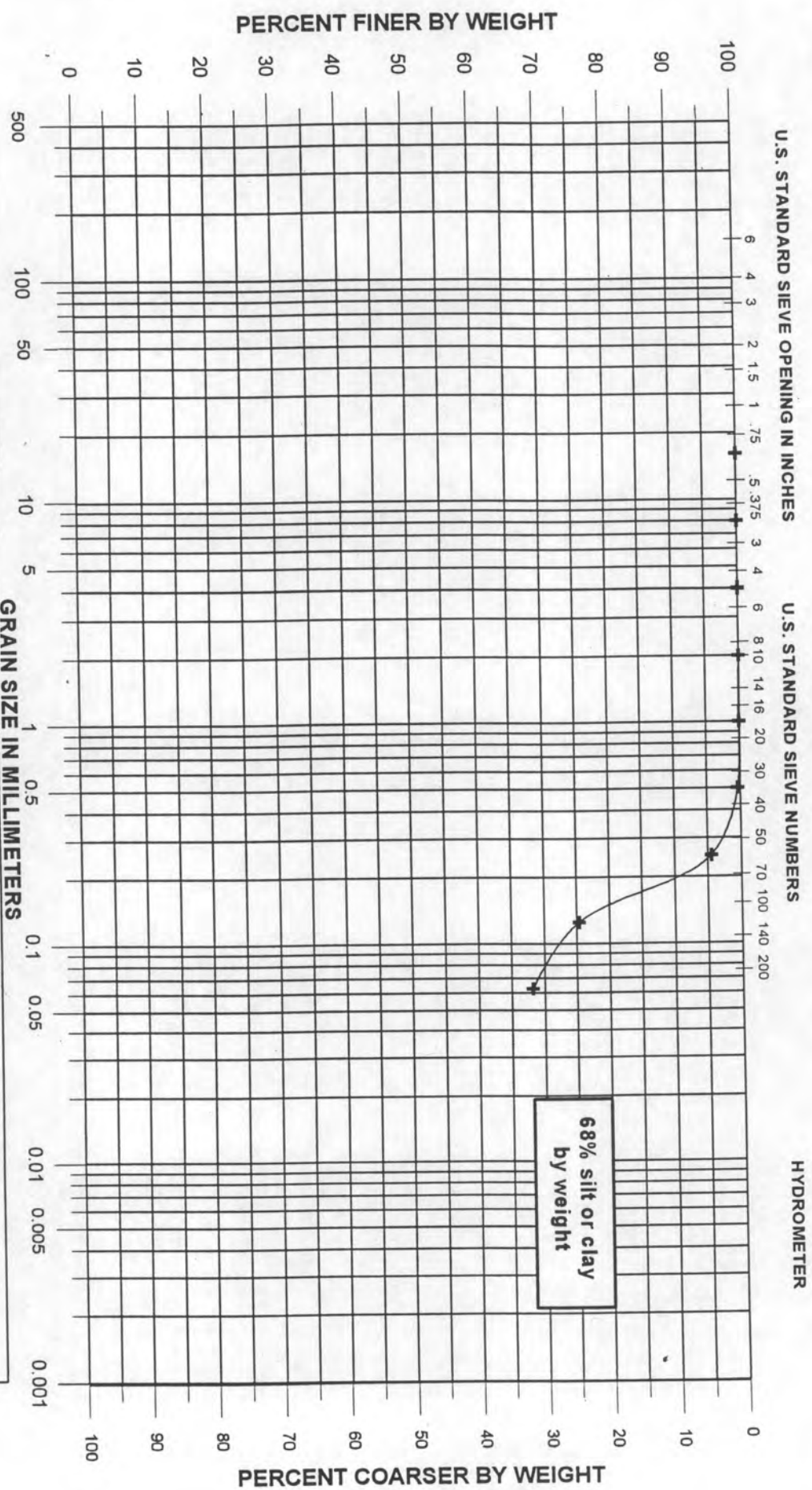
PERCENT COARSER BY WEIGHT

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

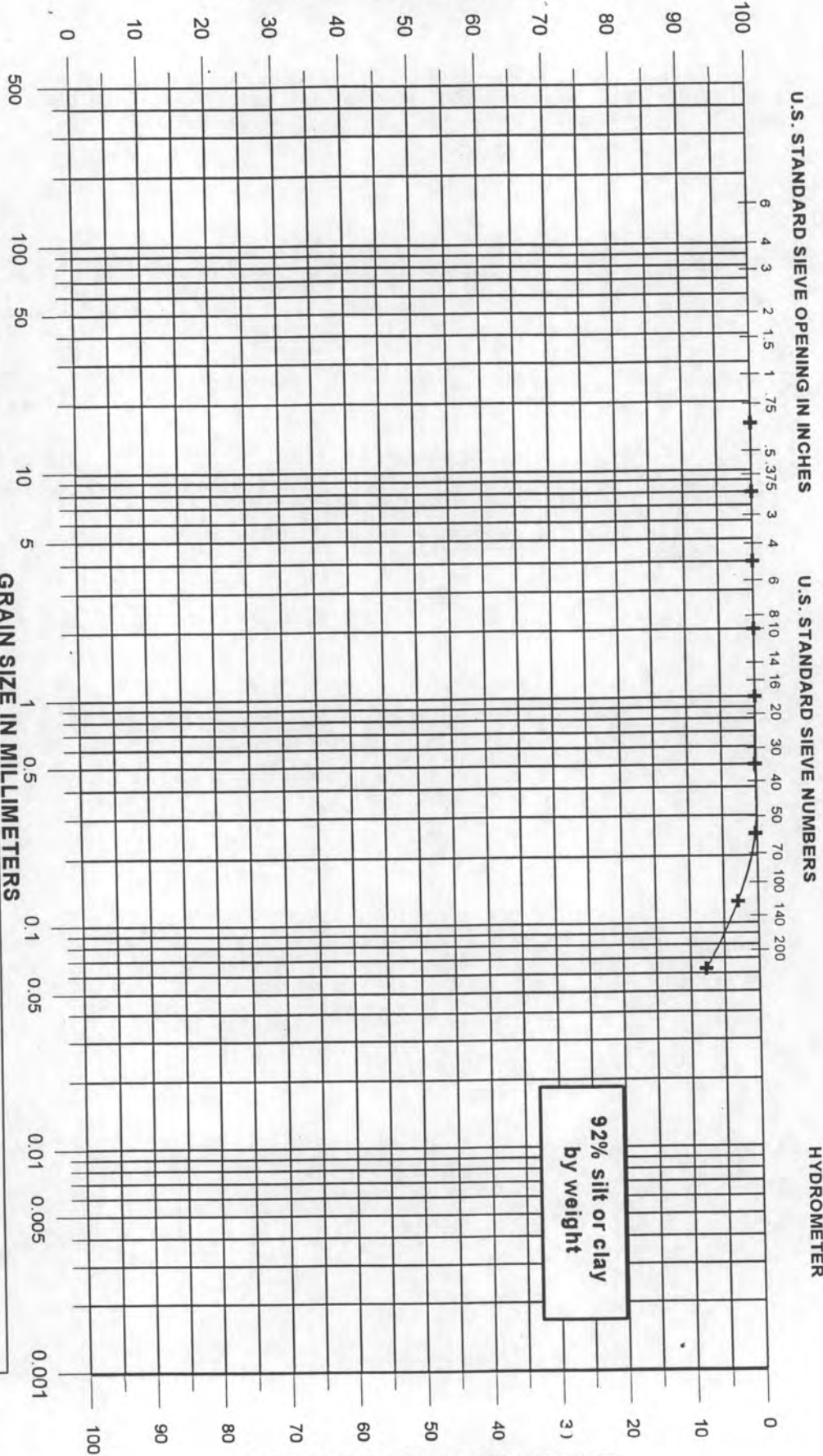
Sample No # 6	Elev or Depth Depth 49.0 feet	Classification	Net w %	LL	PL	PI
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GRADATION CURVES

