ECS Southeast, LLC

Report of Limited Subsurface Exploration

Butler High School Athletic Field & Track

Matthews, Mecklenburg County, North Carolina

ECS Project No. 08:13994-A

January 9, 2025

January 9, 2025

Mr. Dan Dodd, RLA
FitFields
314 Tom Hall Street
Fort Mill, South Carolina 29715

ECS Project No. 08:13994-A

Reference: Report of Limited Subsurface Exploration
Butler High School Athletic Field & Track
Matthews, Mecklenburg County, North Carolina

Dear Mr. Dodd,

ECS Southeast, LLC (ECS) has completed the limited subsurface exploration, laboratory testing, and geotechnical engineering considerations for the above-referenced project. Our services were performed in general accordance with our agreed to scope of work. This report presents our understanding of the geotechnical aspects of the project along with the results of the field exploration and laboratory testing conducted, and our design and construction recommendations.

It has been our pleasure to be of service to you during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design and construction phase to confirm subsurface conditions assumed for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us at (704) 525-5152.

Respectfully submitted,

ECS Southeast, LLC

NORTH CAROLINA PROFESSIONAL SEAL 058427 ENGINEER SIERRA MONDIN VARDAOULIS 1-09-25

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1.0 INTRODUCTION

The purpose of this study was to provide subsurface exploration and geotechnical considerations for the proposed improvements at the Butler High School athletic field and track located at 1810 Matthews-Mint Hill Road in Matthews, Mecklenburg County, North Carolina. The recommendations developed for this report are based on the project information supplied by the Client. Our services were provided in accordance with ECS Proposal No. 08:30913P dated December 9, 2024, and includes the Terms and Conditions of Service outlined within the agreement.

This report contains the procedures and results of our subsurface exploration and laboratory testing programs, review of existing site conditions, engineering analyses, and recommendations for the design and construction of the geotechnical aspects of the project. The report includes the following items.

- Information on current site conditions, including geologic information and special site features.
- Description of the field exploration and laboratory tests performed.
- Final logs of the soil borings and records of the field exploration and laboratory tests performed.
- Measurement of the surficial materials at each boring location.
- Evaluation of the on-site soil characteristics encountered in the hand auger borings with respect to the suitability of the on-site materials for reuse as Engineered Fill.
- General recommendations for compaction requirements for fill and backfill areas.
- General recommendations regarding site preparation and construction observations and testing.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION/CURRENT SITE USE/PAST SITE USE

The project site is located at 1810 Matthews-Mint Hill Road in Matthews, Mecklenburg County, North Carolina as shown on the figure below and included on the Site Location Diagram in Appendix A. According to Mecklenburg County GIS, the site is a portion of the parcels identified as Mecklenburg County Parcels ID Number (PINs) 21510204, 21510203, and 21510222.

Based on our site reconnaissance, the site is currently developed with an athletic field and track, associated ancillary structures, and drive areas. The site is located within the southeastern portion of the Butler High School Campus and surrounded by additional athletic fields and parking areas. Based on available Mecklenburg County GIS topographic information, existing site grade elevations range from approximately 732 to 734 feet.

Based on a review of available historic imagery, as early as 1993, it appears that the site was undeveloped and consisted primarily of wooded land. By 1998, the Butler High School campus had been constructed. The site has remained in a generally similar condition since that time. The previous use of discussion is not considered a comprehensive or in-depth of the site history, rather a quick overview of available aerial imagery.

2.2 PROPOSED CONSTRUCTION

The site is currently an active high school athletic field and track. Based on our correspondence with you, we understand that the existing track is going to be removed and replaced, and a new synthetic turf field system will be installed. No additional information has been provided to us.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

Our exploration procedures are explained in greater detail in Appendix B including the insert titled Subsurface Exploration Procedure. Our scope of work included performing four (4) asphalt cores within the existing track pavement and three (3) hand auger borings coupled with Wildcat™ Dynamic Cone Penetrometer (WDCP) tests to depths ranging from approximately 3 to 5 feet below existing grades. The borings were located using GPS technology and existing site features as reference and their approximate locations are shown on the Exploration Location Diagram in Appendix A. The topographic data and elevations noted on the Boring Logs, Subsurface Cross Sections, and referenced in this report were estimated from Mecklenburg County GIS topographic information and should be considered preliminary and approximate.

