GEOTECHNICAL ENGINEERING REPORT

LIFECORE DRIVE SHARED USE FACILITY
LIFECORE DRIVE
AUGUSTA COUNTY, VIRGINIA

JOB NUMBER: 34049.001

PREPARED FOR:

AUGUSTA COUNTY
DEPARTMENT OF COMMUNITY DEVELOPMENT
P.O. BOX 590
VERONA, VIRGINIA 24482

April 15, 2016

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EXECUTIVE SUMMARY

For your convenience, this report is summarized in outline form below. This brief summary should not be used for design or construction purposes without reviewing the more detailed conclusions and recommendations contained in this report.

1. The field exploration included a visual site reconnaissance by a representative of Timmons Group and the performance of two hand auger borings (HA-01 and HA-02) and six pavement cores (C-01 through C-06).

2. The hand auger borings encountered approximately 1 inch of surficial topsoil. Existing fill soils were encountered in both of the hand auger borings up to 2.4 feet below the ground surface. The fill consisted of stiff highly plastic clay (CH), lean clay (CL), and medium dense clayey sand (SC). Beneath the topsoil and fill, undisturbed residual soils were encountered in hand auger boring HA-02 up to a depth of 2.7 feet below the ground surface. The soils consisted of medium dense silty gravel (GM). At the time of exploration, water was not encountered in the borings.

3. Six roadway cores were performed along the eastbound mainline of Lifecore Drive and the adjacent paved shoulder. The cores indicate the eastbound mainline and shoulder have similar pavement section thicknesses. Overall pavement section thicknesses ranged from 12 to 17.5 inches.

4. We recommend that site grading be conducted during the typically drier summer months.

5. We recommend that new fill slopes, which will be extended no more than 10 feet beyond existing slopes, be constructed using VDOT Type II fill materials. These materials will need to be imported to the site. Use of these materials should provide a slope stability safety factor of at least 1.5, which satisfies VDOT slope stability criteria.

6. We expect that some on-site soils can be re-used as fill below future pavements. We do not recommend that highly plastic soils be re-used at shallow depths below pavements. Where highly plastic soils exist in cut subgrade areas below pavements, these soils should be undercut and replaced with suitable, well-compacted materials.

7. A pavement section consisting of 7 inches of asphalt pavement underlain by 8 inches of VDOT 21B stone is recommended for new pavement sections along Lifecore Drive.

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April 15, 2016

Augusta County
Department of Community Development
Post Office Box 590
Verona, Virginia 24482

Attention: Mr. Jerry Van Lear

Re: **Geotechnical Engineering Report**
Lifecore Drive Shared Use Facility
Lifecore Drive (Route 636)
Augusta County, Virginia
Timmons Group Project No. 34049.001

Mr. Van Lear:

Timmons Group is pleased to submit this geotechnical engineering report for the referenced project. The objectives of our services were to explore subsurface conditions and provide our geotechnical recommendations for pavement support.

1. PROJECT INFORMATION

The project corridor is approximately 3, 400 feet along Lifecore Drive (Route 636) in Augusta County, Virginia. A Site Vicinity Map is shown on Figure 1.

We understand a shared-use path will be constructed south of Lifecore Drive from Village Creek Drive to approximately 1,000 feet east of Pinnacle Drive. In addition to construction of the share-use path, some new pavement sections will be constructed for right turns into Crossroads Lane, North Medical Park Drive, South Medical Park Drive, Beam Lane, and Pinnacle Drive. Some existing pavements will also be demolished to allow for construction of the path.

The path will typically follow the existing grade with little cut and fill required. However, between Crossroads Lane and North Medical Park Drive, the existing fill slope will need to be extended no more than 10 feet. The new slope will be steepened from 2.5(H):1(V) to 2(H):1(V). The maximum fill height will be approximately 16 feet. Cut slopes are not expected to be taller than 3 feet and will be inclined at 2(H):1(V).

Currently, Lifecore Drive is an asphalt-paved two-lane road. A portion of the project corridor has a center turn lane. In addition, the majority of the project corridor has a wide shoulder along the eastbound mainline. The shoulder acts as a turn lane at several locations.

2. FIELD EXPLORATION

The field exploration included a visual site reconnaissance by a representative of Timmons Group and the performance of two hand auger borings (HA-01 and HA-02) and six pavement cores (C-01 through C-06). Core and hand auger boring locations were selected by Timmons Group. A representative of Timmons Group established locations in the field using GPS equipment. Approximate boring locations are shown on Figure 2 in the Appendix.

Hand auger borings were performed to depths ranging from about 2.4 to 2.7 feet below the ground surface where very stiff soils prevented further auger advancement. Encountered materials were visually classified in the field. The DCP test procedure is as follows: The cone point of the penetrometer is first seated 2 inches into the bearing materials to embed the point. Then the cone point is driven an additional 1-3/4 inches using a 15-pound weight falling 20 inches. The penetrometer reading is the number of blows required to drive the cone point 1-3/4 inches. The cone point is then driven a second and third increment of 1-3/4 inches each and the penetrometer readings are recorded. The “average” penetration reading is the average of the second and third penetration readings. The penetrometer reading is similar to the standard penetration resistance “N-value” as defined by ASTM D 1586. The penetrometer test results provide an index for estimating soil strength and relative density.

Pavement cores were performed with a 4-inch diameter diamond-impregnated core barrel. We performed 3 cores in the eastbound mainline and 3 adjacent cores in the paved shoulder. Following coring operations, underlying crushed stone was excavated with a hand auger. Pavement and crushed stone thicknesses were then recorded. The core holes were backfilled with excavated crushed stone and the surface was patched with compacted Aquaphalt brand cold patch.

Water levels were measured in open boreholes at the time of drilling. Upon completion, boreholes were then backfilled up to the original ground surface with auger cuttings. Representative portions of soil samples were returned to our laboratory for quantitative testing and visual classification in general accordance with Unified Soil Classification System guidelines.

Hand Auger Boring Logs are provided in the Appendix. The Logs provide a summary of field data and approximate depths of changes in soil strata. Naturally, transitional changes in soil types are often gradual and cannot be defined at particular depths.

