ORANGE COUNTY PUBLIC SCHOOLS

Taylor Education Administration Complex
200 Dailey Drive
Orange, VA 22960
540-661-4550

Career and Technical Education Facility Feasibility Study

October 17, 2023

Addendum 02, October 25, 2024

RRMM ARCHITECTS
115 S. 15TH STREET., SUITE 502
RICHMOND, VA 23219
804.277.8987

Career and Technical Education Facility Feasibility Study
ADDENDUM 02, OCTOBER 24, 2024

SUMMARY

This Addendum 02 provides new information relating to study options G, H and J for a new CTE building behind Orange County High School as described in Addendum 01, dated 09/23/2024. The information contained in this addendum pertains to two topics: Project Timeframe and recently acquired Geotechnical Information.

PROJECT TIMEFRAME

See Addendum 01 dated 09/23/2024 for descriptions of study options G, H and J for a new CTE building behind Orange County High School. The below timeframes start from the point at which a design team is under contract with a notice to proceed until the facility and it's associated site work is substantially complete. Timeframe does not account for project funding period, design team selection process or unforeseen delays (permitting, environmental, earthwork, weather, etc). Also note that it is always possible to shorten project timeframe and this can be determined in early stages of project design.

OPTION G – 30,000 sf, 1-story, pre-engineered metal building on softball practice field

Project Timeframe: 28 months

OPTION H – 30,000 sf 2-story, pre-engineered metal bldg on lower parking lot

Project Timeframe: 31 months

OPTION J – 30,000 sf 2-story, pre-engineered metal bldg on upper and lower parking lots

Project Timeframe: 33 months

GEOTECHNICAL INFORMATION

We recently received a geotechnical report from the Timmons Group. This report is attached to this addendum. The Timmons Group performed field borings and lab work. With that information, they have provided an analysis and recommendations for additional excavation and supplemental structural fill, among other procedures. From these recommendations, they are recommending adding $200,000 to your project budget for each of these options to cover this likely needed work.

END OF ADDENDUM 02

(SEE EMAIL REGARDING ADDITIONAL COSTS AT END OF THIS DOCUMENT)

GEOTECHNICAL ENGINEERING REPORT

ORANGE COUNTY HIGH SCHOOL CTE
ORANGE COUNTY, VIRGINIA

JOB NUMBER: 68316

PREPARED FOR:

ORANGE COUNTY PUBLIC SCHOOLS
TAYLOR EDUCATION ADMINISTRATION COMPLEX
200 DAILEY DRIVE
ORANGE, VA 22960

OCTOBER 2, 2024

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

TABLE OF CONTENTS

EXECUTIVE SUMMARY ..... A
1. PROJECT INFORMATION 1
2. FIELD EXPLORATION 2
3. LABORATORY TESTING 2
4. SITE GEOLOGY 4
5. SUBSURFACE CONDITIONS 4
5.1 Ground Surface Cover 4
5.2 Existing Fill Soils 4
5.3 Residual Soils 5
5.4 Weathered Rock 5
5.5 Auger Refusal Materials 5
5.6 Groundwater 5
6. CONCLUSIONS AND RECOMMENDATIONS 5
6.1 Site Preparation 6
6.1.1 General 6
6.1.2 Existing Utilities 6
6.1.3 Subgrade Evaluation 6
6.1.4 Existing Fill 7
6.2 Excavations 8
6.3 Re-use of On-site Soils as Structural Fill 8
6.4 Structural Fill 8
6.5 Permanent Cut and Fill Slopes 9
6.6 Building Foundations 9
6.7 Foundation Settlement 10
6.8 Slab-On-Grade 10
6.9 Seismic Site Classification 11
6.10 Pavement Support 11
7. LIMITATIONS OF REPORT 12
8. CLOSURE 13

APPENDICES

Appendix A – Figures
Appendix B – Boring Logs
Appendix C – Laboratory Test Results

EXECUTIVE SUMMARY

For your convenience, this report is summarized in an outline form below. This brief summary should not be used for design or construction purposes without reviewing the more detailed conclusions and recommendations contained in this report.

1. The subsurface exploration included a visual site reconnaissance, the performance of eight test borings to depths of approximately 9 to 14 feet below the ground surface and quantitative laboratory testing.

2. The borings encountered approximately two to three inches of surficial topsoil. Beneath the topsoil, existing fill soils were encountered in a majority of the borings to depths of 2 to 6 feet. These soils consisted of moderate to high consistency clays, silts, and sands. Beneath the topsoil or fill soils, undisturbed residual soils were encountered to depths up to approximately 12 feet. These soils consisted of low to moderate consistency clays, silts, and sands. Weathered rock was encountered in Borings B-01 through B-06 and B-08 at depths of approximately 6 to 12 feet below the existing ground surface and extended to boring termination or auger refusal depths. At the time of exploration, water was not encountered in the borings.

3. We recommend that site grading be conducted during the typically warmer summer months.

4. Near-surface soils appeared relatively stiff in most of the borings. However, these soils can become unstable from construction equipment traffic, particularly if prevailing weather conditions are poor. If weather conditions are favorable (hot and dry conditions), it may be possible to repair unstable soils in place by scarification, drying, and recompaction. In poor weather conditions, undercutting and replacement of unstable soils will likely be required, or these soils will need to be chemically conditioned, with lime (AASHTO M216), to facilitate drying and allow for recompaction. Lime application and mixing should be conducted in accordance with the 2020 VDOT Road and Bridge Specifications.

5. Based on our test borings, the majority of the near surface soils appeared to be highly plastic. Highly plastic soils are susceptible to shrink and swell behavior. Therefore, we recommend that highly plastic soils (CH/MH)) not be used as structural fill within 2 feet of finished subgrade in the building pad. When encountered, low plasticity soils, excluding topsoil and debris laden soils, should be suitable for re-use as structural fill. The drying of on-site soils should be anticipated prior to their use as structural fill.

6. The proposed building may be supported on shallow foundations designed using an allowable bearing pressure of 3,000 psf. Foundations should bear at least 36 inches below the exterior grade to provide frost protection, develop the bearing capacity and to help mitigate the potential shrink/swell behavior from the near surface highly plastic soils. The overexcavation and replacement of existing fill soils will be required beneath the foundations.

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

1001 Boulders Parkway
Suite 300
Richmond, VA 23225

P 804.200.6500
F 804.560.1016
www.timmons.com

October 2, 2024

Orange County Public Schools
Taylor Education Administration Complex
200 Dailey Drive
Orange, VA 22960

Attention: Mr. Douglas Arnold

Re: **Geotechnical Engineering Report**
Orange County High School CTE
201 Selma Road
Orange County, Virginia
Timmons Group Project No. 68316

Mr. Arnold:

Timmons Group is pleased to submit this geotechnical engineering report for the referenced project. The objectives of our services were to explore subsurface conditions and provide our geotechnical recommendations for site grading, foundation support, and pavement support.

1. PROJECT INFORMATION

The site is on the Orange County High School campus at 201 Selma Road in Orange County, Virginia. A Site Vicinity Map is shown on Figure 1. The site currently consists of active athletic fields for the high school. Based on our review of available on-line historical aerial photographs, this site appears to have experienced prior development and site disturbance activities within the past couple of decades.

We understand that this is site being considered for the construction of an educational facility, consisting of a new one-story building, asphalt parking lots and drive aisles. The proposed building will be approximately 30,000 square feet with a finished floor elevation of approximately 455 feet. We anticipate that no more than three feet of cut or fill will be required to reach the proposed finished grades. At the issue of this report, structural loading information was not unavailable. However, based on our experience with similar projects, we assumed that maximum column and wall loads will not exceed 100 kips and 4 kips per linear foot, respectively. If the actual structural

loads are greater than what is stated in the report, then we should be contacted to review our recommendations.

2. FIELD EXPLORATION

The field exploration included a visual site reconnaissance by a representative of Timmons Group and the performance of eight soil test borings (B-01 through B-08). Boring locations were selected by Timmons Group. A representative of Timmons Group established boring locations in the field using GPS equipment. Approximate boring locations are shown on Figure 2 in Appendix A.

Borings were performed to depths of approximately 9 to 14 feet below the existing ground surface with hollow stem auger drilling techniques. Auger refusal was encountered in Borings B-01 through B-05. Split-spoon samples of subsurface soils were taken within soil test borings at approximate 2-foot intervals above a depth of 10 feet and at 5-foot intervals below 10 feet. Two bulk samples of near-surface soil cuttings were also collected. Standard Penetration Tests were conducted in conjunction with split-spoon sampling in general accordance with ASTM D 1586.

Water levels were measured in open boreholes at the time of drilling. Representative portions of split-spoon soil samples and the bulk samples were returned to our laboratory for quantitative testing and visual classification in general accordance with Unified Soil Classification System guidelines.

Boring logs and a generalized soil profile (Figure 3), which present specific information from the borings, are included in the Appendix. Stratification lines shown on the boring logs and profile are intended to represent approximate depths of changes in soil types. Naturally, transitional changes in soil types are often gradual and cannot be defined at particular depths. Ground surface elevations shown on these documents were interpolated from the project topographic plan and should be considered approximate.

3. LABORATORY TESTING

Laboratory testing was performed on representative split-spoon and bulk soil samples obtained from the borings. This testing consisted of natural moisture contents, Atterberg limits, grain size analyses, Standard Proctors, California Bearing Ratio (CBR), and one-dimensional remolded swell tests. Laboratory tests were performed in general accordance with applicable ASTM procedures. Individual laboratory test data sheets are provided in the Appendix. A summary of laboratory test data is provided in the tables below.

Natural Moisture and Classification Tests

Boring	Sample	Depth (Feet)	Natural Moisture Content (%)	Atterberg Limits			Grain Size Analysis			USCS Classification
				LL	PL	PI	% Sand	% Fines*	% Gravel	
B-01	S-2	2-3.5	21.7	52	30	22	27.1	55.5	17.4	MH
B-03	Bulk	0-5	18.2	62	26	36	24.1	72.2	3.7	CH
B-03	S-3	4-5.5	28.9	59	30	29	17.7	81.3	1.0	CH
B-04	S-2	2-3.5	30.3	--	--	--	--	--	--	MH**
B-04	S-3	4-5.5	31.6	58	31	27	8.6	91.4	0.0	MH
B-05	S-1	0-1.5	25.6	--	--	--	--	--	--	CH**
B-06	S-1	0-1.5	22.8	--	--	--	--	--	--	MH**
B-06	S-2	2-3.5	28.7	--	--	--	--	--	--	MH**
B-07	Bulk	0-5	25.9	66	60	36	18.2	77.2	4.6	CH

*Material passing No. 200 sieve (clay and silt)
**Visual Classification

Standard Proctor and CBR Testing

Boring	Depth (Feet)	Natural Moisture Content (%)	Standard Proctor		CBR	%Swell (0.1")	USCS Classification
			Optimum Moisture Content (%)	Maximum Dry Density (pcf)			
B-03	0-5	18.2	21.6	104.3	6.8	0.8	CH
B-07	0-5	25.9	24.5	98.8	6.9	1.2	CH

Based on the Atterberg limits testing, near-surface soils are of high plasticity. Based on comparison of natural moisture contents to the optimum moisture contents of the bulk samples, near-surface soils appear near to wet of optimum moistures. The time of year the grading occurs will likely have a significant impact on the moisture levels of near-surface soils.

To measure the expansive properties of the on-site soils, a one-dimensional swell test (ASTM D 4546) was performed on a remolded bulk sample of the soils obtained from Boring B-03. The remolded sample was compacted to approximately 99% of its Standard Proctor maximum dry density and approximately 2 percent dry of optimum moisture. The measured swell strain (percent heave) and swell pressure is shown below.

Swell Test Data

Boring	Depth (Feet)	Swell Strain (Heave %)	Swell Pressure (psf)	USCS Classification
B-03	0-5	2.6	3,500	CH

These values of swell strain and swell pressure are considered to be relatively low.

4. SITE GEOLOGY

According to the 1993 Geologic Map of Virginia, the site is located in the Piedmont Physiographic Province of Virginia. The Piedmont is characterized by low, rounded hills composed of saprolitic soils overlying folded metamorphic and igneous bedrock. Triassic-age sedimentary basins, bounded by normal faults, are also located within the Piedmont region, trending along northeast-southwest axes. Diabase dikes, trending north-south to northwest-southeast, are common in some areas of the Piedmont. These dikes are related to the extensional tectonics that formed the Triassic Basins.

Locally, the site is underlain by the Catoctin Formation. The Catoctin Formation consists of Proterozoic Z-Cambrian aged soils. The majority of undisturbed soils in the Catoctin Formation were formed from the chemical weathering of parent bedrock and are termed “residual” soils. In many locations, the transition zone between soil and rock is not well defined. Locally, the transition zone is termed weathered rock. For engineering purposes, weathered rock is defined as residual material in which Standard Penetration Test N-values are 60 blows per foot or greater.

5. SUBSURFACE CONDITIONS

The following is a summary of subsurface conditions encountered during the exploration.

5.1 Ground Surface Cover

The borings encountered approximately 2 to 3 inches of surficial topsoil.

5.2 Existing Fill Soils

Beneath the topsoil, existing fill soils were encountered within Borings B-01, B-02, B-05, B-06, and B-08 to depths of 2 to 6 feet below the ground surface. These soils consisted of stiff to very stiff highly plastic clay (CH), elastic silt (MH), and very dense silty sand (SM). Standard Penetration Test (SPT) N-values within the fill ranged from 9 blows per foot (bpf) to 50 blows over 4 inches.

The fill at this site is considered uncontrolled, as there is no known documented evidence that the fill was placed in controlled lifts and compacted under the supervision of a qualified geotechnical representative. As detailed later in this report, we provide recommendations for these soils when they are present within the proposed building and pavement areas.

5.3 Residual Soils

Beneath the fill soils or topsoil in the remaining borings, undisturbed residual soils were encountered to depths up to approximately 12 feet below the ground surface. These soils consisted of medium stiff to hard highly plastic clay (CH), elastic silt (MH), silt (ML), and medium dense clayey sand (SC). SPT N-values within the soil profile ranged from 6 to 45 blows per foot (bpf).

5.4 Weathered Rock

Weathered rock was encountered in Borings B-01 through B-06 and B-08 at depths of approximately 6 to 12 feet below the existing ground surface and extended to boring termination or auger refusal depths. Weathered rock is residual material derived from the physical and chemical weathering of underlying parent rock. Weathered rock is defined as a residual material having Standard Penetration Test N-values of 60 blows per foot or greater. Weathered rock was sampled primarily as clayey sand (SC) and silty sand (SM).

5.5 Auger Refusal Materials

Materials refusing auger advancement were encountered in Borings B-01 through B-05 at depths of approximately 10.5 to 17 feet below the ground surface. Auger refusal materials could represent competent bedrock or hard lenses within the weathered rock profile.

5.6 Groundwater

At the time of exploration, water was not encountered in the borings. It is important to realize that groundwater levels will fluctuate with changes in rainfall and evaporation rates. In addition, perched groundwater could be encountered within near-surface soils, particularly after rainfall.

6. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based upon our borings, laboratory testing, engineering analysis, and our past experience with similar projects and subsurface conditions.

When reviewing our recommendations, it is important to note the prior development activities have occurred at this site. Based on our past experience with previously developed sites, unexpected subsurface conditions are often encountered. These conditions could include zones of

low-consistency fill, debris-laden materials, abandoned utilities, and others. These conditions, if encountered, can be addressed by on-site engineering evaluation at the time of construction.

