

May 13, 2024

Re: Subsurface Exploration & Geotechnical
Engineering Analysis
Proposed Single-Family Home
4611 Bowleys Lane
Baltimore, Maryland 21206
Project No. 124-071

Dear Mr. McLean:

Geotechnical Laboratories, Inc. (Geolab) has completed the requested exploration and analysis related to the above referenced project. The purpose of this exploration was to determine the subsurface conditions and the soil properties with respect to the foundation design for construction of a new single-family home.

Project Description

Project information has been provided by Mr. Clifton McLean. They indicate that a new single-family home is to be constructed on the site. It is reported that this new house will feature a full basement. The site is currently vacant and consists of tall grasses.

Scope of Services

For this study, two soil test borings (designated as B-1 and B-2) were drilled to provide soil parameters and recommendations for the design of the foundation. Test Boring No. B-1 was located in the northeast corner of the proposed home and Test Boring No. B-2 was located in the southwest corner. The test borings were drilled with a hand auger and were drilled to auger refusal which occurred at depths of 8.5 and 10.5 feet below the surface.

Geolab performed Dynamic Cone Penetrometer (DCP) testing in accordance with ASTM STP399 at each test boring. The DCP utilizes a 15-pound steel ring-weight falling 20-inches on an E-rod slide drive. For testing, the cone point is seated 2-inches into the soil floor and then driven three consecutive 1-3/4-inch increments. The number of blows required to drive each increment are counted and recorded. These blows furnish a relative indication of the in-place consistency or density of the tested soil stratum and are used to provide an allowable soil bearing capacity.

Representative samples of the soils encountered were routinely collected and placed in sample zip lock bags. Unless notified to the contrary, all samples will be disposed of after three months.

In addition to the field exploration, a supplemental laboratory testing program was conducted to determine additional pertinent engineering characteristics to aid in the foundation design for the proposed addition. The laboratory testing program included a visual classification on all of the samples by a Geotechnical Engineer in accordance with ASTM D-2488. In addition, representative samples were subjected to moisture content determinations (ASTM D-2216), Atterberg Limits (ASTM D-4318), Hydrometer analysis and Grain Size test (ASTM D-6913). The results of these tests were used to classify the soils according to the Unified Soils Classification System (USCS) and the USDA Classifications system.

Subsurface Description

The project site is located in the Piedmont Plateau Physiographic Province of central Maryland, a region characterized by metamorphic and igneous bedrock.

Based on the visual characteristics of the samples obtained during the field exploration and available published geologic information on the area, the site is directly underlain by the Sand facies of the Patuxent Formation of the Lower Cretaceous Geologic Age. The Sand facies is composed of intercalated sand, gravel, silt and clay with hematite-limonite cements.

The site is covered with tall grasses with organic soil. The soils encountered in the test borings vary between the boring locations and depths. This suggests that the soils on the site have been disturbed. The encountered soils can be categorized into three groups, SILT, CLAY and SAND.

SILT was only encountered in Test Boring No. B-2 directly below the surface cover and extended to a depth of 5.5 feet. The SILT is described as light brown clayey fine sandy SILT (ML, Loam).

The SAND soils were encountered in both test borings. In Test Boring No. B-2 it was encountered below the SILT and in Test Boring No. B-1 it was encountered below the surface cover. It is described as silty fine to coarse SAND (SM), silty fine SAND with some gravel (SM, Loam) and as clayey fine SAND (SC, Sandy Clay Loam). The color of the SAND varied between light brown, brown and gray brown.

The CLAY was encountered in both test borings below the SAND. In Test Boring No. B-1 the CLAY was encountered between the depths of 2.5 and 7.0 feet and in Test Boring No. B-2 the CLAY was encountered between the depths of 7.0 and 10.0 feet. The CLAY soil can be described as light brown SILT-CLAY with some fine sand (ML-CL, Silt Loam) and light brown silty fine sandy CLAY (CL, Sandy Clay Loam).