3. LABORATORY TESTING

Laboratory testing was performed on a representative bulk soil sample obtained from the hand auger boring. This testing consisted of natural moisture content, Atterberg limits, grain size analyses, standard Proctor, California Bearing Ratio (CBR), pH, chlorides, and laboratory resistivity. Laboratory tests were performed in general accordance with applicable ASTM procedures. Individual laboratory test data sheets are provided in the Appendix. A summary of laboratory test data is provided in the tables below

Natural Moisture and Classification Tests

Boring	Sample	Depth (Feet)	Natural Moisture Content (%)	Atterberg Limits			Grain Size Analysis		USCS Classification
				LL	PL	PI	% Sand & Gravel	% Fines*	
HA-01	Bulk	0-2.4	29.5	63	31	32	8.9	82.7	CH

*****Material passing No. 200 sieve (clay and silt)

Standard Proctor and CBR Testing

Boring	Depth (Feet)	Natural Moisture Content (%)	Standard Proctor		CBR (0.1")	%Swell	USCS Classification
			Optimum Moisture Content (%)	Maximum Dry Density (pcf)			
HA-01	0-2.4	29.5	26.5	93.5	5.4	1.3	CH

Based on the Atterberg limits testing, the bulk sample is of high plasticity. Based on comparison of the natural moisture content to the optimum moisture content of the bulk sample, near-surface soils appear wet of optimum moisture. Drying of some near-surface soils will be required prior to their re-use as fill.

pH & Resistivity Testing

Boring	Depth (Feet)	pH	Resistivity (ohm-cm)
HA-01	3	6.3	620

The bulk sample is slightly acidic (pH of 6.3) and exhibited a relatively low resistivity (620 ohm-cm).

4. SITE GEOLOGY

According to the 1993 Geologic Map of Virginia, the project site is located in the Valley and Ridge Physiographic Province of Virginia. This province is characterized by folded sedimentary rocks of Paleozoic age, weathered to form low, rounded ridges composed of resistant rocks, such as sandstone, and flat valleys composed of less resistant strata, such as shale or limestone. These rocks, formed during the early Paleozoic, subsequently underwent intense compressional forces during several orogenic (mountain building) events that occurred over the next 200 million years, as evidenced by the large and small scale folding and faulting observed in the Valley and Ridge province. It is this combination of structural deformation with the lithologic properties that influence differential weathering that affected the regional topography, creating northeast-southwest trending sandstone ridges separated by valleys of carbonates and shales.

According to the Map, the site is underlain by the Edinburg Formation, which generally consists of limestone and shale.

It is important to note that the site is located in a geology that is potentially subject to karst activity, such as sinkholes, caverns, dissolution cavities, and others. Based on our site reconnaissance, we did not observe any obvious indicators of potential karst at the site, such as localized surface depressions. However, karst features could exist at the site.

5. SUBSURFACE CONDITIONS

The following is a summary of subsurface conditions encountered during the exploration.

5.1 Ground Surface Cover

The hand auger borings encountered approximately 1 inch of surficial topsoil.

5.2 Existing Fill Soils

Existing fill soils were encountered in both of the hand auger borings up to 2.7 feet below the ground surface. The fill consisted of stiff highly plastic clay (CH), lean clay (CL), and medium dense clayey sand (SC). Average Dynamic Cone Penetrometer (DCP) values in these soils were 9 to 25+ blows per increment.

5.3 Residual Soils

Beneath fill in boring HA-02, undisturbed residual soils were encountered from depths of 2 to 2.7 feet below the ground surface. The soils consisted of medium dense silty gravel (GM). Average Dynamic Cone Penetrometer (DCP) values in this soil was 25+ blows per increment.

5.4 Groundwater

At the time of exploration, water was not encountered in the hand auger borings. It is important to realize that groundwater levels will fluctuate with changes in rainfall and evaporation rates. In addition, perched groundwater could be encountered within near-surface soils, particularly after rainfall.

6. EXISTING PAVEMENT SECTION THICKNESSES

Pavement cores were performed along Lifecore Drive (Route 636) to measure existing asphalt pavement and underlying crushed stone thicknesses. A summary of the encountered pavement and crushed stone (stone base) thicknesses are summarized in the table below.

Measured Pavement Section Thicknesses

Core	Lane Location	Asphalt Thickness (inches)	Stone Base (inches)	Overall Section Thickness (inches)
C-01	Eastbound Mainline	6.25	7.25	13.5
C-02	Eastbound Shoulder	5.5	11.5	17
C-03	Eastbound Mainline	5.25	7.75	13
C-04	Eastbound Shoulder	5.75	6.25	12
C-05	Eastbound Mainline	9.25	7.75	17
C-06	Eastbound Shoulder	6	11.5	17.5

7. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based upon our borings, laboratory testing, engineering analysis, and past experience with similar projects and subsurface conditions

7.1 Site Preparation

7.1.1 General

Site grading will be difficult during periods of extended rainfall and low temperatures that generally occur during the winter months. If grading is conducted during a wet time period, soils

will tend to rut and pump under rubber-tired traffic and provide poor subgrade support for pavements. Heavy rubber-tired construction equipment should not be allowed to operate on wet or unstable subgrades at this site due to the potential for rutting and other damage to the soils. To reduce potential earthwork problems, site preparation and grading should be scheduled during the typically drier summer months, if possible. We recommend that exposed subgrades be sloped and sealed at the end of each day to promote runoff and reduce infiltration from rainfall.

Site preparation should begin with stripping of topsoil, removal of existing pavements (where required per project plans), and removal of any other unsuitable materials. Approximately one inch of topsoil was encountered in the borings. However, stripping activities often mix topsoil with underlying "clean" soils and cause stripping depths to be greater than actual topsoil depths, particularly during wet periods of the year. Topsoil should be wasted from the site or permanently stockpiled outside the proposed construction limits.

7.1.2 Subgrade Evaluation

After excavation to finished subgrade, the subgrade should be evaluated by the Geotechnical Engineer or his representative. To aid the engineer during this evaluation, exposed soil subgrades should be proofrolled with a loaded tandem axle dump truck or equivalent. Proofrolling will help to reveal the presence of unstable or otherwise unsuitable surface materials. The following methods are typically used to repair soil subgrades that are observed to rut, pump, or deflect excessively during proofrolling:

- Undercut the unstable soils to firm soils and replace them with suitable, well compacted fill.
- In-place repair of near-surface soils by scarifying, drying and recompacting, when weather conditions are suitable. In poor weather conditions, our experience has been that the addition of lime (quicklime or hydrated lime) can facilitate drying.

7.1.3 Highly Plastic Soils

Highly plastic soils are expected to exist at finished grades in areas of the project. Where highly plastic soils (liquid limit greater than 60 or plasticity index greater than 30) are encountered at cut subgrade in pavement areas, they should be removed to a maximum depth of 2 feet below finished soil subgrade and replaced with suitable well-compacted materials.