6.1 Site Preparation

6.1.1 General

Site grading will be difficult during periods of extended rainfall and low temperatures that generally occur during late fall to early spring the months. Near-surface soils are very moisture sensitive. If grading is conducted during a wet time period, soils will tend to rut and pump under rubber-tired traffic and provide poor subgrade support for slabs on-grade and pavements. Heavy rubber-tired construction equipment should not be allowed to operate on wet or unstable subgrades at this site due to the potential for rutting and other damage to the soils. To reduce potential earthwork problems, site preparation and grading should be scheduled during the typically warmer summer months, if possible. We recommend that exposed subgrades be sloped and sealed at the end of each day to promote runoff and reduce infiltration from rainfall.

Site preparation should begin with clearing and grubbing of existing vegetation, stripping of topsoil, demolition of existing structures and their foundations, and the removal of any other unsuitable materials. Approximately 2 to 3 inches of topsoil was encountered in the borings. However, stripping activities often mix topsoil with underlying "clean" soils and cause stripping depths to be greater than actual topsoil depths, particularly during wet periods of the year. Topsoil should be wasted from the site or permanently stockpiled outside the proposed construction limits.

6.1.2 Existing Utilities

We recommend that any existing underground utilities that are present in the proposed building area be relocated at least 15 feet beyond the proposed building limits. Abandoned utilities should be removed from the site. Past experience indicates that poorly compacted fill soils are often located within utility trenches. For utilities that are to be removed, we recommend that trenches be cleaned of all backfill soils and backfilled with structural fill compacted to levels recommended in this report. If certain utility lines must remain in place in their current location, we recommend that the suitability of trench backfill be evaluated on a case-by-case basis.

6.1.3 Subgrade Evaluation

After stripping, exposed soil subgrades in areas to receive fill, and finished subgrades, should be evaluated by the Geotechnical Engineer or his representative. To aid the engineer during this evaluation, exposed soil subgrades should be proofrolled with a loaded tandem axle dump truck or equivalent. Proofrolling will help to reveal the presence of unstable or otherwise unsuitable surface materials. The following methods are typically used to repair soil subgrades that are observed to rut, pump, or deflect excessively during proofrolling:

- Undercut the unstable soils to firm soils and replace them with suitable, well compacted fill.

- In-place repair of near-surface soils by scarifying, drying and recompacting, when weather conditions are suitable.

Near-surface soils appeared relatively stiff in the borings. However, these soils can become unstable from construction equipment traffic, particularly if prevailing weather conditions are poor. If weather conditions are favorable (hot and dry conditions), it may be possible to repair unstable soils in place by scarification, drying, and recompaction. In poor weather conditions, undercutting and replacement of unstable soils will likely be required, or these soils will need to be chemically conditioned with lime (AASHTO M216) to facilitate drying and allow for recompaction. Lime application and mixing with on-site soils should be conducted in accordance with the 2020 VDOT Road and Bridge Specifications.

6.1.4 Existing Fill

Past site development activities on this site have resulted in the presence of fill soils on portions of the site. We offer the following recommendations for the building foundations, building slabs-on-grade, and the proposed pavement areas.

- Building Foundations – Existing fill was encountered within the proposed building area. Existing fill is not considered suitable for direct support of shallow foundations. As discussed in the Foundations section of this report, we recommend that existing fill materials beneath the building's foundations be overexcavated and replaced.

- Building Slabs-On-Grade – Existing fill may remain in place beneath the building slabs-on-grade provided the fill is stable when proofrolled, not excessively debris laden. In our opinion, provided the existing fill soils are stable during the proofroll and are not contaminated with debris materials, the risk of excessive slab-on-grade settlement above the existing fill appears relatively low. If the above risk cannot be accepted, we recommend existing fill beneath the building be over excavated and replaced with structural fill.

- Pavement Areas - Within the parking lot and drive areas, subgrades should be evaluated on a case-by-case basis. Based on the borings, the stiffness of existing fill soils is expected to vary considerably throughout the site.

The amount of repairs will likely depend on the in-place density of the soil, the soil moisture content, debris content, level of construction traffic on exposed subgrades prior to proofrolling, and prevailing weather conditions at the time of grading. As such, it is not possible to accurately quantify the amount of repairs needed.

6.2 Excavations

We expect that excavations will extend through moderate consistency soils. Based on the borings, we do not expect excavations to extend to the weathered rock materials. Past experience indicates that moderate consistency soils can be excavated by routine earth moving equipment.

Soil types with respect to trench safety must be evaluated on a case-by-case basis. The Contractor should be responsible for all site safety, including the determination of appropriate trench safety measures according to OSHA guidelines. The contractor should be prepared to control and remove groundwater seepage that occurs within excavations.

Groundwater was not encountered in the borings at the time of drilling. However, the contractor should be prepared to control and remove groundwater or surface runoff that collects within excavations.

6.3 Re-use of On-site Soils as Structural Fill

Based on our test borings, the majority of the near surface soils appeared to be highly plastic. However, when encountered low plasticity soils, excluding those with more than 5 percent organics or debris, should be suitable for re-use as structural fill, provided the moisture content can be properly controlled. Highly plastic soils (Liquid Limit (LL) > 50 or Plastic Index (PI) > 30) should not be used as structural fill within 2 feet of finished subgrade in the building pad area.

Based on visual observation and comparison of the measured natural moisture contents of the bulk soil samples to the optimum moisture contents from the Standard Proctor tests, near-surface soils appear near to wet of the optimum moistures. As such, drying of some on-site soils should be anticipated prior to their re-use as structural fill. Prevailing weather conditions will have a significant impact on the amount of moisture manipulation (i.e., drying or wetting) required prior to fill placement. We recommend the use of lime for drying of soils be thoroughly considered if site grading will occur during a period of poor prevailing weather. Highly plastic soils are often difficult to dry and manipulate, even during favorable weather conditions.

6.4 Structural Fill

On site soils used for structural fill should be free of debris, contain less than 5 percent organics, have a maximum particle size of 3 inches, have a maximum liquid limit (LL) of 50, and have a maximum plasticity index (PI) of 30. Again, highly plastic soils (LL) > 50 or PI) > 30) should not be used as structural fill within 2 feet of the finished subgrade in the building pad area. Imported materials used as structural fill should consist of sands (USCS types SC, SM, SP) or well-graded gravels (GM), have a maximum LL of 30, have a maximum PI of 15, and otherwise meet the requirements above.

Structural fill should be placed in maximum 8 to 10-inch loose lifts and compacted to at least 95 percent of the Standard Proctor maximum dry density (ASTM D 698). The final 12 inches of subgrade soils in building and pavement areas should be compacted to at least 98 percent of the Standard Proctor maximum dry density. Structural fill should be maintained within 3 percent of optimum moisture during placement and compaction.

Site preparation, including fill placement and compaction, should be observed by a qualified soils technician working under the direction of the Geotechnical Engineer. During fill placement, a sufficient amount of in-place density tests should be conducted to confirm that compaction and fill moisture is in accordance with our recommendations.

6.5 Permanent Cut and Fill Slopes

Permanent cut and fill slopes should have inclinations of 3(H):1(V) or flatter for long term stability and erosion control. Localized zones of perched groundwater may be present within the near surface soils following periods of rainfall. If seepage is observed along permanent cut slopes, flattening of the slope angle, installation of a toe drain or other measures may be required to improve long-term stability.

Based on our experience, compaction equipment often has difficulty compacting soils along the faces of fill slopes. As such, we recommend that fill slopes be slightly overbuilt and then cut back to the design geometry, leaving the slope face compacted to the required degree.

6.6 Building Foundations

For the purpose of this report, we have assumed that maximum column and wall loads will not exceed 100 kips and 4 kips per linear foot, respectively. If the actual structural loads are greater than what is stated in the report, then we should be contacted to review our recommendations.

Based on the borings, the assumed structural loads, and our analysis, the proposed building may be supported on shallow foundations supported in undisturbed soils or new structural fill overlying undisturbed soils. Existing fill soils are not considered acceptable for foundation support. Shallow foundations may be designed using an allowable bearing pressure of 3,000 pounds per square foot (psf). Column and continuous wall foundations should be at least 24 and 18 inches wide, respectively. This recommendation is made to prevent a localized or “punching” shear failure condition which can occur with very narrow footings. Foundations should bear at least 36 inches below the exterior grade to provide frost protection, develop the bearing capacity and to help mitigate the potential shrink/swell behavior from the near surface highly plastic soils.

Based on the borings and assuming a foundation bearing elevation of approximately 451 feet, maximum over-excavation depths are expected to be approximately 2 feet below the design

foundation bearing elevation. Based on the borings, it appears that over-excavation will be required for most of the foundations for the building.

Foundation excavations should be evaluated by the Geotechnical Engineer or his representative prior to reinforcing steel and concrete placement. The evaluation should involve probing of foundation bearing surfaces, advancing shallow hand auger borings, and dynamic cone penetrometer (DCP) testing. If soft or existing fill foundation bearing soils are encountered, they should be overexcavated and replaced with VDOT No. 57 stone. The VDOT No. 57 stone should be placed in maximum lift thicknesses of 18 inches, and each lift should be compacted with vibratory compaction equipment or possibly by tamping the stone lifts repeatedly (and uniformly) with an excavator bucket.

If groundwater or surface water runoff collects in any excavation, it should be removed promptly. Care should be exercised during construction of foundations in order not to disturb bearing soils and reduce their bearing strength. Concrete for the foundations should be placed as soon as practical following excavation. If concrete placement is delayed, placement of a concrete "mud mat" on exposed bearing soils should be considered.

6.7 Foundation Settlement

Based on the assumed structural loads and our analysis, we expect that total foundation settlements for the building foundations will be one inch or less. Our settlement estimate is based on an applied bearing pressure of 3,000 psf. Differential settlements should be less than ½ inches for footings bearing on similar materials.

6.8 Slab-On-Grade

The slab-on-grade can be adequately supported on suitable in-place soils or new structural fill, provided the site preparation and fill placement procedures outlined in this report are implemented. As previously stated, there is potential settlement risk with leaving existing fill beneath the building slabs-on-grade. However, in our opinion, provided the existing fill soils are stable during the proofroll and are not contaminated with debris materials, the risk of excessive slab-on-grade settlement above the existing fill appears relatively low. If this risk is deemed unacceptable, then the existing fill materials should be over excavated and replaced with structural fill.

It is our opinion that a modulus of subgrade reaction of 100 pci is applicable for slab-on-grade design. We recommend the slab-on-grade be separated from building foundations to allow for relative displacement.

In addition, we recommend that a minimum of 6 inches of VDOT 21B stone be considered for placement beneath concrete slabs to help provide uniformity in slab subgrade support. We recommend that the stone be compacted to at least 98 percent of its Standard Proctor maximum

dry density (ASTM D 698). A vapor barrier should be installed beneath the slab in accordance with ACI 302.1 (Guide to Concrete Floor and Slab Construction).

Exposure to the environment and construction activities will weaken the floor slab subgrade soils. Therefore, we recommend that subgrade soils in slab areas be evaluated prior to crushed stone placement. If deterioration of soils has occurred, undercutting may be necessary.

6.9 Seismic Site Classification

Based on our test borings and our past experience, it is our opinion the site should be considered Seismic Site Classification C in accordance with current Virginia Building Code.

6.10 Pavement Support

Our analysis assumptions and recommendations for the proposed flexible pavements are presented below. The assumed traffic loading should be reviewed for accuracy. If traffic loading will exceed our assumptions, we should be contacted to revisit the recommendations presented below.

Pavement analyses were performed to calculate the necessary pavement thicknesses for on-site flexible pavements. Laboratory testing of near surface soils returned California Bearing Ratio (CBR) values of 6.8 and 6.9. However, based on our experience with similar highly plastic soils a California Bearing Ratio (CBR) value of 5 percent was used for pavement design assuming the in-place subgrade soil is compacted to at least 98 percent of its standard Proctor maximum dry density. Pavement thickness design procedures are based on the "AASHTO Guide for Design of Pavement Structures, 1993" and associated literature. The following is a summary of pavement.

At the issue of this report, traffic loading information was unavailable. However, our understanding is that the proposed pavement sections will be subject to predominately lightweight vehicles with an occasional tractor trailer for deliveries. For the purpose of this report, we have assumed the traffic loading will not exceed more than 100 vehicles per day with one percent of this traffic consisting of tractor trailers. The design parameters for the pavement section were as follows: ESAL factor of 01.05 for heavy trucks (tractor trailers), a design life of 20 years, terminal serviceability = 2.5, reliability = 85%, initial serviceability = 4.2, standard deviation = 0.49 for flexible asphalt pavements.

The following table provides our recommendations for on-site flexible asphalt pavements.

Flexible Pavement Section
1.5 Inches VDOT SM-9.5A (Placed in single lift)
2.5 Inches VDOT BM-25.0 (Placed in single lift)
8 Inches VDOT 21B

Although our analysis was based on a 20-year design life, our experience indicates that an overlay may be needed in approximately 10 to 12 years due to normal weathering (oxidation) of the asphaltic concrete. Also, some areas could require repair in a shorter time period.

All materials and construction methods should conform to the 2020 VDOT Road and Bridge Specifications. To confirm that the base course stone has been uniformly compacted and meets VDOT density requirements, in-place density tests should be performed by a qualified soils technician and the area should be thoroughly proofrolled under his observation.

Important factors regarding pavement performance are the condition of subgrade soils at time of construction and post construction drainage. We recommend that all pavement subgrade areas be evaluated prior to base course stone placement. Any areas which deflect or rut during proofrolling must be repaired prior to stone placement. Sufficient testing and observation should be performed during pavement construction to confirm that the required thickness, density, and quality requirements of the specifications are followed.

7. LIMITATIONS OF REPORT

The recommendations contained in this report are made on the basis of the site information made available to us and the surface and subsurface conditions that existed at the time of the exploration. While this exploration has been conducted in accordance with generally accepted geotechnical engineering practices, there remains some potential for variation of the subsurface conditions in unexplored areas of the site. If the subsurface conditions encountered during construction vary significantly from those presented in this report, we should be notified to reevaluate our recommendations. No other warranty, expressed or implied, is made as to the professional advice included in this report.

8. CLOSURE

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, or if we can be of further assistance, please contact us at (804) 200-6500.

