FEBRUARY 1989

CENTRAL AND SOUTHERN FLORIDA PROJECT

FOR FLOOD CONTROL AND OTHER PURPOSES

PART III

UPPER ST. JOHNS RIVER BASIN AND RELATED AREAS SUPPLEMENT 15---

DETAIL DESIGN MEMORANDUM, STRUCTURE 96C AND STRUCTURE 96D

US Army Corps
of Engineers
Jacksonville District

47

Structure 96C and Structure 96D

Appendix A

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CENTRAL AND SOUTHERN FLORIDA PROJECT

FOR FLOOD CONTROL AND OTHER PURPOSES

Part III

Upper St. Johns River Basin And Related Areas

Supplement 15 - Detail Design Memorandum

Structure 96C and Structure 96D

APPENDIX A

CORE BORING LOGS AND GRADATION CURVES

Hole No. CB-596C-1

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 3 SHEETS

1. PROJECT Upper St. Johns River Basin - Structure 96C	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) X = 563,068 Y = 1,267,665	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
3. DRILLING AGENCY U.S. Army Corps of Engineers	12. MANUFACTURER'S DESIGNATION OF DRILL Sprague and Henwood
4. HOLE NO. (As shown on drawing title and file number) CB-596C-1	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
5. NAME OF DRILLER J. DETLOFF	14. TOTAL NUMBER CORE BOXES 1
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE — STARTED 30-June-87 — COMPLETED 8-July-87
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE +4.6 ft
9. TOTAL DEPTH OF HOLE 49.5 ft.	18. TOTAL CORE RECOVERY FOR BORING 78 %
	19. SIGNATURE OF ~~INSPECTOR~~ Geologist J. Hand.

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
+4.6	0.0					+4.6 BLOWS 0.5/FT.
+1.2	3.4		Peat, brown (Pt)	100	1	Split Spoon settled
-1.4	6.0		Clay, with some silt and layers and nodules of soft and moderately hard white limestone, brown (CH)	77	* 2 / 3*	+0.10 / -1.4
-4.9	9.5		Sand, with some silt and clay, calcareous, nodules and layers of soft white limestone, light green (SC) nodules and layers of moderately hard quartz sandstone and little shell -2.2 to -4	85 / 33	4 / * 5	-2.9 / -4.4
-6.7	11.3		Sandstone, moderately hard, quartz, calcareous, fossiliferous, slightly permeable, light gray, some soft and semi-consolidated materials	40	6	-5.9
-8.9	13.5		Sand, clayey, some silt, calcareous, nodules of moderately hard limestone. (SC)	77	7 / 8 / * 9	-7.4 / -8.9
			Sand, fine quartz, silty with a little clay, layers of (SC), calcareous, nodules and layers of soft and medium hard sandstone and limestone, light green (SM)	66 / 50	* 10 / 11	-10.4 / -11.9

1	5	10	15
16	15	7	8
7	4	5	5
5	7	6	5
6	7	3	5
6	7	8	10
5	5	7	

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

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PROJECT Upper St. Johns River Basin Structure 96C — HOLE NO. CB-596C-1

DRILLING LOG (Cont Sheet) ELEVATION TOP OF HOLE 44.6 **Hole No.** CB-596C-1

PROJECT Upper St. Johns River Basin 596C | INSTALLATION Jacksonville District | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-12.4	17.0					-18.9 Blows/0.5 FT
-15.9	20.5		Sand, medium to fine quartz a little shell and calcareous silt, layers and nodules of moderately hard, calcareous quartz sandstone, gray (SP)	66	12	Split Spoon 7 8 15
				27	13	-18.4 " 3 8 11
				66	14	-14.9 " 5 6 4
-18.4	23.0		Sand, fine quartz, clayey, green (SC)	50	15	-16.4 " 4 8 10
-19.9	24.5		Sand, medium to fine quartz, shelly with a little calcareous silt, nodules of soft sandstone gray (SP-SM)	85	16	-17.9 " 3 5 9
-23.1	27.7		Clay, sandy, fine quartz silty, calcareous, some shell, nodules and layers of soft sandstone, light green (CL)	77	17	-19.4 " 3 8 8
				66	18	-20.9 " 4 7 10
-24.4	29.0		Shell, sandy, silty, layers of soft sandstone, white and green	33	19	-22.4 " 4 5 10
-28.4	33.0		Sand, fine quartz, silty to very silty, calcareous, trace of shell, light green (SM)	33	20	-23.9 " 2 7 8
				50	21	-25.4 " 7 9 8
				85	22	-26.9 " 2 3 3
-29.9	34.5		Clay, with a little silt and sand, slightly calcareous, light green (CH)	93	23	-28.4 " 4 7 8
-32.9	37.5		Clay, silty with a little; very fine quartz sand (CL)	100	24	-29.9 " 2 5 7
				100	25	-31.4 " 4 4 6

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 628-603

PROJECT Upper St. Johns River Basin 596C | HOLE NO. CB-596C-1

DRILLING LOG (Cont Sheet) ELEVATION TOP OF HOLE +9.6 **Hole No.** CB596C-1

PROJECT Upper St. Johns River Basin-Stuart 96 INSTALLATION Jacksonville District SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-32.9	37.5					-32.9 Blows/0.5ft
-38.4	43.0		Clay, silty, green (CH)	100	29	Split spoon 3 2 5 -34.4
				100	30	" 2 3 7 -35.9
				45	* 31	" 2 3 6 -37.4
-40.4	45.0		Sand, medium to fine quartz and shell, a little silt, calcareous, gray (SP)	0	-	" 8 8 10 -38.9
				85	32	" 7 10 16 -40.4
-44.9	49.5		Clay, silty, calcareous, a little sand and shell gray to green (CL) nodules and layers of soft to moderately hard sandstone -39.7 to -42.5	77	33	" 10 18 20 -41.9
				70	* 34	" 11 11 20 -43.4
				100	35	" 11 11 20 -44.9

140 # hammer with 30" drop used on 2.0 ft. split spoon (1 3/8" I.D. x 2.0" O.D.)

Notes:

1) On 30 June 87
Water level in canal at +22.0
water depth 17.6'

2) On 8 July 87
water level in canal at +23.0
water level in casing +20.0
elev. of bottom of casing -31.0
elev. bottom of hole -39.7

3) Hole grouted with sakrete.

4) * Indicates sample has been laboratory tested. Core log reflects the laboratory classification.

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF-628-603

PROJECT Upper St. Johns River Basin S-96C HOLE NO. CB-596C-

CB-596C-2 1 of 3

Hole No. CB-596C-2

DRILLING LOG	DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 3 SHEETS

1. PROJECT: Upper St. Johns River Basin - Structure 96C
2. LOCATION (Coordinates or Station): X = 583,067 Y = 1,267,637
3. DRILLING AGENCY: U.S. Army Corps of Engineers
4. HOLE NO. (As shown on drawing title and file number): CB-596C-2
5. NAME OF DRILLER: WHITSON & DETLOFF
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 49.5 FT.
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Sprague and Henwood
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
14. TOTAL NUMBER CORE BOXES: 1
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 23-June-87 COMPLETED 29-June-87
17. ELEVATION TOP OF HOLE: +4.2
18. TOTAL CORE RECOVERY FOR BORING: 60 %
19. SIGNATURE OF ~~INSPECTOR~~ GEOLOGIST: J. Hand

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
+4.2	0.0					+4.2 Blows/0.5FT
+2.1	2.1		Peat, brown (Pt)		1	Split spoon settled 1 7 11
			Clay, silty, calcareous nodules and layers of soft and moderately hard limestone, green to white (CL)	40	2	0.7
				93	* 3	" 5 7 15 -0.8
-2.3	6.5		layers of green and brown (CH) Clay from +1.3 / +0.1	100	* 4	" 7 13 14 -2.3
-3.1	7.3		Sand, clayey, silty, calcareous nodules of soft limestone and sandstone, brown (SC)		5	" 5 7 10
-3.8	8.0		Sandstone, quartz, silty calcareous, soft, Light gray	93	6	-3.8
			Clay silty, slightly sandy, calcareous, nodules of moderately hard white limestone, layers and nodules of calcareous; fossil, ferous, gray sandstone, light gray (CL)	0	—	" 3 2 3 -5.3
				10	7	" 3 6 3 -6.8
				33	8	" 5 7 4 -8.3
-9.3	13.5			—	—	-9.3 WASHED
-10.8	15.0		Sandstone, soft to moderately hard, quartz, calcareous, green	42	9	" 4 5 5 -10.8
			Sand, fine quartz calcareous, nodules of moderately hard white limestone, brown to green (SC)	33	* 10	" 6 9 16 -12.3
-13.8	18.0			45	* 11	" 7 9 14 -13.8

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

A-6

PROJECT: Upper St. Johns River Basin Structure 96C | HOLE NO. CB-596C-2

CB-596C-2 2 of 3

DRILLING LOG (Cont Sheet) ELEVATION TOP OF HOLE +4.2 **Hole No.** CB-596C-2

PROJECT Upper St. Johns River Basin - Structure 96C INSTALLATION Jacksonville District SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	Blows/0.5FT
-13.8	18.0					-13.8 Split spoon	2 6 9
-16.3	20.5		Sand, medium to fine quartz with a little shell and silt, white (SP)	33	12	-15.3 "	6 6 7
-18.3	22.5		Sand. fine, quartz, clayey gray to green (SC)	50	13	-16.8 "	7 6 7
-19.8	24.0		Sand, fine, quartz with a little silt. calcareous. some shell. white (SP-SM)	66	* 14	-18.3 "	5 5 6
-21.0	25.2		Sand. fine quartz, slightly silty. calcareous, some clay and shell (SM)	85	* 15	-19.8 "	3 3 7
-21.5	25.7		Clay silty with some sand. calcareous. white (CL)	100	16 17	-21.3 "	4 4 5
-24.3	28.5		Sand. fine quartz, clayey, silty. calcareous, light gray (SM)	85	18	-22.8 "	4 4 6
-27.5	31.7		Sand. very fine quartz silty to clayey, calcareous light gray (SC)	93	* 19	-24.3 "	2 3 5
-30.3	34.5		Clay. slightly silty. slightly calcareous with a trace of sand and shell. gray to green (CL)	93	* 20	-25.8 "	4 3 5
-31.8	36.0		Silt. green and gray (ML)	100	21	-27.3 "	1 3 4
-33.3	37.5		Sand. clayey. silty. with gravel sized shell, gray green (SC)	77	22	-28.8 "	3 4 7
				66	* 23	-30.3 "	4 5 6
				93	24	-31.8 "	4 5 8
				93	* 25	-33.3	

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF-628-603

PROJECT Upper St. Johns River Basin Structure 96C HOLE NO. CB-596C-2

CB-596D-2 3 of 3

DRILLING LOG (Cont Sheet) ELEVATION TOP OF HOLE +4.2 **Hole No.** CB-596C-2

PROJECT Upper St. Johns River Basin - Structure 96C INSTALLATION Jacksonville District SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-33.3	37.5					Blows/0.5 FT
			Clay, green (CH) layer of (CL), elevation -34.2/-37.2		*	split spoon 5 4 6
				100	26	-34.8
						" 3 4 7
				72	27	-36.3
					*	" 2 3 8
-38.3	42.5			100	28	-37.8
			Sand, clayey, calcareous some shell and nodules and layers of soft and moderately hard sandstone, gray (SC)			" 3 4 8
				10	–	-39.3
					*	" 4 10 15
				85	29	-40.8
						" 17 8 9
				43	30	-42.3
					*	" 6 11 20
				93	31	-43.8
						" 5 7 13
-45.3	49.5			93	32	-45.3
						140 # hammer with 30" drop used on 2.0 Ft. split spoon sampler (1 3/8" I.D. x 2" O.D.)

Notes:

1) On 23 June 87 water level in canal at +22.8 water depth 18.0'

2) On 29 June 87 water level in casing +18.3 Bottom casing -17.7 Bottom hole -32.7

3) On 30 June 87 water level in canal at +22.9 water level in casing -17.7 Bottom of hole -44.7

4) Hole Grouted with Sakrete

5) * Indicates sample has been laboratory tested. Core log reflects the laboratory classification.

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 628 - 603

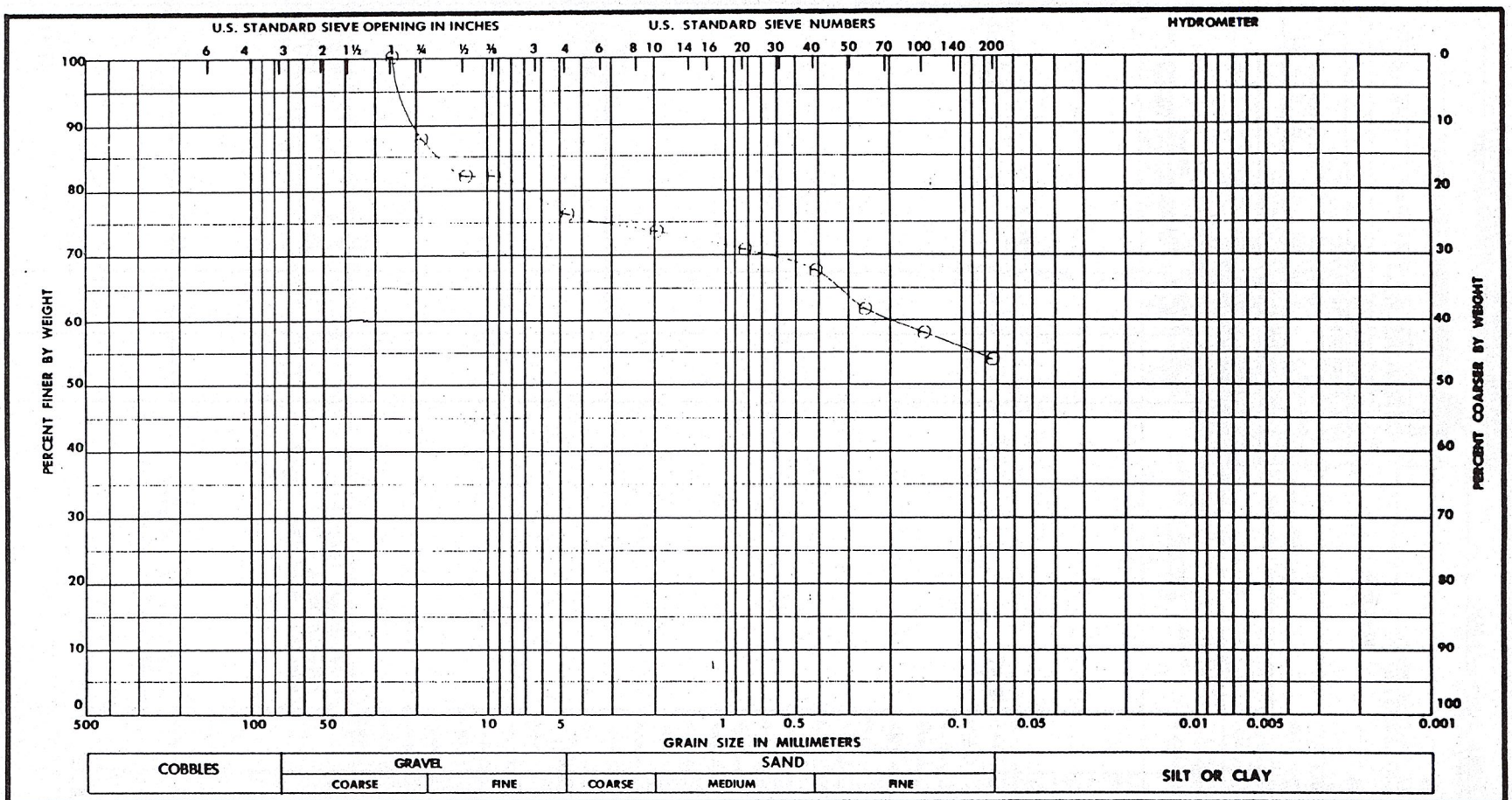
A-8

PROJECT Upper St. Johns River Basin Structure 96C. HOLE NO. CB-596C.