7.2 Embankment Fill

Because the extended fill slopes between Crossroads Lane and North Medical Park Drive will be constructed at to 2(H):1(V) inclination, we recommend that select granular materials be used to

construct these slopes. We expect some of the on-site soils may be re-used for pavement support. Our recommendations for embankment fill materials are provided below.

7.2.1 Embankment Fill Materials

New Fill Slopes – New slopes should be constructed of VDOT Type II materials, as referenced in Section 207.02 of the VDOT 2007 Road and Bridge Specifications.

Pavement Areas - Embankment fill in pavement areas should contain less than 5 percent organics or debris, have a maximum particle size of 3 inches, have a maximum liquid limit (LL) of 60, and have a maximum plasticity index (PI) of 30. Embankment fill should have a minimum CBR value of 5.0 (VDOT Test Method VTM-8).

7.2.2 Re-use of On-Site Soils as Embankment Fill

The bulk sample tested for this project exceeds the plasticity requirement for use as embankment fill and is not considered suitable for re-use as embankment fill beneath pavements. We expect clayey sands and lean clays encountered in the borings will be suitable for re-use as embankment fill below pavements.

7.2.3 Compaction Recommendations

Embankment fill should be compacted in accordance with the latest addition of the VDOT Road and Bridge Specifications. When tying into the existing embankment with new fill, the new fill must be benched into the existing slope in accordance with the above Specifications. Embankment fill testing should be performed in accordance with the procedures and sampling frequencies in Section 309 of the VDOT Manual of Instruction, Chapter III.

7.3 Slope Stability

Based on our past experience, well-compacted VDOT Type II fill materials should exhibit a friction angle of at least 36 degrees. Slopes constructed of this material at an inclination of 2(H):1(V) are expected to exhibit a slope stability safety factor of approximately 1.5, which satisfies VDOT requirements for slope stability.

7.4 Excavations

We expect that excavations will extend through moderate consistency soils. Based observation on our site observations, rock materials are likely present at shallow depths below the borings, which refused at depths near 2.5 feet. Past experience indicates that moderate consistency soils can be excavated by routine earth moving equipment.

Soil types with respect to trench safety must be evaluated on a case-by-case basis. The Contractor should be responsible for all site safety, including the determination of appropriate trench safety measures according to OSHA guidelines.

7.1 New Lifecore Drive Pavements

New pavements for Lifecore Drive should be constructed at a similar thickness to the existing pavement section thickness. Based on the roadway cores, the average overall pavement section thickness is approximately 15 inches. Therefore, an overall pavement section thickness of 15 inches recommended in areas of new pavement. The following table provides recommended material types for new Lifecore Drive pavement sections.

Recommended Pavement Section Thickness

Lifecore Drive
2 Inches VDOT SM-12.5A
5 Inches BM-25.0A (Placed in 2 equal lifts)
8 Inches VDOT 21B

All materials and construction methods should conform to the latest edition of the VDOT Road and Bridge Specifications. To confirm that the base course stone has been uniformly compacted and meets VDOT density requirements, in-place density tests should be performed by a qualified soils technician and the area should be thoroughly proofrolled under his observation.

8. LIMITATIONS OF REPORT

The recommendations contained in this report are made on the basis of the site information made available to us and the surface and subsurface conditions that existed at the time of the exploration. While this exploration has been conducted in accordance with generally accepted geotechnical engineering practices, there remains some potential for variation of the subsurface conditions in unexplored areas of the site. If the subsurface conditions encountered during construction vary significantly from those presented in this report, we should be notified to reevaluate our recommendations. No other warranty, expressed or implied, is made as to the professional advice included in this report.

9. CLOSURE

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this study or if we can be of further assistance, please contact us at (804) 200-6500.

Respectfully submitted,
TIMMONS GROUP

Julian M. Ruffin IV, P.E.
Geotechnical Engineer

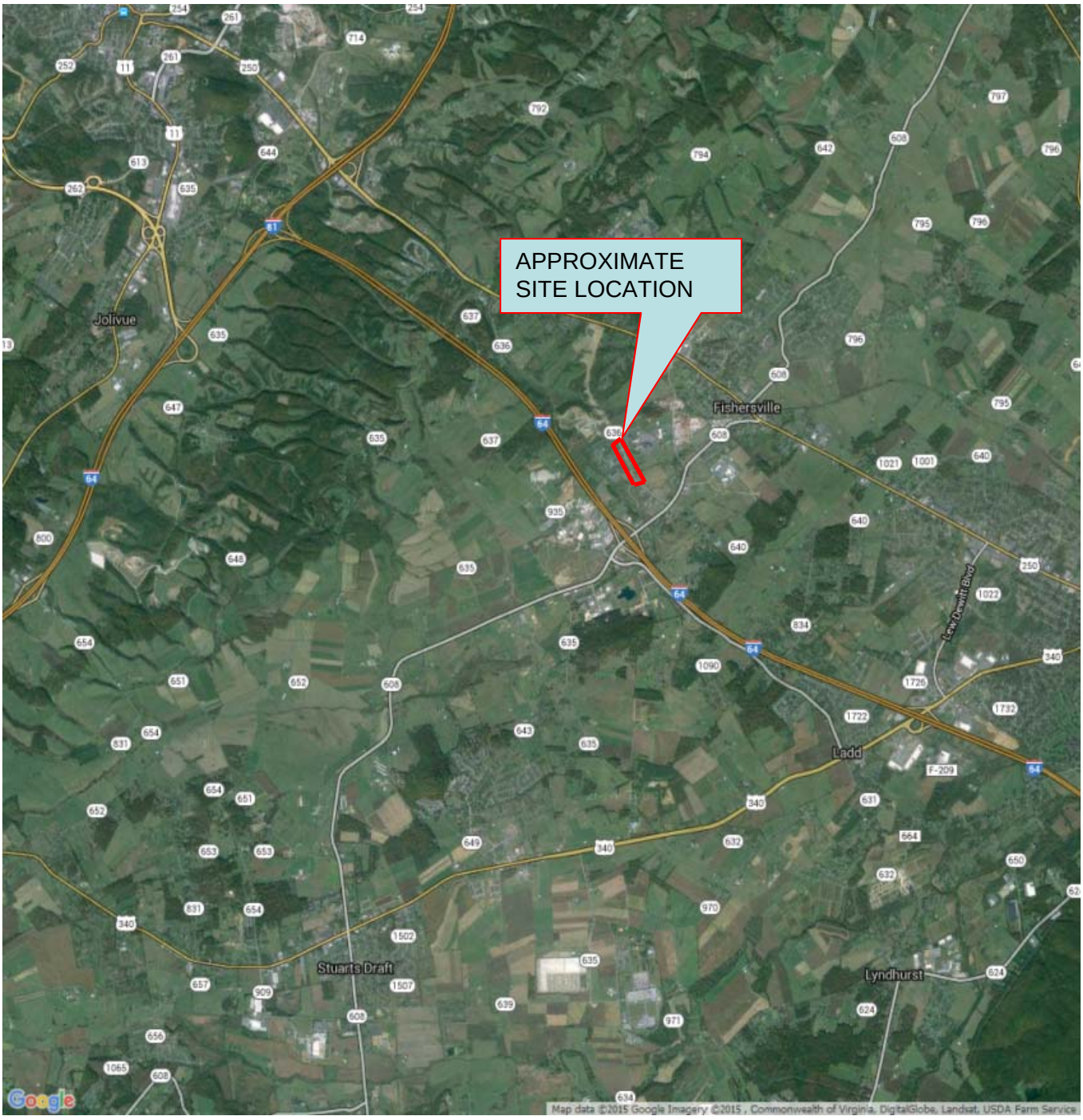
COMMONWEALTH OF VIRGINIA
JNR
4/15/16
J NATHAN REEVES
No. 049619
PROFESSIONAL ENGINEER

