

REPORT OF GEOTECHNICAL EXPLORATION

I-75 Interchange at I-24 Redevelopment of I-75/I-24 Interchange PIN 114174.00 Chattanooga, Tennessee

<u>Prepared For:</u>

Neel-Schaffer, Inc. 210 25th Ave N #800 Nashville, TN 37203

Prepared By:

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KSWA Project Number 300-18-0001

May 18, 2018



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May 18, 2018

Mr. Richard Sullivan Neel-Schaffer, Inc. 210 25th Ave N #800 Nashville, TN 37203

Subject: **Report of Pavement Exploration** I-75 Interchange at I-24 Chattanooga, Tennessee PIN 114174.00 KSWA Project No. 300-18-0001

Dear Mr. Sullivan:

K. S. Ware and Associates, L.L.C. (KSWA) is pleased to submit this report which details the results of our pavement exploration for the referenced project. Our services were provided in accordance with our proposal dated February 20, 2018.

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 is divided into phases therefore, we have divided this report into sections, which include Phase I, Phase II and Pavement Design to assist with separating our sections of the reports if needed.

The attached report reviews the project information provided to us, 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 a description of our field-testing procedures, and our field and laboratory test results.

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,

K. S. Ware and Associates, L.L.C.

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Staff Professional

Enclosures: Report of Geotechnical Exploration

Distribution: Michael Agnew, Neel Schaffer Richard Sullivan, Neel-Schaffer File

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1.0 INTRODUCTION

1.1 **PROJECT INFORMATION**

Project information was provided by Mr. Michael Agnew, of Neel-Schaffer, in a series of e-mails between Mr. Agnew and Kathy Ware and Julie Oliphant, of KSWA. Additional information was provided after our initial proposal was submitted. KSWA was awarded a notice to proceed from Neel Schaffer on March 16, 2018.

The Tennessee Department of Transportation is considering construction of 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 a point between Moore Road and Belvoir Avenue. The project will be divided in to at least two phases, the first phase will start south of Ringgold Road and extend through the Interchange to about Station 443+00, west of the CSX Railroad Bridge Crossing. Phase II will continue to the approximately East Brainerd Road exit. On I-24, Phase I will include interchange ramps and extend 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 112+00, including the McBrien Road and Moore Road overpasses.

To facilitate widening of lanes, additional fill soil will be placed to construct embankment fills to support the roadway. Where the embankment fills would otherwise encroach on existing features and adjoining properties, retaining walls will be used to contain the fill with the TDOT Right of Way (ROW).

An additional ramp lane will also be constructed from the Bass Pro Shops parking lot which will connect to the on ramp from Exit 1. This ramp will continue north and collect traffic from the Welcome Center. Overhead signs, ITS Systems, noise barrier walls, and other features will also be included.

These structures will include replacing or widening existing bridges or constructing new bridges. The following list provides the location of the planned structures and the boring prefix label used to identify with each structure.

Phase I

Bridge #2 NB (BN2) and #2 SB (BS2), I-75 North and South over the I-75 NB to I-24 WB ramp Bridge #3 NB (BN3) and #3 SB (BS3), I-75 North and South over the I-24 EB to I-75 NB ramp Bridge #9 I-75 NB (B9) ramp to I-24 WB over the I-24 EB to I-75 NB ramp Bridges over Spring Creek (SCK) for I-75 SB and I-75 NB Bridge over South Chickamauga Creek (SCC) for I-75 SB and I-75 NB Bridges to carry Spring Creek Road (SCR) over I-24 EB and WB

Phase II

Bridge of the CSX Railroad (CSX) for I-75 SB and I-75 NB Bridge to carry McBrien Road (McB) over I-24 EB and WB Bridge to carry Moore Road (M) over I-24 EB and WB

1.2 PURPOSE AND SCOPE OF EXPLORATION

KSWA was tasked with providing a baseline report of geotechnical conditions present in the project area. This preliminary data will be used for evaluation and cost estimation for the preparation of the 30% Design Package being prepared by Neel-Schaffer. The scope of services performed does not constitute all geotechnical exploration work necessary for design of the complete project. This report is 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.

The initial phase of exploration included an evaluation of the existing pavement thickness at 13 locations within the project limits. At each location, a coring machine was used to penetrate the pavement and allow for excavation through the existing basestone layer, where possible. At some locations, a dynamic cone penetrometer (DCP) was used to collect information regarding the consistency of the subgrade and allow for estimation of the pavement support characteristics of the underlying soil. The locations of the pavement core holes is provided on Figure 2 in Appendix A.

Subsequently, exploratory test borings were drilled in areas where bridges and retaining walls are planned. Additional borings were drilled along the alignment of the widened interstate or new ramps. The selection of the boring locations was based on proximity to the layout of the interchange presented to us by Neel-Schaffer and accessibility. Note that some preferred locations required minor lateral adjustments from the staked location to accommodate access. Figure 3 in Appendix A shows the approximate location of each of the exploratory borings. The following table summarizes the exploration performed.

LOCATION	QUANTITY	BORING PREFIX	COMMENTS									
	Phase I and Phase II											
Alignment Borings	21	А	Terminated at 15 ft or Refusal									
Pavement Coring	13	В	Designated as L for travel lane or S for shoulder, two coreholes at each location									
		Phase I Exploration										
Bridge #2 NB75	4	BN2	BN-21 through BN-24									
Bridge #2 SB75	2	BS2	BS-24									
Bridge #3 NB75	3	BN3	BN-31, BN-32, BN-34 (BN-33 not drilled)									

Table 1 Summary of Test Borings



Bridge #3 SB75	2	BS3	BS-32 and BS-33
Bridge #9	2	B9	B-92 and B-93 (B-91 not drilled)
Spring Creek	6	SCK	SCK 1-3 SB SCK4-6 NB
South Chickamauga Creek	4	SCC	SCC-1 and SCC-4 drilled from golf cart path passing below existing the bridge SCC-2 and SCC-3 drilled from greenway trail passing below existing the bridge
Spring Creek Road	3	SCR	SCR-1 and SCR-3 drilled from Spring Creek Rd, SCR-2 drilled in median of I-24
		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	М	M-1 drilled from Moore Road, M-2 drilled from shoulder of I-24 EB
Retaining Walls	6	RW	RW 1-3 drilled on northern side of I- 75 near the toe of the existing embankment fill RW 4-6 drilled through the embankment fill from the R shoulder of I-75 NB

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 C. The field testing procedures used for drilling and sampling are included in Appendices D. Procedure matrices for classification of subsurface materials encountered are provided in Appendix E for both the USCS Classification and AASHTO classification systems.



2.0 GEOLOGIC CONDITIONS

2.1 SITE GEOLOGY

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 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 eastern end of the project area, the site is underlain by the Knox Group. 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 eastern 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 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.

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.

During the exploration, we did not observe direct evidence of sinkhole development. 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 321+00 TO 370+00

Near the start of the project area to the northern side of the Spring Creek bridge crossing, I-75 south of the interchange with I-24, was constructed on embankment fills crossing flood areas associated with South Chickamauga Creek and Spring Creek, especially north of Exit 1 and around and behind the Welcome Center. These areas typically are inundated during seasonally wet times of the year and during flood events. The ground surface in the lower lying areas generally have soft soil near the surface, especially in the surficial organic zone.

The route for the new ramp connecting from the existing Bass Pro Parking lot to the I-75 NB ramp from Ringgold Road through the Welcome Center area will cross over the existing embankment slope and existing fills used to construct the existing entrance and exit ramps servicing the Welcome Center. The lower-lying land on the eastern side of the fill embankments has a relatively thick organic layer noted to be soft. Hand probes in the area indicate stiffer soil is present within about a foot of the surface in some areas, and deeper in other areas.

3.2 I-75 STATION 370+00 TO STATION 407+00

From the northern side of the Spring Creek crossing, the interchange with I-24 begins. Within the interchange with I-24, the roadways continue to be elevated on embankment fills and bridge structures, with low, poorly-drained areas in the median areas. Some of the median areas have been previously filled, some of the fill materials placed included broken concrete debris materials from previous demolition of Interstate pavements on past projects. Concrete rubble was observed at the surface in the flatter area immediately south of the I-75S to I-24W ramp and in northern part of the area bounded by I-75N, I-75N to I-24W and I-24E to I-75N.

Soft, poorly drained soils were present in the lower-lying areas of the median sections, especially between the I-75 ramps. Thick brush and tall grass was present in and around some of these areas, indicating inability to mow and maintain the areas as well as the majority of the median areas.

3.3 I-75 STATION 407+00 TO 443+00

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 areas. The flood prone areas generally begin along the golf course and extend to the interchange along both sides of I-75 except for the northern side of the I-75 corridor west of South Chickamauga Creek.

3.4 I-75 STATION 443+00 TO STATION 476+00

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 areas. The flood prone areas generally begin along the golf course and extend to the interchange along both sides of I-75 except for the northern side of the I-75 corridor west of South Chickamauga Creek.

3.5 I-24 STATION 112+00 TO STATION 175+00

Interstate 24 beginning between Belvoir Road and Moore Road 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.

3.6 I-24 Station 175+00 East Into the Interchange with I-75

The ramps from I-24 to I-75 are constructed on embankment fills as the interstate enters the lower lying flood prone areas on the southern end of the interchange. On the northern end of the interchange, the surrounding ground conditions are generally higher and better drained than those on the southern portion of the interchange. Fill soil, including a swath of concrete rubble fill is present along the southern side of I-75 SB ramp to I-24 WB.

4.0 SUBSURFACE CONDITIONS

4.1 **PAVEMENT CORING**

The existing pavement conditions were explored with 26 pavement cores, numbered B-1 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. The pavement cores were obtained with mechanical core drilling equipment. In the travel lanes, the thickness of the asphalt averaged about 16 inches of asphalt overlying 16 inches of basestone. Where concrete was present in the travel lane, the concrete averaged about 12 inches thick overlying an average of 15 inches of basestone. The thickness of the basestone below the concrete varied widely, with most of the locations being close to 10 inches of basestone. The pavement thicknesses are listed below in Table 2.

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.

	Table 2: Summary of Pavement Thicknesses												
		TRAVEL LA	NE			SHOULDER							
<u>Boring</u> <u>No.</u>	<u>Pavement</u> type	<u>Pavement</u> <u>Thickness</u>	<u>Base</u> <u>Material</u> <u>Thickness</u>	<u>Total</u> <u>Thickness</u>	<u>Boring</u> <u>No.</u>	<u>Pavement</u> type	<u>Pavement</u> <u>Thickness</u>	<u>Base</u> <u>Material</u> <u>Thickness</u>	<u>Total</u> <u>Thickness</u>				
		<u>(in.)</u>	<u>(in.)</u>	<u>(in.)</u>			<u>(in.)</u>	<u>(in.)</u>	<u>(in.)</u>				
BL-1	Asphalt	15	12	27	BS-1	Asphalt	3 3/4	8 1/2	12 1/4				
BL-2	Asphalt	18	19	37	BS-2	Asphalt	14	27	41				
BL-3	Asphalt	19	17	36	BS-3	Asphalt	14 1/2	18 1/2	33				
BL-4	Asphalt	18	16	34	BS-4	Asphalt	15 1/2	32 1/2	48				
BL-5	Asphalt	19	n/a		BS-5	Asphalt	19 1/2	19 1/2	39				
BL-6	Asphalt	11 1/2	15	26 1/2	BS-6	Asphalt	2 1/2	8 3/4	11 1/4				
BL-7	Asphalt	18	21	39	BS-7	Asphalt	13 3/4	19 1/4	33				
BL-8	Asphalt	13 1/2	13	26 1/2	BS-8	Asphalt	2 1/2	22	24 1/2				
BL-9	Concrete	12 1/2	21 1/2	36 1/2	BS-9	Aanhalt	2	10 1/2	12 1/2				
DL-9	Asphalt	2 1/2	211/2	30 I/Z	DO-9	Asphalt	Z	10 1/2	12 1/2				
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				
ASPHALT CONC	Average Average	16.50 10.33	16.67 14.95	33.25 27.21	ASPHALT CONC	Average Average	9.31 10.00	18.00 24.00	27.31 34.00				

From the DCP test results, the following CBR Values were estimated. Wet soil conditions were noted in the soil at the subgrade elevation and in the basestone layer at the base of the paving where noted.

Table 5. Estimated CDR values										
Boring Location	Estimated CBR Value	Comments								
B-1	2	Wet Soil								
B-5	4	Wet Soil								
B-6	5	Wet Soil								
B-9	12									
B-13	11									

Table 3: Estimated CBR	Values
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CBR Values estimated from DCP Values

4.2 SOIL AND BEDROCK CONDITIONS

Soil encountered by the borings varied along the alignment, but generally encountered existing fill soil underlain in some cases by alluvial soil, followed by residual soil before encountering auger refusal. Some of the alignment borings, planned for a depth of 15 feet below the ground surface, reached the termination depth without encountering auger refusal or, in some cases, reaching the bottom of the existing fill interval.

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 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 G of this report.

4.3 I-75 STATION 321+00 TO 370+00

Borings drilled in this area encountered existing fill soil underlain by alluvial soil, in some cases, followed by residual soil. Fill soil was found to consist of reddish-brown, cherty, silty clay within the pavement areas

throughout most of this stretch of interstate, except as the interstate approached the Spring Creek bridges, where the embankment fill was composed of gray and brown silty clay. Similar fill materials were encountered around the entrance and exit ramps for the Welcome Center. Borings drilled except the SPT values indicated the consistency of the soil was generally softer.

Two borings were drilled outside the limits of the existing fill embankments in the lower elevations to the east and west of the intestate corridor. These borings encountered a thin layer of fill, apparently placed when the access roads to billboards were constructed. Below this layer, firm to stiff, silty clay was encountered. These soils were generally wet and of poor quality as they are believed to be moisture sensitive.

Bedrock encountered in the vicinity of the existing bridges over Spring Creek encountered hard, gray, argillaceous limestone. The quality of the rock encountered was mostly good to excellent, except at SCK-3 which encountered about 7 feet of weathered rock and mud seams before encountering rock of good quality.

4.4 I-75 STATION 370+00 TO STATION 407+00

Most of the existing fill soil encountered below the soft wet areas and concrete rubble was composed of brown and gray silty clay and clayey silt of varying consistency, but was generally firm (medium stiff) to stiff. Auger refusal elevations varied within an interval of 643 to 659. The degree of weathering varied from about 3 feet to as much as 15 feet before rock of good to excellent quality was encountered. Rock quality did not appear to have a direct correlation to the elevation at which refusal was encountered because deep weathering was encountered throughout the auger refusal range. Bedrock consisted of hard, gray, argillaceous, limestone.

4.5 I-75 STATION 407+00 TO 443+00

Alluvial soils, consisting of silty clay, clayey silt and intervals of brown sand were encountered along the northern side of the embankment fill in RW-1 through RW-3 and SCC-1 and SCC-4(4A). Similar soils were encountered below the embankment fill in RW-4 through RW-6. Residual soil was encountered below the alluvial soil layer.

At SCC-2, shallow auger refusal was encountered. After coring through about a foot and a half of limestone, an interval of soil about 12 feet thick was encountered. Sloping rock surface conditions were encountered at SCC-4. Because the drilling tools were turning to follow the shape of the rock surface, the boring had to be abandoned after reaching a depth of 30 feet in favor of an offset boring, which encountered rock at about 17 feet. SCC series borings encountered bedrock (except as noted above) between 14 and 18 feet below the ground surface. Rock quality in these borings was generally good to excellent.

In the lower portion of the soil profile above the auger refusal depth, RW-1, RW-2, and RW-4 encountered weathered shale. Auger refusal in these borings was noted as the condition of the shale gradually improved until penetration with soil augers was no longer practical.

4.6 I-75 STATION 443+00 TO STATION 476+00

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. 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.

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, we believe this location is within or near a thrust fault zone.

4.7 I-24 STATION 112+00 TO STATION 175+00

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 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.

4.8 I-24 Station 175+00 East Into the Interchange with I-75

Borings drilled around the existing Spring Creek Road bridge abutments (SCR-1 and SCR-3) encountered 12 to 20 feet of existing fill soil underlain by residual soil before encountering auger refusal. One boring was drilled from the median of the interstate between the two overpasses (SCR-2). About 5 feet of fill soil was encountered at SCR-2 followed by residual soil. The fill soil was generally composed of brown and gray silty clay, similar to the underlying residual soil. SPT Values in the fill interval showed the filled to be mostly stiff, but became firm to soft toward the bottom of the fill interval. Residual soils were generally firm to stiff.

Overall, the bedrock encountered by these three borings was good to excellent, except for some areas of weathered shale and a deep mud seam encountered in SCR-1.

Borings drilled for Bridge #9, planned for the I-75 NB ramp to I-24 WB, encountered brown and gray silty clay down to auger refusal. Most of the soil encountered was found to be stiff, except near the surface in B-93 where the soil was soft to medium stiff down to a depth of about 4 feet. Bedrock encountered consisted of hard, gray, limestone of good to excellent quality, except for some weathering encountered in the upper four feet of the core recovered in B-93.

Alignment borings drilled in this area encountered existing fill underlain by residual soil. The existing fill varied between reddish-brown, silty clay and brown and gray silty clay. Most of the fill soil was found to be stiff to very stiff, but some areas of soft to firm fill soil was found, especially toward the lower portion of the fill intervals and in the median gore where I-24 EB ramps split to I-75 NB and SB.

4.9 BORING SUMMARY

The following table provides a summary of all borings drilled, 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. Figure 5 in Appendix provides graphical summary diagrams for different sections. Because specific bridge profiles are not developed at this time, the diagrams refer to baselines shown on Figure 3 sheets.

									/	
Boring No.	Surface Elevation	Soil Drill Depth (ft)	Auger Refusal?	Depth Cored (ft)	Total Depth	Existing Fill Thicknes s (ft)	Elev GW (ft)	Approximate Top of Rock Elevation	Base of Signficant Weathering Elevation	Comments
								Alignmer	it Borings	
A-01	717.3	15	NO	Х	15	15	Х	Х	х	Cherty, silty, clay FILL
A-02	718.7	15	NO	Х	15	15	Х	х	х	Cherty, silty, clay FILL
A-03	675.3	5	YES	Х	5	Х	Х	670.3	х	Shallow Refusal at 5 ft
A-04	670	14	YES	Х	14	5.5	Х	656.04	х	Hole moved approx 10 feet offset from stake and approx -2 feet in elevation.
A-05	680.2	15	NO	Х	15	8	Х	Х	х	CONCRETE RUBBLE to 5 ft
A-06	680.6	15	NO	Х	15	11	Х	х	х	CONCRETE RUBBLE TO 4.5 ft
A-07	677.4	15	NO	Х	15	12.5	Х	х	х	
A-08	673.9	14.7	YES	Х	14.7	3.5	Х	659.2	х	Possible FOUNDRY SAND, could be RAP
A-09	673	5.5	YES	Х	5.5	Х	Х	667.5	х	Shallow Refusal at 5.5 ft
A-10	684.5	9.4	YES	Х	9.4	4.9	Х	675.1	х	
A-11	680.5	9.3	YES	Х	9.3	3.2	Х	671.2	х	Moved hole to 4.9 offset
A-12	674.1	15	NO	Х	15	8	Х	х	х	
A-13	679.3	14.7	YES	Х	14.7	5.5	Х	664.6	х	
A-14	679.2	15	NO	Х	15	9	Х	х	х	Moved hole to 7.4 offset
A-15	680.3	15	NO	Х	15	11.5	Х	х	х	Hole is 5.1 feet offset
A-16	662.9	10.8	YES	Х	10.8	3	Х	652.1	х	Hole moved approx 10 feet NE of the stake
A-17	681*	15	NO	Х	15	11	Х	х	х	
A-18	680.1	15	NO	Х	15	10	Х	х	х	
A-19	677.4	15	NO	Х	15	7	Х	х	х	
A-20	678.5	15	NO	Х	15	7.5	Х	х	х	
A-21	661.8	10.5	YES	Х	10.5	Х	Х	651.3	х	thick topsoil, FAT, wet clay
								BRIDG	E No. 2	
BN21	667.9	12	YES	10	22	8.5	662.4	655.9	649	Soft Soil to 5 ft, GW at 5.5
BN22	669.7	14	YES	11.5	25.5	6	Х	655.7	647	
BN23	668.5	11.4	YES	12	23.4	Х	Х	657.1	655	
BN24	680.1	15	NO	х	15	8.5	х	х	х	CONCRETE RUBBLE to 4 ft, SOFT to 13.5, Augers leading off - irregular rock surface
BN24A	680.1	18	YES	12.5	30.5	х	657.6	662.1	650	OFFSET Boring to BN24
BS21				-				0		Not Drilled - not in revised scope
BS22	670.5	16	YES	11	27	х	х	654.5	648	
BS23								0		Not Drilled - not in revised scope
BS24	669.9	13	YES	16.3	29.3	Х	х	656.9	645	SOFT soil to 6 ft

Table 4: Summary of Boring Data

Table 4:	Summary	of Boring	Data (continued)

Boing								ie n oui	ninary of D		(continued)		
Boins beins			Soil Drill		Donth		Existing		Approvimato	Base of			
No. Bertano Origin Parkua? Certer book Desphi Pricinas No. Weathering Committee UN Formation Formation Formation Formation Formation Formation UN Formation Social Soci	Boring	Surface		Auger		Total	Fill	Elev GW		Signficant			
Image: 10 (10 (10 (10 (10 (10 (10 (10 (10 (10) (1	No.	Elevation				Depth	Thicknes	(ft)		Weathering	Comments		
Interface of the second			(ft)		(ft)		s (ft)	. ,	Elevation				
NN1 OF59 22.8 YTS 11.1 30.5 KS X 656.2 650 Used 4 inch OD auger to drill through concrete NN3 64.5 V1 V1<							÷ ()		Bridge				
NN2 CFS6 194 VTS 11.1 20.5 8.5 X 6652 653 Used 4 inch OB ager to drill through concrete 9N34 6649 21.1 YTS 19.5 40.6 X 64.6 0 Not Accessible 9N34 6643 12.0 YTS 10.2 21.1 X X 656.4 653 CONCRET RUBBLE to 51t 6532 676.4 779 YTS 11.3 4.2 4 X 656.4 653 CONCRET RUBBLE to 51t 6334 74 75 11.7 4.6 7 6 7.0 Not Accessible 834 61.7 7 YTS 14.4 21.1 3 X 667.13 655 More of namp marked on the stake is 079.4 835 671.7 7 YTS 14.4 21.2 3.5 12.7 4.66.1 654 Steet from stake 656.4 553 Steet from stake 656.4 553 554 552.9 553	DNI24	676.0	22.0	VEC	42.0	25.6	6	V			Used Alisek OD success addition whereas success		
Image Image <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>													
BY31 Cell V Cell V Cell Cell No BS32 Cell V V 10 V Cell No		675.6	19.4	YES	11.1	30.5	8.5	Х		653			
BS3 Mode	BN33								0		Not Accessible		
BS2 6663 122 VIS 102 23.1 X X 6664 653 CONCRET RUBBLE 10.5 ft. B33 67.0 VIS 14.3 42.2 4 X 666.7 642 Mixed to Bamp Not Accessible B33 67.1 7 VIS 11.7 46.7 8 X 665.7 655 Mixed to Bamp Mot Accessible B-93 671.7 7 VIS 14 21.8 X 666.4 6651 Merked to action was to steep to drill. Moved 40 feet North of marked loction a paprox-8 feet in elevation. Elevation marked on the stake is 679.40 SCK1 680.2 28.8 VIS 14.5 43.3 16.5 X 666.1 661 Steet from stake SCK2 680.1 28.8 VIS 13.8 8.8 5.5 X 656.0 676.4 4.4 4.4 X 662.4 662.1 166.1 Steet from stake SCC4 662.1 28.8 VIS 13.8 8.8 X	BN34	664.9	21.1	YES	19.5	40.6	Х	646.9	643.8	634			
633.6 674.6 27.9 VIS 14.3 42.2 4 X 666.7 662.4 Moved to Ramp. 693.4 62.1 3 V 61.7 64.7 66.7 66.7 66.7 66.7 Moved to Ramp. 8-93 671.7 7 VTS 11.7 64.7 66.7 66.7 66.7 66.7 66.7 Moved to Ramp. 8-93 671.7 7 VTS 11.7 64.7 66.7	BS31								0		Not Drilled - not in revised scope		
633.6 674.6 27.9 VIS 14.3 42.2 4 X 666.7 662.4 Moved to Ramp. 693.4 62.1 3 V 61.7 64.7 66.7 66.7 66.7 66.7 Moved to Ramp. 8-93 671.7 7 VTS 11.7 64.7 66.7 66.7 66.7 66.7 66.7 Moved to Ramp. 8-93 671.7 7 VTS 11.7 64.7 66.7	BS32	669.3	12.9	YES	10.2	23.1	Х	Х	656.4	653	CONCRETE RUBBLE to .5 ft		
B33 Image: Process of the state in the stat													
Bridge No. 9 Bridge No. 9 B-91 621.13 35 VES 11.7 46.7 8 X 657.13 655 Moved to Bamp B-93 671.7* 7 VES 14 21 3 X 664.7 660 More de loation was too steep to drill. Moved 40 feet North of marked loction a dynamical on the stake is 579.40 B-93 671.7* 7 VES 14.5 44.3 16.5 X 660.4 645 SCK-1 680.2 29.8 VES 14.5 44.3 16.5 X 666.1 644 SCK-3 681.0 125 Y X 656.4 644 SCK-4 679.9 28.8 VES 11.9 8.8 X 665.4 644 SCK-5 679.9 28.8 VES 11.9 8.8 X 666.2 644 SCK-5 679.4 WTS 11.3 25.6 X X 666.7 645 Boring Locaton moved on greenwy trail at side of the brindge. SCC-4 662.3		07 110	27.5	125	1.15			~		012			
B-92 692 692.1 35 YES 11.7 46.7 8 X 657.13 6655 Moved to Ramp B-93 671.7* 7 YES 14 21 3 X 664.7 660 Marked loattion was too steep to drill. Moved 40 feet North of marked loction a paprox 3 feet in elevation. Elevation marked on the stake is 679.49 SCK-1 680.2 29.8 YES 14.4 YE 17.7 X 661.4 661.4 661.5 Steet in elevation. Elevation marked on the stake is 679.49 SCK-1 680.2 29.8 YES 14.4 XE 652.0 660.4 645 5 SCK-2 680.1 24 YES 10 38 14 X 652.9 660.0 Offset 7.6 feet from stake SCK-4 679.4 28.8 YES 13 39.8 65.5 X 653.1 660 644 5 SCC-2 667.4 4 YES 13 26.6 X 5 661.0 Unestonumeted near ground surface	0334									N- 0	Not Accessible		
B-92 6921 7 YE 11.7 46.7 8 X 657.3 655 Moved to ramp B-3 671.7 7 YE 14 21 3 X 664.7 660 Marked loadion vana too step to diff. Moved 40 feet North of marked locition a pprox - 8 feet in elevation. Elevation marked on the stake is 673.49 SCK1 6802 29.8 YES 14.5 44.3 16.5 X 666.1 651 5 feet in elevation. Elevation marked on the stake is 673.49 SCK2 6601 29.8 YES 14.5 44.3 16.5 X 656.4 664 SCK4 680.9 28.8 YES 15.9 46.7 8 X 666.6 664 SCC4 67.9 28.6 YES 13 39.8 6.5 X 663.1 Unestone encountered near ground surface with large clay seam below. SCC2 667.4 4 YES 10.1 27.5 X 652.2 645.7 645 Boring location moved on greenway trail at side of the bridge.									Bridge	2 NO. 9			
9-39 671.7 7 VtS 1.4 2.1 3 X 664.7 660 Marked location was too steep to drill. Noved 40 feet North of marked location approx-8 feet in elevation. Elevation marked on the stake is 67.49 SCK-1 660.1 24 VtS 14.5 44.3 16.5 X 660.4 645 SCK-2 660.1 24 VtS 12.7 36.7 12 X 656.1 651 551 55 574.4 20.0 23.8 VtS 11.4 X 652.2 660.0 Offset 7.6 feet from stake SCK-6 679.4 22.8 VtS 13.9 38.6 6.5 X 663.1 650 VT VtS 10.0 27.5 X 666.4 644 VtS VtS 10.0 27.5 X 663.4 645 Unstand the dright is													
B*3 Dr./. Y </td <td>B-92</td> <td>692.13</td> <td>35</td> <td>YES</td> <td>11.7</td> <td>46.7</td> <td>8</td> <td>Х</td> <td>657.13</td> <td>655</td> <td>Moved to Ramp</td>	B-92	692.13	35	YES	11.7	46.7	8	Х	657.13	655	Moved to Ramp		
Image: Image: <th mage:<="" td="" th<=""><td></td><td>CR4 R⁴</td><td></td><td>1150</td><td></td><td></td><td></td><td></td><td></td><td></td><td>Marked loaction was too steep to drill. Moved 40 feet North of marked loction and</td></th>	<td></td> <td>CR4 R⁴</td> <td></td> <td>1150</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Marked loaction was too steep to drill. Moved 40 feet North of marked loction and</td>		CR4 R ⁴		1150							Marked loaction was too steep to drill. Moved 40 feet North of marked loction and	
Bridges over Syning Creek SCK-1 602 288 YES 14.5 V 650.1 661 5 feet from stake SCK-2 660.1 24 YES 12.7 36.7 12 X 650.1 661 5 feet from stake SCK-3 661.1 23.8 YES 11.7 X 651.6 644 SCK-4 660.2 28 YES 11.5 9 48.7 8 X 665.6 644 SCK-6 679.4 22.8 YES 11.3 38.8 6.5 X 653.1 650 CFC-1 662.2 10.7 27.5 X 662.2 663.4 646 Immettore encountered near ground surface with large day seam below. SCC-4 662.3 10.1 27.5 X 664.7 645.1 Immettore incountered near ground surface with large day seam below. SCC-4 662.3 10.1 27.3 X X 664.7 664.8 Immettore incountered near ground surface with large day seam below.	B-93	6/1./*	/	YES	14	21	3	х	664.7	660	approx -8 feet in elevation. Elevation marked on the stake is 679.49		
Style1 6802 29.8 YES 14.5 44.3 16.5 X 650.4 645 SCK-2 680.1 24 YES 12.7 36.7 12 X 656.1 651 5feet from stake SCK-3 681.1 29.5 17 X 651.6 644 SCK-4 69.9 28 YES 10 38 14 X 652.9 660 Offset 7.6 feet from stake SCK-6 679.9 28.8 YES 10 38 4 X 662.6 0 Offset 7.6 feet from stake SCC-1 662.2 17.5 YES 10 27.5 X 663.4 646.5 Boring location moved on greenway trail at side of the bridge. SCC-4 662.3 17.2 YES 11.3 25.6 X X 646.7 645 Boring location moved on greenway trail at side of the bridge. SCC-4 662.3 17.2 YES 11.3 25.6 X X 645.1 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Bridges over</td> <td>Spring Creek</td> <td></td>									Bridges over	Spring Creek			
SCC2 680.1 24 YES 12.7 95.7 12 X 656.1 651.1 Sfert from stake SCK-3 681.1 295 YES 10 38 14 X 651.6 664.4 SCK-5 679.4 22.8 YES 15.9 48.7 8 X 664.6 664.4 SCK-6 679.9 22.8 YES 13 93.8 6.5 X 663.1 650 TCC-1 662 17.5 YES 10 27.5 X 663.4 664 664 SCC-4 661.4 YES 11.3 25.6 X X 664.67 664.5 Borng location moved on greenway trail at side of the bridge. SCC-4 662.3 30 NO 30 4 649.3 632.3 x Images Augers leading off at 30 Abandon and offset, lost center plug, sank abead of augers SCC-4 662.3 17.2 YES 10.1 30 4 649.1 63.1 <t< td=""><td>0.014</td><td>600 Q</td><td>aa a</td><td>1/50</td><td></td><td></td><td>46.5</td><td></td><td></td><td></td><td></td></t<>	0.014	600 Q	a a a	1/50			46.5						
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SCC-3 673.4 32.8 YES 15.9 48.7 8 X 646.6 644 SCC-6 679.9 26.8 YES 13 39.8 6.5 X 653.1 660 SCC-1 666.2 17.5 YES 10 27.5 X 652.2 648.7 645 Envestore 646 Linestone encountered near ground surface with large day seam below. SCC-2 661.0* 14.3 YES 11.3 25.6 X X 646.7 645 Boring location moved on greenway trail at side of the bridge. SCC-4 662.3 30 NO 30 4 649.3 632.3 x Augers leading off at 30 Abandon and offset, lost center plug, sank ahead of augers SCC-4 662.3 17.2 YES 7.4 94.3 28.5 X 634 X Irregular rock surface, hard abrasive rock, no recovery FAULT ZONE CSX-1 720.9 86.9 YES 7.4 94.3 28.5 X 650 Irregular rock surface, hard abrasive rock, no rec	SCK-3	681.1	29.5	YES	FALSE	29.5	17	Х	651.6	644			
SEK-6 679.9 26.8 YES 13 39.8 6.5 X 653.1 650 Bridge over South Chickamauga Creek Bridge over South Chickamauga Creek 645 Bridge over South Chickamauga Creek SCC-2 667.4 4 YES 17.5 X 652.2 648.7 645 SCC-3 661.0* 14.3 YES 11.3 25.6 X X 664.7 645 Boring location mored on greenway trail at side of the bridge. SCC-4 662.3 30 NO 20.1 4 649.3 632.3 x Augers leading off a 20 Abandon and offset, lost center plug, sank ahead of augers SCC-4 662.3 17.2 VES 7.4 94.3 28.5 X 634 X Irregular nock surface, hard abrasive rock, no recovery FAULT ZONE CSX-1 720.9 7.5 7.8 80.3 1.5 X 664.4 X Irregular nock surface, hard abrasive rock, no recovery FAULT ZONE CSX-1 720.9 7.5 7.8 80.3 1.5 X	SCK-4	680.9	28	YES	10	38	14	Х	652.9	650	Offset 7.6 feet from stake		
Bridge over South Chickamaga Creek SCC-1 666.2 17.5 YES 10 27.5 X 652.2 648.7 648.7 648.7 SCC-26 667.4 4 YES 11.3 22.6 X 663.4 646.7 646.5 Boring location moved on greenway trail at side of the bridge. SCC-4 662.3 30 NO 30 4 649.3 632.3 x Augers leading off at 37 Abandon and offset, lost center plug, sank ahead of augers SCC-4 662.3 17.2 YES 10.1 27.3 X C 645.1 643 Irregular rock surface, hard barsive rock, no recovery FAULT ZONE Bridge over CSX Railroad CK-4 662.3 YES 7.4 94.3 28.5 X 634 X Irregular rock surface, hard barsive rock, no recovery FAULT ZONE CK-4 65.9 YES 7.4 94.3 28.5 X 634 X Irregular rock surface, hard barsive rock, no recovery FAULT ZONE CK-4 65.9 YES	SCK-5	679.4	32.8	YES	15.9	48.7	8	Х	646.6	644			
Bridge over South Chickamaga Creek SCC-1 666.2 17.5 YES 10 27.5 X 652.2 648.7 648.7 648.7 SCC-26 667.4 4 YES 11.3 22.6 X 663.4 646.7 646.5 Boring location moved on greenway trail at side of the bridge. SCC-4 662.3 30 NO 30 4 649.3 632.3 x Augers leading off at 37 Abandon and offset, lost center plug, sank ahead of augers SCC-4 662.3 17.2 YES 10.1 27.3 X C 645.1 643 Irregular rock surface, hard barsive rock, no recovery FAULT ZONE Bridge over CSX Railroad CK-4 662.3 YES 7.4 94.3 28.5 X 634 X Irregular rock surface, hard barsive rock, no recovery FAULT ZONE CK-4 65.9 YES 7.4 94.3 28.5 X 634 X Irregular rock surface, hard barsive rock, no recovery FAULT ZONE CK-4 65.9 YES	SCK-6	679.9	26.8	YES	13	39.8	6.5	X	653.1	650			
SEC-1 666.2 17.5 YES 10 27.5 X 652.2 648.7 645 SCC-2 667.4 4 YES 12 31 4 X 665.4 645 Limestone encountered near ground surface with large clay seam below. SCC-2 667.4 4 YES 11.3 25.6 X X 646.7 645 Boring location moved on greenway trail at side of the bridge. SCC-4 662.3 30 NO 30 4 649.3 632.3 X Augers leading off at 30' Abandon and offset, lost center plug, sank ahead of augers SCC-4A 662.3 17.2 YES 10.1 27.3 X X 645.1 643 IRREGULAR ROCK SURFACE SCC-4A 662.3 17.2 YES 7.4 94.3 28.5 X 648.4 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 660.5 666 Hoar ock, siliceous, low grade metamorph	JULY O												
SCC-2 667.4 4 YES 27 31 4 X 663.4 646 Umestone encountered near ground surface with large day seam below. SCC-3 661.0* 14.3 YES 11.3 25.6 X X 646.7 648 Boring location moved on greenway trail at side of the bridge. SCC-4 662.3 30 NO 30 4 649.3 632.3 X Augers leading off a 20'Abandon and offset, lost center plug, sank ahead of augers leading off at 20'Abandon and offset, lost center plug, sank ahead of augers leading off at 20'Abandon and offset, lost center plug, sank ahead of augers leading off at 20'Abandon and offset, lost center plug, sank ahead of augers leading off at 20'Abandon and offset, lost center plug, sank ahead of augers leading off at 20'Abandon and offset, lost center plug, sank ahead of augers leading off at 20'Abandon and offset, lost center plug, sank ahead of augers leading off at 20'Abandon and offset, lost center plug, sank ahead of augers leading off at 20'Abandon and offset, lost center plug, sank ahead of lo			17.5	1/50	4.0	07.5			_	_	Jeek		
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SCC-4 662.3 30 NO 30 4 649.3 632.3 x Augers leading off at 30 Abandon and offset, lost center plug, sank ahead of augers SCC-4A 662.3 17.2 YES 10.1 27.3 X x 645.1 643.1 IRREGUAR ROCK SURFACE Bridge over CSX Railroad CSX-1 720.9 72.5 YES 7.4 94.3 28.5 X 634.4 X Irregular rock surface, hard abrasive rock, no recovery FAULT ZONE CSX-12 715.5 55 YES 1.4 69 18.5 X 666.5 656 CSX-2 715.5 57.5 YES 1.4 69 18.5 X 666.5 656 CSX-3 716.0* 57.7 YES 9.8 39.9 12 X 665.6 666 9.6 feet offset from stake M-1 699.7 30.1 YES 9.8 39.9 12 X 665.6 661 MCB-1 697.2 27.2													
SUC-4 662.3 30 NO 30 4 649.3 652.3 x augers SCC-4A 662.3 17.2 YES 10.1 27.3 X X 645.1 663 IRREGULAR OCK SURFACE 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-1 720.9 72.5 YES 7.8 80.3 1.5 X 648.4 X Irregular rock surface, hard abrasive rock, no recovery FAULT ZONE CSX-3 716.0° 57.9 YES 14.8 69 18.5 X 660.5 666 9.6 feet offset from stake M-1 699.7 30.1 YES 9.8 39.9 12 X 663.6 666 9.6 feet offset from stake M-1 697.7 30.1 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 uppe frock	SCC-3	661.0*	14.3	YES	11.3	25.6	Х	Х	646.7	645	Boring location moved on greenway trail at side of the bridge.		
SC-4A 662.3 17.2 YES 10.1 27.3 X K 645.1 143 IRREGULAR ROCK SURFACE Bridge over CSX Railroad CSX-14 72.9 96.9 YES 7.4 94.3 28.5 X 634 X Irregular rock surface, hard abrasive rock, no recovery FAULT ZONE CSX-14 72.5 YES 7.4 94.3 28.5 X 648.4 X Irregular rock surface, hard abrasive rock, no recovery FAULT ZONE CSX-17 72.5 YES 14.8 69 18.5 X 660.5 656 CSX-3 716.0* 57.9 YES 14.8 72.7 22 X 669.6 9.6 feet offset from stake More Road Bridge More Road Bridge MCBrie Road Bridge 11 42.4	666 A	662.2	20			20		640.0	(22.2.2.2		Augers leading off at 30' Abandon and offset, lost center plug, sank ahead of		
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Retaining Walls - I-75 Lane Widening along Brown Acres Golf Course RW-1 669.2 22 YES X 22 6 X 647.2 x RW-2 668.3 24 YES X 24 X 655.3 644.3 x RW-3 665.8 19.5 YES X 19.5 657.8 646.3 x RW-4 677.7 33.8 YES X 33.8 13.5 X 643.9 x 2 tubes in offset auger hole RW-4 677.7 33.8 VES X 23 X X 652.8 632.4 x RW-5 677.8 45.4 YES X 45.4 13.5 652.8 632.4 x													
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RW-5 677.8 45.4 YES X 45.4 13.5 652.8 632.4 x											z tubes in onset duger note		
RW-6 699.3 47.2 YES X 47.2 35 X 652.1 x										х			
	RW-6	699.3	47.2	YES	Х	47.2	35	Х	652.1	х			