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
2	1.9/0.8	FAT CLAY (CH)	31.4	69	16	53
		TAN, SANDY, W/SOME SILTSTONE				
		& TRACE OF MICA				

Project: UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area: LAB NO. 73/2594

Boring No. CB-S96C-1 . SAMPLE 2

Date: 02/24/88

GRADATION CURVES

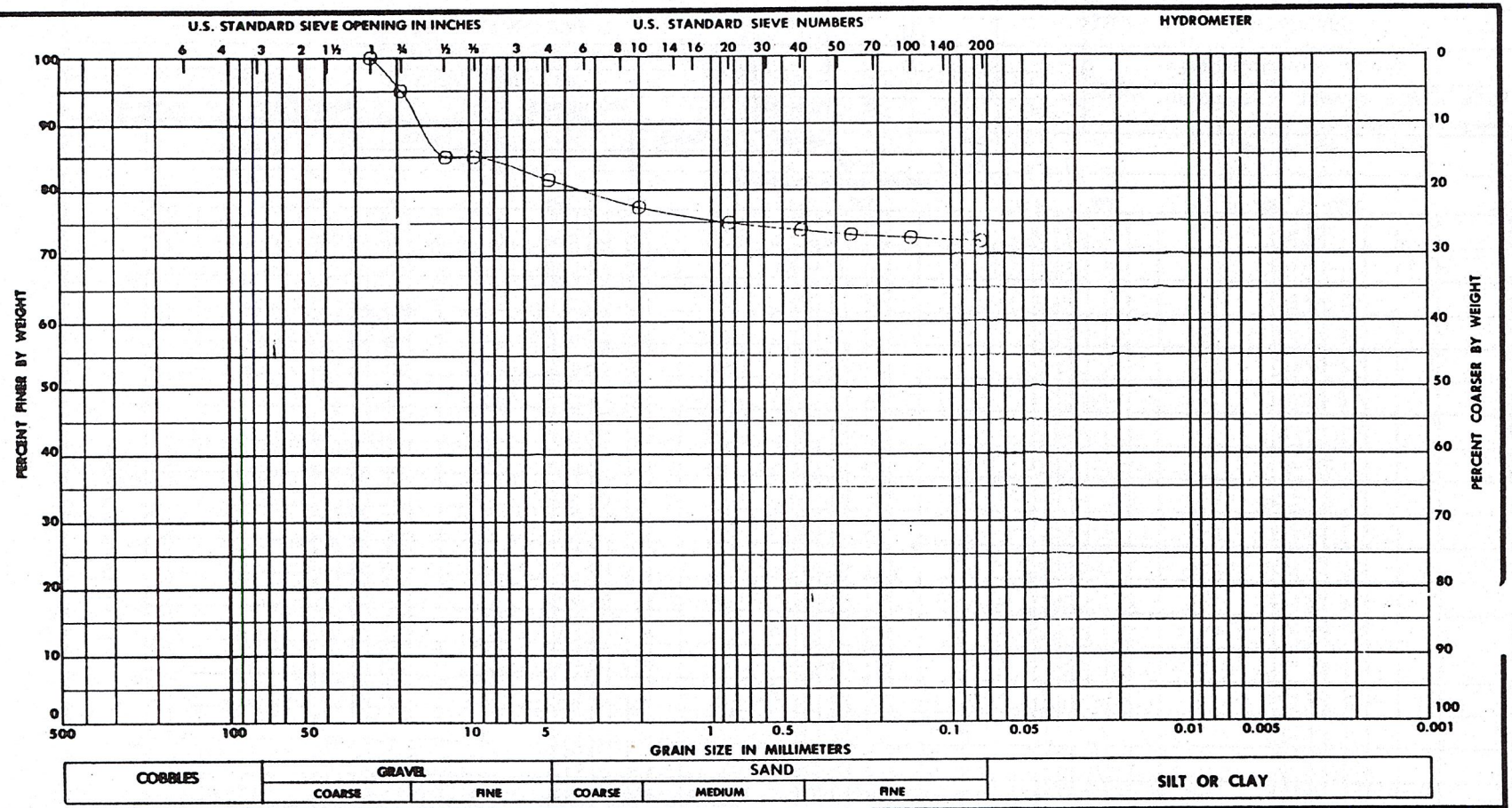
ENG FORM 1 MAY 63 2087

A-22

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM--CW--88--0039



Sample No.	Elev	Classification	Nat w %	LL	PL	PI
3	.8/-0.7'	FAT CLAY (CH)	29.1	70	15	55
		TAN. W/SOME SAND & A/LITTLE				
		CHERT				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2595

Boring No. CB--S96C--1 .SAMPLE 3

Date 02/24/88

GRADATION CURVES

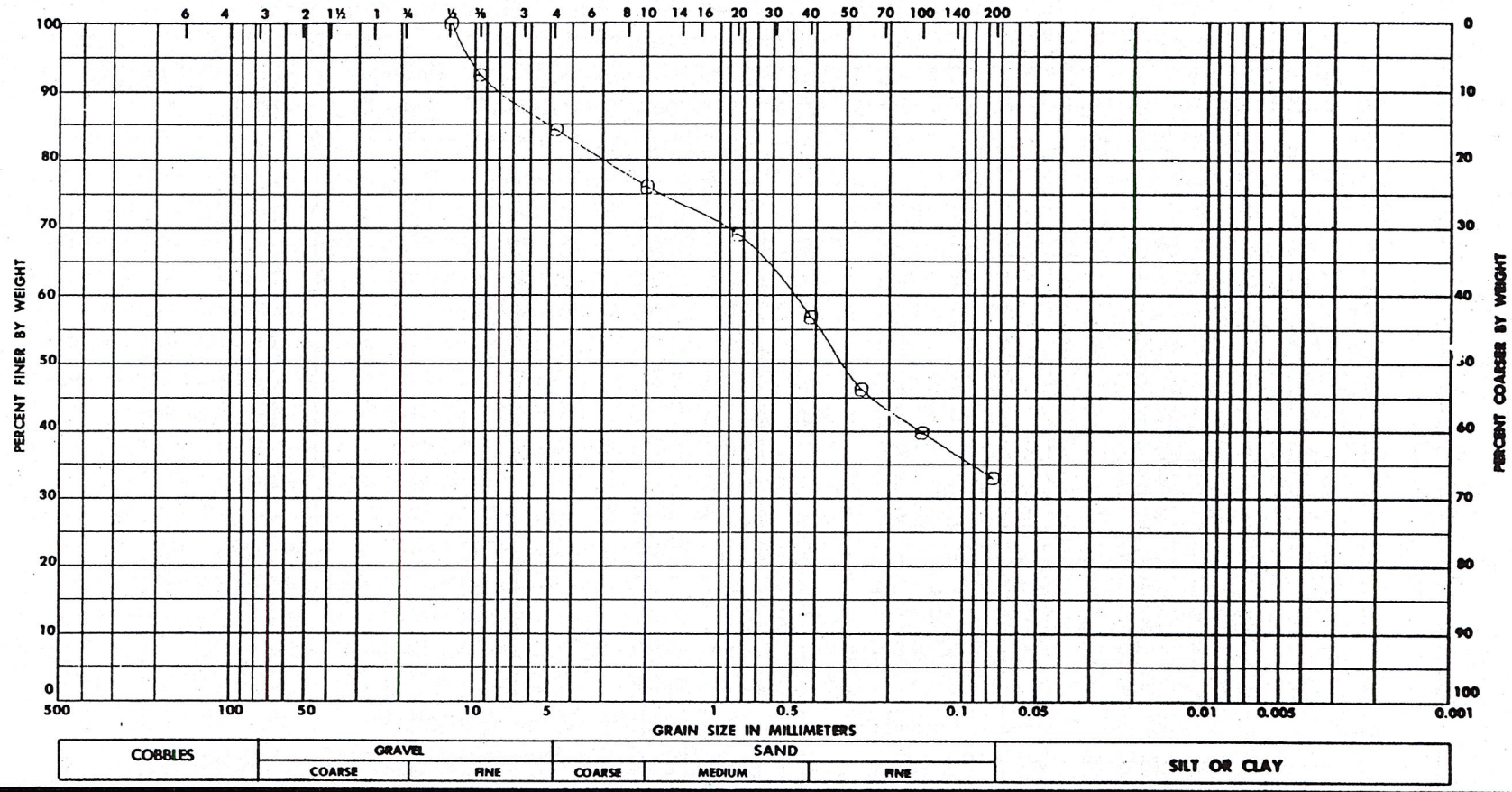
ENG FORM 1 MAY 63 2087

A-23

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev ~~d(X)D(X)(%)~~	Classification	Nat w %	LL	PL	PI
5	-2.2/-3.7'	CLAYEY SAND (SC)	20.9	27	15	12
		TAN. W/A TRACE OF MICA & A/				
		LITTLE LIMESTONE				

GRADATION CURVES

Project: UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area: LAB NO. 73/2596

Boring No. CB-S96C-1 . SAMPLE 5

Date: 02/24/88

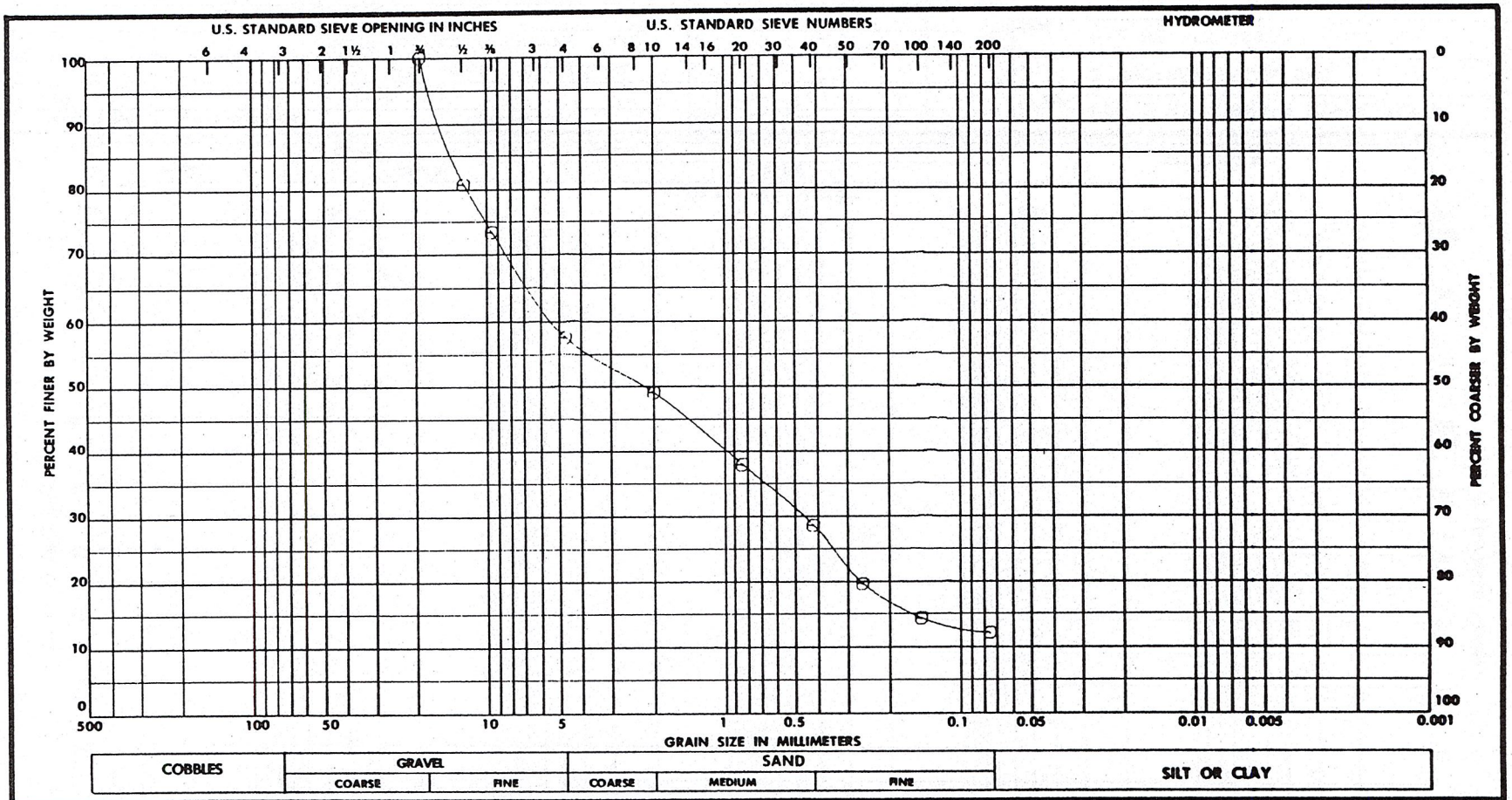
ENG FORM 1 MAY 63 2087

A-24

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
6	-3.7/-5.2'	CLASS. NOT REQUESTED	--	--	--	--

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2597

Boring No. CB-S96C-1 . SAMPLE 6

Date 02/24/88

GRADATION CURVES

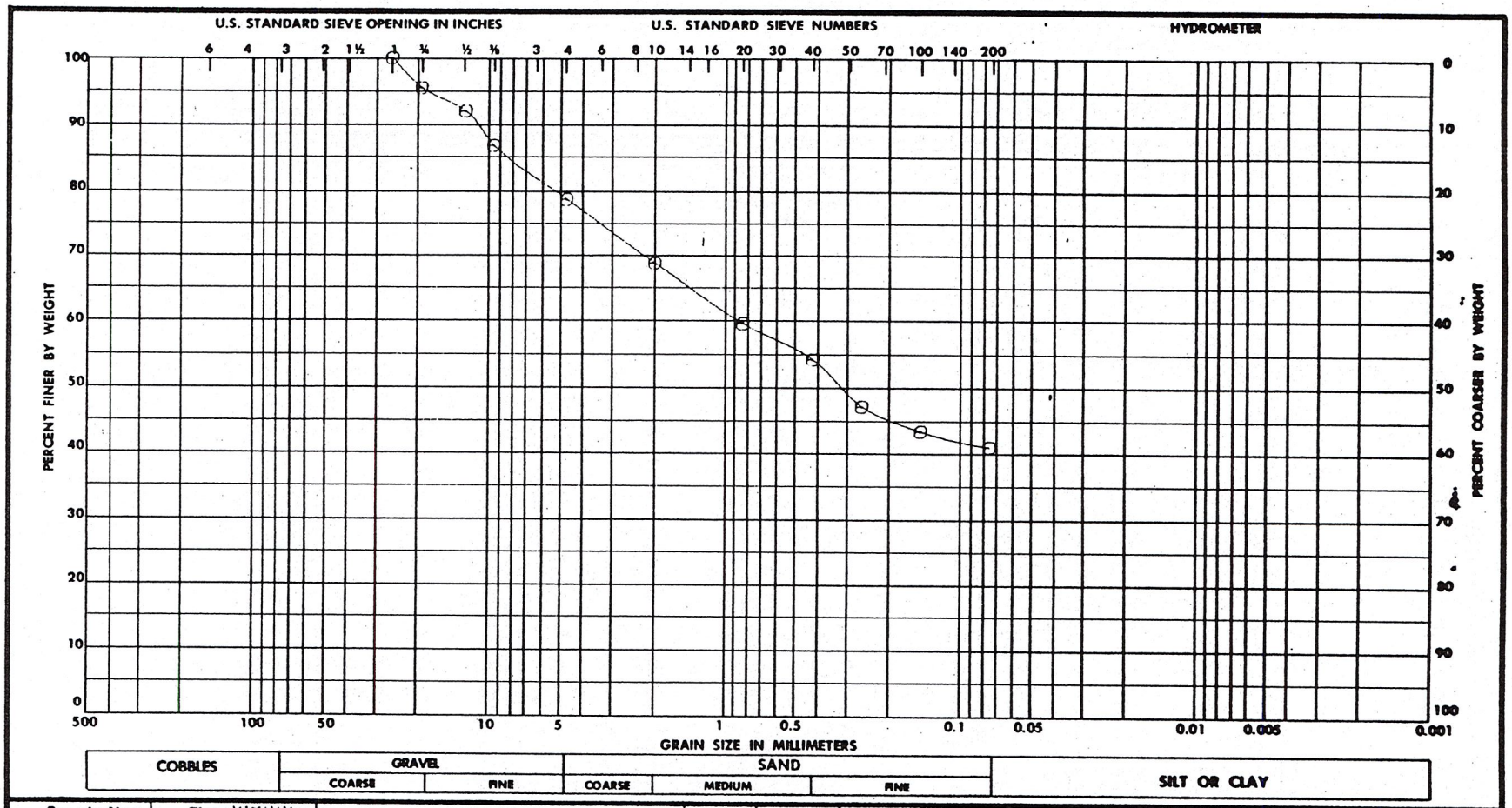
ENG FORM 1 MAY 63 2087

A-25

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev	Classification	Nat w %	LL	PL	PI
9	-6.7/-8.2'	CLAYEY SAND (SC)	17.8	42	14	28
		TAN. W/A TRACE OF MICA &				
		SOME CEMENTED GRAVEL SIZE				
		SHELL				

Project: UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area: LAB NO. 73/2598

Boring No. CB-S96C-1 SAMPLE 9

Date: 02/24/88

GRADATION CURVES

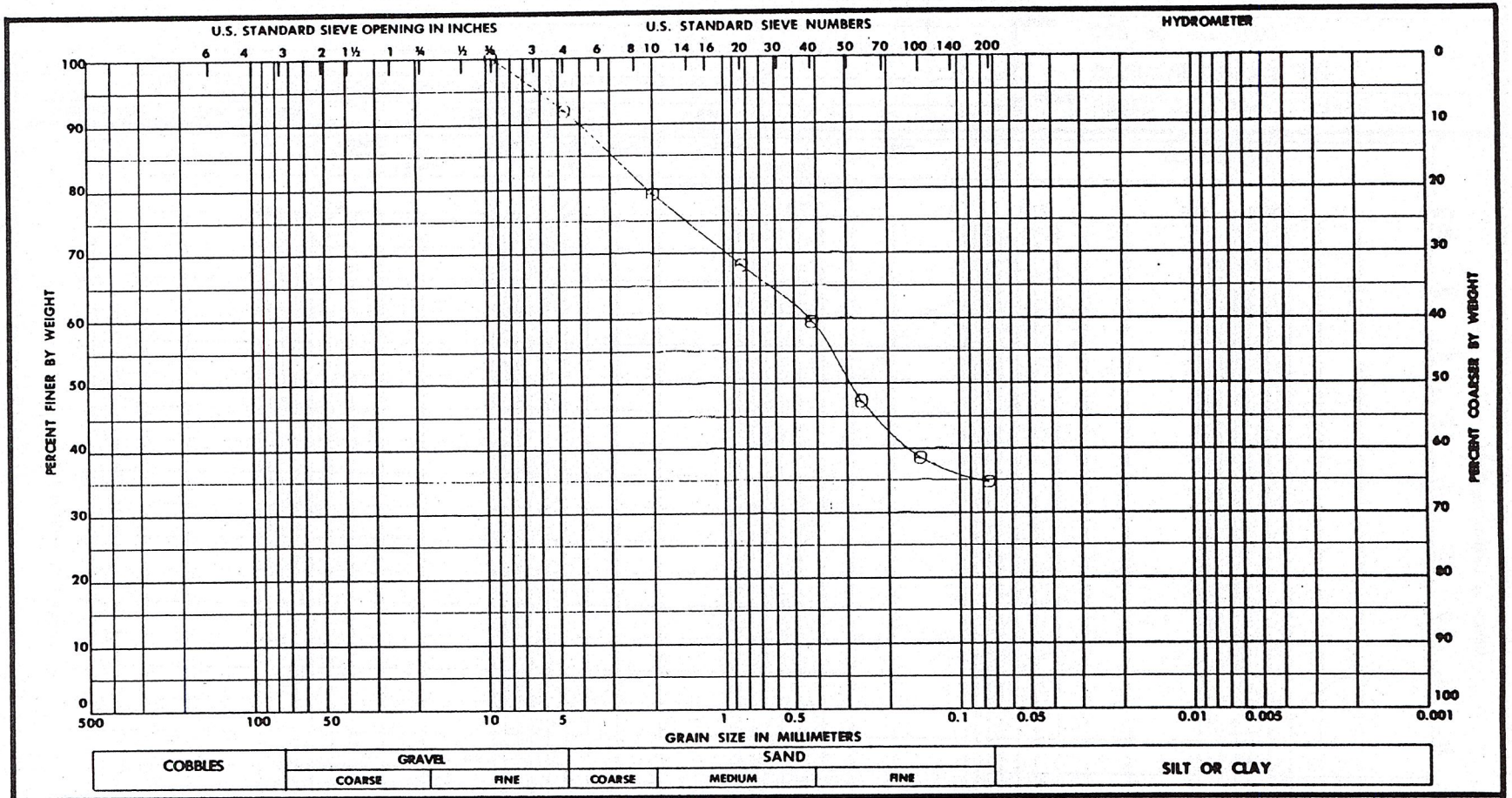
ENG FORM 1 MAY 63 2087

A-26

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev ~~or Depth~~	Classification	Nat w %	LL	PL	PI
10	-8.2/-9.7'	SILTY CLAYEY SAND (SM-SC)	19.2	21	14	7
		TAN. W/A TRACE OF MICA &				
		LIMESTONE				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2599

