



ECS Mid-Atlantic, LLC

Geotechnical Engineering Report

Roanoke Gateway Project

614 Bullitt Avenue
Roanoke, Virginia

ECS Project No. 12:20641

April 16, 2026





ECS MID-ATLANTIC, LLC

Geotechnical • Construction Materials • Environmental • Facilities

April 16, 2026

Ms. Denise Fazio
Homes for America
175 Admiral Cochrane Drive
Annapolis, Maryland 21401

ECS Project No. 12:20641

Reference: Geotechnical Engineering Report
Roanoke Gateway Project
614 Bullitt Avenue
Roanoke, Virginia

Dear Ms. Fazio:

ECS Mid-Atlantic, LLC (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses 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 Homes for America during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify 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.

Respectfully submitted,

ECS Mid-Atlantic, LLC

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EXECUTIVE SUMMARY

This Executive Summary is intended as a very brief overview of the primary geotechnical conditions that are expected to affect design and construction. Information gleaned from the Executive Summary should not be utilized in lieu of reading the entire geotechnical report.

- The soils encountered at the site generally consisted of CLAYEY SAND (SC), LEAN CLAY (CL), FAT CLAY (CH), SILT (ML), and WEATHERED ROCK (WR) materials. Existing fill consisting of SANDY GRAVEL (GP) was encountered in boring B-08 to a depth of 2 feet. These materials appear to be dense graded aggregate below the existing pavement.
- Based on boring data obtained during the exploration, we anticipate that materials requiring difficult or rock excavation techniques will be encountered during site grading, utility installation, and excavation to planned subgrades, specifically around Building 1 and Building 2. Utility installation may encounter weathered rock and rock conditions depending on their location. The excavation of weathered rock and rock can have a substantial impact on the cost and schedule of the proposed construction.
- The soil strength profiles encountered in the center of Building 2 (borings B-02 and B-04) decrease significantly with depth. Boring B-02 encountered Weight of Hammer (WOH) material from approximately 23 to 35 feet below ground surface before hitting auger refusal at 38 feet below existing grade. These conditions are indicative of residual soils underlain by karst bedrock, which is subject to sinkhole development. For Building 2, we recommend additional exploration to include electrical resistivity imaging (ERI) and verification soil borings to assist in identifying the extent of the poor soil conditions. This study is currently underway and results will be submitted under a separate cover.
- Buildings 1 and 3 may be supported by conventional shallow foundations consisting of column and/or continuous strip footings bearing on natural soil or newly compacted fill soils designed for an allowable bearing pressure of 2,000 psf. The buildings can be designed based on a seismic site classification of D.

1.0 INTRODUCTION

The purpose of this study was to provide geotechnical information for the design and construction of three (3) proposed multi-family buildings and associated infrastructure. These buildings each have multiple stories with split elevations in some conditions. Below grade walls within the interior of the structure and extended foundation walls are anticipated. The recommendations developed for this report are based on project information supplied by you. It is our understanding that Building 1 is to be constructed first and Buildings 2 and 3 are to follow in later phases.

Our services were provided in accordance with our Proposal No. 16605-RP, dated July 24, 2025, as authorized by W. Andrew Hanson on July 29, 2025, which includes our Terms and Conditions of Service.

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 project.

The report includes the following items:

- A brief review and description of our field and laboratory test procedures and the results of testing conducted
- A review of surface topographical features and site conditions
- A review of area and site geologic conditions
- A review of subsurface soil/rock stratigraphy with pertinent physical properties
- Final soil exploration/test boring logs
- Recommendations for site preparation and construction of compacted fills, including an evaluation of on-site soils for use as compacted fills and identification of potentially unsuitable soils and/or soils exhibiting excessive moisture at the time of sampling
- Recommended foundation type
- Recommendations for design of slabs on grade and construction.
- Recommended lateral earth pressures for below-grade building walls.
- General recommendations for pavement design, including a recommended design CBR value
- Recommendations for seismic site classification in accordance with the International Building Code (IBC 2021)
- An evaluation of soil and rock excavation issues
- Recommendations for additional testing and/or consultation that might be required to complete the geotechnical assessment and related engineering for this project.

The recommendations contained herein were developed from the data obtained in the soil test borings, which indicate subsurface conditions at these specific locations at the time of exploration. Soil conditions may vary between the soil test borings. If during construction, variations appear evident; the Geotechnical Engineer should be informed so that the conditions can be reviewed and addressed.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION/CURRENT SITE USE/PAST SITE USE

The site is located at 614 Bullitt Avenue within the corporate city limits of Roanoke, Virginia. At the time of our visit, the ground surface over the site was a mixture of maintained grass, asphalt, and demolition debris. The overall site is bounded to north and west by Jamison Avenue SE, to the east by 9th Street, and to the south by Bullitt Avenue.



Figure 2.1.1. Site Location

Building 1 is proposed to be located on the western portion of the site bounded by Jamison Avenue SE, Bullitt Avenue SE, and 7th Street. Based on our site visit and review of historical imagery, there used to be multiple residential structures located within the proposed Building 1 footprint that were demolished at some point between November 2019 and July 2021. Buildings 2 and 3 are to be located on the eastern portion of the site bounded by Jamison Avenue SE, Bullitt Avenue SE, 7th Street, and 8th Street. Based on our review of historical imagery, there used to be multiple residential structures located within the proposed Building 3 footprint that were demolished at some point between November 2019 and July 2021. There also appeared to be residential structures within the Building 2 footprint that were demolished between March 1995 and December 2002.

During our site layout, we observed surficial demolition debris in the area of Building 1, and an area with surficial sand within the footprint of Building 2. The debris within Building 1 was located in the central part of the proposed building and consisted of concrete and rock fragments. Within Building 2, the surficial sand area was located close to the southwest corner of the proposed footprint. There were also sewage cleanouts observed within the footprints of Building 1 and 3 that pose the possibility of existing utilities

being present beneath the ground surface of these buildings. An existing utility bisects building 2 as well. Below are images of the surficial debris and sand noted above that were encountered during our site reconnaissance:



Figure 2.1.2. Demolition debris observed within Building 1 footprint



Figure 2.1.3. Sand area located at southwest corner of Building 2 footprint.

Rock outcrops were observed within the footprints of Buildings 1 (near B-09), 2 (near B-02), and 3 (near B-02) suggesting shallow rock may be encountered in these areas during grading operations.

It is not known whether any of the previous residential structures had below grade levels.

Based on our site visit and review of the grading plan we were provided that depicts existing grades, the site grades down to the north and northwest with elevations ranging from approximately EL. +944 feet to EL. +964 feet.

2.2 PROPOSED CONSTRUCTION

The following information explains our understanding of the planned development, including proposed buildings and related infrastructure:

Table 2.2.1 Proposed Construction Properties

SUBJECT	DESIGN INFORMATION / ASSUMPTIONS
Usage	Multi-Family Residential
Framing	Wood Framed
Column Loads*	12 kips maximum
Wall Loads*	6 kips per linear foot (klf) maximum

* Loads are based on the values provided by Liz Chapman with Grimm and Parker Architects via email on February 3, 2026. If final design loads exceed our assumed loads, this report needs to be revised to update our foundation recommendations, bearing capacity, and settlement calculations.

Based on the existing grades, Buildings 1 and 2 will have a split where portions of the structure will have a lower (walk-out) elevation on one side and a higher first floor on the other side of the building. This will create below grade walls within the center of the building in some areas. To reduce exterior grading, the exterior foundations of the structure will follow existing grades creating extended foundation walls in some areas.

Table 2.2.2 Building Characteristics

STRUCTURE	# STORIES	BELOW GRADE WALLS	FINISHED FLOOR ELEVATION
Building 1	3 to 4	Interior Wall at split Elevations, and Exterior Foundation Walls to existing grades	1st Floor EL. +954 ft 2 nd Floor EL. +966 ft
Building 2	3		Terrace EL. +950 ft 1st Floor EL. +960 ft
Building 3	3 to 4		1st Floor EL. +954 ft 2 nd Floor EL. +964 ft

The location and depth of utilities was not known at the time of this report. Site retaining walls and stormwater management were not depicted on the provided plan and are not included in this scope.

Driving entrances to the buildings will be off of 7th and 8th Streets. Parking spaces will be located north of Building 1 and between Buildings 2 and 3. Traffic volumes were not provided.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

Our exploration procedures are explained in greater detail in Appendix B including the insert titled Subsurface Exploration Procedures. Our scope of work included drilling 24 Standard Penetration Test (SPT) soil borings and four (4) offset borings. Our borings were located with a handheld GPS unit while referencing Google Earth aerial imaging and existing site features. The approximate locations are shown on the Boring Location Diagram in Appendix A.

3.1 SITE GEOLOGY

Based on our review of the “Geology of the Roanoke and Stewartsville Quadrangles, Virginia” (Virginia Division of Mineral Resources, 1981), the project site is located within Virginia’s Blue Ridge Physiographic and Geologic Province.

Specifically, the project site is mapped to be underlain by the Rome Formation (€R) and surrounded by alluvial deposits (al) and terrace deposits. The Rome Formation primarily consists of shale and siltstone with carbonate rock intervals up to approximately 50 feet thick. The carbonate rock formations located in this area typically consist of limestone and dolomite. Alluvial deposits primarily consists of sand, silt, clay, pebbles, cobbles, and boulders of quartzite, sandstone, and chert. Terrace deposits include rounded cobbles and boulders of vein quartz, metaquartzite, quartzose, and felspathic sandstone, and chert.

The boundary between soil and rock is not sharply defined. A transitional zone termed "weathered rock" is normally found overlying the parent bedrock. Weathered Rock (WR) is defined, for engineering purposes, as residual material with Standard Penetration resistance greater than 60 blows per foot (bpf).

Because weathering is facilitated by fractures, joints, and the presence of less resistant rock types, the profile of the WR and hard rock is typically irregular and erratic, even over short horizontal distances. Also, it is not unusual to find lenses and natural floating boulders of hard rock in zones of WR within the soil mantle, well above the general bedrock level. In carbonate rock formations, the transition between soil and rock can be abrupt with little to no weathered rock zone.

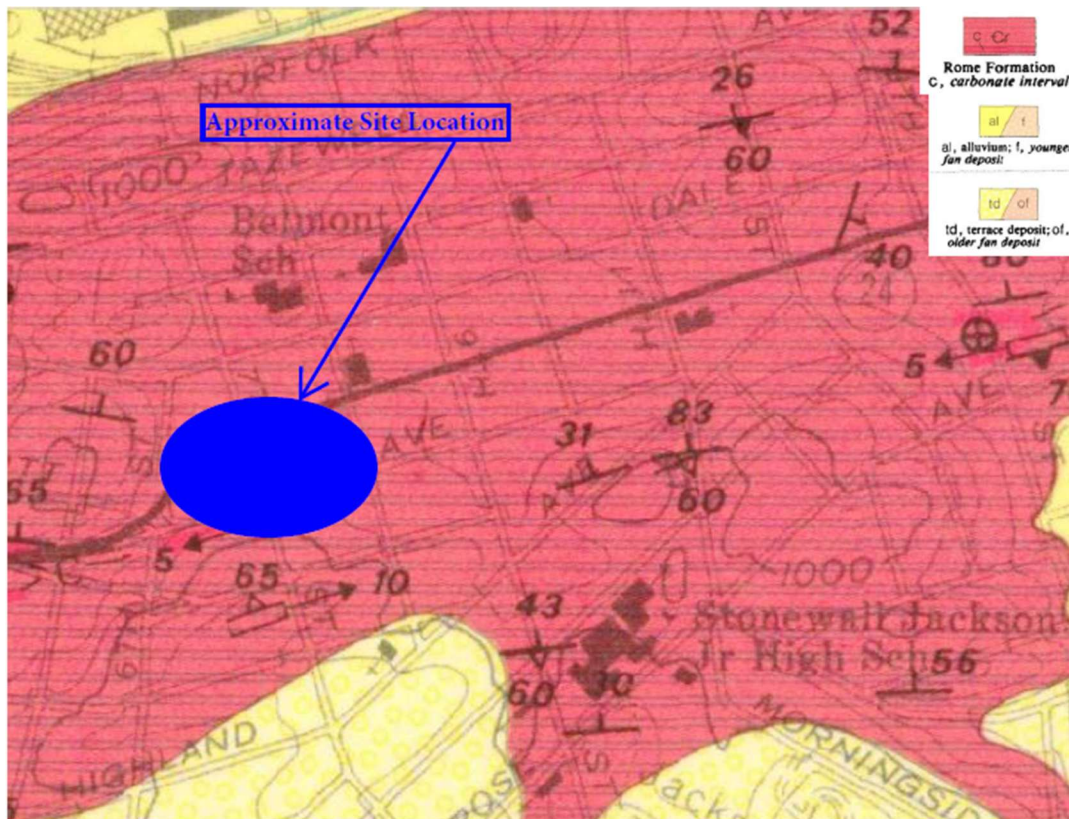


Figure 3.1.1 Site Geology Mapping “Geology of the Roanoke and Stewartville Quadrangles, Virginia”

3.2 SUBSURFACE CHARACTERIZATION

The subsurface conditions encountered were generally consistent with published geological mapping. The following sections provide generalized characterizations of the soil strata. Please note that the ground surface elevations were not surveyed by a licensed surveyor; these elevations are approximate based on the grading plan provided to us by you entitled *Roanoke Gateway* prepared by Balzer & Associates and dated January 17, 2025; therefore, elevation ranges are approximate +/- 1 foot. When shallow refusal was encountered, the boring was offset. Please refer to the boring logs in Appendix B for detailed information.

Table 3.2.1 Subsurface Characterization

Approximate Depth (ft)	Stratum	Description	Ranges of SPT ⁽¹⁾ N-values (bpf)
0-0.2 (Surface cover)	N/A	Topsoil (2 to 4 inches) Asphalt (2 to 4 inches) Gravel (4 to 6 inches)	N/A
0.2-2.2	I – Existing Fill	FILL, Poorly Graded Sandy GRAVEL (GP)	50+
0-20	II - Residuum	Residuum, Lean Clay (CL); Fat Clay (CH); Silty Sand (SM); Silt (ML); Well-Graded Gravel (GW); Clayey Gravel (GC); Poorly-Graded Gravel (GP)	2 to 50+
13-38	III - Epikarst	Residuum, (Boring B-02) Lean Clay (CL); Fat Clay (CH)	WOH to 2
3-38.3	IV – Weathered Rock	Weathered Rock Sampled as Gravelly Fat Clay With Sand (WR); Well-Graded Gravel With Sand (WR); Clayey Gravel With Sand (WR); Lean Clay With Sand (WR); Fat Clay With Sand (WR); Poorly-Graded Gravel With Sand (WR)	60+

Notes:

(1) Standard Penetration Testing

Based on our subsurface exploration and site history, Existing FILL soils consisting of poorly graded Sandy GRAVEL (GP) was observed in boring B-08 below the existing pavement. Although not identified in the other borings, based on the existing pavements and utilities, and the previous structures, Existing Fill should be anticipated in other areas on the site. The surface materials should be expected to be disturbed due to shallow grading, however, where existing utilities are located, fill soil should be anticipated above the utility in a 1H:1V “V” shape from the utility to the ground surface.

Epikarst materials are typically very soft, saturated zones infilling valleys within the calcareous bedrock formation overlying karst/sinkhole features within the parent bedrock geology (Bakalowicz, 2019)¹. This is a key indicator of the carbonate rock dissolution process of the underlying bedrock in karst environments. The regional geology supports the presence of epikarst/karst formations. The characteristic nature of these materials are high natural moisture contents/percent saturation, very soft consistency and very loose density, presence of perched water conditions, and interbedded layers of weathered/dissolution rock materials within the soil matrix. Boring B-02 reflected probable epikarst materials at about elevations EL +937 ft to EL +913 feet. Boring B-04 has possible epikarst materials based on the SPT N-values in the lower part of the boring.

Auger refusal materials are indicators of very hard or very dense zones unable to be advanced by the drilling equipment. These are typical indicators of top of rock, boulders, and/or very hard lenses. Auger refusal was encountered in the following locations:

¹ Bakalowicz, M. (2019). Chapter 45: Epikarst. In Encyclopedia of caves. Academic Press. Retrieved from <https://catalog.lib.ncsu.edu/catalog/NCU4706096>. P. 394-398

Boring	Approximate Depth to Auger Refusal (ft)	Approximate Elevation of Auger Refusal (ft)
B-01	3.0	942.0
B-01A	7.2	937.8
B-01B	3.1	941.9
B-06	8.8	937.2
B-07	13.1	937.9
B-08	13.8	937.2
B-09	14.8	938.2
B-10	5.8	951.2
B-11	13.6	936.4
B-12	12.7	947.3
B-13	1.2	963.8
B-13A	1.8	963.2
B-13B	0.2	964.8
P-01	3.6	947.4
P-02	11.0	937.0
P-03	8.6	938.4

A graphical presentation of the subsurface conditions is shown on the Subsurface Cross Section Diagrams included in Appendix A.

3.3 GROUNDWATER OBSERVATIONS

Water levels were measured in our borings during drilling and at completion of drilling. In auger drilling operations, water is not introduced into the boreholes, and the groundwater position can often be determined by observing water flowing into or out of the boreholes. Furthermore, visual observation of the soil samples recovered during the auger drilling exploration can often be used in evaluating the groundwater conditions. Groundwater was only encountered in boring B-02 and was measured at the time of drilling at 30 feet below the ground surface, corresponding to EL. +920 feet. No groundwater was encountered in the rest of our borings; however, elevated moisture was noted in borings B-16 and B-17 at approximately 18 feet. It should be expected that elevated moisture and/or perched water will be located above very dense materials, auger refusal and cohesive soils.

Variations in the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, construction activities, and other factors.

“Perched water is typically of limited quantity, replenished or recharged very slowly. When encountered in an excavation, perched water will typically drain off very quickly, with limited continuous flow or bleeding, unless a source of recharge, such as a leaking utility is present.”

From: Construction Dewatering and Groundwater Control – New Methods and Applications, 3rd Addition

A water table aquifer is distinguished from a perched groundwater table based on the water table aquifer’s recharge ability, which may be limitless but can be lowered temporarily through adequate dewatering techniques such as deep wells and well points. Perched groundwater is often alleviated in excavations by pumping from sump pits and French drains.

The highest groundwater observations are normally encountered in the late winter and early spring. Therefore, earthwork operations in the winter and spring are more likely to encounter difficulties with perched conditions than those operations undertaken in the summer or fall.

3.4 LABORATORY TESTING

The laboratory testing consisted of selected tests performed on samples obtained during our field exploration operations. Classification and index property tests were performed on representative soil samples. The laboratory testing program included natural moisture content tests (ASTM D2216), grain size analyses tests (ASTM D6913), and Atterberg Limits tests (ASTM D4318). Standard Proctor tests (ASTM D698) and California Bearing Ratio (CBR) tests (D1883) were performed on bulk soil samples. The results of all laboratory testing conducted are included in Appendix C of this report.

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 DESIGN RECOMMENDATIONS

4.1 KARST RISK COMMENTARY

Based on our site reconnaissance karst features were not observed in close vicinity of the proposed development. However, the site is mapped to be underlain by geologic parent rock which is known to be carbonate in nature. There are mapped karst features within one mile of the site.

The subsurface conditions encountered in the soil test borings consist of residual soils of varying strength and moisture, as well as an erratic karst bedrock surface. The borings for Buildings 1 and 3 (B-06 through B-18) have soil strength profiles that shouldn’t pose an issue with shallow foundations. However, the soil strength profiles encountered in Building 2 borings, particularly B-02 and B-04, decrease with depth. Boring B-02 encountered Weight of Hammer (WOH) material from approximately 23 to 35 feet below ground surface before hitting auger refusal at 38 feet below existing grade. These conditions are indicative of the presence of epikarst material. ECS recommends additional exploration in Building 2 to evaluate the

lateral extent of the poor soil conditions and potential for karst conditions. The additional exploration should include Electrical Resistivity Imaging (ERI) and additional soil borings.

General Karst: The local geology includes carbonate rock which is prone to karst activity. As carbonate rock dissolves, the soluble minerals are carried away by the groundwater, leaving behind the insoluble materials (clay minerals and silicates). The process reduces hard rock into soft soil with the consistency of soft paste. The rate of rock solutioning is rapid relative to geologic time (where processes are generally measured in tens of thousands to millions of years), but very slow on a human time scale. Rock solutioning occurs primarily from the surface downward, along the surfaces of fissures (joints, bedding planes, and fracture zones) in the bedrock. The rock fissures are enlarged, creating soil-filled troughs and channels, surrounded by hard rock. The soil filling is often eroded by flowing groundwater and the troughs and channels become open cavities. These cavities can develop and become interconnected to form caves, which in turn, become open conduits for groundwater flow and sediment transport.

As a cavity in the bedrock grows and expands, the tensile stresses in the roof of the cavity increase, and occasionally the roof will spall slabs of rock as the cavity grows upward toward the ground surface. When a cavity in the rock grows to the point that the roof of rock is too thin or weak to span the void and support the overburden, the cavity can collapse and form a depression or sinkhole at the ground surface. This type of sinkhole development is relatively rare because it is a slow process in terms of human time.

The more common mechanism for sinkhole development is through the erosion of soil overburden into cavities in the underlying bedrock. This erosion starts at the soil-rock interface over an opening in the bedrock. As soil is carried into the opening by percolating groundwater, a cavity is formed in the soil. This cavity grows as the result of raveling of soils from the roof, and can eventually collapse, propagating to the surface and causing a sinkhole. Factors that can contribute to or cause such a collapse include: soil overburden weight, new structural loads, vibrations, construction equipment weight, changes in groundwater levels, and changes to surface water infiltration patterns.

Subsurface soil erosion is aggravated by, among others, the following hydrologic factors: increasing the infiltration of water at the ground surface; lowering of the groundwater level so as to increase the vertical flow gradient and erosion potential at the critical rock-soil interface; and alternately, draining and saturating the soil at the critical rock-soil interface by repeatedly fluctuating the groundwater level from above to below the surface.

4.2 FOUNDATIONS

4.2.1 Building 1 and 3 Foundations

Provided subgrades and Structural Fills are prepared as recommended in this report, the proposed structures can be supported by shallow foundations including continuous wall footings and any possible column footings. We recommend the foundation design use the following parameters:

Design Parameter	Column Footing	Wall Footing
Net Allowable Bearing Pressure ⁽¹⁾	2,000 psf	2,000 psf
Acceptable Bearing Soil Material	Stratum II, IV or Approved Structural Fill	Stratum II, IV or Approved Structural Fill
Minimum Width	24 inches	24 inches
Minimum Interior Footing Embedment Depth (below slab or finished grade) ⁽²⁾	24 inches	24 inches
Minimum Exterior Footing Depth (below final exterior grade) ⁽²⁾	30 inches	30 inches
Estimated Total Settlement ⁽³⁾	Less than 1- inch	Less than 1- inch
Estimated Differential Settlement ⁽⁴⁾	Less than ¾ inches between columns	Less than ¾ inches over 30 feet

Notes:

- (1) Net allowable bearing pressure is the applied pressure in excess of the surrounding overburden soils above the base of the foundation.
- (2) For bearing considerations, frost penetration requirements or expansive soil concerns.
- (3) Based on provided structural loads. If final loads are different, ECS must be contacted to update foundation recommendations and settlement calculations.
- (4) Based on maximum column/wall loads and variability in borings.

Shallow Rock: Early auger refusal was encountered in the center and southeast area of Building 1. Based on the first floor elevation, excavation at this area to reach the subgrade and foundation bearing elevations may be difficult. In addition, excavation for the slab and foundation for the interior below grade wall on the eastern part of the building may also be difficult. The contractor should review the boring logs carefully and be prepared for hard excavation techniques.

The rock is likely to be seamy, with abrupt transitions between soil-supported and rock-supported footings. In such instances, it is recommended to perform isolated undercuts along the footing to reduce the potential for excessive differential settlement across relatively short horizontal distances. Where footings transition from soil-support to rock-support and the length of the rock seam is greater than 4 feet, we recommend that the rock be removed to a depth of 12 inches for a length of 10 feet from the soil/rock interface and be replaced with compacted soil. In instances where the rock pinnacle extends for a distance of less than 4 feet along the trench, the rock pinnacle should be removed to a depth of 12 inches below the design bearing level and replaced with compacted soil.

Potential Undercuts: Most of the soils at the foundation bearing elevation are anticipated to be suitable for support of the proposed structure. If soft or unsuitable soils are observed at the footing bearing elevations, the unsuitable soils should be undercut to firm materials. Any undercut should be backfilled with cementitious flowable fill ($f'_c \geq 200$ psi at 28 days), lean concrete, or compacted dense graded aggregate (VDOT No. 21-A) up to the original design bottom of footing elevation; the original footing shall be constructed at the designed footing elevations.

If shallow foundations are subject to lateral loading, the following engineering parameters can be utilized:

SOIL PARAMETER	ESTIMATED VALUE
Coefficient of Passive Earth Pressure (K_p)	2.66
Soil Moist Unit Weight (γ)	110 pcf
Cohesion (C)	0 psf
Interface Friction Angle [Concrete on Soil] (ϕ_f)	18°
Sliding Friction Coefficient [Concrete on Soil] (μ)	0.32
Passive equivalent fluid pressure	200H (psf)*

*The passive equivalent pressure has been reduced since the amount of movement required for full mobilization is not likely.

4.2.2 Building 2

Medium dense to dense soils and weathered rock were encountered at the west and east areas of Building 2; however, very soft soil was encountered in the central area of Building 2, particularly boring B-02 and B-04. Materials that appear to be epikarst are located in B-02 from approximately 8 feet to 24 feet below existing grade. Based on the conditions, it is our recommendation that an additional exploration be performed to help identify the lateral and vertical extent of the soft soil conditions. The additional exploration would consist of additional borings and Electrical Resistivity Imaging (ERI).