* Surface Elevation by GIS, should be considered approximate All other elevaitons by survey supplied by TDOT

4.10 **GROUNDWATER CONDITIONS**

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 (SCK, BN2, BN3, BS2, and BS3) 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). Groundwater levels will vary depending on the time of year, climatic conditions and the degree of construction activities.

4.11 LABORATORY TEST RESULTS

KSWA 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 F where results require additional space for reporting. The laboratory testing included:

- Natural Moisture Content (AASHTO T 265)
- Atterberg Limit Determination (AASHTO T 89 and T 90)
- Unconfined Compressive Strength Testing Soil (AASHTO T 208)
- Grain Size Analysis (AASHTO T 27)
- Soil Moisture/Density Relationship Determination (AASHTO T 99)
- Unconfined Compressive Test- Rock

Unconfined compressive strength of selected samples of rock 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 are presented in Table 5.

Test Boring	Depth of Sample ²	Compressive Strength			
Number	(feet)	(psi) ¹	(ksf) ¹		
BN-21	13.3-13.7	15,422	2,220		
BN-21	20.4-20.8	4,996	710		
BN-23	12.5-12.9	7,213	1,030		
BN-23	19.0-19.4	8,775	1,260		
BN-34	29.2-29.8	7,461	1,070		
BN-34	37.3-37.7	10,221	1,470		
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		
SCK-1	33.0-33.4	5,537	800		
SCK-6	33.1-34.2	4,797	690		
SCR-1	44.8-45.2	5,217	750		
SCR-1	45.6-46.1	4,903	710		

TABLE 5: SUMMARY OF ROCK CORE COMPRESSIVE STRENGTH TESTING

¹ Pounds per square inch (psi); Kips per square foot (ksf).

² All sample depths are approximate.

5.0 PAVEMENT DESIGN RECOMMENDATIONS

A preliminary design was developed for the project using traffic data supplied by TDOT. The data included average daily traffic (ADT) data for different sections of the interstate. Vehicle load distribution data was also included with the information supplied. This data is located in Appendix H of this report. KSWA evaluated the traffic data along with the conditions encountered during the pavement exploration, soil and groundwater conditions encountered during exploration to provide recommendations for rigid and flexible pavement designs.

The designs are based on subgrade support characteristics similar to a CBR of 6 or greater, with good drainage being provided through the use a 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.

Provided the pavement subgrade is properly prepared, the following pavement sections are recommended.

	1			lable	6: Pavement	Thickness Recor								
		Thickness in Inches												
RECOMMENDATIONS				Flex	kible Paveme	nt				Rigid Pav	ement			
	Base Stone	Surface	Binder	Base			ACC Total	TOTAL THICKNESS	Base Stone	PCC	TOTAL	Dowel Condition		
Mainline Interstate	14	1 1/4	2 3/4	8 1/4	A Mix	4	12 1/4	26 1/4	12	9.5	21.5	doweled Joints		
	14	1 1/4	2 3/4	81/4	AS Mix	4 1/4	° 12 1/4	20 1/4	12	12.5	24.5	no dowels		
Mainline Shoulder	20 3/4	1 1/2	22/4	4	A Mix	4	8 1/4	29	12	12	24	no dowels		
Ivialitilite Shoulder	20 5/4	1 1/2	2 3/4	4	AS Mix	0	0 1/4	29	12	12	24	no dowers		
24 Domas	14	1 1/4	2 3/4	7	A Mix	3 1/2	- 11	25	12	9	21	doweled Joints		
24 Ramps	14	1 1/4	2 3/4	/	AS Mix	3 1/2	11	25	12	12.5	24.5	no dowels		
Ramp Shoulder	20 1/4	1 1/2	2 3/4	3 1/2	A Mix	3 1/2	7 3/4	28	12	9	21	no dowels		
Ramp Shoulder	20 1/4	1 1/2			AS Mix	0	7 3/4	20	12	9	21	no dowers		
McBrien	8	1 1/4	4				5 1/4	13 1/4	Х	Х	Х			
Spring Creek Road	8	1 1/4	4				5 1/4	13 1/4	Х	Х	Х			
Moore Rd	8	1 1/4	4				5 1/4	13 1/4	Х	Х	Х			
On Damas	12		22/4	6	A Mix	3	10	10 22	12	9	21	doweled Joints		
On Ramps	12	1 1/4	2 3/4		AS Mix	3	10		12	12	24	no dowels		
Mill and Overlay	Х	1 1/4	2 3/4	Х			4	varies	Х	Х	Х			

NOTES:

Rigid Pavement Concrete Strength Modulus of Rupture = 750 psi

Based on Pavement Support Characteristics similar to CBR value of 6, with good drainage Asphalt Base Mix or Binder may be used below concrete pavement in place of Base Stone. Shoulder thickness may be thicker if used for mainline traffic during construction. Base course on shoulders thickened to match total section thickness of adjacent section

6.0 QUALIFICATIONS OF RECOMMENDATIONS

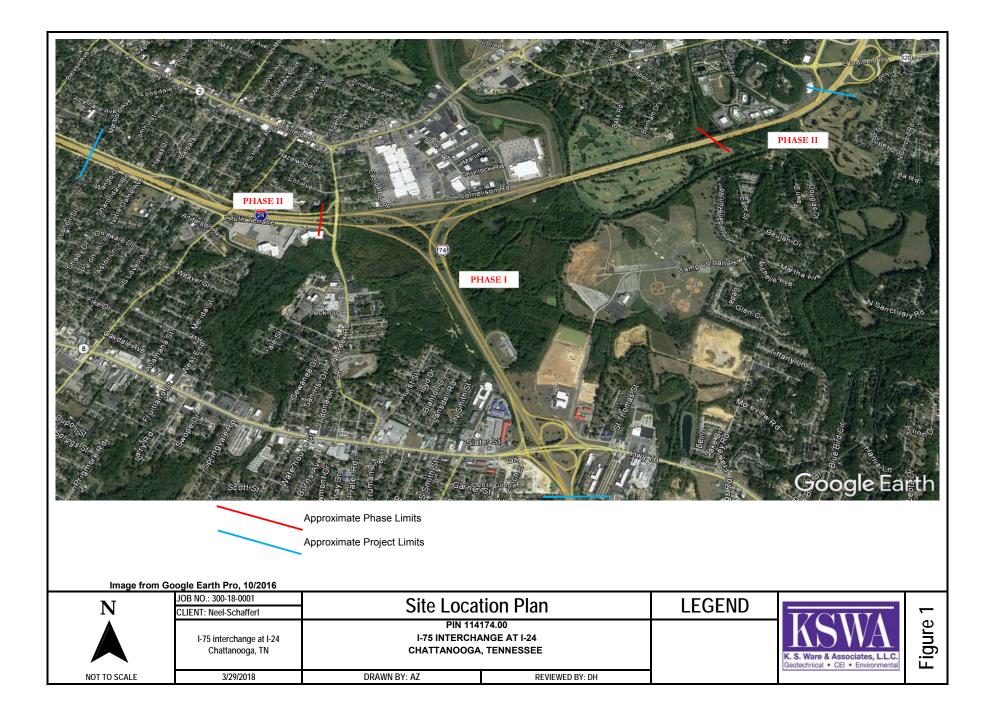
The conditions described in this report were interpreted from our observations at the site and using the information obtained from the test borings that were advanced at the site. Test borings only depict the soil and rock conditions at the specific location and time at which they were made. The soil 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. Additional evaluation of the pavement section is recommended to coincide with particular project limits, traffic routing during construction and other factors.

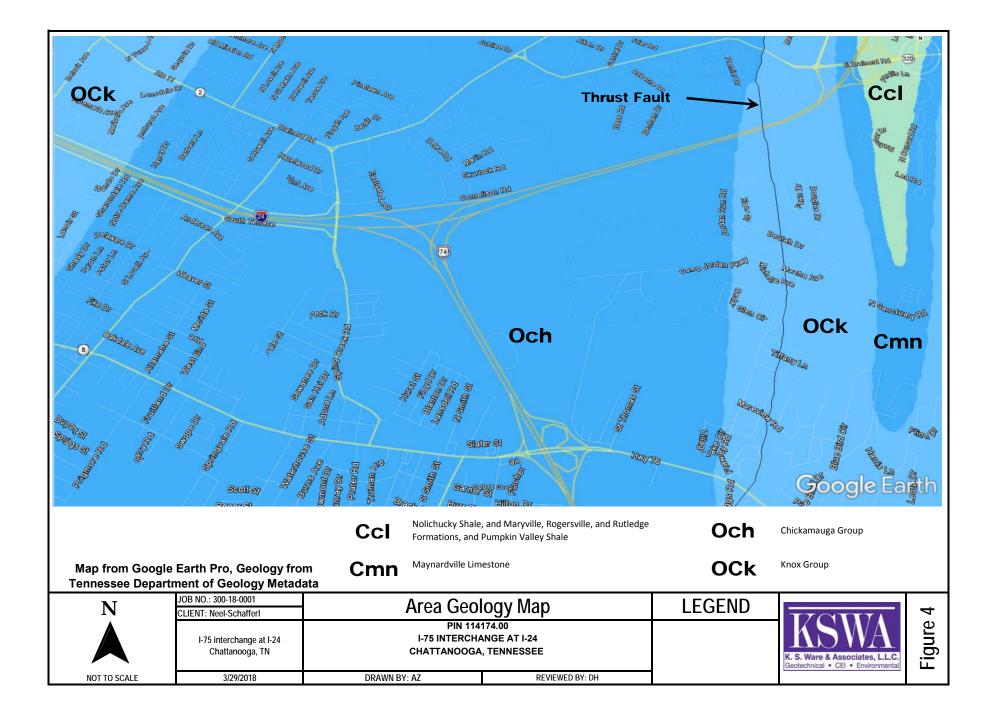
The scope of our geotechnical services did not include assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater or surface water within or beyond the site studied. Any statements in this report or indicated on the test boring logs regarding odors, staining of soils or other unusual conditions observed are strictly for the information of our client.

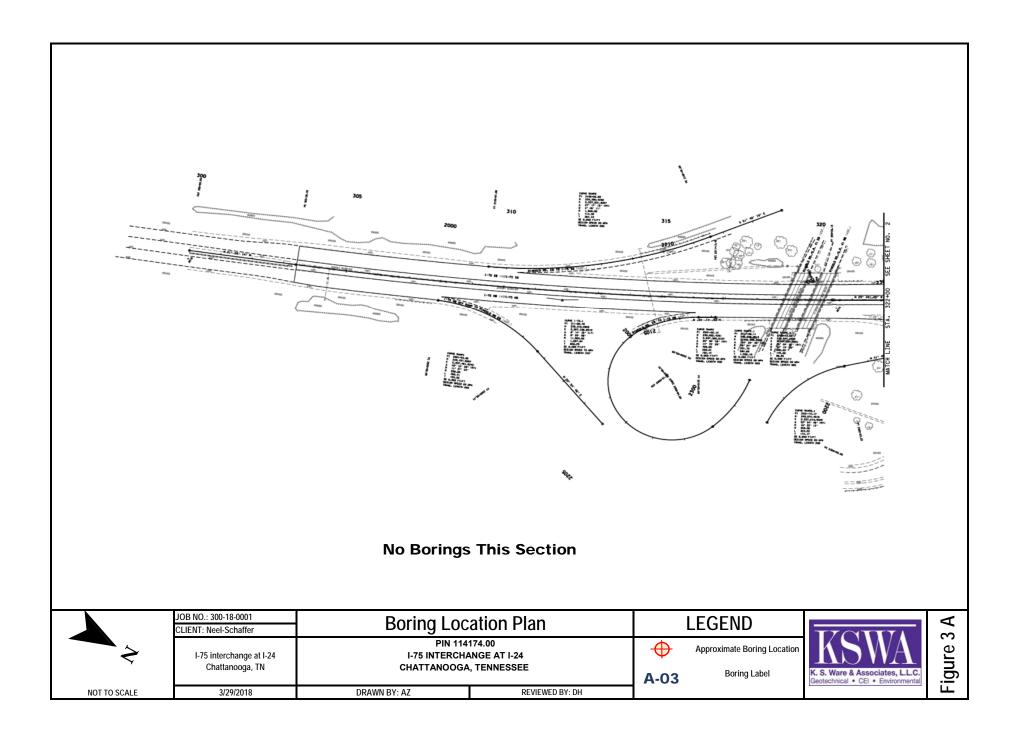
Our professional services were limited to developing a geotechnical conditions baseline report and was not intended to act as a design geotechnical study for this project. Additional exploration and evaluation will be need to conform to the requirements of the TDOT Geotechnical Manual for each of the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

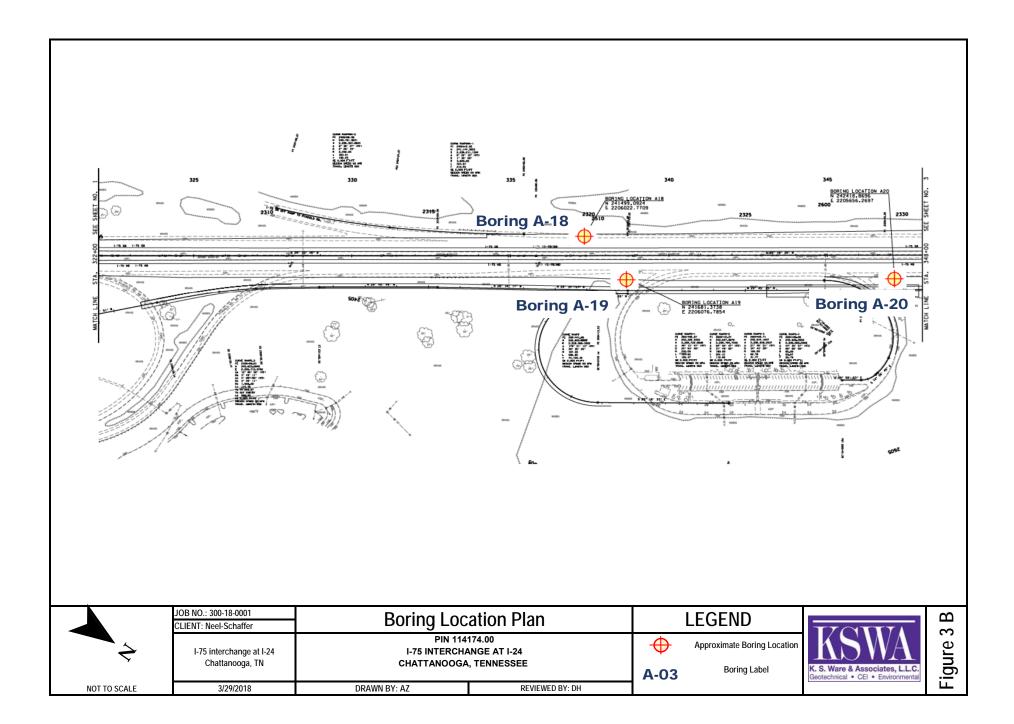
Our services include retaining the soil and rock samples obtained during this study for 60 days after report submittal. Further storage or transfer of the samples can be made at the Client's expense upon a written request. APPENDIX A FIGURES

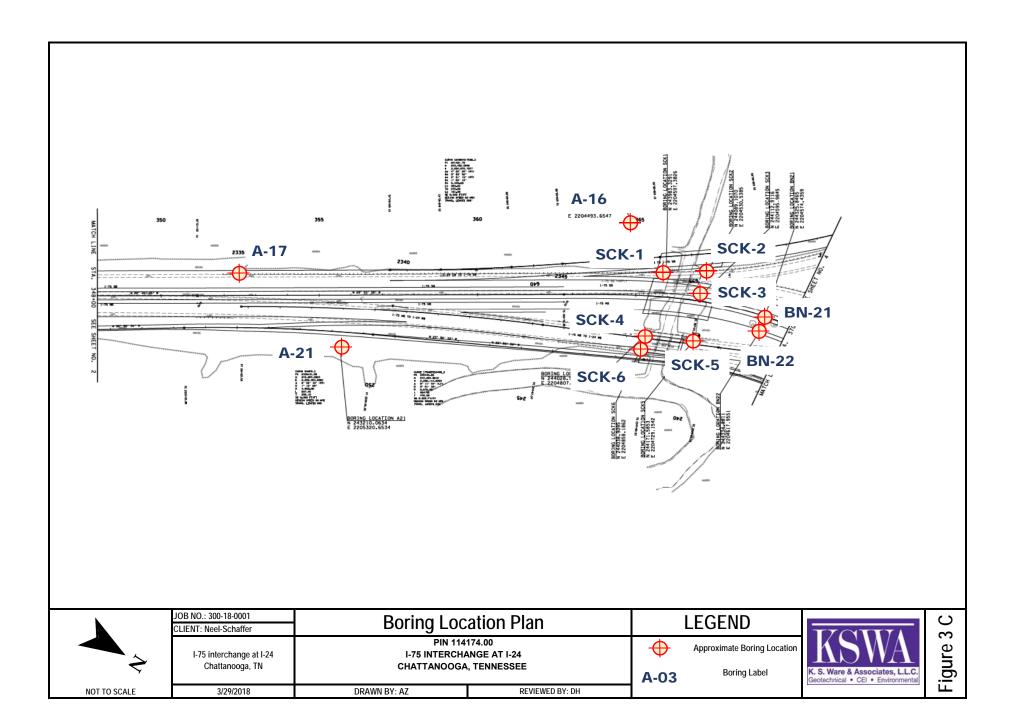


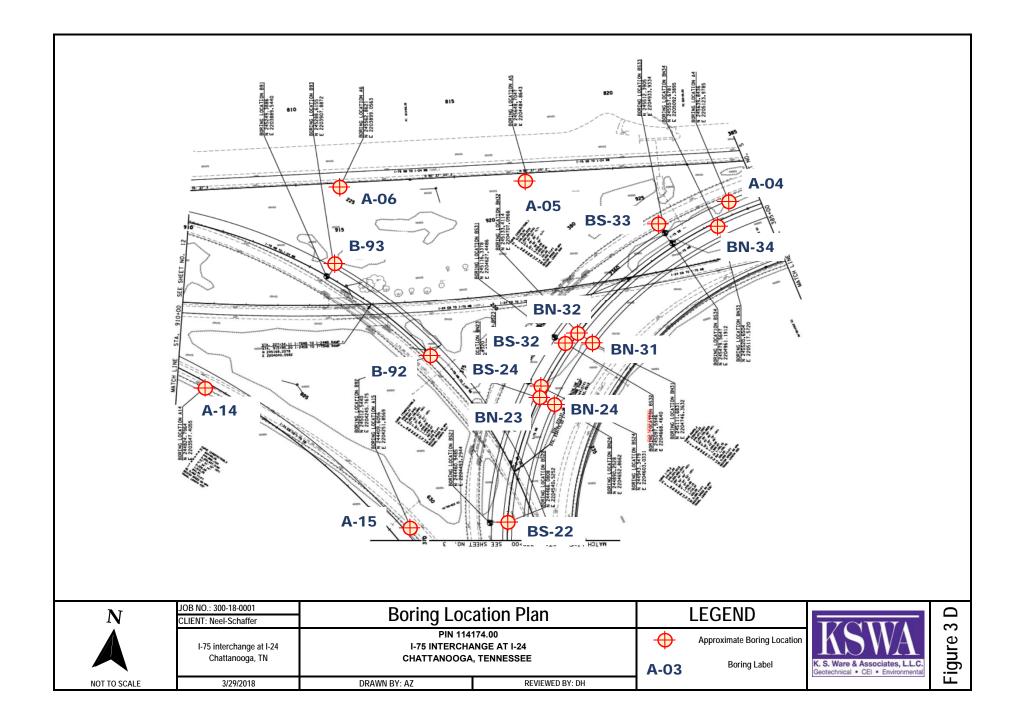
Sond Drivents BRAUINERD Bark of America (ATAL P BE LV 011 BE LV 011 Carterio Carteri	n Crome Hansportation	Finor Freight Bols Brow	Banilan Panal Dana Banilan Banilan Banil Banilan Banil Banilan Banil Banilan Banilan Banilan Banilan Banilan Banilan Banilan Banilan Banilan Banilan Banilan Banilan Banilan Banilan Banilan Banilan Banilan Banilan Banilan B	entre de la conserva de la conserva de la conserva de la conserva	Rice Apartments	
Ν	JOB NO.: 300-18-0001 CLIENT: Neel-Schafferl	Coring Location Plan		LEGEND	TZOTTA	2
NOT TO SCALE	I-75 interchange at I-24 Chattanooga, TN 3/29/2018	PIN 114174.00 I-75 INTERCHANGE AT I-24 CHATTANOOGA, TENNESSEE DRAWN BY: AZ REVIEWED BY: DH		B-1 Approximate Location of Core Holes on Shoulder and Travel Lane and	K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	Figure 2
NOT TO JUALE	512712010			reference number		