Respectfully submitted,
TIMMONS GROUP

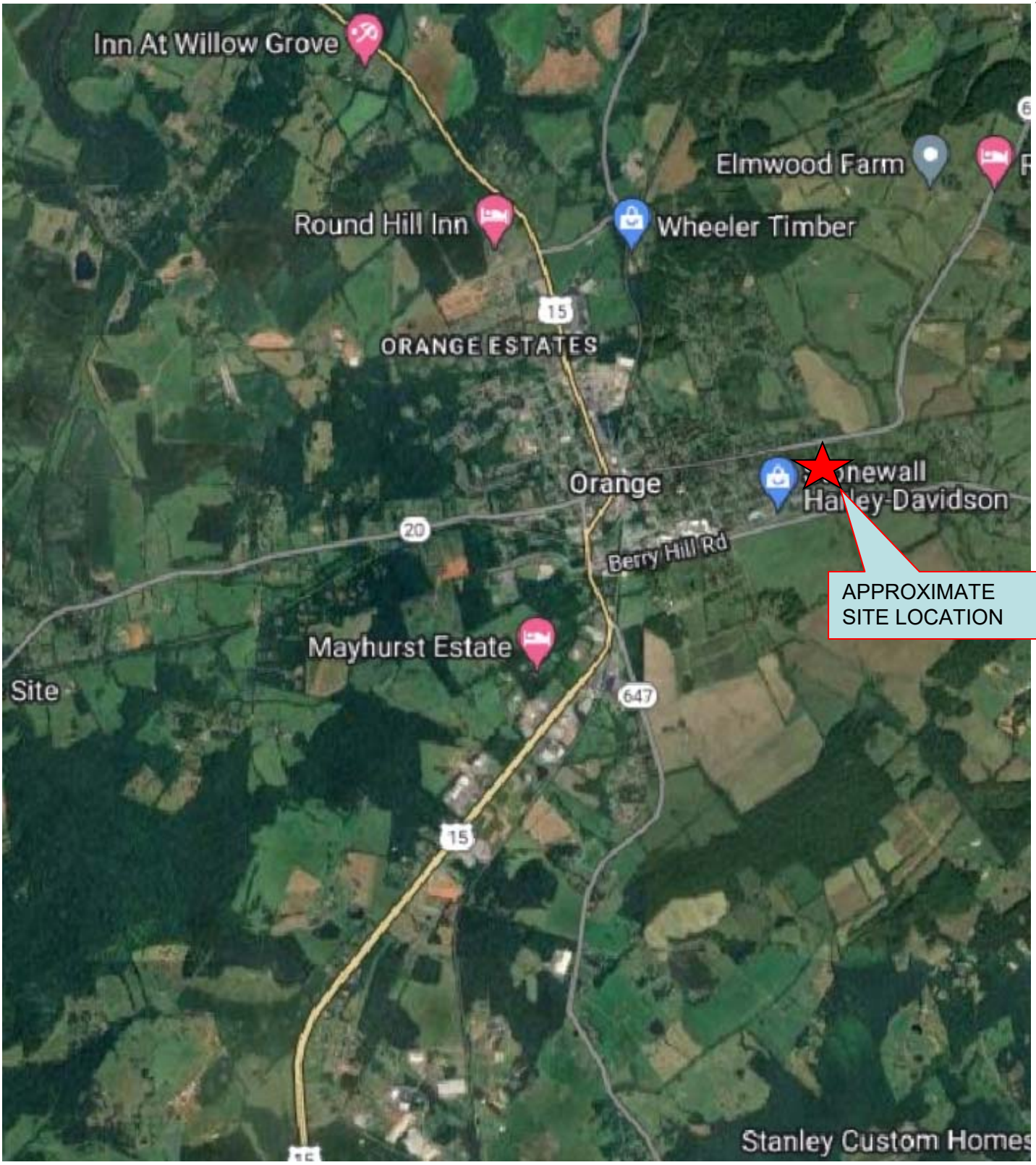
COMMONWEALTH OF VIRGINIA
JULIAN M. RUFFIN IV
Lic. No. 050631
10.2.2024
PROFESSIONAL ENGINEER

Julian M. Ruffin IV, P.E.
Geotechnical Engineer
VA Registration No. 050631

J. Nathan Reeves, P.E.
Senior Geotechnical Engineer
VA Registration No. 049619

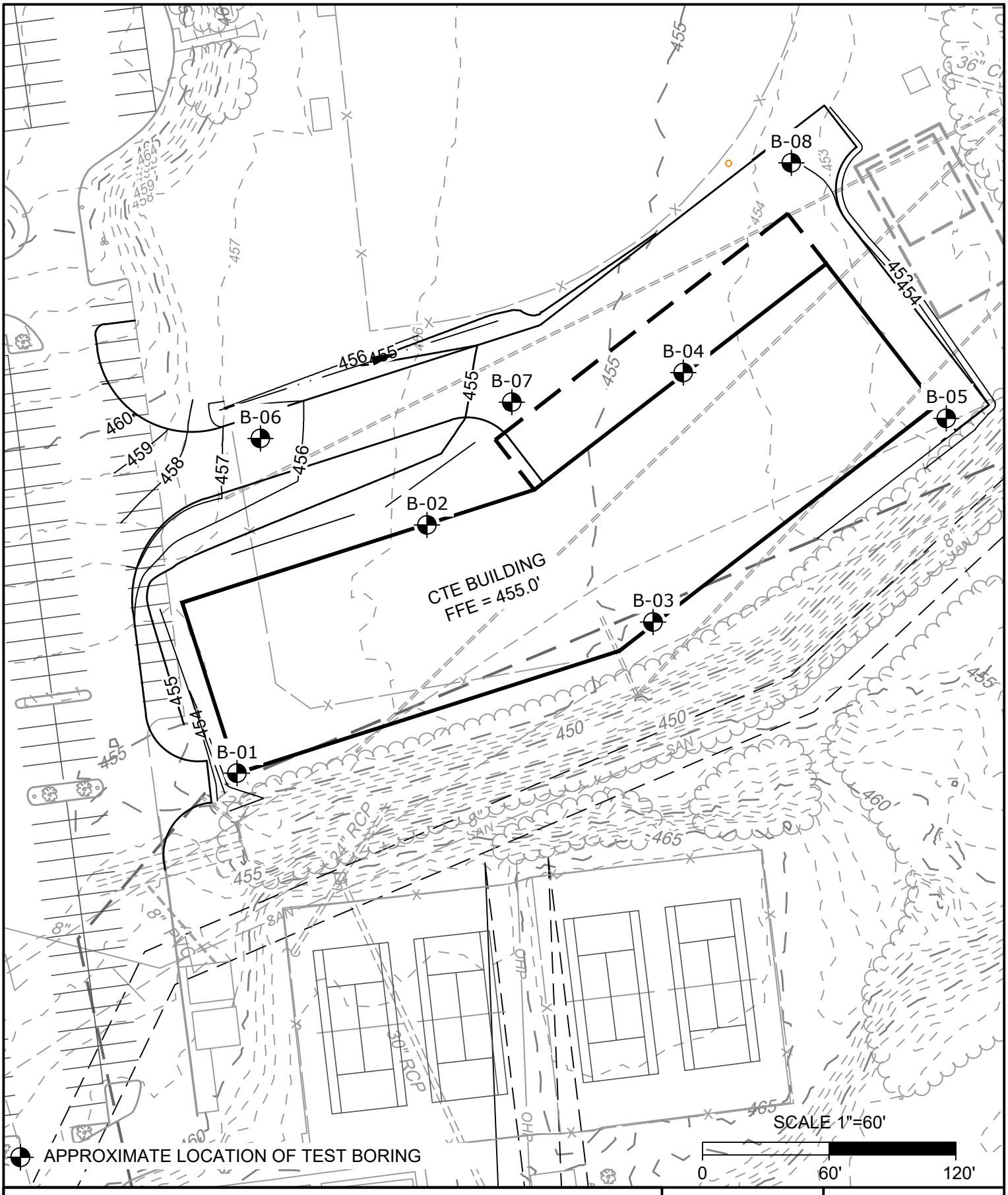
APPENDIX A

FIGURES



Source: Google Maps

SCALE: NTS	TIMMONS GROUP YOUR VISION ACHIEVED THROUGH OURS.	**SITE VICINITY MAP** ORANGE COUNTY HIGH SCHOOL CTE ORANGE COUNTY, VA	FIGURE 1
CHECKED BY: JNR			
PLOTTED BY: JMR			
DATE: 8-23-2024	PROJECT NUMBER: 68316		



TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

THIS DRAWING PREPARED AT THE
Corporate Headquarters
1001 Boulders Parkway | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1016 www.timmons.com

ORANGE COUNTY HIGH SCHOOL CTE

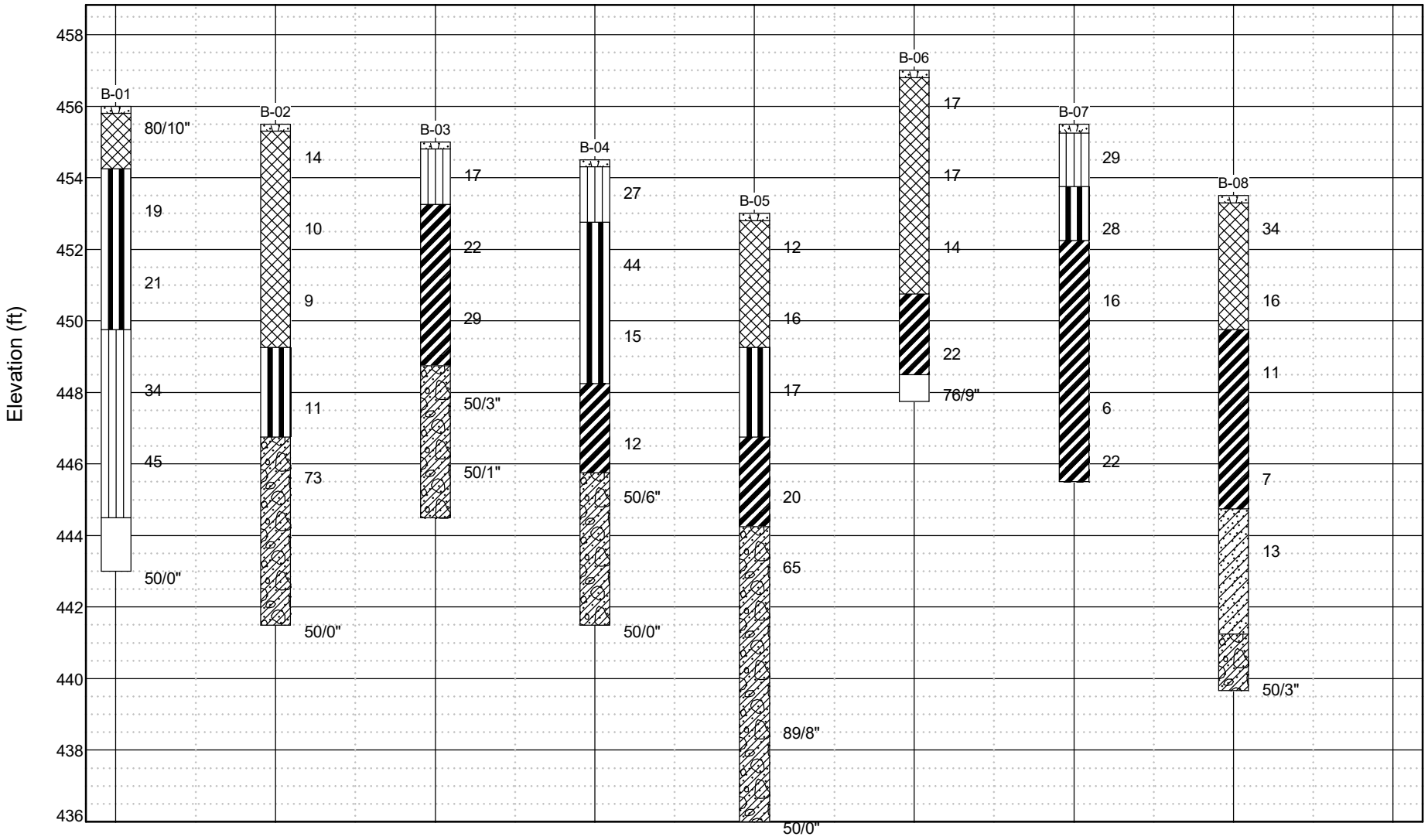
ORANGE COUNTY - VIRGINIA

BORING LOCATION PLAN

SHEET NO.	JOB NO.	SCALE	CHECKED BY	DESIGNED BY	DRAWN BY	DATE
2	68316	AS SHOWN	J. RUFFIN	---	J. RUFFIN	

DATE	REVISION DESCRIPTION
.	.

These plans and associated documents are the exclusive property of TIMMONS GROUP and may not be reproduced in whole or in part and shall not be used for any purpose whatsoever, inclusive, but not limited to construction, bidding, and/or construction staking without the express written consent of TIMMONS GROUP.



Lithology Symbols

- Topsoil
- Fill (made ground)
- Elastic Silt
- Silt
- Weathered Rock
- High Plasticity Clay
- Clayey Sand

Groundwater Symbols

At End of Drilling ▽ ▼ At 24 Hours

Exploration Symbols

B-01 (Exploration ID)

13 (N-Value)

53% 98% (RQD REC)

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, VA 23225

Fence Diagram

Orange County High School CTE

Orange County, Virginia

PROJECT NUMBER	DRAWN BY	DATE DRAWN
68316	JR	9.26.2024
HORIZONTAL SCALE NTS	**APPROVED BY**	**FIGURE**
VERTICAL SCALE NTS	NR	3

TG SUBSURFACE PROFILE V2.0 - GINT STD US LAB.GDT - 9/26/24 15:45 - Y:\801\GEOTECHNICAL\PROJECTS\2024 PROJECTS\68316 ORANGE COUNTY CTE BUILDING\LOGS\ORANGE CTE.GPJ

APPENDIX B

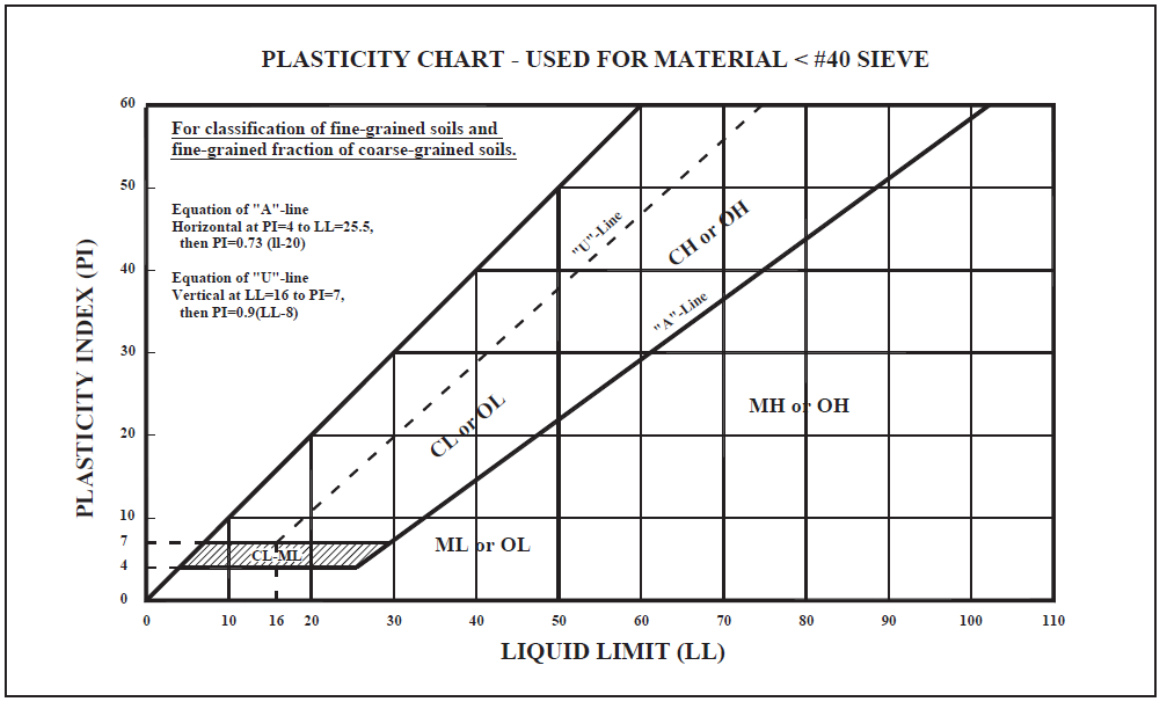
BORING LOGS

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

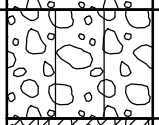
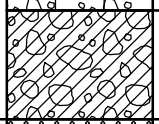
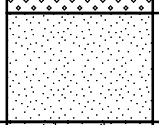
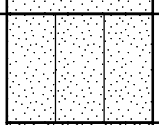
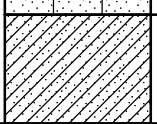
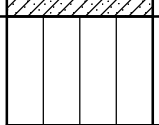
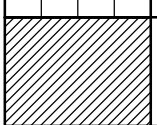
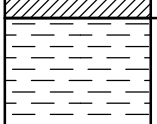
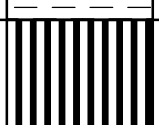
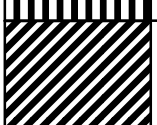
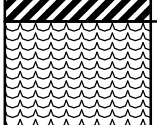
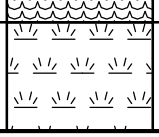
KEY TO BORING LOG TERMINOLOGY

