BRIDGE AND RETAINING WALL
FOUNDATION INVESTIGATION REPORT
Dupree Road over I-575
Northwest Corridor Project
GDOT Project No. CSNHS-0008-00(256), PI No. 0008256
Cherokee County, Georgia

WILLMER ENGINEERING INC.
Project No. ATL-171-3099G

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Revision: 1
Issue Date: August 22, 2008
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Prepared For

GEORGIA TRANSPORTATION PARTNERS
Atlanta, Georgia

Prepared By

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August 22, 2008

VIA COURIER

Pete M. McMahon, PE
Georgia Transportation Partners
c/o PBS&J, Inc.
5665 New Northside Drive
Suite 400
Atlanta, Georgia 30328

SUBJECT: Bridge and Retaining Wall Foundation Investigation Report
Dupree Road over I-575
Northwest Corridor Project
GDOT Project No. CSNHS-0008-00(256), PI No. 0008256
Cherokee County, Georgia
Willmer Project No. ATL-171-3099G

Dear Mr. McMahon:

Willmer Engineering Inc. (Willmer) is pleased to provide this Bridge and Retaining Wall Foundation Investigation (BFI and WFI) report for the proposed widening of Dupree Road bridge over I-575 in Cherokee County, Georgia. The BFI and WFI were performed in general accordance with our contract with Georgia Transportation Partners (GTP), dated May 12, 2007. The objective of this investigation was to gather sufficient geotechnical information to support the costing plans to be developed by GTP. Additional borings will be performed in the design/build phase of the project to provide additional information as required. This report was prepared in general accordance with Georgia Department of Transportation (GDOT) guidance documents for bridge and retaining wall foundation investigations. This report was revised to incorporate GTP comments dated January 29, 2008, and GDOT comments dated July 18, 2008.

The attached summary presents the site and subsurface conditions along the proposed bridge and retaining wall alignments, and our geotechnical recommendations related to foundation design and construction.

We appreciate the opportunity to be of service to you on this project and look forward to a continuing relationship. Please contact us if you have any questions concerning this report or require further assistance.

Sincerely,

WILLMER ENGINEERING INC.

Murthy S. Kotha
Project Engineer

Sujit K. Bhowmik, PhD, PE
Chief Engineer

James L. Willmer, PE
Executive Vice President/Principal Consultant

MSK/SKB/JLW:ks
I:\Word Processing\Projects\171-GEO\171-3099 Northwest Corridor Project (Bechtel)\Reports\3099 G - Dupree Road\171-3099G - REVISED BFI Report - Dupree Road 8-22-08.doc

Attachments: **Bridge and Retaining Wall Foundation Investigations**

Figures

Figure 1	Project Location Map
Figure 2A	Boring Location Plan (Bridges)
Figure 2B	Boring Location Plan (MSE Walls)
Figure 2C	Boring Location Plan (MSE Walls)
Figure 3	Generalized Subsurface Profile Section A-A'
Figure 4	Generalized Subsurface Profile Section B-B'
Figure 5A	Generalized Subsurface Profile Section C-C' (South)
Figure 5B	Generalized Subsurface Profile Section C-C' (North)
Figure 6	Generalized Subsurface Profile Section D-D' (Wall No. 16)

Appendix I

Boring Record Legend
Unified Soil Classification System Reference Sheet
Engineering Description of Rock Hardness
Boring Records: BB-1 through BB-3, and W-1 through W-12 (New Borings)
Laboratory Test Results

Appendix II

Boring Records: B-2, B-5 and B-7 (Borings from Existing GDOT BFI Report)
Pile Driving Data and As-Built Bridge Foundation Reports (for Existing Bridge)

Revision History:

Revision	Issue Date	Document Status
A	January 14, 2008	Issued for Review
0	January 29, 2008	Issued for Use
1	August 22, 2008	Issued for Use

BRIDGE FOUNDATION INVESTIGATION	
Willmer Project Number	ATL-171-3099G
GDOT Project Number	CSNHS-0008-00(256)
Project P.I. Number	0008256
Location	Dupree Road Bridge over I-575, Cherokee County, Georgia (See Figure 1).
GENERAL INFORMATION	
Project Description	The existing Dupree Road bridge over I-575 is planned to be replaced with two new bridges as part of the proposed I-575 widening project. The bridges will be single-span with lengths of about 132 and 111 feet for the West Bridge and East Bridge, respectively. New high occupancy vehicle (HOV) ramps from I-575 up to Dupree Road will be constructed between the two bridges. The existing bridge has two spans and is supported on H-pile bents at the end bents and an H-pile footing at the intermediate bent. The BFI report, pile driving data and as-built bridge foundation reports for the existing bridge were obtained from GDOT, and the report includes three borings performed by GDOT in 1980. Subsurface information from those three borings was used along with three new borings performed as part of the present study.
Geologic Information	The project alignment is geologically sited within the Piedmont Physiographic Province of Georgia, and is underlain by Metamorphosed Maffic Rock Formations which include amphibolite, hornblende gneiss and biotite gneiss.
Subsurface Features	Subsurface information for this project was obtained from three borings (BB-1 through BB-3) performed by Willmer as part of the present study (see Appendix I) and three borings (B-2, B-5 and B-7) performed by GDOT in 1980 as part of the BFI for the existing bridges (see Appendix II). The subsurface profile is generally comprised of fill and residuum underlain by partially weathered rock and parent bedrock. Boring BB-2 did not encounter any fill. It should be noted that the available logs for the GDOT borings B-2, B-5 and B-7 do not differentiate between fill and residuum in the soil description. The fill material consists of loose to medium dense silty sand. The residual soils consist of very loose to medium dense silty sand. During the present field investigation, ground water was encountered at all boring locations between elevations 879 and 881 feet, and during the field investigation by GDOT in 1980, ground water was encountered between elevations 887 and 895 feet.

PWR AND AUGER REFUSAL ELEVATIONS (feet)

Bridge	Bent No.	Reference Boring No.	Top of PWR	Auger Refusal
West	1	BB-1	871	864
		B-2	*	855
	2	B-5	*	854
		BB-2	868	864
East	1	BB-3	869	867
	2	B-7	*	838

* Boring did not encounter PWR.

MAXIMUM PILE DESIGN LOADS

Pile Type	Load Transfer (%)		Design Load
	Friction	End Bearing	
H-Piles	10	90	10 BP 42 = 55 Tons
			12 BP 53 = 70 Tons
			14 BP 73 = 96 Tons
			14 BP 89 = 117 Tons

FOUNDATION RECOMMENDATIONS

Bridge	Bent No.	Pile Footing (Type)	Pile Bent (Type)
West	1		H
	2		H
East	1		H
	2		H

PILE TIP ELEVATIONS (feet)

Bridge	Bent No.	Reference Boring No.	H-Pile	
			Minimum Tip	Estimated Tip
West	1-Left	BB-1	864±	864±
	1-Right	B-2, BB-2	857±	857±
	2-Left	BB-1, B-5	857±	857±
	2-Right	BB-2	864±	864±
East	1-Left	BB-3	867±	867±
	1-Right	BB-2, B-7	865±	845±
	2	B-7	850±	845±

NOTES

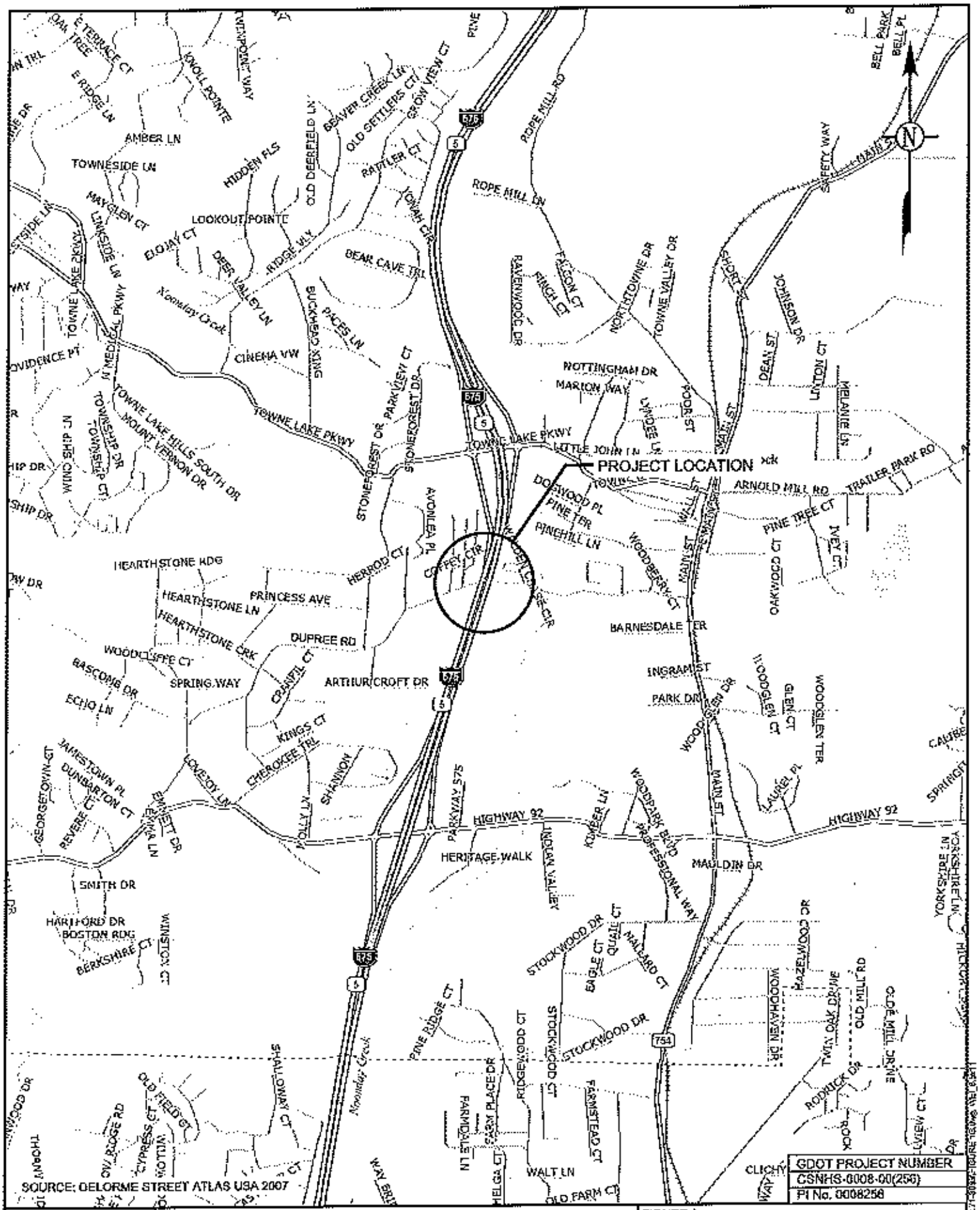
Elevations	All elevations referenced in this report are based on Control Points No.121 (1/2" rebar, EL. 891.33 feet), No. 874 (SPUR 60 T, EL. 889.21 feet), No. 4542 (5/8" rebar, EL. 891.67 feet), No. 9200 (5/8" rebar, EL. 890.07 feet) and No. 9571 (EL. 928.28 feet) established by the surveyors.
PDO	Driving resistance after Minimum Tip Elevations are achieved.

Points	Pile points are recommended for piles driven at all bents to insure adequate penetration through/into PWR. The use of points should be at the direction of the project Geotechnical Engineer.
Down-Drag Protection	To avoid inducing down-drag loads onto the piles from potential settlement of the very loose and loose silty sand layers during construction of the MSE wall, we recommend that the piles at all bents be protected from down-drag by using Jackets or other approved measures.
Waiting Period	None required (see MSE wall recommendations)
Special Problems	None.
As-Built Information	As-built information should be forwarded to the Geotechnical Engineering Bureau upon completion of the foundation system.

RETAINING WALL INVESTIGATION	
Location and Description	Four MSE walls are proposed for the bridge abutments and new HOV ramps from I-575 up to Dupree Road. Wall Nos. 14 and 15 extend from Station 554+00 along the two sides of the proposed HOV ramp to Station 571+90, i.e., to the beginning of the proposed I-575 bridge over Noonday Creek (North) (see Figures 2B and 2C). Wall No. 16 forms the abutment and wing walls at Bent 1 of the West Bridge and Wall No. 17 forms the abutment and wing walls at Bent 2 of the East Bridge. The total length of each of Wall Nos. 14 and 15 is 1790 feet, and the lengths of Wall Nos. 16 and 17 are about 900 and 187 feet, respectively. The maximum height of Wall Nos. 14 and 15 is about 34 feet (at Station 562+15) with bottom elevations ranging from 887 to 891 feet and top elevations ranging from 900 to 921 feet. The maximum height of Wall No. 16 is about 28 feet (at Station 561+45) with bottom elevations ranging from 887 to 890 feet and top elevations ranging from 891 to 915 feet. The maximum height of Wall No. 17 is about 24 feet (at Station 562+45) with bottom elevation of 887 feet and top elevations ranging from 893 to 911 feet.
Subsurface Features	The subsurface profile (see Figures 5A, 5B and 6 and boring logs for W-1 through W-12, BB-1 through BB-3 and B-7) along the proposed walls is comprised of fill and residuum underlain by partially weathered rock (PWR) and parent bedrock. Fill material was not encountered at some of the boring locations. The fill consists of loose to medium dense silty sand and/or very soft to very stiff sandy silt/clay. The residual soils consist of very loose to very dense silty sand and firm to hard sandy silt underlain by partially weathered rock. During the present field investigation, ground water was encountered at borings BB-1 through BB-3, W-1 through W-6 and W-12 between elevations 876 and 885 feet. During the field investigation by GDOT in 1980, ground water was encountered between elevations 887 and 895 feet. It should be noted that the present borings were performed during an extended dry period, and ground water may be encountered at a higher elevation during construction.
Soil Parameters	The following soil design parameters are recommended for use for the proposed retaining walls: Soil Unit Weight γ = 125 pcf Cohesion c = 0 psf Angle of Internal Friction ϕ = 28 degrees Coefficient of Sliding Friction μ = 0.40 (MSE Walls) Coefficient of Sliding Friction μ = 0.35 (Cantilever Retaining Wall) The above design parameters assume the backfill material behind the retaining wall (or MSE wall reinforced fill) to consist of silty sand compacted to the specified density, and the subgrade prepared as recommended below.

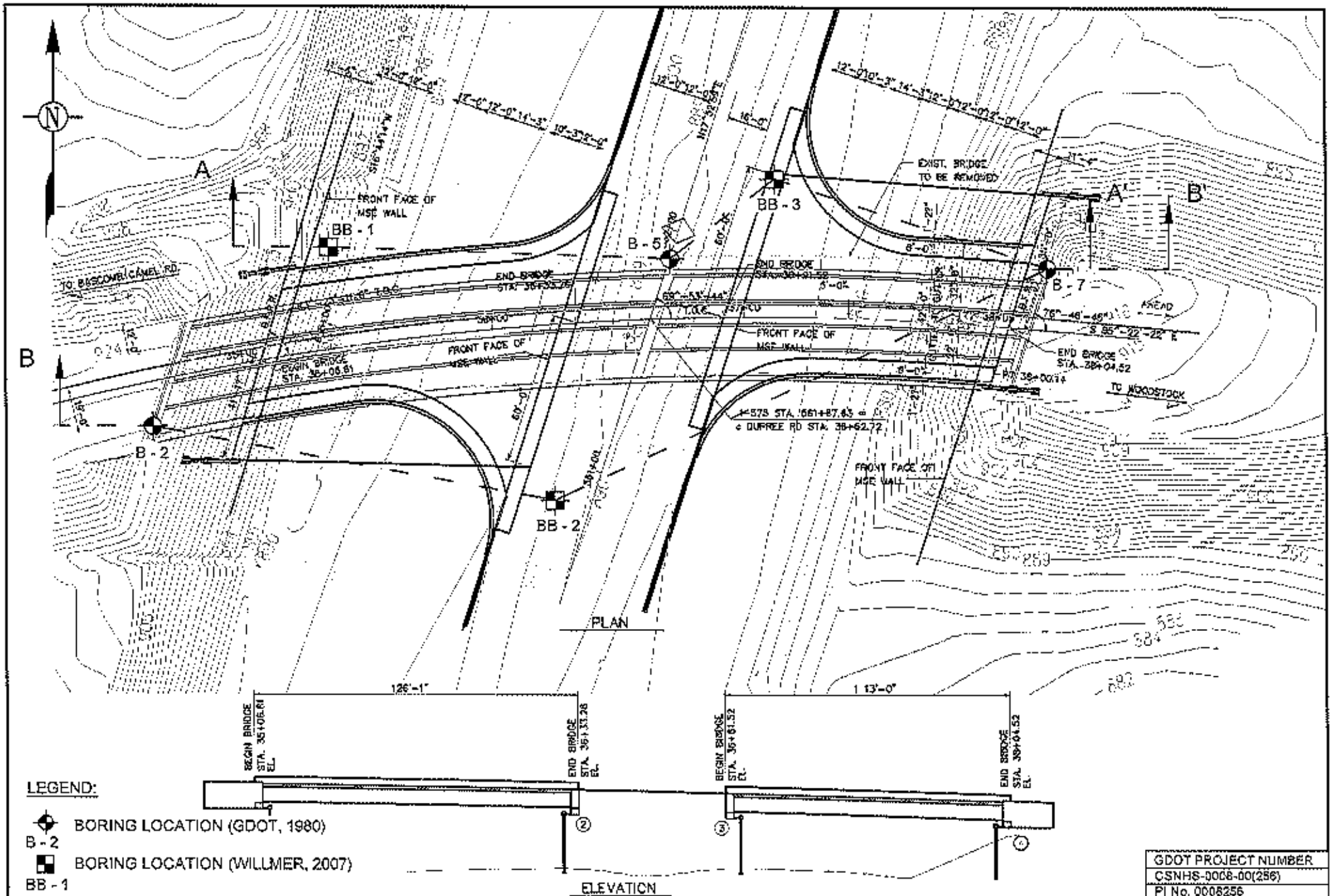
Recommendations	Based on the available boring data in the vicinity of the proposed walls, the soil type and strength along the walls are expected to vary significantly. The following steps are recommended for the walls: (i) Any soft/loose soils from beneath the wall should be over-excavated and replaced with compacted wall backfill material. The depth and extent of over-excavation should be determined by the project Geotechnical Engineer. (ii) Allowable Bearing Pressures: **Wall Nos. 14, 15, 16 (from Station 560+50 to 561+50) and 17**: For Wall Nos. 14, 15, 16 (from Station 560+50 to 561+50) and 17, we recommend a maximum allowable bearing pressure of 2,000 psf for use in design. However, at the location of the maximum wall height, the design bearing pressure will likely exceed the maximum allowable bearing pressure. Therefore, we recommend that the MSE walls be constructed in two stages. In the first stage, the wall should be constructed to half of its final height. A minimum 30-day waiting period should be allowed after the first stage before beginning the second stage of construction. Settlement of the MSE walls should be monitored upon completion of the first stage of construction. The length of the waiting period may be increased or decreased based on the settlement monitoring data, at the discretion of the project Geotechnical Engineer. After the waiting period, the MSE wall should be constructed to the final height. **Wall No. 16 (from Station 556+00 to 560+50 and 561+50 to 565+00)**: For the cut portion of Wall No. 16 (from Stations 556+00 to 560+50 and 561+50 to 565+00), we recommend an allowable bearing pressure of 3,000 psf for use in design. Although ground water was not encountered above the proposed wall bottom in our borings (drilled during an extended dry period), ground water may be encountered during construction of Wall No. 16. If ground water is encountered during construction, dewatering measures should be used to maintain the ground water level at least two feet below the retaining wall subgrade. It is also recommended that the cut portion of the wall (i.e., from Station 556+00 to 560+50 and from 561+50 to 565+00) be designed with a ground water elevation of 895 feet behind the wall. (iii) The backfill materials and drainage measures for the retaining walls should conform to GDOT standard specifications.
Prepared By	Murthy S. Kotha / Sujit K. Bhowmik, PhD, PE
Senior Review By	James L. Willmer, PE

FIGURES



GDOT PROJECT NUMBER
CSNHS-0008-00(256)
PI No. 0008256

SCALE: 1" = 2000'	WE	GEOTECHNICAL ENGINEERING CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270
DATE: 1/9/2008		FIGURE 1 PROJECT LOCATION MAP DUPREE ROAD OVER I-575 NORTHWEST CORRIDOR PROJECT CHEROKEE COUNTY, GEORGIA WILLMER PROJECT No. ATL-171-3099G
DRAWN BY: MDB		
REVIEWED BY: MK		



LEGEND:

B - 2 BORING LOCATION (GDOT, 1980)

BB - 1 BORING LOCATION (WILLMER, 2007)