J. Nathan Reeves, P.E.
Geotechnical Engineer
VA Registration No. 049619

APPENDIX A

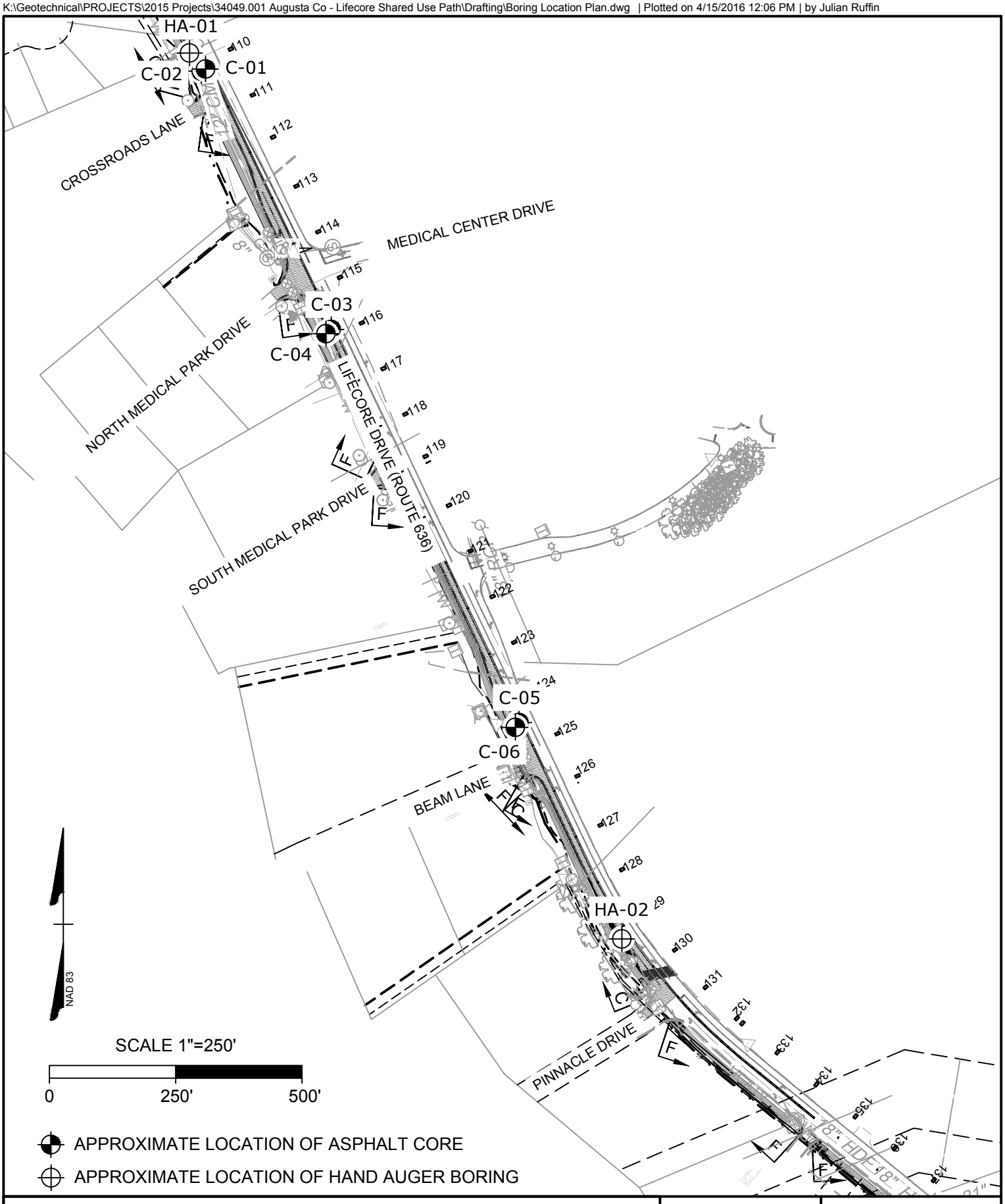
FIGURES

NORTH



Source: Google Maps

SCALE: NTS	TIMMONS GROUP YOUR VISION ACHIEVED THROUGH OURS.	**SITE VICINITY MAP** **LIFECORE DRIVE SHARED USE FACILITY** **AUGUSTA COUNTY, VA**	**FIGURE** **1**
CHECKED BY: JNR			
PLOTTED BY: JMR			
DATE: 10-8-2015	**PROJECT NUMBER: 34049.001**		



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LIFECORE DRIVE SHARED USE FACILITY

AUGUSTA COUNTY - VIRGINIA

LOCATION PLAN

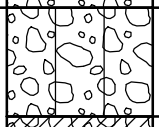
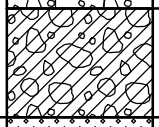
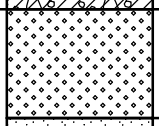
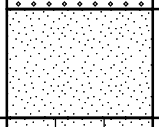
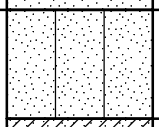
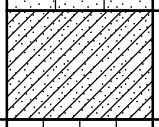
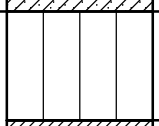
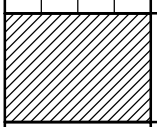
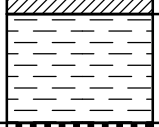
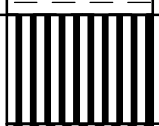
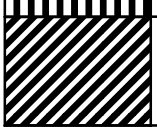
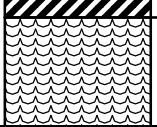
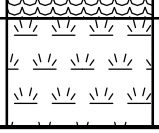
SHEET NO.	JOB NO.	SCALE	CHECKED BY	DESIGNED BY	DRAWN BY	DATE
2	34049.001	AS SHOWN	N. REEVES	N. REEVES	J. RUFFIN	2/3/2016

DATE	REVISION DESCRIPTION
.	.