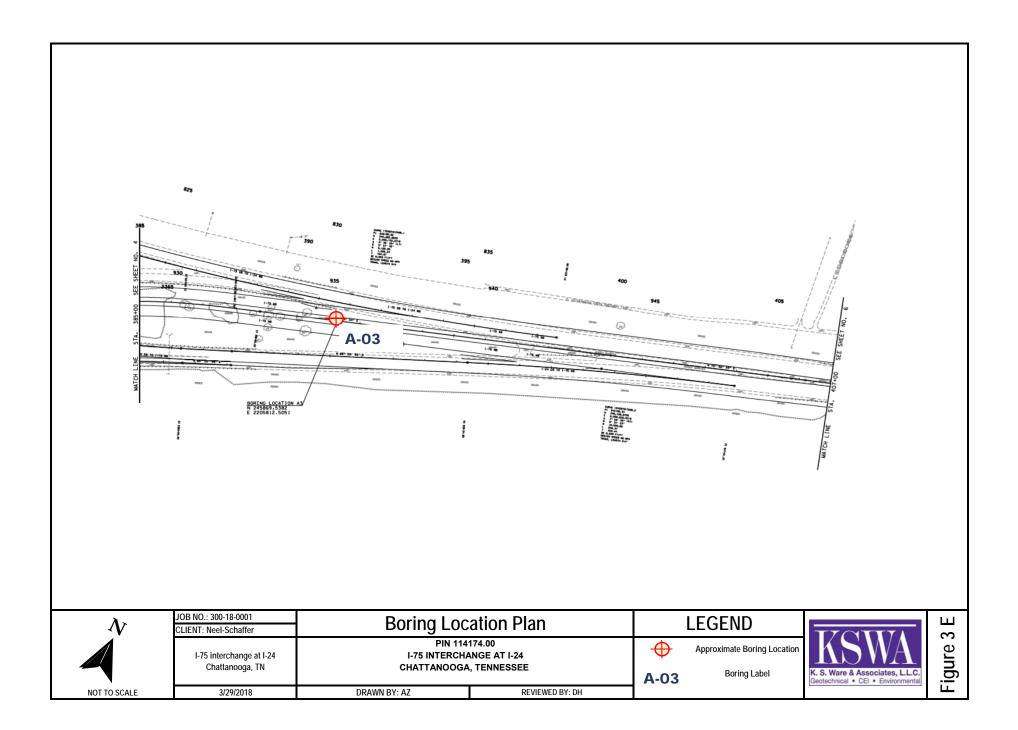


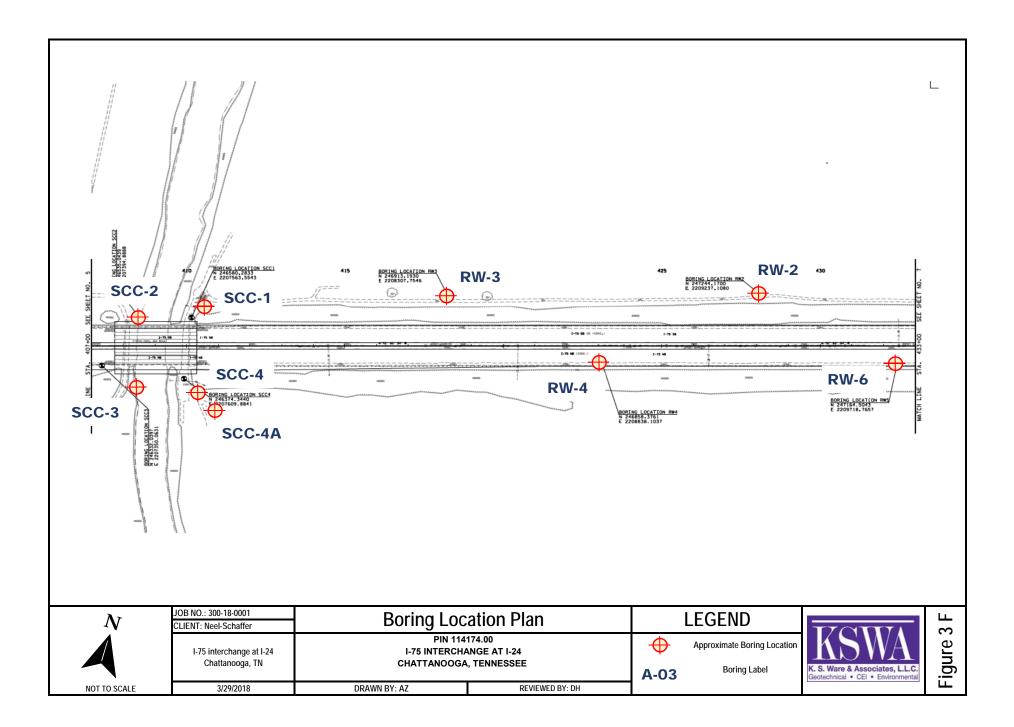


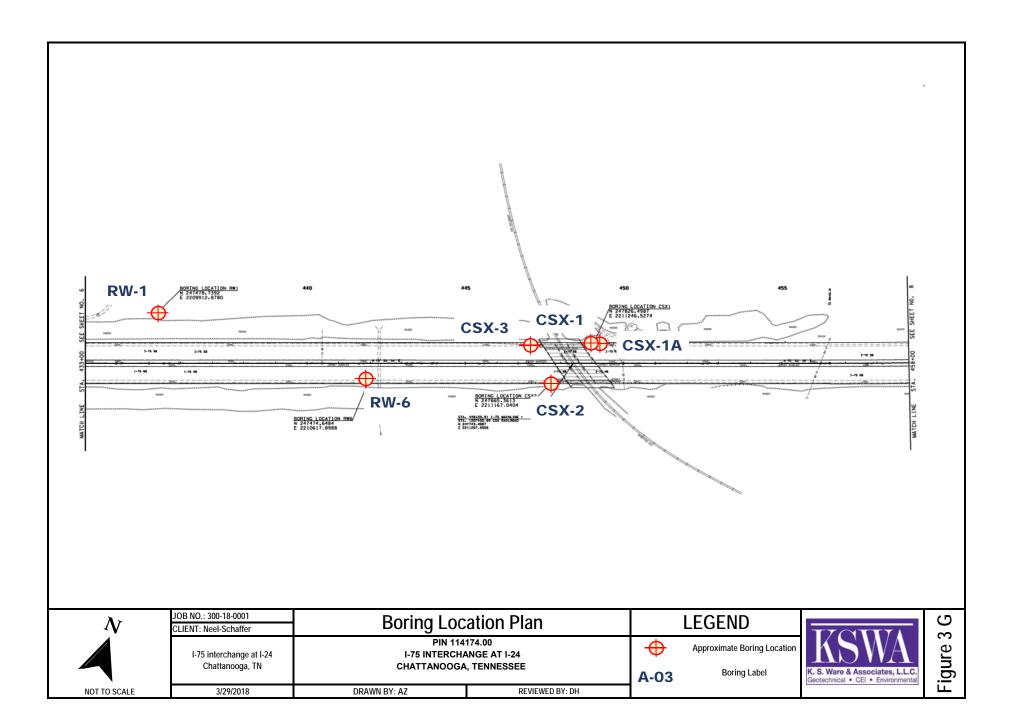


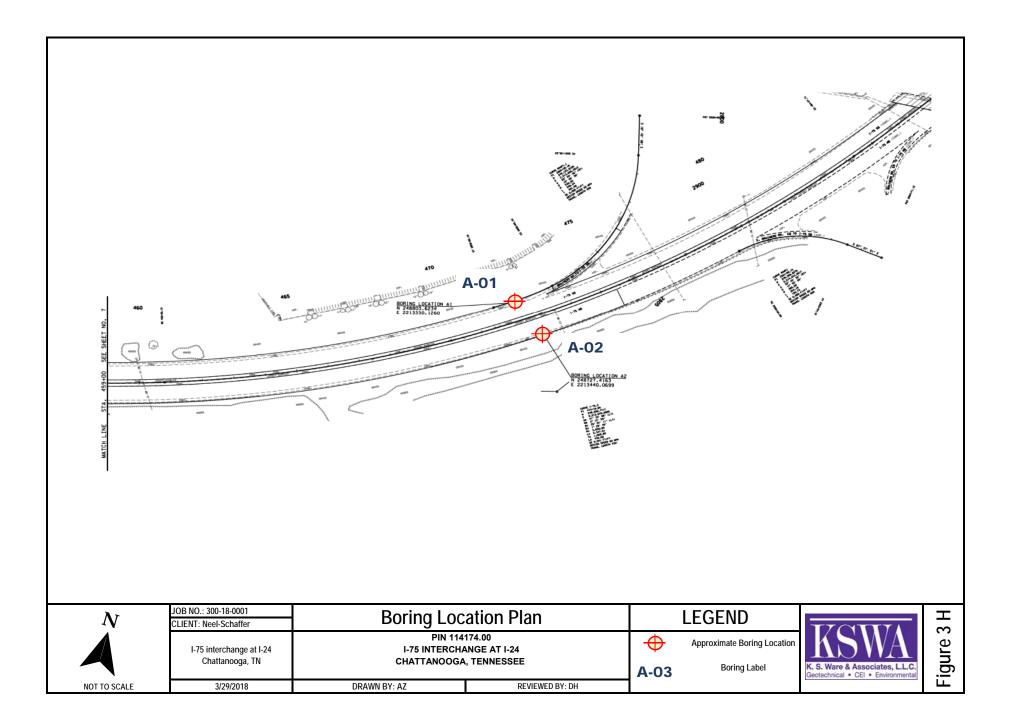


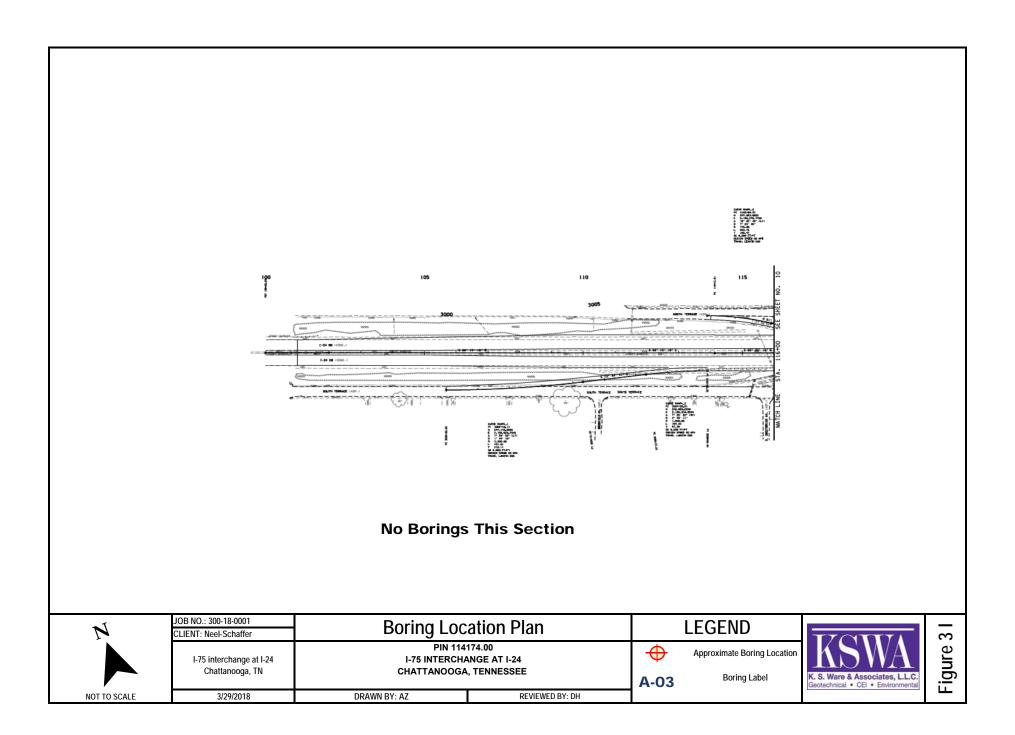


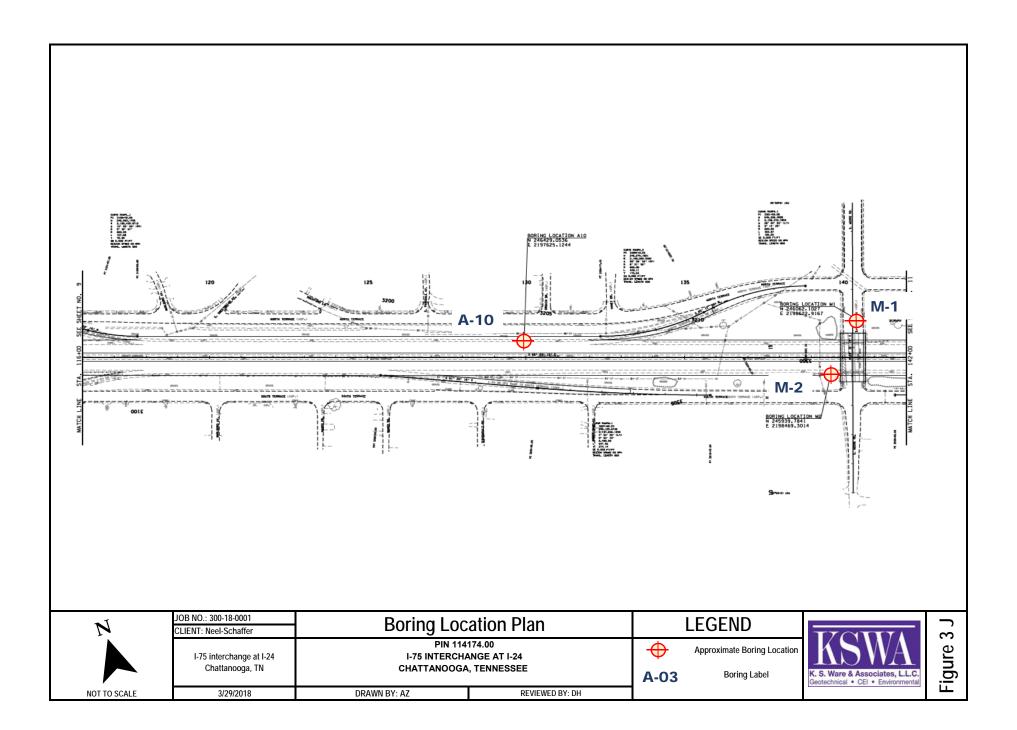


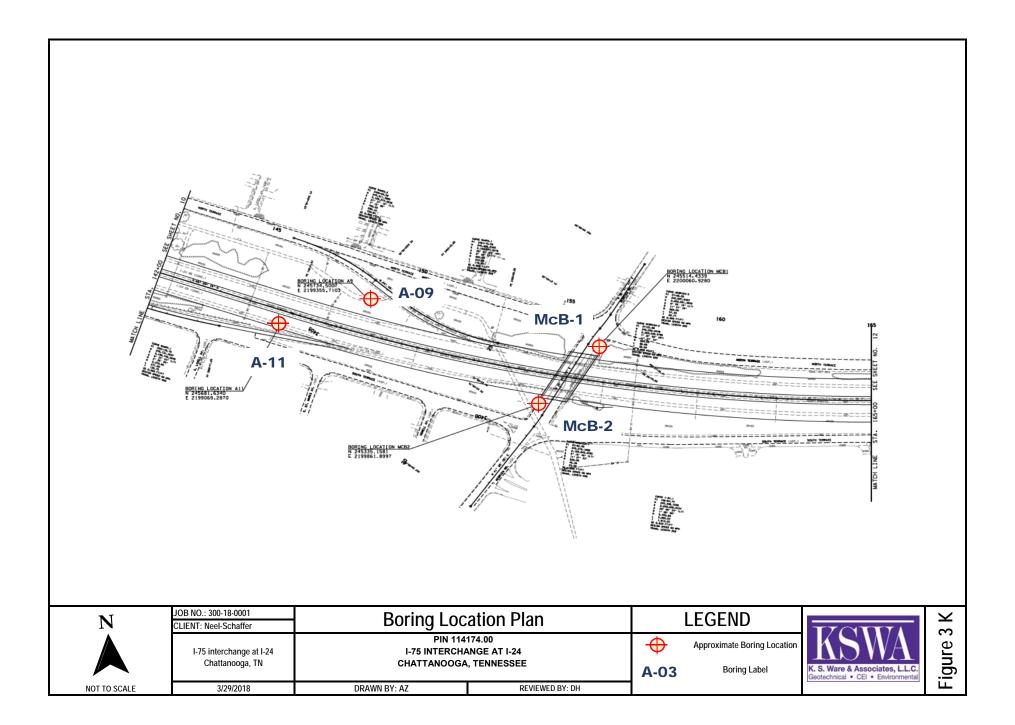


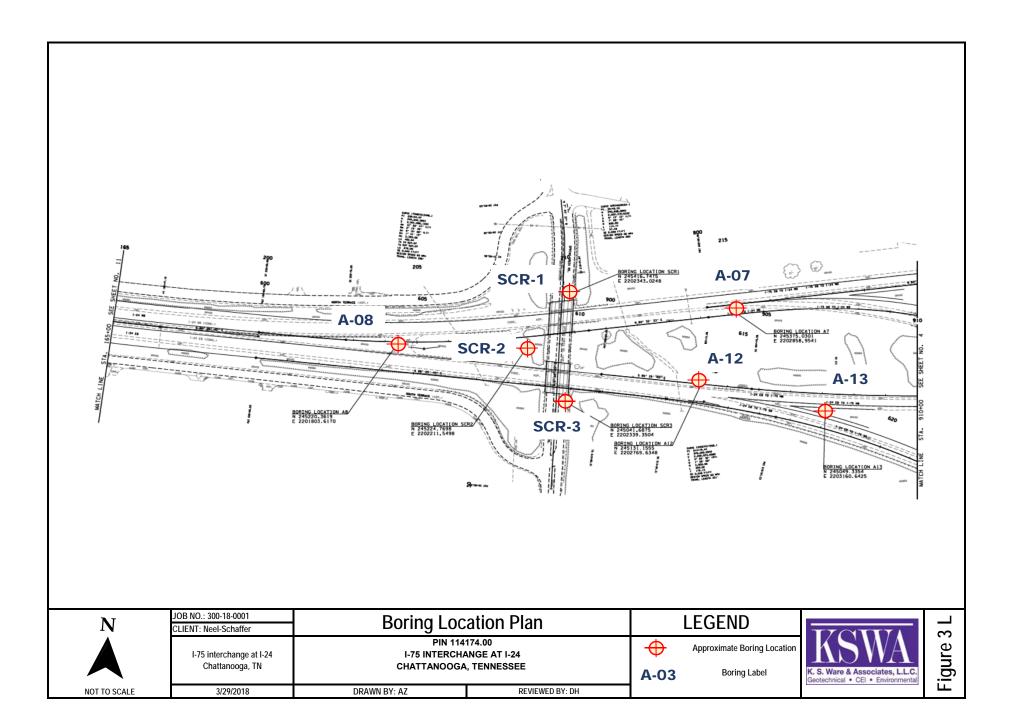














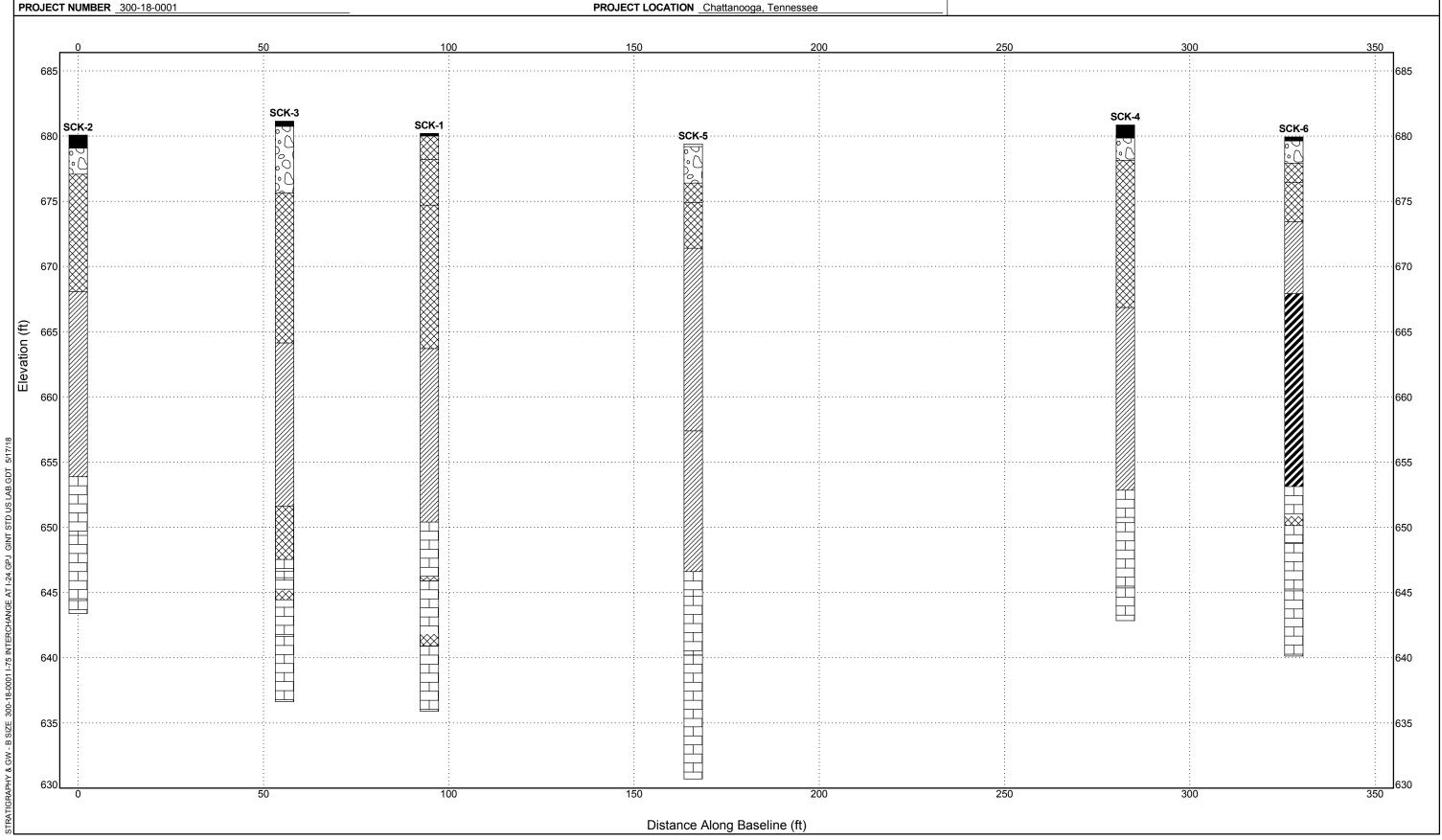
SUBSURFACE DIAGRAM **SPRING CREEK BRIDGE** FIGURE # 5A

Asphalt

Limestone USCS High Plasticity Clay

CLIENT Neel-Schaffer

PROJECT NUMBER 300-18-0001





Fill (made ground) USCS Poorly-graded



USCS Low Plasticity Clay

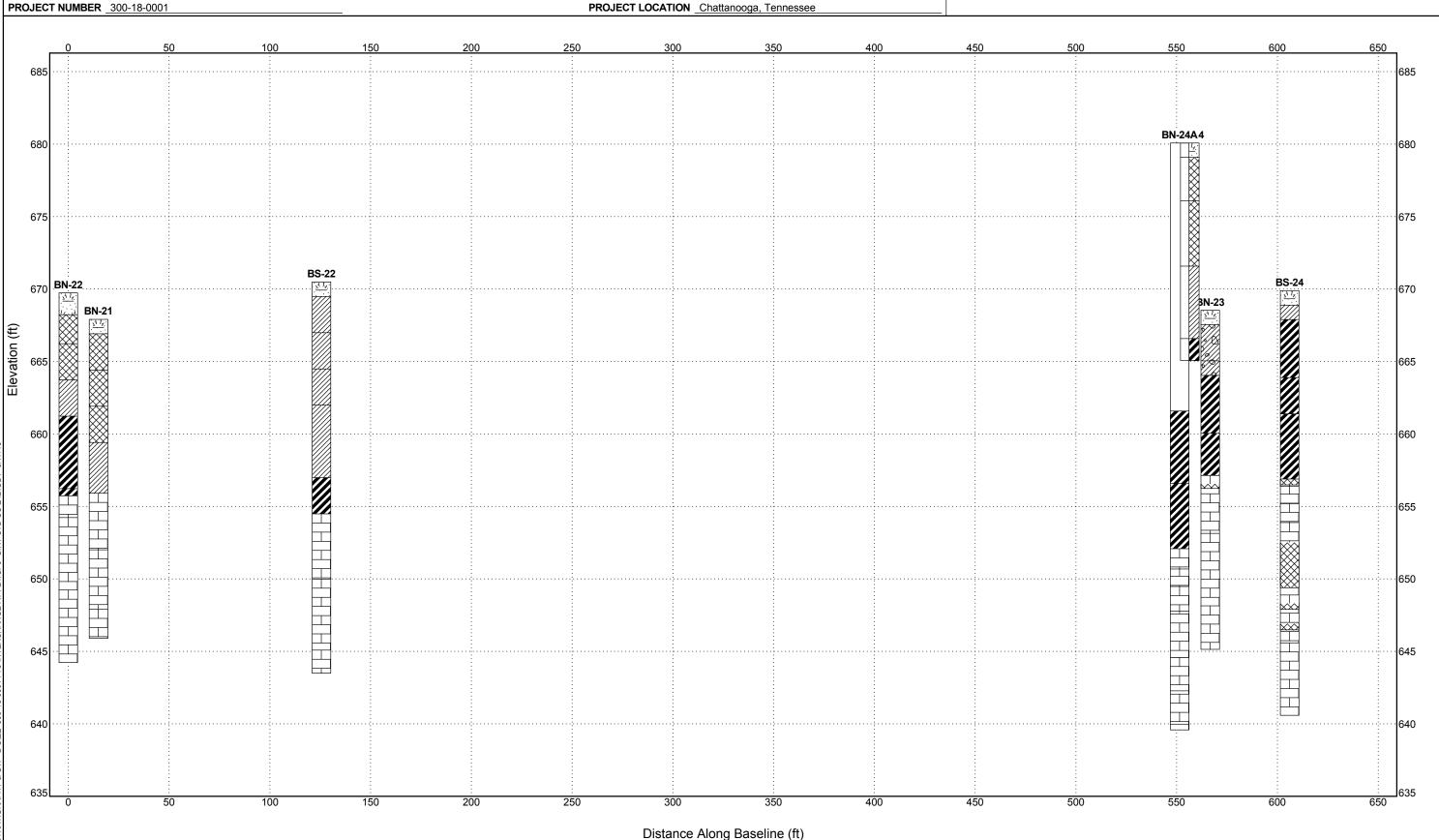


SUBSURFACE DIAGRAM BRIDGE # 2 (NB, SB) FIGURE # 5B

Topsoil Limestone

CLIENT Neel-Schaffer

PROJECT NUMBER _300-18-0001





Fill (made ground) USCS High Plasticity Clay



USCS Low Plasticity Clay USCS Low Plasticity Gravelly Clay



SUBSURFACE DIAGRAM Topsoil BRIDGE # 3 (NB, SB) FIGURE # 5C

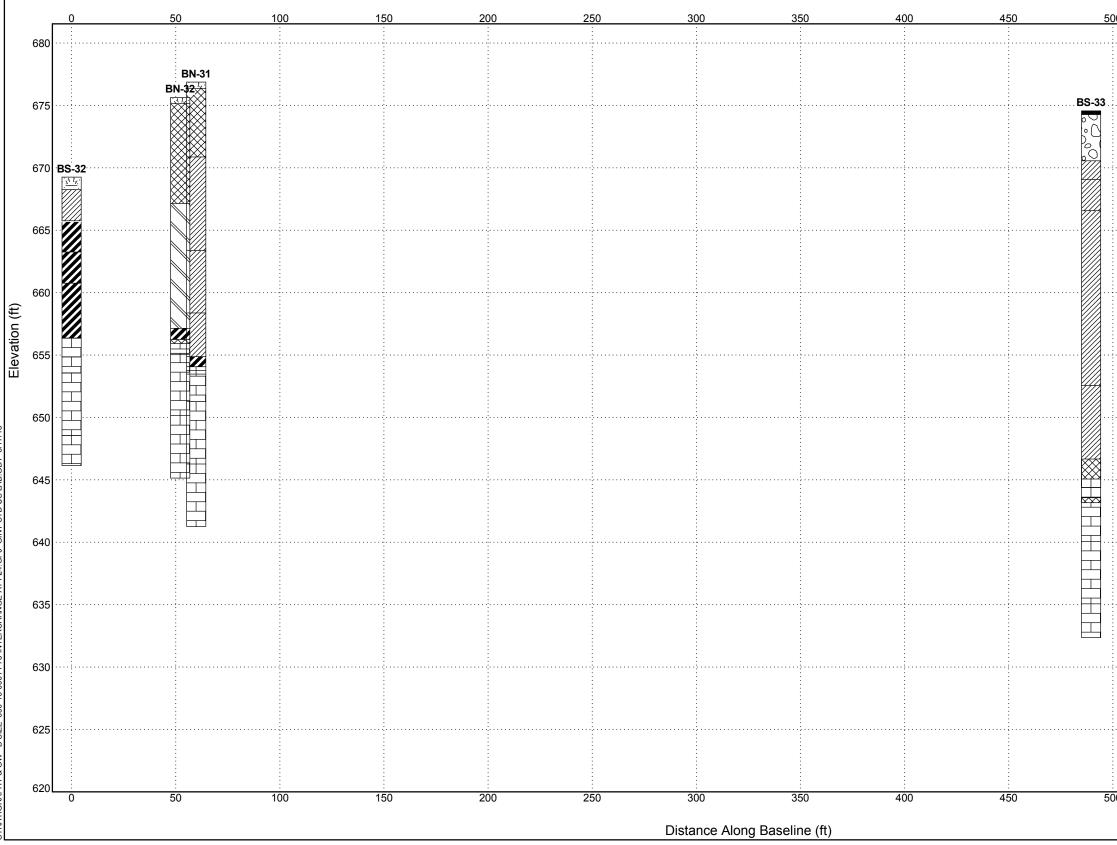
USCS High Plasticity Clay

Asphalt

CLIENT Neel-Schaffer

PROJECT NUMBER 300-18-0001

PROJECT LOCATION Chattanooga, Tennessee





Fill (made ground)



USCS Low Plasticity Clay USCS Low to High Plasticity Clay

□ □ □ □ □ USCS Poorly-graded Gravel

550	600	650
 		:
 	······	680
•		
 ·····	·····	
		: .
 	BN-3	4 665
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 ·····	·······	
•		
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	i F	
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 	······	625
		i I
 550	600	620
550	000	0.00



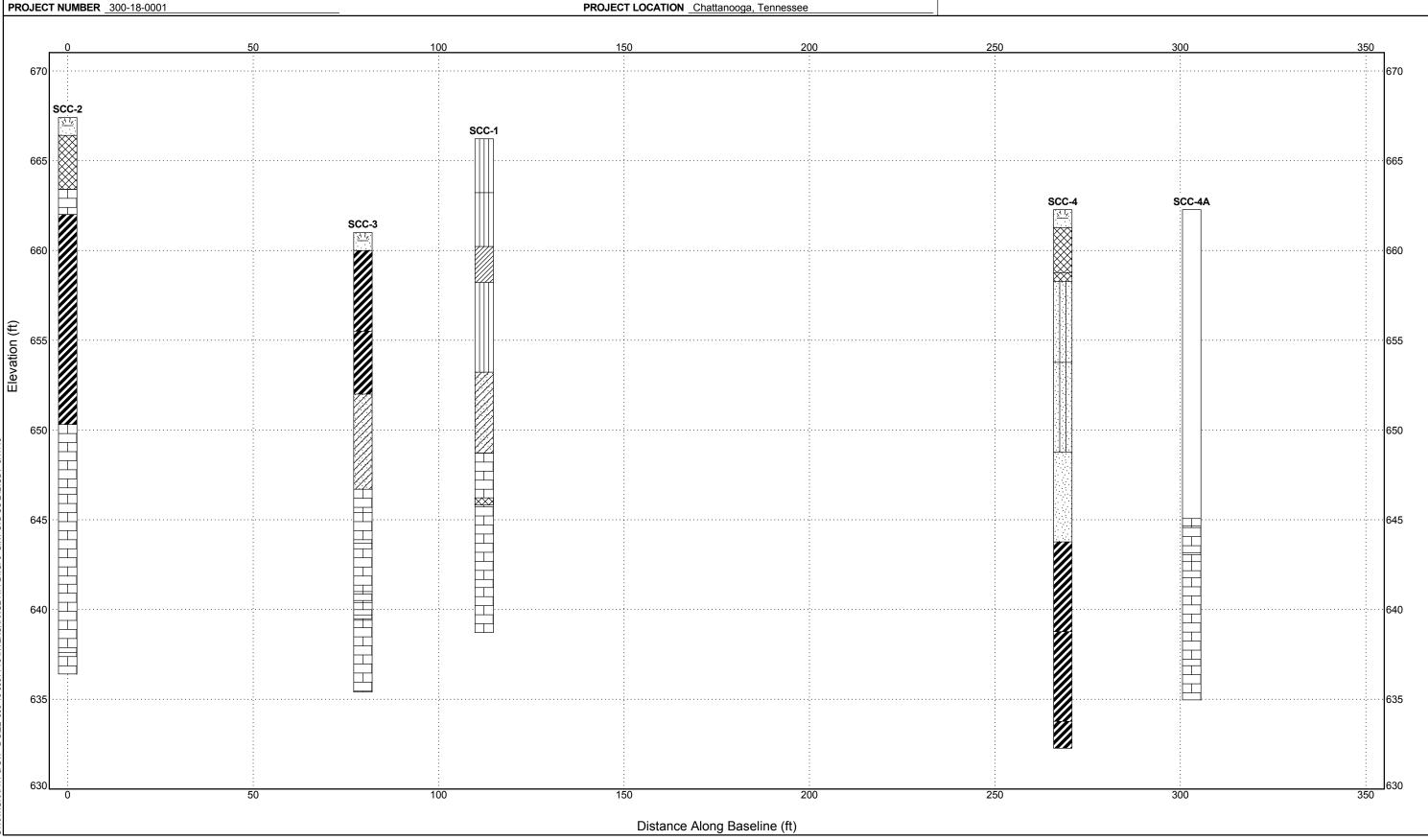
SUBSURFACE DIAGRAM SOUTH CHICKAMAUGA CREEK BRIDGE FIGURE # 5D

USCS Silt Limestone

USCS High Plasticity Clay

CLIENT Neel-Schaffer

PROJECT NUMBER 300-18-0001





USCS Low Plasticity Clay

Fill (made ground)

USCS Silty Sand

Topsoil

USCS Clayey Sand

USCS Poorly-graded Sand



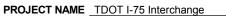
SUBSURFACE DIAGRAM SPRING CREEK ROAD BRIDGE FIGURE # 5E

Asphalt

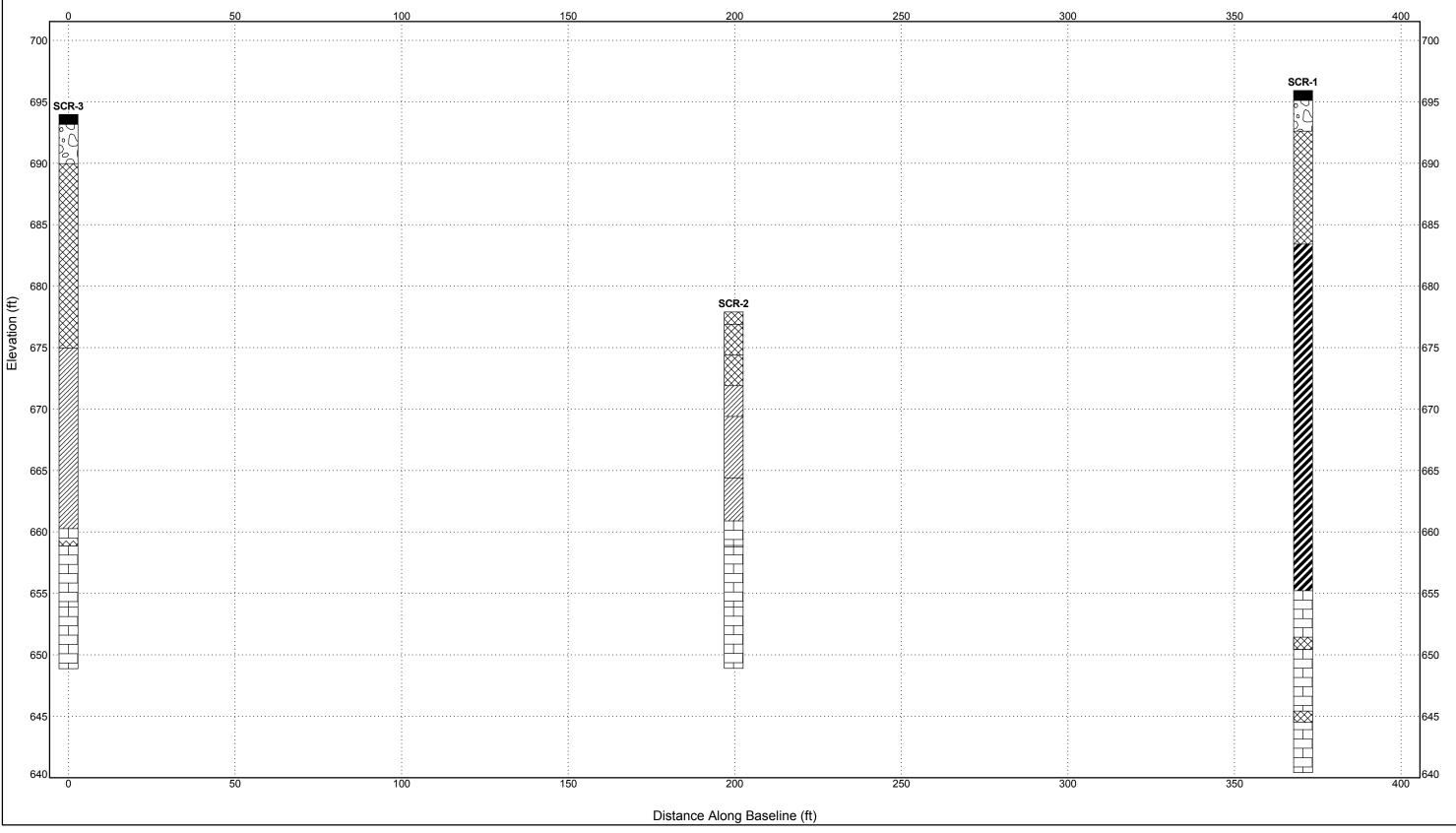
USCS High Plasticity Clay

CLIENT Neel-Schaffer

PROJECT NUMBER 300-18-0001



PROJECT LOCATION Chattanooga, Tennessee





o ◯ USCS Poorly-graded o ∩ O Gravel



Fill (made ground) USCS Low Plasticity Clay



SUBSURFACE DIAGRAM BRIDGE # 9 (I-75 NB - I-24 WB) FIGURE # 5F

Asphalt

USCS High Plasticity Clay

CLIENT Neel-Schaffer

695

690

685

680

675

670

665

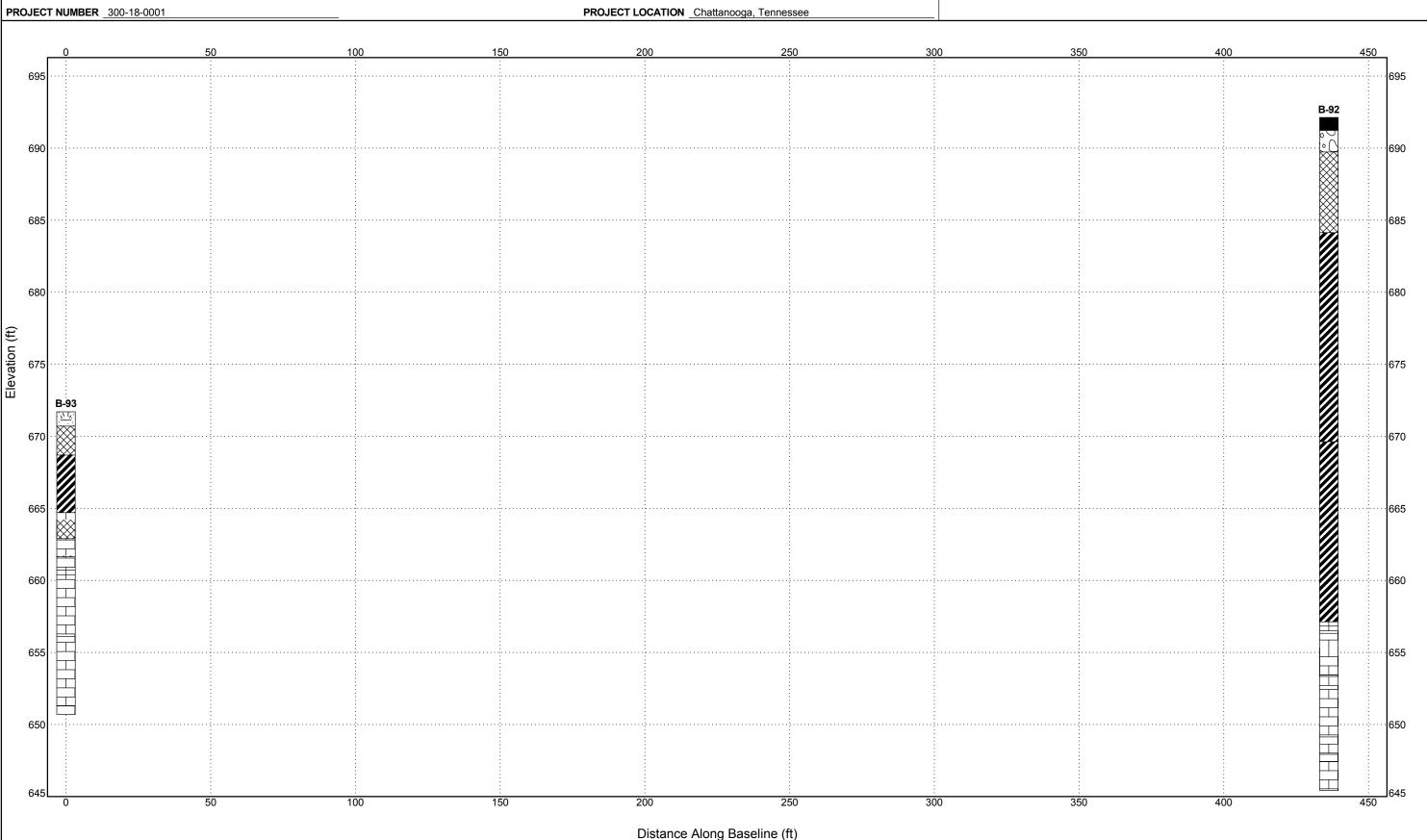
660

655

650

645

Elevation (ft)