Mobile River
Station North #6
Lat. 30°43' 42"
Long. 88° 02' 27"
Nov 1996



PERCENT FINER BY WEIGHT



U.S. STANDARD SIEVE OPENING IN INCHES

U.S. STANDARD SIEVE NUMBERS

HYDROMETER

COBBLES

GRAVEL

SAND

SILT OR CLAY

Sample No
8

Elev or Depth
Depth 50.0 feet

Classification

Net w %

LL

PL

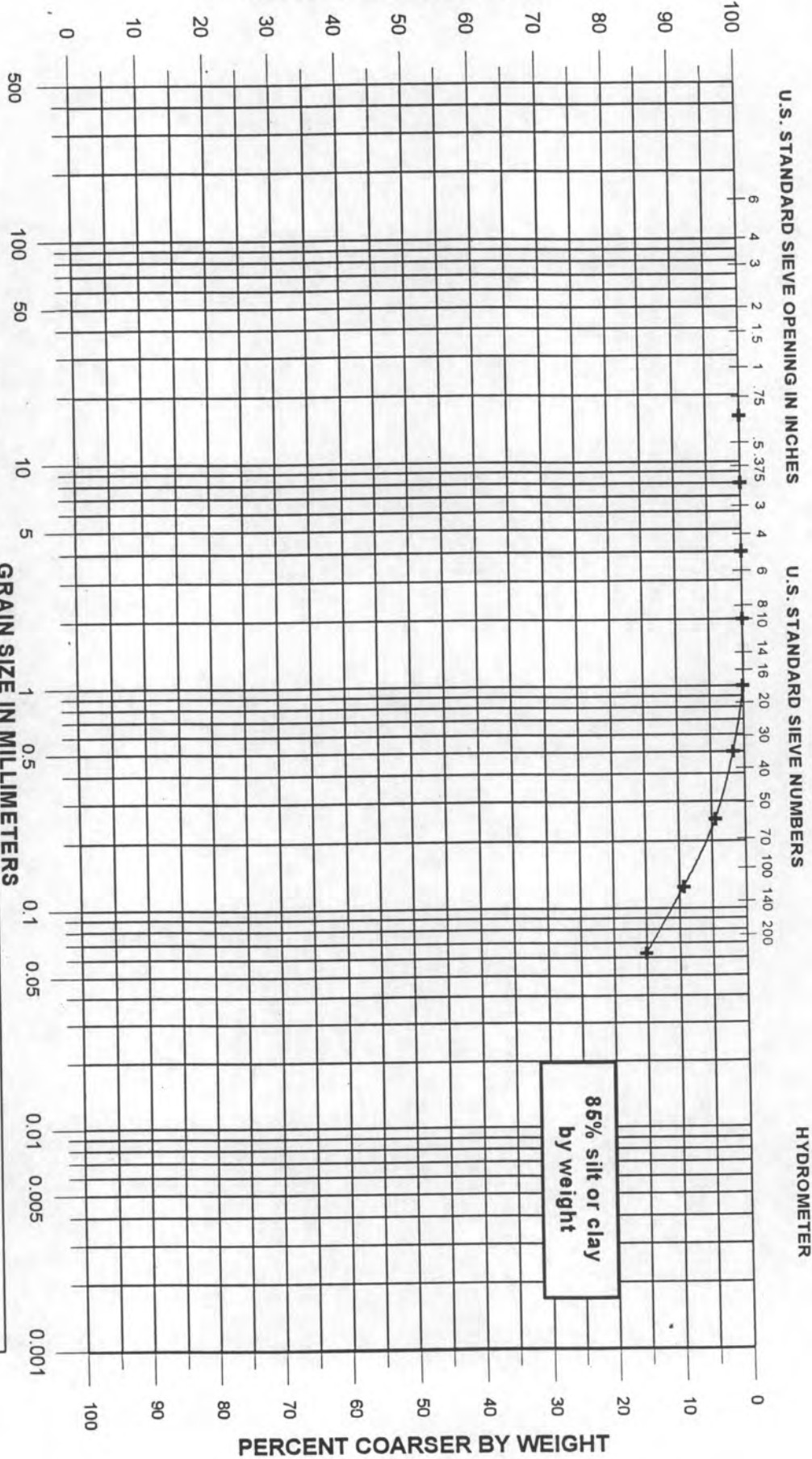
PI

Mobile River
Station North #8
Lat. 30°43' 36"
Long. 88° 02' 30"

