BID ADDENDUM NO. 1

NEW GEORGE WYTHE HIGH SCHOOL
EARLY SITE PACKAGE

RICHMOND PUBLIC SCHOOLS

IFB # 23 – 7043 – 05
RRMM Project # 21310 – 00

May 24, 2023

This Addendum forms a part of the Construction Documents and modifies the Project Manual dated May 1, 2023 and Construction Drawings dated April 19, 2023.

The information in this Addendum supersedes any contradictory information or omission set forth in the Contract Documents.

Where any component of the Contract Documents is modified or deleted by this Addendum, the unaltered components of that Section, Article, or Drawing shall remain in effect.

Acknowledge receipt of this Addendum by inserting its number and date in the Proposal Form. Failure to do so may subject Bidder to disqualification.

Bid Addendum No. 1 consists of this seven (7) page Bid Addendum and ninety-nine (99) pages of attachments.

CLARIFICATIONS

1.1 **Pre-Bid Meeting Sign-In Sheet.** Attached for reference.

1.2 **Sealed Bids Due and Opening.** Bid due date as noted in the bid documents shall be modified/extended from May 31, 2023 @ 2:00 p.m. to *June 5, 2023 @ 2:00 p.m.*

1.3 **Salvaged Items.** In the event any of the following items are in conflict with the trenching and/or grading required for this project, Contractor shall salvage below items and coordinate with Owner to determine onsite storage location.

- Stadium Light Poles
- Stadium Lights
- Aluminum Bleachers
- Goal Post(s)
- Shot Put Equipment
- Soccer Goals
- Scoreboards
- Tires
- Amphitheatre Stone (250 Stones)

PRE-BID QUESTIONS

1.4 **Pre-Bid Questions & Responses.** See below questions with associated response to each question in *ITALIC* text.

QUESTION #1: Can the removal of the Power and lines to the poles at the Water Pump and Vault and Overhead lights be removed from the Contract and that coordination be attempted now by the Owner to allow for this work to be completed in a timely manner and not affect the project schedule?

RESPONSE: Contractor shall plan to coordinate any utility relocations that are in conflict with the work shown as defined by Sheet C3.01.

QUESTION #2: It appears that one of the Sports Field Light Poles on the South West Corner of the site has an X to be removed. Are all 4 of these to be removed or just this one?

RESPONSE: For this package, assume all stadium lighting will remain in place but do not need to continue to function. If electrical feeds are encountered with storm and sanitary trenching, the electrical feeds can be disconnected.

QUESTION #3: The Limits of Disturbance along the left or east side of the parcel is a straight line and goes through the wood line up to Crutchfield Street. Can you clarify if all of the trees Northeast or Right of the Tree protection Safety fence on plan sheet C3.01 are to be removed or just to the limits of the tree protection?

RESPONSE: Trees shall be removed to construct the utility lines and to accommodate the proposed grading. Any trees beyond shall remain.

QUESTION #4: **Can you confirm that per 311000-4 the abandonment of pipes is to include masonry brick or blocking of the ends of the pipe and that no fill is required in the pipe to be abandoned?**

RESPONSE: Confirmed. Contractor shall cap open ends and abandon in place the remaining 72" and 15" pipes as shown. Filling of the pipe(s) is not required.

QUESTION #5: **The Specifications seem to indicate that stone backfill is required to go 1' above the top of the concrete pipe and 2' above the top of PVC pipe. However, the detail drawing on sheet C7.03 seems to indicate stone to spring line. Can you confirm for each pipe type what backfill limit with stone is required?**

RESPONSE: Contractor shall follow guidelines defined in the details shown on Sheet C7.03.

QUESTION #6: **Can the Geotech Report be provided?**

RESPONSE: Final Geotech Report (dated April 27, 2023) attached for reference.

QUESTION #7: **Will Cad files be available after the award to the Contractor?**

RESPONSE: Yes.

QUESTION #8: **Are there anticipated liquidated damages? If so, what is that cost?**

RESPONSE: No. Liquidated damages are not a part of this contract.

QUESTION #9: **Can the schedule be revisited based on the lead times and install times of these deep installations?**

RESPONSE: Contractor(s) shall submit bids based on the delivery schedule published within the Bid Form. Long lead items will be reviewed with the successful bidder and any warranted contract extension will be reviewed for approval by the Owner.

QUESTION #10: **Can Asphalt millings and crushed concrete be incorporated into the backfills of the utility installs above the neat lines of the stone backfill?**

RESPONSE: Asphalt millings and crushed concrete can be used as backfill with the Geotechnical engineer's permission. This will be coordinated during construction.

QUESTION #11: **The project manual for the above referenced project calls for SDR-35 PVC pipe. The latest City of Richmond Standards call for SD4-26 HEAVY WALL PVC pipe. Which will be required?**

RESPONSE: The City now requires that all new sewer be SDR-26. The specifications will be modified to reflect this.

QUESTION #12: **Please provide the geotechnical report that is mentioned in specification section 310000:1.8 or other geotechnical reports associated with the project.**

RESPONSE: Final Geotech Report (dated April 27, 2023) attached for reference.

QUESTION #13: **The description for the Unit price allowance for "Excavation of Unsuitable Material" description in section 012200 has language regarding testing, identification, demolition, removal, preparation of new work, installation of work and close-out requirements. This description seems very odd for excavation of unsuitable materials such as dirt, where this type of allowance would normally be used. What types of unsuitable material excavation should bidders anticipate will be unsuitable, if it will need to be demolished.**

RESPONSE: Unsuitable, or unclassified material, is defined in Section 310000 – EARTHWORK, Section 3.3.

QUESTION #14: **Please provide additional information as to the location of the existing pipes that need to be connected to the new 72" RCP per the note on sheet C4.01.**

RESPONSE: It is unclear how the existing pipes connect to the 72" pipe. It is assumed that they are blind connect to the existing 72". The 15" and 12" pipes should be connected temporarily into the proposed 84".

QUESTION #15: **Will RPS relocate existing electric, telephone, or other communication lines that are in conflict, prior to Early Site Package contractor mobilization?**

RESPONSE: Contractor shall plan to coordinate any utility relocations that are in conflict with the work shown.

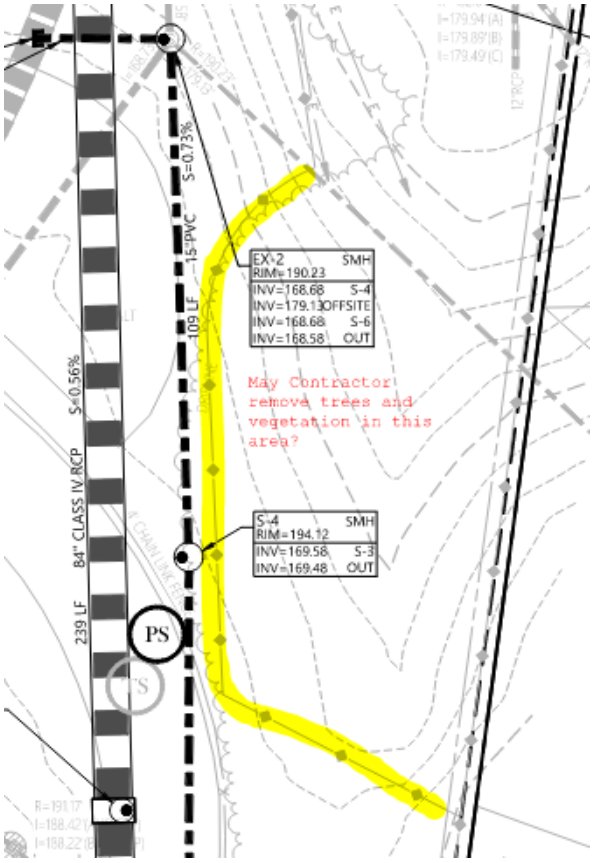
QUESTION #16: **Will the existing utilities that will be abandoned need to be filled, or only cut and capped?**

RESPONSE: Contractor shall cap open ends and abandon in place the remaining 72" and 15" pipes as shown. Filling of the pipe(s) is not required.

QUESTION #17: **Will permanent seeding be necessary as shown on the erosion control plan or will temporary seeding be allowed for the disturbed area and stockpile?**

RESPONSE: Permanent seeding will be needed as required by the Virginia Department of Environmental Quality and the City of Richmond. See Sheet C7.01.

QUESTION #18: **Plan sheet shows tree protection adjacent to proposed sanitary sewer MH S4. May the contractor remove these trees due to the proximity to the proposed sanitary sewer line. See below screenshot to show location and contractor proposed clearing limits.**



RESPONSE: Yes, the safety fence can be shifted east to accommodate excavation, if necessary. Protection for remaining trees would still be required.

<u>QUESTION #19:</u> Please clarify that it is the intent of the project to leave all excess topsoil and subsoil onsite.

RESPONSE: The stockpile should be for material that can be reused. Unsuitable material shall be removed and disposed of legally.

<u>QUESTION #20:</u> Please provide the geotechnical report prepared by Schnabel Engineering dated August 15, 2018.

RESPONSE: Final Geotech Report (dated April 27, 2023) attached for reference.

<u>QUESTION #21:</u> Please clarify what is to be done with the existing stadium lighting and poles (4 total).

RESPONSE: All lights shall remain in place.

<u>QUESTION #22:</u> Please clarify that the selected contractor will remove their temporary 6' safety fence at the end of their contractually obligated work.

RESPONSE: Yes, Contractor shall remove any temporary safety fence installed/required by the project.

QUESTION #23: **Please confirm this contract is not required to provide temporary trailers for Richmond Public Schools or any other entity.**

RESPONSE: Confirmed. Any trailers provided by the Contractor shall be for the sole purpose of the Contractor.

QUESTION #24: **The Notice to Bidders states "installation of construction staging and laydown areas" are included in this contract. Please provide specifications for the laydown and staging areas (i.e. depth of stone, fabric required). And please confirm if the staging and laydown areas are to be removed at the completion of this scope of work / contract.**

RESPONSE: The laydown and staging area to be determined by the Contractor. Contractor shall remove laydown and staging area(s) at the completion of the Early Site Package project.

QUESTION #25: **Will the Sediment and Erosion Controls installed by this contract remain in place upon the completion of this scope of work or are the controls to be removed by this contract?**

RESPONSE: Contractor shall remove the erosion control measures per the requirements of the Virginia Department of Environmental Quality and the City of Richmond.

QUESTION #26: **Can a geotechnical report be provided?**

RESPONSE: Final Geotech Report (dated April 27, 2023) attached for reference.

QUESTION #27: **The specifications list (31000 3.9A) a modified proctor with various compaction rates for fill. Has the Geotechnical engineer reviewed these rates to determine if the onsite material will meet these rates without conditioning (drying, screening, etc)? Since we do not know the Phase 2 design please identify what compaction rates apply for the pipeline.**

RESPONSE: The Phase 2 design will construct asphalt paving over the pipes. The pipe depths will be roughly the same as is shown on the Early Site Package plans. Assume 92% for trench backfill, per the specifications.

QUESTION #28: **The specifications have a permanent fencing specification. Please confirm there is no permanent fencing and that the contractor is only required to have temporary jobsite fencing that doesn't have to meet this specification.**

RESPONSE: No permanent fencing is proposed.

QUESTION #29: **At the pre-bid there was discussions of salvage. Please list the salvage requirements as well as a list of items desired.**

RESPONSE: Refer to Section 1.2 of this Bid Addendum for salvaged items. Contractor shall coordinate with Owner to determine onsite storage location.

QUESTION #30: Is the electrical disconnected to the field. Who is responsible for disconnecting power to lights?

RESPONSE: Disconnection of the lights will need to be coordinated by the contractor if it conflicts with trenching or grading.

QUESTION #31: What are the flow rates on the sewer and storm piping?

RESPONSE: The 10-year flow in the storm drain was calculated to be 480.7 cfs. The flow in the sanitary sewer has not been calculated.

QUESTION #32: In regard to the stadium lights/pole (page C3.01), what exactly is being removed?

RESPONSE: All lights shall remain in place.

QUESTION #33: Are there liquidated damages?

RESPONSE: No. Liquidated damages are not a part of this contract.

QUESTION #34: Can you clarify the intended use for the stockpile?

RESPONSE: The stockpile should be for material that can be reused. Unsuitable material shall be removed and disposed of legally.

QUESTION #35: Will you allow suitable material to be left onsite for future construction? Or is all material to be hauled offsite?

RESPONSE: All suitable material should remain onsite.

END OF BID ADDENDUM NO. 1

PRE-BID CONFERENCE SIGN-IN

Invitation No.: 23-7043-05 **Title: New George Wythe HS-Early Site Package**

Non-Mandatory **Date: 05/11/2023 Time: 10:00 a.m.**

Firm Name & Complete Address LIESFELD Telephone E-mail Representative Name (please print): Craig Hollins	Firm Name & Complete Address J.S. LIESFELD 1851 BANKLOTON RD ROCKVILLE VA 23146 Telephone 804-749-3276 E-mail KMCLEOD@LIESFELD.COM Representative Name (please print): KARL MCLEOD
Firm Name & Complete Address RJ Smith 1711 Reymet RD Telephone 804-400-7818 E-mail tsamuel@rjsmithcos.com Representative Name (please print): Troy R Samuel	Firm Name & Complete Address RJ Smith 1711 Reymet RD N. Chesterfield, VA 23237 Telephone 804 664 2495 E-mail tfuessle@rjsmithcos.com Representative Name (please print): Torben Fuessle
Firm Name & Complete Address J.H. KENT SONS, Inc. P.O. Box 69 Spotsylvania, Va. 22553 Telephone 540-898-3357 E-mail rkentjlkent@outlook.com Representative Name (please print): RICHARD KENT	Firm Name & Complete Address Telephone E-mail Representative Name (please print):

PRE-BID CONFERENCE SIGN-IN

Invitation No.: 23-7043-05 **Title: New George Wythe HS-Early Site Package**

Non-Mandatory **Date: 05/11/2023 Time: 10:00 a.m.**

Firm Name & Complete Address J R Caskey P.O. Box 305 Oilville, VA 23129 Telephone 804-784-8001 E-mail tpotter@jrcaskey.com Representative Name (please print): Tammy Potter	Firm Name & Complete Address Telephone E-mail Representative Name (please print):
Firm Name & Complete Address Stingray 101 E. Chames St. Suite 200 La Plata, MD 20646 Telephone 302-420-7533 E-mail Jason@StingrayWelding.com Representative Name (please print): Jason Wolskee	Firm Name & Complete Address Telephone E-mail Representative Name (please print):
Firm Name & Complete Address VHB 115 S 15th St RICHMOND Telephone 804 - 343 - 7470 E-mail MIKE MILLER@VHB.COM Representative Name (please print): MICHAEL MILLER Mitch Bowser mbowser@vhb.com	Firm Name & Complete Address Telephone E-mail Representative Name (please print):

GEOTECHNICAL ENGINEERING REPORT

George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Schnabel Reference 22130254.000
April 27, 2023

Schnabel ENGINEERING
T 804.649.7035
9800 JEB Stuart Parkway, Suite 100 / Glen Allen, VA 23059 schnabel-eng.com

April 27, 2023

Ms. Kim Wilson
Project Manager
City of Richmond Public Schools
2395 Hermitage Road
Richmond, VA 23220

Subject: **Project 22130254.000, Geotechnical Engineering Report, George Wythe High School, 4314 Crutchfield Street, Richmond, Virginia**

Dear Ms. Wilson:

SCHNABEL ENGINEERING, LLC (Schnabel) is pleased to submit our geotechnical engineering report for this project. This study was performed in accordance with our proposal dated June 30, 2022, and as authorized by you through the issuance of a purchase order (PO No. 209595) on July 11, 2022. This report also includes our proposal addendum dated March 6, 2023, for supplemental geotechnical engineering services for the retaining walls, which was authorized by you on March 9, 2023.

PROJECT DESCRIPTION

Site Description

The project site is located on the existing George Wythe High School campus at 4314 Crutchfield Street in Richmond, VA. Crutchfield Street is the northern boundary, and Midlothian Turnpike is the southern boundary of the site. The site consists of the existing school building, grass-covered recreational fields, and several parking lots. Portions of the site at the west corner near Crutchfield Street and the southeast corner near Midlothian Turnpike appeared to be undeveloped and wooded. The site generally slopes down from the southwest at EL 206 to the northeast at EL 183. Existing grades in the building area vary from approximately EL 203 to 192.

We obtained the site information from the site civil drawings dated February 1, 2023, and through our site visits during this geotechnical study. A Site Vicinity Map is included as Figure 1.

Proposed Construction

The proposed construction consists of a new school building with approximately 225,000 SF of space. We understand that the school building will be two stories tall with no basement. The new school building will be located on the existing baseball and football fields east of the existing school building. The FFE of the proposed school is at EL 196. Up to approximately 7 ft of cut and 4 ft of fill will be needed to grade the building area.

The existing school building will be demolished, and a new football field with a running track will be constructed with two sets of bleachers on the north and south sides of the field, along with baseball and softball fields. In addition, two (2) field houses will be constructed to the west and north of the new football field. Multiple new parking lots and driveways, including a new entrance from Midlothian Turnpike, will be constructed around the new school building. We understand that no new turn lanes into the school are anticipated.

We understand that retaining walls will be constructed as part of the site development. The proposed retaining walls will be located at the southeast corner of the site and along the east side of the track and football field. The retaining wall at the southeast corner of the site will be along the property boundary and adjacent to the Midlothian Turnpike. The approximate length of the wall will be about 570 ft long, with wall heights ranging from about 3 ft to 12 ft. The retaining wall along the track and field will be approximately 380 ft long and up to about 6 ft tall.

Detailed loading information of the proposed structures was not available at the time when this report was prepared. We anticipate that the maximum column and wall loads for the proposed school building will not exceed 200 kips and 8 klf, respectively. Additionally, we assume the maximum column load for the bleachers and field houses will not exceed 50 kips.

We obtained the project information from the latest site drawings February 1, 2023, and our communication with the design team.

SUBSURFACE EXPLORATION AND TESTING PROGRAM

We performed a subsurface exploration and field testing program to identify the subsurface stratigraphy underlying the site and to evaluate the geotechnical properties of the materials encountered. This program included test borings, hand augers, and bulk sampling. Exploration methods used are discussed below. The appendices contain the results of our exploration.

Subsurface Exploration Methods

Test Borings

Schnabel's subcontractors, Ayers & Ayers, Inc., and SEQ Drilling, Inc., drilled 32 test borings at the project site under our observation between July 12 through July 15, 2022, and on March 13, 2023, respectively. Prior to the drilling, the boring locations were scanned by a third-party utility locator to avoid utilities. The final boring locations are shown on the boring location plan included as Figure 2.

The Standard Penetration Test (SPT) was performed, and relatively undisturbed Shelby tube samples were obtained at selected depths in the borings. Appendix A includes specific observations, remarks, and logs for the borings, classification criteria; drilling methods; and sampling protocols. We will retain soil samples for up to 45 days beyond the issuance of this report unless you request other dispositions.

The SPT samples for RW-01 through RW-07 were obtained using a hydraulically driven automatic trip hammer (ATH). Most correlations with SPT data are based on N-values collected with a safety hammer. The energy applied to the split-spoon sampler using the ATH is about 33 percent greater than that applied using the safety hammer, resulting in lower N-values. The hammer blows shown on the boring

logs are uncorrected for the higher energy. However, we correct SPT N values for the higher energy when using N values in our analyses.

Hand Augers

Borings P-07 and P-07A were drilled as hand augers to avoid site utilities. A penetrometer was used to estimate the relative density of the soils at this location.

Soil Laboratory Testing

Our laboratory performed tests on selected samples collected during the subsurface exploration. The testing program aided in the classification of materials encountered in the subsurface exploration and provided data for use in the development of recommendations for design of foundations, earthwork, and pavements. The results of the laboratory tests are included in Appendix B and are summarized for each stratum in the following section of this report. Selected test results are also shown on the boring logs in Appendix A.

SITE GEOLOGY AND SUBSURFACE CONDITIONS

Site Geology

We reviewed publicly available geologic maps, existing geologic data, and information in our files. Based on this review, the geologic stratigraphy at the project site, from the ground surface down, typically consists of Pleistocene Age terrace deposits, the Miocene Age Calvert Formation, and residual soils and rock of the Petersburg granite formation. The terrace deposits are alluvial soils consisting of a mixture of clay, silt, sand, and gravel exhibiting moderate strength and compressibility. The Calvert Formation consists of marine-deposited sediment. These soils exhibit moderate to high strength and low to moderate compressibility. The residual soils are derived from the chemical and physical weathering of the underlying parent material, the Petersburg granite rock.

Generalized Subsurface Stratigraphy

We characterized the following generalized subsurface stratigraphy based on the subsurface exploration and laboratory test data included in the appendices.

Ground Cover:

Three (3) test borings drilled within the existing asphaltic pavement encountered about 2 to 3 inches of asphalt, dense graded aggregate was not encountered below the asphalt. The thickness of this asphalt layer may vary at other locations across the site. The remaining test borings drilled within the unpaved areas encountered approximately 1 to 5 inches of topsoil.

Stratum F: Existing Fill

Undocumented existing fill soils of Stratum F were encountered to depths of about 2 to 18 ft below the existing asphalt and topsoil. These soils were classified as silty to clayey sand (SM, SC), poorly graded sand (SP), and sandy fat to lean clay (CH, CL). Stratum F1 represents the semi-cohesive to cohesionless fill soils, whereas Stratum F2 represents the cohesive fill soil. Samples representing this stratum were found in mixed colors containing root and asphalt fragments. The liquid limits and plasticity

indices of four (4) samples tested in our laboratory ranged from 26 to 40 and 11 to 17, respectively. The SPT N-values recorded in the fill soils ranged from 2 to >50 blows per ft (bpf).

We performed one (1) Standard Proctor Compaction test and one (1) CBR test on the collected bulk sample from Boring P-06. The collected bulk sample consisted of brown to reddish brown clayey sand of Stratum F1. The compaction test resulted in a maximum dry density of 124.5 pcf at an optimum moisture content of 9.8 percent. Natural moisture content values of Stratum F1 soils tested in our laboratory varied from 8 to 23 percent. We obtained a laboratory CBR value of 15.1 with no discernible swell of the sample.

Petroleum/creosote odor was observed in the auger cuttings of Boring B-04 from about a depth of 2 to 10 ft. Photoionization Detector (PID) readings taken from the SPT samples at this depth range were below the measurable limit.

Stratum A: Pleistocene Age Terrace Deposits

Below the fill soils of Stratum F, the test borings encountered terrace deposits consisting of sandy lean to fat clay (CL, CH), silty to clayey sand (SM, SC), sandy elastic silt (MH), clayey to poorly graded gravel GC, GP) and poorly graded sand (SP) with a variable amount of silt and clay. This stratum was subdivided into two (2) sub-strata – Stratum A1 of cohesive soils and Stratum A2 consisting of semi-cohesive to cohesionless soils.

The cohesive soils of Stratum A1 soils were generally of low to high plasticity, having liquid limits of 26 to 61 and plasticity indices of 12 to 35. The natural moisture contents measured were about 13 to 34 percent. The SPT N-values ranged from 5 to 41 bpf.

The semi-cohesive soils of Stratum A2 consisting of silty to clayey sand were generally of very low to medium plasticity, having liquid limits of 28 to 70 and plasticity indices of 11 to 31. The non-plastic cohesionless soils of this stratum were classified as clayey sand and poorly graded sand and gravel with various amount of silt and clay. The natural moisture contents measured were about 7 to 27 percent. The SPT N-values ranged from 1 to >50 bpf.

We performed one (1) one-dimensional consolidation test on a tube sample collected from this stratum. The test results indicated the soils are pre-consolidated to about 2 tsf above existing effective overburden pressure. Estimated compression and recompression ratios are 0.21 and 0.028, respectively. In addition, we performed one (1) unconsolidated undrained (UU) triaxial test on a tube sample collected from this stratum. The compressive strength of the tested sample is 29.8 psi.

Stratum B: Miocene Age Calvert Formation

Stratum B soils were encountered and sampled in five (5) of the test borings at depth of about 28 ft to 37 ft below the ground surface underlying the Stratum A soils. These soils belong to the Miocene Age Calvert Formation and consist of light brown to orangish brown lean to fat clay (CL, CH) soils with variable amounts of sand. The natural moisture contents measured were about 36 to 39 percent. The SPT N-values ranged from 3 to 20 bpf.

Stratum C: Residual Soil

Residual soils were encountered and sampled in eight (8) test borings at depths of about 18 to 39 ft below the existing ground surface. These soils were derived from the chemical and physical weathering of the underlying Petersburg granite rock and were generally encountered underlying the Stratum A soils, with the exception of Borings B-08 and RW-06, where Stratum B overlies this stratum. These soils were classified as brown to black silty to clayey sand (SM, SC) and gray to brown sandy elastic silt (MH). Based on the Standard Penetration Tests performed this stratum was encountered in the borings in loose to very dense conditions with SPT N-values of about 4 to 30 bpf.

Stratum D: Disintegrated Rock

We encountered disintegrated rock of the Petersburg granite formation at a depth of about 38 to 39 ft in two (2) test borings - Borings B-10 and RW-02. In general, disintegrated rock is defined as residual material with SPT N values between 60 blows per foot and refusal. Refusal is defined as an N value of 50 blows for a penetration of one inch or less.

Groundwater

Groundwater was encountered in the test borings at depths of about 14 to 24 ft below the ground surface. Ground water levels on completion of the drilling varied from depths of about 2 to 30 ft. The test boring logs in Appendix A include groundwater observations obtained during our subsurface exploration. These data include depths to groundwater encountered during drilling, upon drilling completion, and following completion of the boring.

We did not obtain long-term water level readings since we backfilled the test borings upon completion for safety. The groundwater levels on the logs indicate our estimate of the hydrostatic water table at the time of our subsurface exploration. The final design should anticipate the fluctuation of the hydrostatic water table depending on variations in precipitation, surface runoff, pumping, evaporation, leaking utilities, and similar factors.

Seismic Site Classification

We evaluated the Seismic Site Class and Seismic Site Coefficients for this project in accordance with ASCE 7-22 *Minimum Design Loads for Buildings and Other Structures*. Our analysis considered Site Class D for this location. This Site Class was evaluated based on SPT N-values extrapolated to a depth of 100 ft.

GEOTECHNICAL RECOMMENDATIONS

We based our geotechnical engineering analysis on the information developed from our subsurface exploration and soil laboratory testing, the project information furnished to our office, and our experience with similar projects.

Detailed structural loads for the proposed school building and other structures were not available. For our analyses, we assumed maximum column and wall loads for the new school building to be in the order of 200 kips and 8 klf, respectively. We also considered the bleachers and field houses will be lightly loaded structures with maximum column load not exceeding 50 kips.

We encountered deep deposits of undocumented fill soils at the project site, especially within the footprint of the proposed school building. The depth of fill varied from about 2 to 18 ft, with deeper fills in the northeastern portion of the proposed school building. These fill soils vary significantly in depth, density, and consistency and thus are unsuitable for direct support of shallow foundations.

We recommend that subsurface conditions within the proposed school building area be improved with Rammed Aggregate Piers (RAPs) in order to utilize shallow spread footings to support the building. The following sections of the report provide our detailed recommendations.

Site Grading and Earthwork

Based on the site grading plans, we understand that both cut and fill operations will be needed to achieve the finished floor elevation of the proposed school building. The finished site grades will require placement of up to 4 ft of compacted structural fill and cut of about 7 ft within the school building footprint. Rough grading of the site should be completed in the building area prior to the installation of the rammed aggregate piers.

We understand that the finished elevations of the new field houses and bleachers will be within 3 ft of the existing grade. We do not anticipate ground improvement will be required as these structures are anticipated to be lightly loaded structures. Recommendations for ground improvement, compacted fill subgrade preparation, fill soil requirements, placement, and compaction criteria are presented in subsequent sections.

Cut and fill slopes on the site may be constructed at 3H:1V or flatter.

Compacted Structural Fill Subgrades

Subgrades to receive compacted structural fill for the buildings or pavement support should be stripped of vegetation, topsoil, and organic matter. Our subsurface exploration indicated topsoil to depths of about 2 to 5 inches below the ground surface.

Compacted structural fill subgrades should consist of suitable soil of Strata F or A. These soils are expected to be encountered at shallow depths beneath the topsoil and root mat.

The Geotechnical Engineer should evaluate the suitability of the fill subgrades. The stripped subgrades should be proofrolled with a loaded dump truck to evaluate the subgrade suitability for support of the compacted structural fill prior to any undercutting or initiation of fill placement. Areas that exhibit excessive pumping, weaving, or rutting should be scarified, dried and recompacted, or undercut and replaced with compacted structural fill as recommended by the Geotechnical Engineer. Subgrade evaluation techniques complementary to proofrolling could include a combination of probing with a penetrometer, drilling hand augers, or observing test pits.

When removal of unsuitable materials is required, the excavation should be performed in a manner to limit disturbance of the underlying suitable material. The excavation should be performed under the observation of the Geotechnical Engineer to evaluate required excavation depths.

Compacted structural fill subgrades should be kept free of ponded water. If springs or other flowing water is present at the compacted structural fill subgrade level, the Contractor should direct water to discharge

beyond the fill limits. Recommendations for discharging springs should be provided by the Geotechnical Engineer.