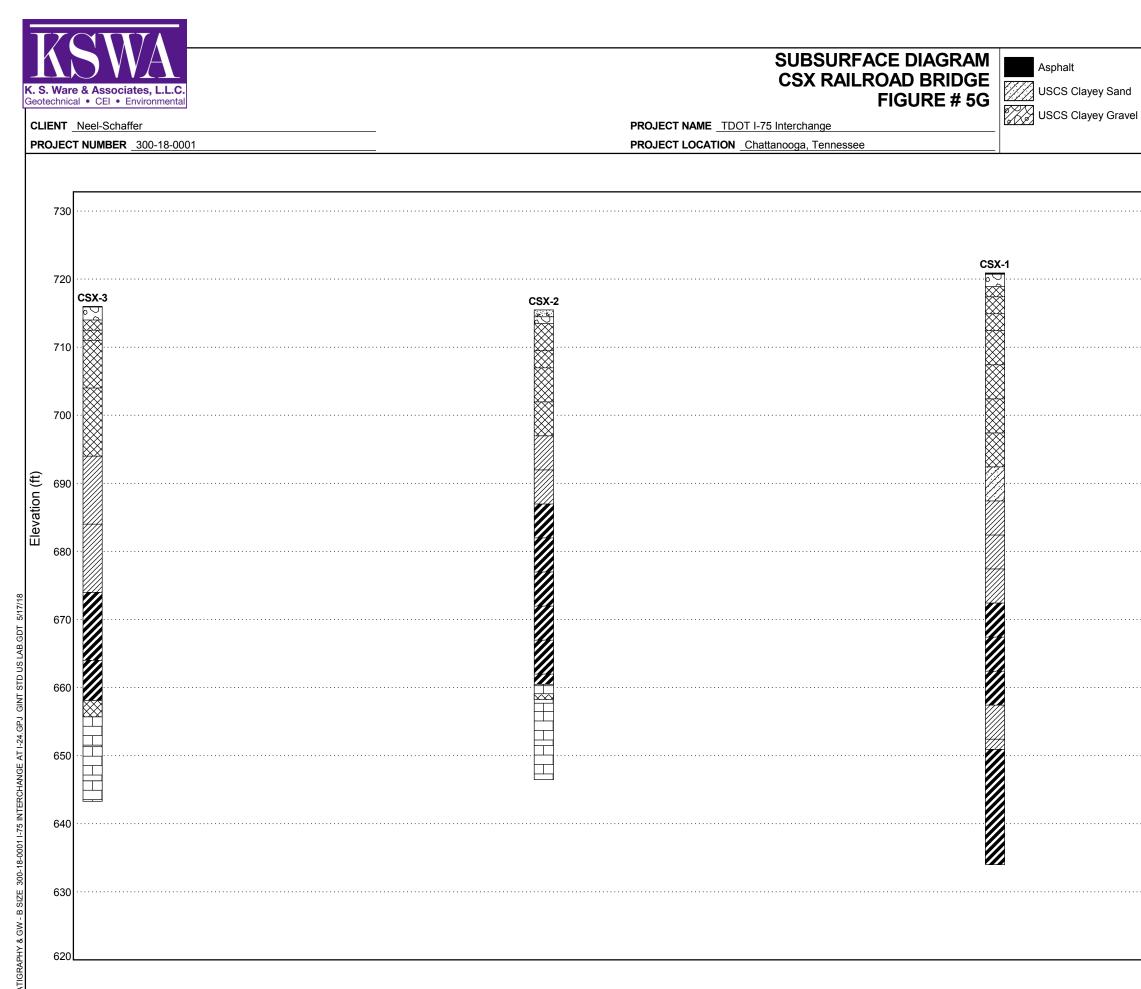




o∽⊖ USCS Poorly-graded o∩o Gravel



Fill (made ground)



Distance Along Baseline (ft)



o∽⊖ USCS Poorly-graded o∩o Gravel USCS Low Plasticity Clay



Fill (made ground)

USCS High Plasticity Clay

 730
 CSX-1A
620



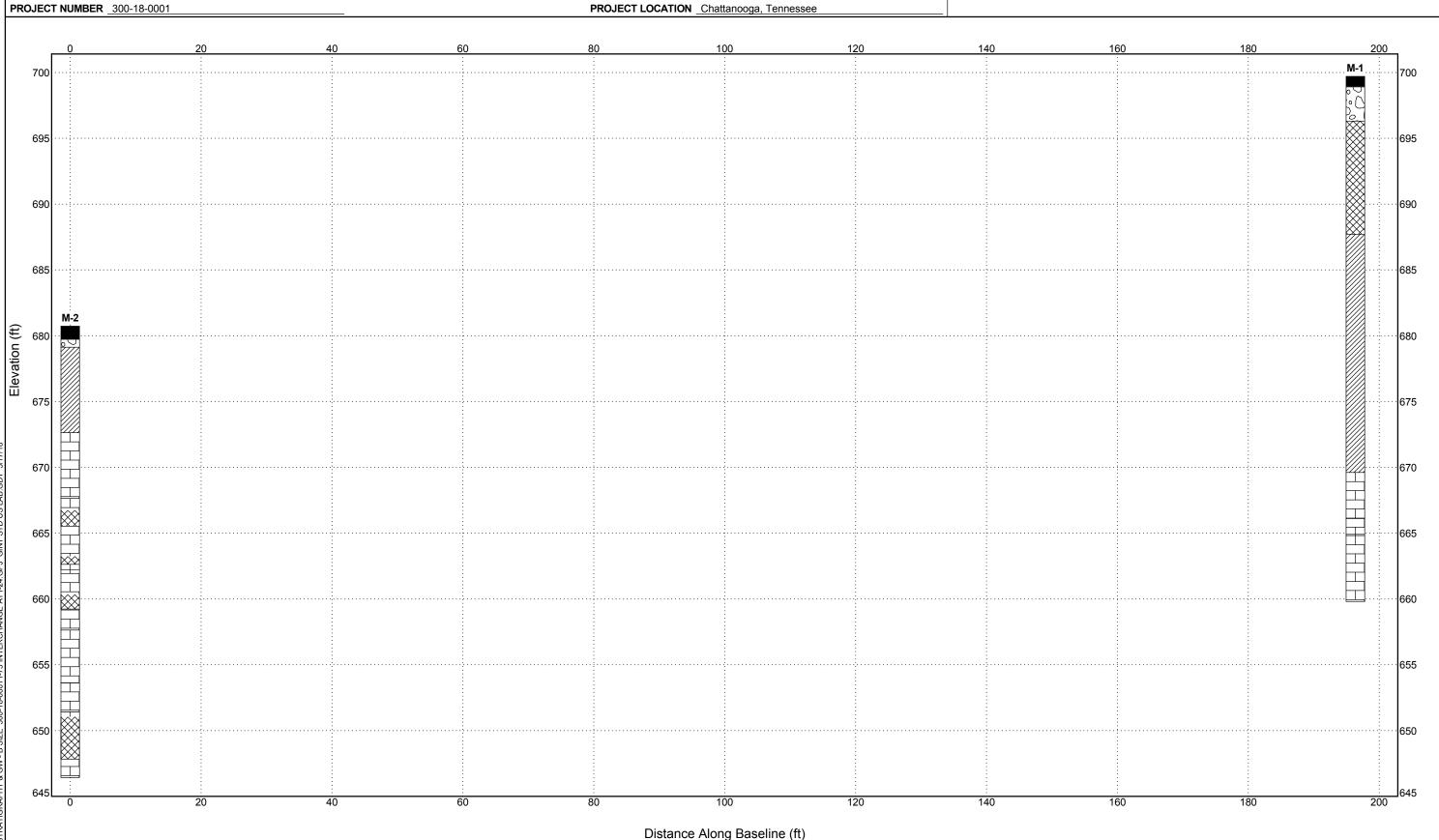
SUBSURFACE DIAGRAM MOORE ROAD BRIDGE FIGURE # 5H

Asphalt

//// USCS Low Plasticity Clay

CLIENT Neel-Schaffer

PROJECT NUMBER 300-18-0001



y	

USCS Poorly-graded Gravel



Fill (made ground)



SUBSURFACE DIAGRAM MCBRIEN ROAD BRIDGE FIGURE # 5I

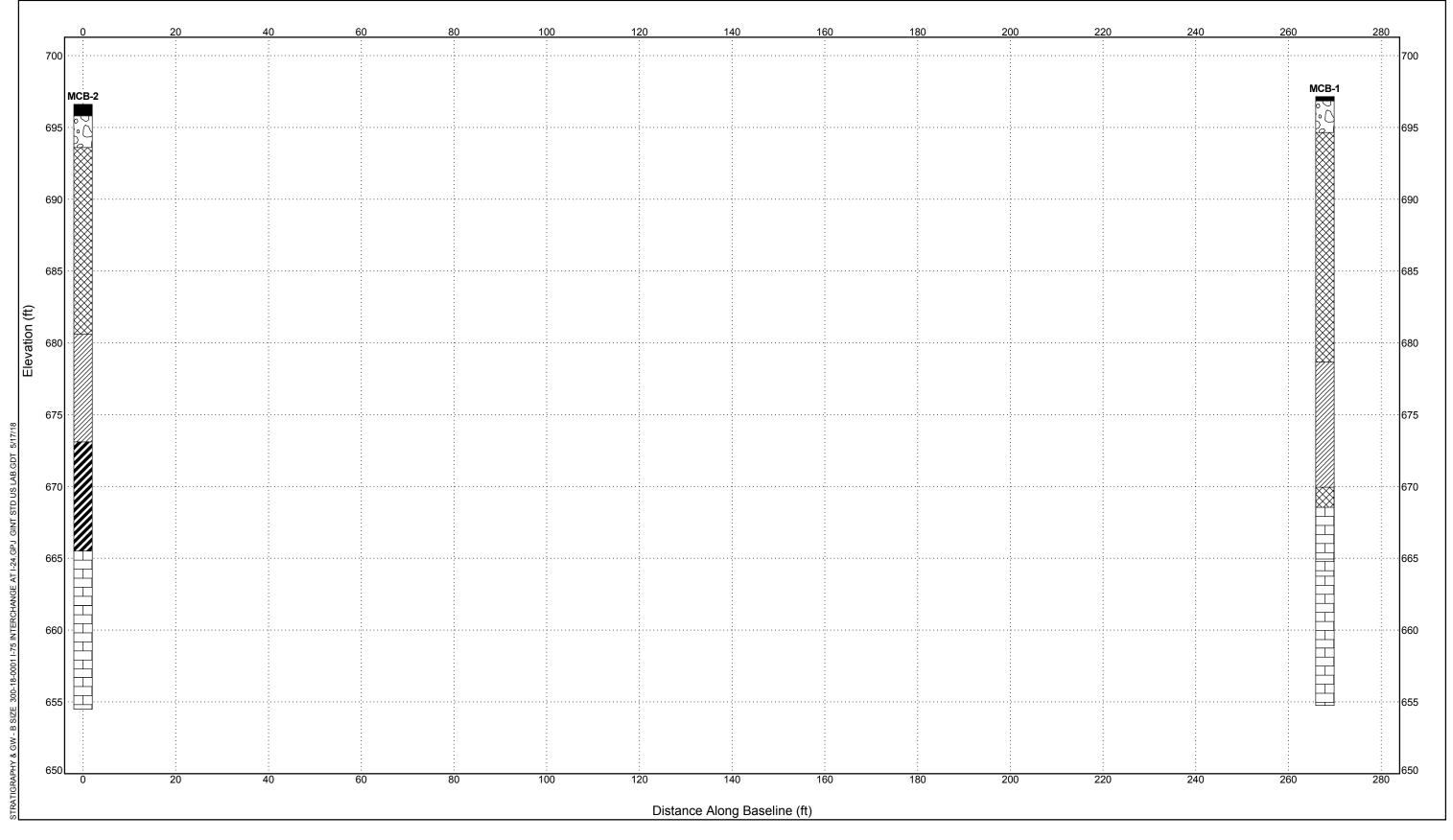
Asphalt

USCS Low Plasticity Clay ////

CLIENT Neel-Schaffer

PROJECT NUMBER 300-18-0001

PROJECT LOCATION Chattanooga, Tennessee





୦୦୦ USCS Poorly-graded ଜ∩ଂ Gravel



Fill (made ground) USCS High Plasticity Clay

APPENDIX B FIELD TESTING PROCEDURES

FIELD PROCEDURES

Drilling, sampling, and testing were conducted in general accordance with methods of the American Society for Testing and Materials (ASTM) or other widely-accepted geotechnical engineering standards. Descriptions of the procedures used during this exploration are provided below.

BORING LOCATIONS AND ELEVATIONS

The boring locations were selected by KSWA based on our review of the site layout plan and any physical access constraints, including underground and overhead utilities. Most of the actual boring locations were marked at the site by TDOT personnel using survey methods. KSWA personnel marked borings CSX-3, A-17, BS-33 (relocated from original position) and offset borings by estimating distances and angles relative to on-site features. GPS coordinates and elevations from GIS methods were used to determine the location and elevation of these borings and should be considered approximate. Surveying of boring coordinates was beyond the scope of our exploration.

Test Borings ASTM D 1586

Test borings were advanced using auger drilling techniques. At regular intervals, soil samples were obtained with a standard 1.4-inch I.D., 2.0-inch O.D., split-barrel sampler. The sampler was initially seated 6 inches to penetrate any loose cuttings and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is the *standard penetration resistance*, or N-value. Standard penetration resistance, when properly evaluated, is an index to the soil's strength and density. The criteria used during this exploration are presented on the Field Classification System sheet in this appendix. Representative portions of the soil samples obtained were placed in sealed containers and transported to our laboratory, where our engineer selected samples for laboratory testing.

The standard penetration tests were performed using an automatic hammer. The automatic hammer has a higher efficiency than the traditional rope and cathead hammer, thus yielding comparatively lower N-values. This reduction in N-value was accounted for during our engineering analysis. However, the consistencies presented on the boring logs were based on the customary relationships with N-value.

INTACT SAMPLES ASTM D 1587

Relatively undisturbed (intact) samples were obtained for laboratory testing by slowly and uniformly pushing a 3-inch O.D., 16-guage, steel tube into the soil at the desired sampling level, in accordance with ASTM D 1587. The tube was then removed from the ground and the encased soil was sealed at the ends to prevent loss of moisture. The depth at which undisturbed samples were taken is indicated on the respective Test Boring Logs.

REFUSAL MATERIALS

Soil drilling and sampling equipment may not be capable of penetrating hard cemented soils, thin rock seams, large boulders, waste materials, weathered rock, or sound continuous rock. Refusal is the term applied to materials that cannot be penetrated with soil drilling equipment or where the standard penetration resistance exceeds 100 blows per foot. Core drilling is needed to determine the character and continuity of the refusal materials.

FIELD PROCEDURES (CONTINUED)

WATER LEVEL READINGS

The boreholes were checked for groundwater upon completion. The groundwater conditions encountered are indicated on the boring logs. Groundwater levels may depend upon recent rainfall or seasonal conditions, construction activity, and other site-specific factors. Since these conditions may change with time, the water level information presented on the boring logs represents the conditions only at the time each measurement was taken.

BORING LOGS

The soil samples obtained during the drilling were visually classified using the Unified Soil Classification System (USCS) as a guide (reference Soil Classification Chart in Appendix B). The Test Boring Logs in Appendix B provide the soil descriptions and penetration resistances, and represent our interpretation of the conditions encountered at each boring location. The stratification lines indicated on the boring records represent the approximate boundaries between material types, but these transitions may be gradual. The boring logs were prepared based on the field logs and review of the laboratory classification test results. The USCS designations indicated on the boring logs are based on visual-manual evaluation of the samples unless otherwise defined by laboratory testing.

The boring logs indicate estimated interfaces between soil strata. The interfaces indicated represent the approximate interface location, but the actual transition between strata may be gradual. Water levels indicated on the boring logs represent the conditions only at the time each measurement was taken.

FIELD CLASSIFICATION SYSTEM

Boulders:

Sands and Gravels

Particle Size Identification

No. of Blows	Relative Density
0-5	Very Loose
6-10	Loose
11-30	Medium dense
31-50	Dense
51+	Very Dense

Silts and Clays

No. of Blows	Relative Consistency
0-2	Very Soft
3-4	Soft
5-9	Firm
10-15	Stiff
16-30	Very Stiff
31+	Hard

Cobbles:	3- to 8-inch diameter
Gravel:	
Coarse:	1- to 3-inch
Medium:	0.50- to 1-inch
Fine:	0.25- to 0.50-inch
Sand:	
Coarse:	2.00-mm to 0.25-inch
	(diameter of pencil lead)
Medium:	0.074-mm to 2.00-mm
	(diameter of broom straw)
Fine:	0.042-mm to 0.074-mm
	(diameter of human hair)
Silt:	0.002-mm to 0.042-mm
	(Cannot see particles)
Clay:	<0.002-mm

8-inch diameter or more

Relative Proportions

Descriptive Term	Percent
Trace	1-10
Little	11-20
Some	21-35
And	36-50

Relative Quality of Rock Cores

Quality	RQD
Very Poor	0-25%
Poor	25-50%
Fair	50-75%
Good	75-90%
Excellent	90-100%

RQD = <u>Total length of core recovered in pieces 4 inches long or longer x 100%</u> Total length of core run

Rock Hardness

Very Soft	Rock disintegrates or easily compresses to touch; can be hard to very hard soil
J	J J I J

Soft Rock is coherent but breaks easily to thumb pressure at sharp edges and crumbles with firm hand pressure

Moderately Hard Small pieces can be broken off along sharp edges by considerable hard thumb pressure; can be broken by light hammer blows

Hard Rock cannot be broken by thumb pressure, but can be broken by moderate hammer blows

Very Hard Rock can be broken by heavy hammer blows

APPENDIX C TEST BORING LOGS

				Т	EST BOF	RINC) L	.OG	ì									
								TEST BORING NO. A-01										
		KS	PROJECT N	NAME: TDOT I-75 Interchange ATION: Chattanooga, Tennessee														
									-		esse	Ð						
		K. S. Ware & As Geotechnical • CE	sociates, L.L.C.		PROJECT	T NO.	: 30	0-18	-0001					Sheet	1 of			
Depth, feet	Graphic Log	Approx. Su Location:	Irface El. (feet, N N 248803.6234				Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index		
			MATERIAL DE	SCRIPTI	ON	0.0		_		••	ă.		Wat			<u> </u>		
	$\frac{1}{2}$	BASESTO	NE (15.6 inches)			<u>0.</u> 3⁄												
		A-1 LEAN CLA A-7-5	Y (CL), with chert, re	eddish bro	own, stiff, (FILL	<u>1.6</u> .) 3.5	$\overline{\times}$			5-5-6			18.1					
- 4 -		LEAN CLA stiff, (FILL) A-7-5	Y (CL), with chert, ve	ery silty,	reddish brown,	(X			3-4-5			20.8	41	21	20		
		LEAN CLA A-7-5	Y (CL), very silty, da	irk reddis	h brown, (FILL)	2	X			3-4-5			22.0					
		LEAN CLA A-7-5	Y (CL), silty, dark re	ddish bro	wn, (FILL)	_ <u>8.5</u>	X			3-3-4			20.7					
-12-		A-7-6	(CH), very silty, darl		brown, (FILL)	<u>13.5</u> 15.0	\times			3-3-5			27.0					
-16-		BORING TI	ERMINATED AT 15	.0 FBGS														
- 20-																		
-24-																		
-28- 																		
Date	Starte	oleted: 4/ TS	.0 11/18 11/18 SD / Richardson .S. Anderson	com	arks: Groun ng activities pleted with leel-Schaffer	s. Boi a truc	ring	was	back	ncounte afilled wi rillrig. El	ith cu	itting	s. Bo	oring	was ded			

			•	TEST BORIN								_		
								BORIN		10.	A-0 2	2		
			$\mathbf{K}\mathbf{S}\mathbf{W}\mathbf{A}$	PROJECT NAMI					-					
					LOCATION: Chattanooga, Tennessee PROJECT NO.: 300-18-0001 Sheet 1 of									
		(K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NC	0.: 30	00-18	8-0001				-	Sheet	1 of	
	eet	Log	Approx. Surface El. (feet, MSL):	718.7	es	y (%)	(%	nes	Pocket Pen (tsf)	Percent Fines	Water Content (%)	imit	-imit	Plasticity Index
	Depth, feet	Graphic Log	Location: N 248727.4136 E 22		Samples	Recovery (%)	RQD (%)	SPT Values	et Pe	cent F	Conte	Liquid Limit	Plastic Limit	ticity
	Del	Ū.	MATERIAL DESCRIP		0	Rec		SP ⁻	Pock	Per	ater (Lic	Pla	Plas
\vdash		<u>.</u>	ASPHALT (4 inches)	<u>0.</u> 3⁄							3			
F	_		BASESTONE (19.2 inches) A-1	1.9										
F	_		LEAN CLAY (CL), silty, some chert, re	eddish brown, stiff,										
F	_		(FILL) A-7-5					3-4-6			18.7			
F	4 –		LEAN CLAY (CL), silty, occaisional sa	indy, medium	\bigtriangledown						10.0			
-	_		reddish brown, with gravel, (FILL) A-7-5		\square			4-5-6			18.0			
F	_		LEAN CLAY (CL), silty, sandy, with lot	s of sandy chert	\bigtriangledown			4-5-6			13.8			
F	_		zones, (FILL) A-7-5		\square			4-3-0			13.0			
F	8 —		LEAN CLAY (CL), very silty, reddish b	<u> </u>										
F	_		A-7-5	iowii, (fill)	X			3-2-3			18.4			
F	_													
F	_													
F	12–													
F			LEAN CLAY (CL), silty, reddish brown	<u>13.5</u> <u>13.5</u> _										
			A-7-5	15.0	X			4-6-8			15.3			
	_		BORING TERMINATED AT 15.0 FBG											
F	16-													
5/17/18	_													
	_													
ARE.GI	_													
KSW	20-													
4.GPJ	_													
AT I-2														
ANGE	24-													
TERC	24-													
I-75 IN	_													
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300-1	28-													
PORT														
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		pletion Starte		narks: Groundwa Iling activities. Bo									was	
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₽Ľ		ed By:		Neel-Schaffer.										

					T	EST BO	RIN	GL	.OG	ì							
ļ						TEST BORING NO. A-03											
			KSWA			PROJECT	NAME	: TI	DOT	I-75 I	nterchar	nge					
					LOCATION: Chattanooga, Tennessee												
			K. S. Ware 8 Geotechnical	 Associates, L.L.C. CEI • Environmental 		PROJEC	T NO.	: 30	00-18	-000 ′	1				Sheet	1 of	1
	Depth, feet	Graphic Log	Approx. Locatio	Surface El. (feet, M n: N 245869.5382 E	-			Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	Depi	Gra						S	Reco	R	SPT	ocke	Perc	ater C	Liqu	Plas	Plasti
+		<u>, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,</u>	TOPSO	MATERIAL DES DIL (12 inches)	CRIPTIC	ON								Š			
+				CLAY (CL), dark brown wi	th organ	ic material	<u>1.0</u>										
			A-8		-		2.0	Х	56		1-2-4			34.6	66	30	36
			fragmer A-7-6	AY (CH, reddish brown to nts, stiff, Black mineral st	aining	ana g.a.j, i co.											
	- 4 -							\bigvee	39		2-50/6-			31.1			
				REFUSAL AT 5 FBGS G TERMINATED AT 5 FE	BGS		5.0	\square									
		-															
	- 8 -																
		-															
		-															
		-															
	-12-	-															
		-															
		-															
	-16-																
5/17/18		-															
WARE	-20-	_															
RS KS		_															
-24.G		-															
IGE AT																	
RCHAN	-24-																
5 INTEL																	
201 1-7;																	
0-18-0(
RT 30	-28-																
REPO																	
NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT	Date Date Drille	pletion Starte Comp d By: ed By:	leted:	5.0 4/18/18 4/18/18 Geotech / Patrick A. Zeb	com	rks: Grour ng activitie pleted with ided by Neo	s. Bo CME·	ring •550	was HSA	bacl		th cu	utting	js. Bo	oring	was	

		Т	EST BORIN										
					TES	ST E	BORIN	IG N	10.	A-0-	4		
			PROJECT NAME	: TI	DOT	I-75 I	nterchar	nge					
			LOCATION	I: C	hatta	anoog	ja, Tenn	esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	.: 30	00-18	8-0001	1			-	Sheet	1 of	1
et	Log	Approx. Surface El. (feet, MSL):	670.0	se	(%) /	(%	ser	Pocket Pen (tsf)	ines	Water Content (%)	imit	imit	Plasticity Index
Depth, feet	Graphic Log	Location: N 245639.8436 E 2205		Samples	Recovery (%)	RQD (%)	SPT Values	et Pe	Percent Fines	Conte	Liquid Limit	Plastic Limit	icity
Dep	Gra			S	Rec	2	SPT	Pock	Perc	ater (Liq	Pla	Plast
	<u>x1 1,</u>	MATERIAL DESCRIPTI						-		Š			
		LEAN CLAY (CL), with traces of topsoil,	<u>1.0</u> 1.0										
	-888	traces of roots, (FILL)		\square	56		1-2-3			34.3			
		FAT CLAY (CH), reddish brown, stiff, bla											
- 4 -	-888	staining, (FILL)		\mathbb{N}	78		2-5-5			22.6	49	22	27
+ -			5.5_										
		FAT CLAY (CH), yellowish brown mottle stiff, black mineral staining, aggregates	ed reddish brown,										
		A-7-6		igtriangleup	89		3-6-7			21.9			
- 8 -													
+ ·					78		2-3-4			26.1			
			12.0										
-12-		FAT CLAY (CH), brown and gray, very s	stiff, limestone										
		fragments A-7-6			83		50/6						
			15.0	\frown	00		50/0			31.6			
		AUGER REFUSAL AT 14 FBGS BORING TERMINATED AT 14 FBGS	15.0										
-16		BORING TERMINATED AT 141 BGS											
. 1													
0T 5/17/18 	1												
₩ 20- 8	1												
14.GPJ	1												
AT I-2													
8-0001													
[₩] -28-													
E Con	npletio e Starl	n Depth (ft.): 14.0 Rema ed: 4/18/18 d rill i	arks: Groundwat										
		pleted: 4/18/18 with	cuttings. Elevat	ion	was	abou	t 2' lowe	r tha	n the				
	ged By		tion. Elevatons w	vere	prov	nued	Dy Neel-	SCUS	mer.				

				TEST BORIN	<u>G</u> L	. O G	i							
						TES	ST E	BORIN	IG N	10.	A-0	5		
			TAM	PROJECT NAM	Е: Т	DOT	I-75 I	nterchai	nge					
			NOWA	LOCATIO	N: C	hatta	noog	ya, Tenn	esse	e				
			K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO).: 3	00-18	-000 [,]	1				Sheet	1 of	1
	et	bo-			s	(%)		s	(tsf)	nes	t (%)	nit	mit	xabr
	Jepth, feet	Graphic Log	Approx. Surface El. (feet, MSL Location: N 245648.7047 E 2	•	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Nater Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	Dept	Grap		201101.0010	Sa	Reco	R	SPT	ockei	Perce	ter C	Liqu	Plas	lasti
		· <u></u>	MATERIAL DESCR TOPSOIL (7 inches)						٩		Na			ш.
			CONCRETE RUBBLE (4.4 feet), (FI	0.6_ ILL)	-									
	- 1 -													
	4			5.0										
			LOW TO HIGH PLASTICITY CLAY brown to brown, aggregates, soft, (F											
			A-7-5	/	\square	33		3-2-2			15.3			
				8.0	\square			022						
F	- 8 -		LEAN CLAY (CL), black to dark gray			7								
			mineral staining, aggregates A-7-5		X	100		2-2-3			17.7	35	19	16
				44.0										
╞			LEAN CLAY (CL), brown and gray, s		-									
-	-12-		A-7-5											
-														
-					\mathbb{N}	67		2-3-4			19.5			
			BORING TERMINATED AT 15 FBG	15.0 S	$\downarrow $									
-	-16-			-										
_														
5/17/18														
VARE.	-20-													
N KS														
-24.GF														
EAT														
HANG	-24-													
TERC														
I-75 IN														
1000														
300-18	~~~													
ORT .	-28-													
GREP														
ы Н				emarks: Groundwa										
TEC		Starte Comp	leted: 4/18/18 c	Irilling activities. Be completed with CME									was	
ຽ ≷	Drille	d By: ed By:	Geotech / Patrick	provided by Neel-Sc			11							

					TES	ST BO	RIN										
											BORIN		10.	A-0	6		
			KS		PR	ROJECT	NAME	: TI	DOT	I-75 I	ntercha	nge					
						LOC	ATION	: C	hatta	noog	ja, Tenn	esse	e				
			K. S. Ware & Assoc Geotechnical • CEI •			PROJE	CT NO.	: 30	00-18	-0001	1				Sheet	1 of	1
	Depth, feet	Graphic Log		ice El. (feet, MS 245562.8621 E		0.6 9.0563		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		. A. L. A.	TOD0011 (7 in	MATERIAL DESC	CRIPTION							<u> </u>		Mai			ш
_	-		TOPSOIL (7 in CONCRETE R	ches) UBBLE (3.9 feet),	 (FILL)		0.6										
_	4 -		LEAN CLAY (C A-7-5	CL), light brown and	d gray, (FIL	 _L)	4.5										
_	- 8 -						<u>8.0</u>	X	67		3-3-5			19.9	34	18	16
_	_		A-7-5	CL), brown, (FILL)				\times	44		2-2-3			17.7			
_	_ 12-		FAT CLAY (CH A-7-6	I), gray and moist			<u>11.0</u> <u>13.0</u>										
_	_		FAT CLAY (CH A-7-6	i), mostly gray with	h some bro	wn, stiff	15.0	\times	89		2-3-7			19.5			
	16		BORING TERM	MINATED AT 15 F	BGS												
ANGE AT I-24.GPJ KSWARE.GDT 5/17/18	16 — _ _ 20 — _ _ 24 — _ _																
SEOTECH LOG REPORT 300-18-0001	Date Date	Starte Comp	leted: 4/18/	18	comple	activitie ted with	es. Bo n CME·	ring 550	was , HS/	back	ncounte filled w 4 inch I.	ith cı	utting	js. Bo	oring	was	
		d By: ed By:		ech / Patrick b	provide	ed by Ne	el-Sch	affe	er.								

			Т	EST BORING										
					1	TES	ST E	BORIN	GN	10.	A-0	7		
				PROJECT NAME	: TI	тос	I-75 l	nterchar	nge					
				LOCATION	: C	hatta	noog	ja, Tenno	esse	e				
			K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO.	: 30	00-18	-0001	l				Sheet	1 of	1
	it				s	(%)		s	(tsf)	les	t (%)	nit	nit	dex
	Jepth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 245375.0301 E 2202		Samples	Recovery (%)	RQD (%)	SPT Values	[⊃] ocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	Dept	Grap	Location: N 245375.0301 E 2202	030.3341	Sai	Seco	R R	SPT V	ocket	erce	er Cc	Liqu	Plast	lastic
			MATERIAL DESCRIPTI	ON		ш		0)	Ъ	<u> </u>	Wate		_	
		$\mathbf{b} \cup (\mathbf{c})$	ASPHALT (8.4 inches) BASESTONE (12 inches)	0.7_										
		\circ	_ A-1	1.7										
f			FAT CLAY (CH), reddish brown to brown firm, (FILL)	n mottled gray,	\bigtriangledown	0 -								
┢			A-7-6		\wedge	67		4-2-3						
+	- 4 -				\bigvee	78		3-3-4						
				5.5	\bigtriangleup									
			FAT CLAY (CH), brown mottled gray and	d dark gray, soft										
			to firm, dense, aggregates, with occasio material (roots), (FILL)	nal organic	\bigvee	83		1-2-2						
			A-7-6	ŕ	$ \bigtriangleup $									
f	- 8 -			,										
┢					\vee	100		1-2-4						
				2										
	-12-													
	12		FAT CLAY (CH), brown, stiff, dense, hig	hly plastic some										
			black mineral staining A-7-6	,										
F			A-1-0	15.0	Х	100		4-4-6						
╞			BORING TERMINATED AT 15 FBGS	15.0										
+	-16-													
5/17/18														
RE.G														
KSW	-20-													
GB														
-24.														
HAN	-24-													
-75 IN														
0-18-(
130	-28-													
EPOR														
0GR														
		pletion Starte	Depth (ft.): 15.0 Remaind: 5/1/18 Remaind: 6	arks: Groundwate ng activities. Bor									Nae	
2011	Date	Comp	leted: 5/1/18 com	pleted with Diedr	ich	D-50								
S		d By: ed By:	TSD / Richardson prov	ided by Neel-Sch										

									BORIN		1 ().	A-0	8		
		KS	$\mathcal{N}\mathcal{A}$							-	_				
		K. S. Ware & Asso	ciates, L.L.C.							esse	e		_		
		Geotechnical • CEI		PR	OJECT NO	.: 30	00-18	-000 [,]	1			_	Sheet	: 1 of	
	Graphic Log		• ·	MSL): 673.9 9 E 2201803.6 ⁷ ESCRIPTION		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Disctinity Index
			RADED SAND (SP		1.0							_>			
		A-3a POORLY-GF (FILL) Possible Fou A-30a		^D), black, dense, (-	X	93		16-22-25			3.7			
		LEAN CLAY A-7-5	(CL), brown, stiff,	moist	<u>3.5</u>	X	67		7-4-6			18.2			
		LEAN CLAY A-7-5	(CL), brown, stiff,	moist	<u>6.0_</u>	X	13		7-6-4			15.2			
		LEAN CLAY A-7-5	(CL) with traces of	of sand, brown, st		X	87		4-5-6			17.9	48	20	
2-		<u></u>	CH), brown, stiff, r		<u>13.5_</u> 14.1 14.7/	\times	100		11-15- 50/2			13.5			
6-		AUGER REF	USAL AT 14.7 FE RMINATED AT 14	BGS	/										
- 0-															
4-															
28-															
ate ate	Starte	leted: 4/12	7 2/18 2/18 / / Mike	drilling act	Groundwat tivities. Off und surfac	set I e at	iole ' hole	15' fr is at	om stake out 2.7'	aloı high	ng a er tha	bearii an sta	ng of ake.		_

					TEST BO	RIN	GL	.OG	ì							
								TES	ST E	BORIN	IG N	10.	A-0	9		
					PROJECT	NAME	: TI	DOT	I-75 I	nterchai	nge					
					LOC	ATION	l: C	hatta	noog	ja, Tenn	esse	e				
		0	K. S. Ware & Geotechnical	 Associates, L.L.C. CEI • Environmental 	PROJEC	CT NO	.: 30	00-18	-000 ′	1				Sheet	1 of	1
	Jepth, feet	Graphic Log		Surface El. (feet, MS n: N 245727.9300 E	•		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	Dept	Grap	Location	1: N 243727.9300 E	2199330.2300		Sal	Reco	RQ	SPT	ocket	erce	er Cc	Liqu	Plast	lastic
		J <u></u>	TOPSO	MATERIAL DESC IL (12 inches)	CRIPTION			_			ă.		Wat			<u> </u>
				. ,		1.0										
			gravels,	LAY (CL), reddish brown black mineral staing	mottied gray, stiff,		X	67		3-5-8			19.0			
			A-7-5			o =										
	- 4 -		LEAN C fragmer A-7-5	CLAY (CL), brown mottled hts, black mineral staining	gray, stiff, rock	3.5	X	89		4-7-6			13.3			
				REFUSAL AT 5.5 FBGS G TERMINATED AT 5.5 F		5.5										
-																
	-12-															
	- – -16–															
5/17/18																
GDT																
KSWAR	-20-															
I-24.GPJ																
ANGE AT																
	-24-															
01 1-75 11																
00-18-00																
EPORT 3	-28- 															
W GEOTEC	Date Date Drille	pletion Starte Comp d By: ed By:	leted:	5.5 4/16/18 4/16/18 Geotech / Patrick A. Zeb	Remarks: Grou drilling activitie completed with provided by Ne	es. Bo n CME	ring -550	was , HS/	back		th cu	tting	s. Bo	ring	was	

			TEST BORIN	GL	.OG	ì							
					TES	ST E	BORIN	IG N	10.	A-1	0		
		TAMY	PROJECT NAME	: TI	оот	I-75 I	nterchar	nge					
		MOWA	LOCATION	: C	hatta	noog	ja, Tenno	esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	: 30	00-18	-0001	I				Sheet	1 of	1
-	b			(0	(%)	<u> </u>	ş	(tsf)	les	(%)	nit	nit	dex
n, fee	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 246429.0536 E 21		Samples	very	RQD (%)	Value	Pen	nt Fii	inten	Liquid Limit	Plastic Limit	sity In
Depth, feet	Grap	Location: N 246429.0536 E 21	57025.1244	Sai	Recovery (%)	RQ	SPT Values	^o ocket Pen (tsf)	Percent Fines	Water Content (%)	Liqu	Plast	Plasticity Index
		MATERIAL DESCRIP			-			Å	ш.	Wat			
		ASPHALT (4.8 inches) BASESTONE (54 inches)	<u>0.4</u>										
		A-1											
	$\frac{1}{2}$												
	000			\bigvee	50		3-10-7						
	\mathbb{P}		4.9	$ \land $									
		FAT CLAY (CH), brown mottled gray, fragments	, firm, dense, chert										
		A-7-6		\bigvee	100		3-4-4						
				\bigtriangleup									
- 8 -				$\overline{}$									
		AUGER REFUSAL AT 9.4 FBGS	9.4	\bigtriangleup	93		6-50/5-						
	1	BORING TERMINATED AT 9.4 FBG	S										
	1												
-12-	1												
	1												
	-												
	-												
-16-	-												
₽	-												
5/17/18	-												
	-												
120-	-												
ця 2 – –	-												
	-												
GE AT	-												
NAH 24-	-												
	-												
1 - 75	-												
- 1	-												
6 	4												
	4												
OGRI		1											
	pletior Starte		emarks: Groundwat illing activities. Bo									Nae	
	e Comp	oleted: 4/30/18 cc	ompleted with Died	rich	D-50	, HSA	2-1/4 in	ch I.	D. Ele	evato	ns w	ere	
	ed By: ged By		ovided by Neel-Sch	affe	r.								

