REPORT OF GEOTECHNICAL EXPLORATION

I-75 Interchange Modification at I-24 (Phase 2) (Design Build) (IA)

PIN 114174.01

Chattanooga, Tennessee

Prepared For:

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May 6, 2022

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Subject: **Report of Geotechnical Exploration**
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Dear Mr. Blevins:
Neel-Schaffer, Inc., is pleased to submit this report which details the results of our geotechnical exploration for the referenced project.

The project described includes the design of the reconstruction of the Interchange of Interstate 75 (I-75) and Interstate 24 (I-24) and approaches.

The project has been divided into two phases, and this report presents the general geologic conditions at the site of the bridge replacements and retaining walls proposed as part of Phase II. Information from the 2018 K.S. Ware and Associates (KSWA) report, and existing bridge foundation data was also utilized. In addition, a series of pavement cores and field dynamic cone penetrometer tests were performed to investigate the subgrade conditions along a section of I-24.

The attached report describes the site and subsurface conditions encountered. This report contains information for use by designers and is not intended for use as a design report conforming to the TDOT Geotechnical Manual. The Appendices contain figures and drawings, and field and laboratory test results from the most recent drilling as well as information that applies to Phase II from the KSWA report submitted in May of 2018.

We appreciate this opportunity to be of service to you on this project. Please contact us if you have any questions regarding this report.

Respectfully submitted,

Neel-Schaffer, Inc.

David Barker

David Barker, P.E.
Senior Geotechnical Engineer

Enclosures: Report of Geotechnical Exploration

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APPENDICES

1.0 INTRODUCTION

1.1 PROJECT INFORMATION

The Tennessee Department of Transportation (TDOT) is currently building a new interchange at the junction of Interstate 75 and Interstate 24 in Chattanooga, Tennessee. A Site Location Plan is included as Figure 1 in Appendix A. The new interchange will include construction of new ramps and bridges within the interchange to reconfigure the traffic pattern in the interchange. Additional improvements to add traffic lanes will extend south on I-75 to about Exit 1 (Ringgold Road), north of I-75 to approximately Exit 4 (East Brainerd Road) and west on I-24 to Germantown Road. The project has been divided in to two phases, the first phase started south of Ringgold Road and extended through the Interchange to about Station 443+00, or south of the I-75 bridge over the CSX Railroad. Phase II will continue to approximately the East Brainerd Road exit, and includes the bridge over the CSX Railroad. On I-24, Phase I included interchange ramps and extended to approximately Station 175+00, inclusive of the Spring Creek Road overpass. Phase II will begin from this point back to the start of the project on I-24 at about Station 75+00, including the McBrien Road and Moore Road overpasses. It should be noted that noise walls are shown on the functional cross sections left of centerline as far west as Station 56+00, and right of centerline as far west as Station 60+00.

To facilitate the widening of lanes on I-24, **retaining walls** (primarily cut walls) are proposed to maintain grade separation between the interstate, off and on ramps, and the existing frontage roads. Overhead signs, ITS Systems, noise barrier walls, and other features will also be included.

The preliminary plans developed by Neel-Schaffer proposes the following retaining walls at the approximate locations along I-24 in Phase II:

Wall No. 1, I-24 Station 96+50 to Station 113+00, left of centerline.
Wall No. 2, I-24 Station 139+75 to Station 140+75, left of centerline, includes Moore Rd. N. abutment.
Wall No. 3, I-24 Station 155+00 to Station 160+50, left of centerline, includes McBrien Rd. N. abutment.
Wall No. 4, I-24 Station 105+10 to Station 114+60, right of centerline.
Wall No. 5, I-24 Station 114+00 to Station 117+50, right of centerline, cut/fill wall for proposed off-ramp.
Wall No. 6, I-24 Station 131+50 to Station 144+50, right of centerline, includes Moore Rd. S. abutment.
Wall No. 7, I-24 Station 154+25 to Station 155+75, right of centerline, includes McBrien Rd. S. abutment.

The following retaining walls are proposed along I-75 in Phase II:

Wall No. 8, I-75 Station 443+50 to Station 447+00, left of centerline.
Wall No. 10, I-75 Station 454+50 to Station 456+00, right of centerline.
Wall No. 11, I-75 Station 460+50 to Station 463+00, right of centerline.

Phase II will also include replacing 3 existing **bridges**. The following list provides the location of the planned structures.

Bridge for I-75 SB and I-75 NB over CSX Railroad, to be replaced.
Bridge for McBrien Road over I-24 EB and WB, to be replaced.
Bridge for Moore Road over I-24 EB and WB, to be replaced.

A review of the cross sections included with the functional plans indicate that **noise barrier walls** are being considered as far west as I-24 Station 56+00. It should be noted that the surcharge load of noise walls (where required) must be considered in the design of the proposed retaining walls discussed in this report. The intervals where noise walls are required adjacent to retaining walls are noted in the discussion of the site conditions along each retaining wall. It is understood that the Design-Build (DB) team may alter the height and offset from centerline of a noise wall if it meets the Department's noise abatement criteria.

1.2 PURPOSE AND SCOPE OF EXPLORATION

This report is being submitted as a supplement to the baseline report of the geotechnical conditions prepared by K. S. Ware and Associates, L.L.C. (KSWA), and submitted to Neel-Schaffer, Inc. in May of 2018. This preliminary data, in addition to the supplemental data collected by GeoEngineers for Neel-Schaffer in 2022, is used for evaluation and cost estimation for the preparation of the 30% Design Package being prepared by Neel-Schaffer. This report makes use of the drilling data performed for the KWSA report, particularly at the 3 bridge sites, as well as the additional borings performed in the vicinity of the 10 retaining walls listed above. Foundation data from the plans for the existing bridges, as well as from the recently constructed I -24 over Germantown Road bridge and the Belvoir Avenue over I-24 bridge has also been examined. The scope of services performed does not constitute all geotechnical exploration work necessary for design of the complete project. This report and portions of the earlier KSWA report are intended as information to assist prospective Design/Build teams in understanding the subsurface conditions present along the alignment. Additional geotechnical work will need to be performed to provide design studies compliant with TDOT's geotechnical manual for each structure and road alignment.

Exploratory test borings were previously drilled at the bridges as part of the KSWA report, and these will be referenced in this report. Additional borings have been documented by GeoEngineers for Neel-Schaffer along the walls proposed along I-24 and I-75 for the widened interstate or new ramps.

It should be noted that drilling access for this preliminary report was restricted to areas that did not require the removal of trees, the construction of dozer roads, and the installation of erosion prevention and sediment control (EPSC) measures. Due to those restrictions, the borings were offset from the proposed wall face, and is it expected that the Design-Build team will be able to locate borings along the final wall locations.

Figure 2 in Appendix A shows the approximate location of each of the exploratory borings.

The following table from the KSWA report summarizes the exploration previously performed for Phase II.

Table 1 Summary of KSWA Test Borings

LOCATION	QUANTITY	BORING PREFIX	COMMENTS
Phase I and Phase II			
Alignment Borings	21	A	Terminated at 15 ft or Refusal
Pavement Coring	13	B	Designated as L for travel lane or S for shoulder, two coreholes at each location
Phase II			
CSX Railroad	3	CSX	Borings drilled from interstate shoulder
McBrien Road Bridge	2	McB	McB-1 and MCB-2 drilled from McBrien Road
Moore Road Bridge	2	M	M-1 drilled from Moore Road, M-2 drilled from shoulder of I-24 EB

It should be noted that 6 of the 21 borings with the boring prefix A are located in Phase II. Borings A-01 and A-02 were performed north of the CSX Railroad bridge, immediately south of the East Brainerd Road exit. Borings A-08, A-09, A-10, and A-11 were performed between I-24 Station 130+00 and the Spring Creek Road bridge. The logs for these borings have been attached to this report.

Field sampling and test procedures are described in Appendix B. The Test Boring Logs which detail the subsurface conditions encountered at each test boring location are included in Appendix B. The field testing procedures used for drilling and sampling are also included in Appendix B.

2.0 GEOLOGIC CONDITIONS

2.1 SITE GEOLOGY

As outlined in the KSWA report, the site is located in Chattanooga, Tennessee within the Valley and Ridge Physiographic Province. The Valley and Ridge is characterized by folded sedimentary rock composed of limestone, dolomite, sandstone, shale, and siltstone. Folding of the units formed as systems of anticlines and synclines developed. The forces causing the folding also resulted in the formation of a series of faults throughout the Valley and Ridge. In the Chattanooga area, many of the faults are low-angle, shallow, thrust faults. This type of faulting in conjunction with the folding resulted in many nonconformable contacts between geologic units.

The majority of the total project area is underlain by Ordovician-aged carbonate rock collectively called the Chickamauga Supergroup. The Supergroup is composed of the equivalent units of the Chickamauga Group (Reedsville Shale, an unnamed limestone unit, Moccasin Formation, Bays Formation, Ottosee Shale, Holston Formation (red limestone), Lenoir Limestone, Athens Shale, and Sevier Shale) and the Nashville Group (Hermitage Formation and Bigby-Cannon Limestone, Leipers-Catheys Limestone). Locally, the Chickamauga Group consists of mostly limestone units with some minor shale.

At the northern end of the project area, the site is underlain by the Knox Group. The geologic map in Appendix A of the KSWA report also indicates the Knox Group beneath the western end of the project, west of approximate Station 130+00, with the geologic contact mapped along Wando Drive south of I-24, and along Parkdale Avenue (Amhurst Avenue on the map) north of I-24. The Knox Group is an undifferentiated grouping of siliceous limestone and dolomites (Newala Formation, Mascot Dolomite, Kingsport Formation, Longview Dolomite, Chepultepec Dolomite, and Copper Ridge Dolomite). Zones of sandstone shale and quartzite are also contained in the group.

Geologic maps indicate that a thrust fault zone is present at the contact between the Chickamauga and the Knox in the northern portion of the site, approximately following the CSX Railroad crossing of the project site. The change can be observed in the area topography, where the ground at lower elevations with minor topographic undulations generally indicate areas underlain by the Chickamauga Super-Group, while the area of the site where the hillier areas are located generally indicate areas underlain by the Knox. A generalized geologic map from the public domain is provided as Appendix A, Figure 4.

2.2 GEOLOGIC HAZARDS

Many of the faults in the area are considered incapable or inactive. However, earthquakes are known to occur within the region. Past events generally point to lower magnitude events located at relatively short distances to the epicenter, or greater magnitudes at greater distances to the epicenter. The higher magnitude events potentially impacting the area include the New Madrid Fault Zone and fault system located near Charleston, South Carolina. It is assumed that the seismic hazard, specifically the acceleration spectrum (peak ground acceleration coefficient, and the short- and long-term spectral acceleration coefficients) will analyzed using the General Procedure outlined in Section 3.10.2.1 of the AASHTO LRFD Bridge Design Specifications, Ninth Edition, 2020.

The site is located in an area underlain by carbonate bedrock. Limestone and dolomite, to a lesser extent, are subject to chemical solution weathering, especially along predisposed planes of weakness, such as faults, joints and bedding planes. Such weathering often results in the formation of irregular rock surfaces, including: pinnacles, slots, sloping surfaces, clay filled seams and open cavities. Water moving through the subsurface system can create erosion channels, which over time may increase in size. These channels can lead to the formation of underground voids and ultimately sinkholes.

It should be noted that no active sinkholes were observed while reconnoitering the area to be impacted by Phase II of the subject project. However, because of the geologic conditions, the risk of sinkholes is present within the project area.

3.0 SITE CONDITIONS

3.1 I-75 STATION 440+00 TO STATION 476+00

The KSWA report noted that Interstate 75 near Exit 4 begins in rolling terrain and slopes down to lower-lying areas with less topographic relief. The roadways through this area are primarily constructed on fill embankments to maintain grades and elevate the roadway above adjoining flood prone areas. The borings performed in this interval as part of the KSWA investigation were logged as CSX-1, CSX-1A, CSX-2, CSX-3 near the beginning of this interval, and A-01 and A-02 at the end of this interval near exit 4. The

Neel-Schaffer borings in this interval are logged as RW8-1, RW10-1, RW10-2, RW11-1, RW11-1A, and RW11-2.

3.2 I-24 STATION 56+00 TO STATION 95+50

Interstate 24 beginning west of Germantown Road is generally constructed on natural ground as I-24 approaches Belvoir Avenue. Parallel frontage roads are located on either side of the interstate east of Germantown Road, and also are generally constructed on natural ground, although not at the same elevation as the interstate. West of Germantown Road, dense vegetation has become established outside of the shoulder, which may create an obstacle to drilling access for the proposed noise barrier walls.

3.3 I-24 STATION 95+50 TO STATION 175+00

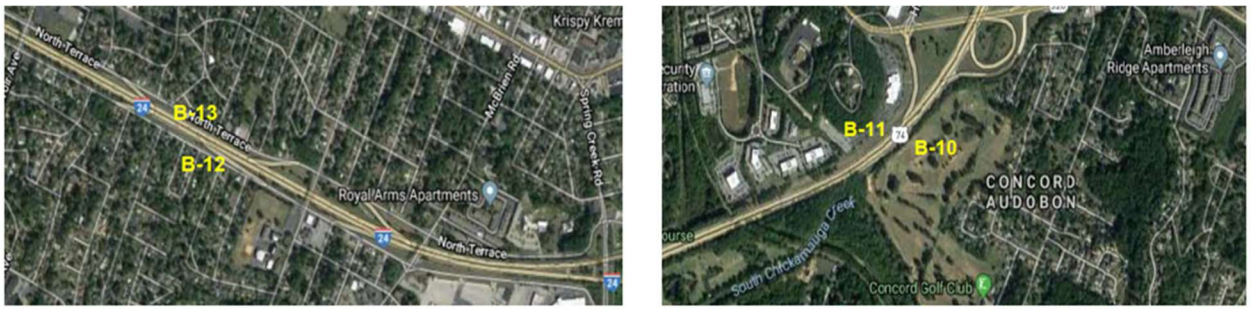
Interstate 24 beginning between Germantown Road and Belvoir Avenue is generally constructed on natural ground or relatively thin fill sections as I-24 approaches the Spring Creek Road overpass. Parallel frontage roads located on either side of the interstate are generally at higher elevations than the interstate traffic lanes. In many areas along this interval, dense vegetation has become established, which may create an obstacle to drilling access for the final design plans, particularly for the proposed retaining walls.

4.0 SUBSURFACE CONDITIONS

4.1 PAVEMENT CORING

The existing pavement conditions in Phase II were explored by KSWA with 8 pavement cores, numbered B-10 through B-13 (BL stands for core hole in lane, BS stands for core hole in shoulder). TDOT crews surveyed the general boring locations. KSWA located the pavement cores at each location, although documentation of the survey data is not included in the KSWA report. It is assumed that the borings with the BL prefix were located in the outside lane, and the borings with the BS prefix were located on the adjacent shoulder. The approximate location of the KWSA coring locations were shown in Figure 2 of Appendix A of the KSWA report, and snapshots of the Figure showing the Phase II locations are shown below:

Figure 1: Excerpt of KSWA Pavement Coring Location Plan



The pavement thicknesses encountered by KSWA within Phase II are listed below in Table 2.

Table 2: Summary of Pavement Thicknesses from KSWA Coring

TRAVEL LANE					SHOULDER				
Boring No.	Pavement type	Pavement Thickness (in.)	Base Material Thickness (in.)	Total Thickness (in.)	Boring No.	Pavement type	Pavement Thickness (in.)	Base Material Thickness (in.)	Total Thickness (in.)
BL-10	Concrete	11 3/4	8	19 3/4	BS-10	Asphalt	8 3/4	19 1/4	28
BL-11	Concrete	12 1/4	9 1/4	21 1/2	BS-11	Asphalt	5	17 1/4	22 1/4
BL-12	Concrete	12 1/2	25 1/2	38	BG-12	Concrete	10	24	34
BL-13	Concrete	10 1/2	10 1/2	21	BS-13	Asphalt	10	13	23

Note that core sites B-10 and B-11 are located on I-75, with B-12 and B-13 are located between Belvoir Avenue and Moore Road on I-24.

Additional pavement coring and in-situ subgrade testing was performed beneath each lane of I-24 between Stations 140+00 and 164+40, and those coring locations are shown on the Neel-Schaffer boring location sheets in Appendix A, with the prefix EB or WB. The pavement thicknesses encountered by GeoEngineers/Neel-Schaffer are listed below in Table 3:

Table 3: Summary of Pavement Thicknesses from GeoEngineers/Neel-Schaffer Coring

Boring No.	Station	Lane	Pavement Type	Pavement Thickness (in.)	Base Material Thickness (in.)	Total Thickness (in.)
EB-1	140+00	Outside EBL	Concrete	12	7	19
WB-3	145+00	Inside WBL	Concrete	12	4.5	16.5
EB-2	150+00	Middle EBL	Concrete	12	7	19
WB-2	155+00	Middle WBL	Concrete	12	7	19
EB-3	160+00	Inside EBL	Concrete	12	6	18
WB-1	164+40	Outside WBL	Concrete	12	8	20

Dynamic Cone Penetrometer (DCP) Tests - To evaluate the consistency and pavement support characteristics in the underlying soil, DCP tests were performed at some locations. The DCP values were used to estimate the California Bearing Ratio (CBR) of the subgrade material.

From the DCP test results, the following CBR Values were estimated. Below is the result of the DCP test performed by KSWA within the limits of Phase II. Note that the location is estimated from examining the coring location layout sheet.

Table 4: Estimated CBR Values from KSWA Testing

Boring No.	Station	Lane	Estimated CBR Value
B-13	120+00±	Outside WBL	11

The estimated CBR values from the in-situ testing by Neel-Schaffer are shown in the table below:

Table 5: Estimated CBR Values from GeoEngineers/Neel-Schaffer Testing

Boring No.	Station	Lane	Estimated CBR Value
EB-1	140+00	Outside EBL	31
WB-3	145+00	Inside WBL	13
EB-2	150+00	Middle EBL	24
WB-2	155+00	Middle WBL	37
EB-3	160+00	Inside EBL	31
WB-1	164+40	Outside WBL	45

Of particular interest to the Department was the section of I-24 between approximate Stations 140+00 and 164+50. GeoEngineers performed a series of continuous DCP tests at each location listed above, from the top of soil subgrade/bottom of base stone to a depth of 500 mm (19.7 inches) below the top of subgrade. The tests at 5 of the 6 locations encountered a subgrade with a CBR value reflective of a compacted clay that has remained at optimum moisture content. However, the CBR values at WB-3, located in the left inside lane at Station 145+00, are indicative of perched/trapped water. Note that the relatively high CBR at the end of the test interval increases the average CBR value in this series of tests. It also indicates reduced moisture content with depth. The results at WB-3 are shown below:

Table 6: CBR Estimates based on DCP at WB-3

Boring ID: WB-3

Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Factor[1]	DCP Index (mm/blow)	USCS Classifcation	Estimated CBR (%)
3	50	50	17	2	33	CL	6
4	100	50	13	2	25	CL	8
5	150	50	10	2	20	CL	10
3	200	50	17	2	33	CL	6
3	250	50	17	2	33	CL	6
5	300	50	10	2	20	CL	10
7	350	50	7	2	14	CL	15
18	400	50	3	2	6	CL	43

Average CBR (%) =	13

Compare the values above to those at EB-1, which is typical of the other 5 test sites:

Table 7: CBR Estimates based on DCP at EB-1

Boring ID: EB-1

Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Factor[1]	DCP Index (mm/blow)	USCS Classifcation	Estimated CBR (%)
9	50	50	6	2	11	CL	20
11	100	50	5	2	9	CL	25
15	150	50	3	2	7	CL	35
18	200	50	3	2	6	CL	43
10	250	50	5	2	10	CL	22
16	300	50	3	2	6	CL	37
14	350	50	4	2	7	CL	32
					Average CBR (%) =		31

All of the DCP test results are in Appendix B.

It should be noted that TDOT typically performs CBR lab tests on samples that are compacted to optimum density and then submerged in order to account for the possibility of water accumulation. It is therefore likely that a relatively low CBR value was utilized in the design of the existing pavement structure, and the other areas tested could be considered to be over-designed.

4.1.1 SUBGRADE RECOMMENDATIONS

It is recommended that pavement design within this interval be based on subgrade with a CBR of 6, with good drainage being provided through the use of drainage layers of stone or underdrains in poorly drained areas. Improvements to the subgrade may be needed in some areas of the lane widening to improve the conditions below existing shoulders and grassed areas alongside the interstate. Imported fill used to construct embankments should be of sufficient quality to produce a CBR value of at least 6.

4.2 SOIL AND BEDROCK CONDITIONS

Soil encountered by the borings varied along the alignment. On the I-75, or north portion, it generally encountered existing fill soil underlain in some cases by alluvial soil, followed by residual soil before encountering auger refusal. Two of the alignment borings performed by KSWA, located near I-75 exit 4, planned for a depth of 15 feet below the ground surface, reached the termination depth without encountering auger refusal or reaching the bottom of the existing fill interval. On the I-24, or west portion of Phase II, existing fill soils and residual soils were encountered along the frontage roads, and the existing interstate was underlain by residual soil of widely varying depth.

The bedrock encountered in most of the borings where rock was cored consisted of hard, gray, argillaceous, limestone with seams of dark gray shale. Based on the elevations where auger refusal was encountered, weathering of the limestone appears to have created an undulating surface, with areas of localized weathering where the bedrock surface has near vertical weathering features creating slots of deeper soil cover. In these areas, locally steep sloping rock is present. This was noted in several locations where the steep surface caused drilling tools to wander, following the angle of the rock surface. In some of these cases, the condition was severe enough to cause the boring to be abandoned as noted on the

logs. Rock quality was generally good to excellent after penetrating the upper 1 to 5 feet of bedrock. Lower-quality rock was encountered in some locations at greater depth, but appeared to be a more aberrant condition in this formation.

The following sections describe the conditions in more detail, focusing on differences or highlights to the descriptions given above. Additional information can be found on the boring logs, including natural moisture and Atterberg limit data. Laboratory test results not shown on the borings logs are provided in Appendix B of this report.

4.3 I-75 STATION 440+00 TO STATION 450+00

The KSWA report noted that alluvial soils, consisting of silty clay, clayey silt and intervals of brown sand were encountered along the northern side of the embankment fill for the recently completed Phase I construction. Similar soils were encountered below the embankment by borings performed from the right shoulder of I-75. North of the CSX railroad, the embankment was underlain by residual soil.

4.3.1 RETAINING WALL 8, STATION 443+00 TO STATION 447+00, LEFT OF CENTERLINE

KSWA boring CSX-3 was drilled from the left shoulder near approximate Station 447+00, encountering 22 feet of medium stiff to stiff clay fill underlain by 25 feet of very moist to moist stiff residual clay. Neel-Schaffer boring RW8-1 was performed along the left shoulder at Station 443+62, indicating 35 feet of fill over 13 feet of silty clay. Below is an excerpt from the GeoEngineers/Neel-Schaffer boring summary table showing the additional boring performed for Wall 8:

Table 8: Summary of GeoEngineers/Neel-Schaffer drilling at Wall 8

Boring No.	I-24 Station	Offset From C/L	Surface Elevation	Soil Drill Depth (ft)	Elev. GW (ft)	Approximate Top-of-Rock Elevation	Comments
RW8-1	443+62.2	77.9' Lt.	703.6	48	X	655.6	Upper 35' medium stiff to stiff fill, over medium stiff to stiff residuum

See the attached KSWA log CSX-3 and GeoEngineers log RW8-1 for detailed descriptions of the boring profiles, including SPT blow counts.

4.3.2 I-75 OVER CSX RAILROAD

The portion of Table 4 of the KSWA report that applies to I-75 over CSX Railroad is shown below:

Table 9: Summary of KSWA drilling at I-75 over CSX Railroad

Boring No.	Surface Elevation	Soil Drill Depth (ft)	Auger Refusal?	Depth Cored (ft)	Total Depth	Existing Fill Thickness (ft)	Elev GW (ft)	Approximate Top of Rock Elevation	Base of Signficant Weathering Elevation	Comments
Bridge over CSX Railroad										
CSX-1	720.9	86.9	YES	7.4	94.3	28.5	X	634	X	Irregular rock surface, hard abrasive rock, no recovery FAULT ZONE
CSX-1A	720.9	72.5	YES	7.8	80.3	1.5	X	648.4	X	Irregular rock surface, hard abrasive rock, no recovery FAULT ZONE
CSX-2	715.5	55	YES	14	69	18.5	X	660.5	656	
CSX-3	716.0*	57.9	YES	14.8	72.7	22	X	658.1	656	Hard rock, siliceous, low grade metamorphism, brecciated dolomite

The rock compressive strength varied widely at the railroad bridge. The wide range of rock compressive strengths between the samples taken from near the same elevation but opposite sides of I-75 is notable. However, this difference will likely not affect the end bearing piles expected to achieve refusal on the rock surface near elevation 650 along most of the bridge site.

Table 10: Summary of KSWA Compressive Strength Testing from CSX Railroad over I-24

Test Boring Number	Depth of Sample[2] (feet)	Compressive Strength (psi)[1]	(ksf)[1]
CSX-2	58.4-58.8	14,253	2,050
CSX-2	64.1-64.5	27,594	3,970
CSX-3	64.0-64.4	6,785	970

Below is a snip of the boring table included in the original bridge plans:

Table 11: Ground and Rock Elevation Data from Original I-24 over CSX RR Bridge Plans

BORINGS

Hole	Station	Offset	Ground El.	Rock El.	Hole	Station	Offset	Ground El.	Rock El.
1	75+96	64'Lt.	700.0	651.0	9	76+50	24'Rt.	710.9	650.9
2	76+20	24'Lt	707.6	653.6	10	76+57	70'Rt.	720.4	650.4
7	77+13	64 Lt.	709 3	647.3	15	77+71	24'Rt.	716.4	652.4
8	77+38	24'Lt.	711.2	647.2	16	78+05	64'Rt.	717.5	647.5

Boring locations are referenced to ℄ I-502

The table above indicates a relatively uniform rock surface between elevations 647.2 and 653.6. It should be noted that KSWA borings CSX-1 and CSX-1A, located on the left shoulder of I-24 immediately east of the existing bridge abutment, indicated the possibility of deeper refusal depths along the proposed 2nd abutment due to the presence of the thrust fault noted above. It is assumed that the abutments and bent foundations of the replacement bridge will be placed on end-bearing piles.

4.4 I-75 STATION 450+00 TO STATION 476+00

The KSWA report stated that borings drilled from the shoulder in this area encountered relatively thick intervals of existing fill, about 20 to 30 feet, before residual soil was encountered, and the additional Neel-Schaffer borings have indicated similar conditions. The fill and the underlying residual soil was generally composed of reddish-brown, yellowish-brown and light brown silty clay containing chert fragments and some sand. Sand in this soil was typically seen as remnants of weathered chert. These soils are typical of the type of soil encountered in areas underlain by the Knox Group. It should be noted that chert fragments can inflate SPT blow counts.

The KSWA report also noted that bedrock encountered by the borings CSX-1 through CSX-3 was composed of hard, gray, siliceous dolomite. Calcite healed fractures were common in the recovered core. Drilling operations reported slow penetration rates and above normal wear on drilling tools. At CSX-1 and the offset boring drilled after CSX-1 was abandoned, floating brecciated rock above the steeply sloping surface was noted. Both attempts as CSX-1 were unsuccessful in recovering measurable rock core. As noted previously, it is believed this location is within or near a thrust fault zone.

4.4.1 RETAINING WALL 10, STATION 454+50 TO STATION 456+00, RIGHT OF CENTERLINE

Neel-Schaffer borings RW10-1 and RW10-2 were performed along the right shoulder of I-24 NB at Stations 455+03 and 456+04, respectively, indicating 20 to 23 feet of fill over medium stiff silty clay. Each boring was terminated at a depth of 50 feet without encountering in-place rock. Below is an excerpt from the Neel-Schaffer boring summary table listing the additional borings performed for this wall:

Table 12: Summary of GeoEngineers/Neel-Schaffer drilling at Wall 10

Boring No.	I-24 Station	Offset From C/L	Surface Elevation	Soil Drill Depth (ft)	Elev. GW (ft)	Approximate Top-of-Rock Elevation	Comments
RW10-1	455+02.8	62.6' Rt.	727.26	50	X	X	Upper 20' medium stiff to stiff fill, over medium stiff to stiff residuum
RW10-2	456+04.6	62.3' Rt.	727.8	50	X	X	Upper 23' medium stiff to stiff fill, over residuum with chert

See the attached logs for Retaining Wall 10 for detailed descriptions of the boring profiles, including SPT blow counts.

4.4.2 RETAINING WALL 11, STATION 460+50 TO STATION 463+00, RIGHT OF CENTERLINE

Neel-Schaffer borings RW11-1, RW11-1A, and RW11-2 were performed along the right shoulder near Stations 461+00 and 463+00, respectively. Relatively high N-values were indicated at the 2 borings located right of Station 460+50 before auger refusal, possibly on heavy chert or rock fill. The boring located right of Station 463+00 was advanced through approximately 15 feet of clay fill before being terminated in residual clay at a depth of 50 feet.

Table 13: Summary of GeoEngineers/Neel-Schaffer drilling at Wall 11

Boring No.	I-24 Station	Offset From C/L	Surface Elevation	Soil Drill Depth (ft)	Elev. GW (ft)	Approximate Top-of-Rock Elevation	Comments
RW11-1A	460+92.6	62.6' Rt.	732.2	17	X	715.2	Clay fill with moderately heavy chert, possible refusal on rock fill
RW11-1	460+99.5	62.8' Rt.	732.3	7.5	X	724.8	Clay fill with moderately heavy chert, possible refusal on rock fill
RW11-2	463+04.4	61.5	733.3	50	X	X	Upper 15' clay fill with chert, over residuum with chert.

See the attached logs for a detailed description of the boring profile, including SPT blow counts.

4.5 I-24 STATION 56+00 TO STATION 99+00

The foundation data sheet from the plans for the recently completed I-24 over Germantown Road bridge replacement lists 12 borings that encountered irregularly weathered rock at depths of between 127.9 and 199.8 feet. It is estimated that the borings for the bridge are located between approximate I-24 Stations 73+00 and 74+00. It should be noted that the stationing used in the plans for the recently completed bridge replacements do not match the stationing for the interchange project.

At the time of this writing, no additional drilling has been performed between Station 56+00 and Germantown Road, and between Germantown Road and Belvoir Avenue. It should be noted that the rock surface was encountered at such depths at both bridges that it is not likely to be a factor in the design of any retaining walls or noise barrier walls proposed between Germantown Road and Belvoir Avenue.

A review of the cross sections indicates that roadway and embankment widening is proposed immediately east of Germantown Road, or near Station 75+00. Based on the drilling information obtained for the replacement of the I-24 over Germantown Road bridge, this interval is likely to be underlain by deep residual soils.

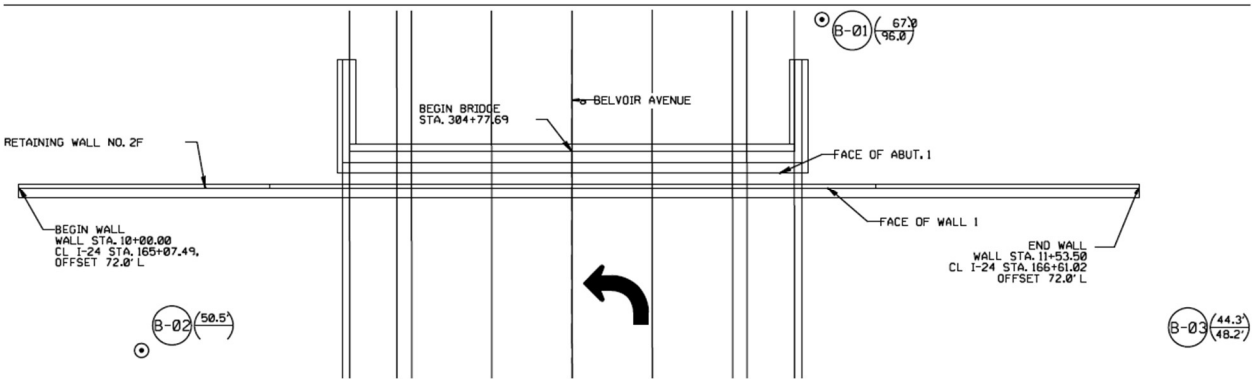
4.6 I-24 STATION 96+50 TO STATION 117+50

The foundation data sheet from the plans for the recently completed Belvoir Avenue over I-24 bridge replacement lists 8 borings that encountered irregularly weathered rock at depths of between 44.3 and 76.3 feet. According to the preliminary plans, the borings for the bridge are located between Stations 99+75 and 101+00. With the exception of the 2 holes located left of Station 103+00, which refused near 12 feet, the Neel-Schaffer borings performed along the proposed wall sites in this interval (Walls 1, 4, and 5) obtained auger refusals at depths as shallow as 26.6 feet, while the majority were terminated at 50 feet without encountering rock. See Table 17 for a summary of the wall borings. The bedrock that was cored by KSWA at the one bridge in this section was very highly weathered with thick clay-filled zones encountered below the auger refusal/top-of-rock elevation.

4.6.1 RETAINING WALL 1, I-24 STATION 96+50 TO STATION 113+00, LEFT OF CENTERLINE

Prior to the drilling performed for this report, 3 borings were performed between approximate Stations 109+75 and 101+50 by KSWA for the Belvoir Avenue over I-24 bridge replacement, as shown below:

Figure 2: Excerpt of KSWA Retaining Wall Boring Location Plan



Two borings were located along the interstate shoulder, and one was located near the intersection of North Terrace Road and Belvoir Avenue. These borings indicated deep, medium stiff to stiff clay soils along this area. Note that the centerline of the bridge crosses I-24 near Station 100+50, and the I-24 stationing shown on the drawing snip does not apply. It should also be noted that an MSE wall has been constructed in this area, and Wall 1 has been designed to tie-in to this wall, particularly east of Belvoir Avenue.

Seven additional borings were performed by Neel-Schaffer along the proposed cut wall site, which begins approximately 100 feet west of the recently completed Belvoir Avenue over I-24 bridge replacement. With the exceptions of Borings RW1-1 and RW1-1A, which achieved auger refusals at approximately 12 feet, the borings indicated a relatively deep (25 to over 50 feet) irregularly weathered rock surface. Standard Penetration Tests (SPTs) performed on the overburden produced N-values that were typically between 7 and 15, reflective of medium stiff to stiff clays. Please refer to the boring logs

for additional information. The preliminary wall concept drawings are based on the assumption that depending on the wall height, anchored and unanchored pile and lagging walls will be the preferred wall type. Below is a summary table of the additional borings performed along Wall 1:

Table 14: Summary of GeoEngineers/Neel-Schaffer drilling at Wall 1

Boring No.	I-24 Station	Offset From C/L	Surface Elevation	Soil Drill Depth (ft)	Elev. GW (ft)	Approximate Top-of-Rock Elevation	Comments
I-24 Walls							
Retaining Wall 1							
RW1-1A	102+76.25	130.2' Rt.	752.9	11.8	X	741.1	Offset 12' west of RW1-1 to confirm shallow refusal
RW1-1	102+88.65	129.7' Lt.	753.3	12	X	741.3	Offset 53 ' north of wall, shallow refusal
RW1-2	104+51.44	127.8' Lt.	757.35	44.7	X	712.65	Offset 49' north of wall, medium stiff to stiff clay
RW1-3	106+01.91	130.8' Lt.	757.9	50	728.4	X	Offset 36' north of wall, boring terminated at 50'
RW1-4	107+50.12	128.9' Lt.	753.7	26.6	X	727.1	Offset 39' north of wall, medium stiff to stiff clay
RW1-5	108+95.9	127.6' Lt.	745.2	50	727.2	X	Offset 38' north of wall, soft 13'-20', boring terminated at 50'
RW1-6	113+95	86.1' Lt.	706	50	678	X	Offset 100' east of end of wall, boring terminated at 50'

See the attached logs for a detailed description of the boring profiles, including SPT blow counts.

The retaining wall built for the north abutment of the recently completed Belvoir Avenue bridge replacement extends between approximate stations 99+75 and 101+25. This MSE wall was constructed with the use of soil nail excavation support, and a review of the contractor records included verification and proof test data performed on the soil nails. It was noted that a design bond strength of 750 psf was used in determining the loading schedule of the verification test nail, which was located at the north abutment. The verification test load of 2 times the design load, or 1,500 psf, was held for 10 minutes before the nail was loaded to 2.76 times the design load without pullout failure.

North Terrace Road

While drilling along the shoulder of North Terrace Road, it was observed that the asphalt curb along the frontage road had been displaced between approximate Stations 105+00 and 109+50, and it was noted that the pavement of the shoulder and left lane was cracked and broken in a pattern indicative of long-term slow movement of the cut slope above I-24. Proposed Wall 1 should help stabilize the toe of the slope above I-24, but not necessarily the entire slope. It is assumed that the scope of work for the final design will specify stabilizing the upper part of the slope. It is likely that this will affect the loading and possibly the height of Wall 1 within the interval that the Design-Build (DB) team determines is unstable or marginally stable.

Noise Wall Proposed Between Wall and North Terrace Road

Another factor in the design of some segments of Wall 1 will be the surcharge load from the noise wall proposed/required between Wall 1 and North Terrace Road. Inspection of the Functional Plans cross sections indicate that a noise wall will be required between the retaining wall and North Terrace Road from the beginning of the wall to Station 100+00, and from approximate Station 106+00 to the end of the wall. As mentioned in Section 1.1, it is understood that the Design-Build team may alter the height and offset from centerline of a noise wall if it meets the Department's noise abatement criteria.

4.6.2 RETAINING WALL 4, I-24 STATION 105+10 to STATION 115+60, RIGHT OF CENTERLINE

Four offset borings were performed along the proposed cut wall site, which begins approximately 400 feet east of the recently completed Belvoir Avenue over I-24 bridge replacement. Borings RW4-1 through RW4-4 indicated from 28.5 to over 50 feet of clay over an irregularly weathered rock surface. Standard Penetration Tests (SPTs) performed on the overburden produced N-values that were typically between 10 and 16, reflective of medium stiff to very stiff clays. The Neel-Schaffer borings for Wall 4 that are listed in Table 17 are shown below:

Table 15: Summary of GeoEngineers/Neel-Schaffer drilling at Wall 4

Boring No.	I-24 Station	Offset From C/L	Surface Elevation	Soil Drill Depth (ft)	Elev. GW (ft)	Approximate Top-of-Rock Elevation	Comments
RW4-1	105+12	117.3' Rt.	736.4	50	699.4	X	Offset 36' south of wall, medium stiff to stiff clay, wet at 33.5'
RW4-2	107+94.3	115.4' Rt.	738	50	706	X	Offset 31' south of wall, medium stiff to stiff clay, wet at 34'
RW4-3	111+02.5	114.8' Rt.	734.2	28.5	X	705.7	Offset 25' south of wall, medium stiff to stiff clay
RW4-4	113+88.8	119.8' Rt.	719.4	45	X	674.4	Offset 15' south of wall face, medium stiff to stiff clay

See the attached logs for a detailed description of the boring profiles, including SPT blow counts.

Noise Wall Proposed Between Retaining Wall and South Terrace Road

Another factor in the design of some segments of Wall 4 will be the surcharge load from the noise wall required between the proposed retaining wall and South Terrace Road. Inspection of the Functional Plans cross sections indicate that a noise wall will be required between the retaining wall and south Terrace Road from Station 110+00 to approximate Station 113+15. As mentioned in Section 1.1, it is understood that the Design-Build team may alter the height and offset from centerline of a noise wall if it meets the Department's noise abatement criteria.

4.6.3 RETAINING WALL 5, I-24 STATION 114+00 TO STATION 117+50, RIGHT OF CENTERLINE

Two borings were performed near the site of the proposed wall. Inspection of the Functional Plans cross sections indicates that the wall begins as a small cut wall and ends as a small fill wall, maintaining grade separation between I-24 eastbound and proposed Ramp K. Borings RW5-1 and RW5-2 indicated deep residual soils, with both borings terminated in clay at depth of 50 feet. Standard Penetration Tests (SPTs) performed in the upper 30 feet of soil produced N-values that were typically between 8 and 18, indicative of medium stiff to very stiff clays. Please refer to the boring logs for additional information. The GeoEngineers/Neel-Schaffer borings for Wall 5 that are listed in Table 33 are shown below:

Table 16: Summary of GeoEngineers/Neel-Schaffer drilling at Wall 5

Boring No.	I-24 Station	Offset From C/L	Surface Elevation	Soil Drill Depth (ft)	Elev. GW (ft)	Approximate Top-of-Rock Elevation	Comments
RW5-1	115+76.1	119.6' Rt.	710.8	50	X	X	Offset 20' south of wall, stiff clay to 20', medium stiff below 20'
RW5-2	117+90.1	70.3' Rt.	695.7	50	648.7	X	Offset east of end of wall, medium stiff to stiff clay

4.7 I-24 STATION 117+50 TO STATION 175+00

The KSWA report noted that except where fill soil was encountered, the residual soil profile in this area is relatively thin, less than about 15 feet, and in some cases less than 10 feet. Residual soils were found

to be composed of stiff to very stiff, brown and gray, silty clay. A layer of black to brown sand was encountered between about 1 and 3 feet below the surface in KSWA boring A-8, located within the median on the western side of Spring Creek Road.

The bedrock encountered at the two bridges in this section, Moore Road and McBrien Road overpasses, was different. At M-1 and M-2 (Moore Road), pink to dark red limestone and gray, brown and green calcareous shale was recovered. The rock quality varied from fair to good, but the recovery percentages were good to excellent. Fractured zones within the rock were common. Most of the fractures appeared to be closed but some weathering was encountered on open fractures. The higher degree of fracturing is believed to be related to a thrust fault zone located west of the project area. Bedrock encountered at McB-1 and McB-2 (McBrien Road) returned to the hard, gray, argillaceous limestone. The upper 5 feet of coring at McB-1 encountered significant weathering and mud seams. The remainder of the rock quality was good to excellent.

4.7.1 RETAINING WALL 2, I-24 STATION 139+75 TO STATION 140+75, LEFT OF CENTERLINE

One additional boring was performed for this cut wall, which will support the north abutment of the Moore Road bridge over I-24. This boring was offset west of the beginning of the wall to Station 138+00, along the shoulder of the existing interstate. Boring RW2-1 obtained auger refusal at a depth of 10.3 feet, near elevation 669. As is shown in the discussion of the site conditions at the proposed bridge on the following page, KSWA boring M-1 is located north of Abutment 2, left of approximate I-24 Station 140+50. The upper 12 feet of soil at hole M-1 was logged as fill, and is a firm clay with an average N-value of 8. The lower soils are stiff to very stiff residual clays with an average N-value of 16. Prior to the construction of the existing bridge, eight rock soundings were performed across the site of the north abutment of the Moore Road bridge, which is also discussed in the following section. The surface of the underlying limestone along the wall site is expected to be encountered near elevation 670. Below is a summary table of the Neel-Schaffer boring performed along Wall 2:

Table 17: Summary of GeoEngineers/Neel-Schaffer drilling at Wall 2

Boring No.	I-24 Station	Offset From C/L	Surface Elevation	Soil Drill Depth (ft)	Elev. GW (ft)	Approximate Top-of-Rock Elevation	Comments
RW2-1	139+08.6	76.2' Lt.	679.3	10.25	X	668.75	Offset 75' west of beginning of wall, medium stiff to stiff clay

Please refer to KSWA boring log M-1 and Neel-Schaffer log RW2-1 for additional information.

4.7.2 MOORE ROAD OVER I-24

The portion of Table 4 of the KSWA report that applies to Moore Road over I-24 is shown below:

Table 18: Summary of KSWA drilling at I-75 over Moore Road

Boring No.	Surface Elevation	Soil Drill Depth (ft)	Auger Refusal?	Depth Cored (ft)	Total Depth	Existing Fill Thickness (ft)	Elev GW (ft)	Approximate Top of Rock Elevation	Base of Signficant Weathering Elevation	Comments
Moore Road Bridge										
M-1	699.7	30.1	YES	9.8	39.9	12	X	669.6	666	9.6 feet offset from stake
M-2	680.7	8.1	YES	26.2	34.3	1.6	X	672.6	657	

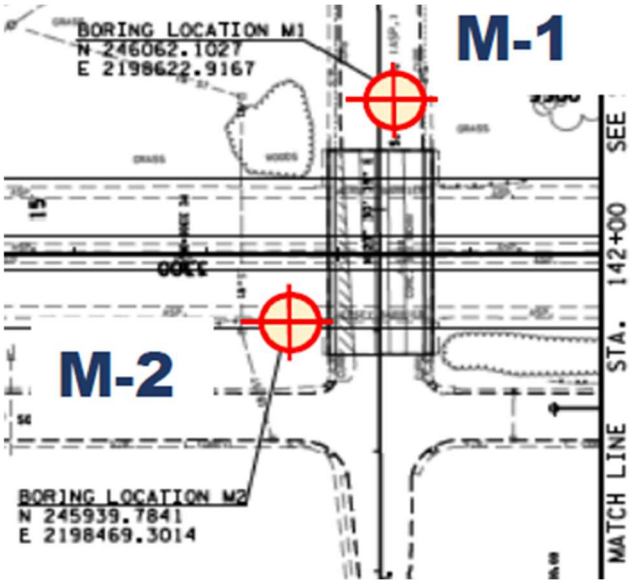
The rock compressive strength varied somewhat at this bridge. It should be noted that sample M-1 was taken from approximate elevation 768, which is near the rock surface, and the M-2 sample is from approximate elevation 753, or 19 feet below the rock surface. This difference in compressive strengths will likely not be a factor in the end bearing piles achieving refusal on the rock surface near elevation 670 along most of the bridge site. However, the compressive strength of the rock at depth would be an important factor in modeling the capacity of drilled shafts, if used at the center bent.

Table 19: Summary of KSWA Compressive Strength Testing from Moore Road over I-24

Test Boring Number	Depth of Sample[2] (feet)	Compressive Strength (psi)[1]	(ksf)[1]
M-1	32.1-33.2	2,614	370
M-2	27.3-27.7	6,230	890

Below is a snip from the KSWA report showing the approximate locations of borings M-1 and M-2:

Figure 3: Excerpt from Figure 3J in Appendix 1 of KSWA Report showing Moore Road Boring Locations



Note that boring M-1 was advanced through the entire fill thickness, while boring M-2 was located south of the interstate near the existing ditchline.

The preliminary layout for the replacement bridge indicates that Abutment 1 is south of I-24, and Abutment 2 is north of I-24. Sounding points 27 through 34 for the existing bridge were performed at the existing south abutment, or proposed **Abutment 1**:

Table 20: Ground and Rock Elevation Data from Original Bridge Plans, Abutment 1

Hole No.	Ground Elev.	Rock Elev.
27	682.2	671. 2
28	*	*
29	682.7	671. 7
30	682.9	669. 9
31	682.7	669. 7
32	682.6	671. 6
33	681.0	668. 0
34	681.1	667. 1

Based on the information provided in the 2018 KSWA report and the original bridge plans, it is assumed that end-bearing piles will be used at the south abutment, with an average pile tip refusal elevation of 670 expected.

Soundings 15 through 20 were located along the site of the **center bent**:

Table 21: Ground and Rock Elevation Data from Original Bridge Plans, Center Bent

Hole No.	Ground Elev.	Rock Elev.
15	678.5	667. 5
16	680.5	667. 5
17	680.5	667. 5
18	680.2	669. 2
19	679.6	666. 6
20	678.4	668. 4

The plans for the existing bridge dated 1958 indicate that a bottom of footing elevation of 776.7 was proposed for both end columns. In the absence of as-built plans, and based on the existing drilling information, it is likely that some of the driven piles for this bent have slightly less than 10 feet of soil embedment. If a 10-foot minimum H-pile length is required at the center bent, it is anticipated that the rock will be pre-drilled as much as 3 feet prior to inserting the pile and backfilling the space around the pile with concrete.

It is assumed that core borings similar to those performed during the KSWA investigation will be needed to characterize the in-place rock at depth if the designer of the final bridge plans proposes to use spread footings or drilled shaft foundations.

Sounding points 1 through 8 were performed at the existing north abutment, or proposed **Abutment 2**:

Table 22: Ground and Rock Elevation Data from Original Bridge Plans, Abutment 2

Hole No.	Ground Elev.	Rock Elev.
1	679.4	668. 4
2	679.3	668. 3
3	679.5	666. 5
4	679.5	667. 5
5	679.3	667. 3
6	679.3	669. 3
7	677.9	670. 9
8	677.9	669. 9

Based on the information provided in the KSWA report and the original bridge plans, it is assumed that end-bearing piles will be used at the north abutment, with an average pile tip refusal elevation of 668 expected.