GRADATION CURVES

Nov 1996

PERCENT FINER BY WEIGHT



COBBLES

GRAVEL

SAND

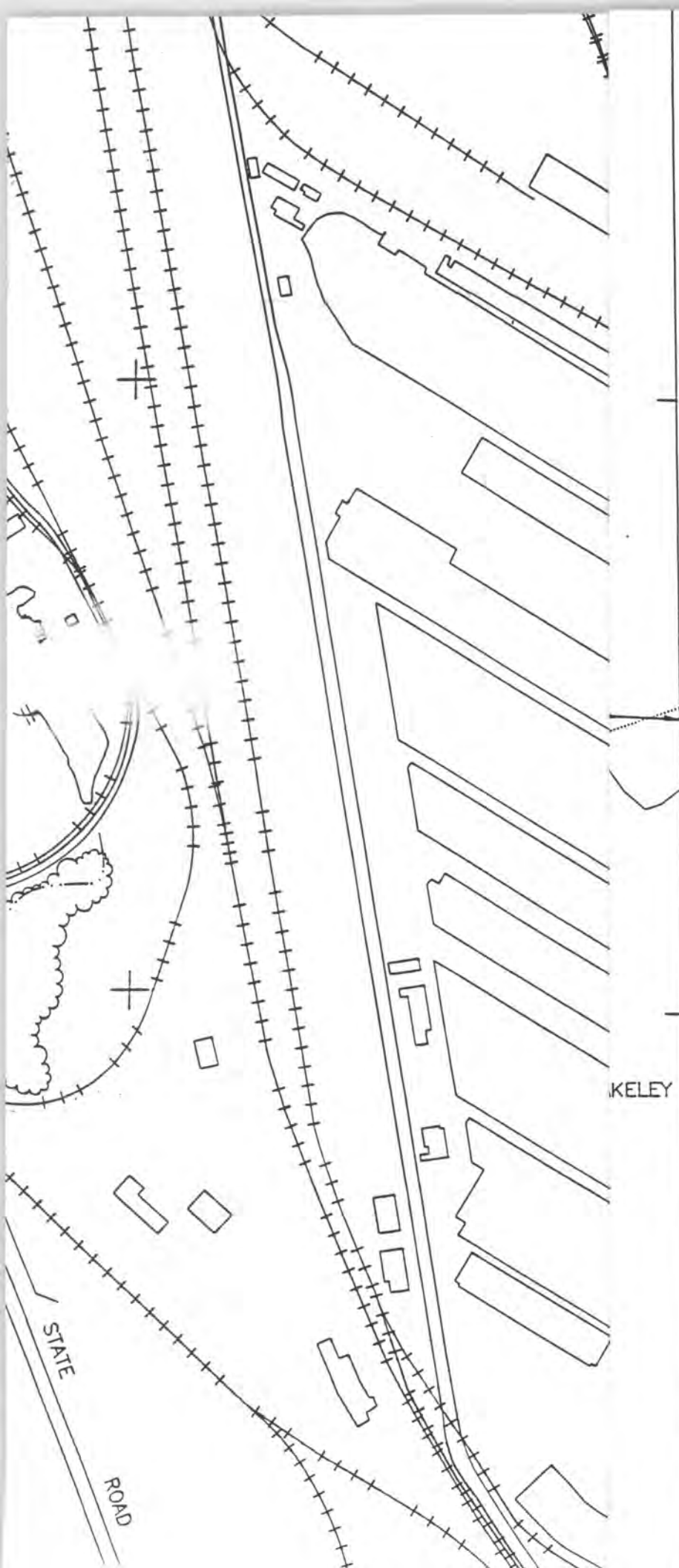
SILT OR CLAY

Sample No	Elev or Depth	Classification	Net w %	LL	PL	PI
#9	Depth 49.0 feet					

GRADATION CURVES

86% silt or clay
by weight

Mobile River
Station North #9
Lat. 30°43' 36"
Long. 88° 02' 26"
Nov 1996



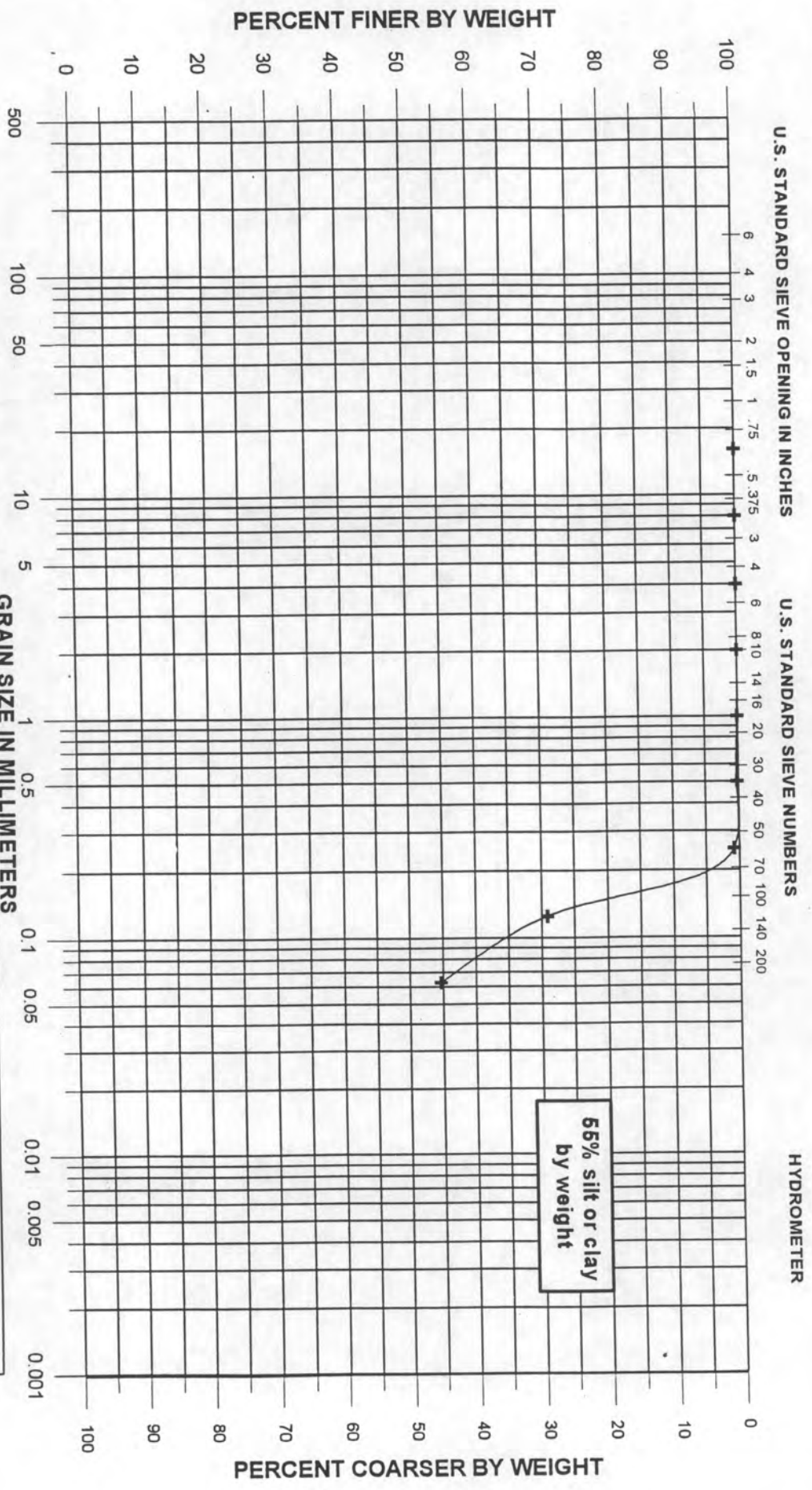
LEGEND	
	SWAMP
	TRANSMISSION TOWER
	LIGHT
	POWER POLE
	CONCRETE MONUMENT
	PILING
	TREES
	STREAM
	SUPPORT POLE/SIGN

CHANNEL TOES	NORTHING	EASTING
K	259597.09	330049.18
L	259861.22	330239.11
M	260388.26	330639.75
N	259919.11	331043.64
O	256668.21	331168.91
P	257121.14	331308.68
Q	257256.39	330482.55