Boring No. CB-S96C-1 .SAMPLE 10

Date 02/24/88

GRADATION CURVES

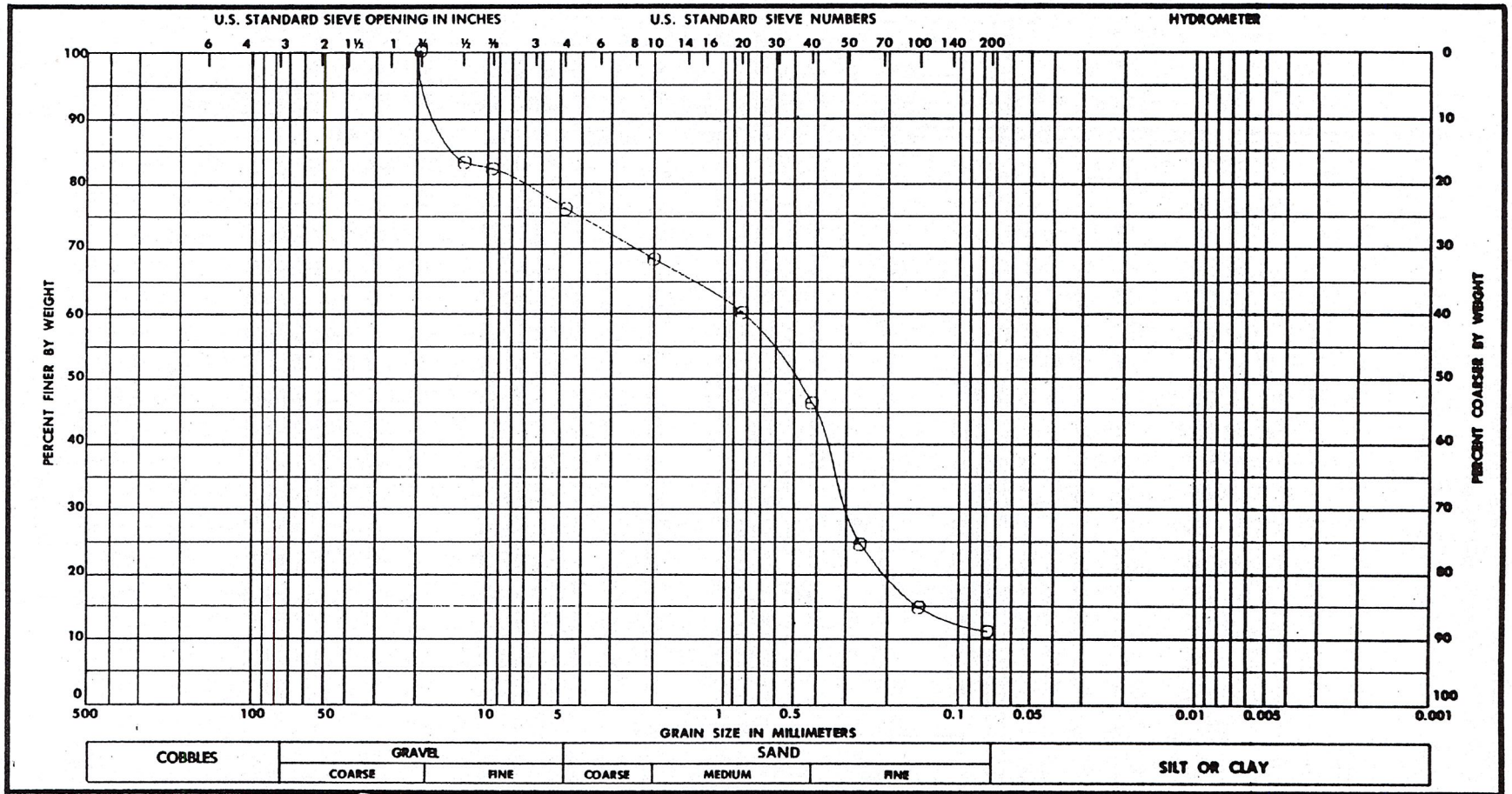
ENG FORM 1 MAY 63 2087

A-27

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
15	-14.2/-15.2'	CLASS. NOT REQUESTED	--	--	--	--

Project: UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area: LAB NO. 73/2600

Boring No. CB-S96C-1 . SAMPLE 15

Date: 02/24/88

GRADATION CURVES

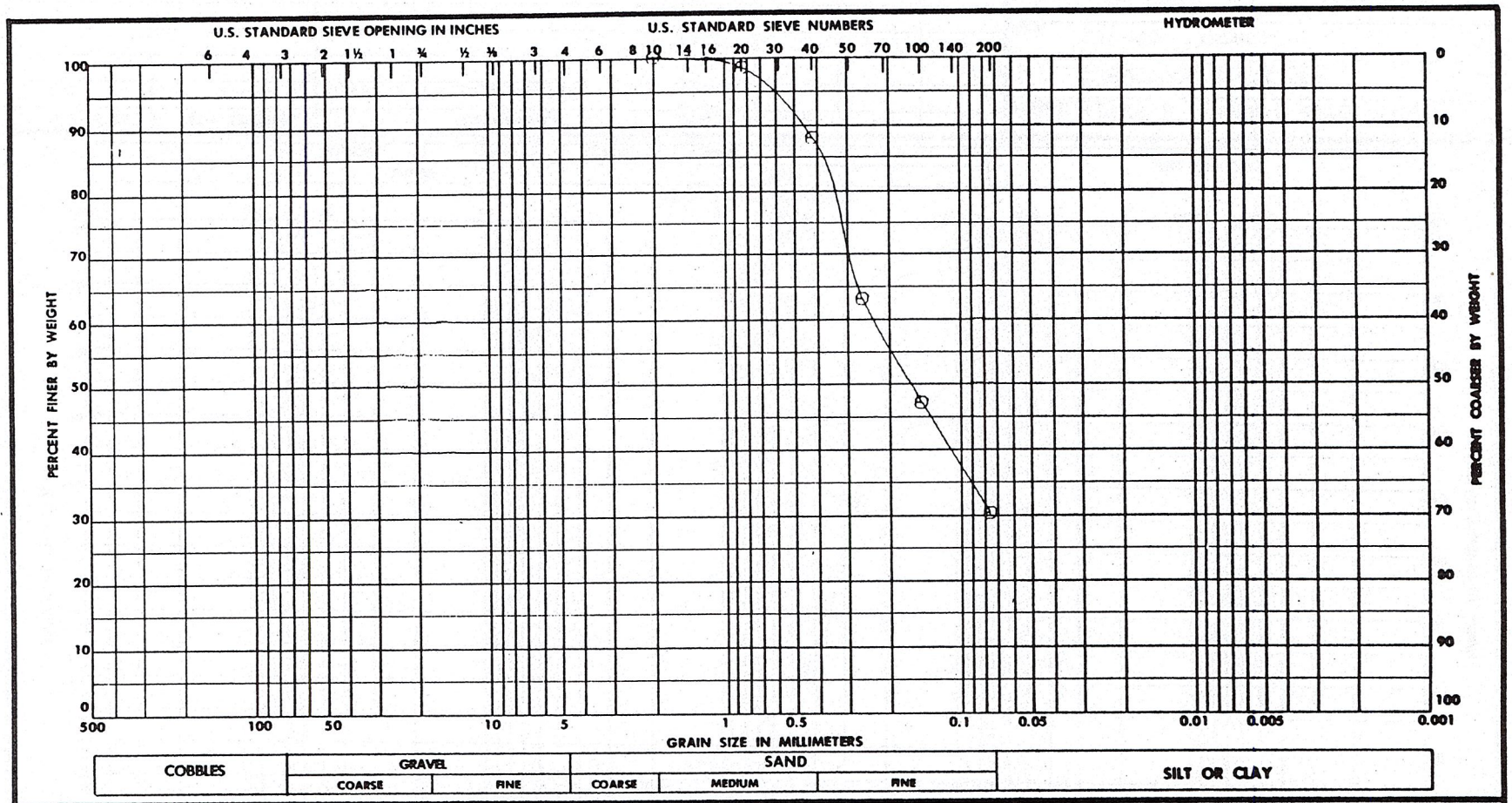
ENG FORM 1 MAY 63 2087

A-28

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
17	-15.7/-17.2'	CLAYEY SAND (SC)	---	30	13	17
		TAN. W/A TRACE OF SHELL FRAG.				

Project: UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area: LAB NO. 73/2601

Boring No. CB-S96C-1 . SAMPLE 17

Date: 02/24/88

GRADATION CURVES

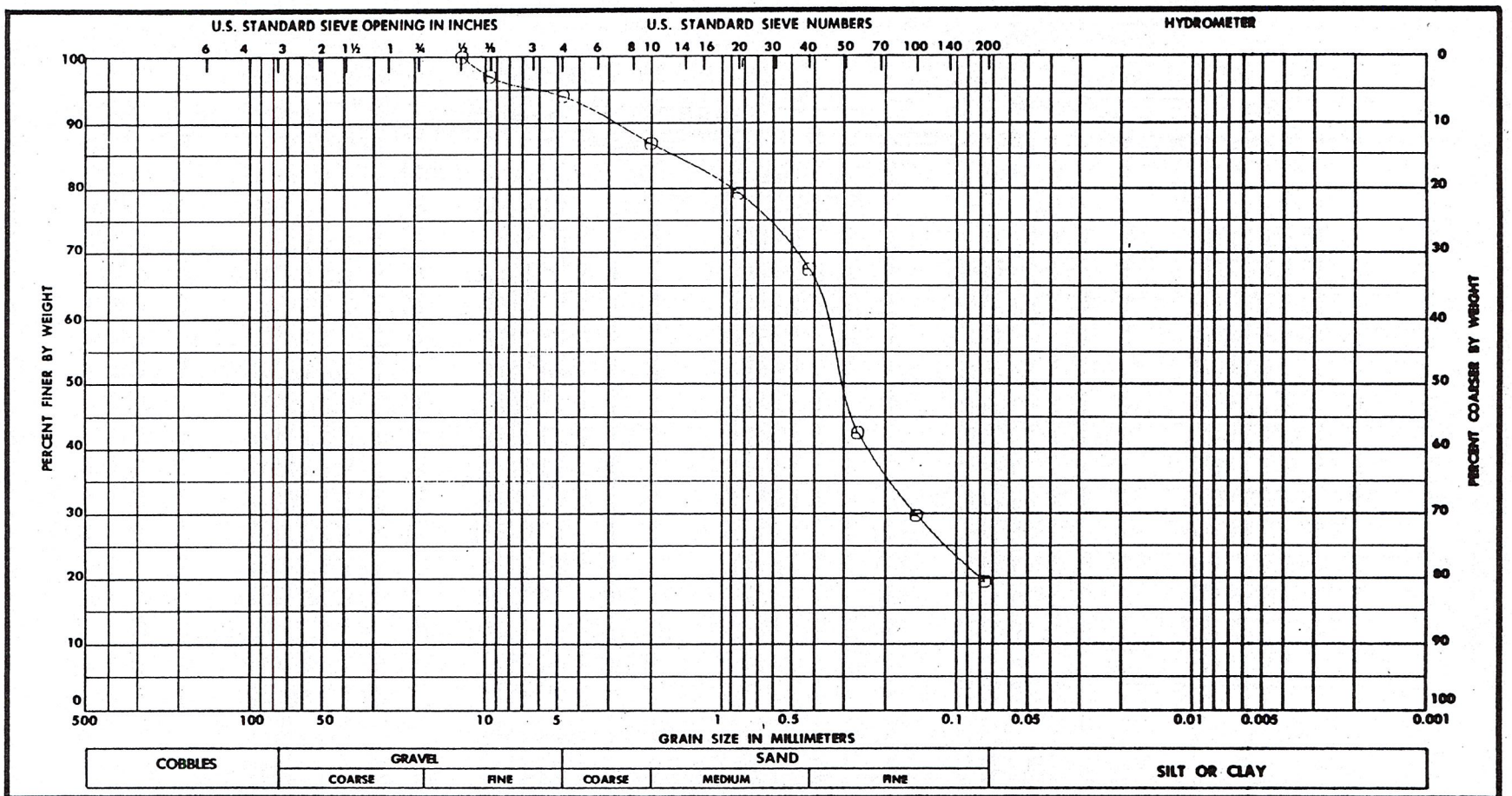
ENG FORM 1 MAY 63 2087

A-29

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
18	-17.2/-18.7'	CLASS. NOT REQUESTED	--	--	--	--

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2602

Boring No. CB-S96C-1 .SAMPLE 18

Date 02/24/88

GRADATION CURVES

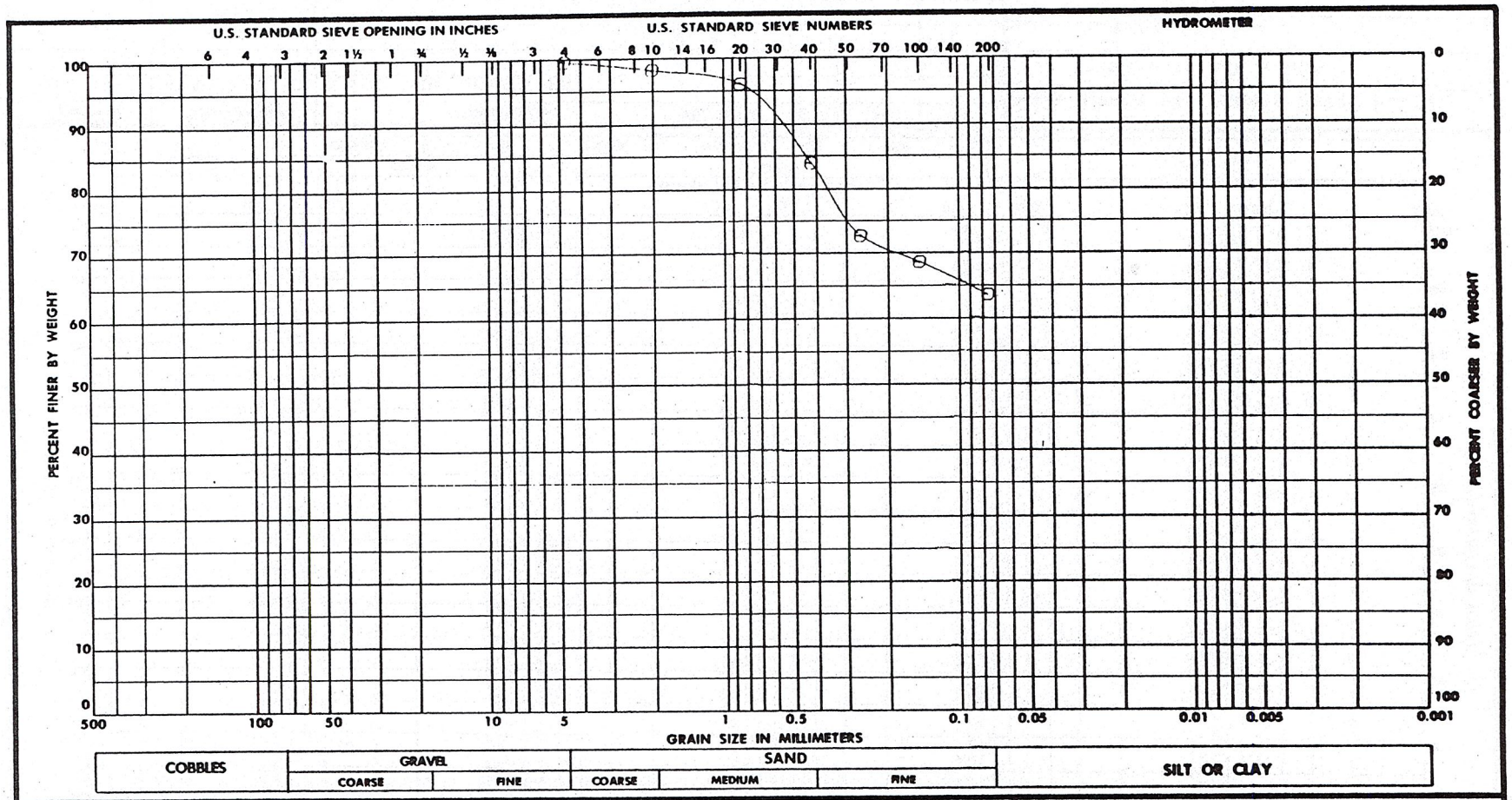
ENG FORM 1 MAY 63 2087

A-30

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
21	-20.2/-21.7'	LEAN CLAY (CL)	---	22	12	10
		TAN, SANDY, W/A TRACE OF MICA				
		& SHELL FRAG.				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2603