3.1 SUBSURFACE CHARACTERIZATION

The site is located in the Piedmont Physiographic Province of North Carolina. The native soils in the Piedmont Province consist mainly of residuum with underlying saprolites weathered from the parent bedrock, which can be found in both weathered and unweathered states. In a mature weathering profile of the Piedmont Province, the soils are generally found to be finer grained at the surface where more extensive weathering has occurred. The particle size of the soils generally becomes more granular with increasing depth and gradually changes first to weathered and finally to unweathered parent bedrock.

The natural geology within the site has been modified in the past by grading, disturbance of near-surface soils, and/or placement of fill materials. The quality of man-made fills can vary significantly, and it is difficult to assess the engineering properties of existing fills. Furthermore, there is no specific correlation between WDCP penetration test values and the degree of compaction of existing fill soils; however, a qualitative assessment of existing fills can sometimes be made based on the penetration values obtained and observations of the materials sampled in the borings.

The following sections provide generalized characterizations of the subsurface materials. Please refer to the subsurface cross sections in Appendix A and hand auger logs in Appendix B for more detailed information.

GENERALIZED SUBSURFACE CONDITIONS			
Approximate Depth (ft)	**Stratum**	**Description**	**Ranges of WDCP Correlated SPT N-values (bpf)(1)**
0 to 0.4	N/A	Surficial organic laden soils	N/A
0.4 to 5	I	FILL(2) – Lean CLAY (CL) and Sandy ORGANIC SILT/CLAY (OL/OH) (3)	5 to 17
0.4 to 5	II	RESIDUUM – Lean CLAY with Sand (CL), Sandy SILT (ML), and Silty SAND (SM)	6 to 25+

Notes:
(1) Standard Penetration Test N-values correlated from WDCP test data.
(2) Existing fill was encountered at boring locations HA-01 and HA-03 and extended to depths ranging from approximately 1 to 5 feet below the existing ground surface. Boring HA-03 was terminated in fill material.
(3) Organic laden fill included various roots and wood debris.

3.2 EXISTING PAVEMENT OBSERVATIONS
Four (4) asphalt cores were performed at widely spaced locations within the existing track. Photos of the cores obtained are provided in Appendix B. Additionally, the stone base course materials below the asphalt were removed by hand to approximate the thickness at each testing location. The core locations were located using handheld GPS technology and existing site features as reference and the approximate locations are shown on the Exploration Location Diagram attached.

Pavement thicknesses at each core location are recorded in the table below:

APPROXIMATE TRACK MATERIAL THICKNESSES				
Core No.	**Rubber Surface Coat (inches)**	**Asphalt Thickness (inches)**	**Stone Base Thickness (inches)**	**Total Section Thickness (inches)**
C-04	1/8	1 5/8	4	5 3/4
C-05	3/8	3 1/8	4	7 1/2
C-06	3/8	3 1/8	4	7 1/2
C-07	3/8	3 3/8	5	8 3/4

3.3 GROUNDWATER OBSERVATIONS
Groundwater measurements were attempted at the termination of drilling and prior to demobilization from the site. Groundwater was not apparent within the borings at the time of drilling to the explored depths.

3.4 LABORATORY TESTING
The laboratory testing consisted of selected tests performed on samples obtained during our field exploration. Classification, moisture content, percent fines (-200 wash), and Atterberg limit tests were

performed. The results are included on the boring logs in Appendix B and Laboratory Testing Summary in Appendix C.

Each sample was visually classified on the basis of texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and including USCS classification symbols, and ASTM D2487 Standard Practice for Classification for Engineering Purposes (Unified Soil Classification System, USCS). After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual.

4.0 COMMENTARY AND CONSIDERATIONS

4.1 ARTIFICIAL TURF SPORTS FIELD

ECS has not been provided information regarding planned synthetic turf field systems. Subgrade preparation and fill material placement within the playing surface area should conform to the field manufacturers specifications.

4.2 EXISTING ORGANIC LADEN FILL

Existing fill was encountered at boring locations HA-01 and HA-03 and extended to depths ranging from approximately 1 to at least 5 feet below existing grades. Portions of the fill contained organic laden soil material along with roots and wood debris. Records of the fill placement were not provided to us; therefore, the fill is considered undocumented. Constructing over undocumented and organic laden fill inherently creates a greater than normal risk that there could be excessive settlement of the supported structure. Existing fill devoid of deleterious materials and meeting the requirements of Engineered Fill may be re-used following undercutting/excavation. If available, records of the previous sitework (i.e. proofrolling, compaction testing, etc.) should be obtained and provided to us for review and updates to our recommendations, if warranted.

