QORE™

PROPERTY SCIENCES

June 7, 2007

Mr. Jeff Sizemore, P.E.
SCDOT Road Design Office
Post Office Box 191
Columbia, South Carolina 29202-0191

Re: Summary of Geotechnical Investigation
S-103 (Oak Park Road) - Replace Bridge Over Fishing Creek
York County, South Carolina
SC File 46.169B.1; PIN No. 31919
Project No. BR-BR46 (012)
QORE Job No. 7272O, Report No. 115235

Dear Mr. Sizemore:

We have completed borings and laboratory testing for the referenced project, as requested in the SCDOT Interoffice Memo for the Preliminary Boring Request, dated January 4, 2007. Accompanying the Work Scope were preliminary plans including Plan and Profile drawings for the construction area. The borings were performed to evaluate the general subsurface soil, rock, and groundwater conditions in the vicinity of the end bents, interior bents, and roadway of the replacement bridge over Fishing Creek on Secondary Road S-103.

Eight soil test borings (B-1 through B-8), and one analysis of shear wave velocity (by Refraction Microtremor at location SA-1) were performed near requested locations indicated on the plans and referenced Memo. Boring B-1 was offset from the requested locations to avoid trespassing near a concerned resident's property line; Boring B-2 was offset slightly from the requested location due to topography (steep roadway embankment); and Borings B-3, B-4, and B-6 through B-10 were offset slightly from the requested locations to avoid the underlying bridge deck beams, to allow enough available space for drilling operations, and to allow for safer traffic control situations.

The borings were performed with a truck-mounted CME-45 drill rig. The elevations at the boring locations were approximated from the topographic information on the provided Plan and Profile Sheets and field assessments. The station, elevation, and coordinates (latitude and longitude) of each boring are indicated on the attached Boring Logs. The coordinates were obtained using a portable Magellan SporTrak GPS unit (with a horizontal position accuracy of 10 feet) and should be considered approximate.

281 Fairforest Way Greenville, South Carolina 29607 (864) 297-9944 fax (864) 297-0462

Roadway Borings B-1, B-2, and B-8 were extended to the planned termination depth of 15 feet below the ground surface. Roadway Boring B-7 encountered auger refusal at a depth of 26 feet. The measurement of shear wave velocity at roadway boring location SA-1 (Refraction Microtremor analysis) was performed to a depth of 100 feet below the ground surface. Bridge Borings B-3 through B-6 were extended to auger refusal at depths of approximately 19 to 25 ½ feet below the existing ground surface (or bridge deck). Rock coring was not requested at this time. The soil samples collected from the borings were transported to our laboratory for engineering review and classification. We also obtained a bulk sample of the fill and alluvial soils at station 64+00, sampled at a depth of 0 to 5 feet. The subsurface soil data (including the soil descriptions, standard penetration test results, and measured groundwater depths) are presented on the attached Boring Logs.

Per the SCDOT Interoffice Memo for the Preliminary Boring Request, dated January 4, 2007, laboratory tests (including standard proctor, Atterberg limits, grain size distribution, natural moisture content, and triaxial shear compression) were performed on the obtained bulk sample from Station 64+00. Per the SCDOT Interoffice Memo for Per the SCDOT Interoffice Memo for Soil Exploration Testing dated March 2, 2007, laboratory index tests (including grain size with wash #200 (with and without hydrometer), Atterberg limits, and natural moisture content) were performed on select samples from Borings B-1 through B-3 and B-5 through B-8. The laboratory assignment from the SCDOT was received by QORE via email, on May 9, 2007, from Mr. Mike Lockman. The requested laboratory index test data is summarized in the attached table, and the individual grain size distribution reports, standard proctor report, and triaxial shear test report are also attached.

We appreciate the opportunity to be of service to the SCDOT on this project, and we look forward to working with you on future projects. Please contact us if you have any questions concerning the boring or laboratory test results.

Respectfully submitted,
QORE, Inc.
SC COA #C00356

Kevin B. Farmer
Engineering Aide

Kenneth W. Weinel, P.E.
Senior Engineer

Attachments: Boring Logs (8)
Analysis of Shear Wave Velocity (Refraction Microtremor) Log (Boring SA-1)
Summary of Laboratory Index Test Results
Grain Size Distribution Test Reports (15)
Moisture/Density Relationships of Soil
Triaxial Shear Test Report (1)

cc: Mr. Mickey Wilson

SCDOT

S-103 (Oak Park Road) - RBO Fishing Creek
York County, South Carolina
File No. 46.169B.1; Project No. BR-BR46 (012) Pin. No. 31919

LOG OF BORING No. B-1

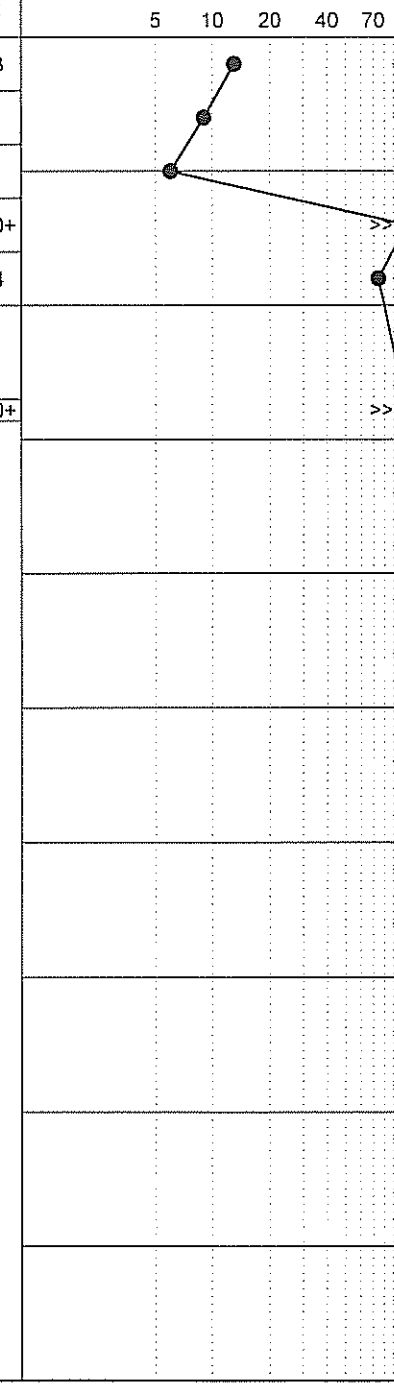
Station: 57+00
Offset: 14 Feet Right of Proposed Centerline

Date Drilled: 2/13/07
Supervisor: QORE (7272O)
Casing Length: NA
Ground Elevation: 541. Feet
Hammer Type: ☒ Gravity ☐ Automatic ☒ Other: CME-45
Water Level: NE at TOB; 7 Ft. after 24 Hrs.
Drilling Method: HSA

Notes:
Coordinates: N34°54.307' W81°06.518'

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.3	4 Inches Topsoil		0.	SS-1	4	5	8	13
	1.5	**Fill** - Stiff Brownish Red and Brown Sandy Clay with Small Roots		2.	SS-2	4	5	4	9
536	5.	**Fill** - Loose Brown and Gray Silty Fine to Medium Sand (SM)		4.	SS-3	3	3	3	6
	6.	**Fill** - Firm Reddish Brown Clay with Sand (CL)		6.	SS-4	42	50/3"		100+
531	8.	**Partially Weathered Rock** - Sampled as Very Dense Brown, Yellowish Brown, and Gray Silty Fine to Medium Sand (PWR)		8.	SS-5	30	37	37	74
	12.	**Residuum** - Very Dense Brown, Yellowish Brown, and Gray Silty Fine to Coarse Sand (SM)		13.5	SS-6	50/4"			100+
526	15.	**Partially Weathered Rock** - Sampled as Very Dense Gray, White, and Brown Silty Fine to Coarse Sand (PWR)							
		Boring Terminated at 15 Feet							

STD. PENETRATION TEST DATA (blows/ft)



LEGEND

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
AWG - Rock Core, 1-1/8"
NQ - Rock Core, 1-7/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

SC_DOT 7272O GPJ QOR_CORP GDT 6/1/07

SCDOT

S-103 (Oak Park Road) - RBO Fishing Creek
York County, South Carolina
File No. 46.169B.1; Project No. BR-BR46 (012) Pin. No. 31919

LOG OF BORING No. B-2

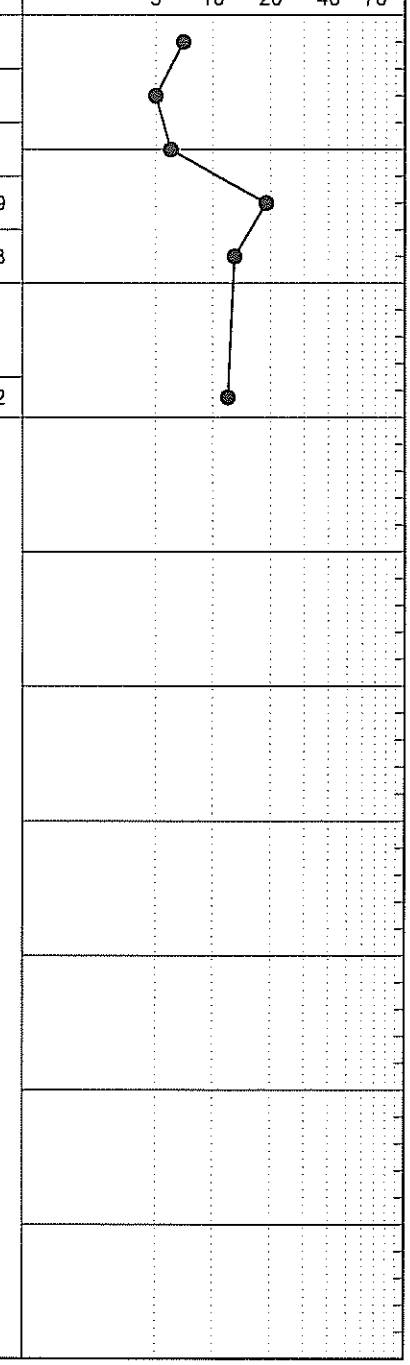
Station: 58+93
Offset: 13 Feet Left of Proposed Centerline

Date Drilled: 2/13/07
Supervisor: QORE (7272O)
Casing Length: NA
Ground Elevation: 539. Feet
Hammer Type: ☒ Gravity ☐ Automatic ☒ Other: CME-45
Water Level: 10.5 Ft. at TOB; 7 Ft. after 24 Hrs.
Drilling Method: HSA

Notes:
Coordinates: N34°54.312' W81°06.476'

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.5	6 Inches Topsoil		0.	SS-1	3	3	4	7
	4.	**Fill** - Loose Brown, Gray, and Red Silty Fine to Medium Sand with Small Roots (SM)		2.	SS-2	3	3	2	5
534	6.	**Fill** - Firm Reddish Brown, Brown, and Gray Sandy Clay with Small Roots (CL)		4.	SS-3	2	3	3	6
	8.	**Alluvium** - Firm Brown, Gray, and Reddish Brown Silty Fine to Coarse Sand with Gravel (SM)		6.	SS-4	10	10	9	19
529		**Residuum** - Stiff Grayish Brown, Brown, and Dark Brown Sandy Lean Clay (CL)		8.	SS-5	3	5	8	13
	14.			13.5					
524	15.	Stiff Gray and Brown Sandy Clay (CL)			SS-6	4	5	7	12
		Boring Terminated at 15 Feet							

STD. PENETRATION TEST DATA (blows/ft)



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT

S-103 (Oak Park Road) - RBO Fishing Creek
York County, South Carolina
File No. 46.169B.1; Project No. BR-BR46 (012) Pin. No. 31919

LOG OF BORING No. B-3

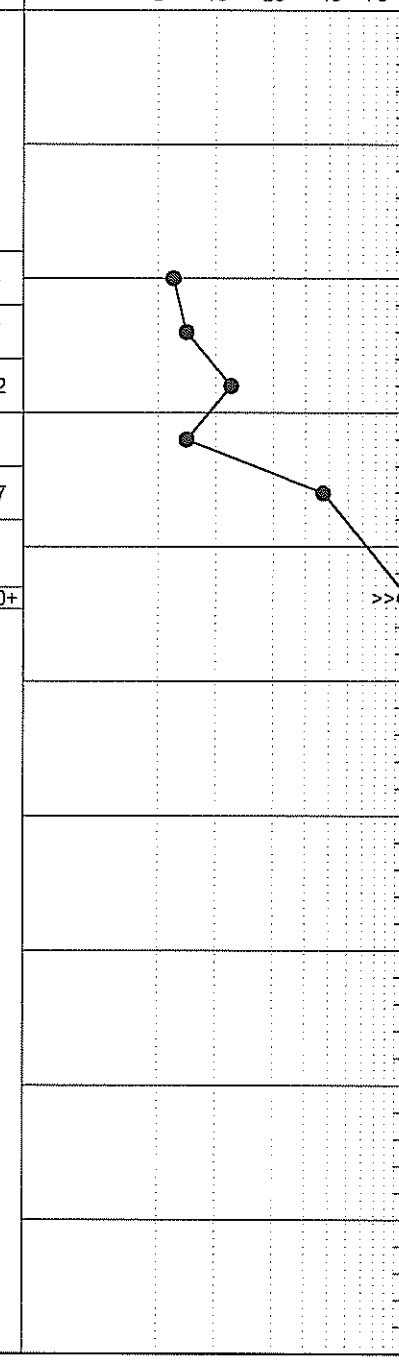
Station: 60+40
Offset: 2 Feet Right of Proposed Centerline

Date Drilled: 2/14/07
Supervisor: QORE (7272O)
Casing Length: 9
Ground Elevation: 540. Feet
Hammer Type: ☒ Gravity ☐ Automatic ☒ Other: CME-45
Water Level: 9 Ft. at TOB; 9.5 Ft. after 24 Hrs.
Drilling Method: HSA

Notes:
Coordinates: N34°54.333' W81°06.449'

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Bridge Deck						
	0.3	3 Inches Asphalt						
	1.	8-1/2 Inches Concrete with Reinforcing Steel						
535		Space Between Bottom of Bridge Deck and Ground Surface						
	9.		9.					
530		**Alluvium** - Firm Brown and Reddish Brown Sandy Lean Clay (CL)	11.	SS-1	3	3	3	6
	13.		13.	SS-2	2	3	4	7
525	15.	**Alluvium** - Firm Brown and Gray Clayey Fine to Medium Sand with Small Roots (SC)	15.	SS-3	3	5	7	12
	17.	**Alluvium** - Loose Gray Poorly Graded Fine to Medium Sand with Silt and Wood Pieces (SP-SM)	17.	SS-4	3	3	4	7
				SS-5	15	17	20	37
520	20.	**Residuum** - Dense Gray and Brown Fine to Coarse Sand with Silt and Gravel Fragments	21.5	SS-6	50/2"			100+
515	25.	**Partially Weathered Rock** - Sampled as Very Dense Gray and Brown Fine to Coarse Sand with Gravel (PWR)						
		Auger Refusal Encountered at 25 Feet; Boring Terminated						
510								
505								
500								
495								

STD. PENETRATION TEST DATA (blows/ft)



LEGEND

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
AWG - Rock Core, 1-1/8"
NQ - Rock Core, 1-7/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

SCDOT

S-103 (Oak Park Road) - RBO Fishing Creek
York County, South Carolina
File No. 46.169B.1; Project No. BR-BR46 (012) Pin. No. 31919

