

April 24, 2019

HILLIS-CARNES

ENGINEERING ASSOCIATES

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Mr. Bo Koch
BuilderGuru Contracting | Gardiner & Gardiner Contracting
741 Generals Highway, Suite 104
Millersville, MD 21108

Re: **Weems-Whelan Field Borings**
935 Spa Rd, Annapolis, MD 21401
HCEA Job No. 19215A

Dear Mr. Koch,

Pursuant to your request, HCEA conducted a subsurface exploration of the athletic field site at 935 Spa Road in Annapolis, Maryland. HCEA drilled four (4) Standard Penetration Test (SPT) soil borings ranging in depth from 20 feet to 30 feet. Soil samples were obtained and groundwater depths were recorded during drilling. The soils were visually and manually classified according to the Unified Soils Classification System (USCS) by a Geotechnical Engineer in our laboratory.

The Records of Soil Exploration (boring logs) are included with this letter. Elevations were estimated using available on-line sources. Our method of soil classification and a boring location plan are also attached.

Should you have any questions or require any additional information please do not hesitate to contact us.

Most sincerely,

Hillis-Carnes Engineering Associates, Inc.



Nathaniel Payer, E.I.T.
Staff Engineer



David G. Patron, P.E.
Vice President
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Attachments – Records of Soil Explorations (4 pages), Method of Soil Description, Boring Location Plan

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

RECORD OF SOIL EXPLORATION

Project Name Weems - Whelan Field Borings Boring No. B-1

Location 935 Spa Rd, Annapolis, MD Job # 19215A

SAMPLER

Datum _____ Hammer Wt. 140 lbs. Hole Diameter 6 in. Foreman C. Leatherman

Surf. Elev. 26 ft Hammer Drop 30 in. Rock Core Diameter NA Inspector _____

Date Started 4/17/2019 Pipe Size (O.D.) 2.0 in. Boring Method HSA Date Completed 4/17/2019

Elevation/ Depth (ft)	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Sample No.	Rec. (in)	NM (%)	SPT Blows	SPT N (blows/ft)												
								N	10	30	50									
0																				
25	D	Brown, moist, loose, clayey SAND, trace gravel and organics (SC; FILL)	3" topsoil	1	14		1-3-4	7												
	D	Dark gray with orange-brown, moist, loose to very loose, clayey SAND, trace brick, burnt or vitrified wood, and glass (SC; FILL)	Groundwater not encountered while drilling	2	15		2-4-5	9												
5	I	- some burnt or vitrified wood in Sample 4		3	12		3-4-1	5												
20	D			4	11		1-1-1	2												
	D	Orange-brown and green-brown, moist, medium stiff, sandy CLAY (CL)		5	14		1-2-4	6												
15				6	12		1-7-4	11												
10	D	Purple-brown and green-brown, moist, medium dense, clayey SAND (SC)																		
5				7	16		3-7-8	15												
20		Dark red-brown, very moist, medium dense, SAND, some silt, trace clay (SM)	Boring backfilled at completion																	
5		Boring terminated at 20 ft																		
25																				
0																				
30																				
-5																				

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

AT COMPLETION
AFTER 24 HRS.
AFTER _____ HRS.

GROUND WATER

17.5 ft.
____ ft.
____ ft.

CAVE IN DEPTH

18.5 ft.
____ ft.
____ ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

RECORD OF SOIL EXPLORATION

Project Name Weems - Whelan Field Borings Boring No. B-2

Location 935 Spa Rd, Annapolis, MD Job # 19215A

SAMPLER

Datum _____ Hammer Wt. 140 lbs. Hole Diameter 6 in. Foreman C. Leatherman

Surf. Elev. 26 ft Hammer Drop 30 in. Rock Core Diameter NA Inspector _____

Date Started 4/17/2019 Pipe Size (O.D.) 2.0 in. Boring Method HSA Date Completed 4/17/2019