4.3 PROOFROLLING

Prior to fill placement or other construction on subgrades, the subgrades should be observed for stability. In areas accessible to appropriate construction equipment, the exposed subgrade should be thoroughly proofrolled. Typical equipment may include a vehicle having a minimum axle load of 10 tons [e.g. fully loaded tandem-axle dump truck]. Proofrolling should be traversed in two perpendicular directions with overlapping passes of the vehicle under the observation of ECS. However, if full depth removal of existing fill is selected as the remediation option, access to the bottom of the excavation may not be feasible to typical proofrolling equipment, and alternative methods of evaluation should be considered (i.e. dynamic cone penetration testing, static probing, etc.). In any event, the prepared subgrade should meet the stability criteria and material properties required by the artificial turf designer.

Undocumented fill poses risks associated with undetected deleterious inclusions within the fill and/or deleterious materials at the virgin ground/fill interface that are covered by the fill. Deleterious materials can consist of significant amounts of organics derived from organic rich strippings, rubbish, construction or demolition debris, shot rock, stumps and roots and logs. If these materials are covered over by or are within undocumented fill, the organic materials tend to decompose slowly in the anaerobic conditions in or under the fill. Decomposition can occur over periods ranging from several years to several decades. As the organic materials decompose, a void is created which can create soft conditions and even subsidence in areas above the organics. Additionally, nested debris or rock materials may contain voids and result in ground subsidence. Where these types of conditions exist under or within undocumented fill, they are sometimes in discreet pockets that can go undetected by normal subsurface exploration techniques, i.e. soil test borings and test pits.

The risk of constructing athletic fields on undocumented and organic laden fill can be reduced by removal of the existing fill (or partial undercuts) and replacement with general Engineered Fill and/or materials specified by the synthetic field manufacturer.

4.4 ENGINEERED FILL

Prior to placement of Engineered Fill, representative bulk samples (about 50 pounds) of on-site and/or off-site borrow should be submitted to ECS for laboratory testing, which will typically include Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships (i.e., Proctors) for compaction. Import materials should be tested prior to being hauled to the site to determine if they meet project specifications. Additional specifications may be required by the artificial turf design build contractor.

Engineered Fill Materials: Materials for use as general Engineered Fill should consist of inorganic soils classified as CL, ML, SM, SC, SW, SP, GM or GC, or a combination of these group symbols per ATSM D2487. These materials should have maximum liquid limit (LL) and plasticity index (PI) values of 50 and 30, respectfully, be free of organic matter, debris, and should contain no particle sizes greater than 4 inches in the largest diameter. Open graded materials and gravels (GW and GP), which contain void space in their mass, should not be used in Engineered Fills unless properly encapsulated with filter fabric. Additional fill criteria and specifications associated with synthetic field systems should be provided by the field designer/manufacturer as appropriate.

Fill Placement: Fill materials should not be placed on frozen soils, on frost-heaved soils, and/or on excessively wet soils. Borrow fill materials should not contain frozen materials at the time of placement, and frozen or frost-heaved soils should be removed prior to placement of Engineered Fill or other fill soils and aggregates. Excessively wet soils or aggregates should be scarified, aerated, and moisture conditioned. Where fill materials will be placed to widen existing embankment fills, or placed up against sloping ground, the soil subgrade should be scarified, and the new fill benched or keyed into the existing material. Fill material should be placed in horizontal lifts.

Fill Compaction Control: The expanded limits of the proposed construction areas should be well defined, including the limits of the fill zones for development areas at the time of fill placement. Grade controls should be maintained throughout the filling operations. Filling operations should be observed on a full-time basis by ECS to determine that the minimum compaction requirements are being achieved. The turf designer shall specify the testing frequency for all fills.

Compaction Equipment: Compaction equipment appropriate for the soil type being compacted should be used to compact the subgrades and fill materials. Sheepsfoot compaction equipment should be used for fine-grained soils (Clays and Silts). A vibratory steel drum roller should be used for compaction of coarse-grained soils (Sands) as well as for sealing compacted surfaces.

4.5 GENERAL CONSTRUCTION CONSIDERATIONS

Because the site has been previously disturbed, built-over, and/or filled, we emphasize the importance of comprehensive subgrade evaluations prior to Engineered Fill placement and/or other construction activities. These evaluations may include proofrolling the subgrade soils, performing hand auger borings, and excavation of test pits within previously disturbed, built-over, and/or filled areas. The mentioned evaluations would help in identifying areas of soft, loose, otherwise unsuitable materials, or buried debris, which would require remedial activities. We recommend a contingency for unforeseen conditions in the earthwork phase of construction.