The DCP results ranged from 6 to over 20 blows per increment indicating medium dense to dense relative density and medium stiff to stiff consistency. The natural moisture

content of the soils encountered at the time of drilling ranged between 10.1 to 20.9 percent, considered "moist" on a continuum of dry, damp, moist, wet, and saturated. Results on select samples indicate that the on-site soils are low to moderately plastic with plasticity indexes of 0 to 8.1 and liquid limits of 0 to 25.3.

The textural class of the encountered soils at Test Boring No. SWM-1 has the following hydrologic soil properties and infiltration rates assigned by the USDA.

Texture Class	Effective Water Capacity (inch/inch)	Minimum Infiltration Rate (inches/hour)	Hydrologic Soil Group (HSG)
Loam	0.19	0.52	B
Silt Loam	0.17	0.27	C
Sandy Clay Loam	0.14	0.17	C

Groundwater Observations

Groundwater was not encountered in the test boring during drilling. At completion, groundwater was only encountered in Test Boring No. B-2 at a depth of 10.25 feet. The groundwater levels on this site may vary due to seasonal conditions and recent rainfall as well as drought, and temperature.

Foundation Design Recommendations

Considering the soil classifications, moisture contents and DCP values of the encountered soils at the proposed foundation elevation, we recommend that the foundation elements be supported on conventional spread footings bearing at a minimum depth of 2.5 feet below final, finished grade. Footings which bear on approved natural soils may be proportioned based on a maximum allowable soil bearing pressure of 2000 pounds per square foot.

A minimum dimension of 16 inches for continuous footings and 36 inches for square or rectangular footings should be used in the foundation design to minimize the possibility of local shear failure. During excavation, localized, loose pockets may be encountered in the foundation excavations. In the event of this occurrence, they should be delineated and densified in-place. Alternatively, any loose pockets may be removed and replaced with controlled fill. This should be determined by the Geotechnical Engineer at the time of construction.

All foundation excavations should be inspected by the Geotechnical Engineer prior to the placement of concrete. The purpose of the inspection would be to verify that the exposed bearing materials are suitable for the design soil bearing pressure and that loose, wet, frozen or compressible soils are not present.

Soils exposed at the base of all satisfactory foundation excavations should be protected against any detrimental change in condition such as disturbance from rain or frost. Surface runoff should be drained away from the excavations and not allowed to pond. If possible, concrete should be placed in the footings the same day the excavations are made. Otherwise, footing excavations should be adequately protected from rainfall or freezing conditions.

Exterior footings and footings in unheated areas should be located at a depth of at least 2.5 feet below the final exterior grade to provide adequate frost cover protection. If the footings are to be constructed during the winter months, or if they will be subjected to freezing temperatures after footing construction, then all footings should be adequately protected during freezing periods. Otherwise, interior footings can be located on approved soils at nominal depths below the finished floor levels.

Stormwater Management Design Recommendations

Stormwater management facilities may be required to be designed and constructed to help control the additional stormwater runoff created by the increase in impermeable surfaces due to the construction of the proposed house.

The "2000 Maryland Stormwater Design Manual", published by the Maryland Department of the Environment, states that stormwater management facilities utilizing infiltration shall have a Hydrologic Soil Group classification (HSG) of A or B. Soils that classify as HSG C and D are not ideal for infiltration, however they may be used with an underdrain system. Stormwater management facilities should be located at least four feet above groundwater and bedrock.

The results of this study indicate the shallow soils in each test boring are considered to be hydrologic soil group B or better. Soils that are considered HSG C are located 2.5 and 7.0 feet below the surface. The shallow presence of HSG C soils will hinder the use of infiltration on the property. Underdrain or facilities what do not use infiltration would be better suited for this property.

Limitations

This report has been prepared for the exclusive use Prominent Homes, LLC. or their agents for specific application to the foundation design for the proposed addition located at 4611 Bowleys Lane, Baltimore, Maryland, in accordance with generally accepted soils engineering practices. No other warranty, expressed or implied, is made. Our conclusions

GEOTECHNICAL LABORATORIES, INC.
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geolab@verizon.net 410-772-2220 fax: 410-772-2221

and recommendations are based on design information furnished to us, the data obtained from the previously described subsurface exploration program and our previous experience.