LOG OF BORING No. B-4

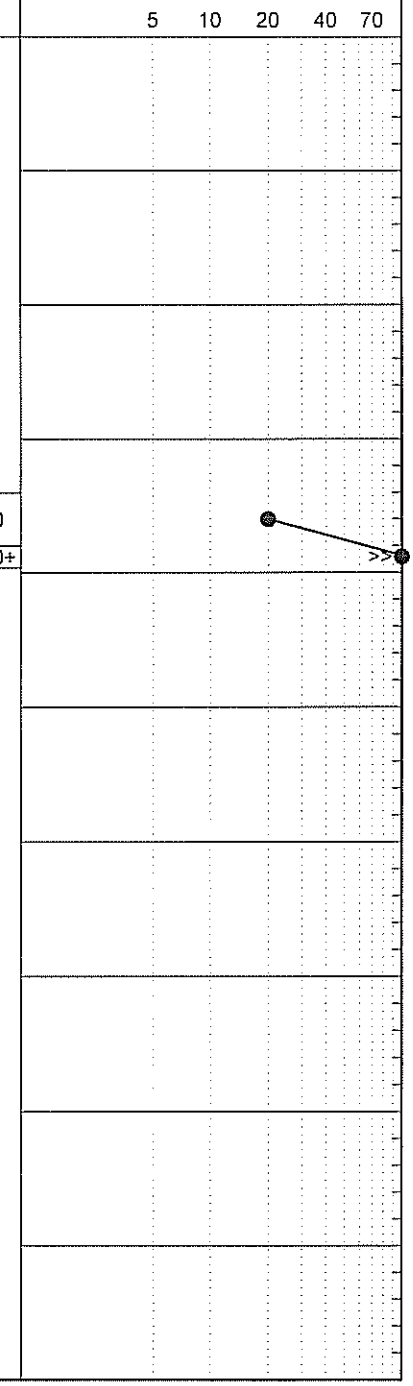
Station: 61+40
Offset: 15 Feet Left of Proposed Centerline

Date Drilled: 2/14/07
Supervisor: QORE (7272O)
Casing Length: 17
Ground Elevation: 540. Feet
Hammer Type: ☒ Gravity ☐ Automatic ☒ Other: CME-45
Water Level: 12 Ft. at TOB; 12 Ft. after 24 Hrs.
Drilling Method: HSA

Notes:
Coordinates: N34°54.335' W81°06.436'

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Bridge Deck							
	0.2	2-1/2 Inches Asphalt							
	1.	9 Inches Concrete with Reinforcing Steel							
		Space Between Bottom of Bridge Deck and Creek Bed							
535									
530									
525									
	17.			17.					
	18.	**Alluvium**- Firm Brownish Gray Fine to Coarse Sand with Silt (SP-SM)			SS-1	24	12	8	20
	19.			19.	SS-2	50/0"			100+
520		**Partially Weathered Rock** - Sampled as Very Dense Brown, Yellowish Brown, and Reddish Brown Silty Fine to Medium Sand (PWR)							
		Auger Refusal Encountered at 19 Feet; Boring Terminated							
515									
510									
505									
500									
495									

STD. PENETRATION TEST DATA (blows/ft)



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT

S-103 (Oak Park Road) - RBO Fishing Creek
York County, South Carolina
File No. 46.169B.1; Project No. BR-BR46 (012) Pin. No. 31919

LOG OF BORING No. B-5

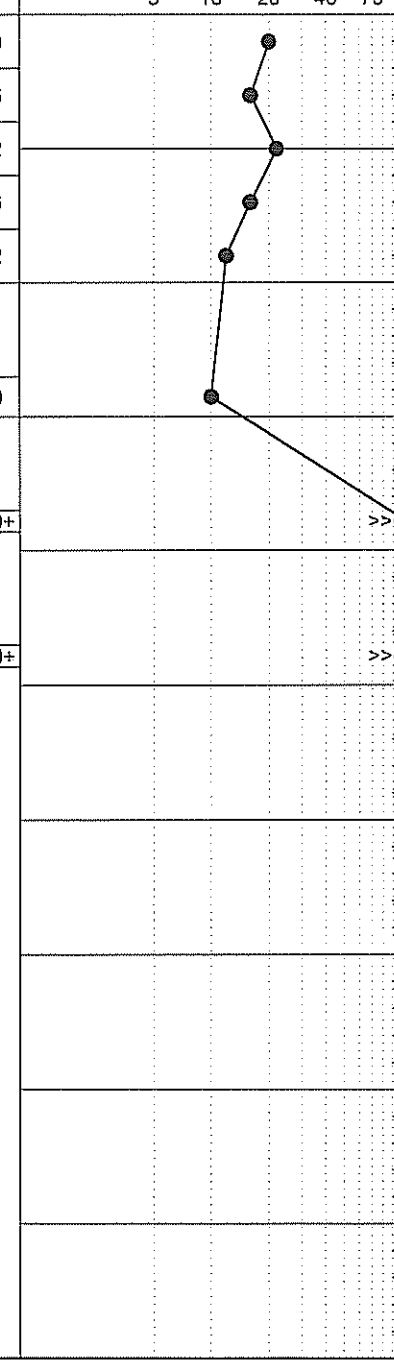
Station: 62+60
Offset: 30 Feet Left of Proposed Centerline

Date Drilled: 2/14/07
Supervisor: QORE (7272O)
Casing Length: NA
Ground Elevation: 540. Feet
Hammer Type: ☒ Gravity ☐ Automatic ☒ Other: CME-45
Water Level: 9 Feet at TOB
Drilling Method: HSA

Notes:
Coordinates: N34°54.340' W81°06.415'
Backfilled and patched with asphalt at time of boring completion.

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Existing Roadway						
	0.7	8 Inches Asphalt	0.	SS-1	10	9	11	20
	0.8	1 Inch Stone Base	2.					
	2.	**Fill** - Firm Grayish Brown, Reddish Brown, and Brown Clayey Fine to Medium Sand (SC)		SS-2	8	7	9	16
	4.		4.					
535		**Fill** - Firm Grayish Brown Silty Fine to Medium Sand (SM)		SS-3	6	10	12	22
			6.					
				SS-4	6	8	8	16
	8.	**Fill** - Stiff Yellowish Brown and Reddish Brown Sandy Lean Clay (CL)	8.					
				SS-5	4	5	7	12
530		**Alluvium** - Firm to Loose Reddish Brown, Light Brown, and Gray Silty Clayey Fine Sand (SC-SM)						
	14.		13.5	SS-6	7	4	6	10
525		**Residuum** - Loose Brown, Reddish Brown, and Gray Micaceous Silty Fine to Medium Sand (SM)						
	17.							
		Partially Weathered Rock - Sampled as Very Dense Gray, Brown, and White Micaceous Silty Fine to Coarse Sand (PWR)	18.5	SS-7	50/5"			100+
520								
	23.		23.5	SS-8	50/5"			100+
515	25.5	**Partially Weathered Rock** - Sampled as Very Dense Grayish Brown, Brown, and Dark Brown Slightly Micaceous Silty Fine to Coarse Sand (PWR)						
		Auger Refusal Encountered at 25-1/2 Feet; Boring Terminated						
510								
505								
500								
495								

STD. PENETRATION TEST DATA (blows/ft)



LEGEND

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
AWG - Rock Core, 1-1/8"
NQ - Rock Core, 1-7/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

SCDOT

S-103 (Oak Park Road) - RBO Fishing Creek
York County, South Carolina
File No. 46.169B.1; Project No. BR-BR46 (012) Pin. No. 31919

LOG OF BORING No. B-6

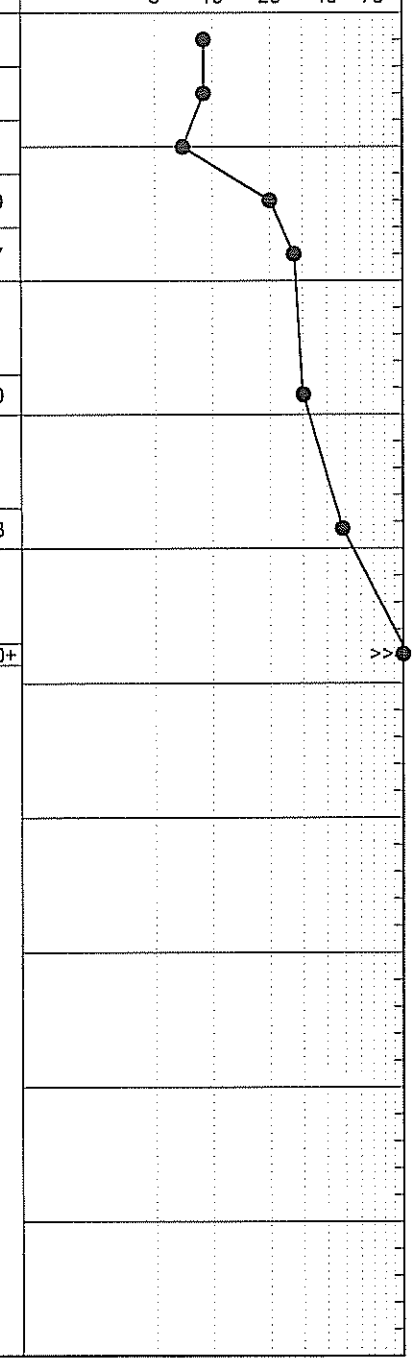
Station: 63+52
Offset: 9 Feet Left of Proposed Centerline

Date Drilled: 2/14/07
Supervisor: QORE (7272O)
Casing Length: NA
Ground Elevation: 538. Feet
Hammer Type: ☒ Gravity ☐ Automatic ☒ Other: CME-45
Water Level: 9.5 Ft. at TOB; 8 Ft. after 24 Hrs.
Drilling Method: HSA

Notes:
Coordinates: N34°54.344' W81°06.399'

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground						
	0.5	6 Inches Topsoil						
		Fill - Stiff Brownish Red and Brown Sandy Lean Clay (CL)	0.	SS-1	3	4	5	9
	4.		2.	SS-2	2	4	5	9
533	6.	**Alluvium** - Firm Gray, Brown, and Dark Brown Sandy Silt (ML)	4.	SS-3	3	3	4	7
	8.	**Residuum** - Very Stiff Grayish Brown, Brown, and Dark Brown Sandy Silt (ML)	6.	SS-4	6	9	11	20
528		Very Firm Grayish Brown, Yellowish Brown, and Brown Silty Fine Sand (SM)	8.	SS-5	6	15	12	27
	12.	Very Firm Reddish Brown, Yellowish Brown, and Brown Micaceous Silty Fine to Coarse Sand (SM)	13.5	SS-6	15	15	15	30
523	18.	Dense Gray, Light Brown, and White Slightly Micaceous Fine to Coarse Sand with Silt and Gravel (SP-SM)	18.5	SS-7	12	28	20	48
518	22.	**Partially Weathered Rock** (No Sample Recovery for SS-8; Classified as PWR Based on SPT Values)	23.5	SS-8	50/0			100+
513	25.5	Auger Refusal Encountered at 25-1/2 Feet; Boring Terminated						
508								
503								
498								
493								

STD. PENETRATION TEST DATA (blows/ft)



LEGEND

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
AWG - Rock Core, 1-1/8"
NQ - Rock Core, 1-7/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

SCDOT

S-103 (Oak Park Road) - RBO Fishing Creek
York County, South Carolina
File No. 46.169B.1; Project No. BR-BR46 (012) Pin. No. 31919

LOG OF BORING No. B-7

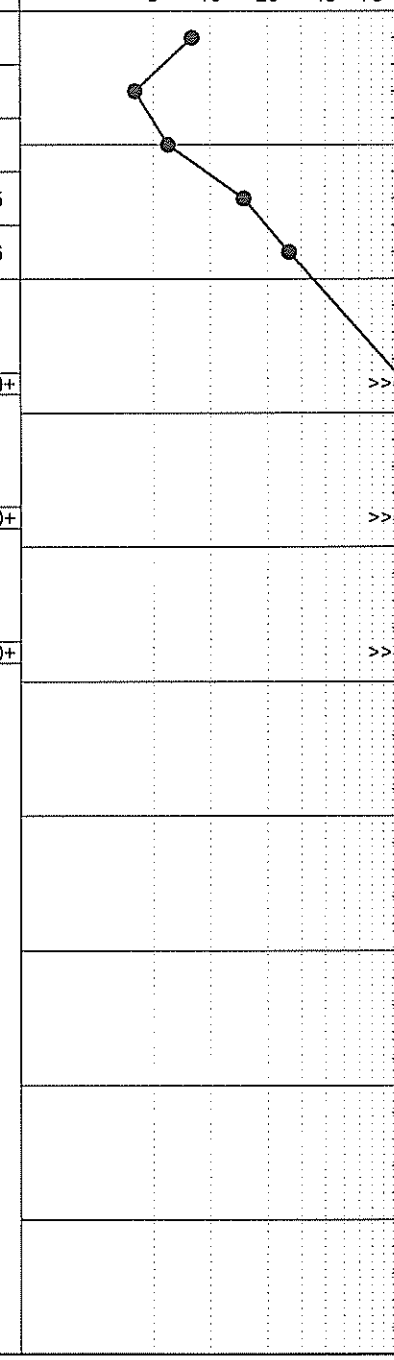
Station: 64+50
Offset: 3 Feet Right of Proposed Centerline

Date Drilled: 2/13/07
Supervisor: QORE (7272O)
Casing Length: NA
Ground Elevation: 537. Feet
Hammer Type: ☒ Gravity ☐ Automatic ☒ Other: CME-45
Water Level: 11 Ft. at TOB; 7 Ft. after 24 Hrs.
Drilling Method: HSA

Notes:
Coordinates: N34°54.345' W81°06.378'

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.5	6 Inches Topsoil		0.	SS-1	4	4	4	8
		Fill - Firm to Soft Brown Sandy Silt (ML)		2.	SS-2	3	2	2	4
	4.			4.					
532		**Alluvium** - Firm Brown, Gray, and Dark Brown Sandy Lean Clay (CL)			SS-3	3	3	3	6
	6.			6.					
		▼**Residuum** - Stiff Gray, Brown, and Light Brown Lean Clay with Sand (CL)			SS-4	5	7	8	15
	8.			8.					
		Very Firm Light Brown, Brown, and Yellowish Brown Clayey Fine to Medium Sand (SC)			SS-5	6	10	16	26
527		▽							
	12.								
		Partially Weathered Rock - Sampled as Very Dense Dark Gray, Gray, and Brown Silty Fine to Coarse Sand (PWR)		13.5	SS-6	50/5"			100+
522									
				18.5	SS-7	50/5"			100+
517									
				23.5	SS-8	50/5"			100+
512	26.								
		Auger Refusal Encountered at 26 Feet; Boring Terminated							
507									
502									
497									
492									

STD. PENETRATION TEST DATA (blows/ft)



LEGEND

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
AWG - Rock Core, 1-1/8"
NQ - Rock Core, 1-7/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

SCDOT

S-103 (Oak Park Road) - RBO Fishing Creek
York County, South Carolina
File No. 46.169B.1; Project No. BR-BR46 (012) Pin. No. 31919