Compacted structural fill subgrades should be free of snow, ice, and frozen soils. If snow, ice, or frozen soils are present at subgrade levels, these materials should be removed as recommended by the Geotechnical Engineer.

Existing utilities and drainage structures within the proposed building area should be removed and replaced with compacted structural fill.

Compacted structural fill subgrades should not be steeper than about 4H:1V. If steeper slopes are present, subgrades should be benched to permit placement of horizontal lifts of fill.

Compacted Structural Fill

Compacted structural fill and backfill in building and pavement areas should consist of material classifying CL, ML, SC, SM, SP, SW, GC, GM, GP, or GW according to ASTM D2487. In addition, fill materials should not contain particles larger than three inches. On-site soils of Stratum A2 are generally expected to meet these criteria. The fill soils of Stratum A1, F1 and F2 can be re-used as compacted structural fill, provided they meet the requirements mentioned above.

Compacted structural fill should be placed in maximum 8-inch thick horizontal, loose lifts. Fill should be compacted to at least 95 percent of the maximum dry density per ASTM D698 (Standard Proctor). Soil moisture contents at the time of compaction should be within ±2 percent of the soils' optimum moisture content.

Backfill placed in excavations, trenches, and other areas that large compaction equipment cannot access should be placed in maximum 4-inch thick lifts. Backfill should meet the material, placement, and compaction requirements outlined above.

Successful re-use of the excavated on-site soils as compacted structural fill will depend on their natural moisture contents during excavation. Laboratory test results on the collected bulk sample indicate that the natural moisture contents of the surficial soils are at about their optimum moisture contents. Scarifying and drying of these soils should be anticipated to achieve the recommended compaction. Drying of these soils will likely result in some delays. We recommend that the earthwork be performed during the warmer, drier times of the year.

Spread Footings on Rammed Aggregate Piers

The proposed school building can be supported on spread footings provided the footing bearing materials are improved using properly constructed rammed aggregate piers. We recommend footings supported on the aggregate piers be designed for a net allowable soil bearing pressure of 5,000 psf. This allowable bearing pressure provides a factor of safety against general bearing capacity failure of at least 3.0. All footing subgrades should be observed by the Geotechnical Engineer prior to placement of concrete to evaluate if subgrade materials are as anticipated.

Settlements of shallow foundations supported on the rammed aggregate piers are not expected to exceed about one inch. Differential settlements between similarly loaded footings are not expected to exceed about half this value.

Column and wall footings should be at least 24 and 16 inches wide, respectively, for shear considerations. Exterior footings should be founded at least 2 ft below final exterior grades for frost protection. Interior footings may be founded at nominal depths below the floor slabs. Interior footings subject to freezing should be founded at least 2 ft below slab grade. Where bearing grades between adjacent footings vary, the slope between the bottom edges of adjacent footings should not be steeper than 45 degrees (1H:1V).

Ground Improvement with Rammed Aggregate Pier

We recommend the construction of rammed aggregate piers for improving the undocumented fill soils for support of the proposed school building. The installation of the piers should commence after the rough site grading is completed. In this ground improvement technique, the soils are improved by partially removing the compressible soils and replacing them with individual piers of compacted aggregate thus reducing potential for long-term settlement. The typical construction process is as follows:

- Drill a hole.
- Place a bottom bulb of open-graded stone (typically VDOT No. 57) in the bottom of the shaft.
- Compact the bottom bulb with repeated strokes with a hydraulic ram.
- Form the pier shaft on the bottom bulb by repeatedly placing lifts of dense-graded aggregate (typically VDOT No. 21B) and compacting each lift with the hydraulic ram until the pier reaches the ground surface.

The rammed aggregate pier program, including pier diameter, depth and spacing, is normally designed by the Contractor. The program should be designed to limit total foundation settlements to 1 inch and differential settlements to ½ inch. The Geotechnical Engineer should be retained to review the design for conformance with our recommendations. The rammed aggregate pier program should include a Quality Control Plan. The quality control plan should include conducting at least one modulus load test on an individual pier.

The Geotechnical Engineer should be retained to monitor the pier installer's operations as a Quality Assurance (QA) service. Our services will supplement the installer's internal Quality Control (QC) program. Together, the QA and QC programs will monitor drill depths, pier element lengths, average lift thickness, installation procedures, aggregate quality, and densification of lifts. These items should be documented for each pier installed to provide a complete installation report.

Footings Supporting Ancillary Structures

Footings supporting the proposed field houses, the bleachers and the retaining wall adjacent to the track and field can be designed for a net allowable soil bearing pressure of 2,500 psf. Rammed aggregate piers are not required for these structures. However, lowering footings to suitable natural soils or undercutting and replacement of unsuitable existing fill or natural soils may be required. If the maximum column loads for these structures exceeds 50 kips, we should be retained to contacted to provide revised foundation recommendations for these structures.

Borings B-01 through B-04 and RW-07 were drilled for these structures. Existing fill was encountered to depths of 2 to 7 ft in the area of these structures. High plasticity fat clay was encountered in Boring B-01 below a depth of 4 ft. High plasticity fat clay soils and existing fill soils are not considered suitable for direct support of footings in these areas.

Accordingly, we recommend undercutting the footing subgrades to expose suitable natural soils or to a minimum depth of 2 ft where existing fill soils are present. The geotechnical engineer should perform hand augers and dynamic cone penetrometer tests to evaluate the suitability of any existing fill remaining in place below the undercut depth. Additional undercut could be needed depending on the suitability of the remaining existing fill.

Undercut excavations should be laterally over excavated at least 12 inches on all sides of the footing and backfilled with compacted structural fill or 200 psi flowable fill. If additional footing concrete is used to backfill undercuts, then lateral over-excavation would not be needed. Open graded crushed stone such as VDOT No. 57 aggregate should not be used to backfill undercut excavations because water can collect in this material and soften the footing subgrades.

Settlements of shallow foundations supported as described above are not expected to exceed about one inch. Differential settlements between similarly loaded footings are not expected to exceed about half this value. Footing dimension and depth requirements for these footings are the same as those described above for the school building footings.

Retaining Walls

We understand that two retaining walls are planned for the site development. The proposed retaining walls will be located at the southeast corner of the site along the property boundary near Midlothian Turnpike and along the east side of the track and football field. The following sections includes our recommendations for the proposed retaining walls.

Top-Down Retaining Wall – Along Property Boundary Near Midlothian Turnpike

We understand that a retaining wall will be constructed at the southeast corner of the project site along the property boundary near Midlothian Turnpike. Due to the proximity to the property boundary and limited area to excavate behind the retaining wall, we understand this wall will be constructed top-down. Retaining walls can be categorized as top-down or bottom-up construction. Top-down walls are typically excavated in stages, and each stage includes excavation, installation of structural elements, and installation of facing. The structural elements are typically tiebacks or soil nails, and the facing can be precast concrete or wooden lagging, shotcrete, cast-in-place concrete, etc. The type of facing and structural elements are selected based on the type of retained soils, the configuration of the site (available workspace), the depth of the cut, and similar factors. Top-down walls are typically constructed by specialty contractors and have unique design procedures.

Bottom-up construction is more traditional and includes Mechanically Stabilized Earth (MSE) Walls, gravity walls, reinforced concrete cantilever walls, etc. Bottom-up walls are often designed for construction by unspecialized contractors and can be less expensive. However, in cut scenarios, the construction of a bottom-up wall will include larger excavations. In addition to the area in front of the wall, some volume behind the wall will have to be excavated to facilitate the construction of the wall footing or reinforced zone. On this site, the larger lateral extent of the excavation would require excavation beyond

the school property and extend into Midlothian Turnpike and residential properties, therefore a bottom-up constructed wall is not feasible.

Schnabel is designing the and preparing plan sets for the top-down construction of this wall under a separate contract. Based on the wall heights, site conditions and coordination with the architect, we designing a soldier pile and lagging wall to retain the embankment without tie-backs or alternative anchoring. Constructing a soldier pile and lagging wall includes driving or drilling and placing piles along the wall alignment prior to excavation. After installation, the piles resist the potential lateral earth movement, and soil can be excavated in front of and between the piles, and lagging is installed to support the vertical cut. The pile size depends on the wall height, soil properties, and allowable deflections along the wall face. The type and size of lagging will depend on the span between piles, the magnitude of the expected earth pressure, the design life of the wall, etc.

We evaluated global stability of the proposed retaining wall at two (2) sections – A-A' and B-B', using data collected during our subsurface exploration and laboratory testing program and the computer program SLOPE/W. We considered a soldier pile and lagging wall to represent the top-down walls. The results of our evaluation are summarized in Table 3 below. The approximate locations of the selected sections are indicated on Figure 2. The results of the global stability analyses for the soldier pile wall are included in Appendix C of this report. The internal stability of the wall is considered in the design under our separate contract.

Table 3: Summary of Retaining Wall Global Stability

Wall Type	Section	Factor of Safety (FS)
Soldier Pile and Lagging	A – A'	2.9
	B – B'	3.2

Based on our evaluation, the potential failure surfaces for Section B-B' will most likely extend into the VDOT RoW. Therefore, we considered the stability requirements included in Chapter III of the VDOT Materials Manual of Instructions and VDOT Memorandum MD 340-10 Slope Stability Requirements. The requirements in these manuals indicate the factor of safety for the embankment slope should be at least 1.5.

Bottom-Up Retaining Wall – East Side of Track and Field

We understand that a site retaining wall is planned west of the new school building, along the east side of the track and field. The proposed retaining wall will be approximately 380 lf long and up to about 6 ft tall. We anticipate the proposed wall to be a cantilevered or gravity retaining wall. The wall should be designed considering the equivalent fluid pressure factors presented in the Table 2 below for respective backfill conditions. Where applicable, the design of the wall should also include additional lateral loads due to surcharge and live loads. The surcharge pressure ordinate should be obtained by multiplying the surface surcharge pressure, q, by the factor in the table below for the respective backfill condition. Horizontal forces on the wall should be resisted by friction acting on the base of the wall and passive earth pressure acting on the front of the wall foundation.

Table 2: Recommended Site Retaining Wall Design Parameters

Backfill Materials	Equivalent Fluid Pressure Factor γ_A	Surcharge Pressure Factor	Friction Factor	Passive Equivalent Fluid Pressure Factor γ_P
On-site	40H	0.36	0.35	360H
Free-draining	32H	0.28	0.35	400H

The above parameters consider a horizontal ground surface behind and in front of the walls and are applicable if the backfill behind the wall extends to a minimum distance equal to the wall height. For sloping backfill, the lateral earth pressure values would be significantly higher. We should be contacted to provide alternative parameters if sloping ground surface conditions are anticipated.

The above design parameters do not consider hydrostatic pressure since we recommend permanent subdrainage behind the walls to prevent the development of hydrostatic pressures. Subdrainage should consist of perimeter subdrains located on top of the wall footing, next to the wall. Subdrains should consist of four-inch slotted, corrugated polyethylene tubing according to ASTM F405 surrounded by at least six inches of filter drainage material. Filter material should consist of VDOT No. 78 aggregate. A drainage geotextile should wrap around the drainage material to help reduce transporting of fine-grained particles into the subdrainage system. Drainage geotextile should consist of a non-woven geotextile such as Mirafi 140N or equivalent. Subdrains should drain by gravity to an outlet or storm sewer. Wall subdrainage may be provided using weepholes when free-draining backfill is used. Weepholes should be four inches in diameter and installed on 10- ft centers. A filter plug consisting of at least one cubic foot of filter drainage material wrapped in drainage geotextile should be placed at the back of each weephole.

On-site materials used for backfill should consist of material classifying CL, ML, SC, SM, SP, SW, GP, or GW according to ASTM D2487. Backfill materials for walls designed considering free-draining backfill materials should consist of non-plastic material classifying SP-SM, SW-SM, SP, SW, GW-GM, GP-GM, GP or GW according to ASTM D2487. This classification includes open-graded crushed stone such as VDOT No. 78 or No. 57. Free-draining backfill should be placed in the zone extending from the base of the wall upwards at 45 degrees. The Contractor should place backfill in maximum 6-inch thick loose lifts, and compact each lift to at least 95 percent of maximum dry density according to ASTM D698 (Standard Proctor). The Contractor should place open-graded crushed stone backfill in maximum 12-inch thick lifts, and compact each lift using suitable vibratory equipment. Only light hand-operated equipment should be used to compact backfill against walls. The Structural Engineer of Record should approve the size of the compaction equipment.

Floor Slabs

The proposed floor slabs should be supported on compacted structural fill soils. A modulus of subgrade reaction, k, of 150 pci should be used in the design of floor slabs. The recommended modulus value is for a 1-ft-square plate. Some slab design software may consider different definitions of k for input. The Structural Engineer should contact our office if their software considers a different definition of k.

A four-inch crushed stone or washed gravel capillary moisture barrier should underlie floor slabs on grade. Moisture barrier material should consist of VDOT (AASHTO) No. 57 crushed stone. The

Contractor should compact the stone in place with at least two passes of suitable vibratory compaction equipment.

The Contractor should compact floor slab subgrades to repair any disturbance that may occur due to construction operations before placing capillary moisture barrier materials. Since floors will be slab-on-grade, footing and utility excavations should be backfilled with compacted structural fill as defined in the Site Grading and Earthwork section of this report.

Pavements

The Contractor should prepare pavement subgrades and place compacted structural fill for pavement support as described in the Site Grading and Earthwork section of this report. Dense-graded aggregate placed as pavement base course should be compacted to at least 95 percent of maximum dry density according to ASTM D698, Standard Proctor. Dense-graded aggregate should be placed in maximum 8-inch thick loose lifts.

Final pavement subgrades should be proofrolled under the observation of the Geotechnical Engineer immediately prior to placing subbase or base coarse aggregate to evaluate their suitability to support the pavement.

We developed the recommended pavement sections according to the AASHTO 1993 design method for flexible pavements based on a design CBR value of 5. This CBR value has been reduced to account for the presence of higher plasticity existing fill and natural soils that will likely be present at pavement subgrade level on portions of the site.

Design traffic type and volume were not provided to us. The traffic volumes considered in our analysis are 1,200 vehicles per day in the driveways and service roadways, and 200 vehicles per day in automobile parking spaces. These traffic volumes include less than three percent heavy truck traffic.

Our analysis considers that proper grading will be maintained to provide runoff from the pavement surface and beyond the limits of paved areas. We recommend the following pavement sections:

Table 1: Pavement Sections

Type Section	Thickness (inches)
Type 1: Automobile Parking Areas – Type I Section	
Asphalt Concrete Surface Course, VDOT SM-9.5A	1.5
Asphalt Concrete Intermediate Course, VDOT IM-19.0A	2.0
Dense-Graded Aggregate Base Course, VDOT 21B	6.0
Type II: Bus Loop and Service Roadways – Type II Section	
Asphalt Concrete Surface Course, VDOT SM-9.5A	1.5
Asphalt Concrete Intermediate Course, VDOT IM-19.0A	2.0
Asphalt Concrete Base Course, VDOT BM-25.0A	2.5
Dense-Graded Aggregate Subbase Course, VDOT 21B	6.0

The Type I Section should be used only in automobile parking areas. The Type II Section should be used where truck and bus traffic or high traffic volumes are anticipated.

We recommend that reinforced concrete pavement be used in dumpster pad and dumpster approach pad areas. These pads should be designed based on a modulus of subgrade reaction value, k, of 120 pci. The recommended modulus value is for a 1-ft-square steel plate. Some pavement design software may consider different definitions of k for input. The Civil Engineer should contact our office if their software considers a different definition of k.

Adequate control of surface drainage will be a very important consideration for the overall performance of this pavement design. The area surrounding pavements should be graded to direct surface water away from paved areas. Utility excavations within pavement areas should be backfilled with compacted structural fill.

We recommend providing pavement subdrains or drainage ditches in cut areas where grades slope toward the pavement. The invert grade of ditches should be at least one foot below the pavement subgrade level. Pavement subdrains should discharge into a ditch or into a storm sewer.

CONSTRUCTION CONSIDERATIONS

Site Grading and Earthwork

The test boring data indicate the approximate depth of topsoil based on our visual identification procedures. The depth of stripping needed to provide a suitable base for placement of earthwork or pavements may include topsoil and other softer surficial layers. Stripping depths in wooded or previously cultivated areas will be greater, particularly during periods of wet weather. The depth of required stripping should be determined by the excavation Contractor prior to construction using test pits, probes, or other means.

The on-site soils are susceptible to moisture changes, will be easily disturbed, and will be difficult to compact under wet weather conditions. Drying and reworking of the soils are likely to be difficult during periods of wet months. We recommend that the earthwork phases of this project be performed during the warmer, drier times of the year to limit the potential for disturbance of on-site soils.

Traffic on stripped or undercut subgrades should be limited to reduce disturbance of underlying soils. Also, using lightweight, track-mounted dozer equipment for stripping will limit the disturbance of underlying soils, and may reduce the undercut volume needed. The Contractor should provide site drainage to maintain subgrades free of water and to avoid saturation and disturbance of the subgrade soils before placing compacted structural fill, pavement base course or moisture barrier material. This site drainage will be important during all phases of the construction work. The Contractor should be responsible for reworking of subgrades and compacted structural fill that were initially considered suitable but were later disturbed by equipment and/or weather.

Spread Footings

The Contractor should exercise care during excavation for spread footings so that as little disturbance as possible occurs at the foundation level. The Contractor should carefully clean loose or soft soils from the bottom of the excavation before placing concrete. A Geotechnical Engineer from our firm should observe footing subgrades prior to concrete placement to evaluate whether subgrade soils are as anticipated in this report.

Footing subgrades needing undercut may be concreted at the elevation of undercut or backfilled as described in the Spread Footing section of this report. Placement of concrete should take place the same day as excavation of footings.

The potential for variation of moisture content in foundation soils is probably greatest during construction. If the moisture content of foundation soils increases or decreases during construction, a moisture-related change in volume will likely occur as these soils return to their natural moisture content. Therefore, prompt placement of concrete, backfilling, and grading are very important for proper foundation performance.

Ground water or surface water could accumulate in the footing excavations prior to placing concrete. We anticipate that pumping from sump pits within the footing excavations can control groundwater.

Engineering Services During Construction

The engineering recommendations provided in this report are based on the information obtained from the subsurface exploration and laboratory testing. However, conditions on the site may vary between the discrete locations observed at the time of our subsurface exploration. The nature and extent of variations between borings may not become evident until during construction.

To account for this variability, we should provide professional observation and testing of subsurface conditions revealed during construction as an extension of our engineering services. These services will also help in evaluating the contractor's conformance with the plans and specifications in accordance with building code requirements. Because of our unique position to understand the intent of the geotechnical engineering recommendations, retaining Schnabel for these services will allow the owner to receive consistent service throughout the project construction.

General Specification Recommendations

An allowance should be established to account for possible additional costs that may be required to construct earthwork and foundations as recommended in this report. Additional costs may be incurred for a variety of reasons including variation of soil between borings, greater than anticipated unsuitable fill soils, need for borrow fill material, wet on-site soils, obstructions, temporary dewatering etc.

We recommend that the construction contract include unit prices for scarifying and drying wet and/or loose subgrade soils, and provide an allowance for this work. In addition, the construction contract should include an allowance for undercutting soft or loose, near-surface fill soils, and replacement with compacted structural fill. Add/deduct unit prices should also be established in the contract so adjustments can be made for the actual volume of materials handled.

The project specifications should indicate the Contractor's responsibility for providing adequate site drainage during construction. Inadequate drainage will most likely lead to disturbance of soils by construction traffic and increased volume of undercut.

This report may be made available to prospective bidders for informational purposes. We recommend that the project specifications contain the following statement:

> *Schnabel Engineering, LLC has prepared this geotechnical engineering report for this project. This report is for informational purposes only and is not part of the contract documents. The opinions expressed represent the Geotechnical Engineer's interpretation of the subsurface conditions, tests, and the results of analyses performed. Should the data contained in this report not be adequate for the Contractor's purposes, the Contractor may make, before bidding, independent exploration, tests and analyses. This report may be examined by bidders at the office of the Owner, or copies may be obtained from the Owner at nominal charge.*

Additional data and reports prepared by others that could have an impact upon the Contractor's bid should also be made available to prospective bidders for informational purposes.

LIMITATIONS

We based the analyses and recommendations submitted in this report on the information revealed by our exploration. We attempted to provide for normal contingencies, but the possibility remains that unexpected conditions may be encountered during construction.

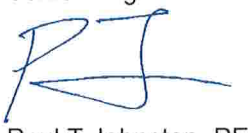
This report has been prepared to aid in the evaluation of this site and to assist in the design of the project. It is intended for use concerning this specific project. We based our recommendations on information on the site and proposed construction as described in this report. Substantial changes in loads, locations, or grades should be brought to our attention so we can modify our recommendations as needed. We would appreciate an opportunity to review the plans and specifications as they pertain to the recommendations contained in this report, and to submit our comments to you based on this review.

We have endeavored to complete the services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied, is included or intended, and no warranty or guarantee is included or intended in this report, or other instrument of service.

We appreciate the opportunity to be of service for this project. Please call us if you have any questions regarding this report.

Sincerely,
SCHNABEL ENGINEERING, LLC

Dipta M Joy, PE
Senior Engineer



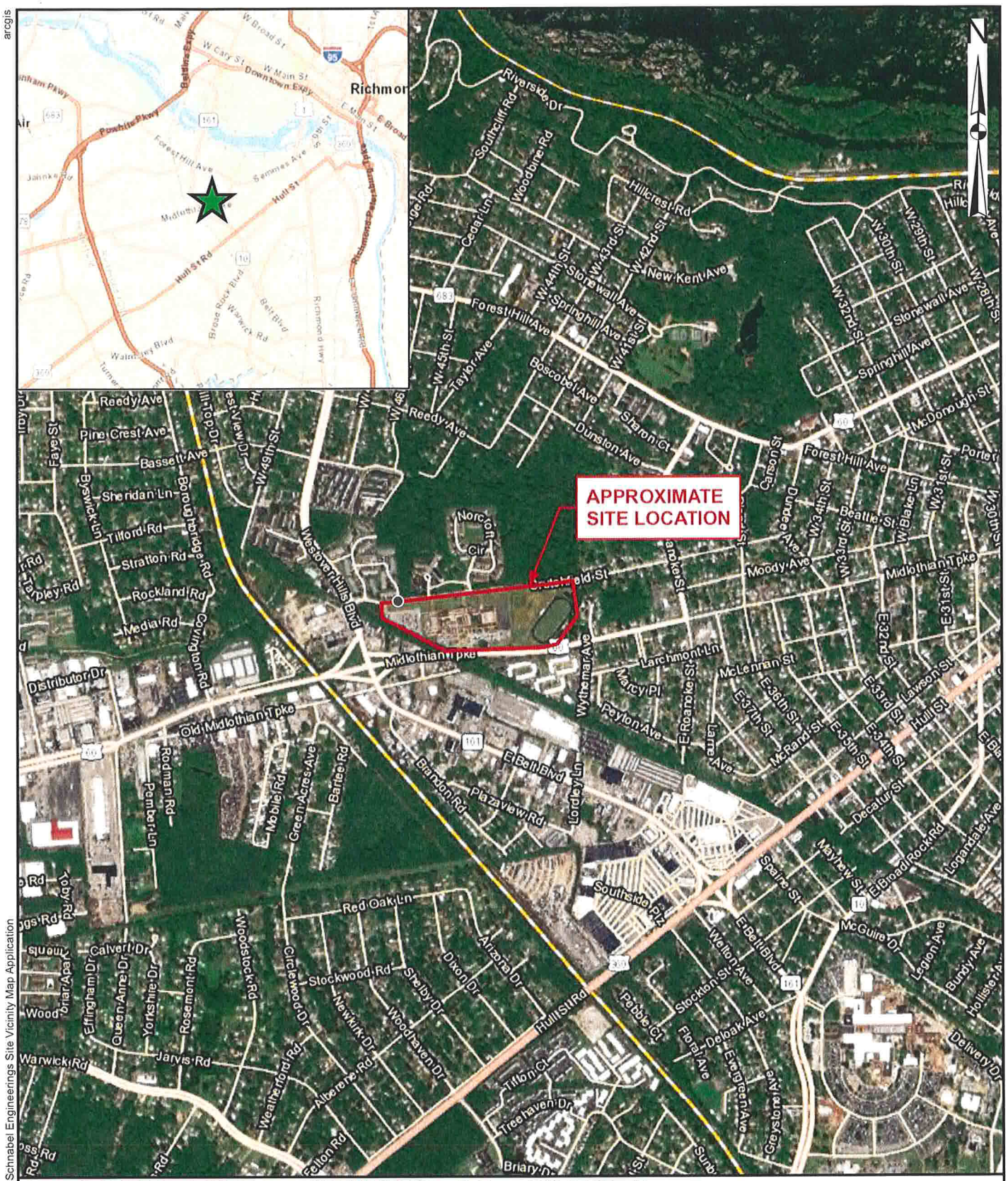
Paul T Johnston, PE
Associate

DMJ:EGD:PTJ:dah

Figures
Appendix A: Subsurface Exploration Data
Appendix B: Soil Laboratory Test Data
Appendix C: Retaining Wall Stability Analyses Output

FIGURES

Figure 1: Site Vicinity Map
Figure 2: Boring Location Plan
Figures 3A-3D: Fence Diagrams



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Projection: WGS 1984 Web Mercator Auxiliary Sphere

NOT TO SCALE

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4314 CRUTCHFIELD STREET RICHMOND, VIRGINIA

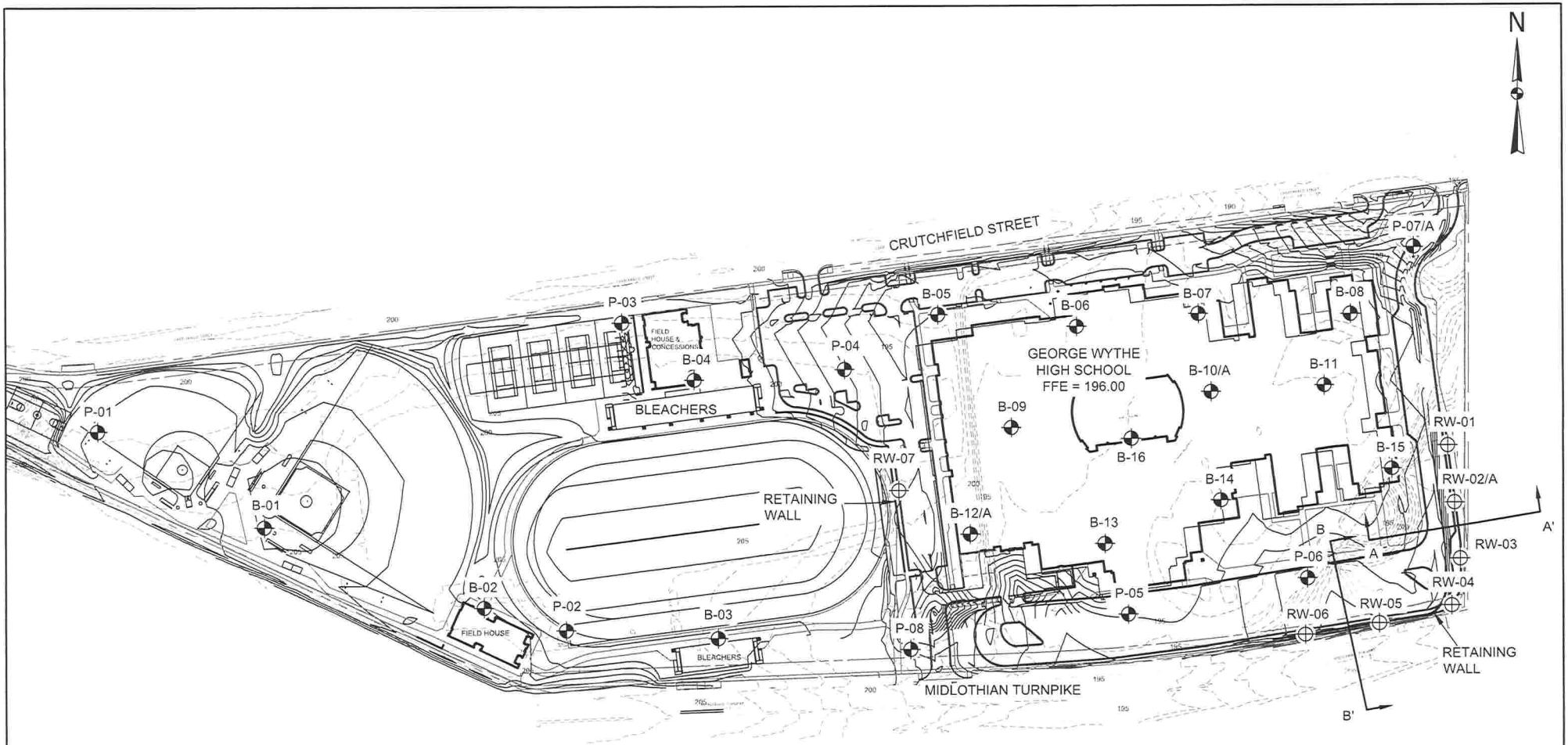
PROJECT NO. 22130254

SITE VICINITY MAP

FIGURE 1

7/21/2022 This Map was Created In Schnabel Engineerings Site Vicinity Map Application

arcgis



LEGEND

- APPROXIMATE RETAINING WALL BORING LOCATION
- APPROXIMATE PREVIOUS BORING LOCATION (2022)

SCALE: 1"=150'
0 150' 300'

Base Plan Provided by RRMM Architects and VHB on February 7, 2023.

