BURNS COOLEY DENNIS, INC.
GEOTECHNICAL AND MATERIALS ENGINEERING CONSULTANTS

CHEMICALLY STABILIZED SOILS

Prepared for
Mississippi Department of Transportation

State Study No. 205
Project No. SPR-1(51)/105129 134000

Prepared by
Robert S. James, P.E.
L. Allen Cooley, Jr., Ph.D.
R. C. Ahlrich, Ph.D., P.E.

December 2009

Technical Report Documentation Page

1.Report No. FHWA/MS-DOT-RD-09-205	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Chemically Stabilized Soils		5. Report Date December 2009
		6. Performing Organization Code BCD No. 070904
7. Author(s) Robert S. James, L. Allen Cooley, Jr. and R. C. Ahlrich		8. Performing Organization Report No. MS-DOT-RD-09-205
9. Performing Organization Name and Address Burns Cooley Dennis, Inc. Post Office Box 12828 Jackson, Mississippi 39236		10. Work Unit No. (TRAIS)
		11. Contract or Grant No. SS-205
12. Sponsoring Agency Name and Address Mississippi Department of Transportation P.O. Box 1850 Jackson, MS 39215-1850		13. Type Report and Period Covered Final Report (March 2008 to December 2009)
		14. Sponsoring Agency Code
15. Supplementary Notes MDOT State Study 205 Project No. SPR-1(51)/105129 134000		

16. Abstract: The objective of this study was to conduct laboratory evaluations to quantify the effects of compaction and moisture conditions on the strength of chemically treated soils typical utilized in pavement construction in Mississippi. In order to accomplish these objectives, seven typical virgin soils of Mississippi were selected for evaluation. Strength tests were conducted on these virgin materials in order to develop baseline strength data. Next, selected soils were combined with lime, cement, and/or lime/fly ash to represent typical MDOT stabilized materials. Tests conducted within this study included the CBR, unconfined compression test and resilient modulus.

17. Key Words Chemical Stabilization, Cement, Lime, Lime/Fly Ash, Compaction, Resilient Modulus, CBR, Unconfined Compressive Strength		18. Distribution Statement Unclassified	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 396	22. Price

Form DOT F 1700.7 (8-72)

Reproduction of completed page authorized

NOTICE

The contents of this report reflect the views of the authors, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the views or policies of the Mississippi Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government and the State of Mississippi assume no liability for its contents or use thereof.

The United States Government and the State of Mississippi do not endorse products or manufacturers. Trade or manufacturer's names appear herein solely because they are considered essential to the object of this report.

TABLE OF CONTENTS

TABLE OF CONTENTS iii

LIST OF TABLES iv

LIST OF FIGURES vii

CHAPTER 1 – INTRODUCTION 1

1.1 INTRODUCTION AND PROBLEM STATEMENT 1

1.2 OBJECTIVE 2

CHAPTER 2 – TEST PLAN 3

2.1 PHASE I 3

2.2 PHASE II 4

CHAPTER 3 – TEST METHODS 5

CHAPTER 4 – TEST RESULTS AND ANALYSIS 7

4.1 PHASE I 7

4.1.1 Virgin Soils 8

4.1.2 Stabilized Soils 12

4.2 PHASE II 28

4.2.1 Virgin Soils 28

4.2.2 Stabilized Soils 32

CHAPTER 5 – CONCLUSIONS AND RECOMMENDATIONS 41

5.1 Conclusions 41

5.2 Recommendations 42

LIST OF TABLES

Table 1: Soil and Stabilized Soil Combinations Investigated in this Research 3

Table 2: MEPDG Protocol for Strength Testing of Soils and Stabilized Soils 4

Table 3: Classification of Soils 7

Table 4: Virgin Soil CBR Data at Optimum Moisture Content 8

Table 5: CBR Values for Virgin Materials at Selected Density Levels – Optimum Moisture Content 10

Table 6: Virgin Soil CBR Data at Optimum + 3 Percent Moisture Content 10

Table 7: CBR Values for Virgin Materials at Selected Density Levels – Optimum + 3 Percent Moisture 12

Table 8: Additional Mix Design Testing 14

Table 9: Lime Stabilized Soil CBR Data at Optimum Moisture Content 15

Table 10: Comparison of CBR Values for Virgin Materials and Lime Stabilized Materials – Optimum Moisture Content 16

Table 11: Lime Stabilized Soil CBR Data at Optimum +3percent Moisture Content 17

Table 12: Comparison of CBR Values for Virgin Materials and Lime Stabilized Materials – Optimum Moisture Content + 3percent 18

Table 13: Cement Stabilized Soil Unconfined Compression Data at Optimum Moisture Content 20

Table 14: UC Values for Cement Stabilized Materials at Selected Density Levels – Optimum Moisture Content 21

Table 15: Cement Stabilized Soil Unconfined Compression Data at Optimum + 3 Percent Moisture Content 22

Table 16: UC Values for Cement Stabilized Materials at Selected Density Levels – Optimum + 3 Percent Moisture Content 23

Table 17: Lime/Fly Ash Stabilized Soil - Unconfined Compression Results at Optimum Moisture Content 24

Table 18: UC Values for Lime/Fly Ash Stabilized Materials at Selected Density Levels – Optimum Moisture Content 25

Table 19: Lime/Fly Ash Stabilized Soil - Unconfined Compression Results at Optimum + 3 Percent Moisture Content 26

Table 20: UC Values for Lime/Fly Ash Stabilized Materials at Selected Density Levels – Optimum + 3 Percent Moisture Content 27

Table 21: Virgin Soil Resilient Modulus Testing at Optimum Moisture Content 29

Table 22: Resilient Modulus Values for Virgin Materials at Selected Density Levels – Optimum Moisture Content 30

Table 23: Virgin Soil Resilient Modulus Testing at Optimum + 3 Percent Moisture Content 32

Table 24: Lime Stabilized Soil Resilient Modulus Testing at Optimum Moisture Content 33

Table 25: Lime Stabilized Soil Resilient Modulus Testing at Optimum + 3 Percent Moisture Content 34

Table 26: Cement Stabilized Soil Elastic Modulus Calculations at Optimum Moisture Content 37

Table 27 Cement Stabilized Soil Elastic Modulus Calculations at Optimum + 3 Percent Moisture Content 38

Table 28: Lime-Fly-Ash Stabilized Soil Elastic Modulus Calculations at Optimum Moisture Content 39

Table 29: Lime-Fly-Ash Stabilized Soil Elastic Modulus Calculations at Optimum + 3 Percent Moisture Content 40

LIST OF FIGURES

Figure 1: Optimum Moisture CBR Results for Virgin Soils at Various Densities.....9

Figure 2: Optimum + 3 Percent Moisture CBR Results for Virgin Soils at Various Densities 11

Figure 3: Comparison of CBR Values at Optimum and Optimum + 3 Percent Moisture for Virgin Materials 12

Figure 4: Optimum Moisture CBR Results for Lime Stabilized Soils at Various Densities 16

Figure 5: Optimum + 3 Percent Moisture CBR Results for Lime Stabilized Soils at Various Densities.....18

Figure 6: Comparison of CBR Values at Optimum and Optimum + 3 Percent Moisture for Lime Stabilized Materials 19

Figure 7: Optimum Moisture UC 14 Day Strengths for Cement Stabilized Soils at Various Densities.....20

Figure 8: Optimum + 3 Percent Moisture UC 14 Day Strengths for Cement Stabilized Soils at Various Densities.....22

Figure 9: Optimum Moisture UC 28 Day Strengths for Lime/Fly Ash Stabilized Soils at Various Densities.....25

Figure 10: Optimum + 3 Percent Moisture UC 28 Day Strengths for Lime/Fly Ash Stabilized Soils at Various Densities 27

Figure 11: Comparison of CBR Values at Optimum and Optimum + 3 Percent for Lime/Fly Ash Stabilized Materials.....28

Figure 12: Results of Resilient Modulus Testing on Virgin Materials – Optimum Moisture Content 30

Figure 13: Resilient Modulus Values for Lime Stabilized Materials – Optimum.....35

Figure 14: Comparison of Resilient Modulus Values for Virgin and Lime Stabilized Materials – Optimum Moisture Content.....35

Figure 15: Resilient Modulus Values for Lime Stabilized Materials - Optimum + 3 Percent Moisture Content 36

CHAPTER 1 – INTRODUCTION

1.1 INTRODUCTION AND PROBLEM STATEMENT

As part of the Mississippi Department of Transportation's (MDOT's) pavement design policies, subgrade soils and base materials are generally chemically stabilized to provide increased strength and integrity. Three types of chemical stabilization typically utilized during the construction of MDOT roadways are: lime treatment, cement treatment, or lime/fly ash treatment. Construction of lime treated soils is governed by Section 307 of the Mississippi Standard Specifications for Road and Bridge Construction, while Sections 308 and 311 govern the construction of cement treatment and lime/fly ash treatment, respectively.

Within the standard MDOT specifications, the construction requirements for field compaction for the three stabilization techniques are slightly different. One constant within the specifications is that each lot of stabilized material shall be divided into five equal sublots. Within each sublot, a single density measurement shall be randomly taken. The slight difference within the three specifications is that the density measurements for lime stabilized materials must average 95 percent of maximum dry density with no individual measurement less than 91 percent, while for the cement stabilized and lime/fly ash stabilized materials the average must be 98 percent of maximum dry density with no value less than 94 percent. Interestingly, no requirements are found within the three specifications for the allowable range of moisture contents when measuring field density. However, the allowable range of moisture contents may be inferred in that it would become difficult to meet the maximum dry density requirements with moisture contents greatly deviating from optimum.

Current MDOT pavement design procedures utilize the California Bearing Ratio (CBR) test or the Unconfined Compression (UC) test to characterize the strength of the chemically treated subgrade soils and base materials. The new Mechanistic-Empirical Pavement Design Guide (MEPDG) uses elastic modulus (E) calculated from UC test results for cement and lime/fly ash treated soils, and resilient modulus (M_R) values to characterize lime treated soils.

1.2 OBJECTIVE

In conversations with MDOT representatives, the influence of density and moisture content on the strength of chemically stabilized materials has not been quantified. As the owner that specifies and monitors highway construction, an understanding of the influence of these two properties is very important. **Therefore, the objective of this study was to conduct laboratory evaluations to quantify the effects of compaction (density levels) and moisture conditions on the strength of chemically treated soils and bases for the typical Mississippi DOT highways.** Because MDOT is in the transition between the American Association of State Highway and Transportation Officials (AASHTO) pavement design guide and the MEPDG, quantifying the stabilized materials with test methods required by both pavement design systems was conducted. These results can be used to optimize current and future pavement structural sections and to provide data to improve construction specifications. This research will enhance MDOT's capabilities to design highways and will provide material properties that can be used to predict pavement performance.

CHAPTER 2 – TEST PLAN

The test plan was divided into two phases. Phase I evaluated virgin soils and chemically stabilized soils by the current, traditional MDOT methods to provide a baseline of data typically utilized by the existing pavement structural design procedures. Phase II evaluated the same materials using the recommended MEPDG test methods. Both phases prepared specimen at varying density levels and moisture conditions. The following sections describe the work within each phase.

2.1 PHASE I

Within Phase I testing, fourteen combinations of various Mississippi soils and materials and stabilization techniques were tested with the California Bearing Ratio (CBR) test and Unconfined Compression (UC) test. Additionally, the seven virgin soil materials were tested using the CBR test to generate baseline data for the materials. The combinations tested are shown in Table 1. **The soils were tested at various compaction levels (designated as low, standard and high), at optimum moisture content and at three percent above optimum moisture content.** The compaction levels were created by adjusting the number of blows per layer when fabricating the samples.

As part of the testing of the various soils and chemically treated soils, all pertinent classification testing was performed as well as any required proctor density testing. The classification testing included Atterberg limits and gradation testing. Standard Proctor density testing was performed on each of the virgin soils as well as the chemically stabilized material combinations.

Table 1: Soil and Stabilized Soil Combinations Investigated in this Research

Material No.	Soil Type		Virgin	Chemical Treatment		
	ASTM	AASHTO		Lime	Lime-Fly Ash	Cement
1	CL	A-7-6	X	X	X	–
2	CL	A-6	X	X	X	X
3	ML	A-4	X	--	X	X
4	CL	A-4	X	X	X	X
5	SM	A-2-4	X	--	–	X
6	SM	A-2-4	X	--	–	X
7	SC	A-2-4	X	--	X	X

2.2 PHASE II

For Phase II, the same 21 combinations were tested using the new MEPDG design protocols. Table 2 shows the recommended protocols for the chemically stabilized material combinations. **These tests were also conducted at the low, standard and high compaction levels and at optimum moisture content and at three percent above optimum, where possible. The MEPDG protocols recommend resilient modulus testing for lime stabilized materials and unconfined compression testing for lime/fly ash and cement stabilized materials.** Elastic modulus, the required input within the MEPDG, is calculated from the unconfined compression test results for lime/fly ash and cement stabilized materials.

Table 2: MEPDG Protocol for Strength Testing of Soils and Stabilized Soils

Virgin Material No.	Classifications		Stabilization Method	MEDPG Protocol
	AASHTO	USCS		
1	A-7-6 (23)	CL	--	Resilient Modulus
2	A-6 (17)	CL	--	Resilient Modulus
3	A-4 (1)	ML	--	Resilient Modulus
4	A-4 (5)	CL	--	Resilient Modulus
5	A-2-4 (0)	SM	--	Resilient Modulus
6	A-2-4 (0)	SM	--	Resilient Modulus
7	A-2-4 (0)	SC	--	Resilient Modulus
1	A-7-6 (23)	CL	Lime	Resilient Modulus
2	A-6 (17)	CL	Lime	Resilient Modulus
4	A-4 (5)	CL	Lime	Resilient Modulus
1	A-7-6 (23)	CL	LFA	Unconfined Compression
2	A-6 (17)	CL	LFA	Unconfined Compression
3	A-4 (1)	ML	LFA	Unconfined Compression
4	A-4 (5)	CL	LFA	Unconfined Compression
7	A-2-4 (0)	SC	LFA	Unconfined Compression
2	A-6 (17)	CL	Cement	Unconfined Compression
3	A-4 (1)	ML	Cement	Unconfined Compression
4	A-4 (5)	CL	Cement	Unconfined Compression
5	A-2-4 (0)	SM	Cement	Unconfined Compression
6	A-2-4 (0)	SM	Cement	Unconfined Compression
7	A-2-4 (0)	SC	Cement	Unconfined Compression

*LFA - Lime-Fly Ash

CHAPTER 3 – TEST METHODS

Each soil evaluated in this study was tested to determine Unified Soil Classification System (USCS) and AASHTO classifications. This classification testing included Atterberg limit testing and gradation testing. The Atterberg limits were tested using American Association of State Highway and Transportation Officials (AASHTO) T89, "Determining the Liquid Limit of Soils" and AASHTO T90, "Determining the Plastic Limit and Plasticity Index of Soils." The gradation testing was accomplished using AASHTO T11, "Materials Finer than 75mm (No. 200) Sieve in Mineral Aggregates by Washing" and AASHTO T88, "Particle Size Analysis of Soils." The moisture density relationship (Proctor test) for each soil and chemically stabilized material was developed using MDOT methods with standard effort (MT–8 and MT–9).

The strength characterization for the virgin and stabilized soils was tested using the California Bearing Ratio (CBR), the Unconfined Compression (UC) test or the Resilient Modulus test. The CBR test method utilized was ASTM D 1883, "Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils." The stabilized soils were tested for unconfined compression strength using the standard MDOT test method MT-26, "Compressive Strength of Soil Cement Cylinders and Cores."

The resilient modulus testing was performed per the NCHRP 1-28A document entitled "Laboratory Determination of Resilient Modulus for Flexible Pavement Design," as was done during the development of the subgrade soils portion of the "Materials Library" within MDOT State Study 170.

The elastic modulus, the required MEPDG input for cement and lime-fly ash stabilized soils, is calculated from unconfined compression test results. The elastic modulus for the cement stabilized soil is calculated from the unconfined compression results as:

$$E = 1200 * q_u \,^{\dagger}$$

where:

E=Elastic Modulus

q_u=unconfined compression strength, psi

For the lime-fly-ash stabilized soil, the elastic modulus is calculated as:

$E = 1000 * (500 + q_u)$ †

where:

E=Elastic Modulus

q_u=unconfined compression strength, psi

† NCHRP, Guide for Mechanistic –Empirical Design of New and Rehabilitated Pavement Structures, Final Report, Part 2 Design Inputs, Chapter 2 Material Characterization, Page 2.2.61, Table 2.2.42, March 2004.

CHAPTER 4 – TEST RESULTS AND ANALYSIS

In order to properly characterize the soils used in this study, classification testing was performed. Results from classification testing are provided in Table 3. This table includes soil classifications using both the AASHTO and USCS methods. Also included in the table are the percent passing the 10, 40, 60 and 200 sieves; liquid limit; plastic limit; and plasticity index. Based upon the results of the classification testing, three silty clays (CL), one silt (ML), two silty sands (SM) and one clayey sand (SC) were tested. These soils are generally representative of the range of materials encountered in the state of Mississippi.

Table 3: Classification of Soils

Material No.	Classifications		% Passing # 10 (2.00 mm)	% Passing # 40 (0.425 mm)	% Passing # 60 (0.250 mm)	% Passing # 200 (0.075 mm)	Liquid Limit	Plastic Limit	Plasticity Index
	AASHTO	USCS							
1	A-7-6 (23)	CL	100	100	100	90	43	18	25
2	A-6 (17)	CL	100	100	100	93	37	19	18
3	A-4 (1)	ML	100	100	100	99	27	26	1
4	A-4 (5)	CL	100	100	98	83	22	14	8
5	A-2-4 (0)	SM	100	92	51	23	NP	NP	NP
6	A-2-4 (0)	SM	100	99	76	23	19	17	2
7	A-2-4 (0)	SC	100	99	65	33	25	16	9

4.1 PHASE I

The phase one testing of the soils utilized traditional MDOT methods to evaluate the strength of soils used in construction. In order to accomplish the strength testing, the moisture-density relationships were required on all the virgin materials and the stabilized materials. A summary of the results for the moisture-density testing is presented in the tables of data showing the strength properties for the soils. The moisture-density curves for each material are presented in Appendix A.

4.1.1 Virgin Soils

Table 4 presents the results from the CBR testing performed on the seven virgin soils at optimum moisture content. Each soil was tested over a range of compactive efforts. The CBR samples were fabricated using three layers of soil with different blows per layer that varied from 10 to 80 in order to achieve the compaction level variations. Comparatively, the CBR test method calls for 56 blows per layer as the standard compactive effort (100 percent density). The percent moisture at which the samples were molded, the percent moisture after the four day soak, the initial density (pcf), the initial percent maximum dry density, and the percent saturation after soaking are presented in Table 4. All CBR data is presented in Appendix B.

Table 4: Virgin Soil CBR Data at Optimum Moisture Content

Material No.		1	2	3	4	5	6	7
ASTM		**CL**	**CL**	**ML**	**CL**	**SM**	**SM**	**SC**
AASHTO		**A-7-6**	**A-6**	**A-4**	**A-4**	**A-2-4**	**A-2-4**	**A-2-4**
Standard Effort Proctor								
Optimum Moisture, %		16.4	16.7	14.9	11.4	14.1	12.2	13.3
Maximum Dry Density, pcf		107.7	106.3	110.9	120.5	105.9	114.3	116.0
Specific Gravity		2.692	2.663	2.698	2.787	2.680	2.730	2.642
CBR using 3 lifts with Standard Hammer at Optimum Moisture								
10 Blows/Lift	% Moisture, Initial	15.3	--	14.6	11.8	13.9	12.0	13.4
	% Moisture, Final	29.6	--	23.9	17.5	19.2	18.3	19.7
	Density, pcf	85.1	--	95.8	101.0	97.8	102.7	96.3
	% Density	79.0	--	86.4	83.8	92.3	89.8	83.0
	% Saturation	81.8	--	85.1	67.6	72.5	75.8	73.1
	CBR, %	0.2	--	1.3	1.3	3.0	3.7	1.5
25 Blows/Lift	% Moisture, Initial	15.4	16.7	14.5	11.7	13.9	12.1	13.4
	% Moisture, Final	24.8	21.2	19.7	14.0	15.9	15.4	15.0
	Density, pcf	95.8	101.3	104.9	113.1	104.4	110.4	108.6
	% Density	89.0	95.3	94.6	93.8	98.6	96.6	93.6
	% Saturation	88.6	88.2	87.9	72.6	70.8	77.4	76.5
	CBR, %	1.0	1.9	7.3	8.3	13.4	13.2	8.3
56 Blows/Lift	% Moisture, Initial	16.1	15.4	14.4	11.8	14.0	11.6	13.3
	% Moisture, Final	22.6	20.0	17.0	12.0	14.6	13.1	13.1
	Density, pcf	106.1	106.8	110.4	120.8	107.5	116.4	116.7
	% Density	98.5	100.5	99.5	100.3	101.5	101.8	100.6
	% Saturation	104.3	95.8	87.4	76.1	70.4	77.1	83.9
	CBR, %	2.7	2.8	10.3	11.2	18.3	29.7	17.9
80 Blows/Lift	% Moisture, Initial	16.5	15.7	14.6	12.1	14.1	12.2	13.3
	% Moisture, Final	21.4	17.9	16.2	12.1	14.5	12.7	13.1
	Density, pcf	108.3	109.9	111.2	120.7	108.1	117.1	118.3
	% Density	100.6	103.4	100.3	100.2	102.1	102.4	102.0
	% Saturation	104.5	93.1	85.0	76.5	71.1	76.2	88.0
	CBR, %	3.2	4.1	12.6	15.7	22.6	31.9	28.0

Figure 1 illustrates the relationship between CBR and percent maximum dry density for each of the seven virgin materials. **The data indicates the CBR values increase as the percent of maximum dry density increases.** Based upon the seven relationships, the fine-grained silty clay materials, represented by Materials 1 and 2, had the lowest CBR values. These two materials also had the highest plasticity indexes. The sandy soils (Materials 5, 6 and 7) tended to have the highest CBR values at a given percent maximum dry density level. Table 5 presents the CBR values for the seven virgin materials at percent maximum dry density levels of 90, 95, 98, 100, and 102 percent. As shown in this table, there are generally significant increases in CBR values between 90 and 100 percent maximum dry density. The table also shows that there are significant increases in CBR values between 95 and 98 percent maximum dry density for the sandy soils (Materials 3, 5, 6, and 7); however, the increase in CBR values for the plastic silty clays (Materials 1, 2 and 4) are minimal in this range.

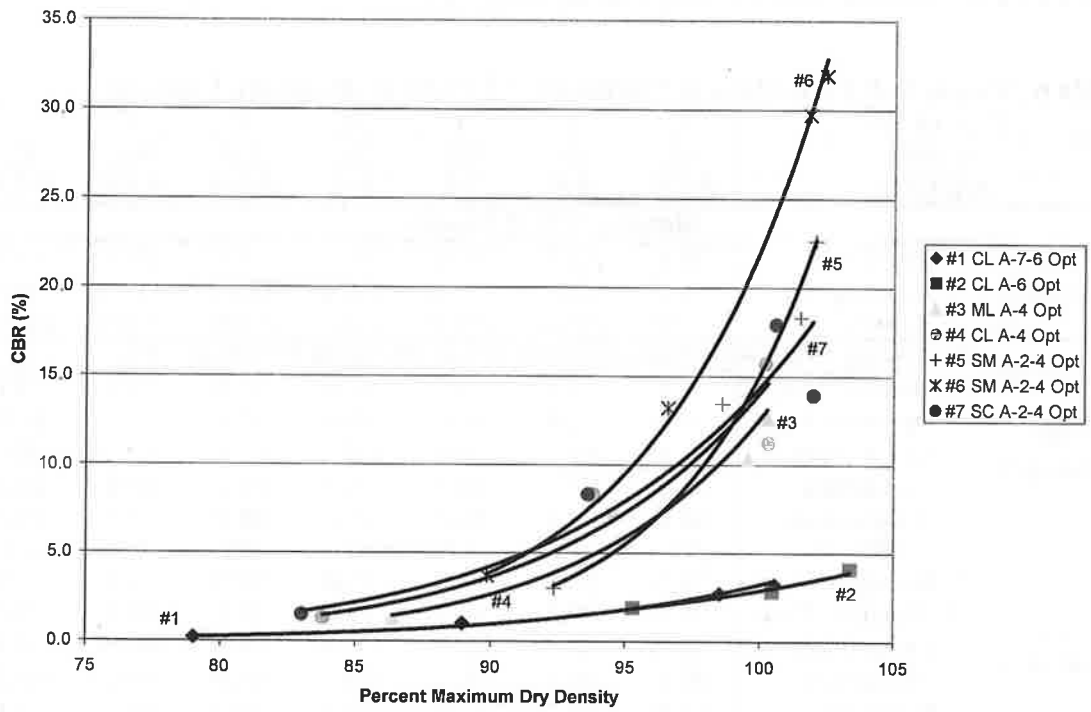


Figure 1: Optimum Moisture CBR Results for Virgin Soils at Various Densities

Table 5: CBR Values for Virgin Materials at Selected Density Levels – Optimum Moisture Content

% Max. Dry Density	CBR Values						
	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6	Material 7
90	1	1	3	1	2	4	4
95	2	1	6	3	6	10	8
98	3	2	10	4	11	17	11
100	3	2	13	6	16	24	14
102	4	3	18	8	24	33	17

Table 6 presents the results of CBR testing conducted on each of the virgin soils at moisture contents of optimum plus 3 percent. Again, each soil was tested over a range of compactive efforts. **As expected, the optimum plus 3 percent samples were generally weaker than the samples molded at optimum moisture content.** Figure 2 is a graphical representation of the data in Table 6. The general trend is CBR values increase as the percent maximum dry density increases.

Table 6: Virgin Soil CBR Data at Optimum + 3 Percent Moisture Content

Material No.		1	2	3	4	5	6	7
ASTM		**CL**	**CL**	**ML**	**CL**	**SM**	**SM**	**SC**
AASHTO		**A-7-6**	**A-6**	**A-4**	**A-4**	**A-2-4**	**A-2-4**	**A-2-4**
Standard Effort Proctor								
Optimum Moisture, %		16.4	16.7	14.9	11.4	14.1	12.2	13.3
Maximum Dry Density, pcf		107.7	106.3	110.9	120.5	105.9	114.3	116.0
Specific Gravity		2.692	2.663	2.698	2.787	2.680	2.730	2.642
CBR using 3 lifts with Standard Hammer at Optimum Moisture + 3%								
10 Blows/Lift	% Moisture, Initial	19.1	19.4	18.0	14.9	17.3	15.7	16.1
	% Moisture, Final	29.0	24.8	22.8	15.5	17.7	15.7	17.9
	Density, pcf	87.4	92.6	98.0	108.5	98.7	106.2	100.7
	% Density	81.2	87.1	88.4	90.0	93.2	92.9	86.8
	% Saturation	84.7	83.1	85.7	71.7	68.3	71.0	74.2
	CBR, %	0.5	0.6	1.2	1.5	3.6	4.8	2.4
25 Blows/Lift	% Moisture, Initial	18.3	20.4	18.0	15.0	17.0	15.2	17.0
	% Moisture, Final	22.7	20.8	19.3	15.0	17.6	15.4	15.7
	Density, pcf	100.9	101.9	105.3	113.4	99.9	111.5	110.4
	% Density	93.7	95.8	95.0	94.1	94.3	97.6	95.2
	% Saturation	91.9	87.7	87.0	78.3	70.0	79.7	84.1
	CBR, %	2.2	2.2	3.3	1.7	4.1	6.4	3.2
56 Blows/Lift	% Moisture, Initial	19.1	19.6	18.2	14.8	17.1	15.1	15.9
	% Moisture, Final	19.6	19.8	18.4	14.8	16.8	15.5	16.0
	Density, pcf	105.5	104.7	106.3	113.9	101.8	112.0	112.1
	% Density	98.0	95.5	95.9	94.5	96.1	98.0	96.6
	% Saturation	89.1	89.8	85.0	78.3	70.0	81.2	89.7
	CBR, %	4.4	1.7	4.0	3.5	5.9	5.8	4.2

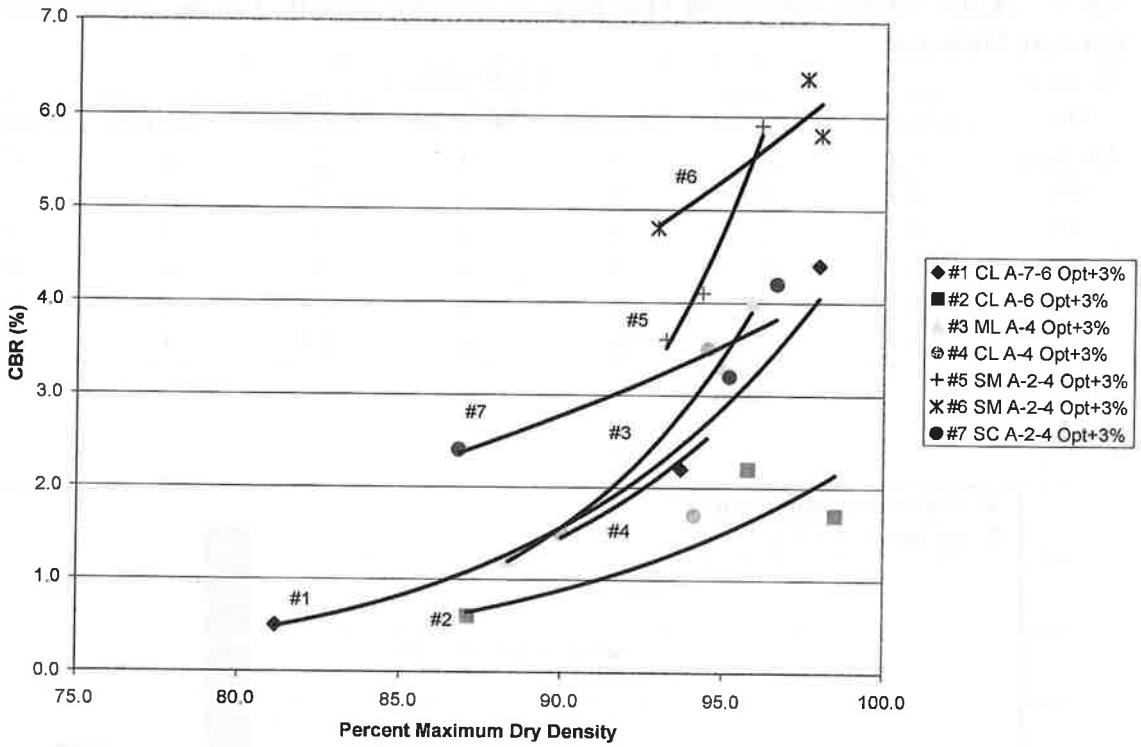


Figure 2: Optimum + 3 Percent Moisture CBR Results for Virgin Soils at Various Densities

Table 7 presents the CBR values at various density levels for the virgin materials tested at 3 percent above optimum moisture content. Comparison of Tables 5 and 7 provide an interesting observation. **The two silty clay soils with plasticity indexes of 18 and above had equal or higher CBR values when compacted at plus 3 percent moisture while the remaining five materials all had significant decreases in CBR values.** This is illustrated in Figure 3 at 98 percent maximum dry density. Additionally, the silty clay soil with a plasticity index of 8 (Material 4) had essentially the same CBR value at 98 percent of maximum dry density for both target moisture contents. **These two observations about CBR values would suggest that fine grained silty clay materials having plasticity indexes above 8 are less susceptible to slight increases in moisture when compacted to high percentages of maximum dry density.**

Table 7: CBR Values for Virgin Materials at Selected Density Levels – Optimum + 3 Percent Moisture

% Max. Dry Density	CBR Values						
	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6	Material 7
90	2	1	2	2	2	4	3
95	4	2	3	3	4	5	4
98	5	2	5	4	7	6	4
100	6	3	7	5	10	7	5
102	8	3	9	6	14	7	5

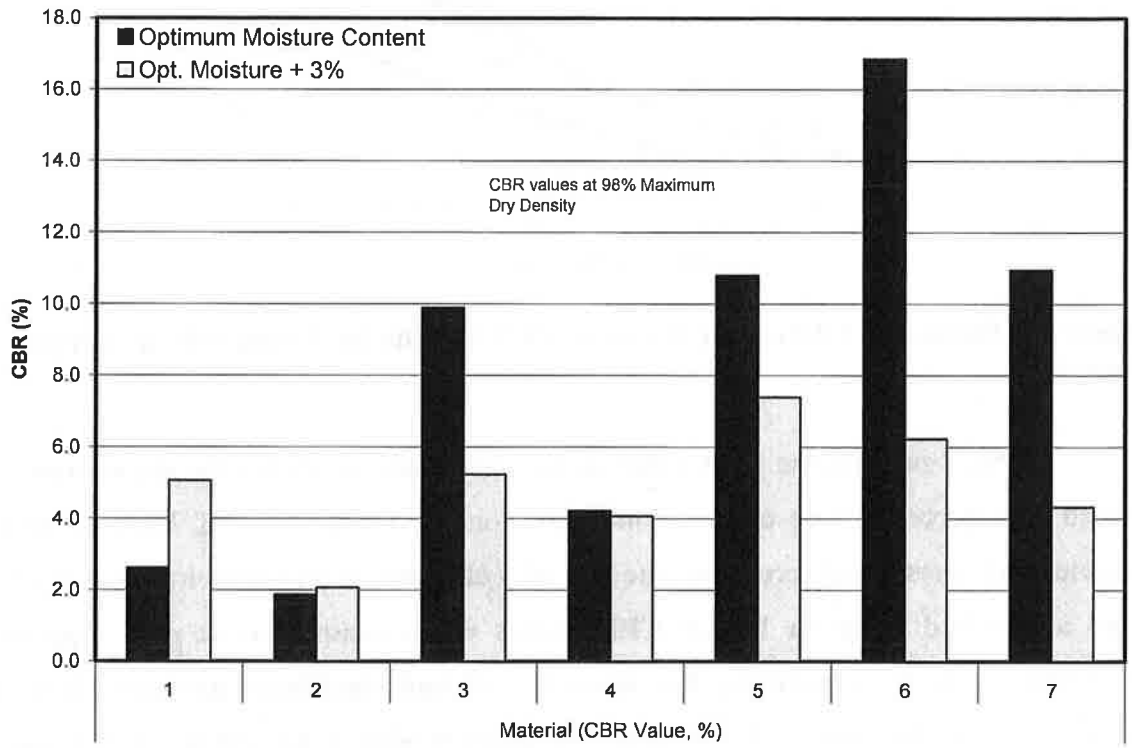


Figure 3: Comparison of CBR Values at Optimum and Optimum + 3 Percent Moisture for Virgin Materials

4.1.2 Stabilized Soils

As part of Phase I, testing was performed on the seven virgin materials stabilized with either lime, cement and/or lime-fly ash materials. These stabilization methods and materials are typical for roadway construction in Mississippi. The traditional method for testing a lime stabilized soil is the CBR, while the typical MDOT test method for cement and lime/fly ash stabilized soils is the unconfined compression (UC) method. Except for

three cases discussed in the next paragraph, the lime and cement were added at 5 percent by dry weight of soil and the lime-fly ash materials were tested with 3 percent lime and 12 percent fly ash by dry weight of soil in order to represent typical proportions of the materials used in the chemical treatments. The samples were created using Mississippi Test Methods 25, 27 and 79 (MT-25, MT-27 and MT-79) entitled, "Design of Soil-Cement Mixtures," "Design of Soil-Lime-Water Mixtures" and "Design of Soil-Lime-Fly Ash Mixtures."

Initially, full mix designs were not performed in order to ensure the strength requirements were met. After the initial round of testing, five material/chemical stabilization method combinations were chosen to be designed following MDOT standard practices. These five combinations are listed in Table 8 along with the resulting chemical stabilization contents. The results of the mix design on Materials 1 and 2 agreed with the initially chosen stabilization content; therefore, no additional testing was conducted other than that originally planned. The designs of Materials 4, 6 and 7, however, produced different percentages of stabilization than initially tested. The decision was made to perform additional testing on these materials. For the additional testing, it was determined that the new A-2-4 soil intended to represent Material 7 was significantly different than the original A-2-4 and should be presented separately; therefore this combination will be referred to as Material 8. The additional testing performed on Materials 4, 6 and 8 combinations mirrored the original Phase II testing planned. Although the MDOT deign procedure selected a 3 percent design for Material 4, the additional testing was performed with 4 percent because this content is typical for MDOT roadway construction. The Material 4 and 6 results tested at the mix design percentages are referenced as 4R and 6R along with the original results.

Table 8: Additional Mix Design Testing

Material	Classification		Chemical Stabilization Additive	Additive, %		
				Initial	By Design	Additional Testing
1	A-7-6	CL	Lime	5	5	5
2	A-6	CL	Lime	5	5	5
4	A-4	CL	Cement	5	3	4
6	A-2-4	SM	Cement	5	4	4
7	A-2-4	SC	LFA	3 (Lime) / 12 (FlyAsh)	--	--
8*	A-2-4	SC	LFA	--	4/8	4/8

* this A-2-4 was intended to represent Material #7, but after testing it was determined to evaluate this material seperately

Table 9 presents the data from the CBR testing of the lime stabilized soils used in this study. To build the lime stabilized CBR samples, the lime was added to the soil and allowed to mellow for 30 minutes before compaction. The samples were compacted to 10, 25, 56 or 80 blows and soaked for 96 hours (4 days) prior to testing. Table 9 shows the standard effort proctor results, the percent moisture before and after soaking, the density (pcf), the percent maximum dry density, percent saturation and the CBR value for each material. Figure 4 is a graphical representation of the test results for the lime stabilized soils. This figure shows increased CBR values as the percent maximum dry density increased.

Table 9: Lime Stabilized Soil CBR Data at Optimum Moisture Content

Material No.		1	2	4
ASTM		**CL**	**CL**	**CL**
AASHTO		**A-7-6**	**A-6**	**A-4**
Standard Effort Proctor				
Optimum Moisture		19.0	19.5	12.9
Maximum Dry Density		102.6	103.3	116.6
Specific Gravity		2.673	2.646	2.764
5% Lime treated CBR using 3 lifts with Standard Hammer at Optimum Moisture				
10 Blows/Lift	% Moisture, Initial	--	--	13.0
	% Moisture, Final	--	--	23.5
	Density, pcf	--	--	94.8
	% Density	--	--	81.3
	% Saturation	--	--	81.7
	CBR, %	--	--	8.8
25 Blows/Lift	% Moisture, Initial	17.6	16.6	13.2
	% Moisture, Final	27.9	26.0	18.1
	Density, pcf	88.2	92.3	104.6
	% Density	86.0	89.4	89.7
	% Saturation	83.1	86.5	80.1
	CBR, %	10.3	9.7	26.8
56 Blows/Lift	% Moisture, Initial	17.7	18.5	13.6
	% Moisture, Final	23.7	21.3	14.3
	Density, pcf	93.8	99.0	112.9
	% Density	91.4	95.8	96.8
	% Saturation	80.6	83.6	78.5
	CBR, %	25.6	33.3	61.7
80 Blows/Lift	% Moisture, Initial	17.7	17.7	12.5
	% Moisture, Final	22.3	19.4	14.1
	Density, pcf	98.5	102.7	114.7
	% Density	96.0	99.4	98.4
	% Saturation	85.1	83.6	81.3
	CBR, %	38.3	54.6	70.1

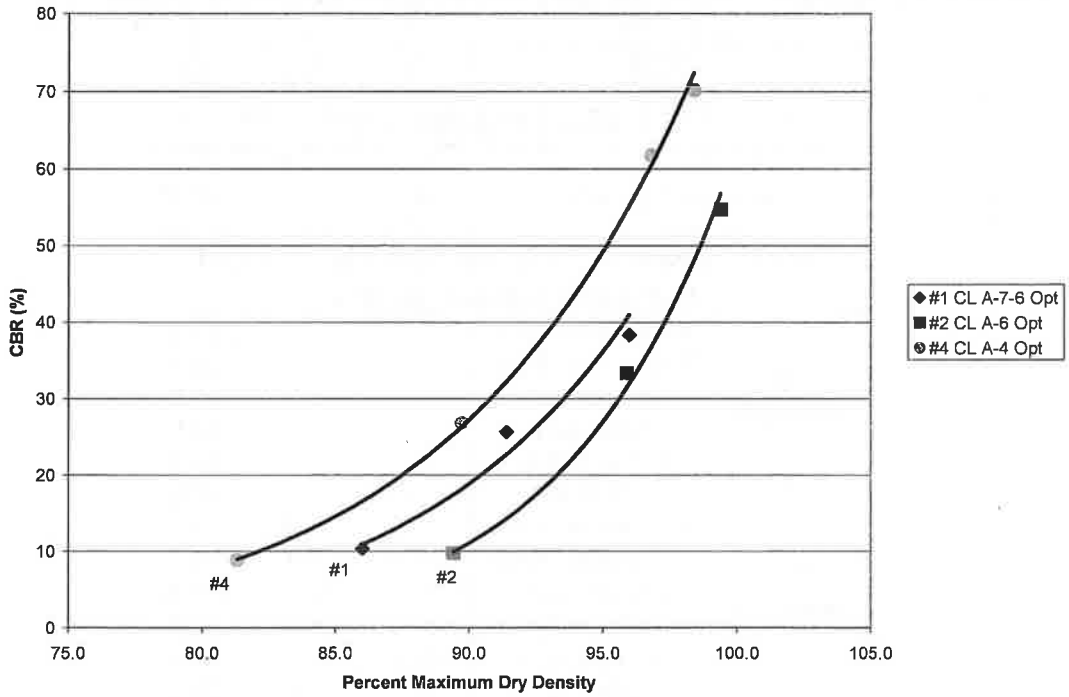


Figure 4: Optimum Moisture CBR Results for Lime Stabilized Soils at Various Densities

Table 10 provides a comparison between the virgin materials and lime stabilized materials at various density levels. **As shown in this table, the CBR values increased significantly for all three materials that were lime stabilized. At 98 percent of maximum dry density, the average CBR value increased significantly when comparing virgin materials to lime stabilized materials.**

Table 10: Comparison of CBR Values for Virgin Materials and Lime Stabilized Materials – Optimum Moisture Content

% Max. Dry Density	CBR Values					
	Material 1		Material 2		Material 4	
	w/ Lime	Virgin	w/ Lime	Virgin	w/ Lime	Virgin
90	18	1	10	1	27	1
95	35	2	25	1	49	3
98	51	3	42	2	69	4
100	65	3	58	2	86	6
102	83	4	81	3	106	8

Table 11 presents the CBR data for the lime stabilized soils molded at optimum plus three percent moisture content. Figure 5 illustrates the influence of density on the measured CBR values for the three materials. Again, CBR vales increased as the percent maximum dry density increased.

Table 11: Lime Stabilized Soil CBR Data at Optimum +3 percent Moisture Content

Material No.		1	2	4
ASTM		**CL**	**CL**	**CL**
AASHTO		**A-7-6**	**A-6**	**A-4**
Standard Effort Proctor				
Optimum Moisture		19.0	19.5	12.9
Maximum Dry Density		102.6	103.3	116.6
5% Lime treated CBR using 3 lifts with Standard Hammer at Optimum Moisture + 3%				
10 Blows/Lift	% Moisture, Initial	20.6	21.1	15.6
	% Moisture, Final	34.4	32.4	21.0
	Density, pcf	79.0	82.4	96.3
	% Density	77	79.8	82.6
	% Saturation	82.2	84.9	75.7
	CBR, %	2.9	3.2	10.3
25 Blows/Lift	% Moisture, Initial	20.4	21.1	16.0
	% Moisture, Final	26.9	25.3	16.6
	Density, pcf	88.9	91.9	107.5
	% Density	86.6	89.0	92.2
	% Saturation	81.3	83.4	79.1
	CBR, %	12.1	14.1	39.5
56 Blows/Lift	% Moisture, Initial	20.8	21.2	15.6
	% Moisture, Final	23.8	21.2	15.4
	Density, pcf	96.0	100.7	113.0
	% Density	93.6	97.5	96.9
	% Saturation	85.5	86.9	84.8
	CBR, %	26.4	35.1	40.2

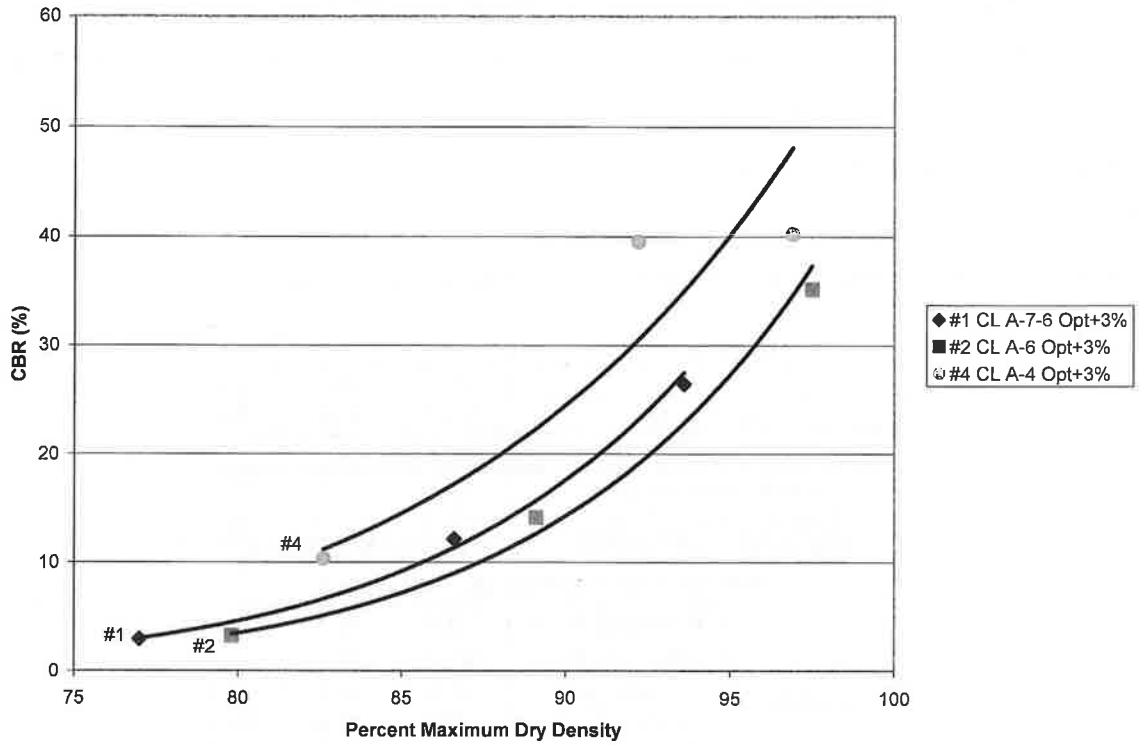


Figure 5: Optimum + 3 Percent Moisture CBR Results for Lime Stabilized Soils at Various Densities

Table 12 compares the CBR values at different density levels of virgin materials and lime stabilized materials for samples prepared at 3 percent above optimum moisture content. **Even at the higher moisture content, the CBR values are significantly higher for the samples that have been lime stabilized. The CBR values at 98 percent of maximum dry density with lime stabilization average 45, while the virgin materials averaged a CBR value of 4.**

Table 12: Comparison of CBR Values for Virgin Materials and Lime Stabilized Materials – Optimum Moisture Content + 3 percent

% Max. Dry Density	CBR Values					
	Material 1		Material 2		Material 4	
	w/ Lime	Virgin	w/ Lime	Virgin	w/ Lime	Virgin
90	17	2	15	1	22	2
95	32	4	28	2	36	3
98	46	5	41	2	47	4
100	58	6	52	3	57	5
102	72	8	66	3	68	6

Figure 6 presents a comparison of CBR values for the lime stabilized materials prepared at optimum and optimum +3 percent moisture contents at 98 percent maximum dry density. Similar to the virgin materials, the increased moisture content did not affect the CBR values of the higher plasticity silty clays (Materials 1 and 2) as much as the lower plasticity silty clay (Material 4).

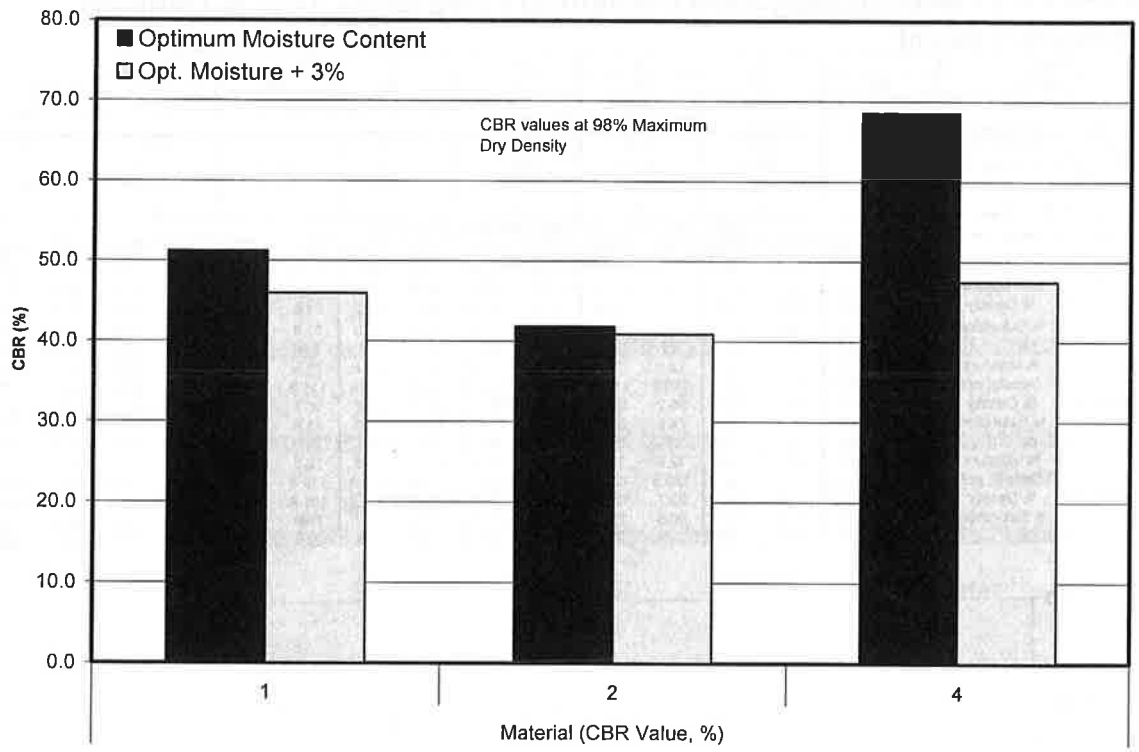


Figure 6: Comparison of CBR Values at Optimum and Optimum + 3 Percent Moisture for Lime Stabilized Materials

Table 13 provides the results from the cement stabilized soil testing using the unconfined compression method at various compactive efforts. This table provides the results from the standard effort Proctor as well as the percent moisture, density (in pounds per cubic foot and as a percentage of the maximum dry density), percent saturation and the UC value. Note that materials 4R and 6R are the additional retests that were performed at the designed cement contents. Figure 7 is a graphical representation of these results. The Mississippi Test Method 25 minimum strength requirement for cement treated materials is 200 psi for subgrades and 300 psi for bases. These values are shown on the Figures 7 and 8 as a reference for the strengths of the tested stabilized soils. The soils were not, with the exception of 4R and 6R, designed to meet the strength

requirements. The percent cement content chosen was held constant through each of the stabilized soils in order to evaluate the effect of density and moisture content on UC strength for different soil types. Unconfined compression test results are presented in Appendix C.

Table 13: Cement Stabilized Soil Unconfined Compression Data at Optimum Moisture Content

Material No.	2		3		4		4R		5		6		6R		7	
ASTM	CL		ML		CL		CL		SM		SM		SM		SC	
AASHTO	A-6		A-4		A-4		A-4		A-2-4		A-2-4		A-2-4		A-2-4	
Standard Effort Proctor																
Optimum Moisture, %	17.9		16.2		11.8		11.8		13.5		12.7		12.7		13.3	
Maximum Dry Density, pcf	106.0		108.5		120.9		120.9		110.6		117.8		117.8		117.2	
Specific Gravity	2.680		2.713		2.798		2.798		2.696		2.744		2.744		2.660	
Cement, %	5		5		5		4		5		5		4		5	
3 Lifts with Standard Hammer at Optimum Moisture																
	7 day	14 day	7 day	14 day	7 day	14 day	7 day	14 day	7 day	14 day	7 day	14 day	7 day	14 day	7 day	14 day
% Moisture	16.7	17.0	14.9	15.1	12.2	11.4	12.0	11.9	13.6	13.5	12.4	12.5	12.2	12.5	12.8	12.5
10 Density, pcf	94.4	94.2	101.7	101.4	110.5	109.9	110.6	110.5	101.8	102.0	107.8	107.6	109.4	108.8	102.8	103.4
Blows/Lift % Density	89.1	88.9	93.7	93.5	91.4	90.9	91.5	91.4	92.0	92.2	91.5	91.3	92.9	92.4	87.7	88.2
% Saturation	58.1	58.8	60.8	61.3	58.9	54.2	58.1	57.4	56.1	56.0	57.8	58.0	59.3	59.9	55.4	54.9
UC, psi	34	44	67	90	167	140	179	182	53	77	174	208	251	293	127	171
% Moisture	16.5	16.5	15.0	15.3	12.2	11.4	11.9	11.9	13.5	13.4	12.3	12.7	12.4	12.6	13.2	13.1
25 Density, pcf	104.8	105.0	109.5	109.3	119.9	119.3	119.4	119.1	108.5	108.6	116.3	116.0	117.6	117.2	114.3	114.6
Blows/Lift % Density	98.9	99.1	100.9	100.7	99.2	98.7	98.8	98.5	98.1	98.2	98.7	98.5	99.8	99.5	97.5	97.8
% Saturation	74.3	74.7	74.5	75.5	74.9	68.9	72.1	71.5	66.1	65.8	71.4	73.3	74.6	75.1	77.6	77.8
UC, psi	132	155	127	173	266	303	247	295	88	111	317	305	355	408	291	322
% Moisture	16.8	16.9	14.4	14.4	12.9	11.6	11.9	11.8	13.5	13.5	12.6	12.7	12.4	12.5	12.7	13.0
40 Density, pcf	107.8	107.9	112.7	112.3	120.5	122.7	121.0	121.5	111.4	111.6	119.4	119.0	119.3	118.9	118.7	118.3
Blows/Lift % Density	101.7	101.8	103.9	103.5	99.7	101.5	100.1	100.5	100.7	100.9	101.4	101.0	101.3	100.9	101.3	100.9
% Saturation	81.7	82.4	77.9	77.0	80.5	76.8	75.2	75.6	71.3	71.7	79.8	79.4	78.3	77.9	84.9	85.7
UC, psi	147	168	175	208	238	362	286	336	104	148	275	352	352	411	358	484

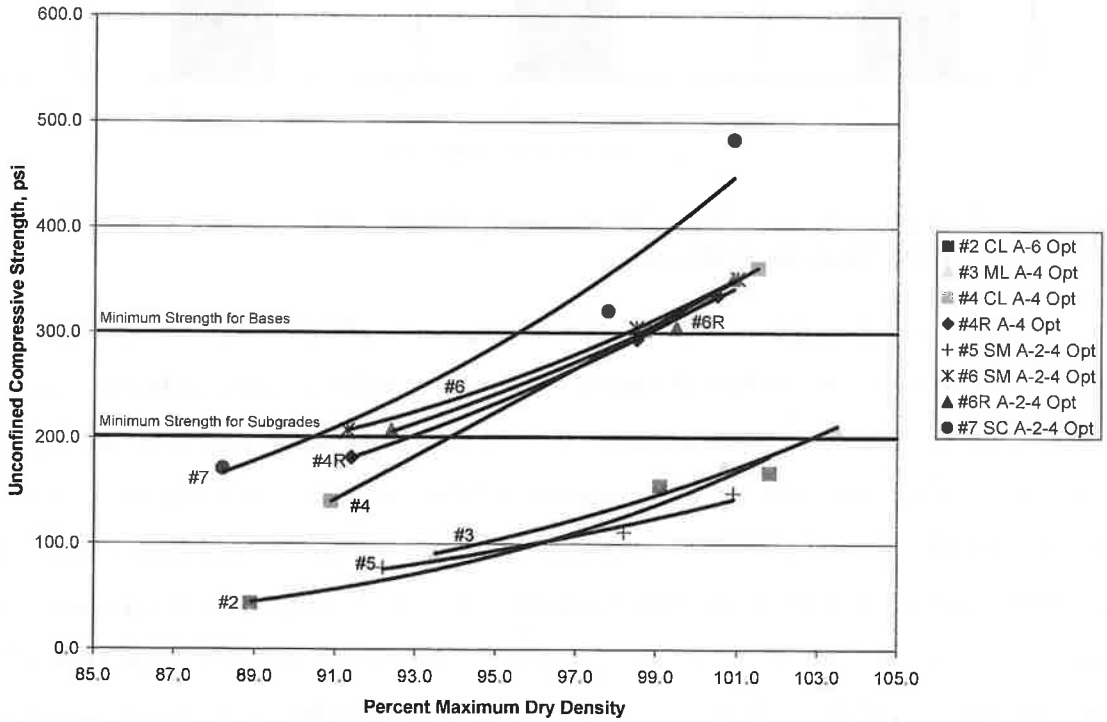


Figure 7: Optimum Moisture UC 14 Day Strengths for Cement Stabilized Soils at Various Densities

Based upon Table 13 and Figure 7, **the UC strength of the cement stabilized materials increased as the percent maximum dry density increased.** Table 14 summarizes the UC strength values of the cement stabilized materials at varying percentages of maximum dry density.

Table 14: UC Values for Cement Stabilized Materials at Selected Density Levels – Optimum Moisture Content

% Max. Dry Density	Unconfined Compressive Strength, psi, 14 days							
	Material 2	Material 3	Material 4	Material 4 R	Material 5	Material 6	Material 6 R	Material 7
90	54	66	131	164	46	143	177	188
95	94	104	210	233	67	190	242	279
98	130	135	276	285	83	223	289	351
100	161	159	330	325	96	248	525	407
102	198	188	393	370	110	275	364	470

Table 15 displays the same information for the cement stabilized materials prepared at optimum plus three percent moisture. Figure 8 is a graphical representation of these results. **This figure shows that the three compactive efforts used to fabricate samples at different densities did not result in as wide a range of densities for several of the materials.** It is unclear why the combination of cement stabilization and optimum plus 3 percent moisture resulted in this lower range in densities at the three compactive efforts. However, it is likely due to an increased sensitivity to excess moisture for these cement stabilized soils. The increased sensitivity due to the higher moisture contents produced "pumping" during the impact compaction method more so that the virgin materials, leading to similar densities.

Table 15: Cement Stabilized Soil Unconfined Compression Data at Optimum + 3 Percent Moisture Content

Material No.		2		3		4		4R		5		6		6R		7	
ASTM		CL		ML		CL		CL		SM		SM		SM		SC	
AASHTO		A-6		A-4		A-4		A-4		A-2-4		A-2-4		A-2-4		A-2-4	
Standard Effort Proctor																	
Optimum Moisture, %		17.9		16.2		11.8		11.8		13.5		12.7		12.7		13.3	
Maximum Dry Density, pcf		106.0		108.5		120.9		120.9		110.6		117.8		117.8		117.2	
Specific Gravity		2.680		2.713		2.798		2.798		2.696		2.744		2.744		2.660	
Cement, %		5		5		5		4		5		5		4		5	
3 lifts with Standard Hammer at Optimum + 3% Moisture																	
		7 day	14 day	7 day	14 day	7 day	14 day	7 day	14 day	7 day	14 day	7 day	14 day	7 day	14 day	7 day	14 day
10 Blows/Lift	% Moisture	19.8	19.8	18.0	17.5	15.0	14.5	15.0	15.1	16.2	16.4	14.6	14.6	15.6	15.3	16.0	15.8
	Density, pcf	97.8	97.6	102.4	103.7	114.0	114.7	112.8	113.0	104.1	103.7	112.1	111.9	111.3	111.6	107.9	107.7
	% Density	92.3	92.1	94.4	95.6	94.3	94.9	93.3	93.5	94.1	93.8	95.2	95.0	94.5	94.7	92.1	91.9
	% Saturation	74.8	74.4	74.8	75.1	79.0	77.6	76.6	77.6	70.9	71.1	76.1	75.6	79.6	78.5	79.2	77.7
	UC, psi	105	93	70	92	158	189	162	208	56	72	138	173	208	245	206	240
25 Blows/Lift	% Moisture	20.5	20.6	18.3	18.3	15.0	14.9	15.1	14.9	14.9	15.0	15.5	14.8	15.2	15.6	16.0	16.2
	Density, pcf	104.8	105.0	106.5	106.8	114.5	116.1	113.9	114.7	107.7	108.6	113.8	114.3	113.4	113.3	113.3	113.2
	% Density	98.9	99.1	98.2	98.4	94.7	96.0	94.2	94.9	97.4	98.2	96.6	97.0	96.3	96.2	96.7	96.6
	% Saturation	92.3	93.1	84.3	84.8	80.0	82.6	79.3	79.9	71.5	73.7	84.3	81.5	81.9	83.8	91.6	92.5
	UC, psi	130	140	67	93	152	207	129	173	60	114	158	191	170	201	235	296
40 Blows/Lift	% Moisture	19.6	19.7	18.8	18.5	15.9	14.7	15.1	15.3	16.6	16.5	15.0	14.9	15.3	15.4	16.5	16.1
	Density, pcf	104.9	105.0	106.0	106.1	113.5	116.4	113.8	113.9	108.2	108.1	114.4	114.6	114.1	114.0	113.6	113.9
	% Density	99.0	99.1	97.7	97.8	93.9	96.3	94.1	94.2	97.8	97.7	97.1	97.3	96.9	96.8	96.9	97.2
	% Saturation	88.4	89.2	85.4	84.3	82.6	82.1	79.0	80.3	80.6	79.9	82.9	82.8	84.0	84.3	95.1	93.7
	UC, psi	126	148	53	67	166	239	118	166	60	90	168	210	163	181	240	297

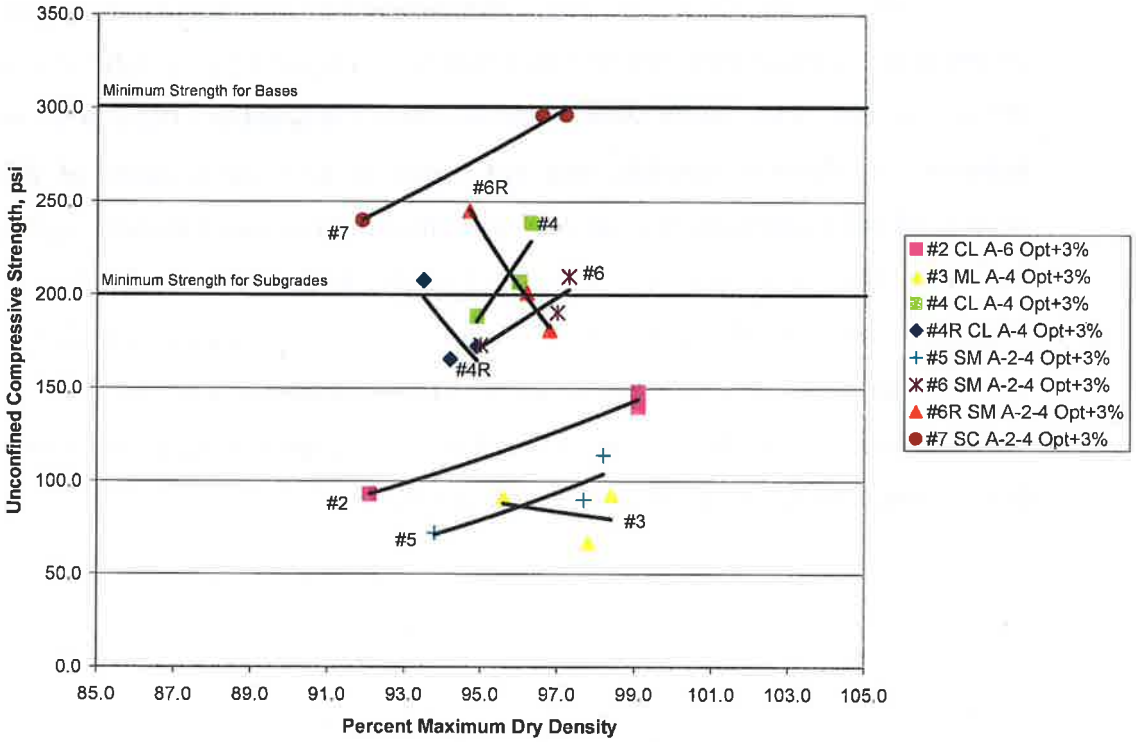


Figure 8: Optimum + 3 Percent Moisture UC 14 Day Strengths for Cement Stabilized Soils at Various Densities

Table 16 presents the UC strengths for the cement stabilized materials prepared at optimum plus 3 percent moisture at various percentages of maximum dry density. Based upon Figure 8, it is unclear whether the data shown in Table 16 for Materials 3, 4R and 6R are meaningful as the regression equations are based on a very small range of densities. Generally, the UC strengths are less for the specimens prepared at optimum plus 3 percent moisture than those for specimens prepared at optimum moisture content at a given density level. Intuitively, the lower UC strengths and the negative trends illustrated in Figure 8 suggest that moisture content, especially at 3 percent above optimum moisture content, can have a significant influence on the performance of cement stabilized materials.

Table 16: UC Values for Cement Stabilized Materials at Selected Density Levels – Optimum + 3 Percent Moisture Content

% Max. Dry Density	Unconfined Compressive Strength, psi, 14 days							
	Material 2	Material 3	Material 4	Material 4 R	Material 5	Material 6	Material 6 R	Material 7
90	90	*	92	*	47	115	*	198
95	124	*	195	*	73	166	*	245
98	150	*	301	*	94	205	*	277
100	169	*	---	*	111	---	*	---

*Irregular results produced a negative trend

The lime-fly ash stabilized soils were also tested using the unconfined compression test. Table 17 presents the results from the lime/fly ash unconfined compression testing at various compactive efforts molded at optimum moisture content. The percent moisture at compaction, the density (pcf), the percent maximum dry density, percent saturation and the unconfined compression strength (psi) are shown in Table 16. This information is shown for the 14 and 28 day breaks. Mississippi Test Method 79 requires minimum lime-fly-ash stabilized strength of 400 psi for subgrades and 500 psi for bases. Figure 9 shows a graphical representation of the 28 day unconfined compressive strength for the lime-fly ash stabilized soil molded at optimum moisture content. Again, the soils were not designed to meet the strength requirements, except for Material 8. With the exception of Material 8, the lime-fly ash treatment was held constant at typical levels of three percent lime and twelve percent fly-ash in order to

evaluate the effect of density and moisture on strength. The design for Material 8 resulted in four percent lime and eight percent fly ash. The MDOT required strengths on Figure 9 are shown for reference purposes. Similar to other relationships shown within this report, the strength of the stabilized materials increased as density increased.

Table 17: Lime/Fly Ash Stabilized Soil - Unconfined Compression Results at Optimum Moisture Content

Material No.		1		2		3		4		7		8	
ASTM		CL		CL		ML		CL		SC		SC	
AASHTO		A-7-6		A-6		A-4		A-4		A-2-4		A-2-4	
Standard Effort Proctor													
Optimum Moisture, %		17.8		19.2		15.2		13.4		14.7		11.3	
Maximum Dry Density, pcf		105.5		104.5		108.2		116.6		113.5		122.7	
Specific Gravity		2.610		2.585		2.615		2.691		2.567		2.507	
3% Lime/12% Fly Ash treated UC using 3 Lifts with Standard Hammer at Optimum Moisture												4% Lime/8% Fly Ash	
		14 day	28 day	14 day	28 day	14 day	28 day	14 day	28 day	14 day	28 day	14 day	28 day
10 Blows/ Lift	% Moisture	16.6	16.9	18.7	18.9	14.3	14.3	13.1	13.6	14.0	14.3	11.2	11.1
	Density, pcf	91.7	91.5	92.7	92.5	97.1	96.5	106.2	104.9	100.4	99.7	105.0	104.9
	% Density	86.9	86.7	88.7	88.5	89.7	89.2	91.1	90.0	88.5	87.8	92.5	92.4
	% Saturation	55.8	56.5	65.3	65.6	54.9	54.1	60.7	61.0	60.4	60.4	57.3	56.6
	UC, psi	62	77	59	83	129	343	223	366	114	201	276	515
25 Blows/ Lift	% Moisture	16.9	16.8	18.2	18.6	14.3	14.3	13.7	13.5	14.1	14.1	11.2	11.2
	Density, pcf	100.6	100.6	102.7	102.0	106.3	106.4	114.2	114.2	110.9	110.4	111.7	112.1
	% Density	95.4	95.4	98.3	97.6	98.2	98.3	97.9	97.9	97.7	97.3	98.4	98.8
	% Saturation	71.4	70.9	82.5	82.7	69.8	70.0	78.3	77.2	81.4	80.3	70.1	71.1
	UC, psi	201	225	183	229	265	725	356	590	272	520	332	524
40 Blows/ Lift	% Moisture	17.1	17.1	18.6	18.6	14.3	14.1	12.4	12.4	14.3	14.4	11.1	11.1
	Density, pcf	104.2	104.8	105.3	105.0	110.1	109.7	119.4	118.1	114.0	113.8	113.0	113.4
	% Density	98.8	99.3	100.8	100.5	101.8	101.4	102.4	101.3	100.4	100.3	99.6	99.9
	% Saturation	79.4	80.5	90.5	89.7	77.7	75.7	82.1	79.2	90.5	90.8	72.5	73.3
	UC, psi	278	352	221	288	348	836	430	754	300	578	334	567

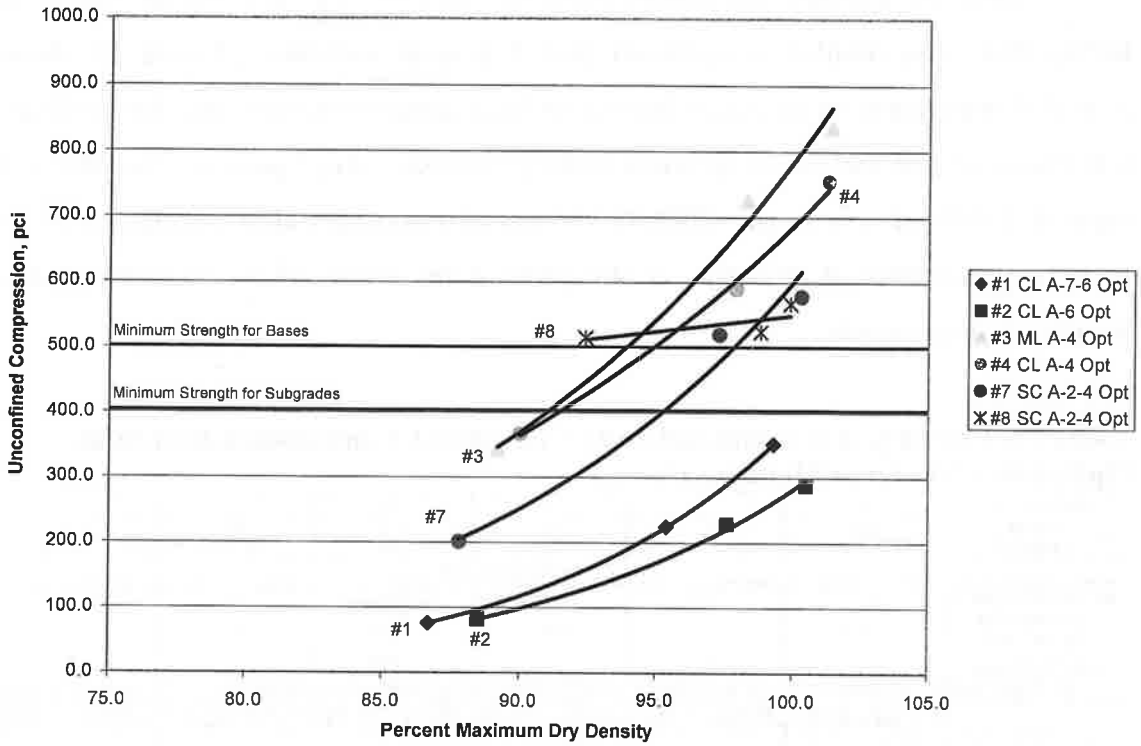


Figure 9: Optimum Moisture UC 28 Day Strengths for Lime/Fly Ash Stabilized Soils at Various Densities

Table 18 summarizes the UC strengths for the five lime/fly ash stabilized materials prepared at optimum moisture content at various percentages of maximum dry density. **Similar to the other material combinations tested, the trend in UC strength is an increase with increasing density.**

Table 18: UC Values for Lime/Fly Ash Stabilized Materials at Selected Density Levels – Optimum Moisture Content

% Max. Dry Density	Unconfined Compressive Strength, psi, 28 days					
	Material 1	Material 2	Material 3	Material 4	Material 7	Material 8
90	150	97	363	352	288	500
95	275	166	535	487	451	525
98	390	227	668	588	583	540
100	489	277	771	664	689	549
102	610	338	889	748	811	559

Table 19 presents the results from the lime-fly ash unconfined compression testing that were molded at optimum plus 3 percent moisture. Figure 10 shows a graphical representation of the 28 day unconfined compressive strengths for the lime-fly ash stabilized soil molded at optimum moisture content plus 3 percent. **Similar to the cement stabilized results, the addition of 3 percent moisture above optimum resulted in a smaller range of densities at the given compactive efforts than the samples prepared at optimum.**

Table 19: Lime/Fly Ash Stabilized Soil - Unconfined Compression Results at Optimum + 3 Percent Moisture Content

Material No.		1		2		3		4		7		8	
ASTM		CL		CL		ML		CL		SC		SC	
AASHTO		A-7-6		A-6		A-4		A-4		A-2-4		A-2-4	
Standard Effort Proctor													
Optimum Moisture, %		17.8		19.2		15.2		13.4		14.7		11.3	
Maximum Dry Density, pcf		105.5		104.5		108.2		116.6		113.5		122.7	
Specific Gravity		2.610		2.585		2.615		2.691		2.567		2.507	
3% Lime/12% Fly Ash treated UC using 3 Lifts with Standard Hammer at Optimum Moisture + 3%												4% Lime/8% Fly Ash	
		14 day	28 day	14 day	28 day	14 day	28 day	14 day	28 day	14 day	28 day	14 day	28 day
10 Blows/ Lift	% Moisture	19.6	19.5	20.9	21.3	17.2	17.2	15.3	15.8	16.6	17.0	14.3	14.0
	Density, pcf	94.8	94.0	95.8	93.9	98.6	98.6	111.0	109.7	102.9	102.6	106.5	106.7
	% Density	89.9	89.1	91.7	89.9	91.1	91.1	95.2	94.1	90.7	90.4	93.8	94.0
	% Saturation	71.3	69.5	79.1	76.8	68.6	68.6	80.2	80.0	76.6	77.8	76.4	75.3
	UC, psi	116	131	84	87	118	402	265	528	147	251	141	277
25 Blows/ Lift	% Moisture	20.0	20.2	21.8	23.9	17.4	17.4	15.3	16.1	16.8	16.8	14.0	14.0
	Density, pcf	102.8	102.8	101.4	99.6	107.3	107.4	113.5	112.4	110.9	111.0	106.8	107.3
	% Density	97.4	97.4	97.0	95.3	99.2	99.3	97.3	96.4	97.7	97.8	94.1	94.5
	% Saturation	89.3	90.1	95.3	99.7	87.5	87.7	85.7	88.0	97.0	97.3	75.6	76.6
	UC, psi	278	323	106	164	231	545	221	395	218	392	127	227
40 Blows/ Lift	% Moisture	19.6	19.7	20.9	21.0	17.6	17.5	15.3	15.5	16.8	16.9	14.1	14.0
	Density, pcf	105.1	104.4	103.0	103.2	107.9	107.9	113.0	113.5	111.9	111.6	106.7	106.9
	% Density	99.6	99.0	98.6	98.8	99.7	99.7	96.9	97.3	98.6	98.3	94.0	94.2
	% Saturation	93.0	91.9	95.5	96.5	89.8	89.3	84.9	86.7	100.0	99.5	75.8	75.8
	UC, psi	275	357	130	175	190	408	205	472	225	353	110	203

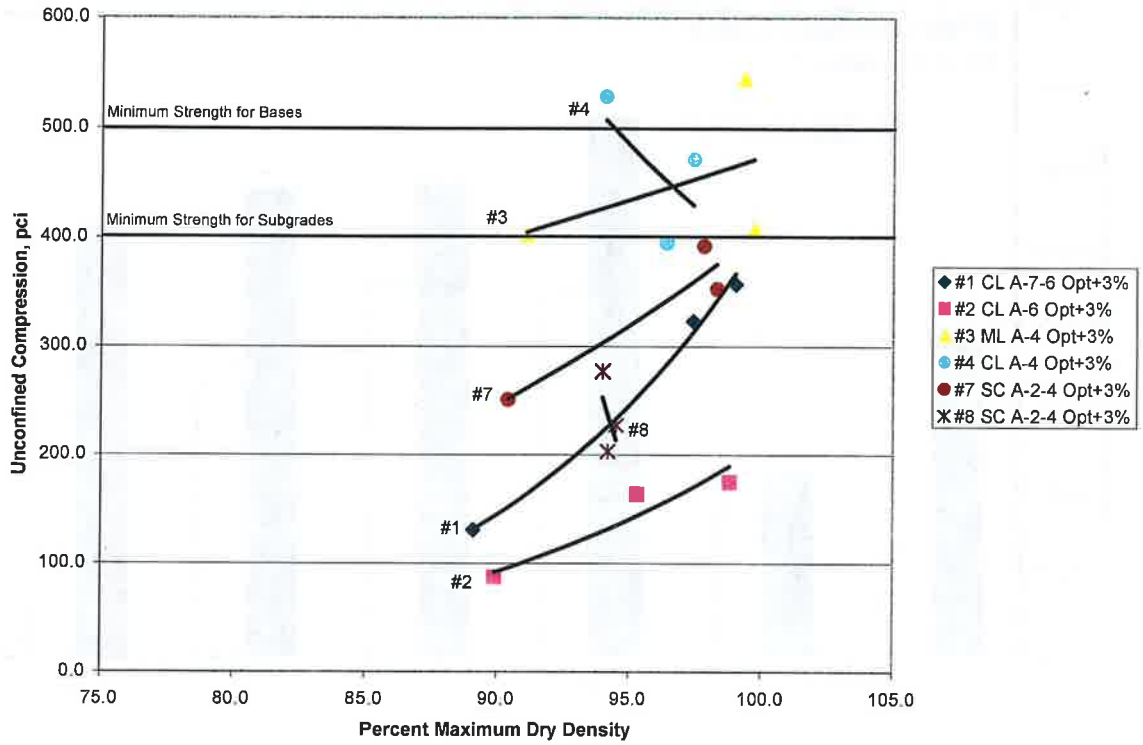


Figure 10: Optimum + 3 Percent Moisture UC 28 Day Strengths for Lime/Fly Ash Stabilized Soils at Various Densities

Table 20 summarizes the unconfined compressive strengths for the lime/fly ash stabilized samples prepared at a moisture content 3 percent above optimum. **Collectively, these UC values are less than those determined for the samples prepared at optimum moisture content.** Figure 11 compares the UC strengths for samples prepared at the two moisture contents at a maximum dry density of 98 percent.

Table 20: UC Values for Lime/Fly Ash Stabilized Materials at Selected Density Levels – Optimum + 3 Percent Moisture Content

% Max. Dry Density	Unconfined Compressive Strength, psi, 28 days					
	Material 1	Material 2	Material 3	Material 4	Material 7	Material 8
90	61	92	396	*	223	*
95	102	139	434	*	288	*
98	137	177	458	*	335	*
100	167	207	474	*	369	*

* Irregular results produced a negative trend

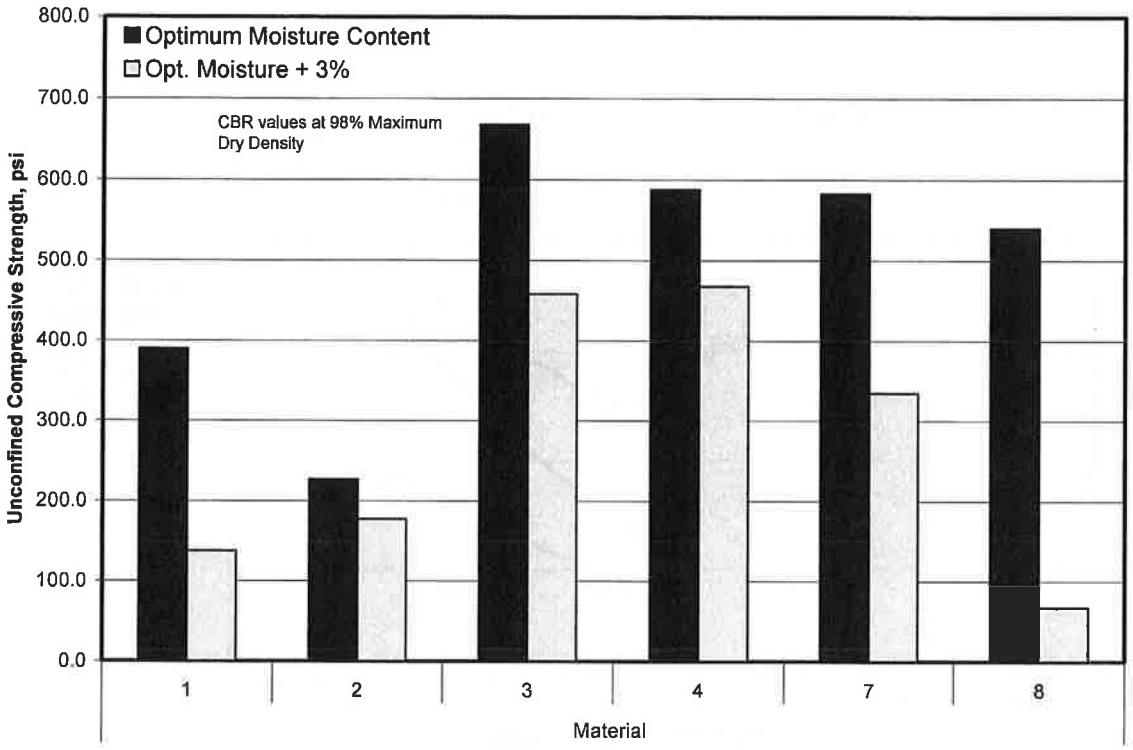


Figure 11: Comparison of CBR Values at Optimum and Optimum + 3 Percent for Lime/Fly Ash Stabilized Materials

4.2 PHASE II

The Phase II portion of this study examined the strength of typical Mississippi soils under the new MEPDG protocols. The MEPDG recommends that virgin soils and lime stabilized soils be tested using resilient modulus test procedures. The elastic modulus is the recommended strength property for cement and lime/fly ash stabilized soils. The elastic modulus was calculated from the unconfined compression testing that was accomplished in Phase I.

4.2.1 Virgin Soils

Table 21 presents the resilient modulus results from the testing of the virgin soils. Each result is the average of testing three replicate specimens. The compactive effort was varied in order to create a range of densities in the soil samples; however, compaction of five layers as prescribed by NCHRP 1-28A was followed. The number of blows per layer was varied between the different soil types in order to achieve a range of

compaction levels, but held constant for each of the soil lifts within a single sample. As noted in Table 21, the resilient modulus averages represented a single stress state. Appendix D displays the resilient modulus data for the virgin soil testing at optimum moisture content.

Table 21: Virgin Soil Resilient Modulus Testing at Optimum Moisture Content

Material No.	Classifications		Compaction Level	Density, %	Saturation, %	Average			M_R Average, psi	St Dev, psi
	AASHTO	USCS				K_1	K_2	K_3		
1	A-7-6 (23)	CL	Low	89.5	61.6	729.0	0.567	-2.081	6698	409
1	A-7-6 (23)	CL	Medium	95.7	71.0	845.1	0.551	-1.950	7943	1398
1	A-7-6 (23)	CL	High	98.8	76.7	1126.4	0.502	-2.272	10377	318
2	A-6 (17)	CL	Low	93.3	60.0	1520.8	0.314	-2.604	14467	771
2	A-6 (17)	CL	Medium	96.6	71.9	1724.5	0.269	-2.077	17783	2116
2	A-6 (17)	CL	High	105.0	88.4	2168.9	0.386	-1.785	22190	2013
3	A-4 (1)	ML	Low	91.8	61.5	718.4	1.080	-1.643	5771	1722
3	A-4 (1)	ML	Medium	95.4	68.2	867.9	0.856	-1.486	7668	395
3	A-4 (1)	ML	High	100.5	77.7	894.8	0.930	-1.529	7652	635
4	A-4 (5)	CL	Low	89.8	51.8	1070.5	0.754	-1.872	9389	238
4	A-4 (5)	CL	Medium	95.4	60.9	1306.0	0.729	-1.921	11499	125
4	A-4 (5)	CL	High	101.1	73.3	1248.7	0.838	-1.854	10645	1380
5	A-2-4 (0)	SM	Low	96.2	59.0	1049.8	0.925	-1.339	9192	719
5	A-2-4 (0)	SM	Medium	100.7	65.6	1090.0	0.883	-1.060	10036	375
5	A-2-4 (0)	SM	High	103.3	68.7	1096.8	0.892	-1.021	10109	178
6	A-2-4 (0)	SM	Low	94.9	60.8	795.5	0.829	-0.575	15473	321
6	A-2-4 (0)	SM	Medium	99.0	67.9	867.6	0.779	-0.535	16603	1185
6	A-2-4 (0)	SM	High	102.3	72.4	873.6	0.804	-0.528	16980	845
7	A-2-4 (0)	SC	Low	94.6	70.7	1366.7	0.644	-1.081	16913	1616
7	A-2-4 (0)	SC	Medium	100.3	83.9	1446.1	0.671	-1.077	20922	1223
7	A-2-4 (0)	SC	High	102.6	92.1	1006.2	0.917	-1.262	22489	909

Note: M_R calculated using a standard stress state of σ_1 = 6 psi; σ_2,σ_3 = 2 psi except 6 and 7 which used a standard stress state of σ1 = 15 psi; σ2,σ3 = 5 psi

Figure 12 illustrates the relationships between resilient modulus and percent maximum dry density. **As shown in Figure 12, resilient modulus increases as the percent maximum dry density increases.** Interestingly, the influence of percent maximum dry density at optimum moisture content on resilient modulus appears to be greatest (i.e., steepest slope) for the three soils with the three highest plasticity indexes (Materials 1, 2 and 7). Table 22 compares resilient modulus values for each of the seven virgin materials at various levels of density.

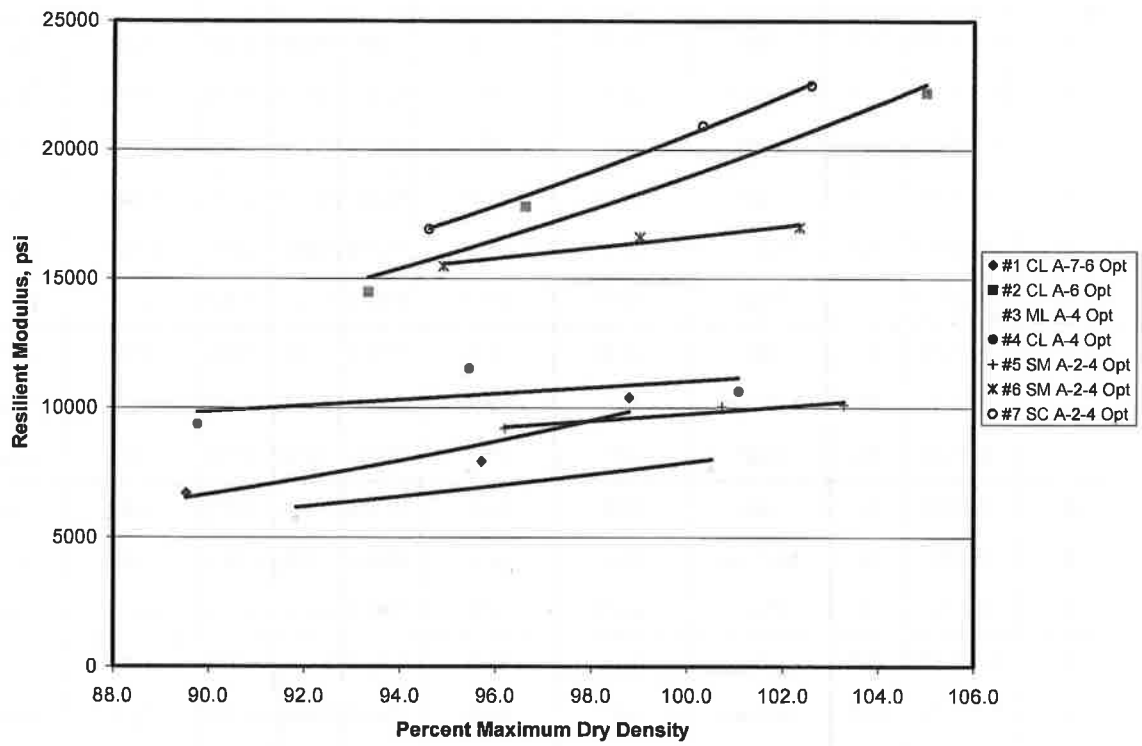


Figure 12: Results of Resilient Modulus Testing on Virgin Materials – Optimum Moisture Content

Table 22: Resilient Modulus Values for Virgin Materials at Selected Density Levels – Optimum Moisture Content

% Max. Dry Density	Resilient Modulus, psi						
	Material 1	Material 2	Material 3	Material 4	Material 5	Material 6	Material 7
90	6645	13442	5811	9897	8455	14656	14400
95	8297	15989	6762	10467	9073	15617	17240
98	9479	17743	7405	10825	9465	16223	19206
100	10359	19019	7868	11070	9735	16641	20640
102	11322	20385	8359	11321	10014	17069	22181

Table 23 presents the resilient modulus results from the optimum plus three percent moisture samples at a range of densities. The resilient modulus results are again presented at a standard stress state. These samples were created with the same compactive efforts (blows per lift) as the respective optimum moisture samples. **Materials 4, 5, 6 and 7 were unstable because of the increased moisture and could not be tested. These samples were either damaged/destroyed during the unmolding process or by the small contact load applied at the start of the test.** Comparing the results presented in Tables 21 and 23, it appears that for those soils that could be tested, **the addition of 3 percent moisture reduced the resilient modulus by approximately half**. Appendix E displays the resilient modulus data for the virgin soil testing at optimum plus three percent moisture content.

Table 23: Virgin Soil Resilient Modulus Testing at Optimum + 3 Percent Moisture Content

Material No.	Classifications		Compaction Level	Density, %	Saturation, %	Average			M_R Average, psi	St Dev, psi
	AASHTO	USCS				K_1	K_2	K_3		
1	A-7-6 (23)	CL	Low	91.2	71.1	450.2	0.600	-2.251	3998	863
1	A-7-6 (23)	CL	Medium	93.8	79.1	462.0	0.599	-1.276	4320	164
1	A-7-6 (23)	CL	High	98.3	87.1	600.4	0.702	-2.665	4884	145
2	A-6 (17)	CL	Low	95.3	78.7	1256.9	0.250	-3.376	11164	628
2	A-6 (17)	CL	Medium	98.4	87.6	1359.3	0.244	-3.576	11813	127
2	A-6 (17)	CL	High	101.2	94.7	1332.3	0.226	-4.109	10931	708
3	A-4 (1)	ML	Low	94.0	77.5	733.9	1.046	-2.000	5664	26
3	A-4 (1)	ML	Medium	97.1	83.3	613.2	1.135	-1.601	4802	241
3	A-4 (1)	ML	High	97.3	86.4	NT	NT	NT	NT	NT
4	A-4 (5)	CL	Low	95.4	78.0	NT	NT	NT	NT	NT
4	A-4 (5)	CL	Medium	95.6	78.7	NT	NT	NT	NT	NT
4	A-4 (5)	CL	High	95.6	79.5	NT	NT	NT	NT	NT
5	A-2-4 (0)	SM	Low	95.3	67.3	NT	NT	NT	NT	NT
5	A-2-4 (0)	SM	Medium	95.9	68.5	NT	NT	NT	NT	NT
5	A-2-4 (0)	SM	High	97.5	70.8	NT	NT	NT	NT	NT
6	A-2-4 (0)	SM	Low	96.9	74.7	NT	NT	NT	NT	NT
6	A-2-4 (0)	SM	Medium	96.6	78.9	NT	NT	NT	NT	NT
6	A-2-4 (0)	SM	High	98.3	80.3	NT	NT	NT	NT	NT
7	A-2-4 (0)	SC	Low	NA	NA	NT	NT	NT	NT	NT
7	A-2-4 (0)	SC	Medium	96.3	90.5	NT	NT	NT	NT	NT
7	A-2-4 (0)	SC	High	96.2	89.1	NT	NT	NT	NT	NT

Note: M_R calculated using a standard stress state of σ_1 = 6 psi; σ_2,σ_3 = 2 psi except 6 ad 7 which used a standard stress state of $\sigma 1$ = 15 psi; $\sigma 2,\sigma 3$ = 5 psi, NT: Not testable at optimum+3% moisture

4.2.2 Stabilized Soils

Tables 24 and 25 present the resilient modulus results from the lime stabilized soil testing at optimum and optimum plus 3 percent moisture content, respectively. The lime stabilized soils were molded at the prescribed moisture content and then allowed to mellow for four days in a concrete curing humid room before resilient modulus testing.

The time period of four days was chosen because this is the same time period used for CBR testing. Material 1 was not tested in triplicate because of the limited availability of the soil. Appendices F and G display the resilient modulus data for the lime stabilized soil testing at optimum moisture content and optimum plus three percent moisture, respectively.

Table 24: Lime Stabilized Soil Resilient Modulus Testing at Optimum Moisture Content

Material No.	Classifications		Compaction Level	Density, %	Saturation, %	Average			M_R Average, psi	St Dev, psi
	AASHTO	USCS				K_1	K_2	K_3		
1	A-7-6 (23)	CL	Low	91.7	66.9	1911.8	0.685	-1.281	28313	NA
1	A-7-6 (23)	CL	Medium	97.9	70.9	2725.4	0.841	-1.912	36790	NA
1	A-7-6 (23)	CL	High	98.7	82.9	2580.1	0.664	-0.877	42281	NA
2	A-6 (17)	CL	Low	90.6	66.7	1935.6	0.691	-1.036	30600	2861
2	A-6 (17)	CL	Medium	96.3	77.8	2338.2	0.919	-0.852	43814	4027
2	A-6 (17)	CL	High	101.1	88.5	1832.8	0.577	0.339	37836	755
4	A-4 (5)	CL	Low	85.9	50.4	1702.5	0.845	-0.534	29313	3126
4	A-4 (5)	CL	Medium	94.6	63.9	3263.7	0.797	-1.538	47529	8176
4	A-4 (5)	CL	High	99.8	74.5	3151.4	0.769	-1.312	48385	4449

Note: M_R calculated using a standard stress state of σ_1 = 6 psi; σ_2, σ_3 = 2 psi

Table 25: Lime Stabilized Soil Resilient Modulus Testing at Optimum + 3 Percent Moisture Content

Material No.	Classifications		Compaction Level	Density, %	Saturation, %	Average			M_R Average, psi	St Dev, psi
	AASHTO	USCS				K_1	K_2	K_3		
1	A-7-6 (23)	CL	Low	92.5	70.8	1947.7	0.697	-1.494	18277	NA
1	A-7-6 (23)	CL	Medium	97.1	87.6	2347.7	0.767	-1.804	20657	NA
1	A-7-6 (23)	CL	High	98.9	88.6	1859.8	0.839	-2.193	15187	NA
2	A-6 (17)	CL	Low	89.7	77.0	2519.3	0.668	-1.289	24510	1691
2	A-6 (17)	CL	Medium	96.1	89.4	3344.0	0.702	-1.306	32054	2015
2	A-6 (17)	CL	High	98.3	95.1	1981.4	0.762	-1.307	18509	538
4	A-4 (5)	CL	Low	89.9	68.6	2615.6	0.773	-1.746	23147	1418
4	A-4 (5)	CL	Medium	95.4	82.1	1904.3	0.920	-2.172	15164	2385
4	A-4 (5)	CL	High	96.3	80.1	1825.9	0.934	-2.505	13854	1195

Note: M_R calculated using a standard stress state of σ_1 = 6 psi; σ_2,σ_3 = 2 psi

Resilient modulus test results for the lime stabilized soils prepared at optimum moisture content are illustrated in Figure 13. Figure 13 presents the resilient modulus test values versus the percent maximum dry density for the molded specimens. **As expected, the resilient modulus values increased as the percent maximum dry density increased.** Figure 14 compares the resilient modulus of the virgin soils and lime stabilized soils at 98 percent maximum dry density. **As shown in this figure, the resilient modulus of the lime stabilized soils is significantly higher than the virgin soils.**

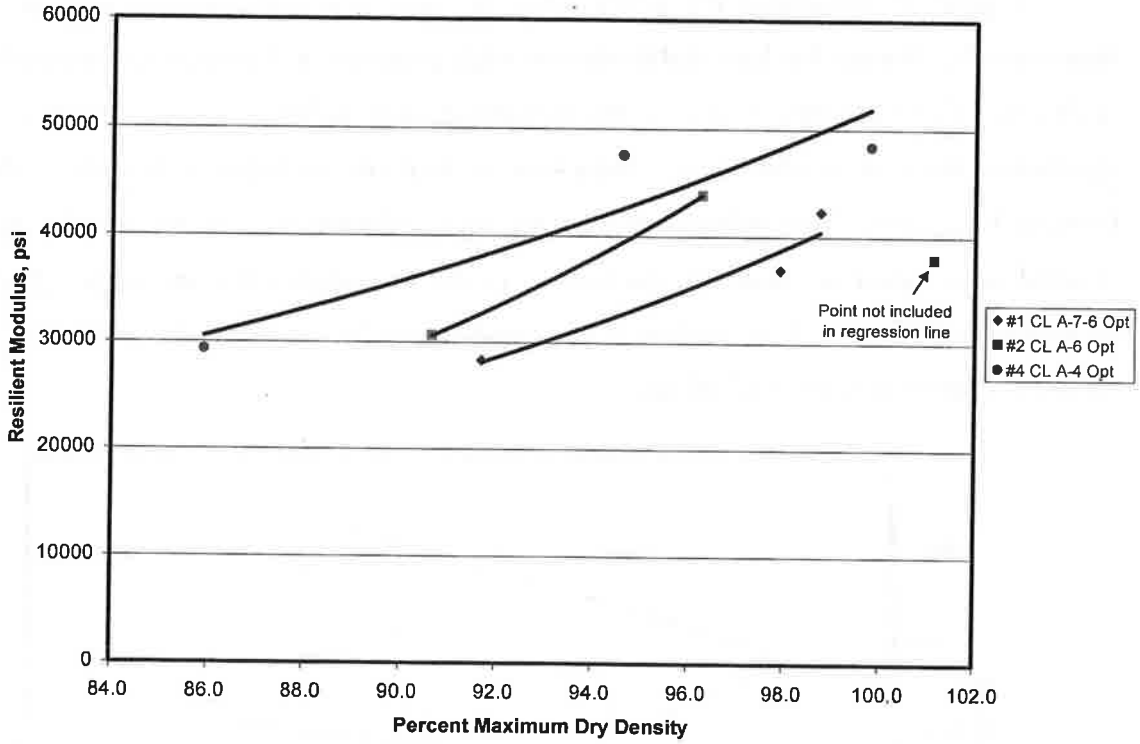


Figure 13: Resilient Modulus Values for Lime Stabilized Materials – Optimum

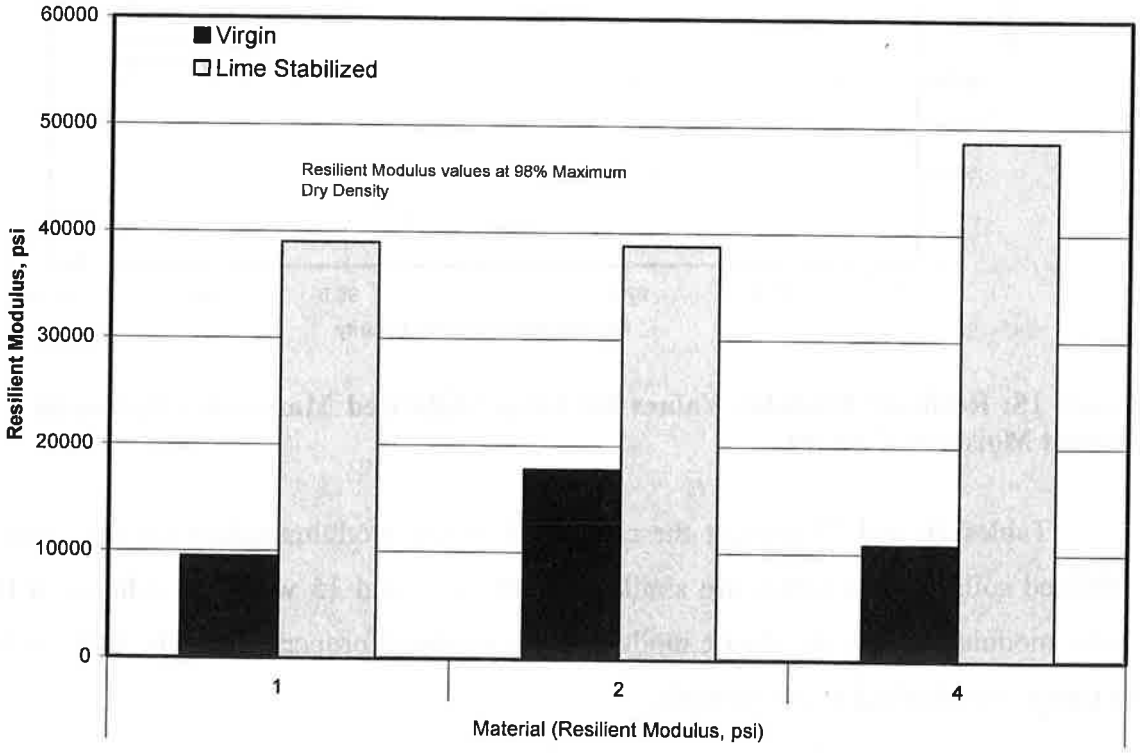


Figure 14: Comparison of Resilient Modulus Values for Virgin and Lime Stabilized Materials – Optimum Moisture Content

Figure 15 illustrates the relationship between resilient modulus and percent maximum dry density for lime stabilized materials prepared at 3 percent moisture above optimum. For Materials 1 and 2, the highest density point was removed from the regression, because of the drastic reduction in resilient modulus with only a slight increase in density. Interestingly, one of the three relationships shown in this figure, resulted in a negative slope or decreasing resilient modulus for increasing percent maximum dry density. It is unclear if this trend is significant or the by-product of test sample preparation or test variability.

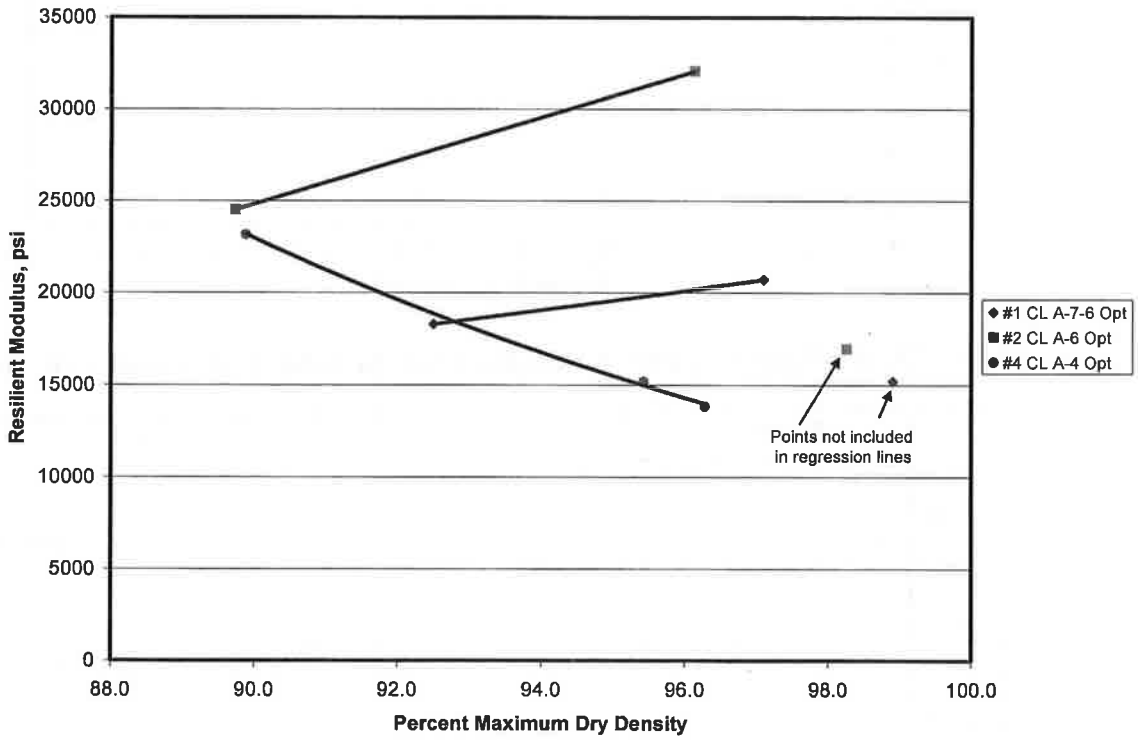


Figure 15: Resilient Modulus Values for Lime Stabilized Materials - Optimum + 3 Percent Moisture Content

Tables 26 and 27 present the calculated elastic modulus values for the cement stabilized soils. These tables are similar to Tables 13 and 15 with the addition of the elastic modulus. Since the elastic modulus is a calculated property form the UC results, the trends are identical to the strength.