4.3 SLABS ON GRADE

Provided subgrades and structural fills are prepared as discussed herein, the proposed floor slabs for Buildings 1 and 3 can be constructed as Ground Supported Slabs (or Slab-On-Grade). It appears that the slabs will bear on newly compacted fill or Stratum II. The following graphic depicts our soil-supported slab recommendations:

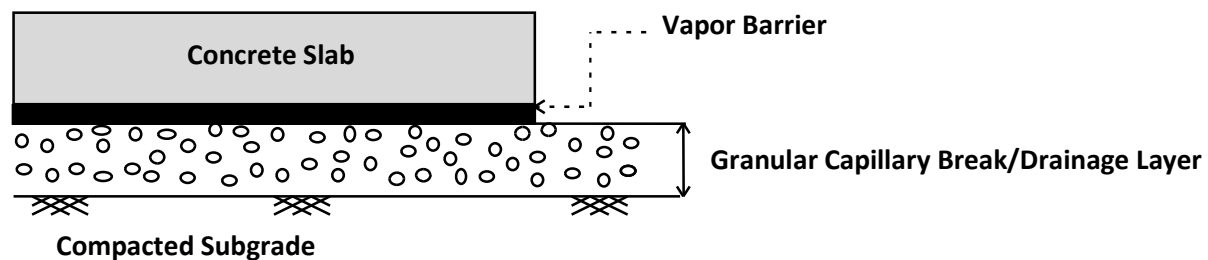


Figure 4.3.1

1. Drainage Layer Thickness: 4 inches
2. Drainage Layer Material: VDOT 21A/B or 57 stone

Soft or yielding soils may be encountered in some areas. Those soils should be removed and replaced with compacted Structural Fill in accordance with the recommendations included in this report.

Subgrade Modulus: Provided the Structural Fill and Granular Drainage Layer are constructed in accordance with our recommendations, the slab may be designed assuming a modulus of subgrade

reaction, k_1 of 125 pci (lbs./cu. inch). The modulus of subgrade reaction value is based on a 1 foot by 1 foot plate load test basis.

Vapor Barrier: Before the placement of concrete, a vapor barrier may be placed on top of the granular drainage layer to provide additional protection against moisture penetration through the floor slab. When a vapor barrier is used, special attention should be given to surface curing of the slab to reduce the potential for uneven drying, curling and/or cracking of the slab. Depending on proposed flooring material types, the structural engineer and/or the architect may choose to eliminate the vapor barrier.

Rock Above Design Bearing Elevation: We recommend that sufficient rock be removed to allow placement of the entire drainage layer. This will serve to cushion the slab and reduce the potential for point loads and subsequent cracking of the concrete. In such cases, additional overexcavation of rock should be considered to allow installation of underslab utilities.

Slab Isolation: Soil-supported slabs should be isolated from the foundations and foundation-supported elements of the structure so that differential movement between the foundations and slab will not induce excessive shear and bending stresses in the floor slab. Where the structural configuration prevents the use of a free-floating slab such as in a drop down footing/monolithic slab configuration, the slab should be designed with suitable reinforcement and load transfer devices to preclude overstressing of the slab.

4.4 BELOW GRADE WALLS

Below grade interior walls (at split elevations) and exterior foundations walls are planned in the design. We recommend that below grade walls be designed to withstand at-rest lateral earth pressures and surcharge loads from adjacent building foundations and slabs. These recommendations apply to a “drained” condition which is where there is drainage material behind below grade walls that prevents hydrostatic water pressures on the back of the below grade wall.

To accomplish a drained condition, drainage materials such as a free draining gravel, geocomposite drainage panels, and weep holes should be used. The geocomposite and weepholes are primarily for the construction phase of development. This system should consist of weepholes through the wall and/or a 4-inch perforated closed joint drain line located along the backside of the walls above the top of the footing. The drain line should be surrounded by a minimum of 6 inches of VDOT #57 stone wrapped with an approved non-woven geotextile, such as Mirafi 140-N or equivalent. The drains should daylight or be connected to a sump pump that directs water away from the structure.

We recommend that walls that are restrained from movement at the top be designed for a linearly increasing lateral earth pressure. The following figure depicts our recommended at-rest lateral earth pressure condition for a “drained below-grade wall” with restrained wall top:

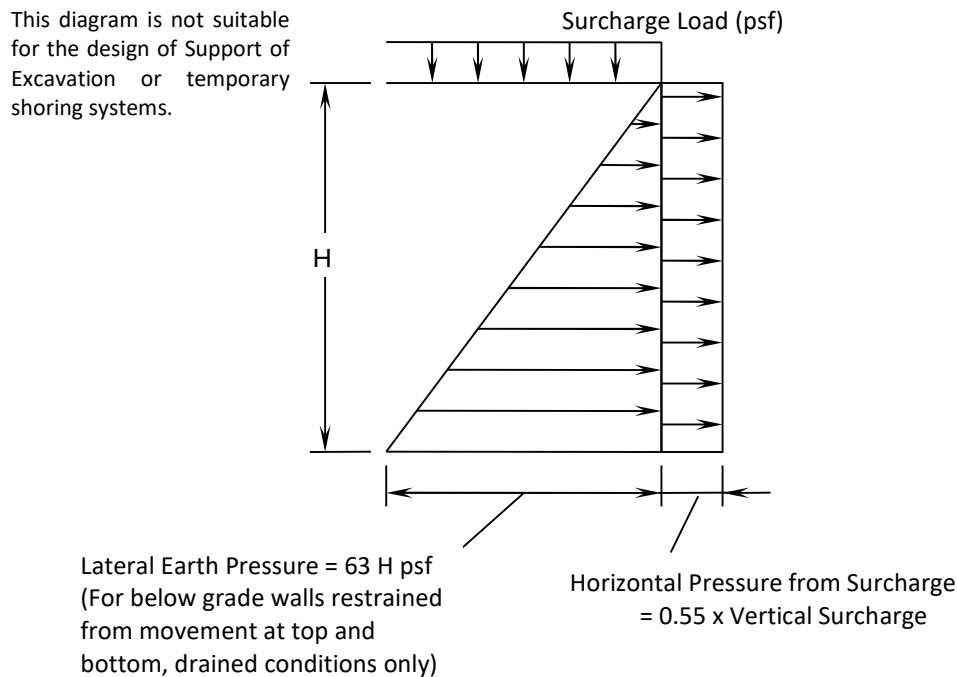


Figure 4.4.1

Surcharge loads imposed within a 45 degree slope from the base of the restrained wall should be considered in the below grade wall design. These surcharge loads should be based on an at-rest pressure coefficient, k_0 , of 0.55. Care should be used to avoid the operation of heavy equipment to compact the wall backfill since it may overload and damage the wall; in addition, such loads are not typically considered in the design of below grade walls.

4.5 SEISMIC DESIGN CONSIDERATIONS

The Commonwealth of Virginia has adopted Virginia Construction Code 2021 (VCC) via the Virginia Uniform Statewide Building Code (USBC). The current version of VCC incorporates ASCE 7-22, Minimum Design Loads and Associated Criteria for Building and Other Structures into the building code. This adoption supersedes section 16 of IBC 2021, in respect to seismic site classification.

ASCE 7-22, Chapter 20 has updated the procedure for determining Site Classification. This chapter requires that site classification be conducted based on the average shear wave velocity of the top 100 feet of the site. The shear wave velocity can either be measured or estimated based on established correlations. If site classification is based on estimated values of shear wave velocity (v_s) the site class shall be derived using V_s , $V_s/1.3$ and $V_s(1.3)$. The seismic site class definitions for the weighted average shear wave velocities in the upper 100 feet of the soil profile are presented in Chapter 20 of ASCE 7-22 and in the table below.

SEISMIC SITE CLASSIFICATION		
Site Class	Soil Profile Name	Shear Wave Velocity, V_s , (ft./s)
A	Hard Rock	$V_s > 5,000$ ft./s
B	Rock	$>3,000$ to $5,000$ ft./s
BC	Soft Rock	$>2,100$ to $3,000$ ft./s
C	Very Dense Sand or Hard Clay	$>1,450$ to $2,100$ ft./s
CD	Dense Sand or Very Stiff Clay	$>1,000$ to $1,450$ ft./s
D	Medium Dense Sand or Stiff Clay	>700 to $1,000$ ft./s
DE	Loose Sand or Medium Stiff Clay	>500 to 700 ft./s
E	Very Loose Sand or Soft Clay	$V_s < 500$ ft./s

For this project, shear wave velocity of the soil profile was estimated based on the soil densities observed. Based upon our estimate and assumed proposed bearing elevations of the structures we recommend that a **Site Classification D** be used for the design of the structures. This Site Classification is based on a Risk Category of III for the building. This recommendation is in accordance with the procedure outlined in ASCE 7-22.

4.6 PAVEMENTS

Subgrade Characteristics: Based on the results of our borings, it appears that the pavement subgrades in cuts will consist mainly of CLAYEY GRAVEL (GC), LEAN CLAY (CL), POORLY GRADED GRAVEL (GP), and WEATHERED ROCK (WR) material. We anticipate pavement subgrades in fill areas will consist of similar materials from on-site cuts or import material.

California Bearing Ratio (CBR) testing was performed on soil from boring P-05 and P-03. The soils classified as Lean Sandy CLAY (CL) and demonstrated CBR values of 2.9 and 5.0 at approximately 98 and 100% compaction, respectively. Maximum swell was 1.40%. For design purposes, we recommend a design CBR value of 3, approximately two-thirds of the average laboratory value and compact the top 12-inches of pavement subgrade to 100 % of the maximum dry density

Traffic Loading Information: We were provided with traffic loading information by Chris Burns with Westwood via email on January 28, 2026. Based on the information provided, we have utilized 500 ADT for our pavement design with the assumption of no more than 5% trucks. Should traffic loading differ from the data noted, ECS should be contacted to revise our pavement design.

Pavement Design Recommendations: Our pavement design was performed in general accordance with the *VDOT Pavement Design Guide for Subdivision and Secondary Roads in Virginia*. The preliminary pavement sections below are minimum sections. The civil engineer should review potential traffic and contact ECS should the loading be higher.

MATERIAL	FLEXIBLE PAVEMENT		RIGID PAVEMENT
	Heavy Duty	Light Duty	Heavy Duty
Portland Cement Concrete ($f'_c = 4000$ psi)	-	-	6 in
Asphaltic Concrete Surface Course (SM-12.5)	1.5 in	1.5 in	-
Asphaltic Concrete Base Course (BM-25.0)	3.0 in	2.0 in	-
Graded Aggregate Base Course (AASHTO #21A/21B)	8.0 in	8.0 in	6 in
Pavement Thickness	12.5 in	11.5 in	12 in

In general, heavy duty sections are areas that will be subjected to trucks, buses, or other similar vehicles including main drive lanes of the development. Light duty sections are appropriate for vehicular traffic and parking areas.

Large, front loading trash dumpsters frequently impose concentrated front wheel loads on pavements during loading. This type of loading typically results in rutting of asphalt pavement and ultimately pavement failures. For preliminary design purposes, we recommend that the pavement in trash pickup areas consist of the heavy duty rigid pavement.

Prior to subbase placement and paving, we recommend that CBR testing of the subgrade soils (both natural and fill soils) be performed to determine the soil engineering properties for final pavement design.

Pavement Drainage/Subdrainage: The pavement sections should be designed to mitigate the potential for “bath tub” effects from differential pavement thicknesses. Drainage mechanisms consisting of edge drains should be incorporated into the design to facilitate positive subbase drainage. The onsite ML and CL materials are sensitive to moisture fluctuations and have poor drainage characteristics that can degrade subgrade support over time. Once parking areas and drive lanes have been established to subgrade elevations, it is important to proceed with the placement of all roadway design elements in a timely manner. Where standing water develops, either on the pavement surface or within the base course layer, softening of the subgrades and other problems related to the deterioration of the pavement can be expected. Curbs should be backfilled as soon as possible to reduce the infiltration of water the pavement subbase and soil subgrade.

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 SUBGRADE PREPARATION

5.1.1 Demolition

All existing structures (including all above and below-ground construction) within these areas to be developed should be removed prior to the initiation of new construction. There was demolition debris observed on site, specifically in the central portion of the Building 1 footprint and the southwest corner of the Building 2 footprint. The debris within Building 1 consisted of concrete and rock fragments and was

surficial. The debris within Building 2 appeared to be an excavation backfilled with sandy material. The demolition debris from the existing structures should be completely removed from the site. Removal should include all concrete, asphalt/gravel, underground pipes, tanks, drain fields and utilities at the site that might interfere with the new construction. For all excavations resulting from the removal of abandoned utilities, provisions should be made in the construction specifications and budget to restore the subgrade to a stable condition with properly compacted Structural Fill. Restoration should include backfilling and compaction of the excavated areas. Abandoning and grouting of utilities is not recommended.

5.1.2 Stripping and Grubbing

The subgrade preparation should consist of stripping all vegetation, rootmat, topsoil, existing fill, existing asphalt, subbase materials, and any soft or unsuitable materials from the 5-foot expanded building and pavement limits. Stripping limits should be extended an additional foot for each foot of fill required to reach the design subgrade elevation.

5.1.3 Proofrolling

Prior to fill placement or other construction on subgrades, the subgrades should be evaluated by a representative of ECS. The exposed subgrade should be thoroughly proofrolled with construction equipment 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 an ECS technician. This procedure is intended to assist in identifying any localized yielding materials.

Where proofrolling identifies areas that are unstable or “pumping” subgrade in those areas should be repaired prior to the placement of any subsequent Structural Fill or other construction materials. Methods of stabilization include undercutting, moisture conditioning, or chemical stabilization. The situation should be discussed with ECS to determine the appropriate procedure. Test pits may be excavated to explore the shallow subsurface materials to help in determining the cause of the observed unstable materials, and to assist in the evaluation of appropriate remedial actions to stabilize the subgrade.

5.2 EARTHWORK OPERATIONS

5.2.1 Existing Man-Placed Fill

Fill Content: Surficial debris is present on site, specifically within the footprint of Building 1 and 2. The material was located in the central portion of the Building 1 footprint (rock and concrete fragments) and the southwest corner of the Building 3 footprint (sandy backfill material). Although not encountered in our borings, based on the previous developments at the site, Existing Fill soils may be encountered at the site in unexplored areas. The fill may be surficial from shallow surficial grading or backfill for existing utilities or basements of previous residential structures. If materials that appear to be Existing Fill are identified, they should be completely undercut and removed during grading operations as they are not suitable for reuse as structural fill.

5.2.2 High Plasticity Soils

High plasticity soils are those materials classified as FAT CLAY (CH). High plasticity soils were encountered in many of the borings at variable depths. Where high plasticity soils are encountered at design subgrade elevations in slab and pavement areas, the subgrade should be undercut 2 feet and grades restored with approved low plasticity Structural Fill ($LL < 40$, $PI < 20$).

5.2.3 Weathered Rock and Rock

Based on boring data obtained during the exploration, we anticipate that materials requiring difficult or rock excavation techniques may be encountered during site grading, utility installation, and excavation to planned subgrades.

The excavation of weathered rock and rock can have a substantial impact on the cost and schedule of the proposed construction. This discussion considers two general classes of materials for purposes of describing excavatability. Residuum and weathered rock will be used as the terms for the materials to be excavated.

In mass excavations for general site work, overburden soils with standard penetration test N-values of 40 bpf or less can usually be removed with conventional earth excavation equipment. Residual soils or soft weathered (Saprolitic) rock with N-values of 40 to 50 bpf can generally be removed with conventional earth moving equipment after first being loosened with a large single-tooth ripper attached to a large crawler tractor. Harder, less weathered rock will generally require the use of a large single-tooth ripper, dozers, and/or track-mounted backhoes for excavation. However, materials exhibiting N-values of 50 blows or greater for 6 inches of penetration will be more difficult to excavate and generally require hoe ramming, blasting or other rock excavation techniques. The actual excavatability of the bedrock material will be greatly controlled by in-situ jointing and bedding and the type of excavating equipment utilized. The contractor should review the borings and be prepared with appropriate equipment for material removal.

In confined excavations, such as utility trenches, excavation of dense residual soils typically requires the use of large track-mounted backhoes. Excavation of harder phases of weathered rock typically requires the use of large track-mounted backhoes, pneumatic spades, or light blasting. Refusal materials (apparent rock) normally require blasting in trench excavations. Blasting in utility trenches should be done carefully to avoid damage to the surrounding materials. When the material to be excavated requires blasting, the contractor should comply with the jurisdictional requirements. We advise ensuring that any blasting performed adheres to local jurisdictions and regulations as the karst conditions encountered within Building 2 may inhibit blasting operations.

5.2.4 Structural Fill

Prior to placement of Structural 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. Alternatively, Proctor data from other accredited laboratories can be submitted if the test results are within the last 90 days.

Satisfactory Structural Fill Materials: Materials satisfactory for use as Structural Fill should consist of inorganic soils having a USCS classification of CL, ML, SC, SM or more granular free of debris, cobbles or rock fragments greater than 4 inches in diameter. Low plasticity soils consisting of ML or more granular should be used behind below grade walls.

Since import materials are being paid for, we recommend that these materials consist of SM or more granular when possible and have liquid limits and plasticity indices less than 40 and 20, respectively. The onsite and import materials should have the following characteristics and compaction:

STRUCTURAL FILL INDEX PROPERTIES	
Subject	Property
Building and Pavement Areas (Borrow Soils)	LL < 40, PI<20
Building and Pavement Areas (On-site Soils)	LL < 50, PI < 25
Max. Particle Size	4 inches

STRUCTURAL FILL COMPACTION REQUIREMENTS	
Subject	Requirement
Compaction Standard	Standard Proctor, ASTM D698 or VTM-1
Required Compaction	General: 95% of Max. Dry Density Top 12-inches of Pavement Subgrades: 100% of Max Dry Density
Moisture Content	+/-3 % points of the soil's optimum value
Loose Thickness	8 inches prior to compaction

On-Site Borrow Suitability: Onsite soils that meet the definition of Satisfactory Structural Fill are present on the site. These occur mostly at relatively shallow depth below the surface where residual soils are most weathered. It should be expected that the onsite materials will have moisture above optimum and will be moisture sensitive. Onsite materials from cut or taken from utility excavations should be anticipated to be wet of optimum and require drying.

Drying can be achieved by mechanical discing or chemical drying. Depending on the time of year, mechanical drying may not be practical. Chemical drying can be performed using quicklime or Calciment. Typically, 2 to 3% quicklime by dry weight is suitable for drying purposes. A higher percentage will be required using Calciment.

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 all frozen or frost-heaved soils should be removed prior to placement of Structural Fill or other fill soils and aggregates. Excessively wet soils or aggregates should be scarified, aerated, and moisture conditioned.

5.3 FOUNDATION AND SLAB OBSERVATIONS

Protection of Foundation Excavations: Exposure to the environment may weaken the soils at the footing bearing level if the foundation excavations remain open for too long a time. Therefore, foundation concrete should be placed the same day that excavations are made. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, a 1 to 3-inch thick “mud mat” of “lean” concrete should be placed on the bearing soils before the placement of reinforcing steel.

Footing Subgrade Observations: Most of the soils at the foundation bearing elevation are anticipated to be suitable for support of the proposed structure. It is important to have ECS observe the foundation subgrade prior to placing foundation concrete, to confirm the bearing soils are what was anticipated.

Slab Subgrade Verification: Prior to placement of a drainage layer, the subgrade should be prepared in accordance with the recommendations found in **Section 5.1.3 Proofrolling**.

5.4 UTILITY INSTALLATIONS

Utility Subgrades: The soils encountered in our exploration are expected to be generally suitable for support of utility pipes with the exception of the central area around Building 2 where materials become soft and wet with depth. The location and inverts of utility structures were not known. The pipe subgrades should be observed and probed for stability by ECS. Any loose or unsuitable materials encountered should be removed and replaced with suitable compacted Structural Fill, or additional pipe stone bedding material.

Shallow weathered rock and auger refusals were encountered on the site. The locations and inverts of proposed utilities were unknown at the time of this report. Depending on the location and depth of utilities, difficult excavation may be encountered. The contractor should review the borings and the proposed utility locations carefully and be prepared for difficult excavation.

Utility Backfilling: The granular bedding material (AASHTO #57 stone) should be at least 4 inches thick, but not less than that specified by the civil engineer’s project drawings and specifications. We recommend that the bedding materials be placed up to the springline of the pipe. Fill placed for support of the utilities, as well as backfill over the utilities, should satisfy the requirements for Structural Fill and Fill Placement.

Excavation Safety: All 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.

5.5 KARST CONSIDERATIONS

Although sinkholes stem from geologic conditions within the underlying rock that have developed over significant time periods, they are often triggered by present day changes in the surface and subsurface drainage patterns. In order to reduce the potential for future sinkhole development which could impact the performance of foundations and other development infrastructure, positive surface drainage should be maintained both during and after construction. We recommend that the following preventative measures be followed (where practical) to reduce the potential inducement of sinkhole formation in proposed development areas.

1. All earthwork operations should be graded to drain away from the ground disturbance areas at all times. Upon completion of daily earthwork operations, the ground surface should be sealed by thorough rolling with a smooth-drum roller to facilitate runoff and reduce infiltration of precipitation.
2. Backfill of grading excavations should be performed in lifts that are compacted to minimize settlement. The top two feet of structural backfill should be low permeability material (CL or ML) and should be compacted to at least 95% of the maximum dry density as determined using ASTM D-698 or VTM-1. This will help to minimize the amount of water that can percolate into the subsurface.
3. During construction, care should be taken to reduce the ponding of surface water.
4. Visual observations during all earthwork operations should be carried out in order to detect any previous unexposed or recently created karst features. Any such feature should be called to the Geotechnical Engineer's attention for remedial improvement.
5. All storm piping should be designed such that joints and structure tie-ins remain watertight with allowance for some settlement. Leaking storm pipes promote subsurface seepage and can instigate sinkhole development in the form of surficial dropouts with little or no warning.

It should be noted that these recommendations are provided on an "as practical" basis. We understand that it is not always cost effective to implement all of the recommendations contained herein. ECS would be happy to discuss the contents of this with you in person should you desire.

Although not anticipated, in the event that a karst feature, such as a soft soil zone or void, is encountered during construction, ECS should be contacted so that our personnel can visit the site and evaluate the conditions encountered. We recommend that budgets be established to cover the costs for such consultation efforts.

Several methods are available to remediate sinkholes such as low mobility grouting, cap grouting, and the creation of a reverse-graded filter. Whenever possible, we recommend that a reverse graded filter be used to stabilize sinkholes as this method allows subsurface water to continue to flow in its original flow path. Grouting in karst areas often blocks subsurface flows, backing water up in the karst groundwater system causing the formation of new sinkholes upstream. The decision to utilize a particular method to remediate karst features should be made after the consultation with an ECS engineer or geologist.

6.0 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 our 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. Additional exploration is required for Building 2.

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

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

APPENDIX A – Diagrams & Reports

Site Location Diagram
Boring Location Diagram
Subsurface Cross-Sections



SITE LOCATION DIAGRAM

Roanoke Gateway Project Phase I

624 Bullitt Ave SE, Roanoke, Virginia

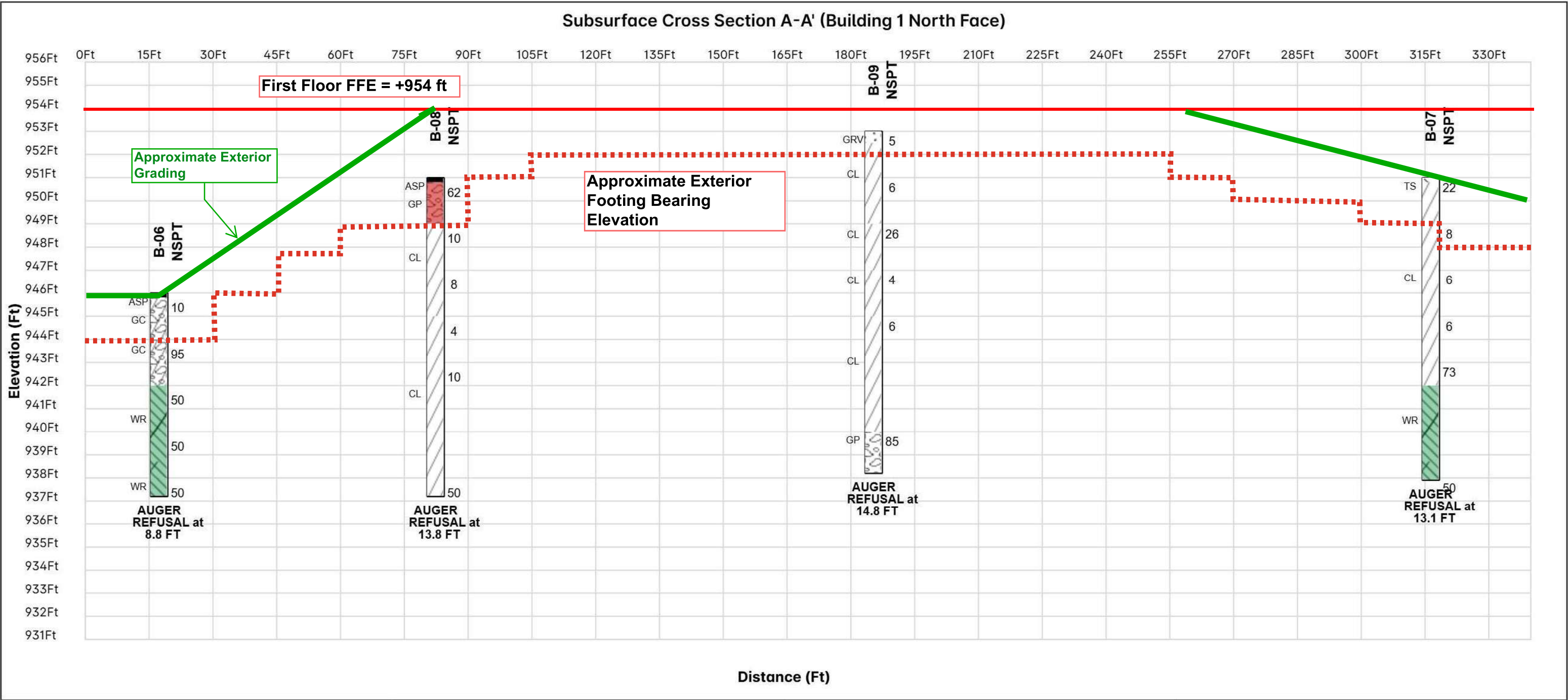
Homes for America



ENGINEER LNB
SCALE 1" = 300'
PROJECT NO. 12:20641
SHEET 1
DATE 1/13/2026



DATE
4/15/2026



CLIENT:	Homes for America	PROJECT:	Roanoke Gateway Project Phase I
DRAWN DATE:	Apr 13, 2026	PROJECT NO.:	12:20641
CHECKED DATE:	Apr 13, 2026	SCALE:	AS SHOWN

Notes:

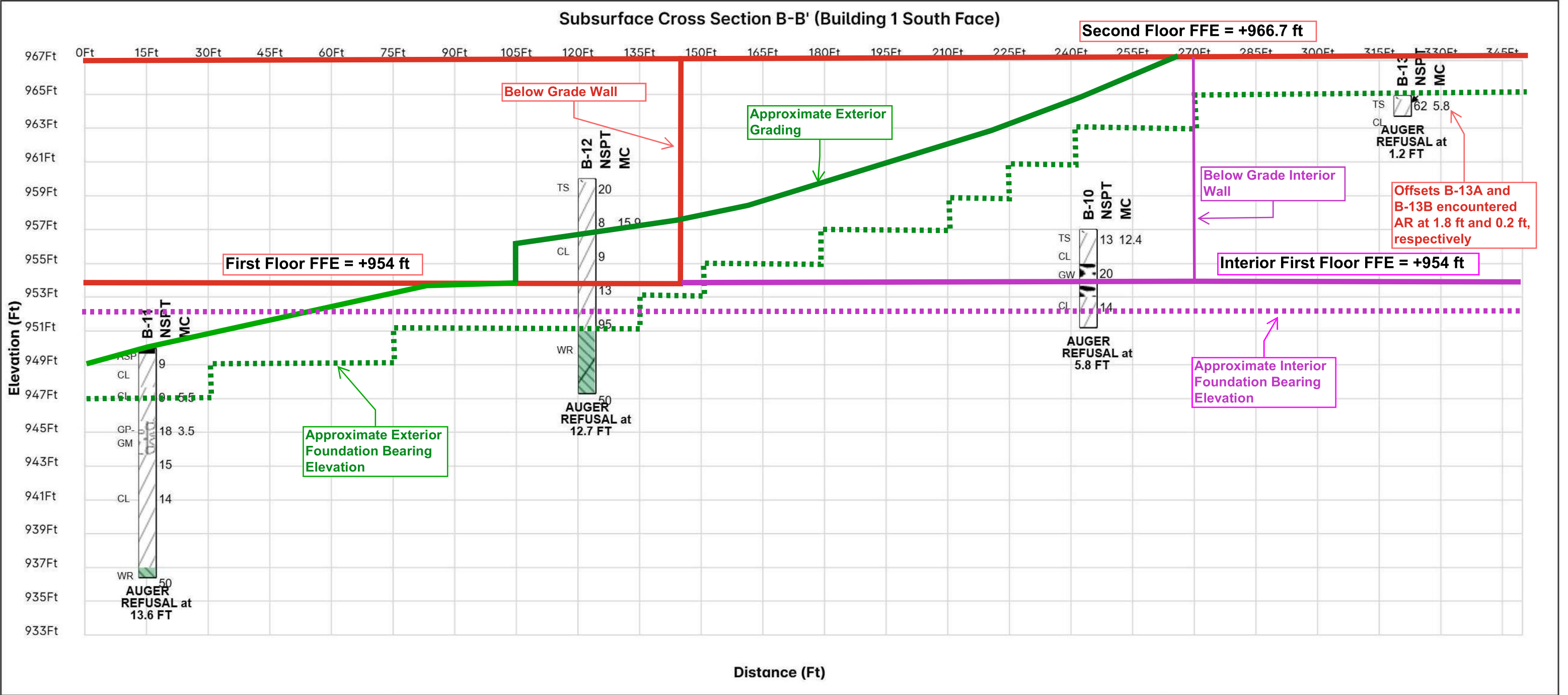
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2-SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION.