4.7.3 RETAINING WALL 6, I-24 STATION 131+50 TO STATION 144+50, RIGHT OF CENTERLINE

Six additional borings were performed for this cut wall, a section of which will support the south abutment of the Moore Road bridge over I-24. As shown in the discussion of the site conditions at the proposed bridge in the previous section, KSWA boring M-2 was located near the existing ditchline, and the Neel-Schaffer borings were located upslope of the proposed wall face, primarily along the shoulder of South Terrace Road. The additional borings obtained auger refusal at depths from 4.75 feet to 24.5 feet, as shown in the table below. The surface of the underlying limestone is expected to be encountered between elevations 665 and 685. Please refer to the boring logs for additional information. Below is a summary table of the additional borings performed along Wall 6:

Table 23: Summary of GeoEngineers/Neel-Schaffer drilling at Wall 6

Boring No.	I-24 Station	Offset From C/L	Surface Elevation	Soil Drill Depth (ft)	Elev. GW (ft)	Approximate Top-of-Rock Elevation	Comments
RW6-1	131+99.6	130.9' Rt.	689.8	10	X	679.8	Offset 23' south of wall , medium stiff clay
RW6-2	135+03.5	108.4' Rt.	688.8	4.75	X	684.05	Offset 22' south of wall, medium stiff to stiff clay
RW6-3	137+99.4	114.1 'Rt.	694.1	19	X	675.1	Offset 24' south of wall, medium stiff to stiff clay
RW6-4	139+50.4	114.4' Rt.	698	24.5	X	673.5	Offset 24' south of wall, medium stiff to stiff clay. Upper 5' fill.
RW6-5	142+00	115.7' Rt.	695.4	22	X	673.4	Offset 28' south of wall, medium stiff to stiff clay. Upper 10' fill.
RW6-6	143+75.8	98.0' Rt.	687.9	18.5	X	669.4	Offset 6' south of wall, medium stiff to stiff clay. Upper 5' fill.

Noise Wall Proposed Between Retaining Wall and South Terrace Road

Another factor in the design of one of Wall 6 will be the surcharge load from the noise wall required between the proposed wall and South Terrace Road. Inspection of the Functional Plans cross sections indicate that a noise wall will be required between the retaining wall and South Terrace Road from approximate Station 133+50 to approximate Station 134+70. Unlike at other wall locations, it does not appear that the Design-Build team will have much room to alter the height and offset from centerline of a noise wall.

4.7.4 MCBRIEN ROAD OVER I-24

The portion of Table 4 of the KSWA report that applies to McBrien Road over I-24 is shown below:

Table 24: Summary of KSWA drilling at I-75 over Moore Road

Boring No.	Surface Elevation	Soil Drill Depth (ft)	Auger Refusal?	Depth Cored (ft)	Total Depth	Existing Fill Thickness (ft)	Elev GW (ft)	Approximate Top of Rock Elevation	Base of Signficant Weathering Elevation	Comments
McBrien Road Bridge										
MCB-1	697.2	27.2	YES	15.2	42.4	18.5	X	670	663	Moved hole 12 feet NE. Elevation 0.5 foot lower than stake. Clay Seams in upper 5 ft of rock
MCB-2	696.6	31.1	YES	11	42.1	16	X	665.5	661	

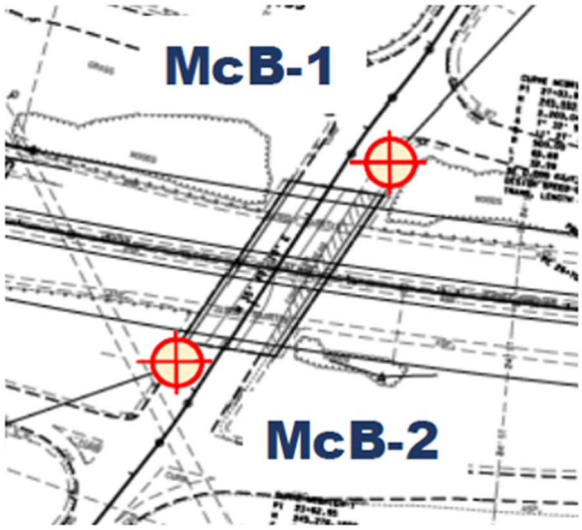
The compressive strength of the rock sample obtained near the rock surface at Boring MCB-2 is shown in the snip from Table 5 of the KSWA report.

Table 25: Summary of KSWA Compressive Strength Testing from McBrien Road over I-24

Test Boring Number	Depth of Sample[2] (feet)	Compressive Strength (psi)[1]	(ksf)[1]
MCB-2	31.7-32.1	3,801	550

Below is a snip from the KSWA report showing the approximate locations of borings MCB-1 and MCB-2:

Figure 4: Excerpt from Figure 3K in Appendix 1 of KSWA Report showing McBrien Rd. Boring Locations



The preliminary layout for the replacement bridge indicates that Abutment 1 is south of I-24, and Abutment 2 is north of I-24. Boring MCB-2 was performed near the existing south abutment, or proposed **Abutment 1**, indicating hard, argillaceous in-place limestone near elevation 665.5, at a depth of 31 feet.

Sounding points 27 through 34 for the existing bridge were performed at the south abutment, or proposed **Abutment 1**:

Table 26: Ground and Rock Elevation Data from Original Bridge Plans, Abutment 1

Hole No.	Ground Elev.	Rock Elev.
27	672.8	664.8
28	672.9	664.9
29	673.0	666.0
30	674.1	665.1
31	674.3	665.3
32	671.9	664.9
33	671.6	664.6
34	671.5	664.5

Based on the information provided in the 2018 KSWA report and the original bridge plans, it is assumed that end-bearing piles will be used at the south abutment, with an average pile tip refusal elevation of 665 expected.

Soundings 15 through 20 were located along the site of the **center bent**:

Table 27: Ground and Rock Elevation Data from Original Bridge Plans, Center Bent

Hole No.	Ground Elev.	Rock Elev.
15	672.8	666.8
16	673.1	666.1
17	674.4	665.4
18	674.5	665.5
19	673.5	664.5
20	673.6	665.6

The plans for the existing bridge indicate that a bottom-of-pile cap elevation of 773.3 was proposed for both end columns at the **center bent**. In the absence of as-built plans, and based on the existing drilling information, it is likely that some of the driven piles (if used) for this bent have slightly less than 10 feet of soil embedment. If a 10-foot minimum H-pile length is required at the center bent, it is anticipated that the rock will be pre-drilled as much as 3 feet prior to inserting the pile and backfilling the space around the pile with concrete.

It is assumed that core borings similar to those performed during the KSWA investigation will be needed to characterize the in-place rock at depth if the designer of the final bridge plans proposes to use spread footings or drilled shaft foundations.

KSWA boring MCB-1 was performed near the existing north abutment, or proposed **Abutment 2**, indicating weathered, argillaceous in-place limestone near elevation 670, at a depth of 27.2 feet. The boring indicates that the limestone becomes hard at a depth of 32.2 feet.

Sounding points 1 through 8 were performed at the existing north abutment, or proposed Abutment 2:

Table 28: Ground and Rock Elevation Data from Original Bridge Plans, Abutment 2

Hole No.	Ground Elev.	Rock Elev.
1	675.1	668.1
2	674.5	667.5
3	676.0	668.0
4	676.5	666.5
5	676.7	667.7
6	676.9	666.9
7	677.0	669.0
8	677.5	668.5

Based on the information provided in the KSWA report and the original bridge plans, it is assumed that end-bearing piles will be used at the north abutment, with an average pile tip refusal elevation of 668 expected.

4.7.5 RETAINING WALL 3, I-24 STATION 155+00 TO STATION 160+50, LEFT OF CENTERLINE

Three additional borings were advanced along this cut wall, part of which will also support the north abutment of the McBrien Road bridge over I-24. As shown in the discussion of the site conditions at the proposed bridge, boring McB-1 is located north of Abutment 2. Additional borings RW3-1, RW3-2, and

RW3-3 were offset left of the proposed wall face along the shoulder of North Terrace Road. The upper 10 to 20 feet of soil appears to be fill, and is a stiff clay with an average N-value of 10. The lower soils are stiff to very stiff residual clays with an average N-value of 18. Below is an excerpt from the summary table of the additional Neel-Schaffer borings listing the holes performed for Wall 3:

Table 29: Summary of GeoEngineers/Neel-Schaffer drilling at Wall 3

Boring No.	I-24 Station	Offset From C/L	Surface Elevation	Soil Drill Depth (ft)	Elev. GW (ft)	Approximate Top-of-Rock Elevation	Comments
RW3-1	155+14.8	167.9' Lt.	695.3	25	X	670.3	Offset 50' north of wall, medium stiff to stiff clay
RW3-2	156+88.5	139.5' Lt.	694.4	23.5	X	670.9	Offset 49' north of wall face, stiff to very stiff clay. Predominantly fill.
RW3-3	159+03.9	108.3' Lt.	687.9	25	X	663	Offset 18' north of wall face, medium stiff to stiff clay. Upper 15' fill.

Please refer to KSWA boring log McB-1 and GeoEngineer/Neel-Schaffer logs RW3-1, RW3-2, and RW3-3 for additional information.

Noise Wall Proposed Between Wall 3 and North Terrace Road

Inspection of the Functional Plans cross sections indicate that a noise wall will be required between the retaining wall and North Terrace Road from east of McBrien Road near Station 157+00 to the end of the wall near Station 160+50. The surcharge load of the noise wall must be considered in the design of the proposed retaining wall, depending on its proximity to the retaining wall. As mentioned in Section 1.1, it is understood that the Design-Build team may alter the height and offset from centerline of a noise wall if it meets the Department's noise abatement criteria.

4.7.6 RETAINING WALL 7, I-24 STATION 154+25 TO STATION 155+75, RIGHT OF CENTERLINE

Two additional borings were advanced along this cut wall, part of which will also support the south abutment of the McBrien Road bridge over I-24. As shown in the discussion of the site conditions at the proposed bridge, boring McB-2 is located south of Abutment 1. Additional borings RW7-1 and RW7-2, were located near Stations 154+50 and 155+50, respectively. The upper 16 feet of soil appears to be fill, and is a stiff clay, and the lower soils are stiff to very stiff residual clays. The surface of the underlying limestone is expected to be encountered near elevation 665.

Table 30: Summary of GeoEngineers/Neel-Schaffer drilling at Wall 7

Boring No.	I-24 Station	Offset From C/L	Surface Elevation	Soil Drill Depth (ft)	Elev. GW (ft)	Approximate Top-of-Rock Elevation	Comments
RW7-1	154+60.2	110.9' Rt.	696	31	X	665	Offset 20' south of wall, medium stiff to stiff clay
RW7-2	155+29.5	103.6' Rt.	697.2	34.5	X	662.7	Offset 13' south of wall, medium stiff to stiff clay

Please refer to KSWA boring log McB-2 and GeoEngineer/Neel-Schaffer logs RW7-1 and RW7-2 for additional information.

4.8 KSWA BORING SUMMARY

The following table provides a summary of the KSWA borings, showing the surface elevations, thickness of fill encountered, auger refusal elevation, and estimated elevation of the start of good-to-excellent

quality rock. Additional information and comments about the conditions are also provided in the summary table. Conditions can vary from between locations, including significant variations even at close distances due to the nature of the weathering and variability in the surface of the bedrock. Please refer to the boring logs for additional information. Figures 5G, 5H, and 5I in Appendix A provides graphical summary diagrams for I-75 over CSX Railroad, Moore Road over I-24, and McBrien Road over I-24, respectively.

Table 31: Excerpt from Table 4 of KSWA Report

Boring No.	Surface Elevation	Soil Drill Depth (ft)	Auger Refusal?	Depth Cored (ft)	Total Depth	Existing Fill Thickness (ft)	Elev GW (ft)	Approximate Top of Rock Elevation	Base of Signficant Weathering Elevation	Comments
Alignment Borings										
A-01	717.3	15	NO	X	15	15	X	X	X	Cherty, silty, clay FILL
A-02	718.7	15	NO	X	15	15	X	X	X	Cherty, silty, clay FILL
A-08	673.9	14.7	YES	X	14.7	3.5	X	659.2	X	Possible FOUNDRY SAND, could be RAP
A-09	673	5.5	YES	X	5.5	X	X	667.5	X	Shallow Refusal at 5.5 ft
A-10	684.5	9.4	YES	X	9.4	4.9	X	675.1	X	
A-11	680.5	9.3	YES	X	9.3	3.2	X	671.2	X	Moved hole to 4.9 offset
Bridge over CSX Railroad										
CSX-1	720.9	86.9	YES	7.4	94.3	28.5	X	634	X	Irregular rock surface, hard abrasive rock, no recovery FAULT ZONE
CSX-1A	720.9	72.5	YES	7.8	80.3	1.5	X	648.4	X	Irregular rock surface, hard abrasive rock, no recovery FAULT ZONE
CSX-2	715.5	55	YES	14	69	18.5	X	660.5	656	
CSX-3	716.0*	57.9	YES	14.8	72.7	22	X	658.1	656	Hard rock, siliceous, low grade metamorphism, brecciated dolomite
Moore Road Bridge										
M-1	699.7	30.1	YES	9.8	39.9	12	X	669.6	666	9.6 feet offset from stake
M-2	680.7	8.1	YES	26.2	34.3	1.6	X	672.6	657	
McBrien Road Bridge										
MCB-1	697.2	27.2	YES	15.2	42.4	18.5	X	670	663	Moved hole 12 feet NE. Elevation 0.5 foot lower than stake. Clay Seams in upper 5 ft of rock
MCB-2	696.6	31.1	YES	11	42.1	16	X	665.5	661	

4.9 GEOENGINEERS/NEEL-SCHAFFER BORING SUMMARY

The following table provides a summary of the Retaining Wall borings logged by GeoEngineers for Neel-Schaffer, showing the ground surface elevations, auger refusal elevation, and estimated top-of-rock elevation. Additional information and comments about the conditions are also provided in the summary table. Conditions can vary from between locations, including significant variations even at close distances due to the nature of the weathering and variability in the surface of the bedrock. Please refer to the boring logs for additional information.

Table 32: Summary of GeoEngineers/Neel-Schaffer Retaining Wall Boring Data

Boring No.	I-24 Station	Offset From C/L	Surface Elevation	Soil Drill Depth (ft)	Elev. GW (ft)	Approximate Top-of-Rock Elevation	Comments
I-24 Walls							
Retaining Wall 1							
RW1-1A	102+76.25	130.2' Rt.	752.9	11.8	X	741.1	Offset 12' west of RW1-1 to confirm shallow refusal
RW1-1	102+88.65	129.7' Lt.	753.3	12	X	741.3	Offset 53 ' north of wall, shallow refusal
RW1-2	104+51.44	127.8' Lt.	757.35	44.7	X	712.65	Offset 49' north of wall, medium stiff to stiff clay
RW1-3	106+01.91	130.8' Lt.	757.9	50	728.4	X	Offset 36' north of wall, boring terminated at 50'
RW1-4	107+50.12	128.9' Lt.	753.7	26.6	X	727.1	Offset 39' north of wall, medium stiff to stiff clay
RW1-5	108+95.9	127.6' Lt.	745.2	50	727.2	X	Offset 38' north of wall, soft 13'-20', boring terminated at 50'
RW1-6	113+95	86.1' Lt.	706	50	678	X	Offset 100' east of end of wall, boring terminated at 50'
Retaining Wall 2							
RW2-1	139+08.6	76.2' Lt.	679.3	10.25	X	668.75	Offset 75' west of beginning of wall, medium stiff to stiff clay
Retaining Wall 3							
RW3-1	155+14.8	167.9' Lt.	695.3	25	X	670.3	Offset 50' north of wall, medium stiff to stiff clay
RW3-2	156+88.5	139.5' Lt.	694.4	23.5	X	670.9	Offset 49' north of wall face, stiff to very stiff clay. Predominantly fill.
RW3-3	159+03.9	108.3' Lt.	687.9	25	X	663	Offset 18' north of wall face, medium stiff to stiff clay. Upper 15' fill.

Table 33: Summary of GeoEngineers/Neel-Schaffer Retaining Wall Boring Data (Continued)

Boring No.	I-24 Station	Offset From C/L	Surface Elevation	Soil Drill Depth (ft)	Elev. GW (ft)	Approximate Top-of-Rock Elevation	Comments
I-24 Walls							
Retaining Wall 4							
RW4-1	105+12	117.3' Rt.	736.4	50	699.4	X	Offset 36' south of wall, medium stiff to stiff clay, wet at 33.5'
RW4-2	107+94.3	115.4' Rt.	738	50	706	X	Offset 31' south of wall, medium stiff to stiff clay, wet at 34'
RW4-3	111+02.5	114.8' Rt.	734.2	28.5	X	705.7	Offset 25' south of wall, medium stiff to stiff clay
RW4-4	113+88.8	119.8' Rt.	719.4	45	X	674.4	Offset 15' south of wall face, medium stiff to stiff clay
Retaining Wall 5							
RW5-1	115+76.1	119.6' Rt.	710.8	50	X	X	Offset 20' south of wall, stiff clay to 20', medium stiff below 20'
RW5-2	117+90.1	70.3' Rt.	695.7	50	648.7	X	Offset east of end of wall, medium stiff to stiff clay
Retaining Wall 6							
RW6-1	131+99.6	130.9' Rt.	689.8	10	X	679.8	Offset 23' south of wall , medium stiff clay
RW6-2	135+03.5	108.4' Rt.	688.8	4.75	X	684.05	Offset 22' south of wall, medium stiff to stiff clay
RW6-3	137+99.4	114.1 'Rt.	694.1	19	X	675.1	Offset 24' south of wall, medium stiff to stiff clay
RW6-4	139+50.4	114.4' Rt.	698	24.5	X	673.5	Offset 24' south of wall, medium stiff to stiff clay. Upper 5' fill.
RW6-5	142+00	115.7' Rt.	695.4	22	X	673.4	Offset 28' south of wall, medium stiff to stiff clay. Upper 10' fill.
RW6-6	143+75.8	98.0' Rt.	687.9	18.5	X	669.4	Offset 6' south of wall, medium stiff to stiff clay. Upper 5' fill.
Retaining Wall 7							
RW7-1	154+60.2	110.9' Rt.	696	31	X	665	Offset 20' south of wall, medium stiff to stiff clay
RW7-2	155+29.5	103.6' Rt.	697.2	34.5	X	662.7	Offset 13' south of wall, medium stiff to stiff clay
I-75 Walls							
Retaining Wall 8							
RW8-1	443+62.2	77.9' Lt.	703.6	48	X	655.6	Upper 35' medium stiff to stiff fill, over medium stiff to stiff residuum
Retaining Wall 10							
RW10-1	455+02.8	62.6' Rt.	727.26	50	X	X	Upper 20' medium stiff to stiff fill, over medium stiff to stiff residuum
RW10-2	456+04.6	62.3' Rt.	727.8	50	X	X	Upper 23' medium stiff to stiff fill, over residuum with chert
Retaining Wall 11							
RW11-1A	460+92.6	62.6' Rt.	732.2	17	X	715.2	Clay fill with moderately heavy chert, possible refusal on rock fill
RW11-1	460+99.5	62.8' Rt.	732.3	7.5	X	724.8	Clay fill with moderately heavy chert, possible refusal on rock fill
RW11-2	463+04.4	61.5	733.3	50	X	X	Upper 15' clay fill with chert, over residuum with chert.

4.10 GROUNDWATER CONDITIONS

The KSWA report noted that groundwater was observed in some of the borings within the soil profile during drilling. Borings encountering water were generally those drilled within the interchange and/or near Spring Creek (located in Phase I) and those near South Chickamauga Creek (SCC and RW). In most cases, groundwater was found to occur in sand layers present in the alluvial soil in the lower-lying areas and trapped in loose fill materials in low-lying areas (especially in the interchange medians).

An examination of the moisture content tests performed by Geotechnics on samples obtained by GeoEngineers/Neel-Schaffer indicates soils with moisture contents above 30 percent below a depth of 32 feet, particularly along Retaining Walls 4 and 5. Although some isolated lenses of soils with relatively high moisture contents were indicated at other boring locations, an extensive, near-surface water table does not appear to be present along the I-24 retaining wall locations. It should be noted that groundwater levels will vary depending on the time of year, climatic conditions and the degree of construction activities.

4.11 LABORATORY TEST RESULTS

KSWA and Neel-Schaffer/Geotechnics performed the laboratory testing on split spoon and rock core samples in general accordance with ASTM and AASHTO procedures with results presented on the boring logs or in Appendix B where results require additional space for reporting. The laboratory testing included:

- Natural Moisture Content (AASHTO T 265 and ASTM D 2216-19)
- Atterberg Limit Determination (AASHTO T 89, T 90, and ASTM D 4318-17)
- Grain Size Analysis (AASHTO T 27 and ASTM D 422-63 (2007), AASHTO T88)
- Unconfined Compressive Test- Rock

Unconfined compressive strength of selected samples of rock by KSWA were determined by generally using applicable ASTM methods. Samples of weathered to moderately weathered rock and relatively unweathered rock samples were selected for testing to permit comparison. The results of the rock core compressive strength testing from the I-75 over South Chickamauga Creek, I-75 over CSX railroad, Moore Road over I-24, and McBrien Road over I-24 I are presented in this excerpt from Table 5 of the KSWA report.

Table 34: Summary of KSWA Rock Core Compressive Strength Data

Test Boring Number	Depth of Sample[2] (feet)	Compressive Strength (psi)[1]	(ksf)[1]
CSX-2	58.4-58.8	14,253	2,050
CSX-2	64.1-64.5	27,594	3,970
CSX-3	64.0-64.4	6,785	970
M-1	32.1-33.2	2,614	370
M-2	27.3-27.7	6,230	890
MCB-2	31.7-32.1	3,801	550
SCC-1	20.9-21.1	3,194	460

[1] Pounds per square inch (psi); Kips per square foot (ksf).
[2] All sample depths are approximate.

5.0 QUALIFICATIONS OF RECOMMENDATIONS

The conditions described in this report were interpreted from our observations at the site and using the information obtained from the test borings that were advanced at the site. Test borings only depict the soil and rock conditions at the specific location and time at which they were made. The soil and rock conditions at other locations on the sites may differ from those occurring at the boring locations.

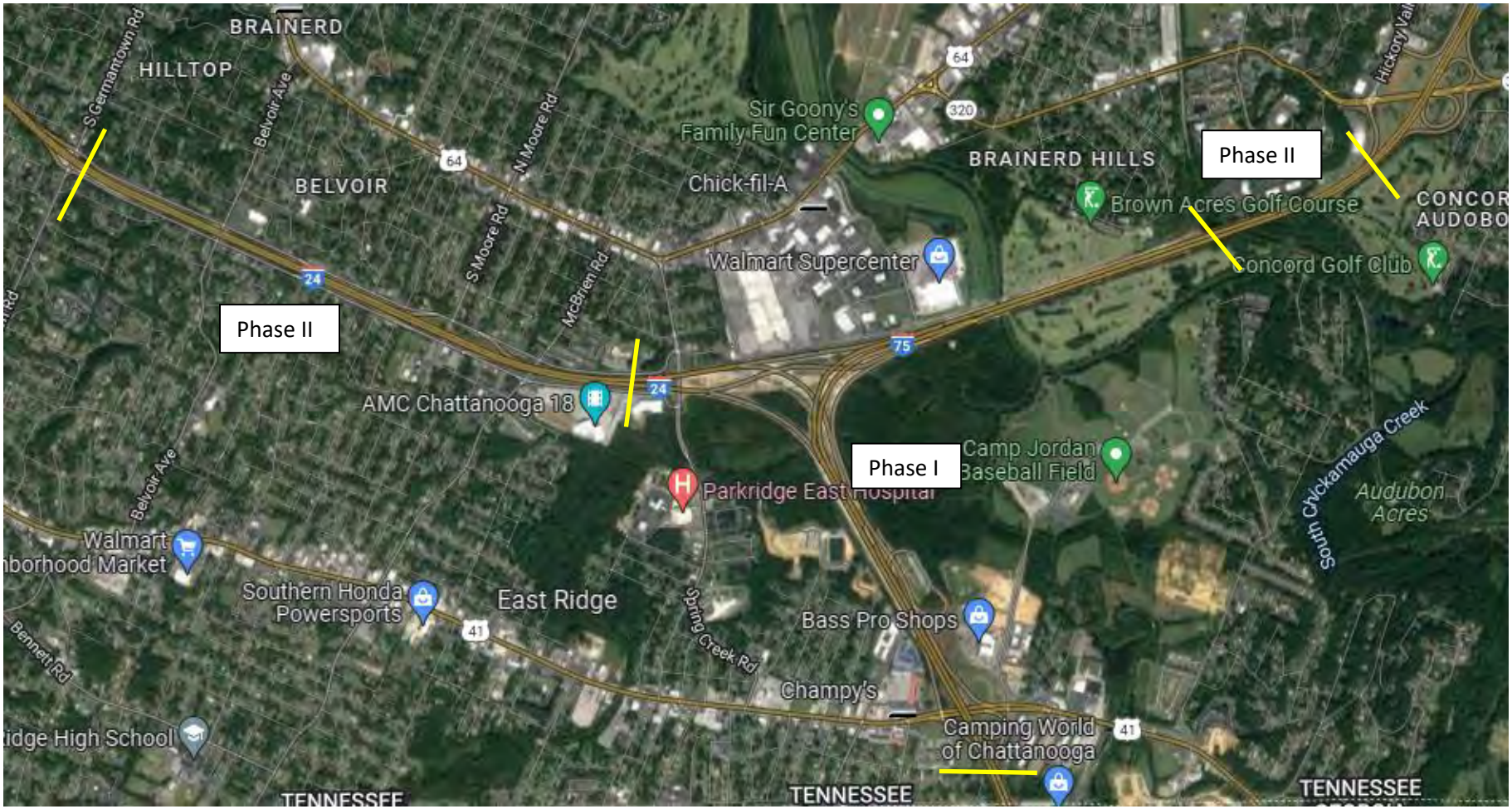
The conclusions and recommendations for the design of pavements in this report were based on the available subsurface information, the project information provided, and the assumptions previously stated.

The scope of our geotechnical services did not include assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater or surface water within or beyond the site studied.

Our professional services were limited to developing a geotechnical conditions baseline report and was not intended to act as a design geotechnical study for this project. Additional exploration and evaluation will be need to conform to the requirements of the TDOT Geotechnical Manual for each of the structures. Neel-Schaffer is not responsible for the conclusions, opinions, or recommendations made by others based upon the data included herein.

APPENDIX A

FIGURES



Site Location Plan

I-75 Interchange Modification at I-24 (Phase 2)
PIN 114174.01
Chattanooga, Tennessee

Figure 1

Figure 2

GeoEngineers/Neel-Schaffer

Boring Location Sheets

TYPE	YEAR	PROJECT NO.	SHEET NO.
FUNCT.	2022	NH-I-75-1(155)	8

MATCH LINE STA. 98+00 SEE SHT. NO. 8

MATCH LINE STA. 111+00 SEE SHT. NO. 9

I-24 W

I-24 E

℄ I-24

S 66° 20' 34" E

S 66° 19' 18" E

S 63° 34' 25" E

RW01-1A EL752.91

RW01-01 EL753.26

RW01-02 EL757.35

RW01-03 EL757.89

RW01-04 EL753.71

RW01-05 EL745.21

RW04-01 EL736.36

RW04-02 EL737.98

BELVOIR ROAD

LIMIT OF CONST. 302+39.10

LIMIT OF CONST. 308+50.96

BELVOIR ROAD STA. 305+53.52
= I-24 STA 100+41.21
N: 247558.92
E: 2194896.44

BEGIN CONST. RAMP (K) STA. 2002+50.29
= I-24 STA 107+60.68 OFF 62.00' RT
N: 247213.32
E: 2195530.58

POT 2000+00.00

PI 2002+50.29

POT 2005+50.00

PC 2005+50.00

100

105

110

2000

2005

BRAINERD BAPTIST CHURCH

KIM M. CHAMBERLAIN

FONTAINE INVESTMENTS, LLC

JOE REID WORK

J. EDD WARD

TINA H. HENNEN

KATHY LEWIS FICKLEY

JOHN J. BAKER, III AND RAMONA H. BAKER

ROBERT L. LOCKHART AND JANIE H. LOCKHART

NICOLE BURNEY AND TOMMY BURNEY, JR.

KEITH J. REISMAN

TENNESSEE ASSOCIATION OF CHRISTIAN SCHOOLS

CHARLES L. GRIFFIN JR.

BEYER FAMILY TRUST

GREG A. BOLTON AND KAREN M. BOLTON

TERESA G. BYRD

SALVADOR MENDEZ

MOMENTUM OF CHATTANOOGA, LLC

ELLIS YARRELL, JR. AND LAURA YARRELL

CITY OF CHATTANOOGA

CITY OF EAST RIDGE

COORDINATES ARE NAD/83(1995), ARE DATUM ADJUSTED BY THE FACTOR OF 0.99998 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988.

STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION

BORING LOCATIONS

STA.98+00 TO STA.111+00

SCALE: 1"= 50'

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TYPE	YEAR	PROJECT NO.	SHEET NO.
FUNCT.	2022	NH-I-75-1(155)	9

CURVE RAMP_L/N-1
PI 1010+38.00
N 247,157.7571
E 2,195,966.0576
Δ 4° 09′ 28″ (LT)
D 5° 28′ 21″
R 1,047.00
L 75.98
T 38.00
SE 0.030 FT/FT
DESIGN SPEED 45 MPH
TRANS. LENGTH 222.22

CURVE RAMP_L/N-2
PI 1018+13.96
N 246,898.4635
E 2,196,697.4465
Δ 4° 13′ 36″ (RT)
D 5° 33′ 26″
R 1,031.00
L 76.06
T 38.05
SE 0.020 FT/FT
DESIGN SPEED 45 MPH
TRANS. LENGTH 000

JERRY DALE STEWART
ROBERT FRANCIS COYNE AND MARY LYNN COYNE
CITY OF CHATTANOOGA C/O ELECTRIC POWER BOARD
ASHLEY N. PARTICK
CAROL J. CATRON
MARTHA DIANE L. OWEN AND DANNY EUGENE OWEN
ROBERT ANTHONY OLIVER AND TERESA FAYE OLIVER
KEITH WILSON BLAKE
SARAH K. COLEMAN CLINE
MARK ALLEN SINIARD
JAMES LOWENBERG
FRED L. STAFFORD

BEGIN CONST. RAMP (L) STA. 1010+00.00
= I-24 STA 111+43.80 OFF -62.00' LT
N: 247173.02
E: 2195931.25

END CONST. RAMP (L) STA. 1018+51.97
= I-24 STA 119+93.83 OFF -118.05' LT
N: 246883.14
E: 2196732.27

PC 1010+00.00
PT 1010+75.98
PI 1014+13.51
PI 1018+13.96
PI 2005+86.37
PI 2013+66.09
PC 2013+30.33
PT 2014+01.82
PT 2006+22.72
PI 1016+38.00
PC 1017+74.92
PT 1018+49.97

RW01-06 EL705.96
RW04-03 EL734.19
RW04-04 EL719.41
RW05-01 EL710.82
RW05-02 EL695.74

RAMP L
RAMP K
S 70° 28′ 46″ E
S 62° 20′ 32″ E
S 66° 15′ 10″ E
S 66° 20′ 16″ E
S 66° 18′ 55″ E

I-24 W
℄ I-24
I-24
I-24 E

MATCH LINE STA. 111+00 SEE SHT. NO. 8
MATCH LINE STA. 124+00 SEE SHT. NO. 10

JUNE S. KEMPSON
LAWRENCE EBERHART
CASEY JOHNSON
2010
CHRISTOPHER A. SCHOBERT
MELODY ANNE CROMWELL
MITCHELL A. CHADWICK
DAVID RODNEY FRALEY
CLINTON D. GIPSON AND DANA R. GIPSON
WILLIAM F. GREEN
FLOYD GLEN MEDLEY
RIDGE CORPORTATION
JORGE MACARIO-DELEON
2015
ROGER C. MILNER AND JENNIFER L. MILNER
KIMBERLY ALICE SHAHAN WHITING
ROGER MILNER AND JENNIFER MILNER
EMILY C. WADE

CURVE RAMP_K/M-1
PI 2005+86.37
N 247,078.3485
E 2,195,838.3773
Δ 3° 58′ 46″ (RT)
D 5° 28′ 21″
R 1,047.00
L 72.72
T 36.37
SE 0.030 FT/FT
DESIGN SPEED 45 MPH
TRANS. LENGTH 222.22

CURVE RAMP_K/M-2
PI 2013+66.09
N 246,716.4003
E 2,196,529.0270
Δ 3° 58′ 23″ (LT)
D 5° 33′ 26″
R 1,031.00
L 71.49
T 35.76
SE 0.020 FT/FT
DESIGN SPEED 45 MPH
TRANS. LENGTH 000

END CONST. RAMP (K) STA. 2014+01.82
= I-24 STA 119+10.36 OFF 116.26' RT
N: 246702.04
E: 2196558.22

COORDINATES ARE NAD/83(1995), ARE DATUM ADJUSTED BY THE FACTOR OF 0.99998 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988.

STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION

BORING LOCATIONS

STA.111+00 TO STA.124+00

SCALE: 1"= 50'

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TYPE	YEAR	PROJECT NO.	SHEET NO.
FUNCT.	2022	NH-I-75-1(155)	10

N

BEGIN CONST. RAMP (N) STA. 1023+76.97
= I-24 STA 125+18.83 OFF -117.27' LT
N: 246671.72
E: 2197212.82

END CONST. RAMP (N) STA. 1031+79.01
= I-24 STA 133+18.83 OFF -62.00' LT
N: 246300.02
E: 2197979.49

CURVE RAMP_L/N-3
PI 1024+15.61
N 246,656.164
E 2,197,248.041
Δ 4° 17' 32" (RT)
D 5° 33' 26"
R 1,031.00
L 77.24
T 38.64
SE 0.020 FT/FT
DESIGN SPEED 45 MPH
TRANS. LENGTH 000

CURVE RAMP_L/N-4
PI 1031+39.04
N 246,316.0797
E 2,197,886.7282
Δ 4° 22' 38" (LT)
D 5° 28' 21"
R 1,047.00
L 79.99
T 40.01
SE 0.030 FT/FT
DESIGN SPEED 45 MPH
TRANS. LENGTH 222.22

STEVIE RIFENBERICK ANDWILLIAM CONNELL
AND LAURA M. DAHLKE
REBECCA ALLEN
VIKRAM VASHI
ILUMINADA B. GENTRY AND WILLIAM A. GENTRY
CALVARY INDEPENDENT BAPTIST CHURCH
CALVARY BAPTIST CHURCH
KENNETH CECIL FOWLER
DILLION WILLIAMS
MATTHEW ANSEL CONERLY AND TINA BROYLES CONERLY
SCARLETT L. BOWMAN
EDWARD BENCOSME
ROY S. R TRUS

125 130 135 1025 1030

I-24 W
℄ I-24
I-24 E
RAMP N S 61° 57' 38" E
RAMP N S 66° 20' 16" E
I-24 S 66° 20' 16" E
RAMP M S 70° 21' 38" E
RAMP M

RW06-01 EL689.82
RW06-02 EL688.78

MATCH LINE STA. 124+00 SEE SHT. NO. 9
MATCH LINE STA. 137+00 SEE SHT. NO. 11

BEGIN CONST. RAMP (M) STA. 2023+26.82
= I-24 STA 128+35.36 OFF 116.62' RT
N: 246330.46
E: 2197408.86

END CONST. RAMP (M) STA. 2031+78.68
= I-24 STA 136+85.36 OFF 62.00' RT
N: 246028.35
E: 2198204.51

CURVE RAMP_K/M-3
PI 2023+63.23
N 246,315.8357
E 2,197,442.2058
Δ 4° 02' 42" (LT)
D 5° 33' 26"
R 1,031.00
L 72.79
T 36.41
SE 0.020 FT/FT
DESIGN SPEED 45 MPH
TRANS. LENGTH 000

CURVE RAMP_K/M-4
PI 2031+41.94
N 246,054.1001
E 2,198,175.6427
Δ 4° 01' 22" (RT)
D 5° 28' 21"
R 1,047.00
L 73.51
T 36.77
SE 0.030 FT/FT
DESIGN SPEED 45 MPH
TRANS. LENGTH 222.22

2020 CHRISTY ELLIS
2025 FIRST BIBLE MISSIONARY CHURCH
2030 STEPHEN ERRICO AND JACKIE ERRICO
COLTON JOSEPH FEAGANS
VREK MOEDER REVOCABLE TRUST
RJ PROPERTIES, LLC
ROBERT C. DOUB AND JERRY L. DOUB
TAYLOR JONES
ROMAN CATHOLIC DIOCESE OF KNOXVILLE

CITY OF CHATTANOOGA
CITY OF EAST RIDGE

COORDINATES ARE NAD/83(1995), ARE DATUM ADJUSTED BY THE FACTOR OF 0.99998 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988.

STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION

BORING LOCATIONS

STA.124+00 TO STA.137+00

SCALE: 1"= 50'

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TYPE	YEAR	PROJECT NO.	SHEET NO.
FUNCT.	2022	NH-I-75-1(155)	11

BEGIN CONST. RAMP (O) STA. 3000+00.00
= I-24 STA 140+60.82 OFF -235.01' LT
N: 246160.70
E: 2198672.42

CURVE RAMP_O-1
PI 3006+31.22
N 245,906.1782
E 2,199,250.0507
Δ 19° 11' 44" (RT)
D 7° 23' 01"
R 776.00
L 259.98
T 131.22
SE 0.025 FT/FT
DESIGN SPEED 45 MPH
TRANS. LENGTH 69.8

END PROPOSED BRIDGE
STA. 15+43.81

S. MOORE RD. STA. 14+64.81
= I-24 STA 140+30.87
N: 245957.46
E: 2198550.67

BEGIN PROPOSED BRIDGE
STA. 13+73.81

BEGIN CONST. RAMP (P) STA. 4000+00.00
= I-24 STA 140+74.92 OFF 129.33 RT
N: 245801.33
E: 2198539.11

CURVE RAMP_P-1
PI 4004+45.48
N 245,643.9035
E 2,198,947.7344
Δ 6° 29' 30" (LT)
D 7° 08' 39"
R 802.00
L 90.87
T 45.48
SE 0.020 FT/FT
DESIGN SPEED 45 MPH
TRANS. LENGTH 000

LIMIT OF CONST.
11+57.74

MATCH LINE STA. 137+00 SEE SHT. NO. 10

MATCH LINE STA. 150+00 SEE SHT. NO. 12

COORDINATES ARE NAD/83(1995), ARE DATUM ADJUSTED BY THE FACTOR OF 0.99998 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

BORING LOCATIONS

STA. 124+00 TO STA. 137+00

SCALE: 1"= 50'

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TYPE	YEAR	PROJECT NO.	SHEET NO.
FUNCT.	2022	NH-I-75-1(155)	12

CURVE RAMP_O-2
PI 3011+22.71
N 245,569.4642
E 2,199,611.4489
Δ 26° 28′ 01″ (LT)
D 7° 03′ 22″
R 812.00
L 375.09
T 190.95
SE 0.030 FT/FT
DESIGN SPEED 45 MPH
TRANS. LENGTH 250

CURVE RAMP_O-3
PI 3014+03.44
N 245,487.7596
E 2,199,887.1359
Δ 1° 57′ 07″ (LT)
D 1° 00′ 38″
R 5,670.00
L 193.15
T 96.59
SE 0.030 FT/FT
DESIGN SPEED 45 MPH
TRANS. LENGTH 000

END CONST. RAMP (O) STA. 3013+06.85
= I-24 STA 153+55.73 50.00' LT
N: 245515.20
E: 2199794.53

CURVE I-24_1
PI 156+54.74
N 245,305.7296
E 2,200,038.0154
Δ 20° 05′ 24″ (LT)
D 1° 00′ 06″
R 5,720.00
L 2,005.64
T 1,013.22
SE 0.029 FT/FT
DESIGN SPEED 60 MPH
TRANS. LENGTH 265

LIMIT OF CONST. 28+34.27

END PROPOSED BRIDGE STA. 26+54.21

RW03-01 EL695.27
RW03-02 EL694.42
RW03-03 EL687.86

RW07-01 EL695.97
RW07-02 EL697.20

MCBRIEN ROAD STA. 25+39.21
= I-24 STA 155+34.62
N: 245419.12
E: 2199952.60

BEGIN PROPOSED BRIDGE STA. 24+24.21

END CONST. RAMP (P) STA. 4012+46.32
= I-24 STA 153+08.79 OFF 74.00' RT
N: 245410.02
E: 2199713.76

CURVE RAMP_P-2
PI 4013+23.16
N 245,387.5801
E 2,199,787.2541
Δ 1° 31′ 11″ (LT)
D 0° 59′ 20″
R 5,794.00
L 153.68
T 76.84
SE 0.029 FT/FT
DESIGN SPEED 45 MPH
TRANS. LENGTH 145.19

CITY OF CHATTANOOGA
312 MCBRIEN RD, LLC
GLOBAL SIGNAL ACQUISITIONS IV LLC
A & A MANAGEMENT OF TN, LLC
RICK NORTON AND GENA NORTON
CITY OF CHATTANOOGA
CITY OF EAST RIDGE
FLETCHER BRIGHT
TIMOTHY GORDON AND KRISTINA B. GORDON
ANDRES GARCIA CRUZ AND CANDELARIA CANO ARGUETA
ANDREW C. GLADDEN
JOHN E. AND KATHRYN A. GROVES
WILLIAM HENRY, JR.
DANIEL G. KAMIN CHATTANOOGA LLC
EAST RIDGE

MATCH LINE STA. 150+00 SEE SHT. NO. 11
MATCH LINE STA. 163+00 SEE SHT. NO. 13

COORDINATES ARE NAD/83(1995), ARE DATUM ADJUSTED BY THE FACTOR OF 0.99998 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988.

STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION

BORING LOCATIONS

STA. 150+00 TO STA. 163+00

SCALE: 1"= 50'

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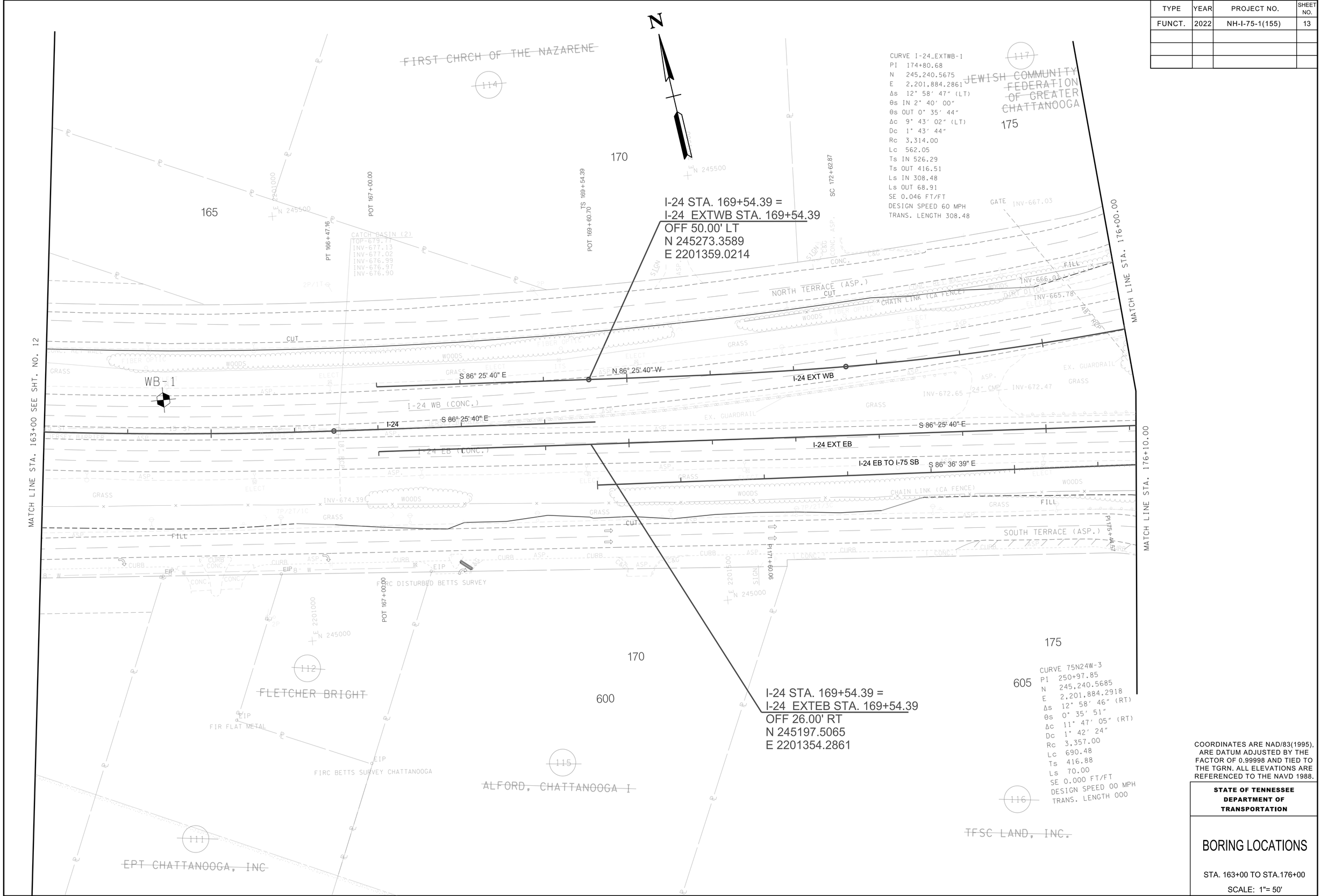
TYPE	YEAR	PROJECT NO.	SHEET NO.
FUNCT.	2022	NH-I-75-1(155)	13



COORDINATES ARE NAD/83(1995), ARE DATUM ADJUSTED BY THE FACTOR OF 0.99998 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988.

STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION

BORING LOCATIONS

STA. 163+00 TO STA.176+00

SCALE: 1"= 50'

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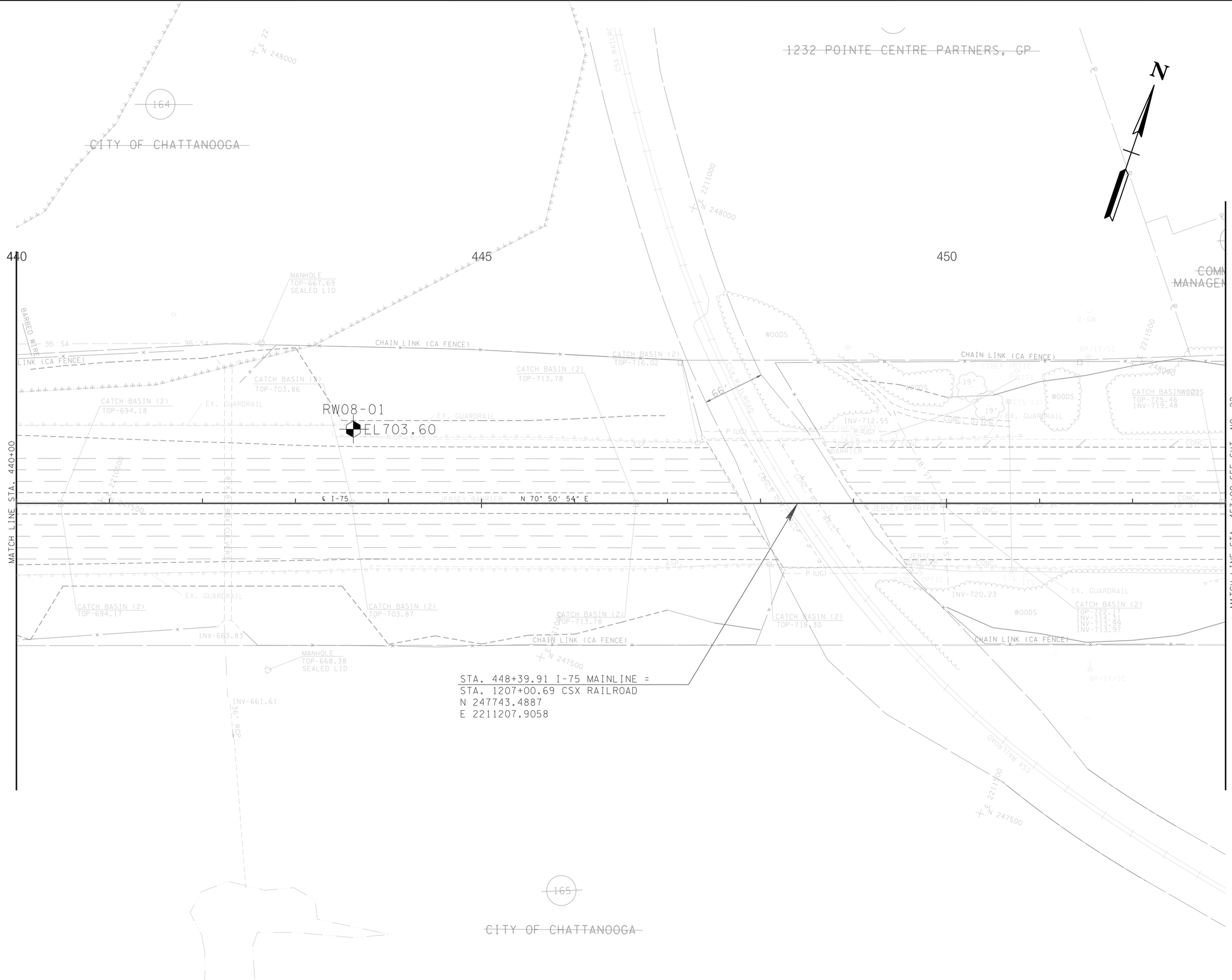
TYPE	YEAR	PROJECT NO.	SHEET NO.
FUNCT.	2022	NH-I-75-1(155)	21



COORDINATES ARE NAD/83(1995), ARE DATUM ADJUSTED BY THE FACTOR OF 0.99998 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

BORING LOCATIONS

STA.440+00 TO STA.453+00

SCALE: 1"= 50'

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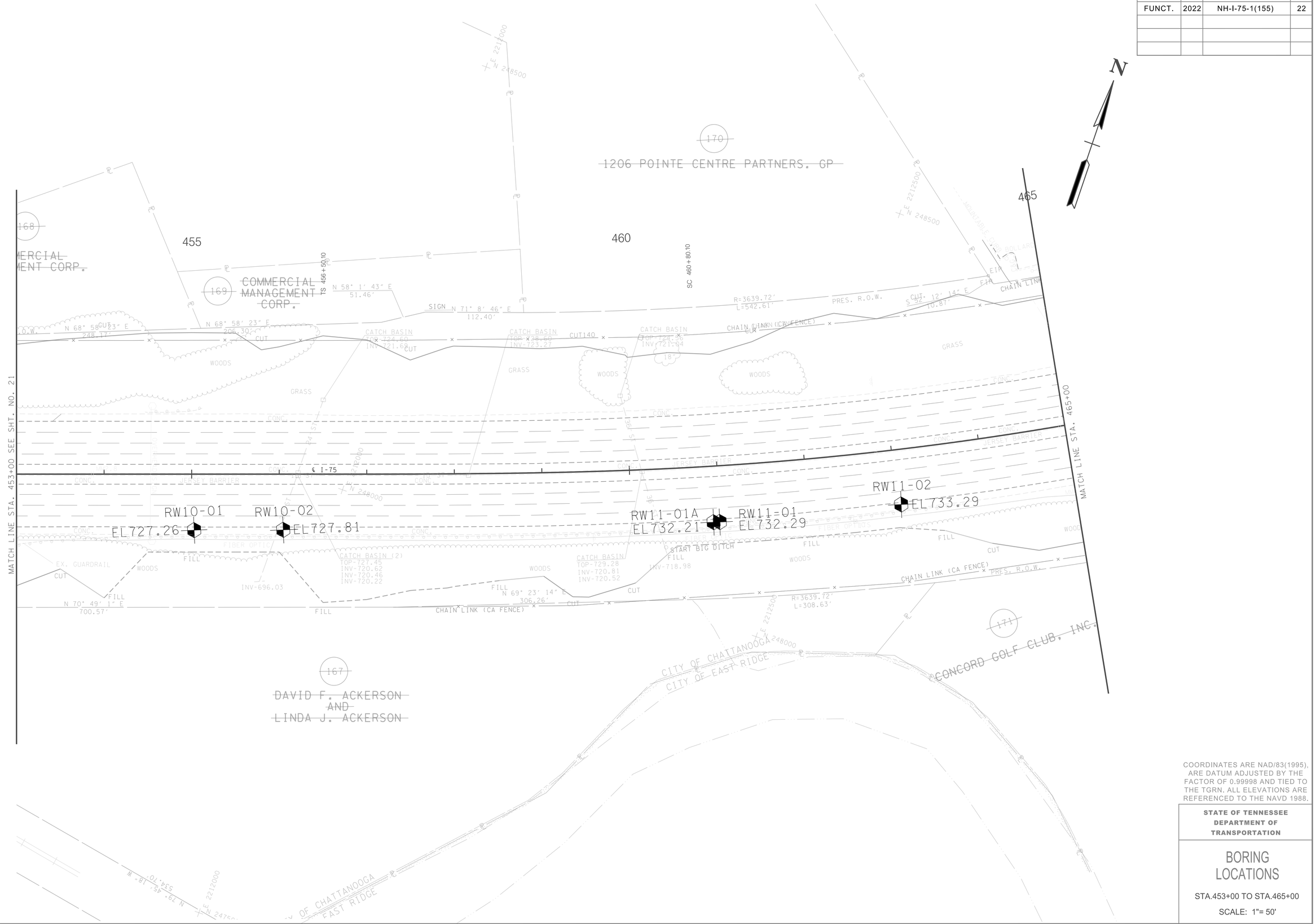
TYPE	YEAR	PROJECT NO.	SHEET NO.
FUNCT.	2022	NH-I-75-1(155)	22



COORDINATES ARE NAD/83(1995), ARE DATUM ADJUSTED BY THE FACTOR OF 0.99998 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988.

STATE OF TENNESSEE DEPARTMENT OF TRANSPORTATION

BORING LOCATIONS

STA.453+00 TO STA.465+00

SCALE: 1"= 50'

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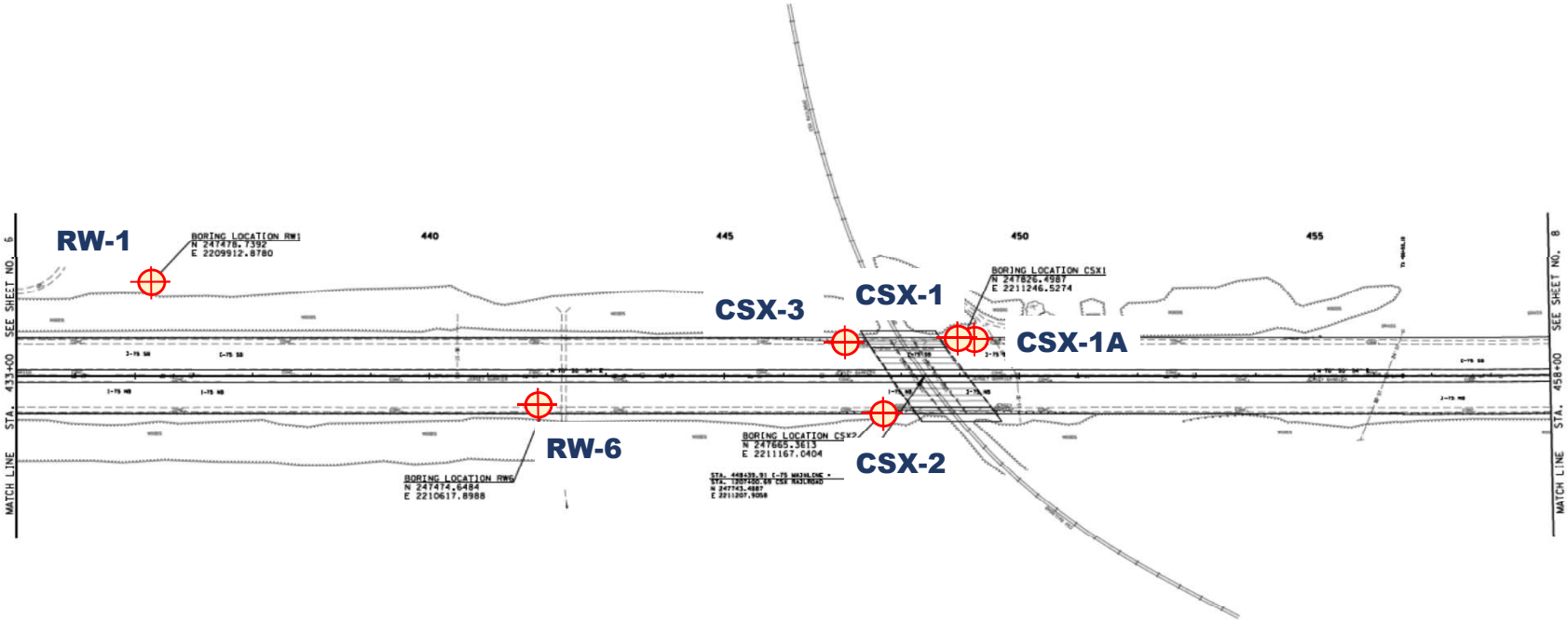
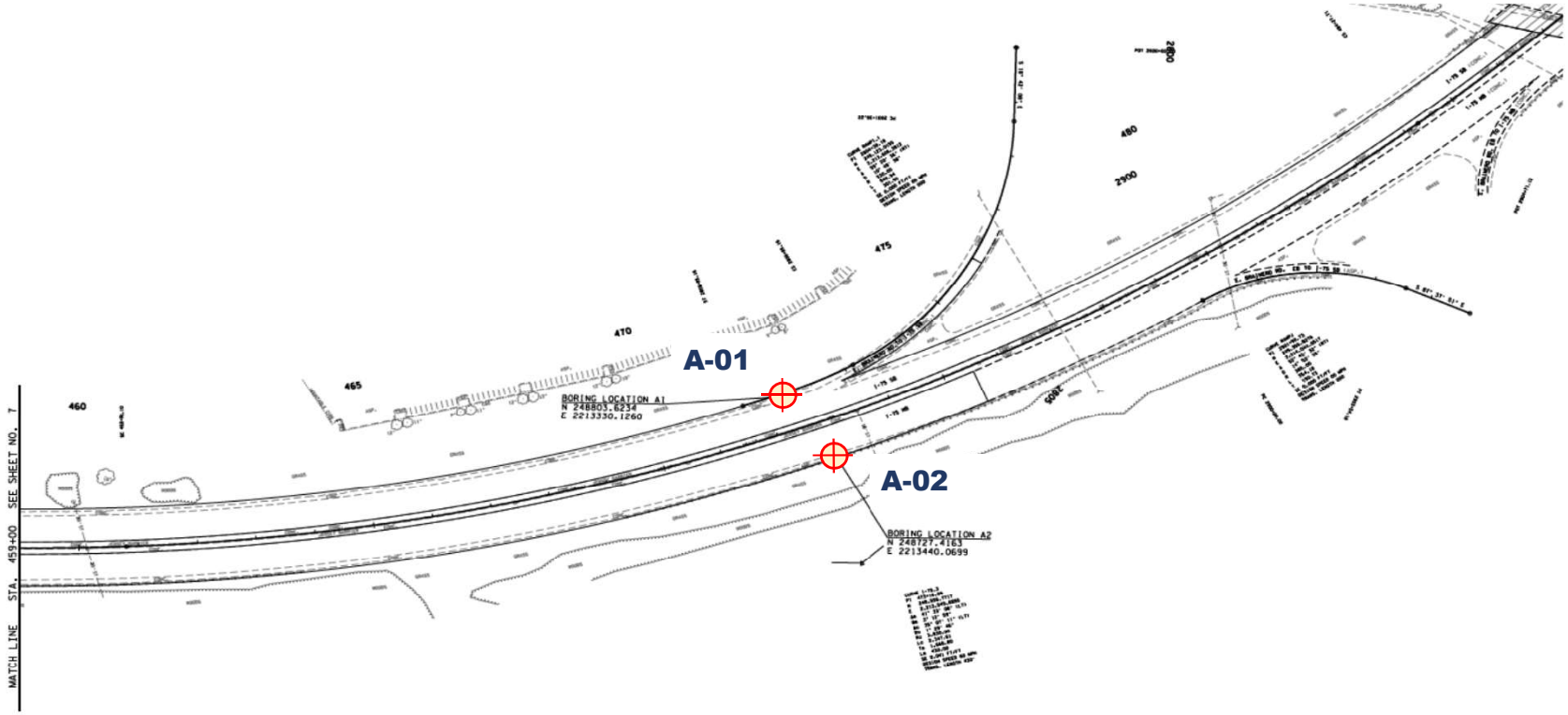
Figure 3

K.S. Ware & Associates

Boring Location Sheets



N NOT TO SCALE	JOB NO.: 300-18-0001 CLIENT: Neel-Schaffer I-75 interchange at I-24 Chattanooga, TN 3/29/2018	**Boring Location Plan** PIN 114174.00 I-75 INTERCHANGE AT I-24 CHATTANOOGA, TENNESSEE DRAWN BY: AZ | REVIEWED BY: DH	**LEGEND** Approximate Boring Location A-03 Boring Label	KSWA K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	Figure 3 G



N

NOT TO SCALE

JOB NO.: 300-18-0001

CLIENT: Neel-Schaffer

I-75 interchange at I-24
Chattanooga, TN

3/29/2018

Boring Location Plan

PIN 114174.00
I-75 INTERCHANGE AT I-24
CHATTANOOGA, TENNESSEE

DRAWN BY: AZ

REVIEWED BY: DH

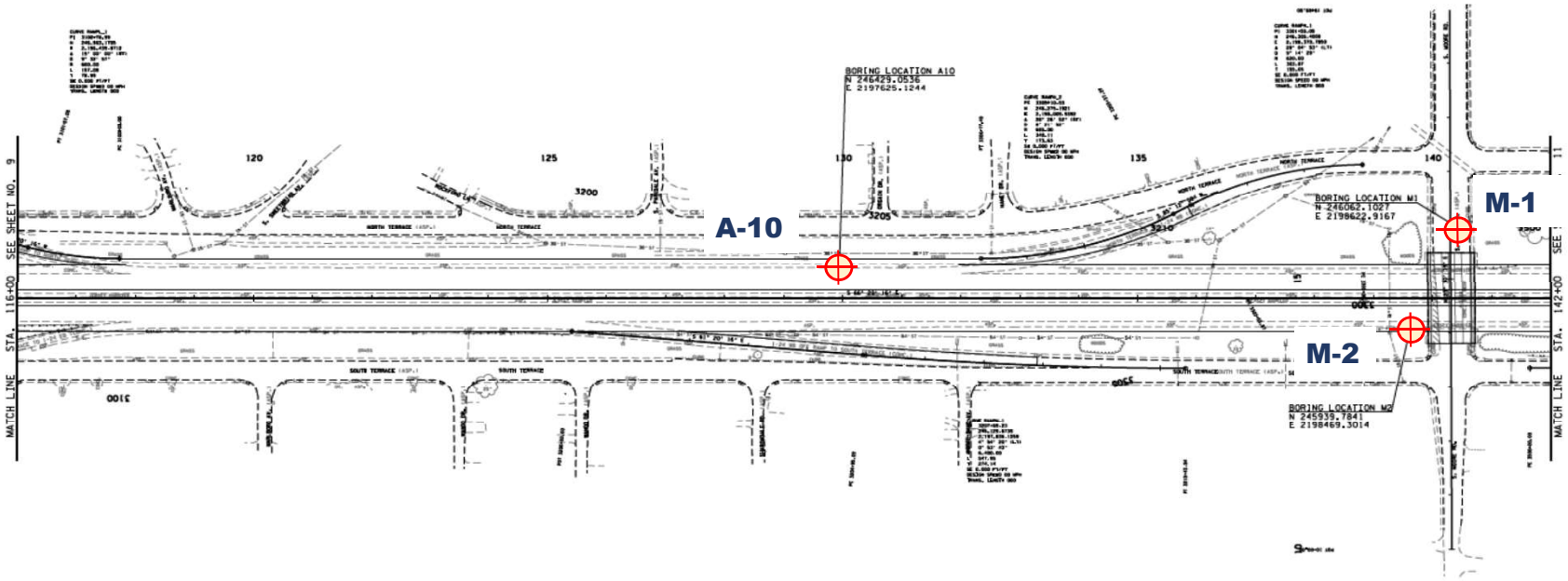
LEGEND

Approximate Boring Location

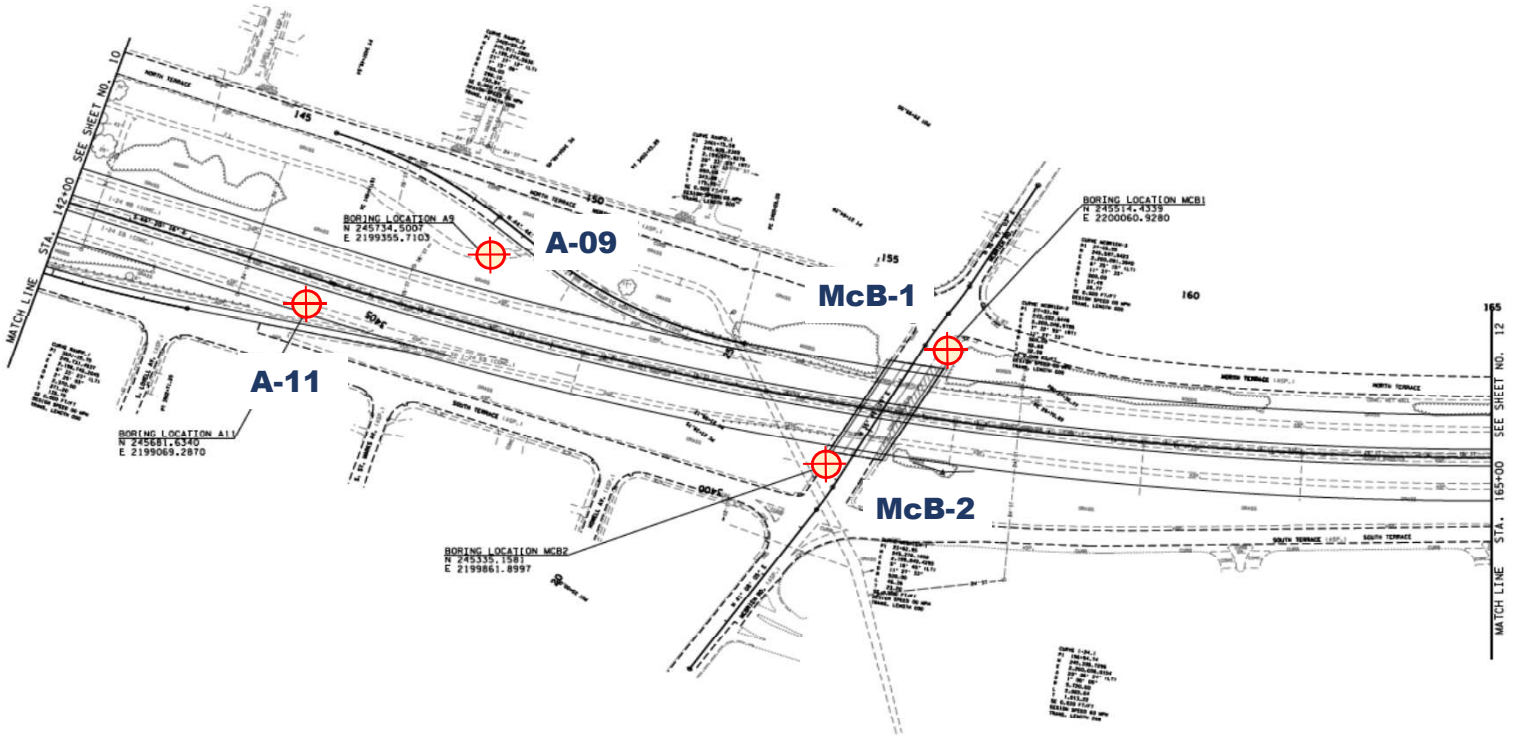
A-03 Boring Label

KSWA
K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

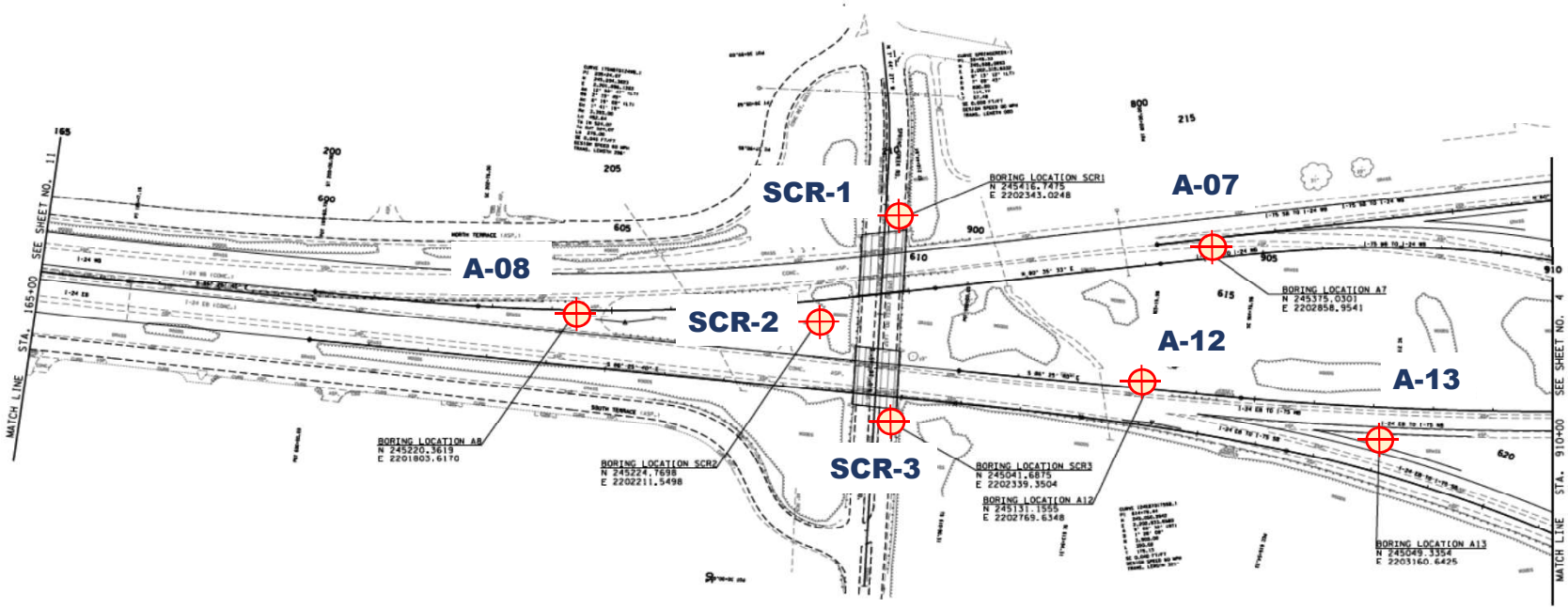
Figure 3 H



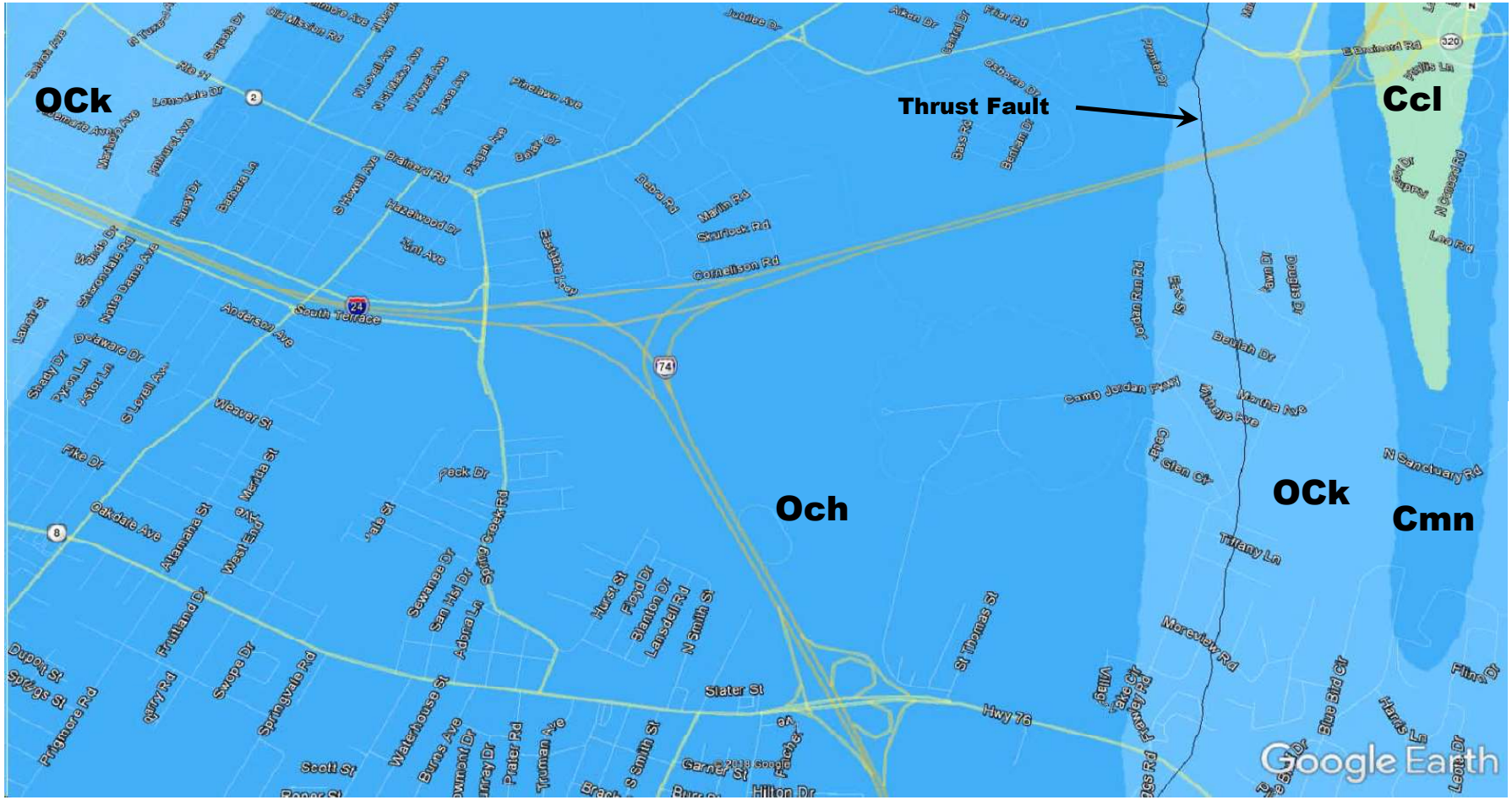
N NOT TO SCALE	JOB NO.: 300-18-0001 CLIENT: Neel-Schaffer I-75 interchange at I-24 Chattanooga, TN 3/29/2018	**Boring Location Plan** PIN 114174.00 I-75 INTERCHANGE AT I-24 CHATTANOOGA, TENNESSEE DRAWN BY: AZ | REVIEWED BY: DH	**LEGEND** Approximate Boring Location A-03 Boring Label	KSWA K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	Figure 3 J



N NOT TO SCALE	JOB NO.: 300-18-0001 CLIENT: Neel-Schaffer I-75 interchange at I-24 Chattanooga, TN 3/29/2018	**Boring Location Plan** PIN 114174.00 I-75 INTERCHANGE AT I-24 CHATTANOOGA, TENNESSEE DRAWN BY: AZ / REVIEWED BY: DH	**LEGEND** Approximate Boring Location A-03 Boring Label	KSWA K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	Figure 3 K



N NOT TO SCALE	JOB NO.: 300-18-0001 CLIENT: Neel-Schaffer I-75 interchange at I-24 Chattanooga, TN 3/29/2018	**Boring Location Plan** PIN 114174.00 I-75 INTERCHANGE AT I-24 CHATTANOOGA, TENNESSEE DRAWN BY: AZ / REVIEWED BY: DH	**LEGEND** Approximate Boring Location A-03 Boring Label	KSWA K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	Figure 3 L



Ccl	Nolichucky Shale, and Maryville, Rogersville, and Rutledge Formations, and Pumpkin Valley Shale	**Och**	Chickamauga Group
Cmn	Maynardville Limestone	**OCk**	Knox Group

Map from Google Earth Pro, Geology from Tennessee Department of Geology Metadata

N	JOB NO.: 300-18-0001	**Area Geology Map**	**LEGEND**	KSWA K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	Figure 4
	CLIENT: Neel-Schafferl				
	I-75 interchange at I-24 Chattanooga, TN	PIN 114174.00 I-75 INTERCHANGE AT I-24 CHATTANOOGA, TENNESSEE			
NOT TO SCALE	3/29/2018	DRAWN BY: AZ	REVIEWED BY: DH		

Figure 5

KSWA Bridge Subsurface Diagrams

KSWA
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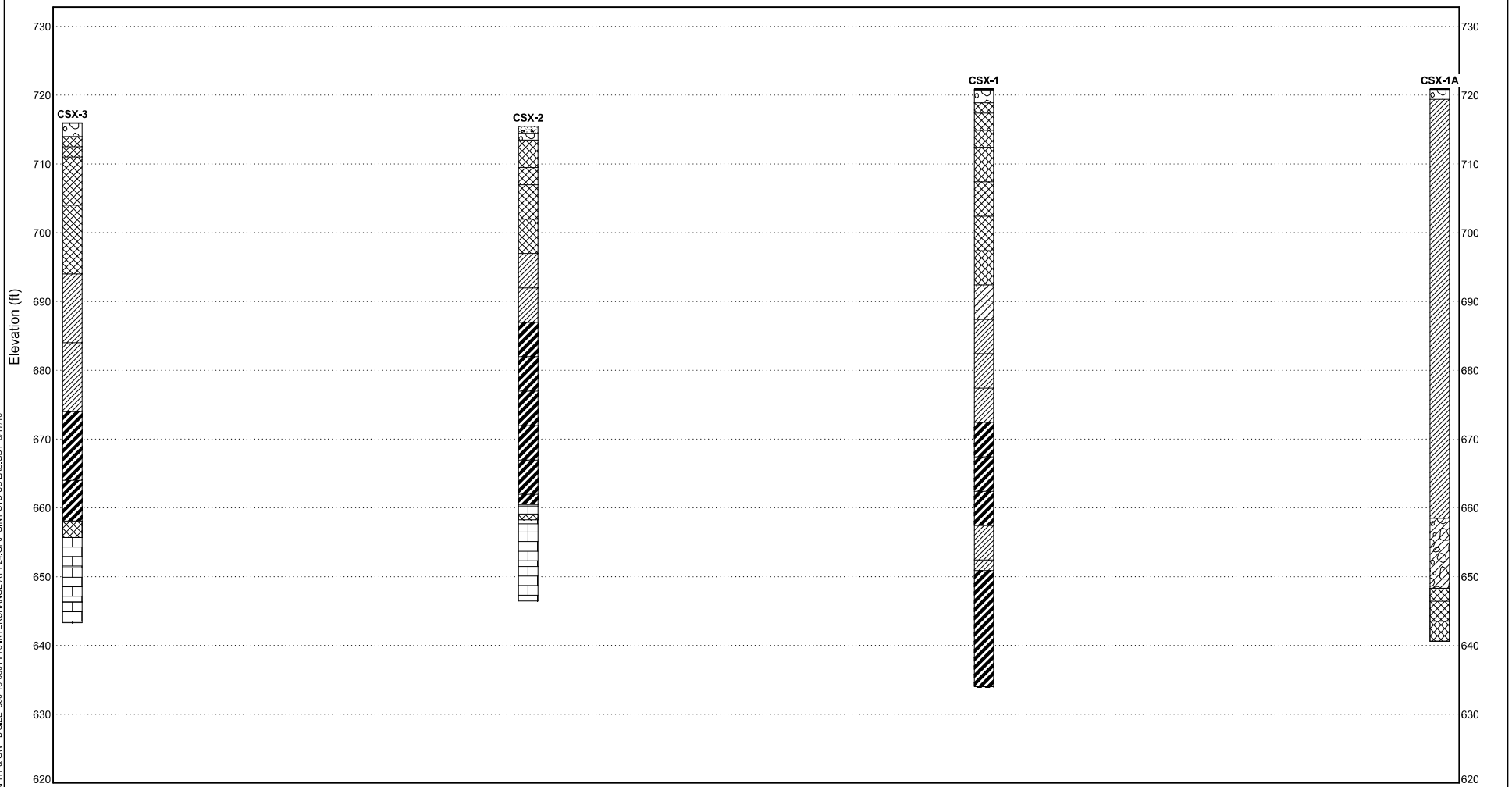
SUBSURFACE DIAGRAM
CSX RAILROAD BRIDGE
FIGURE # 5G

CLIENT Neel-Schaffer
PROJECT NUMBER 300-18-0001
PROJECT NAME TDOT I-75 Interchange
PROJECT LOCATION Chattanooga, Tennessee

- Asphalt
- USCS Clayey Sand
- USCS Clayey Gravel
- USCS Poorly-graded Gravel
- USCS Low Plasticity Clay
- Limestone
- Fill (made ground)
- USCS High Plasticity Clay
- Concrete



STRATIGRAPHY & GW - B SIZE 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ GINT STD US LAB.GDT 5/17/18

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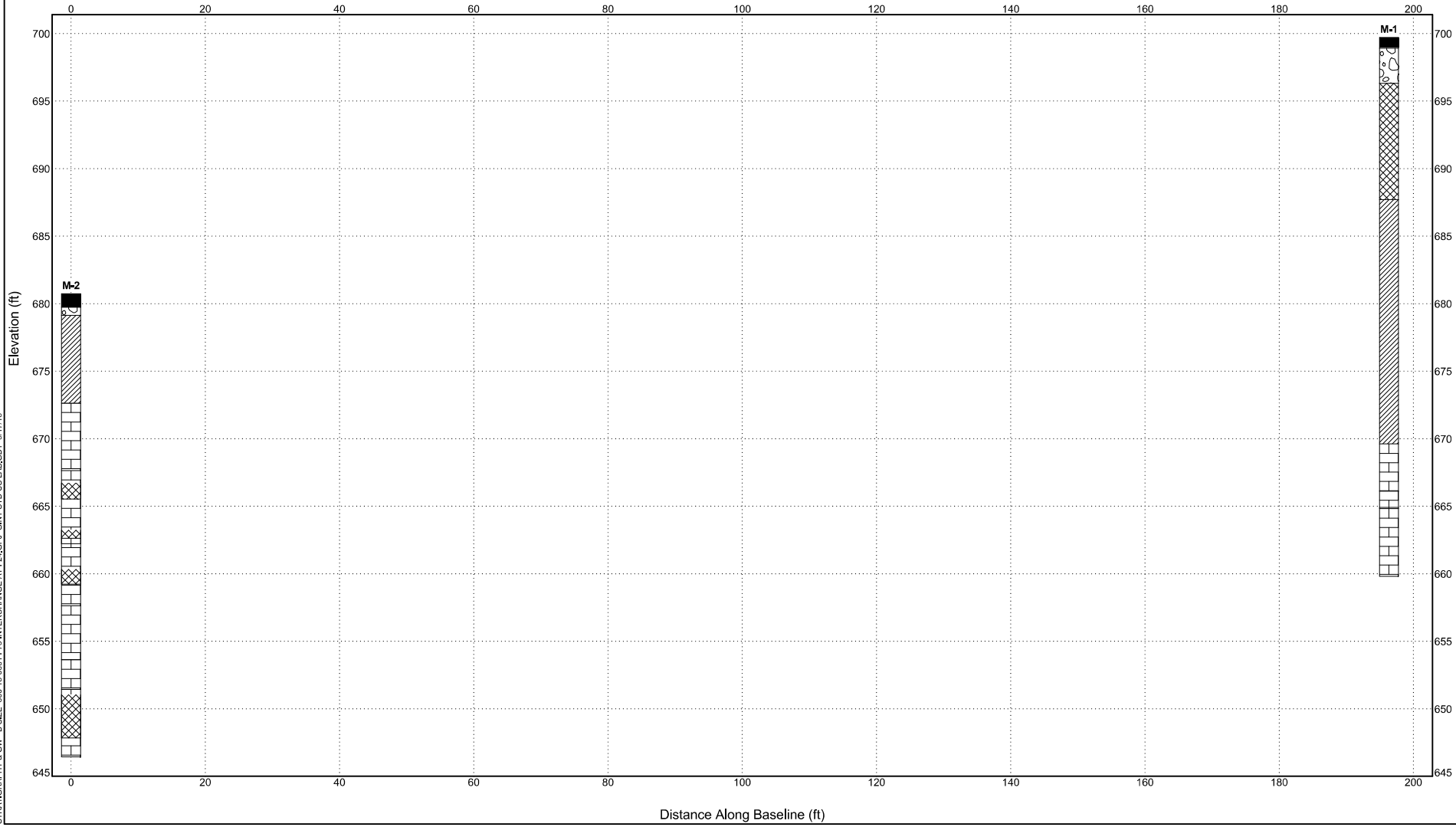
SUBSURFACE DIAGRAM
MOORE ROAD BRIDGE
FIGURE # 5H

Asphalt
USCS Low Plasticity Clay
USCS Poorly-graded Gravel
Limestone
Fill (made ground)

CLIENT Neel-Schaffer
PROJECT NUMBER 300-18-0001
PROJECT NAME TDOT I-75 Interchange
PROJECT LOCATION Chattanooga, Tennessee



STRATIGRAPHY & GW - B SIZE 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ GINT STD US LAB.GDT 5/17/18

KSWA
K. S. Ware & Associates, L.L.C.
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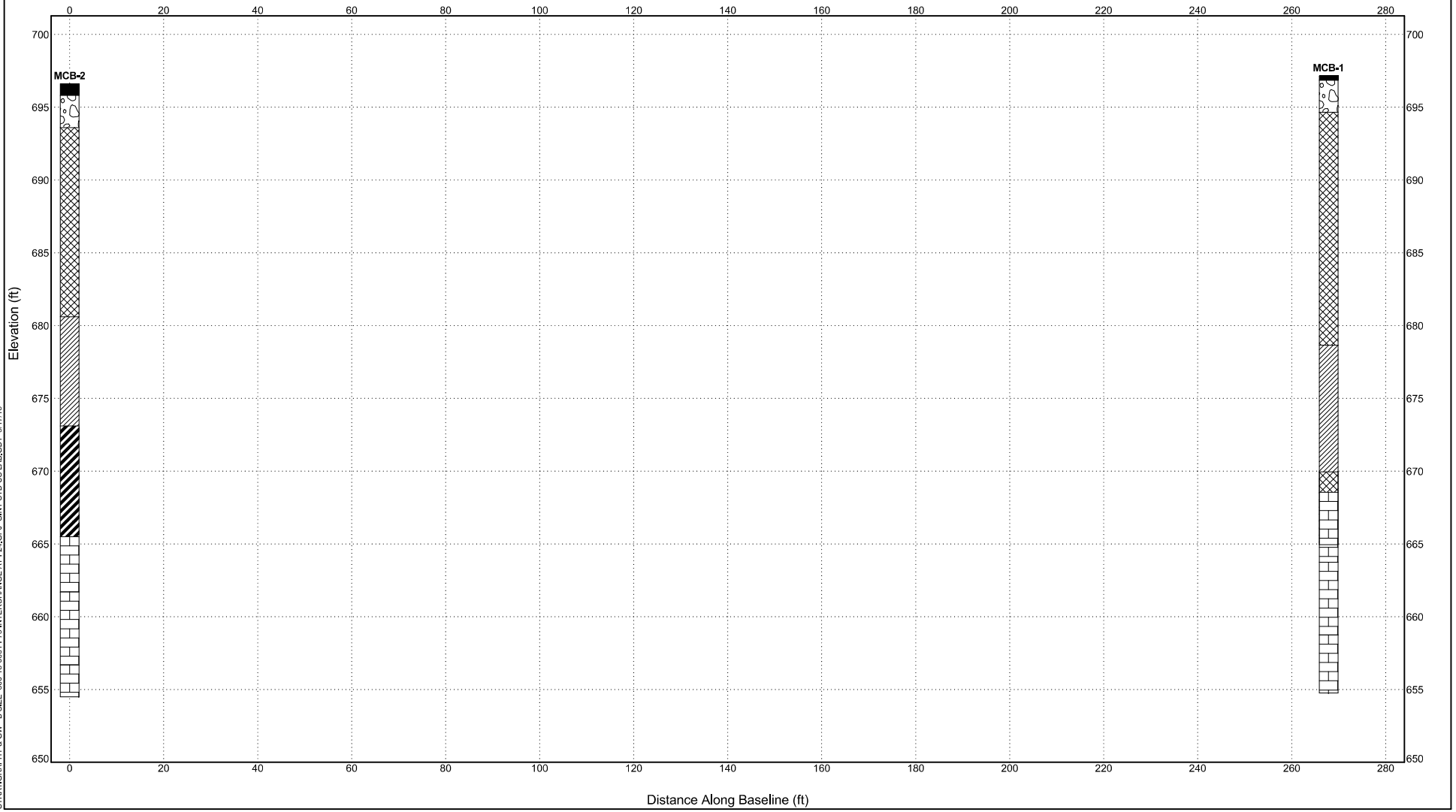
SUBSURFACE DIAGRAM
MCBRIEN ROAD BRIDGE
FIGURE # 5I

Asphalt
USCS Low Plasticity Clay
USCS Poorly-graded Gravel
Limestone
Fill (made ground)
USCS High Plasticity Clay

CLIENT Neel-Schaffer
PROJECT NUMBER 300-18-0001
PROJECT NAME TDOT I-75 Interchange
PROJECT LOCATION Chattanooga, Tennessee



STRATIGRAPHY & GW - B SIZE 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ GINT STD US LAB.GDT 5/17/18

APPENDIX B

KSWA Boring Logs

GeoEngineers Boring Logs

Geotechnics Lab Test Results

GeoEngineers Subgrade Test Results

TEST BORING LOG

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

TEST BORING NO. A-01

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 717.3
Location: N 248803.6234 E 2213330.1260

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (4 inches) 0.3										
		BASESTONE (15.6 inches) A-1 1.6										
		LEAN CLAY (CL), with chert, reddish brown, stiff, (FILL) A-7-5				5-5-6			18.1			
		3.5										
4		LEAN CLAY (CL), with chert, very silty, reddish brown, stiff, (FILL) A-7-5				3-4-5			20.8	41	21	20
		6.0										
		LEAN CLAY (CL), very silty, dark reddish brown, (FILL) A-7-5				3-4-5			22.0			
8		8.5										
		LEAN CLAY (CL), silty, dark reddish brown, (FILL) A-7-5				3-3-4			20.7			
12		13.5										
		FAT CLAY (CH), very silty, dark reddish brown, (FILL) A-7-6				3-3-5			27.0			
		15.0										
		BORING TERMINATED AT 15.0 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **15.0**
Date Started: **4/11/18**
Date Completed: **4/11/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

TEST BORING NO. A-02

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 718.7
Location: N 248727.4136 E 2213440.0699

Depth, feet	MATERIAL DESCRIPTION	Samples	SPT Values	Water Content (%)
	ASPHALT (4 inches) 0.3			
	BASESTONE (19.2 inches) A-1 1.9			
	LEAN CLAY (CL), silty, some chert, reddish brown, stiff, (FILL) A-7-5		3-4-6	18.7
4	4.0			
	LEAN CLAY (CL), silty, occaisional sandy, medium reddish brown, with gravel, (FILL) A-7-5		4-5-6	18.0
	6.0			
	LEAN CLAY (CL), silty, sandy, with lots of sandy chert zones, (FILL) A-7-5		4-5-6	13.8
8	8.5			
	LEAN CLAY (CL), very silty, reddish brown, (FILL) A-7-5		3-2-3	18.4
12	13.5			
	LEAN CLAY (CL), silty, reddish brown, (FILL) A-7-5 15.0		4-6-8	15.3
	BORING TERMINATED AT 15.0 FBGS			
16				
20				
24				
28				

Recovery (%), RQD (%), Pocket Pen (tsf), Percent Fines, Liquid Limit, Plastic Limit, Plasticity Index: no data

Completion Depth (ft.): **15.0**
Date Started: **4/10/18**
Date Completed: **4/10/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. A-08

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 673.9
Location: N 245220.3619 E 2201803.6170

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		POORLY-GRADED SAND (SP) A-3a 1.0										
		POORLY-GRADED SAND (SP), black, dense, dry, (FILL) Possible Foundry Sand A-30a		93		16-22-25			3.7			
		3.5										
4		LEAN CLAY (CL), brown, stiff, moist A-7-5		67		7-4-6			18.2			
		6.0										
		LEAN CLAY (CL), brown, stiff, moist A-7-5		13		7-6-4			15.2			
8		8.5										
		LEAN CLAY (CL) with traces of sand, brown, stiff, moist A-7-5		87		4-5-6			17.9	48	20	28
12		13.5										
		FAT CLAY (CH), brown, stiff, moist A-7-6 14.1 14.7		100		11-15-50/2			13.5			
		Severely weathered Limestone										
		AUGER REFUSAL AT 14.7 FBGS BORING TERMINATED AT 14.7 FBGS										
16												
20												
24												
28												

Completion Depth (ft.): **14.7**
Date Started: **4/12/18**
Date Completed: **4/12/18**
Drilled By: **MW / Mike**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Offset hole 15' from stake along a bearing of N93E. Ground surface at hole is about 2.7' higher than stake. Boring was backfilled with cuttings. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

TEST BORING NO. A-09

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 673.0
Location: N 245727.9300 E 2199356.2500

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		TOPSOIL (12 inches)										
		1.0										
		LEAN CLAY (CL), reddish brown mottled gray, stiff, gravels, black mineral staing A-7-5		67		3-5-8			19.0			
		3.5										
4		LEAN CLAY (CL), brown mottled gray, stiff, rock fragments, black mineral staining A-7-5		89		4-7-6			13.3			
		5.5										
		AUGER REFUSAL AT 5.5 FBGS BORING TERMINATED AT 5.5 FBGS										
8												
12												
16												
20												
24												
28												

Completion Depth (ft.): **5.5**
Date Started: **4/16/18**
Date Completed: **4/16/18**
Drilled By: **Geotech / Patrick**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. A-10

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 684.5
Location: N 246429.0536 E 2197625.1244

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (4.8 inches) 0.4										
		BASESTONE (54 inches) A-1										
4				50		3-10-7						
		4.9										
		FAT CLAY (CH), brown mottled gray, firm, dense, chert fragments A-7-6		100		3-4-4						
8		9.4		93		6-50/5-						
		AUGER REFUSAL AT 9.4 FBGS BORING TERMINATED AT 9.4 FBGS										
12												
16												
20												
24												
28												

Completion Depth (ft.): **9.4**
Date Started: **4/30/18**
Date Completed: **4/30/18**
Drilled By: **TSD / Richardson**
Logged By: **A. Zeb**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. A-11

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.5
Location: N 245681.6340 E 2199069.2870

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (9.8 inches)										
		0.8										
		POORLY GRADED SAND (SP), gray, dry, medium dense, (FILL) A-2		67		22-8-6			4.4			
		3.2										
4		FAT CLAY (CH), Residual soil, brown and gray, moist, firm to very stiff, mottled A-7-5		100		8-3-6			25.3	61	27	34
				100		6-9-15			22.1			
8												
		9.3		100		50/4--						
		AUGER REFUSAL AT 9.3 FBGS BORING TERMINATED AT 9.3 FBGS							24.5			
12												
16												
20												
24												
28												

Completion Depth (ft.): **9.3**
Date Started: **4/15/18**
Date Completed: **4/15/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved 4.9' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. CSX-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 720.9
Location: N 247841.8209 E 2211283.5481

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	ASPHALT (3 inches) 0.2										
	BASESTONE (21.6 inches) A-1 2.0										
	LEAN CLAY (CL), very silty, sandy, gravel, light brown, (FILL) A-2-7 3.5	X			10-8-5			11.3			
4	LEAN CLAY (CL), silty, sandy, reddish brown, (FILL) A-2-7 6.0	X			3-3-4			23.7			
	LEAN CLAY (CL), very silty, brown to reddish brown,(FILL) A-7-5 8.5	X			5-6-7			14.9			
8	LEAN CLAY (CL), silty, reddish brown, (FILL) A-7-5 13.5	X			10-12-13			19.4			
12	LEAN CLAY (CL), silty, yellowish to reddish brown, (FILL) A-7-5 18.5	X			9-10-13			25.7			
16	LEAN CLAY, sandy with chert fragments, silty, light reddish brown, (FILL) A-2-7 23.5	X			4-6-7			14.8			
20	LEAN CLAY (CL), sandy, silty, light reddish brown to light brown, (FILL) A-2-7 28.5	X			14-16-50/4			23.0			
24	SAND (SC), very clayey, light reddish brown to brown A-2-7	X			15-19-14			14.5			
28											