Table 26: Cement Stabilized Soil Elastic Modulus Calculations at Optimum Moisture Content

Material No.	2		3		4		4R		5		6		6R		7	
ASTM	**CL**		**ML**		**CL**		**CL**		**SM**		**SM**		**SM**		**SC**	
AASHTO	**A-6**		**A-4**		**A-4**		**A-4**		**A-2-4**		**A-2-4**		**A-2-4**		**A-2-4**	
Standard Effort Proctor																
Optimum Moisture, %	17.9		16.2		11.8		11.8		13.5		12.7		12.7		13.3	
Maximum Dry Density, pcf	106.0		108.5		120.9		120.9		110.6		117.8		117.8		117.2	
Specific Gravity	2.680		2.713		2.798		2.798		2.696		2.744		2.744		2.660	
Cement, %	5		5		5		4		5		5		4		5	
3 Lifts with Standard Hammer at Optimum Moisture																
	7 day	**14 day**	**7 day**	**14 day**	**7 day**	**14 day**	**7 day**	**14 day**	**7 day**	**14 day**	**7 day**	**14 day**	**7 day**	**14 day**	**7 day**	**14 day**
% Moisture	16.7	17.0	14.9	15.1	12.2	11.4	12.0	11.9	13.6	13.5	12.4	12.5	12.2	12.5	12.8	12.5
10 Density, pcf	94.4	94.2	101.7	101.4	110.5	109.9	110.6	110.5	101.8	102.0	107.8	107.6	109.4	108.8	102.8	103.4
Blows/Lift % Density	89.1	88.9	93.7	93.5	91.4	90.9	91.5	91.4	92.0	92.2	91.5	91.3	92.9	92.4	87.7	88.2
% Saturation	58.1	58.8	60.8	61.3	58.9	54.2	58.1	57.4	56.1	56.0	57.8	58.0	59.3	59.9	55.4	54.9
UC, psi	34	44	67	90	167	140	179	182	53	77	174	208	251	293	127	171
Elastic Modulus, psi	40,800	52,200	79,800	108,000	200,400	168,000	214,200	217,800	63,600	92,400	208,800	249,000	301,200	351,000	152,400	205,200
% Moisture	16.5	16.5	15.0	15.3	12.2	11.4	11.9	11.9	13.5	13.4	12.3	12.7	12.4	12.6	13.2	13.1
25 Density, pcf	104.8	105.0	109.5	109.3	119.9	119.3	119.4	119.1	108.5	108.6	116.3	116.0	117.6	117.2	114.3	114.6
Blows/Lift % Density	98.9	99.1	100.9	100.7	99.2	98.7	98.8	98.5	98.1	98.2	98.7	98.5	99.8	99.5	97.5	97.8
% Saturation	74.3	74.7	74.5	75.5	74.9	68.9	72.1	71.5	66.1	65.8	71.4	73.3	74.6	75.1	77.6	77.8
UC, psi	132	155	127	173	266	303	247	295	88	111	317	305	355	408	291	322
Elastic Modulus, psi	158,400	186,000	152,400	207,600	318,600	363,000	296,400	354,000	105,600	133,200	379,800	366,000	425,400	489,600	348,600	385,800
% Moisture	16.8	16.9	14.4	14.4	12.9	11.6	11.9	11.8	13.5	13.5	12.6	12.7	12.4	12.5	12.7	13.0
40 Density, pcf	107.8	107.9	112.7	112.3	120.5	122.7	121.0	121.5	111.4	111.6	119.4	119.0	119.3	118.9	118.7	118.3
Blows/Lift % Density	101.7	101.8	103.9	103.5	99.7	101.5	100.1	100.5	100.7	100.9	101.4	101.0	101.3	100.9	101.3	100.9
% Saturation	81.7	82.4	77.9	77.0	80.5	76.8	75.2	75.6	71.3	71.7	79.8	79.4	78.3	77.9	84.9	85.7
UC, psi	147	168	175	208	238	362	286	336	104	148	275	352	352	411	358	484
Elastic Modulus, psi	175,800	201,000	210,000	249,600	285,000	434,400	343,200	403,200	124,800	177,600	329,400	422,400	421,800	493,200	429,600	580,800

Table 27 Cement Stabilized Soil Elastic Modulus Calculations at Optimum + 3 Percent Moisture Content

Material No.		2		3		4		4R		5		6		6R		7	
ASTM		**CL**		**ML**		**CL**		**CL**		**SM**		**SM**		**SM**		**SC**	
AASHTO		**A-6**		**A-4**		**A-4**		**A-4**		**A-2-4**		**A-2-4**		**A-2-4**		**A-2-4**	
Standard Effort Proctor																	
Optimum Moisture, %		17.9		16.2		11.8		11.8		13.5		12.7		12.7		13.3	
Maximum Dry Density, pcf		106.0		108.5		120.9		120.9		110.6		117.8		117.8		117.2	
Specific Gravity		2.680		2.713		2.798		2.798		2.696		2.744		2.744		2.660	
Cement, %		5		5		5		4		5		5		4		5	
3 lifts with Standard Hammer at Optimum + 3% Moisture																	
		7 day	**14 day**	**7 day**	**14 day**	**7 day**	**14 day**	**7 day**	**14 day**	**7 day**	**14 day**	**7 day**	**14 day**	**7 day**	**14 day**	**7 day**	**14 day**
10 Blows/Lift	% Moisture	19.8	19.8	18.0	17.5	15.0	14.5	15.0	15.1	16.2	16.4	14.6	14.6	15.6	15.3	16.0	15.8
	Density, pcf	97.8	97.6	102.4	103.7	114.0	114.7	112.8	113.0	104.1	103.7	112.1	111.9	111.3	111.6	107.9	107.7
	% Density	92.3	92.1	94.4	95.6	94.3	94.9	93.3	93.5	94.1	93.8	95.2	95.0	94.5	94.7	92.1	91.9
	% Saturation	74.8	74.4	74.8	75.1	79.0	77.6	76.6	77.6	70.9	71.1	76.1	75.6	79.6	78.5	79.2	77.7
UC, psi		105	93	70	92	158	189	162	208	56	72	138	173	208	245	206	240
Elastic Modulus, psi		125,400	111,600	83,400	109,800	189,000	226,200	193,800	249,600	66,600	86,400	165,600	207,600	249,600	294,000	247,200	288,000
25 Blows/Lift	% Moisture	20.5	20.6	18.3	18.3	15.0	14.9	15.1	14.9	14.9	15.0	15.5	14.8	15.2	15.6	16.0	16.2
	Density, pcf	104.8	105.0	106.5	106.8	114.5	116.1	113.9	114.7	107.7	108.6	113.8	114.3	113.4	113.3	113.3	113.2
	% Density	98.9	99.1	98.2	98.4	94.7	96.0	94.2	94.9	97.4	98.2	96.6	97.0	96.3	96.2	96.7	96.6
	% Saturation	92.3	93.1	84.3	84.8	80.0	82.6	79.3	79.9	71.5	73.7	84.3	81.5	81.9	83.8	91.6	92.5
UC, psi		130	140	67	93	152	207	129	173	60	114	158	191	170	201	235	296
Elastic Modulus, psi		155,400	168,000	80,400	111,000	182,400	248,400	154,200	207,000	72,000	136,200	189,000	228,600	203,400	241,200	282,000	355,200
40 Blows/Lift	% Moisture	19.6	19.7	18.8	18.5	15.9	14.7	15.1	15.3	16.6	16.5	15.0	14.9	15.3	15.4	16.5	16.1
	Density, pcf	104.9	105.0	106.0	106.1	113.5	116.4	113.8	113.9	108.2	108.1	114.4	114.6	114.1	114.0	113.6	113.9
	% Density	99.0	99.1	97.7	97.8	93.9	96.3	94.1	94.2	97.8	97.7	97.1	97.3	96.9	96.8	96.9	97.2
	% Saturation	88.4	89.2	85.4	84.3	82.6	82.1	79.0	80.3	80.6	79.9	82.9	82.8	84.0	84.3	95.1	93.7
UC, psi		126	148	53	67	166	239	118	166	60	90	168	210	163	181	240	297
Elastic Modulus, psi		150,600	177,600	63,600	80,400	199,200	286,200	141,600	198,600	72,000	108,000	201,600	252,000	195,000	217,200	288,000	355,800

Tables 28 and 29 show the calculated elastic modulus values for the lime-fly ash stabilized soils. These tables are similar to Tables 17 and 19 with the addition of the elastic modulus. Again, because the elastic modulus is a calculated property, the trends will be identical to the unconfined compression strength.

Table 28: Lime-Fly-Ash Stabilized Soil Elastic Modulus Calculations at Optimum Moisture Content

Material No.		1		2		3		4		7		8	
ASTM		CL		CL		ML		CL		SC		SC	
AASHTO		A-7-6		A-6		A-4		A-4		A-2-4		A-2-4	
Standard Effort Proctor													
Optimum Moisture, %		17.8		19.2		15.2		13.4		14.7		11.3	
Maximum Dry Density, pcf		105.5		104.5		108.2		116.6		113.5		122.7	
Specific Gravity		2.610		2.585		2.615		2.691		2.567		2.507	
3% Lime/12% Fly Ash treated UC using 3 Lifts with Standard Hammer at Optimum Moisture												4% Lime/8% Fly Ash	
		14 day	28 day	14 day	28 day	14 day	28 day	14 day	28 day	14 day	28 day	14 day	28 day
10 Blows/ Lift	% Moisture	16.6	16.9	18.7	18.9	14.3	14.3	13.1	13.6	14.0	14.3	11.2	11.1
	Density, pcf	91.7	91.5	92.7	92.5	97.1	96.5	106.2	104.9	100.4	99.7	105.0	104.9
	% Density	86.9	86.7	88.7	88.5	89.7	89.2	91.1	90.0	88.5	87.8	92.5	92.4
	% Saturation	55.8	56.5	65.3	65.6	54.9	54.1	60.7	61.0	60.4	60.4	57.3	56.6
UC, psi		62	77	59	83	129	343	223	366	114	201	276	515
Elastic Modulus, psi		561,500	577,000	558,500	582,500	628,500	842,500	723,000	866,000	614,000	701,000	775,500	1,014,500
25 Blows/ Lift	% Moisture	16.9	16.8	18.2	18.6	14.3	14.3	13.7	13.5	14.1	14.1	11.2	11.2
	Density, pcf	100.6	100.6	102.7	102.0	106.3	106.4	114.2	114.2	110.9	110.4	111.7	112.1
	% Density	95.4	95.4	98.3	97.6	98.2	98.3	97.9	97.9	97.7	97.3	98.4	98.8
	% Saturation	71.4	70.9	82.5	82.7	69.8	70.0	78.3	77.2	81.4	80.3	70.1	71.1
UC, psi		201	225	183	229	265	725	356	590	272	520	332	524
Elastic Modulus, psi		700,500	725,000	683,000	729,000	765,000	1,225,000	856,000	1,089,500	771,500	1,019,500	832,000	1,024,000
40 Blows/ Lift	% Moisture	17.1	17.1	18.6	18.6	14.3	14.1	12.4	12.4	14.3	14.4	11.1	11.1
	Density, pcf	104.2	104.8	105.3	105.0	110.1	109.7	119.4	118.1	114.0	113.8	113.0	113.4
	% Density	98.8	99.3	100.8	100.5	101.8	101.4	102.4	101.3	100.4	100.3	99.6	99.9
	% Saturation	79.4	80.5	90.5	89.7	77.7	75.7	82.1	79.2	90.5	90.8	72.5	73.3
UC, psi		278	352	221	288	348	836	430	754	300	578	334	567
Elastic Modulus, psi		777,500	851,500	720,500	788,000	848,000	1,336,000	930,000	1,253,500	799,500	1,078,000	833,500	1,067,000

Table 29: Lime-Fly-Ash Stabilized Soil Elastic Modulus Calculations at Optimum + 3 Percent Moisture Content

Material No.		1		2		3		4		7		8	
ASTM		CL		CL		ML		CL		SC		SC	
AASHTO		A-7-6		A-6		A-4		A-4		A-2-4		A-2-4	
Standard Effort Proctor													
Optimum Moisture, %		17.8		19.2		15.2		13.4		14.7		11.3	
Maximum Dry Density, pcf		105.5		104.5		108.2		116.6		113.5		122.7	
Specific Gravity		2.610		2.585		2.615		2.691		2.567		2.507	
3% Lime/12% Fly Ash treated UC using 3 Lifts with Standard Hammer at Optimum Moisture + 3%												4% Lime/8% Fly Ash	
		14 day	28 day	14 day	28 day	14 day	28 day	14 day	28 day	14 day	28 day	14 day	28 day
10 Blows/ Lift	% Moisture	19.6	19.5	20.9	21.3	17.2	17.2	15.3	15.8	16.6	17.0	14.3	14.0
	Density, pcf	94.8	94.0	95.8	93.9	98.6	98.6	111.0	109.7	102.9	102.6	106.5	106.7
	% Density	89.9	89.1	91.7	89.9	91.1	91.1	95.2	94.1	90.7	90.4	93.8	94.0
	% Saturation	71.3	69.5	79.1	76.8	68.6	68.6	80.2	80.0	76.6	77.8	76.4	75.3
UC, psi		116	131	84	87	118	402	265	528	147	251	141	277
Elastic Modulus, psi		616,000	630,500	584,000	587,000	617,500	902,000	765,000	1,028,000	647,000	750,500	640,500	777,000
25 Blows/ Lift	% Moisture	20.0	20.2	21.8	23.9	17.4	17.4	15.3	16.1	16.8	16.8	14.0	14.0
	Density, pcf	102.8	102.8	101.4	99.6	107.3	107.4	113.5	112.4	110.9	111.0	106.8	107.3
	% Density	97.4	97.4	97.0	95.3	99.2	99.3	97.3	96.4	97.7	97.8	94.1	94.5
	% Saturation	89.3	90.1	95.3	99.7	87.5	87.7	85.7	88.0	97.0	97.3	75.6	76.6
UC, psi		278	323	106	164	231	545	221	395	218	392	127	227
Elastic Modulus, psi		777,500	823,000	606,000	664,000	730,500	1,045,000	721,000	895,000	718,000	892,000	627,000	727,000
40 Blows/ Lift	% Moisture	19.6	19.7	20.9	21.0	17.6	17.5	15.3	15.5	16.8	16.9	14.1	14.0
	Density, pcf	105.1	104.4	103.0	103.2	107.9	107.9	113.0	113.5	111.9	111.6	106.7	106.9
	% Density	99.6	99.0	98.6	98.8	99.7	99.7	96.9	97.3	98.6	98.3	94.0	94.2
	% Saturation	93.0	91.9	95.5	96.5	89.8	89.3	84.9	86.7	100.0	99.5	75.8	75.8
UC, psi		275	357	130	175	190	408	205	472	225	353	110	203
Elastic Modulus, psi		774,500	857,000	629,500	674,500	689,500	908,000	705,000	971,500	724,500	852,500	610,000	703,000

CHAPTER 5 – CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The objective of this study was to conduct laboratory evaluations to quantify the effects of compaction and moisture conditions on the strength of chemically treated soils typically utilized in pavement construction in Mississippi. In order to accomplish these objectives, seven virgin soils typical of Mississippi were selected. Strength tests were conducted on these virgin materials in order to develop baseline strength data. Next, these selected soils were combined with lime, cement, and/or lime/fly ash to represent typical stabilized materials. Tests conducted to evaluate strength properties within this study included the CBR, unconfined compression test and resilient modulus. Based upon the analyses of test results obtained using these tests, the following are concluded:

- There is an influence of density on the results of CBR testing on raw (virgin) soils. As the percent maximum dry density increases, CBR values increased. The influence of density on sandy soils was more prevalent than for the finer-grained silty clay soils.
- There is an influence of density on the results of CBR testing on raw soils prepared at 3 percent above optimum moisture content. As the percent maximum dry density increases, CBR values increased.
- There is an influence of increased moisture content (plus 3 percent) on the results of CBR testing of raw soils. For the raw soils having a plasticity index greater than 8, the addition of 3 percent moisture above optimum resulted in similar or higher CBR values. Fine grained silts and sandy soils, the addition of the 3percent moisture resulted in significantly lower CBR values.
- There is an influence of density on the results of CBR testing of lime stabilized soils. As the percent maximum dry density increases, CBR values increased.
- The addition of lime to the tested raw soils significantly increased the CBR values. At 98 percent of maximum dry density, the average CBR value increased from 3 to 54 when comparing virgin soils to lime stabilized soils.

- There is an influence of increased moisture on the results of CBR testing of lime stabilized soils. However, this influence was more pronounced on CL soils having a plasticity index of 8. The influence of the increased moisture content was minimal for the two soils having a plasticity index greater than 18.
- There is an influence of density on the results of unconfined compression testing on cement stabilized soils. As the percent maximum dry density increased, the unconfined compressive strength increased.
- Generally, the unconfined compressive strengths were lower for cement stabilized soils when 3 percent above optimum moisture was added.
- There is an influence of density on the results of unconfined compression testing for lime/fly ash treated soils. Compressive strength increased as the percent maximum dry density increased.
- The unconfined compressive strengths were lower for lime/fly ash treated soils when 3 percent above optimum moisture was added.
- There is an influence of density on the results of resilient modulus testing of raw soils. Resilient modulus increases as the percent maximum dry density increases.
- The chemical treatment of the virgin soils significantly increases resilient modulus.
- Specimen prepared at 3 percent optimum produced inconsistent density and strength values.

5.2 Recommendations

- Compaction requirements for the subgrade soils and chemically treated layer should be at least 98 percent of standard Proctor density.
- Subgrade and chemically treated material strengths can be significantly improved if compaction requirements are increased to 100 percent of standard Proctor density.
- Chemically treating the top 6 to 9 inches of subgrade and base layers should be required to improve structural strength, integrity and capacity of pavement structure.
- Field moisture contents should not exceed the optimum moisture content by 3 percent. Moisture content control will reduce the potential to decrease the strengths of chemically stabilized subgrade and base materials.

Appendix A

Standard Proctor Density Curves

COMPACTION TEST REPORT

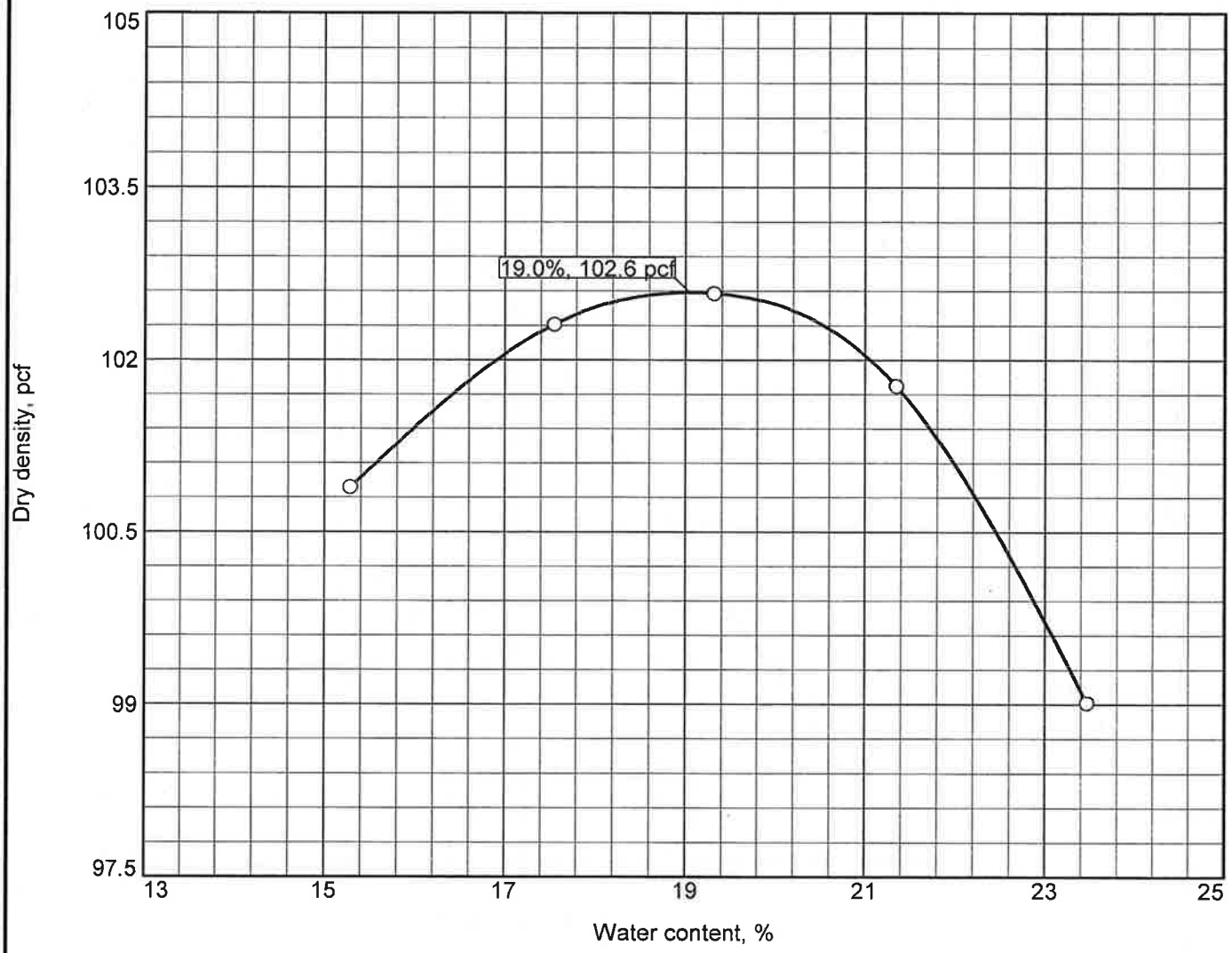
Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	CL	A-7-6		2.692	43	25		

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 107.7 pcf Optimum moisture = 16.4 %	Tan silty clay CL A-7-6; Material 1
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A1

Tested By: ds

COMPACTION TEST REPORT



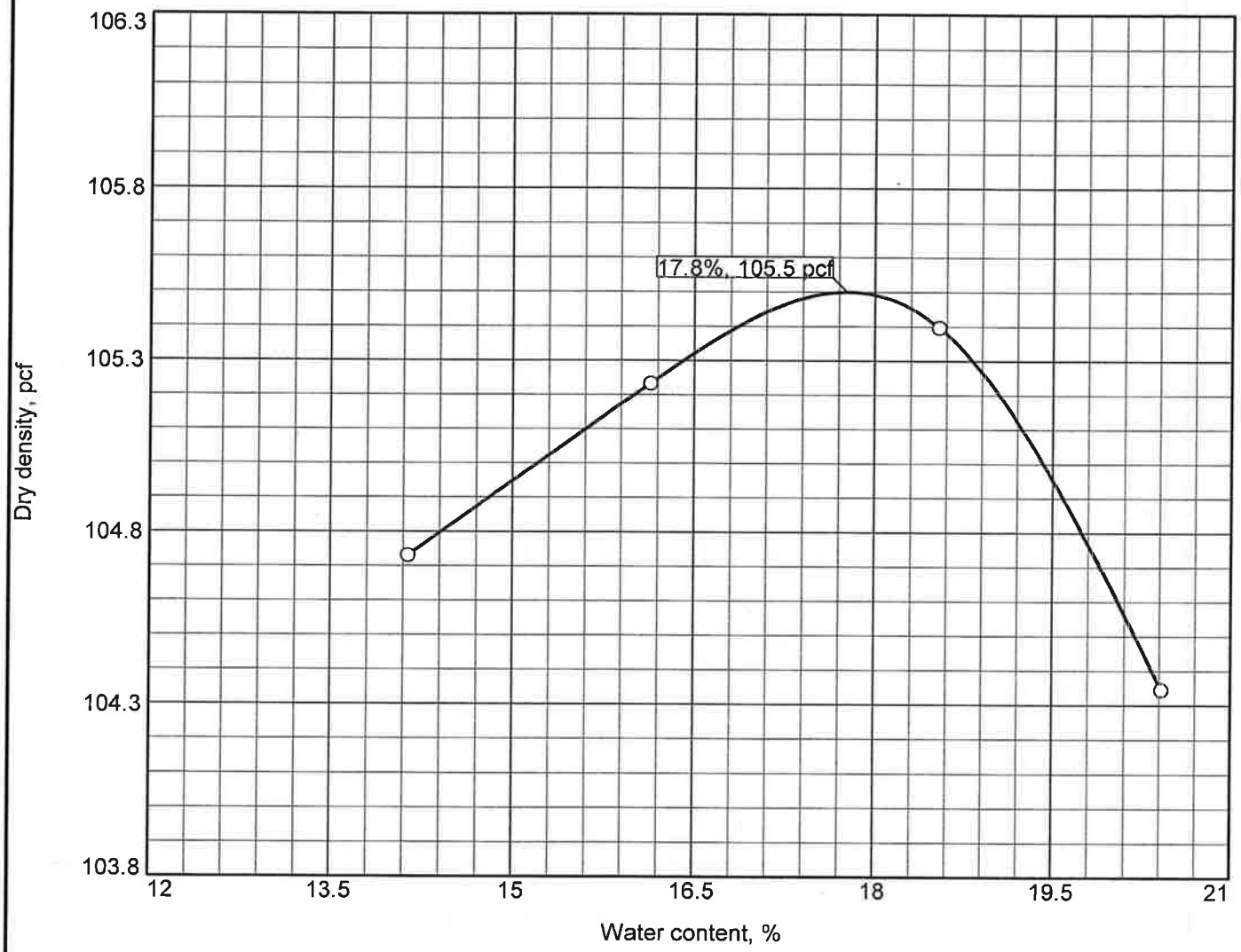
Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 102.6 pcf Optimum moisture = 19.0 %	Lime Treated - 5% CL A-7-6; Material 1
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A2

Tested By: ds

COMPACTION TEST REPORT



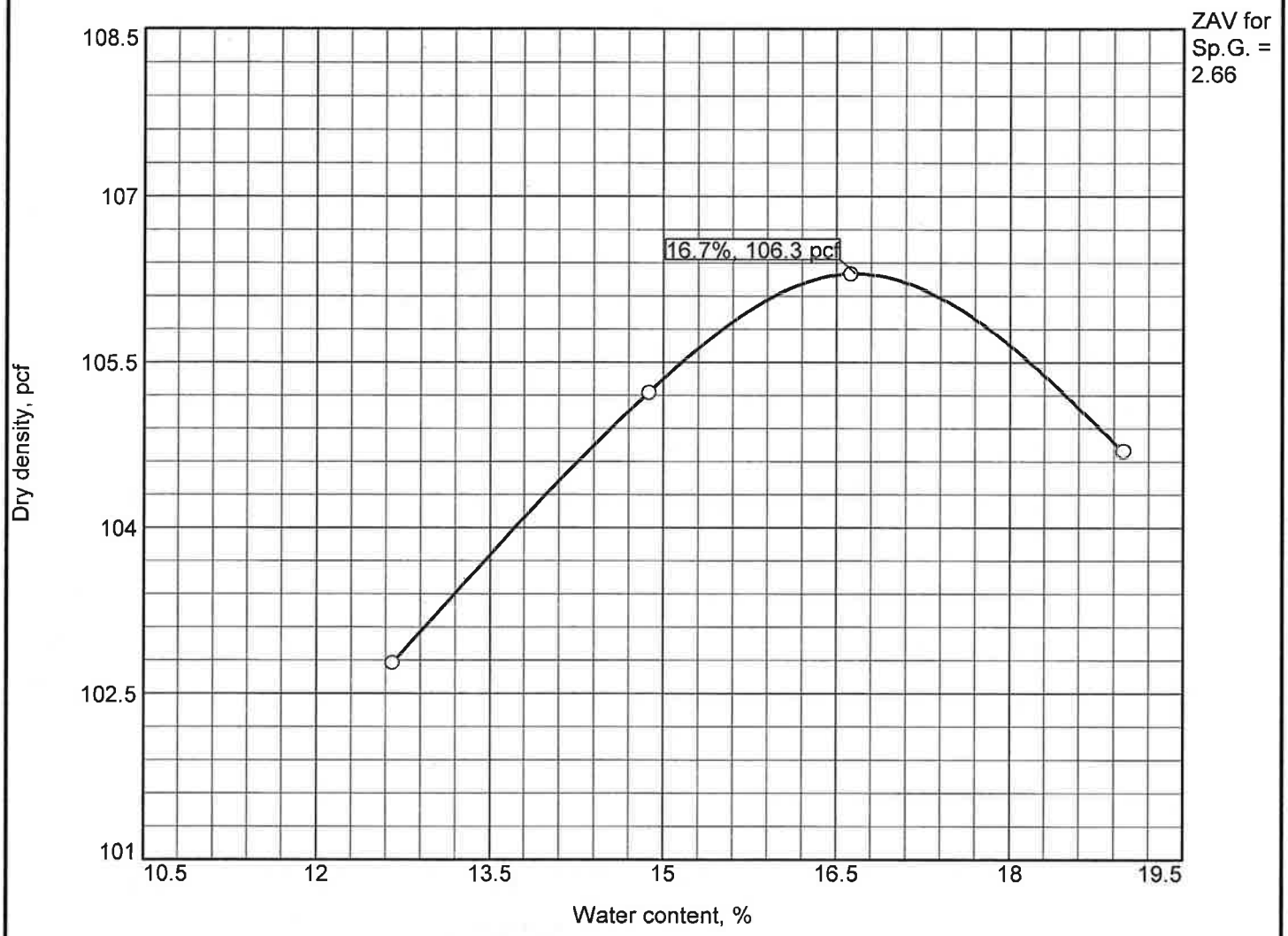
Test specification: MS DOT (2005) Case 1 Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 105.5 pcf Optimum moisture = 17.8 %	Lime/Fly Ash Treated - (3%L/12%FA) CL A-7-6; Material 1
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A3

Tested By: ds

COMPACTION TEST REPORT



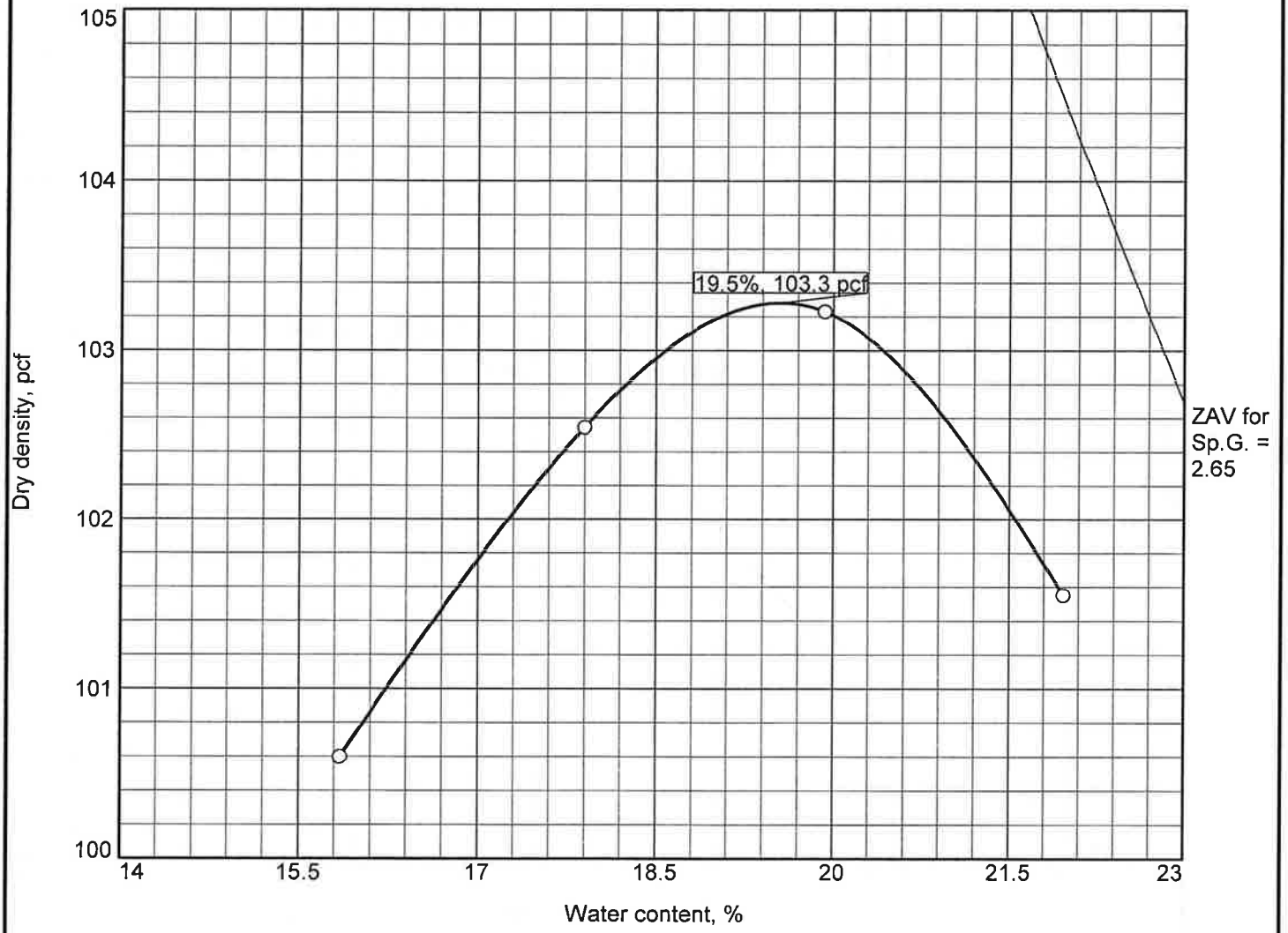
Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	CL	A-6		2.663	37	19		93

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 106.3 pcf Optimum moisture = 16.7 %	Tan silty clay CL A-6; Material 2
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A4

Tested By: ds

COMPACTION TEST REPORT



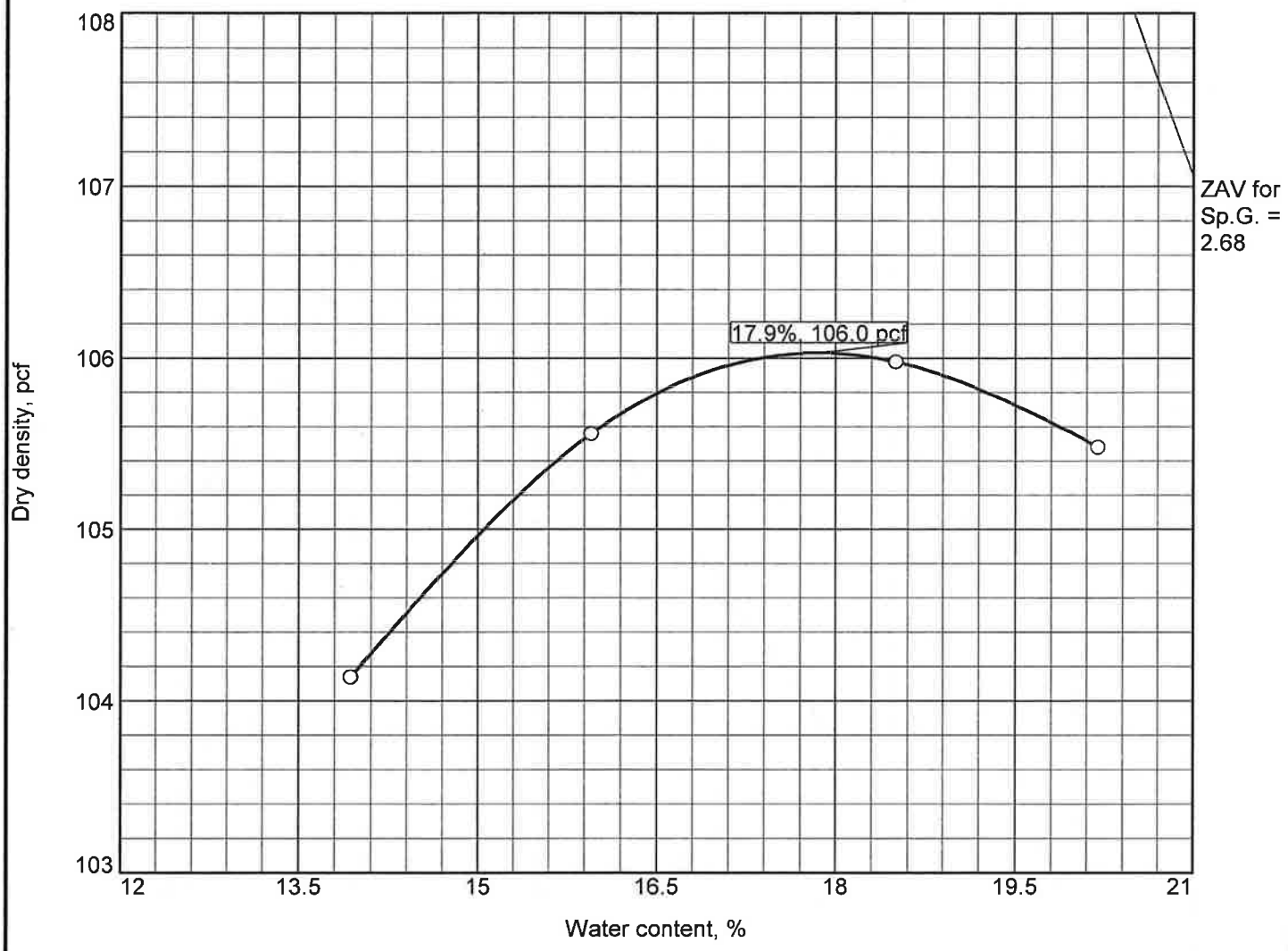
Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.646	--	--		

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 103.3 pcf Optimum moisture = 19.5 %	Lime Treated - 5% CL A-6; Material 2
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A5

Tested By: ds

COMPACTION TEST REPORT



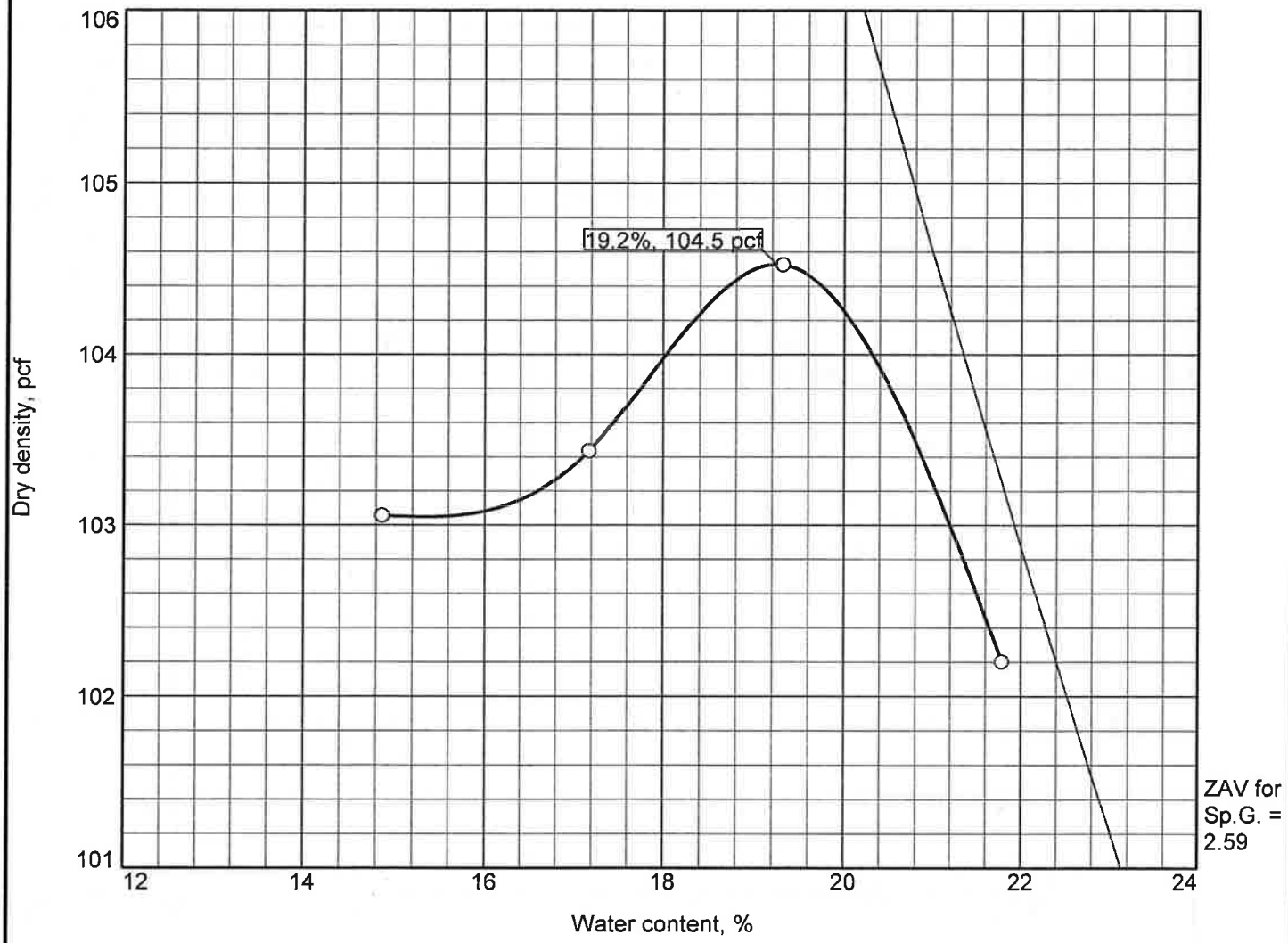
Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.680				

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 106.0 pcf Optimum moisture = 17.9 %	Cement Treated - 5% CL A-6; Material 2
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A6

Tested By: ds

COMPACTION TEST REPORT



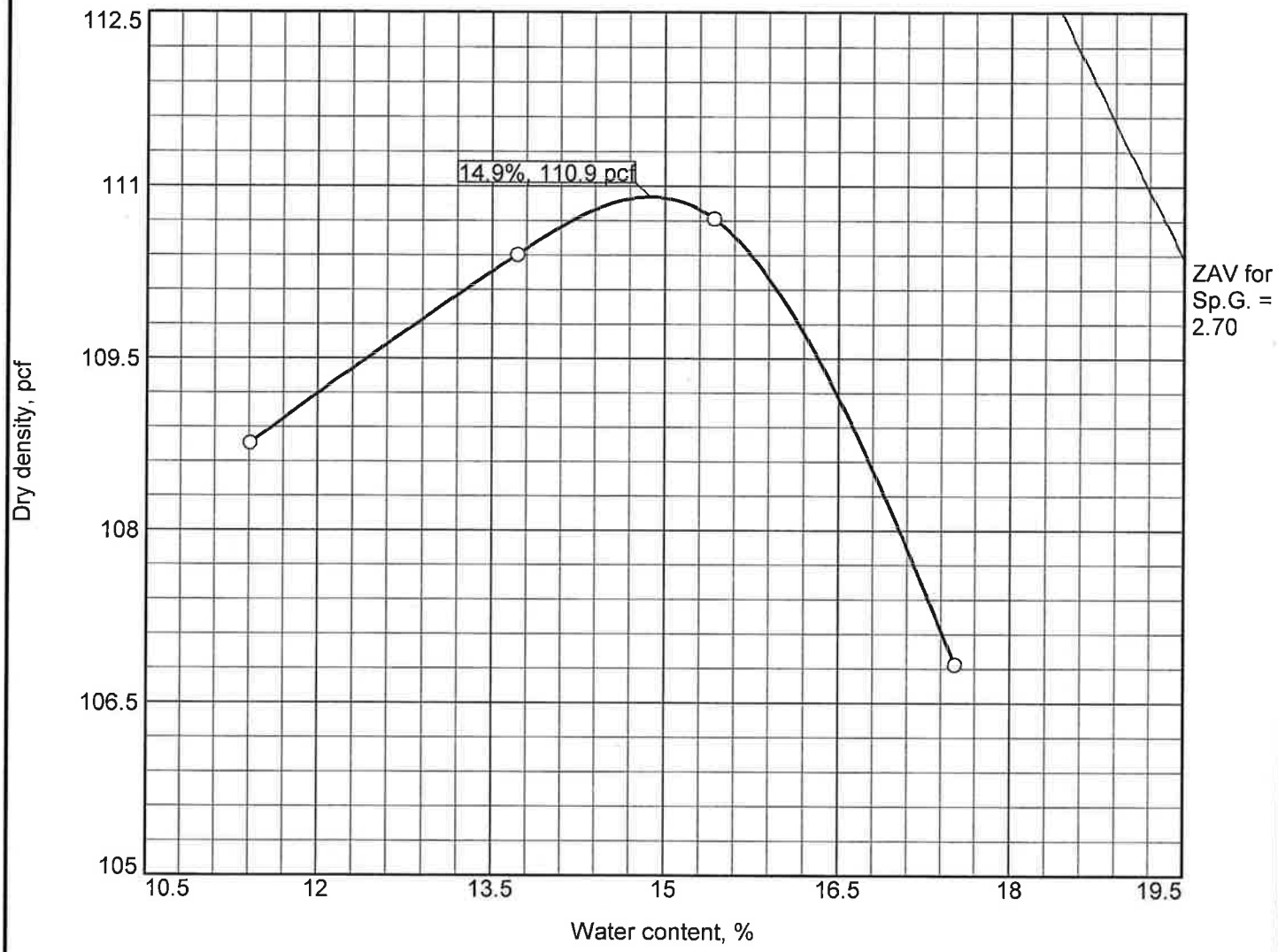
Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.585				

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 104.5 pcf Optimum moisture = 19.2 %	Lime/Fly Ash Treated (3%L/12%FA) CL A-6; Material 2
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A7

Tested By: ds

COMPACTION TEST REPORT



Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	ML	A-4		2.698	27	1		99

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 110.9 pcf Optimum moisture = 14.9 %	Tan silt, slightly clayey ML A-4; Material 3

Project No. 070904 **Client:**
Project: MDOT SS 205

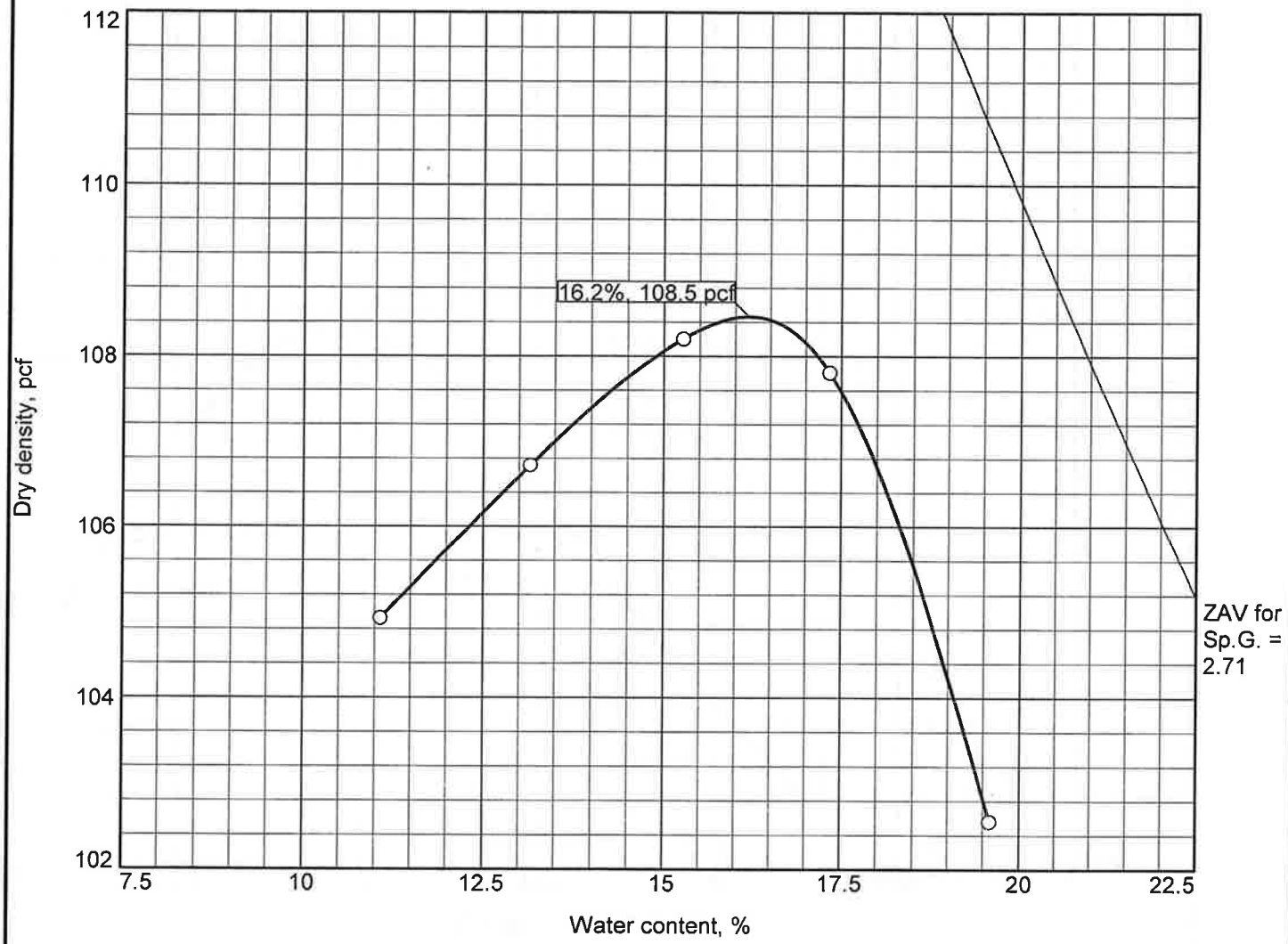
Remarks:

BURNS COOLEY DENNIS, INC.

Ridgeland, Mississippi

Figure A8

COMPACTION TEST REPORT



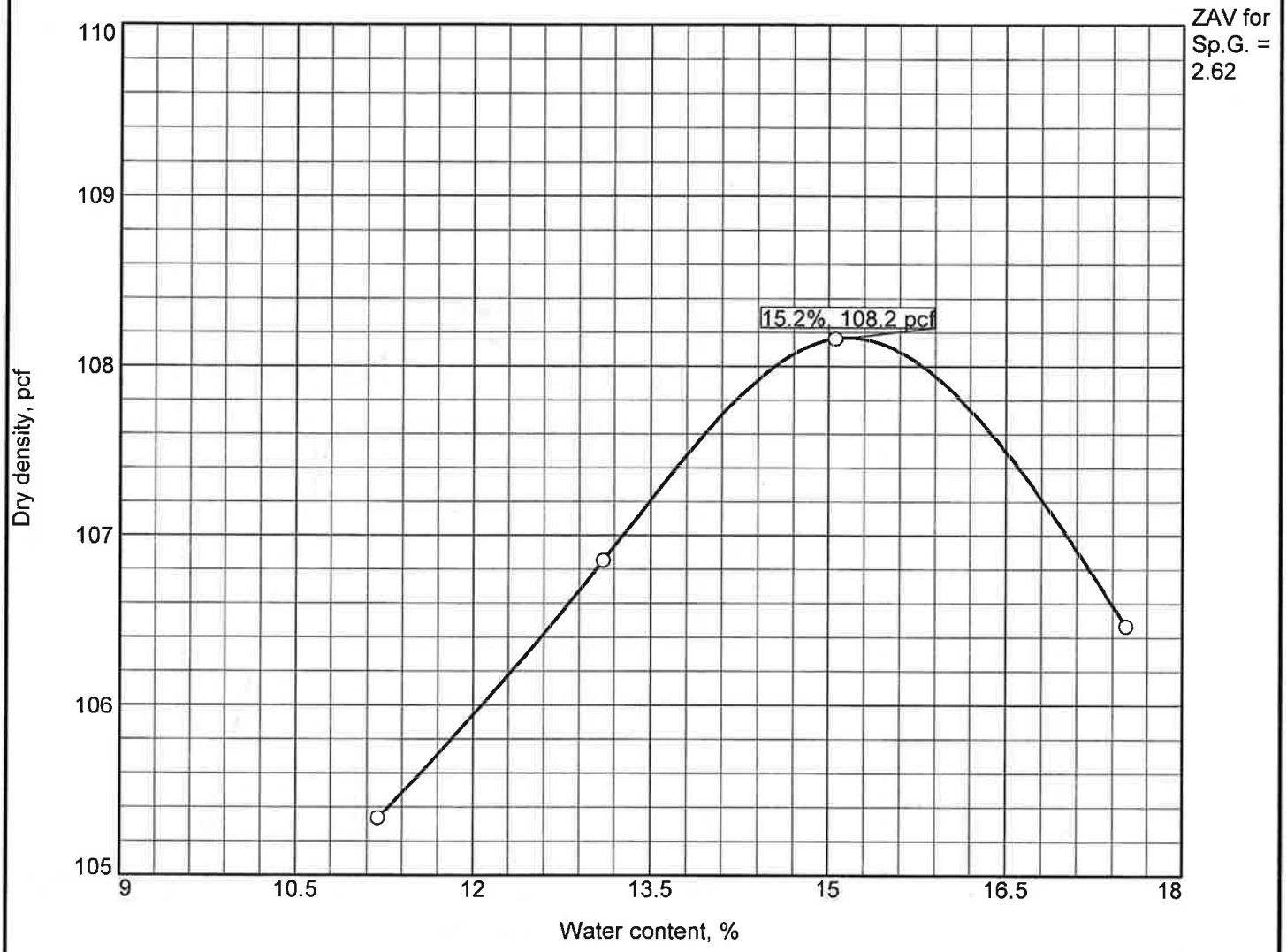
Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.713				

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 108.5 pcf Optimum moisture = 16.2 %	Cement Treated - 5% ML A-4; Material 3
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A9

Tested By: ds

COMPACTION TEST REPORT



Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.615				

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 108.2 pcf Optimum moisture = 15.2 %	Lime/Fly Ash Treated (3%L/12%FA) ML A-4; Material 3

Project No. 070904 **Client:**
Project: MDOT SS 205

Remarks:

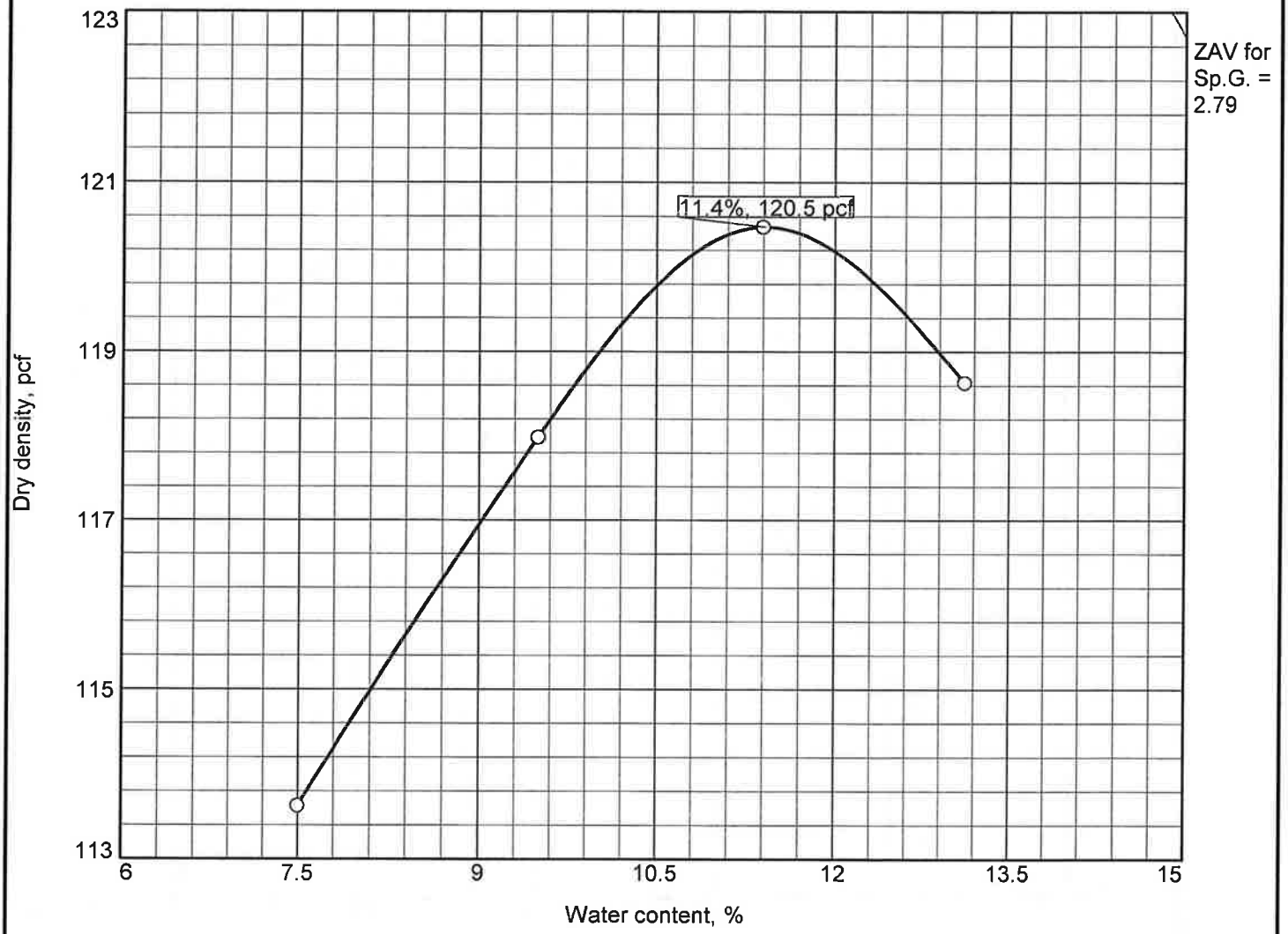
BURNS COOLEY DENNIS, INC.

Ridgeland, Mississippi

Figure A10

Tested By: ds

COMPACTION TEST REPORT



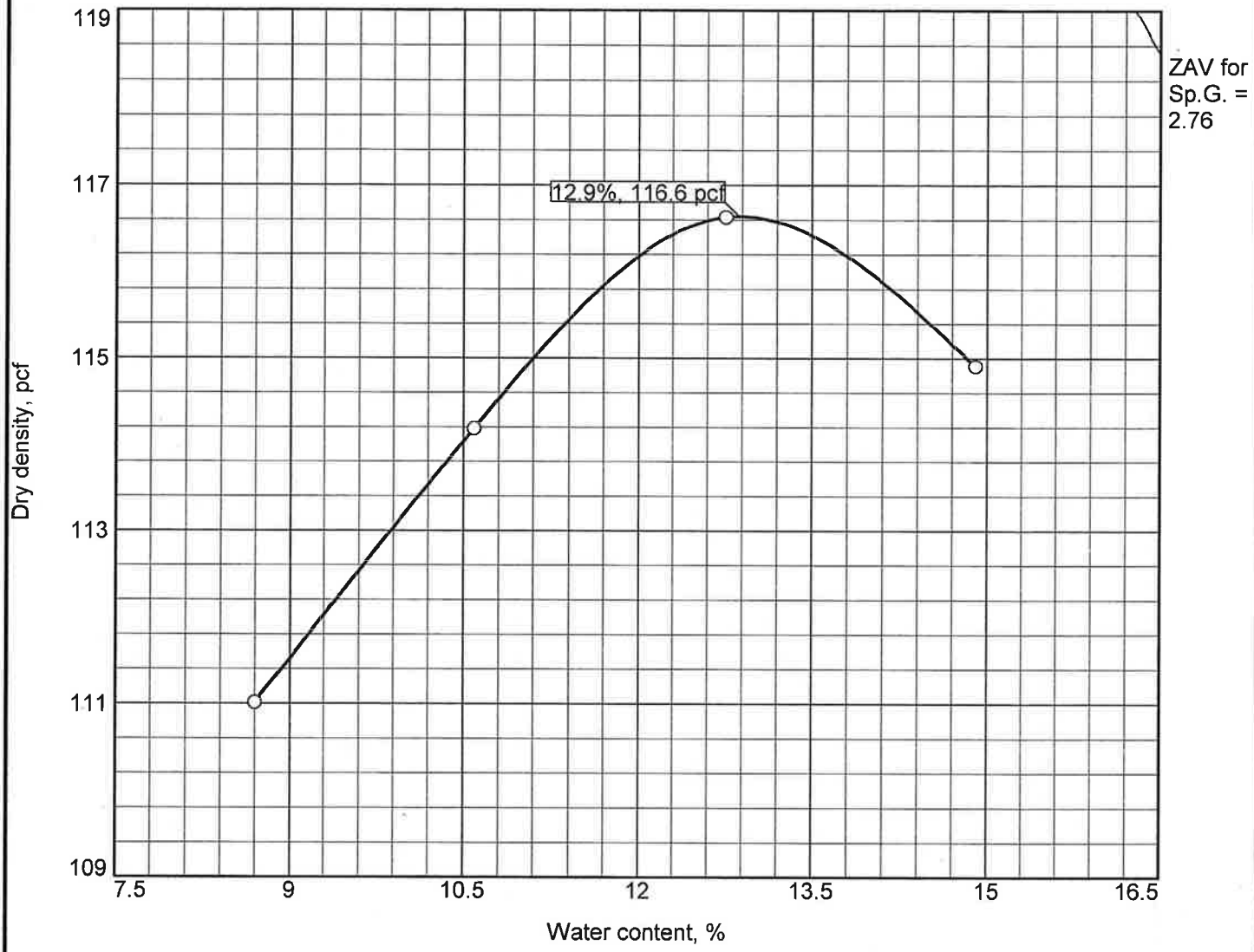
Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	CL	A-4		2.787	22	8		83

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 120.5 pcf Optimum moisture = 11.4 %	Tan silty clay, slightly sandy CL A-4; Material 4
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A11

Tested By: ds

COMPACTION TEST REPORT



Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.764				

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 116.6 pcf Optimum moisture = 12.9 %	Lime Treated - 5% CL A-4; Material 4

Project No. 070904 **Client:**
Project: MDOT SS 205

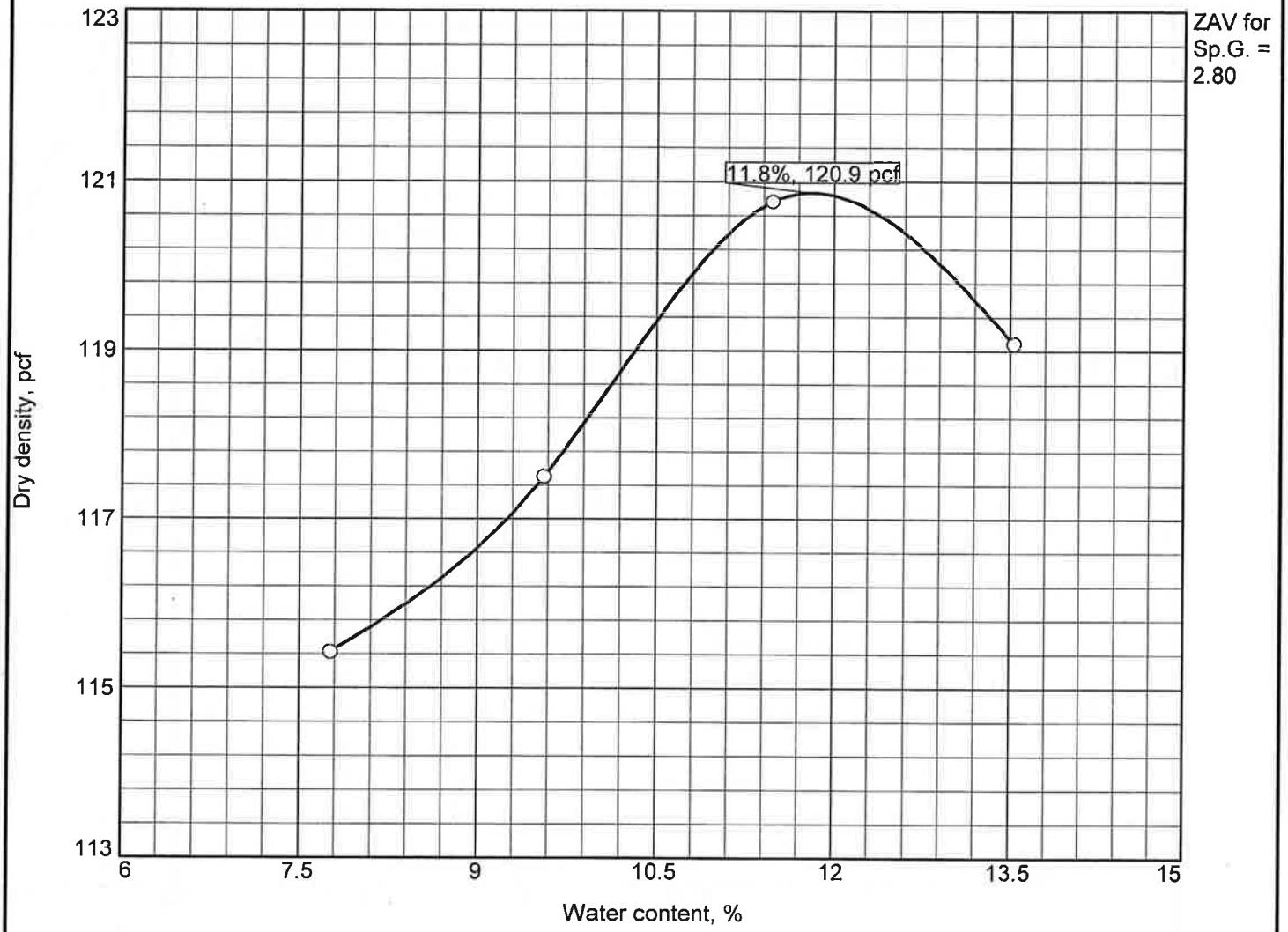
Remarks:

BURNS COOLEY DENNIS, INC.

Ridgeland, Mississippi

Figure A12

COMPACTION TEST REPORT



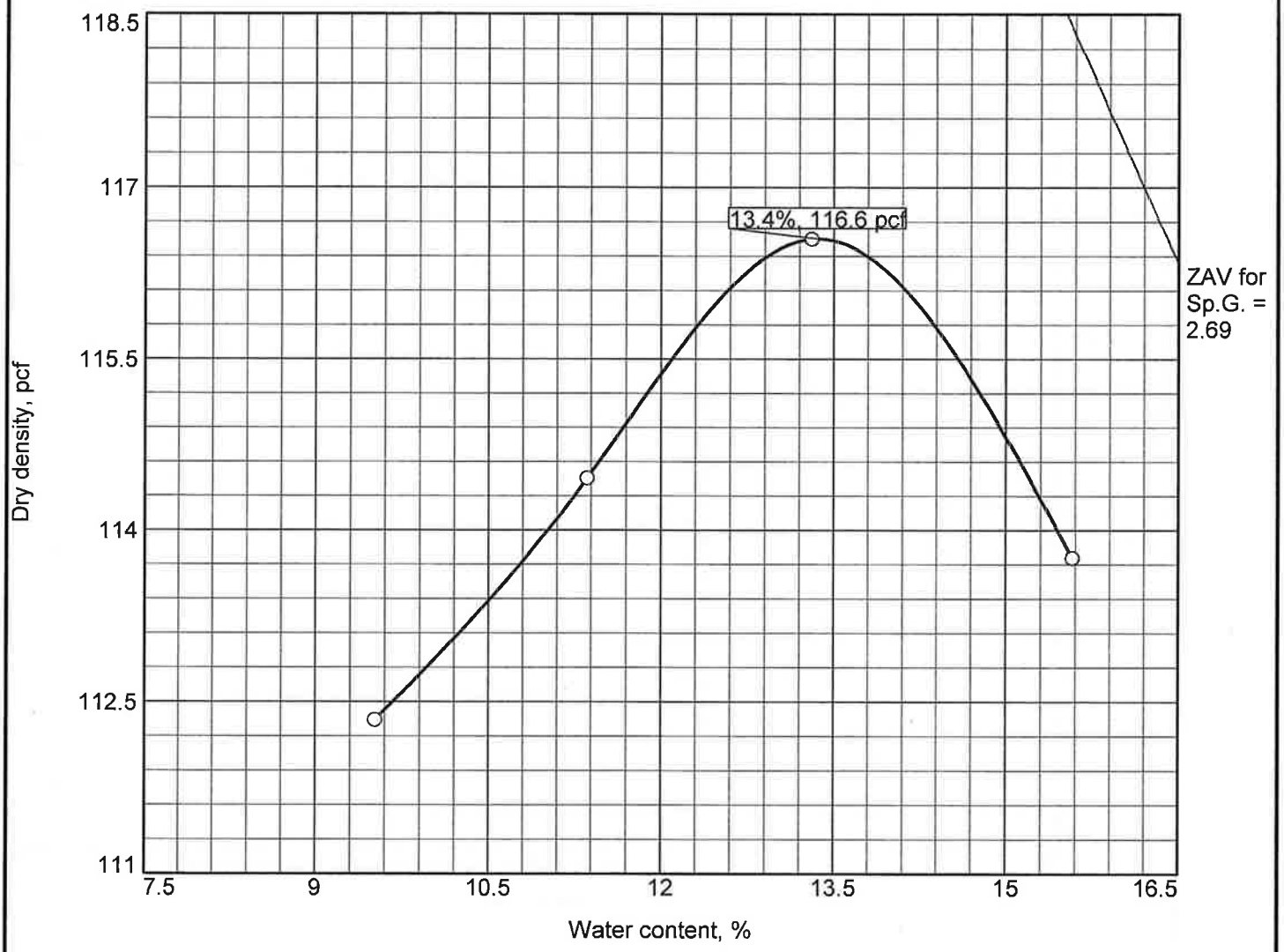
Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.798				

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 120.9 pcf Optimum moisture = 11.8 %	Cement Treated - 5% CL A-4; Material 4
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A13

Tested By: ds

COMPACTION TEST REPORT



Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.691				

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 116.6 pcf Optimum moisture = 13.4 %	Lime/Fly Ash Treated (3%L/12%FA) CL A-4; Material 4
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A14

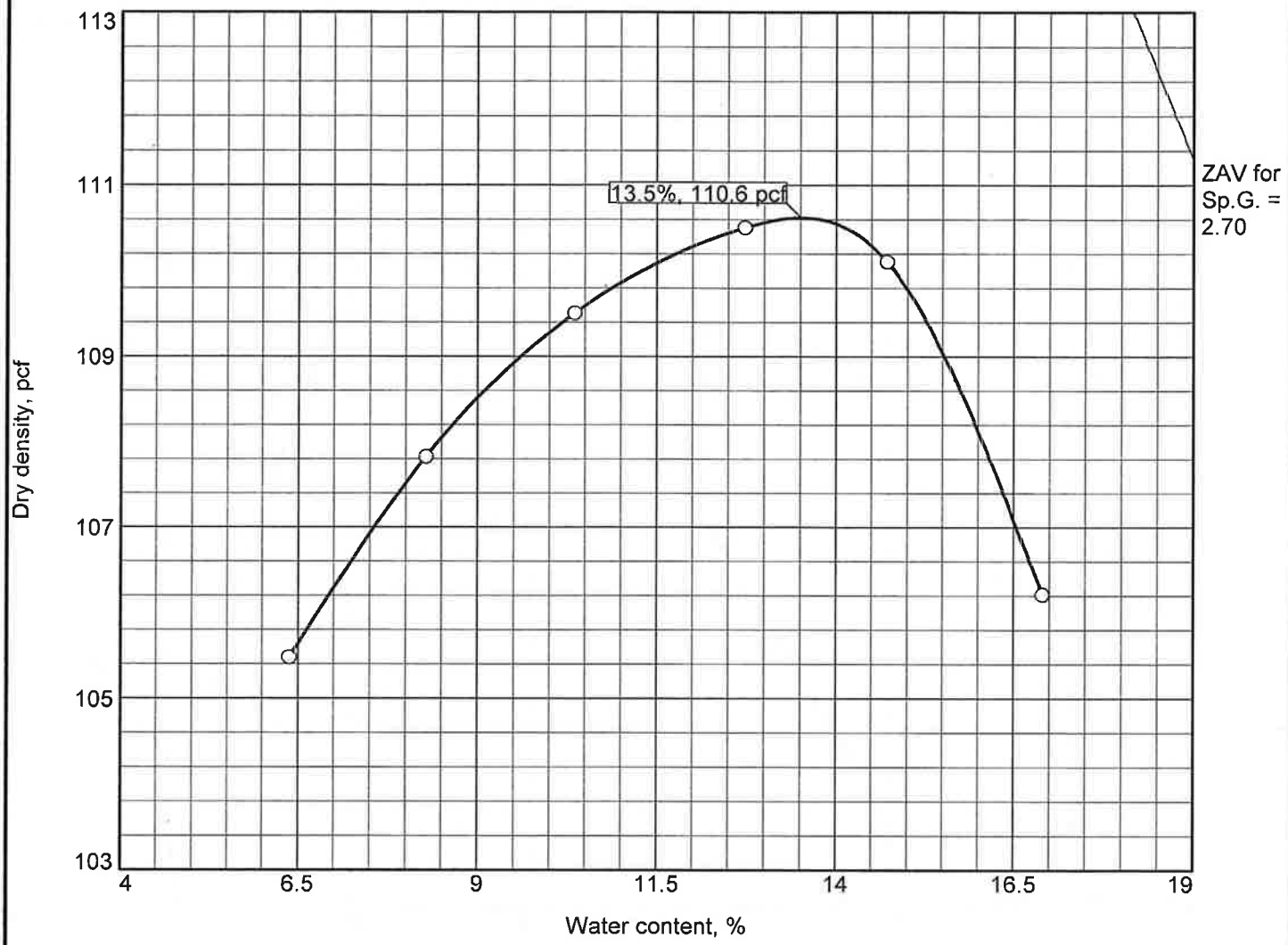
COMPACTION TEST REPORT

Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	SM	A-2-4		2.680	NV			23

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 105.9 pcf Optimum moisture = 14.1 %	Red silty sand SM A-2-4; Material 5
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A15

COMPACTION TEST REPORT



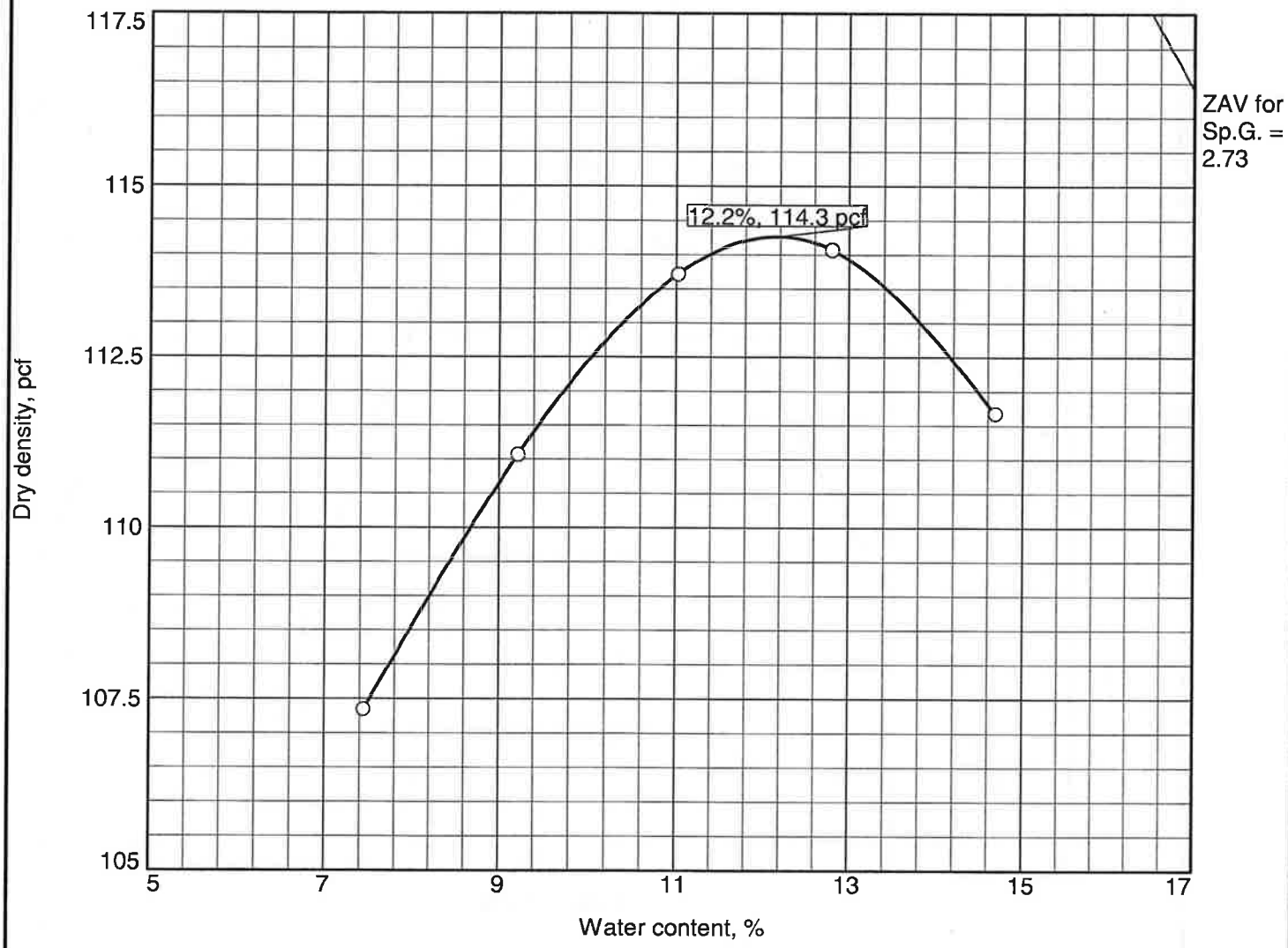
Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.696				

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 110.6 pcf Optimum moisture = 13.5 %	Cement Treated - 5% SM A-2-4; Material 5
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A16

Tested By: ds

COMPACTION TEST REPORT



Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	SM	A-2-4		2.730	19	2		23

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 114.3 pcf Optimum moisture = 12.2 %	Red silty sand (SM) MDOT Class 9-A; Material 6

Project No. 070904 **Client:**
Project: MDOT SS 205

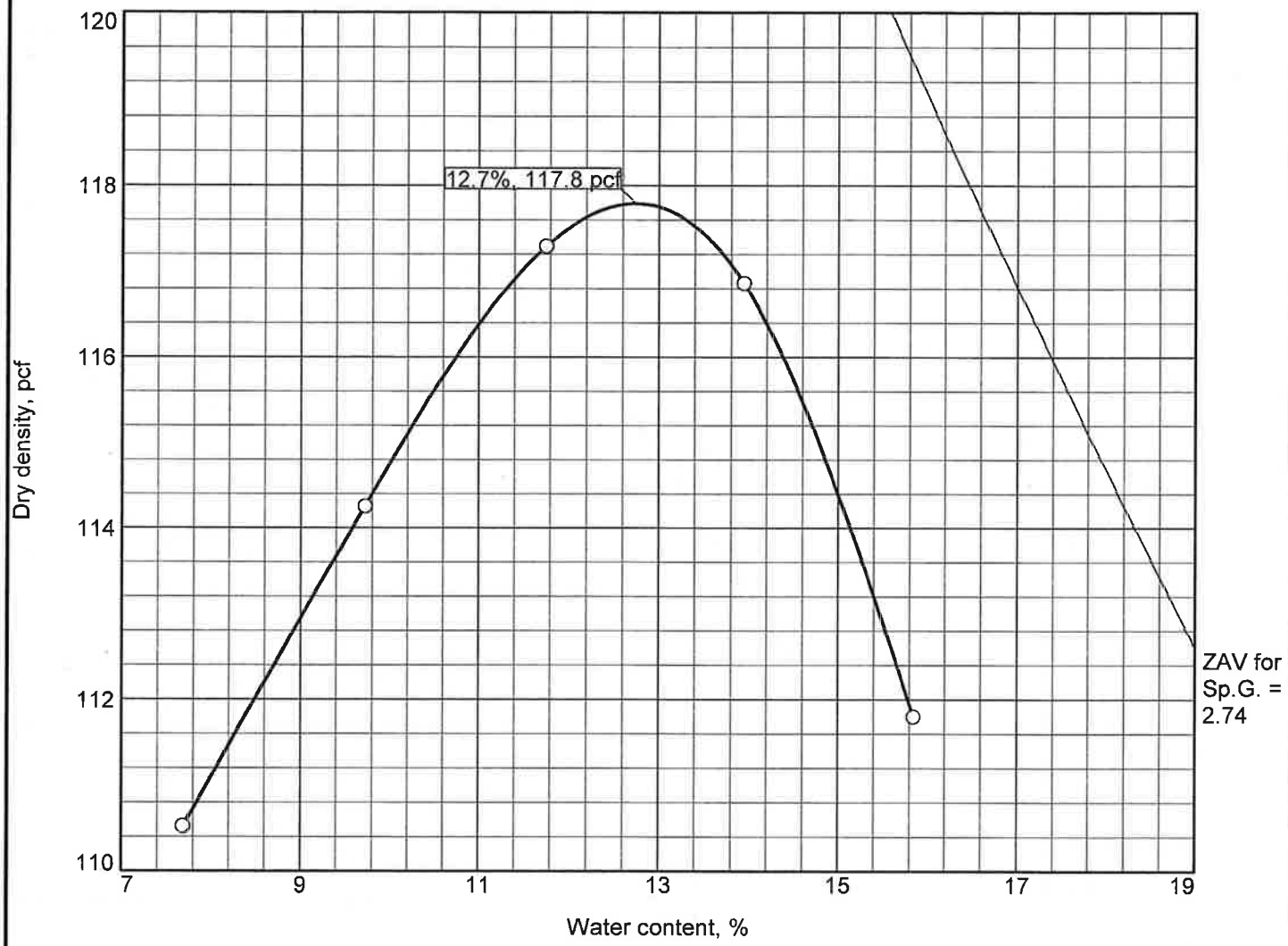
Remarks:

BURNS COOLEY DENNIS, INC.

Ridgeland, Mississippi

Figure A17

COMPACTION TEST REPORT



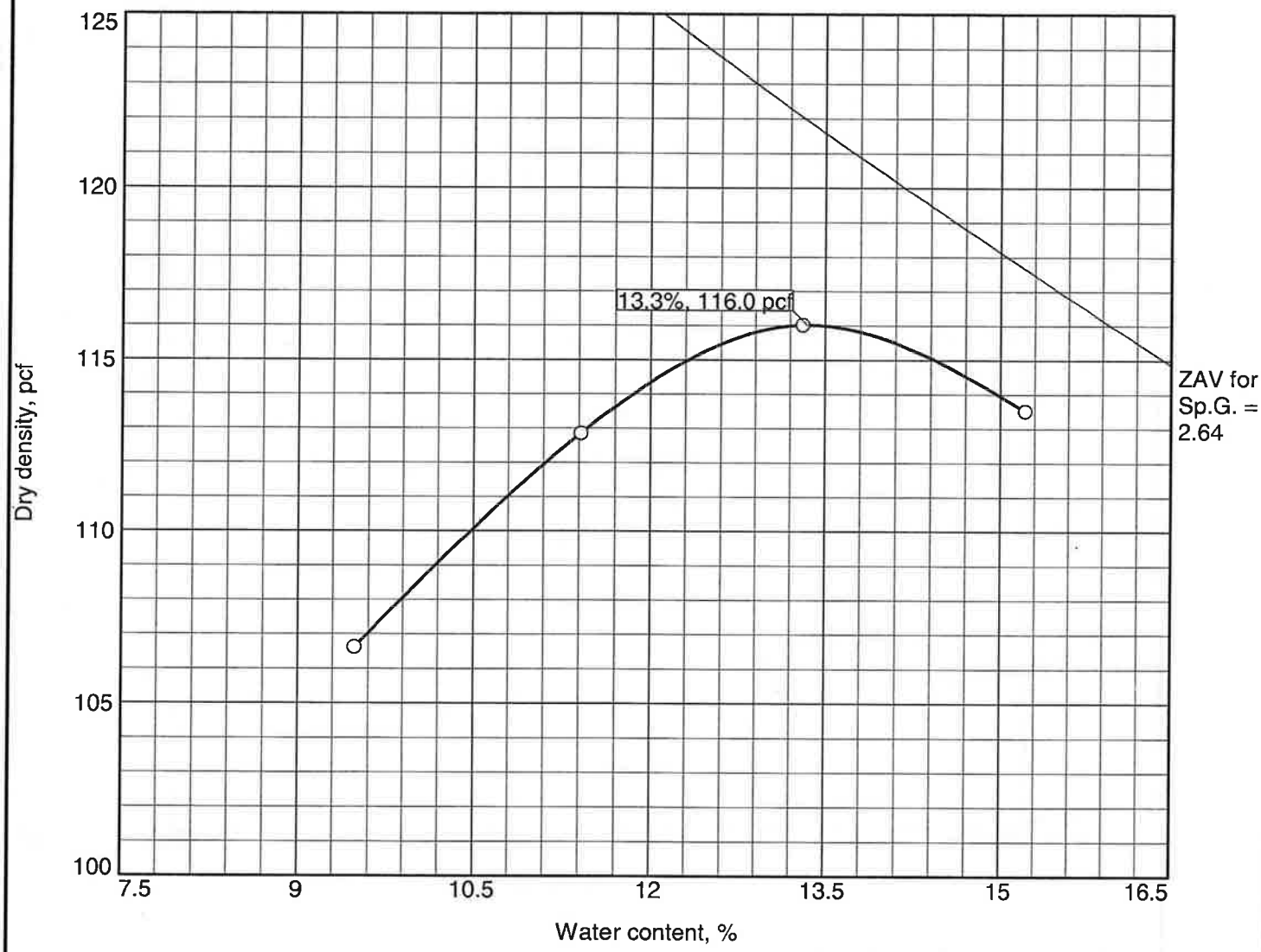
Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.744				

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 117.8 pcf Optimum moisture = 12.7 %	Cement Treated - 5% SM Class 9 Group A; Material 6
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A18

Tested By: ds

COMPACTION TEST REPORT

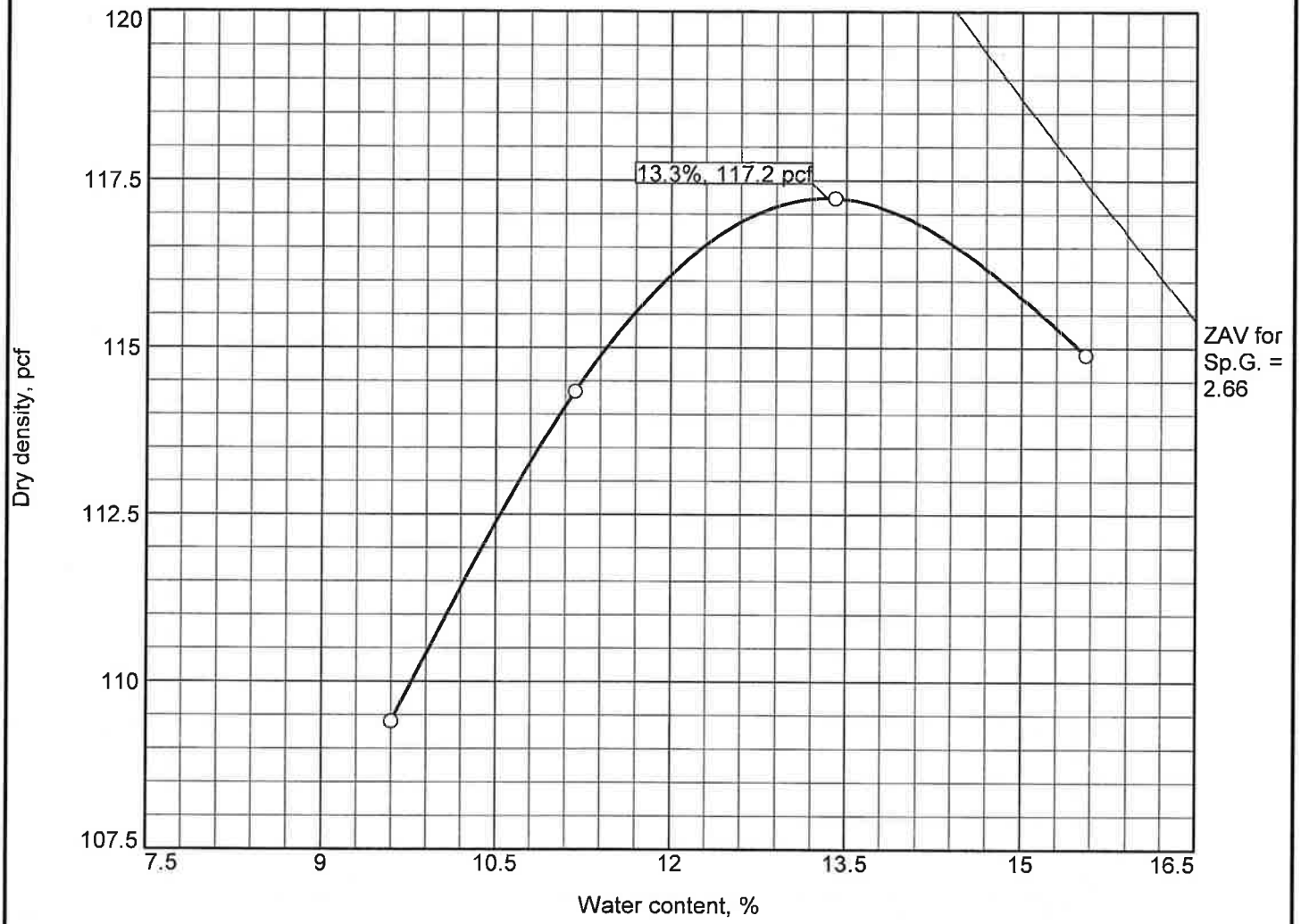


Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	SC	A-2-4		2.642	25	9		33

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 116.0 pcf Optimum moisture = 13.3 %	Red clayey sand SC Class 9 Group C; Material 7
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A19

COMPACTION TEST REPORT



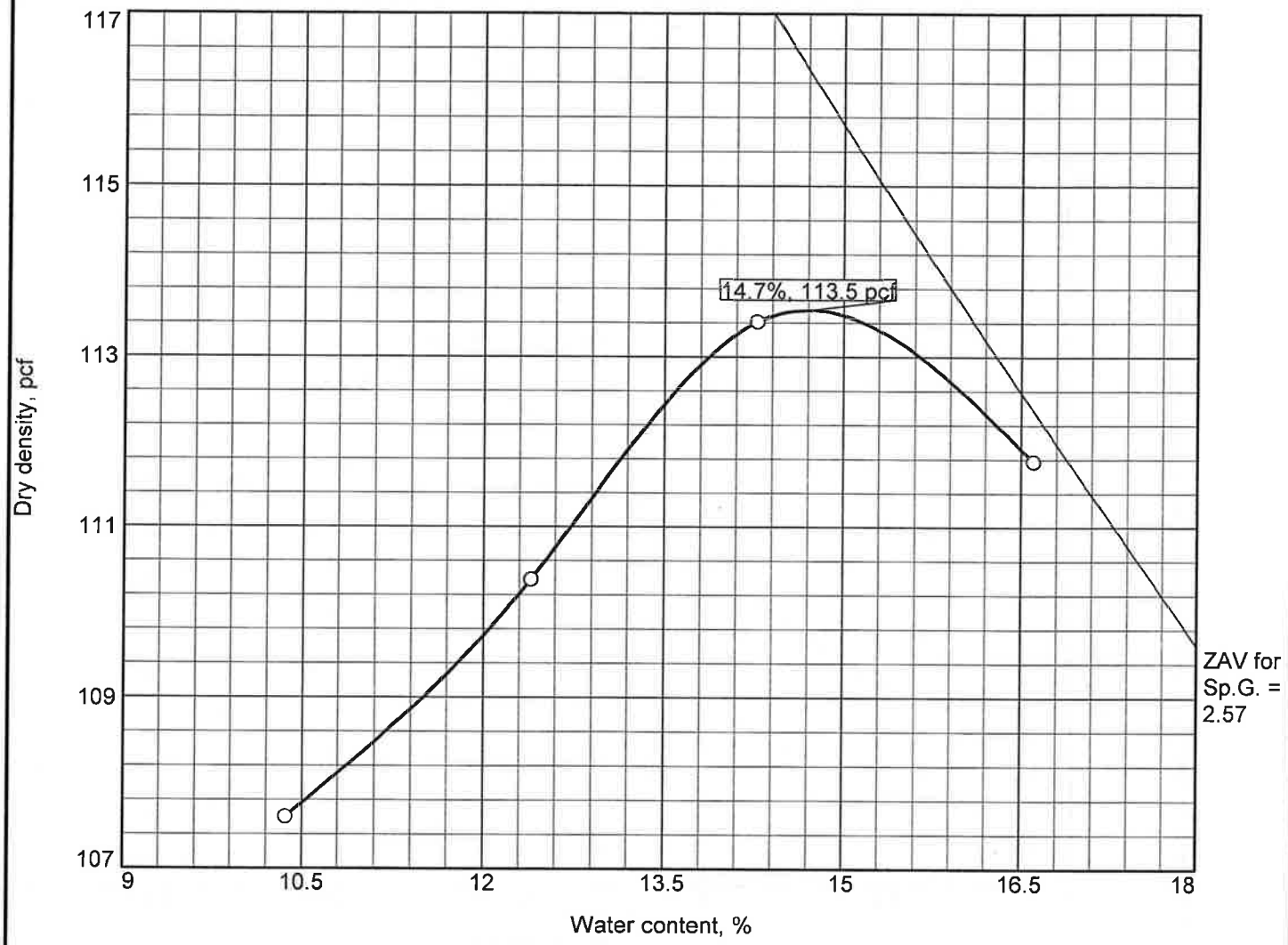
Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.660				

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 117.2 pcf Optimum moisture = 13.3 %	Cement Treated - 5% SC Class 9 Group C; Material 7
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A20

Tested By: ds

COMPACTION TEST REPORT



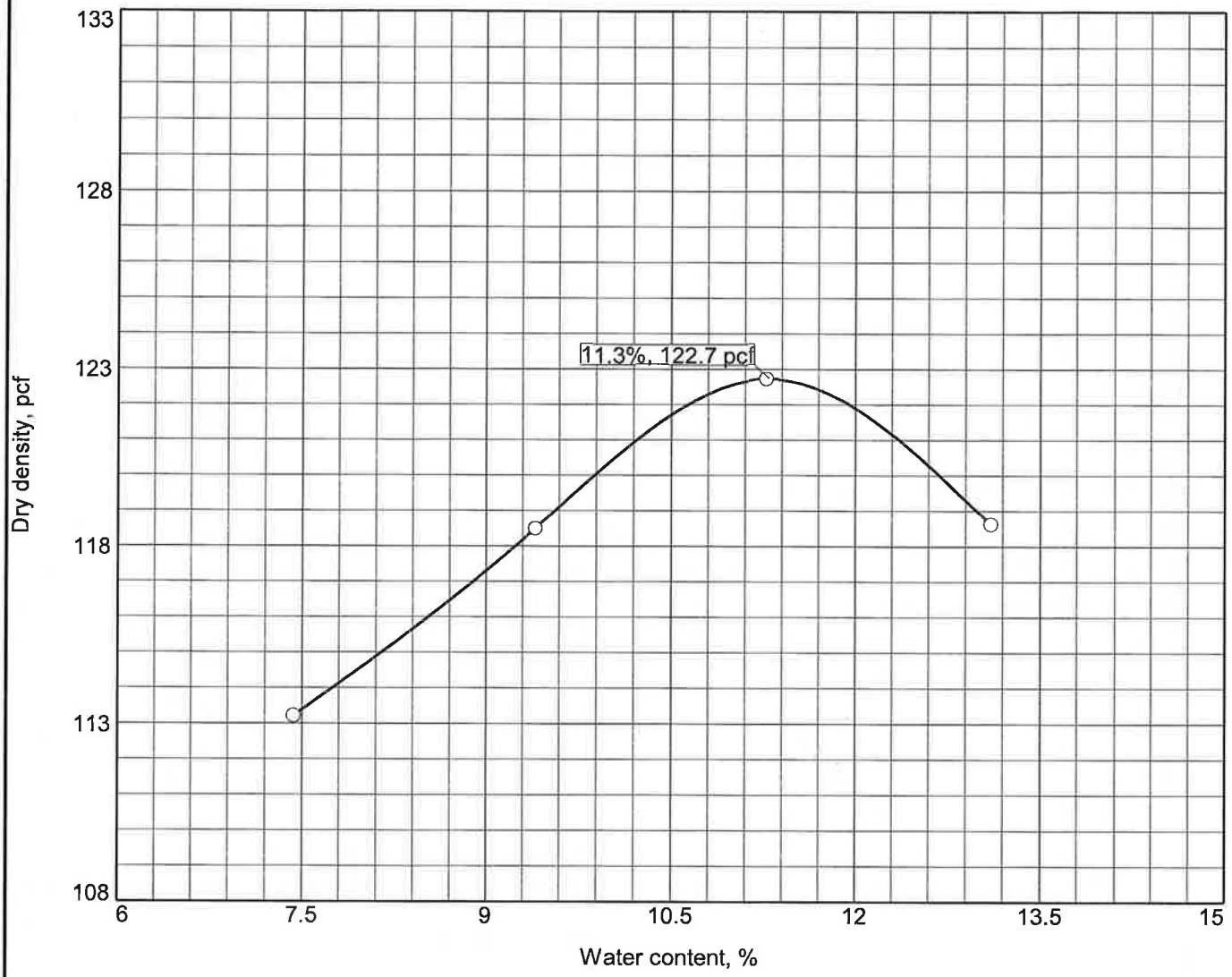
Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.567				

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 113.5 pcf Optimum moisture = 14.7 %	Lime/Fly Ash Treated (3%L/12%FA) SC Class 9 Group C; Material 7
Project No. 070904 **Client:** **Project:** MDOT SS 205	**Remarks:**
BURNS COOLEY DENNIS, INC. **Ridgeland, Mississippi**	**Figure** A21

Tested By: ds

COMPACTION TEST REPORT



Test specification: MS DOT (2005) Case 1

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.507				

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 122.7 pcf Optimum moisture = 11.3 %	3% Lime / 12% Fly Ash SC, A-2-4, Material 8

Project No. 070904 **Client:**
Project: MDOT SS 205

Remarks:
8/3/2010

BURNS COOLEY DENNIS, INC.

Ridgeland, Mississippi

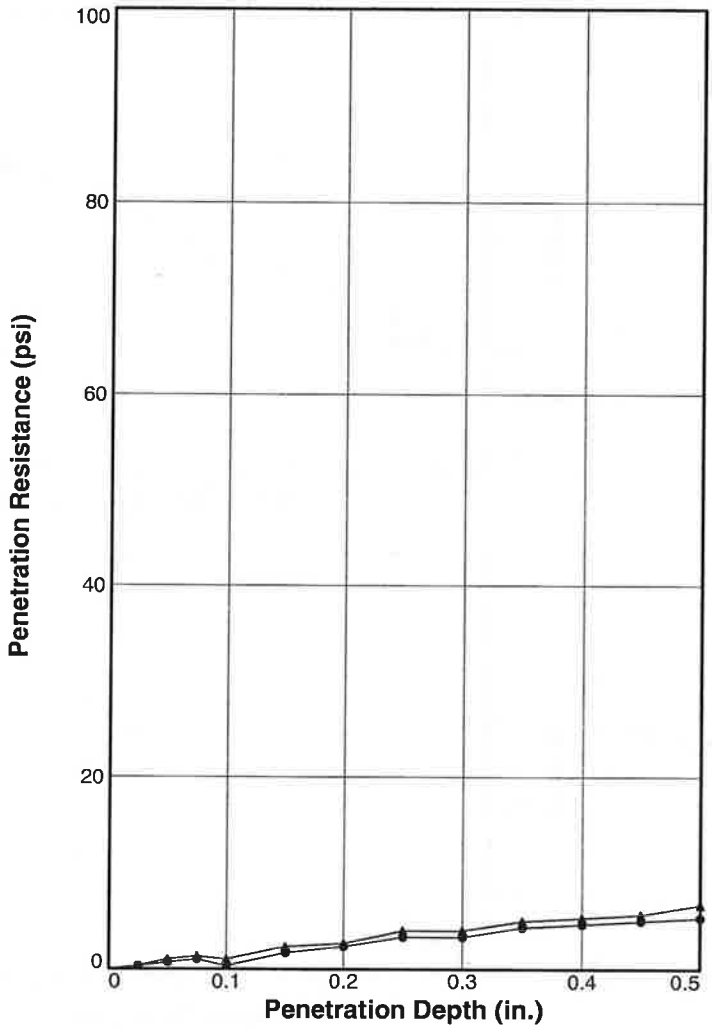
Figure A22

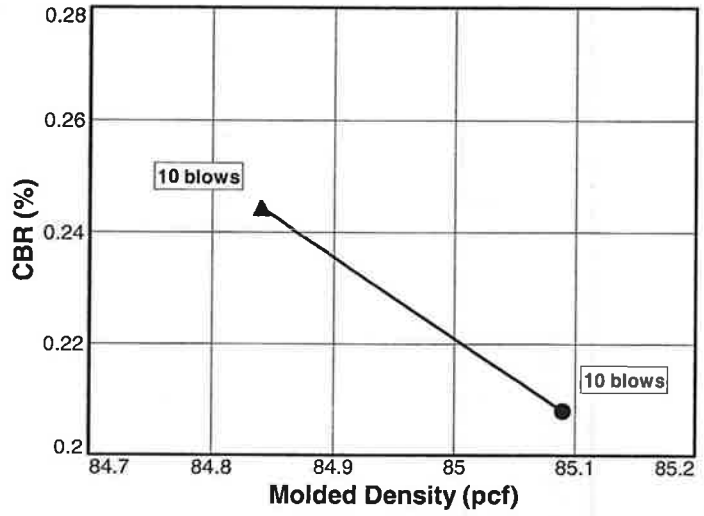
Tested By: ds

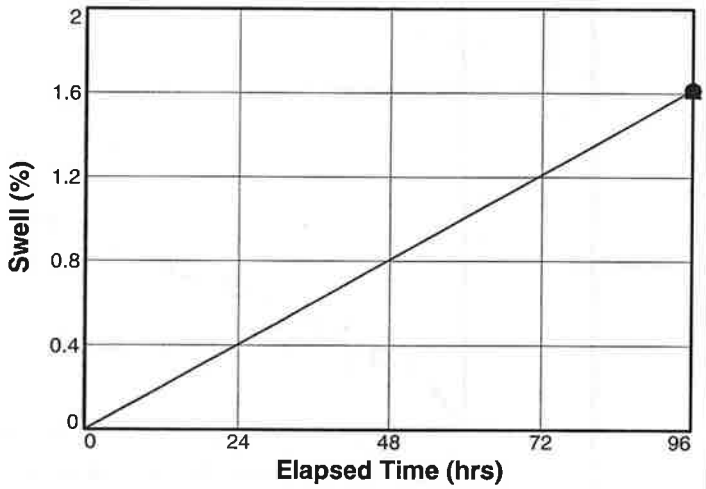
Appendix B

California Bearing Ratio (CBR) Results

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	85.1	79	15.3	83.7	77.8	30.5	0.2	0.2	0.081	10	1.6
2 △	84.8	78.7	15.3	83.5	77.5	28.9	0.2	0.3	0.066	10	1.6
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay CL A-7-6; Material 1	CL	107.7	16.4	43	25

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

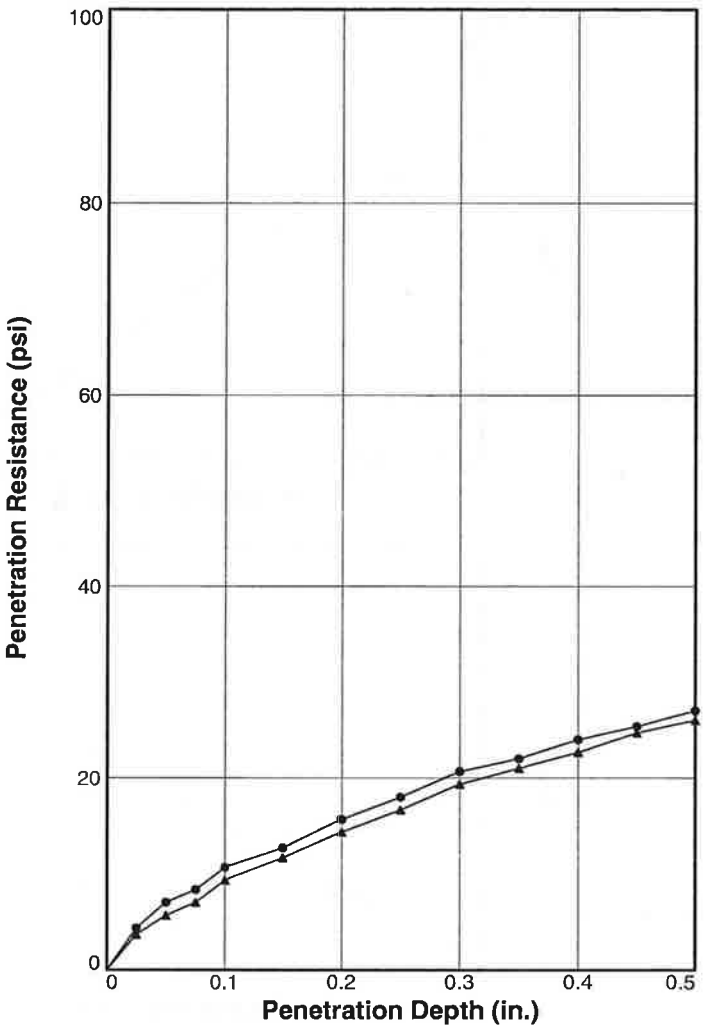
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content

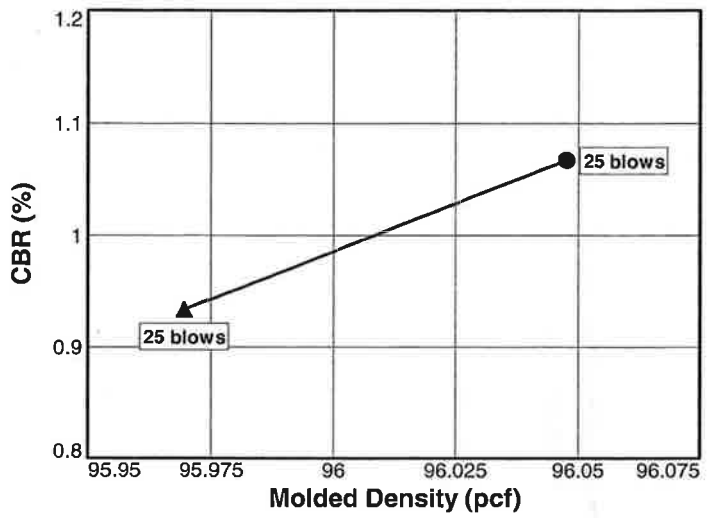
BEARING RATIO TEST REPORT

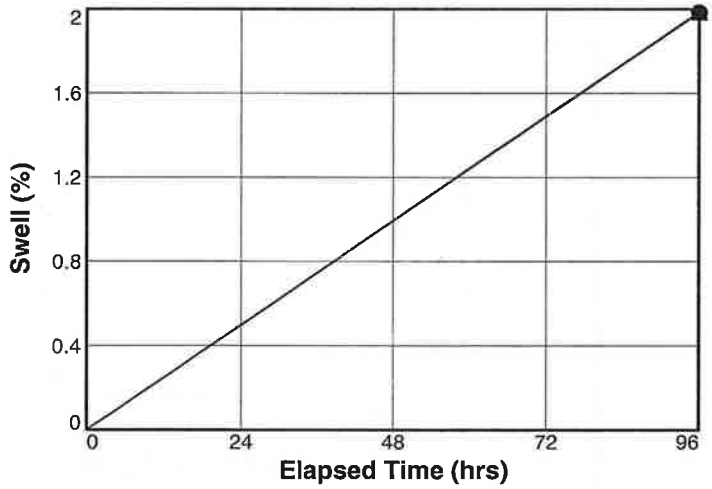
BURNS COOLEY DENNIS, INC.