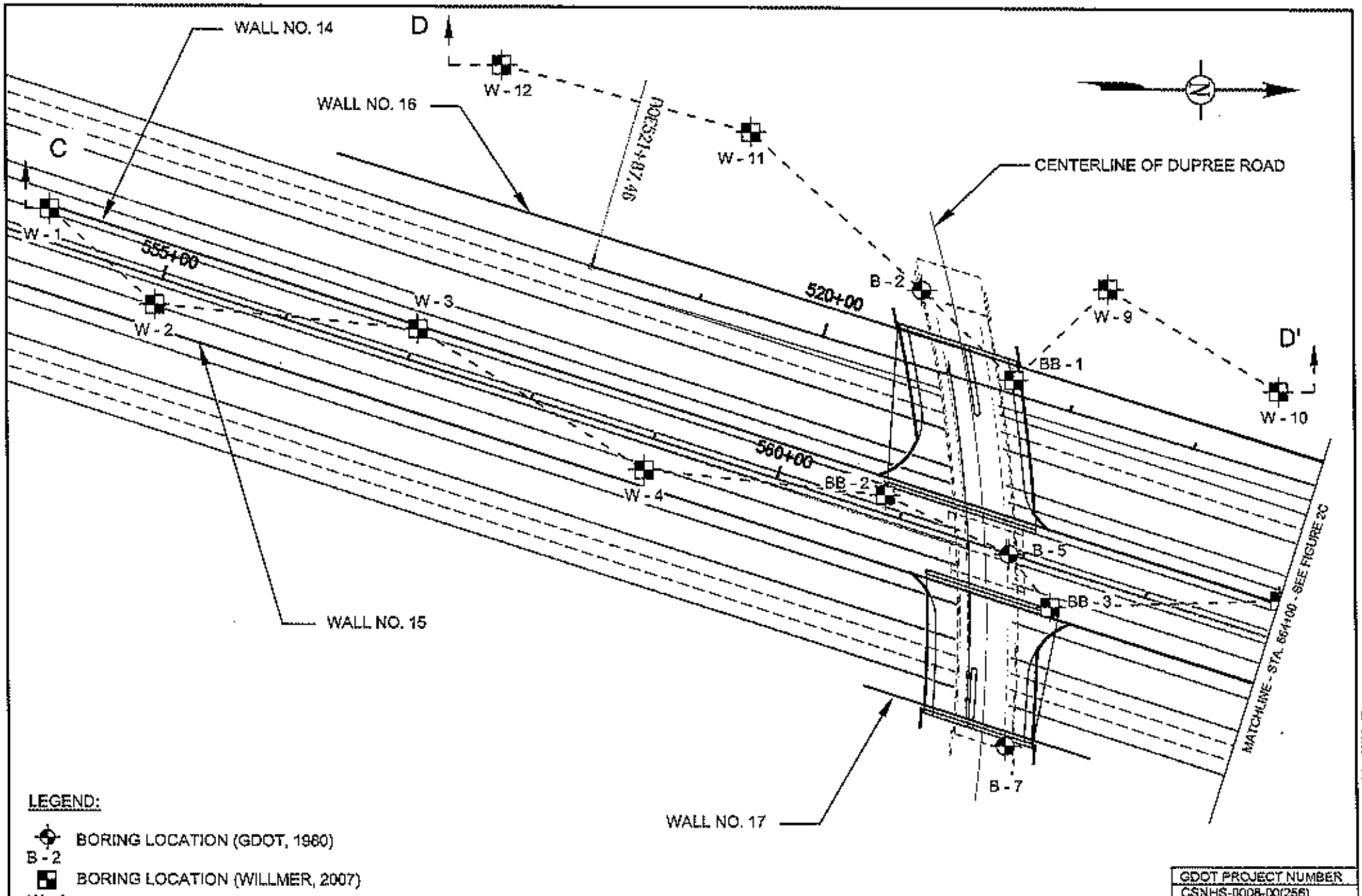
GDOT PROJECT NUMBER
CSNHS-0008-00(256)
PI No. 0008256

SCALE: 1" = 50'	
DATE: 6/3/2008	
DRAWN BY: CBS	
REVIEWED BY: MK	

WILLMER ENGINEERING INC.

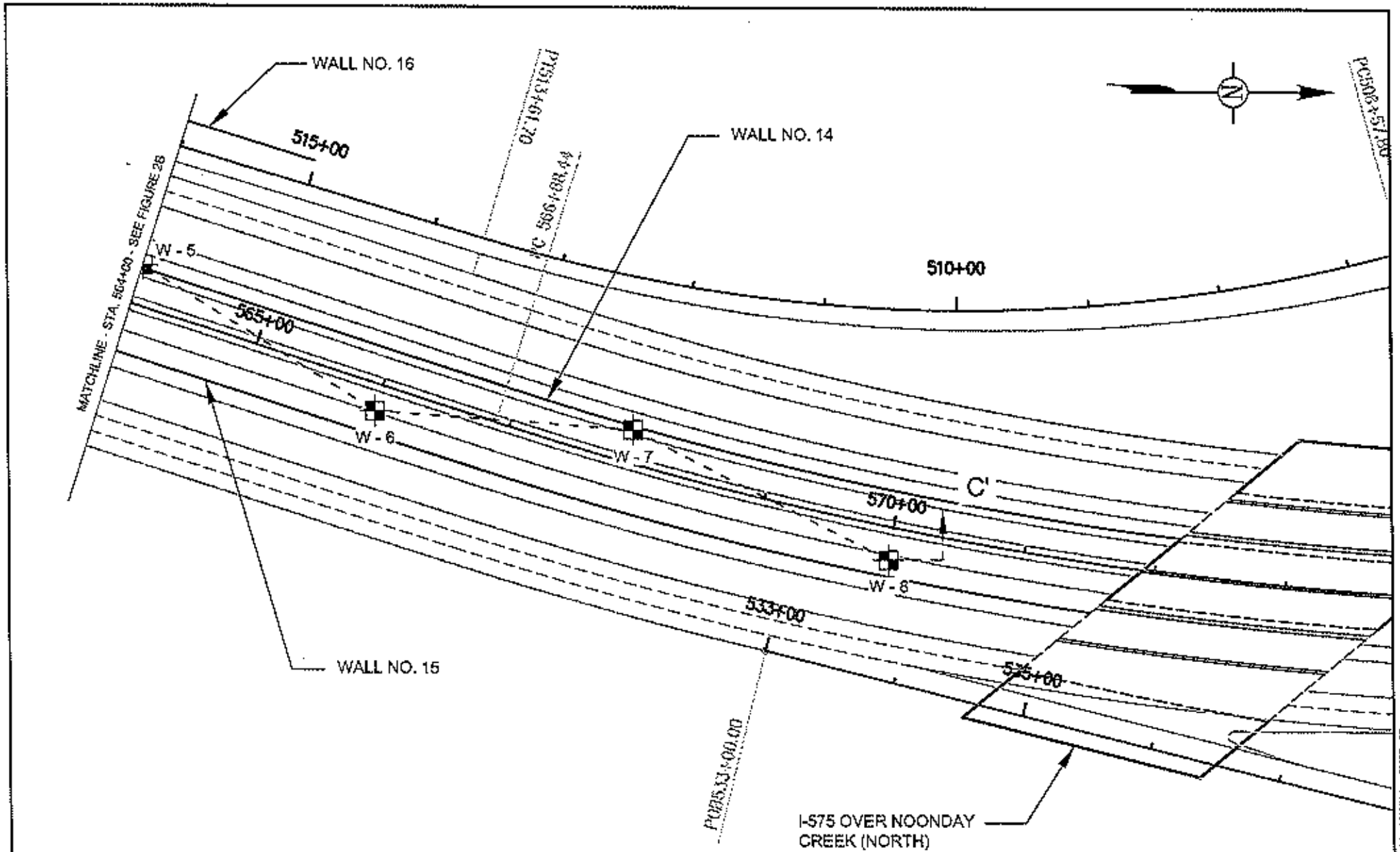
GEOTECHNICAL ENGINEERING • CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 185
ATLANTA, GA 30340-4270

FIGURE 2A
BORING LOCATION PLAN (BRIDGES)
DUPREE ROAD OVER I-575
NORTHWEST CORRIDOR PROJECT
CHEROKEE COUNTY, GEORGIA
WILLMER PROJECT No. ATL-171-3099G



GDOT PROJECT NUMBER
CSNHS-0008-00(256)
PI No. 0008256

SCALE: 1" = 100'	WILLMER ENGINEERING, INC.	WE	GEOTECHNICAL ENGINEERING & CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 5772 PLEASANTDALE ROAD - SUITE 185 ATLANTA, GA 30340-4250
DATE: 1/9/2008			FIGURE 2B BORING LOCATION PLAN (MSE WALLS) DUPREE ROAD ROAD OVER I-575 NORTHWEST CORRIDOR PROJECT CHEROKEE COUNTY, GEORGIA WILLMER PROJECT No. ATL-171-3099G
DRAWN BY: MDB			
REVIEWED BY: MK			



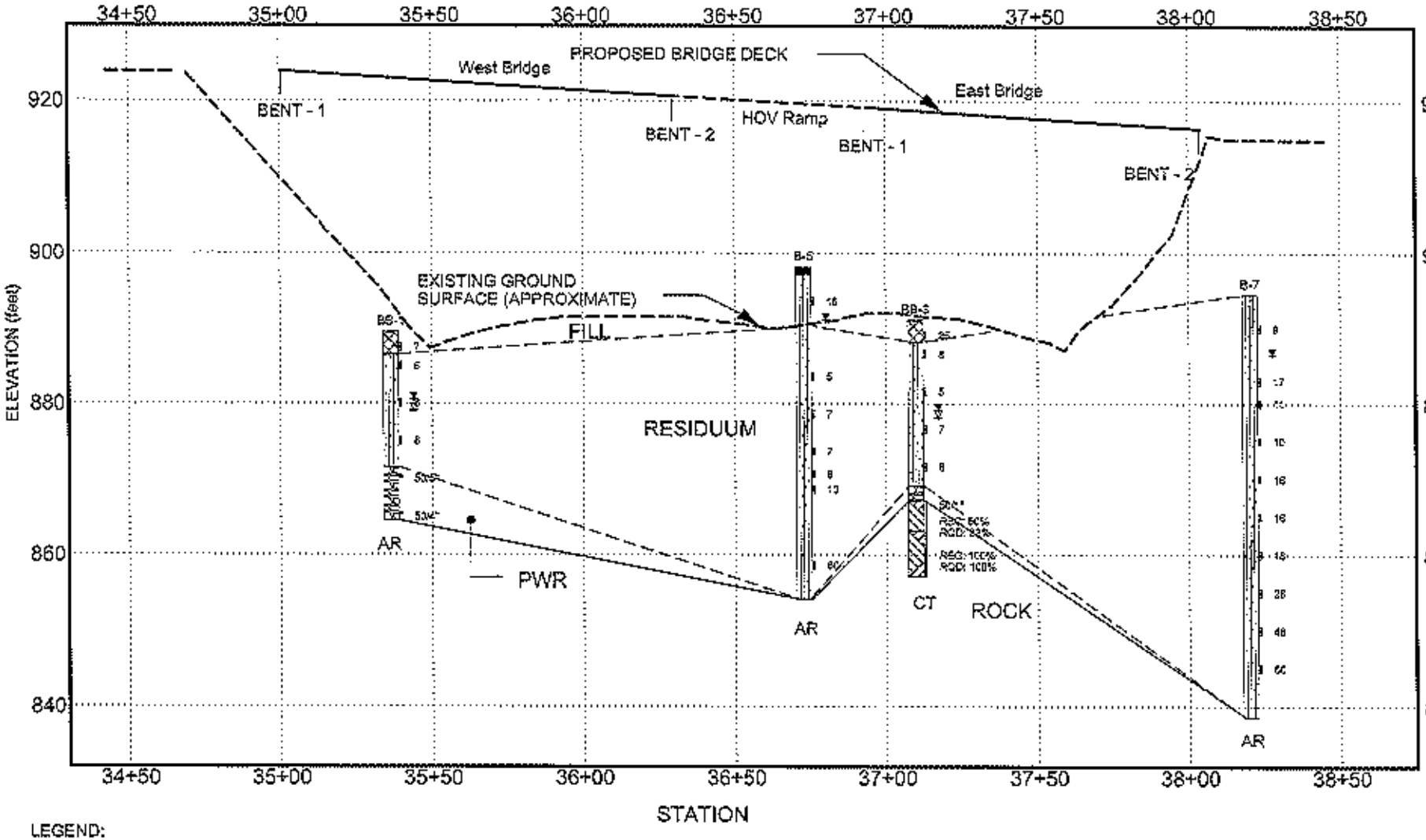
LEGEND:

W - 5 BORING LOCATION (WILLMER, 2007)

GDOT PROJECT NUMBER
CSNHS-0008-00(256)
PI No. 0008256

SCALE: 1" = 100'	WILLMER ENGINEERING INC. WE	GEOTECHNICAL ENGINEERING • CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270
DATE: 1/10/2008		
DRAWN BY: MDB		
REVIEWED BY: MK		

FIGURE 2C
BORING LOCATION PLAN (MSE WALLS)
DUPREE ROAD ROAD OVER I-575
NORTHWEST CORRIDOR PROJECT
CHEROKEE COUNTY, GEORGIA
WILLMER PROJECT No. ATL-171-3099G



LEGEND:
- Groundwater Table @ 24 hours
- Groundwater Table @ Time of Boring
AR - Auger Refusal
CT - Coring Terminated
PWR - Partially Weathered Rock
REC - Recovery
RQD - Rock Quality Description

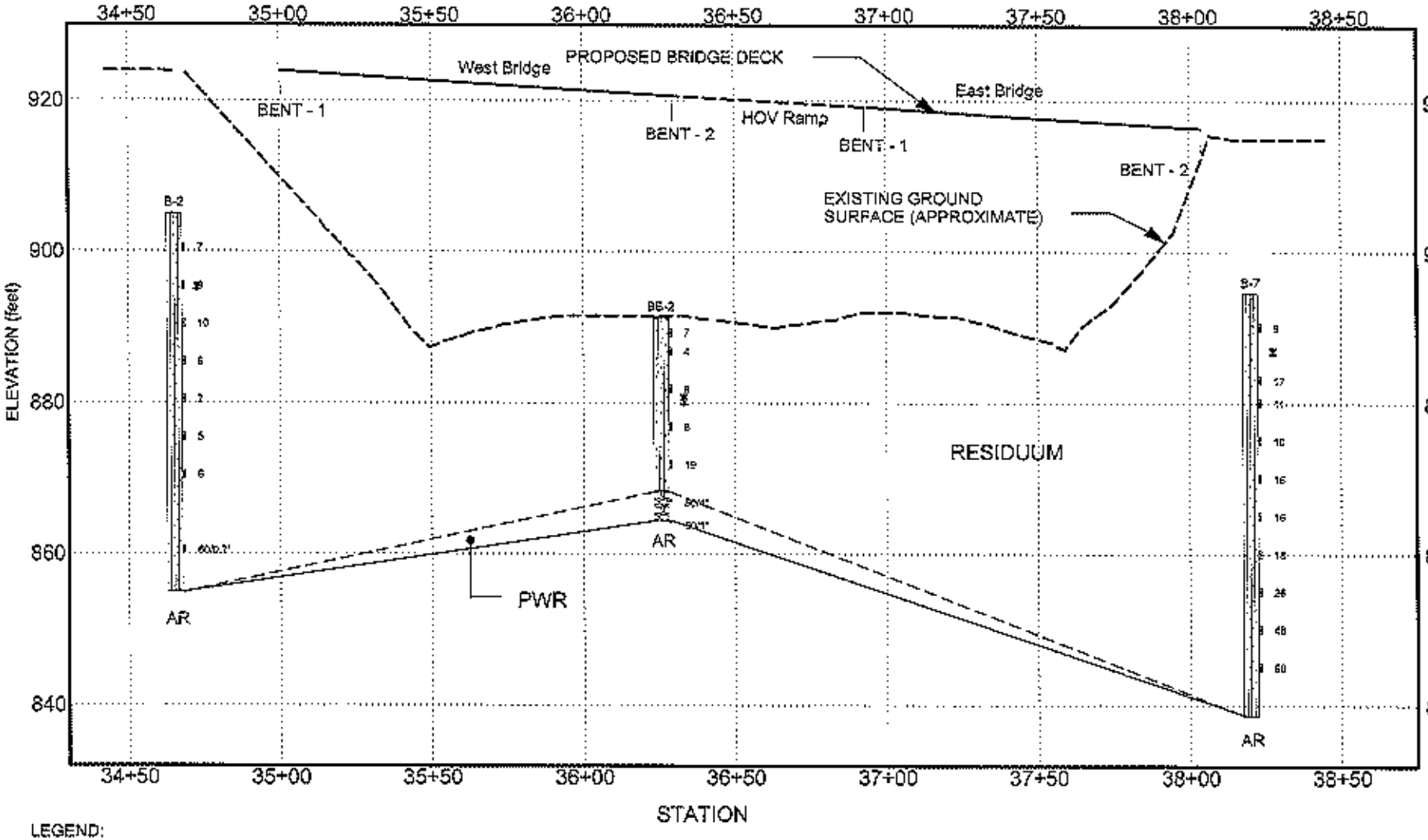
SCALE : 1 inch = 20 feet (vertical)
1 inch = 50 feet (horizontal)

Note: Borings B-5 and B-7 were drilled by GDOT in 1980.

GENERALIZED SUBSURFACE PROFILE
SECTION A-A'

Dupree Road over I-575
GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256
Cherokee County, Georgia

PROJECT #	DATE	FIGURE
171-3099G	Jan 09, 2008	3



LEGEND:
- Groundwater Table @ 24 hours
- Groundwater Table @ Time of Boring
AR - Auger Refusal
PWR - Partially Weathered Rock

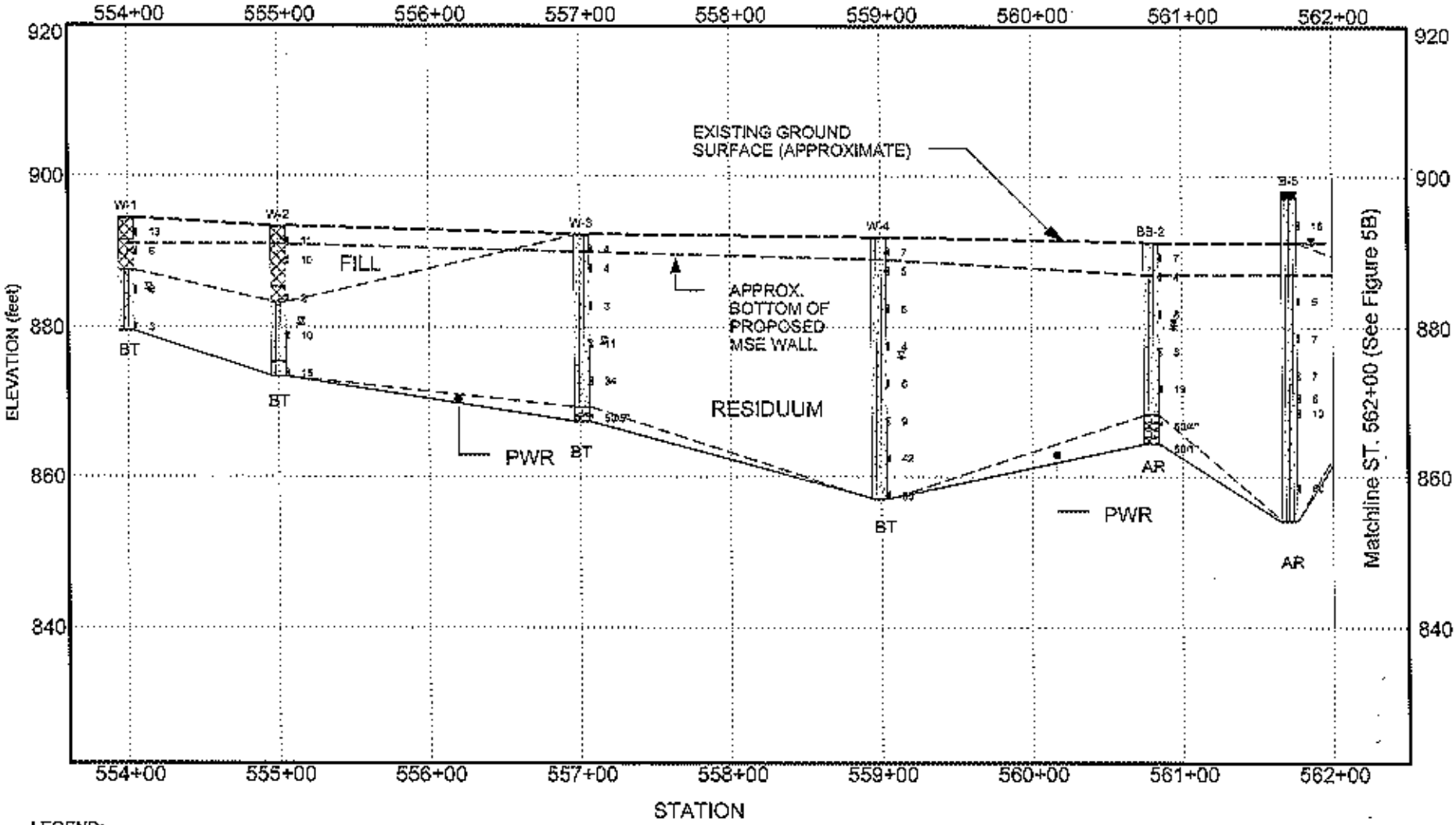
SCALE : 1 inch = 20 feet (vertical)
1 inch = 50 feet (horizontal)

Note: Borings B-2 and B-7 were drilled by GDOT in 1980.