3-STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586).

4- TOPOGRAPHIC INFORMATION IS BASED ON PUBLICLY AVAILABLE DATA (GOOGLE OR CESIUM).THE TOPOGRAPHIC LINE SHOWN BETWEEN BORINGS IS FOR VISUAL REFERENCE ONLY.PLEASE REFER TO THE REFERENCE NOTES FOR BORING LOGS FOR SYMBOL OGY MEANING AND ADDITONAI

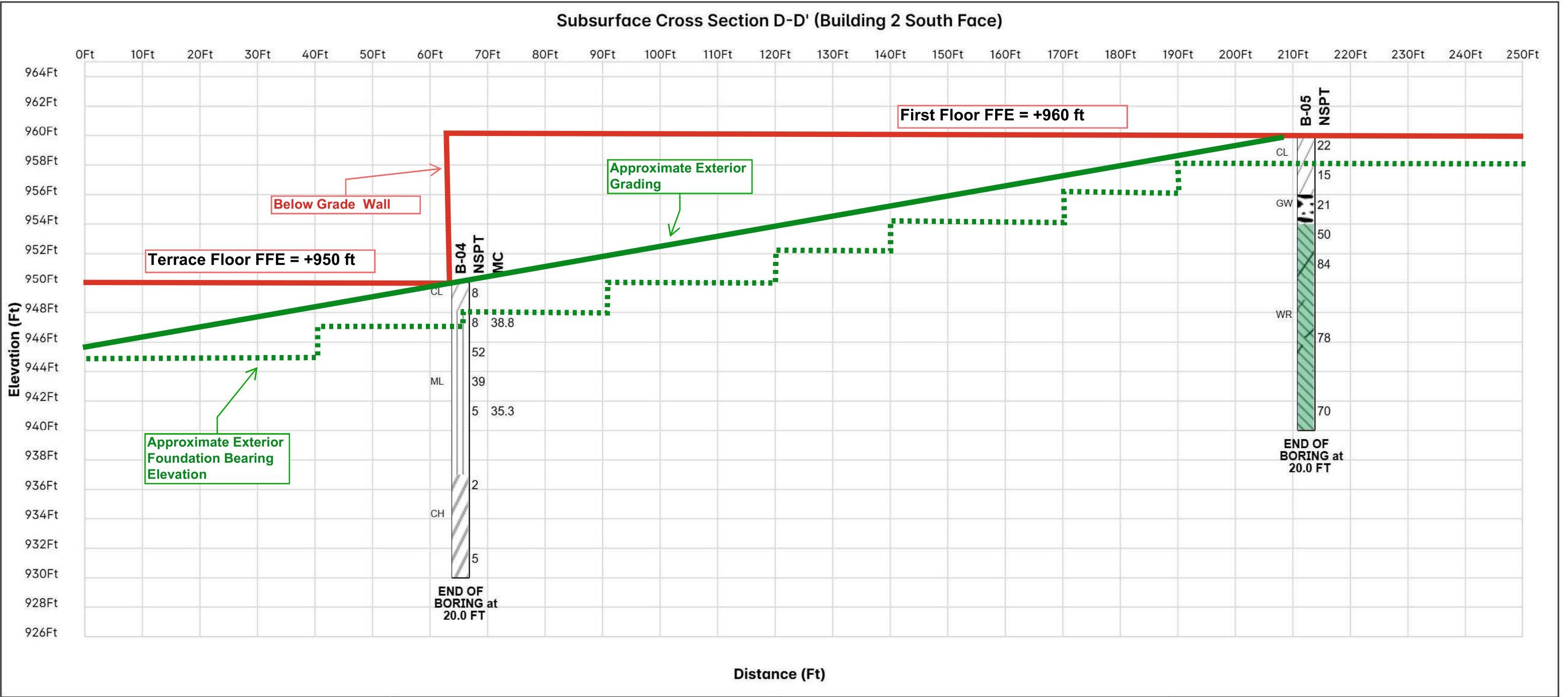
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X	●	△	▼	WL (Completion)	Possible Fill
[FINES CONTENT %]			▽	WL (Estimated Seasonal High Water)	Probable Fill
BOTTOM OF CASING			▽	WL (Stabilized)	WR/Rock
LOSS OF CIRCULATION					
CALIBRATED PENETROMETER					



CLIENT:	Homes for America	PROJECT:	Roanoke Gateway Project Phase I
DRAWN DATE:	Apr 14, 2026	PROJECT NO.:	12:20641
CHECKED DATE:	Apr 14, 2026	SCALE:	AS SHOWN

Notes: 1-EOB: END OF BORING AR: AUGER REFUSALSR: SAMPLER REFUSAL 2-SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION. 3-STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586). 4- TOPOGRAPHIC INFORMATION IS BASED ON PUBLICLY AVAILABLE DATA (GOOGLE OR CESIUM).THE TOPOGRAPHIC LINE SHOWN BETWEEN BORINGS IS FOR VISUAL REFERENCE ONLY.PLEASE REFER TO THE REFERENCE NOTES FOR BORING LOGS FOR SYMBOL OGY MEANING AND ADDITONAI	Plastic Limit	Water Content	Liquid Limit	▽	WL (First Encountered)	Fill
	X	●	△	▼	WL (Completion)	Possible Fill
	[FINES CONTENT %]			▽	WL (Estimated Seasonal High Water)	Probable Fill
	▶	BOTTOM OF CASING		▽	WL (Stabilized)	WR/Rock
	100%	LOSS OF CIRCULATION				
	○	CALIBRATED PENETROMETER				





CLIENT:	Homes for America	PROJECT:	Roanoke Gateway Project Phase II
DRAWN DATE:	Apr 15, 2026	PROJECT NO.:	12:20641-A
CHECKED DATE:	Apr 15, 2026	SCALE:	AS SHOWN

Notes:

1-EOB: END OF BORING AR: AUGER REFUSALSR: SAMPLER REFUSAL

2-SEE INDIVIDUAL BORING LOG AND GEOTECHNICAL INFORMATION.

3-STANDARD PENETRATION TEST RESISTANCE (LEFT OF BORING) IN BLOWS PER FOOT (ASTM D1586).

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[FINES CONTENT %]			▽	WL (Estimated Seasonal High Water)	Probable Fill
BOTTOM OF CASING			▽	WL (Stabilized)	WR/Rock
LOSS OF CIRCULATION					
CALIBRATED PENETROMETER					

Subsurface Cross Section E-E' (Building 3 North Face)

Elevation (Ft)

Distance (Ft)

First Floor FFE = +954 ft

Approximate Exterior Foundation Bearing Elevation

B-14 NSPT

B-16 NSPT MC

B-15 NSPT

END OF BORING at 20.0 FT

END OF BORING at 20.0 FT

END OF BORING at 20.0 FT

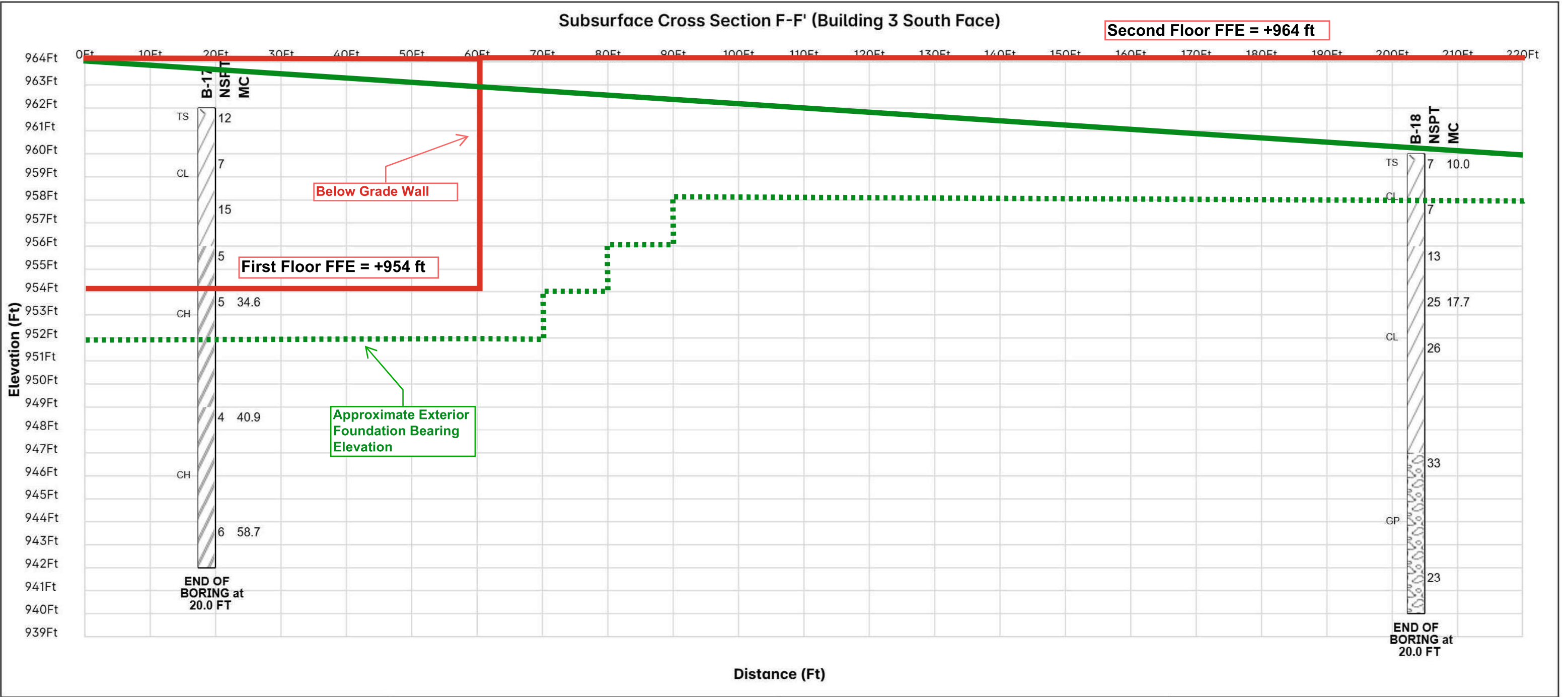
Soil Profile Data:

Borehole	Soil Type	Thickness (Ft)	NSPT (blows/ft)	MC (ft)
B-14	CL	19		
	CL	11		
		7		
		6		
	CH	4		
		44		
	WR	50		
B-16	TS	20		
	SM	23	12.2	
	GW	24		
	CL	13		
	CH	11	30.5	
		5	36.3	
	ML			
	CH	7	58.0	
B-15	TS	15		
	CL	14		
	CH	8		
	CL	9		
	CH	12		
	GW	64		

CLIENT:	Homes for America	PROJECT:	Roanoke Gateway Project Phase II
DRAWN DATE:	Apr 15, 2026	PROJECT NO.:	12:20641-A
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	[FINES CONTENT %]	▼	WL (Completion)		Possible Fill
	 BOTTOM OF CASING	▽	WL (Estimated Seasonal High Water)		Probable Fill
	 LOSS OF CIRCULATION	▽	WL (Stabilized)		WR/Rock
	○ CALIBRATED PENETROMETER				





CLIENT:	Homes for America	PROJECT:	Roanoke Gateway Project Phase II
DRAWN DATE:	Apr 15, 2026	PROJECT NO.:	12:20641-A
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BOTTOM OF CASING			▽	WL (Stabilized)		WR/Rock
LOSS OF CIRCULATION						
CALIBRATED PENETROMETER						

APPENDIX B – Field Operations

Reference Notes for Boring Logs

Subsurface Exploration Procedure: Standard Penetration Testing (SPT)

Boring Logs B-01 through B-18 and P-01 through P-06



REFERENCE NOTES FOR BORING LOGS

MATERIAL^{1,2}

	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	VOID
	BRICK
	AGGREGATE BASE COURSE
	GW WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GP POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GM SILTY GRAVEL gravel-sand-silt mixtures
	GC CLAYEY GRAVEL gravel-sand-clay mixtures
	SW WELL-GRADED SAND gravelly sand, little or no fines
	SP POORLY-GRADED SAND gravelly sand, little or no fines
	SM SILTY SAND sand-silt mixtures
	SC CLAYEY SAND sand-clay mixtures
	ML SILT non-plastic to medium plasticity
	MH ELASTIC SILT high plasticity
	CL LEAN CLAY low to medium plasticity
	CH FAT CLAY high plasticity
	OL ORGANIC SILT or CLAY non-plastic to low plasticity
	OH ORGANIC SILT or CLAY high plasticity
	PT PEAT highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION

DESIGNATION	PARTICLE SIZES
Boulders	12 inches (300 mm) or larger
Cobbles	3 inches to 12 inches (75 mm to 300 mm)
Gravel: Coarse	¾ inch to 3 inches (19 mm to 75 mm)
Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand: Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")	<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS

UNCONFINED COMPRESSION STRENGTH, QP ⁴	SPT ⁵ (BPF)	CONSISTENCY ⁷ (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	2 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

RELATIVE AMOUNT ⁷	COARSE GRAINED (%) ⁸	FINE GRAINED (%) ⁸
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective (ex: "Silty")	25 - 45	30 - 45

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT ⁵	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

WATER LEVELS⁶

	WL (First Encountered)
	WL (Completion)
	WL (Seasonal High Water)
	WL (Stabilized)

FILL AND ROCK

FILL	POSSIBLE FILL	PROBABLE FILL	ROCK

¹Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

²To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

³Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

⁴Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

⁵Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

⁶The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

⁷Minor deviation from ASTM D 2488-17 Note 14.

⁸Percentages are estimated to the nearest 5% per ASTM D 2488-17.



SUBSURFACE EXPLORATION PROCEDURE: STANDARD PENETRATION TESTING (SPT) ASTM D 1586 Split-Barrel Sampling

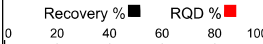
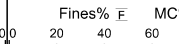
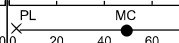
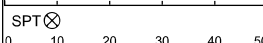
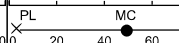
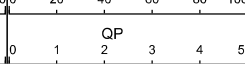
Standard Penetration Testing, or **SPT**, is the most frequently used subsurface exploration test performed worldwide. This test provides samples for identification purposes, as well as a measure of penetration resistance, or N-value. The N-Value, or blow counts, when corrected and correlated, can approximate engineering properties of soils used for geotechnical design and engineering purposes.

SPT Procedure:

- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 18-24 inches (in 3 or 4 Increments of 6 inches each)
- Auger is advanced* and an additional SPT is performed
- One SPT typically performed for every two to five feet. An approximate 1.5 inch diameter soil sample is recovered.



**Drilling Methods May Vary—* The predominant drilling methods used for SPT are open hole fluid rotary drilling and hollow-stem auger drilling.

CLIENT: Homes for America				PROJECT NO.: 12:20641-A		BORING NO.: B-01		SHEET: 1 OF 1			
PROJECT NAME: Roanoke Gateway Project Phase II				DRILLER/CONTRACTOR: SEQ Drilling, Inc.							
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION			
LATITUDE: 37.2684341		LONGITUDE: -79.93137282		STRUCTURE:		SURFACE ELEVATION: 945		BOTTOM OF CASING			
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT-N VALUE)*	Recovery %  RQD %  Fines%  MC%  SPT  PL  MC  LL QP 	
	S-1	SS	24	16	Topsoil [Thickness=2"]. (CL) Residuum, LEAN CLAY WITH SAND - trace gravel, light brown, moist, stiff.				3-5-6-11 (11)		
					AUGER REFUSAL at 3.0 FT						
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL											
 WL (First Encountered):				Dry		BORING STARTED: 12/03/2025				CAVE IN DEPTH: Not Observed	
 WL (Completion):				Dry		BORING COMPLETED: 12/03/2025				HAMMER TYPE: Automatic	
 WL (Seasonal High Water):						EQUIPMENT:		LOGGED BY:		DRILLING METHOD:	
 WL (Stabilized):						Track CME-550X		LNB		Hollow Stem Auger (0'-3')	
GEOTECHNICAL BOREHOLE LOG											

CLIENT: Homes for America				PROJECT NO.: 12:20641-A		BORING NO.: B-01A		SHEET: 1 OF 1				
PROJECT NAME: Roanoke Gateway Project Phase II				DRILLER/CONTRACTOR: SEQ Drilling, Inc.								
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION				
LATITUDE: 37.2684341			LONGITUDE: -79.93137282		STRUCTURE:		SURFACE ELEVATION: 945		BOTTOM OF CASING			

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL ⊗	MC ●	LL ▽
5.0					AUGER PROBE.								
	S-1	S-1	S-1	13	(CL) Residuum, LEAN CLAY WITH SAND - trace gravel, light brown, moist, very stiff.			8-19-11-6 (30)					
	S-2	S-2	S-2	17	(CH) FAT CLAY WITH SAND - brown, moist, firm.			3-2-3-5 (5)					
	S-3	S-3	S-3	9				4-5-50/2" (55/6)					
AUGER REFUSAL at 7.2 FT													
NOTE: Offset performed approximately 3 ft S of B-01													

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

WL (First Encountered): Dry		BORING STARTED: 12/03/2025		CAVE IN DEPTH: 6FT	
WL (Completion): Dry		BORING COMPLETED: 12/03/2025		HAMMER TYPE: Automatic	
WL (Seasonal High Water):		EQUIPMENT: Track CME 550X		LOGGED BY: LNB	
WL (Stabilized):				DRILLING METHOD: Hollow Stem Auger (0'-7.2')	

GEOTECHNICAL BOREHOLE LOG

CLIENT: Homes for America				PROJECT NO.: 12:20641-A		BORING NO.: B-01B		SHEET: 1 OF 1				
PROJECT NAME: Roanoke Gateway Project Phase II				DRILLER/CONTRACTOR: SEQ Drilling, Inc.								
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION				
LATITUDE: 37.2684341			LONGITUDE: -79.93137282		STRUCTURE:		SURFACE ELEVATION: 945		BOTTOM OF CASING			

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPRS/MC/SPT-N VALUE)*	Recovery % ■ RQD % ■		Fines% [F] MC% ●	
										SPT ⊗	PL	MC	LL
					AUGER PROBE.								
	S-1	S-1	S-1	0	AUGER REFUSAL at 3.1 FT				50/1" (50/1)				
					NOTE: Offset performed approximately 3 ft E of B-01								

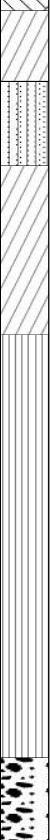
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▼ WL (First Encountered):		Dry	BORING STARTED: 12/03/2025	CAVE IN DEPTH: Not Observed
▼ WL (Completion):		Dry	BORING COMPLETED: 12/03/2025	HAMMER TYPE: Automatic
▼ WL (Seasonal High Water):			EQUIPMENT: Track CME 550X	LOGGED BY: LNB
▼ WL (Stabilized):			DRILLING METHOD: Hollow Stem Auger (0'-3.1')	

GEOTECHNICAL BOREHOLE LOG

CLIENT: Homes for America				PROJECT NO.: 12:20641-A		BORING NO.: B-02		SHEET: 1 OF 2																																																																																																																																																																																																																																																																																																																																	
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WL (First Encountered): 30 FT				BORING STARTED: 12/03/2025				CAVE IN DEPTH: 30 FT																																																																																																																																																																																																																																																																																																																																	
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CLIENT: Homes for America				PROJECT NO.: 12:20641-A		BORING NO.: B-02		SHEET: 2 OF 2			
PROJECT NAME: Roanoke Gateway Project Phase II				DRILLER/CONTRACTOR: SEQ Drilling, Inc.							
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022									LOSS OF CIRCULATION 		
LATITUDE: 37.26853065			LONGITUDE: -79.93089813		STRUCTURE:		SURFACE ELEVATION: 950		BOTTOM OF CASING 		
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TOP/RS/MC/SPT-N VALUE)*	SPT 01020304050 Recovery % 020406080100 RQD % 020406080100 Fines% F 020406080100 MC% 020406080100	
35.0	S-10	SS	24	22	(CH) FAT CLAY - trace sand, orangish brown, wet, very soft. (continued)			X		0 1 2 3 4 5 PL MC LL 0 20 40 60 80 100 61.8 99.4	
	S-11	SS	3	3	(WR) WEATHERED ROCK sampled as GRAVELLY FAT CLAY WITH SAND - brown, wet, hard. SPOON REFUSAL at 38.3 FT				50/3" (50/3)	50/3	
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL											
WL (First Encountered): 30 FT				BORING STARTED: 12/03/2025				CAVE IN DEPTH: 30 FT			
WL (Completion): 30 FT				BORING COMPLETED: 12/03/2025				HAMMER TYPE: Automatic			
WL (Seasonal High Water):				EQUIPMENT: Track CME-550X		LOGGED BY: LNB		DRILLING METHOD: Hollow Stem Auger (0'-40')			
WL (Stabilized):											
GEOTECHNICAL BOREHOLE LOG											

CLIENT: Homes for America				PROJECT NO.: 12:20641-A		BORING NO.: B-03		SHEET: 1 OF 1			
PROJECT NAME: Roanoke Gateway Project Phase II				DRILLER/CONTRACTOR: SEQ Drilling, Inc.							
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION			
LATITUDE: 37.26864635			LONGITUDE: -79.93034054		STRUCTURE:		SURFACE ELEVATION: 956		BOTTOM OF CASING		

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPIRS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL	MC	LL
5.0 10.0 15.0	S-1	SS	24	10	Topsoil [Thickness=4"]. (CL) Residuum, LEAN CLAY WITH GRAVEL - trace sand, light brown, moist, stiff.			955	4-6-8-7 (14)	14			
	S-2	SS	24	11	(SM) SILTY SAND WITH GRAVEL - light brown, moist, loose.			950	3-2-3-4 (5)	5		32.4 F	
	S-3	SS	24	11	(CL) GRAVELLY LEAN CLAY WITH SAND - grayish brown, moist, hard.			950	10-16-15-14 (31)		31		
	S-4	SS	24	19	(CL) LEAN CLAY WITH SAND - trace gravel, orangish brown, moist, very stiff.			950	3-10-14-15 (24)		24		
	S-5	SS	24	14	(ML) SANDY SILT - trace gravel, orangish brown, moist, stiff, medium dense to dense.			945	4-5-6-10 (11)		11		
	S-6	SS	24	16				945	7-20-30-33 (50)		50		
	S-7	SS	22	8	(GW) WELL-GRADED SANDY GRAVEL - reddish brown, moist, dense.			940	7-15-33-50/4" (48)		48		
					END OF BORING at 20.0 FT								

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

 WL (First Encountered): Dry		BORING STARTED: 12/03/2025		CAVE IN DEPTH: 18FT	
 WL (Completion): Dry		BORING COMPLETED: 12/03/2025		HAMMER TYPE: Automatic	
 WL (Seasonal High Water):		EQUIPMENT: Track CME 550X		LOGGED BY: LNB	
 WL (Stabilized):				DRILLING METHOD: Hollow Stem Auger (0'-20')	

GEOTECHNICAL BOREHOLE LOG

CLIENT: Homes for America				PROJECT NO.: 12:20641-A		BORING NO.: B-04		SHEET: 1 OF 1				
PROJECT NAME: Roanoke Gateway Project Phase II				DRILLER/CONTRACTOR: SEQ Drilling, Inc.								
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION 				
LATITUDE: 37.26830761			LONGITUDE: -79.9310621		STRUCTURE:		SURFACE ELEVATION: 950		BOTTOM OF CASING 			