The conclusions and recommendations do not reflect variations in subsurface conditions which could exist in unexplored areas of the site. Should such variations become apparent during construction, it will be necessary to re-evaluate our conclusions and recommendations based upon an on-site observation of the conditions.

All phases of the soil laboratory testing program were conducted in general accordance with applicable ASTM specifications. The results of these tests can be found on the accompanying Particle Size Distribution test reports.

Should you have any questions, please do not hesitate to contact our office at your convenience.

Sincerely,
Geotechnical Laboratories, Inc.



Brian J. Luoma, P.E.
Staff Engineer



BJL:GMN

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GEOTECHNICAL LABORATORIES, INC.

8980 State Route 108, Suite D, Columbia, Maryland 21045
geolab@verizon.net 410-772-2220 fax: 410-772-2221

Boring Location Plan

4611 Bowlerys Lane

Legend

📌 Soil Test Boring



Date: 5/14/2024

Client: **Prominent Homes, LLC**Project: **4611 Bowleys Lane**Project No. **124-071**Boring No.: **B-1** (1 of 1) Total Depth (feet) **10.25** Elev: **91.0 +/-** Location: **See Boring Location Plan**Type of Boring: **Hand Auger** Started: **4/30/24** Completed: **4/30/24** Driller: **B. King**

Elevation	Depth	DESCRIPTION OF MATERIALS (classification)	*Sample Blows	Sample Depth (Feet)	Moisture Content	REMARKS
91	0.0	Grasses with organic soil				Boring was dry during drilling and at completion.
90.5	0.5	Brown silty fine SAND with some gravel, moist, loose (SM, Loam)				
88.5	2.5	Light brown to gray silty fine sandy CLAY, moist, stiff (CL, Sandy Clay Loam)				
			7 6 7	3.0		
				3.5		
			7 8 10	4.0		
				4.5		
					18.6	
				6.0		
			9 11 14	6.5		
84	7.0	Gray brown clayey fine SAND, moist medium dense to dense (SC, Sandy Clay Loam)				
				8.0		
			10 8 10	8.5		
					18.1	
			14 12	9.75		
			16			
					15.7	
80.75	10.25	End of Boring		10.25		

*Number of blows required for a 15 lb hammer dropping 20" to drive a 1.5" diameter cone with a 45 degree vertex angle a total of three 1.75" increments.