GENERALIZED SUBSURFACE PROFILE
SECTION B-B'

Dupree Road over I-575
GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256
Cherokee County, Georgia

PROJECT #	DATE	FIGURE
171-3099G	Jan 09, 2008	4



LEGEND:
- - Groundwater Table @ 24 hours
- - Groundwater Table @ Time of Boring
AR - Auger Refusal
BT - Boring Terminated
PWR - Partially Weathered Rock

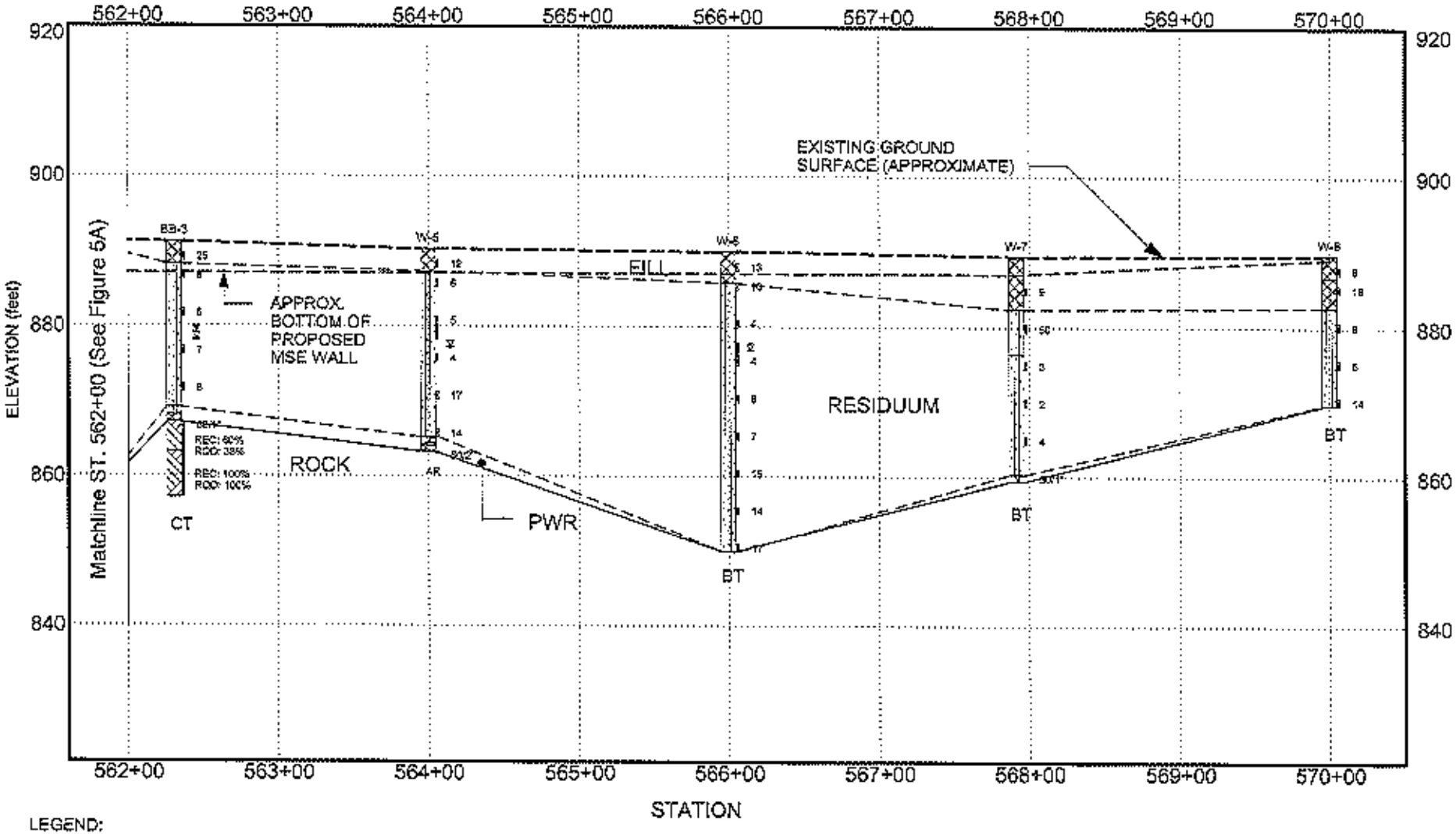
SCALE : 1 inch = 20 feet (vertical)
1 inch = 100 feet (horizontal)

Note: Boring B-5 was drilled by GDOT in 1980.

GENERALIZED SUBSURFACE PROFILE
SECTION C-C' (SOUTH)

Dupree Road over I-575
GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256
Cherokee County, Georgia

PROJECT #	DATE	FIGURE
171-3099G	Jan 09, 2008	5A



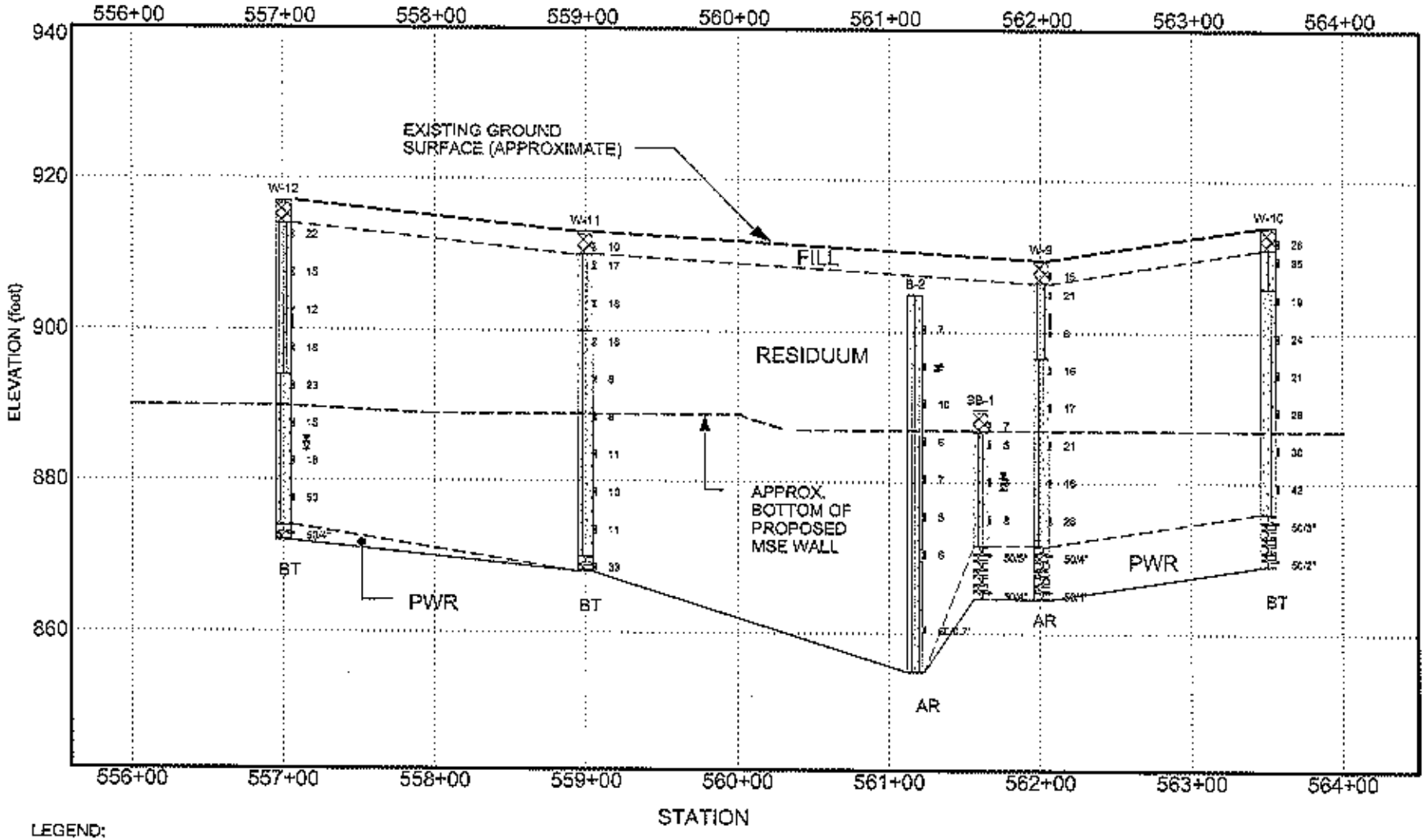
LEGEND:
- Groundwater Table @ 24 hours
- Groundwater Table @ Time of Boring
AR - Auger Refusal
BT - Boring Terminated
CT - Coring Terminated
PWR - Partially Weathered Rock
REC - Recovery
RQD - Rock Quality Description

SCALE : 1 inch = 20 feet (vertical)
1 inch = 100 feet (horizontal)

GENERALIZED SUBSURFACE PROFILE
SECTION C-C' (NORTH)

Dupree Road over I-575
GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256
Cherokee County, Georgia

PROJECT #	DATE	FIGURE
171-3099G	Jan 09, 2008	5B



LEGEND:
- Groundwater Table @ 24 hours
- Groundwater Table @ Time of Boring
AR - Auger Refusal
BT - Boring Terminated
PWR - Partially Weathered Rock

SCALE : 1 inch = 20 feet (vertical)
1 inch = 100 feet (horizontal)

Notes:
1. Boring B-2 was drilled by GDOT in 1980.
2. Boring BB-1 was drilled from I-575 which is at a lower elevation than the other boring locations.

GENERALIZED SUBSURFACE PROFILE
SECTION D-D' (Wall No. 16)

Dupree Road over I-575
GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256
Cherokee County, Georgia

PROJECT #	DATE	FIGURE
171-3099G	Jan 09, 2008	6

APPENDIX I

BORING RECORD LEGEND

SM, CL, etc: - GROUP SYMBOL based on Unified Soil Classification System.
(Refer to ASTM D-2488 and Table 1 of D-2487)

N-VALUE: BLOWS PER FOOT- Standard Penetration Resistance (SPT) blow count, the sum of the second and third 6-inch increments of the SPT test.
(Refer to ASTM D-1586)

CONSISTENCY / RELATIVE DENSITY Correlated with SPT Blow Count, N:

SILTS AND CLAYS

N (blows per foot)	Consistency
0 - 2	Very Soft
3 - 4	Soft
5 - 8	Firm
9 - 15	Stiff
16 - 30	Very Stiff
31 - 50	Hard
> 50	Very Hard

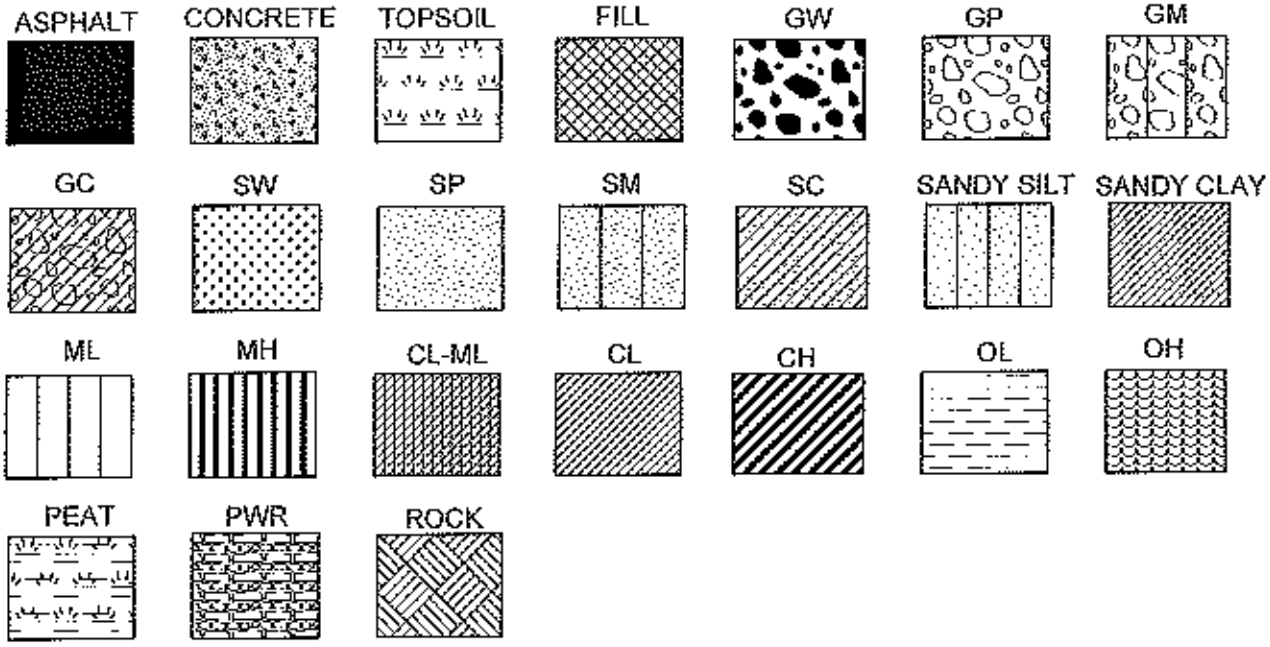
SANDS

N (blows per foot)	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
> 50	Very Dense

NOTES:

Groundwater Measurements:

- ▼ Water level at time of backfilling
- ▽ Water level at time of boring
- ▣ Caved level at 24 hours



WILLMER ENGINEERING INC. WE

Willmer Engineering Inc.
3772 Pleasantdale Road, Suite 165
Atlanta, Georgia 30340

UNIFIED SOIL CLASSIFICATION SYSTEM REFERENCE SHEET

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED #4 SIEVE	CLEAN GRAVELS LITTLE OR NO FINES	(GW)	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			(GP)	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES APPRECIABLE AMOUNT OF FINES	(GM)	SILTY GRAVELS and GRAVEL-SAND-SILT MIXTURES
			(GC)	CLAYEY GRAVELS and GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING #4 SIEVE	CLEAN SAND LITTLE OR NO FINES	(SW)	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			(SP)	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES APPRECIABLE AMOUNT OF FINES	(SM)	SILTY SANDS and SAND-SILT MIXTURES
			(SC)	CLAYEY SANDS and SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		(ML)	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR VERY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			(CL)	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			(OL)	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		(MH)	INORGANIC ELASTIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS
			(CH)	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			(OH)	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			(PT)	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

WIDMER ENGINEERING INC. WE

ENGINEERING DESCRIPTION OF ROCK HARDNESS

Hardness	Description
Very hard	Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows of geologist's pick.
Hard	Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.
Moderately hard	Can be scratched with knife or pick. can be excavated by hard blow of point of a geologist's pick. Hand specimens can be detached by moderate blow.
Medium	Can be grooved or gouged 1/16 inch deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1 inch maximum size by hard blows of the point of a geologist's pick.
Soft	Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.
Very soft	Can be carved with knife. Can be excavated readily with point of pick. Pieces 1 inch or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.
Partially Weathered Rock	For engineering purposes, partially weathered rock (PWR) is locally defined as residual soils exhibiting Standard Penetration Test N-values in excess of 50 blows for 6 inches of penetration.

WILLIAMS ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. BB-1**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: BENT - 1 (West Bridge)

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 889.51 Station: ST. 35+40, 40' Lt. of CL (Dupree Rd.)

Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

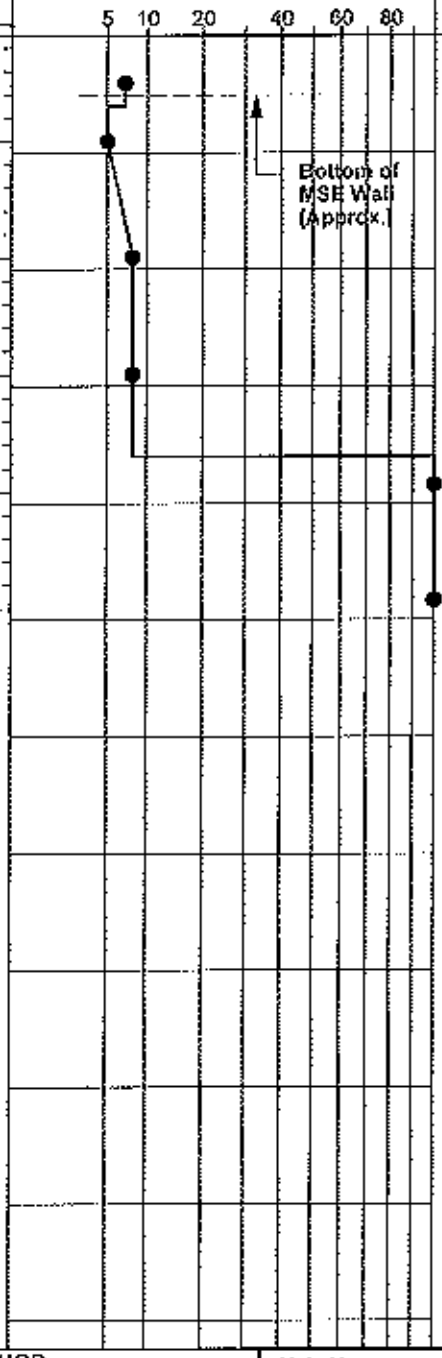
Core Boxes: -- Samples: 6 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 25.0

Logged By: PT Date Drilled: 10/12/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
		SS			TOPSOIL = 3 inches (FILL)	889.5	
		SS			FILL : Loose brown silty medium to fine **SAND** with fibrous roots, wood debris and organic odour (micaceous) (SM)		7
5		SS			RESIDUUM : Loose brown, black and gray silty medium to fine **SAND** (micaceous)	885	5
10		SS				880	8
15		SS				875	8
20		SS			PARTIALLY WEATHERED ROCK : Sampled as very dense brown, gray and black silty medium to fine **SAND** (micaceous) (PWR)	870	50/5"
25		SS				865	50/4"

Auger refusal encountered at 25 feet below the existing ground surface.

Groundwater was encountered at 10.5 feet below the existing ground surface at the time of boring and at 9 feet below the existing ground surface at 24 hours after boring completion.



SAMPLER TYPE		DRILLING METHOD		Hole No.
SS - Split Spoon	NX - Rock Core, 2-1/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	BB-1
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	
NQ - Rock Core, 1-7/8"	CT - Continuous Tube	DC - Driving Casing		

SPTN 171-3099G.GPJ 1/8/09

WILLMOTT ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. BB-2**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: BENT - 2 (West Bridge)

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 891.32 Station: ST. 36+20, 70' Rt. of CL (Dupree Rd.)

Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

Core Boxes: -- Samples: 7 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 27.0

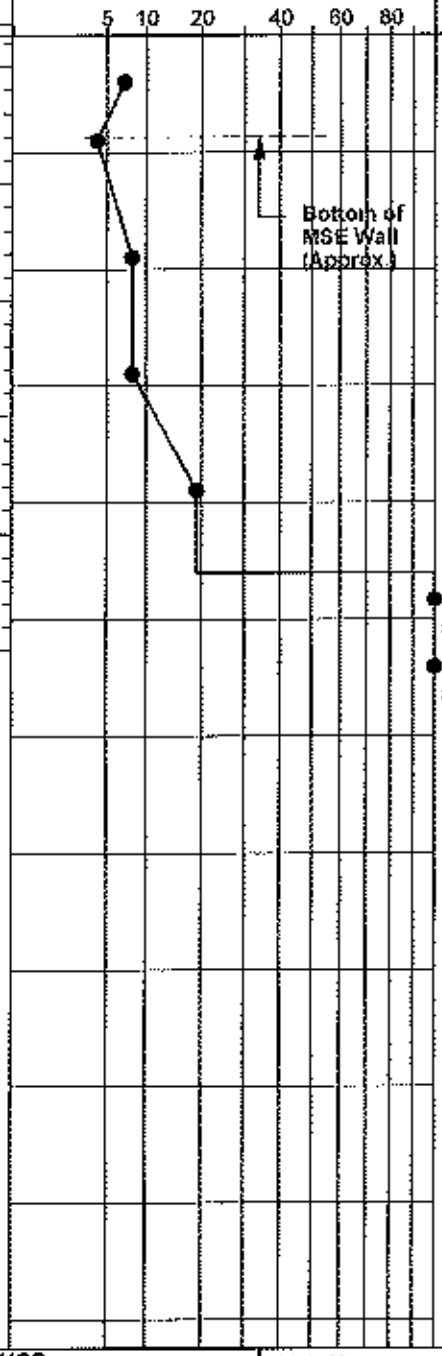
Logged By: PT Date Drilled: 10/10/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)
					TOPSOIL = 2 inches (SM)	891.3
		SS			RESIDUUM : Very loose, loose and medium dense brown, gray and tan silty medium to fine SAND (micaceous)	890
		SS				
5						885
10		SS				880
15		SS				875
20		SS				870
					PARTIALLY WEATHERED ROCK : Sampled as very dense brown and gray silty medium to fine SAND (slightly micaceous) (PWR)	
25		SS				865
		SS				

Auger refusal encountered at 27 feet below the existing ground surface.