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPIRS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●		
										SPT ⊗	PL	MC	LL	
5.0	S-1	SS	24	18	(CL) Residuum, LEAN CLAY WITH SAND - trace gravel, light brown to orangish brown, moist, firm.			945	2-3-5-5 (8)	8				
	S-2	SS	24	20	(ML) SILT WITH SAND - trace gravel and clay, light brown, moist, loose to very dense.				1-4-4-8 (8)	8		38.8 29 30	81.6 F	
	S-3	SS	24	20					8-27-25-32 (52)			52		
	S-4	SS	24	16					13-24-15-13 (39)			39		
	S-5	SS	24	20					1-2-3-4 (5)	5		35.3 26	82.4 F	
10.0														
	S-6	SS	24	22	(CH) FAT CLAY WITH SAND - trace silt, orangish brown, moist, soft to firm.		935	1-1-1-3 (2)	2					
S-7	SS	24	21		1-2-3-3 (5)			5						
15.0														
					END OF BORING at 20.0 FT			930						

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

 WL (First Encountered): Dry		BORING STARTED: 12/03/2025		CAVE IN DEPTH: 16FT	
 WL (Completion): Dry		BORING COMPLETED: 12/03/2025		HAMMER TYPE: Automatic	
 WL (Seasonal High Water):		EQUIPMENT:		LOGGED BY:	
 WL (Stabilized):		Track CME-550X		LNB	
DRILLING METHOD: Hollow Stem Auger (0'-20')					

GEOTECHNICAL BOREHOLE LOG

CLIENT: Homes for America				PROJECT NO.: 12:20641-A		BORING NO.: B-05		SHEET: 1 OF 1				
PROJECT NAME: Roanoke Gateway Project Phase II				DRILLER/CONTRACTOR: SEQ Drilling, Inc.								
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION				
LATITUDE: 37.26841512			LONGITUDE: -79.93057425		STRUCTURE:		SURFACE ELEVATION: 960		BOTTOM OF CASING			

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL	MC	LL
5.0	S-1	SS	24	17	(CL) Residuum, LEAN CLAY WITH SAND - trace gravel and silt, brown to orangish brown, moist, stiff to very stiff.				3-10-12-10 (22)	22			
	S-2	SS	24	17					4-6-9-11 (15)	15			
	S-3	SS	24	20	(GW) WELL-GRADED GRAVEL WITH SAND - trace silt, reddish brown, moist, medium dense.				3-3-18-24 (21)	21			
	S-4	SS	22	16	(WR) WEATHERED ROCK sampled as WELL-GRADED GRAVEL WITH SAND - trace clay, reddish brown, moist, dense to very dense.				12-20-30-50/4 (50)	50			
	S-5	SS	15	15					22-34-50/3" (84/9)	84/9			
10.0													
	S-6	SS	24	19					20-40-38-30 (78)	78			
	15.0												
S-7		SS	24	4					20-28-42-34 (70)	70			
					END OF BORING at 20.0 FT								

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

 WL (First Encountered): Dry		BORING STARTED: 12/03/2025		CAVE IN DEPTH: 18FT	
 WL (Completion): Dry		BORING COMPLETED: 12/03/2025		HAMMER TYPE: Automatic	
 WL (Seasonal High Water):		EQUIPMENT:		LOGGED BY:	
 WL (Stabilized):		Track CME-550X		LNB	
DRILLING METHOD: Hollow Stem Auger (0'-20')					

GEOTECHNICAL BOREHOLE LOG

CLIENT: Homes for America				PROJECT NO.: 12:20641		BORING NO.: B-06		SHEET: 1 OF 1											
PROJECT NAME: Roanoke Gateway Project Phase I				DRILLER/CONTRACTOR: SEQ Drilling, Inc.															
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION											
LATITUDE: 37.2676605		LONGITUDE: -79.93281171		STRUCTURE:		SURFACE ELEVATION: 946		BOTTOM OF CASING											
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TOP/RS/MC/SPT- N VALUE)*	SPT		Recovery %		RQD %		Fines% F		MC%	
										0 10 20 30 40 50	0 1 2 3 4 5	0 20 40 60 80 100	0 20 40 60 80 100	0 20 40 60 80 100	0 20 40 60 80 100	0 20 40 60 80 100	0 20 40 60 80 100	0 20 40 60 80 100	
5.0	S-1	SS	24	10	Asphalt [Thickness=2"].			945	9-6-4-4 (10)	10									
	S-2	SS	15	10	(GC) Residuum, CLAYEY GRAVEL WITH SAND - orangish brown, moist, loose.				9-45-50/3 (95/6)										
	S-3	SS	4	4	(GC) SANDY GRAVEL WITH SILT - light brown, moist.					50/4 (50/4)									
	S-4	SS	5	5	(WR) WEATHERED ROCK sampled as WELL-GRADED GRAVEL WITH SAND - trace clay, gray, moist, very dense.					50/5 (50/5)									
	S-5	SS	7	6	(WR) WEATHERED ROCK SAMPLED AS CLAYEY GRAVEL WITH SAND - light brown, moist, very dense.					47-50/1 (50/1)									
					AUGER REFUSAL at 8.8 FT														
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL																			
WL (First Encountered): Dry					BORING STARTED: 11/18/2025					CAVE IN DEPTH: 7.5 FT									
WL (Completion): Dry					BORING COMPLETED: 11/18/2025					HAMMER TYPE: Automatic									
WL (Seasonal High Water):					EQUIPMENT: Track CME 300					LOGGED BY: LNB					DRILLING METHOD: Hollow Stem Auger (0'-8.6')				
WL (Stabilized):																			
GEOTECHNICAL BOREHOLE LOG																			

CLIENT: Homes for America				PROJECT NO.: 12:20641		BORING NO.: B-07		SHEET: 1 OF 1				
PROJECT NAME: Roanoke Gateway Project Phase I				DRILLER/CONTRACTOR: SEQ Drilling, Inc.								
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION 				
LATITUDE: 37.26792476			LONGITUDE: -79.9318359		STRUCTURE:		SURFACE ELEVATION: 951		BOTTOM OF CASING 			

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPIRS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL	MC	LL
5.0	S-1	SS	24	12	Topsoil [Thickness=2"]. (CL) Residium, SANDY LEAN CLAY WITH GRAVEL - brown to orangish brown, moist, firm to very stiff.			950	5-10-12-10 (22)	22			
	S-2	SS	24	14					7-4-4-4 (8)	8		22.5	59.2
	S-3	SS	24	15					8-3-3-3 (6)	6		17.1	
	S-4	SS	24	16					3-3-3-5 (6)	6			
	S-5	SS	17	13					6-23-50/5" (73/5)			73/5	
10.0					(WR) WEATHERED ROCK sampled as LEAN CLAY WITH SAND - brown, moist, very hard.			X 940					
	S-6	SS	1	0	AUGER REFUSAL at 13.1 FT				50/1" (50/1)				

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

WL (First Encountered):	Dry	BORING STARTED:	11/17/2025	CAVE IN DEPTH:	9.5FT
WL (Completion):	Dry	BORING COMPLETED:	11/17/2025	HAMMER TYPE:	Automatic
WL (Seasonal High Water):		EQUIPMENT:	Track CME300	LOGGED BY:	LNB
WL (Stabilized):				DRILLING METHOD:	Hollow Stem Auger (0'-13.1')

GEOTECHNICAL BOREHOLE LOG

CLIENT: Homes for America				PROJECT NO.: 12:20641		BORING NO.: B-08		SHEET: 1 OF 1					
PROJECT NAME: Roanoke Gateway Project Phase I				DRILLER/CONTRACTOR: SEQ Drilling, Inc.									
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION					
LATITUDE: 37.26762264		LONGITUDE: -79.93256714		STRUCTURE:		SURFACE ELEVATION: 951		BOTTOM OF CASING					
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT-N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗		PL MC LL	
										0 20 40 60 80 100	0 20 40 60 80 100	0 20 40 60 80 100	0 20 40 60 80 100
										0 10 20 30 40 50	0 20 40 60 80 100	0 20 40 60 80 100	0 20 40 60 80 100
												QP	MC
												0 1 2 3 4 5	
5.0	S-1	SS	24	4	Asphalt [Thickness=2"].			950	10-45-17-3 (62)				
	S-2	SS	24	10	FILL - (GP) POORLY GRADED SANDY GRAVEL - black, moist, very dense.				2-4-6-2 (10)	10			
	S-3	SS	24	18	(CL) Residuum, LEAN CLAY WITH GRAVEL - trace sand, orangish brown to brown, moist, firm to stiff.				4-4-4-4 (8)	8			20.2
	S-4	SS	24	8	(CL) LEAN CLAY WITH SAND - trace gravel, reddish brown, moist, soft to stiff.				4-3-1-3 (4)	4			
	S-5	SS	24	7					2-3-7-8 (10)	10			
10.0								940					
	S-6	SS	7	6					3-50/1" (50/1)				
					AUGER REFUSAL at 13.8 FT								
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL													
WL (First Encountered): Dry				BORING STARTED: 11/18/2025				CAVE IN DEPTH: 10.5FT					
WL (Completion): Dry				BORING COMPLETED: 11/18/2025				HAMMER TYPE: Automatic					
WL (Seasonal High Water):				EQUIPMENT: Track CME300		LOGGED BY: LNB		DRILLING METHOD: Hollow Stem Auger (0'-13.6')					
WL (Stabilized):													
GEOTECHNICAL BOREHOLE LOG													

CLIENT: Homes for America						PROJECT NO.: 12:20641				BORING NO.: B-09				SHEET: 1 OF 1																																																																																																																																																																																						
PROJECT NAME: Roanoke Gateway Project Phase I								DRILLER/CONTRACTOR: SEQ Drilling, Inc.																																																																																																																																																																																												
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022												LOSS OF CIRCULATION																																																																																																																																																																																								
LATITUDE: 37.2676939				LONGITUDE: -79.93222194				STRUCTURE:				SURFACE ELEVATION: 953				BOTTOM OF CASING																																																																																																																																																																																				
<table border="1"><thead><tr><th rowspan="2">DEPTH (FT)</th><th rowspan="2">SAMPLE NUMBER</th><th rowspan="2">SAMPLE TYPE</th><th rowspan="2">SAMPLE DISTANCE (IN)</th><th rowspan="2">SAMPLE RECOVERY (IN)</th><th rowspan="2">DESCRIPTION OF MATERIAL</th><th rowspan="2">STRATIGRAPHY</th><th rowspan="2">WATER LEVELS</th><th rowspan="2">ELEVATION (FT)</th><th rowspan="2">BLOWS/6" (TCP/RS/MC/SPT - N VALUE)*</th><th colspan="4">Recovery % ■ RQD % ■</th><th colspan="4">Fines% F MC% ●</th></tr><tr><th>SPT ⊗</th><th>PL X</th><th>MC ●</th><th>LL ▼</th><th>QP</th></tr></thead><tbody><tr><td rowspan="5">5.0</td><td>S-1</td><td>SS</td><td>24</td><td>8</td><td rowspan="4">(CL) Residuum, LEAN CLAY WITH SAND - trace gravel, brown, moist, firm. (CL) LEAN CLAY WITH GRAVEL - trace sand, brown, moist, very stiff. (CL) LEAN CLAY - trace sand, reddish brown, moist, soft. (CL) LEAN CLAY WITH SAND - trace gravel, reddish brown, moist, firm.</td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5">950 945 X 940</td><td>6-2-3-2 (5)</td><td>⊗ 5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>S-2</td><td>SS</td><td>24</td><td>8</td><td>3-3-3-3 (6)</td><td>⊗ 6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>S-3</td><td>SS</td><td>24</td><td>18</td><td>5-9-17-5 (26)</td><td></td><td>⊗ 26</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>S-4</td><td>SS</td><td>24</td><td>18</td><td>2-2-2-2 (4)</td><td>⊗ 4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="2">10.0</td><td>S-5</td><td>SS</td><td>24</td><td>15</td><td>1-2-4-3 (6)</td><td>⊗ 6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>S-6</td><td>SS</td><td>21</td><td>13</td><td>(GP) POORLY GRADED SANDY GRAVEL - trace clay, gray and orangish brown, moist, very dense.</td><td></td><td></td><td>940</td><td>16-40-45-50/3 (85)</td><td></td><td>⊗ 85</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="5"></td><td>AUGER REFUSAL at 14.8 FT</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>																DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT - N VALUE)*	Recovery % ■ RQD % ■				Fines% F MC% ●				SPT ⊗	PL X	MC ●	LL ▼	QP	5.0	S-1	SS	24	8	(CL) Residuum, LEAN CLAY WITH SAND - trace gravel, brown, moist, firm. (CL) LEAN CLAY WITH GRAVEL - trace sand, brown, moist, very stiff. (CL) LEAN CLAY - trace sand, reddish brown, moist, soft. (CL) LEAN CLAY WITH SAND - trace gravel, reddish brown, moist, firm.			950 945 X 940	6-2-3-2 (5)	⊗ 5														S-2	SS	24	8	3-3-3-3 (6)	⊗ 6																S-3	SS	24	18	5-9-17-5 (26)		⊗ 26																S-4	SS	24	18	2-2-2-2 (4)	⊗ 4																	10.0	S-5	SS	24	15	1-2-4-3 (6)	⊗ 6																	S-6	SS	21	13	(GP) POORLY GRADED SANDY GRAVEL - trace clay, gray and orangish brown, moist, very dense.			940	16-40-45-50/3 (85)		⊗ 85																	AUGER REFUSAL at 14.8 FT																		
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT - N VALUE)*	Recovery % ■ RQD % ■				Fines% F MC% ●																																																																																																																																																																																						
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5.0	S-1	SS	24	8	(CL) Residuum, LEAN CLAY WITH SAND - trace gravel, brown, moist, firm. (CL) LEAN CLAY WITH GRAVEL - trace sand, brown, moist, very stiff. (CL) LEAN CLAY - trace sand, reddish brown, moist, soft. (CL) LEAN CLAY WITH SAND - trace gravel, reddish brown, moist, firm.			950 945 X 940	6-2-3-2 (5)	⊗ 5																																																																																																																																																																																										
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	S-3	SS	24	18					5-9-17-5 (26)		⊗ 26																																																																																																																																																																																									
	S-4	SS	24	18					2-2-2-2 (4)	⊗ 4																																																																																																																																																																																										
	10.0	S-5	SS	24	15				1-2-4-3 (6)	⊗ 6																																																																																																																																																																																										
S-6		SS	21	13	(GP) POORLY GRADED SANDY GRAVEL - trace clay, gray and orangish brown, moist, very dense.			940	16-40-45-50/3 (85)		⊗ 85																																																																																																																																																																																									
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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL																																																																																																																																																																																																				
WL (First Encountered): Dry												BORING STARTED: 11/18/2025						CAVE IN DEPTH: 11FT																																																																																																																																																																																		
WL (Completion): Dry												BORING COMPLETED: 11/18/2025						HAMMER TYPE: Automatic																																																																																																																																																																																		
WL (Seasonal High Water):												EQUIPMENT:				LOGGED BY:				DRILLING METHOD:																																																																																																																																																																																
WL (Stabilized):												Track CME300				LNB				Hollow Stem Auger (0'-14.8')																																																																																																																																																																																
GEOTECHNICAL BOREHOLE LOG																																																																																																																																																																																																				

CLIENT: Homes for America				PROJECT NO.: 12:20641		BORING NO.: B-10		SHEET: 1 OF 1					
PROJECT NAME: Roanoke Gateway Project Phase I				DRILLER/CONTRACTOR: SEQ Drilling, Inc.									
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION					
LATITUDE: 37.26767217			LONGITUDE: -79.93194657		STRUCTURE:		SURFACE ELEVATION: 957		BOTTOM OF CASING				
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT-N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL	MC	LL
	S-1	SS	24	13	Topsoil [Thickness=2"]. (CL) Residium, LEAN CLAY WITH SAND - light brown, moist, stiff.			955	5-6-7-8 (13)	13		12.4	
	S-2	SS	24	13	(GW) WELL-GRADED GRAVEL WITH SAND - gray, moist, medium dense.			10-11-9-3 (20)	20				
5.0	S-3	SS	21	12	(CL) LEAN CLAY WITH SAND - reddish brown, moist, stiff.			9-7-7-50/3" (14)	14				
AUGER REFUSAL at 5.8 FT													
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL													
 WL (First Encountered): Dry				BORING STARTED: 11/18/2025				CAVE IN DEPTH: 4FT					
 WL (Completion): Dry				BORING COMPLETED: 11/18/2025				HAMMER TYPE: Automatic					
 WL (Seasonal High Water):				EQUIPMENT: Track CME300		LOGGED BY: LNB		DRILLING METHOD: Hollow Stem Auger (0'-5.8')					
 WL (Stabilized):													
GEOTECHNICAL BOREHOLE LOG													

CLIENT: Homes for America				PROJECT NO.: 12:20641		BORING NO.: B-11		SHEET: 1 OF 1				
PROJECT NAME: Roanoke Gateway Project Phase I				DRILLER/CONTRACTOR: SEQ Drilling, Inc.								
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION				
LATITUDE: 37.26743365			LONGITUDE: -79.93268178		STRUCTURE:		SURFACE ELEVATION: 950		BOTTOM OF CASING			

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPIRS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗		PL MC LL	
										0 10 20 30 40 50		0 20 40 60 80 100	
5.0	S-1	SS	24	7	Asphalt [Thickness=4"]. (CL) Residium, LEAN CLAY WITH SAND - trace gravel, orangish brown, moist, stiff.			945	8-4-5-10 (9)	9			
	S-2	SS	24	2	(CL) LEAN CLAY WITH SAND - light brown, dry, stiff.			13-5-4-4 (9)	9		5.5		
	S-3	SS	24	10	(GP-GM) POORLY GRADED GRAVEL WITH SILT AND SAND - reddish brown, moist, medium dense.			6-5-13-15 (18)	18		8.3 35		
	S-4	SS	24	19	(CL) LEAN CLAY WITH SAND - reddish brown to light brown, moist, stiff.			8-8-7-7 (15)	15				
	S-5	SS	24	18				4-7-7-11 (14)	14				
10.0							X	940					
	S-6	SS	3	3	(WR) WEATHERED ROCK sampled as FAT CLAY WITH SAND - trace gravel, reddish brown, moist, very hard. AUGER REFUSAL at 13.6 FT			50/3" (50/3)		50/3			

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

WL (First Encountered):	Dry	BORING STARTED:	11/18/2025	CAVE IN DEPTH:	11FT
WL (Completion):	Dry	BORING COMPLETED:	11/18/2025	HAMMER TYPE:	Automatic
WL (Seasonal High Water):		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	
WL (Stabilized):		Track CME300	LNB	Hollow Stem Auger (0'-13.3')	

GEOTECHNICAL BOREHOLE LOG

CLIENT: Homes for America				PROJECT NO.: 12:20641		BORING NO.: B-12		SHEET: 1 OF 1			
PROJECT NAME: Roanoke Gateway Project Phase I				DRILLER/CONTRACTOR: SEQ Drilling, Inc.							
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION 			
LATITUDE: 37.2675629		LONGITUDE: -79.93234393		STRUCTURE:		SURFACE ELEVATION: 960		BOTTOM OF CASING 			

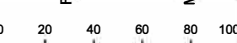
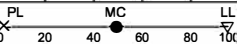
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●		
										SPT ⊗	PL	MC	LL	
5.0	S-1	SS	24	14	Topsoil [Thickness=2"]. (CL) SANDY LEAN CLAY - trace gravel, brown to reddish brown, moist, firm to very stiff.			955	3-10-10-17 (20)	20				
	S-2	SS	24	15					9-4-4-4 (8)	8		28.5 15.7	30	
	S-3	SS	24	5					7-5-4-8 (9)	9				
	S-4	SS	24	8					7-7-6-6 (13)	13				
	S-5	SS	14	11					15-45-50/2" (95/8)			95/8		
10.0					(WR) WEATHERED ROCK sampled as POORLY GRADED GRAVEL WITH SAND - gray and light brown, moist, very dense.			950 X						
	S-6	SS	2	2	AUGER REFUSAL at 12.7 FT				50/2" (50/2)				50/2	

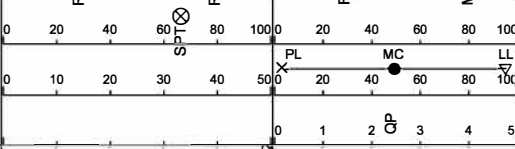
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

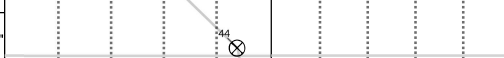
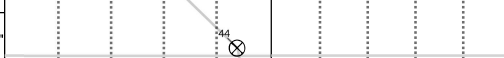
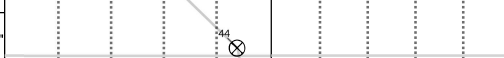
▼ WL (First Encountered):	Dry	BORING STARTED:	11/18/2025	CAVE IN DEPTH:	10.5FT
▼ WL (Completion):	Dry	BORING COMPLETED:	11/18/2025	HAMMER TYPE:	Automatic
▼ WL (Seasonal High Water):		EQUIPMENT:	Track CME300	LOGGED BY:	LNB
▼ WL (Stabilized):				DRILLING METHOD:	Hollow Stem Auger (0'-12.7')

GEOTECHNICAL BOREHOLE LOG

CLIENT: Homes for America				PROJECT NO.: 12:20641		BORING NO.: B-13		SHEET: 1 OF 1					
PROJECT NAME: Roanoke Gateway Project Phase I				DRILLER/CONTRACTOR: SEQ Drilling, Inc.									
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION					
LATITUDE: 37.26769603		LONGITUDE: -79.93168374		STRUCTURE:		SURFACE ELEVATION: 965		BOTTOM OF CASING					
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPIRS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗		PL MC LL	
	S-1	SS	14	5	Topsoil [Thickness=2"]. (CL) Residuum, LEAN CLAY WITH SAND - brown, contains roots, moist, very hard. AUGER REFUSAL at 1.2 FT				3-12-50/2" (62/8)	62/8	5.8		
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL													
▼ WL (First Encountered): Dry				BORING STARTED: 11/18/2025				CAVE IN DEPTH: Not Observed					
▼ WL (Completion): Dry				BORING COMPLETED: 11/18/2025				HAMMER TYPE: Automatic					
▼ WL (Seasonal High Water):				EQUIPMENT: Track CME300		LOGGED BY: LNB		DRILLING METHOD: Hollow Stem Auger (0'-1.2')					
▼ WL (Stabilized):													
GEOTECHNICAL BOREHOLE LOG													

CLIENT: Homes for America					PROJECT NO.: 12:20641		BORING NO.: B-13A		SHEET: 1 OF 1				
PROJECT NAME: Roanoke Gateway Project Phase I					DRILLER/CONTRACTOR: SEQ Drilling, Inc.								
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022									LOSS OF CIRCULATION				
LATITUDE: 37.26769603			LONGITUDE: -79.93168374		STRUCTURE:		SURFACE ELEVATION: 965		BOTTOM OF CASING				
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPRS/MC/SPT-N VALUE)*				
	S-1	S-1	S-1	12	Topsoil [Thickness=2"]. (CL) Residuum, LEAN CLAY WITH SAND - brown, moist, very stiff.				3-7-13-50/4" (20)				
					AUGER REFUSAL at 1.8 FT								
					NOTE: Offset performed approximately 5 ft N of B-13								
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL													
 WL (First Encountered):					Dry		BORING STARTED:			11/18/2025		CAVE IN DEPTH: Not Observed	
 WL (Completion):					Dry		BORING COMPLETED:			11/18/2025		HAMMER TYPE: Automatic	
 WL (Seasonal High Water):							EQUIPMENT:		LOGGED BY:		DRILLING METHOD:		
 WL (Stabilized):							Track CME300		LNB		Hollow Stem Auger (0'-1.8')		
GEOTECHNICAL BOREHOLE LOG													

CLIENT: Homes for America					PROJECT NO.: 12:20641		BORING NO.: B-13B		SHEET: 1 OF 1				
PROJECT NAME: Roanoke Gateway Project Phase I					DRILLER/CONTRACTOR: SEQ Drilling, Inc.								
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022									LOSS OF CIRCULATION				
LATITUDE: 37.26769603			LONGITUDE: -79.93168374		STRUCTURE:		SURFACE ELEVATION: 965		BOTTOM OF CASING				
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPRS/MC/SPT-N VALUE)*				
	S-1	S-1	S-1	0	Topsoil [Thickness=2"] AUGER REFUSAL at 0.2 FT NOTE: Offset performed approximately 7 ft NW of B-13				50/2" (50/2)				
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL													
 WL (First Encountered):					Dry		BORING STARTED:			11/18/2025		CAVE IN DEPTH: Not Observed	
 WL (Completion):					Dry		BORING COMPLETED:			11/18/2025		HAMMER TYPE: Automatic	
 WL (Seasonal High Water):							EQUIPMENT:		LOGGED BY:		DRILLING METHOD:		
 WL (Stabilized):							Track CME300		LNB		Hollow Stem Auger (0'-0.2')		
GEOTECHNICAL BOREHOLE LOG													

