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Geotechnical Engineering Report

Fort Belvoir Kingman and Walker Gates
Federal Aid Project No. VA ST FB_KNGMN/WLKR_GTS
Fairfax County, Virginia

Prepared for

WSP
July 28, 2022 (Revised)

DMY

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Reference: Geotechnical Engineering Report
Fort Belvoir Kingman and Walker Gates
Federal Aid Project No. VA ST FB_KNGMN/WLKR_GTS
Fairfax County, Virginia
DMY Project No. 01.04361.01

Dear Mr. Ramey:

DMY Engineering Consultants Inc. (DMY) is pleased to submit this report of our geotechnical exploration for the above-referenced project. This report presents a review of the information provided to us, a discussion of the site and subsurface conditions encountered, and our geotechnical recommendations. This report was revised to address VDOT NOVA Materials Division's comments dated April 9, 2021 and January 20, 2022 and Eastern Federal Lands Highway Division's comments on March 17, 2021 and February 23, 2022.

We appreciate the opportunity to be of service to you on this project and would be happy to discuss our findings with you. We look forward to serving as your geotechnical engineer on the remainder of this project and on future projects.

Respectfully,

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TABLE OF CONTENTS

1.0 PROJECT OVERVIEW 3
2.0 FIELD EXPLORATION AND LABORATORY TESTING 3
2.1. FIELD EXPLORATION 3
2.2. LABORATORY TESTING 4
3.0 SITE GEOLOGY AND SUBSURFACE CONDITIONS 4
3.1. SITE GEOLOGY 4
3.2. SOIL SURVEY MAP 5
3.3. SUBSURFACE CONDITIONS 6
3.4. GROUNDWATER 8
3.5. EXISTING PAVEMENT 8
3.6. PAVEMENT CONDITIONS 11
4.0 GEOTECHNICAL AND PAVEMENT RECOMMENDATIONS 12
4.1. GENERAL PAVEMENT RECOMMENDATIONS 12
4.2. PAVEMENT DESIGN 12
4.3. FILL AND CUT SLOPES 14
4.4. SITE PREPARATION 15
4.5. EARTHWORK 15
4.6. SUBGRADE PREPARATION 15
4.7. UNSUITABLE SOILS 16
5.0 LIMITATIONS 16

APPENDIX A FIGURES
APPENDIX B FIELD OPERATIONS
APPENDIX C GROUND PENETRATION RADAR SURVEY RESULTS
APPENDIX D LABORATORY TESTING
APPENDIX E PAVEMENT DESIGN CALCULATIONS
APPENDIX F SLOPE STABILITY ANALYSIS RESULTS
APPENDIX G AS-BUILT PLANS

1.0 PROJECT OVERVIEW

The project site is located near Kingman and Walker Gates of Fort Belvoir in Fairfax County, Virginia. Site Location Maps showing the approximate locations of the project for Kingman and Walker Gates are included in Appendix A. We understand that the project for Kingman Gate consists of increasing the capacity of left turn lane along the Fairfax County Parkway (VA Route 286) eastbound through the John J. Kingman Road (referred as Kingman Road throughout this report) into Fort Belvoir's Kingman Gate to reduce occurrence of queuing of left turning vehicles into the main through lane on eastbound. The project for Walker Gate consists of increasing the capacity of left turn lane along Mount Vernon Memorial Highway (VA Route 235) through the Mount Vernon Road into Fort Belvoir's Walker Gate to reduce occurrence of queuing of left turning vehicles into the main through lane on westbound. To accommodate the capacity increase, roadway widening along Fairfax County Parkway eastbound, Kingman Road and Mount Vernon Memorial Highway is proposed. In addition, shared use path and trail are proposed along Kingman Road as part of the improvement.

The description of the proposed project given above is based on the information provided to us by WSP and information gathered during our site reconnaissance. If any of the assumptions or project information is incorrect, DMY should be informed so that we may revise our geotechnical recommendations, if necessary.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1. FIELD EXPLORATION

Our original field exploration consisted of drilling eight (8) Standard Penetration Test (SPT) borings (KG-B-01 through KG-B-05; WG-B-01 through WG-B-03) and fourteen (14) pavement cores (KG-PC-01 through KG-PC-10; WG-PC-01 through WG-PC-03; WG-B-02). Per VDOT reviewer's comments dated September 25, 2020, DMY drilled additional sixteen (16) SPT borings (KG-B-06 through KG-B-15; WG-B-04 through WG-B-09). The boring locations were chosen by DMY and approved by WSP. DMY personnel located those borings and coring locations in the field based on visual reference to the existing site features. The as-drilled locations were surveyed by Rice Associates and coordinates & elevations were provided to DMY. The locations of the borings and pavement cores are shown on the Boring and Pavement Core Location Plan included in Appendix A.

The SPT borings were drilled by truck- or track-mounted CME 45 and 55 drill rigs using the hollow stem auger method with 3.25-inch I.D. augers. Groundwater levels, where encountered, were measured at each boring location at the time of drilling. Groundwater measurement at 24 hours after drilling completion was not measured due to public safety concern. Upon completion of the field exploration, boreholes were backfilled with auger cuttings. Pavement core locations and borings drilled in the existing paved area were patched with quick-set concrete mix. The field exploration procedures are included in Appendix B.

Following field operations, the soil samples were transported to our laboratory for further analysis and testing. The samples will be stored in our laboratory for a period of 90 days from the submittal date of this report. After this period, the samples will be discarded unless we are instructed otherwise.

In addition to SPT borings and pavement cores, Ground Penetration Radar (GPR) survey was performed to determine the pavement thickness of existing Kingman Road within project limits. The GPR survey was performed by using Geophysical Survey Systems, Inc. (GSSI) SIR-3000 GPR unit walking along the centerline of each lane with a 1500 megahertz (MHz) frequency antenna. Coordinates of endpoints, borings, and other site features were captured with Topcon HiperGA Real Time Kinematic Global Positioning System (RTK GPS). Figure 1 in Appendix C shows a map of GPR survey line locations on the aerial view photos. The six GPR profiles were identified by their lane and corresponding field file number.

2.2. LABORATORY TESTING

Representative soil samples were selected and tested to verify field classifications and to determine pertinent engineering properties. The tests were performed in accordance with applicable ASTM, AASHTO, and/or VTM standards and VDOT MOI Chapter III. The table below is a summary of the laboratory testing program. The laboratory testing results are included in Appendix D.

Table 2-1: Summary of Laboratory Tests

Lab Test	Test Method	Number of Tests
Natural Moisture Content	AASHTO T-265	141
Atterberg Limits	AASHTO T-89 & T-90	32
Grain Size Analyses	AASHTO T-88	32
Standard Proctor	VTM-1	10
CBR	VTM-8	10
Direct Shear Test	ASTM D3080	1

3.0 SITE GEOLOGY AND SUBSURFACE CONDITIONS

3.1. SITE GEOLOGY

Based on the review of the Geologic Map of Virginia (1993) published by Virginia Division of Mineral Resources, the project site is located within the Coastal Plain Physiographic Province of Virginia. The project site at Kingman and Walker Gates are underlain by early Cretaceous-aged Potomac Group (*Kp*) and middle Pleistocene Shirley Formation (Qsh), respectively. The Potomac Group soils in this area consist of very light gray to pinkish-gray, medium to very coarse sand, green clay and clayey sand, and dark-yellowish-brown to olive-gray sandy silt and clay. Shirley Formation consists of light- to dark-gray, bluish-gray and brown sand, gravel, silt, clay, and peat.

3.2. SOIL SURVEY MAP

The project site at Kingman Gate is mapped as (95) Urban Land, (48) Gunston silt loam and (91) Sassafras – Marumsco complex according to the *2011 Official Soil Maps of Fairfax County*. (95) Urban Land, (48) Gunston silt loam and (91) Sassafras – Marumsco complex are classified as Soil Problem Class IVB, III and III, respectively, in the *Description & Interpretative Guide to Soils in Fairfax County,* published by Fairfax County Public Works and Environmental Services and Northern Virginia Soil and Water Conservation District in April 2008 and revised in August 2011.

The project site at Walker Gate is mapped as (95) Urban Land, (77) Mattapex loam, (46) Grist Mill - Mattapex complex, and (43) Grist Mill - Gunston complex according to the *2011 Official Soil Maps of Fairfax County*. (95) Urban Land, (77) Mattapex loam, (46) Grist Mill - Mattapex complex, and (43) Grist Mill - Gunston complex are classified as Soil Problem Class IVB, II, IVB and IVA, respectively, in the *Description & Interpretative Guide to Soils in Fairfax County,* published by Fairfax County Public Works and Environmental Services and Northern Virginia Soil and Water Conservation District in April 2008 and revised in August 2011.

Detailed descriptions of aforementioned soil units can be found in this publication. The following paragraphs are excerpts from this publication.

(95) Urban Land - This unit consists entirely of man-made surfaces such as pavement, concrete or rooftop. Urban land is impervious and will not infiltrate stormwater. All precipitation landing on Urban Land will be converted to runoff. Urban Land units lie atop development disturbed soils. Ratings for this unit are not provided.

(48) Gunston silt loam - This silty and clayey soil occurs on flat portions of the Coastal Plain in Mason Neck. The topsoil is typically grey silt loam while the subsoil consists of deep moderately plastic clays. Bedrock is greater than 20 feet below the surface. The seasonal high water table ranges from 10 inches to 2½ feet below the surface. Foundation support is poor because of the high water table, soft soil and plastic clays. Extensive foundation drains (both exterior and interior), waterproofing and surface grading are necessary to prevent wet basements. Suitability for septic tanks and infiltration trenches is poor because of the high water table and slow permeability. Surface grading and subsurface drainage are needed to prevent wet yards.

(91) Sassafras – Marumsco complex - This soil complex occurs along steeper slopes separating the high elevation and low elevation areas of the Coastal Plain and along slopes bordering larger Coastal Plain streams. This complex was formerly referred to as Marine Clay. Dry, sandy and gravelly Sassafras material is stratified with layers of thick, highly plastic marine clays. Water perches on top of the clay layers and springs can form where the clay strata come to the surface. Depth to the perched water table is variable depending on the specific stratification. This soil is highly variable. Unstable slopes can lead to serious land slippage or landslides. Depth to bedrock is greater than 50 feet. Foundation support is poor because of the potential perched water table, unstable slopes and plastic clays. Intensive geotechnical analysis is needed before construction commences. Suitability for septic drainfields and infiltration trenches is poor because of the high water table, plastic clays and unstable slopes.

(77) Mattapex loam - This soil occurs on uplands in sand, silt, and clay sediments of the lower Coastal Plain. Loams and clay loams overlie very sandy layers. The seasonal high water table is between 2 and 3 feet below the surface. Depth to hard bedrock is typically greater than 200 feet. Foundation support may be marginal because of occasional soft soil and seasonal saturation. Foundation drains and waterproofing are needed to prevent wet basements. Grading and subsurface drainage are often necessary to eliminate wet yards. Suitability for septic drainfields and infiltration trenches is poor because of the high water table.

(46) Grist Mill - Mattapex complex - This complex is a mixture of the development-disturbed Grist Mill soil and the natural Mattapex soil. The complex occurs in low elevation areas of the Coastal Plain that have been developed but retain a good portion of undisturbed soil. Grist Mill soil will be clustered around foundations, streets, sidewalks, playing fields and other graded areas. Mattapex soil will be found under older vegetation in ungraded back and front yards and common areas. For a description of the two soils that make up this map unit, please see (40) Grist Mill and (77) Mattapex.

(43) Grist Mill - Gunston complex - This complex is a mixture of the development-disturbed Grist Mill soil and the natural Gunston soil. The complex occurs in areas of Mason Neck that have been developed but retain a good portion of undisturbed soil. Grist Mill soil will be clustered around foundations, streets, sidewalks, playing fields and other graded areas. Gunston soil will be found under older vegetation in ungraded back and front yards and common areas. For a description of the two soils that make up this map unit, please see (40) Grist Mill and (48) Gunston.

(40) Grist Mill - This soil consists of sandy, silty and clayey sediments of the Coastal Plain that have been mixed, graded and compacted during development and construction. Characteristics of the soil can be quite variable depending on what materials were mixed in during construction. The subsoil is generally a clay loam, but can range from sandy loam to clay. The soil has been compacted, resulting in high strength and slow permeability. The soil is well drained and depth to bedrock is greater than 20 feet below the surface. In most cases, foundation support is suitable assuming that the soil is well compacted and contains few clays. Because of the slow permeability, suitability for septic drainfields is poor and for infiltration trenches is marginal. Grading and subsurface drains may be needed to eliminate wet yards caused by the slow permeability. This soil is found in low elevation developed areas of the Coastal Plain.

3.3. SUBSURFACE CONDITIONS

The subsurface conditions encountered at the locations explored are shown in the boring logs presented in Appendix B. The records represent our interpretation of the subsurface conditions based on visual observations and laboratory testing of the soil samples collected. The lines designating the interfaces between various strata on the boring logs are approximate, as the actual transitions between soil strata are often gradual. In the absence of foreign substances, it is difficult to distinguish between natural soils and clean soil fills. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of the subsurface conditions at other locations or at other times.

Kingman Gate

Approximately 2.4 to 6 inches of asphalt and 1 to 8.4 inches of aggregate base were encountered at Borings KG-B-01 to KG-B-03, KG-B-06 to KG-B-12, and KG-B-15. Approximately 2 to 4 inches of topsoil were encountered at Boring KG-B-05, KG-B-13 and KG-B-14. Topsoil encountered is typically a dark colored soil material containing roots, fibrous matter, and/or other organic components, and is generally unsuitable for engineering purposes. Although the measured topsoil depths were found to be of minimal thickness in the borings during our exploration, the topsoil may be thicker in unexplored areas, particularly in vegetated undisturbed areas. DMY has not performed any laboratory testing to determine the organic content or other horticultural properties of the observed surficial soil material; therefore, the term topsoil is not intended to indicate suitability for landscaping and/or other purposes.

Below the surficial materials, two strata were encountered at the borings within boring termination depths. The soil strata observed in the exploration at the site include man-made fill and Coastal Plain soils of Potomac Group. The following table summarizes the generalized soil descriptions from the available subsurface exploration.

Table 3-1: Summary of Subsurface Conditions at Kingman Gate

Geologic Strata	Soil Description	USCS Classification		SPT N-values	
		Primary	Secondary	Min	Max
Fill	Generally composed of soils obtained from nearby natural soils. The soils from this stratum generally retain some of the properties of the parent soil, but may contain debris and organic material.	SC/SM/CL	GM/ML	3	43
Potomac	Coastal Plain soils that belong to the Potomac Group.	CH/CL/SC	SM	2	50/4”

Walker Gate

Approximately 5 to 7.5 inches of asphalt was encountered at Borings WG-B-02 and WG-B-09. Approximately 2 to 5 inches of topsoil were encountered at Borings WG-B-01 and WG-B-03 to WG-B-08. Topsoil encountered is typically a dark colored soil material containing roots, fibrous matter, and/or other organic components, and is generally unsuitable for engineering purposes. Although the measured topsoil depths were found to be of minimal thickness in the borings during our exploration, the topsoil may be thicker in unexplored areas, particularly in vegetated undisturbed areas. DMY has not performed any laboratory testing to determine the organic content or other horticultural properties of the observed surficial soil material; therefore, the term topsoil is not intended to indicate suitability for landscaping and/or other purposes.

Below the surficial materials, only one stratum, which was identified as man-made fill, was encountered at the borings within boring termination depths. The following table summarizes the generalized soil descriptions from the available subsurface exploration.

Table 3-2: Summary of Subsurface Conditions at Walker Gate

Geologic Strata	Soil Description	USCS Classification		SPT N-values	
		Primary	Secondary	Min	Max
Fill	Generally composed of soils obtained from nearby natural soils. The soils from this stratum generally retain some of the properties of the parent soil, but may contain debris and organic material.	CL	SM	3	28

3.4. GROUNDWATER

Groundwater was encountered at Boring KG-B-03, KG-B-06 and KG-B-11 at depth of 29.0 feet, 6.3 feet and 8.7 feet during the time of drilling, respectively. It should be noted that groundwater levels fluctuate with seasonal and climatic variations and may be different at other times and locations than those stated in this report.

3.5. EXISTING PAVEMENT

We obtained and reviewed the as-built plans from VDOT. The following table summarizes the available existing pavement information at the project site near Kingman Gate. These as-built roadway plans and typical section sheets are included in Appendix G.

Table 3-3: Pavement Information from As-Built Plans

Location	Pavement Section	Source of Information
Fairfax County Parkway Eastbound Main Lane	1.5 inches Surface Course - Asphalt Concrete	1995 Plans
	2.0 inches Intermediate Course - Asphalt Concrete	
	5.0 inches Base Course - Asphalt Concrete	
	3.0 inches Asphalt-Stabilized Open-Graded Material	
	8.0 inches Subbase - Cement-Treated Aggregate Material	
Fairfax County Parkway Eastbound Shoulder	3.0 inches of Surface Course - Asphalt Concrete	
Kingman Road	1.5 inches Surface Course - Asphalt Concrete	
	5.5 inches Base Course - Asphalt Concrete	
	6.0 inches Subbase - Cement-Treated Aggregate Material	

At Kingman Gate, seven (7) pavement cores (KG-PC-01 through KG-PC-07) were obtained along Fairfax County Parkway eastbound and three (3) pavement cores (KG-PC-08 through KG-PC-10) were obtained along Kingman Road. At Walker Gate, four (4) pavement cores (WG-PC-01 through WG-PC-03 and Pavement Core at WG-B-02) were obtained along Mount Vernon Memorial Highway. The pavement core photos and information are included in Appendix B. Upon completion of the field exploration, all pavement core holes were patched with quick-set concrete mix. Following field operations, the pavement cores were transported to our laboratory for further analysis and documentation. Table below summarize the pavement thickness information at boring and pavement coring locations.

Table 3-4: Summary of Pavement Information at Boring & Coring Locations

Boring/Core Number	Station	Offset (feet)	Existing Lane ID	AC Thickness (inches)	OGDL Thickness (inches)	CTA Thickness (inches)	GAB Thickness (inches)	Remarks
Fairfax County Parkway Eastbound (Kingman Gate)								
KG-PC-01	103+00	5.75 LT	Right Lane	9.0	2.5	2.5	6.0	CTA broke into several pieces and not fully recovered
KG-PC-02	105+00	22.0 LT	Left Lane	9.5	2.5	0.0	6.0	
KG-PC-03	109+25	28.25 LT	Left Lane	10.5	3.0	0.0	6.0	
KG-PC-04	110+90	51.5 LT	Inside Left Turn Lane	12.0	0.0	0.0	6.0	
KG-PC-05	115+00	11.75 LT	Right Lane	8.8	2.7	0.0	6.0	
KG-PC-06	117+00	0.0	Right Shoulder	9.0	0.0	0.0	6.0	Top 3.5" of AC broke into 3 pieces due to surface cracks; Bottom 5.5" of AC was intact
KG-PC-07	119+00	18.25 LT	Left Lane	11.5	0.0	0.0	6.0	
KG-B-01	104+00	3.75 RT	Right Shoulder	5.0	0.0	0.0	3.0	Augered through existing pavement
KG-B-02	106+00	0.0	Right Shoulder	6.0	0.0	0.0	4.0	Augered through existing pavement
KG-B-03	113+70	1.0 LT	Right Shoulder	2.4	0.0	0.0	6.0	Augered through existing pavement
KG-B-06	108+05	7.5 RT	Right Shoulder	3.5	0.0	0.0	2.5	Augered through existing pavement
KG-B-07	110+13	7.5 RT	Right Shoulder	5.0	0.0	0.0	3.0	Augered through existing pavement
KG-B-08	111+18	7.5 RT	Right Shoulder	5.0	0.0	0.0	4.0	Augered through existing pavement
KG-B-09	112+55	3.0 LT	Right Shoulder	4.0	0.0	0.0	3.6	Augered through existing pavement
KG-B-10	115+75	3.0 RT	Right Shoulder	5.0	0.0	0.0	1.0	Augered through existing pavement
KG-B-11	117+75	6.25 RT	Right Shoulder	5.0	0.0	0.0	3.0	Augered through existing pavement

Table 3-4: Summary of Pavement Information at Boring & Coring Locations (Continues)

Boring/Core Number	Station	Offset (feet)	Existing Lane ID	AC Thickness (inches)	OGDL Thickness (inches)	CTA Thickness (inches)	GAB Thickness (inches)	Remarks
John J. Kingman Rd (Kingman Gate)								
KG-PC-08	204+40	23.5 RT	Northbound Right Lane	5.5	0.0	0.0	6.0	
KG-PC-09	205+25	34.75 LT	Southbound Right Lane	2.5	0.0	3.0	3.0	
KG-PC-10	207+25	23.25 LT	Southbound Left Lane	5.2	0.0	3.0	4.0	
KG-B-12	204+25	19.5 RT	Northbound Right Lane	5.0	0.0	0.0	8.2	Augered through existing pavement
KG-B-15	207+25	35.5 LT	Southbound Right Lane	6.0	0.0	3.0	8.4	Augered through existing pavement
Mount Vernon Memorial Highway (Walker Gate)								
WG-PC-01	305+50	29.0 LT	Westbound Through Lane	7.8	0.0	0.0	0.0	
WG-B-02	310+50	16.75 LT	Eastbound Lane	7.5	0.0	0.0	0.0	
WG-PC-02	315+50	21.5 LT	Eastbound Lane	7.0	0.0	0.0	0.0	
WG-PC-03	320+50	9.0 LT	Eastbound Lane	9.0	0.0	0.0	0.0	
WG-B-09	322+50	9.5 RT	Eastbound Right Turn Lane	5.0	0.0	0.0	4.9	Augered through existing pavement

Kingman Gate: Along Fairfax County Parkway eastbound, Pavement Cores KG-PC-01 through KG-PC-07 indicated asphalt concrete (AC) thicknesses ranging from 8.8 to 12.0 inches, with an average thickness of about 10.0 inches. Approximate 2.5 to 3.0 inches of Asphalt-Stabilized Open-Graded Material (ASOGM) was encountered beneath the asphalt concrete at KG-PC-01 through KG-PC-03 and KG-PC-05. Approximate 2.5 inches of loosely bound Cement-Treated Aggregate (CTA) was also encountered beneath the ASOGM at KG-PC-01. Graded Aggregate Base (GAB) with thicknesses of 6 inches was encountered beneath the AC, ASOGM or CTA in these core locations. Along Kingman Road, Pavement Cores KG-PC-08 through KG-PC-10 indicated asphalt concrete (AC) thicknesses ranging from 2.5 to 5.5 inches, with an average thickness of 4.4 inches. Approximate 3.0 inches of Cement-Treated Aggregate (CTA) was also encountered beneath the AC at KG-PC-09 and KG-PC-10. Graded Aggregate Base (GAB) with thicknesses of 3 to 6 inches was encountered beneath the AC or CTA in these core locations.

Walker Gate: Along Mount Vernon Highway, Pavement Cores WG-PC-01 through WG-PC-03 and WG-B-02 indicated asphalt concrete (AC) thicknesses ranging from 7.0 to 9.0 inches, with an average thickness of about 7.9 inches. No historic plan inside the project limit of Walker Gate was available from VDOT for review.

Kingman Road (from GPR results): Figure 2 through 7 in Appendix C shows the pavement profile from GPR results for Kingman Road within the project limits. The approximate depths of interpreted layers including asphalt concrete (AC), Graded Aggregate Base (GAB) and/or Cement-Treated Aggregate (CTA) were plotted against the station numbers on each scanned lane. It should be noted there is no clear boundary between GAB and CTA due to similarity of electromagnetic material property between GAB and CTA. It should be also noted that there is a signal disturbance near Station 202+90 due to possible utility across the road. Below table is a summary of the estimated AC, GAB/CTA thicknesses in each lane.

Table 3-5: Summary of Estimated Pavement Profile Thickness from GPR Results for Kingman Rd

Lane ID	AC Thickness (inch)			GAB and/or CTA Thickness (inch)		
	Min	Max	Mean	Min	Max	Mean
Northbound Right Turn Lane	4.0	6.0	5.0	3.0	12.0	8.0
Northbound Right Lane	4.0	8.0	5.5	3.0	12.0	7.5
Northbound Left Lane	4.0	8.0	5.0	5.5	13.0	7.0
Southbound Left Turn Lane	3.0	8.0	5.0	3.0	9.0	7.0
Southbound Left Lane	2.0	6.0	3.5	3.0	10.5	7.0
Southbound Right Lane	3.0	6.0	5.0	5.0	12.5	8.0

3.6. PAVEMENT CONDITIONS

We performed pavement condition survey and patching survey for the existing pavement within the project limits. The select photos of our pavement condition survey are included in Appendix B. Below is the summary of our pavement condition survey results.

Kingman Gate
Fairfax County Parkway eastbound main through and left turn lanes is in satisfactory to fair condition with low to moderate severity fatigue cracking, low to moderate severity longitudinal and transverse cracking, low to moderate severity edge cracking and a moderate severity pothole. Fairfax County Parkway eastbound right turn lane and right shoulder are in fair to very poor condition with moderate to high severity longitudinal and transverse cracking, moderate severity block cracking. We also observed tension crack and shoulder drop-off (about 8 inches) approximately between Stations 113+50 and 114+10. The tension crack and shoulder drop-off typically indicates that the slope is distressed and has sign of potential slope instability.

Kingman Road within the project limit is in very poor to serious condition with moderate to high severity fatigue cracking, high severity longitudinal cracking, rutting, potholes with patching and significant patch

deterioration. The photos of pavement conditions on Fairfax County Parkway EB and Kingman Road are included in Appendix B.

Walker Gate

Mount Vernon Memorial Highway eastbound and westbound are in satisfactory to good condition with low to moderate severity fatigue cracking and low severity edge cracking which were mainly observed on eastbound between Stations 303+50 and 304+50. Other sections within the project limit show no or little pavement distress.

4.0 GEOTECHNICAL AND PAVEMENT RECOMMENDATIONS

4.1. GENERAL PAVEMENT RECOMMENDATIONS

Based on our pavement patch survey per VDOT MOI Chapter VI Section 601.03 Patching Survey Guidelines and our pavement analyses, we recommend mill & overlay for Fairfax County Parkway eastbound main through and left turn lanes and full depth patches (new pavement) for Fairfax County Parkway eastbound right turn lane and right shoulder and Kingman Road northbound and southbound.

4.2. PAVEMENT DESIGN

We performed pavement design for new pavement (widening area) and mill & overlay (existing pavement) per VDOT Manual of Instructions (MOI) Chapter VI Section 603 *Guidelines for 1993 AASHTO Pavement Design*. Detailed pavement design calculations are included in the Appendix E of this report. The design traffic data for the proposed improvement is provide by WSP and is summarized in Table 4-1.

Table 4-1: Design Traffic Data

	Fairfax County Parkway Eastbound	**Kingman Road**	**Mount Vernon Memorial Highway**
New Pavement Design Life (Years)	30	30	30
Overlay Design Life (Years)	12	12	12
Initial Design Year	2022	2022	2022
Two-way AADT (Initial)	23,980	18,125	14,211
Annual Growth Rate	0.7%	0.7%	0.5%
Directional Ratio (Pavement Design)	54.9%	50.0%	58.5%
Percent Cars/Passenger Vehicles	99%	98%	99%
Percent Single Unit Trucks	1%	1%	1%
Percent Tractor Trailer Trucks	0%	1%	0%

We collected bulk samples from eight (8) locations and performed California Bearing Ratio (CBR). Table 4-2 shows the laboratory results. The design CBR values are selected as two-thirds of the average laboratory CBR values per VDOT MOI.

Table 4-2: Summary of Laboratory and Design CBR Values

Roadway ID	Laboratory CBR Values			Design CBR Values	Reference Boring IDs
	Min	Max	Average		
Fairfax County Parkway Eastbound	10.0	14.2	12.6	8.4	KG-B-01 KG-B-02 KG-B-03
Kingman Road	5.4	14.2	9.2	6.1	KG-B-04 KG-B-05 KG-B-14
Mount Vernon Memorial Highway	5.1	16.9	10.4	6.9	WG-B-01 WG-B-02 WG-B-03 WG-B-08

Below are our pavement recommendations. The pavement widening should be performed in accordance with VDOT standard detail WP-2 for asphalt pavement widening. VDOT standard UD-4 edge drains should be installed beneath the curb and gutter of all new pavements. The underdrain pipes should be either connected to existing underdrain or storm structures.

Table 4-3: New Pavement or Full Depth Patch

Location	Pavement Section
Fairfax County Parkway Eastbound	Surface Course (SM-9.5E) = 2.0” Intermediate Course (IM-19.0D) = 2.0” Base Course (BM-25.0D) = 5.0” Drainage Layer (Asphalt-Stabilized Open-Graded Material[a]) = 3.0” Subbase Course (Cement-Treated Aggregate Material Size 21A) = 8.0”
Kingman Road	Surface Course (SM-9.5E) = 2.0” Intermediate Course (IM-19.0D) = 2.0” Base Course (BM-25.0D) = 3.0” Subbase Course (Cement-Treated Aggregate Material Size 21A) = 8.0”
Mount Vernon Memorial Highway Eastbound	Surface Course (SM-9.5E) = 3.0”[b] Base Course (BM-25.0D) = 5.0” Subbase Course (Aggregate Base No. 21B) = 6.0” [c] Subbase Course (Cement-Treated Aggregate Material Size 21A) = 6.0” [c]

Note: a. Asphalt-Stabilized Open-Graded Material shall comply with VDOT Road and Bridge Specifications Section 313.
b. The surface course shall be placed in two equal lifts with tack coat between lifts.
c. Aggregate Base No. 21B shall be for the drainage low side; while Cement-Treated Aggregate Material Size 21A shall be used for the drainage high side;

Table 4-4: Mill & Overlay[a]

Fairfax County Parkway Eastbound Main Through and Left Turn Lanes	Mill 2.0 inches and replace with 2.0 inches SM 9.5E
Kingman Road	Based on the existing pavement thickness (varying from 2.0" to 8.0") and our pavement analysis, we recommend that the existing pavement be re-constructed. This is due to two reasons: (1) traffic; (2) existing pavement is insufficient for mill & overlay.
Mount Vernon Memorial Highway Eastbound	Mill 3.0 inches and replace with 3.0 inches SM 9.5E[b]

Note: a. The tack coat shall be applied between Asphalt lifts, to all vertical faces and on top of milled existing Asphalt. The tack coat shall comply with VDOT Road and Bridge Specification Section 310.
b. The surface course shall be placed in two equal lifts with tack coat between lifts.

4.3. FILL AND CUT SLOPES

VDOT MOI Chapter III defines critical slope as "any slope that is greater than 25 feet in height, affects or supports a structure (i.e. irrespective of height), impounds water or whose failure would result in significant cost for repair, or damage to private property". Based on the plans and cross sections prepared by WSP dated August 20, 2020, the proposed slope heights are less than 25 feet and are not considered critical slopes. We have performed slope stability analyses at three selected locations as summarized in Table 4-5.

Table 4-5: Slope Stability Analysis Sections

Slope Location	Analyzed Cross-Section (Station)	Maximum Slope Height (feet)	Factor of Safety (FS)	Reference Borings
Fairfax County Parkway Eastbound Stations 102+25 to 108+00	106+00	10.2	1.3	KG-B-02
Fairfax County Parkway Eastbound Stations 112+75 to 119+00	113+75	12.7	1.0	KG-B-03
Kingman Road Southbound Stations 202+00 to 202+50	202+25	10.0	1.8	KG-B-05

The slope stability analyses were performed by *Slide 7.0* computer program using a limit equilibrium analysis method (e.g., Bishop Simplified). The factor of safety (F.S.) against slope instability computed by the program is defined as the ratio of the sum of the resisting moments (or forces) divided by the sum

of the driving moments (or forces) along a specified potential slip surface. During this analysis, numerous conditions and potential slip surfaces were analyzed. The computer outputs show the most critical surfaces and their safety factors. The results of the slope global stability analyses are summarized in Table 4-5. The slope stability analysis results are included in Appendix F.

The slope stability analysis results show the factors of safety are below 1.3 (from Station 112+75 to 119+00) and barely meet 1.3 (from Station 102+25 to 108+00) for both proposed and existing slope at Fairfax County Parkway eastbound. The results are consistent with the field observation of distressed slope condition with high severity pavement distress. We recommend the section of existing slope from Stations 102+25 to 108+00 and 112+75 to 119+00 be removed and reconstructed with new fill materials and riprap slope toe to meet the minimum required factor of safety of 1.3 per Figure 2 in Appendix A. VDOT Select Material Type II or III and VDOT Riprap Class I should be used as the new embankment fill and riprap materials, respectively in accordance with *Section 207 – Select Material and Section 204 – Stone for Masonry, Riprap, Porous Backfill and Gabions of the VDOT Road and Bridge Specifications.* VDOT Class B Geotextile should be placed between the riprap and soils in accordance with *Section 245 – Geosynthetics and Low Permeability Liners of the VDOT Road and Bridge Specifications.*

4.4. SITE PREPARATION

Site preparation should consist of any proposed demolition, removing existing underground utilities, existing structures, topsoil and vegetation, and any other soft or unsuitable material from the proposed construction areas. Utilities such as pipes should be removed entirely or abandoned by filling the pipe with grout to prevent future migration of soils into the pipe. Voids resulting from the removal of tree stumps should be filled with compacted structural fill. Disposal of demolition debris should be performed in accordance with local, state and federal regulations. Additional requirements included in *Section 301 – Clearing and Grubbing* of the *VDOT Road and Bridge Specifications* should be followed.

4.5. EARTHWORK

The earthwork for the proposed roadway and sidewalk construction should be performed in accordance with *Section 303 – Earthwork of the VDOT Road and Bridge Specifications*. Additional site specific recommendations are discussed in the following paragraphs.

4.6. SUBGRADE PREPARATION

Following the site preparation and any required excavation, the newly exposed roadway and sidewalk subgrade should be evaluated by an authorized representative of the Geotechnical Engineer of Record. During this evaluation, we recommend that all subgrade areas be proof-rolled using a fully loaded tandem axle dump truck (10-ton minimum) or similar rubber-tired vehicle. The proofrolling should be performed in such a pattern that the entire subgrade areas are loaded with at least one pass. Areas that are not accessible to proofrolling may be evaluated using other suitable methods such as a steel probe rod.

If the subgrade exhibits excessive deflections or pumping when proof-rolled or soft subgrade is detected by probing, an appropriate remedial measure would be recommended by the Geotechnical Engineer of Record at that time. Potential problem subgrade areas as identified by this soil investigation and the

recommended remedial measures are detailed in the following paragraphs. The stabilized subgrade areas should be again evaluated and approved by the Geotechnical Engineer of Record prior to fill placement or pavement installation.

4.7. UNSUITABLE SOILS

Unsuitable soils generally include soils that have excessive moisture, high plasticity (Liquid Limits greater than 50%), soils with low SPT N-values (less than 5 bpf), low CBR value (CBR < 5), high swell (swell >5%), and soils containing excessive debris and organics. The types and recommended treatment methods of the unsuitable soils are discussed in detail in the following paragraphs.

Highly Plastic or High Swell (>5%) Subgrade Soils: Highly plastic or high swell soils were not encountered at the proposed subgrade elevations in any of the roadway borings.

Low CBR, Soft/Loose, and Excessively Moist Subgrade Soils: Low CBR (< 5) soils were not encountered at the proposed subgrade elevations in any of the roadway borings while soft/loose soils (SPT N-values less than 5 bpf) were encountered in Borings KG-B-03 and WG-B-07 within the proposed subgrade elevation. In addition, the soils at/near the proposed subgrade along the project alignment were found to be excessively moist at the time of field exploration and this condition has the potential to cause pumping problems during subgrade and base construction. If soft/loose unsuitable soils are encountered at locations shown in Table B2 of Appendix B (e.g., Station 318+50 on Mount Vernon Hwy), we recommend that 3 feet of subgrade soils be undercut and replaced with compacted VDOT Select Material Type I with a minimum CBR value of 30 in accordance with *Section 207 – Select Material of the VDOT Road and Bridge Specifications*. If unsuitable subgrade soils with excessive moisture are encountered, we recommend that 3 feet of subgrade soils be undercut and replaced with compacted VDOT Select Material Type I with a minimum CBR value of 30 or dry up the top 2 feet of subgrade soils beneath the proposed pavement using mechanical means to within 120% of the optimum moisture content and recompact in place as suggested in Table B2 of Appendix B. Depending on the weather conditions at the time of subgrade construction, the locations and quantities of the excessively moist subgrade soils may be different and may be adjusted by the Geotechnical Engineer of Record or an authorized representative at the time of construction.

5.0 LIMITATIONS

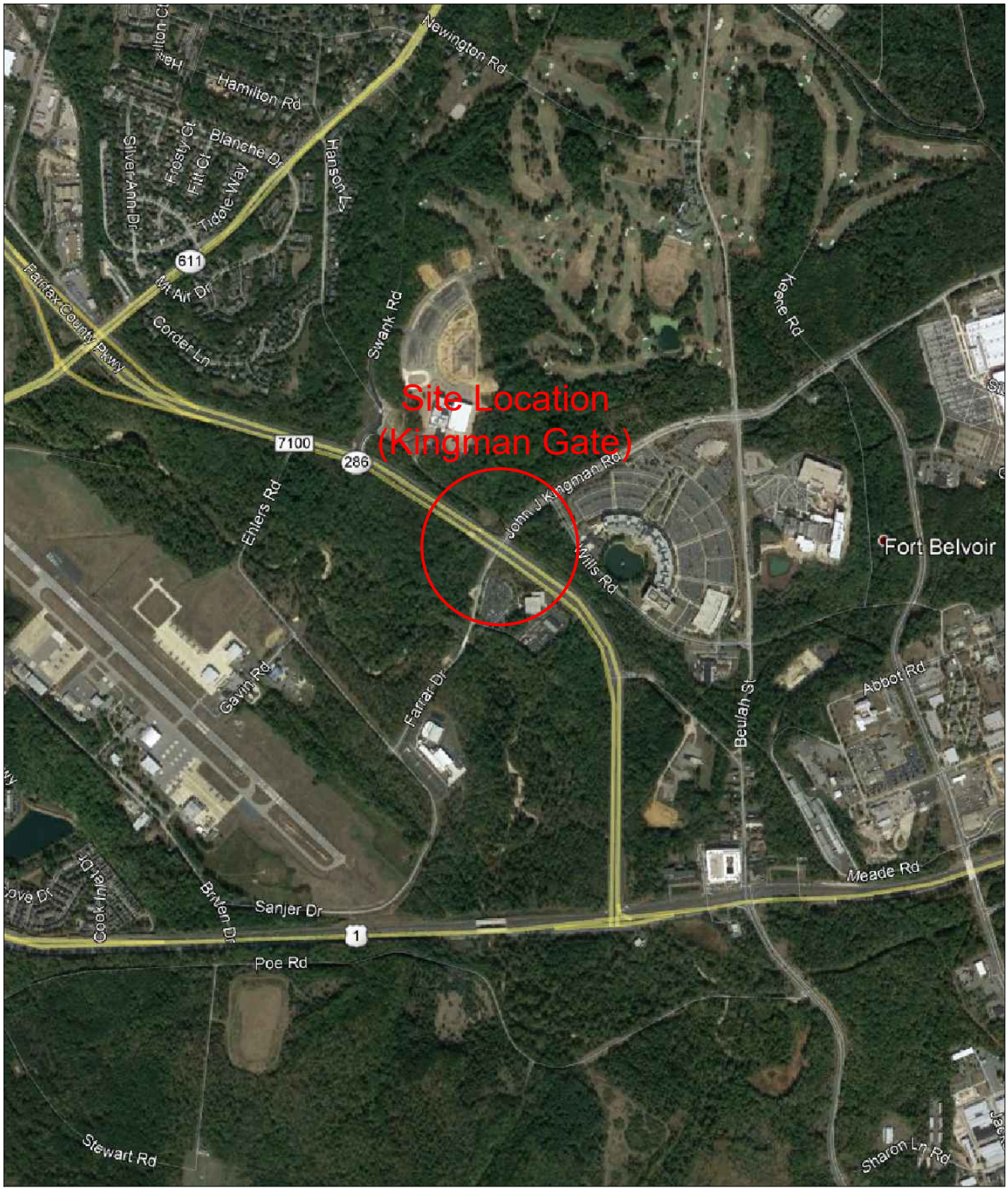
The recommendations provided are based in part on project information provided to us and are only applied to the specific project and site discussed in this report. If the project information section in this report contains incorrect information or if additional information is available, DMY should be contacted to review our recommendations. We can then modify our recommendations for the proposed project.

Regardless of the thoroughness of a subsurface investigation, there is always a possibility that subsurface conditions may vary from those documented during a subsurface exploration at specific locations. In addition, the construction process itself may alter subsurface conditions. Therefore, experienced geotechnical personnel should be engaged to observe and document the construction procedures used and the conditions encountered. Unanticipated conditions and inadequate procedures

should be reported to the design team along with timely recommendations. We recommend that DMY be retained to provide this service based upon our familiarity with the project, the subsurface conditions, and the intent of the recommendations.

We have prepared this report for use by the design professionals for design purposes in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made as to the professional advice included in this report.

APPENDIX A FIGURES



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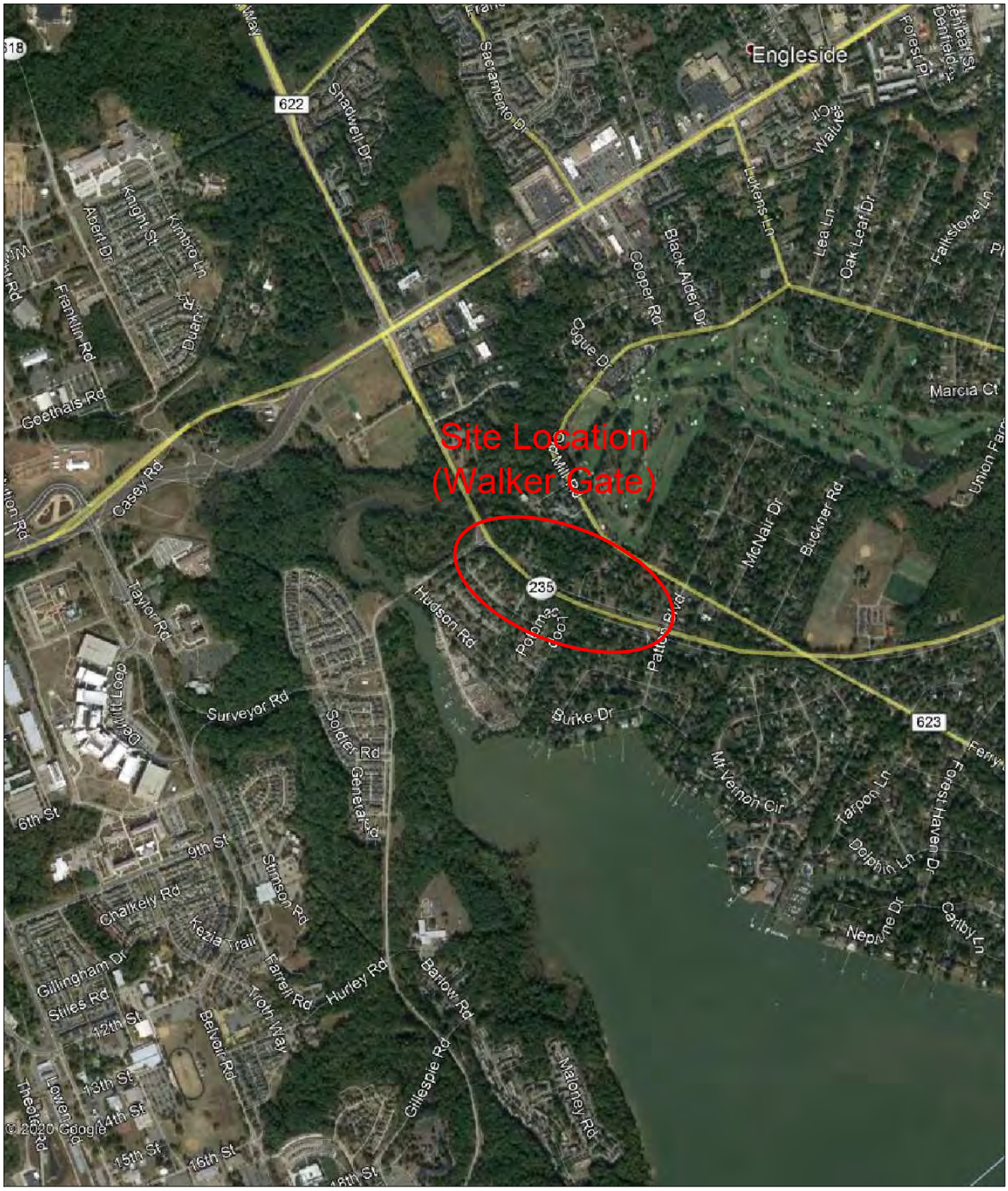
SITE LOCATION MAP

DMY ENGINEERING CONSULTANTS INC.
4170 LAFAYETTE CENTER DR, SUITE 500
CHANTILLY, VIRGINIA 20151
PHONE: (703) 665-0586
FAX: (301) 768-4169

FORT BELVOIR KINGMAN AND WALKER GATES
FAIRFAX COUNTY, VIRGINIA

DATE:	DRAFTED BY:	PROJECT NO.:
8/22/2020	JY	01.04361.01
SCALE:	CHECKED BY:	FIGURE NO.:
1"=2000'	XC	1A



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SITE LOCATION MAP

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CHANTILLY, VIRGINIA 20151
PHONE: (703) 665-0586
FAX: (301) 768-4169

FORT BELVOIR KINGMAN AND WALKER GATES
FAIRFAX COUNTY, VIRGINIA

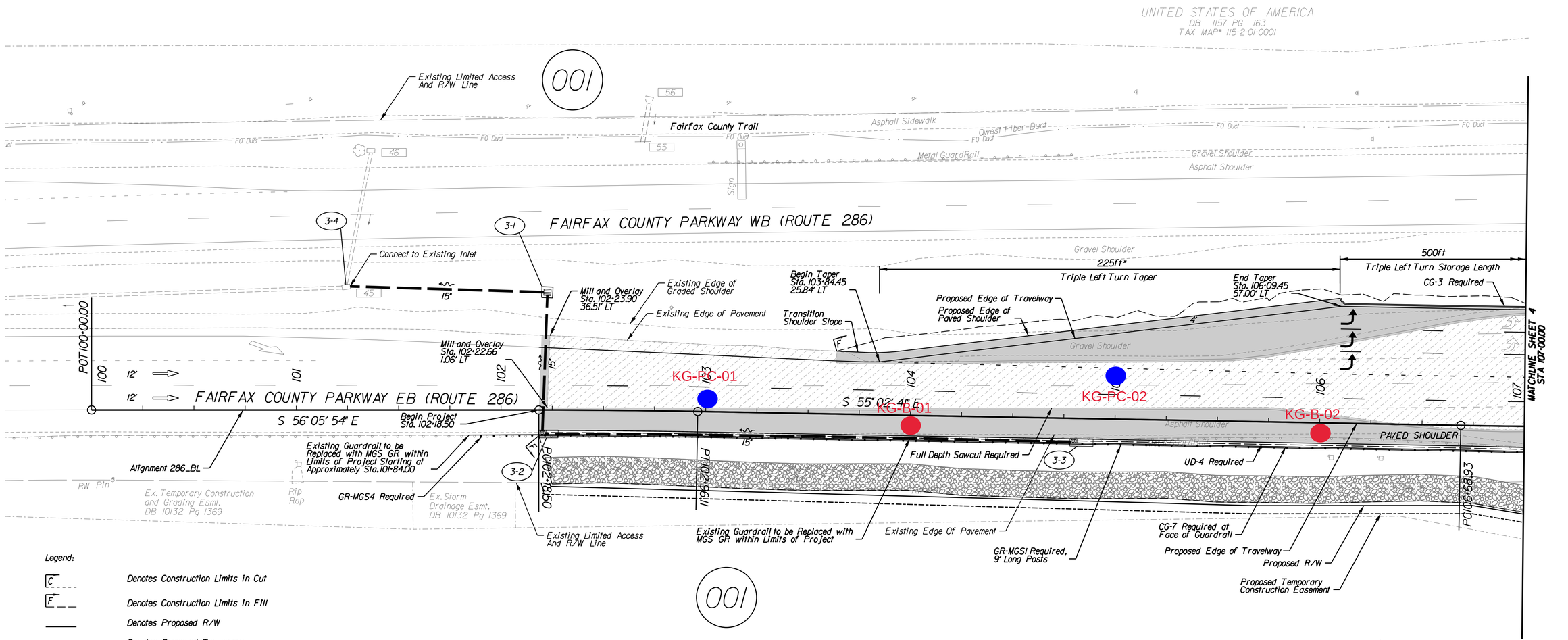
DATE:	DRAFTED BY:	PROJECT NO.:
8/22/2020	JY	01.04361.01
SCALE:	CHECKED BY:	FIGURE NO.:
1"=2000'	XC	1B

PROJECT MANAGER EDEN JEMAL, PE, PMP (703) 404-6323 (EFLHD)
SURVEYED BY, DATE RICE ASSOCIATES, (703) 968-3200, OCTOBER 2019, SUPPLEMENTED MAY 2020
DESIGN SUPERVISED BY TIMOTHY J RAMEY, PE (WSP USA INC.)
DESIGNED BY MARTHA J ALINKAL, PE (WSP USA INC.)
SUBSURFACE UTILITY BY, DATE RICE ASSOCIATES, (703) 968-3200, OCTOBER 2019

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION.

REVISED	STATE	EASTERN FEDERAL LANDS HIGHWAY DIVISON		SHEET NO.
		ROUTE	PROJECT	
	VA.	286	VA ST FB_KNGMN / WLKR GTS	3

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE GOVERNMENT



* Design waiver for reduced taper length submitted with Intermediate Plans Submission

Soil Boring

Pavement Cores

KINGMAN GATE
PLAN
FAIRFAX COUNTY PARKWAY
STA 100+00.00 TO STA 107+00.00

SCALE	PROJECT	SHEET NO.
0 25' 50'	VA ST FB_KNGMN / WLKR GTS	3

PROJECT MANAGER EDEN JEMAL, PE, PMP (703) 404-6323 (EFLHD)
SURVEYED BY, DATE RICE ASSOCIATES (703) 968-3200, OCTOBER 2019, SUPPLEMENTED MAY 2020
DESIGN SUPERVISED BY TIMOTHY J RAMEY, PE (WSP USA INC.)
DESIGNED BY MARTHA J ALUNKAL, PE (WSP USA INC.)
SUBSURFACE UTILITY BY, DATE RICE ASSOCIATES (703) 968-3200, OCTOBER 2019

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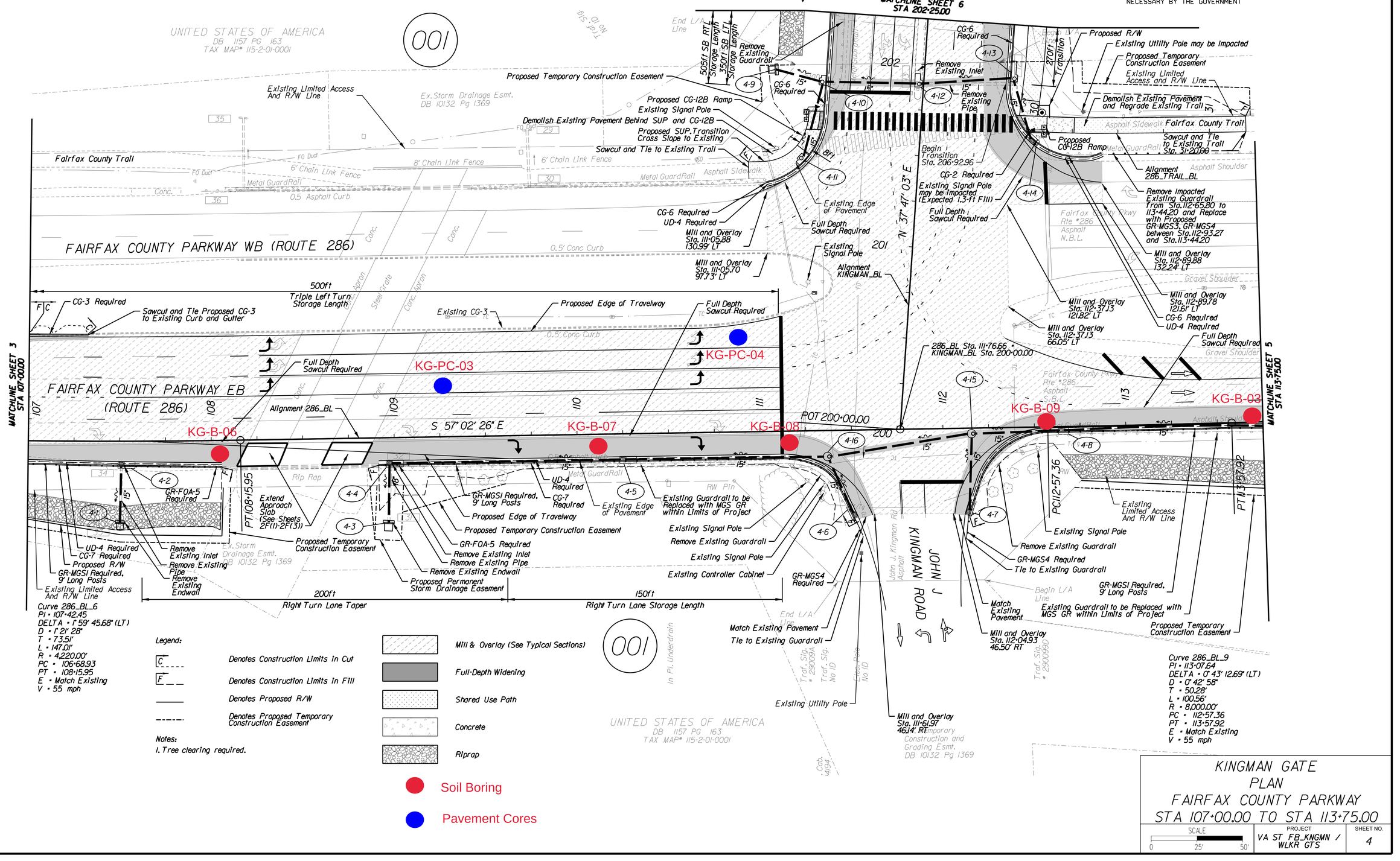
REVISED	STATE	EASTERN FEDERAL LANDS HIGHWAY DIVISON		SHEET NO.
		ROUTE	PROJECT	
	VA.	286	VA ST FB_KNGMN / WLKR GTS	4

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE GOVERNMENT



KINGMAN GATE
PLAN
FAIRFAX COUNTY PARKWAY
STA 107+00.00 TO STA 113+75.00

SCALE	PROJECT	SHEET NO.
0 25' 50'	VA ST FB_KNGMN / WLKR GTS	4

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Plotted By: buchanantm

PROJECT MANAGER EDEN JEMAL, PE, PMP (703) 404-6323 (EFLHD)
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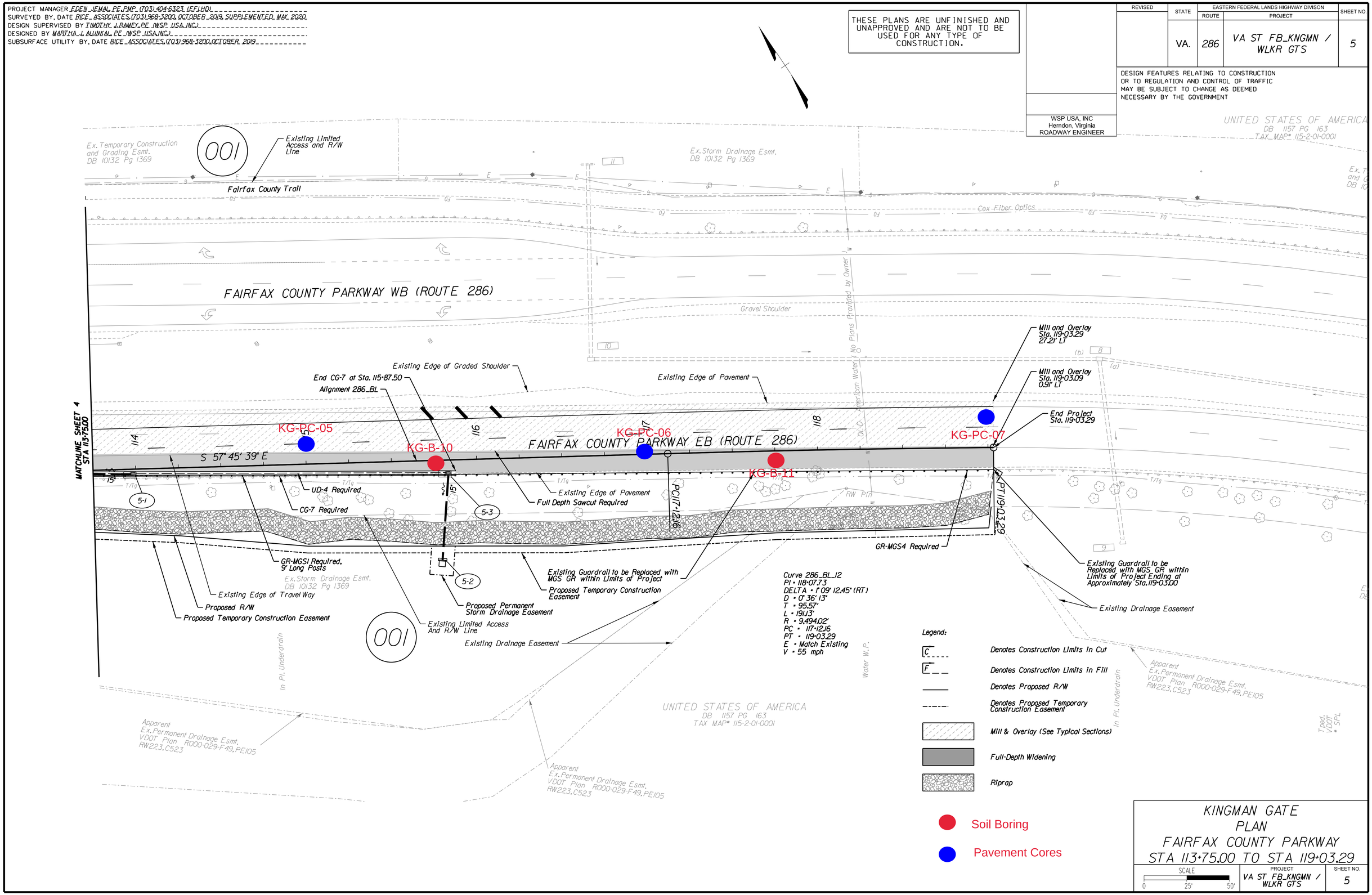
DESIGN SUPERVISED BY TIMOTHY J. RAMEY, PE (WSP USA, INC.)
DESIGNED BY MARTHA J. ALUNKAL, PE (WSP USA, INC.)
SUBSURFACE UTILITY BY, DATE RICE ASSOCIATES (703) 968-3200, OCTOBER 2019

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION.

WSP USA, INC
Herndon, Virginia
ROADWAY ENGINEER

REVISED	STATE	EASTERN FEDERAL LANDS HIGHWAY DIVISON ROUTE	PROJECT	SHEET NO.
	VA.	286	VA ST FB_KNGMN / WLKR GTS	5

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE GOVERNMENT



KINGMAN GATE
PLAN
FAIRFAX COUNTY PARKWAY
STA 113+75.00 TO STA 119+03.29

SCALE	PROJECT	SHEET NO.
0 25' 50'	VA ST FB_KNGMN / WLKR GTS	5

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Plotted By: buchanantm

PROJECT MANAGER EDEN JEMAL, PE, PMP (703) 404-6323 (EFLHD)
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DESIGN SUPERVISED BY TIMOTHY J. RAMEY, PE (WSP USA, INC.)
DESIGNED BY MARTHA J. ALUNKAL, PE (WSP USA, INC.)
SUBSURFACE UTILITY BY, DATE RICE ASSOCIATES (703) 968-3200, OCTOBER 2019

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION.

REVISED	STATE	EASTERN FEDERAL LANDS HIGHWAY DIVISON ROUTE	PROJECT	SHEET NO.
	VA.	286	VA ST FB_KNGMN / WLKR GTS	6

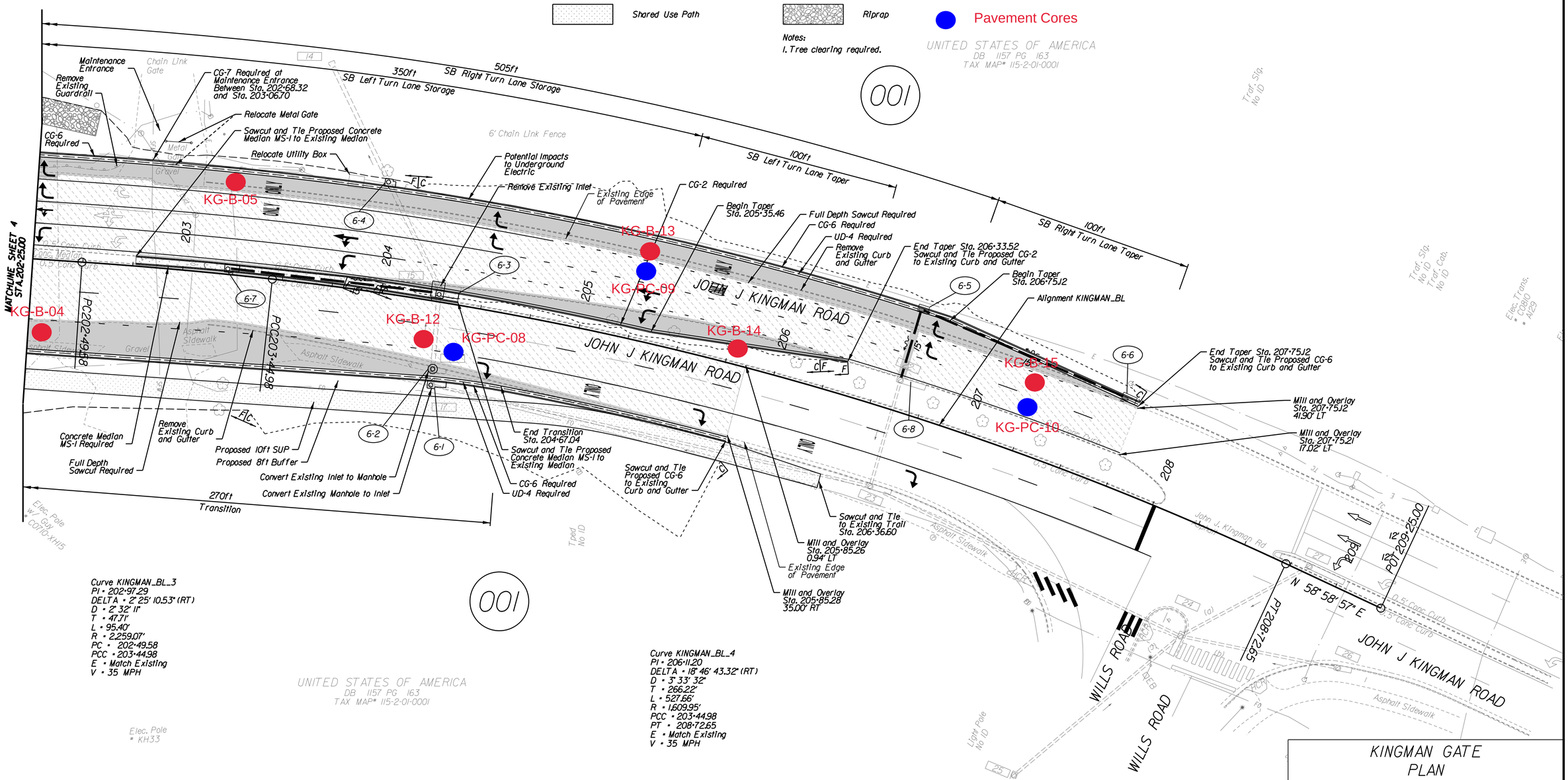
DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE GOVERNMENT

WSP USA, INC
Herndon, Virginia
ROADWAY ENGINEER

Legend:

- C — Denotes Construction Limits In Cut
- F — Denotes Construction Limits In Fill
- Mill & Overlay (See Typical Sections)
- Full-Depth Widening
- Shared Use Path
- Concrete
- Riprap
- Soil Boring
- Pavement Cores

Notes:
1. Tree clearing required.



KINGMAN GATE
PLAN
KINGMAN ROAD
STA 202+25.00 TO STA 209+25.00

SCALE	PROJECT	SHEET NO.
0 25' 50'	VA ST FB_KNGMN / WLKR GTS	6

PROJECT MANAGER EDEN JEMAL, PE, PMP (703) 404-6323 (EFLHD)
SURVEYED BY, DATE RICE ASSOCIATES (703) 968-3200, OCTOBER 2019, SUPPLEMENTED MAY 2020
DESIGN SUPERVISED BY TIMOTHY J. RAMEY, PE (WSP USA, INC.)
DESIGNED BY MARTHA J. ALUNKAL, PE (WSP USA, INC.)
SUBSURFACE UTILITY BY, DATE RICE ASSOCIATES (703) 968-3200, OCTOBER 2019

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION.

REVISED	STATE	EASTERN FEDERAL LANDS HIGHWAY DIVISON		SHEET NO.
		ROUTE	PROJECT	
	VA.	235	VA ST FB_KNGMN / WLKR GTS	7

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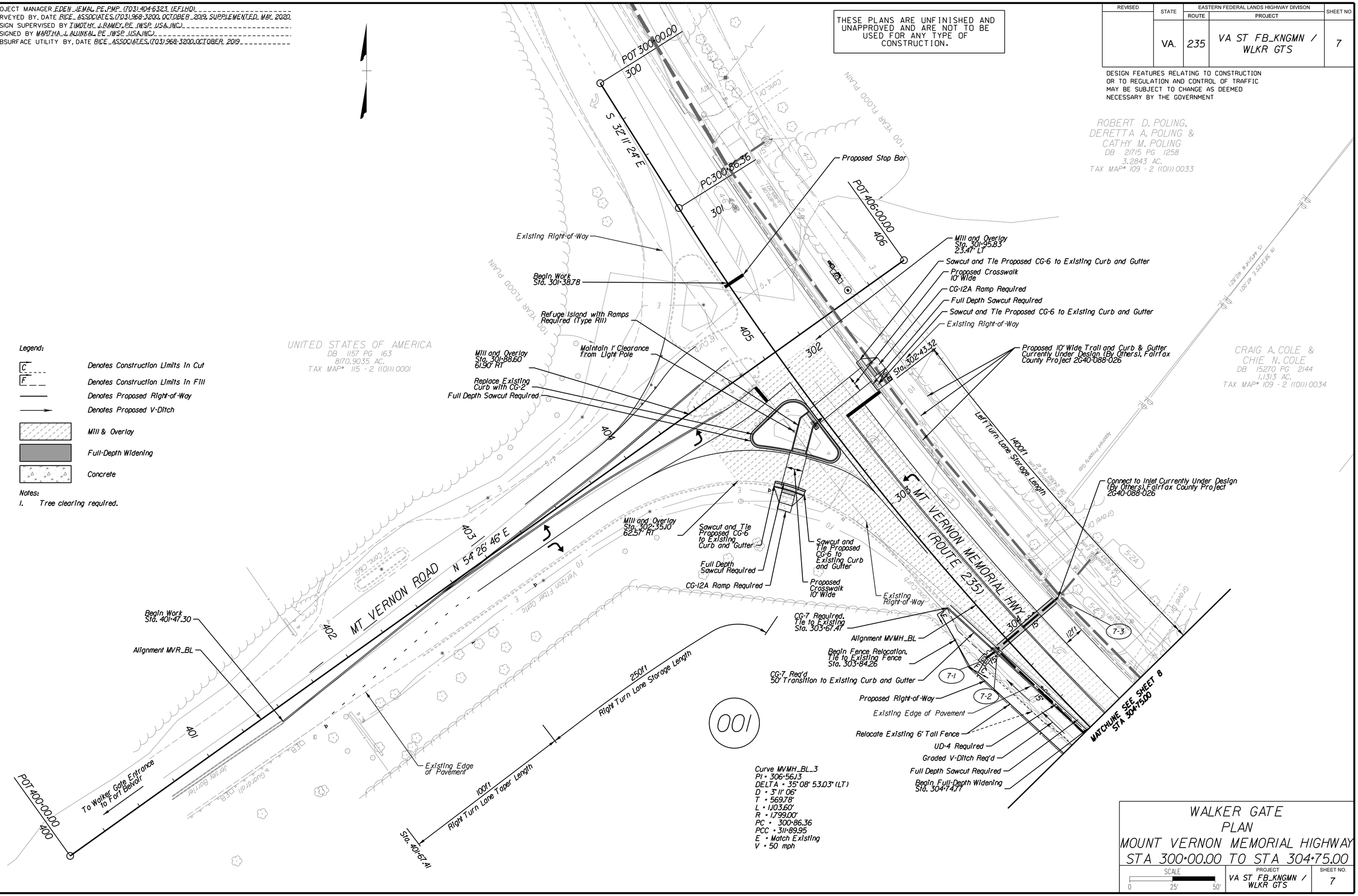

Legend:

- C — Denotes Construction Limits in Cut
- F — Denotes Construction Limits in Fill
- Denotes Proposed Right-of-Way
- Denotes Proposed V-Ditch
- Mill & Overlay
- Full-Depth Widening
- Concrete

Notes:
1. Tree clearing required.

WALKER GATE
PLAN
MOUNT VERNON MEMORIAL HIGHWAY
STA 300+00.00 TO STA 304+75.00

SCALE	PROJECT	SHEET NO.
0 25' 50'	VA ST FB_KNGMN / WLKR GTS	7

1/25/2021
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Plotted By: buchanantm

PROJECT MANAGER EDEN JEMAL, PE, PMP (703) 404-6323 (EFLHD)
SURVEYED BY, DATE RICE ASSOCIATES, (703) 968-3200, OCTOBER 2019, SUPPLEMENTED MAY 2020
DESIGN SUPERVISED BY TIMOTHY J RAMEY, PE (WSP USA INC.)
DESIGNED BY MARTHA J ALVARAL, PE (WSP USA INC.)
SUBSURFACE UTILITY BY, DATE RICE ASSOCIATES, (703) 968-3200, OCTOBER 2019

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION.