Figure B1

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	96.0	89.1	15.4	94.2	87.4	25.0	1.1	1.0	0.000	10	2
2 △	96.0	89.1	15.4	94.1	87.4	24.5	0.9	1.0	0.000	10	2
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay CL A-7-6; Material 1	CL	107.7	16.4	43	25

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

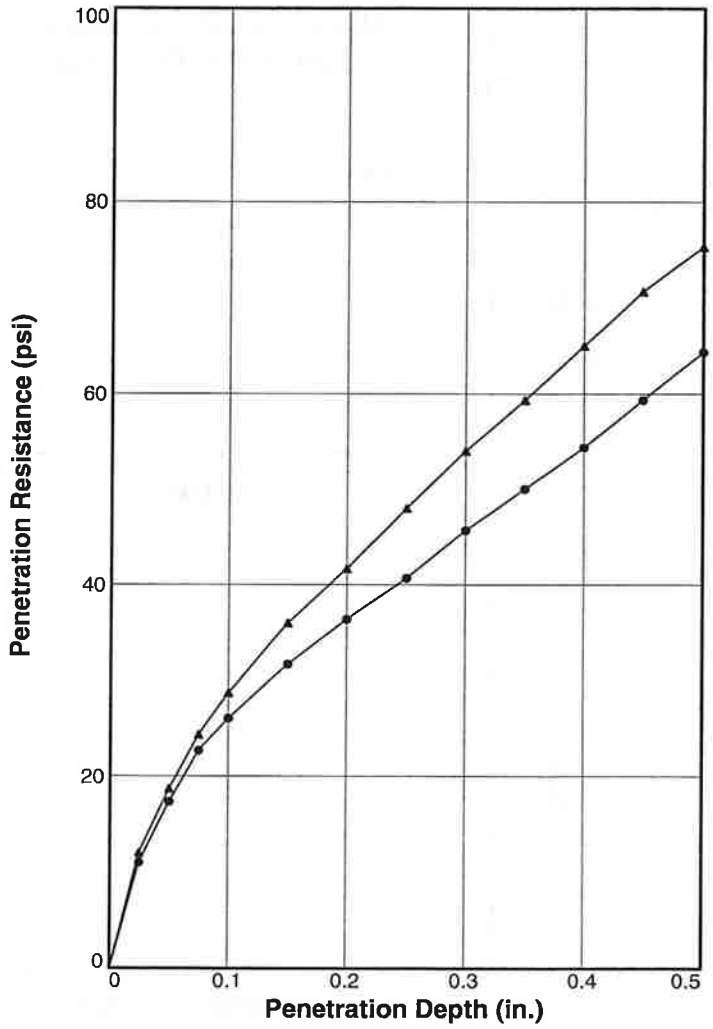
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content

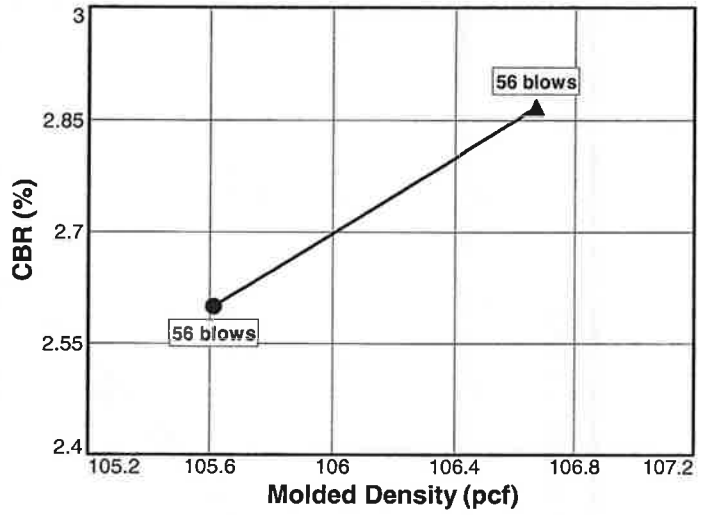
BEARING RATIO TEST REPORT

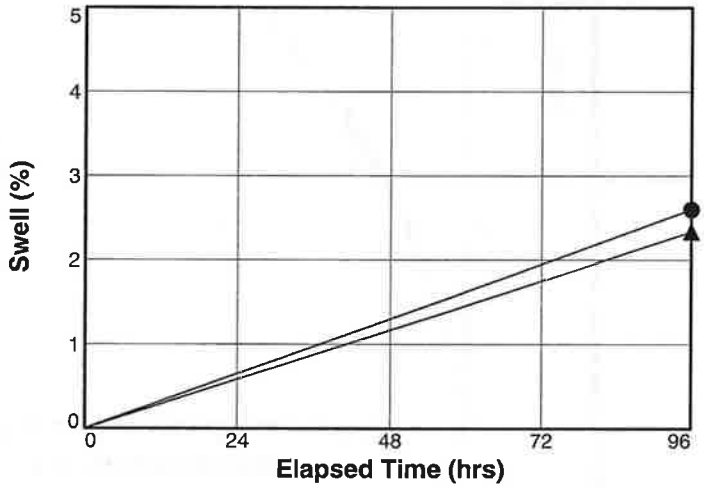
BURNS COOLEY DENNIS, INC.

Figure B2

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	105.6	98.1	16.1	102.9	95.6	24.0	2.6	2.4	0.000	10	2.6
2 △	106.7	99.1	16.1	104.2	96.8	21.8	2.9	2.8	0.000	10	2.3
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay CL A-7-6; Material 1	CL	107.7	16.4	43	25

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

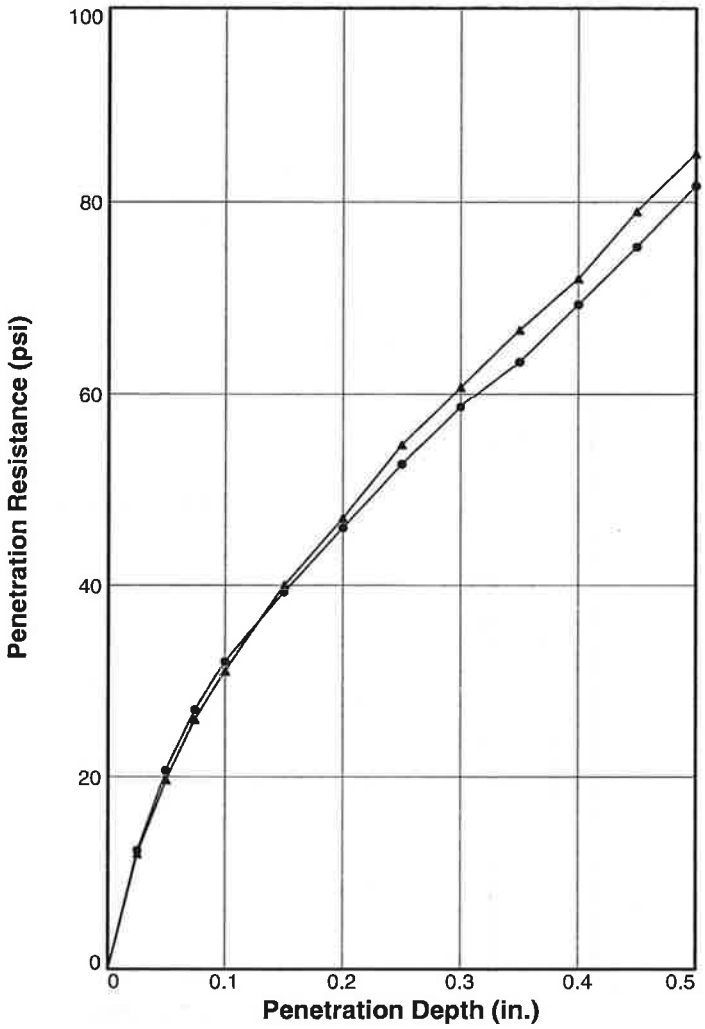
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content

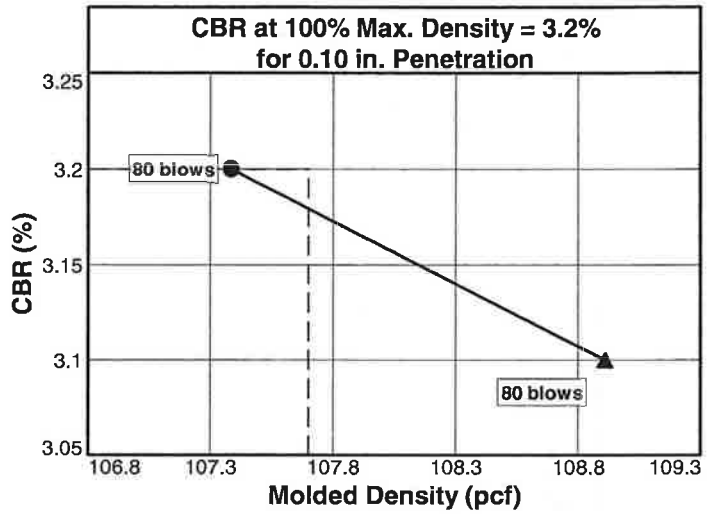
BEARING RATIO TEST REPORT

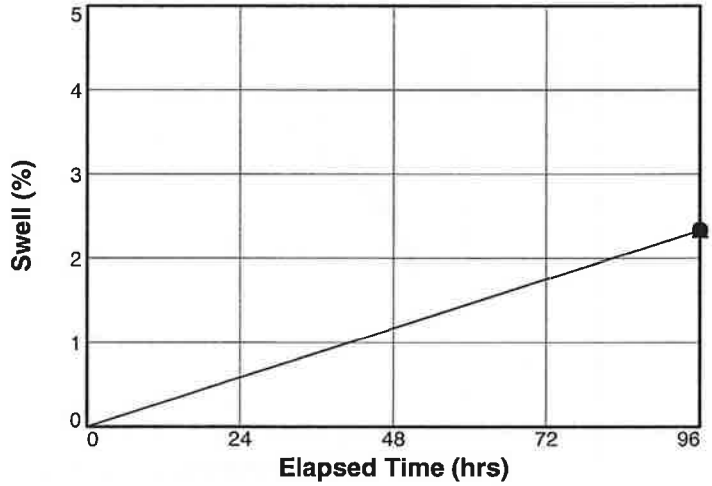
BURNS COOLEY DENNIS, INC.

Figure B3

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	107.4	99.7	16.7	104.9	97.4	21.7	3.2	3.1	0.000	10	2.3
2 ▲	108.9	101.1	16.7	106.4	98.8	21.2	3.1	3.1	0.000	10	2.3
3 ■											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay CL A-7-6; Material 1	CL	107.7	16.4	43	25

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

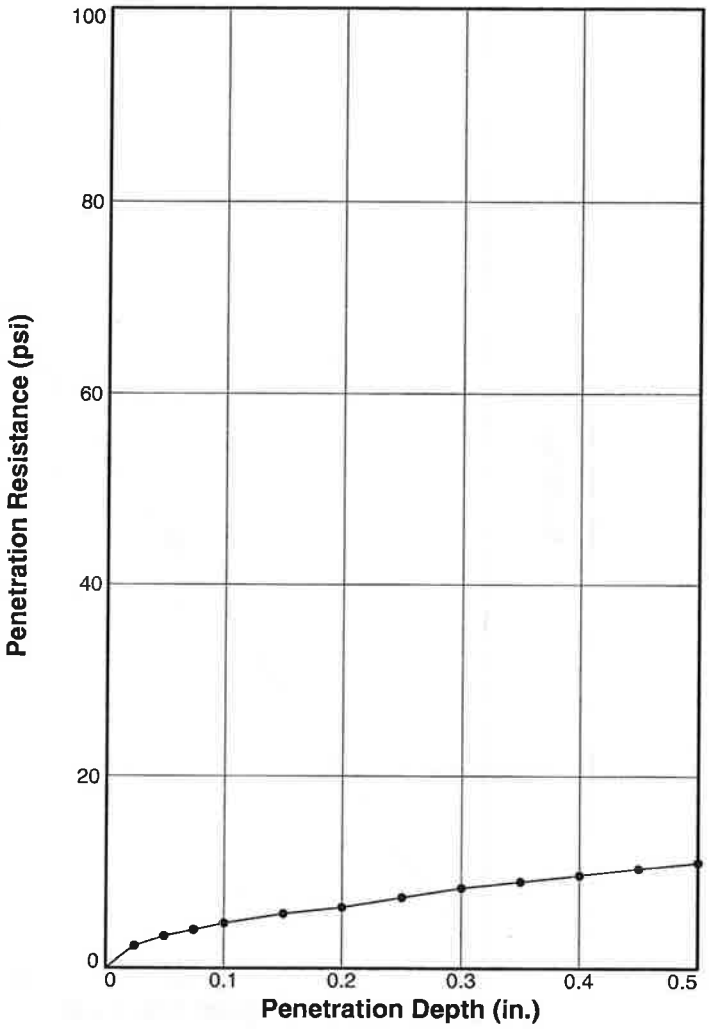
Standard hammer
3 layers - 80 blows/layer
Optimum Moisture Content

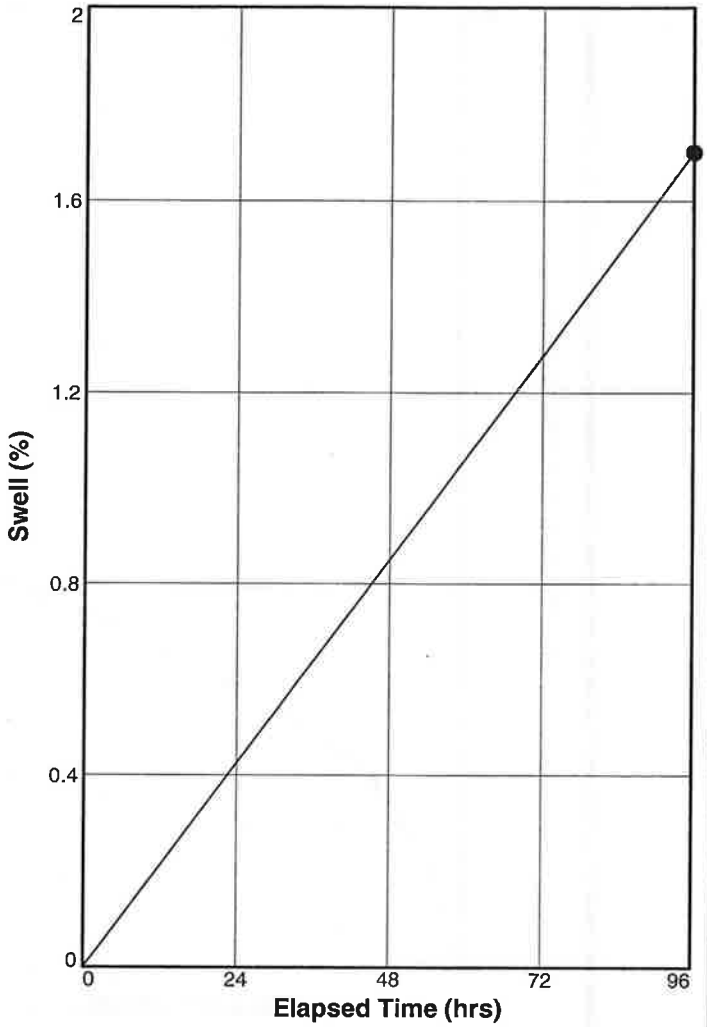
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B4

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	87.4	81.2	19.1	86.0	79.8	29.0	0.5	0.4	0.000	10	1.7
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay CL A-7-6; Material 1	CL	107.7	16.4	43	25

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

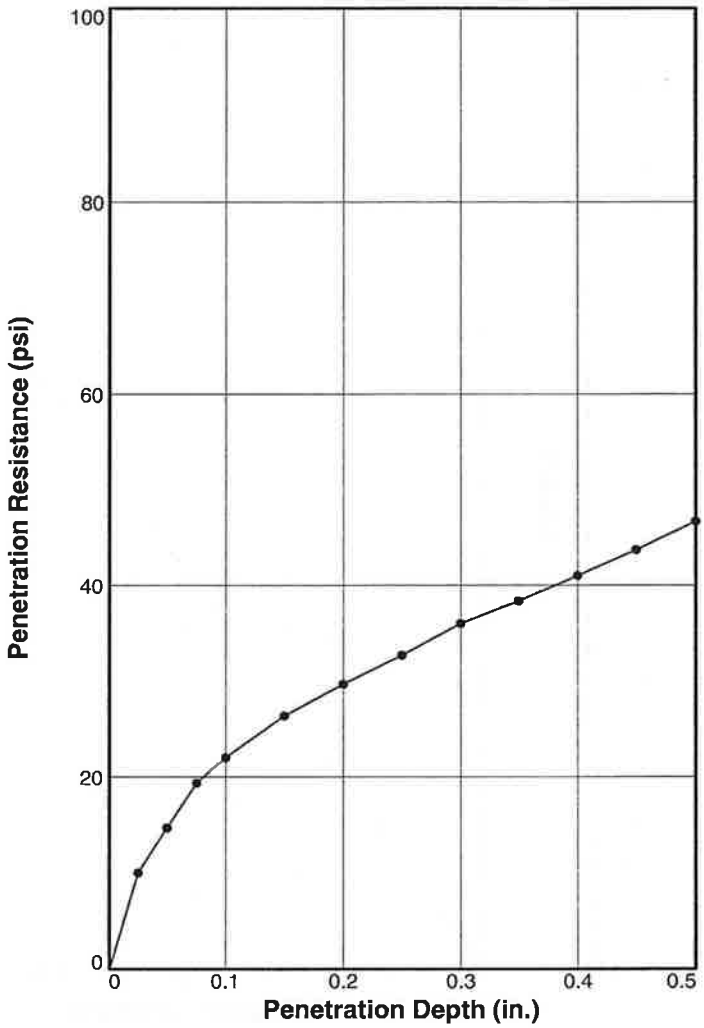
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content + 3%

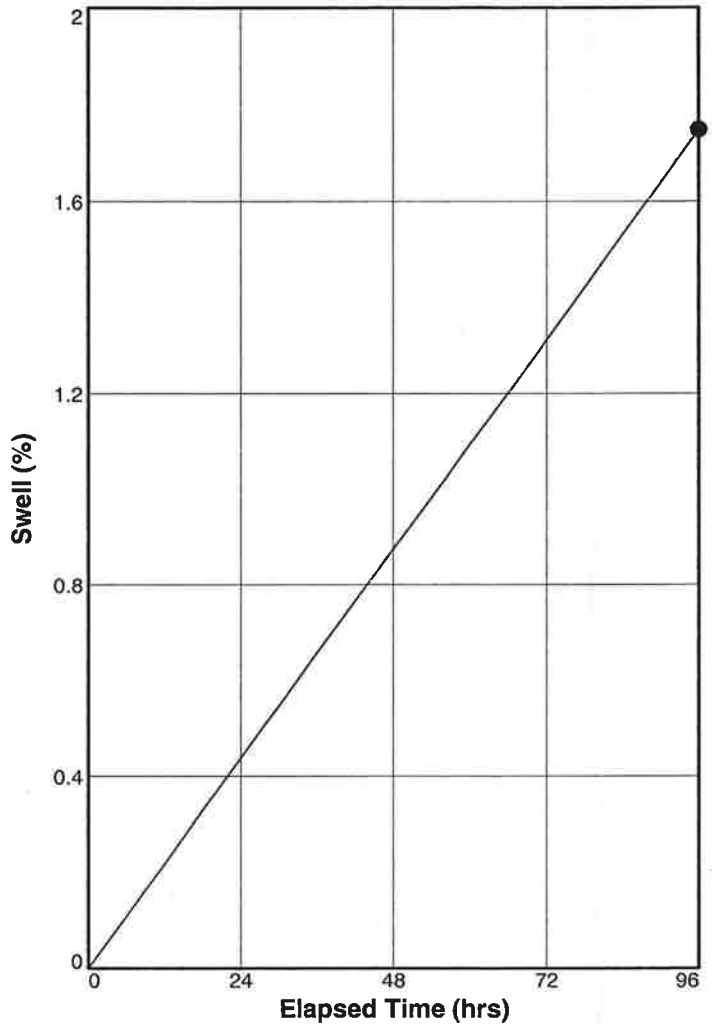
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B5

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	100.9	93.7	18.3	99.2	92.1	22.7	2.2	2.0	0.000	10	1.7
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay CL A-7-6; Material 1	CL	107.7	16.4	43	25

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

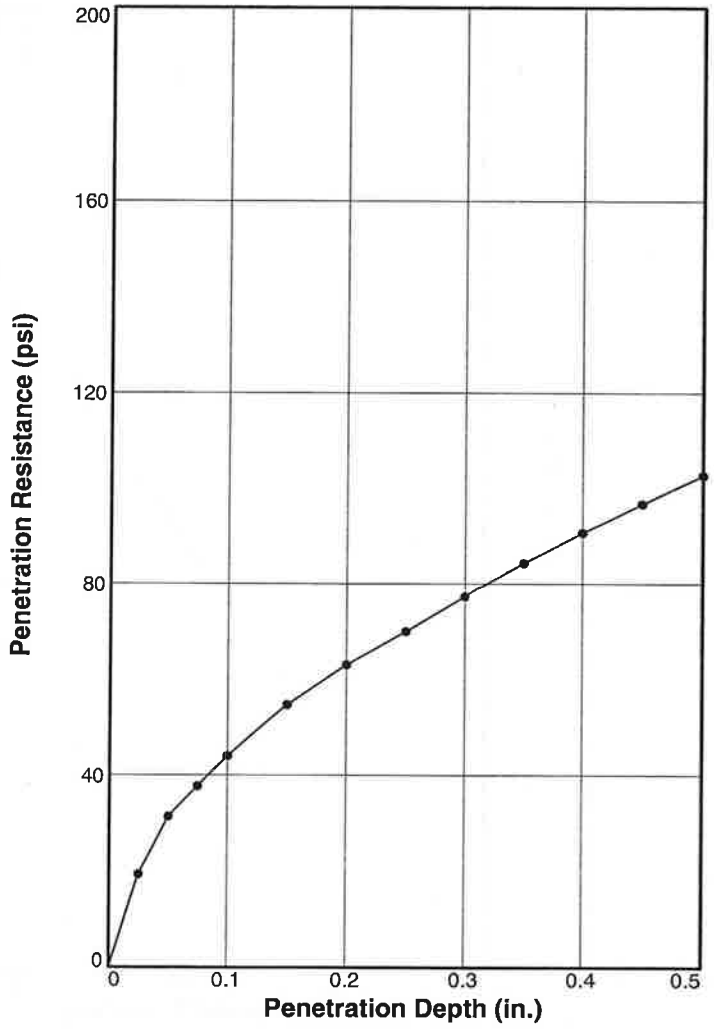
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content + 3%

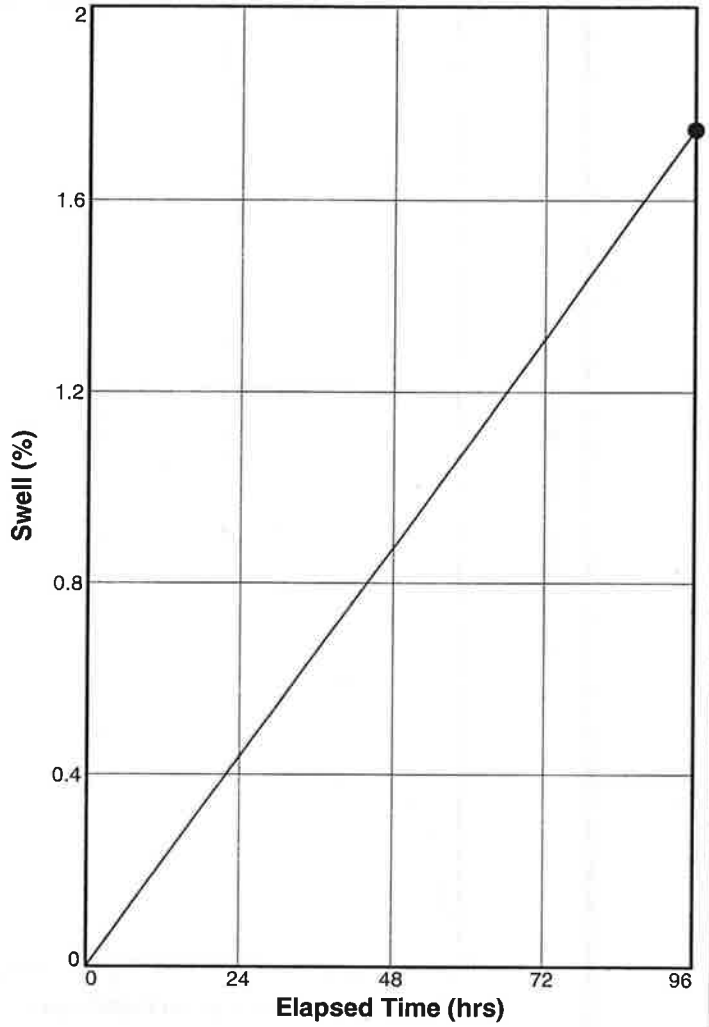
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B6

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	105.5	98	19.1	103.7	96.3	19.6	4.4	4.2	0.000	10	1.7
2 ▲											
3 ■											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay CL A-7-6; Material 1	CL	107.7	16.4	43	25

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

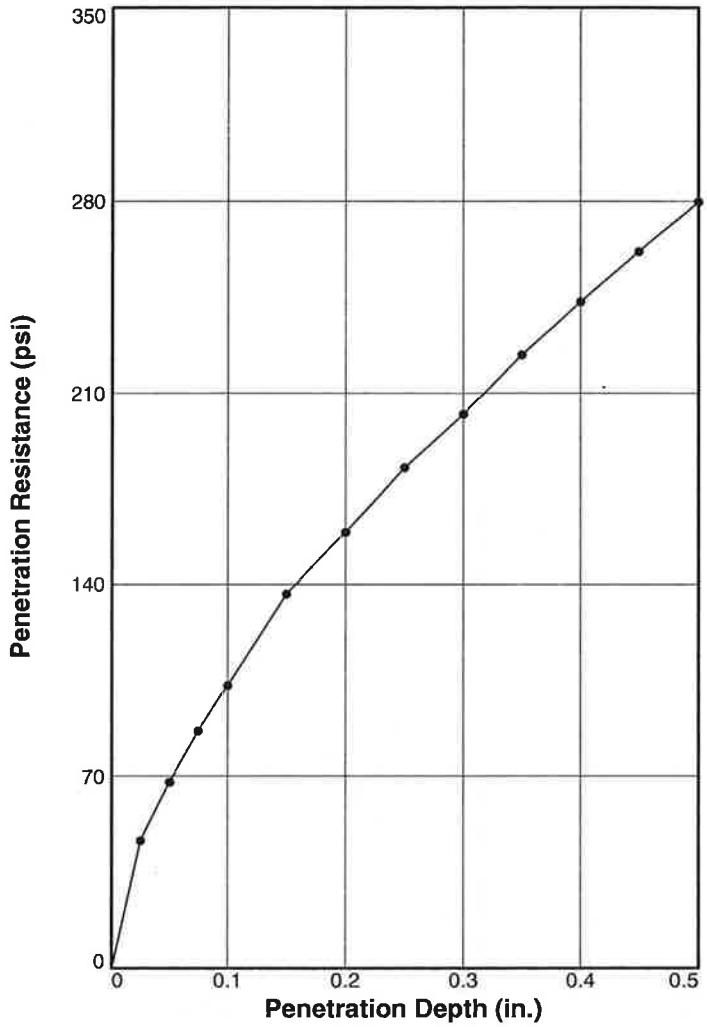
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content + 3%

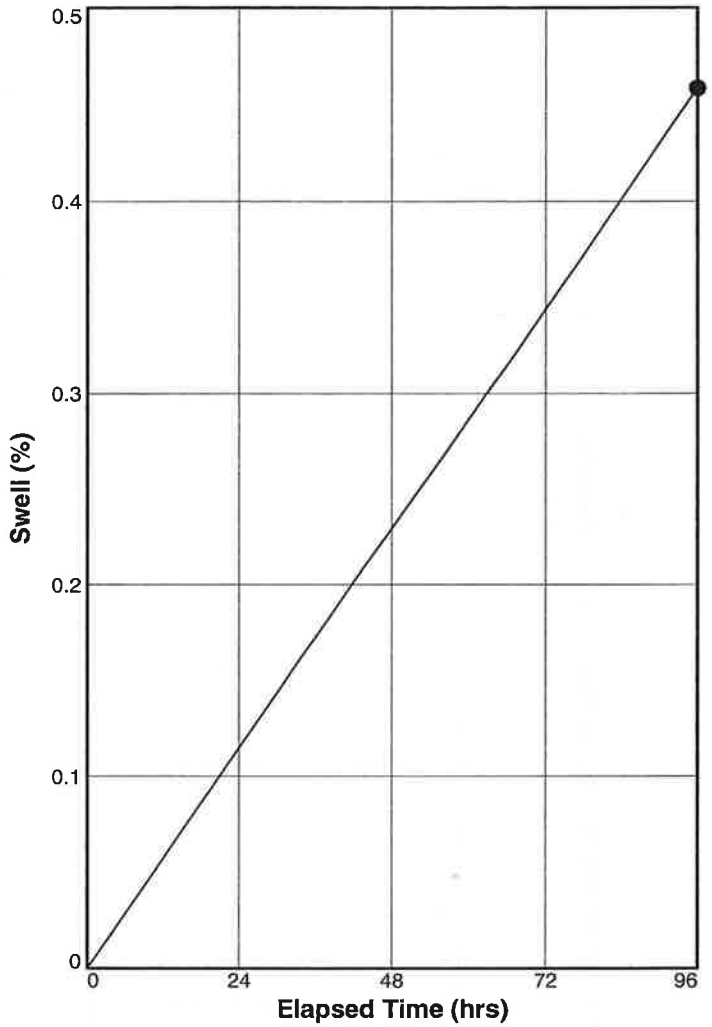
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B7

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	88.2	86	17.6	87.8	85.5	27.9	10.3	10.6	0.000	10	0.5
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-7-6; Material 1		102.6	19.0		

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

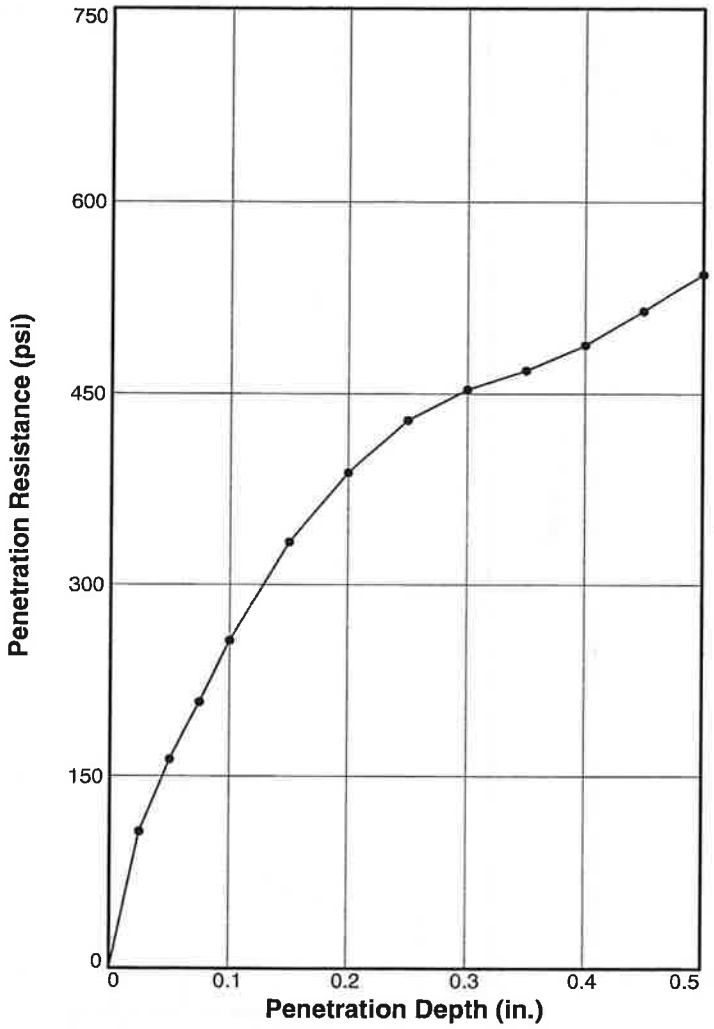
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content

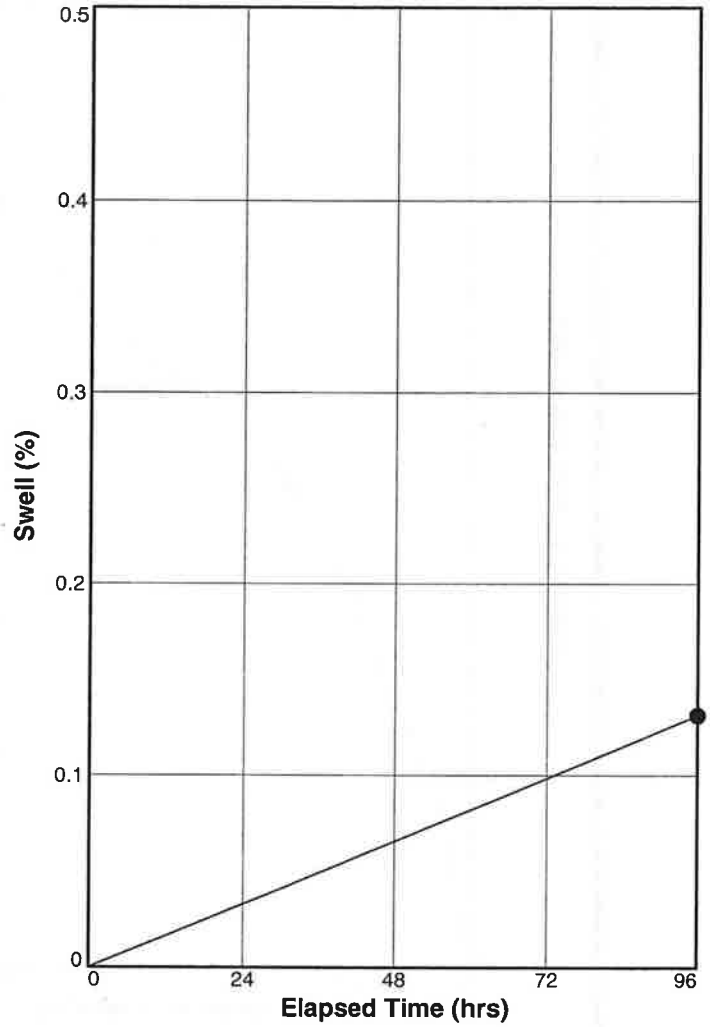
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B8

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	93.8	91.4	17.7	93.7	91.3	23.7	25.6	25.8	0.000	10	0.1
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-7-6; Material 1		102.6	19.0		

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

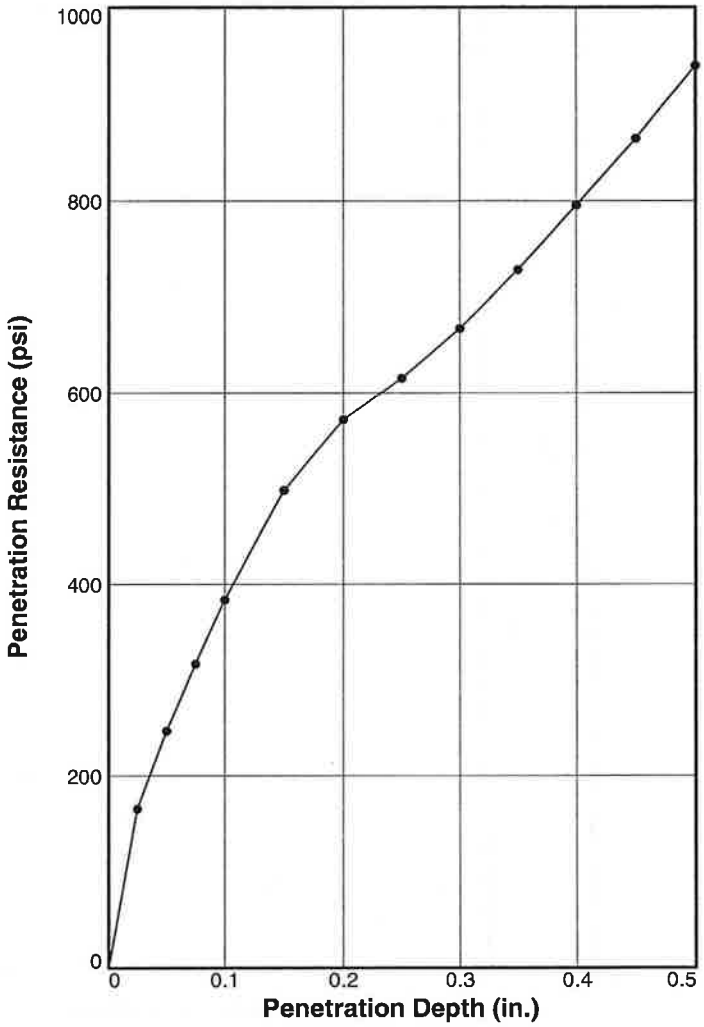
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content

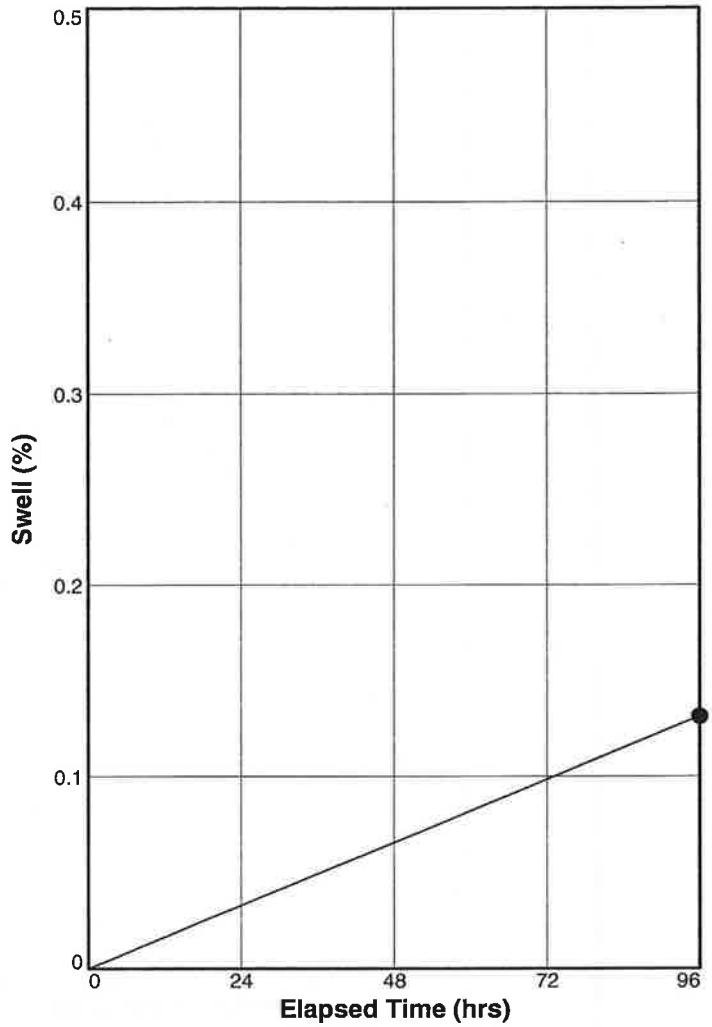
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B9

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	98.5	96	17.7	98.4	95.9	22.3	38.3	38.1	0.000	10	0.1
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-7-6; Material 1		102.6	19.0		

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

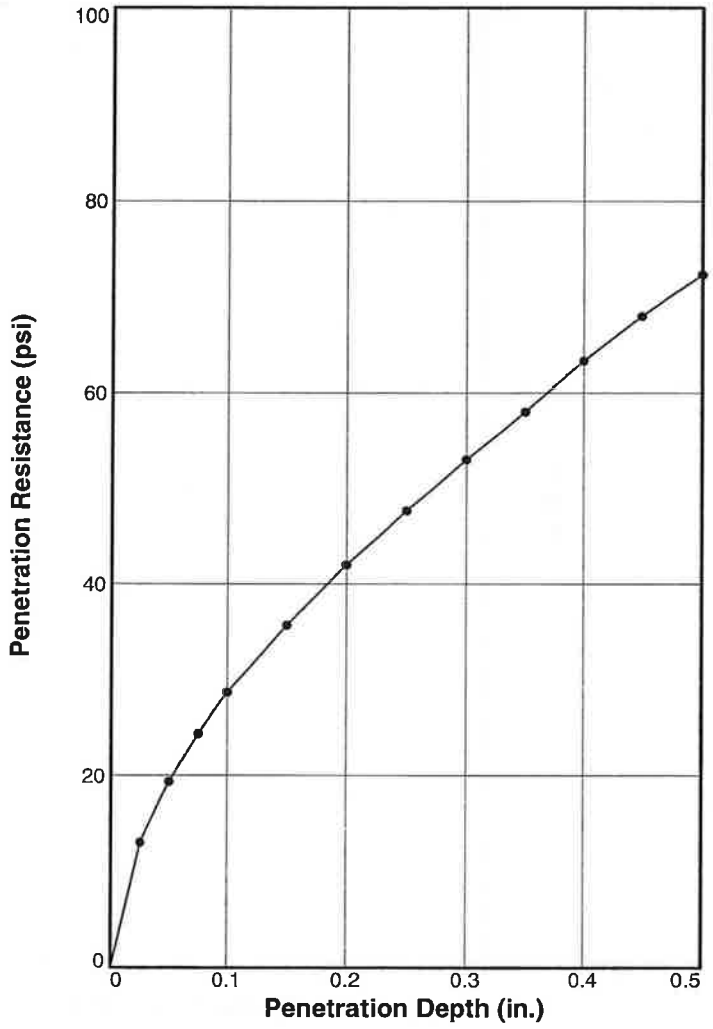
Standard hammer
3 layers - 80 blows/layer
Optimum Moisture Content

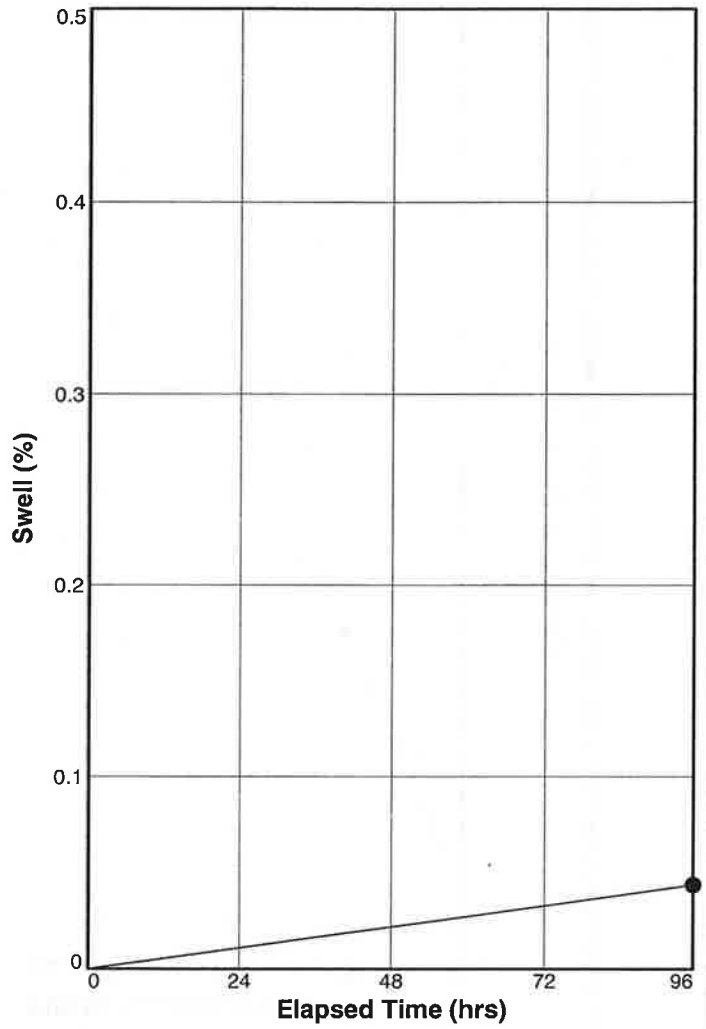
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B10

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	79.0	77	20.6	78.9	76.9	34.4	2.9	2.8	0.000	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-7-6; Material 1		102.6	19.0		

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

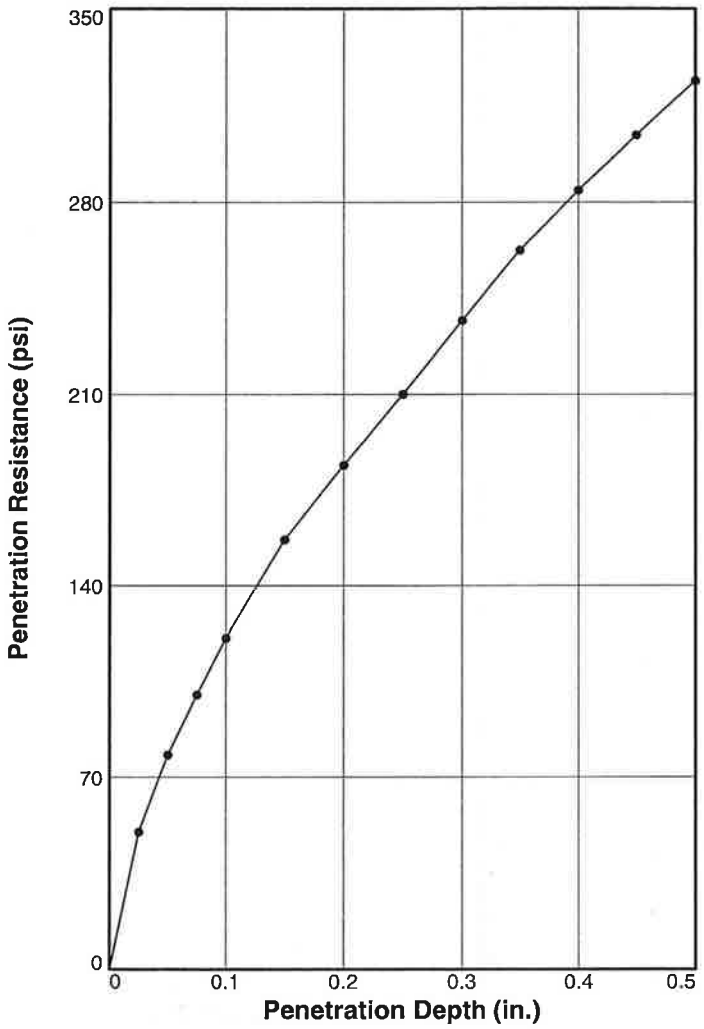
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content + 3%

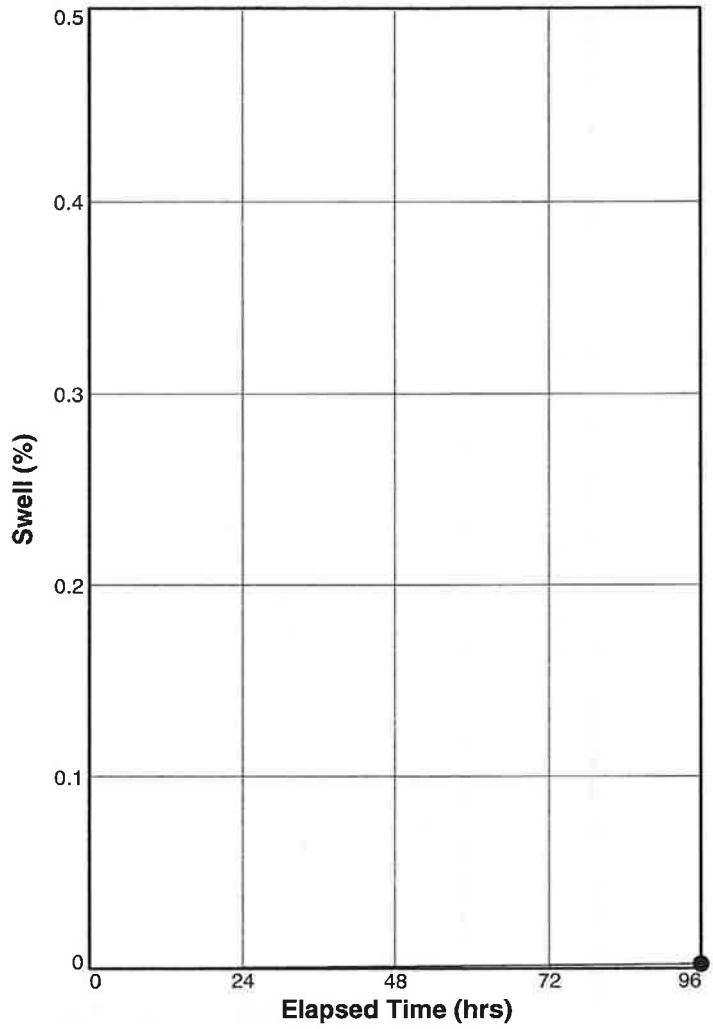
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B11

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	88.9	86.6	20.4	88.9	86.7	26.9	12.1	12.3	0.000	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-7-6; Material 1		102.6	19.0		

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

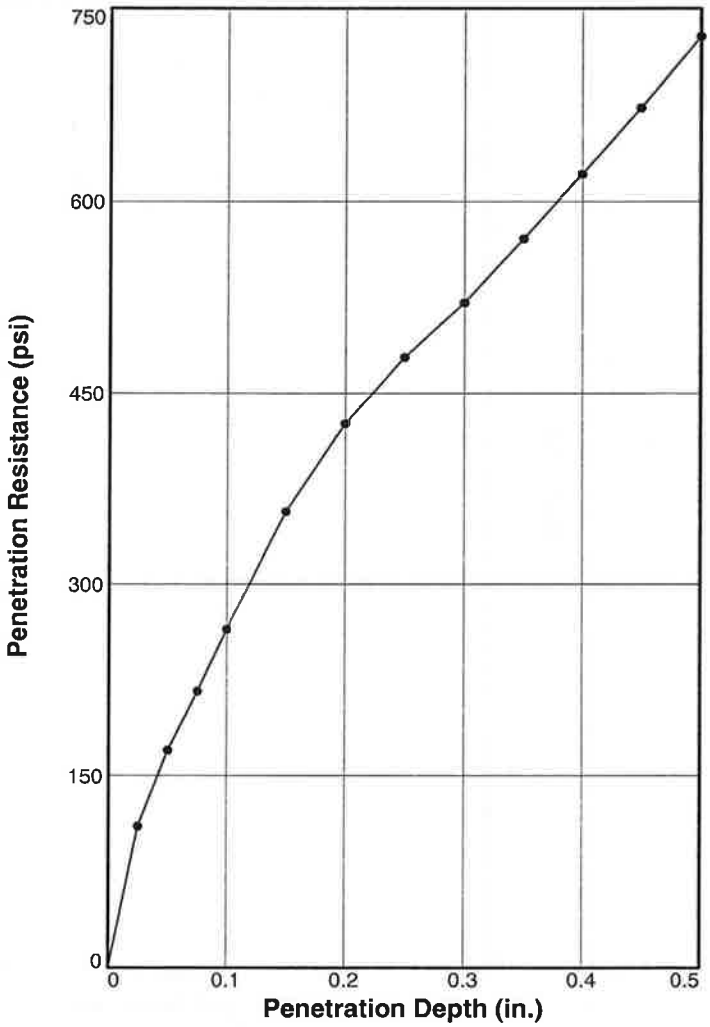
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content + 3%

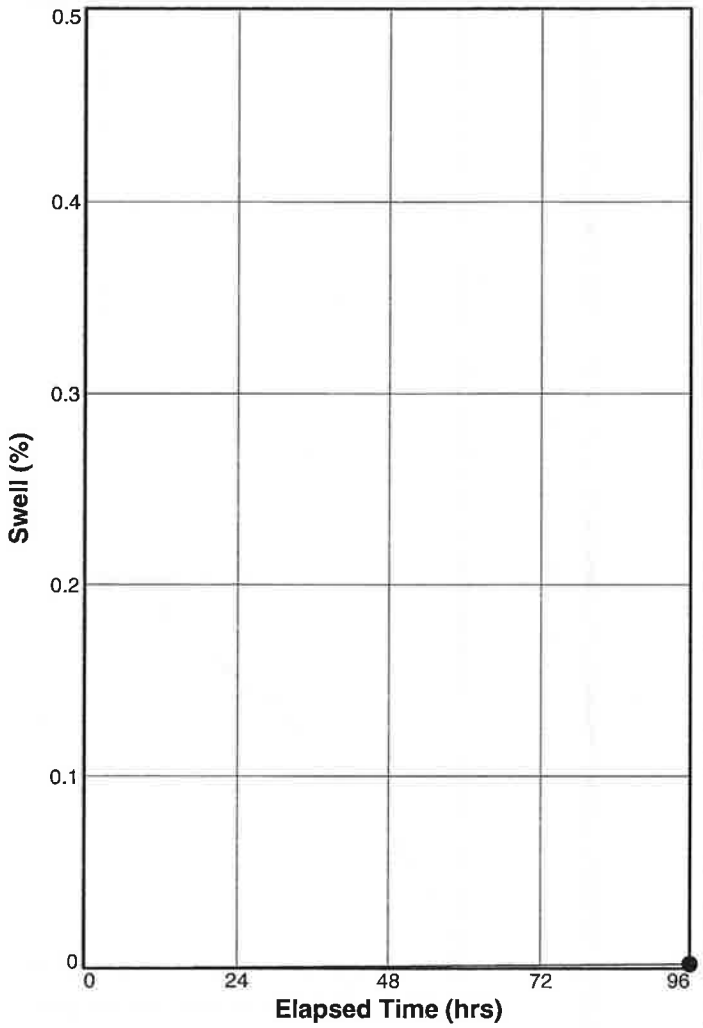
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B12

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	96.0	93.6	20.8	96.0	93.6	23.8	26.4	28.4	0.000	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-7-6; Material 1		102.6	19.0		

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

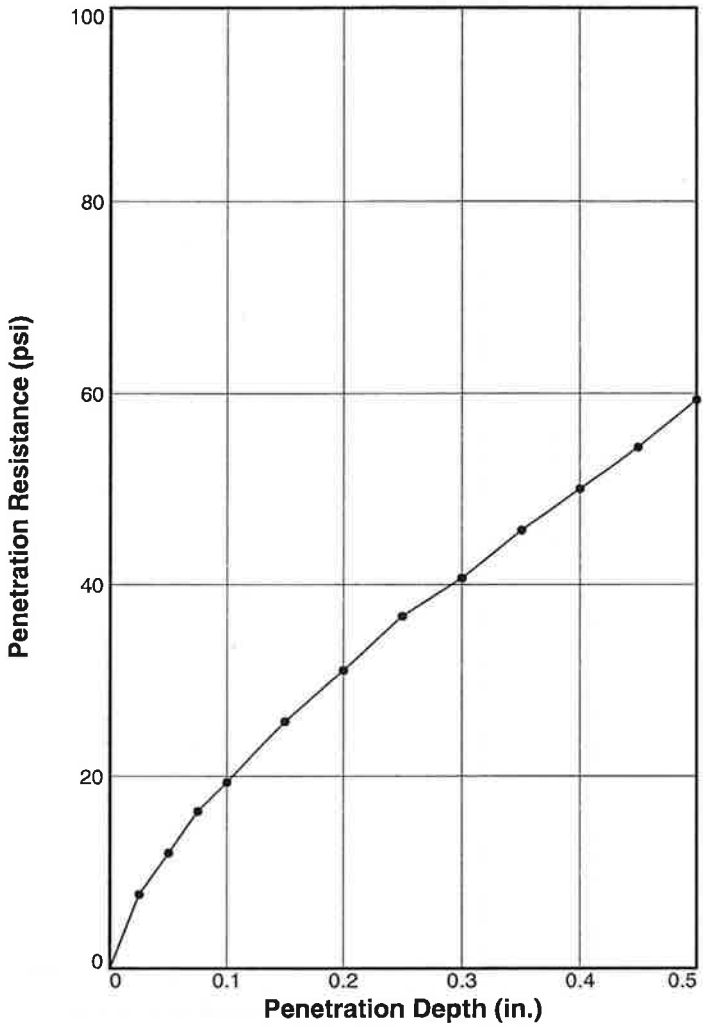
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content + 3%

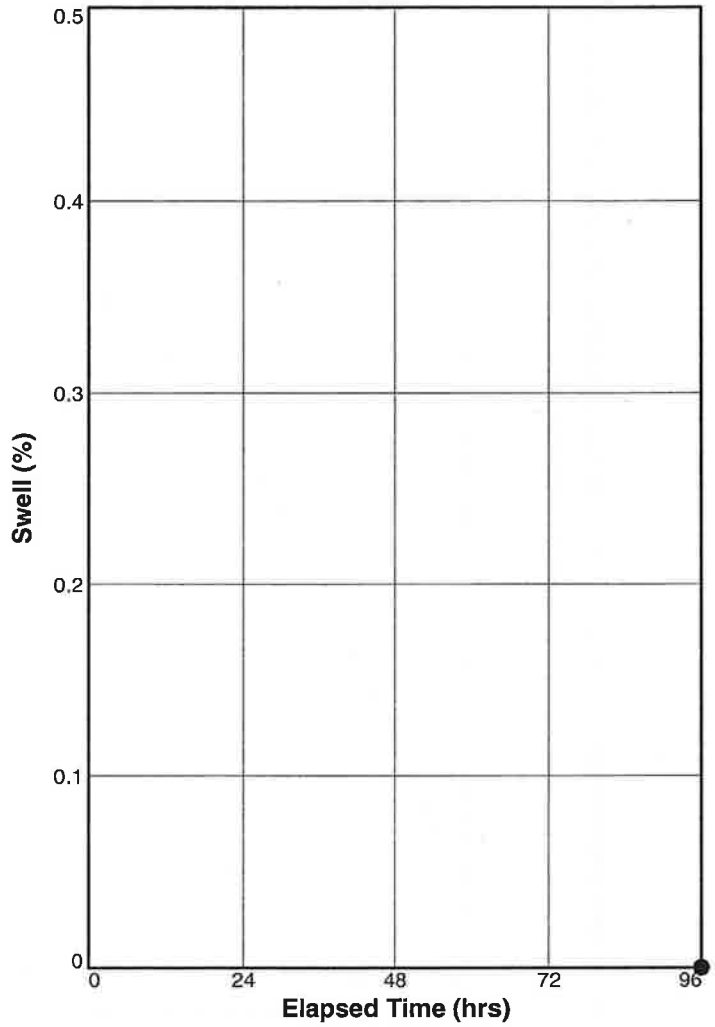
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B13

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	101.3	95.3	16.7	101.3	95.3	21.2	1.9	2.1	0.000	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay CL A-6; Material 2	CL	106.3	16.7	37	18

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

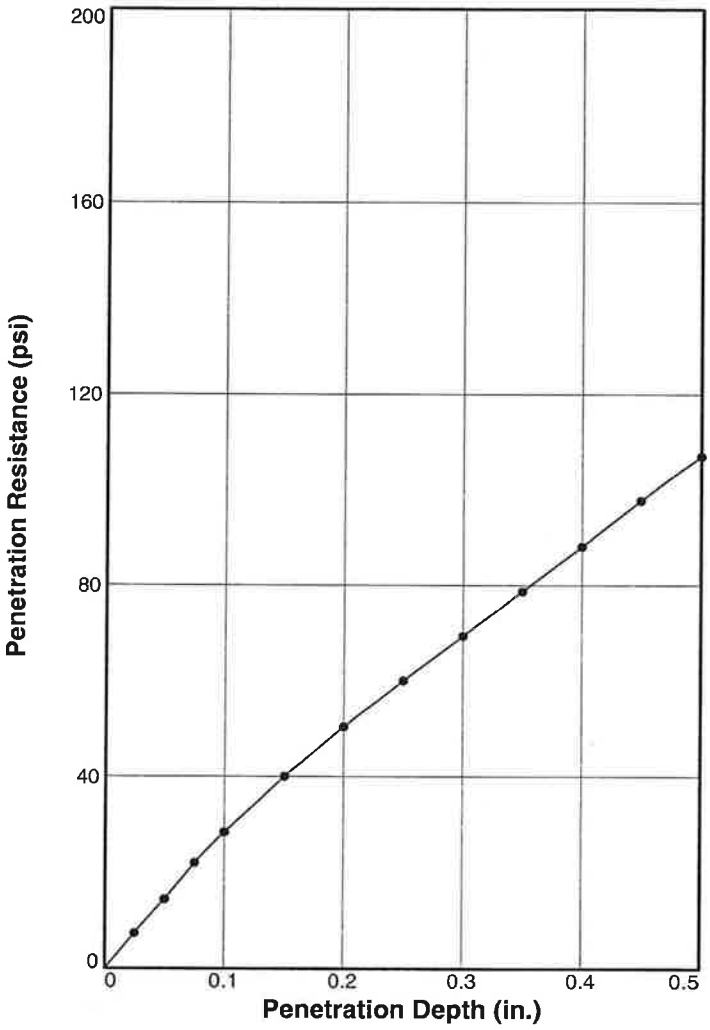
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content

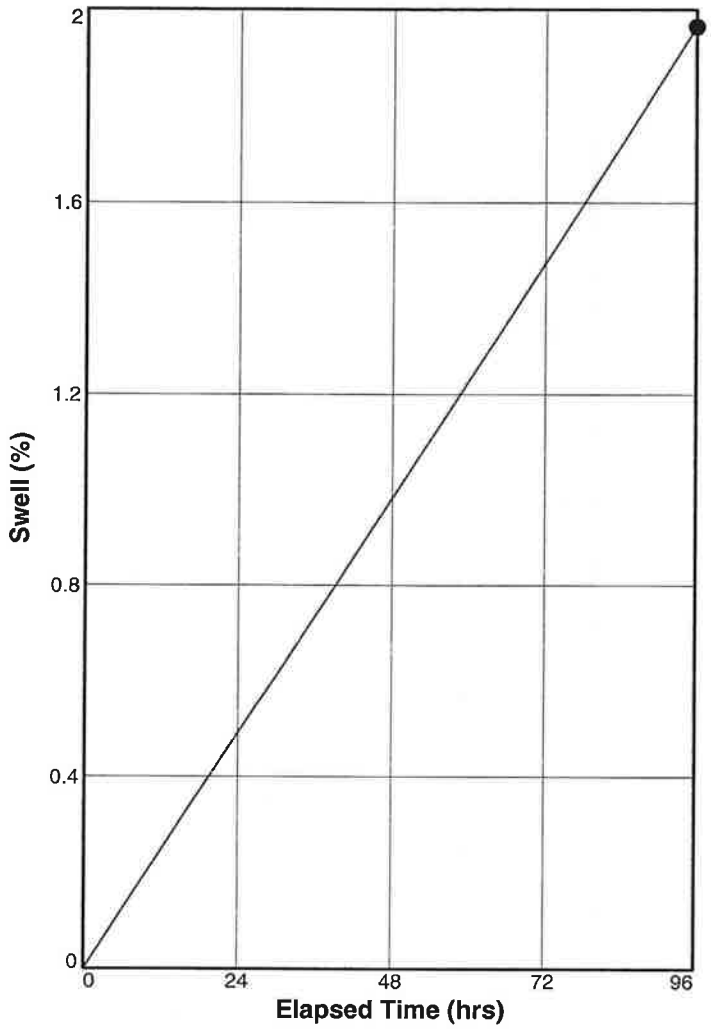
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B14

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	106.8	100.5	15.4	104.7	98.5	20.0	2.8	3.4	0.000	10	2
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay CL A-6; Material 2	CL	106.3	16.7	37	18

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

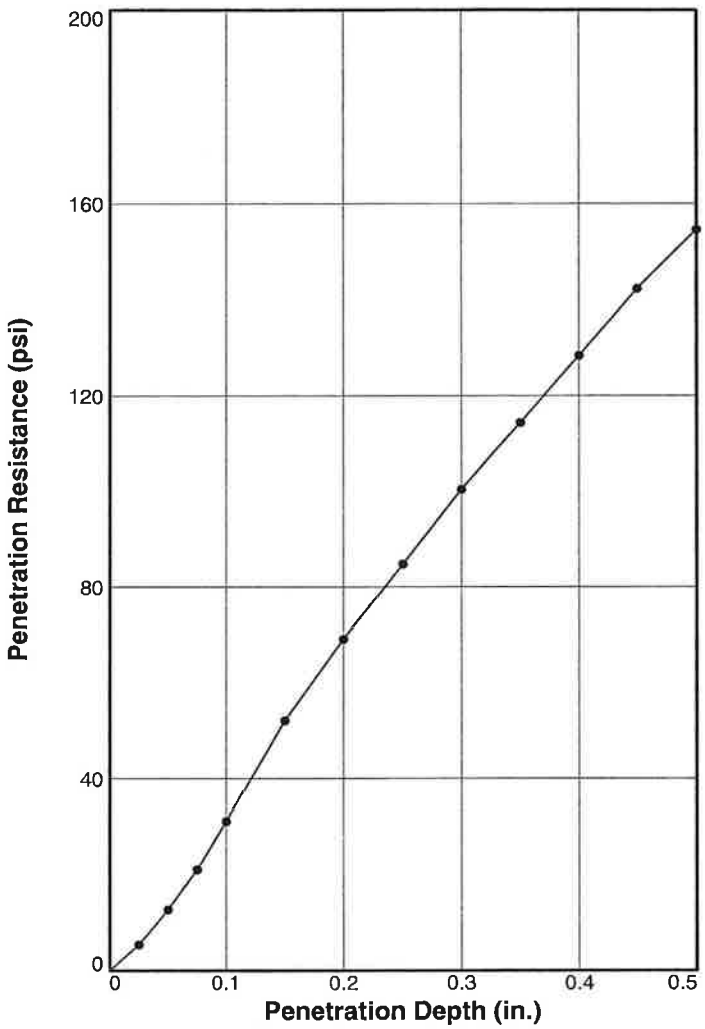
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content

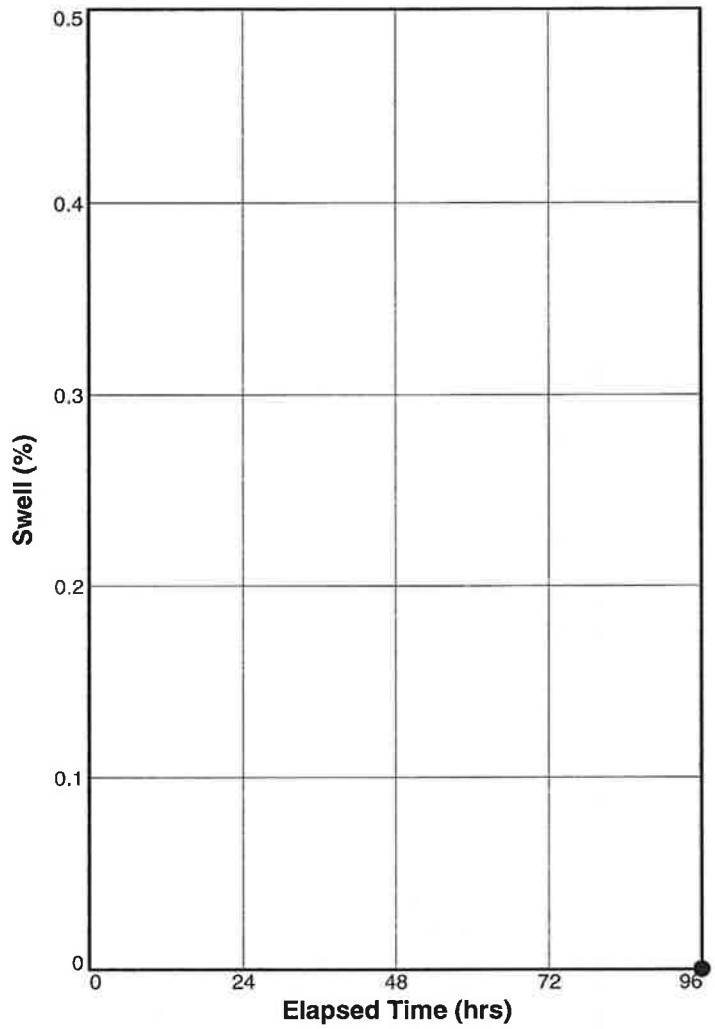
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B15

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	109.9	103.4	15.7	109.9	103.3	17.9	4.1	5.1	0.025	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay CL A-6; Material 2	CL	106.3	16.7	37	18

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

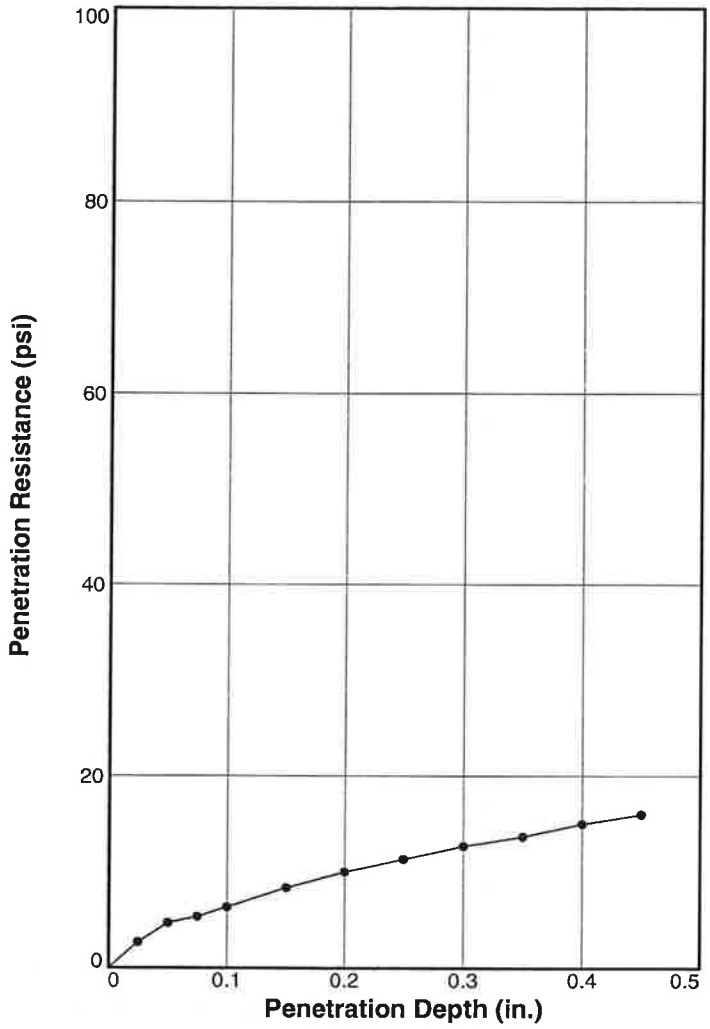
Standard hammer
3 layers - 80 blows/layer
Optimum Moisture Content

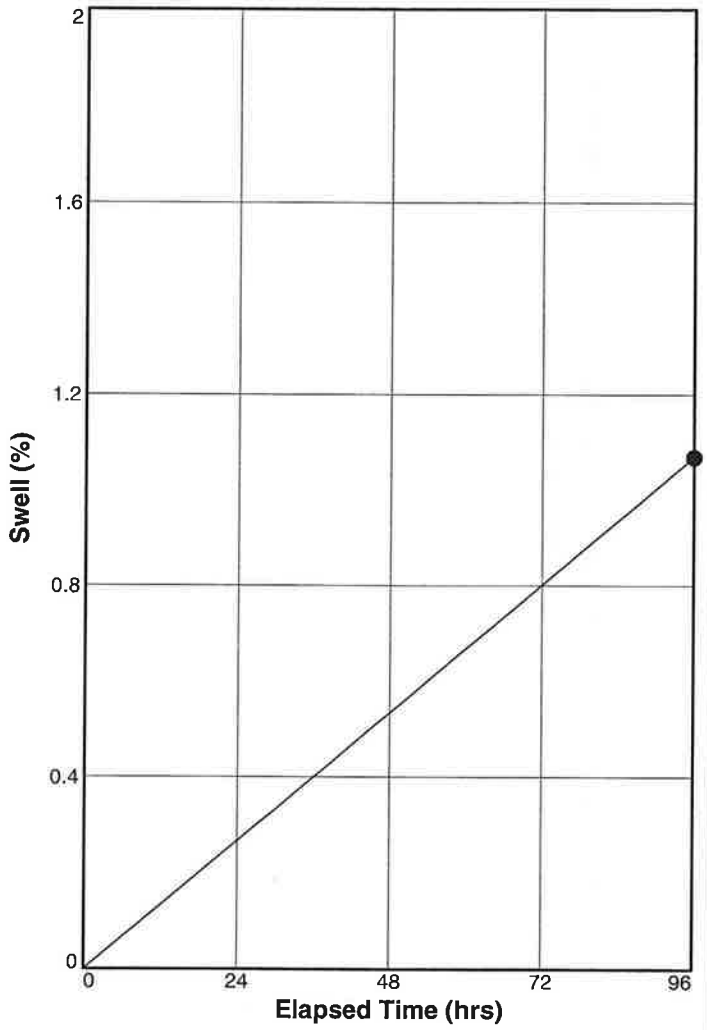
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B16

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	92.6	87.1	19.4	91.6	86.2	24.8	0.6	0.7	0.000	10	1.1
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay CL A-6; Material 2	CL	106.3	16.7	37	18

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

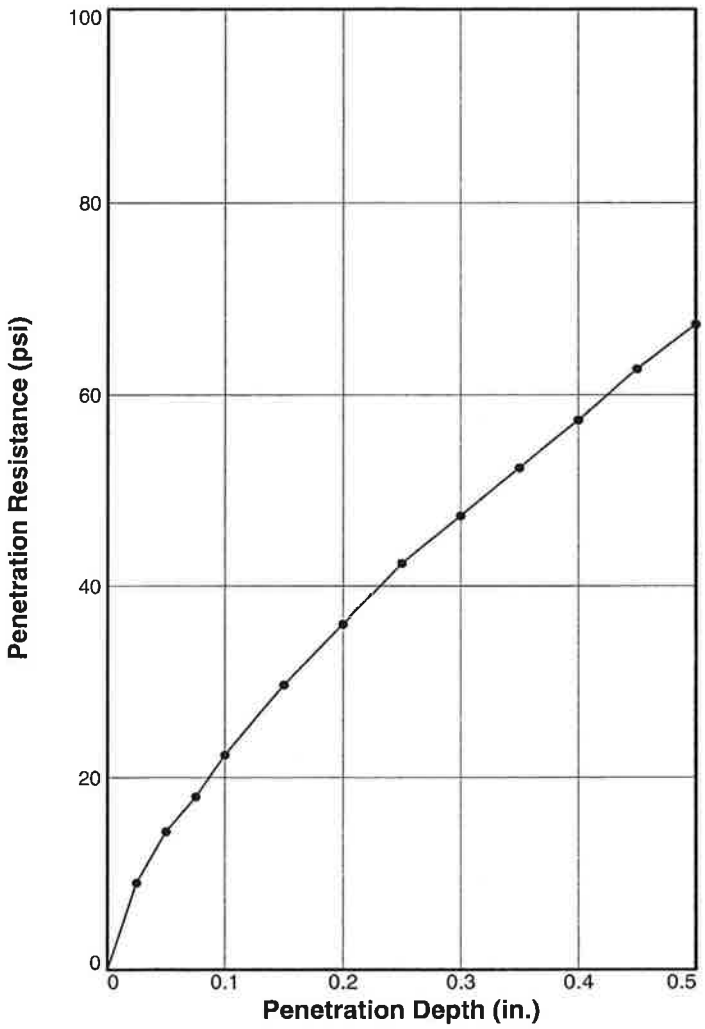
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content + 3%

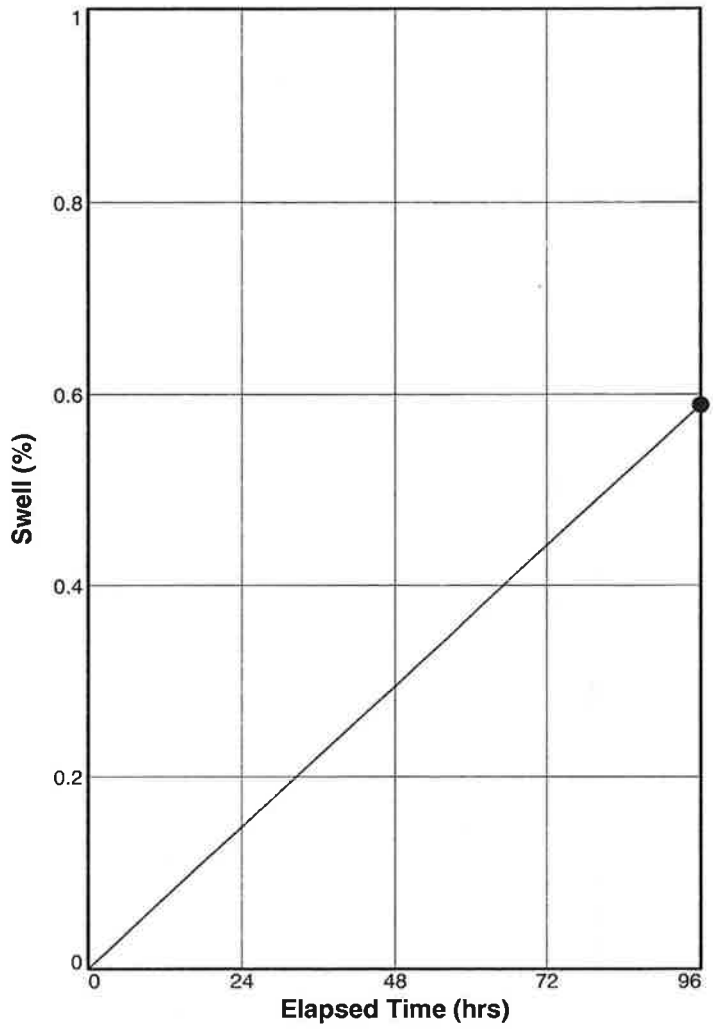
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B17

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	101.8	95.8	20.4	101.2	95.2	20.8	2.2	2.4	0.000	10	0.6
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay CL A-6; Material 2	CL	106.3	16.7	37	18

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

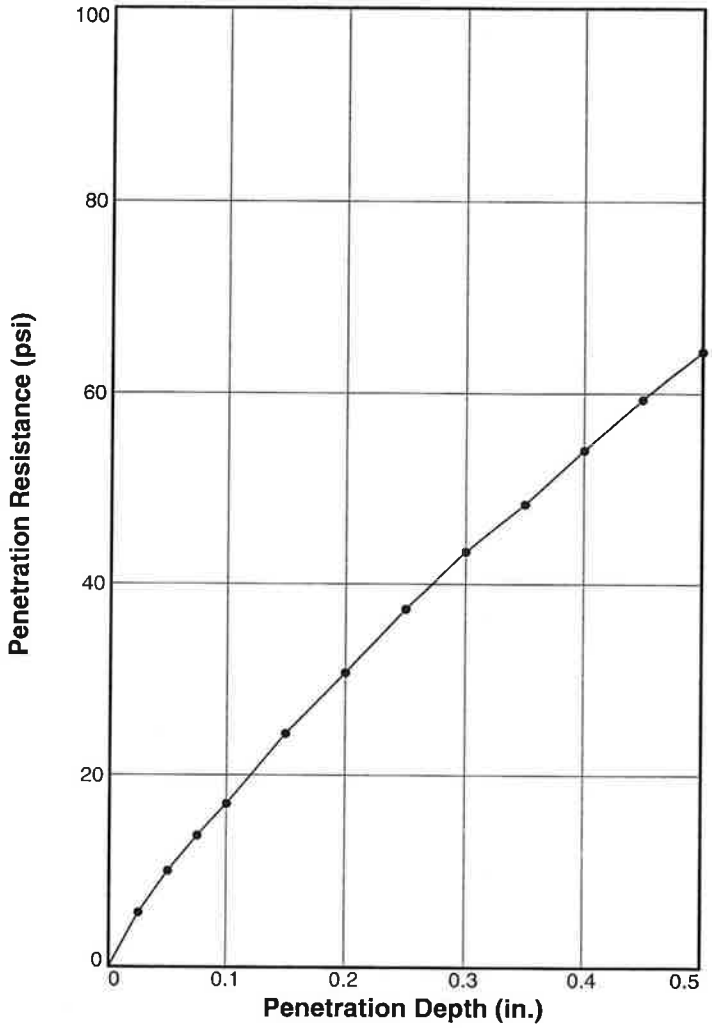
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content + 3%

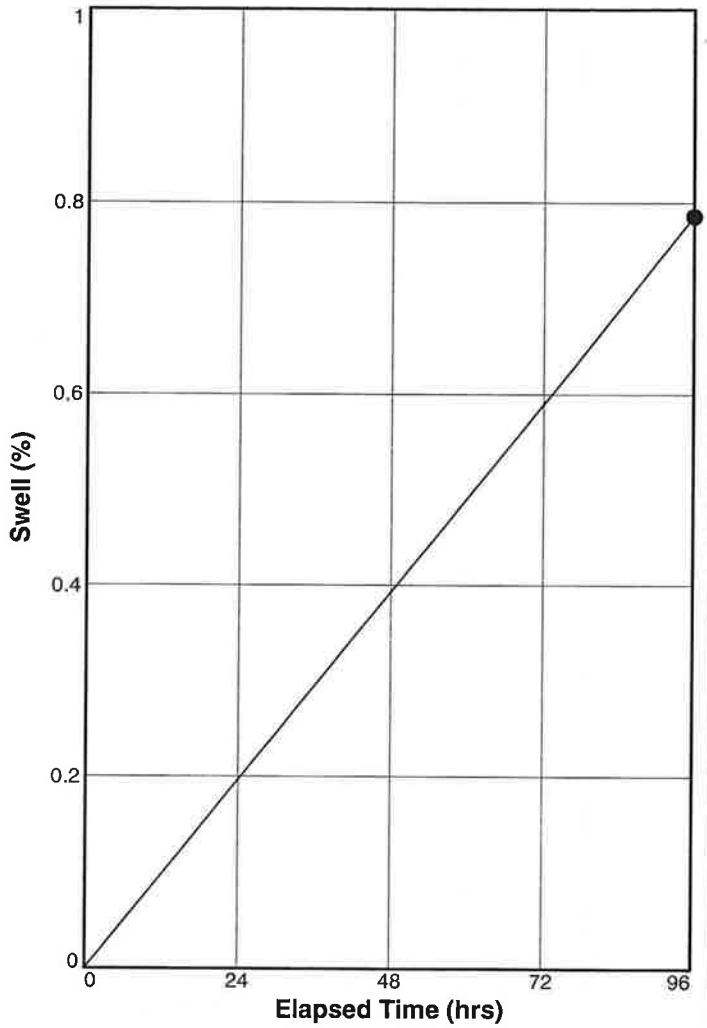
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B18

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	104.7	98.5	19.6	103.9	97.7	19.8	1.7	2.0	0.000	10	0.8
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay CL A-6; Material 2	CL	106.3	16.7	37	18

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

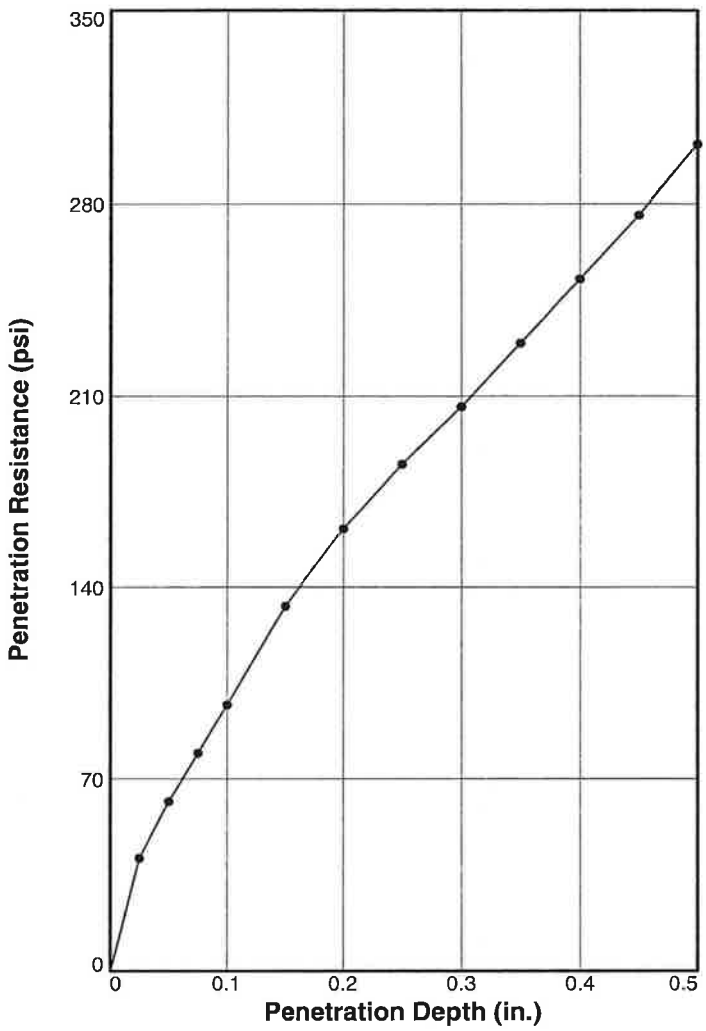
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content + 3%

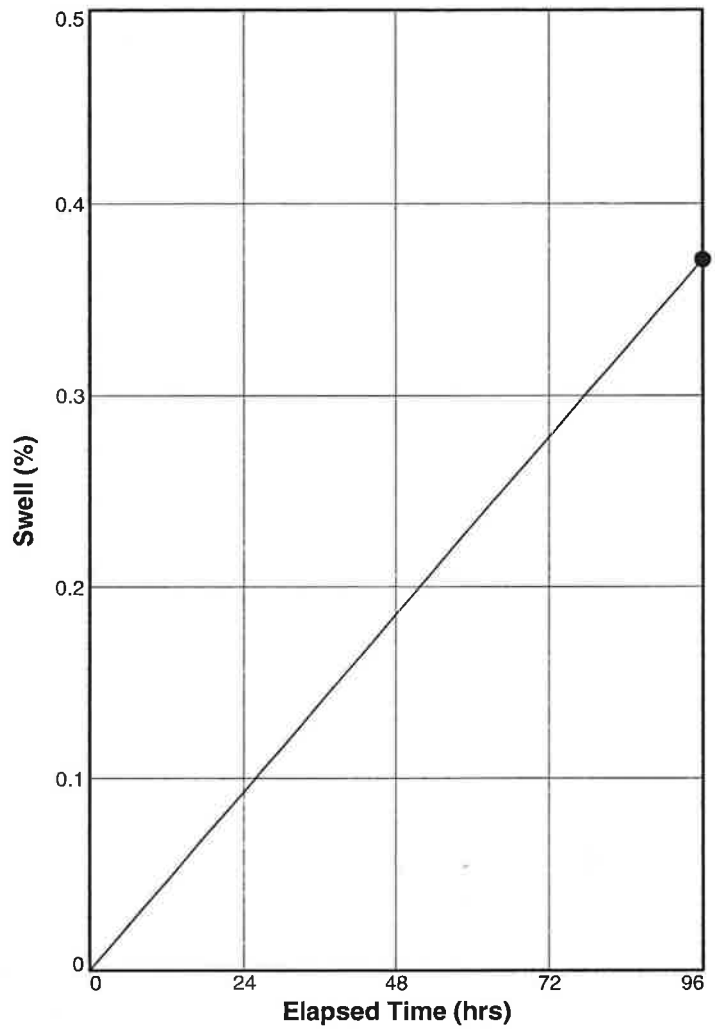
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B19

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	92.3	89.4	16.6	92.0	89	26.0	9.7	10.8	0.000	10	0.4
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-6; Material 2		103.3	19.5	--	--

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

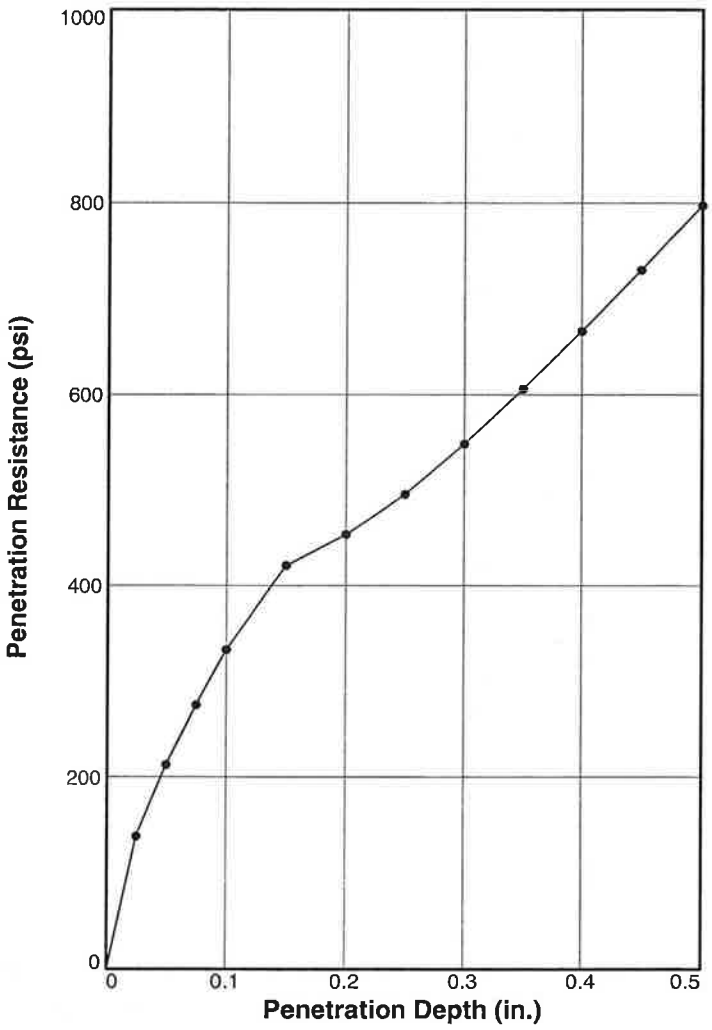
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content

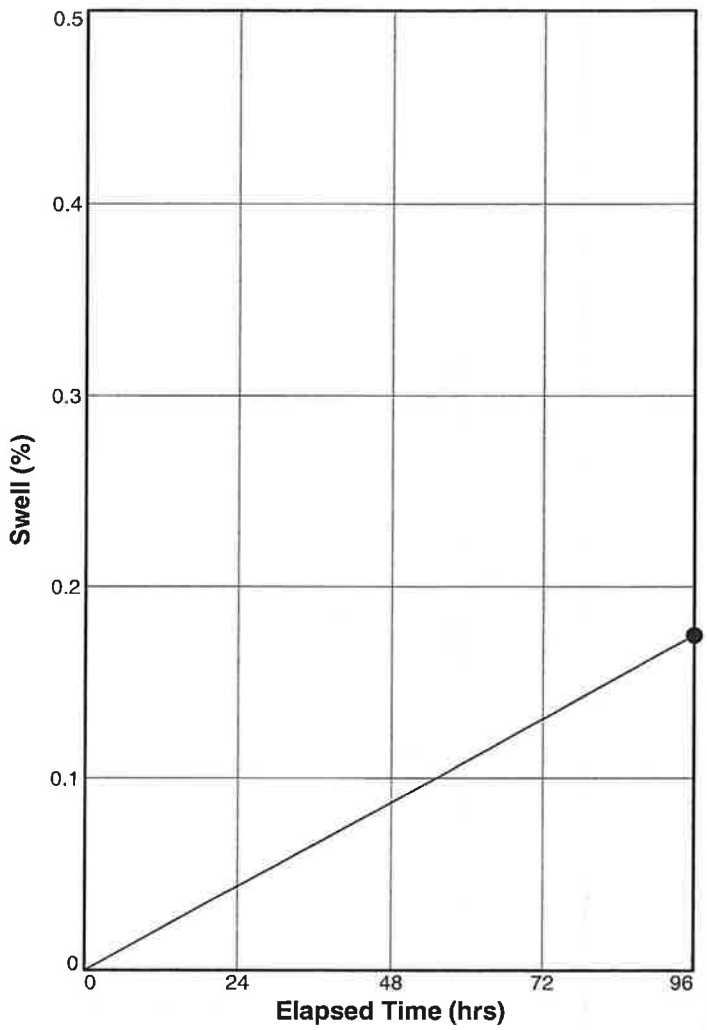
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B20

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	99.0	95.8	18.5	98.9	95.7	21.3	33.3	30.2	0.000	10	0.2
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-6; Material 2		103.3	19.5	--	--

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

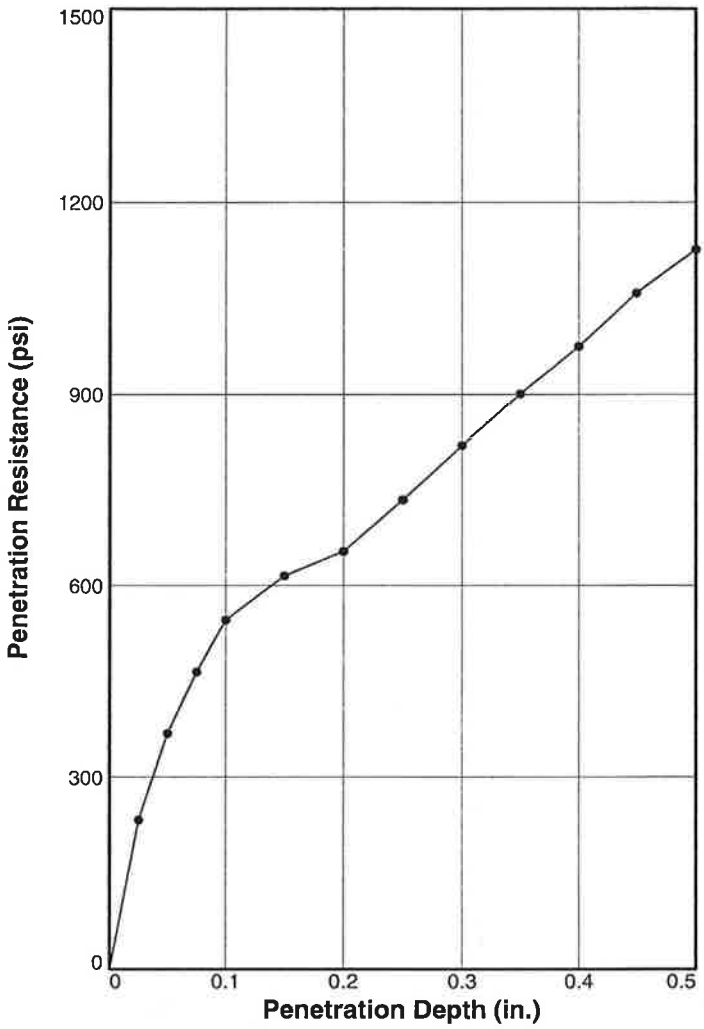
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content

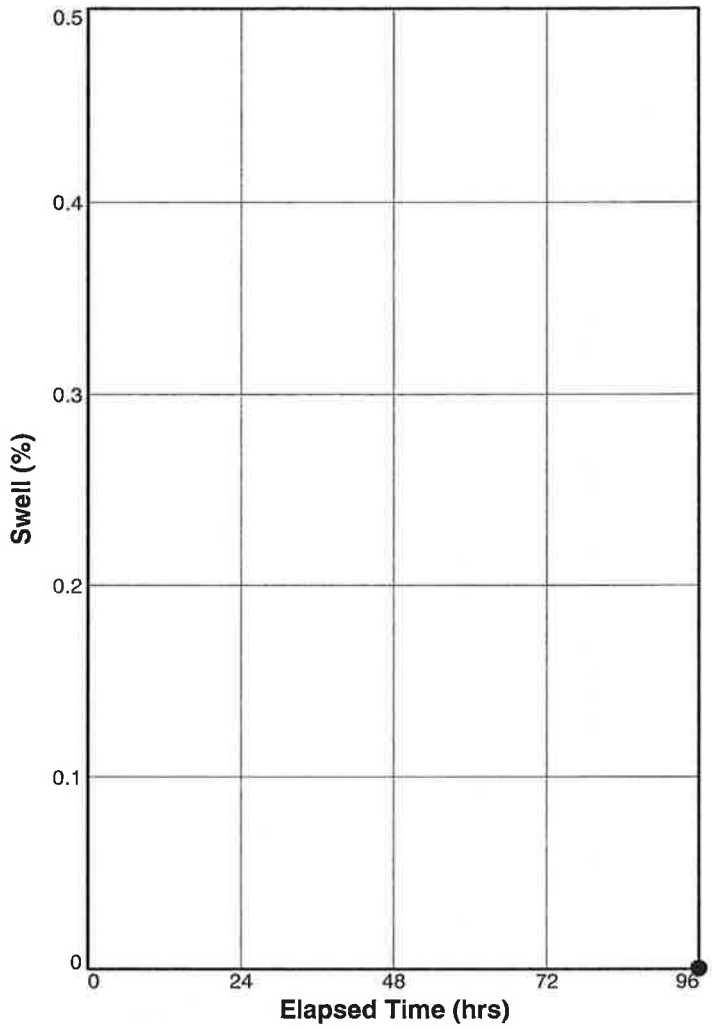
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B21

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	102.7	99.4	17.7	102.7	99.4	19.4	54.6	43.5	0.000	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-6; Material 2		103.3	19.5	--	--

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

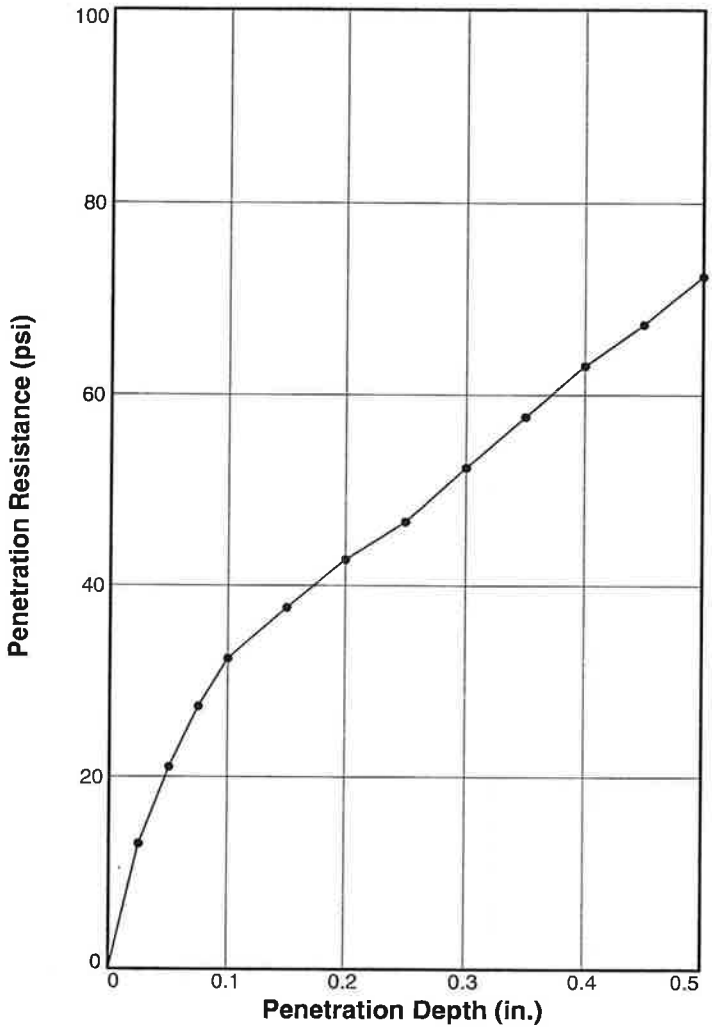
Standard hammer
3 layers - 80 blows/layer
Optimum Moisture Content

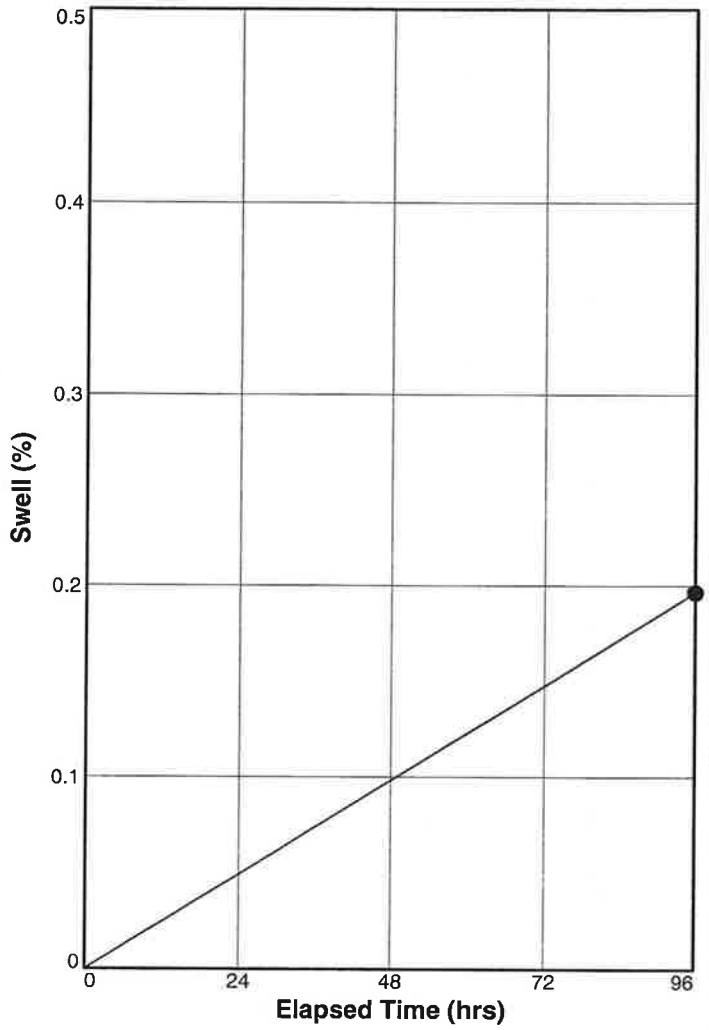
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B22

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	82.4	79.8	21.1	82.2	79.6	32.4	3.2	2.8	0.000	10	0.2
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-6; Material 2		103.3	19.5	--	--

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

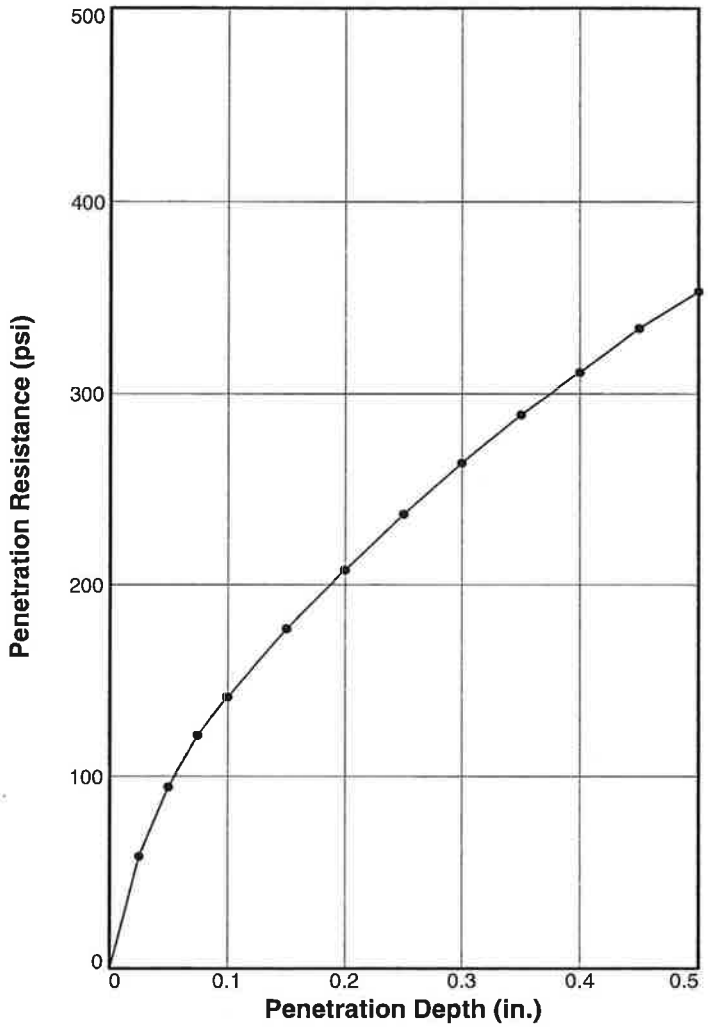
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content + 3%

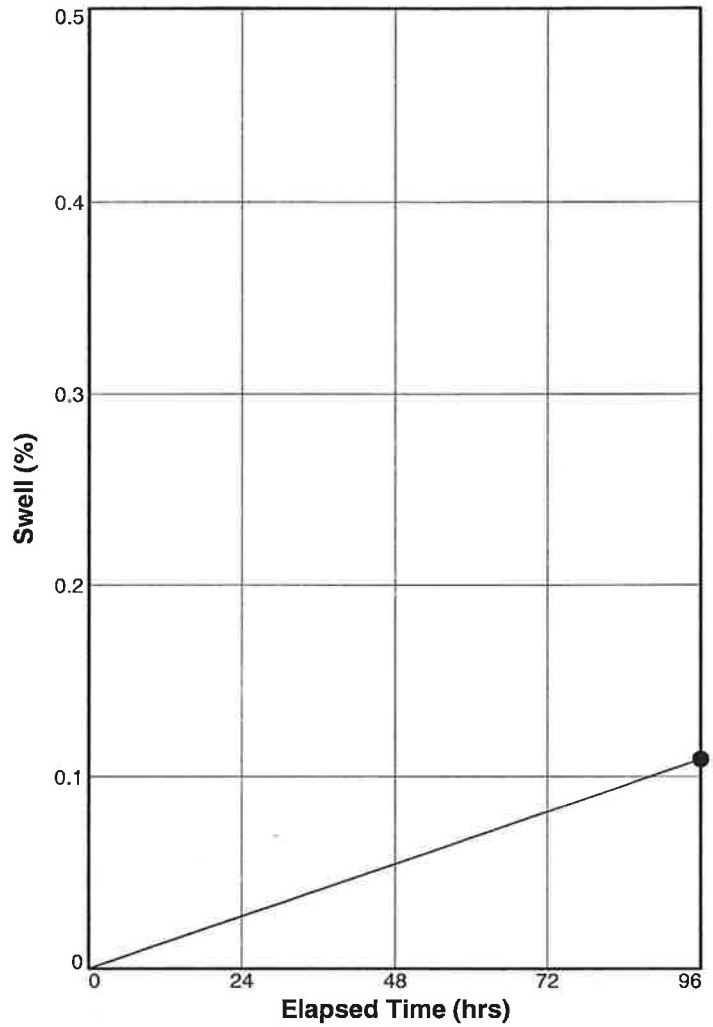
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B23

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	91.9	89	21.1	91.8	88.9	25.3	14.1	13.8	0.000	10	0.1
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-6; Material 2		103.3	19.5	--	--

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

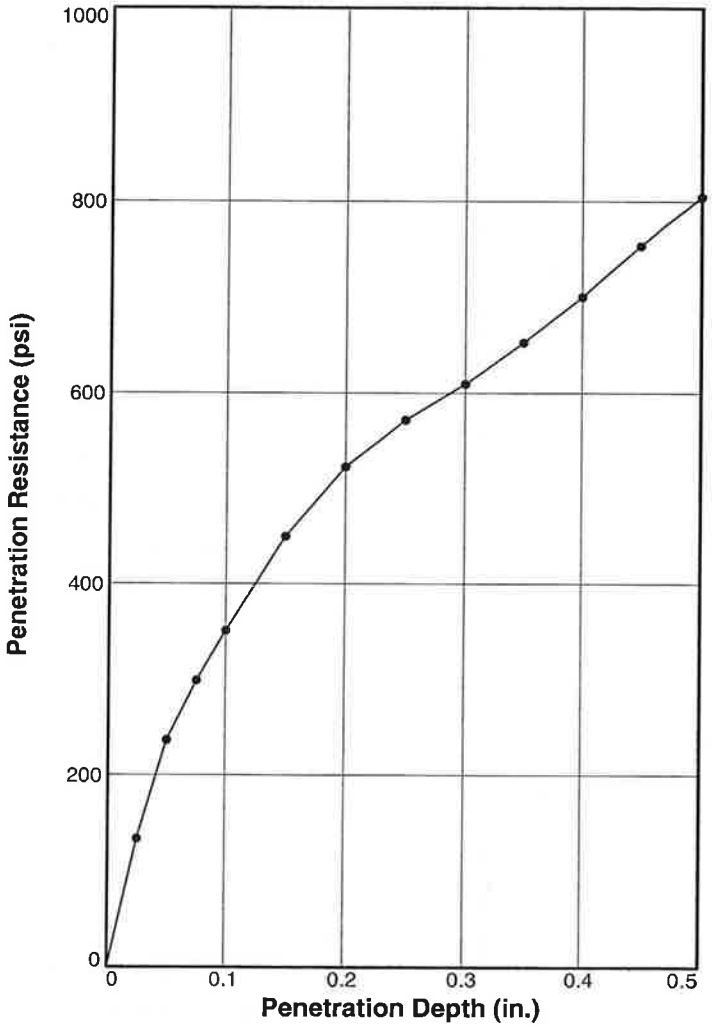
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content + 3%

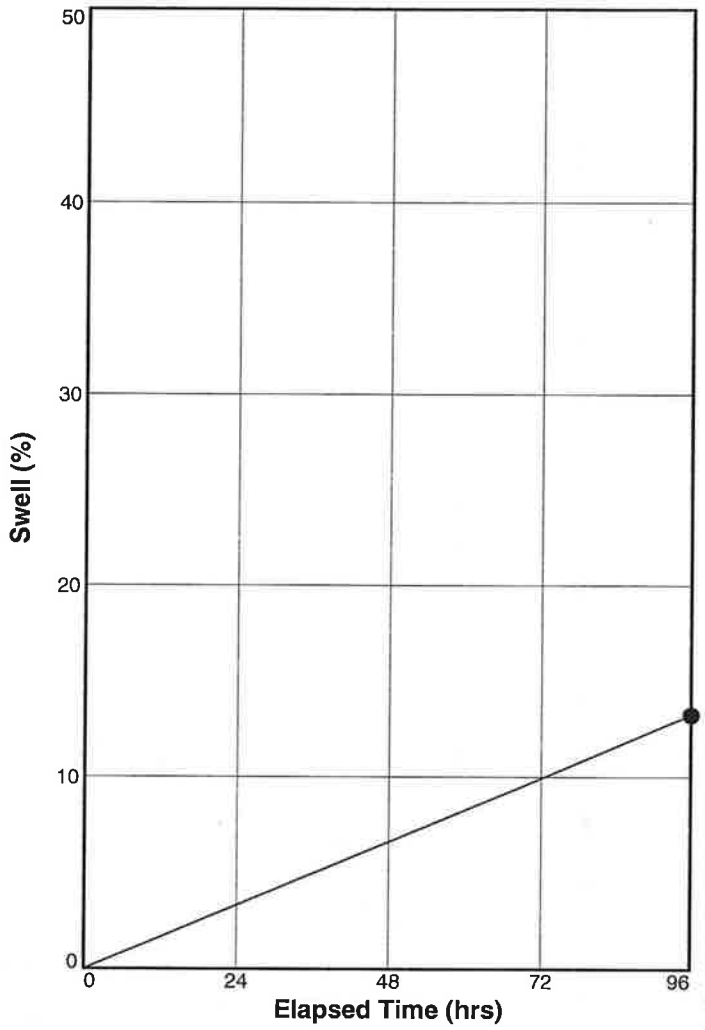
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B24

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	100.7	97.5	21.2	88.9	86.1	21.2	35.1	34.8	0.000	10	13.2
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-6; Material 2		103.3	19.5	--	--

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

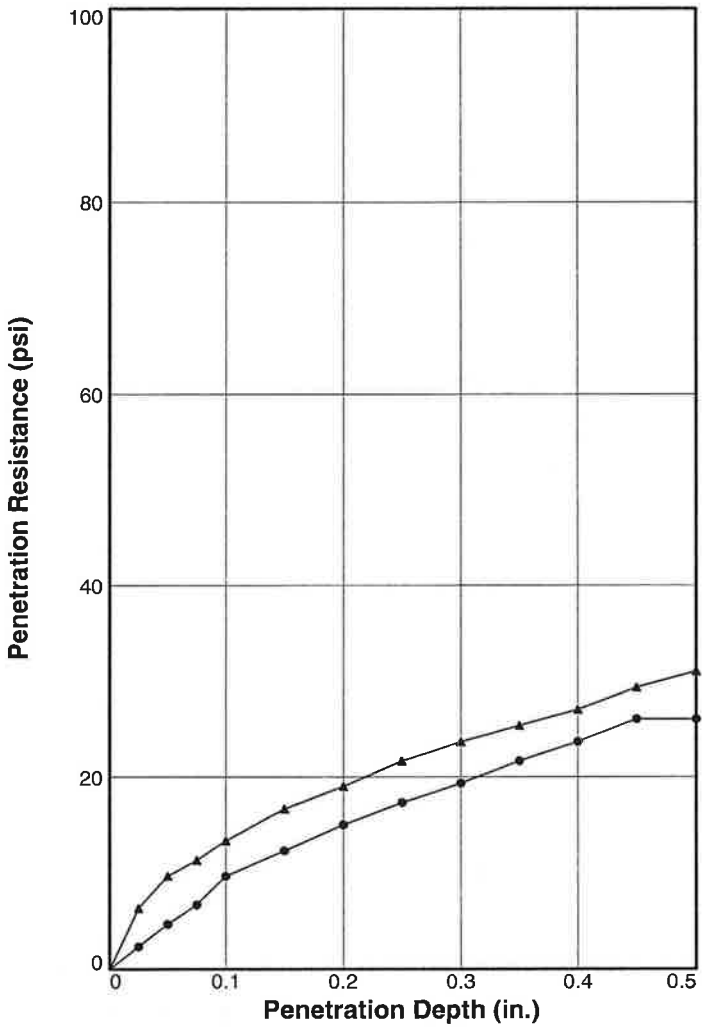
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content + 3%

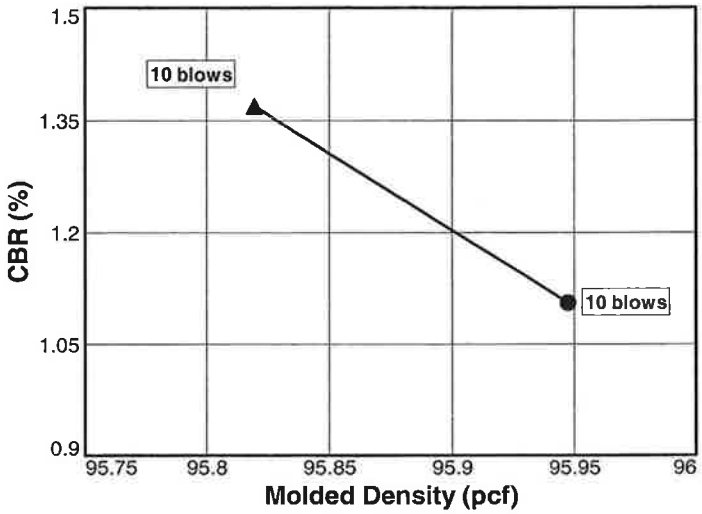
BEARING RATIO TEST REPORT

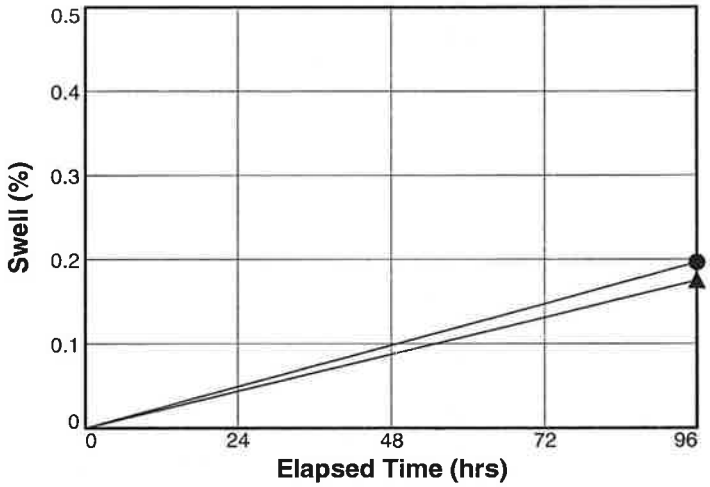
BURNS COOLEY DENNIS, INC.