Groundwater was encountered at 11.5 feet below the existing ground surface at the time of boring and at 11 feet below the existing ground surface at 24 hours after boring completion.

STANDARD PENETRATION TEST DATA (blows/foot)



N-VALUE: 7, 4, 8, 8, 19, 50/4", 50/1"

SAMPLER TYPE		DRILLING METHOD		Hole No.
SS - Split Spoon	NX - Rock Core, 2-1/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	BB-2
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	
NQ - Rock Core, 1-7/8"	CT - Continuous Tube	DC - Driving Casing		

SPTN 171-3099G.GPJ 1/8/08

WILLMER ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. BB-3**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: BENT - 1 (East Bridge)

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 891.17 Station: ST. 37+10, 55' Lt. of CL (Dupree Rd.)

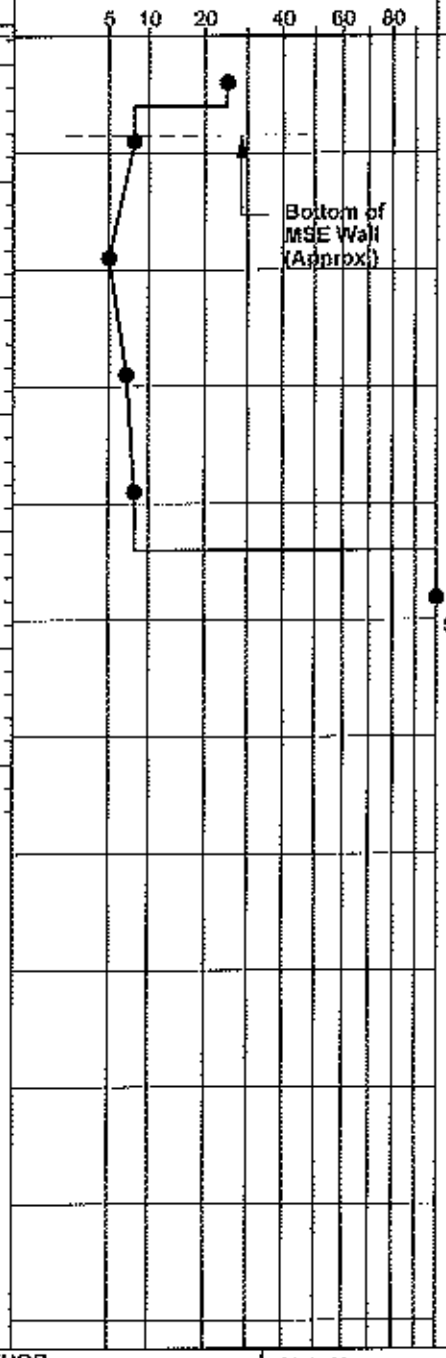
Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

Core Boxes: 1 Samples: 6 Overburden (ft): -- Rock (ft): 10 Total Depth (ft): 34.0

Logged By: PT Date Drilled: 10/10/07

VERTICAL DEPTH (ft)	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
				TOPSOIL = 1 inch	FILL	891.2	
	SS			FILL : Medium dense reddish brown silty medium to fine **SAND** with rock fragments	SM	890	25
5	SS			RESIDUUM : Loose tan, gray and black silty medium to fine **SAND** (micaceous)		885	8
10	SS					880	5
15	SS			rock fragments		875	7
20	SS					870	8
				PARTIALLY WEATHERED ROCK : Sampled as very dense gray, white and brown silty medium to fine **SAND** with rock fragments	PWR		
25	SS						50/1"
	NQ	60	33	ROCK CORE : Moderately hard to soft gray, black and white **BIOTITE GNEISS**		865	
30	NQ	100	100	Very hard gray, black and white **BIOTITE GNEISS**		860	

STANDARD PENETRATION TEST DATA (blows/foot)



Auger refusal encountered at 24 feet below the existing ground surface.

Coring terminated at 34 feet below the existing ground surface.

Groundwater was encountered at 13 feet below the existing ground surface at the time of boring and at 12 feet below the existing ground surface at 24 hours after boring completion.

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

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

Hole No. BB-3

SPTX 171-3099G.GPJ 1/8/08

WILLMERT ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. W-1**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: Wall No. 14

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 894.54 Station: 554+00, 25' Lt. of CL

Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

Core Boxes: -- Samples: 4 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 15.0

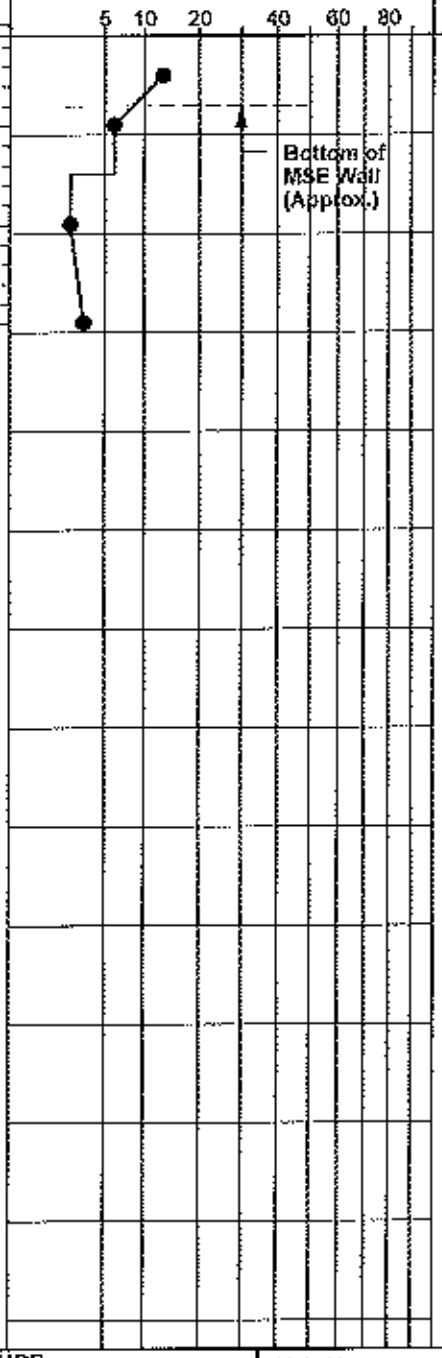
Logged By: PZ Date Drilled: 10/12/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
		SS			TOPSOIL= 2 inches (FILL)	894.5	13
		SS			FILL : Stiff reddish brown medium to fine sandy SILT (micaceous) (FILL)	890	6
5		SS			Loose gray silty medium to fine SAND with rock fragments and root debris (micaceous) (SM)		
10		SS			RESIDUUM : Very loose brown and gray silty medium to fine SAND with rock fragments	885	2
15		SS				880	3

Boring terminated at 15 feet below the existing ground surface.

Groundwater was encountered at 9.5 feet below the existing ground surface at the time of boring. Bore hole caved in to 8 feet below the existing ground surface at 24 hours after boring completion.

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE		DRILLING METHOD		Hole No.
SS - Split Spoon	NX - Rock Core, 2-1/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	W-1
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	
NQ - Rock Core, 1-7/8"	CT - Continuous Tube	DC - Driving Casing		

SFT\ 171-3099G.GPJ 1/10/08

WITHERS ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. W-2**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: Wall No. 15

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 893.57 Station: 555+00, 20' Rt. of CL

Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

Core Boxes: -- Samples: 5 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 20.0

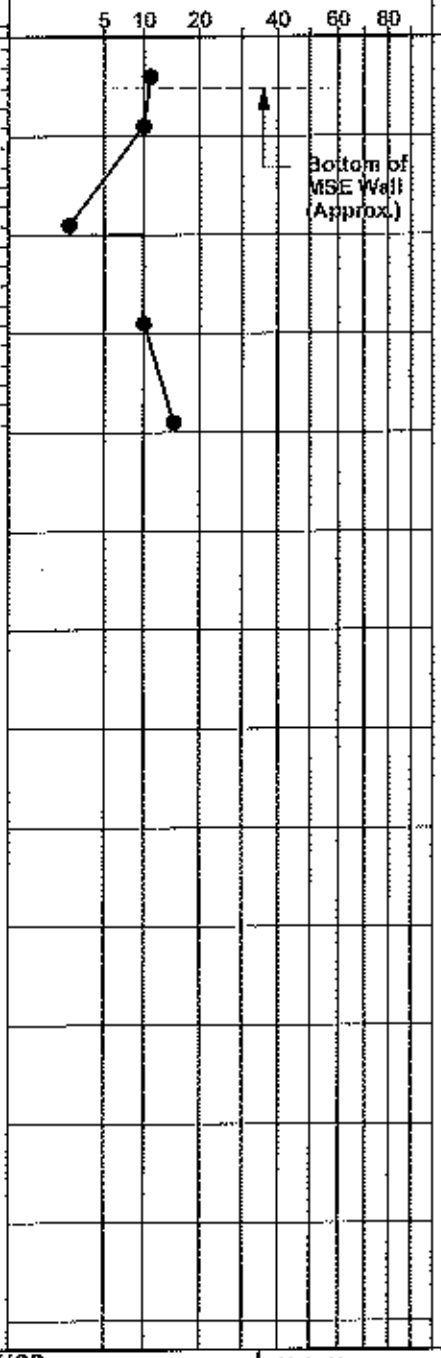
Logged By: PZ Date Drilled: 10/12/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					TOPSOIL = 2 inches	FILL	893.6	
		SS			FILL : Stiff reddish brown medium to fine sandy **SILT** with rock fragments (micaceous)		890	11
5		SS						10
					Very soft reddish brown medium to fine sandy **SILT** (micaceous)	FILL	885	2
10		SS			RESIDUUM : Loose gray silty coarse to fine **SAND** with rock fragments	SM	880	10
15		SS						
					Medium dense tan and brown silty medium to fine **SAND** (micaceous)	SM	875	15
20		SS						

Boring terminated at 20 feet below the existing ground surface.

Groundwater was encountered at 13 feet below the existing ground surface at the time of boring. Bore hole caved in to 11 feet below the existing ground surface at 24 hours after boring completion.

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE		DRILLING METHOD		Hole No.
SS - Split Spoon	NX - Rock Core, 2-1/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	W-2
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	
NQ - Rock Core, 1-7/8"	CT - Continuous Tube	DC - Driving Casing		

SPT\ 171-3099G.GPJ 1/10/08

WILLMER ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. W-3**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: Wall No. 14

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 892.34 Station: 557+00, 25' Lt. of CL

Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

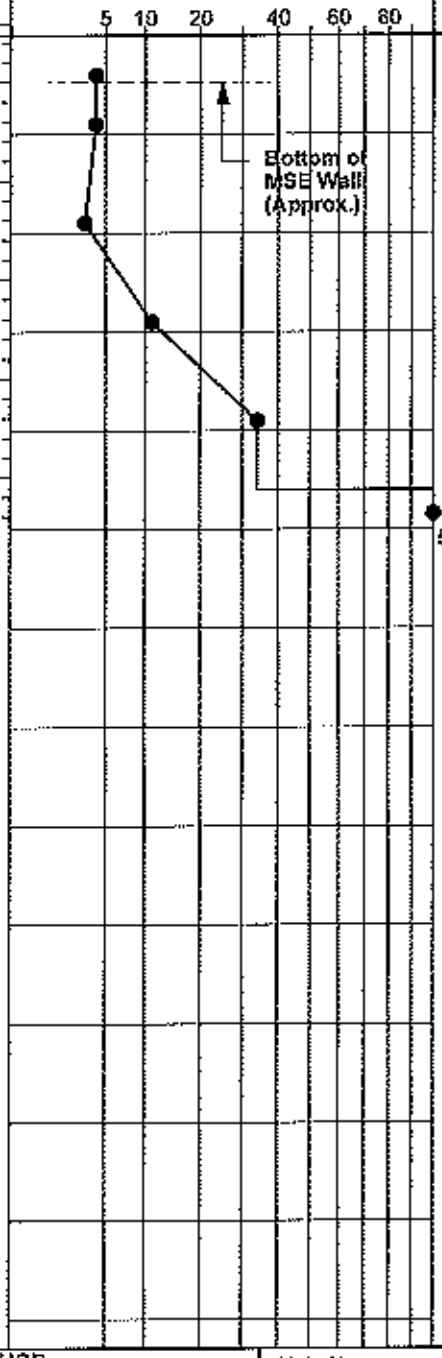
Core Boxes: -- Samples: 6 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 25.0

Logged By: PZ Date Drilled: 10/12/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
					TOPSOIL = 2 inches (SM)	892.3	
		SS			RESIDUUM : Very loose to dense reddish brown, gray and white silty medium to fine **SAND** (micaceous)	890	4
5		SS					4
						885	
10		SS					3
						880	
15		SS					11
						875	
20		SS					34
						870	
25		SS			PARTIALLY WEATHERED ROCK : Sampled as very dense gray, white and brown silty medium to fine **SAND** (micaceous) (PWR)		50/5"

Boring terminated at 25 feet below the existing ground surface.

Groundwater was encountered at 14.5 feet below the existing ground surface at the time of boring. Bore hole caved in to 11 feet below the existing ground surface at 24 hours after boring completion.



SAMPLER TYPE		DRILLING METHOD		Hole No.
SS - Split Spoon	NX - Rock Core, 2-1/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	W-3
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	
NQ - Rock Core, 1-7/8"	CT - Continuous Tube	DC - Driving Casing		

SPTN: 171-3099G.GPJ 1/1/08

WILLMERT ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. W-4**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: Wall No. 15

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 892.00 Station: 559+00, 25' Rt. of CL

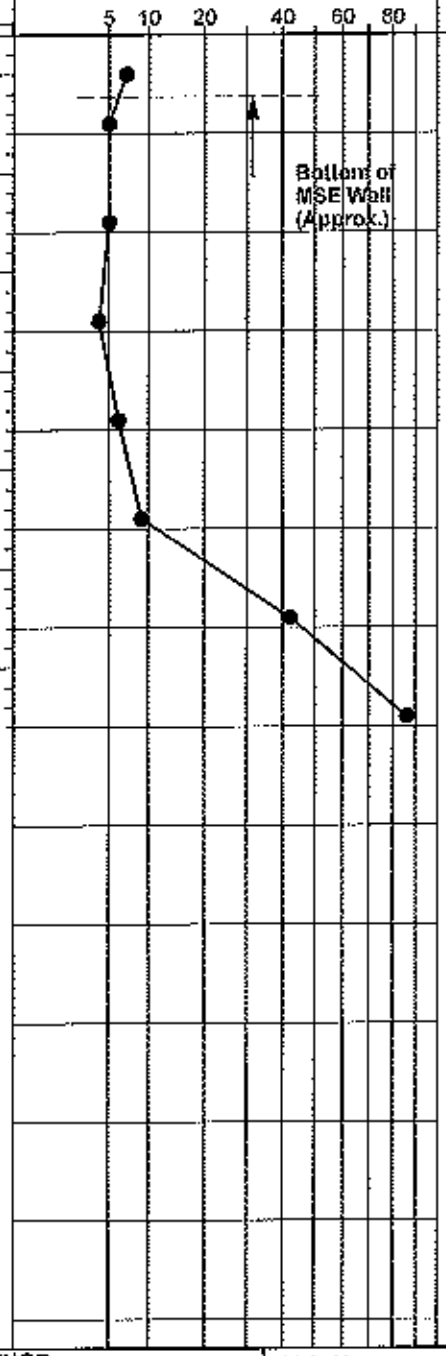
Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

Core Boxes: -- Samples: 8 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 35.0

Logged By: PZ Date Drilled: 10/12/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
					TOPSOIL = 2 Inches / SM	892.0	
		SS			RESIDUUM : Very loose to very dense reddish brown to gray, brown and tan silty medium to fine SAND (micaceous)	890	7
5		SS					5
						885	
10		SS					5
						880	
15		SS					4
						875	
20		SS					6
						870	
25		SS					9
						865	
30		SS					42
						860	
35		SS					86

STANDARD PENETRATION TEST DATA (blows/foot)



Boring terminated at 35 feet below the existing ground surface.

Groundwater was encountered at 16 feet below the existing ground surface at the time of boring. Bore hole caved in to 13 feet below the existing ground surface at 24 hours after boring completion.

SAMPLER TYPE		DRILLING METHOD		Hole No.
SS - Split Spoon	NX - Rock Core, 2-1/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	W-4
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	
NQ - Rock Core, 1-7/8"	CT - Continuous Tube	DC - Driving Casing		

SPTN 171-3099G.GPJ 1/10/08

WILLIAMS ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. W-5**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: Wall No. 14

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 890.23 Station: 564+00, 30' Lt. of CL

Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

Core Boxes: -- Samples: 7 Overburden (ft): 27 Rock (ft): -- Total Depth (ft): 27.0

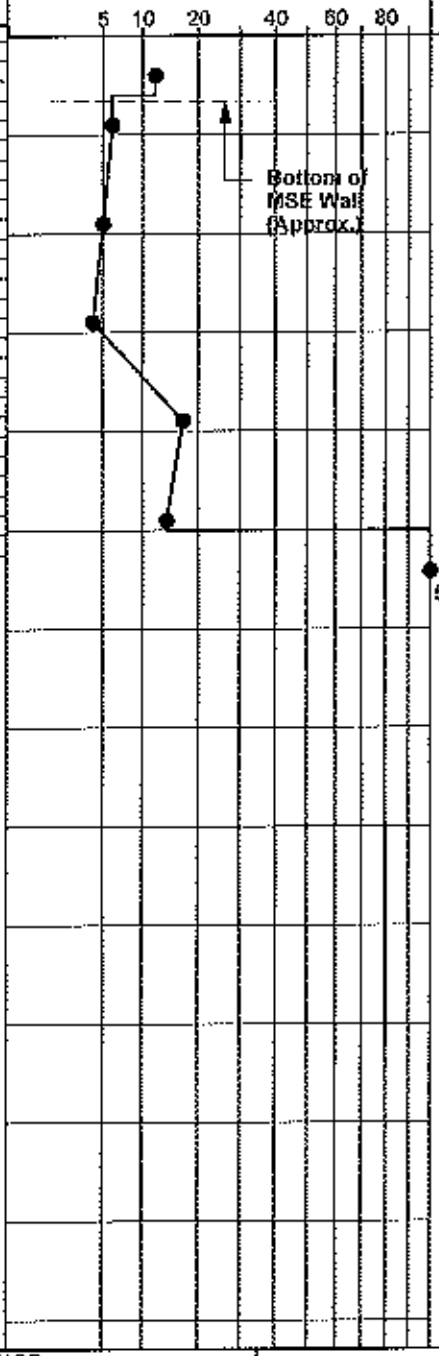
Logged By: PT Date Drilled: 10/10/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
		SS			FILL : Medium dense reddish brown silty medium to fine **SAND** with rock fragments	FILL	890.2	12
						SM		
5		SS			RESIDUUM : Very loose, loose and medium dense brown, gray and black silty medium to fine **SAND** (micaceous)		885	6
10		SS					880	5
		ST						
15		SS					875	4
20		SS					870	17
25		SS			PARTIALLY WEATHERED ROCK : Sampled as very dense black, white and gray silty coarse to fine **SAND**	PWR	865	14
		SS						50/2"

Auger refusal encountered at 27 feet below the existing ground surface.

Groundwater was encountered at 13 feet below the existing ground surface at the time of boring. Bore hole caved in to 11 feet below the existing ground surface at 24 hours after boring completion.