CLIENT: Homes for America				PROJECT NO.: 12:20641-A		BORING NO.: B-14		SHEET: 1 OF 1																																																																																																																																					
PROJECT NAME: Roanoke Gateway Project Phase II				DRILLER/CONTRACTOR: SEQ Drilling, Inc.																																																																																																																																									
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION																																																																																																																																					
LATITUDE: 37.26789794			LONGITUDE: -79.93147625		STRUCTURE:		SURFACE ELEVATION: 951		BOTTOM OF CASING																																																																																																																																				
<table><tr><td rowspan="2">DEPTH (FT)</td><td rowspan="2">SAMPLE NUMBER</td><td rowspan="2">SAMPLE TYPE</td><td rowspan="2">SAMPLE DISTANCE (IN)</td><td rowspan="2">SAMPLE RECOVERY (IN)</td><td rowspan="2">DESCRIPTION OF MATERIAL</td><td rowspan="2">STRATIGRAPHY</td><td rowspan="2">WATER LEVELS</td><td rowspan="2">ELEVATION (FT)</td><td rowspan="2">BLOWS/6" (TCP/RS/MC/SPT - N VALUE)*</td><td colspan="2">Recovery % ■</td><td colspan="2">RQD % ■</td><td colspan="2">Fines% F</td><td colspan="2">MC% ●</td></tr><tr><td colspan="2">0 20 40 60 80 100</td><td colspan="2">0 20 40 60 80 100</td><td colspan="2">0 20 40 60 80 100</td><td colspan="2">0 20 40 60 80 100</td></tr><tr><td colspan="10"></td><td colspan="2">SPT ⊗</td><td colspan="2">PL ⊗</td><td colspan="2">MC ●</td><td colspan="2">LL ▽</td></tr><tr><td colspan="10"></td><td colspan="2">0 10 20 30 40 50</td><td colspan="2">0 20 40 60 80 100</td><td colspan="2">0 20 40 60 80 100</td><td colspan="2">0 20 40 60 80 100</td></tr><tr><td colspan="10"></td><td colspan="2"></td><td colspan="2">QP</td><td colspan="2"></td><td colspan="2"></td></tr><tr><td colspan="10"></td><td colspan="2"></td><td colspan="2">0 1 2 3 4 5</td><td colspan="2"></td><td colspan="2"></td></tr></table>												DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT - N VALUE)*	Recovery % ■		RQD % ■		Fines% F		MC% ●		0 20 40 60 80 100		0 20 40 60 80 100		0 20 40 60 80 100		0 20 40 60 80 100												SPT ⊗		PL ⊗		MC ●		LL ▽												0 10 20 30 40 50		0 20 40 60 80 100		0 20 40 60 80 100		0 20 40 60 80 100														QP																		0 1 2 3 4 5																																					
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT - N VALUE)*	Recovery % ■												RQD % ■		Fines% F		MC% ●																																																																																																																			
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<table><tr><td rowspan="7">5.0</td><td>S-1</td><td>SS</td><td>24</td><td>15</td><td>(CL) Residuum, LEAN CLAY WITH GRAVEL - trace sand, brown, moist, very stiff.</td><td rowspan="7"></td><td rowspan="7"></td><td>950</td><td>2-5-14-5 (19)</td><td colspan="7"></td></tr><tr><td>S-2</td><td>SS</td><td>24</td><td>16</td><td>(CL) LEAN CLAY WITH SAND - brown, moist, stiff.</td><td>5-4-7-9 (11)</td><td colspan="7"></td></tr><tr><td>S-3</td><td>SS</td><td>24</td><td>20</td><td rowspan="3">(CH) FAT CLAY WITH SAND - orangish brown, moist, soft to hard.</td><td>3-3-4-4 (7)</td><td colspan="7"></td></tr><tr><td>S-4</td><td>SS</td><td>24</td><td>21</td><td>2-2-4-5 (6)</td><td colspan="7"></td></tr><tr><td>S-5</td><td>SS</td><td>24</td><td>22</td><td>2-1-3-3 (4)</td><td colspan="7"></td></tr><tr><td rowspan="2">10.0</td><td></td><td></td><td></td><td></td><td></td><td></td><td>945</td><td></td><td colspan="7"></td></tr><tr><td>S-6</td><td>SS</td><td>20</td><td>17</td><td></td><td></td><td></td><td>1-14-30-50/2" (44)</td><td colspan="7"></td></tr><tr><td rowspan="2">15.0</td><td></td><td></td><td></td><td></td><td rowspan="2">(WR) WEATHERED ROCK sampled as POORLY GRADED GRAVEL WITH SAND - gray, moist, very dense.</td><td rowspan="2"></td><td rowspan="2"></td><td>940</td><td></td><td colspan="7"></td></tr><tr><td>S-7</td><td>SS</td><td>3</td><td>3</td><td></td><td></td><td></td><td>50/3" (50/3)</td><td colspan="7"></td></tr></table>												5.0	S-1	SS	24	15	(CL) Residuum, LEAN CLAY WITH GRAVEL - trace sand, brown, moist, very stiff.			950	2-5-14-5 (19)								S-2	SS	24	16	(CL) LEAN CLAY WITH SAND - brown, moist, stiff.	5-4-7-9 (11)								S-3	SS	24	20	(CH) FAT CLAY WITH SAND - orangish brown, moist, soft to hard.	3-3-4-4 (7)								S-4	SS	24	21	2-2-4-5 (6)								S-5	SS	24	22	2-1-3-3 (4)								10.0							945									S-6	SS	20	17				1-14-30-50/2" (44)								15.0					(WR) WEATHERED ROCK sampled as POORLY GRADED GRAVEL WITH SAND - gray, moist, very dense.			940									S-7	SS	3	3				50/3" (50/3)							
5.0	S-1	SS	24	15	(CL) Residuum, LEAN CLAY WITH GRAVEL - trace sand, brown, moist, very stiff.			950	2-5-14-5 (19)																																																																																																																																				
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WL (First Encountered): Dry				BORING STARTED: 12/04/2025				CAVE IN DEPTH: 17FT																																																																																																																																					
WL (Completion): Dry				BORING COMPLETED: 12/04/2025				HAMMER TYPE: Automatic																																																																																																																																					
WL (Seasonal High Water):				EQUIPMENT:		LOGGED BY:		DRILLING METHOD:																																																																																																																																					
WL (Stabilized):				Track CME-550X		LNB		Hollow Stem Auger (0'-20')																																																																																																																																					
GEOTECHNICAL BOREHOLE LOG																																																																																																																																													

CLIENT: Homes for America						PROJECT NO.: 12:20641-A			BORING NO.: B-15			SHEET: 1 OF 1																																																																																																																																																																					
PROJECT NAME: Roanoke Gateway Project Phase II						DRILLER/CONTRACTOR: SEQ Drilling, Inc.																																																																																																																																																																											
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022									LOSS OF CIRCULATION																																																																																																																																																																								
LATITUDE: 37.26803323			LONGITUDE: -79.93087035			STRUCTURE:			SURFACE ELEVATION: 954			BOTTOM OF CASING																																																																																																																																																																					
<table border="1"><thead><tr><th>DEPTH (FT)</th><th>SAMPLE NUMBER</th><th>SAMPLE TYPE</th><th>SAMPLE DISTANCE (IN)</th><th>SAMPLE RECOVERY (IN)</th><th>DESCRIPTION OF MATERIAL</th><th>STRATIGRAPHY</th><th>WATER LEVELS</th><th>ELEVATION (FT)</th><th>BLOWS/6" (TCP/RS/MC/SPT - N VALUE)*</th><th>Recovery % ■</th><th>RQD % ■</th><th>Fines% F ●</th><th>MC% ●</th><th>SPT ⊗</th><th>PL ⊗</th><th>MC ⊗</th><th>LL ⊗</th><th>QP</th></tr></thead><tbody><tr><td rowspan="5">5.0</td><td>S-1</td><td>SS</td><td>24</td><td>16</td><td rowspan="2">Topsoil [Thickness=3"]: (CL) Residuum, LEAN CLAY WITH SAND - brown, moist, stiff.</td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5">950</td><td>4-7-8-7 (15)</td><td></td><td></td><td></td><td></td><td>15</td><td></td><td></td><td></td><td></td></tr><tr><td>S-2</td><td>SS</td><td>24</td><td>12</td><td>7-8-6-6 (14)</td><td></td><td></td><td></td><td></td><td>14</td><td></td><td></td><td></td><td></td></tr><tr><td>S-3</td><td>SS</td><td>24</td><td>17</td><td>(CH) FAT CLAY WITH SAND - trace silt, orangish brown, moist, firm.</td><td>2-3-5-7 (8)</td><td></td><td></td><td></td><td></td><td>8</td><td></td><td></td><td></td><td>30.0</td></tr><tr><td>S-4</td><td>SS</td><td>24</td><td>15</td><td>(CL) SANDY LEAN CLAY - trace gravel, light brown, moist, stiff.</td><td>2-3-6-13 (9)</td><td></td><td></td><td></td><td></td><td>9</td><td></td><td></td><td></td><td></td></tr><tr><td>S-5</td><td>SS</td><td>24</td><td>14</td><td>(CH) FAT CLAY WITH GRAVEL - trace sand, orangish brown, moist, stiff.</td><td>8-8-4-5 (12)</td><td></td><td></td><td></td><td></td><td>12</td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="3">15.0</td><td>S-6</td><td>SS</td><td>21</td><td>17</td><td rowspan="3">(GW) WELL-GRADED GRAVEL WITH SAND - trace silt, light gray, moist, very dense.</td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3">940</td><td>18-26-38-50/3 (64)</td><td></td><td></td><td></td><td></td><td>64</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>S-7</td><td>SS</td><td>24</td><td>16</td><td>3-7-7-5 (14)</td><td></td><td></td><td></td><td></td><td></td><td>14</td><td></td><td></td><td></td><td></td></tr><tr><td colspan="5"></td><td>END OF BORING at 20.0 FT</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>															DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT - N VALUE)*	Recovery % ■	RQD % ■	Fines% F ●	MC% ●	SPT ⊗	PL ⊗	MC ⊗	LL ⊗	QP	5.0	S-1	SS	24	16	Topsoil [Thickness=3"]: (CL) Residuum, LEAN CLAY WITH SAND - brown, moist, stiff.			950	4-7-8-7 (15)					15					S-2	SS	24	12	7-8-6-6 (14)					14					S-3	SS	24	17	(CH) FAT CLAY WITH SAND - trace silt, orangish brown, moist, firm.	2-3-5-7 (8)					8				30.0	S-4	SS	24	15	(CL) SANDY LEAN CLAY - trace gravel, light brown, moist, stiff.	2-3-6-13 (9)					9					S-5	SS	24	14	(CH) FAT CLAY WITH GRAVEL - trace sand, orangish brown, moist, stiff.	8-8-4-5 (12)					12					15.0	S-6	SS	21	17	(GW) WELL-GRADED GRAVEL WITH SAND - trace silt, light gray, moist, very dense.			940	18-26-38-50/3 (64)					64																		S-7	SS	24	16	3-7-7-5 (14)						14										END OF BORING at 20.0 FT													
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CLIENT: Homes for America						PROJECT NO.: 12:20641-A			BORING NO.: B-16			SHEET: 1 OF 1																																																																																																																																																																																																						
PROJECT NAME: Roanoke Gateway Project Phase II						DRILLER/CONTRACTOR: SEQ Drilling, Inc.																																																																																																																																																																																																												
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LATITUDE: 37.26787285			LONGITUDE: -79.93112004			STRUCTURE:			SURFACE ELEVATION: 956			BOTTOM OF CASING 																																																																																																																																																																																																						
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WL (Completion): Dry					BORING COMPLETED: 12/04/2025					HAMMER TYPE: Automatic																																																																																																																																																																																																								
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CLIENT: Homes for America						PROJECT NO.: 12:20641-A			BORING NO.: B-17			SHEET: 1 OF 1						
PROJECT NAME: Roanoke Gateway Project Phase II						DRILLER/CONTRACTOR: SEQ Drilling, Inc.												
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022											LOSS OF CIRCULATION							
LATITUDE: 37.26771686				LONGITUDE: -79.93142982			STRUCTURE:			SURFACE ELEVATION: 962			BOTTOM OF CASING					
END OF BORING at 20.0 FT																		
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL																		
WL (First Encountered): Dry						BORING STARTED: 12/04/2025						CAVE IN DEPTH: 16FT						
WL (Completion): Dry						BORING COMPLETED: 12/04/2025						HAMMER TYPE: Automatic						
WL (Seasonal High Water):						EQUIPMENT:			LOGGED BY:			DRILLING METHOD:						
WL (Stabilized):						Track CME-550X			LNB			Hollow Stem Auger (0'-20')						
GEOTECHNICAL BOREHOLE LOG																		

CLIENT: Homes for America				PROJECT NO.: 12:20641-A		BORING NO.: B-18		SHEET: 1 OF 1				
PROJECT NAME: Roanoke Gateway Project Phase II				DRILLER/CONTRACTOR: SEQ Drilling, Inc.								
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION 				
LATITUDE: 37.26784629			LONGITUDE: -79.93081155		STRUCTURE:		SURFACE ELEVATION: 960		BOTTOM OF CASING 			

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPIRS/MC/SPT-N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL	MC	LL
5.0	S-1	SS	24	16	Topsoil [Thickness=3"]. (CL) Residium, SANDY LEAN CLAY - trace gravel, brown, moist, firm.			955	2-3-4-4 (7)	7		10.0	62.7
	S-2	SS	24	18				955	3-3-4-5 (7)	7			
	S-3	SS	24	18	(CL) LEAN CLAY WITH SAND - trace gravel and silt, orangish brown to brown, moist, stiff to very stiff.			955	5-6-7-7 (13)	13			
	S-4	SS	24	19				955	5-12-13-30 (25)	25		17.7	
	S-5	SS	24	17				955	11-13-13-30 (26)	26			
15.0	S-6	SS	24	18	(GP) POORLY GRADED GRAVEL WITH SAND - reddish brown, moist, medium dense to dense.			945	8-12-21-16 (33)	33			
							945						
	S-7	SS	24	13				940	9-10-13-14 (23)	23			
					END OF BORING at 20.0 FT			940					

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

WL (First Encountered): Dry		BORING STARTED: 12/04/2025		CAVE IN DEPTH: 18FT	
WL (Completion): Dry		BORING COMPLETED: 12/04/2025		HAMMER TYPE: Automatic	
WL (Seasonal High Water):		EQUIPMENT: Track CME-550X		LOGGED BY: LNB	
WL (Stabilized):				DRILLING METHOD: Hollow Stem Auger (0'-20')	

GEOTECHNICAL BOREHOLE LOG

CLIENT: Homes for America				PROJECT NO.: 12:20641		BORING NO.: P-01		SHEET: 1 OF 1			
PROJECT NAME: Roanoke Gateway Project Phase I				DRILLER/CONTRACTOR: SEQ Drilling, Inc.							
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION			
LATITUDE: 37.267835		LONGITUDE: -79.93239886		STRUCTURE:		SURFACE ELEVATION: 951		BOTTOM OF CASING			

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPIRS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL	MC	LL
	S-1	SS	24	8	Gravel [Thickness=4"]. (GC) Residuum, CLAYEY GRAVEL WITH SAND - reddish brown, moist, medium dense.			950	4-7-7-7 (14)	14	8.0	17	25
	S-2	SS	16	7					3-5-50/4" (55/10)	55/10			
	S-3	SS	1	1	(WR) WEATHERED ROCK sampled as WELL-GRADED GRAVEL WITH SAND - gray and light brown, moist, very dense. AUGER REFUSAL at 3.6 FT				50/1" (50/1)	50/1			

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

 WL (First Encountered): Dry		BORING STARTED: 11/18/2025		CAVE IN DEPTH: Not Observed	
 WL (Completion): Dry		BORING COMPLETED: 11/18/2025		HAMMER TYPE: Automatic	
 WL (Seasonal High Water):		EQUIPMENT: Track CME300		LOGGED BY: LNB	
 WL (Stabilized):				DRILLING METHOD: Hollow Stem Auger (0'-3.6')	

GEOTECHNICAL BOREHOLE LOG

CLIENT: Homes for America				PROJECT NO.: 12:20641		BORING NO.: P-02		SHEET: 1 OF 1			
PROJECT NAME: Roanoke Gateway Project Phase I				DRILLER/CONTRACTOR: SEQ Drilling, Inc.							
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION 			
LATITUDE: 37.26806411		LONGITUDE: -79.93227908		STRUCTURE:		SURFACE ELEVATION: 948		BOTTOM OF CASING 			

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCP/RS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL	MC	LL
5.0	S-1	SS	24	15	Asphalt [Thickness=2"]. (CL) Residium, LEAN CLAY WITH GRAVEL - trace sand, brown, moist, very stiff.			945	10-13-5-4 (18)	18			
	S-2	SS	24	16	(GC) CLAYEY GRAVEL - trace sand, brown, moist, medium dense.			945	2-6-9-10 (15)	15			
	S-3	SS	24	21	(CL) LEAN CLAY WITH SAND - trace silt, orangish brown, moist, hard.			940	10-21-28-18 (49)	49			
	S-4	SS	24	21	(GW) WELL-GRADED GRAVEL WITH SAND - trace clay, orangish brown, moist, dense.			940	14-23-23-27 (46)	46			
	S-5	SS	23	22				10-25-33-50/5 (58)	58				
10.0								X					
AUGER REFUSAL at 11.0 FT													

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

WL (First Encountered): Dry		BORING STARTED: 11/17/2025		CAVE IN DEPTH: 10FT	
WL (Completion): Dry		BORING COMPLETED: 11/17/2025		HAMMER TYPE: Automatic	
WL (Seasonal High Water):		EQUIPMENT: Track CME300		LOGGED BY: LNB	
WL (Stabilized):				DRILLING METHOD: Hollow Stem Auger (0'-11')	

GEOTECHNICAL BOREHOLE LOG

CLIENT: Homes for America				PROJECT NO.: 12:20641		BORING NO.: P-03		SHEET: 1 OF 1			
PROJECT NAME: Roanoke Gateway Project Phase I				DRILLER/CONTRACTOR: SEQ Drilling, Inc.							
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION 			
LATITUDE: 37.26808314		LONGITUDE: -79.93197668		STRUCTURE:		SURFACE ELEVATION: 947		BOTTOM OF CASING 			

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPIRS/MC/SPT- N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL	MC	LL
5.0	S-1	SS	24	10	Asphalt [Thickness=2"]. (CL) SANDY LEAN CLAY WITH GRAVEL - orangish brown, moist, firm.			945	14-3-2-3 (5)	5		27.5	
	S-2	SS	24	21			3-3-3-3 (6)	6		44.3			
	S-3	SS	17	17	(WR) WEATHERED ROCK sampled as LEAN CLAY WITH SAND - light brown, moist, very hard.		3-15-50/5" (65/11)	65/11		330.0	51.6		
	S-4	SS	5	5	(WR) WEATHERED ROCK sampled as FAT CLAY WITH SAND - light brown, moist, very hard.		50/5" (50/5)	50/5		18	35		
	S-5	SS	5	4	(WR) WEATHERED ROCK sampled as WELL-GRADED GRAVEL WITH SAND - gray and light brown, moist, very dense.		50/5" (50/5)	50/5					
					AUGER REFUSAL at 8.6 FT								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL			
▼ WL (First Encountered): Dry		BORING STARTED: 11/17/2025	
▼ WL (Completion): Dry		BORING COMPLETED: 11/17/2025	
▼ WL (Seasonal High Water):		EQUIPMENT: Track CME300	LOGGED BY: LNB
▼ WL (Stabilized):		DRILLING METHOD: Hollow Stem Auger (0'-8.6')	

GEOTECHNICAL BOREHOLE LOG

CLIENT: Homes for America				PROJECT NO.: 12:20641-A		BORING NO.: P-04		SHEET: 1 OF 1			
PROJECT NAME: Roanoke Gateway Project Phase II				DRILLER/CONTRACTOR: SEQ Drilling, Inc.							
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION 			
LATITUDE: 37.26820181			LONGITUDE: -79.93147677		STRUCTURE:		SURFACE ELEVATION: 946		BOTTOM OF CASING 		

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPIRS/MC/SPT-N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL	MC	LL
5.0	S-1	SS	24	16	Topsoil [Thickness=2"]. (CL) Residuum, SANDY LEAN CLAY - trace gravel, light brown, moist, firm.			945	2-4-4-5 (8)	8			
	S-2	SS	24	15	(CL) LEAN CLAY WITH SAND - brown to orangish brown, moist, stiff to very stiff.			945	3-5-4-7 (9)	9			
	S-3	SS	24	16				940	3-6-7-9 (13)	13			
	S-4	SS	24	19				940	3-5-9-12 (14)	14			
	S-5	SS	24	20				940	3-7-9-10 (16)	16			
					END OF BORING at 10.0 FT								

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

WL (First Encountered): Dry		BORING STARTED: 12/03/2025		CAVE IN DEPTH: 7FT	
WL (Completion): Dry		BORING COMPLETED: 12/03/2025		HAMMER TYPE: Automatic	
WL (Seasonal High Water):		EQUIPMENT: Track CME-550X		LOGGED BY: LNB	
WL (Stabilized):				DRILLING METHOD: Hollow Stem Auger (0'-10')	

GEOTECHNICAL BOREHOLE LOG

CLIENT: Homes for America				PROJECT NO.: 12:20641-A		BORING NO.: P-05		SHEET: 1 OF 1			
PROJECT NAME: Roanoke Gateway Project Phase II				DRILLER/CONTRACTOR: SEQ Drilling, Inc.							
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION 			
LATITUDE: 37.26811612		LONGITUDE: -79.93077803		STRUCTURE:		SURFACE ELEVATION: 955		BOTTOM OF CASING 			
DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPIRS/MC/SPT-N VALUE)*	Recovery % ■ RQD % ■	Fines% F MC% ●
									0 20 40 60 80 100	0 20 40 60 80 100	0 20 40 60 80 100
									SPT ⊗	PL	MC
									0 10 20 30 40 50	0 20 40 60 80 100	0 20 40 60 80 100
										QP	
										0 1 2 3 4 5	
5.0	S-1	SS	24	20	Topsoil [Thickness=2"]. (CL) Residium, SANDY LEAN CLAY - trace gravel, brown, moist, firm to stiff.			950	2-3-5-8 (8)	8	
	S-2	SS	24	17					5-12-16-20 (28)	28	
	S-3	SS	24	12					6-7-9-7 (16)	16	9.3 17
	S-4	SS	24	14					2-3-4-3 (7)	7	58.5 31
	S-5	SS	24	7					2-2-3-2 (5)	5	
					END OF BORING at 10.0 FT			945			
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL											
▼ WL (First Encountered):		Dry		BORING STARTED:		12/03/2025		CAVE IN DEPTH: 8FT			
▼ WL (Completion):		Dry		BORING COMPLETED:		12/03/2025		HAMMER TYPE: Automatic			
▼ WL (Seasonal High Water):				EQUIPMENT:		LOGGED BY:		DRILLING METHOD:			
▼ WL (Stabilized):				Track CME-550X		LNB		Hollow Stem Auger (0'-10')			
GEOTECHNICAL BOREHOLE LOG											

CLIENT: Homes for America				PROJECT NO.: 12:20641-A		BORING NO.: P-06		SHEET: 1 OF 1			
PROJECT NAME: Roanoke Gateway Project Phase II				DRILLER/CONTRACTOR: SEQ Drilling, Inc.							
SITE LOCATION: 624 Bullitt Ave SE, Roanoke, Virginia, 24022								LOSS OF CIRCULATION 			
LATITUDE: 37.26837679		LONGITUDE: -79.93033181		STRUCTURE:		SURFACE ELEVATION: 964		BOTTOM OF CASING 			

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE (IN)	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	WATER LEVELS	ELEVATION (FT)	BLOWS/6" (TCPIRS/MC/SPT-N VALUE)*	Recovery % ■ RQD % ■		Fines% F MC% ●	
										SPT ⊗	PL	MC	LL
5.0	S-1	SS	24	13	(GP) POORLY GRADED GRAVEL WITH SAND - reddish brown, moist, medium dense to very dense.			960	4-8-11-15 (19)	19			
	S-2	SS	24	18					10-20-36-40 (56)	56			
	S-3	SS	11	9	(WR) WEATHERED ROCK sampled as POORLY GRADED GRAVEL WITH SAND - reddish brown, moist, very dense.		X	16-50/5" (50/5)	50/5				
	S-4	SS	23	8				18-27-38-50/5 (65)	65				
	S-5	SS	22	8				17-25-46-50/4 (71)	71				
END OF BORING at 10.0 FT													

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

 WL (First Encountered): Dry		BORING STARTED: 12/03/2025		CAVE IN DEPTH: 7FT	
 WL (Completion): Dry		BORING COMPLETED: 12/03/2025		HAMMER TYPE: Automatic	
 WL (Seasonal High Water):		EQUIPMENT: Track CME-550X		LOGGED BY: LNB	
 WL (Stabilized):				DRILLING METHOD: Hollow Stem Auger (0'-10')	

GEOTECHNICAL BOREHOLE LOG

APPENDIX C – Laboratory Testing

Laboratory Test Results Summary

Plasticity Charts

Grain Size Analyses

Moisture-Density Relationship Curves

CBR Test Results

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.	
B-02	S-2	2.0-4.0	25.1										
B-02	S-5	8.0-10.0	42.5										
B-02	S-6	13.0-15.0	69.5	CL	49	24	25	97.7					
B-02	S-9	28.0-30.0	61.9	CH	81	29	52	99.4					
B-03	S-2	2.0-4.0	9.6	SM	29	23	6	32.4					
B-04	S-2	2.0-4.0	38.8	ML	36	29	7	81.6					
B-04	S-5	8.0-10.0	35.3	ML	37	26	11	82.2					
B-14	S-4	6.0-8.0	36.9										
B-15	S-3	4.0-6.0	30.0										
B-16	S-2	2.0-4.0	12.2	SM		NP		33.4					

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: Roanoke Gateway Project Phase II
Client: Homes for America

Project No.: 12:20641-A
Date Reported: 1/14/2026



Office / Lab

Address

Office Number / Fax

ECS Mid-Atlantic LLC - Roanoke

7670 Enon Drive
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Roanoke, VA 24019

(540)362-2000

(540)362-1202

Tested by	Checked by	Approved by	Date Received
JHrysenko	JMurphy	JMurphy	1212/2025

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.	
B-16	S-5	8.0-10.0	30.5										
B-16	S-6	13.0-15.0	36.3	ML	34	25	9	74.9					
B-16	S-7	18.0-20.0	58.0										
B-17	S-5	8.0-10.0	34.6	CH	57	22	35	93.6					
B-17	S-6	13.0-15.0	40.9	CH	50	24	26	70.9					
B-17	S-7	18.0-20.0	58.7										
B-18	S-1	0.0-2.0	10.0	CL	34	19	15	62.7					
B-18	S-4	6.0-8.0	17.7										
P-05	D3S-88	1.0-10.0	9.3	CL	31	17	14	58.5	108.8	15.8	2.9	2.4	

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: Roanoke Gateway Project Phase II
Client: Homes for America

Project No.: 12:20641-A
Date Reported: 1/14/2026



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Tested by	Checked by	Approved by	Date Received
JHrysenko	JMurphy	JMurphy	1212/2025

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.	
P-03	D3S-56	1.0-10.0	30.0	CL	36	18	18	51.6	113.8	15.8	5	4.4	

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: Roanoke Gateway Project Phase I
Client: Homes for America