					TEST BC	RIN										
										BORIN		10.	A-1	1		
					PROJECT	NAME	: T	DOT	I-75 I	nterchar	nge					
					LOC	ATION	: C	hatta	noog	ga, Tenn	esse	e				
				 Associates, L.L.C. CEI • Environmental 	PROJE	CT NO	: 30	00-18	-000 ⁻	1	-			Sheet	1 of	1
	Depth, feet	Graphic Log	Approx. Locatior		2199069.2870		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
			ASPHA	MATERIAL DESC LT (9.8 inches)	RIPTION								Ň			
			POORL dense, (A-2	Y GRADED SAND (SP), g (FILL)		0.8 <u>3.2</u>	X	67		22-8-6			4.4			
	- 4 - 		FAT CL firm to v A-7-5	AY (CH), Residual soil, bro ery stiff, mottled	own and gray, mois	st,		100		8-3-6			25.3	61	27	34
	 - 8 -						X	100		6-9-15			22.1			
				REFUSAL AT 9.3 FBGS G TERMINATED AT 9.3 FI	3GS	9.3	\times	100		50/4			24.5			
	 -12-															
	-16-															
5/17/18																
SWARE.GDT	 -20-															
AT I-24.GPJ h																
HANGE	 -24-															
NTERCI	<u>-</u>															
1 -75																
18-000																
RT 300-	-28-															
S REPO																
NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT	Date Date Drille	Starte	leted:	9.3 4/15/18 4/15/18 MW / Bill Woods Buehler	Remarks: Grou drilling activiti backfilled with truck-mounted	es. Bo cuttin	ring gs. l	was Borin	mov ng wa	is compl	offset leted	. Bor with	ing w a	as	ffer.	

			TEST BORIN										
							BORIN		10.	A-1	2		
		IKSWA	PROJECT NAME					-					
			LOCATION					esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	.: 30	00-18	-0001					Sheet	1 of	1
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 245131.1555 E 220		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIP		-	ш.		0)	а Ч	<u> </u>	Wate			₫.
_		ASPHALT (6 inches) BASESTONE (24 inches) A-1	<u>0.5</u>										
- - 4 -		LEAN CLAY (CL), brown mottled gray, dense, aggregates, (FILL) A-7-5	, soft to firm,	X	83		3-4-5						
_ _ _ 8		FAT CLAY (CH), brown mottled gray a	8.0	X	89		2-1-2						
_		dense to very dense A-7-6	ino dan gray, son,	X	100		1-2-3						
- 12			15.0	\times	100		3-2-3						
-16	5-	BORING TERMINATED AT 15 FBGS											
5/17/18 													
SWARE.GD	- -(
1-24.GPJ K	_												
CHANGE AT													
1 I-75 INTER	_												
200-18-000													
	_												
Da Da Da Da Dri	te Sta	ted: 4/30/18 dril npleted: 4/30/18 cor r: TSD / Richardson pro	narks: Groundwat Iling activities. Bo mpleted with Died ovided by Neel-Sch	ring rich	was D-50	back	filled wit	th cu	tting	s. Bo	ring	was ere	

					Т	EST BO	RIN								_		
			TTO								BORIN		10.	A-1	3		
				$\langle \Lambda / \Delta \rangle$		PROJECT						-					
										-	ga, Tenn	esse	9				
		C	Geotechnical •	Associates, L.L.C. CEI • Environmental		PROJEC	T NO.	: 30	00-18	3-000°	1			_	Sheet	1 of	
	Depth, feet	Graphic Log	Approx.	Surface El. (feet : N 245049.33	· ·			Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	Dept	Grap	Location			0100.0420		Sa	Reco	RC	SPT	ockei	Perce	ter C	Liqu	Plas	Plastic
			ΔΩΡΗΔΙ	MATERIAL I T (4.8 inches)	DESCRIPT	ON								Wa			ш.
		$\mathcal{O}(\mathcal{O})$	BASEST	ONE (21.6 inches)			_0.7_										
			A-1				_2.5_										
			LEAN C mostly s A-7-5	LAY (CL), gray to da oft, (FILL)	ark gray and	I some brown,	3.5	$\left\langle \right\rangle$	50		4-2-2						
	- 4 - 		LEAN C (FILL) 	LAY (CL), brown to	reddish brov	wn, stiff, dense	e, 5.5	X	83		4-8-8						
			FAT CLA to stiff, d A-7-6	AY (CH), brown mot lense	tled gray an	d dark gray, s	oft	\mathbf{X}	72		4-4-6						
	- 8 -																
								X	100		4-4-3						
			AUGER	REFUSAL AT 14.7	FBGS		14.7	X	97		3-4-50/1						
	-16-		BORING	TERMINATED AT	14.7 FBGS												
5/17/18																	
J KSWAF	-20-																
AT I-24.GF																	
CHANGE ,	 -24-																
75 INTER																	
18-0001 -																	
DRT 300-1	-28-																
OG REPC					I												
NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT	Date Date Drille	pletion Starte Comp d By: ed By:	leted:	14.7 5/1/18 5/1/18 TSD / Richards A. Zeb	com	arks: Groun ing activitie pleted with vided by Ne	s. Bor Diedr	'ing 'ich	was D-50	back		th cư	tting	s. Bo	ring		

				TEST BO	RING) L	OG	ì							
							TES	ST E	BORIN	IG N	10.	A-1	4		
				PROJECT I	NAME:	Т	тос	I-75 I	nterchar	nge					
			IDVA	LOCA	ATION:	Cl	hatta	noog	ga, Tenno	esse	Ð				
			K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJEC	T NO.:	30	0-18	-0001	1				Sheet	1 of	1
Douth foot	Deptn, reet	Graphic Log	Approx. Surface El. (feet, MSL) Location: N 244824.7964 E 22	203547.4055		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Nater Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
_			MATERIAL DESCRI ASPHALT (15.6 inches)	PTION								Ma			
_			BASESTONE (20.4 inches) A-1			\times	100		50/3.6			2.7			
	4 -		LEAN CLAY (CL), brown and gray, n stiff, mottled, (FILL) A-6a	noist, stiff to very	<u>3.0</u>	$\overline{\langle}$	67		8-7-9			17.5			
- 8					Z	$\left \right $	93		5-5-6			18.9	33	19	14
_			LEAN CLAY (CL), Residual soil, brow stiff to very stiff, mottled A-6a Becoming wet from 9.7'	wn and gray, wet,	<u>9.0</u>	X	100		4-6-8			17.9			
-1 - -	2-			-	15.0	$\overline{\langle}$	100		4-4-3			18.7			
	6-		BORING TERMINATED AT 15 FBG	8											
E.GDT 5/17/18	_														
.GPJ KSWAR	0-02 -														
HANGE AT I-24	-														
	-4 														
-PORI 300-18-000	- 8- -														
N GEOTEC	ate ate rille	Starte	ed: 4/15/18 dr bleted: 4/16/18 ba MW / Bill Woods tr	emarks: Grour rilling activities ackfilled with o uck-mounted o	s. Bor cutting	ing s. E	was Borin	mov ig wa	is compl	offset eted	. Bor with	ing w a	as	ffer.	

				EST BORIN										
						TES	ST E	BORIN	IG N	10.	A-1	5		
			TAMA	PROJECT NAM	E: T	DOT	I-75 I	nterchar	nge					
			NOWA	LOCATIO	N: C	hatta	noog	ga, Tenno	essee	e				
			K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO).: 30	00-18	8-000 ⁻	1			:	Sheet	1 of	1
	set	Log	Approx. Surface El. (feet, MSL):	680.3	es	y (%)	(%	sen	Pocket Pen (tsf)	Percent Fines	Water Content (%)	imit	-imit	Plasticity Index
	Depth, feet	Graphic Log	Location: N 244409.6056 E 220		Samples	Recovery (%)	RQD (%)	SPT Values	tet Pe	cent	Conte	Liquid Limit	Plastic Limit	ticity
	De	Ū	MATERIAL DESCRIPT			Re		SP	Pock	Per	/ater	Ľ	Pl	Plas
			ASPHALT (24 inches)								5			
		****	POORLY GRADED SAND (SP), gray,	2.0 dry, dense, (FILL)	-	100		45-50/5-			1.1			
			A-7-5											
	- 4 -		LEAN CLAY (CL), brown and gray, mo	3.9	\mathbb{N}	80		5-10-13			18.6	44	23	21
			mottled, (FILL) A-7-5		\vdash									
					\bigtriangledown	100		5-6-7			24.1			
					\square	100		0-0-1			27.1			
	- 8 -													
					X	100		5-8-10			17.8			
	10		FAT CLAY (CH), brown and gray, mois	<u>11.511.5_</u> t and firm,	-									
	-12-		mottled A-7-6											
					\leftarrow									
				15.0		27		2-3-5			22.1			
	-16-		BORING TERMINATED AT 15 FBGS											
5/17/18														
IARE.G	-20-													
NSX L														
I-24.GF														
GE AT														
CHAN	-24-													
INTER														
11 -75														
-18-000														
T 300-	-28-													
NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT														
LOGF	Com	nletion	Depth (ft.): 15.0 Rem	arks: Groundwa	l tor w	iae N		ncounto	rod d	urin		ftor		
DTECH	Date	Starte	ed: 4/16/18 dril	ling activities. Be	oring	was	mov	red 5.1' o	ffset	. Bor	ing w			
W GEC	Drille		MW / Bill Woods true	kfilled with cuttin ck-mounted drillr	igs. I ig. El	Borir evat	ng wa ons v	as compl vere pro	eted vided	with I by N	a Neel-S	Scha	ffer.	
ШZ	Logg	ed By:	Buehler		<u> </u>									

					TEST BO	RIN								_			
										BORIN		10.	A-1	6			
					PROJECT						-	-					
		K	. S. Ware &	Associates, L.L.C.		LOCATION: Chattanooga, Tennessee PROJECT NO.: 300-18-0001 Sheet 1 of 1											
-		G		CEI • Environmental	PROJEC		. JI		-000	I	ţ)	6					
Depth. feet		Graphic Log	Approx. Location	Surface El. (feet, MS : N 243793.7153 E			Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	
		1.4 · X	TOPEOI	MATERIAL DESC L (12 inches)	CRIPTION						ď		Wat			<u> </u>	
				. ,		_1.0_											
-		\bigotimes	A-7-5	ΑΥ (CH), reddish brown, ((FILL)	3.0	X	67		3-5-7			22.6	50	26	24	
- 4			FAT CLA mineral s A-7-5	Y (CH), yellowish brown staining	mottled gray, black	` `	X	72		3-5-6			21.1				
- 8							X	72		2-4-5			19.6				
_			FAT CLA A-7-6	AY (CH), dark gray, moisi	, rock fragments	<u>9.5</u> 10.8	X	78		2-5-7			20.8				
NEW GEOTECH LOG REPORT 300-18-0001 -75 INTERCHANGE AT 1-24 GPI KSWARE.GDT 5/17/18 1 <th1< th=""> 1 1 <th1< th=""></th1<></th1<>				REFUSAL AT AT 10.8 F													
NEW GEOTECH LOG	te Sta	tarteo ompl By:	eted:	10.8 4/19/18 4/19/18 Geotech / Patrick A. Zeb	Remarks: Grou drilling activitie Boring was bac CME-550, HSA Neel-Schaffer.	es. Hol ckfilled	e wa 1 wit	as m :h cu	oved tting	s. Boring	of ma g was	rked s con	locat	ion.	th		

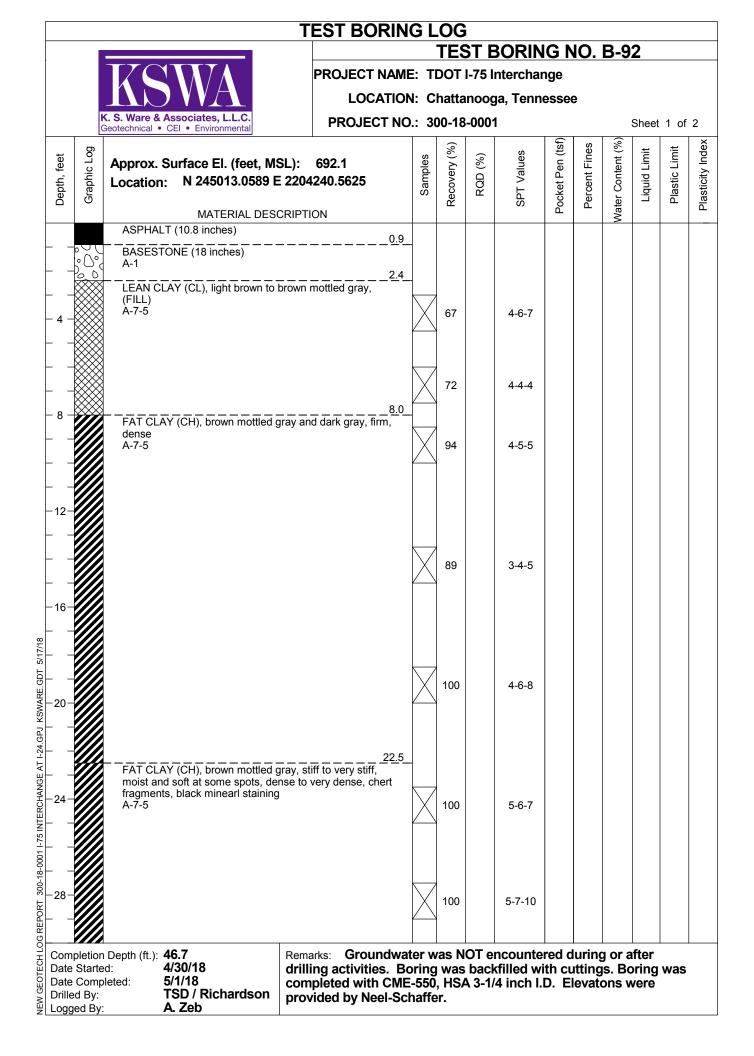
			Т	EST BOR							A 4	7			
				PROJECT N				BORIN		10.	A- 1	1			
		KSWA							-	Ð					
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental		LOCATION: Chattanooga, Tennessee PROJECT NO.: 300-18-0001 Sheet 1 of 1											
						(%)		ő	(tsf)	les	(%)	it	nit	dex	
Depth, feet	Graphic Log	Approx. Surface EI. (fee Location: N 241263.51	· ·		Samples	Recovery (%)	RQD (%)	SPT Values	t Pen	Percent Fines	ontent	Liquid Limit	Plastic Limit	city In	
Dept	Grap				Sa	Reco	RG	SPT	Pocket Pen (tsf)	Perce	Water Content (%)	Liqu	Plas	Plasticity Index	
	<u>م</u> ر (MATERIAL ASPHALT (2.4 inches)	DESCRIPTI		0.2/						Ma				
-	-000	BASESTONE (26.4 inches) A-1													
-		LEAN CLAY (CL), with trace			2.4	7					00.7				
-	-	brown, (FILL)	es of basesio		3.5	*		14-3-3			23.7				
- 4		FAT CLAY (CH), basestone brown and yellow mottled, (A-7-5	e (fall in), slig FILL)		5.5			5-6-8			30.0	50	23	27	
-	-	LEAN CLAY (CL), slightly si fragments, (FILL)	ilty, reddish I	prown, chert		7									
-	-	A-7-5						6-5-5			28.3				
- 8		FAT CLAY (CH), slightly silt	y, light reddi		<u>8.0</u> /	,									
-	-	mootled, chert fragments, (F A-7-5	-ILL)					5-5-6			32.7				
-				1	1.0										
	Î	FAT CLAY (CH), silty and s	andy, light y	ellowish brown to)										
		gray A-7-5													
						7									
				1:	5.0	4		2-2-3			31.6				
-16	_	BORING TERMINATED AT	15 FBGS												
	_														
1 1	_														
	-														
20 – 20	-														
	-														
AT I-24															
1) -24 															
I-75 IN															
8-0001															
₽- 0 28	_														
	_														
	npletion e Starte	n Depth (ft.): 15.0 ed: 4/19/18	Rema	arks: Ground				ncounte					n		
Dat	e Comp led By: lged By	bleted: 4/19/18 TSD / Richards	on and	UTM coordin						ung:	5. 210	van	/11		

				Т	EST BO	RIN	GL	.OG	ì											
										BORIN		10.	A-1	8						
		KS		PROJECT	NAME	: TI	тос	I-75 I	nterchar	nge										
				LOCATION: Chattanooga, Tennessee																
		K. S. Ware & As Geotechnical • CE	Sociates, L.L.C.		PROJECT NO.: 300-18-0001								Sheet 1 of 1							
Depth, feet	Graphic Log	Approx. Su Location:		4 E 2206	022.7709		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index				
		ASPHALT		ESCRIPTI	ON	0.2⁄							Š							
		BASESTON A-1	NE (27.6 inches)			2.5														
		yellowish bi A-7-5	Y (CL), slightly silty rown, (FILL)			4.0	\bigotimes			4-17-15			16.8							
4		FAT CLAY to gray, (FII A-7-5	(CH), reddish brov LL)	wn mottled	yellowish brow	vn	Δ			3-3-4			36.9	61	27	34				
- 8 -							X			2-3-4			30.9							
		FAT CLAY	(CH), Residual so		, light vellowis	<u>10.0</u> h	\times			2-3-4			21.3							
- 12-		brown mott A-7-6	tled gray, moist zo	nes	,															
		BORING T	ERMINATED AT 1	5 FBGS		15.0	X	100		2-3-4			33.0							
-16-	-	BOKING II		51 665																
	-																			
- 20 - 20 - 20 - 20 - 20 - 20 - 20 - 20	-																			
= AI 1-24.GF																				
1 -75 INTE																				
300-18-000																				
9 KEPORT 3																				
Date	pletion Starte Comp ed By: jed By:	leted: 4/2	5.0 20/18 20/18 SD / Richardso .S. Anderson	com	arks: Groun ing activitie pleted with vided by Ne	s. Bor Diedr	'ing 'ich	was D-50	back	ncounte filled wit A 2-1/4 in	h cư	tting	s. Bo	ring	was ere					

					TEST BOR	RING L	.OG	ì									
							TES	ST E	BORIN	IG N	10.	A-1	9				
			TZC		PROJECT N	AME: T	DOT	I-75 I	nterchar	nge							
					LOCAT	FION: C	hatta	noog	ga, Tenno	esse	e						
		ŀ	K. S. Ware &	Associates, L.L.C. CEI • Environmental	PROJECT	PROJECT NO.: 300-18-0001 Sheet 1 of 1											
╞				OLI I LIMIOIIIIEIIAI		(9)							t	it	ex		
	Depth, feet	Graphic Log	Approx.	Surface El. (feet, MS	•	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index		
	epth,	raph	Location	n: N 241681.3738 E	2206076.7854	Sam	SCOVE	RQD	1 A	ket F	rcen	Co Co	iquid	lastic	sticit		
	ă	G		MATERIAL DESC	RIPTION		Å		L. L	Poc	Pe	Vater		Ч	Pla		
F		7 <u>77</u> 7		IL (9.6 inches)		0.8	80		4-4-4			15.4					
ł			LEAN C	LAY (CL), reddish brown,	gravels, (FILL)	1.3						-					
┢			LEANC	LAY (CL), silty, brown to y	vellowish brown, chert	' 📐	100		3-3-3			23.1					
+			gravels, A-7-5	(FILL)													
+	- 4 -						9		2-3-3			24.5					
						5.5	-										
			LEAN C	LAY (CL), silty to very silty		<u></u>											
			A-7-5	moist, (FILL)		7.0	100		3-4-4			25.3	35	18	17		
	- 8 -			LAY (CL), Residual soil, s	ilty to very silty, sandy	,											
	0		A-7-5														
							100		2-3-3			14.8					
					1	1.0											
F			LEAN C	LAY (CL), Residual soil, v	ery silty and sandy,	1.0											
ŀ	-12-		A-7-5	lowish brown to reddish br	own, sum												
╞																	
-							100		7-11-12			21.1					
+			BORINO	G TERMINATED AT 15 FE		5.0											
	-16-		Dorard														
5/17/18																	
KSWARE.GDT	-20-																
KSW/	-20-																
f.GPJ																	
AT I-2/																	
-NGE																	
RCHA	-24-																
01 - 75																	
18-00																	
300	-28-																
PORT																	
OG RE																	
		pletion Starte	Depth (ft.):	15.0 4/17/18					ncounte								
E0	Date	Comp		4/17/18	drilling activities. completed with D	boring Diedrich	was D-50	, HS/	111ea wit 2-1/4 in	ch I.	ung D. El	s. Bo evato	nng ns w	was ere			
≥		d By: ed By:		TSD / Richardson W.S. Anderson	provided by Neel			-									

		TE	EST BORING	GL	OG	i										
							BORIN	GN	10.	A-2	0					
		KCWA	PROJECT NAME	: TI	тос	I-75 lı	nterchar	nge								
			LOCATION	: C	hatta	noog	a, Tenne	essee	e							
	•	K. S. Ware & Associates, L.L.C. aeotechnical • CEI • Environmental	PROJECT NO.).: 300-18-0001							Sheet	1 of	1			
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 242418.8696 E 22050	656.2697	Samples	Recovery (%)	RQD (%)	SPT Values	^o ocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index			
	۰Ä	MATERIAL DESCRIPTIC CRUSHED STONE (12 inches), (at edge		\bigtriangledown	100		8-8-9	ш.		Wa						
	• ()•]	A-1 LEAN CLAY (CL) with traces of crushed brown to reddish brown, some gravel and A-7-5	1.0 stone, silty, d grass, (FILL) 2.5	\bigcirc	100		8-8-9 3-6-6			19.6 24.0						
- 4 -		FAT CLAY (CH), silty, slightly sandy in lo reddish brown to brown, chert fragments A-7-5	ower part, , (FILL)	\times	100		2-3-3			26.8						
		FAT CLAY (CH), Residual soil, slightly si	7.5	X	100		3-4-5			27.8	65	25	40			
		reddish brown, minor chert fragments in large chert fragments in lower part A-7-5	upper part and	X	50		3-4-5			20.3						
-12- 			15.0	\times	100		6-8-6			29.6						
-16- 		BORING TERMINATED AT 15 FBGS														
 -20-																
-24-																
-28- 																
Date Date Drille	pletion Starte Comp d By: ed By:	leted: 4/17/18 TSD / Richardson provi	rks: Groundwat ng activities. Bor pleted with Diedr ided by Neel-Sch	ing ich	was D-50	back	filled wit	h cu	tting	s. Bo	ring	was ere				

						TES	T BOI	RIN										
					-							BORIN		10.	A-2	1		
					PRO	OJECT I	NAME	: ті	тос	I-75 I	ntercha	nge						
					LOCATION: Chattanooga, Tennessee PROJECT NO.: 300-18-0001 Sheet 1 of 1													
				 Associates, L.L. CEI Environmer 		P	ROJEC	T NO.	: 30	0-18	-000 ′	1				Sheet	1 of	
	Deptn, teet	Graphic Log	Approx. Locatior	Surface El. (f n: N 243210.					Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		1 <u>. 1.</u>	TOPEO	MATERIA IL (12 inches)						۵.		Wai			ш			
	_			,				1.0										
	_		mineral	-				ж <u>3.0</u>	X	78		3-4-6			22.7			
	4 -		LEAN C aggrega	EAY (CL), silty, bites, black minera	prown and so al staining	ome gray	y, stiff,	,	X	61		3-4-6			23.9	45	23	22
-	- 8 -								X	89		3-3-6			20.6			
_	_							10.5	X	72		2-4-5						
_	- 12- - -			REFUSAL AT A														
5/17/18	16- - - 20-																	
SEAT I-24.GPJ KSW	-																	
-75 INTERCHAN	<u>2</u> 4 – _																	
NEW GEOTECH LOG REPORT 300-18-0001 1-75 INTERCHANGE AT 1-24.GPJ KSWARE.GDT	 28 -																	
	ate ate rille	Starte	leted:	10.5 4/19/18 4/19/18 Geotech / Pa A. Zeb	oring v	activities vas bac 0, HSA 3	s. Ho kfilleo	le w I wit	as m h cu	noved tting	ncounte I 10' E of s. Boring tons we	f mar g was	ked l s con	ocation plete	on.	th		



			Т	EST BORIN	IG L	.OG	ì							
						TES	ST E	BORIN	GN	10.	B-9	2		
				PROJECT NAM	IE: T	DOT	I-75 I	nterchar	nge					
				LOCATIC	N: C	hatta	noog	ga, Tenne	esse	e				
			C. S. Ware & Associates, L.L.C.	PROJECT N			-	-				Sheet	2 of	2
-			Geotechnical • CEI • Environmental			_		-	sf)	s	_			
	leel	Graphic Log	Approx. Surface El. (feet, MSL):	692.1	les	Recovery (%)	(%)	lues	[⊃] ocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
44	ueptn, reet	aphi	Location: N 245013.0589 E 2204	240.5625	Samples	cove	RQD (%)	SPT Values	(et P	cent	Cont	quid	astic	sticity
	- E	Ū	MATERIAL DESCRIPT			Re		SP	Pock	Per	/ater	Ľ	Ē	Plas
-											3			
+	-													
-3	32-													
F	_													
L	_					00		0 4 50/0						
		<u>////</u>		35.0		83		3-4-50/2						
	86-		AUGER REFUSAL AT 35 FBGS	35.3 35.8										
			RUN 1 LIMESTONE, gray, hard, argillaceous w	<i>i</i> th shale										
			partings Healed Vertcal fracture (35.3')			100	100							
F	-		Closed bedding plane (35.8')	38.7										
F	-		Closed bedding plane (36.8') Closed bedding plane (38.7')	38.8 39.7										
-4	0-		RUN 2											
+	_													
+	_					100	100							
F	_		Closed bedding plane (43')	43.0		100	100							
4	4-		Closed bedding plane (43)	44.2										
			Closed bedding plane (44.2')	44.2 44.7 44.7	/									
			RUN 3			100	100							
Γ				46.7										
/18			CORING TERMINATED AT 46.7 FBGS											
12/ <u>1</u>	8-													
	-													
SWAR	-													
Б. Г.К.	_													
-54.6	52-													
SE AT	_													
HANG														
-75 IN														
-1000	6-													
300-18-0001 1-75 INTERCHANGE AT 1-24.GPJ KSWARE.GDT 5/17/18 C. C. C	-													
	-													
REPO	-													
6			Donth (ft): /67	arko: Groundur	ator			ncounto	rod d	lurin		ftor		
비 D	ate	Starte		ing activities. E	oring	was	back	cfilled wi	th cu	utting	js. Bo	oring	was	
		Comp d By:	leted: 5/1/18 com	pleted with CM	E-550	, HS/								
		ed By:		vided by Neel-Se	Jiane	;í .								

					TEST BORI	NG I	_OG	ì							
							TES	ST E	BORIN	IG N	10.	B-9	3		
			TZC		PROJECT NA	ME: T	DOT	I-75 I	ntercha	nge					
					LOCATI	ON: C	hatta	noog	ya, Tenn	esse	e				
			K. S. Ware & Geotechnical	• CEI • Environmental	PROJECT I	NO.: 3	00-18	-000 ⁻	1			;	Sheet	1 of	1
	et	bo.	_			s	(%)		S	(tsf)	nes	t (%)	nit	mit	yapı
	Depth, feet	Graphic Log	Approx. Location	Surface El. (feet, MS n: N 245288.6155 E	•	Samples	Recovery (%)	RQD (%)	Value	Pen	int Fi	onten	Liquid Limit	Plastic Limit	city Ir
	Deptl	Grap	LUCALIO	1. N 243200.0133 L	2203307.0072	Sa	Seco	RC	SPT Values	^{>} ocket Pen (tsf)	Percent Fines	Water Content (%)	Liqu	Plast	Plasticity Index
		J	TODOO	MATERIAL DESC DIL (12 inches)	RIPTION					<u> </u>		Wat			<u> </u>
				. ,		.0	7								
			traces o	CLAY (CL), top part is blac of roots, bottom part is gra			72		2-2-3			24.2			
			A-7-5			.0									
	- 4 -		FAT CL A-7-6	AY (CH), brown, rock frag	ments		7								
							67		2-3-9			24.2			
					7	.0	100		50/6						
	•	***		R REFUSAL AT 7 FBGS I CORING AT 7 FBGS								23.5			
	- 8 -		RUN 1 Mud sea	am, weathered limestone	8	.8	00	45							
					10	1	80	45							
			1/2" mu	d seam (10')		.0									
			RUN 2		11	.3									
	-12-		partings												
ľ			Closed	bedding plane (11.3)			98	90							
F															
						.6									
	-16-		RUN 3	bedding plane (15.6')	16	.0									
/18															
T 5/17							98	96							
E.GD.															
SWAF	-20-		Closed	bedding plane (20.4')											
GPJ				G TERMINATED AT 21 FI	21 3GS	.0									
T I-24															
NGE															
RCHA	-24-														
5 INTE															
01 1-7															
-18-00															
RT 30(-28-														
REPOF															
NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE. GDT 5/17/18	Com	nlation	Depth (ft.):	21.0	Remarks: Groundy	water w	vae N		ncounto	rod d	lurina		ftor		
DIECH	Date	Starte	d:	4/19/18	drilling activities.	Marke	d loc	ation	was too	o stee	p to	drill.	Move	d	
W GEC	Drille	Comp d By:		4/19/18 Geotech / Patrick	40 ft N of marked I Elevation used in	locatio log wa	n. Bo s tak	ring en fro	was bac om GIS d	ktille durine	d wit g dril	n cut llina.	tings	5.	
ШZ	Logg	ed By:		A. Zeb		5	•					3-			

		TE		G L	.OG	ì							
				1	ES	ΤB	ORIN	G N	0. E	3N-2	21		
			PROJECT NAME	E: TI	DOT	I-75 I	nterchar	nge					
			LOCATION	1: C	hatta	noog	ja, Tenno	esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	.: 30	00-18	8-0001	l				Sheet	1 of	1
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 244319.7316 E 22045		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIPTIO	DN		ш.		0)	Ъ Ч		Wate			
	<u>x 1/</u> <u>x</u>	TOPSOIL (12 inches)	1.0										
		LEAN CLAY (CL), TOPSOIL, roots, brow (FILL) A-7-5	n, mottled, soft, 3.5	X	67		1-2-3			39.6			
- 4 -		LEAN CLAY (CL), dark brown and dark g soft, (FILL) A-7-5 ∑ GROUNDWATER ENCOUNTERED DUF	ray, mottled,		67		1-2-2			36.0			
		AT 5.5 FBGS LEAN CLAY (CL), aggregates, brown and black mineral staining, stiff, (FILL) A-7-5	6.0 d gray, wet,		100		4-6-12			14.5			
- 8 - 		LEAN CLAY (CL), moist, brown and gray stiff A-7-5	8.5 , iron staining,		100		3-7-7			17.7			
- 12-		AUGER REFUSAL AT 12.0 FBGS BEGAN CORING AT 12.0 FBGS	12.0		100		50/1			24.6			
		RUN 1 LIMESTONE, gray, hard, argillaceous wit partings	th shale		100	100							
-16-		RUN 2	15.9										
					100	85							
-20		RUN 3	<u>20.0</u>		100	100							
		BORING TERMINATED AT 22.0 FBGS	22.0										
-24-													
-28-													
Date Date Drille	Starte Comp	leted: 4/17/18 comp Geotech / Patrick provi	ks: Groundwat fbgs. Boring w bleted with CME ded by Neel-Sch	as b -550	ackfi , HS/	lled v	vith cutt	ings.	Bor	ing w	as	ties	

			EST BORIN				ORIN	GΝ	O. F	BN-2	22		
			PROJECT NAM						<u> </u>				
		NDWA	LOCATIO					•	e				
		C. S. Ware & Associates, L.L.C. Beotechnical • CEI • Environmental	PROJECT NO			-					Sheet	1 of	1
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 244334.8811 E 2204		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Decticity Index
		MATERIAL DESCRIPTION	ON		R		S	Po	ď	Wate		ш.	ā
<u>1</u>	<u>, 17</u> <u>, 17</u>	TOPSOIL (18 inches)											
		LEAN CLAY (CL), aggregate, light brown (FILL) A-7-5			61		3-8-4			14.3			
4 -		LEAN CLAY (CL), aggregates, roots, bro A-7-5	3_53_5		50		3-3-3			14.6			
		LEAN CLAY (CL), brown and gray, soft, A-7-5	6.0_		67		2-1-3			23.9			
8 -		FAT CLAY (CH), dark brown and gray, n fragments A-7-5	8.5_ noist with rock		78		1-3-3			19.7			
		FAT CLAY (CH), light brown and gray, m fragments at the bottom A-7-5 AUGER REFUSAL AT 14.0 FBGS	<u>13.5</u> noist with rock 14.0 15.5		83 100	100	2-50/3- 						
16		BEGAN CORING AT 14.0 FBGS RUN 1 LIMESTONE, gray, hard, argillaceous wi partings RUN 2	 ith shale i I		100	100							
20		RUN 3	20.5_										
24					100	100							
_ _ 28-		CORING TERMINATED AT 25.5 FBGS	25.5										
Comple Date S Date C Drilled	tarte compl By:	leted: 4/17/18 com Geotech / Patrick prov	rks: Groundwa ng activities. Bo pleted with CME ided by Neel-Sc	ring E-550	was , HS/	back	filled wit	th cu	tting	s. Bo	ring	was	

				Т	EST BOI	RINC	<u>G</u> L	<u>.</u> 0 G	i							
							T	ES	ΤB	ORIN	G N	O . E	3N-2	23		
		KS			PROJECT N	NAME	: TI	тос	I-75 l	nterchai	nge					
									-	a, Tenn	esse	e				
			El • Environmental		PROJEC	T NO.	: 30	0-18	-0001				-	Sheet	1 of	
Depth, feet	Graphic Log	Approx. Su Location:	urface El. (feet, N 244906.853 MATERIAL DI	9 E 2204	599.6742		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	<u>, 1, 1, 1, 1</u>	TOPSOIL ((12 inches)			1.0										
 		LEAN CLA fragments A-7-5	Y WITH GRAVEL (at bottom, soft	(CLG), ligh	nt brown, rock	3.5	X	61		2-2-2			20.0			
- 4 - 		mineral sta A-7-5 FAT CLAY	Y WITH GRAVEL (ining, firm (CH) with rock frag	. , -		4.5	\times	39		2-4-4			20.9	38	19	19
 		stiff A-7-5					X			2-4-6			23.7			
		FAT CLAY A-7-5	(CH) with rock frag	gments, br	own, very stiff	_ <u>8.5</u>	\times	83		3-5-8			15.5			
 _ 12_ 		BEGAN CO RUN 1 LIMESTON partings Open stain	EFUSAL AT 11.4 F DRING AT 11.4 FB IE, gray, hard, argil ed bedding planes,	GS llaceous w		11.4 12.3 .3' 15.4		100	78							
-16- 		RUN 2						100	100							
-20- 		RUN 3				<u>20.4</u> 23.4		100	100							
-24- - 28- 		CORING T	ERMINATED AT 2	3.4 FBGS		20.4										
Date Date Drille	Starte	ed: 4/ bleted: 4/ G	8.4 12/18 12/18 eotech / Patrick . Zeb	com	arks: Groun ing activities pleted with rided by Nee	s. Bor CME-	ing 550	was , HS/	back	ncounte filled wit 4 inch I.	th cư	tting	s. Bo	ring	was	