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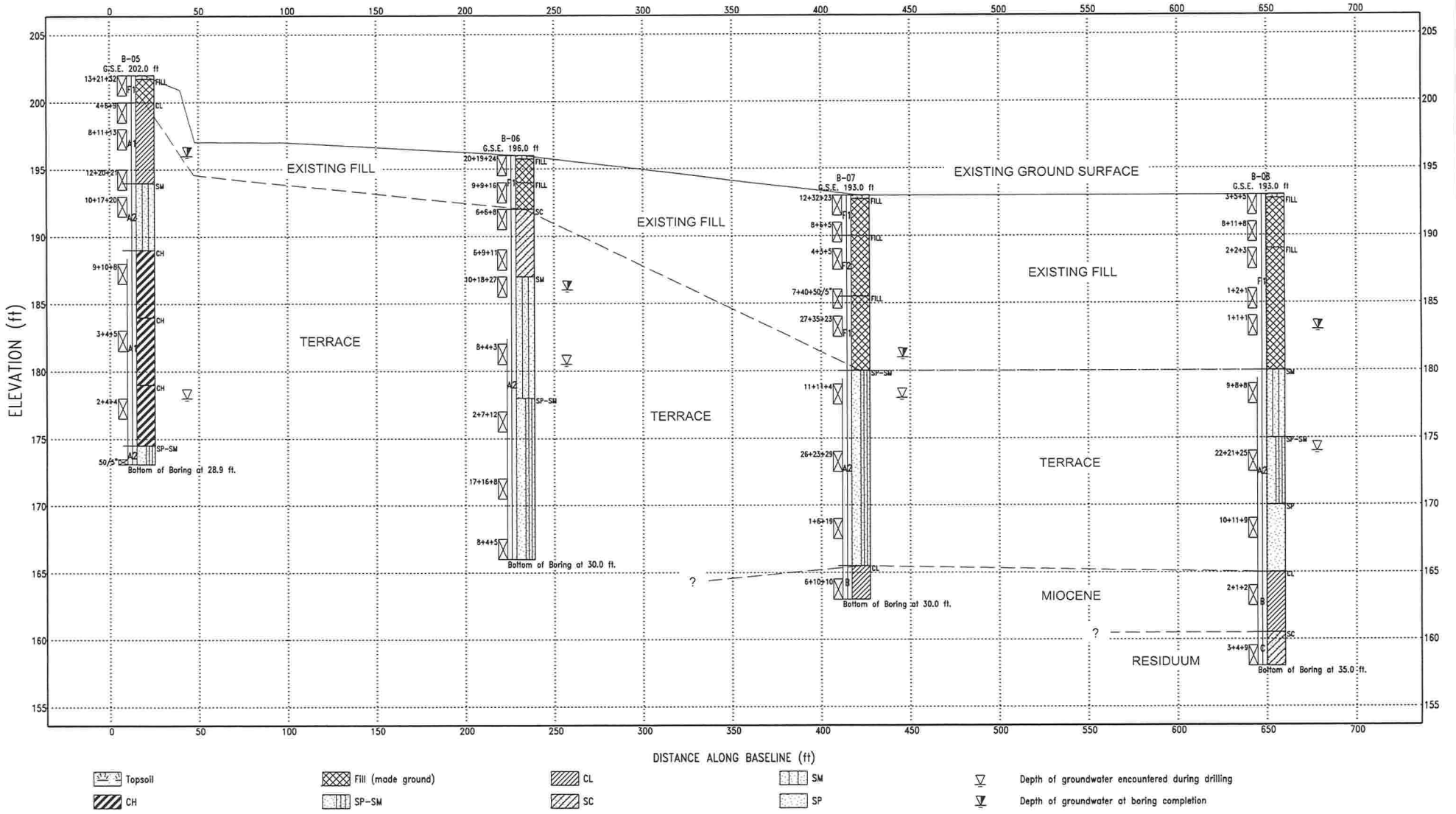
Figure Name:	Done:	Figure Number:
BORING LOCATION PLAN	E. WALSH	2
Project Number:	Reviewed:	Date:
22130254	P. JOHNSTON	APR 2023



Notes:
1) Not To Scale.
2) Ground surface elevation based on survey data.

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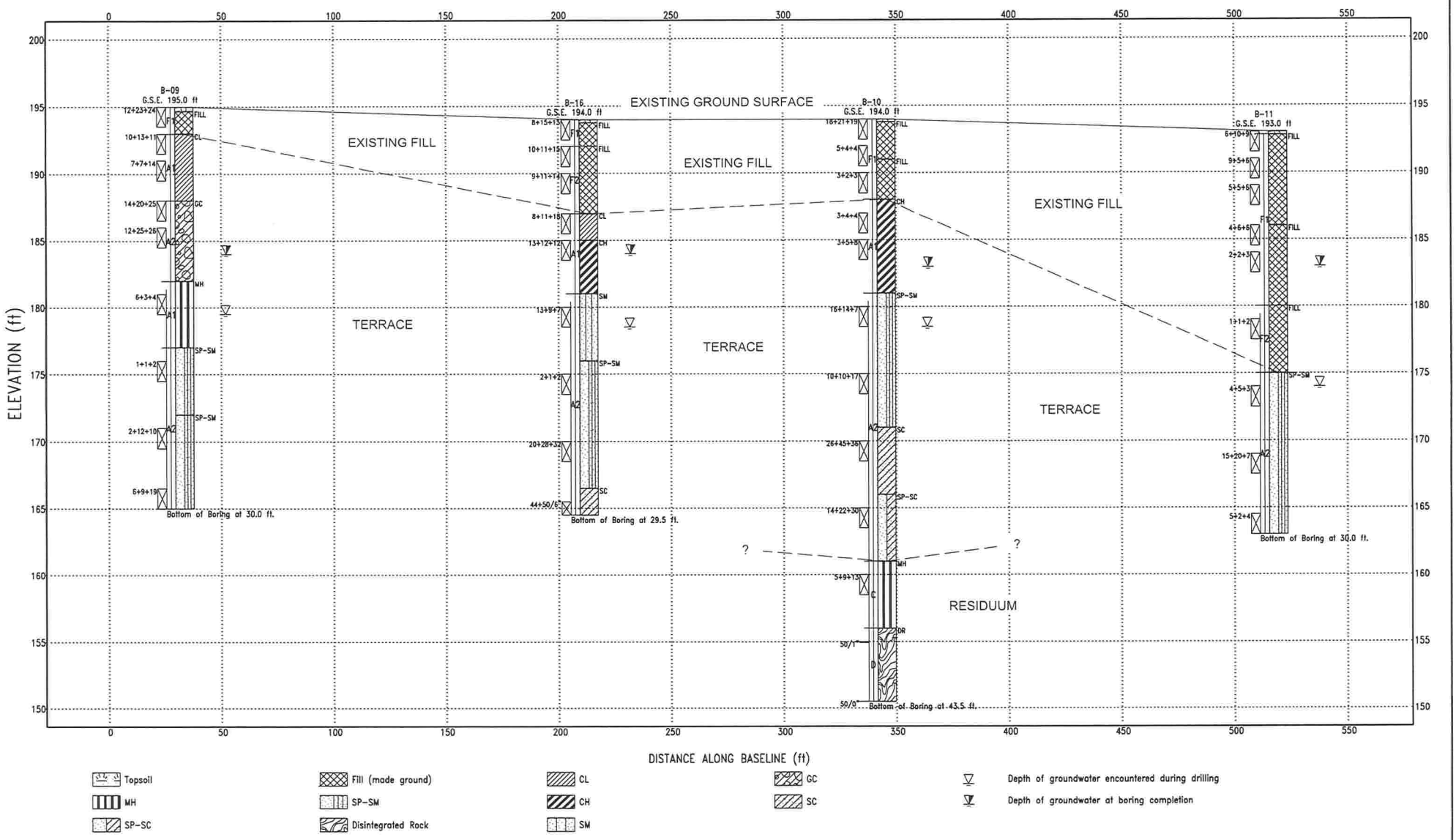
Figure Name:	Done:	Figure Number:
FENCE DIAGRAM	E. WALSH	3A
Project Number:	Reviewed:	Date:
22130254.000	P. JOHNSTON	APR 2023



Notes:
1) Not To Scale.
2) Ground surface elevation based on survey data.

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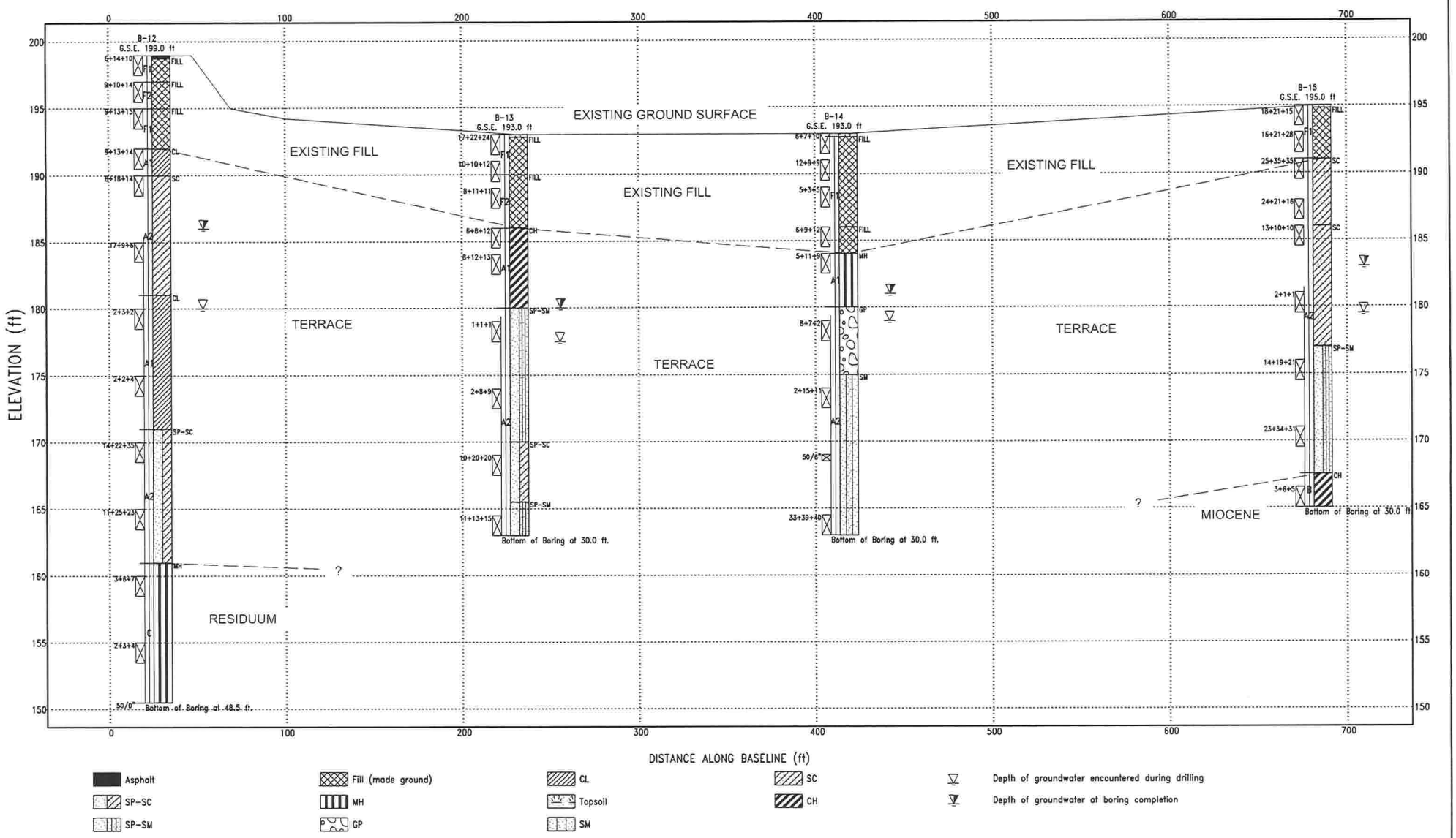
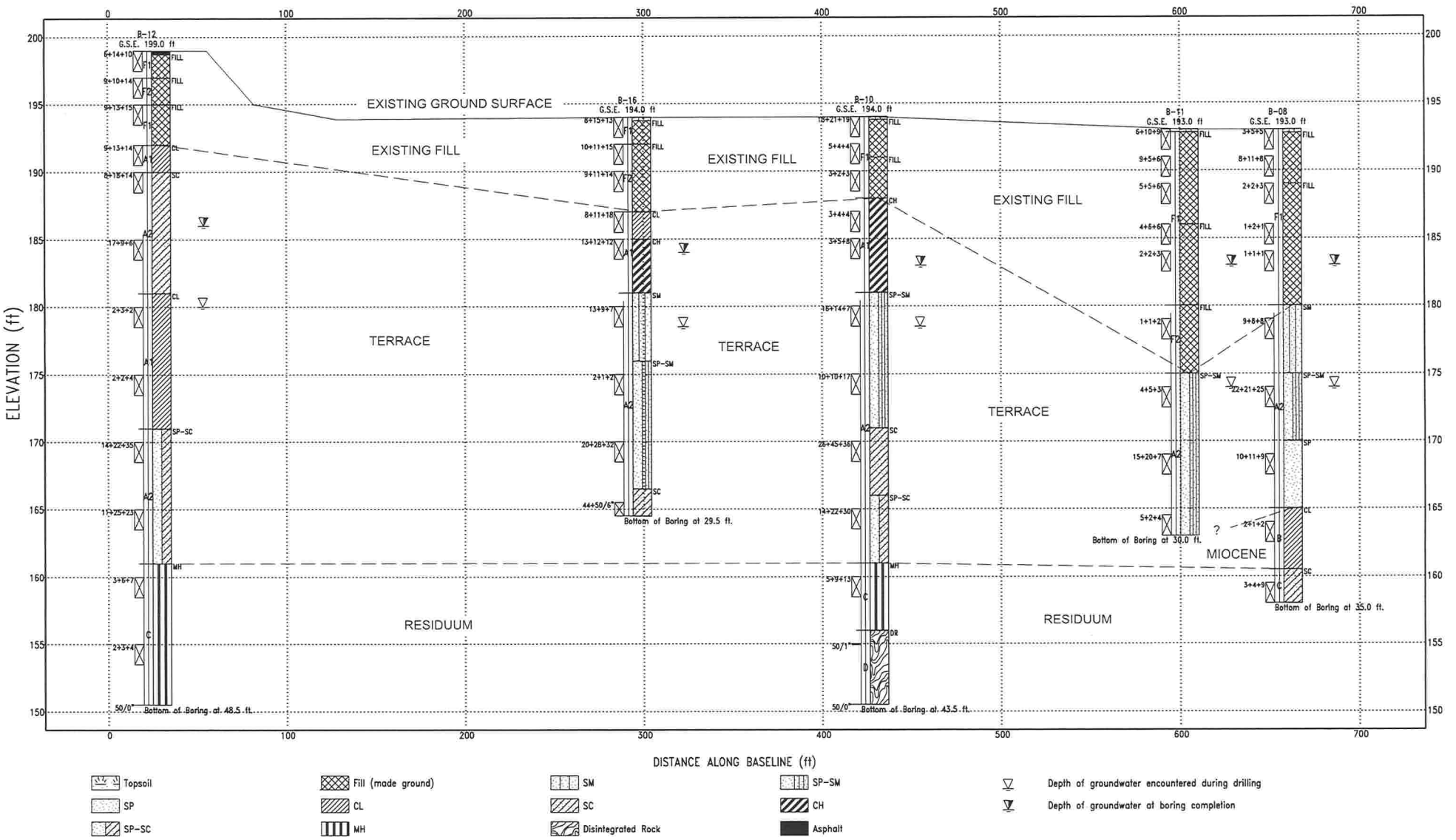
Figure Name:	Done:	Figure Number:
FENCE DIAGRAM	E. WALSH	3B
Project Number:	Reviewed:	Date:
22130254.000	P. JOHNSTON	APR 2023



Notes:
1) Not To Scale.
2) Ground surface elevation based on survey data.

Schnabel ENGINEERING	GEORGE WYTHE HIGHSCHOOL 4314 CRUTCHFIELD STREET RICHMOND, VIRGINIA	Figure Name: FENCE DIAGRAM	Done: E. WALSH	Figure Number: 3C
		Project Number: 22130254.000	Reviewed: P. JOHNSTON	Date: APR 2023



Notes:
1) Not To Scale.
2) Ground surface elevation based on survey data.

Schnabel ENGINEERING	GEORGE WYTHE HIGHSCHOOL 4314 CRUTCHFIELD STREET RICHMOND, VIRGINIA	Figure Name: FENCE DIAGRAM	Done: E. WALSH	Figure Number: 3D
		Project Number: 22130254.000	Reviewed: P. JOHNSTON	Date: APR 2023

APPENDIX A

SUBSURFACE EXPLORATION DATA

Subsurface Exploration Procedures
General Notes for Subsurface Exploration Logs
Identification of Soil
Boring Logs - B-01 through B-16, P-01 through P-08, and RW-01 through RW-07

SUBSURFACE EXPLORATION PROCEDURES

Test Borings – Hollow Stem Augers

The borings are advanced by turning a continuous flight auger with a center opening of 2¼ or 3¼ inches. A plug device blocks off the center opening while augers are advanced. Cuttings are brought to the surface by the auger flights. Sampling is performed through the center opening in the hollow stem auger, by standard methods, after removal of the plug. Usually, no water is introduced into the boring using this procedure.

Hand Augers

Our personnel drilled the hand augers using a three-inch O.D. auger. We visually classified the soils encountered according to ASTM D2488. Geostick penetrometer readings were taken during excavation. Geostick penetrometer readings give a general indication of the soil's in place density or consistency. Geostick penetrations are shown in the Remarks column as "GP= ."

Standard Penetration Test Results

The numbers in the Sampling Data column of the boring logs represent Standard Penetration Test (SPT) results. Each number represents the blows needed to drive a 2-inch O.D., 1⅜-inch I.D. split-spoon sampler 6 inches, using a 140-pound hammer falling 30 inches. The sampler is typically driven a total of 18 or 24 inches. The first 6 inches are considered a seating interval. The total of the number of blows for the second and third 6-inch intervals is the SPT "N value." The SPT is performed according to ASTM D1586.

The SPT samples for borings RW-01 through RW-07 were obtained using a hydraulically driven automatic trip hammer (ATH). Most correlations with SPT data are based on N-values collected with a safety hammer. The energy applied to the split-spoon sampler using the ATH is about 33 percent greater than that applied using the safety hammer, resulting in lower N-values. The hammer blows shown on the boring logs are uncorrected for the higher energy. However, we correct SPT N values for the higher energy when using N values in our analyses.

Soil Classification Criteria

The group symbols on the logs represent the Unified Soil Classification System Group Symbols (ASTM D2487) based on visual observation and limited laboratory testing of the samples. Criteria for visual identification of soil samples are included in this appendix. Some variations can be expected between samples visually classified, and samples classified in the laboratory.

Residual soils are derived through the in-place physical and chemical weathering of the underlying rock. Disintegrated rock is defined as residual material with SPT N values between 60 blows per foot and refusal. Refusal is defined as an N value of 50 blows for a penetration of one inch or less.

Pocket Penetrometer Results

The values following "PP=" in the sampling data column of the logs represent pocket penetrometer readings. Pocket penetrometer readings provide an estimate of the unconfined compressive strength of fine-grained soils.

Test Borings and Elevations

Borings locations were staked by us and located using sub-meter GPS equipment. Approximate boring locations are shown on Figure 2. Ground surface elevations at the boring locations were estimated from the site topographic plans and are indicated on the boring logs. Locations and elevations should be considered no more accurate than the methods used to determine them.

GENERAL NOTES FOR SUBSURFACE EXPLORATION LOGS

1. Numbers in sampling data column next to Standard Penetration Test (SPT) symbols indicate blows required to drive a 2-inch O.D., 1⅜-inch I.D. sampling spoon 6 inches using a 140 pound hammer falling 30 inches. The Standard Penetration Test (SPT) N value is the number of blows required to drive the sampler 12 inches, after a 6-inch seating interval. The Standard Penetration Test is performed in general accordance with ASTM D1586.
2. Visual classification of soil is in accordance with terminology set forth in "Identification of Soil." The ASTM D2487 group symbols (e.g., CL) shown in the classification column are based on visual observations.
3. Estimated water levels indicated on the logs are only estimates from available data and may vary with precipitation, porosity of the soil, site topography, and other factors.
4. Refusal at the surface of rock is defined as an SPT resistance of 50 blows for 1 inch or less of penetration.
5. The logs and related information depict subsurface conditions only at the specific locations and at the particular time when drilled or excavated. Soil conditions at other locations may differ from conditions occurring at these locations. Also, the passage of time may result in a change in the subsurface soil and water level conditions at the subsurface exploration location.
6. The stratification lines represent the approximate boundary between soil and rock types as obtained from the subsurface exploration. Some variation may also be expected vertically between samples taken. The soil profile, water level observations and penetration resistances presented on these logs have been made with reasonable care and accuracy and must be considered only an approximate representation of subsurface conditions to be encountered at the particular location.
7. Key to symbols and abbreviations:

S-01, SPT	Sample No., Standard Penetration Test
4+6+10	Number of blows in each 6-inch increment

UD-01, UNDIST	Sample No., 3" Undisturbed Tube Sample
Rec=16", 67%	Recovery in inches, Percent Recovery

S-01, SAMPLE	Sample No., Hand Auger or Test Pit sample

LL	Liquid Limit
MC	Moisture Content (percent)
PL	Plastic Limit
PP	Pocket Penetrometer Reading (tsf)
%Passing#200	Percent by weight passing a No. 200 Sieve
GP	Geostick Penetration Reading (inches)
PID	Photoionization Detector Reading (ppm)

IDENTIFICATION OF SOIL

I. DEFINITION OF SOIL GROUP NAMES (ASTM D2487)

			SYMBOL	GROUP NAME
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels – More than 50% of coarse fraction retained on No. 4 sieve Coarse, ¾" to 3" Fine, No. 4 to ¾"	Clean Gravels Less than 5% fines	GW	WELL GRADED GRAVEL
			GP	POORLY GRADED GRAVEL
		Gravels with fines More than 12% fines	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	Sands – 50% or more of coarse Fraction passes No. 4 sieve Coarse, No. 10 to No. 4 Medium, No. 40 to No. 10 Fine, No. 200 to No. 40	Clean Sands Less than 5% fines	SW	WELL GRADED SAND
			SP	POORLY GRADED SAND
		Sands with fines More than 12% fines	SM	SILTY SAND
			SC	CLAYEY SAND
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays – Liquid Limit less than 50 Low to medium plasticity	Inorganic	CL	LEAN CLAY
			ML	SILT
		Organic	OL	ORGANIC CLAY
				ORGANIC SILT
	Silts and Clays – Liquid Limit 50 or more Medium to high plasticity	Inorganic	CH	FAT CLAY
			MH	ELASTIC SILT
		Organic	OH	ORGANIC CLAY
				ORGANIC SILT
Highly Organic Soils	Primarily organic matter, dark in color and organic odor		PT	PEAT

II. DEFINITION OF SOIL COMPONENT PROPORTIONS (ASTM D2487)

			Examples
Adjective Form	GRAVELLY SANDY	>30% to <50% coarse grained component in a fine-grained soil	GRAVELLY LEAN CLAY
	CLAYEY SILTY	>12% to <50% fine grained component in a coarse-grained soil	SILTY SAND
"With"	WITH GRAVEL WITH SAND	>15% to <30% coarse grained component in a fine-grained soil	FAT CLAY WITH GRAVEL
	WITH GRAVEL WITH SAND	>15% to <50% coarse grained component in a coarse-grained soil	POORLY GRADED GRAVEL WITH SAND
	WITH SILT WITH CLAY	>5% to <12% fine grained component in a coarse-grained soil	POORLY GRADED SAND WITH SILT

III. GLOSSARY OF MISCELLANEOUS TERMS

SYMBOLS ..... Unified Soil Classification Symbols are shown above as group symbols. A dual symbol "-" indicates the soil belongs to two groups. A borderline symbol "/" indicates the soil belongs to two possible groups.

FILL..... Man-made deposit containing soil, rock and often foreign matter.

PROBABLE FILL..... Soils which contain no visually detected foreign matter but which are suspect with regard to origin.

DISINTEGRATED ROCK (DR)..... Residual materials with a standard penetration resistance (SPT) between 60 blows per foot and refusal. Refusal is defined as a SPT of 100 blows for 2" or less penetration.

PARTIALLY WEATHERED ROCK (PWR)..... Residual materials with a standard penetration resistance (SPT) between 100 blows per foot and refusal. Refusal is defined as a SPT of 100 blows for 2" or less penetration.

BOULDERS & COBBLES..... Boulders are considered rounded pieces of rock larger than 12 inches, while cobbles range from 3 to 12 inch size.

LENSES..... 0 to ½ inch seam within a material in a test pit.

LAYERS..... ½ to 12 inch seam within a material in a test pit.

POCKET ..... Discontinuous body within a material in a test pit.

MOISTURE CONDITIONS..... Wet, moist or dry to indicate visual appearance of specimen.

COLOR ..... Overall color, with modifiers such as light to dark or variation in coloration.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-01**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/15/22 **Finished:** 7/15/22
Location: See Location Plan

Ground Surface Elevation: 204± (ft) **Total Depth:** 20.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/15	---	15.5'	---	---
Completion ▼	7/15	---	8.0'	---	---
Casing Pulled	7/15	---	Dry	---	2.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Asphalt; 2 inches		203.8					
	SANDY LEAN CLAY; moist, reddish brown	CL		A1		S-01, SPT 4+6+10 REC=17", 94%	MC = 22.0% PP = 4.25 tsf	TERRACE
2.0	SILTY SAND, fine to coarse grained sand; moist, reddish brown	SM	202.0	A2		S-02, SPT 8+14+14 REC=18", 100%		
4.0	SANDY FAT CLAY; moist, reddish brown and gray	CH	200.0	A1	5	S-03, SPT 11+14+17 REC=17", 94%	LL = 58 PL = 27 MC = 18.0% % Passing #200 = 79.7 PP = 4.50 tsf	
7.0	SILTY SAND; moist, brown and white, trace gravel ▼	SM	197.0	A2		S-04, SPT 12+29+40 REC=14", 78%		
					10	S-05, SPT 21+31+49 REC=12", 67%		Augers grinding/scraping. Drilling penetration rate slower.
	Change: wet, light brown ▽				15	S-06, SPT 18+10+7 REC=8", 44%		Augers grinding/scraping.
17.5	SILTY SAND, fine to coarse grained sand; wet, brown and black, contains mica	SM	186.5	C				RESIDUUM
20.0			184.0		20	S-07, SPT 6+10+11 REC=9", 50%		

Bottom of Boring at 20.0 ft.
Boring terminated at selected depth.