REVISED	STATE	EASTERN FEDERAL LANDS HIGHWAY DIVISON		SHEET NO.
		ROUTE	PROJECT	
	VA.	235	VA ST FB_KNGMN / WLKR GTS	8

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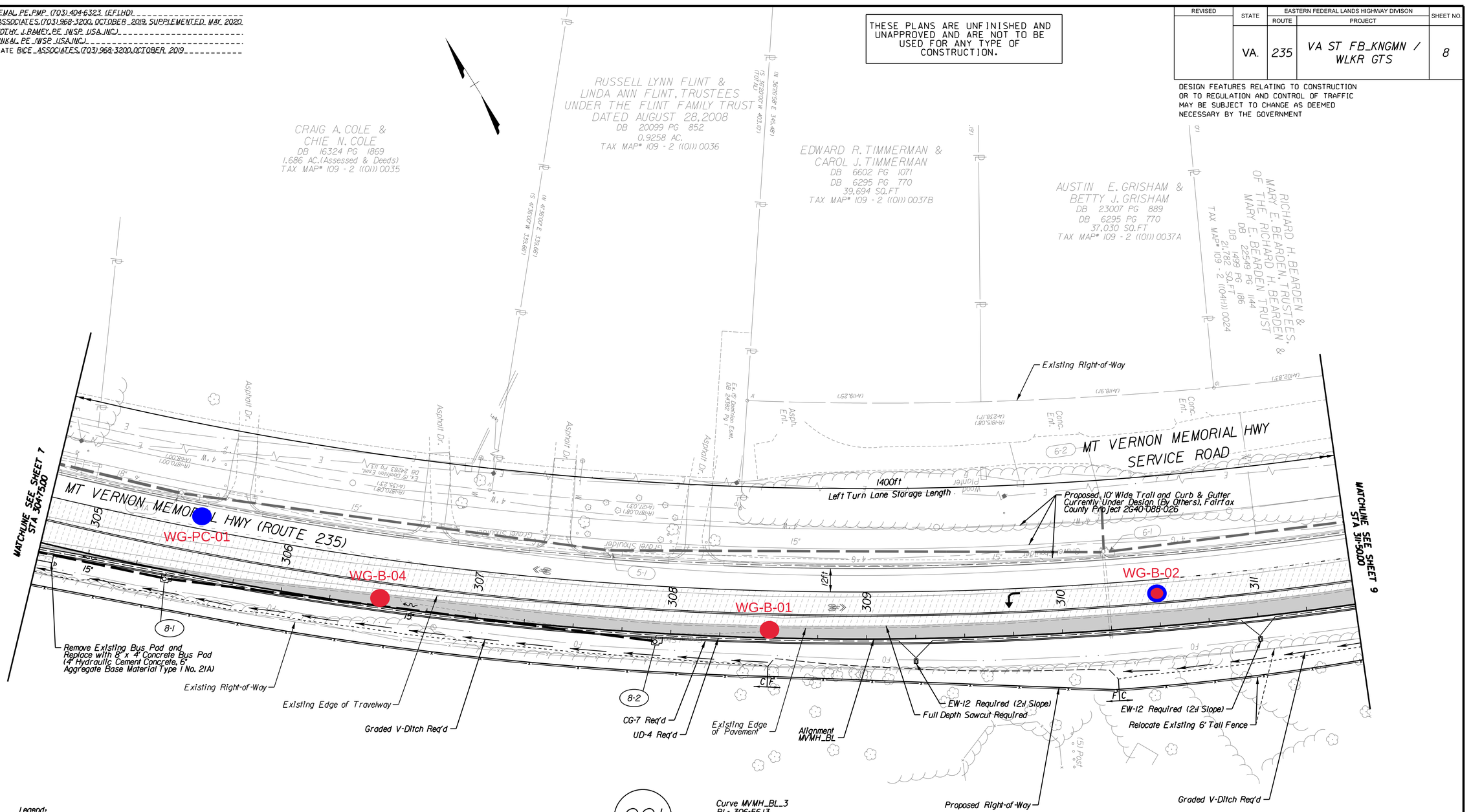

Legend:

- Denotes Construction Limits In Cut
- Denotes Construction Limits In Fill
- Denotes Proposed Right-of-Way
- Denotes Proposed V-Ditch
- Mill & Overlay
- Full-Depth Widening

Notes:
1. Tree clearing required.

- Soil Boring
- Pavement Cores
- Pavement Core + Soil Boring

001

Curve MVMH_BL_3
PI = 306+56.13
DELTA = 35°08' 53.03" (LT)
D = 3°11' 06"
T = 569.78'
L = 1103.60'
R = 1799.00'
PC = 300+86.36
PCC = 311+89.95
E = Match Existing
V = 50 mph

UNITED STATES OF AMERICA
DB 1157 PG 163
8170.9035 AC.
TAX MAP# 115 - 2 ((01)) 0001

WALKER GATE
PLAN
MOUNT VERNON MEMORIAL HIGHWAY
STA 304+75.00 TO STA 311+50.00

SCALE	PROJECT	SHEET NO.
0 25' 50'	VA ST FB_KNGMN / WLKR GTS	8

1/25/2021
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Plotted By: buchanantm

PROJECT MANAGER EDEN JEMAL, PE, PMP (703) 404-6323 (EFLHD)
SURVEYED BY, DATE RICE ASSOCIATES, (703) 968-3200, OCTOBER 2019, SUPPLEMENTED MAY 2020
DESIGN SUPERVISED BY TIMOTHY J RAMEY, PE (WSP USA INC.)
DESIGNED BY MARTHA A ALVAREZ, PE (WSP USA INC.)
SUBSURFACE UTILITY BY, DATE RICE ASSOCIATES, (703) 968-3200, OCTOBER 2019

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION.

REVISED	STATE	EASTERN FEDERAL LANDS HIGHWAY DIVISON		SHEET NO.
		ROUTE	PROJECT	
	VA.	235	VA ST FB_KNGMN / WLKR GTS	9

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE GOVERNMENT

MICHAEL K. POST, FRANCIS M. POST & SHARON K. POST
DB 25518 PG 598
DB 1499 PG 186
21,798 SQ.FT
TAX MAP# 109 - 2 ((04H)) 0023

RICHARD H. BEARDEN & MARY E. BEARDEN, TRUSTEES, OF THE RICHARD H. BEARDEN & MARY E. BEARDEN TRUST
DB 22549 PG 1144
DB 1499 PG 186
21,782 SQ.FT
TAX MAP# 109 - 2 ((04H)) 0024

MARGARET H. ROY & WILLIAM L. ROY
DB 21587 PG 1932
DB 1499 PG 186
21,781 SQ.FT
TAX MAP# 109 - 2 ((04H)) 0016

SUZANNE L. JENNELLE, AS TRUSTEE OF THE SUZANNE L. JENNELLE REVOCABLE TRUST
DB 24827 PG 2078
DB 1499 PG 186
23,158 SQ.FT
TAX MAP# 109 - 2 ((04H)) 0015

JOHN ENGELMAN
DB 25227 PG 222
DB 1499 PG 186
23,745 SQ.FT
TAX MAP# 110 - 1 ((16H)) 0014

THE WALTER A. KLEIN REVOCABLE INTERVIVOS TRUST AND THE JOAN M. KLEIN REVOCABLE INTERVIVOS TRUST
DB 10218 PG 1540
DB 1499 PG 186
24,590 SQ.FT
TAX MAP# 110 - 1 ((16H)) 0013

GRIST MILL ROAD

MT VERMONT MEMORIAL HWY SERVICE ROAD (ROUTE 3110)

MT VERNON MEMORIAL HWY (ROUTE 235)

MT VERNON MEMORIAL HWY SERVICE ROAD (ROUTE 3102)

Existing Right-of-Way

1400ft
Left Turn Lane Storage Length

200ft
Left Turn Lane Taper Length

Sta. 316+56.81

Proposed 10' Wide Trail and Curb & Gutter Currently Under Design (By Others), Fairfax County Project 2G40-088-026

MATCHLINE SEE SHEET 8 STA 311+50.00

MATCHLINE SEE SHEET 10 STA 318+25.00

WG-B-03
WG-B-05
WG-PC-02
WG-B-06

PCC 311+89.95
PT 316+66.53

CG-7 Req'd
UD-4 Req'd
Full Depth Sawcut Required
Existing Edge of Travelway
Graded V-Ditch Req'd
Proposed Right-of-Way
Relocate Existing 6' Tall Fence
Existing Right-of-Way
Alignment MVMH_BL
Existing Edge of Pavement
End Fence Relocation. Tie to Existing Sta. 315+06.16

Curve MVMH_BL_4
PI = 314+28.52
DELTA = 6° 49' 35.7" (LT)
D = 1° 25' 57"
T = 238.57'
L = 476.57'
R = 4,000.00'
PCC = 311+89.95
PT = 316+66.53
E = 2.3%
V = 50 mph

Sta. 316+56.81
600ft
Transition (Travelway/Construction Baseline)

Legend:
- Denotes Construction Limits In Cut
- Denotes Construction Limits In Fill
- Denotes Proposed Right-of-Way
- Denotes Proposed V-Ditch
- Denotes Proposed Flat Bottom Ditch
- Mill & Overlay
- Full-Depth Widening
- Soil Boring
- Pavement Cores

Notes:
1. Tree clearing required.

001

UNITED STATES OF AMERICA
DB 1157 PG 163
8170.9035 AC.
TAX MAP# 115 - 2 ((01)) 0001

TODD L. STEPHENS & BONNIE G. STEPHENS
DB 10097 PG 921
DB 611 PG 256
24,996 SQ.FT
TAX MAP# 109 - 4 ((05A)) 0001

MELISSA K. SCHERMERHORN
DB 22571 PG 1827
DB 611 PG 256
24,000 SQ.FT
TAX MAP# 109 - 4 ((02A)) 0002

NOVA HOLDINGS LLC
DB 25319 PG 493
DB 611 PG 256
24,000 SQ.FT
TAX MAP# 109 -4 ((02A)) 0003

WALKER GATE
PLAN
MOUNT VERNON MEMORIAL HIGHWAY
STA 311+50.00 TO STA 318+25.00

SCALE	PROJECT	SHEET NO.
0 25' 50'	VA ST FB_KNGMN / WLKR GTS	9

1/25/2021
4:12:42 PM

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Plotted By: buchanantm

PROJECT MANAGER EDEN JEMAL, PE, PMP (703) 404-6323 (EFLHD)
SURVEYED BY, DATE RICE ASSOCIATES, (703) 968-3200, OCTOBER 2019, SUPPLEMENTED MAY 2020
DESIGN SUPERVISED BY TIMOTHY J RAMEY, PE (WSP USA INC.)
DESIGNED BY MARTHA J ALVAREZ, PE (WSP USA INC.)
SUBSURFACE UTILITY BY, DATE RICE ASSOCIATES, (703) 968-3200, OCTOBER 2019

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION.

REVISED	STATE	EASTERN FEDERAL LANDS HIGHWAY DIVISON		SHEET NO.
		ROUTE	PROJECT	
	VA.	235	VA ST FB_KNGMN / WLKR GTS	10

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE GOVERNMENT

MATCHLINE SEE SHEET 9 STA 318+25.00

ANTHONI MARC ROJOTTE & KELLEY RENNE ROJOTTE, TRUSTEES UNDER THE ROJOTTE FAMILY TRUST DATED APRIL 13, 2020
DB 26191 PG 1432
DB 1499 PG 186 (Plat)
23,254 SQ.FT
TAX MAP# 110 -1 ((16H)) 0011

ANDREW E. WORMSER & TIMOTHY J. MYERS
DB 23914 PG 1359
DB 1499 PG 186 (Plat)
21,937 SQ.FT
TAX MAP# 110 -1 ((16H)) 0010

JOHN E. MONNO & CHERYL C. BASALA
DB 11858 PG 1906
DB 1426 PG 82 (Plat)
21,792 SQ.FT
TAX MAP# 110 -1 ((16H)) 0008

CHARLES T. BIITNER JR. & SAMANTHA SCHER BIITNER
DB 25345 PG 204
DB 1426 PG 82 (Plat)
21,790 SQ.FT
TAX MAP# 110 -1 ((16H)) 0009

ANDREW JACKSON BONDURANT JR., TRUSTEE OF THE ANDREW JACKSON BONDURANT JR. TRUST DATED MARCH 16, 2012 & GRETCHEN MARY MARTHA BONDURANT TRUSTEE OF THE GRETCHEN MARY MARTHA BONDURANT TRUST DATED MARCH 16, 2012
DB 22238 PG 197
DB 1499 PG 186 (Plat)
24,557 SQ.FT
TAX MAP# 110 -1 ((16H)) 0012

DONALD A. SUBERROC & PATRICIA E. SUBERROC
DB 8751 PG 1283
DB 611 PG 256
24,000 SQ.FT
TAX MAP# 110 - 3 ((05A)) 0004

JAMES LEROY RHODES, JR. & MARCY ANN RHODES
DB 9570 PG 1349
DB 611 PG 256
24,000 SQ.FT
TAX MAP# 110 - 3 ((05A)) 0005

MARY EVELYN MORRIS
DB 10175 PG 250
DB 611 PG 256
24,000 SQ.FT
TAX MAP# 110 - 3 ((05A)) 0006

KENNETH S. HAMMOND & BARBARA L. HAMMOND
DB 11475 PG 1672
DB 611 PG 256
24,000 SQ.FT
TAX MAP# 110 - 3 ((05A)) 0007

HAROLD H. HENEGAR, JR. & PAULA J. HENEGAR
DB 7722 PG 305
DB 611 PG 256
25,864 SQ.FT
TAX MAP# 110 - 3 ((05A)) 0008

MT VERNON MEMORIAL HWY SERVICE ROAD (ROUTE 3110)
MT VERNON MEMORIAL HWY (ROUTE 235)
MT VERNON MEMORIAL HWY SERVICE ROAD (ROUTE 3102)
PATTON BOULEVARD

Existing Right-of-Way
DO NOT DISTURB EX.CONC.DITCH
3.5 CY CL.AI RIPRAP
1 CY CL.AI RIPRAP
200ft Left Turn Lane Taper Length
Sta. 318+57.04
Proposed 10' Wide Trail and Curb & Gutter Currently Under Design (By Others), Fairfax County Project 2G40-088-026
Connect to Inlet Currently Under Design (By Others). Fairfax County Project 2G40-088-026
EW-12 Required (2:1 Slope)
WG-B-07
WG-PC-03
WG-B-08
WG-B-09
S 74° 09' 53" E
S 73° 06' 27" E
Existing Edge of Travelway
Existing Edge of Pavement
Alignment MVMH_BL
Remove Existing 15" RCP
Full Depth Sawcut Required
CG-7 Req'd
UD-4 Req'd
Begin Right Turn Lane Taper Sta. 321+32.50
PC 322+29.04
PT 322+84.39
End Full-Depth Widening Sta. 322+97.69
Mill and Overlay Sta. 323+08.02 10.67' LT
End Project Work Sta. 323+07.68
Mill and Overlay Sta. 323+06.95 23.17' RT
POT 325+00.00
Proposed 10' Wide Trail and Curb & Gutter Currently Under Design (By Others), Fairfax County Project 2G40-088-026
Bus Stop Sign To Be Relocated By Others. Fairfax County Project 2G40-088-026
Existing Right-of-Way
Sta. 322+56.84
600ft Transition (Travelway/Construction Baseline)
10-1 10-2 10-3 10-4 10-5 7-1 7-2 7-3 7-4 7-6
319 320 321 322 323 324 325

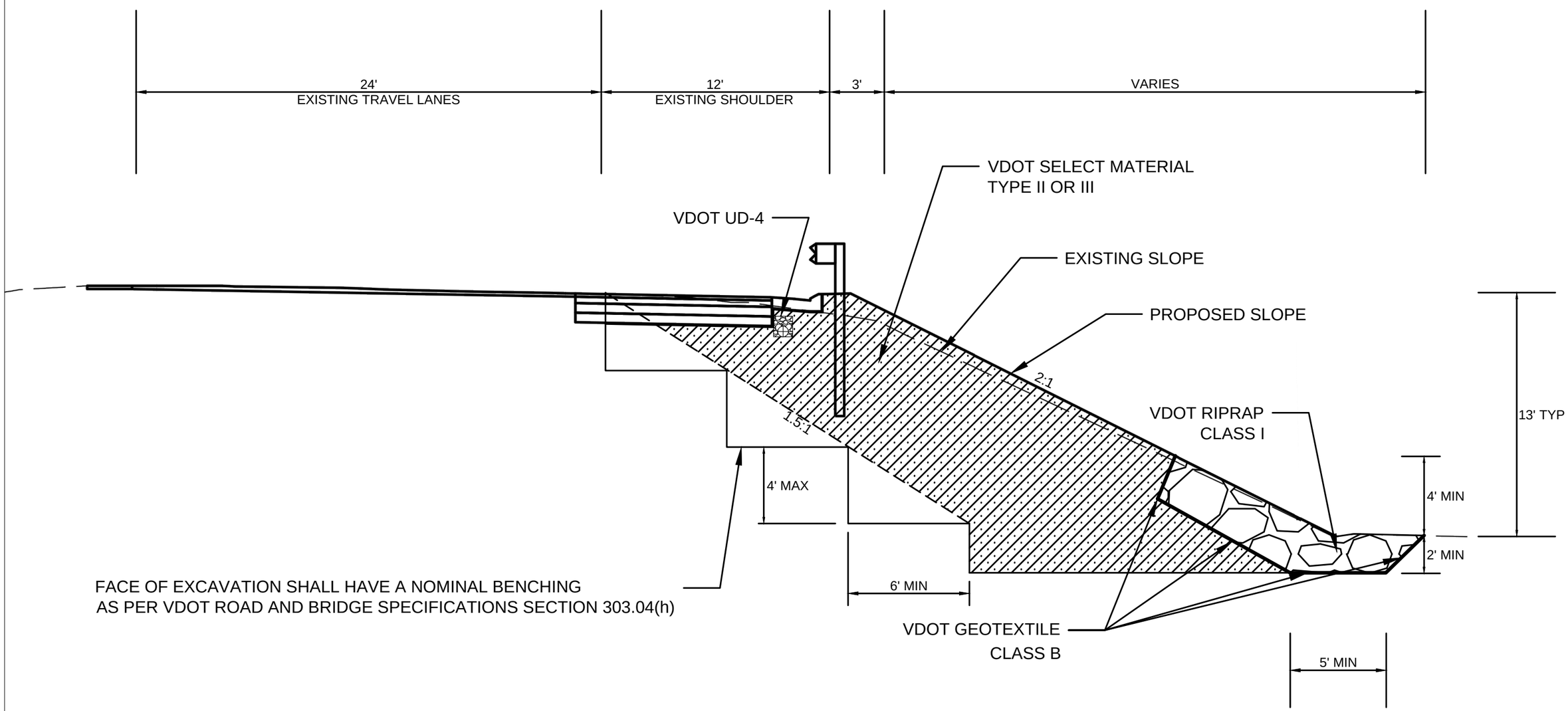
Curve MVMH_BL_7
PI = 322+56.72
DELTA = 1° 03' 25.29" (RT)
D = 1° 54' 35"
T = 27.67'
L = 55.35'
R = 3,000.00'
PC = 322+29.04
PT = 322+84.39
E = Match Existing
V = 50 mph

Legend:
- C ---- Denotes Construction Limits In Cut
- F __ __ Denotes Construction Limits In Fill
- Denotes Proposed V-Ditch
- Denotes Proposed Flat Bottom Ditch
- Mill & Overlay
- Full-Depth Widening
- Soil Boring
- Pavement Cores

Notes:
1. Tree clearing required.

WALKER GATE
PLAN
MOUNT VERNON MEMORIAL HIGHWAY
STA 318+25.00 TO STA 325+00.00

SCALE	PROJECT	SHEET NO.
0 25' 50'	VA ST FB_KNGMN / WLKR GTS	10



TYPICAL SECTION FROM STATIONS 102+25 TO 108+00 AND 112+75 TO 119+00

BASE DRAWING PROVIDED BY WSP

SLOPE RECONSTRUCTION DETAILS

DMY

DMY ENGINEERING CONSULTANTS INC.
4170 LAFAYETTE CENTER DR, SUITE 500
CHANTILLY, VIRGINIA 20151
PHONE: (703) 665-0586
FAX: (301) 768-4169

FORT BELVOIR KINGMAN AND WALKER GATES
FAIRFAX COUNTY, VIRGINIA

DATE:	DRAFTED BY:	PROJECT NO.:
09/01/2020	JY	01.04361.01
SCALE:	CHECKED BY:	FIGURE NO.:
1"=5'	XC	2

APPENDIX B FIELD OPERATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS
(more than 50% of material is larger than No. 200 sieve size.)

GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% 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 (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures

FINE-GRAINED SOILS
(50% or more 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 of 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 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

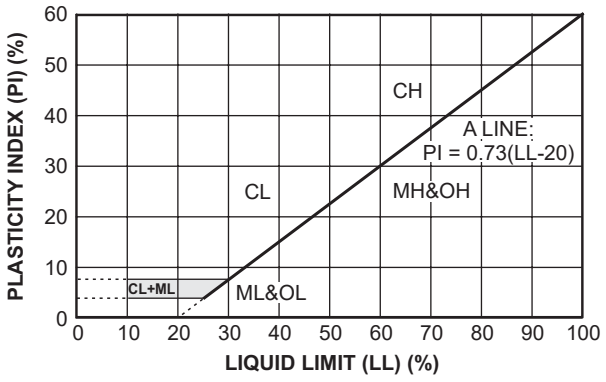
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

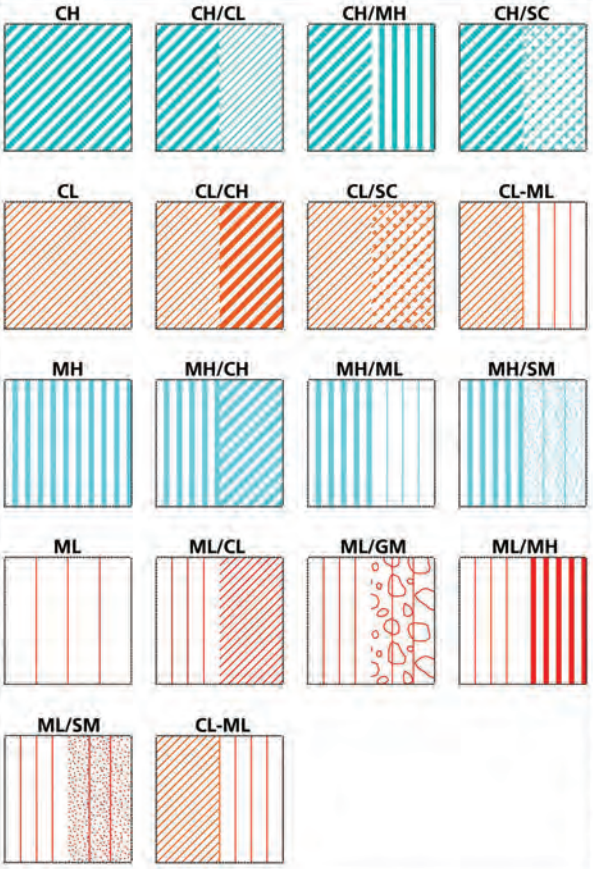
PLASTICITY CHART



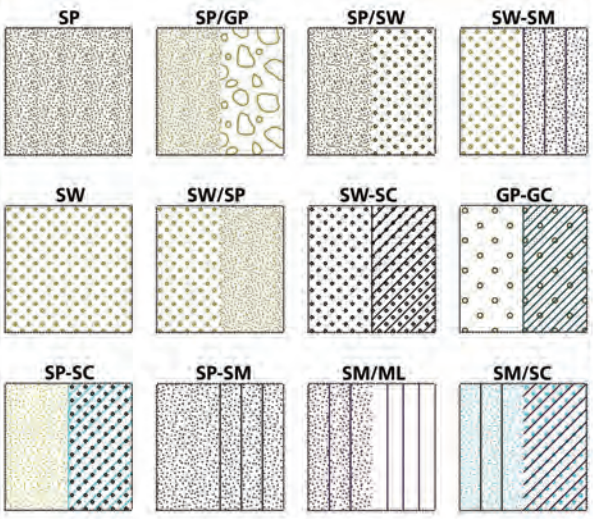
VDOT Virginia Department of Transportation

MATERIAL AND SAMPLE SYMBOLS LIST

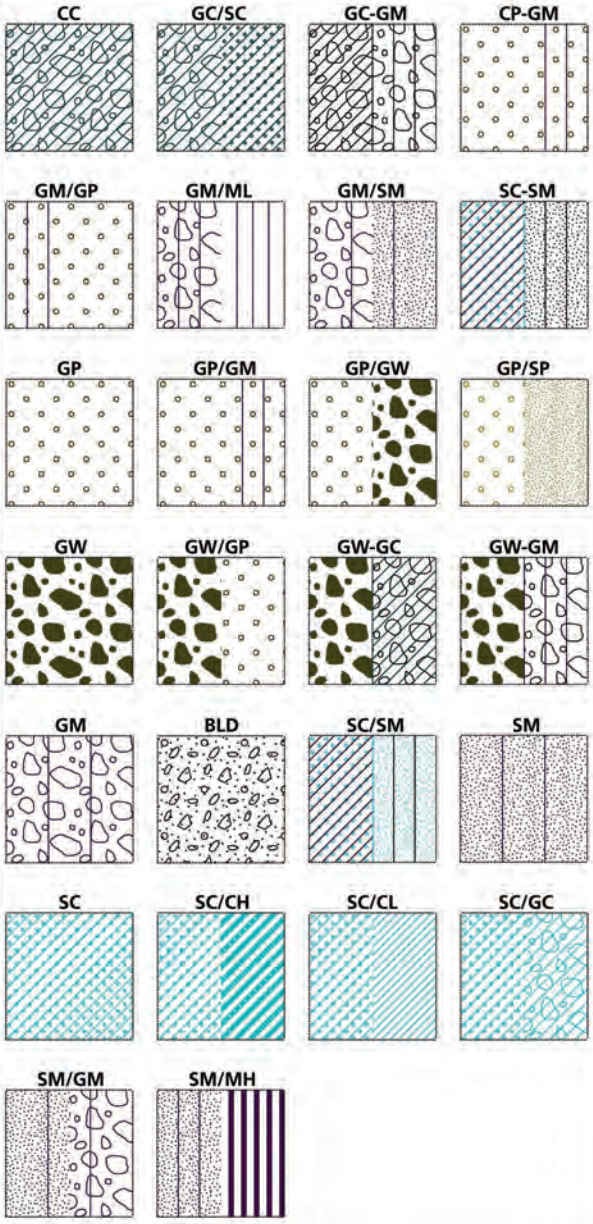
Fine Grained Soil



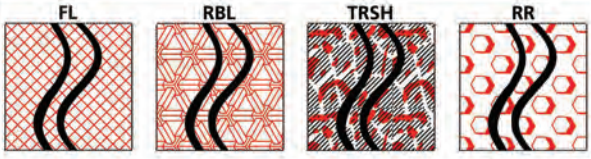
Coarse Grained Soil



Coarse Grained Soil



Fill



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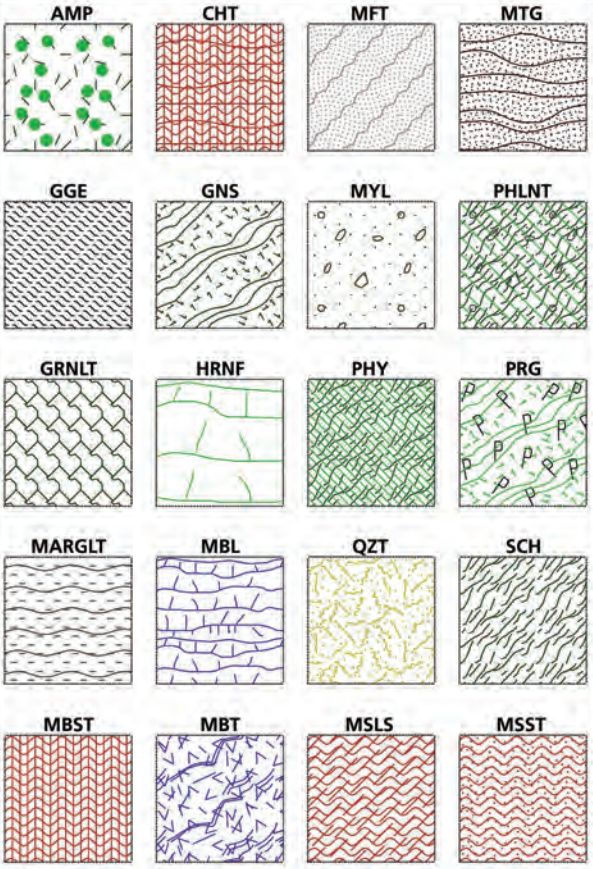
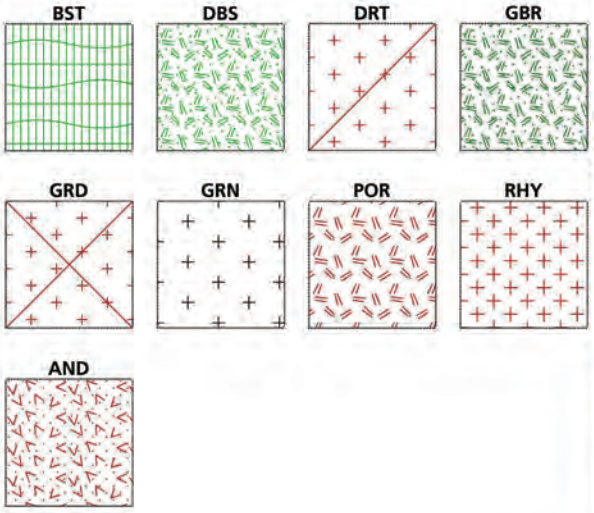
MATERIAL AND SAMPLE SYMBOLS LIST

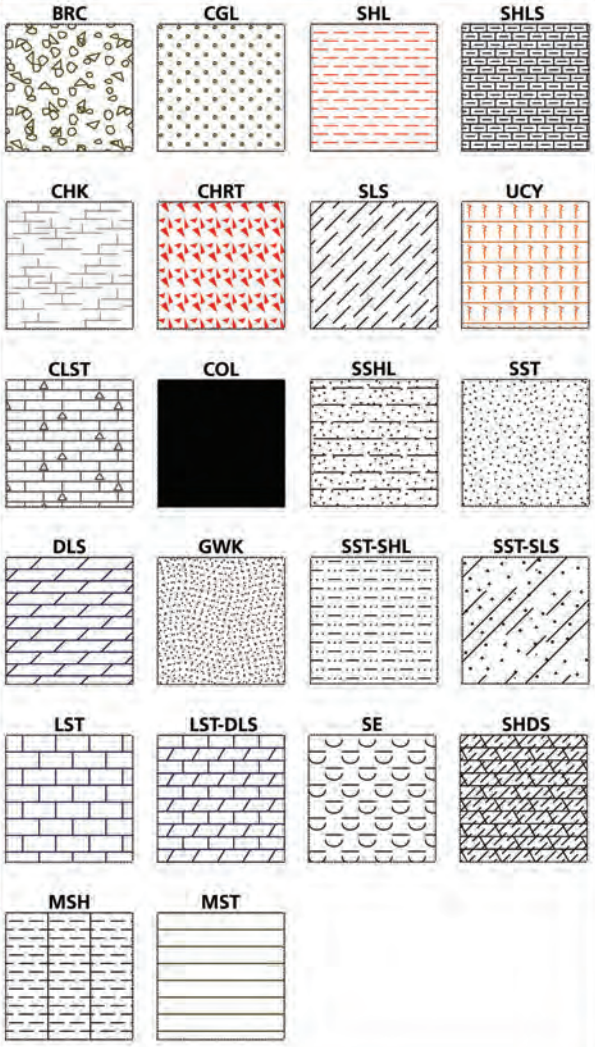
Metamorphic Rock



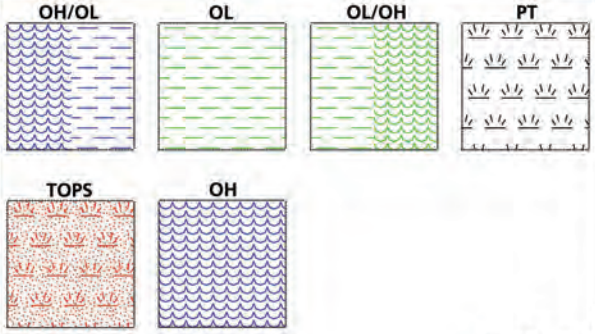
Igneous Rock



Sedimentary Rock



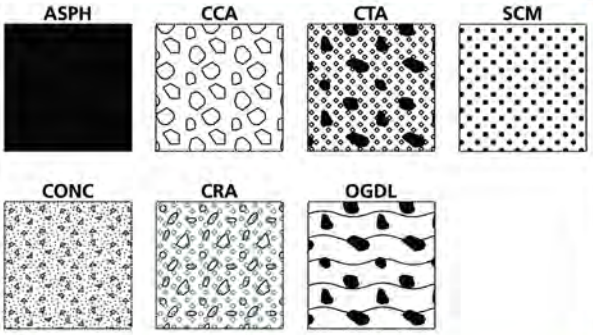
Organic Soil



VDOT Virginia Department of Transportation

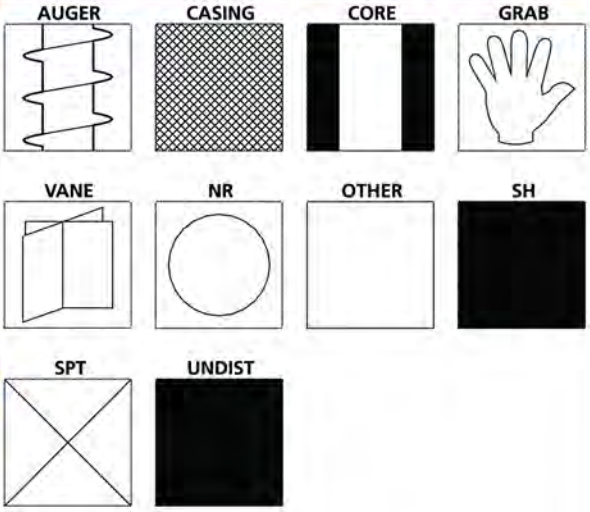
MATERIAL AND SAMPLE SYMBOLS LIST

Pavement Structure



Cavity

Sample Symbols



REFERENCE NOTES FOR BORING LOGS

I. Drilling and Sampling Symbols:

SS	-	Split Spoon Sampler	RB	-	Rock Bit Drilling
ST	-	Shelby Tube Sampler	BS	-	Bulk Sample of Cuttings
RC	-	Rock Core; NX, BX, AX	PA	-	Power Auger (no sample)
PM	-	Pressuremeter	HSA	-	Hollow Stem Auger
DC	-	Dutch Cone Penetrometer	WS	-	Wash Sample

Standard Penetration Test (SPT) resistance refers to the blows per foot (bpf) of a 140 lb hammer falling 30 inches on a 2 in. O.D. split-spoon sampler as specified in ASTM D-1586. The blow count is commonly referred to as the N-value.

II. Correlation of Penetration Resistances to Soil Properties:

Relative Density of Cohesionless Soils

SPT-N (bpf)	Relative Density
0 – 3	Very Loose
4 – 9	Loose
10 – 29	Medium Dense
30 – 50	Dense
>50	Very Dense

Consistency of Cohesive Soils

SPT-N (bpf)	Consistency
0 – 1	Very Soft
2 – 4	Soft
5 – 8	Firm
9 – 15	Stiff
16 – 30	Very Stiff
31 – 50	Hard
>50	Very Hard

Weathered Rock (WR) may be defined as SPT-N values exceeding 60 bpf depending on site specific conditions. Refer carefully to boring logs.

Rock Fragments, gravel, cobbles, boulders, or debris may produce N-values that are not representative of actual soil properties.

III. Unified Soil Classification Symbols:

GP – Poorly Graded Gravel
GW – Well Graded Gravel
GM – Silty Gravel
GC – Clayey Gravels
SP – Poorly Graded Sands
SW – Well Graded Sands
SM – Silty Sands
SC – Clayey Sands

ML – Low Plasticity Silts
MH – High Plasticity Silts
CL – Low Plasticity Clays
CH – High Plasticity Clays
OL – Low Plasticity Organics
OH – High Plasticity Organics
CL-ML – Dual Classification (Typical)

IV. Laboratory Testing and Water Level Symbols:

LL – Liquid Limit (%)
PI – Plastic Index (%)
W – Moisture Content (%)
DD – Dry Density (PCF)
NP – Non Plastic
-200 – Percent Passing No. 200 Sieve
PP – Pocket Penetrometer (TSF)

Water Level at Time of Drilling, or as Shown

Water Level at End of Drilling, or as Shown

Water Level after 24 Hours, or as Shown

SUBSURFACE EXPLORATION PROCEDURES

Soil Borings – Hollow Stem Auger

In hollow stem auger drilling, the drill rig utilizes continuous flight, hollow stem (center opening ranges from 2-1/4 to 4-1/4 inches in size) augers to advance the boreholes. During drilling or formation cutting, the center of the hollow augers is filled with rods connected to a plug at the bottom bit. Once the desired drilling depth is reached, the center plug and rods can be pulled out, leaving the hollow augers in place to hold the borehole open for sampling and well installation. Sampling is performed through the center opening in the hollow stem augers by means of the split-barrel sampling procedure in accordance with ASTM D1586. Usually, drilling fluid is not used during the soil drilling using this procedure.

Standard Penetration Tests

In this process, a 2 foot long, 2 inch outside-diameter split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140 pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The blows required for the first 6 inches of penetration are allowed for seating the sampler into any loose cuttings, and the sum of the blows required for penetration of the second and third 6 inch increments constitutes the standard penetration resistance or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value can be used as a qualitative indication of the in-place relative density of cohesionless soils (sands). In a less reliable way, it also indicates the consistency of cohesive soils (clays/silts). This indication is qualitative, since many factors can significantly affect the N-value and prevent a direct correlation among drilling crews, drill rigs, drilling procedures, and hammer-rod-sampler assemblies. The N-value also has been empirically correlated with various soil properties including strength, compressibility and potential for difficult excavation.

VDOT Virginia Department of Transportation

PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-01

STATION: 104+00 OFFSET: 3.75RT
NORTHING: 6947897.85 ft Easting: 11862172.63 ft
SURFACE ELEVATION: 56.43 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 7/16/2020
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: H. Guzman
Logger: J. Yao

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
											0.0 / 56.43 Asphalt=5 inches **ASPH**				
					0.6						0.42 / 56.01 Aggregate Base=3 inches **CRA**				
	55	5 3 3 3	34								0.67 / 55.76 *Fill*, Gray, fine, CLAYEY SAND WITH GRAVEL FILL, loose, moist **SC**			6.4	
2		1 4			2.6						SAME, contains trace roots	39	21	9.1	26.5
		4	75											14.4	
4		7 3			4.6						4.6 / 51.83 *Fill*, Gray, fine, CLAYEY SAND FILL, contains trace roots, loose, moist **SC**				
		4 3	25		5.6							34	15	15.1	48.1
6	50	6 1			6.6						SAME, contains wood				
		2 7	84											22.6	
8		7 3			8.6						8.6 / 47.83 *Coastal* , Gray and brown, FAT CLAY WITH SAND, firm, moist **CH**				
		3 4	59									55	28	25.3	75.0
10		5			10.6						10.6 / 45.83 Boring Terminated				

REMARKS: Rig Type: CME45.
Cave-in depth = 7.5 feet.

SPT_LOGB:01.04361.01 DRAFT LOG.GPJ:SPT7.GDT:gINT_version 8.30.003:2/23/21:DMY

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VDOT Virginia Department of Transportation

PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-02

STATION: 106+00 OFFSET: 0.0
NORTHING: 6947786.37 ft Easting: 11862338.46 ft
SURFACE ELEVATION: 59.29 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 7/16/2020
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: H. Guzman
Logger: J. Yao

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
0											0.0 / 59.29 Asphalt=6 inches **ASPH**				
											0.5 / 58.79 Aggregate Base=4 inches **CRA**			19.2	
2		5 6 6	59		0.7						0.83 / 58.46 *Fill*, Gray, fine, CLAYEY SAND WITH GRAVEL FILL, contains wood, loose to medium dense, moist **SC**				
		2 3 3			2.7							39	21	10.6	32.4
4	55	3 5 2	42		4.7									11.4	
		5 10 8	75		5.7						4.7 / 54.59 *Fill*, Dark brown, SANDY SILT FILL, very stiff, moist **ML**			8.6	
6		6 5 5			6.7						6.7 / 52.59 *Fill*, Gray, CLAYEY SAND WITH GRAVEL FILL, loose to medium dense, moist **SC**				
		7 7 2	100		8.7							30	14	15.0	27.5
8		2 3 2													
	50		50		10.7									15.7	
10															
12					13						13.0 / 46.29 *Coastal* , Gray, SANDY LEAN CLAY, firm to stiff, moist **CL**				
		3 4 3										29	14	16.7	55.4
14	45		100		15										
16															
18		3 4 5	100		18									21.3	
	40														
20					20						20.0 / 39.29 Boring Terminated				

REMARKS: Rig Type: CME45.
Cave-in depth = 18.5 feet.

KG-B-02

SPT_LOGB:01.04361.01 DRAFT LOG.GPJ:SPT7.GDT:gINT_version 8.30.003:2/23/21:DMY

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Virginia Department of Transportation

PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-03

STATION: 113+70 OFFSET: 1LT
NORTHING: 6947362.13 ft Easting: 11862988.46 ft
SURFACE ELEVATION: 66.24 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 7/15/2020
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: R. Balbuena
Logger: J. Yao

GROUND WATER
▽ FIRST ENCOUNTERED AT 29.0 ft DEPTH

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
0	65	1 1 3 4	75		0.5						0.0 / 66.24 Asphalt=2.4 inches **ASPH** 0.2 / 66.04 Aggregate Base=6 inches **CRA**			11.3	
2		1 2 6 7	50		2.5						0.7 / 65.54 *Fill*, Brown and gray, fine to medium, CLAYEY SAND WITH GRAVEL FILL, loose, moist **SC**	45	27	8.9	33.7
4		3 3 5 7	71		4.5 5.5									21.2 21.7	
6	60	4 4 3 4	71		6.5									11.9	
8		1 1 5 7	100		8.5 10.5							32	15	16.3	39.7
10	55		100		11							28	13	13.7	30.0
12		2 2 7 12	100		13 14						14.0 / 52.24 *Fill*, Gray, SANDY LEAN CLAY FILL, trace gravel, contains trace roots, stiff, moist **CL**	24	9	10.3	55.0
14					15										
16	50														
18		4 6 7 10	100		18									15.0	
20					20						19.5 / 46.74 *Coastal* , Gray and brown, SANDY LEAN CLAY, stiff, moist **CL**				
22	45														
24		3 3 9 9	59		23 25							37	20	19.9	50.1
26	40														
28		3 4 5 8	100		28						SAME, wet			21.6	
30					30						30.0 / 36.24 Boring Terminated				

REMARKS: Rig Type: CME55.
Cave-in depth = 26.5 feet.

SPT_LOGB:01.04361.01 DRAFT LOG.GPJ:SPT7.GDT:gINT_version 8.30.003:2/23/21:DMY

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-04

STATION: 202+30 OFFSET: 36.25RT
NORTHING: 6947628.11 ft Easting: 11862991.49 ft
SURFACE ELEVATION: 67.46 ft COORD. DATUM: VA North

Date(s) Drilled: 7/17/2020
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: H. Guzman
Logger: A. Damtew

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
0.5		13			0.5						0.0 / 67.46 *Fill*, Gray, fine to medium, SILTY SAND WITH GRAVEL FILL, medium dense, moist **SM**			2.6	
1.0		8	92								0.5 / 66.96 *Fill*, Brown, fine, CLAYEY SAND WITH GRAVEL FILL, medium dense, moist **SC**			9.9	
1.5	66	5													
2.0		8			2						SAME, trace gravel				
2.5		5										39	21	8.3	47.0
3.0		8	75									41	20	16.3	48.3
3.5	64	10													
4.0		12			4						4.0 / 63.46 *Fill*, Brown, SANDY LEAN CLAY FILL, trace gravel, stiff to very stiff, moist **CL**				
4.5		5													
5.0		8	84		5									15.9	
5.5	62	9													
6.0		14			6						SAME, Gray and brown,				
6.5		8													
7.0		10	59											15.2	
7.5	60	12													
8.0		10			8										
8.5		3													
9.0		5	92									39	21	16.5	50.8
9.5	58	6													
10.0		9			10						10.0 / 57.46 Boring Terminated				

REMARKS: Rig Type: CME45.
Cave-in depth = 8 feet.

KG-B-04

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-05

STATION: 203+25 OFFSET: 46.0LT
NORTHING: 6947761.53 ft Easting: 11862989.87 ft
SURFACE ELEVATION: 70.33 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 7/17/2020
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: H. Guzman
Logger: A. Damtew

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SOIL: SAMPLE LEGEND	SOIL: SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
0.0	70	15									0.0 / 70.33 Topsoil=2 inches **TOPS**				
0.5		14	42								0.2 / 70.13 *Fill*, Gray, fine to medium, SILTY SAND WITH GRAVEL FILL, medium dense, moist **SM**			3.7	
1.0		11													
1.5		5			2										
2.0	68	4									2.0 / 68.33 *Fill*, Brown and red, CLAYEY SAND FILL, trace gravel, medium dense, moist **SC**	41	22	8.0	47.4
2.5		6													
3.0		10	84											21.7	
3.5		11													
4.0	66	4			4										
4.5		5													
5.0		8	92		5							37	18	19.0	46.1
5.5		9													
6.0	64	5			6										
6.5		8													
7.0		11	100											16.5	
7.5		10													
8.0	62	3			8						8.0 / 62.33 *Fill*, Gray and brown, SANDY LEAN CLAY FILL, trace gravel, stiff, moist **CL**				
8.5		3													
9.0		7	100											19.6	
9.5		7			9.5						9.5 / 60.83 *Coastal* , Gray, SANDY FAT CLAY, stiff, moist **CH**	76	49	27.7	78.3
10.0					10						10.0 / 60.33 Boring Terminated				

REMARKS: Rig Type: CME45.
Cave-in depth = 8 feet.

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-06
PAGE 1 OF 1

STATION: 108+05 OFFSET: 7.5 RT
NORTHING: 6947667.08 ft Easting: 11862500.69 ft
SURFACE ELEVATION: 62.14 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 01/28/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
▽ FIRST ENCOUNTERED AT 6.3 ft DEPTH

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)
					0.3						0.0 / 62.14 Asphalt=3.5 inches **Asph** 0.29 / 61.85 Aggregate Base=2.5 inches **CRA**			
2	60	4 5 5 4	59		2.3						0.5 / 61.64 *F*, Brown, fine to coarse, SILTY GRAVEL WITH SAND FILL, medium dense, moist **GM**			7.4
4		5 5 8 8	50		4.3						2.3 / 59.84 *F*, Brown, fine to medium, SILTY SAND FILL, contains trace quartz gravel, loose to medium dense, moist **SM** Same, with gravel			12.7
6	55	4 3 3 3 3 2 1 2	25		6.3						6.3 / 55.84 *F*, Brown, fine, CLAYEY SAND WITH GRAVEL FILL, very loose, wet **SC**			10.0
8		5 5 4 4	17		8.3						8.3 / 53.84 *Coastal* , Gray, fine, CLAYEY SAND WITH GRAVEL, loose, moist **SC**			25.6
10			42		10.3						10.3 / 51.84 Boring Terminated			11.6

REMARKS: Rig Type: CME55.
Cave-in depth = 8 feet.

PAGE 1 OF 1
KG-B-06

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-07
PAGE 1 OF 1

STATION: 110+13 OFFSET: 7.5RT
NORTHING: 6947553.31 ft Easting: 11862668.61 ft
SURFACE ELEVATION: 64.69 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 01/28/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
											0.0 / 64.69 Asphalt=5 inches **Asph**				
											0.42 / 64.27 Aggregate Base=3 inches **CRA**				
		21 6 17 9	84		0.8						0.67 / 64.02 *F*, Brown, fine to medium, SILTY SAND WITH GRAVEL FILL, medium dense to dense, moist **SM**			11.8	
2		19 15 15 8	75		2.8						SAME, Dark gray			6.5	
4	60	6 4 3 3	42		4.8						4.8 / 59.89 *F*, Brown, fine to medium, CLAYEY SAND FILL, trace gravel, loose, moist **SC**	31	15	13.9	37.9
6		2 3 6 6	84		6.8						6.8 / 57.89 *F*, Brown, fine, SILTY SAND WITH GRAVEL FILL, loose, moist **SM**			13.5	
8		6 6 6 50/4	100		8.8						8.8 / 55.89 *Coastal* , Gray, fine to medium, CLAYEY SAND WITH GRAVEL, contains quartz gravel, very dense, moist **SC**			12.8	
10	55				10.13						10.13 / 54.56 Boring Terminated				

REMARKS: Rig Type: CME55.
Cave-in depth = 8 feet.

PAGE 1 OF 1
KG-B-07

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-08

STATION: 111+18 OFFSET: 7.5RT
NORTHING: 6947497.56 ft Easting: 11862761.74 ft
SURFACE ELEVATION: 66.04 ft COORD. DATUM: VA North

Date(s) Drilled: 01/28/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

FIELD DATA | **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)
0	65	8 7 5 4	67		0.8						0.0 / 66.04 Asphalt=5 inches **Asph** 0.42 / 65.62 Aggregate Base=4 inches **CRA** 0.75 / 65.29 *F*, Brown, SANDY LEAN CLAY FILL, trace gravel, stiff, moist **CL**			14.6
2		3 4 5 6	79		2.8						2.8 / 63.24 *F*, Brown, fine to medium, CLAYEY SAND WITH GRAVEL FILL, loose to medium dense, moist **SC**			14.3
4	60	3 3 4 5	75		4.8									13.8
6		5 5 5 6	50		6.8									12.4
8		5 4 5 7	75		8.8						8.8 / 57.24 *Coastal* , Gray, fine, CLAYEY SAND, trace gravel, loose, moist **SC**			14.6
10					10.8						10.8 / 55.24 Boring Terminated			

REMARKS: Rig Type: CME55.
Cave-in depth = 8 feet.

KG-B-08

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-09

STATION: 112+55 OFFSET: 3LT
NORTHING: 6947423.33 ft Easting: 11862890.57 ft
SURFACE ELEVATION: 66.75 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 01/28/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)
											0.0 / 66.75 Asphalt=4 inches **Asph**			
											0.33 / 66.42 Aggregate Base=3.6 inches **CRA**			
2	65	8 6 5 4	50		0.7						0.63 / 66.12 *F*, Brown, fine, CLAYEY SAND FILL, trace gravel, medium dense, moist **SC**			12.1
					2.7						2.7 / 64.05 *F*, Brown, fine, SILTY GRAVEL WITH SAND FILL, medium dense to dense, moist **GM**			
4		8 15 28 6	59											6.9
		7 5 5 6	34		4.7									7.9
6	60	9 7 5 4	9		6.7									9.8
8		6 5 41 12	42		8.7						8.7 / 58.05 *Coastal* , Gray and brown, fine, CLAYEY SAND, trace gravel, dense, moist **SC**			13.5
10					10.7						10.7 / 56.05 Boring Terminated			

REMARKS: Rig Type: CME55.
Cave-in depth = 7.5 feet.

KG-B-09

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-10
PAGE 1 OF 1

STATION: 115+75 OFFSET: 3RT
NORTHING: 6947244.11 ft Easting: 11863166.46 ft
SURFACE ELEVATION: 64.2 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 01/28/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
					0.5						0.0 / 64.2 Asphalt=5 inches **Asph** 0.42 / 63.78 Aggregate Base=1 inches **CRA**				
2	60	11 15 13 8	29		2.5						0.5 / 63.7 *F*, Brown, fine to medium, SILTY SAND WITH GRAVEL FILL, medium dense, moist **SM**			6.2	
		5 4 3	50		4.5						2.5 / 61.7 *F*, Brown, fine to medium, CLAYEY SAND WITH GRAVEL FILL, loose, moist **SC**			8.2	
4		3 2 2	59		6.5						Same, trace gravel			16.3	
6		3 2 2	92		8.5						Same, Dark green and brown	46	24	20.4	32.4
8	55	3 4 4	100		10.5						8.5 / 55.7 *Coastal* , Brown, SANDY LEAN CLAY, trace gravel, stiff, moist **CL**			15.6	
10		4 5 5									10.5 / 53.7 Boring Terminated				

REMARKS: Rig Type: CME55.
Cave-in depth = 7 feet.

PAGE 1 OF 1
KG-B-10

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-11

STATION: 117+75 OFFSET: 6.25RT
NORTHING: 6947147.72 ft Easting: 11863315.46 ft
SURFACE ELEVATION: 62.39 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 01/28/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
▽ FIRST ENCOUNTERED AT 8.7 ft DEPTH

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
											0.0 / 62.39 Asphalt=5 inches **Asph**				
											0.42 / 61.97 Aggregate Base=3 inches **CRA**				
2	60	7 3 3 / 12 5 7 / 3 3 3	50		0.7 – 2.7						0.67 / 61.72 *F*, Gray and brown, fine to medium, CLAYEY SAND WITH GRAVEL FILL, loose to medium dense, moist **SC**			13.7	
4			42		2.7 – 4.7									13.1	
6			42		4.7 – 6.7									13.9	
8	55	3 2 2 / 7 1 1	42		6.7 – 8.7									17.6	
10			84		8.7 – 10.7						8.7 / 53.69 *Coastal* , Brown, fine, CLAYEY SAND, trace gravel, very loose, moist **SC**	39	23	20.2	42.0
12	50	2 / 28 5 6													
14		8	100		13 – 15						13.0 / 49.39 *Coastal* , Brown and gray, SANDY LEAN CLAY, contains organics, stiff, moist **CL**			26.5	
											15.0 / 47.39 Boring Terminated				

REMARKS: Rig Type: CME55.
Cave-in depth = 12 feet.

KG-B-11

SPT_LOGB:01.04361.01 DRAFT LOG.GPJ:SPT7.GDT:gINT_version 8.30.003:2/23/21:DMY

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-12

STATION: 204+25 OFFSET: 19.5RT
NORTHING: 6947772.28 ft Easting: 11863096.27 ft
SURFACE ELEVATION: 70.49 ft COORD. DATUM: VA North

Date(s) Drilled: 01/28/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

FIELD DATA | **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)
0	70	9 4 7 6	50		0.8						0.0 / 70.49 Asphalt=5 inches **Asph** 0.42 / 70.07 Aggregate Base=8.2 inches **CRA** 1.1 / 69.39 *F*, Brown, fine, CLAYEY SAND WITH GRAVEL FILL, contains quartz gravel, medium dense, moist **SC**			19.6
2		4 5 7 8	84		2.8						2.8 / 67.69 *F*, Brown, SANDY LEAN CLAY FILL, trace gravel, stiff to very stiff, moist **CL**			33.2
4	65	3 5 10 10	50		4.8									32.2
6		4 7 9 9	100		6.8									17.9
8		5 6 7 8	50		8.8									16.3
10	60				10.8						10.8 / 59.69 Boring Terminated			

REMARKS: Rig Type: CME55.
Cave-in depth = 7 feet.

KG-B-12

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-13

STATION: 205+25 OFFSET: 44.5LT
NORTHING: 6947890.9 ft Easting: 11863123.17 ft
SURFACE ELEVATION: 74.59 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 01/29/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)
0.5	74	3 4	13								0.0 / 74.59 Topsoil=4 inches **Tops** 0.33 / 74.26 *F*, Brown and gray, fine to medium, SILTY SAND FILL, trace gravel, contains quartz gravel, loose to medium dense, moist **SM**			14.8
1.0														
1.5		4 6												
2.0		5			2									
2.5	72	8	100											18.4
3.0		10												
3.5		12												
4.0					4									
4.5	70	5 5	92											16.4
5.0		6												
5.5		7												
6.0					6									
6.5	68	4 6	88											16.1
7.0		6												
7.5		8												
8.0					8									
8.5	66	5 7	96											18.2
9.0		7												
9.5		9												
10.0					10						10.0 / 64.59 Boring Terminated			

REMARKS: Rig Type: CME55.
Cave-in depth = 8.5 feet.

KG-B-13

SPT_LOG:01.04361.01 DRAFT LOG.GPJ:SPT77.GDT:gINT_version 8.30.003:2/23/21:DMY

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-14
PAGE 1 OF 1

STATION: 205+80 OFFSET: 7.5LT
NORTHING: 6947918.04 ft Easting: 11863198.21 ft
SURFACE ELEVATION: 77.44 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 01/28/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
0.5		2									0.0 / 77.44 Topsoil=4 inches **Tops**				
1.0		3	84								0.33 / 77.11 *F*, Dark green, fine, CLAYEY SAND FILL, trace gravel, medium dense, moist **SC**			7.2	
1.5	76	11													
2.0		8			2										
2.5		4													
3.0		9	100									52	29	27.8	47.8
3.5	74	13												28.2	
4.0		13			4										
4.5		5													
5.0		6	100											30.4	
5.5	72	9													
6.0		8			6										
6.5		4									6.0 / 71.44 *Coastal* , Gray, fine, SILTY SAND, medium dense, moist **SM**				
7.0		10	100											21.4	
7.5	70	13													
8.0		16			8										
8.5		4													
9.0		10	100											25.0	
9.5	68	11													
10.0		12			10						10.0 / 67.44 Boring Terminated				

REMARKS: Rig Type: CME55.
Cave-in depth = 8 feet.

PAGE 1 OF 1
KG-B-14

SPT_LOGB:01.04361.01 DRAFT LOG.GPJ:SPT7.GDT:gINT_version 8.30.003:2/23/21:DMY

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

KG-B-15

STATION: 207+25 OFFSET: 35.5LT
NORTHING: 6948027.76 ft Easting: 11863283.78 ft
SURFACE ELEVATION: 85.2 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 01/29/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
	85										0.0 / 85.2 Asphalt=6 inches **Asph**				
					0.8						0.5 / 84.7 Aggregate Base=8.4 inches **CRA**				
2		13 8 7 12	67								1.2 / 84.0 *F*, Brown, fine to medium, SILTY SAND WITH GRAVEL FILL, medium dense, moist **SM**			13.1	
					2.8						Same, Gray and brown, no gravel				
4		5 7 8 9	100											29.0	
					4.8						4.8 / 80.4 *Coastal* , Dark greenish and brown, fine, CLAYEY SAND WITH GRAVEL, medium dense, moist **SC**				
6	80	6 8 9 10	42									67	43	27.6	42.0
					6.8						6.8 / 78.4 *Coastal* , Gray and brown, fine to medium, SILTY SAND, medium dense, moist **SM**				
8		4 7 11 12	100											22.5	
					8.8						SAME, Brown				
10	75	9 10 19 17	100											24.1	
					10.8						10.8 / 74.4 Boring Terminated				

REMARKS: Rig Type: CME55.
Cave-in depth = 8 feet.

KG-B-15

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

WG-B-01
PAGE 1 OF 1

STATION: 308+50 OFFSET: 4.25LT
NORTHING: 6944465.72 ft Easting: 11874529 ft
SURFACE ELEVATION: 28.21 ft COORD. DATUM: VA North

Date(s) Drilled: 07/20/2020
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: H. Guzman
Logger: A. Damtew

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SOIL: SAMPLE LEGEND	SOIL: SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LAB: LIQUID LIMIT LL	LAB: PLASTICITY INDEX PI	LAB: MOISTURE CONTENT (%)	LAB: FINES CONTENT #200 (%)
0.0	28.21										0.0 / 28.21 Topsoil=2 inches **TOPS**				
0.2	28.01	8									0.2 / 28.01 *Fill*, Brown, SANDY LEAN CLAY WITH GRAVEL FILL, very stiff, moist **CL**				
0.5		16													
1.0		7	84											12.0	
1.5		7													
2.0					2										
2.0	26.21	6									2.0 / 26.21 *Fill*, Gray and brown, SANDY LEAN CLAY FILL, trace gravel, stiff to very stiff, moist **CL**				
2.5		4										33	16	8.5	57.4
3.0		6	75											17.7	
3.5		7													
4.0					4										
4.0	24.21	4													
4.5		8													
5.0		10	84		5									16.9	
5.5		12													
6.0					6										
6.0	22.21	7													
6.5		12													
7.0		13	84									36	17	17.5	95.5
7.5		14													
8.0					8										
8.0	20.21	4													
8.5		7													
9.0		9	100											19.3	
9.5		13													
10.0					10										
10.0	18.21										10.0 / 18.21 Boring Terminated				

REMARKS: Rig Type: CME45.
Cave-in depth = 8 feet.

PAGE 1 OF 1
WG-B-01

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

WG-B-02
PAGE 1 OF 1

STATION: 310+50 OFFSET: 16.75LT
NORTHING: 6944371.45 ft Easting: 11874715.54 ft
SURFACE ELEVATION: 29.97 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 7/20/2020
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: H. Guzman
Logger: A. Damtew

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
					0.6						0.0 / 29.97 Asphalt=7.5 inches **ASPH**				
		15			1						0.63 / 29.35 *Fill*, Brown, fine to medium, SILTY SAND WITH GRAVEL FILL, NA, moist **SM**			9.4	
		11	75								1.0 / 28.97 *Fill*, Brown, SANDY LEAN CLAY FILL, trace gravel, firm to very stiff, moist **CL**			21.6	
2		5			2.6						SAME, Gray,				
		5										37	17	13.8	64.2
		2	75											25.3	
		3													
4		3			4.6						SAME, Brown and red,				
		3													
	25	2	75		5.6							41	19	20.4	68.6
		2													
6		3													
		5			6.6						SAME, Gray and brown,				
		3													
		6	84											20.7	
8		8													
		10			8.6										
		3													
		5													
		5	100									38	18	19.9	95.2
10	20	7			10.6						10.6 / 19.37 Boring Terminated				

REMARKS: Rig Type: CME45.
Cave-in depth = 7 feet.

PAGE 1 OF 1
WG-B-02

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

WG-B-03

STATION: 312+50 OFFSET: 7.5LT
NORTHING: 6944283.64 ft Easting: 11874886.04 ft
SURFACE ELEVATION: 31.11 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 07/20/2020
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: H. Guzman
Logger: A. Damtew

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
0.5		5									0.0 / 31.11 Topsoil=2 inches **TOPS**				
1.0	30	13	75								0.2 / 30.91 *Fill*, Brown, fine to medium, SILTY SAND WITH GRAVEL FILL, medium dense, moist **SM**			5.2	
1.5		15													
2.0		9			2						2.0 / 29.11 *Fill*, Brown and gray, SANDY LEAN CLAY FILL, trace gravel, stiff, moist **CL**	36	17	9.1	55.9
2.5		4													
3.0	28	6	84											16.6	
3.5		8													
4.0		8			4										
4.5		3													
5.0	26	5	50		5							39	20	17.3	90.3
5.5		5													
6.0		7			6						SAME, Brown and red,				
6.5		4													
7.0	24	5	75											22.0	
7.5		7													
8.0		11			8										
8.5		3													
9.0	22	6	100											18.9	
9.5		8													
10.0		9			10						10.0 / 21.11 Boring Terminated				

REMARKS: Rig Type: CME45.
Cave-in depth = 8 feet.

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

WG-B-04
PAGE 1 OF 1

STATION: 306+50 OFFSET: 4.25LT
NORTHING: 6944580.37 ft Easting: 11874373.09 ft
SURFACE ELEVATION: 26.16 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 01/29/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)
0.0	26.16	8									0.0 / 26.16 Topsoil=4 inches **Tops**			
0.5		8									0.33 / 25.83 *F*, Brown and gray, fine to medium, SILTY SAND WITH GRAVEL FILL, contains quartz gravel, medium dense, moist **SM**			
1.0		5	50											5.5
1.5		4												
2.0	24	4			2						2.0 / 24.16 *F*, Brown, SANDY LEAN CLAY FILL, stiff to very stiff, moist **CL**			
2.5		5												
3.0		6	84											22.1
3.5		8												
4.0	22	5			4									
4.5		5												
5.0		5	96											19.1
5.5		5												
6.0	20	4			6									
6.5		5												
7.0		6	100											21.7
7.5		7												
8.0	18	5			8									
8.5		6												
9.0		11	100											22.3
9.5		13												
10.0					10						10.0 / 16.16 Boring Terminated			

REMARKS: Rig Type: CME55.
Cave-in depth = 8 feet.

PAGE 1 OF 1
WG-B-04

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

WG-B-05
PAGE 1 OF 1

STATION: 314+50 OFFSET: 4.5LT
NORTHING: 6944215.88 ft Easting: 11875065.17 ft
SURFACE ELEVATION: 31.77 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 01/29/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)
0.0		9									0.0 / 31.77 Topsoil=3 inches **Tops**			
0.5		8									0.25 / 31.52 *F*, Brown, fine, SILTY SAND FILL, trace gravel, medium dense, moist **SM**			
1.0		4	67											20.6
1.5	30	5												
2.0		5			2									
2.5		7									2.0 / 29.77 *F*, Brown, SANDY LEAN CLAY FILL, stiff to very stiff, moist **CL**			
3.0		11	100											21.4
3.5	28	10												
4.0		5			4									
4.5		5												
5.0		7	92											17.0
5.5	26	11												
6.0		4			6									
6.5		5												
7.0		7	100											25.4
7.5	24	7												
8.0		4			8									
8.5		5												
9.0		7	100											21.2
9.5	22	10												
10.0					10						10.0 / 21.77 Boring Terminated			

REMARKS: Rig Type: CME55.
Cave-in depth = 8 feet.

PAGE 1 OF 1
WG-B-05

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

WG-B-06
PAGE 1 OF 1

STATION: 316+50 OFFSET: 4.5LT
NORTHING: 6944154.27 ft Easting: 11875257.29 ft
SURFACE ELEVATION: 27.81 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 01/29/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)
0.5		5									0.0 / 27.81 Topsoil=5 inches **Tops**			
1.0		3									0.42 / 27.39 *F*, Brown, fine, SILTY SAND FILL, loose, moist **SM**			19.7
1.5		4	100											
2.0	26	6			2									
2.5		5												
3.0		4	100											21.1
3.5		5												
4.0	24	5			4									
4.5		2									4.0 / 23.81 *F*, Brown, SANDY LEAN CLAY FILL, firm to stiff, moist **CL**			
5.0		3	84											23.4
5.5		3												
6.0	22	5			6									
6.5		3												
7.0		3	100											20.0
7.5		4												
8.0	20	6			8									
8.5		3												
9.0		3	100											20.6
9.5		6												
10.0	18	7			10						10.0 / 17.81 Boring Terminated			

REMARKS: Rig Type: CME55.
Cave-in depth = 8 feet.

PAGE 1 OF 1
WG-B-06

SPT_LOG:01.04361.01 DRAFT LOG.GPJ:SPT77.GDT:gINT_version 8.30.003:2/23/21:DMY

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

WG-B-07
PAGE 1 OF 1

STATION: 318+50 OFFSET: 3.5LT
NORTHING: 6944095.9 ft Easting: 11875457.78 ft
SURFACE ELEVATION: 21.74 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 01/29/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
0.5		6									0.0 / 21.74 Topsoil=4 inches **Tops**				
1.0		4	92								0.33 / 21.41 *F*, Brown, fine, SILTY SAND FILL, contains trace roots, loose, moist **SM**			22.9	
1.5		4													
2.0	20	4			2						2.0 / 19.74 *F*, Brown, LEAN CLAY FILL, soft to very stiff, moist **CL**				
2.5		3													
3.0		2	92											24.8	
3.5		3													
4.0	18	3			4										
4.5		1													
5.0		1	84									49	24	27.5	91.4
5.5		2													
6.0	16	2			6										
6.5		4													
7.0		8	100											22.0	
7.5		11													
8.0	14	15			8						8.0 / 13.74 *F*, Brown, fine, SILTY SAND FILL, medium dense, moist **SM**				
8.5		4													
9.0		6	100											20.4	
9.5		9													
10.0	12	10			10						10.0 / 11.74 Boring Terminated				

REMARKS: Rig Type: CME55.
Cave-in depth = 8 feet.

PAGE 1 OF 1
WG-B-07

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

WG-B-08

STATION: 320+50 OFFSET: 0.0
NORTHING: 6944042.74 ft Easting: 11875633.68 ft
SURFACE ELEVATION: 20.52 ft COORD. DATUM: VA North

Date(s) Drilled: 01/29/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

FIELD DATA | **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
0.5	20	6 4	67		2						0.0 / 20.52 Topsoil=3 inches **Tops** 0.25 / 20.27 *F*, Brown, LEAN CLAY WITH SAND FILL, firm, moist **CL**			21.0	
1.0															
1.5		3 5													
2.0					2										
2.5	18	3 3													
3.0		3 4	75									32	13	17.8 21.0	79.3
3.5															
4.0		4			4										
4.5	16	3 2													
5.0		3	92											26.4	
5.5		2													
6.0					6										
6.5	14	1 3													
7.0		2	88											19.7	
7.5		3													
8.0					8						8.0 / 12.52 *F*, Brown, fine, SILTY SAND FILL, medium dense, moist **SM**				
8.5	12	3 5													
9.0			84											18.4	
9.5		7													
10.0		7			10						10.0 / 10.52 Boring Terminated				

REMARKS: Rig Type: CME55.
Cave-in depth = 6 feet.

WG-B-08

SPT_LOGB:01.04361.01 DRAFT LOG.GPJ:SPT7.GDT:gINT_version 8.30.003:2/23/21:DMY

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PROJECT #: 01.04361.01
LOCATION: Fairfax County, VA
STRUCTURE: ROADWAY

WG-B-09
PAGE 1 OF 1

STATION: 322+50 OFFSET: 9.5RT
NORTHING: 6943972.57 ft Easting: 11875854.7 ft
SURFACE ELEVATION: 25.74 ft COORD. DATUM: VA North

FIELD DATA

Date(s) Drilled: 01/29/2021
Drilling Method(s): 3.25 in HSA
SPT Method: Automatic
Other Test(s):
Driller: M. Santos
Logger: M. Dong

GROUND WATER
NOT ENCOUNTERED DURING DRILLING

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT #200 (%)
											0.0 / 25.74 Asphalt=5 inches **Asph**				
											0.42 / 25.32 Aggregate Base=4.9 inches **CRA**				
2	25	5 5 6 9	50		0.9						0.83 / 24.91 *F*, Brown, fine, SILTY SAND FILL, medium dense, moist **SM**			20.2	
		5 6 7 8	84		2.9						2.9 / 22.84 *F*, Brown, LEAN CLAY FILL, firm to stiff, moist **CL**			20.4	
4					4.9										
6	20	3 3 5 6	50		6.9									21.9	
		4 5 7 8	100		8.9									25.3	
8															
10		3 3 5 5	100		10.9							40	20	21.8	97.9
	15										10.9 / 14.84 Boring Terminated				

REMARKS: Rig Type: CME55.
Cave-in depth = 7.5 feet.

PAGE 1 OF 1
WG-B-09

SPT_LOGB:01.04361.01 DRAFT LOG.GPJ:SPT7.GDT:gINT_version 8.30.003:2/23/21:DMY

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Table B1 - Summary of Pavement Core Information
Fort Belvoir Kingman and Walker Gates
Fairfax County, Virginia
DMY Project No. 01.04361.01

Boring/Core Number	Station	Offset (feet)	Existing Lane ID	AC Thickness (inches)	OGDL Thickness (inches)	CTA Thickness (inches)	GAB Thickness (inches)	Remarks
Fairfax County Parkway Eastbound (Kingman Gate)								
KG-PC-01	103+00	5.75 LT	Right Lane	9.0	2.5	2.5	6.0	CTA broke into several pieces and not fully recovered
KG-PC-02	105+00	22.0 LT	Left Lane	9.5	2.5	0.0	6.0	
KG-PC-03	109+25	28.25 LT	Left Lane	10.5	3.0	0.0	6.0	
KG-PC-04	110+90	51.5 LT	Inside Left Turn Lane	12.0	0.0	0.0	6.0	
KG-PC-05	115+00	11.75 LT	Right Lane	8.8	2.7	0.0	6.0	
KG-PC-06	117+00	0.0	Right Shoulder	9.0	0.0	0.0	6.0	Top 3.5" of AC broke into 3 pieces due to surface cracks; Bottom 5.5" of AC was intact
KG-PC-07	119+00	18.25 LT	Left Lane	11.5	0.0	0.0	6.0	
KG-B-01	104+00	3.75 RT	Right Shoulder	5.0	0.0	0.0	3.0	Augered through existing pavement
KG-B-02	106+00	0.0	Right Shoulder	6.0	0.0	0.0	4.0	Augered through existing pavement
KG-B-03	113+70	1.0 LT	Right Shoulder	2.4	0.0	0.0	6.0	Augered through existing pavement
KG-B-06	108+05	7.5 RT	Right Shoulder	3.5	0.0	0.0	2.5	Augered through existing pavement
KG-B-07	110+13	7.5 RT	Right Shoulder	5.0	0.0	0.0	3.0	Augered through existing pavement
KG-B-08	111+18	7.5 RT	Right Shoulder	5.0	0.0	0.0	4.0	Augered through existing pavement
KG-B-09	112+55	3.0 LT	Right Shoulder	4.0	0.0	0.0	3.6	Augered through existing pavement
KG-B-10	115+75	3.0 RT	Right Shoulder	5.0	0.0	0.0	1.0	Augered through existing pavement
KG-B-11	117+75	6.25 RT	Right Shoulder	5.0	0.0	0.0	3.0	Augered through existing pavement
John J. Kingman Rd (Kingman Gate)								
KG-PC-08	204+40	23.5 RT	Northbound Right Lane	5.5	0.0	0.0	6.0	
KG-PC-09	205+25	34.75 LT	Southbound Right Lane	2.5	0.0	3.0	3.0	
KG-PC-10	207+25	23.25 LT	Southbound Left Lane	5.2	0.0	3.0	4.0	
KG-B-12	204+25	19.5 RT	Northbound Right Lane	5.0	0.0	0.0	8.2	Augered through existing pavement
KG-B-15	207+25	35.5 LT	Southbound Right Lane	6.0	0.0	3.0	8.4	Augered through existing pavement
Mount Vernon Memorial Highway (Walker Gate)								
WG-PC-01	305+50	29.0 LT	Westbound Through Lane	7.8	0.0	0.0	0.0	
WG-B-02	310+50	16.75 LT	Eastbound Lane	7.5	0.0	0.0	0.0	
WG-PC-02	315+50	21.5 LT	Eastbound Lane	7.0	0.0	0.0	0.0	
WG-PC-03	320+50	9.0 LT	Eastbound Lane	9.0	0.0	0.0	0.0	
WG-B-09	322+50	9.5 RT	Eastbound Right Turn Lane	5.0	0.0	0.0	4.9	Augered through existing pavement

AC: Asphalt Concrete HCC: Hydraulic Cement Concrete OGDL: Open Graded Drainage Layer CTA: Cement Treated Aggregate GAB: Graded Aggregate Base

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, VA
CLIENT:	WSP USA INC.