LOG OF BORING No. B-8

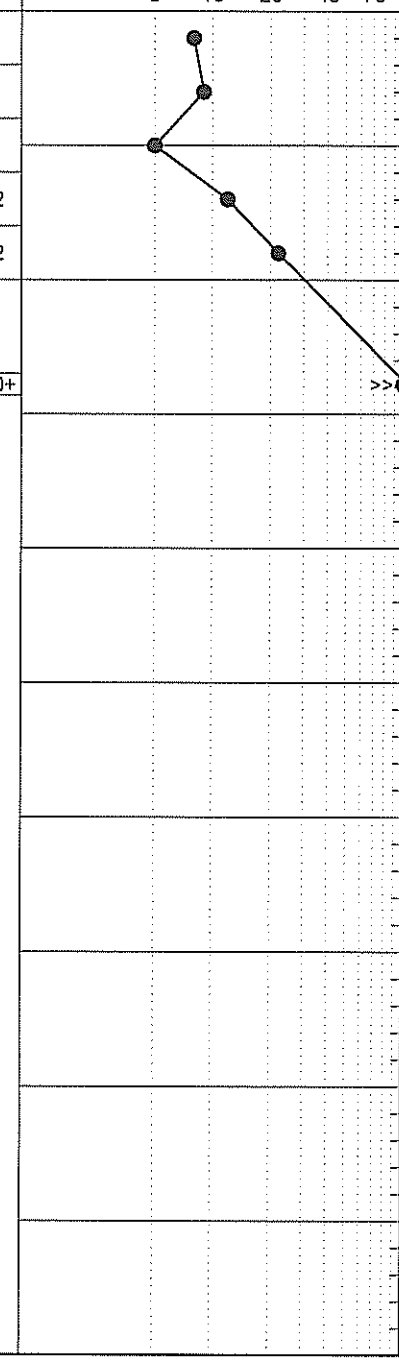
Station: 67+50
Offset: 13 Feet Left of Proposed Centerline

Date Drilled: 2/13/07
Supervisor: QORE (7272O)
Casing Length: NA
Ground Elevation: 537. Feet
Hammer Type: ☒ Gravity ☐ Automatic ☒ Other: CME-45
Water Level: 10' at TOB; Caved at 7' after 24 Hrs.
Drilling Method: HSA

Notes:
Coordinates: N34°54.344' W81°06.312'

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0	Top of Ground							
	0.5	6 Inches Topsoil		0.	SS-1	4	4	4	8
		Fill - Firm to Stiff Brown Sandy Lean Clay with Small Roots and Gravel (CL)		2.	SS-2	4	4	5	9
	4.5			4.					
532		**Residuum** - Firm Gray and Brown Sandy Lean Clay (CL)			SS-3	2	2	3	5
	6.5			6.					
	8.	Stiff Gray and Brown Sandy Clay with Small Roots (CL)			SS-4	4	5	7	12
				8.					
527		Very Firm Blueish Gray Clayey Sand (SC)			SS-5	5	10	12	22
	12.								
		Partially Weathered Rock - Sampled as Very Dense Brown and Dark Brown Silty Fine to Coarse Sand (PWR)		13.5	SS-6	50/3"			100+
522	15.	Boring Terminated at 15 Feet							
517									
512									
507									
502									
497									
492									

STD. PENETRATION TEST DATA (blows/ft)

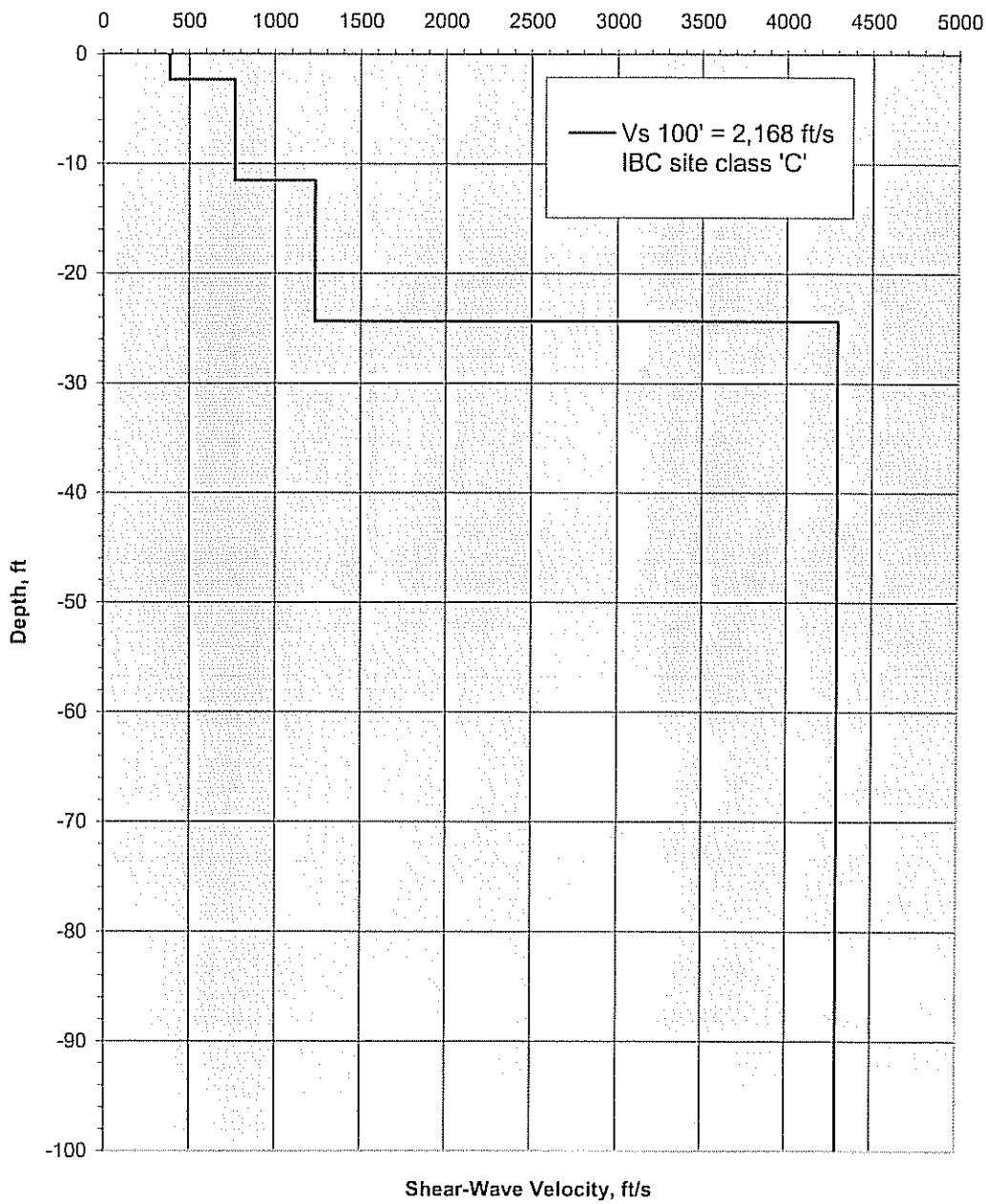


LEGEND

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
AWG - Rock Core, 1-1/8"
NQ - Rock Core, 1-7/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Job No. 7272O: S-103 (Oak Park Road) RBO Fishing Creek
File No. 46.169B.1; Project No. BR-BR46 (012) PIN No. 31919
Station: 63+77
Offset: 6 Feet Left of Proposed Centerline
Boring No. SA-1 Vs Model



SUMMARY OF LABORATORY INDEX TEST RESULTS
S-103 (Oak Park Road)-Replace Bridge Over Fishing Creek
York County, South Carolina
SCDOT Project No. BR-BR46(012); PIN No. 31919
QORE Job No. 7272O, Report No. 115235

Boring No.	Sample Depth (ft)	Sample No.	Soil Classification		% Fines (% Passing #200 Sieve)	Atterberg Limits		Moisture Content (%)
			AASHTO	USCS		Liquid Limit (%)	Plasticity Index (%)	
B-1	2-4	SS-2	[A-5]	[SM]	40.3	N/A	N/A	13.3
B-2	2-4	SS-2	[A-2-4]	[SM]	27.6	N/A	N/A	12.7
B-2	8-10	SS-5	A-4(2)	CL	60.2	24	8	18.1
B-3	9-11	SS-1	A-4(4)	CL	65.6	29	10	24.6
B-3	15-17	SS-4	[A-2-4]	[SP-SM]	10.4	N/A	N/A	36.1
B-5	6-8	SS-4	A-6(7)	CL	70.5	34	12	23.2
B-5	8-10	SS-5	A-2-4	SC-SM	29.7	22	5	18.7
B-5	13.5-15	SS-6	A-2-4	SM	26.9	31	6	24.7
B-6	2-4	SS-2	A-6(5)	CL	52.0	35	15	19.7
B-6	8-10	SS-5	A-4	SM	42.6	22	NP	16.9
B-7	4-6	SS-3	A-6(4)	CL	20.3	26	11	20.3
B-7	6-8	SS-4	A-6(16)	CL	72.9	39	25	19.0
B-8	2-4	SS-2	A-6(4)	CL	54.5	29	13	17.3
B-8	4-6	SS-3	A-6(6)	CL	51.4	30	19	17.6
Sta. 64+00	0-5	Bulk	A-4(1)	SC	44.9	26	9	16.9

Notes: NP = Non-plastic; N/A = Test Not Performed

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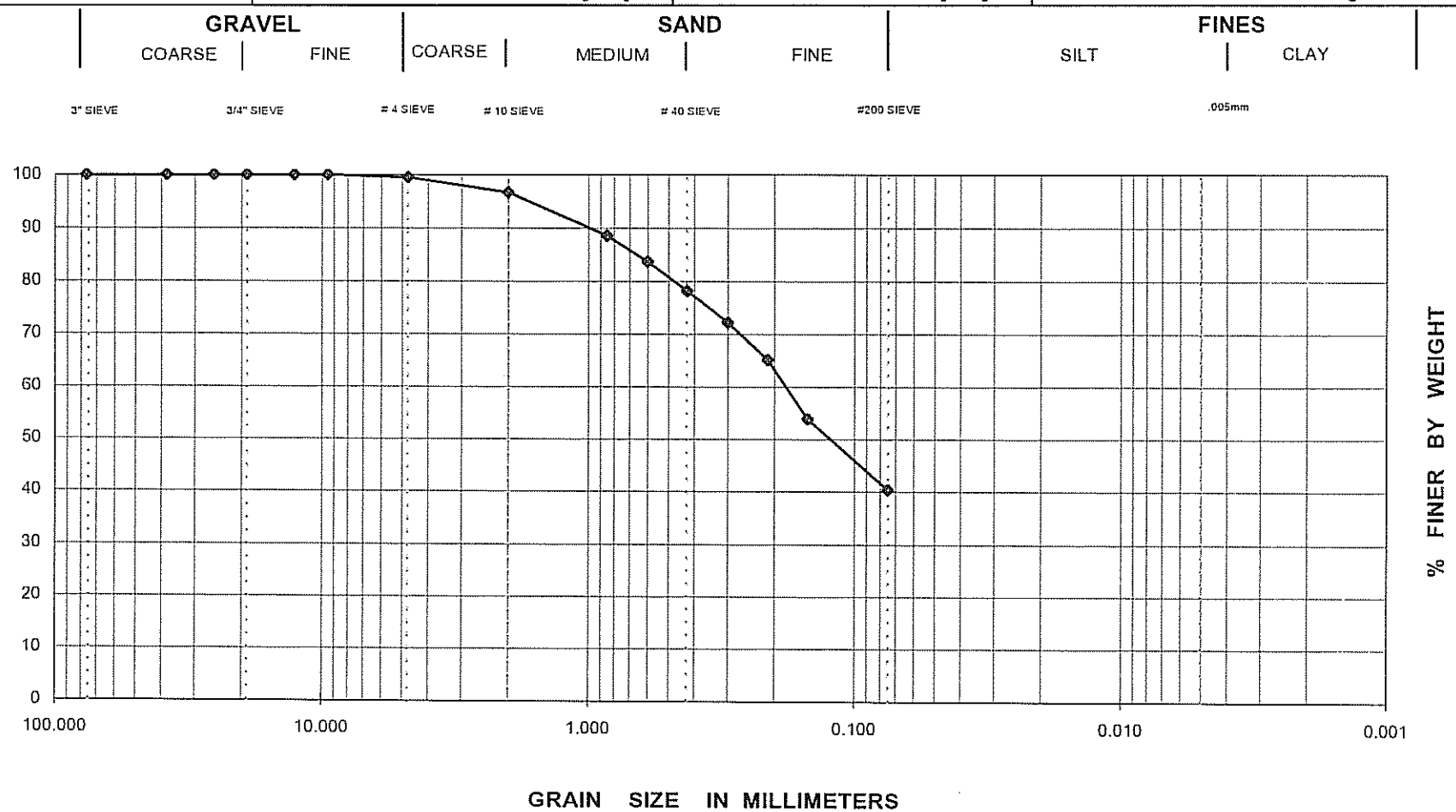
GRAIN SIZE DISTRIBUTION TEST REPORT

(ASTM D422)

AASHTO R18

JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	**REPORT NO. :**	115235	**DATE :**	5/30/2007	**REVIEWED BY :**	
BORING / PIT NO. :	B - 1	**DEPTH / ELEV. :**	2' - 4'	**SAMPLE NO. :**	SS-2	**SAMPLE TYPE :**	SS
SAMPLE LOCATION :		-					
SOIL DESCRIPTION :	Brown and Gray Silty Fine to Medium Sand					**SP. GRAVITY, Gs :**	-
LIQUID LIMIT, % :	N/A	**PLASTICITY INDEX , % :**	N/A	**MOISTURE , % :**	13.3	**FINES , % :**	40.3
D10 , MM :	-	**D30 , MM :**	-	**D60 , MM :**	0.18	**COEFF. OF CURVATURE , C_C :**	-
CLASSIFICATION		**UNIFIED :**	[SM]	**AASHTO :**	[A-5]	**COEFF. OF UNIFORMITY , C_U :**	-



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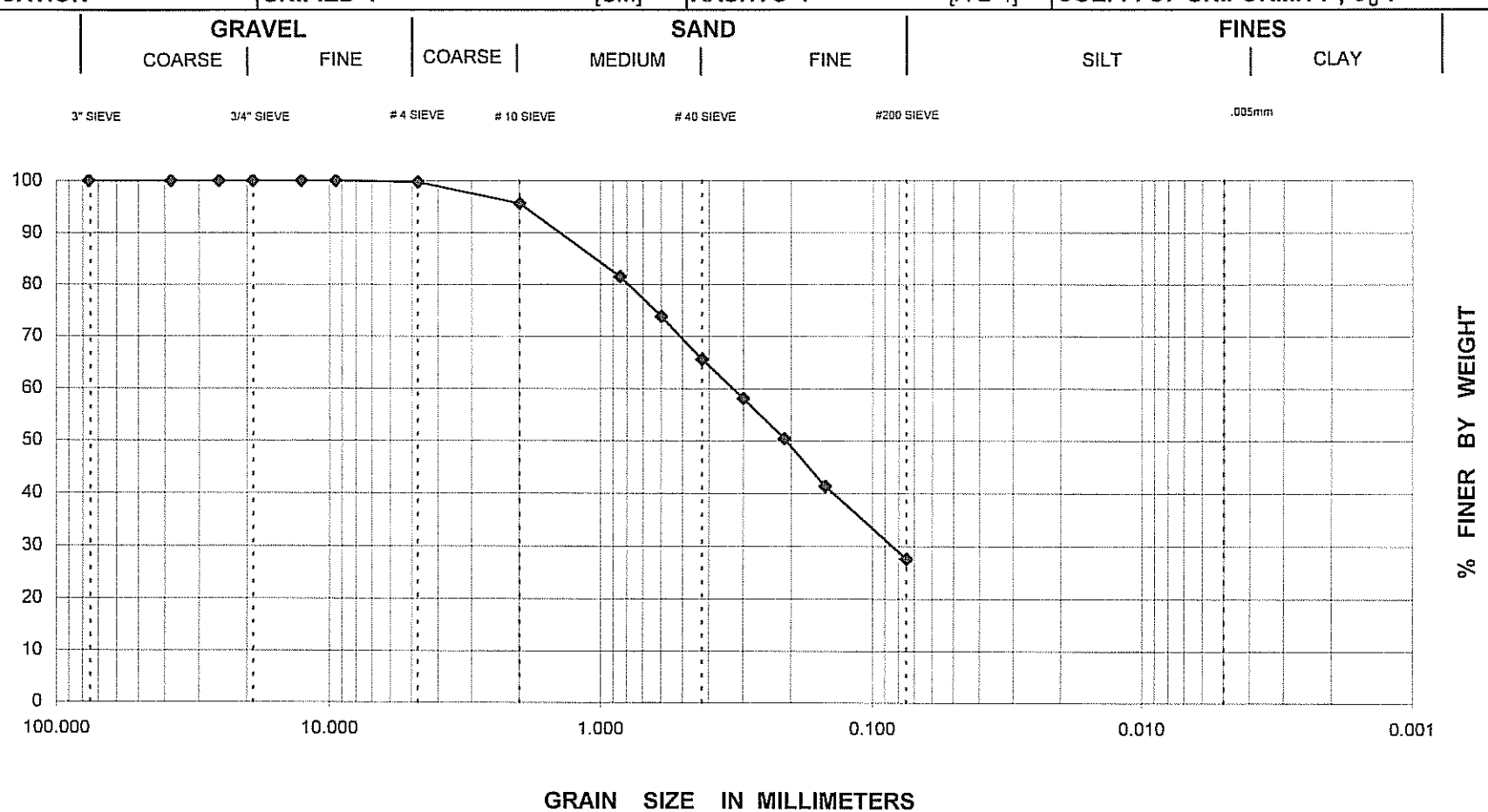
GRAIN SIZE DISTRIBUTION TEST REPORT