C/L STA.	NORTHING	EASTING
0+00 TANG.1	267067.39	329516.59
30+38 TANG.1	264030.78	329621.11
0+00 TANG.2	259948.79	330476.42
41+70 TANG.2	259948.79	330476.42
0+00 TANG.2A	257063.39	330811.93
29+4 TANG.2A	257063.39	330811.93
0+00 TANG.3	251511.61	331572.95
56+03 TANG.3	251511.61	331572.95
0+00 TANG.4	247361.77	331292.93
41+59 TANG.4	247361.77	331292.93
0+00 TANG.4A	245967.09	331600.55
14+28 TANG.4A	245967.09	331600.55
0+00 TANG.5	243141.20	333016.27
31+61 TANG.5	243141.20	333016.27

SOUTH BASIN

2
• DENOTES SAMPLE LOCATION



COBBLES

GRAVEL

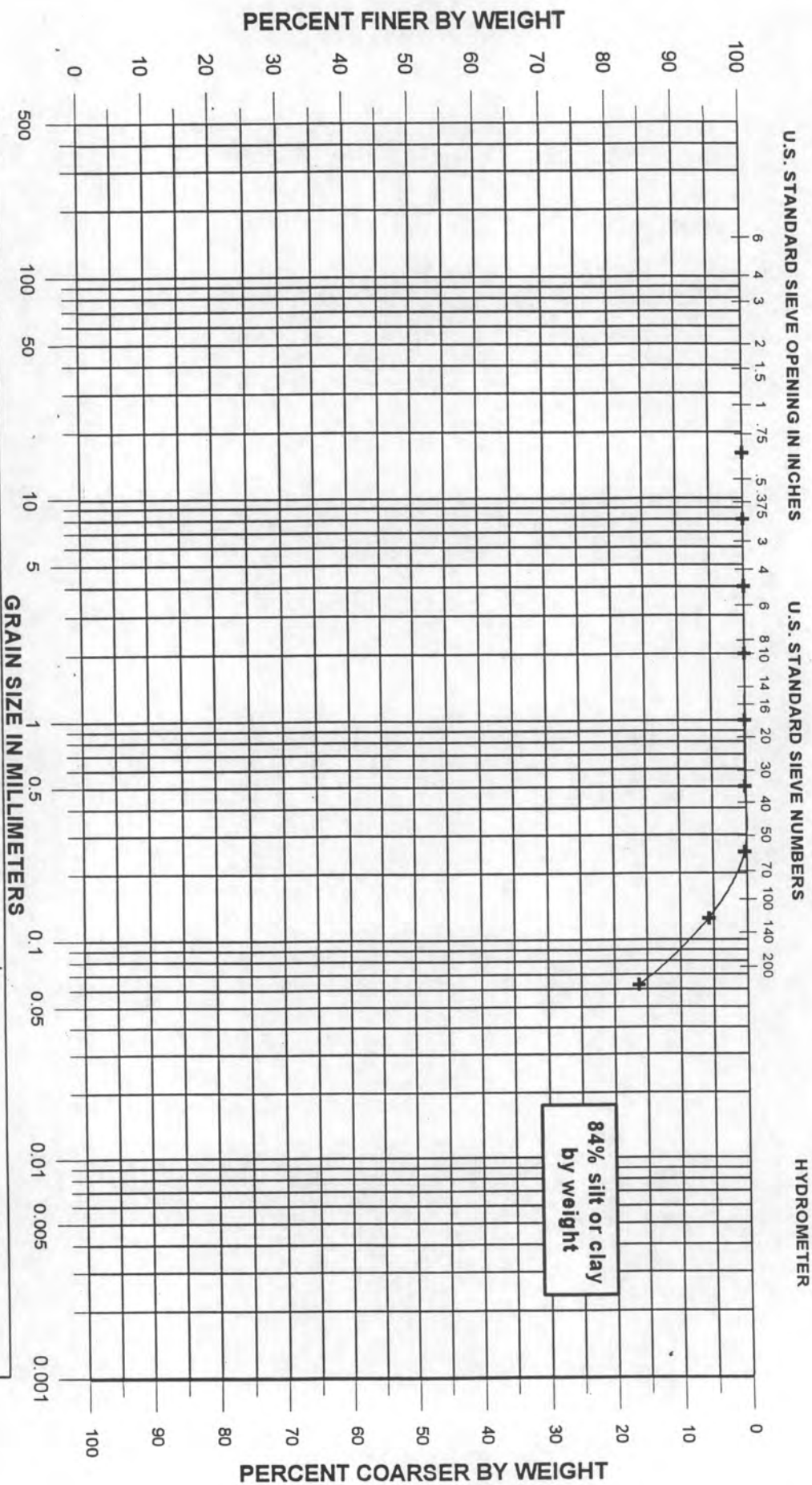
SAND

SILT OR CLAY

Sample No	Elev or Depth	Classification	Net w %	LL	PL	PI
# 1	Depth 41.0 feet					

GRADATION CURVES

Mobile River
Station South #1
Lat. 30°42' 47"
Long. 88° 02' 24"
Nov 1996



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No
2

Elev or Depth
Depth 40.0 feet

Classification

Net w %

77

PL

P1

**Mobile River
Station South #2**

Lat. 30°42' 47"

Long. 88° 02' 20"