PAVEMENT CORE PHOTOGRAPH LOG

Top

Bottom

KG-PC-01

Fairfax County Parkway, Station 103+00, 5.75 LT, EB Right Through Lane

Asphalt Concrete =	9.0	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	2.5	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	2.5	inches
Aggregate Base =	6.0	inches
Soil Cement =	NA	inches

CTA broke into pieces and not fully recovered

Top

Bottom

KG-PC-02

Fairfax County Parkway, Station 105+00, 22.0 LT, EB Left Through Lane

Asphalt Concrete =	9.5	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	NA	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	2.5	inches
Aggregate Base =	6.0	inches
Soil Cement =	NA	inches

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, VA
CLIENT:	WSP USA INC.

PAVEMENT CORE PHOTOGRAPH LOG

Top

Bottom

KG-PC-03

Fairfax County Parkway, Station 109+25, 28.25 LT, EB Left Through Lane

Asphalt Concrete =	10.5	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	NA	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	3.0	inches
Aggregate Base =	6.0	inches
Soil Cement =	NA	inches

Top

Bottom

KG-PC-04

Fairfax County Parkway, Station 110+90, 51.5 LT, EB Inside Left Turn Lane

Asphalt Concrete =	12.0	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	NA	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	NA	inches
Aggregate Base =	6.0	inches
Soil Cement =	NA	inches

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, VA
CLIENT:	WSP USA INC.

PAVEMENT CORE PHOTOGRAPH LOG

Top

Bottom

KG-PC-05

Fairfax County Parkway, Station 115+00, 11.75 LT, EB Right Lane

Asphalt Concrete =	8.8	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	NA	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	2.7	inches
Aggregate Base =	6.0	inches
Soil Cement =	NA	inches

Top

Bottom

KG-PC-06

Fairfax County Parkway, Station 117+00, 0.0 LT, EB Right Shoulder

Asphalt Concrete =	9.0	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	NA	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	NA	inches
Aggregate Base =	6.0	inches
Soil Cement =	NA	inches

Top 3.5" of AC broke into 3 pieces due to surface cracks; Bottom 5.5" of AC was intact

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, VA
CLIENT:	WSP USA INC.

PAVEMENT CORE PHOTOGRAPH LOG

Top

Bottom

KG-PC-07

Fairfax County Parkway, Station 119+00, 18.25 LT, EB Left Lane

Asphalt Concrete =	11.5	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	NA	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	NA	inches
Aggregate Base =	6.0	inches
Soil Cement =	NA	inches

Top

Bottom

KG-PC-08

John J. Kingman Road, Station 204+40, 23.5 RT, NB Right Lane

Asphalt Concrete =	5.5	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	NA	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	NA	inches
Aggregate Base =	6.0	inches
Soil Cement =	NA	inches

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, VA
CLIENT:	WSP USA INC.

PAVEMENT CORE PHOTOGRAPH LOG

Top

Bottom

KG-PC-09

John J. Kingman Road, Station 205+25, 34.75 LT, SB Right Lane

Asphalt Concrete =	2.5	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	3.0	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	NA	inches
Aggregate Base =	3.0	inches
Soil Cement =	NA	inches

CTA broke into pieces and not fully recovered

Top

Bottom

KG-PC-10

John J. Kingman Road, Station 207+25, 23.25 LT, SB Left Lane

Asphalt Concrete =	5.2	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	3.0	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	NA	inches
Aggregate Base =	4.0	inches
Soil Cement =	NA	inches

CTA broke into pieces and not fully recovered

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, VA
CLIENT:	WSP USA INC.

PAVEMENT CORE PHOTOGRAPH LOG

Top

Bottom

WG-PC-01

Mount Vernon Memorial Highway, Station 305+50, 29.0 LT, WB Through Lane

Asphalt Concrete =	7.8	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	NA	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	NA	inches
Aggregate Base =	NA	inches
Soil Cement =	NA	inches

Top

Bottom

WG-PC-03

Mount Vernon Memorial Highway, Station 320+50, 9.0 LT, EB Lane

Asphalt Concrete =	9.0	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	NA	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	NA	inches
Aggregate Base =	NA	inches
Soil Cement =	NA	inches

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, VA
CLIENT:	WSP USA INC.

PAVEMENT CORE PHOTOGRAPH LOG

Top

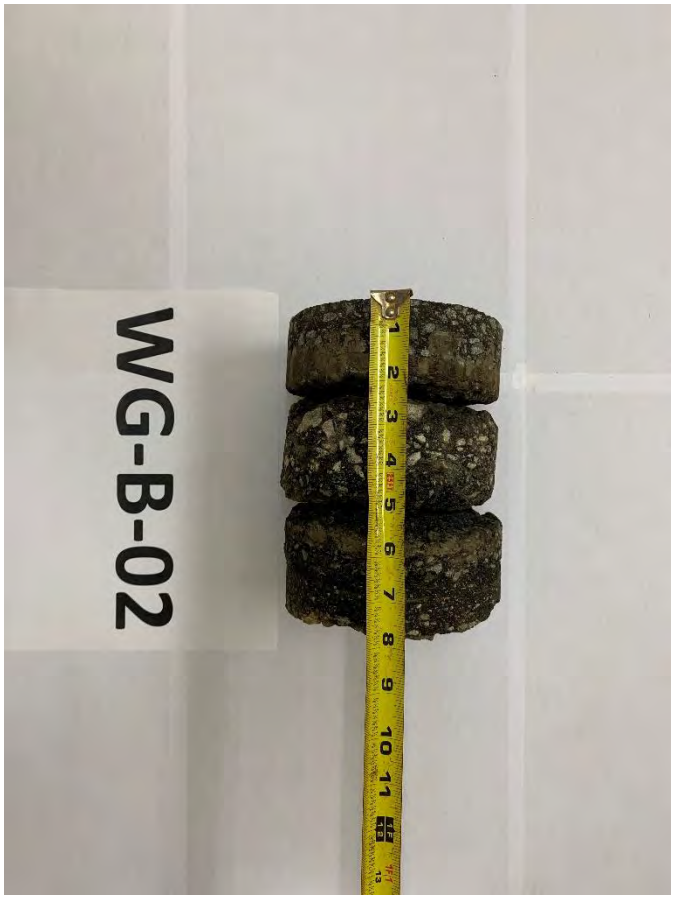
Bottom

WG-PC-02

Mount Vernon Memorial Highway, Station 315+50, 21.5 LT, EB Lane

Asphalt Concrete =	7.0	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	NA	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	NA	inches
Aggregate Base =	NA	inches
Soil Cement =	NA	inches

Top



Bottom

WG-B-02

Mount Vernon Memorial Highway, Station 310+50, 16.75 LT, EB Lane

Asphalt Concrete =	7.5	inches
Portland Cement Concrete =	NA	inches
Cement-Treated Aggregate =	NA	inches
Soil Cement =	NA	inches
Open-Graded Drainage Layer =	NA	inches
Aggregate Base =	NA	inches
Soil Cement =	NA	inches

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, Virginia
CLIENT:	WSP

PAVEMENT CONDITION PHOTOS

Location: Fairfax County Parkway eastbound right and left through lane

Distress type and severity: low to moderate severity fatigue cracking; low severity transverse cracking.

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, Virginia
CLIENT:	WSP

PAVEMENT CONDITION PHOTOS

Location: Fairfax County Parkway eastbound left turn lane

Distress type and severity: low to moderate severity longitudinal and transverse cracking

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, Virginia
CLIENT:	WSP

PAVEMENT CONDITION PHOTOS

Location: Fairfax County Parkway eastbound left lane

Distress type and severity: moderate severity pothole; low to moderate severity edge cracking

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, Virginia
CLIENT:	WSP

PAVEMENT CONDITION PHOTOS

Location: Fairfax County Parkway eastbound right shoulder

Distress type and severity: moderate to high severity longitudinal and transverse cracking

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, Virginia
CLIENT:	WSP

PAVEMENT CONDITION PHOTOS

Location: Fairfax County Parkway eastbound right turn lane

Distress type and severity: moderate severity block cracking

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, Virginia
CLIENT:	WSP

PAVEMENT CONDITION PHOTOS

Location: Fairfax County Parkway eastbound right shoulder

Distress type and severity: high severity shoulder drop-off with high severity crown-shape cracking

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, Virginia
CLIENT:	WSP

PAVEMENT CONDITION PHOTOS

Location: Kingman Road northbound

Distress type and severity: high severity fatigue cracking, rutting; high severity longitudinal cracking

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, Virginia
CLIENT:	WSP

PAVEMENT CONDITION PHOTOS

Location: Kingman Road northbound

Distress type and severity: moderate to high severity fatigue cracking; high severity edge cracking; high severity longitudinal cracking; potholes.

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, Virginia
CLIENT:	WSP

PAVEMENT CONDITION PHOTOS

Location: Kingman Road southbound

Distress type and severity: moderate to high severity fatigue cracking; rutting; high severity longitudinal cracking;

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, Virginia
CLIENT:	WSP

PAVEMENT CONDITION PHOTOS

Location: Kingman Road southbound

Distress type and severity: moderate to high severity fatigue cracking; high severity patch; patch deterioration; potholes

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, Virginia
CLIENT:	WSP

PAVEMENT CONDITION PHOTOS

Location: Mount Vernon Memorial Highway eastbound between Station 303+50 and 304+50.

Distress type and severity: low to moderate severity fatigue cracking

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, Virginia
CLIENT:	WSP

PAVEMENT CONDITION PHOTOS

Location: Mount Vernon Memorial Highway eastbound between Station 303+50 and 304+50.

Distress type and severity: low severity edge cracking

PROJECT NAME:	Fort Belvoir Kingman and Walker Gates
PROJECT NO.:	01.04361.01
LOCATION:	Fairfax County, Virginia
CLIENT:	WSP

PAVEMENT CONDITION PHOTOS

Location: Mount Vernon Memorial Highway eastbound and westbound

Distress type and severity: no or little fatigue cracking

Table B2 - Summary of Pavement Subgrade Soil Conditions

Fort Belvoir Kingman and Walker Gates

DMY Project No. 01.04361.01

Boring Information			Subgrade Soils Characteristics																
Boring ID	Station	Offset	Soil Class.	Fine Content (%)	LL (%)	PI (%)	CBR	Reference CBR/Proctor Tests	Swell (%)	OMC (%)	NMC (%)	SPT N-Value	High Plasticity (CH/MH)	Low CBR (CBR < 5)	Swell >5%	Soft/ Loose	Excessive Moisture (NMC >1.2 OMC)	Highly Organic	Subgrade Treatment Option
Fairfax County Parkway EB (Kingman Gate)																			
KG-B-01	104+00	3.75 RT	SC	26.5	39	21	13.6	KG-B-01	0.6	7.5	14.4	6	-	-	-	-	Yes	-	A or B
KG-B-02	106+00	0	SC	32.4	39	21	10.0	KG-B-02	1.1	9.2	19.2	6	-	-	-	-	Yes	-	A or B
KG-B-03	113+70	1 LT	SC	33.7	45	27	14.2	KG-B-03	0.8	9.6	21.2	4	-	-	-	Yes	Yes	-	A
KG-B-06	108+05	7.5 RT	GM/SM					KG-B-02		9.2	12.7	7	-	-	-	-	Yes	-	A or B
KG-B-07	110+13	7.5 RT	SM					KG-B-02		9.2	11.8	23	-	-	-	-	Yes	-	A or B
KG-B-08	111+18	7.5 RT	SC/CL					KG-B-02		9.2	14.6	9	-	-	-	-	Yes	-	A or B
KG-B-09	112+55	3 LT	SC/GM					KG-B-03		9.6	12.1	9	-	-	-	-	Yes	-	A or B
KG-B-10	115+75	3 RT	SC/SM					KG-B-03		9.6	8.2	7	-	-	-	-	-	-	-
KG-B-11	117+75	6.25RT	SC					KG-B-03		9.6	13.7	6	-	-	-	-	Yes	-	A or B
Kingman Road (Kingman Gate)																			
KG-B-04	202+30	36.25 RT	SC	48.3	41	20	14.2	KG-B-04	0.7	12.0	16.3	13	-	-	-	-	Yes	-	A or B
KG-B-05	203+25	46.0 LT	SC/SM	47.4	41	22	7.9	KG-B-05	0.3	14.9	21.7	16	-	-	-	-	Yes	-	A or B
KG-B-12	204+25	19.5 RT	SC/CL					KG-B-14		14.8	33.2	11	-	-	-	-	Yes	-	A or B
KG-B-13	205+25	44.5 LT	SM					KG-B-14		14.8	18.4	8	-	-	-	-	Yes	-	A or B
KG-B-14	205+80	7.5 LT	SC	47.8	52	29	5.4	KG-B-14	2.3	14.8	30.4	11	-	-	-	-	Yes	-	A or B
KG-B-15	207+25	35.5 LT	SM					KG-B-14		14.8	29	15	-	-	-	-	Yes	-	A or B
Mount Vernon Memorial Highway (Walker Gate)																			
WG-B-01	308+50	4.25 LT	CL	57.4	33	16	8.5	WG-B-01	1.2	12.0	17.7	10	-	-	-	-	Yes	-	A or B
WG-B-02	310+50	16.75 LT	CL	64.2	37	17	11.2	WG-B-02	0.7	12.9	25.3	6	-	-	-	-	Yes	-	A or B
WG-B-03	312+50	7.5 LT	CL	55.9	36	17	16.9	WG-B-03	0.6	12.0	16.6	14	-	-	-	-	Yes	-	A or B
WG-B-04	306+50	4.25 LT	CL/SM					WG-B-01		12.0	22.1	9	-	-	-	-	Yes	-	A or B
WG-B-05	314+50	4.5 LT	CL/SM					WG-B-03		12.0	21.4	9	-	-	-	-	Yes	-	A or B
WG-B-06	316+50	4.5 LT	SM/CL					WG-B-03		12.0	21.1	9	-	-	-	-	Yes	-	A or B
WG-B-07	318+50	3.5 LT	CL					WG-B-08		15.1	24.8	2	-	-	-	Yes	Yes	-	A
WG-B-08	320+50	0	CL	79.3	32	13	5.1	WG-B-08	0.6	15.1	21	5	-	-	-	-	Yes	-	A or B
WG-B-09	322+50	9.5 RT	CL					WG-B-08		15.1	26.4	5	-	-	-	-	Yes	-	A or B

A. Undercut to a depth of at least 3 feet below subgrade and backfill with compacted VDOT Select Material Type I with a minimum CBR value of 30.

B. For unstable areas as identified by proofrolling, dry up the top 2 feet of subgrade soils beneath the proposed pavement using mechanical means to within 120% of the optimum moisture content and recompact in-place.

APPENDIX C GROUND PENETRATION RADAR SURVEY RESULTS

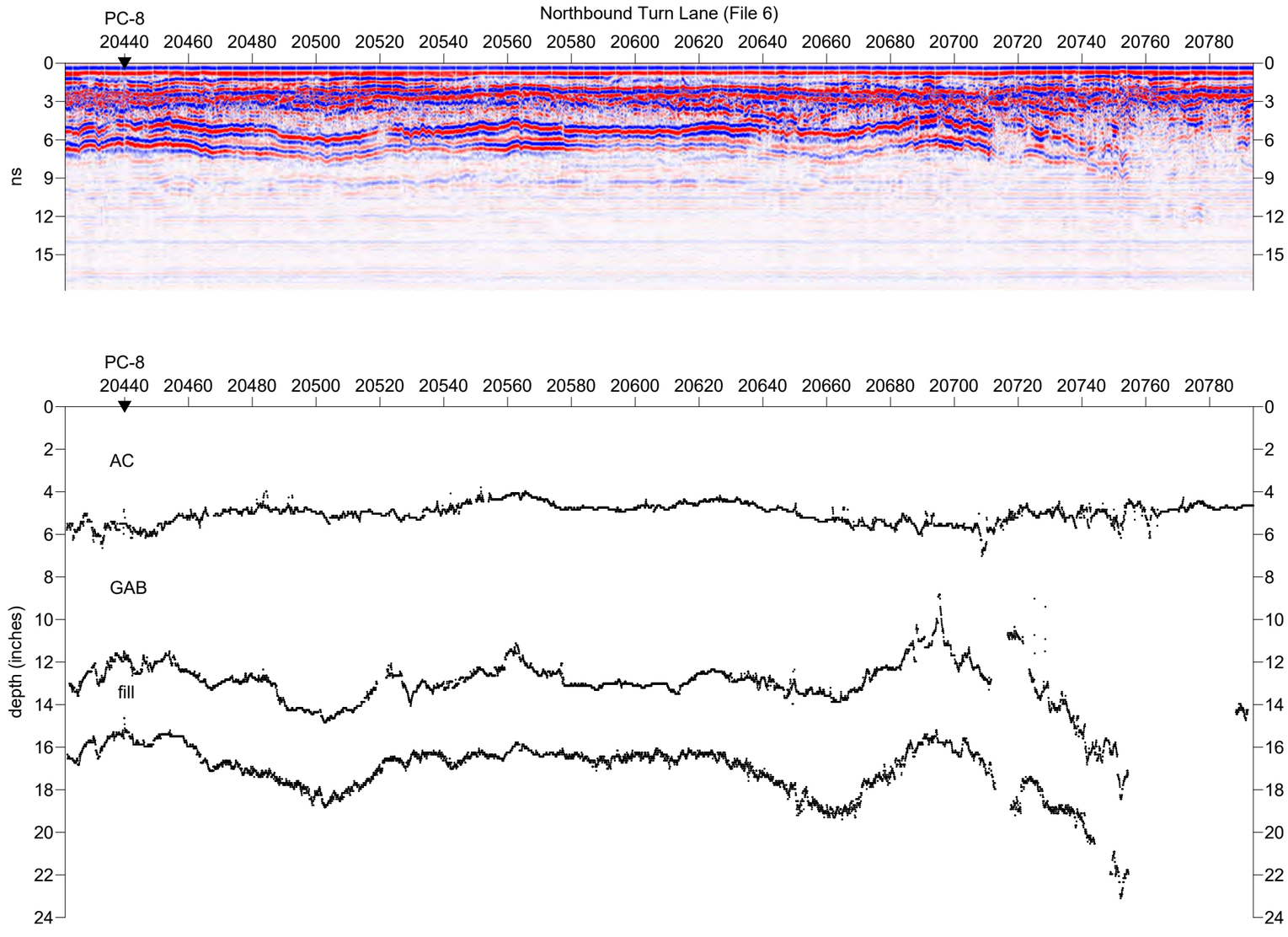
ERT

Ground Penetrating Radar Profile Locations
Kingman Road
Fairfax County, Virginia

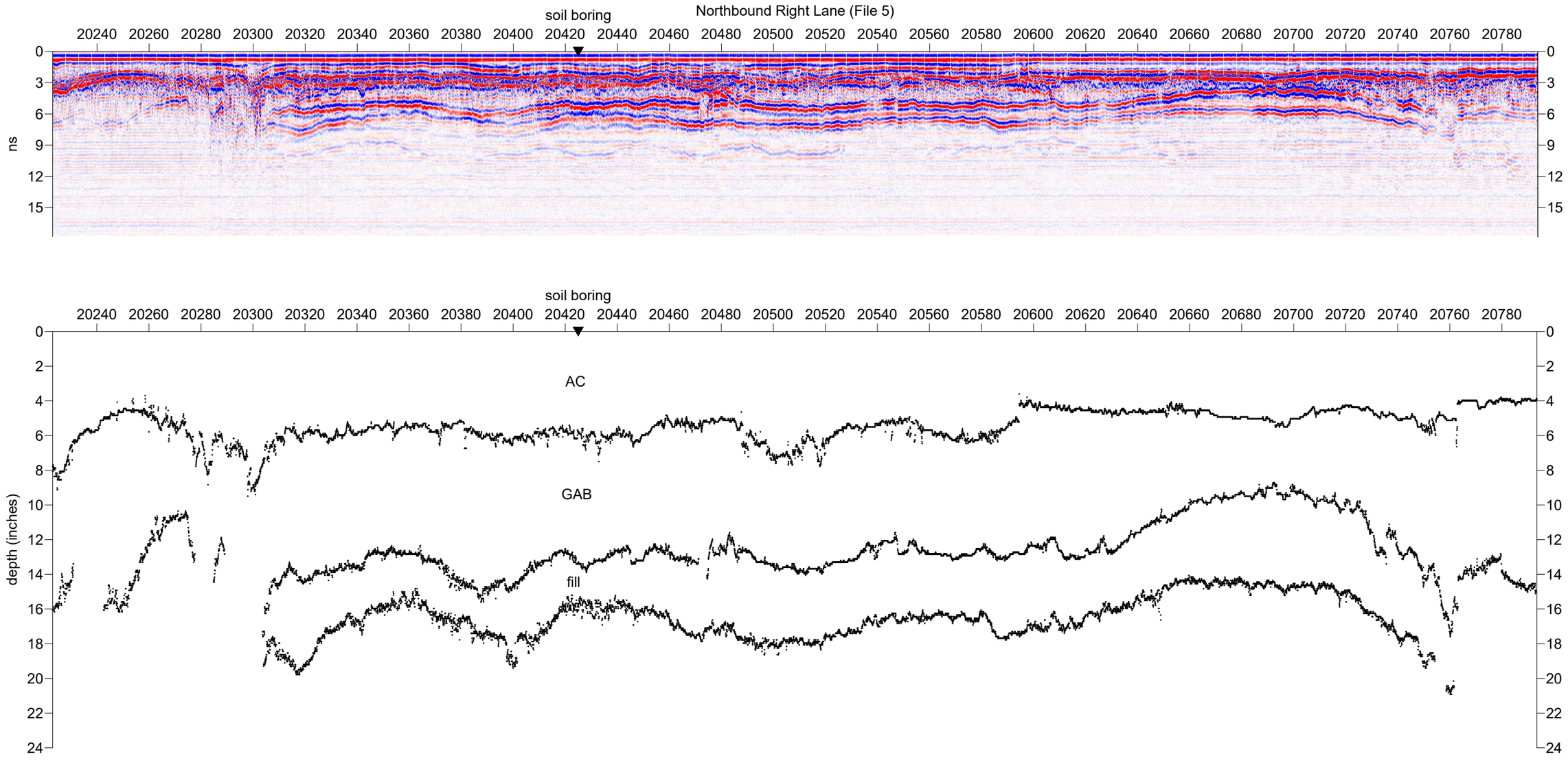
FIGURE 1

February 2021

Scale: 1" = 100'

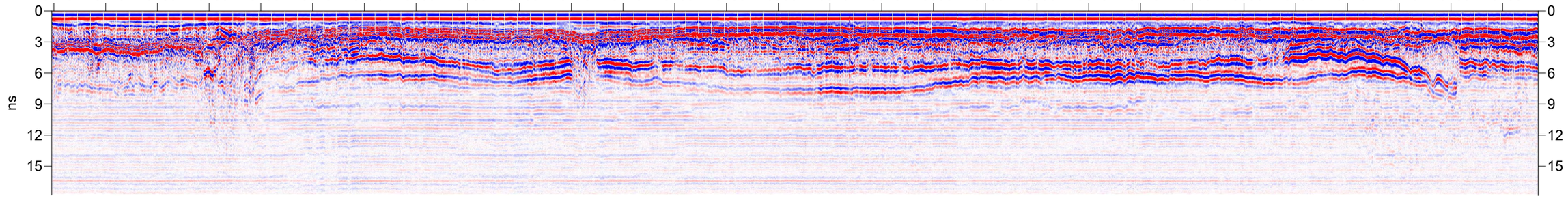


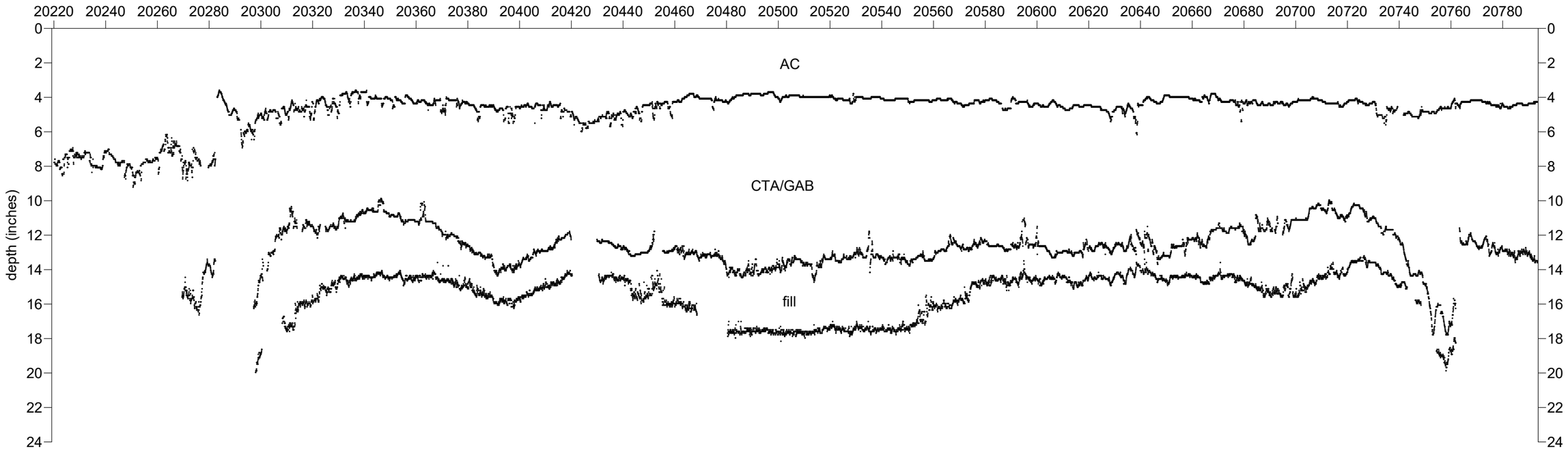
ERT	Northbound Turn Lane (File 6) Kingman Road Fairfax County, Virginia	FIGURE 2 February 2021 Horizontal Scale: 1" = 40'



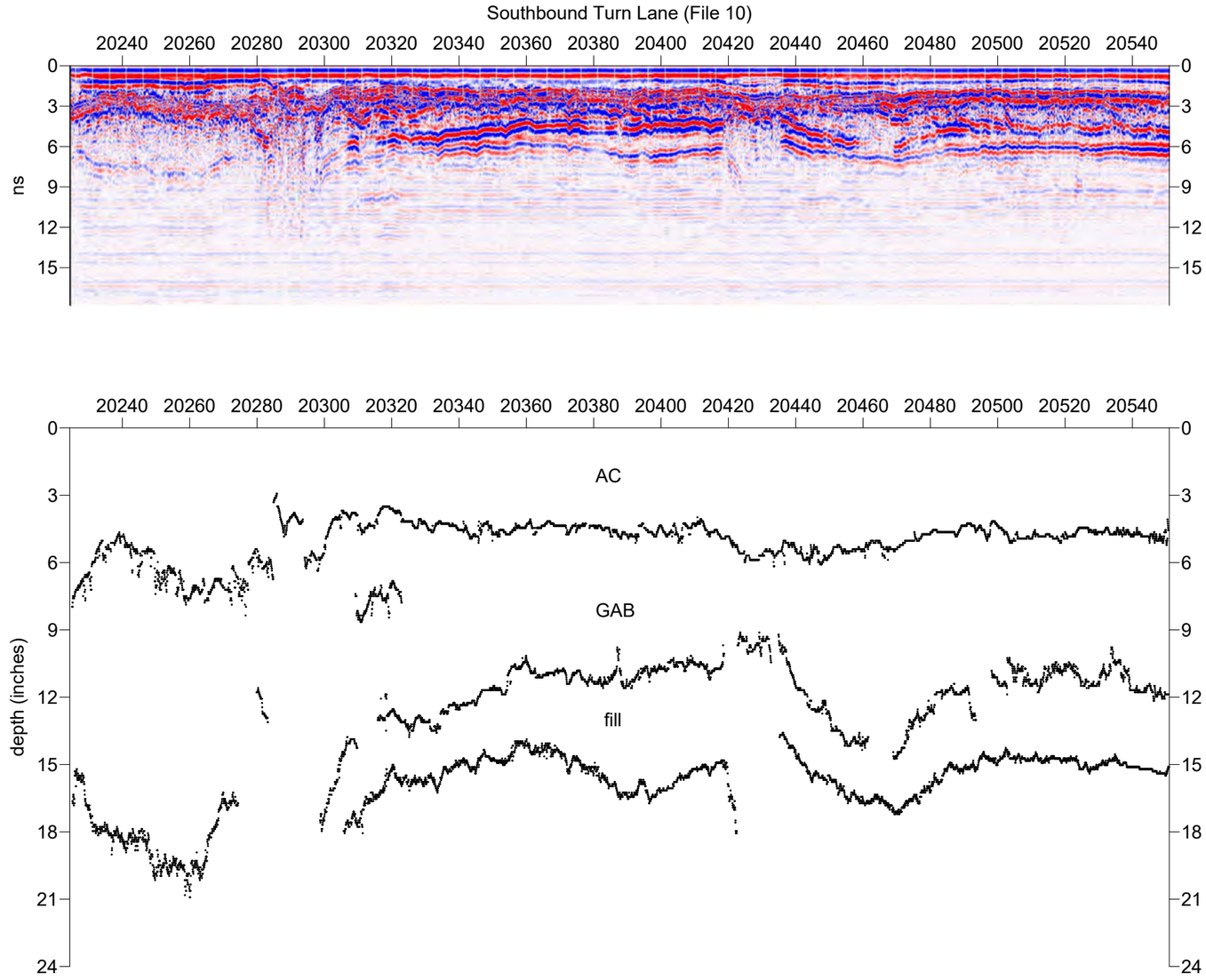
ERT	Northbound Right Lane (File 5) Kingman Road Fairfax County, Virginia	FIGURE 3 February 2021 Horizontal Scale: 1" = 40'

Northbound Left Lane (File 7)





ERT	Northbound Left Lane (File 7) Kingman Road Fairfax County, Virginia	FIGURE 4 February 2021 Horizontal Scale: 1" = 40'



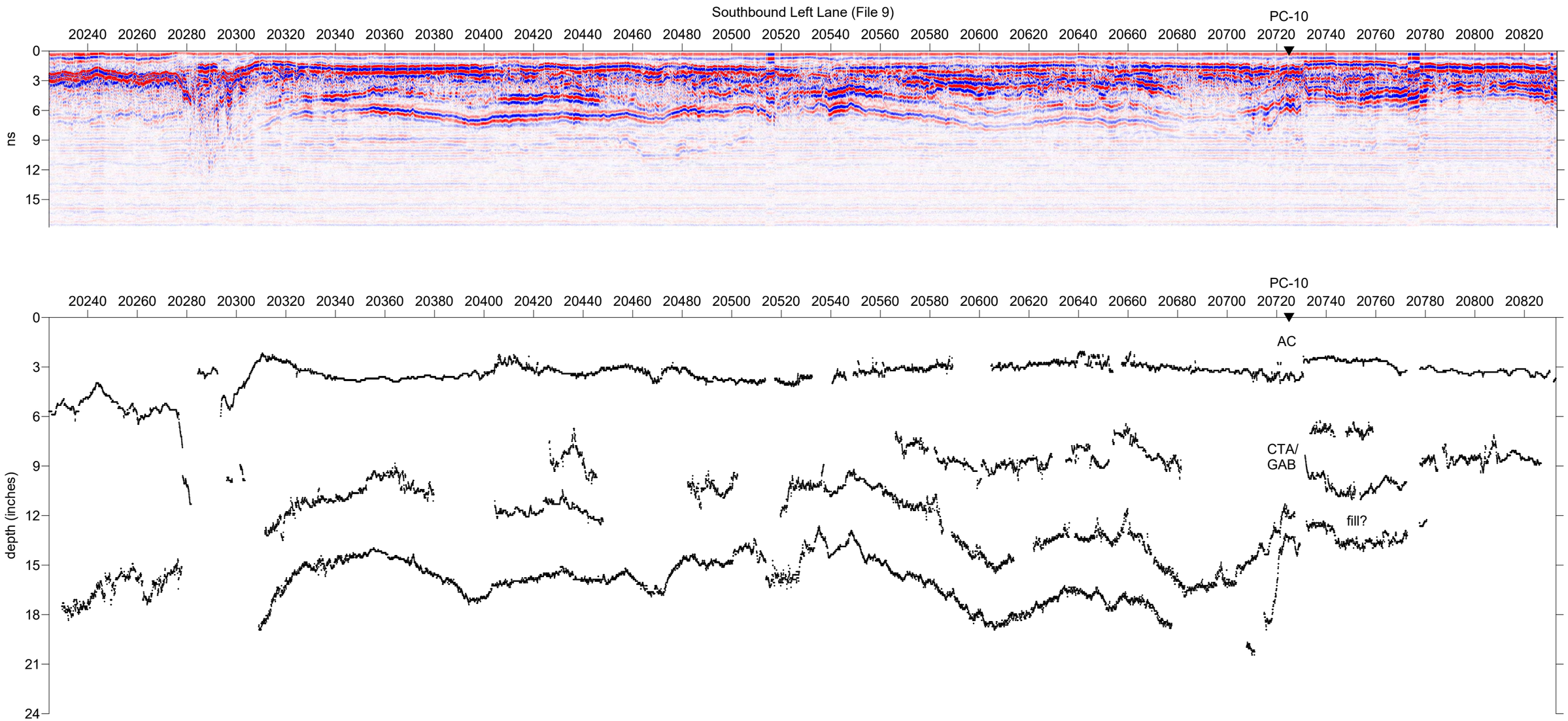
Southbound Turn Lane (File 10)
Kingman Road
Fairfax County, Virginia

FIGURE 5

February 2021

Horizontal Scale: 1" = 40'

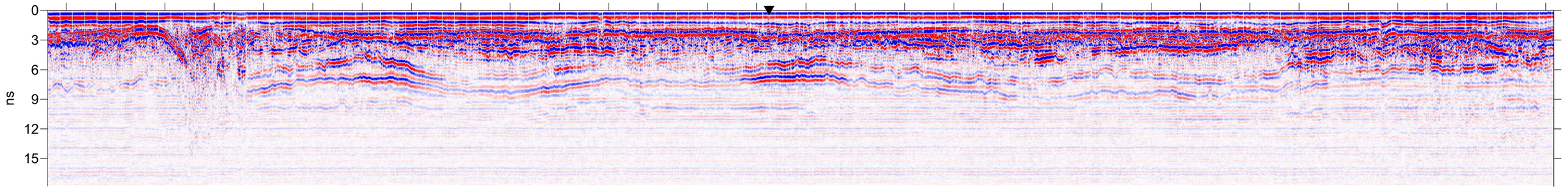
Southbound Left Lane (File 9)



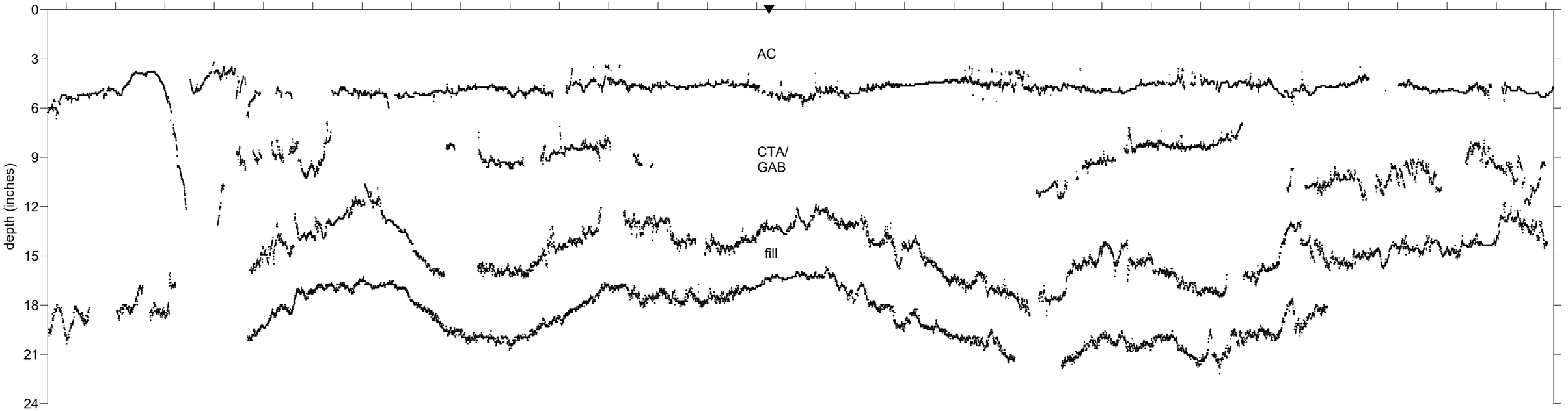
Southbound Right Lane (File 9)
Kingman Road
Fairfax County, Virginia

FIGURE 6
February 2021
Horizontal Scale: 1" = 40'

PC-9
Southbound Right Lane (File 8)



PC-9



ERT	Southbound Right Lane (File 8) Kingman Road Fairfax County, Virginia	FIGURE 7 February 2021 Horizontal Scale: 1" = 40'

APPENDIX D LABORATORY TESTING

SUMMARY OF LABORATORY TESTING

FORT BELVOIR KINGDOM AND WALKER GATES

PROJECT NO.	01.04361.01	**SAMPLE DATE**	-	**JAY KAY TESTING, INC.**
SAMPLES:	83	**LOCATION:**	-	5233 Lehman Road, Suite 110
REPORT:	02/15/21	**REMARKS:**	-	Spring Grove, PA 17362
				Phone: (814) 404-9283

BORING	SAMPLE	DEPTH	MC %	OM %	LL	PL	PI	% FINES	USCS
KB-B-06	S-1	0.3-2.3	7.4	-	-	-	-	-	-
KB-B-06	S-2	2.3-4.3	12.7	-	-	-	-	-	-
KB-B-06	S-3	4.3-6.3	10.0	-	-	-	-	-	-
KB-B-06	S-4	6.3-8.3	25.6	-	-	-	-	-	-
KB-B-06	S-5	8.3-10.3	11.6	-	-	-	-	-	-
KG-B-07	S-1	0.8-2.8	11.8	-	-	-	-	-	-
KG-B-07	S-2	2.8-4.8	6.5	-	-	-	-	-	-
KG-B-07	S-3	4.8-6.8	13.9	-	31	16	15	37.9	SC
KG-B-07	S-4	6.8-8.8	13.5	-	-	-	-	-	-
KG-B-07	S-5	8.8-10.8	12.8	-	-	-	-	-	-
KG-B-08	S-1	0.8-2.8	14.6	-	-	-	-	-	-
KG-B-08	S-2	2.8-4.8	14.3	-	-	-	-	-	-
KG-B-08	S-3	4.8-6.8	13.8	-	-	-	-	-	-
KG-B-08	S-4	6.8-8.8	12.4	-	-	-	-	-	-
KG-B-08	S-5	8.8-10.8	14.6	-	-	-	-	-	-
KG-B-09	S-1	0.7-2.7	12.1	-	-	-	-	-	-
KG-B-09	S-2	2.7-4.7	6.9	-	-	-	-	-	-
KG-B-09	S-3	4.7-6.7	7.9	-	-	-	-	-	-
KG-B-09	S-4	6.7-8.7	9.8	-	-	-	-	-	-
KG-B-09	S-5	8.7-10.7	13.5	-	-	-	-	-	-
KG-B-10	S-1	0.5-2.5	6.2	-	-	-	-	-	-
KG-B-10	S-2	2.5-4.5	8.2	-	-	-	-	-	-
KG-B-10	S-3	4.5-6.5	16.3	-	-	-	-	-	-
KG-B-10	S-4	6.5-8.5	20.4	-	46	22	24	32.4	SC
KG-B-10	S-5	8.5-10.5	15.6	-	-	-	-	-	-
KG-B-11	S-1	0.7-2.7	13.7	-	-	-	-	-	-
KG-B-11	S-2	2.7-4.7	13.1	-	-	-	-	-	-
KG-B-11	S-3	4.7-6.7	13.9	-	-	-	-	-	-
KG-B-11	S-4	6.7-8.7	17.6	-	-	-	-	-	-
KG-B-11	S-5	8.7-10.7	20.2	-	39	16	23	42.0	SC
KG-B-11	S-6	13-15	26.5	-	-	-	-	-	-
KG-B-12	S-1	0.8-2.8	19.6	-	-	-	-	-	-
KG-B-12	S-2	2.8-4.8	33.2	-	-	-	-	-	-
KG-B-12	S-3	4.8-6.8	32.2	-	-	-	-	-	-
KG-B-12	S-4	6.8-8.8	17.9	-	-	-	-	-	-

Jay Kay Testing, Inc. (AASHTO-Accredited)

SUMMARY OF LABORATORY TESTING

FORT BELVOIR KINGDOM AND WALKER GATES

PROJECT NO.	01.04361.01	**SAMPLE DATE**	-	**JAY KAY TESTING, INC.**
SAMPLES:	83	**LOCATION:**	-	5233 Lehman Road, Suite 110
REPORT:	02/15/21	**REMARKS:**	-	Spring Grove, PA 17362
				Phone: (814) 404-9283

BORING	SAMPLE	DEPTH	MC %	OM %	LL	PL	PI	% FINES	USCS
KG-B-12	S-5	8.8-10.8	16.3	-	-	-	-	-	-
KG-B-13	S-1	0-2	14.8	-	-	-	-	-	-
KG-B-13	S-2	2-4	18.4	-	-	-	-	-	-
KG-B-13	S-3	4-6	16.4	-	-	-	-	-	-
KG-B-13	S-4	6-8	16.1	-	-	-	-	-	-
KG-B-13	S-5	8-10	18.2	-	-	-	-	-	-
KG-B-14	Bulk-1	0-6	27.8	-	52	23	29	47.8	SC
KG-B-14	S-1	0-2	7.2	-	-	-	-	-	-
KG-B-14	S-2	2-4	28.2	-	-	-	-	-	-
KG-B-14	S-3	4-6	30.4	-	-	-	-	-	-
KG-B-14	S-4	6-8	21.4	-	-	-	-	-	-
KG-B-14	S-5	8-10	25.0	-	-	-	-	-	-
KG-B-15	S-1	0.8-2.8	13.1	-	-	-	-	-	-
KG-B-15	S-2	2.8-4.8	29.0	-	-	-	-	-	-
KG-B-15	S-3	4.8-6.8	27.6	-	67	24	43	42.0	SC
KG-B-15	S-4	6.8-8.8	22.5	-	-	-	-	-	-
KG-B-15	S-5	8.8-10.8	24.1	-	-	-	-	-	-
WG-B-04	S-1	0-2	5.5	-	-	-	-	-	-
WG-B-04	S-2	2-4	22.1	-	-	-	-	-	-
WG-B-04	S-3	4-6	19.1	-	-	-	-	-	-
WG-B-04	S-4	6-8	21.7	-	-	-	-	-	-
WG-B-04	S-5	8-10	22.3	-	-	-	-	-	-
WG-B-05	S-1	0-2	20.6	-	-	-	-	-	-
WG-B-05	S-2	2-4	21.4	-	-	-	-	-	-
WG-B-05	S-3	4-6	17.0	-	-	-	-	-	-
WG-B-05	S-4	6-8	25.4	-	-	-	-	-	-
WG-B-05	S-5	8-10	21.2	-	-	-	-	-	-
WG-B-06	S-1	0-2	19.7	-	-	-	-	-	-
WG-B-06	S-2	2-4	21.1	-	-	-	-	-	-
WG-B-06	S-3	4-6	23.4	-	-	-	-	-	-
WG-B-06	S-4	6-8	20.0	-	-	-	-	-	-
WG-B-06	S-5	8-10	20.6	-	-	-	-	-	-
WG-B-07	S-1	0-2	22.9	-	-	-	-	-	-
WG-B-07	S-2	2-4	24.8	-	-	-	-	-	-
WG-B-07	S-3	4-6	27.5	-	49	25	24	91.4	CL

Jay Kay Testing, Inc. (AASHTO-Accredited)

SUMMARY OF LABORATORY TESTING

FORT BELVOIR KINGDOM AND WALKER GATES

PROJECT NO.	01.04361.01	**SAMPLE DATE**	-	**JAY KAY TESTING, INC.**
SAMPLES:	83	**LOCATION:**	-	5233 Lehman Road, Suite 110
REPORT:	02/15/21	**REMARKS:**	-	Spring Grove, PA 17362
				Phone: (814) 404-9283

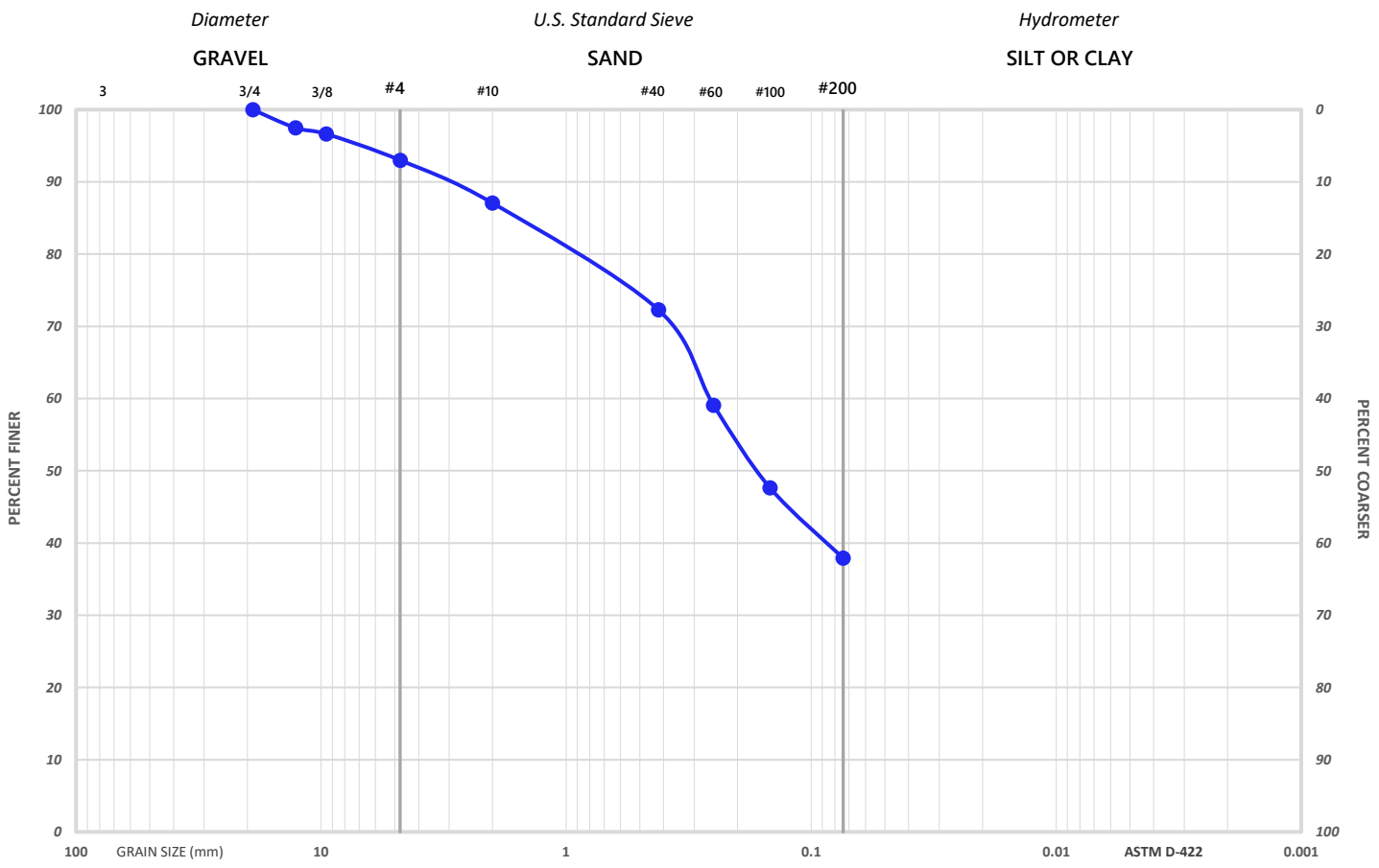
BORING	SAMPLE	DEPTH	MC %	OM %	LL	PL	PI	% FINES	USCS
WG-B-07	S-4	6-8	22.0	-	-	-	-	-	-
WG-B-07	S-5	8-10	20.4	-	-	-	-	-	-
WG-B-08	Bulk-1	0-6	17.8	-	32	19	13	79.3	CL
WG-B-08	S-1	0-2	21.0	-	-	-	-	-	-
WG-B-08	S-2	2-4	21.0	-	-	-	-	-	-
WG-B-08	S-3	4-6	26.4	-	-	-	-	-	-
WG-B-08	S-4	6-8	19.7	-	-	-	-	-	-
WG-B-08	S-5	8-10	18.4	-	-	-	-	-	-
WG-B-09	S-1	0.9-2.9	20.2	-	-	-	-	-	-
WG-B-09	S-2	2.9-4.9	20.4	-	-	-	-	-	-
WG-B-09	S-3	4.9-6.9	21.9	-	-	-	-	-	-
WG-B-09	S-4	6.9-8.9	25.3	-	-	-	-	-	-
WG-B-09	S-5	8.9-10.9	21.8	-	40	20	20	97.9	CL

Jay Kay Testing, Inc. (AASHTO-Accredited)

FORT BELVOIR KINGDOM AND WALKER GATES

Boring:	**KG-B-07**	Project No.:	01.04361.01	
Sample:	**S-3**	Sample Date:	-	
Depth:	**4.8-6.8'**	Location:	-	

JAY KAY TESTING, INC.
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	100.0	97.5	96.6	93.0	87.1	72.3	59.1	47.6	**37.9**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
7.0	**55.1**	-	7.0	5.9	14.8	34.4	-	-

Moisture Content	13.9	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	31
Plastic Limit	16
Plasticity Index	15

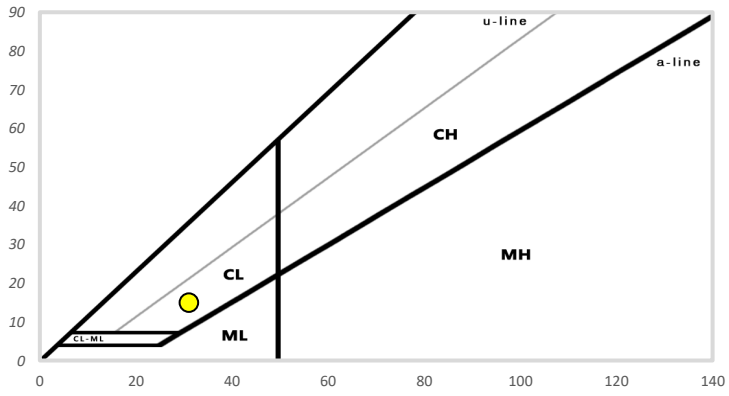
CLASSIFICATION

AASHTO	A-6
USCS	SC

SOIL DESCRIPTION

Brown clayey SAND

ASTM D-4318



FORT BELVOIR KINGDOM AND WALKER GATES

Boring:	**KG-B-10**	Project No.:	01.04361.01	
Sample:	**S-4**	Sample Date:	-	
Depth:	**6.5-8.5'**	Location:	-	

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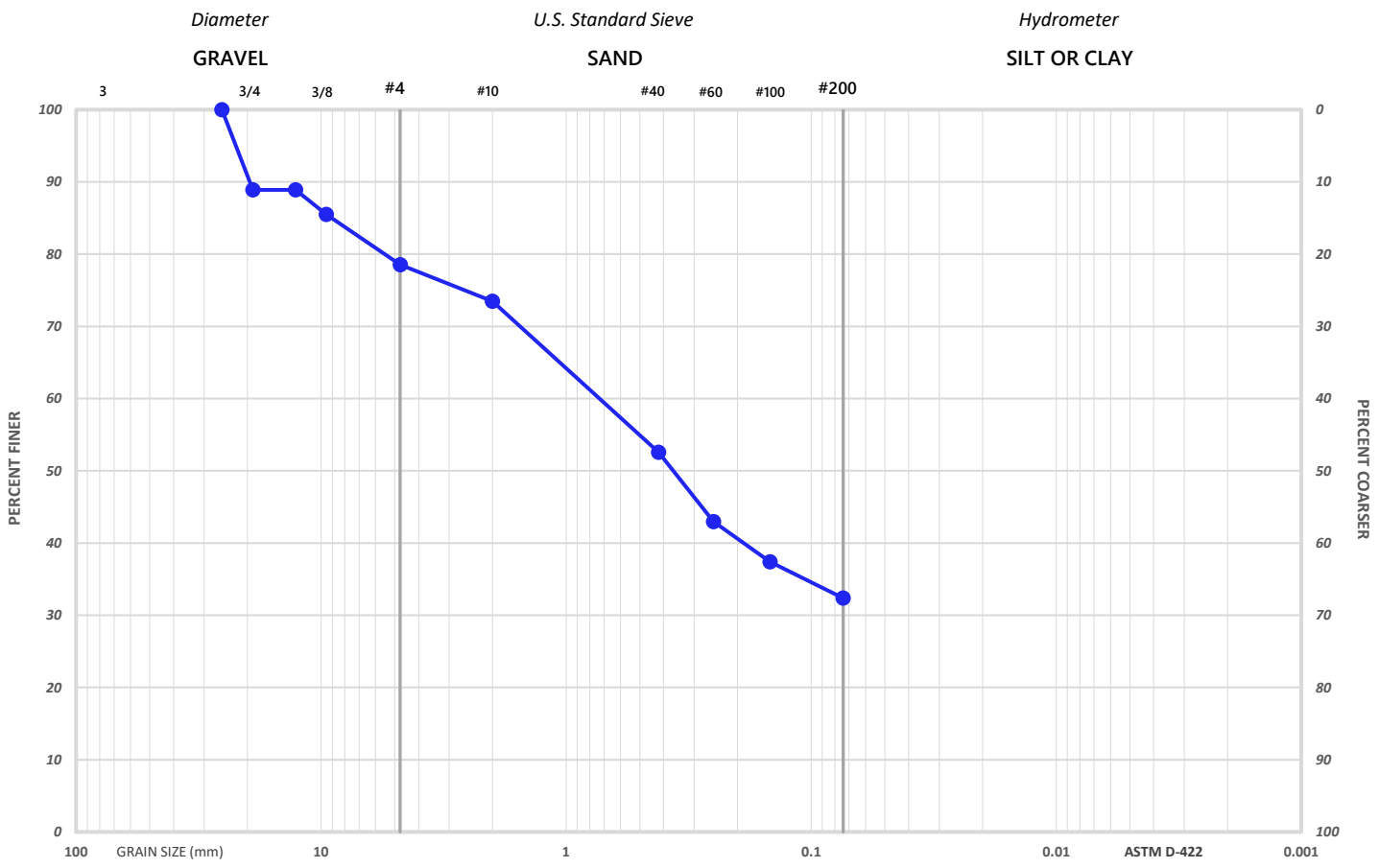
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	100.0	88.9	88.9	85.5	78.5	73.5	52.6	43.0	37.4	**32.4**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
21.5	**46.1**	11.1	10.4	5.0	20.9	20.2	-	-

Moisture Content	20.4	Organic Content	-
pH	-	Other	-

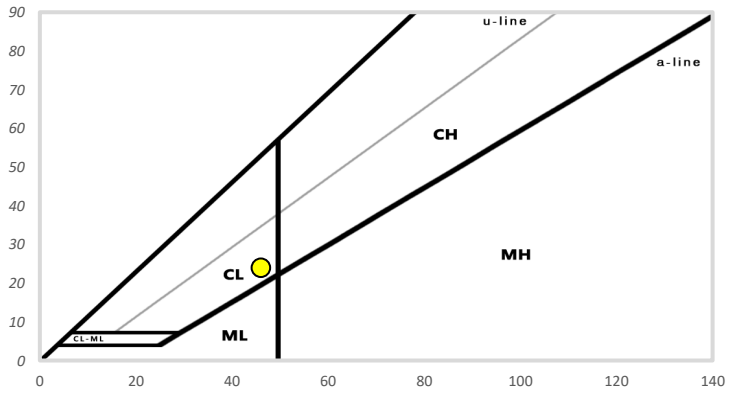
ATTERBERG LIMITS

Liquid Limit	46
Plastic Limit	22
Plasticity Index	24

CLASSIFICATION

AASHTO	A-2-7
USCS	SC

ASTM D-4318



SOIL DESCRIPTION

Dark greenish-brown clayey SAND with gravel

FORT BELVOIR KINGDOM AND WALKER GATES

Boring:	**KG-B-11**	Project No.:	01.04361.01	
Sample:	**S-5**	Sample Date:	-	
Depth:	**8.7-10.7'**	Location:	-	

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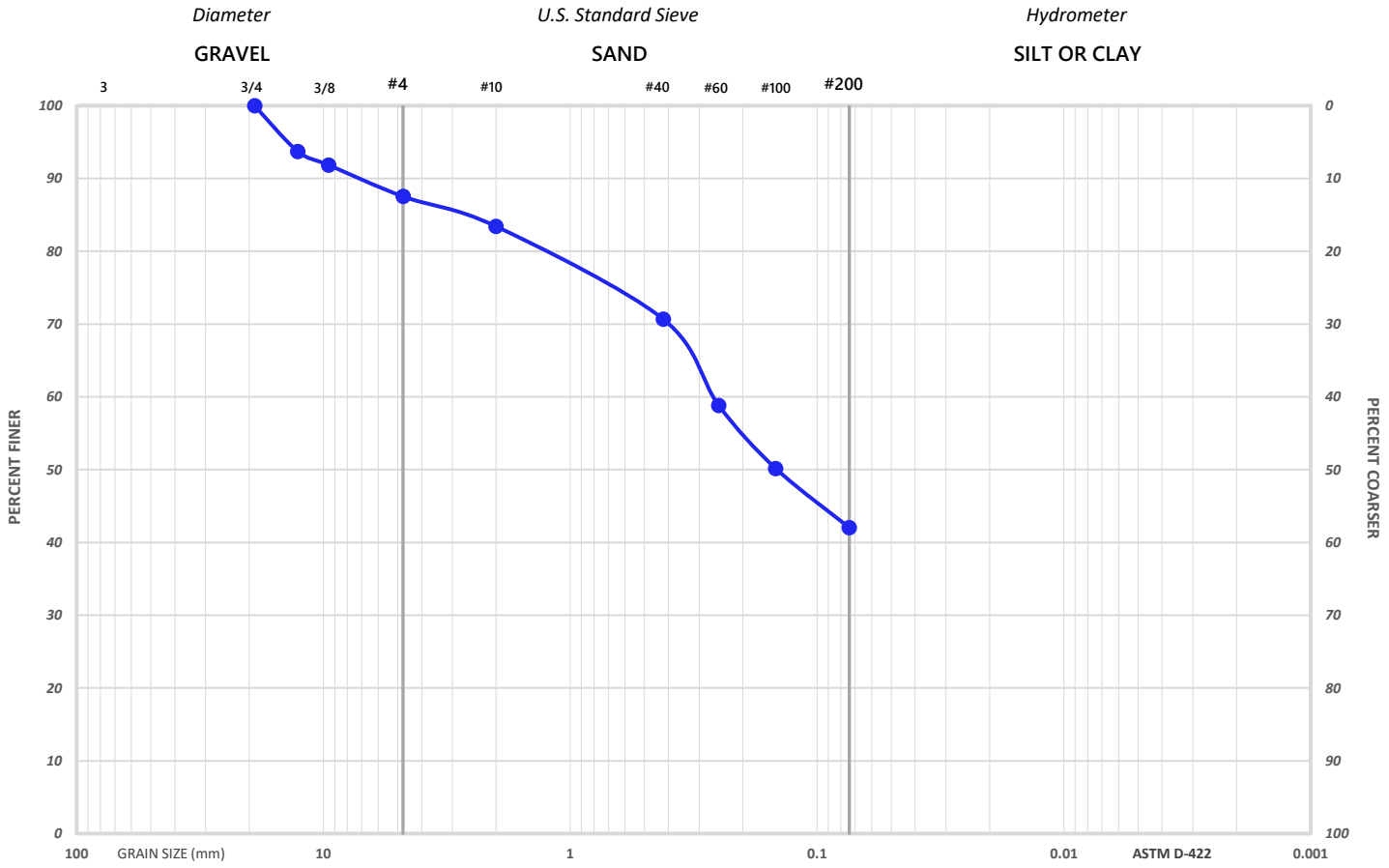
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	100.0	93.7	91.8	87.5	83.4	70.7	58.8	50.2	**42.0**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
12.5	**45.5**	-	12.5	4.1	12.7	28.7	-	-

Moisture Content	20.2	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	39
Plastic Limit	16
Plasticity Index	23

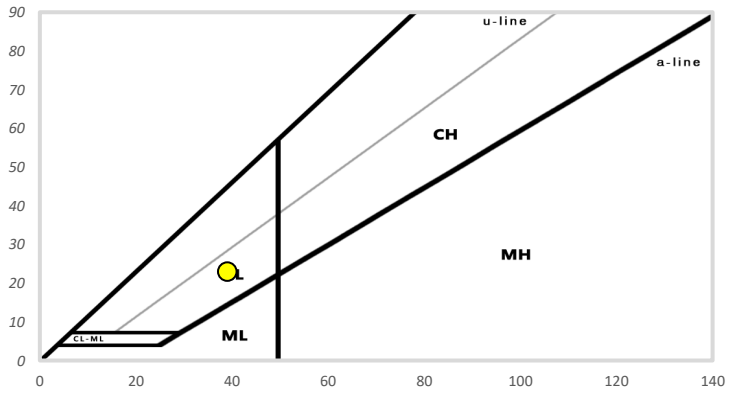
CLASSIFICATION

AASHTO	A-6
USCS	SC

SOIL DESCRIPTION

Brown clayey SAND

ASTM D-4318



FORT BELVOIR KINGDOM AND WALKER GATES

Boring:	**KG-B-14**	Project No.:	01.04361.01
Sample:	**Bulk-1**	Sample Date:	-
Depth:	**0-6'**	Location:	-

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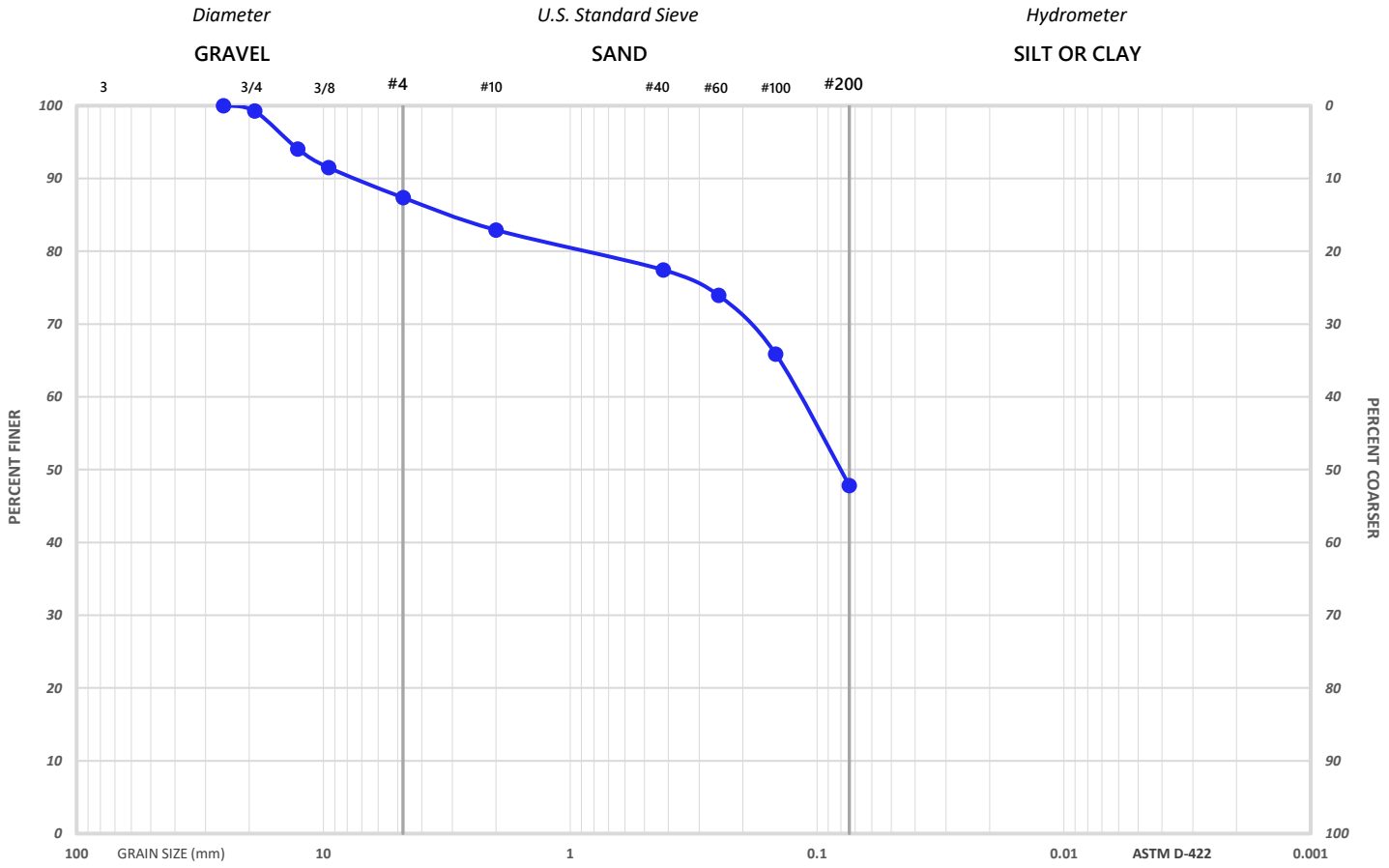
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	100.0	99.2	94.1	91.5	87.4	82.9	77.4	73.9	65.9	**47.8**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
12.6	**39.6**	0.8	11.8	4.5	5.5	29.6	-	-

Moisture Content	27.8	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	52
Plastic Limit	23
Plasticity Index	29

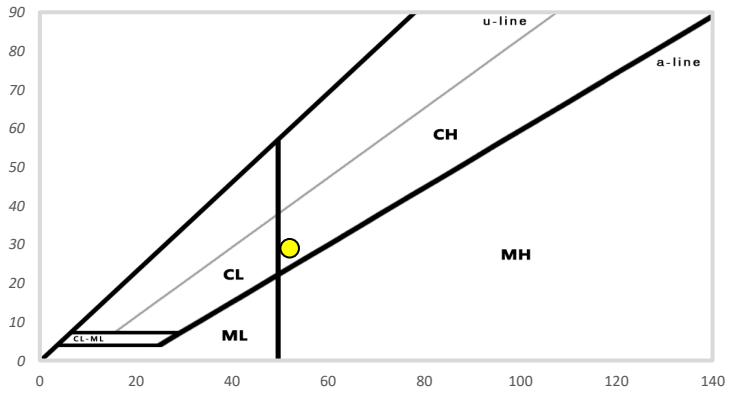
CLASSIFICATION

AASHTO	A-7-6
USCS	SC

SOIL DESCRIPTION

Dark green clayey SAND

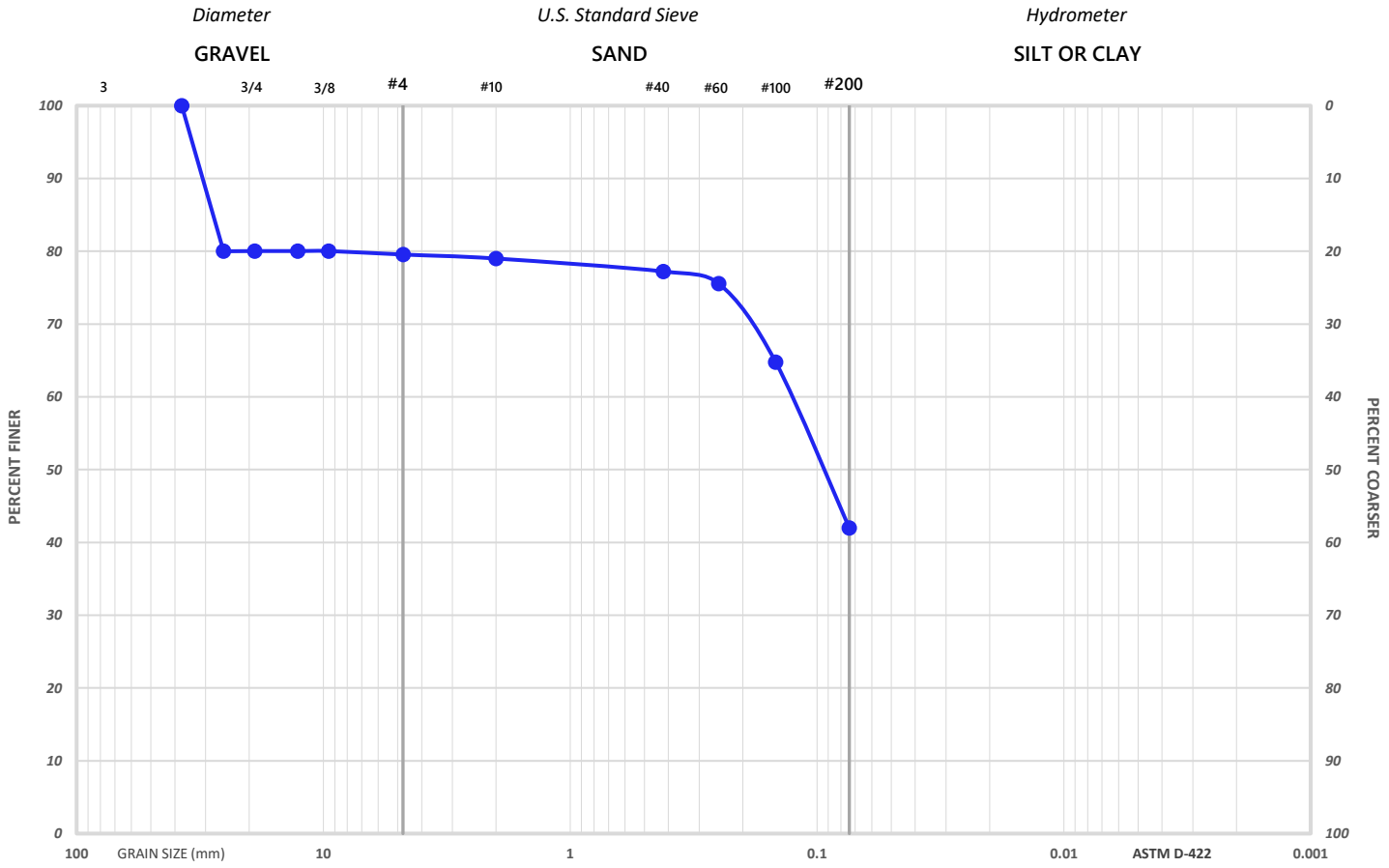
ASTM D-4318



FORT BELVOIR KINGDOM AND WALKER GATES

Boring:	**KG-B-15**	Project No.:	01.04361.01	
Sample:	**S-3**	Sample Date:	-	
Depth:	**4.8-6.8'**	Location:	-	