Boring No. CB-S96C-1 , SAMPLE 21

Date 02/24/88

GRADATION CURVES

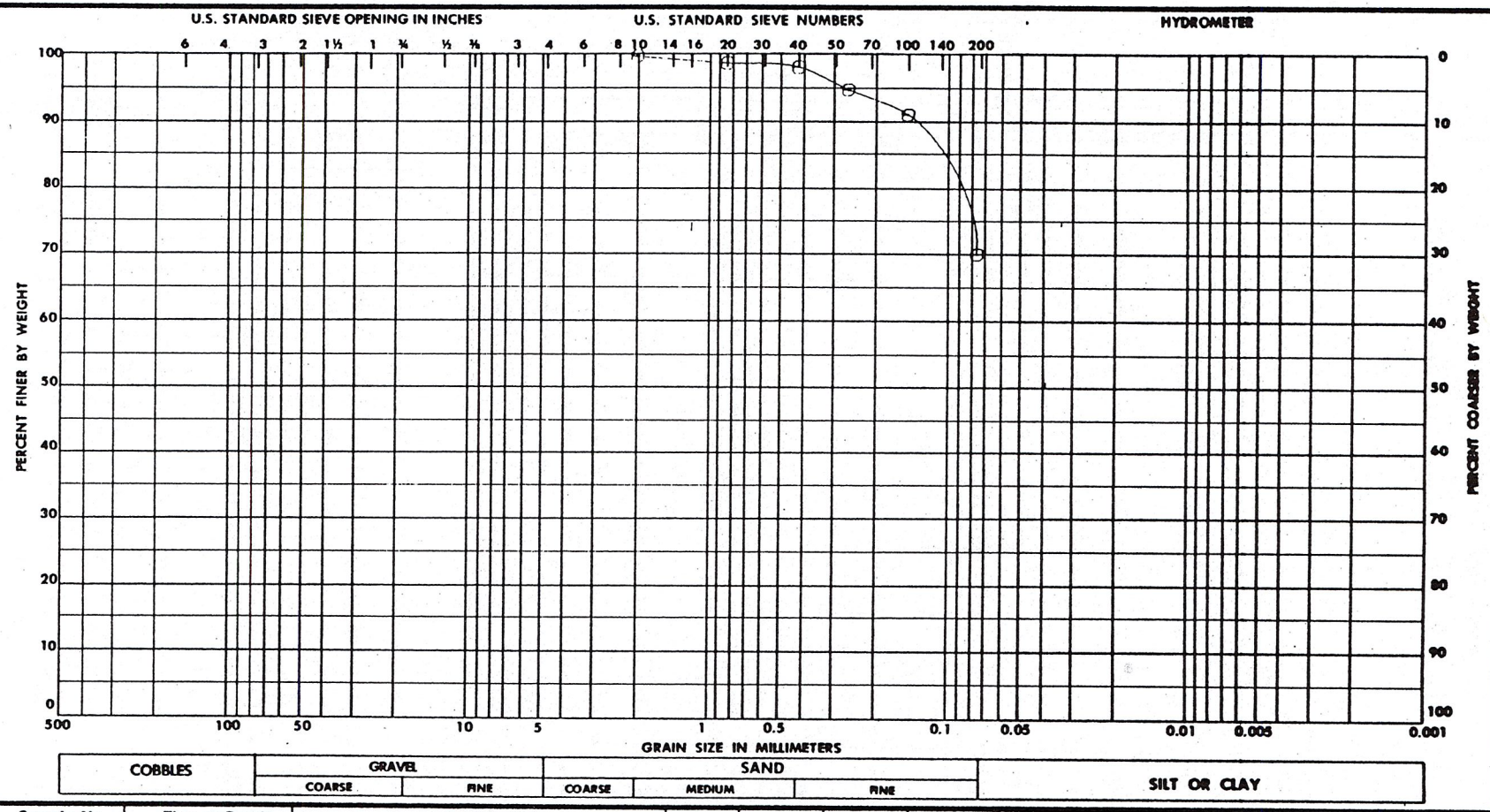
ENG FORM 1 MAY 63 2087

A-31

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
25	-26.2/-27.7'	CLASS. NOT REQUESTED	--	--	--	--

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2604

Boring No. CB-S96C-1 , SAMPLE 25

Date 02/24/88

GRADATION CURVES

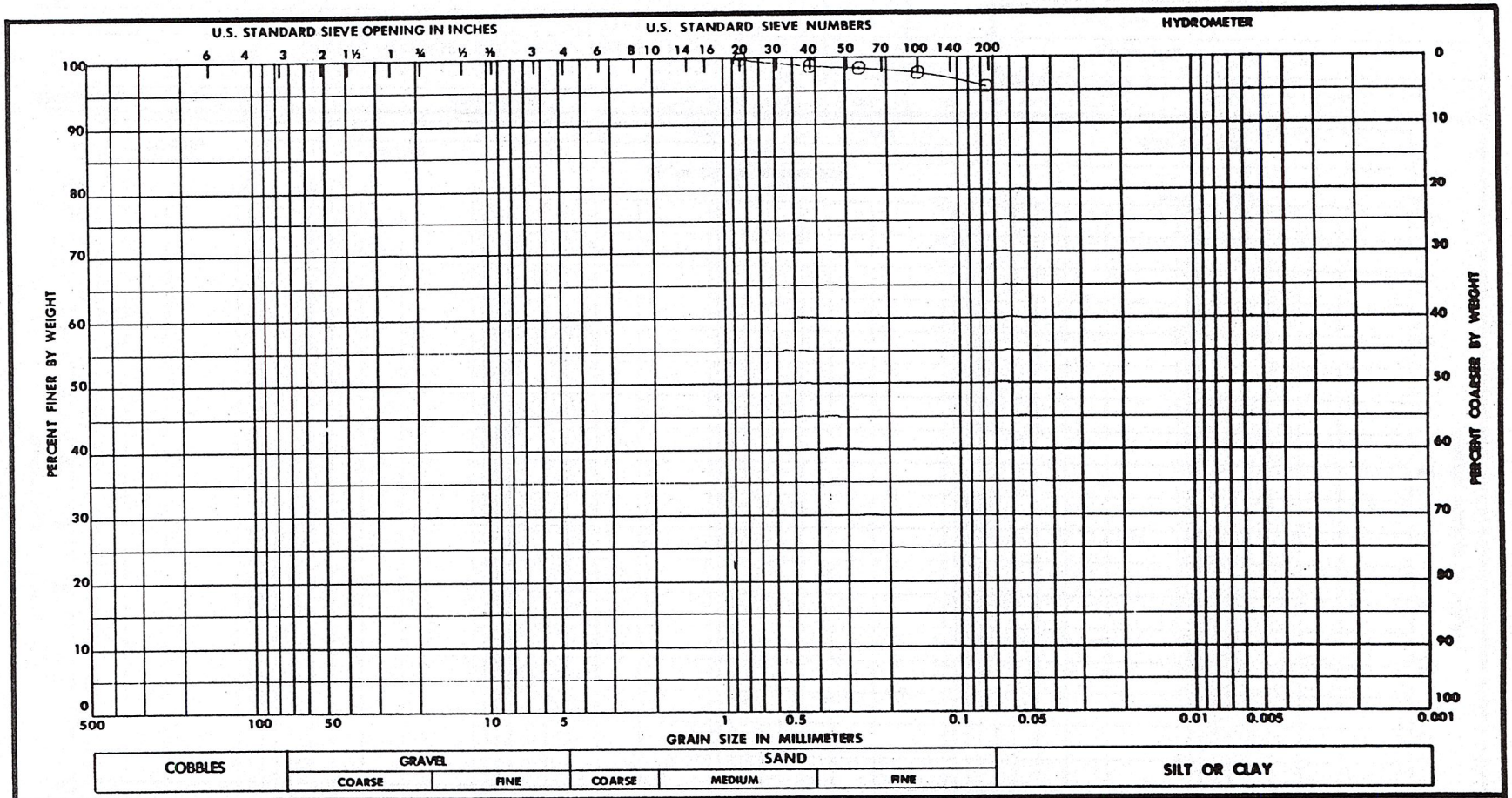
ENG FORM 1 MAY 63 2087

A-32

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
26	-27.7/-29.2'	FAT CLAY (CH)	--	86	21	65
		TAN. W/A TRACE OF SAND. MICA.				
		AND SHELL FRAG.				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2605

Boring No. CB-S96C-1 , SAMPLE 26

Date 02/24/88

GRADATION CURVES

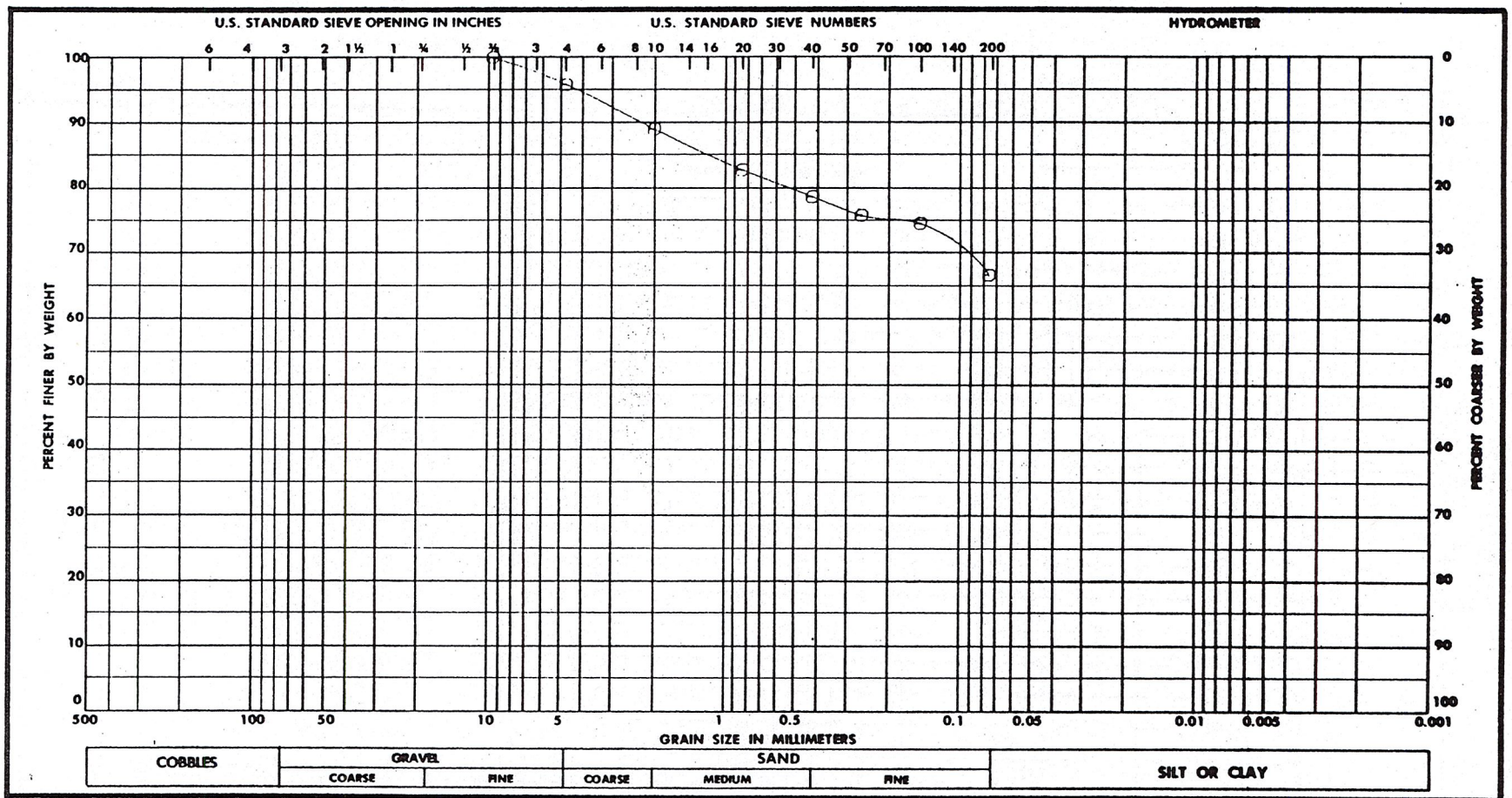
ENG FORM 1 MAY 63 2087

A-33

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev (Depth)	Classification	Nat w. %	LL	PL	PI
28	-30.7/-32.2'	LEAN CLAY (CL)	--	36	22	14
		GRAY. W/SOME SAND & A TRACE				
		OF MICA & GRAVEL SIZE SHELL				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D
Area LAB NO. 73/2606
Boring No. CB-S96C-1 . SAMPLE 28
Date 02/24/88

GRADATION CURVES

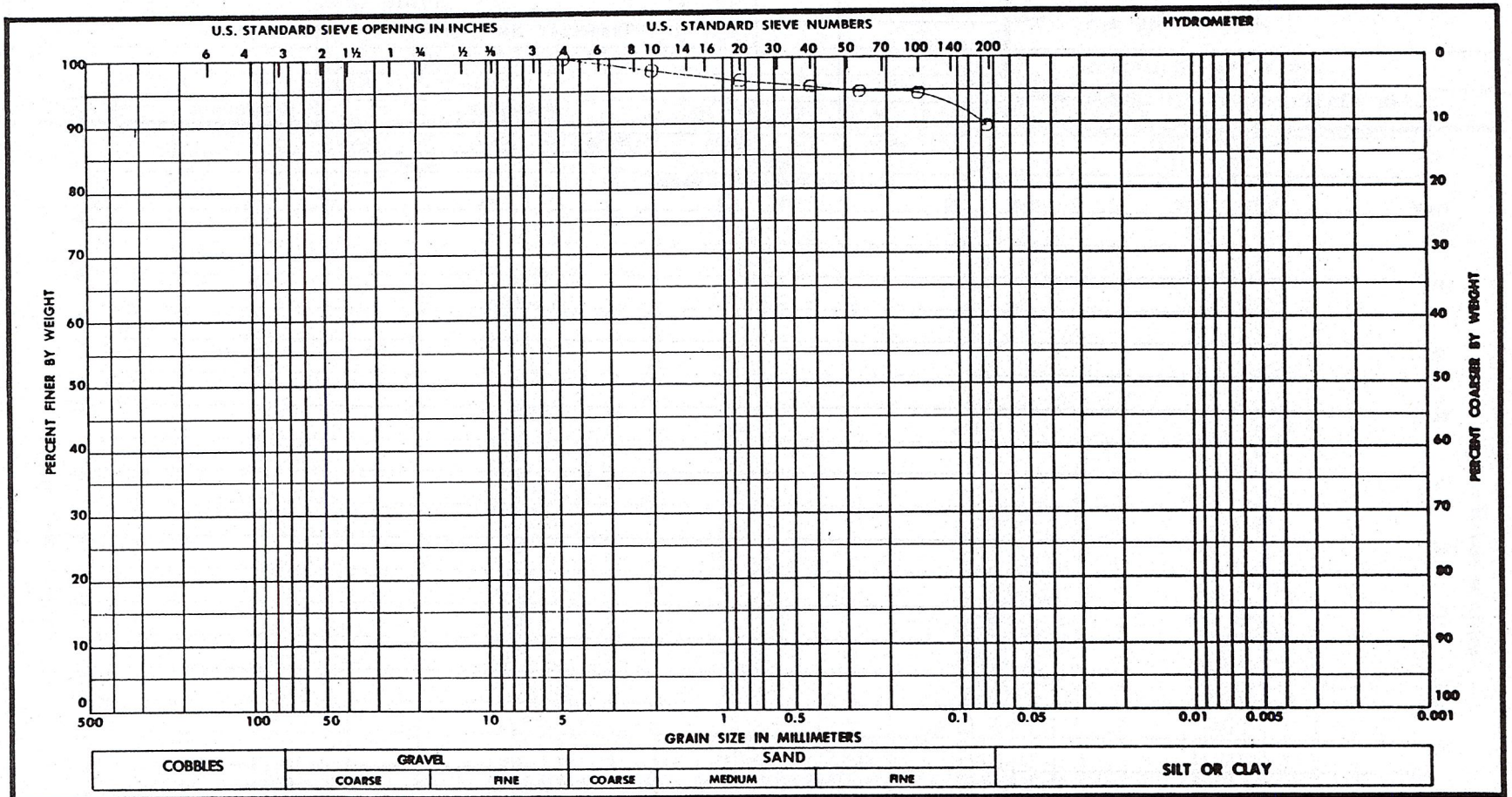
ENG FORM 1 MAY 63 2087

A-34

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039 .



Sample No.	Elev ~~(X)(X)(X)~~	Classification	Nat w %	LL	PL	PI
31	-35.2/-36.7'	FAT CLAY (CH)	--	51	15	36
		GRAY, W/A LITTLE SAND & TRACE				
		OF MICA & SHELL FRAG.				

GRADATION CURVES

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D
Area LAB NO. 73/2607
Boring No. CB-S96C-1 .SAMPLE 31
Date 02/24/88

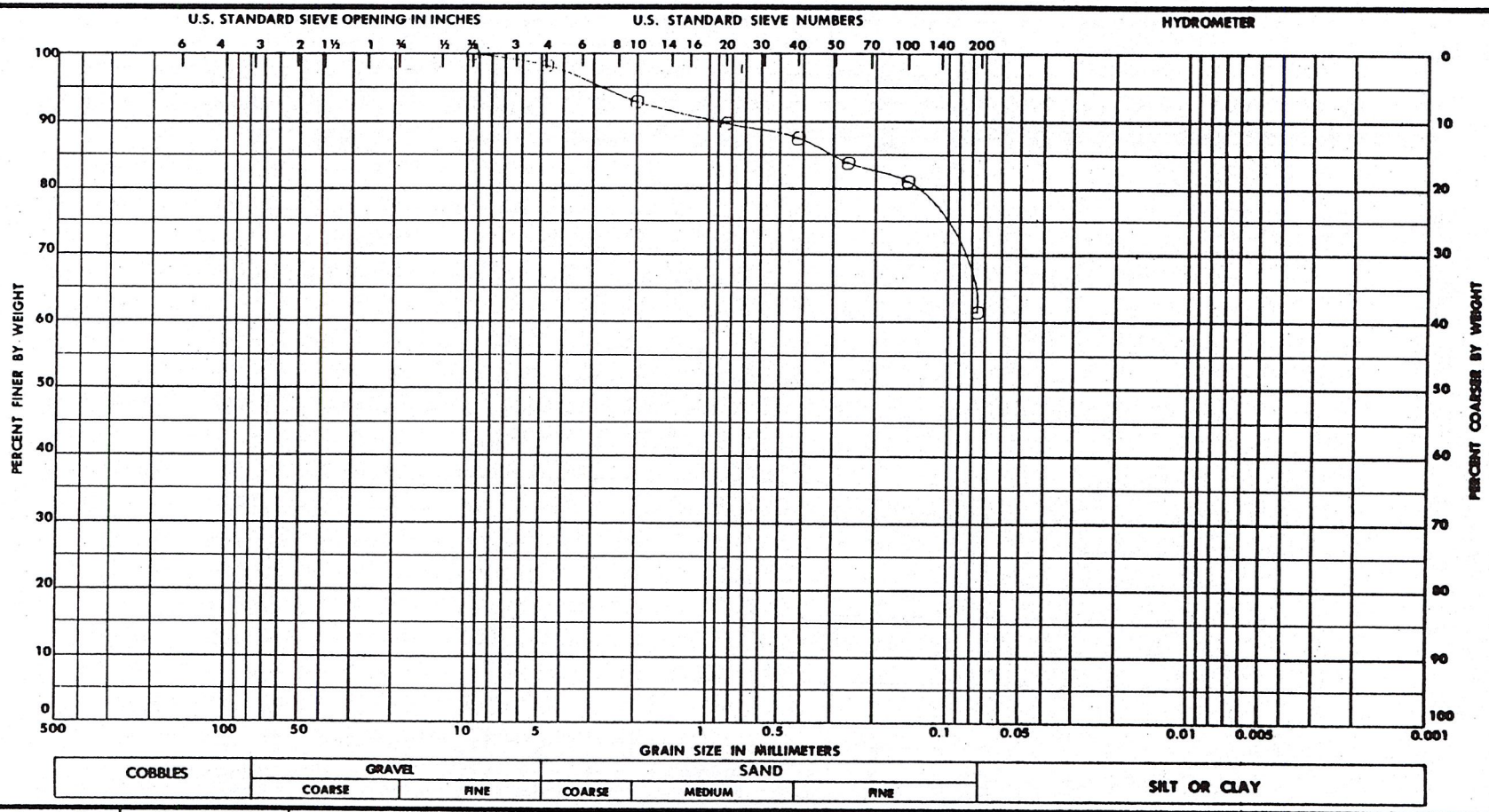
ENG FORM 1 MAY 63 2087

A-35

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev ~~(X)(X)(X)~~	Classification	Nat w %	LL	PL	PI
34	-41.2/-42.7'	LEAN CLAY (CL)	---	45	16	29
		GRAY, SANDY, W/A TRACE OF				
		MICA & LIMESTONE & GRAVEL				
		SIZE SHELL				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2608