Figure B25

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	95.9	86.5	14.6	95.8	86.3	23.7	1.1	1.1	0.026	10	0.2
2 △	95.8	86.4	14.6	95.7	86.3	24.1	1.4	1.3	0.005	10	0.2
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silt, slightly clayey ML A-4; Material 3	ML	110.9	14.9	27	1

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

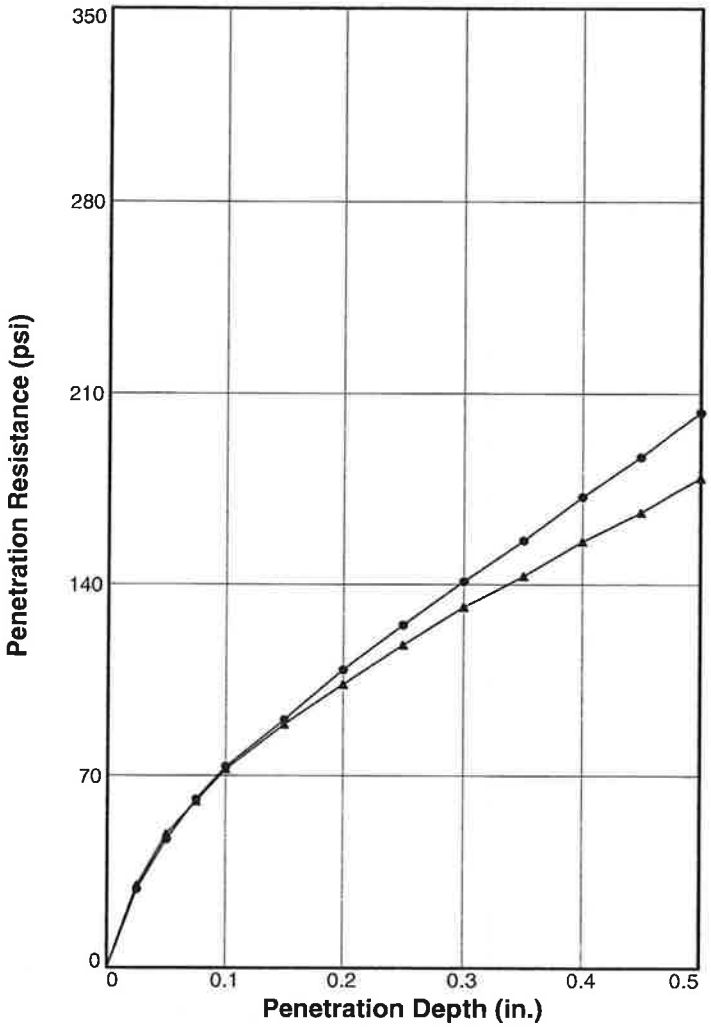
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content

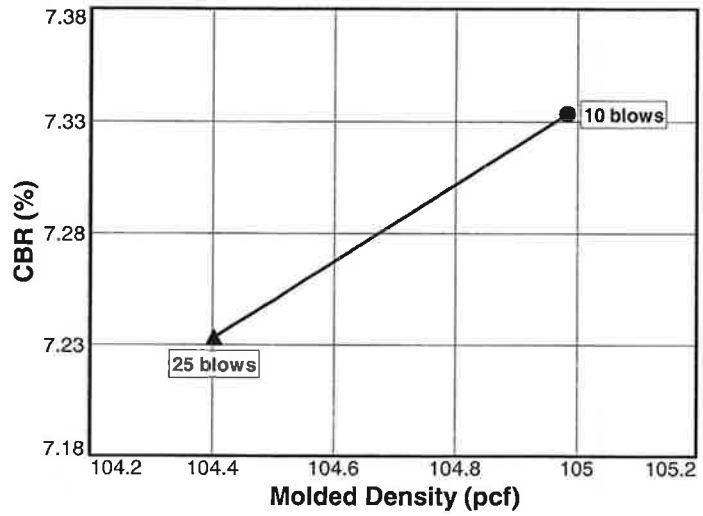
BEARING RATIO TEST REPORT

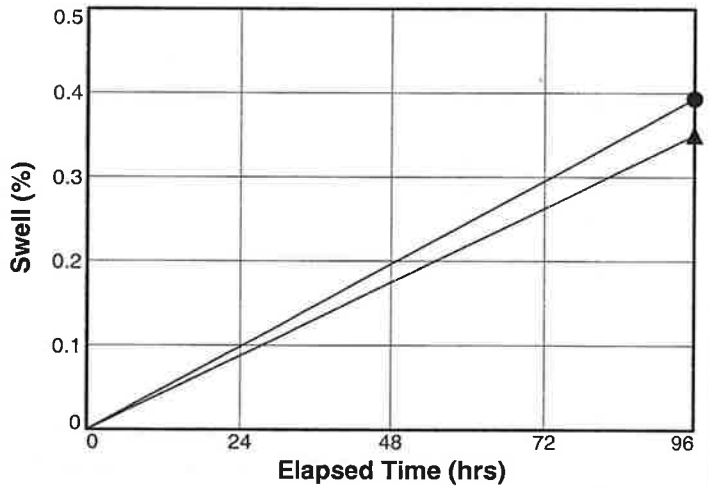
BURNS COOLEY DENNIS, INC.

Figure B26

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	105.0	94.7	14.6	104.6	94.3	19.5	7.3	7.2	0.000	10	0.4
2 △	104.4	94.1	14.5	104.0	93.8	19.8	7.2	6.9	0.000	10	0.3
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silt, slightly clayey ML A-4; Material 3	ML	110.9	14.9	27	1

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

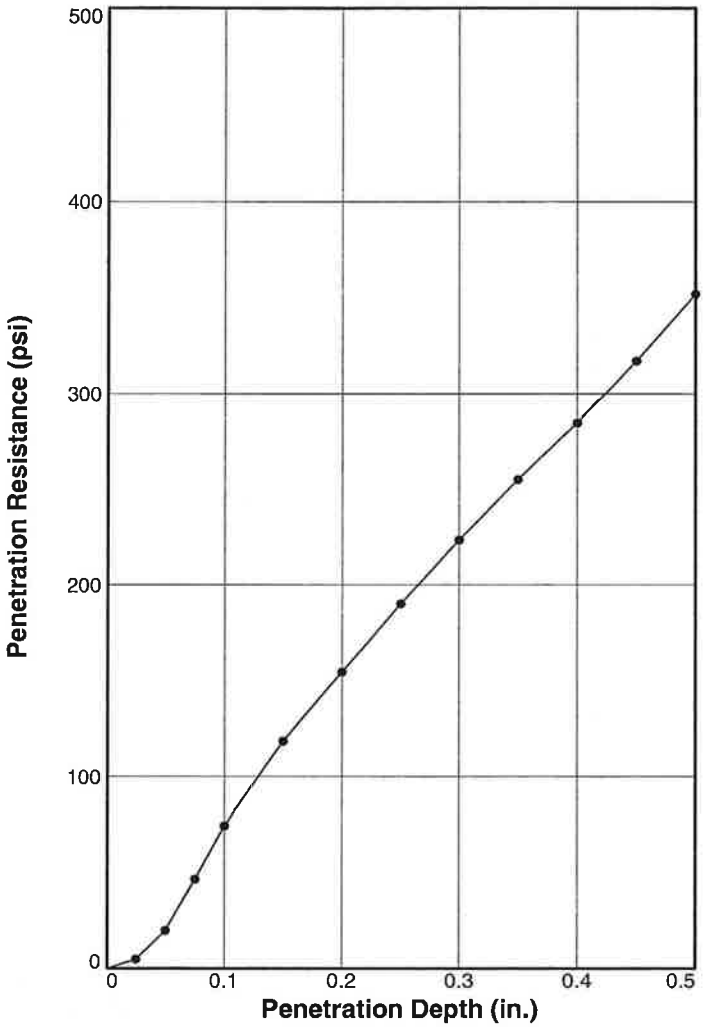
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content

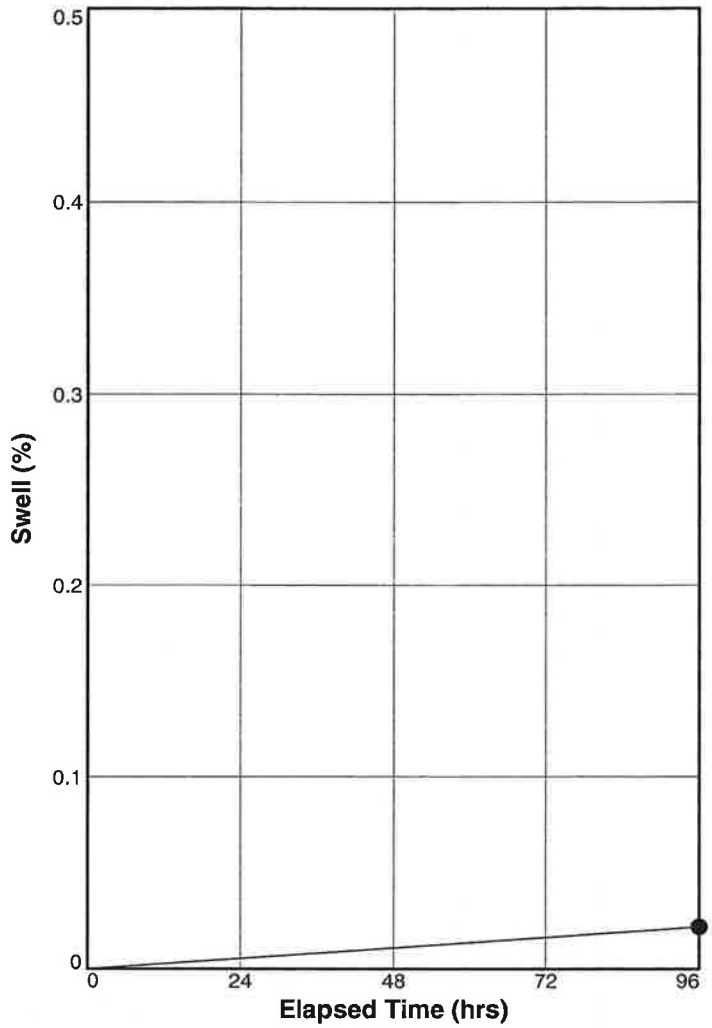
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B27

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	110.4	99.5	14.4	110.3	99.5	17.1	10.3	11.9	0.033	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silt, slightly clayey ML A-4; Material 3	ML	110.9	14.9	27	1

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

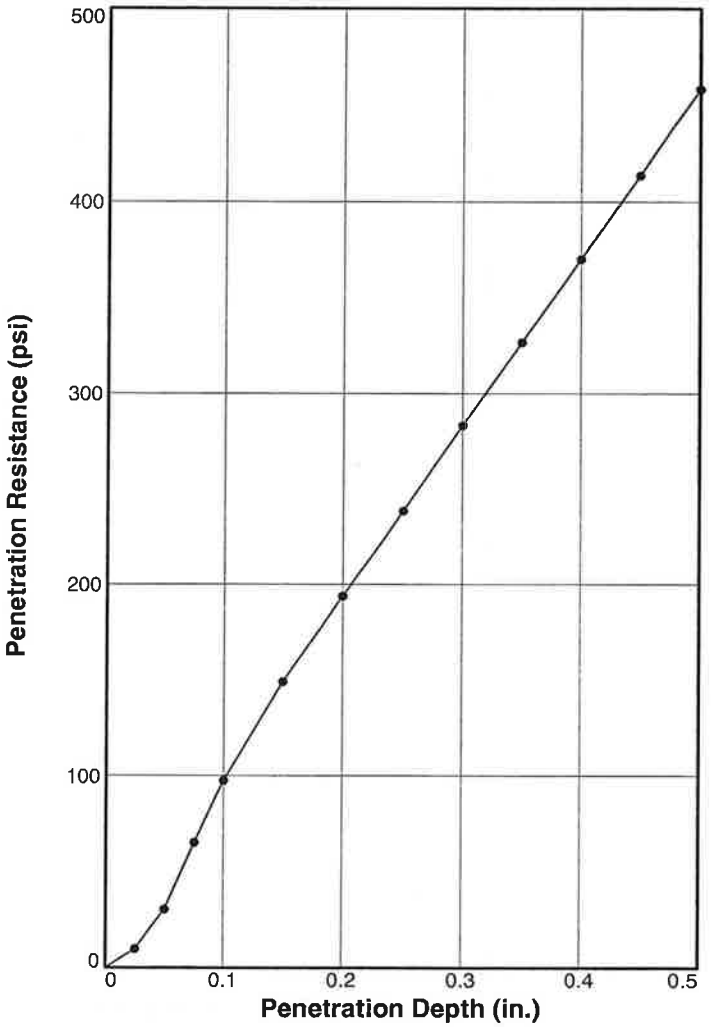
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content

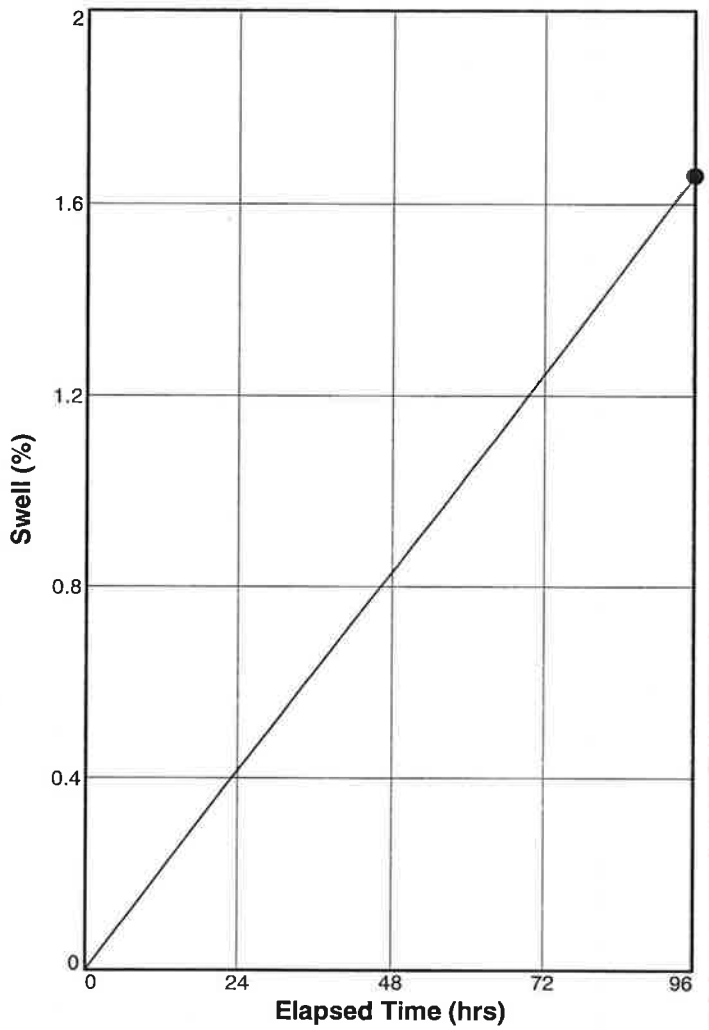
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B28

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	111.2	100.3	14.6	109.4	98.6	16.2	12.3	14.4	0.025	10	1.7
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silt, slightly clayey ML A-4; Material 3	ML	110.9	14.9	27	1

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

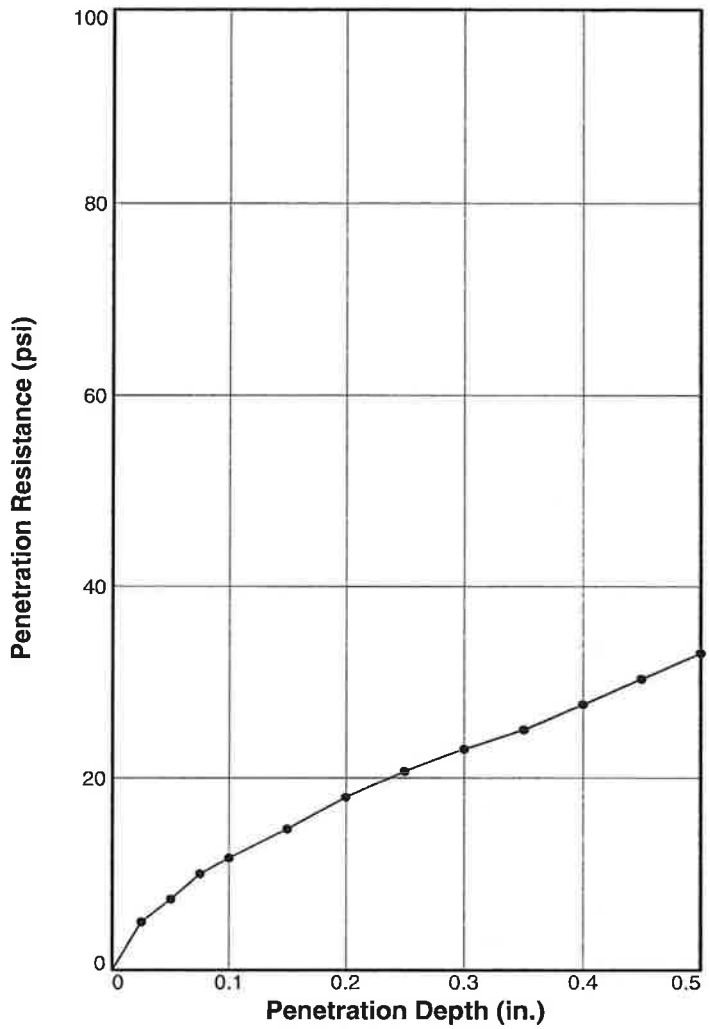
Standard hammer
3 layers - 80 blows/layer
Optimum Moisture Content

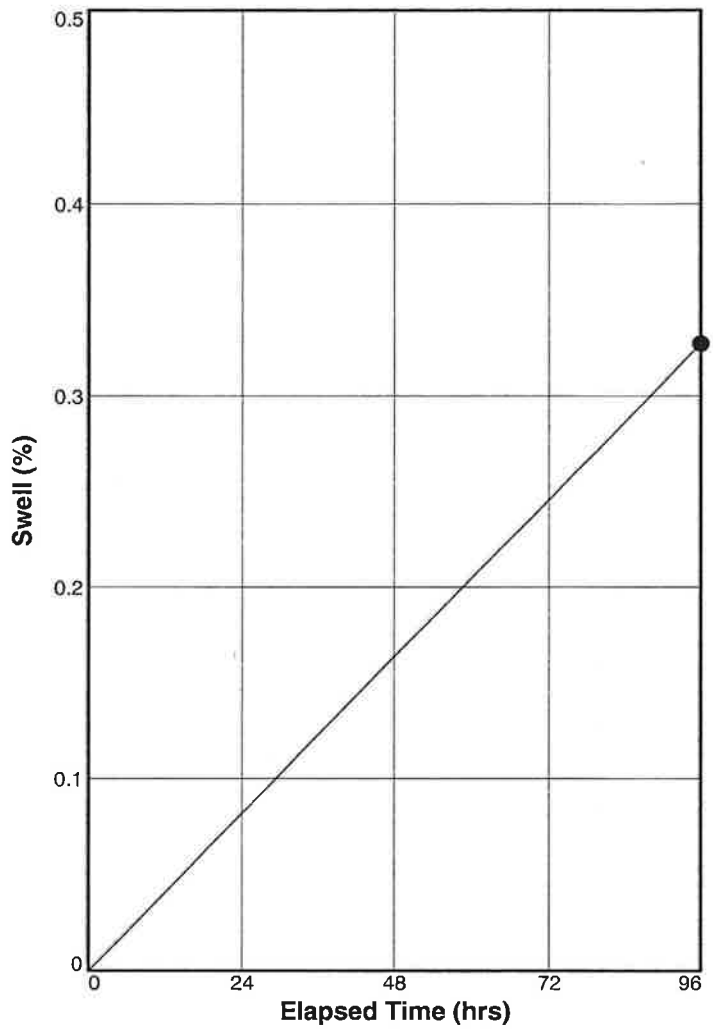
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B29

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	98.0	88.4	18.0	97.6	88	22.8	1.2	1.2	0.000	10	0.3
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silt, slightly clayey ML A-4; Material 3	ML	110.9	14.9	27	1

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

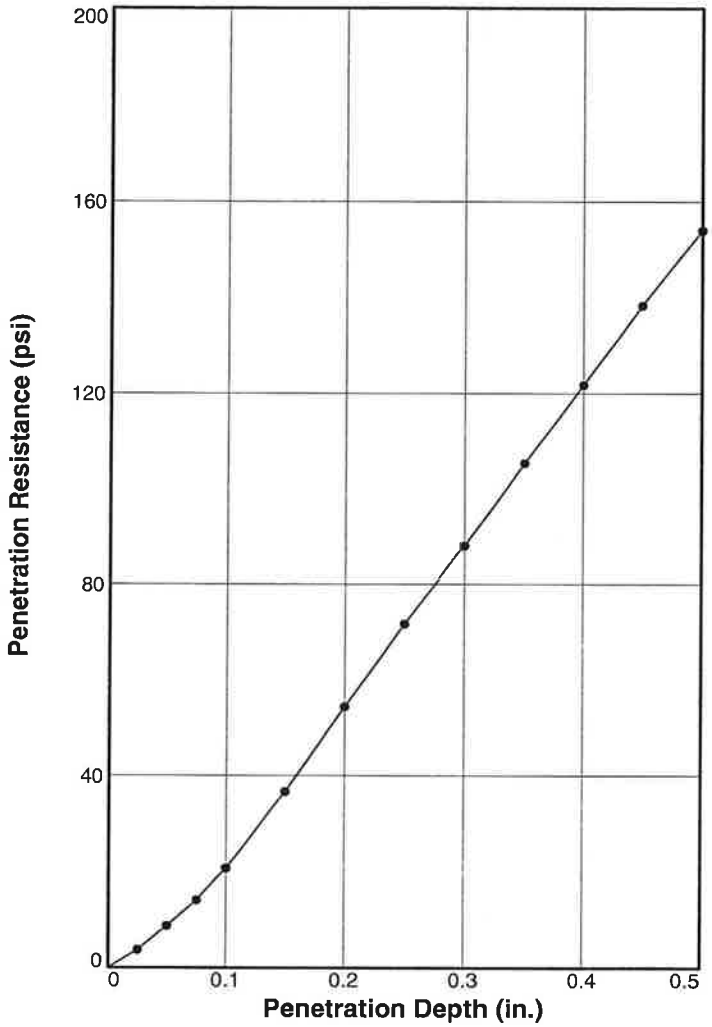
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content + 3%

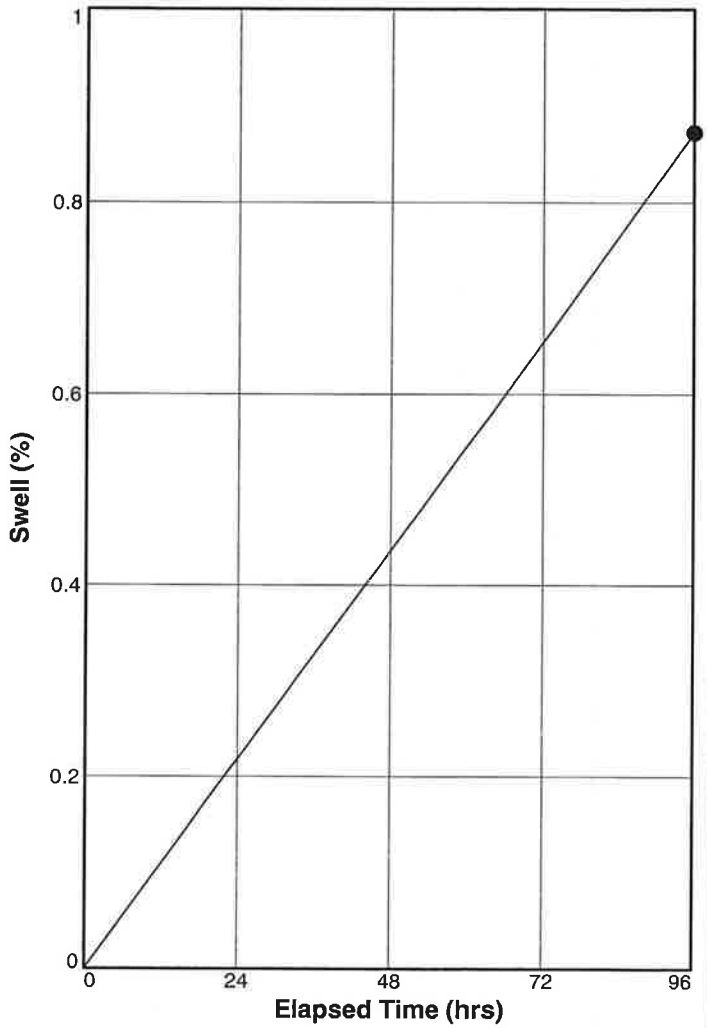
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B30

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	105.3	95	18.0	104.4	94.1	19.3	3.3	4.5	0.039	10	0.9
2 ▲											
3 ■											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silt, slightly clayey ML A-4; Material 3	ML	110.9	14.9	27	1

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

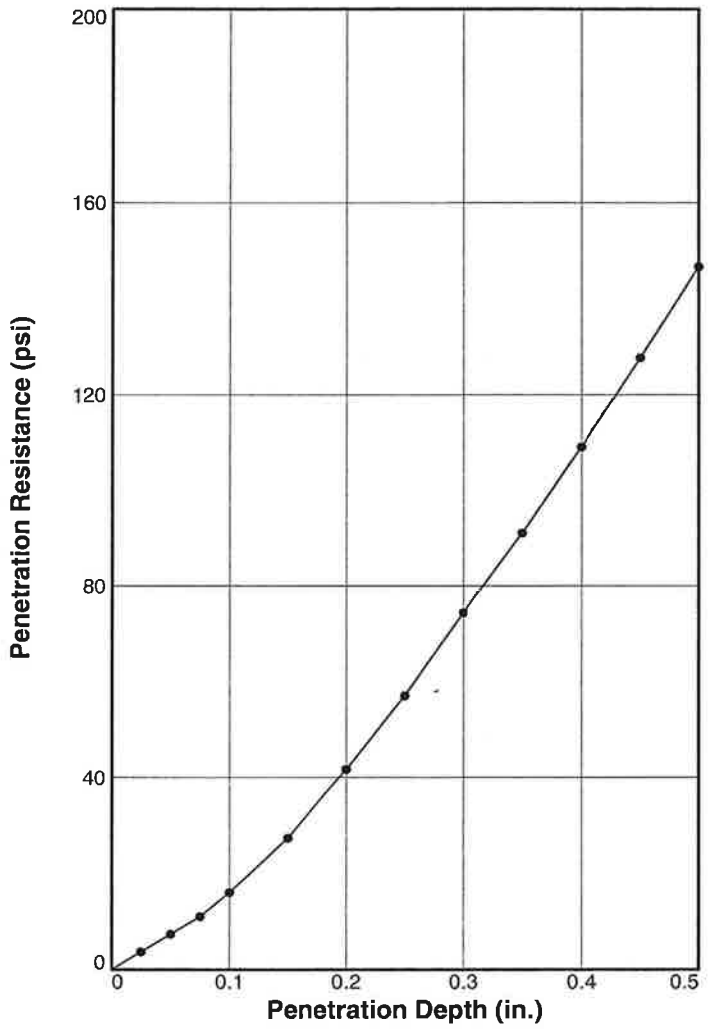
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content + 3%

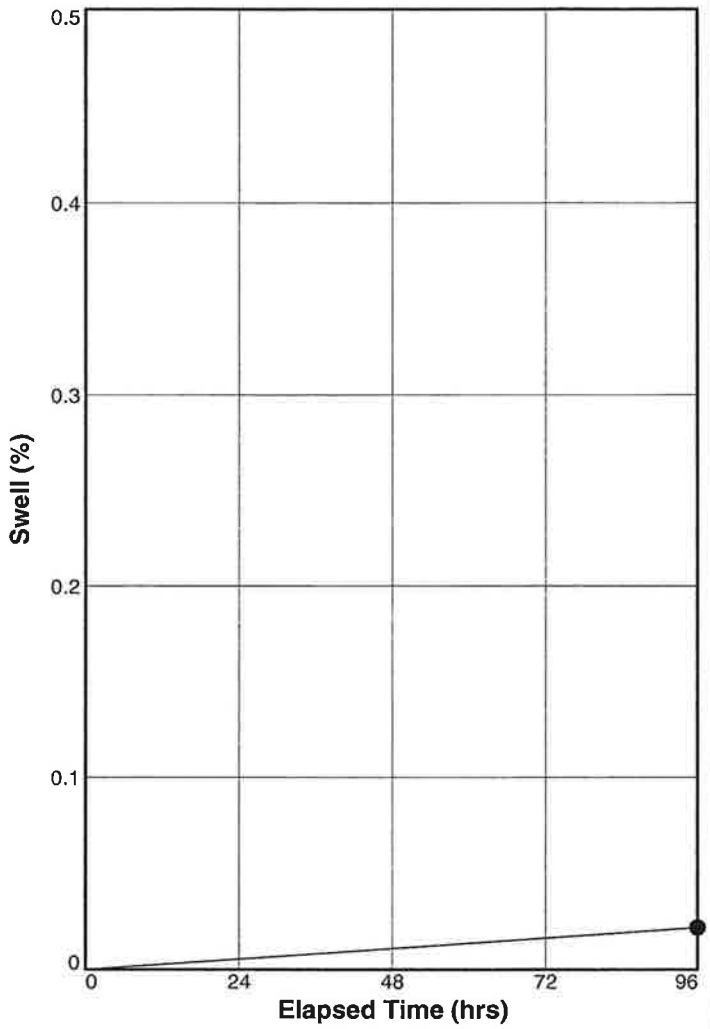
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B31

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	106.3	95.9	18.2	106.2	95.8	18.4	4.0	4.8	0.093	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silt, slightly clayey ML A-4; Material 3	ML	110.9	14.9	27	1

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

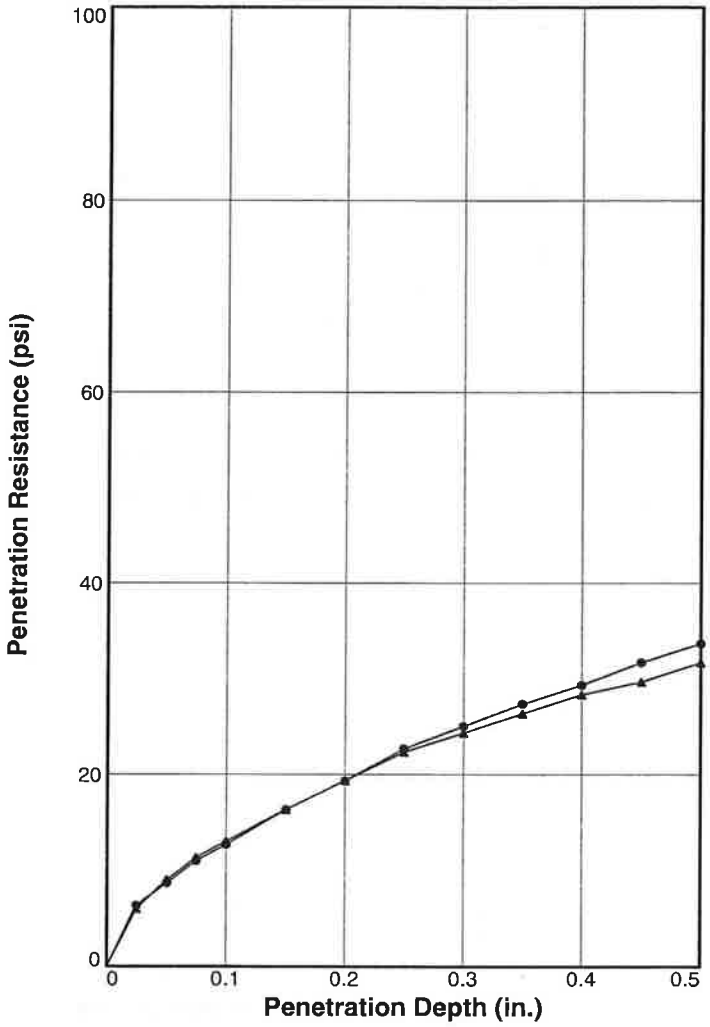
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content + 3%

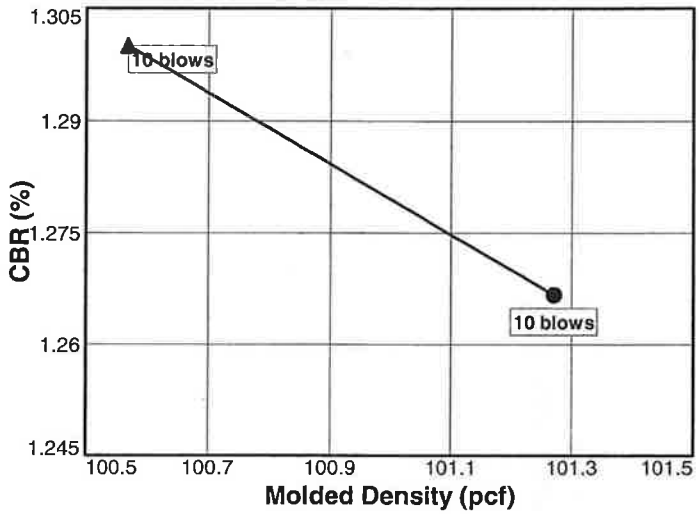
BEARING RATIO TEST REPORT

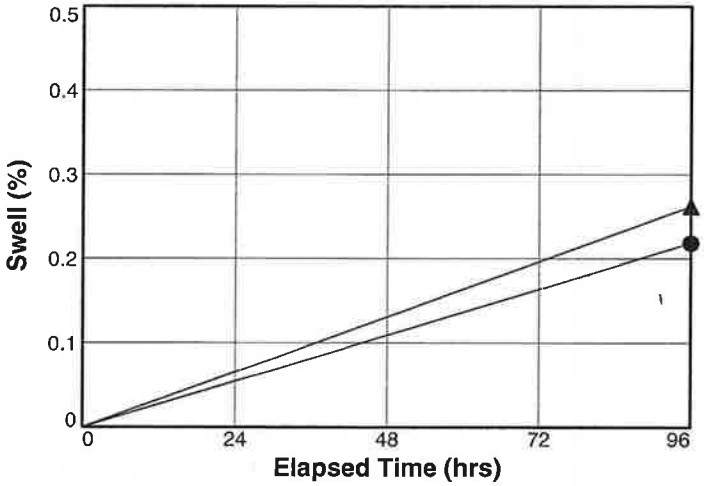
BURNS COOLEY DENNIS, INC.

Figure B32

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	101.3	84.1	11.8	101.0	83.9	17.5	1.3	1.3	0.000	10	0.2
2 △	100.6	83.5	11.8	100.3	83.2	17.5	1.3	1.3	0.000	10	0.3
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay, slightly sandy CL A-4; Material 4	CL	120.5	11.4	22	8

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

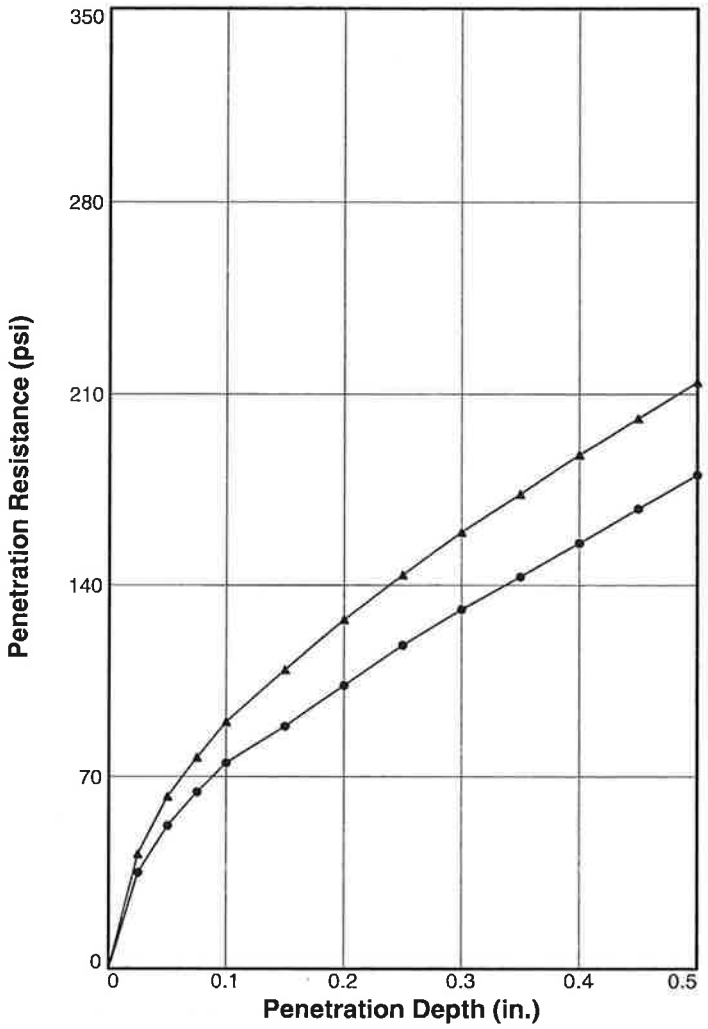
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content

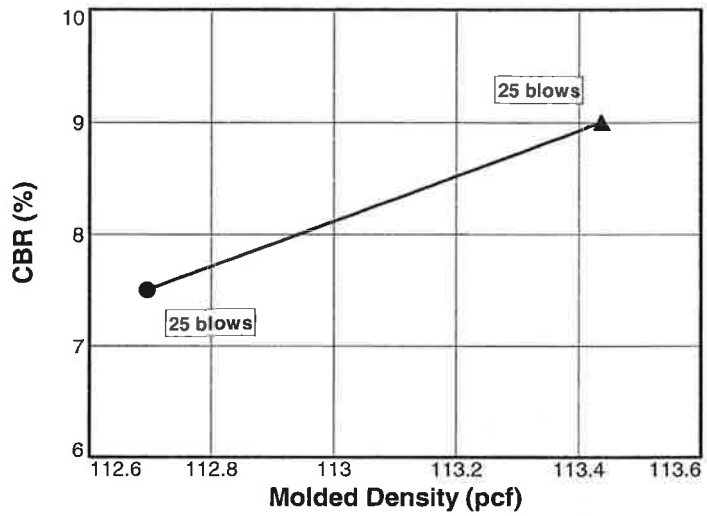
BEARING RATIO TEST REPORT

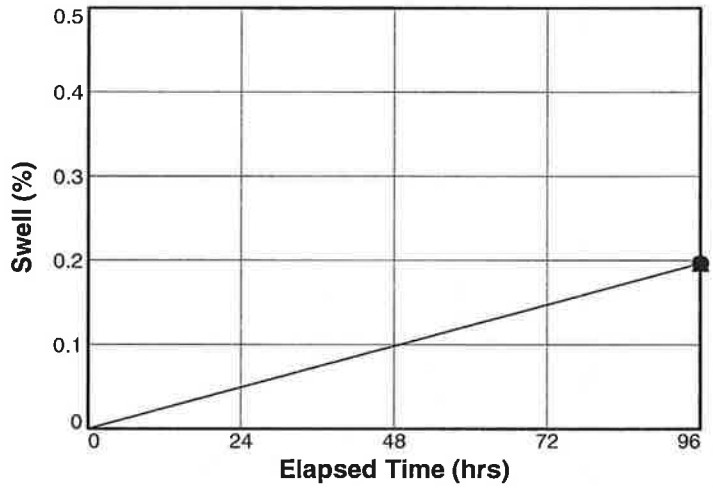
BURNS COOLEY DENNIS, INC.

Figure B33

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	112.7	93.5	11.7	112.5	93.3	13.9	7.5	6.9	0.000	10	0.2
2 △	113.4	94.1	11.7	113.2	94	14.0	9.0	8.5	0.000	10	0.2
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay, slightly sandy CL A-4; Material 4	CL	120.5	11.4	22	8

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

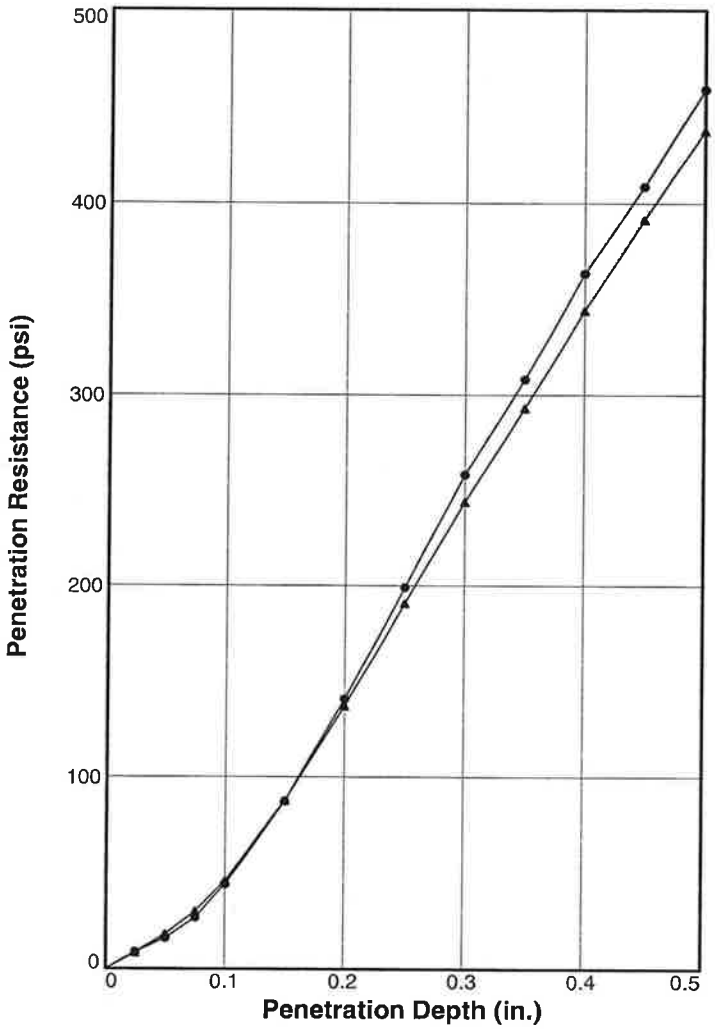
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content

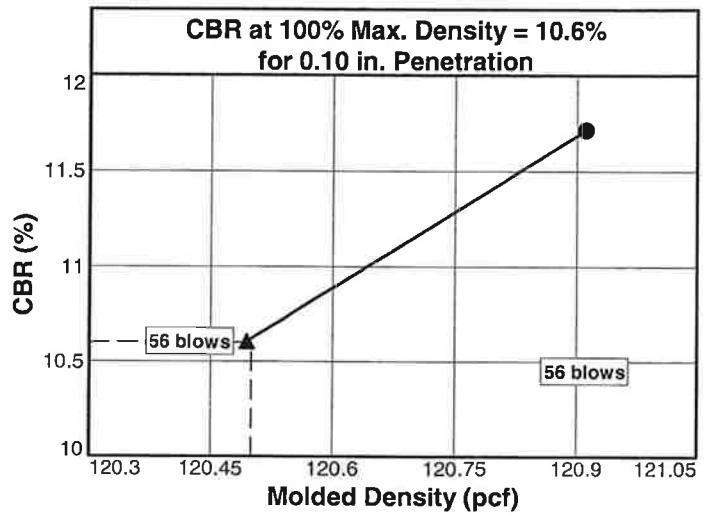
BEARING RATIO TEST REPORT

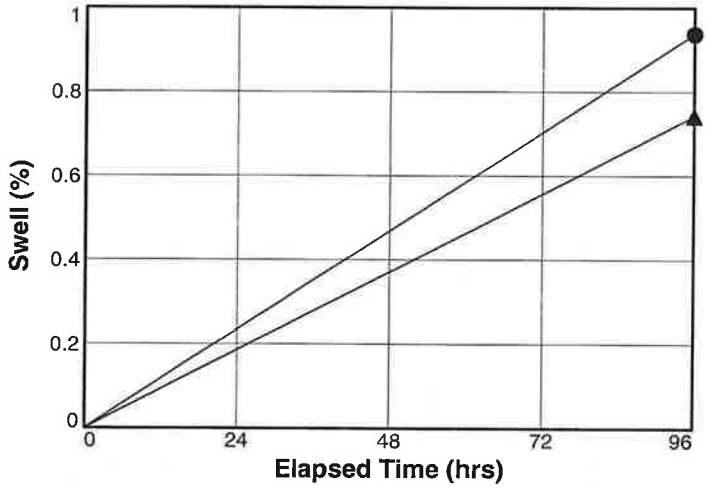
BURNS COOLEY DENNIS, INC.

Figure B34

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	120.9	100.3	12.1	119.8	99.4	12.1	11.7	15.5	0.078	10	0.9
2 △	120.5	100	12.1	119.6	99.3	12.1	10.6	14.0	0.069	10	0.7
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay, slightly sandy CL A-4; Material 4	CL	120.5	11.4	22	8

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

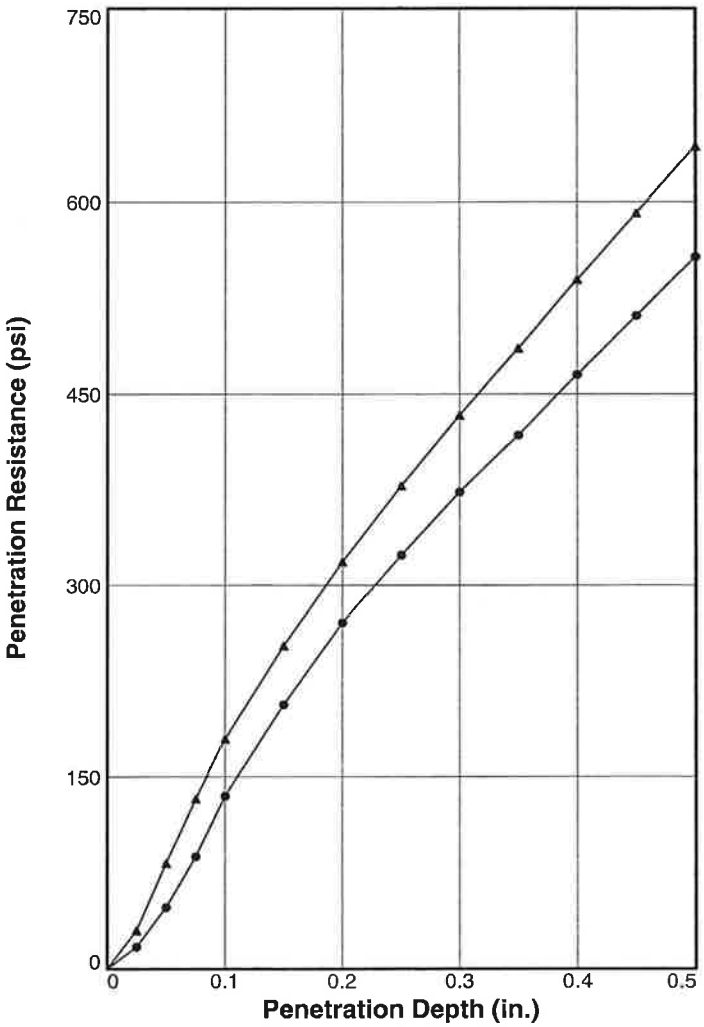
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content

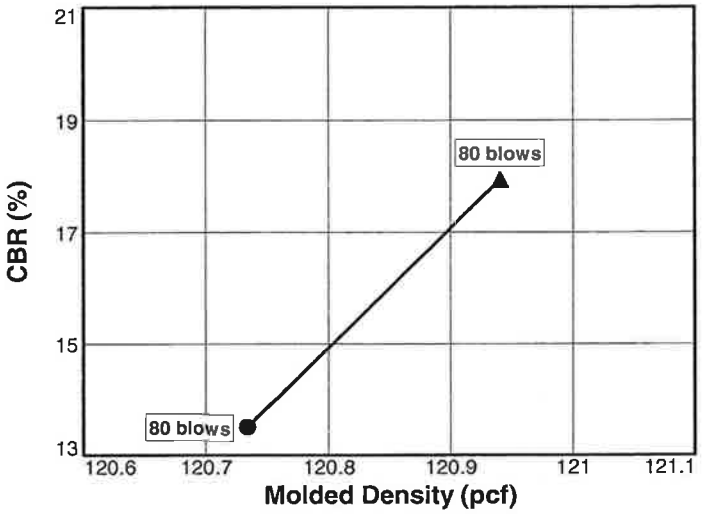
BEARING RATIO TEST REPORT

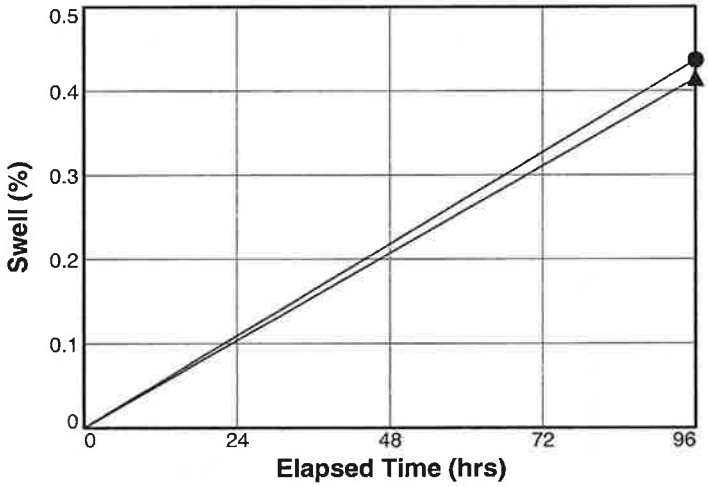
BURNS COOLEY DENNIS, INC.

Figure B35

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	120.7	100.2	11.8	120.2	99.8	12.0	13.5	18.0	0.000	10	0.4
2 △	120.9	100.3	11.7	120.4	100	11.9	17.9	21.2	0.000	10	0.4
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay, slightly sandy CL A-4; Material 4	CL	120.5	11.4	22	8

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

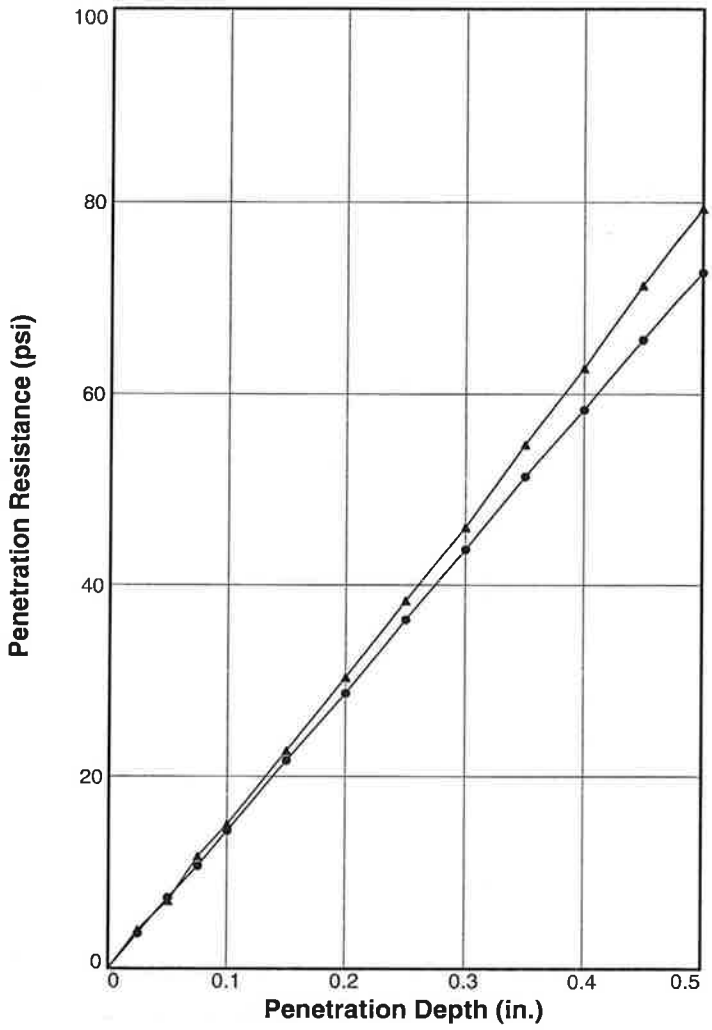
Standard hammer
3 layers - 80 blows/layer
Optimum Moisture Content

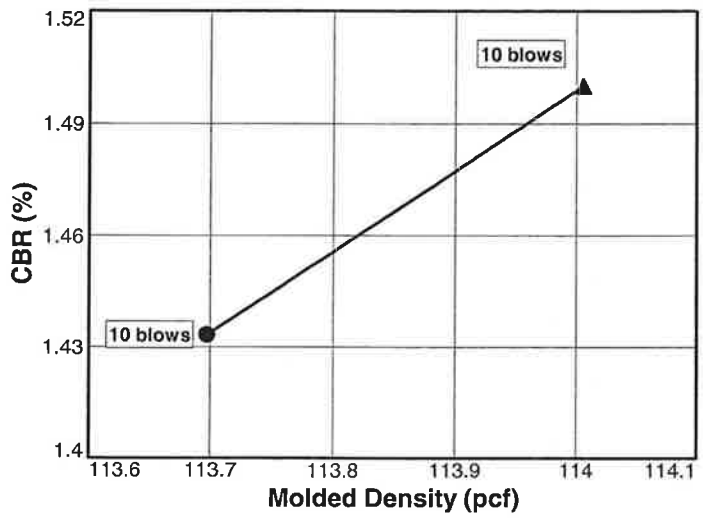
BEARING RATIO TEST REPORT

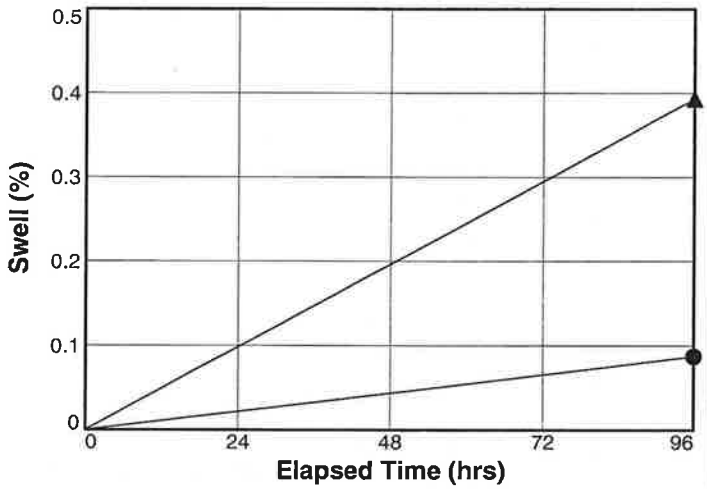
BURNS COOLEY DENNIS, INC.

Figure B36

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	113.7	94.4	14.7	113.6	94.3	14.8	1.4	1.9	0.000	10	0.1
2 △	114.0	94.6	14.8	113.6	94.2	14.7	1.5	2.0	0.000	10	0.4
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay, slightly sandy CL A-4; Material 4	CL	120.5	11.4	22	8

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

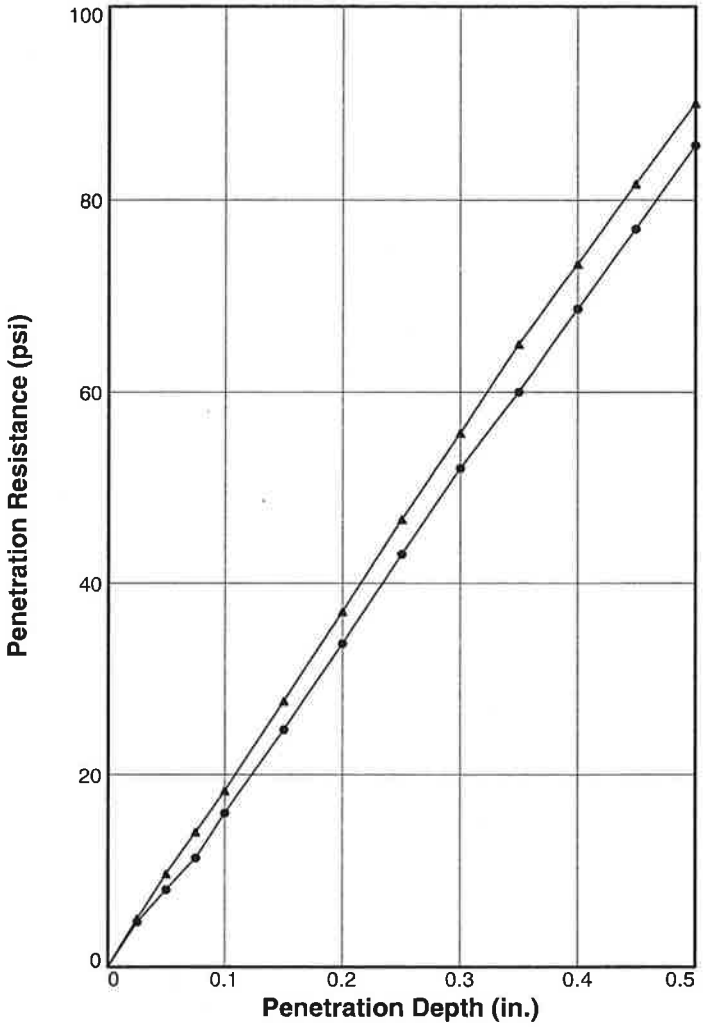
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content + 3%

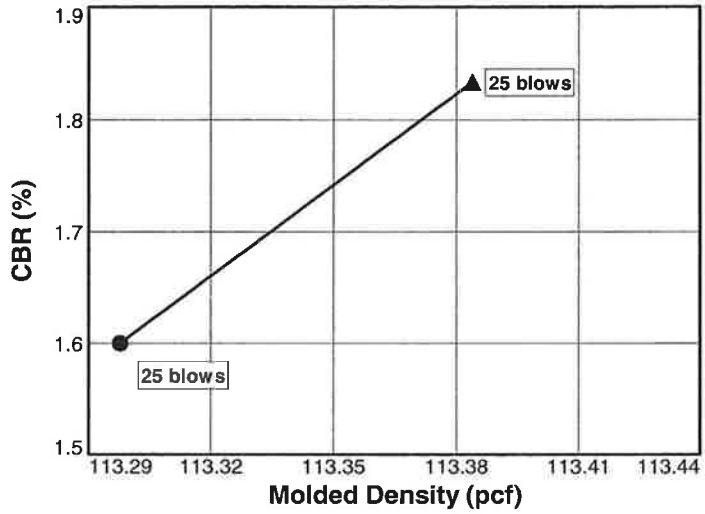
BEARING RATIO TEST REPORT

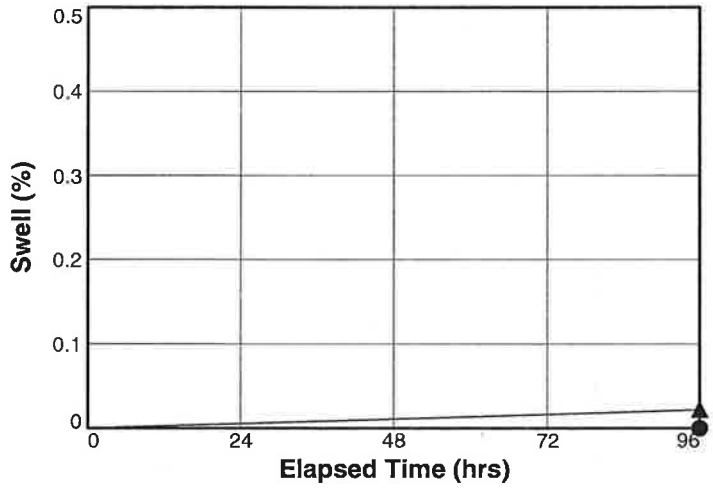
BURNS COOLEY DENNIS, INC.

Figure B37

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	113.3	94	15.0	113.3	94	15.0	1.6	2.2	0.000	10	0
2 △	113.4	94.1	14.9	113.4	94.1	15.0	1.8	2.5	0.000	10	0
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay, slightly sandy CL A-4; Material 4	CL	120.5	11.4	22	8

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

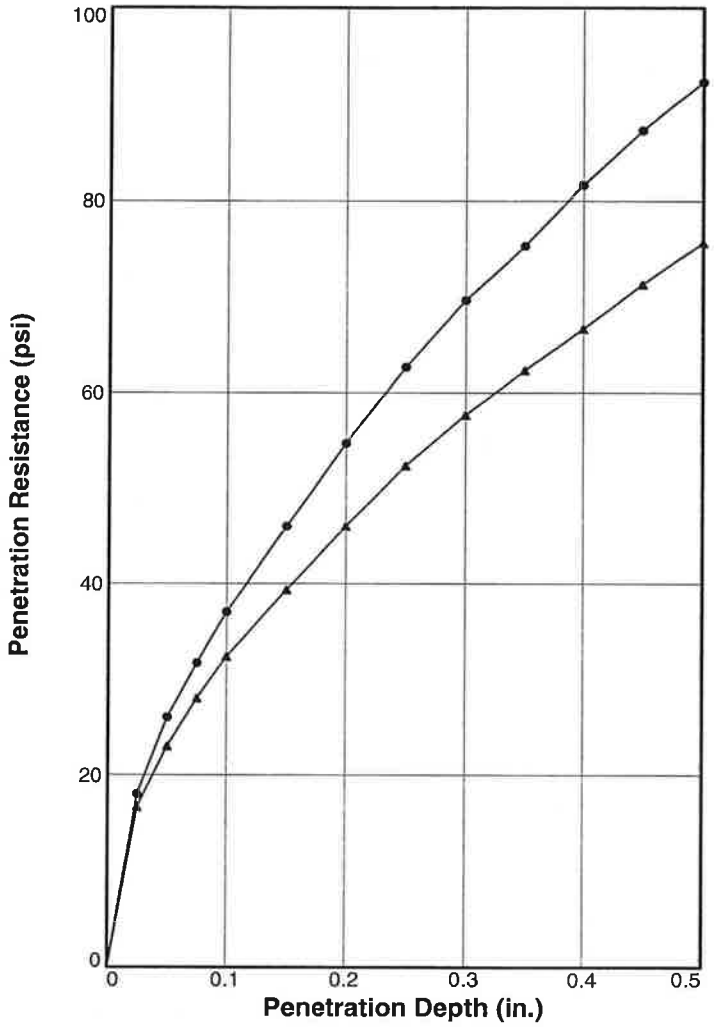
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content + 3%

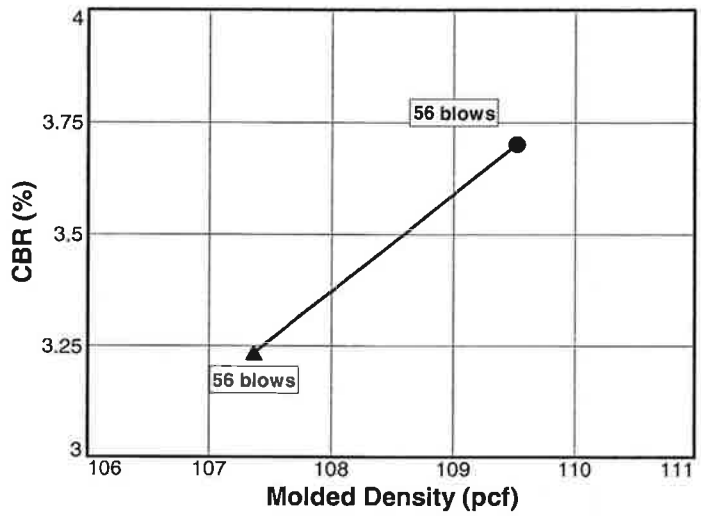
BEARING RATIO TEST REPORT

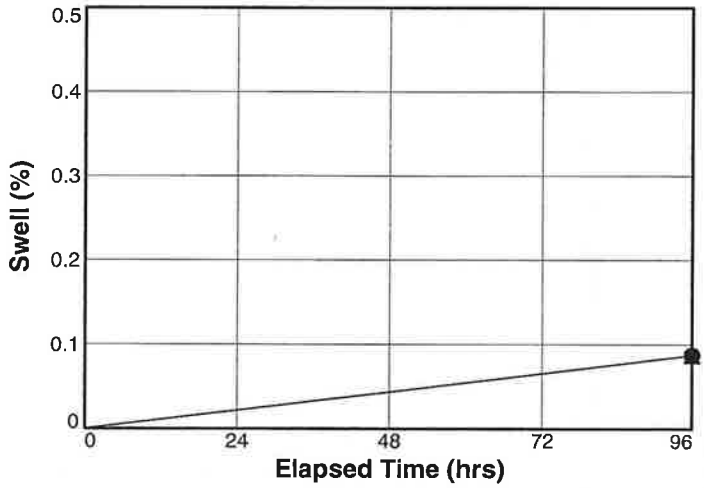
BURNS COOLEY DENNIS, INC.

Figure B38

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	109.5	90.9	14.9	109.4	90.8	15.3	3.7	3.6	0.000	10	0.1
2 △	107.4	89.1	14.9	107.3	89	15.6	3.2	3.1	0.000	10	0.1
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan silty clay, slightly sandy CL A-4; Material 4	CL	120.5	11.4	22	8

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

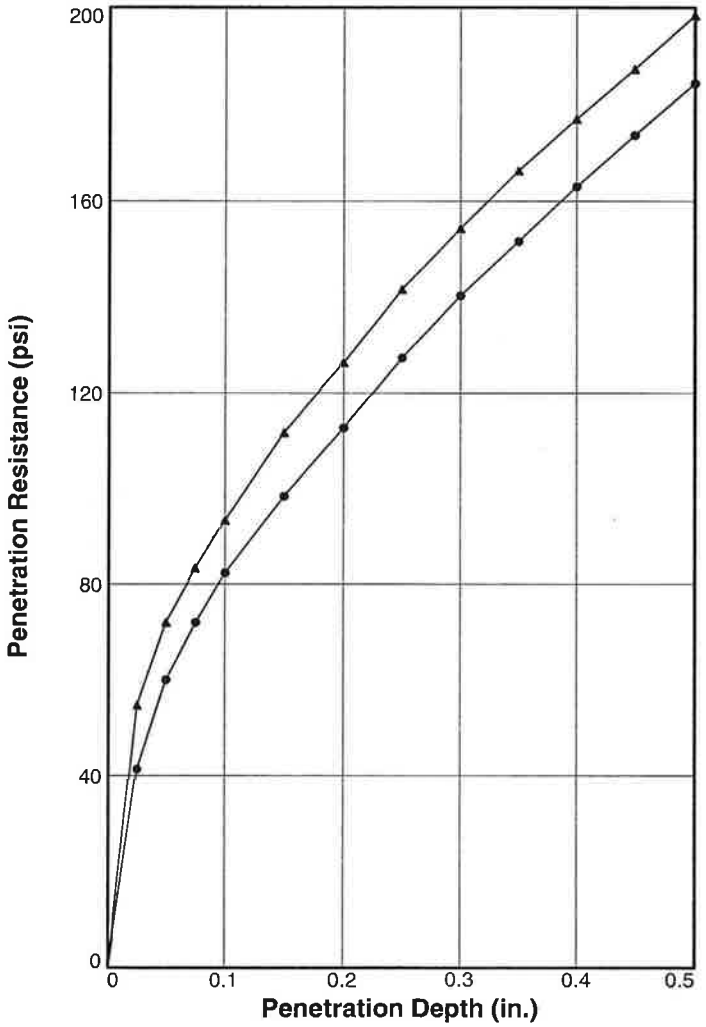
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content + 3%

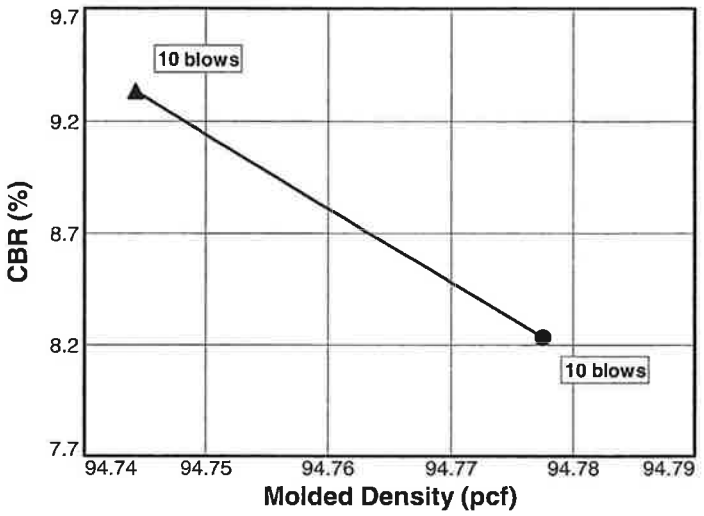
BEARING RATIO TEST REPORT

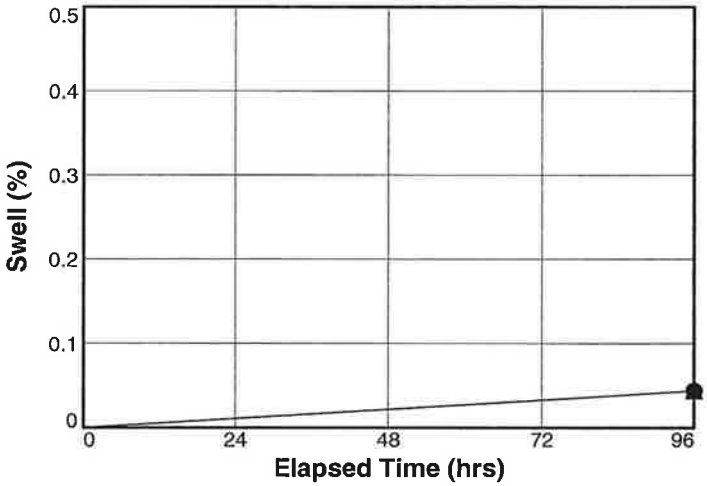
BURNS COOLEY DENNIS, INC.

Figure B39

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	94.8	81.3	12.7	94.7	81.2	23.7	8.2	7.5	0.000	10	0
2 △	94.7	81.2	13.2	94.7	81.2	23.2	9.3	8.4	0.000	10	0
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-4; Material 4	CL	116.6	12.9	--	--

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

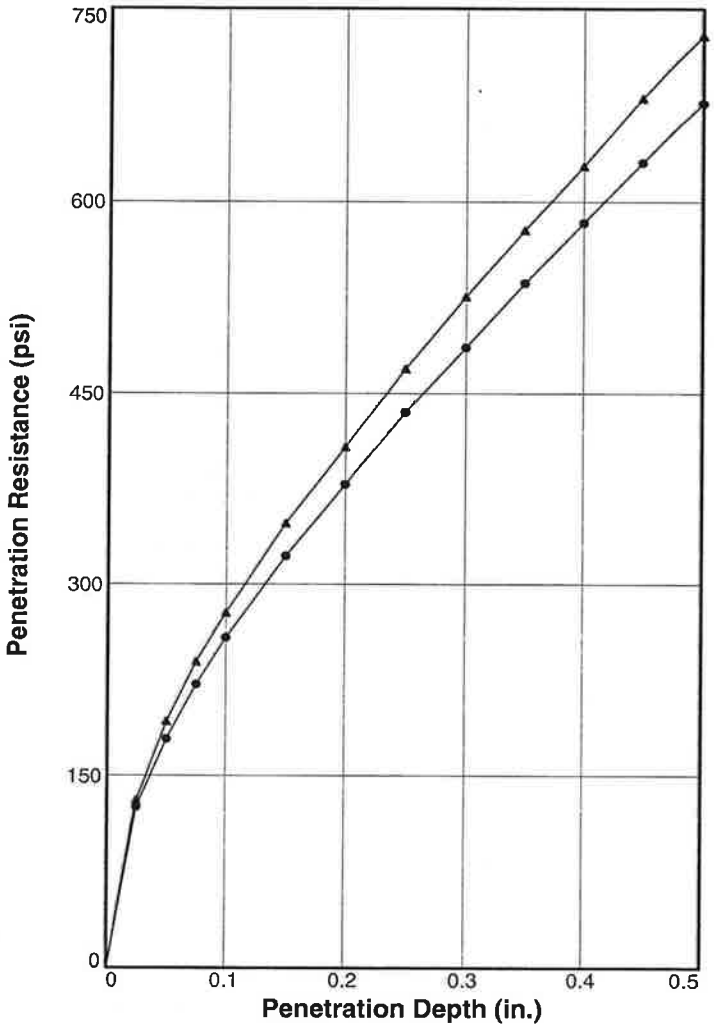
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content

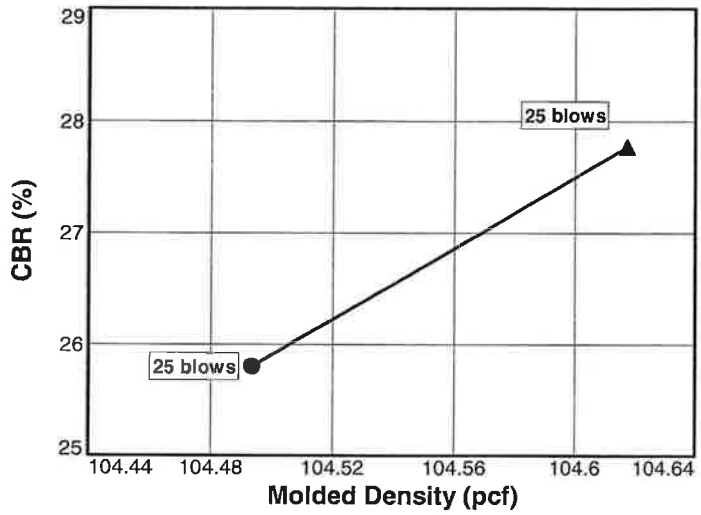
BEARING RATIO TEST REPORT

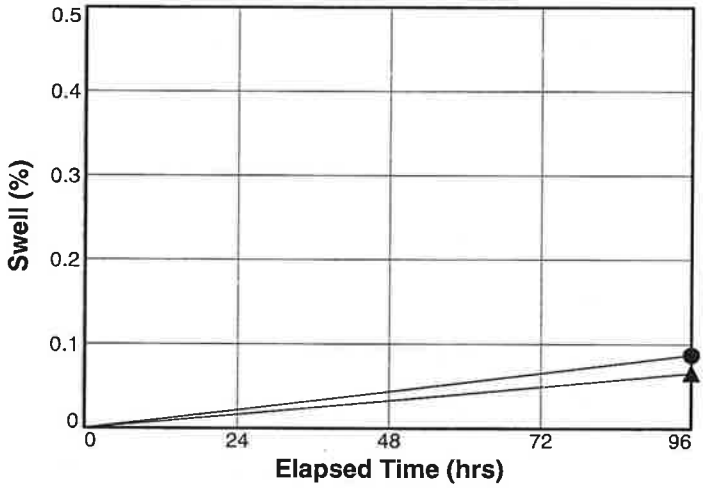
BURNS COOLEY DENNIS, INC.

Figure B40

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	104.5	89.6	13.1	104.4	89.5	17.7	25.8	25.2	0.000	10	0.1
2 △	104.6	89.7	13.3	104.5	89.7	18.4	27.8	27.2	0.000	10	0.1
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-4; Material 4	CL	116.6	12.9	--	--

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

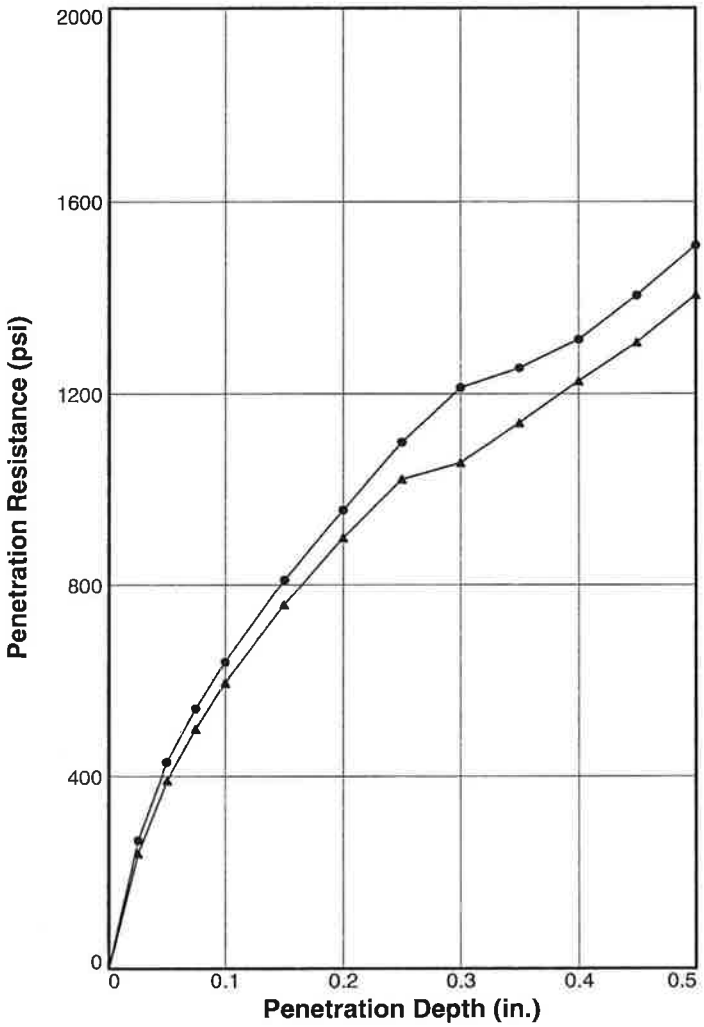
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content

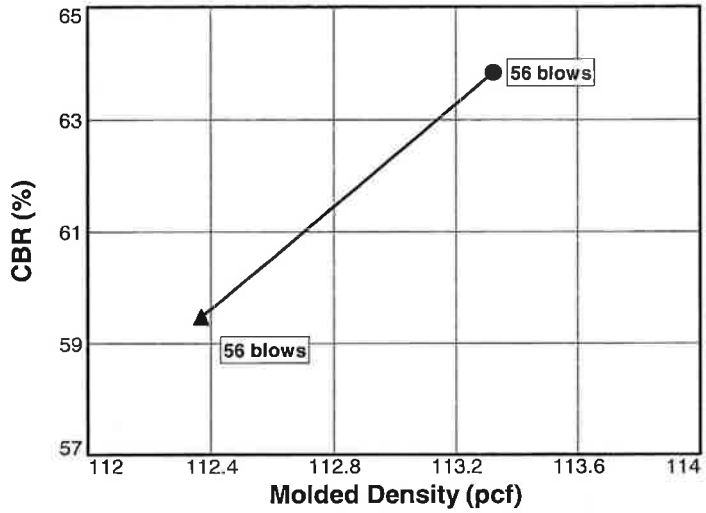
BEARING RATIO TEST REPORT

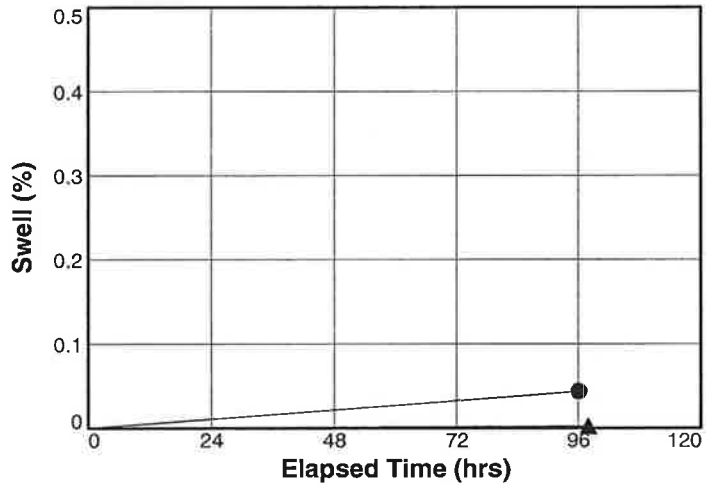
BURNS COOLEY DENNIS, INC.

Figure B41

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	113.3	97.2	13.6	113.3	97.1	14.4	63.8	63.8	0.000	10	0
2 △	112.4	96.4	13.6	112.4	96.4	14.1	59.5	59.9	0.000	10	0
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-4; Material 4	CL	116.6	12.9	--	--

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

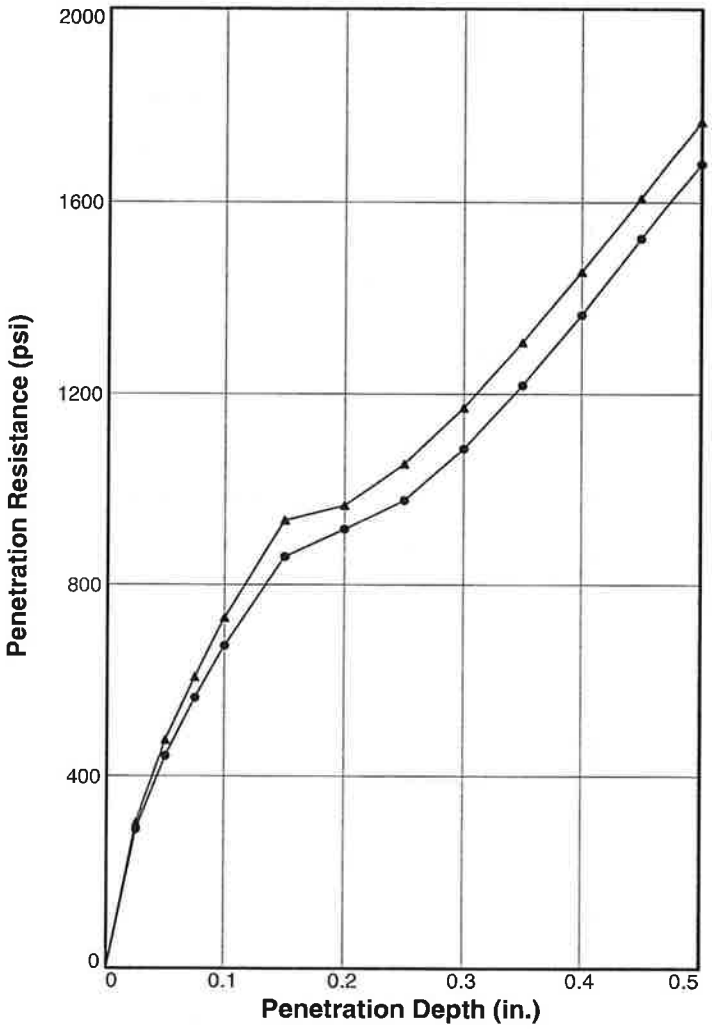
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content

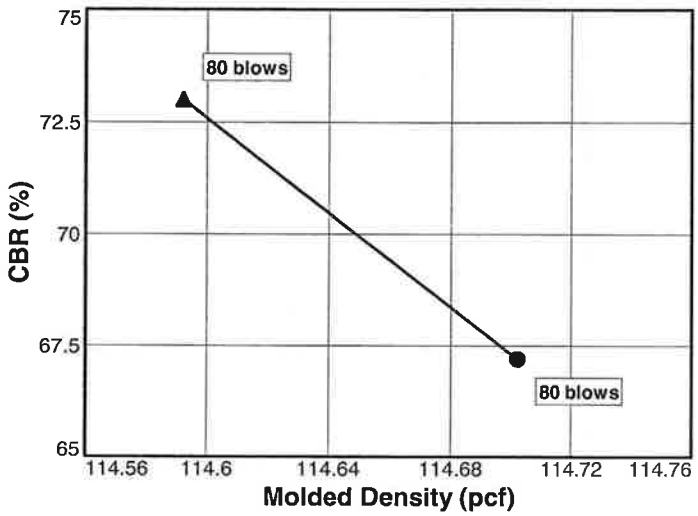
BEARING RATIO TEST REPORT

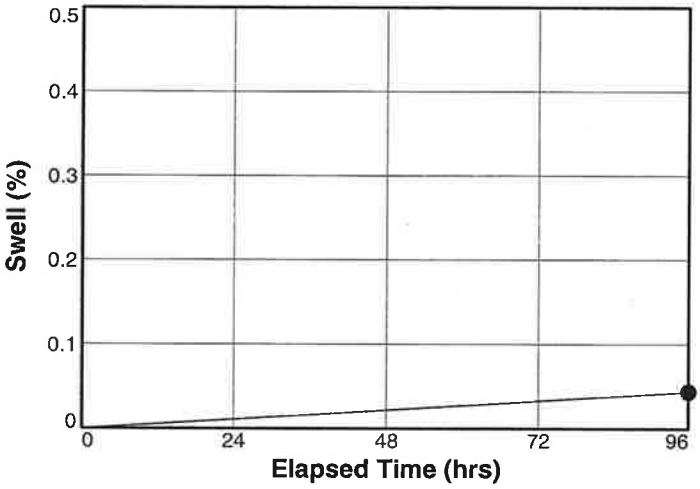
BURNS COOLEY DENNIS, INC.

Figure B42

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	114.7	98.4	12.6	114.7	98.3	14.0	67.2	61.1	0.000	10	0
2 △	114.6	98.3	12.3	114.6	98.3	14.2	73.0	64.4	0.000	10	
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-4; Material 4	CL	116.6	12.9	--	--

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

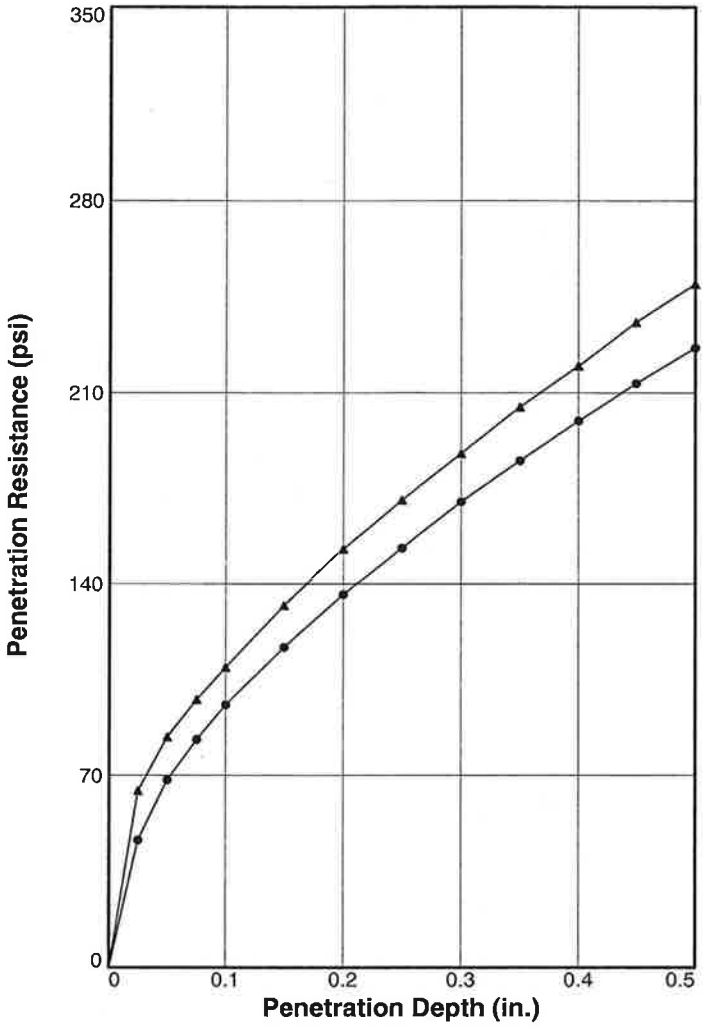
Standard hammer
3 layers - 80 blows/layer
Optimum Moisture Content

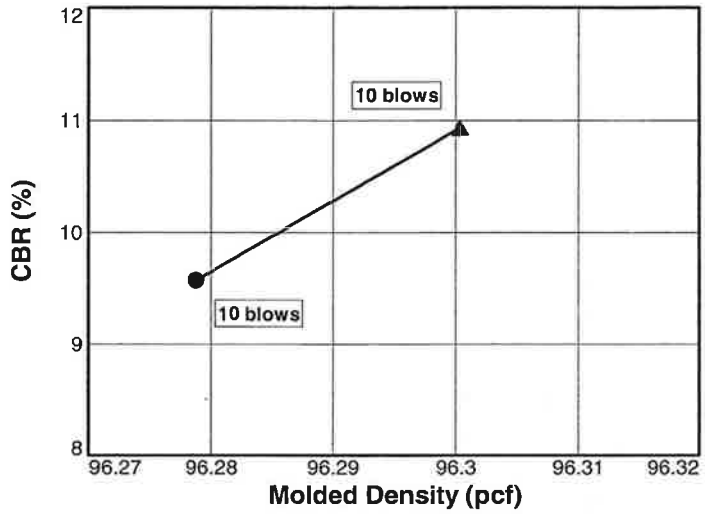
BEARING RATIO TEST REPORT

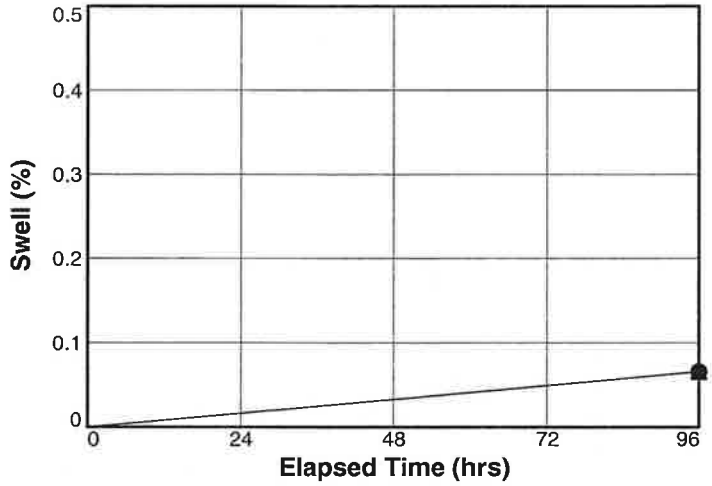
BURNS COOLEY DENNIS, INC.