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

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

Hole No. W-5

SPT_171-3099.GPJ 11/10/08

WILLIAMS ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. W-6**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: Wall No. 15

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 889.93 Station: 566+00, 20' Rt. of CL

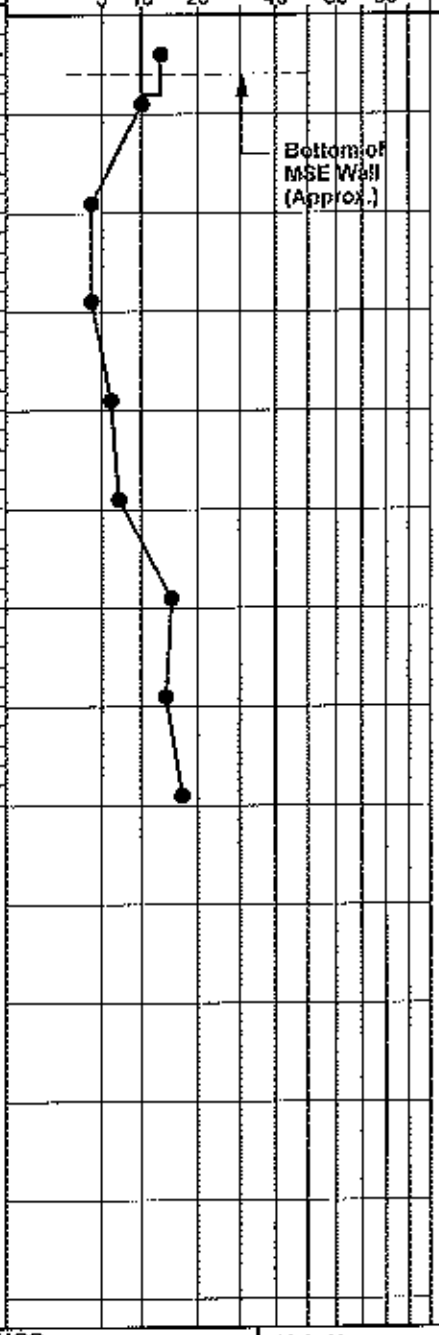
Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

Core Boxes: -- Samples: 9 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 40.0

Logged By: PT Date Drilled: 10/10/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
		SS			FILL : Medium dense reddish brown silty medium to fine **SAND** with rock fragments	FILL	889.9	13
5		SS			RESIDUUM : Very loose, loose and medium dense brown, gray and white silty medium to fine **SAND** (micaceous)	SM	885	10
10		SS					880	4
		ST						
15		SS					875	4
20		SS					870	6
25		SS					865	7
30		SS					860	15
35		SS					855	14
40		SS					850	17

STANDARD PENETRATION TEST DATA (blows/foot)



Boring terminated at 40 feet below the existing ground surface.

Groundwater was encountered at 13 feet below the existing ground surface at the time of boring. Bore hole caved in to 13 feet below the existing ground surface at 24 hours after boring completion.

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

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

Hole No. W-6

SPTS 171-3099G.GPJ 1/10/08

WILLIAMS ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. W-7**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: Wall No. 14

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 889.40 Station: 567+90, 25' Lt. of CL

Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

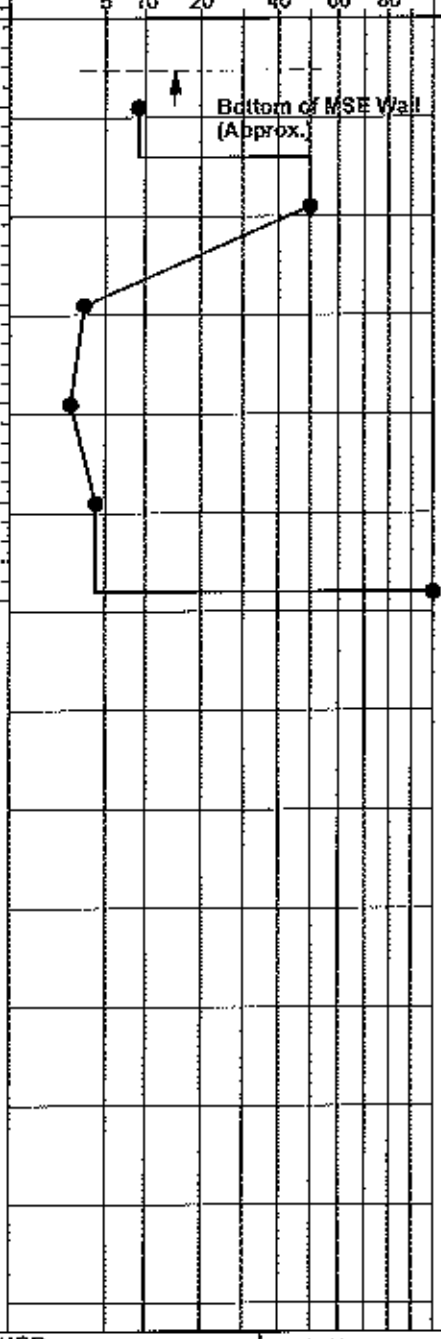
Core Boxes: -- Samples: 6 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 30.0

Logged By: PZ Date Drilled: 10/12/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					TOPSOIL= 2 inches	FILL	889.4	
5		SS			FILL : Loose brown and reddish brown silty medium to fine **SAND** with rock fragments		885	9
10		SS			RESIDUUM : Dense brown, orange and black silty medium to fine **SAND** with rock fragments	SM	880	50
15		SS			Very loose light brown and orange silty medium to fine **SAND**	SM	875	3
20		SS					870	2
25		SS					865	4
30		SS			PARTIALLY WEATHERED ROCK : Sampled as very dense brown, black and gray silty medium to fine **SAND** (micaceous)	PWR	860	50/1"

Boring terminated at 30 feet below the existing ground surface.

Groundwater was not encountered at the time of boring. Bore hole caved in to 16 feet below the existing ground surface after boring completion.



SAMPLER TYPE		DRILLING METHOD		Hole No.
SS - Split Spoon	NX - Rock Core, 2-1/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	W-7
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	
NQ - Rock Core, 1-7/8"	CT - Continuous Tube	DC - Driving Casing		

SPTN 171-3099G.GPJ 1/10/08

WILLMER ENGINEERING INC. WE

Project: Duprce Road over I-575	**HOLE No. W-8**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: Wall No. 15

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 889.65 Station: 570+00, 25' Rt. of CL

Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

Core Boxes: -- Samples: 5 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 20.0

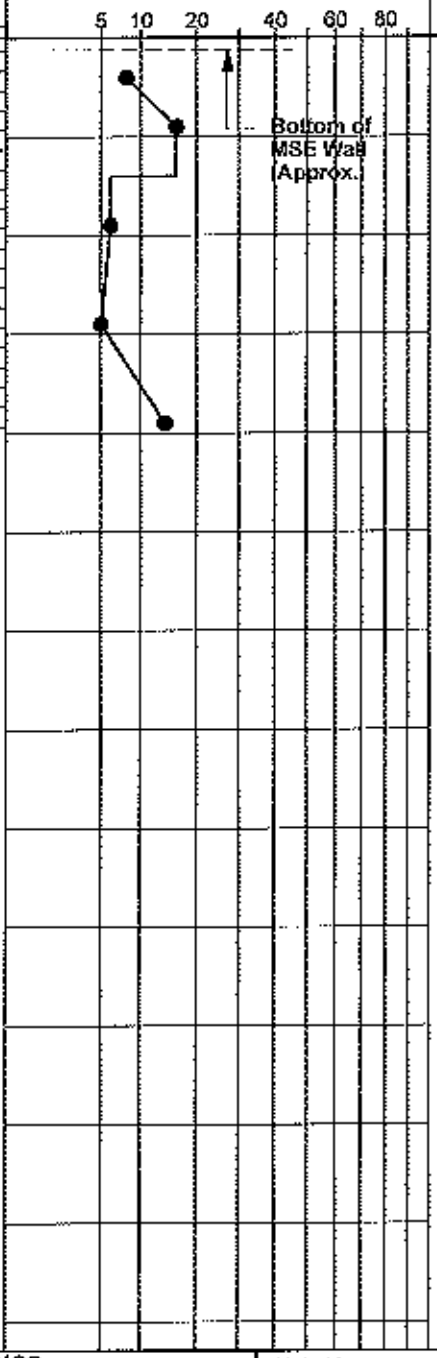
Logged By: PZ Date Drilled: 10/12/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)
					TOPSOIL= 3 inches	FILL	889.7
		SS			FILL : Firm tan and orange medium to fine sandy SILT (micaceous)	FILL	
5		SS			Very stiff reddish brown and gray medium to fine sandy SILT with root debris	SM	885
10		SS			RESIDUUM : Loose to medium dense reddish brown to gray and brown silty medium to fine SAND (micaceous)		880
15		SS					875
20		SS					870

Boring terminated at 20 feet below the existing ground surface.

Groundwater was not encountered at the time of boring.

STANDARD PENETRATION TEST DATA (blows/foot)



N-VALUE: 8, 16, 6, 5, 14

SAMPLER TYPE		DRILLING METHOD		Hole No.
SS - Split Spoon	NX - Rock Core, 2-1/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	W-8
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	
NQ - Rock Core, 1-7/8"	CT - Continuous Tube	DC - Driving Casing		

SPTN 171-3099G.GPJ 1/18/08

WILLMERT ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. W-9**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: Wall No. 16

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 909.57 Station: 562+00, 220' Lt. of CL

Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

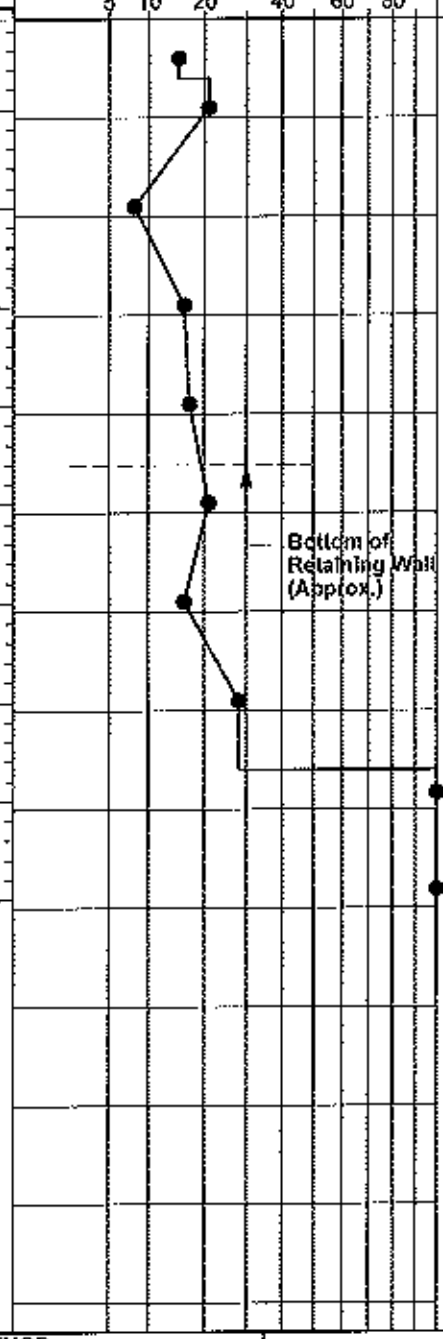
Core Boxes: -- Samples: 11 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 45.0

Logged By: PT Date Drilled: 11/20/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
		SS			TOPSOIL = 3 inches	FILL	909.6	
		SS			FILL : Medium dense brown, reddish bown and black clayey medium to fine **SAND** with rock fragments	ML	905	15, 21
5		SS			RESIDUUM : Very stiff to firm reddish brown and tan medium to fine sandy **SILT** (slightly micaceous)		900	8
		ST						
10		SS						
15		SS			Medium dense gray and brown silty medium to fine **SAND** (micaceous)	SM	895	16
20		SS					890	17
25		SS					885	21
30		SS					880	16
35		SS					875	28
40		SS			Sampled as very dense gray and brown silty medium to fine **SAND** with rock fragments (micaceous)	PWR	870	50/4"
45		SS					865	50/1"

Boring terminated at 45 feet below the existing ground surface.

Groundwater was not encountered at the time of boring.



SAMPLER TYPE		DRILLING METHOD		Hole No.
SS - Split Spoon	NX - Rock Core, 2-1/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	W-9
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	
NQ - Rock Core, 1-7/8"	CT - Continuous Tube	DC - Driving Casing		

SPTN 171-3099G.GPJ 2/10/08

WILLMER ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. W-10**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: Wall No. 16

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 913.95 Station: 563+50, 185' Lt. of CL

Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

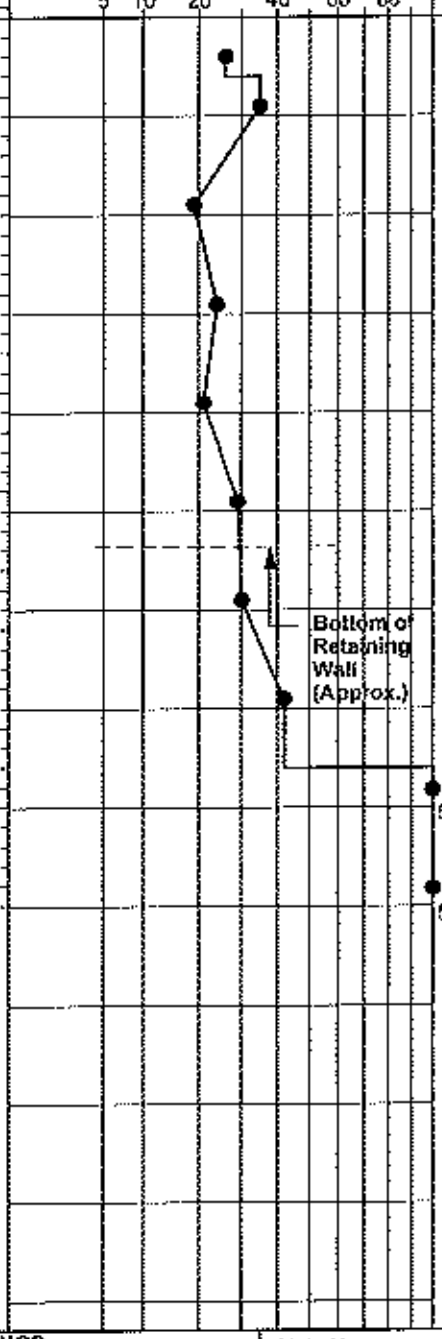
Core Boxes: -- Samples: 10 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 45.0

Logged By: PT Date Drilled: 11/20/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					TOPSOIL = 3 inches	FILL	914.0	
		SS			FILL : Very stiff reddish brown medium to fine sandy **SILT** with rock fragments (micaceous)	ML	910	26
5		SS						35
					RESIDUUM : Hard reddish brown medium to fine sandy **SILT** (micaceous)	SM	905	19
10		SS			Medium dense to dense gray, white and brown silty medium to fine **SAND** (very micaceous)			
15		SS					900	24
20		SS					895	21
25		SS					890	20
30		SS					885	30
35		SS					880	42
40		SS			PARTIALLY WEATHERED ROCK : Sampled as very dense gray, brown and black silty coarse to fine **SAND** (very micaceous)	PWR	875	50/3"
45		SS					870	50/2"

Boring terminated @ 45 feet below the existing ground surface.

Groundwater was not encountered @ the time of boring.



SAMPLER TYPE		DRILLING METHOD		Hole No.
SS - Split Spoon	NX - Rock Core, 2-1/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	W-10
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	
NQ - Rock Core, 1-7/8"	CT - Continuous Tube	DC - Driving Casing		

SPTK 171-3099G.GPJ 1/10/08

WILLMORE ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. W-11**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: Wall No. 16

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 913.04 Station: 559+00, 250' Lt. of CL

Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

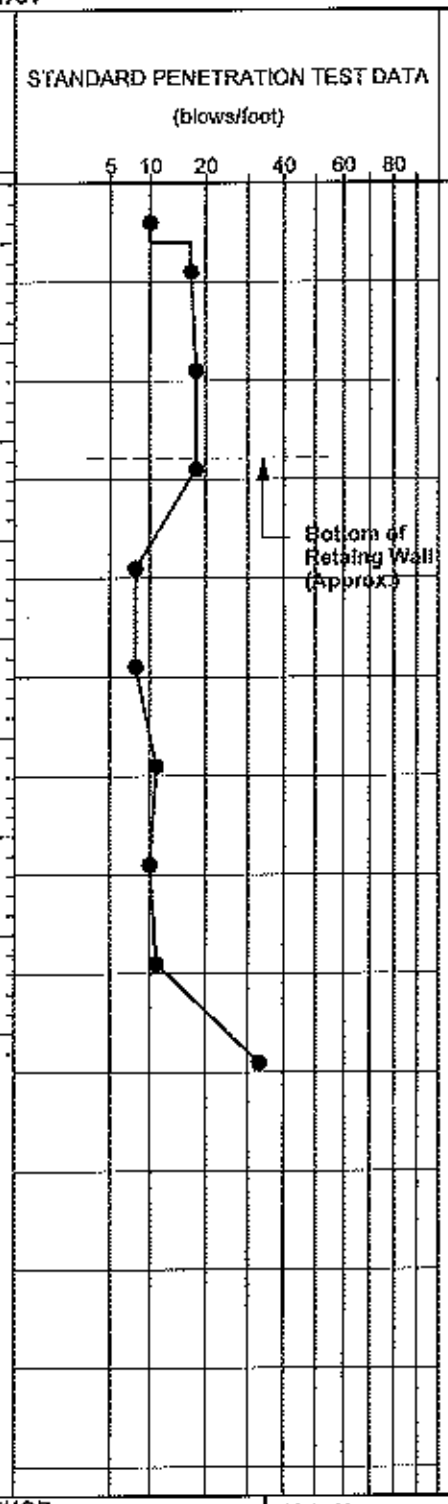
Core Boxes: -- Samples: 10 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 45.0

Logged By: PT Date Drilled: 11/21/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
					GAB = 4 inches	GAB	913.0	
		SS			FILL : Stiff reddish brown to brown medium to fine sandy **SILT** (slightly micaceous)	FILL	910	10
5		SS				SM		17
					Medium dense brown to reddish brown silty medium to fine **SAND** with rock fragments (micaceous)		905	16
10		SS						
							900	18
15		SS			Loose and medium dense brown, white and gray silty medium to fine **SAND** (micaceous)	SM		
20		SS					895	8
25		SS					890	8
30		SS					885	11
35		SS					880	10
40		SS					875	11
45		SS			PARTIALLY WEATHERED ROCK : Sampled as very dense brown and gray silty medium to fine **SAND** (micaceous)	PWR	870	33

Boring terminated at 45 feet below the existing ground surface.

Groundwater was not encountered at the time of boring. Bore hole caved in to 25 feet below the existing ground surface at boring completion.