(ASTM D422)

AASHTO R18

JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	**REPORT NO. :**	115235	**DATE :**	5/30/2007	**REVIEWED BY :**	
BORING / PIT NO. :	B - 2	**DEPTH / ELEV. :**	2' - 4'	**SAMPLE NO. :**	SS-2	**SAMPLE TYPE :**	SS
SAMPLE LOCATION :		-					
SOIL DESCRIPTION :	Brown, Gray, and Red Silty Fine to Medium Sand					**SP. GRAVITY, Gs :**	-
LIQUID LIMIT, % :	N/A	**PLASTICITY INDEX , % :**	N/A	**MOISTURE , % :**	12.7	**FINES , % :**	27.6
D10 , MM :	-	**D30 , MM :**	0.085	**D60 , MM :**	0.33	**COEFF. OF CURVATURE , C_C :**	-
CLASSIFICATION		**UNIFIED :**	[SM]	**AASHTO :**	[A-2-4]	**COEFF. OF UNIFORMITY , C_U :**	-



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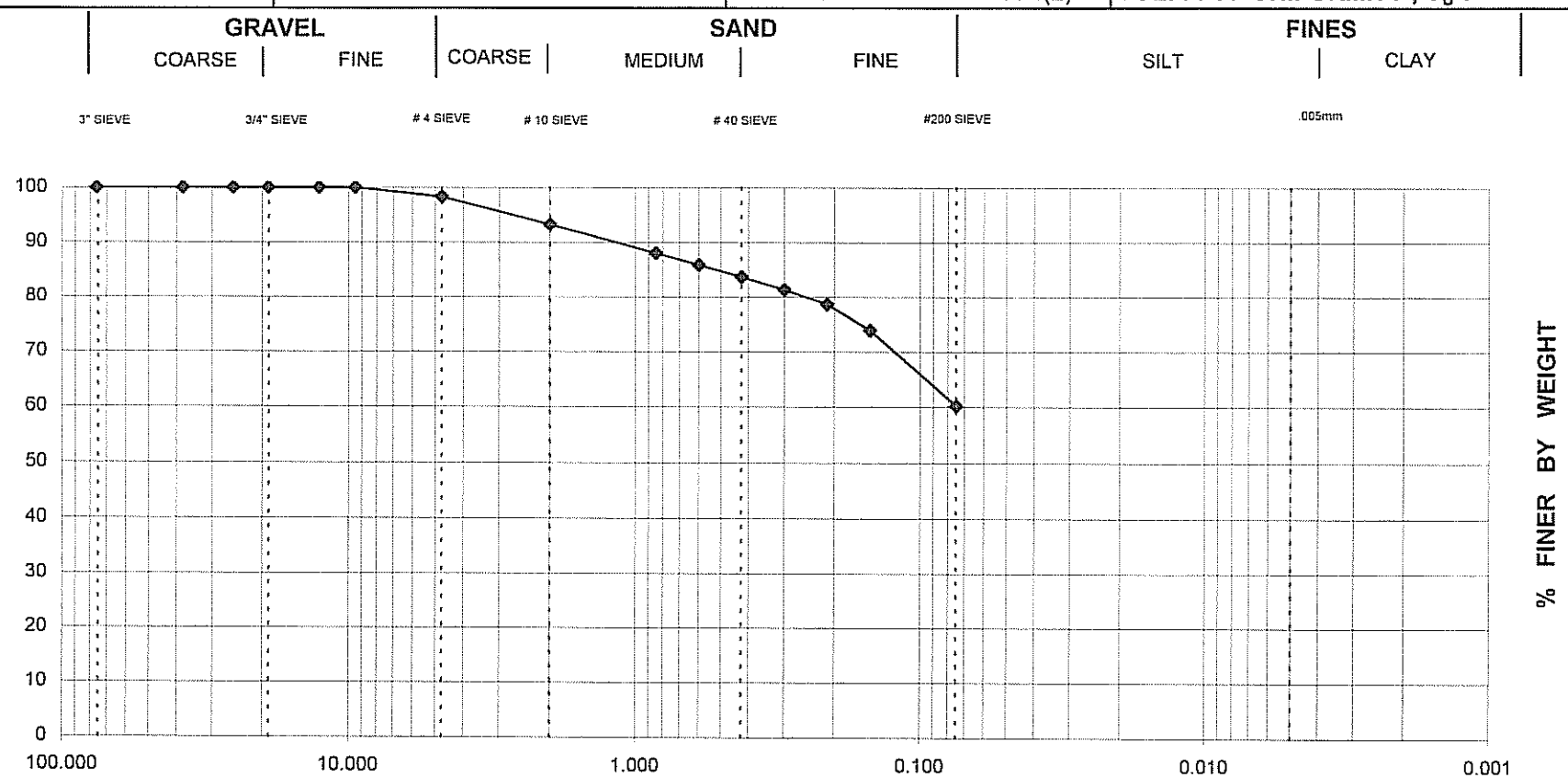
(ASTM D422)

AASHTO R18

JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	REPORT NO. :	115235	DATE :	5/30/2007	REVIEWED BY :	
BORING / PIT NO. :	B - 2	DEPTH / ELEV. :	8' - 10'	SAMPLE NO. :	SS-5	SAMPLE TYPE :	SS
SAMPLE LOCATION :	-						
SOIL DESCRIPTION :	Grayish Brown, Brown, and Dark Brown Sandy Lean Clay					SP. GRAVITY, Gs :	-
LIQUID LIMIT, % :	24	PLASTICITY INDEX , % :	8	MOISTURE , % :	18.1	FINES , % :	60.2
D10 , MM :	-	D30 , MM :	-	D60 , MM :	0.074	COEFF. OF CURVATURE , C_C :	-
CLASSIFICATION		UNIFIED :	CL	AASHTO :	A-4(2)	COEFF. OF UNIFORMITY , C_U :	-



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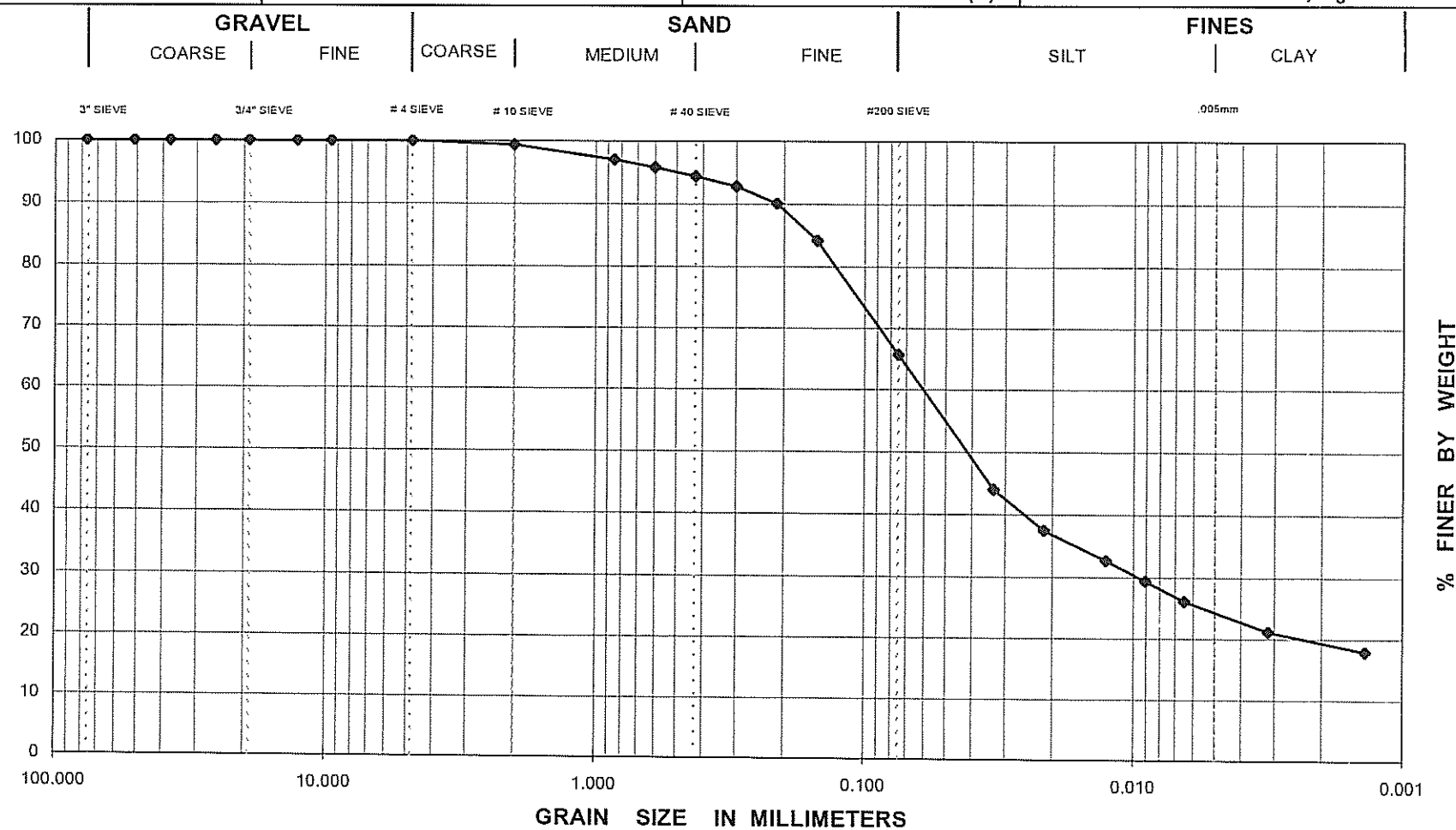
PARTICLE- SIZE DISTRIBUTION TEST REPORT

SIEVE AND HYDROMETER ASTM D422

REV1,9/17/03

AASHTO R18

JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	REPORT NO. :	115235	DATE :	5/30/07	REVIEWED BY :	
BORING / PIT NO. :	B - 3	DEPTH / ELEV. :	9' - 11'	SAMPLE NO. :	SS-1	SAMPLE TYPE :	SS
SAMPLE LOCATION :							
SOIL DESCRIPTION :	Brown and Reddish Brown Sandy Lean Clay					SP. GRAVITY, Gs :	2.68
LIQUID LIMIT, % :	29	PLASTICITY INDEX , % :	10	MOISTURE , % :	24.6	FINES , % :	65.6
D10 , MM :	-	D30 , MM :	0.0098	D60 , MM :	0.061	COEFF. OF CURVATURE , C_C :	-
CLASSIFICATION		UNIFIED :	CL	AASHTO :	A-4(4)	COEFF. OF UNIFORMITY , C_U :	-



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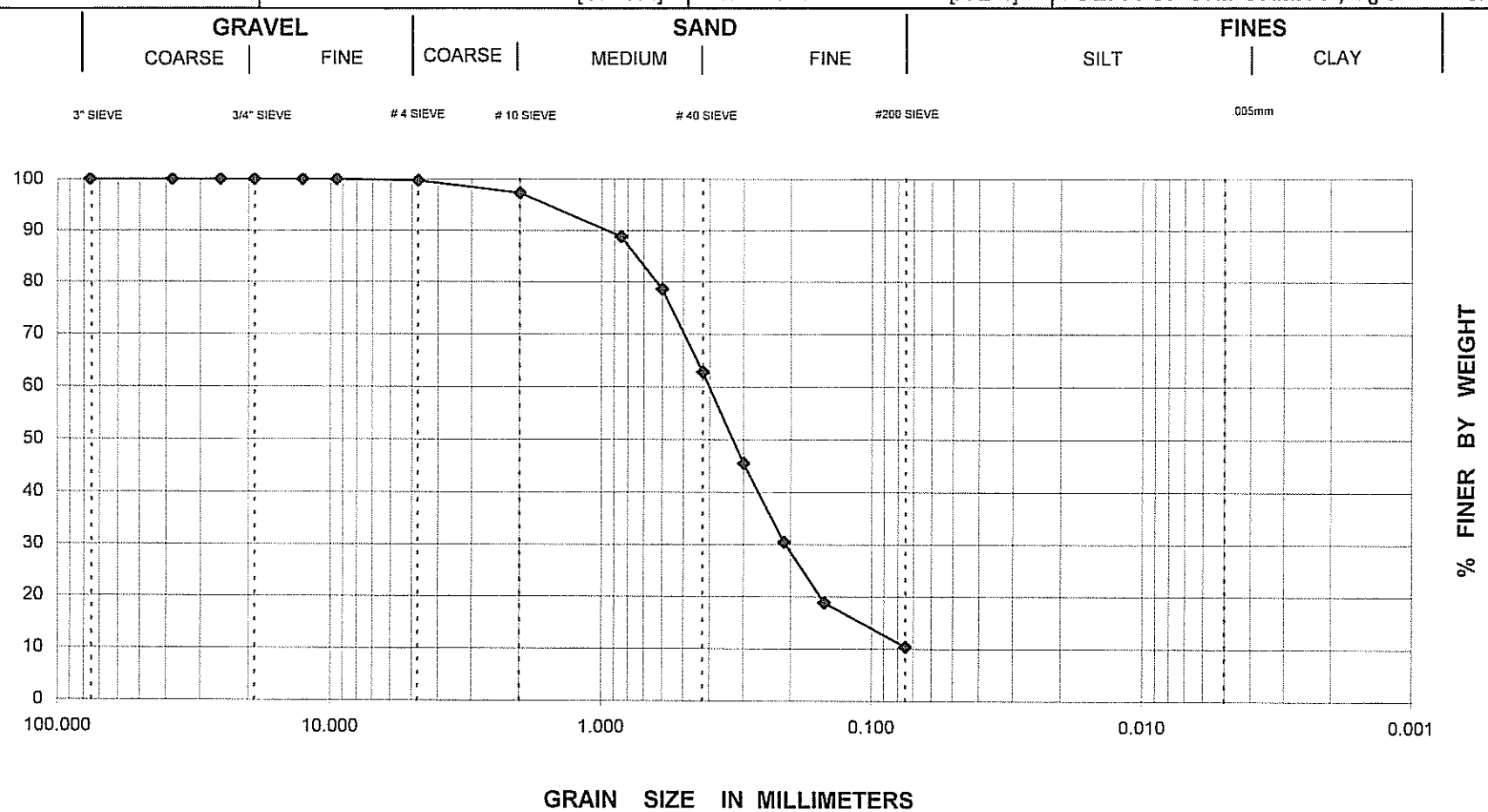
GRAIN SIZE DISTRIBUTION TEST REPORT