Completion Depth (ft.): **94.3**
Date Started: **4/11/18**
Date Completed: **4/12/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. CSX-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 720.9
Location: N 247841.8209 E 2211283.5481

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32											
	33.5										
	LEAN CLAY (CL), with chert, gravel and sand streaks, medium reddish brown A-2-7				8-8-50/5			23.3			
36											
	38.5										
	LEAN CLAY (CL), with chert, gravel and sand streaks, medium reddish brown A-2-7				5-5-7			29.3			
40											
	43.5										
44	LEAN CLAY (CL), silty, sandy, reddish brown, chert gravel and sand, gray A-2-7				4-6-6			29.7			
	48.5										
48	FAT CLAY (CH), with silt, reddish brown A-7-5				2-3-3			36.9			
	53.5										
52	FAT CLAY (CH), reddish brown, wet A-7-5				2-2-4			36.4			
56											
	58.5										
	FAT CLAY (CH), high palsticity, reddish brown, wet A-7-5				4-4-6			30.7			
60											

Completion Depth (ft.): **94.3**
Date Started: **4/11/18**
Date Completed: **4/12/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. CSX-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 720.9
Location: N 247841.8209 E 2211283.5481

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
63.5											
64	LEAN CLAY (CL) with chert and gravel, sandy and silty A-2-7				13-9-13			29.7			
68											
68.5											
	LEAN CLAY (CL), some gravel, silty, sandy, very soft A-2-7				1-1-1			48.4			
70.0											
	FAT CLAY (CH), wet, very soft with seams of chert (Drilling tods advanced under their own weight to 78.5 ft) A-7-6										
72											
76											
	NO RECOVERY				50/0.2"--			28.6			
80											
	NO RECOVERY				7-8-50/1			18.0			
84											
86.9											
	AUGER REFUSAL AT 86.9 FBGS BEGAN CORING AT 86.9 FBGS NO RECOVERY, CORE BARREL LEADING OFF CORING TERMINATED AT 94.3 FBGS										
88											

Completion Depth (ft.): **94.3**
Date Started: **4/11/18**
Date Completed: **4/12/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Boring was completed with Diedrich D-50, HSA 2-1/4 inch I.D. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. CSX-1A

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 720.9

Location: Offset 20 feet E of CSX-1

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (1 inch) 0.1/ BASESTONE (16.8 inches) A-1 1.5										
		AUGER ONLY LEAN CLAY (CL), some chert, silty, reddish brown A-4a										
4												
8												
12												
16												
20												
24												
28												

Completion Depth (ft.): **80.3**
Date Started: **4/12/18**
Date Completed: **4/13/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. UTM coordinates were taken from GIS.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. CSX-1A

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 720.9
Location: Offset 20 feet E of CSX-1

MATERIAL DESCRIPTION

Depth, feet	Graphic Log	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32											
36											
40											
44											
48											
52											
56											
60											

Completion Depth (ft.): **80.3**
Date Started: **4/12/18**
Date Completed: **4/13/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. UTM coordinates were taken from GIS.**

TEST BORING LOG

TEST BORING NO. CSX-1A

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 720.9
Location: Offset 20 feet E of CSX-1

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		62.4										
		CLAYEY GRAVEL (GC) Casing advanced with tri-cone roller bit through dense chert zone A-2-7										
64												
68												
72		72.6										
		RUN 1 Weathered rock from 72.6' - 74.5'		34	0	--						
		74.5										
		RUN 2 LIMESTONE, brecciated and quartzitic		21	0	--						
76		77.4										
		RUN 3 NO RECOVERY				--						
80		80.3										
		CORING TERMINATED AT 80.3 FBGS CORE BARREL RUPTURED, LOST IN THE HOLE BORING ABONDONED										
84												
88												

Completion Depth (ft.): **80.3**
Date Started: **4/12/18**
Date Completed: **4/13/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. UTM coordinates were taken from GIS.**

TEST BORING LOG

TEST BORING NO. CSX-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 715.5
Location: N 247665.3613 E 2211167.0404

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		CONCRETE (1 foot)										
		1.0										
		BASESTONE (12 inches)										
		A-1 2.0		87		22-17-16			7.6			
		LEAN CLAY (CL), sandy, brown, stiff, moist, (FILL) A-2-7										
4				73		11-5-6			7.4			
		6.0										
		LEAN CLAY (CL), sandy with gravel, brown, hard, moist, (FILL) A-2-7		100		12-22-24			18.8			
8		8.5										
		CLAYEY SAND (SC), gravel, brown, very stiff, moist, (FILL) A-2-7		100		5-11-15			17.9			
12		13.5										
		LEAN CLAY (CL), sandy, brown, very stiff, moist, (FILL) A-2-7		100		7-10-15			27.0			
16		18.5										
		LEAN CLAY (CL), with traces of fine sand, brown, firm, very moist A-7-5		100		4-3-3						
20		23.5										
24		LEAN CLAY (CL), very stiff, moist, mottled A-7-5		100		8-9-12			27.1			
28		28.5										
		FAT CLAY (CH), stiff, moist, mottled A-7-5		87		6-6-8			29.0			

Completion Depth (ft.): **69.0**
Date Started: **4/9/18**
Date Completed: **4/10/18**
Drilled By: **MW / Mike**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 10.8' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. CSX-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 715.5
Location: N 247665.3613 E 2211167.0404

Depth, feet	Material Description	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
33.5	FAT CLAY (CH), with traces of gravel and chert, brown, very stiff, moist A-7-6		100		7-7-9			36.8			
38.5	FAT CLAY (CH), with traces of gravel and chert, brown, very stiff, moist A-7-6		100		6-10-7			41.8			
43.5	FAT CLAY (CH), with traces of gravel and chert, brown, very stiff, moist A-7-6		60		5-6-9			33.9			
48.5	FAT CLAY (CH), with traces of gravel and chert, brown, very stiff, moist A-7-6				6-11-7			30.7			
53.5	FAT CLAY (CH), with traces of gravel and chert, brown, very stiff, moist A-7-6		100		9-50/5-			15.9			
55.0	AUGER REFUSAL AT 55 FBGS										
55.2	BEGAN CORING AT 55 FBGS RUN 1 Stained core (55.2') Zone of angled fractures from 56.5' - 57.2'		95	95	--						
57.2											
59.0	RUN 2 LIMESTONE, very hard, quartzitic, gray with calcite										

Completion Depth (ft.): **69.0**
Date Started: **4/9/18**
Date Completed: **4/10/18**
Drilled By: **MW / Mike**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 10.8' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. CSX-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 715.5
Location: N 247665.3613 E 2211167.0404

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		healed fractures		100	100	--						
64		64.0 RUN 3 Non-jointed below 64 FBGS		90	90	--						
68		Core loss left in hole 69.0 CORING TERMINATED AT 69.0 FBGS										
72												
76												
80												
84												
88												

Completion Depth (ft.): **69.0**
Date Started: **4/9/18**
Date Completed: **4/10/18**
Drilled By: **MW / Mike**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 10.8' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. CSX-3

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 716.0

Location: 25 paces of W-SW of W corner of CSX bridge

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (1.2 inches) 0.1/										
		BASESTONE (22.8 inches) A-1										
		2.0										
		LEAN CLAY (CL), with traces of gravel / basestone, silty, brown to reddish brown, (FILL) A-7-5 3.5		50		5-3-4			15.9			
4		LEAN CLAY (CL), with traces of basestone, slightly silty, reddish brown, (FILL) A-7-5 5.0		33		2-2-2			16.0			
		LEAN CLAY (CL), silty to very silty, sandy, abundant chert gravels, yellowish to reddish brown, very soft, (FILL) A-2-7		80		1-2-2			21.5			
8				100		2-2-2			22.5			
12		12.0 LEAN CLAY (CL), silty to very silty, sandy to very sandy, yellowish to reddish brown, firm to stiff, (FILL) A-2-7		100		2-3-3			19.9			
16												
				100		5-7-6			22.8			
20		22.0 LEAN CLAY (CL), silty to very silty, sandy, reddish brown, some chert A-2-7										
24				100		6-9-10			16.8			
28				100		9-9-12			26.9			

Completion Depth (ft.): **72.7**
Date Started: **4/18/18**
Date Completed: **4/25/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Elevation and UTM coordinates were taken from GIS.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. CSX-3

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 716.0
Location: 25 paces of W-SW of W corner of CSX bridge

MATERIAL DESCRIPTION

Depth, feet	Graphic Log	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32											
36											
40											
44											
48											
52											
56											
60											

32.0
LEAN CLAY (CL), silty to very silty, reddish to yellowish brown, mottled
A-7-5

Samples	Recovery (%)	RQD (%)	SPT Values	Water Content (%)
	100		7-11-13	25.3
	100		4-6-9	27.8

42.0
FAT CAY (CH), slightly silty, reddish to yellowish brown, with black and white mottling
A-7-6

Samples	Recovery (%)	RQD (%)	SPT Values	Water Content (%)
	100		6-7-9	36.5
	100		9-8-11	28.7

52.0
FAT CLAY (CH), slightly silty, light brown to brown, mottled
A-7-6

Samples	Recovery (%)	RQD (%)	SPT Values	Water Content (%)
	100		5-5-6	28.7

57.9
AUGER REFUSAL AT 57.9 FBGS
BEGAN CORING AT 57.9 FBGS
RUN 1, Run 2
Weatherd Dolomite, stained core, mud seams from 57.9'

Samples	Recovery (%)	RQD (%)	SPT Values
	50	0	--

Completion Depth (ft.): **72.7**
Date Started: **4/18/18**
Date Completed: **4/25/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Elevation and UTM coordinates were taken from GIS.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. CSX-3

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 716.0

Location: 25 paces of W-SW of W corner of CSX bridge

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		- 60.3' 60.3										
		RUN 3 60.3 BRECCIA, Dolomite, stained with high angle fractures		100	100	--						
64		64.7										
		RUN 4 BRECCIA, Dolomite, silicious, quartzitic with calcite healed fractures		100	100	--						
68		69.7										
		Open, stained bedding plane (69.7') 69.7/ RUN 5 BRECCIA, Dolomite		100	100	--						
72		72.7										
		CORING TERMINATED AT 72.7 FBGS										
76												
80												
84												
88												

Completion Depth (ft.): **72.7**
Date Started: **4/18/18**
Date Completed: **4/25/18**
Drilled By: **TSD / Richardson**
Logged By: **W.S. Anderson**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was backfilled with cuttings. Elevation and UTM coordinates were taken from GIS.**

TEST BORING LOG

TEST BORING NO. M-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 699.7
Location: N 246062.1027 E 2198622.9167

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	ASPHALT (9.6 inches)										
	0.8 BASESTONE (31.2 inches) A-1										
	3.4 LEAN CLAY (CL), brown, dry, moist and firm, (FILL) A-7-5										
4			72		2-3-6			20.4			
			72		3-3-3				50	23	27
8			100		3-4-6			22.3			
12	12.0 LEAN CLAY (CL), Residual Soil, brown, stiff to very stiff A-7-5		100		6-7-9			28.1			
16											
			100		3-5-7			16.8			
20											
24			94		7-10-11						
28			100		7-8-50/4						

Completion Depth (ft.): **39.9**
Date Started: **4/20/18**
Date Completed: **4/20/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 9.6' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. M-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 699.7
Location: N 246062.1027 E 2198622.9167

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32	AUGER REFUSAL AT 30.1 FBGS 30.1 BEGAN CORING AT 30.1 FBGS RUN 1 LIMESTONE, argillaceous, pink and dark red to gray and brown, hard (Holstan Formation)		100	88	--						
	33.6 Open bedding plane (33.6')										
	34.8 High angle vertical fracture (34.8') 34.9 RUN 2										
36			100	92	--						
40	39.9 CORING TERMINATED AT 39.9 FBGS										
44											
48											
52											
56											
60											

Completion Depth (ft.): **39.9**
Date Started: **4/20/18**
Date Completed: **4/20/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 9.6' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. M-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.7
Location: N 245939.7841 E 2198469.3014

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	ASPHALT (12 inches)										
	1.0										
	BASESTONE (7.2 inches)										
	A-1 1.6		89		9-4-7			16.1			
	LEAN CLAY (CL), with traces of sand, brown and gray, stiff and moist										
	A-7-5		89		3-3-5			24.3	56	24	32
					4-2-4			37.5			
	8.1 AUGER REFUSAL AT 8.1 FBGS										
	BEGAN CORING AT 8.1 FBGS										
	RUN 1										
	LIMESTONE, dark red and gray with seam of green calcareous shale		100	96	--						
	13.1 RUN 2										
	Zone of weatherd, fractured Limestone 14' - 15.2'										
	15.2		100	52	--						
	Zone of high angled fractures 17.5' - 18.5' 18.1										
	RUN 3 18.5										
	Zone of weatherd, fractured Limestone 20.4' - 21.5'		100	56	--						
	21.5										
	23.1 RUN 4		100	100	--						
	27.1 RUN 5		100	100	--						
	29.3 RUN 6										

Completion Depth (ft.): **34.3**
Date Started: **4/12/18**
Date Completed: **4/16/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 7.6' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. M-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 680.7
Location: N 245939.7841 E 2198469.3014

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32		Zone of fractured Limestone 29.7' - 32.9'		48	48	--						
		32.9										
		34.3										
		CORING TERMINATED AT 34.3 FBGS										
36		CASING ADVANCER USED TO SET CASING TO 18.1 FEET DUE LOOSE ROCK COLLAPSING IN HOLE										
40												
44												
48												
52												
56												
60												

Completion Depth (ft.): **34.3**
Date Started: **4/12/18**
Date Completed: **4/16/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 7.6' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. MCB-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange

LOCATION: Chattanooga, Tennessee

PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 697.2
Location: N 245514.4339 E 2200060.9280

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (3.6 inches) 0.3										
		BASESTONE (26.4 inches) A-1										
		2.5										
		LEAN CLAY (CL), gray, moist, firm to stiff, (FILL) A-7-5										
4				67		4-5-6			22.4	56	23	33
				78		4-6-4			23.0			
8				67		2-2-5			31.1			
12				100		2-3-5			28.7			
16												
		18.5										
		LEAN CLAY (CL), gray, moist, very stiff, chert fragments A-7-5		100		2-11-10			15.2			
20												
24				100		6-6-10			25.7			
		27.2										
		AUGER REFUSAL AT 27.2 FBGS BEGAN CORING AT 27.2 FBGS		100	43	--						
28		RUN 1 28.6 LIMESTONE, weathered with mud seams from 27.2' - 32.2'										

Completion Depth (ft.): **42.4**
Date Started: **4/18/18**
Date Completed: **4/19/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring moved to 12' offset NE. Driller reported 2 small rod drops. Elevation was about 0.5' lower than the marked location. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. MCB-1

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 697.2
Location: N 245514.4339 E 2200060.9280

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
32		RUN 2		88	50	--						
		32.2										
		33.4										
		RUN 3 LIMESTONE, gray, hard, argillaceous with shale partings										
36				100	100	--						
		38.4										
		RUN 4										
40				100	100	--						
		42.4										
		CORING TERMINATED AT 42.4 FBGS										
44												
48												
52												
56												
60												

Completion Depth (ft.): **42.4**
Date Started: **4/18/18**
Date Completed: **4/19/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring moved to 12' offset NE. Driller reported 2 small rod drops. Elevation was about 0.5' lower than the marked location. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

TEST BORING LOG

TEST BORING NO. MCB-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 696.6
Location: N 245335.1581 E 2199861.8997

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		ASPHALT (9.6 inches)										
		0.8										
		BASESTONE (26.4 inches) A-1		56		13-12-10			3.6			
		3.0										
4		LEAN CLAY (CL), brown and gray, moist and firm, (FILL) A-7-5		0		3-4-4						
				100		2-2-5			29.3			
8												
				40		3-4-8			25.6			
12												
				100		8-5-6			18.8			
16		16.0										
		LEAN CLAY (CL), Residual soil, moist, stiff A-7-5										
20				100		5-6-9			19.8			
		23.5										
24		FAT CLAY (CH), brown to gary with chert fragments up to 1" A-7-6 Becoming wet from 24.3'		100		5-5-9			26.3			
28												

Completion Depth (ft.): **42.1**
Date Started: **4/19/18**
Date Completed: **4/19/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 10' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

TEST BORING LOG

TEST BORING NO. MCB-2

K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

PROJECT NAME: TDOT I-75 Interchange
LOCATION: Chattanooga, Tennessee
PROJECT NO.: 300-18-0001

Approx. Surface El. (feet, MSL): 696.6
Location: N 245335.1581 E 2199861.8997

Depth, feet	MATERIAL DESCRIPTION	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
			100		5-7-11			16.5			
31.1	AUGER RFUSAL AT 31.1 FBGS BEGAN CORING AT 31.1 FBGS										
32	RUN 1 LIMESTONE, gray, hard, argillaceous with occasional shale partings		95	87	--						
34.9	RUN 2										
36			98	84	--						
39.9	RUN 3										
40			100	100	--						
42.1	CORING TERMINATED AT 42.1										
44											
48											
52											
56											
60											

Completion Depth (ft.): **42.1**
Date Started: **4/19/18**
Date Completed: **4/19/18**
Drilled By: **MW / Bill Woods**
Logged By: **Buehler**

Remarks: **Groundwater was NOT encountered during or after drilling activities. Boring was moved to 10' offset. Boring was backfilled with cuttings. Boring was completed with a truck-mounted drillrig. Elevatons were provided by Neel-Schaffer.**

NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18

GeoEngineers
5409 Maryland Way, Suite 150
Brentwood, Tennessee 37027
615.712.2180

May 2, 2022

Neel-Schaffer, Inc.
210 25th Avenue North, Suite 800
Nashville, Tennessee 37203

Attention: Mr. Richard Sullivan, PE, Associate DBIA

Subject: Geotechnical Exploration Data - Revision 1
I-24/I-75 Interchange Improvements Phase II - 30 Percent Report
Chattanooga, Tennessee
File No. 24647-009-00

INTRODUCTION

GeoEngineers, Inc. (GeoEngineers) has completed the geotechnical exploration supporting the development of the 30 Percent Report for the I-24/I-75 Interchange Improvements Phase II project located in Chattanooga, Tennessee for Neel-Schaffer, Inc. (NS). This revised letter summarizes the details of the field exploration and laboratory testing and provides the data obtained. Our services were performed in accordance with our Revised Proposal for Geotechnical Services dated March 29, 2022 and we were authorized by Richard Sullivan of Neel-Schaffer, Inc. by signed acceptance of our proposal on March 31, 2022. We issued our original report on April 28, 2022. Subsequent to our report submittal, NS requested that we provide additional laboratory data. This revised report includes the requested information.

FIELD EXPLORATION

General Field Exploration Information

GeoEngineers' field exploration took place between March 21, 2022 to April 18, 2022. We performed our field exploration both during the day and night. Daytime field services took place during March 21, 2022 to April 4, 2022. Nighttime field services took place on April 7, 10, 12, 13, and 18, 2022. A rubber tire-mounted drill rig with automatic hammer was used for the duration of the soil boring exploration.

Exploration Coordination

GeoEngineers contacted Tennessee "One-Call" to locate utilities prior to performing the field exploration. We obtained work zone permits from the Chattanooga Transportation Department, and the Tennessee Department of Transportation (TDOT). GeoEngineers also coordinated with traffic control subcontractors to provide the appropriate signage, lighting, and police presence during our field operations. GeoEngineers

representative Emily Reed, P.E. made a site visit on March 11, 2022 to meet with TDOT survey personnel and our driller to evaluate drill rig access, and adjust proposed boring locations previously staked in the field by TDOT. TDOT surveyed the as-built boring locations and provided the soil boring survey coordinates and elevations to GeoEngineers on April 11, 2022. This survey information is presented on the soil boring logs in Appendix A.

Soil Borings

A total of thirty-one (31) soil borings were advanced using hollow stem auger drilling methods. Of these borings, two borings (Boring RW1-1A and Boring RW11-1A) were offset from their proposed locations due to shallow refusal. Samples of the subgrade were mostly collected by performing standard penetration tests (SPT) in general accordance with ASTM D1586 using a 2-inch O.D. split spoon sampler. Where SPT tests were performed, blow counts are shown on the boring logs in Appendix A and a disturbed sample was collected for classification and further evaluation.

Soil boring termination depths ranged between 4-¾ and 50 feet below ground surface. Sampling was conducted in general accordance with applicable ASTM standards.

Immediately upon retrieval from the subsurface, each sample was examined by our field representative and visually classified. Disturbed SPT samples were sealed in plastic bags, labeled, and transported to the laboratory for testing. Laboratory results for those samples selected for testing are provided on the borings logs in Appendix A and in Appendix B.

The soil borings were backfilled with auger cuttings and asphalt cold patch upon completion.

Roadway Pavement Coring

A total of six (6) roadway pavement corings were completed in Interstate 24 in both eastbound and westbound directions. The existing concrete pavement was cored using a 6-inch diameter core barrel to expose the underlying aggregate base course. The base course was excavated using hand tools to expose the underlying soil. Dynamic Cone Penetrometer (DCP) testing was performed on the soil to estimate California Bearing Ratio (CBR) values. Individual DCP readings and CBR estimates are provided in Appendix C. Summaries of the coring data obtained are provided in Tables 1 and 2 below.

TABLE 1. I-24 EASTBOUND ROADWAY PAVEMENT CORING DATA SUMMARY

Coring ID	EB-1	EB-2	EB-3
Latitude[1]	35°0'23.39"N	35°0'19.55"N	35°0'16.98"N
Longitude[1]	85°13'54.78"W	85°13'43.65"W	85°13'31.84"W
Travel Lane	Right	Middle	Left
Concrete Pavement Thickness (in)	12	12	12
Aggregate Base Course Thickness (in)	7	7	6
Average CBR Estimate[2]	31	24	31

[1]Coordinate data is approximate and was obtained using a handheld GPS device.
[2]Average of CBR estimates calculated for each boring. For individual CBR calculations, please see Appendix C.

TABLE 2. I-24 WESTBOUND ROADWAY PAVEMENT CORING DATA SUMMARY

Coring ID	WB-1	WB-2	WB-3
Latitude[1]	35°0'16.79"N	35°0'18.46"N	35°0'21.69"N
Longitude[1]	85°13'25.82"W	85°13'37.74"W	85°13'48.83"W
Travel Lane	Right	Middle	Left
Concrete Pavement Thickness (in)	12	12	12
Aggregate Base Course Thickness (in)	8	7	4 ½
Average CBR Estimate[2]	45	37	13

[1]Coordinate data is approximate and was obtained using a handheld GPS device.
[2]Average of CBR estimates calculated for each boring. For individual CBR calculations, please see Appendix C.

LIMITATIONS

We have prepared this report exclusively for use by Neel-Schaffer for the I-24/I-75 Interchange Improvements Phase II project in Chattanooga, Tennessee.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

An electronic form or hard copy of this document (e-mail, text, table, and/or figure), if provided, and any attachments are only a copy of a master document. The master hard copy is stored by GeoEngineers. and will serve as the official document of record.

Please refer to Appendix D entitled *Report Limitations and Guidelines for Use* for additional information pertaining to use of this report.

CLOSING

We appreciate the opportunity to be of service to Neel-Schaffer. If you have any questions about this letter, please email or call.

Sincerely,
GeoEngineers, Inc.

Emily C. Reed, PE
Geotechnical Engineer

Blake E. Cotton, PE
Senior Principal

BLAKE ERIC COTTON
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
No. 105458
STATE OF TENNESSEE
5/2/2022

Attachments:
Appendix A. Logs of Soil Borings
Appendix B. Laboratory Test Results
Appendix C. CBR Estimates Based on DCP
Appendix D. Report Limitations and Guidelines for Use

APPENDICES

GeoEngineers

APPENDIX A
Logs of Soil Borings

SOIL CLASSIFICATION CHART

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

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel / Dames & Moore (D&M)

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point lead test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
UU	Unconsolidated undrained triaxial compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

Key to Exploration Logs

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Figure A-1

Drilled Start 3/24/2022 End 3/24/2022	Total Depth (ft) 12	Logged By HH Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 753.26 Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2195175.21 Northing (Y) 247578.3938		System Datum Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-24 STA 102+88.65, Offset -129.6885 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0						AC	Asphalt concrete pavement (5 inches)						
							GW	Gravel base (9 inches)						
		7	15		1		CL	Reddish brown lean clay with chert (stiff, moist) (residuum)						
750		12	12		2 MC				21.5					
	5													
745		18	12		3 MC				29					
	10													

Boring terminated at approximately 12 feet below ground surface due to auger refusal

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW1-1

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-2
Sheet 1 of 1

Drilled Start 3/24/2022 End 3/24/2022	Total Depth (ft) 11.75	Logged By HH Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 752.91 Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2195164.054 Northing (Y) 247583.8355		System Datum Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-24 STA 102+76.25, Offset -130.1964 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0					AC	Asphalt concrete pavement (5 inches)						
						GW	Gravel base (7 inches)						Offset from boring RW1-1 about 15 feet west due to shallow refusal
750							Augering only, no SPT sampling						
	5												
745													
	10												

Boring terminated at approximately 11¾ feet below ground surface due to auger refusal

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW1-1A

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-3
Sheet 1 of 1

Drilled Start 3/24/2022 End 3/24/2022	Total Depth (ft) 44.75	Logged By HH Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 757.35 Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2195323.567 Northing (Y) 247511.3646		System Datum Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-24 STA 104+51.44, Offset -127.8224 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0						AC	Asphalt concrete pavement (7½ inches)						
							GW	Gravel base (5 inches)						
755		12	10		1		SC	Reddish brown clayey sand with chert (firm, moist) (residuum)						
		12	15		2									
	5													
750														
		10	14		3 MC; SA; AL				14.3	35	20	15	21	AASHTO (GI) A-2-6 (0)
	10													
745														
		18	8		4 MC		CL	Tan silty lean clay with trace of chert (stiff, moist)	37.4					
	15													
740														
		18	11		5		CL	Tan lean clay with some chert (stiff, moist)						
	20													
735														
		16	18		6		CL	Reddish brown lean clay with chert (very stiff, moist)						
	25													
730														
		14	33		7 MC		CH	Reddish brown to gray fat clay with trace of chert (hard, moist)	17.1					
	30													

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW1-2

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-4
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	30					CH	Reddish brown to gray fat clay with trace of chert (hard, moist)						
725		18	12	8		CH	Reddish brown fat clay with trace of chert (stiff, moist)						
	35												
720		9	13	9 MC		CH	Reddish dark gray fat clay with chert (stiff, moist)	13.8					
	40												
715													

Boring terminated at approximately 44¾ feet below ground surface due to auger refusal

Log of Boring RW1-2 (continued)

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Drilled Start 3/23/2022 End 3/23/2022	Total Depth (ft) 50	Logged By ECR Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 757.89 Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2195462.605 Northing (Y) 247453.6375		System Datum Geographic NAD83 (feet)		See "Remarks" section for groundwater observed	

Notes: I-24 STA 106+01.91, Offset -130.7852 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0					AC	Asphalt concrete pavement (7½ inches)						
						GW	Gravel base (8½ inches)						
755		12.5	8	1		CL	Reddish brown to orange lean clay with chert (stiff, moist) (residuum)						
		12	11	2									
	5												
750													
		12.5	13	3 MC				24					
	10												
745													
		15.5	15	4		CL	Reddish brown to orange lean clay with chert (very stiff, moist)						
	15												
740													
		15	11	5 MC		CL	Light brown to orange lean clay with trace of chert (stiff, moist)	19.8					
	20												
735													
		12	11	6									
	25												
730													
		16	12	7 MC		CL	Light brown to orange lean clay with sand and trace of chert (stiff, wet)	24					
	30												

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW1-3

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-5
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	30					CL	Light brown to orange lean clay with sand and trace of chert (stiff, wet)						Groundwater observed at approximately 29½ feet below ground surface during drilling
725		18	13	8 MC		CL	Light brown to orange lean clay with trace of sand (stiff, moist)	22.3					
	35												
720		18	16	9 MC		CL	Light brown to orange lean clay with chert and trace of sand (very stiff, moist)	22.8					
	40												
715		18	15	10									
	45												
710		17	15	11		CL	Light brown to orange lean clay with soft white clay lenses (very stiff, moist)						
	50						Boring terminated at approximately 50 feet below ground surface						

Log of Boring RW1-3 (continued)

Drilled: Start 3/23/2022 End 3/23/2022	Total Depth (ft): 26.5	Logged By: ECR Checked By: RDH	Driller: Tri-State Drilling LLC	Drilling Method: Hollow-stem Auger	
Surface Elevation (ft): 753.71 Vertical Datum: NAVD88		Hammer Data: Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment: CME 550X	
Easting (X): 2195597.576 Northing (Y): 247392.3785		System Datum: Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-24 STA 107+50.12, Offset -128.8874 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0					AC	Asphalt concrete pavement (12 inches)						
		8	8	1		GW	Gravel base (4 inches)						
						CL	Orange to brown lean clay with trace of chert (stiff, moist) (residuum)						
750		12	5	2 MC		CL	Orange to brown lean clay with trace of chert (medium, moist)	38					
	5												
745		18	14	3		CL	Orange to brown lean clay with trace of chert and soft white clay lenses (stiff, moist)						
	10												
740		12	14	4 MC; SA; AL		SC	Orange to brown clayey sand with chert (firm, moist)	22.9	47	27	20	48	AASHTO (GI) A-7-6 (6)
	15												
735		8	12	5									
	20												
730		13	10	6 MC		SC	Orange to brown clayey sand with chert and soft white clay lenses (firm, moist)	27.5					
	25												

Boring terminated at approximately 26½ feet below ground surface due to auger refusal

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW1-4

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-6
Sheet 1 of 1

Drilled: Start 3/22/2022 End 3/22/2022	Total Depth (ft): 50	Logged By: ECR Checked By: RDH	Driller: Tri-State Drilling LLC	Drilling Method: Hollow-stem Auger	
Surface Elevation (ft) / Vertical Datum: 745.21 NAVD88	Hammer Data: Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment: CME 550X			
Easting (X): 2195730.589 Northing (Y): 247332.6427	System Datum: Geographic NAD83 (feet)	See "Remarks" section for groundwater observed			

Notes: I-24 STA 108+95.92, Offset -127.5987 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
745	0						AC	Asphalt concrete pavement (7½ inches)						
							GW	Gravel base (4½ inches)						
		6	15		1		CL	Reddish gray to orange lean clay (very stiff, moist) (residuum)						
740	5	10	10		2 MC		CL	Reddish gray to orange lean clay with trace of chert (stiff, moist)	28.2					
		18	11		3									
735	10													
		5.5	5		4 MC		CL	Reddish gray to orange lean clay with trace of chert (medium, moist)	31					
730	15													
		2	WOH		5 MC		CL	Reddish gray to orange lean clay with trace of chert (very soft, wet)	34.8					Groundwater observed at approximately 18 feet below ground surface during drilling
725	20													
		7.5	21		6		CL	Reddish gray to orange clay with chert (very stiff, wet)						
720	25													
		13	7		7 MC		CL	Reddish gray to orange lean clay with trace of chert (medium, wet)	31.8					
	30													

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW1-5

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
715	30					CL	Reddish gray to orange lean clay with trace of chert (medium, wet)						
		18	9	8		CL	Reddish gray to orange lean clay with trace of chert (stiff, wet)						
710	35												
		9	15	9 MC		CH	Reddish brown fat clay with chert (very stiff, wet)	24.7					
705	40												
		3	41	10		CH	Reddish brown fat clay with chert (hard, moist)						
700	45												
		6	11	11		CH	Reddish brown fat clay and chert (stiff, moist)						
	50						Boring terminated at approximately 50 feet below ground surface						

Date:4/28/22 Path:P:\24\24647009\GINT\24647009.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_NO_GW_NVL

Log of Boring RW1-5 (continued)

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-7
Sheet 2 of 2

Drilled Start 3/22/2022 End 3/22/2022	Total Depth (ft) 50	Logged By ECR Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 705.96 Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2196171.062 Northing (Y) 247094.2129		System Datum Geographic NAD83 (feet)		See "Remarks" section for groundwater observed	

Notes: I-24 STA 113+95.07, Offset -86.1350 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
705	0					TS	Topsoil (4 inches)						
		18	9	1		CL	Dark brown lean clay (stiff, moist) (fill)						
						CL	Grayish brown lean clay with trace chert (stiff, moist) (fill)						
		18	10	2		CL	Light gray and orange lean clay (stiff, moist) (residuum)						
700	5												
		18	12	3 MC				18.4					
	10												
695		18	13	4		CL	Light gray and reddish orange lean clay (stiff, moist)						
	15												
690		18	8	5 MC; SA; AL		CL	Light gray lean clay with trace of chert (stiff, moist)	21.2	30	19	11	86	AASHTO (GI) A-6 (8)
	20												
685		18	8	6 MC		CL	Gray and orange lean clay with chert (stiff, very moist to wet)	19.4					
	25												
680		16	13	7 MC		CL	Dark brown lean clay with chert (stiff, wet)	24.6					Groundwater observed at approximately 28 feet below ground surface during drilling
	30												

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW1-6

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-8
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
675	30					CL	Dark brown lean clay with chert (stiff, wet)						
		13.5	13	8		CL	Light gray lean clay with trace of chert (stiff, moist)						
670	35												
		12	7	9 / MC		CL	Light gray lean clay with trace of chert (medium, moist)	15.5					
665	40												
		18	6	10 / MC		CL	Light gray lean clay with trace of chert (medium, moist)	19.1					
660	45												
		18	7	11									
	50						Boring terminated at approximately 50 feet below ground surface						

Log of Boring RW1-6 (continued)

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-8
Sheet 2 of 2

Drilled	Start 4/4/2022	End 4/4/2022	Total Depth (ft)	10.25	Logged By / Checked By	HH / RDH	Driller	Tri-State Drilling LLC	Drilling Method	Hollow-stem Auger
Surface Elevation (ft) / Vertical Datum	679.32 / NAVD88		Hammer Data	Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME 550X				
Easting (X) / Northing (Y)	2198469.243 / 246076.3326		System Datum	Geographic NAD83 (feet)	Groundwater not observed at time of exploration					

Notes: I-24 STA 139+08.58, Offset -76.1981 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0					TS	Topsoil (8 inches)						
		8	10	1		CL	Tan lean clay with small roots (stiff, moist) (residuum)						
675		18	13	2 MC; SA; AL		CL	Gray sandy lean clay with chert (stiff, moist)	16.4	44	22	22	51	AASHTO (GI) A-7-6 (8)
	5												
670		0	50	3		CL	Gray sandy lean clay with chert (hard, moist)						
	10												

Boring terminated at approximately 10¼ feet below ground surface due to auger refusal

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW2-1

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-9
Sheet 1 of 1

Drilled Start 3/21/2022 End 3/21/2022	Total Depth (ft) 23.5	Logged By ECR Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 695.27 Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2199976.674 Northing (Y) 245586.4734		System Datum Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-24 STA 155+14.81, Offset -167.9401 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
695	0						AC	Asphalt concrete pavement (1 inch)						
							GW	Gravel base (15 inches)						
		11	7		1		CH	Reddish brown fat clay with chert (medium to stiff, moist) (residuum)						
690	5	9.5	8		2									
		18	13		3 MC				25.2					
685	10													
		15	15		4		CH	Reddish brown fat clay with chert (very stiff, moist)						
680	15													
		18	16		5 MC				25.7					
675	20													
		0	50/1"		6		CH	Reddish brown fat clay with chert (hard, moist)						
								Boring terminated at approximately 23½ feet below ground surface due to sampler refusal						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW3-1

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-10
Sheet 1 of 1

Drilled Start 3/21/2022 End 3/21/2022	Total Depth (ft) 23.5	Logged By ECR Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 694.42 Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2200133.783 Northing (Y) 245517.857		System Datum Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-24 STA 156+88.55, Offset -139.4983 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0						AC	Asphalt concrete pavement (1 inch)						
							GW	Gravel base (13½ inches)						
		11	14		1		CH	Reddish brown fat clay with chert (stiff, moist) (residuum)						
690	5	10	13		2									
685	10	9.5	15		3 MC		CH	Reddish brown fat clay with chert (very stiff, moist)	18.3					
680	15	14	16		4 MC; SA; AL		MH	Grayish brown elastic silt (very stiff to hard, moist)	28.8	64	33	31	94	AASHTO (GI) A-7-5 (36)
675	20	14	18		5 MC				25.6					

Boring terminated at approximately 23½ feet below ground surface due to auger refusal

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW3-2

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-11
Sheet 1 of 1

Drilled Start 3/21/2022 End 3/21/2022	Total Depth (ft) 25	Logged By ECR Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 687.86 Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2200333.288 Northing (Y) 245443.2266		System Datum Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-24 STA 159+03.94, Offset -108.3242 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0					AC	Asphalt concrete pavement (6 inches)						
		10	9	1		GW	Gravel base (14½ inches)						
685						CL	Reddish brown lean clay with chert (stiff, moist) (residuum)						
	5	14	10	2 MC				21.1					
680													
	10	14	10	3									
675													
	15	1	10	4									
670													
	20	15.5	18	5 MC		CL	Light brownish gray lean clay (very stiff to hard, moist)	19.1					
665													
	25	0	50/4"	6									

Boring terminated at approximately 25 feet below ground surface due to auger refusal

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW3-3

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-12
Sheet 1 of 1

Drilled	Start 3/25/2022	End 3/25/2022	Total Depth (ft) 50	Logged By HH / Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger
Surface Elevation (ft) / Vertical Datum	736.36 NAVD88		Hammer Data	Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME 550X
Easting (X) / Northing (Y)	2195280.625 247262.5027		System Datum	Geographic NAD83 (feet)	See "Remarks" section for groundwater observed	

Notes: I-24 STA 105+12.01, Offset 117.3423 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
735	0					AC	Asphalt concrete pavement (4½ inches)						
						GW	Gravel base (8½ inches)						
		14	16	1		CH	Reddish brown fat clay with chert (very stiff, moist) (residuum)						
		17	15	2									
730	5												
		18	14	3		CL	Tan lean clay with chert (stiff to very stiff, moist)						
725	10												
		17	18	4 MC				17.8					
720	15												
		18	10	5		CL	Tan lean clay with trace of chert (stiff, moist to very moist)						
715	20												
		18	11	6 MC		CL	Reddish brown to gray lean clay with trace of chert (stiff, moist)	27.2					
710	25												
		18	18	7		CH	Reddish brown fat clay with trace of chert (very stiff, moist)						
	30												

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW4-1

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-13
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
705	30					CH	Reddish brown fat clay with trace of chert (very stiff, moist)						
		12	14	8 MC		CH	Reddish brown fat clay with trace of chert (stiff, moist to very moist)	34.2					
700	35												Groundwater observed at approximately 37 feet below ground surface during drilling
		18	16	9 MC		CH	Reddish brown to gray fat clay (very stiff, very moist to wet)	36.4					
695	40												
		18	18	10									
690	45												
		16	41	11		CH	Tan fat clay with chert (hard, wet)						
	50						Boring terminated at approximately 50 feet below ground surface						

Log of Boring RW4-1 (continued)

Drilled	Start 3/25/2022	End 3/25/2022	Total Depth (ft) 39.5	Logged By HH / Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger
Surface Elevation (ft) / Vertical Datum	737.98 NAVD88		Hammer Data	Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME 550X
Easting (X) / Northing (Y)	2195539.937 247150.9248		System Datum	Geographic NAD83 (feet)	See "Remarks" section for groundwater observed	

Notes: I-24 STA 107+94.30, Offset 115.3873 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0					AC	Asphalt concrete pavement (1 inch)						
						GW	Gravel base (5 inches)						
		18	11	1		CL	Tan lean clay with chert (stiff, moist) (fill)						
735													
		6	12	2		GP	Gray gravel with sand and clay (firm, moist) (fill)						
	5												
730													
		8	18	3 MC		CH	Tan fat clay with chert (very stiff, moist) (residuum)	21.1					
	10												
725													
		18	17	4		CL	Tan to black lean clay with sand and chert (stiff to very stiff, moist)						
	15												
720													
		16	13	5 MC				24.7					
	20												
715													
		18	14	6 MC; SA; AL				23.7	45	26	19	82	AASHTO (GI) A-7-6 (17)
	25												
710													
		18	14	7 MC		CH	Tan and red fat clay with chert (stiff, moist)	24.4					
	30												

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Date:4/28/22 Path:P:\24\24647009\GINT\24647009900.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_NO_GW_NVL

Log of Boring RW4-2

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-14
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	30					CH	Tan and red fat clay with chert (stiff, moist)						
705													Groundwater observed at approximately 32 feet below ground surface during drilling
		18	10	8 MC		CH	Tan and red fat clay with trace of sand (stiff, very moist to wet)	47.4					
	35												
700													
		9	50/3"*	9		CH	Tan and red fat clay with trace of sand (hard, very moist to wet)						*SPT blow counts: 4, 50/3"
							Boring terminated at approximately 39½ feet below ground surface due to auger refusal						

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Log of Boring RW4-2 (continued)

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-14
Sheet 2 of 2

Drilled	Start 3/28/2022	End 3/28/2022	Total Depth (ft) 28.5	Logged By HH / Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger
Surface Elevation (ft) / Vertical Datum	734.19 NAVD88		Hammer Data	Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME 550X
Easting (X) / Northing (Y)	2195822.485 247027.6928		System Datum	Geographic NAD83 (feet)	Groundwater not observed at time of exploration	

Notes: I-24 STA 111+02.55, Offset 114.7737 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0					AC	Asphalt concrete pavement (1 inch)						
						GW	Gravel base (12 inches)						
		7	8	1		CH	Orange and brown fat clay with trace of chert (stiff, moist) (residuum)						
730		16	14	2		CH	Orange and brown fat clay with chert (stiff to very stiff, moist)						
	5												
725		18	17	3 MC				24.4					
	10												
720		18	14	4		SC	Orange and tan clayey sand with chert (firm, moist to very moist)						
	15												
715		18	13	5 MC; SA; AL				18.4	36	22	14	37.1	AASHTO (GI) A-6 (1)
	20												
710		18	11	6 MC		CH	Orange and tan fat clay with chert (stiff, very moist)	23.6					
	25												
		0	50/0"	7			Boring terminated at approximately 28½ feet below ground surface due to sampler refusal						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW4-3

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-15
Sheet 1 of 1

Drilled	Start 3/28/2022	End 3/28/2022	Total Depth (ft) 45	Logged By HH / Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger
Surface Elevation (ft) / Vertical Datum	719.41 NAVD88		Hammer Data	Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME 550X
Easting (X) / Northing (Y)	2196082.656 246908.1161		System Datum	Geographic NAD83 (feet)	Groundwater not observed at time of exploration	

Notes: I-24 STA 113+88.84, Offset 119.7990 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0					AC	Asphalt concrete pavement (4½ inches)						
						GW	Gravel base (9 inches)						
		10	8	1		CL	Brown and red lean clay with chert (stiff, moist) (fill)						
715		0	11	2									
	5												
710		18	10	3 MC		CL	Reddish brown lean clay with trace of chert (stiff, moist) (residuum)	17.9					
	10												
705		18	14	4		CH	Reddish brown fat clay with chert (stiff, moist)						
	15												
700		18	13	5 MC		CH	Tan fat clay with trace of chert (stiff, moist)	27.3					
	20												
695		12	16	6									
	25												
690		18	14	7									
	30												

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

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Log of Boring RW4-4

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-16
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	30					CH	Tan fat clay with trace of chert (stiff, moist)						
685		18	6	8 MC		CH	Tan fat clay with trace of chert (medium, very moist)	37					
	35												
680		18	21	9 MC		CH	Tan fat clay with limestone fragments (very stiff, very moist)	28.6					
	40												
675		0	50/0"	10									
	45												

Boring terminated at approximately 45 feet below ground surface due to auger refusal

Log of Boring RW4-4 (continued)

Drilled: Start 3/31/2022 End 3/31/2022	Total Depth (ft): 50	Logged By: HH Checked By: RDH	Driller: Tri-State Drilling LLC	Drilling Method: Hollow-stem Auger	
Surface Elevation (ft) / Vertical Datum: 710.82 NAVD88	Hammer Data: Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment: CME 550X			
Easting (X) / Northing (Y): 2196254.28 / 246833.0678	System Datum: Geographic NAD83 (feet)	Groundwater not observed at time of exploration			

Notes: I-24 STA 115+76.12, Offset 119.6505 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
710	0					AC	Asphalt concrete pavement (4 inches)						
						GW	Gravel base (11 inches)						
		14	15	1		CH	Reddish brown fat clay with chert and fine roots (very stiff, moist) (residuum)						
		18	14	2		CH	Reddish brown fat clay with chert (stiff, moist)						
705	5												
		18	19	3 MC		CH	Reddish brown and gray fat clay with trace of chert (very stiff, moist)	22.7					
700	10												
		18	18	4		CH	Tan and gray fat clay (very stiff, moist)						
695	15												
		18	18	5 MC				17.9					
690	20												
		18	11	6 MC		CH	Tan and gray fat clay (stiff, very moist)	29.1					
685	25												
		18	7	7		CH	Tan and gray fat clay (medium to stiff, very moist)						
	30												

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

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Log of Boring RW5-1

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-17
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
680	30					CH	Tan and gray fat clay (medium to stiff, very moist)						
	35	18	8	8 MC				27.8					
675													
	40	18	5	9 MC				34.3					
670													
	45	18	6	10		CL	Tan lean clay (medium, very moist)						
665													
	50	18	7	11									

Boring terminated at approximately 50 feet below ground surface

Log of Boring RW5-1 (continued)

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-17
Sheet 2 of 2

Drilled	Start 3/31/2022	End 3/31/2022	Total Depth (ft) 50	Logged By HH / Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger
Surface Elevation (ft) / Vertical Datum	695.74 NAVD88		Hammer Data	Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME 550X
Easting (X) / Northing (Y)	2196470.067 246792.3681		System Datum	Geographic NAD83 (feet)	See "Remarks" section for groundwater observed	

Notes: I-24 STA 117+90.10, Offset 70.3235 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
695	0					TS	Topsoil (12 inches)						
		10	9	1		CH	Reddish brown fat clay with chert (stiff, very moist) (fill)						
		18	11	2 MC		CH	Reddish brown fat clay with chert and pockets of gray silty clay (stiff, moist) (fill)	26.6					
690	5												
		18	9	3 MC; SA; AL		CL	Reddish brown and gray lean clay with sand and trace of chert (stiff, moist) (residuum)	27.7	49	27	22	82	AASHTO (GI) A-7-6 (19)
685	10												
		18	16	4		CH	Tan fat clay with trace of chert (very stiff, moist)						
680	15												
		18	9	5 MC		CH	Tan fat clay with lenses of gray silty clay (stiff, moist)	33					
675	20												
		18	12	6 MC		CL	Gray silty lean clay (stiff, moist)	30.1					
670	25												
		18	15	7		CL	Tan lean clay with trace of chert and gray silty clay lenses (very stiff, moist)						
	30												

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW5-2

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
665	30					CL	Tan lean clay with trace of chert and gray silty clay lenses (very stiff, moist)						
		18	6	8 MC		CL	Tan lean clay (medium, moist to very moist)	34.3					
660	35												
		18	13	9		CL	Tan lean clay with sand lenses (stiff, moist)						
655	40												
		16	50	10 MC		CH	Tan fat clay (hard, very moist)	39.9					
650	45												Groundwater observed at approximately 47 feet below ground surface during drilling
		6	50	11 MC		CH	Tan fat clay (hard, wet)	58.8					
	50						Boring terminated at approximately 50 feet below ground surface						

Log of Boring RW5-2 (continued)

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Drilled Start 3/29/2022 End 3/29/2022	Total Depth (ft) 10	Logged By HH Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 689.82 Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2197736.804 Northing (Y) 246171.1963		System Datum Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-24 STA 131+99.65, Offset 130.8740 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0						TS	Topsoil (10 inches)						
		12	27		1		GW	Gravel (firm, moist) (fill)						
685		2	7		2		CL	Brown lean clay with trace of chert (medium, moist) (residuum)						
	5													
680		9	50/3"*		3		CL	Brown lean clay with trace of chert and limestone fragments (hard, moist)						*SPT blow counts: 17, 20, 50/3"
	10							Boring terminated at approximately 10 feet below ground surface due to auger refusal						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Date:4/28/22 Path:P:\24\24647009\GINT\24647009900.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_NO_GW_NVL

Log of Boring RW6-1

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-19
Sheet 1 of 1

Drilled	Start 3/29/2022	End 3/29/2022	Total Depth (ft) 5	Logged By HH / Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger
Surface Elevation (ft) / Vertical Datum	688.78 NAVD88		Hammer Data	Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME 550X
Easting (X) / Northing (Y)	2198024.149 246069.7793		System Datum	Geographic NAD83 (feet)	Groundwater not observed at time of exploration	