JAY KAY TESTING, INC.
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	100.0	80.0	80.0	80.0	80.0	79.5	79.0	77.2	75.5	64.8	**42.0**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
20.5	**37.5**	20.0	0.5	0.5	1.8	35.2	-	-

Moisture Content	27.6	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	67
Plastic Limit	24
Plasticity Index	43

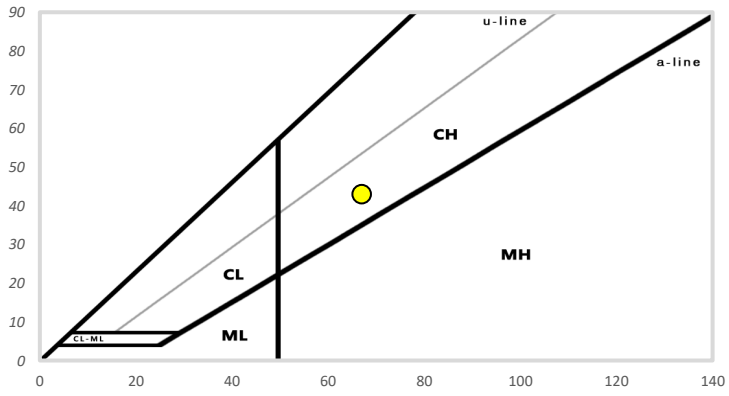
CLASSIFICATION

AASHTO	A-7-6
USCS	SC

SOIL DESCRIPTION

Dark greenish-brown clayey SAND with gravel

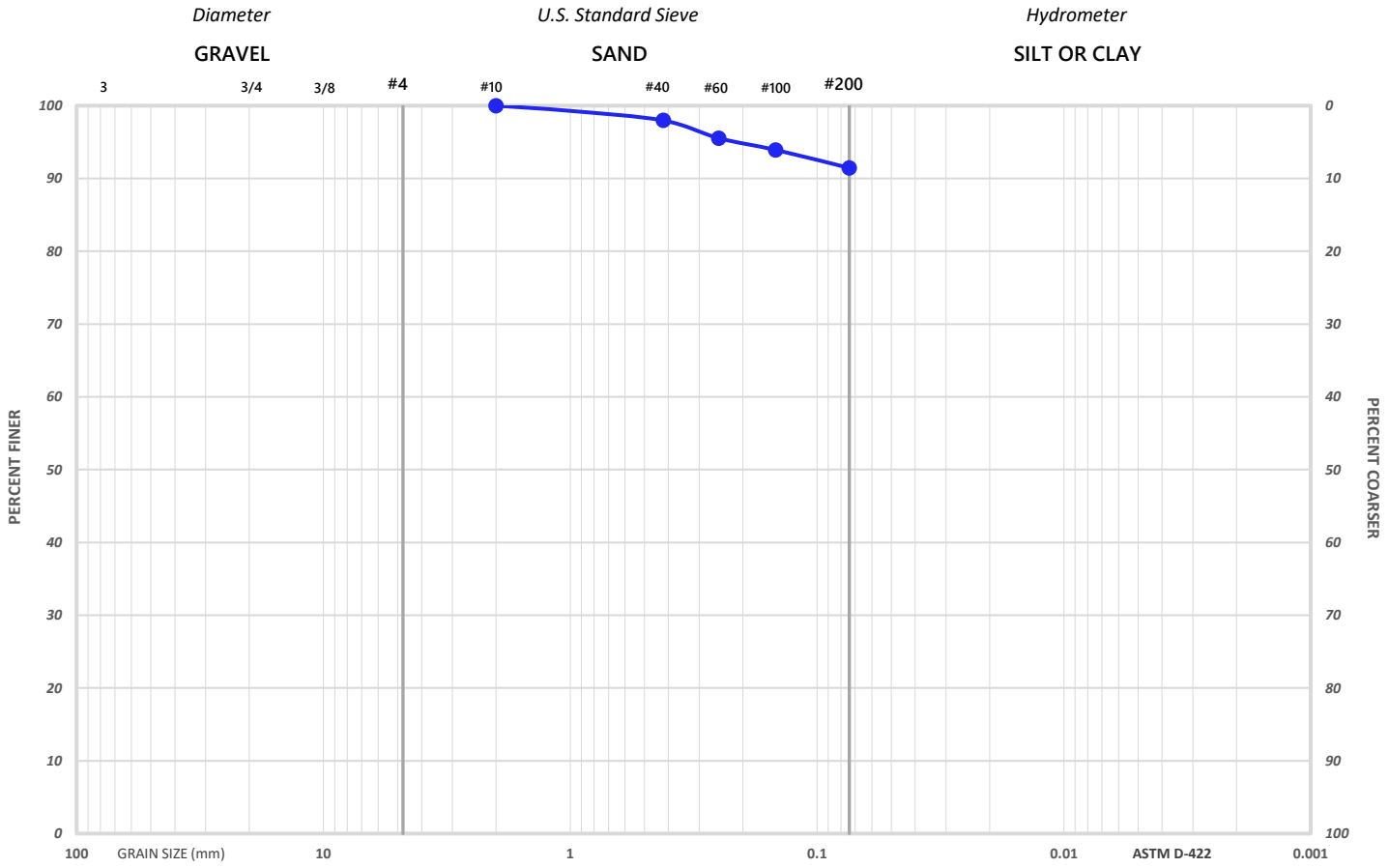
ASTM D-4318



FORT BELVOIR KINGDOM AND WALKER GATES

Boring:	**WG-B-07**	Project No.:	01.04361.01	
Sample:	**S-3**	Sample Date:	-	
Depth:	**4-6'**	Location:	-	

JAY KAY TESTING, INC.
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	-	100.0	98.0	95.5	93.9	**91.4**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
-	**8.6**	-	-	-	2.0	6.6	-	-

Moisture Content	27.5	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

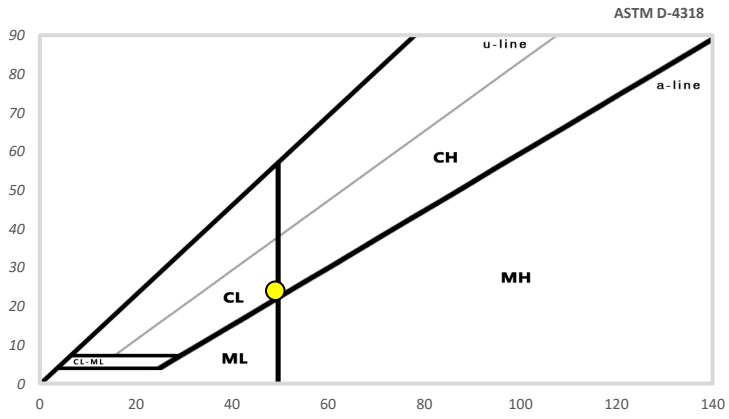
Liquid Limit	49
Plastic Limit	25
Plasticity Index	24

CLASSIFICATION

AASHTO	A-7-6
USCS	CL

SOIL DESCRIPTION

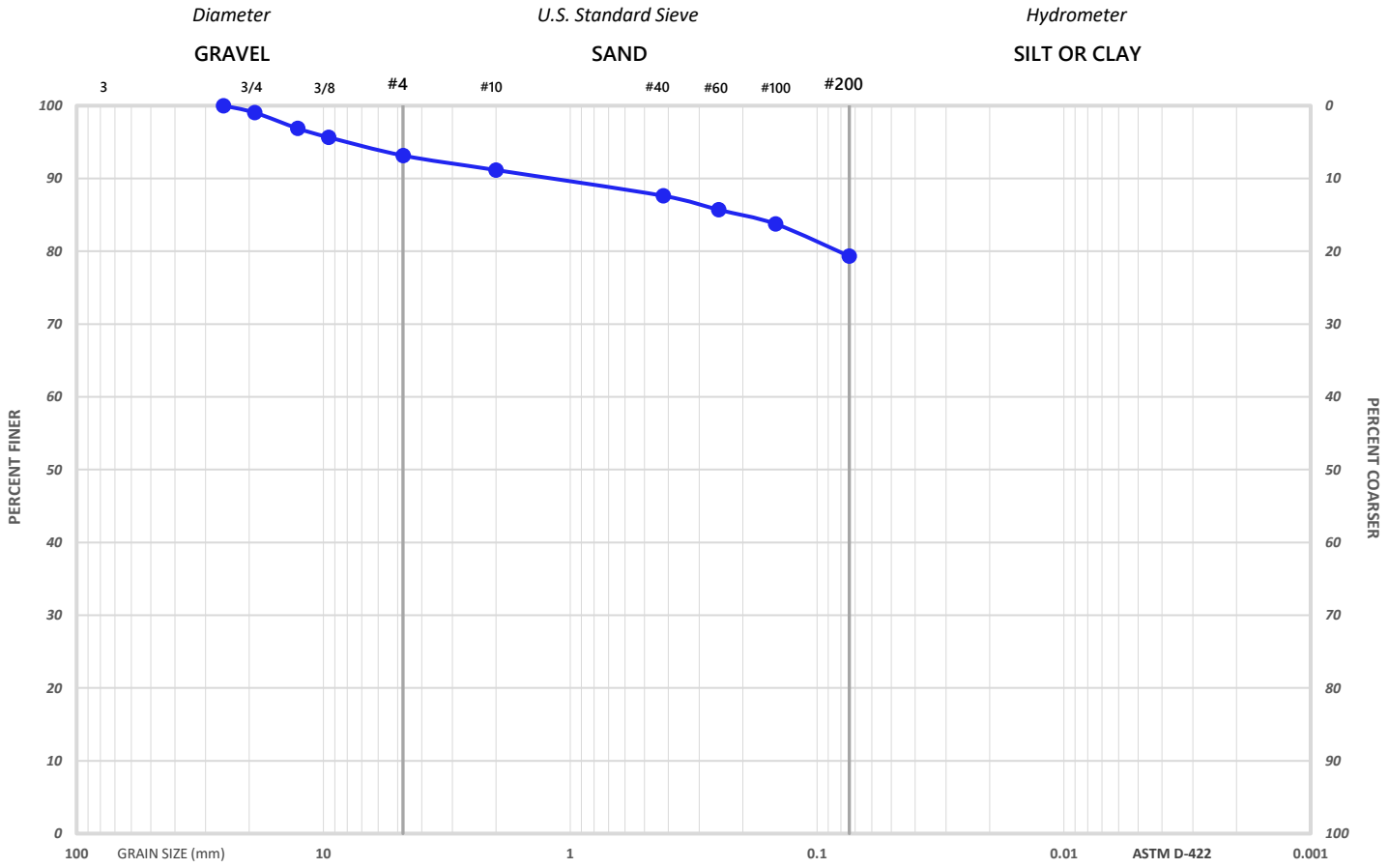
Brown lean CLAY



FORT BELVOIR KINGDOM AND WALKER GATES

Boring:	**WG-B-08**	Project No.:	01.04361.01
Sample:	**Bulk-1**	Sample Date:	-
Depth:	**0-6'**	Location:	-

JAY KAY TESTING, INC.
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	100.0	99.0	96.9	95.6	93.1	91.2	87.6	85.7	83.7	**79.3**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
6.9	**13.8**	1.0	5.9	1.9	3.6	8.3	-	-

Moisture Content	17.8	Organic Content	-
pH	-	Other	-

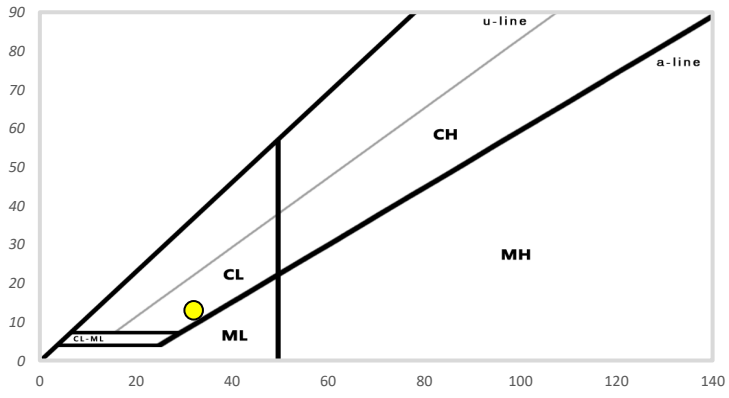
ATTERBERG LIMITS

Liquid Limit	32
Plastic Limit	19
Plasticity Index	13

CLASSIFICATION

AASHTO	A-6
USCS	CL

ASTM D-4318



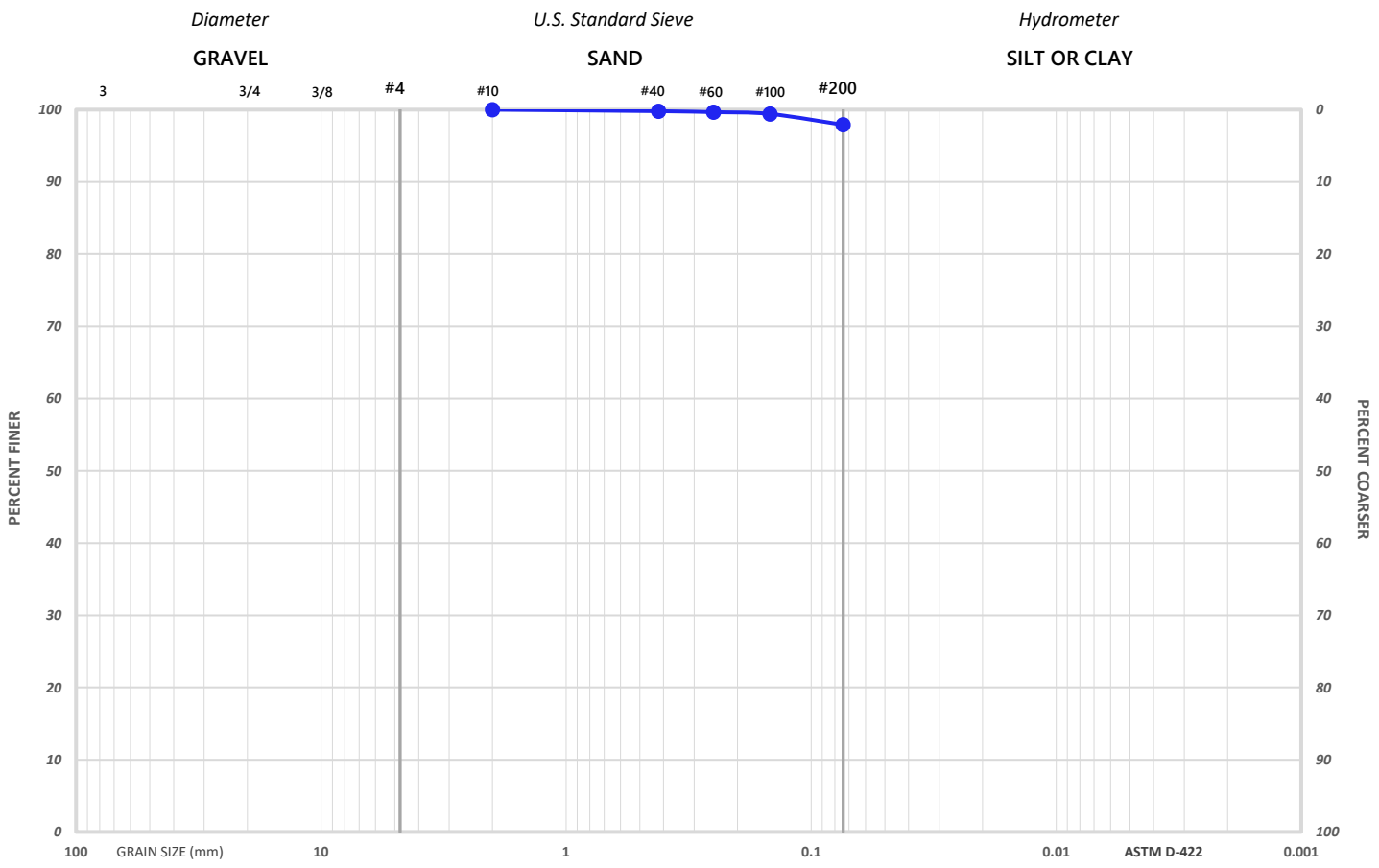
SOIL DESCRIPTION

Brown lean CLAY with sand

FORT BELVOIR KINGDOM AND WALKER GATES

Boring:	**WG-B-09**	Project No.:	01.04361.01	
Sample:	**S-5**	Sample Date:	-	
Depth:	**8.9-10.9'**	Location:	-	

JAY KAY TESTING, INC.
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	-	100.0	99.8	99.7	99.4	**97.9**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
-	**2.1**	-	-	-	0.2	1.9	-	-

Moisture Content	21.8	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	40
Plastic Limit	20
Plasticity Index	20

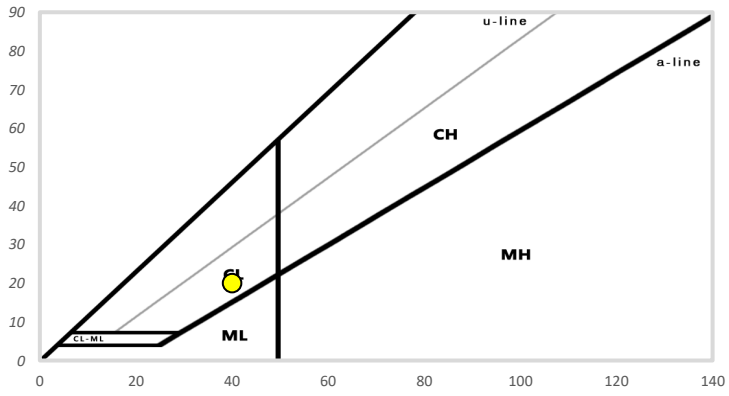
CLASSIFICATION

AASHTO	A-6
USCS	CL

SOIL DESCRIPTION

Light brown lean CLAY

ASTM D-4318



FORT BELVOIR KINGDOM AND WALKER GATES

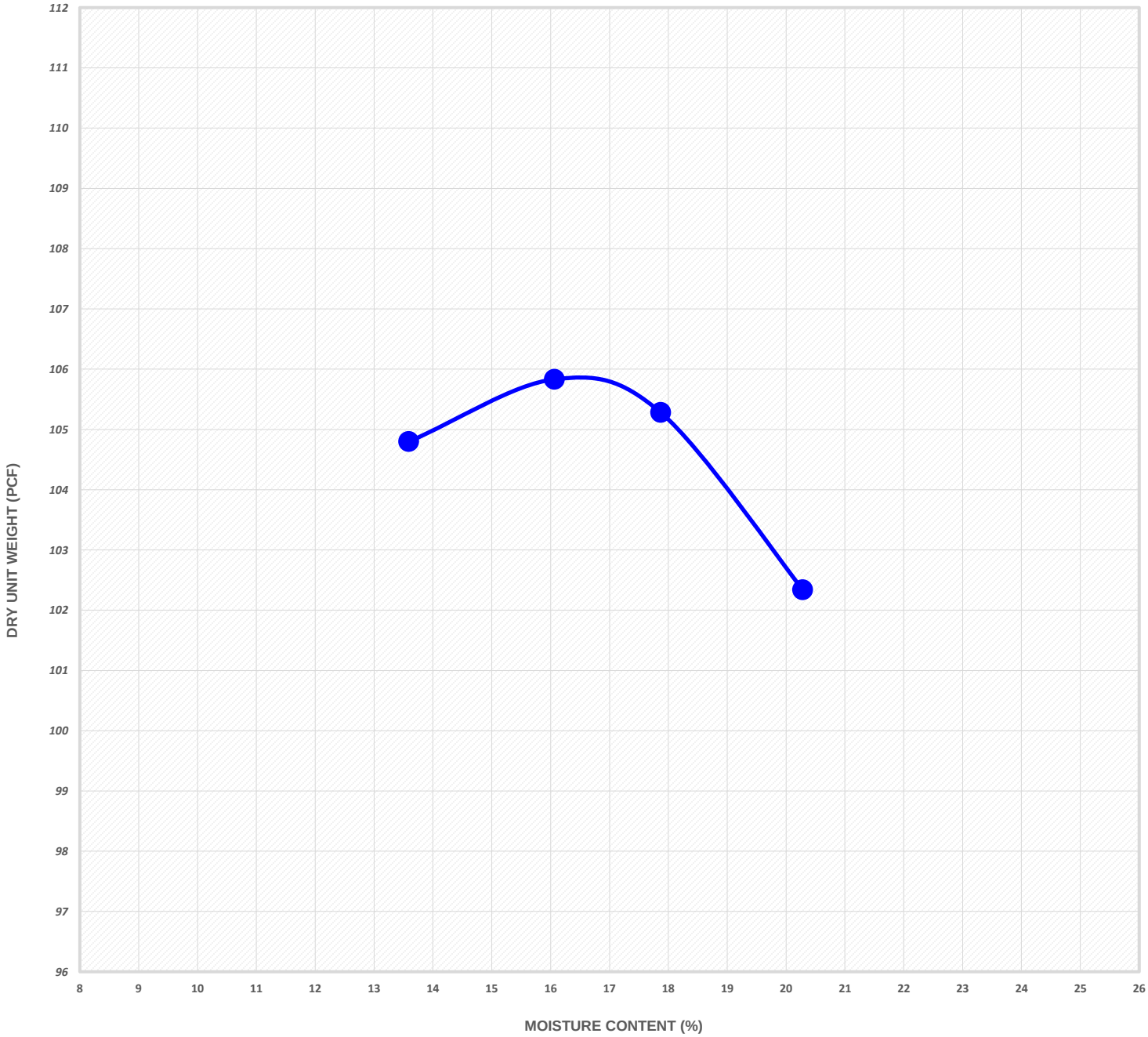
Boring:	**KG-B-14**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**
Sample:	**Bulk-1**	Sample Date:	-	5233 Lehman Road, Suite 110
Depth:	**0-6'**	Location:	-	Spring Grove, PA 17362
				Phone: (814) 404-9283

STANDARD PROCTOR TEST RESULTS

TEST METHOD: VTM-1

*Corrected for 12.6% retained on #4 sieve

	UNCORRECTED		CORRECTED *
Maximum Dry Unit Weight	105.9	PCF	110.7
Optimum Moisture Content	16.6	MC	14.8



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
27.8	52	23	29	SC	A-7-6	47.8	Dark green clayey SAND

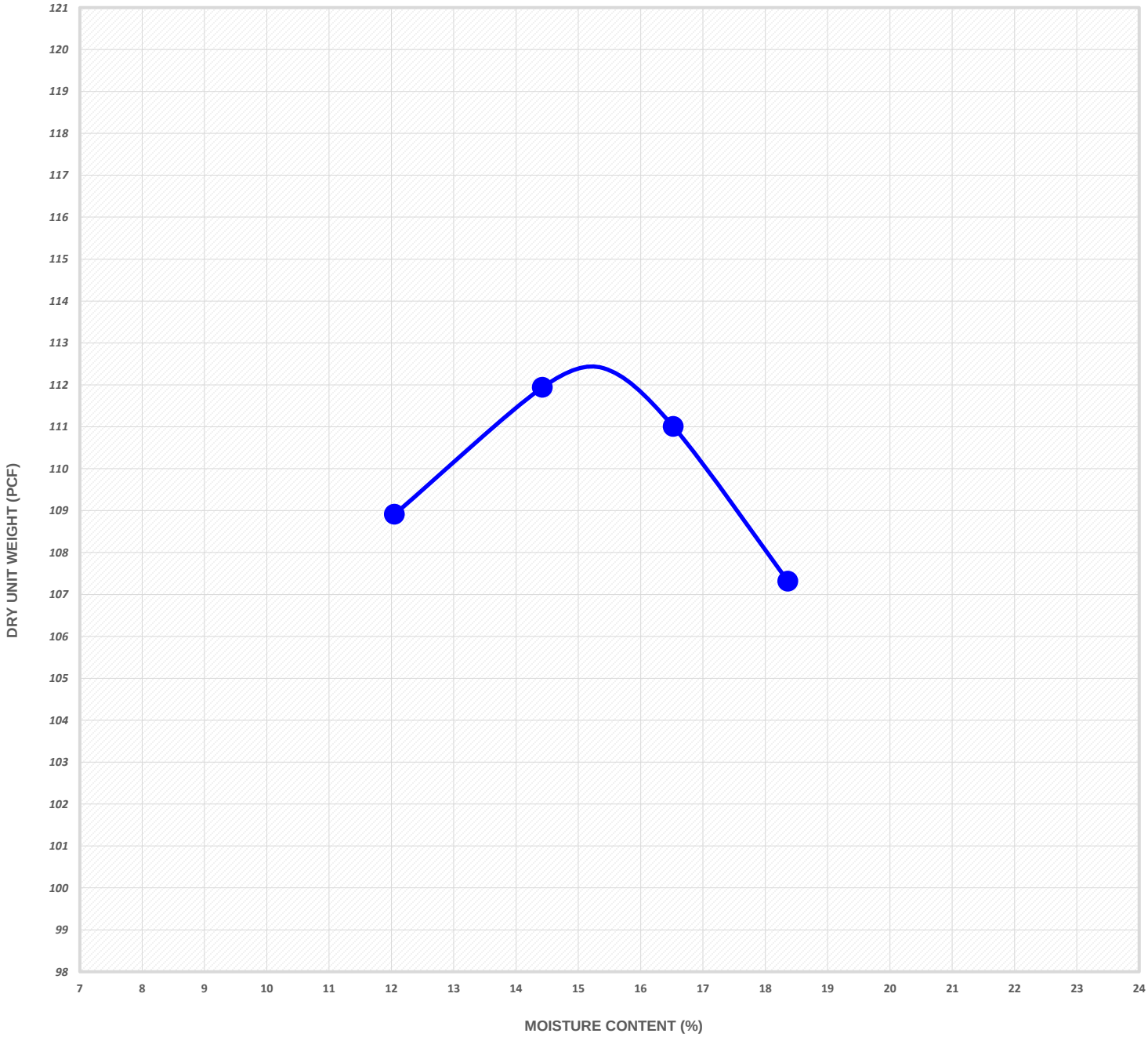
FORT BELVOIR KINGDOM AND WALKER GATES

Boring:	**WG-B-08**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**
Sample:	**Bulk-1**	Sample Date:	-	5233 Lehman Road, Suite 110
Depth:	**0-6'**	Location:	-	Spring Grove, PA 17362
				Phone: (814) 404-9283

STANDARD PROCTOR TEST RESULTS

TEST METHOD: VTM-1

MAXIMUM DRY UNIT WEIGHT	OPTIMUM MOISTURE CONTENT
112.4	15.1
PCF	%



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
17.8	32	19	13	CL	A-6	79.3	Brown lean CLAY with sand

FORT BELVOIR KINGDOM AND WALKER GATES

Boring:	**KG-B-14**	Project No.:	01.04361.01	
Sample:	**Bulk-1**	Sample Date:	-	
Depth:	**0-6'**	Location:	-	

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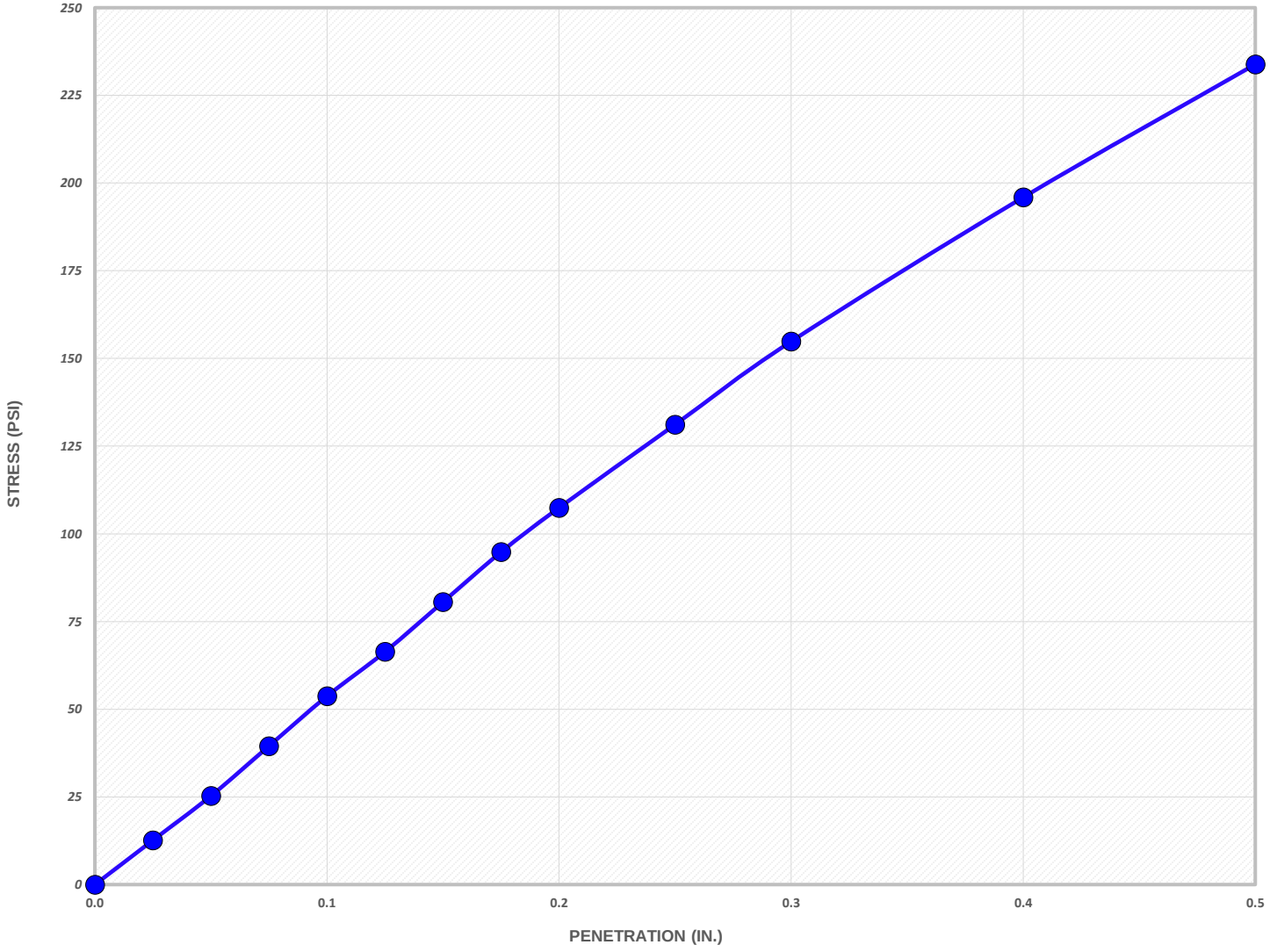
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283

CALIFORNIA BEARING RATIO TEST RESULTS

CBR AT 0.1"	CBR AT 0.2"
5.4	7.2

	Dry Unit Weight	Moisture Content	Compaction	Swell	Surcharge
As Molded	111.6	14.1	100.7	-	50
After Soak	110.8	16.3	100.1	2.27	50
	PCF	**%**	**%**	**%**	**PSF**

METHOD: VTM-8, COMPACTION: VTM-1



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
27.8	52	23	29	SC	A-7-6	47.8	Dark green clayey SAND

FORT BELVOIR KINGDOM AND WALKER GATES

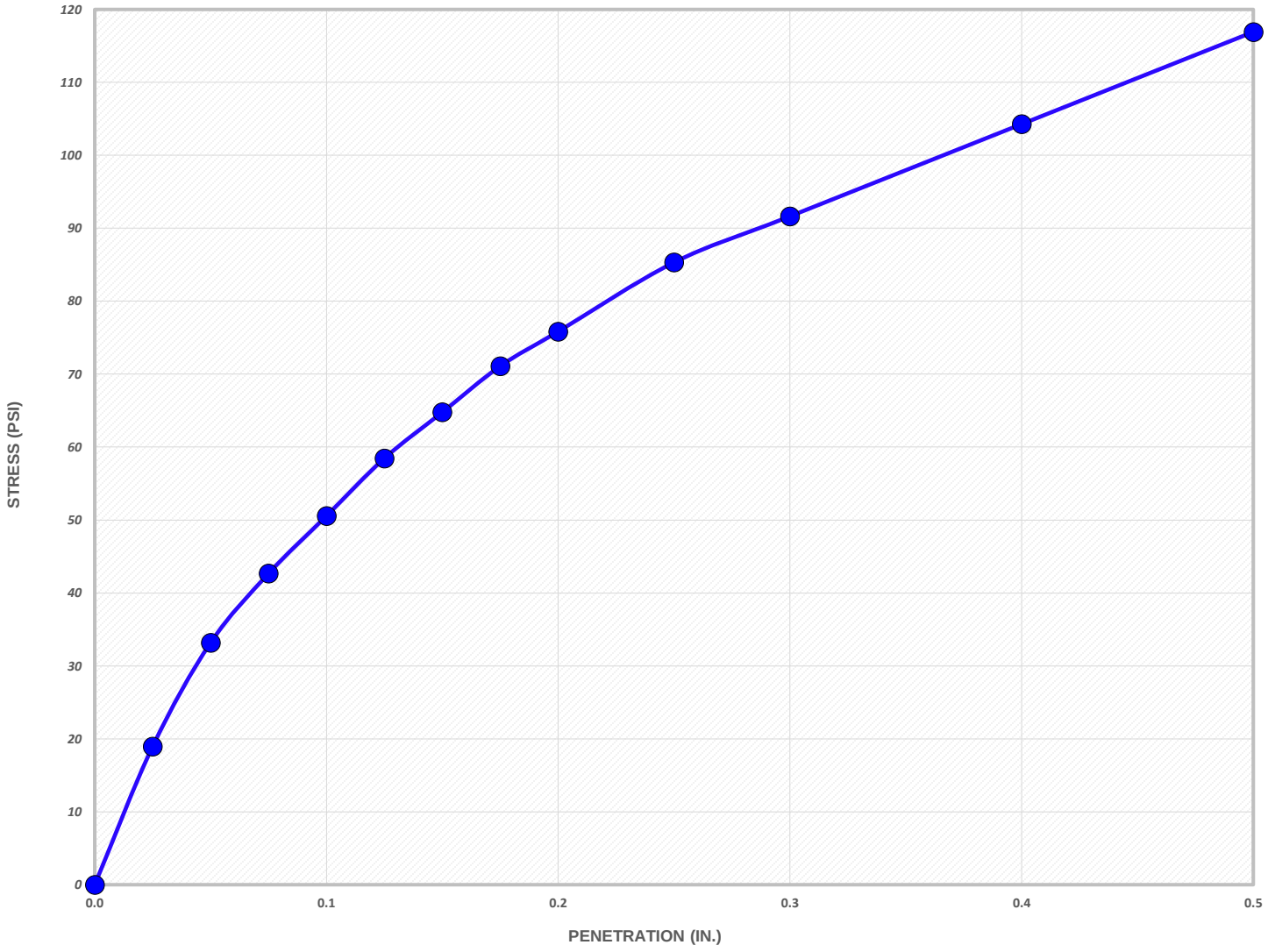
Boring:	**WG-B-08**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**
Sample:	**Bulk-1**	Sample Date:	-	5233 Lehman Road, Suite 110
Depth:	**0-6'**	Location:	-	Spring Grove, PA 17362
				Phone: (814) 404-9283

CALIFORNIA BEARING RATIO TEST RESULTS

CBR AT 0.1"	CBR AT 0.2"
5.1	5.1

	Dry Unit Weight	Moisture Content	Compaction	Swell	Surcharge
As Molded	114.5	15.2	101.8	-	50
After Soak	111.1	19.7	98.9	0.57	50
	PCF	%	%	%	PSF

METHOD: VTM-8, COMPACTION: VTM-1



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
17.8	32	19	13	CL	A-6	79.3	Brown lean CLAY with sand

SUMMARY OF LABORATORY TESTING

FORT BELVOIR KINGMAN AND WALKER GATES

PROJECT NO.	01.04361.01	**SAMPLE DATE**	07/15 to 07/20	**JAY KAY TESTING, INC.**
SAMPLES:	57	**LOCATION:**	*Fort Belvoir, VA*	5233 Lehman Road, Suite 110
REPORT:	08/10/20	**REMARKS:**	-	Spring Grove, PA 17362
				Phone: (814) 404-9283

BORING	SAMPLE	DEPTH	MC %	OM %	LL	PL	PI	% FINES	USCS
KG-B-01	Bulk-1	0.6-5.6	9.1	-	39	18	21	26.5	SC
KG-B-01	S-1	0.6-2.6	6.4	-	-	-	-	-	-
KG-B-01	S-2	2.6-4.6	14.4	-	-	-	-	-	-
KG-B-01	S-3	4.6-6.6	15.1	-	34	19	15	48.1	SC
KG-B-01	S-4	6.6-8.6	22.6	-	-	-	-	-	-
KG-B-01	S-5	8.6-10.6	25.3	-	55	27	28	75.0	CH
KG-B-02	Bulk-1	0.7-5.7	10.6	-	39	18	21	32.4	SC
KG-B-02	S-1	0.7-2.7	19.2	-	-	-	-	-	-
KG-B-02	S-2	2.7-4.7	11.4	-	-	-	-	-	-
KG-B-02	S-3	4.7-6.7	8.6	-	-	-	-	-	-
KG-B-02	S-4	6.7-8.7	15.0	-	30	16	14	27.5	SC
KG-B-02	S-5	8.7-10.7	15.7	-	-	-	-	-	-
KG-B-02	S-6	13-15	16.7	-	29	15	14	55.4	CL
KG-B-02	S-7	18-20	21.3	-	-	-	-	-	-
KG-B-03	Bulk-1	0.5-5.5	8.9	-	45	18	27	33.7	SC
KG-B-03	S-1	0.5-2.5	11.3	-	-	-	-	-	-
KG-B-03	S-2	2.5-4.5	21.2	-	-	-	-	-	-
KG-B-03	S-3	4.5-6.5	21.7	-	-	-	-	-	-
KG-B-03	S-4	6.5-8.5	11.9	-	-	-	-	-	-
KG-B-03	S-5	8.5-10.5	16.3	-	32	17	15	39.7	SC
KG-B-03	S-6	14-15	10.3	-	24	15	9	55.0	CL
KG-B-03	S-7	18.5-20	15.0	-	-	-	-	-	-
KG-B-03	S-8	23-25	19.9	-	37	17	20	50.1	CL
KG-B-03	S-9	28-30	21.6	-	-	-	-	-	-
KG-B-04	Bulk-1	0-5	8.3	-	39	18	21	47.0	SC
KG-B-04	S-1A	0-0.5	2.6	-	-	-	-	-	-
KG-B-04	S-1B	0.5-2	9.9	-	-	-	-	-	-
KG-B-04	S-2	2-4	16.3	-	41	21	20	48.3	SC
KG-B-04	S-3	4-6	15.9	-	-	-	-	-	-
KG-B-04	S-4	6-8	15.2	-	-	-	-	-	-
KG-B-04	S-5	8-10	16.5	-	39	18	21	50.8	CL
KG-B-05	Bulk-1	0-5	8.0	-	41	19	22	47.4	SC
KG-B-05	S-1	0-2	3.7	-	-	-	-	-	-
KG-B-05	S-2	2-4	21.7	-	-	-	-	-	-
KG-B-05	S-3	4-6	19.0	-	37	19	18	46.1	SC

Jay Kay Testing, Inc. (AASHTO-Accredited)

SUMMARY OF LABORATORY TESTING

FORT BELVOIR KINGMAN AND WALKER GATES

PROJECT NO.	01.04361.01	**SAMPLE DATE**	07/15 to 07/20	**JAY KAY TESTING, INC.**
SAMPLES:	57	**LOCATION:**	*Fort Belvoir, VA*	5233 Lehman Road, Suite 110
REPORT:	08/10/20	**REMARKS:**	-	Spring Grove, PA 17362
				Phone: (814) 404-9283

BORING	SAMPLE	DEPTH	MC %	OM %	LL	PL	PI	% FINES	USCS
KG-B-05	S-4	6-8	16.5	-	-	-	-	-	-
KG-B-05	S-5A	8-9.5	19.6	-	-	-	-	-	-
KG-B-05	S-5B	9.5-10	27.7	-	76	27	49	78.3	CH
WG-B-01	Bulk-1	0-5	8.5	-	33	17	16	57.4	CL
WG-B-01	S-1	0-2	12.0	-	-	-	-	-	-
WG-B-01	S-2	2-4	17.7	-	-	-	-	-	-
WG-B-01	S-3	4-6	16.9	-	-	-	-	-	-
WG-B-01	S-4	6-8	17.5	-	36	19	17	95.5	CL
WG-B-01	S-5	8-10	19.3	-	-	-	-	-	-
WG-B-02	Bulk-1	0.6-5.6	13.8	-	37	20	17	64.2	CL
WG-B-02	S-1A	0.6-1	9.4	-	-	-	-	-	-
WG-B-02	S-1B	1-2.6	21.6	-	-	-	-	-	-
WG-B-02	S-2	2.6-4.6	25.3	-	-	-	-	-	-
WG-B-02	S-3	4.6-6.6	20.4	-	41	22	19	68.6	CL
WG-B-02	S-4	6.6-8.6	20.7	-	-	-	-	-	-
WG-B-02	S-5	8.6-10.6	19.9	-	38	20	18	95.2	CL
WG-B-03	Bulk-1	0-5	9.1	-	36	19	17	55.9	CL
WG-B-03	S-1	0-2	5.2	-	-	-	-	-	-
WG-B-03	S-2	2-4	16.6	-	-	-	-	-	-
WG-B-03	S-3	4-6	17.3	-	39	19	20	90.3	CL
WG-B-03	S-4	6-8	22.0	-	-	-	-	-	-
WG-B-03	S-5	8-10	18.9	-	-	-	-	-	-

Jay Kay Testing, Inc. (AASHTO-Accredited)

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-01**	Project No.:	01.04361.01	
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	
Depth:	**0.6-5.6'**	Location:	*Fort Belvoir, VA*	

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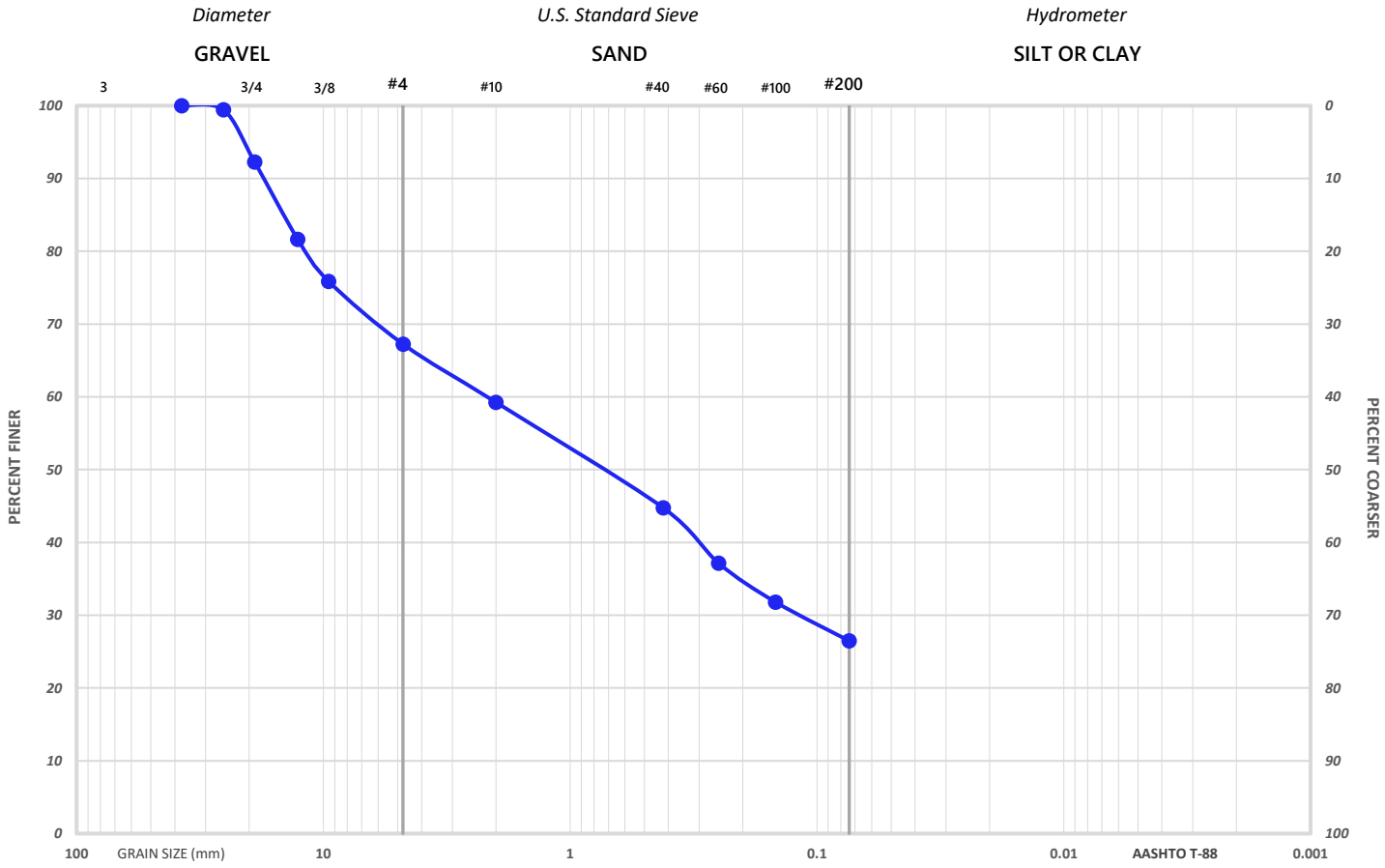
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	100.0	99.4	92.3	81.6	75.9	67.2	59.3	44.8	37.1	31.8	**26.5**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
32.8	**40.7**	7.7	25.1	7.9	14.5	18.3	-	-

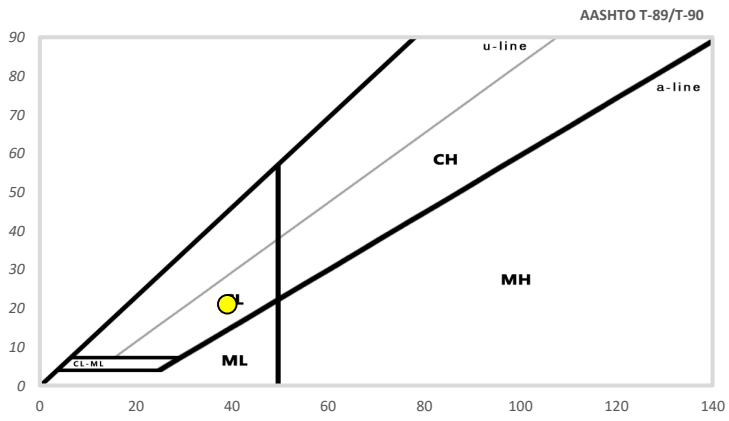
Moisture Content	9.1	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	39
Plastic Limit	18
Plasticity Index	21

CLASSIFICATION

AASHTO	A-2-6
USCS	SC



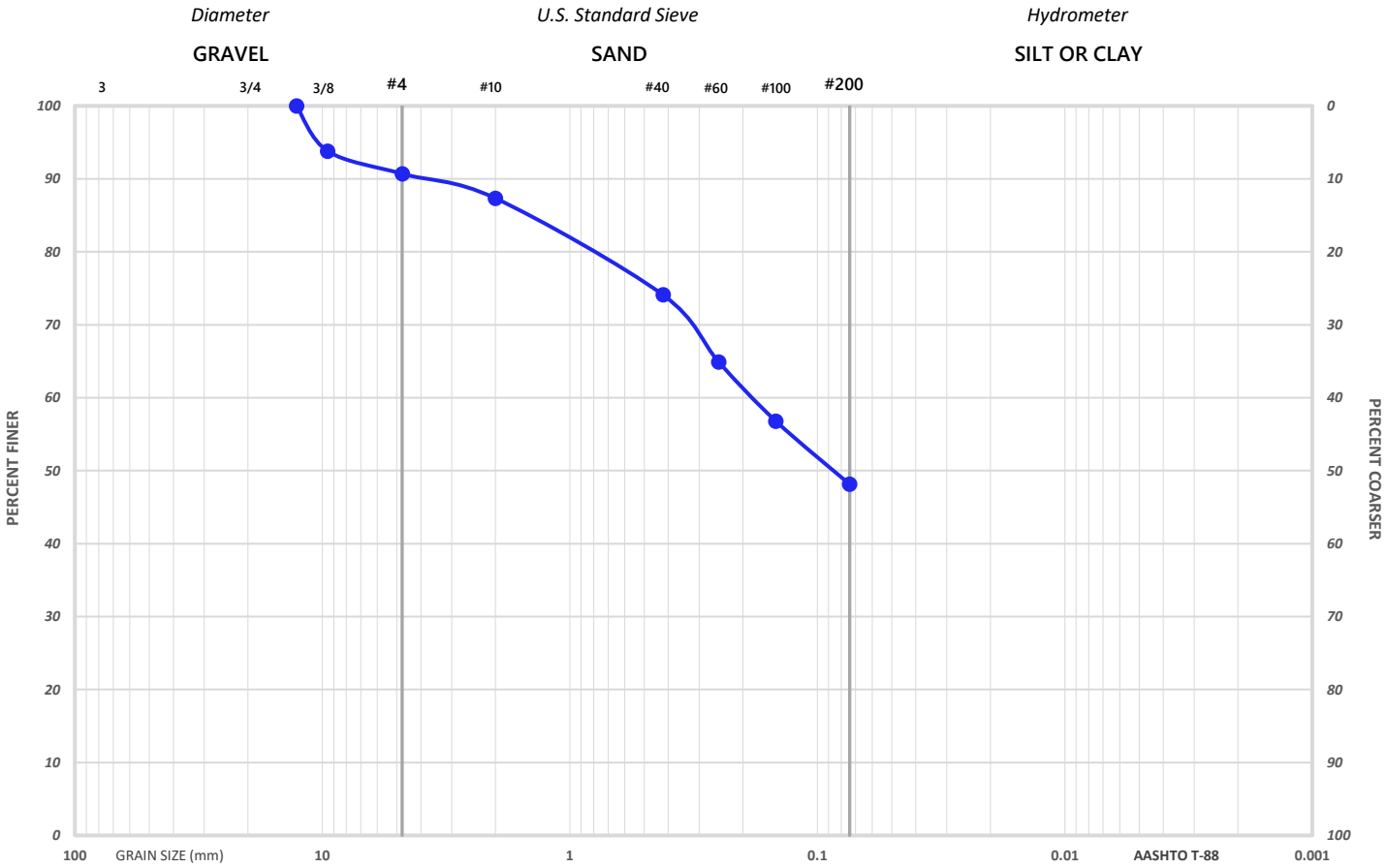
SOIL DESCRIPTION

Gray clayey SAND with gravel

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-01**	Project No.:	01.04361.01	
Sample:	**S-3**	Sample Date:	07/15 to 07/20	
Depth:	**4.6-6.6'**	Location:	*Fort Belvoir, VA*	

JAY KAY TESTING, INC.
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	100.0	93.8	90.7	87.3	74.1	64.9	56.8	**48.1**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
9.3	**42.6**	-	9.3	3.4	13.2	26.0	-	-

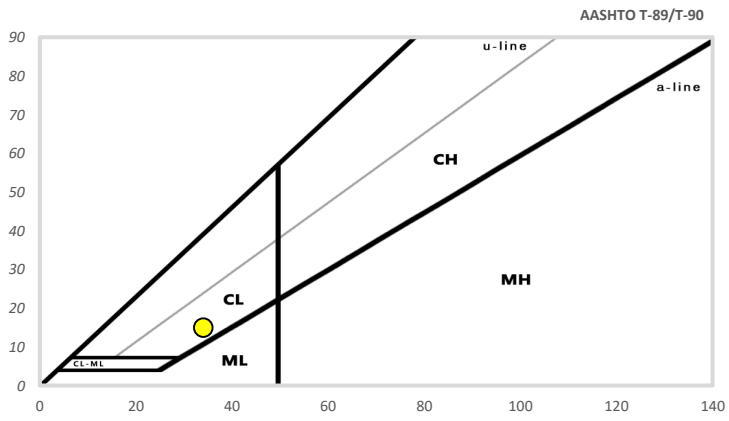
Moisture Content	15.1	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	34
Plastic Limit	19
Plasticity Index	15

CLASSIFICATION

AASHTO	A-6
USCS	SC

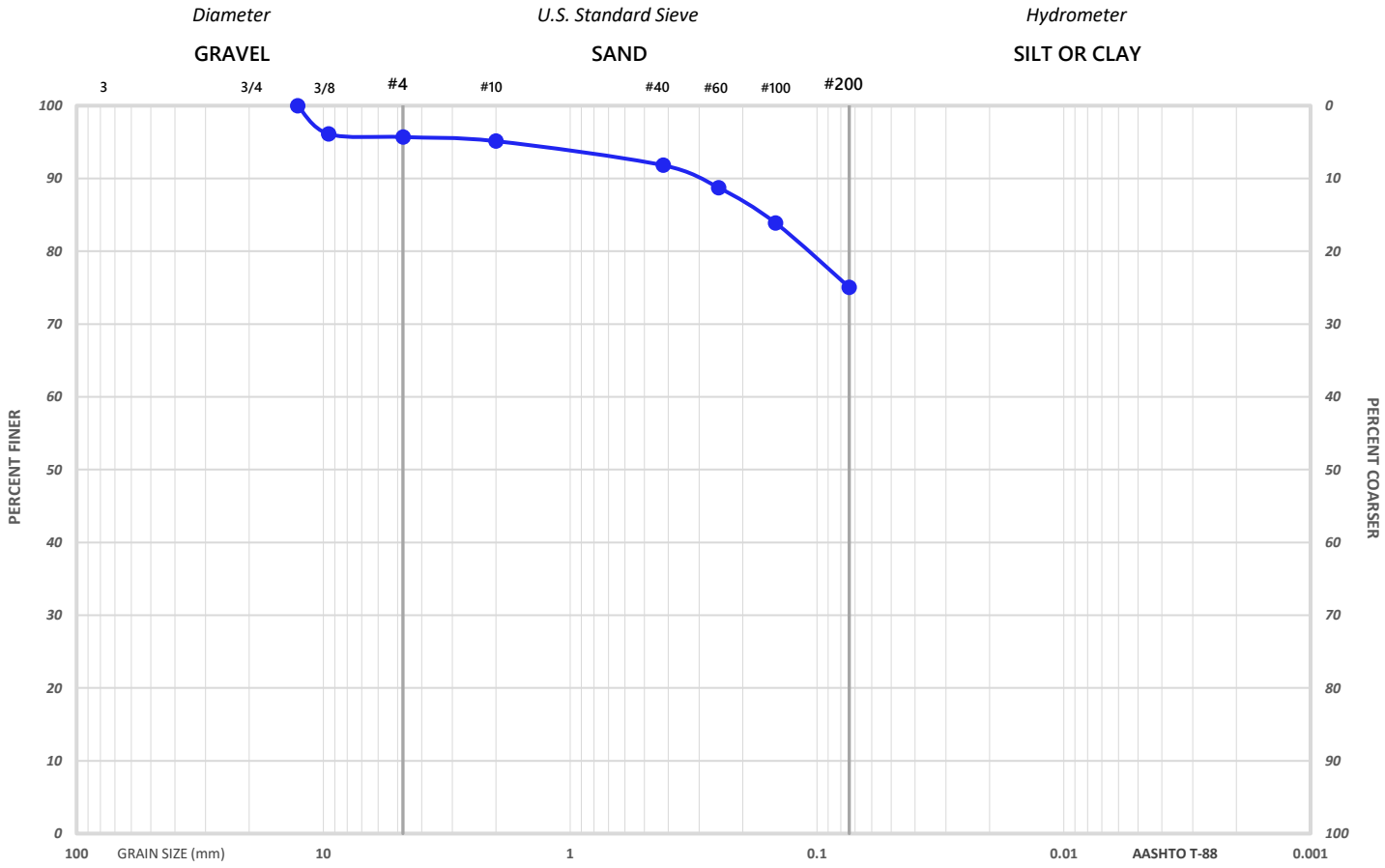


SOIL DESCRIPTION

Dark green clayey SAND

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-01**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**	
Sample:	**S-5**	Sample Date:	07/15 to 07/20	5233 Lehman Road, Suite 110	
Depth:	**8.6-10.6'**	Location:	*Fort Belvoir, VA*	Spring Grove, PA 17362	
				Phone: (814) 404-9283	



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	100.0	96.1	95.7	95.1	91.8	88.7	83.9	**75.0**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
4.3	**20.7**	-	4.3	0.6	3.3	16.8	-	-

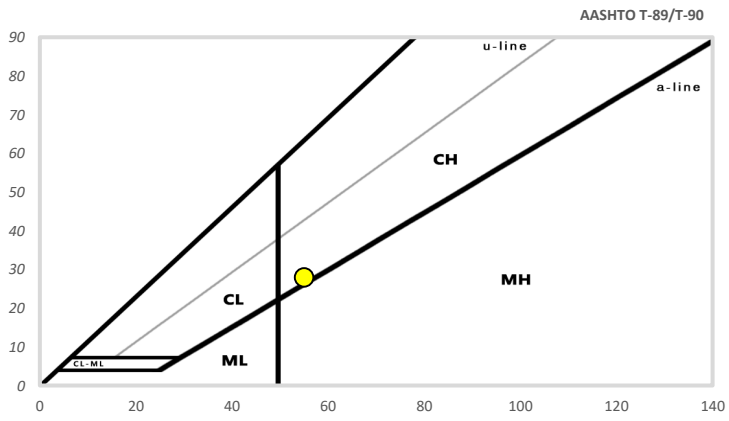
Moisture Content	25.3	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	55
Plastic Limit	27
Plasticity Index	28

CLASSIFICATION

AASHTO	A-7-6
USCS	CH

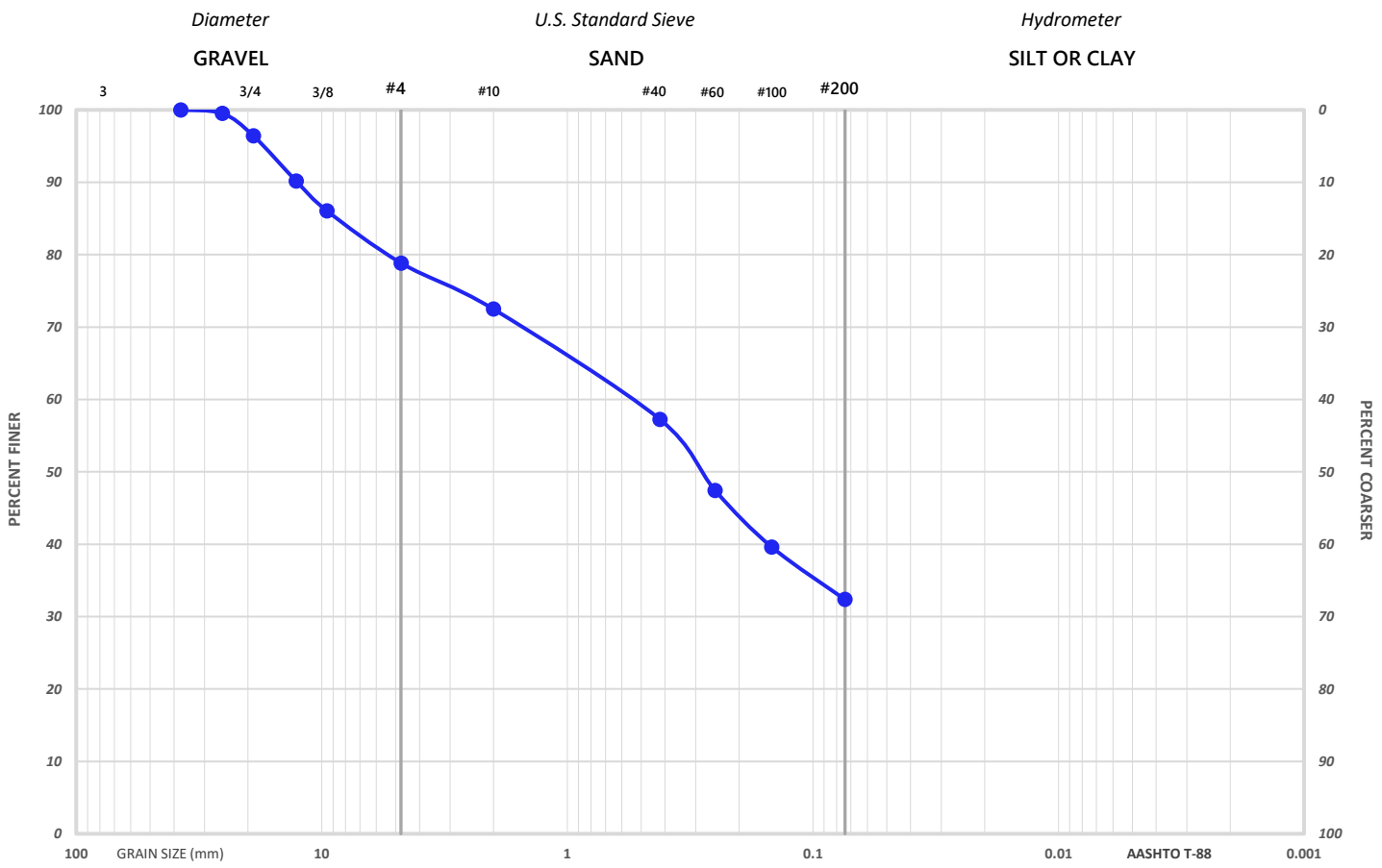


SOIL DESCRIPTION

Dark green fat CLAY with sand

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-02**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	5233 Lehman Road, Suite 110
Depth:	**0.7-5.7'**	Location:	*Fort Belvoir, VA*	Spring Grove, PA 17362
				Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	100.0	99.5	96.4	90.2	86.0	78.8	72.5	57.2	47.4	39.6	**32.4**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
21.2	**46.4**	3.6	17.6	6.3	15.3	24.8	-	-

Moisture Content	10.6	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

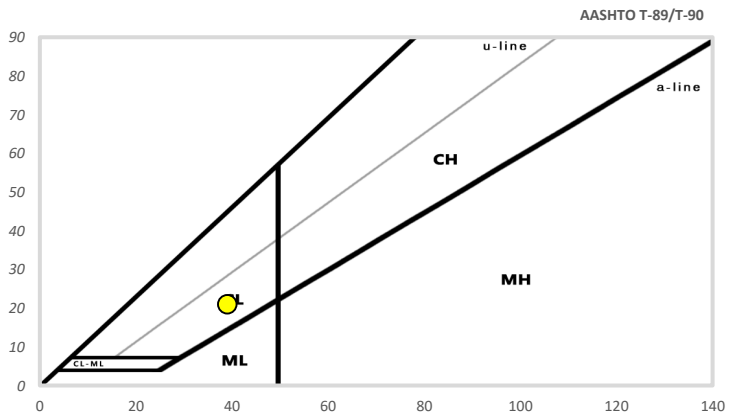
Liquid Limit	39
Plastic Limit	18
Plasticity Index	21

CLASSIFICATION

AASHTO	A-2-6
USCS	SC

SOIL DESCRIPTION

Brown clayey SAND with gravel



FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-02**	Project No.:	01.04361.01	
Sample:	**S-4**	Sample Date:	07/15 to 07/20	
Depth:	**6.7-8.7'**	Location:	*Fort Belvoir, VA*	

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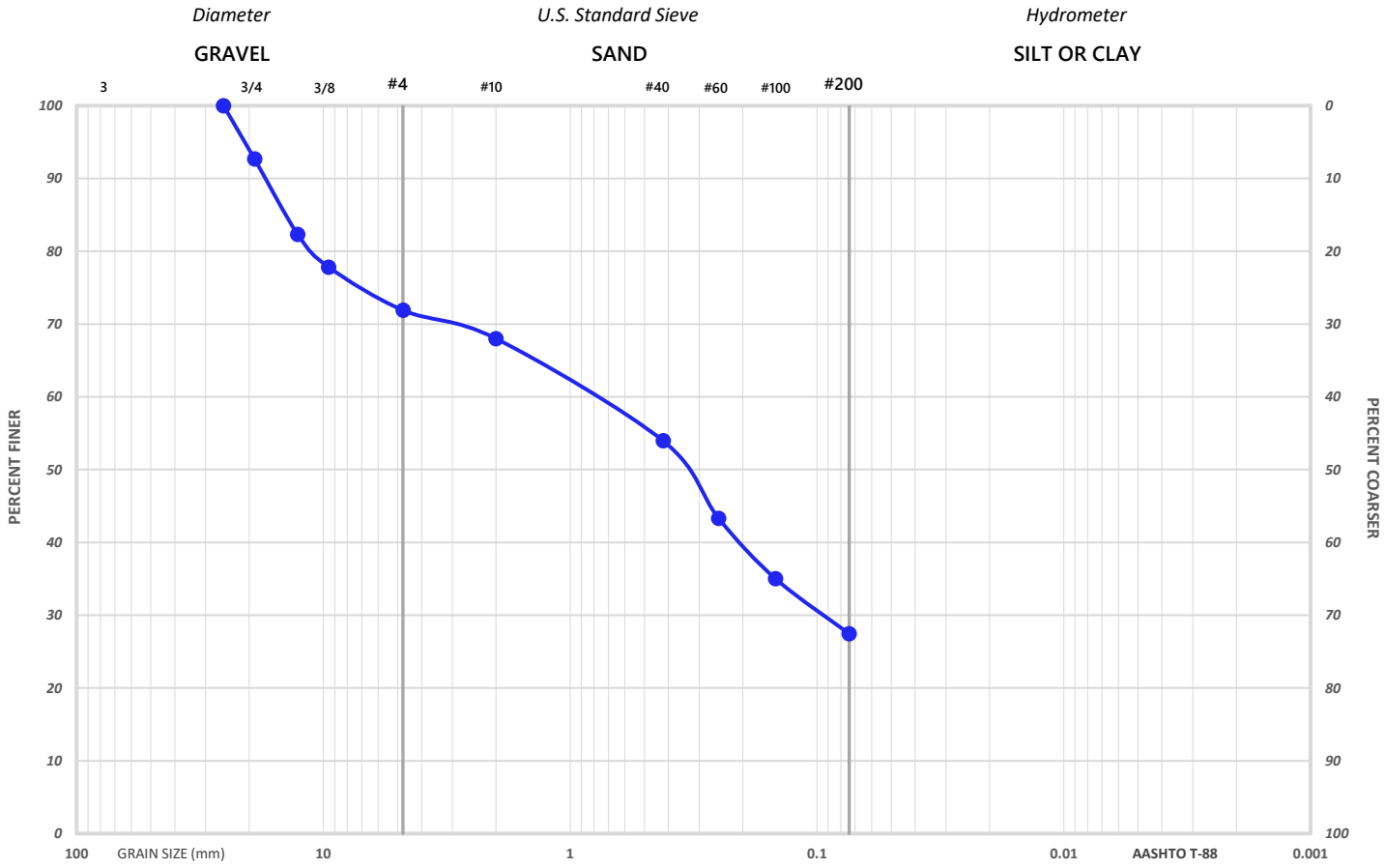
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	100.0	92.7	82.3	77.8	71.9	68.0	53.9	43.3	35.0	**27.5**

% GRAVEL	**% SAND**	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
28.1	**44.4**	7.3	20.8	3.9	14.1	26.4	-	-

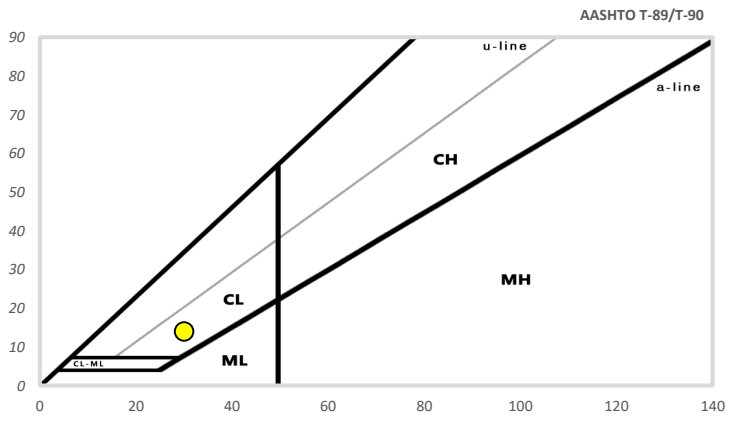
Moisture Content	15.0	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	30
Plastic Limit	16
Plasticity Index	14

CLASSIFICATION

AASHTO	A-2-6
USCS	SC



SOIL DESCRIPTION

Dark green clayey SAND with gravel

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-02**	Project No.:	01.04361.01	
Sample:	**S-6**	Sample Date:	07/15 to 07/20	
Depth:	**13-15'**	Location:	*Fort Belvoir, VA*	

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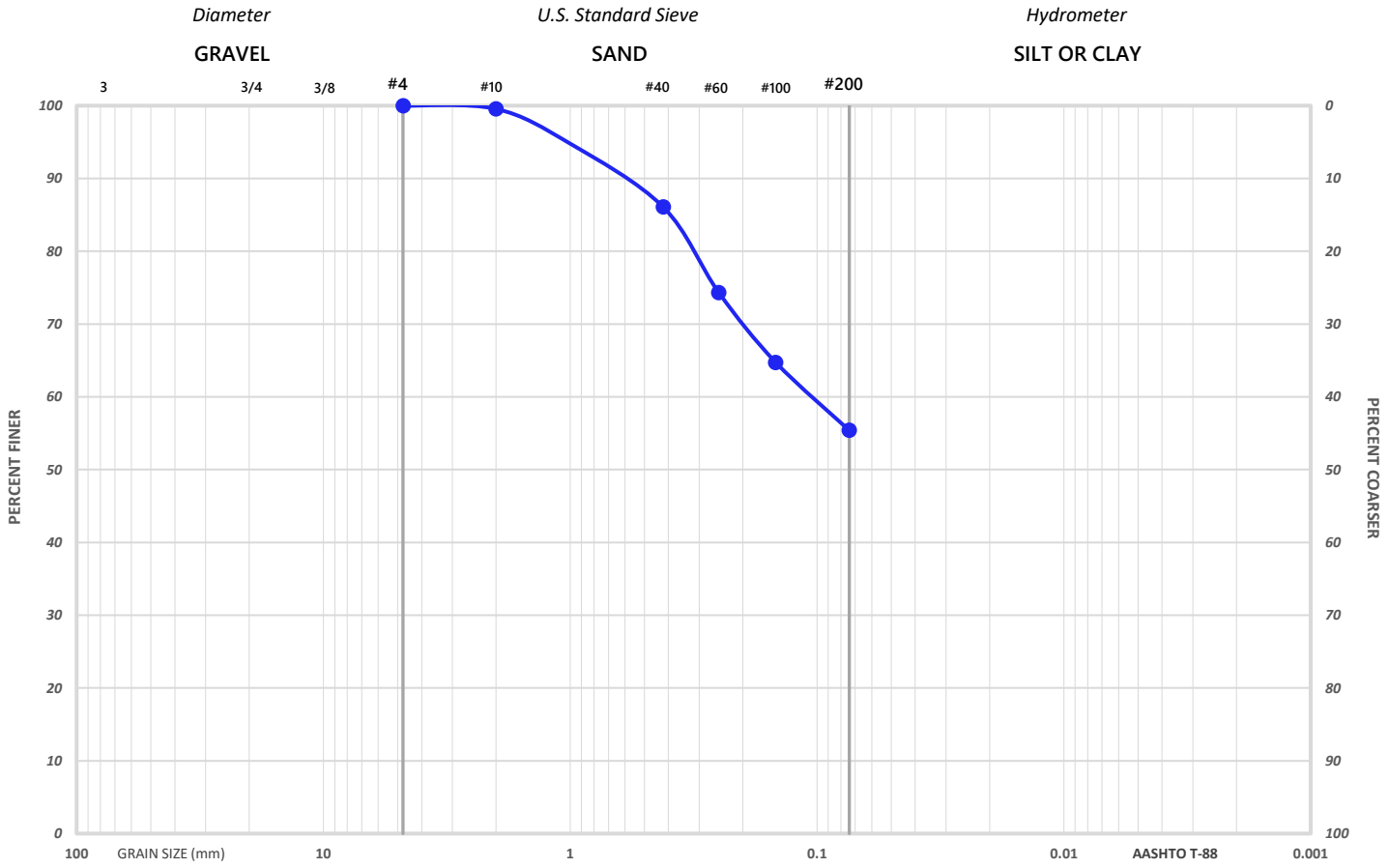
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	100.0	99.6	86.1	74.3	64.7	**55.4**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
-	**44.6**	-	-	0.4	13.5	30.7	-	-