TEST BORING LOG 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 4/26/23

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-02**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/15/22 **Finished:** 7/15/22
Location: See Location Plan

Ground Surface Elevation: 203± (ft) **Total Depth:** 20.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/15	---	18.5'	---	---
Completion ▼	7/15	---	2.0'	---	---
Casing Pulled	7/15	---	Dry	---	3.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Asphalt; 3 inches		202.8					
	SANDY LEAN CLAY; moist, reddish brown and brown, contains mica ▽	CL		A1		S-01, SPT 8+8+9 REC=12", 67%	PP = 3.25 tsf	TERRACE
	Change: reddish brown and gray					S-02, SPT 16+12+16 REC=15", 83%	MC = 22.5% PP >4.50 tsf	
					5	S-03, SPT 7+13+16 REC=18", 100%	PP >4.50 tsf	
7.0	CLAYEY SAND, fine to coarse grained sand; moist, orangish brown		196.0			S-04, SPT 6+9+15 REC=16", 89%		
	Change: light brown, trace gravel	SC			10	S-05, SPT 8+23+23 REC=17", 94%		
				A2				
					15	S-06, SPT 10+18+20 REC=8", 44%		
17.5	POORLY GRADED SAND WITH SILT AND GRAVEL; wet, light brown ▽	SP-SM	185.5					
					20	S-07, SPT 19+20+20 REC=9", 50%		
20.0			183.0					

Bottom of Boring at 20.0 ft.
Boring terminated at selected depth.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-03**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/14/22 **Finished:** 7/14/22
Location: See Location Plan

Ground Surface Elevation: 203± (ft) **Total Depth:** 20.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/14	---	15.5'	---	---
Completion	7/14	---	Dry	---	---
Casing Pulled	7/14	---	Dry	---	11.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Topsoil; 2 inches	FILL	202.8	F1		S-01, SPT 7+16+20 REC=12", 67%		FILL
2.0	FILL, sampled as silty sand, fine to coarse grained sand; moist, brown, contains root fragments		201.0			S-02, SPT 10+5+7 REC=12", 67%	LL = 46 PL = 26 MC = 12.7% % Passing #200 = 70.6	TERRACE
	SANDY LEAN CLAY; moist, reddish brown	CL		A1	5	S-03, SPT 6+10+13 REC=15", 83%		
7.0	SILTY SAND, fine to coarse grained sand; moist, reddish brown		196.0			S-04, SPT 11+14+13 REC=14", 78%		
					10	S-05, SPT 7+9+12 REC=16", 89%		
		SM		A2				
	Change: wet ▽				15	S-06, SPT 6+6+9 REC=7", 39%		
17.5	POORLY GRADED SAND WITH CLAY AND GRAVEL, fine to coarse grained sand; wet, orangish brown	SP-SC	185.5					
20.0			183.0		20	S-07, SPT 8+13+6 REC=5", 28%		

Bottom of Boring at 20.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-04**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/15/22 **Finished:** 7/15/22
Location: See Location Plan

Ground Surface Elevation: 205± (ft) **Total Depth:** 20.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	7/15	---	Dry	---	---
Completion	7/15	---	Dry	---	---
Casing Pulled	7/15	---	Dry	---	6.5'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 3 inches		204.8					
	FILL, sampled as clayey sand, fine to coarse grained sand; moist, reddish brown, trace gravel Change: reddish brown and gray	FILL		F1		S-01, SPT 6+8+9 REC=14", 78% S-02, SPT 6+6+5 REC=12", 67%	PID = 0 ppm PID = 0 ppm	FILL Strong petroleum/creosote odor from about 2 ft to 10 ft
4.0	FILL, sampled as sandy fat clay; moist, grayish brown	FILL	201.0	F2	5	S-03, SPT 4+8+8 REC=15", 83%	MC = 16.0% PID = 0 ppm PP = 2.75 tsf	
7.0	SILTY SAND, fine to coarse grained sand; moist, brown	SM	198.0		10	S-04, SPT 8+10+10 REC=16", 89% S-05, SPT 6+8+10 REC=16", 89%	PID = 0 ppm PID = 0 ppm	TERRACE
13.5	POORLY GRADED SAND WITH CLAY, fine to coarse grained sand; moist, white	SP-SC	191.5	A2	15	S-06, SPT 13+14+19 REC=14", 78%	PID = 0 ppm	
17.5	POORLY GRADED SAND WITH SILT AND GRAVEL, fine to coarse grained sand; moist, gray and orangish brown	SP-SM	187.5					
20.0			185.0		20	S-07, SPT 16+24+17 REC=9", 50%	PID = 0 ppm	

Bottom of Boring at 20.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-05**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/14/22 **Finished:** 7/14/22
Location: See Location Plan

Ground Surface Elevation: 202± (ft) **Total Depth:** 28.9 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/14	---	24.0'	---	---
Completion ▼	7/14	---	6.0'	---	---
Casing Pulled	7/14	---	Dry	---	2.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 3 inches		201.8					
	FILL, sampled as silty sand, fine to coarse grained sand; moist, reddish brown and gray	FILL		F1		S-01, SPT 13+21+32 REC=14", 78%		FILL
2.0	LEAN CLAY WITH SAND; moist, reddish brown, trace gravel	CL	200.0	A1		S-02, SPT 4+6+9 REC=14", 78%	MC = 21.5% PP = 3.00 tsf	TERRACE Augers grinding/scraping.
					5	S-03, SPT 8+11+13 REC=17", 94%	PP = 3.75 tsf	
						S-04, SPT 12+20+21 REC=7", 39%	MC = 20.7% PP = 2.50 tsf	
8.0	SILTY SAND, fine to coarse grained sand; moist, reddish brown	SM	194.0	A2	10	S-05, SPT 10+17+20 REC=15", 83%	MC = 18.7%	
13.0	SANDY FAT CLAY; moist, brown, trace gravel	CH	189.0		15	S-06, SPT 9+10+8 REC=16", 89%	MC = 21.2% PP = 3.25 tsf	Augers grinding/scraping.
18.0	FAT CLAY; moist, brown and gray	CH	184.0	A1	20	S-07, SPT 3+4+5 REC=18", 100%	MC = 32.2% PP = 1.50 tsf	
23.0	SANDY FAT CLAY; wet, orangish brown ▽	CH	179.0		25	S-08, SPT 2+4+4 REC=18", 100%	PP = 1.25 tsf	
27.5	POORLY GRADED SAND WITH SILT AND GRAVEL, fine to coarse grained sand; wet, brown	SP-SM	174.5	A2				
28.9			173.1			S-09, SPT 50/5" REC=2", 40%		

Bottom of Boring at 28.9 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

TEST BORING LOG 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 4/26/23

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-06**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/13/22 **Finished:** 7/13/22
Location: See Location Plan

Ground Surface Elevation: 196± (ft) **Total Depth:** 30.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/13	---	15.5'	---	---
Completion ▼	7/13	---	10.0'	---	---
Casing Pulled	7/13	---	Dry	---	8.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 3 inches		195.8			S-01, SPT 20+19+24 REC=16", 89%		FILL
	FILL, sampled as silty sand, fine to coarse grained sand; moist, brown and gray	FILL						
2.0			194.0	F1		S-02, SPT 9+9+16 REC=14", 78%		
	FILL, sampled as clayey sand, fine to coarse grained sand; moist, brown	FILL						
4.0			192.0			S-03, SPT 6+6+8 REC=15", 83%		TERRACE
	CLAYEY SAND, fine to coarse grained sand; moist, orangish brown and gray, trace gravel	SC			5	S-04, SPT 6+9+11 REC=16", 89%		
9.0			187.0			S-05, SPT 10+18+27 REC=18", 100%		
	SILTY SAND, fine to coarse grained sand; moist, orangish brown, trace gravel ▽	SM			10			Drilling penetration rate slower.
	Change: wet ▽			A2	15	S-06, SPT 8+4+3 REC=9", 50%		
18.0			178.0					
	POORLY GRADED SAND WITH SILT AND GRAVEL, fine to coarse grained sand; wet, brown	SP-SM			20	S-07, SPT 2+7+12 REC=16", 89%		
					25	S-08, SPT 17+16+8 REC=5", 28%		
	Change: light gray							
30.0			166.0		30	S-09, SPT 8+4+5 REC=18", 100%		

Bottom of Boring at 30.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

TEST BORING LOG 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 4/26/23

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-07**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/13/22 **Finished:** 7/13/22
Location: See Location Plan

Ground Surface Elevation: 193± (ft) **Total Depth:** 30.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/13	---	15.0'	---	---
Completion ▼	7/13	---	12.0'	---	---
Casing Pulled	7/13	---	Dry	---	12.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 3 inches		192.8					FILL
	FILL, sampled as silty sand, fine to coarse grained sand; moist, light brown, contains root fragments	FILL		F1		S-01, SPT 12+32+23 REC=7", 39%		
						S-02, SPT 8+6+5 REC=13", 72%	MC = 14.4%	
3.0	Change: gray and brown		190.0					
	FILL, sampled as sandy lean clay; moist, brown	FILL		F2	5	S-03, SPT 4+3+5 REC=7", 39%	PP = 2.00 tsf	
7.5	FILL, sampled as poorly graded sand with silt and gravel, fine to coarse grained sand; moist, gray		185.5			S-04, SPT 7+40+50/5" REC=13", 76%	MC = 8.4%	Augers grinding/scraping.
		FILL		F1	10	S-05, SPT 27+35+23 REC=4", 22%		Drilling penetration rate slower.
13.0	POORLY GRADED SAND WITH SILT, fine to coarse grained sand; moist, gray		180.0					TERRACE
					15	S-06, SPT 11+11+4 REC=4", 22%		
	Change: wet							
	Change: orangish brown	SP-SM		A2	20	S-07, SPT 26+23+29 REC=8", 44%		
					25	S-08, SPT 1+6+19 REC=12", 67%		
27.5	SANDY LEAN CLAY; wet, orangish brown, trace gravel	CL	165.5	B				MIOCENE Oxidized
					30	S-09, SPT 6+10+10 REC=6", 33%	MC = 35.7% PP = 1.00 tsf	
30.0			163.0					

Bottom of Boring at 30.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

TEST BORING LOG 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 4/26/23

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-08**
Contract Number: 22130254.000
Sheet: 1 of 2

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/12/22 **Finished:** 7/12/22
Location: See Location Plan

Ground Surface Elevation: 193± (ft) **Total Depth:** 35.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/12	---	19.0'	---	---
Completion ▼	7/12	---	10.0'	---	---
Casing Pulled	7/12	---	Dry	---	4.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 3 inches		192.8			S-01, SPT 3+5+5 REC=15", 83%		FILL
	FILL, sampled as silty sand, fine to coarse grained sand; moist, brown, trace gravel	FILL				S-02, SPT 8+11+8 REC=10", 56%		
4.0	FILL, sampled as clayey sand; moist, brown and gray, contains gravel		189.0		5	S-03, SPT 2+2+3 REC=10", 56%	MC = 16.1% PP = 1.25 tsf	
				F1		S-04, SPT 1+2+1 REC=5", 28%	LL = 40 PL = 23 MC = 13.6% % Passing #200 = 28.0	
		FILL			10	S-05, SPT 1+1+1 REC=5", 28%	MC = 17.2%	
13.0	SILTY SAND WITH GRAVEL, fine to coarse grained sand; moist, light brown	SM	180.0		15	S-06, SPT 9+8+8 REC=10", 56%	MC = 7.3%	TERRACE
18.0	POORLY GRADED SAND WITH SILT AND GRAVEL, fine to coarse grained sand; wet, orangish brown ▽	SP-SM	175.0	A2	20	S-07, SPT 22+21+25 REC=8", 44%		
23.0	POORLY GRADED SAND WITH GRAVEL, fine to coarse grained sand; wet, gray	SP	170.0		25	S-08, SPT 10+11+9 REC=10", 56%		
28.0	LEAN CLAY WITH SAND; wet, orangish brown	CL	165.0	B	30	S-09, SPT 2+1+2 REC=12", 67%	MC = 38.7% PP = 1.00 tsf	MIOCENE Oxidized
32.5		SC	160.5	C				

(continued)

TEST BORING LOG 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 4/26/23

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-08**
Contract Number: 22130254.000
Sheet: 2 of 2

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
35.0	CLAYEY SAND, fine to coarse grained sand; wet, brown with streaks of black *(continued)*	SC	158.0	C	35	S-10, SPT 3+4+9 REC=15", 83%		RESIDUUM

Bottom of Boring at 35.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-09**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/13/22 **Finished:** 7/13/22
Location: See Location Plan

Ground Surface Elevation: 195± (ft) **Total Depth:** 30.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/13	---	15.5'	---	---
Completion ▼	7/13	---	11.0'	---	---
Casing Pulled	7/13	---	Dry	---	5.5'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 4 inches		194.7					FILL
	FILL, sampled as silty sand, fine to coarse grained sand; moist, gray	FILL		F1		S-01, SPT 12+23+24 REC=16", 89%		
2.0			193.0					TERRACE
	SANDY LEAN CLAY; moist, reddish brown and brown, trace gravel	CL		A1		S-02, SPT 10+13+11 REC=10", 56%		
					5	S-03, SPT 7+7+14 REC=16", 89%	MC = 12.6%	
7.0	CLAYEY GRAVEL, fine and coarse grained gravel; moist, brown		188.0			S-04, SPT 14+20+25 REC=16", 89%		
	▼	GC		A2	10	S-05, SPT 12+25+26 REC=14", 78%		
13.0	SANDY ELASTIC SILT; moist, orangish brown		182.0					
	Change: wet ▽	MH		A1	15	S-06, SPT 6+3+4 REC=15", 83%	PP = 0.75 tsf	
18.0	POORLY GRADED SAND WITH SILT, fine to coarse grained sand; wet, brown		177.0					
		SP-SM			20	S-07, SPT 1+1+2 REC=16", 89%	LL = NP MC = 25.8% % Passing #200 = 11.5	
23.0	POORLY GRADED SAND WITH SILT AND GRAVEL, fine to coarse grained sand; wet, gray		172.0	A2				
		SP-SM			25	S-08, SPT 2+12+10 REC=18", 100%		
						S-09, SPT 6+9+19 REC=18", 100%		
30.0			165.0		30			

Bottom of Boring at 30.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

TEST BORING LOG 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 4/26/23

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-10**
Contract Number: 22130254.000
Sheet: 1 of 2

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/13/22 **Finished:** 7/13/22
Location: See Location Plan

Ground Surface Elevation: 194± (ft) **Total Depth:** 43.5 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/13	---	15.5'	---	---
Completion ▼	7/13	---	11.0'	---	---
Casing Pulled	7/13	---	Dry	---	1.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Topsoil; 2 inches		193.8					FILL
	FILL, sampled as silty sand, fine to coarse grained sand; moist, brown, trace gravel	FILL				S-01, SPT 18+21+19 REC=16", 89%		
3.0	Change: black		191.0	F1		S-02, SPT 5+4+4 REC=10", 56%		
	PROBABLE FILL, sampled as clayey sand, fine to coarse grained sand; moist, gray	FILL			5	S-03, SPT 3+2+3 REC=10", 56%	MC = 16.2%	
6.0	SANDY FAT CLAY; moist, light brown		188.0					TERRACE
		CH		A1		S-04, SPT 3+4+4 REC=112", 622%	LL = 40 PL = 16 MC = 13.8% % Passing #200 = 50.3	
					10	S-05, SPT 3+5+8 REC=13", 72%	PP = 1.75 tsf MC = 12.5% PP = 3.25 tsf	
13.0	POORLY GRADED SAND WITH SILT AND GRAVEL, fine to coarse grained sand; wet, orangish brown		181.0					Augers grinding/scraping.
					15	S-06, SPT 16+14+7 REC=8", 44%	MC = 8.0%	
		SP-SM			20	S-07, SPT 10+10+17 REC=8", 44%		
23.0	CLAYEY SAND WITH GRAVEL, fine to coarse grained sand; wet, orangish brown		171.0	A2				
		SC			25	S-08, SPT 26+45+36 REC=14", 78%		
28.0	POORLY GRADED SAND WITH CLAY AND GRAVEL, fine to coarse grained sand; wet, orangish brown		166.0					
		SP-SC			30	S-09, SPT 14+22+30 REC=10", 56%		

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-10**
Contract Number: 22130254.000
Sheet: 2 of 2

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
33.0	SANDY ELASTIC SILT; wet, brown and black, contains mica	MH	161.0	C	35	S-10, SPT 5+9+13 REC=10", 56%		RESIDUUM
38.0	DISINTEGRATED ROCK, sampled as silty sand, fine to coarse grained sand; wet, brown and black, contains mica	DR	156.0	D	40	S-11, SPT 50/1" REC=1", 100%		Drilling penetration rate slower.
43.5	Bottom of Boring at 43.5 ft. Boring terminated at auger refusal. Boring backfilled with cuttings and borehole plug upon completion.		150.5			S-12, SPT 50/0" REC=0"		

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-10A**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 3-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/14/22 **Finished:** 7/14/22
Location: See Location Plan

Ground Surface Elevation: 194± (ft) **Total Depth:** 10.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	7/14	---	Dry	---	---
Completion	7/14	---	Dry	---	---

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	Auger probe to 8 ft. See Boring B-10 for stratigraphy.					AUGER		
8.0	SANDY FAT CLAY; gray	CH	186.0	A1	5	UD-01, UNDIST REC=16", 67%	PP = 1.25 tsf	TERRACE
10.0			184.0		10			

Bottom of Boring at 10.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-11**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/12/22 **Finished:** 7/12/22
Location: See Location Plan

Ground Surface Elevation: 193± (ft) **Total Depth:** 30.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/12	---	19.0'	---	---
Completion ▼	7/12	---	10.0'	---	---
Casing Pulled	7/12	---	---	---	3.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Topsoil; 2 inches		192.8			S-01, SPT 6+10+9 REC=12", 67%		FILL
	FILL, sampled as silty sand, fine to coarse grained sand; moist, brown and reddish gray, trace gravel	FILL				S-02, SPT 9+5+6 REC=12", 67%		
					5	S-03, SPT 5+5+6 REC=10", 56%		
7.0	FILL, sampled as clayey sand, fine to coarse grained sand; moist, light gray	FILL	186.0	F1		S-04, SPT 4+6+6 REC=8", 44%		
					10	S-05, SPT 2+2+3 REC=7", 39%	MC = 12.7%	
13.0	FILL, sampled as lean clay; moist, dark gray, contains organics	FILL	180.0	F2				
					15	S-06, SPT 1+1+2 REC=7", 39%	MC = 20.3% PP = 1.25 tsf	
18.0	POORLY GRADED SAND WITH SILT AND GRAVEL, fine to coarse grained sand; wet, light brown ▽	SP-SM	175.0	A2				TERRACE
					20	S-07, SPT 4+5+3 REC=6", 33%		
					25	S-08, SPT 15+20+7 REC=4", 22%		
30.0			163.0		30	S-09, SPT 5+2+4 REC=14", 78%		

Bottom of Boring at 30.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

TEST BORING LOG 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 4/26/23

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-12**
Contract Number: 22130254.000
Sheet: 1 of 2

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/12/22 **Finished:** 7/12/22
Location: See Location Plan

Ground Surface Elevation: 199± (ft) **Total Depth:** 48.5 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/12	---	19.0'	---	---
Completion ▼	7/13	---	13.0'	---	---
Casing Pulled	7/13	---	---	---	8.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Asphalt; 3 inches, no base		198.8					
	FILL, sampled as silty sand, fine to coarse grained sand; moist, brown and black	FILL		F1		S-01, SPT 6+14+10 REC=16", 89%		FILL
2.0			197.0					
	FILL, sampled as sandy lean clay; moist, orangish brown and speckled black	FILL		F2		S-02, SPT 9+10+14 REC=15", 83%	MC = 15.4%	
4.0			195.0					
	FILL, sampled as clayey sand, fine to coarse grained sand; moist, reddish brown	FILL		F1	5	S-03, SPT 9+13+15 REC=14", 78%		
7.0			192.0					
	SANDY LEAN CLAY; moist, orangish brown	CL		A1		S-04, SPT 9+13+14 REC=17", 94%	MC = 20.1% PP = 3.75 tsf	TERRACE
9.0			190.0					
	CLAYEY SAND, fine to coarse grained sand; moist, orangish brown, trace gravel ▼	SC		A2	10	S-05, SPT 8+18+14 REC=16", 89%		
					15	S-06, SPT 17+9+6 REC=8", 44%	MC = 16.5%	
18.0			181.0					
	SANDY LEAN CLAY; wet, orangish brown ▽	CL		A1	20	S-07, SPT 2+3+2 REC=15", 83%	PP = 0.75 tsf	
					25	S-08, SPT 2+2+4 REC=18", 100%	MC = 34.4% PP = 0.75 tsf	
28.0			171.0					
	POORLY GRADED SAND WITH CLAY, fine to coarse grained sand; wet, orangish brown	SP-SC		A2	30	S-09, SPT 14+22+35 REC=6", 33%		

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: B-12
Contract Number: 22130254.000
Sheet: 2 of 2

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	POORLY GRADED SAND WITH CLAY, fine to coarse grained sand; wet, orangish brown *(continued)*	SP-SC		A2	35	S-10, SPT 11+25+23 REC=7", 39%		TERRACE
38.0	SANDY ELASTIC SILT; wet, gray and brown, contains mica	MH	161.0	C	40	S-11, SPT 3+6+7 REC=11", 61%		RESIDUUM
					45	S-12, SPT 2+3+4 REC=13", 72%		
48.5	Bottom of Boring at 48.5 ft. Boring terminated at selected depth.		150.5			S-13, SPT 50/0" REC=0"		

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-12A**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 3-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/14/22 **Finished:** 7/14/22
Location: See Location Plan

Ground Surface Elevation: 199± (ft) **Total Depth:** 22.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/14	---	17.0'	---	---
Completion ▼	7/14	---	17.0'	---	---

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	Auger probe to 17 ft. See Boring B-12 for stratigraphy.				5	AUGER		
					10			
					15			
17.0	SANDY FAT CLAY; wet, light brown	CL	182.0	A1	20	S-01, SPT 4+4+3 REC=14", 78%	PP = 1.25 tsf	TERRACE
						UD-01, UNDIST REC=24", 100%	LL = 61 PL = 26 MC = 31.2% % Passing #200 = 62.9 PP = 3.00 tsf	
21.0	SILTY SAND, fine to coarse grained sand; wet, gray and white	SM	178.0	A2				
22.0	Bottom of Boring at 22.0 ft. Boring terminated at selected depth.		177.0					

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-13**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/14/22 **Finished:** 7/14/22
Location: See Location Plan

Ground Surface Elevation: 193± (ft) **Total Depth:** 30.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/14	---	15.5'	---	---
Completion ▼	7/14	---	13.0'	---	---
Casing Pulled	7/14	---	Dry	---	10.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Topsoil; 2 inches		192.8					
	FILL, sampled as silty sand, fine to coarse grained sand; moist, brown, contains root fragments, trace gravel	FILL		F1		S-01, SPT 17+22+24 REC=12", 67%	MC = 13.7%	FILL
3.0			190.0			S-02, SPT 10+10+12 REC=12", 67%		
	FILL, sampled as sandy lean clay; moist, brown	FILL		F2	5	S-03, SPT 8+11+11 REC=16", 89%	LL = 34 PL = 17 MC = 13.1% % Passing #200 = 39.6	
7.0	FAT CLAY WITH SAND; moist, brown and gray		186.0			S-04, SPT 6+8+12 REC=13", 72%	PP = 2.75 tsf MC = 21.7% PP = 3.75 tsf	TERRACE
	Change: orangish brown and gray	CH		A1	10	S-05, SPT 8+12+13 REC=14", 78%	MC = 28.2% PP = 4.50 tsf	
13.0	POORLY GRADED SAND WITH SILT AND GRAVEL, fine to coarse grained sand; wet, orangish brown		180.0		15	S-06, SPT 1+1+1 REC=10", 56%		
		SP-SM			20	S-07, SPT 2+8+9 REC=6", 33%		
23.0	POORLY GRADED SAND WITH CLAY AND GRAVEL, fine to coarse grained sand; wet, brown	SP-SC	170.0	A2	25	S-08, SPT 10+20+20 REC=6", 33%		
27.5	POORLY GRADED SAND WITH SILT AND GRAVEL, fine to coarse grained sand; wet, gray	SP-SM	165.5					
30.0			163.0		30	S-09, SPT 11+13+15 REC=5", 28%		

Bottom of Boring at 30.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

TEST BORING LOG 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 4/26/23

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: B-14
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/12/22 **Finished:** 7/12/22
Location: See Location Plan

Ground Surface Elevation: 193± (ft) **Total Depth:** 30.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/12	---	14.0'	---	---
Completion ▼	7/12	---	12.0'	---	---
Casing Pulled	7/12	---	---	---	13.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 3 inches		192.8			S-01, SPT 6+7+10 REC=15", 83%		FILL
	FILL, sampled as silty sand, fine to coarse grained sand; moist, brown	FILL				S-02, SPT 12+9+9 REC=9", 50%		
	Change: reddish brown, trace gravel							
	Change: reddish brown and black			F1	5	S-03, SPT 5+3+5 REC=12", 67%	MC = 22.9%	
7.0	PROBABLE FILL, sampled as silty sand, fine to coarse grained sand; moist, brown and red	FILL	186.0			S-04, SPT 6+9+12 REC=17", 94%		
9.0	ELASTIC SILT; moist, light gray	MH	184.0	A1	10	S-05, SPT 5+11+9 REC=12", 67%	MC = 22.6% PP = 4.25 tsf	TERRACE
13.0	POORLY GRADED GRAVEL, fine to coarse grained sand; wet, yellowish brown	GP	180.0		15	S-06, SPT 8+7+2 REC=2", 11%		
18.0	SILTY SAND, fine to coarse grained sand; wet, whitish gray, trace gravel	SM	175.0	A2	20	S-07, SPT 2+15+11 REC=15", 83%		
					25	S-08, SPT 50/6" REC=3", 50%		
	Change: light brown							
30.0			163.0		30	S-09, SPT 33+39+40 REC=16", 89%		

Bottom of Boring at 30.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

TEST BORING LOG 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 4/26/23

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-15**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/14/22 **Finished:** 7/14/22
Location: See Location Plan

Ground Surface Elevation: 195± (ft) **Total Depth:** 30.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/14	---	15.5'	---	---
Completion ▼	7/14	---	12.0'	---	---
Casing Pulled	7/14	---	---	---	13.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Topsoil; 2 inches		194.8					
	FILL, sampled as silty sand, fine to coarse grained sand; moist, reddish brown, trace gravel	FILL		F1		S-01, SPT 18+21+15 REC=16", 89%	MC = 9.9%	FILL
	Change: light gray					S-02, SPT 16+21+28 REC=16", 89%		
4.0	CLAYEY SAND WITH GRAVEL, fine to coarse grained sand; moist, brown and gray	SC	191.0		5	S-03, SPT 25+35+35 REC=12", 67%		TERRACE
						S-04, SPT 24+21+16 REC=10", 56%		
9.0	CLAYEY SAND, fine to coarse grained sand; moist, reddish brown		186.0		10	S-05, SPT 13+10+10 REC=8", 44%	MC = 28.8% PP = 1.25 tsf	
	Change: light brown	SC			15	S-06, SPT 2+1+1 REC=17", 94%	LL = NP MC = 27.3% % Passing #200 = 12.0	
	Change: wet			A2				
18.0	POORLY GRADED SAND WITH SILT AND GRAVEL, fine to coarse grained sand; wet, light brown	SP-SM	177.0		20	S-07, SPT 14+19+21 REC=8", 44%		
					25	S-08, SPT 23+34+31 REC=8", 44%		
27.5	SANDY FAT CLAY; wet, light brown	CH	167.5	B				Augers grinding/scraping.
30.0			165.0		30	S-09, SPT 3+6+5 REC=18", 100%	PP = 1.00 tsf	MIOCENE Oxidized

Bottom of Boring at 30.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

TEST BORING LOG 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 4/26/23

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **B-16**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/13/22 **Finished:** 7/13/22
Location: See Location Plan

Ground Surface Elevation: 194± (ft) **Total Depth:** 29.5 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	7/13	---	15.5'	---	---
Completion ▼	7/13	---	10.0'	---	---
Casing Pulled	7/13	---	Dry	---	5.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 3 inches		193.8					
	FILL, sampled as silty sand, fine to coarse grained sand; moist, gray	FILL		F1		S-01, SPT 8+15+13 REC=15", 83%		FILL
2.0			192.0					
	FILL, sampled as sandy lean clay; moist, brown	FILL		F2		S-02, SPT 10+11+15 REC=15", 83%	MC = 13.2% PP = 2.25 tsf	
					5	S-03, SPT 9+11+14 REC=17", 94%	PP = 2.00 tsf	
7.0	SANDY LEAN CLAY; moist, gray and brown	CL	187.0			S-04, SPT 8+11+18 REC=18", 100%	MC = 25.1% PP = 2.75 tsf	TERRACE
9.0	FAT CLAY; moist, gray ▼	CH	185.0	A1	10	S-05, SPT 13+12+12 REC=18", 100%	MC = 20.1% PP = 4.00 tsf	
13.0	SILTY SAND, fine to coarse grained sand; wet, orangish brown, trace gravel ▽	SM	181.0		15	S-06, SPT 13+9+7 REC=10", 56%		
18.0	POORLY GRADED SAND WITH SILT AND GRAVEL, fine to coarse grained sand; wet, light brown	SP-SM	176.0	A2	20	S-07, SPT 2+1+2 REC=10", 56%		
					25	S-08, SPT 20+28+32 REC=14", 78%		
27.5	CLAYEY SAND WITH GRAVEL, fine to coarse grained sand; wet, light brown, trace gravel	SC	166.5					
29.5			164.5			S-09, SPT 44+50/6" REC=9", 75%		

Bottom of Boring at 29.5 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

TEST BORING LOG 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 4/26/23

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **P-01**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/15/22 **Finished:** 7/15/22
Location: See Location Plan

Ground Surface Elevation: 201± (ft) **Total Depth:** 5.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	7/15	---	Dry	---	---
Completion	7/15	---	Dry	---	---
Casing Pulled	7/15	---	Dry	---	3.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Asphalt; 3 inches		200.8					
	SANDY LEAN CLAY; moist, reddish brown	CL		A1		S-01, SPT 7+10+12 REC=13", 72%	MC = 14.0% PP = 3.25 tsf	TERRACE
						S-02, SPT 6+8+8 REC=14", 78%	PP = 1.75 tsf	
3.5	CLAYEY SAND, fine to coarse grained sand; moist, reddish brown	SC	197.5	A2		S-03, SPT 4+5+6 REC=14", 78%		
5.0			196.0		5			

Bottom of Boring at 5.0 ft.
Boring terminated at selected depth.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **P-02**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/15/22 **Finished:** 7/15/22
Location: See Location Plan