Project No.: 12:20641
Date Reported: 12/26/2025



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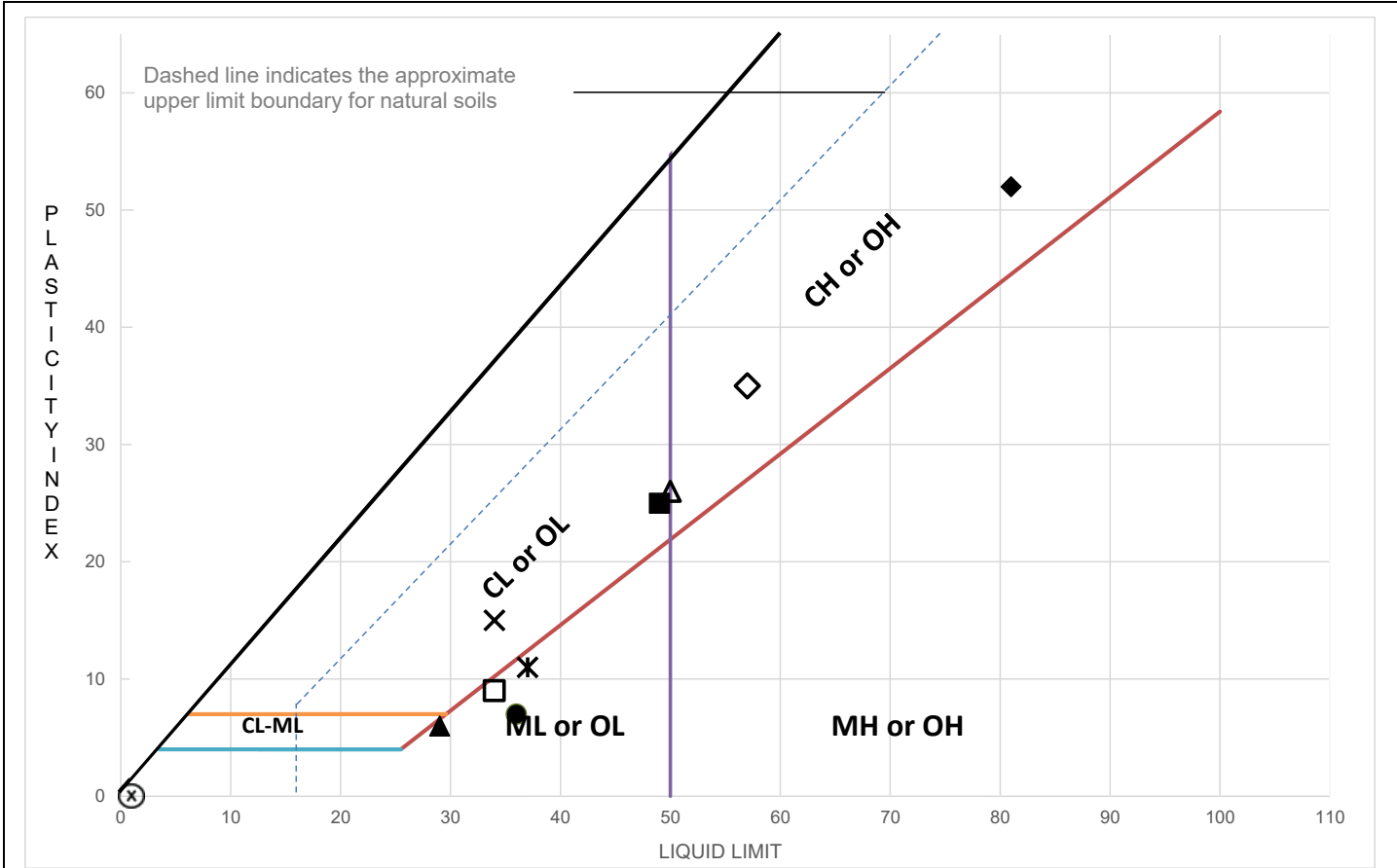
ECS Mid-Atlantic LLC - Chantilly

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100 Chantilly, VA 20151-3232

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jvong	MUzun	MUzun	12/16/2025

LIQUID AND PLASTIC LIMITS TEST REPORT



TEST RESULTS (ASTM D4318-10 (MULTIPOINT TEST))

	Sample Location	Sample Number	Sample Depth (ft)	LL	PL	PI	%<#40	%<#200	AASHTO	USCS	Material Description
■	B-02	S-6	13.00-15.00	49	24	25	99.4	97.7	A-7-6	CL	Light Brown LEAN CLAY
◆	B-02	S-9	28.00-30.00	81	29	52	99.9	99.4	A-7-6	CH	Orange Brown FAT CLAY
▲	B-03	S-2	2.00-4.00	29	23	6	42.7	32.4	A-2-4	SM	Brown SILTY SAND with Gravel
●	B-04	S-2	2.00-4.00	36	29	7	93.8	81.6	A-4	ML	Yellow SILT with Sand
*	B-04	S-5	8.00-10.00	37	26	11	93.3	82.2	A-6	ML	Red Brown SILT with Sand
⊗	B-16	S-2	2.00-4.00	NP	NP	NP	45.5	33.4	A-2-4	SM	Light Brown SILTY SAND with Gravel
□	B-16	S-6	13.00-15.00	34	25	9	85.0	74.9	A-4	ML	Yellow Brown SILT with Sand
◇	B-17	S-5	8.00-10.00	57	22	35	98.6	93.6	A-7-6	CH	Orange Brown FAT CLAY
△	B-17	S-6	13.00-15.00	50	24	26	85.5	70.9	A-7-6	CH	Light Brown FAT CLAY with Sand
×	B-18	S-1	0.00-2.00	34	19	15	84.4	62.7	A-6	CL	Dark Brown SANDY LEAN CLAY

Project: Roanoke Gateway Project Phase II
Client: Homes for America

Project No.: 12:20641-A
Date Reported: 1/14/2026



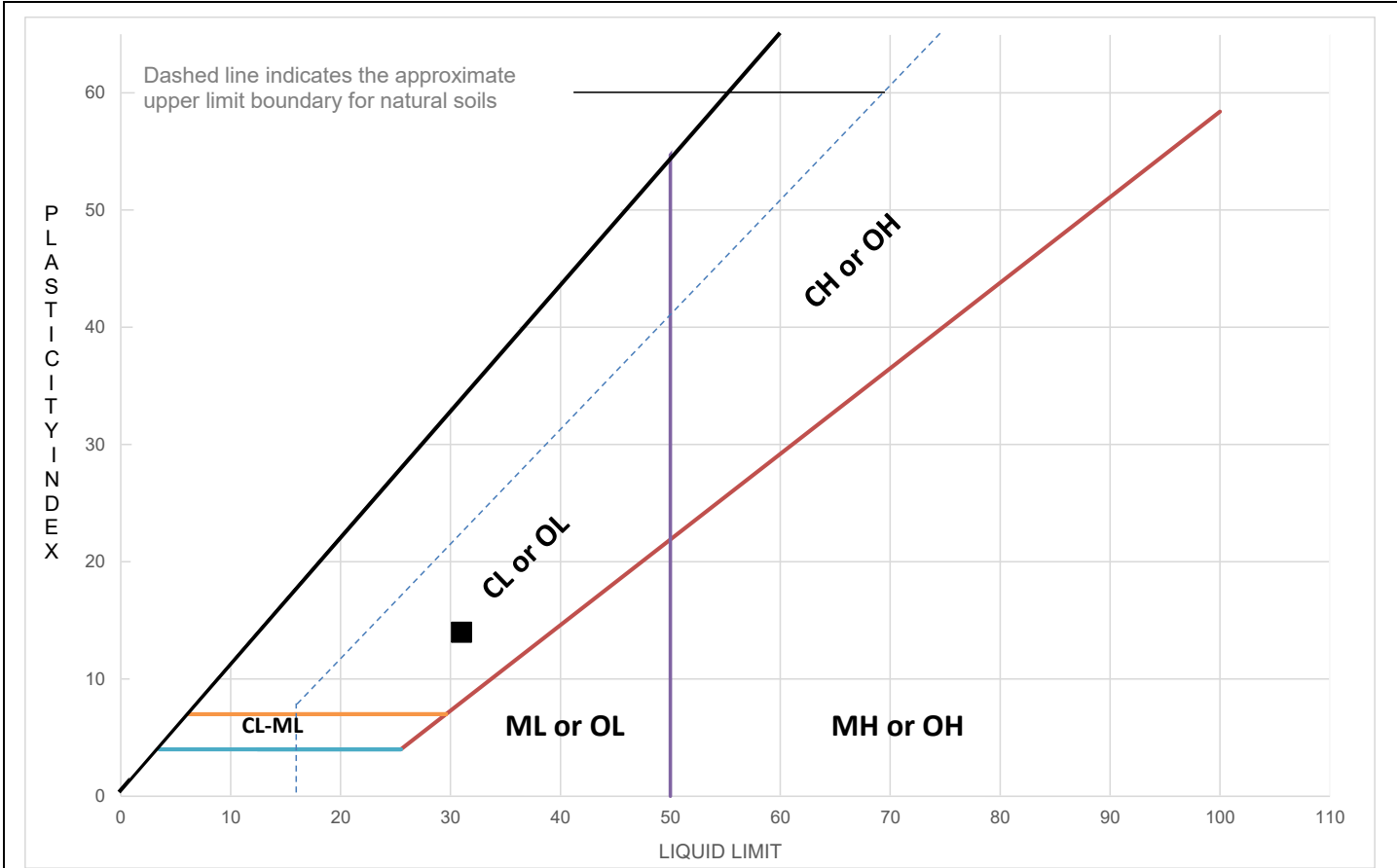
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Tested by	Checked by	Approved by	Date Received
JHrysenko	JMurphy	JMurphy	12/12/2025

LIQUID AND PLASTIC LIMITS TEST REPORT



TEST RESULTS (ASTM D4318-10 (MULTIPOINT TEST))

	Sample Location	Sample Number	Sample Depth (ft)	LL	PL	PI	%<#40	%<#200	AASHTO	USCS	Material Description
■	P-05	D3S-88	1.00-10.00	31	17	14	71.7	58.5	A-6	CL	Sandy Lean Clay Brown

Project: Roanoke Gateway Project Phase II
Client: Homes for America

Project No.: 12:20641-A
Date Reported: 1/14/2026



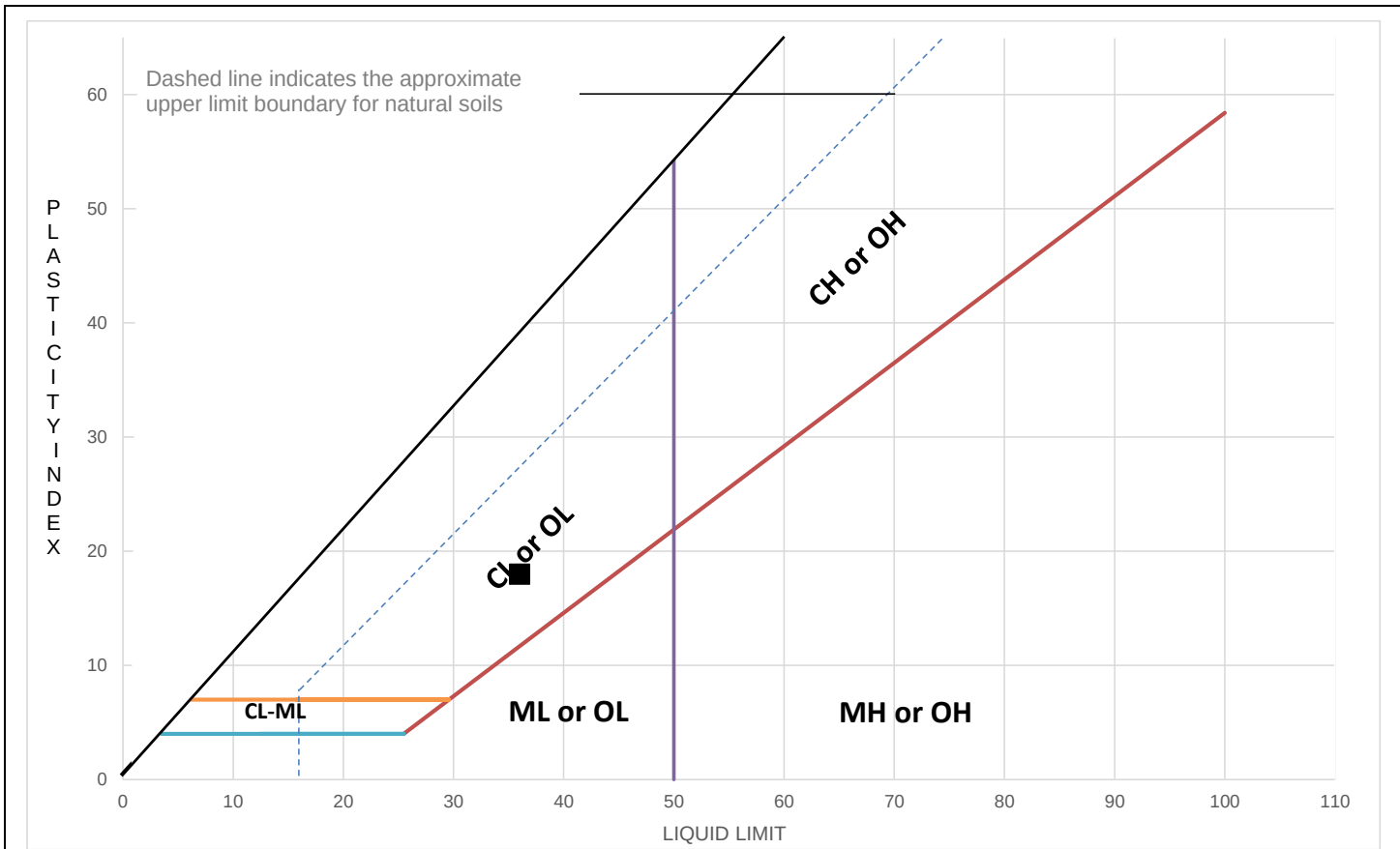
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Tested by	Checked by	Approved by	Date Received
jvong	Htran	MUZun	12/16/2025

LIQUID AND PLASTIC LIMITS TEST REPORT



TEST RESULTS (ASTM D4318-10 (MULTIPOINT TEST))

	Sample Location	Sample Number	Sample Depth (ft)	LL	PL	PI	%<#40	%<#200	AASHTO	USCS	Material Description
■	P-03	D3S-56	1.00-10.00	36	18	18	59.5	51.6	A-6	CL	Sandy Lean Clay with Gravel Yellow Brown

Project: Roanoke Gateway Project Phase I
Client: Homes for America

Project No.: 12:20641
Date Reported: 12/26/2025



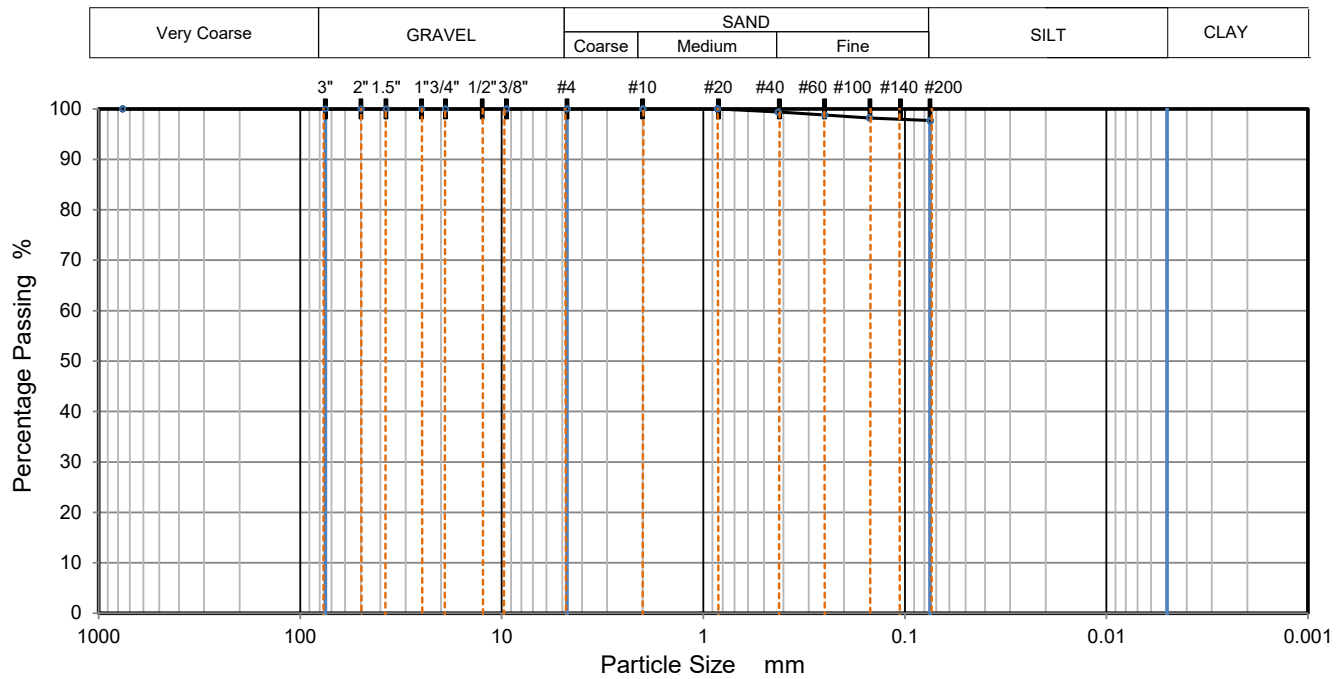
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Tested by	Checked by	Approved by	Date Received
jvong	MUzun	MUzun	12/16/2025

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	100		
#4	100		
#10	100		
#20	100		
#40	99		
#60	99		
#100	98		
#200	98		

Dry Mass of sample, g

28.1

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	0
Coarse Sand, #4 to #10 sieve	0
Medium Sand, #10 to #40	1
Fine Sand, #40 to #200	2
Fines <#200	98

USCS	CL	Liquid Limit	49	D90		D50		D10	
AASHTO	A-7-6	Plastic Limit	24	D85		D30		Cu	
USCS Group Name	Lean clay	Plasticity Index	25	D60		D15		Cc	

Project: Roanoke Gateway Project Phase II

Client: Homes for America

Sample Description: Light Brown LEAN CLAY

Sample Source: B-02

Project No.: 12:20641-A

Depth (ft): 13.0 - 15.0

Sample No.: S-6

Date Reported: 1/14/2026



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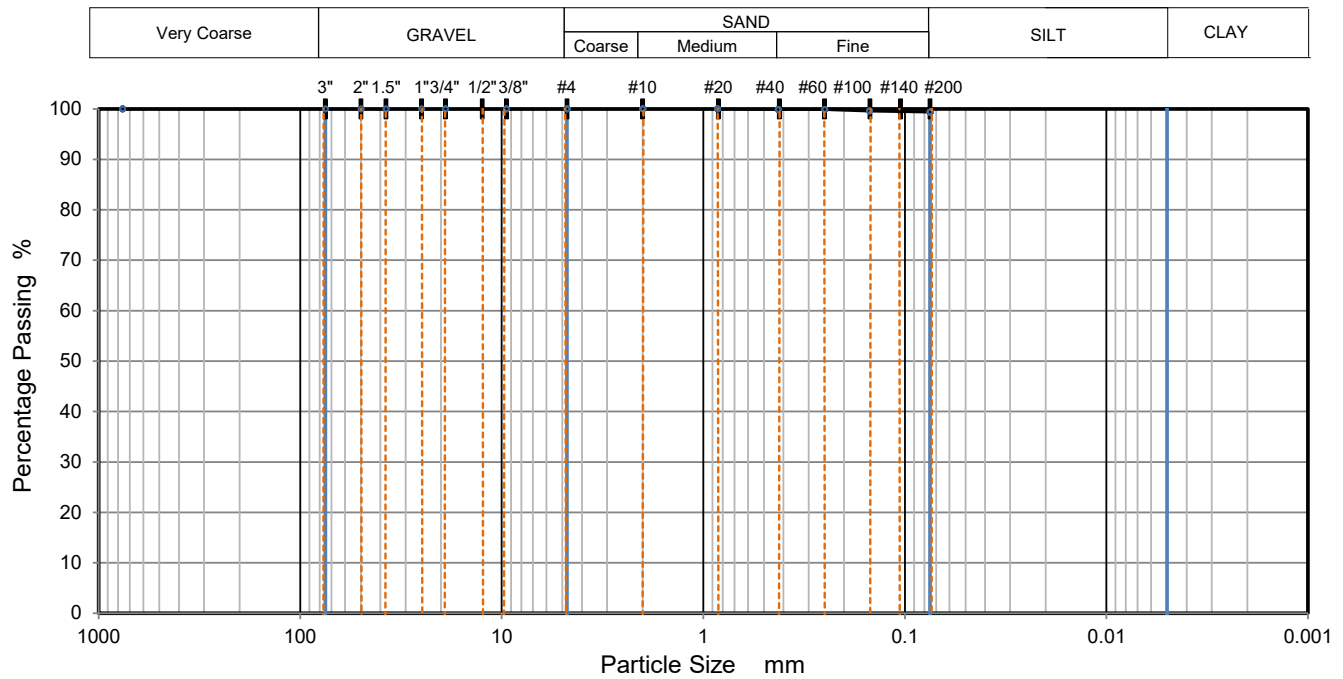
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Tested by	Checked by	Approved by	Date Received	Remarks
JHrysenko	JMurphy	JMurphy	1212/2025	

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	100		
#4	100		
#10	100		
#20	100		
#40	100		
#60	100		
#100	100		
#200	99		

Dry Mass of sample, g

9.6

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	0
Coarse Sand, #4 to #10 sieve	0
Medium Sand, #10 to #40	0
Fine Sand, #40 to #200	1
Fines <#200	99

USCS	CH	Liquid Limit	81	D90		D50		D10	
AASHTO	A-7-6	Plastic Limit	29	D85		D30		Cu	
USCS Group Name	Fat clay	Plasticity Index	52	D60		D15		Cc	

Project: Roanoke Gateway Project Phase II

Client: Homes for America

Sample Description: Orange Brown FAT CLAY

Sample Source: B-02

Project No.: 12:20641-A

Depth (ft): 28.0 - 30.0

Sample No.: S-9

Date Reported: 1/14/2026



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Address

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ECS Mid-Atlantic LLC - Roanoke

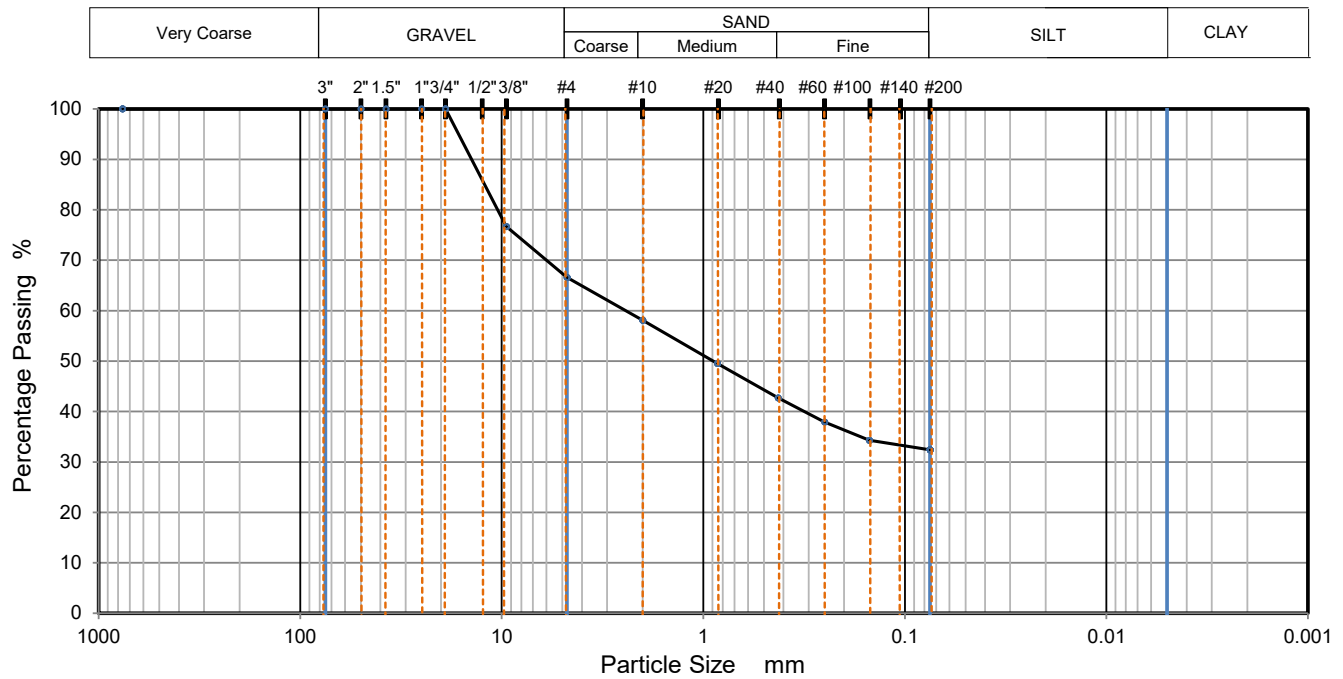
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Tested by	Checked by	Approved by	Date Received	Remarks
JHrysenko	JMurphy	JMurphy	1212/2025	

PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	77		
#4	67		
#10	58		
#20	50		
#40	43		
#60	38		
#100	34		
#200	32		

Dry Mass of sample, g

47.6

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	33
Coarse Sand, #4 to #10 sieve	8
Medium Sand, #10 to #40	15
Fine Sand, #40 to #200	10
Fines <#200	32

USCS	SM	Liquid Limit	29	D90	14.110	D50	0.893	D10	
AASHTO	A-2-4	Plastic Limit	23	D85	12.160	D30		Cu	
USCS Group Name	Silty sand with gravel	Plasticity Index	6	D60	2.427	D15		Cc	