Moisture Conditioning: During the cooler and wetter periods of the year, delays and additional costs should be anticipated. At these times, reduction of soil moisture of general structural fill may need to be accomplished by mechanical manipulation. Chemical additives, such as lime or cement, may be considered to dry general engineered fill outside the limits of the development areas. Alternatively, during the drier times of the year, such as the summer months, moisture may need to be added to the soil to provide adequate moisture for successful compaction according to the project requirements.

Subgrade Protection: Measures should also be taken to limit site disturbance, especially from rubber-tired heavy construction equipment, and to control and remove surface water from development areas. It would be advisable to designate a haul road and construction staging area to limit the areas of disturbance and to prevent construction traffic from excessively degrading sensitive subgrade soils and existing pavement areas. Haul roads and construction staging areas could be covered with excess depths of aggregate to protect those subgrades. The aggregate can later be removed and used as Engineered Fill provided it meets project specifications.

Surface Drainage: Surface drainage conditions should be properly maintained. Surface water should be directed away from the construction area, and the work area should be sloped away from the construction area at a gradient of at least 1 percent to reduce the potential of ponding water and the subsequent saturation of the surface soils. At the end of each workday, the subgrade soils should be sealed by rolling the surface with a smooth drum roller to minimize infiltration of surface water.

Excavation Safety: Excavations and slopes should be constructed and maintained in accordance with OSHA excavation safety standards. The Contractor is solely responsible for designing, constructing, and maintaining stable temporary excavations and slopes. The Contractor’s responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the Contractor’s safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our Client. ECS is not assuming responsibility for construction site safety or the Contractor’s activities; such responsibility is not being implied and should not be inferred.

5.0 CLOSING

ECS has prepared this report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided to ECS by the Client. If any of this information is inaccurate or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our recommendations and provide additional or alternate recommendations that reflect the proposed construction.

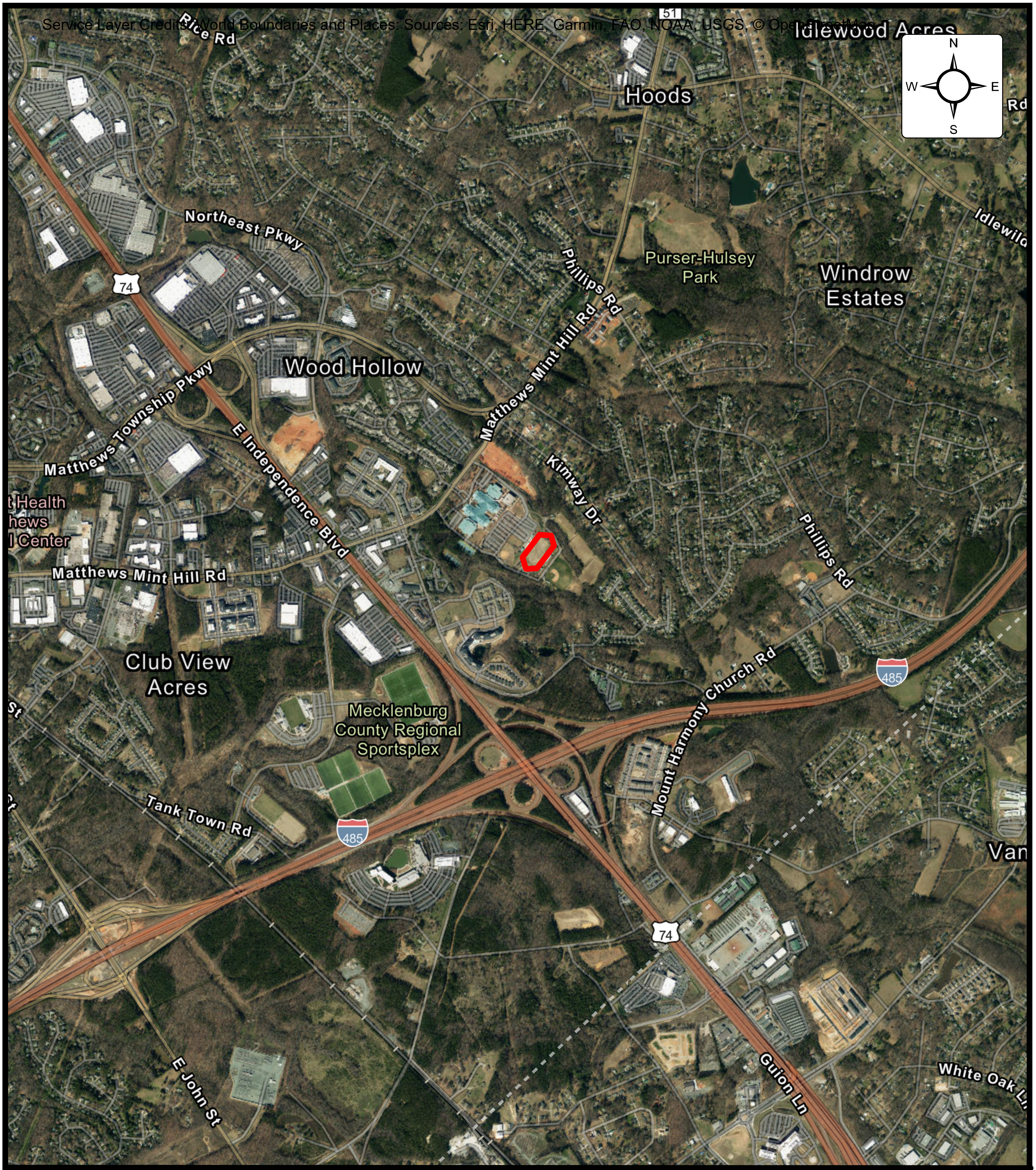
We recommend that ECS review the project plans and specifications so we can confirm that those plans/specifications are in accordance with the recommendations of this geotechnical report.