Boring No. CB-S96C-1 .SAMPLE 34

Date 02/24/88

GRADATION CURVES

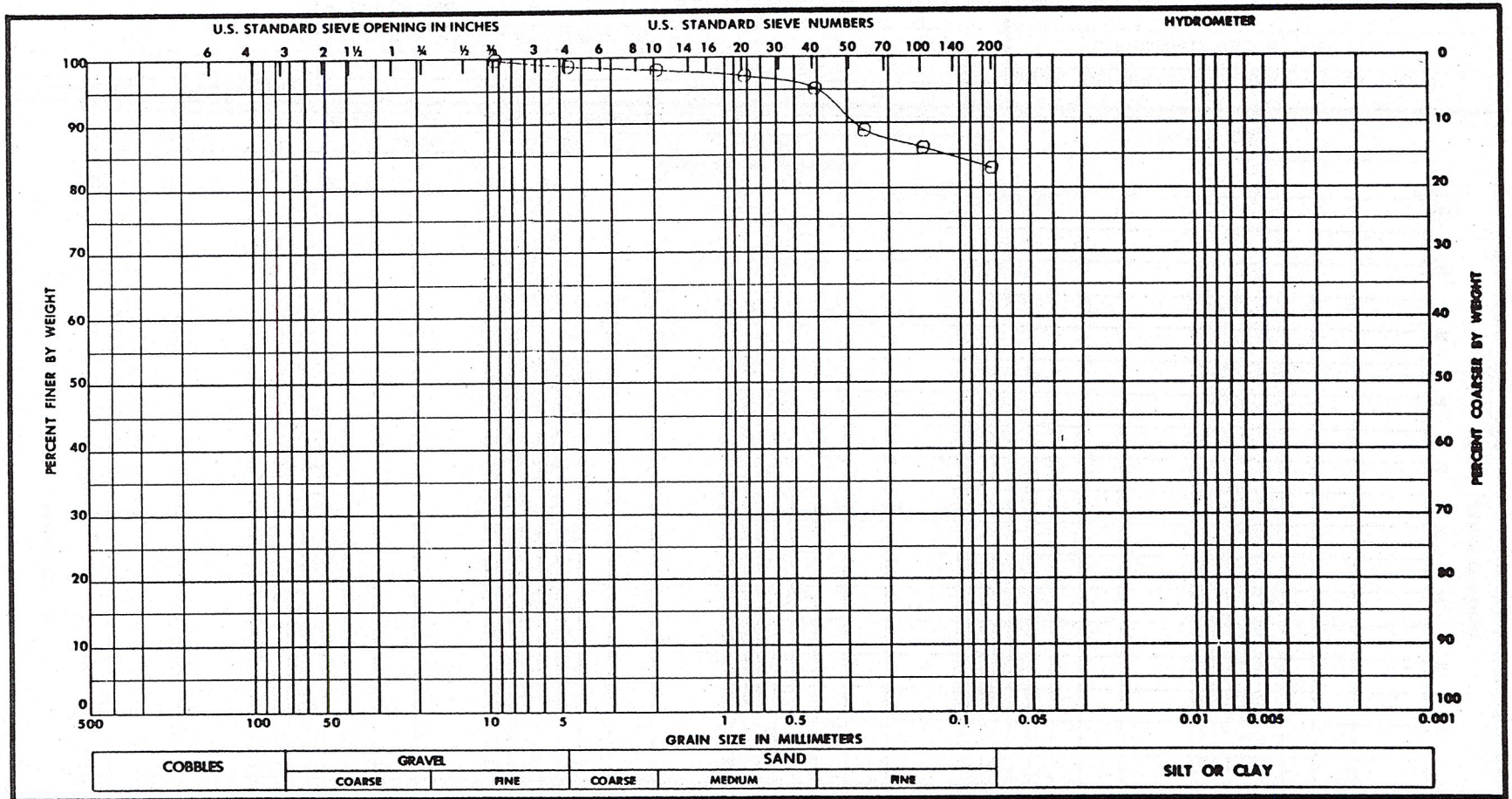
ENG FORM 1 MAY 63 2087

A-36

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
3	+1.3/-0.2'	FAT CLAY (CH)	33.7	77	16	61
		TAN. W/A LITTLE SAND & LIME-				
		STONE. GRAVEL SIZE SHELL				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2609

Boring No. CB-S96C-2 .SAMPLE 3

Date 02/25/88

GRADATION CURVES

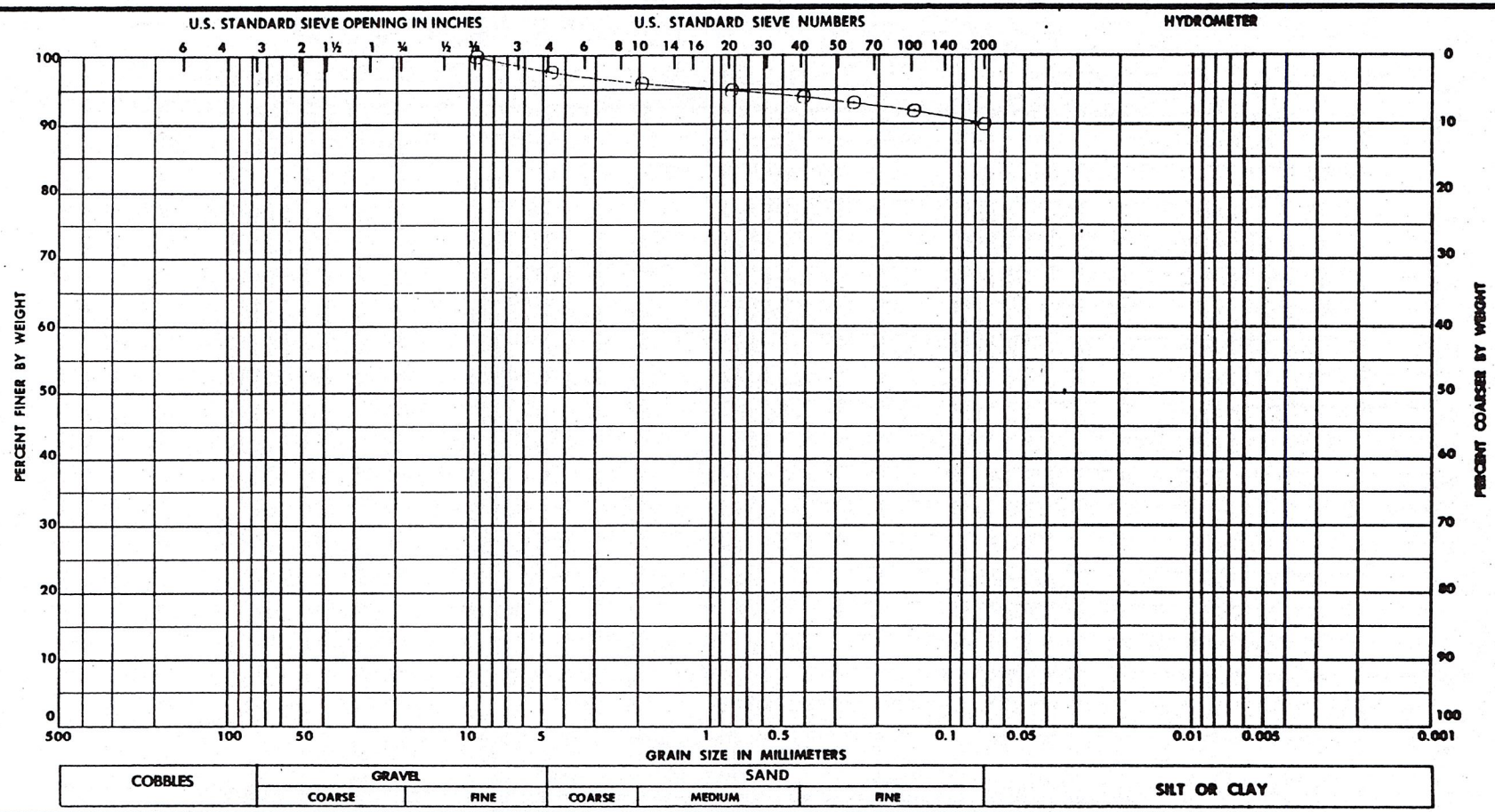
ENG FORM 1 MAY 63 2087

A-37

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or ~~Depth~~	Classification	Nat w %	LL	PL	PI
4	-0.2/-1.7'	LEAN CLAY (CL)	25.5	46	13	33
		TAN, W/A TRACE OF SAND, MICA				
		& SILTSTONE				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2610

Boring No. CB-S96C-2 . SAMPLE 4

Date 02/25/88

GRADATION CURVES

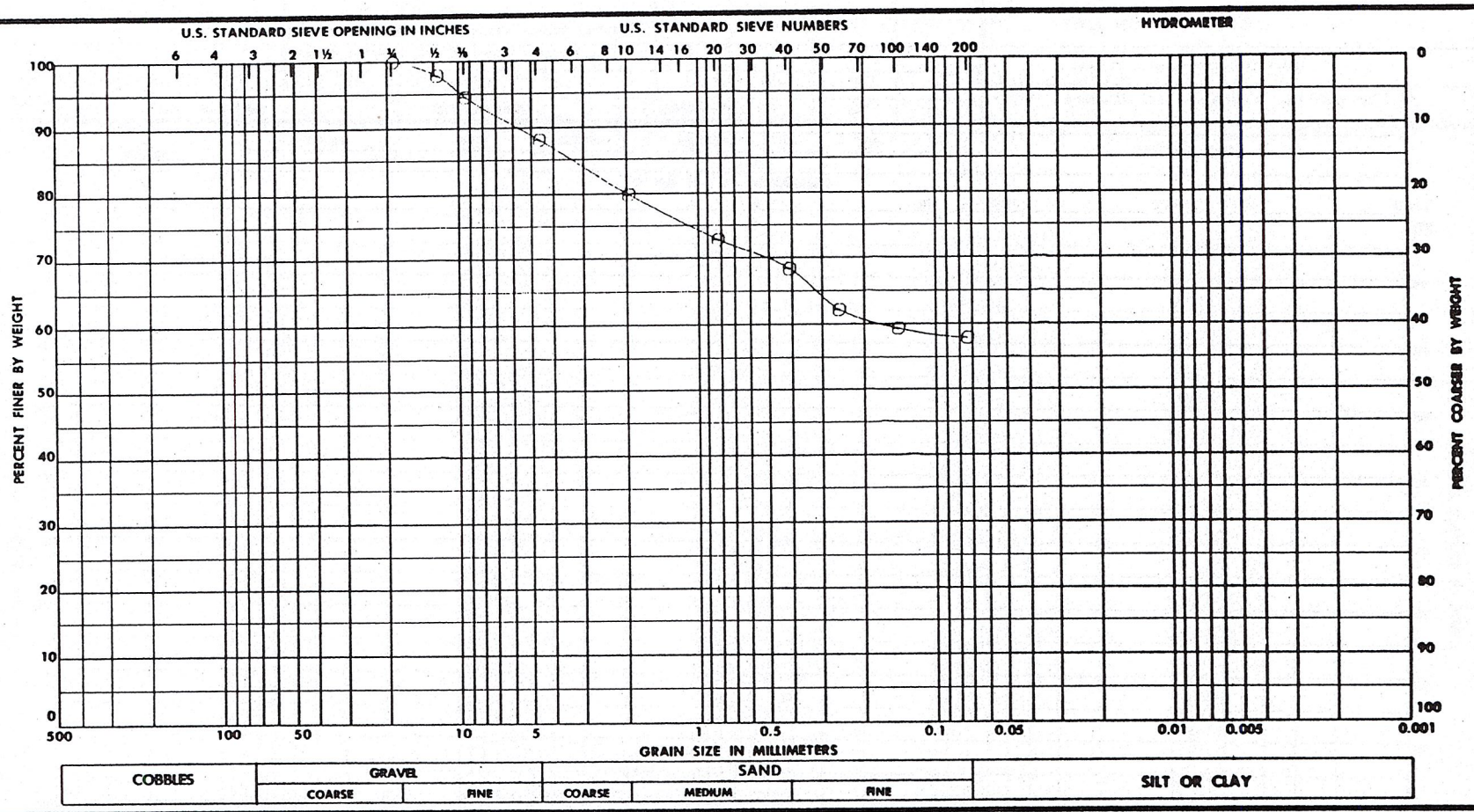
ENG FORM 1 MAY 63 2087

4-38

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	~~Elev or~~ Depth	Classification	Nat w %	LL	PL	PI
8	-6.2/-7.7'	LEAN CLAY (CL)	20.0	29	15	14
		TAN, SANDY, W/A LITTLE LIME-				
		STONE				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2611

Boring No. CB-S96C-2 , SAMPLE 8

Date 02/25/88

GRADATION CURVES

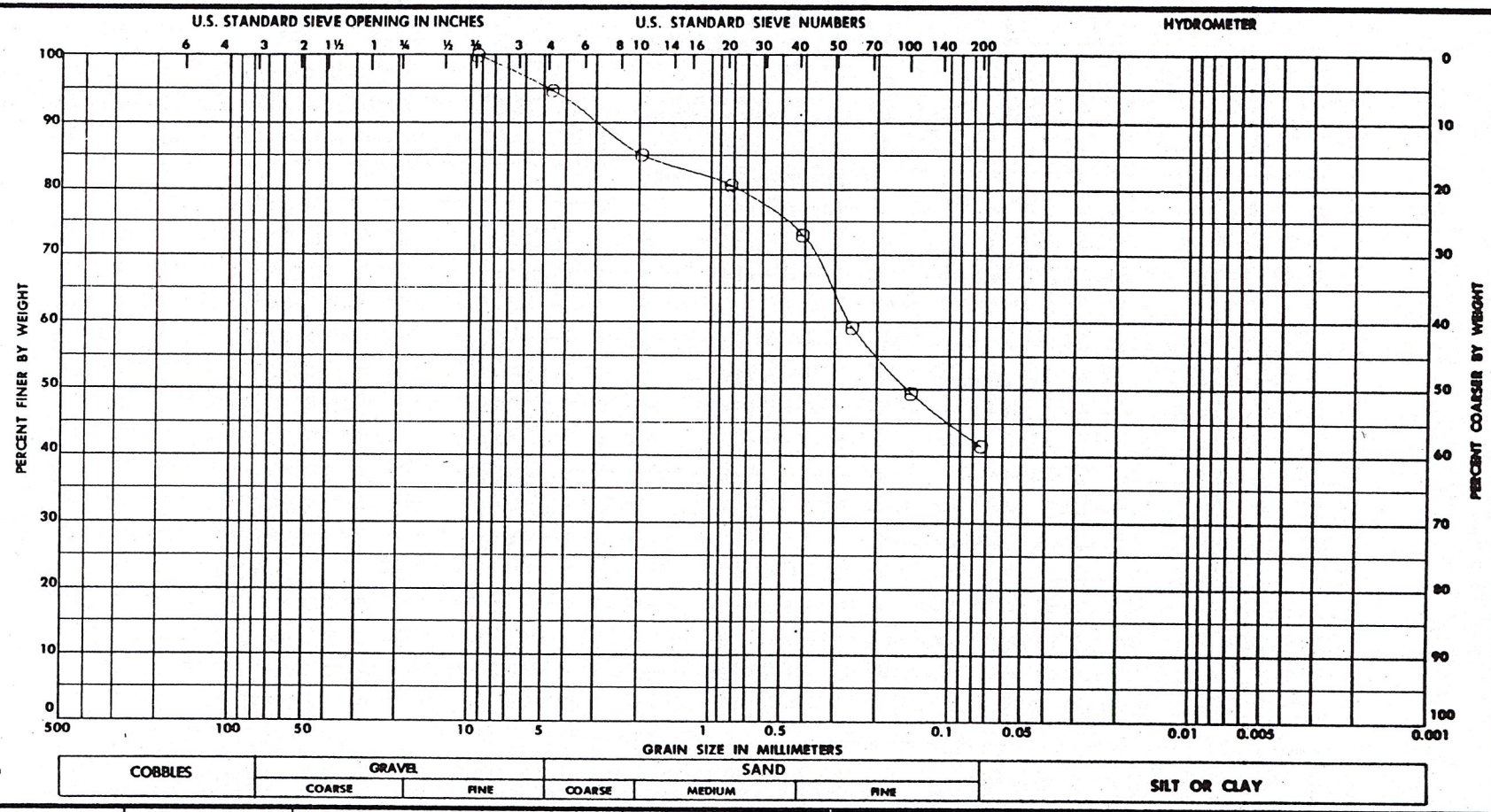
ENG FORM 1 MAY 63 2087

A-39

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
10	-9.2/-10.7'	CLAYEY SAND (SC)	17.5	21	10	11
		TAN. W/A TRACE OF MICA &				
		SILTSTONE. GRAVEL SIZE SHELL				

GRADATION CURVES

Project: UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area: LAB NO. 73/2612