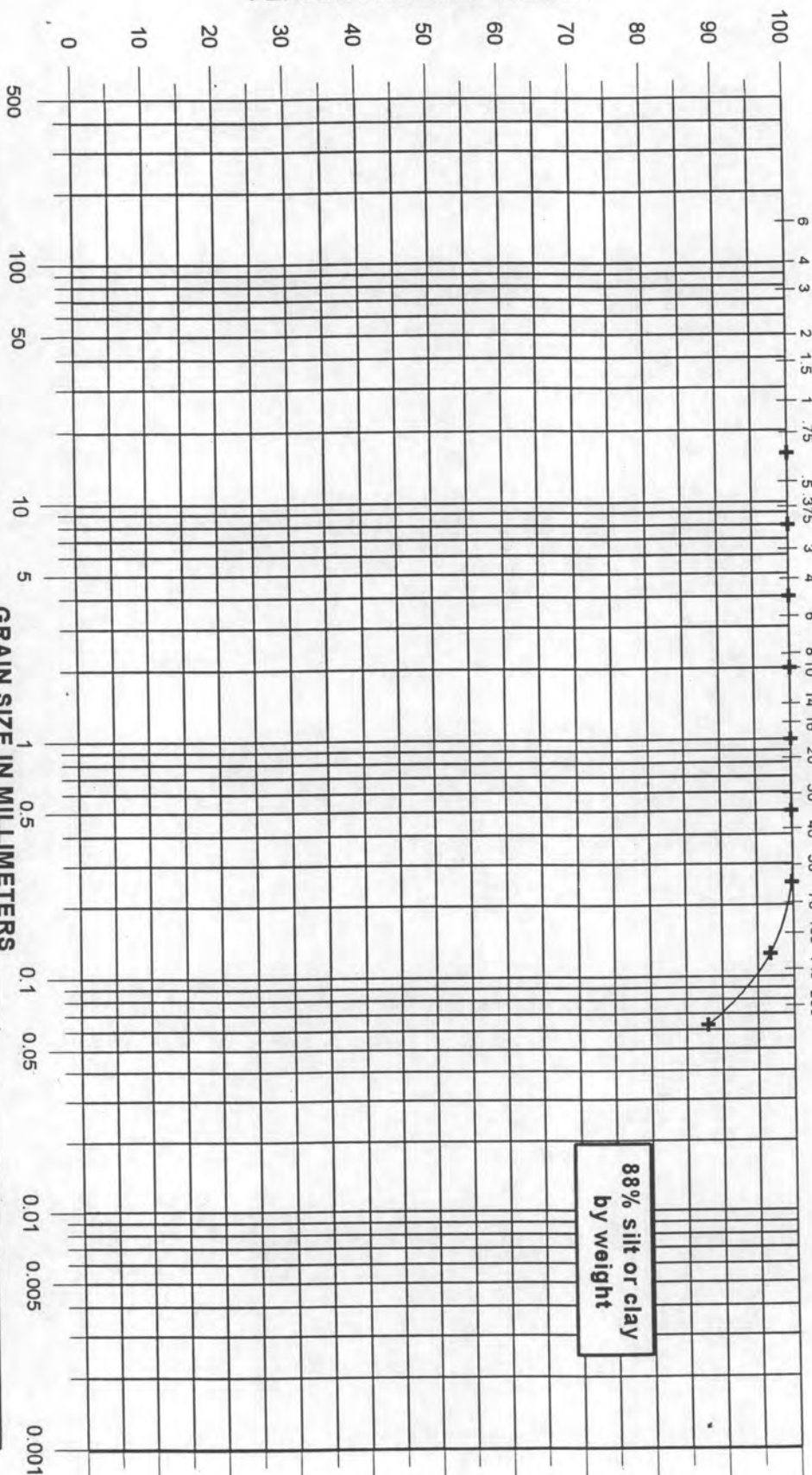
Nov 1996

U.S. STANDARD SIEVE OPENING IN INCHES

U.S. STANDARD SIEVE NUMBERS

HYDROMETER

PERCENT FINER BY WEIGHT



88% silt or clay
by weight

PERCENT COARSER BY WEIGHT

COBBLES

GRAVEL

COARSE

FINE

COARSE

MEDIUM

FINE

LL

PL

PI

SILT OR CLAY

Sample No

3

Elev or Depth

Depth 41.5 feet

Classification

Net w %

LL

PL

PI

GRADATION CURVES

Mobile River
Station South #3

Lat. 30°42' 48"

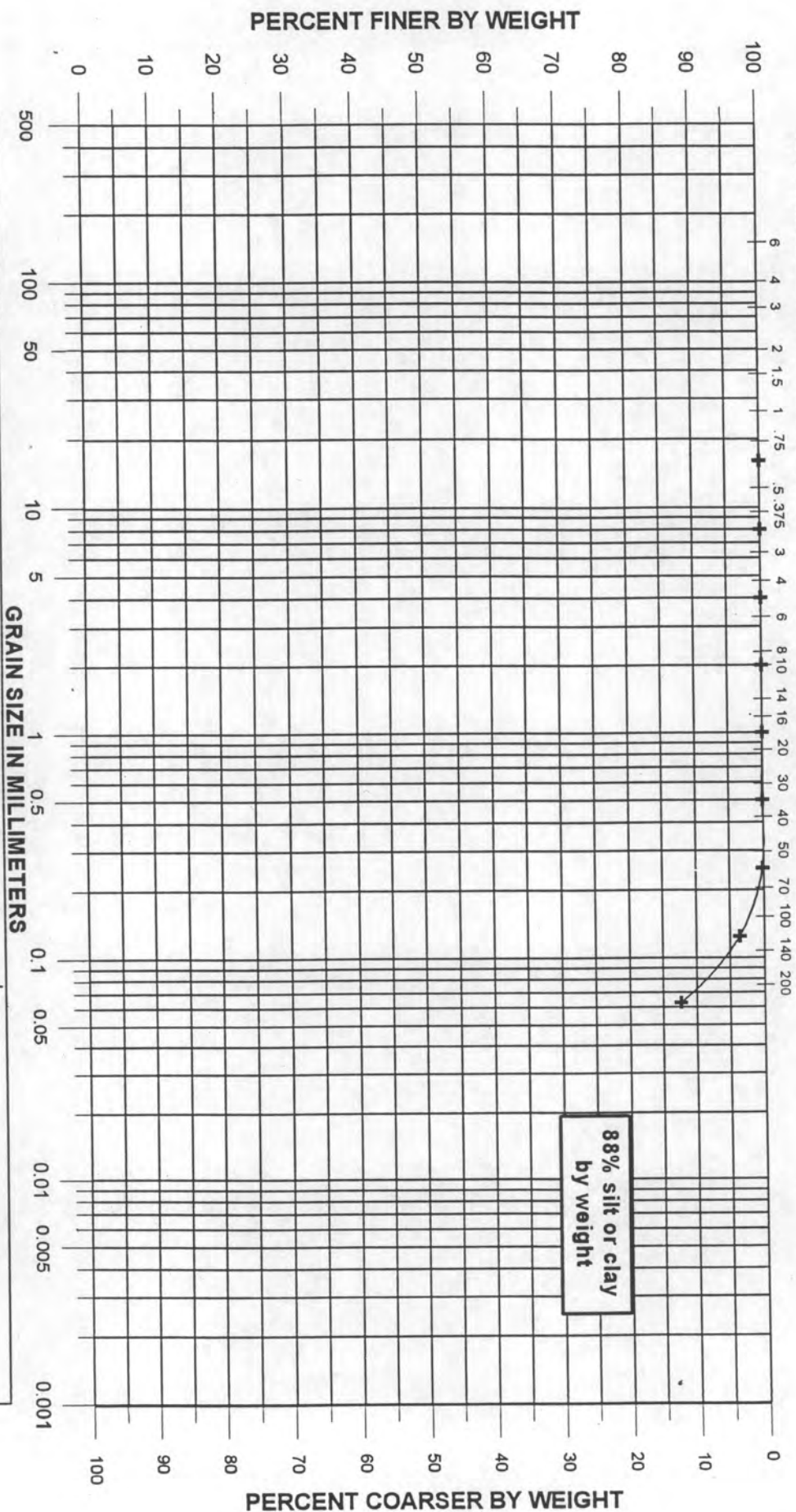
Long. 88° 02' 17"