Relative Density – Used for soils with less than 50% passing No. 200 sieve		Consistency – Used for soils with 50 percent or more passing No. 200 sieve	
Relative Density	**SPT N-Value (blows/ft)**	**Consistency**	**SPT N-Value (blows/foot)**
Very Loose	0 to 3	Very Soft	0 to 1
Loose	4 to 9	Soft	2 to 4
Medium Dense	10 to 29	Medium Stiff	5 to 8
Dense	30 to 50	Stiff	9 to 15
Very Dense	Greater than 50	Very Stiff	16 to 30
		Hard	31 to 50
		Very Hard	Greater than 50

Grain Size Terminology (U.S. Standard Sieves)		Natural Moisture Content	
Term	**Particle Size**		
Boulder	12 inches +	Dry	Very little apparent moisture, dusty
Cobble	3 to 12 inches		
Coarse Gravel	¾ to 3 inches	Moist	Damp, but no free water visible
Fine Gravel	#4 to ¾ inches		
Coarse Sand	#10 to #4		
Medium Sand	#40 to #10	Wet	Visible free water, or in cohesive soil, clearly saturated
Fine Sand	#200 to #40		
Silt and Clay	<#200		



SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, VA 23225

BORING B-01

PROJECT NUMBER 68316 **PROJECT NAME** Orange County High School CTE

CLIENT Orange County Public Schools **PROJECT LOCATION** Orange County, Virginia

DATE STARTED 9/12/2024 **COMPLETED** 9/12/2024 **GROUND ELEVATION** 456 ft **HOLE DEPTH** 13 feet

DRILLING CONTRACTOR Central Virginia Utilities **BOREHOLE WATER LEVELS:**

DRILLING METHOD Hollow Stem Auger **AT TIME OF DRILLING** --- Not encountered

LOGGED BY Julian Ruffin **CHECKED BY** **AT 24 HOURS DRILLING** ---

NOTES **CAVE DEPTH**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SYMBOL	SAMPLING BLOW COUNTS (N-VALUE)	RECOVERY (%)	LAB TESTS	REMARKS
0	455	TOPSOIL: topsoil, (2 Inches) SILTY SAND WITH GRAVEL, (SM): dark brown, fine to coarse grained, moist, very dense, fill		S-1, SPT 80/10"			
		SANDY ELASTIC SILT WITH GRAVEL, (MH): red-brown, moist, very stiff		S-2, SPT 9-8-11 (19)			
5	450			S-3, SPT 6-10-11 (21)			
		SANDY SILT, (ML): orangeish brown and gray, moist, hard		S-4, SPT 8-11-23 (34)			
10	445	Orangeish brown		S-5, SPT 17-17-28 (45)			
		Weathered decomposed rock, No Recovery					
		Refusal at 13.0 feet. Bottom of borehole at 13.0 feet.		S-6, SPT 50/0"			

TG GEOTECH BH LOG V2.1 - GINT STD US LAB.GDT - 9/26/24 15:36 - Y:\801\GEOTECHNICAL\PROJECTS\2024 PROJECTS\68316 ORANGE COUNTY CTE BUILDING\LOGS\ORANGE CTE.GPJ

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, VA 23225

BORING B-02

PROJECT NUMBER 68316 **PROJECT NAME** Orange County High School CTE

CLIENT Orange County Public Schools **PROJECT LOCATION** Orange County, Virginia

DATE STARTED 9/12/2024 **COMPLETED** 9/12/2024 **GROUND ELEVATION** 455.5 ft **HOLE DEPTH** 14 feet

DRILLING CONTRACTOR Central Virginia Utilities **BOREHOLE WATER LEVELS:**

DRILLING METHOD Hollow Stem Auger **AT TIME OF DRILLING** --- Not encountered

LOGGED BY Julian Ruffin **CHECKED BY** **AT 24 HOURS DRILLING** ---

NOTES **CAVE DEPTH**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SYMBOL	SAMPLING BLOW COUNTS (N-VALUE)	RECOVERY (%)	LAB TESTS	REMARKS
0	455	TOPSOIL: topsoil, (2 Inches)		S-1, SPT 7-6-8 (14)			
		SANDY ELASTIC SILT, (MH): dark reddish brown, moist, stiff, fill Trace gravel		S-2, SPT 3-5-5 (10)			
5	450			S-3, SPT 3-4-5 (9)			
		SANDY ELASTIC SILT, (MH): orangeish brown, moist, stiff		S-4, SPT 4-5-6 (11)			
10	445	SANDY SILT, (ML): dark brown, moist, very hard, weathered decomposed rock		S-5, SPT 8-23-50 (73)			
		Refusal at 14.0 feet. Bottom of borehole at 14.0 feet.		S-6, SPT 50/0"			

TG GEOTECH BH LOG V2.1 - GINT STD US LAB.GDT - 9/26/24 15:36 - Y:\801\GEOTECHNICAL\PROJECTS\2024 PROJECTS\68316 ORANGE COUNTY CTE BUILDING\LOGS\ORANGE CTE.GPJ

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, VA 23225

BORING B-03

PROJECT NUMBER 68316 **PROJECT NAME** Orange County High School CTE

CLIENT Orange County Public Schools **PROJECT LOCATION** Orange County, Virginia

DATE STARTED 9/12/2024 **COMPLETED** 9/12/2024 **GROUND ELEVATION** 455 ft **HOLE DEPTH** 10.5 feet

DRILLING CONTRACTOR Central Virginia Utilities **BOREHOLE WATER LEVELS:**

DRILLING METHOD Hollow Stem Auger **AT TIME OF DRILLING** --- Not encountered

LOGGED BY Julian Ruffin **CHECKED BY** _____ **AT 24 HOURS DRILLING** ---

NOTES _____ **CAVE DEPTH** _____

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SYMBOL	SAMPLING BLOW COUNTS (N-VALUE)	RECOVERY (%)	LAB TESTS	REMARKS
0	455	TOPSOIL: topsoil, (2 Inches)		S-1, SPT 6-8-9 (17)			
		SANDY SILT, (ML): brown, moist, very stiff, contains gravel					
		FAT CLAY WITH SAND, (CH): dark red, moist, very stiff, trace gravel		S-2, SPT 8-10-12 (22)			
5	450			S-3, SPT 8-11-18 (29)			
		SILTY SAND WITH GRAVEL, (SM): gray, fine to coarse grained, moist, very dense, with rock fragments, weathered decomposed rock		S-4, SPT 50/3"			
10	445			S-5, SPT 50/1"			

Refusal at 10.5 feet.
Bottom of borehole at 10.5 feet.

TG GEOTECH BH LOG V2.1 - GINT STD US LAB.GDT - 9/26/24 15:36 - Y:\801\GEOTECHNICAL\PROJECTS\2024 PROJECTS\68316 ORANGE COUNTY CTE BUILDING\LOGS\ORANGE CTE.GPJ

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, VA 23225

BORING B-04

PROJECT NUMBER 68316 **PROJECT NAME** Orange County High School CTE

CLIENT Orange County Public Schools **PROJECT LOCATION** Orange County, Virginia

DATE STARTED 9/12/2024 **COMPLETED** 9/12/2024 **GROUND ELEVATION** 454.5 ft **HOLE DEPTH** 13 feet

DRILLING CONTRACTOR Central Virginia Utilities **BOREHOLE WATER LEVELS:**

DRILLING METHOD Hollow Stem Auger **AT TIME OF DRILLING** --- Not encountered

LOGGED BY Julian Ruffin **CHECKED BY** **AT 24 HOURS DRILLING** ---

NOTES **CAVE DEPTH**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SYMBOL	SAMPLING BLOW COUNTS (N-VALUE)	RECOVERY (%)	LAB TESTS	REMARKS
0		TOPSOIL: topsoil, (2 Inches)		S-1, SPT 15-13-14 (27)			
		SANDY SILT, (ML): dark reddish brown, moist, very stiff, trace roots					
		ELASTIC SILT, (MH): dark red, moist, hard, trace sand		S-2, SPT 18-19-25 (44)			
5	450	Stiff		S-3, SPT 7-7-8 (15)			
		SANDY FAT CLAY, (CH): orangeish brown and gray, moist, stiff		S-4, SPT 2-3-9 (12)			
10	445	SILTY SAND, (SM): gray, fine to coarse grained, moist, very dense, weathered decomposed rock		S-5, SPT 50/6"			
		Refusal at 13.0 feet. Bottom of borehole at 13.0 feet.		S-6, SPT 50/0"			

TG GEOTECH BH LOG V2.1 - GINT STD US LAB.GDT - 9/26/24 15:36 - Y:\801\GEOTECHNICAL\PROJECTS\2024 PROJECTS\68316 ORANGE COUNTY CTE BUILDING\LOGS\ORANGE CTE.GPJ

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, VA 23225

BORING B-05

PROJECT NUMBER 68316 **PROJECT NAME** Orange County High School CTE

CLIENT Orange County Public Schools **PROJECT LOCATION** Orange County, Virginia

DATE STARTED 9/12/2024 **COMPLETED** 9/12/2024 **GROUND ELEVATION** 453 ft **HOLE DEPTH** 17 feet

DRILLING CONTRACTOR Central Virginia Utilities **BOREHOLE WATER LEVELS:**

DRILLING METHOD Hollow Stem Auger **AT TIME OF DRILLING** --- Not encountered

LOGGED BY Julian Ruffin **CHECKED BY** **AT 24 HOURS DRILLING** ---

NOTES **CAVE DEPTH**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SYMBOL	SAMPLING BLOW COUNTS (N-VALUE)	RECOVERY (%)	LAB TESTS	REMARKS
0	453	TOPSOIL: topsoil, (2 Inches)		S-1, SPT 6-7-5 (12)			
		FAT CLAY WITH SAND, (CH): dark red, moist, stiff, trace gravel, fill Very stiff, trace roots		S-2, SPT 7-7-9 (16)			
	450						
5		SANDY ELASTIC SILT, (MH): reddish brown and orange, moist, very stiff		S-3, SPT 5-7-10 (17)			
		SANDY FAT CLAY, (CH): orangeish brown, moist, very stiff		S-4, SPT 7-8-12 (20)			
	445						
10		SANDY SILT, (ML): orangeish brown, moist, very hard, weathered decomposed rock		S-5, SPT 8-15-50 (65)			
	440						
15		Light brownish gray		S-6, SPT 89/8"			
		Refusal at 17.0 feet. Bottom of borehole at 17.0 feet.		S-7, SPT 50/0"			

TG GEOTECH BH LOG V2.1 - GINT STD US LAB.GDT - 9/26/24 15:36 - Y:\801\GEOTECHNICAL\PROJECTS\2024 PROJECTS\68316 ORANGE COUNTY CTE BUILDING\LOGS\ORANGE CTE.GPJ

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, VA 23225

BORING B-06

PROJECT NUMBER 68316 **PROJECT NAME** Orange County High School CTE

CLIENT Orange County Public Schools **PROJECT LOCATION** Orange County, Virginia

DATE STARTED 9/12/2024 **COMPLETED** 9/12/2024 **GROUND ELEVATION** 457 ft **HOLE DEPTH** 9.25 feet

DRILLING CONTRACTOR Central Virginia Utilities **BOREHOLE WATER LEVELS:**

DRILLING METHOD Hollow Stem Auger **AT TIME OF DRILLING** --- Not encountered

LOGGED BY Julian Ruffin **CHECKED BY** **AT 24 HOURS DRILLING** ---

NOTES **CAVE DEPTH**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SYMBOL	SAMPLING BLOW COUNTS (N-VALUE)	RECOVERY (%)	LAB TESTS	REMARKS
0	457	TOPSOIL: topsoil, (2 Inches)		S-1, SPT 6-8-9 (17)			
	455	SANDY ELASTIC SILT, (MH): dark reddish brown, moist, very stiff, trace roots, fill		S-2, SPT 7-7-10 (17)			
5				S-3, SPT 3-6-8 (14)			
	450	SANDY FAT CLAY, (CH): orangeish brown and gray, moist, very stiff		S-4, SPT 4-6-16 (22)			
		Weathered decomposed rock, No Recovery		S-5, SPT 76/9"			
		Bottom of borehole at 9.3 feet.					

TG GEOTECH BH LOG V2.1 - GINT STD US LAB.GDT - 9/26/24 15:36 - Y:\801\GEOTECHNICAL\PROJECTS\2024 PROJECTS\68316 ORANGE COUNTY CTE BUILDING\LOGS\ORANGE CTE.GPJ

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, VA 23225

BORING B-07

PROJECT NUMBER 68316 **PROJECT NAME** Orange County High School CTE

CLIENT Orange County Public Schools **PROJECT LOCATION** Orange County, Virginia

DATE STARTED 9/12/2024 **COMPLETED** 9/12/2024 **GROUND ELEVATION** 455.5 ft **HOLE DEPTH** 10 feet

DRILLING CONTRACTOR Central Virginia Utilities **BOREHOLE WATER LEVELS:**

DRILLING METHOD Hollow Stem Auger **AT TIME OF DRILLING** --- Not encountered

LOGGED BY Julian Ruffin **CHECKED BY** **AT 24 HOURS DRILLING** ---

NOTES **CAVE DEPTH**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SYMBOL	SAMPLING BLOW COUNTS (N-VALUE)	RECOVERY (%)	LAB TESTS	REMARKS
0	455	TOPSOIL: topsoil, (3 Inches)		S-1, SPT 7-11-18 (29)			
		SANDY SILT, (ML): dark reddish brown, moist, very stiff					
		ELASTIC SILT WITH SAND, (MH): dark reddish brown, moist, very stiff		S-2, SPT 8-12-16 (28)			
		SANDY FAT CLAY, (CH): orangeish brown and gray, moist, very stiff, trace gravel		S-3, SPT 4-9-7 (16)			
5	450						
		Medium stiff		S-4, SPT 3-3-3 (6)			
		Very stiff					
10				S-5, SPT 7-9-13 (22)			
		Bottom of borehole at 10.0 feet.					