Field observations, and quality assurance testing during earthwork and construction are an extension of, and integral to, the geotechnical design. ECS should be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendations should issues arise.

ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

Appendix A - Drawings and Reports

Site Location Diagram
Boring Location Diagram(s)
Subsurface Cross-Section(s)



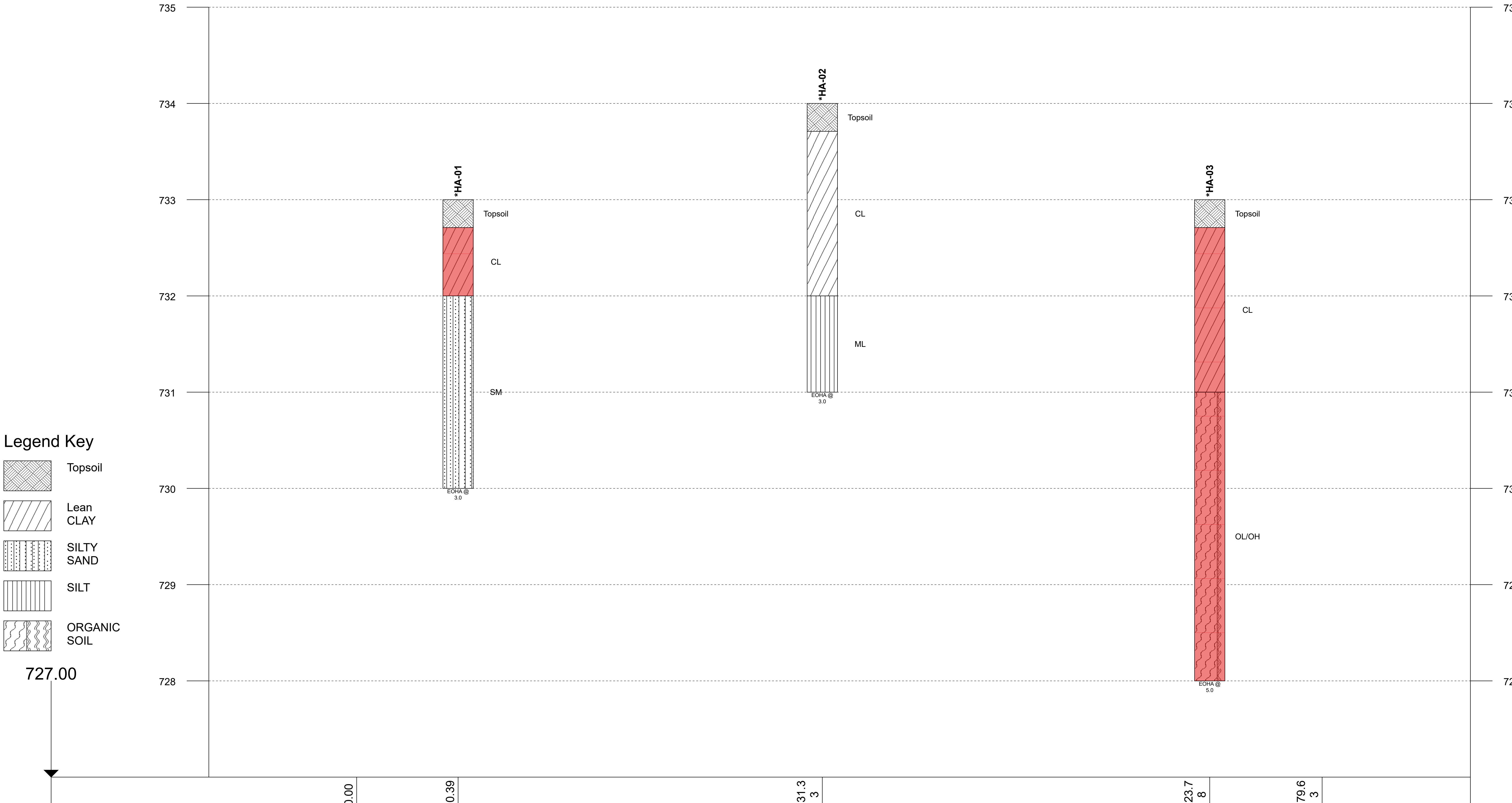
SITE LOCATION DIAGRAM **Butler HS Athletic Field & Track** **Matthews, Mecklenburg County, North Carolina** **FitFields**	ENGINEER CJC
	SCALE 1" = 2000'
	PROJECT NO. 08:13994-A
	SHEET 1
	DATE 1/9/2025