Notes: I-24 STA 135+03.54, Offset 108.4403 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0						TS	Topsoil (3 inches)						
		15	7	1	MC; SA; AL		CL	Brown and gray sandy gravelly lean clay (fill)	29.2	51	27	24	83	AASHTO (GI) A-7-6 (22)
							CH	Brown fat clay with sand and trace of chert (medium, moist to very moist) (residuum)						
685		2	50/0"*	2			CH	Brown fat clay with limestone fragments (hard, moist)						*SPT blow counts: 5, 7, 50/0"
	5							Boring terminated at approximately 5 feet below ground surface due to auger refusal						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW6-2

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-20
Sheet 1 of 1

Drilled Start 3/29/2022 End 3/29/2022	Total Depth (ft) 19	Logged By HH Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 694.15 Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2198292.844 Northing (Y) 245945.8658		System Datum Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-24 STA 137+99.37, Offset 114.0966 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0						AC	Asphalt concrete pavement (1½ inches)						
							GW	Gravel base (15 inches)						
		12	7		1		CH	Reddish brown fat clay with chert (medium, moist to very moist) (fill)						
690		16	12		2 MC		CH	Reddish brown fat clay with chert (stiff, moist) (residuum)	19.6					
	5													
685		18	13		3									
	10													
680		14	19		4 MC		CL	Brown lean clay with trace of chert (very stiff to hard, moist)	18.8					
	15													
		0	50/0"		5			Boring terminated at approximately 19 feet below ground surface due to sampler and auger refusal						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Date:4/28/22 Path:P:\24\24647009\GINT\24647009900.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEIR_GEOTECH_STANDARD_NO_GW_NVL

Log of Boring RW6-3

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-21
Sheet 1 of 1

Drilled Start 3/29/2022 End 3/29/2022	Total Depth (ft) 24.5	Logged By HH Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 697.92 Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2198431.08 Northing (Y) 245884.9618		System Datum Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-24 STA 139+50.43, Offset 114.3999 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0						AC	Asphalt concrete pavement (4 inches)						
							GW	Gravel base (4 inches)						
695		15	12		1		CH	Reddish brown and gray fat clay with chert (stiff, moist) (fill)						
		18	15		2 MC		CH	Reddish brown fat clay with chert (very stiff, moist) (fill)	27.8					
690	5													
		16	10		3 MC; SA; AL		CL	Reddish brown sandy lean clay with chert (stiff, moist to very moist) (residuum)	23.2	49	27	22	56	AASHTO (GI) A-7-6 (10)
685	10													
		0	8		4									
680	15													
		15	28		5		CH	Grayish brown fat clay with limestone fragments (very stiff to hard, very moist)						
675	20													
		0	50/1"		6									

Boring terminated at approximately 24½ feet below ground surface due to auger refusal

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Date:4/28/22 Path:P:\24\24647009\GINT\24647009900.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_NO_GW_NVL

Log of Boring RW6-4

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-22
Sheet 1 of 1

Drilled Start	3/30/2022	End	3/30/2022	Total Depth (ft)	22	Logged By	HH	Driller	Tri-State Drilling LLC	Drilling Method	Hollow-stem Auger
Surface Elevation (ft) / Vertical Datum	695.43 NAVD88			Hammer Data	Automatic Hammer 140 (lbs) / 30 (in) Drop			Drilling Equipment	CME 550X		
Easting (X) / Northing (Y)	2198659.176 245783.6254			System Datum	Geographic NAD83 (feet)			Groundwater not observed at time of exploration			

Notes: I-24 STA 142+00.02, Offset 115.6719 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
695	0						AC	Asphalt concrete pavement (3 inches)						
							GW	Gravel base (10 inches)						
		8	10		1		CH	Reddish brown fat clay with chert and wood pieces (stiff, moist) (fill)						
		10	11		2		CH	Reddish brown fat clay with chert (stiff, moist) (fill)						
690	5													
		13	15		3 MC		CH	Reddish brown to gray fat clay with chert (very stiff, moist) (fill)	17.4					
685	10													
		10	14		4		CH	Grayish brown fat clay with chert (stiff, moist) (residuum)						
680	15													
		5	10		5 MC		CL	Greenish gray lean clay with limestone fragments (stiff, moist to very moist)	18.9					
675	20													
								Boring terminated at approximately 22 feet below ground surface due to auger refusal						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW6-5

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-23
Sheet 1 of 1

Drilled	Start 3/30/2022	End 3/30/2022	Total Depth (ft)	18.5	Logged By / Checked By	HH / RDH	Driller	Tri-State Drilling LLC	Drilling Method	Hollow-stem Auger
Surface Elevation (ft) / Vertical Datum	687.86 NAVD88		Hammer Data	Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME 550X				
Easting (X) / Northing (Y)	2198827.269 245729.2885		System Datum	Geographic NAD83 (feet)	Groundwater not observed at time of exploration					

Notes: I-24 STA 143+75.79, Offset 97.9774 feet

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0							AC	Asphalt concrete pavement (2 inches)						
								GW	Gravel base (11 inches)						
685			8	9		1		CH	Reddish brown fat clay with chert (stiff, moist to very moist) (fill)						
			2	7		2		CL	Gray silty lean clay (medium, moist) (fill)						
680	5														
			16	12		3 MC		CL	Tan lean clay (stiff, moist) (residuum)	28.3					
675	10														
			0	50/0"		4 MC; SA; AL		GC	Gray clayey limestone gravel with sand (very dense, moist)	8.9	27	17	10	24	AASHTO (GI) A-2-4 (0)
670	15														

Boring terminated at approximately 18½ feet below ground surface due to auger refusal

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW6-6

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-24
Sheet 1 of 1

Drilled	Start 4/1/2022	End 4/1/2022	Total Depth (ft)	31	Logged By / Checked By	HH / RDH	Driller	Tri-State Drilling LLC	Drilling Method	Hollow-stem Auger
Surface Elevation (ft) / Vertical Datum	695.97 NAVD88		Hammer Data	Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME 550X				
Easting (X) / Northing (Y)	2199851.236 245331.6236		System Datum	Geographic NAD83 (feet)	Groundwater not observed at time of exploration					

Notes: I-24 STA 154+60.25, Offset 110.8743 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
695	0						AC	Asphalt concrete pavement (4 inches)						
							GW	Gravel base (10 inches)						
		4	8		1		CH	Reddish brown fat clay with trace of chert (stiff, moist) (fill)						
		12	10		2		CH	Reddish brown fat clay with chert (stiff, moist) (fill)						
690	5													
		10	9		3									
685	10													
		`8	9		4									
	15						CL	Dark gray and tan lean clay with chert (stiff, moist) (fill)						
680														
		18	12		5 MC				16.2					
675	20													
		14	17		6		CH	Tan and gray fat clay with trace of chert (very stiff, moist) (fill)						
670	25													
		18	10		7 MC; SA; AL		CL	Dark gray clay with sand and chert (stiff, moist to very moist) (residuum)	17.6	36	21	15	51.12	AASHTO (GI) A-6-5 (5)
	30													

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Date:4/28/22 Path:P:\24\24647009\GINT\24647009.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_NO_GW_NVL

Log of Boring RW7-1

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-25
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
665	30						CL	Dark gray clay with sand and chert (stiff, moist to very moist) (residuum)						
								Boring terminated at approximately 31 feet below ground surface due to auger refusal						

Log of Boring RW7-1 (continued)

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Drilled	Start 4/1/2022	End 4/1/2022	Total Depth (ft)	34.5	Logged By	HH	Driller	Tri-State Drilling LLC	Drilling Method	Hollow-stem Auger
					Checked By	RDH				

Surface Elevation (ft) Vertical Datum	697.2 NAVD88	Hammer Data	Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME 550X
Easting (X) Northing (Y)	2199921.272 245320.4926	System Datum	Geographic NAD83 (feet)	Groundwater not observed at time of exploration	

Notes: I-24 STA 155+29.47, Offset 103.3581 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0						AC	Asphalt concrete pavement (7 inches)						
							GW	Gravel base (8 inches)						
695		6	8		1		CH	Tan fat clay with chert (stiff, moist) (fill)						
		8	11		2		CH	Reddish tan fat clay with chert (stiff, moist) (fill)						
690	5													
		14	6		3		CH	Reddish tan fat clay with trace of chert (medium, moist) (fill)						
685	10													
		18	12		4		CH	Reddish tan fat clay with trace of chert (stiff, moist) (fill)						
680	15													
		10	7		5 MC		CL	Tan lean clay with chert (medium, very moist) (fill)	17.4					
675	20													
		18	11		6		CL	Dark gray lean clay with trace of chert (stiff, moist) (residuum)						
670	25													
		18	11		7 MC		CL	Gray lean clay with chert (stiff, very moist)	16					
	30													

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Date:4/28/22 Path:P:\24\24647009\GINT\24647009900.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_NO_GW_NVL

Log of Boring RW7-2

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-26
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Platicity Index (PI), %	Fines Content (%)	REMARKS
	30												
665						CL	Gray lean clay with chert (stiff, very moist)						
		2	50/3"	8		CL	Tan lean clay with limestone fragments (hard, moist)						
							Boring terminated at approximately 34½ feet below ground surface due to auger refusal						

Log of Boring RW7-2 (continued)

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-26
Sheet 2 of 2

Drilled Start 4/4/2022 End 4/4/2022	Total Depth (ft) 48	Logged By HH / Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 703.6 / Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2210731.088 / Northing (Y) 247660.3245		System Datum Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-75 STA 443+62.20, Offset -77.8689 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0					GW	Gravel (3½ feet)						
700		4	8	1		CL	Light brown lean clay with gravel and wood pieces (stiff, moist) (fill)						
	5												
695		18	13	2		CH	Reddish brown fat clay with chert (stiff, moist to very moist) (fill)						
	10												
690		10	9	3									
	15												
685		9	23	4		CH	Reddish brown fat clay with chert (very stiff, moist) (fill)						
	20												
680		12	12	5 MC		CL	Gray silty lean clay with trace of chert and roots (stiff, moist) (fill)	14.7					
	25												
675		16	13	6		CH	Reddish brown fat clay with chert (stiff, moist) (fill)						
	30												

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW8-1

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-27
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	30					CL	Reddish brown fat clay with chert (stiff, moist) (fill)						
670		18	12	7 MC				22					
	35												
665		18	9	8 MC; SA; AL		CL	Brown lean clay (stiff, moist to very moist) (residuum)	22.4	32	19	13	90	AASHTO (GI) A-6 (11)
	40												
660		16	14	9 MC				26.1					
	45												

Boring terminated at approximately 48 feet below ground surface due to auger refusal

Log of Boring RW8-1 (continued)

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-27
Sheet 2 of 2

Drilled	Start 4/7/2022	End 4/7/2022	Total Depth (ft) 50	Logged By HH / Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger
Surface Elevation (ft) / Vertical Datum	727.26 NAVD88		Hammer Data	Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME 550X
Easting (X) / Northing (Y)	2211854.689 247901.8534		System Datum	Geographic NAD83 (feet)	Groundwater not observed at time of exploration	

Notes: I-75 STA 455+02.85, Offset 62.5913 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0						AC	Asphalt concrete pavement (1 inch)						
							GW	Gravel base (11 inches)						
725		4	12		1		CH	Reddish brown fat clay with chert (stiff, moist) (fill)						
		5	14		2									
	5													
720														
		8	7		3		CH	Tan fat clay with chert (medium, very moist) (fill)						
	10													
715														
		10	9		4		CH	Tan fat clay with chert (stiff, moist) (fill)						
	15													
710														
		12	5		5		CH	Tan fat clay with chert (medium, very moist) (fill)						
	20													
705														
		18	13		6		CL	Reddish brown lean clay with trace of chert (stiff, moist) (residuum)						
	25													
700														
		18	15		7 MC; SA		SC	Reddish brown clayey sand with chert (firm, moist)	20.2	28	18	10	48.01	AASHTO (GI) A-4 (2)
	30													

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW10-1

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-28
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
695	30					SC	Reddish brown clayey sand with chert (firm, moist)						
	35	18	16	8 MC				19.2					
690													
	40	18	13	9		CH	Reddish brown fat clay with chert (stiff, moist)						
685		18	14	10 MC		CH	Reddish brown fat clay (stiff, moist)	32.8					
	45												
680		18	17	11		CH	Reddish brown fat clay with trace of chert (very stiff, moist)						
	50						Boring terminated at approximately 50 feet below ground surface						

Log of Boring RW10-1 (continued)

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-28
Sheet 2 of 2

Drilled Start 4/8/2022 End 4/8/2022	Total Depth (ft) 50	Logged By HH / Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 727.81 / Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2211950.687 / Northing (Y) 247935.5495		System Datum Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-75 STA 456+04.59, Offset 62.2543 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0						AC	Asphalt concrete pavement (1 inch)						
							GW	Gravel base (8 inches)						
725		10	16		1		CH	Reddish brown fat clay with chert (very stiff, moist) (fill)						
	5	16	11		2		CH	Reddish brown fat clay with chert (stiff, moist) (fill)						
720														
	10	8	9		3 MC		CL	Tan lean clay with chert (stiff, very moist) (fill)	15.5					
715														
	15	14	5		4		CL	Tan lean clay with chert (medium, very moist) (fill)						
710														
	20	18	10		5		CH	Reddish brown fat clay with chert (stiff, moist) (fill)						
705														
	25	8	13		6 MC		CL	Gray silty lean clay with trace of chert (stiff, moist) (residuum)	14.9					
700														
	30	16	50		7		CL	Reddish brown lean clay with chert (hard, moist)						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW10-2

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	30					CL	Reddish brown lean clay with chert (hard, moist)						
695		18	29	8		CL	Reddish brown lean clay with chert (very stiff, moist)						
	35												
690		18	28	9 MC				21.4					
	40												
685		18	15	10									
	45												
680		18	7	11 MC		CL	Reddish brown lean clay with chert (medium, very moist)	28.3					
	50						Boring terminated at approximately 50 feet below ground surface						

Log of Boring RW10-2 (continued)

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-29
Sheet 2 of 2

Drilled	Start 4/10/2022	End 4/10/2022	Total Depth (ft)	7.5	Logged By	HH	Driller	Tri-State Drilling LLC	Drilling Method	Hollow-stem Auger
					Checked By	RDH				

Surface Elevation (ft) Vertical Datum	732.29 NAVD88	Hammer Data	Automatic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	CME 550X
Easting (X) Northing (Y)	2212418.7567 248107.3746	System Datum	Geographic NAD83 (feet)	Groundwater not observed at time of exploration	

Notes: I-75 STA 460+99.45, Offset 62.7959 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
730	0	10	28		1		AC	Asphalt concrete pavement (1 inch)						
							GW	Gravel base (10 inches)						
							CL	Orange to tan lean clay with chert (very stiff, moist) (fill)						
			25		2									
	5													
725								Boring terminated at approximately 7½ feet below ground surface due to auger refusal						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW11-1

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-30
Sheet 1 of 1

Drilled Start 4/10/2022 End 4/10/2022	Total Depth (ft) 17	Logged By HH Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 732.21 Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2212412.219 Northing (Y) 248104.8755		System Datum Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-75 STA 460+92.57, Offset 62.5900 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
730	0					AC	Asphalt concrete pavement (1 inch)						Offset from boring RW11-1 about 10 feet south due to shallow refusal
						GW	Gravel base (10 inches)						
							Augering only, no SPT sampling						
	5												
725													
		16	20	1		CL	Orange to tan lean clay with chert (very stiff, moist) (fill)						
	10												
720													
		18	15	2 MC		CH	Tan fat clay with chert (very stiff, moist) (fill)	15.9					
	15												

Boring terminated at approximately 17 feet below ground surface due to auger refusal

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW11-1A

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-31
Sheet 1 of 1

Drilled Start 4/10/2022 End 4/10/2022	Total Depth (ft) 50	Logged By HH / Checked By RDH	Driller Tri-State Drilling LLC	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 733.29 / Vertical Datum NAVD88		Hammer Data Automatic Hammer 140 (lbs) / 30 (in) Drop		Drilling Equipment CME 550X	
Easting (X) 2212608.141 / Northing (Y) 248193.8873		System Datum Geographic NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: I-75 STA 463+04.36, Offset 61.4832 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	0						AC	Asphalt concrete pavement (2 inches)						
							GW	Gravel base (6 inches)						
		14	29		1		CL	Orange to tan lean clay with chert (very stiff, moist) (fill)						
730														
	5	12	22		2									
725														
		18	16		3									
	10													
720														
		7	17		4									
	15													
715														
		18	20		5 MC; SA; AL		SC	Orange to brown clayey sand with chert (firm, moist) (residuum)	17.1	42	24	18	42	AASHTO (GI) A-7-6 (4)
	20													
710														
		10	50		6		SC	Orange to brown clayey sand with chert (dense, moist)						
	25													
705														
		18	28		7		SC	Orange to brown clayey sand with chert (firm, moist)						
	30													

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Coordinates and elevations provided by TDOT Region 2 Survey Office.

Log of Boring RW11-2

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-32

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content (%)	Liquid Limit (LL), %	Plastic Limit (PL), %	Plasticity Index (PI), %	Fines Content (%)	REMARKS
	30					SC	Orange to brown clayey sand with chert (firm, moist)						
700		18	22	8									
	35												
695		18	22	9									
	40												
690		18	24	10 / MC		CH	Orange to brown fat clay with chert (very stiff to hard, moist)	21.3					
	45												
685		18	30	11									
	50						Boring terminated at approximately 50 feet below ground surface						

Date:4/28/22 Path:P:\24\24647009\GINT\24647009.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_GEOTECH_STANDARD_NO_GW_NVL

Log of Boring RW11-2 (continued)

GeoEngineers

Project: I-24/I-75 Interchange Improvements Phase II
Project Location: Chattanooga, Tennessee
Project Number: 24647-009-00

Figure A-32
Sheet 2 of 2

APPENDIX B
Laboratory Test Results

April 15, 2022

Project No. N2022-051-001

Emily Reed
GeoEngineers, Inc.
5409 Maryland Way, Suite 150
Brentwood, TN 37027

Transmittal
Laboratory Test Results
24647-009-00, I-24/I-75 Interchange

Please find attached the laboratory test results for the above referenced project. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position regarding the nature of the test results, i.e., pass/fail and no claims as to the suitability of the material for its intended use. The client should evaluate the data and interpret design parameters based on their knowledge of the Project.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectfully submitted,
Geotechnics, Inc.

Wm. Daniel Smith

Wm. Daniel Smith, P.E.
Regional Manager

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

MOISTURE CONTENT

ASTM D 2216-19

Client: GeoEngineers, Inc.
Client Reference: 24647-009-00 I-24/I-75 Interchange
Project No.: N-2022-051-001

Lab ID:	001	002	003	004	005
Boring No.:	RW1-1	RW1-1	RW1-2	RW1-2	RW1-2
Depth (ft):	3.5-5	8.5-10	8.5-10	13.5-15	28.5-30
Sample No.:	2	3	3	4	7
Tare Number	1	2	27	3	4
Wt. of Tare & Wet Sample (g)	223.03	220.77	581.14	211.13	213.18
Wt. of Tare & Dry Sample (g)	185.09	173.05	533.93	155.89	183.31
Weight of Tare (g)	8.36	8.31	202.79	8.34	8.35
Weight of Water (g)	37.94	47.72	47.21	55.24	29.87
Weight of Dry Sample (g)	176.73	164.74	331.14	147.55	174.96
Water Content (%)	**21.5**	**29.0**	**14.3**	**37.4**	**17.1**

Lab ID	006	007	008	009	010
Boring No.	RW1-2	RW1-3	RW1-3	RW1-3	RW1-3
Depth (ft)	38.5-40	8.5-10	18.5-20	29.5-30	33.5-35
Sample No.	9	3	5	7	8
Tare Number	5	6	7	8	9
Wt. of Tare & Wet Sample (g)	219.11	223.77	224.31	216.85	214.68
Wt. of Tare & Dry Sample (g)	193.57	182.09	188.61	176.47	177.05
Weight of Tare (g)	8.20	8.12	8.10	8.26	8.26
Weight of Water (g)	25.54	41.68	35.70	40.38	37.63
Weight of Dry Sample (g)	185.37	173.97	180.51	168.21	168.79
Water Content (%)	**13.8**	**24.0**	**19.8**	**24.0**	**22.3**

Notes :

Tested By PM *Date* 4/13/22 *Checked By* WDS *Date* 4/15/22

13 Industrial Park Drive, Suite 500 • Hendersonville, TN 37075 • Phone (615) 590-7695 • Fax (615) 265-8147 • www.geotechnics.net

MOISTURE CONTENT

ASTM D 2216-19

Client: GeoEngineers, Inc.
Client Reference: 24647-009-00 I-24/I-75 Interchange
Project No.: N-2022-051-001

Lab ID:	011	012	013	014	015
Boring No.:	RW1-3	RW1-4	RW1-4	RW1-4	RW1-5
Depth (ft):	38.5-40	3.5-5	13.5-15	23.5-25	3.5-5
Sample No.:	9	2	4	6	2
Tare Number	10	11	29	12	13
Wt. of Tare & Wet Sample (g)	211.39	212.78	665.09	212.31	211.81
Wt. of Tare & Dry Sample (g)	173.71	156.41	579.12	168.35	167.07
Weight of Tare (g)	8.22	8.25	203.08	8.23	8.26
Weight of Water (g)	37.68	56.37	85.97	43.96	44.74
Weight of Dry Sample (g)	165.49	148.16	376.04	160.12	158.81
Water Content (%)	**22.8**	**38.0**	**22.9**	**27.5**	**28.2**

Lab ID	016	017	018	019	020
Boring No.	RW1-5	RW1-5	RW1-5	RW1-5	RW1-6
Depth (ft)	13.5-15	18.5-20	28.5-30	38.5-40	8.5-10
Sample No.	4	5	7	9	3
Tare Number	14	15	16	17	18
Wt. of Tare & Wet Sample (g)	216.85	150.53	216.94	226.35	215.10
Wt. of Tare & Dry Sample (g)	167.47	113.82	166.61	183.16	182.89
Weight of Tare (g)	8.29	8.26	8.25	8.25	8.23
Weight of Water (g)	49.38	36.71	50.33	43.19	32.21
Weight of Dry Sample (g)	159.18	105.56	158.36	174.91	174.66
Water Content (%)	**31.0**	**34.8**	**31.8**	**24.7**	**18.4**

Notes :

Tested By PM *Date* 4/13/22 *Checked By* WDS *Date* 4/15/22

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MOISTURE CONTENT

ASTM D 2216-19

Client: GeoEngineers, Inc.
Client Reference: 24647-009-00 I-24/I-75 Interchange
Project No.: N-2022-051-001

Lab ID:	021	022	023	024	025
Boring No.:	RW1-6	RW1-6	RW1-6	RW1-6	RW1-6
Depth (ft):	18.5-20	23.5-25	28.5-30	38.5-40	43.5-45
Sample No.:	5	6	7	9	10
Tare Number	48	19	1	2	3
Wt. of Tare & Wet Sample (g)	1054.13	231.38	360.52	352.85	371.72
Wt. of Tare & Dry Sample (g)	905.08	195.09	317.65	324.92	334.91
Weight of Tare (g)	200.91	8.24	143.10	144.34	142.20
Weight of Water (g)	149.05	36.29	42.87	27.93	36.81
Weight of Dry Sample (g)	704.17	186.85	174.55	180.58	192.71
Water Content (%)	**21.2**	**19.4**	**24.6**	**15.5**	**19.1**

Lab ID	026	027	028	029	030
Boring No.	RW3-1	RW3-1	RW3-2	RW3-2	RW3-2
Depth (ft)	8.5-10	18.5-20	8.5-10	13.5-15	18.5-20
Sample No.	3	5	3	4	5
Tare Number	4	5	6	55	7
Wt. of Tare & Wet Sample (g)	357.93	367.00	361.20	756.43	356.00
Wt. of Tare & Dry Sample (g)	314.72	321.09	327.52	632.35	312.60
Weight of Tare (g)	143.16	142.39	143.33	201.26	142.86
Weight of Water (g)	43.21	45.91	33.68	124.08	43.40
Weight of Dry Sample (g)	171.56	178.70	184.19	431.09	169.74
Water Content (%)	**25.2**	**25.7**	**18.3**	**28.8**	**25.6**

Notes :

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MOISTURE CONTENT

ASTM D 2216-19

Client: GeoEngineers, Inc.
Client Reference: 24647-009-00 I-24/I-75 Interchange
Project No.: N-2022-051-001

Lab ID:	031	032	033	034	035
Boring No.:	RW3-3	RW3-3	RW4-1	RW4-1	RW4-1
Depth (ft):	3.5-5	18.5-20	13.5-15	23.5-25	33.5-35
Sample No.:	2	5	4	6	8
Tare Number	8	9	10	11	1
Wt. of Tare & Wet Sample (g)	361.44	357.14	351.75	365.86	214.16
Wt. of Tare & Dry Sample (g)	323.05	322.73	320.22	317.81	161.73
Weight of Tare (g)	141.38	142.57	142.85	141.07	8.36
Weight of Water (g)	38.39	34.41	31.53	48.05	52.43
Weight of Dry Sample (g)	181.67	180.16	177.37	176.74	153.37
Water Content (%)	**21.1**	**19.1**	**17.8**	**27.2**	**34.2**

Lab ID	036	037	038	039	040
Boring No.	RW4-1	RW4-2	RW4-2	RW4-2	RW4-2
Depth (ft)	38.5-40	8.5-10	18.5-20	23.5-25	28.5-30
Sample No.	9	3	5	6	7
Tare Number	2	3	4	31	5
Wt. of Tare & Wet Sample (g)	213.17	224.41	212.34	1095.29	234.68
Wt. of Tare & Dry Sample (g)	158.49	186.81	171.88	924.32	190.19
Weight of Tare (g)	8.32	8.34	8.37	201.88	8.19
Weight of Water (g)	54.68	37.60	40.46	170.97	44.49
Weight of Dry Sample (g)	150.17	178.47	163.51	722.44	182.00
Water Content (%)	**36.4**	**21.1**	**24.7**	**23.7**	**24.4**

Notes :

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MOISTURE CONTENT

ASTM D 2216-19

Client: GeoEngineers, Inc.
Client Reference: 24647-009-00 I-24/I-75 Interchange
Project No.: N-2022-051-001

Lab ID:	041	042	043	044	045
Boring No.:	RW4-2	RW4-3	RW4-3	RW4-3	RW4-4
Depth (ft):	33.5-35	8.5-10	18.5-20	23.5-25	8.5-10
Sample No.:	8	3	5	6	3
Tare Number	6	7	26	8	9
Wt. of Tare & Wet Sample (g)	224.51	228.99	927.02	221.08	228.28
Wt. of Tare & Dry Sample (g)	154.95	185.61	813.85	180.40	194.87
Weight of Tare (g)	8.13	8.11	198.55	8.30	8.31
Weight of Water (g)	69.56	43.38	113.17	40.68	33.41
Weight of Dry Sample (g)	146.82	177.50	615.30	172.10	186.56
Water Content (%)	**47.4**	**24.4**	**18.4**	**23.6**	**17.9**

Lab ID	046	047	048	049	050
Boring No.	RW4-4	RW4-4	RW4-4	RW5-1	RW5-1
Depth (ft)	18.5-20	33.5-35	38.5-40	8.5-10	18.5-20
Sample No.	5	8	9	3	5
Tare Number	10	11	12	13	14
Wt. of Tare & Wet Sample (g)	214.45	237.31	215.26	222.31	246.62
Wt. of Tare & Dry Sample (g)	170.24	175.46	169.28	182.69	210.46
Weight of Tare (g)	8.26	8.26	8.24	8.26	8.28
Weight of Water (g)	44.21	61.85	45.98	39.62	36.16
Weight of Dry Sample (g)	161.98	167.20	161.04	174.43	202.18
Water Content (%)	**27.3**	**37.0**	**28.6**	**22.7**	**17.9**

Notes :

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MOISTURE CONTENT

ASTM D 2216-19

Client: GeoEngineers, Inc.
Client Reference: 24647-009-00 I-24/I-75 Interchange
Project No.: N-2022-051-001

Lab ID:	051	052	053	054	055
Boring No.:	RW5-1	RW5-1	RW5-1	RW5-2	RW5-2
Depth (ft):	23.5-25	33.5-35	38.5-40	3.5-5	8.5-10
Sample No.:	6	8	9	2	3
Tare Number	15	16	17	18	Z18
Wt. of Tare & Wet Sample (g)	210.40	213.24	245.14	230.33	756.47
Wt. of Tare & Dry Sample (g)	164.80	168.60	184.62	183.74	635.97
Weight of Tare (g)	8.30	8.30	8.31	8.26	200.56
Weight of Water (g)	45.60	44.64	60.52	46.59	120.50
Weight of Dry Sample (g)	156.50	160.30	176.31	175.48	435.41
Water Content (%)	**29.1**	**27.8**	**34.3**	**26.6**	**27.7**

Lab ID	056	057	058	059	060
Boring No.	RW5-2	RW5-2	RW5-2	RW5-2	RW5-2
Depth (ft)	18.5-20	23.5-25	33.5-35	43.5-45	48.5-50
Sample No.	5	6	8	10	11
Tare Number	19	1	2	3	4
Wt. of Tare & Wet Sample (g)	228.89	353.25	363.64	409.21	241.48
Wt. of Tare & Dry Sample (g)	174.13	304.65	307.61	333.06	205.06
Weight of Tare (g)	8.26	143.12	144.37	142.20	143.16
Weight of Water (g)	54.76	48.60	56.03	76.15	36.42
Weight of Dry Sample (g)	165.87	161.53	163.24	190.86	61.90
Water Content (%)	**33.0**	**30.1**	**34.3**	**39.9**	**58.8**

Notes :

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MOISTURE CONTENT

ASTM D 2216-19

Client: GeoEngineers, Inc.
Client Reference: 24647-009-00 I-24/I-75 Interchange
Project No.: N-2022-051-001

Lab ID:	061	062	063	064	065
Boring No.:	RW6-2	RW6-3	RW6-3	RW6-4	RW6-4
Depth (ft):	1-2.5	3.5-5	13.5-15	3.5-5	8.5-10
Sample No.:	1	2	4	2	3
Tare Number	51	5	6	7	Z10
Wt. of Tare & Wet Sample (g)	623.33	383.08	368.97	388.43	687.11
Wt. of Tare & Dry Sample (g)	527.31	343.60	333.32	335.05	595.22
Weight of Tare (g)	198.71	142.39	143.33	142.87	199.79
Weight of Water (g)	96.02	39.48	35.65	53.38	91.89
Weight of Dry Sample (g)	328.60	201.21	189.99	192.18	395.43
Water Content (%)	**29.2**	**19.6**	**18.8**	**27.8**	**23.2**

Lab ID	066	067	068	069	070
Boring No.	RW6-5	RW6-5	RW6-6	RW6-6	RW7-1
Depth (ft)	8.5-10	18.5-20	8.5-10	13.5-14.9	18.5-20
Sample No.	3	5	3	4	5
Tare Number	8	9	10	1569	11
Wt. of Tare & Wet Sample (g)	385.34	352.86	367.82	862.84	364.08
Wt. of Tare & Dry Sample (g)	349.27	319.41	318.21	817.33	332.95
Weight of Tare (g)	141.43	142.58	142.86	306.70	141.09
Weight of Water (g)	36.07	33.45	49.61	45.51	31.13
Weight of Dry Sample (g)	207.84	176.83	175.35	510.63	191.86
Water Content (%)	**17.4**	**18.9**	**28.3**	**8.9**	**16.2**

Notes :

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MOISTURE CONTENT

ASTM D 2216-19

Client: GeoEngineers, Inc.
Client Reference: 24647-009-00 I-24/I-75 Interchange
Project No.: N-2022-051-001

Lab ID:	071	072	073
Boring No.:	RW7-1	RW7-2	RW7-2
Depth (ft):	28.5-30	18.5-20	28.5-30
Sample No.:	10	5	7
Tare Number	585	12	13
Wt. of Tare & Wet Sample (g)	1064.11	380.47	371.25
Wt. of Tare & Dry Sample (g)	950.94	344.95	339.90
Weight of Tare (g)	308.64	141.01	144.09
Weight of Water (g)	113.17	35.52	31.35
Weight of Dry Sample (g)	642.30	203.94	195.81
Water Content (%)	**17.6**	**17.4**	**16.0**

Notes :

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW1-2
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	8.5-10
Project No.:	N2022-051-001	Sample No.:	3
Lab ID:	N2022-051-001-003	Soil Description:	ORANGISH BROWN LEAN CLAY

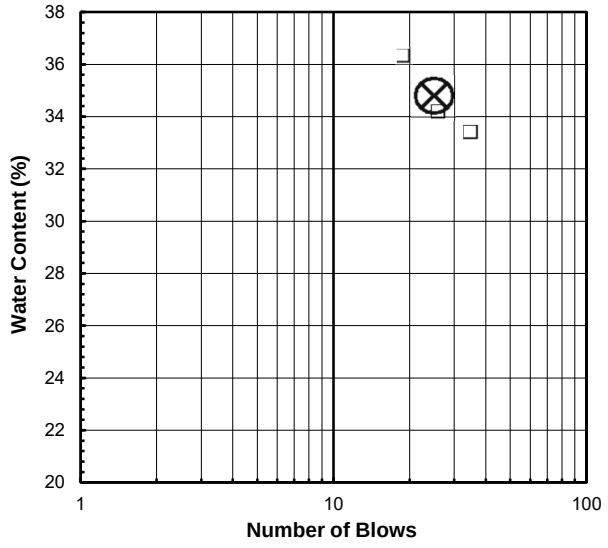
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content ASTM D2216-19		**Liquid Limit Test**			
		1	**2**	**3**	**M**
Tare Number:	27	C	U	E	**U**
Wt. of Tare & Wet Sample (g):	581.14	32.46	33.74	32.93	**L**
Wt. of Tare & Dry Sample (g):	533.93	30.24	31.18	30.41	**T**
Weight of Tare (g):	202.79	23.59	23.69	23.47	**I**
Weight of Water (g):	47.2	2.2	2.6	2.5	**P**
Weight of Dry Sample (g):	331.1	6.7	7.5	6.9	**O**
Was As Received MC Preserved:	**Yes**				**I**
Moisture Content (%):	**14.3**	**33.4**	**34.2**	**36.3**	**N**
Number of Blows:		**35**	**26**	**19**	**T**

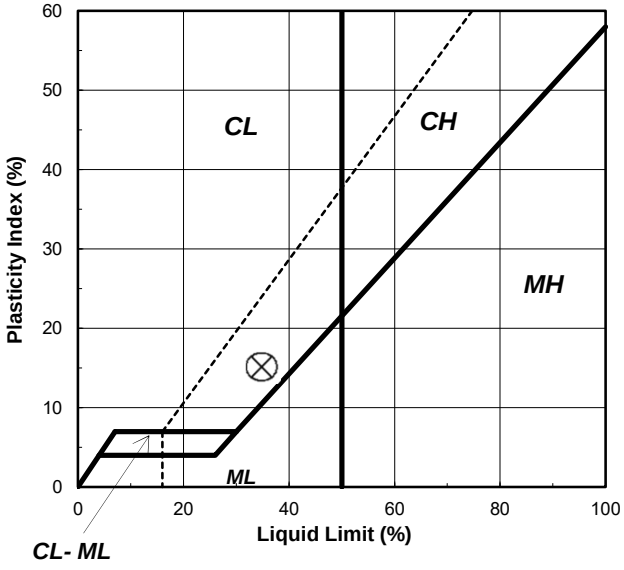
Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	G	T	
Wt. of Tare & Wet Sample (g):	34.33	32.07	
Wt. of Tare & Dry Sample (g):	32.57	30.67	
Weight of Tare (g):	23.58	23.54	
Weight of Water (g):	1.8	1.4	
Weight of Dry Sample (g):	9.0	7.1	
Moisture Content (%):	**19.6**	**19.6**	**-0.1**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**35**
Plastic Limit (%):	**20**
Plasticity Index (%):	**15**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



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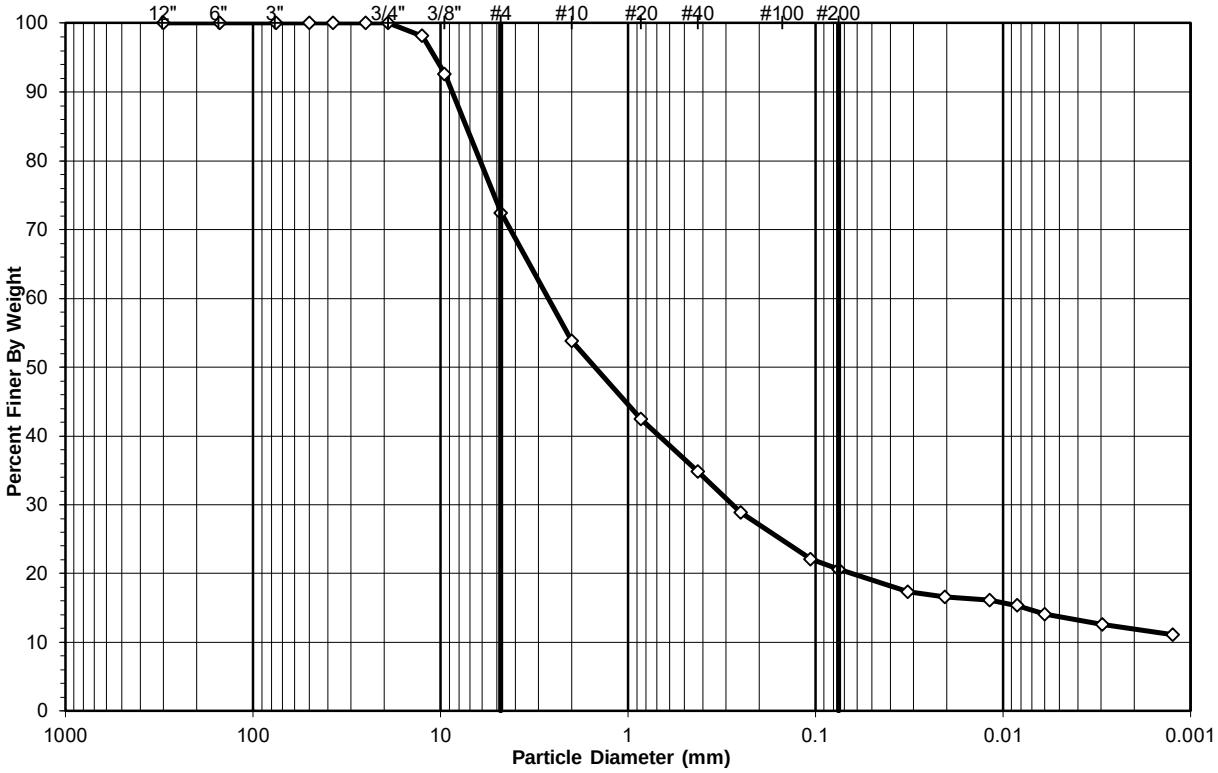
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW1-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	8.5-10
Project No.:	N2022-051-001	Sample No.:	3
Lab ID:	N2022-051-001-003	Soil Color:	Orangish Brown

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer		USCS (%)		AASHTO (%)		ASTM (%)
				Gravel	46.18		
100	100.00	*Gravel*	27.58	*Sand*	33.26	*Gravel*	27.58
2	53.82	*Sand*	51.85	*Coarse Sand*	19.01	*Sand*	51.85
0.075	20.56	*Silt&Clay*	20.56	*Fine Sand*	14.25	*Silt*	6.83
0.05	19.01			*Silt & Clay*	20.56	Clay	13.73
0.005	13.73			Silt	8.62		
0.002	11.94			Clay	11.94		

AASHTO (GI): **USCS Symbol:** **D50 = 1.50**

A - 2 - 6 (0) ***SC, TESTED***

USCS Classification

CLAYEY SAND WITH GRAVEL

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW1-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	8.5-10
Project No.:	N2022-051-001	Sample No.:	3
Lab ID:	N2022-051-001-003	Soil Color:	Orangish Brown

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	27	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	417.08	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	417.08	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	202.79	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	214.29	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	214.29
Dry Weight of - 3/4" Sample (g):	214.29	Weight of minus #200 Material (g):	44.06
Wet Weight of +3/4" Sample (g):	0.00	Weight of plus #200 Material (g):	170.23
Dry Weight of +3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	214.29		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	3.98		1.86	1.86	98.14	**98.14**
3/8"	9.50	11.83		5.52	7.38	92.62	**92.62**
#4	4.75	43.30		20.21	27.58	72.42	**72.42**
#10	2.00	39.85		18.60	46.18	53.82	**53.82**
#20	0.85	24.44	(**)	11.41	57.59	42.41	**42.41**
#40	0.425	16.29		7.60	65.19	34.81	**34.81**
#60	0.250	12.75		5.95	71.14	28.86	**28.86**
#140	0.106	14.53		6.78	77.92	22.08	**22.08**
#200	0.075	3.26		1.52	79.44	20.56	**20.56**
Pan	-	44.06		20.56	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

Tested By JV Date 4/14/22 Checked By NC Date 4/15/22

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW1-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	8.5-10
Project No.:	N2022-051-001	Sample No.:	3
Lab ID:	N2022-051-001-003	Soil Color:	Orangish Brown

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	23.25	23.9	5.8	17.4	84.2	0.01284	0.0321	**17.3**
5	22.50	23.9	5.8	16.7	80.5	0.01284	0.0204	**16.6**
15	22.00	24.0	5.8	16.2	78.3	0.01282	0.0118	**16.1**
30	21.25	24.0	5.8	15.5	74.6	0.01282	0.0084	**15.3**
60	20.00	24.0	5.8	14.2	68.6	0.01282	0.0060	**14.1**
250	18.50	24.0	5.8	12.7	61.3	0.01282	0.0030	**12.6**
1440	17.00	24.0	5.8	11.2	54.1	0.01282	0.0012	**11.1**

Soil Specimen Data		**Other Corrections**		
Tare No.	13			
Wt. of Tare & Dry Material (g):	325.21	a - Factor	0.993	
Weight of Tare (g):	299.65			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	20.56	
Weight of Dry Material (g):	20.56			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 35

PL = 20

PI = 15

Tested By JV Date 4/12/22 Checked By NC Date 4/15/22

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW1-4
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	13.5-15
Project No.:	N2022-051-001	Sample No.:	4
Lab ID:	N2022-051-001-013	Soil Description:	YELLOWISH BROWN LEAN CLAY

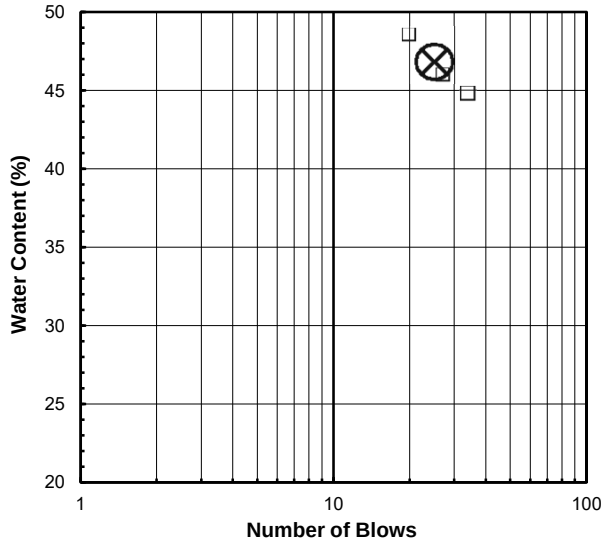
***Note: The* USCS symbol used with this test refers only to the minus No. 40** (Minus No. 40 sieve material, Air dried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	29	Q	O	R	U
Wt. of Tare & Wet Sample (g):	665.09	32.22	33.96	34.10	L
Wt. of Tare & Dry Sample (g):	579.12	29.56	30.61	30.61	T
Weight of Tare (g):	203.08	23.62	23.33	23.42	I
Weight of Water (g):	86.0	2.7	3.4	3.5	P
Weight of Dry Sample (g):	376.0	5.9	7.3	7.2	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**22.9**	**44.8**	**46.0**	**48.5**	N
Number of Blows:		**34**	**27**	**20**	T

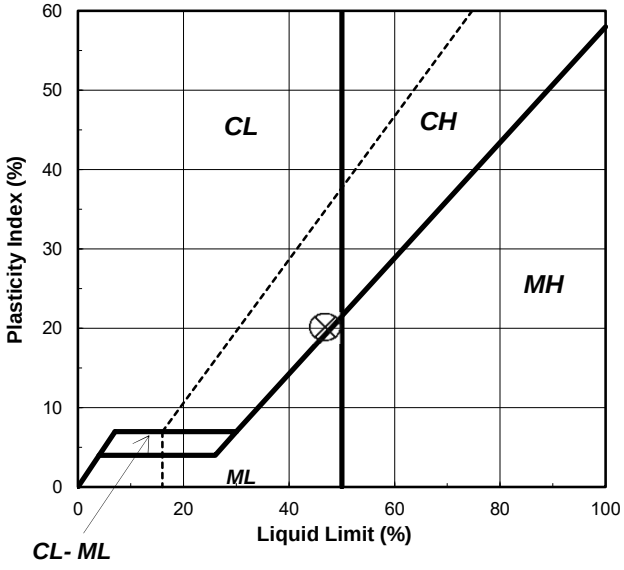
Plastic Limit Test	1	2	Range
Tare Number:	A	F	
Wt. of Tare & Wet Sample (g):	35.20	33.15	
Wt. of Tare & Dry Sample (g):	32.74	31.16	
Weight of Tare (g):	23.59	23.71	
Weight of Water (g):	2.5	2.0	
Weight of Dry Sample (g):	9.2	7.5	
Moisture Content (%):	**26.9**	**26.7**	**0.2**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**47**
Plastic Limit (%):	**27**
Plasticity Index (%):	**20**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



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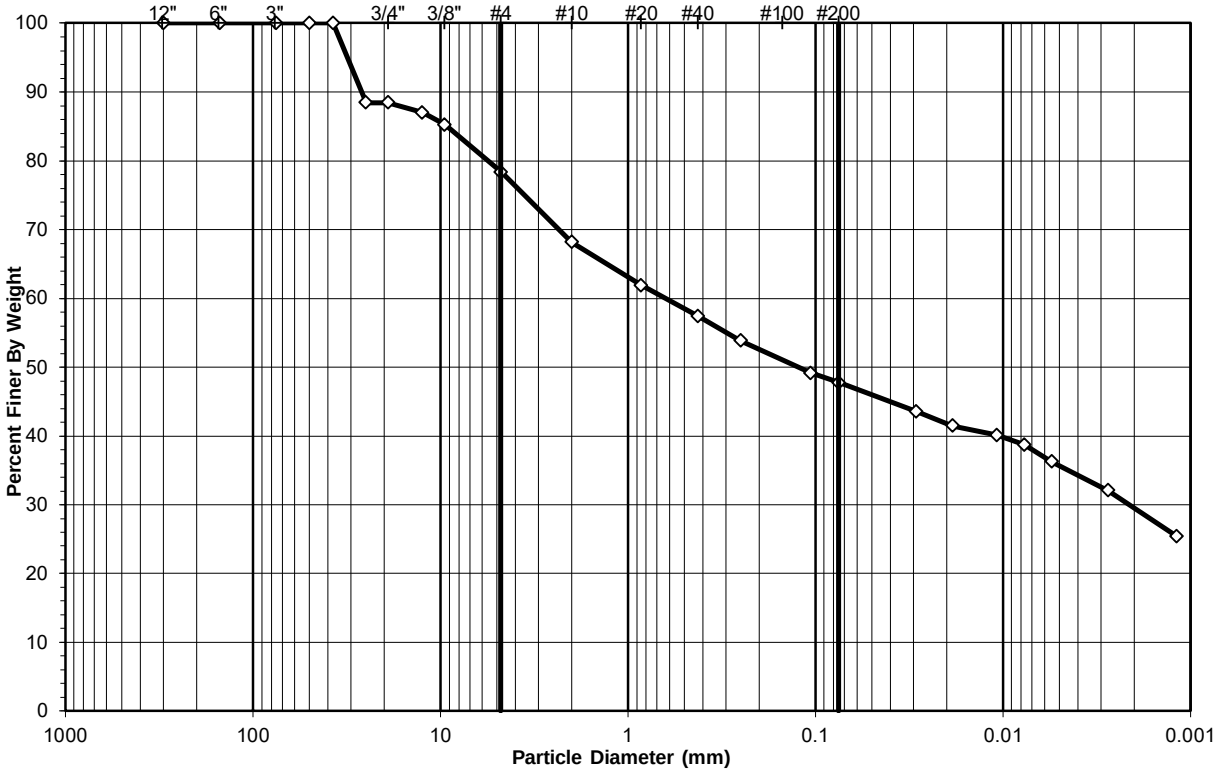
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW1-4
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	13.5-15
Project No.:	N2022-051-001	Sample No.:	4
Lab ID:	N2022-051-001-013	Soil Color:	Yellowish Brown