Ground Surface Elevation: 204± (ft) **Total Depth:** 5.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	7/15	---	Dry	---	---
Completion	7/15	---	Dry	---	---
Casing Pulled	7/15	---	---	---	3.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 3 inches		203.8					
	FILL, sampled as silty sand, fine to coarse grained sand; moist, brown	FILL		F1		S-01, SPT 7+10+10 REC=8", 44%		FILL
2.0	SANDY LEAN CLAY; moist, reddish brown	CL	202.0	A1		S-02, SPT 5+5+13 REC=16", 89%	PP = 2.75 tsf	TERRACE
3.5	SILTY SAND, fine to coarse grained sand; moist, reddish brown	SM	200.5	A2		S-03, SPT 6+15+18 REC=16", 89%		
5.0	Bottom of Boring at 5.0 ft.		199.0		5			

Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **P-03**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/15/22 **Finished:** 7/15/22
Location: See Location Plan

Ground Surface Elevation: 202± (ft) **Total Depth:** 5.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	7/15	---	Dry	---	---
Completion	7/15	---	Dry	---	---
Casing Pulled	7/15	---	Dry	---	3.5'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 3 inches		201.8					
	SILTY SAND, fine to coarse grained sand; moist, reddish brown, contains root fragments	SM		A2		S-01, SPT 8+11+13 REC=13", 72%	LL = 47 PL = 23 MC = 14.7% % Passing #200 = 64.7 PP = 3.50 tsf	TERRACE
2.0		CL	200.0	A1		S-02, SPT 9+10+11 REC=15", 83%		
3.5	SANDY LEAN CLAY; moist, brown		198.5					
	SILTY SAND, fine to coarse grained sand; moist, orangish brown and gray	SM		A2	5	S-03, SPT 6+9+10 REC=9", 50%		
5.0			197.0					

Bottom of Boring at 5.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **P-04**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/14/22 **Finished:** 7/14/22
Location: See Location Plan

Ground Surface Elevation: 204± (ft) **Total Depth:** 5.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	7/14	---	Dry	---	---
Completion	7/14	---	Dry	---	---
Casing Pulled	7/14	---	Dry	---	3.5'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Topsoil; 2 inches	FILL	203.8	F1		S-01, SPT 20+26+25 REC=12", 67%		FILL
2.0	FILL, sampled as silty sand, fine to coarse grained sand; moist, gray, contains root fragments		202.0			S-02, SPT 13+17+20 REC=14", 78%	PP >4.50 tsf	TERRACE
	SANDY LEAN CLAY; moist, reddish brown	CL		A1	5	S-03, SPT 10+16+17 REC=16", 89%	PP = 3.75 tsf	
5.0			199.0					

Bottom of Boring at 5.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: P-05
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/14/22 **Finished:** 7/14/22
Location: See Location Plan

Ground Surface Elevation: 193± (ft) **Total Depth:** 5.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	7/14	---	Dry	---	---
Completion	7/14	---	Dry	---	---
Casing Pulled	7/14	---	Dry	---	3.5'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Topsoil; 2 inches	FILL	192.8	F1		S-01, SPT 40+38+15 REC=16", 89%		FILL
2.0	FILL, sampled as silty sand, fine to coarse grained sand; moist, gray, contains asphalt fragments	FILL	191.0			S-02, SPT 11+10+6 REC=12", 67%		
3.5	FILL, sampled as clayey sand, fine to coarse grained sand; moist, grayish brown	CL	189.5	A1		S-03, SPT 4+6+5 REC=10", 56%	PP = 4.50 tsf	TERRACE
5.0	SANDY LEAN CLAY; moist, orangish brown		188.0		5			

Bottom of Boring at 5.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **P-06**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/14/22 **Finished:** 7/14/22
Location: See Location Plan

Ground Surface Elevation: 194± (ft) **Total Depth:** 5.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	7/14	---	Dry	---	---
Completion	7/14	---	Dry	---	---
Casing Pulled	7/14	---	Dry	---	3.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Topsoil; 2 inches		193.8					
	FILL, sampled as silty sand, fine to coarse grained sand; brown, contains root fragments	FILL		F1		S-01, SPT 9+11+12 REC=10", 56% S-02, SPT 16+16+9 REC=12", 67%	LL = 26 PL = 15 MC = 7.0% % Passing #200 = 45.0	FILL
3.5	CLAYEY SAND, fine to coarse grained sand; reddish brown	SC	190.5	A2	5	S-03, SPT 3+8+16 REC=13", 72%		TERRACE
5.0			189.0					

Bottom of Boring at 5.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **HAND AUGER LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Hand Auger Number: P-07
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Not Applicable

Contractor Foreman: Not Applicable

Schnabel Representative: G. Volo

Equipment: 3.0" O.D. Hand Auger

Method: 3.0" O.D. Hand Auger

Dates Started: 7/15/22 **Finished:** 7/15/22

Location: See Location Plan

Ground Surface Elevation: 185± (ft) **Total Depth:** 2.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	7/15	---	Dry	---	---
Completion	7/15	---	Dry	---	---

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Topsoil; 2 inches		184.8					FILL
	FILL, sampled as silty sand, fine to coarse grained sand; moist, brown, contains root fragments, trace gravel	FILL		F1		S-01, GEOPROBE 1"		
						S-02, GEOPROBE 1"		
2.0			183.0					

Bottom of Hand Auger at 2.0 ft.
Boring terminated at auger refusal.
Hand auger backfilled with cuttings upon completion.

Schnabel ENGINEERING **HAND AUGER LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Hand Auger Number: **P-07A**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Not Applicable

Contractor Foreman: Not Applicable

Schnabel Representative: G. Volo

Equipment: 3.0" O.D. Hand Auger

Method: 3.0" O.D. Hand Auger

Dates Started: 7/15/22 **Finished:** 7/15/22

Location: See Location Plan

Ground Surface Elevation: 185± (ft) **Total Depth:** 2.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	7/15	---	Dry	---	---
Completion	7/15	---	Dry	---	---

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Topsoil; 2 inches		184.8			SAMPLE		FILL
	FILL, sampled as silty sand, fine to coarse grained sand; moist, brown	FILL		F1		SAMPLE		
2.0			183.0			SAMPLE		

Bottom of Hand Auger at 2.0 ft.
Boring terminated at auger refusal.
Hand auger backfilled with cuttings upon completion.
Offset about 5 ft from P-07 due to shallow refusal.

TEST BORING LOG 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 4/26/23

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **P-08**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: Ayers & Ayers, Inc.
Powhatan, Virginia
Contractor Foreman: J. Ayers Jr.
Schnabel Representative: G. Volo
Equipment: CME-45B (ATV)
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 7/14/22 **Finished:** 7/14/22
Location: See Location Plan

Ground Surface Elevation: 198± (ft) **Total Depth:** 5.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Completion	7/14	---	Dry	---	---
Encountered	7/14	---	Dry	---	---
Casing Pulled	7/14	---	Dry	---	3.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 3 inches		197.8					
	SILTY SAND, fine to coarse grained sand; moist, light brown, trace gravel	SM		A2		S-01, SPT 10+16+11 REC=10", 56% S-02, SPT 7+7+5 REC=10", 56% S-03, SPT 5+7+12 REC=11", 61%	MC = 9.8%	TERRACE
5.0			193.0		5			

Bottom of Boring at 5.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **RW-01**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: SEQ Drilling, Inc.
Richmond, Virginia
Contractor Foreman: S. Sequist
Schnabel Representative: C. Lewis
Equipment: CME-550X
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Auto Hammer (140 lb)
Dates Started: 3/13/23 **Finished:** 3/13/23
Location: See Location Plan

Ground Surface Elevation: 202± (ft) **Total Depth:** 22.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	3/13	---	Dry	---	---
Completion	3/13	---	Dry	---	---
Casing Pulled	3/13	---	Dry	---	18.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 3 inches	FILL	201.8	F1		S-01, SPT 5+3+2+4 REC=12", 50%		FILL
2.0	FILL, sampled as clayey sand, fine to coarse grained sand; moist, brown, contains brick fragments		200.0			S-02, SPT 3+3+4+7 REC=13", 54%	PP = 3.25 tsf	TERRACE
	SILTY SAND, fine to coarse grained sand; moist, reddish brown	SM			5	S-03, SPT 6+11+16+20 REC=24", 100%	LL = 70 PL = 39 MC = 20.6% % Passing #200 = 44.8	
						S-04, SPT 6+6+8+8 REC=19", 79%		
	Change: reddish brown and orangish brown				10	S-05, SPT 5+6+8+10 REC=16", 67%	MC = 16.5%	
12.0	POORLY GRADED GRAVEL, fine to coarse gravel; moist, light brown	GP	190.0	A2	15	S-06, SPT 19+28+27+28 REC=20", 83%		
19.0	CLAYEY SAND WITH GRAVEL, fine to coarse grained sand; moist, light brown	SC	183.0		20	S-07, SPT 10+15+15+12 REC=0", 0%		
22.0			180.0					

Bottom of Boring at 22.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

TEST BORING LOG 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 4/26/23

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **RW-02**
Contract Number: 22130254.000
Sheet: 1 of 2

Contractor: SEQ Drilling, Inc.
Richmond, Virginia
Contractor Foreman: S. Sequist
Schnabel Representative: C. Lewis
Equipment: CME-550X
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Auto Hammer (140 lb)
Dates Started: 3/13/23 **Finished:** 3/13/23
Location: See Location Plan

Ground Surface Elevation: 204± (ft) **Total Depth:** 39.6 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	3/13	---	23.0'	---	---
Completion ▼	3/13	---	18.0'	---	---
Casing Pulled	3/13	---	Dry	---	21.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.4	Topsoil; 5 inches		203.6			S-01, SPT 4+6+3+7 REC=19", 79%		TERRACE
	SILTY SAND, fine to medium grained sand; moist, reddish brown, trace gravel	SM				S-02, SPT 4+7+10+15 REC=18", 75%	LL = 69 PL = 38 MC = 22.8% % Passing #200 = 48.6	
4.0	CLAYEY SAND, fine to coarse grained sand; moist, reddish brown		200.0		5	S-03, SPT 10+14+11+15 REC=24", 100%		
						S-04, SPT 5+7+8+11 REC=18", 75%	MC = 15.7%	
	Change: orangish brown	SC			10	S-05, SPT 4+7+9+12 REC=15", 63%		
12.0	POORLY GRADED GRAVEL, fine to coarse gravel; moist, light brown	GP	192.0		15	S-06, SPT 13+20+20+18 REC=20", 83%	MC = 13.3%	Rig chatter.
17.0	CLAYEY SAND WITH GRAVEL, fine to coarse grained sand; moist, light brown ▼		187.0	A2				
					20	S-07, SPT 10+9+12+5 REC=15", 63%	LL = 36 PL = 18 MC = 8.4% % Passing #200 = 12.6	
	Change: wet, light orangish brown ▽	SC			25	S-08, SPT 1+1+2+3 REC=12", 50%		
27.0	POORLY GRADED CLAYEY GRAVEL, fine to coarse gravel; wet, gray and orangish brown	GC	177.0		30	S-09, SPT 7+7+16+13 REC=10", 42%		Rig chatter.

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **RW-02**
Contract Number: 22130254.000
Sheet: 2 of 2

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	POORLY GRADED CLAYEY GRAVEL, fine to coarse gravel; wet, gray and orangish brown *(continued)*	GC		A2	35	S-10, SPT 7+10+13+23 REC=4", 17%		TERRACE
37.0	FAT CLAY; wet, orangish brown, trace gravel	CH	167.0	B		S-11, SPT 2+3+17+50/1" REC=19", 100%	PP = 2.00 tsf	MIOCENE
39.5 39.6	DISINTEGRATED ROCK, sampled as silty sand, fine to coarse grained sand; wet, light brown, contains rock fragments	DR	164.5 164.4	D				RESIDUUM

Bottom of Boring at 39.6 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **RW-02A**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: SEQ Drilling, Inc.
Richmond, Virginia
Contractor Foreman: S. Sequist
Schnabel Representative: C. Lewis
Equipment: CME-550X
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Auto Hammer (140 lb)
Dates Started: 3/13/23 **Finished:** 3/13/23
Location: See Location Plan

Ground Surface Elevation: 204± (ft) **Total Depth:** 8.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	3/13	---	Dry	---	---
Completion	3/13	---	Dry	---	---
Casing Pulled	3/13	---	Dry	---	8.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	Auger probe to 6 ft, see Boring RW-02 for stratigraphy.				5	AUGER		
6.0	CLAYEY SAND, fine to coarse grained sand; moist, reddish brown	SC	198.0	A2	UD	UD-01, UNDIST REC=24", 100%	LL = 45 PL = 25 MC = 18.0% % Passing #200 = 26.8	TERRACE
8.0			196.0					

Bottom of Boring at 8.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **RW-03**
Contract Number: 22130254.000
Sheet: 1 of 2

Contractor: SEQ Drilling, Inc.
Richmond, Virginia
Contractor Foreman: S. Sequist
Schnabel Representative: C. Lewis
Equipment: CME-550X
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Auto Hammer (140 lb)
Dates Started: 3/13/23 **Finished:** 3/13/23
Location: See Location Plan

Ground Surface Elevation: 205± (ft) **Total Depth:** 40.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	3/13	---	---	---	---
Completion ▼	3/13	---	25.0'	---	---
Casing Pulled ▼	3/13	---	25.0'	---	36.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.1	Topsoil; 1 inch		204.9					
	SANDY LEAN CLAY; moist, brown	CL		A1		S-01, SPT 4+4+3+4 REC=14", 58%	LL = 26 PL = 14 MC = 13.0% % Passing #200 = 52.9	TERRACE
2.0	CLAYEY SAND, fine to coarse grained sand; reddish brown, trace gravel	SC	203.0			S-02, SPT 2+5+6+13 REC=14", 58%		
					5	S-03, SPT 6+7+6+9 REC=15", 63%		
						S-04, SPT 6+5+7+8 REC=18", 75%		
8.0	POORLY GRADED GRAVEL WITH CLAY, fine and coarse grained gravel; moist, light brown and reddish brown	GP-GC	197.0			S-05, SPT 7+9+12+10 REC=12", 50%		
					10			
12.0	SILTY SAND WITH GRAVEL, fine to coarse grained sand; moist, orangish brown	SM	193.0	A2		S-06, SPT 11+19+19+12 REC=18", 75%	MC = 10.7%	
					15			
						S-07, SPT 8+7+8+11 REC=10", 42%		
					20			
22.0	CLAYEY SAND WITH GRAVEL, fine to coarse grained sand; wet, orangish brown ▼	SC	183.0			S-08, SPT 4+2+4+9 REC=10", 42%	LL = 46 PL = 24 MC = 23.4% % Passing #200 = 12.5	
					25			
27.0	POORLY GRADED GRAVEL WITH SILT, fine to coarse gravel; wet, orangish brown	GP-GM	178.0			S-09, SPT 4+4+1+3 REC=8", 33%		
					30			
32.0		SM	173.0	C				RESIDUUM

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **RW-03**
Contract Number: 22130254.000
Sheet: 2 of 2

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	SILTY SAND, fine to medium grained sand; wet, light brown and black, contains mica *(continued)*	SM		C	35	S-10, SPT 3+4+6+9 REC=16", 67%	LL = 41 PL = 34 MC = 31.3% % Passing #200 = 31.8	RESIDUUM
	Change: brown and white							
40.0			165.0		40	S-11, SPT 2+3+3+6 REC=20", 83%		

Bottom of Boring at 40.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **RW-04**
Contract Number: 22130254.000
Sheet: 1 of 2

Contractor: SEQ Drilling, Inc.
Richmond, Virginia
Contractor Foreman: S. Sequist
Schnabel Representative: C. Lewis
Equipment: CME-550X
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Auto Hammer (140 lb)
Dates Started: 3/13/23 **Finished:** 3/13/23
Location: See Location Plan

Ground Surface Elevation: 204± (ft) **Total Depth:** 40.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	3/13	---	18.0'	---	---
Completion ▼	3/13	---	30.0'	---	---
Casing Pulled ▼	3/13	---	29.0'	---	29.5'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Topsoil; 2 inches		203.8					TERRACE
	CLAYEY SAND WITH GRAVEL, fine to coarse grained sand; moist, brown, contains root fragments	SC				S-01, SPT 3+3+4+7 REC=8", 33%		
	Change: reddish brown and orangish brown, no root fragments					S-02, SPT 7+7+9+26	LL = 33 PL = 17 MC = 11.2% % Passing #200 = 27.6	
					5	S-03, SPT 11+13+12+18 REC=20", 83%		
6.0	SILTY SAND WITH GRAVEL, fine to coarse grained sand; moist, light brown	SM	198.0			S-04, SPT 11+13+18+20 REC=12", 50%		
8.0	CLAYEY SAND WITH GRAVEL, fine to coarse grained sand; moist, reddish brown	SC	196.0	A2		S-05, SPT 9+11+10+13 REC=14", 58%	LL = 28 PL = 17 MC = 9.1% % Passing #200 = 13.6	
					10			
						S-06, SPT 4+2+7+12 REC=6", 25%		
					15			
17.0	SILTY SAND, fine to medium grained sand; wet, brown and black, contains mica ▽	SM	187.0	C		S-07, SPT 2+1+2+1 REC=20", 83%	MC = 33.1%	RESIDUUM
					20			
						S-08, SPT 2+2+2+4 REC=24", 100%	LL = 39 PL = 32 MC = 33.4% % Passing #200 = 25.4	
	▽ ▼				25			
						S-09, SPT 2+2+3+4 REC=20", 83%		
					30			

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **RW-04**
Contract Number: 22130254.000
Sheet: 2 of 2

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	SILTY SAND, fine to medium grained sand; wet, brown and black, contains mica *(continued)*	SM		C	35	S-10, SPT 1+2+3+5 REC=24", 100%		RESIDUUM
40.0			164.0		40	S-11, SPT 2+3+5+6 REC=14", 58%		

Bottom of Boring at 40.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **RW-05**
Contract Number: 22130254.000
Sheet: 1 of 2

Contractor: SEQ Drilling, Inc.
Richmond, Virginia
Contractor Foreman: S. Sequist
Schnabel Representative: C. Lewis
Equipment: CME-550X
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Auto Hammer (140 lb)
Dates Started: 3/13/23 **Finished:** 3/13/23
Location: See Location Plan

Ground Surface Elevation: 202± (ft) **Total Depth:** 40.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	3/13	---	18.0'	---	---
Completion ▼	3/13	---	25.0'	---	---
Casing Pulled ▼	3/13	---	20.0'	---	28.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 3 inches		201.8			S-01, SPT 3+3+3+3 REC=8", 33%		TERRACE
	SILTY SAND, fine to coarse grained sand; moist, brown	SM						
2.0	CLAYEY SAND, fine to coarse grained sand; moist, reddish brown, trace gravel	SC	200.0			S-02, SPT 2+5+6+7 REC=18", 75%	LL = 52 PL = 24 MC = 15.7% % Passing #200 = 30.2	
					5	S-03, SPT 3+5+4+6 REC=18", 75%		
6.0	SILTY SAND, fine to coarse grained sand; moist, reddish brown and orangish brown, trace gravel	SM	196.0			S-04, SPT 3+4+11+7 REC=10", 42%		
					10	S-05, SPT 4+11+17+18 REC=17", 71%	MC = 6.5%	
12.0	POORLY GRADED GRAVEL WITH CLAY AND SAND, fine and coarse grained sand; moist, light brown and white	GP-GC	190.0	A2	15	S-06, SPT 9+10+7+7 REC=14", 58%	LL = 32 PL = 17 MC = 6.7% % Passing #200 = 8.7	
					20	S-07, SPT 5+7+4+2 REC=6", 25%		
22.0	POORLY GRADED SAND WITH SILT AND GRAVEL, fine to coarse grained sand; wet, light brown	SP-SM	180.0		25	S-08, SPT 1+5+6+8 REC=10", 42%		
					30	S-09, SPT 1+3+6+13 REC=12", 50%		

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **RW-05**
Contract Number: 22130254.000
Sheet: 2 of 2

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	POORLY GRADED SAND WITH SILT AND GRAVEL, fine to coarse grained sand; wet, light brown *(continued)*	SP-SM		A2	35	S-10, SPT 5+7+9+13 REC=12", 50%	LL = 20 PL = 18 MC = 9.9% % Passing #200 = 6.1	TERRACE
37.0	SILTY SAND, fine to coarse grained sand; wet, brown and black, contains mica	SM	165.0	C		S-11, SPT 5+11+19+26 REC=3", 13%		RESIDUUM
40.0			162.0		40			

Bottom of Boring at 40.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **RW-06**
Contract Number: 22130254.000
Sheet: 1 of 2

Contractor: SEQ Drilling, Inc.
Richmond, Virginia
Contractor Foreman: S. Sequist
Schnabel Representative: C. Lewis
Equipment: CME-550X
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Auto Hammer (140 lb)
Dates Started: 3/13/23 **Finished:** 3/13/23
Location: See Location Plan

Ground Surface Elevation: 199± (ft) **Total Depth:** 40.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	3/13	---	18.0'	---	---
Completion ▼	3/13	---	24.0'	---	---
Casing Pulled ▼	3/13	---	19.0'	---	20.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.2	Topsoil; 2 inches		198.8			S-01, SPT 5+5+6+5 REC=19", 79%		FILL
	FILL, sampled as clayey sand, fine to coarse grained sand; moist, brown Change: contains brick fragments, and asphalt fragments, trace gravel	FILL		F1		S-02, SPT 5+2+2+7 REC=8", 33%	LL = 32 PL = 16 MC = 12.0% % Passing #200 = 34.3	
4.0	FILL, sampled as silty sand, fine to coarse grained sand; moist, brown	FILL	195.0		5	S-03, SPT 3+2+2+2 REC=7", 29%		
6.0	CLAYEY SAND, fine to coarse grained sand; moist, reddish brown Change: trace gravel	SC	193.0	A2		S-04, SPT 2+3+4+6 REC=16", 67%		TERRACE
9.0	SANDY LEAN CLAY; moist, light gray and orangish brown	CL	190.0	A1	10	S-05, SPT 3+2+4+9 REC=12", 50%	LL = 34 PL = 16 MC = 16.1% % Passing #200 = 59.7 PP = 3.50 tsf	
12.0	CLAYEY SAND WITH GRAVEL, fine to coarse grained sand; moist, light brown	SC	187.0		15	S-06, SPT 11+11+12+15 REC=12", 50%		
17.0	CLAYEY SAND, fine to coarse grained sand; wet, orangish brown ▽ ▼	SC	182.0	A2	20	S-07, SPT 1/12"+1/12" REC=14", 58%	LL = 37 PL = 20 MC = 26.5% % Passing #200 = 13.9	
					25	S-08, SPT WOR+1+1+1 REC=20", 83%		
27.0	POORLY GRADED GRAVEL WITH SILT, fine and coarse grained gravel; wet, orangish brown	GP-GM	172.0		30	S-09, SPT 4+7+6+5 REC=17", 71%		

(continued)

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **RW-06**
Contract Number: 22130254.000
Sheet: 2 of 2

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
	POORLY GRADED GRAVEL WITH SILT, fine and coarse grained gravel; wet, orangish brown *(continued)*	GP-GM		A2	35	S-10, SPT 3+4+4+7 REC=5", 21%		TERRACE
37.0	FAT CLAY; wet, orangish brown	CH	162.0	B				MIOCENE
39.0						S-11, SPT 2+2+3+4 REC=24", 100%	PP = 2.00 tsf	
40.0	SILTY SAND, fine to coarse grained sand; wet, brown and black	SM	160.0 / 159.0	C	40			RESIDUUM

Bottom of Boring at 40.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

Schnabel ENGINEERING **TEST BORING LOG**

Project: George Wythe High School
4314 Crutchfield Street
Richmond, Virginia

Boring Number: **RW-07**
Contract Number: 22130254.000
Sheet: 1 of 1

Contractor: SEQ Drilling, Inc.
Richmond, Virginia
Contractor Foreman: S. Sequist
Schnabel Representative: C. Lewis
Equipment: CME-550X
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Auto Hammer (140 lb)
Dates Started: 3/13/23 **Finished:** 3/13/23
Location: See Location Plan

Ground Surface Elevation: 202± (ft) **Total Depth:** 20.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered	3/13	---	Dry	---	---
Completion	3/13	---	Dry	---	---
Casing Pulled	3/13	---	Dry	---	16.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.3	Topsoil; 3 inches		201.8					
	FILL, sampled as sandy lean clay; moist, reddish brown and brown, contains root fragments	FILL		F1		S-01, SPT 4+4+5+4 REC=7", 29%	PP = 4.50 tsf	FILL
2.0			200.0			S-02, SPT 3+4+5+5 REC=16", 67%	MC = 10.9%	
	FILL, sampled as clayey sand, fine to coarse grained sand; moist, brown	FILL		F2				
5.0	Change: trace gravel, contains crushed stone		197.0		5	S-03, SPT 5+8+5+6 REC=15", 63%		TERRACE
	SANDY LEAN CLAY; moist, light brown and orangish brown	CL		A1		S-04, SPT 3+5+6+8 REC=23", 96%	LL = 43 PL = 20 MC = 19.0% % Passing #200 = 63.8	
8.0	CLAYEY SAND, fine to coarse grained sand; moist, light brown and orangish brown		194.0			S-05, SPT 4+7+9+9 REC=24", 100%		
					10			
		SC		A2				Rig chatter.
	Change: orangish brown, trace gravel					S-06, SPT 15+13+14+16 REC=22", 92%		
					15			
17.0	FAT CLAY; moist, orangish brown and reddish brown, trace gravel		185.0					
		CH		A1		S-07, SPT 3+4+6+10 REC=24", 100%	PP >4.50 tsf	
20.0			182.0		20			

Bottom of Boring at 20.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and borehole plug upon completion.