APPENDIX B

BORING LOGS

SOIL CLASSIFICATION CHART

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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

HAND AUGER BORING LOG

Project: Lifecore Drive Shared Use Facility
Project No: 34049.001
Performed By: Matthew Thornton

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Date	Boring	Depth (Feet)	Description	DCP Values				
				Depth (Feet)	1	2	3	Average
10/15/2015	HA-01	0 to 0.1	Topsoil approximately 1"	0	17	19	13	16
		0.1 to 2.4	FILL consisting of orange-brown, fat clay with various amounts of sand and gravel, moist (FL)	1	9	9	9	9
				2	6	8	24	12
		2.4	No recovery; Hand Auger Refusal	2.4	25+	---	---	25+
			Boring terminated at 2.4 feet					
			No water encountered in boring					
			Shale outcrop observed on right hand shoulder of south bound lane 85' northwest of HA-01					
10/15/2015	HA-02	0 to 0.1	Topsoil approximately 1"	0	15	19	19	17
		0.1 to 1	FILL consisting of brown, fine to coarse, clayey sand, trace gravel, moist (FL)	1	15	25+	---	20+
		1 to 2	FILL consisting of brown and red-brown, sandy lean clay, trace gravel, moist (FL)	2	25+	---	---	25+
		2 to 2.4	Brown, silty GRAVEL with sand, moist (GM)	2.7	25+	---	---	25+
		2.7	No recovery; Hand Auger Refusal					
			Boring terminated at 2.7 feet					
			No water encountered in boring					
			Shale outcrop observed on right hand shoulder of south bound lane 47' northwest of HA-02					
			Auger cuttings collected as bulk material from a depth of 0 to 2.7'					

The dynamic cone penetrometer (DCP) test procedure is as follows:
The cone point of the penetrometer is first seated 2 inches into the undisturbed bottom of borehole to embed the point. Then the cone point is driven three consecutive 1-3/4 inch depth intervals using a 15-pound weight falling 20 inches. The penetrometer reading is the number of blows required to drive the cone point 1-3/4 inches. An average is taken from the three readings.

Reference: "Dynamic Cone for Shallow In-Situ Penetration Testing," Sowers and Hedges, 1966.

APPENDIX C

LABORATORY TEST RESULTS

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

GRAIN SIZE DISTRIBUTION TEST REPORT

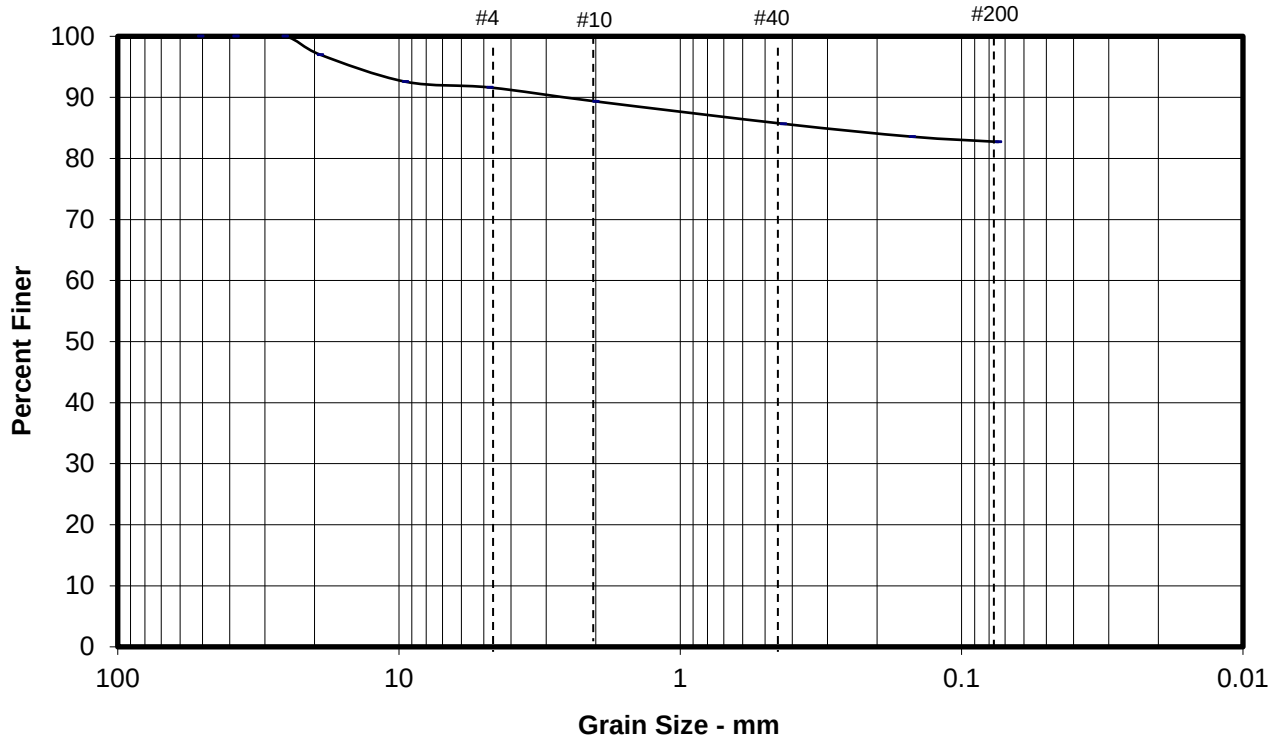
Project Number	34049.001
Project Name	Lifecore Drive
Location	HA-01/ 0-2.4