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer	USCS	(%)	AASHTO	(%)	ASTM	(%)
				Gravel	31.80		
100	100.00	*Gravel*	21.65	*Sand*	20.46	*Gravel*	21.65
2	68.20	*Sand*	30.62	*Coarse Sand*	10.79	*Sand*	30.62
0.075	47.74	*Silt&Clay*	47.74	*Fine Sand*	9.67	*Silt*	12.05
0.05	45.96			*Silt & Clay*	47.74	Clay	35.69
0.005	35.69			Silt	18.19		
0.002	29.55			Clay	29.55		

AASHTO (GI): **USCS Symbol:** **D50 = 0.12**

A - 7 - 6 (6) ***SC, TESTED***

USCS Classification

CLAYEY SAND WITH GRAVEL

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW1-4
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	13.5-15
Project No.:	N2022-051-001	Sample No.:	4
Lab ID:	N2022-051-001-013	Soil Color:	Yellowish Brown

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	29	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	476.24	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	476.24	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	203.08	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	273.16	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	273.16
Dry Weight of - 3/4" Sample (g):	241.68	Weight of minus #200 Material (g):	130.40
Wet Weight of +3/4" Sample (g):	31.48	Weight of plus #200 Material (g):	142.76
Dry Weight of +3/4" Sample (g):	31.48		
Total Dry Weight of Sample (g):	273.16		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	31.48		11.52	11.52	88.48	**88.48**
3/4"	19.0	0.00		0.00	11.52	88.48	**88.48**
1/2"	12.5	3.89		1.42	12.95	87.05	**87.05**
3/8"	9.50	4.87		1.78	14.73	85.27	**85.27**
#4	4.75	18.89		6.92	21.65	78.35	**78.35**
#10	2.00	27.74		10.16	31.80	68.20	**68.20**
#20	0.85	17.18	(**)	6.29	38.09	61.91	**61.91**
#40	0.425	12.29		4.50	42.59	57.41	**57.41**
#60	0.250	9.72		3.56	46.15	53.85	**53.85**
#140	0.106	12.79		4.68	50.83	49.17	**49.17**
#200	0.075	3.91		1.43	52.26	47.74	**47.74**
Pan	-	130.40		47.74	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW1-4
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	13.5-15
Project No.:	N2022-051-001	Sample No.:	4
Lab ID:	N2022-051-001-013	Soil Color:	Yellowish Brown

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	37.00	23.9	5.8	31.2	91.3	0.01284	0.0290	**43.6**
5	35.50	23.9	5.8	29.7	86.9	0.01284	0.0186	**41.5**
15	34.50	24.0	5.8	28.7	84.0	0.01282	0.0108	**40.1**
30	33.50	24.0	5.8	27.7	81.1	0.01282	0.0077	**38.7**
60	31.75	24.0	5.8	26.0	76.0	0.01282	0.0055	**36.3**
250	28.75	24.0	5.8	23.0	67.2	0.01282	0.0028	**32.1**
1440	24.00	24.0	5.8	18.2	53.3	0.01282	0.0012	**25.4**

Soil Specimen Data		Other Corrections		
Tare No.	14			
Wt. of Tare & Dry Material (g):	339.09	a - Factor	0.993	
Weight of Tare (g):	300.18			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	47.74	
Weight of Dry Material (g):	33.91			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 47

PL = 27

PI = 20

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW1-6
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	18.5-20
Project No.:	N2022-051-001	Sample No.:	5
Lab ID:	N2022-051-001-021	Soil Description:	BROWNISH YELLOW LEAN CLAY

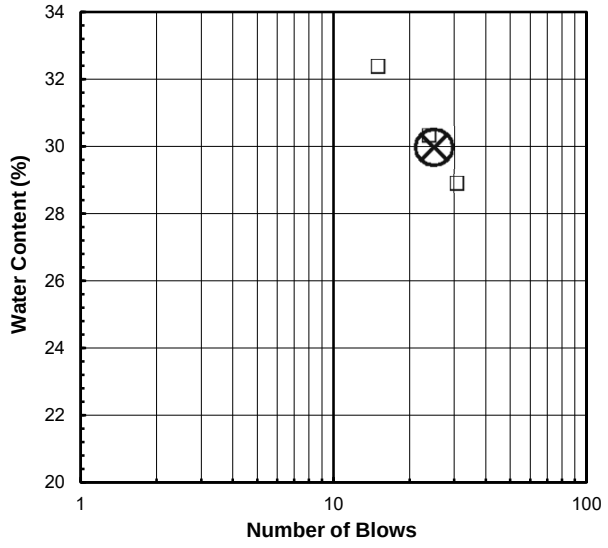
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	48	W	H	P	U
Wt. of Tare & Wet Sample (g):	1054.13	32.23	32.67	32.76	L
Wt. of Tare & Dry Sample (g):	905.08	30.31	30.51	30.55	T
Weight of Tare (g):	200.91	23.66	23.38	23.72	I
Weight of Water (g):	149.1	1.9	2.2	2.2	P
Weight of Dry Sample (g):	704.2	6.7	7.1	6.8	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**21.2**	**28.9**	**30.3**	**32.4**	N
Number of Blows:		**31**	**24**	**15**	T

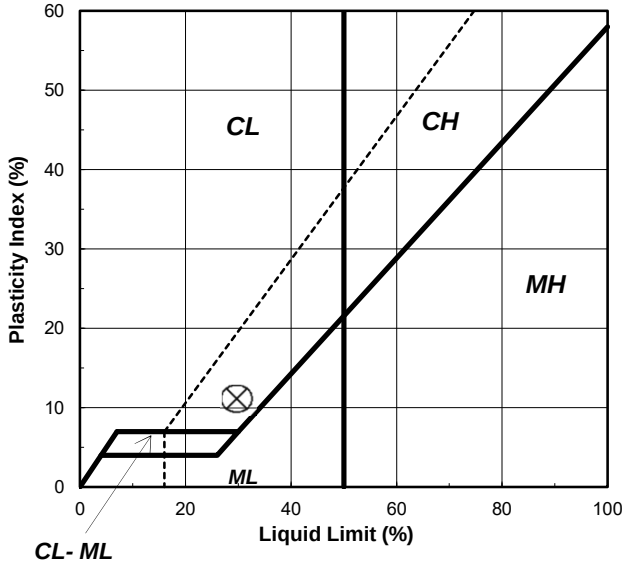
Plastic Limit Test	1	2	Range
Tare Number:	J	V	
Wt. of Tare & Wet Sample (g):	37.06	35.87	
Wt. of Tare & Dry Sample (g):	34.89	33.88	
Weight of Tare (g):	23.53	23.53	
Weight of Water (g):	2.2	2.0	
Weight of Dry Sample (g):	11.4	10.4	
Moisture Content (%):	**19.1**	**19.2**	**-0.1**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**30**
Plastic Limit (%):	**19**
Plasticity Index (%):	**11**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



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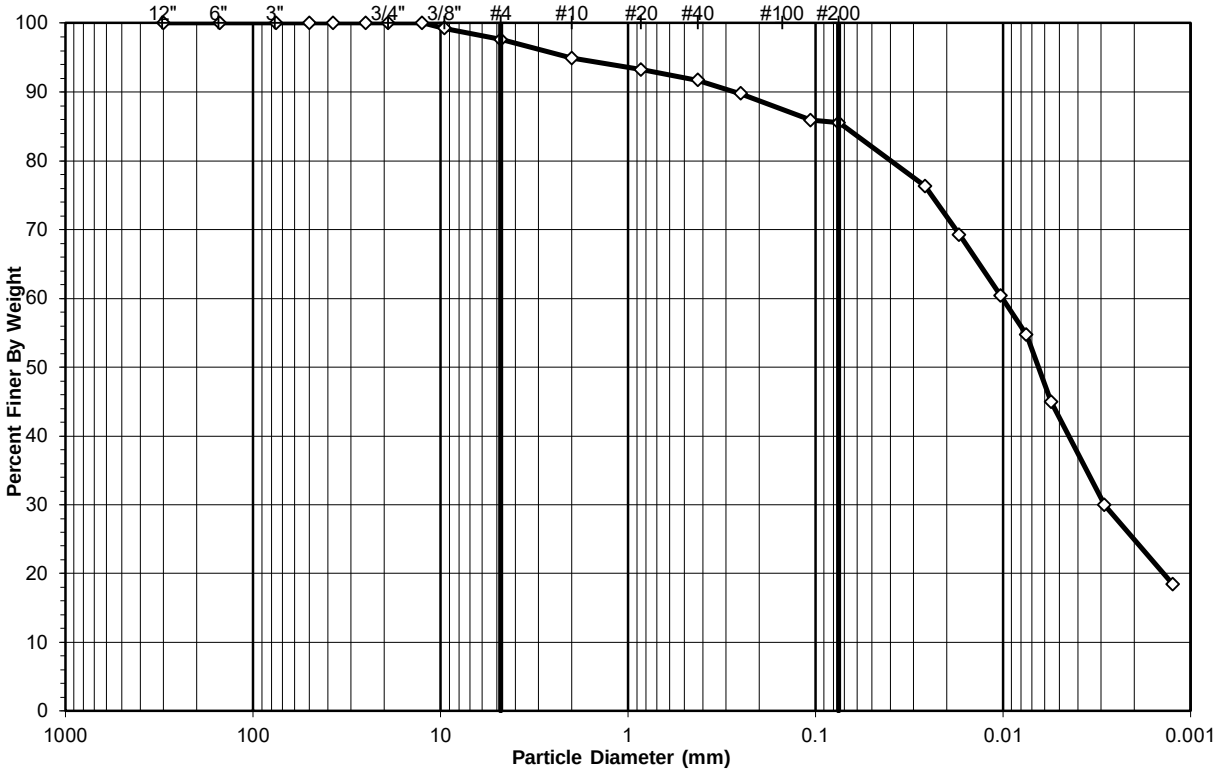
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW1-6
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	18.5-20
Project No.:	N2022-051-001	Sample No.:	5
Lab ID:	N2022-051-001-021	Soil Color:	Brownish Yellow

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer		USCS (%)		AASHTO (%)		ASTM (%)
				Gravel	5.07		
100	100.00	*Gravel*	2.35	*Sand*	9.38	*Gravel*	2.35
2	94.93	*Sand*	12.10	*Coarse Sand*	3.21	*Sand*	12.10
0.075	85.55	*Silt&Clay*	85.55	*Fine Sand*	6.17	*Silt*	42.91
0.05	82.02			*Silt & Clay*	85.55	Clay	42.65
0.005	42.65			Silt	60.59		
0.002	24.96			Clay	24.96		

AASHTO (GI): **USCS Symbol:**

A - 6 **(8)** ***CL, TESTED***

USCS Classification

LEAN CLAY

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW1-6
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	18.5-20
Project No.:	N2022-051-001	Sample No.:	5
Lab ID:	N2022-051-001-021	Soil Color:	Brownish Yellow

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	48	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	627.55	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	627.55	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	200.91	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	426.64	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	426.64
Dry Weight of - 3/4" Sample (g):	426.64	Weight of minus #200 Material (g):	365.01
Wet Weight of +3/4" Sample (g):	0.00	Weight of plus #200 Material (g):	61.63
Dry Weight of +3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	426.64		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00		0.00	0.00	100.00	**100.00**
3/8"	9.50	3.21		0.75	0.75	99.25	**99.25**
#4	4.75	6.81		1.60	2.35	97.65	**97.65**
#10	2.00	11.60		2.72	5.07	94.93	**94.93**
#20	0.85	7.23	(**)	1.69	6.76	93.24	**93.24**
#40	0.425	6.46		1.51	8.28	91.72	**91.72**
#60	0.250	8.37		1.96	10.24	89.76	**89.76**
#140	0.106	16.48		3.86	14.10	85.90	**85.90**
#200	0.075	1.47		0.34	14.45	85.55	**85.55**
Pan	-	365.01		85.55	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW1-6
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	18.5-20
Project No.:	N2022-051-001	Sample No.:	5
Lab ID:	N2022-051-001-021	Soil Color:	Brownish Yellow

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	49.00	24.0	5.8	43.2	89.2	0.01282	0.0261	**76.3**
5	45.00	24.0	5.8	39.2	81.0	0.01282	0.0171	**69.3**
15	40.00	24.0	5.8	34.2	70.6	0.01282	0.0103	**60.4**
30	36.75	24.0	5.8	31.0	63.9	0.01282	0.0075	**54.7**
60	31.25	24.0	5.8	25.5	52.6	0.01282	0.0055	**45.0**
250	22.75	24.0	5.8	17.0	35.0	0.01282	0.0029	**30.0**
1440	16.25	24.0	5.8	10.5	21.6	0.01282	0.0012	**18.5**

Soil Specimen Data		Other Corrections		
Tare No.	15			
Wt. of Tare & Dry Material (g):	352.15	a - Factor	0.993	
Weight of Tare (g):	299.07			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	85.55	
Weight of Dry Material (g):	48.08			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 30

PL = 19

PI = 11

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW3-2
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	13.5-15
Project No.:	N2022-051-001	Sample No.:	4
Lab ID:	N2022-051-001-029	Soil Description:	BROWN ELASTIC SILT

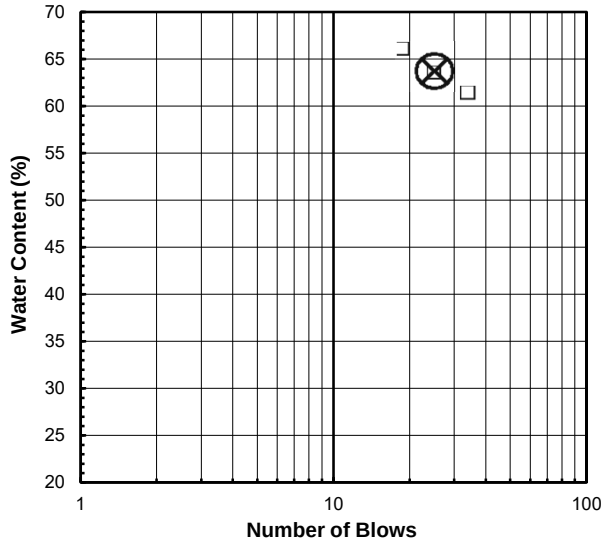
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content		**Liquid Limit Test**			
ASTM D2216-19		**1**	**2**	**3**	**M**
Tare Number:	55	M	N	K	**U**
Wt. of Tare & Wet Sample (g):	756.43	33.04	32.39	32.14	**L**
Wt. of Tare & Dry Sample (g):	632.35	29.48	28.86	28.76	**T**
Weight of Tare (g):	201.26	23.68	23.30	23.64	**I**
Weight of Water (g):	124.1	3.6	3.5	3.4	**P**
Weight of Dry Sample (g):	431.1	5.8	5.6	5.1	**O**
Was As Received MC Preserved:	**Yes**				**I**
Moisture Content (%):	**28.8**	**61.4**	**63.5**	**66.0**	**N**
Number of Blows:		**34**	**25**	**19**	**T**

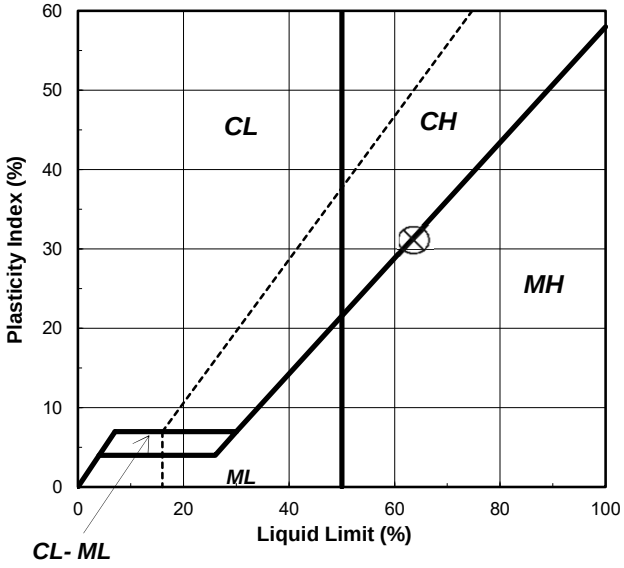
Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	X	L	
Wt. of Tare & Wet Sample (g):	33.65	32.62	
Wt. of Tare & Dry Sample (g):	31.12	30.36	
Weight of Tare (g):	23.45	23.57	
Weight of Water (g):	2.5	2.3	
Weight of Dry Sample (g):	7.7	6.8	
Moisture Content (%):	**33.0**	**33.3**	**-0.3**
Note: The acceptable range of the two Moisture Contents is ±			0.84

Test Results	
Liquid Limit (%):	**64**
Plastic Limit (%):	**33**
Plasticity Index (%):	**31**
USCS Symbol:	**MH**

Flow Curve



Plasticity Chart



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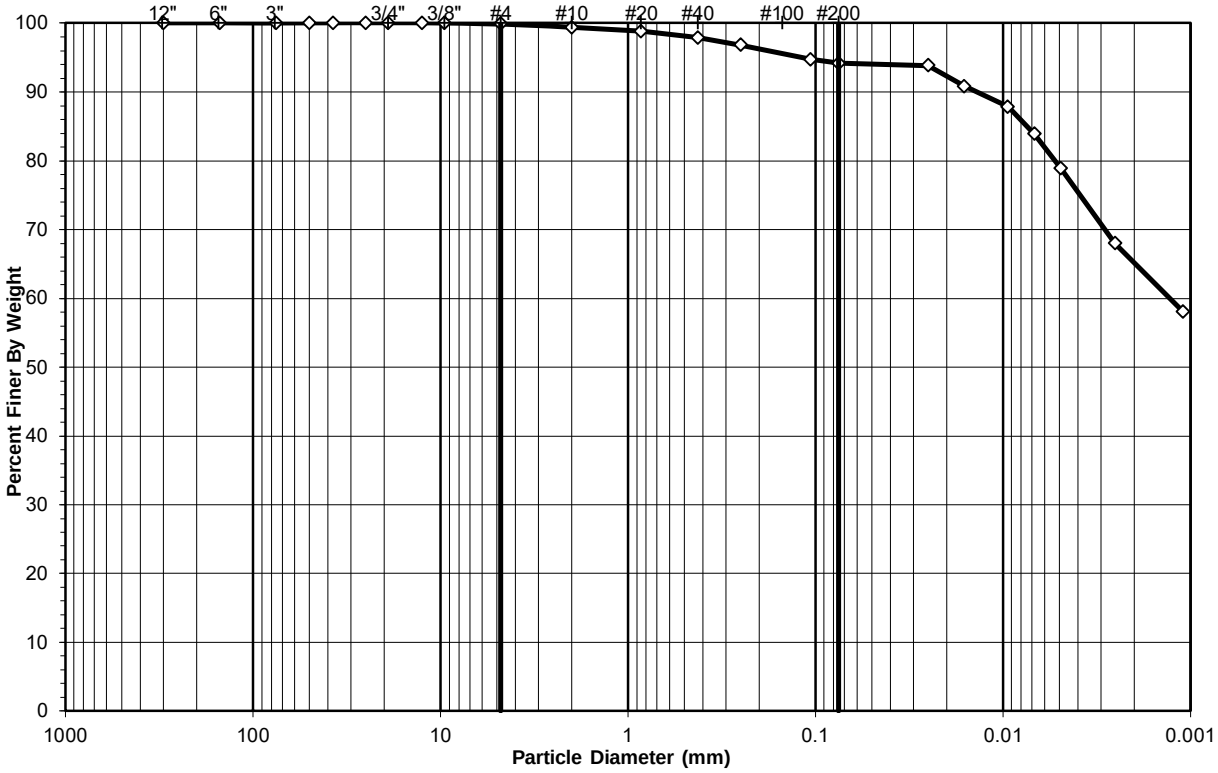
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW3-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	13.5-15
Project No.:	N2022-051-001	Sample No.:	4
Lab ID:	N2022-051-001-029	Soil Color:	Brown

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer		USCS (%)		AASHTO (%)		ASTM (%)	
				Gravel	0.60			
100	100.00	*Gravel*	0.08	*Sand*	5.19	*Gravel*	0.08
2	99.40	*Sand*	5.71	*Coarse Sand*	1.46	*Sand*	5.71
0.075	94.21	*Silt&Clay*	94.21	*Fine Sand*	3.73	*Silt*	15.03
0.05	94.08			*Silt & Clay*	94.21	Clay	79.18
0.005	79.18			Silt	29.01		
0.002	65.20			Clay	65.20		

AASHTO (GI):
A - 7 - 5 (36)

USCS Symbol:
MH, TESTED

USCS Classification
ELASTIC SILT

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW3-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	13.5-15
Project No.:	N2022-051-001	Sample No.:	4
Lab ID:	N2022-051-001-029	Soil Color:	Brown

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	55	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	503.85	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	503.85	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	201.26	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	302.59	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	302.59
Dry Weight of - 3/4" Sample (g):	302.59	Weight of minus #200 Material (g):	285.07
Wet Weight of +3/4" Sample (g):	0.00	Weight of plus #200 Material (g):	17.52
Dry Weight of +3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	302.59		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00		0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00		0.00	0.00	100.00	**100.00**
#4	4.75	0.24		0.08	0.08	99.92	**99.92**
#10	2.00	1.58		0.52	0.60	99.40	**99.40**
#20	0.85	1.68	(**)	0.56	1.16	98.84	**98.84**
#40	0.425	2.73		0.90	2.06	97.94	**97.94**
#60	0.250	3.35		1.11	3.17	96.83	**96.83**
#140	0.106	6.22		2.06	5.22	94.78	**94.78**
#200	0.075	1.72		0.57	5.79	94.21	**94.21**
Pan	-	285.07		94.21	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW3-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	13.5-15
Project No.:	N2022-051-001	Sample No.:	4
Lab ID:	N2022-051-001-029	Soil Color:	Brown

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	53.00	24.0	5.8	47.2	99.6	0.01282	0.0250	**93.9**
5	51.50	24.0	5.8	45.7	96.5	0.01282	0.0161	**90.9**
15	50.00	24.0	5.8	44.2	93.3	0.01282	0.0094	**87.9**
30	48.00	24.0	5.8	42.2	89.1	0.01282	0.0068	**83.9**
60	45.50	24.0	5.8	39.7	83.8	0.01282	0.0049	**78.9**
250	40.00	24.0	5.8	34.2	72.2	0.01282	0.0025	**68.0**
1440	35.00	24.0	5.8	29.2	61.6	0.01282	0.0011	**58.1**

Soil Specimen Data		**Other Corrections**	
Tare No.	16		
Wt. of Tare & Dry Material (g):	352.41	a - Factor	0.993
Weight of Tare (g):	300.36		
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	94.21
Weight of Dry Material (g):	47.05		
		Specific Gravity	2.70 Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 64

PL = 33

PI = 31

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW4-2
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	23.5-25
Project No.:	N2022-051-001	Sample No.:	6
Lab ID:	N2022-051-001-039	Soil Description:	BROWNISH ORANGE LEAN CLAY

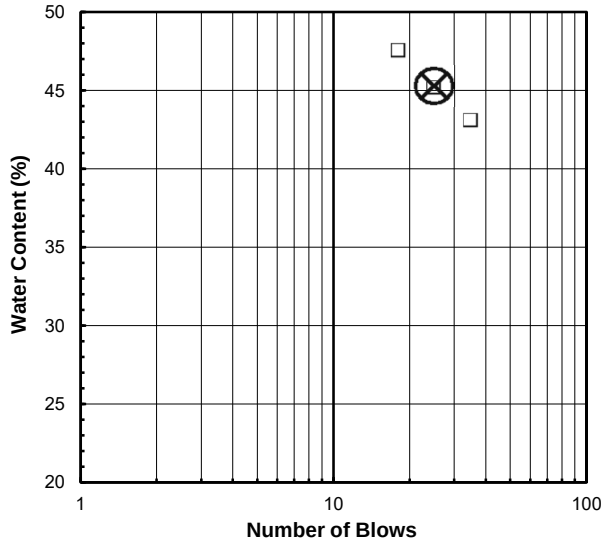
***Note: The* USCS symbol used with this test refers only to the minus No. 40** (Minus No. 40 sieve material, Air dried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	31	N	L	O	U
Wt. of Tare & Wet Sample (g):	1095.29	32.40	33.57	32.61	L
Wt. of Tare & Dry Sample (g):	924.32	29.66	30.46	29.62	T
Weight of Tare (g):	201.88	23.30	23.57	23.33	I
Weight of Water (g):	171.0	2.7	3.1	3.0	P
Weight of Dry Sample (g):	722.4	6.4	6.9	6.3	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**23.7**	**43.1**	**45.1**	**47.5**	N
Number of Blows:		**35**	**25**	**18**	T

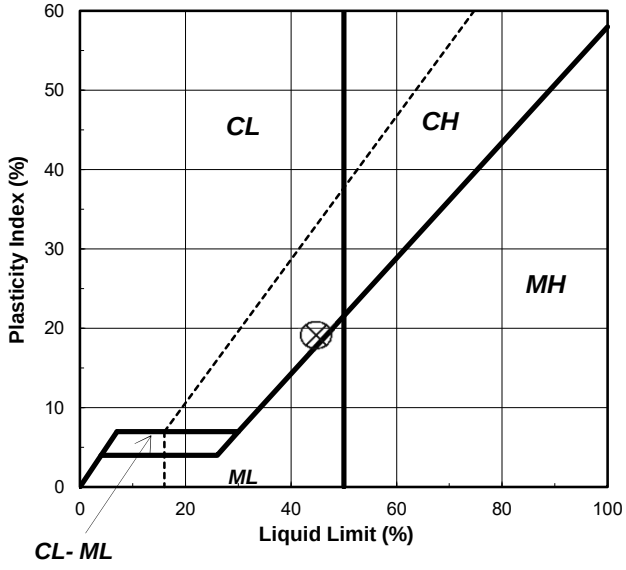
Plastic Limit Test	1	2	Range
Tare Number:	Q	C	
Wt. of Tare & Wet Sample (g):	34.18	34.03	
Wt. of Tare & Dry Sample (g):	31.98	31.86	
Weight of Tare (g):	23.62	23.60	
Weight of Water (g):	2.2	2.2	
Weight of Dry Sample (g):	8.4	8.3	
Moisture Content (%):	**26.3**	**26.3**	**0.0**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**45**
Plastic Limit (%):	**26**
Plasticity Index (%):	**19**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



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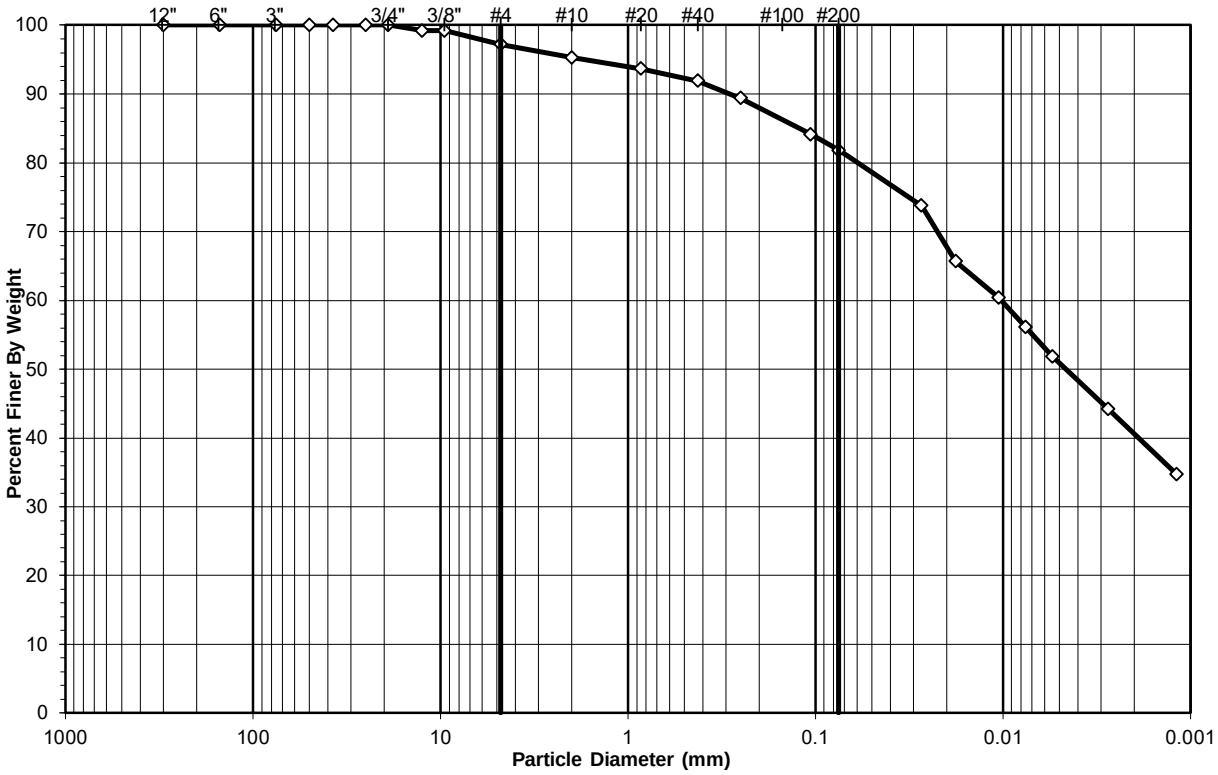
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW4-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	23.5-25
Project No.:	N2022-051-001	Sample No.:	6
Lab ID:	N2022-051-001-039	Soil Color:	Brownish Orange

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer		USCS (%)		AASHTO (%)		ASTM (%)
				Gravel	4.69		
100	100.00	*Gravel*	2.78	*Sand*	13.47	*Gravel*	2.78
2	95.31	*Sand*	15.38	*Coarse Sand*	3.39	*Sand*	15.38
0.075	81.84	*Silt&Clay*	81.84	*Fine Sand*	10.08	*Silt*	30.98
0.05	78.61			*Silt & Clay*	81.84	Clay	50.86
0.005	50.86			Silt	41.25		
0.002	40.59			Clay	40.59		

AASHTO (GI):
A - 7 - 6 (17)

USCS Symbol:
CL, TESTED

USCS Classification
LEAN CLAY WITH SAND

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW4-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	23.5-25
Project No.:	N2022-051-001	Sample No.:	6
Lab ID:	N2022-051-001-039	Soil Color:	Brownish Orange

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	31	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	592.58	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	592.58	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	201.88	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	390.70	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	390.70
Dry Weight of - 3/4" Sample (g):	390.70	Weight of minus #200 Material (g):	319.75
Wet Weight of +3/4" Sample (g):	0.00	Weight of plus #200 Material (g):	70.95
Dry Weight of +3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	390.70		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	3.11		0.80	0.80	99.20	**99.20**
3/8"	9.50	0.00		0.00	0.80	99.20	**99.20**
#4	4.75	7.76		1.99	2.78	97.22	**97.22**
#10	2.00	7.44		1.90	4.69	95.31	**95.31**
#20	0.85	6.37	(**)	1.63	6.32	93.68	**93.68**
#40	0.425	6.89		1.76	8.08	91.92	**91.92**
#60	0.250	9.79		2.51	10.59	89.41	**89.41**
#140	0.106	20.48		5.24	15.83	84.17	**84.17**
#200	0.075	9.11		2.33	18.16	81.84	**81.84**
Pan	-	319.75		81.84	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

Tested By JV Date 4/12/22 Checked By NC Date 4/15/22

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW4-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	23.5-25
Project No.:	N2022-051-001	Sample No.:	6
Lab ID:	N2022-051-001-039	Soil Color:	Brownish Orange

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	44.50	24.0	5.8	38.7	90.1	0.01282	0.0272	**73.8**
5	40.25	24.0	5.8	34.5	80.2	0.01282	0.0179	**65.7**
15	37.50	24.0	5.8	31.7	73.8	0.01282	0.0105	**60.4**
30	35.25	24.0	5.8	29.5	68.6	0.01282	0.0076	**56.1**
60	33.00	24.0	5.8	27.2	63.3	0.01282	0.0055	**51.8**
250	29.00	24.0	5.8	23.2	54.0	0.01282	0.0028	**44.2**
1440	24.00	24.0	5.8	18.2	42.4	0.01282	0.0012	**34.7**

Soil Specimen Data		**Other Corrections**		
Tare No.	17			
Wt. of Tare & Dry Material (g):	346.96	a - Factor	0.993	
Weight of Tare (g):	299.32			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	81.84	
Weight of Dry Material (g):	42.64			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 45

PL = 26

PI = 19

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW4-3
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	18.5-20
Project No.:	N2022-051-001	Sample No.:	5
Lab ID:	N2022-051-001-043	Soil Description:	ORANGISH BROWN LEAN CLAY

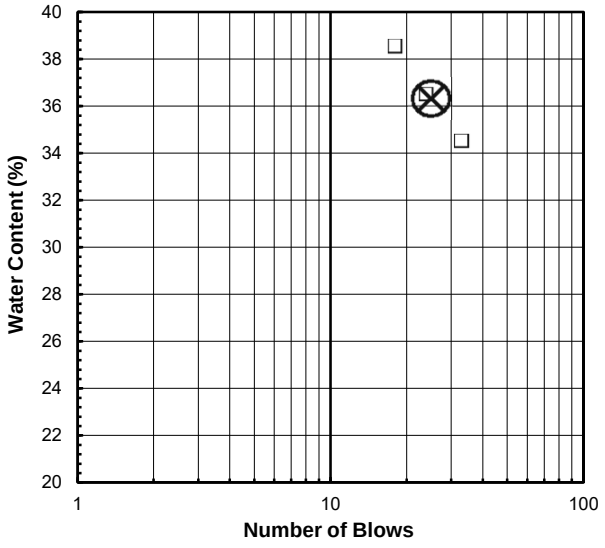
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	26	B	P	H	U
Wt. of Tare & Wet Sample (g):	927.02	33.72	33.45	32.61	L
Wt. of Tare & Dry Sample (g):	813.85	31.08	30.85	30.04	T
Weight of Tare (g):	198.55	23.43	23.72	23.37	I
Weight of Water (g):	113.2	2.6	2.6	2.6	P
Weight of Dry Sample (g):	615.3	7.7	7.1	6.7	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**18.4**	**34.5**	**36.5**	**38.5**	N
Number of Blows:		**33**	**24**	**18**	T

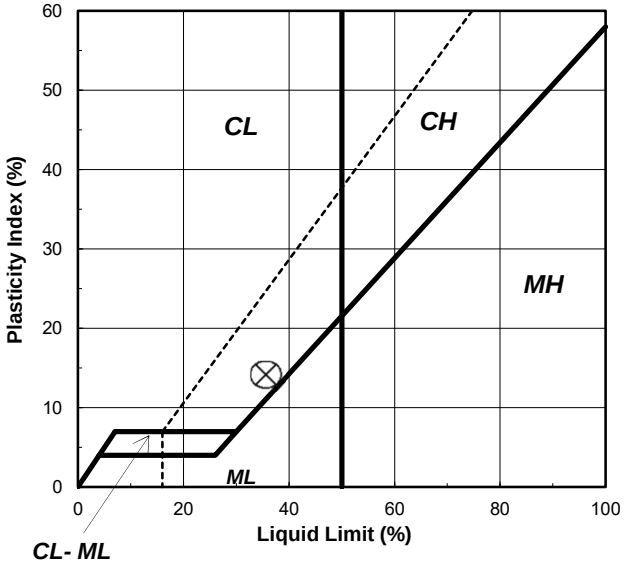
Plastic Limit Test	1	2	Range
Tare Number:	U	K	
Wt. of Tare & Wet Sample (g):	36.73	34.60	
Wt. of Tare & Dry Sample (g):	34.39	32.65	
Weight of Tare (g):	23.68	23.64	
Weight of Water (g):	2.3	2.0	
Weight of Dry Sample (g):	10.7	9.0	
Moisture Content (%):	**21.8**	**21.6**	**0.2**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**36**
Plastic Limit (%):	**22**
Plasticity Index (%):	**14**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



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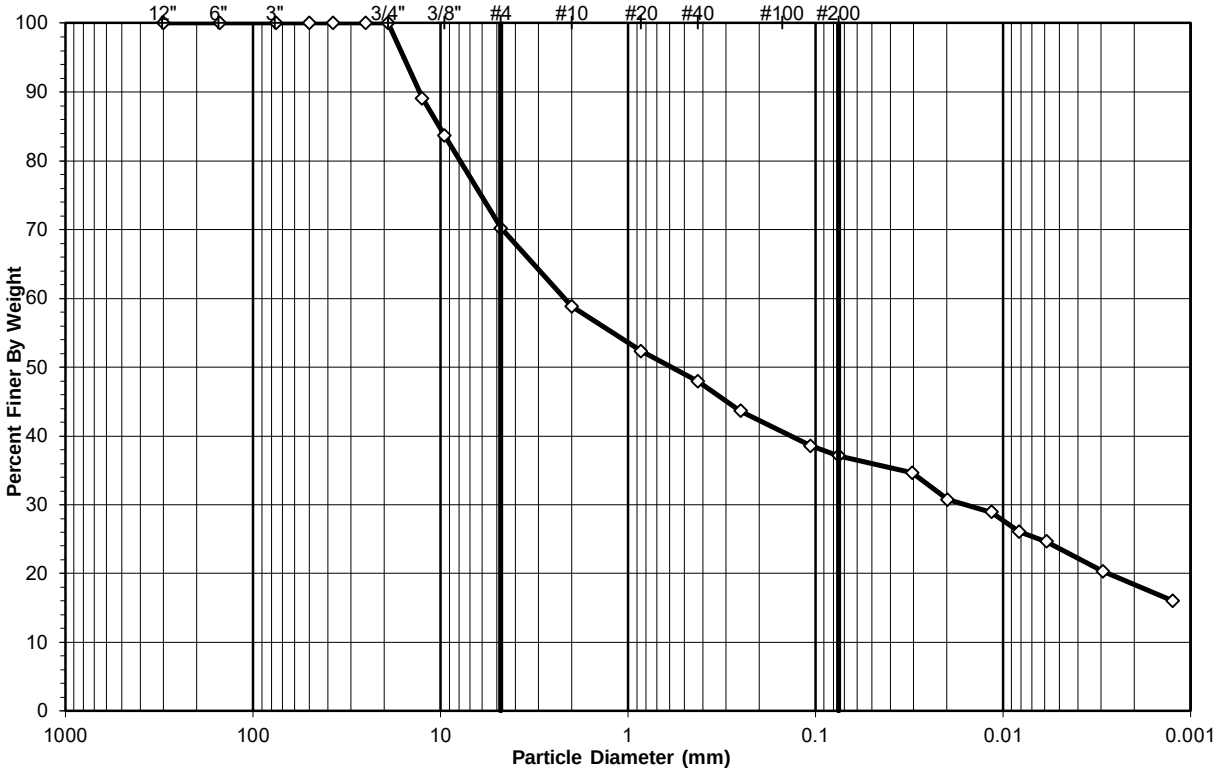
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW4-3
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	18.5-20
Project No.:	N2022-051-001	Sample No.:	5
Lab ID:	N2022-051-001-043	Soil Color:	Orangish Brown

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer		USCS (%)		AASHTO (%)		ASTM (%)
				Gravel	41.18		
100	100.00	*Gravel*	29.79	*Sand*	21.72	*Gravel*	29.79
2	58.82	*Sand*	33.11	*Coarse Sand*	10.88	*Sand*	33.11
0.075	37.10	*Silt&Clay*	37.10	*Fine Sand*	10.84	*Silt*	13.46
0.05	35.99			*Silt & Clay*	37.10	Clay	23.64
0.005	23.64			Silt	18.68		
0.002	18.42			Clay	18.42		

AASHTO (GI): **USCS Symbol:** **D50 = 0.59**

A - 6 (1) ***SC, TESTED***

USCS Classification

CLAYEY SAND WITH GRAVEL

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW4-3
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	18.5-20
Project No.:	N2022-051-001	Sample No.:	5
Lab ID:	N2022-051-001-043	Soil Color:	Orangish Brown

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	26	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	522.45	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	522.45	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	198.55	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	323.90	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	323.90
Dry Weight of - 3/4" Sample (g):	323.90	Weight of minus #200 Material (g):	120.18
Wet Weight of +3/4" Sample (g):	0.00	Weight of plus #200 Material (g):	203.72
Dry Weight of +3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	323.90		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	35.33		10.91	10.91	89.09	**89.09**
3/8"	9.50	17.64		5.45	16.35	83.65	**83.65**
#4	4.75	43.51		13.43	29.79	70.21	**70.21**
#10	2.00	36.89		11.39	41.18	58.82	**58.82**
#20	0.85	21.13	(**)	6.52	47.70	52.30	**52.30**
#40	0.425	14.11		4.36	52.06	47.94	**47.94**
#60	0.250	14.00		4.32	56.38	43.62	**43.62**
#140	0.106	16.48		5.09	61.47	38.53	**38.53**
#200	0.075	4.63		1.43	62.90	37.10	**37.10**
Pan	-	120.18		37.10	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW4-3
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	18.5-20
Project No.:	N2022-051-001	Sample No.:	5
Lab ID:	N2022-051-001-043	Soil Color:	Orangish Brown

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	30.00	24.0	5.8	24.2	93.4	0.01282	0.0306	**34.6**
5	27.25	24.0	5.8	21.5	82.8	0.01282	0.0197	**30.7**
15	26.00	24.0	5.8	20.2	77.9	0.01282	0.0115	**28.9**
30	24.00	24.0	5.8	18.2	70.2	0.01282	0.0082	**26.1**
60	23.00	24.0	5.8	17.2	66.4	0.01282	0.0059	**24.6**
250	20.00	24.0	5.8	14.2	54.8	0.01282	0.0029	**20.3**
1440	17.00	24.0	5.8	11.2	43.2	0.01282	0.0012	**16.0**

Soil Specimen Data		Other Corrections		
Tare No.	18			
Wt. of Tare & Dry Material (g):	330.66	a - Factor	0.993	
Weight of Tare (g):	299.92			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	37.10	
Weight of Dry Material (g):	25.74			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 36

PL = 22

PI = 14

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW5-2
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	8.5-10
Project No.:	N2022-051-001	Sample No.:	3
Lab ID:	N2022-051-001-055	Soil Description:	RED LEAN CLAY

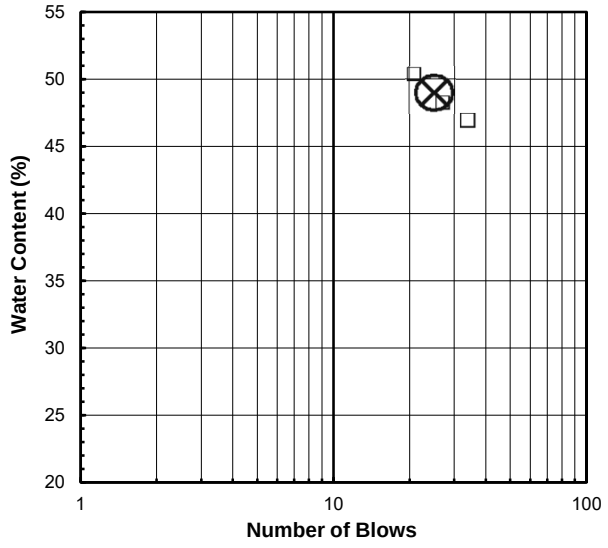
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	Z18	D	S	W	U
Wt. of Tare & Wet Sample (g):	756.47	33.37	33.50	33.26	L
Wt. of Tare & Dry Sample (g):	635.97	30.22	30.27	30.05	T
Weight of Tare (g):	200.56	23.50	23.57	23.67	I
Weight of Water (g):	120.5	3.2	3.2	3.2	P
Weight of Dry Sample (g):	435.4	6.7	6.7	6.4	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**27.7**	**46.9**	**48.2**	**50.3**	N
Number of Blows:		**34**	**27**	**21**	T

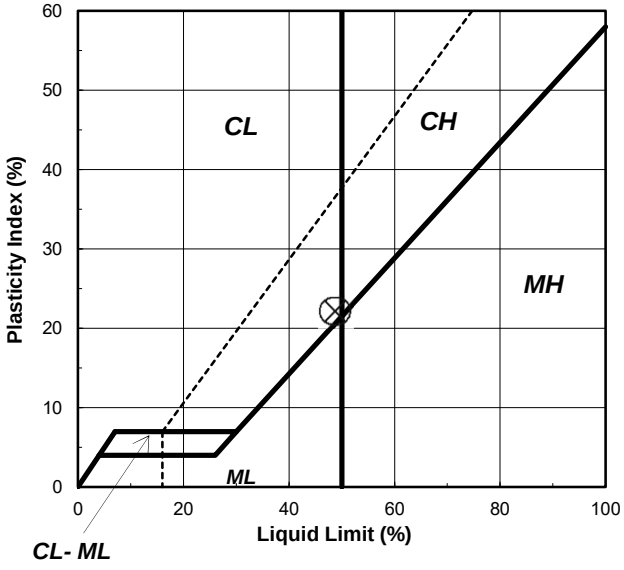
Plastic Limit Test	1	2	Range
Tare Number:	13	14	
Wt. of Tare & Wet Sample (g):	27.95	26.78	
Wt. of Tare & Dry Sample (g):	26.11	25.01	
Weight of Tare (g):	19.35	18.58	
Weight of Water (g):	1.8	1.8	
Weight of Dry Sample (g):	6.8	6.4	
Moisture Content (%):	**27.2**	**27.5**	**-0.3**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**49**
Plastic Limit (%):	**27**
Plasticity Index (%):	**22**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



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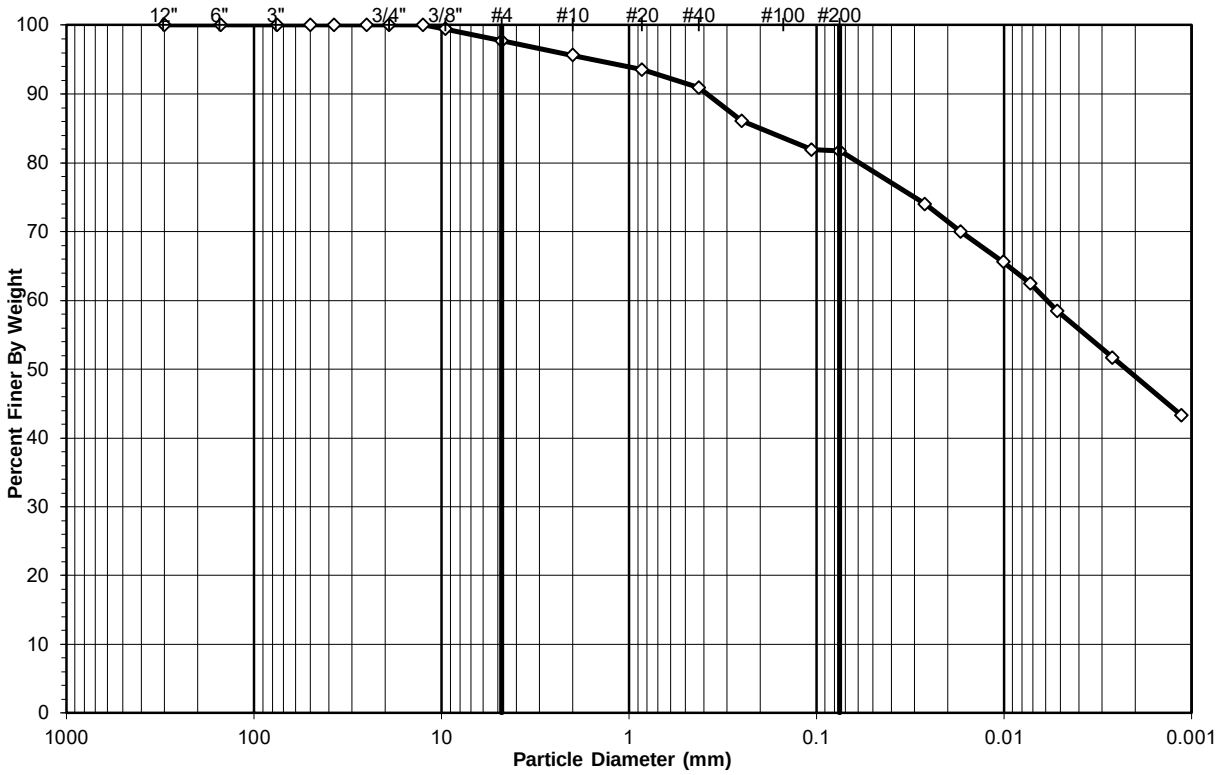
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW5-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	8.5-10
Project No.:	N2022-051-001	Sample No.:	3
Lab ID:	N2022-051-001-055	Soil Color:	Red