BORING LOCATION DIAGRAM
Butler HS Athletic Field & Track

Matthews, Mecklenburg County, North Carolina

FitFields

ENGINEER	CJC
SCALE	1" = 100'
PROJECT NO.	08:13994-A
SHEET	2
DATE	1/9/2025



Notes:

1- EOB: END OF BORING AR: AUGER REFUSAL SR: SAMPLER REFUSAL.
2- THE NUMBER BELOW THE STRIPS IS THE DISTANCE ALONG THE BASELINE.
3- SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION.
4- STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586).

Plastic Limit X	Water Content ● Liquid Limit △
[FINES CONTENT %]	
	BOTTOM OF CASING
	LOSS OF CIRCULATION
○	CALIBRATED PENETROMETER

▽	WL (First Encountered)		Fill
▼	WL (Completion)		Possible Fill
▽	WL (Estimated Seasonal High Water)		Probable Fill
▽	WL (Stabilized)		Rock

GENERALIZED SUBSURFACE CROSS SECTION

A-A'

Butler HS Athletic Field & Track

FitFields

Matthews, Mecklenburg County, North Carolina

Project No:	08:13994-A	Date:	01/09/2025

Appendix B – Field Operations

Exploration Procedures
Hand Auger Boring Logs
Photographs

SUBSURFACE EXPLORATION PROCEDURES:
HAND AUGER BORINGS
DYNAMIC CONE PENETROMETER (DCP) TESTS
WILDCAT DYNAMIC CONE PENETROMETER (WDCP) TESTS

Hand auger borings coupled with dynamic cone penetrometer testing are often performed to evaluate shallow subsurface explorations and/or locations with limited access to larger equipment.

Hand Auger Boring Procedure:

The hand auger borings were conducted in general conformance with ASTM D1452. In this procedure, the auger boring is performed by manually rotating and advancing an auger to the desired depths while periodically removing the auger from the hole to clear and examine the auger cuttings. The auger cuttings were visually classified in the field. Stratification lines shown on the hand auger boring logs represent approximate boundaries between physical soil types.

Dynamic Cone Penetrometer (DCP) Test Procedure:

The dynamic cone penetrometer testing was performed in general accordance with ASTM SPT 399. In this procedure, a sliding hammer with a 15 pound steel mass is dropped 20 inches on a cone tip and the number of blows to penetrate 1.75 inches is recorded. The results are presented in blows per increment (bpi).

Wildcat Dynamic Cone Penetrometer (WDCP) Test Procedure:

For the WDCP test, a sliding hammer is dropped on a cone tip and the resulting penetration of the cone is recorded. The 35 lb hammer is repeated dropped from a height of 15 inches and the number of hammer drops (blows per increment) is recorded over continuous 10 centimeter lengths.