Nov 1996

U.S. STANDARD SIEVE OPENING IN INCHES

U.S. STANDARD SIEVE NUMBERS

HYDROMETER



COBBLES

GRAVEL

SAND

SILT OR CLAY

Sample No

#4

Elev or Depth
Depth 42.5 feet

Classification

Net w %

LL

PL

PI

Mobile River

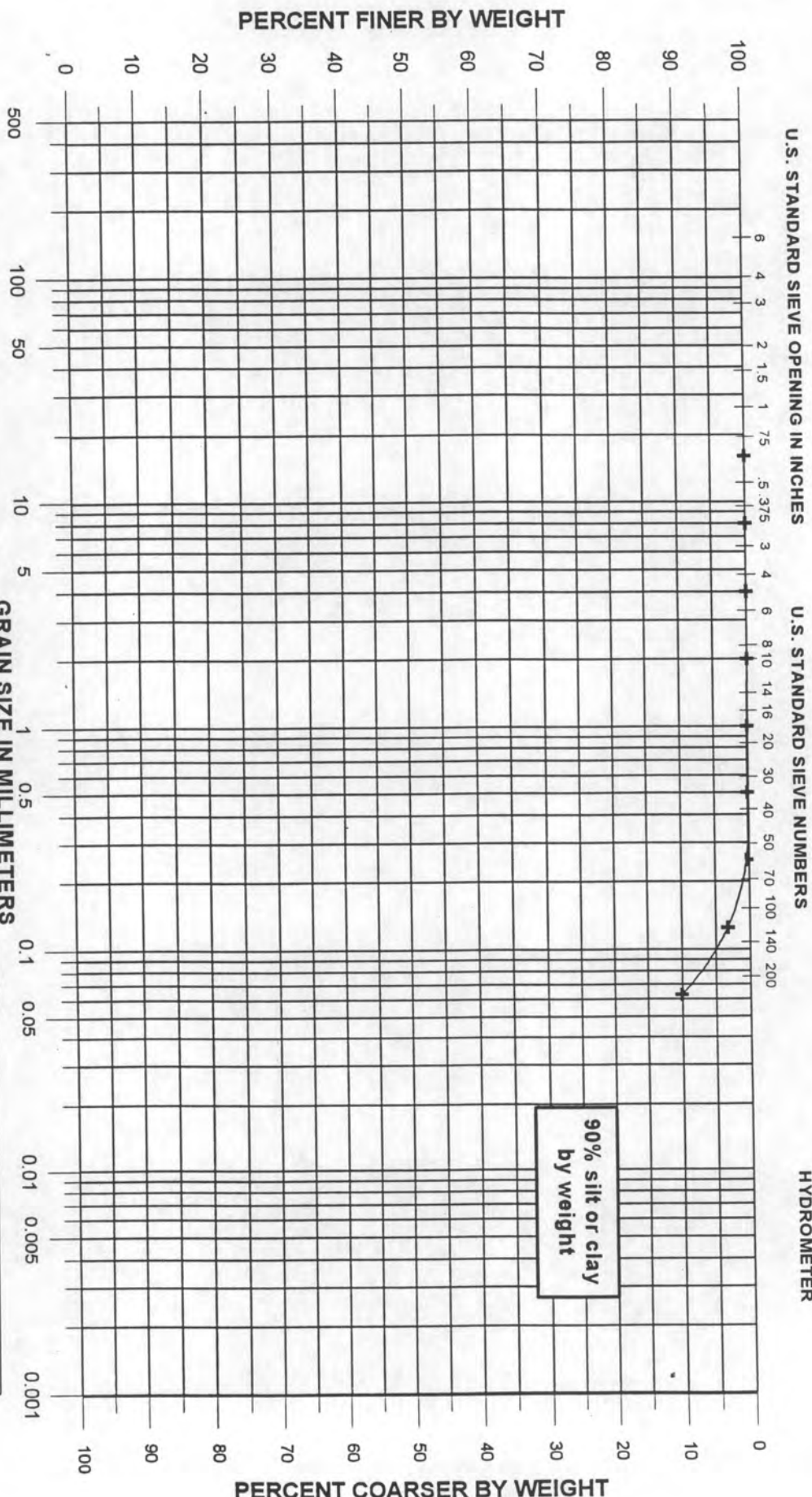
Station South #4

Lat. 30°42'37"

Long. 88° 02' 23"

GRADATION CURVES

Nov 1996



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No #5	Elev or Depth Depth 43.6 feet	Classification	Net w %	LL	PL	PI