			EST BORIN	IG L	.OG)							
				1	ES	ΤB	ORIN	G N	O . E	3N-2	24		
		TRANA	PROJECT NAM	E: T	DOT	I-75 I	nterchai	nge					
		AVA	LOCATIO	N: C	hatta	anoog	ya, Tenn	esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	D.: 30	00-18	8-000 ⁻	1				Sheet	1 of	1
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 244890.3028 E 220	680.1 4668.7253	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIPT	ION		<u>ш</u>		0)	ЪР	<u>с</u>	Wate			Ы
			1.0										
_	-	CONCRETE RUBBLE (3 feet), (FILL)	4.0		0		3-2-3						
- 4 - -		LEAN CLAY (OL), brown to dark browr organic material, (FILL) A-8			61		2-3-3						
- 8	-		8.5		22		2-3-3			13.9			
_ _ _ 12		LEAN CLAY (CL), brown to dark browr organic material A-8	-		44		1-1-2			27.3			
		FAT CLAY (CH) with some gravel, dral A-7-5	<u>13.5</u> < gray, firm, moist 15.0		61		2-3-4			19.9			
New Geolech Log Report 300-18-0001 7.8 11.24 6001 91 91 New Geolech Log Report 200-18-0001 -1		BORING TERMINATED AT 15 FBGS Drilling tools were being forced on an a abandoned - moved offset boring	ngle. Hole	nter w	ras N	OTe	ncounte	red d	luring		fter		
Dat Dat Dat Dat Dat Dat	npletion e Starte e Comp led By: gged By	ed: 4/12/18 dril pleted: 4/12/18 con Geotech / Patrick pro	ling activities. Bo npleted with CMI vided by Neel-Sc	oring E-550	was , HS/	back	filled wit	th cu	tting	s. Bo	ring	was	

				TEST BC	RINC) L	.OG	ì							
						T	EST	Γ BC	ORING	i NC). B	N-24	4A		
		TZC		PROJECT	NAME	: TI	оот	I-75 I	nterchai	nge					
				LOC	ATION	C	hatta	noog	ya, Tenn	esse	e				
		K. S. Ware &	Associates, L.L.C. CEI • Environmental	PROJE	CT NO.	: 30	00-18	-000 ⁻	1			:	Sheet	1 of	2
							(%		ß	(tsf)	es	(%)	it	nit	dex
Depth, feet	Graphic Log		Surface El. (feet, MS	•		Samples	Recovery (%)	(%) (SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
epth	Graph	Location	n: Moved offset 5 f	t South of BN-24	4	San	ecov	RQD	PT V	cket	ercer	r Col	-iquic	lasti	astici
			MATERIAL DESC	RIPTION			Ŕ		<u>N</u>	Poe	Å	Wate		ш	Ъ
		AUGER	ONLY												
		Offset b	oring for BN-24 moved ov	er 5 ft South											
						L									
- 4 -						L									
						I									
						l									
	-					ľ									
- 8 -	-														
	-														
10															
-12-															
-16-						l									
						I									
1					18.5	l									
			AY (CH), some gravel, bro	own and gray, soft, i		$\overline{\checkmark}$	61		2-2-2			21.9			
<u>ы</u> ∦–20–		A-7-5	, mottled		4		01					21.0			
NSX –															
24.GP															
AT I-			IDWATER ENCOUNTER	ED DURING DRILLI	ING										
ANGE		<u>AT 22.5</u>	FBGSAY (CH) with gravel, brow		23.5										
		very mo A-7-5	ist, mottled	n and gray, stin, we		Х	78		3-4-6			25.2			
- 1		A-7-5			2										
[∞] –28–			REFUSAL AT 28.0 FBG	5	28.0	~	100		50/2						
		BEGAN	CORING AT 28.0 FBGS		29.4		100	85				27.2			
LOGF		LIMEST	ONE, gray, hard, argillace										-4		
	pletion Starte	Depth (ft.): d:	4/13/18	Remarks: Grou at 22.5 fbgs. Bo	inawate oring w	er w vas l	as e back	ncou filled	ntered d with cu	uring	g arill s. UT	iing a M	CUVI	Ies	
	Comp ed By:	leted:	4/13/18 Geotech / Patrick	coordinates we	ere tak	en f	rom	GIS.		0					
	ed By:		A. Zeb												

			TEST BORING	G LC)G								
				TE	ST	BC	ORING	6 NC). B	N-2	4A		
			PROJECT NAME:	TDO	ЭΤ	I-75 I	nterchai	nge					
			LOCATION:	Cha	atta	noog	a, Tenn	esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO.:	300	-18	-0001					Sheet	2 of	2
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL Location: Moved offset 5 ft		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCR	RIPTION 30.6							Ma			
32 		Weathered zone (29.4') RUN 2 Closed bedding plane (32.3')	32.3	1	00	94							
_ _36 _		RUN 3	<u>35.5_</u> 37.8	_									
_ _ _40		Closed bedding plane (37.8') Closed bedding plane (40.1')	40.1 40.5	ç	98	94							
VARE.GDT 5/17/18	_	CORING TERMINATED AT 40.5 F											
New GEOTECH LOG REPORT 300-18-0001 1-75 INTERCHANGE AT 1-24.GPU KSWARE.GDT 5/17/18 5/11/18 8 OT D D D D D D D D D D D D D D D D D D D	-												
Dat Dat Dat Dat Dat Dat Dat	mpletion e Starte e Comp led By: gged By	ed: 4/13/18 bleted: 4/13/18 Geotech / Patrick	Remarks: Groundwate at 22.5 fbgs. Boring w coordinates were take	as ba	ack	filled					ctivi	ties	

		Т	EST BORIN										
ľ							ORIN		0. E	3N-3	31		
		$\mathbf{K}\mathbf{S}\mathbf{W}\mathbf{A}$	PROJECT NAM					-					
			LOCATIO	N: C	hatta	noog	ja, Tenno	esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT N	O.: 3	00-18	-000 ′	1				Sheet	1 of	2
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 245111.6831 E 2204	676.9 746.3632	Samples	Recovery (%)	RQD (%)	SPT Values	^{>} ocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
Del	Ū			0	Rec		SP	Pock	Per	ater	Lic	Pla	Plas
	<u></u>	MATERIAL DESCRIPTI TOPSOIL (6 inches)	0.5					-		Š			
		CONCRETE RUBBLE (5.5 feet), (FILL)		7									
4 -													
			6.0										
		LEAN CLAY (CL) with gravel alluvium, h FILL)	ard, (Possible	_									
		A-7-5											
- 8 -													
					39		1-2-50			11.4			
-12-													
		LEAN CLAY (CL), light brown to brown,	<u>13.5</u> stiff, heavy black										
		mineral staining, encountered plug A-7-5			89		2-4-5			18.0			
				<u>,</u>									
-16-													
5/17/18			<u>18.5</u>	_									
		LEAN CLAY (CL) with rock fragments, g black mineral staining, stiff, plug	ray and brown,		83		3-5-6			17.8			
20-		A-7-5											
21	¥////												
		FAT CLAY (CH), brown and gray, some	black mineral				2 50/2						
EAT		staining, plug	22.8 23.1		73		3-50/3-			29.1			
00 H H H H H H H H H H H H H H H H H H		AUGER REFUSAL AT 22.8 FBGS	23.4		100	70							
		BEGAN CORING AT 22.8 FBGS RUN 1			100	79							
-75 IN		EIMESTONE, gray, hard, argillaceous w ∃ partings	ith shale 25.6	- -									
000		Open bedding plane (23.1')											
- 18	╞╍┷	Copen bedding plane (23.4') RUN 2											
™–28-					100	98							
REPC													
		Depth (ft.): 35.6	arks: Groundw a	ater w	l Ias N	0T e	ncounte	red d	uring	u or a	fter		
	Starte	d: 4/12/18 drilli	ng activities. 4'	' OD a	augei	r use	d to aug	er thi	ougł	n con	crete). 41-	
\mathbb{Z} Date	e Comp ed By:	Geotech / Patrick CME	ng was backfill -550, HSA 3-1/4									τn	
E Logo	ged By		-Schaffer.					- 61		~ ,			

		•	TEST BORIN										
							ORIN		O . E	3N-3	31		
			PROJECT NAME	: T	DOT	I-75 I	nterchar	nge					
			LOCATION	I: C	hatta	noog	ja, Tenno	esse	е				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	.: 30	00-18	-0001	l				Sheet	2 of	2
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 245111.6831 E 220		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	+	MATERIAL DESCRIP								Ma			<u>ц</u>
		RUN 3	30.6_										
					100	96							
L .					100	90							
-36-		CORING TERMINATED AT 35.6 FBG	35.6 S										
	-												
	-												
	-												
-40-	-												
	-												
	-												
	1												
-44-	1												
	1												
81/21 -48-													
VARE.0	_												
NSX 	-												
10. 15. -52-	-												
	-												
RCHAN	-												
	-												
²⁻ -56-	-												
00-18-0	-												
ORT 3(1												
	-												
Date	e Starte	ed: 4/12/18 dri Deted: 4/12/18 Bo Geotech / Patrick CN	narks: Groundwat Iling activities. 4" ring was backfilled IE-550, HSA 3-1/4 i el-Schaffer.	OD a d wit	augei th cu	r usee tting:	d to aug s. Boring	er thi g was	rougi s con	n con nplete	crete ed wi	e. th	

TEST BORING NO. BN-32 TEST BORING NO. BN-32 PROJECT NAME: TDOT I-75 Interchange LOCATION: Chattanooga, Tennessee PROJECT NO.: 300-18-0001 Shere and associates, LLC. Getechnical • CEI • Environmental Matternation of the second states PROJECT NO.: 300-18-0001 Shere Topspol, 6 inches) OSCORRETE RUBBLE (8 feet), (FILL) Approx. Surface EL. (feet, MSL): 675.6 Location: N 245133.4114 E 2204707.0966 MATERIAL DESCRIPTION MATERIAL DESCRIPTION TOPSPOL (6 inches) CONCRETE RUBBLE (8 feet), (FILL)	Plastic Limit Plastic ty Index	Sheet			nge	nterchar	I-75 li			PROJECT NAM			
LOCATION: Chattanooga, Tennessee PROJECT NO.: 300-18-0001 Sher Topsport in 245133.4114 E 2204707.0966 State in the second seco				•	-			ООТ	E: TI	PROJECT NAM			
ROJECT NO.: 300-18-0001 Sheat iso org Approx. Surface EI. (feet, MSL): 675.6 Location: N 245133.4114 E 2204707.0966 so so <th< th=""><th></th><th></th><th></th><th>•</th><th>essee</th><th>a, Tenne</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></th<>				•	essee	a, Tenne							
Image: Control - CEI + Environmental PROJECT NOL: 300-18-0001 Stift 1 1 Approx. Surface EI. (feet, MSL): 675.6 Location: N 245133.4114 E 2204707.0966 1						• •	noog	hatta	1: C	LOCATIO	MOWA		
image: second constraints, black mineral staining A.7-5	Plastic Limit Plasticity Index	imit				1	-0001	00-18	.: 30	PROJECT NO			
MATERIAL DESCRIPTION Image: Constraint of the second sec	Plastic Li Plasticity Ir	. <u> </u>	it (%	nes	(tsf)	se	()	(%)	s				it i
MATERIAL DESCRIPTION Image: Constraint of the second sec	Plas	id L	onter	ent Fi	t Per	Valu	6) Q	very	mple	· ·	•••	hic I	h, fe
MATERIAL DESCRIPTION Image: Constraint of the second sec		Liqu	ter C	erce	ocke	SPT	R R	Reco	Sa			Grap	Dept
CONCRETE RUBBLE (8 feet), (FILL) CONCRETE RUBBLE (8 feet), (FILL) CONCRETE RUBBLE (8 feet), (FILL) A			Wat	ш.	ď							ALS	
- 4									-	0.5 et), (FILL)	CONCRETE RUBBLE (8 feet)		L _
LEAN CLAY (CL) at top, FAT CLAY (CH) with gravel and rock fragments, black mineral staining A-7-5													
LEAN CLAY (CL) at top, FAT CLAY (CH) with gravel and rock fragments, black mineral staining A-7-5													– –
LEAN CLAY (CL) at top, FAT CLAY (CH) with gravel and rock fragments, black mineral staining A-7-5													
LEAN CLAY (CL) at top, FAT CLAY (CH) with gravel and rock fragments, black mineral staining A-7-5													- 4 -
LEAN CLAY (CL) at top, FAT CLAY (CH) with gravel and rock fragments, black mineral staining A-7-5													
LEAN CLAY (CL) at top, FAT CLAY (CH) with gravel and rock fragments, black mineral staining A-7-5													
LEAN CLAY (CL) at top, FAT CLAY (CH) with gravel and rock fragments, black mineral staining A-7-5													
LEAN CLAY (CL) at top, FAT CLAY (CH) with gravel and rock fragments, black mineral staining A-7-5										8.5			- 8 -
A-7-5									-	T CLAY (CH) with gravel and		\bigwedge	L -
													L -
													L _
													10
													- 12-
			23.3			3-5-6		61	X				
													-16-
										18.5			
			25.0			2-50/4-		83	\mathbf{X}	and grav. stiff	FAT CLAY (CH), light brown a		
AUGER REFUSAL AT 19.4 FBGS 19.7 BEGAN CORING AT 19.4 FBGS 20.5			20.0				100	100		1 2 6 6	AUGER REFUSAL AT 19.4 F		-20-
RUN 1 20.6										20.6	RUN 1	<u> </u>	L _
LIMESTONE, gray, hard, argillaceous with shale										1	t partings		L _
Image: Stained core from 19.4' - 19.7' Image: Stained core from 19.4' - 19.7' RUN 2 100 96							06	100		<u>7'</u>			L _
Open, stained, leached bedding plane (20.6')							90	100		ding plane (20.6')	Open, stained, leached beddi		
													-24-
25.5 RUN 3										25.5	RUN 3	╞┯╧	F -
													F -
													<u>⊢</u> -
							100	100					-28-
													┝ -
	1 1				 		OT -			Dama la Oracimataria	Death (#): 20 E		
Completion Depth (ft.): 30.5 Date Started: 4/12/18 Attributed: 4/12/18 Completion Depth (ft.): 30.5 Completion Depth (ft.): 30.5 Com		ftor			rea a	ncounte	UIE	as N	ler M	Remarks: Groundwa			Com
FAT CLAY (CH), light brown and gray, stiff 19.4 83 2-50/4- A.7-5 AUGER REFUSAL AT 19.4 FBGS 19.7 100 100 AUGER REFUSAL AT 19.4 FBGS 20.6 100 100 25.0 RUN 1 LIMESTONE, gray, hard, argillaceous with shale 100 96 Partings Stained core from 19.4' - 19.7' 100 96 100 96 Completion Depth (ft.): 30.5 Run 3 100 100 100 96 Completion Depth (ft.): 30.5 Remarks: Groundwater was NOT encountered during or after drilling activities. 4" OD auger used to auger through concret Boring was backfilled with cuttings. Boring was completed w CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by Net Stated: Drilled By: Geotech / Patrick Houl-Schaffer CME-550, HSA 3-1/4 inch I.D. Elevatons were provided by		crete	n con	ough	er thr	d to auge	used						Date
Logged By: A. Zeb Neel-Schaffer.		crete	n con nplete	ough com	er thr g was	d to auge s. Boring	used ttings	hcu	d wit	Boring was backfille	bleted: 4/12/18	Com	Date Date Drille

			EST BORI	NG									
							ORIN		O . E	3N-3	32		
			PROJECT NA	ME:	TDC)T I-75	Interchar	nge					
			LOCATI	ON:	Cha	ttanoo	ga, Tenn	esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT N	NO.:	300-	18-000	1		1	-	Sheet	2 of	
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 245133.4114 E 220		Comolog		RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIPT		<i>г</i> –				ă.		Wai			ш
		CORING TERMINATED AT 30.5 FBG	<u> </u>	.5									
-32													
-	_												
	_												
-	_												
-36	_												
-	_												
-	-												
-	-												
-40	-												
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KSW KSW													
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≤ 22 1 1 1 56													
1 000	_												
300-	_												
EPORI	_												
60 <u>60</u>			- O						 !		64 - ~~		
Date Date Date Date	npletior e Starte e Comp led By: ged By	ed: 4/12/18 dril Deted: 4/12/18 Bon Geotech / Patrick CM	arks: Groundv ling activities. 4 ring was backfi E-550, HSA 3-1/ el-Schaffer.	4" OE lled v) aug with (ger use cutting	d to aug s. Boring	er thi g was	rougi s con	n con nplete	crete	th	

		KS		PF	ROJECT N	AME: T	DOT	I-75 I		nge			<u> </u>		
	Γ		Associates, L.L.C.					-	ja, Tenn	esse	e				
		Geotechnical	CEI • Environmental		PROJECT	NO.: 3		8-0001		6			Sheet	1 of	
Depth, feet	Graphic Log	Approx. Locatior	Surface El. (feet, N 1: N 245584.3935 MATERIAL DES	E 220508	7.5137	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Placticity Index
	<u>, 1, 1, 1</u>	TOPSO	IL (12 inches)			1.0						>_			<u> </u>
 		roots an	AY (CH), pale yellow, br d organic material in top in bottom part	rown and gra p part, black	ay, traces of mineral		67		3-3-4			22.1			
4 -							94		2-2-2			24.6			
- 8		FAT CL	AY (CH), light brown to l	brown, rock	fragments	8.0	100		2-4-7			23.5			
· _		A-7-6	(e.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	2.0,			89		3-4-5			21.8			
12- - - 16-		FAT CL brown to A-7-6	AY (CH), color changes o gray, wet, weathered re	with the de ock at the b	pth from	3.0	83		1-2-2			34.5			
_ _ 20-		⊈ GROUN AT 18 F	IDWATER ENCOUNTE BGS	RED DURIN	NG DRILLING	3	67		0-6-7						
			REFUSAL AT 21.1 FBC CORING AT 21.1 FBG		2	21.1	100		50/5			13.4			
_ 24_		LIMEST partings	ONE, gray, hard, argilla red wash parting from 2			23.9	100	83							
_		RUN 2 Weathe	red wash parting form 2	6' - 26.3'		2 <u>5.7</u> 26.3									
28-							94	72							
Date Date	pletion Starte Comp d By: ed By:	leted:	40.6 4/18/18 4/18/18 Geotech / Patrick A. Zeb	at 18 fb backfil	Ground ogs. Auger led with ci 1/4 inch I.	[.] was sla uttings.	nting Borir	g off a ng wa	at 15 fbg Is compl	js. Bo leted	oring with	was CME	-550,		

			•	TEST BC	RINO										
							ES	ΤB	ORIN	G N	O . E	3N-3	34		
			KSMA	PROJECT	NAME	: TI	DOT	I-75 li	nterchar	nge					
				LOC	ATION	: C	hatta	noog	a, Tenn	esse	e				
			K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJE	CT NO.	: 30	00-18	-0001					Sheet	2 of	2
Denth feet		Graphic Log	Approx. Surface El. (feet, MSL): Location: N 245584.3935 E 220			Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
			MATERIAL DESCRIP	TION						đ	-	Wai			<u>ц</u>
-32			RUN 3		<u>30.7</u>										
					33.8		100	98							
_	_		Closed bedding plane (33.8')		35.7										
-36	6 -		Weathered high angle fracture from 3 RUN 4 RUN 5	5.7' - 36.5'	- 36.5 36 <i>.</i> 7⁄-		100	40							
-	_		Closed bedding plane (38.4')		38.4		100	100							
-40)		CORING TERMINATED AT 40.6 FBG	S	40.6										
	_														
-44	1 —														
	_														
4	- 3-														
sware.gdt	_														
-24.GPJ KS	2-														
HANGE AT	_														
1 - 75 INTERC	_														
000-18-0001	ר, - -														
SREPORT 3	_														
Da Da Da Da Da	ite ite ille	Starte	d: 4/18/18 at bleted: 4/18/18 ba Geotech / Patrick HS	marks: Grou 18 fbgs. Aug ckfilled with A 3-1/4 inch	jer was cutting	sla js. l	nting Borin	g off a Ig wa	s compl	ls. Bo	oring with	was CME	-550,		

	TOWA	PROJECT NAME				ORIN terchai		U. 1	-0-2			
	ND WA	LOCATION	: C	hatta	noog	a, Tenn	esse	е				
	K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	: 30	0-18	-0001				:	Sheet	: 1 of	1
Depth, feet Graphic Log	Approx. Surface El. (feet, MSL): Location: N 244466.0808 E 2204 MATERIAL DESCRIPTI	540.5252	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	ī
<u>x¹ 1₂</u>									3			┢
	LEAN CLAY (CL), aggregates, brown, s A-7-5		X	33		4-6-4			14.0			
4 -	LEAN CLAY (CL), aggregates, brown, s organic material A-7-5		X	72		2-3-4			22.6			
8	LEAN CLAY (CL), aggregates, brownish grey, stiff, black mineral staining A-7-5		X	67		2-3-4			19.1			
	LEAN CLAY (CL), rock fragments, brow gray, firm, moist, mottled A-7-5	8.5 n, gray to dark	X	100		1-2-3			23.6			
	FAT CLAY (CH), brown and gray, very s mineral staining A-7-6 AUGER REFUSAL AT 16.0 FBGS	tiff, black 16.0		100		3-7-9			37.0			
20 - 11	BEGIN CORING AT 16.0 FBGS RUN 1 LIMESTONE, gray, hard, argillaceous w partings			100	98				20.1			
24				100	100							
	RUN 3 CORING TERMINATED AT 27.0 FBGS	<u>25.4</u> 27.0		100	88							
28– Completic Date Star	on Depth (ft.): 27.0 Rema ted: 4/17/18 drill	arks: Groundwat ing activities. Boi	er w	as N	OT er	ncounte	red d	lurin	g or a	fter		

			PROJECT NAME						U. I	53-4	14		
		KSWA	LOCATION					•	<u>م</u>				
		K. S. Ware & Associates, L.L.C.	PROJECT NO.			-		6336	5		Shoot	: 1 of	1
		Geotechnical • CEI • Environmental						sf)	s	-			
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 244943.3479 E 22046 MATERIAL DESCRIPTIC	603.0331	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Discritticity of the states
	<u>xt 1</u> x <u>x</u> t	TOPSOIL (12 inches)											┢
		LEAN CLAY (CL), some gravel, light brow firm A-7-5 FAT CLAY (CH), brown and gray, moist, at bottom, firm A-7-5	2.0_		61		2-2-3			27.6			
4 -			6.0	$ \ge $	78		1-2-3			29.2			
- 8		FAT CLAY (CH) with some gravel, brown stiff A-7-5	, iron staining, 8.5	X	78		2-4-6			22.9			
		FAT CLAY (CH) with some gravel, brown A-7-5	<u></u> <u></u> , stiff	X	72		2-3-7			24.8			
_ 12_ _		AUGER REFUSAL AT 13 FBGS	13.0 13.4		31	0							
_		BEGAN CORING AT 13 FBGS RUN 1	<u> </u>										
_ 16_ _		Weathered Shale parting from 13' - 13.5' RUN 2 LIMESTONE, gray, hard, argillaceous wit partings Weathered Limestone (14.7') RUN 3	ـــــــــــــــــــــــــــــــــــــ		100	84							
_ 20-		Zone of open bedding planes from 17.4' -	20.5		100	98							
		RUN 4 Open, stained, leached, rear vertical fract 22' Open, stained, leached, rear vertical fract	21.0 ture from 21.6 ^{22.0}		100	42							
24-		23.4' RUN 5	<u>24.3</u>										
_ 28-					98	96							
_		BORING TERMINATED AT 29.3 FBGS	29.3										
Date Date	Starte	n Depth (ft.): 29.3 ed: 4/11/18 drillir oleted: 4/11/18 comp Geotech / Patrick provi	ks: Groundwat ng activities. Bor bleted with CME- ded by Neel-Sch	ing 550	was , HSA	back	filled wit	th cu	tting	s. Bo	ring	was	L

	Т	EST BORIN										
				ES	ΤB	ORIN	G N	O . I	BS-3	32		
		PROJECT NAME	E: TI	оот	l-75 lı	nterchar	nge					
		LOCATION	I: C	hatta	noog	a, Tenn	esse	e				
	K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	.: 30	00-18	-0001				:	Sheet	1 of	1
Depth, feet Granhin Lon		668.4640	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Diceticity, Jodew
<u>×1</u>	MATERIAL DESCRIPTI	ON							Š			
	LEAN CLAY (CL), with gravel, light brow	<u>1.0</u>										
	A-7-5	3.5	X	100		2-2-3			17.6			
4 -	FAT CLAY (CH), with gravel, light brown staining, firm A-7-5		\times	56		2-3-2			27.3			
8	FAT CLAY (CH), with rock fragments at brown to brown and gray, firm A-7-5	the top, light 8.5	\square	67		1-3-5			25.0			
	FAT CLAY (CH), with gravel, light brown staining, firm A-7-6		X	72		2-4-5			29.7			
	AUGER REFUSAL AT 12.9 FBGS BEGAN CORING AT 12.9 FBGS RUN 1 Vertical fracture (12.9') Mud seam (14.4') RUN 2 LIMESTONE, gray, hard, argillaceous w partings	12.9 12.9 14.4 14.4 15.7_		100	82							
				100	100							
	RUN 3	20.723.1		100	100							
24 – _ _	CORING TERMINATED AT 23.1 FBGS											
28- Complet	on Depth (ft.): 23.1 Rema rted: 4/11/18 drilli		er w	as N	OT ei	ncounte	red d	lurin	g or a	fter		
	npleted: 4/11/18 com /: Geotech / Patrick prov	ing activities. Bo pleted with CME rided by Neel-Sch	-550	, HS/	A 3-1/	4 inch I.	D. E	levat	5. 60 Ons V	vere	was	

		Т		GL	.OG	ì							
							ORIN	GΝ	O . E	3S-3	33		
		KSWA	PROJECT NAME	: T	DOT	I-75 I	nterchar	nge					
		IND VVA	LOCATION	I: C	hatta	noog	ja, Tenno	esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	.: 30	00-18	-0001			1	-	Sheet	1 of	
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 245512.3905 E 2204	933.9334	Samples	Recovery (%)	RQD (%)	SPT Values	^{>} ocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIPTI A ASPHALT (3.6 inches)	ON 0.3⁄							Ma			
		BASESTONE (44.4 inches) A-1		\square			8-8-3						
- 4 -		LEAN CLAY (CL), very silty, light yellow mottled gray A-7-5	4.0ish brown5.5	X	20		2-3-3						
		LEAN CLAY (CL), very silty, brown A-7-5	8.0	X	20		2-2-3						
- 8 - 		LEAN CLAY (CL), yellowish brown to sli brown, moist, soft to firm A-7-5	ghtly grayish	\times	100		2-4-4						
- 12				\mathbf{X}	100		2-2-2						
·16- · 20-				\mathbf{X}	100		2-2-4						
 4 		LEAN CLAY (CL), silty, yellowish to gray A-7-5	22.0 vish brown, stiff	\mathbf{X}	100		5-5-7						
- – -28–		AUGER REFUSAL AT 27.9 FBGS BEGAN CORING AT 27.9 FBGS RUN 1 LIMESTONE, gray, hard, argillaceous w	27.9 ith shale		69	0							
Date Date Drille	Starte	ed: 4/25/18 drilli oleted: 4/26/18 com TSD / Richardson prov	arks: Groundwat ing activities. Bon pleted with Diedn rided by Neel-Sch	ring rich	was D-50	back	filled wit	h cu	tting	s. Bo	ring	was ere	

				TEST BO	RINC										
							ſES	ΤB	ORIN	G N	O . E	3S- (33		
				PROJECT	NAME	: TI	DOT	I-75 I	ntercha	nge					
				LOC	ATION	C	hatta	noog	ja, Tenn	esse	e				
			K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJEC	CT NO.	: 30	00-18	-0001	l				Sheet	2 of	2
	Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 245512.3905 E 220			Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
-			MATERIAL DESCRIP	TION	20.247		14	0			_	Va			ш ———
-			Zone of weathered rock and mud sea	ms from 27.9' -	30.2/1 30.2/1 _ <u>31.0/</u> / _ <u>31.4/</u>		100	100							
			RUN 4 Weathered rock from 31' - 31.4' RUN 5				100	63							
-	-36- 						100	92							
-	 -40 		RUN 6		39.5		100	93							
NEW GEOTECH LOG REPORT 300-18-0001 1-75 INTERCHANGE AT 1-24.GPJ KSWARE. GDT 5/17/18			CORING TERMINATED AT 42.2 FBG		42.2								fior		
NEW GEOTECH L	Date Date Drille	Starte	ed: 4/25/18 dri oleted: 4/26/18 co TSD / Richardson pro	marks: Grou Iling activitie mpleted with ovided by Ne	es. Bor NDiedr	ing ich	was D-50	back	ncounte filled wi \$2-1/4 ir	th cu	tting	s. Bo	ring	was ere	

feet ic Log	S. Ware & Associates, L.L.C. Motechnical • CEI • Environmental Approx. Surface EI. (feet, MSL): Location: N 247841.8209 E 22112		: Cł	hatta	noog	ja, Tenne	-	Ð				
Graphic Log	Approx. Surface EI. (feet, MSL): Location: N 247841.8209 E 22112	720.9	: 30	0-18	-0001	1						
Depth, feet Graphic Log	Approx. Surface El. (feet, MSL): Location: N 247841.8209 E 22112								,	Sheet	1 of	3
			Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	
	MATERIAL DESCRIPTIC ASPHALT (3 inches)	ON 0.2/					ш.		Ma			-
	BASESTONE (21.6 inches) A-1											
-	LEAN CLAY (CL), very silty, sandy, grave (FILL) A-2-7	el, light brown, 3.5	\mathbf{X}			10-8-5			11.3			
4 -	LEAN CLAY (CL), silty, sandy, reddish bi A-2-7		\square			3-3-4			23.7			
	LEAN CLAY (CL), very silty, brown to rec FILL) A-7-5	ddish brown,(\mathbf{X}			5-6-7			14.9			
8	LEAN CLAY (CL), silty, reddish brown, (F A-7-5	= <u>8.5_</u> =ILL)	X			10-12-13			19.4			
12- 	LEAN CLAY (CL), silty, yellowish to redd (FILL) A-7-5	<u>13.5</u> ish brown,	\times			9-10-13			25.7			
20-	LEAN CLAY, sandy with chert fragments reddish brown, (FILL) A-2-7	. <u>18.5</u> , silty, light	\times			4-6-7			14.8			
24	LEAN CLAY (CL), sandy, silty, light reddi light brown, (FILL) A-2-7	23.5ish brown to	X			14-16- 50/4			23.0			
28-	SAND (SC), very clayey, light reddish bro A-2-7	28.5 own to brown	\times			15-19-14			14.5			

	KSWA		E: TI	DOT	I-75 I		ige		<u>57</u>	<u>-1</u>		
	K. S. Ware & Associates, L.L.C.						esse	e		Sheet	2 of	i 3
Depth, feet Graphic Log	Approx. Surface EI. (feet, MSL): Location: N 247841.8209 E 221	720.9	Samples	Recovery (%)	RQD (%)	SPT Values	^o ocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	
	MATERIAL DESCRIPT	ΓΙΟΝ				S S S S S S S S S S S S S S S S S S S	Ро	ă.	Wate			i
32	LEAN CLAY (CL), with chert, gravel an medium reddish brown A-2-7	<u>33.5</u> Id sand streaks,				8-8-50/5			23.3			
40-	LEAN CLAY (CL), with chert, gravel an medium reddish brown A-2-7	<u>38.5</u>				5-5-7			29.3			
	LEAN CLAY (CL), silty, sandy, reddish gravel and sand, gray A-2-7	<u>43.5</u> brown, chert				4-6-6			29.7			
48-	FAT CLAY (CH), with silt, reddish brow A-7-5	48 <u>.5</u>				2-3-3			36.9			
	FAT CLAY (CH), reddish brown, wet A-7-5	<u>53.5</u>				2-2-4			36.4			
	FAT CLAY (CH), high palsticity, reddis A-7-5	<u>58.5</u> h brown, wet				4-4-6			30.7			

			TEST BORIN										
							ORINO		0. (CSX	-1		
		$\mathbf{K}\mathbf{S}\mathbf{W}\mathbf{A}$	PROJECT NAM					-					
		K. S. Ware & Associates, L.L.C.	LOCATIC					esse	e				
		Geotechnical • CEI • Environmental	PROJECT N	O.: 30	00-18	-000 ′	1		1		Sheet	3 of	
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 247841.8209 E 22	11283.5481	Samples	Recovery (%)	RQD (%)	SPT Values	[⊃] ocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIP	TION					ш.		Wa			
 64 - 		LEAN CLAY (CL) with chert and grave A-2-7	63_5 el, sandy and silty				13-9-13			29.7			
68- 		LEAN CLAY (CL), some gravel, silty, A-2-7 FAT CLAY (CH), wet, very soft with se (Drilling tods advanced under their ow A-7-6					1-1-1			48.4			
72- 													
- 08		NO RECOVERY					50/0.2"			28.6			
001 I-75 INTERCHANGE AT I		NO RECOVERY	96.0	\times			7-8-50/1			18.0			
- 1		AUGER REFUSAL AT 86.9 FBGS BEGAN CORING AT 86.9 FBGS	86.9										
- 88 - 30 - 88 - 30	-	NO RECOVERY, CORE BARREL LE CORING TERMINATED AT 94.3 FBG											
Date Date Date Date Date Date Date	Starte	ed: 4/11/18 dri oleted: 4/12/18 co TSD / Richardson pro	marks: Groundwa Iling activities. B mpleted with Die ovided by Neel-So	oring drich	was D-50	back	filled wit	h cư	tting	s. Bo	ring	was ere	

					Т	EST BO	RIN	GL	OG	ì							
								TI	EST	Г ВС	ORING	i NC). C	SX-	1A		
			TZQ			PROJECT	NAME	: ті	тос	I-75 I	nterchai	nge					
						LOC	ATION	: C	hatta	noog	ja, Tenn	esse	Э				
			K. S. Ware & A Beotechnical • (ssociates, L.L.C.		PROJEC		: 30	0-18	-0001	l				Sheet	1 of	3
									(%		ø	(tsf)	es	(%)	it	it	dex
	, feet	nic Lo		urface El. (feet, M				Samples	ery (RQD (%)	'alue	Pen	it Fin	ntent	d Lim	c Lin	ty Inc
	Depth, feet	Graphic Log	Location:	Offset 20 feet E	of CS	X-1		San	Recovery (%)	RQI	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		0		MATERIAL DES	CRIPTI	ON			£		S	Po	ď	Wate	_	ш	Ē
				(1 inch) DNE (16.8 inches)			0.1/										
		1111					1.5										
			LEAN CLA	AY (CL), some chert, si	ilty, rede	dish brown											
	_		A-4a														
	4 –																
F	_							1									
F	_																
F	_							1									
F	8 –																
\vdash	_							1									
-	_																
-	_							4									
-	12-																
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RT 3(28–																
NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT	_																
	Com	oletion	Depth (ft.): 8	0.3	Rema	arks: Grou	ndwat	er w	as N	OT ei	ncounte	red d	urina	a or a	fter		
	Date	Starte	d: 4	/12/18	drilli	ng activitie	s. Bor	ing	was	back	filled wi	th cu	tting	s. UT	M		
] S 2	Drille	Comp d By:	Т	/13/18 SD / Richardson	coor	dinates we	re tak	en fi	rom	GIS.							
۳L	ogg	ed By:	V	V.S. Anderson													