Liquid Limit	Plastic Index	USCS	AASHTO
63	**32**	**CH**	**A-7-5 (14.9)**

Percent Gravel	Percent Sand	Percent Silt and Clay
8.4%	**8.9%**	**82.7%**

Material Description	Fat CLAY with Sand
Natural Moisture	29.5%
SPT Blow Counts	N/A

Grain Size Distribution



DATE 10/30/15

FIGURE NUMBER GS4

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

PROCTOR TEST REPORT

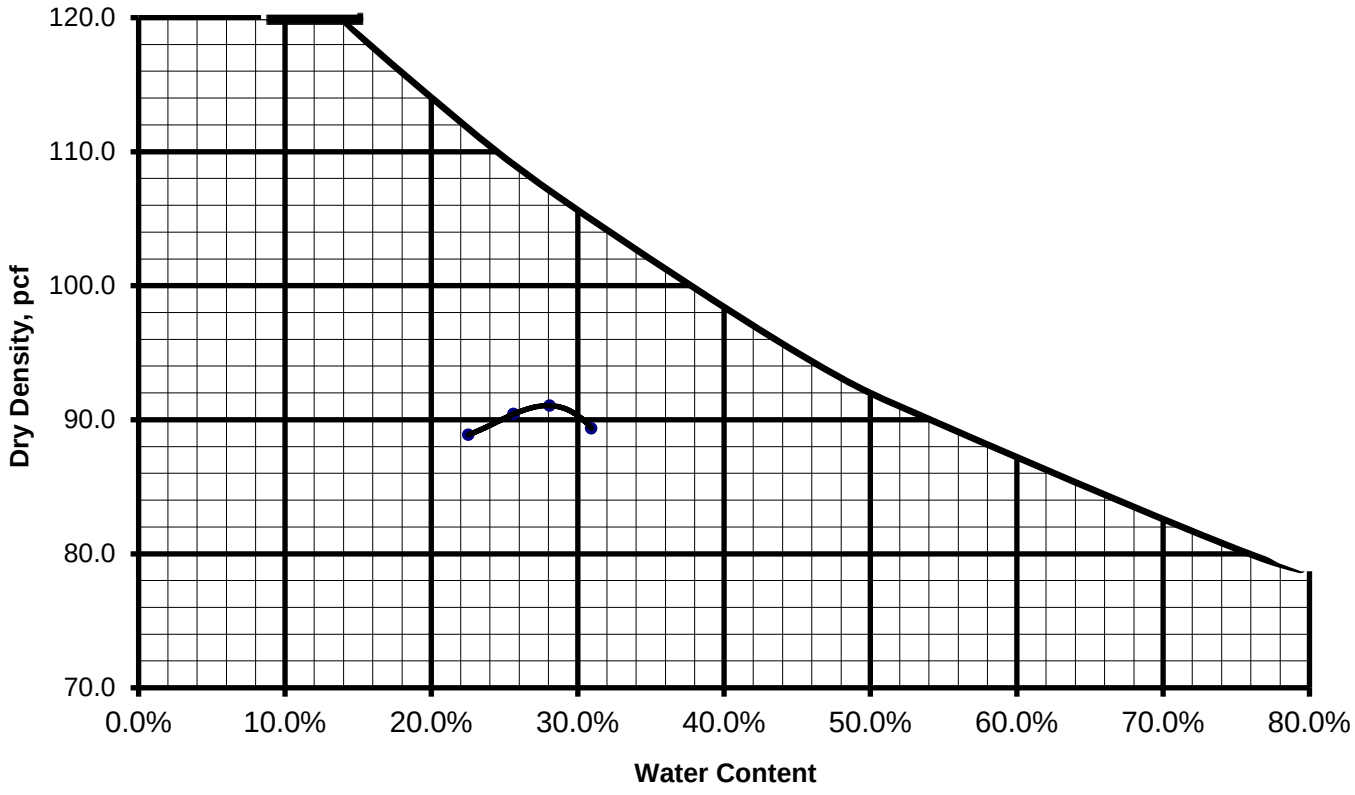
Project Number	34049.001
Project Name	Lifecore Drive
Location	HA-01/ 0-2.4

	Uncorrected	Rock Corrected Results
Maximum Dry Density, pcf	**91.2**	**93.5**
Optimum Moisture	**28.0**	**26.5**

Material Description	Fat CLAY with Sand

USCS	CH	AASHTO	A-7-5 (14.9)
Natural Moisture	29.5%	Percent Fines	82.7%
Liquid Limit	63	Plastic Index	32

Moisture-Density Curve



DATE 10/30/15

FIGURE NUMBER PR2

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

CBR TEST REPORT

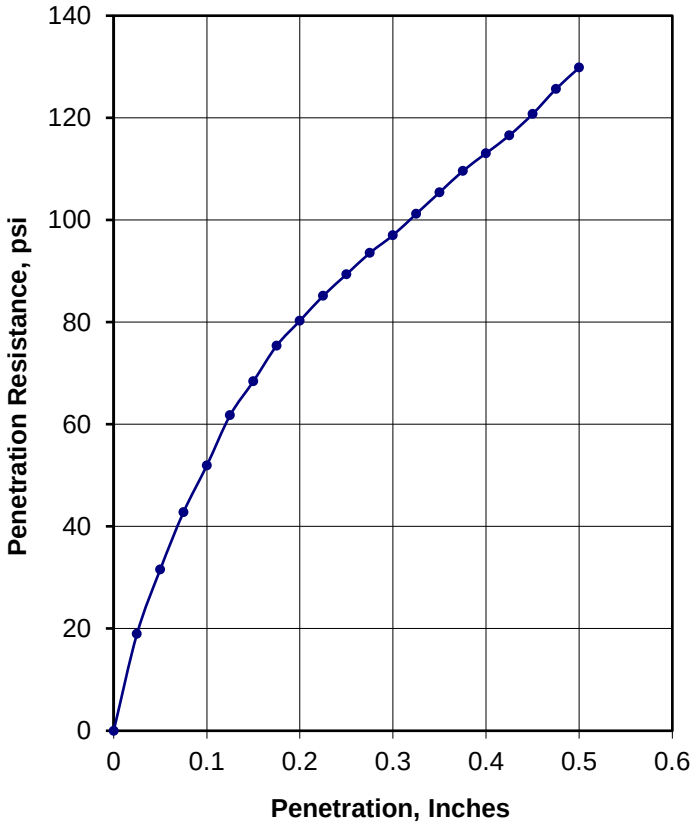
Project Number	34049.001
Project Name	Lifecore Drive
Location	HA-01/ 0-2.4