APPENDIX B

SOIL LABORATORY TEST DATA

Summary of Laboratory Tests
Gradation Curves
Atterberg Limits
Moisture-Density Relationships
CBR Test Results
One-Dimensional Consolidation Test Results
Unconsolidated-Undrained Triaxial Test Results

Summary Of Laboratory Tests

Project Number: 22130254.000

Boring No.	Sample Depth ft / Elevation ft	Sample Type	Description of Soil Specimen	Stratum	Natural Moisture (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	% Passing No. 40 Sieve	% Retained No. 4 Sieve	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	CBR Value
B-01	4.0 - 5.5 / 200.0 - 198.5	Jar	FAT CLAY WITH SAND (CH), orange-brown and gray	A1	18.0	58	27	31	79.7	96.7	0.0	--	--	--
B-03	2.0 - 3.5 / 201.0 - 199.5	Jar	LEAN CLAY WITH SAND (CL), brown	A1	12.7	46	26	20	70.6	92.9	0.0	--	--	--
B-08	7.0 - 8.5 / 186.0 - 184.5	Jar	FILL, sampled as clayey sand with gravel (SC), brown and gray	F2	13.6	40	23	17	28.0	50.5	19.2	--	--	--
B-09	19.0 - 20.5 / 176.0 - 174.5	Jar	POORLY GRADED SAND WITH SILT AND GRAVEL(SP-SM), brown	A2	25.8	NP	NP	NP	11.5	35.4	4.9	--	--	--
B-10	7.0 - 8.5 / 187.0 - 185.5	Jar	SANDY LEAN CLAY (CL), light brown	A1	13.8	40	16	24	50.3	75.2	8.0	--	--	--
B-12A	20.0 - 21.0 / 179.0 - 178.0	Tube	SANDY FAT CLAY (CH), light brown	A1	31.2	61	26	35	62.9	95.0	0.0	--	--	--
B-13	4.0 - 5.5 / 189.0 - 187.5	Jar	Fill, sampled as, clayey sand (SC), fine to coarse grained sand, brown	F1	13.1	34	17	17	39.6	77.7	0.7	--	--	--

Notes:
1. Soil tests in general accordance with ASTM standards.
2. Soil classifications are in general accordance with ASTM D2487(as applicable), based on testing indicated and visual classification.
3. Key to abbreviations: NP=Non-Plastic; -- indicates no test performed

Schnabel ENGINEERING

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Summary Of Laboratory Tests

Project Number: 22130254.000

Boring No.	Sample Depth ft / Elevation ft	Sample Type	Description of Soil Specimen	Stratum	Natural Moisture (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	% Passing No. 40 Sieve	% Retained No. 4 Sieve	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	CBR Value
B-15	14.0 - 15.5 / 181.0 - 179.5	Jar	CLAYEY SAND (SC), reddish brown	A2	27.3	NP	NP	NP	12.0	37.4	2.5	--	--	--
P-03	0.0 - 5.0 / 202.0 - 197.0	Bulk	SANDY LEAN CLAY (CL, A-7-6), brown	A1	14.7	47	23	24	64.7	87.9	0.4	111.3	16.2	13.4
P-06	0.0 - 5.0 / 194.0 - 189.0	Bulk	FILL, sampled as clayey sand (SC, A-2-6), brown	F2	7.0	26	15	11	45.0	73.5	1.7	124.5	9.8	15.1
RW-01	4.0 - 6.0 / 198.0 - 196.0	Jar	SILTY SAND (SM), fine to coarse grained sand, reddish brown	A2	20.6	70	39	31	44.8	66.9	4.4	--	--	--
RW-02	2.0 - 4.0 / 202.0 - 200.0	Jar	SILTY SAND (SM), fine to coarse grained sand, reddish brown	A2	22.8	69	38	31	48.6	66.6	5.0	--	--	--
RW-02	18.0 - 20.0 / 186.0 - 184.0	Jar	CLAYEY SAND WITH GRAVEL (SC), fine to coarse grained sand, brown	A2	8.4	36	18	18	12.6	29.5	36.2	--	--	--
RW-02A	6.0 - 8.0 / 198.0 - 196.0	Tube	CLAYEY SAND (SC), fine to medium grained sand, red and gray	A2	18.0	45	25	20	26.8	83.7	--	--	--	--

Notes:
1. Soil tests in general accordance with ASTM standards.
2. Soil classifications are in general accordance with ASTM D2487(as applicable), based on testing indicated and visual classification.
3. Key to abbreviations: NP=Non-Plastic; -- indicates no test performed

Schnabel ENGINEERING

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Summary Of Laboratory Tests

Project Number: 22130254.000

Boring No.	Sample Depth ft / Elevation ft	Sample Type	Description of Soil Specimen	Stratum	Natural Moisture (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	% Passing No. 40 Sieve	% Retained No. 4 Sieve	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	CBR Value
RW-03	0.0 - 2.0 205.0 - 203.0	Jar	SANDY LEAN CLAY (CL), brown	A1	13.0	26	14	12	52.9	82.3	1.9	--	--	--
RW-03	23.0 - 25.0 182.0 - 180.0	Jar	CLAYEY SAND WITH GRAVEL (SC), fine to coarse grained sand , orangish brown	A2	23.4	46	24	22	12.5	31.1	21.1	--	--	--
RW-03	33.0 - 35.0 172.0 - 170.0	Jar	SILTY SAND (SM), fine to coarse grained sand, brown	C	31.3	41	34	7	31.8	81.8	0.9	--	--	--
RW-04	2.0 - 4.0 202.0 - 200.0	Jar	CLAYEY SAND WITH GRAVEL (SC), fine to coarse grained sand, brown	A2	11.2	33	17	16	27.6	60.1	15.4	--	--	--
RW-04	8.0 - 10.0 196.0 - 194.0	Jar	CLAYEY SAND WITH GRAVEL (SC),fine to coarse grained sand, brown	A2	9.1	28	17	11	13.6	43.4	30.8	--	--	--
RW-04	23.0 - 25.0 181.0 - 179.0	Jar	SILTY SAND (SM), fine to medium grained sand, contains mica, brown	C	33.4	39	32	7	25.4	83.3	--	--	--	--
RW-05	2.0 - 4.0 200.0 - 198.0	Jar	CLAYEY SAND (SC), fine to coarse grained sand, reddish brown	A2	15.7	52	24	28	30.2	63.1	0.0	--	--	--

Notes:
1. Soil tests in general accordance with ASTM standards.
2. Soil classifications are in general accordance with ASTM D2487(as applicable), based on testing indicated and visual classification.
3. Key to abbreviations: NP=Non-Plastic; -- indicates no test performed

Schnabel ENGINEERING

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Summary Of Laboratory Tests

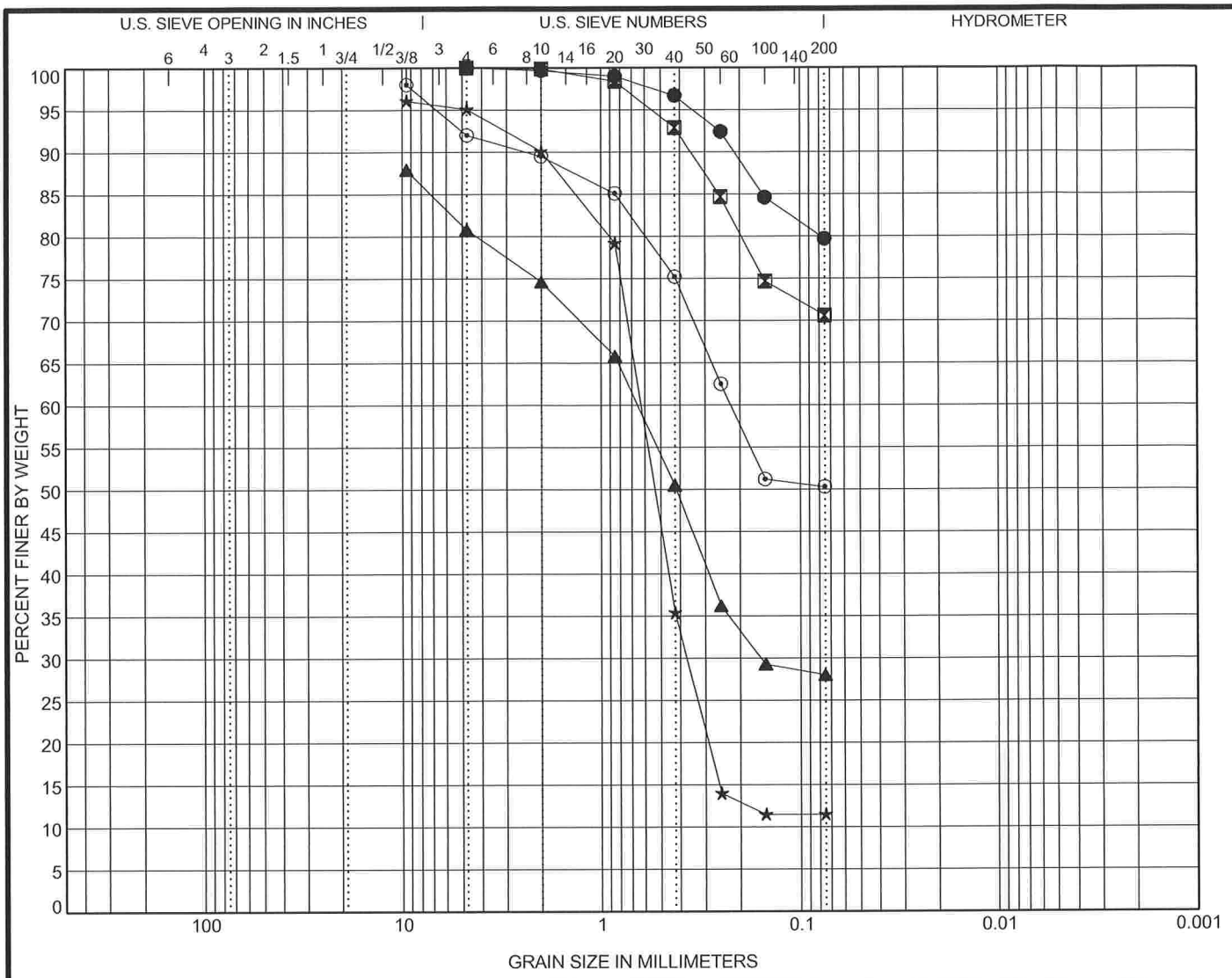
Project Number: 22130254.000

Boring No.	Sample Depth ft / Elevation ft	Sample Type	Description of Soil Specimen	Stratum	Natural Moisture (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	% Passing No. 40 Sieve	% Retained No. 4 Sieve	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	CBR Value
RW-05	13.0 - 15.0 / 189.0 - 187.0	Jar	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), fine and coarse grained, light brown	A2	6.7	32	17	15	8.7	22.1	49.9	--	--	--
RW-05	33.0 - 35.0 / 169.0 - 167.0	Jar	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), fine to coarse grained sand, brown	A2	9.9	20	18	2	6.1	21.6	45.6	--	--	--
RW-06	2.0 - 4.0 / 197.0 - 195.0	Jar	CLAYEY SAND (SC), fine to coarse grained sand, brown	F2	12.0	32	16	16	34.3	70.7	2.6	--	--	--
RW-06	8.0 - 10.0 / 191.0 - 189.0	Jar	SANDY LEAN CLAY (CL), brown and gray	A1	16.1	34	16	18	59.7	84.3	4.4	--	--	--
RW-06	18.0 - 20.0 / 181.0 - 179.0	Jar	CLAYEY SAND (SC), fine to coarse grained sand, brown	A2	26.5	37	20	17	13.9	46.2	0.5	--	--	--
RW-07	6.0 - 8.0 / 196.0 - 194.0	Jar	SANDY LEAN CLAY (CL), brown	A1	19.0	43	20	23	63.8	89.2	0.0	--	--	--

Notes:
1. Soil tests in general accordance with ASTM standards.
2. Soil classifications are in general accordance with ASTM D2487(as applicable), based on testing indicated and visual classification.
3. Key to abbreviations: NP=Non-Plastic; -- indicates no test performed

Schnabel ENGINEERING

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen		Sample Description	LL	PL	PI	Cc	Cu
● B-01	4.0 ft	FAT CLAY WITH SAND (CH), orange-brown and gray	58	27	31	--	--
⊠ B-03	2.0 ft	LEAN CLAY WITH SAND (CL), brown	46	26	20	--	--
▲ B-08	7.0 ft	FILL, sampled as clayey sand with gravel (SC), brown and gray	40	23	17	--	--
★ B-09	19.0 ft	POORLY GRADED SAND WITH SILT AND GRAVEL(SP-SM), brown	NP	NP	NP	--	--
⊙ B-10	7.0 ft	SANDY LEAN CLAY (CL), light brown	40	16	24	--	--

Specimen		Test Method	Testing Lab	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-01	4.0 ft	ASTM D6913	RICH	4.75	--	--	--	0.0	20.3	79.7	
⊠ B-03	2.0 ft	ASTM D6913	RICH	4.75	--	--	--	0.0	29.4	70.6	
▲ B-08	7.0 ft	ASTM D6913	RICH	9.5	0.65	0.16	--	19.2	52.8	28.0	
★ B-09	19.0 ft	ASTM D6913	RICH	9.5	0.63	0.37	--	4.9	83.6	11.5	
⊙ B-10	7.0 ft	ASTM D6913	RICH	9.5	0.22	--	--	8.0	41.7	50.3	

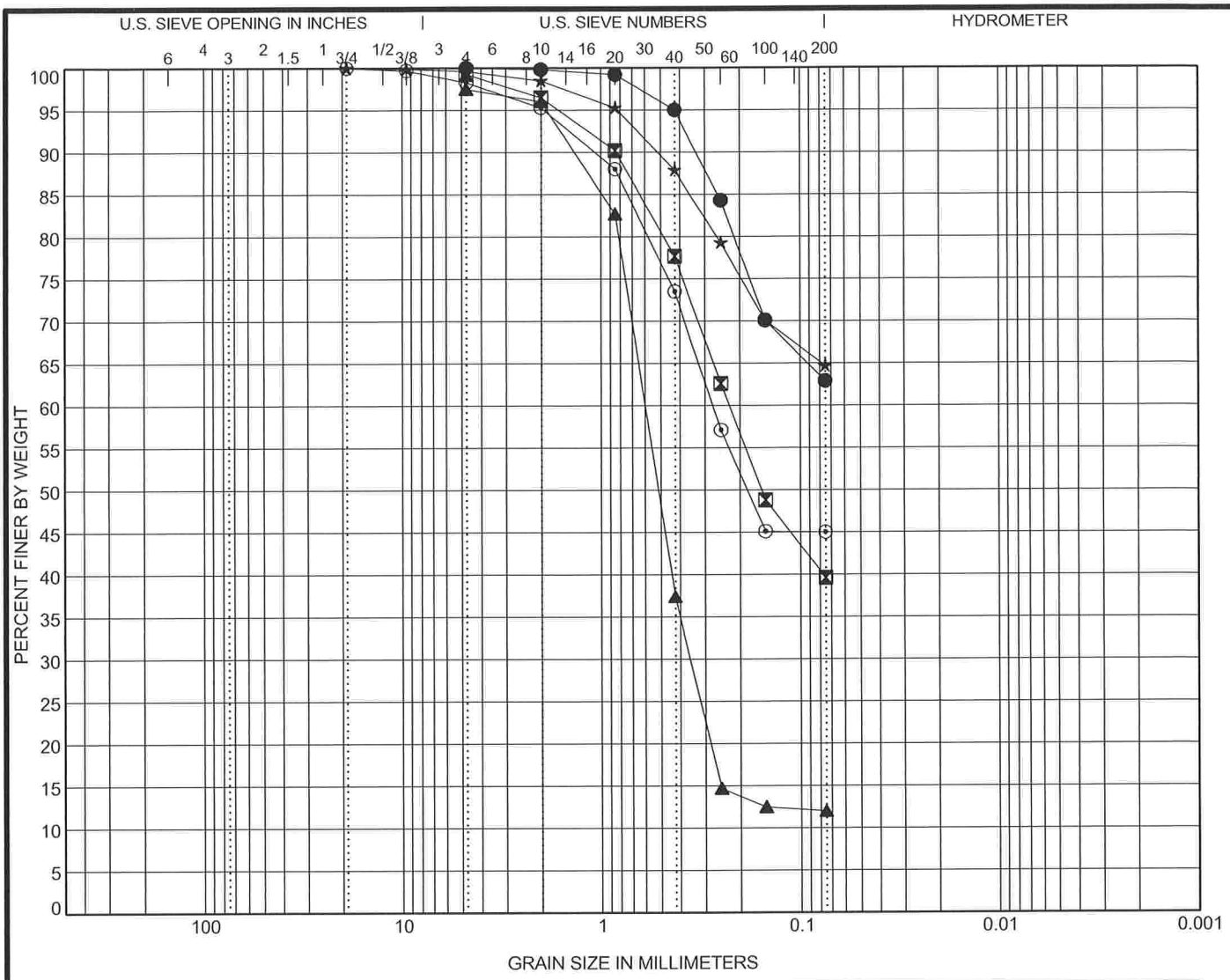
Schnabel ENGINEERING

GRADATION CURVES

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Contract: 22130254.000

SIEVE 5 SHEET 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2010 02 25.GDT 4/25/23



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen		Sample Description	LL	PL	PI	Cc	Cu
● B-12A	20.0 ft	SANDY FAT CLAY (CH), light brown	61	26	35	--	--
⊠ B-13	4.0 ft	Fill, sampled as, clayey sand (SC), fine to coarse grained sand, brown	34	17	17	--	--
▲ B-15	14.0 ft	CLAYEY SAND (SC), reddish brown	NP	NP	NP	45.40	128.12
★ P-03	0.0 ft	SANDY LEAN CLAY (CL, A-7-6), brown	47	23	24	--	--
⊙ P-06	0.0 ft	FILL, sampled as clayey sand (SC, A-2-6), brown	26	15	11	--	--

Specimen		Test Method	Testing Lab	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-12A	20.0 ft	ASTM D6913	RICH	4.75	--	--	--	0.0	37.1	62.9	
⊠ B-13	4.0 ft	ASTM D6913	RICH	4.75	0.23	--	--	0.7	59.7	39.6	
▲ B-15	14.0 ft	ASTM D6913	RICH	4.75	0.6	0.36	--	2.5	85.5	12.0	
★ P-03	0.0 ft	ASTM D6913	RICH	19	--	--	--	0.4	34.9	64.7	
⊙ P-06	0.0 ft	ASTM D6913	RICH	19	0.27	--	--	1.7	53.3	45.0	

Schnabel ENGINEERING

GRADATION CURVES

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Contract: 22130254.000

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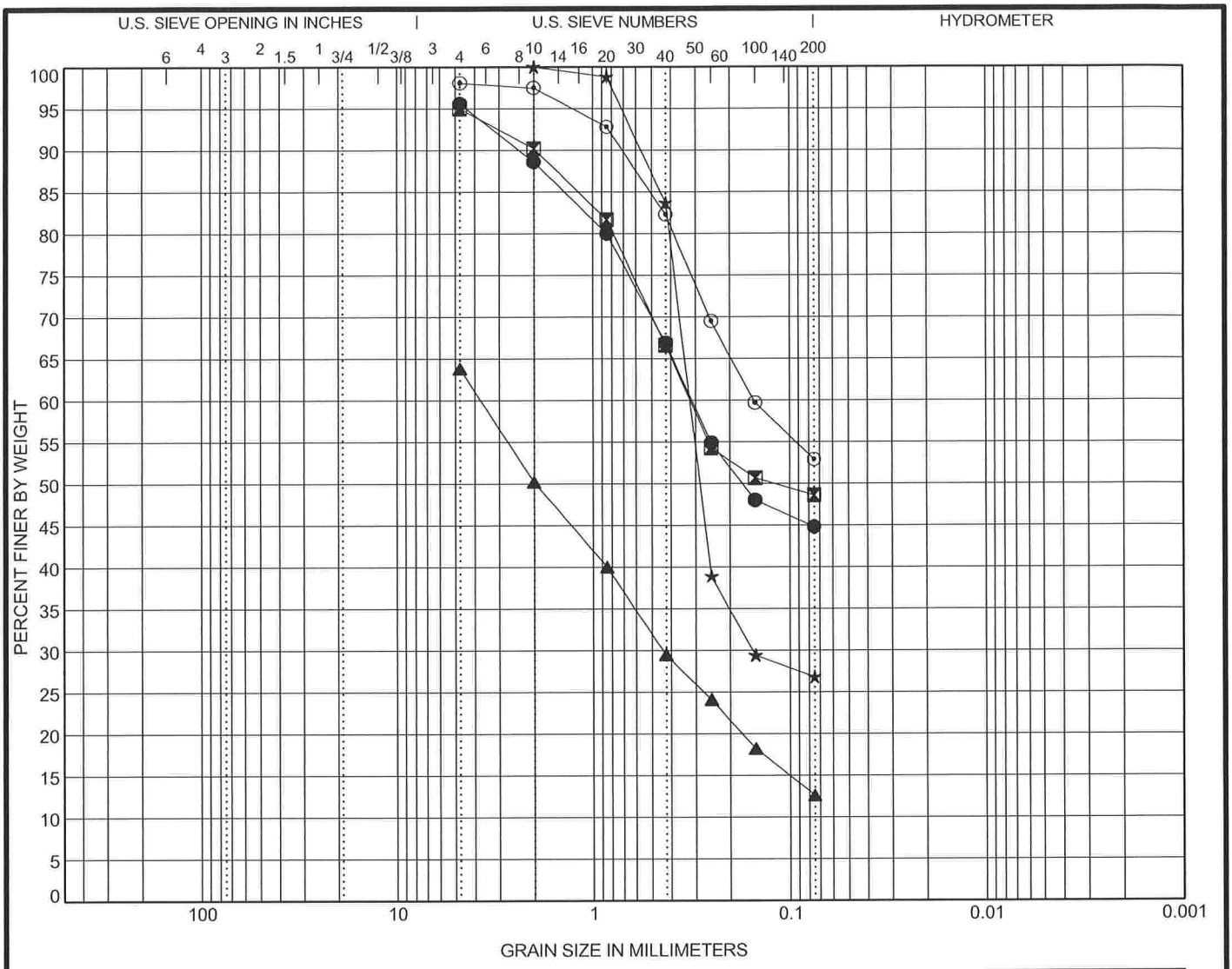


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen		Sample Description	LL	PL	PI	Cc	Cu
● RW-01	4.0 ft	SILTY SAND (SM), fine to coarse grained sand, reddish brown	70	39	31	--	--
⊠ RW-02	2.0 ft	SILTY SAND (SM), fine to coarse grained sand, reddish brown	69	38	31	--	--
▲ RW-02	18.0 ft	CLAYEY SAND WITH GRAVEL (SC), fine to coarse grained sand, brown	36	18	18	--	--
★ RW-02A	6.0 ft	CLAYEY SAND (SC), fine to medium grained sand, red and gray	45	25	20	--	--
⊙ RW-03	0.0 ft	SANDY LEAN CLAY (CL), brown	26	14	12	--	--

Specimen		Test Method	Testing Lab	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-01	4.0 ft	ASTM D6913	RICH	4.75	0.31	--	--	4.4	50.8	44.8	
⊠ RW-02	2.0 ft	ASTM D6913	RICH	4.75	0.32	--	--	5.0	46.4	48.6	
▲ RW-02	18.0 ft	ASTM D6913	RICH	4.75	3.73	0.44	--	36.2	51.2	12.6	
★ RW-02A	6.0 ft	ASTM D6913	RICH	2	0.32	0.15	--	0.0	73.2	26.8	
⊙ RW-03	0.0 ft	ASTM D6913	RICH	4.75	0.15	--	--	1.9	45.2	52.9	

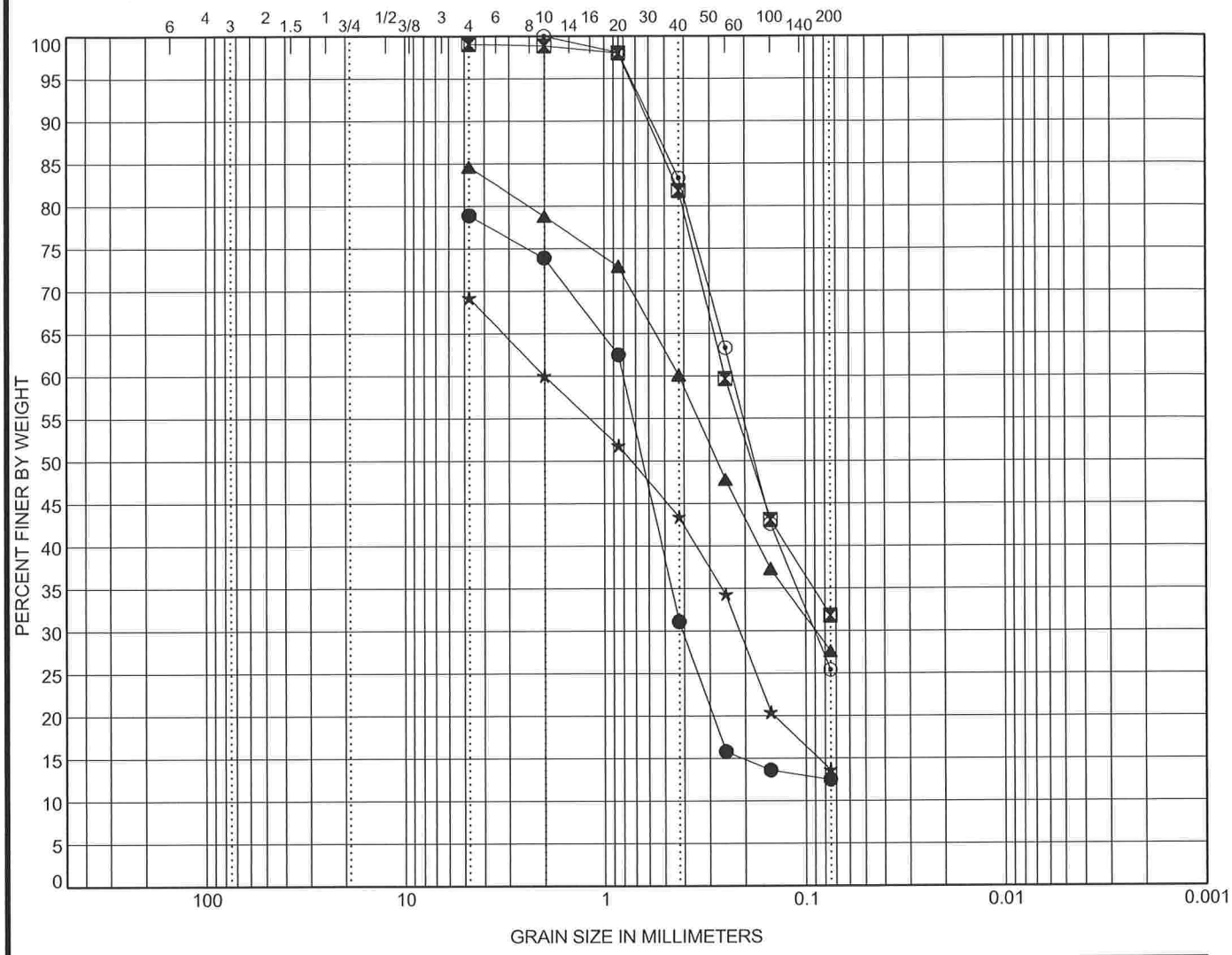
Schnabel ENGINEERING

GRADATION CURVES

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Contract: 22130254.000

SIEVE 5 SHEET 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2010 02 25.GDT 4/25/23



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen		Sample Description	LL	PL	PI	Cc	Cu
● RW-03	23.0 ft	CLAYEY SAND WITH GRAVEL (SC), fine to coarse grained sand , orangish brown	46	24	22	--	--
⊠ RW-03	33.0 ft	SILTY SAND (SM), fine to coarse grained sand, brown	41	34	7	--	--
▲ RW-04	2.0 ft	CLAYEY SAND WITH GRAVEL (SC), fine to coarse grained sand, brown	33	17	16	--	--
★ RW-04	8.0 ft	CLAYEY SAND WITH GRAVEL (SC),fine to coarse grained sand, brown	28	17	11	--	--
⊙ RW-04	23.0 ft	SILTY SAND (SM), fine to medium grained sand, contains mica, brown	39	32	7	--	--

Specimen		Test Method	Testing Lab	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-03	23.0 ft	ASTM D6913	RICH	4.75	0.8	0.41	--	21.1	66.4	12.5	
⊠ RW-03	33.0 ft	ASTM D6913	RICH	4.75	0.25	--	--	0.9	67.3	31.8	
▲ RW-04	2.0 ft	ASTM D6913	RICH	4.75	0.42	0.09	--	15.4	57.0	27.6	
★ RW-04	8.0 ft	ASTM D6913	RICH	4.75	2	0.21	--	30.8	55.6	13.6	
⊙ RW-04	23.0 ft	ASTM D6913	RICH	2	0.23	0.09	--	0.0	74.6	25.4	

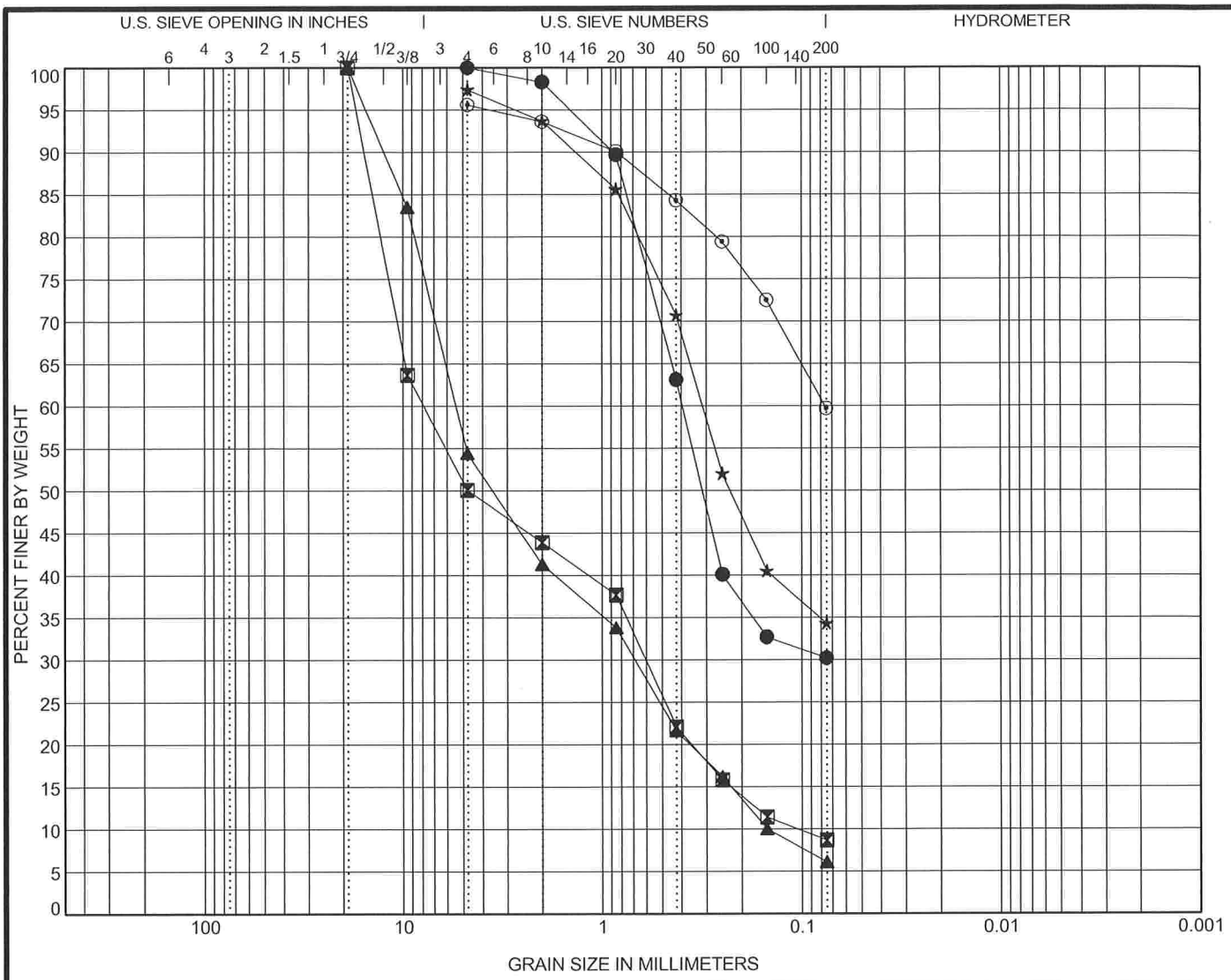
Schnabel ENGINEERING

GRADATION CURVES

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Contract: 22130254.000

SIEVE 5 SHEET 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2010 02 25.GDT 4/25/23