CLIENT:	PROJECT NO.:	SHEET:
FitFields	**08:13994-A**	**1 of 1**
PROJECT NAME: **Butler HS Athletic Field & Track**	HAND AUGER NO.: **HA-01**	SURFACE ELEVATION: **733**
SITE LOCATION: **Matthews, Mecklenburg County, North Carolina**		STATION:
LATITUDE: **35.118653**	LONGITUDE: **-80.688895**	

DEPTH (FT)	WATER LEVELS	ELEVATION (FT)	DESCRIPTION OF MATERIAL	EXCAVATION EFFORT	DCP	SAMPLE NUMBER	FINES CONTENT (%)	MOISTURE CONTENT (%)
			Topsoil Thickness[4.00"]					
			(CL FILL) FILL, LEAN CLAY WITH SAND, reddish brown, moist, trace organics					
			(SM) Residuum, SILTY SAND, grayish light brown, moist	M				
			END OF HAND AUGER AT 3.0 FT					
5		728						
10		723						
15								

REMARKS:

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

		ECS REP:	DATE COMPLETED:	UNITS:	CAVE-IN-DEPTH:
▽ WL (First Encountered)	▼ WL (Seasonal High)				
▼ WL (Completion)		**BW, SJ**	**Dec 20 2024**	**English**	

HAND AUGER LOG

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1812 Center Park Drive, Suite D
Charlotte, NC 28217

PROJECT NUMBER: 08:13994-A
DATE STARTED: 12-20-2024
DATE COMPLETED: 12-20-2024

HOLE #: HA-01
CREW: BW, SJ
PROJECT: Butler HS Athletic Field & Track
ADDRESS: 1810 Matthews-Mint Hill Rd
LOCATION: Matthews, North Carolina

SURFACE ELEVATION: 733
WATER ON COMPLETION:
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
- 1 ft	16	71.0	•••••••••••••••••••	20	MEDIUM DENSE	VERY STIFF
-	32	142.1	••••••••••••••••••••••••••••••••••••••	25+	DENSE	HARD
-	29	128.8	•••••••••••••••••••••••••••••••••••	25+	DENSE	HARD
- 2 ft	35	155.4	•••	25+	DENSE	HARD
-	45	199.8	•••	25+	VERY DENSE	HARD
-	48	213.1	•••	25+	VERY DENSE	HARD
- 3 ft	50	222.0	•••	25+	VERY DENSE	HARD
- 1 m						
-						
- 4 ft						
-						
-						
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

CLIENT: FitFields	PROJECT NO.: 08:13994-A	SHEET: 1 of 1
PROJECT NAME: Butler HS Athletic Field & Track	HAND AUGER NO.: HA-02	SURFACE ELEVATION: 734
SITE LOCATION: Matthews, Mecklenburg County, North Carolina		STATION:
LATITUDE: 35.118899	LONGITUDE: -80.688369	

DEPTH (FT)	WATER LEVELS	ELEVATION (FT)	DESCRIPTION OF MATERIAL	EXCAVATION EFFORT	DCP	SAMPLE NUMBER	FINES CONTENT (%)	MOISTURE CONTENT (%)
			Topsoil Thickness[4.00"]					
			(CL) Residuum, LEAN CLAY WITH SAND, grayish brown to yellowish brown, moist	M			71	16.8
			(ML) SANDY SILT, yellowish brown, moist					
			END OF HAND AUGER AT 3.0 FT					
5		729						
10		724						
15								

REMARKS:

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

▽ WL (First Encountered)	▼ WL (Seasonal High)	ECS REP: BW, SJ	DATE COMPLETED: Dec 20 2024	UNITS: English	CAVE-IN-DEPTH:
▼ WL (Completion)					

HAND AUGER LOG

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1812 Center Park Drive, Suite D
Charlotte, NC 28217

PROJECT NUMBER: 08:13994-A
DATE STARTED: 12-20-2024
DATE COMPLETED: 12-20-2024

HOLE #: HA-02
CREW: BW, SJ
PROJECT: Butler HS Athletic Field & Track
ADDRESS: 1810 Matthews-Mint Hill Rd
LOCATION: Matthews, North Carolina

SURFACE ELEVATION: 733
WATER ON COMPLETION:
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
- 1 ft	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	8	35.5	••••••••••	10	LOOSE	STIFF
-	18	79.9	••••••••••••••••••••••	22	MEDIUM DENSE	VERY STIFF
- 2 ft	38	168.7	•••	25+	DENSE	HARD
-	41	182.0	•••	25+	VERY DENSE	HARD
-	44	195.4	•••	25+	VERY DENSE	HARD
- 3 ft	29	128.8	••••••••••••••••••••••••••••••••••••	25+	DENSE	HARD
- 1 m	22	97.7	•••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
-						
- 4 ft						
-						
-						
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