Boring No. CB-S96C-2 . SAMPLE 10

Date: 02/25/88

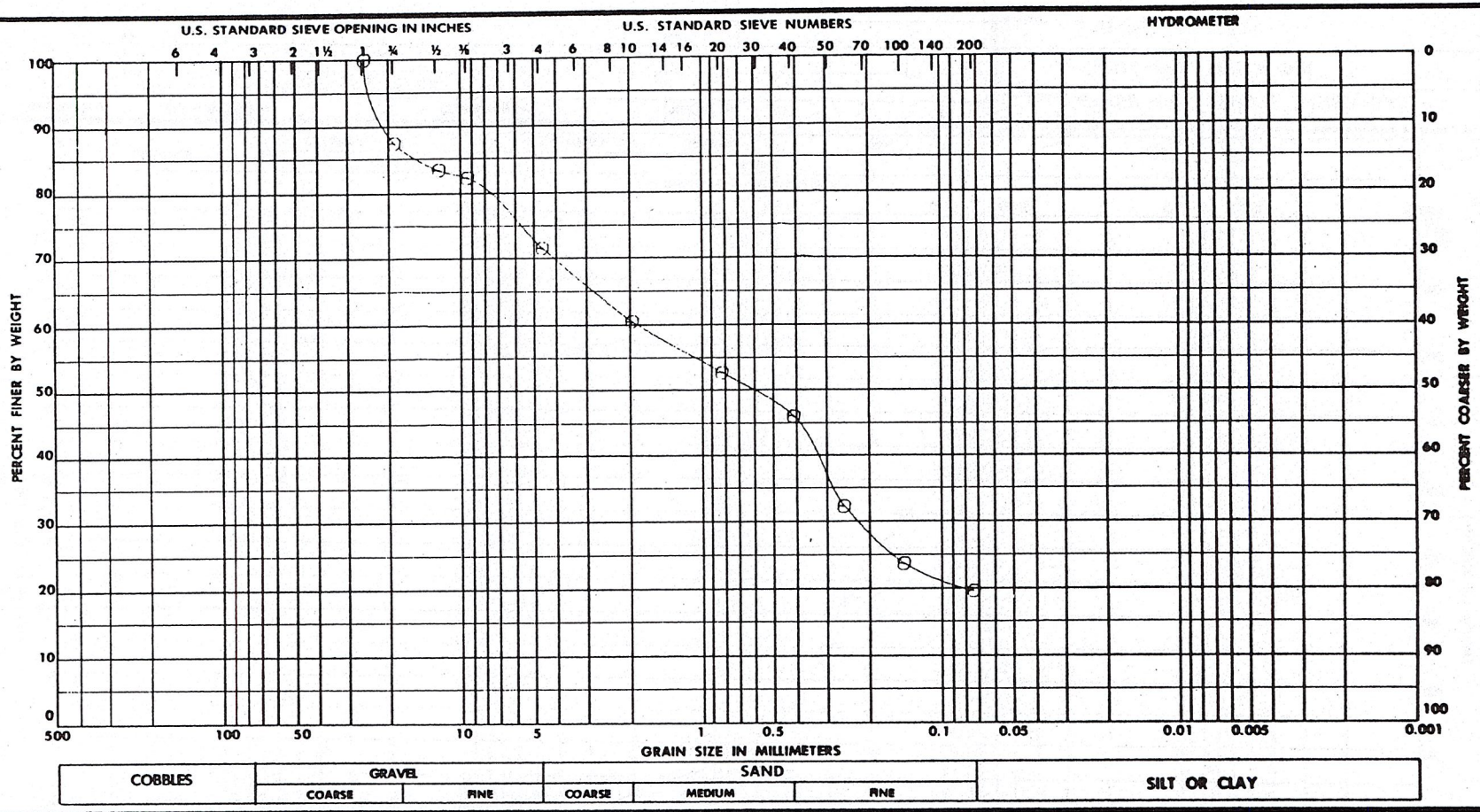
ENG FORM 1 MAY 63 2087

A-40

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	VISUAL Classification	Nat w %	LL	PL	PI
11	-11.7/-13.2'	CLAYEY SAND (SC)	--	--	--	--
		TAN. W/A TRACE OF MICA &				
		SOME SILTSTONE. GRAVEL SIZE				
		SHELL				
		(INSUFFICIENT MAT'L FOR ATT.)				

GRADATION CURVES

Project: UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area: LAB NO. 73/2613

Boring No. CB-S96C-2 . SAMPLE 11

Date: 02/25/88

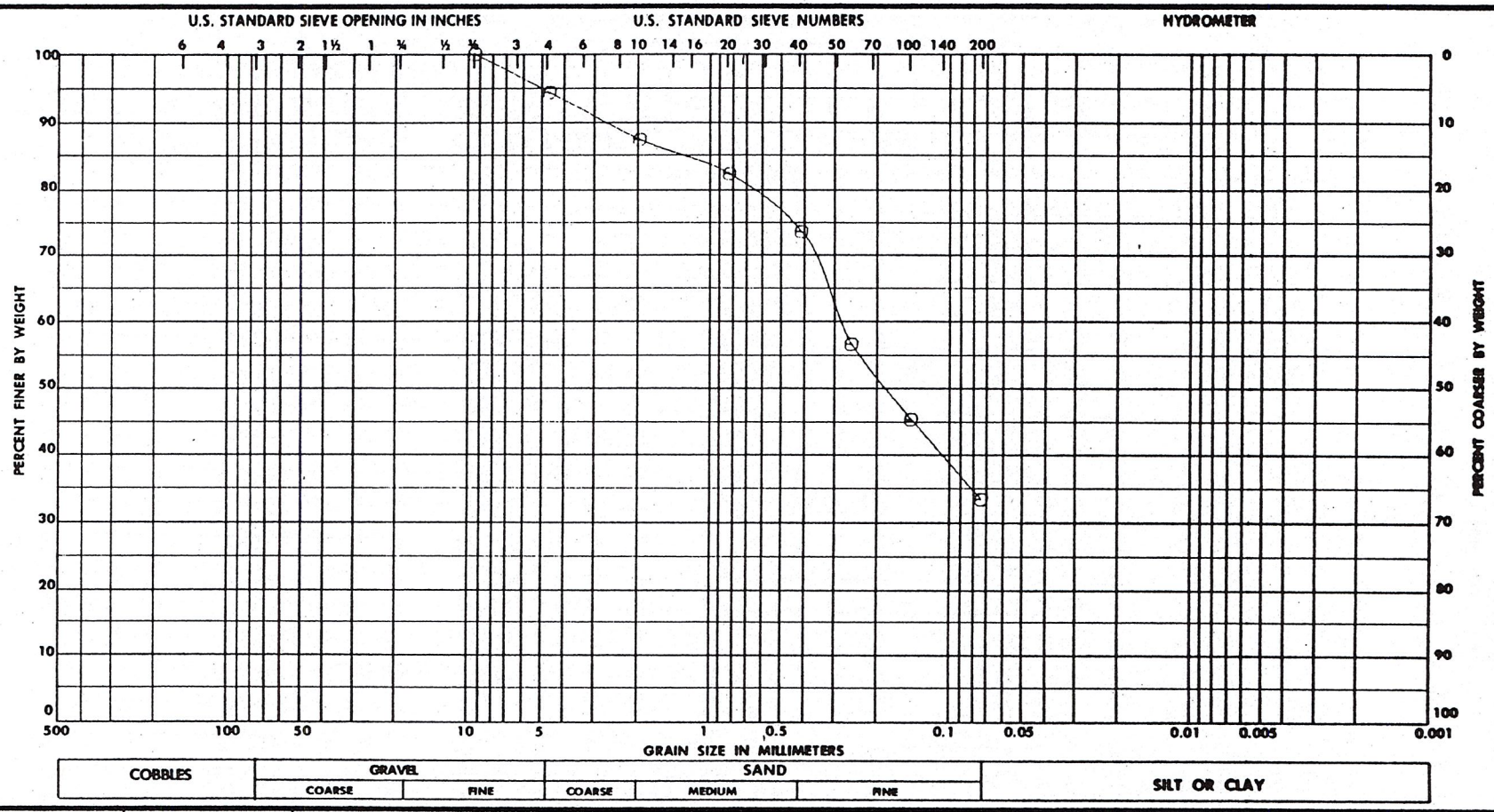
ENG FORM 1 MAY 63 2087

A-41

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
14	-16.2/-17.7'	CLAYEY SAND (SC)	--	24	13	11
		TAN. W/A TRACE OF GRAVEL SIZE				
		SHELL				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2614

Boring No. CB-S96C-2 . SAMPLE 14

Date 02/25/88

GRADATION CURVES

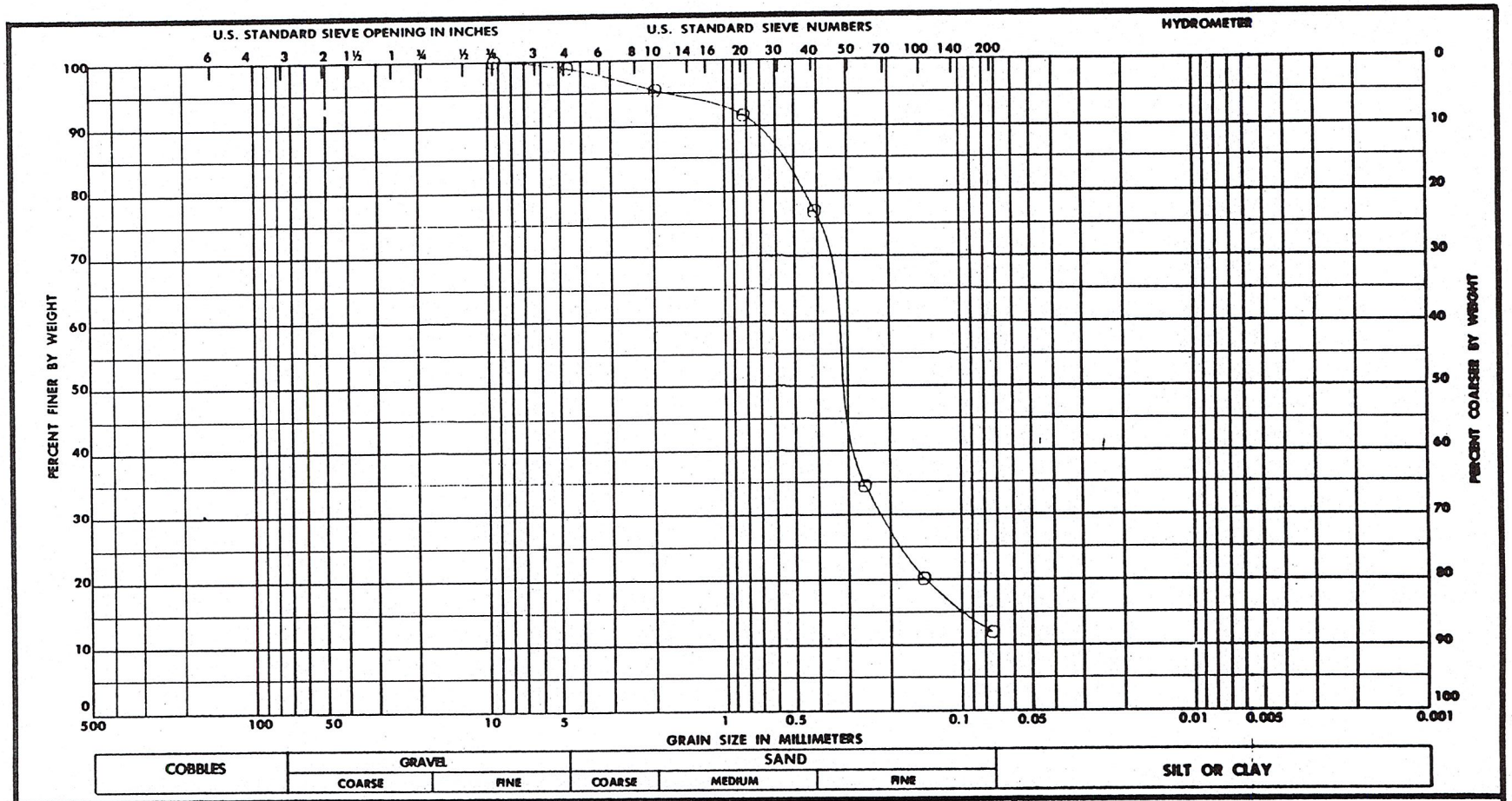
ENG FORM 1 MAY 63 2087

A-42

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
15	-17.7/-19.2'	SILTY SAND (SM)	---	NP	NP	NP
		TAN. W/A TRACE OF MICA &				
		GRAVEL SIZE SHELL				

Project: UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area: LAB NO. 73/2615

Boring No. CB-S96C-2 . SAMPLE 15

Date: 02/25/88

GRADATION CURVES

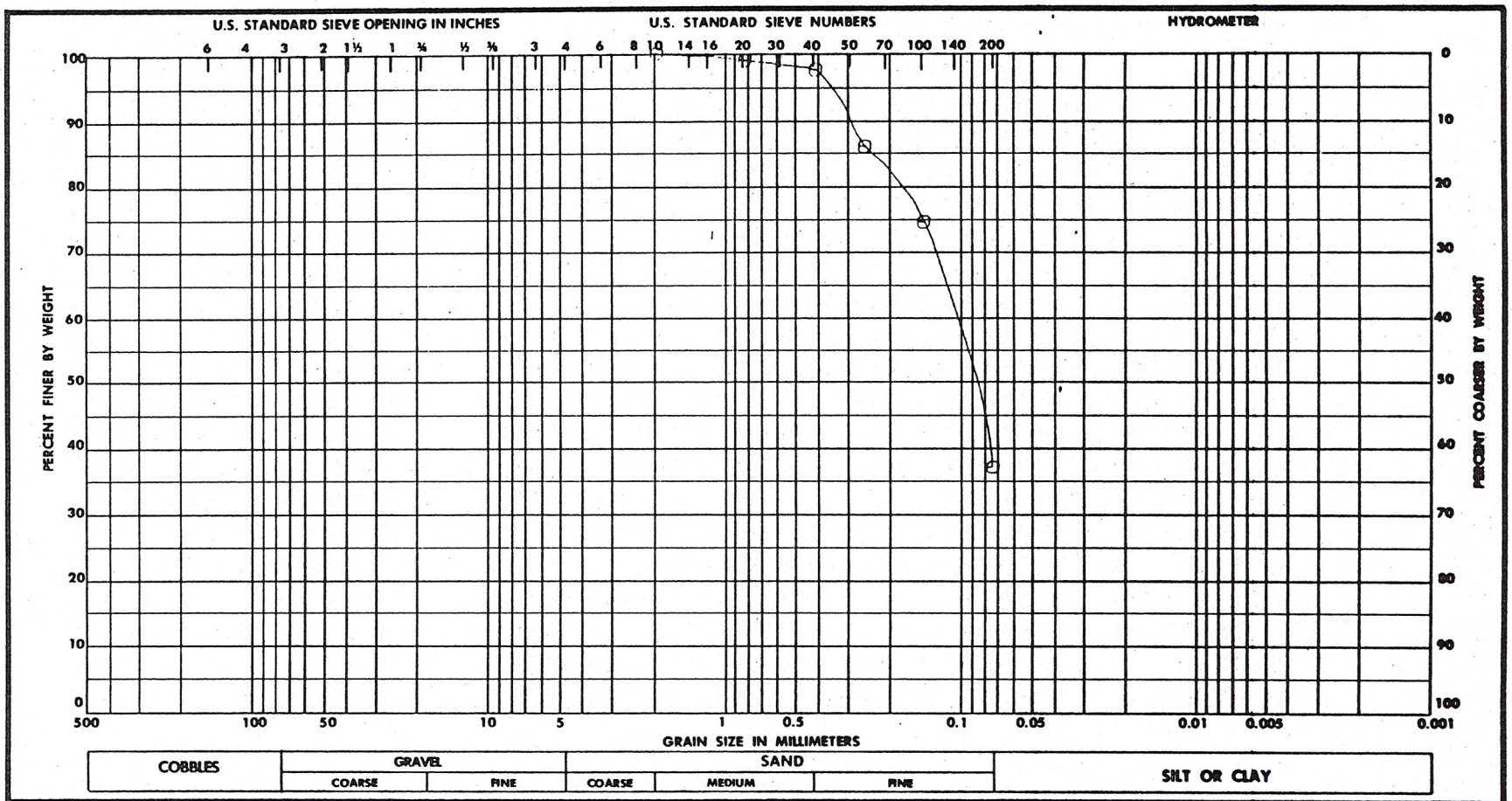
ENG FORM 1 MAY 63 2087

A-43

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No.' RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
19	-22.2/-23.7'	SILTY CLAYEY SAND (SM-SC)	--	26	19	7
		TAN. W/A TRACE OF MICA &				
		SHELL FRAG.				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D
Area LAB NO. 73/2616
Boring No. CB-S96C-2 .SAMPLE 19
Date 02/25/88

GRADATION CURVES

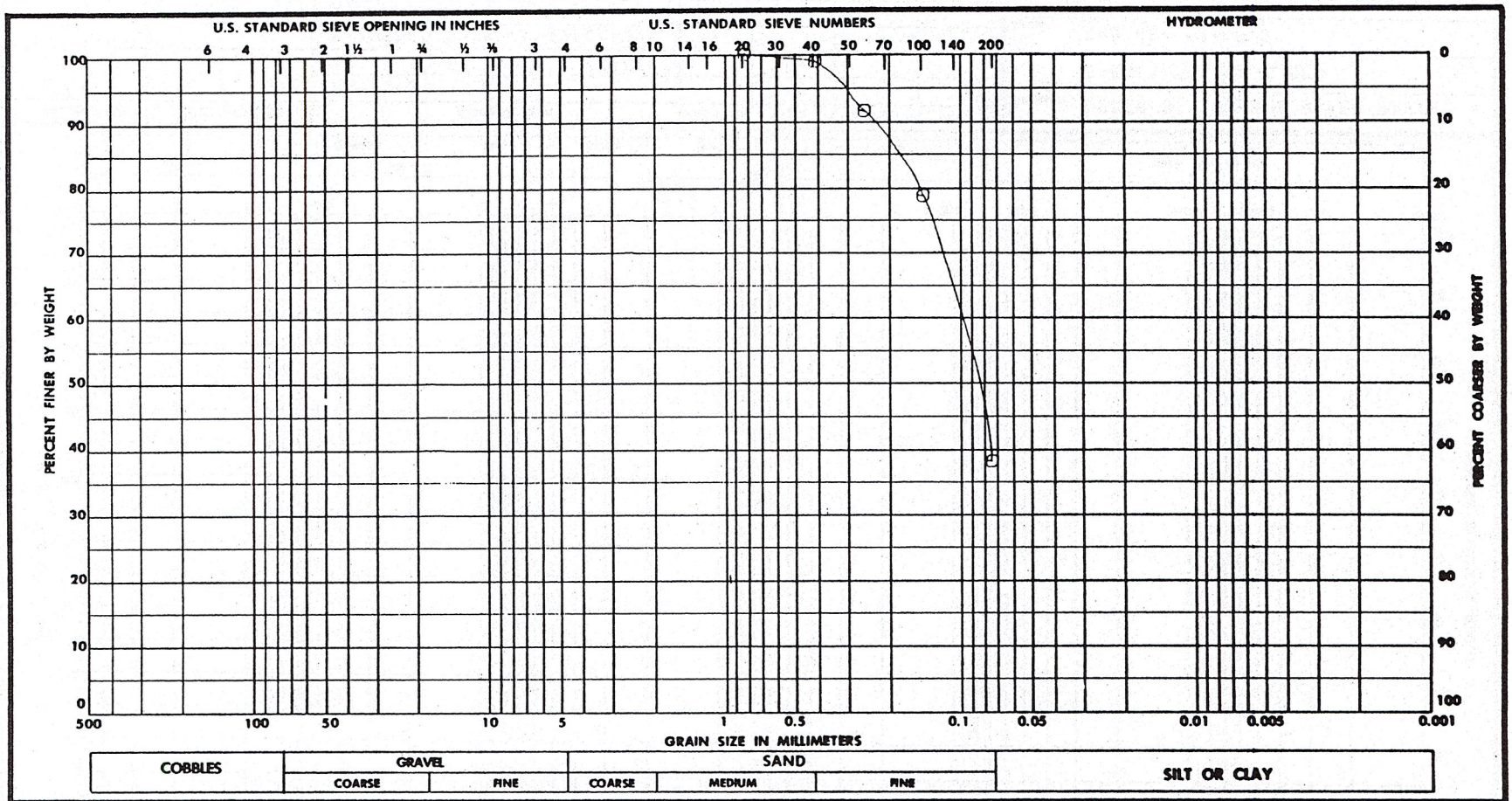
ENG FORM 1 MAY 63 2087

A-44

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
20	-23.7/-25.2'	CLAYEY SAND (SC)	--	32	18	14
		TAN. W/A TRACE OF MICA &				
		SHELL FRAG.				