(ASTM D422)

AASHTO R18

JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	**REPORT NO. :**	115235	**DATE :**	5/30/2007	**REVIEWED BY :**	
BORING / PIT NO. :	B - 3	**DEPTH / ELEV. :**	15' - 17'	**SAMPLE NO. :**	SS-4	**SAMPLE TYPE :**	SS
SAMPLE LOCATION :		-					
SOIL DESCRIPTION :	Gray Poorly Graded Fine to Medium Sand with Silt and Wood Pieces					**SP. GRAVITY, Gs :**	-
LIQUID LIMIT, % :	N/A	**PLASTICITY INDEX , % :**	N/A	**MOISTURE , % :**	36.1	**FINES , % :**	10.4
D10 , MM :	0.073	**D30 , MM :**	0.22	**D60 , MM :**	0.400	**COEFF. OF CURVATURE , C_C :**	1.7
CLASSIFICATION		**UNIFIED :**	[SP-SM]	**AASHTO :**	[A-2-4]	**COEFF. OF UNIFORMITY , C_U :**	5.5



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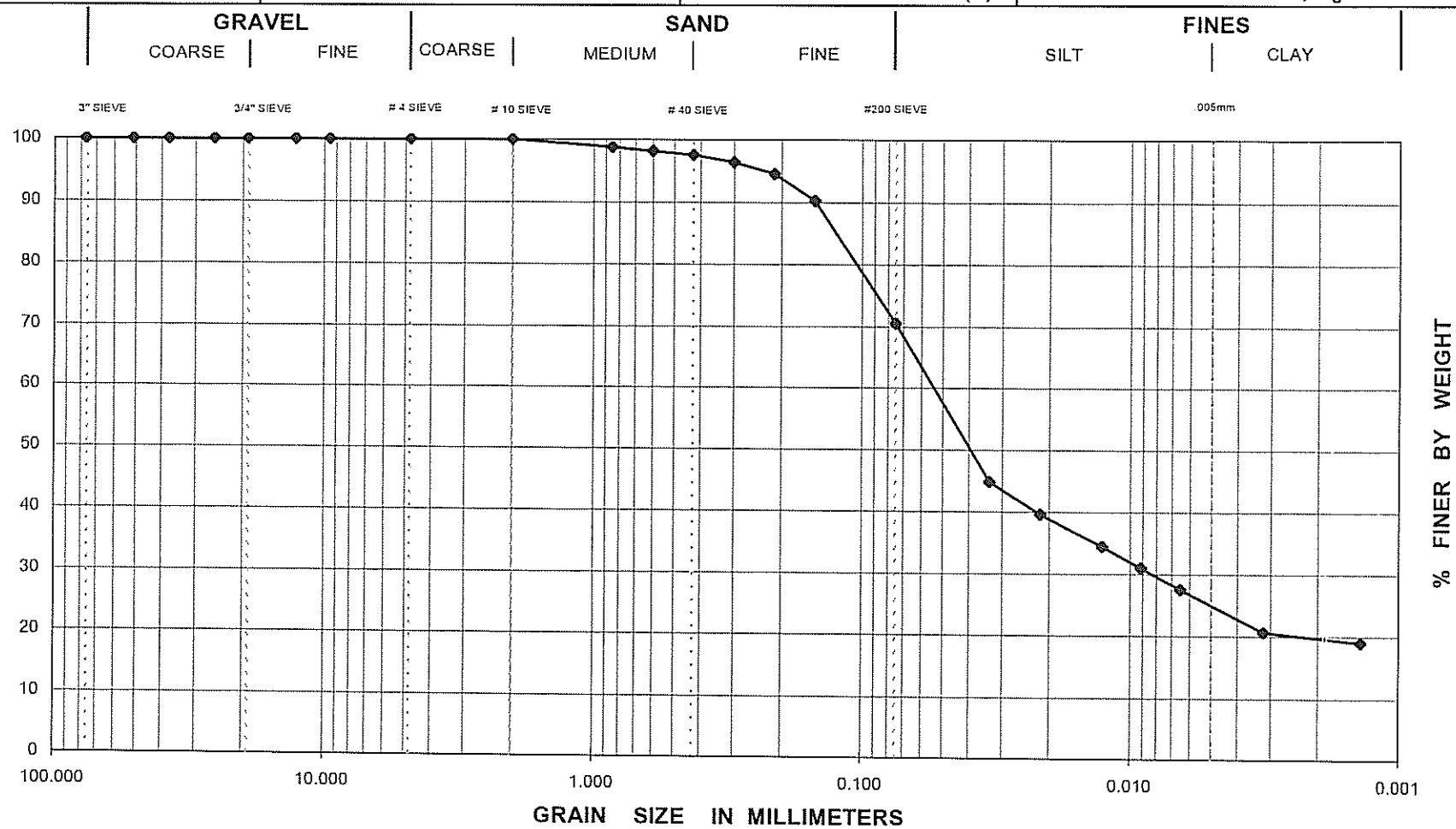
PARTICLE- SIZE DISTRIBUTION TEST REPORT

SIEVE AND HYDROMETER ASTM D422

REV1,9/17/03

AASHTO R18

JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	REPORT NO. :	115235	DATE :	5/30/07	REVIEWED BY :	
BORING / PIT NO. :	B - 5	DEPTH / ELEV. :	6' - 8'	SAMPLE NO. :	SS-4	SAMPLE TYPE :	SS
SAMPLE LOCATION :							
SOIL DESCRIPTION :	Yellowish Brown and Reddish Brown Sandy Lean Clay					SP. GRAVITY, Gs :	2.66
LIQUID LIMIT, % :	34	PLASTICITY INDEX , % :	12	MOISTURE , % :	23.2	FINES , % :	70.5
D10 , MM :	-	D30 , MM :	0.0083	D60 , MM :	0.054	COEFF. OF CURVATURE , C_C :	-
CLASSIFICATION		UNIFIED :	CL	AASHTO :	A-6(7)	COEFF. OF UNIFORMITY , C_U :	-



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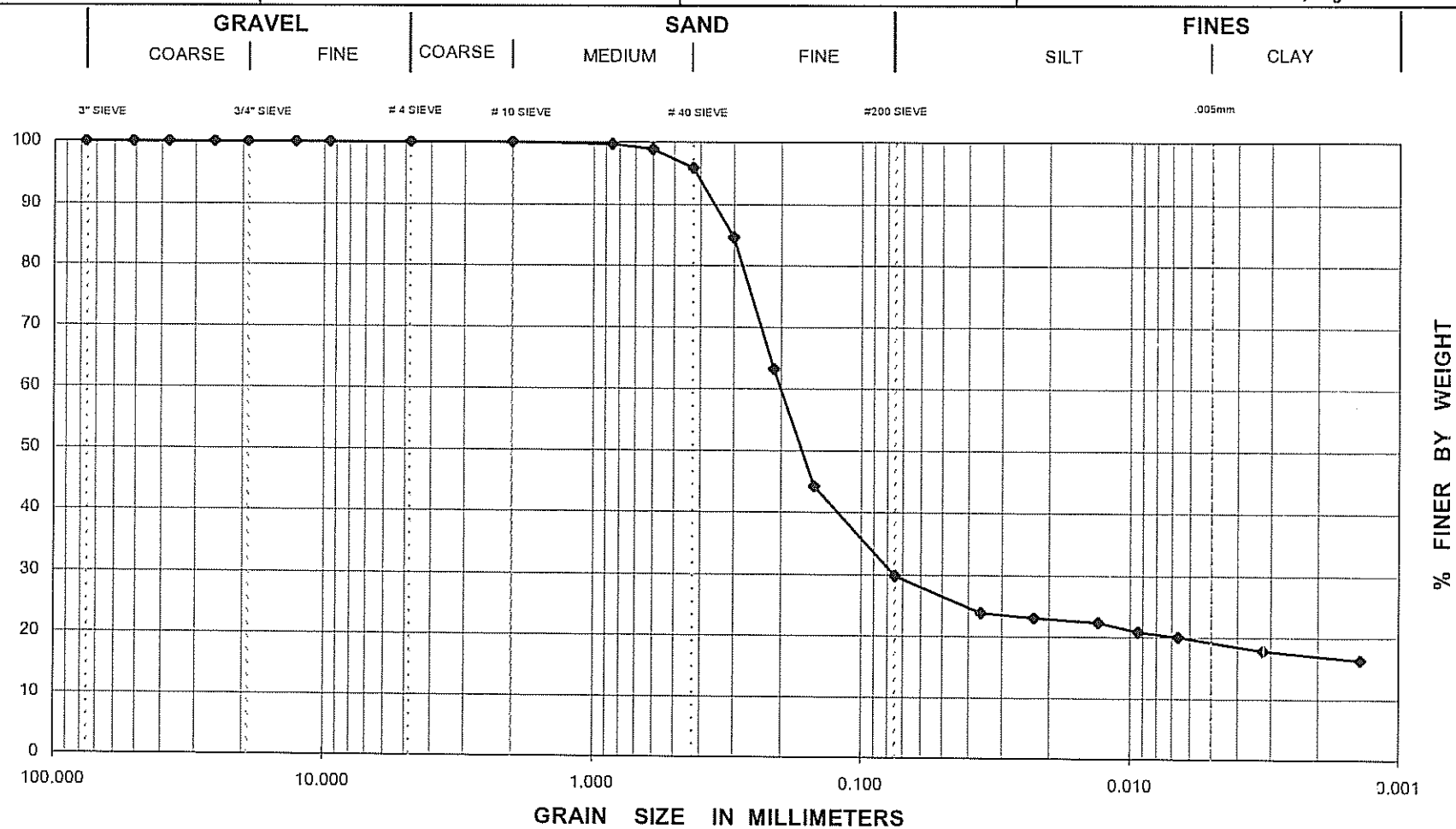
PARTICLE- SIZE DISTRIBUTION TEST REPORT

SIEVE AND HYDROMETER ASTM D422

REV1,9/17/03

AASHTO R18

JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	REPORT NO. :	115235	DATE :	5/30/07	REVIEWED BY :	
BORING / PIT NO. :	B - 5	DEPTH / ELEV. :	8' - 10'	SAMPLE NO. :	SS-5	SAMPLE TYPE :	SS
SAMPLE LOCATION :							
SOIL DESCRIPTION :	Reddish Brown, Light Brown, and Gray Silty, Clayey Fine Sand					SP. GRAVITY, Gs :	2.65
LIQUID LIMIT, % :	22	PLASTICITY INDEX , % :	5	MOISTURE , % :	18.7	FINES , % :	29.7
D10 , MM :	-	D30 , MM :	0.075	D60 , MM :	0.200	COEFF. OF CURVATURE , C_C :	-
CLASSIFICATION		UNIFIED :	SC-SM	AASHTO :	A-2-4	COEFF. OF UNIFORMITY , C_U :	-



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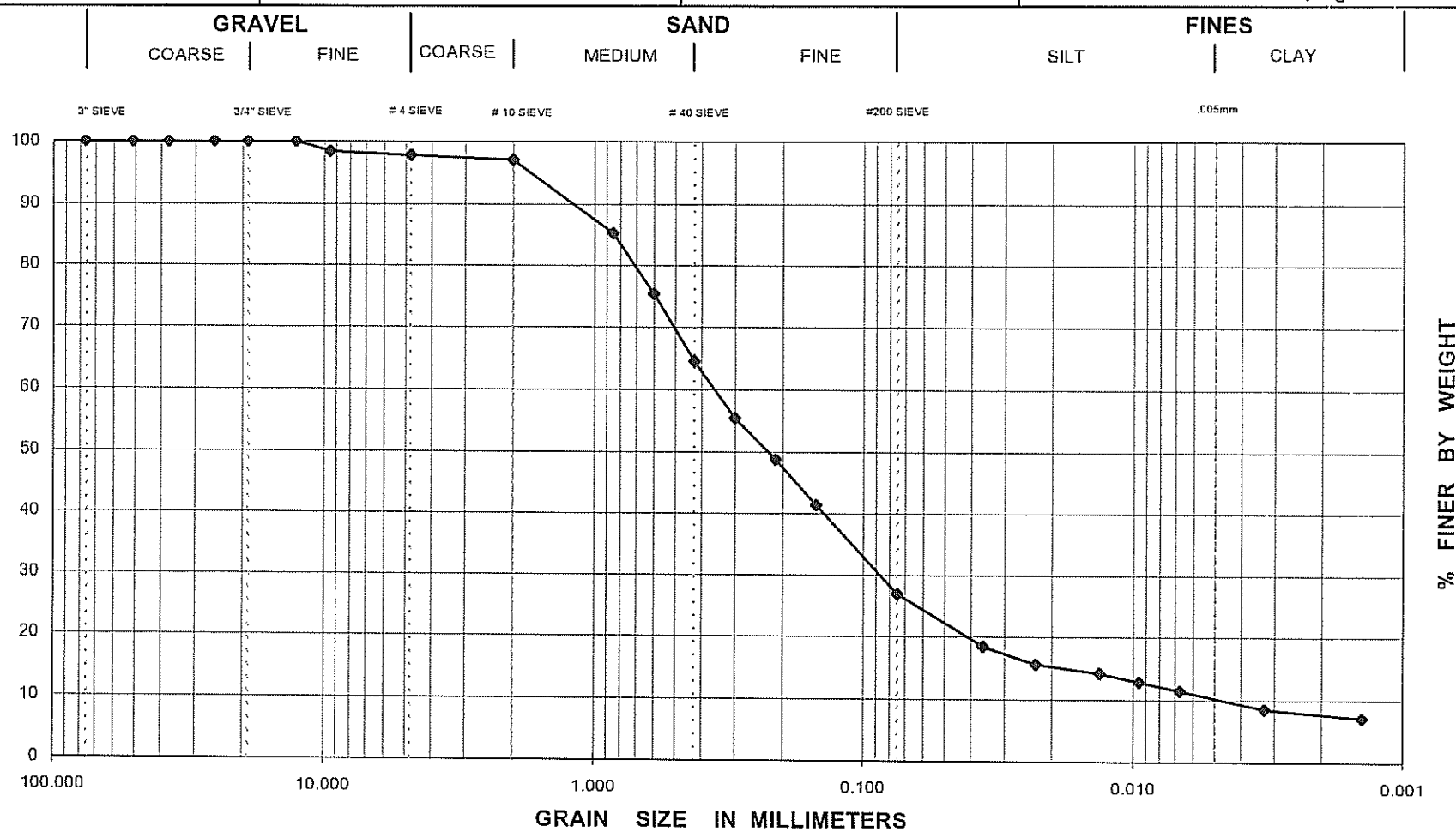
SIEVE AND HYDROMETER ASTM D422

REV1,9/17/03

AASHTO R18

JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	**REPORT NO. :**	115235	**DATE :**	5/30/07	**REVIEWED BY :**	K [illegible]
BORING / PIT NO. :	B - 5	**DEPTH / ELEV. :**	13.5' - 15'	**SAMPLE NO. :**	SS-6	**SAMPLE TYPE :**	SS
SAMPLE LOCATION :							
SOIL DESCRIPTION :	Brown, Reddish Brown, and Gray Micaceous Silty Fine to Medium Sand					**SP. GRAVITY, Gs :**	2.69
LIQUID LIMIT, % :	31	**PLASTICITY INDEX , % :**	6	**MOISTURE , % :**	24.7	**FINES , % :**	26.9
D10 , MM :	0.0050	**D30 , MM :**	0.088	**D60 , MM :**	0.36	**COEFF. OF CURVATURE , C_C :**	4.3
CLASSIFICATION		**UNIFIED :**	SM	**AASHTO :**	A-2-4	**COEFF. OF UNIFORMITY , C_U :**	72.0