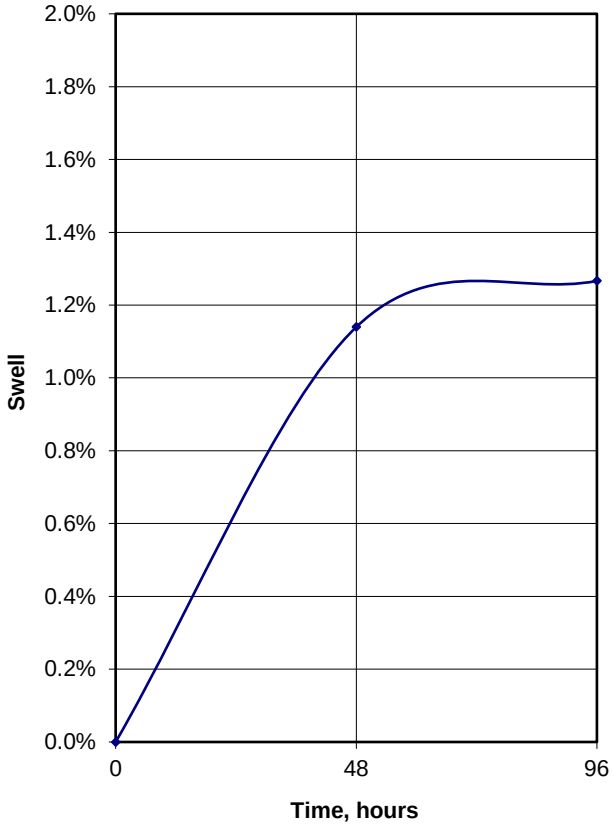
***NOTE: 20 lbs. surcharge weights in place during soak and loading**

	CBR at .1"	CBR at .2 "	Swell
	5.2	**5.4**	**1.3%**
	Dry Density	Moisture	Compaction
Molded	92.6	26.2%	99.1%
Soaked	88.0	32.9%	94.1%

Material Description	Fat CLAY with Sand

USCS	CH	AASHTO	A-7-5 (14.9)
Natural Moisture	29.5%	Percent Fines	82.7%
Liquid Limit	63	Plastic Index	32
Maximum Dry Density	93.5	Optimum Moisture	26.5





DATE 10/30/15

FIGURE NUMBER CBR 1

Summary Of Laboratory Tests

Project Number: 13613123 Task 12

Boring No.	Sample Depth ft / Elevation ft	Sample Type	Description of Soil Specimen	Testing Laboratory	pH	Resistivity (ohm-cm)
HA-01	1.0	Jar	ELASTIC SILT WITH SAND (MH), orange-brown (Visual)	RICH	6.3	620

Notes:
1. Soil tests in general accordance with ASTM standards.
2. Soil classifications are in general accordance with ASTM D2487(as applicable), based on testing indicated and visual classification.
3. Key to abbreviations: NP=Non-Plastic; -- indicates no test performed