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

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

Hole No. W-11

SPTN 171-3099G.GPJ 1/10/08

WILLMER ENGINEERING INC. WE

Project: Dupree Road over I-575	**HOLE No. W-12**
Location: Cherokee County, Georgia	Sheet 1 of 1
Project Number: 171-3099G; GDOT Proj # : CSNHS-0008-00(256); PI # : 0008256	Location: Wall No. 16

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 917.00 Station: 557+00, 240' Lt. of CL

Drilling Equipment: CME 550 Drilling Method: HSA Auto Hammer

Core Boxes: -- Samples: 10 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 45.0

Logged By: PT Date Drilled: 11/21/07

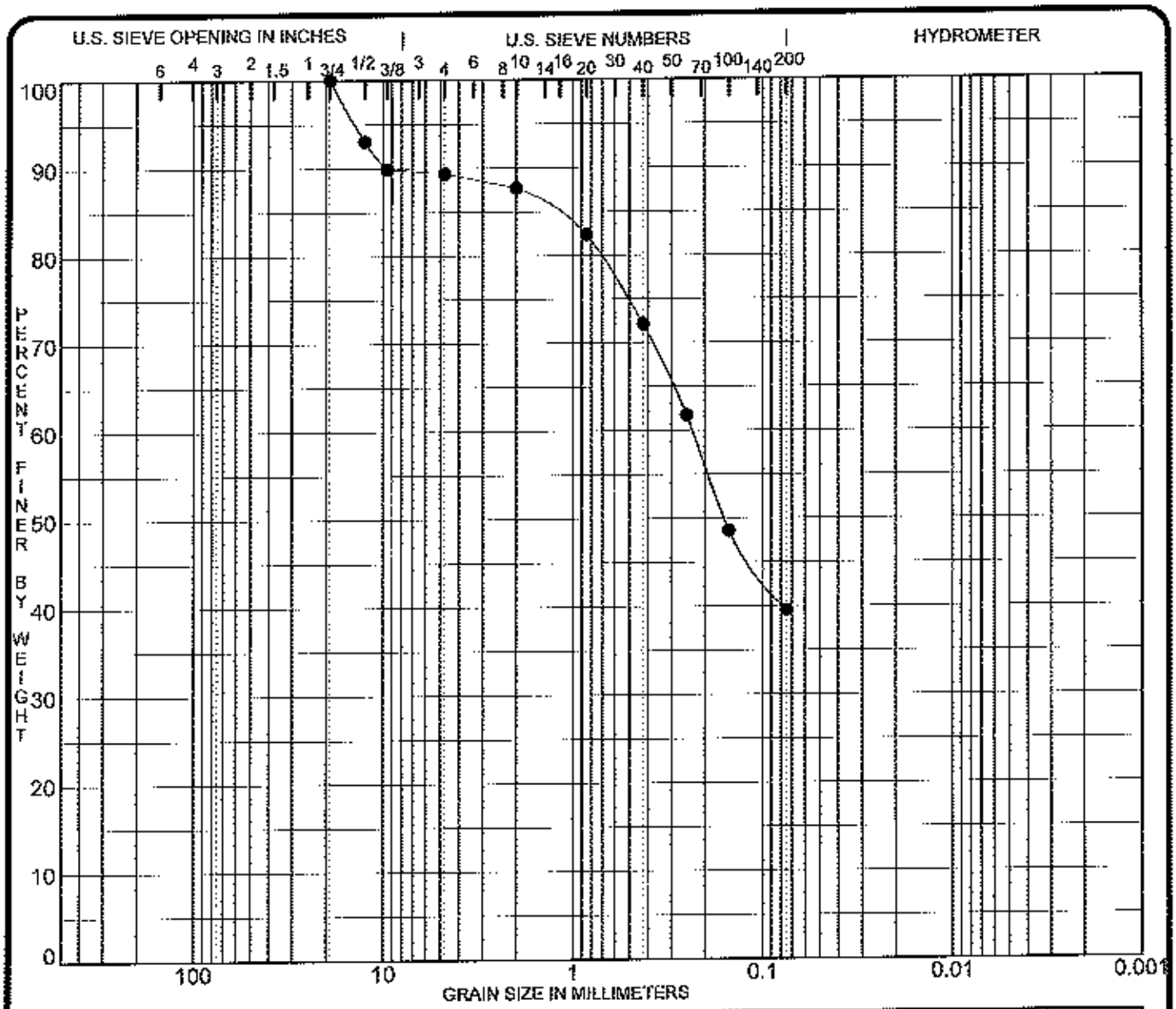
VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					GAB = 4 inches	GAB	917.0		
					FILL : Very stiff orange, tan and pink medium to fine sandy **CLAY** with rock fragments	FILL ML	915		
5		SS			RESIDUUM : Stiff and very stiff reddish brown and tan medium to fine sandy **SILT**				22
10		SS					910		15
							905		12
15		SS ST					900		
20		SS							18
							895		
25		SS			Medium dense to dense gray and brown silty medium to fine **SAND** (micaceous)	SM			23
							890		
30		SS							15
							885	Bottom of Retaining Wall (Approx.)	
35		SS							18
							880		
40		SS							50
							875		
45		SS			PARTIALLY WEATHERED ROCK : Sampled as very dense brown and gray silty medium to fine **SAND** (micaceous)	PWR			50/4"

Boring terminated at 45 feet below the existing ground surface.

Groundwater was encountered at 33 feet below the existing ground surface at the time of boring and at 32 feet below the existing ground surface at 24 hours after boring completion.

SAMPLER TYPE		DRILLING METHOD		Hole No.
SS - Split Spoon	NX - Rock Core, 2-1/8"	HSA - Hollow Stem Auger	RW - Rotary Wash	W-12
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core	
NQ - Rock Core, 1-7/8"	CT - Continuous Tube	DC - Driving Casing		

SPTN 171-3099G.GPJ 1/15/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Soil Description	MC%	LL	PL	PI	Cc	Cu
● BB-1 (1-2.5 ft)	Brown silty medium to fine SAND with root debris (micaceous)						

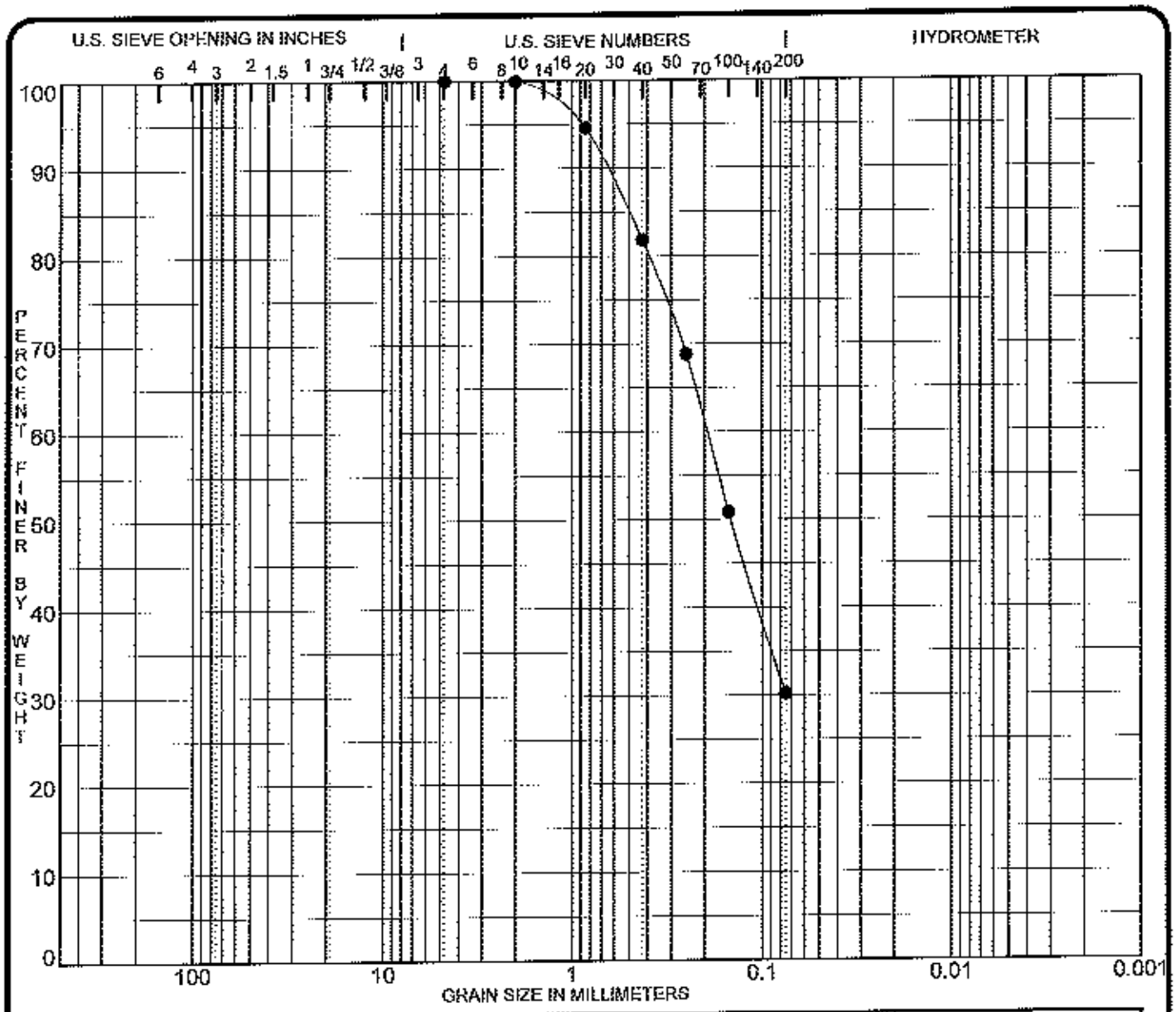
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● BB-1 (1-2.5 ft)	19.00	0.23			10.6	49.8	39.6	

PROJECT Dupree Rd. Over I-575, Cherokee County, Georgia
GDOT Proj #: CSNHS-0008-00(256), PI # : 0008256

JOB NO. 171-3099 G
DATE 1/11/08

WE

GRADATION CURVE



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Soil Description	MC%	LL	PL	PI	Cc	Cu
●	BB-3 (8.5-10 ft)	Gray and black silty medium to fine SAND (micaceous)						

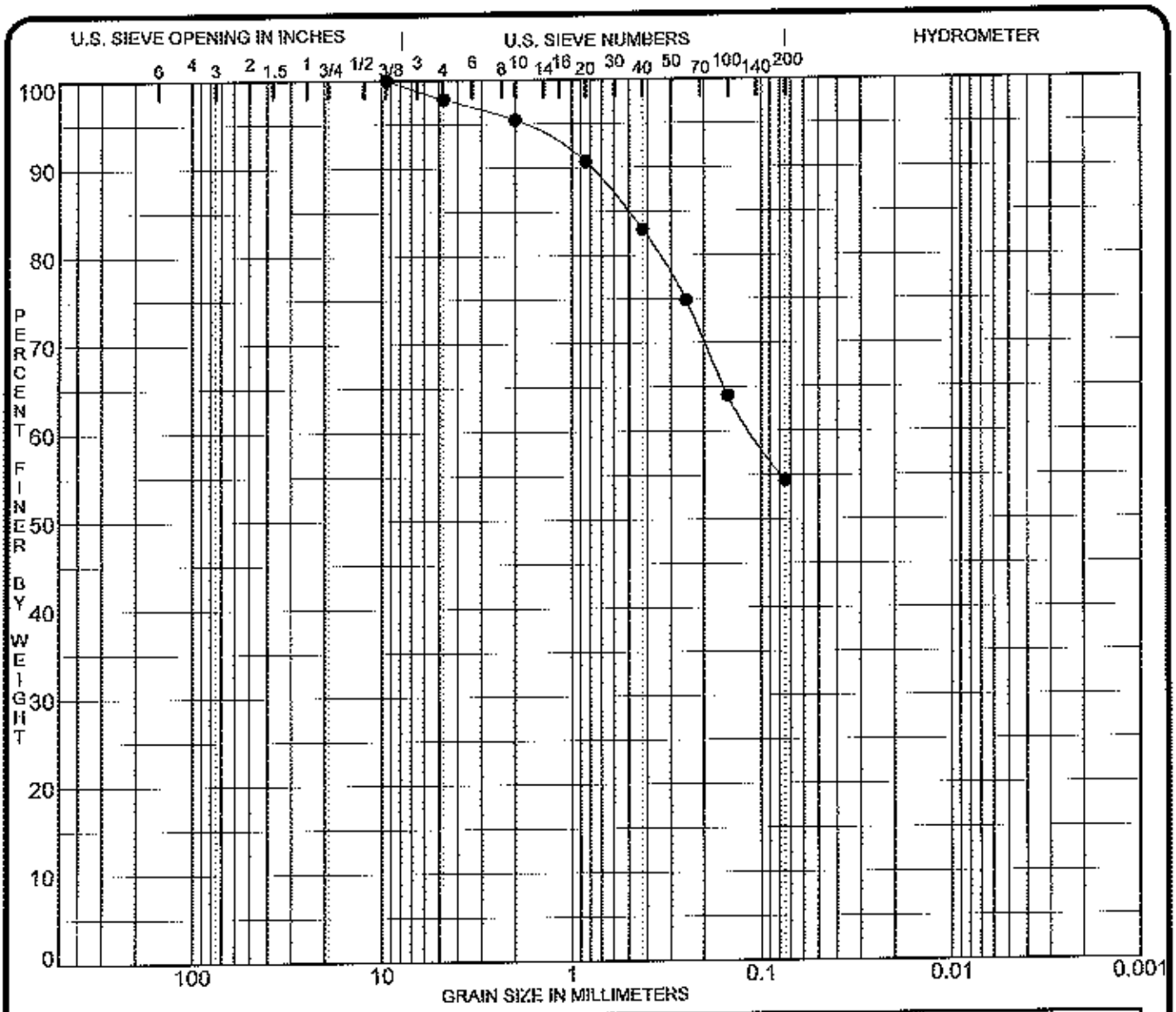
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BB-3 (8.5-10 ft)	4.75	0.19			0.0	69.8	30.2	

PROJECT Dupree Rd. Over I-575, Cherokee County, Georgia
GDOT Proj #: CSNHS-0008-00(256), PI # : 0008256

JOB NO. 171-3099 G
DATE 1/11/08

WE

GRADATION CURVE



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Soil Description	MC%	LL	PL	PI	Cc	Cu
● W-2 (8.5-10 ft)	Reddish brown medium to fine sandy SILT (micaceous)						

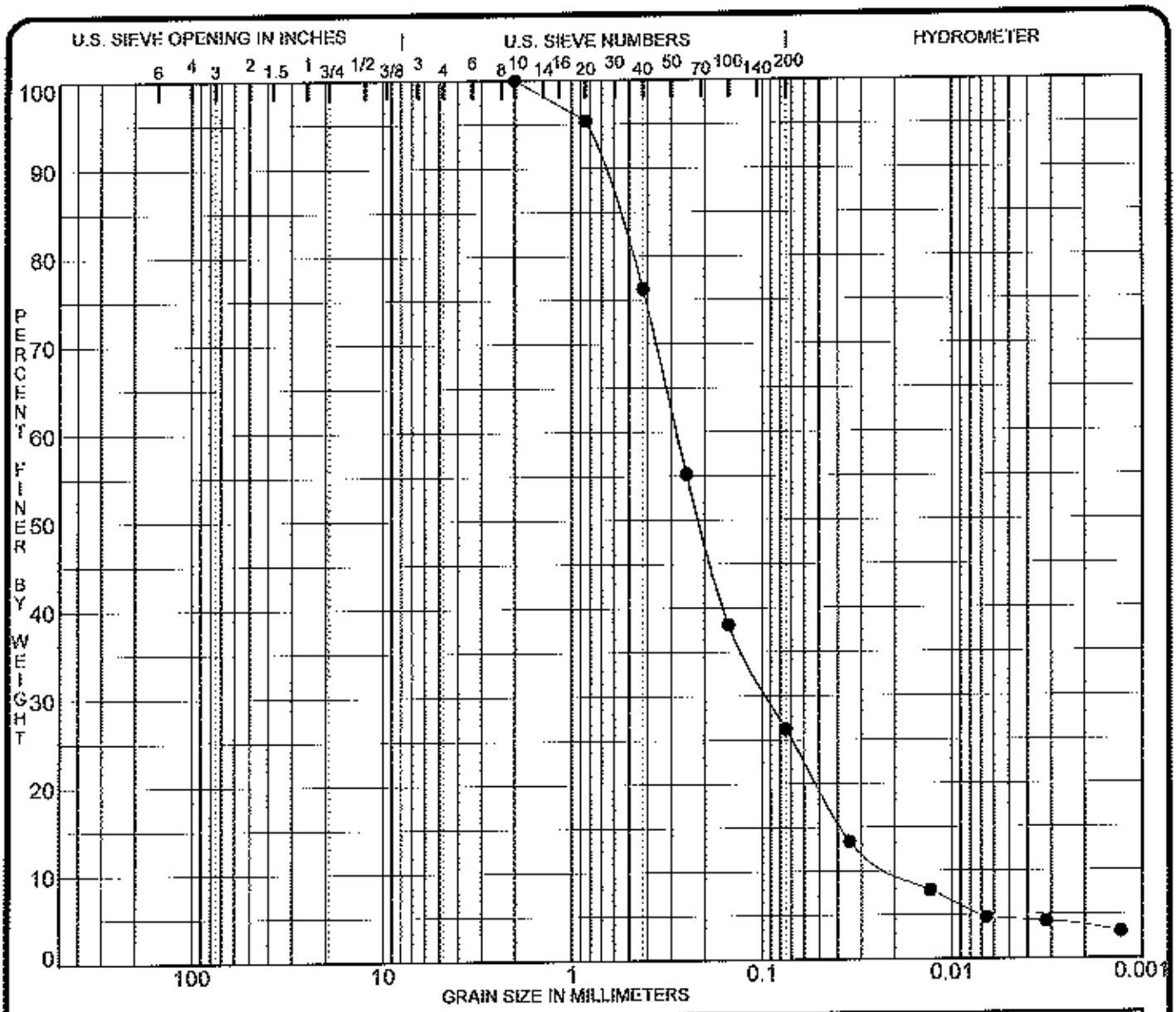
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● W-2 (8.5-10 ft)	9.50	0.11			2.2	43.4	54.4	

PROJECT Dupree Rd. Over I-575, Cherokee County, Georgia
GDOT Proj #: CSNHS-0008-00(256), PI # : 0008256

JOB NO. 171-3099 G
DATE 1/11/08

Williams Engineering WE

GRADATION CURVE



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Soil Description	MC%	LL	PL	PI	Cc	Cu
●	W-5 (10-12 ft)	Black and brown silty medium to fine SAND (micaceous)	41.1				1.61	14.7

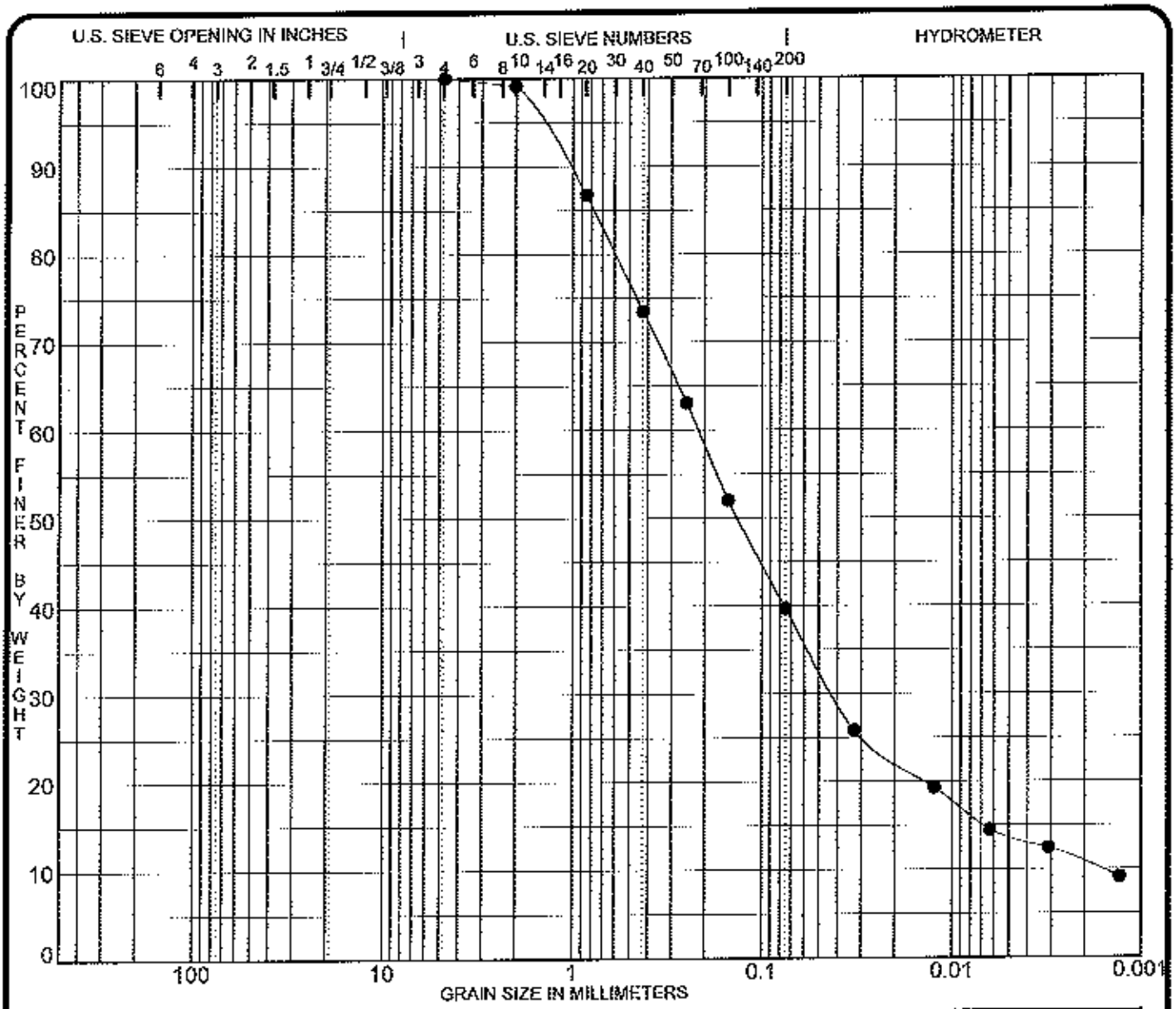
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	W-5 (10-12 ft)	2.00	0.28	0.093	0.0191	0.0	73.7	22.7	3.6

PROJECT Dupree Rd. Over I-575, Cherokee County, Georgia
GDOT Proj #: CSNHS-0008-00(256), PI # : 0008256

JOB NO. 171-3099 G
DATE 1/11/08

WILLIAMS ENGINEERING GROUP WE

GRADATION CURVE



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Soil Description	MC%	LL	PL	PI	Cc	Cu
● W-6 (12-14 ft)	Brown silty medium to fine SAND (micaceous)	26.4				4.97	131.7