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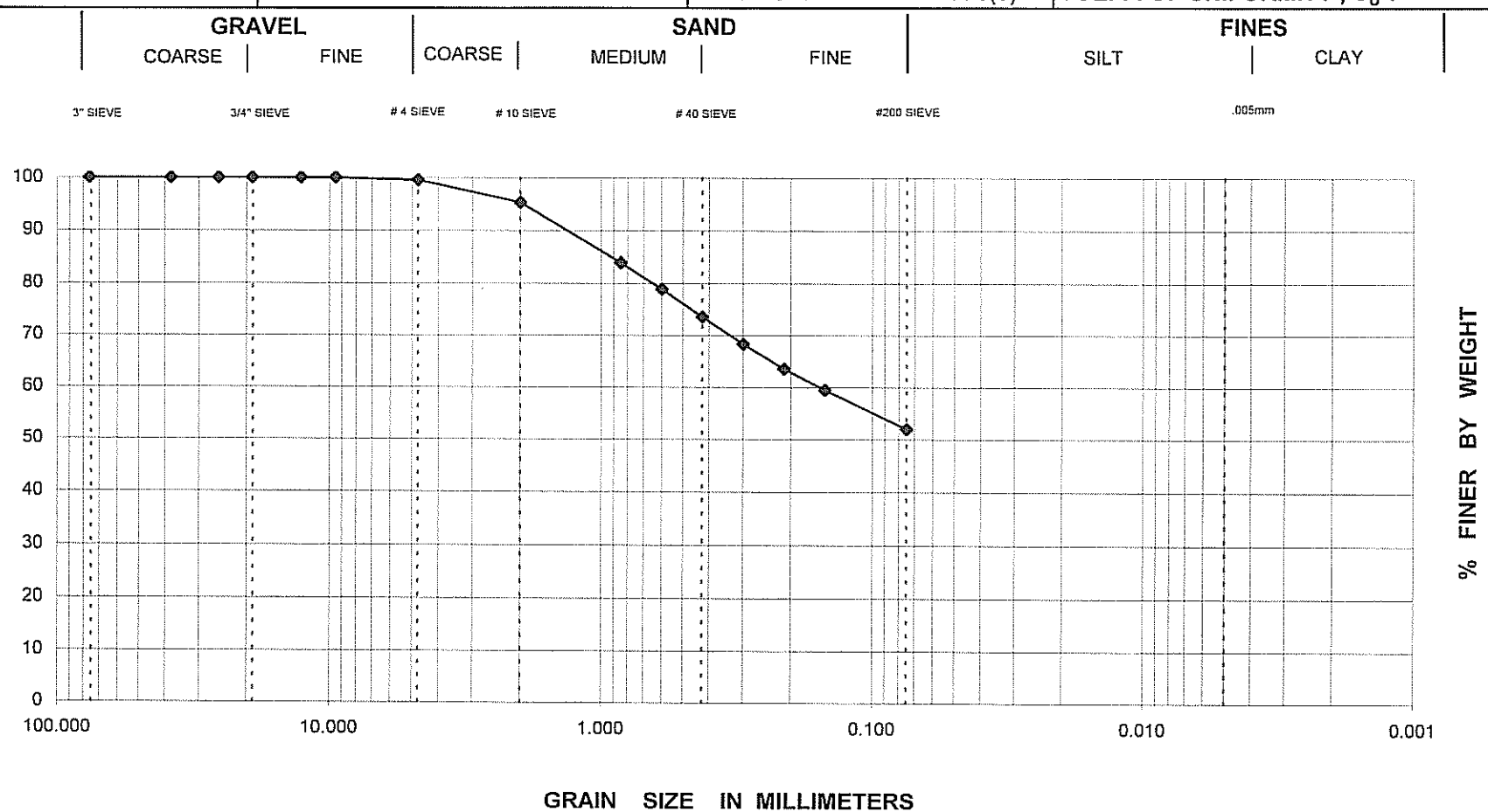
GRAIN SIZE DISTRIBUTION TEST REPORT

(ASTM D422)

AAP℠ AASHTO R18

JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	REPORT NO. :	115235	DATE :	5/30/2007	REVIEWED BY :	
BORING / PIT NO. :	B - 6	DEPTH / ELEV. :	2' - 4'	SAMPLE NO. :	SS-2	SAMPLE TYPE :	SS
SAMPLE LOCATION :		-					
SOIL DESCRIPTION :	Brownish Red and Brown Sandy Lean Clay					SP. GRAVITY, Gs :	-
LIQUID LIMIT, % :	35	PLASTICITY INDEX , % :	15	MOISTURE , % :	19.7	FINES , % :	52.0
D10 , MM :	-	D30 , MM :	-	D60 , MM :	0.16	COEFF. OF CURVATURE , C_C :	-
CLASSIFICATION		UNIFIED :	CL	AASHTO :	A-6(5)	COEFF. OF UNIFORMITY , C_U :	-



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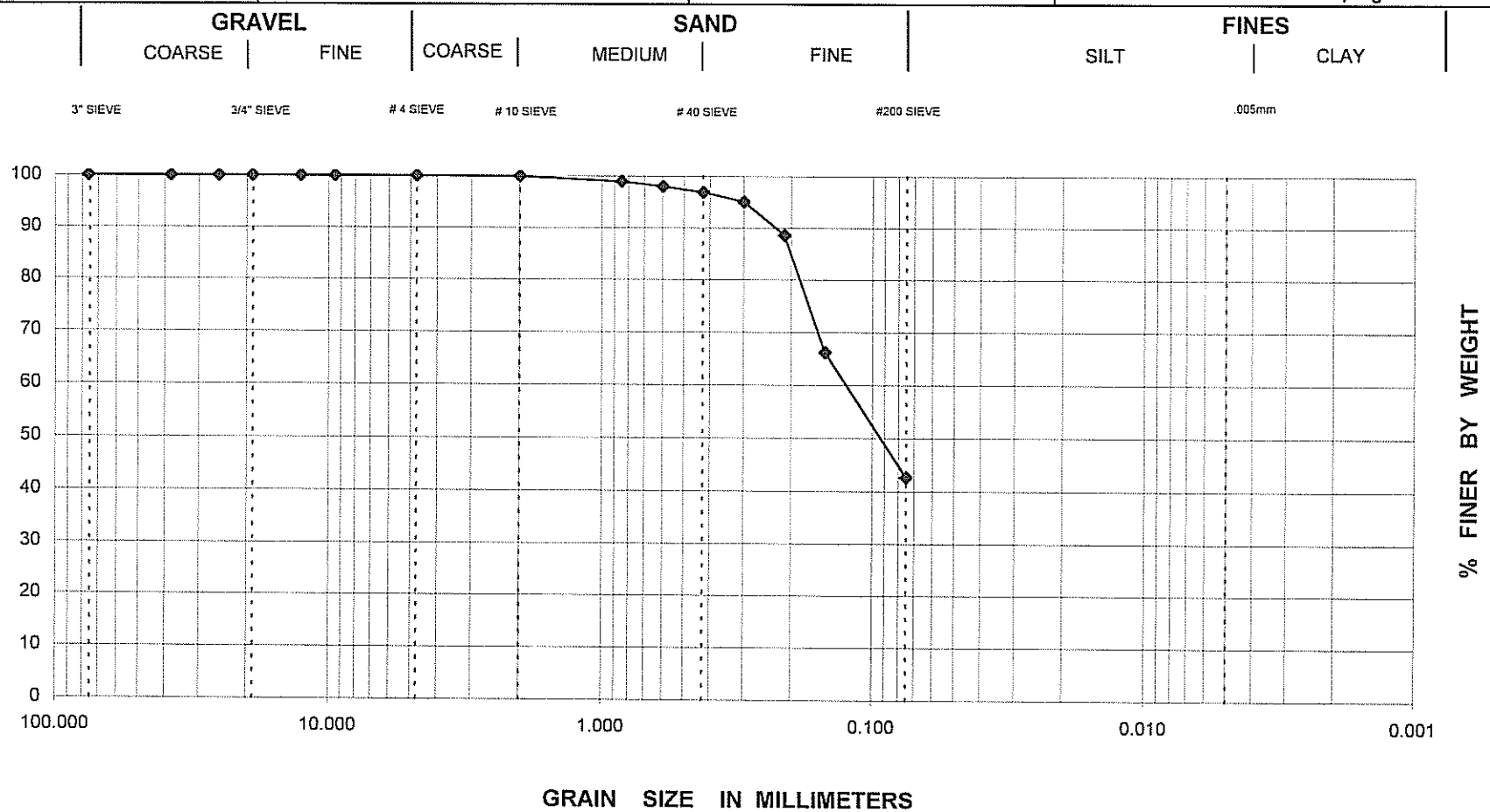
(ASTM D422)

AAP℠ AASHTO R18

JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	**REPORT NO. :**	115235	**DATE :**	5/30/2007	**REVIEWED BY :**	KWW
BORING / PIT NO. :	B - 6	**DEPTH / ELEV. :**	8' - 10'	**SAMPLE NO. :**	SS-5	**SAMPLE TYPE :**	SS
SAMPLE LOCATION :		-					
SOIL DESCRIPTION :	Grayish Brown, Yellowish Brown, and Brown Silty Fine Sand					**SP. GRAVITY, Gs :**	-
LIQUID LIMIT, % :	22	**PLASTICITY INDEX , % :**	NP	**MOISTURE , % :**	16.9	**FINES , % :**	42.6
D10 , MM :	-	**D30 , MM :**	-	**D60 , MM :**	0.13	**COEFF. OF CURVATURE , C_C :**	-
CLASSIFICATION		**UNIFIED :**	SM	**AASHTO :**	A-4	**COEFF. OF UNIFORMITY , C_U :**	-



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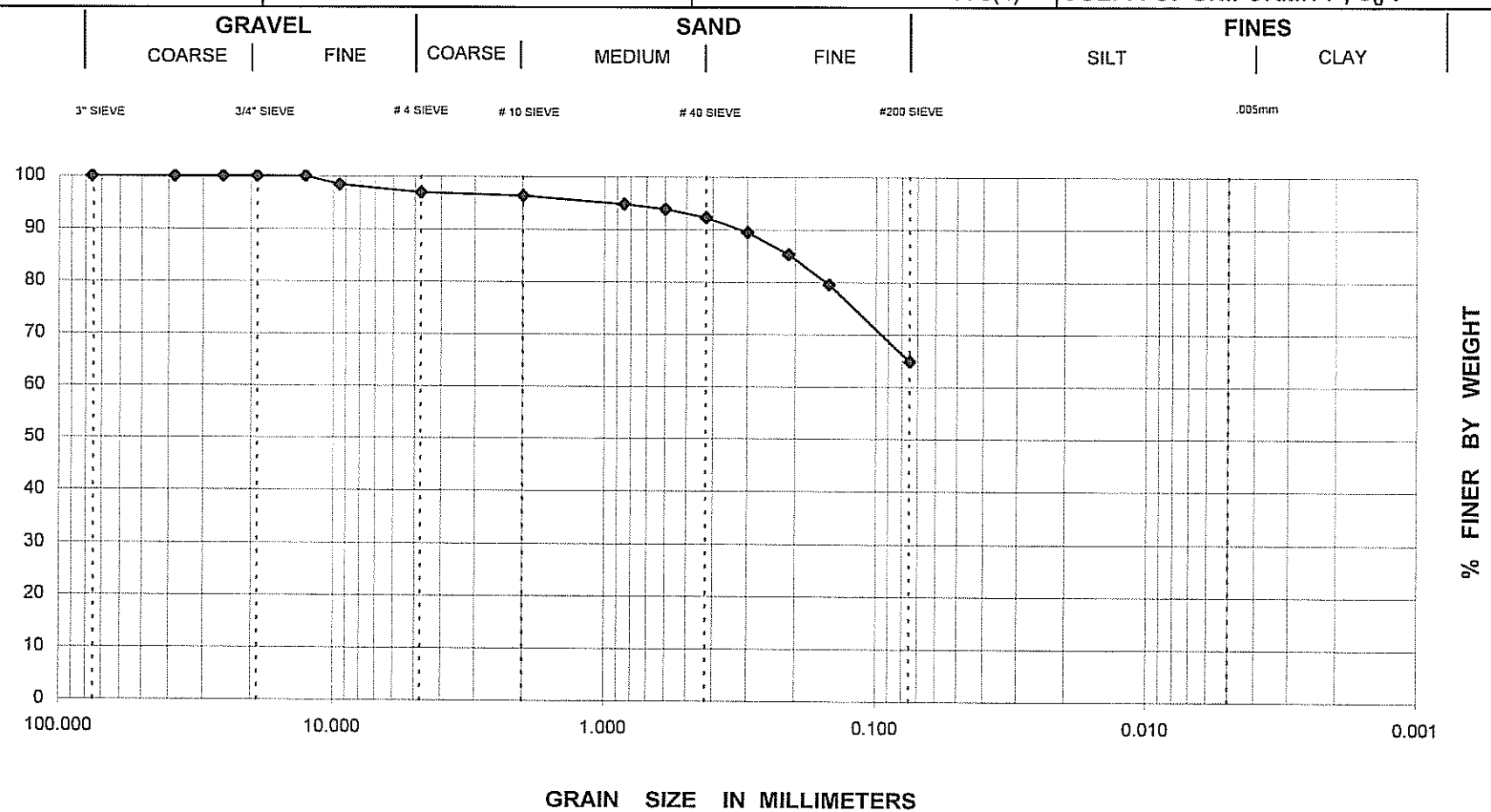
JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	REPORT NO. :	115235	DATE :	5/30/2007	REVIEWED BY :	KWW
BORING / PIT NO. :	B - 7	DEPTH / ELEV. :	4' - 6'	SAMPLE NO. :	SS-3	SAMPLE TYPE :	SS
SAMPLE LOCATION :		-					
SOIL DESCRIPTION :	Brown, Gray, and Dark Brown Sandy Lean Clay					SP. GRAVITY, Gs :	-
LIQUID LIMIT, % :	26	PLASTICITY INDEX , % :	11	MOISTURE , % :	20.3	FINES , % :	64.9
D10 , MM :	-	D30 , MM :	-	D60 , MM :	-	COEFF. OF CURVATURE , C_C :	-
CLASSIFICATION		UNIFIED :	CL	AASHTO :	A-6(4)	COEFF. OF UNIFORMITY , C_U :	-