Figure B43

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	96.3	82.6	15.3	96.2	82.5	21.7	9.6	9.1	0.000	10	0.1
2 △	96.3	82.6	15.8	96.2	82.5	20.3	10.9	10.2	0.000	10	0.1
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-4; Material 4	CL	116.6	12.9	--	--

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

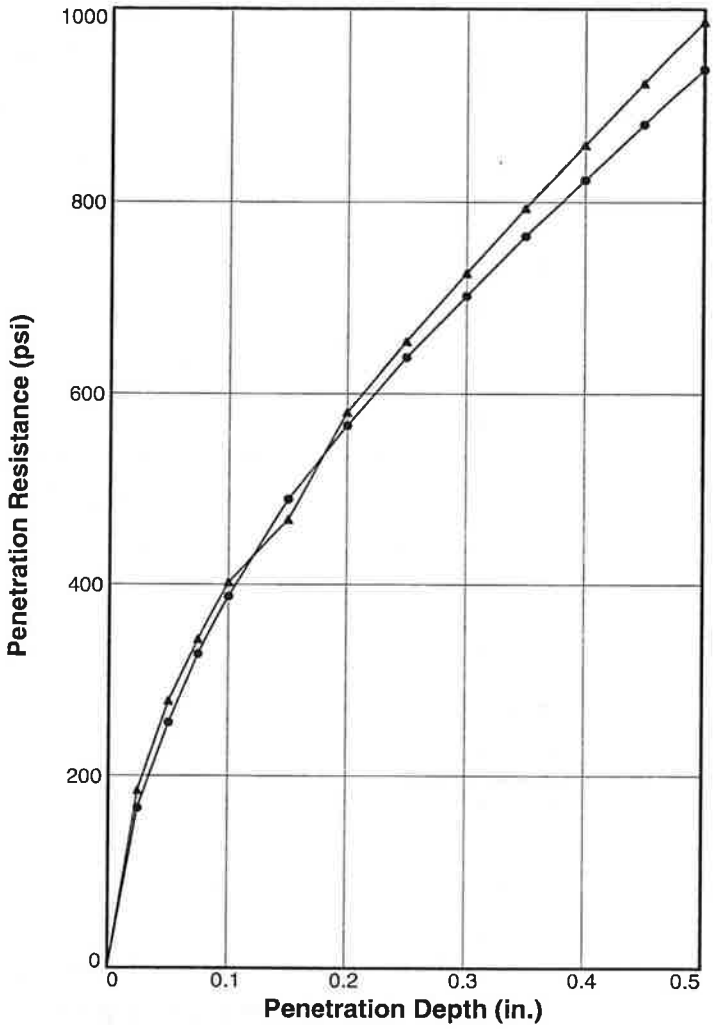
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content + 3%

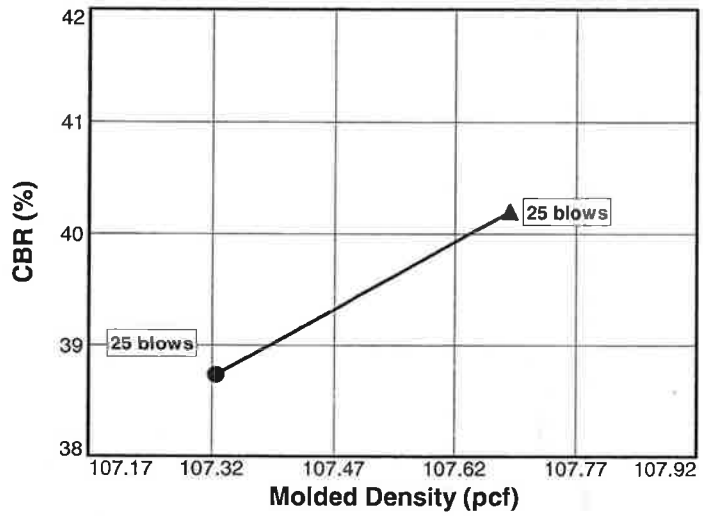
BEARING RATIO TEST REPORT

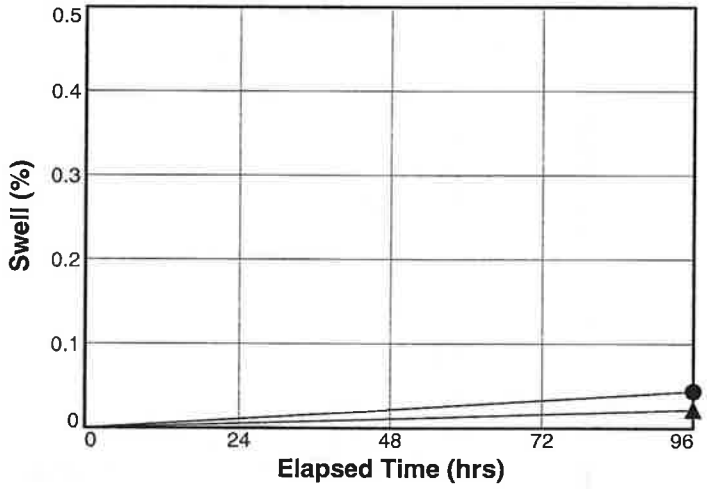
BURNS COOLEY DENNIS, INC.

Figure B44

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	107.3	92	16.0	107.3	92	16.7	38.7	37.8	0.000	10	0
2 △	107.7	92.4	15.9	107.7	92.3	16.5	40.2	38.7	0.000	10	0
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-4; Material 4	CL	116.6	12.9	--	--

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

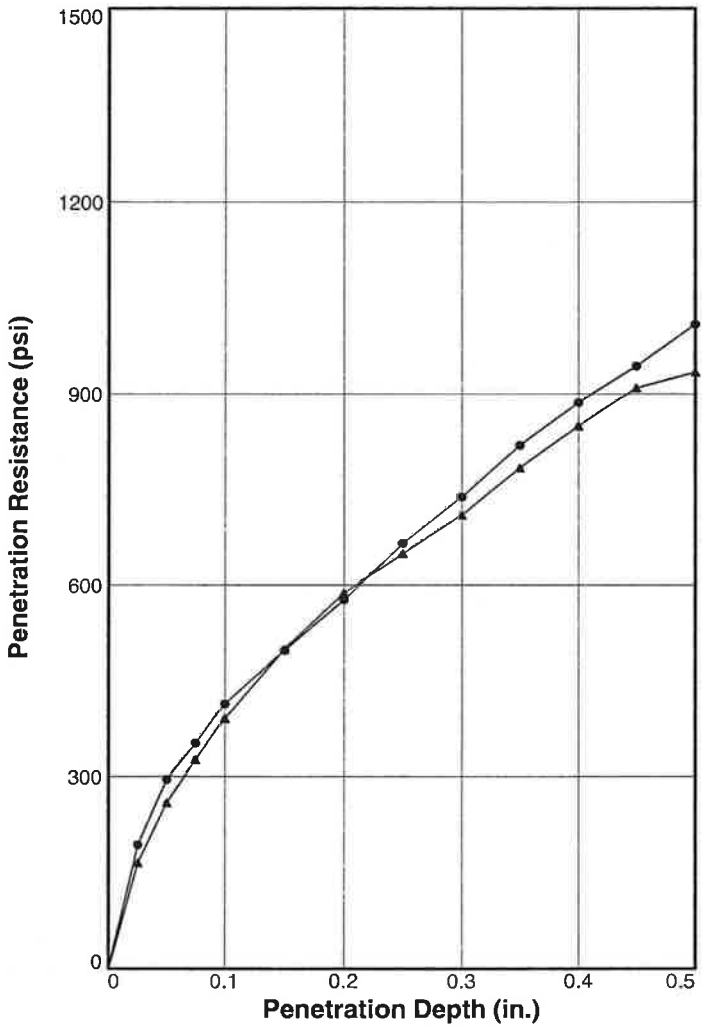
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content + 3%

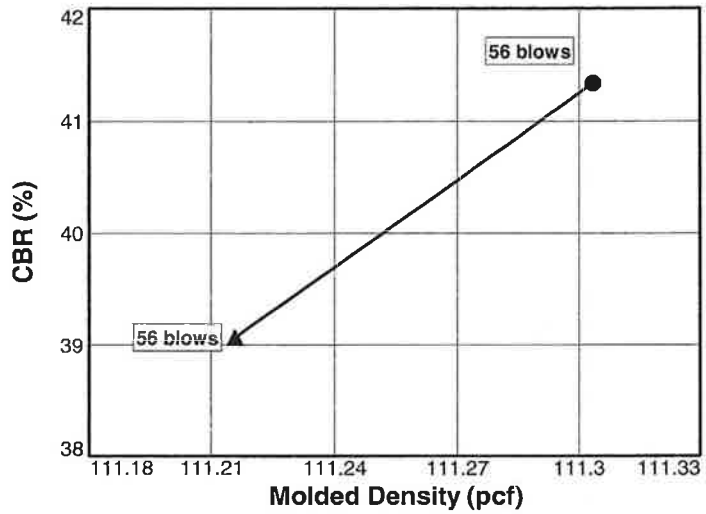
BEARING RATIO TEST REPORT

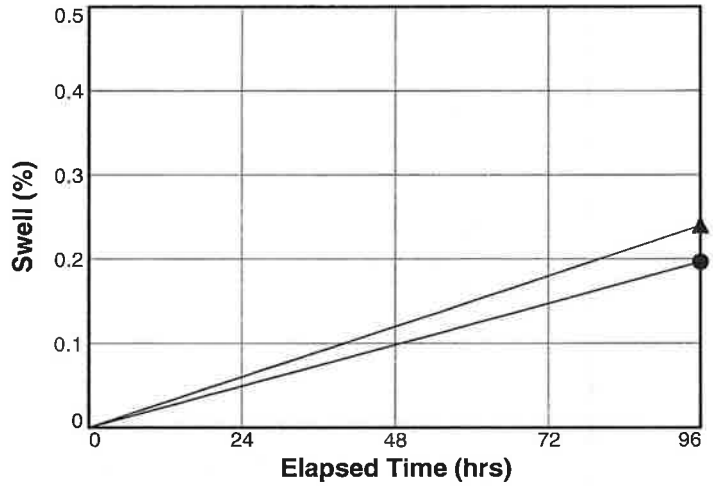
BURNS COOLEY DENNIS, INC.

Figure B45

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	111.3	95.5	15.6	111.1	95.3	15.1	41.3	38.4	0.000	10	0.2
2 △	111.2	95.4	15.6	110.9	95.2	15.6	39.1	39.2	0.000	10	0.2
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Lime Treated - 5% CL A-4; Material 4	CL	116.6	12.9	--	--

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

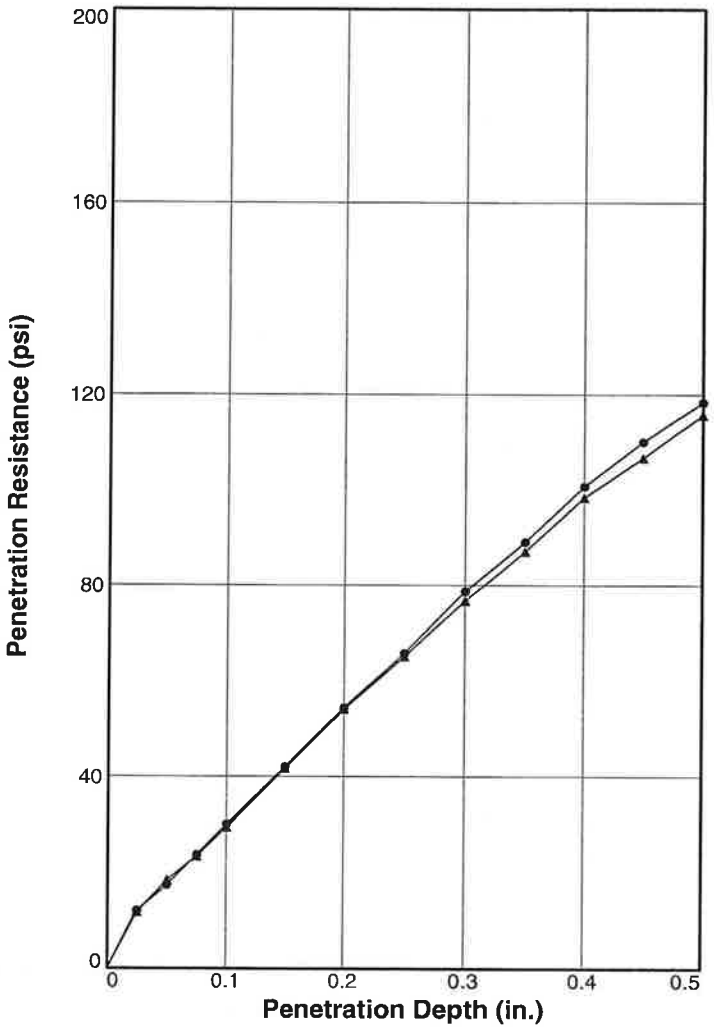
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content + 3%

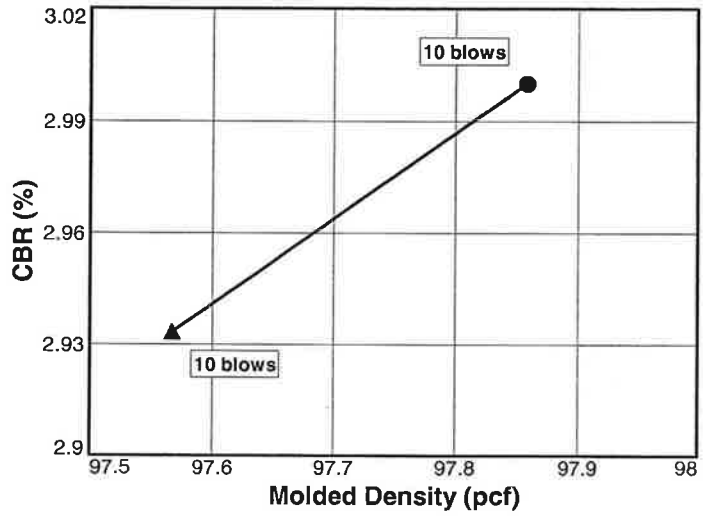
BEARING RATIO TEST REPORT

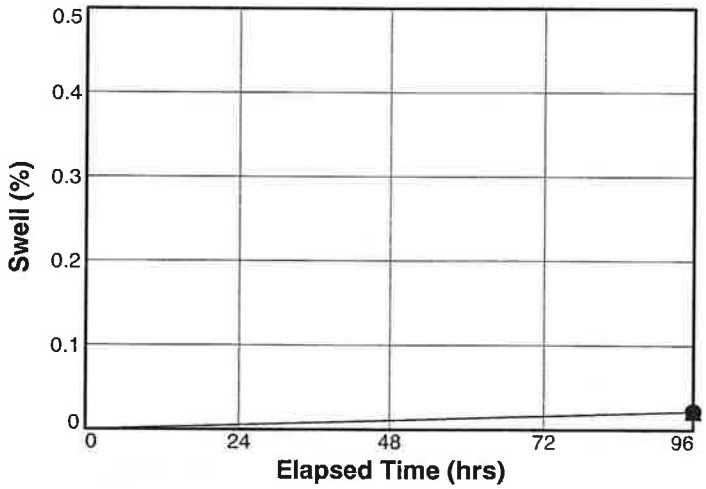
BURNS COOLEY DENNIS, INC.

Figure B46

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	97.9	92.4	13.9	97.8	92.4	19.2	3.0	3.6	0.000	10	0
2 △	97.6	92.2	13.9	97.5	92.1	19.2	2.9	3.6	0.000	10	0
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 5	SM	105.9	14.1	NP	NP

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

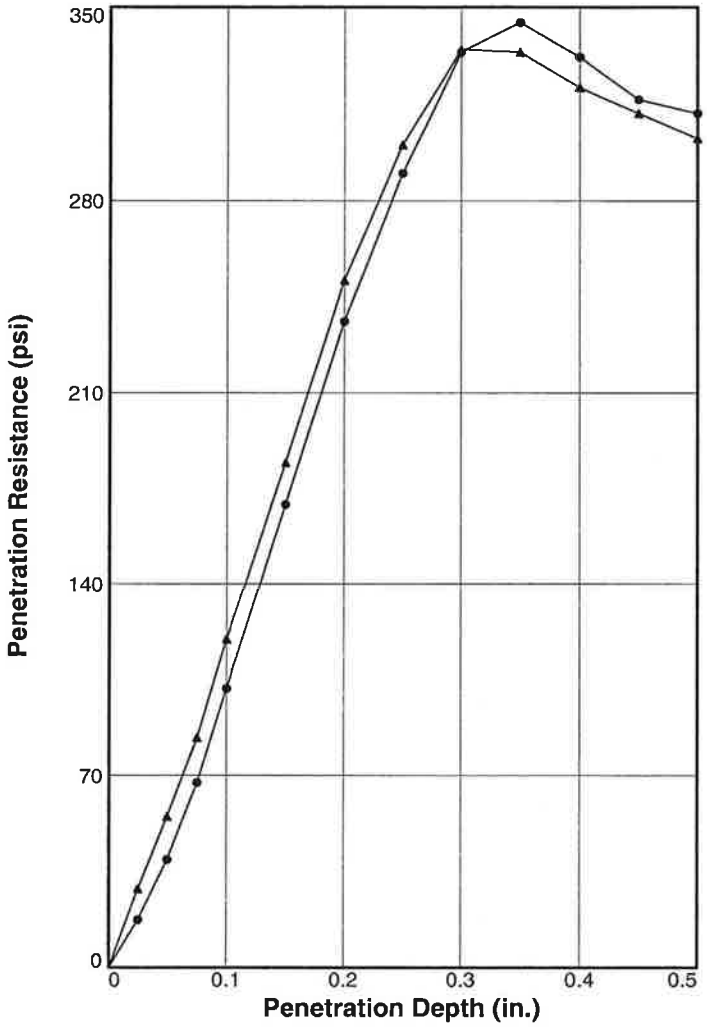
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content

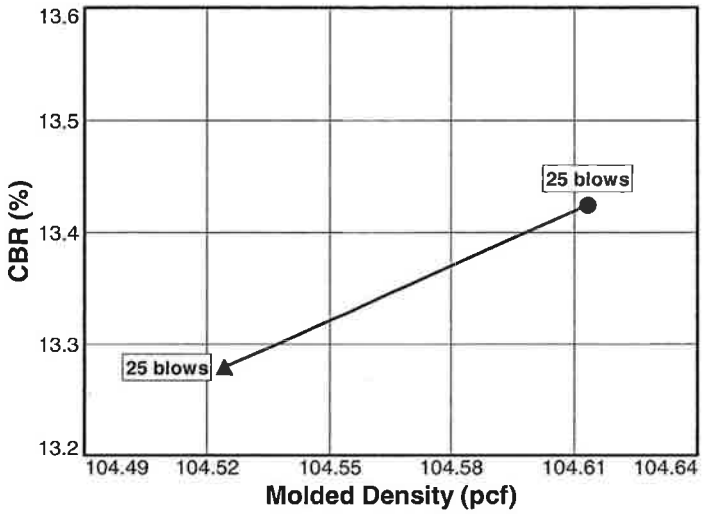
BEARING RATIO TEST REPORT

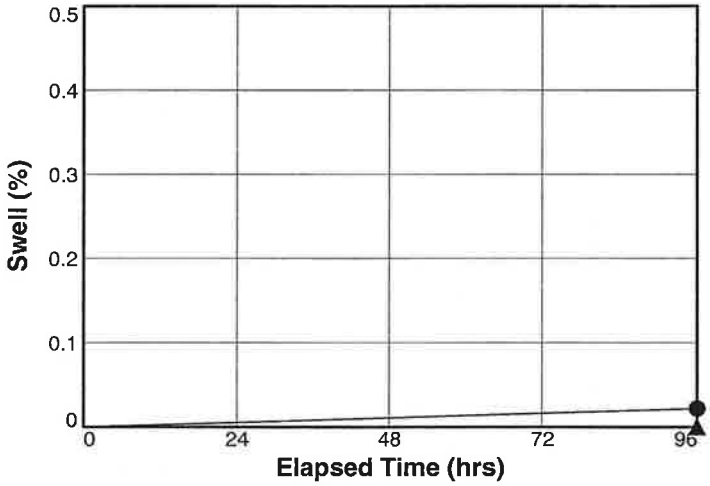
BURNS COOLEY DENNIS, INC.

Figure B47

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	104.6	98.8	13.8	104.6	98.8	16.1	13.4	17.5	0.024	10	0
2 △	104.5	98.7	14.1	104.5	98.7	15.7	13.3	17.4	0.010	10	0
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 5	SM	105.9	14.1	NP	NP

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

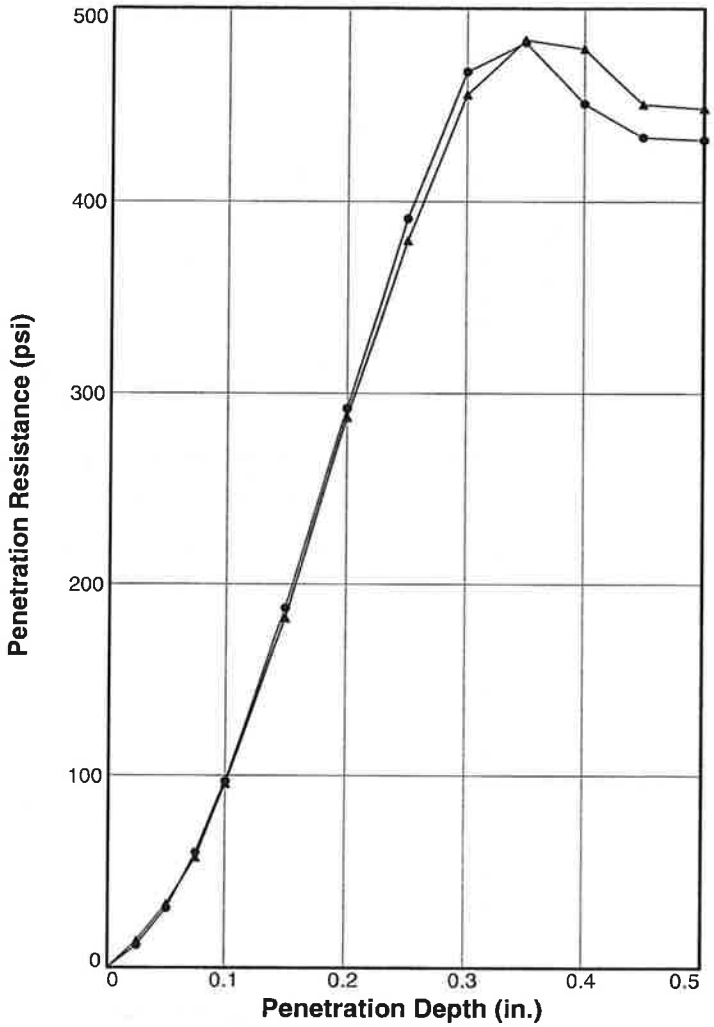
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content

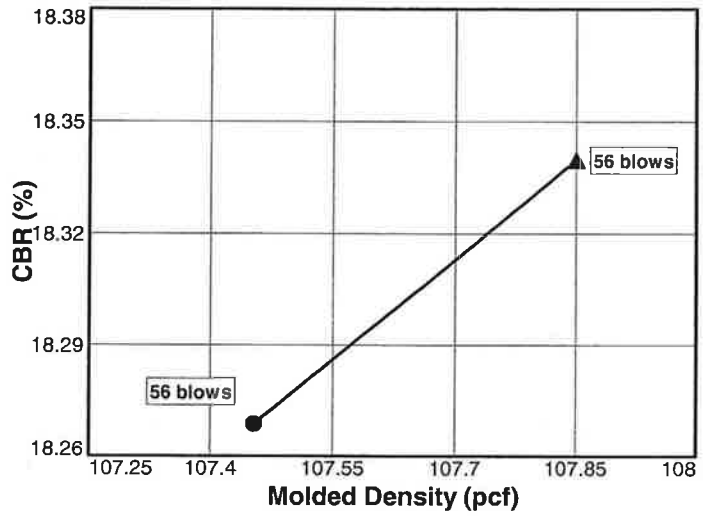
BEARING RATIO TEST REPORT

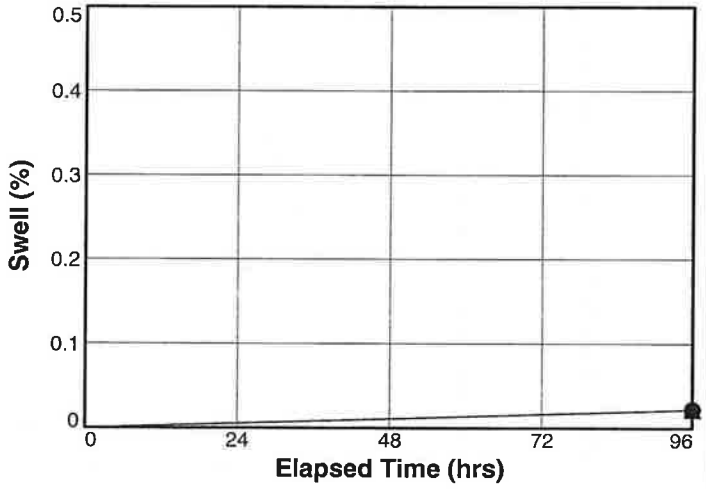
BURNS COOLEY DENNIS, INC.

Figure B48

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	107.5	101.5	14.0	107.4	101.4	15.1	18.3	25.7	0.047	10	0
2 △	107.8	101.8	14.0	107.8	101.8	14.2	18.3	25.4	0.051	10	0
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 5	SM	105.9	14.1	NP	NP

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

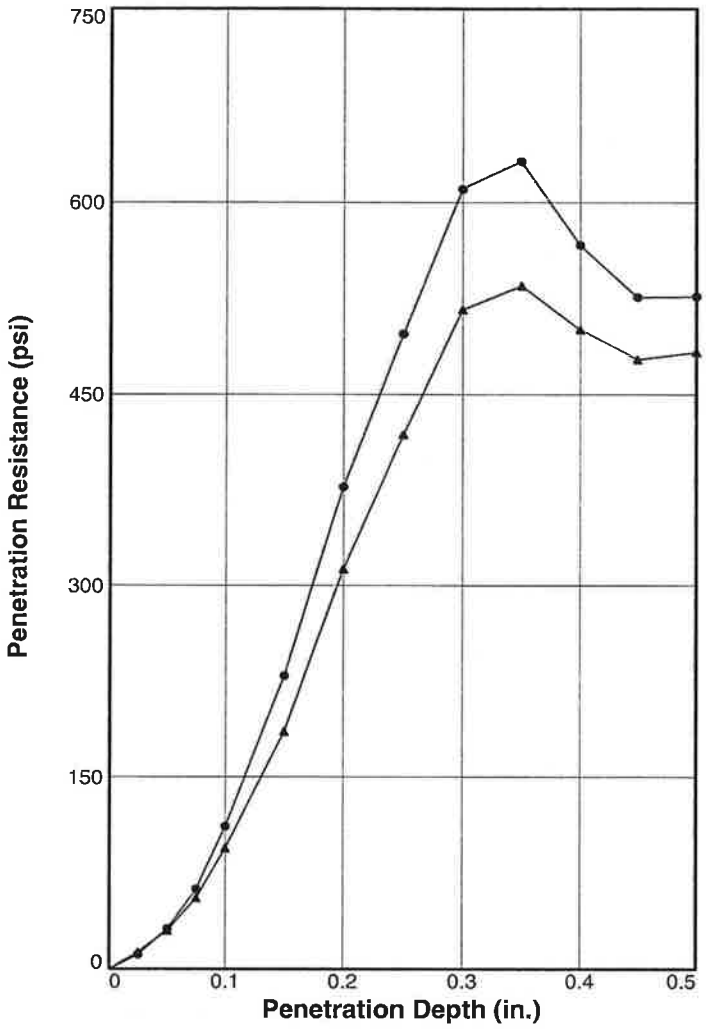
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content

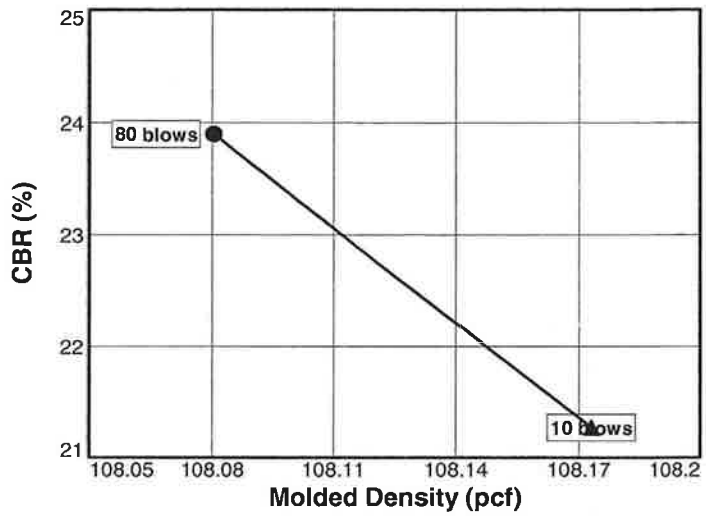
BEARING RATIO TEST REPORT

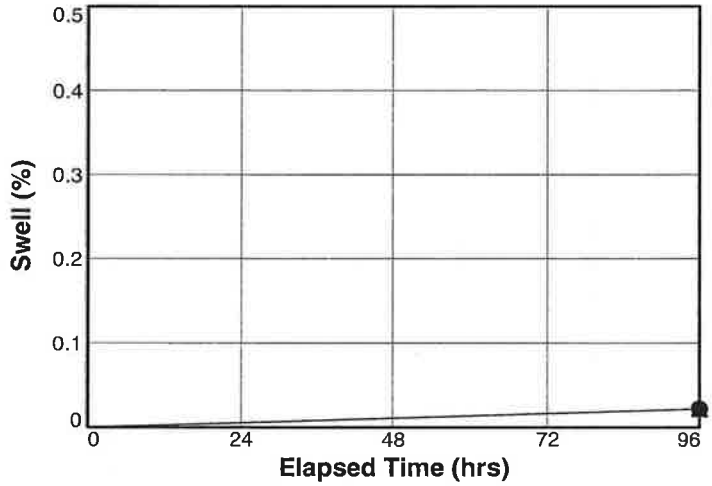
BURNS COOLEY DENNIS, INC.

Figure B49

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	108.1	102.1	14.0	108.1	102	14.6	23.9	33.7	0.053	10	0
2 △	108.2	102.2	14.1	108.1	102.1	14.5	21.3	29.3	0.061	10	0
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 5	SM	105.9	14.1	NP	NP

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

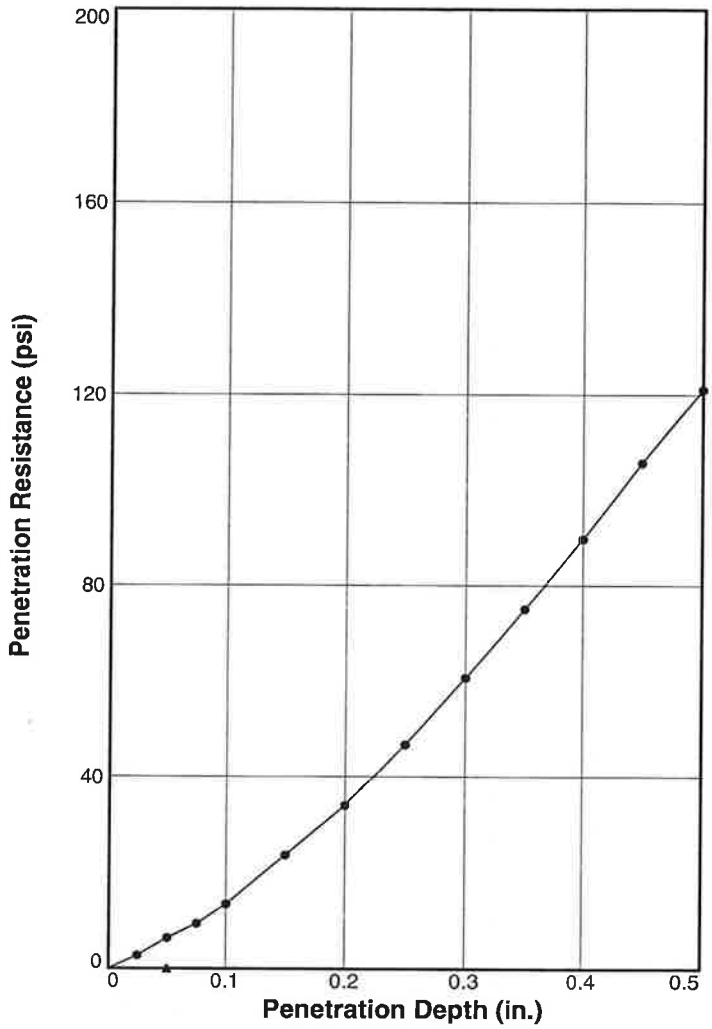
Standard hammer
3 layers - 80 blows/layer
Optimum Moisture Content

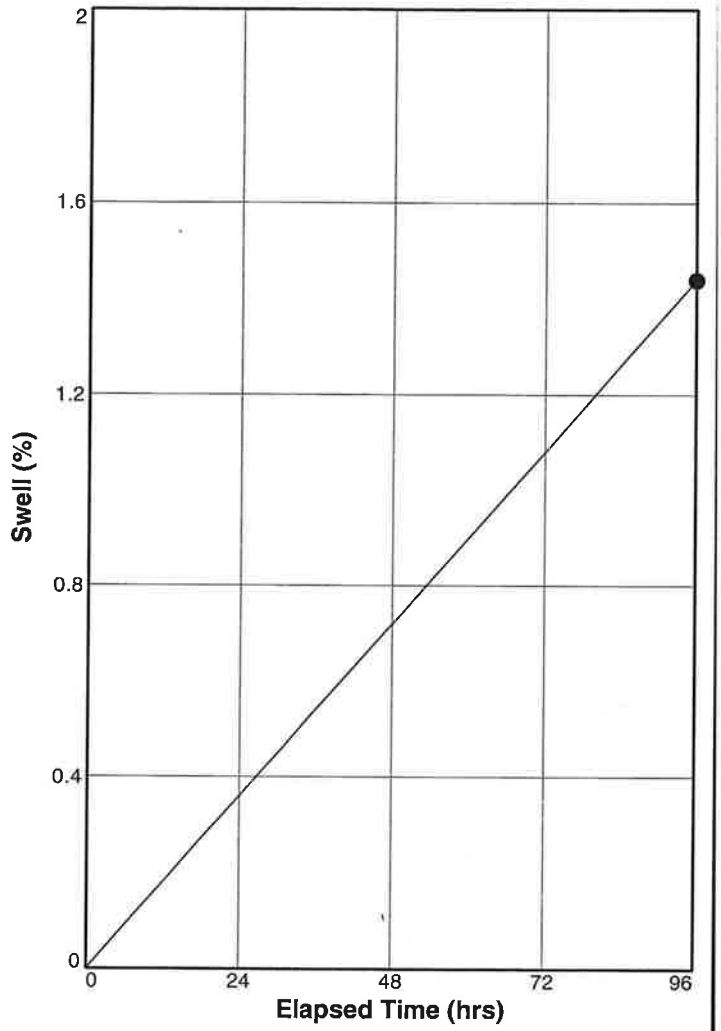
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B50

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	98.7	93.2	17.3	97.3	91.9	17.7	3.6	4.2	0.109	10	1.4
2 ▲											
3 ■											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 5	SM	105.9	14.1	NP	NP

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

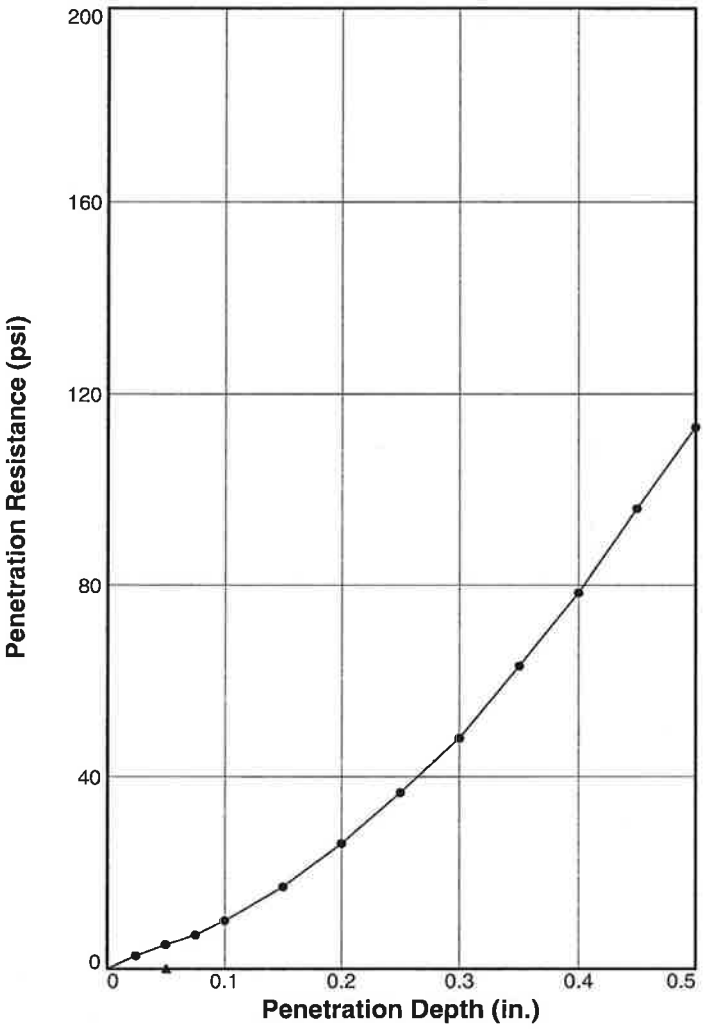
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content + 3%

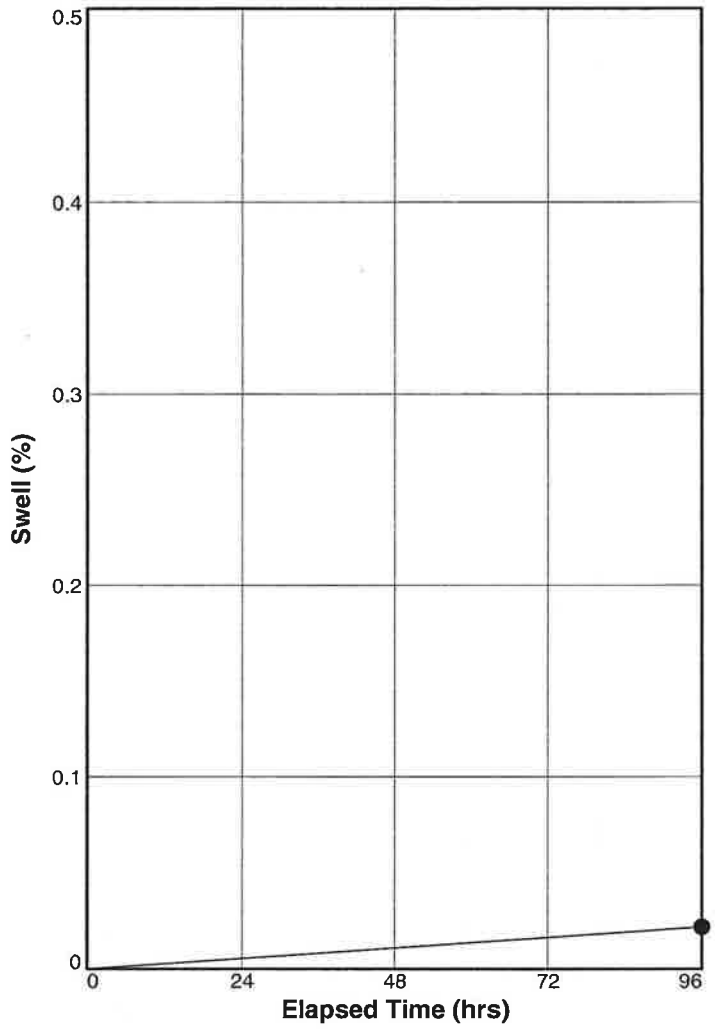
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B51

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	99.9	94.3	17.0	99.9	94.3	17.6	4.1	4.6	0.169	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 5	SM	105.9	14.1	NP	NP

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

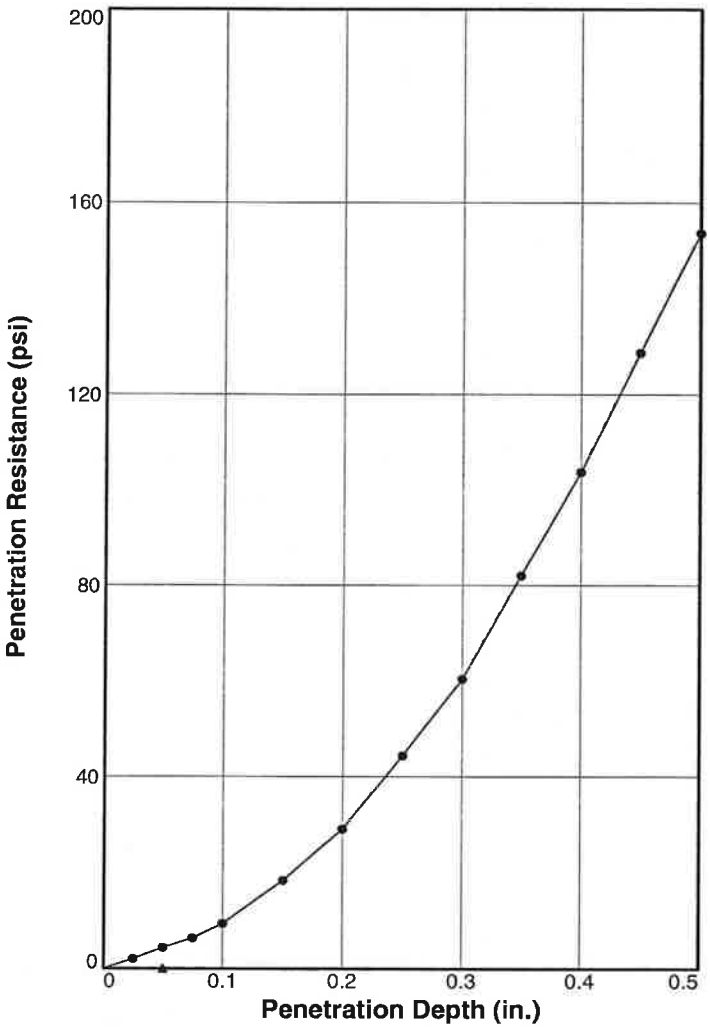
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content + 3%

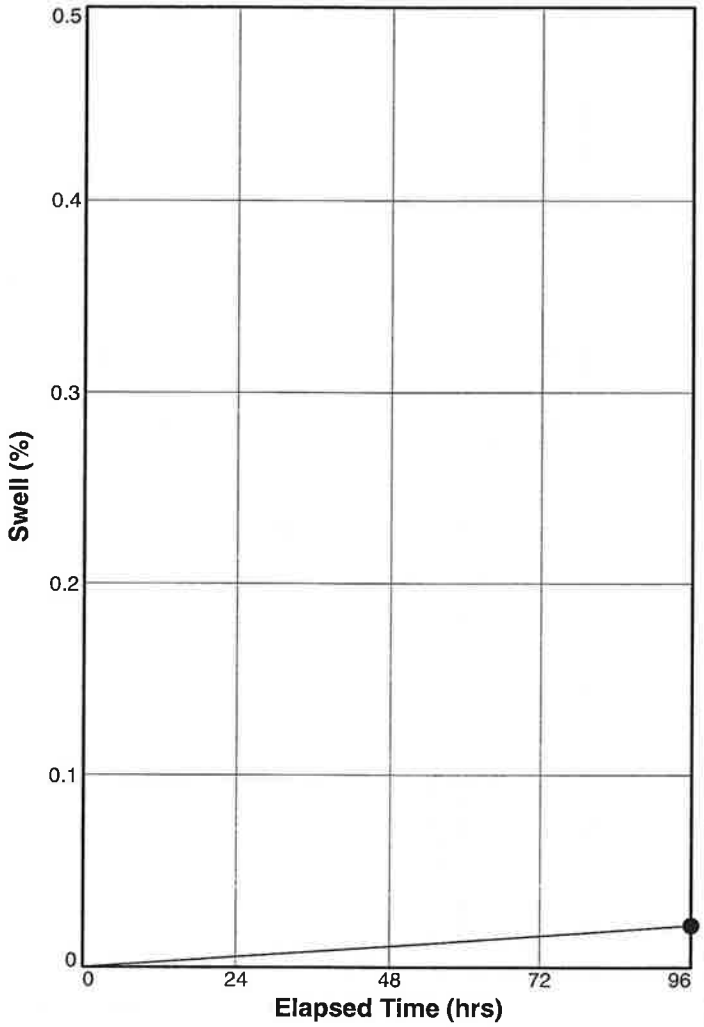
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B52

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	101.8	96.1	17.1	101.8	96.1	16.8	5.9	6.8	0.197	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 5	SM	105.9	14.1	NP	NP

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

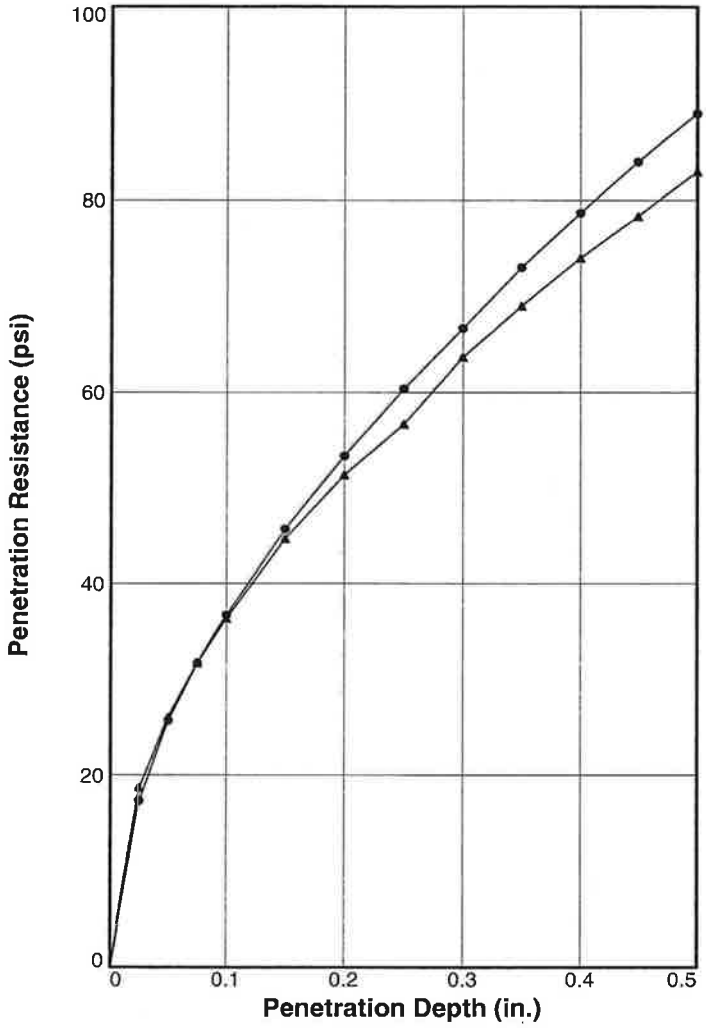
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content + 3%

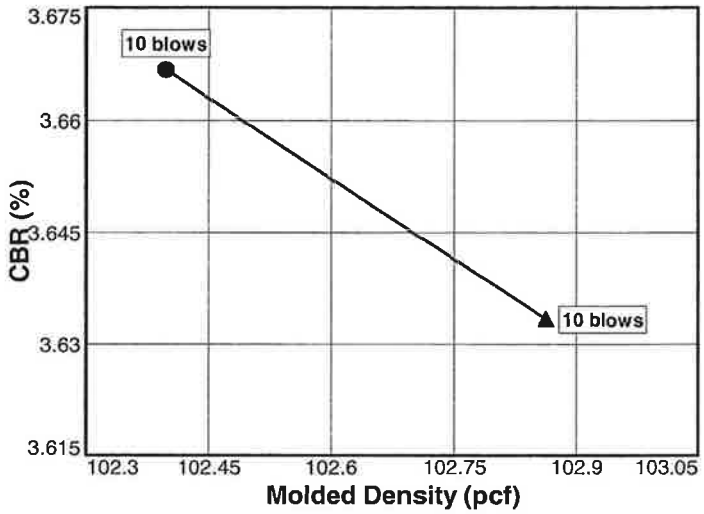
BEARING RATIO TEST REPORT

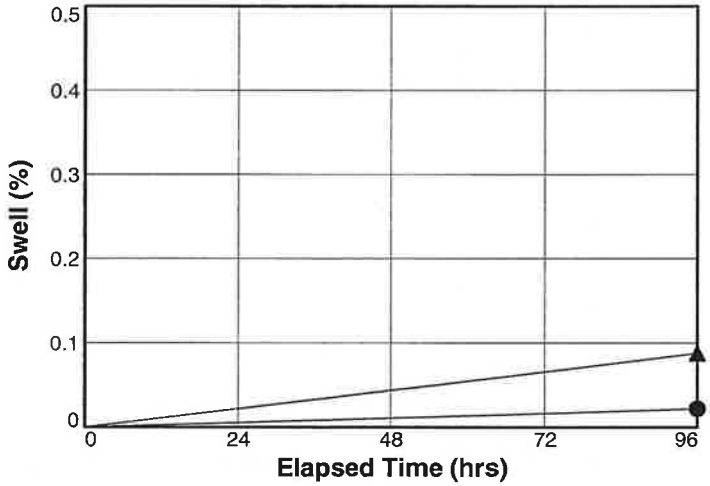
BURNS COOLEY DENNIS, INC.

Figure B53

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	102.4	89.6	12.6	102.4	89.6	18.0	3.7	3.6	0.000	10	0
2 △	102.9	90	11.4	102.8	89.9	18.5	3.6	3.4	0.000	10	0.1
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 6	SM	114.3	12.2	19	2

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

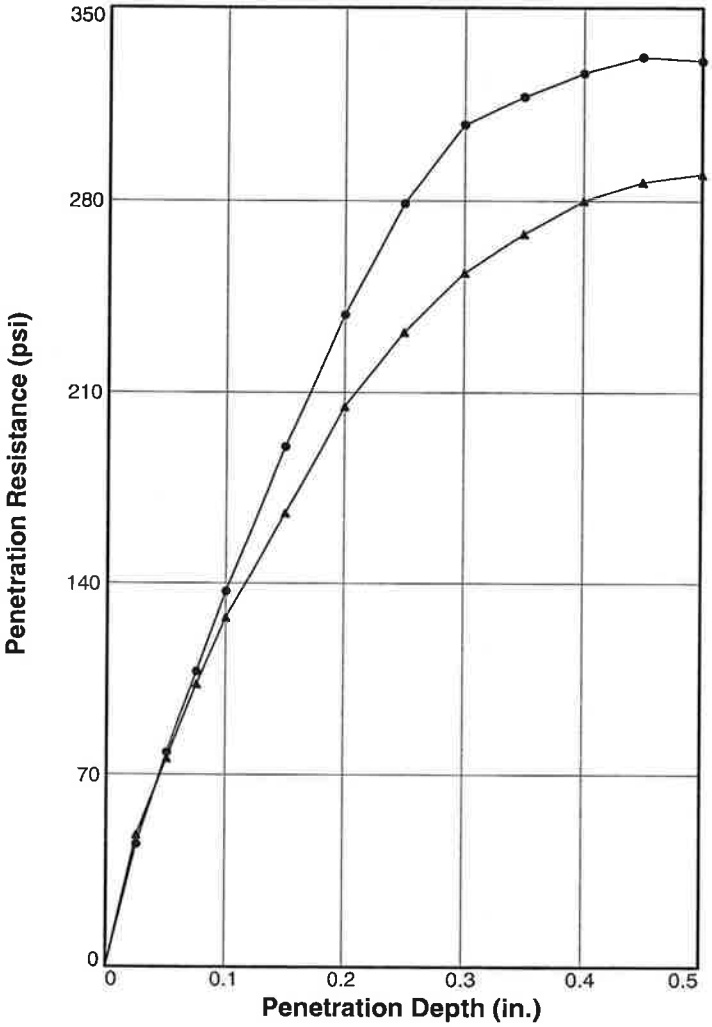
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content

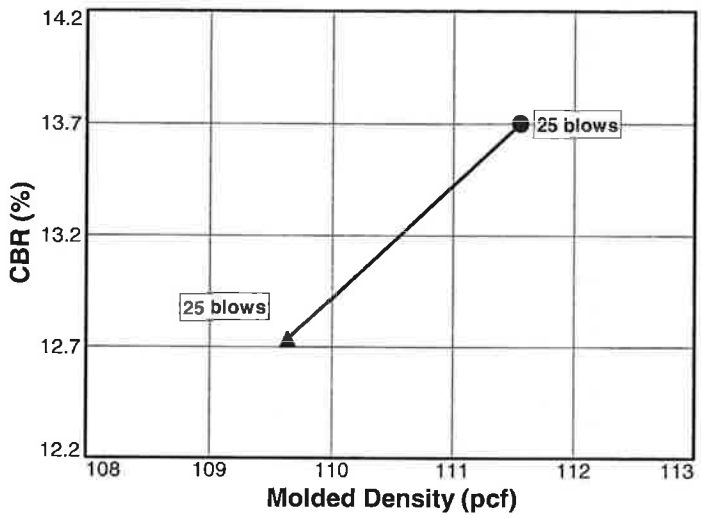
BEARING RATIO TEST REPORT

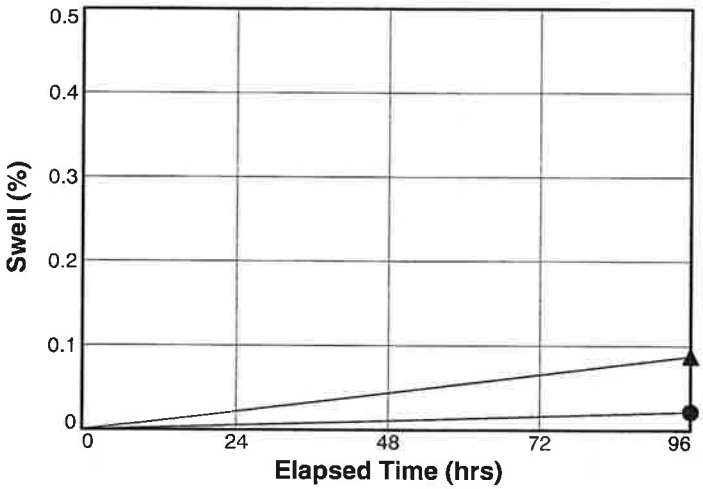
BURNS COOLEY DENNIS, INC.

Figure B54

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	111.6	97.6	12.0	111.5	97.6	15.2	13.7	15.9	0.000	10	0
2 △	109.6	95.9	12.2	109.5	95.8	15.5	12.7	13.6	0.000	10	0.1
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 6	SM	114.3	12.2	19	2

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

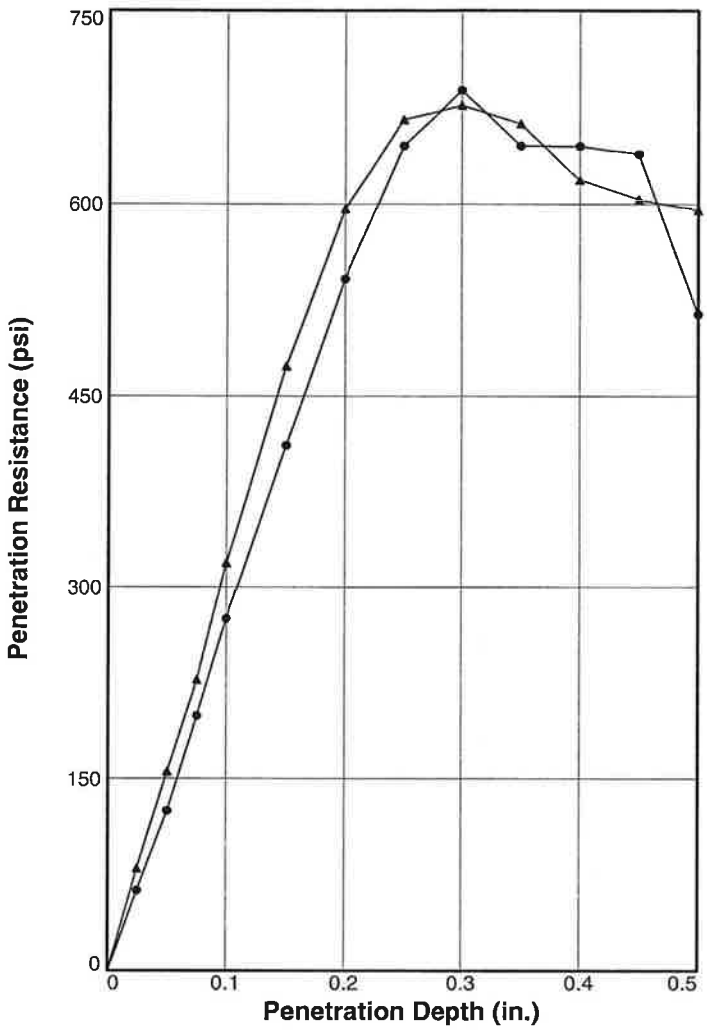
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content

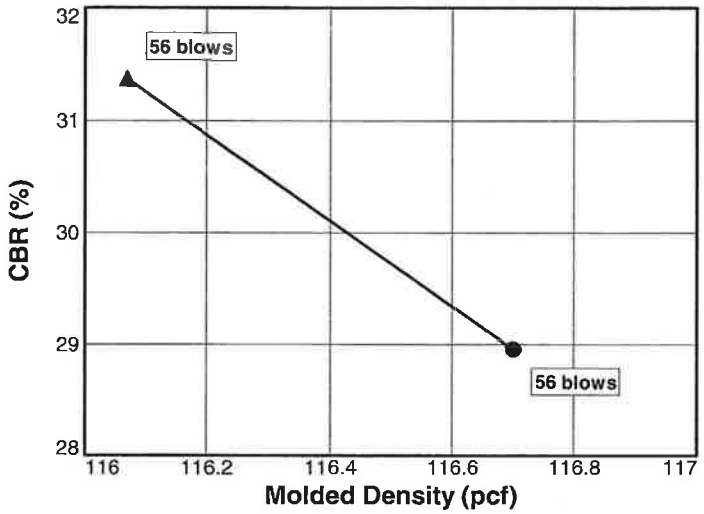
BEARING RATIO TEST REPORT

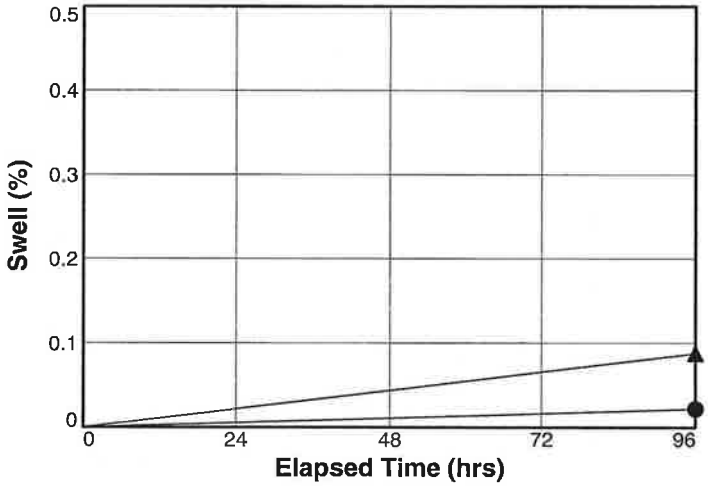
BURNS COOLEY DENNIS, INC.

Figure B55

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	116.7	102.1	11.7	116.7	102.1	13.0	29.0	36.9	0.005	10	0
2 △	116.1	101.6	11.6	116.0	101.5	13.1	31.4	39.5	-0.001	10	0.1
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 6	SM	114.3	12.2	19	2

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

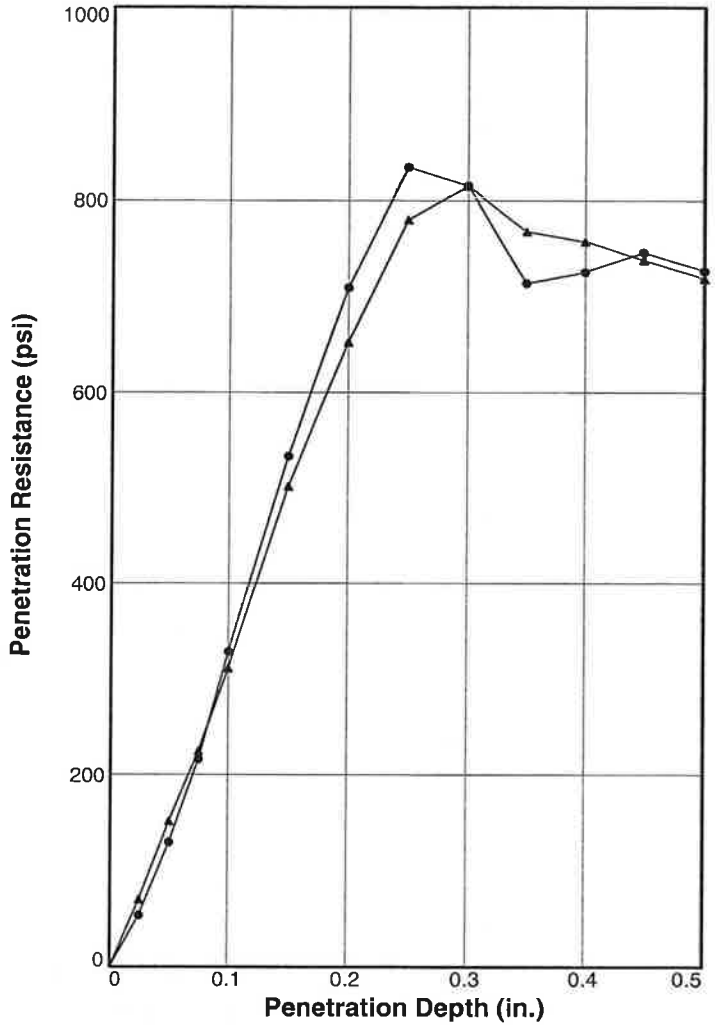
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content

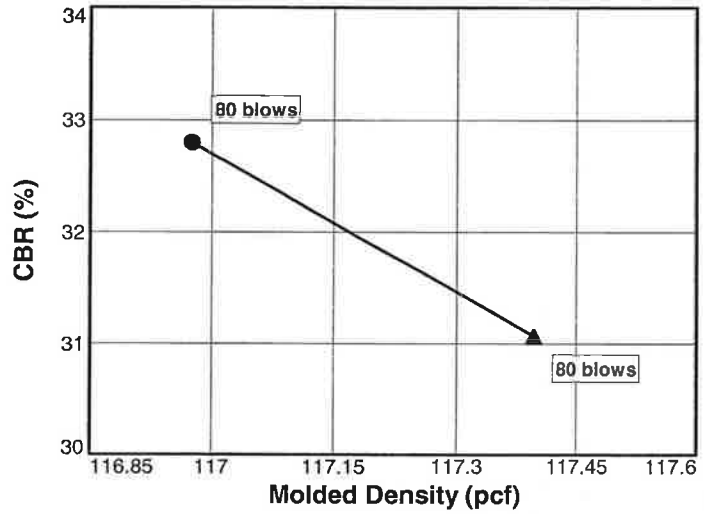
BEARING RATIO TEST REPORT

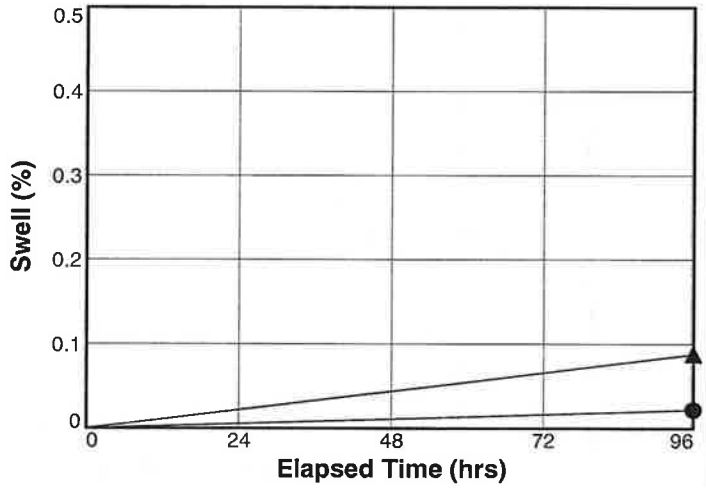
BURNS COOLEY DENNIS, INC.

Figure B56

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	117.0	102.4	12.6	116.9	102.3	12.9	32.8	47.3	0.000	10	0
2 △	117.4	102.7	11.6	117.3	102.6	12.6	31.1	43.5	0.000	10	0.1
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 6	SM	114.3	12.2	19	2

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

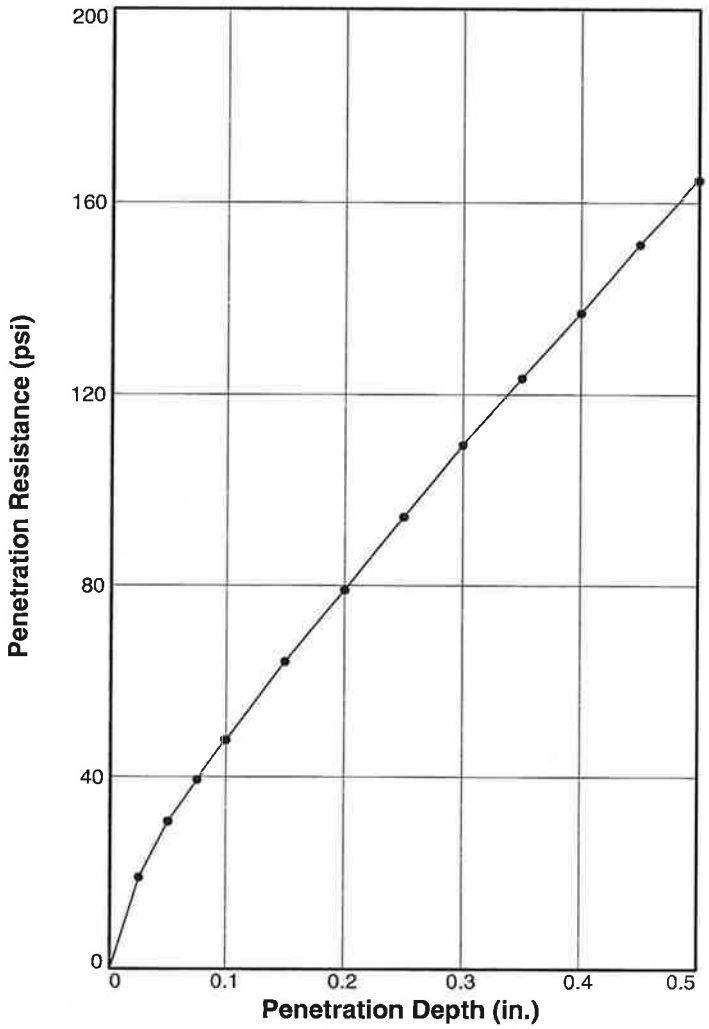
Standard hammer
3 layers - 80 blows/layer
Optimum Moisture Content

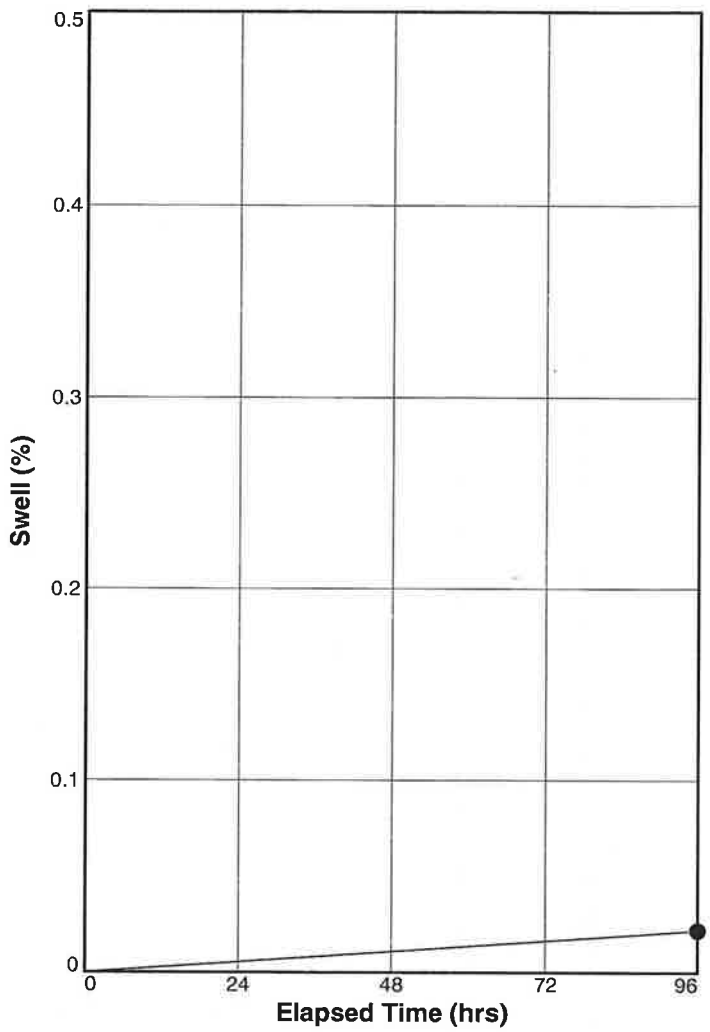
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B57

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	106.2	92.9	15.7	106.2	92.9	15.7	4.8	5.3	0.000	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 6	SM	114.3	12.2	19	2

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

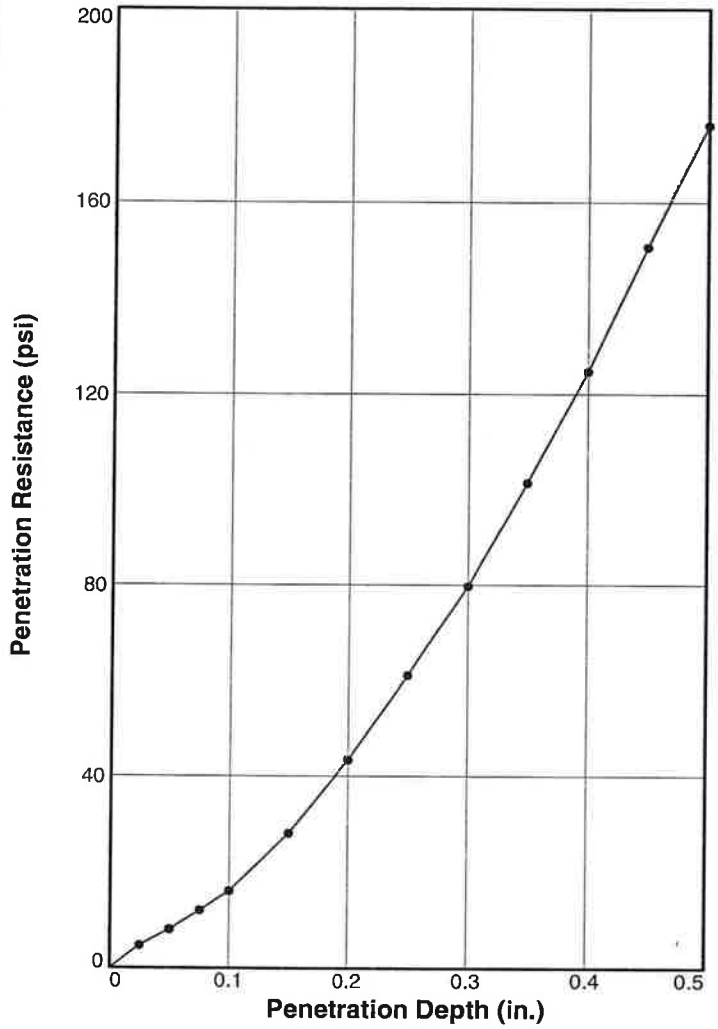
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content + 3%

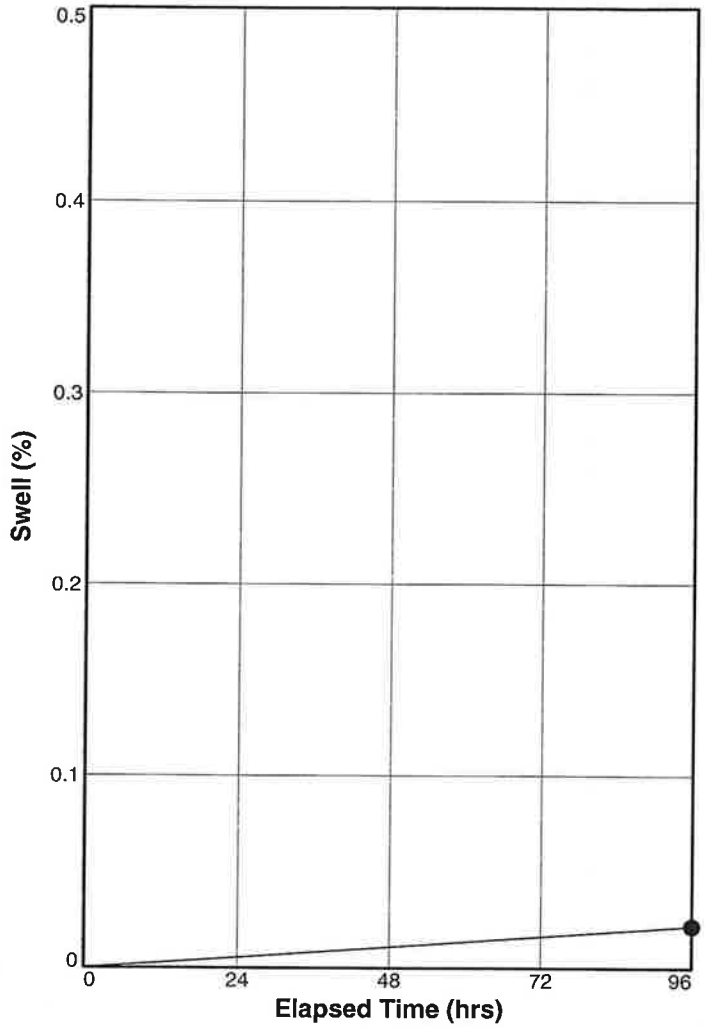
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B58

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	111.5	97.6	15.2	111.5	97.5	15.4	6.4	7.0	0.159	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 6	SM	114.3	12.2	19	2

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

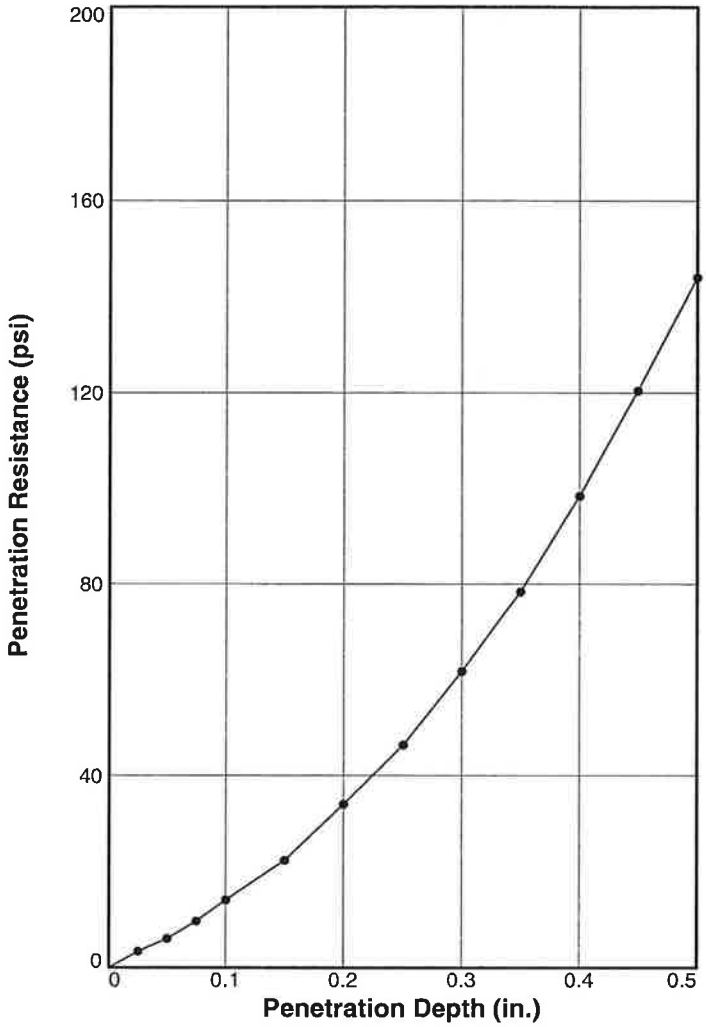
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content + 3%

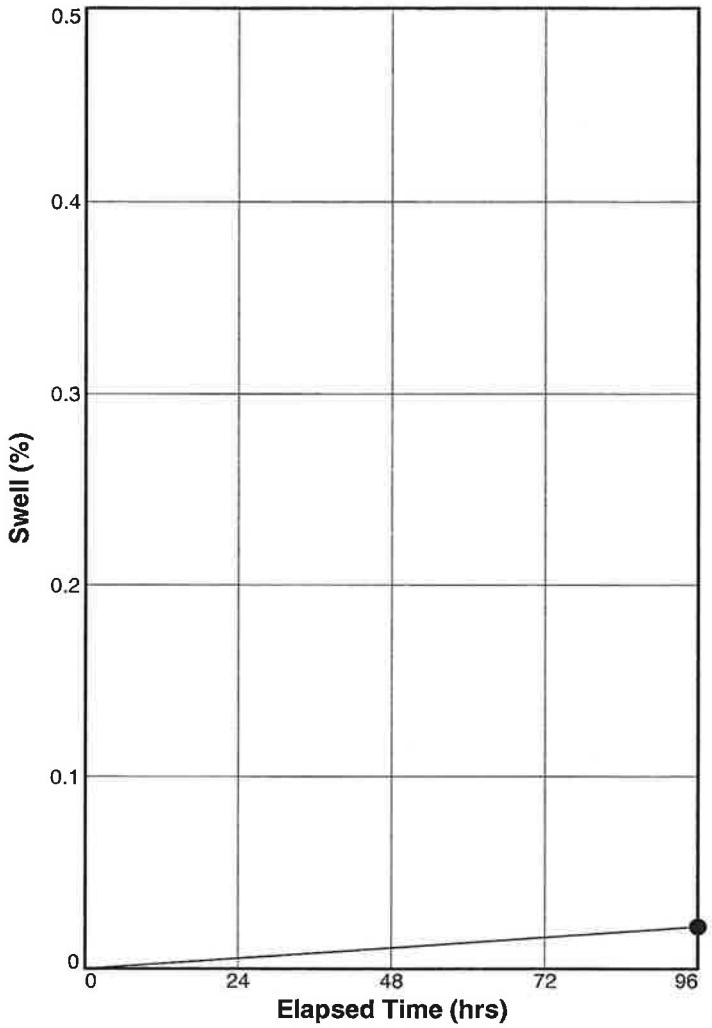
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B59

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	112.0	98	15.1	112.0	98	15.5	5.8	6.2	0.188	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red silty sand SM A-2-4; Material 6	SM	114.3	12.2	19	2

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

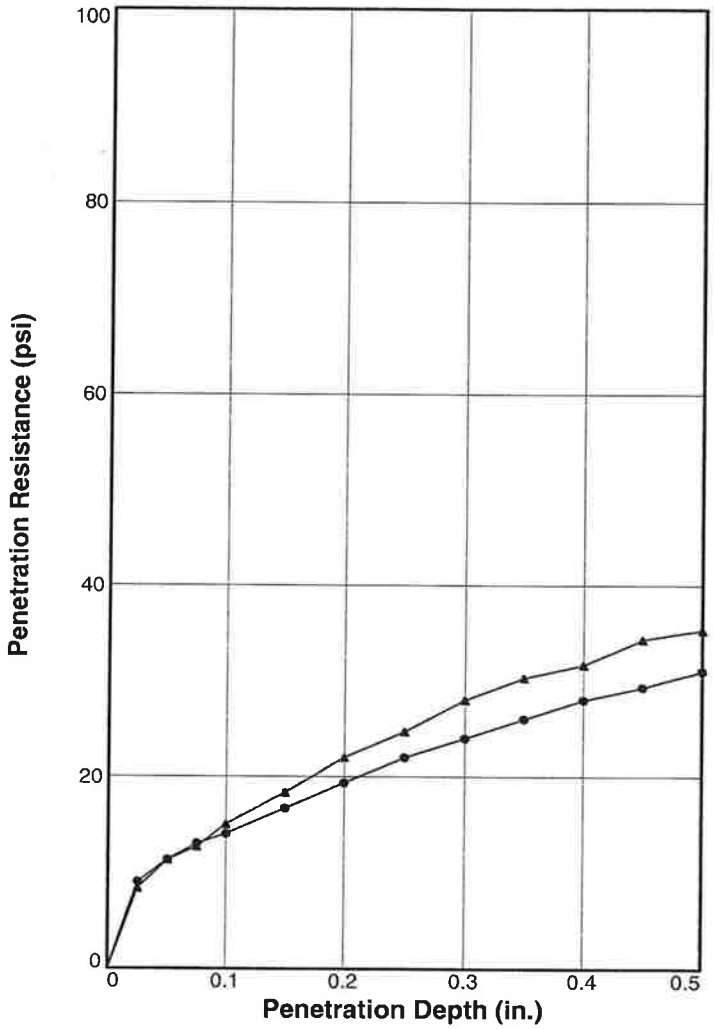
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content + 3%

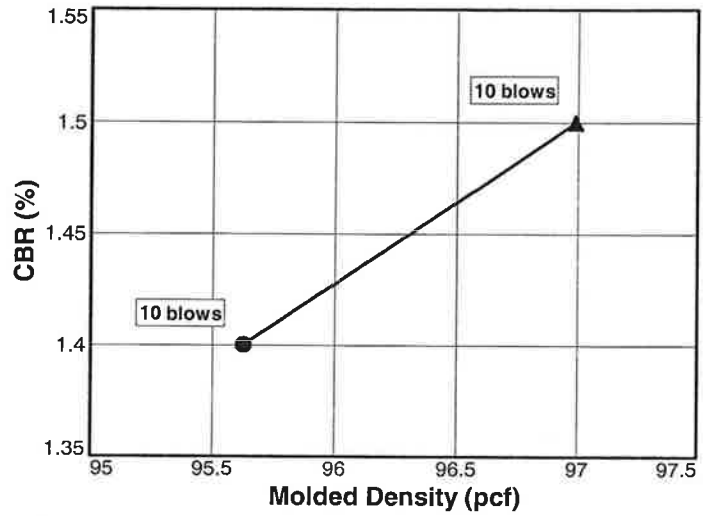
BEARING RATIO TEST REPORT

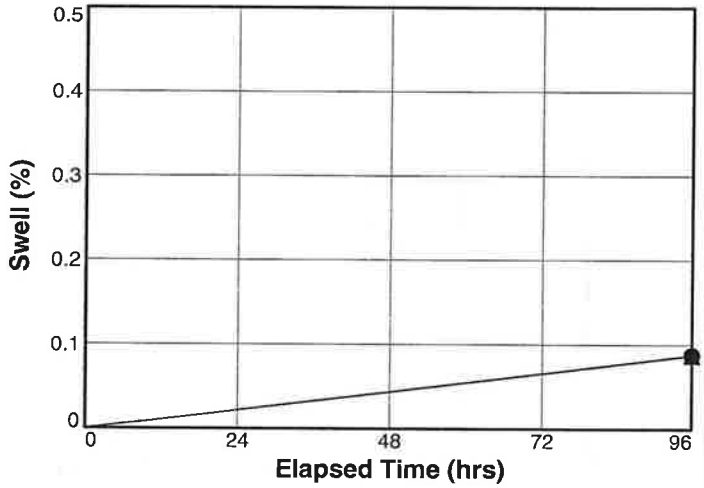
BURNS COOLEY DENNIS, INC.

Figure B60

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	95.6	82.4	13.3	95.5	82.4	19.6	1.4	1.3	0.000	10	0.1
2 △	97.0	83.6	13.5	96.9	83.5	19.7	1.5	1.5	0.000	10	0.1
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red clayey sand SC A-2-4; Material 7	SC	116.0	13.3	25	9

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

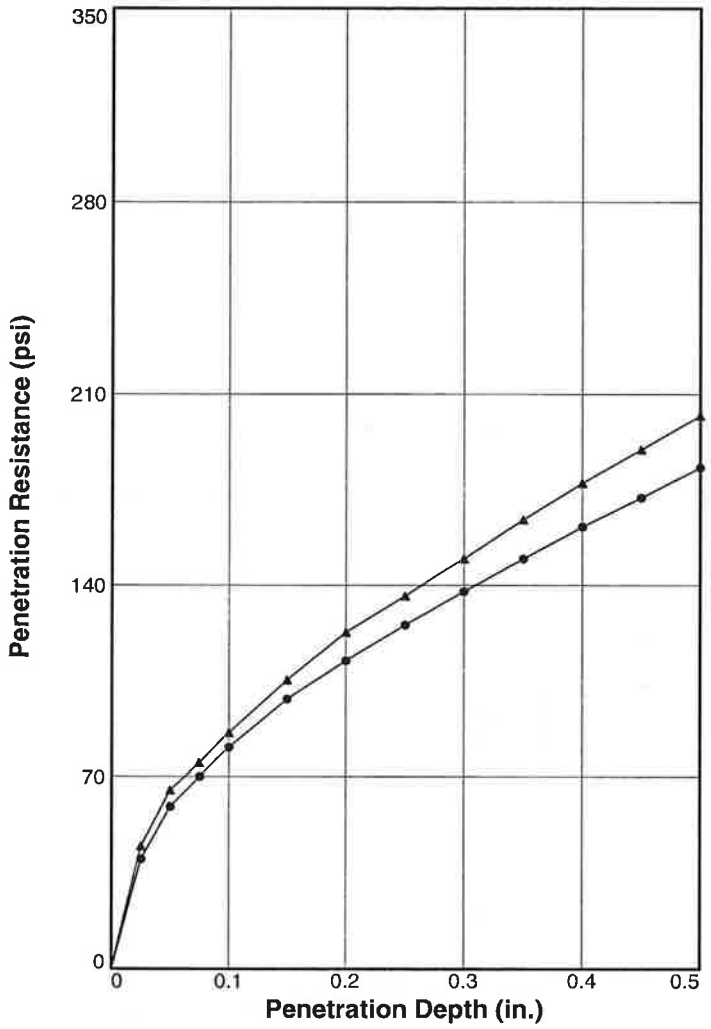
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content

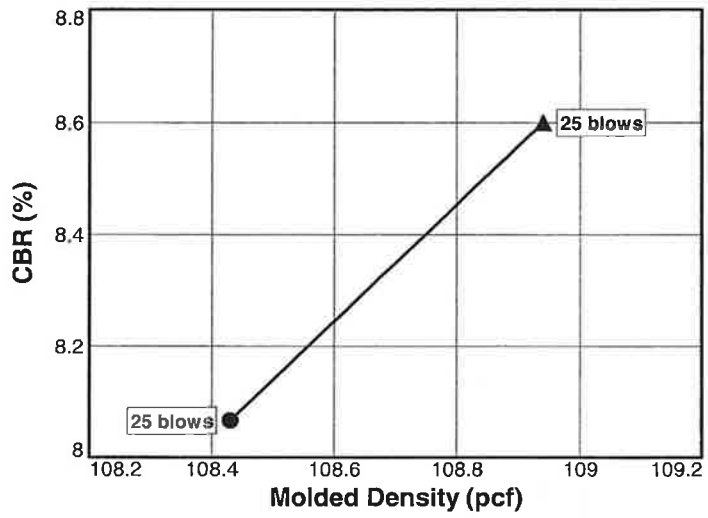
BEARING RATIO TEST REPORT

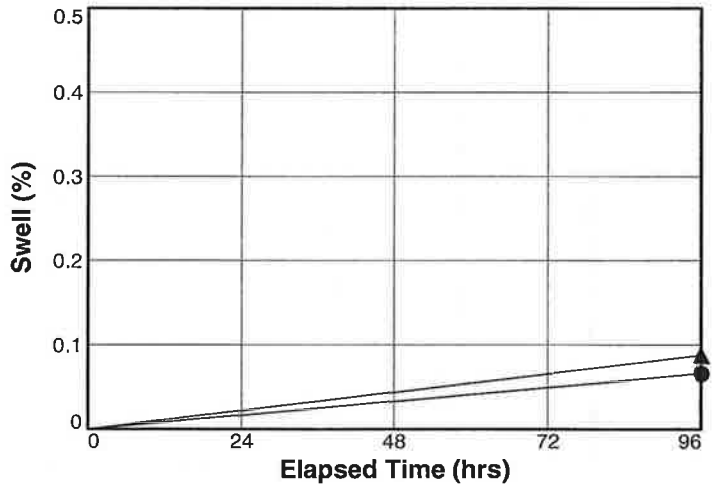
BURNS COOLEY DENNIS, INC.

Figure B61

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	108.4	93.4	13.1	108.4	93.4	15.0	8.1	7.5	0.000	10	0.1
2 △	108.9	93.9	13.7	108.8	93.8	15.0	8.6	8.2	0.000	10	0.1
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red clayey sand SC A-2-4; Material 7	SC	116.0	13.3	25	9

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

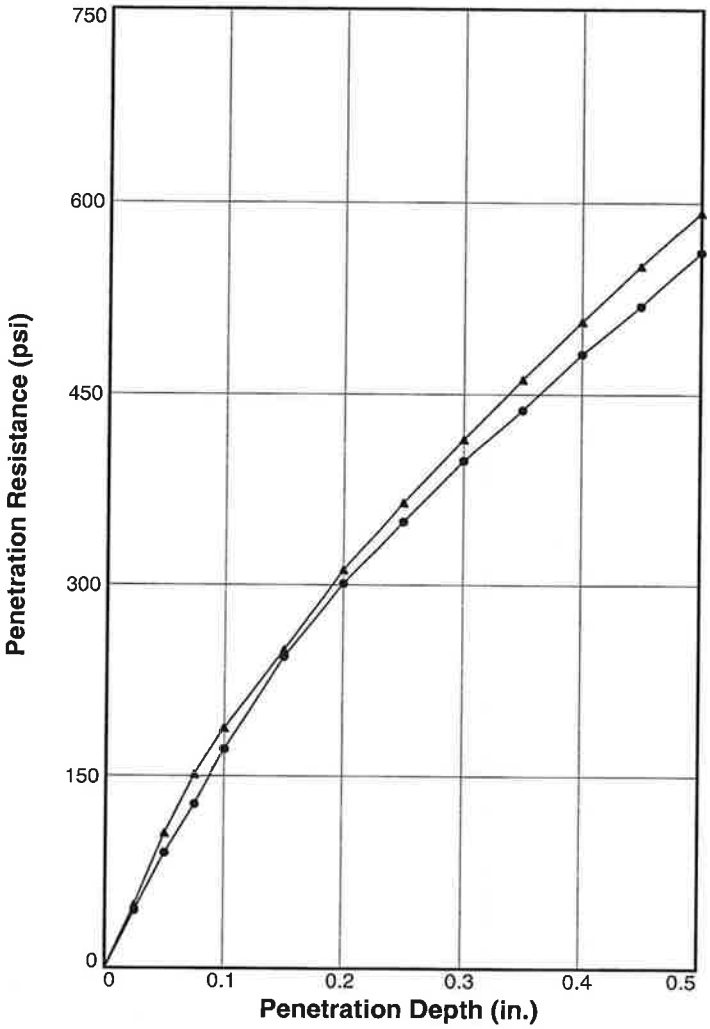
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content

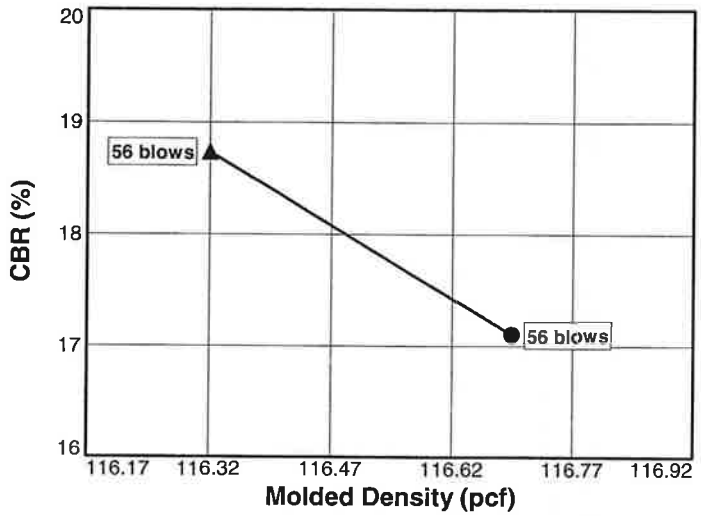
BEARING RATIO TEST REPORT

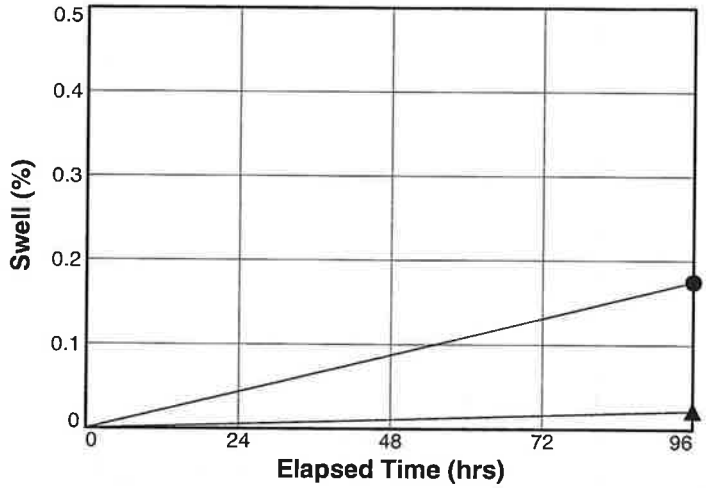
BURNS COOLEY DENNIS, INC.