				Т	EST BORI										
ŀ									RING). C	SX-	1A		
					PROJECT NA					-					
					LOCATI			-		essee	9				
			Associates, L.L.C. CEI • Environmental		PROJECT N	10.: 3	00-18	6-000 1					Sheet	2 of	
Depth, feet	Graphic Log		Surface El. (feet, Man: Offset 20 feet E			Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
			MATERIAL DES	CRIPTI	ON							Wa			ш.
- 32 - - 32 - 															
G REPORT 300-18-0001 I-75 INTERCHA															
HIGH Com Date Date Date Date Date Logo	pletion Starte Comp ed By: ged By	n Depth (ft.): ed: bleted: :	80.3 4/12/18 4/13/18 TSD / Richardson W.S. Anderson	Rema drilli coor	rks: Groundv ng activities. E dinates were t	Boring	was	back	ncounte filled wit	red d th cu	uring	g or a s. UT	ifter M		

				TEST BOR	ING	LO	G								
						TES	ST	BC	RING	i NC). C	SX-	1A		
				PROJECT NA	ME:	TDO	T I-	-75 lr	nterchai	nge					
			INDWA	LOCAT	ION:	Chat	tar	noog	a, Tenn	esse	e				
			K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT	NO.:	300-	18-	0001					Sheet	3 of	3
Denth feet		Graphic Log	Approx. Surface El. (feet, MSL): Location: Offset 20 feet E of C	SX-1	00	Samples Recoverv (%)		RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		////	MATERIAL DESCRIP	TION			+			ш.		Ma			
NEW GEOTECHLLOG REPORT 300-18-0001 1-75 INTERCHANGE AT 1-24.GPT 5/17/18 01 JQ GQ D2 89 99 19 19 19 19 19 19 19 19 19 19 19 19			CLAYEY GRAVEL (GC) Casing advanced with tri-cone roller bi chert zone A-2-7 RUN 1 Weathered rock from 72.6' - 74.5' RUN 2 LIMESTONE, brecciated and quartzitie RUN 3 NO RECOVERY CORING TERMINATED AT 80.3 FBG CORE BARREL RUPTURED, LOST I BORING ABONDONED	62 it through dense 72 74 c 74 c 74 c 74 c 80 80	2.4 2.6 4.5 7.4 0.3	34		0							
IEW GEOTECH LOG REPORT 300- 2 LO C C C C C C C C C C C C C C C C C C	mpl te S te C	Starte	d: 4/12/18 dri leted: 4/13/18 coo TSD / Richardson	marks: Ground lling activities. ordinates were	Borir	ng wa	is b	backt							

		KSWA	PROJECT NAME	: T	DOT	I-75 I		ige					
			LOCATION	I: C	hatta	noog	ga, Tenne	esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	.: 30	00-18	-000	1				Sheet	1 of	3
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 247665.3613 E 2211 MATERIAL DESCRIPTIO		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Diceticity, Index
	P 4 4	CONCRETE (1 foot)								5			+
		BASESTONE (12 inches) A-1 LEAN CLAY (CL), sandy, brown, stiff, mo A-2-7	<u>1.0</u> <u>2.0</u>		87		22-17-16			7.6			
4 -			6.0	X	73		11-5-6			7.4			
8 - 8		LEAN CLAY (CL), sandy with gravel, bro (FILL) A-2-7		X	100		12-22-24			18.8			
		CLAYEY SAND (SC), gravel, brown, ver (FILL) A-2-7	y stiff, moist,	X	100		5-11-15			17.9			
		LEAN CLAY (CL), sandy, brown, very sti A-2-7	ff, moist, (FILL)	X	100		7-10-15			27.0			
20-		LEAN CLAY (CL), with traces of fine san very moist A-7-5	<u>18.5_</u> d, brown, firm,	X	100		4-3-3						
24		LEAN CLAY (CL), very stiff, moist, mottle A-7-5	<u>23.5</u> _ ed		100		8-9-12			27.1			
28- -		FAT CLAY (CH), stiff, moist, mottled A-7-5	28.5_		87		6-6-8			29.0			
Date Date Drilleo	Starte	oleted: 4/10/18 back MW / Mike truck	rks: Groundwat ng activities. Bo filled with cuttin c-mounted drillri	ring gs. l	was Borir	mov ng wa	ed to 10.8 as comple	8' off eted	set. with	Borin a	g wa		

											ORIN	g N	0. (CSX	-2		
		XS				PROJECT		: T	DOT	I-75 I	nterchar	nge					
TEST BORING LOG TEST BORING LOG TEST BORING NO. CSX-2 PRUECT NAME: IDOT 175 Interchange DATE TO TAS Interchange DOLET NO.: 300-18-000 Sheet 2 of 3 TEST BORING LOG PRUECT NO.: 300-18-000 Sheet 2 of 3 TEST CLAY (CH, with traces of gravel and chect, brion, way self, most A-76 TEST CLAY (CH, with traces of gravel and chect, brion, way self, most A-76 A-76 Sheet 2 of 3 TEST CLAY (CH, with traces of gravel and chect, brion, way self, most A-76 A-76 Sheet 2 of 3 TEST CLAY (CH, with traces of gravel and chect, brion, way self, most A-76 A-76 Sheet 2 of 3 Sheet 2 of 3 TEST CLAY (CH, with traces of gravel and chect, brion, A-76 Completion Department Sheet 2 of 3 Sheet 2 of 3 TEST CLAY (CH, with traces of gravel and chect, brion, A-76 Completion Department Sheet 2																	
TEST BORING NO. CSX-2 PROJECT NAME: TDOT 1/5 Interchange DOT 1/5 Interchange DOT 1/5 Interchange DOT 1/5 Interchange PROJECT NO: 300-18-000 Sheet 2 of 3 Sheet 2 of 3 MAPPROX.Surface EI. (feet, MSL): 715.5 Location: N 24766.531512 E211167.0404 MATERIAL DESCRIPTION MATERIAL DESCRIPTION Sheet 2 of 3 MATERIAL DESCRIPTION Sheet 2 of 3 TAT CLAV (CH), with traces of gravel and chert, thrown, wery stiff, most Ar-6 - FAT CLAV (CH), with traces of gravel and chert, thrown, wery stiff, most Ar-7.6 - FAT CLAV (CH), with traces of gravel and chert, thrown, wery stiff, most Ar-7.6 BOD 6-0 - FAT CLAV (CH), with traces of gravel and chert, thrown, wery stiff, most Ar-7.6 BOD 6-0 - FAT CLAV (CH), with traces of gravel and chert, thrown, wery stiff, most Ar-7.6 BOD 6-0 6.6.9 - FAT CLAV (CH), with traces of gravel and chert, thrown, wery stiff, most Ar-7.6 100 6-0.07																	

				FEST BORI										
						ΓES	ΤB	ORIN	G N	0. (CSX	-2		
				PROJECT NA	ME: T	DOT	I-75 l	nterchar	nge					
				LOCATI	ON: C	hatta	noog	a, Tenn	esse	e				
			K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT N	NO.: 3	00-18	-0001					Sheet	3 of	3
	Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 247665.3613 E 221	715.5 1167.0404	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
			MATERIAL DESCRIP healed fractures	TION							Wa			ш ———
-						100	100							
-	_ 64		RUN 3	64	.0									
_			Non-jointed below 64 FBGS											
-	- 68-					90	90							
+	_		Core loss left in hole CORING TERMINATED AT 69.0 FBG	69 S	.0									
	- 72-													
_														
\vdash	_													
-7	76-													
∞	_													
5/17/18	_													
	_													
SWARI 8-	30 -													
GPJ K	_													
VT I-24.	_													
	_													
	34 —													
-75 INT	_													
-0001	_													
300-18-	-													
	38-													
OGRE														
	ate ate rille	Starte	ed: 4/9/18 dri bleted: 4/10/18 bac MW / Mike tru	narks: Groundw Iling activities. I ckfilled with cut ck-mounted dri	Boring ttings.	was Borir	move ng wa	ed to 10. s compl	8' off eted	iset. Ì with	Borin a	g wa		

				TE	ST BOI	RINO					2 N/		<u>.</u>	2		
				-	PROJECT					ORIN(U. (JOX	-3		
		KS	WA	ſ						ja, Tenno	-	-				
			sociates, L.L.C.		PROJEC				-		53361			Sheet	1 of	3
		eotechnical • C	El • Environmental								tsf)	ş				
Depth, feet	Graphic Log	Approx. Su Location:	urface El. (feet, N 25 paces of W- CSX bridge	•		F	Samples	Recovery (%)	RQD (%)	SPT Values	^{>} ocket Pen (tsf)	Percent Fines	Nater Content (%)	Liquid Limit	Plastic Limit	-
	. 		MATERIAL DES (1.2 inches)	SCRIPTIO	N	0.1/							Wa			
_	$\frac{1}{2}$		NE (22.8 inches)			/										
_		LEAN CLA brown to re	Y (CL), with traces o eddish brown, (FILL)		basestone, sil	-	\times	50		5-3-4			15.9			
4 -		<u>A-7-5</u> LEAN CLA reddish bro A-7-5	Y (CL), with traces o wn, (FILL)	of basestor	ne, slightly silt	3.5 ty, 5.0		33		2-2-2			16.0			
		LEAN CLA chert grave (FILL) A-2-7	Y (CL), silty to very s els, yellowish to reddi	silty, sandy lish brown,	, abundant very soft,		\mathbf{X}	80		1-2-2			21.5			
8 -							\square	100		2-2-2			22.5			
-		LEAN CLA	Y (CL), silty to very s	 silty, sandy	/ to very sand	<u>12.0</u> ly,										
		yellowish to A-2-7	o rèddish brown, firm	n to stiff, (É	ILL)		\times	100		2-3-3			19.9			
16- - -																
 20						2	X	100		5-7-6			22.8			
 24		LEAN CLA brown, son A-2-7	Y (CL), silty to very s ne chert	silty, sandy	/, reddish	22.0	\mathbf{X}	100		6-9-10			16.8			
_							\times	100		9-9-12			26.9			
)ate)ate)rille	oletion Starte Comp d By: ed By:	leted: 4/	2.7 18/18 25/18 SD / Richardson /.S. Anderson	and U	ks: Groun Ig activities JTM coordi	s. Bor	ing	was	back	ncounte filled wit rom GIS	th cu				n	L

[TES	st Bof	RINC						_				
			TIO								ORINO		0. (CSX	-3		
					PF							-					
		P	S Ware &	Associates, L.L.C.							ga, Tenne	essee	Ð				
				CEI • Environmental		PROJEC	T NO.:	: 30	_	-000 [,]	1	Ē		-	Sheet	2 of	
	Depth, feet	Graphic Log	Approx. S	Surface EI. (feet, M 25 paces of W-S CSX bridge MATERIAL DES	SW of W			Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
ŀ				MATERIAL DES										\$			
-	- 32 - - 36 - 		LEAN CI brown, m A-7-5	AY (CL), silty to very sil nottled	lty, reddish	to yellowish	32.0 1	\times	100		7-11-13			25.3			
-	 _ 40 <i>-</i> 						42.0	\times	100		4-6-9			27.8			
•	 _44 <i>_</i> 		FAT CAN with blac A-7-6	(CH), slightly silty, red k and white mottling	dish to yell	owish browr	ו, ב	\times	100		6-7-9			36.5			
-24.GPJ KSWARE.GDT 5/17/18	48- - 52-						<u>52.0</u>	\times	100		9-8-11			28.7			
VEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24 GPJ KSWARE GDT 5/17/18	 - 56- 		FAT CLA mottled A-7-6	Y (CH), slightly silty, ligi	nt prown to		57.9	\times	100		5-5-6			28.7			
JG REPORT 3(BEGAN	REFUSAL AT 57.9 FBG CORING AT 57.9 FBGS Run 2 d Dolomite, stained core	8				50	0							
NEW GEOTECH LC	Date Date Drille	pletion Starte Comp d By: ed By:	leted:	72.7 4/18/18 4/25/18 TSD / Richardson W.S. Anderson	Remarks drilling and UT	: Groun activities M coordi	s. Bor	ing	was	back	ncounter filled wit rom GIS.	h cư	uring	g or a s. Ele	fter vatio	'n	

		Т	EST BORING										
							ORINO		0. (CSX	-3		
		IK S WA	PROJECT NAME					-					
		K. S. Ware & Associates, L.L.C.	LOCATION			-		esse	e				
		Geotechnical • CEI • Environmental	PROJECT NO.	: 30		5-0001		Ē		-	Sheet	3 of	
eet	: Log	Approx. Surface El. (feet, MSL):	716.0	les	Recovery (%)	(%)	lues	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Limit	Limit	Plasticity Index
Depth, feet	Graphic Log	Location: 25 paces of W-SW of	W corner of	Samples	covel	RQD (%)	SPT Values	ket Pe	cent	Conte	Liquid Limit	Plastic Limit	sticity
De	Ū	CSX bridge MATERIAL DESCRIPT	ION	0,	Re		S	Poc	Per	Vater		ā	Plas
			<u>60.3</u>							_>			
	╞╍┾	BRECCIA, Dolomite, stained with high a											
					100	100							
-64-			64.7										
		RUN 4 BRECCIA, Dolomite, silicious, quartzition healed fractures	c with calcite										
	╞┼┥												
					100	100							
-68-													
		Open, stained bedding plane (69.7')	69.7 69.7/	_									
		RUN 5 BRECCIA, Dolomite											
-72-		BRECCIA, DOIOITILE			100	100							
	╞╧╾	CORING TERMINATED AT 72.7 FBGS	72.7										
L -													
L -													
-76-													
	-												
5/17/18	-												
<u> </u>	-												
₩ 80-	-												
ы К	-												
- 1-24.G	-												
10E A1	-												
-84-	-												
	-												
- 1-7 	-												
0-18-00	-												
-88-	-												
- REPO	1												
Date	e Starte e Comp	Depth (ft.): 72.7 Rem ed: 4/18/18 drill pleted: 4/25/18 and TSD / Richardson TSD / Richardson TSD	arks: Groundwate ing activities. Bor UTM coordinates	ing	was	back	filled wit	th cu	luring tting:	g or a s. Ele	fter vatic	n	
	ed By: ged By												

feet ic Log	S. Ware & Associates, L.L.C. extechnical • CEI • Environmental Approx. Surface EI. (feet, MSL): Location: N 246062.1027 E 21986 MATERIAL DESCRIPTION ASPHALT (9.6 inches) BASESTONE (31.2 inches) A-1 LEAN CLAY (CL), brown, dry, moist and A-7-5	622.9167			-		ocket Pen (tsf)				1 of ∺≓	
Contraction of the sector of t	Approx. Surface El. (feet, MSL): Location: N 246062.1027 E 21980 MATERIAL DESCRIPTIO ASPHALT (9.6 inches) BASESTONE (31.2 inches) A-1	699.7 622.9167 DN					en (tsf)	ines				
	Location: N 246062.1027 E 2198 MATERIAL DESCRIPTION ASPHALT (9.6 inches) BASESTONE (31.2 inches) A-1 LEAN CLAY (CL), brown, dry, moist and	622.9167 DN	Samples	Recovery (%)	3QD (%)	Values	en (tst	ines	t (%	ij	Ξ	
	ASPHALT (9.6 inches) BASESTONE (31.2 inches) A-1 LEAN CLAY (CL), brown, dry, moist and	0.8_	-			SPT	ocket F	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	-
	BASESTONE (31.2 inches) A-1 LEAN CLAY (CL), brown, dry, moist and						<u>п</u>		Wa			_
	A-1 LEAN CLAY (CL), brown, dry, moist and	3.4										
8				72		2-3-6			20.4			
8 – 🔆 🔆				72		3-3-3				50	23	
				100		3-4-6			22.3			
	LEAN CLAY (CL), Residual Soil, brown, A-7-5	<u>12.0</u> stiff to very stiff		100		6-7-9			28.1			
20				100		3-5-7			16.8			
24				94		7-10-11						
28-			\times	100		7-8-50/4						

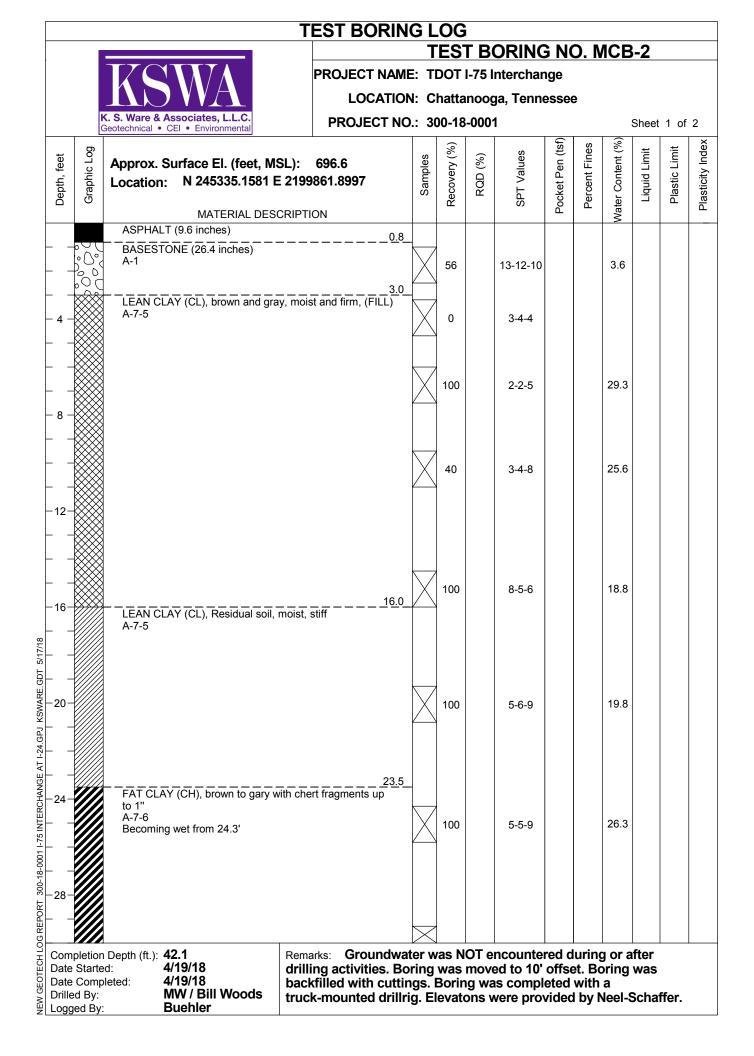
		T	EST BORIN	GL	.OG	ì							
					TE	ST I	BORIN	IG I	NO.	M- ′	1		
			PROJECT NAME	: TI	DOT	I-75 I	nterchar	nge					
		AN CAL	LOCATION	I: C	hatta	noog	ja, Tenn	esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	.: 30	00-18	-0001	1				Sheet	2 of	2
Depth, feet	Graphic Log	Location: N 246062.1027 E 219		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIPT	10N 30.1/							Ň			
32 		BEGAN CORING AT 30.1 FBGS RUN 1 LIMESTONE, argillaceous, pink and da brown, hard (Holstan Formation) Open bedding plane (33.6') High angle vertical fracture (34.8') RUN 2]		100	88							
-					100	92							
_													
_			39.9										
-40		CORING TERMINATED AT 39.9 FBGS											
300-18-0001 -75 INTERCHANGE AT I-24.GPU KSWARE.GDT 5/17/18 7 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2													
REPOR	-												
Dat 0≝ Dat Dat	npletior e Starte e Comp led By: ged By	ed: 4/20/18 drill bleted: 4/20/18 bac MW / Bill Woods true	arks: Groundwat ling activities. Bo kfilled with cuttin ck-mounted drillri	ring gs. l	was Borin	move ng wa	ed to 9.6 Is compl	' offs leted	et. B with	oring a	was		

	TE	EST BORIN	GL	. O G	i							
				TE	ST E	BORIN	IG I	NO.	M-2	2		
		PROJECT NAME	E: TI	DOT	I-75 l	nterchar	nge					
		LOCATION			-		esse	e				
	K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO).: 30	00-18	8-0001					Sheet	1 of	
Depth, feet Graphic Log	Approx. Surface El. (feet, MSL): Location: N 245939.7841 E 21984 MATERIAL DESCRIPTIO	469.3014	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 LEAN CLAY (CL), with traces of sand, br stiff and moist A-7-5	 1.6 /		89		9-4-7			16.1			
4				89		3-3-5			24.3	56	24	32
_		8.1	\mid			4-2-4			37.5			
	AUGER REFUSAL AT 8.1 FBGS BEGAN CORING AT 8.1 FBGS RUN 1 LIMESTONE, dark red and gray with sea calcareous shale			100	96							
16-	RUN 2 Zone of weatherd, fractured Limestone 1			100	52							
	Zone of high angled fractures 17.5' - 18.5	5' <u>18.1</u> 18.5_										
20	Zone of weatherd, fractured Limestone 2	21.5	·	100	56							
	RUN 4	<u>23.</u> 1_		100	100							
	RUN 5	27.1_										
-28	RUN 6	29.3		100	100							
Completion Date Start Date Comp Drilled By: Logged By	pleted: 4/16/18 back MW / Bill Woods truck	rks: Groundwat ng activities. Bo filled with cuttir a-mounted drillri	ring Igs. I	was Borir	move ng wa	ed to 7.6 s compl	' offs eted	et. B with	oring a	was		

		Т	EST BORING	GL									
							BORIN		NO.	M-2	2		
		$\mathbf{K}\mathbf{S}\mathbf{W}\mathbf{A}$	PROJECT NAME					-					
			LOCATION			-		esse	Э				
		C. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	: 30	00-18	-0001					Sheet	2 of	
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 245939.7841 E 2198		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIPT Zone of fractured Limestone 29.7' - 32.9						ш.		Ň			
- ·													
-32					48	48							
			32.9										
			34.3										
L .		CORING TERMINATED AT 34.3 FBGS											
-36	_	CASING ADVANCER USED TO SET C FEET DUE LOOSE ROCK COLLAPSIN											
	_												
	_												
	_												
-40	_												
- ·	_												
Ļ.	_												
L .	_												
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L .													
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4.GPJ													
₽ <u>-</u> 1-52													
ERCH	1												
75 INT													
00-18-(-												
0RT 3(-												
. TEPC	-												
NEW GEOTECHLOG REPORT 300-18-0001 1-75 INTERCHANGE AT 1-24.6PJ KSWARE GDT 25	npletior	Depth (ft.): 34.3 Rema	arks: Groundwat	er w	as N	OT e	ncounte	red d	urina	a or a	fter		
	e Starte	d: 4/12/18 drill	ing activities. Boi	ing	was	move	ed to 7.6	' offs	et. B	oring			
	e Comp led By:	MW / Bill Woods truc	kfilled with cuttin k-mounted drillrig								Schat	ffer.	
≝ Log	ged By	Buehler					-		-				

		PROJECT NAME:			ORINC Interchar		U. N	/ICB	5-1		
	INDWA	LOCATION:				-	е				
	K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO.:	300-1	8-000	1				Sheet	1 of	2
Depth, feet Graphic Log	Approx. Surface El. (feet, MSL): Location: N 245514.4339 E 2200		Samples Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	MATERIAL DESCRIPTI ASPHALT (3.6 inches)	ON 0.3⁄						Ma			<u> </u>
	BASESTONE (26.4 inches) A-1										
-	LEAN CLAY (CL), gray, moist, firm to st A-7-5										
4			67		4-5-6			22.4	56	23	3
			78		4-6-4			23.0			
8			67		2-2-5			31.1			
			100)	2-3-5			28.7			
20-	LEAN CLAY (CL), gray, moist, very stiff, A-7-5	<u>18.5</u> chert fragments	100)	2-11-10			15.2			
24-			100)	6-6-10			25.7			
28-28-	AUGER REFUSAL AT 27.2 FBGS BEGAN CORING AT 27.2 FBGS RUN 1 LIMESTONE, weathered with mud sean	27.2 28.6 ns from 27.2' - /	100) 43							

					TEST BC	RIN										
										ORINO		0. N	ICE	8-1		
					PROJECT	NAME	: Т	DOT	I-75 I	ntercha	nge					
									-	ja, Tenn	esse	е				
				Associates, L.L.C. CEI • Environmental	PROJE	CT NO.	: 3	00-18	-0001			1		Sheet	2 of	2
	Depth, feet	Graphic Log	Approx. Location	Surface El. (feet, MS n: N 245514.4339 E			Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		XXXX	RUN 2	MATERIAL DESC	RIPTION			_			<u> </u>		Wat			<u> </u>
	 -32-		RUN 2			32.2		88	50							
						33.4										
			RUN 3 LIMEST partings	ONE, gray, hard, argillace	ous with shale											
	-36-							100	100							
			 RUN 4			38.4	_									
	-40-							100	100							
						10.4										
			CORIN	G TERMINATED AT 42.4 F	BGS	42.4										
	-44-															
_																
5/17/18	-48-															
GDT																
SWARE																
SPJ K																
VT I-24.	-52-															
NGE A																
ERCHA																
75 INTI																
0001-	-56-															
300-18-																
ORT :																
JG REF	 60															
W GEOTEC	Com Date Date Drille	Starte	leted:	4/18/18 4/19/18	Remarks: Grou drilling activiti small rod drop location. Eleva	es. Boi os. Elev	ing atio	mov n wa	ed to s abo	out 0.5' l	et NE ower	E. Dril than	ller re	port	ed 2 ed	



					•	TEST BC	RIN	GL	.OG	ì							
								Τ	ES	ΤB	ORINO	G N(D. N	ICB	-2		
						PROJECT	NAME	: TI	DOT	I-75 I	nterchar	nge					
						LOC		: C	hatta	noog	ja, Tenn	esse	e				
		(K. S. Ware & Geotechnical	Associates, L.L.C. CEI • Environmenta		PROJE		: 30	00-18	-0001	1			;	Sheet	2 of	2
	Depth, feet	Graphic Log	Approx. Locatior		581 E 219	99861.8997		Samples	Recovery (%)	RQD (%)	SPT Values	^o ocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		////		MATERIAL	DESCRIP	TION		\sim	100		5-7-11			Wa			ш.
	 -32-		BEGAN RUN 1 LIMEST	RFUSAL AT 31.1 CORING AT 31.1	FBGS	with occasiona	31.1 	\sim	95	87				16.5			
			shale pa	artings			34.9		90	07							
	-36- 								98	84							
	 40 						39.9		100	100							
NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18	44 - 44 48 48 		CORING	G TERMINATED A	T 42.1		42.1										
NEW GEOTECH LOG	Date Date Drille	Starte Comp	leted:	42.1 4/19/18 4/19/18 MW / Bill Wood Buehler	dri . ba	marks: Grou Iling activition ckfilled with ack-mounted	es. Boi cuttin	'ing gs. I	was Borin	move ng wa	is compl	offse eted	et. Bo with	oring a	was	ffer.	

			Т	EST BORI										
								ORIN		O . I	RW-	·1		
				PROJECT NA					•					
		K. S. Ware & Associates, L.		LOCATI			-		essee	9				
		Geotechnical • CEI • Environme		PROJECT N	10.: 3	00-18	6-0001					Sheet	1 of	
Depth, feet	Graphic Log		feet, MSL): 3.7392 E 2209	912.8780	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	<u>7, 1</u> × -7/		IAL DESCRIPT								3			
		LEAN CLAY (CL), roots brown, firm, (FILL) A-7-5	, rock fragments			72		4-4-5			17.9			
- 4 -		FAT CLAY (CH), rock fr soft, moist, (FILL) A-7-6	agments, gray a	3. and light brown, 6.		100		1-2-1			22.8			
		SILTY LEAN CLAY (CL A-7-5	-ML), gray and I			100		4-7-8			18.8			
		SILTY LEAN CLAY (CL mineral staining, moist, A-7-5				100		4-6-9			19.9			
- 12 - - 16		LEAN CLAY (CL), gray A-7-5	and light brown,		5	100		3-4-4			19.7			
		LEAN CLAY (CL), silty, A-7-5	rock fragments	17.	5	100		17-15-8						
		AUGER REFUSAL AT BORING TERMINATED		22.	0									
-24- 														
- – -28– - –														
Date Date Drille	Starte	bleted: 4/11/18 Geotech / P	drill com	arks: Groundw ing activities. E pleted with CM vided by Neel-S	Boring ME-550	was , HS/	back	filled wit	h cu	tting	s. Bo	ring	was	

			PROJECT NAMI				ORIN oterchar		U.	r.vv-	-2		
								-	•				
	P	S. S. Ware & Associates, L.L.C.				-		esse	e				
		Geotechnical • CEI • Environmental	PROJECT NC).: 30	JU-18	-0001		0		-	Sheet	1 of	
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 247244.1700 E 22092	237.1080	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	
	<u>×1 /</u> . <u>/</u>	TOPSOIL (12 inches)											
		LEAN CLAY (CL), brown, moist, firm A-7-5	1.0		100		1-2-3			21.7			
4 -		LEAN CLAY (CL), light brown, stiff A-7-5	3.5_		94		3-5-5			22.9			
_		LEAN CLAY (CL), with silt, gray and light A-7-5	t brown, stiff		100		4-6-6			17.4			
8 -		LEAN CLAY (CL), gray and brown, silt, g A-7-5	<u>8.5</u> 8.5_		100		11-5-7			19.7			
12- 16-		GROUNDWATER ENCOUNTERED DUP AT 13.0 FBGS SILTY SAND (SM), with gravel, gray to n dense, wet A-2-7	nedium brown,		94		10-19-30			10.9			
_ _ 20-		FAT CLAY (CH), brown and gray, moist t fragements A-7-6	17.5_ to wet, rock		83		31-32-27						
24-		AUGER REFUSAL AT 24.0 FBGS BORING TERMINATED AT 24.0 FBGS	2 <u>4.0</u>		50		50/6			14.5			
Date Date Drille	Starte	leted: 4/11/18 comp Geotech / Patrick provi	rks: Groundwa fbgs. Boring wa pleted with CME ided by Neel-Sc	as ba -550	ackfil , HS/	led w	ith cutti	ngs.	Bori	ng wa	IS	ties	

							ORIN		О.	RW-	.3		
			PROJECT NAME					•					
			LOCATION			-		esse	e				
		C. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO.	: 30	00-18	-0001		-			Sheet	1 of	
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 246913.1930 E 22083 MATERIAL DESCRIPTIO	307.7546	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	<u>, 1, 1, 1</u>	TOPSOIL (12 inches)								5			-
_		LEAN CLAY (CL), brown, firm, moist, with material, (FILL) A-7-5	-	X	100		2-3-4			22.3			
4		LEAN CLAY (CL), silty, brown, firm, mois A-7-5		X	94		2-3-3			21.5			
- 8 -		LEAN CLAY (CL), silty, brown and gray, n A-7-5			97					23.5	27	20	7
_		GROUNDWATER ENCOUNTERED DUF AT 8.0 FBGS FAT CLAY (CH), sandy, silty, brown, moi A-7-5 POORLY GRADED GRAVEL (GP), sand moist	st 9.5	X	94		1-2-3			24.2			
12— — —		A-2-6		\times	67		3-7-7			17.4			
6— 		FAT CLAY (CH), some sand at top, gray, fragments at bottom	<u></u>	\times	125		0-50/3-			33.4			
20—		A-7-6 AUGER REFUSAL AT 19.5 FBGS BORING TERMINATED AT 19.5 FBGS								00.4			
_ 24-													
_													
28- _													
Date Date Drille	pletion Starte Comp d By: ed By:	leted: 4/11/18 Geotech / Patrick provi	ks: Groundwate bgs. Boring was bleted with CME- ded by Neel-Sch	bac 550	;kfille , HSA	d wit	h cuttin	gs. Ē	Sorin	g was	5	ties	

	KSWA		E: TI	DOT	I-75 I		nge					
B	K. S. Ware & Associates, L.L.C.	LOCATIOI PROJECT NO					esse	e		01 4	4 - 5	
	Geotechnical • CEI • Environmental	PROJECT NC).: SU	-	-000		sf)	6	-		: 1 of	
Depth, feet Graphic Log	Approx. Surface El. (feet, MSL): Location: N 246858.3761 E 2208	838.1037	Samples	Recovery (%)	RQD (%)	SPT Values	^o ocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Placticity Index
	MATERIAL DESCRIPTIC	ON 0.3⁄					ш. 		Ň			-
-000	BASESTONE (14.4 inches)	1.5										
	Compacted LEAN CLAY (CL), with chert brown to reddish brown, (FILL) A-2-7	and gravel,	\square			4-9-15						
4	Compacted LEAN CLAY (CL), with chert brown to reddish brown, (FILL) A-2-7	t and gravel,	X			6-10-12			12.8	50	25	2
	Compacted LEAN CLAY (CL), with chert brown to reddish brown, (FILL) A-2-7	6.5_ t and gravel, 8.5				6-6-7			16.2			
	Compacted LEAN CLAY (CL), with chert brown to reddish brown, (FILL) A-2-7					4-5-5			17.4			
12- - - - 16-	LEAN CLAY (CL), silty, gray, soft A-7-5	<u>13.5</u>				1-2-2			19.8	28	17	1
	FAT CLAY (CH), silty, light brown A-7-5	18.5_				3-4-6			24.2			
	FAT CLAY (CH), silty, brown with darker A-7-5	23.5_ brown, mottled				2-3-4			27.3			
	FAT CLAY (CH), with highly weathered r A-7-5	28.5_ ock fragments				16-19-22						

					T	EST BO	ORINO										
								-	TES	ST B	ORIN	G N	O . I	RW	-4		
						PROJECT		: T	DOT	I-75 I	nterchar	nge					
						LOO	CATION	: C	hatta	noog	ga, Tenn	esse	e				
				 Associates, L.L.C. CEI • Environmental 		PROJE	CT NO.	: 30	00-18	-000	1				Sheet	2 of	2
	Depth, feet	Graphic Log	Approx. Locatior		2208			Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
				MATERIAL DESC	SRIPTI	ON								Š			
NEW GEOTECH LOG REPORT 300-18-0001 1-75 INTERCHANGE AT 1-24.GPJ KSWARE.GDT 5/17/18				REFUSAL AT 33.8 FBG 3 TERMINATED AT 33.8			33.8										
JRT 300-																	
3 REPC																	
NEW GEOTECH LOC	Date Date Drille	Starte	leted:	33.8 4/9/18 4/10/18 TSD / Richardson W.S. Anderson	com	arks: Gro ng activit pleted wit ided by N	ies. Bor h Diedr	'ing 'ich	was D-50	back	ncounte filled wit 2-1/4 in	th cu	tting	s. Bo	ring	was vere	1