Schnabel ENGINEERING

Project: Laboratory Testing for Timmons
Life Core Drive
34049.001

APPENDIX D

ASPHALT CORE PHOTO LOGS

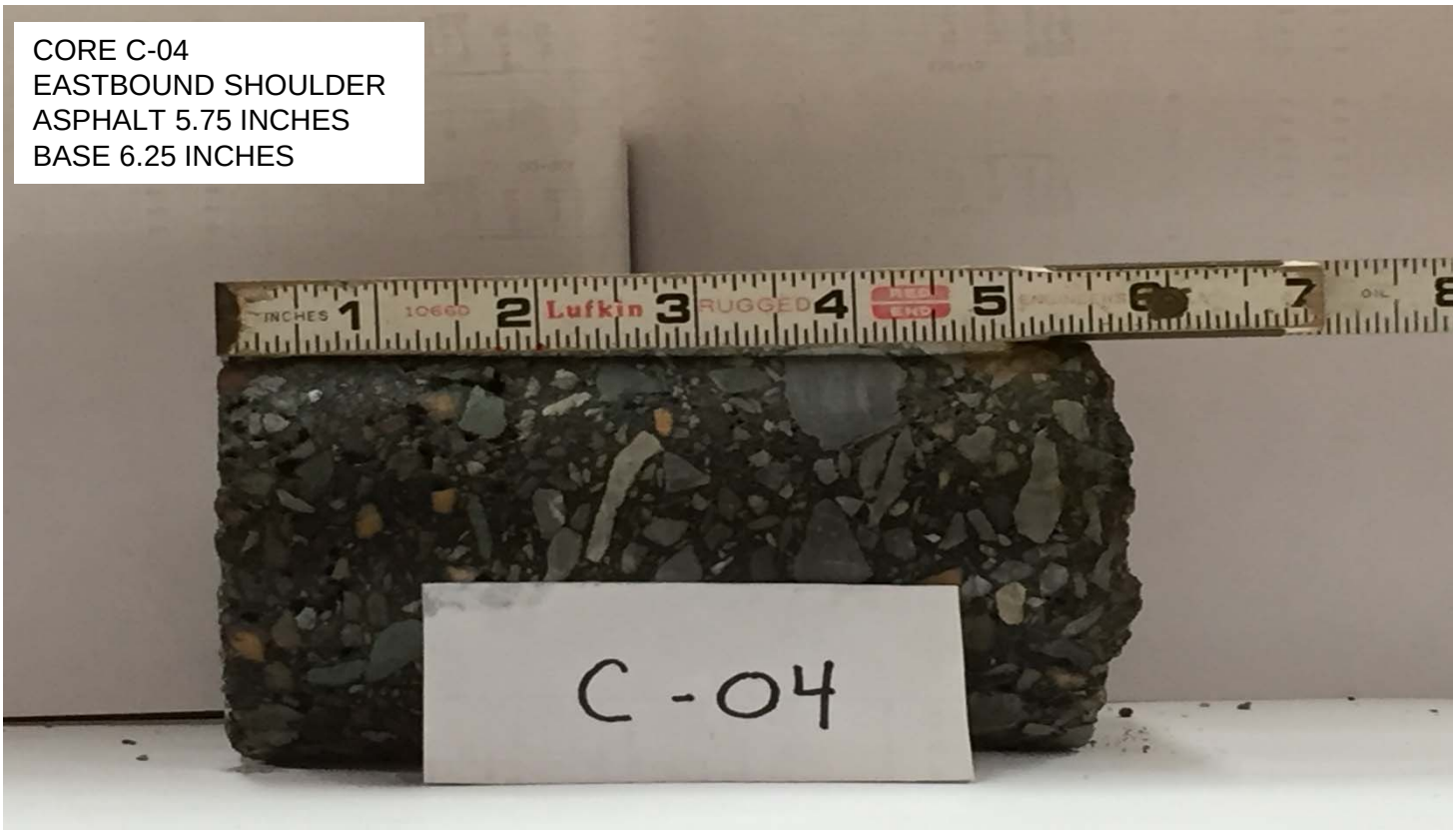
CORE C-01
EASTBOUND MAINLINE
ASPHALT 6.25 INCHES
BASE 7.25 INCHES

CORE C-02
EASTBOUND SHOULDER
ASPHALT 5.5 INCHES
BASE 11.5 INCHES

SCALE: NTS	TIMMONS GROUP YOUR VISION ACHIEVED THROUGH OURS.	**ASPHALT CORE PHOTO LOG** **LIFECORE DRIVE SHARED USE FACILITY** **AUGUSTA COUNTY, VA**	**PAGE 1**
CHECKED BY: JNR			
PLOTTED BY: JMR			
DATE: 4-15-2016	**PROJECT NUMBER: 34049.001**		

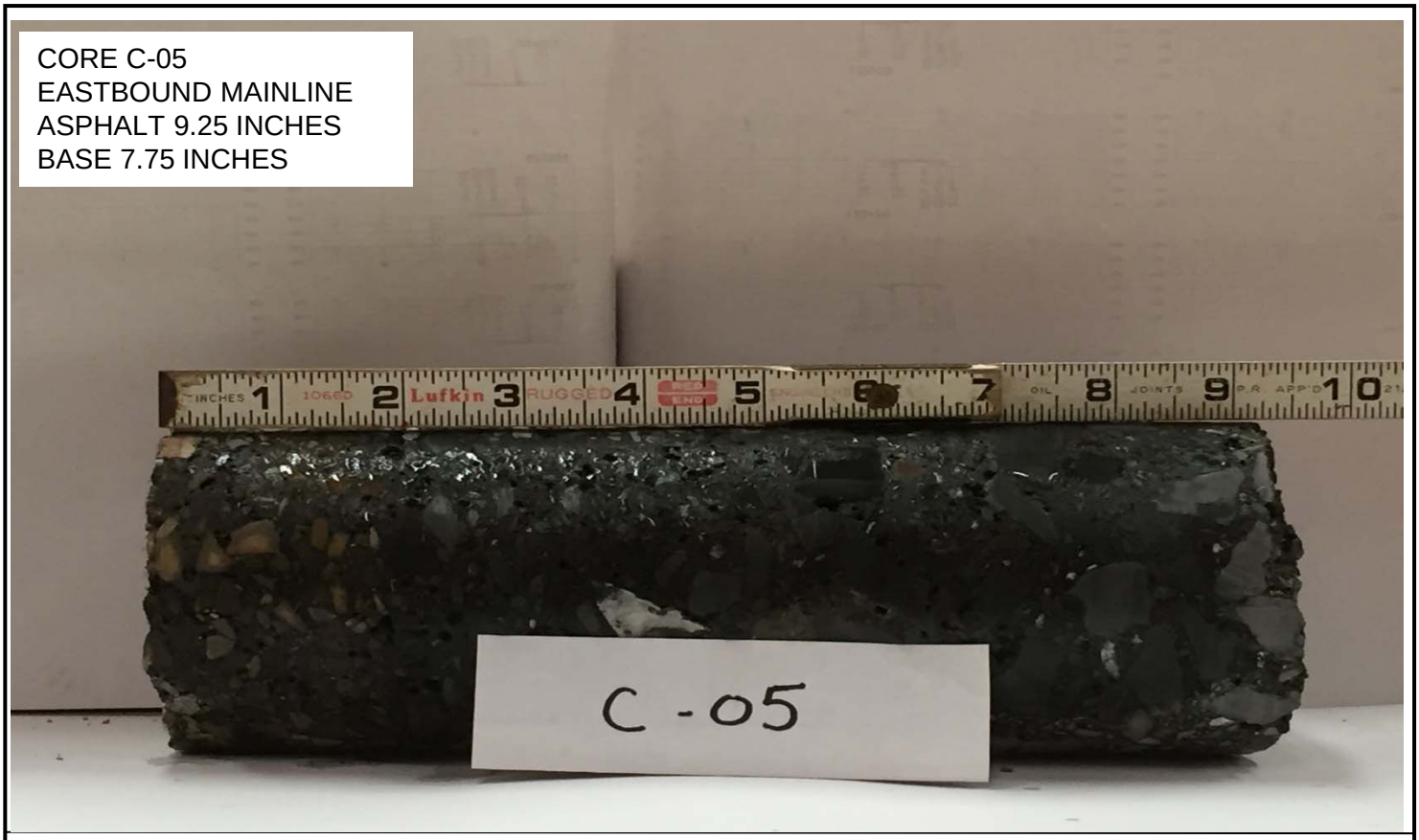
CORE C-03
EASTBOUND MAINLINE
ASPHALT 5.25 INCHES
BASE 7.75 INCHES

CORE C-04
EASTBOUND SHOULDER
ASPHALT 5.75 INCHES
BASE 6.25 INCHES



SCALE: NTS	TIMMONS GROUP YOUR VISION ACHIEVED THROUGH OURS.	**ASPHALT CORE PHOTO LOG** **LIFECORE DRIVE SHARED USE FACILITY** **AUGUSTA COUNTY, VA**	**PAGE 2**
CHECKED BY: JNR			
PLOTTED BY: JMR			
DATE: 4-15-2016	**PROJECT NUMBER: 34049.001**		

CORE C-05
EASTBOUND MAINLINE
ASPHALT 9.25 INCHES
BASE 7.75 INCHES



CORE C-06
EASTBOUND SHOULDER
ASPHALT 6 INCHES
BASE 11.5 INCHES

SCALE: NTS	TIMMONS GROUP YOUR VISION ACHIEVED THROUGH OURS.	**ASPHALT CORE PHOTO LOG** **LIFECORE DRIVE SHARED USE FACILITY** **AUGUSTA COUNTY, VA**	**PAGE 3**
CHECKED BY: JNR			
PLOTTED BY: JMR			
DATE: 4-15-2016	**PROJECT NUMBER: 34049.001**		