GRADATION CURVES

Project: UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area: LAB NO. 73/2617

Boring No. CB-S96C-2 . SAMPLE 20

Date: 02/25/88

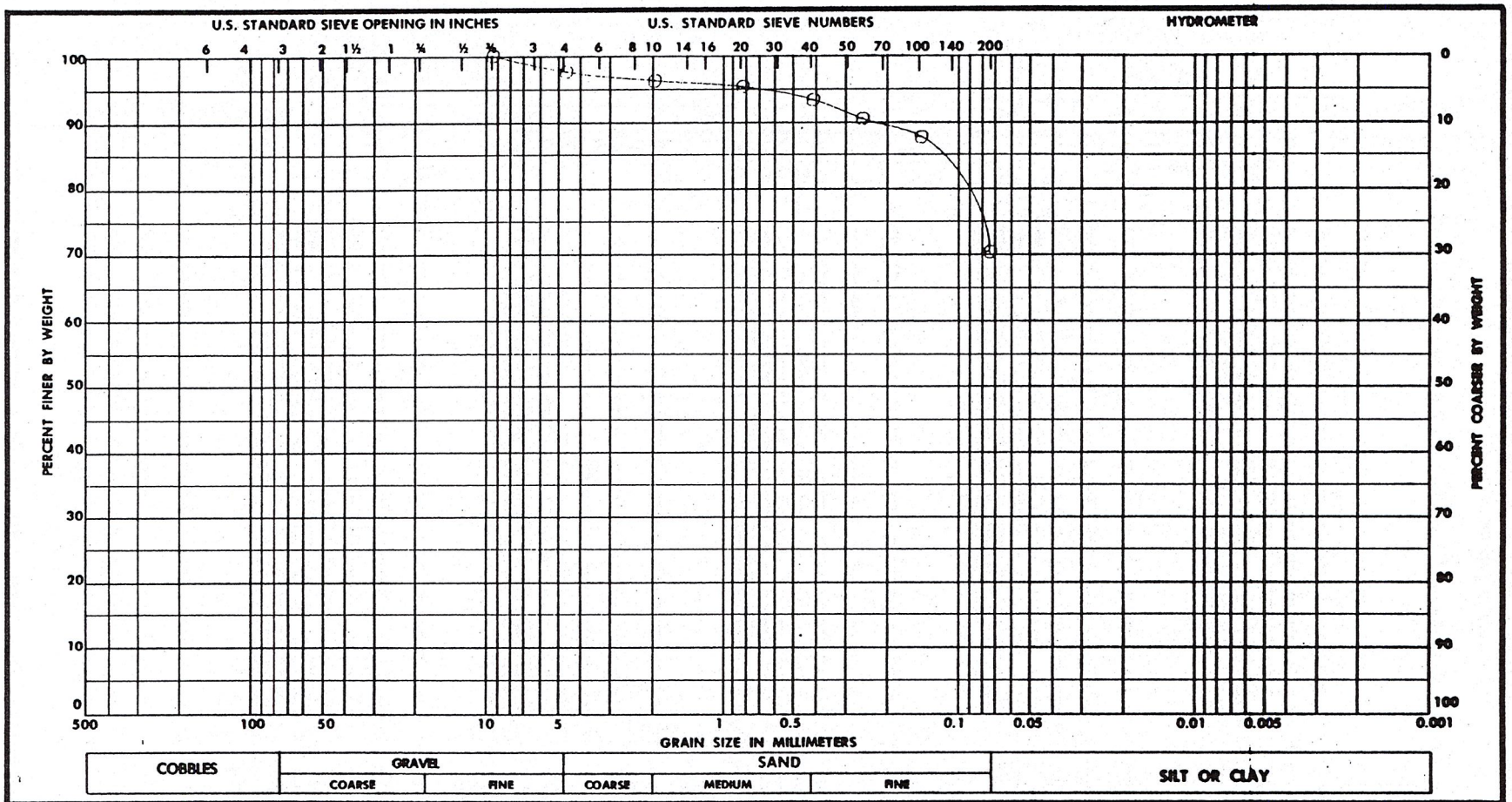
ENG FORM 1 MAY 63 2087

A-45

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
23	-28.2/-29.7'	LEAN CLAY (CL)	---	49	16	33
		TAN. W/SOME SAND & A TRACE OF				
		WEATHERED ROCK. GRAVEL SIZE				
		SHELL				

Project: UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area: LAB NO. 73/2618

Boring No. CB-S96C-2 . SAMPLE 23

Date: 02/25/88

GRADATION CURVES

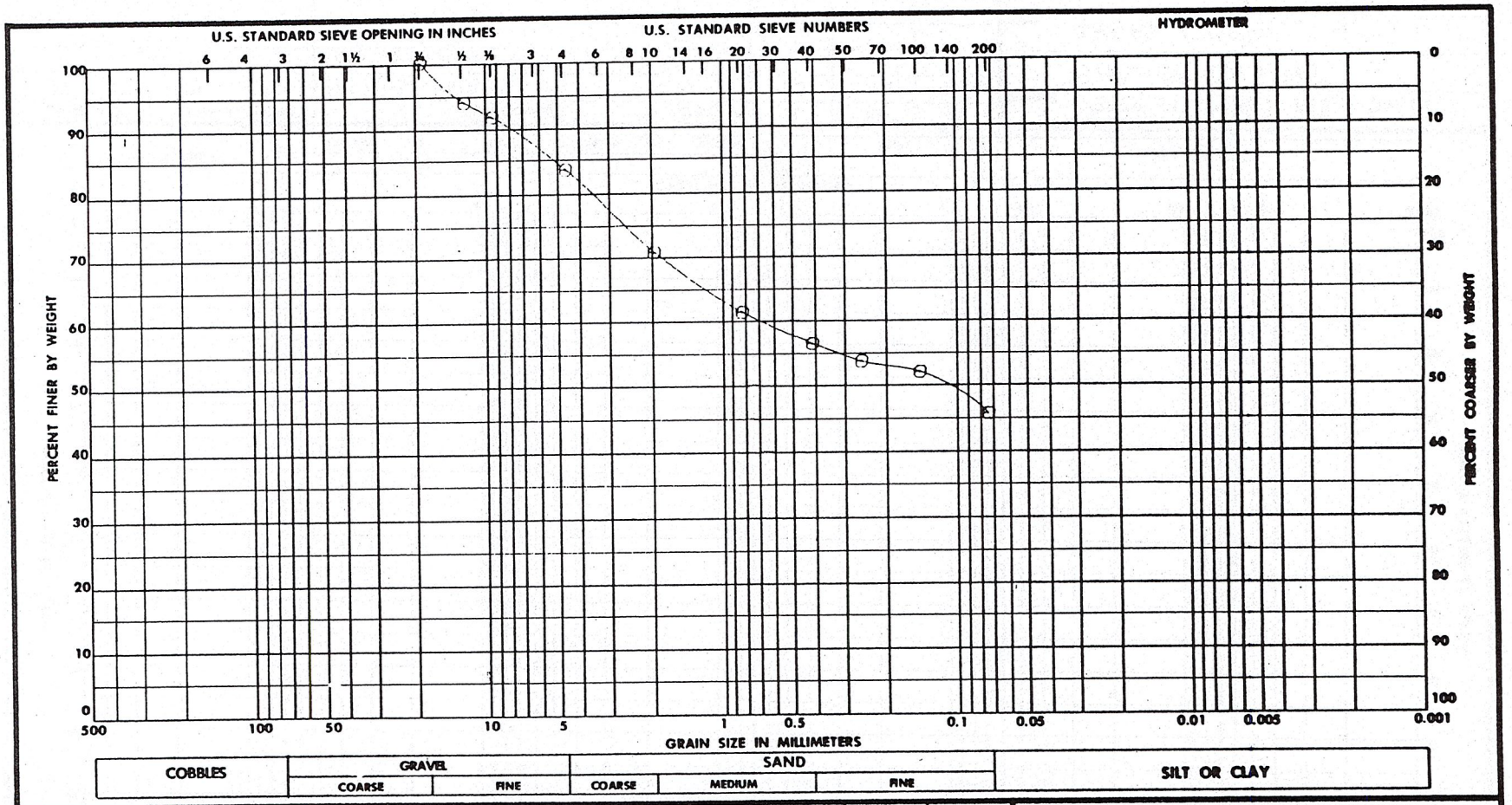
ENG FORM 1 MAY 63 2087

A-46

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or ~~Depth~~	Classification	Nat w %	LL	PL	PI
25	-31.2/-32.7'	CLAYEY SAND (SC)	--	42	13	29
		TAN. W/A LITTLE LIMESTONE &				
		GRAVEL SIZE SHELL				

GRADATION CURVES

Project: UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area: LAB NO. 73/2619

Boring No. CB-S96C-2 . SAMPLE 25

Date: 02/25/88

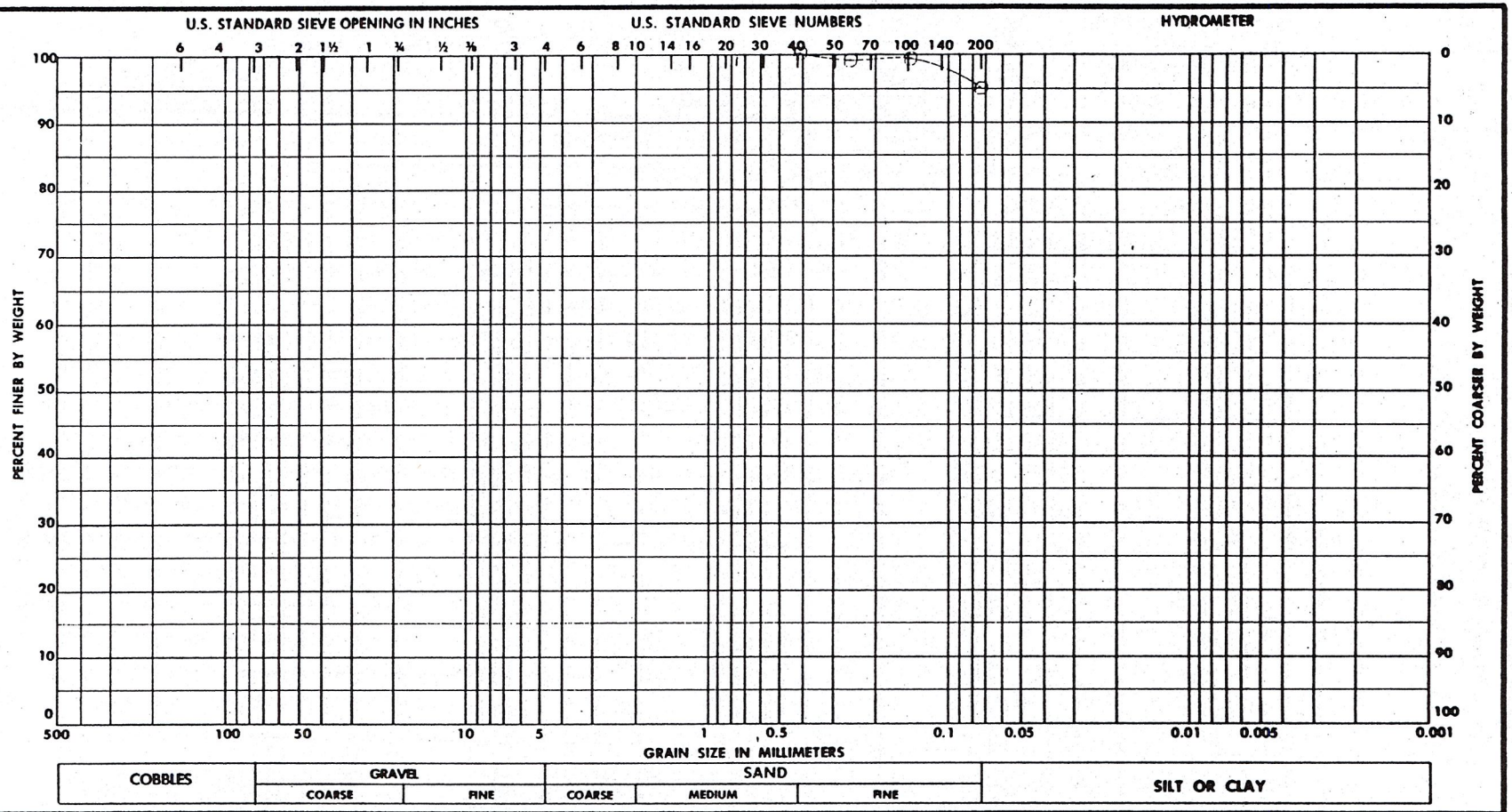
ENG FORM 1 MAY 63 2087

A-47

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or ~~Depth~~	Classification	Nat w %	LL	PL	PI
26	-32.7/-34.2'	FAT CLAY (CH)	--	53	14	39
		TAN, W/A TRACE OF SAND, MICA				
		& SHELL FRAG.				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2620

Boring No. CB-S96C-2 . SAMPLE 26

Date 02/25/88

GRADATION CURVES

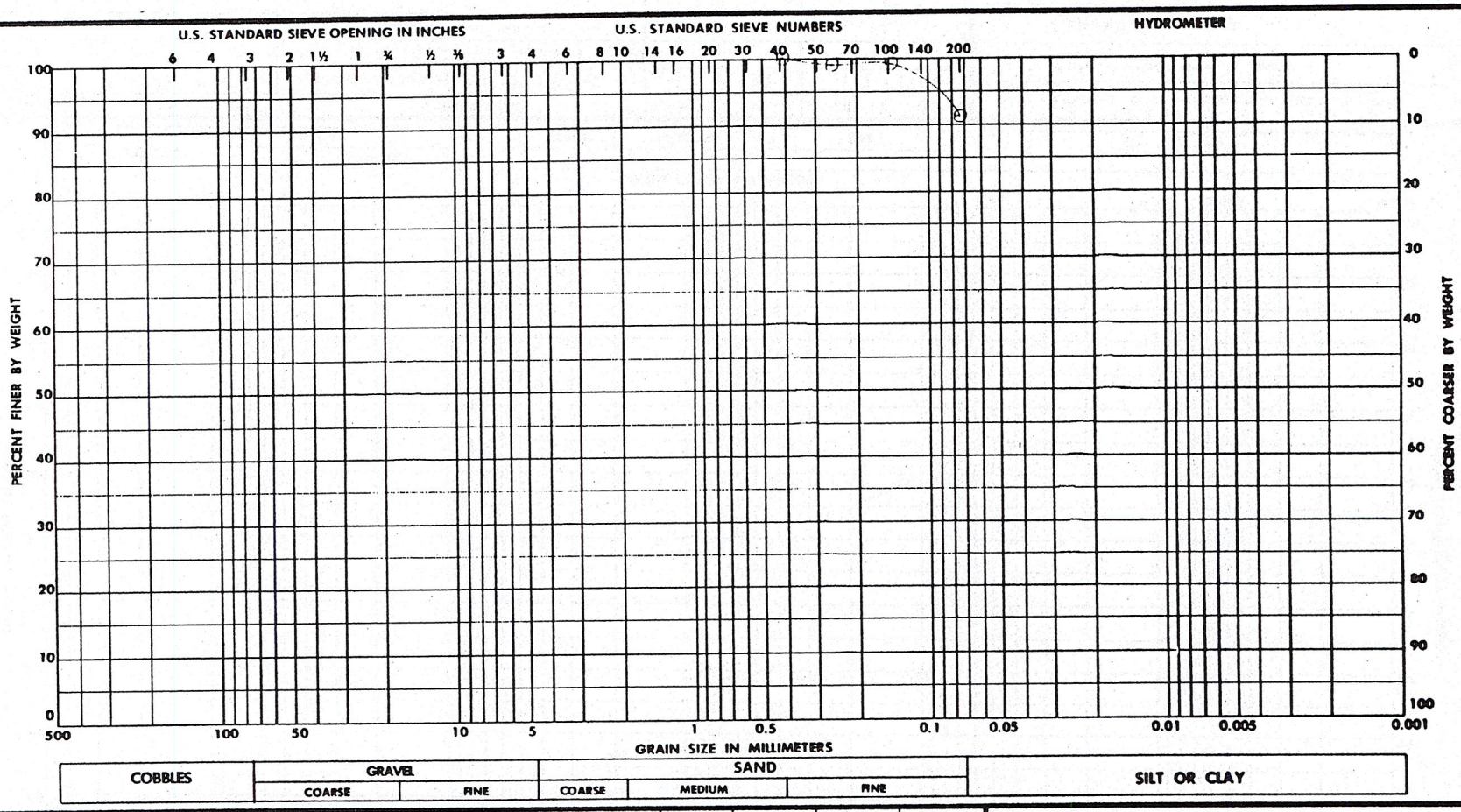
ENG FORM 1 MAY 63 2087

A-48

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
28	-35.7/-37.2'	LEAN CLAY (CL)	--	49	14	35
		TAN, W/A TRACE OF SAND, MICA				
		& SHELL FRAG.				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2621