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer		USCS (%)		AASHTO (%)		ASTM (%)
				Gravel	4.36		
100	100.00	*Gravel*	2.24	*Sand*	13.94	*Gravel*	2.24
2	95.64	*Sand*	16.06	*Coarse Sand*	4.69	*Sand*	16.06
0.075	81.70	*Silt&Clay*	81.70	*Fine Sand*	9.24	*Silt*	23.62
0.05	78.70			*Silt & Clay*	81.70	Clay	58.07
0.005	58.07			Silt	32.76		
0.002	48.94			Clay	48.94		

AASHTO (GI):
A - 7 - 6 (19)

USCS Symbol:
CL, TESTED

USCS Classification
LEAN CLAY WITH SAND

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW5-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	8.5-10
Project No.:	N2022-051-001	Sample No.:	3
Lab ID:	N2022-051-001-055	Soil Color:	Red

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	Z18	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	415.47	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	415.47	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	200.56	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	214.91	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	214.91
Dry Weight of - 3/4" Sample (g):	214.91	Weight of minus #200 Material (g):	175.58
Wet Weight of +3/4" Sample (g):	0.00	Weight of plus #200 Material (g):	39.33
Dry Weight of +3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	214.91		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00		0.00	0.00	100.00	**100.00**
3/8"	9.50	1.19		0.55	0.55	99.45	**99.45**
#4	4.75	3.63		1.69	2.24	97.76	**97.76**
#10	2.00	4.56		2.12	4.36	95.64	**95.64**
#20	0.85	4.50	(**)	2.09	6.46	93.54	**93.54**
#40	0.425	5.59		2.60	9.06	90.94	**90.94**
#60	0.250	10.42		4.85	13.91	86.09	**86.09**
#140	0.106	8.94		4.16	18.07	81.93	**81.93**
#200	0.075	0.50		0.23	18.30	81.70	**81.70**
Pan	-	175.58		81.70	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW5-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	8.5-10
Project No.:	N2022-051-001	Sample No.:	3
Lab ID:	N2022-051-001-055	Soil Color:	Red

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	47.50	24.2	5.7	41.8	90.6	0.01279	0.0264	**74.0**
5	45.25	24.2	5.7	39.5	85.7	0.01279	0.0170	**70.0**
15	42.75	24.2	5.7	37.0	80.3	0.01279	0.0101	**65.6**
30	41.00	24.2	5.7	35.3	76.5	0.01279	0.0072	**62.5**
60	38.75	24.2	5.7	33.0	71.6	0.01279	0.0052	**58.5**
250	35.00	23.9	5.8	29.2	63.3	0.01284	0.0026	**51.7**
1440	30.00	24.8	5.6	24.4	53.0	0.01270	0.0011	**43.3**

Soil Specimen Data		**Other Corrections**		
Tare No.	1			
Wt. of Tare & Dry Material (g):	357.15	a - Factor	0.993	
Weight of Tare (g):	306.36			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	81.70	
Weight of Dry Material (g):	45.79			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 49

PL = 27

PI = 22

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW6-2
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	1-2.5
Project No.:	N2022-051-001	Sample No.:	1
Lab ID:	N2022-051-001-061	Soil Description:	BROWN FAT CLAY

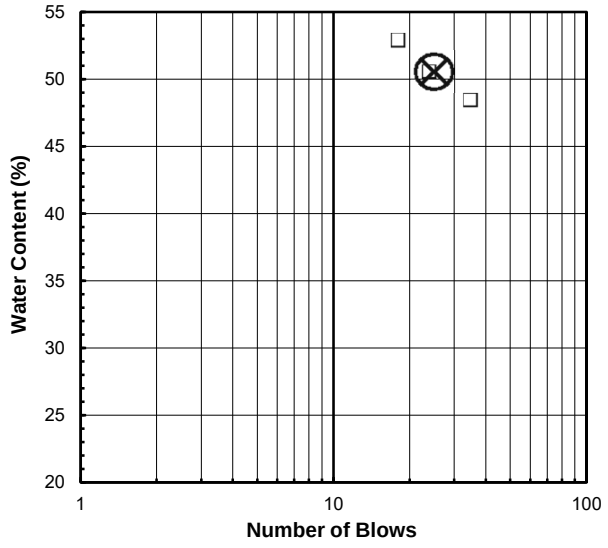
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	51	M	G	X	U
Wt. of Tare & Wet Sample (g):	623.33	33.15	33.96	32.73	L
Wt. of Tare & Dry Sample (g):	527.31	30.06	30.48	29.52	T
Weight of Tare (g):	198.71	23.68	23.59	23.45	I
Weight of Water (g):	96.0	3.1	3.5	3.2	P
Weight of Dry Sample (g):	328.6	6.4	6.9	6.1	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**29.2**	**48.4**	**50.5**	**52.9**	N
Number of Blows:		**35**	**24**	**18**	T

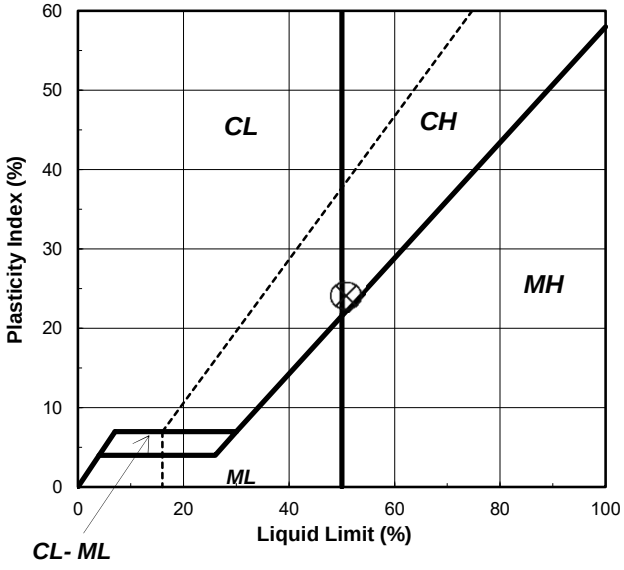
Plastic Limit Test	1	2	Range
Tare Number:	A	J	
Wt. of Tare & Wet Sample (g):	30.34	34.41	
Wt. of Tare & Dry Sample (g):	28.89	32.07	
Weight of Tare (g):	23.59	23.55	
Weight of Water (g):	1.5	2.3	
Weight of Dry Sample (g):	5.3	8.5	
Moisture Content (%):	**27.4**	**27.5**	**-0.1**
Note: The acceptable range of the two Moisture Contents is ±			1.4

Test Results	
Liquid Limit (%):	**51**
Plastic Limit (%):	**27**
Plasticity Index (%):	**24**
USCS Symbol:	**CH**

Flow Curve



Plasticity Chart



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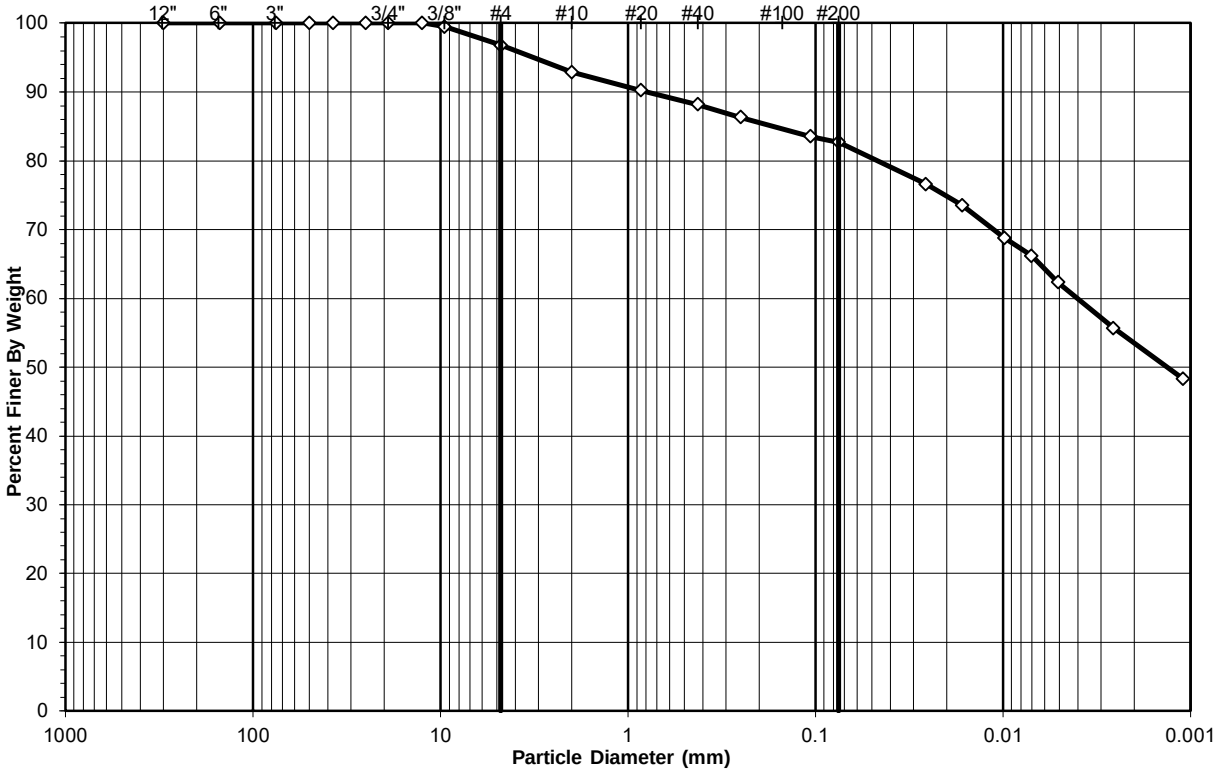
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW6-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	1-2.5
Project No.:	N2022-051-001	Sample No.:	1
Lab ID:	N2022-051-001-061	Soil Color:	Brown

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer		USCS (%)		AASHTO (%)		ASTM (%)
				Gravel	7.09		
100	100.00	*Gravel*	3.19	*Sand*	10.21	*Gravel*	3.19
2	92.91	*Sand*	14.11	*Coarse Sand*	4.73	*Sand*	14.11
0.075	82.70	*Silt&Clay*	82.70	*Fine Sand*	5.48	*Silt*	20.55
0.05	80.38			*Silt & Clay*	82.70	Clay	62.16
0.005	62.16			Silt	29.22		
0.002	53.49			Clay	53.49		

AASHTO (GI):
A - 7 - 6 (22)

USCS Symbol:
CH, TESTED

USCS Classification
FAT CLAY WITH SAND

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW6-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	1-2.5
Project No.:	N2022-051-001	Sample No.:	1
Lab ID:	N2022-051-001-061	Soil Color:	Brown

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	51	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	418.85	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	418.85	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	198.71	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	220.14	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	220.14
Dry Weight of - 3/4" Sample (g):	220.14	Weight of minus #200 Material (g):	182.06
Wet Weight of +3/4" Sample (g):	0.00	Weight of plus #200 Material (g):	38.08
Dry Weight of +3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	220.14		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00		0.00	0.00	100.00	**100.00**
3/8"	9.50	1.07		0.49	0.49	99.51	**99.51**
#4	4.75	5.95		2.70	3.19	96.81	**96.81**
#10	2.00	8.58		3.90	7.09	92.91	**92.91**
#20	0.85	5.92	(**)	2.69	9.78	90.22	**90.22**
#40	0.425	4.49		2.04	11.82	88.18	**88.18**
#60	0.250	4.09		1.86	13.67	86.33	**86.33**
#140	0.106	6.14		2.79	16.46	83.54	**83.54**
#200	0.075	1.84		0.84	17.30	82.70	**82.70**
Pan	-	182.06		82.70	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW6-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	1-2.5
Project No.:	N2022-051-001	Sample No.:	1
Lab ID:	N2022-051-001-061	Soil Color:	Brown

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	50.00	24.2	5.7	44.3	92.6	0.01279	0.0257	**76.6**
5	48.25	24.2	5.7	42.5	88.9	0.01279	0.0166	**73.6**
15	45.50	24.2	5.7	39.8	83.2	0.01279	0.0098	**68.8**
30	44.00	24.2	5.7	38.3	80.0	0.01279	0.0070	**66.2**
60	41.75	24.2	5.7	36.0	75.3	0.01279	0.0051	**62.3**
250	38.00	23.9	5.8	32.2	67.3	0.01284	0.0026	**55.7**
1440	33.50	24.8	5.6	27.9	58.4	0.01270	0.0011	**48.3**

Soil Specimen Data		Other Corrections		
Tare No.	2			
Wt. of Tare & Dry Material (g):	362.89	a - Factor	0.993	
Weight of Tare (g):	310.43			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	82.70	
Weight of Dry Material (g):	47.46			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 51

PL = 27

PI = 24

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW6-4
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	8.5-10
Project No.:	N2022-051-001	Sample No.:	3
Lab ID:	N2022-051-001-065	Soil Description:	BROWNISH ORANGE LEAN CLAY

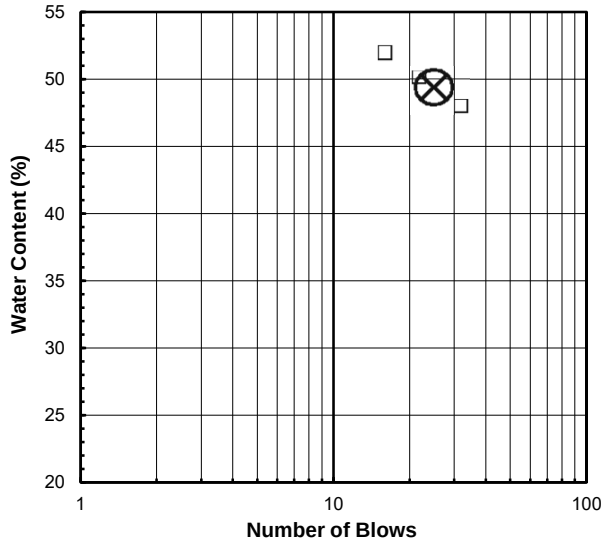
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	Z10	R	E	V	U
Wt. of Tare & Wet Sample (g):	687.11	32.61	32.04	33.39	L
Wt. of Tare & Dry Sample (g):	595.22	29.63	29.18	30.02	T
Weight of Tare (g):	199.79	23.42	23.47	23.53	I
Weight of Water (g):	91.9	3.0	2.9	3.4	P
Weight of Dry Sample (g):	395.4	6.2	5.7	6.5	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**23.2**	**48.0**	**50.1**	**51.9**	N
Number of Blows:		**32**	**22**	**16**	T

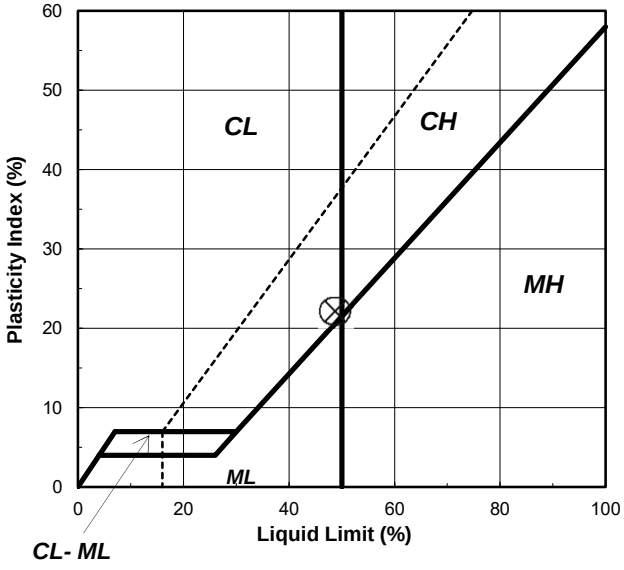
Plastic Limit Test	1	2	Range
Tare Number:	F	T	
Wt. of Tare & Wet Sample (g):	33.09	33.67	
Wt. of Tare & Dry Sample (g):	31.08	31.49	
Weight of Tare (g):	23.71	23.54	
Weight of Water (g):	2.0	2.2	
Weight of Dry Sample (g):	7.4	8.0	
Moisture Content (%):	**27.3**	**27.4**	**-0.1**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**49**
Plastic Limit (%):	**27**
Plasticity Index (%):	**22**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



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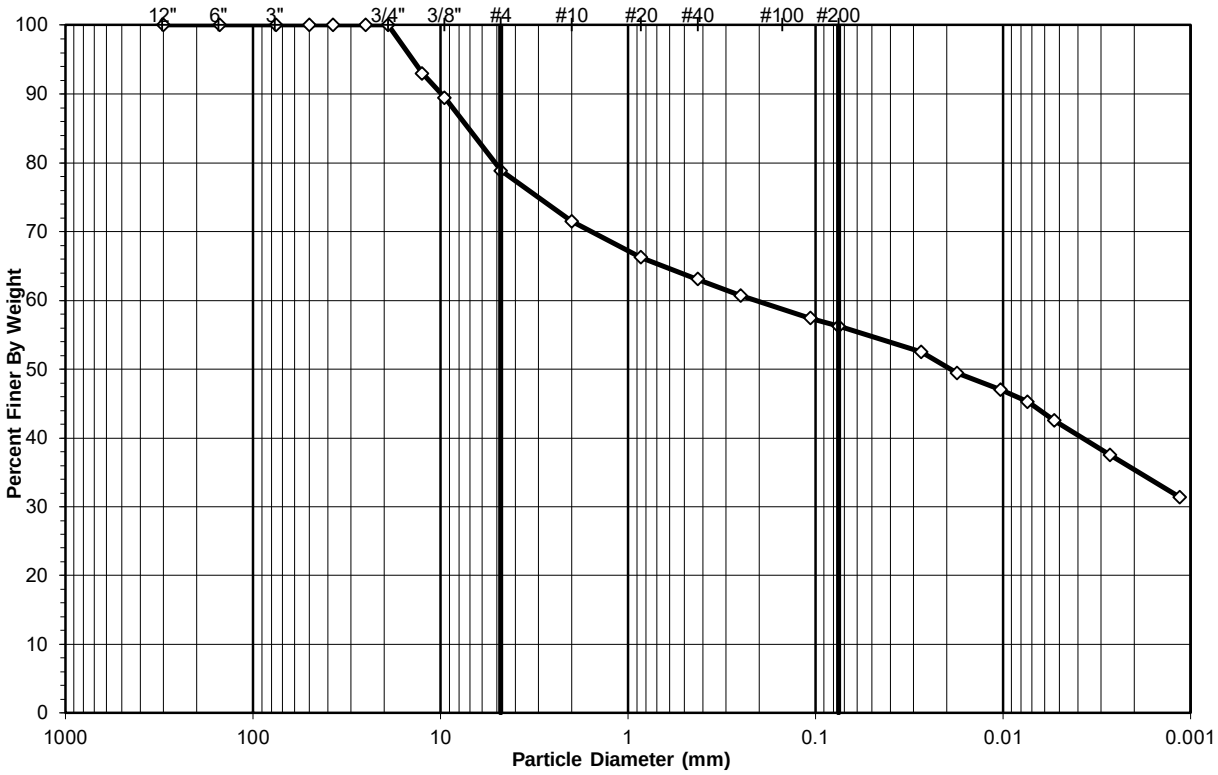
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW6-4
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	8.5-10
Project No.:	N2022-051-001	Sample No.:	3
Lab ID:	N2022-051-001-065	Soil Color:	Brownish Orange

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer		USCS (%)		AASHTO (%)		ASTM (%)	
				Gravel	28.53			
100	100.00	*Gravel*	21.17	*Sand*	15.26	*Gravel*	21.17
2	71.47	*Sand*	22.62	*Coarse Sand*	8.39	*Sand*	22.62
0.075	56.20	*Silt&Clay*	56.20	*Fine Sand*	6.87	*Silt*	14.13
0.05	54.73			*Silt & Clay*	56.20	Clay	42.07
0.005	42.07			Silt	20.82		
0.002	35.38			Clay	35.38		

AASHTO (GI):
A - 7 - 6 (10)

USCS Symbol:
CL, TESTED

USCS Classification
SANDY LEAN CLAY WITH GRAVEL

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW6-4
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	8.5-10
Project No.:	N2022-051-001	Sample No.:	3
Lab ID:	N2022-051-001-065	Soil Color:	Brownish Orange

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	Z10	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	494.07	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	494.07	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	199.79	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	294.28	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	294.28
Dry Weight of - 3/4" Sample (g):	294.28	Weight of minus #200 Material (g):	165.40
Wet Weight of +3/4" Sample (g):	0.00	Weight of plus #200 Material (g):	128.88
Dry Weight of +3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	294.28		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	20.61		7.00	7.00	93.00	**93.00**
3/8"	9.50	10.45		3.55	10.55	89.45	**89.45**
#4	4.75	31.24		10.62	21.17	78.83	**78.83**
#10	2.00	21.67		7.36	28.53	71.47	**71.47**
#20	0.85	15.39	(**)	5.23	33.76	66.24	**66.24**
#40	0.425	9.30		3.16	36.92	63.08	**63.08**
#60	0.250	7.00		2.38	39.30	60.70	**60.70**
#140	0.106	9.71		3.30	42.60	57.40	**57.40**
#200	0.075	3.51		1.19	43.80	56.20	**56.20**
Pan	-	165.40		56.20	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW6-4
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	8.5-10
Project No.:	N2022-051-001	Sample No.:	3
Lab ID:	N2022-051-001-065	Soil Color:	Brownish Orange

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	43.75	24.2	5.7	38.0	93.4	0.01279	0.0273	**52.5**
5	41.50	24.2	5.7	35.8	87.9	0.01279	0.0176	**49.4**
15	39.75	24.2	5.7	34.0	83.6	0.01279	0.0103	**47.0**
30	38.50	24.2	5.7	32.8	80.5	0.01279	0.0074	**45.3**
60	36.50	24.2	5.7	30.8	75.6	0.01279	0.0053	**42.5**
250	33.00	23.8	5.9	27.1	66.7	0.01285	0.0027	**37.5**
1440	28.25	24.8	5.6	22.7	55.8	0.01270	0.0011	**31.3**

Soil Specimen Data		**Other Corrections**		
Tare No.	3			
Wt. of Tare & Dry Material (g):	356.80	a - Factor	0.993	
Weight of Tare (g):	311.41			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	56.20	
Weight of Dry Material (g):	40.39			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 49

PL = 27

PI = 22

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW6-6
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	13.5-14.9
Project No.:	N2022-051-001	Sample No.:	4
Lab ID:	N2022-051-001-069	Soil Description:	GRAYISH GREEN LEAN CLAY

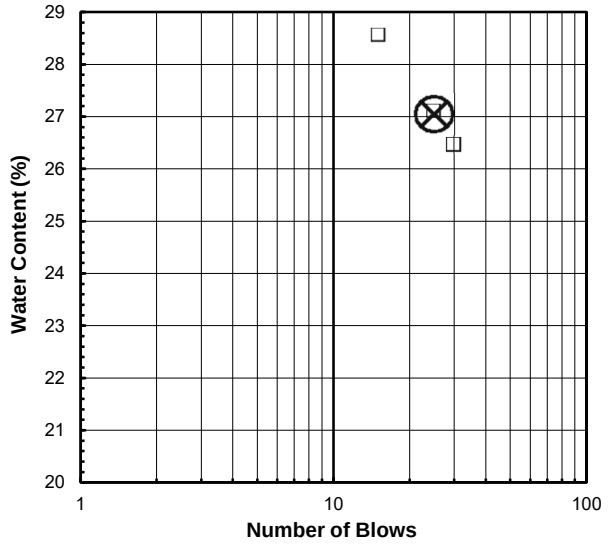
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	1569	1	2	3	U
Wt. of Tare & Wet Sample (g):	862.84	26.80	28.13	28.66	L
Wt. of Tare & Dry Sample (g):	817.33	24.76	26.06	26.45	T
Weight of Tare (g):	306.70	17.05	18.42	18.71	I
Weight of Water (g):	45.5	2.0	2.1	2.2	P
Weight of Dry Sample (g):	510.6	7.7	7.6	7.7	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**8.9**	**26.5**	**27.1**	**28.6**	N
Number of Blows:		**30**	**25**	**15**	T

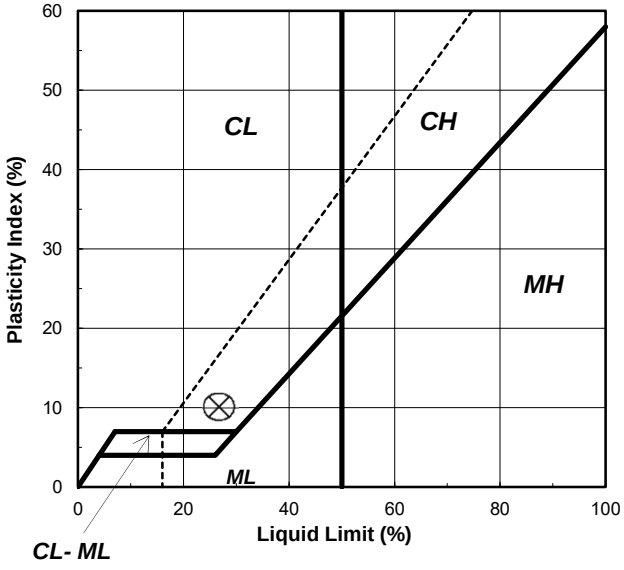
Plastic Limit Test	1	2	Range
Tare Number:	15	16	
Wt. of Tare & Wet Sample (g):	26.59	27.30	
Wt. of Tare & Dry Sample (g):	25.51	26.00	
Weight of Tare (g):	19.30	18.55	
Weight of Water (g):	1.1	1.3	
Weight of Dry Sample (g):	6.2	7.5	
Moisture Content (%):	**17.4**	**17.4**	**-0.1**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**27**
Plastic Limit (%):	**17**
Plasticity Index (%):	**10**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



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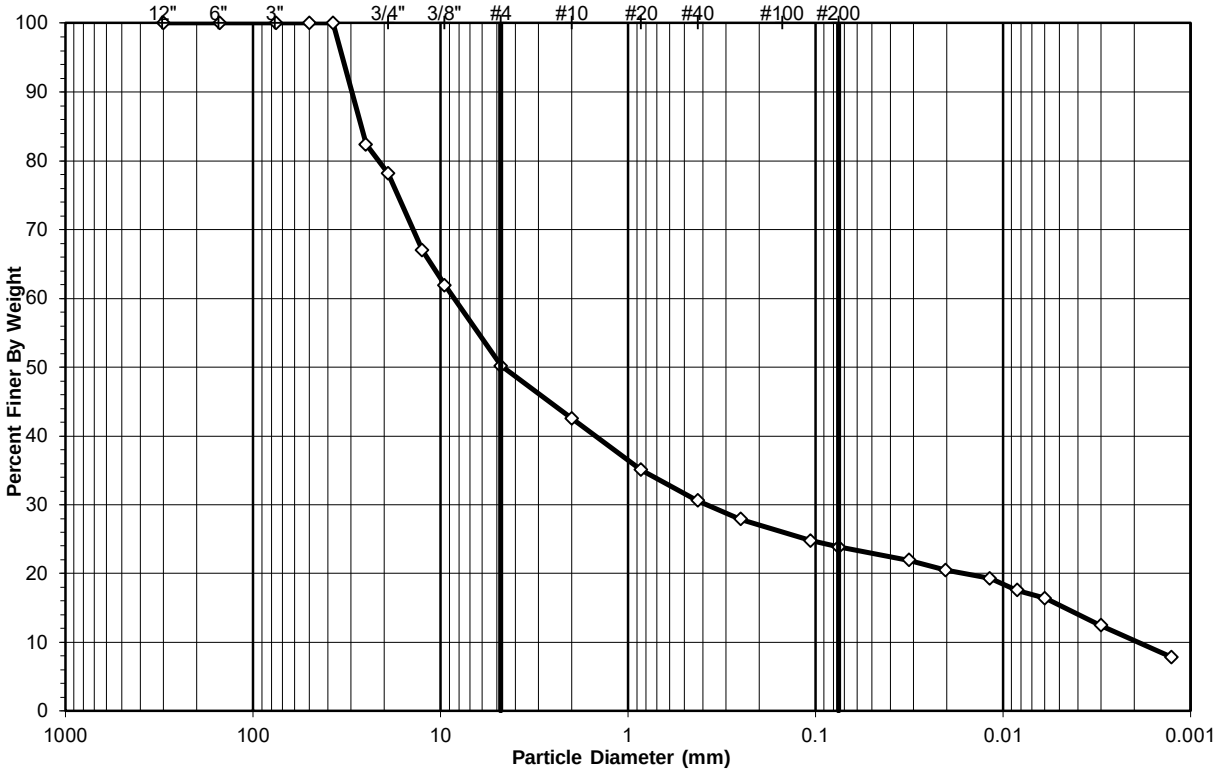
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW6-6
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	13.5-14.9
Project No.:	N2022-051-001	Sample No.:	4
Lab ID:	N2022-051-001-069	Soil Color:	Grayish Green

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer		USCS (%)		AASHTO (%)		ASTM (%)
				Gravel	57.45		
100	100.00	*Gravel*	49.85	*Sand*	18.72	*Gravel*	49.85
2	42.55	*Sand*	26.32	*Coarse Sand*	11.97	*Sand*	26.32
0.075	23.83	*Silt&Clay*	23.83	*Fine Sand*	6.75	*Silt*	8.46
0.05	22.94			*Silt & Clay*	23.83	Clay	15.38
0.005	15.38			Silt	13.56		
0.002	10.28			Clay	10.28		

AASHTO (GI): **USCS Symbol:** **D50 = 4.67**

A - 2 - 4 **(0)** ***GC, TESTED***

USCS Classification

CLAYEY GRAVEL WITH SAND

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW6-6
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	13.5-14.9
Project No.:	N2022-051-001	Sample No.:	4
Lab ID:	N2022-051-001-069	Soil Color:	Grayish Green

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	1569	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	570.41	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	570.41	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	306.70	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	263.71	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	263.71
Dry Weight of - 3/4" Sample (g):	206.15	Weight of minus #200 Material (g):	62.85
Wet Weight of +3/4" Sample (g):	57.56	Weight of plus #200 Material (g):	200.86
Dry Weight of +3/4" Sample (g):	57.56		
Total Dry Weight of Sample (g):	263.71		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	46.51		17.64	17.64	82.36	**82.36**
3/4"	19.0	11.05		4.19	21.83	78.17	**78.17**
1/2"	12.5	29.54		11.20	33.03	66.97	**66.97**
3/8"	9.50	13.42		5.09	38.12	61.88	**61.88**
#4	4.75	30.93		11.73	49.85	50.15	**50.15**
#10	2.00	20.05		7.60	57.45	42.55	**42.55**
#20	0.85	19.72	(**)	7.48	64.93	35.07	**35.07**
#40	0.425	11.85		4.49	69.42	30.58	**30.58**
#60	0.250	7.08		2.68	72.11	27.89	**27.89**
#140	0.106	8.24		3.12	75.23	24.77	**24.77**
#200	0.075	2.47		0.94	76.17	23.83	**23.83**
Pan	-	62.85		23.83	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW6-6
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	13.5-14.9
Project No.:	N2022-051-001	Sample No.:	4
Lab ID:	N2022-051-001-069	Soil Color:	Grayish Green

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	24.50	24.2	5.7	18.8	92.1	0.01279	0.0317	**21.9**
5	23.25	24.2	5.7	17.5	85.9	0.01279	0.0202	**20.5**
15	22.25	24.2	5.7	16.5	81.0	0.01279	0.0117	**19.3**
30	20.75	24.2	5.7	15.0	73.7	0.01279	0.0084	**17.6**
60	19.75	24.2	5.7	14.0	68.8	0.01279	0.0060	**16.4**
250	16.50	23.8	5.9	10.6	52.3	0.01285	0.0030	**12.5**
1440	12.25	24.8	5.6	6.7	32.8	0.01270	0.0013	**7.8**

Soil Specimen Data		**Other Corrections**		
Tare No.	4			
Wt. of Tare & Dry Material (g):	339.33	a - Factor	0.993	
Weight of Tare (g):	314.10			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	23.83	
Weight of Dry Material (g):	20.23			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 27

PL = 17

PI = 10

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW7-1
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	28.5-30
Project No.:	N2022-051-001	Sample No.:	10
Lab ID:	N2022-051-001-071	Soil Description:	BROWNISH GRAY LEAN CLAY

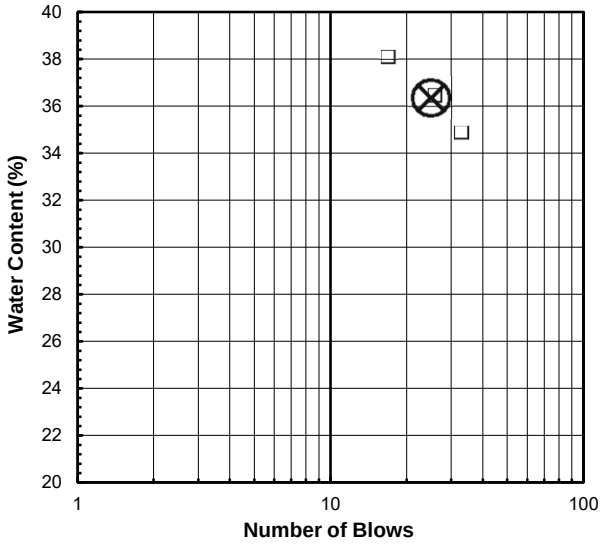
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	585	4	5	6	U
Wt. of Tare & Wet Sample (g):	1064.11	26.99	27.69	27.81	L
Wt. of Tare & Dry Sample (g):	950.94	24.63	25.25	25.29	T
Weight of Tare (g):	308.64	17.86	18.55	18.67	I
Weight of Water (g):	113.2	2.4	2.4	2.5	P
Weight of Dry Sample (g):	642.3	6.8	6.7	6.6	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**17.6**	**34.9**	**36.4**	**38.1**	N
Number of Blows:		**33**	**26**	**17**	T

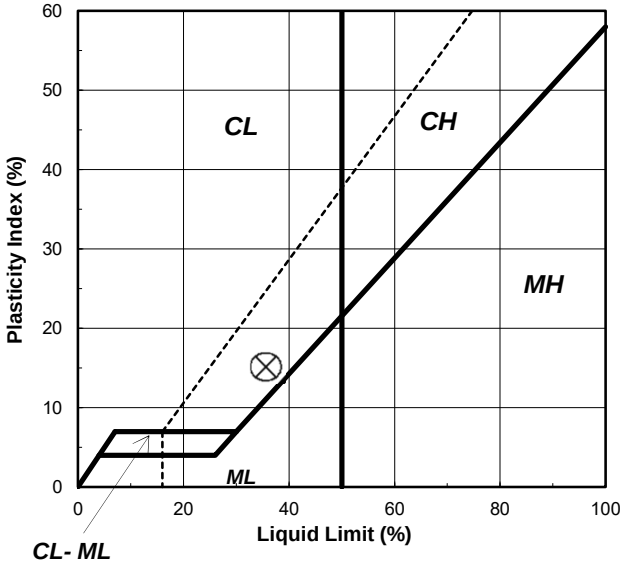
Plastic Limit Test	1	2	Range
Tare Number:	17	18	
Wt. of Tare & Wet Sample (g):	27.97	28.84	
Wt. of Tare & Dry Sample (g):	26.33	27.18	
Weight of Tare (g):	18.49	19.21	
Weight of Water (g):	1.6	1.7	
Weight of Dry Sample (g):	7.8	8.0	
Moisture Content (%):	**20.9**	**20.8**	**0.1**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**36**
Plastic Limit (%):	**21**
Plasticity Index (%):	**15**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



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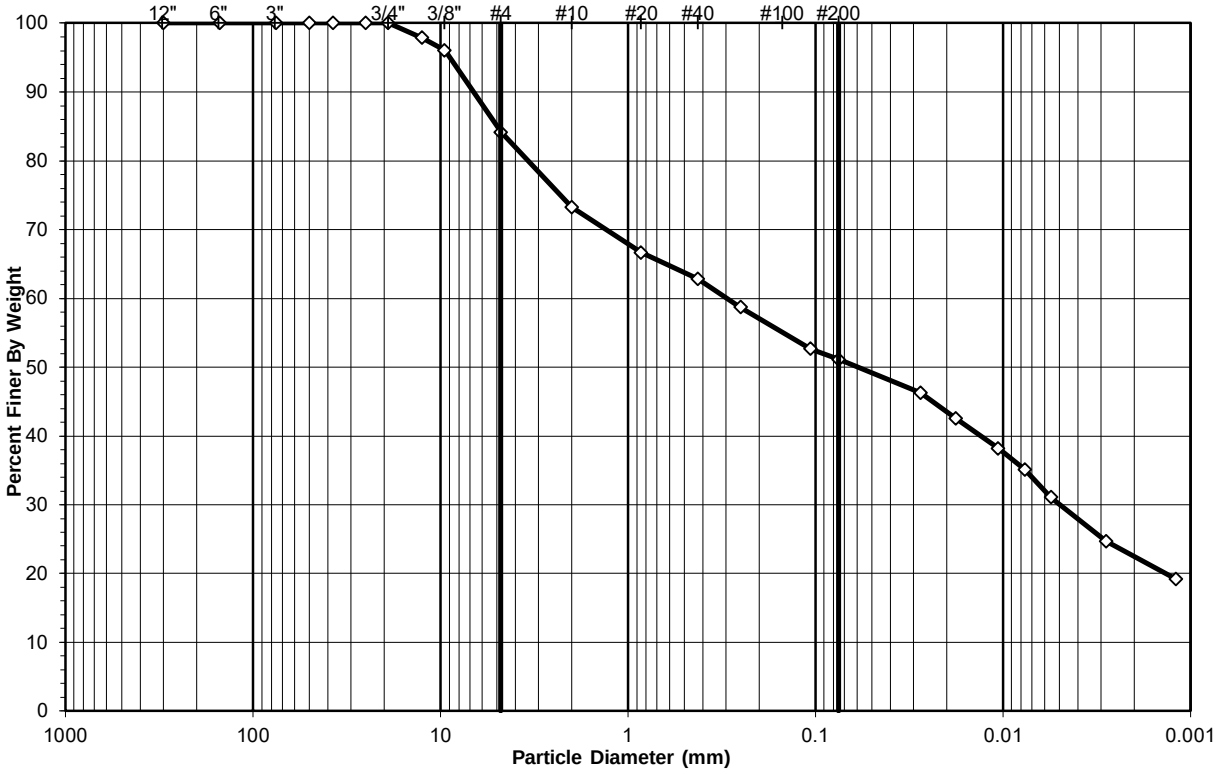
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW7-1
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	28.5-30
Project No.:	N2022-051-001	Sample No.:	10
Lab ID:	N2022-051-001-071	Soil Color:	Brownish Gray

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer		USCS (%)		AASHTO (%)		ASTM (%)	
				Gravel	26.76			
100	100.00	*Gravel*	15.85	*Sand*	22.12	*Gravel*	15.85
2	73.24	*Sand*	33.03	*Coarse Sand*	10.43	*Sand*	33.03
0.075	51.12	*Silt&Clay*	51.12	*Fine Sand*	11.70	*Silt*	21.04
0.05	49.16			*Silt & Clay*	51.12	Clay	30.08
0.005	30.08			Silt	28.66		
0.002	22.46			Clay	22.46		

AASHTO (GI): **USCS Symbol:**

A - 6 **(5)** ***CL, TESTED***

USCS Classification

SANDY LEAN CLAY WITH GRAVEL

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW7-1
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	28.5-30
Project No.:	N2022-051-001	Sample No.:	10
Lab ID:	N2022-051-001-071	Soil Color:	Brownish Gray

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	585	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	595.16	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	595.16	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	308.64	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	286.52	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	286.52
Dry Weight of - 3/4" Sample (g):	286.52	Weight of minus #200 Material (g):	146.48
Wet Weight of +3/4" Sample (g):	0.00	Weight of plus #200 Material (g):	140.04
Dry Weight of +3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	286.52		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	6.11		2.13	2.13	97.87	**97.87**
3/8"	9.50	5.18		1.81	3.94	96.06	**96.06**
#4	4.75	34.12		11.91	15.85	84.15	**84.15**
#10	2.00	31.25		10.91	26.76	73.24	**73.24**
#20	0.85	18.82	(**)	6.57	33.32	66.68	**66.68**
#40	0.425	11.05		3.86	37.18	62.82	**62.82**
#60	0.250	11.80		4.12	41.30	58.70	**58.70**
#140	0.106	17.32		6.04	47.34	52.66	**52.66**
#200	0.075	4.39		1.53	48.88	51.12	**51.12**
Pan	-	146.48		51.12	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

Tested By JV Date 4/12/22 Checked By NC Date 4/15/22

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW7-1
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	28.5-30
Project No.:	N2022-051-001	Sample No.:	10
Lab ID:	N2022-051-001-071	Soil Color:	Brownish Gray

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	43.00	24.2	5.7	37.3	90.5	0.01279	0.0275	**46.3**
5	40.00	24.2	5.7	34.3	83.2	0.01279	0.0179	**42.5**
15	36.50	24.2	5.7	30.8	74.7	0.01279	0.0106	**38.2**
30	34.00	24.2	5.7	28.3	68.6	0.01279	0.0076	**35.1**
60	30.75	24.2	5.7	25.0	60.7	0.01279	0.0055	**31.0**
250	25.75	23.8	5.9	19.9	48.3	0.01285	0.0028	**24.7**
1440	21.00	24.8	5.6	15.4	37.5	0.01270	0.0012	**19.2**

Soil Specimen Data		**Other Corrections**		
Tare No.	5			
Wt. of Tare & Dry Material (g):	358.36	a - Factor	0.993	
Weight of Tare (g):	312.47			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	51.12	
Weight of Dry Material (g):	40.89			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 36

PL = 21

PI = 15

Tested By JV Date 4/13/22 Checked By NC Date 4/15/22

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April 21, 2022

Project No. N2022-051-002

Emily Reed
GeoEngineers, Inc.
5409 Maryland Way, Suite 150
Brentwood, TN 37027

Transmittal
Laboratory Test Results
24647-009-00, I-24/I-75 Interchange

Please find attached the laboratory test results for the above referenced project. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position regarding the nature of the test results, i.e., pass/fail and no claims as to the suitability of the material for its intended use. The client should evaluate the data and interpret design parameters based on their knowledge of the Project.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectfully submitted,
Geotechnics, Inc.