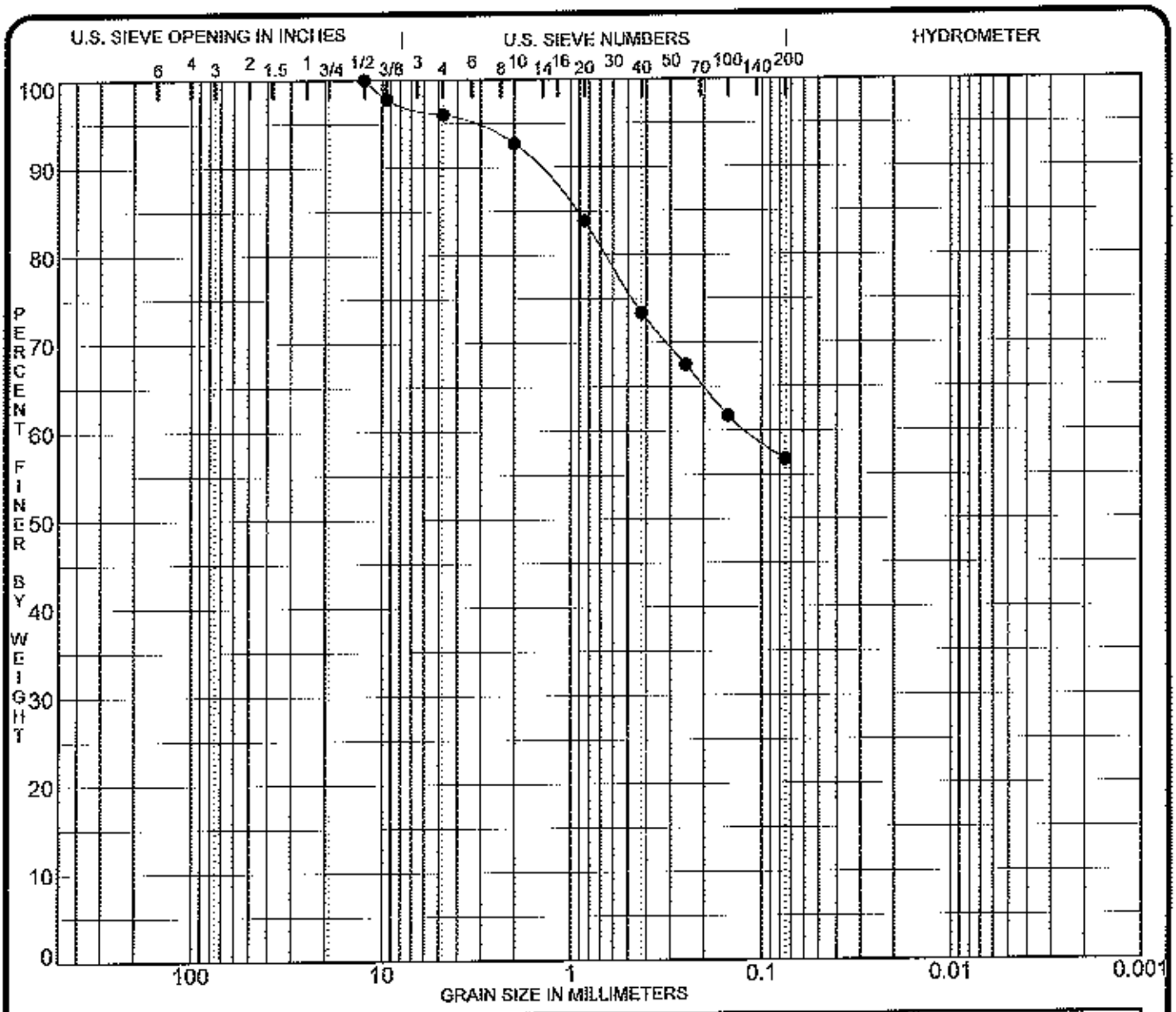
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● W-6 (12-14 ft)	4.75	0.22	0.042	0.0016	0.0	60.3	28.9	10.7

PROJECT Dupree Rd. Over I-575, Cherokee County, Georgia
GDOT Proj #: CSNHS-0008-00(256), PI # : 0008256

JOB NO. 171-3099 G
DATE 1/11/08

WE

GRADATION CURVE



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Soil Description	MC%	LL	PL	PI	Cc	Cu
● W-8 (1-2.5 ft)	Tan medium to fine sandy SILT (micaceous)						

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● W-8 1-2.5 ft)	12.50	0.12			4.0	39.2	56.8	

PROJECT Dupree Rd. Over I-575, Cherokee County, Georgia
GDOT Proj #: CSNHS-0008-00(256), PI # : 0008256

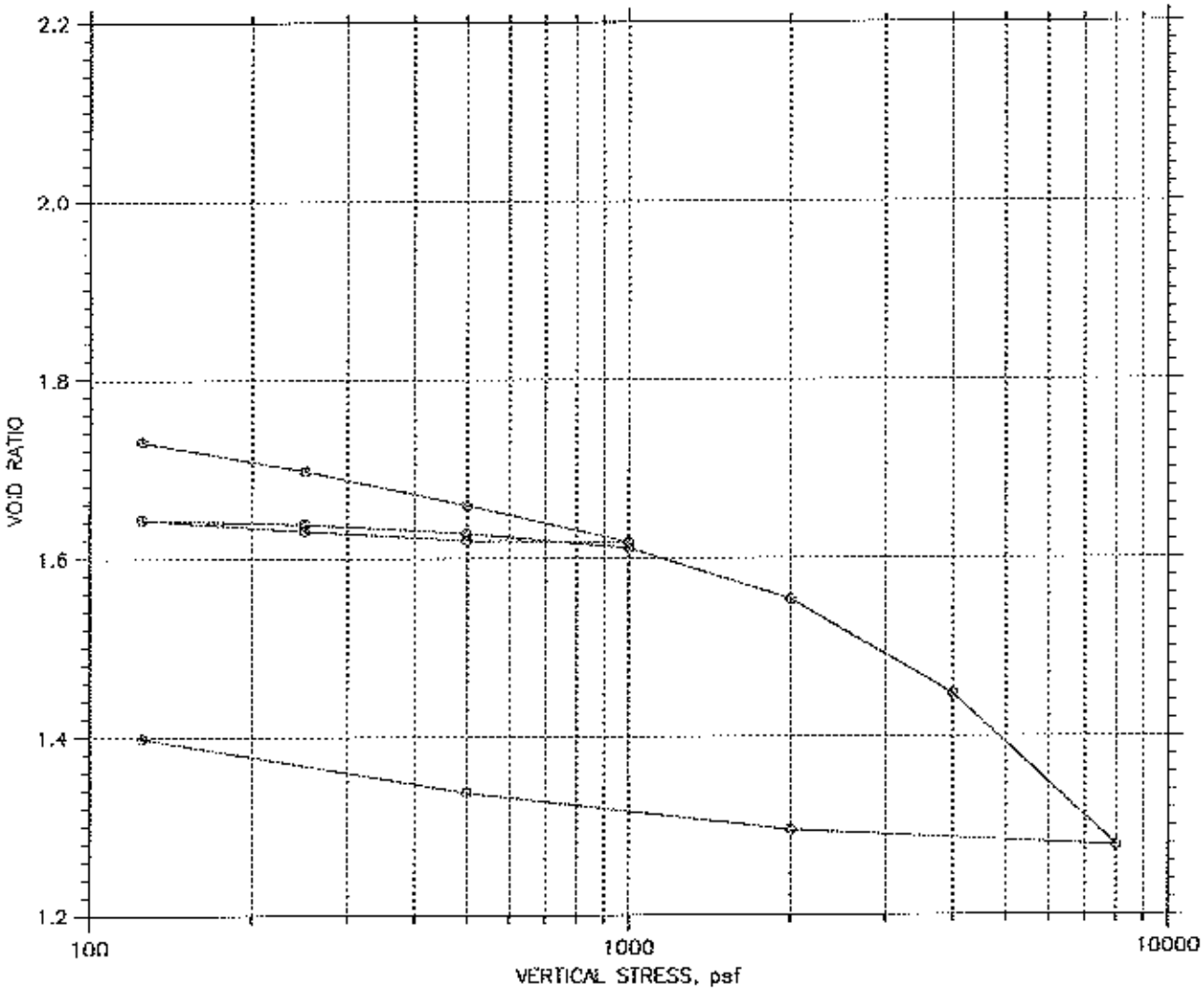
JOB NO. 171-3099 G
DATE 1/11/08

WILLIAMS ENGINEERING WE

GRADATION CURVE

CONSOLIDATION TEST DATA

SUMMARY REPORT



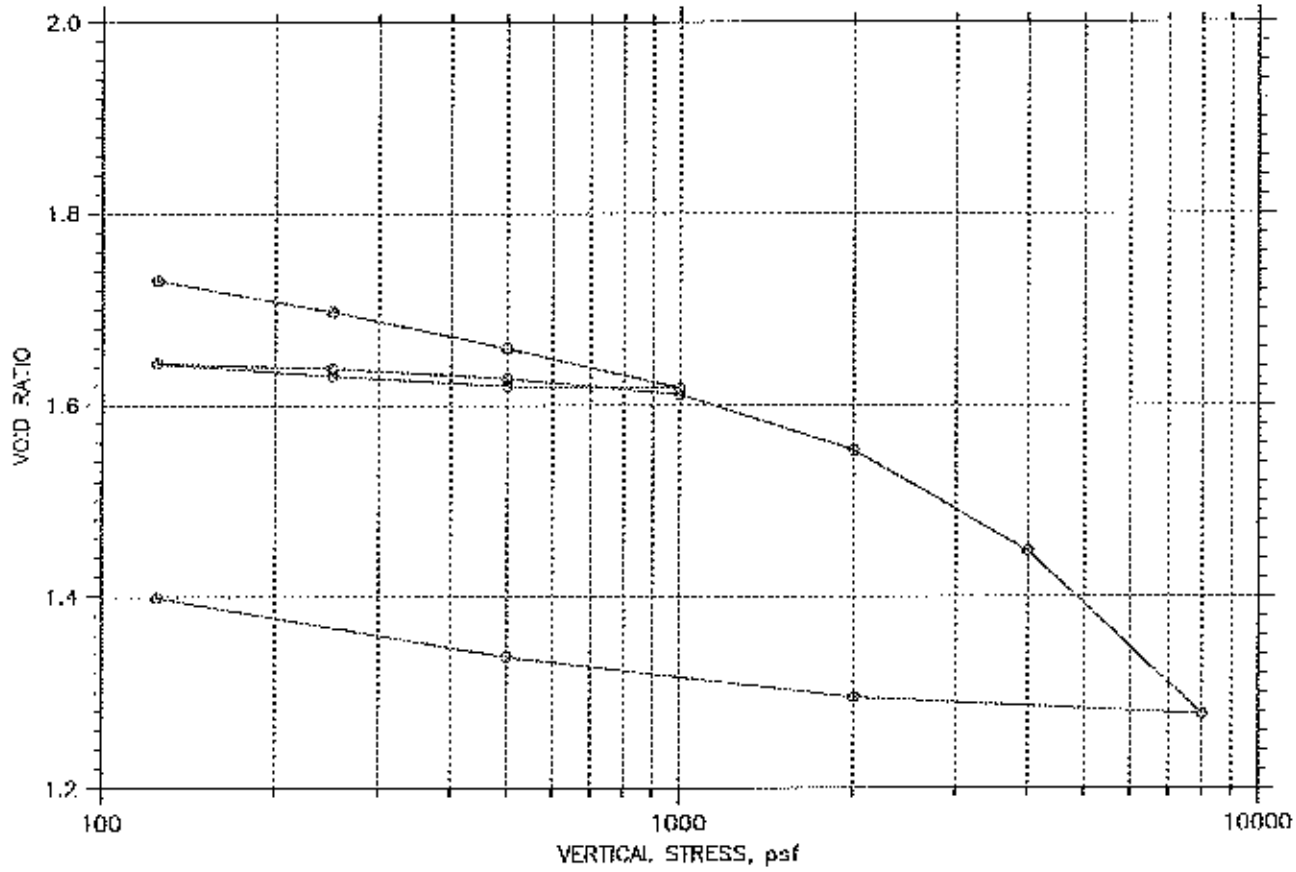
					Before Test	After Test
Overburden Pressure: 1200 psf				Water Content, %	99.32	50.16
Preconsolidation Pressure: 2800 psf				Dry Unit Weight, pcf	60.77	69.76
Compression Index: 3.81959e-313				Saturation, %	151.82	96.13
Diameter: 2.5 in		Height: 1 in		Void Ratio	1.75	1.40
LL: NP	PL: NP	PI: NP	GS: 2.68			

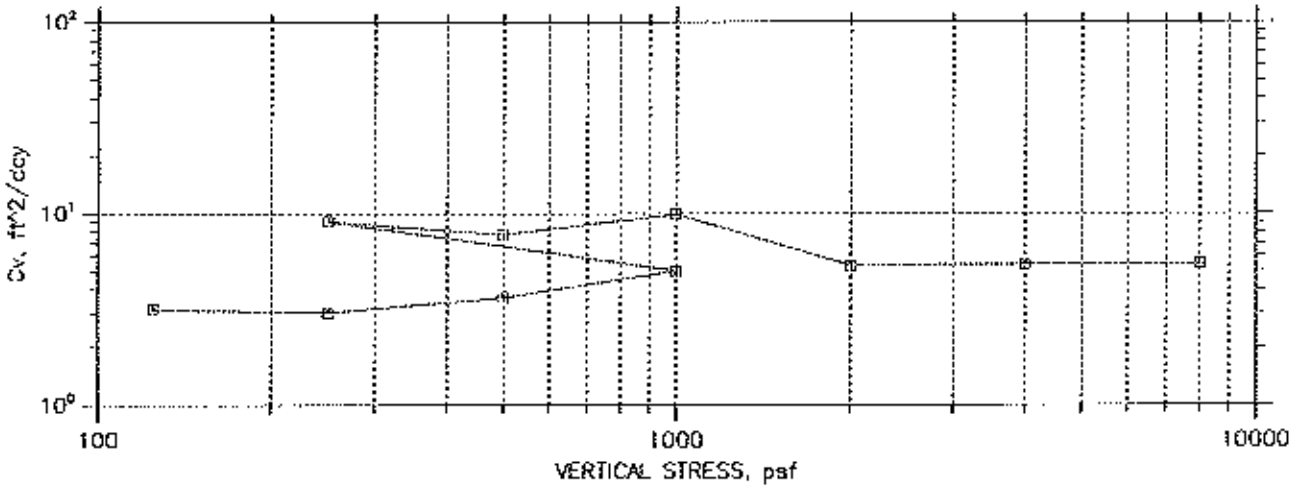
	Project: Dupree Rd.Over I-575	Location: Cherokee County, GA	Project No.: 171-3099 G
	Boring No.: W-5	Tested By: kulin	Checked By: M.K.
	Sample No.: 564+00,30'L	Test Date: 11/01/07	Depth: 10-12 feet
	Test No.: 3541	Sample Type: Shelby Tube	Elevation: 880-878feet
	Description: Black and brown silty medium to fine SAND (micaceous)		
	Remarks: ASTM D2435		

Mon, 28-JAN-2008 08:23:40

CONSOLIDATION TEST DATA

SUMMARY REPORT



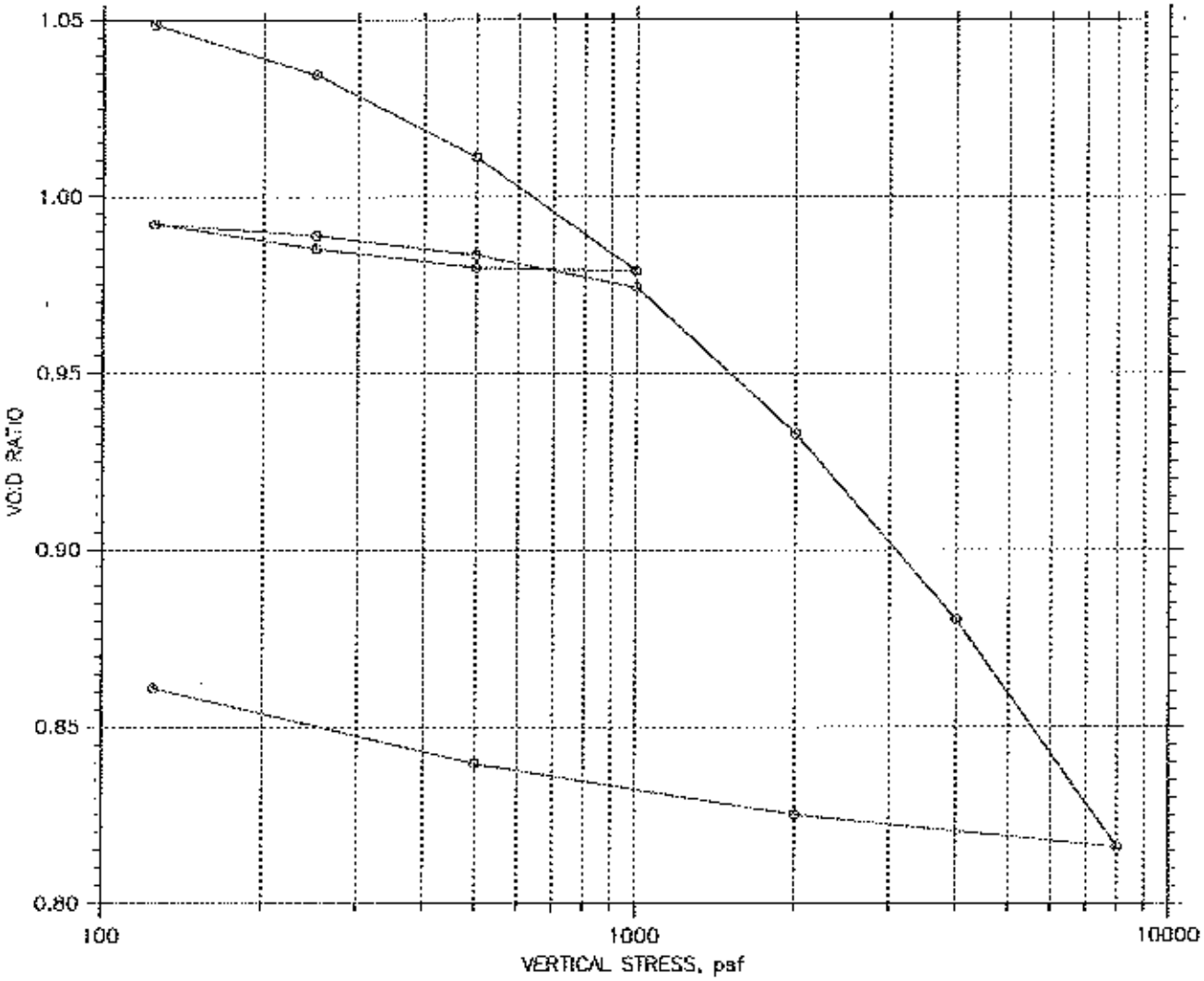


	Project: Dupree Rd.Over I-575	Location: Cherokee County, GA	Project No.: 171-3099 G
	Boring No.: W-5	Tested By: kulin	Checked By: M.K.
	Sample No.: 564+00,30'L	Test Date: 11/01/07	Depth: 10-12 feet
	Test No.: 3541	Sample Type: Shelby Tube	Elevation: 880-878feet
	Description: Black and brown silty medium to fine SAND (micaceous)		
	Remarks: ASTM D2435		