Date: 5/14/2024

Client: **Prominent Homes, LLC**

Project: **4611 Bowleys Lane**

Project No. **124-071**

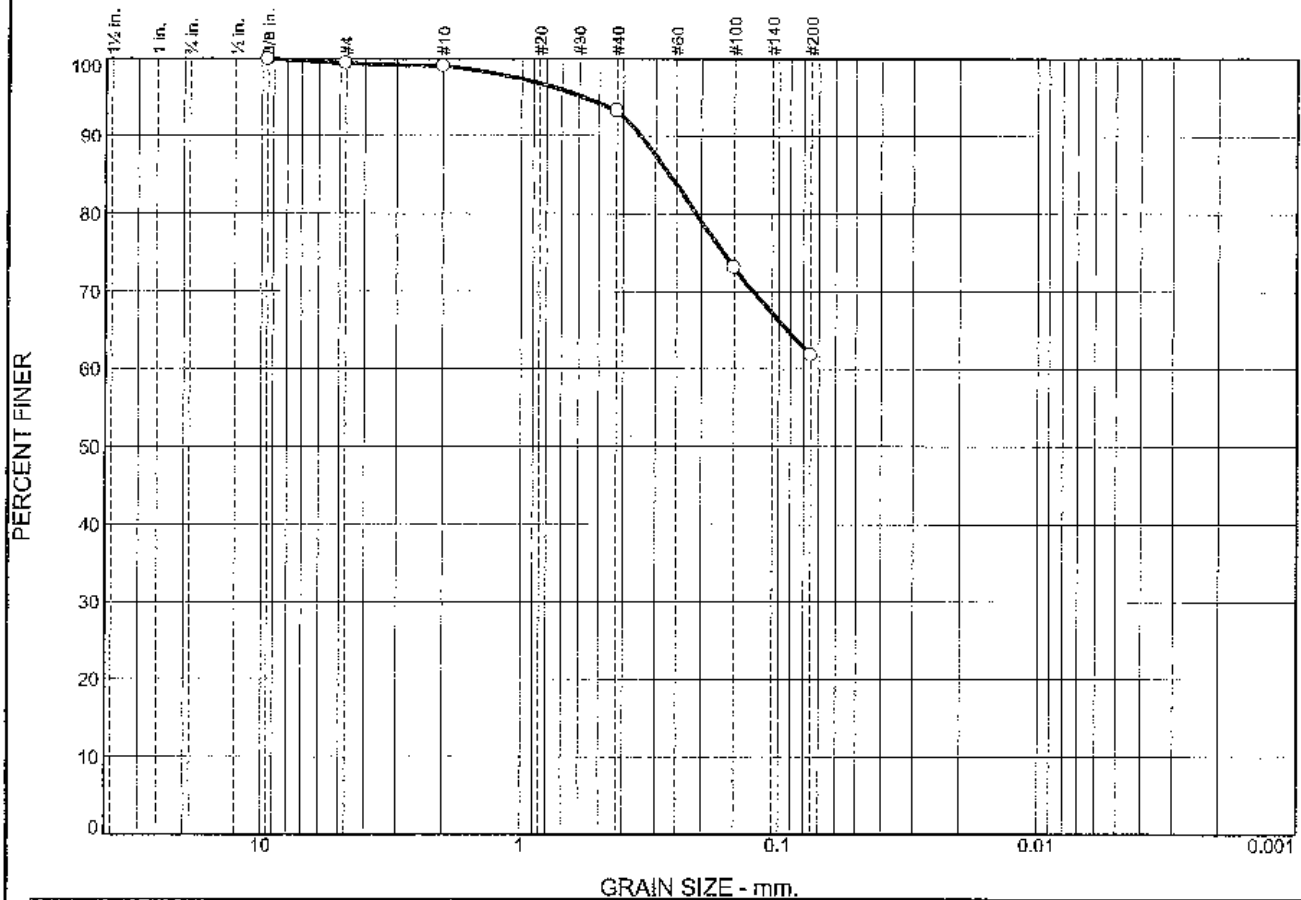
Boring No.: **B-2** (1 of 1) Total Depth (feet) **11** Elev: **90.0 +/-** Location: **See Boring location plan**

Type of Boring: **Hand Auger** Started: **4/30/24** Completed: **5/1/24** Driller: **B. King**

Elevation	Depth	DESCRIPTION OF MATERIALS (classification)	*Sample Blows	Sample Depth (Feet)	Moisture Content	REMARKS
90	0.0	Grasses with organic soil				Boring was dry during drilling. At completion, groundwater was encountered at a depth of 10.95 ft.
89.5	0.5	Light brown clayey fine sandy SILT, moist, stiff (ML, LOAM)				
			9 8 8	2.0 2.5		
			14 16 16	4.25 4.75	20.3	
84.5	5.5	Dark brown silty fine to coarse SAND, damp, dense (SM, Loam)				
			16 13 20	6.75 7.25		
83	7.0	Light brown SILT-CLAY with some fine sand, moist, very dense (ML-CL, Silt Loam)				
			9 23 20+	8.0 8.5	20.9	
80	10.0	Orange brown fine to coarse silty SAND with some gravel, moist, very stiff (SM, Loam)				
			20+	10.5	10.1	
79	11.0	End of Boring		11		

*Number of blows required for a 15 lb hammer dropping 20" to drive a 1.5" diameter cone with a 45 degree vertex angle a total of three 1.75" increments.