Project: Roanoke Gateway Project Phase II

Client: Homes for America

Sample Description: Brown SILTY SAND with Gravel

Sample Source: B-03

Project No.: 12:20641-A

Depth (ft): 2.0 - 4.0

Sample No.: S-2

Date Reported: 1/14/2026



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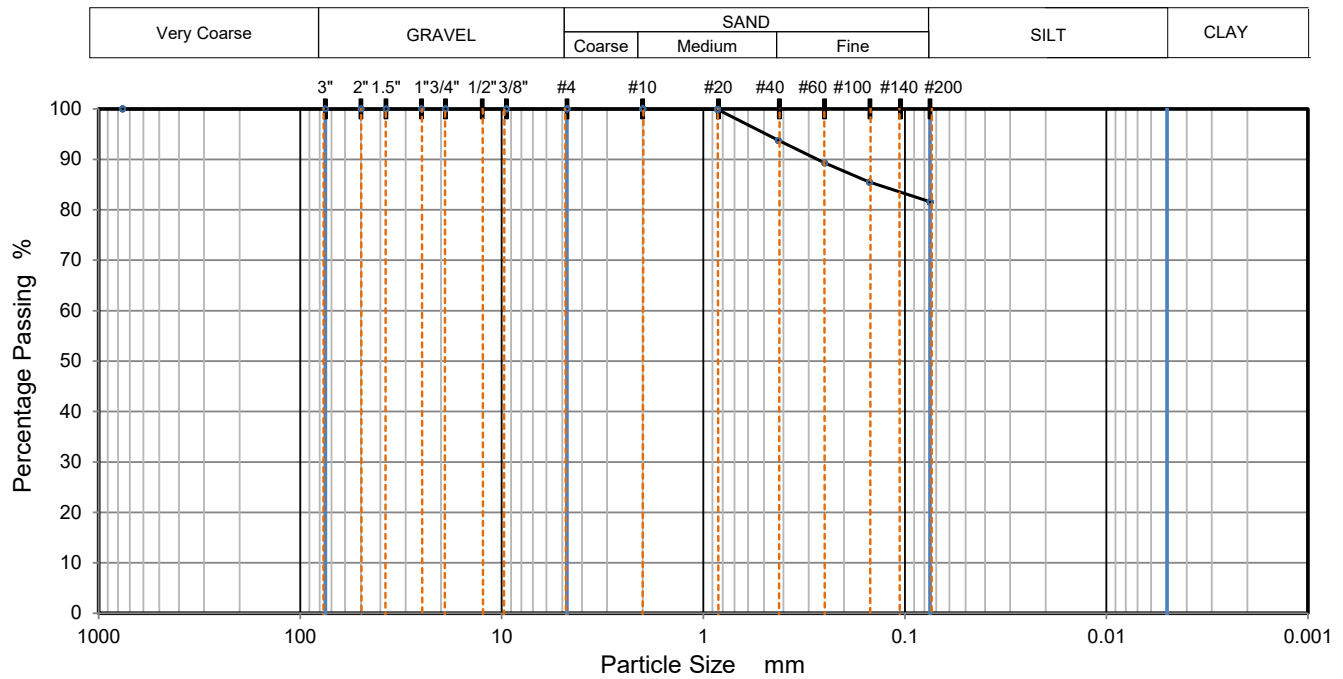
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PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	100		
#4	100		
#10	100		
#20	100		
#40	94		
#60	89		
#100	86		
#200	82		

Dry Mass of sample, g

37.1

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	0
Coarse Sand, #4 to #10 sieve	0
Medium Sand, #10 to #40	6
Fine Sand, #40 to #200	12
Fines <#200	82

USCS	ML	Liquid Limit	36	D90	0.272	D50		D10	
AASHTO	A-4	Plastic Limit	29	D85	0.137	D30		Cu	
USCS Group Name	Silt with sand	Plasticity Index	7	D60		D15		Cc	

Project: Roanoke Gateway Project Phase II

Client: Homes for America

Sample Description: Yellow SILT with Sand

Sample Source: B-04

Project No.: 12:20641-A

Depth (ft): 2.0 - 4.0

Sample No.: S-2

Date Reported: 1/14/2026



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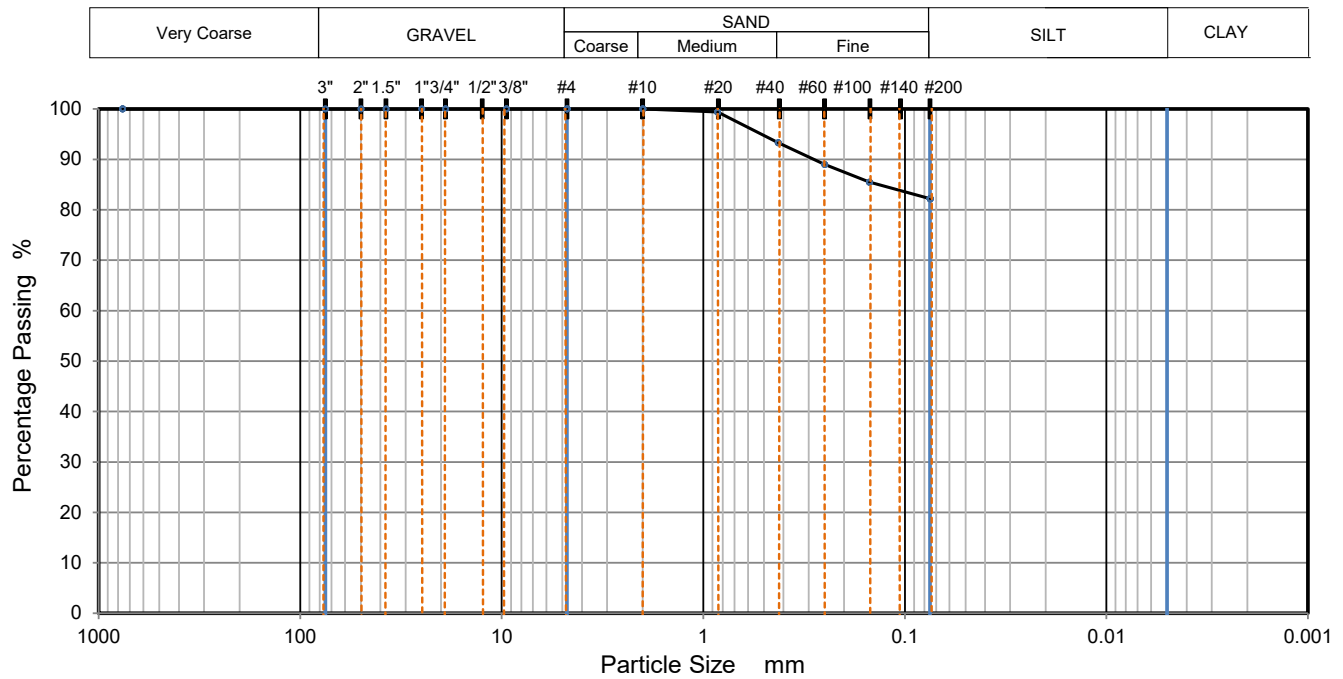
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PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	100		
#4	100		
#10	100		
#20	99		
#40	93		
#60	89		
#100	86		
#200	82		

Dry Mass of sample, g

38.0

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	0
Coarse Sand, #4 to #10 sieve	0
Medium Sand, #10 to #40	7
Fine Sand, #40 to #200	11
Fines <#200	82

USCS	ML	Liquid Limit	37	D90	0.283	D50		D10	
AASHTO	A-6	Plastic Limit	26	D85	0.135	D30		Cu	
USCS Group Name	Silt with sand	Plasticity Index	11	D60		D15		Cc	

Project: Roanoke Gateway Project Phase II

Client: Homes for America

Sample Description: Red Brown SILT with Sand

Sample Source: B-04

Project No.: 12:20641-A

Depth (ft): 8.0 - 10.0

Sample No.: S-5

Date Reported: 1/14/2026



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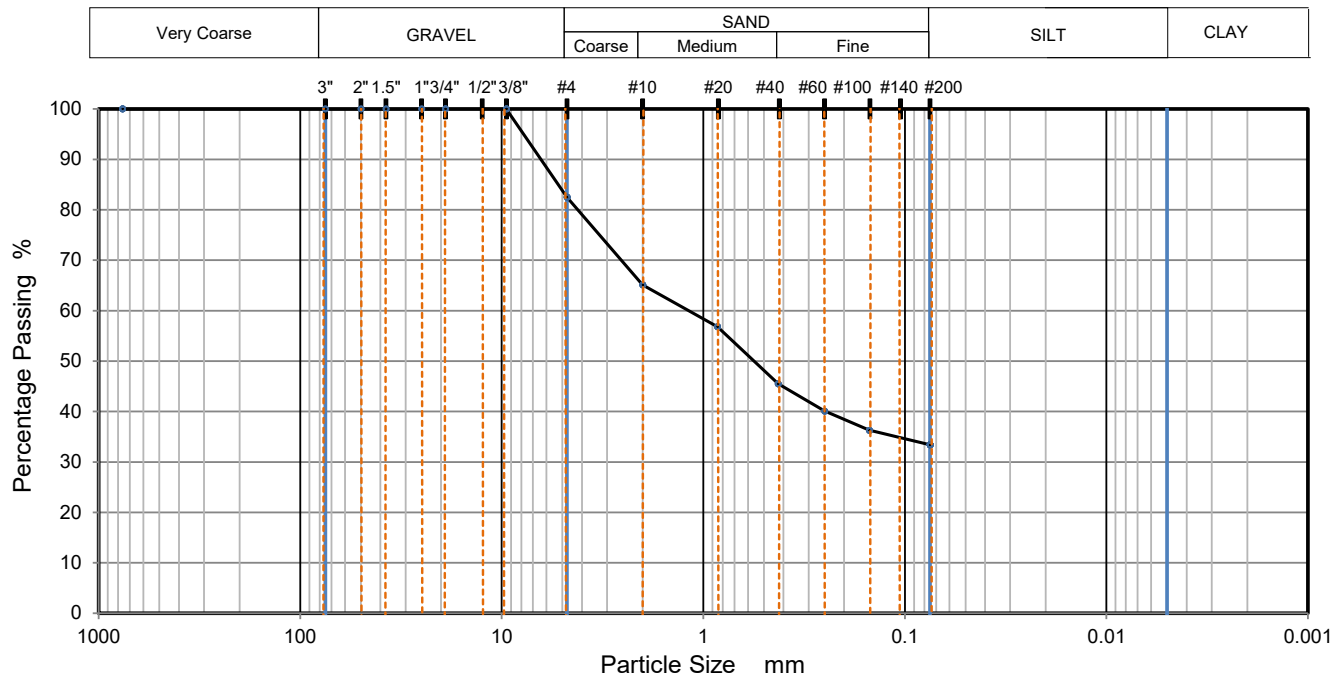
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PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	100		
#4	83		
#10	65		
#20	57		
#40	46		
#60	40		
#100	36		
#200	33		

Dry Mass of sample, g

44.3

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	18
Coarse Sand, #4 to #10 sieve	17
Medium Sand, #10 to #40	20
Fine Sand, #40 to #200	12
Fines <#200	33

USCS	SM	Liquid Limit		D90	6.393	D50	0.560	D10	
AASHTO	A-2-4	Plastic Limit	NP	D85	5.244	D30		Cu	
USCS Group Name	Silty sand with gravel	Plasticity Index		D60	1.182	D15		Cc	

Project: Roanoke Gateway Project Phase II

Client: Homes for America

Sample Description: Light Brown SILTY SAND with Gravel

Sample Source: B-16

Project No.: 12:20641-A

Depth (ft): 2.0 - 4.0

Sample No.: S-2

Date Reported: 1/14/2026



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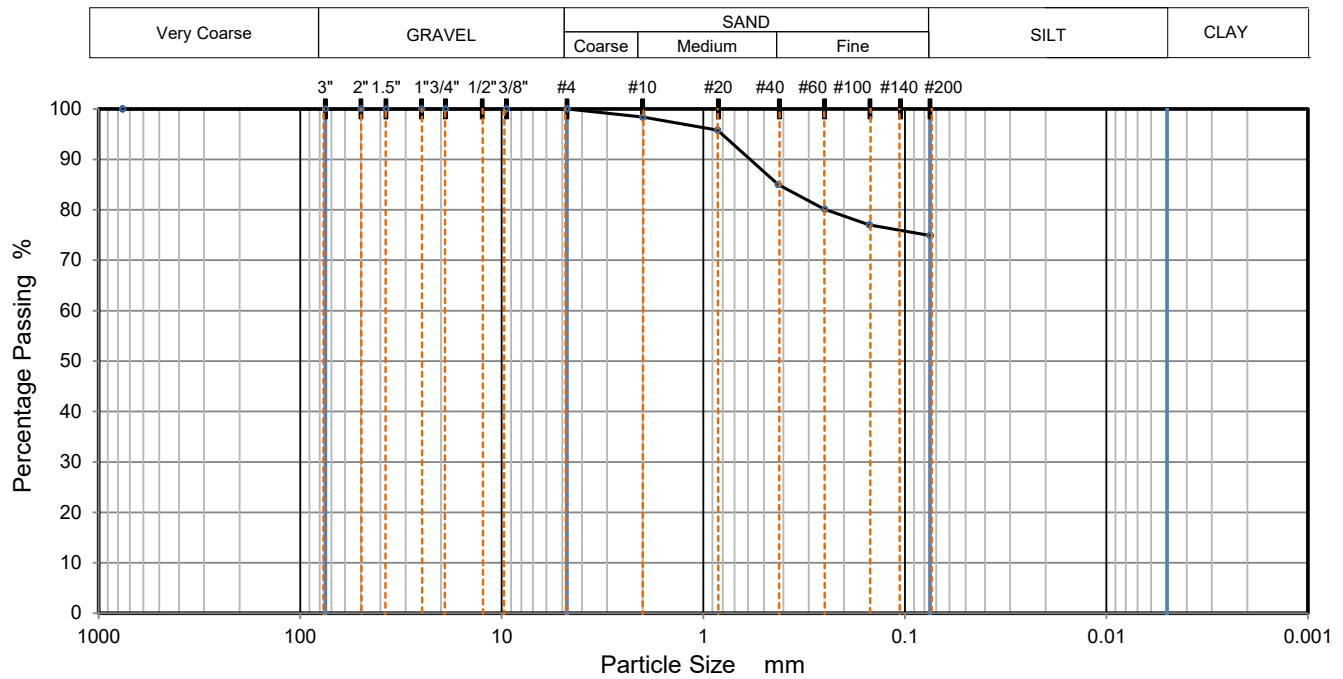
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PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	100		
#4	100		
#10	98		
#20	96		
#40	85		
#60	80		
#100	77		
#200	75		

Dry Mass of sample, g

37.4

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	0
Coarse Sand, #4 to #10 sieve	2
Medium Sand, #10 to #40	13
Fine Sand, #40 to #200	10
Fines <#200	75

USCS	ML	Liquid Limit	34	D90	0.586	D50		D10	
AASHTO	A-4	Plastic Limit	25	D85	0.425	D30		Cu	
USCS Group Name	Silt with sand	Plasticity Index	9	D60		D15		Cc	

Project: Roanoke Gateway Project Phase II

Client: Homes for America

Sample Description: Yellow Brown SILT with Sand

Sample Source: B-16

Project No.: 12:20641-A

Depth (ft): 13.0 - 15.0

Sample No.: S-6

Date Reported: 1/14/2026



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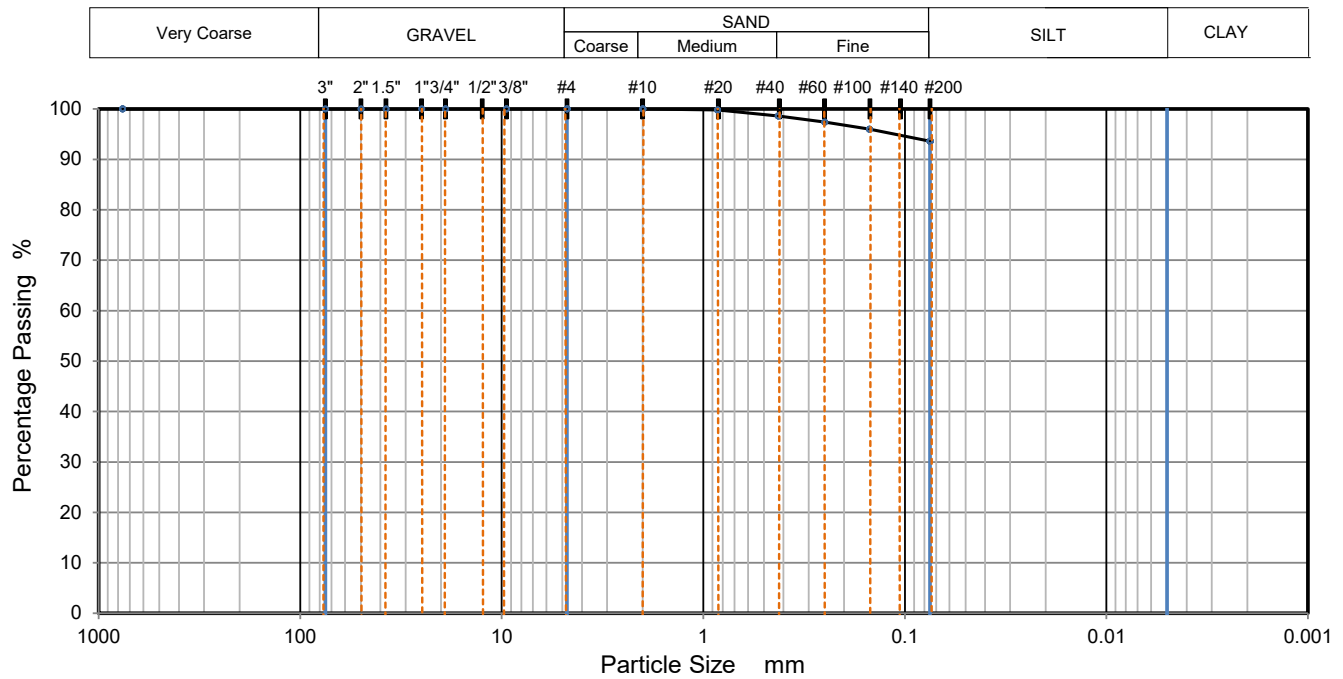
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PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	100		
#4	100		
#10	100		
#20	100		
#40	99		
#60	97		
#100	96		
#200	94		

Dry Mass of sample, g

37.5

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	0
Coarse Sand, #4 to #10 sieve	0
Medium Sand, #10 to #40	1
Fine Sand, #40 to #200	5
Fines <#200	94

USCS	CH	Liquid Limit	57	D90		D50		D10	
AASHTO	A-7-6	Plastic Limit	22	D85		D30		Cu	
USCS Group Name	Fat clay	Plasticity Index	35	D60		D15		Cc	

Project: Roanoke Gateway Project Phase II

Client: Homes for America

Sample Description: Orange Brown FAT CLAY

Sample Source: B-17

Project No.: 12:20641-A

Depth (ft): 8.0 - 10.0

Sample No.: S-5

Date Reported: 1/14/2026



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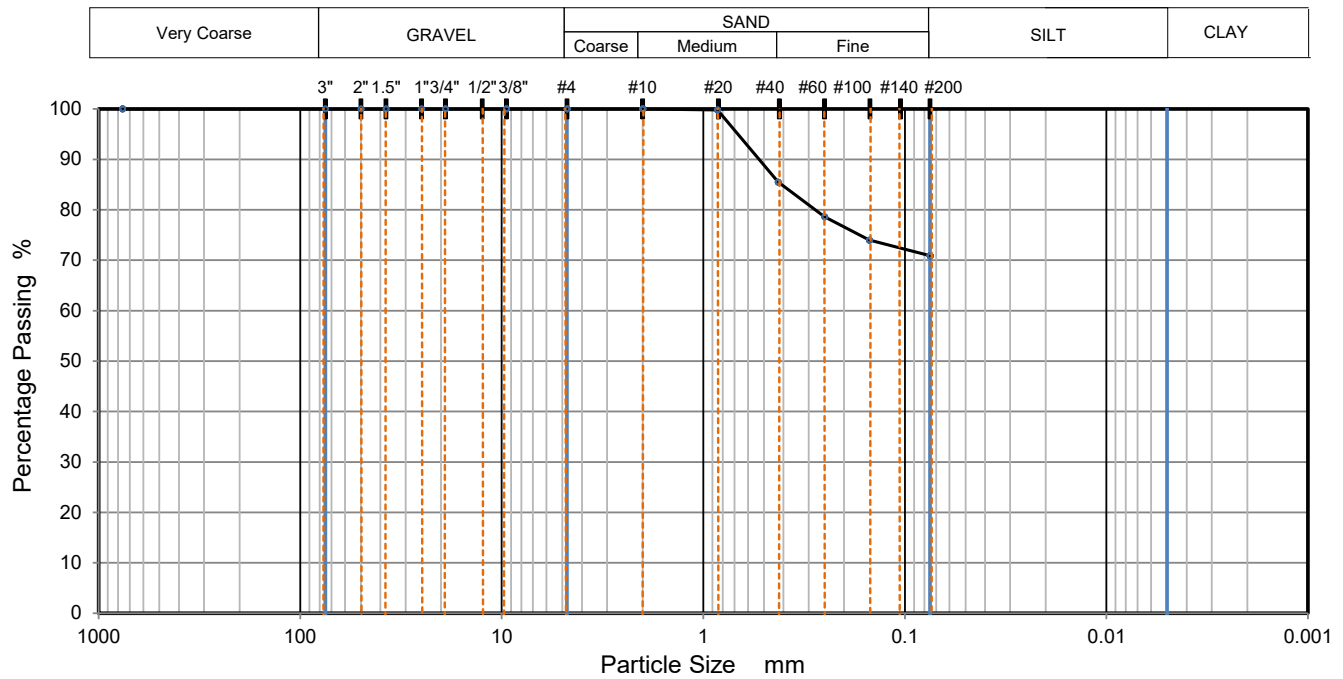
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PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	100		
#4	100		
#10	100		
#20	100		
#40	86		
#60	79		
#100	74		
#200	71		

Dry Mass of sample, g

36.7

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	0
Coarse Sand, #4 to #10 sieve	0
Medium Sand, #10 to #40	15
Fine Sand, #40 to #200	15
Fines <#200	71

USCS	CH	Liquid Limit	50	D90	0.529	D50		D10	
AASHTO	A-7-6	Plastic Limit	24	D85	0.409	D30		Cu	
USCS Group Name	Fat clay with sand	Plasticity Index	26	D60		D15		Cc	

Project: Roanoke Gateway Project Phase II

Client: Homes for America

Sample Description: Light Brown FAT CLAY with Sand

Sample Source: B-17

Project No.: 12:20641-A

Depth (ft): 13.0 - 15.0

Sample No.: S-6

Date Reported: 1/14/2026



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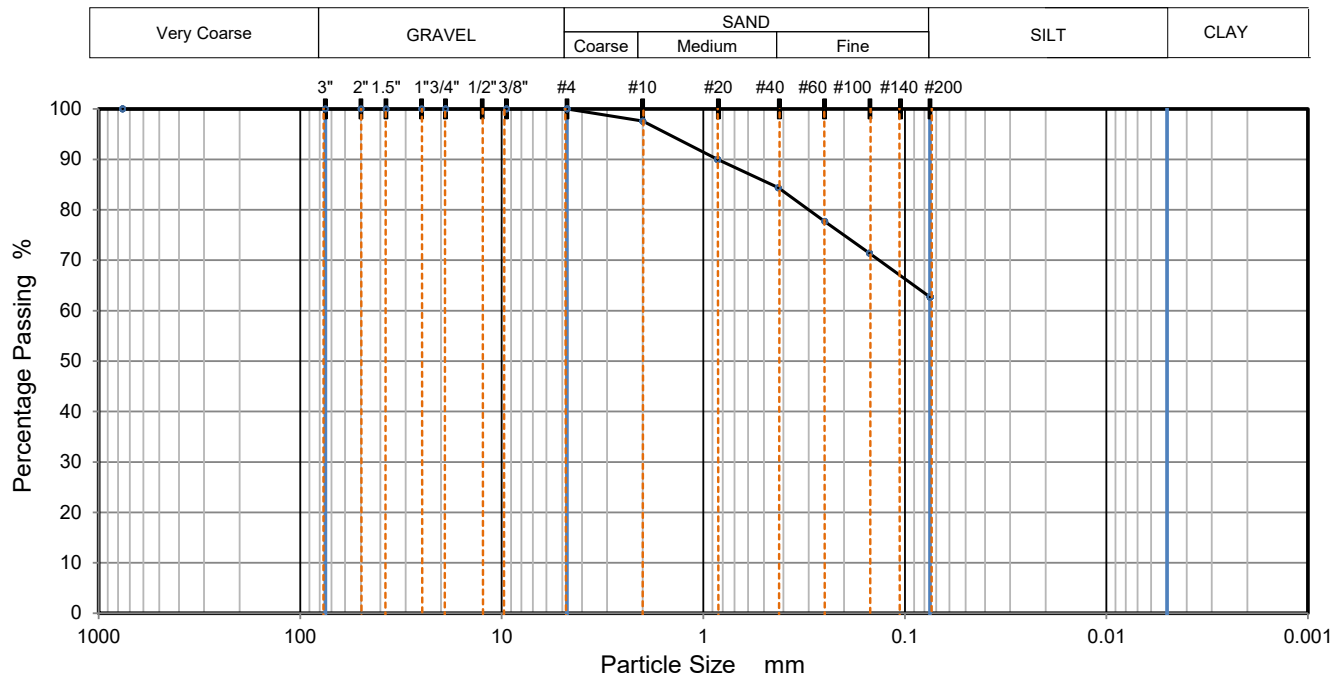
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PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D6913M-17-METHOD A)

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100		
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
3/8"	100		
#4	100		
#10	98		
#20	90		
#40	84		
#60	78		
#100	71		
#200	63		

Dry Mass of sample, g

33.1

Sample Proportions	% dry mass
Very coarse, >3" sieve	0
Gravel, 3" to # 4 sieve	0
Coarse Sand, #4 to #10 sieve	2
Medium Sand, #10 to #40	13
Fine Sand, #40 to #200	22
Fines <#200	63

USCS	CL	Liquid Limit	34	D90	0.850	D50		D10	
AASHTO	A-6	Plastic Limit	19	D85	0.458	D30		Cu	
USCS Group Name	Sandy lean clay	Plasticity Index	15	D60		D15		Cc	