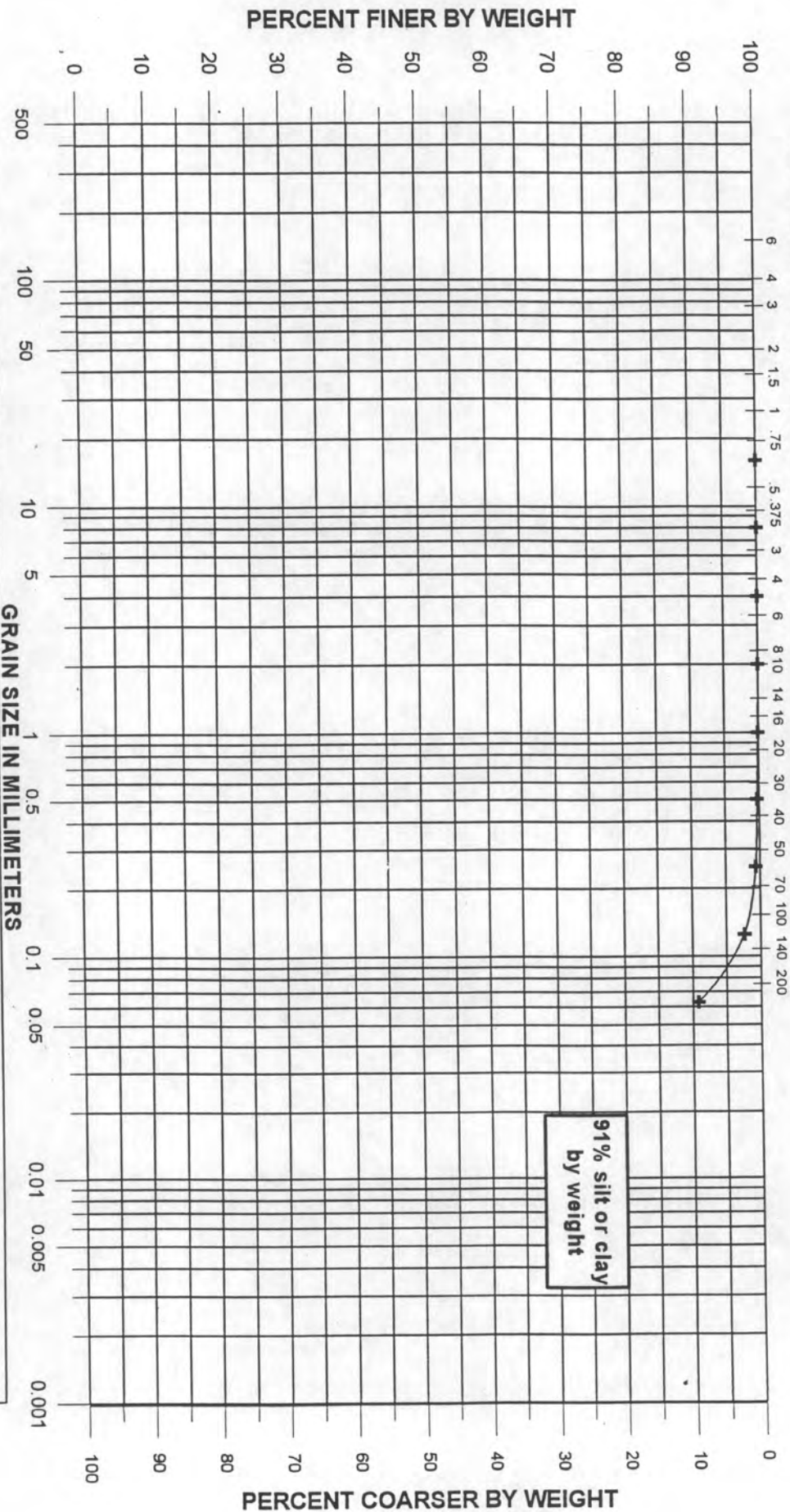
GRADATION CURVES

Mobile River
Station South #6
Lat. 30°42' 38"
Long. 88° 02' 18"
Nov 1996

U.S. STANDARD SIEVE OPENING IN INCHES

U.S. STANDARD SIEVE NUMBERS

HYDROMETER



COBBLES

GRAVEL

SAND

SILT OR CLAY

COARSE

FINE

COARSE

MEDIUM

FINE

Sample No
6

Elev or Depth
Depth 43.2 feet

Classification

Net w %

LL

PL

PI

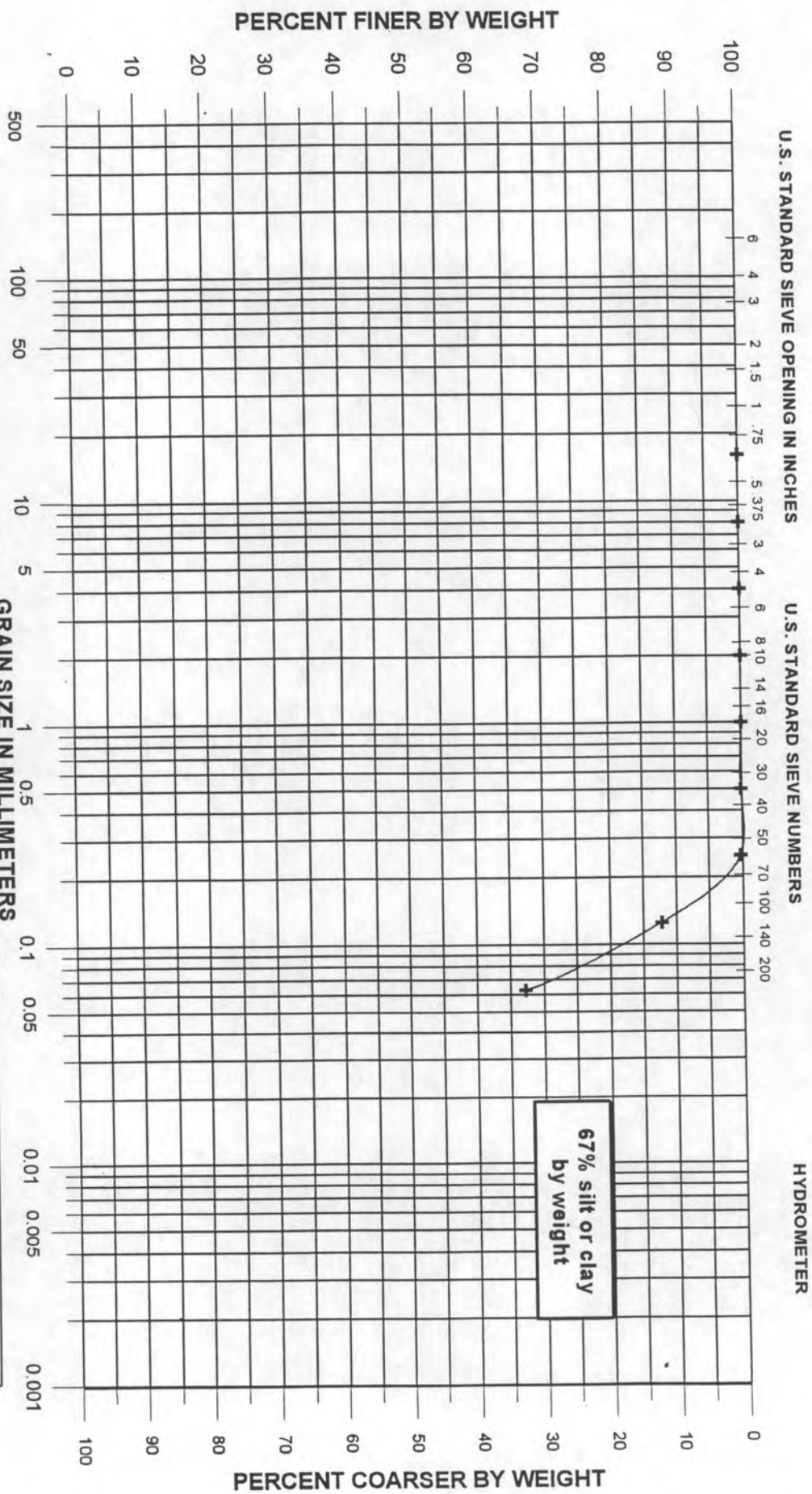
GRADATION CURVES

Mobile River
Station South #6

Lat. 30°42' 38"

Long. 88° 02' 16"