Particle Size Distribution Report

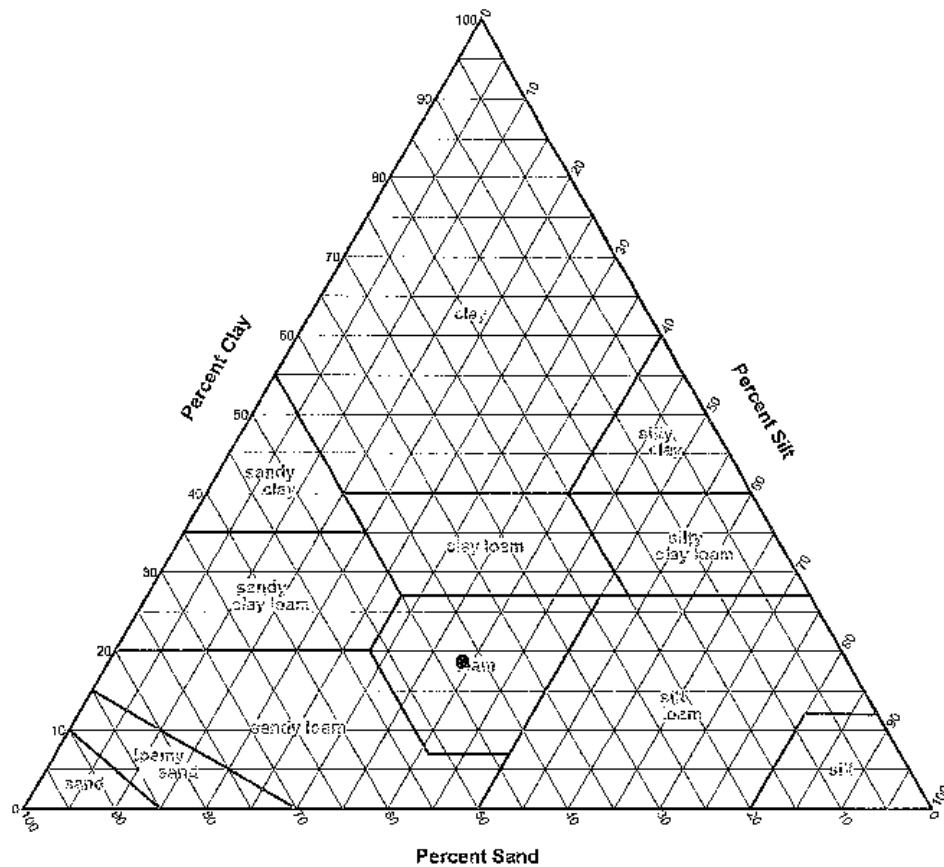


% Gravel			% Sand			% Fines	
Coarse	Fine		Coarse	Medium	Fine	Silt	Clay
0.0	0.6	0.3	5.7	31.6	61.8		
LL	PL	D85	D60	D50	D30	D15	D10
25.3	17.2	0.2657					

Material Description	USCS	AASHTO
Light brown silty fine sandy CLAY	CL	A-4(2)

Project No. 124-071 Client: Prominent Homes, LLC Project: 4611 Bowleys Lane Source of Sample: B-1 Depth: 4.0 Feet Sample Number: S-2	Remarks: Date Received: 5/1/2024 Nat. M/C: 18.6%
Geolab, Inc. Columbia, MD	Figure

USDA Soil Classification



SOIL DATA							
	Source	Sample No.	Depth	Percentages From Material Passing a #10 Sieve			Classification
				Sand	Silt	Clay	
1	B-2	S-2	4.25'	42.4	39.0	18.6	Loam

Geolab, Inc.