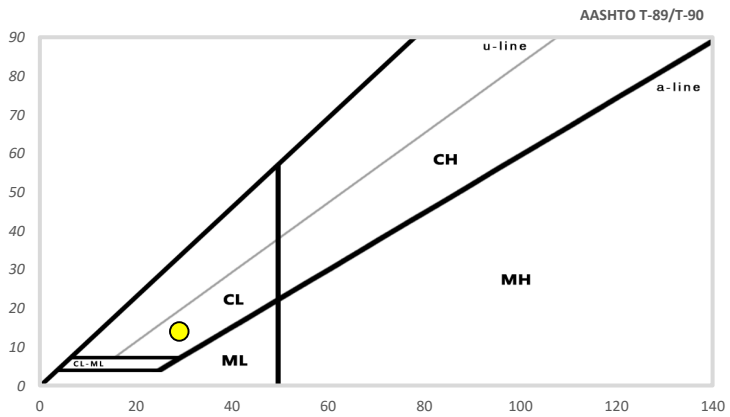
Moisture Content	16.7	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	29
Plastic Limit	15
Plasticity Index	14

CLASSIFICATION

AASHTO	A-6
USCS	CL

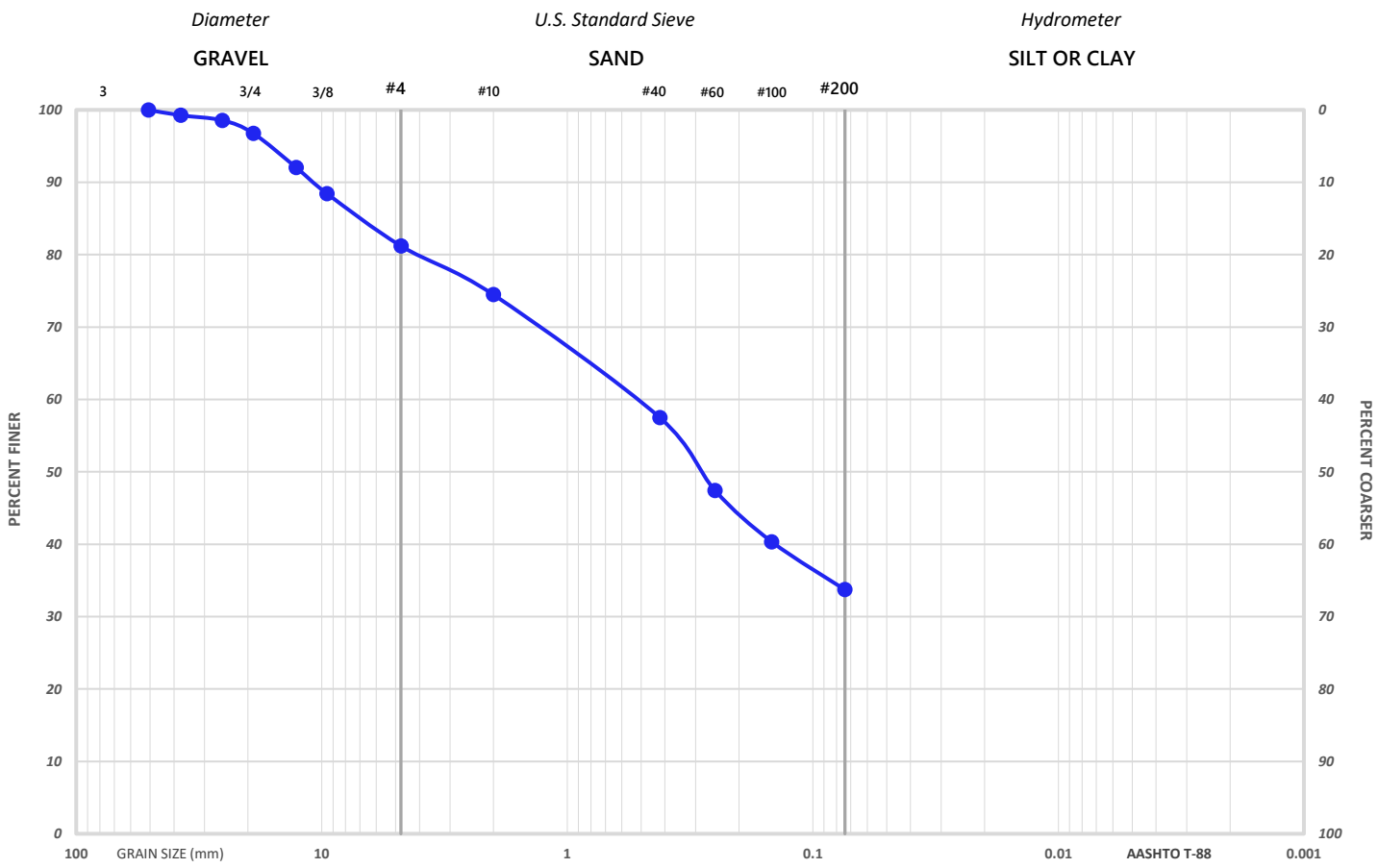


SOIL DESCRIPTION

Dark green sandy lean CLAY

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-03**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**	
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	5233 Lehman Road, Suite 110	
Depth:	**0.5-5.5'**	Location:	*Fort Belvoir, VA*	Spring Grove, PA 17362	
				Phone: (814) 404-9283	



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	100.0	99.2	98.6	96.8	92.0	88.4	81.2	74.5	57.5	47.4	40.3	**33.7**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
18.8	**47.5**	3.2	15.6	6.7	17.0	23.8	-	-

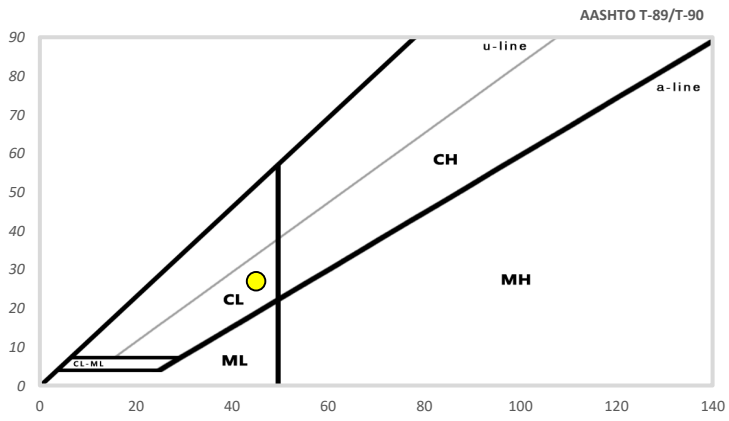
Moisture Content	8.9	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	45
Plastic Limit	18
Plasticity Index	27

CLASSIFICATION

AASHTO	A-2-7
USCS	SC

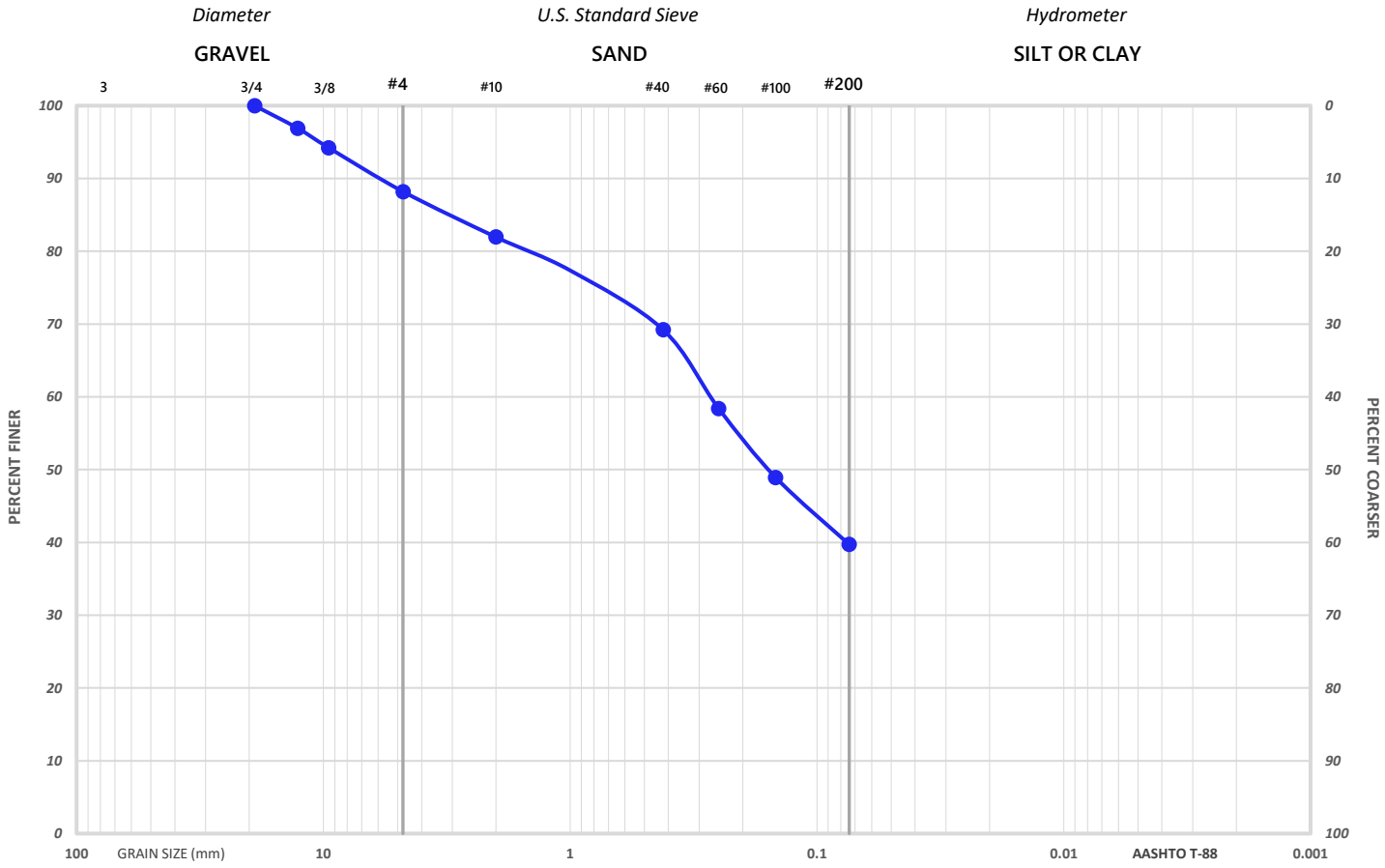


SOIL DESCRIPTION

Brown clayey SAND with gravel

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-03**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**	
Sample:	**S-5**	Sample Date:	07/15 to 07/20	5233 Lehman Road, Suite 110	
Depth:	**8.5-10.5'**	Location:	*Fort Belvoir, VA*	Spring Grove, PA 17362	
				Phone: (814) 404-9283	



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	100.0	96.9	94.2	88.2	81.9	69.2	58.4	48.9	**39.7**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
11.8	**48.5**	-	11.8	6.3	12.7	29.5	-	-

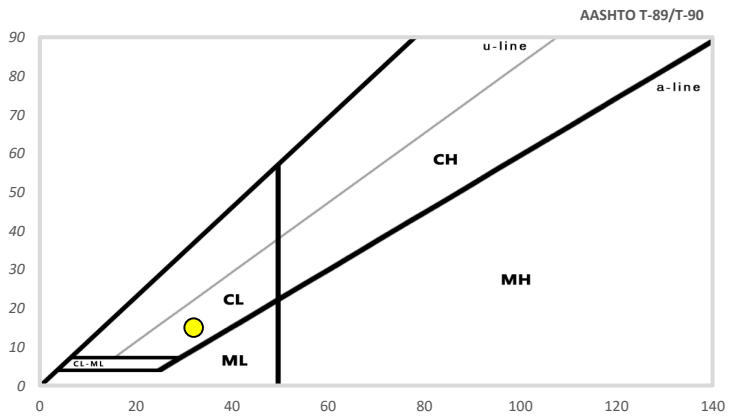
Moisture Content	16.3	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	32
Plastic Limit	17
Plasticity Index	15

CLASSIFICATION

AASHTO	A-6
USCS	SC



SOIL DESCRIPTION

Dark green clayey SAND

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-03**	Project No.:	01.04361.01	
Sample:	**S-6**	Sample Date:	07/15 to 07/20	
Depth:	**14-15'**	Location:	*Fort Belvoir, VA*	

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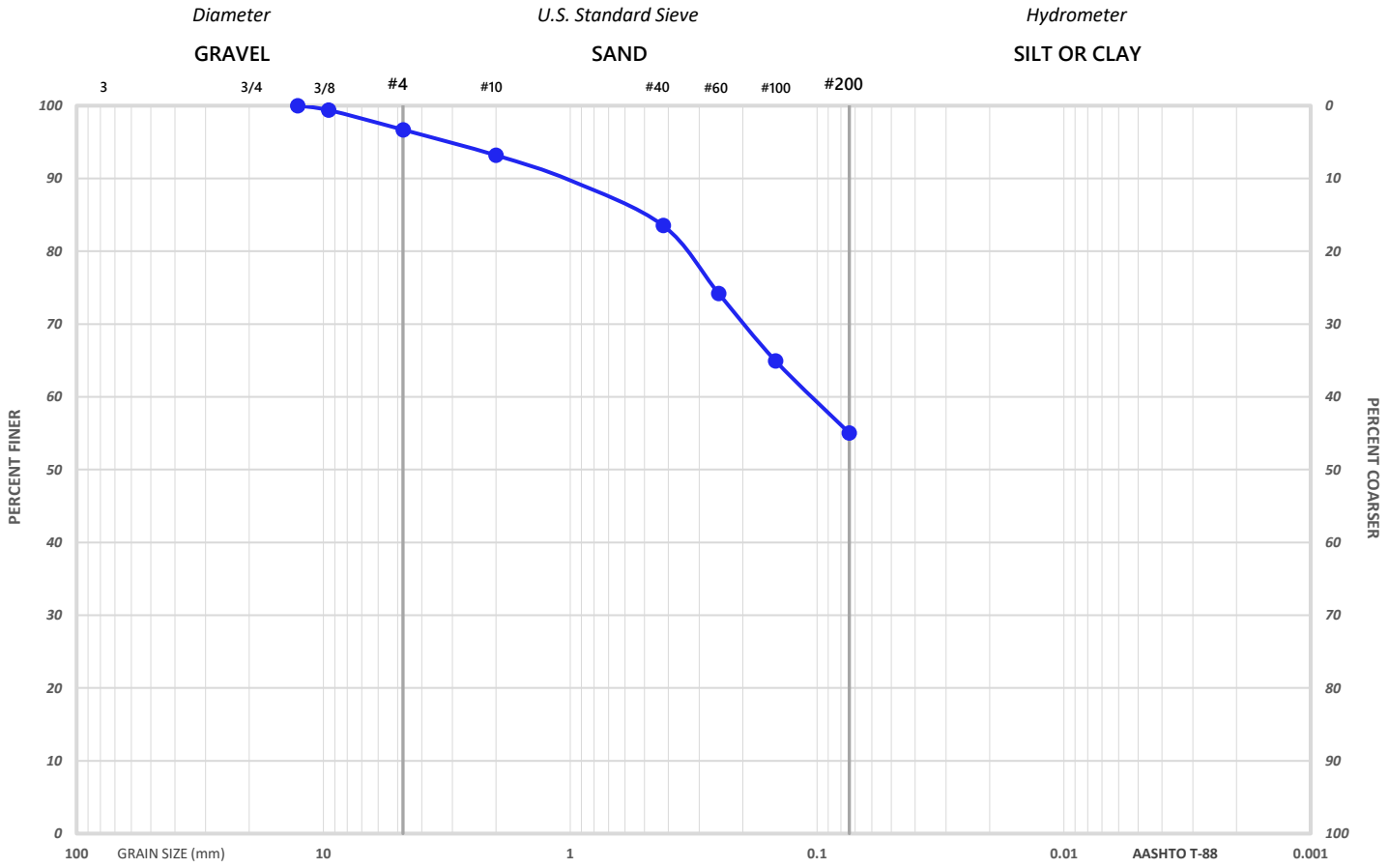


GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	100.0	99.4	96.7	93.2	83.5	74.2	64.9	**55.0**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
3.3	**41.7**	-	3.3	3.5	9.7	28.5	-	-

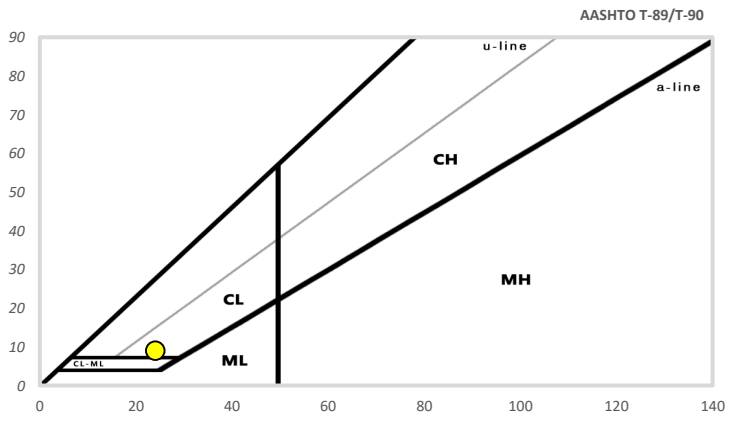
Moisture Content	10.3	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	24
Plastic Limit	15
Plasticity Index	9

CLASSIFICATION

AASHTO	A-4
USCS	CL



SOIL DESCRIPTION

Dark green sandy lean CLAY

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-03**	Project No.:	01.04361.01	
Sample:	**S-8**	Sample Date:	07/15 to 07/20	
Depth:	**23-25'**	Location:	*Fort Belvoir, VA*	

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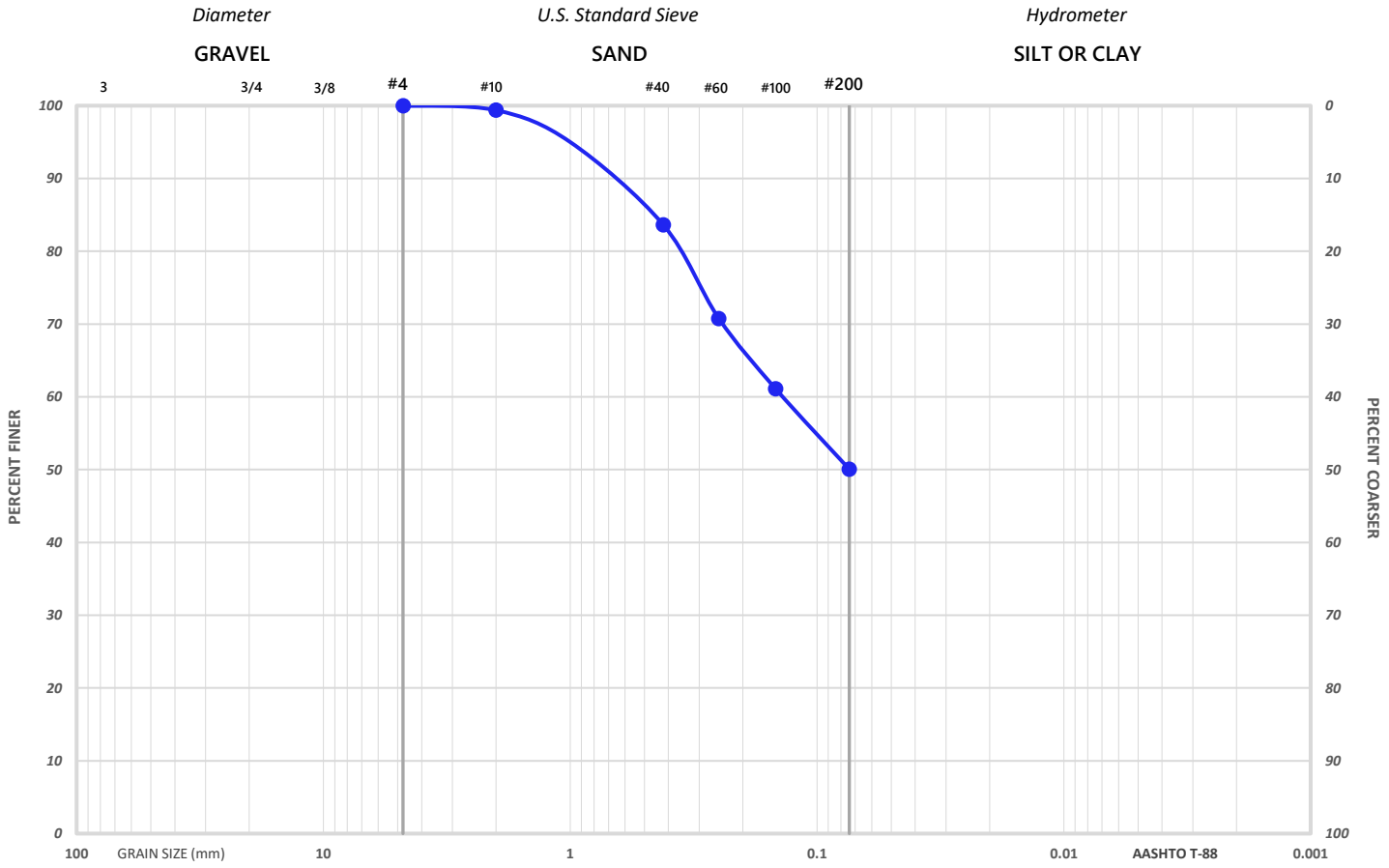


GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	100.0	99.4	83.6	70.8	61.1	**50.1**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
-	**49.9**	-	-	0.6	15.8	33.5	-	-

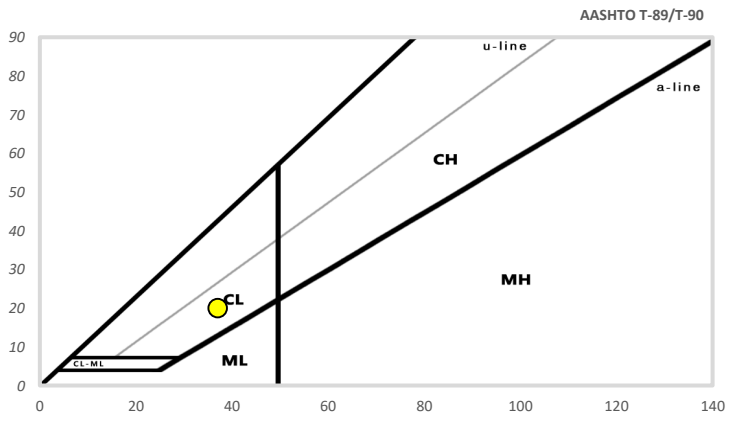
Moisture Content	19.9	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	37
Plastic Limit	17
Plasticity Index	20

CLASSIFICATION

AASHTO	A-6
USCS	CL



SOIL DESCRIPTION

Light brown sandy lean CLAY

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-04**	Project No.:	01.04361.01	
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	
Depth:	**0-5'**	Location:	*Fort Belvoir, VA*	

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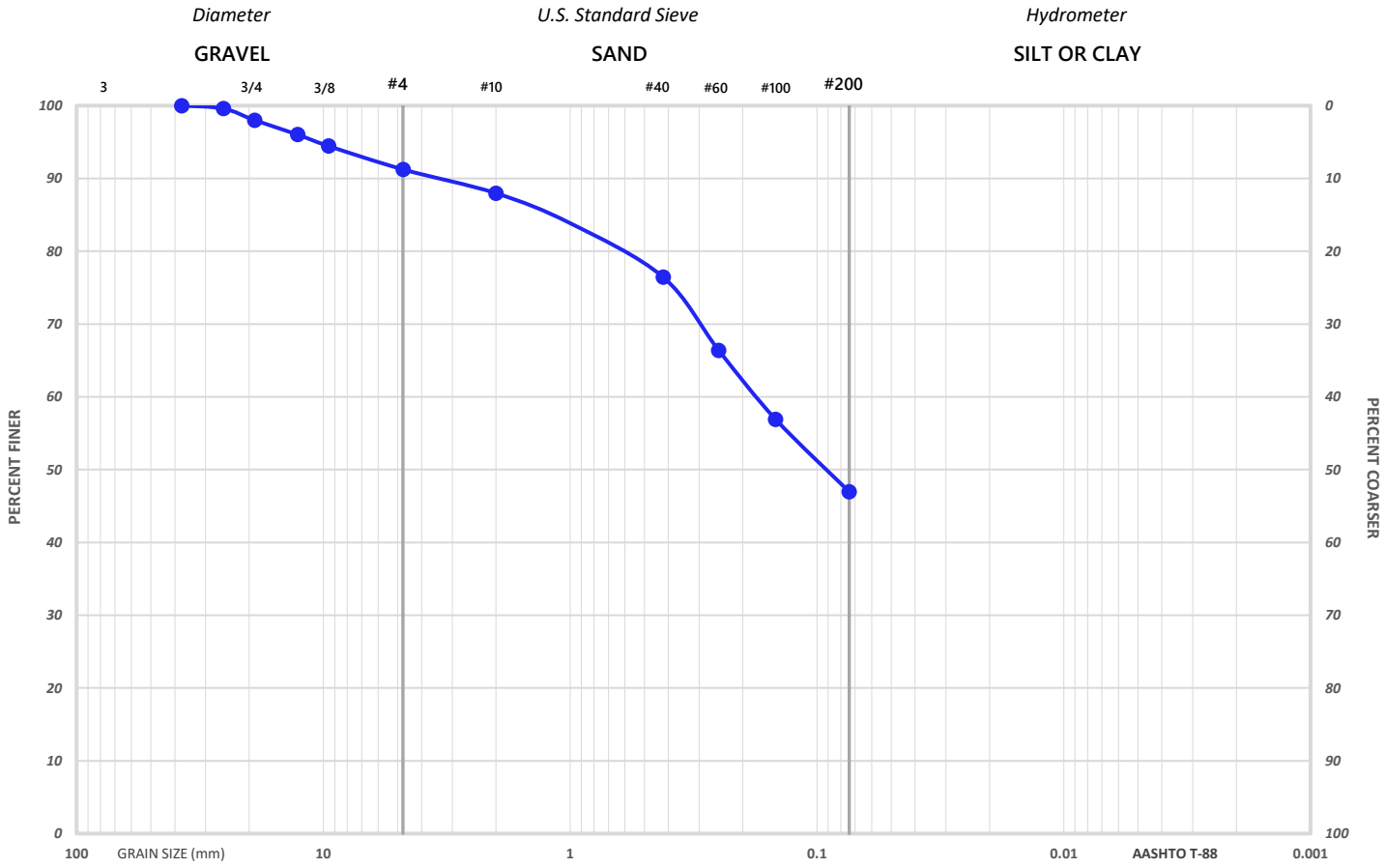
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	100.0	99.6	98.0	96.0	94.4	91.2	88.0	76.4	66.4	56.9	**47.0**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
8.8	**44.2**	2.0	6.8	3.2	11.6	29.4	-	-

Moisture Content	8.3	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

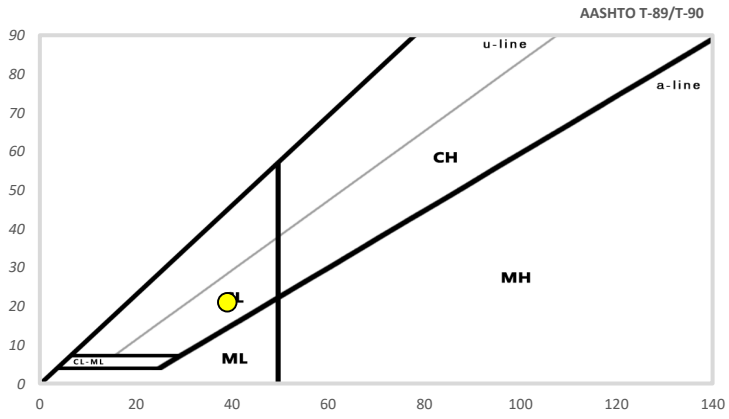
Liquid Limit	39
Plastic Limit	18
Plasticity Index	21

CLASSIFICATION

AASHTO	A-6
USCS	SC

SOIL DESCRIPTION

Brown clayey SAND



FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-04**	Project No.:	01.04361.01	
Sample:	**S-2**	Sample Date:	07/15 to 07/20	
Depth:	**2-4'**	Location:	*Fort Belvoir, VA*	

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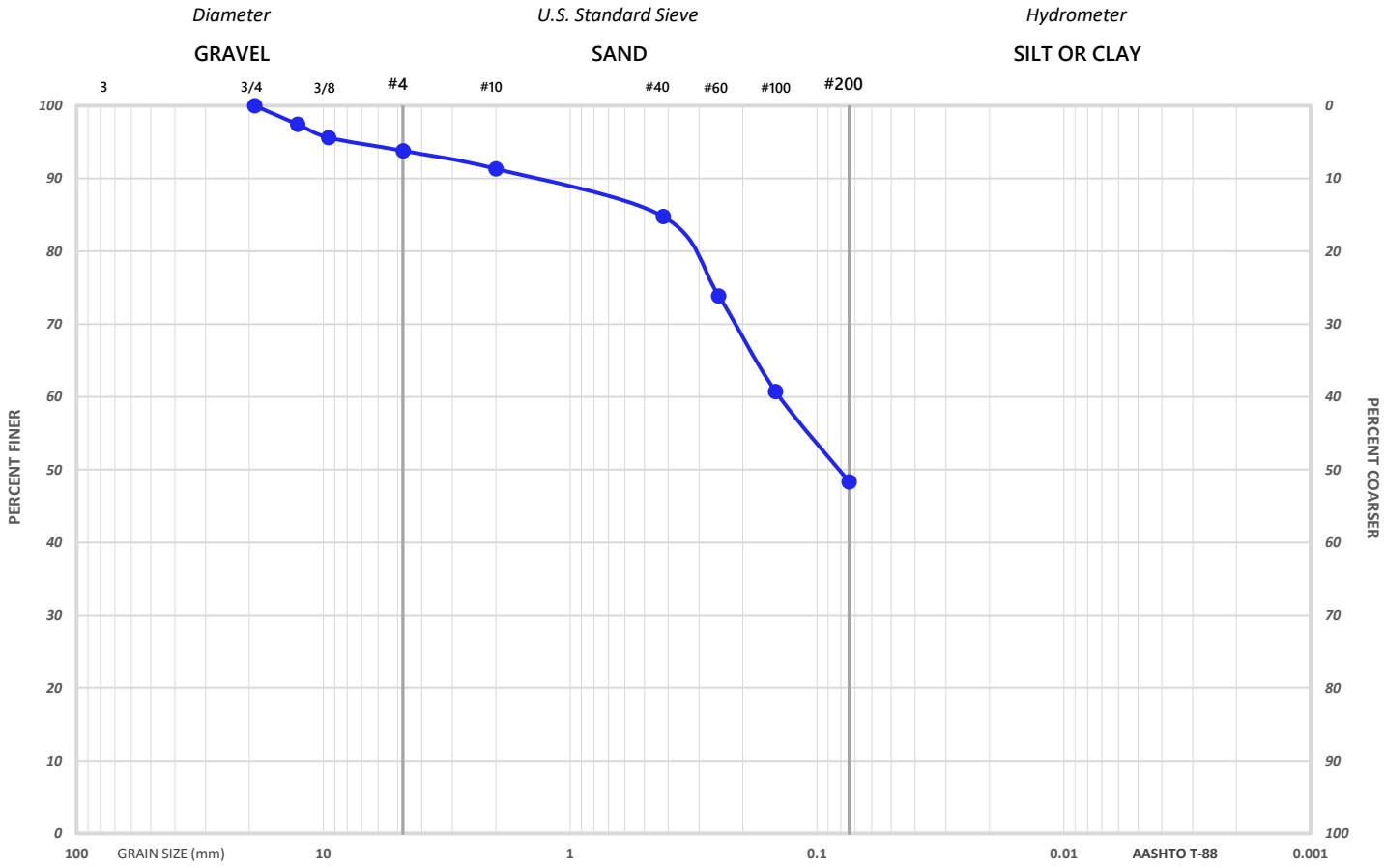
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	100.0	97.4	95.6	93.8	91.3	84.8	73.9	60.7	**48.3**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
6.2	**45.5**	-	6.2	2.5	6.5	36.5	-	-

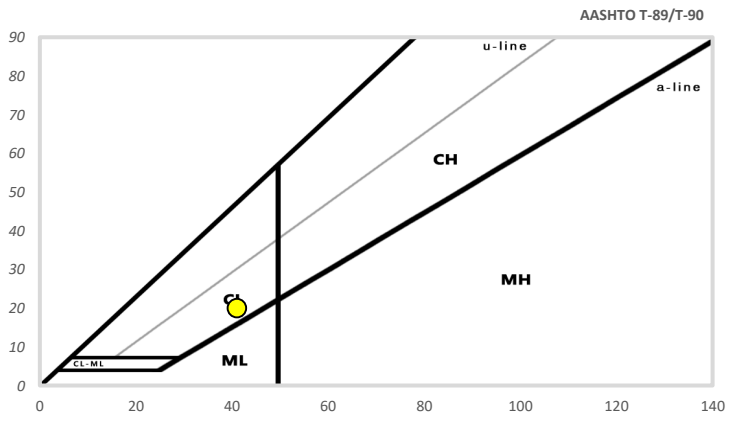
Moisture Content	16.3	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	41
Plastic Limit	21
Plasticity Index	20

CLASSIFICATION

AASHTO	A-7-6
USCS	SC



SOIL DESCRIPTION

Brown clayey SAND

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-04**	Project No.:	01.04361.01	
Sample:	**S-5**	Sample Date:	07/15 to 07/20	
Depth:	**8-10'**	Location:	*Fort Belvoir, VA*	

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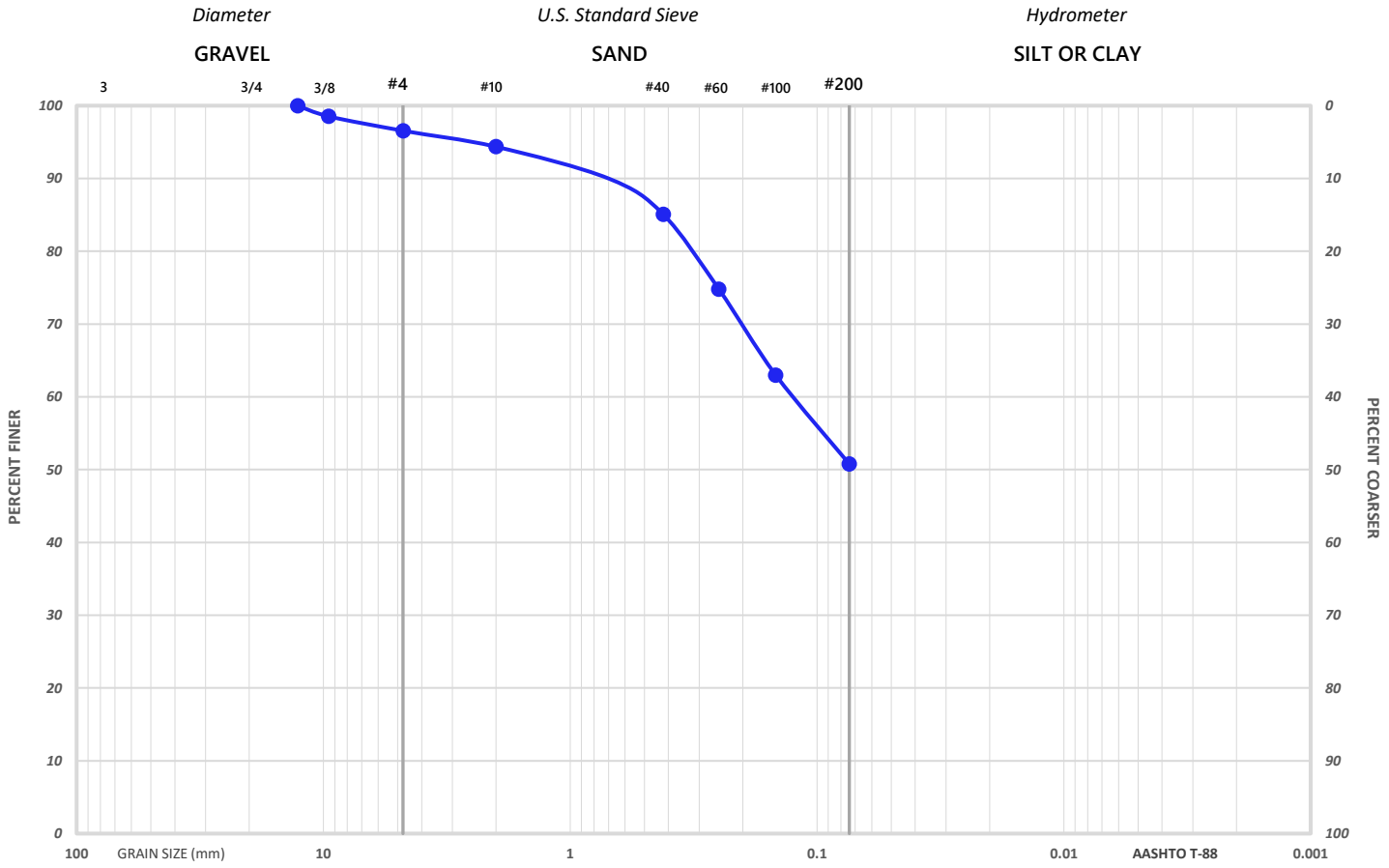
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	100.0	98.5	96.5	94.4	85.1	74.8	63.0	**50.8**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
3.5	**45.7**	-	3.5	2.1	9.3	34.3	-	-

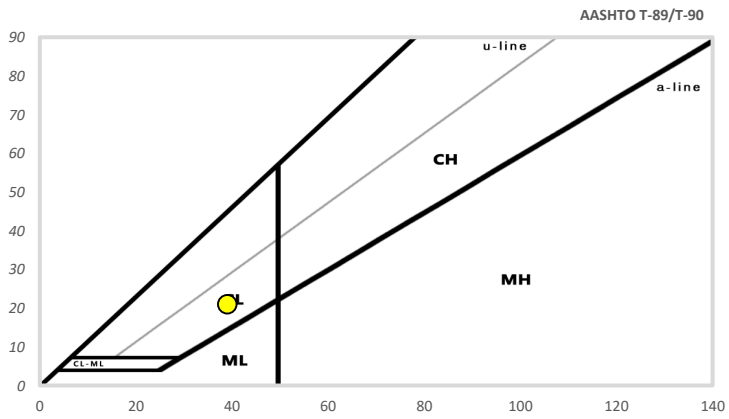
Moisture Content	16.5	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	39
Plastic Limit	18
Plasticity Index	21

CLASSIFICATION

AASHTO	A-6
USCS	CL



SOIL DESCRIPTION

Light brown sandy lean CLAY

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-05**	Project No.:	01.04361.01	
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	
Depth:	**0-5'**	Location:	*Fort Belvoir, VA*	

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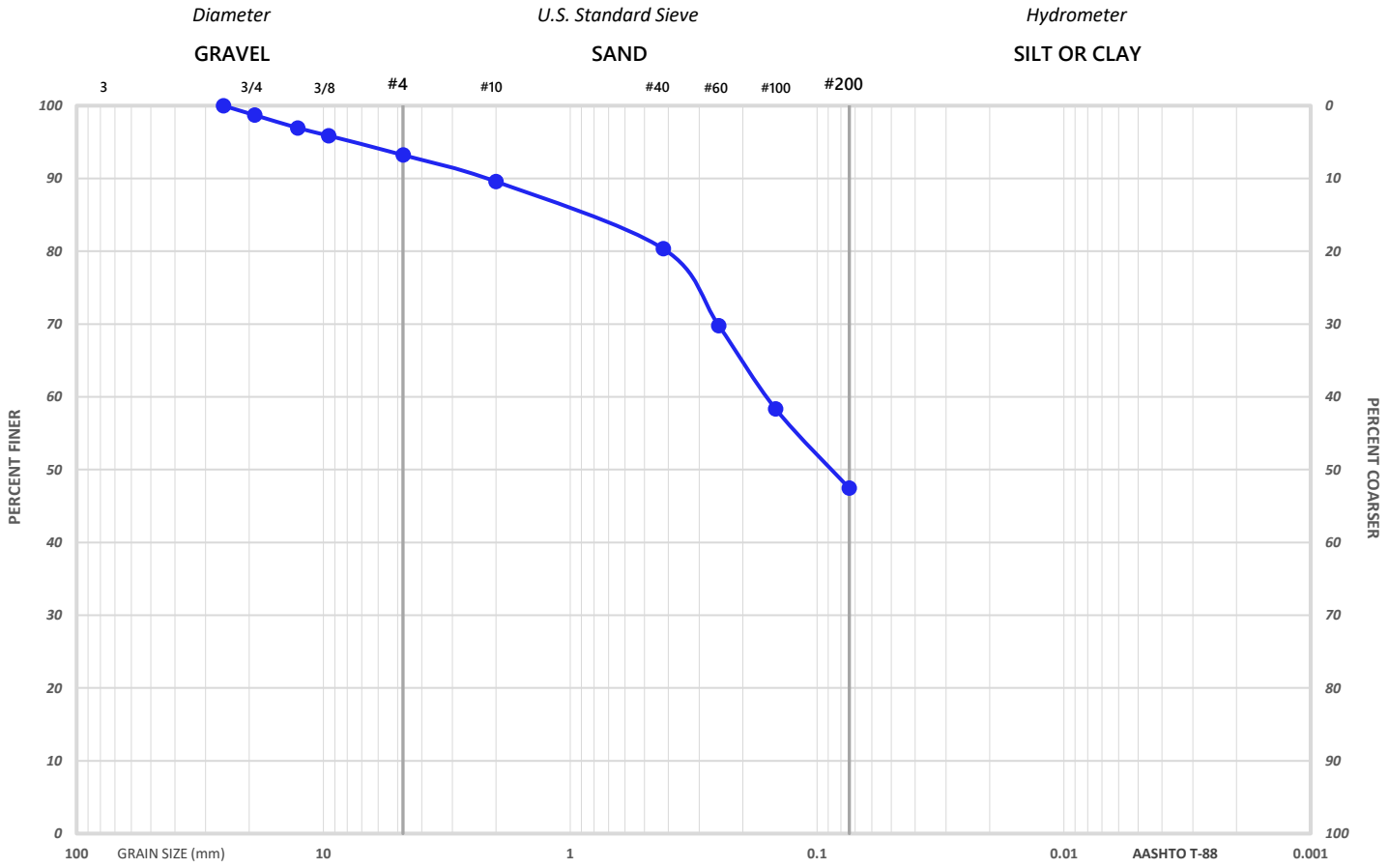
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	100.0	98.7	96.9	95.9	93.2	89.6	80.3	69.8	58.3	**47.4**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
6.8	**45.8**	1.3	5.5	3.6	9.3	32.9	-	-

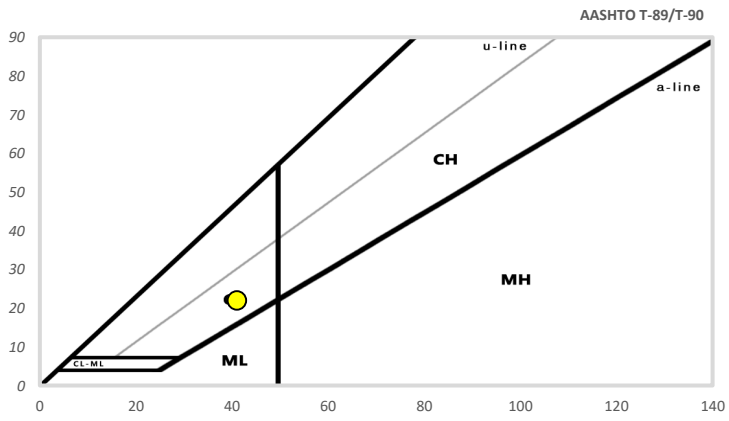
Moisture Content	8.0	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	41
Plastic Limit	19
Plasticity Index	22

CLASSIFICATION

AASHTO	A-7-6
USCS	SC



SOIL DESCRIPTION

Brown clayey SAND

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-05**	Project No.:	01.04361.01	
Sample:	**S-3**	Sample Date:	07/15 to 07/20	
Depth:	**4-6'**	Location:	*Fort Belvoir, VA*	

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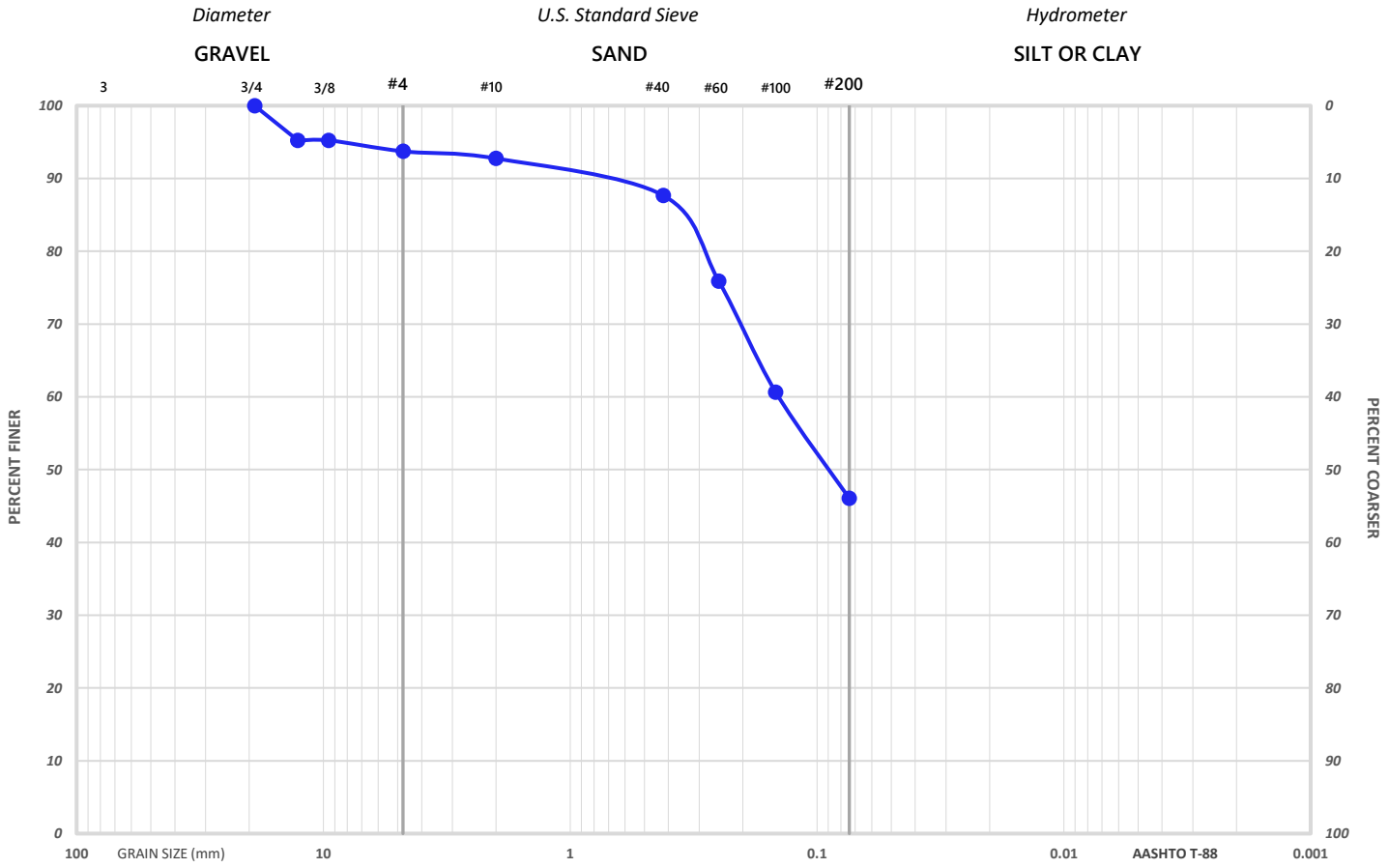
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	100.0	95.2	95.2	93.7	92.7	87.7	75.9	60.6	**46.1**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
6.3	**47.6**	-	6.3	1.0	5.0	41.6	-	-

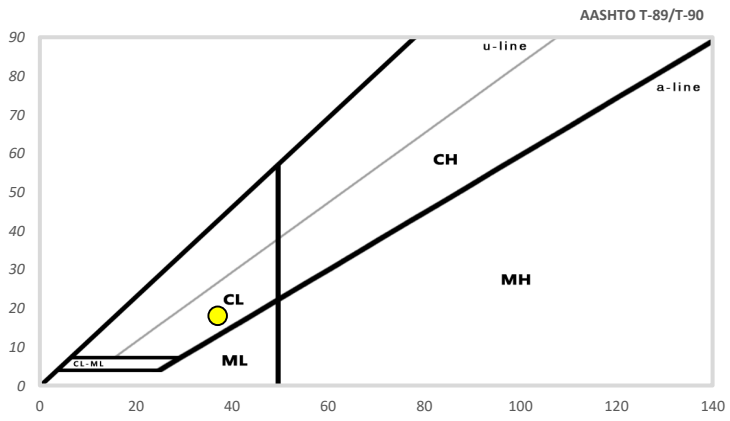
Moisture Content	19.0	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	37
Plastic Limit	19
Plasticity Index	18

CLASSIFICATION

AASHTO	A-6
USCS	SC



SOIL DESCRIPTION

Brown clayey SAND

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-05**	Project No.:	01.04361.01	
Sample:	**S-5B**	Sample Date:	07/15 to 07/20	
Depth:	**9.5-10'**	Location:	*Fort Belvoir, VA*	

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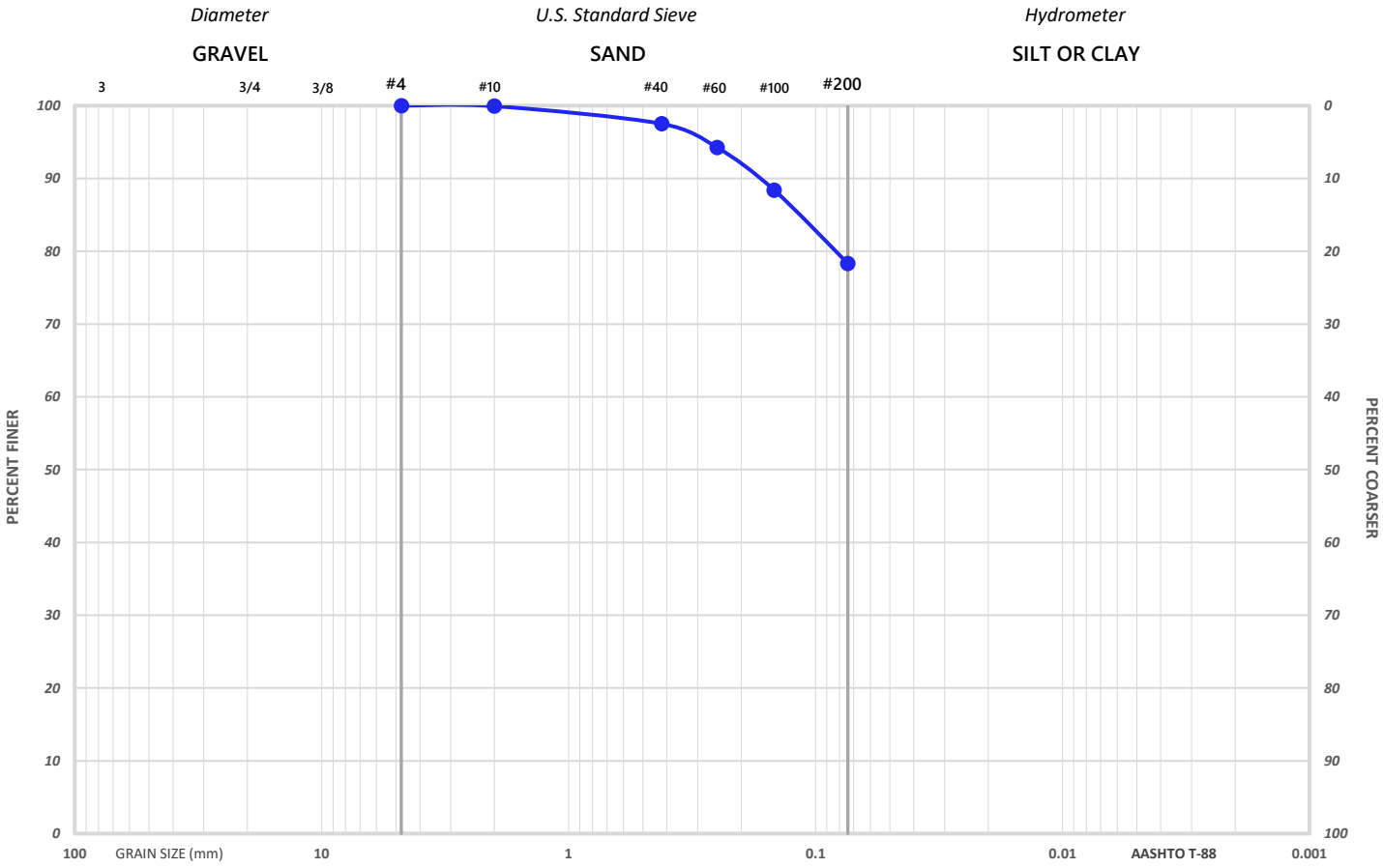


GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	100.0	99.9	97.5	94.2	88.4	**78.3**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
-	**21.7**	-	-	0.1	2.4	19.2	-	-

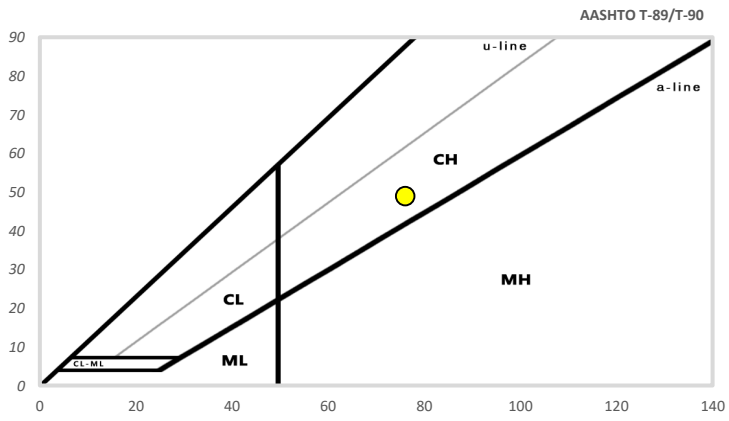
Moisture Content	27.7	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	76
Plastic Limit	27
Plasticity Index	49

CLASSIFICATION

AASHTO	A-7-6
USCS	CH



SOIL DESCRIPTION

Light brown fat CLAY with sand

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**WG-B-01**	Project No.:	01.04361.01	
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	
Depth:	**0-5'**	Location:	*Fort Belvoir, VA*	

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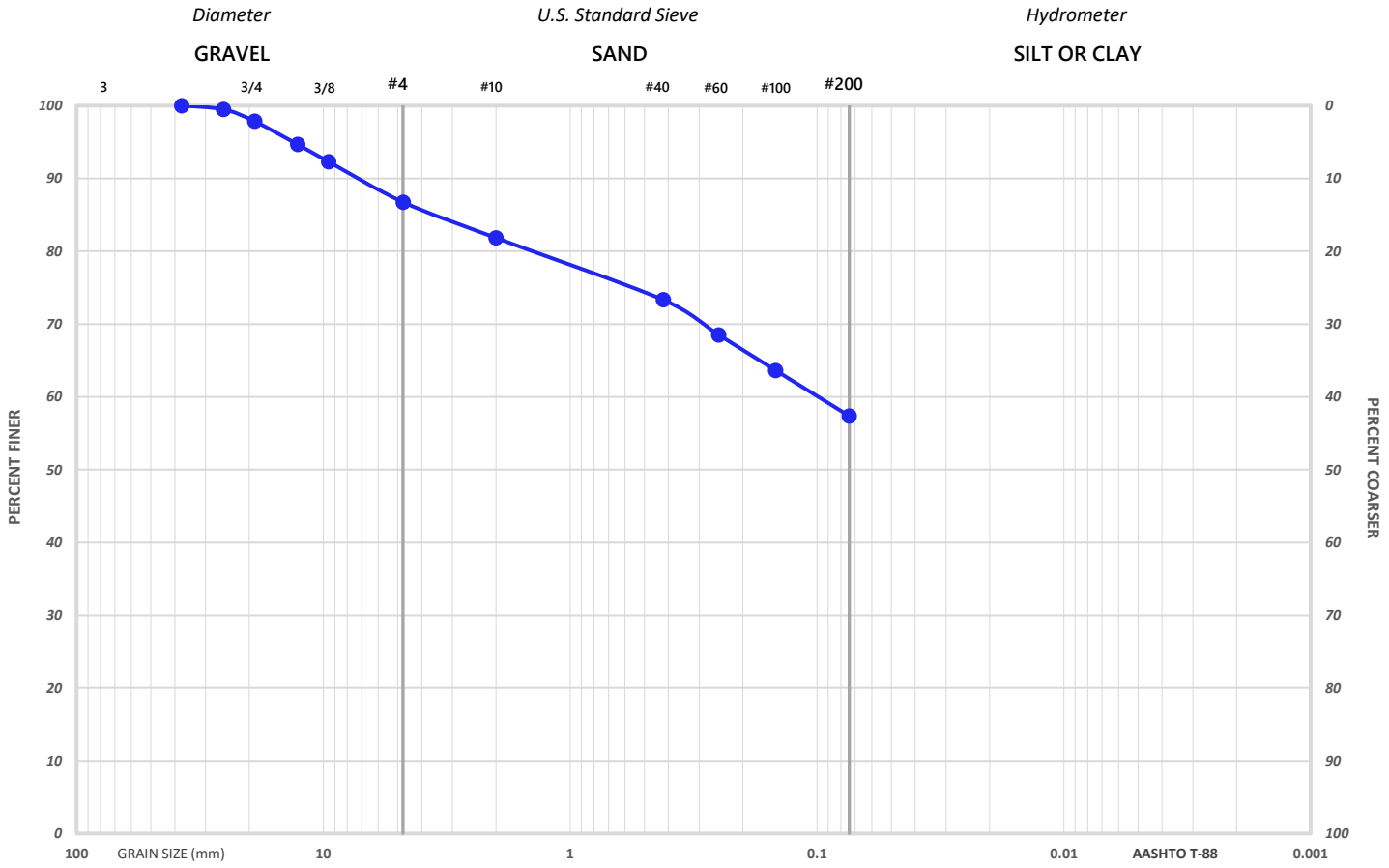


GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	100.0	99.5	97.8	94.7	92.3	86.7	81.8	73.3	68.5	63.6	**57.4**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
13.3	**29.3**	2.2	11.1	4.9	8.5	15.9	-	-

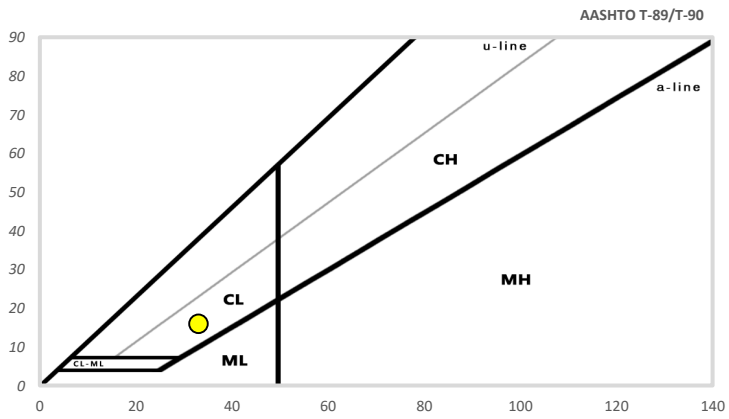
Moisture Content	8.5	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	33
Plastic Limit	17
Plasticity Index	16

CLASSIFICATION

AASHTO	A-6
USCS	CL



SOIL DESCRIPTION

Brown sandy lean CLAY

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**WG-B-01**	Project No.:	01.04361.01	
Sample:	**S-4**	Sample Date:	07/15 to 07/20	
Depth:	**6-8'**	Location:	*Fort Belvoir, VA*	

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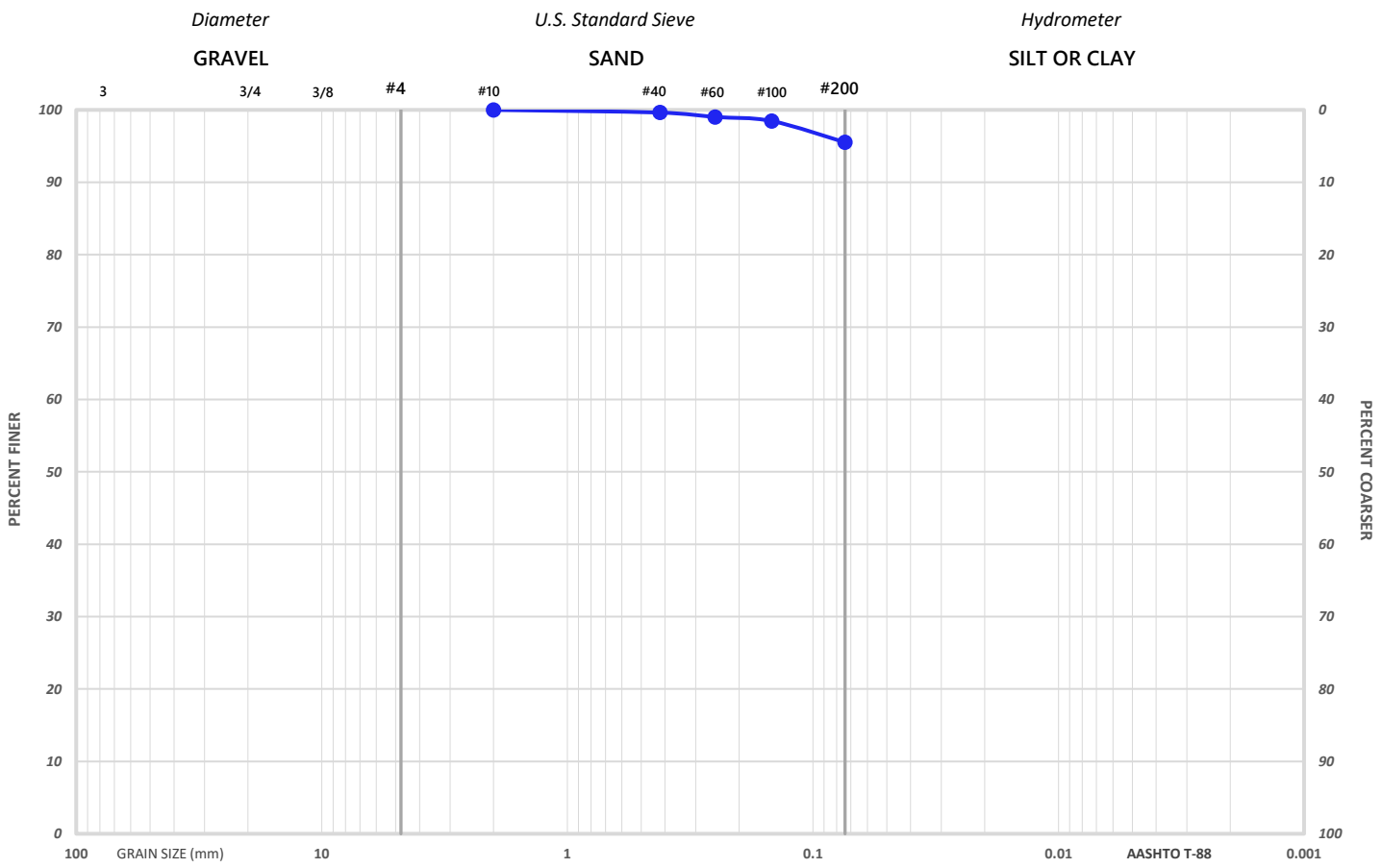


GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	-	100.0	99.6	99.0	98.5	**95.5**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
-	**4.5**	-	-	-	0.4	4.1	-	-

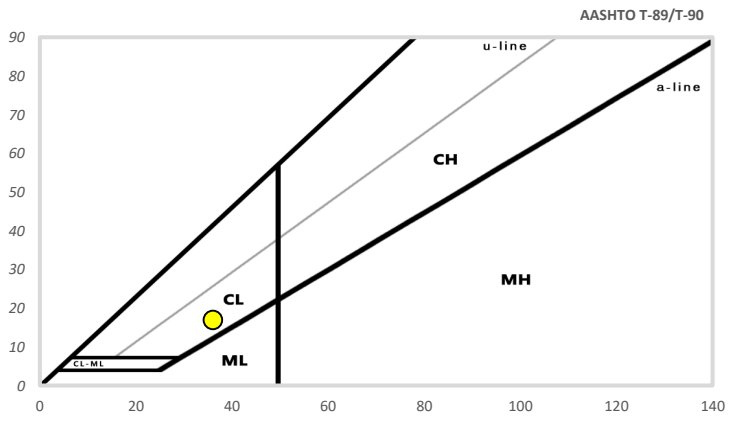
Moisture Content	17.5	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	36
Plastic Limit	19
Plasticity Index	17

CLASSIFICATION

AASHTO	A-6
USCS	CL



SOIL DESCRIPTION

Light brown lean CLAY

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**WG-B-02**	Project No.:	01.04361.01	
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	
Depth:	**0.6-5.6'**	Location:	*Fort Belvoir, VA*	

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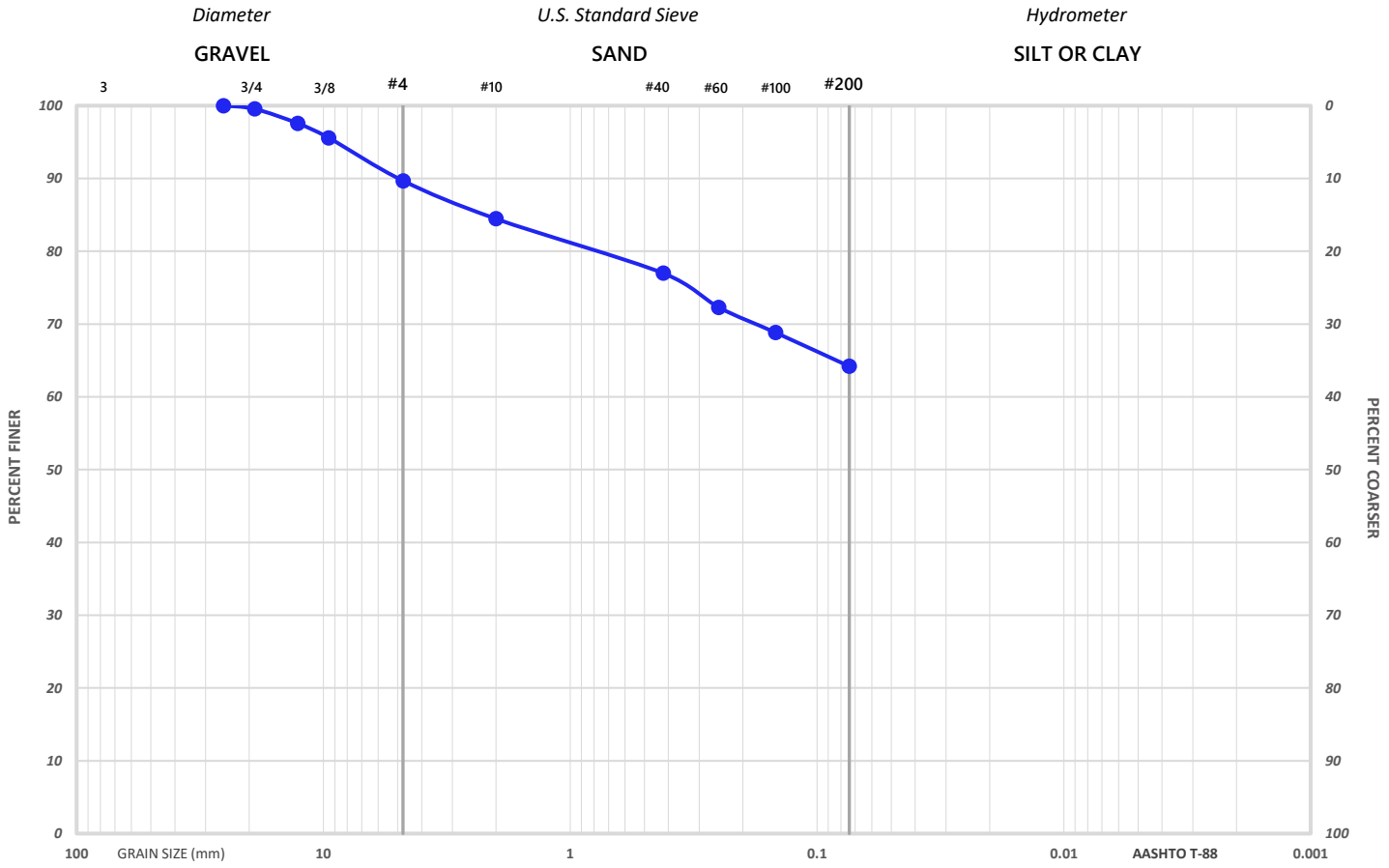


GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	100.0	99.6	97.6	95.6	89.7	84.5	77.0	72.3	68.8	**64.2**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
10.3	**25.5**	0.4	9.9	5.2	7.5	12.8	-	-

Moisture Content	13.8	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

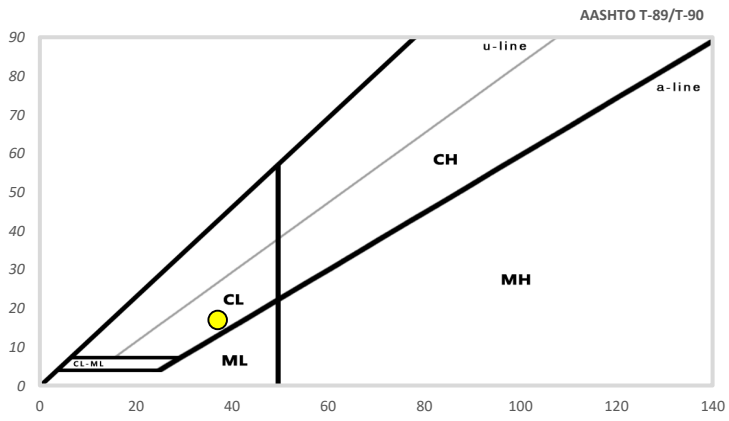
Liquid Limit	37
Plastic Limit	20
Plasticity Index	17

CLASSIFICATION

AASHTO	A-6
USCS	CL

SOIL DESCRIPTION

Brown sandy lean CLAY



FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**WG-B-02**	Project No.:	01.04361.01	
Sample:	**S-3**	Sample Date:	07/15 to 07/20	
Depth:	**4.5-6.5'**	Location:	*Fort Belvoir, VA*	