Figure B62

BEARING RATIO TEST REPORT
ASTM D 1883-99







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	116.7	100.6	13.2	116.5	100.4	13.2	17.1	20.1	0.000	10	0.2
2 △	116.3	100.3	13.4	116.3	100.3	13.1	18.7	20.8	0.000	10	0
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red clayey sand SC A-2-4; Material 7	SC	116.0	13.3	25	9

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

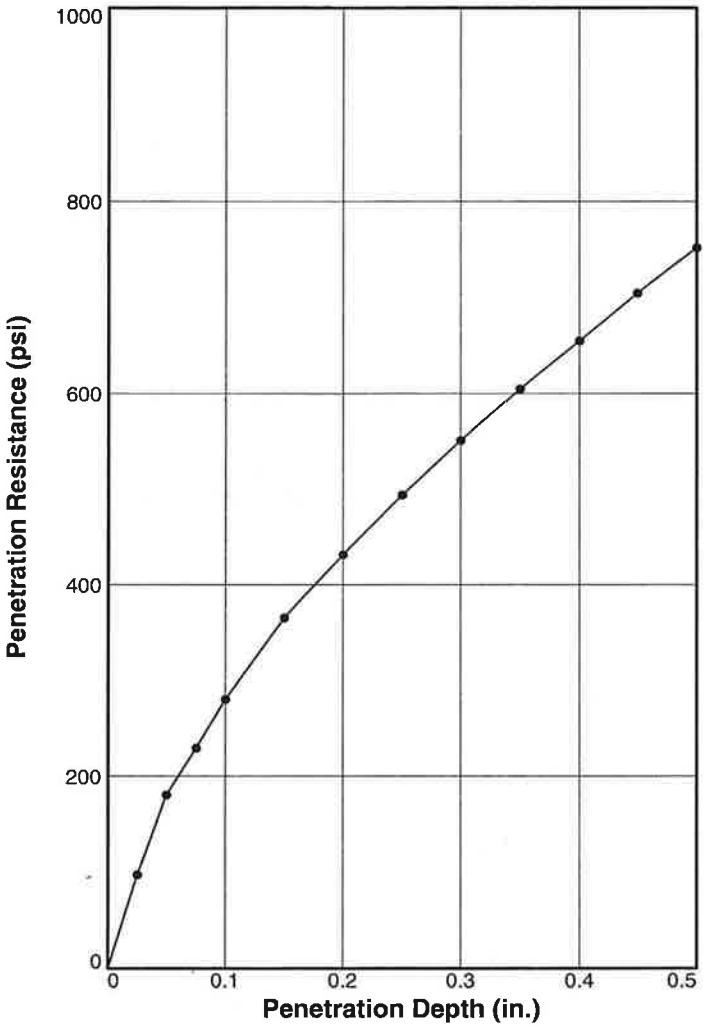
Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content

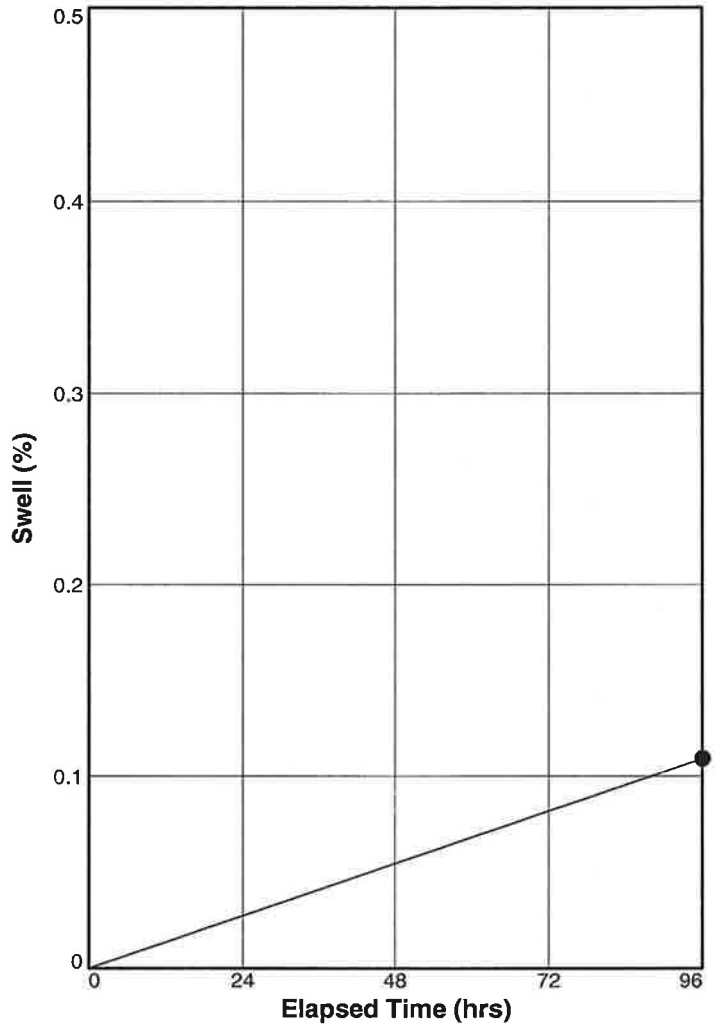
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B63

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	118.3	102	13.3	118.2	101.9	13.1	28.0	28.7	0.000	10	0.1
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red clayey sand SC A-2-4; Material 7	SC	116.0	13.3	25	9

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

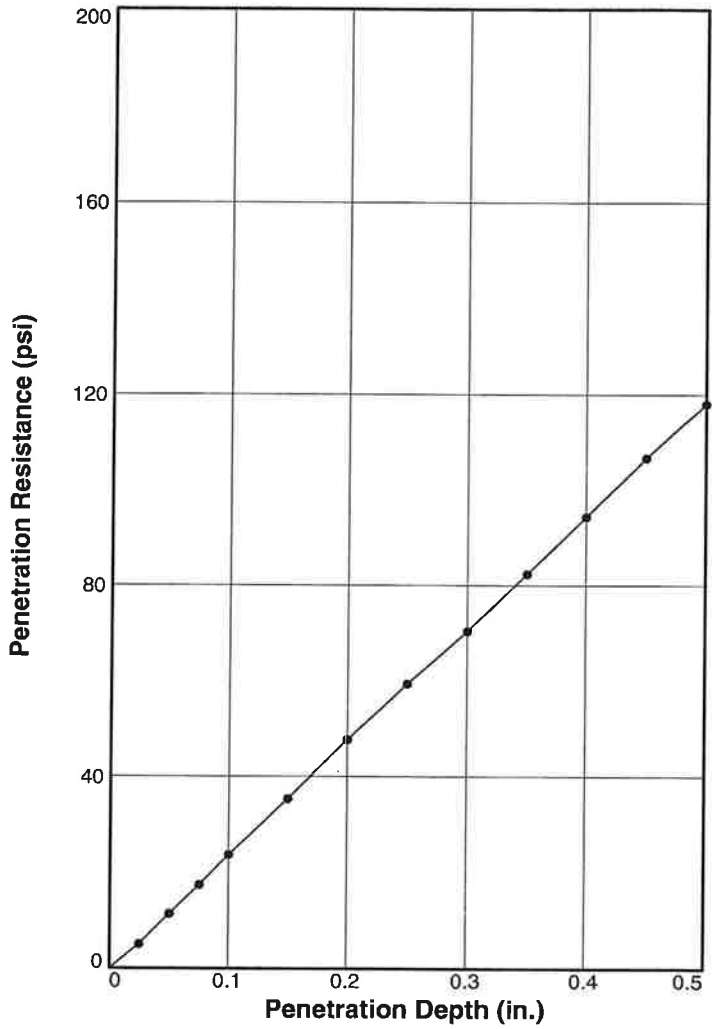
Standard hammer
3 layers - 80 blows/layer
Optimum Moisture Content

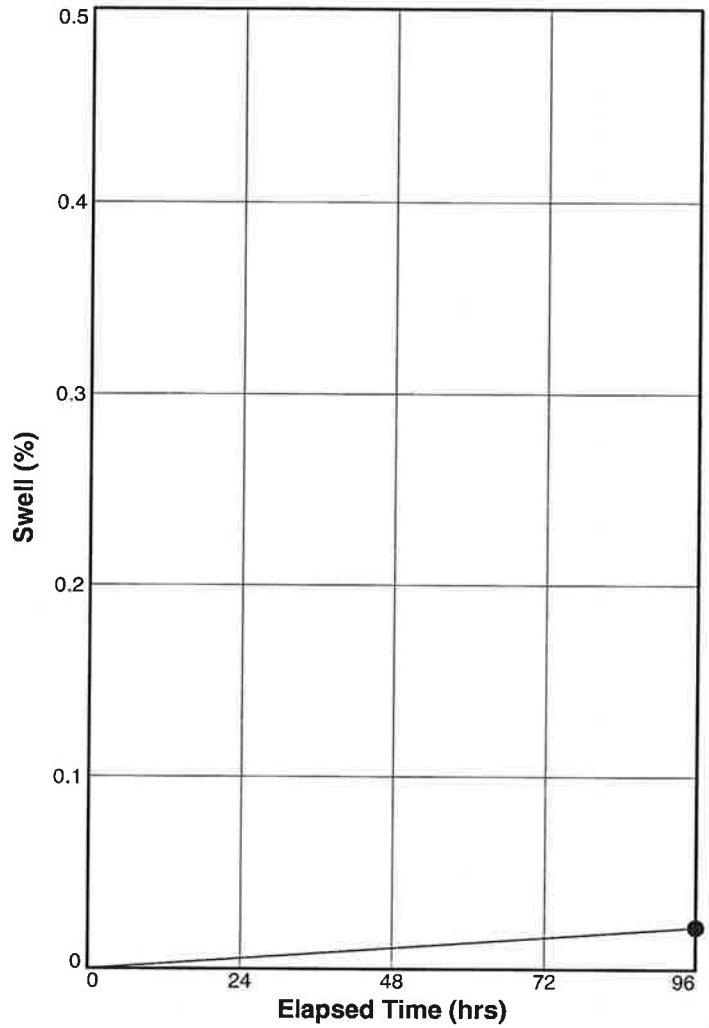
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B64

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	100.7	86.8	16.1	100.7	86.8	17.9	2.4	3.2	0.000	10	0
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red clayey sand SC A-2-4; Material 7	SC	116.0	13.3	25	9

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

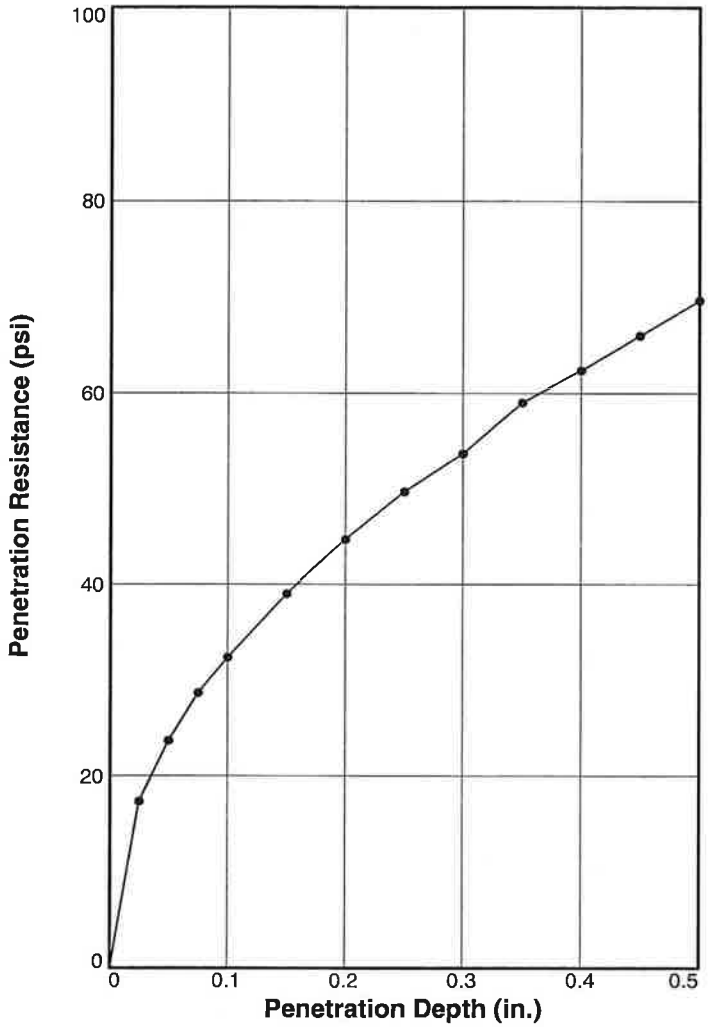
Standard hammer
3 layers - 10 blows/layer
Optimum Moisture Content + 3%

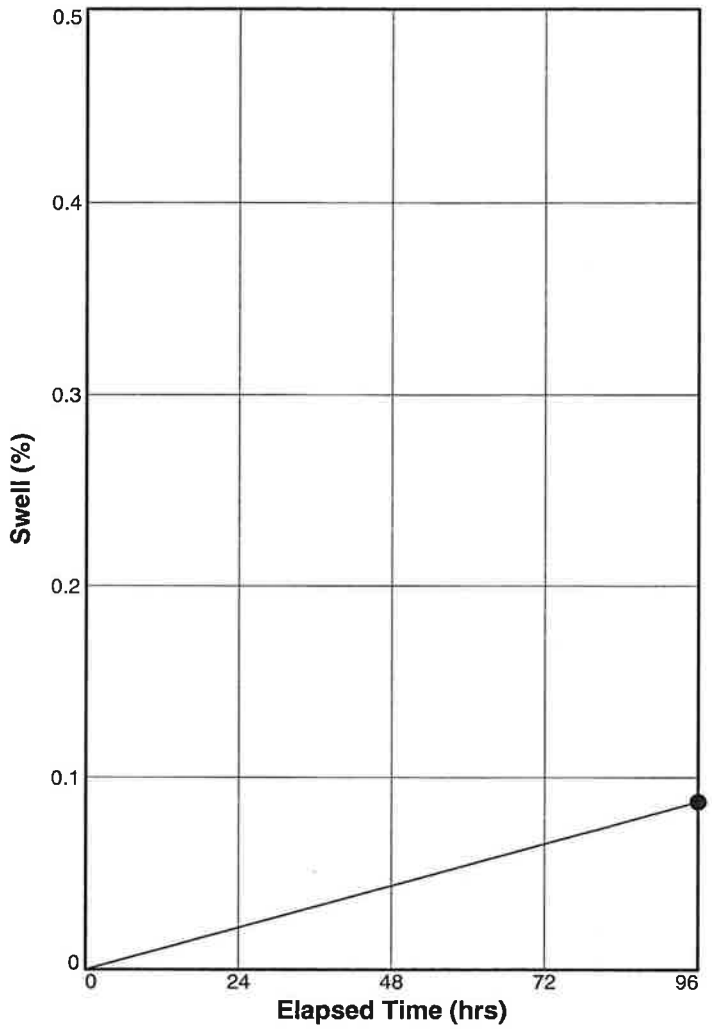
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B65

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	110.4	95.2	17.0	110.3	95.1	15.7	3.2	3.0	0.000	10	0.1
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red clayey sand SC A-2-4; Material 7	SC	116.0	13.3	25	9

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

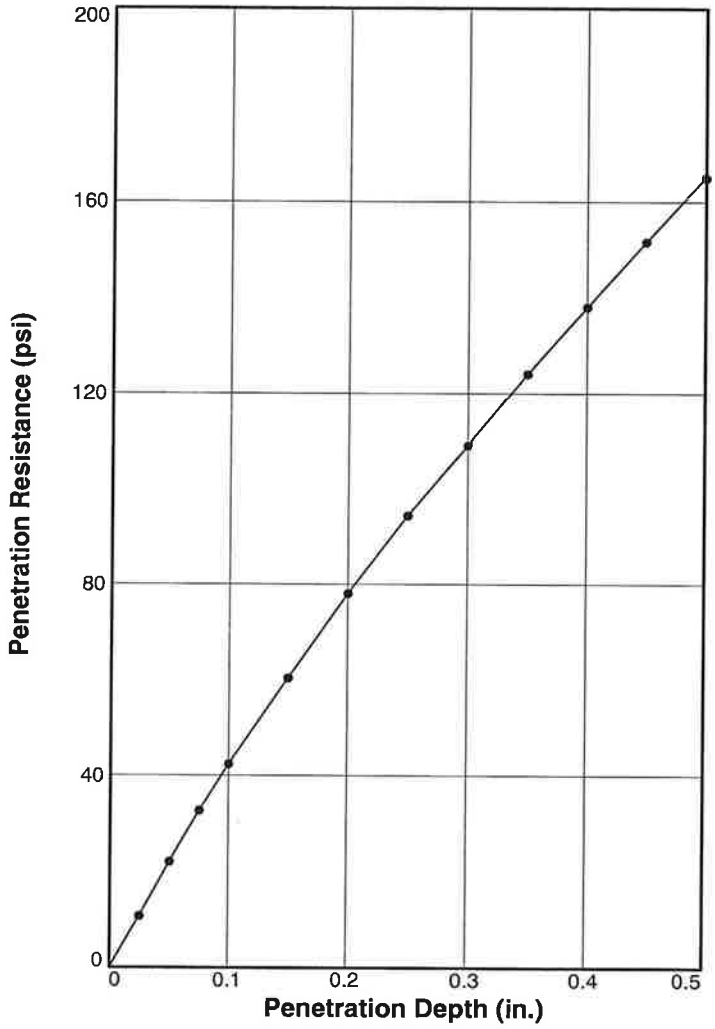
Standard hammer
3 layers - 25 blows/layer
Optimum Moisture Content + 3%

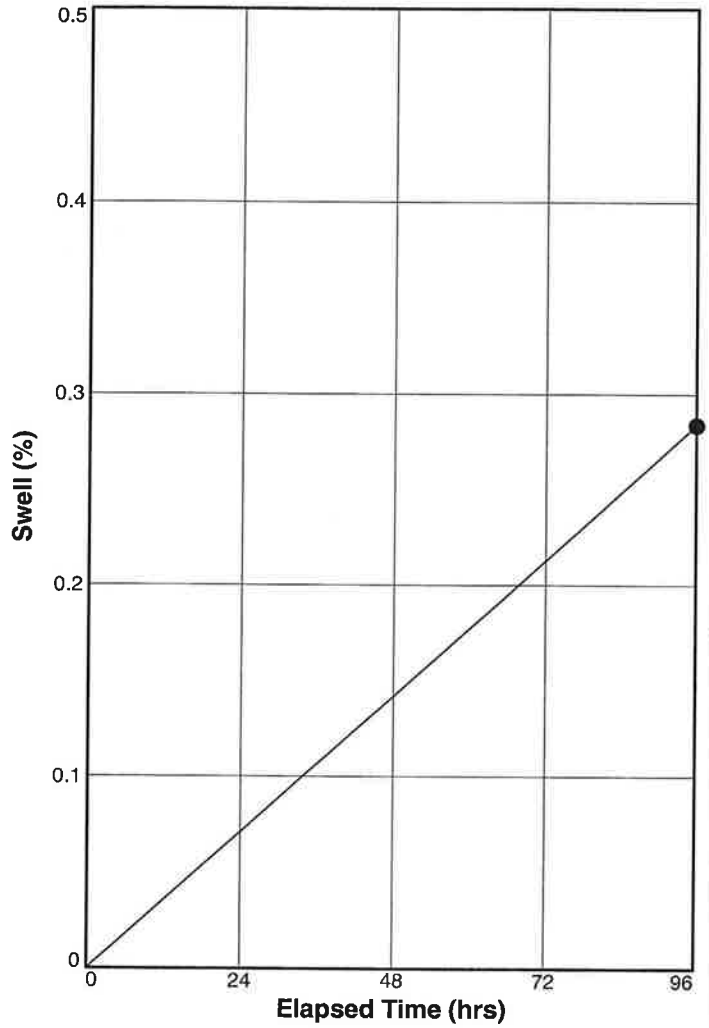
BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B66

BEARING RATIO TEST REPORT
ASTM D 1883-99





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	112.1	96.6	15.9	111.8	96.4	16.0	4.2	5.2	0.000	10	0.3
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Red clayey sand SC A-2-4; Material 7	SC	116.0	13.3	25	9

Project No: 070904

Project: MDOT SS 205

Date:

Test Description/Remarks:

Standard hammer
3 layers - 56 blows/layer
Optimum Moisture Content + 3%

BEARING RATIO TEST REPORT

BURNS COOLEY DENNIS, INC.

Figure B67

Appendix C

Unconfined Compression Strength Results

MDOT SS 205 BCD Project No. 070904 Material: CL A-6; Material 2 Cement Treated - 5% Optimum Moisture Max Dry Density 106.0

Unit Weight	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Weight of Mold + Soil	3756.7	3760.5	3941.6	3934.7	3993.0	4000.0	3760.7	3756.9	3943.3	3942.0	4000.8	3997.8
Weight of Mold	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8
Wet Unit Weight	110.1	110.4	122.3	121.9	125.7	126.2	110.4	110.1	122.5	122.4	126.3	126.1
Dry Unit Weight	94.4	94.6	105.0	104.6	107.6	108.0	94.4	94.2	105.1	105.0	108.0	107.8
Percent Compaction	89.0	89.2	99.0	98.7	101.6	101.9	89.0	88.8	99.2	99.1	101.9	101.7
Average Compaction	89.1		98.9		101.7		88.9		99.1		101.8	

Moisture Content	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Wet Weight + Tare	222.3		227.7		249.1		253.5		218.5		254.2	
Dry Weight + Tare	195.4		200.5		218.2		221.8		192.4		222.3	
Weight of Tare	34		36		34.4		34.9		34.3		33.9	
Moisture Content	16.7	16.7	16.5	16.5	16.8	16.8	17.0	17.0	16.5	16.5	16.9	16.9

Unconfined	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
PSI	33	35	142	122	144	149	40	47	173	137	146	189
Average PSI	34		132		147		44		155		168	

MDOT SS 205 BCD Project No. 070904 Material: CL A-6; Material 2 Cement Treated - 5% Optimum Moisture + 3% Max Dry Density 106.0

Unit Weight	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 30 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 30 Blow OM+3	
Wt of Mold + Soil	3870.2	3858.9	4001.4	4003.6	3994.9	3982.2		3862.5	3859	4006.5	4005.2	3993.1	3992.6
Weight of Mold	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8		2091.8	2092	2091.8	2091.8	2091.8	2091.8
Wet Unit Weight	117.6	116.9	126.3	126.4	125.9	125.0		117.1	116.8	126.6	126.6	125.8	125.7
Dry Unit Weight	98.2	97.6	104.8	104.9	105.3	104.6		97.8	97.6	105.0	105.0	105.1	105.0
% Compaction	92.6	92.0	98.9	99.0	99.3	98.6		92.2	92.0	99.1	99.0	99.1	99.1
Avg % Compaction	92.3		98.9		99.0			92.1		99.1		99.1	

Moisture Content	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 30 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 30 Blow OM+3	
Wet Weight + Tare	268.2		256.6		249.7			274		253.4		254.6	
Dry Weight + Tare	229.5		218.8		214.1			234.5		216.1		218.2	
Weight of Tare	34		34.4		32.3			34.8		34.7		33.4	
Moisture Content	19.80	19.80	20.50	20.50	19.58	19.58		19.78	19.78	20.56	20.56	19.70	19.70

Unconfined	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 30 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 30 Blow OM+3	
PSI	109	100	131	128	122	129		95	91	143	137	135	161
Average PSI	105		130		126			93		140		148	

MDOT SS 205 BCD Project No. 070904 Material: ML A-4; Material 3 Optimum Moisture Max Dry Density 108.5

Cement Treated - 5%

Unit Weight	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Weight of Mold + Soil	3861.0	3853.8	3999.2	3990.8	4045.3	4037.1	3864.3	3852.1	3989.9	4001.5	4033.8	4032.6
Weight of Mold	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8
Wet Unit Weight	117.0	116.5	126.2	125.6	129.2	128.7	117.2	116.4	125.5	126.3	128.4	128.4
Dry Unit Weight	101.8	101.4	109.7	109.2	112.9	112.5	101.8	101.1	108.9	109.6	112.3	112.2
Percent Compaction	93.9	93.5	101.1	100.6	104.1	103.7	93.9	93.2	100.4	101.0	103.5	103.4
Average Compaction	93.7		100.9		103.9		93.5		100.7		103.5	

Moisture Content	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Wet Weight + Tare	239.9		227.5		226.9		265.9		237.8		257.6	
Dry Weight + Tare	213.3		202.2		202.6		235.5		211.2		229.7	
Weight of Tare	34.7		33.7		33.8		34.5		36.9		35.9	
Moisture Content	14.9	14.9	15.0	15.0	14.4	14.4	15.1	15.1	15.3	15.3	14.4	14.4

Unconfined	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
PSI	66	67	136	118	179	171	93	87	161	185	210	206
Average PSI	67		127		175		90		173		208	

MDOT SS 205 BCD Project No. 070904 Material: ML A-4; Material 3 Cement Treated - 5% Optimum Moisture + 3% Max Dry Density 108.5

Unit Weight	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 40 Blow OM+3		14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3	
Wt of Mold + Soil	3914.2	3927.1	4006.7	3987.8	3999.7	3990.0	3924.9	3943.0	4004.3	3999.5	3997.9	3990.3
Weight of Mold	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8
Wet Unit Weight	120.5	121.4	126.6	125.4	126.2	125.5	121.2	122.4	126.5	126.2	126.1	125.6
Dry Unit Weight	102.1	102.8	107.0	106.0	106.2	105.7	103.2	104.2	106.9	106.6	106.3	105.9
% Compaction	94.1	94.8	98.6	97.7	97.9	97.4	95.1	96.0	98.5	98.3	98.0	97.6
Avg % Compaction	94.4		98.2		97.7		95.6		98.4		97.8	

Moisture Content	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 40 Blow OM+3		14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3	
Wet Weight + Tare	242.8		293.3		265.3		272.6		253.6		291.4	
Dry Weight + Tare	210.8		253.2		228.8		236.8		219.6		251	
Weight of Tare	33.4		34.4		34.4		32.2		34.3		33.2	
Moisture Content	18.0	18.0	18.3	18.3	18.8	18.8	17.5	17.5	18.3	18.3	18.5	18.5

Unconfined	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 30 Blow OM+3		14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 30 Blow OM+3	
PSI	68	71	62	72	60	46	87	96	96	89	65	69
Average PSI	70		67		53		92		93		67	

MDOT SS 205 BCD Project No. 070904 Material: CL A-4; Material 4 Optimum Moisture Max Dry Density 120.9

Cement Treated - 5%

Unit Weight	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Weight of Mold + Soil	3966.2	3958.4	4116.9	4128.8	4143.0	4149.5	3940.4	3939.8	4101.2	4094.3	4155.2	4162.6
Weight of Mold	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2
Wet Unit Weight	124.2	123.7	134.2	135.0	135.9	136.3	122.5	122.5	133.1	132.7	136.7	137.2
Dry Unit Weight	110.7	110.3	119.6	120.3	120.3	120.7	110.0	109.9	119.5	119.1	122.5	122.9
Percent Compaction	91.6	91.2	98.9	99.5	99.5	99.9	91.0	90.9	98.9	98.5	101.3	101.7
Average Compaction	91.4		99.2		99.7		90.9		98.7		101.5	

Moisture Content	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Wet Weight + Tare	264.7		264.7		240.4		237.4		237.4		270.4	
Dry Weight + Tare	239.7		239.7		216.8		216.5		216.5		245.8	
Weight of Tare	34.5		34.5		34.3		33.1		33.1		33.8	
Moisture Content	12.2	12.2	12.2	12.2	12.9	12.9	11.4	11.4	11.4	11.4	11.6	11.6

Unconfined	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
PSI	176	158	302	229	231	244	141	139	314	291	381	343
Average PSI	167		266		238		140		303		362	

MDOT SS 205 BCD Project No. 070904 Material: CL A-4; Material 4 Cement Treated - 5% Optimum Moisture + 3% Max Dry Density 120.9

Unit Weight	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 40 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3	
Wt of Mold + Soil	4066.2	4073.1	4089.3	4067.1	4074	4078.6		4075.7	4073.8	4109.2	4097.6	4103.8	4108
Weight of Mold	2088.2	2088.2	2088.2	2088.2	2088.2	2088.2		2088.2	2088.2	2088.2	2088.2	2088.2	2088.2
Wet Unit Weight	130.8	131.3	132.4	130.9	131.3	131.6		131.5	131.3	133.7	132.9	133.3	133.6
Dry Unit Weight	113.8	114.2	115.1	113.8	113.4	113.6		114.8	114.7	116.3	115.7	116.3	116.5
% Compaction	94.1	94.4	95.2	94.1	93.8	94.0		95.0	94.9	96.2	95.7	96.2	96.4
Avg % Compaction	94.3		94.7		93.9			94.9		96.0		96.3	
Moisture Content	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 30 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 30 Blow OM+3	
Wet Weight + Tare	273.2		273.2		290.3			264.4		227.6		278.7	
Dry Weight + Tare	241.7		241.7		255.1			235.4		202.4		247.4	
Weight of Tare	31.7		31.7		33.3			34.8		33.2		33.8	
Moisture Content	15.0	15.0	15.0	15.0	15.9	15.9		14.5	14.5	14.9	14.9	14.7	14.7
Unconfined	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 40 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3	
PSI	152	163	147	157	157	175		189	188	228	186	243	234
Average PSI	158		152		166			189		207		239	

MDOT SS 205 BCD Project No. 070904 Material: CL A-4; Material 4R Cement Treated - 4% Optimum Moisture Max Dry Density 120.9

Unit Weight	7 Day, 4% Cement		7 Day, 4% Cement		7 Day, 4% Cement		14 Day, 4% Cement		14 Day, 4% Cement		14 Day, 4% Cement	
Weight of Mold + Soil	3956.8	3952.0	4102.6	4103.6	4131.7	4129.4	3947.0	3954.9	4097.2	4097.1	4134.7	4140.2
Weight of Mold	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0
Wet Unit Weight	124.0	123.7	133.6	133.7	135.6	135.4	123.3	123.9	133.3	133.3	135.8	136.1
Dry Unit Weight	110.7	110.5	119.4	119.5	121.1	121.0	110.3	110.7	119.1	119.1	121.4	121.7
Percent Compaction	91.6	91.4	98.8	98.8	100.2	100.0	91.2	91.6	98.5	98.5	100.4	100.7
Average Compaction	91.5		98.8		100.1		91.4		98.5		100.5	
											49.5	
Moisture Content	7 Day, 4% Cement		7 Day, 4% Cement		7 Day, 4% Cement		14 Day, 4% Cement		14 Day, 4% Cement		14 Day, 4% Cement	
Wet Weight + Tare	229.6		228.1		262.3		297.3		276.8		252.8	
Dry Weight + Tare	208.6		207.4		237.9		269.3		251.2		229.6	
Weight of Tare	33.1		33.8		33.7		33.2		36.5		33.7	
Moisture Content	12.0	12.0	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.8	11.8
Unconfined	10 Blows		25 Blows		40 Blows		10 Blows		25 Blows		40 Blows	
PSI	168	189	241	252	276	295	169	194	277	312	323	349
Average PSI	178.5		246.5		285.5		181.5		294.5		336.0	

MDOT SS 205 BCD Project No. 070904 Material: CL A-4; Material 4R Cement Treated - 4% Optimum Moisture + 3% Max Dry Density 120.9

Unit Weight	7 Day, 4% Cement		7 Day, 4% Cement		7 Day, 4% Cement			14 Day, 4% Cement		14 Day, 4% Cement		14 Day, 4% Cement	
Weight of Mold + Soil	4042.1	4043.1	4060.7	4064.7	4058.7	4064.5		4049.5	4048.9	4072.4	4076.7	4069.1	4068.9
Weight of Mold	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0		2082.0	2082.0	2082.0	2082.0	2082.0	2082.0
Wet Unit Weight	129.6	129.7	130.9	131.1	130.7	131.1		130.1	130.1	131.6	131.9	131.4	131.4
Dry Unit Weight	112.8	112.8	113.7	114.0	113.6	113.9		113.1	113.1	114.6	114.8	113.9	113.9
Percent Compaction	93.3	93.3	94.1	94.3	93.9	94.2		93.5	93.5	94.8	95.0	94.3	94.2
Average Compaction	93.3		94.2		94.1			93.5		94.9		94.2	
												49.5	
Moisture Content	7 Day, 4% Cement		7 Day, 4% Cement		7 Day, 4% Cement			14 Day, 4% Cement		14 Day, 4% Cement		14 Day, 4% Cement	
Wet Weight + Tare	238.5		256.6		241			226.5		252.6		238.2	
Dry Weight + Tare	211.9		227.7		213.7			201.2		224.4		210.9	
Weight of Tare	34.1		35.9		33.1			33.2		35.2		32.9	
Moisture Content	15.0	15.0	15.1	15.1	15.1	15.1		15.1	15.1	14.9	14.9	15.3	15.3
Unconfined	10 Blows		25 Blows		40 Blows			10 Blows		25 Blows		40 Blows	
PSI	156	167	127	130	119	117		202	214	161	184	155	176
Average PSI	161.5		128.5		118.0			208.0		172.5		165.5	

MDOT SS 205 BCD Project No. 070904 Material: SM A-2-4; Material 5 Optimum Moisture Max Dry Density 110.6

Cement Treated - 5%

Unit Weight	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM			14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Weight of Mold + Soil	3838.3	3840.4	3952.1	3956.1	3999.7	4006.3		3842.2	3841.4	3954.8	3951.8	4006.2	4005.0
Weight of Mold	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8		2091.8	2091.8	2091.8	2091.8	2091.8	2091.8
Wet Unit Weight	115.5	115.7	123.0	123.3	126.2	126.6		115.8	115.7	123.2	123.0	126.6	126.5
Dry Unit Weight	101.7	101.8	108.4	108.6	111.2	111.6		102.0	102.0	108.7	108.5	111.6	111.5
Percent Compaction	91.9	92.0	98.0	98.2	100.5	100.9		92.2	92.2	98.2	98.1	100.9	100.8
Average Compaction	92.0		98.1		100.7			92.2		98.2		100.9	

Moisture Content	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM			14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Wet Weight + Tare	245.4		299.8		277.3			254.5		288.8		310.6	
Dry Weight + Tare	220		268.2		248.6			228.3		258.4		277.9	
Weight of Tare	33.3		34.1		35.9			33.9		31.6		34.8	
Moisture Content	13.6	13.6	13.5	13.5	13.5	13.5		13.5	13.5	13.4	13.4	13.5	13.5

Unconfined	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM			14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
PSI	51	55	86	90	101	107		77	77	107	115	148	148
Average PSI	53		88		104			77		111		148	

MDOT SS 205 BCD Project No. 070904 Material: SM A-2-4; Material 5 Cement Treated - 5% Optimum Moisture + 3% Max Dry Density 110.6

Unit Weight	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 40 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3	
Wt of Mold + Soil	3919.8	3920.9	3962.9	3961.8	4009.4	3987.5		3916.8	3919.1	3979.5	3979.7	3991.0	3998.8
Weight of Mold	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8		2091.8	2091.8	2091.8	2091.8	2091.8	2091.8
Wet Unit Weight	120.9	121.0	123.8	123.7	126.8	125.4		120.7	120.9	124.9	124.9	125.6	126.1
Dry Unit Weight	104.1	104.1	107.7	107.7	108.8	107.5		103.7	103.8	108.6	108.6	107.8	108.3
% Compaction	94.1	94.2	97.4	97.3	98.3	97.2		93.7	93.9	98.2	98.2	97.5	97.9
Avg % Compaction	94.1		97.4		97.8			93.8		98.2		97.7	
Moisture Content	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 40 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3	
Wet Weight + Tare	305.6		274.8		295.0			300.5		271.9		309.8	
Dry Weight + Tare	267.8		243.5		257.6			262.9		240.7		271.7	
Weight of Tare	33.9		33.2		32.6			33.8		32.4		40.8	
Moisture Content	16.2	16.2	14.9	14.9	16.6	16.6		16.4	16.4	15.0	15.0	16.5	16.5
Unconfined	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 30 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 30 Blow OM+3	
PSI	54	57	59	61	80	40		74	70	109	118	79	101
Average PSI	56		60		60			72		114		90	

MDOT SS 205 BCD Project No. 070904 Material: SM A-2-4; Material 6 Cement Treated - 5% Optimum Moisture Max Dry Density 117.8

Unit Weight	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM			14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Weight of Mold + Soil	3921.9	3922.5	4066.5	4066.0	4125.6	4123.9		3922.0	3919.6	4068.6	4069.7	4120.7	4118.1
Weight of Mold	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8		2091.8	2091.8	2091.8	2091.8	2091.8	2091.8
Wet Unit Weight	121.0	121.1	130.6	130.6	134.5	134.4		121.0	120.9	130.7	130.8	134.2	134.0
Dry Unit Weight	107.7	107.7	116.3	116.2	119.5	119.4		107.6	107.5	116.0	116.1	119.1	118.9
Percent Compaction	91.4	91.5	98.7	98.7	101.5	101.4		91.4	91.3	98.5	98.6	101.1	101.0
Average Compaction	91.5		98.7		101.4			91.3		98.5		101.0	

Moisture Content	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM			14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Wet Weight + Tare	274.7		288.5		272			285		308.2		302.4	
Dry Weight + Tare	248		260.6		245.4			257.1		277.4		272.3	
Weight of Tare	32.2		34.4		33.5			33.1		34.3		34.9	
Moisture Content	12.4	12.4	12.3	12.3	12.6	12.6		12.5	12.5	12.7	12.7	12.7	12.7

Unconfined	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM			14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
PSI	189	159	320	313	290	259		223	192	318	292	343	361
Average PSI	174		317		275			208		305		352	

MDOT SS 205 | BCD Project No. 070904 | Material: SM A-2-4; Material 6 Cement Treated - 5% | Optimum Moisture + 3% | Max Dry Density 117.8

Unit Weight	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 40 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3	
Wt of Mold + Soil	4037.4	4035.7	4082.7	4073.5	4078.5	4082.8		4035.5	4028.7	4074.5	4076.6	4081.8	4083.8
Weight of Mold	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8		2091.8	2091.8	2091.8	2091.8	2091.8	2091.8
Wet Unit Weight	128.7	128.6	131.7	131.1	131.4	131.7		128.6	128.1	131.1	131.3	131.6	131.7
Dry Unit Weight	112.2	112.1	114.0	113.5	114.2	114.5		112.1	111.7	114.2	114.3	114.5	114.6
% Compaction	95.3	95.2	96.8	96.3	97.0	97.2		95.2	94.9	97.0	97.1	97.2	97.3
Avg % Compaction	95.2		96.6		97.1			95.0		97.0		97.3	

Moisture Content	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 40 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3	
Wet Weight + Tare	260.1		311.9		353.3			260.1		345.1		336.0	
Dry Weight + Tare	231.2		274.7		311.9			231.2		305.9		296.8	
Weight of Tare	33.8		34.6		36.7			33.8		41.3		34.4	
Moisture Content	14.6	14.6	15.5	15.5	15.0	15.0		14.6	14.6	14.8	14.8	14.9	14.9

Unconfined	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 30 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 30 Blow OM+3	
PSI	148	128	159	156	161	175		177	169	190	191	214	206
Average PSI	138		158		168			173		191		210	

MDOT SS 205 BCD Project No. 070904 Material: SM A-2-4 Material 6R Cement Treated - 4% Optimum Moisture Max Dry Density 117.8

Unit Weight	7 Day, 4% Cement		7 Day, 4% Cement		7 Day, 4% Cement		14 Day, 4% Cement		14 Day, 4% Cement		14 Day, 4% Cement	
Weight of Mold + Soil	3942.1	3935.5	4080.8	4079.6	4112.6	4106.7	3932.3	3934.3	4078.8	4075.3	4107.5	4099.7
Weight of Mold	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0
Wet Unit Weight	123.0	122.6	132.2	132.1	134.3	133.9	122.4	122.5	132.1	131.8	134.0	133.4
Dry Unit Weight	109.6	109.3	117.6	117.6	119.5	119.1	108.8	108.9	117.3	117.1	119.1	118.6
Percent Compaction	93.1	92.7	99.9	99.8	101.4	101.1	92.4	92.5	99.6	99.4	101.1	100.7
Average Compaction	92.9		99.8		101.3		92.4		99.5		100.9	
											49.5	
Moisture Content	7 Day, 4% Cement		7 Day, 4% Cement		7 Day, 4% Cement		14 Day, 4% Cement		14 Day, 4% Cement		14 Day, 4% Cement	
Wet Weight + Tare	225.6		206.7		220.5		231.8		215.4		245.6	
Dry Weight + Tare	204.9		187.8		199.9		209.8		195.2		222.1	
Weight of Tare	35.3		35		33.8		33.2		34.5		34.2	
Moisture Content	12.2	12.2	12.4	12.4	12.4	12.4	12.5	12.5	12.6	12.6	12.5	12.5
Unconfined	10 Blows		25 Blows		40 Blows		10 Blows		25 Blows		40 Blows	
PSI	265	237	352	357	344	359	278	307	390	426	400	422
Average PSI	251.0		354.5		351.5		292.5		408.0		411.0	

MDOT SS 205 BCD Project No. 070904 Material: SM A-2-4 Material 6R Cement Treated - 4% Optimum Moisture +3% Max Dry Density 117.8

Unit Weight	7 Day, 4% Cement		7 Day, 4% Cement		7 Day, 4% Cement			14 Day, 4% Cement		14 Day, 4% Cement		14 Day, 4% Cement	
Weight of Mold + Soil	4029.2	4024.3	4054.6	4061.4	4069.9	4071.1		4029.1	4026.7	4062.1	4060.2	4070.1	4071.3
Weight of Mold	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0		2082.0	2082.0	2082.0	2082.0	2082.0	2082.0
Wet Unit Weight	128.8	128.5	130.5	130.9	131.5	131.6		128.8	128.6	131.0	130.8	131.5	131.6
Dry Unit Weight	111.5	111.2	113.3	113.7	114.1	114.1		111.7	111.5	113.3	113.2	114.0	114.0
Percent Compaction	94.6	94.4	96.2	96.5	96.8	96.9		94.8	94.7	96.2	96.1	96.7	96.8
Average Compaction	94.5		96.3		96.9			94.7		96.2		96.8	
												49.5	
Moisture Content	7 Day, 4% Cement		7 Day, 4% Cement		7 Day, 4% Cement			14 Day, 4% Cement		14 Day, 4% Cement		14 Day, 4% Cement	
Wet Weight + Tare	276.8		235.8		233.5			248.2		232.1		257.7	
Dry Weight + Tare	244		209.1		207.1			219.6		205.4		228.2	
Weight of Tare	33.1		33.1		34.1			33		33.7		36.5	
Moisture Content	15.6	15.6	15.2	15.2	15.3	15.3		15.3	15.3	15.6	15.6	15.4	15.4
Unconfined	10 Blows		25 Blows		40 Blows			10 Blows		25 Blows		40 Blows	
PSI	210	206	172	167	165	160		240	250	197	205	176	186
Average PSI	208.0		169.5		162.5			245.0		201.0		181.0	

MDOT SS 205 BCD Project No. 070904 Material: SC A-2-4; Material 7 Optimum Moisture Max Dry Density 117.2

Cement Treated - 5%

Unit Weight	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Weight of Mold + Soil	3844.5	3847.6	4050.2	4045.2	4114.5	4114.1	3846.5	3851.7	4049.6	4054.3	4114.1	4110.0
Weight of Mold	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8
Wet Unit Weight	115.9	116.1	129.5	129.2	133.8	133.8	116.1	116.4	129.5	129.8	133.8	133.5
Dry Unit Weight	102.7	102.9	114.4	114.1	118.7	118.7	103.2	103.5	114.5	114.8	118.4	118.1
Percent Compaction	87.7	87.8	97.6	97.4	101.3	101.3	88.1	88.3	97.7	97.9	101.0	100.8
Average Compaction	87.7		97.5		101.3		88.2		97.8		100.9	

Moisture Content	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Wet Weight + Tare	248.2		300		307.2		285		284.9		296.6	
Dry Weight + Tare	223.8		268.9		276.2		257.1		255.9		266.3	
Weight of Tare	33.6		33.9		31.6		33.1		34		33.2	
Moisture Content	12.8	12.8	13.2	13.2	12.7	12.7	12.5	12.5	13.1	13.1	13.0	13.0

Unconfined	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
PSI	141	113	297	284	364	352	189	153	333	310	513	455
Average PSI	127		291		358		171		322		484	

MDOT SS 205 | BCD Project No. 070904 | Material: SC A-2-4; Material 7 Cement Treated - 5% | Optimum Moisture + 3% | Max Dry Density 117.2

Unit Weight	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 40 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3	
Wt of Mold + Soil	3979.5	3988.2	4079.1	4081.7	4096.1	4086.6		3977.3	3975.9	4079.6	4084.1	4090.4	4089.7
Weight of Mold	2091.8	2091.8	2091.8	2091.8	2091.8	2091.8		2091.8	2091.8	2091.8	2091.8	2091.8	2091.8
Wet Unit Weight	124.9	125.4	131.4	131.6	132.6	131.9		124.7	124.6	131.5	131.8	132.2	132.1
Dry Unit Weight	107.7	108.2	113.3	113.4	113.8	113.3		107.7	107.6	113.1	113.4	113.9	113.8
% Compaction	91.9	92.3	96.7	96.8	97.1	96.7		91.9	91.8	96.5	96.8	97.2	97.1
Avg % Compaction	92.1		96.7		96.9			91.9		96.6		97.2	
Moisture Content	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 40 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3	
Wet Weight + Tare	283.0		304.6		302.5			283.3		306.6		284.5	
Dry Weight + Tare	248.6		267.3		265.5			249.6		268.7		249.8	
Weight of Tare	33.1		34.3		40.8			36.0		34.8		33.8	
Moisture Content	16.0	16.0	16.0	16.0	16.5	16.5		15.8	15.8	16.2	16.2	16.1	16.1
Unconfined	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 30 Blow OM+3			14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 30 Blow OM+3	
PSI	197	215	235	235	242	238		225	255	290	302	296	297
Average PSI	206		235		240			240		296		297	

MDOT SS 205 BCD Project No. 070904 Material: CL A-7-6; Material 1 Optimum Moisture Max Dry Density 105.5

Lime/Fly Ash Treated (3%L/12%FA)

Unit Weight	14 Day, 10 blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM			28 Day, 10 Blow OM		28 Day, 25 Blow OM		28 Day, 40 Blow OM	
Weight of Mold + Soil	3704.7	3708.1	3875.3	3862.3	3931.6	3939.4		3706.3	3707.5	3870.6	3863.5	3940.1	3950.7
Weight of Mold	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8		2089.8	2089.8	2089.8	2089.8	2089.8	2089.8
Wet Unit Weight	106.8	107.0	118.1	117.2	121.8	122.3		106.9	107.0	117.8	117.3	122.4	123.1
Dry Unit Weight	91.6	91.8	101.0	100.3	104.0	104.5		91.4	91.5	100.8	100.4	104.5	105.1
Percent Compaction	86.8	87.0	95.7	95.0	98.6	99.0		86.7	86.7	95.5	95.2	99.1	99.6
Average Compaction	86.9		95.4		98.8			86.7		95.4		99.3	

Moisture Content	14 Day, 10 blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM			28 Day, 10 Blow OM		28 Day, 25 Blow OM		28 Day, 40 Blow OM	
Wet Weight + Tare	227.8		295.1		305.1			273.6		306.3		286	
Dry Weight + Tare	200.3		257.4		265.4			238.8		267.1		249.2	
Weight of Tare	34.7		34.8		33.1			33.3		34.4		33.9	
Moisture Content	16.6	16.6	16.9	16.9	17.1	17.1		16.9	16.9	16.8	16.8	17.1	17.1

Unconfined	14 Day, 10 blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM			28 Day, 10 Blow OM		28 Day, 25 Blow OM		28 Day, 40 Blow OM	
PSI	65	58	217	184	279	276		81	73	212	238	319	384
Average PSI	62		201		278			77		225		352	

MDOT SS 205 BCD Project No. 070904 Material: CL A-7-6; Material 1 Lime/Fly Ash Treated (3%L/12%FA) Optimum Moisture + 3% Max Dry Density 105.5

Unit Weight	14 Day, 10 blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3		X	28 Day, 10 Blow OM+3		28 Day, 25 Blow OM+3		28 Day, 40 Blow OM+3	
Wt of Mold+Soil	3812.0	3799.9	3943.6	3963.6	3992.5	3987.9	X	3794.4	3782.6	3963.4	3949.6	3982.6	3975.9
Weight of Mold	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	X	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8
Wet Unit Weight	113.9	113.1	122.6	123.9	125.8	125.5	X	112.7	112.0	123.9	123.0	125.2	124.7
Dry Unit Weight	95.2	94.6	102.2	103.3	105.2	105.0	X	94.4	93.7	103.1	102.3	104.6	104.2
% Compaction	90.3	89.6	96.8	97.9	99.7	99.5	X	89.4	88.8	97.7	97.0	99.2	98.8
Avg % Comp	89.9		97.4		99.6		X	89.1		97.4		99.0	
							X					49.5	
% Moisture	14 Day, 10 blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3		X	28 Day, 10 Blow OM+3		28 Day, 25 Blow OM+3		28 Day, 40 Blow OM+3	
Wet Weight+Tare	273.0		294.3		262.3		X	285.7		303.7		306.4	
Dry Weight+Tare	233.8		251.0		224.8		X	244.7		258.4		261.6	
Weight of Tare	34.0		34.6		33.3		X	34.2		34.2		33.8	
% Moisture	19.6	19.6	20.0	20.0	19.6	19.6	X	19.5	19.5	20.2	20.2	19.7	19.7
							X						
Unconfined	14 Day, 10 blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3		X	28 Day, 10 Blow OM+3		28 Day, 25 Blow OM+3		28 Day, 40 Blow OM+3	
PSI	113	119	288	267	272	277	X	134	127	323	323	362	352
Average PSI	116		278		275		X	131		323		357	

MDOT SS 205 BCD Project No. 070904 Material: CL A-6; Material 2 Optimum Moisture Max Dry Density 104.5

Lime/Fly Ash Treated (3%L/12%FA)

Unit Weight	14 Day, 10 blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM			28 Day, 10 Blow OM		28 Day, 25 Blow OM		28 Day, 40 Blow OM	
Weight of Mold + Soil	3754.6	3752.4	3930.5	3919.9	3980.2	3975.5		3748.2	3756.2	3913.5	3924.7	3970.4	3974.8
Weight of Mold	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8		2089.8	2089.8	2089.8	2089.8	2089.8	2089.8
Wet Unit Weight	110.1	110.0	121.7	121.0	125.0	124.7		109.7	110.2	120.6	121.4	124.4	124.7
Dry Unit Weight	92.8	92.7	103.0	102.4	105.4	105.2		92.2	92.7	101.7	102.3	104.9	105.2
Percent Compaction	88.8	88.7	98.6	98.0	100.9	100.6		88.2	88.7	97.3	97.9	100.4	100.6
Average Compaction	88.7		98.3		100.8			88.5		97.6		100.5	

Moisture Content	14 Day, 10 blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM			28 Day, 10 Blow OM		28 Day, 25 Blow OM		28 Day, 40 Blow OM	
Wet Weight + Tare	271.4		261.9		310.8			274.4		277		305	
Dry Weight + Tare	234.1		226.7		267.4			236.1		238.8		262.6	
Weight of Tare	34.3		33.1		33.9			33.9		33.2		34.2	
Moisture Content	18.7	18.7	18.2	18.2	18.6	18.6		18.9	18.9	18.6	18.6	18.6	18.6

Unconfined	14 Day, 10 blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM			28 Day, 10 Blow OM		28 Day, 25 Blow OM		28 Day, 40 Blow OM	
PSI	61	56	191	175	222	219		82	83	227	231	290	286
Average PSI	59		183		221			83		229		288	

MDOT SS 205 BCD Project No. 070904 Material: CL A-6; Material 2 Lime/Fly Ash Treated (3%L/12%FA) Optimum Moisture + 3% Max Dry Density 104.5

Unit Weight	14 Day, 10 blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3		X	28 Day, 10 Blow OM+3		28 Day, 25 Blow OM+3		28 Day, 40 Blow OM+3	
Wt of Mold+Soil	3853.7	3828.6	3957.5	3954.6	3970.7	3976.5	X	3812.1	3813.8	3956.1	3955.2	3976.6	3979.4
Weight of Mold	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	X	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8
Wet Unit Weight	116.7	115.0	123.5	123.3	124.4	124.8	X	113.9	114.0	123.4	123.4	124.8	125.0
Dry Unit Weight	96.5	95.1	101.4	101.3	102.9	103.2	X	93.9	94.0	99.6	99.6	103.1	103.3
% Compaction	92.4	91.0	97.1	96.9	98.4	98.7	X	89.9	90.0	95.3	95.3	98.7	98.9
Avg % Comp	91.7		97.0		98.6		X	89.9		95.3		98.8	
							X						
% Moisture	14 Day, 10 blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3		X	28 Day, 10 Blow OM+3		28 Day, 25 Blow OM+3		28 Day, 40 Blow OM+3	
Wet Weight+Tare	264.5		294.4		295.9		X	292.6		289.1		312.7	
Dry Weight+Tare	224.8		247.9		250.7		X	247.2		239.8		264.5	
Weight of Tare	34.6		34.3		34.8		X	33.8		33.4		34.8	
% Moisture	20.9	20.9	21.8	21.8	20.9	20.9	X	21.3	21.3	23.9	23.9	21.0	21.0
							X						
Unconfined	14 Day, 10 blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3		X	28 Day, 10 Blow OM+3		28 Day, 25 Blow OM+3		28 Day, 40 Blow OM+3	
PSI	100	68	104	108	121	138	X	84	90	165	163	167	182
Average PSI	84		106		130		X	87		164		175	

MDOT SS 205 BCD Project No. 070904 Material: ML A-4; Material 3 Optimum Moisture Max Dry Density 108.2

Lime/Fly Ash Treated (3%L/12%FA)

Unit Weight	14 Day, 10 blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM			28 Day, 10 Blow OM		28 Day, 25 Blow OM		28 Day, 40 Blow OM	
Weight of Mold + Soil	3764.0	3768.3	3929.3	3925.1	3997.3	3986.4		3757.4	3759.9	3929.3	3926.9	3985.5	3979.0
Weight of Mold	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8		2089.8	2089.8	2089.8	2089.8	2089.8	2089.8
Wet Unit Weight	110.7	111.0	121.7	121.4	126.2	125.4		110.3	110.5	121.7	121.5	125.4	124.9
Dry Unit Weight	96.9	97.1	106.4	106.2	110.4	109.8		96.5	96.6	106.5	106.3	109.9	109.5
Percent Compaction	89.5	89.8	98.3	98.1	102.1	101.5		89.2	89.3	98.4	98.3	101.6	101.2
Average Compaction	89.7		98.2		101.8			89.2		98.3		101.4	

Moisture Content	14 Day, 10 blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM			28 Day, 10 Blow OM		28 Day, 25 Blow OM		28 Day, 40 Blow OM	
Wet Weight + Tare	254.8		243.4		252.1			262		268.6		268.3	
Dry Weight + Tare	227.1		217.2		224.8			233.5		239.3		239.3	
Weight of Tare	33.3		34.4		33.3			34.7		33.9		33.2	
Moisture Content	14.3	14.3	14.3	14.3	14.3	14.3		14.3	14.3	14.3	14.3	14.1	14.1

Unconfined	14 Day, 10 blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM			28 Day, 10 Blow OM		28 Day, 25 Blow OM		28 Day, 40 Blow OM	
PSI	106	151	249	281	385	311		323	362	708	742	827	845
Average PSI	129		265		348			343		725		836	

MDOT SS 205 BCD Project No. 070904 Material: ML A-4; Material 3 Lime/Fly Ash Treated (3%L/12%FA) Optimum Moisture + 3% Max Dry Density 108.2

Unit Weight	14 Day, 10 blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3		X	28 Day, 10 Blow OM+3		28 Day, 25 Blow OM+3		28 Day, 40 Blow OM+3	
Wt of Mold+Soil	3837.6	3837.1	3994.2	3995.1	4009.4	4006.7	X	3836.5	3838.0	3995.8	3999.2	4009.4	4006.4
Weight of Mold	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	X	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8
Wet Unit Weight	115.6	115.6	126.0	126.0	127.0	126.8	X	115.5	115.6	126.1	126.3	127.0	126.8
Dry Unit Weight	98.6	98.6	107.3	107.3	107.9	107.8	X	98.6	98.7	107.4	107.6	108.0	107.8
% Compaction	91.2	91.1	99.2	99.2	99.8	99.6	X	91.1	91.2	99.2	99.4	99.8	99.7
Avg % Comp	91.1		99.2		99.7		X	91.1		99.3		99.7	
							X						
% Moisture	14 Day, 10 blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3		X	28 Day, 10 Blow OM+3		28 Day, 25 Blow OM+3		28 Day, 40 Blow OM+3	
Wet Weight+Tare	296.1		291.6		282.0		X	296.1		291.6		296.9	
Dry Weight+Tare	257.3		253.4		244.8		X	257.3		253.4		257.7	
Weight of Tare	31.7		33.9		33.8		X	31.7		33.9		34.3	
% Moisture	17.2	17.2	17.4	17.4	17.6	17.6	X	17.2	17.2	17.4	17.4	17.5	17.5
							X						
Unconfined	14 Day, 10 blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3		X	28 Day, 10 Blow OM+3		28 Day, 25 Blow OM+3		28 Day, 40 Blow OM+3	
PSI	120	115	223	238	194	185	X	403	401	550	540	401	415
Average PSI	118		231		190		X	402		545		408	

MDOT SS 205 BCD Project No. 070904 Material: CL A-4; Material 4 Optimum Moisture Max Dry Density 116.6

Lime/Fly Ash Treated (3%L/12%FA)

Unit Weight	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Weight of Mold + Soil	3912.3	3899.0	4052.4	4050.6	4123.3	4116.9	3887.3	3897.9	4050.1	4049.1	4103.6	4090.0
Weight of Mold	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8
Wet Unit Weight	120.5	119.7	129.8	129.7	134.5	134.1	118.9	119.6	129.7	129.6	133.2	132.3
Dry Unit Weight	106.6	105.8	114.2	114.1	119.6	119.3	104.7	105.3	114.2	114.2	118.5	117.7
Percent Compaction	91.4	90.7	97.9	97.8	102.6	102.3	89.8	90.3	98.0	97.9	101.6	100.9
Average Compaction	91.1		97.9		102.4		90.0		97.9		101.3	

Moisture Content	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
Wet Weight + Tare	243.8		220.4		221.2		216.1		225.4		221.2	
Dry Weight + Tare	219.4		198.3		200.5		194.2		202.6		200.5	
Weight of Tare	33.2		36.6		33.8		33		33.9		33.8	
Moisture Content	13.1	13.1	13.7	13.7	12.4	12.4	13.6	13.6	13.5	13.5	12.4	12.4

Unconfined	7 Day, 10 blow OM		7 Day, 25 Blow OM		7 Day, 40 Blow OM		14 Day, 10 Blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM	
PSI	233	213	360	352	398	461	364	368	605	574	713	794
Average PSI	223		356		430		366		590		754	

MDOT SS 205 BCD Project No. 070904 Material: CL A-4; Material 4 Lime/Fly Ash Treated (3%L/12%FA) Optimum Moisture + 3% Max Dry Density 116.6

Unit Weight	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 40 Blow OM+3		14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3	
Wt of Mold + Soil	4029.8	4021	4066.3	4069.3	4058.1	4061.1	4011.7	4006.9	4064.8	4060.7	4067.2	4071.8
Weight of Mold	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8
Wet Unit Weight	128.3	127.7	130.7	130.9	130.2	130.4	127.1	126.8	130.6	130.4	130.8	131.1
Dry Unit Weight	111.3	110.8	113.4	113.6	112.9	113.0	109.8	109.5	112.5	112.2	113.3	113.5
% Compaction	95.5	95.0	97.2	97.4	96.8	96.9	94.2	93.9	96.5	96.3	97.1	97.4
Avg % Compaction	95.2		97.3		96.9		94.1		96.4		97.3	

Moisture Content	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 30 Blow OM+3		14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 30 Blow OM+3	
Wet Weight + Tare	223		232.6		249.6		215.8		235.1		231.7	
Dry Weight + Tare	198		206.3		220.7		191.1		208.1		206.1	
Weight of Tare	34.4		34.3		32.3		34.4		40.8		40.6	
Moisture Content	15.28	15.28	15.29	15.29	15.34	15.34	15.76	15.76	16.14	16.14	15.47	15.47

Unconfined	7 Day, 10 blow OM+3		7 Day, 25 Blow OM+3		7 Day, 40 Blow OM+3		14 Day, 10 Blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3	
PSI	265	265	221	220	200	209	511	545	399	391	496	447
Average PSI	265		221		205		528		395		472	

MDOT SS 205 BCD Project No. 070904 Material: SC A-2-4; Material 7 Lime/Fly Ash Treated (3%L/12%FA) Optimum Moisture Max Dry Density 113.5

Unit Weight	14 Day, 10 blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM			28 Day, 10 Blow OM		28 Day, 25 Blow OM		28 Day, 40 Blow OM	
Wt of Mold+Soil	3833.2	3806.6	4010.2	3994.4	4055.8	4062.4		3812.6	3810.2	3992.2	3999.8	4066.0	4053.4
Weight of Mold	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8		2089.8	2089.8	2089.8	2089.8	2089.8	2089.8
Wet Unit Weight	115.3	113.5	127.0	126.0	130.0	130.5		113.9	113.8	125.8	126.3	130.7	129.9
Dry Unit Weight	101.2	99.6	111.3	110.4	113.7	114.1		99.7	99.6	110.3	110.7	114.2	113.5
% Compaction	89.2	87.8	98.1	97.3	100.2	100.5		87.9	87.7	97.1	97.5	100.6	100.0
Avg % Comp	88.5		97.7		100.4			87.8		97.3		100.3	

% Moisture	14 Day, 10 blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM			28 Day, 10 Blow OM		28 Day, 25 Blow OM		28 Day, 40 Blow OM	
Wet Weight+Tare	298.5		282.3		288.8			300.3		282.3		270.7	
Dry Weight+Tare	266.1		251.6		256.8			267.1		251.6		240.8	
Weight of Tare	33.9		34.2		33.8			34.4		34.2		33.4	
% Moisture	14.0	14.0	14.1	14.1	14.3	14.3		14.3	14.3	14.1	14.1	14.4	14.4

Unconfined	14 Day, 10 blow OM		14 Day, 25 Blow OM		14 Day, 40 Blow OM			28 Day, 10 Blow OM		28 Day, 25 Blow OM		28 Day, 40 Blow OM	
PSI	115	113	307	236	295	304		204	198	515	524	602	554
Average PSI	114		272		300			201		520		578	

MDOT SS 205 BCD Project No. 070904 Material: SC A-2-4; Material 7 Optimum Moisture + 3% Max Dry Density 113.5

Lime/Fly Ash Treated (3%L/12%FA)

Unit Weight	14 Day, 10 blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3		X	28 Day, 10 Blow OM+3		28 Day, 25 Blow OM+3		28 Day, 40 Blow OM+3	
Wt of Mold+Soil	3904.5	3905.9	4047.0	4050.5	4070.2	4063.5	X	3911.7	3899.3	4049.3	4051.0	4064.5	4060.3
Weight of Mold	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	X	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8
Wet Unit Weight	120.0	120.1	129.4	129.7	131.0	130.5	X	120.5	119.7	129.6	129.7	130.6	130.3
Dry Unit Weight	102.9	103.0	110.8	111.0	112.1	111.7	X	103.0	102.3	110.9	111.0	111.7	111.5
% Compaction	90.7	90.7	97.7	97.8	98.8	98.4	X	90.7	90.1	97.7	97.8	98.4	98.2
Avg % Comp	90.7		97.7		98.6		X	90.4		97.8		98.3	
							X						
% Moisture	14 Day, 10 blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3		X	28 Day, 10 Blow OM+3		28 Day, 25 Blow OM+3		28 Day, 40 Blow OM+3	
Wet Weight+Tare	258.2		327.1		294.6		X	304.7		287.0		277.7	
Dry Weight+Tare	225.9		285.0		257.1		X	265.2		250.7		242.4	
Weight of Tare	31.6		34.3		34.4		X	33.1		34.8		33.9	
% Moisture	16.6	16.6	16.8	16.8	16.8	16.8	X	17.0	17.0	16.8	16.8	16.9	16.9
							X						
Unconfined	14 Day, 10 blow OM+3		14 Day, 25 Blow OM+3		14 Day, 40 Blow OM+3		X	28 Day, 10 Blow OM+3		28 Day, 25 Blow OM+3		28 Day, 40 Blow OM+3	
PSI	147	147	223	213	225	224	X	255	246	403	381	346	359
Average PSI	147		218		225		X	251		392		353	

MDOT SS 205 BCD Project No. 070904 Material: SC A-2-4; Material 8 Lime/Fly Ash Treated (4%L/8%FA) Optimum Moisture Max Dry Density 122.7

Unit Weight	14 Day, 4/8% LFA		14 Day, 4/8% LFA		14 Day, 4/8% LFA			28 Day, 4/8% LFA		28 Day, 4/8% LFA		28 Day, 4/8% LFA	
Weight of Mold + Soil	3987.9	3989.5	4115.5	4111.2	4135.8	4138.3		3983.8	3990.6	4120.4	4120.0	4140.0	4144.9
Weight of Mold	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0		2082.0	2082.0	2082.0	2082.0	2082.0	2082.0
Wet Unit Weight	126.1	126.2	134.5	134.2	135.8	136.0		125.8	126.2	134.8	134.8	136.1	136.4
Dry Unit Weight	113.4	113.5	120.9	120.7	122.1	122.2		113.2	113.6	121.2	121.2	122.5	122.8
Percent Compaction	92.4	92.5	98.5	98.3	99.5	99.6		92.2	92.6	98.8	98.8	99.8	100.0
Average Compaction	92.5		98.4		99.6			92.4		98.8		99.9	
												49.5	
Moisture Content	14 Day, 4/8% LFA		14 Day, 4/8% LFA		14 Day, 4/8% LFA			28 Day, 4/8% LFA		28 Day, 4/8% LFA		28 Day, 4/8% LFA	
Wet Weight + Tare	257.1		290.1		222.8			217		239.1		307.8	
Dry Weight + Tare	234.7		264.2		203.6			198.7		218.4		280.6	
Weight of Tare	34.1		33.6		33.1			34.3		33.8		36.5	
Moisture Content	11.2	11.2	11.2	11.2	11.3	11.3		11.1	11.1	11.2	11.2	11.1	11.1
Unconfined	10 Blows		25 Blows		40 Blows			10 Blows		25 Blows		40 Blows	
PSI	279	272	314	350	307	360		493	536	527	520	542	592
Average PSI	275.5		332.0		333.5			514.5		523.5		567.0	

MDOT SS 205 BCD Project No. 070904 Material: SC A-2-4; Material 8 Lime/Fly Ash Treated (4%L/8%FA) Optimum Moisture + 3% Max Dry Density 122.7

Unit Weight	14 Day, 4/8% LFA		14 Day, 4/8% LFA		14 Day, 4/8% LFA			28 Day, 4/8% LFA		28 Day, 4/8% LFA		28 Day, 4/8% LFA	
Weight of Mold + Soil	4071.9	4069.9	4070.5	4075.1	4072.9	4073.0		4070.1	4069.4	4081.1	4080.9	4074.9	4073.7
Weight of Mold	2082.0	2082.0	2082.0	2082.0	2082.0	2082.0		2082.0	2082.0	2082.0	2082.0	2082.0	2082.0
Wet Unit Weight	131.6	131.5	131.5	131.8	131.7	131.7		131.5	131.4	132.2	132.2	131.8	131.7
Dry Unit Weight	115.2	115.1	115.3	115.6	115.4	115.4		115.4	115.3	116.0	116.0	115.6	115.5
Percent Compaction	93.9	93.8	94.0	94.2	94.0	94.0		94.0	94.0	94.5	94.5	94.2	94.1
Average Compaction	93.8		94.1		94.0			94.0		94.5		94.2	
												49.5	
Moisture Content	14 Day, 4/8% LFA		14 Day, 4/8% LFA		14 Day, 4/8% LFA			28 Day, 4/8% LFA		28 Day, 4/8% LFA		28 Day, 4/8% LFA	
Wet Weight + Tare	256		229.6		247.3			208.8		233.5		284.3	
Dry Weight + Tare	228.3		205.5		220.8			187.4		209		253.8	
Weight of Tare	34.1		33.6		33.1			34.3		33.8		36.5	
Moisture Content	14.3	14.3	14.0	14.0	14.1	14.1		14.0	14.0	14.0	14.0	14.0	14.0
Unconfined	10 Blows		25 Blows		40 Blows			10 Blows		25 Blows		40 Blows	
PSI	131	150	133	121	107	113		264	290	244	210	195	211
Average PSI	140.5		127.0		110.0			277.0		227.0		203.0	

Appendix D

Resilient Modulus Results

Virgin Soils at Optimum Moisture Content

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Low, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 1
Sample No.:	1		
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-7-6		
Group Index:	23	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS		
TOTAL % PASSING BY WEIGHT		
No. 3" Sieve		100
No. 2" Sieve		100
No. 1 1/2" Sieve		100
No. 1" Sieve		100
No. 3/4" Sieve		100
No. 1/2" Sieve		100
No. 4 Sieve		100
No. 10 Sieve		100
No. 40 Sieve		100
No.100 Sieve		100
No.200 Sieve		90
No.270 Sieve		Not Determined
% Silt		
% Clay		

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	43
Plastic Limit:	18
Plasticity Index:	25
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	107.9
Optimum Moisture (%):	16.6

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Low, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	90.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	97.1
Target Moisture Content (%):	16.6

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.00

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	
Additional Water Needed (ml):	

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	113.2
Wet Weight of Sample (g):	2943.2
Adjusted Wet Weight (g):	3034.7
Layer Weight (g):	379.3

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		5	5	5			
Specimen Wet Weight (g):		2935.7	2940.1	2931.1			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	41.80	41.10	42.30			
	Wet Weight + Tare (g):	381.00	379.60	400.40			
	Dry Weight + Tare (g):	331.4	331.0	348.80			
Moisture Content (%):		17.1	16.8	16.8			
Wet Density (pcf):		112.9	113.1	112.8			
Dry Density (pcf):		96.4	96.9	96.5			
Percent Differences	Target & Specimen Dry Density	0.7	0.2	0.6			
	Target & Specimen Moisture	0.5	0.2	0.2			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	9702	9859
2	13.9	5.8	5.8	25.5	3.8	8.1	8812	8832
3	11.5	3.8	3.8	19.1	3.6	7.7	7620	7620
4	9.2	1.9	1.9	13.0	3.4	7.3	6523	6219
5	19.3	7.8	7.8	34.9	5.4	11.5	9003	8965
6	16.8	5.8	5.8	28.4	5.2	11.0	8148	8143
7	14.6	3.9	3.9	22.4	5.0	10.7	7108	7195
8	12.1	1.9	1.9	15.9	4.8	10.2	6062	6038
9	22.2	7.8	7.8	37.8	6.8	14.4	8208	8223
10	19.8	5.8	5.8	31.4	6.6	14.0	7429	7513
11	17.4	3.8	3.8	25.0	6.4	13.6	6564	6699
12	15.1	1.9	1.9	18.9	6.2	13.2	5599	5796
13	26.3	7.8	7.8	41.9	8.7	18.5	7580	7336
14	23.8	5.8	5.8	35.4	8.5	18.0	6967	6787
15	21.5	3.9	3.9	29.3	8.3	17.6	6187	6180
16	19.1	1.9	1.9	22.9	8.1	17.2	5346	5444

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
Low Compaction Effort

Replicate Test: REP 1

K_1 =	695.4
K_2 =	0.582
K_3 =	-2.022

n = 16

SES = 0.001

Sy = 0.075

Se = 0.010

Se/Sy = 0.131

R^2 = 0.983

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	9657	9774
2	13.8	5.8	5.8	25.4	3.8	8.0	8842	8826
3	11.4	3.8	3.8	19.0	3.6	7.6	7637	7656
4	9.2	1.9	1.9	13.0	3.4	7.3	6658	6283
5	19.3	7.8	7.8	34.9	5.4	11.5	8827	8836
6	16.8	5.8	5.8	28.4	5.2	11.0	8039	8063
7	14.6	3.9	3.9	22.4	5.0	10.7	7054	7159
8	12.1	1.9	1.9	15.9	4.8	10.2	6047	6051
9	22.2	7.8	7.8	37.8	6.8	14.4	8040	8063
10	19.9	5.8	5.8	31.5	6.6	14.1	7309	7376
11	17.5	3.9	3.9	25.3	6.4	13.6	6471	6672
12	15.1	1.9	1.9	18.9	6.2	13.2	5551	5767
13	26.3	7.8	7.8	41.9	8.7	18.5	7422	7144
14	23.8	5.8	5.8	35.4	8.5	18.0	6824	6635
15	21.5	3.9	3.9	29.3	8.3	17.6	6100	6066
16	19.0	1.9	1.9	22.8	8.1	17.1	5290	5381

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
Low Compaction Effort

Replicate Test: REP 2

K_1 =	709.1
K_2 =	0.563
K_3 =	-2.078

n = 16

SES = 0.002

Sy = 0.074

Se = 0.011

Se/Sy = 0.152

R^2 = 0.977

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	10321	10557
2	13.9	5.8	5.8	25.5	3.8	8.1	9574	9525
3	11.4	3.8	3.8	19.0	3.6	7.6	8332	8311
4	9.0	1.8	1.8	12.6	3.4	7.2	7089	6762
5	19.3	7.8	7.8	34.9	5.4	11.5	9482	9493
6	16.8	5.8	5.8	28.4	5.2	11.0	8706	8681
7	14.5	3.9	3.9	22.3	5.0	10.6	7694	7744
8	12.2	1.9	1.9	16.0	4.9	10.3	6530	6538
9	22.3	7.8	7.8	37.9	6.8	14.5	8566	8592
10	19.8	5.8	5.8	31.4	6.6	14.0	7859	7922
11	17.4	3.8	3.8	25.0	6.4	13.6	6972	7113
12	15.1	1.9	1.9	18.9	6.2	13.2	5953	6206
13	26.3	7.8	7.8	41.9	8.7	18.5	7831	7588
14	23.8	5.8	5.8	35.4	8.5	18.0	7249	7060
15	21.4	3.8	3.8	29.0	8.3	17.6	6491	6430
16	19.1	1.9	1.9	22.9	8.1	17.2	5620	5739

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
Low Compaction Effort

Replicate Test: REP 3

K_1 =	782.4
K_2 =	0.557
K_3 =	-2.144

n = 16

SES = 0.001
Sy = 0.075

Se = 0.010
Se/Sy = 0.136
R^2 = 0.981

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Standard, Optimum

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	1
USCS:	CL
AASHTO:	A-7-6
Group Index:	23

Description:	Material 1
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	90
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	43
Plastic Limit:	18
Plasticity Index:	25
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	107.9
Optimum Moisture (%):	16.6

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Standard, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	95.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	102.5
Target Moisture Content (%):	16.6

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	
Additional Water Needed (ml):	

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	119.5
Wet Weight of Sample (g):	3106.7
Adjusted Wet Weight (g):	3203.3
Layer Weight (g):	400.4

Molded Specimen Data							
Specimen No.:		2 REP 1	3 REP 2	4 REP 3			
Number of Blows per Layer:		8	8	8			
Specimen Wet Weight (g):		3117.2	3125.9	3132.6			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	41.20	42.40	40.20			
	Wet Weight + Tare (g):	415.40	441.00	401.90			
	Dry Weight + Tare (g):	362.3	385.30	350.40			
Moisture Content (%):		16.5	16.2	16.6			
Wet Density (pcf):		119.9	120.3	120.5			
Dry Density (pcf):		102.9	103.5	103.4			
Percent Differences	Target & Specimen Dry Density	0.4	0.9	0.8			
	Target & Specimen Moisture	0.1	0.4	0.0			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	10711	11042
2	13.9	5.8	5.8	25.5	3.8	8.1	9553	9707
3	11.6	3.9	3.9	19.4	3.6	7.7	8199	8265
4	9.2	1.9	1.9	13.0	3.4	7.3	6736	6481
5	19.3	7.8	7.8	34.9	5.4	11.5	10452	10374
6	16.8	5.8	5.8	28.4	5.2	11.0	9256	9252
7	14.4	3.8	3.8	22.0	5.0	10.6	7997	7961
8	12.1	1.9	1.9	15.9	4.8	10.2	6633	6549
9	22.3	7.8	7.8	37.9	6.8	14.5	9993	9779
10	19.8	5.8	5.8	31.4	6.6	14.0	8856	8813
11	17.4	3.8	3.8	25.0	6.4	13.6	7657	7711
12	15.1	1.9	1.9	18.9	6.2	13.2	6401	6525
13	26.2	7.8	7.8	41.8	8.7	18.4	9361	9099
14	23.8	5.8	5.8	35.4	8.5	18.0	8370	8277
15	21.5	3.9	3.9	29.3	8.3	17.6	7313	7419
16	19.1	1.9	1.9	22.9	8.1	17.2	6188	6407

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
Standard Compaction

Replicate Test: REP 1

K_1 =	676.8
K_2 =	0.650
K_3 =	-1.658

n = 16

SES = 0.001

Sy = 0.077

Se = 0.010

Se/Sy = 0.123

R^2 = 0.985

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	11871	12213
2	13.9	5.8	5.8	25.5	3.8	8.1	11053	11173
3	11.5	3.9	3.9	19.3	3.6	7.6	9953	10007
4	9.1	1.9	1.9	12.9	3.4	7.2	8723	8384
5	19.4	7.9	7.9	35.2	5.4	11.5	11004	10966
6	16.9	5.8	5.8	28.5	5.2	11.1	10186	10081
7	14.5	3.9	3.9	22.3	5.0	10.6	9150	9160
8	12.1	1.9	1.9	15.9	4.8	10.2	8040	7911
9	22.3	7.8	7.8	37.9	6.8	14.5	9945	9832
10	19.8	5.8	5.8	31.4	6.6	14.0	9145	9172
11	17.4	3.8	3.8	25.0	6.4	13.6	8224	8352
12	15.1	1.9	1.9	18.9	6.2	13.2	7215	7415
13	26.3	7.8	7.8	41.9	8.7	18.5	8920	8629
14	23.9	5.8	5.8	35.5	8.5	18.1	8216	8089
15	21.4	3.8	3.8	29.0	8.3	17.6	7442	7481
16	19.0	1.9	1.9	22.8	8.1	17.1	6569	6791

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
Standard Compaction

Replicate Test: REP 2

K_1 =	950.1
K_2 =	0.494
K_3 =	-2.146

n = 16

SES = 0.001

Sy = 0.072

Se = 0.010

Se/Sy = 0.135

R^2 = 0.982

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	11825	12086
2	13.8	5.8	5.8	25.4	3.8	8.0	10843	11048
3	11.4	3.8	3.8	19.0	3.6	7.6	9677	9737
4	9.2	1.9	1.9	13.0	3.4	7.3	8527	8159
5	19.3	7.8	7.8	34.9	5.4	11.5	10982	10899
6	16.8	5.8	5.8	28.4	5.2	11.0	10074	10055
7	14.4	3.8	3.8	22.0	5.0	10.6	9016	9007
8	12.2	1.9	1.9	16.0	4.9	10.3	7874	7776
9	22.2	7.8	7.8	37.8	6.8	14.4	10049	9922
10	19.9	5.8	5.8	31.5	6.6	14.1	9172	9168
11	17.4	3.8	3.8	25.0	6.4	13.6	8203	8340
12	15.1	1.9	1.9	18.9	6.2	13.2	7183	7370
13	26.3	7.8	7.8	41.9	8.7	18.5	9060	8766
14	23.8	5.8	5.8	35.4	8.5	18.0	8321	8215
15	21.4	3.8	3.8	29.0	8.3	17.6	7499	7550
16	19.1	1.9	1.9	22.9	8.1	17.2	6607	6810

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
Standard Compaction

Replicate Test: REP 3

K_1 =	908.3
K_2 =	0.508
K_3 =	-2.045

n = 16

SES = 0.001

Sy = 0.070

Se = 0.010

Se/Sy = 0.136

R^2 = 0.981

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - High, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 1
Sample No.:	1		
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-7-6		
Group Index:	23	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	90
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	43
Plastic Limit:	18
Plasticity Index:	25
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	107.9
Optimum Moisture (%):	16.6

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - High, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	100.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	107.9
Target Moisture Content (%):	16.6

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	
Additional Water Needed (ml):	

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	125.8
Wet Weight of Sample (g):	3270.2
Adjusted Wet Weight (g):	3371.9
Layer Weight (g):	421.5

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		12	12	12			
Specimen Wet Weight (g):		3222.7	3224.2	3229.1			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	41.50	39.80	41.50			
	Wet Weight + Tare (g):	423.20	406.10	415.80			
	Dry Weight + Tare (g):	370.0	353.6	363.40			
Moisture Content (%):		16.2	16.7	16.3			
Wet Density (pcf):		124.0	124.0	124.2			
Dry Density (pcf):		106.7	106.3	106.8			
Percent Differences	Target & Specimen Dry Density	1.1	1.5	1.0			
	Target & Specimen Moisture	0.4	0.1	0.3			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	13761	14149
2	13.9	5.8	5.8	25.5	3.8	8.1	12955	12992
3	11.4	3.8	3.8	19.0	3.6	7.6	11536	11602
4	9.1	1.9	1.9	12.9	3.4	7.2	10152	9853
5	19.3	7.8	7.8	34.9	5.4	11.5	12580	12564
6	16.9	5.8	5.8	28.5	5.2	11.1	11756	11638
7	14.4	3.8	3.8	22.0	5.0	10.6	10602	10550
8	12.2	1.9	1.9	16.0	4.9	10.3	9364	9196
9	22.3	7.8	7.8	37.9	6.8	14.5	11321	11240
10	19.8	5.8	5.8	31.4	6.6	14.0	10418	10521
11	17.5	3.8	3.8	25.1	6.5	13.7	9452	9587
12	15.1	1.9	1.9	18.9	6.2	13.2	8364	8574
13	26.3	7.8	7.8	41.9	8.7	18.5	10131	9788
14	23.8	5.8	5.8	35.4	8.5	18.0	9364	9231
15	21.4	3.8	3.8	29.0	8.3	17.6	8486	8539
16	19.1	1.9	1.9	22.9	8.1	17.2	7543	7762

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6 High Compaction

Replicate Test: REP 1

K_1 =	1,132.9
K_2 =	0.481
K_3 =	-2.224

n = 16

SES = 0.001

Sy = 0.073

Se = 0.009

Se/Sy = 0.121

R^2 = 0.985

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	13682	14217
2	13.9	5.8	5.8	25.5	3.8	8.1	12985	12879
3	11.5	3.9	3.9	19.3	3.6	7.6	11440	11395
4	9.2	1.9	1.9	13.0	3.4	7.3	9382	9344
5	19.3	7.8	7.8	34.9	5.4	11.5	12530	12560
6	16.8	5.8	5.8	28.4	5.2	11.0	11712	11535
7	14.4	3.8	3.8	22.0	5.0	10.6	10498	10257
8	12.1	1.9	1.9	15.9	4.8	10.2	8848	8781
9	22.2	7.8	7.8	37.8	6.8	14.4	11184	11225
10	19.8	5.8	5.8	31.4	6.6	14.0	10400	10353
11	17.4	3.8	3.8	25.0	6.4	13.6	9312	9331
12	15.1	1.9	1.9	18.9	6.2	13.2	8017	8175
13	26.3	7.8	7.8	41.9	8.7	18.5	9807	9679
14	23.9	5.8	5.8	35.5	8.5	18.1	9120	9009
15	21.4	3.8	3.8	29.0	8.3	17.6	8251	8260
16	19.1	1.9	1.9	22.9	8.1	17.2	7214	7399

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6 High Compaction

Replicate Test: REP 2

K_1 =	1,121.0
K_2 =	0.549
K_3 =	-2.377

n = 16

SES = 0.001

Sy = 0.079

Se = 0.007

Se/Sy = 0.094

R^2 = 0.991

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	13610	14063
2	14.0	5.9	5.9	25.8	3.8	8.1	12895	12951
3	11.6	3.9	3.9	19.4	3.6	7.7	11522	11571
4	8.9	1.9	1.9	12.7	3.3	7.0	10181	9852
5	19.3	7.8	7.8	34.9	5.4	11.5	12539	12436
6	17.0	5.9	5.9	28.8	5.2	11.1	11704	11592
7	14.4	3.9	3.9	22.2	4.9	10.5	10598	10574
8	12.1	1.9	1.9	15.9	4.8	10.2	9285	9170
9	22.2	7.8	7.8	37.8	6.8	14.4	11251	11165
10	19.9	5.9	5.9	31.7	6.6	14.0	10457	10473
11	17.4	3.9	3.9	25.2	6.4	13.5	9452	9627
12	15.0	1.9	1.9	18.8	6.2	13.1	8351	8545
13	26.3	7.8	7.8	41.9	8.7	18.5	10025	9688
14	23.9	5.9	5.9	35.7	8.5	18.0	9297	9182
15	21.5	3.9	3.9	29.3	8.3	17.6	8405	8513
16	19.4	1.9	1.9	23.2	8.2	17.5	7481	7655

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6 High Compaction

Replicate Test: REP 3

K_1 =	1,125.2
K_2 =	0.475
K_3 =	-2.216

n = 16

SES = 0.001

Sy = 0.073

Se = 0.009

Se/Sy = 0.122

R^2 = 0.985

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Low, Optimum

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	2
USCS:	CL
AASHTO:	A-6
Group Index:	17

Description:	Material 2
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	93
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	37
Plastic Limit:	19
Plasticity Index:	18
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	106.3
Optimum Moisture (%):	16.7

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Low, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	93.0
Material Type* (1,2, or 3):	

Target Data	
Target Dry Density (pcf):	98.9
Target Moisture Content (%):	16.7

Initial Moisture Content Data	
Tare Weight (g):	266.60
Wet Weight + Tare (g):	740.40
Dry Weight + Tare (g):	693.00
Initial Moisture Content:	11.1

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	
Additional Water Needed (ml):	

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	115.4
Wet Weight of Sample (g):	2998.8
Adjusted Wet Weight (g):	3092.0
Layer Weight (g):	386.5

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		8	8	8			
Specimen Wet Weight (g):		2933.20	3001.20	2979.20			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	41.00	40.00	39.50			
	Wet Weight + Tare (g):	395.50	327.70	380.40			
	Dry Weight + Tare (g):	349.7	288.2	336.10			
Moisture Content (%):		14.8	15.9	14.9			
Wet Density (pcf):		112.8	115.5	114.6			
Dry Density (pcf):		98.3	99.6	99.7			
Percent Differences	Target & Specimen Dry Density	0.6	0.8	0.9			
	Target & Specimen Moisture	1.9	0.8	1.8			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	15096	15750
2	13.8	5.8	5.8	25.4	3.8	8.0	15117	15150
3	11.4	3.8	3.8	19.0	3.6	7.6	14145	14304
4	9.1	1.9	1.9	12.9	3.4	7.2	12886	13138
5	19.2	7.8	7.8	34.8	5.4	11.4	13454	13434
6	16.8	5.8	5.8	28.4	5.2	11.0	13398	12978
7	14.4	3.8	3.8	22.0	5.0	10.6	12807	12355
8	12.0	1.8	1.8	15.6	4.8	10.2	11666	11468
9	22.2	7.8	7.8	37.8	6.8	14.4	11605	11579
10	19.8	5.8	5.8	31.4	6.6	14.0	11410	11226
11	17.4	3.8	3.8	25.0	6.4	13.6	10946	10753
12	15.1	1.8	1.8	18.7	6.3	13.3	10130	10062
13	26.3	7.8	7.8	41.9	8.7	18.5	9601	9590
14	23.8	5.8	5.8	35.4	8.5	18.0	9331	9374
15	21.4	3.8	3.8	29.0	8.3	17.6	8903	9037
16	19.2	1.9	1.9	23.0	8.2	17.3	8285	8587

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Low Compaction

Replicate Test: REP 1

K_1 =	1,570.1
K_2 =	0.287
K_3 =	-2.532

n = 16

SES = 0.001
Sy = 0.082

Se = 0.010
Se/Sy = 0.124
R^2 = 0.985

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 . \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	14398	15016
2	13.9	5.8	5.8	25.5	3.8	8.1	14360	14388
3	11.4	3.8	3.8	19.0	3.6	7.6	13446	13582
4	9.1	1.9	1.9	12.9	3.4	7.2	12059	12369
5	19.3	7.8	7.8	34.9	5.4	11.5	12728	12648
6	16.8	5.8	5.8	28.4	5.2	11.0	12601	12242
7	14.5	3.8	3.8	22.1	5.0	10.7	11983	11535
8	12.0	1.8	1.8	15.6	4.8	10.2	10909	10682
9	22.2	7.8	7.8	37.8	6.8	14.4	10822	10829
10	19.8	5.8	5.8	31.4	6.6	14.0	10634	10464
11	17.4	3.8	3.8	25.0	6.4	13.6	10176	9979
12	15.0	1.8	1.8	18.6	6.2	13.2	9363	9318
13	26.2	7.8	7.8	41.8	8.7	18.4	8834	8874
14	23.9	5.8	5.8	35.5	8.5	18.1	8534	8570
15	21.4	3.8	3.8	29.0	8.3	17.6	8160	8269
16	19.0	1.8	1.8	22.6	8.1	17.2	7565	7818

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Low Compaction

Replicate Test: REP 2

K_1 =	1,550.6
K_2 =	0.315
K_3 =	-2.744

n = 16

SES = 0.001

Sy = 0.088

Se = 0.010

Se/Sy = 0.117

R^2 = 0.986

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	14420	14969
2	13.8	5.8	5.8	25.4	3.8	8.0	14278	14304
3	11.4	3.8	3.8	19.0	3.6	7.6	13300	13299
4	9.0	1.8	1.8	12.6	3.4	7.2	11361	11871
5	19.2	7.8	7.8	34.8	5.4	11.4	12929	12893
6	16.8	5.8	5.8	28.4	5.2	11.0	12708	12322
7	14.4	3.8	3.8	22.0	5.0	10.6	12044	11572
8	12.0	1.8	1.8	15.6	4.8	10.2	10754	10548
9	22.2	7.8	7.8	37.8	6.8	14.4	11108	11158
10	19.8	5.8	5.8	31.4	6.6	14.0	10893	10712
11	17.4	3.8	3.8	25.0	6.4	13.6	10406	10138
12	15.0	1.8	1.8	18.6	6.2	13.2	9485	9378
13	26.2	7.8	7.8	41.8	8.7	18.4	9188	9328
14	23.8	5.8	5.8	35.4	8.5	18.0	8906	8998
15	21.4	3.8	3.8	29.0	8.3	17.6	8503	8583
16	19.0	1.8	1.8	22.6	8.1	17.2	7853	8051

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Low Compaction

Replicate Test: REP 3

K_1 =	1,441.6
K_2 =	0.341
K_3 =	-2.537

n = 16

SES = 0.002

Sy = 0.081

Se = 0.011

Se/Sy = 0.137

R^2 = 0.981

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Standard, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 2
Sample No.:	2		
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-6		
Group Index:	17	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	93
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	37
Plastic Limit:	19
Plasticity Index:	18
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	106.3
Optimum Moisture (%):	16.7

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Standard, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	96.0
Material Type* (1,2, or 3):	

Target Data	
Target Dry Density (pcf):	102.0
Target Moisture Content (%):	16.7

Initial Moisture Content Data	
Tare Weight (g):	266.60
Wet Weight + Tare (g):	740.40
Dry Weight + Tare (g):	693.00
Initial Moisture Content:	11.1

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	
Additional Water Needed (ml):	

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	119.1
Wet Weight of Sample (g):	3095.5
Adjusted Wet Weight (g):	3191.8
Layer Weight (g):	399.0

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		12	12	12			
Specimen Wet Weight (g):		3060.20	3135.90	3148.20			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	41.20	42.20	41.60			
	Wet Weight + Tare (g):	292.60	353.10	391.30			
	Dry Weight + Tare (g):	257.3	308.6	340.50			
Moisture Content (%):		16.3	16.7	17.0			
Wet Density (pcf):		117.7	120.6	121.1			
Dry Density (pcf):		101.2	103.4	103.5			
Percent Differences	Target & Specimen Dry Density	0.8	1.3	1.4			
	Target & Specimen Moisture	0.4	0.0	0.3			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	18681	19299
2	13.8	5.8	5.8	25.4	3.8	8.0	18521	18681
3	11.5	3.8	3.8	19.1	3.6	7.7	17630	17658
4	9.2	1.9	1.9	13.0	3.4	7.3	15980	16365
5	19.2	7.8	7.8	34.8	5.4	11.4	17274	17234
6	16.8	5.8	5.8	28.4	5.2	11.0	17021	16681
7	14.4	3.8	3.8	22.0	5.0	10.6	16355	15941
8	12.1	1.9	1.9	15.9	4.8	10.2	15119	14975
9	22.3	7.8	7.8	37.9	6.8	14.5	15534	15391
10	19.8	5.8	5.8	31.4	6.6	14.0	15343	14999
11	17.4	3.8	3.8	25.0	6.4	13.6	14807	14414
12	15.0	1.8	1.8	18.6	6.2	13.2	13785	13622
13	26.2	7.8	7.8	41.8	8.7	18.4	13310	13485
14	23.8	5.8	5.8	35.4	8.5	18.0	13019	13140
15	21.4	3.8	3.8	29.0	8.3	17.6	12554	12700
16	19.1	1.9	1.9	22.9	8.1	17.2	11828	12164

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2

CL A-6

Replicate Test: REP 1

K_1 =	1,716.1
K_2 =	0.249
K_3 =	-1.912

n = 16

SES = 0.001

Sy = 0.061

Se = 0.009

Se/Sy = 0.147

R^2 = 0.978

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	17062	17553
2	13.9	5.9	5.9	25.7	3.8	8.0	16501	16760
3	11.6	3.9	3.9	19.4	3.6	7.7	15354	15586
4	9.2	1.9	1.9	13.0	3.4	7.3	13757	14039
5	19.2	7.8	7.8	34.8	5.4	11.4	15734	15584
6	16.8	5.8	5.8	28.4	5.2	11.0	15264	14904
7	14.5	3.9	3.9	22.3	5.0	10.6	14410	14085
8	12.1	1.9	1.9	15.9	4.8	10.2	13166	12917
9	22.2	7.8	7.8	37.8	6.8	14.4	14147	13944
10	19.9	5.8	5.8	31.5	6.6	14.1	13717	13346
11	17.5	3.9	3.9	25.3	6.4	13.6	13009	12742
12	15.1	1.9	1.9	18.9	6.2	13.2	11981	11842
13	26.2	7.8	7.8	41.8	8.7	18.4	11933	12147
14	23.9	5.9	5.9	35.7	8.5	18.0	11594	11751
15	21.5	3.9	3.9	29.3	8.3	17.6	11068	11230
16	19.1	1.9	1.9	22.9	8.1	17.2	10311	10569

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2
CL A-6

Replicate Test: REP 2

K_1 =	1,516.2
K_2 =	0.313
K_3 =	-2.015

n = 16

SES = 0.001

Sy = 0.064

Se = 0.009

Se/Sy = 0.147

R^2 = 0.978

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	19153	19802
2	13.9	5.9	5.9	25.7	3.8	8.0	19013	19336
3	11.5	3.9	3.9	19.3	3.6	7.6	18092	18455
4	10.0	1.9	1.9	13.8	3.8	8.1	16459	16503
5	19.3	7.9	7.9	35.1	5.4	11.4	17383	17231
6	16.9	5.9	5.9	28.7	5.2	11.0	17261	16761
7	14.5	3.9	3.9	22.3	5.0	10.6	16555	16105
8	12.1	1.9	1.9	15.9	4.8	10.2	15208	15154
9	22.3	7.9	7.9	38.1	6.8	14.4	15150	15029
10	19.8	5.8	5.8	31.4	6.6	14.0	15027	14626
11	17.5	3.9	3.9	25.3	6.4	13.6	14555	14158
12	15.1	1.9	1.9	18.9	6.2	13.2	13505	13456
13	26.2	7.8	7.8	41.8	8.7	18.4	12461	12665
14	23.8	5.8	5.8	35.4	8.5	18.0	12311	12388
15	21.4	3.8	3.8	29.0	8.3	17.6	11904	12021
16	19.1	1.9	1.9	22.9	8.1	17.2	11213	11562

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2

CL A-6

Replicate Test: REP 3

K_1 =	1,941.2
K_2 =	0.245
K_3 =	-2.304

n = 16

SES = 0.001

Sy = 0.074

Se = 0.010

Se/Sy = 0.131

R^2 = 0.983

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - High, Optimum

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	2
USCS:	CL
AASHTO:	A-6
Group Index:	17

Description:	Material 2
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	93
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	37
Plastic Limit:	19
Plasticity Index:	18
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	106.3
Optimum Moisture (%):	16.7

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - High, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	105.0
Material Type* (1,2, or 3):	

Target Data	
Target Dry Density (pcf):	111.6
Target Moisture Content (%):	16.7

Initial Moisture Content Data	
Tare Weight (g):	266.60
Wet Weight + Tare (g):	740.40
Dry Weight + Tare (g):	693.00
Initial Moisture Content:	11.1

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	
Additional Water Needed (ml):	

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	130.3
Wet Weight of Sample (g):	3385.7
Adjusted Wet Weight (g):	3491.0
Layer Weight (g):	436.4

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		25	25	25			
Specimen Wet Weight (g):		3376.20	3371.20	3367.10			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	41.50	42.00	40.80			
	Wet Weight + Tare (g):	436.60	450.50	465.00			
	Dry Weight + Tare (g):	382.3	393.7	404.70			
Moisture Content (%):		15.9	16.2	16.6			
Wet Density (pcf):		129.9	129.7	129.5			
Dry Density (pcf):		112.0	111.7	111.1			
Percent Differences	Target & Specimen Dry Density	0.4	0.0	0.4			
	Target & Specimen Moisture	0.8	0.5	0.1			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	26623	27525
2	13.8	5.8	5.8	25.4	3.8	8.0	25215	25306
3	11.4	3.8	3.8	19.0	3.6	7.6	22275	22492
4	9.1	1.8	1.8	12.7	3.4	7.3	17869	18874
5	19.3	7.8	7.8	34.9	5.4	11.5	25355	25130
6	16.8	5.8	5.8	28.4	5.2	11.0	24172	23303
7	14.4	3.8	3.8	22.0	5.0	10.6	21927	21028
8	12.2	1.9	1.9	16.0	4.9	10.3	18253	18341
9	22.2	7.8	7.8	37.8	6.8	14.4	23211	23135
10	19.8	5.8	5.8	31.4	6.6	14.0	22385	21545
11	17.4	3.8	3.8	25.0	6.4	13.6	20709	19671
12	15.1	1.9	1.9	18.9	6.2	13.2	17890	17529
13	26.2	7.8	7.8	41.8	8.7	18.4	19533	20796
14	23.8	5.8	5.8	35.4	8.5	18.0	19020	19518
15	21.5	3.8	3.8	29.1	8.3	17.7	18023	17999
16	19.1	1.9	1.9	22.9	8.1	17.2	16263	16385

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
High Compaction

Replicate Test: REP 1

K_1 =	2,021.1
K_2 =	0.471
K_3 =	-1.830

n = 16

SES = 0.003

Sy = 0.065

Se = 0.016

Se/Sy = 0.237

R^2 = 0.944

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	26492	27392
2	13.8	5.8	5.8	25.4	3.8	8.0	25798	26081
3	11.5	3.8	3.8	19.1	3.6	7.7	23899	24191
4	9.1	1.8	1.8	12.7	3.4	7.3	21001	21696
5	19.2	7.8	7.8	34.8	5.4	11.4	25209	24967
6	16.8	5.8	5.8	28.4	5.2	11.0	24551	23822
7	14.5	3.8	3.8	22.1	5.0	10.7	22950	22311
8	12.1	1.8	1.8	15.7	4.9	10.3	20572	20399
9	22.2	7.8	7.8	37.8	6.8	14.4	23120	22821
10	19.8	5.8	5.8	31.4	6.6	14.0	22563	21871
11	17.4	3.8	3.8	25.0	6.4	13.6	21382	20691
12	15.1	1.8	1.8	18.7	6.3	13.3	19508	19129
13	26.2	7.8	7.8	41.8	8.7	18.4	19710	20412
14	23.8	5.8	5.8	35.4	8.5	18.0	19340	19657
15	21.4	3.8	3.8	29.0	8.3	17.6	18499	18737
16	18.9	1.8	1.8	22.5	8.1	17.1	17276	17627

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
High Compaction

Replicate Test: REP 2

K_1 =	2,206.4
K_2 =	0.310
K_3 =	-1.696

n = 16

SES = 0.002

Sy = 0.055

Se = 0.011

Se/Sy = 0.208

R^2 = 0.957

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	27889	28953
2	13.9	5.8	5.8	25.5	3.8	8.1	26914	27020
3	11.4	3.8	3.8	19.0	3.6	7.6	24562	24763
4	9.0	1.8	1.8	12.6	3.4	7.2	20566	21626
5	19.2	7.8	7.8	34.8	5.4	11.4	26531	26206
6	16.8	5.8	5.8	28.4	5.2	11.0	25596	24701
7	14.4	3.8	3.8	22.0	5.0	10.6	23785	22834
8	12.1	1.9	1.9	15.9	4.8	10.2	20501	20569
9	22.2	7.8	7.8	37.8	6.8	14.4	23981	23870
10	19.8	5.8	5.8	31.4	6.6	14.0	23361	22624
11	17.4	3.8	3.8	25.0	6.4	13.6	22097	21106
12	15.1	1.8	1.8	18.7	6.3	13.3	19650	19157
13	26.2	7.8	7.8	41.8	8.7	18.4	20208	21256
14	23.8	5.8	5.8	35.4	8.5	18.0	19782	20267
15	21.4	3.8	3.8	29.0	8.3	17.6	18948	19086
16	19.0	1.8	1.8	22.6	8.1	17.2	17438	17641

BCD Project:	070904
Project Name:	MDOT SS 205
Sample I.D.:	Material 2 CL A-6
	High Compaction
Replicate Test:	REP 3

K_1 =	2,279.1
K_2 =	0.376
K_3 =	-1.828

n =	16
SES =	0.003
Sy =	0.061
Se =	0.014
Se/Sy =	0.236
R^2 =	0.944

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 3 - Low, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 3
Sample No.:	3		
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-4		
Group Index:	1	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS		
TOTAL % PASSING BY WEIGHT		
No. 3" Sieve		100
No. 2" Sieve		100
No. 1 1/2" Sieve		100
No. 1" Sieve		100
No. 3/4" Sieve		100
No. 1/2" Sieve		100
No. 4 Sieve		100
No. 10 Sieve		100
No. 40 Sieve		100
No.100 Sieve		100
No.200 Sieve		99
No.270 Sieve		Not Determined
% Silt		
% Clay		

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	25
Plastic Limit:	23
Plasticity Index:	2
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	110.9
Optimum Moisture (%):	14.9

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 3 - Low, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	92.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	102.0
Target Moisture Content (%):	14.9

Initial Moisture Content Data	
Tare Weight (g):	267.20
Wet Weight + Tare (g):	774.30
Dry Weight + Tare (g):	742.80
Initial Moisture Content:	6.6

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	271.7

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	117.2
Wet Weight of Sample (g):	3047.2
Adjusted Wet Weight (g):	3141.9
Layer Weight (g):	392.7

Molded Specimen Data							
Specimen No.:		2 REP 1	3 REP 2	4 REP 3			
Number of Blows per Layer:		4	4	4			
Specimen Wet Weight (g):		3051.0	3042.2	3056.9			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	263.40	267.40	400.90			
	Wet Weight + Tare (g):	790.50	723.20	836.50			
	Dry Weight + Tare (g):	721.2	663.70	780.50			
Moisture Content (%):		15.1	15.0	14.8			
Wet Density (pcf):		117.4	117.0	117.6			
Dry Density (pcf):		101.9	101.8	102.5			
Percent Differences	Target & Specimen Dry Density	0.1	0.3	0.4			
	Target & Specimen Moisture	0.2	0.1	0.1			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.9	7.9	32.1	4.0	8.4	15327	15931
2	13.9	5.9	5.9	25.7	3.8	8.0	12945	13254
3	11.5	3.9	3.9	19.3	3.6	7.6	10243	10403
4	9.2	1.9	1.9	13.0	3.4	7.3	7812	7358
5	19.4	7.9	7.9	35.2	5.4	11.5	14980	15039
6	16.9	5.9	5.9	28.7	5.2	11.0	12743	12761
7	14.5	3.9	3.9	22.3	5.0	10.6	10360	10318
8	12.1	1.9	1.9	15.9	4.8	10.2	8015	7714
9	22.4	7.9	7.9	38.2	6.8	14.5	14449	14262
10	19.9	5.9	5.9	31.7	6.6	14.0	12363	12280
11	17.5	3.9	3.9	25.3	6.4	13.6	10144	10163
12	15.1	1.9	1.9	18.9	6.2	13.2	7674	7919
13	26.4	7.9	7.9	42.2	8.7	18.5	14026	13339
14	23.9	5.9	5.9	35.7	8.5	18.0	12145	11669
15	21.5	3.9	3.9	29.3	8.3	17.6	9910	9894
16	19.2	1.9	1.9	23.0	8.2	17.3	7279	8024

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4
Low Compaction

Replicate Test: REP 1

K_1 =	831.7
K_2 =	0.913
K_3 =	-1.881

n = 16

SES = 0.004

Sy = 0.110

Se = 0.018

Se/Sy = 0.164

R^2 = 0.973

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.9	7.9	32.2	4.0	8.5	15297	15895
2	13.9	5.9	5.9	25.7	3.8	8.0	12911	13181
3	11.5	3.9	3.9	19.3	3.6	7.6	10097	10278
4	9.1	1.9	1.9	12.9	3.4	7.2	7598	7187
5	19.4	7.9	7.9	35.2	5.4	11.5	14961	15061
6	16.9	5.9	5.9	28.7	5.2	11.0	12741	12720
7	14.5	3.9	3.9	22.3	5.0	10.6	10277	10226
8	12.1	1.9	1.9	15.9	4.8	10.2	7853	7586
9	22.3	7.9	7.9	38.1	6.8	14.4	14498	14331
10	20.0	5.9	5.9	31.8	6.6	14.1	12383	12251
11	17.5	3.9	3.9	25.3	6.4	13.6	10096	10099
12	15.1	1.9	1.9	18.9	6.2	13.2	7610	7817
13	26.3	7.9	7.9	42.1	8.7	18.4	14055	13429
14	23.9	5.9	5.9	35.7	8.5	18.0	12130	11685
15	21.5	3.9	3.9	29.3	8.3	17.6	9905	9862
16	19.2	1.9	1.9	23.0	8.2	17.3	7227	7954

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4
Low Compaction

Replicate Test: REP 2

K_1 =	817.2
K_2 =	0.936
K_3 =	-1.884

n = 16

SES = 0.004

Sy = 0.112

Se = 0.017

Se/Sy = 0.153

R^2 = 0.977

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 . \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	16092	16524
2	13.8	5.8	5.8	25.4	3.8	8.0	13716	12214
3	11.4	3.8	3.8	19.0	3.6	7.6	10911	8254
4	9.2	1.9	1.9	13.0	3.4	7.3	8365	4913
5	19.3	7.8	7.8	34.9	5.4	11.5	15678	17202
6	16.9	5.8	5.8	28.5	5.2	11.1	13500	13121
7	14.4	3.8	3.8	22.0	5.0	10.6	11030	9281
8	2.2	1.9	1.9	6.0	0.1	0.3	1225	2117
9	22.2	7.8	7.8	37.8	6.8	14.4	15244	17807
10	19.8	5.8	5.8	31.4	6.6	14.0	13124	13899
11	17.4	3.8	3.8	25.0	6.4	13.6	10865	10228
12	15.2	1.9	1.9	19.0	6.3	13.3	8359	7037
13	26.2	7.8	7.8	41.8	8.7	18.4	14741	18572
14	23.8	5.8	5.8	35.4	8.5	18.0	12841	14879
15	21.4	3.8	3.8	29.0	8.3	17.6	10623	11382
16	19.2	1.9	1.9	23.0	8.2	17.3	8019	8304

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3; CL A-4
Low Compaction

Replicate Test: REP 3

K_1 =	506.4
K_2 =	1.391
K_3 =	-1.163

n = 16

SES = 0.161

Sy = 0.266

Se = 0.111

Se/Sy = 0.419

R^2 = 0.824

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 3 - Standard, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 3
Sample No.:	3		
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-4		
Group Index:	1	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	99
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	25
Plastic Limit:	23
Plasticity Index:	2
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	110.9
Optimum Moisture (%):	14.9

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 3 - Standard, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	95.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	105.4
Target Moisture Content (%):	14.9

Initial Moisture Content Data	
Tare Weight (g):	267.20
Wet Weight + Tare (g):	774.30
Dry Weight + Tare (g):	742.80
Initial Moisture Content:	6.6

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	271.7

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	121.1
Wet Weight of Sample (g):	3146.5
Adjusted Wet Weight (g):	3244.4
Layer Weight (g):	405.5

Molded Specimen Data							
Specimen No.:		1 REP 1	4 REP 2	5 REP 3			
Number of Blows per Layer:		7	7	7			
Specimen Wet Weight (g):		3140.1	3173.8	3173.9			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	41.20	42.10	40.90			
	Wet Weight + Tare (g):	413.80	454.20	424.50			
	Dry Weight + Tare (g):	366.7	400.0	374.00			
Moisture Content (%):		14.5	15.1	15.2			
Wet Density (pcf):		120.8	122.1	122.1			
Dry Density (pcf):		105.5	106.0	106.0			
Percent Differences	Target & Specimen Dry Density	0.2	0.7	0.6			
	Target & Specimen Moisture	0.4	0.2	0.3			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 . \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.9	7.9	32.2	4.0	8.5	16428	16699
2	13.8	5.8	5.8	25.4	3.8	8.0	13760	13844
3	11.6	3.9	3.9	19.4	3.6	7.7	10842	11077
4	9.2	1.9	1.9	13.0	3.4	7.3	8314	7941
5	19.3	7.8	7.8	34.9	5.4	11.5	16146	16067
6	16.9	5.9	5.9	28.7	5.2	11.0	13701	13793
7	14.6	3.9	3.9	22.4	5.0	10.7	11067	11237
8	12.1	1.9	1.9	15.9	4.8	10.2	8645	8490
9	22.3	7.8	7.8	37.9	6.8	14.5	15934	15601
10	19.9	5.9	5.9	31.7	6.6	14.0	13536	13576
11	17.6	3.9	3.9	25.4	6.5	13.7	11167	11308
12	15.2	1.9	1.9	19.0	6.3	13.3	8813	8902
13	26.2	7.9	7.9	42.0	8.6	18.3	15667	15144
14	23.9	5.9	5.9	35.7	8.5	18.0	13439	13267
15	21.5	3.9	3.9	29.3	8.3	17.6	11213	11309
16	19.2	1.9	1.9	23.0	8.2	17.3	8910	9246

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4
Standard Compaction

Replicate Test: REP 1

K_1 =	822.5
K_2 =	0.870
K_3 =	-1.490

n = 16

SES = 0.001

Sy = 0.104

Se = 0.010

Se/Sy = 0.097

R^2 = 0.991

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 . \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.9	7.9	32.2	4.0	8.5	17387	17635
2	13.9	5.9	5.9	25.7	3.8	8.0	14618	14898
3	11.6	3.9	3.9	19.4	3.6	7.7	11659	11926
4	9.1	1.9	1.9	12.9	3.4	7.2	9177	8659
5	19.4	7.9	7.9	35.2	5.4	11.5	17097	17033
6	16.9	5.9	5.9	28.7	5.2	11.0	14504	14628
7	14.5	3.9	3.9	22.3	5.0	10.6	11862	12028
8	12.1	1.9	1.9	15.9	4.8	10.2	9400	9209
9	22.3	7.9	7.9	38.1	6.8	14.4	16814	16491
10	19.9	5.9	5.9	31.7	6.6	14.0	14345	14339
11	17.5	3.9	3.9	25.3	6.4	13.6	11889	12045
12	15.1	1.9	1.9	18.9	6.2	13.2	9465	9578
13	26.3	7.9	7.9	42.1	8.7	18.4	16533	15804
14	23.9	5.9	5.9	35.7	8.5	18.0	14220	13946
15	21.5	3.9	3.9	29.3	8.3	17.6	11832	11977
16	19.1	1.9	1.9	22.9	8.1	17.2	9382	9878

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4
Standard Compaction

Replicate Test: REP 2

K_1 =	895.6
K_2 =	0.832
K_3 =	-1.494

n = 16

SES = 0.002
Sy = 0.100

Se = 0.013
Se/Sy = 0.127
R^2 = 0.984

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	17649	17869
2	13.8	5.8	5.8	25.4	3.8	8.0	14749	14942
3	11.6	3.9	3.9	19.4	3.6	7.7	11682	11963
4	9.2	1.9	1.9	13.0	3.4	7.3	9019	8585
5	19.2	7.8	7.8	34.8	5.4	11.4	17318	17368
6	16.8	5.8	5.8	28.4	5.2	11.0	14660	14766
7	14.5	3.8	3.8	22.1	5.0	10.7	11934	12006
8	12.2	1.9	1.9	16.0	4.9	10.3	9417	9202
9	22.2	7.8	7.8	37.8	6.8	14.4	17138	16879
10	19.8	5.8	5.8	31.4	6.6	14.0	14611	14559
11	17.6	3.9	3.9	25.4	6.5	13.7	12053	12233
12	15.1	1.9	1.9	18.9	6.2	13.2	9511	9625
13	26.2	7.8	7.8	41.8	8.7	18.4	16922	16271
14	23.8	5.8	5.8	35.4	8.5	18.0	14520	14257
15	21.4	3.8	3.8	29.0	8.3	17.6	12097	12139
16	19.1	1.9	1.9	22.9	8.1	17.2	9493	10012

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4
Standard Compaction

Replicate Test: REP 3

K_1 =	885.5
K_2 =	0.867
K_3 =	-1.473

n = 16

SES = 0.002

Sy = 0.103

Se = 0.012

Se/Sy = 0.113

R^2 = 0.987

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 3 - High, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 3
Sample No.:	3	Testing Performed By (MDOT, BCD, etc.):	BCD
USCS:	CL		
AASHTO:	A-4		
Group Index:	1	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	99
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	25
Plastic Limit:	23
Plasticity Index:	2
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	110.9
Optimum Moisture (%):	14.9

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 3 - High, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	100.0
Material Type* (1,2, or 3):	