Columbia, MD

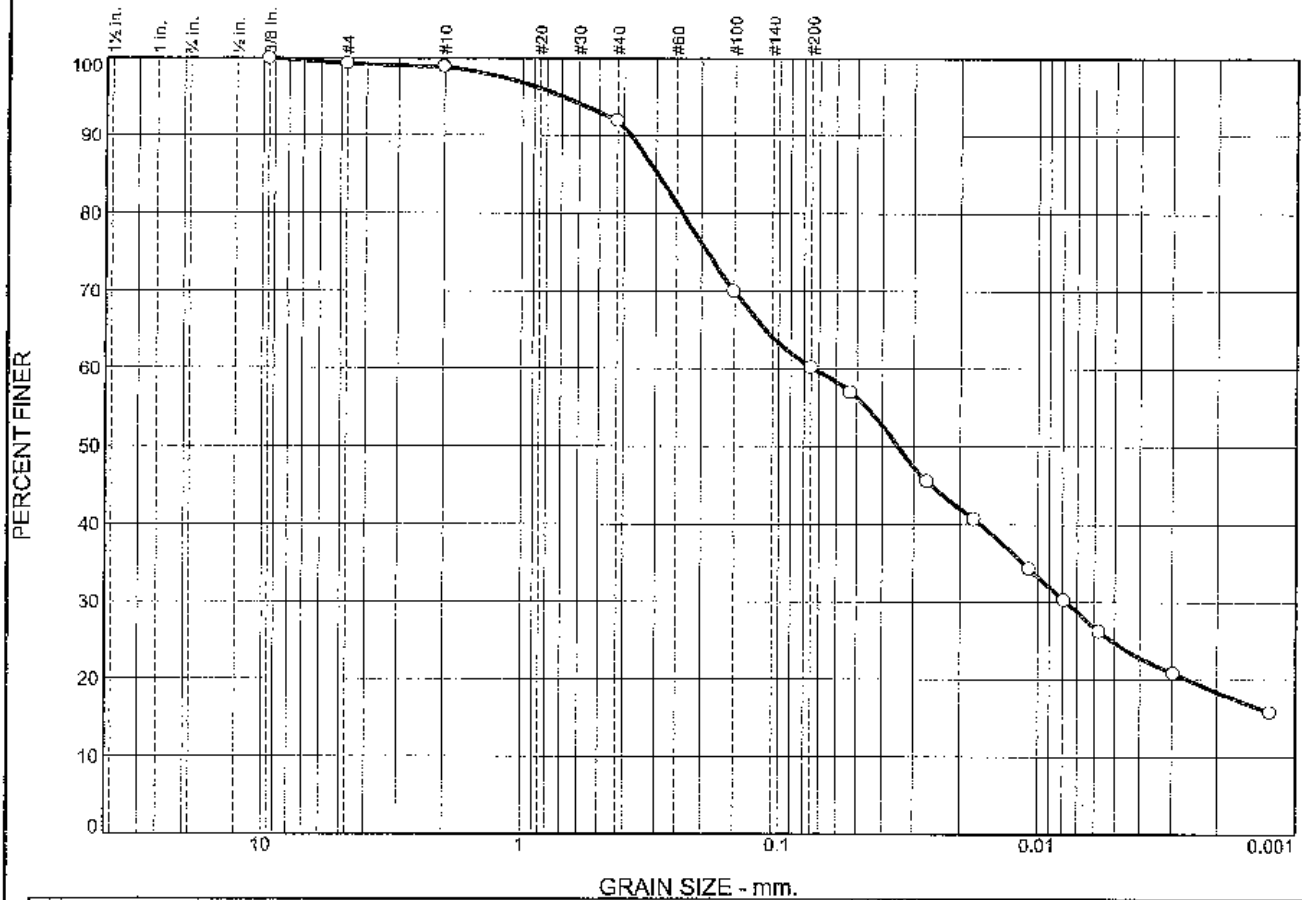
Client: Prominent Homes, LLC

Project: 4611 Bowleys Lane

Project No.: 124-071

Figure

Particle Size Distribution Report

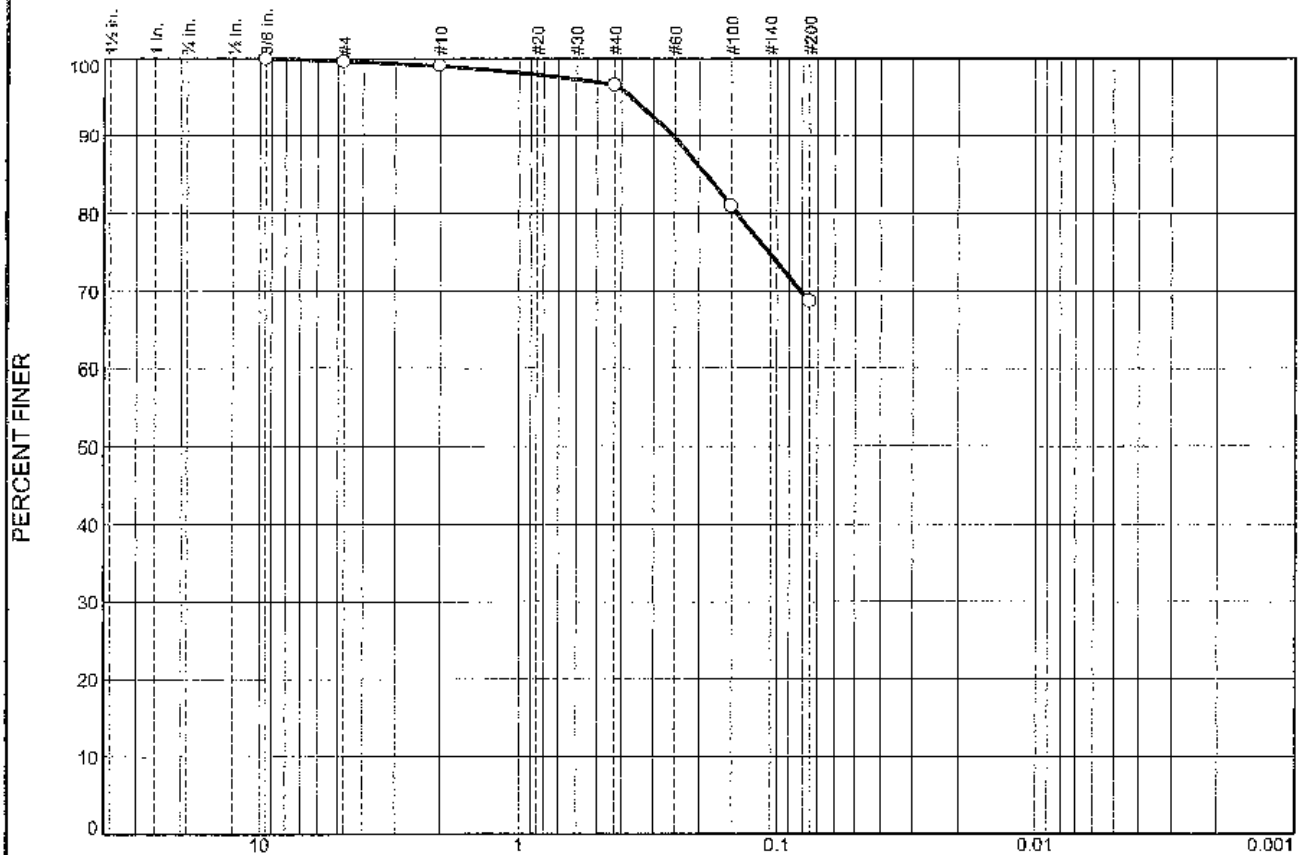


% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.7	0.4	6.9	31.8	35.4	24.8
LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅
		0.2954	0.0736	0.0347	0.0078	
D ₁₀	C _c	C _u				

Material Description	USCS	AASHTO
○ Light brown clayey fine sandy SILT	ML	A-4

Project No. 124-071 Client: Prominent Homes, LLC Project: 4611 Bowleys Lane Source of Sample: B-2 Depth: 4.25' Sample Number: S-2	Remarks: ○ Date Received: 5/1/2024 Nat. M/C: 20.3% USDA: Loam SpG Assumed
Geolab, Inc. Columbia, MD	Figure

Particle Size Distribution Report



GRAIN SIZE - mm.										
% Gravel			% Sand			% Fines				
Coarse		Fine	Coarse	Medium	Fine	Silt			Clay	
0.0		0.4	0.6	2.5	27.9	68.6				
X	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
0	22.6	17.3	0.1890							

Material Description	USCS	AASHTO
☐ Light brown SILT-CLAY with some fine sand	CL-ML	A-4(2)

Project No. 124-071 Client: Prominent Homes, LLC Project: 4611 Bowleys Lane ☐ Source of Sample: B-2 Depth: 8.0' Sample Number: S-4	Remarks: ☐ Date Received: 5/1/2024 Nat. M/C: 20.9%
Geolab, Inc. Columbia, MD	