TG GEOTECH BH LOG V2.1 - GINT STD US LAB.GDT - 9/26/24 15:36 - Y:\801\GEOTECHNICAL\PROJECTS\2024 PROJECTS\68316 ORANGE COUNTY CTE BUILDING\LOGS\ORANGE CTE.GPJ

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, VA 23225

BORING B-08

PROJECT NUMBER 68316 **PROJECT NAME** Orange County High School CTE

CLIENT Orange County Public Schools **PROJECT LOCATION** Orange County, Virginia

DATE STARTED 9/12/2024 **COMPLETED** 9/12/2024 **GROUND ELEVATION** 453.5 ft **HOLE DEPTH** 13.833 feet

DRILLING CONTRACTOR Central Virginia Utilities **BOREHOLE WATER LEVELS:**

DRILLING METHOD Hollow Stem Auger **AT TIME OF DRILLING** --- Not encountered

LOGGED BY Julian Ruffin **CHECKED BY** **AT 24 HOURS DRILLING** ---

NOTES **CAVE DEPTH**

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SYMBOL	SAMPLING BLOW COUNTS (N-VALUE)	RECOVERY (%)	LAB TESTS	REMARKS
0	453.5	TOPSOIL: topsoil, (2 Inches)		S-1, SPT 13-21-13 (34)			
		SILTY SAND, (SM): dark reddish brown, fine to coarse grained, moist, dense, fill					
		Medium dense		S-2, SPT 6-8-8 (16)			
	450						
5		FAT CLAY WITH SAND, (CH): brown and gray, moist, stiff, contains organics		S-3, SPT 3-5-6 (11)			
		Medium stiff		S-4, SPT 3-3-4 (7)			
	445						
10		CLAYEY SAND, (SC): brown, fine to coarse grained, moist, medium dense, contains gravel		S-5, SPT 8-7-6 (13)			
	440	SILTY SAND, (SM): gray, fine to coarse grained, moist, very dense, contains rock fragments, weathered decomposed rock		S-6, SPT 50/3"			
		Bottom of borehole at 13.8 feet.					

TG GEOTECH BH LOG V2.1 - GINT STD US LAB.GDT - 9/26/24 15:36 - Y:\801\GEOTECHNICAL\PROJECTS\2024 PROJECTS\68316 ORANGE COUNTY CTE BUILDING\LOGS\ORANGE CTE.GPJ

APPENDIX C

LABORATORY TEST RESULTS

Material Classification

ASTM D2487

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

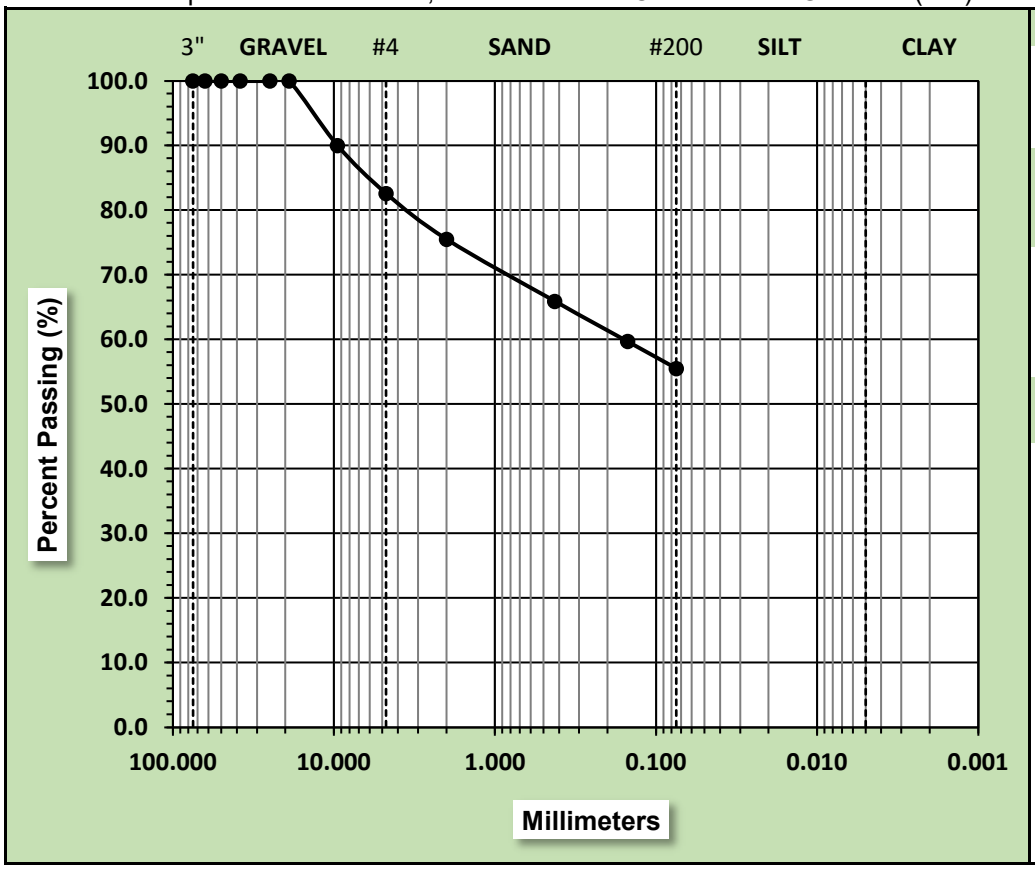
PROJECT INFORMATION

Project #:	68316	Report Date:	9/22/2024
Project Name:	Orange County High School CTE		
Project Location:	Orange County, Virginia		
Client Name:	Orange County Public Schools (VA)		
Client Address:	200 Dailey Drive, Orange, VA 22960		

SAMPLE INFORMATION

Location:	B-01	Sample #:	S-2	Sample Date:	9/12/2024
Depth:	2 to 3.5 feet	Offset:	N/A	Lab Control #:	3736

Material Description: Red-brown, SANDY ELASTIC SILT WITH GRAVEL (MH)



Soil Properties	
Natural Moisture Content	21.7%
Specific Gravity	---
Liquid Limit	52
Plastic Limit	30
Plastic Index	22
Group Symbol	MH
%Passing	
3"	
2.5"	
2"	
1.5"	
1"	
3/4"	100.0
3/8"	90.0
#4	82.6
#10	75.5
#40	65.9
#100	59.7
#200	55.5

Maximum Particle Size 3/4" **Gravel** 17.4% **Sand** 27.1% **Silt and Clay** 55.5%

C_u --- C_c ---

Description of Sand & Gravel Particles: Rounded, Angular, Hard, Friable

Notes:

References: AASHTO T265 Method B tested on 9/17/24 by Ken Pruner
AASHTO T11 & T88 tested on 9/18/24 & 9/19/24 by KP and GE
AASHTO T89 Method A & T90 tested on 9/20/24 by Ken Pruner

Matthew Thornton	Matthew Thornton	Laboratory Manager	9/22/24
Technical Responsibility	*Signature*	*Position*	*Date*

Information included in this report relates only to material sampled at the time of testing.
This report shall not be reproduced, except in full, without the written approval of Timmons Group

Material Classification

ASTM D2487

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

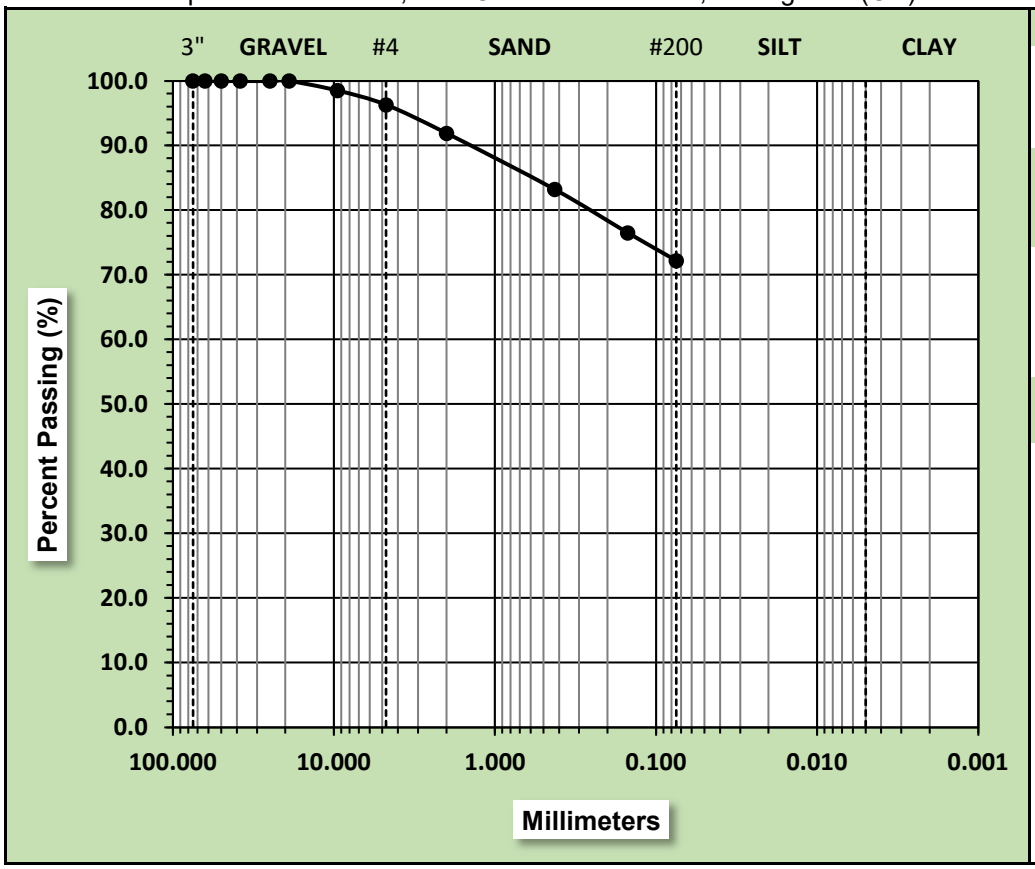
PROJECT INFORMATION

Project #:	68316	Report Date:	9/22/2024
Project Name:	Orange County High School CTE		
Project Location:	Orange County, Virginia		
Client Name:	Orange County Public Schools (VA)		
Client Address:	200 Dailey Drive, Orange, VA 22960		

SAMPLE INFORMATION

Location:	B-03	Sample #:	Bulk	Sample Date:	9/12/2024
Depth:	0 to 5 feet	Offset:	N/A	Lab Control #:	3734

Material Description: Dark red, FAT CLAY WITH SAND, trace gravel (CH)



Soil Properties	
As-Received Moisture Content	18.2%
Specific Gravity	---
Liquid Limit	62
Plastic Limit	26
Plastic Index	36
Group Symbol	CH
%Passing	
3"	
2.5"	
2"	
1.5"	
1"	
3/4"	100.0
3/8"	98.5
#4	96.3
#10	91.9
#40	83.2
#100	76.5
#200	72.2

Maximum Particle Size 3/4" **Gravel** 3.7% **Sand** 24.1% **Silt and Clay** 72.2%

C_u --- C_c ---

Description of Sand & Gravel Particles: Angular, Hard

Notes:

References: AASHTO T265 Method B tested on 9/17/24 by Ken Pruner
AASHTO T11 & T88 tested on 9/18/24 & 9/19/24 by Ken Pruner
AASHTO T89 Method A & T90 tested on 9/20/24 by Ken Pruner

Matthew Thornton	Matthew Thornton	Laboratory Manager	9/22/24
Technical Responsibility	*Signature*	*Position*	*Date*

Information included in this report relates only to material sampled at the time of testing.
This report shall not be reproduced, except in full, without the written approval of Timmons Group

Form No. TR-Class
Revision No. 1.2
Revision Date: 9/18/22

Material Classification

ASTM D2487

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

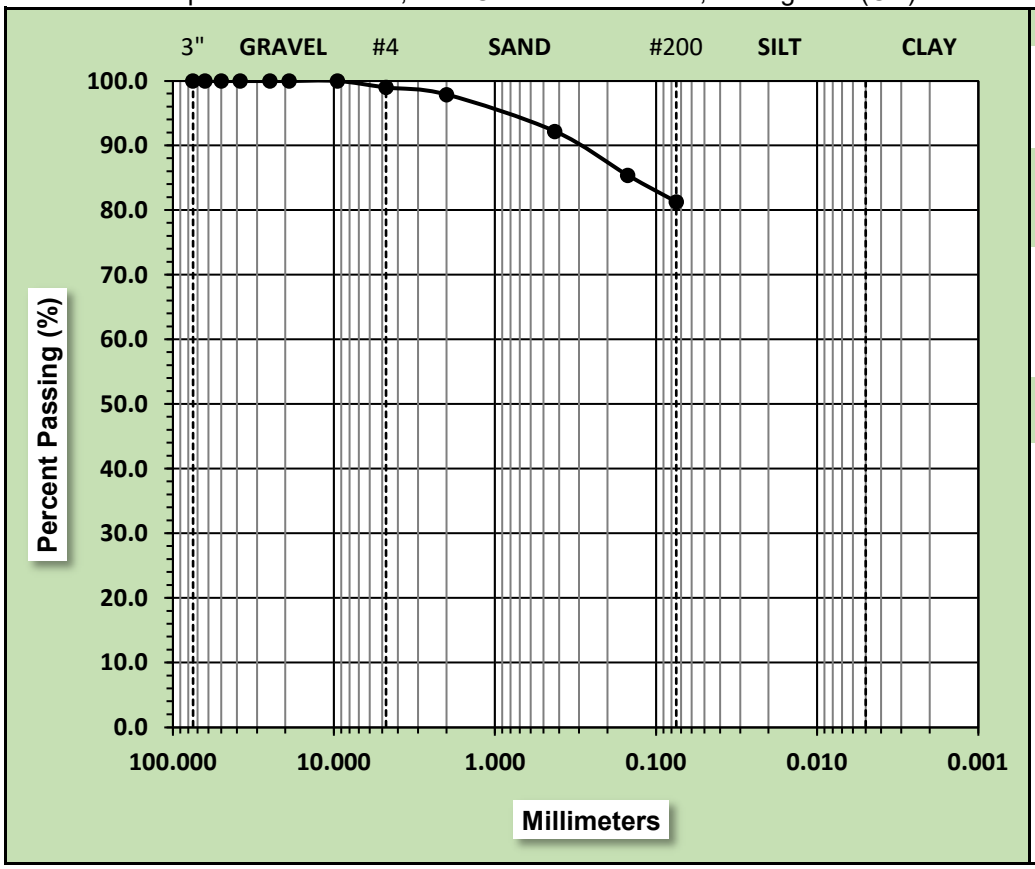
PROJECT INFORMATION

Project #:	68316	Report Date:	9/22/2024
Project Name:	Orange County High School CTE		
Project Location:	Orange County, Virginia		
Client Name:	Orange County Public Schools (VA)		
Client Address:	200 Dailey Drive, Orange, VA 22960		

SAMPLE INFORMATION

Location:	B-03	Sample #:	S-3	Sample Date:	9/12/2024
Depth:	4 to 5.5 feet	Offset:	N/A	Lab Control #:	3742

Material Description: Dark red, FAT CLAY WITH SAND, trace gravel (CH)



Soil Properties	
Natural Moisture Content	28.9%
Specific Gravity	---
Liquid Limit	59
Plastic Limit	30
Plastic Index	29
Group Symbol	CH
%Passing	
3"	
2.5"	
2"	
1.5"	
1"	
3/4"	
3/8"	100.0
#4	99.0
#10	97.9
#40	92.2
#100	85.4
#200	81.3