Nov 1996

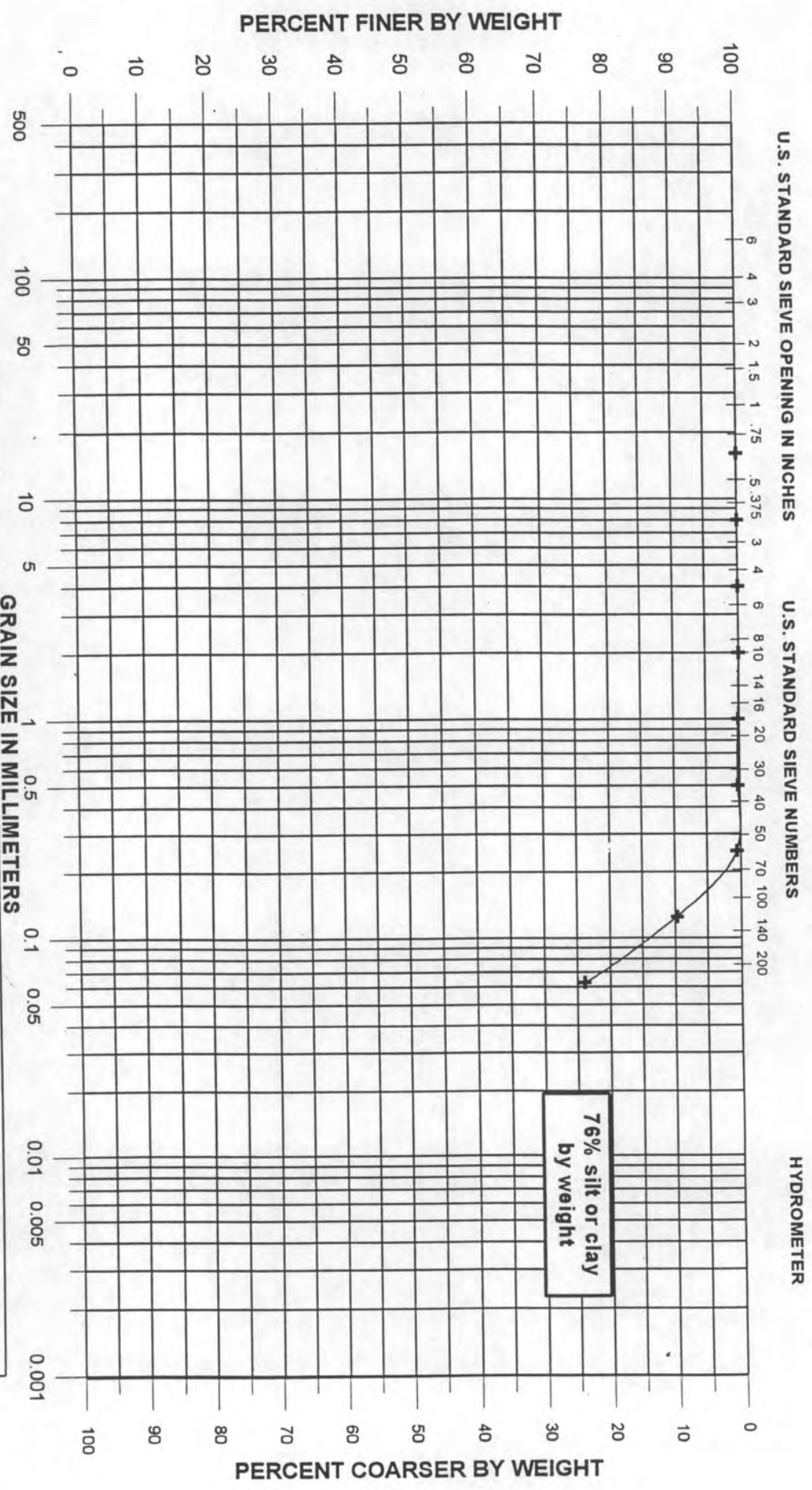


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No	Elev or Depth	Classification	Net w %	LL	PL	PI
#7	Depth 42.6 feet					

GRADATION CURVES

Mobile River
Station South #7
Lat. 30°42' 29"
Long. 88° 02' 21"
Nov 1996



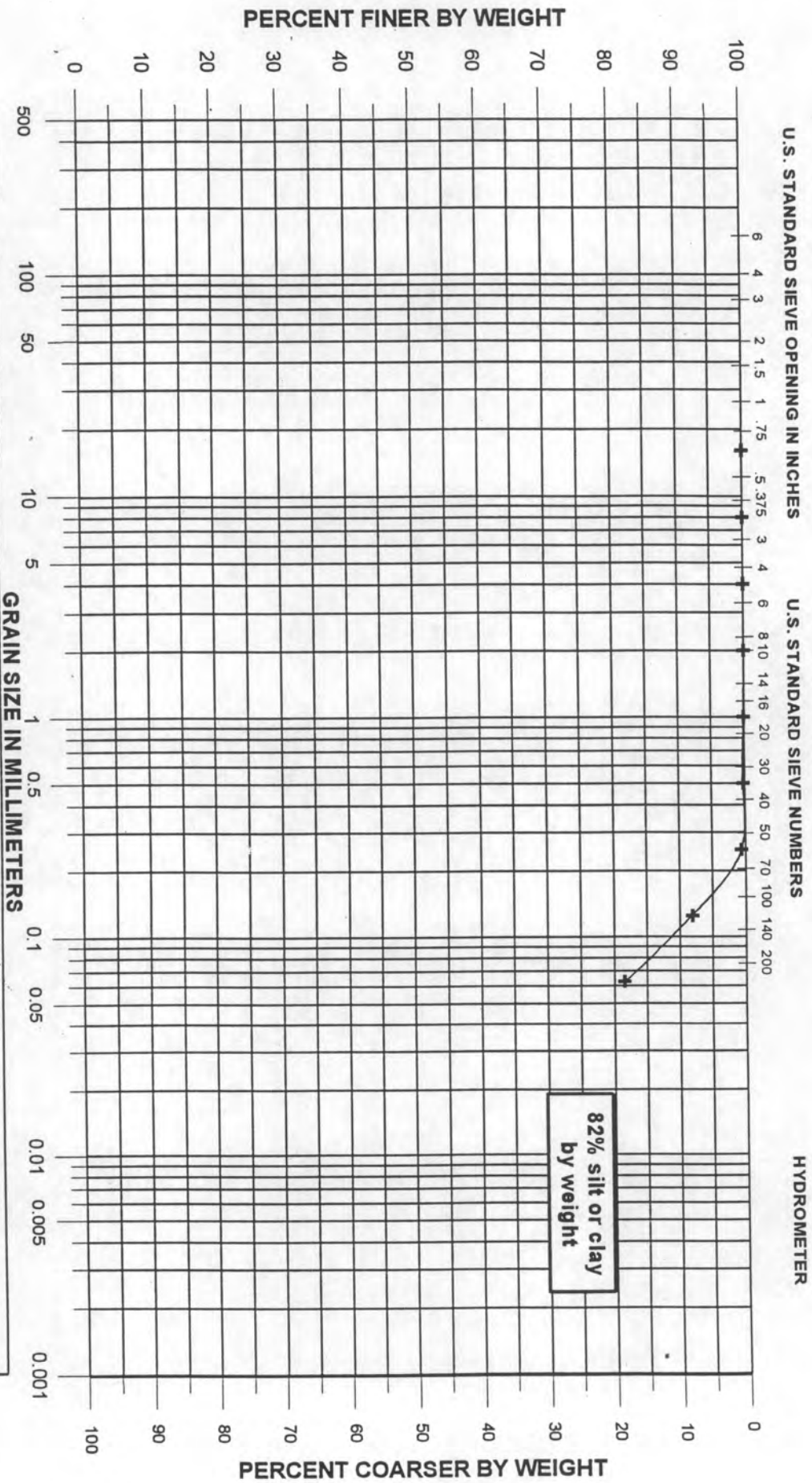
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No #8	Elev or Depth Depth 44.0 feet	Classification	Net w %	LL	PL	PI

GRADATION CURVES

76% silt or clay by weight

Mobile River
Station South #8
Lat. 30°42' 30"
Long. 88° 02' 17"
Nov 1996



COBBLES

GRAVEL

SAND

SILT OR CLAY

COARSE

FINE

COARSE

MEDIUM

FINE

Sample No
10

Elev or Depth
Depth 42.8 feet

Classification

Net w %

LL

PL

PI

GRADATION CURVES

Mobile River
Station South #10
Lat. 30°42' 20"
Long. 88° 02' 20"
Nov 1996