Wm. Daniel Smith

Wm. Daniel Smith, P.E.
Regional Manager

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

MOISTURE CONTENT

ASTM D 2216-10

Client: GeoEngineers, Inc.
Client Reference: 24647-009-00, I-24/I-75 Interchange
Project No.: N2022-051-002

Lab ID:	001	002	003	004	005
Boring No.:	RW2-1	RW8-1	RW8-1	RW8-1	RW8-1
Depth (ft):	3.5-5	23.5-25	33.5-35	38.5-40	43.5-45
Sample No.:	2	5	7	8	9
Tare Number	26	1519	1482	51	1439
Wt. of Tare & Wet Sample (g)	968.88	497.28	811.69	1249.25	680.88
Wt. of Tare & Dry Sample (g)	860.21	452.48	691.80	1057.12	569.92
Weight of Tare (g)	198.55	147.67	147.65	198.66	144.79
Weight of Water (g)	108.67	44.80	119.89	192.13	110.96
Weight of Dry Sample (g)	661.66	304.81	544.15	858.46	425.13
Water Content (%)	**16.4**	**14.7**	**22.0**	**22.4**	**26.1**

Lab ID:	006	007	008	009	010
Boring No.:	RW10-1	RW10-1	RW10-1	RW10-2	RW10-2
Depth (ft):	28.5-30	33.5-35	43.5-45	8.5-10	23.5-25
Sample No.:	7	9	10	3	6
Tare Number	55	1416	1545	29	1506
Wt. of Tare & Wet Sample (g)	1137.79	871.09	822.24	510.45	477.64
Wt. of Tare & Dry Sample (g)	980.49	754.28	655.49	469.19	434.66
Weight of Tare (g)	201.27	145.71	147.36	203.05	145.70
Weight of Water (g)	157.30	116.81	166.75	41.26	42.98
Weight of Dry Sample (g)	779.22	608.57	508.13	266.14	288.96
Water Content (%)	**20.2**	**19.2**	**32.8**	**15.5**	**14.9**

Notes :

Tested By *JV* *Date* *4/15/22* *Checked By* *NC* *Date* *4/20/22*

DCN: CT-S1 DATE: 3/18/13 REVISION: 4

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MOISTURE CONTENT

ASTM D 2216-10

Client: GeoEngineers, Inc.
Client Reference: 24647-009-00, I-24/I-75 Interchange
Project No.: N2022-051-002

Lab ID:	011	012	013	014	015
Boring No.:	RW10-2	RW10-2	RW11-1A	RW11-2	RW11-2
Depth (ft):	38.5-40	48.5-50	13.5-15	18.5-20	43.5-45
Sample No.:	9	11	2	5	10
Tare Number	1556	1461	1470	27	1546
Wt. of Tare & Wet Sample (g)	629.83	710.85	779.88	1014.30	660.26
Wt. of Tare & Dry Sample (g)	544.79	586.32	693.20	895.80	570.19
Weight of Tare (g)	146.66	146.14	146.58	202.80	147.61
Weight of Water (g)	85.04	124.53	86.68	118.50	90.07
Weight of Dry Sample (g)	398.13	440.18	546.62	693.00	422.58
Water Content (%)	**21.4**	**28.3**	**15.9**	**17.1**	**21.3**

Notes :

Tested By JV *Date* 4/15/22 *Checked By* NC *Date* 4/20/22

DCN: CT-S1 DATE: 3/18/13 REVISION: 4

S:\Excel\Excel Qa\Spreadsheets\Water Content.xls

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW2-1
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	3.5-5
Project No.:	N2022-051-002	Sample No.:	2
Lab ID:	N2022-051-002-001	Soil Description:	YELLOWISH BROWN LEAN CLAY

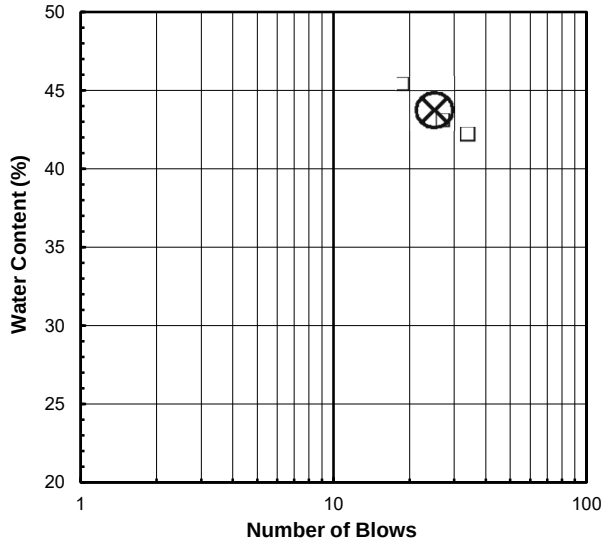
***Note: The* USCS symbol used with this test refers only to the minus No. 40** (Minus No. 40 sieve material, Air dried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	26	H	R	S	U
Wt. of Tare & Wet Sample (g):	968.88	32.98	33.27	33.63	L
Wt. of Tare & Dry Sample (g):	860.21	30.13	30.30	30.49	T
Weight of Tare (g):	198.55	23.37	23.41	23.57	I
Weight of Water (g):	108.7	2.9	3.0	3.1	P
Weight of Dry Sample (g):	661.7	6.8	6.9	6.9	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**16.4**	**42.2**	**43.1**	**45.4**	N
Number of Blows:		**34**	**27**	**19**	T

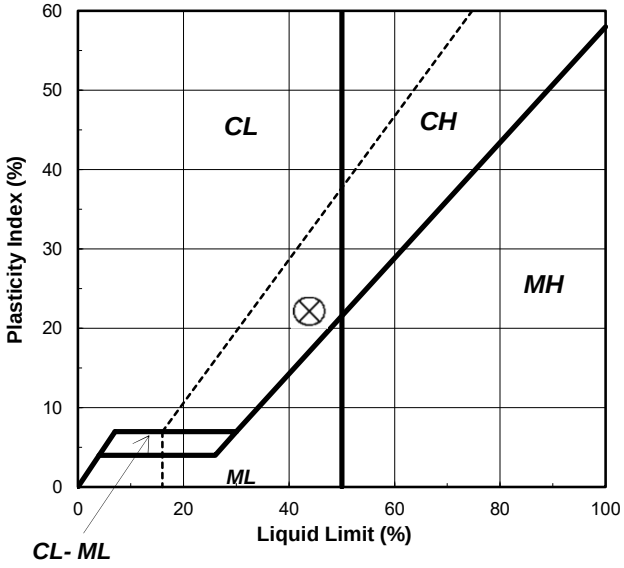
Plastic Limit Test	1	2	Range
Tare Number:	K	J	
Wt. of Tare & Wet Sample (g):	34.79	33.45	
Wt. of Tare & Dry Sample (g):	32.78	31.64	
Weight of Tare (g):	23.63	23.54	
Weight of Water (g):	2.0	1.8	
Weight of Dry Sample (g):	9.2	8.1	
Moisture Content (%):	**22.0**	**22.3**	**-0.4**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**44**
Plastic Limit (%):	**22**
Plasticity Index (%):	**22**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By JV *Date* 4/19/22 *Checked By* NC *Date* 4/20/22

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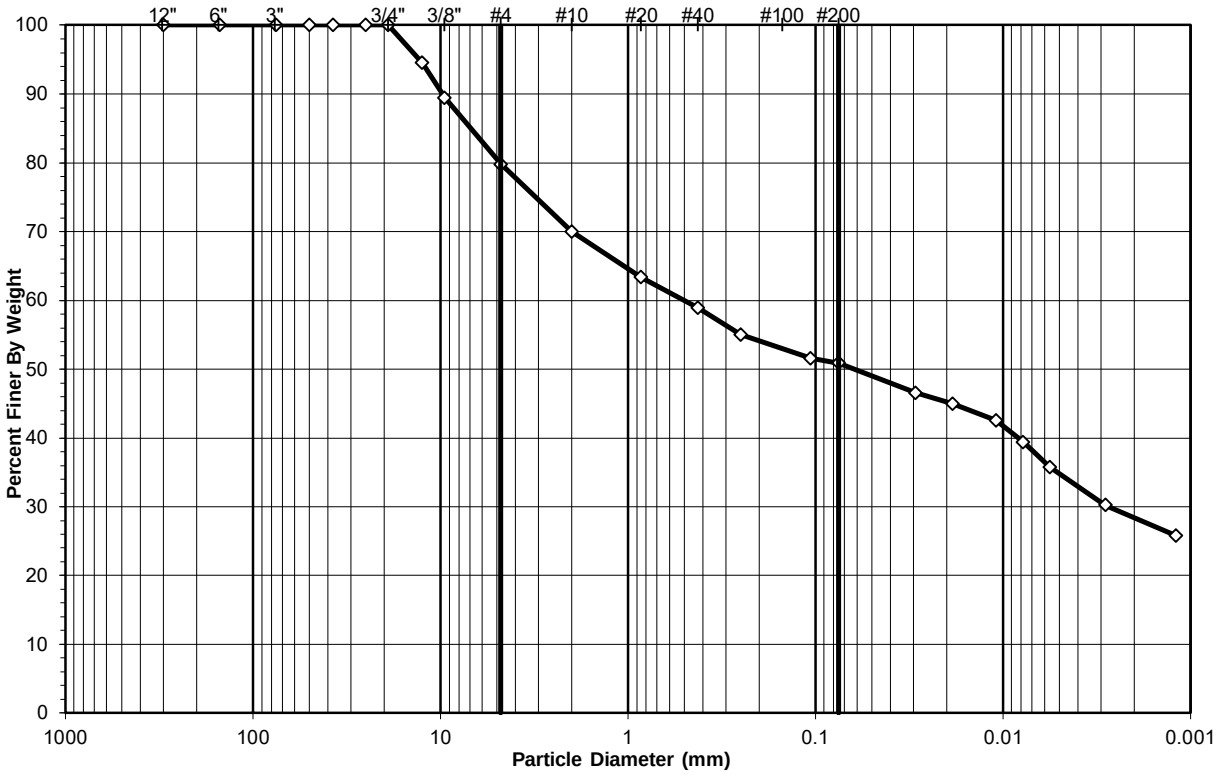
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW2-1
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	3.5-5
Project No.:	N2022-051-002	Sample No.:	2
Lab ID:	N2022-051-002-001	Soil Color:	Yellowish Brown

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer		USCS (%)		AASHTO (%)		ASTM (%)	
				Gravel	30.02			
100	100.00	*Gravel*	20.24	*Sand*	19.11	*Gravel*	20.24
2	69.98	*Sand*	28.89	*Coarse Sand*	11.08	*Sand*	28.89
0.075	50.87	*Silt&Clay*	50.87	*Fine Sand*	8.04	*Silt*	16.07
0.05	49.02			*Silt & Clay*	50.87	Clay	34.80
0.005	34.80			Silt	22.45		
0.002	28.42			Clay	28.42		

AASHTO (GI):
A - 7 - 6 (8)

USCS Symbol:
CL, TESTED

USCS Classification
SANDY LEAN CLAY WITH GRAVEL

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW2-1
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	3.5-5
Project No.:	N2022-051-002	Sample No.:	2
Lab ID:	N2022-051-002-001	Soil Color:	Yellowish Brown

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	26	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	518.33	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	518.33	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	198.55	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	319.78	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	319.78
Dry Weight of - 3/4" Sample (g):	319.78	Weight of minus #200 Material (g):	162.67
Wet Weight of +3/4" Sample (g):	0.00	Weight of plus #200 Material (g):	157.11
Dry Weight of +3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	319.78		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	17.47		5.46	5.46	94.54	**94.54**
3/8"	9.50	16.28		5.09	10.55	89.45	**89.45**
#4	4.75	30.98		9.69	20.24	79.76	**79.76**
#10	2.00	31.26		9.78	30.02	69.98	**69.98**
#20	0.85	21.27	(**)	6.65	36.67	63.33	**63.33**
#40	0.425	14.15		4.42	41.09	58.91	**58.91**
#60	0.250	12.39		3.87	44.97	55.03	**55.03**
#140	0.106	10.96		3.43	48.40	51.60	**51.60**
#200	0.075	2.35		0.73	49.13	50.87	**50.87**
Pan	-	162.67		50.87	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

Tested By JV Date 4/19/22 Checked By NC Date 4/20/22

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW2-1
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	3.5-5
Project No.:	N2022-051-002	Sample No.:	2
Lab ID:	N2022-051-002-001	Soil Color:	Yellowish Brown

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	35.00	24.8	5.6	29.4	91.5	0.01270	0.0292	**46.6**
5	34.00	24.8	5.6	28.4	88.4	0.01270	0.0186	**45.0**
15	32.50	24.7	5.6	26.9	83.7	0.01272	0.0109	**42.6**
30	30.50	24.7	5.6	24.9	77.5	0.01272	0.0078	**39.4**
60	28.25	24.5	5.7	22.6	70.3	0.01275	0.0056	**35.8**
250	25.00	23.6	5.9	19.1	59.4	0.01288	0.0028	**30.2**
1440	22.00	24.4	5.7	16.3	50.8	0.01276	0.0012	**25.8**

Soil Specimen Data		**Other Corrections**		
Tare No.	14			
Wt. of Tare & Dry Material (g):	337.11	a - Factor	0.993	
Weight of Tare (g):	300.19			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	50.87	
Weight of Dry Material (g):	31.92			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 44

PL = 22

PI = 22

Tested By JV Date 4/19/22 Checked By NC Date 4/21/22

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW8-1
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	38.5-40
Project No.:	N2022-051-002	Sample No.:	8
Lab ID:	N2022-051-002-004	Soil Description:	BROWN LEAN CLAY

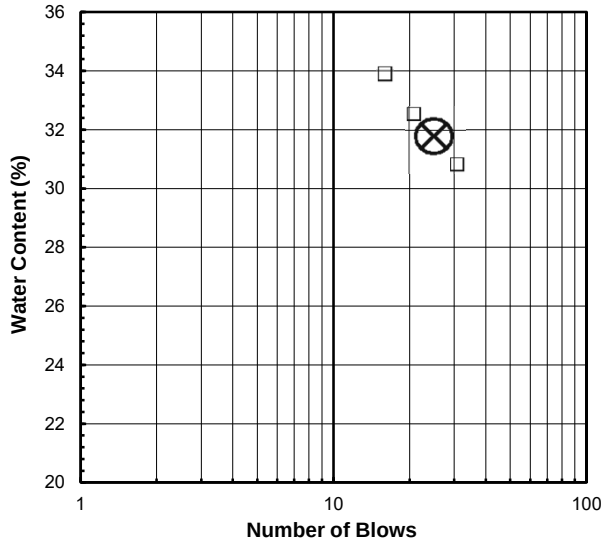
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	51	A	Q	T	U
Wt. of Tare & Wet Sample (g):	1249.25	34.87	33.97	33.42	L
Wt. of Tare & Dry Sample (g):	1057.12	32.21	31.43	30.92	T
Weight of Tare (g):	198.66	23.58	23.62	23.54	I
Weight of Water (g):	192.1	2.7	2.5	2.5	P
Weight of Dry Sample (g):	858.5	8.6	7.8	7.4	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**22.4**	**30.8**	**32.5**	**33.9**	N
Number of Blows:		**31**	**21**	**16**	T

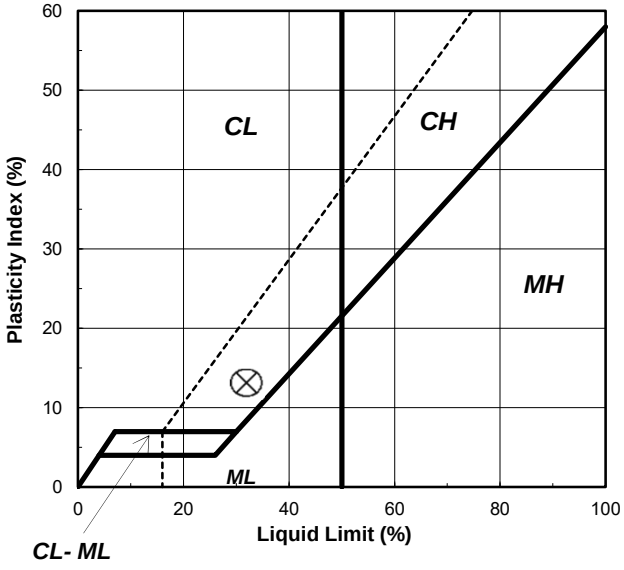
Plastic Limit Test	1	2	Range
Tare Number:	X	C	
Wt. of Tare & Wet Sample (g):	33.99	37.59	
Wt. of Tare & Dry Sample (g):	32.28	35.30	
Weight of Tare (g):	23.45	23.59	
Weight of Water (g):	1.7	2.3	
Weight of Dry Sample (g):	8.8	11.7	
Moisture Content (%):	**19.4**	**19.6**	**-0.2**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**32**
Plastic Limit (%):	**19**
Plasticity Index (%):	**13**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



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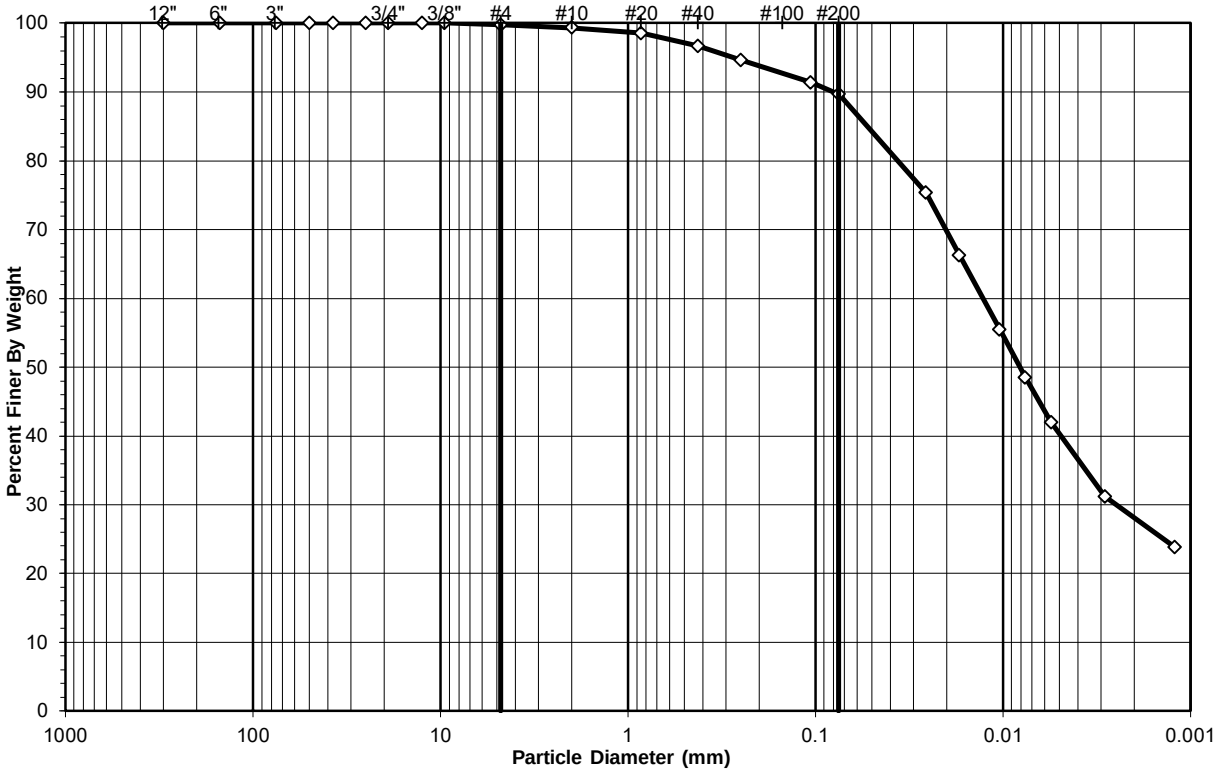
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW8-1
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	38.5-40
Project No.:	N2022-051-002	Sample No.:	8
Lab ID:	N2022-051-002-004	Soil Color:	Brown

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer
100	100.00
2	99.38
0.075	89.69
0.05	84.24
0.005	40.28
0.002	28.11

USCS (%)	
Gravel	0.20
Sand	10.12
Silt&Clay	89.69

AASHTO (%)	
Gravel	0.62
Sand	9.69
Coarse Sand	2.67
Fine Sand	7.03
Silt & Clay	89.69
Silt	61.58
Clay	28.11

ASTM (%)	
Gravel	0.20
Sand	10.12
Silt	49.40
Clay	40.28

AASHTO (GI):
A - 6 **(11)**

USCS Symbol:
CL, TESTED

USCS Classification
LEAN CLAY

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW8-1
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	38.5-40
Project No.:	N2022-051-002	Sample No.:	8
Lab ID:	N2022-051-002-004	Soil Color:	Brown

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	51	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	628.25	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	628.25	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	198.66	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	429.59	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	429.59
Dry Weight of - 3/4" Sample (g):	429.59	Weight of minus #200 Material (g):	385.28
Wet Weight of +3/4" Sample (g):	0.00	Weight of plus #200 Material (g):	44.31
Dry Weight of +3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	429.59		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00		0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00		0.00	0.00	100.00	**100.00**
#4	4.75	0.84		0.20	0.20	99.80	**99.80**
#10	2.00	1.84		0.43	0.62	99.38	**99.38**
#20	0.85	3.53	(**)	0.82	1.45	98.55	**98.55**
#40	0.425	7.92		1.84	3.29	96.71	**96.71**
#60	0.250	8.84		2.06	5.35	94.65	**94.65**
#140	0.106	14.01		3.26	8.61	91.39	**91.39**
#200	0.075	7.33		1.71	10.31	89.69	**89.69**
Pan	-	385.28		89.69	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

Tested By JV Date 4/19/22 Checked By NC Date 4/20/22

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW8-1
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	38.5-40
Project No.:	N2022-051-002	Sample No.:	8
Lab ID:	N2022-051-002-004	Soil Color:	Brown

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	49.25	24.8	5.6	43.7	84.0	0.01270	0.0258	**75.3**
5	44.00	24.8	5.6	38.4	73.9	0.01270	0.0171	**66.3**
15	37.75	24.7	5.6	32.1	61.8	0.01272	0.0104	**55.5**
30	33.75	24.6	5.6	28.1	54.1	0.01273	0.0076	**48.5**
60	30.00	24.5	5.7	24.3	46.8	0.01275	0.0056	**42.0**
250	24.00	23.6	5.9	18.1	34.8	0.01288	0.0029	**31.2**
1440	19.50	24.4	5.7	13.8	26.6	0.01276	0.0012	**23.8**

Soil Specimen Data		**Other Corrections**		
Tare No.	15			
Wt. of Tare & Dry Material (g):	355.63	a - Factor	0.993	
Weight of Tare (g):	299.00			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	89.69	
Weight of Dry Material (g):	51.63			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 32

PL = 19

PI = 13

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW10-1
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	28.5-30
Project No.:	N2022-051-002	Sample No.:	7
Lab ID:	N2022-051-002-006	Soil Description:	BROWNISH ORANGE LEAN CLAY

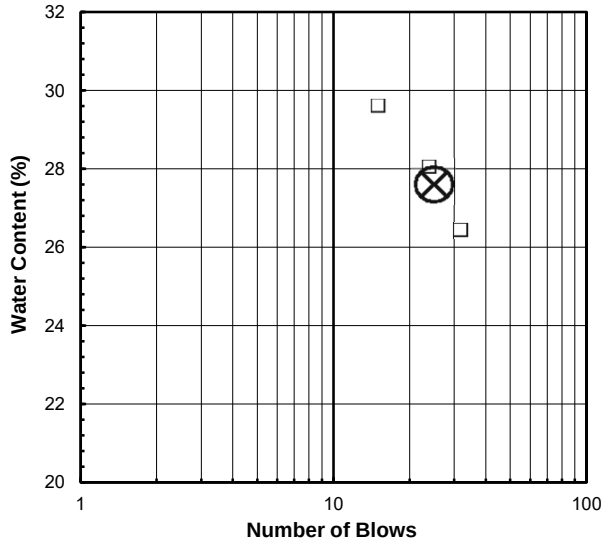
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content		Liquid Limit Test			
ASTM D2216-19		1	2	3	M
Tare Number:	55	F	W	N	U
Wt. of Tare & Wet Sample (g):	1137.79	32.61	33.49	33.02	L
Wt. of Tare & Dry Sample (g):	980.49	30.75	31.34	30.80	T
Weight of Tare (g):	201.27	23.71	23.67	23.30	I
Weight of Water (g):	157.3	1.9	2.2	2.2	P
Weight of Dry Sample (g):	779.2	7.0	7.7	7.5	O
Was As Received MC Preserved:	**Yes**				I
Moisture Content (%):	**20.2**	**26.4**	**28.0**	**29.6**	N
Number of Blows:		**32**	**24**	**15**	T

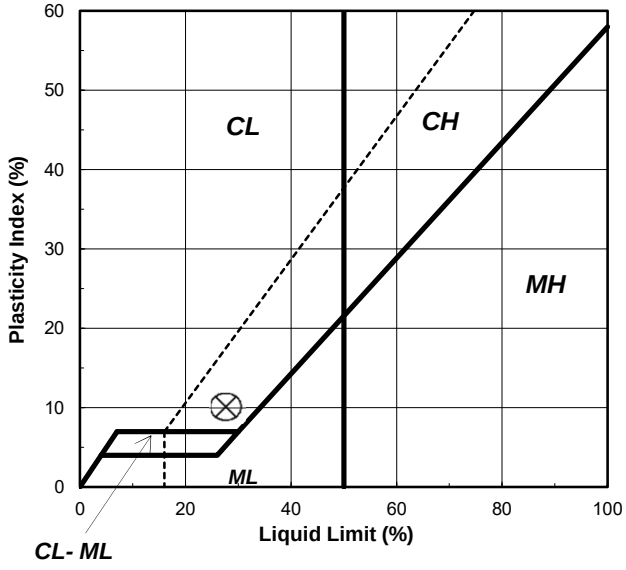
Plastic Limit Test	1	2	Range
Tare Number:	D	M	
Wt. of Tare & Wet Sample (g):	33.56	33.95	
Wt. of Tare & Dry Sample (g):	32.02	32.38	
Weight of Tare (g):	23.50	23.69	
Weight of Water (g):	1.5	1.6	
Weight of Dry Sample (g):	8.5	8.7	
Moisture Content (%):	**18.1**	**18.1**	**0.0**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**28**
Plastic Limit (%):	**18**
Plasticity Index (%):	**10**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



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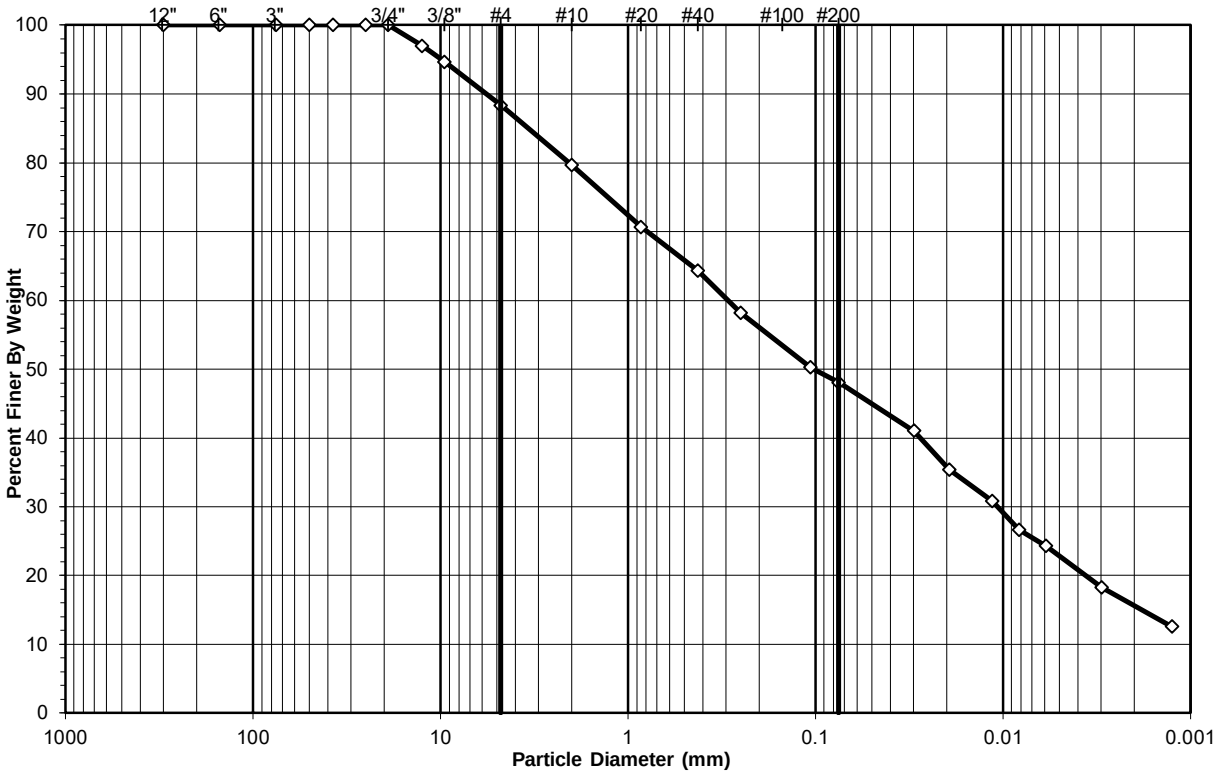
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW10-1
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	28.5-30
Project No.:	N2022-051-002	Sample No.:	7
Lab ID:	N2022-051-002-006	Soil Color:	Brownish Orange

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer		USCS (%)		AASHTO (%)		ASTM (%)	
				Gravel	20.33			
100	100.00	*Gravel*	11.66	*Sand*	31.66	*Gravel*	11.66
2	79.67	*Sand*	40.33	*Coarse Sand*	15.38	*Sand*	40.33
0.075	48.01	*Silt&Clay*	48.01	*Fine Sand*	16.29	*Silt*	25.16
0.05	44.95			*Silt & Clay*	48.01	Clay	22.84
0.005	22.84			Silt	32.38		
0.002	15.63			Clay	15.63		

AASHTO (GI): **USCS Symbol:** **D50 = 0.10**

A - 4 **(2)** ***SC, TESTED***

USCS Classification

CLAYEY SAND

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW10-1
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	28.5-30
Project No.:	N2022-051-002	Sample No.:	7
Lab ID:	N2022-051-002-006	Soil Color:	Brownish Orange

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	55	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	649.37	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	649.37	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	201.27	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	448.10	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	448.10
Dry Weight of - 3/4" Sample (g):	448.10	Weight of minus #200 Material (g):	215.13
Wet Weight of +3/4" Sample (g):	0.00	Weight of plus #200 Material (g):	232.97
Dry Weight of +3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	448.10		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	13.46		3.00	3.00	97.00	**97.00**
3/8"	9.50	10.46		2.33	5.34	94.66	**94.66**
#4	4.75	28.33		6.32	11.66	88.34	**88.34**
#10	2.00	38.84		8.67	20.33	79.67	**79.67**
#20	0.85	40.38	(**)	9.01	29.34	70.66	**70.66**
#40	0.425	28.52		6.36	35.70	64.30	**64.30**
#60	0.250	27.28		6.09	41.79	58.21	**58.21**
#140	0.106	35.70		7.97	49.76	50.24	**50.24**
#200	0.075	10.00		2.23	51.99	48.01	**48.01**
Pan	-	215.13		48.01	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW10-1
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	28.5-30
Project No.:	N2022-051-002	Sample No.:	7
Lab ID:	N2022-051-002-006	Soil Color:	Brownish Orange

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	32.75	24.7	5.6	27.1	85.4	0.01272	0.0297	**41.0**
5	29.00	24.7	5.6	23.4	73.6	0.01272	0.0193	**35.4**
15	26.00	24.7	5.6	20.4	64.2	0.01272	0.0114	**30.8**
30	23.25	24.6	5.6	17.6	55.5	0.01273	0.0082	**26.6**
60	21.75	24.4	5.7	16.1	50.6	0.01276	0.0059	**24.3**
250	18.00	23.6	5.9	12.1	38.0	0.01288	0.0030	**18.3**
1440	14.00	24.4	5.7	8.3	26.2	0.01276	0.0013	**12.6**

Soil Specimen Data		**Other Corrections**		
Tare No.	16			
Wt. of Tare & Dry Material (g):	336.85	a - Factor	0.993	
Weight of Tare (g):	300.30			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	48.01	
Weight of Dry Material (g):	31.55			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 28

PL = 18

PI = 10

Tested By JV Date 4/19/22 Checked By NC Date 4/21/22

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ATTERBERG LIMITS

ASTM D 4318-17

Client:	GeoEngineers, Inc.	Boring No.:	RW11-2
Client Reference:	24647-009-00, I-24/I-75 Interchange	Depth (ft):	18.5-20
Project No.:	N2022-051-002	Sample No.:	5
Lab ID:	N2022-051-002-014	Soil Description:	ORANGISH BROWN LEAN CLAY

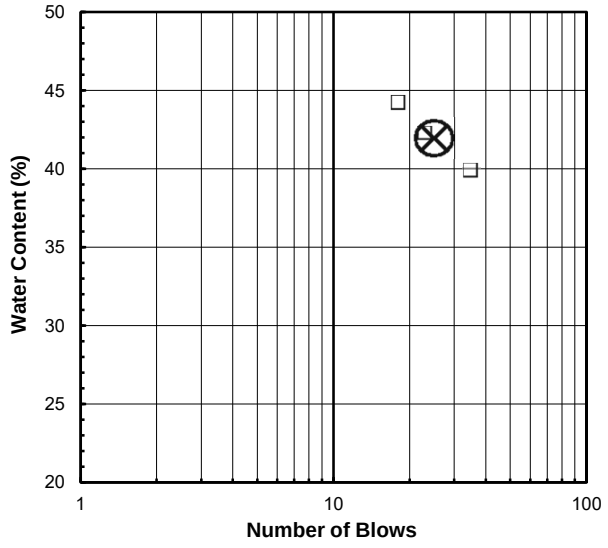
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Air dried)

As Received Moisture Content		**Liquid Limit Test**			
ASTM D2216-19		**1**	**2**	**3**	**M**
Tare Number:	27	L	E	G	**U**
Wt. of Tare & Wet Sample (g):	1014.30	34.48	33.94	33.67	**L**
Wt. of Tare & Dry Sample (g):	895.80	31.37	30.83	30.58	**T**
Weight of Tare (g):	202.80	23.57	23.47	23.59	**I**
Weight of Water (g):	118.5	3.1	3.1	3.1	**P**
Weight of Dry Sample (g):	693.0	7.8	7.4	7.0	**O**
Was As Received MC Preserved:	**Yes**				**I**
Moisture Content (%):	**17.1**	**39.9**	**42.3**	**44.2**	**N**
Number of Blows:		**35**	**23**	**18**	**T**

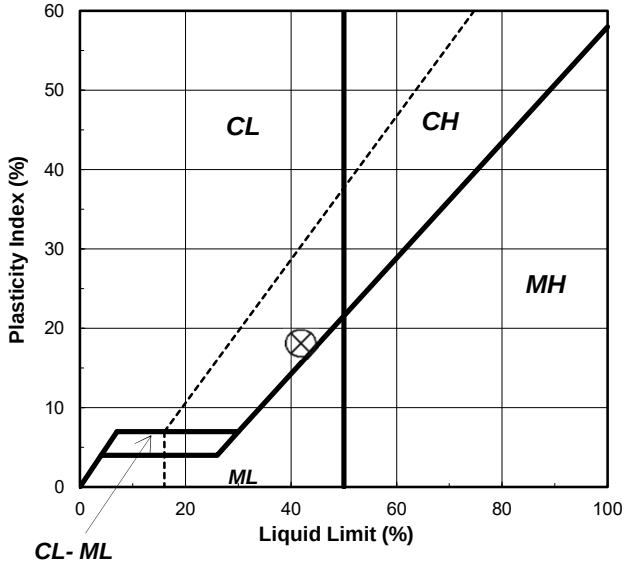
Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	B	P	
Wt. of Tare & Wet Sample (g):	32.78	32.69	
Wt. of Tare & Dry Sample (g):	30.98	30.97	
Weight of Tare (g):	23.44	23.72	
Weight of Water (g):	1.8	1.7	
Weight of Dry Sample (g):	7.5	7.3	
Moisture Content (%):	**23.9**	**23.7**	**0.1**
Note: The acceptable range of the two Moisture Contents is ±			1.12

Test Results	
Liquid Limit (%):	**42**
Plastic Limit (%):	**24**
Plasticity Index (%):	**18**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



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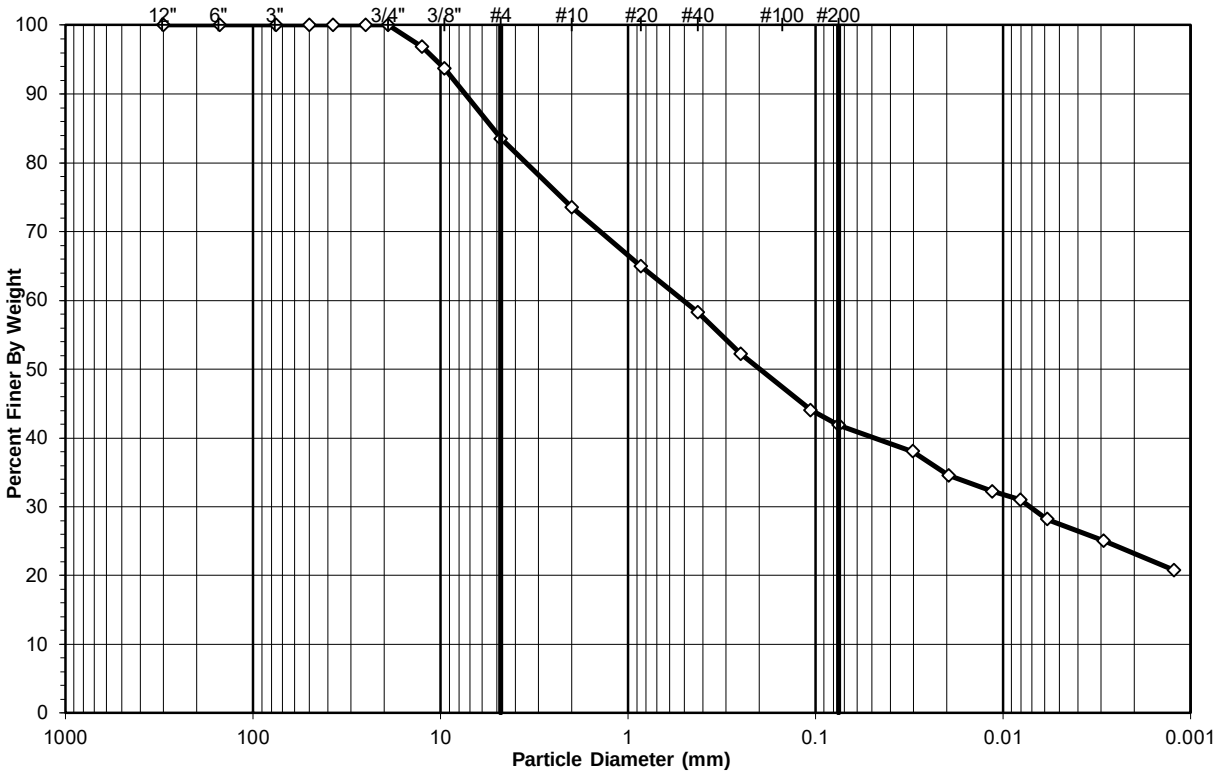
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW11-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	18.5-20
Project No.:	N2022-051-002	Sample No.:	5
Lab ID:	N2022-051-002-014	Soil Color:	Orangish Brown

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer		USCS (%)		AASHTO (%)		ASTM (%)
				Gravel	26.44		
100	100.00	*Gravel*	16.50	*Sand*	31.70	*Gravel*	16.50
2	73.56	*Sand*	41.65	*Coarse Sand*	15.31	*Sand*	41.65
0.075	41.86	*Silt&Clay*	41.86	*Fine Sand*	16.39	*Silt*	14.36
0.05	40.15			*Silt & Clay*	41.86	Clay	27.50
0.005	27.50			Silt	18.64		
0.002	23.22			Clay	23.22		

AASHTO (GI): **USCS Symbol:** **D50 = 0.20**

A - 7 - 6 (4) ***SC, TESTED***

USCS Classification

CLAYEY SAND WITH GRAVEL

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW11-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	18.5-20
Project No.:	N2022-051-002	Sample No.:	5
Lab ID:	N2022-051-002-014	Soil Color:	Orangish Brown

Moisture Content of Passing 3/4" Material		Moisture Content of Retained 3/4" Material	
Tare No.:	27	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	591.39	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	591.39	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	202.80	Weight of Tare (g):	NA
Weight of Water (g):	0.00	Weight of Water (g):	NA
Weight of Dry Soil (g):	388.59	Weight of Dry Soil (g):	NA
Moisture Content (%):	**0.0**	**Moisture Content (%):**	**0.0**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	388.59
Dry Weight of - 3/4" Sample (g):	388.59	Weight of minus #200 Material (g):	162.66
Wet Weight of +3/4" Sample (g):	0.00	Weight of plus #200 Material (g):	225.93
Dry Weight of +3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	388.59		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	0.00	(*)	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00		0.00	0.00	100.00	**100.00**
1"	25.0	0.00		0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00		0.00	0.00	100.00	**100.00**
1/2"	12.5	12.29		3.16	3.16	96.84	**96.84**
3/8"	9.50	12.29		3.16	6.33	93.67	**93.67**
#4	4.75	39.52		10.17	16.50	83.50	**83.50**
#10	2.00	38.66		9.95	26.44	73.56	**73.56**
#20	0.85	33.57	(**)	8.64	35.08	64.92	**64.92**
#40	0.425	25.91		6.67	41.75	58.25	**58.25**
#60	0.250	23.38		6.02	47.77	52.23	**52.23**
#140	0.106	31.96		8.22	55.99	44.01	**44.01**
#200	0.075	8.35		2.15	58.14	41.86	**41.86**
Pan	-	162.66		41.86	100.00	-	**-**

NOTES: *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*

*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Sample*

Tested By JV Date 4/19/22 Checked By NC Date 4/20/22

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	GeoEngineers, Inc.	Boring No.:	RW11-2
Client Reference:	24647-009-00 I-24/I-75 Interchange	Depth (ft):	18.5-20
Project No.:	N2022-051-002	Sample No.:	5
Lab ID:	N2022-051-002-014	Soil Color:	Orangish Brown

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	30.00	24.7	5.6	24.4	90.9	0.01272	0.0303	**38.0**
5	27.75	24.7	5.6	22.1	82.5	0.01272	0.0195	**34.5**
15	26.25	24.7	5.6	20.6	76.9	0.01272	0.0114	**32.2**
30	25.50	24.6	5.6	19.9	74.0	0.01273	0.0081	**31.0**
60	23.75	24.4	5.7	18.1	67.3	0.01276	0.0058	**28.2**
250	22.00	23.6	5.9	16.1	59.9	0.01288	0.0029	**25.1**
1440	19.00	24.4	5.7	13.3	49.6	0.01276	0.0012	**20.8**

Soil Specimen Data		**Other Corrections**		
Tare No.	17			
Wt. of Tare & Dry Material (g):	330.97	a - Factor	0.993	
Weight of Tare (g):	299.31			
Weight of Deflocculant (g):	5.0	Percent Finer than # 200	41.86	
Weight of Dry Material (g):	26.66			
		Specific Gravity	2.70	Assumed

Note: *Hydrometer test is performed on - # 200 sieve material.*

Atterberg Limits Test Results:

LL = 42

PL = 24

PI = 18

Tested By JV Date 4/19/22 Checked By NC Date 4/21/22

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APPENDIX C
CBR Estimates Based on DCP

GeoEngineers

PROJECT I-24/I-75 Interchange Improvements Phase II | FILE NO. 24647-009-00

CBR Estimates Based on DCP | PAGE 1 OF 3

PREPARED BY HH | DATE 4/25/2022 | CHECKED BY ECR | DATE 4/27/2022

PURPOSE: Estimate California Bearing Ratio (CBR) based on dynamic cone penetrometer (DCP) readings taken in the field.

REFERENCES: Steve L. Webster, et al. (1992) *Description and Application of Dual Mass Dynamic Cone Pentrometer.* Instruction Report GL-92-3, US Army Corps of Engineers, Washington, DC

CALCUATIONS:

$$CBR = \frac{292}{DCP\ Index^{1.12}}$$

Boring ID: WB-1

Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Factor[1]	DCP Index (mm/blow)	USCS Classifcation	Estimated CBR (%)
21	50	50	2	2	5	CL	51
20	100	50	3	2	5	CL	48
25	150	50	2	2	4	CL	62
13	200	50	4	2	8	CL	30
18	250	50	3	2	6	CL	43
15	300	50	3	2	7	CL	35

Average CBR (%) = 45

Boring ID: WB-2

Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Factor[1]	DCP Index (mm/blow)	USCS Classifcation	Estimated CBR (%)
10	50	50	5	2	10	CL	22
26	100	50	2	2	4	CL	65
24	150	50	2	2	4	CL	59
8	200	50	6	2	13	CL	17
7	250	50	7	2	14	CL	15
12	300	50	4	2	8	CL	27
21	350	50	2	2	5	CL	51

Average CBR (%) = 37

[1]Hammer factor = 1 for 17.6 pound hammer and hammer factor = 2 for 10.1 pound hammer

Boring ID: WB-3

Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Factor[1]	DCP Index (mm/blow)	USCS Classifcation	Estimated CBR (%)
3	50	50	17	2	33	CL	6
4	100	50	13	2	25	CL	8
5	150	50	10	2	20	CL	10
3	200	50	17	2	33	CL	6
3	250	50	17	2	33	CL	6
5	300	50	10	2	20	CL	10
7	350	50	7	2	14	CL	15
18	400	50	3	2	6	CL	43

Average CBR (%) = 13

Boring ID: EB-1

Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Factor[1]	DCP Index (mm/blow)	USCS Classifcation	Estimated CBR (%)
9	50	50	6	2	11	CL	20
11	100	50	5	2	9	CL	25
15	150	50	3	2	7	CL	35
18	200	50	3	2	6	CL	43
10	250	50	5	2	10	CL	22
16	300	50	3	2	6	CL	37
14	350	50	4	2	7	CL	32

Average CBR (%) = 31

[1]Hammer factor = 1 for 17.6 pound hammer and hammer factor = 2 for 10.1 pound hammer

GeoEngineers

PROJECT I-24/I-75 Interchange Improvements Phase II | FILE NO. 24647-009-00

CBR Estimates Based on DCP | PAGE 3 OF 3

PREPARED BY HH | DATE 4/25/2022 | CHECKED BY ECR | DATE 4/27/2022

Boring ID: EB-2

Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Factor[1]	DCP Index (mm/blow)	USCS Classifcation	Estimated CBR (%)
7	50	50	7	2	14	CL	15
10	100	50	5	2	10	CL	22
10	150	50	5	2	10	CL	22
9	200	50	6	2	11	CL	20
13	250	50	4	2	8	CL	30
7	300	50	7	2	14	CL	15
6	350	50	8	2	17	CL	13
12	400	50	4	2	8	CL	27
11	450	50	5	2	9	CL	25
20	500	50	3	2	5	CL	48

Average CBR (%) = 24

Boring ID: EB-3

Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Factor[1]	DCP Index (mm/blow)	USCS Classifcation	Estimated CBR (%)
10	50	50	5	2	10	CL	22
6	100	50	8	2	17	CL	13
4	150	50	13	2	25	CL	8
4	200	50	13	2	25	CL	8
14	250	50	4	2	7	CL	32
10	300	50	5	2	10	CL	22
28	350	50	2	2	4	CL	70
28	400	50	2	2	4	CL	70
14	450	50	4	2	7	CL	32
14	500	50	4	2	7	CL	32

Average CBR (%) = 31

[1]Hammer factor = 1 for 17.6 pound hammer and hammer factor = 2 for 10.1 pound hammer

APPENDIX D
Report Limitations and Guidelines for Use

APPENDIX D
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

This letter has been prepared for Neel-Schaffer, Inc. (NS), and their authorized agents and regulatory agencies. The information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. No party other than NS may rely on the product of our services unless we agree to such reliance in advance and in writing. This is to provide our firm with reasonable protection against open-ended liability claims by third parties; otherwise, there would be no contractual limits to their actions. Within the limitations of scope, schedule, and budget, our services have been executed in accordance with our Agreement with the Client and generally accepted geotechnical practices in this area at the time this report was prepared. Use of this report is not recommended for any purpose or project except the one originally contemplated.

A Geotechnical Engineering or Geologic Report is Based on a Unique Set of Project-Specific Factors

This report has been prepared for the I-24/I-75 Interchange Improvements Phase II project. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, it is important not to rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed structure;
- elevation, configuration, location, orientation, or weight of the proposed structure;
- composition of the design team; or
- project ownership.

[1] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org.

If important changes are made after the date of this report, we recommend that GeoEngineers be given the opportunity to review our interpretations and recommendations. Based on that review, we can provide written modifications or confirmation, as appropriate.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by man-made events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability, or groundwater fluctuations. If more than a few months have passed since issuance of our report or work product, or if any of the described events may have occurred, please contact GeoEngineers before applying this report for its intended purpose so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Most Geotechnical and Geologic Findings Are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies the specific subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an informed opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in this report. Our report, conclusions, and interpretations should not be construed as a warranty of the subsurface conditions.

Geotechnical Engineering Report Recommendations Are Not Final

The construction recommendations included in this report are preliminary and should not be considered final. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers is unable to assume responsibility for the recommendations in this report without performing construction observation.

We recommend that you allow sufficient monitoring, testing, and consultation during construction by GeoEngineers to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes if the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective method of managing the risks associated with unanticipated conditions.

A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation

Misinterpretation of this report by members of the design team or by contractors can result in costly problems. GeoEngineers can help reduce the risks of misinterpretation by conferring with appropriate members of the design team after submitting the report, reviewing pertinent elements of the design team's plans and specifications, participating in pre-bid and preconstruction conferences, and providing construction observation.

Do Not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. The logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Photographic or electronic reproduction is acceptable but separating logs from the report can create a risk of misinterpretation.

Give Contractors a Complete Report and Guidance

To help prevent costly problems associated with unanticipated subsurface conditions, we recommend giving contractors the complete geotechnical engineering or geologic report but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report's accuracy is limited. In addition, encourage them to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer.

Contractors Are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule, or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and adjacent properties.

Read These Provisions Closely

It is important to recognize that the geoscience practices (geotechnical engineering, geology, and environmental science) are less exact than other engineering and natural science disciplines. Without this understanding, there may be expectations that could lead to disappointments, claims, and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you need to know more how these "Report Limitations and Guidelines for Use" apply to your project or site.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention, or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detecting, assessing, preventing, or abating of Biological Pollutants, and no conclusions or inferences should be drawn regarding Biological Pollutants as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

APPENDIX C

SOIL CLASSIFICATION CHARTS

KSWA
K. S. Ware & Associates, L.L.C.
Geotechnical • CEI • Environmental

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% 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 (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more 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 of 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 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

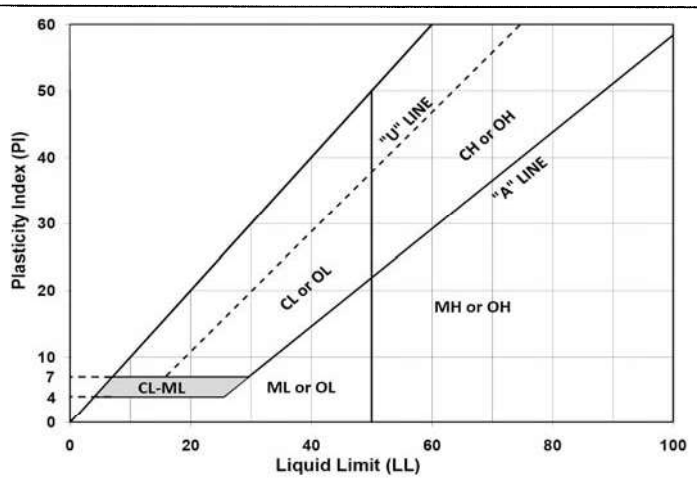
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

PLASTICITY CHART



General Classification	Granular Materials								Silt-Clay Materials						
	35 percent or less of total sample passing No. 200 (75 µm)								More than 35 percent of total sample passing No. 200 (75 µm)						
Group Classification	A-1		A-3 [1]		A-2				A-4		A-5	A-6		A-7	
	A-1-a	A-1-b	A-3	A-3a	A-2-4	A-2-5	A-2-6	A-2-7	A-4a	A-4b		A-6a	A-6b	A-7-5	A-7-6
Sieve analysis, percent passing:						*				**	*			*	
No. 10 (2 mm)	50 max														
No. 40 (425 µm)	30 max	50 max	51 min	[2]					[3]	[4]					
No. 200 (75 µm)	15 max	25 max	10 max	35 max	35 max	35 max	35 max	35 max	36 min	50 min	36 min	36 min		36 min	
Characteristics of fraction passing No. 40															
Liquid limit	—	—	Non-Plastic	—	40 max	41 min	40 max	41 min	40 max		41 min	40 max		41 min	
Plasticity index	6 max	6 max		6 max	10 max	10 max	11 min	11 min	10 max		10 max	11 – 15	16 min	≤LL-30	>LL-30
Group Index	0						4 max		8 max		12 max	10 max	16 max	20 max	
Usual types of significant constituent materials	Stone fragments, gravel and sand		Fine sand	Sand	Silty or clayey gravel and sand				Silty soils			Clayey soils			
General rating as subgrade	Excellent to good								Good to fair						

Notes

With the test data available, the classification of a soil is found by proceeding from left to right on the chart. The first classification that the test data fits is the correct classification.

* A-2-5 is not allowed under 703.16.B. A-5 and A-7-5 is not allowed under 703.16.A. See "Natural Soil and Natural Granular Soils" (203.02.H) in this manual

** A-4b is not allowed in the top 3 feet (1.0 m) of the embankment under 203.03.A.

[1] The placing of A-3 before A-2 is necessary in the "left to right" process, and does not indicate superiority of A-3 over A-2.

[2] A-3a must contain a minimum 50 percent combined coarse and find sand sizes (passing No. 10 but retained on No. 200, between 2 mm and 75 µm).

[3] A-4a must contain less than 50 percent silt size material (between 75 µm and 5 µm).

[4] A-4b must contain 50 percent or more silt size material (between 75 µm and 5 µm).

JOB NO.: 300-18-0001

CLIENT: Neel-Schaffer

I-75 interchange at I-24
Chattanooga, TN

AASHTO CLASSIFICATION CHART

PIN 114174.00
I-75 INTERCHANGE AT I-24

CHATTANOOGA, TENNESSEE

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Appendix E