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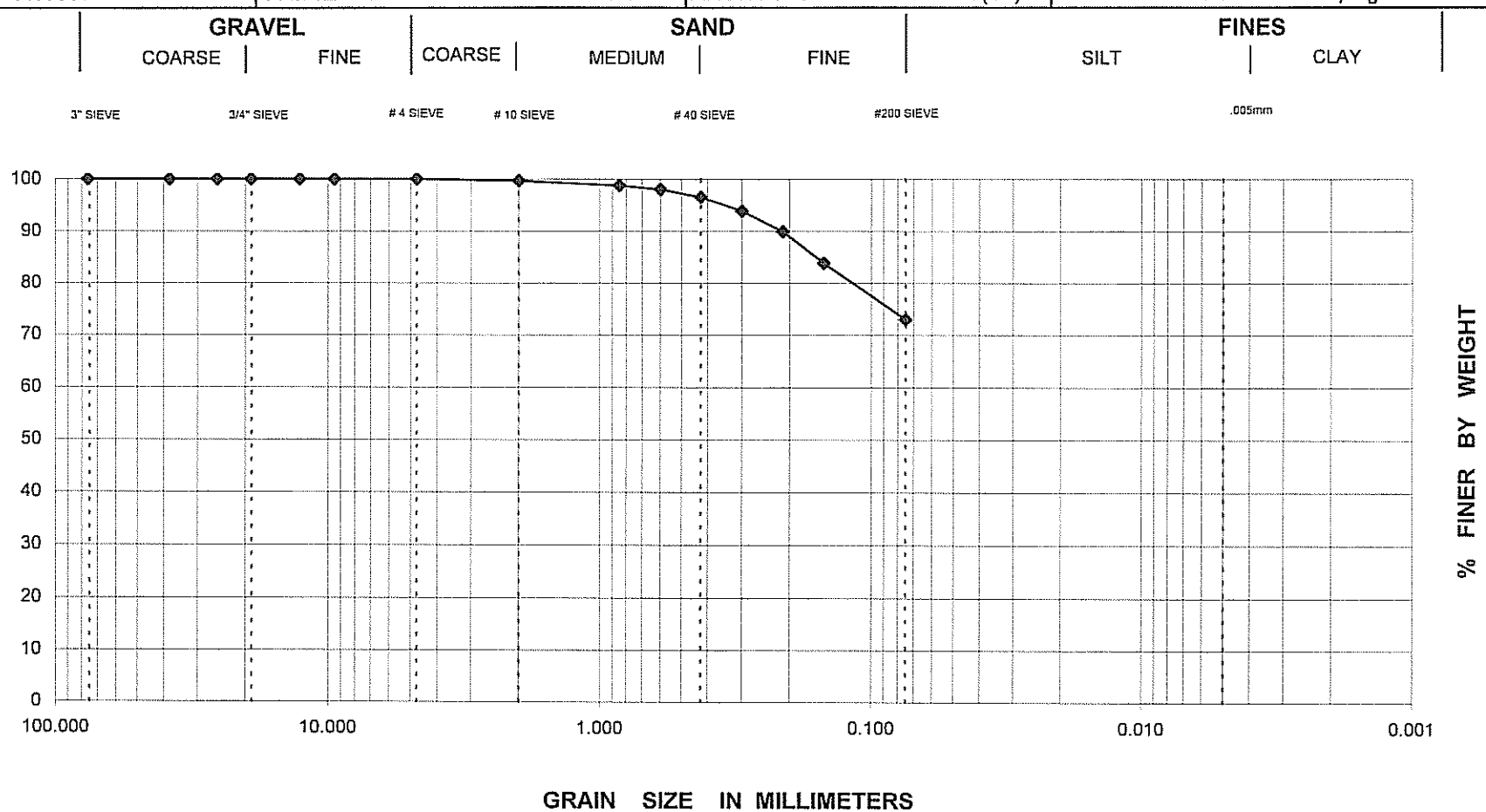
JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	**REPORT NO. :**	115235	**DATE :**	5/30/2007	**REVIEWED BY :**	
BORING / PIT NO. :	B - 7	**DEPTH / ELEV. :**	6' - 8'	**SAMPLE NO. :**	SS-4	**SAMPLE TYPE :**	SS
SAMPLE LOCATION :		-					
SOIL DESCRIPTION :	Gray, Brown, and Light Brown Lean Clay with Sand					**SP. GRAVITY, Gs :**	-
LIQUID LIMIT, % :	39	**PLASTICITY INDEX , % :**	25	**MOISTURE , % :**	19.0	**FINES , % :**	72.9
D10 , MM :	-	**D30 , MM :**	-	**D60 , MM :**	-	**COEFF. OF CURVATURE , C_C :**	-
CLASSIFICATION		**UNIFIED :**	CL	**AASHTO :**	A-6(16)	**COEFF. OF UNIFORMITY , C_U :**	-



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GRAIN SIZE DISTRIBUTION TEST REPORT

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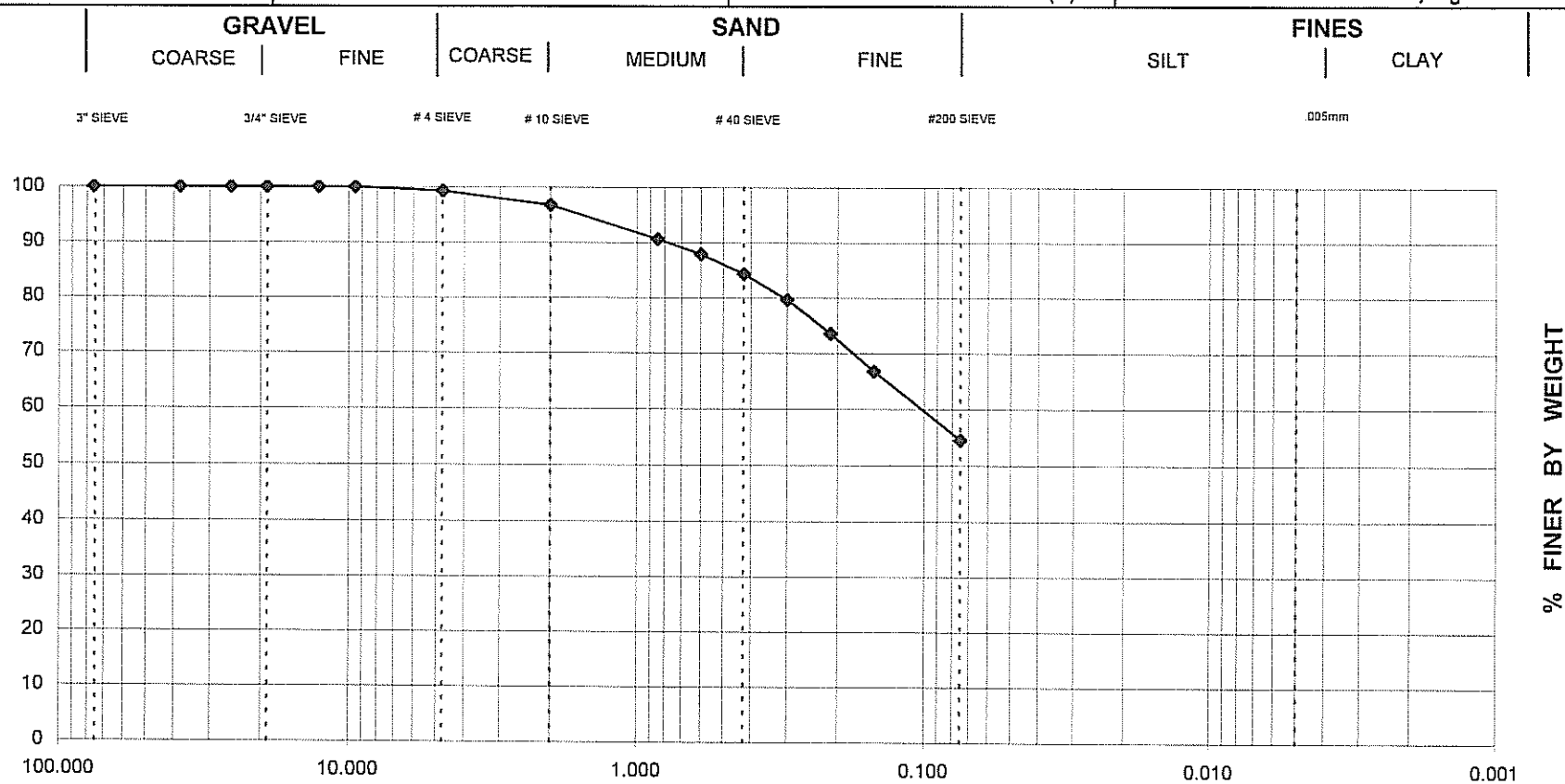
JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	REPORT NO. :	115235	DATE :	5/30/2007	REVIEWED BY :	
BORING / PIT NO. :	B - 8	DEPTH / ELEV. :	2' - 4'	SAMPLE NO. :	SS-2	SAMPLE TYPE :	SS
SAMPLE LOCATION :		-					
SOIL DESCRIPTION :	Brown Sandy Lean Clay with Small Roots and Gravel					SP. GRAVITY, Gs :	-
LIQUID LIMIT, % :	29	PLASTICITY INDEX , % :	13	MOISTURE , % :	17.3	FINES , % :	54.5
D10 , MM :	-	D30 , MM :	-	D60 , MM :	0.11	COEFF. OF CURVATURE , C_C :	-
CLASSIFICATION		UNIFIED :	CL	AASHTO :	A-6(4)	COEFF. OF UNIFORMITY , C_U :	-



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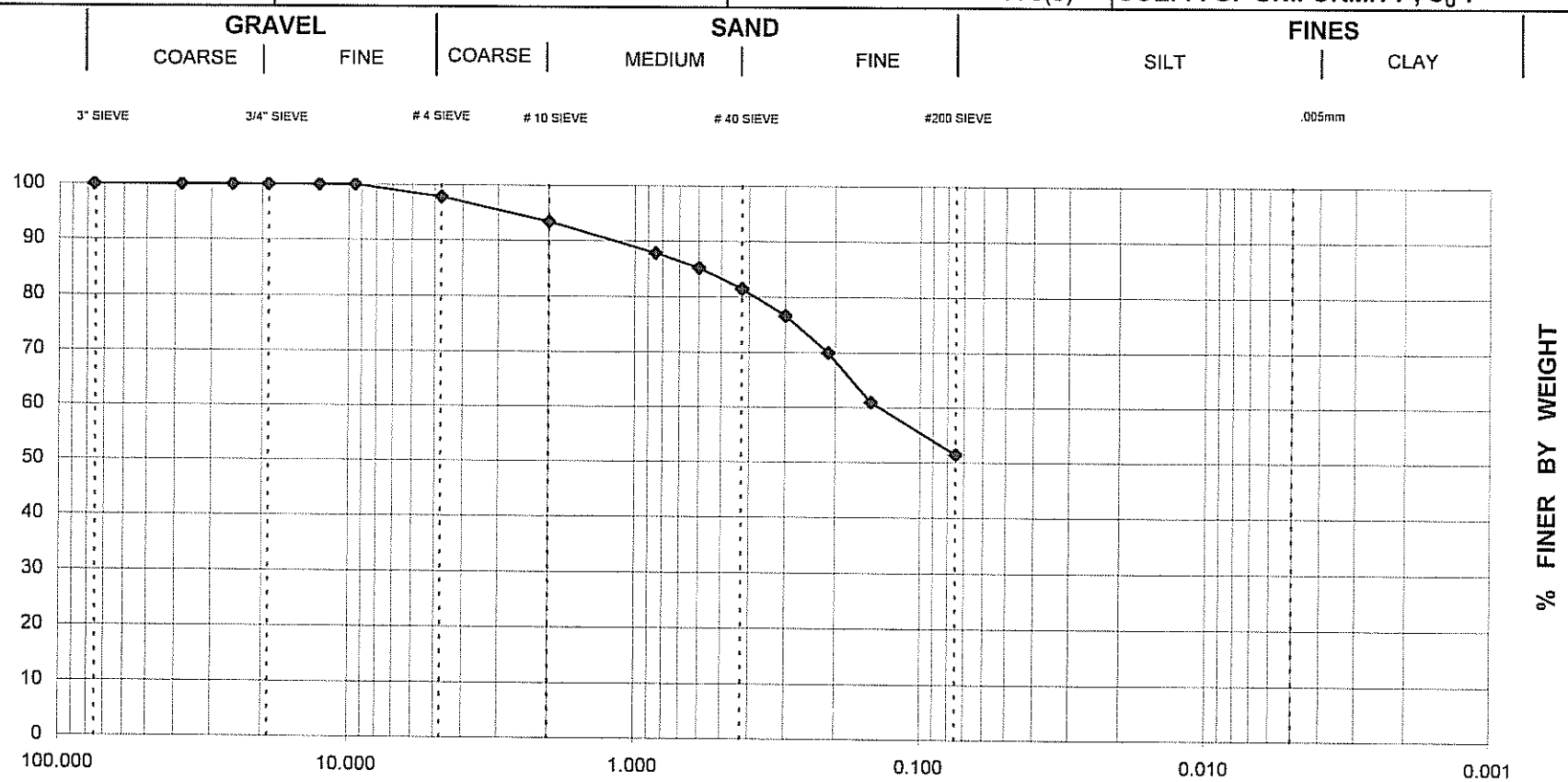
GRAIN SIZE DISTRIBUTION TEST REPORT

(ASTM D422)

AAP SM AASHTO R18

JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; York County, South Carolina; File No. 46.169B.1; Project No. BR-BR46(012); Pin No. 31919						
JOB NO. :	7272O	REPORT NO. :	115235	DATE :	5/30/2007	REVIEWED BY :	
BORING / PIT NO. :	B - 8	DEPTH / ELEV. :	4' - 6'	SAMPLE NO. :	SS-3	SAMPLE TYPE :	SS
SAMPLE LOCATION :		-					
SOIL DESCRIPTION :	Gray and Brown Sandy Lean Clay					SP. GRAVITY, Gs :	-
LIQUID LIMIT, % :	30	PLASTICITY INDEX , % :	19	MOISTURE , % :	17.6	FINES , % :	51.4
D10 , MM :	-	D30 , MM :	-	D60 , MM :	0.15	COEFF. OF CURVATURE , C_C :	-
CLASSIFICATION		UNIFIED :	CL	AASHTO :	A-6(6)	COEFF. OF UNIFORMITY , C_U :	-



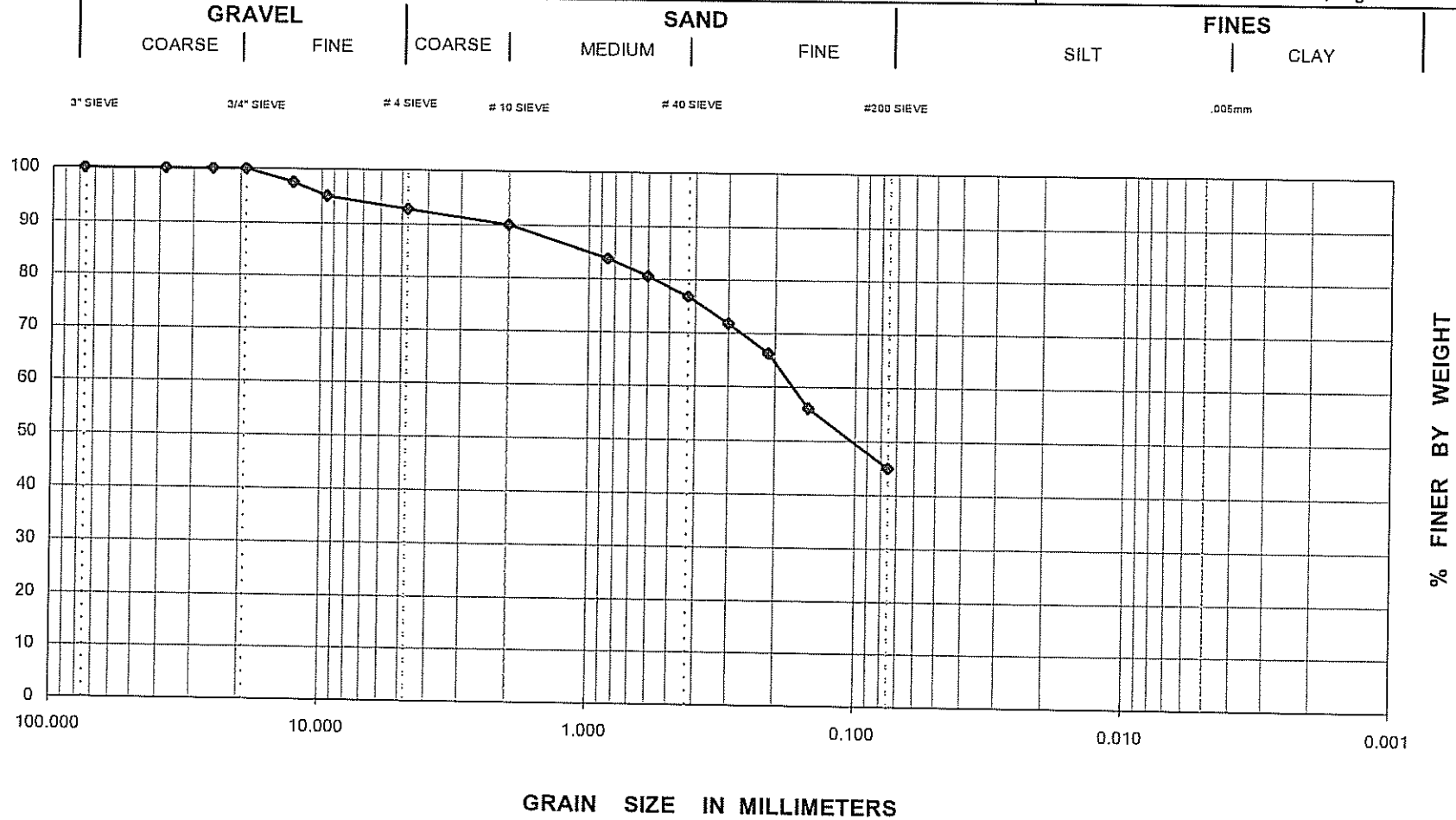
QORE PROPERTY SCIENCES

GRAIN SIZE DISTRIBUTION TEST REPORT

(ASTM D422)