Project: Roanoke Gateway Project Phase II

Client: Homes for America

Sample Description: Dark Brown SANDY LEAN CLAY

Sample Source: B-18

Project No.: 12:20641-A

Depth (ft): 0.0 - 2.0

Sample No.: S-1

Date Reported: 1/14/2026



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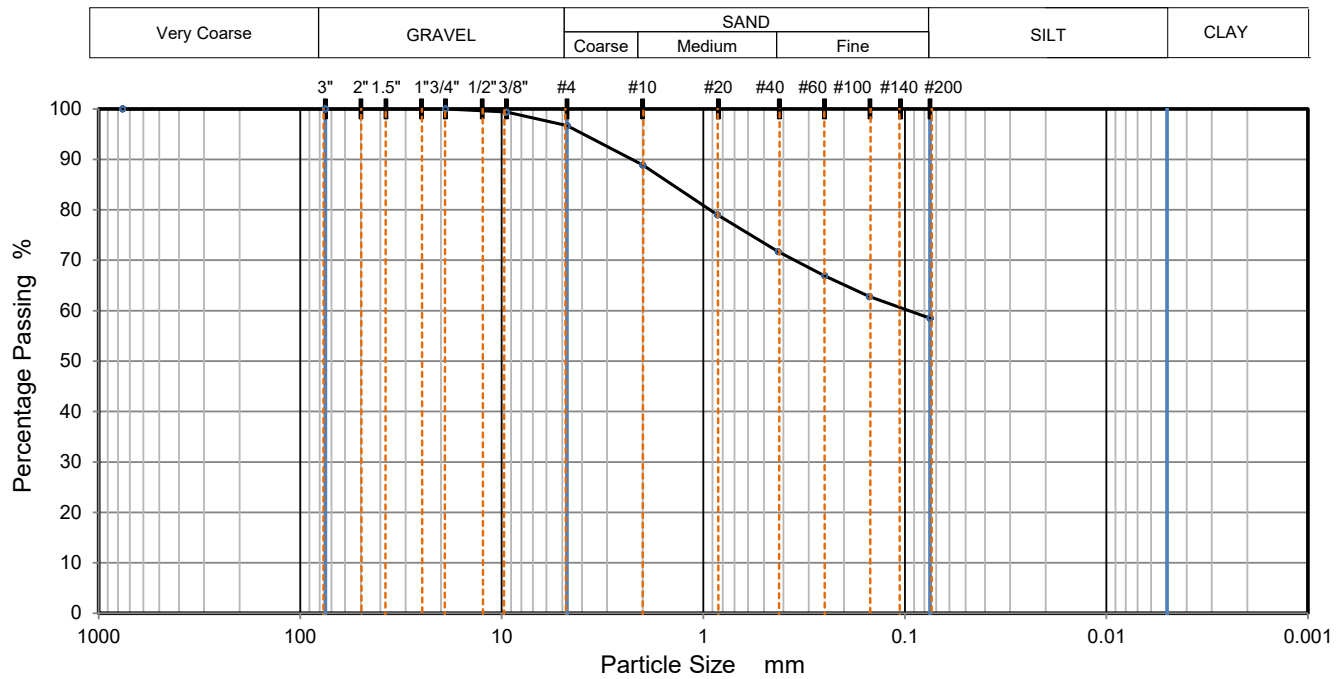
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PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
3/4"	100.0		
3/8"	99.4		
#4	96.7		
#10	88.9		
#20	79.0		
#40	71.7		
#60	66.9		
#100	62.8		
#200	58.5		

Dry Mass of sample, g

12850.0

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	3.3
Coarse Sand, #4 to #10 sieve	7.8
Medium Sand, #10 to #40	17.2
Fine Sand, #40 to #200	13.2
Fines <#200	58.5

USCS	CL	Liquid Limit	31	D90	2.259	D50		D10	
AASHTO	A-6	Plastic Limit	17	D85	1.428	D30		Cu	
USCS Group Name	Sandy lean clay	Plasticity Index	14	D60	0.096	D15		Cc	

Project: Roanoke Gateway Project Phase II

Client: Homes for America

Sample Description: Sandy Lean Clay Brown

Sample Source: P-05

Project No.: 12:20641-A

Depth (ft): 1.0 - 10.0

Sample No.: D3S-88

Date Reported: 1/14/2026



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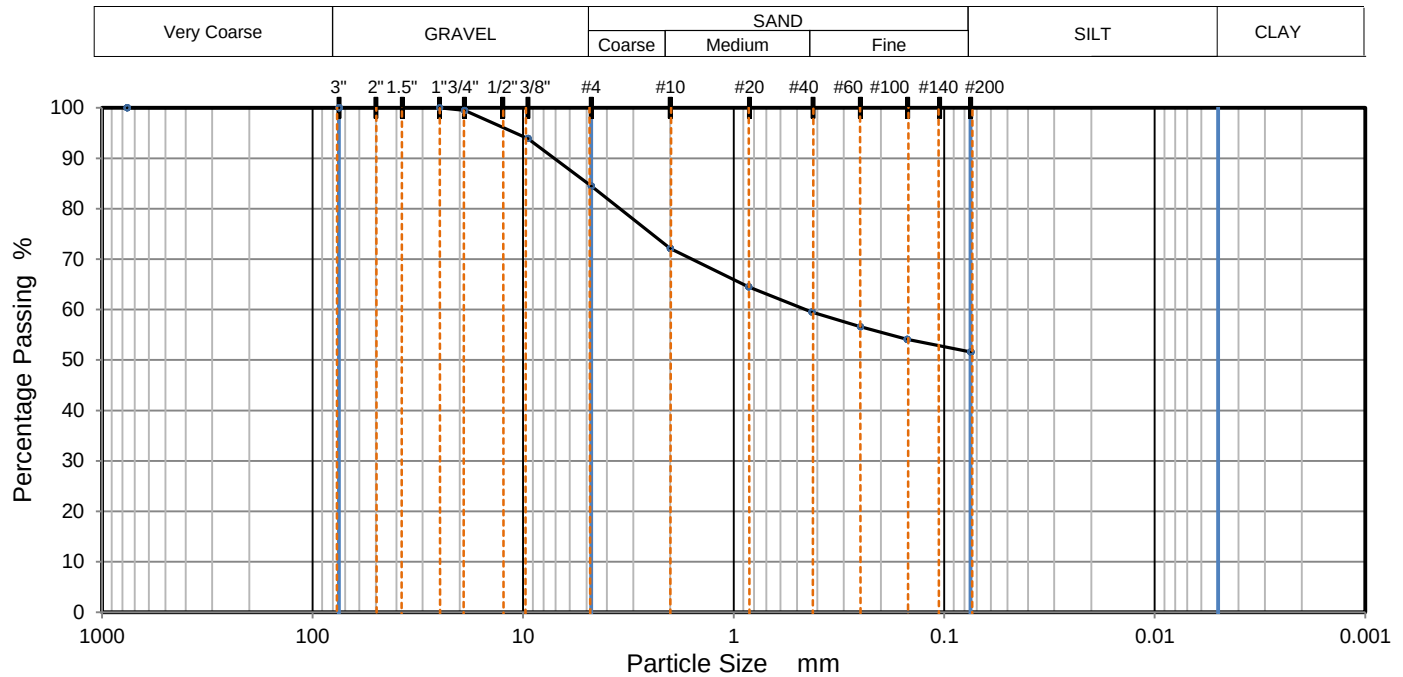
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PARTICLE SIZE DISTRIBUTION



TEST RESULTS (ASTM D422-63(2007))

Sieving		Hydrometer Sedimentation	
Particle Size	% Passing	Particle Size mm	% Passing
3"	100.0		
1"	100.0		
3/4"	99.5		
3/8"	93.9		
#4	84.5		
#10	72.1		
#20	64.5		
#40	59.5		
#60	56.6		
#100	54.1		
#200	51.6		

Dry Mass of sample, g

17222.0

Sample Proportions	% dry mass
Very coarse, >3" sieve	0.0
Gravel, 3" to # 4 sieve	15.5
Coarse Sand, #4 to #10 sieve	12.4
Medium Sand, #10 to #40	12.6
Fine Sand, #40 to #200	7.9
Fines <#200	51.6

USCS	CL	Liquid Limit	36	D90	7.126	D50		D10	
AASHTO	A-6	Plastic Limit	18	D85	4.928	D30		Cu	
USCS Group Name	Sandy lean clay with gravel	Plasticity Index	18	D60	0.456	D15		Cc	

Project: Roanoke Gateway Project Phase I

Client: Homes for America

Sample Description: Sandy Lean Clay with Gravel Yellow Brown

Sample Source: P-03

Project No.: 12:20641

Depth (ft): 1.0 - 10.0

Sample No.: D3S-56

Date Reported: 12/26/2025



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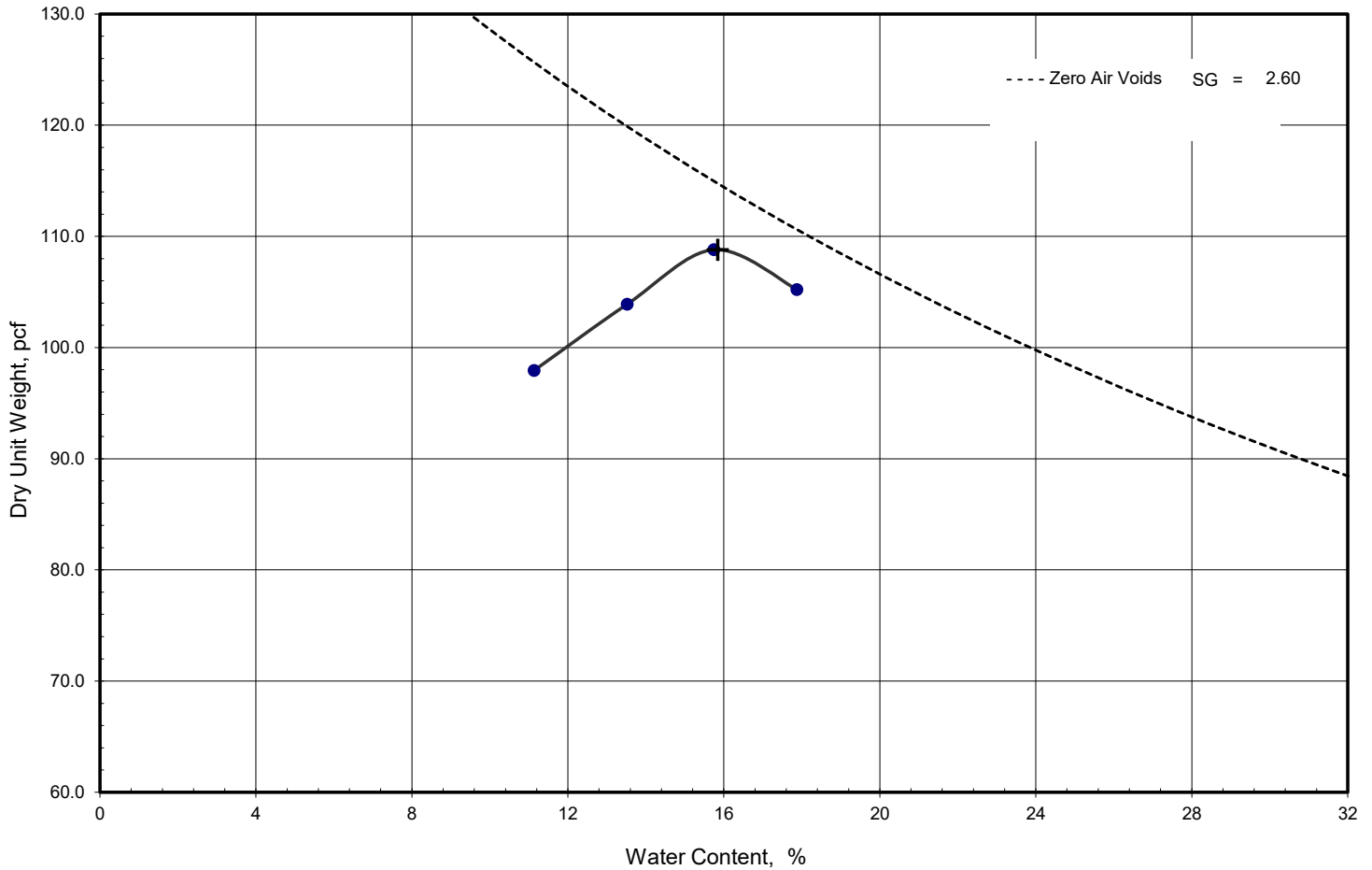
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(703)834-5527

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Laboratory Compaction Characteristics of Soil Using Standard Effort



Optimum Moisture Content

15.8 %

Maximum Dry Unit Weight

108.8 pcf

Preparation

ASTM moist preparation

Type of rammer

Manual - 5.5lbf (24.5N)

Test Specification / Method

ASTM D698-12e2-method A

Specific gravity - D854 water
pycnometer

2.60 Historical

Coarse Aggregate Specific Gravity -

Cumulative material retained on:

3/4 in. sieve 0.0 %

3/8 in. sieve 0.6 %

#4 sieve 3.4 %

Soil Description

Nat.
Moist. %

Liquid Limit

Plasticity
Index

% < #200

USCS

AASHTO

Sandy Lean Clay Brown

9.3

31

14

58.5

CL

A-6

Project: Roanoke Gateway Project Phase II

Client: Homes for America

Sample / Source: P-05

Test Reference/No.:

Project No.: 12:20641-A

Depth (ft.): 1 - 10

Sample No.: D3S-88

Date Reported: 1/14/2026



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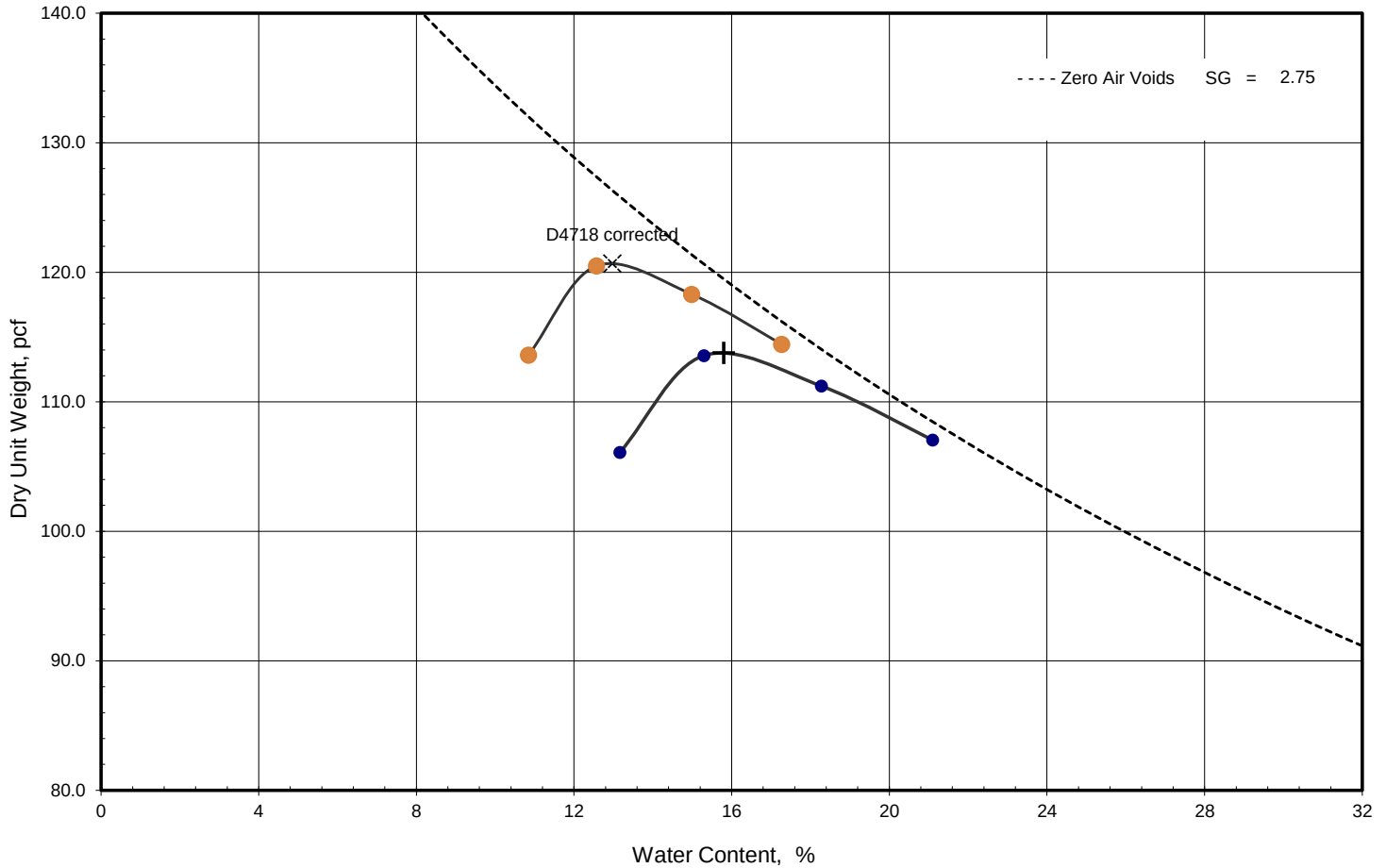
jjong

Htran

MUzun

12/16/2025

Laboratory Compaction Characteristics of Soil Using Standard Effort



Optimum Moisture Content	15.8	%
Maximum Dry Unit Weight	113.8	pcf
Corrected Opt. Moisture Content	13.0	%
Corrected Max. Dry Density	120.7	pcf
Cumulative material retained on:		
3/4 in. sieve	0.5	%
3/8 in. sieve	6.1	%
#4 sieve	15.5	%

15.47 % retained on #4 sieve.

Preparation	ASTM moist preparation
Type of rammer	Manual - 5.5lbf (24.5N)
Test Specification / Method	ASTM D698-12e2-method A
Specific gravity - D854 water pycnometer	2.75 Historical
Coarse Aggregate Specific Gravity - C127 coarse aggregate	2.60 Historical

Soil Description	Nat. Moist. %	Liquid Limit	Plasticity Index	% < #200	USCS	AASHTO
Sandy Lean Clay with Gravel Yellow Brown	30.0	36	18	51.6	CL	A-6

Project: Roanoke Gateway Project Phase I
Client: Homes for America
Sample / Source: P-03
Test Reference/No.:

Project No.: 12:20641
Depth (ft.): 1 - 10
Sample No.: D3S-56
Date Reported: 12/26/2025



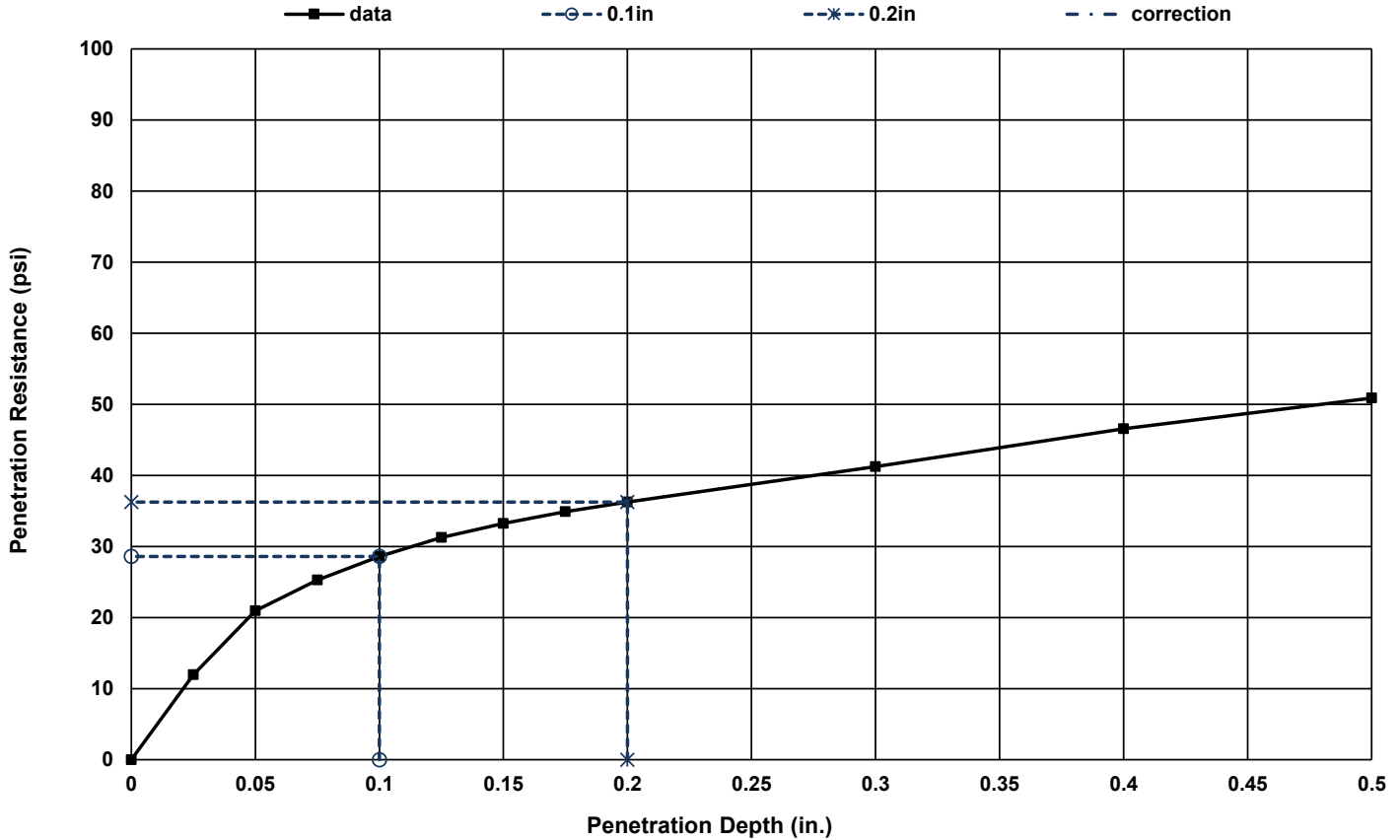
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California Bearing Ratios (CBR) of Laboratory-Compacted Soils



TEST RESULTS (ASTM D1883-21)

Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)		Swell (%)	
Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.1 in.	0.2 in.					
106.9	98.3	16.1	98.1	90.2	24.8	2.9	2.4	0.00	10		1.40	
Material Description					AASHTO	USCS	MAX. Dens. (pcf)	Optimum Moisture (%)	LL	PI	% Fines	% Gravel
Sandy Lean Clay Brown					A-6	CL	108.8	15.8	31	14	58.5	3.3

Project: Roanoke Gateway Project Phase II
 Client: Homes for America
 Sample / Source P-05
 Test Reference/No.: 1

Project No.: 12:20641-A
 Depth (ft.): 1 - 10
 Sample No.: D3S-88
 Date Reported: 1/14/2026



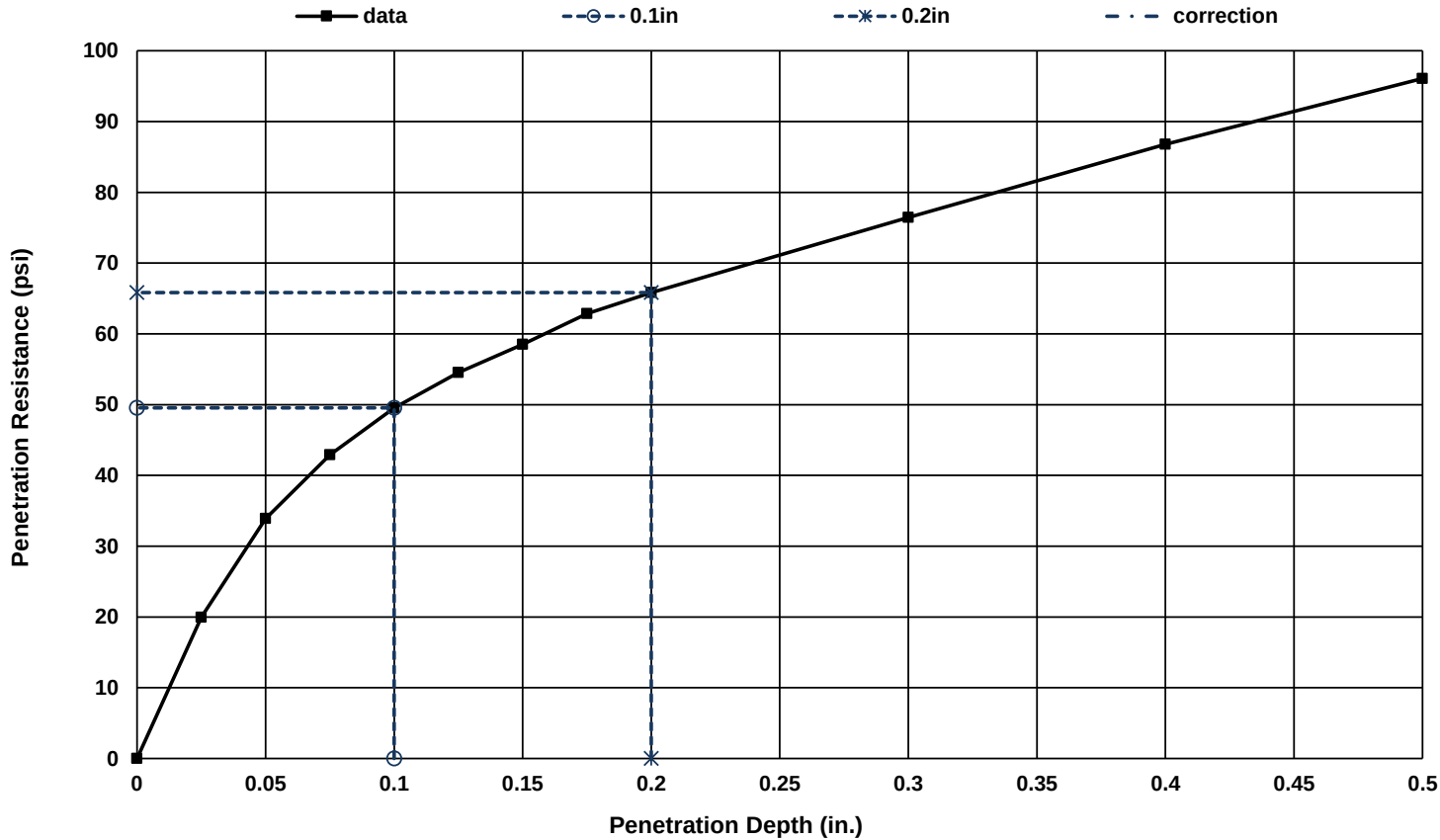
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Tested by	Checked by	Approved by	Date Received	Remarks
jvong	Htran	MUzun	12/16/2025	

California Bearing Ratios (CBR) of Laboratory-Compacted Soils



TEST RESULTS (ASTM D1883-21)

Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)		Swell (%)	
Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.1 in.	0.2 in.					
120.2	99.6	12.8	113.0	93.6	19.0	5.0	4.4	0.00	10		0.83	
Material Description					AASHTO	USCS	MAX. Dens. (pcf)	Optimum Moisture (%)	LL	PI	% Fines	% Gravel
Sandy Lean Clay with Gravel Yellow Brown					A-6	CL	120.68	13	36	18	51.6	15.5

Project: Roanoke Gateway Project Phase I
Client: Homes for America
Sample / Source P-03
Test Reference/No.: 1

Project No.: 12:20641
Depth (ft.): 1 - 10
Sample No.: D3S-56
Date Reported: 12/26/2025



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jvong	MUzun	MUzun	12/16/2025	