CLIENT: FitFields	PROJECT NO.: 08:13994-A	SHEET: 1 of 1
PROJECT NAME: Butler HS Athletic Field & Track	HAND AUGER NO.: HA-03	SURFACE ELEVATION: 733
SITE LOCATION: Matthews, Mecklenburg County, North Carolina		STATION:
LATITUDE: 35.119188	LONGITUDE: -80.687830	

DEPTH (FT)	WATER LEVELS	ELEVATION (FT)	DESCRIPTION OF MATERIAL	EXCAVATION EFFORT	DCP	SAMPLE NUMBER	FINES CONTENT (%)	MOISTURE CONTENT (%)
			Topsoil Thickness[4.00"]					
			(CL FILL) FILL, LEAN CLAY WITH SAND, trace organics, reddish brown, moist				78	19.5
			(OL/OH FILL) FILL, SANDY ORGANIC SILT/CLAY, contains roots and wood, reddish brown to grayish brown, moist	M				
5		728	**END OF HAND AUGER AT 5.0 FT**					
10		723						
15								

REMARKS:

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

EXCAVATION EFFORT: E - EASY M - MEDIUM D - DIFFICULT VD - VERY DIFFICULT

▽ WL (First Encountered)	▼ WL (Seasonal High)	ECS REP:	DATE COMPLETED:	UNITS:	CAVE-IN-DEPTH:
▼ WL (Completion)		BW, SJ	Dec 20 2024	English	

HAND AUGER LOG

WILDCAT DYNAMIC CONE LOG

ECS Southeast, LLC
1812 Center Park Drive, Suite D
Charlotte, NC 28217

PROJECT NUMBER: 08:13994-A
DATE STARTED: 12-20-2024
DATE COMPLETED: 12-20-2024

HOLE #: HA-03
CREW: BW, SJ
PROJECT: Butler HS Athletic Field & Track
ADDRESS: 1810 Matthews-Mint Hill Rd
LOCATION: Matthews, North Carolina

SURFACE ELEVATION: 733
WATER ON COMPLETION:
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
- 1 ft	9	40.0	•••••••••••	11	MEDIUM DENSE	STIFF
-	14	62.2	••••••••••••••••••	17	MEDIUM DENSE	VERY STIFF
-	10	44.4	••••••••••••	12	MEDIUM DENSE	STIFF
- 2 ft	10	44.4	••••••••••••	12	MEDIUM DENSE	STIFF
-	11	48.8	••••••••••••••	13	MEDIUM DENSE	STIFF
-	9	40.0	•••••••••••	11	MEDIUM DENSE	STIFF
- 3 ft	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
- 1 m	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
-						
- 4 ft						
-						
-						
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

Pavement Core C - 04

Rubber Surface Coat: **1/8 inch**
Asphalt Thickness: **1 5/8 inches**
Aggregate Base Course Thickness: **4 inches**

Pavement Core C - 05

Rubber Surface Coat: **3/8 inch**
Asphalt Thickness: **3 1/8 inches**
Aggregate Base Course Thickness: **4 inches**

Pavement Core C-06

Rubber Surface Coat: **3/8 inch**
Asphalt Thickness: **3 1/8 inches**
Aggregate Base Course Thickness: **4 inches**

Pavement Core C-07

Rubber Surface Coat: **3/8 inch**
Asphalt Thickness: **3 3/4 inches**
Aggregate Base Course Thickness: **5 inches**

Pavement Cores Photos
January 9, 2024

Butler HS Athletic Field and Track
Charlotte, Mecklenburg County, North Carolina
ECS Project No. 08:13994-A

Appendix C – Laboratory Testing

Laboratory Testing Summary

Laboratory Testing Summary

Sample Location	Sample Number	Depth (ft)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
HA-02	D3S-1	0.0-1.0	16.8	*CL	44	16	28	70.6					
HA-03	D3S-2	1.0-2.0	19.5	*CL	45	21	24	78.2					

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Butler HS Athletic Field & Track
Client: FitFields

Project No.: 08:13994-A
Date Reported: 1/9/2025

Office / Lab	Address	Office Number / Fax
ECS Southeast LLC - Charlotte	1812 Center Park Drive Suite D Charlotte, NC 28217	(704)525-5152 (704)357-0023

Tested by	Checked by	Approved by	Date Received
MSitzler	AHuxtable	AHuxtable	12/27/2024

Appendix D – Other Information

GBA - Geotechnical Engineering Report Information Sheet

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:
- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:
- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept* *responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are <u>not</u> final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are <u>Not</u> Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will <u>not</u> of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are <u>not</u> building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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