Elevation/ Depth (ft)	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Sample No.	Rec. (in)	NM (%)	SPT Blows	SPT N (blows/ft)			
								N	10	30	50
0		Green/orange-brown, moist, loose, SAND, some clay, trace gravel, asphalt and roots (SC; FILL)	3" topsoil	1	14		2-2-4	6			
25	D			2	14		2-1-1	2			
	D	Dark and light gray, moist to very moist, very loose, silty SAND and burnt or vitrified wood, trace glass (SM; FILL)	Groundwater not encountered while drilling	3	2		1/18"	1			
5	D			4	2		1/18"	1			
20	D	- dark gray and dark orange-brown, trace non-combusted wood		5	8		1-1-1	2			
10	D			6	16		1-1-1	2			
15	D	Beige-gray to blue/green-gray, wet, very soft, CLAY, sandy to some sand (CL; possible FILL)		7	14		1-1-1	2			
10	D		Boring backfilled at completion	8			1-2-5	7			
15	D	Green-gray with orange-brown, wet, very loose, SAND, some silt (SM)									
20	D	Beige and orange-brown, wet, loose, clayey SAND, trace gravel (SC)									
5	D	Boring terminated at 25 ft									
25	D										
0											
30											
-5											

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

AT COMPLETION
AFTER 24 HRS.
AFTER _____ HRS.

GROUND WATER

17.0 ft.

CAVE IN DEPTH

22.0 ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

RECORD OF SOIL EXPLORATION

Project Name Weems - Whelan Field Borings Boring No. B-3

Location 935 Spa Rd, Annapolis, MD Job # 19215A

SAMPLER

Datum _____ Hammer Wt. 140 lbs. Hole Diameter 6 in. Foreman C. Leatherman

Surf. Elev. 26 ft Hammer Drop 30 in. Rock Core Diameter NA Inspector _____

Date Started 4/17/2019 Pipe Size (O.D.) 2.0 in. Boring Method HSA Date Completed 4/17/2019

Elevation/ Depth (ft)	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Sample No.	Rec. (in)	NM (%)	SPT Blows	SPT N (blows/ft)				
								N	10	30	50	
0		Orange-green-brown, moist, loose, SAND, some clay and glass, trace masonry and wood (SC; FILL)	3" topsoil	1	16		3-4-2	6				
25	D			2	2		2-2-1	3				
	D	Gray, moist to very moist, very loose to loose, silty SAND and burnt or vitrified wood, trace glass (SM; FILL)	Groundwater not encountered while drilling	3	2		1/18"	1				
5	D			4	2		1/18"	1				
20	D	- some glass and brick fragments in Sample 4		5	4		5-5-4	9				
10	D			6	1		1-1-2	3				
15	D	- some concrete fragments in Sample 6 [poor recovery]		7	16		1-1-1	2				
20	I	Dark green-gray and green-brown, very moist, very loose to medium dense, SAND, clayey to some clay (SC)		8	12		1-5-6	11				
5			Boring backfilled at completion									
25	D	Boring terminated at 25 ft										

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

AT COMPLETION
AFTER 24 HRS.
AFTER _____ HRS.

GROUND WATER

21.0 ft.
____ ft.
____ ft.

CAVE IN DEPTH

23.5 ft.
____ ft.
____ ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

HILLIS - CARNES ENGINEERING ASSOCIATES, INC.

RECORD OF SOIL EXPLORATION

Project Name Weems - Whelan Field Borings Boring No. B-4

Location 935 Spa Rd, Annapolis, MD Job # 19215A

SAMPLER

Datum _____ Hammer Wt. 140 lbs. Hole Diameter 6 in. Foreman C. Leatherman

Surf. Elev. 25 ft Hammer Drop 30 in. Rock Core Diameter NA Inspector _____

Date Started 4/17/2019 Pipe Size (O.D.) 2.0 in. Boring Method HSA Date Completed 4/17/2019

Elevation/ Depth (ft)	SOIL SYMBOLS/ SAMPLE CONDITIONS	Description	Boring and Sampling Notes	Sample No.	Rec. (in)	NM (%)	SPT Blows	SPT N (blows/ft)			
								N	10	30	50
25	D	Brown and beige, moist, loose, clayey SAND, trace gravel and roots (SC; FILL)	3" topsoil	1	8		2-2-3	5			
		Dark brown and black, moist, very loose to medium dense, silty SAND, trace glass and clay (SM; FILL)	Groundwater not encountered while drilling	2	4		2-1-1	2			
		- some clay		3	2		1-1-2	3			
				4	6		1-1-12	13			
		- trace non-combusted wood and masonry fragments in Sample 5		5	11		3-2-4	6			
				6	8		4-8-3	11			
					7	6		1-1-2	3		
			Dark brown and gray, moist, very loose, silty SAND and burnt or vitrified wood, trace glass, with odor (SM; FILL)	Boring backfilled at completion	8	11		1-2-1	3		
			Dark green-gray, very moist, clayey SAND, some organics and glass, with odor (SC; FILL)		9	12		1-2-4	6		
		Green-brown, wet, loose, SAND, trace clay and gravel, with odor (SP-SC; possible FILL)									
-5		Boring terminated at 30 ft									

SAMPLER TYPE

DRIVEN SPLIT SPOON UNLESS OTHERWISE
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

AT COMPLETION
AFTER 24 HRS.
AFTER _____ HRS.