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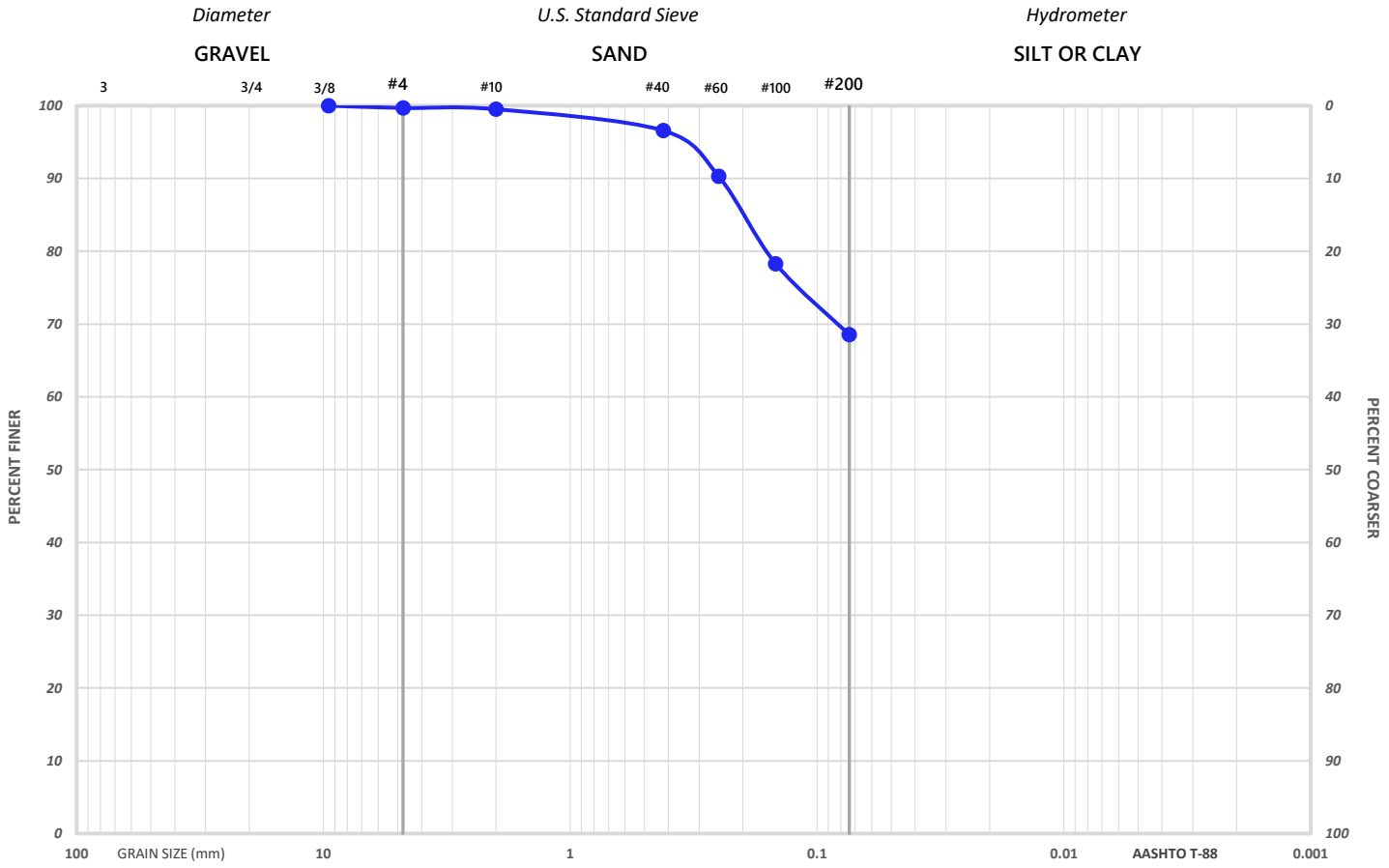


GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	100.0	99.7	99.5	96.6	90.3	78.3	**68.6**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
0.3	**31.1**	-	0.3	0.2	2.9	28.0	-	-

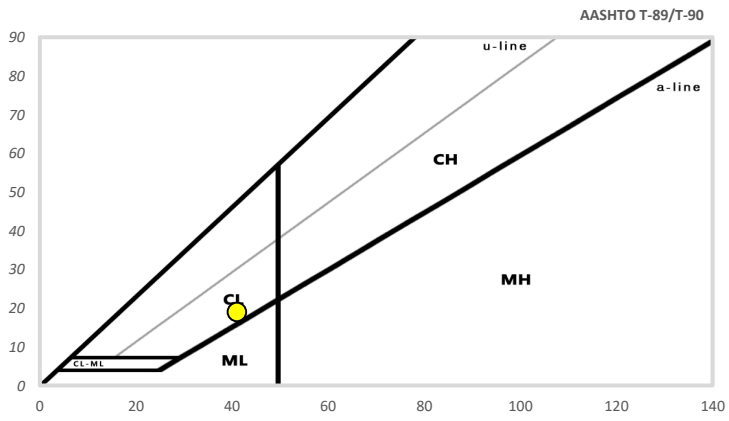
Moisture Content	20.4	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	41
Plastic Limit	22
Plasticity Index	19

CLASSIFICATION

AASHTO	A-7-6
USCS	CL



SOIL DESCRIPTION

Brown sandy lean CLAY

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**WG-B-02**	Project No.:	01.04361.01	
Sample:	**S-5**	Sample Date:	07/15 to 07/20	
Depth:	**8.5-10'**	Location:	*Fort Belvoir, VA*	

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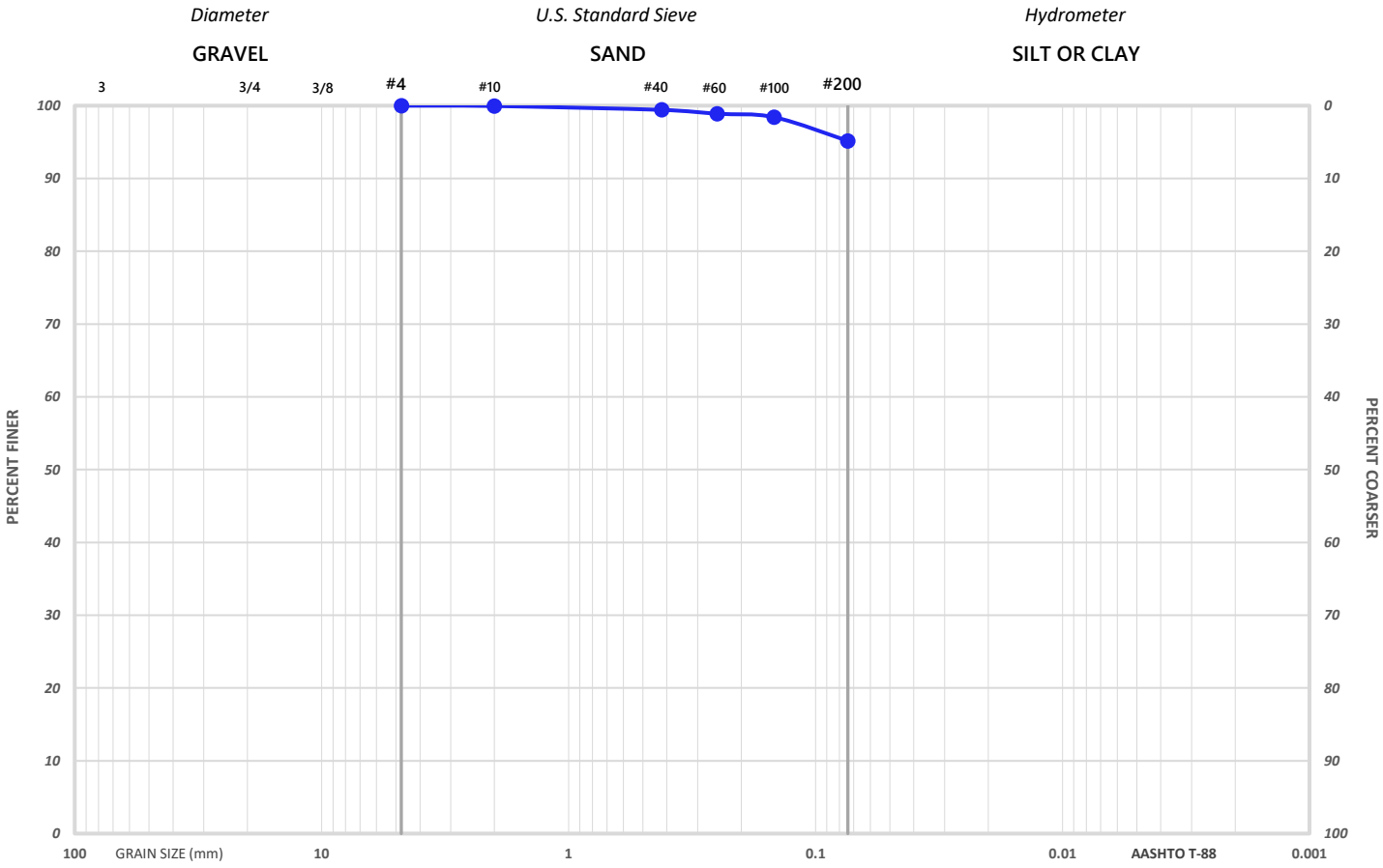


GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	100.0	99.9	99.4	98.9	98.4	**95.2**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
-	**4.8**	-	-	0.1	0.5	4.2	-	-

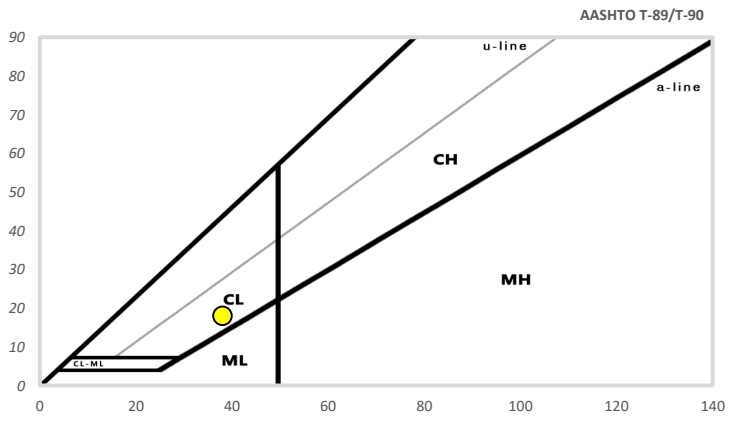
Moisture Content	19.9	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	38
Plastic Limit	20
Plasticity Index	18

CLASSIFICATION

AASHTO	A-6
USCS	CL

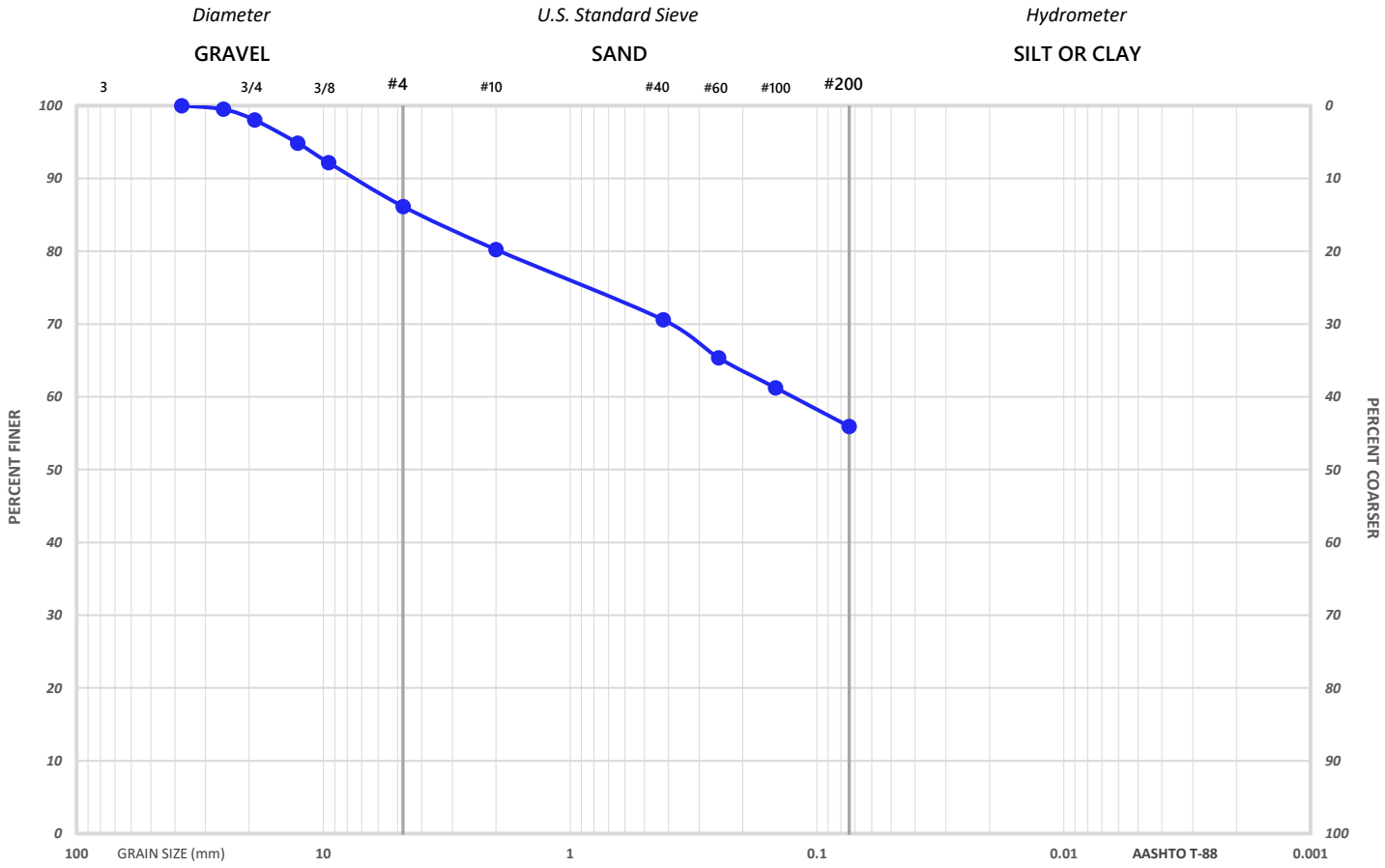


SOIL DESCRIPTION

Brown lean CLAY

FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**WG-B-03**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**	
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	5233 Lehman Road, Suite 110	
Depth:	**0-5'**	Location:	*Fort Belvoir, VA*	Spring Grove, PA 17362	
				Phone: (814) 404-9283	



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	100.0	99.5	98.0	94.9	92.2	86.2	80.2	70.6	65.3	61.2	**55.9**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
13.8	**30.3**	2.0	11.8	6.0	9.6	14.7	-	-

Moisture Content	9.1	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

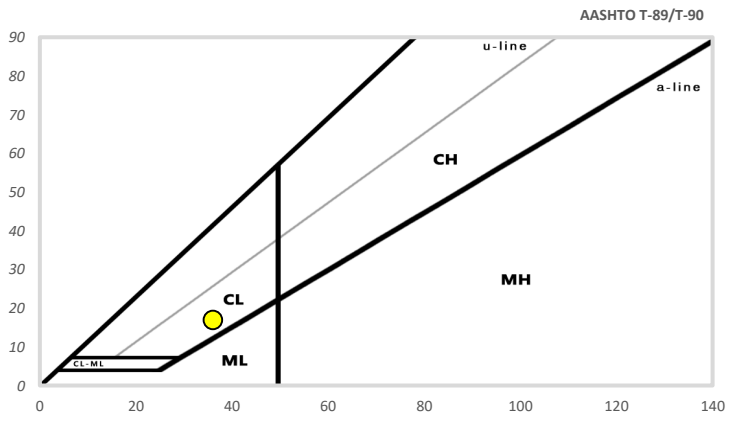
Liquid Limit	36
Plastic Limit	19
Plasticity Index	17

CLASSIFICATION

AASHTO	A-6
USCS	CL

SOIL DESCRIPTION

Brown sandy lean CLAY



FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**WG-B-03**	Project No.:	01.04361.01	
Sample:	**S-3**	Sample Date:	07/15 to 07/20	
Depth:	**4-6'**	Location:	*Fort Belvoir, VA*	

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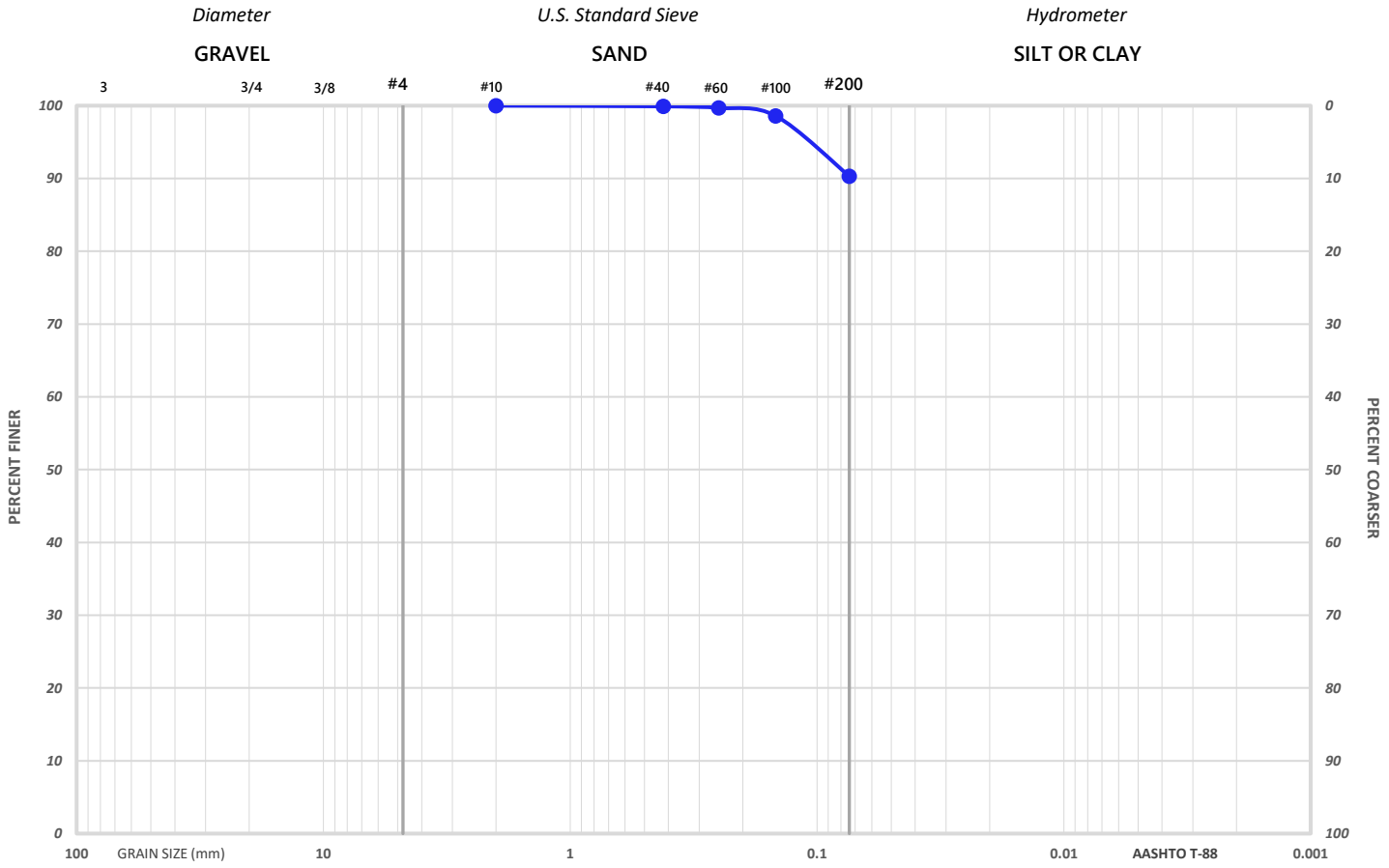


GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	-	100.0	99.9	99.7	98.6	**90.3**

% GRAVEL	% SAND	*Coarse Gravel*	*Fine Gravel*	*Coarse Sand*	*Medium Sand*	*Fine Sand*	CC	CU
-	**9.7**	-	-	-	0.1	9.6	-	-

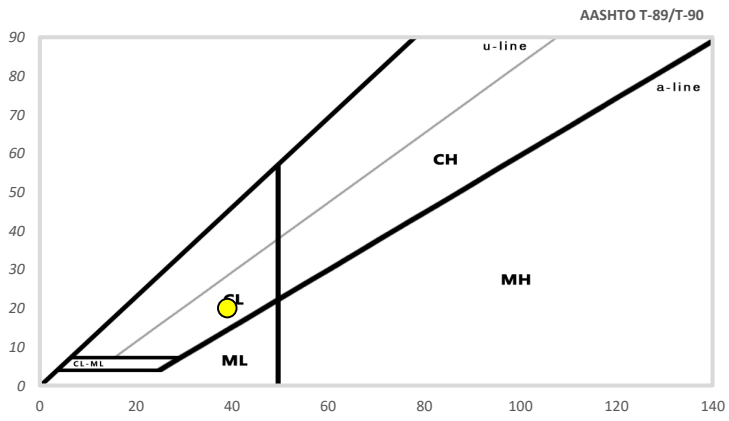
Moisture Content	17.3	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

Liquid Limit	39
Plastic Limit	19
Plasticity Index	20

CLASSIFICATION

AASHTO	A-6
USCS	CL



SOIL DESCRIPTION

Brown lean CLAY

Boring: **KG-B-01**
Sample: **Bulk-1**
Depth: **0.6-5.6'**

Project No.: 01.04361.01
Sample Date: 07/15 to 07/20
Location: *Fort Belvoir, VA*

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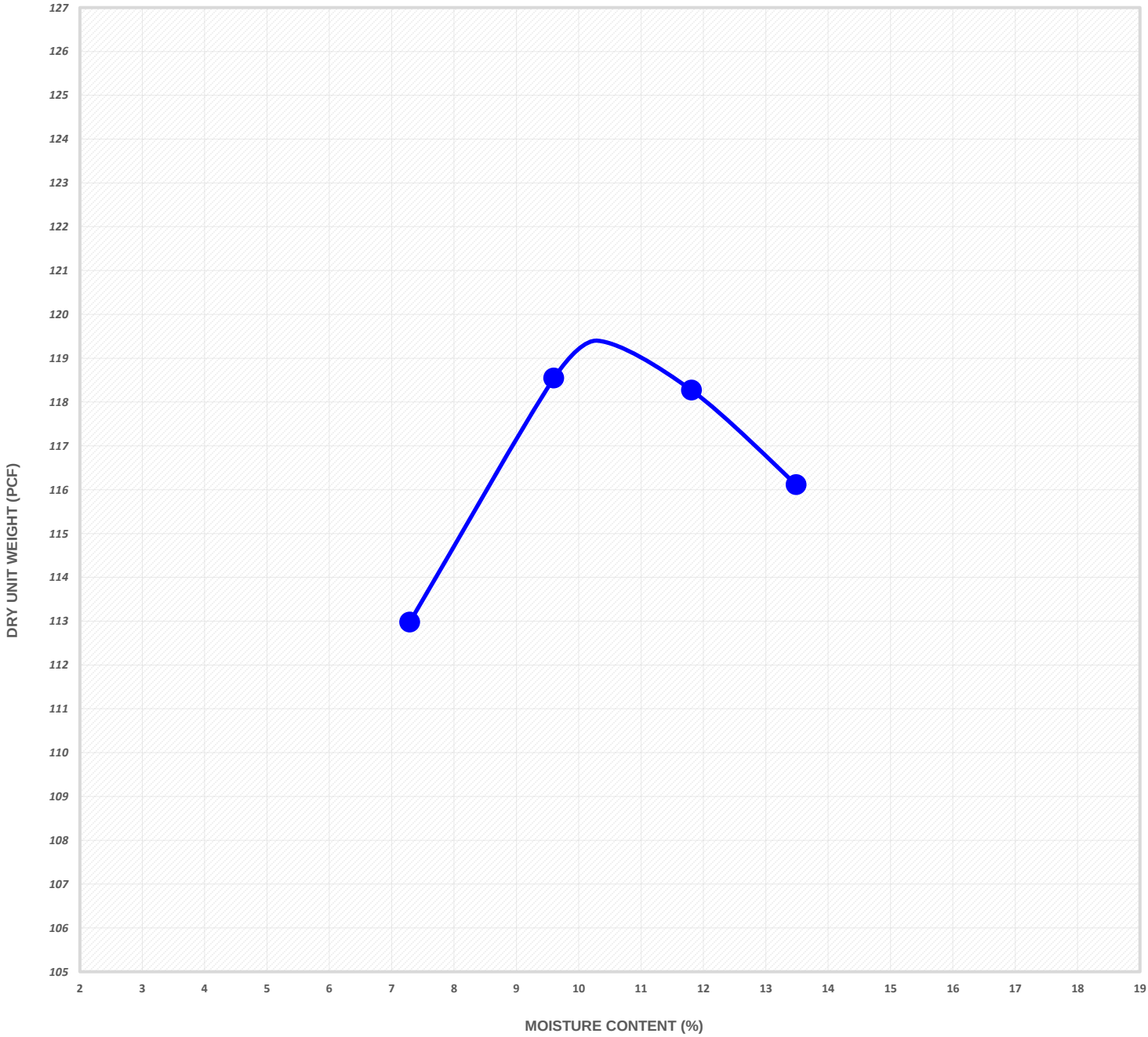
Phone: (814) 404-9283

STANDARD PROCTOR TEST RESULTS

TEST METHOD: VTM-1

*Corrected for 32.8% retained on #4 sieve

	UNCORRECTED		CORRECTED *
Maximum Dry Unit Weight	119.4	PCF	130.7
Optimum Moisture Content	10.2	MC	7.5



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
9.1	39	18	21	SC	A-2-6	26.5	Gray clayey SAND with gravel

Boring: **KG-B-02**
Sample: **Bulk-1**
Depth: **0.7-5.7'**

Project No.: 01.04361.01
Sample Date: 07/15 to 07/20
Location: *Fort Belvoir, VA*

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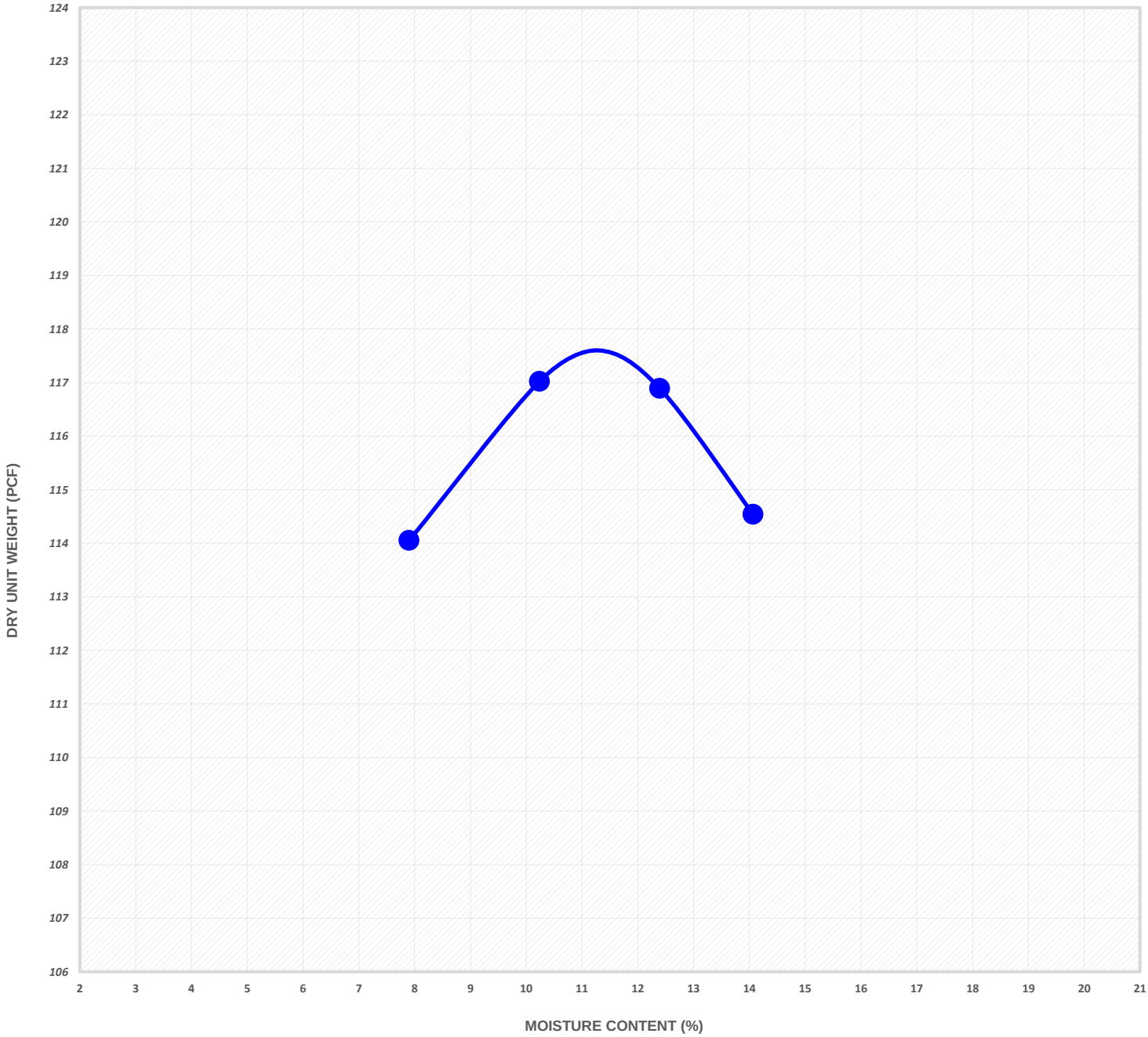
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283

STANDARD PROCTOR TEST RESULTS

TEST METHOD: VTM-1

*Corrected for 21.2% retained on #4 sieve

	UNCORRECTED		CORRECTED *
Maximum Dry Unit Weight	117.6	PCF	124.9
Optimum Moisture Content	11.2	MC	9.2



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
10.6	39	18	21	SC	A-2-6	32.4	Brown clayey SAND with gravel

Boring: **KG-B-03**
Sample: **Bulk-1**
Depth: **0.5-5.5'**

Project No.: 01.04361.01
Sample Date: 07/15 to 07/20
Location: *Fort Belvoir, VA*

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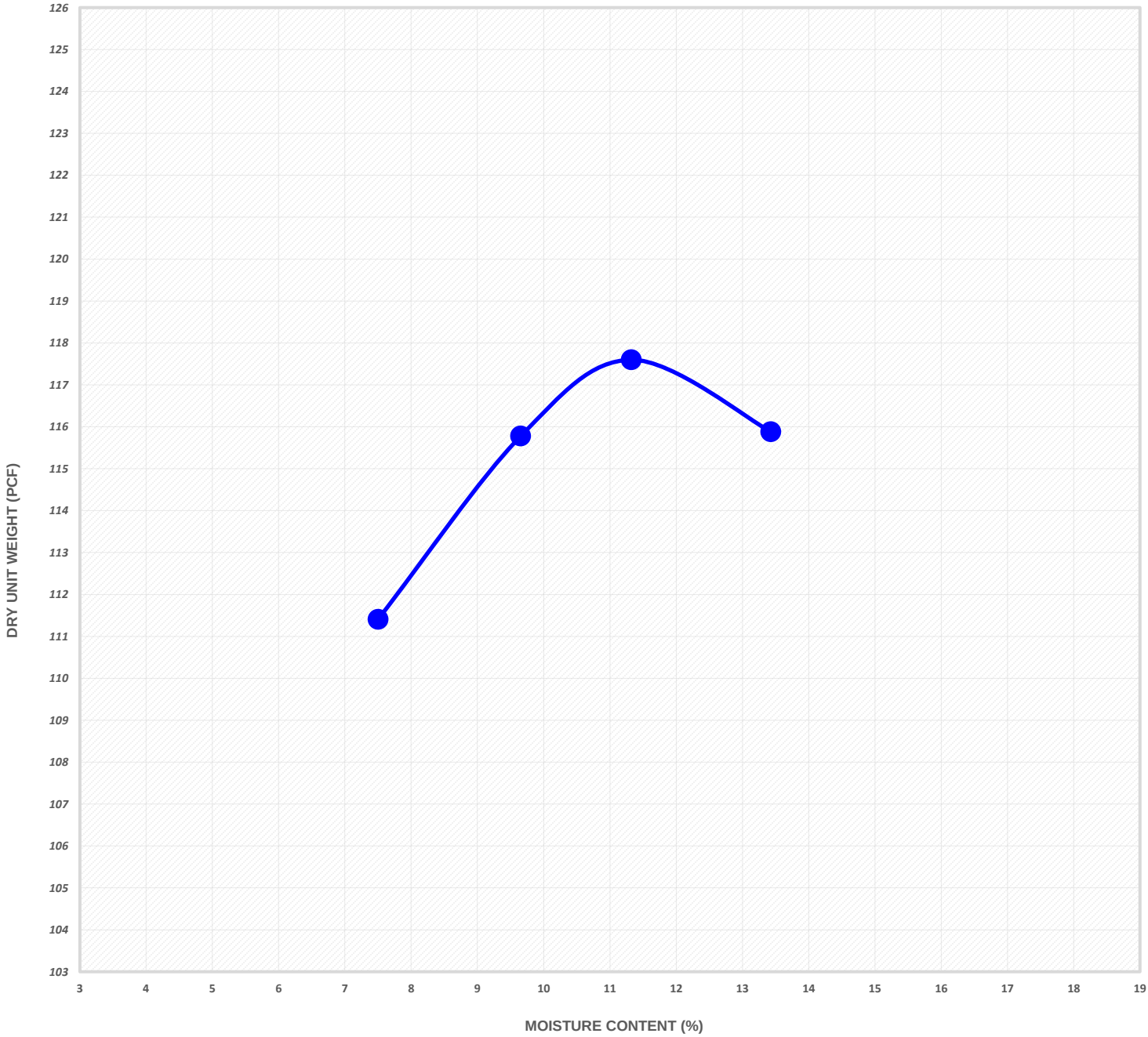
Spring Grove, PA 17362
Phone: (814) 404-9283

STANDARD PROCTOR TEST RESULTS

TEST METHOD: VTM-1

*Corrected for 18.8% retained on #4 sieve

	UNCORRECTED		CORRECTED *
Maximum Dry Unit Weight	117.6	PCF	124.0
Optimum Moisture Content	11.3	MC	9.6



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
8.9	45	18	27	SC	A-2-7	33.7	Brown clayey SAND with gravel

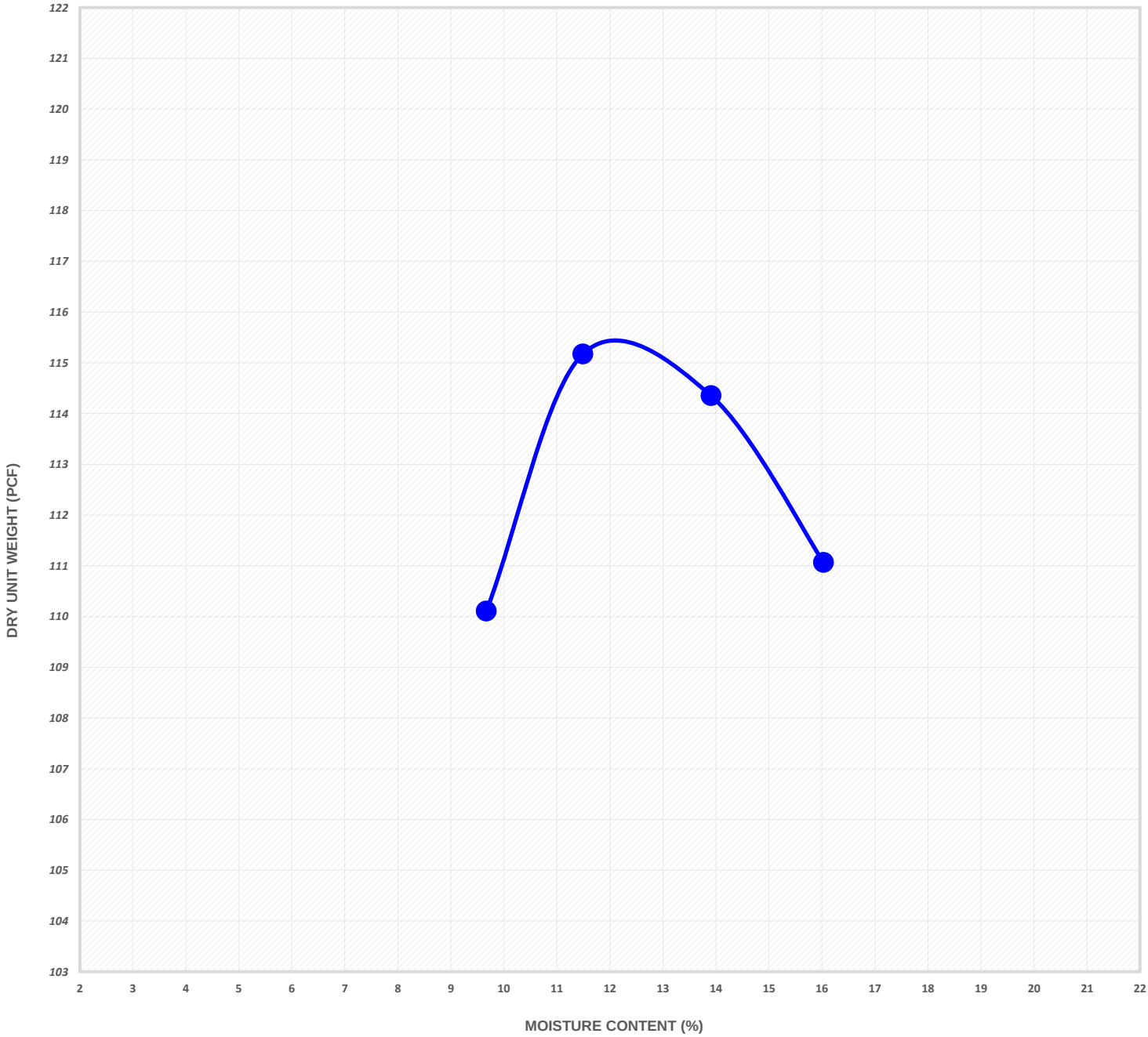
FORT BELVOIR KINGMAN AND WALKER GATES

Boring:	**KG-B-04**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	5233 Lehman Road, Suite 110
Depth:	**0-5'**	Location:	*Fort Belvoir, VA*	Spring Grove, PA 17362
				Phone: (814) 404-9283

STANDARD PROCTOR TEST RESULTS

TEST METHOD: VTM-1

MAXIMUM DRY UNIT WEIGHT	OPTIMUM MOISTURE CONTENT
115.4	12.0
PCF	%



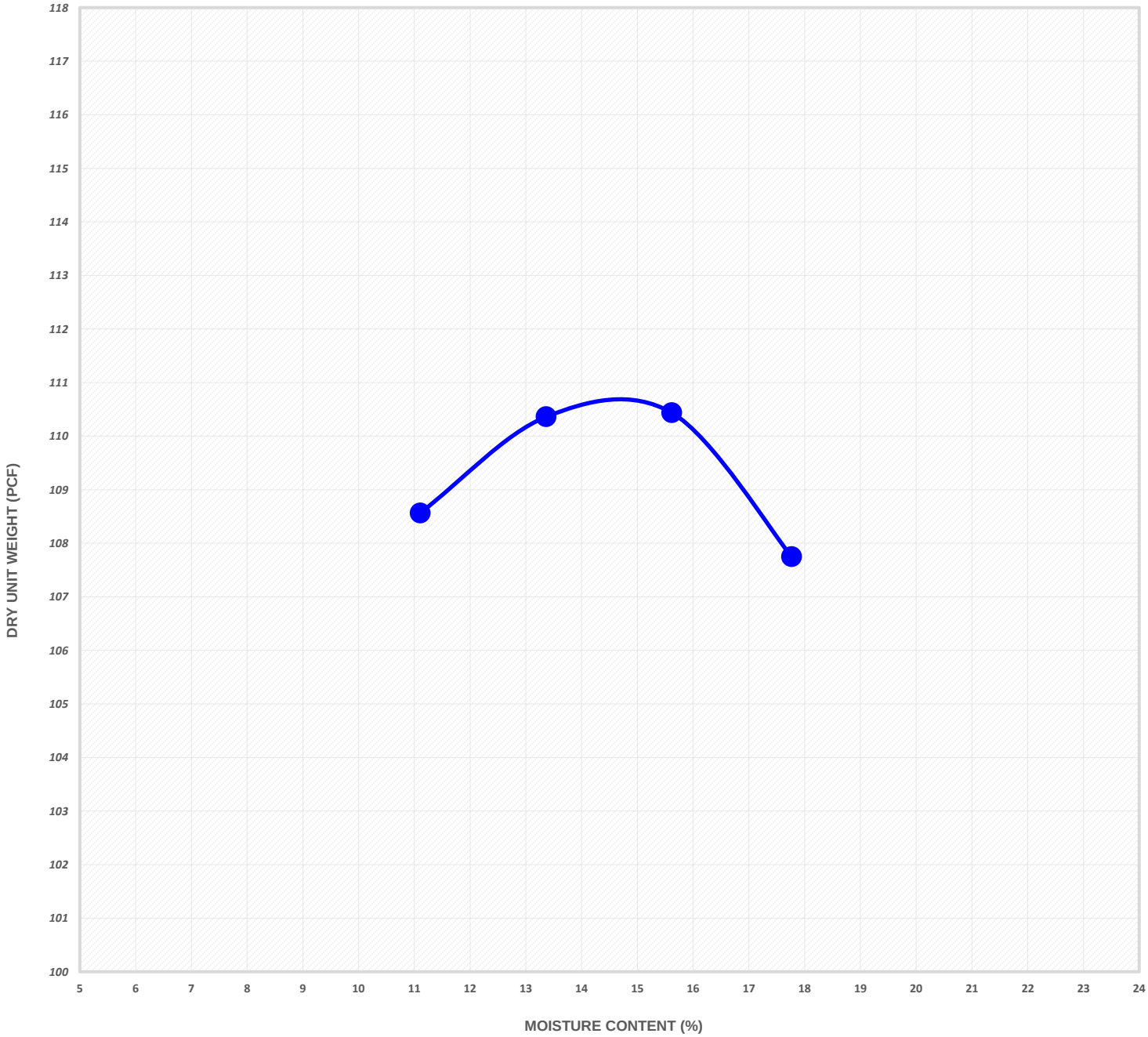
MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
8.3	39	18	21	SC	A-6	47.0	Brown clayey SAND

Boring:	**KG-B-05**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	5233 Lehman Road, Suite 110
Depth:	**0-5'**	Location:	*Fort Belvoir, VA*	Spring Grove, PA 17362
				Phone: (814) 404-9283

STANDARD PROCTOR TEST RESULTS

TEST METHOD: VTM-1

MAXIMUM DRY UNIT WEIGHT	OPTIMUM MOISTURE CONTENT
110.7	14.9
PCF	%



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
8.0	41	19	22	SC	A-7-6	47.4	Brown clayey SAND

FORT BELVOIR KINGMAN AND WALKER GATES

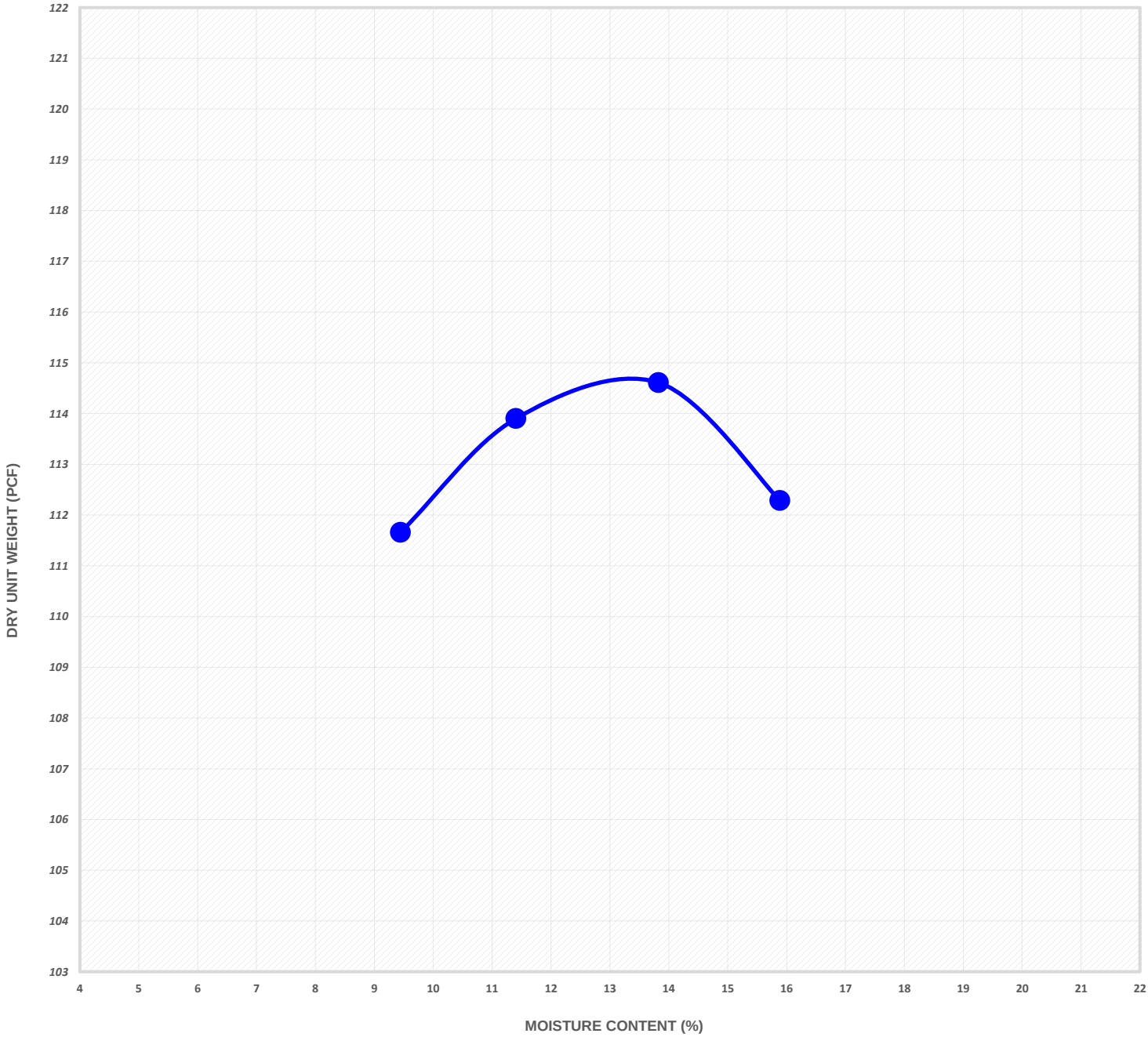
Boring:	**WG-B-01**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	5233 Lehman Road, Suite 110
Depth:	**0-5'**	Location:	*Fort Belvoir, VA*	Spring Grove, PA 17362
				Phone: (814) 404-9283

STANDARD PROCTOR TEST RESULTS

TEST METHOD: VTM-1

*Corrected for 13.3% retained on #4 sieve

	UNCORRECTED		CORRECTED *
Maximum Dry Unit Weight	114.8	PCF	119.4
Optimum Moisture Content	13.5	MC	12.0



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
8.5	33	17	16	CL	A-6	57.4	Brown sandy lean CLAY

Boring: **WG-B-02**
Sample: **Bulk-1**
Depth: **0.6-5.6'**

Project No.: 01.04361.01
Sample Date: 07/15 to 07/20
Location: *Fort Belvoir, VA*

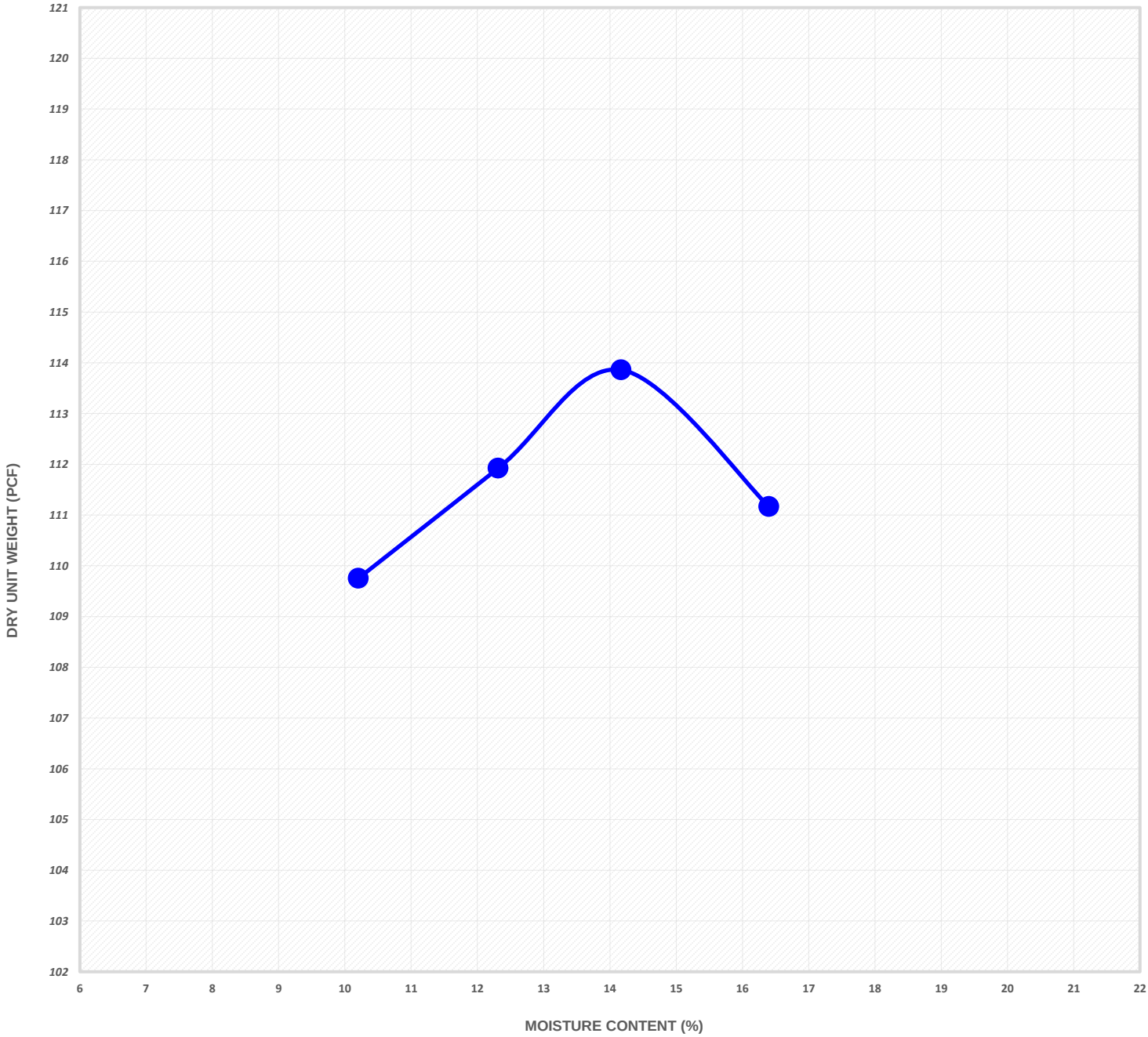
JAY KAY TESTING, INC.
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283

STANDARD PROCTOR TEST RESULTS

TEST METHOD: VTM-1

*Corrected for 10.3% retained on #4 sieve

	UNCORRECTED		CORRECTED *
Maximum Dry Unit Weight	113.8	PCF	117.4
Optimum Moisture Content	14.1	MC	12.9



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
13.8	37	20	17	CL	A-6	64.2	Brown sandy lean CLAY

Boring: **WG-B-03**
Sample: **Bulk-1**
Depth: **0-5'**

Project No.: 01.04361.01
Sample Date: 07/15 to 07/20
Location: *Fort Belvoir, VA*

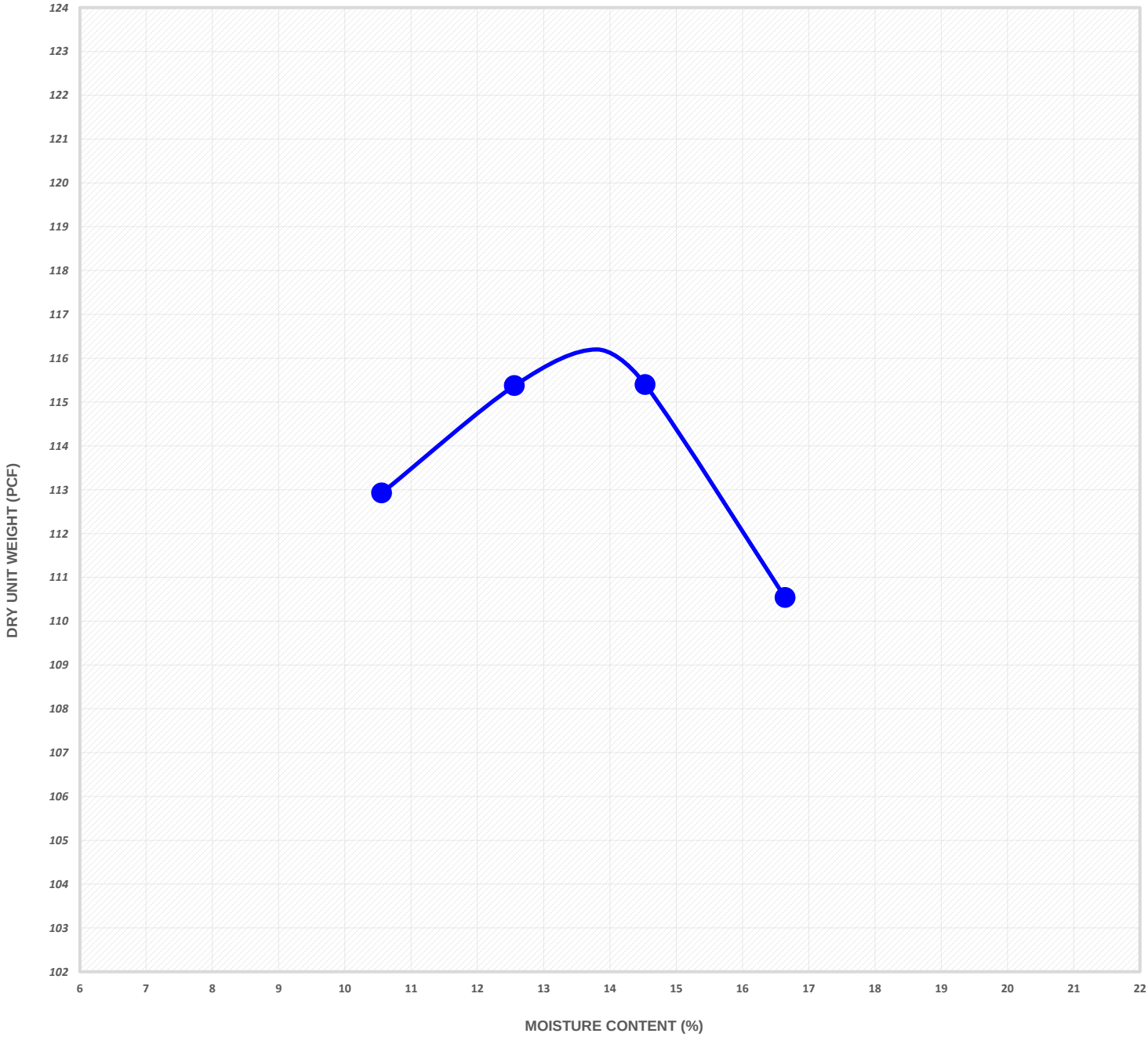
JAY KAY TESTING, INC.
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283

STANDARD PROCTOR TEST RESULTS

TEST METHOD: VTM-1

*Corrected for 13.8% retained on #4 sieve

	UNCORRECTED		CORRECTED *
Maximum Dry Unit Weight	116.2	PCF	120.9
Optimum Moisture Content	13.8	MC	12.2



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
9.1	36	19	17	CL	A-6	55.9	Brown sandy lean CLAY

Boring: **KG-B-01**
Sample: **Bulk-1**
Depth: **0.6-5.6'**

Project No.: 01.04361.01
Sample Date: 07/15 to 07/20
Location: *Fort Belvoir, VA*

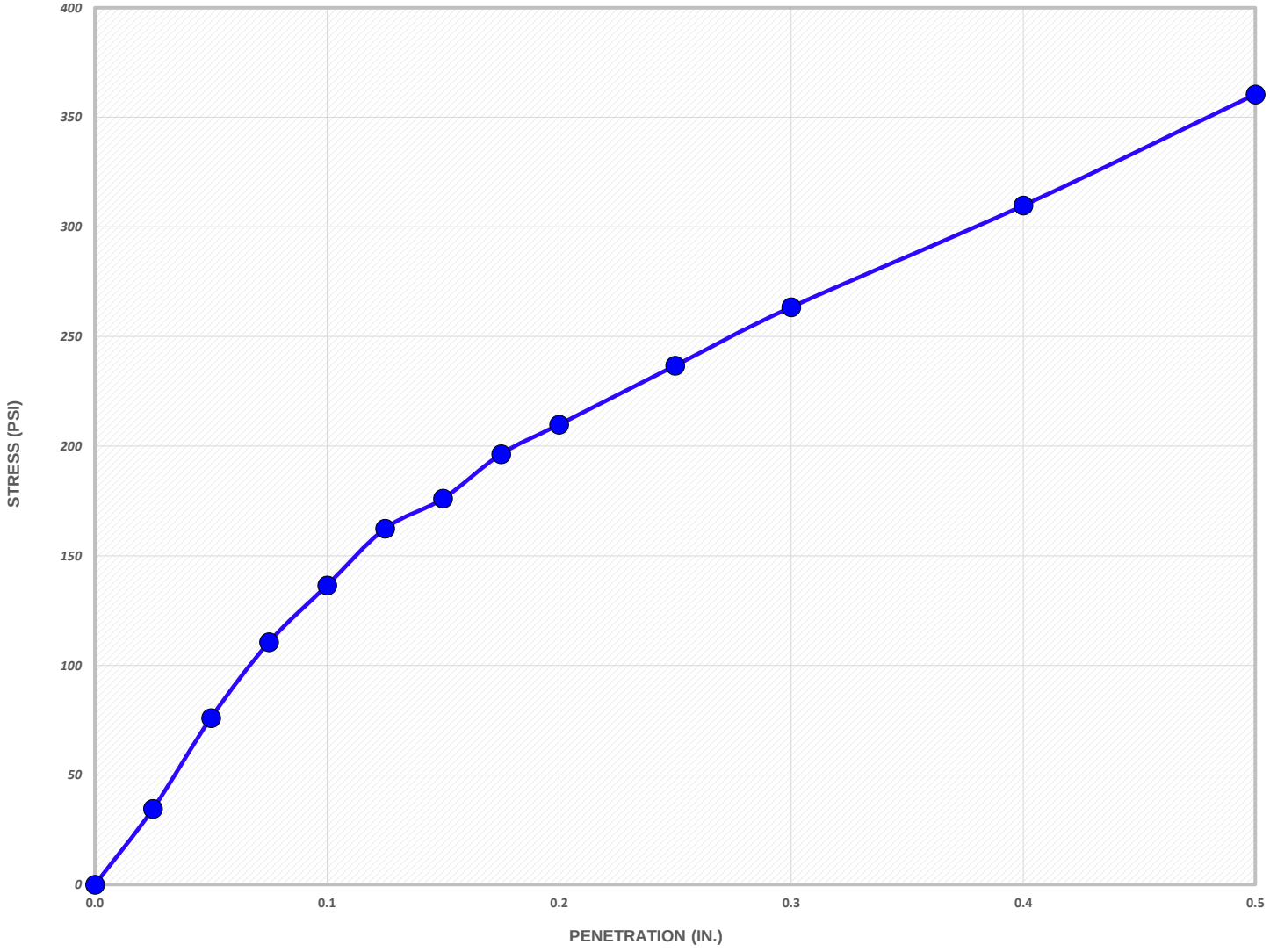
JAY KAY TESTING, INC.
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283

CALIFORNIA BEARING RATIO TEST RESULTS

CBR AT 0.1"	CBR AT 0.2"
13.6	14.0

	Dry Unit Weight	Moisture Content	Compaction	Swell	Surcharge
As Molded	127.7	8.2	97.7	-	50
After Soak	127.4	10.3	97.5	0.63	50
	PCF	%	%	%	PSF

METHOD: VTM-8, COMPACTION: VTM-1



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
9.1	39	18	21	SC	A-2-6	26.5	Gray clayey SAND with gravel

FORT BELVOIR KINGMAN AND WALKER GATES

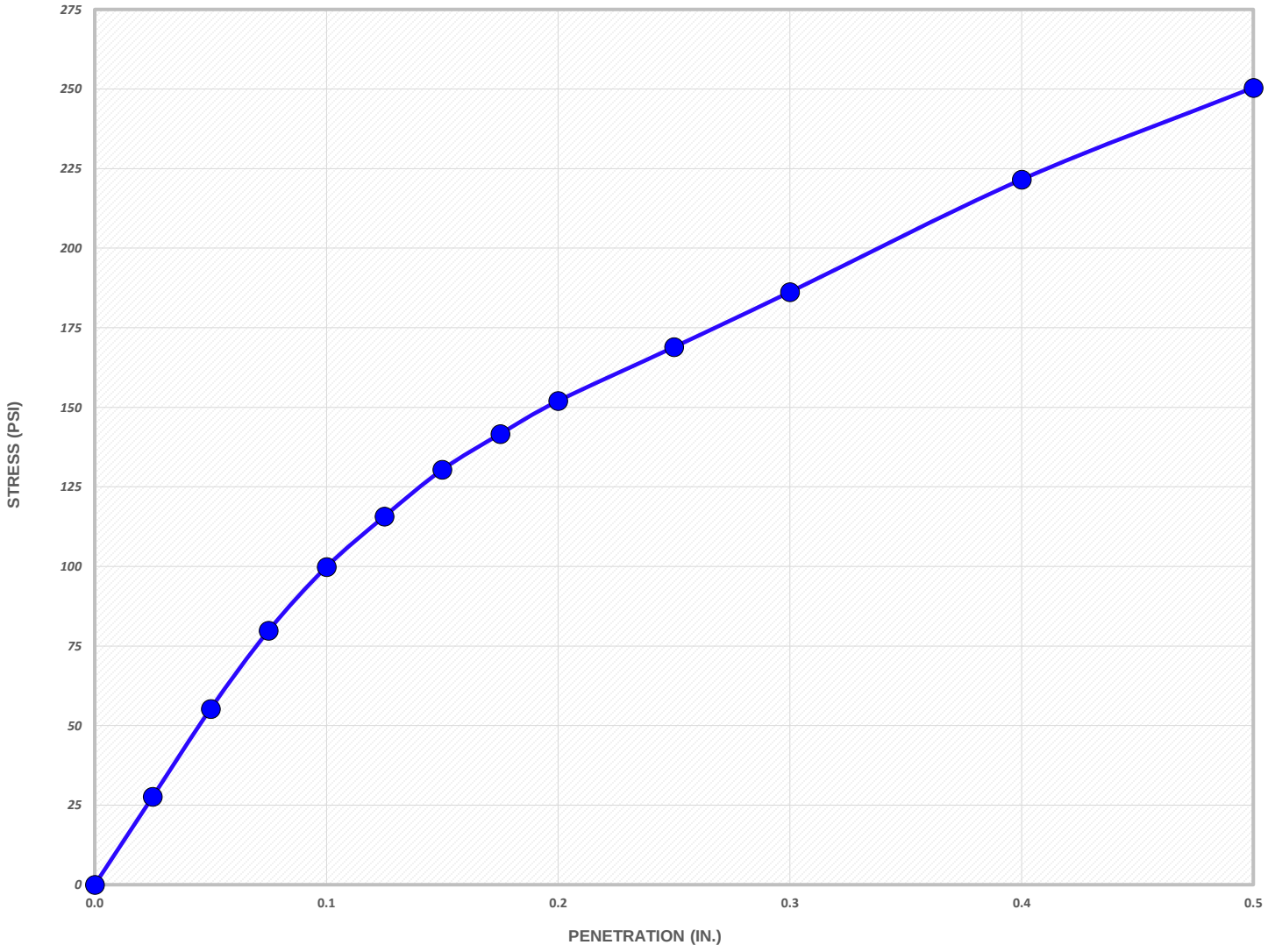
Boring:	**KG-B-02**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	5233 Lehman Road, Suite 110
Depth:	**0.7-5.7'**	Location:	*Fort Belvoir, VA*	Spring Grove, PA 17362
				Phone: (814) 404-9283

CALIFORNIA BEARING RATIO TEST RESULTS

CBR AT 0.1"	CBR AT 0.2"
10.0	10.1

	Dry Unit Weight	Moisture Content	Compaction	Swell	Surcharge
As Molded	122.8	9.2	98.4	-	50
After Soak	120.4	13.1	96.4	1.08	50
	PCF	%	%	%	PSF

METHOD: VTM-8, COMPACTION: VTM-1



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
10.6	39	18	21	SC	A-2-6	32.4	Brown clayey SAND with gravel

FORT BELVOIR KINGMAN AND WALKER GATES

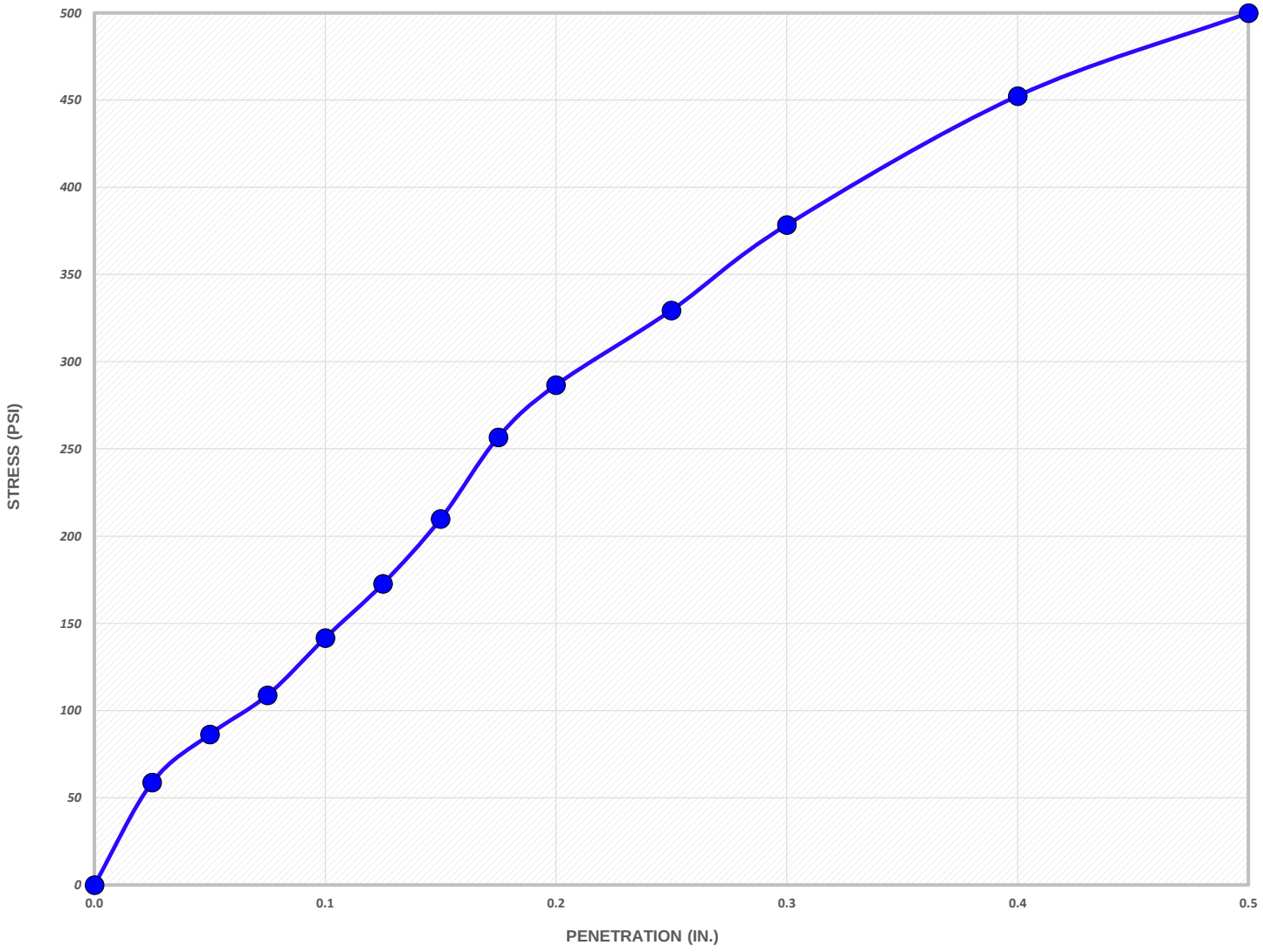
Boring:	**KG-B-03**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	5233 Lehman Road, Suite 110
Depth:	**0.5-5.5'**	Location:	*Fort Belvoir, VA*	Spring Grove, PA 17362
				Phone: (814) 404-9283

CALIFORNIA BEARING RATIO TEST RESULTS

CBR AT 0.1"	CBR AT 0.2"
14.2	19.1

	Dry Unit Weight	Moisture Content	Compaction	Swell	Surcharge
As Molded	123.9	9.7	99.9	-	50
After Soak	122.5	12.1	98.8	0.79	50
	PCF	**%**	**%**	**%**	**PSF**

METHOD: VTM-8, COMPACTION: VTM-1



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
8.9	45	18	27	SC	A-2-7	33.7	Brown clayey SAND with gravel

FORT BELVOIR KINGMAN AND WALKER GATES

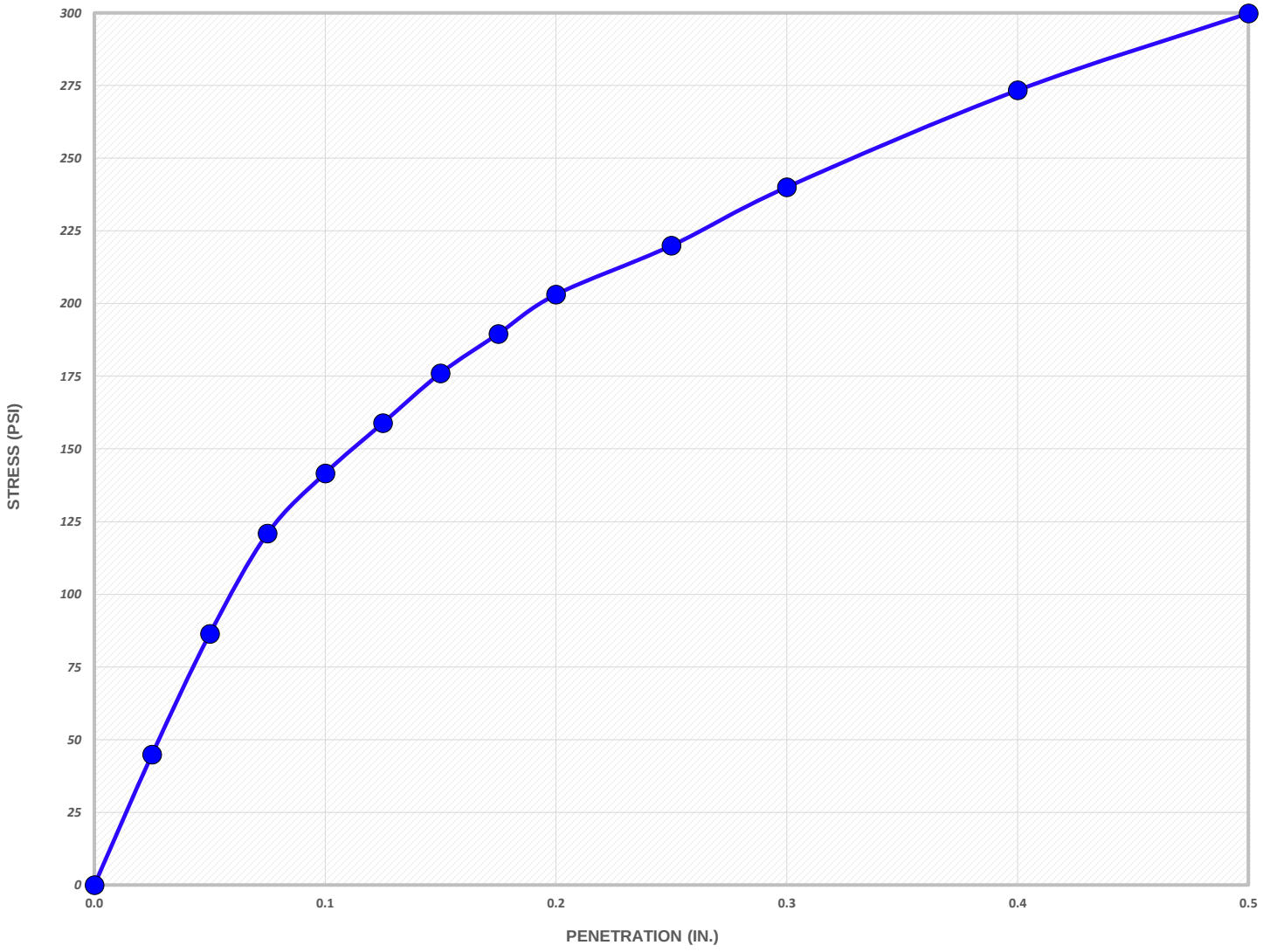
Boring:	**KG-B-04**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	5233 Lehman Road, Suite 110
Depth:	**0-5'**	Location:	*Fort Belvoir, VA*	Spring Grove, PA 17362
				Phone: (814) 404-9283