Maximum Particle Size 3/8" **Gravel** 1.0% **Sand** 17.7% **Silt and Clay** 81.3%

C_u --- C_c ---

Description of Sand & Gravel Particles: Rounded, Angular, Hard

Notes:

References: AASHTO T265 Method B tested on 9/17/24 by Ken Pruner
AASHTO T11 & T88 tested on 9/18/24 & 9/19/24 by KP and GE
AASHTO T89 Method A & T90 tested on 9/20/24 by Ken Pruner

Matthew Thornton	Matthew Thornton	Laboratory Manager	9/22/24
Technical Responsibility	*Signature*	*Position*	*Date*

Information included in this report relates only to material sampled at the time of testing.
This report shall not be reproduced, except in full, without the written approval of Timmons Group

Material Classification

ASTM D2487

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

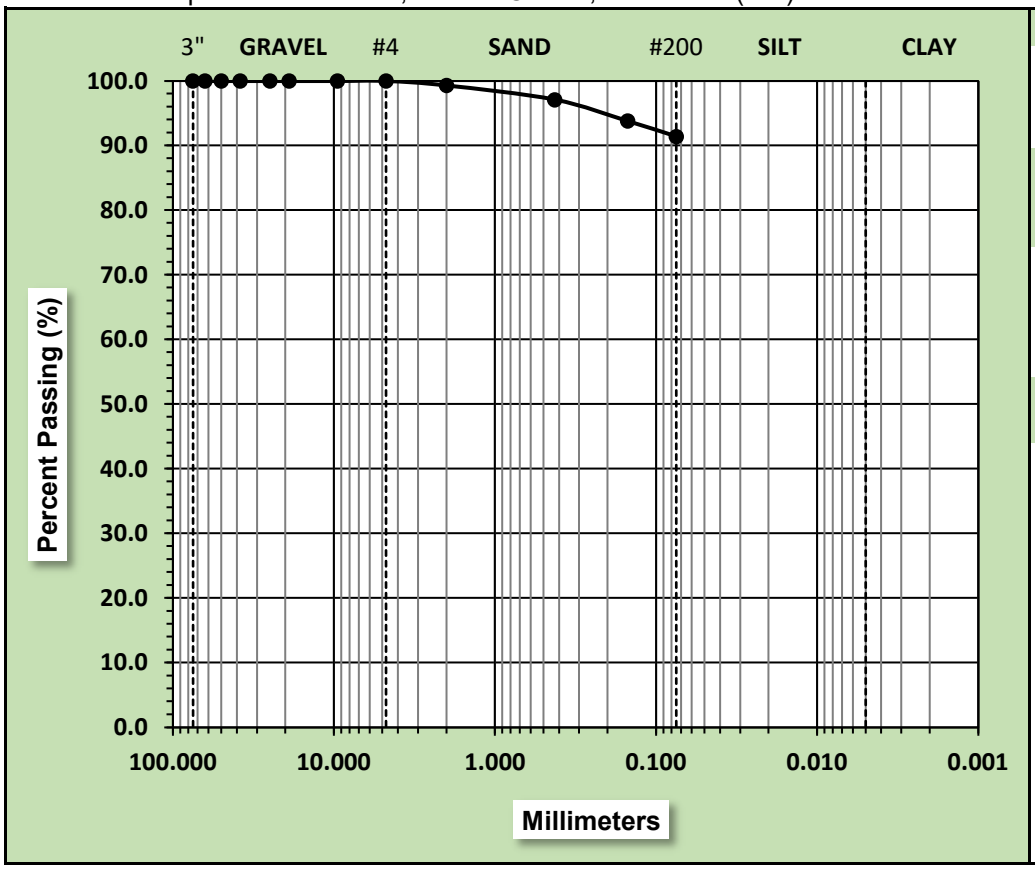
PROJECT INFORMATION

Project #:	68316	Report Date:	9/22/2024
Project Name:	Orange County High School CTE		
Project Location:	Orange County, Virginia		
Client Name:	Orange County Public Schools (VA)		
Client Address:	200 Dailey Drive, Orange, VA 22960		

SAMPLE INFORMATION

Location:	B-04	Sample #:	S-3	Sample Date:	9/12/2024
Depth:	4 to 5.5 feet	Offset:	N/A	Lab Control #:	3737

Material Description: Dark red, ELASTIC SILT, trace sand (MH)



Soil Properties	
Natural Moisture Content	31.6%
Specific Gravity	---
Liquid Limit	58
Plastic Limit	31
Plastic Index	27
Group Symbol	MH
%Passing	
3"	
2.5"	
2"	
1.5"	
1"	
3/4"	
3/8"	
#4	100.0
#10	99.3
#40	97.1
#100	93.8
#200	91.4

Maximum Particle Size #4 **Gravel** 0.0% **Sand** 8.6% **Silt and Clay** 91.4%

C_u --- C_c ---

Description of Sand & Gravel Particles: Rounded, Angular, Hard

Notes:

References: AASHTO T265 Method B tested on 9/17/24 by Ken Pruner
AASHTO T11 & T88 tested on 9/18/24 & 9/19/24 by KP and GE
AASHTO T89 Method A & T90 tested on 9/20/24 by Ken Pruner

Matthew Thornton	Matthew Thornton	Laboratory Manager	9/22/24
Technical Responsibility	*Signature*	*Position*	*Date*

Information included in this report relates only to material sampled at the time of testing.
This report shall not be reproduced, except in full, without the written approval of Timmons Group

Form No. TR-Class
Revision No. 1.2
Revision Date: 9/18/22

Material Classification

ASTM D2487

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

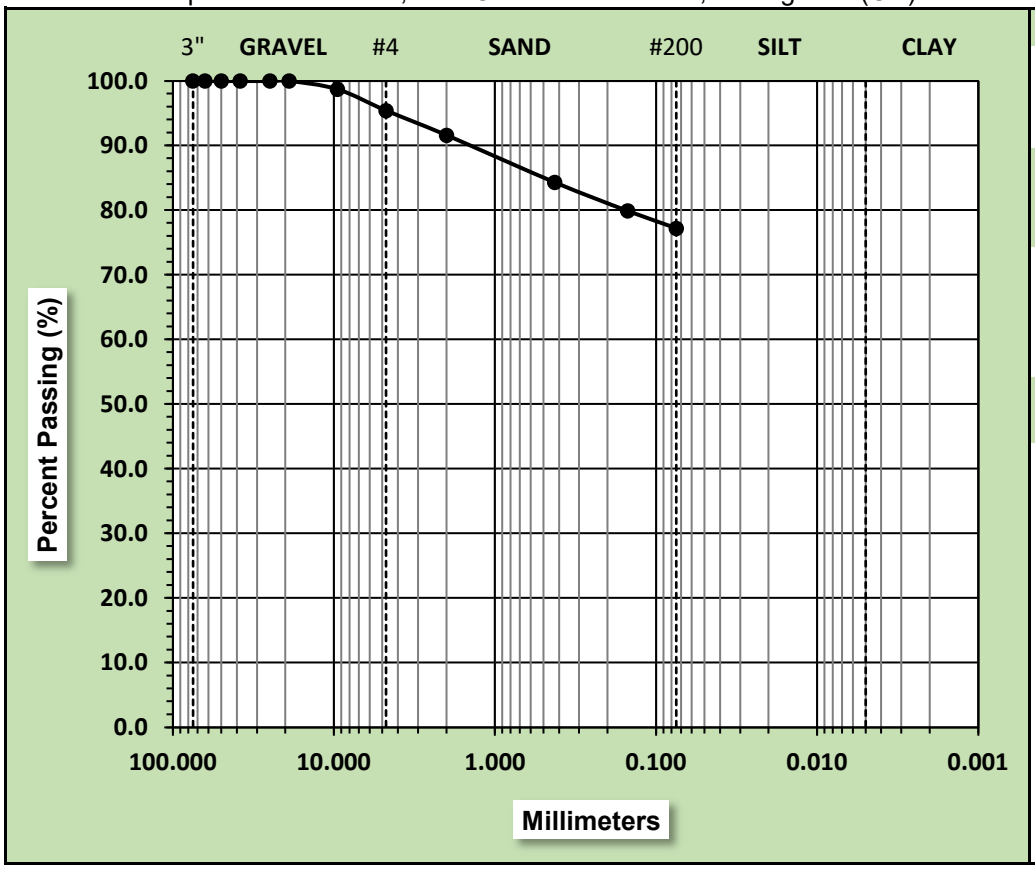
PROJECT INFORMATION

Project #:	68316	Report Date:	9/22/2024
Project Name:	Orange County High School CTE		
Project Location:	Orange County, Virginia		
Client Name:	Orange County Public Schools (VA)		
Client Address:	200 Dailey Drive, Orange, VA 22960		

SAMPLE INFORMATION

Location:	B-07	Sample #:	Bulk	Sample Date:	9/12/2024
Depth:	0 to 5 feet	Offset:	N/A	Lab Control #:	3735

Material Description: Dark red, FAT CLAY WITH SAND, trace gravel (CH)



Soil Properties	
As-Received Moisture Content	25.9%
Specific Gravity	---
Liquid Limit	66
Plastic Limit	30
Plastic Index	36
Group Symbol	CH
%Passing	
3"	
2.5"	
2"	
1.5"	
1"	
3/4"	100.0
3/8"	98.7
#4	95.4
#10	91.6
#40	84.3
#100	79.9
#200	77.2

Maximum Particle Size 3/4" **Gravel** 4.6% **Sand** 18.2% **Silt and Clay** 77.2%

C_u --- C_c ---

Description of Sand & Gravel Particles: Rounded, Angular, Hard

Notes:

References: AASHTO T265 Method B tested on 9/17/24 by Ken Pruner
AASHTO T11 & T88 tested on 9/18/24 & 9/19/24 by Ken Pruner
AASHTO T89 Method A & T90 tested on 9/20/24 by Ken Pruner

Matthew Thornton	Matthew Thornton	Laboratory Manager	9/22/24
Technical Responsibility	*Signature*	*Position*	*Date*

Information included in this report relates only to material sampled at the time of testing.
This report shall not be reproduced, except in full, without the written approval of Timmons Group

MOISTURE-DENSITY RELATIONSHIP REPORT

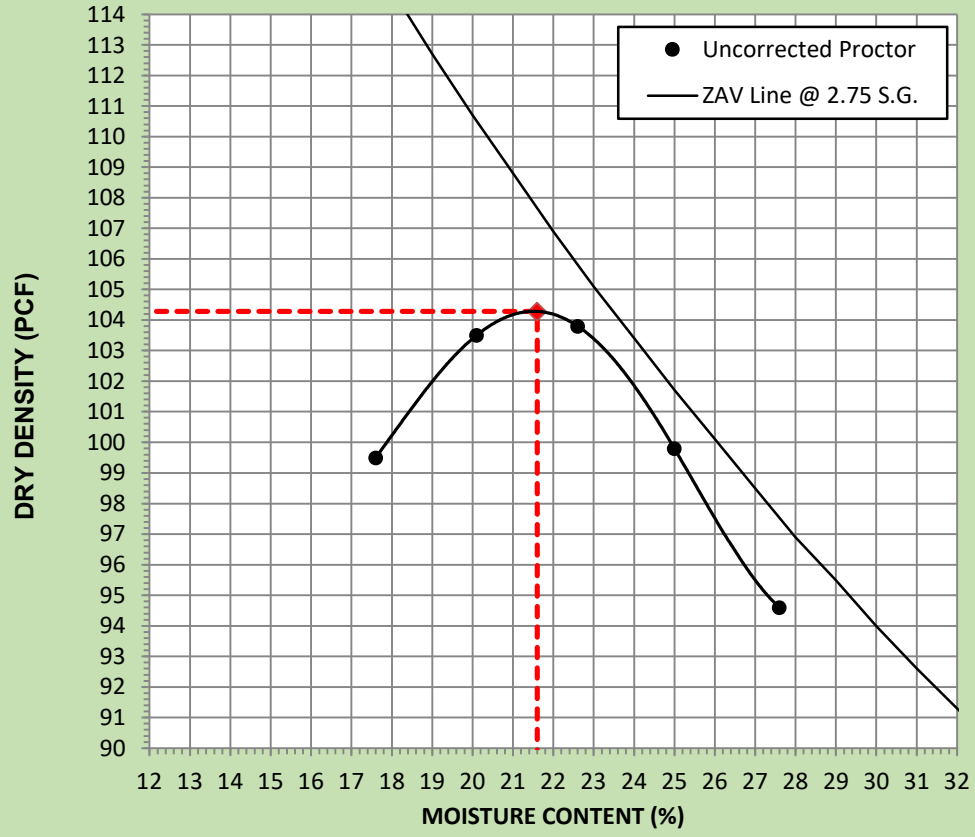
TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

PROJECT INFORMATION			
Project #:	68316	Report Date:	9/22/2024
Project Name:	Orange County High School CTE	Test Date(s):	9/19/2024
Project Location:	Orange County, Virginia	Tested By:	Ken Pruner
Client Name:	Orange County Public Schools (VA)		
Client Address:	200 Dailey Drive, Orange, VA 22960		

SAMPLE INFORMATION					
Location:	B-03	Sample #:	Bulk	Sample Date:	9/12/2024
Depth:	0 to 5 feet	Offset:	N/A	Lab Control #:	3734
Material Description:	Dark red, FAT CLAY WITH SAND, trace gravel (CH)				

Maximum Dry Density **104.3** **PCF** **Optimum Moisture Content** **21.6** **%**

AASHTO T-99 Method A



Soil Properties	
As-Received Moisture Content	18.2%
Assumed Specific Gravity	2.75
Liquid Limit	62
Plastic Limit	26
Plastic Index	36
%Passing	
1.5"	
3/4"	100.0
3/8"	98.5
No. 4	96.3
No. 10	91.9
No. 40	83.2
No. 200	72.2
Corrected Moisture-Density	
MDD (pcf)	---
OMC (%)	---
Assumed Properties of Oversize Fraction	
Sp.Gr.(OD)	---
Absorption	---

The Moisture-Density Curve Displayed relates only to material passing a No. 4 sieve.
Air-dried material passing a No. 4 sieve was prepared then compacted with a circular, manual rammer.