AAP AASHTO R18

JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; File No. 46.169B.1; Project No. BR-BR46 (012); PIN No. 31919						
JOB NO. :	7272O	REPORT NO. :	115235	DATE :	2/26/2007	REVIEWED BY :	KBF
BORING / PIT NO. :	-	DEPTH / ELEV. :	0 - 5'	SAMPLE NO. :	BS-1	SAMPLE TYPE :	Bulk
SAMPLE LOCATION :	Station: 64+00; 3 Feet Left of Proposed Centerline						
SOIL DESCRIPTION :	Dark Brown Clayey Fine to Medium Sand					SP. GRAVITY, Gs :	2.70
LIQUID LIMIT, % :	26	PLASTICITY INDEX , % :	9	MOISTURE , % :	16.9	FINES , % :	44.9
D10 , MM :	-	D30 , MM :	-	D60 , MM :	0.18	COEFF. OF CURVATURE , C_C :	-
CLASSIFICATION		UNIFIED :	SC	AASHTO :	A-4(1)	COEFF. OF UNIFORMITY , C_U :	-



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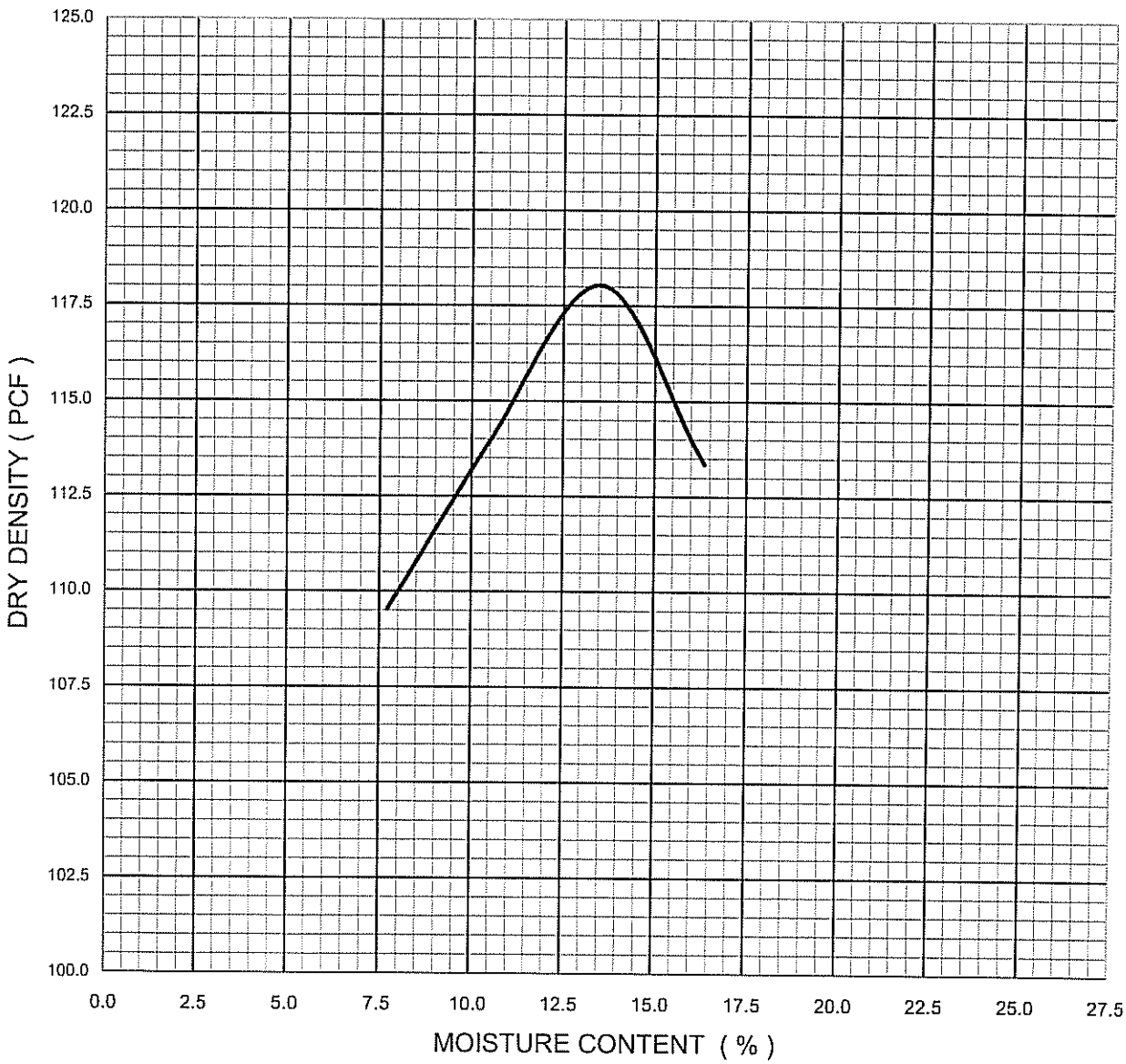
PROPERTY SCIENCES

MOISTURE / DENSITY RELATIONSHIPS OF SOIL
(AASHTO T-99)

JOB NAME :	S-103 (Oak Park Road) - RBO Fishing Creek; File No. 46.169B.1; Project No. BR-BR46 (012); PIN No. 31919						
CLIENT :	SCDOT Research & Materials Laboratory						
JOB NO. :	7272O	REPORT NO. :	115235	DATE :	02/21/07	REVIEWED BY :	KBF
BORING / PIT NO. :	-	DEPTH / ELEV. :	0 - 5'	SAMPLE NO. :	BS-1		
SAMPLE LOCATION :	Station: 64+00; 3 Feet Left of Proposed Centerline						
SOIL DESCRIPTION :	Dark Brown Clayey Fine to Medium Sand						
LIQUID LIMIT , % :	26	PLASTICITY INDEX , % :	9			FINES , % :	44.9
CLASSIFICATION :		USCS :	SC	AASHTO :	A-4(1)		
PROCTOR TYPE :	STANDARD	PROCEDURE :	A	OVERSIZE , % :	-	IN-SITU M .C . :	16.9
UNCORRECTED MAXIMUM DRY DENSITY , PCF :			118.1	CORRECTED MAXIMUM DRY DENSITY , PCF :			-
UNCORRECTED OPTIMUM MOISTURE CONTENT ,% :			13.4	CORRECTED OPTIMUM MOISTURE CONTENT ,% :			-



DISTRIBUTION :

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TRIAXIAL SHEAR TEST REPORT

(ASTM D 4767)

REV4,1/13/04

AASHTO R18

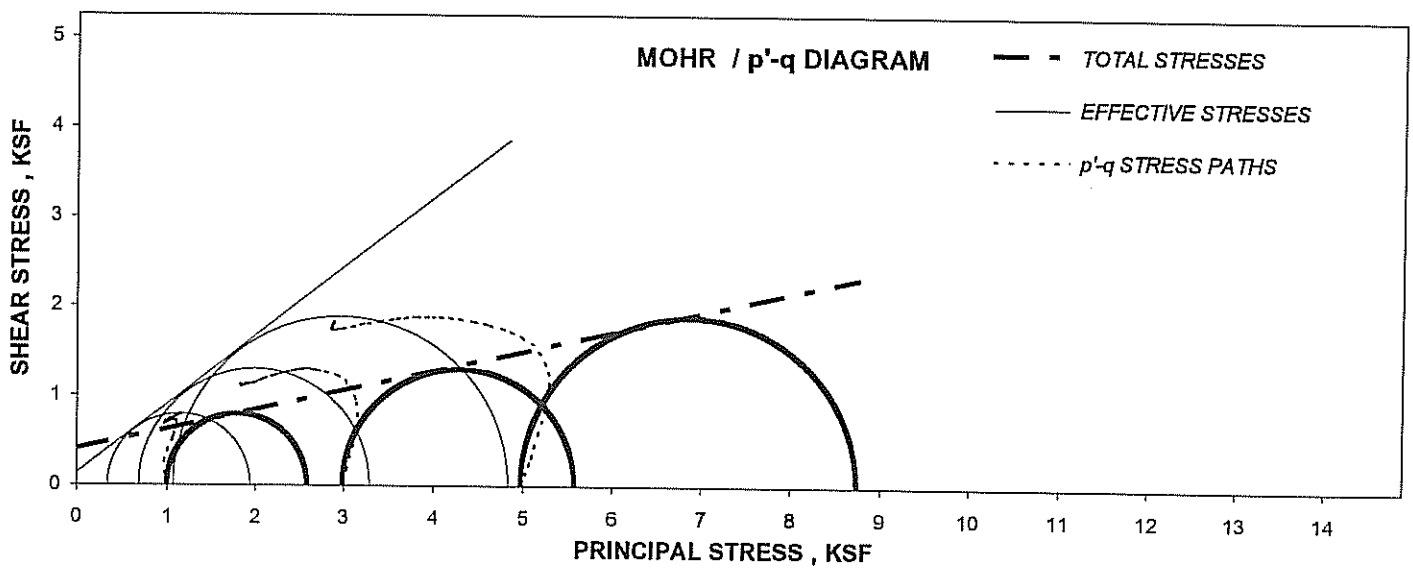
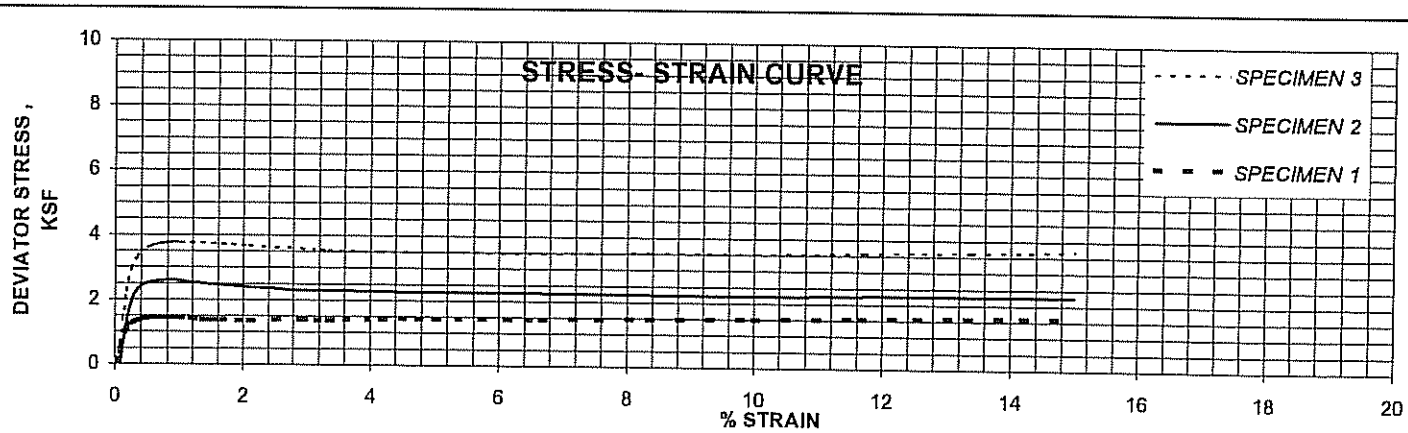
JOB NAME:	S-103 (Oak Park Road) - RBO Fishing Creek; File No. 46.169B.1; Project No. BR-BR46 (012); PIN No. 31919						
JOB NO.:	7272O	REPORT NO. :	115235	REVIEWED BY :	KBF	DATE:	2/26/07
BORING / PIT NO. :	-	DEPTH / ELEV. :	0 - 5'	SAMPLE NO . :	BS-1	TYPE:	Bulk
SAMPLE LOCATION :	Station: 64+00; 3 Feet Left of Proposed Centerline						
SOIL DESCRIPTION :	Dark Brown Clayey Fine to Medium Sand						
LL, % :	26	PI , % :	9	FINES, % :	44.9	G_s :	2.70

SPECIMEN PROPERTIES								
	INITIAL				AFTER CONSOLIDATION			
SPECIMEN NO.		1	2	3		1	2	3
DIAMETER , INCHES	D_o	2.82	2.82	2.82	D_c	2.81	2.80	2.79
HEIGHT , INCHES	H_o	6.03	6.03	6.03	H_c	6.01	5.99	5.98
WATER CONTENT, %	W_o	13.4	13.4	13.4	W_c	18.1	17.3	17.0
DRY DENSITY, PCF	γ_{dryo}	112.5	112.5	112.5	γ_{dryc}	113.2	114.8	115.5
SATURATION ,%	S_o	72.7	72.8	72.8	S_c	95.1	93.6	92.2
VOID RATIO	e_o	0.498	0.497	0.497	e_c	0.489	0.468	0.459

TEST PARAMETERS , TEST TYPE : CU/PP				
SPECIMEN NO.		1	2	3
B Value		0.95	0.95	0.95
BACK PRESSURE, ksf	U_o	8.6	8.6	8.6
CONFINING PRESSURE , ksf	σ_3	1.0	3.0	5.0
MAX. DEVIATOR STRESS ,ksf	σ_1-σ_3	1.6	2.6	3.8
ULT. DEVIATOR STRESS , ksf	σ_1-σ_3	1.6	2.3	3.7
Specimen Shape @ Failure	Bulged			

CONTROLLED : Strain @ 0.37 % per minute T50, Minutes = 1.07

PROCTOR TYPE : *Standard*, MAXIMUM DRY DENSITY , PCF : *118.1* ,OPTIMUM MOISTURE CONTENT , % : *13.4*

REMOLDED : ***Specimens were remolded to 95 % of maximum dry density at about 0.0 % wet of o.m.c.***

SHEAR STRENGTH PARAMETERS	TOTAL		EFFECTIVE	
	COHESION , C (ksf) :	0.4	APPARENT COHESION , (ksf) :	0.1
	ANGLE OF INTER. FRICTION, Φ(DEGREES)	12	ANGLE OF INTER. FRICTION, Φ' (DEGREES) :	38