CALIFORNIA BEARING RATIO TEST RESULTS

CBR AT 0.1"	CBR AT 0.2"
14.2	13.5

	Dry Unit Weight	Moisture Content	Compaction	Swell	Surcharge
As Molded	117.8	10.7	102.1	-	50
After Soak	117.2	13.4	101.6	0.66	50
	PCF	%	%	%	PSF

METHOD: VTM-8, COMPACTION: VTM-1



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
8.3	39	18	21	SC	A-6	47.0	Brown clayey SAND

Boring: **KG-B-05**
Sample: **Bulk-1**
Depth: **0-5'**

Project No.: 01.04361.01
Sample Date: 07/15 to 07/20
Location: *Fort Belvoir, VA*

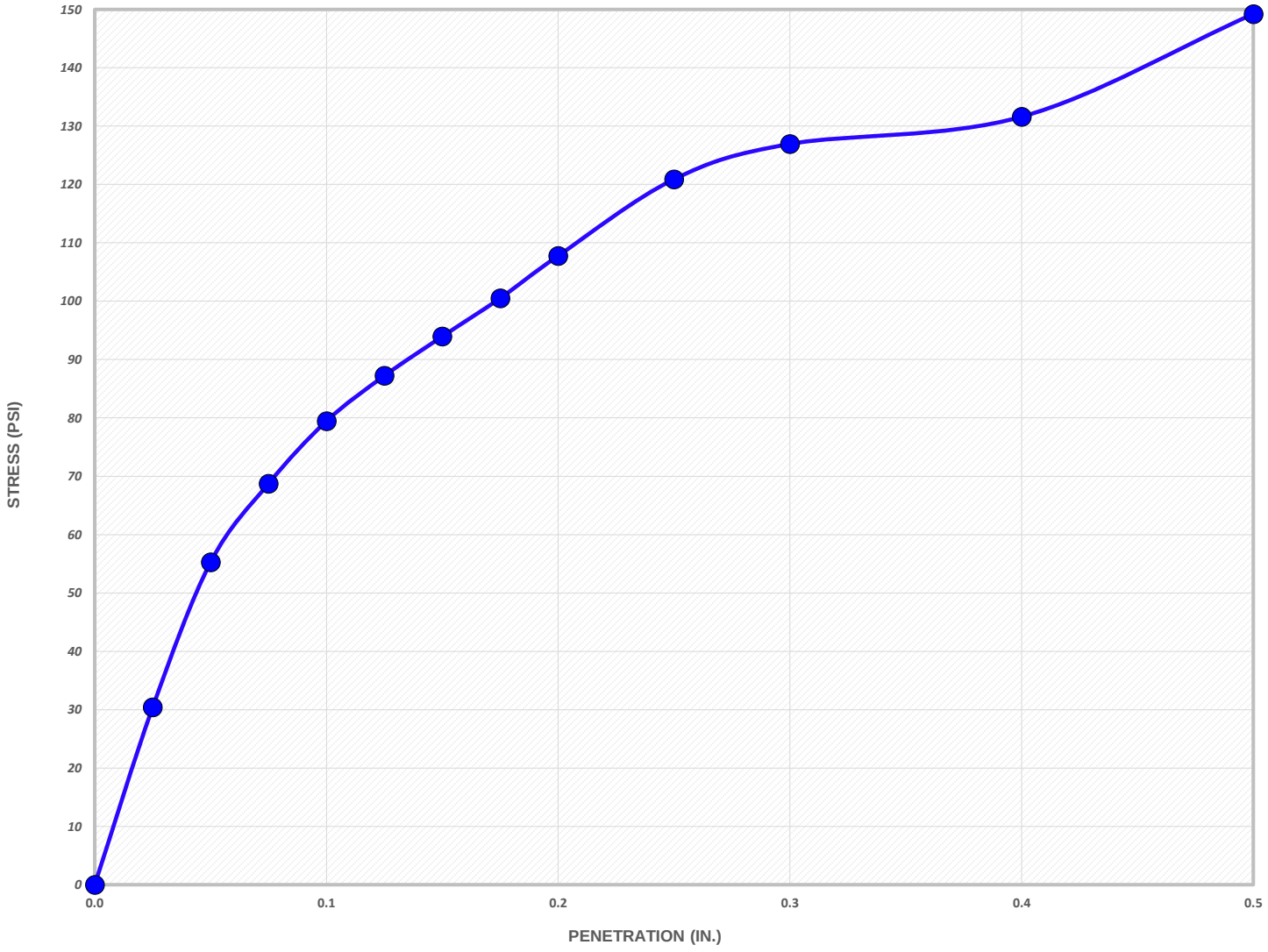
JAY KAY TESTING, INC.
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283

CALIFORNIA BEARING RATIO TEST RESULTS

CBR AT 0.1"	CBR AT 0.2"
7.9	7.2

	Dry Unit Weight	Moisture Content	Compaction	Swell	Surcharge
As Molded	111.6	15.2	100.8	-	50
After Soak	111.3	17.0	100.6	0.33	50
	PCF	%	%	%	PSF

METHOD: VTM-8, COMPACTION: VTM-1



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
8.0	41	19	22	SC	A-7-6	47.4	Brown clayey SAND

Boring: **WG-B-01**
Sample: **Bulk-1**
Depth: **0-5'**

Project No.: 01.04361.01
Sample Date: 07/15 to 07/20
Location: *Fort Belvoir, VA*

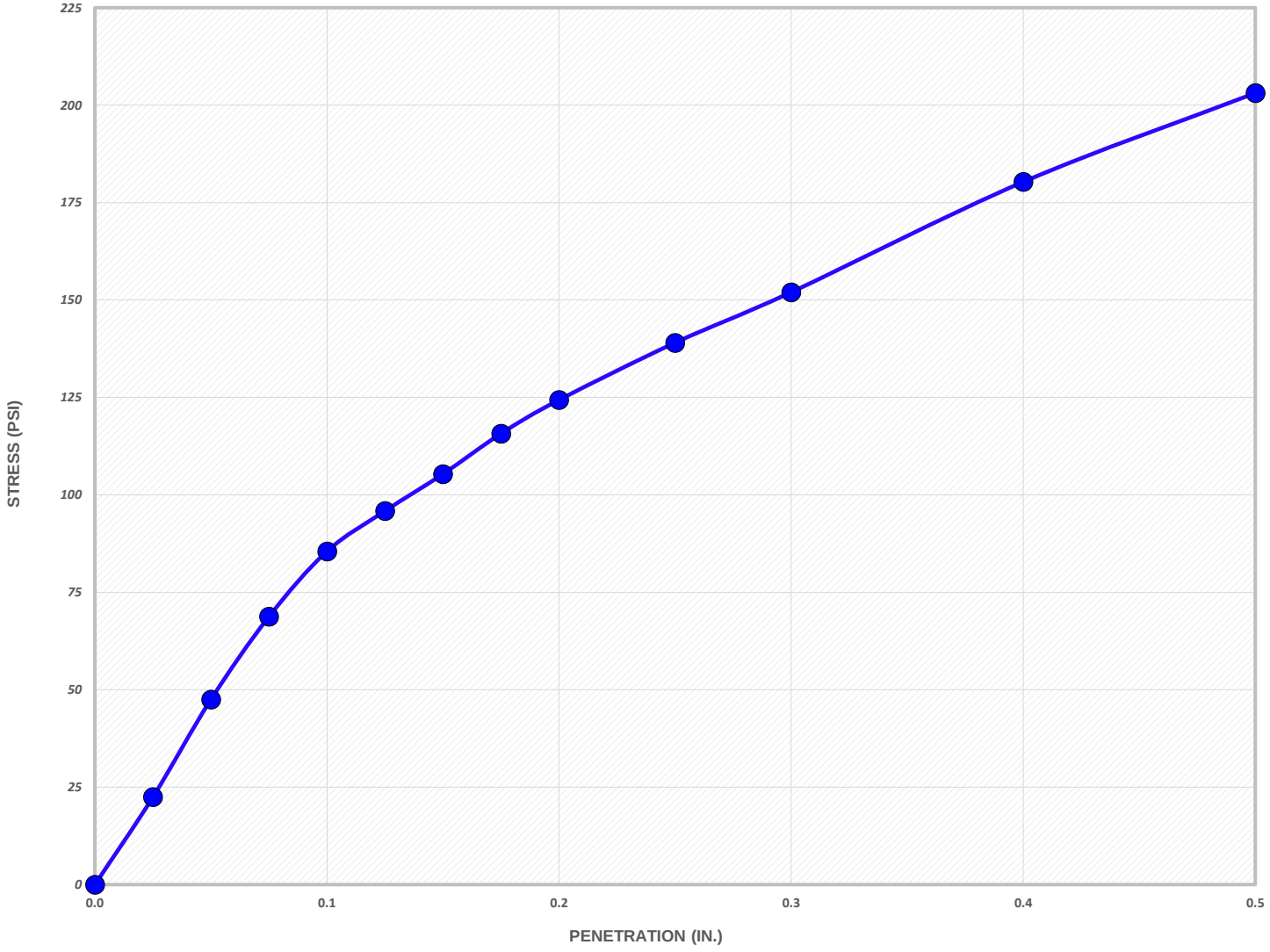
JAY KAY TESTING, INC.
5233 Lehman Road, Suite 110
Spring Grove, PA 17362
Phone: (814) 404-9283

CALIFORNIA BEARING RATIO TEST RESULTS

CBR AT 0.1"	CBR AT 0.2"
8.5	8.3

	Dry Unit Weight	Moisture Content	Compaction	Swell	Surcharge
As Molded	118.2	11.9	98.9	-	50
After Soak	115.7	15.6	96.9	1.22	50
	PCF	%	%	%	PSF

METHOD: VTM-8, COMPACTION: VTM-1



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
8.5	33	17	16	CL	A-6	57.4	Brown sandy lean CLAY

FORT BELVOIR KINGMAN AND WALKER GATES

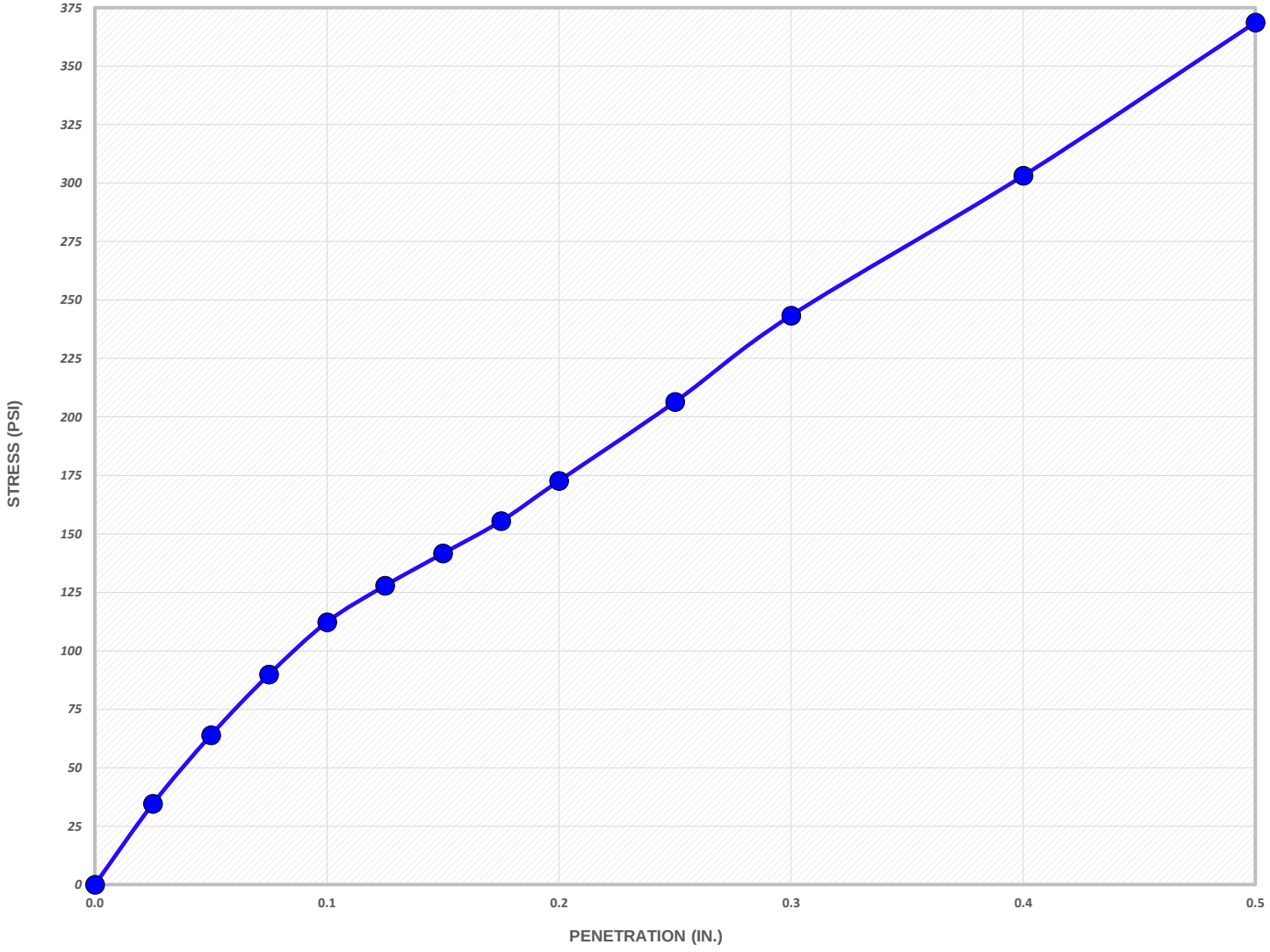
Boring:	**WG-B-02**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	5233 Lehman Road, Suite 110
Depth:	**0.6-5.6'**	Location:	*Fort Belvoir, VA*	Spring Grove, PA 17362
				Phone: (814) 404-9283

CALIFORNIA BEARING RATIO TEST RESULTS

CBR AT 0.1"	CBR AT 0.2"
11.2	11.5

	Dry Unit Weight	Moisture Content	Compaction	Swell	Surcharge
As Molded	117.7	12.8	100.2	-	50
After Soak	116.5	15.6	99.2	0.71	50
	PCF	%	%	%	PSF

METHOD: VTM-8, COMPACTION: VTM-1



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
13.8	37	20	17	CL	A-6	64.2	Brown sandy lean CLAY

FORT BELVOIR KINGMAN AND WALKER GATES

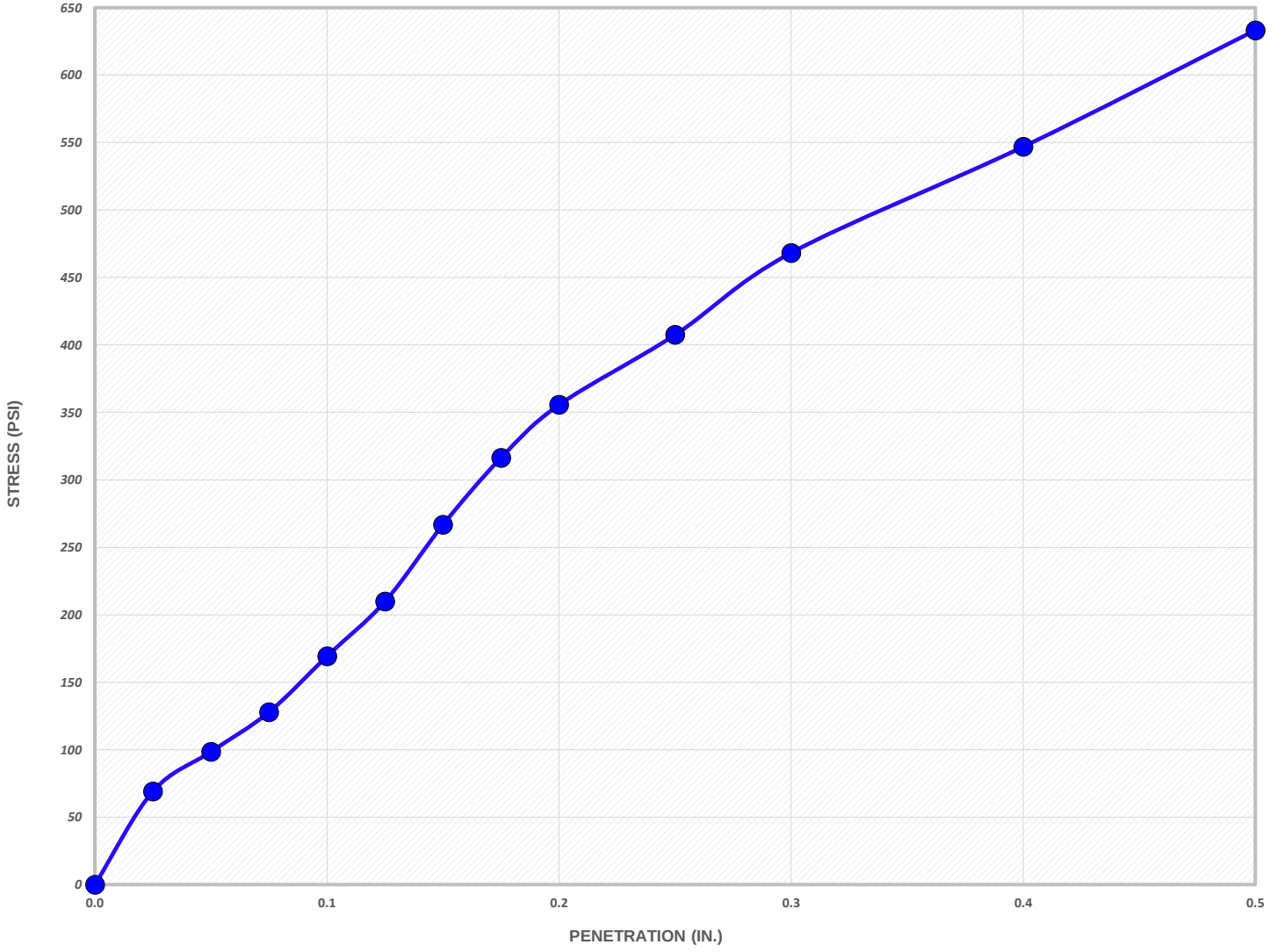
Boring:	**WG-B-03**	Project No.:	01.04361.01	**JAY KAY TESTING, INC.**
Sample:	**Bulk-1**	Sample Date:	07/15 to 07/20	5233 Lehman Road, Suite 110
Depth:	**0-5'**	Location:	*Fort Belvoir, VA*	Spring Grove, PA 17362
				Phone: (814) 404-9283

CALIFORNIA BEARING RATIO TEST RESULTS

CBR AT 0.1"	CBR AT 0.2"
16.9	23.7

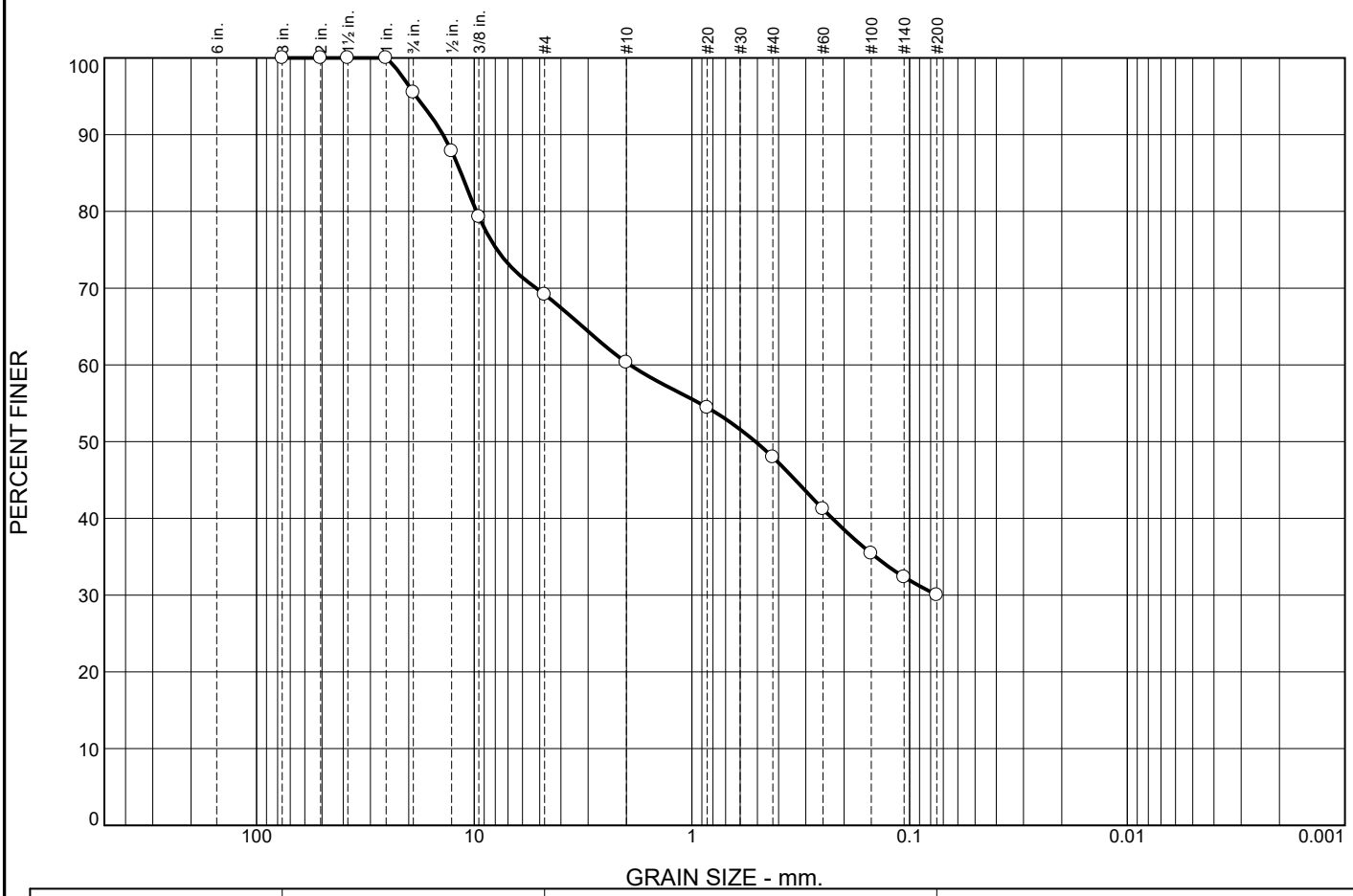
	Dry Unit Weight	Moisture Content	Compaction	Swell	Surcharge
As Molded	120.5	12.0	99.6	-	50
After Soak	118.9	14.3	98.3	0.64	50
	PCF	**%**	**%**	**%**	**PSF**

METHOD: VTM-8, COMPACTION: VTM-1



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
9.1	36	19	17	CL	A-6	55.9	Brown sandy lean CLAY

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	4.5	26.3	8.9	12.3	18.0	30.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	28	15	11.5007	1.9237	0.5104					

Material Description	USCS	AASHTO
○ Dark brown clayey sand with gravel	SC	A-2-6(0)

Project No. 1519-15 **Client:** DMY

Project: Fort Belvoir Kingman and Walker Gates

○ **Source of Sample:** KG-B-03 **Depth:** 11.0'-13.0' **Sample Number:** ST-1

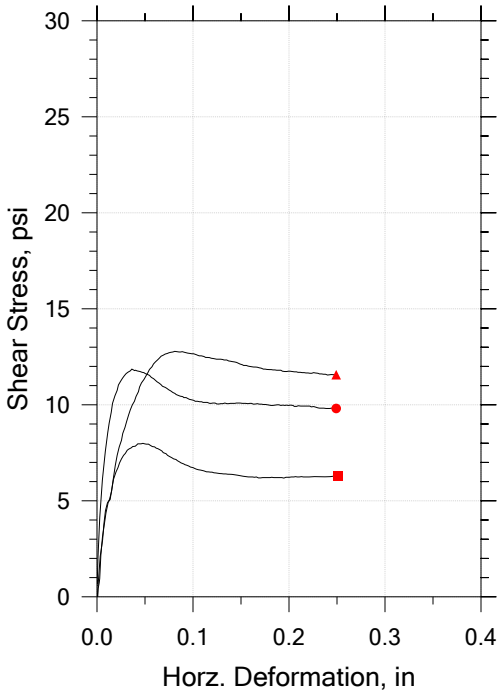
Remarks:

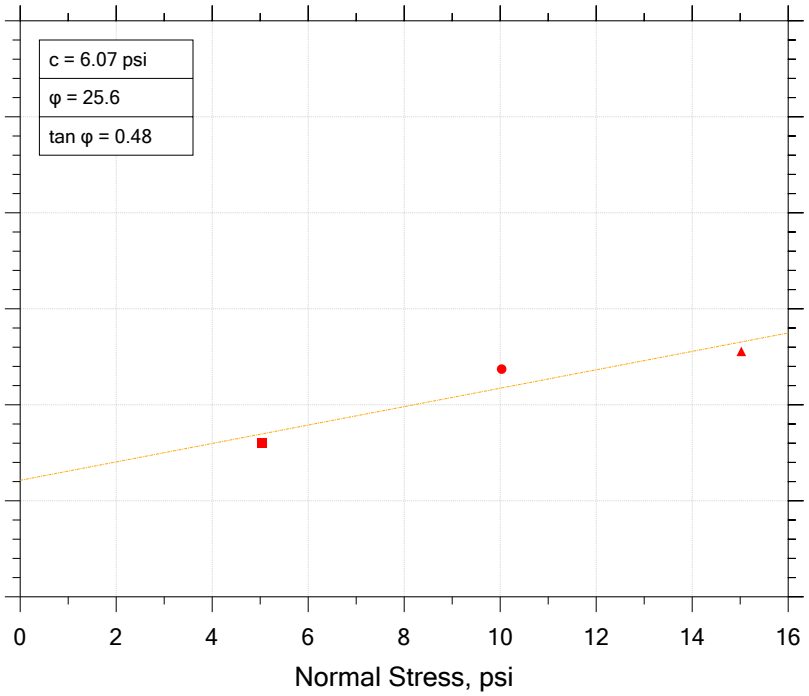
○Moisture content = 13.7%
In-place dry density = 116.0pcf
Date tested: 7/2020

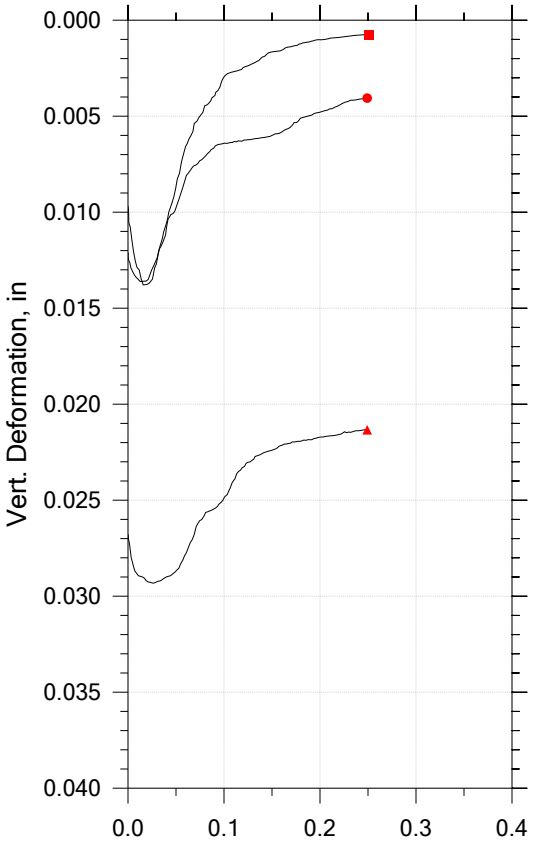
Figure

Tested By: SK **Checked By:** JO

DIRECT SHEAR TEST by ASTM D3080







Symbol		■	●	▲
Test No.		1	2	3
Sample No.		ST-1	ST-1	ST-1
Shape		Circular	Circular	Circular
Initial	Dimension, in	2.5	2.5	2.5
	Area, in²	4.9087	4.9087	4.9087
	Height, in	1	1	1
	Water Content, %	13.91	13.94	13.94
	Dry Density, pcf	116.2	116.5	116.5
	Saturation, %	83.33	84.14	84.16
	Void Ratio	0.45053	0.44734	0.44724
Consol. Height, in		0.99033	0.98785	0.97313
Consol. Void Ratio		0.4365	0.42976	0.40835
Final	Water Content, %	16.25	15.97	15.19
	Dry Density, pcf	116.3	116.9	119.0
	Saturation, %	97.62	97.65	98.52
	Void Ratio	0.44943	0.44146	0.41637
Normal Stress, psi		5.0396	10.032	15.024
Max. Shear Stress, psi		7.9969	11.862	12.786
Ult. Shear Stress, psi		6.2911	9.8123	11.565
Time to Failure, min		26.002	21.001	42.004
Disp. Rate, in/min		0.002	0.002	0.002

Project: Ft. Belvoir Kingman and Walker	Location: Fairfax County, VA	Project No.: 1519-06
Boring No.: KG-B-03	Tested By: SK	Checked By: JO
Sample No.: ST-1	Test Date: 7/28/20	Depth: 11'-13'
Test No.: 1	Sample Type: Remolded	Elevation: N/A
Description: Dark brown clayey sand with gravel		
Remarks: Remolded to in-place density (116.0 pcf), at natural moisture (13.7%). Tested on fraction passing #10 sieve		
LL = 28; PL = 15; Passing #200 = 30%; Assumed specific gravity = 2.700.		

APPENDIX E PAVEMENT DESIGN CALCULATIONS

Pavement Design Worksheet

Project Name: Fort Belvoir Kingman and Walker Gates

Project Location: Fairfax County, VA

DMY Project Number: 01.04361.01

Pavement Location: Fairfax County Parkway Eastbound - New Pavement

Design Life (years) =	30
Total ESALs - W_{18} =	690485
Reliability - R (%) =	**90**
Standard Normal Deviate - Z_R =	-1.282
Standard Deviation - S_0 =	0.49
Initial Serviceability =	**4.2**
Terminal Serviceability =	**2.9**
Serviceability Loss - ΔPSI =	1.3
Design CBR =	**8.4**
Design M_r =	12600
Log W_{18} =	5.84
Right Side of AASHTO Equation =	5.84
Required SN =	**2.82**

OK

Pavement Course	a1	Thickness	SN
SM 9.5	0.44	2	0.88
IM 19.0	0.44	2	0.88
BM 25.0	0.44	5	2.20
CCPRM	0.35	0	0.00
Existing Asphalt	0.396	0	0.00
Existing PCC	0.5	0	0.00
OGDL-Bounded	0.1	3	0.30
GAB (21B)	0.12	8	0.96
CTAB	0.2	0	0.00
			0.00
Total		20	5.22

Prepared by:	JY
Reviewed by:	XC

Remarks:
Design lane ESALs was provided by WSP.

Traffic Load Worksheet

Project Name: Fort Belvoir Kingman and Walker Gates

Project Location: Fairfax County, VA

DMY Project Number: 01.04361.01

Pavement Location: Fairfax County Parkway Eastbound - New Pavement

INPUT DATA	
Design Life (years) =	**30**
Initial Design Year =	**2022**
Initial Design Year AADT =	**23980**
Directional Ratio =	**54.9%**
Growth Rate (%) =	**0.70**
% Cars/Passernger Vehicles =	**99.0**
% Single Unit Trucks =	**1.0**
% Tractor Trailer Trucks =	**0.0**
ESAL Factor - Cars =	0.0002
ESAL Factor - Single Unit Trucks =	0.46
ESAL Factor - Tractor Trailer Trucks =	1.05
Travel Lanes (each direction) =	**2**
Lane Distribution Factor =	**0.9**

RESULTS	
Total ESALs for Design Life (W18) =	**690485**
ESALs - Cars/Passenger Vehicles =	28494
ESALs - Single Unit Trucks =	661991
ESALs - Tractor Trailer Trucks =	0

Remarks:

Prepared by:	JY
Reviewed by:	XC

Year		AADT	Total ADT
2022	1	23980	8752700
2023	2	24148	17566669
2024	3	24317	26442336
2025	4	24487	35380132
2026	5	24659	44380493
2027	6	24831	53443856
2028	7	25005	62570663
2029	8	25180	71761358
2030	9	25356	81016387
2031	10	25534	90336202
2032	11	25712	99721256
2033	12	25892	109172004
2034	13	26074	118688908
2035	14	26256	128272431
2036	15	26440	137923038
2037	16	26625	147641199
2038	17	26811	157427387
2039	18	26999	167282079
2040	19	27188	177205754
2041	20	27378	187198894
2042	21	27570	197261986
2043	22	27763	207395520
2044	23	27957	217599989
2045	24	28153	227875889
2046	25	28350	238223720
2047	26	28549	248643986
2048	27	28749	259137194
2049	28	28950	269703854
2050	29	29152	280344481
2051	**30**	29356	**291059593**

Based on "Guidelines for 1993 AASHTO Pavement Design" published by VDOT and revised July 2011.

Pavement Design Worksheet

Project Name: Fort Belvoir Kingman and Walker Gates

Project Location: Fairfax County, VA

DMY Project Number: 01.04361.01

Pavement Location: Fairfax County Parkway Eastbound - Mill & Overlay

Design Life (years) =	12
Total ESALs - W_{18} =	258990
Reliability - R (%) =	**90**
Standard Normal Deviate - Z_R =	-1.282
Standard Deviation - S_0 =	0.49
Initial Serviceability =	**4.2**
Terminal Serviceability =	**2.9**
Serviceability Loss - ΔPSI =	1.3
Design CBR =	**8.4**
Design M_r =	12600
Log W_{18} =	5.41
Right Side of AASHTO Equation =	5.41
Required SN =	**2.36**
	OK

Pavement Course	a1	Thickness	SN
SM 9.5	0.44	2	0.88
IM 19.0	0.44	0	0.00
BM 25.0	0.44	0	0.00
CCPRM	0.35	0	0.00
Existing Asphalt	0.35	6.8	2.38
Existing PCC	0.5	0	0.00
OGDL-Bounded	0.1	2.5	0.25
GAB (21B)	0.12	6	0.72
CTAB	0.2	0	0.00
			0.00
Total		17.3	4.23

Prepared by:	JY
Reviewed by:	XC

Remarks:
Design lane ESALs was provided by WSP.

Based on *"Guidelines for 1993 AASHTO Pavement Design"* published by VDOT and revised July 2011.

Traffic Load Worksheet

Project Name: Fort Belvoir Kingman and Walker Gates

Project Location: Fairfax County, VA

DMY Project Number: 01.04361.01

Pavement Location: Fairfax County Parkway Eastbound - Mill & Overlay

INPUT DATA	
Design Life (years) =	**12**
Initial Design Year =	**2022**
Initial Design Year AADT =	**23980**
Directional Ratio =	**54.9%**
Growth Rate (%) =	**0.70**
% Cars/Passernger Vehicles =	**99.0**
% Single Unit Trucks =	**1.0**
% Tractor Trailer Trucks =	**0.0**
ESAL Factor - Cars =	0.0002
ESAL Factor - Single Unit Trucks =	0.46
ESAL Factor - Tractor Trailer Trucks =	1.05
Travel Lanes (each direction) =	**2**
Lane Distribution Factor =	**0.9**

RESULTS	
Total ESALs for Design Life (W18) =	**258990**
ESALs - Cars/Passenger Vehicles =	10688
ESALs - Single Unit Trucks =	248303
ESALs - Tractor Trailer Trucks =	0

Remarks:

Prepared by:	JY
Reviewed by:	XC

Year		AADT	Total ADT
2022	1	23980	8752700
2023	2	24148	17566669
2024	3	24317	26442336
2025	4	24487	35380132
2026	5	24659	44380493
2027	6	24831	53443856
2028	7	25005	62570663
2029	8	25180	71761358
2030	9	25356	81016387
2031	10	25534	90336202
2032	11	25712	99721256
2033	12	25892	109172004
2034	**13**	**26074**	**118688908**
2035	14	26256	128272431
2036	15	26440	137923038
2037	16	26625	147641199
2038	17	26811	157427387
2039	18	26999	167282079
2040	19	27188	177205754
2041	20	27378	187198894
2042	21	27570	197261986
2043	22	27763	207395520
2044	23	27957	217599989
2045	24	28153	227875889
2046	25	28350	238223720
2047	26	28549	248643986
2048	27	28749	259137194
2049	28	28950	269703854
2050	29	29152	280344481
2051	30	29356	291059593

Based on "Guidelines for 1993 AASHTO Pavement Design" published by VDOT and revised July 2011.

Pavement Design Worksheet

Project Name: Fort Belvoir Kingman and Walker Gates

Project Location: Fairfax County, VA

DMY Project Number: 01.04361.01

Pavement Location: Kingman Road - New Pavement

Design Life (years) =	30
Total ESALs - W_{18} =	1515299
Reliability - R (%) =	**90**
Standard Normal Deviate - Z_R =	-1.282
Standard Deviation - S_0 =	0.49
Initial Serviceability =	**4.2**
Terminal Serviceability =	**2.8**
Serviceability Loss - ΔPSI =	1.4
Design CBR =	**6.1**
Design M_r =	9150
Log W_{18} =	6.18
Right Side of AASHTO Equation =	6.18
Required SN =	**3.66**

OK

Pavement Course	a1	Thickness	SN
SM 9.5	0.44	2	0.88
IM 19.0	0.44	2	0.88
BM 25.0	0.44	3	1.32
CCPRM	0.35	0	0.00
Existing Asphalt	0.396	0	0.00
Existing PCC	0.5	0	0.00
OGDL-Bounded	0.1	0	0.00
GAB (21B)	0.12	8	0.96
CTAB	0.2	0	0.00
			0.00
Total		15	4.04

Prepared by:	JY
Reviewed by:	XC

Remarks:
Design lane ESALs was provided by WSP.

Traffic Load Worksheet

Project Name: Fort Belvoir Kingman and Walker Gates

Project Location: Fairfax County, VA

DMY Project Number: 01.04361.01

Pavement Location: Kingman Road - New Pavement

INPUT DATA	
Design Life (years) =	**30**
Initial Design Year =	**2022**
Initial Design Year AADT =	**18125**
Directional Ratio =	**50.0%**
Growth Rate (%) =	**0.70**
% Cars/Passernger Vehicles =	**98.0**
% Single Unit Trucks =	**1.0**
% Tractor Trailer Trucks =	**1.0**
ESAL Factor - Cars =	0.0002
ESAL Factor - Single Unit Trucks =	0.46
ESAL Factor - Tractor Trailer Trucks =	1.05
Travel Lanes (each direction) =	**2**
Lane Distribution Factor =	**0.9**

RESULTS	
Total ESALs for Design Life (W18) =	**1515299**
ESALs - Cars/Passenger Vehicles =	19417
ESALs - Single Unit Trucks =	455699
ESALs - Tractor Trailer Trucks =	1040183

Remarks:	
Prepared by:	JY
Reviewed by:	XC

Year		AADT	Total ADT
2022	1	18125	6615625
2023	2	18252	13277559
2024	3	18380	19986127
2025	4	18508	26741655
2026	5	18638	33544472
2027	6	18768	40394908
2028	7	18900	47293297
2029	8	19032	54239976
2030	9	19165	61235280
2031	10	19299	68279552
2032	11	19434	75373134
2033	12	19571	82516371
2034	13	19708	89709611
2035	14	19845	96953203
2036	15	19984	104247500
2037	16	20124	111592858
2038	17	20265	118989633
2039	18	20407	126438185
2040	19	20550	133938878
2041	20	20694	141492075
2042	21	20839	149098144
2043	22	20984	156757456
2044	23	21131	164470384
2045	24	21279	172237301
2046	25	21428	180058587
2047	26	21578	187934622
2048	27	21729	195865790
2049	28	21881	203852475
2050	29	22034	211895068
2051	**30**	22189	**219993958**

Based on "Guidelines for 1993 AASHTO Pavement Design" published by VDOT and revised July 2011.

Pavement Design Worksheet

Project Name: Fort Belvoir Kingman and Walker Gates

Project Location: Fairfax County, VA

DMY Project Number: 01.04361.01

Pavement Location: Kingman Road - Mill & Overlay

Design Life (years) =	12
Total ESALs - W_{18} =	568365
Reliability - R (%) =	**90**
Standard Normal Deviate - Z_R =	-1.282
Standard Deviation - S_0 =	0.49
Initial Serviceability =	**4.2**
Terminal Serviceability =	**2.8**
Serviceability Loss - ΔPSI =	1.4
Design CBR =	**6.1**
Design M_r =	9150
Log W_{18} =	5.75
Right Side of AASHTO Equation =	5.75
Required SN =	**3.07**
	NO

Pavement Course	a1	Thickness	SN
SM 9.5	0.44	2	0.88
IM 19.0	0.44	0	0.00
BM 25.0	0.44	0	0.00
CCPRM	0.35	0	0.00
Existing Asphalt	0.35	3	1.05
Existing PCC	0.5	0	0.00
OGDL-Bounded	0.1	0	0.00
GAB (21B)	0.12	7.5	0.90
CTAB	0.2	0	0.00
			0.00
Total		12.5	2.83

Prepared by:	JY
Reviewed by:	XC

Remarks:
Design lane ESALs was provided by WSP.

Based on *"Guidelines for 1993 AASHTO Pavement Design"* published by VDOT and revised July 2011.

Traffic Load Worksheet

Project Name: Fort Belvoir Kingman and Walker Gates

Project Location: Fairfax County, VA

DMY Project Number: 01.04361.01

Pavement Location: Kingman Road - Mill & Overlay

INPUT DATA	
Design Life (years) =	12
Initial Design Year =	2022
Initial Design Year AADT =	18125
Directional Ratio =	50.0%
Growth Rate (%) =	0.70
% Cars/Passernger Vehicles =	98.0
% Single Unit Trucks =	1.0
% Tractor Trailer Trucks =	1.0
ESAL Factor - Cars =	0.0002
ESAL Factor - Single Unit Trucks =	0.46
ESAL Factor - Tractor Trailer Trucks =	1.05
Travel Lanes (each direction) =	2
Lane Distribution Factor =	0.9

RESULTS	
Total ESALs for Design Life (W18) =	**568365**
ESALs - Cars/Passenger Vehicles =	7283
ESALs - Single Unit Trucks =	170926
ESALs - Tractor Trailer Trucks =	390157

Remarks:

Prepared by:	JY
Reviewed by:	XC

Year		AADT	Total ADT
2022	1	18125	6615625
2023	2	18252	13277559
2024	3	18380	19986127
2025	4	18508	26741655
2026	5	18638	33544472
2027	6	18768	40394908
2028	7	18900	47293297
2029	8	19032	54239976
2030	9	19165	61235280
2031	10	19299	68279552
2032	11	19434	75373134
2033	**12**	**19571**	**82516371**
2034	13	19708	89709611
2035	14	19845	96953203
2036	15	19984	104247500
2037	16	20124	111592858
2038	17	20265	118989633
2039	18	20407	126438185
2040	19	20550	133938878
2041	20	20694	141492075
2042	21	20839	149098144
2043	22	20984	156757456
2044	23	21131	164470384
2045	24	21279	172237301
2046	25	21428	180058587
2047	26	21578	187934622
2048	27	21729	195865790
2049	28	21881	203852475
2050	29	22034	211895068
2051	30	22189	219993958

Based on "Guidelines for 1993 AASHTO Pavement Design" published by VDOT and revised July 2011.

Pavement Design Worksheet

Project Name: Fort Belvoir Kingman and Walker Gates

Project Location: Fairfax County, VA

DMY Project Number: 01.04361.01

Pavement Location: Mount Vernon Memorial Highway - New Pavement

Design Life (years) =	30
Total ESALs - W_{18} =	470289
Reliability - R (%) =	**90**
Standard Normal Deviate - Z_R =	-1.282
Standard Deviation - S_0 =	0.49
Initial Serviceability =	**4.2**
Terminal Serviceability =	**2.8**
Serviceability Loss - ΔPSI =	1.4
Design CBR =	**6.9**
Design M_r =	10350
Log W_{18} =	5.67
Right Side of AASHTO Equation =	5.67
Required SN =	**2.82**

OK

Pavement Course	a1	Thickness	SN
SM 9.5	0.44	3	1.32
IM 19.0	0.44	0	0.00
BM 25.0	0.44	5	2.20
CCPRM	0.35	0	0.00
Existing Asphalt	0.35	0	0.00
Existing PCC	0.5	0	0.00
OGDL-Bounded	0.1	0	0.00
GAB (21B)	0.12	6	0.72
CTAB	0.2	0	0.00
			0.00
Total		14	4.24

Prepared by:	JY
Reviewed by:	XC

Remarks:
Design lane ESALs was provided by WSP.

Traffic Load Worksheet

Project Name: Fort Belvoir Kingman and Walker Gates

Project Location: Fairfax County, VA

DMY Project Number: 01.04361.01

Pavement Location: Mount Vernon Memorial Highway - New Pavement

INPUT DATA	
Design Life (years) =	**30**
Initial Design Year =	**2022**
Initial Design Year AADT =	**14211**
Directional Ratio =	**58.5%**
Growth Rate (%) =	**0.50**
% Cars/Passernger Vehicles =	**99.0**
% Single Unit Trucks =	**1.0**
% Tractor Trailer Trucks =	**0.0**
ESAL Factor - Cars =	0.0002
ESAL Factor - Single Unit Trucks =	0.46
ESAL Factor - Tractor Trailer Trucks =	1.05
Travel Lanes (each direction) =	**1**
Lane Distribution Factor =	**1**

RESULTS	
Total ESALs for Design Life (W18) =	**470289**
ESALs - Cars/Passenger Vehicles =	19407
ESALs - Single Unit Trucks =	450881
ESALs - Tractor Trailer Trucks =	0

Remarks:

Prepared by:	JY
Reviewed by:	XC

Year		AADT	Total ADT
2022	1	14211	5187015
2023	2	14282	10399965
2024	3	14353	15638980
2025	4	14425	20904190
2026	5	14497	26195726
2027	6	14570	31513719
2028	7	14643	36858303
2029	8	14716	42229609
2030	9	14789	47627773
2031	10	14863	53052926
2032	11	14938	58505206
2033	12	15012	63984747
2034	13	15088	69491686
2035	14	15163	75026159
2036	15	15239	80588305
2037	16	15315	86178262
2038	17	15392	91796168
2039	18	15468	97442164
2040	19	15546	103116390
2041	20	15624	108818986
2042	21	15702	114550096
2043	22	15780	120309862
2044	23	15859	126098426
2045	24	15938	131915933
2046	25	16018	137762528
2047	26	16098	143638356
2048	27	16179	149543562
2049	28	16260	155478295
2050	29	16341	161442702
2051	**30**	**16423**	**167436930**

Based on "Guidelines for 1993 AASHTO Pavement Design" published by VDOT and revised July 2011.

Pavement Design Worksheet

Project Name: Fort Belvoir Kingman and Walker Gates

Project Location: Fairfax County, VA

DMY Project Number: 01.04361.01

Pavement Location: Mount Vernon Memorial Highway - Mill & Overlay

Design Life (years) =	12
Total ESALs - W_{18} =	179717
Reliability - R (%) =	**90**
Standard Normal Deviate - Z_R =	-1.282
Standard Deviation - S_0 =	0.49
Initial Serviceability =	**4.2**
Terminal Serviceability =	**2.8**
Serviceability Loss - ΔPSI =	1.4
Design CBR =	**6.9**
Design M_r =	10350
Log W_{18} =	5.25
Right Side of AASHTO Equation =	5.25
Required SN =	**2.38**

OK

Pavement Course	a1	Thickness	SN
SM 9.5	0.44	3	1.32
IM 19.0	0.44	0	0.00
BM 25.0	0.44	0	0.00
CCPRM	0.35	0	0.00
Existing Asphalt	0.35	4	1.40
Existing PCC	0.5	0	0.00
OGDL-Bounded	0.1	0	0.00
GAB (21B)	0.12	0	0.00
CTAB	0.2	0	0.00
			0.00
Total		7	2.72

Prepared by:	JY
Reviewed by:	XC

Remarks:
Design lane ESALs was provided by WSP.

Based on *"Guidelines for 1993 AASHTO Pavement Design"* published by VDOT and revised July 2011.

Traffic Load Worksheet

Project Name: Fort Belvoir Kingman and Walker Gates

Project Location: Fairfax County, VA

DMY Project Number: 01.04361.01

Pavement Location: Mount Vernon Memorial Highway - New Pavement

INPUT DATA	
Design Life (years) =	**12**
Initial Design Year =	**2022**
Initial Design Year AADT =	**14211**
Directional Ratio =	**58.5%**
Growth Rate (%) =	**0.50**
% Cars/Passernger Vehicles =	**99.0**
% Single Unit Trucks =	**1.0**
% Tractor Trailer Trucks =	**0.0**
ESAL Factor - Cars =	0.0002
ESAL Factor - Single Unit Trucks =	0.46
ESAL Factor - Tractor Trailer Trucks =	1.05
Travel Lanes (each direction) =	**1**
Lane Distribution Factor =	**1**

RESULTS	
Total ESALs for Design Life (W18) =	**179717**
ESALs - Cars/Passenger Vehicles =	7416
ESALs - Single Unit Trucks =	172301
ESALs - Tractor Trailer Trucks =	0

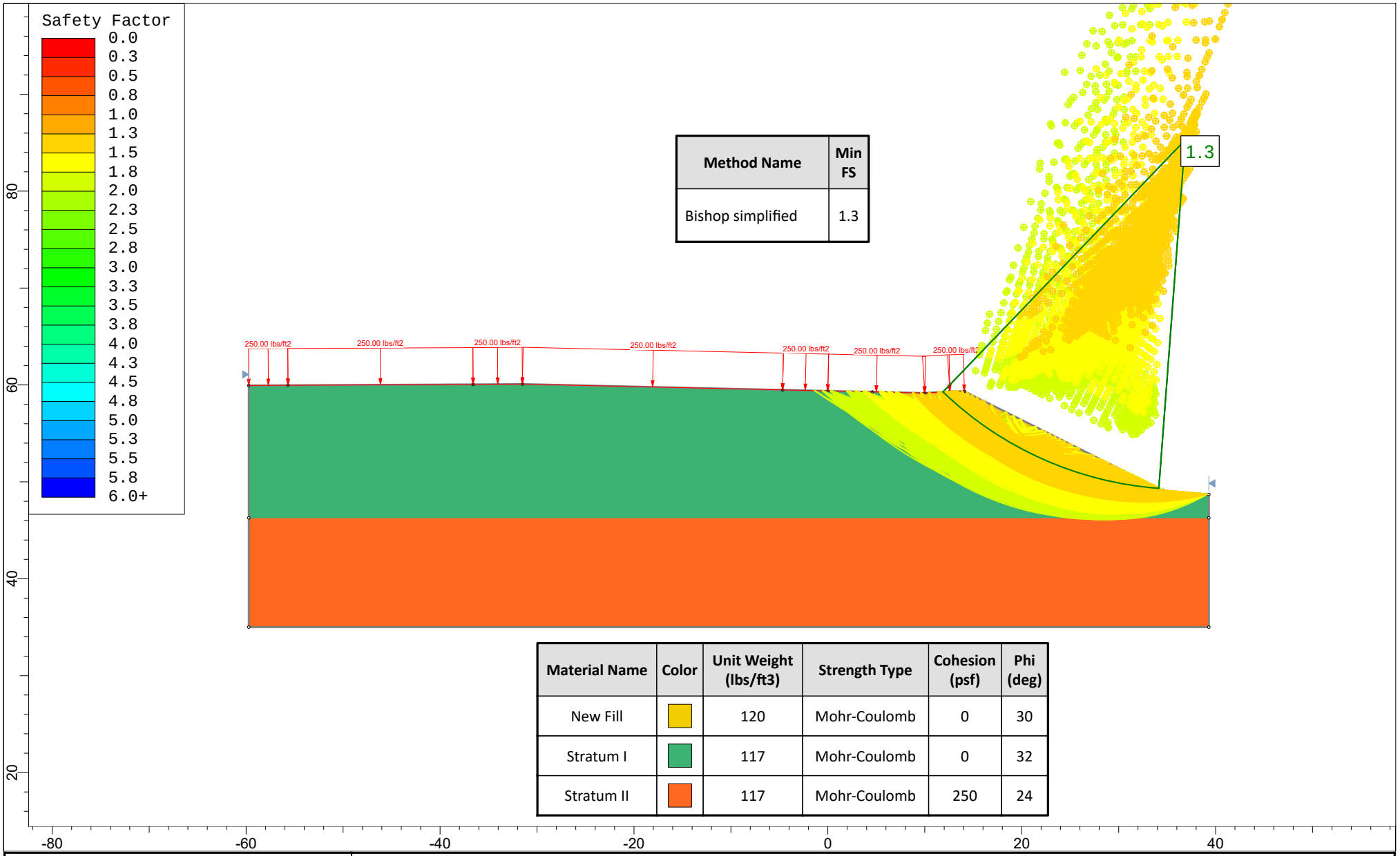
Remarks:

Prepared by:	JY
Reviewed by:	XC

Year		AADT	Total ADT
2022	1	14211	5187015
2023	2	14282	10399965
2024	3	14353	15638980
2025	4	14425	20904190
2026	5	14497	26195726
2027	6	14570	31513719
2028	7	14643	36858303
2029	8	14716	42229609
2030	9	14789	47627773
2031	10	14863	53052926
2032	11	14938	58505206
2033	**12**	15012	**63984747**
2034	13	15088	69491686
2035	14	15163	75026159
2036	15	15239	80588305
2037	16	15315	86178262
2038	17	15392	91796168
2039	18	15468	97442164
2040	19	15546	103116390
2041	20	15624	108818986
2042	21	15702	114550096
2043	22	15780	120309862
2044	23	15859	126098426
2045	24	15938	131915933
2046	25	16018	137762528
2047	26	16098	143638356
2048	27	16179	149543562
2049	28	16260	155478295
2050	29	16341	161442702
2051	30	16423	167436930

Based on "Guidelines for 1993 AASHTO Pavement Design" published by VDOT and revised July 2011.

APPENDIX F SLOPE STABILITY ANALYSIS RESULTS



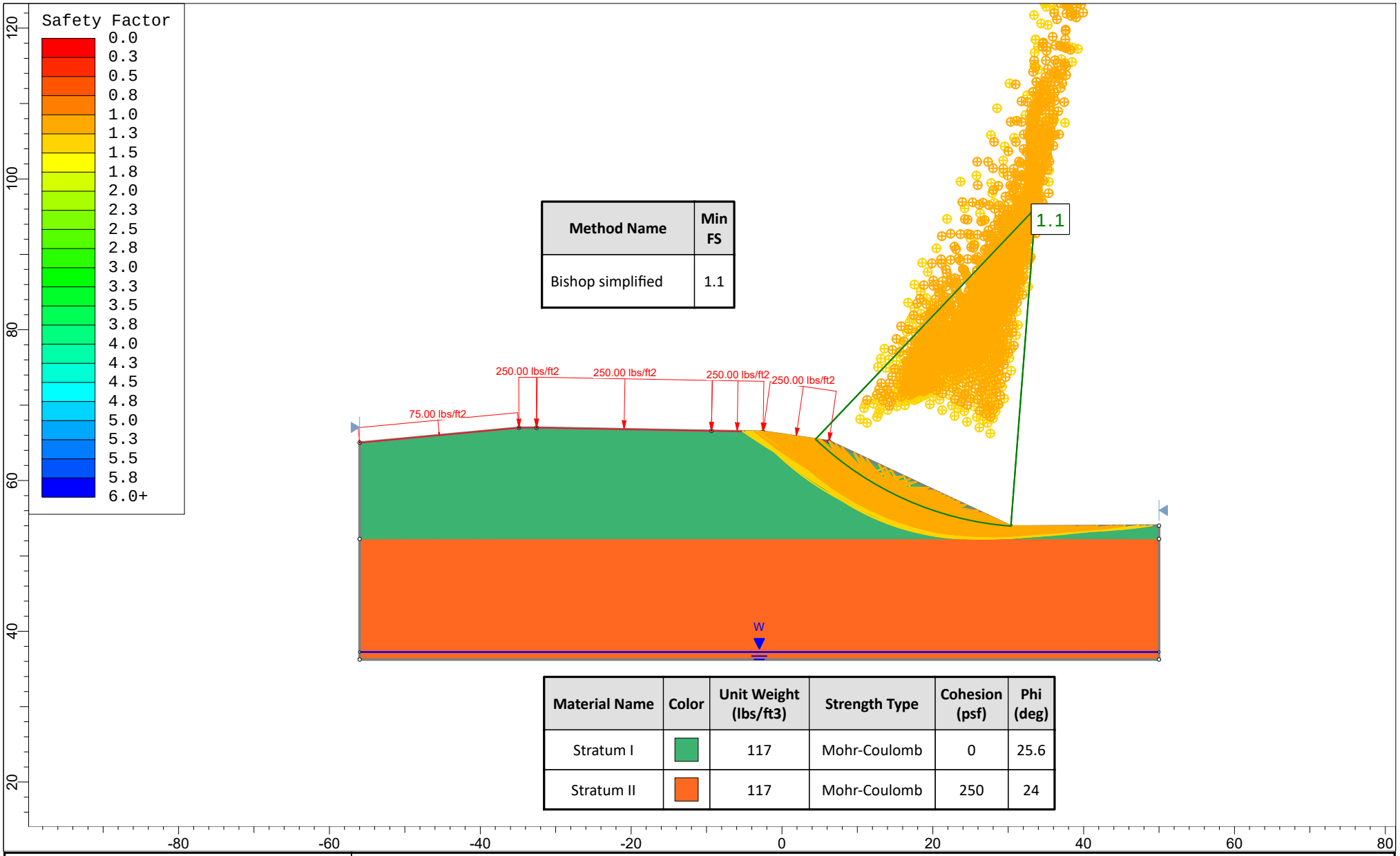
Method Name	Min FS
Bishop simplified	1.3

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill		120	Mohr-Coulomb	0	30
Stratum I		117	Mohr-Coulomb	0	32
Stratum II		117	Mohr-Coulomb	250	24

rocscience

SLIDEINTERPRET 7.038

Project	Fort Belvoir Kingman and Walker Gates		
Analysis Description	Sta. 106+00		
Drawn By	JY	Scale 1:164	Company DMY Engineering Consultants
Date	8/26/2020, 8:58:36 AM		File Name 106+00.slim



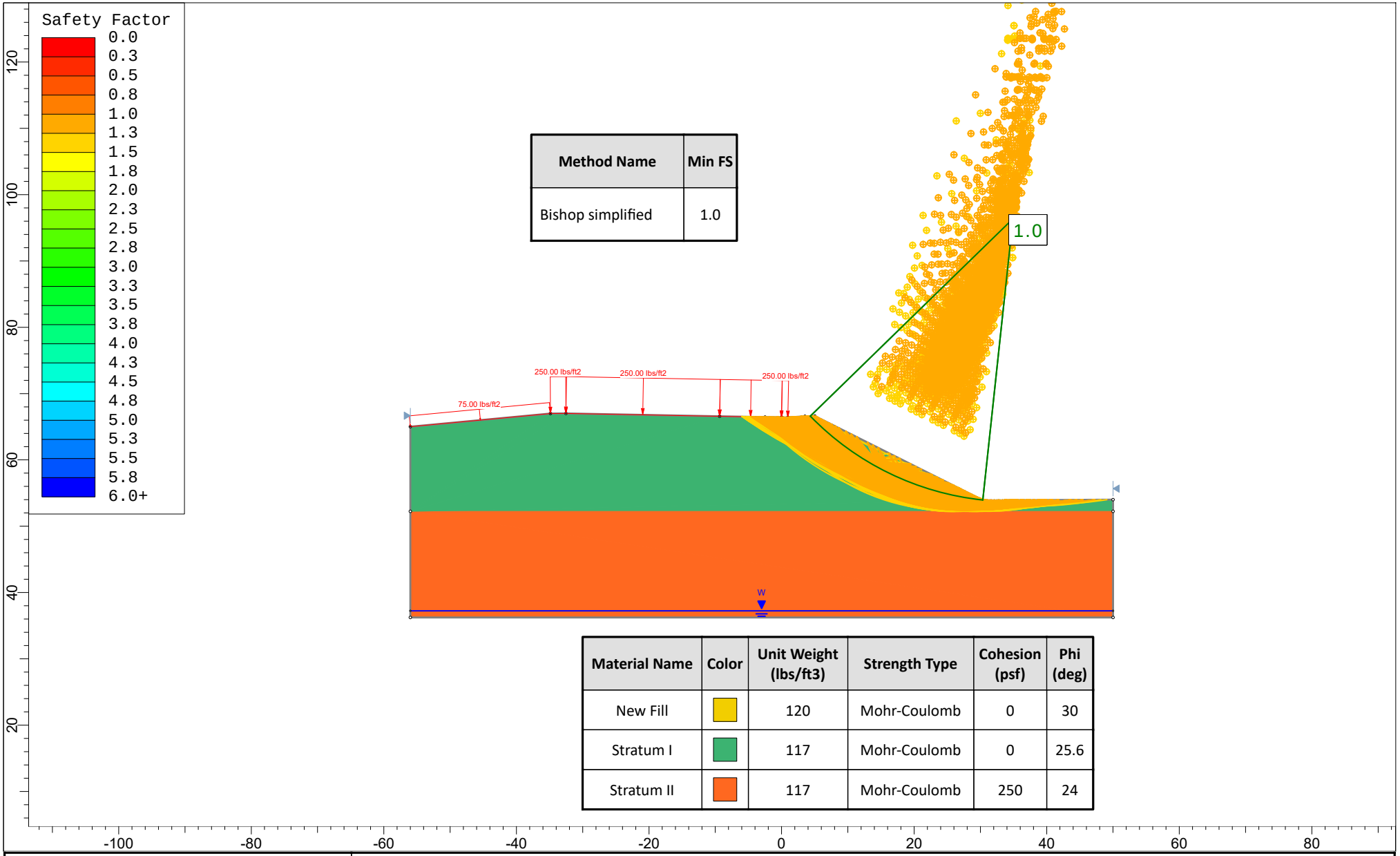
Method Name	Min FS
Bishop simplified	1.1

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Stratum I		117	Mohr-Coulomb	0	25.6
Stratum II		117	Mohr-Coulomb	250	24

rocscience

SLIDEINTERPRET 7.038

Project	Fort Belvoir Kingman and Walker Gates		
Analysis Description	Sta. 113+75 - Existing Slope		
Drawn By	JY	Scale 1:211	Company DMY Engineering Consultants
Date	8/26/2020, 10:31:51 AM		File Name 113+75 - Copy.slim



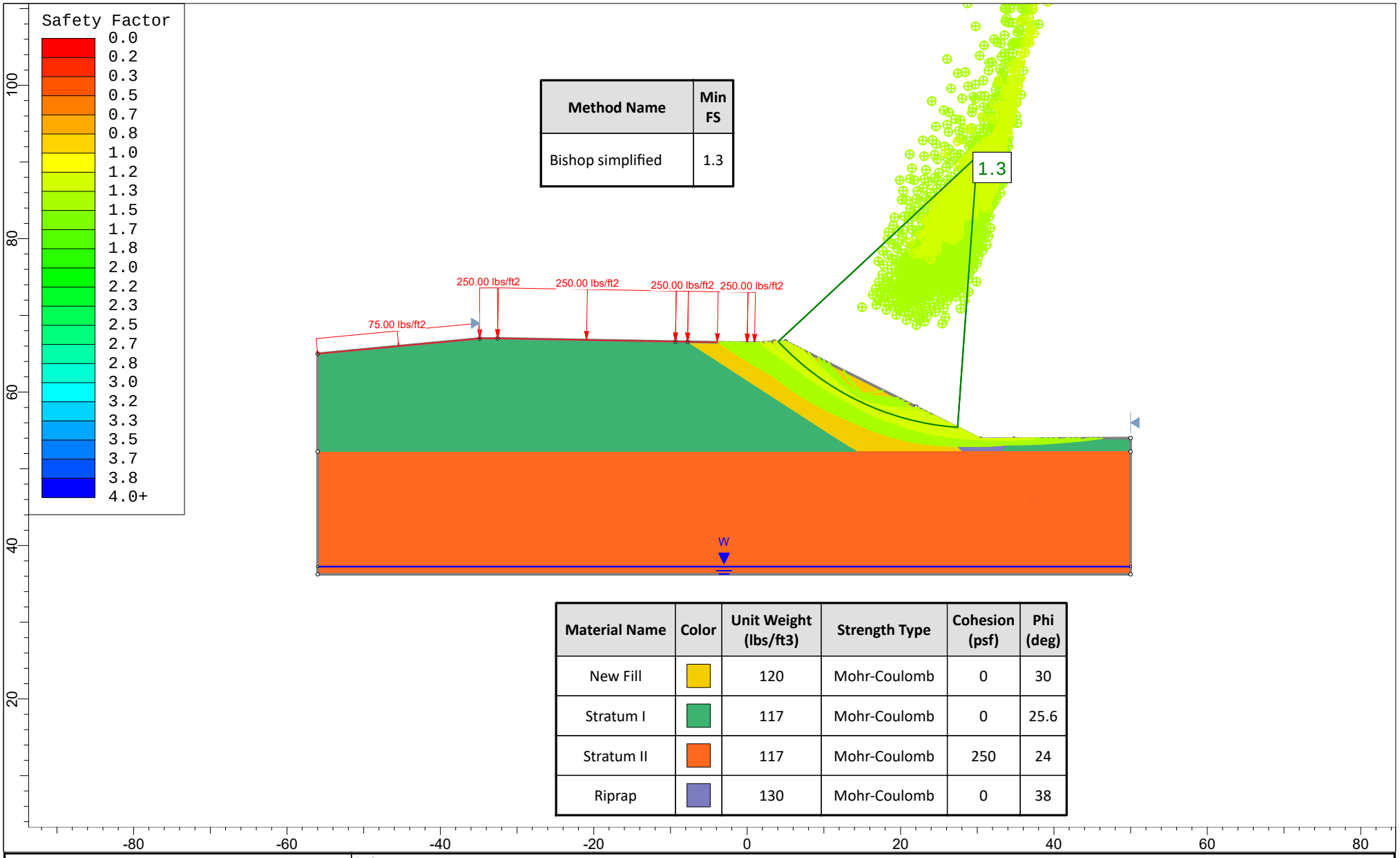
Method Name	Min FS
Bishop simplified	1.0

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill		120	Mohr-Coulomb	0	30
Stratum I		117	Mohr-Coulomb	0	25.6
Stratum II		117	Mohr-Coulomb	250	24

rocscience

SLIDEINTERPRET 7.038

Project	Fort Belvoir Kingman and Walker Gates		
Analysis Description	Sta. 113+75 - Proposed Slope		
Drawn By	JY	*Scale* 1:240	*Company* DMY Engineering Consultants
Date	8/26/2020, 10:31:51 AM		*File Name* 113+75 - Proposed Slope.slim



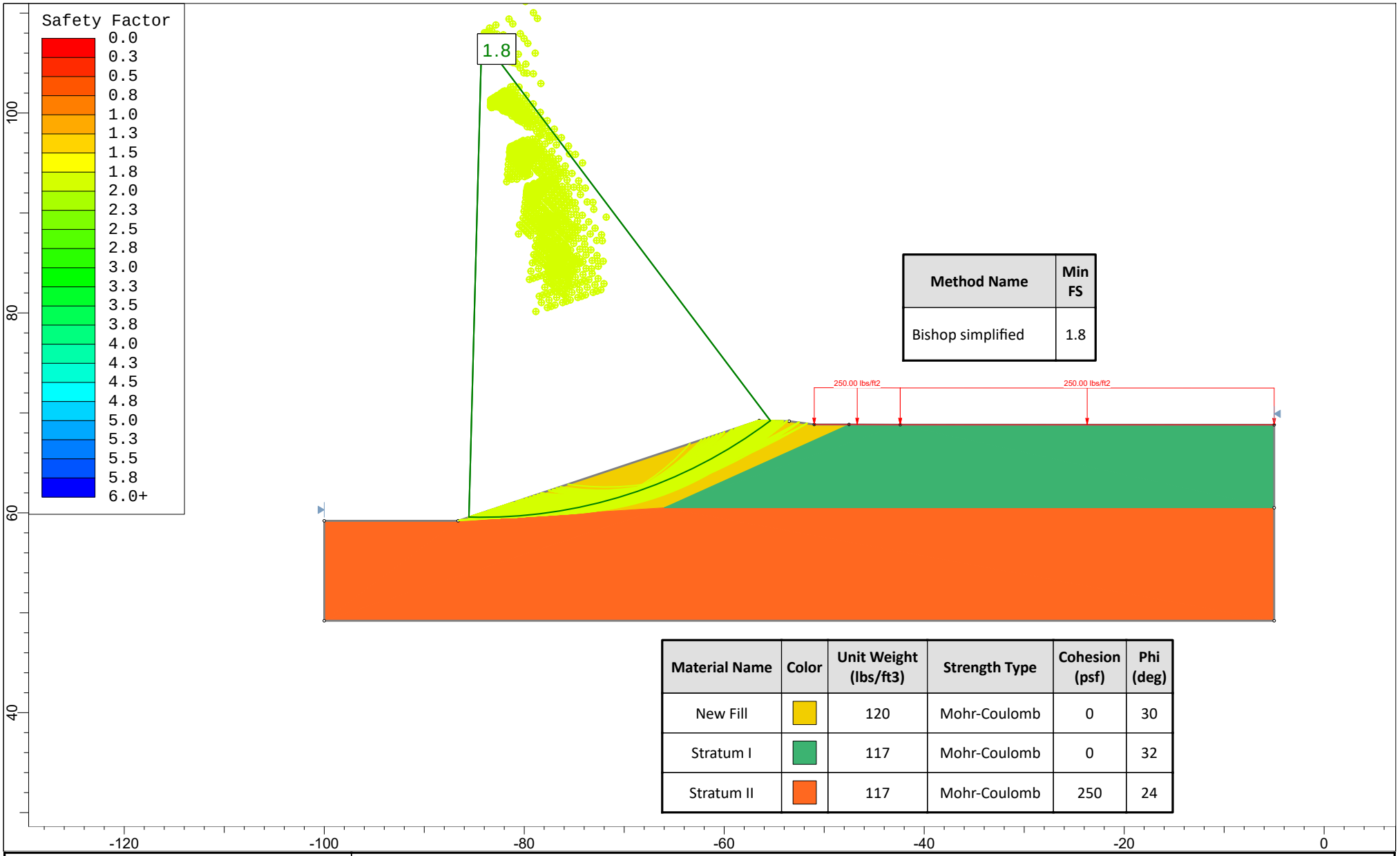
Method Name	Min FS
Bishop simplified	1.3

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill		120	Mohr-Coulomb	0	30
Stratum I		117	Mohr-Coulomb	0	25.6
Stratum II		117	Mohr-Coulomb	250	24
Riprap		130	Mohr-Coulomb	0	38

rocscience

SLIDEINTERPRET 7.038

Project	Fort Belvoir Kingman and Walker Gates		
Analysis Description	Sta. 113+75 - Reconstruct Slope with Riprap Toe		
Drawn By	JY	Scale 1:207	Company DMY Engineering Consultants
Date	8/26/2020, 10:31:51 AM		File Name 113+75 - Reconstruct Slope.slim



Method Name	Min FS
Bishop simplified	1.8

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill		120	Mohr-Coulomb	0	30
Stratum I		117	Mohr-Coulomb	0	32
Stratum II		117	Mohr-Coulomb	250	24

rocscience

SLIDEINTERPRET 7.038

Project	Fort Belvoir Kingman and Walker Gates		
Analysis Description	Sta. 202+25		
Drawn By	JY	Scale 1:159	Company DMY Engineering Consultants
Date	8/26/2020, 10:03:42 AM		File Name 202+25.slim

APPENDIX G AS-BUILT PLANS

ADV. - 129-94A

INDEX OF SHEETS
SEE SHEET IA

● ALL PROPERTY LINE INFORMATION HAS BEEN PROVIDED BY CERVANTES & ASSOCIATES

COMMONWEALTH OF VIRGINIA
John D. Lynch
No. 17646
PROFESSIONAL ENGINEER

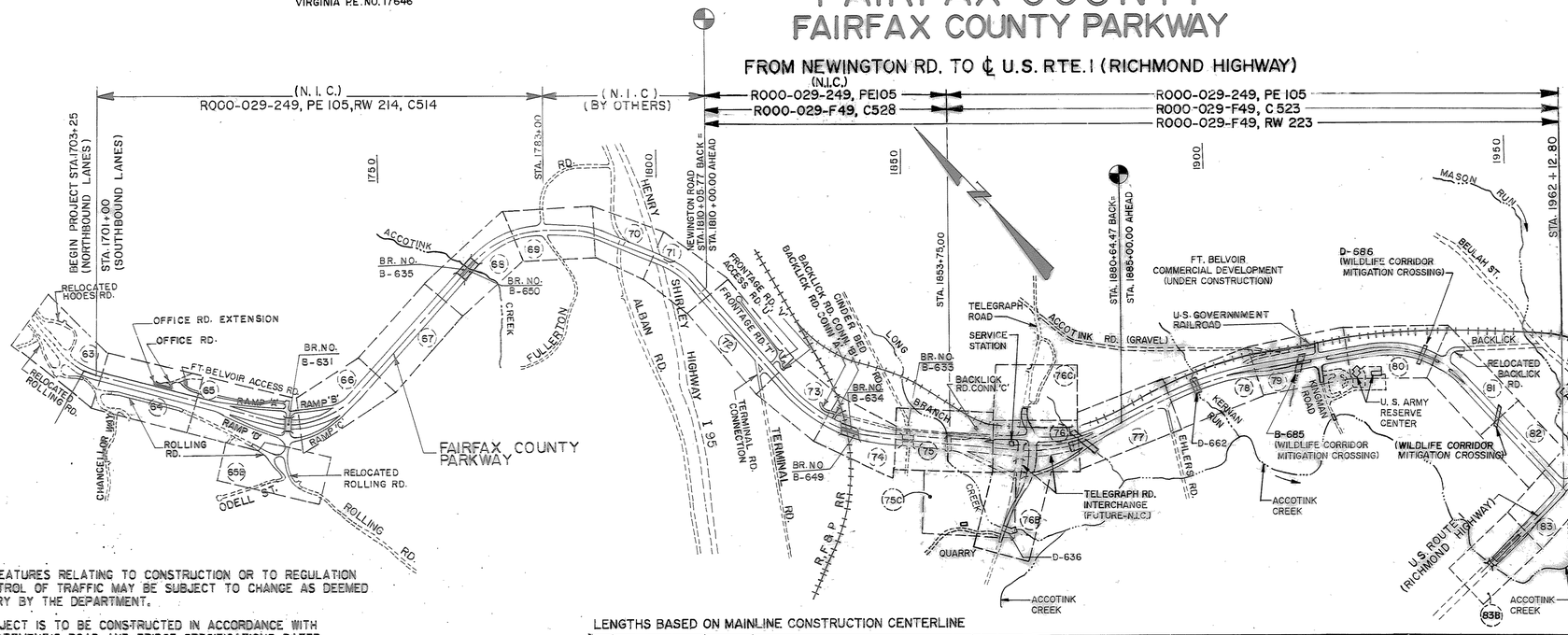
FOR SVERDRUP CORP.
JOHN D. LYNCH (DATE)
VIRGINIA RE. NO. 17646

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

PLAN AND PROFILE OF PROPOSED
STATE HIGHWAY

FAIRFAX COUNTY
FAIRFAX COUNTY PARKWAY

FROM NEWINGTON RD. TO ℄ U.S. RTE. I (RICHMOND HIGHWAY)



DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT.