Target Data	
Target Dry Density (pcf):	110.9
Target Moisture Content (%):	14.9

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	521.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	127.4
Wet Weight of Sample (g):	3312.1
Adjusted Wet Weight (g):	3415.1
Layer Weight (g):	426.9

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		15	15	15			
Specimen Wet Weight (g):		3321.9	3332.9	3314.7			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	185.80	267.60	263.30			
	Wet Weight + Tare (g):	669.20	907.20	1042.20			
	Dry Weight + Tare (g):	607.8	824.5	942.30			
Moisture Content (%):		14.5	14.9	14.7			
Wet Density (pcf):		127.8	128.2	127.5			
Dry Density (pcf):		111.6	111.6	111.2			
Percent Differences	Target & Specimen Dry Density	0.6	0.7	0.2			
	Target & Specimen Moisture	0.4	0.0	0.2			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	19525	19843
2	13.9	5.8	5.8	25.5	3.8	8.1	16190	16434
3	11.4	3.8	3.8	19.0	3.6	7.6	12584	12836
4	9.0	1.8	1.8	12.6	3.4	7.2	9588	8988
5	19.2	7.8	7.8	34.8	5.4	11.4	19300	19283
6	16.9	5.8	5.8	28.5	5.2	11.1	16156	16266
7	14.5	3.8	3.8	22.1	5.0	10.7	12899	13106
8	12.1	1.9	1.9	15.9	4.8	10.2	10046	9905
9	22.3	7.8	7.8	37.9	6.8	14.5	19069	18737
10	19.9	5.8	5.8	31.5	6.6	14.1	16107	16059
11	17.5	3.8	3.8	25.1	6.5	13.7	13041	13250
12	15.1	1.9	1.9	18.9	6.2	13.2	10192	10422
13	26.2	7.8	7.8	41.8	8.7	18.4	18965	18094
14	23.8	5.8	5.8	35.4	8.5	18.0	16091	15758
15	21.4	3.8	3.8	29.0	8.3	17.6	13176	13317
16	19.1	1.9	1.9	22.9	8.1	17.2	10403	10888

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4
High Compaction

Replicate Test: REP 1

K_1 =	961.8
K_2 =	0.906
K_3 =	-1.509

n = 16

SES = 0.002

Sy = 0.109

Se = 0.013

Se/Sy = 0.118

R^2 = 0.986

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	18424	18760
2	13.9	5.8	5.8	25.5	3.8	8.1	14897	15185
3	11.5	3.8	3.8	19.1	3.6	7.7	11315	11519
4	9.1	1.9	1.9	12.9	3.4	7.2	8392	7902
5	19.3	7.8	7.8	34.9	5.4	11.5	18238	18207
6	16.8	5.8	5.8	28.4	5.2	11.0	14969	15061
7	14.4	3.8	3.8	22.0	5.0	10.6	11664	11808
8	12.2	1.9	1.9	16.0	4.9	10.3	8810	8650
9	22.2	7.8	7.8	37.8	6.8	14.4	18041	17714
10	19.8	5.8	5.8	31.4	6.6	14.0	14946	14890
11	17.5	3.8	3.8	25.1	6.5	13.7	11850	11995
12	15.1	1.9	1.9	18.9	6.2	13.2	8961	9163
13	26.2	7.8	7.8	41.8	8.7	18.4	17842	17077
14	23.8	5.8	5.8	35.4	8.5	18.0	14913	14622
15	21.5	3.8	3.8	29.1	8.3	17.7	11979	12107
16	19.1	1.9	1.9	22.9	8.1	17.2	9213	9657

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4
High Compaction

Replicate Test: REP 2

K_1 =	864.5
K_2 =	1.014
K_3 =	-1.649

n = 16

SES = 0.002

Sy = 0.121

Se = 0.013

Se/Sy = 0.103

R^2 = 0.989

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.9	7.9	32.1	4.0	8.4	17540	17686
2	14.0	5.9	5.9	25.8	3.8	8.1	14441	14787
3	11.6	3.9	3.9	19.4	3.6	7.7	11354	11712
4	9.1	1.9	1.9	12.9	3.4	7.2	8908	8369
5	19.4	7.9	7.9	35.2	5.4	11.5	17378	17204
6	16.9	5.9	5.9	28.7	5.2	11.0	14445	14652
7	14.5	3.9	3.9	22.3	5.0	10.6	11731	11928
8	12.2	1.9	1.9	16.0	4.9	10.3	9267	9031
9	22.3	7.9	7.9	38.1	6.8	14.4	17281	16778
10	19.9	5.9	5.9	31.7	6.6	14.0	14443	14481
11	17.5	3.9	3.9	25.3	6.4	13.6	11859	12056
12	15.2	1.9	1.9	19.0	6.3	13.3	9375	9490
13	26.3	7.9	7.9	42.1	8.7	18.4	17031	16226
14	23.9	5.9	5.9	35.7	8.5	18.0	14367	14224
15	21.5	3.9	3.9	29.3	8.3	17.6	11889	12120
16	19.1	1.9	1.9	22.9	8.1	17.2	9494	9899

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4 High Compaction

Replicate Test: REP 3

K_1 =	858.1
K_2 =	0.869
K_3 =	-1.429

n = 16

SES = 0.002

Sy = 0.105

Se = 0.014

Se/Sy = 0.129

R^2 = 0.983

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - Low, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 4
Sample No.:	4		
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-4		
Group Index:	5	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No. 60 Sieve	98
No.200 Sieve	83
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	22
Plastic Limit:	14
Plasticity Index:	8
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	120.5
Optimum Moisture (%):	11.4

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - Low, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	90.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	108.5
Target Moisture Content (%):	11.4

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	399.0

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	120.8
Wet Weight of Sample (g):	3140.0
Adjusted Wet Weight (g):	3238.7
Layer Weight (g):	404.8

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		5	5	5			
Specimen Wet Weight (g):		3120.7	3117.7	3151.4			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	41.30	40.60	39.80			
	Wet Weight + Tare (g):	443.00	436.10	442.50			
	Dry Weight + Tare (g):	402.3	396.2	401.20			
Moisture Content (%):		11.3	11.2	11.4			
Wet Density (pcf):		120.1	119.9	121.2			
Dry Density (pcf):		107.9	107.8	108.8			
Percent Differences	Target & Specimen Dry Density	0.5	0.6	0.3			
	Target & Specimen Moisture	0.1	0.2	0.0			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.9	7.9	32.2	4.0	8.5	17236	17758
2	14.0	5.9	5.9	25.8	3.8	8.1	15113	15295
3	11.6	3.9	3.9	19.4	3.6	7.7	12402	12558
4	9.2	1.9	1.9	13.0	3.4	7.3	9940	9449
5	19.4	7.9	7.9	35.2	5.4	11.5	16628	16599
6	17.1	5.9	5.9	28.9	5.3	11.2	14487	14482
7	14.5	3.9	3.9	22.3	5.0	10.6	12105	12216
8	12.2	1.9	1.9	16.0	4.9	10.3	9765	9625
9	22.3	7.9	7.9	38.1	6.8	14.4	15898	15605
10	20.0	5.9	5.9	31.8	6.6	14.1	13898	13774
11	17.5	3.9	3.9	25.3	6.4	13.6	11732	11822
12	15.2	1.9	1.9	19.0	6.3	13.3	9462	9634
13	26.4	7.9	7.9	42.2	8.7	18.5	14941	14376
14	24.0	5.9	5.9	35.8	8.5	18.1	13077	12882
15	21.5	3.9	3.9	29.3	8.3	17.6	11141	11277
16	19.1	1.9	1.9	22.9	8.1	17.2	9062	9499

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Low Compaction

Replicate Test: REP 1

K_1 =	1,041.8
K_2 =	0.758
K_3 =	-1.852

n = 16

SES = 0.002

Sy = 0.091

Se = 0.011

Se/Sy = 0.125

R^2 = 0.984

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	17274	17670
2	13.9	5.8	5.8	25.5	3.8	8.1	15289	15265
3	11.5	3.8	3.8	19.1	3.6	7.7	12526	12571
4	9.2	1.9	1.9	13.0	3.4	7.3	10014	9648
5	19.3	7.8	7.8	34.9	5.4	11.5	16367	16476
6	16.9	5.8	5.8	28.5	5.2	11.1	14505	14440
7	14.6	3.9	3.9	22.4	5.0	10.7	12217	12305
8	12.2	1.9	1.9	16.0	4.9	10.3	9834	9772
9	22.3	7.8	7.8	37.9	6.8	14.5	15458	15421
10	19.9	5.8	5.8	31.5	6.6	14.1	13675	13676
11	17.5	3.8	3.8	25.1	6.5	13.7	11648	11759
12	15.0	1.8	1.8	18.6	6.2	13.2	9449	9625
13	26.2	7.8	7.8	41.8	8.7	18.4	14658	14222
14	23.9	5.8	5.8	35.5	8.5	18.1	13051	12750
15	21.6	3.9	3.9	29.4	8.3	17.7	11225	11264
16	19.1	1.9	1.9	22.9	8.1	17.2	9228	9549

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Low Compaction

Replicate Test: REP 2

K_1 =	1,065.1
K_2 =	0.738
K_3 =	-1.871

n = 16

SES = 0.001

Sy = 0.088

Se = 0.009

Se/Sy = 0.098

R^2 = 0.990

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.9	7.9	32.2	4.0	8.5	18255	18743
2	14.0	5.9	5.9	25.8	3.8	8.1	16116	16126
3	11.6	3.9	3.9	19.4	3.6	7.7	13149	13218
4	9.2	1.9	1.9	13.0	3.4	7.3	10409	9922
5	19.4	7.9	7.9	35.2	5.4	11.5	17363	17478
6	17.0	5.9	5.9	28.8	5.2	11.1	15295	15260
7	14.6	3.9	3.9	22.4	5.0	10.7	12814	12818
8	12.2	1.9	1.9	16.0	4.9	10.3	10173	10090
9	22.4	7.9	7.9	38.2	6.8	14.5	16443	16361
10	19.9	5.9	5.9	31.7	6.6	14.0	14472	14483
11	17.5	3.9	3.9	25.3	6.4	13.6	12177	12394
12	15.1	1.9	1.9	18.9	6.2	13.2	9785	10084
13	26.4	7.9	7.9	42.2	8.7	18.5	15672	15061
14	23.9	5.9	5.9	35.7	8.5	18.0	13838	13507
15	21.5	3.9	3.9	29.3	8.3	17.6	11752	11793
16	19.1	1.9	1.9	22.9	8.1	17.2	9566	9919

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Low Compaction

Replicate Test: REP 3

K_1 =	1,104.6
K_2 =	0.765
K_3 =	-1.894

n = 16

SES = 0.001

Sy = 0.092

Se = 0.011

Se/Sy = 0.117

R^2 = 0.986

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - Standard, Optimum

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	4
USCS:	CL
AASHTO:	A-4
Group Index:	5

Description:	Material 4
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No. 60 Sieve	98
No.200 Sieve	83
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	22
Plastic Limit:	14
Plasticity Index:	8
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	120.5
Optimum Moisture (%):	11.4

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - Standard, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	95.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	114.5
Target Moisture Content (%):	11.4

Initial Moisture Content Data	
Tare Weight (g):	360.50
Wet Weight + Tare (g):	712.10
Dry Weight + Tare (g):	685.30
Initial Moisture Content:	8.3

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	101.8

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	127.5
Wet Weight of Sample (g):	3314.5
Adjusted Wet Weight (g):	3418.6
Layer Weight (g):	427.3

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		8	8	8			
Specimen Wet Weight (g):		3314.4	3340.8	3315.9			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	40.90	39.90	41.30			
	Wet Weight + Tare (g):	470.20	461.60	471.80			
	Dry Weight + Tare (g):	426.9	418.8	428.70			
Moisture Content (%):		11.2	11.3	11.1			
Wet Density (pcf):		127.5	128.5	127.6			
Dry Density (pcf):		114.7	115.5	114.8			
Percent Differences	Target & Specimen Dry Density	0.2	0.9	0.3			
	Target & Specimen Moisture	0.2	0.1	0.3			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.9	7.9	32.2	4.0	8.5	21685	22227
2	13.9	5.9	5.9	25.7	3.8	8.0	19194	19196
3	11.5	3.9	3.9	19.3	3.6	7.6	15535	15754
4	9.2	1.9	1.9	13.0	3.4	7.3	12428	11848
5	19.4	7.9	7.9	35.2	5.4	11.5	20457	20650
6	16.9	5.9	5.9	28.7	5.2	11.0	18161	18094
7	14.5	3.9	3.9	22.3	5.0	10.6	15151	15217
8	12.1	1.9	1.9	15.9	4.8	10.2	12129	11992
9	22.3	7.9	7.9	38.1	6.8	14.4	19440	19307
10	19.9	5.9	5.9	31.7	6.6	14.0	17165	17080
11	17.5	3.9	3.9	25.3	6.4	13.6	14463	14642
12	15.1	1.9	1.9	18.9	6.2	13.2	11677	11940
13	26.3	7.9	7.9	42.1	8.7	18.4	18431	17695
14	23.9	5.9	5.9	35.7	8.5	18.0	16227	15859
15	21.5	3.9	3.9	29.3	8.3	17.6	13711	13868
16	19.1	1.9	1.9	22.9	8.1	17.2	11229	11686

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Standard Compaction

Replicate Test: REP 1

K_1 =	1,330.0
K_2 =	0.759
K_3 =	-1.938

n = 16

SES = 0.002
Sy = 0.091

Se = 0.011
Se/Sy = 0.118
R^2 = 0.986

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	20782	21246
2	13.8	5.8	5.8	25.4	3.8	8.0	18367	18479
3	11.5	3.8	3.8	19.1	3.6	7.7	15321	15284
4	9.1	1.9	1.9	12.9	3.4	7.2	12406	11821
5	19.2	7.8	7.8	34.8	5.4	11.4	19635	19820
6	16.8	5.8	5.8	28.4	5.2	11.0	17395	17440
7	14.4	3.8	3.8	22.0	5.0	10.6	14810	14785
8	12.1	1.9	1.9	15.9	4.8	10.2	12034	11929
9	22.2	7.8	7.8	37.8	6.8	14.4	18531	18517
10	19.8	5.8	5.8	31.4	6.6	14.0	16435	16482
11	17.4	3.8	3.8	25.0	6.4	13.6	13999	14234
12	15.1	1.9	1.9	18.9	6.2	13.2	11436	11847
13	26.3	7.8	7.8	41.9	8.7	18.5	17775	16972
14	23.8	5.8	5.8	35.4	8.5	18.0	15726	15328
15	21.4	3.8	3.8	29.0	8.3	17.6	13491	13492
16	19.1	1.9	1.9	22.9	8.1	17.2	11128	11569

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Standard Compaction

Replicate Test: REP 2

K_1 =	1,301.8
K_2 =	0.716
K_3 =	-1.869

n = 16

SES = 0.002

Sy = 0.086

Se = 0.011

Se/Sy = 0.132

R^2 = 0.982

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	20020	20478
2	13.8	5.8	5.8	25.4	3.8	8.0	17749	17851
3	11.5	3.8	3.8	19.1	3.6	7.7	14881	14796
4	9.2	1.9	1.9	13.0	3.4	7.3	12031	11483
5	19.2	7.8	7.8	34.8	5.4	11.4	18740	18979
6	16.8	5.8	5.8	28.4	5.2	11.0	16718	16730
7	14.6	3.9	3.9	22.4	5.0	10.7	14305	14330
8	12.2	1.9	1.9	16.0	4.9	10.3	11607	11494
9	22.2	7.8	7.8	37.8	6.8	14.4	17643	17620
10	19.8	5.8	5.8	31.4	6.6	14.0	15728	15710
11	17.6	3.9	3.9	25.4	6.5	13.7	13450	13688
12	15.2	1.9	1.9	19.0	6.3	13.3	10940	11331
13	26.2	7.7	7.7	41.6	8.7	18.5	16735	15939
14	23.8	5.8	5.8	35.4	8.5	18.0	14846	14494
15	21.5	3.8	3.8	29.1	8.3	17.7	12715	12760
16	19.1	1.9	1.9	22.9	8.1	17.2	10573	10979

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Standard Compaction

Replicate Test: REP 3

K_1 =	1,286.3
K_2 =	0.711
K_3 =	-1.955

n = 16

SES = 0.002

Sy = 0.086

Se = 0.011

Se/Sy = 0.133

R^2 = 0.982

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - High, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 4
Sample No.:	4		
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-4		
Group Index:	5	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No. 60 Sieve	98
No.200 Sieve	83
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	22
Plastic Limit:	14
Plasticity Index:	8
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	120.5
Optimum Moisture (%):	11.4

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - High, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	101.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	121.7
Target Moisture Content (%):	11.4

Initial Moisture Content Data	
Tare Weight (g):	360.50
Wet Weight + Tare (g):	712.10
Dry Weight + Tare (g):	685.30
Initial Moisture Content:	8.3

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	101.8

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	135.6
Wet Weight of Sample (g):	3523.8
Adjusted Wet Weight (g):	3634.5
Layer Weight (g):	454.3

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		16	16	16			
Specimen Wet Weight (g):		3514.4	3528.2	3519.5			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	263.50	186.00	267.30			
	Wet Weight + Tare (g):	975.30	638.90	670.30			
	Dry Weight + Tare (g):	903.0	593.0	629.80			
Moisture Content (%):		11.3	11.3	11.2			
Wet Density (pcf):		135.2	135.7	135.4			
Dry Density (pcf):		121.5	122.0	121.8			
Percent Differences	Target & Specimen Dry Density	0.2	0.2	0.1			
	Target & Specimen Moisture	0.1	0.1	0.2			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	23945	24372
2	13.9	5.8	5.8	25.5	3.8	8.1	20936	20825
3	11.4	3.8	3.8	19.0	3.6	7.6	16815	16921
4	9.0	1.8	1.8	12.6	3.4	7.2	13053	12492
5	19.2	7.7	7.7	34.6	5.4	11.5	22582	22747
6	16.8	5.8	5.8	28.4	5.2	11.0	19812	19904
7	14.4	3.8	3.8	22.0	5.0	10.6	16451	16575
8	12.0	1.8	1.8	15.6	4.8	10.2	12982	12879
9	22.1	7.7	7.7	37.5	6.8	14.4	21564	21497
10	19.8	5.8	5.8	31.4	6.6	14.0	18938	19003
11	17.5	3.8	3.8	25.1	6.5	13.7	15878	16135
12	15.1	1.8	1.8	18.7	6.3	13.3	12634	13017
13	26.1	7.7	7.7	41.5	8.7	18.4	20809	19970
14	23.8	5.8	5.8	35.4	8.5	18.0	18222	17889
15	21.5	3.8	3.8	29.1	8.3	17.7	15472	15511
16	19.1	1.8	1.8	22.7	8.2	17.3	12640	12956

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
High Compaction

Replicate Test: REP 1

K_1 =	1,400.1
K_2 =	0.785
K_3 =	-1.821

n = 16

SES = 0.001

Sy = 0.094

Se = 0.010

Se/Sy = 0.102

R^2 = 0.990

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	21525	21801
2	13.8	5.8	5.8	25.4	3.8	8.0	18431	18354
3	11.5	3.8	3.8	19.1	3.6	7.7	14556	14615
4	9.2	1.9	1.9	13.0	3.4	7.3	11222	10746
5	19.2	7.8	7.8	34.8	5.4	11.4	20355	20607
6	16.9	5.8	5.8	28.5	5.2	11.1	17655	17621
7	14.5	3.8	3.8	22.1	5.0	10.7	14361	14450
8	12.2	1.9	1.9	16.0	4.9	10.3	11246	11180
9	22.2	7.8	7.8	37.8	6.8	14.4	19617	19531
10	19.8	5.8	5.8	31.4	6.6	14.0	16906	16957
11	17.6	3.9	3.9	25.4	6.5	13.7	13902	14339
12	15.1	1.9	1.9	18.9	6.2	13.2	11051	11389
13	26.2	7.8	7.8	41.8	8.7	18.4	18953	18255
14	23.8	5.8	5.8	35.4	8.5	18.0	16398	16090
15	21.5	3.8	3.8	29.1	8.3	17.7	13753	13779
16	19.1	1.9	1.9	22.9	8.1	17.2	11286	11457

BCD Project:	070904
Project Name:	MDOT SS 205
Sample I.D.:	Material 4 CL A-4
	High Compacton
Replicate Test:	REP 2

K_1 =	1,189.1
K_2 =	0.848
K_3 =	-1.818

n =	16
SES =	0.001
Sy =	0.100
Se =	0.009
Se/Sy =	0.095
R^2 =	0.991

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.7	7.7	31.6	4.0	8.5	20515	21009
2	13.9	5.8	5.8	25.5	3.8	8.1	17791	17731
3	11.4	3.8	3.8	19.0	3.6	7.6	13954	14019
4	9.1	1.8	1.8	12.7	3.4	7.3	10584	9975
5	19.2	7.8	7.8	34.8	5.4	11.4	19635	19973
6	16.8	5.8	5.8	28.4	5.2	11.0	17032	17001
7	14.4	3.8	3.8	22.0	5.0	10.6	13779	13824
8	12.1	1.9	1.9	15.9	4.8	10.2	10537	10576
9	22.3	7.8	7.8	37.9	6.8	14.5	18858	18811
10	19.8	5.8	5.8	31.4	6.6	14.0	16333	16276
11	17.5	3.8	3.8	25.1	6.5	13.7	13348	13532
12	15.1	1.9	1.9	18.9	6.2	13.2	10360	10766
13	26.2	7.8	7.8	41.8	8.7	18.4	18278	17519
14	23.9	5.8	5.8	35.5	8.5	18.1	15811	15346
15	21.4	3.8	3.8	29.0	8.3	17.6	13068	13094
16	19.1	1.9	1.9	22.9	8.1	17.2	10418	10802

BCD Project:	070904
Project Name:	MDOT SS 205
Sample I.D.:	Material 4 CL A-4
	High Compaction
Replicate Test:	REP 3

K_1 =	1,157.0
K_2 =	0.882
K_3 =	-1.923

n =	16
SES =	0.002
Sy =	0.104
Se =	0.012
Se/Sy =	0.116
R^2 =	0.987

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 5 - Low, Optimum

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	5
USCS:	SM
AASHTO:	A-2-4
Group Index:	0

Description:	Material 5
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	99
No.60 Sieve	76
No.200 Sieve	23
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	105.9
Optimum Moisture (%):	14.1

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 5 - Low, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	96.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	101.7
Target Moisture Content (%):	14.1

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	493.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	116.0
Wet Weight of Sample (g):	3014.9
Adjusted Wet Weight (g):	3109.6
Layer Weight (g):	388.7

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		4	4	4			
Specimen Wet Weight (g):		3026.9	3021.6	3015.7			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	360.50	185.60			
	Wet Weight + Tare (g):	827.60	793.20	824.40			
	Dry Weight + Tare (g):	769.6	740.1	744.90			
Moisture Content (%):		14.2	14.0	14.2			
Wet Density (pcf):		116.5	116.2	116.0			
Dry Density (pcf):		102.0	102.0	101.6			
Percent Differences	Target & Specimen Dry Density	0.3	0.3	0.1			
	Target & Specimen Moisture	0.1	0.1	0.1			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 . \sigma_3$ psi	M_R psi	Pred. M_R psi
1	6.2	1.9	1.9	10.0	2.0	4.3	10035	9850
2	9.5	3.8	3.8	17.1	2.7	5.7	15295	15225
3	12.9	5.8	5.8	24.5	3.3	7.1	20375	20072
4	16.3	7.8	7.8	31.9	4.0	8.5	24341	24300
5	23.0	11.8	11.8	46.6	5.3	11.2	29887	31357
6	7.2	1.9	1.9	11.0	2.5	5.3	10584	10342
7	11.4	3.8	3.8	19.0	3.6	7.6	15916	15645
8	15.9	5.8	5.8	27.5	4.8	10.1	20607	20111
9	20.3	7.8	7.8	35.9	5.9	12.5	24196	23728
10	29.0	11.8	11.8	52.6	8.1	17.2	29256	29212
11	9.0	1.8	1.8	12.6	3.4	7.2	11157	10918
12	15.5	3.8	3.8	23.1	5.5	11.7	16184	16290
13	21.9	5.8	5.8	33.5	7.6	16.1	19834	19992
14	28.1	7.8	7.8	43.7	9.6	20.3	22401	22666
15	40.9	11.8	11.8	64.5	13.7	29.1	26860	26034
16	11.1	1.8	1.8	14.7	4.4	9.3	10525	11680

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 5 SM A-2-4
Low Compaction

Replicate Test: REP 1

K_1 =	1,135.5
K_2 =	0.910
K_3 =	-1.368

n = 16

SES = 0.003
Sy = 0.163

Se = 0.016
Se/Sy = 0.097
R^2 = 0.991

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	6.2	1.9	1.9	10.0	2.0	4.3	8925	8452
2	9.6	3.9	3.9	17.4	2.7	5.7	13291	13440
3	12.9	5.9	5.9	24.7	3.3	7.0	17750	17785
4	16.4	7.9	7.9	32.2	4.0	8.5	21792	21639
5	23.1	11.8	11.8	46.7	5.3	11.3	27508	27970
6	7.1	1.9	1.9	10.9	2.5	5.2	9223	8864
7	11.6	3.9	3.9	19.4	3.6	7.7	13860	13885
8	15.8	5.8	5.8	27.4	4.7	10.0	18018	17756
9	20.3	7.9	7.9	36.1	5.8	12.4	21740	21311
10	29.0	11.9	11.9	52.8	8.1	17.1	26759	26560
11	9.1	1.9	1.9	12.9	3.4	7.2	9761	9670
12	15.5	3.9	3.9	23.3	5.5	11.6	14140	14542
13	21.8	5.8	5.8	33.4	7.5	16.0	17544	17892
14	28.2	7.8	7.8	43.8	9.6	20.4	20185	20500
15	41.0	11.8	11.8	64.6	13.8	29.2	25012	23976
16	11.2	1.9	1.9	15.0	4.4	9.3	9391	10381

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 5 SM A-2-4 Low Compaction

Replicate Test: REP 2

K_1 =	971.6
K_2 =	0.928
K_3 =	-1.294

n = 16

SES = 0.004

Sy = 0.169

Se = 0.017

Se/Sy = 0.098

R^2 = 0.990

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	6.2	1.9	1.9	10.0	2.0	4.3	9411	8960
2	9.6	3.9	3.9	17.4	2.7	5.7	14112	14296
3	13.0	5.9	5.9	24.8	3.3	7.1	19005	18953
4	16.2	7.8	7.8	31.8	4.0	8.4	23294	22872
5	23.1	11.8	11.8	46.7	5.3	11.3	28904	29804
6	7.2	1.9	1.9	11.0	2.5	5.3	9812	9436
7	11.5	3.9	3.9	19.3	3.6	7.6	14720	14719
8	15.9	5.9	5.9	27.7	4.7	10.0	19262	19044
9	20.3	7.9	7.9	36.1	5.8	12.4	23071	22611
10	29.0	11.8	11.8	52.6	8.1	17.2	28201	27938
11	9.1	1.9	1.9	12.9	3.4	7.2	10403	10229
12	15.6	3.9	3.9	23.4	5.5	11.7	15065	15389
13	21.9	5.9	5.9	33.7	7.5	16.0	18621	19036
14	28.3	7.9	7.9	44.1	9.6	20.4	21448	21711
15	41.0	11.8	11.8	64.6	13.8	29.2	26148	25091
16	11.2	1.9	1.9	15.0	4.4	9.3	9828	10963

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 5 SM A-2-4
Low Compaction

Replicate Test: REP 3

K_1 =	1,042.3
K_2 =	0.938
K_3 =	-1.355

n = 16

SES = 0.004

Sy = 0.169

Se = 0.017

Se/Sy = 0.103

R^2 = 0.989

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 5 - Standard, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 5
Sample No.:	5		
USCS:	SM	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-2-4		
Group Index:	0	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	99
No.60 Sieve	76
No.200 Sieve	23
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	105.9
Optimum Moisture (%):	14.1

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 5 - Standard, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	101.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	107.0
Target Moisture Content (%):	14.1

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	493.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	122.0
Wet Weight of Sample (g):	3171.9
Adjusted Wet Weight (g):	3271.6
Layer Weight (g):	408.9

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		8	8	8			
Specimen Wet Weight (g):		3167.1	3158.6	3149.8			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	360.50	185.70			
	Wet Weight + Tare (g):	710.80	830.10	889.80			
	Dry Weight + Tare (g):	668.2	772.8	803.10			
Moisture Content (%):		13.8	13.9	14.0			
Wet Density (pcf):		121.8	121.5	121.2			
Dry Density (pcf):		107.0	106.7	106.3			
Percent Differences	Target & Specimen Dry Density	0.1	0.3	0.7			
	Target & Specimen Moisture	0.3	0.2	0.1			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	6.2	1.9	1.9	10.0	2.0	4.3	10495	10368
2	9.6	3.9	3.9	17.4	2.7	5.7	16211	16087
3	12.9	5.9	5.9	24.7	3.3	7.0	21650	21017
4	16.3	7.9	7.9	32.1	4.0	8.4	25995	25404
5	23.2	11.9	11.9	47.0	5.3	11.3	31830	32844
6	7.2	1.9	1.9	11.0	2.5	5.3	11194	10941
7	11.5	3.9	3.9	19.3	3.6	7.6	16941	16707
8	15.9	5.9	5.9	27.7	4.7	10.0	22017	21465
9	20.3	7.9	7.9	36.1	5.8	12.4	25958	25460
10	29.1	11.9	11.9	52.9	8.1	17.2	31534	31813
11	9.2	1.9	1.9	13.0	3.4	7.3	11981	11965
12	15.5	3.9	3.9	23.3	5.5	11.6	17605	17769
13	22.0	5.9	5.9	33.8	7.6	16.1	21887	22111
14	28.3	7.9	7.9	44.1	9.6	20.4	25082	25441
15	41.1	11.9	11.9	64.9	13.8	29.2	30113	30206
16	11.2	1.9	1.9	15.0	4.4	9.3	12411	12852
17	19.5	3.9	3.9	27.3	7.4	15.6	17569	18583
18	27.9	5.9	5.9	39.7	10.4	22.0	21470	22508
19	36.2	7.9	7.9	52.0	13.3	28.3	25066	25326
20	52.8	11.8	11.8	76.4	19.3	41.0	31034	28932

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 5 SM A-2-4
Standard Compaction

Replicate Test: REP 1

K_1 =	1,124.7
K_2 =	0.865
K_3 =	-1.032

n = 20

SES = 0.003

Sy = 0.154

Se = 0.014

Se/Sy = 0.088

R^2 = 0.992

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	6.2	1.9	1.9	10.0	2.0	4.3	9852	9663
2	9.5	3.8	3.8	17.1	2.7	5.7	15095	14974
3	12.9	5.8	5.8	24.5	3.3	7.1	20096	19844
4	16.3	7.8	7.8	31.9	4.0	8.5	24556	24180
5	23.0	11.8	11.8	46.6	5.3	11.2	30930	31633
6	7.2	1.9	1.9	11.0	2.5	5.3	10544	10216
7	11.4	3.8	3.8	19.0	3.6	7.6	15918	15599
8	15.9	5.8	5.8	27.5	4.8	10.1	20803	20311
9	20.3	7.8	7.8	35.9	5.9	12.5	24766	24271
10	29.1	11.8	11.8	52.7	8.2	17.3	30771	30619
11	9.2	1.9	1.9	13.0	3.4	7.3	11230	11207
12	15.5	3.8	3.8	23.1	5.5	11.7	16461	16697
13	21.8	5.8	5.8	33.4	7.5	16.0	20616	20972
14	28.2	7.8	7.8	43.8	9.6	20.4	23933	24308
15	41.0	11.8	11.8	64.6	13.8	29.2	29255	29106
16	11.2	1.9	1.9	15.0	4.4	9.3	11633	12069
17	19.4	3.8	3.8	27.0	7.4	15.6	16403	17502
18	27.8	5.8	5.8	39.4	10.4	22.0	20397	21412
19	36.2	7.8	7.8	51.8	13.4	28.4	23972	24237
20	52.8	11.8	11.8	76.4	19.3	41.0	29925	27985

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 5 SM A-2-4
Standard Compaction

Replicate Test: REP 2

K_1 =	1,063.1
K_2 =	0.893
K_3 =	-1.059

n = 20

SES = 0.003

Sy = 0.159

Se = 0.014

Se/Sy = 0.086

R^2 = 0.993

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	6.2	1.9	1.9	10.0	2.0	4.3	9876	9808
2	9.5	3.8	3.8	17.1	2.7	5.7	15219	15158
3	12.9	5.8	5.8	24.5	3.3	7.1	20659	20045
4	16.2	7.8	7.8	31.8	4.0	8.4	24846	24379
5	23.0	11.8	11.8	46.6	5.3	11.2	30750	31796
6	7.2	1.9	1.9	11.0	2.5	5.3	10618	10358
7	11.5	3.9	3.9	19.3	3.6	7.6	16257	15983
8	15.9	5.9	5.9	27.7	4.7	10.0	21163	20649
9	20.2	7.8	7.8	35.8	5.8	12.4	25034	24392
10	29.1	11.8	11.8	52.7	8.2	17.3	30584	30639
11	9.2	1.9	1.9	13.0	3.4	7.3	11499	11339
12	15.5	3.9	3.9	23.3	5.5	11.6	16879	16982
13	21.9	5.9	5.9	33.7	7.5	16.0	20916	21198
14	28.3	7.9	7.9	44.1	9.6	20.4	24071	24438
15	41.0	11.8	11.8	64.6	13.8	29.2	29044	28911
16	11.1	1.9	1.9	14.9	4.3	9.2	11728	12147
17	19.5	3.9	3.9	27.3	7.4	15.6	16596	17738
18	27.9	5.9	5.9	39.7	10.4	22.0	20374	21526
19	36.3	7.9	7.9	52.1	13.4	28.4	23778	24224
20	52.9	11.8	11.8	76.5	19.4	41.1	29743	27622

BCD Project:	070904
Project Name:	MDOT SS 205
Sample I.D.:	Material 5 SM A-2-4
	Standard Compaction
Replicate Test:	REP 3

K_1 =	1,082.3
K_2 =	0.890
K_3 =	-1.090

n =	20
SES =	0.004
Sy =	0.157
Se =	0.015
Se/Sy =	0.095
R^2 =	0.991

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 5 - High, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 5
Sample No.:	5		
USCS:	SM	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-2-4		
Group Index:	0	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	92
No.60 Sieve	51
No.200 Sieve	23
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	105.9
Optimum Moisture (%):	14.1

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 5 - High, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	103.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	109.1
Target Moisture Content (%):	14.1

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	493.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	124.5
Wet Weight of Sample (g):	3234.7
Adjusted Wet Weight (g):	3336.3
Layer Weight (g):	417.0

Molded Specimen Data							
Specimen No.:		1 REP 1	3 REP 2	4 REP 3			
Number of Blows per Layer:		16	16	16			
Specimen Wet Weight (g):		3212.8	3240.4	3233.0			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	185.50	360.50	360.50			
	Wet Weight + Tare (g):	890.40	751.00	886.40			
	Dry Weight + Tare (g):	806.0	704.5	823.60			
Moisture Content (%):		13.6	13.5	13.6			
Wet Density (pcf):		123.6	124.7	124.4			
Dry Density (pcf):		108.8	109.8	109.5			
Percent Differences	Target & Specimen Dry Density	0.3	0.7	0.4			
	Target & Specimen Moisture	0.5	0.6	0.5			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	6.2	1.9	1.9	10.0	2.0	4.3	9938	9818
2	9.5	3.9	3.9	17.3	2.6	5.6	15520	15398
3	12.9	5.9	5.9	24.7	3.3	7.0	20921	20328
4	16.3	7.9	7.9	32.1	4.0	8.4	25303	24718
5	23.1	11.9	11.9	46.9	5.3	11.2	31371	32246
6	7.2	1.9	1.9	11.0	2.5	5.3	10718	10381
7	11.6	3.9	3.9	19.4	3.6	7.7	16306	16089
8	16.0	5.9	5.9	27.8	4.8	10.1	21210	20813
9	20.3	7.9	7.9	36.1	5.8	12.4	25309	24812
10	29.1	11.9	11.9	52.9	8.1	17.2	31035	31250
11	9.2	1.9	1.9	13.0	3.4	7.3	11413	11390
12	15.6	3.9	3.9	23.4	5.5	11.7	16838	17159
13	21.9	5.9	5.9	33.7	7.5	16.0	21202	21479
14	28.3	7.9	7.9	44.1	9.6	20.4	24776	24857
15	41.1	11.9	11.9	64.9	13.8	29.2	29840	29731
16	11.2	1.9	1.9	15.0	4.4	9.3	11904	12269
17	19.5	3.9	3.9	27.3	7.4	15.6	16879	17968
18	27.9	5.9	5.9	39.7	10.4	22.0	20773	21926
19	36.2	7.9	7.9	52.0	13.3	28.3	24305	24797
20	53.0	11.9	11.9	76.8	19.4	41.1	30819	28612

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 5 SM A-2-4
High Compaction

Replicate Test: REP 1

K_1 =	1,077.1
K_2 =	0.890
K_3 =	-1.046

n = 20

SES = 0.004

Sy = 0.160

Se = 0.014

Se/Sy = 0.090

R^2 = 0.992

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	6.2	1.9	1.9	10.0	2.0	4.3	10338	10112
2	9.5	3.8	3.8	17.1	2.7	5.7	15510	15649
3	12.9	5.8	5.8	24.5	3.3	7.1	20931	20721
4	16.2	7.8	7.8	31.8	4.0	8.4	25882	25231
5	23.0	11.8	11.8	46.6	5.3	11.2	32436	32989
6	7.2	1.9	1.9	11.0	2.5	5.3	11036	10689
7	11.5	3.8	3.8	19.1	3.6	7.7	16462	16333
8	15.9	5.8	5.8	27.5	4.8	10.1	21561	21211
9	20.2	7.8	7.8	35.8	5.8	12.4	25876	25334
10	28.9	11.8	11.8	52.5	8.1	17.1	32173	31976
11	9.2	1.9	1.9	13.0	3.4	7.3	11877	11725
12	15.4	3.8	3.8	23.0	5.5	11.6	17168	17425
13	21.8	5.8	5.8	33.4	7.5	16.0	21585	21906
14	28.2	7.8	7.8	43.8	9.6	20.4	25336	25384
15	41.0	11.8	11.8	64.6	13.8	29.2	30613	30387
16	11.1	1.9	1.9	14.9	4.3	9.2	12300	12583
17	19.4	3.8	3.8	27.0	7.4	15.6	17088	18292
18	27.8	5.8	5.8	39.4	10.4	22.0	21014	22370
19	36.1	7.8	7.8	51.7	13.3	28.3	24779	25320
20	52.9	11.8	11.8	76.5	19.4	41.1	31371	29225

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 5 SM A-2-4
High Compaction

Replicate Test: REP 2

K_1 =	1,110.5
K_2 =	0.890
K_3 =	-1.053

n = 20

SES = 0.004

Sy = 0.159

Se = 0.014

Se/Sy = 0.091

R^2 = 0.992

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	6.1	1.9	1.9	9.9	2.0	4.2	9906	10074
2	9.5	3.8	3.8	17.1	2.7	5.7	15793	15785
3	12.8	5.8	5.8	24.4	3.3	7.0	21705	20985
4	16.2	7.8	7.8	31.8	4.0	8.4	26140	25692
5	23.0	11.8	11.8	46.6	5.3	11.2	32194	33860
6	7.1	1.9	1.9	10.9	2.5	5.2	10802	10689
7	11.4	3.8	3.8	19.0	3.6	7.6	16982	16525
8	15.8	5.8	5.8	27.4	4.7	10.0	22364	21642
9	20.2	7.8	7.8	35.8	5.8	12.4	26565	26032
10	29.0	11.8	11.8	52.6	8.1	17.2	32645	33212
11	9.2	1.9	1.9	13.0	3.4	7.3	11837	11855
12	15.4	3.8	3.8	23.0	5.5	11.6	17887	17836
13	21.8	5.8	5.8	33.4	7.5	16.0	22752	22661
14	28.1	7.7	7.7	43.5	9.6	20.4	26275	26341
15	40.9	11.8	11.8	64.5	13.7	29.1	32038	32243
16	11.1	1.9	1.9	14.9	4.3	9.2	12506	12786
17	19.4	3.8	3.8	27.0	7.4	15.6	18130	18887
18	27.8	5.8	5.8	39.4	10.4	22.0	22800	23407
19	36.1	7.7	7.7	51.5	13.4	28.4	26543	26659
20	52.8	11.7	11.7	76.2	19.4	41.1	32677	31418

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 5 SM A-2-4 High Compaction

Replicate Test: REP 3

K_1 =	1,102.8
K_2 =	0.895
K_3 =	-0.965

n = 20

SES = 0.002

Sy = 0.165

Se = 0.011

Se/Sy = 0.068

R^2 = 0.995

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 6 - Low, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 6
Sample No.:	6		
USCS:	SM	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-2-4		
Group Index:	0	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	99
No.60 Sieve	76
No.200 Sieve	23
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	19
Plastic Limit:	17
Plasticity Index:	2
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	114.3
Optimum Moisture (%):	12.2

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 6 - Low, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	95.0
Material Type* (1,2, or 3):	1

Target Data	
Target Dry Density (pcf):	108.6
Target Moisture Content (%):	12.2

Initial Moisture Content Data	
Tare Weight (g):	185.30
Wet Weight + Tare (g):	1594.80
Dry Weight + Tare (g):	1589.20
Initial Moisture Content:	0.4

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	14000.0
Additional Water Needed (ml):	1645.6

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	121.8
Wet Weight of Sample (g):	3166.5
Adjusted Wet Weight (g):	3266.0
Layer Weight (g):	408.2

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		4	4	4			
Specimen Wet Weight (g):		3175.1	3181.1	3176.0			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	235.20	267.40	186.50			
	Wet Weight + Tare (g):	846.60	1149.60	884.40			
	Dry Weight + Tare (g):	777.8	1050.2	805.70			
Moisture Content (%):		12.7	12.7	12.7			
Wet Density (pcf):		122.2	122.4	122.2			
Dry Density (pcf):		108.4	108.6	108.4			
Percent Differences	Target & Specimen Dry Density	0.2	0.0	0.2			
	Target & Specimen Moisture	0.5	0.5	0.5			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.8	2.9	2.9	13.6	2.3	4.9	10694	9815
2	12.8	5.8	5.8	24.4	3.3	7.0	15474	15573
3	19.6	9.8	9.8	39.2	4.6	9.8	21513	22303
4	28.2	14.8	14.8	57.8	6.3	13.4	29204	29457
5	36.6	19.8	19.8	76.2	7.9	16.8	36485	35611
6	9.3	2.8	2.8	14.9	3.1	6.5	10909	10329
7	15.8	5.8	5.8	27.4	4.7	10.0	15881	16408
8	24.6	9.8	9.8	44.2	7.0	14.8	22423	23020
9	35.7	14.8	14.8	65.3	9.9	20.9	30238	29713
10	46.6	19.8	19.8	86.2	12.6	26.8	37233	35226
11	12.3	2.8	2.8	17.9	4.5	9.5	11425	11518
12	21.8	5.8	5.8	33.4	7.5	16.0	17081	17865
13	34.8	9.8	9.8	54.4	11.8	25.0	24196	24296
14	50.6	14.8	14.8	80.2	16.9	35.8	31320	30340
15	66.6	19.8	19.8	106.2	22.1	46.8	35159	35093
16	15.4	2.9	2.9	21.2	5.9	12.5	12118	12731
17	27.9	5.8	5.8	39.5	10.4	22.1	18105	19125

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 6 Class 9 Group A
Low Compaction

Replicate Test: REP 1

K_1 =	779.7
K_2 =	0.849
K_3 =	-0.610

n = 17

SES = 0.005

Sy = 0.191

Se = 0.019

Se/Sy = 0.098

R^2 = 0.990

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.8	2.9	2.9	13.6	2.3	4.9	11044	10398
2	12.8	5.8	5.8	24.4	3.3	7.0	16092	16121
3	19.7	9.8	9.8	39.3	4.7	9.9	22256	22737
4	28.1	14.8	14.8	57.7	6.3	13.3	29528	29684
5	36.7	19.8	19.8	76.3	8.0	16.9	36493	35676
6	9.3	2.8	2.8	14.9	3.1	6.5	11380	10942
7	15.9	5.8	5.8	27.5	4.8	10.1	16596	17050
8	24.7	9.8	9.8	44.3	7.0	14.9	23039	23605
9	35.6	14.8	14.8	65.2	9.8	20.8	30539	30242
10	46.7	19.8	19.8	86.3	12.7	26.9	37475	35768
11	12.4	2.9	2.9	18.2	4.5	9.5	11869	12350
12	21.8	5.8	5.8	33.4	7.5	16.0	17682	18611
13	34.8	9.8	9.8	54.4	11.8	25.0	24730	25156
14	50.7	14.8	14.8	80.3	16.9	35.9	31673	31387

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 6 Class 9 Group A
Low Compaction

Replicate Test: REP 2

K_1 =	810.6
K_2 =	0.799
K_3 =	-0.507

n = 14

SES = 0.003

Sy = 0.186

Se = 0.016

Se/Sy = 0.084

R^2 = 0.993

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.7	2.8	2.8	13.3	2.3	4.9	10673	9848
2	12.8	5.8	5.8	24.4	3.3	7.0	15806	15820
3	19.6	9.8	9.8	39.2	4.6	9.8	21839	22545
4	28.1	14.7	14.7	57.5	6.3	13.4	29356	29526
5	36.4	19.6	19.6	75.6	7.9	16.8	36114	35512
6	9.3	2.8	2.8	14.9	3.1	6.5	10934	10549
7	15.8	5.8	5.8	27.4	4.7	10.0	16298	16650
8	24.6	9.8	9.8	44.2	7.0	14.8	22635	23243
9	35.6	14.7	14.7	65.0	9.9	20.9	30268	29766
10	46.6	19.7	19.7	86.0	12.7	26.9	37006	35219
11	12.2	2.8	2.8	17.8	4.4	9.4	11503	11703
12	21.8	5.8	5.8	33.4	7.5	16.0	17461	18093
13	34.8	9.8	9.8	54.4	11.8	25.0	24363	24484
14	50.6	14.7	14.7	80.0	16.9	35.9	31244	30364
15	66.6	19.7	19.7	106.0	22.1	46.9	35009	35045
16	15.2	2.8	2.8	20.8	5.8	12.4	12298	12769
17	27.8	5.8	5.8	39.4	10.4	22.0	18465	19319

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 6 Class 9 Group A
Low Compaction

Replicate Test: REP 3

K_1 =	796.2
K_2 =	0.838
K_3 =	-0.609

n = 17

SES = 0.004

Sy = 0.189

Se = 0.016

Se/Sy = 0.084

R^2 = 0.993

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 6 - Standard, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 6
Sample No.:	6		
USCS:	SM	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-2-4		
Group Index:	0	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	99
No.60 Sieve	76
No.200 Sieve	23
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	19
Plastic Limit:	17
Plasticity Index:	2
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	114.3
Optimum Moisture (%):	12.2

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 6 - Standard, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	99.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	113.2
Target Moisture Content (%):	12.2

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	14000.0
Additional Water Needed (ml):	1708.0

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	127.0
Wet Weight of Sample (g):	3299.8
Adjusted Wet Weight (g):	3403.5
Layer Weight (g):	425.4

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		8	8	8			
Specimen Wet Weight (g):		3306.5	3329.3	3297.7			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	246.20	246.20	267.40			
	Wet Weight + Tare (g):	968.10	1032.00	1024.90			
	Dry Weight + Tare (g):	888.2	943.5	940.30			
Moisture Content (%):		12.4	12.7	12.6			
Wet Density (pcf):		127.2	128.1	126.9			
Dry Density (pcf):		113.1	113.7	112.7			
Percent Differences	Target & Specimen Dry Density	0.0	0.4	0.4			
	Target & Specimen Moisture	0.2	0.5	0.4			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 . \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.8	2.8	2.8	13.4	2.4	5.0	12357	11316
2	12.9	5.8	5.8	24.5	3.3	7.1	17245	17355
3	19.6	9.7	9.7	39.0	4.7	9.9	22994	23794
4	28.0	14.6	14.6	57.2	6.3	13.4	30070	30484
5	36.3	19.5	19.5	75.3	7.9	16.8	36958	36142
6	9.2	2.8	2.8	14.8	3.0	6.4	12481	11964
7	15.8	5.8	5.8	27.4	4.7	10.0	17599	18192
8	24.6	9.7	9.7	44.0	7.0	14.9	23720	24572
9	35.5	14.6	14.6	64.7	9.9	20.9	31267	30890
10	46.4	19.6	19.6	85.6	12.6	26.8	38542	36128
11	12.2	2.8	2.8	17.8	4.4	9.4	13109	13225
12	21.8	5.8	5.8	33.4	7.5	16.0	18830	19705
13	34.7	9.7	9.7	54.1	11.8	25.0	25831	25946
14	50.5	14.6	14.6	79.7	16.9	35.9	33138	31753
15	66.3	19.5	19.5	105.3	22.1	46.8	37979	36282
16	15.2	2.8	2.8	20.8	5.8	12.4	13965	14343
17	27.8	5.8	5.8	39.4	10.4	22.0	20298	20995
18	44.8	9.7	9.7	64.2	16.5	35.1	25720	27126
19	65.7	14.6	14.6	94.9	24.1	51.1	31889	32622

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 6; Class 9-A
Standard Compaction

Replicate Test: REP 1

K_1 =	891.4
K_2 =	0.757
K_3 =	-0.515

n = 19

SES = 0.006

Sy = 0.169

Se = 0.019

Se/Sy = 0.110

R^2 = 0.988

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.7	2.8	2.8	13.3	2.3	4.9	10902	9775
2	12.9	5.8	5.8	24.5	3.3	7.1	15509	15631
3	19.4	9.6	9.6	38.6	4.6	9.8	21140	21881
4	28.1	14.7	14.7	57.5	6.3	13.4	28295	29003
5	36.5	19.6	19.6	75.7	8.0	16.9	36215	34899
6	9.3	2.8	2.8	14.9	3.1	6.5	11011	10483
7	15.9	5.8	5.8	27.5	4.8	10.1	15864	16503
8	24.6	9.7	9.7	44.0	7.0	14.9	21877	22877
9	35.5	14.6	14.6	64.7	9.9	20.9	29736	29393
10	46.5	19.6	19.6	85.7	12.7	26.9	37851	34913
11	12.3	2.8	2.8	17.9	4.5	9.5	11602	11695
12	21.8	5.8	5.8	33.4	7.5	16.0	17041	18017
13	34.6	9.7	9.7	54.0	11.7	24.9	24010	24355
14	50.6	14.7	14.7	80.0	16.9	35.9	32056	30541
15	66.3	19.6	19.6	105.5	22.0	46.7	37320	35374
16	15.3	2.8	2.8	20.9	5.9	12.5	12449	12783
17	27.9	5.8	5.8	39.5	10.4	22.1	18322	19370
18	44.9	9.8	9.8	64.5	16.5	35.1	24239	25760
19	65.8	14.7	14.7	95.2	24.1	51.1	31022	31570

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 6; Class 9-A
Standard Compaction

Replicate Test: REP 2

K_1 =	780.7
K_2 =	0.820
K_3 =	-0.537

n = 19

SES = 0.008

Sy = 0.185

Se = 0.023

Se/Sy = 0.123

R^2 = 0.985

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.7	2.8	2.8	13.3	2.3	4.9	10706	11694
2	12.8	5.8	5.8	24.4	3.3	7.0	15341	17971
3	19.6	9.7	9.7	39.0	4.7	9.9	21218	24643
4	28.1	14.7	14.7	57.5	6.3	13.4	28330	31631
5	36.4	19.6	19.6	75.6	7.9	16.8	36318	37387
6	9.2	2.8	2.8	14.8	3.0	6.4	10953	12400
7	15.9	5.8	5.8	27.5	4.8	10.1	15821	18847
8	24.6	9.8	9.8	44.2	7.0	14.8	21995	25461
9	35.6	14.7	14.7	65.0	9.9	20.9	29834	31852
10	46.5	19.6	19.6	85.7	12.7	26.9	37900	36992
11	12.2	2.8	2.8	17.8	4.4	9.4	11454	13672
12	21.8	5.8	5.8	33.4	7.5	16.0	16990	20287
13	34.8	9.8	9.8	54.4	11.8	25.0	24004	26678
14	50.5	14.6	14.6	79.7	16.9	35.9	31987	32321
15	66.4	19.6	19.6	105.6	22.1	46.8	37335	36820
16	15.2	2.8	2.8	20.8	5.8	12.4	12335	14793
17	27.8	5.8	5.8	39.4	10.4	22.0	18256	21524
18	44.8	9.7	9.7	64.2	16.5	35.1	24275	27607
19	65.9	14.7	14.7	95.3	24.1	51.2	30982	33038

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 6; Class 9-A
Standard Compaction

Replicate Test: REP 3

K_1 =	930.7
K_2 =	0.760
K_3 =	-0.554

n = 19

SES = 0.056

Sy = 0.187

Se = 0.059

Se/Sy = 0.316

R^2 = 0.900

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 6 - High, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 6
Sample No.:	6		
USCS:	SM	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-2-4		
Group Index:	0	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	99
No.60 Sieve	76
No.200 Sieve	23
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	19
Plastic Limit:	17
Plasticity Index:	2
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	114.3
Optimum Moisture (%):	12.2

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 6 - High, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	102.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	116.6
Target Moisture Content (%):	12.2

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	14000.0
Additional Water Needed (ml):	1708.0

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	130.8
Wet Weight of Sample (g):	3399.8
Adjusted Wet Weight (g):	3506.6
Layer Weight (g):	438.3

Molded Specimen Data							
Specimen No.:		2 REP 1	4 REP 2	5 REP 3			
Number of Blows per Layer:		16	16	16			
Specimen Wet Weight (g):		3393.0	3425.3	3404.5			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	246.40	264.90	360.50			
	Wet Weight + Tare (g):	658.90	881.40	885.40			
	Dry Weight + Tare (g):	615.0	814.4	828.50			
Moisture Content (%):		11.9	12.2	12.2			
Wet Density (pcf):		130.5	131.8	131.0			
Dry Density (pcf):		116.6	117.5	116.8			
Percent Differences	Target & Specimen Dry Density	0.0	0.7	0.2			
	Target & Specimen Moisture	0.3	0.0	0.0			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.8	2.8	2.8	13.4	2.4	5.0	12763	11456
2	12.8	5.8	5.8	24.4	3.3	7.0	18122	17935
3	19.7	9.8	9.8	39.3	4.7	9.9	24414	25199
4	28.1	14.7	14.7	57.5	6.3	13.4	32144	32646
5	36.4	19.6	19.6	75.6	7.9	16.8	39945	39015
6	9.3	2.8	2.8	14.9	3.1	6.5	13148	12195
7	15.8	5.8	5.8	27.4	4.7	10.0	18275	18882
8	24.7	9.8	9.8	44.3	7.0	14.9	24969	26052
9	35.6	14.7	14.7	65.0	9.9	20.9	33225	33092
10	46.4	19.6	19.6	85.6	12.6	26.8	41126	38882
11	12.2	2.8	2.8	17.8	4.4	9.4	13549	13499
12	21.9	5.8	5.8	33.5	7.6	16.1	19453	20566
13	34.8	9.8	9.8	54.4	11.8	25.0	27189	27564
14	50.6	14.7	14.7	80.0	16.9	35.9	35584	34049
15	66.4	19.6	19.6	105.6	22.1	46.8	41582	39154
16	15.2	2.8	2.8	20.8	5.8	12.4	14279	14704
17	27.9	5.8	5.8	39.5	10.4	22.1	21157	21983
18	44.7	9.8	9.8	64.3	16.5	34.9	28410	28844
19	65.5	14.7	14.7	94.9	23.9	50.8	34758	35001
20	86.4	19.6	19.6	125.6	31.5	66.8	40427	39733
21	21.2	2.8	2.8	26.8	8.7	18.4	15594	16780
22	40.1	5.8	5.8	51.7	16.2	34.3	23225	24365

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 6; Class 9-A High Compaction

Replicate Test: REP 1

K_1 =	909.2
K_2 =	0.796
K_3 =	-0.541

n = 22

SES = 0.008

Sy = 0.175

Se = 0.021

Se/Sy = 0.120

R^2 = 0.986

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	T_{oct} psi	$\sigma_1 . \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.9	2.9	2.9	13.7	2.4	5.0	11429	10344
2	12.9	5.8	5.8	24.5	3.3	7.1	16469	16342
3	19.6	9.8	9.8	39.2	4.6	9.8	22303	23382
4	28.2	14.8	14.8	57.8	6.3	13.4	30009	30990
5	36.7	19.8	19.8	76.3	8.0	16.9	38735	37610
6	9.3	2.8	2.8	14.9	3.1	6.5	11710	10869
7	15.8	5.8	5.8	27.4	4.7	10.0	16872	17287
8	24.7	9.8	9.8	44.3	7.0	14.9	23242	24393
9	35.7	14.8	14.8	65.3	9.9	20.9	31909	31698
10	46.7	19.8	19.8	86.3	12.7	26.9	40802	37853
11	12.3	2.8	2.8	17.9	4.5	9.5	12383	12185
12	21.8	5.8	5.8	33.4	7.5	16.0	18143	19031
13	34.8	9.8	9.8	54.4	11.8	25.0	25796	26175
14	50.6	14.8	14.8	80.2	16.9	35.8	34859	33101
15	66.5	19.8	19.8	106.1	22.0	46.7	41468	38728
16	15.3	2.9	2.9	21.1	5.8	12.4	13212	13498
17	27.9	5.8	5.8	39.5	10.4	22.1	19634	20578
18	44.7	9.8	9.8	64.3	16.5	34.9	27101	27707
19	65.7	14.8	14.8	95.3	24.0	50.9	34206	34465
20	86.5	19.7	19.7	125.9	31.5	66.8	40040	39739
21	21.3	2.9	2.9	27.1	8.7	18.4	14573	15579
22	40.1	5.8	5.8	51.7	16.2	34.3	21895	23195

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 6; Class 9-A High Compaction

Replicate Test: REP 2

K_1 =	805.3
K_2 =	0.836
K_3 =	-0.511

n = 22

SES = 0.009

Sy = 0.188

Se = 0.022

Se/Sy = 0.118

R^2 = 0.986

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.9	2.9	2.9	13.7	2.4	5.0	13671	11654
2	13.0	5.9	5.9	24.8	3.3	7.1	18516	17959
3	19.7	9.9	9.9	39.5	4.6	9.8	24002	24891
4	28.2	14.8	14.8	57.8	6.3	13.4	30993	32021
5	36.7	19.8	19.8	76.3	8.0	16.9	39699	38190
6	9.3	2.9	2.9	15.1	3.0	6.4	13266	12321
7	15.9	5.9	5.9	27.7	4.7	10.0	18281	18830
8	24.8	9.9	9.9	44.6	7.0	14.9	24359	25708
9	35.8	14.9	14.9	65.6	9.9	20.9	32396	32538
10	46.7	19.9	19.9	86.5	12.6	26.8	41003	38125
11	12.3	2.9	2.9	18.1	4.4	9.4	13574	13622
12	22.0	5.9	5.9	33.8	7.6	16.1	19181	20433
13	34.9	9.9	9.9	54.7	11.8	25.0	26314	27128
14	50.8	14.9	14.9	80.6	16.9	35.9	34970	33394
15	66.6	19.9	19.9	106.4	22.0	46.7	41343	38299
16	15.2	2.9	2.9	21.0	5.8	12.3	14214	14744
17	28.0	5.9	5.9	39.8	10.4	22.1	20445	21779
18	44.8	9.9	9.9	64.6	16.5	34.9	27659	28331
19	65.8	14.9	14.9	95.6	24.0	50.9	34343	34265
20	86.6	19.9	19.9	126.4	31.4	66.7	40143	38791
21	21.2	2.9	2.9	27.0	8.6	18.3	15245	16743
22	40.2	5.9	5.9	52.0	16.2	34.3	22572	24041
23	62.8	9.9	9.9	82.6	24.9	52.9	29273	30189

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 6; Class 9-A High Compaction

Replicate Test: REP 3

K_1 =	906.4
K_2 =	0.779
K_3 =	-0.531

n = 23

SES = 0.015

Sy = 0.171

Se = 0.027

Se/Sy = 0.158

R^2 = 0.975

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 7 - Low, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 7
Sample No.:	7		
USCS:	SC	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-2-4		
Group Index:	0	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	99
No.100 Sieve	65
No.200 Sieve	33.0
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	25
Plastic Limit:	15
Plasticity Index:	9
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	116.0
Optimum Moisture (%):	13.3

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 7 - Low, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	95.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	110.2
Target Moisture Content (%):	13.3

Initial Moisture Content Data	
Tare Weight (g):	248.80
Wet Weight + Tare (g):	819.60
Dry Weight + Tare (g):	801.00
Initial Moisture Content:	3.4

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Dry Weight of Sample (From F56):	3385.9
Wet Weight Needed (to acquire targer M.C.):	3836.3
Additional Water Needed (ml):	336.3

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	124.9
Wet Weight of Sample (g):	3245.4
Adjusted Wet Weight (g):	3346.3
Layer Weight (g):	418.3

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		6	6	6			
Specimen Wet Weight (g):		3213.8	3270.8	3224.8			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	360.50	360.50			
	Wet Weight + Tare (g):	542.50	602.80	523.00			
	Dry Weight + Tare (g):	521.1	573.9	503.70			
Moisture Content (%):		13.3	13.5	13.5			
Wet Density (pcf):		123.6	125.8	124.1			
Dry Density (pcf):		109.1	110.8	109.3			
Percent Differences	Target & Specimen Dry Density	1.0	0.6	0.8			
	Target & Specimen Moisture	0.0	0.2	0.2			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.9	2.9	2.9	13.7	2.4	5.0	19198	17024
2	12.9	5.8	5.8	24.5	3.3	7.1	23088	23075
3	19.7	9.8	9.8	39.3	4.7	9.9	27671	28764
4	28.2	14.8	14.8	57.8	6.3	13.4	33460	33542
5	36.7	19.8	19.8	76.3	8.0	16.9	39176	36791
6	9.4	2.9	2.9	15.2	3.1	6.5	18534	17389
7	15.8	5.8	5.8	27.4	4.7	10.0	21722	22868
8	24.7	9.8	9.8	44.3	7.0	14.9	25758	27376
9	35.8	14.8	14.8	65.4	9.9	21.0	30523	30554
10	46.8	19.8	19.8	86.4	12.7	27.0	35393	32341
11	12.3	2.9	2.9	18.1	4.4	9.4	17216	17905
12	21.9	5.9	5.9	33.7	7.5	16.0	19799	22469
13	34.8	9.8	9.8	54.4	11.8	25.0	23413	25116
14	50.9	14.8	14.8	80.5	17.0	36.1	27854	26418

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 7; Class 9-C
Low Compaction

Replicate Test: REP 1

K_1 =	1,422.8
K_2 =	0.629
K_3 =	-1.086

n = 14

SES = 0.012

Sy = 0.111

Se = 0.033

Se/Sy = 0.297

R^2 = 0.912

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.8	2.8	2.8	13.4	2.4	5.0	18935	16849
2	13.0	5.8	5.8	24.6	3.4	7.2	23212	23131
3	19.6	9.7	9.7	39.0	4.7	9.9	27780	28693
4	27.9	14.7	14.7	57.3	6.2	13.2	33300	33598
5	36.5	19.6	19.6	75.7	8.0	16.9	39076	36699
6	9.2	2.8	2.8	14.8	3.0	6.4	18301	17213
7	15.9	5.8	5.8	27.5	4.8	10.1	21949	22935
8	24.6	9.7	9.7	44.0	7.0	14.9	25689	27349
9	35.7	14.6	14.6	64.9	9.9	21.1	30363	30457
10	46.5	19.6	19.6	85.7	12.7	26.9	35637	32372
11	12.2	2.8	2.8	17.8	4.4	9.4	17113	17791
12	21.9	5.8	5.8	33.5	7.6	16.1	19703	22429
13	34.8	9.8	9.8	54.4	11.8	25.0	23315	25241
14	50.7	14.6	14.6	79.9	17.0	36.1	28042	26452

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 7; Class 9-C
Low Compaction

Replicate Test: REP 2

K_1 =	1,425.2
K_2 =	0.626
K_3 =	-1.075

n = 14

SES = 0.012

Sy = 0.112

Se = 0.034

Se/Sy = 0.298

R^2 = 0.911

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.8	2.8	2.8	13.4	2.4	5.0	16728	14723
2	12.7	5.8	5.8	24.3	3.3	6.9	21145	20832
3	19.6	9.7	9.7	39.0	4.7	9.9	25343	26426
4	28.1	14.6	14.6	57.3	6.4	13.5	31006	31303
5	36.6	19.6	19.6	75.8	8.0	17.0	37798	34861
6	9.2	2.8	2.8	14.8	3.0	6.4	16192	15113
7	15.9	5.8	5.8	27.5	4.8	10.1	19720	20758
8	24.7	9.8	9.8	44.3	7.0	14.9	23182	25442
9	35.6	14.6	14.6	64.8	9.9	21.0	28810	28766
10	46.5	19.6	19.6	85.7	12.7	26.9	34353	30952
11	12.3	2.8	2.8	17.9	4.5	9.5	15154	15776
12	21.8	5.8	5.8	33.4	7.5	16.0	17758	20491
13	34.8	9.8	9.8	54.4	11.8	25.0	21751	23597
14	50.9	14.7	14.7	80.3	17.1	36.2	26847	25228

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 7; Class 9-C
Low Compaction

Replicate Test: REP 3

K_1 =	1,252.1
K_2 =	0.676
K_3 =	-1.081

n = 14

SES = 0.016

Sy = 0.125

Se = 0.038

Se/Sy = 0.304

R^2 = 0.908

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 7 - Standard, Optimum

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 7
Sample No.:	7		
USCS:	SC	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-2-4		
Group Index:	0	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	99
No.100 Sieve	65
No.200 Sieve	33.0
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	25
Plastic Limit:	15
Plasticity Index:	9
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	116.0
Optimum Moisture (%):	13.3

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 7 - Standard, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	100.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	116.0
Target Moisture Content (%):	13.3

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Dry Weight of Sample (From F56):	3500.0
Wet Weight Needed (to acquire targer M.C.):	3965.5
Additional Water Needed (ml):	465.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	131.4
Wet Weight of Sample (g):	3416.2
Adjusted Wet Weight (g):	3522.4
Layer Weight (g):	440.3

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		11	11	11			
Specimen Wet Weight (g):		3434.6	3422.6	3416.2			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	360.50	360.50			
	Wet Weight + Tare (g):	685.90	639.60	616.70			
	Dry Weight + Tare (g):	647.6	606.7	587.20			
Moisture Content (%):		13.3	13.4	13.0			
Wet Density (pcf):		132.1	131.7	131.4			
Dry Density (pcf):		116.6	116.2	116.3			
Percent Differences	Target & Specimen Dry Density	0.5	0.1	0.3			
	Target & Specimen Moisture	0.0	0.1	0.3			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.9	2.9	2.9	13.7	2.4	5.0	18792	16241
2	13.0	5.9	5.9	24.8	3.3	7.1	23519	23108
3	19.8	9.9	9.9	39.6	4.7	9.9	28586	29701
4	28.3	14.9	14.9	58.1	6.3	13.4	35080	35585
5	36.6	19.8	19.8	76.2	7.9	16.8	41817	39785
6	9.3	2.9	2.9	15.1	3.0	6.4	18562	16701
7	16.1	5.9	5.9	27.9	4.8	10.2	22621	23125
8	24.9	9.9	9.9	44.7	7.1	15.0	27108	28604
9	35.9	14.9	14.9	65.7	9.9	21.0	32874	32902
10	46.7	19.8	19.8	86.3	12.7	26.9	38814	35561
11	12.3	2.9	2.9	18.1	4.4	9.4	17850	17484
12	21.9	5.9	5.9	33.7	7.5	16.0	20840	23000
13	35.0	9.9	9.9	54.8	11.8	25.1	25065	26821
14	50.7	14.8	14.8	80.3	16.9	35.9	30697	29124
15	66.7	19.8	19.8	106.3	22.1	46.9	33532	30210
16	15.3	2.9	2.9	21.1	5.8	12.4	16434	18056
17	28.1	5.9	5.9	39.9	10.5	22.2	19391	22743
18	45.1	9.8	9.8	64.7	16.6	35.3	23812	25310
19	66.1	14.8	14.8	95.7	24.2	51.3	27230	26533

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 7; Class 9-C
Standard Compaction

Replicate Test: REP 1

K_1 =	1,354.0
K_2 =	0.693
K_3 =	-1.039

n = 19

SES = 0.022

Sy = 0.120

Se = 0.037

Se/Sy = 0.307

R^2 = 0.906

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.9	2.9	2.9	13.7	2.4	5.0	20504	17380
2	13.0	5.9	5.9	24.8	3.3	7.1	24961	24355
3	19.9	9.9	9.9	39.7	4.7	10.0	30084	30835
4	28.2	14.9	14.9	58.0	6.3	13.3	36277	36539
5	36.7	19.9	19.9	76.5	7.9	16.8	42535	40472
6	9.4	2.9	2.9	15.2	3.1	6.5	20076	17816
7	15.9	5.9	5.9	27.7	4.7	10.0	23492	24188
8	24.9	9.9	9.9	44.7	7.1	15.0	27628	29394
9	35.9	14.9	14.9	65.7	9.9	21.0	32957	33258
10	46.7	19.9	19.9	86.5	12.6	26.8	38756	35595
11	12.3	2.9	2.9	18.1	4.4	9.4	18668	18452
12	22.0	5.9	5.9	33.8	7.6	16.1	21194	23711
13	35.0	9.9	9.9	54.8	11.8	25.1	25011	27045
14	50.8	14.9	14.9	80.6	16.9	35.9	30478	28843
15	66.8	19.9	19.9	106.6	22.1	46.9	32962	29400
16	15.4	2.9	2.9	21.2	5.9	12.5	16958	18909
17	28.0	5.9	5.9	39.8	10.4	22.1	19538	23170
18	45.2	9.9	9.9	65.0	16.6	35.3	23672	25198
19	66.2	14.9	14.9	96.0	24.2	51.3	26798	25769

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 7; Class 9-C
Standard Compaction

Replicate Test: REP 2

K_1 =	1,463.7
K_2 =	0.675
K_3 =	-1.116

n = 19

SES = 0.026

Sy = 0.114

Se = 0.040

Se/Sy = 0.355

R^2 = 0.874

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.9	2.9	2.9	13.7	2.4	5.0	21010	18197
2	13.0	5.9	5.9	24.8	3.3	7.1	25744	25130
3	19.8	9.9	9.9	39.6	4.7	9.9	30732	31518
4	28.4	14.9	14.9	58.2	6.4	13.5	36504	36929
5	36.7	19.8	19.8	76.3	8.0	16.9	42904	40652
6	9.3	2.9	2.9	15.1	3.0	6.4	20807	18602
7	16.0	5.9	5.9	27.8	4.8	10.1	24540	24945
8	24.9	9.9	9.9	44.7	7.1	15.0	28360	30050
9	35.7	14.8	14.8	65.3	9.9	20.9	33275	33731
10	46.6	19.8	19.8	86.2	12.6	26.8	38867	35959
11	12.3	2.9	2.9	18.1	4.4	9.4	19484	19254
12	22.0	5.9	5.9	33.8	7.6	16.1	22155	24456
13	35.0	9.9	9.9	54.8	11.8	25.1	25697	27706
14	50.8	14.8	14.8	80.4	17.0	36.0	30840	29336
15	66.7	19.8	19.8	106.3	22.1	46.9	33339	29888
16	15.3	2.9	2.9	21.1	5.8	12.4	17868	19689
17	28.0	5.9	5.9	39.8	10.4	22.1	20335	23900
18	45.2	9.9	9.9	65.0	16.6	35.3	24220	25859
19	66.2	14.9	14.9	96.0	24.2	51.3	27458	26379

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 7; Class 9-C
Standard Compaction

Replicate Test: REP 3

K_1 =	1,520.5
K_2 =	0.646
K_3 =	-1.076

n = 19

SES = 0.022

Sy = 0.108

Se = 0.037

Se/Sy = 0.346

R^2 = 0.880

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 7 - High, Optimum

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	7
USCS:	SC
AASHTO:	A-2-4
Group Index:	0

Description:	Material 7
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	99
No.100 Sieve	65
No.200 Sieve	33.0
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	25
Plastic Limit:	15
Plasticity Index:	9
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	116.0
Optimum Moisture (%):	13.3

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 7 - High, Optimum

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	103.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	119.5
Target Moisture Content (%):	13.3

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Dry Weight of Sample (From F56):	3500.0
Wet Weight Needed (to acquire targer M.C.):	3965.5
Additional Water Needed (ml):	465.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	135.4
Wet Weight of Sample (g):	3518.7
Adjusted Wet Weight (g):	3628.1
Layer Weight (g):	453.5

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		16	16	16			
Specimen Wet Weight (g):		3510.9	3509.1	3504.2			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	360.50	360.50			
	Wet Weight + Tare (g):	791.90	569.40	538.20			
	Dry Weight + Tare (g):	740.9	544.6	517.20			
Moisture Content (%):		13.4	13.5	13.4			
Wet Density (pcf):		135.1	135.0	134.8			
Dry Density (pcf):		119.1	119.0	118.9			
Percent Differences	Target & Specimen Dry Density	0.3	0.4	0.5			
	Target & Specimen Moisture	0.1	0.2	0.1			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.8	2.8	2.8	13.4	2.4	5.0	11538	9594
2	12.9	5.8	5.8	24.5	3.3	7.1	15931	16183
3	19.7	9.8	9.8	39.3	4.7	9.9	22851	23570
4	28.2	14.8	14.8	57.8	6.3	13.4	31555	31072
5	36.6	19.7	19.7	76.0	8.0	16.9	39524	36973
6	9.3	2.9	2.9	15.1	3.0	6.4	11183	10285
7	15.8	5.8	5.8	27.4	4.7	10.0	15386	16472
8	24.7	9.8	9.8	44.3	7.0	14.9	21319	22929
9	35.8	14.8	14.8	65.4	9.9	21.0	28585	28748
10	46.7	19.7	19.7	86.1	12.7	27.0	35568	32835
11	12.3	2.8	2.8	17.9	4.5	9.5	11060	10999
12	21.8	5.8	5.8	33.4	7.5	16.0	15047	16850
13	34.7	9.8	9.8	54.3	11.7	24.9	20660	21847
14	51.1	14.8	14.8	80.7	17.1	36.3	26988	25529
15	66.8	19.7	19.7	106.2	22.2	47.1	30031	27721
16	15.3	2.8	2.8	20.9	5.9	12.5	10967	11708
17	27.8	5.8	5.8	39.4	10.4	22.0	15092	17037
18	44.9	9.8	9.8	64.5	16.5	35.1	20481	20944

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 7; Class 9-C High Compaction

Replicate Test: REP 1

K_1 =	863.2
K_2 =	0.985
K_3 =	-1.267

n = 18

SES = 0.020

Sy = 0.184

Se = 0.037

Se/Sy = 0.201

R^2 = 0.960

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.9	2.9	2.9	13.7	2.4	5.0	14086	12343
2	12.9	5.8	5.8	24.5	3.3	7.1	19502	19380
3	19.7	9.8	9.8	39.3	4.7	9.9	26443	27076
4	28.2	14.8	14.8	57.8	6.3	13.4	34687	34469
5	36.5	19.7	19.7	75.9	7.9	16.8	42783	40041
6	9.3	2.8	2.8	14.9	3.1	6.5	14210	12626
7	15.9	5.8	5.8	27.5	4.8	10.1	18426	19489
8	24.7	9.8	9.8	44.3	7.0	14.9	23984	25959
9	35.8	14.8	14.8	65.4	9.9	21.0	30926	31363
10	46.7	19.8	19.8	86.3	12.7	26.9	37911	35019
11	12.3	2.9	2.9	18.1	4.4	9.4	13848	13660
12	21.8	5.8	5.8	33.4	7.5	16.0	17317	19503
13	34.9	9.8	9.8	54.5	11.8	25.1	22472	24095
14	50.9	14.8	14.8	80.5	17.0	36.1	28690	27130
15	66.6	19.7	19.7	106.0	22.1	46.9	31409	28627
16	15.3	2.9	2.9	21.1	5.8	12.4	13442	14291
17	27.8	5.8	5.8	39.4	10.4	22.0	17068	19358
18	45.1	9.8	9.8	64.7	16.6	35.3	22132	22623

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 7; Class 9-C High Compaction

Replicate Test: REP2

K_1 =	1,087.1
K_2 =	0.903
K_3 =	-1.309

n = 18

SES = 0.019

Sy = 0.160

Se = 0.036

Se/Sy = 0.225

R^2 = 0.949

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	7.9	2.9	2.9	13.7	2.4	5.0	14301	12345
2	13.0	5.9	5.9	24.8	3.3	7.1	19646	19251
3	19.8	9.9	9.9	39.6	4.7	9.9	25780	26479
4	28.3	14.9	14.9	58.1	6.3	13.4	33305	33400
5	36.7	19.8	19.8	76.3	8.0	16.9	40937	38571
6	9.5	2.9	2.9	15.3	3.1	6.6	14166	12889
7	15.9	5.9	5.9	27.7	4.7	10.0	18461	19390
8	24.9	9.9	9.9	44.7	7.1	15.0	23717	25520
9	35.8	14.8	14.8	65.4	9.9	21.0	30357	30582
10	46.7	19.8	19.8	86.3	12.7	26.9	37033	34136
11	12.3	2.9	2.9	18.1	4.4	9.4	13885	13668
12	21.9	5.9	5.9	33.7	7.5	16.0	17337	19484
13	34.9	9.9	9.9	54.7	11.8	25.0	22305	23970
14	50.8	14.8	14.8	80.4	17.0	36.0	28449	26928
15	66.7	19.8	19.8	106.3	22.1	46.9	31619	28574
16	15.4	2.9	2.9	21.2	5.9	12.5	13398	14333
17	28.0	5.9	5.9	39.8	10.4	22.1	17056	19419
18	45.1	9.9	9.9	64.9	16.6	35.2	22049	22708

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 7; Class 9-C
High Compaction

Replicate Test: REP 3

K_1 =	1,068.4
K_2 =	0.864
K_3 =	-1.209

n = 18

SES = 0.020

Sy = 0.155

Se = 0.036

Se/Sy = 0.234

R^2 = 0.945

Appendix E

Resilient Modulus Results

Virgin Soils at Optimum Moisture Content Plus 3 Percent

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Low, Optimum+3%

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	1
USCS:	CL
AASHTO:	A-7-6
Group Index:	23

Description:	Material 1, Optimum + 3%
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	90
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	43
Plastic Limit:	18
Plasticity Index:	25
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	107.9
Optimum Moisture (%):	16.6

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Low, Optimum+3%

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	94.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	101.4
Target Moisture Content (%):	19.6

Initial Moisture Content Data	
Tare Weight (g):	200.00
Wet Weight + Tare (g):	100.00
Dry Weight + Tare (g):	100.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	4000.0
Additional Water Needed (ml):	784.0

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	121.3
Wet Weight of Sample (g):	3152.8
Adjusted Wet Weight (g):	3251.9
Layer Weight (g):	406.5

Molded Specimen Data							
Specimen No.:		3 REP 1	4 REP 2	5 REP 3			
Number of Blows per Layer:		4	4	4			
Specimen Wet Weight (g):		3042.1	3032.6	3032.1			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	40.80	41.60	40.60			
	Wet Weight + Tare (g):	428.20	425.10	421.90			
	Dry Weight + Tare (g):	366.5	364.9	362.00			
Moisture Content (%):		18.9	18.6	18.6			
Wet Density (pcf):		117.0	116.7	116.7			
Dry Density (pcf):		98.4	98.4	98.3			
Percent Differences	Target & Specimen Dry Density	3.0	3.0	3.1			
	Target & Specimen Moisture	0.7	1.0	1.0			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	6223	6084
2	13.8	5.8	5.8	25.4	3.8	8.0	5501	5443
3	11.5	3.8	3.8	19.1	3.6	7.7	4640	4660
4	9.2	1.9	1.9	13.0	3.4	7.3	3914	3780
5	19.3	7.8	7.8	34.9	5.4	11.5	5756	5579
6	16.9	5.8	5.8	28.5	5.2	11.1	5078	5035
7	14.5	3.8	3.8	22.1	5.0	10.7	4366	4406
8	12.2	1.9	1.9	16.0	4.9	10.3	3713	3702
9	22.3	7.8	7.8	37.9	6.8	14.5	4996	5142
10	19.8	5.8	5.8	31.4	6.6	14.0	4432	4695
11	17.6	3.9	3.9	25.4	6.5	13.7	3881	4191
12	15.2	1.9	1.9	19.0	6.3	13.3	3351	3586
13	26.4	7.8	7.8	42.0	8.8	18.6	4626	4634
14	23.8	5.8	5.8	35.4	8.5	18.0	4427	4283
15	21.4	3.8	3.8	29.0	8.3	17.6	4043	3863
16	19.1	1.9	1.9	22.9	8.1	17.2	3610	3410

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6 OM+3%; Low Compaction

Replicate Test: REP 1

K_1 =	414.7
K_2 =	0.596
K_3 =	-1.924

n = 16

SES = 0.005

Sy = 0.076

Se = 0.019

Se/Sy = 0.246

R^2 = 0.940

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	6124	6194
2	14.0	5.8	5.8	25.6	3.9	8.2	5455	5535
3	11.5	3.8	3.8	19.1	3.6	7.7	4654	4796
4	9.1	1.8	1.8	12.7	3.4	7.3	3946	3856
5	19.3	7.8	7.8	34.9	5.4	11.5	5677	5462
6	16.8	5.8	5.8	28.4	5.2	11.0	5031	4973
7	14.5	3.8	3.8	22.1	5.0	10.7	4355	4357
8	12.0	1.8	1.8	15.6	4.8	10.2	3725	3646
9	22.3	7.8	7.8	37.9	6.8	14.5	4930	4855
10	19.8	5.8	5.8	31.4	6.6	14.0	4388	4458
11	17.5	3.8	3.8	25.1	6.5	13.7	3867	3965
12	15.1	1.8	1.8	18.7	6.3	13.3	3359	3401

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
OM+3%; Low Compaction

Replicate Test: REP 2

K_1 =	480.4
K_2 =	0.597
K_3 =	-2.461

n = 12

SES = 0.001

Sy = 0.080

Se = 0.010

Se/Sy = 0.130

R^2 = 0.983

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 . \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.9	7.9	32.2	4.0	8.5	6031	6083
2	14.0	5.9	5.9	25.8	3.8	8.1	5367	5448
3	11.5	3.9	3.9	19.3	3.6	7.6	4555	4710
4	9.2	1.9	1.9	13.0	3.4	7.3	3881	3776
5	19.3	7.8	7.8	34.9	5.4	11.5	5592	5374
6	17.0	5.9	5.9	28.8	5.2	11.1	4946	4892
7	14.5	3.9	3.9	22.3	5.0	10.6	4287	4309
8	12.2	1.9	1.9	16.0	4.9	10.3	3665	3584
9	22.4	7.9	7.9	38.2	6.8	14.5	4891	4833
10	20.0	5.9	5.9	31.8	6.6	14.1	4365	4416
11	17.4	3.8	3.8	25.0	6.4	13.6	3825	3918
12	15.1	1.9	1.9	18.9	6.2	13.2	3329	3378

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
OM+3%; Low Compaction

Replicate Test: REP 3

K_1 =	455.5
K_2 =	0.606
K_3 =	-2.369

n = 12

SES = 0.001

Sy = 0.079

Se = 0.011

Se/Sy = 0.135

R^2 = 0.982

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Standard, Optimum+3%

GENERAL INFORMATION

BCD Lab No.:			
Sample No.:	1	Description:	Material 1, Optimum + 3%
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-7-6		
Group Index:	23	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	90
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	43
Plastic Limit:	18
Plasticity Index:	25
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	107.9
Optimum Moisture (%):	16.6

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Standard, Optimum+3%

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	90.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	97.1
Target Moisture Content (%):	19.60

Initial Moisture Content Data	
Tare Weight (g):	200.00
Wet Weight + Tare (g):	100.00
Dry Weight + Tare (g):	100.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	4000.0
Additional Water Needed (ml):	784.0

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	116.1
Wet Weight of Sample (g):	3018.7
Adjusted Wet Weight (g):	3113.5
Layer Weight (g):	389.2

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		5	5	5			
Specimen Wet Weight (g):		3129.8	3135.8	3152.6			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	41.30	41.30	41.10			
	Wet Weight + Tare (g):	428.60	431.10	410.60			
	Dry Weight + Tare (g):	364.1	369.2	351.10			
Moisture Content (%):		20.0	18.9	19.2			
Wet Density (pcf):		120.4	120.6	121.3			
Dry Density (pcf):		100.4	101.5	101.8			
Percent Differences	Target & Specimen Dry Density	3.3	4.5	4.8			
	Target & Specimen Moisture	0.4	0.7	0.4			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	6749	6844
2	13.9	5.8	5.8	25.5	3.8	8.1	6201	6085
3	11.4	3.9	3.9	19.2	3.5	7.5	5191	5193
4	9.1	1.9	1.9	12.9	3.4	7.2	4219	4237

BCD Project:	070904
Project Name:	MDOT SS 205
Sample I.D.:	Material 1 CL A-7-6
	OM + 3% Med Compaction
Replicate Test:	REP 1

K_1 =	231.0
K_2 =	0.485
K_3 =	1.370

n =	4
SES =	0.000
Sy =	0.090
Se =	0.010
Se/Sy =	0.114
R^2 =	0.987

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.9	7.9	32.2	4.0	8.5	7385	7520
2	13.9	5.9	5.9	25.7	3.8	8.0	6677	6717
3	11.6	3.9	3.9	19.4	3.6	7.7	5633	5715
4	9.1	1.9	1.9	12.9	3.4	7.2	4581	4541
5	19.3	7.8	7.8	34.9	5.4	11.5	6782	6570
6	16.9	5.9	5.9	28.7	5.2	11.0	6070	5970
7	14.5	3.9	3.9	22.3	5.0	10.6	5223	5199
8	12.1	1.9	1.9	15.9	4.8	10.2	4331	4284
9	22.2	7.8	7.8	37.8	6.8	14.4	5857	5844
10	19.8	5.9	5.9	31.6	6.6	13.9	5283	5356
11	17.5	3.9	3.9	25.3	6.4	13.6	4647	4721
12	15.0	1.9	1.9	18.8	6.2	13.1	3985	4012

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
OM + 3% Med Compaction

Replicate Test: REP 2

K_1 =	572.5
K_2 =	0.645
K_3 =	-2.564

n = 12

SES = 0.000
Sy = 0.084

Se = 0.007
Se/Sy = 0.087
R^2 = 0.992

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	7490	7609
2	13.8	5.8	5.8	25.4	3.8	8.0	6736	6758
3	11.5	3.9	3.9	19.3	3.6	7.6	5658	5780
4	9.1	1.9	1.9	12.9	3.4	7.2	4595	4540
5	19.4	7.9	7.9	35.2	5.4	11.5	6889	6706
6	16.9	5.9	5.9	28.7	5.2	11.0	6135	6037
7	14.5	3.9	3.9	22.3	5.0	10.6	5245	5231
8	12.1	1.9	1.9	15.9	4.8	10.2	4348	4281
9	22.2	7.8	7.8	37.8	6.8	14.4	5940	5915
10	19.8	5.8	5.8	31.4	6.6	14.0	5294	5349
11	17.4	3.8	3.8	25.0	6.4	13.6	4623	4703
12	15.0	1.9	1.9	18.8	6.2	13.1	3968	4006

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
OM + 3% Med Compaction

Replicate Test: REP 3

K_1 =	582.4
K_2 =	0.667
K_3 =	-2.634

n = 12

SES = 0.000

Sy = 0.086

Se = 0.007

Se/Sy = 0.086

R^2 = 0.993

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - High, Optimum+3%

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	1
USCS:	CL
AASHTO:	A-7-6
Group Index:	23

Description:	Material 1, Optimum + 3%
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	90
No.270 Sieve	Not Detemined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	43
Plastic Limit:	18
Plasticity Index:	25
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	107.9
Optimum Moisture (%):	16.6

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - High, Optimum+3%

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	97.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	104.7
Target Moisture Content (%):	19.6

Initial Moisture Content Data	
Tare Weight (g):	360.50
Wet Weight + Tare (g):	702.50
Dry Weight + Tare (g):	646.50
Initial Moisture Content:	19.6

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	4000.0
Additional Water Needed (ml):	0.7

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	125.2
Wet Weight of Sample (g):	3253.4
Adjusted Wet Weight (g):	3355.6
Layer Weight (g):	419.5

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		8	8	8			
Specimen Wet Weight (g):		3260.1	3286.5	3288.3			
Specimen Height (in):		8.040	8.040	8.040			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	41.20	41.10	41.60			
	Wet Weight + Tare (g):	441.90	442.90	441.50			
	Dry Weight + Tare (g):	377.6	379.2	378.60			
Moisture Content (%):		19.1	18.8	18.7			
Wet Density (pcf):		125.4	126.4	126.5			
Dry Density (pcf):		105.3	106.4	106.6			
Percent Differences	Target & Specimen Dry Density	0.6	1.7	1.9			
	Target & Specimen Moisture	0.5	0.8	0.9			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	7756	7860
2	13.8	5.8	5.8	25.4	3.8	8.0	6895	6910
3	11.5	3.9	3.9	19.3	3.6	7.6	5732	5838
4	9.1	1.9	1.9	12.9	3.4	7.2	4599	4502
5	19.3	7.8	7.8	34.9	5.4	11.5	7011	6895
6	16.9	5.8	5.8	28.5	5.2	11.1	6217	6119
7	14.5	3.9	3.9	22.3	5.0	10.6	5251	5302
8	12.1	1.9	1.9	15.9	4.8	10.2	4298	4273
9	22.2	7.8	7.8	37.8	6.8	14.4	6141	6121
10	19.8	5.8	5.8	31.4	6.6	14.0	5501	5490
11	17.4	3.8	3.8	25.0	6.4	13.6	4755	4778
12	15.1	1.9	1.9	18.9	6.2	13.2	3943	4008

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
OM+3% High Compaction

Replicate Test: REP 1

K_1 =	586.4
K_2 =	0.714
K_3 =	-2.678

n = 12

SES = 0.000

Sy = 0.091

Se = 0.006

Se/Sy = 0.070

R^2 = 0.995

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 . \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.9	7.9	32.2	4.0	8.5	8011	8124
2	13.9	5.9	5.9	25.7	3.8	8.0	7130	7201
3	11.6	3.9	3.9	19.4	3.6	7.7	5976	6062
4	9.2	1.9	1.9	13.0	3.4	7.3	4857	4737
5	19.3	7.9	7.9	35.1	5.4	11.4	7227	7139
6	16.9	5.9	5.9	28.7	5.2	11.0	6447	6378
7	14.5	3.9	3.9	22.3	5.0	10.6	5528	5504
8	12.1	1.9	1.9	15.9	4.8	10.2	4489	4479
9	22.3	7.9	7.9	38.1	6.8	14.4	6380	6296
10	20.0	5.9	5.9	31.8	6.6	14.1	5687	5662
11	17.5	3.9	3.9	25.3	6.4	13.6	4924	4987
12	15.1	1.9	1.9	18.9	6.2	13.2	4095	4183

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
OM+3% High Compaction

Replicate Test: REP 2

K_1 =	614.8
K_2 =	0.685
K_3 =	-2.670

n = 12

SES = 0.000

Sy = 0.089

Se = 0.007

Se/Sy = 0.076

R^2 = 0.994

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.9	7.9	32.1	4.0	8.4	8008	8144
2	14.0	5.9	5.9	25.8	3.8	8.1	7099	7122
3	11.5	3.9	3.9	19.3	3.6	7.6	5934	6002
4	9.3	2.0	2.0	13.3	3.4	7.3	4768	4710
5	19.4	7.9	7.9	35.2	5.4	11.5	7244	7119
6	16.9	5.9	5.9	28.7	5.2	11.0	6424	6359
7	14.6	3.9	3.9	22.4	5.0	10.7	5457	5440
8	12.0	1.9	1.9	15.8	4.8	10.1	4465	4417
9	22.3	7.9	7.9	38.1	6.8	14.4	6356	6326
10	19.8	5.9	5.9	31.6	6.6	13.9	5708	5708
11	17.5	3.9	3.9	25.3	6.4	13.6	4923	4965
12	15.1	1.9	1.9	18.9	6.2	13.2	4063	4138

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6 OM+3% High Compaction

Replicate Test: REP 3

K_1 =	600.1
K_2 =	0.706
K_3 =	-2.647

n = 12

SES = 0.000

Sy = 0.090

Se = 0.006

Se/Sy = 0.063

R^2 = 0.996

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Low, Optimum+3%

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	2
USCS:	CL
AASHTO:	A-6
Group Index:	17

Description:	Material 2, Optimum + 3%
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	93.4
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	37
Plastic Limit:	19
Plasticity Index:	18
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	106.3
Optimum Moisture (%):	16.7

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Low, Optimum+3%

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	95.0
Material Type* (1,2, or 3):	

Target Data	
Target Dry Density (pcf):	101.0
Target Moisture Content (%):	19.7

Initial Moisture Content Data	
Tare Weight (g):	266.60
Wet Weight + Tare (g):	740.40
Dry Weight + Tare (g):	693.00
Initial Moisture Content:	11.1

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	
Additional Water Needed (ml):	

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	120.9
Wet Weight of Sample (g):	3142.0
Adjusted Wet Weight (g):	3239.7
Layer Weight (g):	405.0

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		8	8	8			
Specimen Wet Weight (g):		3136.50	3120.30	3140.40			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	186.10	263.70	249.20			
	Wet Weight + Tare (g):	1308.30	604.70	565.40			
	Dry Weight + Tare (g):	1133.1	550.0	514.40			
Moisture Content (%):		18.5	19.1	19.2			
Wet Density (pcf):		120.7	120.0	120.8			
Dry Density (pcf):		101.8	100.8	101.3			
Percent Differences	Target & Specimen Dry Density	0.8	0.2	0.3			
	Target & Specimen Moisture	1.2	0.6	0.5			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	9340	9776
2	13.8	5.8	5.8	25.4	3.8	8.0	9500	9612
3	11.5	3.8	3.8	19.1	3.6	7.7	9204	9159
4	9.2	1.9	1.9	13.0	3.4	7.3	8724	8580
5	19.3	7.8	7.8	34.9	5.4	11.5	7998	7847
6	16.9	5.8	5.8	28.5	5.2	11.1	7943	7683
7	14.4	3.8	3.8	22.0	5.0	10.6	7687	7474
8	12.1	1.9	1.9	15.9	4.8	10.2	7249	7094
9	22.2	7.8	7.8	37.8	6.8	14.4	6395	6434
10	19.8	5.8	5.8	31.4	6.6	14.0	6215	6314
11	17.4	3.8	3.8	25.0	6.4	13.6	5992	6131
12	15.1	1.9	1.9	18.9	6.2	13.2	5632	5875
13	26.2	7.8	7.8	41.8	8.7	18.4	5108	4988
14	23.9	5.8	5.8	35.5	8.5	18.1	4975	4879
15	21.4	3.8	3.8	29.0	8.3	17.6	4780	4790
16	19.2	1.9	1.9	23.0	8.2	17.3	4511	4604

BCD Project:	070904
Project Name:	MDOT SS 205
Sample I.D.:	Material 2 CL A-6
	OM+3%, Low Compaction
Replicate Test:	REP 1

K_1 =	1,215.4
K_2 =	0.259
K_3 =	-3.336

n =	16
SES =	0.002
Sy =	0.110
Se =	0.012
Se/Sy =	0.105
R^2 =	0.989

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	9211	9661
2	13.9	5.8	5.8	25.5	3.8	8.1	9422	9445
3	11.5	3.8	3.8	19.1	3.6	7.7	9219	9087
4	9.1	1.8	1.8	12.7	3.4	7.3	8585	8486
5	19.2	7.8	7.8	34.8	5.4	11.4	7877	7794
6	16.8	5.8	5.8	28.4	5.2	11.0	7816	7642
7	14.5	3.8	3.8	22.1	5.0	10.7	7610	7347
8	12.1	1.8	1.8	15.7	4.9	10.3	7147	6959
9	22.2	7.8	7.8	37.8	6.8	14.4	6258	6333
10	19.8	5.8	5.8	31.4	6.6	14.0	6116	6224
11	17.4	3.8	3.8	25.0	6.4	13.6	5906	6054
12	15.1	1.9	1.9	18.9	6.2	13.2	5530	5813
13	26.3	7.8	7.8	41.9	8.7	18.5	5049	4868
14	23.8	5.8	5.8	35.4	8.5	18.0	4929	4826
15	21.4	3.8	3.8	29.0	8.3	17.6	4722	4716
16	19.1	1.9	1.9	22.9	8.1	17.2	4452	4568

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
OM+3%, Low Compaction

Replicate Test: REP 2

K_1 =	1,213.6
K_2 =	0.253
K_3 =	-3.357

n = 16

SES = 0.002
Sy = 0.111

Se = 0.013
Se/Sy = 0.115
R^2 = 0.987

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	9767	10360
2	13.8	5.8	5.8	25.4	3.8	8.0	10101	10251
3	11.5	3.8	3.8	19.1	3.6	7.7	9939	9836
4	9.2	1.9	1.9	13.0	3.4	7.3	9334	9302
5	19.3	7.8	7.8	34.9	5.4	11.5	8396	8241
6	16.9	5.8	5.8	28.5	5.2	11.1	8407	8111
7	14.5	3.8	3.8	22.1	5.0	10.7	8204	7889
8	12.1	1.8	1.8	15.7	4.9	10.3	7737	7518
9	22.1	7.8	7.8	37.7	6.7	14.3	6727	6748
10	19.8	5.8	5.8	31.4	6.6	14.0	6575	6609
11	17.5	3.8	3.8	25.1	6.5	13.7	6321	6412
12	15.0	1.8	1.8	18.6	6.2	13.2	5987	6206
13	26.3	7.8	7.8	41.9	8.7	18.5	5244	5109
14	23.8	5.8	5.8	35.4	8.5	18.0	5130	5082
15	21.4	3.8	3.8	29.0	8.3	17.6	4948	4985
16	19.0	1.8	1.8	22.6	8.1	17.2	4680	4833

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
OM+3%, Low Compaction

Replicate Test: REP 3

K_1 =	1,341.6
K_2 =	0.238
K_3 =	-3.434

n = 16

SES = 0.002

Sy = 0.115

Se = 0.013

Se/Sy = 0.111

R^2 = 0.988

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Standard, Optimum+3%

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	2
USCS:	CL
AASHTO:	A-6
Group Index:	17

Description:	Material 2, Optimum + 3%
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	93.4
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	37
Plastic Limit:	19
Plasticity Index:	18
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	106.3
Optimum Moisture (%):	16.7

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Standard, Optimum+3%

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	99.0
Material Type* (1,2, or 3):	

Target Data	
Target Dry Density (pcf):	105.2
Target Moisture Content (%):	19.7

Initial Moisture Content Data	
Tare Weight (g):	266.60
Wet Weight + Tare (g):	740.40
Dry Weight + Tare (g):	693.00
Initial Moisture Content:	11.1

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	
Additional Water Needed (ml):	

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	126.0
Wet Weight of Sample (g):	3274.3
Adjusted Wet Weight (g):	3376.1
Layer Weight (g):	422.0

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		12	12	12			
Specimen Wet Weight (g):		3242.00	3244.40	3264.30			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	244.20	179.70	263.60			
	Wet Weight + Tare (g):	615.40	677.00	994.60			
	Dry Weight + Tare (g):	555.2	596.9	878.00			
Moisture Content (%):		19.4	19.2	19.0			
Wet Density (pcf):		124.7	124.8	125.6			
Dry Density (pcf):		104.5	104.7	105.6			
Percent Differences	Target & Specimen Dry Density	0.7	0.5	0.3			
	Target & Specimen Moisture	0.3	0.5	0.7			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	9605	10196
2	13.9	5.8	5.8	25.5	3.8	8.1	9807	9999
3	11.5	3.8	3.8	19.1	3.6	7.7	9620	9653
4	9.2	1.9	1.9	13.0	3.4	7.3	9075	9104
5	19.2	7.8	7.8	34.8	5.4	11.4	8415	8114
6	16.8	5.8	5.8	28.4	5.2	11.0	8317	7978
7	14.6	3.9	3.9	22.4	5.0	10.7	8065	7716
8	12.1	1.9	1.9	15.9	4.8	10.2	7663	7397
9	22.2	7.8	7.8	37.8	6.8	14.4	6505	6506
10	19.9	5.8	5.8	31.5	6.6	14.1	6339	6367
11	17.5	3.9	3.9	25.3	6.4	13.6	6134	6273
12	15.1	1.9	1.9	18.9	6.2	13.2	5847	6024
13	26.2	7.8	7.8	41.8	8.7	18.4	4996	4951
14	23.9	5.8	5.8	35.5	8.5	18.1	4904	4858
15	21.5	3.9	3.9	29.3	8.3	17.6	4755	4803
16	19.1	1.9	1.9	22.9	8.1	17.2	4545	4653

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
OM+3%, Standard Comp.

Replicate Test: REP 1

K_1 =	1,345.3
K_2 =	0.247
K_3 =	-3.544

n = 16

SES = 0.002

Sy = 0.118

Se = 0.013

Se/Sy = 0.114

R^2 = 0.987

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	9600	10194
2	13.9	5.8	5.8	25.5	3.8	8.1	9838	10019
3	11.4	3.8	3.8	19.0	3.6	7.6	9721	9775
4	9.2	1.9	1.9	13.0	3.4	7.3	9168	9175
5	19.3	7.9	7.9	35.1	5.4	11.4	8366	8088
6	16.9	5.8	5.8	28.5	5.2	11.1	8283	7891
7	14.5	3.9	3.9	22.3	5.0	10.6	8069	7765
8	12.1	1.9	1.9	15.9	4.8	10.2	7668	7410
9	22.2	7.8	7.8	37.8	6.8	14.4	6414	6440
10	19.8	5.8	5.8	31.4	6.6	14.0	6311	6358
11	17.4	3.8	3.8	25.0	6.4	13.6	6107	6215
12	15.2	1.9	1.9	19.0	6.3	13.3	5807	5960
13	26.3	7.8	7.8	41.9	8.7	18.5	4925	4838
14	23.8	5.8	5.8	35.4	8.5	18.0	4835	4819
15	21.5	3.9	3.9	29.3	8.3	17.6	4698	4742
16	19.1	1.9	1.9	22.9	8.1	17.2	4479	4603

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
OM+3%, Standard Comp.

Replicate Test: REP 2

K_1 =	1,373.3
K_2 =	0.241
K_3 =	-3.608

n = 16

SES = 0.002

Sy = 0.121

Se = 0.013

Se/Sy = 0.110

R^2 = 0.988

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	13546	14457
2	13.9	5.9	5.9	25.7	3.8	8.0	13968	14541
3	11.6	3.9	3.9	19.4	3.6	7.7	13993	14194
4	9.1	1.9	1.9	12.9	3.4	7.2	13389	13794
5	19.2	7.8	7.8	34.8	5.4	11.4	11828	11396
6	16.9	5.9	5.9	28.7	5.2	11.0	11980	11378
7	14.6	3.9	3.9	22.4	5.0	10.7	11995	11153
8	12.1	1.9	1.9	15.9	4.8	10.2	11456	10933
9	22.3	7.8	7.8	37.9	6.8	14.5	9117	8989
10	20.0	5.9	5.9	31.8	6.6	14.1	9071	8983
11	17.5	3.9	3.9	25.3	6.4	13.6	8990	8963
12	15.1	1.9	1.9	18.9	6.2	13.2	8740	8773
13	26.3	7.9	7.9	42.1	8.7	18.4	6807	6823
14	23.9	5.9	5.9	35.7	8.5	18.0	6741	6815
15	21.4	3.9	3.9	29.2	8.2	17.5	6622	6813
16	19.1	1.9	1.9	22.9	8.1	17.2	6399	6662

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2, CL A-6 OM+3%, Standard Comp.