References / Comments / Deviations:

Matthew Thornton	Matthew Thornton	Laboratory Manager	9/22/24
Technical Responsibility	*Signature*	*Position*	*Date*

Information included in this report relates only to material sampled at the time of testing.
This report shall not be reproduced, except in full, without the written approval of Timmons Group

Form No. TR-Compaction
Revision No. 1.1
Revision Date: 05/18/18

MOISTURE-DENSITY RELATIONSHIP REPORT

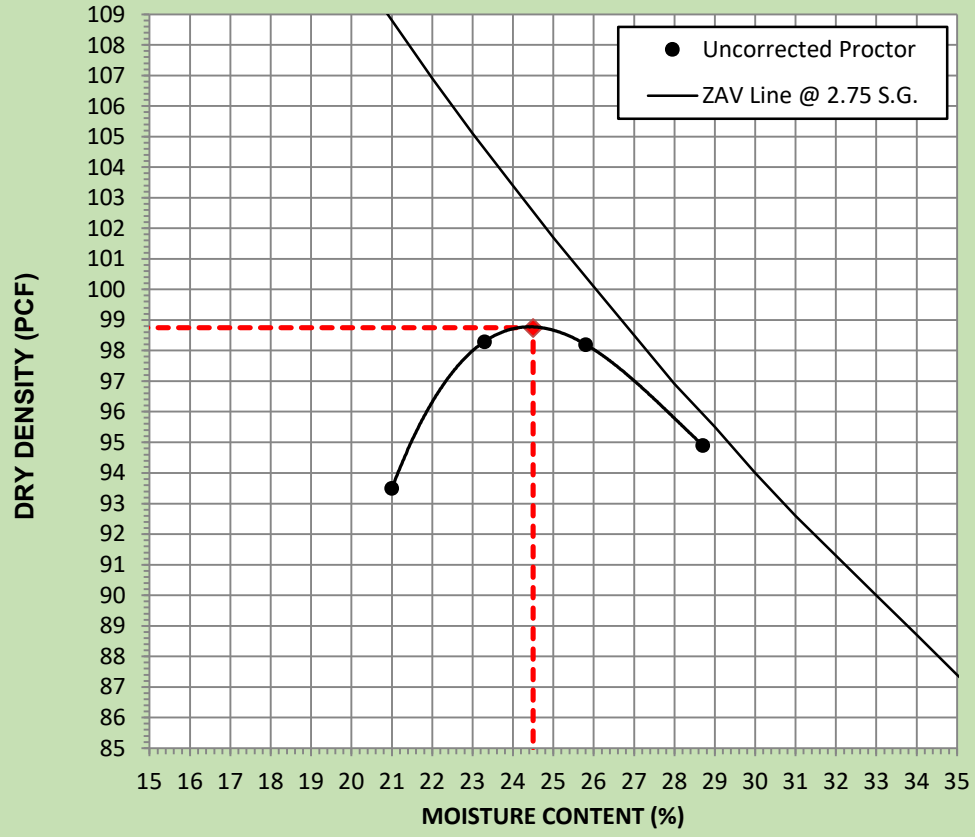
TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

PROJECT INFORMATION			
Project #:	68316	Report Date:	9/22/2024
Project Name:	Orange County High School CTE	Test Date(s):	9/19/2024
Project Location:	Orange County, Virginia	Tested By:	Ken Pruner
Client Name:	Orange County Public Schools (VA)		
Client Address:	200 Dailey Drive, Orange, VA 22960		

SAMPLE INFORMATION					
Location:	B-07	Sample #:	Bulk	Sample Date:	9/12/2024
Depth:	0 to 5 feet	Offset:	N/A	Lab Control #:	3735
Material Description:	Dark red, FAT CLAY WITH SAND, trace gravel (CH)				

Maximum Dry Density **98.8** **PCF** **Optimum Moisture Content** **24.5** **%**

AASHTO T-99 Method A



Soil Properties	
As-Received Moisture Content	25.9%
Assumed Specific Gravity	2.75
Liquid Limit	66
Plastic Limit	30
Plastic Index	36
%Passing	
1.5"	
3/4"	100.0
3/8"	98.7
No. 4	95.4
No. 10	91.6
No. 40	84.3
No. 200	77.2
Corrected Moisture-Density	
MDD (pcf)	---
OMC (%)	---
Assumed Properties of Oversize Fraction	
Sp.Gr.(OD)	---
Absorption	---

The Moisture-Density Curve Displayed relates only to material passing a No. 4 sieve.
Air-dried material passing a No. 4 sieve was prepared then compacted with a circular, manual rammer.

References / Comments / Deviations:

Matthew Thornton	Matthew Thornton	Laboratory Manager	9/22/24
Technical Responsibility	*Signature*	*Position*	*Date*

Information included in this report relates only to material sampled at the time of testing.
This report shall not be reproduced, except in full, without the written approval of Timmons Group

Form No. TR-CBR
Revision No. 1
Revision Date: 05/18/18

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T193

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

PROJECT INFORMATION

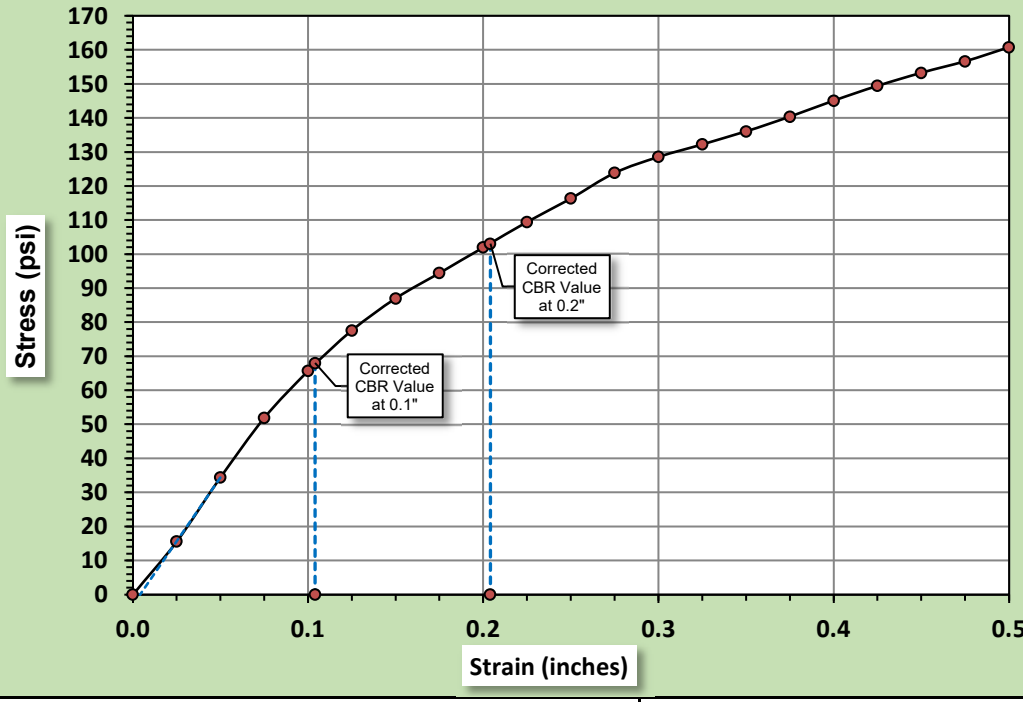
Project #:	68316	Report Date:	9/26/2024
Project Name:	Orange County High School CTE	Test Date(s):	9/21/24 to 9/25/24
Project Location:	Orange County, Virginia	Tested By:	Ken Pruner
Client Name:	Orange County Public Schools (VA)		
Client Address:	200 Dailey Drive, Orange, VA 22960		

SAMPLE INFORMATION

Location:	B-03	Sample #:	Bulk	Sample Date:	9/12/2024
Depth:	0 to 5 feet	Offset:	N/A	Lab Control #:	3734

Material Description: Dark red, FAT CLAY WITH SAND, trace gravel (CH)

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 6.6	CBR at 0.2 in. 6.8	CBR at 0.1 in 6.8	CBR at 0.2 in 6.9



Soil Properties

As-Received Moisture Content	18.2%
Liquid Limit	62
Plastic Limit	26
Plastic Index	36

%Passing

1.5"	
3/4"	100.0
3/8"	98.5
No. 4	96.3
No. 10	91.9
No. 40	83.2
No. 100	76.5
No. 200	72.2

AASHTO T-99 Method A

MDD (pcf)	104.3
OMC (%)	21.6

Before Soaking		*After Soaking*	
Compactive Effort (Blows Per Layer)	56	Final Dry Density (pcf)	102.7
Initial Dry Density (pcf)	104.1	Average Final Moisture Content	23.9%
Moisture Content of Compacted Specimen	21.2%	Moisture Content (top 1" after soaking)	25.4%
Percent Compaction	99.8%	Percent Swell	0.8%

Soak Time (hours): 96 Surcharge Weight (lb): 10 Surcharge Stress (psf): 50.9

AASHTO T-99 Method A was performed on grading complying with CBR specification. % Retained on

AASHTO T193 was performed on the entire gradation compacted in a 6" CBR mold. 3/4" sieve: 0.0

References / Comments / Deviations:

Matthew Thornton	Matthew Thornton	Laboratory Manager	9/26/24
Technical Responsibility	*Signature*	*Position*	*Date*

Information included in this report relates only to material sampled at the time of testing.
This report shall not be reproduced, except in full, without the written approval of Timmons Group

Timmons Group / 430 Southlake Boulevard Suite B-15 Richmond, VA 23236 / p 804.200.6500

Form No. TR-CBR
Revision No. 1
Revision Date: 05/18/18

CBR (California Bearing Ratio) of Laboratory Compacted Soil

AASHTO T193

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

PROJECT INFORMATION

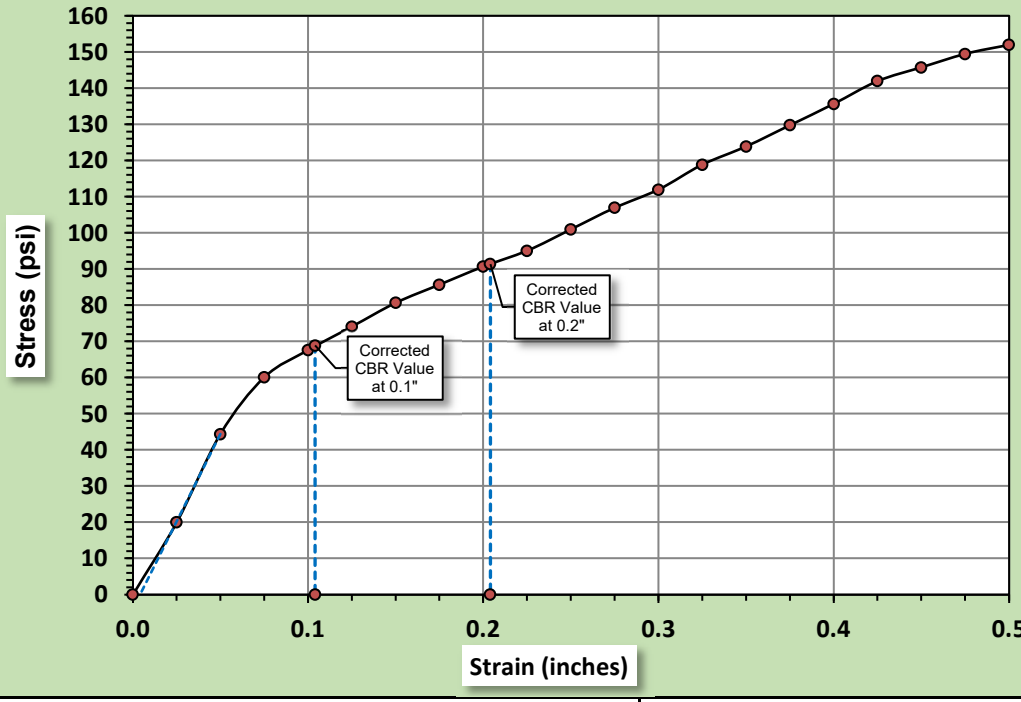
Project #:	68316	Report Date:	9/26/2024
Project Name:	Orange County High School CTE	Test Date(s):	9/21/24 to 9/25/24
Project Location:	Orange County, Virginia	Tested By:	Ken Pruner
Client Name:	Orange County Public Schools (VA)		
Client Address:	200 Dailey Drive, Orange, VA 22960		

SAMPLE INFORMATION

Location:	B-07	Sample #:	Bulk	Sample Date:	9/12/2024
Depth:	0 to 5 feet	Offset:	N/A	Lab Control #:	3735

Material Description: Dark red, FAT CLAY WITH SAND, trace gravel (CH)

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 6.8	CBR at 0.2 in. 6.0	CBR at 0.1 in 6.9	CBR at 0.2 in 6.1



Soil Properties

As-Received Moisture Content	25.9%
Liquid Limit	66
Plastic Limit	30
Plastic Index	36

%Passing	
1.5"	
3/4"	100.0
3/8"	98.7
No. 4	95.4
No. 10	91.6
No. 40	84.3
No. 100	79.9
No. 200	77.2

AASHTO T-99 Method A

MDD (pcf)	98.8
OMC (%)	24.5

Before Soaking		*After Soaking*	
Compactive Effort (Blows Per Layer)	56	Final Dry Density (pcf)	95.9
Initial Dry Density (pcf)	97.6	Average Final Moisture Content	28.2%
Moisture Content of Compacted Specimen	24.2%	Moisture Content (top 1" after soaking)	30.4%
Percent Compaction	98.8%	Percent Swell	1.2%

Soak Time (hours): 96 Surcharge Weight (lb): 10 Surcharge Stress (psf): 50.9

AASHTO T-99 Method A was performed on grading complying with CBR specification. % Retained on

AASHTO T193 was performed on the entire gradation compacted in a 6" CBR mold. 3/4" sieve: 0.0

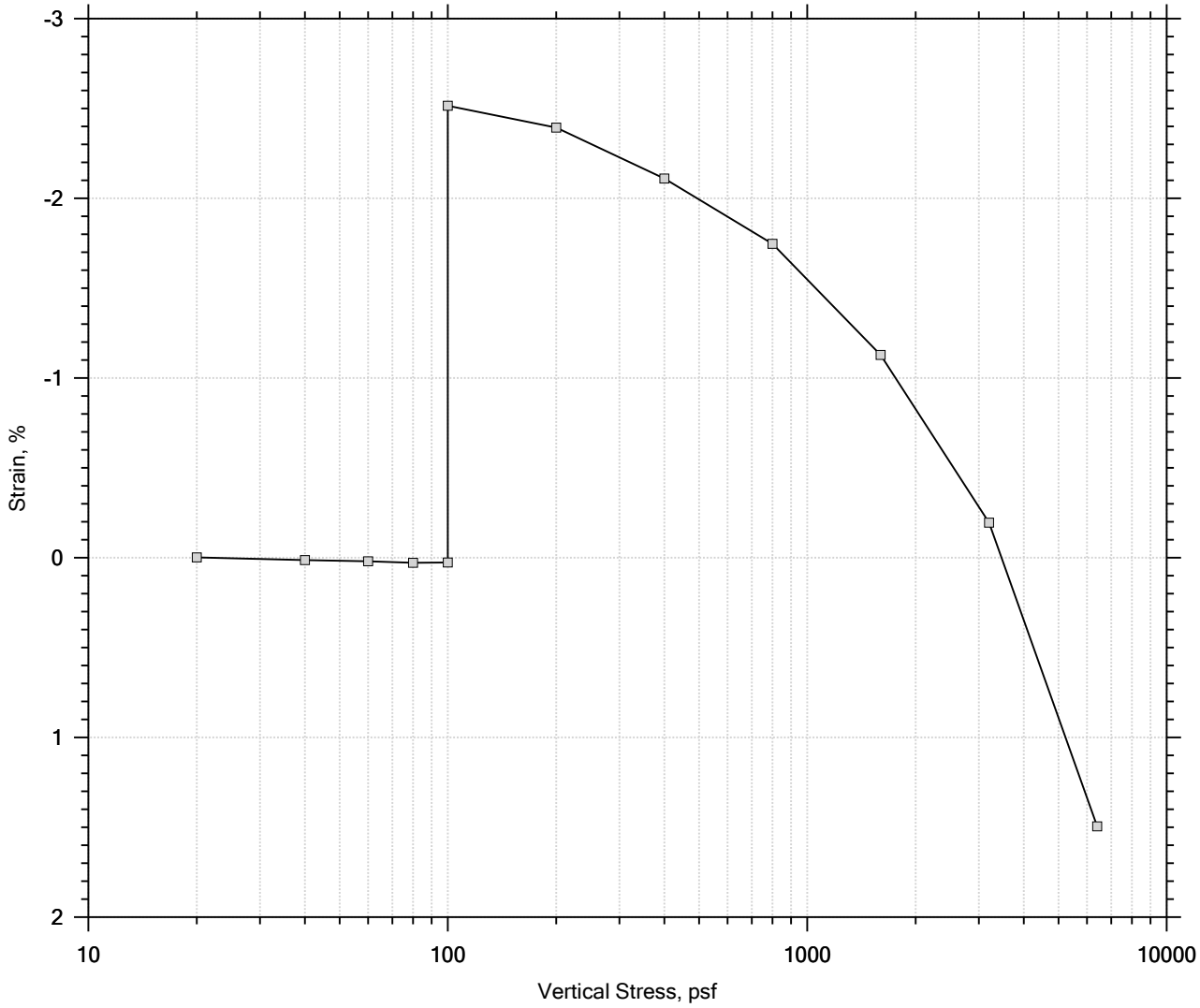
References / Comments / Deviations:

Matthew Thornton	Matthew Thornton	Laboratory Manager	9/26/24
Technical Responsibility	*Signature*	*Position*	*Date*

Information included in this report relates only to material sampled at the time of testing.
This report shall not be reproduced, except in full, without the written approval of Timmons Group

One-Dimensional Swell or Collapse by ASTM D4546 - Method C

Summary Report



					Before Test	After Test
Applied Vertical Stress: 100 psf				Water Content, %	19.66	22.59
Collapse Strain at Vertical Stress: 0.05%				Dry Unit Weight, pcf	103.55	105.12
Test Water: Distilled				Saturation, %	78.39	93.39
Diameter: 2.5 in		Height: 0.997 in		Void Ratio	0.71	0.69
LL: 62	PL: 26	PI: 36	Silt & Clay: 72.2%			

Swell Strain at Applied Vertical Stress: 2.55%

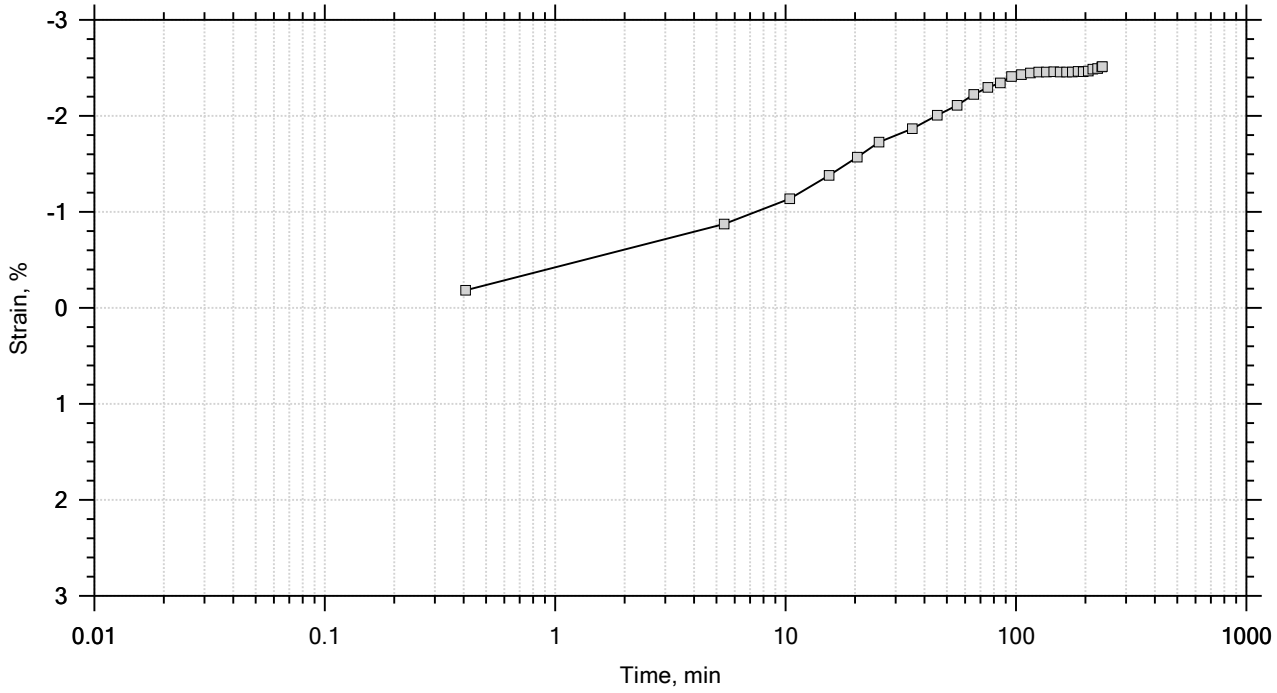
Swell Pressure at 0% Strain: 3,500 psf

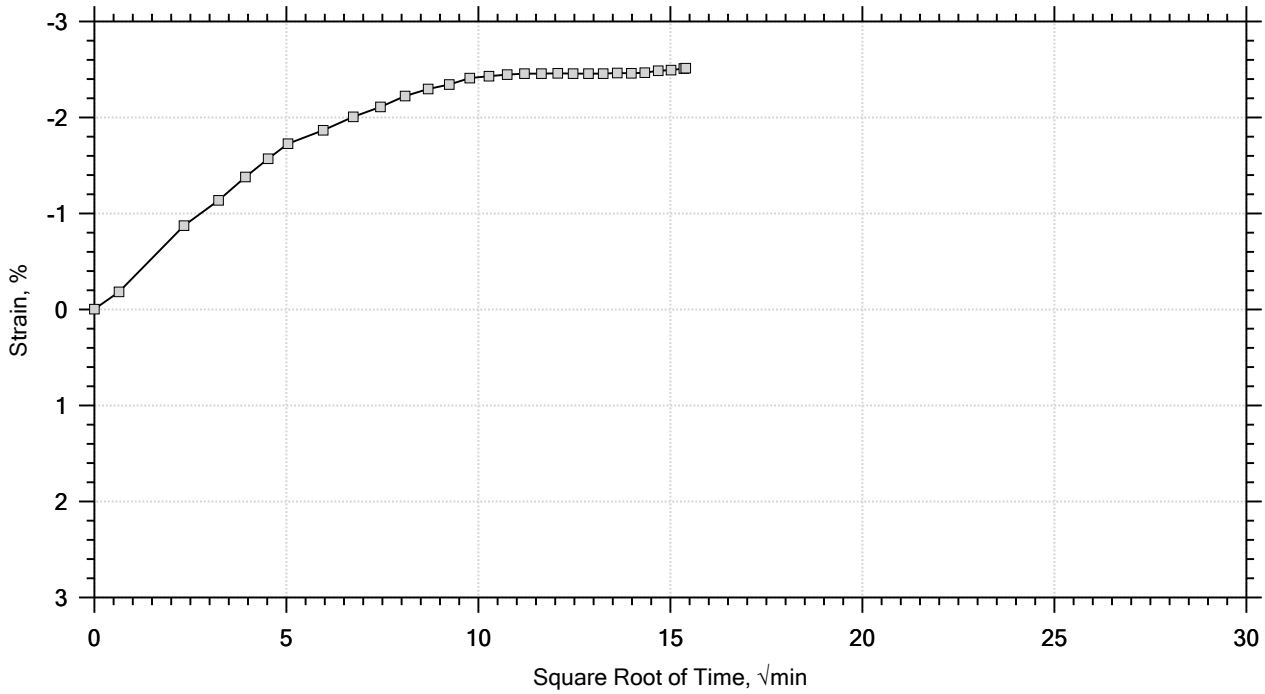
TIMMONS GROUP

Project: Orange Co. HS CTE	Location: Orange Co., VA	Project No.: 68316
Boring No.: B-03	Tested By: MLT	Checked By: JNR
Sample No.: Bulk	Test Date: 9/24/24	Depth: 0 to 5 feet
Test No.: 3734	Sample Type: Lab Compacted	Elevation:
Description: Dark red, FAT CLAY WITH SAND, trace gravel (CH)		
Remarks: Layers of soil passing a No. 4 sieve hand tamped inside retaining ring to 99.3% compaction.		
Displacement at End of Increment		

One-Dimensional Swell or Collapse by ASTM D4546 - Method C

Time Swell Curves
Constant Load Step
Stress: 100 psf





Project: Orange Co. HS CTE	Location: Orange Co., VA	Project No.: 68316
Boring No.: B-03	Tested By: MLT	Checked By: JNR
Sample No.: Bulk	Test Date: 9/24/24	Depth: 0 to 5 feet
Test No.: 3734	Sample Type: Lab Compacted	Elevation:
Description: Dark red, FAT CLAY WITH SAND, trace gravel (CH)		
Remarks: Layers of soil passing a No. 4 sieve hand tamped inside retaining ring to 99.3% compaction.		

One-Dimensional Swell or Collapse by ASTM D4546 - Method C

Specimen Diameter: 2.50 in	Measured Specific Gravity: 2.84	Liquid Limit: 62
Initial Height: 1.00 in	Initial Void Ratio: 0.713	Plastic Limit: 26
Final Height: 0.98 in	Final Void Ratio: 0.687	Plasticity Index: 36

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	543	RING	A	500
Mass Container, gm	123.08	104.35	104.35	125.83
Mass Container + Wet Soil, gm	370.77	263.54	267.43	288.91
Mass Container + Dry Soil, gm	329.65	237.38	237.38	258.86
Mass Dry Soil, gm	206.57	133.03	133.03	133.03
Water Content, %	19.91	19.66	22.59	22.59
Void Ratio	---	0.71	0.69	---
Degree of Saturation, %	---	78.39	93.39	---
Dry Unit Weight, pcf	---	103.55	105.12	---

TIMMONS GROUP

Project: Orange Co. HS CTE	Location: Orange Co., VA	Project No.: 68316
Boring No.: B-03	Tested By: MLT	Checked By: JNR
Sample No.: Bulk	Test Date: 9/24/24	Depth: 0 to 5 feet
Test No.: 3734	Sample Type: Lab Compacted	Elevation:
Description: Dark red, FAT CLAY WITH SAND, trace gravel (CH)		
Remarks: Layers of soil passing a No. 4 sieve hand tamped inside retaining ring to 99.3% compaction.		

Rob Berz

From: Jonathan Showalter <Jonathan.Showalter@timmons.com>
Sent: Thursday, October 24, 2024 3:37 PM
To: Rob Berz; Craig Kotarski
Cc: Dan Weigand; Daniel Hornick; jpitts@ocss-va.org; Julian Ruffin
Subject: RE: Orange H.S. CTE - Geotechnical Report
Attachments: 2024-10-24 Orange CTE Cost Estimate.pdf

Rob and All,
We have updated the Cost Estimate to add in allowances for unsuitable soils and lime stabilization of some subgrade soils per the items found in the Geotechnical Report.
This resulted in the estimate going up around $200,000.
Let us know if you have any questions or want to talk anything through.
Thank you,
Jonathan

From: Rob Berz <rberz@rrmm.com>
Sent: Wednesday, October 23, 2024 6:39 PM
To: Jonathan Showalter <Jonathan.Showalter@timmons.com>; Craig Kotarski <Craig.Kotarski@timmons.com>
Cc: Dan Weigand <dweigand@rrmm.com>; Daniel Hornick <dhornick@ocss-va.org>; jpitts@ocss-va.org; Julian Ruffin <Julian.Ruffin@timmons.com>
Subject: FW: Orange H.S. CTE - Geotechnical Report

Jonathan / Craig
This report tells us that at the potential CTE building site next to softball field, OCPS will definitely be removing / replacing unsuitable soils at footings and likely the same at areas under the building pad and paving. For the site work cost estimating that you have done, would you please confirm that you have included an allowance for this earthwork? We want to make sure when OCPS agrees to a budget based on numbers we collectively give them, they'll be covered.
Let us know.
Thanks
Rob

Robert S. Berz, Jr
Architect, Principal, LEED AP
RRMM ARCHITECTS
1317 Executive Blvd, Suite 200 | Chesapeake, VA 23320
Main: 757.622.2828 | Direct: 757.213.6395 | Cell: 757.274-8601
rberz@rrmm.com
www.**RRMM**.com

Sitework Constuction Cost Estimate 10/24/2024

Orange County CTE

CONSTRUCTION COST ITEM	Quantity	Unit	Unit Price	Item Total
SITEWORK CONSTRUCTION COSTS				
GENERAL SITEWORK				
Mobilization	1	LS	$ 25,000.00	$ 25,000
Erosion & Sediment Control	1.7	AC	$ 50,000.00	$ 85,000
EARTH WORK				
Clearing and Grubbing	1.7	AC	$ 10,000.00	$ 17,000
Lime Stabilization Allowance	1	LS	$ 50,000.00	$ 50,000
Unsuitble Soil Allowance	2500	CY	$ 60.00	$ 150,000
Export Topsoil	1840	CY	$ 40.00	$ 73,600
Fine Grading	8228	SY	$ 1.00	$ 8,228
EXISTING CONDITIONS/DEMO				
Remove Fence	262	LF	$ 10.00	$ 2,620
Asphalt Pavement	137	SY	$ 10.00	$ 1,373
Remove Underground Utilities	1155	LF	$ 30.00	$ 34,650
STORMWATER				
15" HDPE Pipe	662	LF	$ 80.00	$ 52,960
72" CMP	200	LF	$ 230.00	$ 46,000
Excavation & Backfill	474	CY	$ 30.00	$ 14,222
Spoils Removal	474	CY	$ 30.00	$ 14,222
Pipe Bedding	111	CY	$ 40.00	$ 4,444
Outlet Control Structure	2	EA	$ 7,800.00	$ 15,600
DI-1	5	EA	$ 10,600.00	$ 53,000
Manhole	2	EA	$ 5,900.00	$ 11,800
Rip Rap	6.45	TN	$ 80.00	$ 516
ES-1	2	EA	$ 1,000.00	$ 2,000
Stormwater Quality	2.02	PER LB	$ 40,000.00	$ 80,800
Cleanout for Rain Leader	6	EA	$400.00	$ 2,400
SITE IMPROVEMENTS				
Gravel Base	1075	TON	$80.00	$ 86,000
Asphalt Base	420	TON	$160.00	$ 67,200
Asphalt Topcoat	280	TON	$160.00	$ 44,800
UTILITIES				
Tie Into Existing Manhole	1	LOC	$1,327.63	$ 1,328
Sewer Line 6" PVC	113	LF	$ 100.00	$ 11,300
Cleanout	1	EA	$407.84	$ 408
8" Water Line	600	LF	$ 93.22	$ 55,932
Meter and valve assembly	1	EA	$ 9,752.64	$ 9,753
Concrete Meter Vault	1	EA	$ 6,192.32	$ 6,192
Hydrants	2	EA	$ 5,968.38	$ 11,937
LANDSCAPING & LIGHTING				
Landscaping	1	LS	$ 25,000.00	$ 25,000
Site Lighting	1	LS	$ 25,000.00	$ 25,000
ESTIMATED SITEWORK CONSTRUCTION COSTS				$ 1,228,439
PROJECT CONTINGENCY (10%)				$ 122,843.92
1 YEAR COST ESCALATION (5%)				$ 61,421.96
ESTIMATED TOTAL SITEWORK COSTS				**$ 1,412,705**