Boring No. CB-S96C-2 . SAMPLE 28

Date 02/25/88

GRADATION CURVES

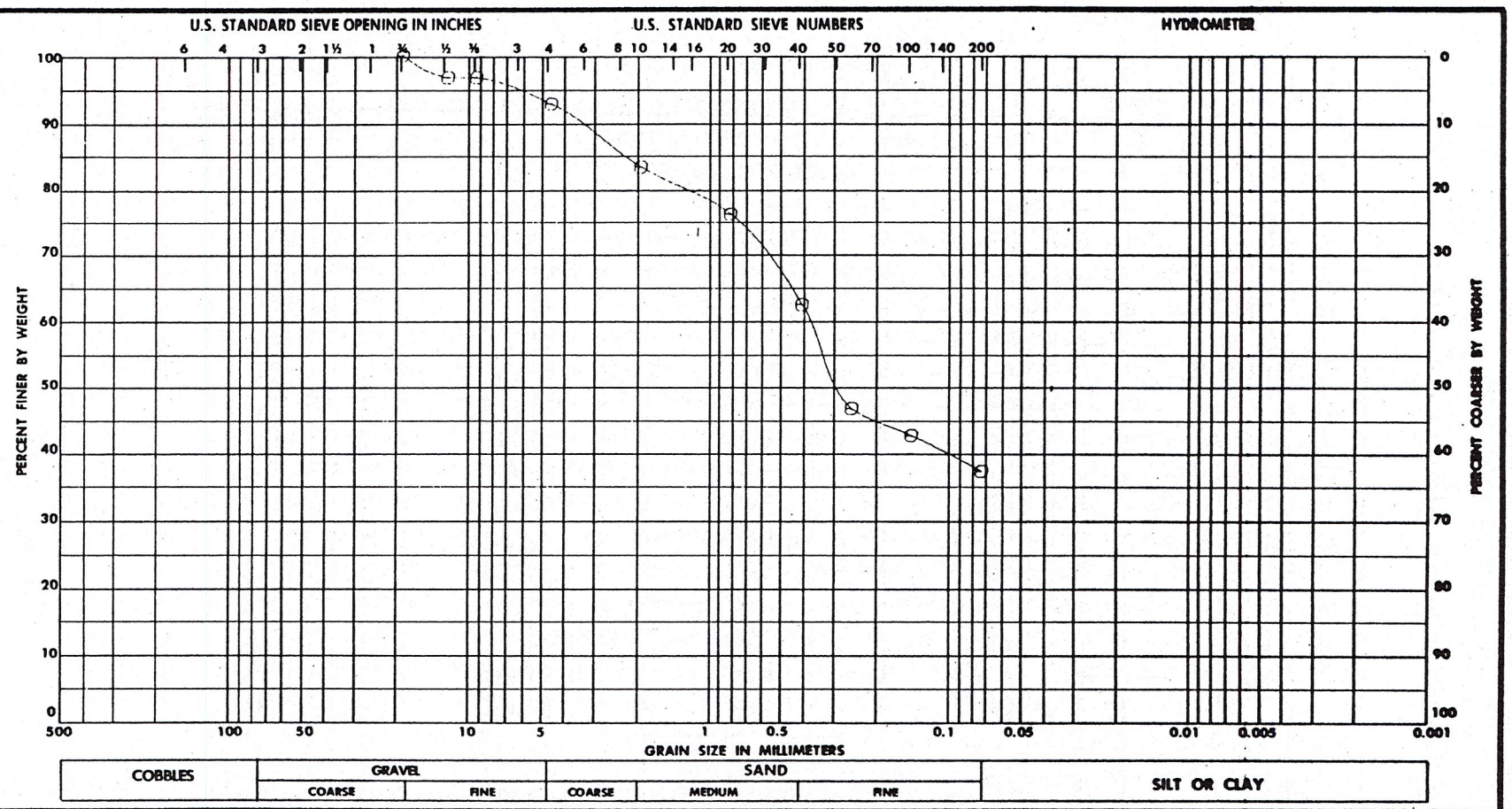
ENG FORM 1 MAY 63 2087

A-49

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
29	-38.7/-40.2'	CLAYEY SAND, HIGH LL (SC-H)	--	91	17	74
		TAN, W/A TRACE OF GRAVEL SIZE				
		SHELL & TRACE OF MICA				

Project UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area LAB NO. 73/2622

Boring No. CB-S96C-2 . SAMPLE 29

Date 02/25/88

GRADATION CURVES

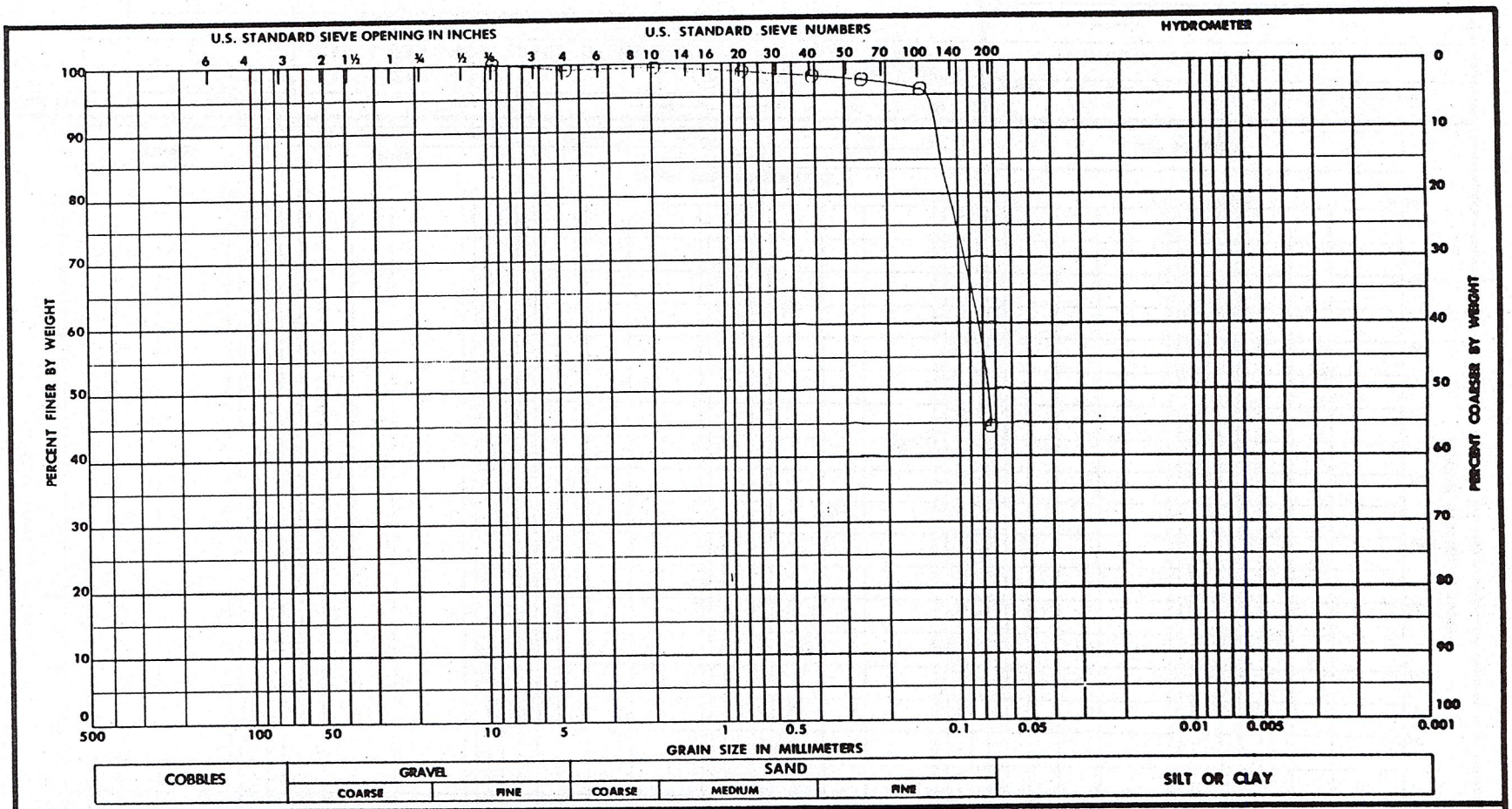
ENG FORM 1 MAY 63 2087

A-50

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

W.O. No. 5468

Req. No. RM-CW-88-0039



Sample No.	Elev or ~~Depth~~	Classification	Nat w %	LL	PL	PI
31	-41.7/-43.2'	CLAYEY SAND (SC)	--	46	20	26
		TAN. W/A TRACE OF MICA &				
		GRAVEL SIZE SHELL				

Project: UPPER ST. JOHN'S RIVER BASIN
STRUCTURE 96C & 96D

Area: LAB NO. 73/2623

Boring No. CB-S96C-2 . SAMPLE 31

Date: 02/25/88

GRADATION CURVES

ENG FORM 1 MAY 63 2087

A-51

Hole No. CB-S96C-3

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION JACKSONVILLE DISTRICT	SHEET 1 OF 3 SHEETS

1. PROJECT UPPER ST. JOHNS, STRUCTURE 96C	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) X = 583,025 Y = 1,267,665	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
3. DRILLING AGENCY CORPS OF ENGINEERS	12. MANUFACTURER'S DESIGNATION OF DRILL S&H SKID RIG
4. HOLE NO. (As shown on drawing title and file number) CB-S96-C-3	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED; UNDISTURBED
5. NAME OF DRILLER C. MASON	14. TOTAL NUMBER CORE BOXES 1
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER +20.2 (after 18 hours)
	16. DATE HOLE: STARTED 11-17-88; COMPLETED 11-22-88
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE +21.0
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING 59 %
9. TOTAL DEPTH OF HOLE 49.5'	19. SIGNATURE OF ~~INSPECTOR~~ GEOLOGIST J. GENTILE

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
+21.0	0.0					
			PEAT, roots, loose wet, brown. (PT)	NO REC		SETTLED +19.5
				NO REC		PUSHED -18.0
				12	1	PUSHED +16.5
				12	2	PUSHED -15.0
				12	3	PUSHED +13.5
				NO REC		PUSHED -12.0
-11.0	10.0			53	4	PUSHED
-10.5	10.5		SILT, plastic, strong organic stain, gray slick, (MH)		5	+10.5
+9.0	12.0		organic clay (OH) from ~~+11.0 to 11.5~~	100	6	PUSHED +9.0
			CLAY, plastic, trace silt, trace shell, gray (CH)	100	7	4 6 6 +7.5
				88	8	PUSHED 1 3 +6.0
				80	9	1 2 4 +4.5
+3.0	18.0			88	10	PUSHED 5 4 +3.0
				88	11	3 3 7 +1.5

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT UPPER ST. JOHNS, S-96C | HOLE NO. CB-S96C-3

DRILLING LOG (Cont Sheet) ELEVATION TOP OF HOLE +21.0 **Hole No.** CB-S96C-3

PROJECT UPPER ST. JOHNS, S96C-3 INSTALLATION JACKSONVILLE DISTRICT SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-1.5	22.5		CLAY, slightly plastic, trace to little silt, limy, fragment weathered soft limestone; tan, buff, to gray, (CL), from 18.0" to 22.5	80 88	12 13	0.0 -1.5
-4.3	25.7		Many thin lenses hard limestone, & trace sand, gray from 22.5' to 25.7 CLAY (CH), very thin lenses hard limestone	73 73	14 15	-3.0 -4.5
-7.7	28.7		LIMESTONE, medium hard, porous, permeable, very fossiliferous gray, some seams loose silty sand, beds (CH) limy clay (CH) limy clay	66 60	16 17	-6.0 -7.5
-8.2	29.2		(CL) clay, silty, limestone fragments from -7.7 to -8.2			
-10.0	31.0		with many seams loose silty sand, from -8.2 to -10.0	66	18	-9.0
-10.5	31.5		clay, (CL), limy, silty, sandy, from -10.0 to -10.5	93	19	-10.5
-12.0	33.0		SAND, fine quartz, clayey, limy, gray to tan, lenses medium hard calcareous sandstone, (SC)	60	20	-12.0
-14.5	35.5		SAND, fine to med. quartz, little to some silt, trace clay, limy, tan, lenses calcareous sandstone (SM)	56	21 22	-13.5 -15.0
-16.5	37.5		LIMESTONE, medium hard, porous, permeable, lenses hard limestone, sandy in composition lt gray, very to sandstone, seams loose silty, shelly sand	33 07	23	-16.5
-18.0	39.0		SAND, fine to medium, quartz, clayey, little shell, Gray-green, (SC)	66	24	-18.0
-21.0	42.0		Lt gray, fine quartz, limy, isolated sandstone lenses, little shell, little shell, little to some clay, (SC) from 39.0' to 42.0'	40 66	25 26	-19.5 -21.0
			SAND, very fine, quartz, silty, trace clay, trace shell, gray to tan, (SM)	88 88	27 28	-22.5 -24.0

REMARKS (Blows per 6 inches)
7 7 9
6 8 14
16 16 12
11 11 10
9 6 7
8 5 6
7 8 5
8 5 8
10 9 18
6 8 11
9 12 18
6 26 21
39 36 50
20 15 8
5 8 6
3 2 4
4 3 3

DRILLING LOG (Cont Sheet) ELEVATION TOP OF HOLE +21.0 **Hole No.** CB-S96C-3

PROJECT UPPER ST. JOHNS, S96C-3 | INSTALLATION JACKSONVILLE DISTRICT | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
					29	1
				66		3
						-25.5 4
					30	2
				66		4
-27.0	48.0					-27.0 5
			SILT, trace clay, damp, gray, (ML)		31	1
				80		3
-28.5	49.5					-28.5 4
						140 # hammer with 30" drop used on 2.0 FT SPLIT SPOON sampler (1 3/8" I.D. x 2" O.D.)

Notes:
1) Core hole grouted upon completion with 8 bags of Sakrete sand mix
2) The groundwater reading on 11-18-88 after 18 hours was at +2.0.
The bottom of the casing was at elev. -6.0 and the bottom of the hole was at el. -7.5

Hole No. CB-S96C-4

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION JACKSONVILLE DISTRICT	SHEET 1 OF 3 SHEETS

1. PROJECT UPPER ST. JOHNS, STRUCTURE 96C	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station) X=583,024 Y=1,267,637	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
3. DRILLING AGENCY CORPS OF ENGINEERS	12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500
4. HOLE NO. (As shown on drawing title and file number) CB-S96C-4	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ; UNDISTURBED 1
5. NAME OF DRILLER M. WHITSON	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER +19.8
	16. DATE HOLE: STARTED 11-30-88; COMPLETED 12-5-88
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE +20.2
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING 58 %
9. TOTAL DEPTH OF HOLE 49.5'	19. SIGNATURE OF ~~INSPECTOR~~ GEOLOGIST J. GENTILE

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
+20.2	0.0					
-10.5	9.7		PEAT, loose wet, roots etc., brown, (PT)	21	1	PUSHED
+8.2	12.0		CLAY, plastic, dark gray, organic stain, damp, (CH)		2	-9.7
				46	3	PUSHED 1 1 +8.2
-3.7	16.5		Gray-green, little shell, damp, (CH), from +8.2 to -3.7, trace weathered soft limestone fragments,	33	4	PUSHED 1 1 +6.7
				88	5	3 3 4 +5.2
				73	6	2 4 4 +3.7
			Many weathered soft thin lenses limestone, slick, trace silt, gray-green-tan, (CH), from 16.5' to 22.5'	100	7	2 4 7 +2.2
				73	8	6 10 13 +0.7

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) A-85

PROJECT UPPER ST. JOHNS, CB-S96C-4 | HOLE NO. CB-S96C-4

DRILLING LOG (Cont Sheet) ELEVATION TOP OF HOLE +20.2 **Hole No.** CB-S96C-4

PROJECT UPPER ST. JOHNS, STRUCTURE 96C | INSTALLATION JACKSONVILLE DISTRICT | SHEET 2 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
				80	9	-0.8 8 11 9
-2.3	22.5			93	10	-2.3 8 7 11
-3.8	24.0		CLAY, slightly plastic, silty limy, limestone lenses, sandy, (CL)	93	11	-3.8 5 5 7
-6.8	27.0		SANDSTONE, calcareous, cemented quartz sand & shell fragments, very porous, very permeable, many seams loose sand, lt gray, fossiliferous very thin bedded, material comes up as gravel with little silt (GP-GM)	60	12	-5.3 4 2 4
				60	13	-6.8 5 5 6
-9.8	30.0		LIMESTONE, porous, thin bedded, poorly consolidated riddled with seams clay (CL), clay is sandy with limestone fragment.	13	14	-8.3 7 5 5
				40	15	-9.8 9 7 6
-12.8	33.0		SAND, fine to medium, quartz, gravelly (limestone & sandstone fragments) thin limestone & sandstone lenses broken up by spoon into gravel: clayey, little silt, limy, tan, 45% rock, (SC)	66	16 R-15	-11.3 5 3 4
				60	17	-12.8 12 15 15
-17.3	37.5		SAND, fine to medium, quartz few calcerous sandstone lenses, trace silt, lt gray, (SP), little shell, clean, lt gray, fine to medium, quartz from 36.0' to -17.3, many sandstone lenses -17.3 to -17.8	56	18	-14.3 10 10 10
				66	19	-15.8 9 13 18
				100	20	-17.3 9 17 16
-17.8	38.0		SAND, fine to medium, quartz, little clay, compacted little shell, gray-green (SC) limy, many lenses calcareous sandstone, trace to little silt, little clay, lt gray, from 39.0' to 40.5	66	21	-18.8 25 35 50
-18.8	39.0			53	22	-20.3 8 8 6
-20.3	40.5					
-21.8	42.0		CLAY, limy, sandstone lenses, trace to little silt, trace sand, SL plastic (CL)	NO REC		-21.8 7 4 6
			SAND, fine to medium, quartz some clay to clayey, trace shell, gray, trace to little silt, (SC)	93	23	-23.3 3 3 4
				93	24	-24.8 3 2 3

DRILLING LOG (Cont Sheet) ELEVATION TOP OF HOLE +20.2 **Hole No.** CB-S96C-4

PROJECT UPPER ST. JOHNS, STRUCTURE 96C | INSTALLATION JACKSONVILLE DISTRICT | SHEET 3 OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-26.3	46.5		Very fine, quartz, clayey, little silt, gray, (SC), from -46.5' to 48.0'	100	25	-26.3 3 2 4
-27.8	48.0			80	26	-27.8 4 3 4
-29.3	-29.3		CLAY, slightly plastic, little silt, gray, trace shell, (CL)	93	27	-29.3 3 2 4
						140 # hammer with 30" drop used on 2 OFT split spoon sampler (1 3/8" I.D. x 2" O.D.)

Notes:

1) Bore hole grouted upon completion with approximately 93 gal of cement grout (6 bags of cement)

2) Groundwater table on 12-2-86 at +19.8; bottom of casing at -12.8 and bottom of hole at elev 75.8

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF-625-603

PROJECT UPPER ST. JOHNS, CB-S96C-4 | HOLE NO CB-S96C-4