Figure

COST ESTIMATE

Proposal for Subsurface Exploration & Geotechnical Analysis

Proposed Single-Family Home
4611 Bowleys Lane
Baltimore, Maryland
April 15, 2024

Service	Est. No.	Unit	Unit Rate	Total
Field Services				
Field Coordination (includes mobilization, site reconnaissance, and utility check)	1	Lump	\$480.00	\$ 480.00
Soil Borings (With DCP testing)	24	Feet	\$20.00	\$480.00
Drill Rig or Excavator (if needed)	1	Lump	\$1,500.00	OPEN
Laboratory Services				
Moisture Contents	6	Test	\$10.00	\$60.00
Atterberg Limits and Sieve Analysis	2	Test	\$150.00	\$300.00
Hydrometer Analysis	1	Test	\$150.00	\$150.00
Professional Services				
Professional Engineer (Analysis and Report)	6	Hours	\$120.00	\$480.00
Drafting	2	Hours	\$50.00	\$50.00
Estimated Total				\$2,000.00 - \$3,500.00

Please note that you will be charged only for the services provided.

Professional Services

At the completion of the field testing, the results will be analyzed by a geotechnical engineer and a written report will be prepared. The report will include a summary of the subsurface conditions. It will also provide a recommended soil-bearing capacity for the design of the house foundation.

Cost:

Based on the scope of work outlined above, including drilling, geotechnical analysis, and the written report, we estimate the cost of the exploration will be between \$2,000.00. If a drill rig or mini excavator are needed, an additional \$1,500.00 will be required. A breakdown of this price with our unit rates is attached to this proposal.

A 50% deposit of \$1,000 will be required before scheduling the work.

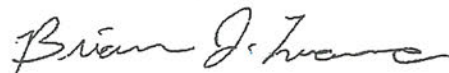
Authorization/Schedule:

To authorize us to perform the exploration, please execute and return the attached Agreement for Geotechnical Services. Any exceptions to this proposal or special requirements not covered in the proposal should be listed on the Agreement for Geotechnical Services and initialed. Your signature of acceptance on the enclosed Agreement for Geotechnical Services will make this proposal and other enclosures the agreement between us and formally authorize Geolab to perform the work.

It is anticipated that the drilling for this study can be conducted within one to two weeks after we receive notice to proceed and the site cleared for utilities. We should be able to submit the report within one to two weeks of the completion of the drilling. Verbal recommendations can generally be provided within one to three days after field activities.

We appreciate the opportunity to be of service to you and look forward to working with you on this and future projects.

Sincerely,
Geotechnical Laboratories, Inc.



Brian J. Luoma, P.E.
Staff Engineer

BJL
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**AGREEMENT FOR
Subsurface Exploration and Geotechnical Analysis STUDY**

Agreement dated April 15, 2024 between **Geotechnical Laboratories, Inc. ("Geolab")** and **Prominent Homes, LLC (CLIENT)**, provides:

Services and Scope of Work:

Geolab agrees to provide to the client with the following specified subsurface exploration and geotechnical engineering analysis study: **Geotechnical Study per our proposal number P24-049 dated April 15, 2024 for the subsurface exploration and geotechnical analysis at the proposed single-family home located at 4611 Bowleys Lane, Baltimore, MD.**

Payment:

Client agrees to pay for all services provided and expenses incurred by Geolab in accordance with the unit rates schedule. Unless otherwise noted, payment shall be due upon receipt of Geolab's invoice. A finance charge of 1-1/2% per month will be charged on invoices 30 days past due. Geolab reserves the right to withhold services if invoices are not paid in full within 30 days of the invoice date.

Terms and Conditions: This Agreement shall be subject to all the terms and conditions set forth on the attached "Terms and Conditions to Agreement for Geotechnical Services".

Deposit: A 50% deposit of \$1,000 will be required before scheduling the work.

WITNESS the following signatures

Geotechnical Laboratories, Inc.

Prominent Homes, LLC

By: Brian J. Ivanc

By: Clifton E. McLean

Date: _____

Date: April 24, 2024