GROUND WATER

19.0 ft.
____ ft.
____ ft.

CAVE IN DEPTH

20.0 ft.
____ ft.
____ ft.

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

HILLIS-CARNES ENGINEERING ASSOCIATES, Inc.

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Description of Soils – per ASTM D2487

Major Component	Component Type	Component Description	Symbol	Group Name		
Coarse-Grained Soils, More than 50% is retained on the No. 200 sieve	Gravels – More than 50% of the coarse fraction is retained on the No. 4 sieve. Coarse = 1" to 3" Medium = ½" to 1" Fine = ¼" to ½"	Clean Gravels <5% Passing No. 200 sieve	GW	Well Graded Gravel		
		Gravels with fines, >12% Passing the No. 200 sieve	GP	Poorly Graded Gravel		
		Sands – More than 50% of the coarse fraction passes the No. 4 sieve. Coarse = No.10 to No.4 Medium = No. 10 to No. 40 Fine = No. 40 to No. 200	Clean Sands <5% Passing No. 200 sieve	SW	Well Graded Sand	
			Sands with fines, >12% Passing the No. 200 sieve	SP	Poorly Graded Sand	
	Fine Grained Soils, More than 50% passes the No. 200 sieve	Silts and Clays Liquid Limit is less than 50 Low to medium plasticity	Inorganic	ML	Silt	
			Organic	CL	Lean Clay	
			Silts and Clays Liquid Limit of 50 or greater Medium to high plasticity	Inorganic	OL	Organic silt Organic Clay
				Organic	MH	Elastic Silt
Highly Organic Soils		Primarily Organic matter, dark color, organic odor	Organic	CH	Fat Clay	
			Organic	OH	Organic Silt Organic Clay	
			Organic	PT	Peat	
			Organic			

Proportions of Soil Components

Component Form	Description	Approximate percent by weight
Noun	Sand, Gravel, Silt, Clay, etc.	50% or more
Adjective	Sandy, silty, clayey, etc.	35% to 49%
Some	Some sand, some silt, etc.	12% to 34%
Trace	Trace sand, trace mica, etc.	1% to 11%
With	With sand, with mica, etc.	Presence only

Particle Size Identification

Particle Size	Particle dimension
Boulder	12" diameter or more
Cobble	3" to 12" diameter
Gravel	¼" to 3" diameter
Sand	0.005" to ¼" diameter
Silt/Clay (fines)	Cannot see particle

Cohesive Soils

Field Description	No. of SPT Blows/ft	Consistency
Easily Molded in Hands	Less than 2	Very Soft
Easily penetrated several inches by thumb	2 – 4	Soft
Penetrated by thumb with moderate effort	4 – 8	Medium Stiff
Penetrated by thumb with great effort	8 – 15	Stiff
Indented by thumb only with moderate effort	15 – 30	Very Stiff
Indented by thumb only with great effort	Greater than 30	Hard

Granular Soils

No. of SPT Blows/ft	Relative Density
Less than 5	Very Loose
5 – 10	Loose
10 – 30	Medium Dense
30 – 50	Dense
Greater than 50	Very Dense

Other Definitions:

- **Fill:** Encountered soils that were placed by man. Fill soils may be controlled (engineered structural fill) or uncontrolled fills that may contain rubble and/or debris.
- **Saprolite:** Soil material derived from the in-place chemical and physical weathering of the parent rock material. May contain relic structure. Also called residual soils. Occurs in Piedmont soils, found west of the fall line.
- **Disintegrated Rock:** Residual soil material with rock-like properties, very dense, N = 60 to 51/0".
- **Karst:** Descriptive term which denotes the potential for solutioning of the limestone rock and the development of sinkholes.
- **Alluvium:** Recently deposited soils placed by water action, typically stream or river floodplain soils.
- **Groundwater Level:** Depth within borehole where water is encountered either during drilling, or after a set period of time to allow groundwater conditions to reach equilibrium.
- **Caved Depth:** Depth at which borehole collapsed after removal of augers/casing. Indicative of loose soils and/or groundwater conditions.



Bates Athletic Complex (Weems Whalen Field)

BORING LOCATION PLAN (NTS)



Imagery ©2019 Google, Map data ©2019 Google 50 ft