Replicate Test: Rep 3

K_1 =	2,030.8
K_2 =	0.184
K_3 =	-3.600

n = 16

SES = 0.004

Sy = 0.125

Se = 0.018

Se/Sy = 0.141

R^2 = 0.980

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - High, Optimum+3%

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 2, Optimum + 3%
Sample No.:	2		
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-6		
Group Index:	17	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	93.4
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	37
Plastic Limit:	19
Plasticity Index:	18
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	106.3
Optimum Moisture (%):	16.7

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - High, Optimum+3%

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	102.0
Material Type* (1,2, or 3):	

Target Data	
Target Dry Density (pcf):	108.4
Target Moisture Content (%):	19.7

Initial Moisture Content Data	
Tare Weight (g):	266.60
Wet Weight + Tare (g):	740.40
Dry Weight + Tare (g):	693.00
Initial Moisture Content:	11.1

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	
Additional Water Needed (ml):	

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	129.8
Wet Weight of Sample (g):	3373.5
Adjusted Wet Weight (g):	3478.4
Layer Weight (g):	434.8

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		25	25	25			
Specimen Wet Weight (g):		3340.90	3334.30	3336.80			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	268.10	185.70	186.90			
	Wet Weight + Tare (g):	781.00	762.90	755.80			
	Dry Weight + Tare (g):	697.8	669.1	663.50			
Moisture Content (%):		19.4	19.4	19.4			
Wet Density (pcf):		128.5	128.3	128.4			
Dry Density (pcf):		107.7	107.4	107.5			
Percent Differences	Target & Specimen Dry Density	0.7	0.9	0.8			
	Target & Specimen Moisture	0.3	0.3	0.3			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	8455	9040
2	14.0	5.9	5.9	25.8	3.8	8.1	8845	8982
3	11.4	3.8	3.8	19.0	3.6	7.6	8809	8834
4	9.2	1.9	1.9	13.0	3.4	7.3	8400	8370
5	19.1	7.8	7.8	34.7	5.3	11.3	7270	6966
6	16.8	5.8	5.8	28.4	5.2	11.0	7250	6854
7	14.4	3.8	3.8	22.0	5.0	10.6	7107	6727
8	12.1	1.8	1.8	15.7	4.9	10.3	6739	6420
9	22.3	7.8	7.8	37.9	6.8	14.5	5207	5275
10	19.8	5.8	5.8	31.4	6.6	14.0	5125	5289
11	17.4	3.8	3.8	25.0	6.4	13.6	4997	5210
12	15.1	1.9	1.9	18.9	6.2	13.2	4763	5074
13	26.2	7.8	7.8	41.8	8.7	18.4	3937	3854
14	23.8	5.8	5.8	35.4	8.5	18.0	3920	3837
15	21.4	3.8	3.8	29.0	8.3	17.6	3821	3793
16	19.0	1.8	1.8	22.6	8.1	17.2	3629	3708

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
OM+3%, High Compaction

Replicate Test: REP 1

K_1 =	1,387.6
K_2 =	0.226
K_3 =	-4.103

n = 16

SES = 0.004

Sy = 0.141

Se = 0.018

Se/Sy = 0.131

R^2 = 0.983

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.9	7.9	32.2	4.0	8.5	8123	8718
2	13.9	5.9	5.9	25.7	3.8	8.0	8651	8764
3	11.6	3.9	3.9	19.4	3.6	7.7	8659	8524
4	9.2	1.9	1.9	13.0	3.4	7.3	8243	8174
5	19.4	7.9	7.9	35.2	5.4	11.5	6822	6533
6	16.9	5.9	5.9	28.7	5.2	11.0	6875	6573
7	14.6	3.9	3.9	22.4	5.0	10.7	6824	6424
8	12.1	1.9	1.9	15.9	4.8	10.2	6498	6280
9	22.3	7.9	7.9	38.1	6.8	14.4	4910	5035
10	20.0	5.9	5.9	31.8	6.6	14.1	4839	4981
11	17.5	3.9	3.9	25.3	6.4	13.6	4744	4970
12	15.1	1.9	1.9	18.9	6.2	13.2	4522	4850
13	26.2	7.8	7.8	41.8	8.7	18.4	3702	3601
14	23.9	5.9	5.9	35.7	8.5	18.0	3703	3603
15	21.5	3.9	3.9	29.3	8.3	17.6	3611	3575
16	19.1	1.9	1.9	22.9	8.1	17.2	3448	3511

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
OM+3%, High Compaction

Replicate Test: REP 2

K_1 =	1,386.9
K_2 =	0.214
K_3 =	-4.220

n = 16

SES = 0.005

Sy = 0.146

Se = 0.019

Se/Sy = 0.130

R^2 = 0.983

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.9	7.9	32.2	4.0	8.5	7743	8244
2	13.9	5.8	5.8	25.5	3.8	8.1	7993	8123
3	11.6	3.9	3.9	19.4	3.6	7.7	7957	7931
4	9.1	1.9	1.9	12.9	3.4	7.2	7629	7582
5	19.3	7.9	7.9	35.1	5.4	11.4	6610	6344
6	16.8	5.8	5.8	28.4	5.2	11.0	6583	6265
7	14.5	3.9	3.9	22.3	5.0	10.6	6466	6146
8	12.1	1.9	1.9	15.9	4.8	10.2	6153	5894
9	22.3	7.8	7.8	37.9	6.8	14.5	4824	4876
10	19.8	5.8	5.8	31.4	6.6	14.0	4710	4873
11	17.4	3.8	3.8	25.0	6.4	13.6	4577	4784
12	15.1	1.9	1.9	18.9	6.2	13.2	4371	4640
13	26.3	7.8	7.8	41.9	8.7	18.5	3654	3568
14	23.8	5.8	5.8	35.4	8.5	18.0	3642	3570
15	21.5	3.9	3.9	29.3	8.3	17.6	3548	3526
16	19.1	1.9	1.9	22.9	8.1	17.2	3383	3438

BCD Project:	070904
Project Name:	MDOT SS 205
Sample I.D.:	Material 2 CL A-6
	OM+3%, High Compaction
Replicate Test:	REP 3

K_1 =	1,222.5
K_2 =	0.237
K_3 =	-4.005

n =	16
SES =	0.004
Sy =	0.137
Se =	0.017
Se/Sy =	0.127
R^2 =	0.984

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 3 - Low, Optimum+3%

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 3, Optimum + 3%
Sample No.:	3		
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-4		
Group Index:	1	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	99.0
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	25
Plastic Limit:	23
Plasticity Index:	2
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	110.9
Optimum Moisture (%):	14.9

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 3 - Low, Optimum+3%

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	94.0
Material Type* (1,2, or 3):	

Target Data	
Target Dry Density (pcf):	104.2
Target Moisture Content (%):	17.9

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	626.5

Sample Weight Data	
Wet Unit Weight (pcf):	122.9
Wet Weight of Sample (g):	3194.7
Adjusted Wet Weight (g):	3294.0
Layer Weight (g):	411.8

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		4	4	4			
Specimen Wet Weight (g):		3187.3	3187.6	3191.3			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	186.50	248.90	244.20			
	Wet Weight + Tare (g):	847.30	1400.70	1022.00			
	Dry Weight + Tare (g):	749.1	1226.5	905.50			
Moisture Content (%):		17.5	17.8	17.6			
Wet Density (pcf):		122.6	122.6	122.8			
Dry Density (pcf):		104.4	104.1	104.4			
Percent Differences	Target & Specimen Dry Density	0.1	0.2	0.1			
	Target & Specimen Moisture	0.4	0.1	0.3			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	14815	15270
2	13.9	5.9	5.9	25.7	3.8	8.0	12123	12443
3	11.6	3.9	3.9	19.4	3.6	7.7	9259	9388
4	9.1	1.9	1.9	12.9	3.4	7.2	6675	6260
5	19.3	7.8	7.8	34.9	5.4	11.5	14619	14491
6	17.0	5.9	5.9	28.8	5.2	11.1	12165	12054
7	14.5	3.9	3.9	22.3	5.0	10.6	9532	9421
8	12.1	1.9	1.9	15.9	4.8	10.2	6893	6718
9	22.2	7.8	7.8	37.8	6.8	14.4	14011	13826
10	19.8	5.8	5.8	31.4	6.6	14.0	11696	11567
11	17.5	3.9	3.9	25.3	6.4	13.6	9225	9372
12	15.2	1.9	1.9	19.0	6.3	13.3	6415	7019
13	26.2	7.8	7.8	41.8	8.7	18.4	13517	12998
14	23.9	5.9	5.9	35.7	8.5	18.0	11416	11182
15	21.5	3.9	3.9	29.3	8.3	17.6	8974	9225

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4
OM+3%, Low Compaction

Replicate Test: REP 1

K_1 =	740.3
K_2 =	1.056
K_3 =	-1.998

n = 15

SES = 0.003

Sy = 0.123

Se = 0.017

Se/Sy = 0.137

R^2 = 0.981

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	14158	14498
2	13.9	5.9	5.9	25.7	3.8	8.0	11732	11922
3	11.6	3.9	3.9	19.4	3.6	7.7	8956	9079
4	9.1	1.9	1.9	12.9	3.4	7.2	6530	6137
5	19.3	7.9	7.9	35.1	5.4	11.4	13893	13855
6	16.9	5.9	5.9	28.7	5.2	11.0	11559	11492
7	14.5	3.9	3.9	22.3	5.0	10.6	9118	9049
8	12.1	1.9	1.9	15.9	4.8	10.2	6672	6525
9	22.3	7.9	7.9	38.1	6.8	14.4	13242	13124
10	19.9	5.9	5.9	31.7	6.6	14.0	11086	11067
11	17.5	3.9	3.9	25.3	6.4	13.6	8758	8945
12	15.1	1.9	1.9	18.9	6.2	13.2	6247	6757
13	26.2	7.8	7.8	41.8	8.7	18.4	12717	12165
14	23.9	5.9	5.9	35.7	8.5	18.0	10775	10522
15	21.5	3.9	3.9	29.3	8.3	17.6	8512	8738

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4
OM+3%, Low Compaction

Replicate Test: REP 2

K_1 =	727.7
K_2 =	1.024
K_3 =	-2.031

n = 15

SES = 0.003

Sy = 0.119

Se = 0.016

Se/Sy = 0.130

R^2 = 0.983

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 . \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	14754	15208
2	13.8	5.8	5.8	25.4	3.8	8.0	12010	12256
3	11.4	3.8	3.8	19.0	3.6	7.6	9131	9203
4	9.2	1.9	1.9	13.0	3.4	7.3	6662	6258
5	19.2	7.8	7.8	34.8	5.4	11.4	14642	14509
6	16.8	5.8	5.8	28.4	5.2	11.0	12015	11925
7	14.5	3.9	3.9	22.3	5.0	10.6	9418	9411
8	12.1	1.9	1.9	15.9	4.8	10.2	6879	6709
9	22.2	7.8	7.8	37.8	6.8	14.4	14029	13847
10	19.8	5.8	5.8	31.4	6.6	14.0	11646	11582
11	17.5	3.9	3.9	25.3	6.4	13.6	9210	9381
12	15.1	1.9	1.9	18.9	6.2	13.2	6459	7016
13	26.2	7.8	7.8	41.8	8.7	18.4	13553	13048
14	23.8	5.8	5.8	35.4	8.5	18.0	11412	11123
15	21.4	3.8	3.8	29.0	8.3	17.6	8906	9156

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4
OM+3%, Low Compaction

Replicate Test: REP 3

K_1 =	733.6
K_2 =	1.057
K_3 =	-1.970

n = 15

SES = 0.003

Sy = 0.123

Se = 0.016

Se/Sy = 0.130

R^2 = 0.983

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 3 - Standard, Optimum+3%

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 3
Sample No.:	3		
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-4		
Group Index:	1	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	99.0
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	25
Plastic Limit:	23
Plasticity Index:	2
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	110.9
Optimum Moisture (%):	14.9

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 3 - Standard, Optimum+3%

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	97.0
Material Type* (1,2, or 3):	

Target Data	
Target Dry Density (pcf):	107.6
Target Moisture Content (%):	17.9

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	626.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	126.8
Wet Weight of Sample (g):	3296.7
Adjusted Wet Weight (g):	3399.2
Layer Weight (g):	424.9

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		7	7	7			
Specimen Wet Weight (g):		3283.7	3285.6	3288.3			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	267.50	263.60	185.70			
	Wet Weight + Tare (g):	1186.50	777.50	649.30			
	Dry Weight + Tare (g):	1050.3	701.3	580.50			
Moisture Content (%):		17.4	17.4	17.4			
Wet Density (pcf):		126.3	126.4	126.5			
Dry Density (pcf):		107.6	107.7	107.7			
Percent Differences	Target & Specimen Dry Density	0.0	0.1	0.1			
	Target & Specimen Moisture	0.5	0.5	0.5			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.1	7.7	7.7	31.5	4.0	8.4	14143	14082
2	13.8	5.8	5.8	25.4	3.8	8.0	11212	11228
3	11.5	3.8	3.8	19.1	3.6	7.7	7939	8233
4	9.2	1.9	1.9	13.0	3.4	7.3	5611	5417
5	19.2	7.8	7.8	34.8	5.4	11.4	14135	13852
6	16.8	5.8	5.8	28.4	5.2	11.0	11278	11182
7	14.4	3.8	3.8	22.0	5.0	10.6	8441	8509
8	12.1	1.9	1.9	15.9	4.8	10.2	6012	5985
9	22.3	7.8	7.8	37.9	6.8	14.5	13589	13473
10	19.8	5.8	5.8	31.4	6.6	14.0	10958	11095
11	17.5	3.8	3.8	25.1	6.5	13.7	8369	8705
12	15.0	1.8	1.8	18.6	6.2	13.2	6295	6318
13	26.2	7.8	7.8	41.8	8.7	18.4	13286	13022
14	23.8	5.8	5.8	35.4	8.5	18.0	10934	10938
15	21.4	3.8	3.8	29.0	8.3	17.6	8621	8848
16	19.1	1.8	1.8	22.7	8.2	17.3	6952	6773

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4
OM+3%, Med Compaction

Replicate Test: REP 1

K_1 =	615.3
K_2 =	1.136
K_3 =	-1.774

n = 16

SES = 0.001

Sy = 0.136

Se = 0.010

Se/Sy = 0.072

R^2 = 0.995

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	14106	14016
2	13.9	5.9	5.9	25.7	3.8	8.0	11160	11246
3	11.6	3.9	3.9	19.4	3.6	7.7	7955	8322
4	9.2	1.9	1.9	13.0	3.4	7.3	5644	5414
5	19.4	7.9	7.9	35.2	5.4	11.5	13943	13693
6	16.9	5.9	5.9	28.7	5.2	11.0	11263	11129
7	14.4	3.9	3.9	22.2	4.9	10.5	8451	8529
8	12.1	1.9	1.9	15.9	4.8	10.2	6054	5945
9	22.3	7.9	7.9	38.1	6.8	14.4	13367	13276
10	19.9	5.9	5.9	31.7	6.6	14.0	10897	10979
11	17.6	3.9	3.9	25.4	6.5	13.7	8356	8669
12	15.2	1.9	1.9	19.0	6.3	13.3	6265	6364
13	26.3	7.8	7.8	41.9	8.7	18.5	12963	12627
14	23.8	5.8	5.8	35.4	8.5	18.0	10684	10648
15	21.5	3.9	3.9	29.3	8.3	17.6	8504	8743
16	19.1	1.9	1.9	22.9	8.1	17.2	6848	6733

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4
OM+3%, Med Compaction

Replicate Test: REP 2

K_1 =	619.8
K_2 =	1.121
K_3 =	-1.819

n = 16

SES = 0.002
Sy = 0.134

Se = 0.011
Se/Sy = 0.081
R^2 = 0.993

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.9	7.9	32.2	4.0	8.5	14247	14122
2	14.0	5.9	5.9	25.8	3.8	8.1	11120	11156
3	11.6	3.9	3.9	19.4	3.6	7.7	7800	8196
4	9.1	1.9	1.9	12.9	3.4	7.2	5506	5255
5	19.4	7.9	7.9	35.2	5.4	11.5	14046	13710
6	17.0	5.9	5.9	28.8	5.2	11.1	11176	11079
7	14.6	3.9	3.9	22.4	5.0	10.7	8306	8450
8	12.1	1.9	1.9	15.9	4.8	10.2	5927	5829
9	22.3	7.9	7.9	38.1	6.8	14.4	13397	13331
10	20.0	5.9	5.9	31.8	6.6	14.1	10757	10966
11	17.5	3.9	3.9	25.3	6.4	13.6	8212	8608
12	15.1	1.9	1.9	18.9	6.2	13.2	6261	6262
13	26.4	7.9	7.9	42.2	8.7	18.5	13200	12828
14	23.9	5.9	5.9	35.7	8.5	18.0	10828	10785
15	21.5	3.9	3.9	29.3	8.3	17.6	8672	8726

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 3 ML A-4
OM+3%, Med Compaction

Replicate Test: REP 3

K_1 =	604.4
K_2 =	1.147
K_3 =	-1.807

n = 15

SES = 0.002

Sy = 0.138

Se = 0.012

Se/Sy = 0.088

R^2 = 0.992

Appendix F

Resilient Modulus Results

Lime-Treated Soils at Optimum Moisture Content

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Low, Optimum, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	1
USCS:	CL
AASHTO:	A-7-6
Group Index:	23

Description:	Material 1 w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	90
No.270 Sieve	Not Detemined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	43
Plastic Limit:	18
Plasticity Index:	25
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	102.6
Optimum Moisture (%):	19.0

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Low, Optimum, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	91.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	93.4
Target Moisture Content (%):	19.0

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	665.0

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	111.1
Wet Weight of Sample (g):	2888.0
Adjusted Wet Weight (g):	2977.8
Layer Weight (g):	372.2

Molded Specimen Data							
Specimen No.:		4 REP 1					
Number of Blows per Layer:		6					
Specimen Wet Weight (g):		2904.4					
Specimen Height (in):		8.040					
Specimen Diamater (in):		3.96					
Moisture Content Data	Tare Weight (g):	360.50					
	Wet Weight + Tare (g):	538.30					
	Dry Weight + Tare (g):	509.3					
Moisture Content (%):		19.5					
Wet Density (pcf):		111.7					
Dry Density (pcf):		93.5					
Percent Differences	Target & Specimen Dry Density	0.2					
	Target & Specimen Moisture	0.5					

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	34612	35119
2	13.9	5.8	5.8	25.5	3.8	8.1	30300	30486
3	11.5	3.8	3.8	19.1	3.6	7.7	25517	25342
4	9.1	1.9	1.9	12.9	3.4	7.2	20044	19693
5	19.2	7.8	7.8	34.8	5.4	11.4	33768	34018
6	16.8	5.8	5.8	28.4	5.2	11.0	30049	29958
7	14.5	3.8	3.8	22.1	5.0	10.7	25715	25461
8	12.1	1.9	1.9	15.9	4.8	10.2	20550	20636
9	22.2	7.8	7.8	37.8	6.8	14.4	32808	32993
10	19.9	5.8	5.8	31.5	6.6	14.1	29564	29367
11	17.4	3.8	3.8	25.0	6.4	13.6	25566	25427
12	15.1	1.9	1.9	18.9	6.2	13.2	20848	21237
13	26.1	7.7	7.7	41.5	8.7	18.4	32133	31579
14	23.8	5.8	5.8	35.4	8.5	18.0	28900	28616
15	21.2	3.8	3.8	28.8	8.2	17.4	25222	25239
16	19.0	1.8	1.8	22.6	8.1	17.2	21067	21491

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1, CL A-7-6
Lime OM, Low
tested at 4 days

Replicate Test: REP 1

K_1 =	1,911.8
K_2 =	0.685
K_3 =	-1.281

n = 16

SES = 0.000

Sy = 0.081

Se = 0.005

Se/Sy = 0.067

R^2 = 0.996

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Standard, Optimum, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	1
USCS:	CL
AASHTO:	A-7-6
Group Index:	23

Description:	Material 1 w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	90
No.270 Sieve	Not Detemined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	43
Plastic Limit:	18
Plasticity Index:	25
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	102.6
Optimum Moisture (%):	19.0

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Standard, Optimum, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	96.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	98.5
Target Moisture Content (%):	19.0

Initial Moisture Content Data	
Tare Weight (g):	351.40
Wet Weight + Tare (g):	655.40
Dry Weight + Tare (g):	638.30
Initial Moisture Content:	6.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	4188.8
Dry Weight of Sample (From F56):	3953.2
Wet Weight Needed (to acquire targer M.C.):	4704.3
Additional Water Needed (ml):	515.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	117.2
Wet Weight of Sample (g):	3046.6
Adjusted Wet Weight (g):	3141.4
Layer Weight (g):	392.7

Molded Specimen Data							
Specimen No.:		5 REP 1					
Number of Blows per Layer:		11					
Specimen Wet Weight (g):		3052.2					
Specimen Height (in):		8.040					
Specimen Diamater (in):		3.96					
Moisture Content Data	Tare Weight (g):	184.90					
	Wet Weight + Tare (g):	381.10					
	Dry Weight + Tare (g):	350.2					
Moisture Content (%):		18.7					
Wet Density (pcf):		117.4					
Dry Density (pcf):		98.9					
Percent Differences	Target & Specimen Dry Density	0.4					
	Target & Specimen Moisture	0.3					

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	46386	48466
2	13.8	5.8	5.8	25.4	3.8	8.0	42745	40999
3	11.4	3.8	3.8	19.0	3.6	7.6	34482	32757
4	9.0	1.8	1.8	12.6	3.4	7.2	24736	23656
5	19.4	7.8	7.8	35.0	5.5	11.6	43327	45377
6	16.9	5.8	5.8	28.5	5.2	11.1	39229	39047
7	14.4	3.8	3.8	22.0	5.0	10.6	31775	32133
8	12.1	1.9	1.9	15.9	4.8	10.2	23848	24910
9	22.3	7.8	7.8	37.9	6.8	14.5	41644	42799
10	19.8	5.8	5.8	31.4	6.6	14.0	37493	37314
11	17.3	3.8	3.8	24.9	6.4	13.5	31291	31364
12	15.1	1.9	1.9	18.9	6.2	13.2	23846	25198
13	26.3	7.8	7.8	41.9	8.7	18.5	41176	39660
14	23.8	5.8	5.8	35.4	8.5	18.0	36769	35092
15	21.4	3.8	3.8	29.0	8.3	17.6	31109	30143
16	19.0	1.9	1.9	22.8	8.1	17.1	24295	25114

BCD Project:	070904
Project Name:	MDOT Design Guide
Sample I.D.:	Material 1 CL A-7-6
	Lime OM, Standard
	aged 4 days
Replicate Test:	REP 1

K_1 =	2,725.4
K_2 =	0.841
K_3 =	-1.912

n =	16
SES =	0.004
Sy =	0.101
Se =	0.018
Se/Sy =	0.177
R^2 =	0.969

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - High, Optimum, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	1
USCS:	CL
AASHTO:	A-7-6
Group Index:	23

Description:	Material 1 w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	90
No.270 Sieve	Not Detemined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	43
Plastic Limit:	18
Plasticity Index:	25
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	102.6
Optimum Moisture (%):	19.0

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - High, Optimum, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	103.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	105.7
Target Moisture Content (%):	19.0

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	665.0

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	125.8
Wet Weight of Sample (g):	3268.8
Adjusted Wet Weight (g):	3370.4
Layer Weight (g):	421.3

Molded Specimen Data							
Specimen No.:		4 REP 1					
Number of Blows per Layer:		20					
Specimen Wet Weight (g):		3226.2					
Specimen Height (in):		8.040					
Specimen Diamater (in):		3.96					
Moisture Content Data	Tare Weight (g):	42.20					
	Wet Weight + Tare (g):	206.50					
	Dry Weight + Tare (g):	180.9					
Moisture Content (%):		18.5					
Wet Density (pcf):		124.1					
Dry Density (pcf):		104.8					
Percent Differences	Target & Specimen Dry Density	0.9					
	Target & Specimen Moisture	0.5					

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	50012	51366
2	13.8	5.8	5.8	25.4	3.8	8.0	44601	44644
3	11.4	3.8	3.8	19.0	3.6	7.6	37563	37147
4	8.9	1.8	1.8	12.5	3.3	7.1	29987	28449
5	19.3	7.8	7.8	34.9	5.4	11.5	50319	51150
6	16.8	5.8	5.8	28.4	5.2	11.0	44926	45069
7	14.4	3.8	3.8	22.0	5.0	10.6	38046	38357
8	12.1	1.9	1.9	15.9	4.8	10.2	30693	31176
9	22.3	7.8	7.8	37.9	6.8	14.5	51172	50906
10	19.9	5.8	5.8	31.5	6.6	14.1	45715	45369
11	17.4	3.8	3.8	25.0	6.4	13.6	39116	39293
12	15.0	1.8	1.8	18.6	6.2	13.2	31723	32540
13	26.1	7.7	7.7	41.5	8.7	18.4	52103	50321
14	23.9	5.8	5.8	35.5	8.5	18.1	46940	45605
15	21.4	3.8	3.8	29.0	8.3	17.6	40435	40230
16	19.1	1.9	1.9	22.9	8.1	17.2	33134	34638

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
Lime OM, High
tested at 4 days

Replicate Test: REP 1

K_1 =	2,580.1
K_2 =	0.664
K_3 =	-0.877

n = 16

SES = 0.002

Sy = 0.083

Se = 0.011

Se/Sy = 0.138

R^2 = 0.981

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Low, Optimum, w/Lime

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 2 w/Lime
Sample No.:	2		
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-6		
Group Index:	17	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	93
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	37
Plastic Limit:	19
Plasticity Index:	18
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	103.3
Optimum Moisture (%):	19.5

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Low, Optimum, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	91.0
Material Type* (1,2, or 3):	

Target Data	
Target Dry Density (pcf):	94.0
Target Moisture Content (%):	19.5

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	682.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	112.3
Wet Weight of Sample (g):	2919.9
Adjusted Wet Weight (g):	3010.7
Layer Weight (g):	376.3

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		10	10	10			
Specimen Wet Weight (g):		2902.40	2886.70	2916.00			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	41.20	41.40	40.30			
	Wet Weight + Tare (g):	228.10	253.30	242.30			
	Dry Weight + Tare (g):	198.0	219.3	209.50			
Moisture Content (%):		19.2	19.1	19.4			
Wet Density (pcf):		111.7	111.1	112.2			
Dry Density (pcf):		93.7	93.2	94.0			
Percent Differences	Target & Specimen Dry Density	0.3	0.8	0.0			
	Target & Specimen Moisture	0.3	0.4	0.1			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 . \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.8	7.8	32.0	4.1	8.6	34009	34351
2	13.8	5.8	5.8	25.4	3.8	8.0	29928	29923
3	11.5	3.8	3.8	19.1	3.6	7.7	25243	24989
4	9.0	1.8	1.8	12.6	3.4	7.2	20544	19241
5	19.5	7.8	7.8	35.1	5.5	11.7	33458	34135
6	16.8	5.8	5.8	28.4	5.2	11.0	29542	30145
7	14.4	3.8	3.8	22.0	5.0	10.6	25212	25713
8	12.0	1.8	1.8	15.6	4.8	10.2	20669	20697
9	22.4	7.8	7.8	38.0	6.9	14.6	34276	33919
10	19.9	5.8	5.8	31.5	6.6	14.1	30195	30286
11	17.4	3.8	3.8	25.0	6.4	13.6	25669	26284
12	15.1	1.9	1.9	18.9	6.2	13.2	21091	22053
13	26.3	7.8	7.8	41.9	8.7	18.5	35266	33620
14	23.8	5.8	5.8	35.4	8.5	18.0	31440	30372
15	21.4	3.8	3.8	29.0	8.3	17.6	26929	26842
16	19.0	1.8	1.8	22.6	8.1	17.2	22297	22959

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM - Low
aged 4 days

Replicate Test: REP 1

K_1 =	1,743.4
K_2 =	0.656
K_3 =	-0.893

n = 16

SES = 0.002

Sy = 0.082

Se = 0.014

Se/Sy = 0.166

R^2 = 0.973

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.7	7.7	31.6	4.0	8.5	41018	41536
2	13.8	5.8	5.8	25.4	3.8	8.0	36578	36472
3	11.4	3.8	3.8	19.0	3.6	7.6	30780	30420
4	9.0	1.8	1.8	12.6	3.4	7.2	24183	23405
5	19.3	7.8	7.8	34.9	5.4	11.5	39549	40369
6	16.8	5.8	5.8	28.4	5.2	11.0	35440	35699
7	14.4	3.8	3.8	22.0	5.0	10.6	30371	30453
8	12.0	1.8	1.8	15.6	4.8	10.2	24473	24484
9	22.3	7.8	7.8	37.9	6.8	14.5	39130	39044
10	19.8	5.8	5.8	31.4	6.6	14.0	34994	34910
11	17.4	3.8	3.8	25.0	6.4	13.6	30088	30308
12	15.1	1.9	1.9	18.9	6.2	13.2	24608	25417
13	26.2	7.8	7.8	41.8	8.7	18.4	38409	37466
14	23.9	5.8	5.8	35.5	8.5	18.1	34672	33842
15	21.5	3.8	3.8	29.1	8.3	17.7	30174	29932
16	18.9	1.8	1.8	22.5	8.1	17.1	24940	25596

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM - Low
aged 4 days

Replicate Test: REP 2

K_1 =	2,316.1
K_2 =	0.671
K_3 =	-1.306

n = 16

SES = 0.001

Sy = 0.081

Se = 0.008

Se/Sy = 0.105

R^2 = 0.989

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	37159	36815
2	13.8	5.8	5.8	25.4	3.8	8.0	31698	31410
3	11.6	3.9	3.9	19.4	3.6	7.7	25435	25862
4	9.1	1.9	1.9	12.9	3.4	7.2	19703	19290
5	19.3	7.8	7.8	34.9	5.4	11.5	36302	36851
6	16.8	5.8	5.8	28.4	5.2	11.0	32000	31931
7	14.5	3.9	3.9	22.3	5.0	10.6	26453	26884
8	12.2	1.9	1.9	16.0	4.9	10.3	21089	21115
9	22.3	7.8	7.8	37.9	6.8	14.5	36528	36849
10	19.9	5.9	5.9	31.7	6.6	14.0	32738	32568
11	17.6	3.9	3.9	25.4	6.5	13.7	27763	27766
12	15.1	1.9	1.9	18.9	6.2	13.2	22440	22491
13	26.2	7.8	7.8	41.8	8.7	18.4	36978	36804
14	24.0	5.9	5.9	35.8	8.5	18.1	33583	32961
15	21.5	3.9	3.9	29.3	8.3	17.6	28802	28642
16	19.0	1.9	1.9	22.8	8.1	17.1	23595	23970

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM - Low
aged 4 days

Replicate Test: REP 3

K_1 =	1,747.2
K_2 =	0.747
K_3 =	-0.908

n = 16

SES = 0.000

Sy = 0.091

Se = 0.006

Se/Sy = 0.061

R^2 = 0.996

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Standard, Optimum, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	2
USCS:	CL
AASHTO:	A-6
Group Index:	17

Description:	Material 2 w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	93
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	37
Plastic Limit:	19
Plasticity Index:	18
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	103.3
Optimum Moisture (%):	19.5

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Standard, Optimum, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	96.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	99.2
Target Moisture Content (%):	19.5

Initial Moisture Content Data	
Tare Weight (g):	351.40
Wet Weight + Tare (g):	606.30
Dry Weight + Tare (g):	595.80
Initial Moisture Content:	4.3

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	4191.8
Dry Weight of Sample (From F56):	4019.1
Wet Weight Needed (to acquire targer M.C.):	4802.9
Additional Water Needed (ml):	611.1

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	118.5
Wet Weight of Sample (g):	3080.3
Adjusted Wet Weight (g):	3176.1
Layer Weight (g):	397.0

Molded Specimen Data							
Specimen No.:		4 REP 1	5 REP 2	6 REP 3			
Number of Blows per Layer:		20	20	20			
Specimen Wet Weight (g):		3091.6	3080.5	3088.2			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	41.30	40.8			
	Wet Weight + Tare (g):	724.60	248.90	246.3			
	Dry Weight + Tare (g):	663.90	215.70	213			
Moisture Content (%):		20.0	19.0	19.3			
Wet Density (pcf):		118.9	118.5	118.8			
Dry Density (pcf):		99.1	99.6	99.6			
Percent Differences	Target & Specimen Dry Density	0.1	0.4	0.4			
	Target & Specimen Moisture	0.5	0.5	0.2			
		Samples Aged 4 Days					

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.1	7.6	7.6	31.3	4.0	8.5	54257	54419
2	13.8	5.7	5.7	25.2	3.8	8.1	45753	44153
3	11.5	3.8	3.8	19.1	3.6	7.7	33507	33776
4	9.1	1.8	1.8	12.7	3.4	7.3	22062	22741
5	19.0	7.6	7.6	34.2	5.4	11.4	56311	58349
6	16.7	5.7	5.7	28.1	5.2	11.0	49577	48282
7	14.5	3.8	3.8	22.1	5.0	10.7	37815	38262
8	12.1	1.8	1.8	15.7	4.9	10.3	25134	27473
9	22.0	7.6	7.6	37.2	6.8	14.4	60960	62323
10	19.7	5.7	5.7	31.1	6.6	14.0	55504	52443
11	17.5	3.8	3.8	25.1	6.5	13.7	47449	42616
12	15.0	1.8	1.8	18.6	6.2	13.2	33952	31898
13	26.0	7.6	7.6	41.2	8.7	18.4	62168	67494
14	23.7	5.7	5.7	35.1	8.5	18.0	56770	57839
15	21.4	3.8	3.8	29.0	8.3	17.6	49273	48105
16	19.1	1.8	1.8	22.7	8.2	17.3	37482	37937

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM, Standard
aged 4 days

Replicate Test: REP 1

K_1 =	1,875.3
K_2 =	0.975
K_3 =	-0.237

n = 16

SES = 0.007

Sy = 0.136

Se = 0.024

Se/Sy = 0.176

R^2 = 0.969

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.7	7.7	31.6	4.0	8.5	47544	48114
2	13.8	5.8	5.8	25.4	3.8	8.0	42374	42277
3	11.4	3.8	3.8	19.0	3.6	7.6	36012	35395
4	9.0	1.8	1.8	12.6	3.4	7.2	28283	27427
5	19.2	7.7	7.7	34.6	5.4	11.5	46969	47845
6	16.8	5.8	5.8	28.4	5.2	11.0	42280	42578
7	14.4	3.8	3.8	22.0	5.0	10.6	36151	36433
8	12.1	1.8	1.8	15.7	4.9	10.3	29249	29514
9	22.2	7.7	7.7	37.6	6.8	14.5	47494	47554
10	19.8	5.8	5.8	31.4	6.6	14.0	42862	42762
11	17.4	3.8	3.8	25.0	6.4	13.6	37031	37221
12	15.0	1.8	1.8	18.6	6.2	13.2	30360	31018
13	26.2	7.7	7.7	41.6	8.7	18.5	48374	47146
14	23.8	5.8	5.8	35.4	8.5	18.0	43843	42877
15	21.4	3.8	3.8	29.0	8.3	17.6	38171	37988
16	19.0	1.8	1.8	22.6	8.1	17.2	31842	32595

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM, Standard
aged 4 days

Replicate Test: REP 2

K_1 =	2,472.0
K_2 =	0.643
K_3 =	-0.877

n = 16

SES = 0.001

Sy = 0.079

Se = 0.008

Se/Sy = 0.098

R^2 = 0.990

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.7	7.7	31.6	4.0	8.5	63366	66220
2	13.8	5.7	5.7	25.2	3.8	8.1	55283	51927
3	11.4	3.8	3.8	19.0	3.6	7.6	38904	38347
4	9.0	1.8	1.8	12.6	3.4	7.2	23926	24382
5	19.2	7.7	7.7	34.6	5.4	11.5	62580	66103
6	16.7	5.7	5.7	28.1	5.2	11.0	55258	53049
7	14.4	3.8	3.8	22.0	5.0	10.6	41562	40700
8	12.0	1.8	1.8	15.6	4.8	10.2	27146	27899
9	22.2	7.7	7.7	37.6	6.8	14.5	63106	65890
10	19.7	5.7	5.7	31.1	6.6	14.0	55872	53930
11	17.4	3.8	3.8	25.0	6.4	13.6	43764	42600
12	15.0	1.8	1.8	18.6	6.2	13.2	29918	30815
13	26.1	7.7	7.7	41.5	8.7	18.4	63233	65515
14	23.7	5.7	5.7	35.1	8.5	18.0	57241	54773
15	21.4	3.8	3.8	29.0	8.3	17.6	46161	44592
16	19.0	1.8	1.8	22.6	8.1	17.2	33078	33969

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM, Standard
aged 4 days

Replicate Test: REP 3

K_1 =	2,667.2
K_2 =	1.139
K_3 =	-1.442

n = 16

SES = 0.004

Sy = 0.141

Se = 0.018

Se/Sy = 0.127

R^2 = 0.984

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - High, Optimum, w/Lime

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 2 w/Lime
Sample No.:	2		
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-6		
Group Index:	17	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	93
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	37
Plastic Limit:	19
Plasticity Index:	18
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	103.3
Optimum Moisture (%):	19.5

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - High, Optimum, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	101.0
Material Type* (1,2, or 3):	

Target Data	
Target Dry Density (pcf):	104.3
Target Moisture Content (%):	19.5

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	682.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	124.7
Wet Weight of Sample (g):	3240.8
Adjusted Wet Weight (g):	3341.5
Layer Weight (g):	417.7

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		40	40	40			
Specimen Wet Weight (g):		3235.20	3254.80	3237.60			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	41.10	360.50	41.10			
	Wet Weight + Tare (g):	270.40	555.40	287.10			
	Dry Weight + Tare (g):	233.4	522.9	247.70			
Moisture Content (%):		19.2	20.0	19.1			
Wet Density (pcf):		124.5	125.2	124.6			
Dry Density (pcf):		104.4	104.3	104.6			
Percent Differences	Target & Specimen Dry Density	0.0	0.0	0.3			
	Target & Specimen Moisture	0.3	0.5	0.4			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in., Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.4	7.9	7.9	32.2	4.0	8.5	46170	47390
2	14.0	5.9	5.9	25.8	3.8	8.1	40291	39879
3	11.5	3.9	3.9	19.3	3.6	7.6	32481	31796
4	9.1	1.9	1.9	12.9	3.4	7.2	25078	23055
5	19.5	7.9	7.9	35.3	5.5	11.6	45700	47572
6	16.9	5.9	5.9	28.7	5.2	11.0	39353	40670
7	14.5	3.9	3.9	22.3	5.0	10.6	32814	33350
8	12.2	1.9	1.9	16.0	4.9	10.3	25627	25557
9	22.4	7.9	7.9	38.2	6.8	14.5	48633	47684
10	19.9	5.9	5.9	31.7	6.6	14.0	40703	41335
11	17.6	3.9	3.9	25.4	6.5	13.7	33315	34669
12	15.1	1.9	1.9	18.9	6.2	13.2	26387	27479
13	26.5	7.9	7.9	42.3	8.8	18.6	52197	47772
14	23.9	5.9	5.9	35.7	8.5	18.0	44261	42035
15	21.5	3.9	3.9	29.3	8.3	17.6	35854	36011
16	19.1	1.9	1.9	22.9	8.1	17.2	27831	29636

BCD Project:	070904
Project Name:	MDOT SS 205
Sample I.D.:	Material 2 CL A-6
	Lime OM , High
	aged 4 days
Replicate Test:	REP 1

K_1 =	2,129.0
K_2 =	0.822
K_3 =	-0.954

n =	16
SES =	0.006
Sy =	0.104
Se =	0.021
Se/Sy =	0.199
R^2 =	0.960

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.7	7.7	31.7	4.1	8.6	46927	46053
2	13.7	5.7	5.7	25.1	3.8	8.0	40281	40261
3	11.4	3.8	3.8	19.0	3.6	7.6	33416	34087
4	9.1	1.8	1.8	12.7	3.4	7.3	27487	26644
5	19.3	7.7	7.7	34.7	5.5	11.6	45837	46048
6	16.8	5.8	5.8	28.4	5.2	11.0	40409	41065
7	14.5	3.8	3.8	22.1	5.0	10.7	34801	35289
8	12.1	1.8	1.8	15.7	4.9	10.3	28843	28697
9	22.2	7.7	7.7	37.6	6.8	14.5	45948	46005
10	19.8	5.8	5.8	31.4	6.6	14.0	41201	41447
11	17.5	3.8	3.8	25.1	6.5	13.7	35829	36208
12	15.1	1.8	1.8	18.7	6.3	13.3	30128	30321
13	26.3	7.8	7.8	41.9	8.7	18.5	46799	46110
14	23.8	5.8	5.8	35.4	8.5	18.0	42538	41817
15	21.4	3.8	3.8	29.0	8.3	17.6	37306	37141
16	19.1	1.9	1.9	22.9	8.1	17.2	31813	32238

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM , High
aged 4 days

Replicate Test: REP 2

K_1 =	2,341.2
K_2 =	0.627
K_3 =	-0.781

n = 16

SES = 0.001
Sy = 0.078

Se = 0.007
Se/Sy = 0.087
R^2 = 0.992

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.7	7.7	7.7	32.1	4.2	9.0	37112	37824
2	14.1	5.8	5.8	25.7	3.9	8.3	30484	33856
3	11.5	3.8	3.8	19.1	3.6	7.7	29049	29863
4	9.1	1.8	1.8	12.7	3.4	7.3	35170	25882
5	19.3	7.7	7.7	34.7	5.5	11.6	46107	45945
6	16.7	5.7	5.7	28.1	5.2	11.0	42427	41650
7	14.5	3.8	3.8	22.1	5.0	10.7	39984	38176
8	12.0	1.8	1.8	15.6	4.8	10.2	40907	33492
9	22.4	7.7	7.7	37.8	6.9	14.7	60623	57057
10	19.9	5.7	5.7	31.3	6.7	14.2	55071	52505
11	17.4	3.8	3.8	25.0	6.4	13.6	49841	47520
12	15.1	1.8	1.8	18.7	6.3	13.3	37209	42996
13	26.4	7.7	7.7	41.8	8.8	18.7	71044	73879
14	24.0	5.7	5.7	35.4	8.6	18.3	67921	68964
15	21.6	3.8	3.8	29.2	8.4	17.8	52544	63533
16	2.1	1.8	1.8	5.7	0.1	0.3	9828	11891

BCD Project:	070904
Project Name:	MDOT SS 205
Sample I.D.:	Material 2 CL A-6
	Lime OM , High
	aged 4 days
Replicate Test:	REP 3

K_1 =	1,028.1
K_2 =	0.281
K_3 =	2.753

n =	16
SES =	0.048
Sy =	0.201
Se =	0.060
Se/Sy =	0.301
R^2 =	0.909

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - Low, Optimum, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	4
USCS:	CL
AASHTO:	A-4
Group Index:	5

Description:	Material 4 w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No. 60 Sieve	98
No.200 Sieve	83
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	22
Plastic Limit:	14
Plasticity Index:	8
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	116.6
Optimum Moisture (%):	12.9

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - Low, Optimum, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	86.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	100.3
Target Moisture Content (%):	12.9

Initial Moisture Content Data	
Tare Weight (g):	360.50
Wet Weight + Tare (g):	714.10
Dry Weight + Tare (g):	704.00
Initial Moisture Content:	2.9

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	338.6

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	113.2
Wet Weight of Sample (g):	2942.4
Adjusted Wet Weight (g):	3034.9
Layer Weight (g):	379.4

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		5	5	5			
Specimen Wet Weight (g):		2919.8	2949.6	2963.7			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	33.90	36.00			
	Wet Weight + Tare (g):	573.50	289.10	261.20			
	Dry Weight + Tare (g):	548.9	259.4	235.00			
Moisture Content (%):		13.1	13.2	13.2			
Wet Density (pcf):		112.3	113.5	114.0			
Dry Density (pcf):		99.4	100.3	100.8			
Percent Differences	Target & Specimen Dry Density	0.9	0.0	0.5			
	Target & Specimen Moisture	0.2	0.3	0.3			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in., Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.0	7.6	7.6	31.2	4.0	8.4	44939	31961
2	13.6	5.6	5.6	24.8	3.8	8.0	38377	24883
3	11.4	3.7	3.7	18.8	3.6	7.7	29131	18552
4	9.1	1.8	1.8	12.7	3.4	7.3	20768	12254
5	19.0	7.6	7.6	34.2	5.4	11.4	43768	40143
6	16.6	5.6	5.6	27.8	5.2	11.0	37935	32009
7	14.4	3.7	3.7	21.8	5.0	10.7	30265	24720
8	12.1	1.8	1.8	15.7	4.9	10.3	22186	17440
9	22.0	7.6	7.6	37.2	6.8	14.4	42995	49570
10	19.6	5.6	5.6	30.8	6.6	14.0	37673	40312
11	17.3	3.7	3.7	24.7	6.4	13.6	30896	31740
12	15.0	1.8	1.8	18.6	6.2	13.2	23211	23451
13	26.0	7.6	7.6	41.2	8.7	18.4	42146	64214
14	23.6	5.6	5.6	34.8	8.5	18.0	37350	53354
15	4.1	3.7	3.7	11.5	0.2	0.4	2496	7688
16	19.0	1.8	1.8	22.6	8.1	17.2	24754	33489

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM, Low
aged 4 days

Replicate Test: REP 1

K_1 =	654.3
K_2 =	1.009
K_3 =	1.853

n = 16

SES = 0.492
Sy = 0.301

Se = 0.195
Se/Sy = 0.647
R^2 = 0.582

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.1	7.6	7.6	31.3	4.0	8.5	40393	41966
2	13.7	5.6	5.6	24.9	3.8	8.1	36382	35890
3	11.3	3.7	3.7	18.7	3.6	7.6	30150	29516
4	9.1	1.8	1.8	12.7	3.4	7.3	22855	22256
5	19.1	7.6	7.6	34.3	5.4	11.5	38143	39210
6	16.6	5.6	5.6	27.8	5.2	11.0	34461	34124
7	14.3	3.7	3.7	21.7	5.0	10.6	28920	28728
8	12.1	1.8	1.8	15.7	4.9	10.3	22598	22717
9	21.9	7.5	7.5	36.9	6.8	14.4	36557	36613
10	19.6	5.6	5.6	30.8	6.6	14.0	32489	32408
11	17.3	3.7	3.7	24.7	6.4	13.6	27804	27822
12	15.0	1.8	1.8	18.6	6.2	13.2	22017	22762
13	26.0	7.6	7.6	41.2	8.7	18.4	35025	33972
14	23.6	5.6	5.6	34.8	8.5	18.0	31182	30305
15	21.3	3.7	3.7	28.7	8.3	17.6	26677	26545
16	19.0	1.8	1.8	22.6	8.1	17.2	21609	22444

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM, Low
aged 4 days

Replicate Test: REP 2

K_1 =	2,524.0
K_2 =	0.768
K_3 =	-1.896

n = 16

SES = 0.002

Sy = 0.091

Se = 0.011

Se/Sy = 0.119

R^2 = 0.986

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.1	7.6	7.6	31.3	4.0	8.5	34486	34543
2	13.8	5.7	5.7	25.2	3.8	8.1	29834	29776
3	11.5	3.8	3.8	19.1	3.6	7.7	24249	24522
4	9.1	1.8	1.8	12.7	3.4	7.3	18991	18291
5	19.1	7.6	7.6	34.3	5.4	11.5	32791	33051
6	16.7	5.7	5.7	28.1	5.2	11.0	28699	28942
7	14.5	3.8	3.8	22.1	5.0	10.7	24194	24395
8	12.0	1.8	1.8	15.6	4.8	10.2	19233	19089
9	22.0	7.6	7.6	37.2	6.8	14.4	31564	31726
10	19.7	5.7	5.7	31.1	6.6	14.0	28009	28082
11	17.4	3.8	3.8	25.0	6.4	13.6	23838	24131
12	15.0	1.8	1.8	18.6	6.2	13.2	19243	19558
13	26.1	7.6	7.6	41.3	8.7	18.5	31139	30031
14	23.7	5.7	5.7	35.1	8.5	18.0	27439	26969
15	21.4	3.8	3.8	29.0	8.3	17.6	23619	23635
16	19.0	1.8	1.8	22.6	8.1	17.2	19304	19818

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4 Lime OM, Low aged 4 days

Replicate Test: REP 3

K_1 =	1,929.2
K_2 =	0.758
K_3 =	-1.558

n = 16

SES = 0.001

Sy = 0.089

Se = 0.008

Se/Sy = 0.091

R^2 = 0.992

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - Standard, Optimum, w/Lime

GENERAL INFORMATION

BCD Lab No.:		Description:	Material 4 w/Lime
Sample No.:	4		
USCS:	CL	Testing Performed By (MDOT, BCD, etc.):	BCD
AASHTO:	A-4		
Group Index:	5	Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No. 60 Sieve	98
No.200 Sieve	83
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	22
Plastic Limit:	14
Plasticity Index:	8
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	116.6
Optimum Moisture (%):	12.9

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - Standard, Optimum, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	95.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	110.8
Target Moisture Content (%):	12.9

Initial Moisture Content Data	
Tare Weight (g):	360.50
Wet Weight + Tare (g):	714.10
Dry Weight + Tare (g):	704.00
Initial Moisture Content:	2.9

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	338.6

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	125.1
Wet Weight of Sample (g):	3250.4
Adjusted Wet Weight (g):	3352.5
Layer Weight (g):	419.1

Molded Specimen Data							
Specimen No.:		4 REP 1	5 REP 2	6 REP 3			
Number of Blows per Layer:		11	11	11			
Specimen Wet Weight (g):		3244.5	3238.4	3238.5			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	41.50	40.3			
	Wet Weight + Tare (g):	652.00	226.40	286.6			
	Dry Weight + Tare (g):	618.80	205.20	257.8			
Moisture Content (%):		12.9	13.0	13.2			
Wet Density (pcf):		124.8	124.6	124.6			
Dry Density (pcf):		110.6	110.3	110.0			
Percent Differences	Target & Specimen Dry Density	0.1	0.4	0.7			
	Target & Specimen Moisture	0.0	0.1	0.3			
		Samples aged 4 days					

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	52658	54701
2	13.8	5.8	5.8	25.4	3.8	8.0	48355	45870
3	11.4	3.8	3.8	19.0	3.6	7.6	38094	36277
4	9.1	1.9	1.9	12.9	3.4	7.2	26852	26377
5	19.4	7.8	7.8	35.0	5.5	11.6	49275	52012
6	16.8	5.8	5.8	28.4	5.2	11.0	44159	44449
7	14.4	3.8	3.8	22.0	5.0	10.6	36061	36193
8	12.1	1.9	1.9	15.9	4.8	10.2	26874	27749
9	22.3	7.7	7.7	37.7	6.9	14.6	48273	49304
10	19.8	5.8	5.8	31.4	6.6	14.0	43351	43033
11	17.4	3.8	3.8	25.0	6.4	13.6	35959	35845
12	14.9	1.8	1.8	18.5	6.2	13.1	27064	28132
13	26.2	7.7	7.7	41.6	8.7	18.5	47701	46580
14	23.8	5.8	5.8	35.4	8.5	18.0	42886	41200
15	21.5	3.8	3.8	29.1	8.3	17.7	36162	35116
16	19.1	1.9	1.9	22.9	8.1	17.2	28193	29025

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM, Standard
aged 4 days

Replicate Test: REP 1

K_1 =	2,887.1
K_2 =	0.870
K_3 =	-1.743

n = 16

SES = 0.003

Sy = 0.103

Se = 0.016

Se/Sy = 0.152

R^2 = 0.977

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.1	7.5	7.5	31.1	4.1	8.6	54470	55397
2	13.7	5.6	5.6	24.9	3.8	8.1	47296	47004
3	11.4	3.7	3.7	18.8	3.6	7.7	37827	37898
4	9.0	1.8	1.8	12.6	3.4	7.2	29046	27829
5	19.0	7.5	7.5	34.0	5.4	11.5	53357	54224
6	16.6	5.6	5.6	27.8	5.2	11.0	46597	46749
7	14.3	3.7	3.7	21.7	5.0	10.6	38311	38692
8	12.0	1.8	1.8	15.6	4.8	10.2	29845	29950
9	22.0	7.5	7.5	37.0	6.8	14.5	53269	53050
10	19.6	5.6	5.6	30.8	6.6	14.0	46924	46362
11	17.3	3.7	3.7	24.7	6.4	13.6	38817	39192
12	15.0	1.8	1.8	18.6	6.2	13.2	30627	31479
13	25.9	7.5	7.5	40.9	8.7	18.4	52575	51593
14	23.6	5.6	5.6	34.8	8.5	18.0	47038	45722
15	21.3	3.7	3.7	28.7	8.3	17.6	39726	39505
16	19.0	1.8	1.8	22.6	8.1	17.2	31922	32875

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM, Standard
aged 4 days

Replicate Test: REP 2

K_1 =	2,833.7
K_2 =	0.815
K_3 =	-1.337

n = 16

SES = 0.001

Sy = 0.096

Se = 0.009

Se/Sy = 0.094

R^2 = 0.991

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.0	7.5	7.5	31.0	4.0	8.5	67307	70014
2	13.6	5.6	5.6	24.8	3.8	8.0	61874	60986
3	11.3	3.7	3.7	18.7	3.6	7.6	52731	50761
4	9.1	1.8	1.8	12.7	3.4	7.3	40109	39094
5	19.0	7.5	7.5	34.0	5.4	11.5	64668	66831
6	16.5	5.5	5.5	27.5	5.2	11.0	58845	58586
7	14.3	3.7	3.7	21.7	5.0	10.6	50726	50296
8	12.0	1.8	1.8	15.6	4.8	10.2	39583	40438
9	21.9	7.5	7.5	36.9	6.8	14.4	63467	64019
10	19.6	5.6	5.6	30.8	6.6	14.0	57736	57121
11	17.3	3.7	3.7	24.7	6.4	13.6	49926	49553
12	15.0	1.8	1.8	18.6	6.2	13.2	39512	41125
13	25.9	7.5	7.5	40.9	8.7	18.4	61678	60515
14	23.7	5.6	5.6	34.9	8.5	18.1	56543	54611
15	21.3	3.7	3.7	28.7	8.3	17.6	49169	48319
16	19.0	1.8	1.8	22.6	8.1	17.2	39792	41339

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM, Standard
aged 4 days

Replicate Test: REP 3

K_1 =	4,070.4
K_2 =	0.706
K_3 =	-1.533

n = 16

SES = 0.002

Sy = 0.082

Se = 0.012

Se/Sy = 0.151

R^2 = 0.977

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - High, Optimum, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	4
USCS:	CL
AASHTO:	A-4
Group Index:	5

Description:	Material 4 w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No. 60 Sieve	98
No.200 Sieve	83
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	22
Plastic Limit:	14
Plasticity Index:	8
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	116.6
Optimum Moisture (%):	12.9

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - High, Optimum, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	100.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	116.6
Target Moisture Content (%):	12.9

Initial Moisture Content Data	
Tare Weight (g):	360.50
Wet Weight + Tare (g):	714.10
Dry Weight + Tare (g):	704.00
Initial Moisture Content:	2.9

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	338.6

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	131.6
Wet Weight of Sample (g):	3421.5
Adjusted Wet Weight (g):	3528.9
Layer Weight (g):	441.1

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		20	20	20			
Specimen Wet Weight (g):		3416.2	3424.8	3409.6			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	41.10	40.80			
	Wet Weight + Tare (g):	736.70	282.00	229.20			
	Dry Weight + Tare (g):	694.0	254.0	207.50			
Moisture Content (%):		12.8	13.2	13.0			
Wet Density (pcf):		131.4	131.8	131.2			
Dry Density (pcf):		116.5	116.4	116.1			
Percent Differences	Target & Specimen Dry Density	0.1	0.1	0.5			
	Target & Specimen Moisture	0.1	0.3	0.1			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.7	7.7	31.6	4.0	8.5	62488	63788
2	13.9	5.8	5.8	25.5	3.8	8.1	54016	53910
3	11.4	3.8	3.8	19.0	3.6	7.6	44146	42731
4	9.1	1.8	1.8	12.7	3.4	7.3	31878	30646
5	19.2	7.7	7.7	34.6	5.4	11.5	59911	61961
6	16.8	5.7	5.7	28.2	5.2	11.1	52733	52758
7	14.4	3.8	3.8	22.0	5.0	10.6	43468	43433
8	12.0	1.8	1.8	15.6	4.8	10.2	32373	32848
9	22.0	7.6	7.6	37.2	6.8	14.4	59223	59879
10	19.7	5.7	5.7	31.1	6.6	14.0	52149	52058
11	17.4	3.8	3.8	25.0	6.4	13.6	43613	43773
12	15.0	1.8	1.8	18.6	6.2	13.2	32965	34459
13	26.0	7.6	7.6	41.2	8.7	18.4	59710	57778
14	23.7	5.7	5.7	35.1	8.5	18.0	53039	50994
15	21.3	3.8	3.8	28.9	8.2	17.5	44545	43849
16	19.1	1.8	1.8	22.7	8.2	17.3	34622	35898

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM, High
aged 4 days

Replicate Test: REP 1

K_1 =	3,211.4
K_2 =	0.853
K_3 =	-1.461

n = 16

SES = 0.002
Sy = 0.102

Se = 0.012
Se/Sy = 0.122
R^2 = 0.985

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.1	7.7	7.7	31.5	4.0	8.4	62618	64549
2	13.9	5.8	5.8	25.5	3.8	8.1	56515	56042
3	11.4	3.8	3.8	19.0	3.6	7.6	47873	46154
4	9.0	1.8	1.8	12.6	3.4	7.2	36349	34880
5	19.1	7.6	7.6	34.3	5.4	11.5	60310	62591
6	16.8	5.7	5.7	28.2	5.2	11.1	55163	55065
7	14.4	3.8	3.8	22.0	5.0	10.6	46771	46807
8	12.1	1.8	1.8	15.7	4.9	10.3	36309	37129
9	22.0	7.6	7.6	37.2	6.8	14.4	60808	61233
10	19.8	5.7	5.7	31.2	6.6	14.1	54962	54455
11	17.4	3.8	3.8	25.0	6.4	13.6	46869	47134
12	15.0	1.8	1.8	18.6	6.2	13.2	37027	38597
13	26.1	7.7	7.7	41.5	8.7	18.4	61694	59774
14	23.7	5.7	5.7	35.1	8.5	18.0	55533	53573
15	21.4	3.8	3.8	29.0	8.3	17.6	48065	47225
16	19.0	1.8	1.8	22.6	8.1	17.2	38457	39935

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM, High
aged 4 days

Replicate Test: REP 2

K_1 =	3,407.5
K_2 =	0.713
K_3 =	-1.213

n = 16

SES = 0.002

Sy = 0.086

Se = 0.013

Se/Sy = 0.153

R^2 = 0.977

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.1	7.6	7.6	31.3	4.0	8.5	46956	53881
2	13.7	5.7	5.7	25.1	3.8	8.0	38820	46473
3	11.4	3.8	3.8	19.0	3.6	7.6	34110	38287
4	9.1	1.8	1.8	12.7	3.4	7.3	33629	28669
5	19.2	7.6	7.6	34.4	5.5	11.6	58275	52558
6	16.7	5.7	5.7	28.1	5.2	11.0	50065	46042
7	14.6	3.8	3.8	22.2	5.1	10.8	47085	38883
8	12.1	1.8	1.8	15.7	4.9	10.3	30176	30522
9	22.1	7.5	7.5	37.1	6.9	14.6	54348	51031
10	19.7	5.7	5.7	31.1	6.6	14.0	49826	45518
11	17.3	3.7	3.7	24.7	6.4	13.6	40795	38794
12	14.9	1.8	1.8	18.5	6.2	13.1	28549	31748
13	26.2	7.6	7.6	41.4	8.8	18.6	49273	49804
14	23.6	5.6	5.6	34.8	8.5	18.0	44762	44454
15	21.4	3.8	3.8	29.0	8.3	17.6	37828	39228
16	19.0	1.8	1.8	22.6	8.1	17.2	28325	32939

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM, High
aged 4 days

Replicate Test: REP 3

K_1 =	2,835.3
K_2 =	0.742
K_3 =	-1.263

n = 16

SES = 0.037

Sy = 0.101

Se = 0.053

Se/Sy = 0.529

R^2 = 0.721

Appendix G

Resilient Modulus Results

Lime-Treated Soils at Optimum Moisture Content Plus 3 Percent

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Low, Optimum+3%, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	1
USCS:	CL
AASHTO:	A-7-6
Group Index:	23

Description:	Material 1, Optimum +3%, w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	90
No.270 Sieve	Not Detemined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	43
Plastic Limit:	18
Plasticity Index:	25
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	102.6
Optimum Moisture (%):	19.0

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Low, Optimum+3%, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	91.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	93.4
Target Moisture Content (%):	22.0

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	770.0

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	113.9
Wet Weight of Sample (g):	2960.8
Adjusted Wet Weight (g):	3052.8
Layer Weight (g):	381.6

Molded Specimen Data							
Specimen No.:		4 REP 1					
Number of Blows per Layer:		6					
Specimen Wet Weight (g):		3016.7					
Specimen Height (in):		8.040					
Specimen Diamater (in):		3.96					
Moisture Content Data	Tare Weight (g):	360.50					
	Wet Weight + Tare (g):	625.90					
	Dry Weight + Tare (g):	577.6					
Moisture Content (%):		22.2					
Wet Density (pcf):		116.1					
Dry Density (pcf):		94.9					
Percent Differences	Target & Specimen Dry Density	1.7					
	Target & Specimen Moisture	0.2					

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 Inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	33357	34277
2	13.9	5.8	5.8	25.5	3.8	8.1	29919	29770
3	11.5	3.8	3.8	19.1	3.6	7.7	25185	24714
4	9.2	1.9	1.9	13.0	3.4	7.3	19807	19194
5	19.4	7.8	7.8	35.0	5.5	11.6	32105	32680
6	16.8	5.8	5.8	28.4	5.2	11.0	28735	28852
7	14.4	3.8	3.8	22.0	5.0	10.6	24606	24494
8	12.1	1.9	1.9	15.9	4.8	10.2	19655	19815
9	22.3	7.8	7.8	37.9	6.8	14.5	31310	31320
10	19.8	5.8	5.8	31.4	6.6	14.0	28028	27926
11	17.4	3.8	3.8	25.0	6.4	13.6	24126	24142
12	15.2	1.9	1.9	19.0	6.3	13.3	19499	20140
13	26.2	7.8	7.8	41.8	8.7	18.4	30415	29671
14	23.8	5.8	5.8	35.4	8.5	18.0	27413	26747
15	21.4	3.8	3.8	29.0	8.3	17.6	23794	23561
16	19.0	1.8	1.8	22.6	8.1	17.2	19411	20047

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6 Lime OM+3%, Low tested at 4 days

Replicate Test: REP 1

K_1 =	1,947.7
K_2 =	0.697
K_3 =	-1.494

n = 16

SES = 0.001

Sy = 0.082

Se = 0.009

Se/Sy = 0.113

R^2 = 0.987

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Standard, Optimum+3%, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	1
USCS:	CL
AASHTO:	A-7-6
Group Index:	23

Description:	Material 1, Optimum +3%, w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	90
No.270 Sieve	Not Delemined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	43
Plastic Limit:	18
Plasticity Index:	25
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	102.6
Optimum Moisture (%):	19.0

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - Standard, Optimum+3%, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	98.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	100.5
Target Moisture Content (%):	22.0

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	770.0

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	122.7
Wet Weight of Sample (g):	3188.5
Adjusted Wet Weight (g):	3287.7
Layer Weight (g):	411.0

Molded Specimen Data							
Specimen No.:		4 REP 1					
Number of Blows per Layer:		11					
Specimen Wet Weight (g):		3168.9					
Specimen Height (in):		8.040					
Specimen Diamater (in):		3.96					
Moisture Content Data	Tare Weight (g):	28.50					
	Wet Weight + Tare (g):	188.90					
	Dry Weight + Tare (g):	159.6					
Moisture Content (%):		22.3					
Wet Density (pcf):		121.9					
Dry Density (pcf):		99.6					
Percent Differences	Target & Specimen Dry Density	0.9					
	Target & Specimen Moisture	0.3					

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	39827	40465
2	13.9	5.8	5.8	25.5	3.8	8.1	35165	34710
3	11.5	3.8	3.8	19.1	3.6	7.7	28314	28330
4	9.1	1.8	1.8	12.7	3.4	7.3	21485	21109
5	19.3	7.8	7.8	34.9	5.4	11.5	37347	38011
6	16.8	5.8	5.8	28.4	5.2	11.0	33500	33153
7	14.4	3.8	3.8	22.0	5.0	10.6	27884	27731
8	12.2	1.9	1.9	16.0	4.9	10.3	21733	22007
9	22.2	7.8	7.8	37.8	6.8	14.4	35400	35891
10	19.7	5.8	5.8	31.3	6.6	13.9	31994	31681
11	17.4	3.8	3.8	25.0	6.4	13.6	27174	26990
12	15.0	1.8	1.8	18.6	6.2	13.2	21510	21866
13	26.3	7.8	7.8	41.9	8.7	18.5	33426	33250
14	23.8	5.8	5.8	35.4	8.5	18.0	30349	29757
15	21.4	3.8	3.8	29.0	8.3	17.6	26228	25917
16	19.0	1.8	1.8	22.6	8.1	17.2	21226	21728

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
Lime OM+3%, Standard
tested at 4 days

Replicate Test: REP 1

K_1 =	2,347.7
K_2 =	0.767
K_3 =	-1.804

n = 16

SES = 0.001

Sy = 0.092

Se = 0.007

Se/Sy = 0.072

R^2 = 0.995

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - High, Optimum+3%, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	1
USCS:	CL
AASHTO:	A-7-6
Group Index:	23

Description:	Material 1, Optimum +3%, w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	90
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	43
Plastic Limit:	18
Plasticity Index:	25
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	102.6
Optimum Moisture (%):	19.0

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 1 - High, Optimum+3%, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	99.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	101.6
Target Moisture Content (%):	22.0

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	770.0

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	123.9
Wet Weight of Sample (g):	3221.1
Adjusted Wet Weight (g):	3321.2
Layer Weight (g):	415.2

Molded Specimen Data							
Specimen No.:		5 REP 1					
Number of Blows per Layer:		20					
Specimen Wet Weight (g):		3227.0					
Specimen Height (in):		8.040					
Specimen Diamater (in):		3.96					
Moisture Content Data	Tare Weight (g):	360.50					
	Wet Weight + Tare (g):	781.70					
	Dry Weight + Tare (g):	704.9					
Moisture Content (%):		22.3					
Wet Density (pcf):		124.1					
Dry Density (pcf):		101.5					
Percent Differences	Target & Specimen Dry Density	0.1					
	Target & Specimen Moisture	0.3					

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 . \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.7	7.7	31.6	4.0	8.5	30194	30620
2	13.8	5.8	5.8	25.4	3.8	8.0	26788	26213
3	11.5	3.8	3.8	19.1	3.6	7.7	21683	20989
4	9.0	1.8	1.8	12.6	3.4	7.2	16112	15233
5	19.3	7.8	7.8	34.9	5.4	11.5	27240	28365
6	16.8	5.8	5.8	28.4	5.2	11.0	24153	24486
7	14.4	3.8	3.8	22.0	5.0	10.6	20009	20183
8	12.1	1.9	1.9	15.9	4.8	10.2	15103	15698
9	22.2	7.8	7.8	37.8	6.8	14.4	25782	26258
10	19.8	5.8	5.8	31.4	6.6	14.0	22899	22913
11	17.4	3.8	3.8	25.0	6.4	13.6	19149	19298
12	15.0	1.8	1.8	18.6	6.2	13.2	14650	15358
13	26.2	7.8	7.8	41.8	8.7	18.4	24609	23757
14	23.8	5.8	5.8	35.4	8.5	18.0	21981	21036
15	21.4	3.8	3.8	29.0	8.3	17.6	18672	18118
16	19.1	1.9	1.9	22.9	8.1	17.2	14681	15133

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 1 CL A-7-6
Lime OM+3%, High
tested at 4 days

Replicate Test: REP 1

K_1 =	1,859.8
K_2 =	0.839
K_3 =	-2.193

n = 16

SES = 0.003
Sy = 0.101

Se = 0.015
Se/Sy = 0.150
R^2 = 0.978

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Low, Optimum+3%, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	2
USCS:	CL
AASHTO:	A-6
Group Index:	17

Description:	Material 2, Optimum +3%, w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	93
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	37
Plastic Limit:	19
Plasticity Index:	18
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	103.3
Optimum Moisture (%):	19.5

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Low, Optimum+3%, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	90.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	93.0
Target Moisture Content (%):	22.5

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Dry Weight of Sample (From F56):	3500.0
Wet Weight Needed (to acquire targer M.C.):	4287.5
Additional Water Needed (ml):	787.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	113.9
Wet Weight of Sample (g):	2960.3
Adjusted Wet Weight (g):	3052.3
Layer Weight (g):	381.5

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		10	10	10			
Specimen Wet Weight (g):		2965.4	2958.4	2943.1			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	40.90	39.70			
	Wet Weight + Tare (g):	723.10	216.00	263.20			
	Dry Weight + Tare (g):	655.4	183.6	222.20			
Moisture Content (%):		23.0	22.7	22.5			
Wet Density (pcf):		114.1	113.8	113.2			
Dry Density (pcf):		92.8	92.8	92.5			
Percent Differences	Target & Specimen Dry Density	0.2	0.2	0.6			
	Target & Specimen Moisture	0.5	0.2	0.0			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	46582	48221
2	13.8	5.8	5.8	25.4	3.8	8.0	43007	42151
3	11.6	3.9	3.9	19.4	3.6	7.7	36922	35601
4	9.1	1.9	1.9	12.9	3.4	7.2	27456	27616
5	19.3	7.8	7.8	34.9	5.4	11.5	45341	46448
6	16.9	5.9	5.9	28.7	5.2	11.0	41538	41431
7	14.5	3.9	3.9	22.3	5.0	10.6	36180	35482
8	12.1	1.9	1.9	15.9	4.8	10.2	28112	28703
9	22.2	7.8	7.8	37.8	6.8	14.4	44081	44868
10	19.9	5.8	5.8	31.5	6.6	14.1	40809	40098
11	17.5	3.9	3.9	25.3	6.4	13.6	35787	35179
12	15.1	1.9	1.9	18.9	6.2	13.2	28670	29328
13	26.2	7.8	7.8	41.8	8.7	18.4	42955	42879
14	23.9	5.9	5.9	35.7	8.5	18.0	39602	39030
15	21.6	3.9	3.9	29.4	8.3	17.7	35196	34585
16	19.2	1.9	1.9	23.0	8.2	17.3	29071	29701

BCD Project:	070904
Project Name:	MDOT SS 205
Sample I.D.:	Material 2 CL A-6
	Lime OM+3%, Low
	aged 4 days
Replicate Test:	REP 1

K_1 =	2,703.3
K_2 =	0.665
K_3 =	-1.334

n =	16
SES =	0.001
Sy =	0.078
Se =	0.010
Se/Sy =	0.126
R^2 =	0.984

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	43293	44414
2	13.9	5.8	5.8	25.5	3.8	8.1	38498	38262
3	11.5	3.8	3.8	19.1	3.6	7.7	31947	31492
4	9.2	1.9	1.9	13.0	3.4	7.3	25268	24184
5	19.3	7.8	7.8	34.9	5.4	11.5	41773	42534
6	16.8	5.8	5.8	28.4	5.2	11.0	37177	37264
7	14.5	3.8	3.8	22.1	5.0	10.7	31380	31389
8	12.2	1.9	1.9	16.0	4.9	10.3	24939	25182
9	22.3	7.8	7.8	37.9	6.8	14.5	40703	40869
10	19.8	5.8	5.8	31.4	6.6	14.0	36290	36233
11	17.4	3.8	3.8	25.0	6.4	13.6	30953	31112
12	15.1	1.9	1.9	18.9	6.2	13.2	24773	25733
13	26.3	7.8	7.8	41.9	8.7	18.5	40073	38858
14	23.8	5.8	5.8	35.4	8.5	18.0	35948	34897
15	21.4	3.8	3.8	29.0	8.3	17.6	30947	30559
16	19.1	1.9	1.9	22.9	8.1	17.2	25140	26058

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM+3%, Low
aged 4 days

Replicate Test: REP 2

K_1 =	2,449.8
K_2 =	0.726
K_3 =	-1.469

n = 16

SES = 0.002
Sy = 0.086

Se = 0.011
Se/Sy = 0.126
R^2 = 0.984

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 . \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	42671	44029
2	13.8	5.8	5.8	25.4	3.8	8.0	39171	38799
3	11.5	3.8	3.8	19.1	3.6	7.7	33917	32836
4	9.0	1.8	1.8	12.6	3.4	7.2	26298	25786
5	19.2	7.7	7.7	34.6	5.4	11.5	41760	42832
6	16.8	5.8	5.8	28.4	5.2	11.0	38309	38419
7	14.4	3.8	3.8	22.0	5.0	10.6	33642	33177
8	12.0	1.8	1.8	15.6	4.8	10.2	26626	27139
9	22.2	7.7	7.7	37.6	6.8	14.5	41505	41936
10	19.8	5.8	5.8	31.4	6.6	14.0	38377	37985
11	17.4	3.8	3.8	25.0	6.4	13.6	33761	33337
12	15.0	1.8	1.8	18.6	6.2	13.2	27096	28067
13	26.2	7.7	7.7	41.6	8.7	18.5	41423	40814
14	23.8	5.8	5.8	35.4	8.5	18.0	38308	37362
15	21.4	3.8	3.8	29.0	8.3	17.6	34002	33344
16	19.0	1.8	1.8	22.6	8.1	17.2	27910	28862

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM+3%, Low
aged 4 days

Replicate Test: REP 3

K_1 =	2,404.7
K_2 =	0.614
K_3 =	-1.063

n = 16

SES = 0.001

Sy = 0.075

Se = 0.011

Se/Sy = 0.141

R^2 = 0.980

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Standard, Optimum+3%, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	2
USCS:	CL
AASHTO:	A-6
Group Index:	17

Description:	Material 2, Optimum +3%, w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	93
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	37
Plastic Limit:	19
Plasticity Index:	18
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	103.3
Optimum Moisture (%):	19.5

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - Standard, Optimum+3%, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	96.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	99.2
Target Moisture Content (%):	22.5

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Dry Weight of Sample (From F56):	3500.0
Wet Weight Needed (to acquire targer M.C.):	4287.5
Additional Water Needed (ml):	787.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	121.5
Wet Weight of Sample (g):	3157.6
Adjusted Wet Weight (g):	3255.8
Layer Weight (g):	407.0

Molded Specimen Data							
Specimen No.:		1 REP 1	3 REP 2	4 REP 3			
Number of Blows per Layer:		20	20	20			
Specimen Wet Weight (g):		3149.9	3161.1	3178.4			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	40.90	360.50			
	Wet Weight + Tare (g):	832.20	271.90	743.60			
	Dry Weight + Tare (g):	745.9	229.70	672.50			
Moisture Content (%):		22.4	22.4	22.8			
Wet Density (pcf):		121.2	121.6	122.3			
Dry Density (pcf):		99.0	99.4	99.6			
Percent Differences	Target & Specimen Dry Density	0.2	0.2	0.4			
	Target & Specimen Moisture	0.1	0.1	0.3			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.6	7.6	31.4	4.1	8.6	57645	59980
2	13.6	5.6	5.6	24.8	3.8	8.0	53153	51825
3	11.4	3.7	3.7	18.8	3.6	7.7	45745	43110
4	9.0	1.8	1.8	12.6	3.4	7.2	33884	33118
5	19.0	7.5	7.5	34.0	5.4	11.5	55513	58132
6	16.6	5.6	5.6	27.8	5.2	11.0	50886	51242
7	14.3	3.7	3.7	21.7	5.0	10.6	44014	43606
8	12.0	1.8	1.8	15.6	4.8	10.2	33804	35037
9	22.1	7.6	7.6	37.3	6.8	14.5	55652	57030
10	19.6	5.6	5.6	30.8	6.6	14.0	51217	50569
11	17.4	3.7	3.7	24.8	6.5	13.7	44678	43822
12	14.9	1.8	1.8	18.5	6.2	13.1	34645	36304
13	26.1	7.6	7.6	41.3	8.7	18.5	56354	55208
14	23.6	5.6	5.6	34.8	8.5	18.0	51710	49597
15	21.3	3.7	3.7	28.7	8.3	17.6	45448	43786
16	18.9	1.8	1.8	22.5	8.1	17.1	35636	37410

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM+3%, Standard
aged 4 days

Replicate Test: REP 1

K_1 =	3,243.1
K_2 =	0.699
K_3 =	-1.235

n = 16

SES = 0.004
Sy = 0.084

Se = 0.017
Se/Sy = 0.199
R^2 = 0.961

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.1	7.7	7.7	31.5	4.0	8.4	59072	60845
2	13.7	5.7	5.7	25.1	3.8	8.0	53254	52109
3	11.4	3.8	3.8	19.0	3.6	7.6	44146	42962
4	9.0	1.8	1.8	12.6	3.4	7.2	32470	32106
5	19.1	7.6	7.6	34.3	5.4	11.5	56668	58445
6	16.7	5.7	5.7	28.1	5.2	11.0	51348	51212
7	14.4	3.8	3.8	22.0	5.0	10.6	43556	43251
8	12.0	1.8	1.8	15.6	4.8	10.2	33547	33937
9	22.2	7.7	7.7	37.6	6.8	14.5	56175	57003
10	19.7	5.7	5.7	31.1	6.6	14.0	50909	50251
11	17.4	3.8	3.8	25.0	6.4	13.6	43583	43244
12	15.0	1.8	1.8	18.6	6.2	13.2	34062	35135
13	26.1	7.7	7.7	41.5	8.7	18.4	55340	54815
14	23.8	5.7	5.7	35.2	8.5	18.1	50367	48903
15	21.5	3.8	3.8	29.1	8.3	17.7	43723	42926
16	19.0	1.8	1.8	22.6	8.1	17.2	34991	36073

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM+3%, Standard
aged 4 days

Replicate Test: REP 2

K_1 =	3,258.4
K_2 =	0.744
K_3 =	-1.374

n = 16

SES = 0.001

Sy = 0.089

Se = 0.010

Se/Sy = 0.113

R^2 = 0.987

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.8	7.8	31.9	4.0	8.5	61936	63244
2	13.8	5.8	5.8	25.4	3.8	8.0	55409	55290
3	11.5	3.8	3.8	19.1	3.6	7.7	46949	46234
4	9.1	1.8	1.8	12.7	3.4	7.3	36773	35758
5	19.3	7.8	7.8	34.9	5.4	11.5	59832	61013
6	16.9	5.8	5.8	28.5	5.2	11.1	54288	54009
7	14.5	3.8	3.8	22.1	5.0	10.7	46359	46203
8	12.0	1.8	1.8	15.6	4.8	10.2	36774	37260
9	22.2	7.8	7.8	37.8	6.8	14.4	58660	59020
10	19.8	5.8	5.8	31.4	6.6	14.0	53346	52798
11	17.4	3.8	3.8	25.0	6.4	13.6	46013	45927
12	15.0	1.8	1.8	18.6	6.2	13.2	37151	38199
13	26.2	7.8	7.8	41.8	8.7	18.4	57459	56506
14	23.8	5.8	5.8	35.4	8.5	18.0	52232	51152
15	21.4	3.8	3.8	29.0	8.3	17.6	45785	45301
16	19.0	1.8	1.8	22.6	8.1	17.2	37784	38817

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM+3%, Standard
aged 4 days

Replicate Test: REP 3

K_1 =	3,530.5
K_2 =	0.663
K_3 =	-1.310

n = 16

SES = 0.001

Sy = 0.080

Se = 0.008

Se/Sy = 0.101

R^2 = 0.990

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - High, Optimum+3%, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	2
USCS:	CL
AASHTO:	A-6
Group Index:	17

Description:	Material 2, Optimum +3%, w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No.100 Sieve	100
No.200 Sieve	93
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	37
Plastic Limit:	19
Plasticity Index:	18
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	103.3
Optimum Moisture (%):	19.5

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 2 - High, Optimum+3%, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	98.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	101.2
Target Moisture Content (%):	22.5

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Dry Weight of Sample (From F56):	3500.0
Wet Weight Needed (to acquire targer M.C.):	4287.5
Additional Water Needed (ml):	787.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	124.0
Wet Weight of Sample (g):	3223.4
Adjusted Wet Weight (g):	3323.7
Layer Weight (g):	415.5

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		20	20	20			
Specimen Wet Weight (g):		3231.3	3232.3	3229.8			
Specimen Height (in):		8.04	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	40.70	41.30			
	Wet Weight + Tare (g):	678.90	278.00	282.80			
	Dry Weight + Tare (g):	620.4	234.3	238.50			
Moisture Content (%):		22.5	22.6	22.5			
Wet Density (pcf):		124.3	124.4	124.3			
Dry Density (pcf):		101.5	101.5	101.5			
Percent Differences	Target & Specimen Dry Density	0.2	0.2	0.2			
	Target & Specimen Moisture	0.0	0.1	0.0			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.7	7.7	31.6	4.0	8.5	40696	41252
2	13.8	5.7	5.7	25.2	3.8	8.1	34822	34669
3	11.4	3.8	3.8	19.0	3.6	7.6	28359	27915
4	9.1	1.8	1.8	12.7	3.4	7.3	21004	20175
5	19.1	7.6	7.6	34.3	5.4	11.5	39154	39624
6	16.7	5.7	5.7	28.1	5.2	11.0	33692	34142
7	14.4	3.8	3.8	22.0	5.0	10.6	27883	28231
8	12.0	1.8	1.8	15.6	4.8	10.2	21450	21493
9	22.1	7.6	7.6	37.3	6.8	14.5	38333	38401
10	19.7	5.7	5.7	31.1	6.6	14.0	33388	33540
11	17.4	3.8	3.8	25.0	6.4	13.6	27797	28324
12	15.0	1.8	1.8	18.6	6.2	13.2	21886	22425
13	26.1	7.6	7.6	41.3	8.7	18.5	38417	36889
14	23.7	5.7	5.7	35.1	8.5	18.0	33531	32694
15	21.5	3.8	3.8	29.1	8.3	17.7	28291	28213
16	19.0	1.8	1.8	22.6	8.1	17.2	22593	23198

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM+3%, High
aged 4 days

Replicate Test: REP 1

K_1 =	2,122.3
K_2 =	0.835
K_3 =	-1.492

n = 16

SES = 0.001

Sy = 0.099

Se = 0.010

Se/Sy = 0.098

R^2 = 0.990

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	34744	35212
2	13.8	5.8	5.8	25.4	3.8	8.0	30515	30514
3	11.4	3.8	3.8	19.0	3.6	7.6	25316	25278
4	9.1	1.9	1.9	12.9	3.4	7.2	19971	19593
5	19.3	7.8	7.8	34.9	5.4	11.5	34181	34497
6	16.8	5.8	5.8	28.4	5.2	11.0	30464	30335
7	14.5	3.8	3.8	22.1	5.0	10.7	25788	25732
8	12.1	1.9	1.9	15.9	4.8	10.2	20676	20795
9	22.2	7.8	7.8	37.8	6.8	14.4	33747	33857
10	19.8	5.8	5.8	31.4	6.6	14.0	30335	30096
11	17.4	3.8	3.8	25.0	6.4	13.6	26119	25986
12	15.1	1.9	1.9	18.9	6.2	13.2	21368	21654
13	26.3	7.8	7.8	41.9	8.7	18.5	33314	32998
14	23.8	5.8	5.8	35.4	8.5	18.0	30115	29720
15	21.4	3.8	3.8	29.0	8.3	17.6	26282	26148
16	19.1	1.9	1.9	22.9	8.1	17.2	21923	22433

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 2 CL A-6
Lime OM+3%, High
aged 4 days

Replicate Test: REP 2

K_1 =	1,840.4
K_2 =	0.688
K_3 =	-1.121

n = 16

SES = 0.000
Sy = 0.082

Se = 0.005
Se/Sy = 0.062
R^2 = 0.996

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.3	7.7	7.7	31.7	4.1	8.6	32766	33424
2	13.9	5.8	5.8	25.5	3.8	8.1	28398	27893
3	11.4	3.8	3.8	19.0	3.6	7.6	22379	21710
4	9.1	1.8	1.8	12.7	3.4	7.3	15479	15194
5	19.3	7.7	7.7	34.7	5.5	11.6	31685	32772
6	16.8	5.8	5.8	28.4	5.2	11.0	27582	27841
7	14.4	3.8	3.8	22.0	5.0	10.6	22500	22349
8	12.0	1.8	1.8	15.6	4.8	10.2	16306	16551
9	22.2	7.7	7.7	37.6	6.8	14.5	31566	32156
10	19.7	5.7	5.7	31.1	6.6	14.0	27655	27462
11	17.4	3.8	3.8	25.0	6.4	13.6	22921	22782
12	15.0	1.8	1.8	18.6	6.2	13.2	17081	17613
13	26.1	7.6	7.6	41.3	8.7	18.5	31859	31132
14	23.7	5.7	5.7	35.1	8.5	18.0	28116	27220
15	21.4	3.8	3.8	29.0	8.3	17.6	23524	23130
16	19.0	1.8	1.8	22.6	8.1	17.2	18049	18636

BCD Project:	070904
Project Name:	MDOT SS 205
Sample I.D.:	Material 2 CL A-6
	Lime OM+3%, High
	aged 4 days
Replicate Test:	REP 3

K_1 =	1,587.9
K_2 =	0.913
K_3 =	-1.407

n =	16
SES =	0.001
Sy =	0.111
Se =	0.011
Se/Sy =	0.096
R^2 =	0.991

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - Low, Optimum+3%, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	4
USCS:	CL
AASHTO:	A-4
Group Index:	5

Description:	Material 4 w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No. 60 Sieve	98
No.200 Sieve	83
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	22
Plastic Limit:	14
Plasticity Index:	8
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	116.6
Optimum Moisture (%):	12.9

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - Low, Optimum+3%, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	90.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	104.9
Target Moisture Content (%):	15.9

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	556.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	121.6
Wet Weight of Sample (g):	3161.1
Adjusted Wet Weight (g):	3260.4
Layer Weight (g):	407.6

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		5	5	5			
Specimen Wet Weight (g):		3157.9	3162.6	3159.3			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	40.90	41.10			
	Wet Weight + Tare (g):	835.10	282.10	219.70			
	Dry Weight + Tare (g):	769.0	248.8	195.20			
Moisture Content (%):		16.2	16.0	15.9			
Wet Density (pcf):		121.5	121.7	121.5			
Dry Density (pcf):		104.6	104.9	104.9			
Percent Differences	Target & Specimen Dry Density	0.4	0.1	0.1			
	Target & Specimen Moisture	0.3	0.1	0.0			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	15.9	7.6	7.6	31.1	3.9	8.3	41974	43795
2	13.6	5.6	5.6	24.8	3.8	8.0	37738	37160
3	11.3	3.7	3.7	18.7	3.6	7.6	30939	30321
4	9.0	1.8	1.8	12.6	3.4	7.2	23106	22632
5	19.0	7.5	7.5	34.0	5.4	11.5	39312	40142
6	16.6	5.6	5.6	27.8	5.2	11.0	35195	35038
7	14.3	3.7	3.7	21.7	5.0	10.6	29794	29342
8	12.1	1.8	1.8	15.7	4.9	10.3	22943	23026
9	22.0	7.5	7.5	37.0	6.8	14.5	37325	37410
10	19.6	5.6	5.6	30.8	6.6	14.0	33303	33069
11	17.3	3.7	3.7	24.7	6.4	13.6	28262	28258
12	15.0	1.8	1.8	18.6	6.2	13.2	22237	22973
13	26.0	7.5	7.5	41.0	8.7	18.5	35214	34239
14	23.5	5.6	5.6	34.7	8.4	17.9	31401	30739
15	21.3	3.7	3.7	28.7	8.3	17.6	26958	26768
16	19.0	1.8	1.8	22.6	8.1	17.2	21677	22514

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4 Lime OM+3%, Low aged 4 days

Replicate Test: REP 1

K_1 =	2,650.7
K_2 =	0.794
K_3 =	-2.026

n = 16

SES = 0.001

Sy = 0.094

Se = 0.010

Se/Sy = 0.111

R^2 = 0.988

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.0	7.6	7.6	31.2	4.0	8.4	44064	45629
2	13.6	5.6	5.6	24.8	3.8	8.0	40103	39501
3	11.3	3.7	3.7	18.7	3.6	7.6	33832	32968
4	9.0	1.8	1.8	12.6	3.4	7.2	26125	25446
5	19.0	7.5	7.5	34.0	5.4	11.5	41865	43127
6	16.6	5.6	5.6	27.8	5.2	11.0	38556	38172
7	14.3	3.7	3.7	21.7	5.0	10.6	32843	32599
8	12.0	1.8	1.8	15.6	4.8	10.2	25811	26292
9	22.1	7.6	7.6	37.3	6.8	14.5	40932	41428
10	19.6	5.6	5.6	30.8	6.6	14.0	37329	36876
11	17.3	3.7	3.7	24.7	6.4	13.6	32235	32059
12	15.0	1.8	1.8	18.6	6.2	13.2	25670	26679
13	25.9	7.5	7.5	40.9	8.7	18.4	39595	38932
14	23.7	5.7	5.7	35.1	8.5	18.0	36478	35439
15	21.4	3.7	3.7	28.8	8.3	17.7	31845	31171
16	19.0	1.8	1.8	22.6	8.1	17.2	25802	26749

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM+3%, Low
aged 4 days

Replicate Test: REP 2

K_1 =	2,654.6
K_2 =	0.696
K_3 =	-1.542

n = 16

SES = 0.002

Sy = 0.082

Se = 0.011

Se/Sy = 0.139

R^2 = 0.981

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.0	7.6	7.6	31.2	4.0	8.4	45489	46807
2	13.7	5.7	5.7	25.1	3.8	8.0	40474	39755
3	11.3	3.7	3.7	18.7	3.6	7.6	32365	31689
4	9.1	1.8	1.8	12.7	3.4	7.3	23204	23298
5	19.0	7.6	7.6	34.2	5.4	11.4	43423	44708
6	16.7	5.7	5.7	28.1	5.2	11.0	39052	38595
7	14.4	3.7	3.7	21.8	5.0	10.7	32460	31649
8	12.1	1.8	1.8	15.7	4.9	10.3	24196	24502
9	21.9	7.5	7.5	36.9	6.8	14.4	41786	42498
10	19.7	5.7	5.7	31.1	6.6	14.0	37764	37431
11	17.3	3.7	3.7	24.7	6.4	13.6	32038	31388
12	15.0	1.8	1.8	18.6	6.2	13.2	24589	25189
13	26.0	7.6	7.6	41.2	8.7	18.4	40528	40463
14	23.7	5.7	5.7	35.1	8.5	18.0	36698	35915
15	21.4	3.8	3.8	29.0	8.3	17.6	31501	31081
16	19.0	1.8	1.8	22.6	8.1	17.2	24954	25630

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4 Lime OM+3%, Low aged 4 days

Replicate Test: REP 3

K_1 =	2,541.6
K_2 =	0.829
K_3 =	-1.669

n = 16

SES = 0.001

Sy = 0.098

Se = 0.009

Se/Sy = 0.096

R^2 = 0.991

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - Standard, Optimum+3%, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	4
USCS:	CL
AASHTO:	A-4
Group Index:	5

Description:	Material 4 w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No. 60 Sieve	98
No.200 Sieve	83
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	22
Plastic Limit:	14
Plasticity Index:	8
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	116.6
Optimum Moisture (%):	12.9

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - Standard, Optimum+3%, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	95.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	110.8
Target Moisture Content (%):	15.9

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	556.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	128.4
Wet Weight of Sample (g):	3336.8
Adjusted Wet Weight (g):	3441.6
Layer Weight (g):	430.2

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		11	11	11			
Specimen Wet Weight (g):		3374.9	3372.0	3349.9			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	41.20	41.20			
	Wet Weight + Tare (g):	693.50	237.70	264.20			
	Dry Weight + Tare (g):	647.0	210.0	232.80			
Moisture Content (%):		16.2	16.4	16.4			
Wet Density (pcf):		129.8	129.7	128.9			
Dry Density (pcf):		111.7	111.4	110.7			
Percent Differences	Target & Specimen Dry Density	0.8	0.6	0.0			
	Target & Specimen Moisture	0.3	0.5	0.5			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.7	7.7	31.6	4.0	8.5	37212	38164
2	13.8	5.8	5.8	25.4	3.8	8.0	32989	32372
3	11.4	3.8	3.8	19.0	3.6	7.6	26274	25669
4	9.1	1.8	1.8	12.7	3.4	7.3	18735	18363
5	19.1	7.7	7.7	34.5	5.4	11.4	34571	35759
6	16.7	5.7	5.7	28.1	5.2	11.0	30861	30484
7	14.4	3.8	3.8	22.0	5.0	10.6	25285	25113
8	12.1	1.8	1.8	15.7	4.9	10.3	18699	18997
9	22.1	7.7	7.7	37.5	6.8	14.4	32895	33541
10	19.8	5.8	5.8	31.4	6.6	14.0	29353	29253
11	17.5	3.8	3.8	25.1	6.5	13.7	24569	24398
12	15.0	1.8	1.8	18.6	6.2	13.2	18525	19225
13	26.0	7.7	7.7	41.4	8.6	18.3	31487	31006
14	23.7	5.7	5.7	35.1	8.5	18.0	28110	27187
15	21.4	3.8	3.8	29.0	8.3	17.6	23849	23407
16	19.0	1.8	1.8	22.6	8.1	17.2	18631	19156

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM+3%, Standard
aged 4 days

Replicate Test: REP 1

K_1 =	2,163.5
K_2 =	0.870
K_3 =	-2.006

n = 16

SES = 0.001

Sy = 0.104

Se = 0.011

Se/Sy = 0.102

R^2 = 0.990

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.1	7.6	7.6	31.3	4.0	8.5	31997	33000
2	13.8	5.7	5.7	25.2	3.8	8.1	27802	26957
3	11.4	3.8	3.8	19.0	3.6	7.6	21050	20693
4	9.1	1.8	1.8	12.7	3.4	7.3	14361	13846
5	19.1	7.7	7.7	34.5	5.4	11.4	29565	30966
6	16.7	5.7	5.7	28.1	5.2	11.0	25826	25561
7	14.4	3.8	3.8	22.0	5.0	10.6	20237	20251
8	12.0	1.8	1.8	15.6	4.8	10.2	14282	14474
9	22.0	7.6	7.6	37.2	6.8	14.4	28040	28561
10	19.7	5.7	5.7	31.1	6.6	14.0	24496	24190
11	17.5	3.8	3.8	25.1	6.5	13.7	19563	19650
12	15.0	1.8	1.8	18.6	6.2	13.2	14139	14759
13	25.9	7.6	7.6	41.1	8.6	18.3	26856	26148
14	23.6	5.7	5.7	35.0	8.4	17.9	23555	22540
15	21.4	3.8	3.8	29.0	8.3	17.6	19169	18795
16	18.9	1.8	1.8	22.5	8.1	17.1	14188	14778

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM+3%, Standard
aged 4 days

Replicate Test: REP 2

K_1 =	1,795.2
K_2 =	1.043
K_3 =	-2.341

n = 16

SES = 0.002

Sy = 0.123

Se = 0.014

Se/Sy = 0.111

R^2 = 0.988

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.0	7.6	7.6	31.2	4.0	8.4	27812	29046
2	13.7	5.7	5.7	25.1	3.8	8.0	24771	24702
3	11.3	3.7	3.7	18.7	3.6	7.6	20456	19691
4	9.0	1.8	1.8	12.6	3.4	7.2	15187	14420
5	19.0	7.6	7.6	34.2	5.4	11.4	26019	26789
6	16.7	5.7	5.7	28.1	5.2	11.0	23136	23157
7	14.4	3.8	3.8	22.0	5.0	10.6	19199	19219
8	12.0	1.8	1.8	15.6	4.8	10.2	14553	14673
9	22.0	7.6	7.6	37.2	6.8	14.4	24804	24813
10	19.6	5.7	5.7	31.0	6.6	13.9	21802	21781
11	17.4	3.8	3.8	25.0	6.4	13.6	18293	18422
12	14.9	1.8	1.8	18.5	6.2	13.1	13902	14632
13	26.0	7.6	7.6	41.2	8.7	18.4	23673	22538
14	23.7	5.7	5.7	35.1	8.5	18.0	20834	20030
15	21.3	3.7	3.7	28.7	8.3	17.6	17479	17195
16	19.0	1.8	1.8	22.6	8.1	17.2	13506	14302

BCD Project:	070904
Project Name:	MDOT SS 205
Sample I.D.:	Material 4 CL A-4
	Lime OM+3%, Standard
	aged 4 days
Replicate Test:	REP 3

K_1 =	1,754.3
K_2 =	0.846
K_3 =	-2.170

n =	16
SES =	0.003
Sy =	0.102
Se =	0.016
Se/Sy =	0.155
R^2 =	0.976

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - High, Optimum+3%, w/Lime

GENERAL INFORMATION

BCD Lab No.:	
Sample No.:	4
USCS:	CL
AASHTO:	A-4
Group Index:	5

Description:	Material 4 w/Lime
Testing Performed By (MDOT, BCD, etc.):	BCD
Remarks:	070904/ Reps 1, 2 & 3

SIEVE ANALYSIS	
TOTAL % PASSING BY WEIGHT	
No. 3" Sieve	100
No. 2" Sieve	100
No. 1 1/2" Sieve	100
No. 1" Sieve	100
No. 3/4" Sieve	100
No. 1/2" Sieve	100
No. 4 Sieve	100
No. 10 Sieve	100
No. 40 Sieve	100
No. 60 Sieve	98
No.200 Sieve	83
No.270 Sieve	Not Determined
% Silt	
% Clay	

INDEX PROPERTIES	
MATERIAL PASSING NO. 40 SIEVE	
Liquid Limit:	22
Plastic Limit:	14
Plasticity Index:	8
Shrinkage Limit:	
Shrinkage Ratio:	
Volume Change:	

Gradation and Atterburg data from virgin material

DENSITY DATA	
STANDARD PROCTOR TEST/IN PLACE DENSITY DATA	
In Place Density (pcf):	
Max. Dry Density (pcf):	116.6
Optimum Moisture (%):	12.9

BURNS COOLEY DENNIS, INC.
GEOTECHNICAL CONSULTANTS

278 COMMERCE PARK DRIVE
RIDGELAND, MISSISSIPPI 39157

BUS: (601) 856-2332
FAX: (601) 856-3552

P.O. BOX 12828
JACKSON, MS 39236

LABORATORY TESTING REPORT

Sample No.: 4 - High, Optimum+3%, w/Lime

COMPACTION INFORMATION

General Data	
Source of Density Value ("SP" for Standard Proctor or "IP" for In Place Density):	SP
Desired Percent of Maximum Dry Density or In Place Density:	96.0
Material Type* (1,2, or 3):	3

Target Data	
Target Dry Density (pcf):	111.9
Target Moisture Content (%):	15.9

Initial Moisture Content Data	
Tare Weight (g):	100.00
Wet Weight + Tare (g):	200.00
Dry Weight + Tare (g):	200.00
Initial Moisture Content:	0.0

Mix Moisture Data	
Sample Weight (g)(at initial m.c.):	3500.0
Additional Water Needed (ml):	556.5

Mold Data	
Mold ID (4A,4B,4C, 4V, or 6):	4A
Height of Mold (in.):	8.04
Diameter of Mold (in.):	3.96
Volume of Mold (cu. ft.):	0.0573
Volume of Mold + .25 (cu. ft.):	0.0591

Sample Weight Data	
Wet Unit Weight (pcf):	129.7
Wet Weight of Sample (g):	3371.9
Adjusted Wet Weight (g):	3477.8
Layer Weight (g):	434.7

Molded Specimen Data							
Specimen No.:		1	2	3			
Number of Blows per Layer:		20	20	20			
Specimen Wet Weight (g):		3366.0	3374.6	3375.4			
Specimen Height (in):		8.040	8.04	8.04			
Specimen Diamater (in):		3.96	3.96	3.96			
Moisture Content Data	Tare Weight (g):	360.50	40.90	41.20			
	Wet Weight + Tare (g):	682.50	220.70	235.10			
	Dry Weight + Tare (g):	638.5	196.7	209.20			
Moisture Content (%):		15.8	15.4	15.4			
Wet Density (pcf):		129.5	129.8	129.9			
Dry Density (pcf):		111.8	112.5	112.5			
Percent Differences	Target & Specimen Dry Density	0.1	0.5	0.5			
	Target & Specimen Moisture	0.1	0.5	0.5			

Material Type 1: Unbound granular base and subbase materials and untreated subgrade materials with maximum grain size greater than 3/4 in.. Material retained on the 1 inch sieve to be scalped. Compacted by impact or vibrartory method in 4 or 6 in mold.

Material Type 2: Unbound granular base and subbase materials and untreated subgrade materials with a maximum grain size less than 3/4 in. and less than 10% passing the No. 200 sieve. Compacted by vibrartory method in 4-in mold.

Material Type 3: Untreated subgrade materials with a maximum grain size less than 3/4 in. and more than 10% passing the No. 200 sieve. Compacted by kneading or impact method in 4-in mold.

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.0	7.6	7.6	31.2	4.0	8.4	26335	27335
2	13.6	5.6	5.6	24.8	3.8	8.0	22957	22590
3	11.3	3.7	3.7	18.7	3.6	7.6	18238	17767
4	9.0	1.8	1.8	12.6	3.4	7.2	13216	12571
5	18.9	7.5	7.5	33.9	5.4	11.4	23774	24543
6	16.6	5.6	5.6	27.8	5.2	11.0	20754	20850
7	14.3	3.7	3.7	21.7	5.0	10.6	16854	16911
8	12.0	1.8	1.8	15.6	4.8	10.2	12582	12695
9	21.9	7.5	7.5	36.9	6.8	14.4	22175	22356
10	19.6	5.6	5.6	30.8	6.6	14.0	19378	19281
11	17.3	3.7	3.7	24.7	6.4	13.6	15925	16016
12	15.0	1.8	1.8	18.6	6.2	13.2	11944	12540
13	25.9	7.5	7.5	40.9	8.7	18.4	20801	19886
14	23.6	5.6	5.6	34.8	8.5	18.0	18133	17432
15	21.2	3.6	3.6	28.4	8.3	17.6	15010	14694
16	19.0	1.8	1.8	22.6	8.1	17.2	11454	12097

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM+3%, High
aged 4 days

Replicate Test: REP 1

K_1 =	1,678.3
K_2 =	0.943
K_3 =	-2.546

n = 16

SES = 0.003

Sy = 0.113

Se = 0.015

Se/Sy = 0.133

R^2 = 0.982

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.1	7.6	7.6	31.3	4.0	8.5	29938	31040
2	13.7	5.7	5.7	25.1	3.8	8.0	26569	26299
3	11.5	3.8	3.8	19.1	3.6	7.7	21639	21021
4	9.0	1.8	1.8	12.6	3.4	7.2	15820	14990
5	19.2	7.7	7.7	34.6	5.4	11.5	27364	28555
6	16.8	5.7	5.7	28.2	5.2	11.1	24301	24356
7	14.4	3.8	3.8	22.0	5.0	10.6	20087	20101
8	12.0	1.8	1.8	15.6	4.8	10.2	14931	15162
9	22.1	7.7	7.7	37.5	6.8	14.4	26029	26253
10	19.7	5.7	5.7	31.1	6.6	14.0	23060	22708
11	17.3	3.8	3.8	24.9	6.4	13.5	19109	19143
12	15.0	1.8	1.8	18.6	6.2	13.2	14302	15018
13	26.1	7.7	7.7	41.5	8.7	18.4	24596	23541
14	23.6	5.7	5.7	35.0	8.4	17.9	21665	20733
15	21.4	3.8	3.8	29.0	8.3	17.6	18108	17805
16	19.0	1.8	1.8	22.6	8.1	17.2	13749	14555

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM+3%, High
aged 4 days

Replicate Test: REP 2

K_1 =	1,910.4
K_2 =	0.887
K_3 =	-2.364

n = 16

SES = 0.003

Sy = 0.107

Se = 0.016

Se/Sy = 0.148

R^2 = 0.978

Sequence	σ_1 psi	σ_2 psi	σ_3 psi	θ psi	τ_{oct} psi	$\sigma_1 - \sigma_3$ psi	M_R psi	Pred. M_R psi
1	16.2	7.8	7.8	31.8	4.0	8.4	29942	31565
2	13.9	5.8	5.8	25.5	3.8	8.1	26638	25980
3	11.4	3.8	3.8	19.0	3.6	7.6	20719	20182
4	9.0	1.8	1.8	12.6	3.4	7.2	14517	13911
5	19.2	7.8	7.8	34.8	5.4	11.4	27281	28481
6	16.8	5.8	5.8	28.4	5.2	11.0	24145	23959
7	14.4	3.8	3.8	22.0	5.0	10.6	19293	19165
8	12.1	1.8	1.8	15.7	4.9	10.3	13912	14070
9	22.2	7.8	7.8	37.8	6.8	14.4	25552	25846
10	19.8	5.8	5.8	31.4	6.6	14.0	22476	22084
11	17.4	3.8	3.8	25.0	6.4	13.6	18175	18112
12	15.1	1.8	1.8	18.7	6.3	13.3	13243	13901
13	26.2	7.8	7.8	41.8	8.7	18.4	23822	22889
14	23.8	5.8	5.8	35.4	8.5	18.0	20826	19891
15	21.3	3.8	3.8	28.9	8.2	17.5	16962	16773
16	19.0	1.8	1.8	22.6	8.1	17.2	12650	13423

BCD Project: 070904

Project Name: MDOT SS 205

Sample I.D.: Material 4 CL A-4
Lime OM+3%, High
aged 4 days

Replicate Test: REP 3

K_1 =	1,889.1
K_2 =	0.972
K_3 =	-2.606

n = 16

SES = 0.003

Sy = 0.119

Se = 0.016

Se/Sy = 0.136

R^2 = 0.982