Mon, 28-JAN-2008 08:23:40

CONSOLIDATION TEST DATA

SUMMARY REPORT



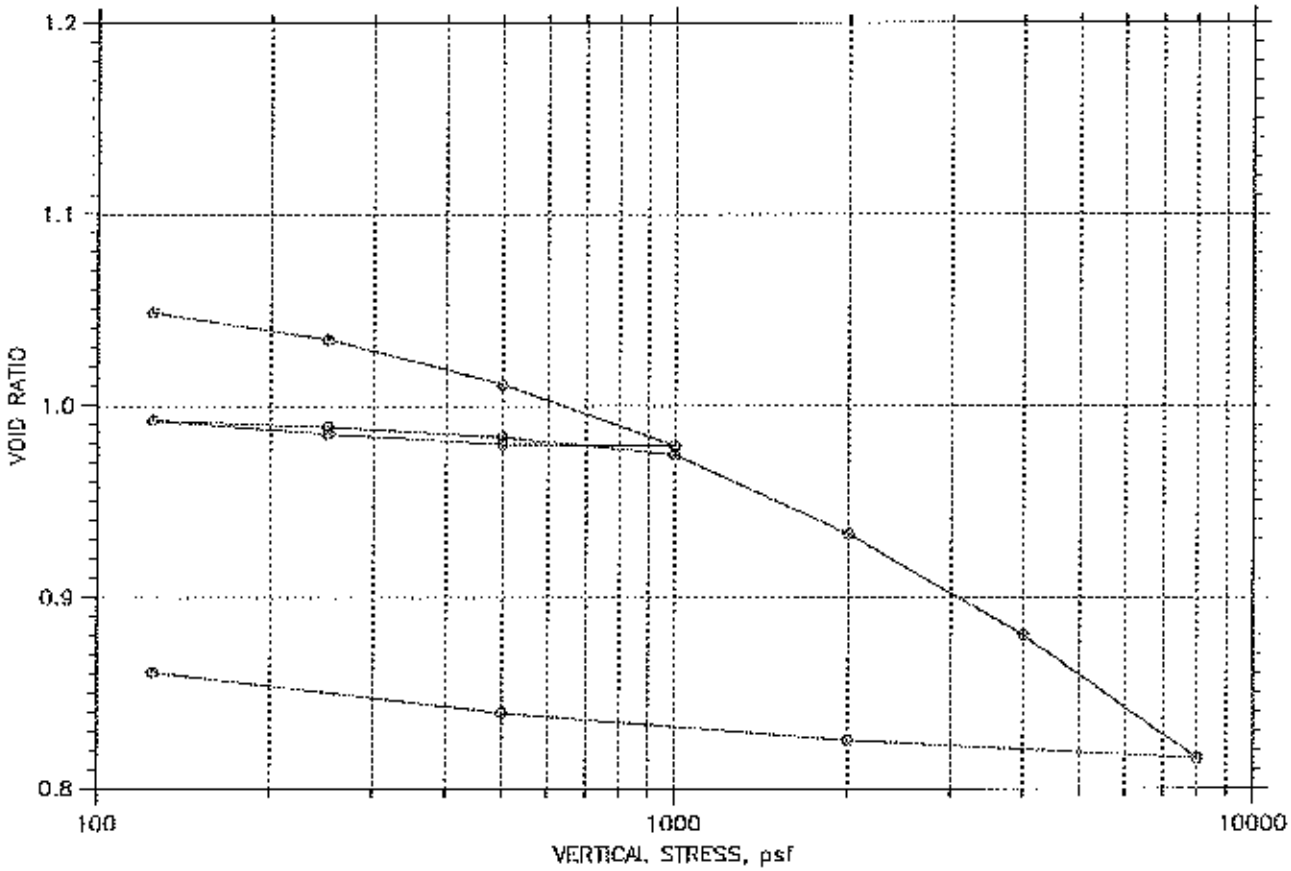
				Before Test	After Test
Overburden Pressure: 1400 psf				Water Content, %	25.75	31.38
Preconsolidation Pressure: 1400 psf				Dry Unit Weight, pcf	81.07	89.91
Compression Index: 3.81959e-313				Saturation, %	64.87	97.70
Diameter: 2.5 in		Height: 1 in		Void Ratio	1.06	0.86
LL: NP	PL: NP	PI: NP	GS: 2.68			

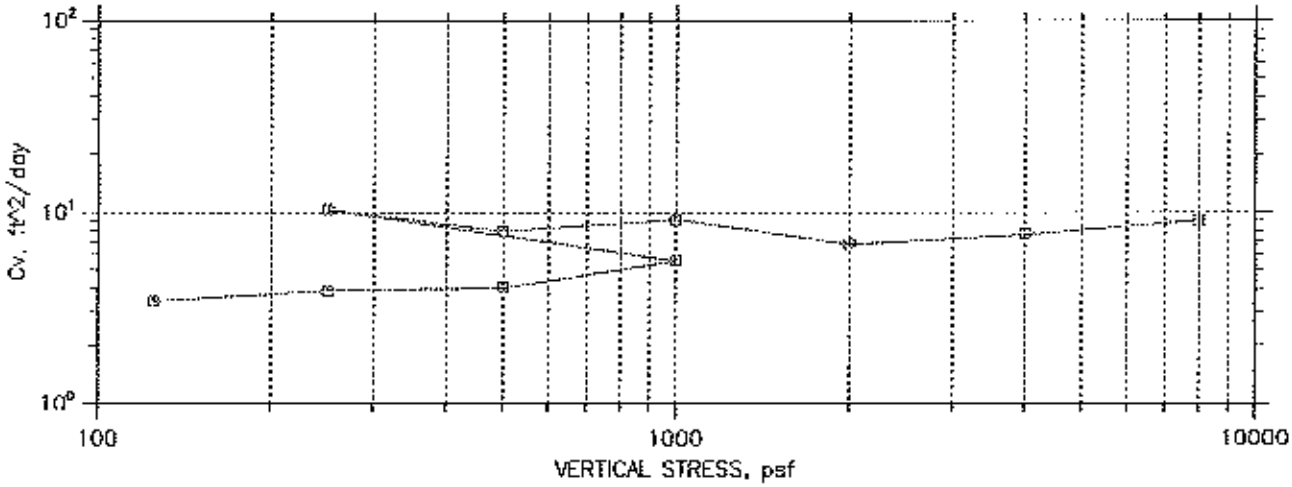
	Project: Dupree Rd.Over I-575	Location: Cherokee County, GA	Project No.: 171-3099 G
	Boring No.: W-6	Tested By: kulin	Checked By: M.K.
	Sample No.: 566+00,20'R	Test Date: 10/25/07	Depth: 12-14 feet
VVR	Test No.: 3540	Sample Type: Shelby Tube	Elevation: 878-876feet
	Description: Reddish brown silty medium to fine SAND (micaceous)		
	Remarks: ASTM D2435		

Mon, 28-JAN-2008 08:27:38

CONSOLIDATION TEST DATA

SUMMARY REPORT

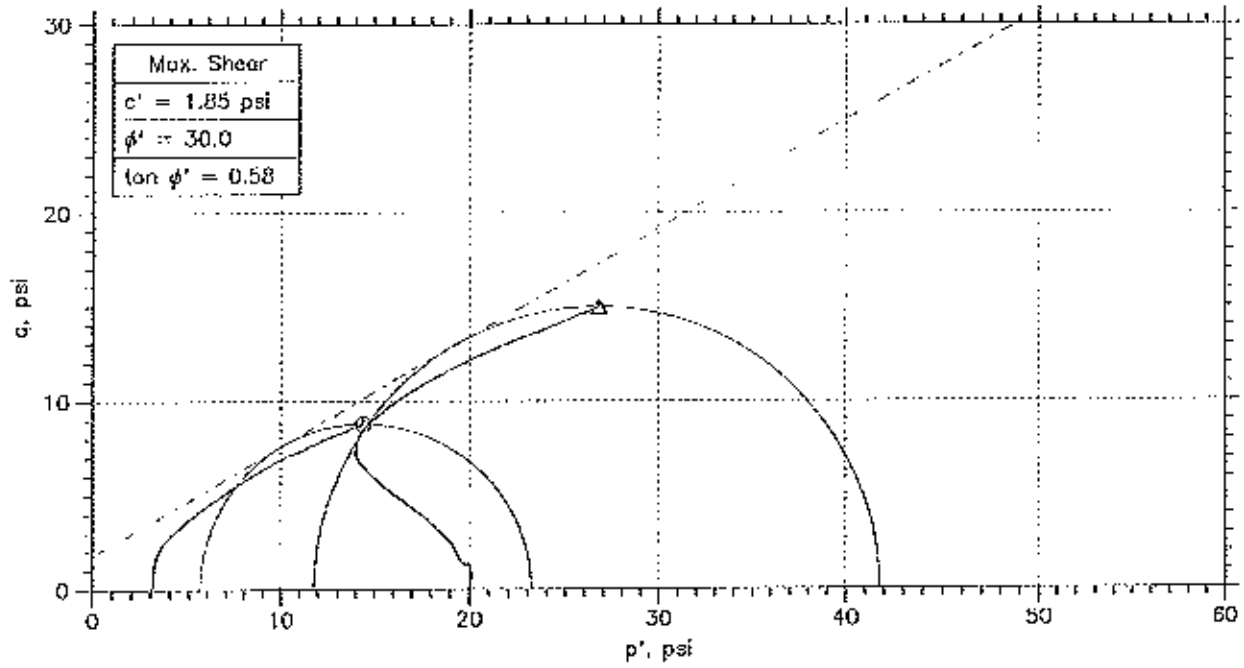


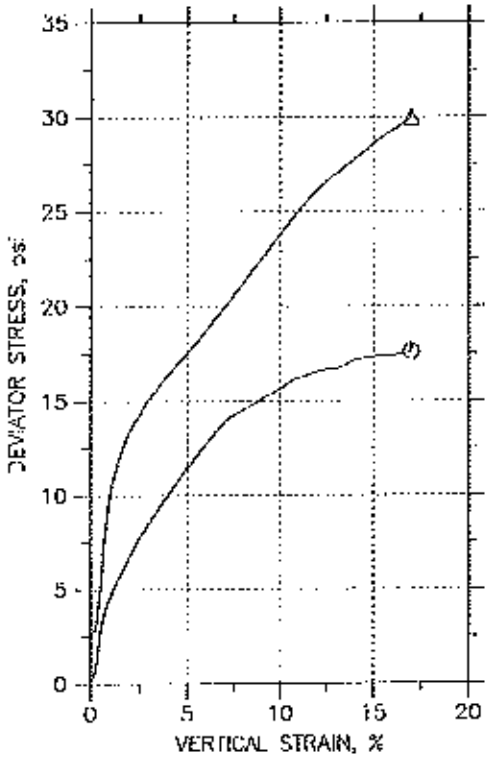


Project: Dupree Rd.Over I-575	Location: Cherokee County, GA	Project No.: 171-3099 G
Boring No.: W-6	Tested By: kulin	Checked By: M.K.
Sample No.: 566+00,20'R	Test Date: 10/25/07	Depth: 12-14 feet
Test No.: 3540	Sample Type: Shelby Tube	Elevation: 878-876feet
Description: Reddish brown silty medium to fine SAND (micaceous)		
Remarks: ASTM D2435		

Mon, 28-JAN-2008 08:27:38

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		⊙	△		
Sample No.		ST-1	St-1		
Test No.		8111.0	8111.3		
Depth		7-9 Ft.	7-9 Ft.		
Initial	Diameter, in	2.875	2.88		
	Height, in	5.997	6.002		
	Water Content, %	30.2	17.7		
	Dry Density, pcf	89.84	104.7		
	Saturation, %	95.1	81.0		
	Void Ratio	0.841	0.58		
Before Shear	Water Content, %	34.1	22.8		
	Dry Density, pcf	86.89	103.2		
	Saturation*, %	100.0	100.0		
	Void Ratio	0.904	0.603		
	Back Press., psi	90.	114.		
Ver. Eff. Cons. Stress, psi		2.985	20.		
Shear Strength, psi		8.801	14.98		
Strain at Failure, %		17	17		
Strain Rate, %/min		0.1	0.1		
B-Value		0.98	0.96		
Estimated Specific Gravity		2.65	2.65		
Liquid Limit		---	---		
Plastic Limit		---	---		

MACTEC

Project: DuPree Rd over I-575

Location: St 562+00 220' Lt. of Cl.

Project No.: 6155070328

Boring No.: W-9

Sample Type: Shelby Tube

Description: Tan Brown Sandy Silt

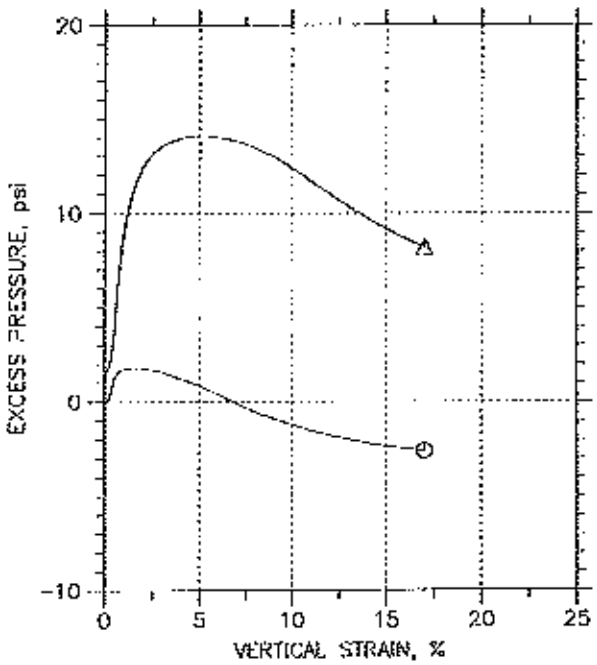
Remarks:

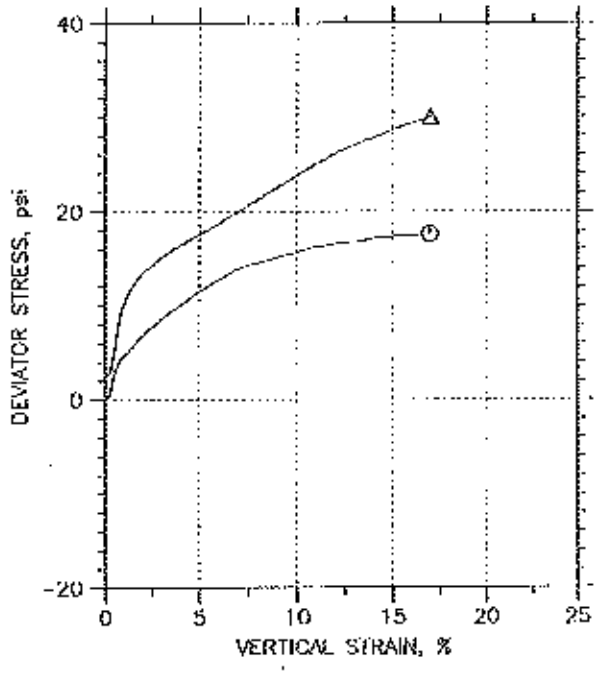
Phase calculations based on start and end of test.

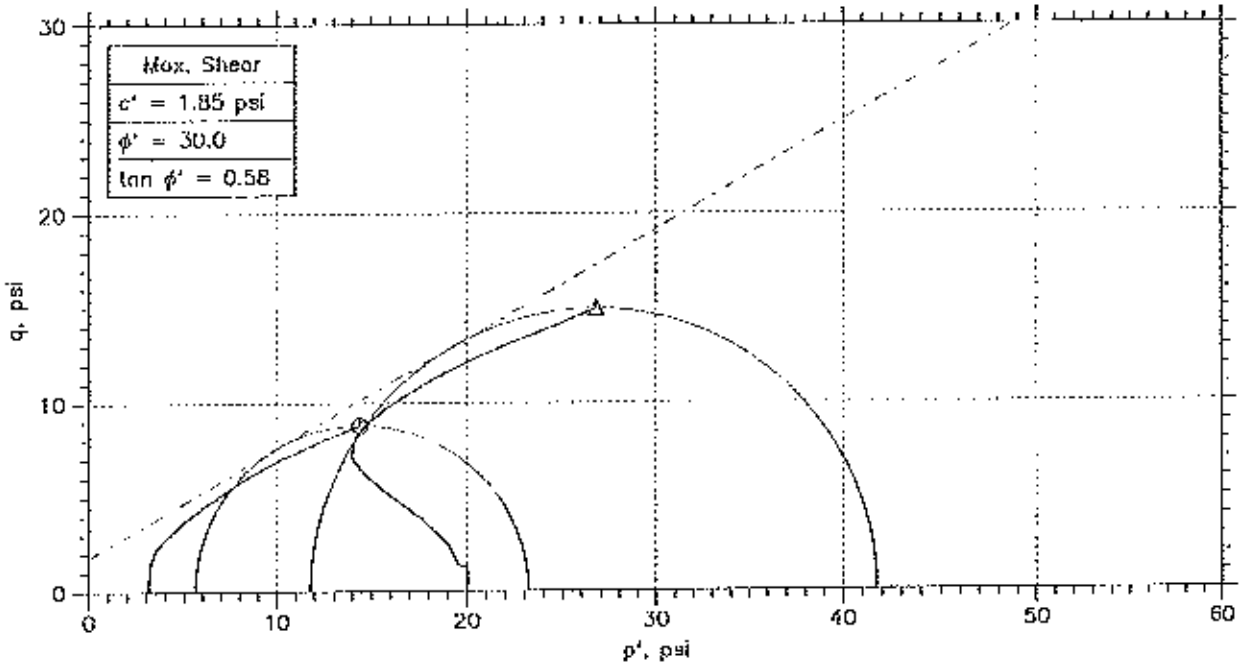
* Saturation is set to 100% for phase calculations.

Fri, 11-JAN-2008 15:11:44

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⏀	ST-1	8111.0	7-9 Ft.	HJ	12/07/07	JW	1/11/08	8111.1_2582.dat
△	St-1	8111.3	7-9 Ft.	HJ	12/7/07	JW	1/11/08	8111.3_2583.dat

MACTEC

Project: DuPree Rd over I-575	Location: St 562+00 220' Lt. of C	Project No.: 6155070328
Boring No.: W-9	Sample Type: Shelby Tube	
Description: Tan Brown Sandy Silt		
Remarks:		

Fri, 11-JAN-2008 15:11:44

APPENDIX II

DOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA
GEOTECHNICAL ENGINEERING

BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00 (256)

PROJECT PI No. 0008256 COUNTY CHEROKEE DATE 3/21/80

LOCATION Dupree Road over I-575 BORING NO. B-2

BENT NO. I-West Br. FOOTING GROUND ELEV. 904.96

PROPOSED FOOTING ELEV. PARTY CHIEF SPORNBERGER

ELEV.	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	ø
	Gr. El.												
900		1s	7										
GWT	Loose Mitc. Micas Sandy Silt	2s	9										
890		3s	10										
		4s	6										
880		5s	7										
		6s	5										
870		7s	6										
860	Very Dense Sand	8s	60=.7'										
	Practical Refusal												
850													
840													

The Department of Transportation in making this information report available to contractors assumes no responsibility for its accuracy.

No claim will be considered if the contractor relies on this information in his bidding or in the construction operations and finds that it is inaccurate.

This foundation investigation report is not considered as a part of the plans and specifications or contract on the job.

DOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA
GEOTECHNICAL ENGINEERING

BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00 (256)

PROJECT PI No. 0008256 COUNTY CHEROKEE DATE 3/25/80

Dupree Road over I-575

LOCATION BORING NO. B-5

2- West Br.

BENT NO. FOOTING GROUND ELEV. 898.15

PROPOSED FOOTING ELEV. PARTY CHIEF SPORNBERGER

ELEV.	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	ø
900	Gr. El.												
	Asphalt & Base												
	Med. Dense Mitc. Micas Sandy Silt	1s	16										
GWT 890													
		2s	5										
880	Loose Same	3s	7										
		4s	7										
870		5s	6										
		6s	10										
860	Very Dense Same	7s	60										
	Practical Refusal												
850													
840													

[illegible] of Transportation [illegible] assumes [illegible] as to its accuracy.

No claim will be considered if the contractor relies on this information in his bidding or in his construction operations and finds that it is inaccurate.

This foundation investigation report is not considered as a part of the Plans and Specifications or Contract on the job.

BOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA
GEOTECHNICAL ENGINEERING

BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00 (256)

PROJECT PI No. 0008256 COUNTY CHEROKEE DATE 3/25/80

LOCATION Dupree Road over I-575 BORING NO. B-7

BENT NO. 2- East Br. FOOTING GROUND ELEV. 894.60

PROPOSED FOOTING ELEV. PARTY CHIEF SPORNBERGER

ELEV	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	φ
900													
	Gr. El.												
890	Loose Mic. Micas Sandy Silt	1s	9										
GWT													
880	Med. Dense Sand	2s	17										
		3s	11										
	Loose Sand	4s	10										
870		5s	16										
	Med. Dense Sand	6s	16										
860		7s	18										
	Dense Sand	8s	26										
850		9s	48										
	Very Dense Sand	10s	60										
840	(Cont.)												

The Department of Transportation in making this foundation report available to contractors assumes no responsibility for its accuracy.

DOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA
GEOTECHNICAL ENGINEERING

PROJECT CSNHS-0008-00 (256) PI No. 0008256 COUNTY Cherokee DATE

LOCATION Dupree Road over I-575 2- East Br. BORING NO. B-7 (Cont)

BENT NO. FOOTING GROUND ELEV.

PROPOSED FOOTING ELEV. PARTY CHIEF

LEV	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	ø		
	Practical Refusal @														

The Department of Transportation in making this foundation report available to contractors assumes no responsibility for its accuracy.

No claim will be [illegible] or relied on [illegible] in his [illegible] it is [illegible].

This foundation investigation report is not considered as a part of the Plans and Specifications [illegible].