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen		Sample Description	LL	PL	PI	Cc	Cu
● RW-05	2.0 ft	CLAYEY SAND (SC), fine to coarse grained sand, reddish brown	52	24	28	--	--
⊠ RW-05	13.0 ft	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), fine and coarse grained, light brown	32	17	15	0.44	75.13
▲ RW-05	33.0 ft	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), fine to coarse grained sand, brown	20	18	2	0.58	36.19
★ RW-06	2.0 ft	CLAYEY SAND (SC), fine to coarse grained sand, brown	32	16	16	--	--
⊙ RW-06	8.0 ft	SANDY LEAN CLAY (CL), brown and gray	34	16	18	--	--

Specimen		Test Method	Testing Lab	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-05	2.0 ft	ASTM D6913	RICH	4.75	0.4	--	--	0.0	69.8	30.2	
⊠ RW-05	13.0 ft	ASTM D6913	RICH	19	7.87	0.6	0.105	49.9	41.4	8.7	
▲ RW-05	33.0 ft	ASTM D6913	RICH	19	5.43	0.68	0.15	45.6	48.3	6.1	
★ RW-06	2.0 ft	ASTM D6913	RICH	4.75	0.31	--	--	2.6	63.1	34.3	
⊙ RW-06	8.0 ft	ASTM D6913	RICH	4.75	0.08	--	--	4.4	35.9	59.7	

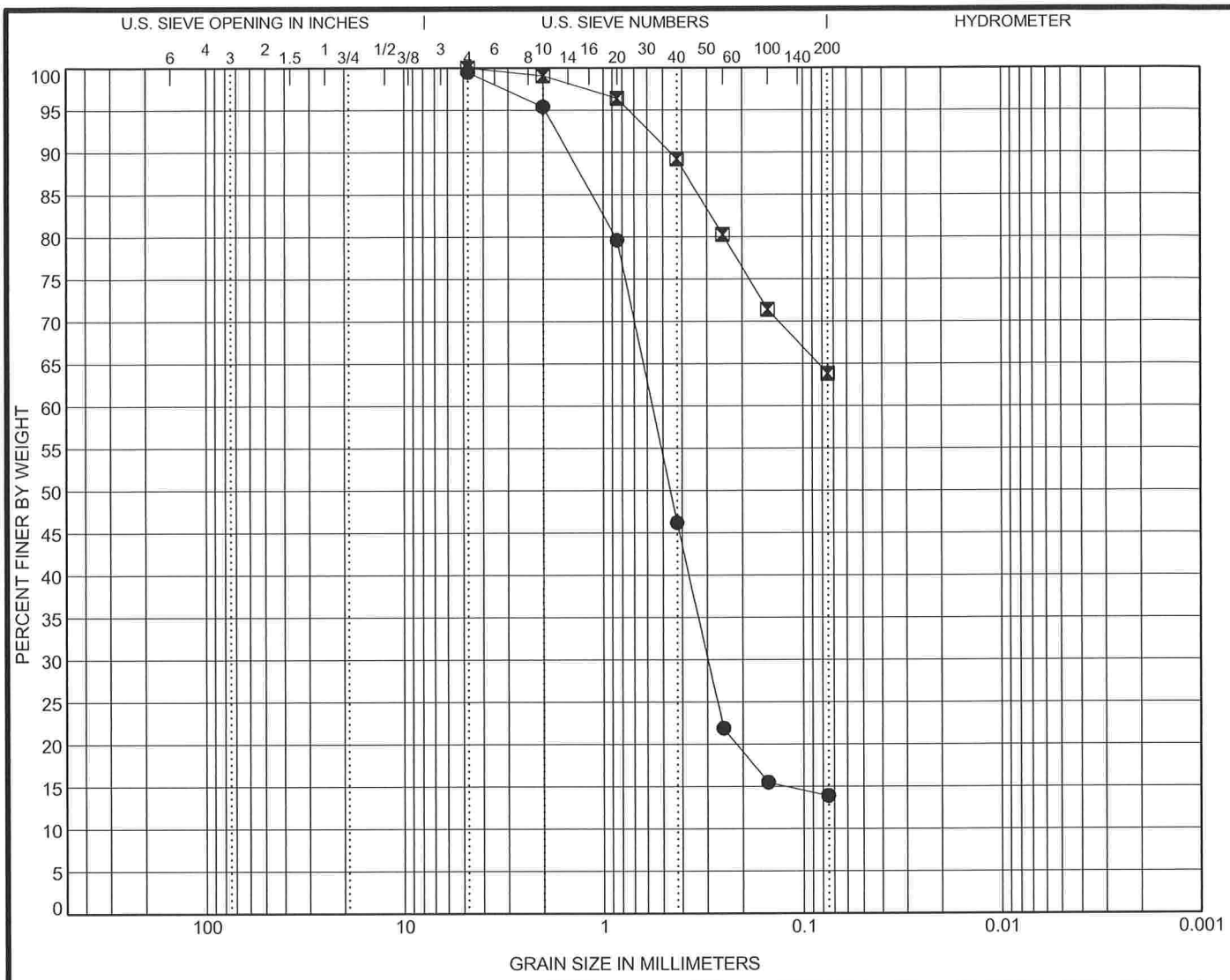
Schnabel ENGINEERING

GRADATION CURVES

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Contract: 22130254.000

SIEVE 5 SHEET 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2010 02 25.GDT 4/25/23



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen		Sample Description	LL	PL	PI	Cc	Cu
● RW-06	18.0 ft	CLAYEY SAND (SC), fine to coarse grained sand, brown	37	20	17	--	--
⊠ RW-07	6.0 ft	SANDY LEAN CLAY (CL), brown	43	20	23	--	--

Specimen		Test Method	Testing Lab	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-06	18.0 ft	ASTM D6913	RICH	4.75	0.57	0.3	--	0.5	85.6	13.9	
⊠ RW-07	6.0 ft	ASTM D6913	RICH	4.75	--	--	--	0.0	36.2	63.8	

Schnabel ENGINEERING

GRADATION CURVES

Project: George Wythe High School
4314 Crutchfield Street
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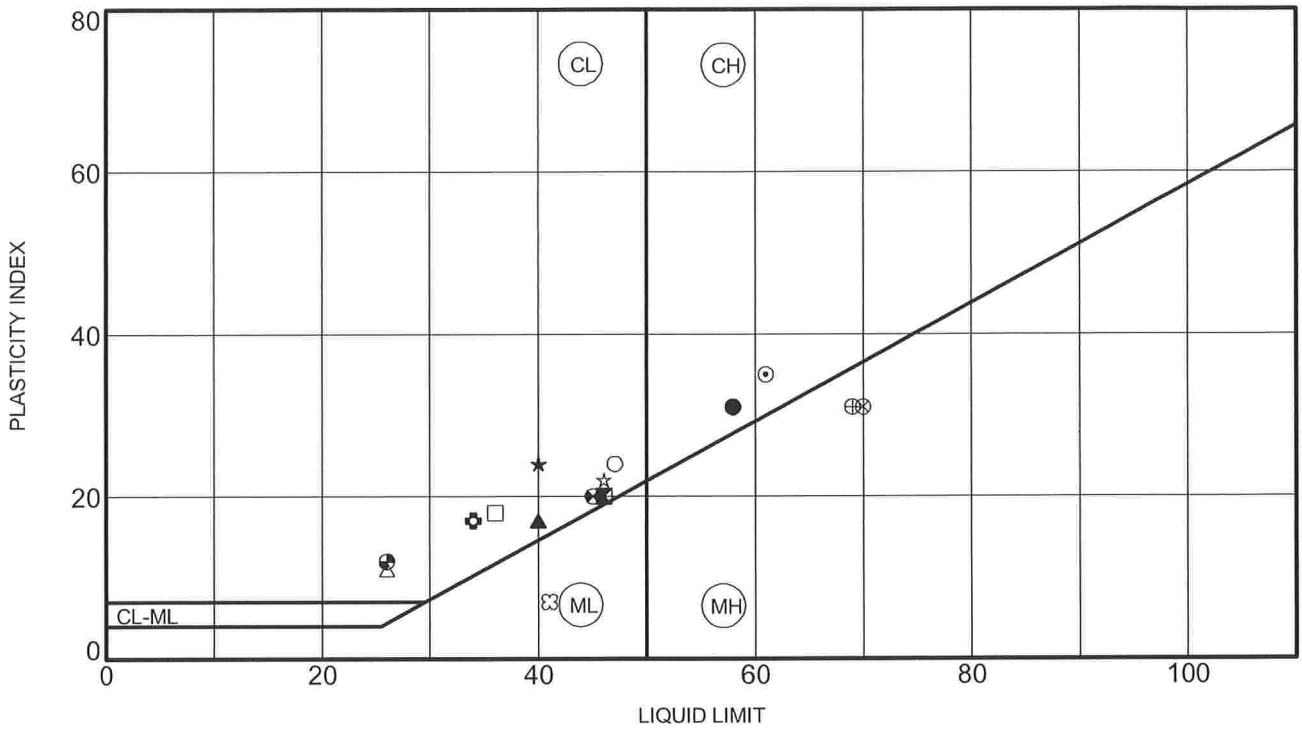
SIEVE 5 SHEET 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2010 02 25.GDT 4/25/23



PLOTTED DATA REPRESENTS SOIL PASSING NO. 40 SIEVE

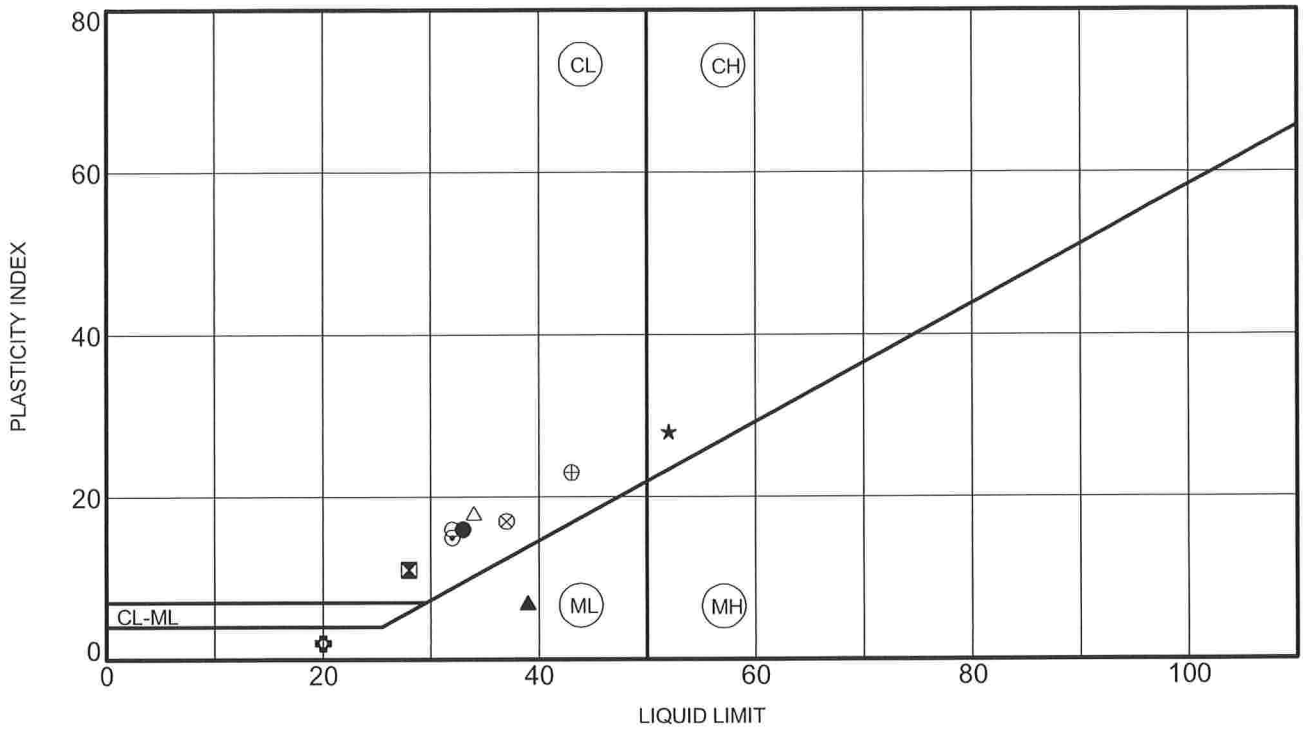
	Specimen		LL	PL	PI	Fines	Testing Lab	Description
●	B-01	4.0 ft	58	27	31	80	RICH	FAT CLAY WITH SAND (CH), orange-brown and gray
⧓	B-03	2.0 ft	46	26	20	71	RICH	LEAN CLAY WITH SAND (CL), brown
▲	B-08	7.0 ft	40	23	17	28	RICH	FILL, sampled as clayey sand with gravel (SC), brown and gray
★	B-10	7.0 ft	40	16	24	50	RICH	SANDY LEAN CLAY (CL), light brown
⊙	B-12A	20.0 ft	61	26	35	63	RICH	SANDY FAT CLAY (CH), light brown
✿	B-13	4.0 ft	34	17	17	40	RICH	Fill, sampled as, clayey sand (SC), fine to coarse grained sand, brown
○	P-03	0.0 ft	47	23	24	65	RICH	SANDY LEAN CLAY (CL, A-7-6), brown
△	P-06	0.0 ft	26	15	11	45	RICH	FILL, sampled as clayey sand (SC, A-2-6), brown
⊗	RW-01	4.0 ft	70	39	31	45	RICH	SILTY SAND (SM), fine to coarse grained sand, reddish brown
⊕	RW-02	2.0 ft	69	38	31	49	RICH	SILTY SAND (SM), fine to coarse grained sand, reddish brown
□	RW-02	18.0 ft	36	18	18	13	RICH	CLAYEY SAND WITH GRAVEL (SC), fine to coarse grained sand, brown
⊠	RW-02A	6.0 ft	45	25	20	27	RICH	CLAYEY SAND (SC), fine to medium grained sand, red and gray
◕	RW-03	0.0 ft	26	14	12	53	RICH	SANDY LEAN CLAY (CL), brown
☆	RW-03	23.0 ft	46	24	22	13	RICH	CLAYEY SAND WITH GRAVEL (SC), fine to coarse grained sand , orangish brown
⧓	RW-03	33.0 ft	41	34	7	32	RICH	SILTY SAND (SM), fine to coarse grained sand, brown

Schnabel ENGINEERING

ATTERBERG LIMITS

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Contract: 22130254.000



PLOTTED DATA REPRESENTS SOIL PASSING NO. 40 SIEVE

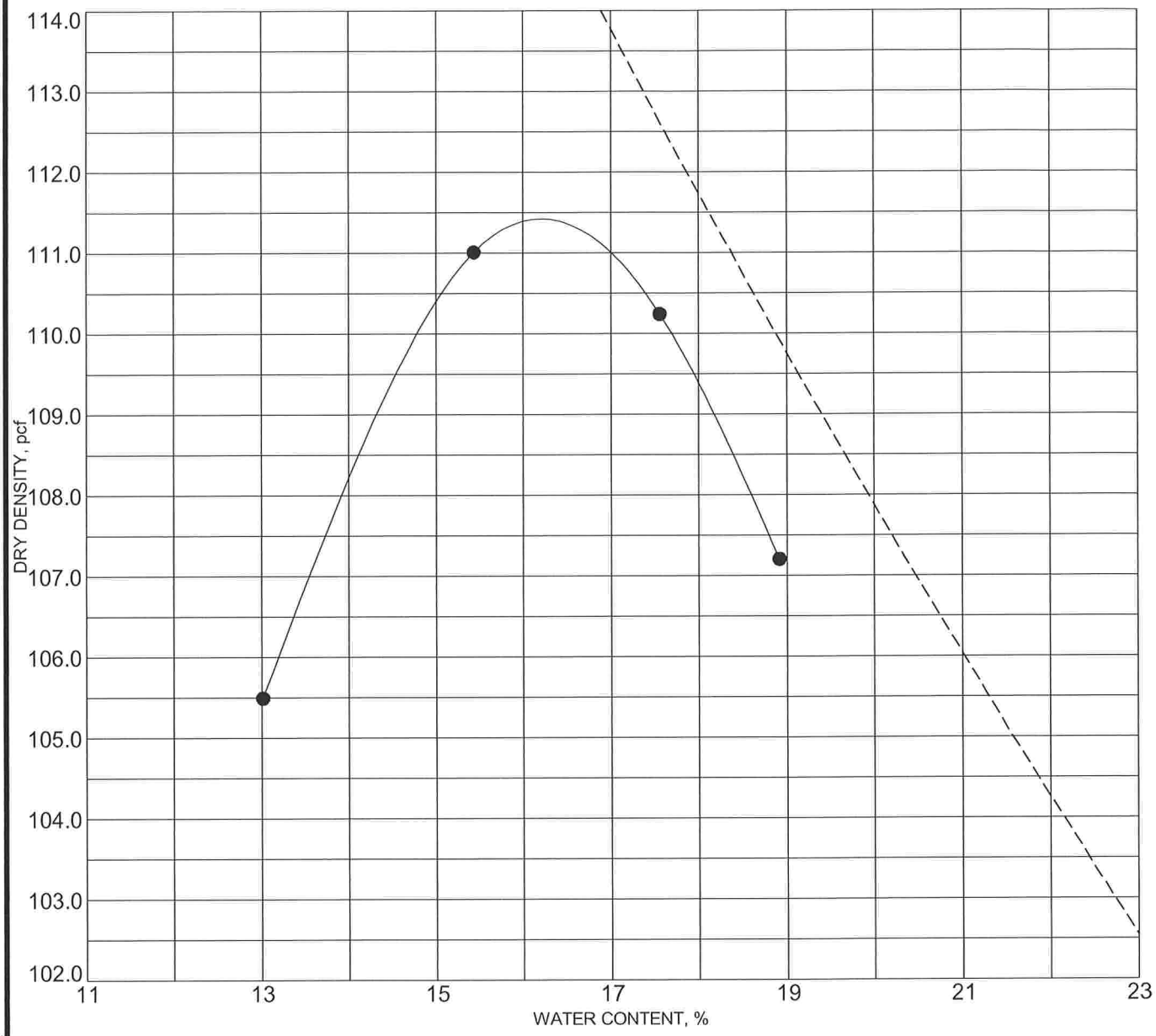
	Specimen		LL	PL	PI	Fines	Testing Lab	Description
●	RW-04	2.0 ft	33	17	16	28	RICH	CLAYEY SAND WITH GRAVEL (SC), fine to coarse grained sand, brown
⊠	RW-04	8.0 ft	28	17	11	14	RICH	CLAYEY SAND WITH GRAVEL (SC),fine to coarse grained sand, brown
▲	RW-04	23.0 ft	39	32	7	25	RICH	SILTY SAND (SM), fine to medium grained sand, contains mica, brown
★	RW-05	2.0 ft	52	24	28	30	RICH	CLAYEY SAND (SC), fine to coarse grained sand, reddish brown
⊙	RW-05	13.0 ft	32	17	15	9	RICH	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), fine and coarse grained, light brown
✿	RW-05	33.0 ft	20	18	2	6	RICH	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), fine to coarse grained sand, brown
○	RW-06	2.0 ft	32	16	16	34	RICH	CLAYEY SAND (SC), fine to coarse grained sand, brown
△	RW-06	8.0 ft	34	16	18	60	RICH	SANDY LEAN CLAY (CL), brown and gray
⊗	RW-06	18.0 ft	37	20	17	14	RICH	CLAYEY SAND (SC), fine to coarse grained sand, brown
⊕	RW-07	6.0 ft	43	20	23	64	RICH	SANDY LEAN CLAY (CL), brown

Schnabel ENGINEERING

ATTERBERG LIMITS

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Contract: 22130254.000



Sample Description:	SANDY LEAN CLAY (CL, A-7-6), brown
Sample Source:	P-03, 0.0 ft
Test Methods:	ASTM D698 Method B

Assumed Specific Gravity:	2.64
Max. Dry Density (pcf):	111.3
Opt. Moisture (%):	16.2

Liquid Limit (LL):	47
Plasticity Index (PI):	24
% Retained #4 Sieve:	0.4
% Passing # 200 Sieve:	64.7

Comments:
Bulk sample obtained from auger cuttings over the depth interval 0 to 6.0 feet

Date: 08/03/22 Reviewed By: DS

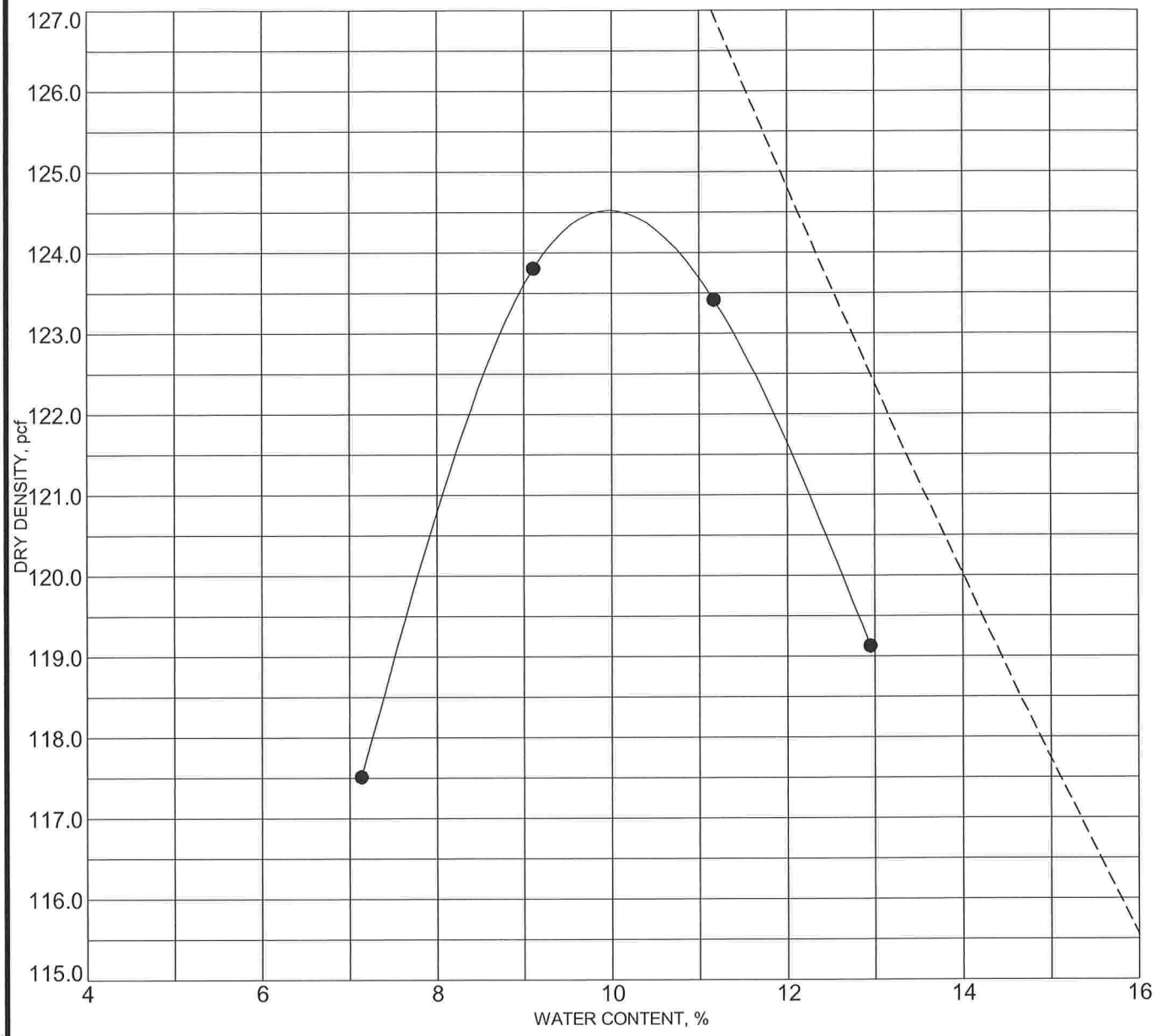
Schnabel ENGINEERING

MOISTURE DENSITY RELATIONSHIP

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Contract: 22130254.000 **Testing Lab:** RICH

COMPACTION 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008 04 22.GDT 8/12/22



Sample Description:	FILL, sampled as clayey sand (SC, A-2-6), brown
Sample Source:	P-06, 0.0 ft
Test Methods:	ASTM D698 Method B

Assumed Specific Gravity:	2.63
Max. Dry Density (pcf):	124.5
Opt. Moisture (%):	9.8

Liquid Limit (LL):	26
Plasticity Index (PI):	11
% Retained #4 Sieve:	1.7
% Passing # 200 Sieve:	45.0

Comments:
Bulk sample obtained from auger cutttings over the depth interval 0 to 5.0 feet

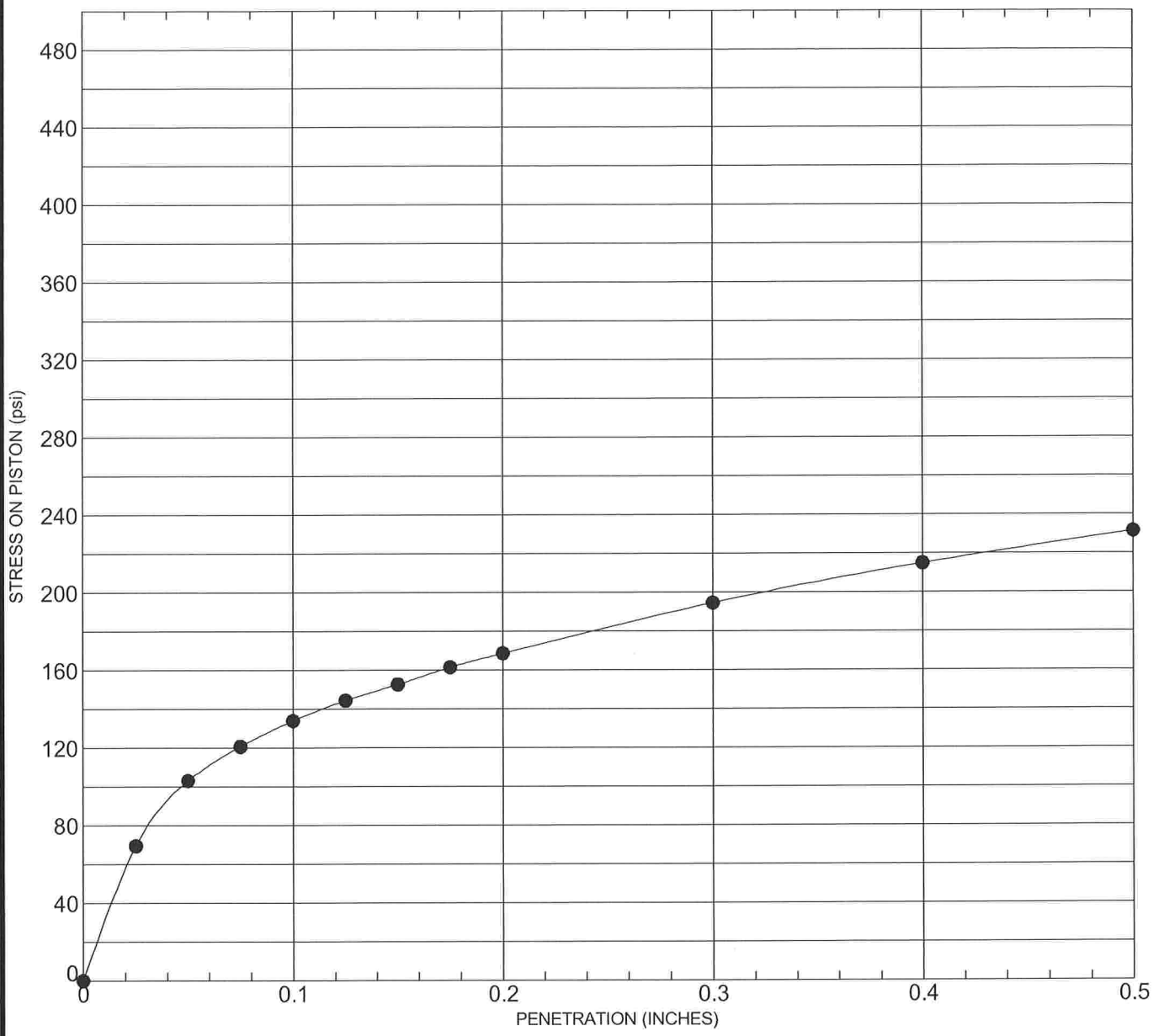
Date: 8/03/22 Reviewed By: DS

Schnabel ENGINEERING

MOISTURE DENSITY RELATIONSHIP

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Contract: 22130254.000 **Testing Lab:** RICH



Sample Description: SANDY LEAN CLAY (CL, A-7-6), brown

Sample Source: P-03
Sample Depth: 0.0 ft
Test Method: VTM-8

Dry Density Before Soaking (pcf):	110.9
Dry Density After Soaking (pcf):	110.6
Maximum Dry Density (pcf):	111.3
Moisture Content Before Soaking (%):	16.2
Moisture Content After Soaking (Avg) (%):	17.6
Moisture Content Top Inch After Soak (%):	19.5
Optimum Moisture Content (%):	16.2