THIS PROJECT IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE DEPARTMENT'S ROAD AND BRIDGE SPECIFICATIONS DATED JANUARY, 1991, ROAD AND BRIDGE STANDARDS DATED JANUARY 1993, WORK AREA PROTECTION MANUAL DATED JANUARY 1987 AND AS AMENDED BY CONTRACT PROVISIONS AND THESE PLANS.

ALL CURVES ARE TO BE SUPERELEVATED, TRANSITIONED AND WIDENED IN ACCORDANCE WITH STANDARD TC - 4 AND STANDARD TC - 5 AS NOTED.

CONVENTIONAL SIGNS

STATE LINE	LEVEE OR EMBANKMENT
COUNTY LINE	BRIDGES
CITY, TOWN OR VILLAGE	CULVERTS
RIGHT OF WAY LINE	DROP INLET
FENCE LINE	POWER POLES
UNFENCED PROPERTY LINE	TELEPHONE OR TELEGRAPH POLES
FENCED PROPERTY LINE	TELEPHONE OR TELEGRAPH LINES
WATER LINE	HEDGE
SANITARY SEWER LINE	TREES
GAS LINE	HEAVY WOODS
ELECTRIC UNDERGROUND CABLE	GROUND ELEVATION
TRAVELED WAY	GRADE ELEVATION
GUARD RAIL	
RETAINING WALL	
RAILROADS	
BASE OR SURVEY LINE	

SUPERVISED BY D.O. LITTON
DESIGNED BY SVERDRUP CORP.
REVISED BY

PRINTS SENT TO	NO.	DATE
R/W DIV.	ADVANCE PLANS / COMPLETED PLANS	
DIST. ENGR.	ADVANCE PLANS / COMPLETED PLANS FOR UTILITIES	
RES. ENGR.	ADVANCE PLANS / COMPLETED PLANS	
CONSTR. ENGR.		

9420 | 89F10

LENGTHS BASED ON MAINLINE CONSTRUCTION CENTERLINE

STATE PROJECT NO.	F.P.M.S. NO.	SECTION	FEDERAL AID PROJECT NO.	FHWA TYPE CODE	EQUALITIES	LENGTH INCLUDING BRIDGES & BOX CULVERTS		LENGTH EXCLUDING BRIDGES & BOX CULVERTS		TYPE OF PROJECT	DESCRIPTION
					FEET	FEET	MILES	FEET	MILES		
R000-029-F49	11681	RW 223	AAD-44(001)	—	435.53	14,777.27	2.7987	14,277.42	2.7041	RIGHT-OF-WAY	FROM NEWINGTON ROAD TO U.S. RTE. I (RICHMOND HIGHWAY)
		C 523	AAD-44(002)	I000	435.53	10,402.27	1.9701	10,335.67	1.9575	CONSTRUCTION	FROM 0.23 MILES WEST OF TELEGRAPH ROAD TO U.S. RTE. I (RICHMOND HIGHWAY)
		B 631				N.I.C.				BRIDGE	RELOCATED ROLLING RD. OVER FAIRFAX CO. PKWY.
		B 634				N.I.C.				BRIDGE	FAIRFAX CO. PARKWAY OVER R.F. & P. RAILROAD
		B 635				N.I.C.				BRIDGE	FAIRFAX CO. PARKWAY OVER ACCOTINK CREEK
		B 650				N.I.C.				BRIDGE	FAIRFAX CO. PARKWAY OVER ACCOTINK CREEK
		B 649				N.I.C.				BRIDGE	FAIRFAX CO. PARKWAY OVER R.F. & P. RAILROAD
		D 636	AAD-44(002)	X028	—	41.8	0.0078	—	—	TRIPLE R.C.B.C. EXT.	TELEGRAPH ROAD OVER LONG BRANCH CREEK
		D 662	AAD-44(002)	X028	—	24.37	0.0046	—	—	DOUBLE R.C.B.C.	FAIRFAX CO. PARKWAY OVER KERNAN RUN AT STA. 1898+48
		B-685	AAD-44(002)	X081	—	28.06	0.0053	—	—	BRIDGE	FAIRFAX CO. PARKWAY OVER CREEK AT STA. 1914+78
		D-686	AAD-44(002)	X028	—	14.17	0.0027	—	—	SINGLE R.C.B.C.	FAIRFAX CO. PARKWAY OVER CREEK AT STA. 1933+22
		D-663	AAD-44(002)	X028	—	6.47	0.0016	—	—	R.C.B.C. EXT	U.S. RTE. I (RICHMOND HIGHWAY) OVER MASON RUN

CODE NO. 6010

TYPE CODE 3-1000-5

FHWA-534-DATA-3E003

FHWA REGION	STATE	FEDERAL AID PROJECT	STATE ROUTE	STATE PROJECT	SHEET NO.	TOTAL SHEETS
3	VA.		7100	R000-029-F49, PE 105 See Tabulation Below	1	219

FUNCTIONAL CLASSIFICATION & TRAFFIC DATA	
OTHER PRINCIPAL ARTERIAL	
	Fr: BACKLICK RD. 0.23 MILES WEST OF TELEGRAPH RD. To: U.S. ROUTE I (RICHMOND HIGHWAY)
ADT	(2005) 45,000 FAIRFAX COUNTY PARKWAY (I-95-TELEGRAPH RD.)
ADT	(2005) 26,000 FAIRFAX COUNTY PARKWAY (TELEGRAPH RD.- U.S. RTE. I)
DHV	4850
D (%)	60
T (%)	5
V (MPH)	SEE PLAN & PROFILE SHEETS FOR HORIZONTAL AND VERTICAL CURVE DESIGN SPEED.

LIMITED ACCESS HIGHWAY BY RESOLUTION OF COMMONWEALTH TRANSPORTATION BOARD DATED JULY 16, 1987.

FAIRFAX COUNTY SIGNATURES

RECOMMENDED APPROVAL FOR CONSTRUCTION

DATE	DIRECTOR, OFFICE OF ROAD PROGRAM MANAGEMENT
DATE	DIRECTOR, PROJECT ENGINEERING DIVISION
DATE	DIRECTOR, OFFICE OF TRANSPORTATION
DATE	DIRECTOR, OFFICE OF CAPITAL FACILITIES

APPROVED FOR CONSTRUCTION

DATE	DIRECTOR, DEPARTMENT OF PUBLIC WORKS

RECOMMENDED FOR APPROVAL FOR RIGHT OF WAY ACQUISITION

11/23/93 DATE	SECONDARY ROADS ENGINEER
11/30/93 DATE	STATE LOCATION AND DESIGN ENGINEER
12/1/93 DATE	
12/1/93 DATE	ASSISTANT COMMISSIONER FOR PLANNING AND PROGRAMMING
12/11/93 DATE	CHIF ENGINEER

APPROVED FOR RIGHT OF WAY ACQUISITION

12/1/93 DATE	

R000-029-F49, C-523 ONLY

RECOMMENDED FOR APPROVAL FOR CONSTRUCTION

2/22/94 DATE	SECONDARY ROAD ENGINEER
2/22/94 DATE	STATE LOCATION AND DESIGN ENGINEER
2/22/94 DATE	ASSISTANT COMMISSIONER FOR PLANNING & PROGRAMMING
DATE	DIRECTOR OF PLANNING & PROGRAMMING

APPROVED FOR CONSTRUCTION

2/23/94 DATE	CHIEF ENGINEER

APPROVED

DATE	DIVISION ADMINISTRATOR FEDERAL HIGHWAY ADMINISTRATION U.S. DEPARTMENT OF TRANSPORTATION

REVISED

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A25068 PLAN NO. | PROJECT R000-029-F49, PE105, RW 223, C523 | FED. AID PROJ. NO. | SHEET NO. 1

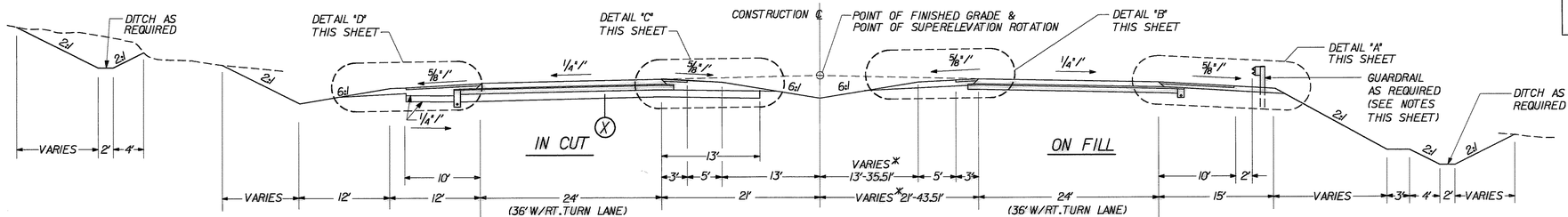
REVISED	FHWA REGION	STATE	FEDERAL AID PROJECT	STATE ROUTE	STATE PROJECT	SHEET NO.
	3	VA.		7100	R000-029-F49, PE 105 RW 223,C523	2A(2)

LIMITED ACCESS HIGHWAY BY RESOLUTION OF COMMONWEALTH TRANSPORTATION BOARD DATED JULY 16,1987.

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

TYPICAL SECTION - TANGENT SECTION WITH 42' & VARIABLE WIDTH MEDIAN

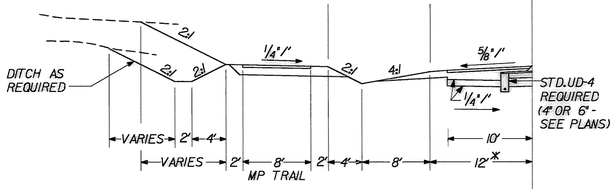
N.T.S.



℄ STA. 1886+57.70 TO ℄ STA. 1893+19.21
℄ STA. 1893+83.28 TO ℄ STA. 1895+13.82
℄ STA. 1907+99.61 TO ℄ STA. 1912+84.65
℄ STA. 1941+27.13 TO ℄ STA. 1961+54.80
* AT ℄ STA. 1911+31.55

DETAIL - MP TRAIL IN CUT

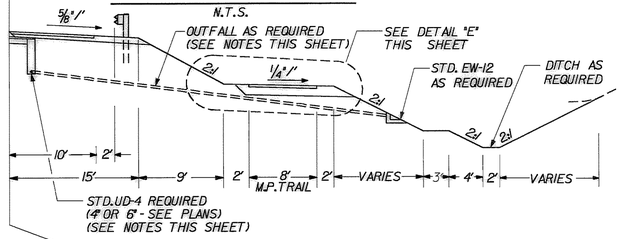
N.T.S.



* VARIES FROM 12' - 24' FROM ℄ STA. 1874+75 TO ℄ STA. 1890+55 (LEFT) FOR CONSTRUCTION OF M.P.TRAIL IN ULTIMATE LOCATION

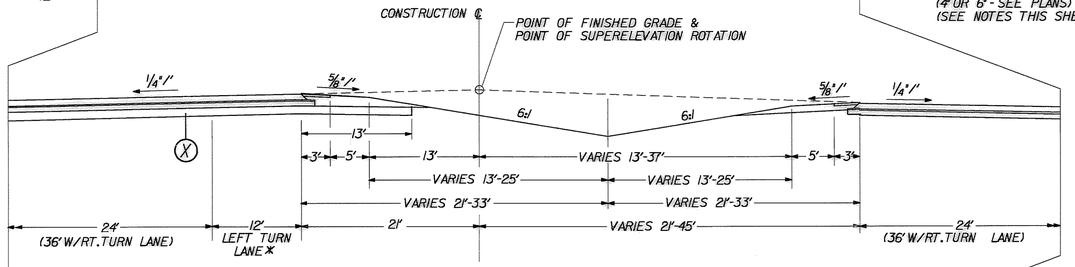
DETAIL - MP TRAIL ON FILL

N.T.S.



DETAIL - VARIABLE WIDTH MEDIAN WITH SINGLE LEFT TURN LANE

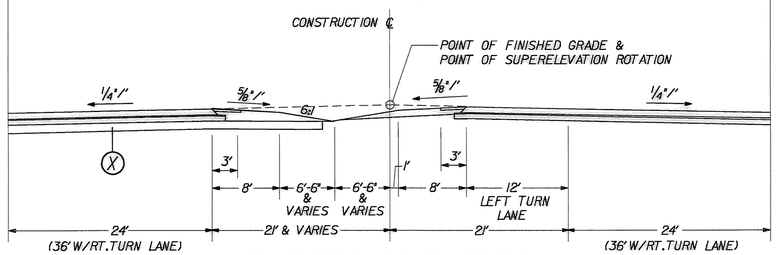
N.T.S.



℄ STA. 1918+12.90 TO ℄ STA. 1922+54.06
℄ STA. 1918+43.47 TO ℄ STA. 1922+93.46 *

DETAIL - VARIABLE WIDTH MEDIAN WITH SINGLE LEFT TURN LANE

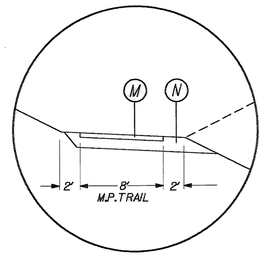
N.T.S.



STA. 1894+22.66 TO ℄ STA. 1898+49.45

DETAIL "E"

N.T.S.

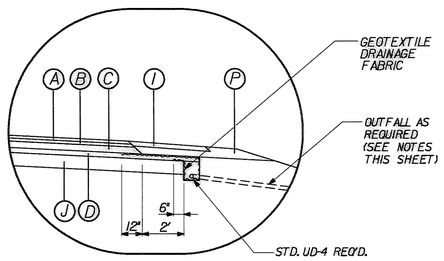


(M.) SURFACE COURSE - ASPHALT CONCRETE TYPE SM-2 AT 220 LBS.PER S.Y.

(N.) 6" AGGREGATE BASE MATERIAL NO.21B EXTEND THROUGH BERM.

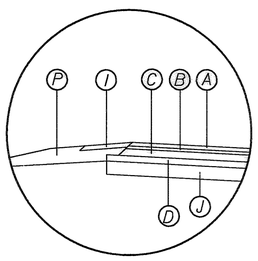
DETAIL "A"

N.T.S.



DETAIL "B"

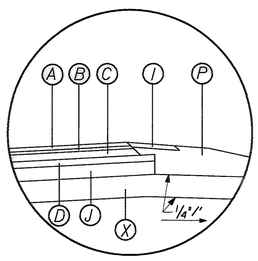
N.T.S.



DETAIL "C"

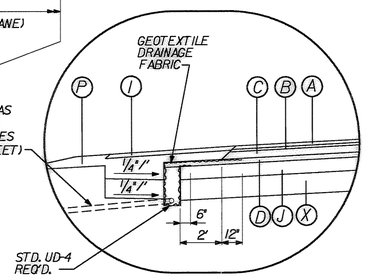
N.T.S.

IN AREAS OF UNSUITABLE EXCAVATION BELOW THE SUBBASE (SEE NOTE 3)



DETAIL "D"

N.T.S.



IN AREAS OF UNSUITABLE EXCAVATION BELOW THE SUBBASE (SEE NOTE 3)

(A.) SURFACE COURSE- ASPHALT CONCRETE, TYPE SM-2C AT 165 LBS.PER SY

(B.) INTERMEDIATE COURSE-ASPHALT CONCRETE TYPE IM-IA AT 230 LBS.PER S.Y.

(C.) 5" BASE COURSE- ASPHALT CONCRETE TYPE BM-3,

(D.) 3" STABILIZED OPEN-GRADED MATERIAL - STABILIZED WITH ASPHALT OR CONCRETE, EXTENDED TO STD.UD-4 AS REQUIRED.

(J.) 8" SUBBASE MATERIAL - CEMENT TREATED AGGREGATE MATERIAL SIZE 21A, PUGMILL MIXED WITH 4% CEMENT BY WEIGHT, TO EXTEND TO STD.UD-4 AS REQUIRED.

(L.) SURFACE COURSE - ASPHALT CONCRETE TYPE SM-3A AT 345 LBS.PER S.Y.

(P.) VARIABLE DEPTH SUBBASE- AGGREGATE BASE MATERIAL, TYPE I, SIZE 21B TO EXTEND THROUGH SHOULDERS.

(X.) SELECT MATERIAL, TYPE I, MINIMUM CBR-30 TO BE USED AS BACKFILL FOR UNSUITABLE EXCAVATION. (SEE NOTE 3)

NOTES

1) MP TRAIL SHOWN HERE ON BOTH SIDES FOR PURPOSES OF SHOWING IN BOTH CUT AND FILL AREAS. SEE PLANS FOR LOCATIONS AND PROFILES FOR VARIABLE ELEVATION OF M.P.TRAIL.
2) SEE PROFILE SHEETS FOR SPECIAL DITCH GRADES.
3) SEE GRADING SUMMARY (SHEET 2J) FOR LOCATION AND DEPTH OF UNSUITABLE EXCAVATION BELOW THE SUBGRADE.
4) SEE PLAN SHEETS FOR GUARDRAIL TYPES AND LOCATIONS.
5) SEE PLAN SHEETS FOR LOCATION OF UNDERDRAIN OUTFALLS (UNDERDRAIN BENEATH CURB & GUTTER IS NOT SHOWN ON PLAN SHEETS TO REDUCE PLAN CLUTTER - TO BE CONSTRUCTED PER TYPICAL SECTIONS HEREIN AND PER VDOT ROAD & BRIDGE STANDARDS).
6) STD.UD-4 IS TO BE LOWERED TO A DEPTH GREATER THAN THE STANDARD FOUR INCHES (4") BELOW THE SUBBASE OR SELECT MATERIAL TO PROVIDE OUTFALL BELOW M.P.TRAIL AS REQUIRED.
7) THE COST FOR GEOTEXTILE DRAINAGE FABRIC IS TO BE INCLUDED IN THE UNIT COST FOR ALL STD.UD-4 UNDERDRAINS.

○ PRIME SHALL BE A LIQUID ASPHALT MATERIAL RC-70, MC-70 OR RC-250 APPLIED AT A RATE OF 0.4 GAL PER SQUARE YARD. WHEN SUBJECTED TO PUBLIC TRAFFIC, THE PRIMED AREA SHALL BE COVERED WITH FINE AGGREGATE GRADING B SAND (NATURAL OR MANUFACTURED) OR NO. 10 AGGREGATE AT THE RATE OF 15 LBS. PER SQUARE YARD.

○ WHEN LIQUID ASPHALT MATERIAL IS USED AS A CURING MATERIAL FOR A HYDRAULIC CEMENT OR LIME STABILIZED COURSE, IT SHALL BE LIQUID ASPHALT MATERIAL RC-70, RC-250, MC-70 OR MC-250 AND APPLIED AT THE RATE OF 0.2 GAL. PER SQUARE YARD. WHERE NECESSARY FOR MAINTENANCE OF CONSTRUCTION TRAFFIC, COVER MATERIALS, FINE AGGREGATE GRADING B SAND (NATURAL OR MANUFACTURED) OR NO. 10 AGGREGATE, SHALL BE APPLIED AT THE RATE OF 15 LBS. PER SQUARE YARD. ALL COSTS FOR SUCH CURING MATERIALS AND ANY COVER MATERIALS SHALL BE INCLUDED IN PRICE BID FOR THE HYDRAULIC CEMENT OR LIME STABILIZED COURSE.

TYPICAL SECTIONS MAINLINE

DESIGNED BY - RAYMOND L. BURKHARDT
DESIGNED BY - SVERDRUP CORP.
CADD OPERATOR -
REVISED BY -

PLAN NOTE BOOK NO. ____
DOC. I.D. NO. 04/27/94
DATE PLOTTED

Plot Requested by =0130354Estes,Michael.A
/proj2/080354/av/ab5c/5dyp2slgn
5dyp2slprf
SCALE: 1"=10'
04/27/94

PLAN NO.	PROJECT	FILE NO.	SHEET NO.
A	R000-029-F49 PE 105 RW 223,C523	66 20 4	2A(2)

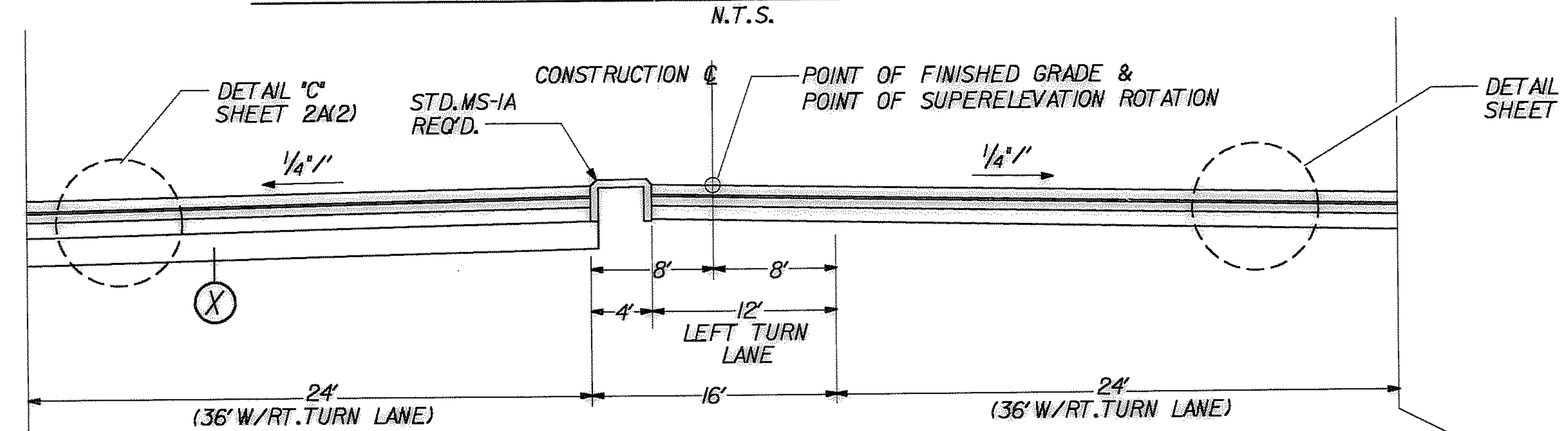
DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

REVISED	FHWA REGION	STATE	FEDERAL AID PROJECT	STATE ROUTE	STATE PROJECT	SHEET NO.
	3	VA.		7100	R000-029-F49, PE 105 RW 223, C523	2A(3)

LIMITED ACCESS HIGHWAY BY RESOLUTION OF COMMONWEALTH TRANSPORTATION BOARD DATED JULY 16, 1987.

DETAIL - CURBED MEDIAN WITH SINGLE LEFT TURN LANE

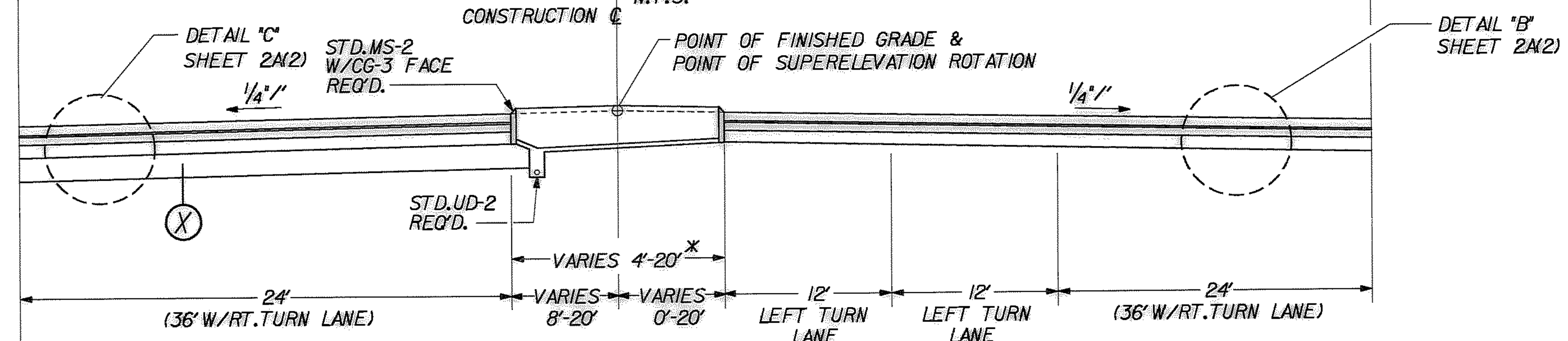
N.T.S.



℄ STA. 1870+28.21 TO ℄ STA. 1871+20.00

DETAIL - CURBED MEDIAN WITH SINGLE OR DOUBLE LEFT TURN LANE

N.T.S.



℄ STA. 1871+20.00 TO ℄ STA. 1871+88.82 *

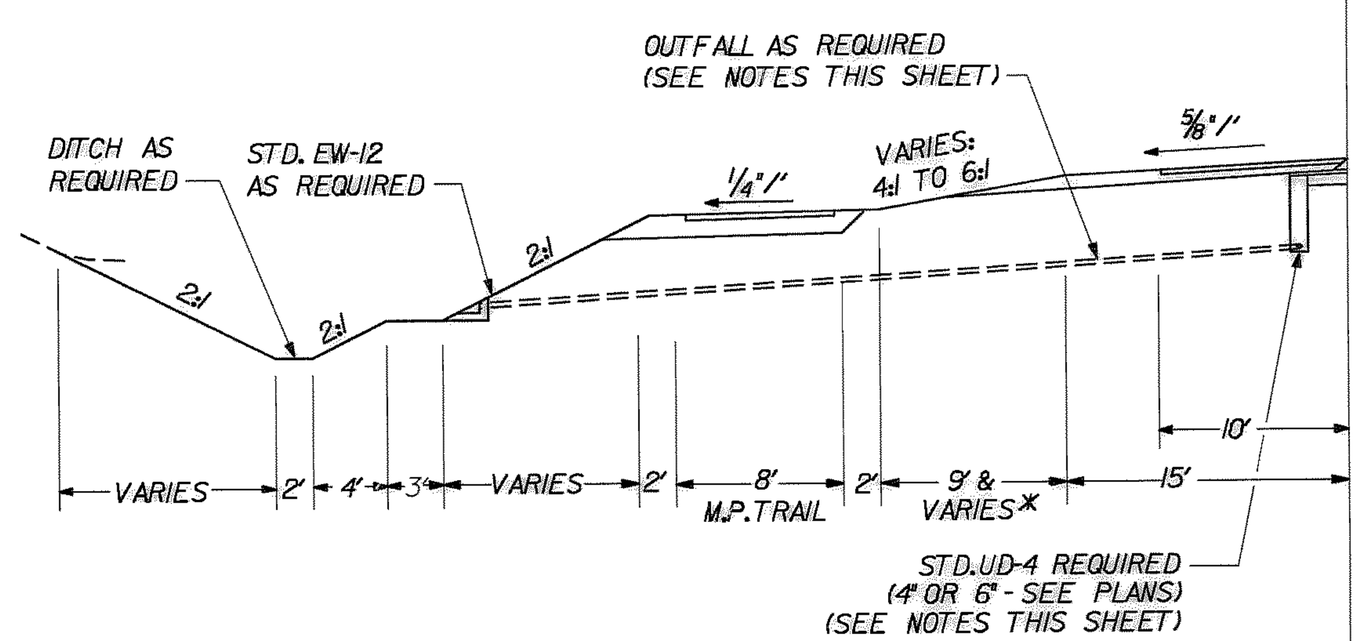
* MEDIAN TRANSITIONS FROM 4' WIDTH (STD. MS-1A) AT ℄ STA. 1871+20.00 TO 12.24' WIDTH (STD. MS-2 W/CG-3 FACE) AT ℄ STA. 1871+88.82

℄ STA. 1912+84.65 TO ℄ STA. 1914+64.06 (B-685)**
℄ STA. 1914+92.13 (B-685) TO ℄ STA. 1917+23.93**

** DOUBLE LEFT TURN FROM ℄ STA. 1912+84.65 TO ℄ STA. 1917+23.93 ONLY

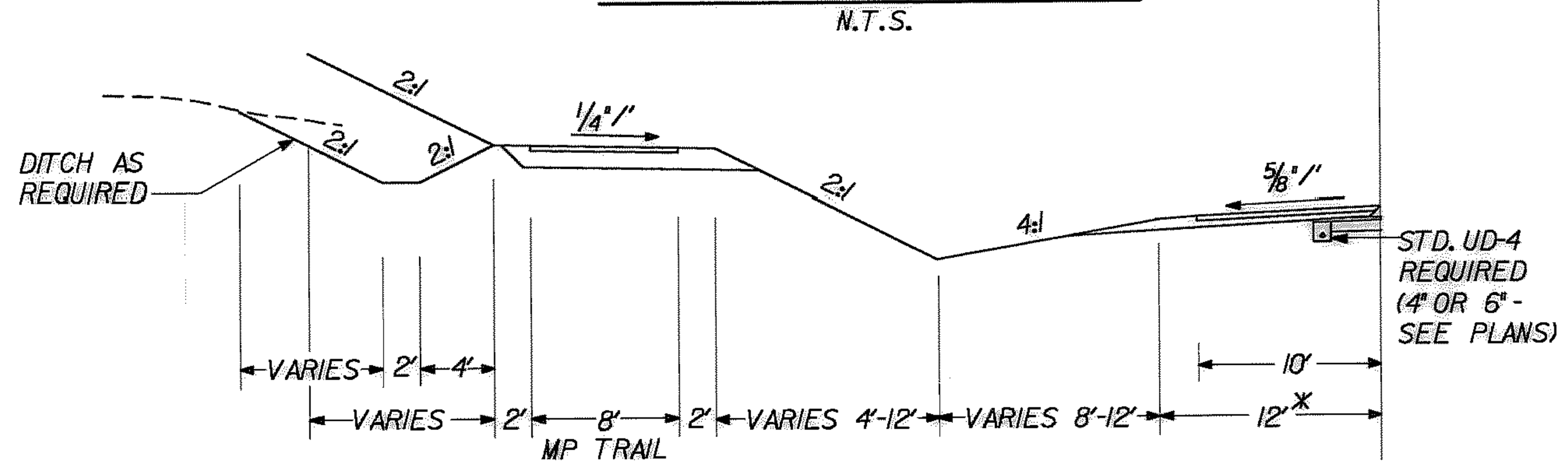
DETAIL - MP TRAIL ON FILL

N.T.S.



DETAIL - MP TRAIL IN CUT

N.T.S.



℄ STA. 1890+50.00 TO ℄ STA. 1936+00.00 (LEFT)

* SLOPE AND DISTANCE BETWEEN SHOULDER AND BERM FOR M.P. TRAIL VARIES TO PROVIDE FOR CONSTRUCTION OF M.P. TRAIL IN IT'S ULTIMATE RAMP "B" LOCATION. SEE CONSTRUCTION PLAN SHEETS 76 & 77 AND LAYOUT DATA SHEETS 1L(2) & 1L(5) FOR ADDITIONAL INFORMATION.

NOTES

1) MP TRAIL SHOWN HERE ON BOTH SIDES FOR PURPOSES OF SHOWING IN BOTH CUT AND FILL AREAS. SEE PLANS FOR LOCATIONS AND PROFILES FOR VARIABLE ELEVATION OF M.P. TRAIL.
2) SEE PROFILE SHEETS FOR SPECIAL DITCH GRADES.
3) SEE GRADING SUMMARY (SHEET 2J) FOR LOCATION AND DEPTH OF UNSUITABLE EXCAVATION BELOW THE SUBGRADE.
4) SEE PLAN SHEETS FOR GUARDRAIL TYPES AND LOCATIONS.
5) SEE PLAN SHEETS FOR LOCATION OF UNDERDRAIN OUTFALLS (UNDERDRAIN BENEATH CURB & GUTTER IS NOT SHOWN ON PLAN SHEETS TO REDUCE PLAN CLUTTER - TO BE CONSTRUCTED PER TYPICAL SECTIONS HEREIN AND PER VDOT ROAD & BRIDGE STANDARDS).
6) STD. UD-4 IS TO BE LOWERED TO A DEPTH GREATER THAN THE STANDARD FOUR INCHES (4") BELOW THE SUBBASE OR SELECT MATERIAL TO PROVIDE OUTFALL BELOW M.P. TRAIL AS REQUIRED.
7) THE COST FOR GEOTEXTILE DRAINAGE FABRIC IS TO BE INCLUDED IN THE UNIT COST FOR ALL STD. UD-4 UNDERDRAINS.

○ PRIME SHALL BE A LIQUID ASPHALT MATERIAL RC-70, MC-70 OR RC-250 APPLIED AT A RATE OF 0.4 GAL PER SQUARE YARD. WHEN SUBJECTED TO PUBLIC TRAFFIC, THE PRIMED AREA SHALL BE COVERED WITH FINE AGGREGATE GRADING B SAND (NATURAL OR MANUFACTURED) OR NO. 10 AGGREGATE AT THE RATE OF 15 LBS. PER SQUARE YARD.

○ WHEN LIQUID ASPHALT MATERIAL IS USED AS A CURING MATERIAL FOR A HYDRAULIC CEMENT OR LIME STABILIZED COURSE, IT SHALL BE LIQUID ASPHALT MATERIAL RC-70, RC-250, MC-70 OR MC-250 AND APPLIED AT THE RATE OF 0.2 GAL. PER SQUARE YARD. WHERE NECESSARY FOR MAINTENANCE OF CONSTRUCTION TRAFFIC, COVER MATERIALS, FINE AGGREGATE GRADING B SAND (NATURAL OR MANUFACTURED) OR NO. 10 AGGREGATE, SHALL BE APPLIED AT THE RATE OF 15 LBS. PER SQUARE YARD. ALL COSTS FOR SUCH CURING MATERIALS AND ANY COVER MATERIALS SHALL BE INCLUDED IN PRICE BID FOR THE HYDRAULIC CEMENT OR LIME STABILIZED COURSE.

TYPICAL SECTIONS MAINLINE

DIRECTORY - 182201
DGN FILE - /proj2/020354/ox/ab5c/5cxtypdgn
PRF - 5cxtyp.prf

SUPERVISED BY RAYMOND L. BURKHARDT
DESIGNED BY SVERDRUP CORP.
CADD OPERATOR
REVISED BY

PLAN
NOTE BOOK
NO.
DOC. I.D. NO. 04/27/94 DATE PLOTTED

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

REVISED	FHWA REGION	STATE	FEDERAL AID PROJECT	STATE ROUTE	STATE PROJECT	SHEET NO.
	3	VA.		7100	R000-029-F49, PE 105 RW 223, C523	2C

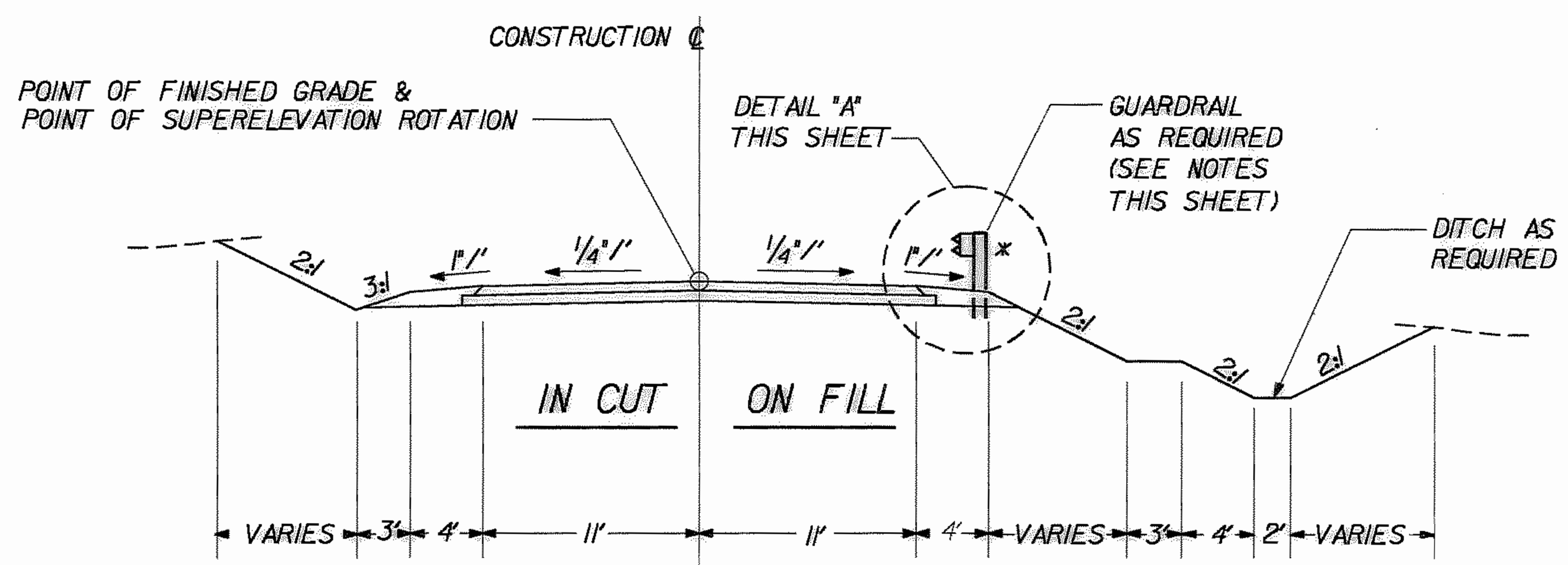
LIMITED ACCESS HIGHWAY BY RESOLUTION OF COMMONWEALTH TRANSPORTATION BOARD DATED JULY 16, 1987.

52

DIRECTORY • 182.00
DGN FILE • /proj2/020354/av/ab5c/5dtyp2c.dgn
PRF • 5dtyp2c.prf

EHLERS ROAD - TANGENT SECTION

N.T.S.

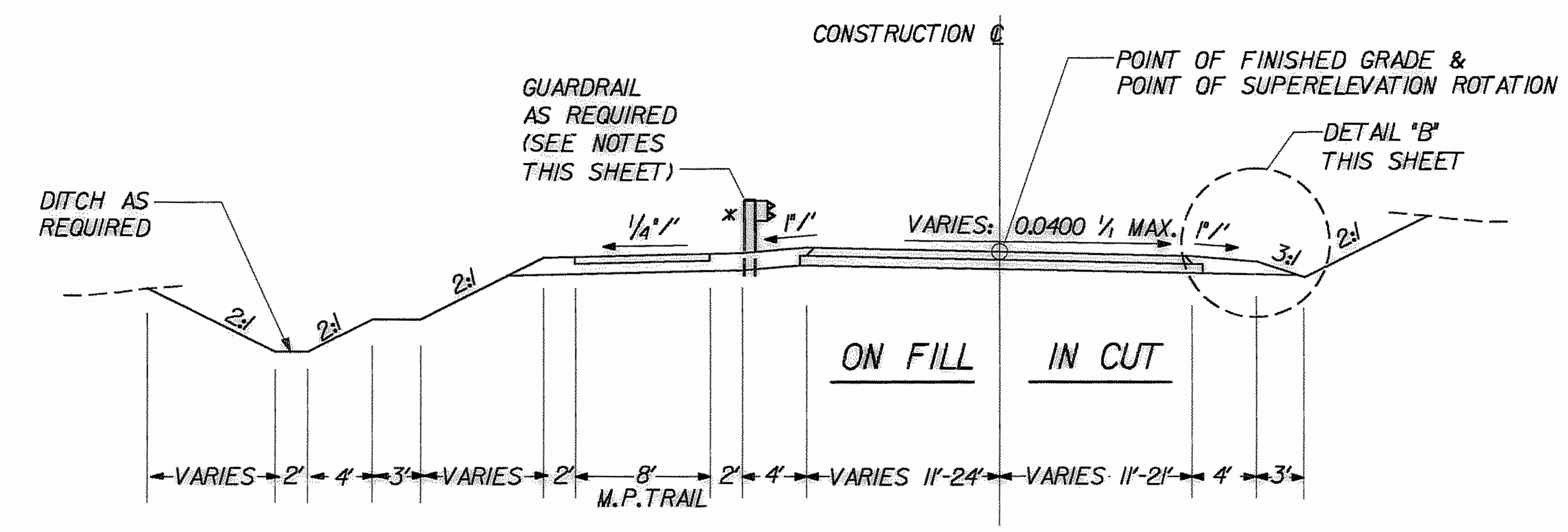


℄ STA.6+00.00 TO ℄ STA.8+00.00

×6' WIDTH WHERE GUARDRAIL IS REQUIRED.

RELOCATED BACKLICK ROAD - SUPERELEVATED SECTION

N.T.S.

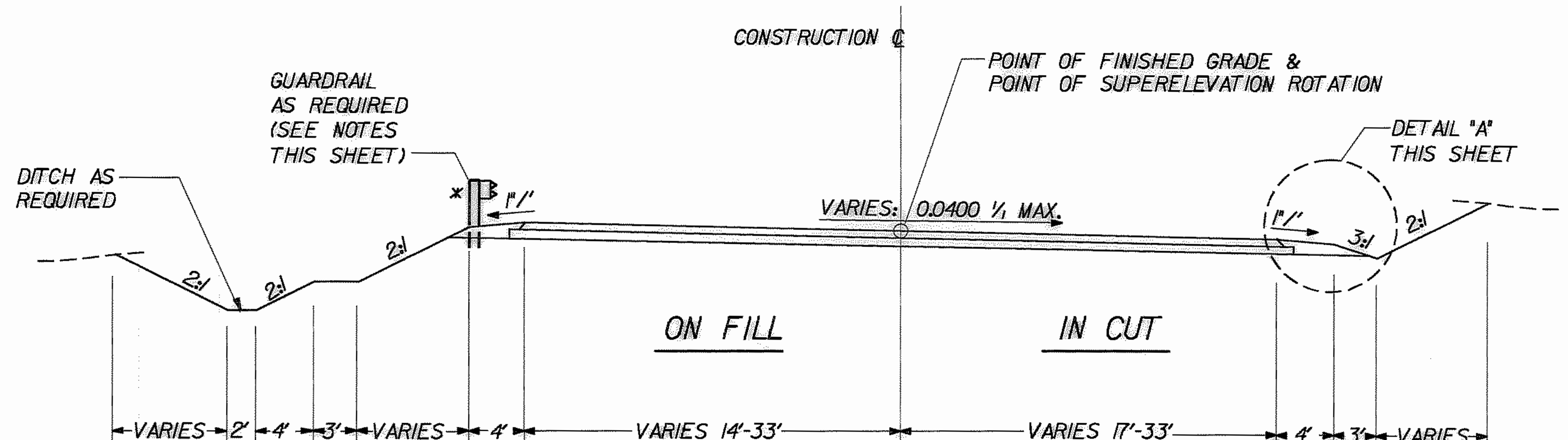


℄ STA.10+00.00 TO ℄ STA.15+00.00 (SUPER RIGHT)

×6' WIDTH WHERE GUARDRAIL IS REQUIRED.

KINGMAN ROAD - SUPERELEVATED SECTION

N.T.S.

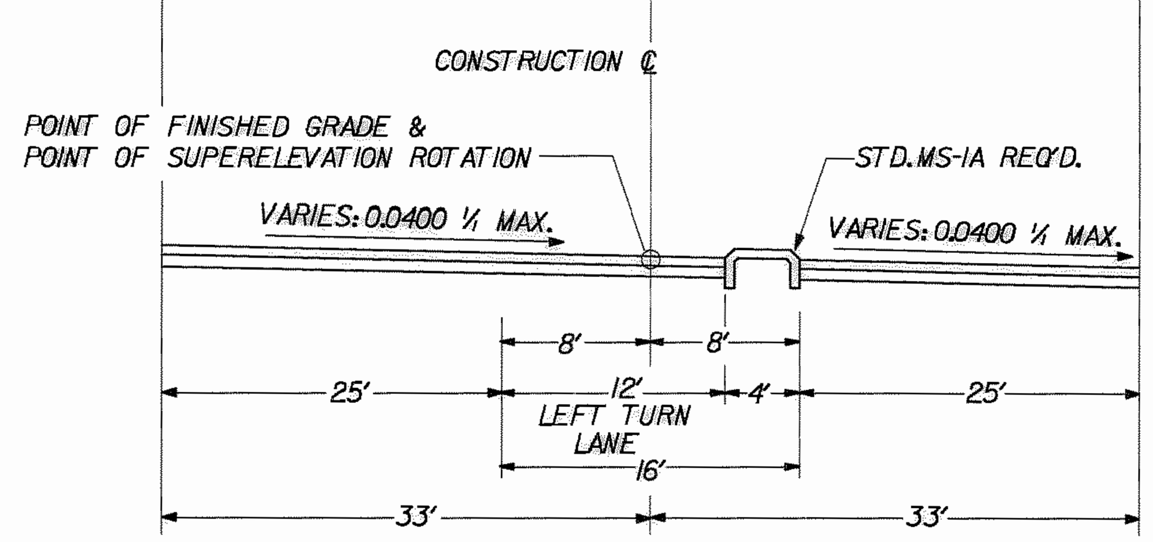


℄ STA.6+00.00 TO ℄ STA.12+07.00 (SUPER RIGHT)

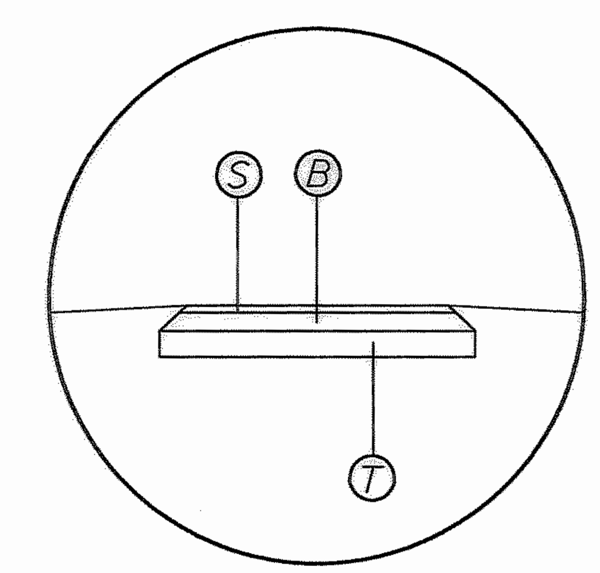
×6' WIDTH WHERE GUARDRAIL IS REQUIRED.

DETAIL
CURBED MEDIAN WITH LEFT TURN LANE

N.T.S.



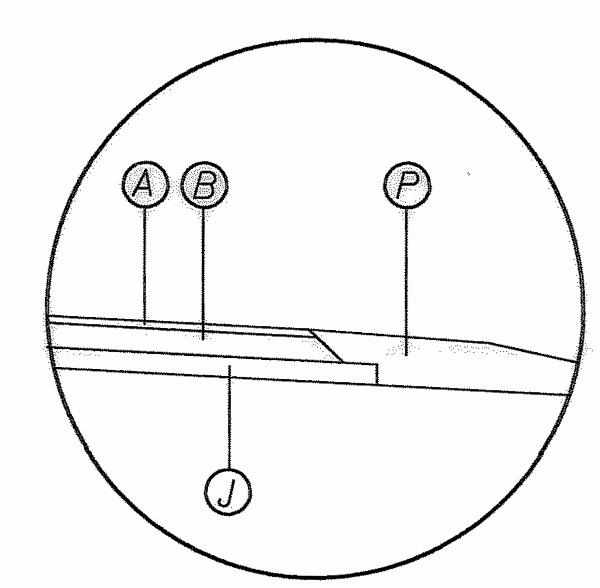
℄ STA.10+85.01 TO ℄ STA.12+00.00



PE-1 PRIVATE ENTRANCES
TYPE IV (COMMERCIAL)
(SEE PLANS FOR LOCATIONS)

N.T.S.

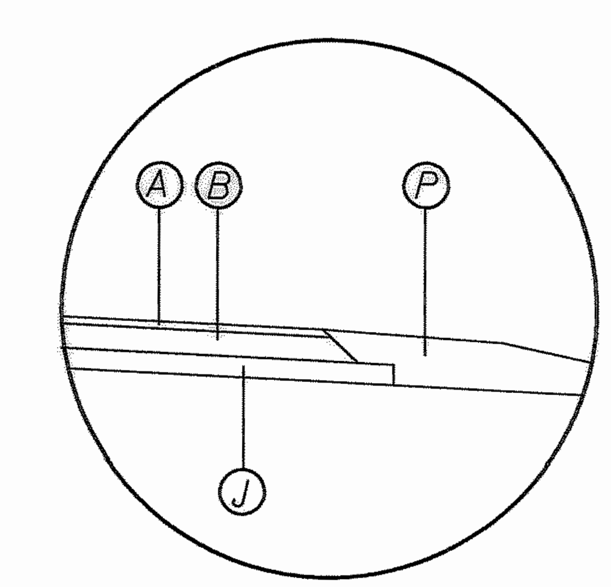
- (S) SURFACE COURSE- ASPHALT CONCRETE. TYPE SM-2A AT 165 LBS.PER SY.
- (B) 4" BASE COURSE- ASPHALT CONCRETE TYPE BM-2.
- (T) 6" SUBBASE MATERIAL - AGGREGATE BASE MATERIAL,TYPE I, SIZE 21B.



DETAIL "A"

N.T.S.

- (A) SURFACE COURSE- ASPHALT CONCRETE. TYPE SM-2C AT 165 LBS.PER SY
- (B) 5.5" BASE COURSE- ASPHALT CONCRETE TYPE BM-2.
- (J) 6" SUBBASE MATERIAL - CEMENT TREATED AGGREGATE MATERIAL SIZE 21A,PUGMILL MIXED WITH 4% CEMENT BY WEIGHT TO EXTEND ONE FOOT BEYOND EDGE OF PAVEMENT.
- (P) VARIABLE DEPTH SUBBASE- AGGREGATE BASE MATERIAL,TYPE I, SIZE 21B TO EXTEND THROUGH SHOULDERS.



DETAIL "B"

N.T.S.

- (A) SURFACE COURSE- ASPHALT CONCRETE. TYPE SM-2C AT 165 LBS.PER SY
- (B) 5.5" BASE COURSE- ASPHALT CONCRETE TYPE BM-2.
- (J) 6" SUBBASE MATERIAL - CEMENT TREATED AGGREGATE MATERIAL SIZE 21B,PUGMILL MIXED WITH 4% CEMENT BY WEIGHT TO EXTEND ONE FOOT BEYOND EDGE OF PAVEMENT.
- (P) VARIABLE DEPTH SUBBASE- AGGREGATE BASE MATERIAL,TYPE I, SIZE 21B TO EXTEND THROUGH SHOULDERS.

NOTES

1) MP TRAIL SHOWN HERE ON BOTH SIDES FOR PURPOSES OF SHOWING IN BOTH CUT AND FILL AREAS. SEE PLANS FOR LOCATIONS AND PROFILES FOR VARIABLE ELEVATION OF M.P.TRAIL.
2) SEE PROFILE SHEETS FOR SPECIAL DITCH GRADES.
3) SEE GRADING SUMMARY (SHEET 2J) FOR LOCATION AND DEPTH OF UNSUITABLE EXCAVATION BELOW THE SUBGRADE.
4) SEE PLAN SHEETS FOR GUARDRAIL TYPES AND LOCATIONS.
5) SEE PLAN SHEETS FOR LOCATION OF UNDERDRAIN OUTFALLS (UNDERDRAIN BENEATH CURB & GUTTER IS NOT SHOWN ON PLAN SHEETS TO REDUCE PLAN CLUTTER - TO BE CONSTRUCTED PER TYPICAL SECTIONS HEREIN AND PER VDOT ROAD & BRIDGE STANDARDS).

○ PRIME SHALL BE A LIQUID ASPHALT MATERIAL RC-70, MC-70 OR RC-250 APPLIED AT A RATE OF 0.4 GAL PER SQUARE YARD. WHEN SUBJECTED TO PUBLIC TRAFFIC, THE PRIMED AREA SHALL BE COVERED WITH FINE AGGREGATE GRADING B SAND (NATURAL OR MANUFACTURED) OR NO. 10 AGGREGATE AT THE RATE OF 15 LBS. PER SQUARE YARD.

○ WHEN LIQUID ASPHALT MATERIAL IS USED AS A CURING MATERIAL FOR A HYDRAULIC CEMENT OR LIME STABILIZED COURSE, IT SHALL BE LIQUID ASPHALT MATERIAL RC-70, RC-250, MC-70 OR MC-250 AND APPLIED AT THE RATE OF 0.2 GAL. PER SQUARE YARD. WHERE NECESSARY FOR MAINTENANCE OF CONSTRUCTION TRAFFIC, COVER MATERIALS, FINE AGGREGATE GRADING B SAND (NATURAL OR MANUFACTURED) OR NO. 10 AGGREGATE, SHALL BE APPLIED AT THE RATE OF 15 LBS.PER SQUARE YARD. ALL COSTS FOR SUCH CURING MATERIALS AND ANY COVER MATERIALS SHALL BE INCLUDED IN PRICE BID FOR THE HYDRAULIC CEMENT OR LIME STABILIZED COURSE.

TYPICAL SECTIONS
EHLERS ROAD
KINGMAN ROAD
RELOCATED BACKLICK ROAD

SUPERVISED BY RAYMOND L. BURKHARDT
DESIGNED BY SVERDRUP CORP.
CADD OPERATOR
REVISED BY

PLAN — NOTE BOOK — NO. — SURVEYED — PLOTTED — ...

DOC.I.D.NO. 04/29/94 DATE PLOTTED

Plot Requested by -013036.Estes,Michael.A
/proj2/020354/av/ab5c/5dtyp2c.dgn
5dtyp2c.prf
SCALE:1=10
04/29/94

PLAN NO.	PROJECT	FILE NO.	SHEET NO.
A	R000-029-F49 PE 105 RW 223, C523	86 20 4	2C

57

63

DIRECTORY - 1122101
DGN FILE - /pro]2/020354/ov/sb5c/5cpav.dgn
PRF - 5cpav.prf

PAVEMENT SUMMARY

STATION TO STATION	ROADWAY	LENGTH LIN.FT.	EQUALITIES LIN.FT.	SELECT MATERIAL TYPE I MIN.CBR-30 (DEPTHS ON SHT.2J) TONS	SUBBASE: CEMENT STABILIZED AGGREGATE BASE MATERIAL, TYPE I, NO.21A 6" DEPTH TONS	SUBBASE: CEMENT STABILIZED AGGREGATE BASE MATERIAL, TYPE I, NO.21A 8" DEPTH TONS	SUBBASE: AGGREGATE BASE MATERIAL TYPE I NO.21B 6" DEPTH TONS	SUBBASE: AGGREGATE BASE MATERIAL TYPE I NO.21B 8" DEPTH TONS	SUBBASE: AGGREGATE BASE MATERIAL TYPE I NO.21B VAR.DEPTH TONS	⊗ FLEXIBLE PAVEMENT PLANING S.Y.	BASE: BASE COURSE, ASPHALT CONCRETE TYPE BM-2 3" DEPTH TONS	BM-2 4" DEPTH TONS	BM-2 5.5" DEPTH TONS	BM-2 6" DEPTH TONS	BASE: BASE COURSE, ASPHALT CONCRETE TYPE BM-3 3" DEPTH TONS	BM-3 4" DEPTH TONS	BM-3 5" DEPTH TONS	BM-3 6" DEPTH TONS	INTERMEDIATE: ASPHALT CONCRETE TYPE IM-1A AT 230#/SY. TONS	STAB. OPEN-GRADED MATERIAL 3" DEPTH TONS	SURFACE: ASPHALT CONCRETE TYPE SM-3A (SHOULDERS) AT 350#/SY. TONS	SURFACE: ASPHALT CONCRETE TYPE SM-2C (ROADWAYS) AT 165#/SY. TONS	SURFACE: ASPHALT CONCRETE TYPE SM-2A (DRIVEWAYS & MP TRAIL) AT 220#/SY. TONS	LIQUID ASPHALT GAL.	COVER MATERIAL (FINE AGGR. OR AGGR. NO.10) TONS
STA. 1854+07 TO 1914+44	EBL F.C.PARKWAY MAINLINE	5,601	436			9,860			6,500	1,400							6,140		2,315	2,770	1,430	1,780			
STA. 1854+07 TO 1914+44	WBL F.C.PARKWAY MAINLINE	5,601	436			9,155			9,785	1,575							5,115		1,930	2,330	1,125	1,515			
STA. 1915+12 TO 1960+83	EBL F.C.PARKWAY MAINLINE	4,571				8,620			6,245								4,760		1,795	2,185	1,115	1,290			
STA. 1915+12 TO 1960+83	WBL F.C.PARKWAY MAINLINE	4,571				9,120			6,740								5,100		1,925	2,300	1,100	1,380			
STA. 5+00 TO 26+50	TELEGRAPH ROAD	2,150				4,695			4,100	2,485			3,120								410	975			
STA. 6+30 TO 16+19	RAMP C					1,315			855								605		285	330	175	205			
STA. 6+00 TO 10+00	EHLERS ROAD	400			270				215				225									55			
STA. 6+00 TO 12+07	KINGMAN ROAD	607					620		275				570									140			
STA. 10+00 TO 15+00	RELOC. BACKLICK ROAD	500			550				190				480									120			
STA. 10+00 TO 32+50	U.S.RTE.1 (RICHMOND HWY.)	2,615						6,170	6,135	5,800			7,015								620	1,535			
SEE PLANS	MULTI-PURPOSE TRAIL						3,130																645		
SEE PLANS	DRIVEWAYS						85					249											358		
SEE PLANS	PAVING UNDER GUARDRAIL																								
SEE PLANS	TEMP. DETOUR PAVEMENT						5,360				190	945							425						
SUBTOTAL PER COLUMN				13,909	820	42,765	9,195	6,170	41,040	11,260	190	1,194	11,410				21,720		8,675	9,915	5,975	8,995	1003	4,000	100
SUBTOTAL PER ITEM				13,909	43,585		56,405			11,260	12,794				21,720				8,675	9,915	5,975	8,995	1003	4,000	100
GRAND TOTALS				13,909	43,585		56,405			11,260	12,794				21,720				8,675	9,915	5,975	8,995	1003	4,000	100

HYDRAULIC CEMENT
4% BY WEIGHT

1,743 TONS

NOTES :

1. PAVEMENT QUANTITES FOR MAINLINE INCLUDE TRAVEL LANES, INTERSECTION AREAS TO THE RADIAL RETURNS OF THE INTERSECTING SIDESTREET(S), LEFT TURN LANES, RIGHT TURN LANES, AND BEYOND THE NOSE OF THE GORE AT RAMP "C".

⊗ DENOTES ITEM(S) TO BE PAID FOR ON BASIS OF PLAN QUANTITIES IN ACCORDANCE WITH CURRENT VDOT ROAD & BRIDGE SPECIFICATIONS.

SUPERVISED BY RAYMOND L. BURKHARDT
DESIGNED BY SVERDRUP CORP.
CADD OPERATOR
REVISED BY

PLAN | NOTE BOOK NO. | SURVEYED | PLOTTED | ALIGNMENT CHECKED | RIGHT OF WAY CHECKED

DOC. I.D. NO. | 05/25/94 | DATE PLOTTED

PAVEMENT SUMMARY

REVISED	FHWA REGION	STATE	FEDERAL AID PROJECT	STATE ROUTE	STATE PROJECT	SHEET NO.
8-3-94 1-16-95	3	VA		7100	R000-029-F49, PE105 RW223, C523	79

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

LIMITED ACCESS HIGHWAY BY RESOLUTION OF COMMONWEALTH TRANSPORTATION BOARD DATED JULY 15,1987.

DIRECTORY - I:\D20\
DGN FILE - I:\proj2\080354\roi\sb5c\5scp79.dgn
PRF - 5scp79.prf

UTILITY COMPANIES

Water lines property of Fairfax County Water Authority.

Sanitary sewers and storm drains property of Fairfax County.

Telephone poles and underground telephone cables property Chesapeake and Potomac Telephone Co. of Va.

Gas lines property of Washington Gas Light Co.

Power poles, wires and underground cable property of Virginia Power.

Underground TV cables property of Media General Cable of Fairfax.

Power poles, wires and underground cable property of Northern Virginia Electric Cooperative.

PROJECT NO. R000-029-F49, B-685
SPECIAL DESIGN BRIDGE REQUIRED
RTE. 7100 (FAIRFAX COUNTY PARKWAY)
OVER UNNAMED TRIBUTARY
(WILDLIFE CORRIDOR MITIGATION CROSSING)
PLAN NO. 272-46 SHEET NO.'S 87(1) - 87(30)

045
USA COMMANDER
USA ARMY
(FORT BELVOIR)
DB. 1157 Pg. 163
AREA = 8,183.2535 Ac.

N 386,500
E 2,379,500

1910+00

1915+00

1920+00

MATCH LINE STA. 1908+00 SHEET 78

MATCH LINE STA. 1922+00 SHEET 80

KINGMAN ROAD CONST. ℄

Δ = 3°49'30" RT.
D = 3°30'00"
L = 109.29'
T = 54.66'
R = 1637.02'
P.C. 10+97.73
P.I. 11+52.39
P.T. 12+07.02
V = 25 MPH
Ls = SEE PROFILE
E = 0.0128 ft

R/W CURVE NO. 2

Δ = 01°06'23" RT.
L = 222.43'
R = 11,518.16'

KINGMAN ROAD CONST. ℄

Δ = 18°00'40" RT.
D = 5°33'22"
L = 324.17'
T = 163.43'
R = 1031.22'
P.C. = 6+00.00
P.I. = 7+63.43
P.T. = 9+24.17
V = 25 MPH
Ls = See Profile
E = 0.0227 ft

P.O.T. 1917+64.00 MAINLINE CONST. ℄
P.O.T. STA. 10+00.00 KINGMAN ROAD CONST. ℄

BEGIN CONSTRUCTION
P.C. STA. 6+00.00

END CONST.
P.T. STA. 12+07.02

BEGIN L/A LINE

END L/A LINE

UNDER CONSTRUCTION (BY OTHERS)

BROKEN ASPH & GRAVEL ROAD

PLASTIC MUD SHIELD

U/G CM ELECT VAULT

PROP. PERM. DRAIN. ESM'T.

PROP. TEMP. SLOPE. ESM'T.

PROP. R/W & L/A LINE

M.P. TRAIL

10' PAVED SHOULDER

3' PAVED SHOULDER

MAINLINE CONST. ℄

MAINLINE E.B. CONST. ℄

S 56°51'47" E

S 55°57'17" E

STD. MS-2 REQ'D.

OPEN GRID STEEL DECK

BEARING BREAK

TRAFFIC SIGNAL POLE (TYP.) SEE SHT. 92(2)

25:1 TAPER

BEGIN R/W CURVE NO. 2

END R/W CURVE NO. 2

PROP. TEMP. SLOPE. ESM'T.

PROPOSED CHANNEL RELOCATION (SEE DETAIL THIS SHEET)

PROP. PERM. DRAIN. ESM'T.

SWM FACILITY NO. 3 ACCESS ROAD

STD. CG-6 REQ'D.

STD. MB-5B MEDIAN BARRIER

STD. CG-9D ENTRANCE GUTTER REQ'D.

STD. CG-12 REQ'D.

STD. PE-1 ENTRANCE REQ'D.

STD. EC-3 TYPE B REQ'D.

STD. EC-3 TYPE A REQ'D.

STD. EC-2 REQ'D.

EROSION CONTROL STONE (CLASS III) REQ'D.

EROSION CONTROL STONE (CLASS I) REQ'D.

I.P. INLET PROTECTION (TEMP. FILTER BARRIER)

C (CUT) F (FILL) LIMITS OF CONSTRUCTION

GUARDRAIL

T.S.F. TEMPORARY SILT FENCE

T.C. TURBIDITY CURTAIN

T.F.B. TEMPORARY FILTER BARRIER

PROPOSED PERM. DRAIN. EASEMENT

PROPOSED PERM. UTILITY EASEMENT

PROPOSED TEMP. SLOPE EASEMENT

PROPOSED R/W AND L/A LINE

CHECK DAMS (TYPE II)

HATCHED AREAS DENOTE AREAS OF DEMOLITION OF PAVEMENT

CROSS-HATCHED AREAS DENOTE AREAS OF OBSCURING ROADWAY

STORMWATER MANAGEMENT FACILITY NO. 3 (SEE SHEET NO. 95(6)) FOR SWM FACILITY PLAN & DETAILS)

KINGMAN ROAD CONST. ℄

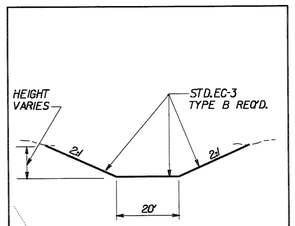
ASPH PARKING

LEGEND:

1. STD. GR-8 REQ'D. *
2. STD. GR-8A REQ'D. *
3. STD. GR-8B REQ'D. *
4. STD. GR-2 REQ'D. *
5. STD. GR-2A REQ'D. *
6. STD. GR-8 TYPE I TERMINAL REQ'D. *
7. STD. GR-8 TYPE II TERMINAL REQ'D. *
8. STD. GR-FOA-2 TYPE I REQ'D. *
9. STD. GR-FOA-2 TYPE II REQ'D. *
9A. STD. GR-FOA-4 TYPE II REQ'D. *
9B. STD. GR-FOA-4 TYPE III REQ'D. *
10. STD. GR-7 BREAKAWAY CABLE TERMINAL REQ'D. *
11. REMOVE EXIST. GUARDRAIL
12. STD. MC-3A ASPHALT CURB REQ'D. (BEGIN)
13. STD. MC-3A ASPHALT CURB REQ'D. (END)
14. FE-CL TYPE I REQ'D.

* SHALL BE WOOD POST WITH WEATHERED STEEL GUARDRAIL IN ACCORDANCE WITH V.D.O.T. SPECIAL PROVISIONS

15. MEDIAN BARRIER TERMINAL MB-5 TYPE II REQ'D.
16. PLUG EXISTING PIPE
17. REMOVE EXISTING MANHOLE.
18. REMOVE EXISTING ENDWALL.
19. REMOVE EXISTING PIPE
20. STD. UD-1 REQ'D.
21. STD. UD-2 REQ'D.
21A. STD. COMBINATION CD-1 & 2 REQ'D.
21B. STD. COMBINATION UNDERDRAIN CD-2 REQ'D.
22. STD. UD-4, 4" LONGITUDINAL PERFORATED PIPE REQ'D.
23. STD. UD-4, 6" LONGITUDINAL PERFORATED PIPE REQ'D.
24. DISMANTLE AND REMOVE EXISTING STRUCTURE
25. RAILING, TEXAS T-6 REQ'D.
26. STD. EW-12 REQ'D.
27. EROSION CONTROL STONE (CLASS I) REQ'D.
28. EROSION CONTROL STONE (CLASS III) REQ'D.
29. STD. EC-2 REQ'D.
30. STD. EC-3 TYPE A REQ'D.
31. STD. EC-3 TYPE B REQ'D.



DETAIL
CHANNEL RELOCATION
℄ STA. 1914+25 (RT.)
℄ STA. 1915+15 (LT.)

NOTE:
1. FE-CL TYPE I FENCE IS 4' HEIGHT CHAINLINK FENCE.

REFERENCES	
MAINLINE PROFILE	79A
KINGMAN ROAD PROFILE	79B
DRAINAGE DESCRIPTIONS	79C
LAYOUT DATA SHEET	11(6)
SIGNALIZATION PLAN	92(2)
SWM FACILITY No. 3	95(6)

SCALE
0 50' 100'

SUPERVISED BY RAYMOND L. BURKHARDT
DESIGNED BY SVERDRUP CORP.
CADD OPERATOR
REVISED BY

PLAN	NOTE BOOK	NO.
DOC. I.D. NO.		
DATE PLOTTED	11/22/94	

Plot Requested by -013036:EstesJMichael, A
/proj2/080354/roi/sb5c/5scp79.dgn
5scp79.prf
SCALE: 1"=50'
11/22/94

A25008 | PLAN NO. | PROJECT R000-029-F49 PE105 RW223, C523 | FILE NO. 66-20-4 | SHEET NO. 79