Liquid Limit (LL):	47
Plasticity Index (PI):	24
% Retained #4 Sieve:	0.4
% Passing # 200 Sieve:	64.7

CBR:	13.4, Soaked
Surcharge (psf):	50
Swell (%):	0.3

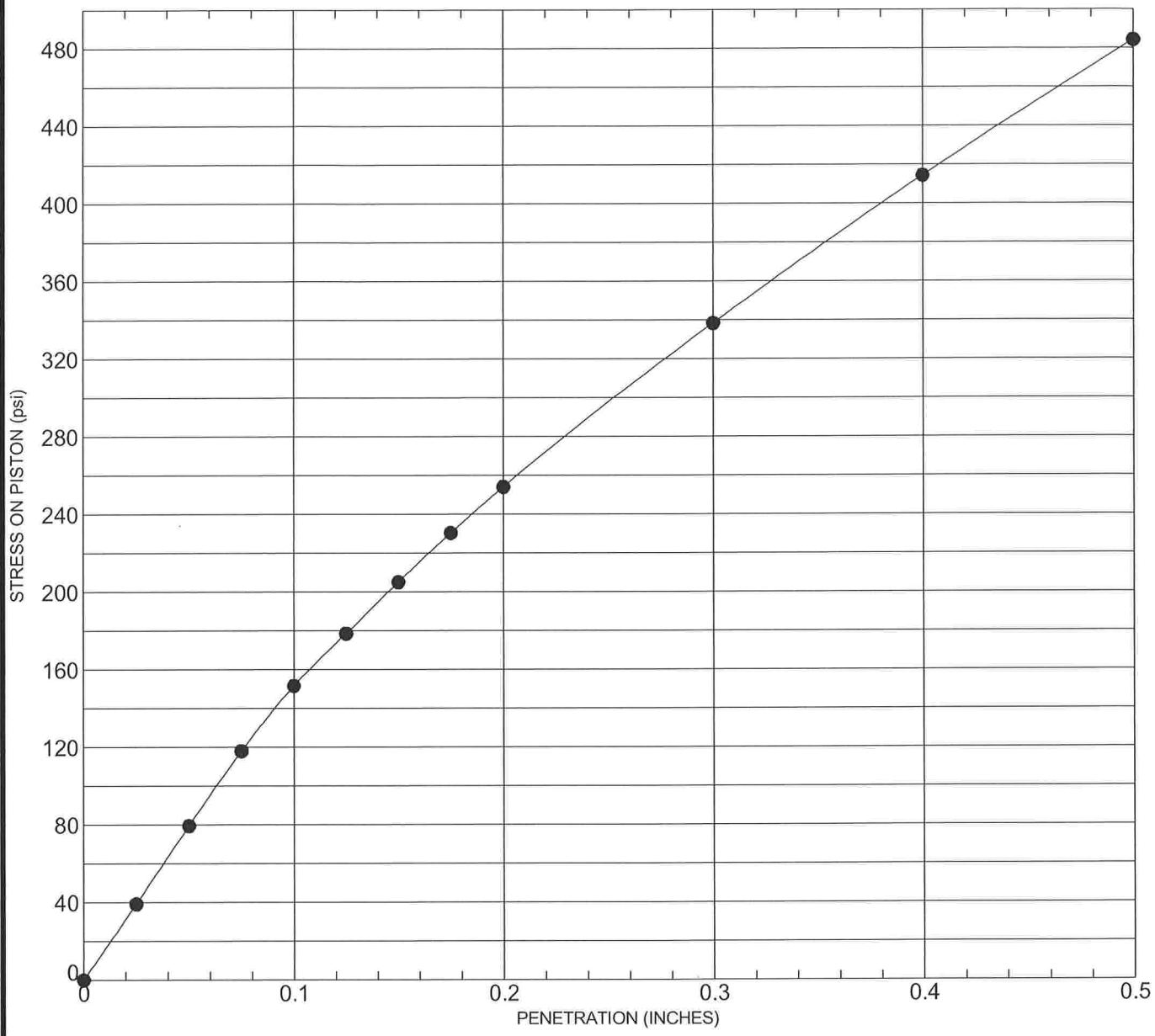
Schnabel ENGINEERING

CALIFORNIA BEARING RATIO TEST

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Contract: 22130254.000 **Testing Lab:** RICH

CBR SINGLE POINT 22130254 LOGS.GPJ SCHNABEL DATA TEMPLATE 2008 04 22.GDT 8/12/22



Sample Description:	FILL, sampled as clayey sand (SC, A-2-6), brown
Sample Source:	P-06
Sample Depth:	0.0 ft
Test Method:	VTM-8

Dry Density Before Soaking (pcf):	124.3
Dry Density After Soaking (pcf):	124.3
Maximum Dry Density (pcf):	124.5
Moisture Content Before Soaking (%):	9.9
Moisture Content After Soaking (Avg) (%):	10.8
Moisture Content Top Inch After Soak (%):	11.7
Optimum Moisture Content (%):	9.8

Liquid Limit (LL):	26
Plasticity Index (PI):	11
% Retained #4 Sieve:	1.7
% Passing # 200 Sieve:	45.0

CBR:	15.1, Soaked
Surcharge (psf):	50
Swell (%):	0.0

Schnabel ENGINEERING

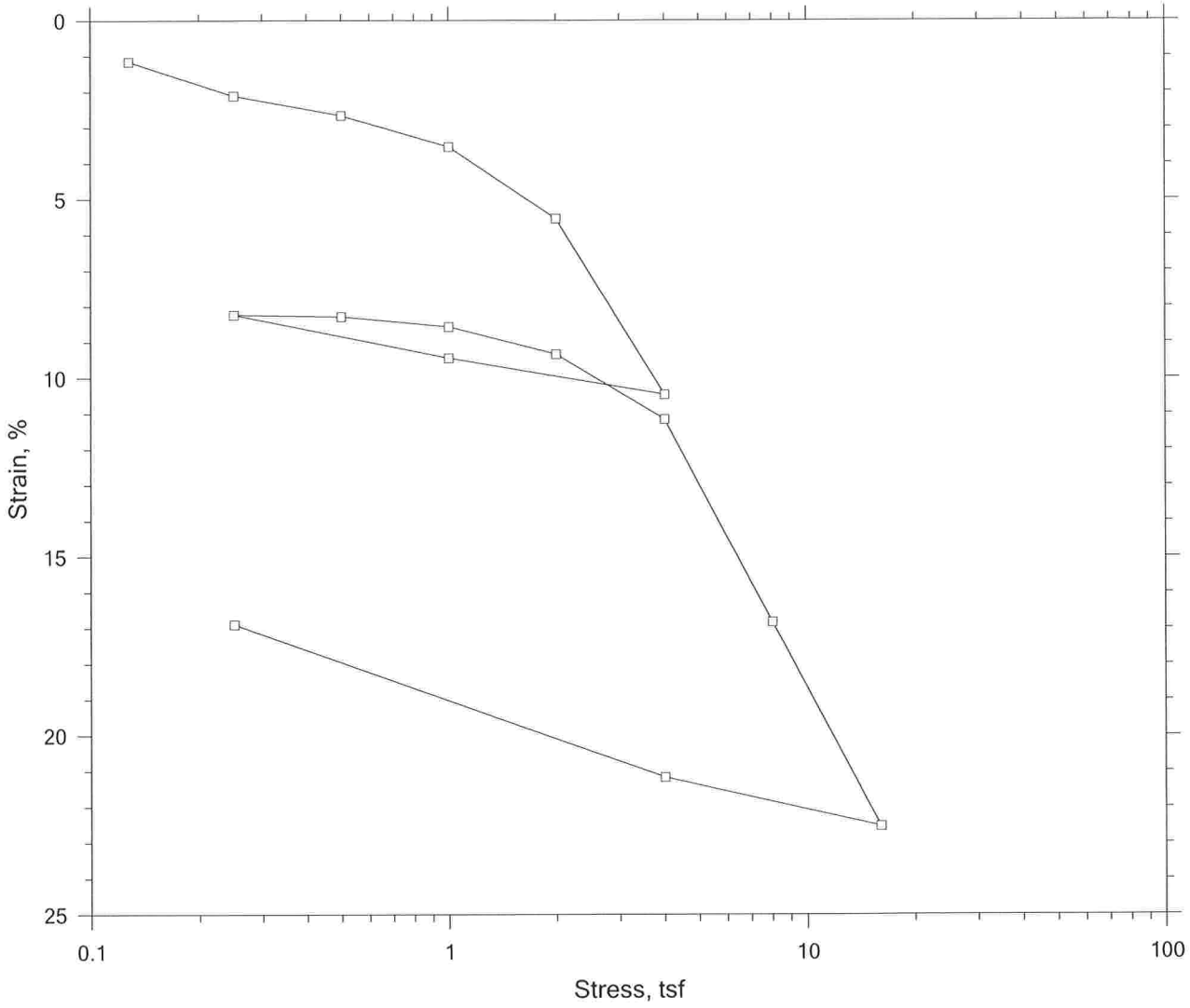
CALIFORNIA BEARING RATIO TEST

Project: George Wythe High School
4314 Crutchfield Street
Richmond, VA

Contract: 22130254.000 **Testing Lab:** RICH

One-Dimensional Consolidation by ASTM D2435 - Method B

Summary Report

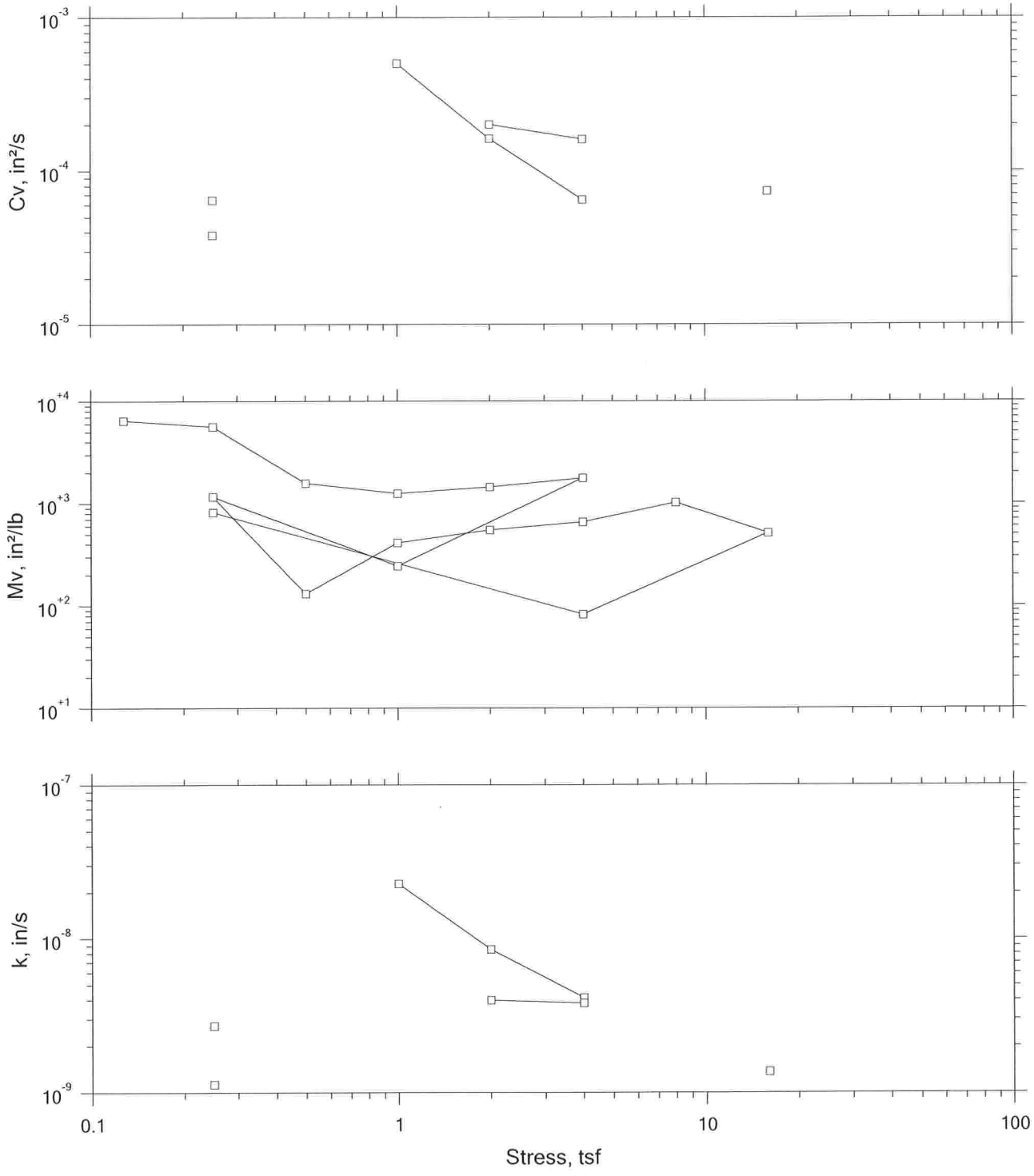


		Before Test	After Test
Current Vertical Effective Stress, tsf: 1.0	Water Content, %	41.69	31.09
Preconsolidation Stress, tsf: 2.0	Dry Unit Weight, pcf	79.265	95.368
Compression Ratio: 0.21 Recompression Ratio: 0.028	Void Ratio	1.28	0.90
Specimen Diameter, in: 2.5 Specimen Height, in: 1.008			
LL: 61 PL: 26 PI: 35			

Schnabel ENGINEERING	Project Name: George Wythe High School	Location: Richmond, VA	Project Number: 22130254
	Boring Number: B-12A	Tester: RG	Checker: DS
	Sample Number:	Test Date: 7-21-22	Depth: 20'-22'
	Test Number: 1	Preparation: Undisturbed	Elevation:
	Description: SANDY FAT CLAY (CH), contains mica, light brown and gray		
	Remarks:		
	Displacement at End of Increment		

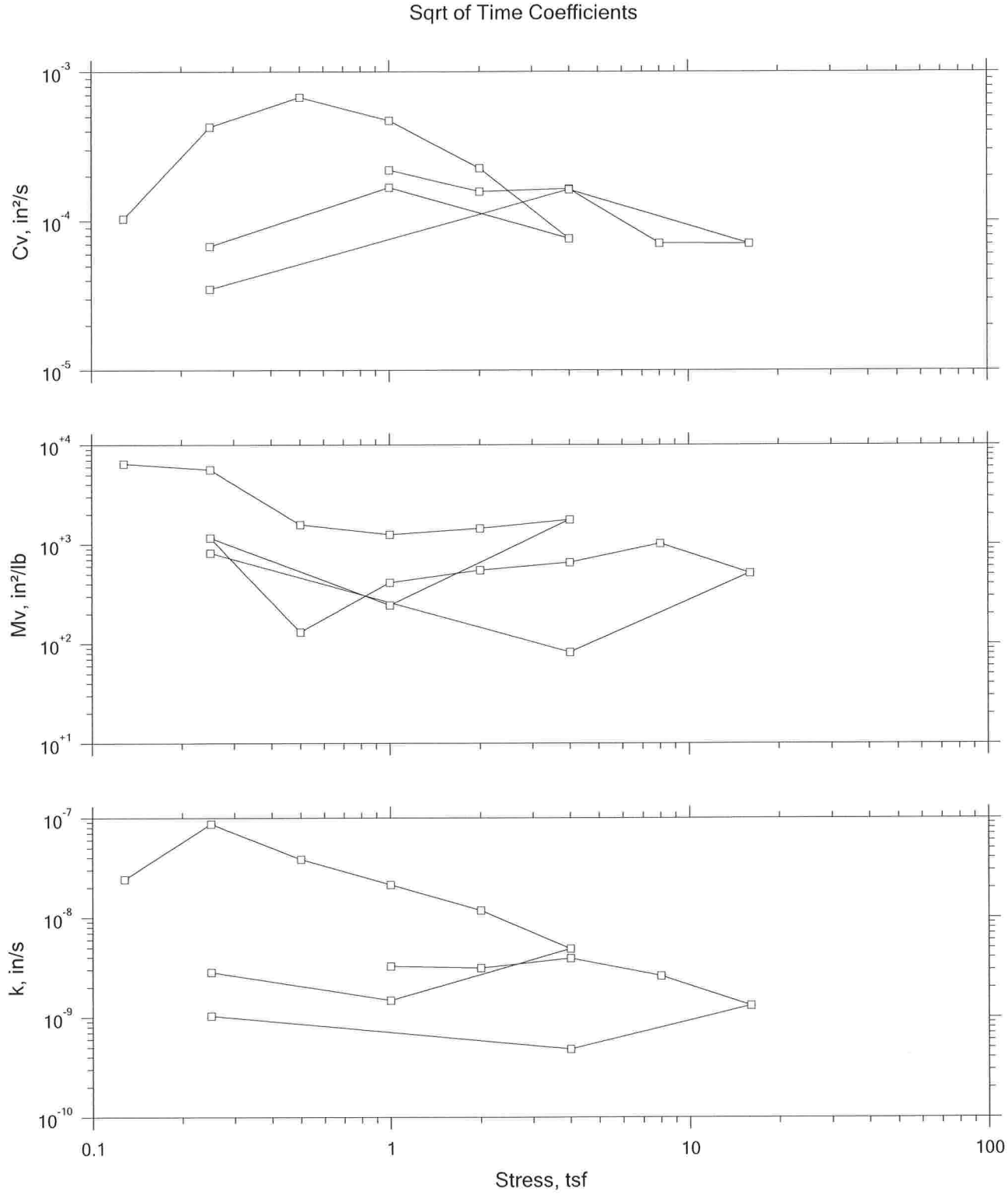
One-Dimensional Consolidation by ASTM D2435 - Method B

Log of Time Coefficients



Schnabel ENGINEERING	Project Name: George Wythe High School	Location: Richmond, VA	Project Number: 22130254
	Boring Number: B-12A	Tester: RG	Checker: DS
	Sample Number:	Test Date: 7-21-22	Depth: 20'-22'
	Test Number: 1	Preparation: Undisturbed	Elevation:
	Description: SANDY FAT CLAY (CH), contains mica, light brown and gray		
	Remarks:		

One-Dimensional Consolidation by ASTM D2435 - Method B



Schnabel ENGINEERING	Project Name: George Wythe High School	Location: Richmond, VA	Project Number: 22130254
	Boring Number: B-12A	Tester: RG	Checker: DS
	Sample Number:	Test Date: 7-21-22	Depth: 20'-22'
	Test Number: 1	Preparation: Undisturbed	Elevation:
	Description: SANDY FAT CLAY (CH), contains mica, light brown and gray		
	Remarks:		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter, in: 2.50		Liquid Limit: 61
Specimen Height, in: 1.01	Initial Void Ratio: 1.28	Plastic Limit: 26
Final Height, in: 0.84	Final Void Ratio: 0.898	Plasticity Index: 35

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID		---		
Mass Container, gm	166.1	110.93	110.93	201.85
Mass Container + Wet Soil, gm	297.6	256.8	245.89	335.68
Mass Container + Dry Soil, gm	263.7	213.88	213.88	303.94
Mass Dry Soil, gm	97.6	102.95	102.95	102.09
Water Content, %	34.73	41.69	31.09	31.09
Void Ratio	---	1.28	0.90	---
Degree of Saturation, %	---	94.15	100.36	---
Dry Unit Weight, pcf	---	79.265	95.368	---

Schnabel ENGINEERING

Project Name: George Wythe High School	Location: Richmond, VA	Project Number: 22130254
Boring Number: B-12A	Tester: RG	Checker: DS
Sample Number:	Test Date: 7-21-22	Depth: 20'-22'
Test Number: 1	Preparation: Undisturbed	Elevation:
Description: SANDY FAT CLAY (CH), contains mica, light brown and gray		
Remarks:		

Schnabel ENGINEERING

Unconsolidated Undrained Triaxial Compression Test

Project: George Wythe High School
4314 Crutchfield Street

Location: Richmond, Virginia

Schnabel Contract: 22130254.01
Boring No.: RW-02A
Depth: 6'-8'
Elevation: 198-196
Confining Stress (psi): 5.0

Date: 4/11/2023
Reviewed by: DS

Specimen Conditions	
Diameter (in)	2.839
Height (in)	6.007
Area (in^2)	6.33
Moisture (%):	18.0
Weight (gm)	1330.30
ρ_{wet} (pcf)	133.29
ρ_{dry} (pcf)	113.0
Void Ratio	0.48
Saturation, %	100

Shear Testing Conditions	
Cell Pressure (psi):	5.0
Rate of Strain (%/min):	0.2

Specimen Type: Undisturbed

Axial Strain at Failure (%): 8.7
Compressive Strength (psi): 29.8
Major Principal Stress (psi): 33.9
Minor Principal Stress (psi): 5.1

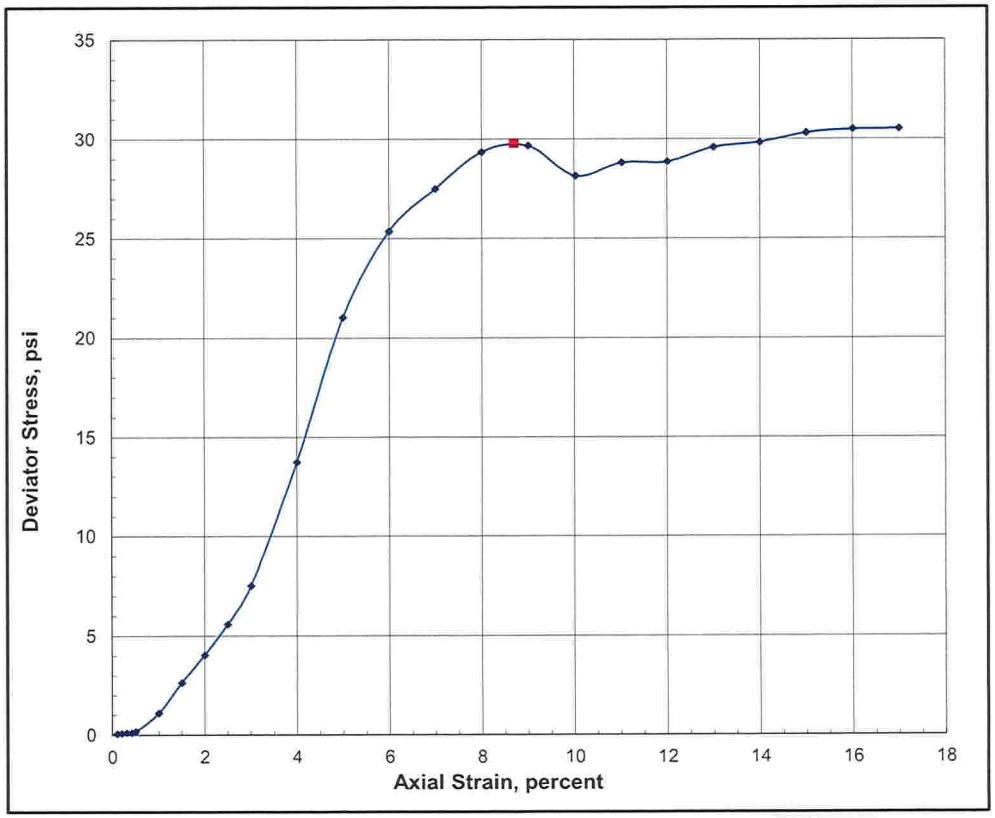
Soil Description: *CLAYEY SAND (SC), fine to medium grained sand, red and gray*

Liquid Limit: 45
Plasticity Index: 20
% finer than No. 200: 26.8

Remarks:

Failure Sketch

Reading No.	Deviator Load[1] (lbs)	Axial Strain (%)	Corrected Area[2] (in^2)	σ_1 (psi)	σ_3 (psi)	Deviator Stress (psi)
Initial	0.0	0.00	6.31	5.0	5.0	0.0
1	0.4	0.10	6.31	5.1	5.0	0.1
2	0.6	0.20	6.32	5.1	5.0	0.1
3	0.9	0.31	6.32	5.1	5.0	0.1
4	0.9	0.42	6.33	5.1	5.0	0.1
5	1.4	0.50	6.34	5.2	5.0	0.2
6	7.4	1.00	6.37	6.0	4.9	1.1
7	17.5	1.50	6.40	7.6	4.9	2.6
8	26.8	2.00	6.43	9.0	4.9	4.1
9	37.1	2.50	6.47	10.6	5.0	5.6
10	49.9	3.00	6.50	12.4	4.9	7.5
11	91.8	4.00	6.57	18.7	5.0	13.7
12	141.4	5.00	6.64	26.0	5.0	21.0
13	172.5	6.00	6.71	30.4	5.0	25.4
14	189.2	7.00	6.78	32.6	5.1	27.5
15	204.2	8.00	6.85	34.4	5.0	29.4
16	209.0	9.01	6.93	34.7	5.0	29.7
17	201.1	10.03	7.01	33.2	5.0	28.2
18	208.4	11.02	7.09	33.9	5.1	28.8
19	211.4	12.00	7.17	33.9	5.1	28.9
20	219.3	13.00	7.25	34.6	5.0	29.6
21	224.0	14.00	7.33	34.9	5.0	29.8
22	230.5	15.00	7.42	35.4	5.1	30.3
23	234.9	16.00	7.51	35.6	5.1	30.5
24	238.1	17.00	7.60	35.6	5.1	30.5
25						
26						



Notes: 1. Deviator load corrected for membrane effects.
2. Right Cylinder Correction Method

Testing Lab: RICH

APPENDIX C

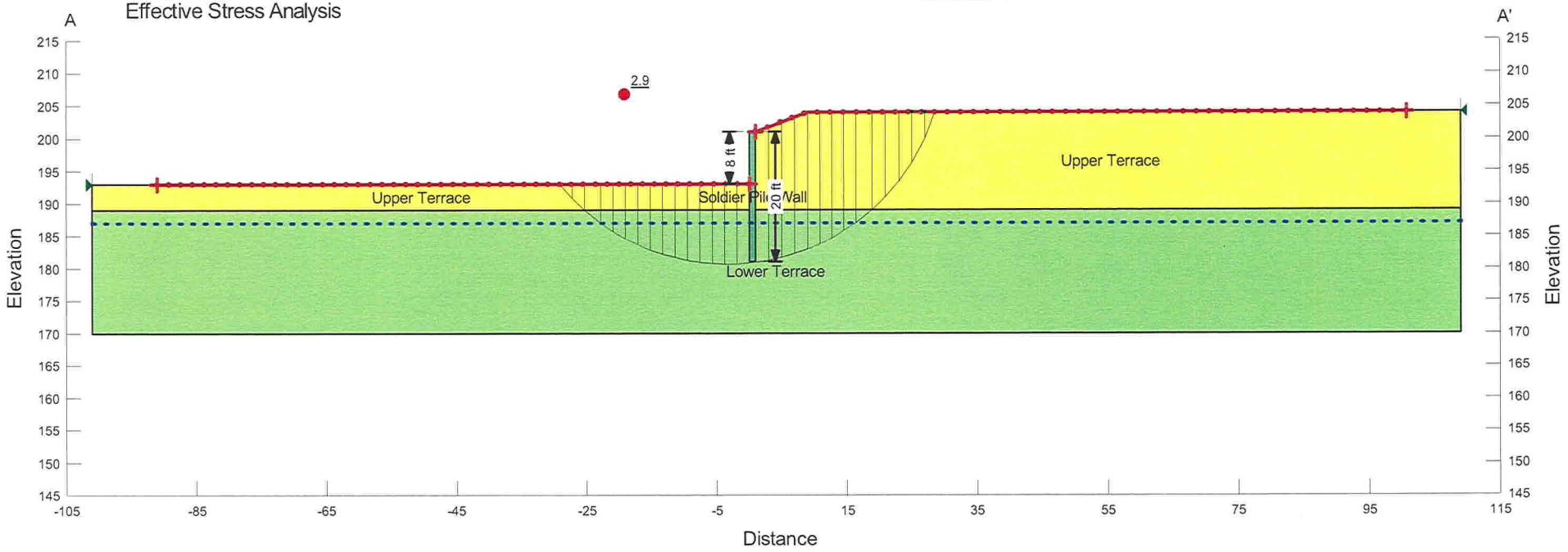
RETAINING WALL STABILITY ANALYSES

Retaining Wall Stability Analyses Outputs

Project: Geotechnical Design Services - George Wythe High School
Project No. 22130254
Global Stability Section A - A'
Date: 04/21/2023
Calculation By: E. Walsh
Reviewed By: P. Johnston

Analysis Type: Spencer
Effective Stress Analysis

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Lower Terrace	125	0	29
	Soldier Pile Wall	150		
	Upper Terrace	125	0	32



Project: Geotechnical Design Services - George Wythe High School
Project No. 22130254
Global Stability Section B - B'
Date: 04/21/2023
Calculation By: E. Walsh
Reviewed By: P. Johnston

Analysis Type: Spencer
Effective Stress Analysis

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Lower Terrace	125	0	29
	Soldier Pile Wall	150		
	Upper Terrace	125	0	32