			TEST BORI	NG L	.OG	ì							
				Т	ES	ΓΒΟ	DRING	<u> </u>). R	2W-4	IA		
			PROJECT NA	ME: T	DOT	I-75 l	nterchar	nge					
		MOWA	LOCATI	ON: C	hatta	noog	a, Tenn	esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT N	NO.: 30	00-18	-0001				:	Sheet	1 of	1
Depth, feet	Graphic Log	Approx. Surface EI. (feet, MS Location: 5 ft offset of RW		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESC AUGER ONLY	RIPTION					ă.		Wat			<u>م</u>
		See RW-4											
- 4 -													
- 8 -													
]												
	1												
-12-	1												
	1												
	1												
	1												
-16-													
/18													
2/17	1		10										
B		LEAN CLAY (CL)	19.	<u>.u</u>						00.0			
44-20-		A-7-5			100					22.3			
GPU K													
					100					21.5	30	19	11
NGE -		BORING TERMINATED AT 23 FE	23. 3GS	.0									
P24-	-												
	-												
011-7	-												
- 18-00	-												
[∞] –28-	-												
- TEPOF	-												
NEW GEOTECHLOG REPORT 300-18-0001 1-75 INTERCHANGE AT 1-24.GPU 6/17/18 		Dopth (ft): 22 0	Domorko: Crownel	votor				 rod d			ftor		
	e Starte		Remarks: Groundw	Only sh	elby	tube	sample	s wei	re tak	en fr	om ti	his	
Date	e Comp ed By:	TSD / Richardson	hole. Boring was b taken from GIS.	backfill	ed w	ith cu	ittings. l	JTM	coord	dinate	es we	ere	
E Log	ged By												

Associates, L.L.C. • CEI • Environmental A. Surface EI. (feet, MS on: N 247164.5043 E MATERIAL DESC ALT (5 inches) STONE (31.2 inches) STONE (31.2 inches) CLAY (CL), silty, sandy, with h brown, (FILL) CLAY (CL), silty, sandy, re CLAY (CL), silty, sandy, re CLAY (CL), silty, sandy, re	PROJEC SL): 677.8 2209718.7657 CRIPTION th gravel, light to th brown, (FILL) cddish brown, (FILL)	ATION: C T NO.: 3 	hattano 00-18-0	ooga, Tenn	•	e Percent Fines 16. 14. 14. 14. 18.	Liquid Limit	Lastic Limit	
• CEI • Environmental A. Surface EI. (feet, MS on: N 247164.5043 E MATERIAL DESC ALT (5 inches) STONE (31.2 inches) CLAY (CL), silty, sandy, with brown, (FILL) CLAY (CL), silty, sandy, re CLAY (CL), silty, sandy, re	PROJEC SL): 677.8 2209718.7657 CRIPTION th gravel, light to th brown, (FILL) cddish brown, (FILL)	T NO.: 3	00-18-0 (%) (Jacobian (%) (Jacobian)() (Jacobian (%) (Jacobian)() (001 (%) (%) 4-4-5 2-3-3 5-4-5		Percent Fines 19. Water Content (%)	Liquid Limit		
A. Surface El. (feet, MS on: N 247164.5043 E MATERIAL DESC ALT (5 inches) STONE (31.2 inches) CLAY (CL), silty, sandy, wi h brown, (FILL) CLAY (CL), with gravel, lig CLAY (CL), silty, sandy, re	E 2209718.7657	<u>0.4</u> <u>3.0</u> <u>4.5</u> <u>6.0</u> <u>8.5</u> 13.5	39 50 50	4-4-5 2-3-3 5-4-5	Pocket Pen (tsf)	16. 14. 17.	2 9	Plastic Limit	
ALT (5 inches) STONE (31.2 inches) CLAY (CL), silty, sandy, wi h brown, (FILL) CLAY (CL), with gravel, lig CLAY (CL), silty, sandy, re	ith gravel, light to ht brown, (FILL) addish brown, (FILL)	<u>3.0</u> <u>4.5</u> <u>6.0</u> <u>8.5</u> 13.5	50	2-3-3 5-4-5		16. 14. 17.	9		
STONE (31.2 inches) CLAY (CL), silty, sandy, wi h brown, (FILL) CLAY (CL), with gravel, lig CLAY (CL), silty, sandy, re	ht brown, (FILL)	<u>3.0</u> <u>4.5</u> <u>6.0</u> <u>8.5</u> 13.5	50	2-3-3 5-4-5		14.	9		
h brown, (FILL) CLAY (CL), with gravel, lig CLAY (CL), silty, sandy, re CLAY (CL), silty, sandy, re	ht brown, (FILL)	4.5 6.0 8.5	50	2-3-3 5-4-5		14.	9		
CLAY (CL), silty, sandy, re	eddish brown, (FILL)	8.5	50	5-4-5		17.	6		
CLAY (CL), silty, sandy, re	adish brown, (FILL)	13.5							
		13.5	50	3-6-7		18.	4		
CLAY (CL), brown with bla	ick mineral staining, fi								
			100	2-3-4		20.	8		
			6	3-4-6		20.	9		
	ottled gray, stiff	23.5 NG	100	4-5-5		22.	D		
.0 FBGS		28.5	100	5-4-4		50.	8		
	UNDWATER ENCOUNTER 0.0 FBGS CLAY (CL), with gravel, gr): 45.4 4/10/18	CLAY (CL), with gravel, gray, very wet, firm	CLAY (CL), silty, brown mottled gray, stiff UNDWATER ENCOUNTERED DURING DRILLING 0 FBGS CLAY (CL), with gravel, gray, very wet, firm 28.5 CLAY (CL), with gravel, gray, very wet, firm 28.5 CLAY (CL), with gravel, gray, very wet, firm 28.5 CLAY (CL), with gravel, gray, very wet, firm	CLAY (CL), silty, brown mottled gray, stiff 23.5 JNDWATER ENCOUNTERED DURING DRILLING 100 .0 FBGS 28.5 CLAY (CL), with gravel, gray, very wet, firm 100 .): 45.4 Remarks: Groundwater was end	CLAY (CL), silty, brown mottled gray, stiff 100 4-5-5 JNDWATER ENCOUNTERED DURING DRILLING 100 4-5-5 CLAY (CL), with gravel, gray, very wet, firm 28.5 100 5-4-4 (CLAY (CL), with gravel, gray, very wet, firm 100 5-4-4 (): 45.4 Remarks: Groundwater was encountered d activities. Boring was backfilled with cuttin	CLAY (CL), silty, brown mottled gray, stiff 100 4-5-5 JNDWATER ENCOUNTERED DURING DRILLING 100 4-5-5 CLAY (CL), with gravel, gray, very wet, firm 28.5 100 5-4-4 (CLAY (CL), with gravel, gray, very wet, firm 100 5-4-4 (): 45.4 Remarks: Groundwater was encountered during activities. Boring was backfilled with cuttings. E	CLAY (CL), silty, brown mottled gray, stiff 23.5 100 4-5-5 22.1 JNDWATER ENCOUNTERED DURING DRILLING 100 4-5-5 22.1 CLAY (CL), with gravel, gray, very wet, firm 28.5 100 5-4-4 50.1 .0 FBGS 100 5-4-4 50.1 .1 45.4 Remarks: Groundwater was encountered during drilling	CLAY (CL), silty, brown mottled gray, stiff 23.5 CLAY (CL), silty, brown mottled gray, stiff 100 4-5-5 22.0 JNDWATER ENCOUNTERED DURING DRILLING 100 4-5-5 22.0 CLAY (CL), with gravel, gray, very wet, firm 28.5 100 5-4-4 50.8 CLAY (CL), with gravel, gray, very wet, firm 100 5-4-4 50.8): 45.4 Remarks: Groundwater was encountered during drilling at 25 activities. Boring was backfilled with cuttings. Boring was	CLAY (CL), silty, brown mottled gray, stiff 23.5 CLAY (CL), silty, brown mottled gray, stiff 100 4-5-5 22.0 JNDWATER ENCOUNTERED DURING DRILLING 100 4-5-5 22.0 O FBGS 28.5 100 5-4-4 50.8 CLAY (CL), with gravel, gray, very wet, firm 100 5-4-4 50.8): 45.4 Remarks: Groundwater was encountered during drilling at 25 fbgs

					Т	EST BC	RIN										
											ORIN		0.	RW	-5		
						PROJECT						-					
											ya, Tenn	esse	Ð				
		C	Geotechnical	Associates, L.L.C. CEI • Environmental		PROJE	CT NO	.: 30	00-18	3-000 ⁻	1				Sheet	2 of	
	Depth, feet	Graphic Log	Approx. Locatior		43 E 2209			Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
-		//////		MATERIAL I	DESCRIPTI	ON								Na			
			FAT CL A-7-6	AY (CH), with gravel	, wet, very s	soft,	<u>33.5</u>	\times	22		3-50/1-			57.4			
	-44			REFUSAL AT 45.4			45.4				50/5			37.2 61.0			
NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18	- 48 - 48 			G TERMINATED AT													
NEW GEOTECH L(Com Date Date Drille	Starte	leted:	45.4 4/10/18 4/10/18 TSD / Richardso W.S. Anderson	com	arks: Grou vities. Bori pleted with leel-Schaff	ng was h a tru	s ba	ckfill	ed wi		ngs. Ē	Borin	g was	5	-	

				Т	EST BOP	RING										
										ORIN		0.	RW-	-6		
		KS			PROJECT N						-					
									-	ja, Tenne	esse	Ð				
		K. S. Ware & As Geotechnical • Cl	sociates, L.L.C.		PROJECT	T NO.:	30	0-18	-0001					Sheet	1 of	2
Depth, feet	Graphic Log	Approx. Su Location:	urface El. (fee N 247474.64				Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
_				DESCRIPT	ION						Ъ.		Wat			
		ASPHALT BASESTO A-1	NE (21 inches)			_ <u>0.3</u> /- 2.0										
		A-7-5	Y (CL), light to m			3.5	$\left \right\rangle$			5-4-5			15.9			
- 4 -		LEAN CLA brown, (FIL A-7-5	Y (CL), some ch L)	ert and grav	el, light reddish	6.0	X			2-4-4			21.4			
		LEAN CLA A-7-5	Y (CL), light redo	dish brown, (FILL)		$\overline{\langle}$			5-5-4			14.8			
		LEAN CLA reddish bro A-2-7	Y (CL), with cher wn, (FILL)	t and gravel	fragments, ligh	<u>8.5</u>	X			9-10-10			21.3	49	25	24
- 12-						<u>13.5</u>										
 		LEAN CLA reddish bro A-2-7	Y (CL), with cher wn, (FILL)	rt and gravel	fragments, ligh	it 🖄	X			4-5-7			18.3			
						18.5										
- 20-		reddish bro A-2-7	Y (CL), with cher wn, (FILL)	rt and gravei	fragments, lign	ιτ	X			4-5-8			21.4	54	24	30
		LEAN CLA brown, (FIL	Y (CL), with cher	t and gravel		<u>23.5</u>	$\overline{\langle}$			4-4-5			20.8			
		A-2-7	-,				\leq			6-6-9			8.8			
Date Date Drille	Starte Comp	leted: 4/	7.2 10/18 10/18 SD / Richards S. Anderson	on prov	arks: Groun ing activities pleted with vided by Nee	s. Bori Diedri	ng ch	was D-50	back	ncounter filled wit 2-1/4 in	h cư	tting	s. Bo	ring	was vere	

				TEST BOR	ING									
						TES	ST B	ORIN	G N	0.	RW-	-6		
				PROJECT NA	AME:	DOT	I-75 I	ntercha	nge					
				LOCAT	ION:	Chatta	anoog	ya, Tenn	esse	e				
			K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT	NO.:	300-1	3 -000 ′	1				Sheet	2 of	2
	Depth, feet	Graphic Log	Approx. Surface El. (feet, MS Location: N 247474.6484 E		Samoles	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		××××	MATERIAL DESC	RIPTION					ď		Wat			<u> </u>
	 32 36 		FAT CLAY (CH), with chert, brown A-2-6	, wet, stiff	5.0			6-5-4 4-7-7 4-7-8			20.4			
CH LOG REPORT 300-18-0001 1-75 INTERCHANGE AT 1-24.GPJ KSWARE.GDT 5 O I	48 52 56 	pletion	AUGER REFUSAL AT 47.2 FBGS BORING TERMINATED AT 47.2 F	BGS Remarks: Ground	7.2	was N	IOT e	ncounte	red d	luring	g or a	fter	was	
	Date Drille	Starte Comp d By: ed By:	leted: 4/10/18 TSD / Richardson	drilling activities. completed with D provided by Neel-	iedric	D-50	back), HSA	tilled wi A 2-1/4 ir	th cu Ich I.	tting D. El	s. Bo evato	ring v ns w	was ere	

		TE	ST BORING	GL	.OG	ì							
				T	ES	ΤB	ORIN	g N	0. 8	SCC	-1		
			PROJECT NAME	: TI	DOT	I-75 I	nterchar	nge					
			LOCATION	: C	hatta	noog	ja, Tenn	esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO.	: 30	00-18	8-0001	l			;	Sheet	1 of	1
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): 6 Location: N 246624.0273 E 22075	666.2 ;82.7919	Samples	Recovery (%)	RQD (%)	SPT Values	^{>} ocket Pen (tsf)	Percent Fines	Nater Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
ď	U U	MATERIAL DESCRIPTIO	N		Å		S	Poc	Pe	Nater		₽.	Pla
		LEAN SILT (ML) with clayey gravel, firm A-7-5											
			<u>3.0_</u>	X	44		2-3-3			9.6			
- 4 -		LEAN SILT (ML) with clayey gravel, limes fragments, firm A-7-5		X	39		2-4-2			14.4			
		LEAN CLAY (CL), soft A-7-5	6.06.0 8.0	X	50		4-2-2			18.5			
- 8 · - ·		LEAN SILT (ML), clayey with rounded gra A-7-5		\times	100		1-3-3			21.0			
- 12 ⁻		CLAYEY SAND (SC), with silt, brown		\times	78		2-5-5			34.3			
PJ KSWARE.GDT 5/17/18		AUGER REFUSAL AT 17.5 FBGS BEGAN CORING AT 17.5 FBGS RUN 1 LIMESTONE, gray, hard, argillaceous with partings RUN 2 Open stained bedding planes from 20' - 2'	$\frac{20.0}{20.4}$		96	84							
CHANGE AT 1-24.G					98	94							
0001 I-75 INTERC		RUN 3	25.025.0		100	100							
G REPORT 300-18- 		CORING TERMINATED AT 27.5 FBGS	27.5										
Date Date Date Date	npletior e Starte e Comp ed By: ged By	oleted: 4/10/18 comp Geotech / Patrick provid	ks: Groundwat fbgs. Boring wa leted with CME- ded by Neel-Sch	s ba •550	ackfil , HS/	led w	ith cutti	ngs.	Bori	ng wa	IS	ies	

					TE	EST BC	RIN										
		TTO			-						ORINO		0. 9	SCC	-2		
					F	PROJECT						-					
	P	S Ware &	Associates, L.								ya, Tenno	esse	e				
			CEI • Environm			PROJE	CT NO.	: 30		6-000°					Sheet	1 of	
Depth, feet	Graphic Log	Approx. Location		• •	E 22073	374.3501		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	<u>, 17 1</u>	TOPSO	L (12 inches)				1.0										
		FAT CL/ in top pa A-7-6	AY (CH), reddis Irt, rock fragme	sh brown t nts, black	to brown, c mineral	, traces of ro staining, (F	oots	X	33		2-2-7			21.8			
- 4 -			REFUSAL AT	4 FBGS			4.0	\ge	83		2-50/2-			23.8			
		BEGAN	CORING AT 4	FBGS	AY with L	imestone			70	70				23.0			
- 8 - 									0	0							
- 12- - 16-									0	0							
		RUN 4 LIMEST partings	— — — — — — — — — — — — — — — — — — —	— — — — - d, argillac	— — — — eous wit	- — — — — — –	17.1		78	34							
 - 24		RUN 5					21.0		100	100							
		RUN 6					26.0										
- 28-							29.8		98	90							
Date Date Drille	pletion Starte Comp ed By: jed By:	leted:	31.0 4/16/18 4/16/18 Geotech / P A. Zeb	atrick	comp	ks: Ground ng activition leted with ded by Ne	es. Bor h CME-	ing •550,	was HS/	back	ncounte filled wit 4 inch I.	th gro	out. I	Boring	g wa	S	

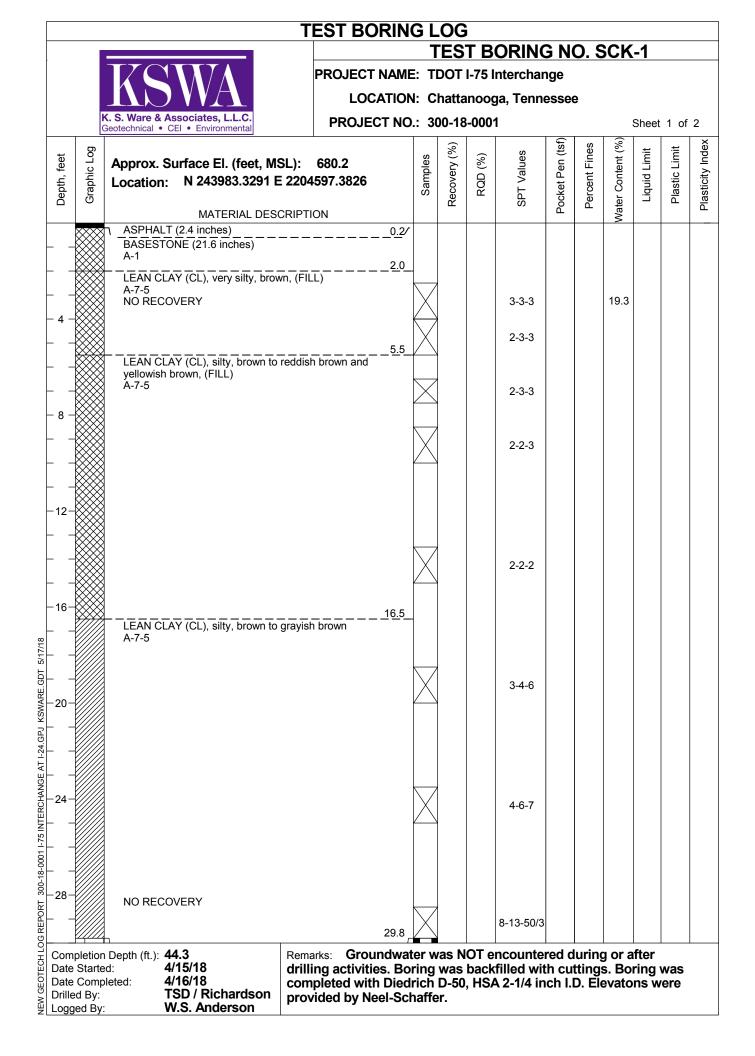
						TE	EST E	BORIN	GL	.OG	ì							
					-				Т	ES	ΤB	ORIN	G N	0. 8	SCC	-2		
						I		CT NAME					-					
							LC	OCATION	1: C	hatta	noog	ja, Tenn	esse	e				
				Associates, L.L CEI • Environme			PRO	JECT NO	.: 30	00-18	-0001					Sheet	2 of	2
	Depth, feet	Graphic Log	Approx. Locatior		8.7736 E	22073		1	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
			Stained	MATER fracture (29.8')	IAL DESC	RIPTIC	DN								Na			
╞	_			G TERMINATED) AT 31 FF	365		31.0										
+	32-					500												
F	_																	
+	_																	
F	_																	
	36-																	
-	_																	
F	_																	
-	_																	
+	40-																	
╞																		
╞	_																	
-	_																	
-	44-																	
-	_																	
-	_																	
	_																	
5/17/	48-																	
	_																	
SWAR	_																	
GPJ ×	_																	
ιΤ I-24.	52-																	
NGE	_																	
	-																	
75 INTE	_																	
2001	56-																	
00-18-(_																	
ORT 3(_																	
3 REP(_																	
	Date Date Drille	Starte	oleted:	31.0 4/16/18 4/16/18 Geotech / Pa A. Zeb	atrick	comp	ng activ pleted w	oundwat ities. Bo /ith CME Neel-Scl	ring -550	was , HS/	back	filled wi	th gro	out. È	Borin	g wa	S	

			TI	EST BORI	NG L	.OG	Ì							
					1	ES	ΤB	ORINO	G N	0. 8	SCC	-3		
			IZAWA	PROJECT NA	ME: T	DOT	I-75 I	nterchar	ige					
			AN A	LOCATI	ON: C	hatta	noog	ga, Tenne	esse	e				
			K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT N	NO.: 3	00-18	-000	1			;	Sheet	1 of	1
eet		: Log	Approx. Surface El. (feet, MSL):	661.0	les	y (%)	(%)	nes	^o ocket Pen (tsf)	Fines	Nater Content (%)	_imit	Limit	Plasticity Index
Depth. feet		Graphic Log	Location: N 246332.0397 E 2207		Samples	Secovery (%)	RQD (%)	SPT Values	ket P	Percent Fines	- Cont	Liquid Limit	Plastic Limit	sticity
Ő	í	G	MATERIAL DESCRIPTIO	ON		۳ ۳		SF	Рос	Ре	Vater		Ч	Pla
		<u>74 1</u> 4	TOPSOIL (12 inches)	1	0									
-	_		FAT CLAY (CH), mottled brown, rock fra mineral staining A-7-6	gments, black	.0	44		6-4-4			16.4			
- 4						50		2-3-2			28.2			
			FAT CLAY (CH), brown to dark gray, mo		.5									
	_		A-7-6			78		2-2-2			22.2			
- 8	_		CLAYEY SAND (SC), brown, rock fragm A-2-7	9_ ents	.0	100		2-1-2			22.8			
- 12	2													
+	_			14	.3	94		0-20-50/1			35.7			
+	_		AUGER REFUSAL AT 14.3 FBGS BEGAN CORING AT 14.3 FBGS	15		100	100				00.7			
	6-		RUN 1 LIMESTONE, gray, hard, argillaceous wi <u>partings</u> RUN 2											
5/18/1	-		Closed bedding plane (17.3')			100	92							
NEW GEOTECH LOG REPORT 300-18-0001 -75 INTERCHANGE AT -24.GPU KSWARE.GDT 5/18/18 0 1 0 0 0 - 2	 		Closed bedding plane (20')	20 20 20 20	.5									
IGE AT I-24.GF			Closed bedding plane (20.6') Closed bedding plane (21.3') Closed bedding plane (21.6')	21. 21.		100	88							
24 CHAN	1-													
	_			25	6									
1 1-75	_		CORING TERMINATED AT 25.6 FBGS	23										
18-000	_													
-28	3-													
TEPORT	_													
TECH LOGF	te	Starte	Depth (ft.): 25.6 Rema d: 4/16/18 drillin	ng activities. I	Boring	was	back	filled wit	h gro	out. È	Boring	g		
Da Dri May Lo	ille	Comp d By: ed By:	leted: 4/16/18 Geotech / Patrick Eleva	ion was move ation was take	ed on g	reen	way	trail at si	de of	fthe	bridg	e.		

	TZC		PROJECT NA				ORINO		0. 8	SCC	-4		
	ND	WA	LOCAT					-	е				
	K. S. Ware & As Beotechnical • CE	sociates, L.L.C.	PROJECT	NO.: 3	00-18	8-0001				:	Sheet	: 1 of	2
Depth, feet Graphic Log	Approx. Su Location:	urface El. (feet, MS N 246361.2597 E		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	TOPSOIL (MATERIAL DESC	RIPTION		_			d d		Wat			
	LEAN CLA	Y (CL), (FILL) r to 3.0 FBGS		l. <u>0</u>									
4	A-7-5	Y (CL), firm, (FILL)	2	<u>3.5</u> H.0 -/	61		3-2-4			10.5			
8			٤	8.5	61		2-4-6			12.4			
	SILTY SAN grains, woo A-2-7	D (SM), with gravel fra d fragments, very loos	gments, brown, coarse		61		2-2-2			14.2			
	ົຸ AT 13.0 FB	GS GRADED SAND (SP),	ED DURING DRILLING	3.5_/	33		2-4-5						
20-	FAT CLAY A-7-5	(CH), with gravel, brov	vn, soft, wet	3.5	100		0-0-3			74.2			
24-	FAT CLAY A-7-5	(CH), with shale grave	I, brown, very soft, wet	3.5	78		1-0-0			68.5			
		(CH), with weathered , brown, soft, moist	imestone and shale	<u>3.5</u>).0	100		2-1-2			66.9			

		Т	EST BORING										
							ORINO		0. 8	SCC	-4		
		KSWA	PROJECT NAME					-	_				
	ľ	K. S. Ware & Associates, L.L.C.				-		esse	Ð				•
	l	Geotechnical • CEI • Environmental	PROJECT NO.	ંડા	_	-0001		÷	<i>(</i> 0	-	Sheet	2 of	
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 246361.2597 E 2207		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIPTI BORING TERMINATED AT 30 FBGS	ON					ш.		Ma			
	-	AUGER STARTED SLANTING OFF MOVED 40 FEET SE OFFSET											
-32-	-												
	-												
-36-													
	-												
	-												
	-												
-40-	-												
	-												
-44-	-												
	-												
	-												
	-												
48- 10													
ARE.GI													
NSX [-												
19 1-52 1-52	-												
	-												
	-												
300-18	-												
	-												
입 Date	Starte	Depth (ft.): 30.0 Remained: 4/10/18 at 13	3 fbgs. Boring wa	s ba	ackfil	led w	ith cutti	ngs.	Borin	ng wa	as	ies	
Date Drille	Comp ed By: jed By	Geotech / Patrick prov	pleted with CME- vided by Neel-Sch			A 3-1/	4 inch I.I	D. El	evato	ons w	ere		

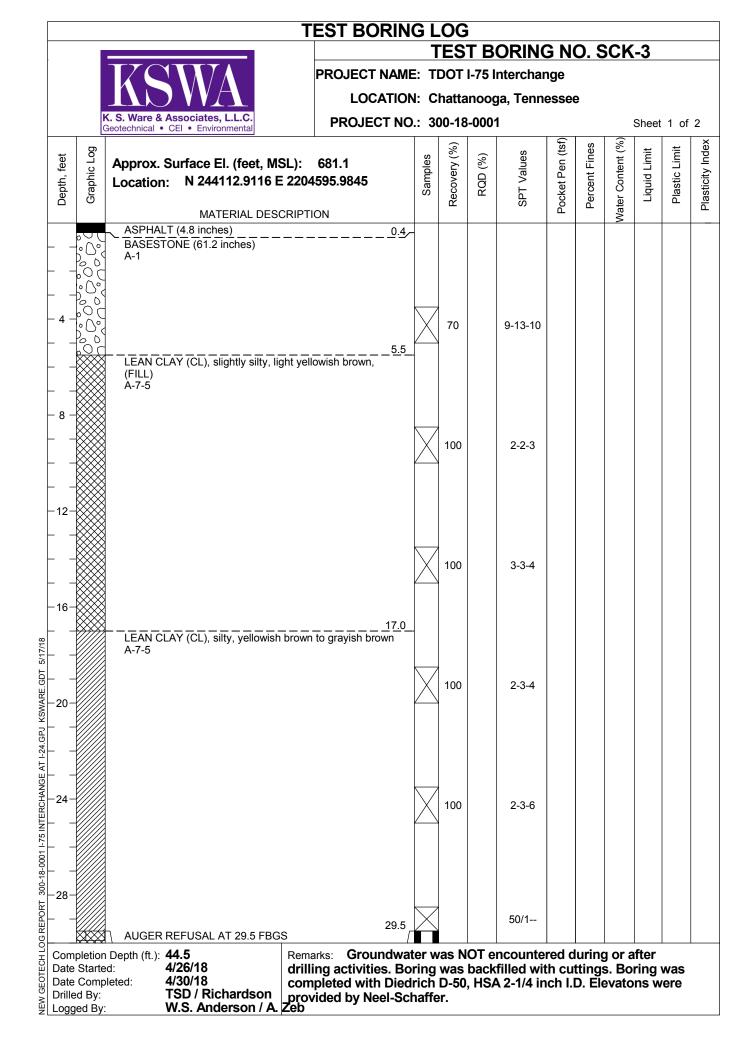
			Т	EST BORIN	IG L	. O G	ì							
					T	EST	BC	RING	i NC). S	CC-	4A		
				PROJECT NAM	E: T	DOT	I-75 I	nterchai	nge					
				LOCATIO	N: C	hatta	noog	ja, Tenn	esse	Ð				
			K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	D.: 30	00-18	6-0001					Sheet	1 of	1
1	Ueptn, reet	Graphic Log	Approx. Surface El. (feet, MSL): Location: Moved offset 40 ft SE	662.3 of SSC-4	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	ן ב	0	MATERIAL DESCRIPTION	ON		Ř		S	Pod	P A	Wate		ц.	Ы
			AUGER ONLY See SCC-4											
-														
	4 –													
-	-													
-	-													
-	-													
-	8 –													
\vdash	_													
-	_													
\vdash	_													
-1	2-													
	_													
	_													
	6-													
				17.2										
7/18			RUN 1	17.6										
DT 5/1			Open bedding plane (17.6')	19.1		96	75							
RE.GI		+	Mud seam (19.1')	19.1 19.6	~									
KSWA	20-	+	RUN 2 LIMESTONE, gray, hard, argillaceous w	ith calcite healed ^{20.5}	/	100	100							
LGPJ			<u>fracture</u> RUN 3	J										
AT I-24														
NGE /	-					98	94							
RCHA	24-													
5 INTE	-			25.4	┛									
001 1-7	4		RUN 4			100	100							
)-18-0(-			27.3										
2-1300	28-		CORING TERMINATED AT 27.3 FBGS											
KEPOF	_													
LOGR			D + (1) 07 0	. O				4				£ 4 - 1		
D ECH	omp ate	oletior Starte	Depth (ft.): 27.3 Rema d: 4/10/18 drilli	rks: Groundwang activities. Bo	ater w oring	vas N was	back	ncounte filled wit	red d th cu	tting	g or a s. UT	nter M		
⊡ D	ate			dinates were ta				-		5				
		ed By:												



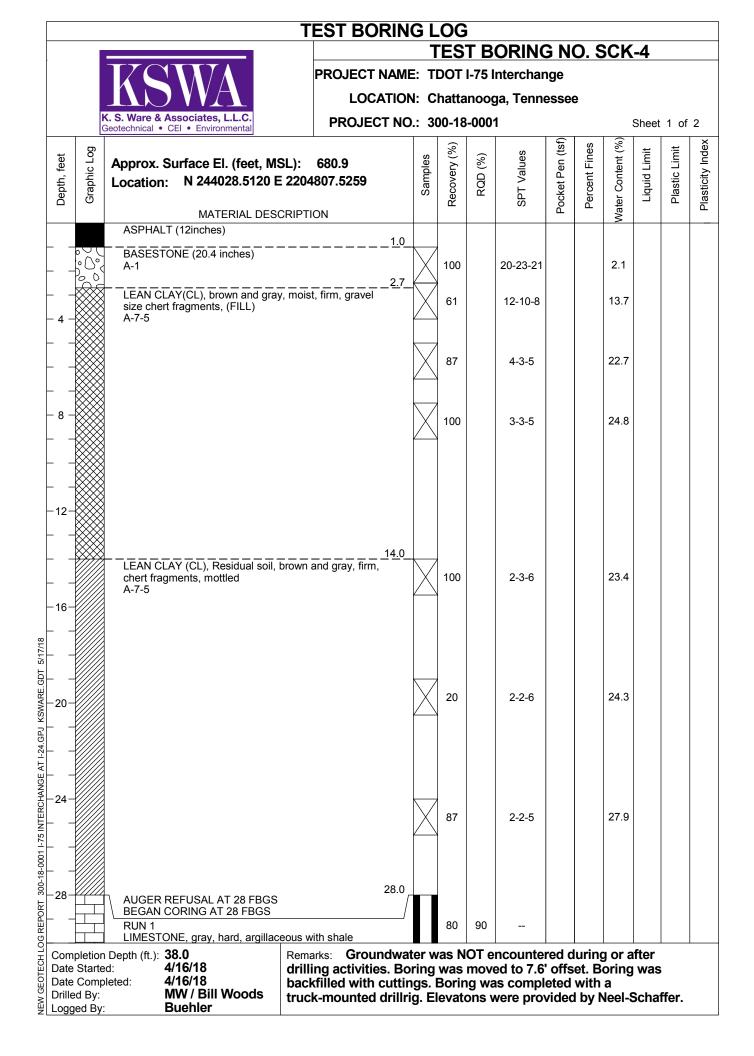
		Т	EST BOR	ING) L	OG	ì							
					Т	ES	ΤB	ORIN	<u>g n</u>	0. 8	SCK	-1		
			PROJECT NA	AME:	Т	тос	I-75 l	ntercha	nge					
			LOCAT	ION:	С	hatta	noog	a, Tenn	esse	Ð				
	I	K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT	NO.:	30	0-18	-0001					Sheet	2 of	2
Depth, feet	Graphic Log		680.2 1597.3826		Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
Dep	Gra				S	Rec	Υ Υ	SPT	ock	Perc	ater (Liq	Pla	Plas
		MATERIAL DESCRIPT	ON						-		Š			
	┢┰┾╴	BEGAN CORING AT 29.8 RUN 1												
-32-		LIMESTONE, gray, hard, argillaceous w partings	vith shale			93	91							
		ر _ Weathered shale parting (34' - 34.3') _ RUN 2	34	4.3										
-36-						100	92							
		Zone of high angle fractures (38.4' - 39.	3')	9.3										
-40-		RUN 3		<u></u>										
						100	100							
-44-		CORING TERMINATED AT 44.3 FBGS		4.3										
	1													
	1													
- 1	1													
48- - 48-	1													
19 19 19	-													
SWAF	-													
×														
-52-	-													
IGE -	-													
CHAN	-													
	-													
<u>11-75</u>	-													
- 18-00	-													
300	-													
	_													
Date	pletior Starte Comp ed By: ged By	leted: 4/16/18 com TSD / Richardson prov	arks: Ground ing activities. pleted with D rided by Neel-	Bori iedri	ng ch	was D-50	back	filled wi	th cu	tting	s. Bo	ring		<u> </u>

	KSWA		: TC	ют	I-75 I		nge		2011	<u>_</u>		
		LOCATION					esse	e				
	K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO.	: 30	0-18	8-000 [°]	1	-			Sheet	1 of	2
Depth, feet Granhic I on	Approx. Surface El. (feet, MSL): (Location: N 244089.1070 E 22045 MATERIAL DESCRIPTIC	530.5385	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Disstinities la
	ASPHALT (12 inches)	1.0										
	BASESTONE (24 inches) A-1 LEAN CLAY (CL), brown and gray, firm to	3.0	X	67		10-11-4			3.3			
4	A-7-5	5 SUII, (FILL)	X	67		4-4-6			22.4			
8 -			X	100		3-4-4			22.8	44	21	:
			X	100		2-3-5			25.5			
12	LEAN CLAY (CL), Residual soil, brown, n very stiff, mottled A-7-5	noist, stiff to	\times	100		3-5-9			23.9			
20-	Moist to wet		\mathbf{X}	61		3-6-7			25.1			
24-		26.2	\mathbf{X}	100		5-7-50/2			19.5			
	AUGER REFUSAL AT 26.2 BEGAN CORING AT 26.2 RUN 1 LIMESTONE, gray, hard, argillaceous wit partings			96	96							
Date Sta	rted: 4/16/18 drillin npleted: 4/16/18 backf y: MW / Bill Woods truck	ks: Groundwat ng activities. Bor filled with cutting -mounted drilling	ing v gs. E	was Borir	move ng wa	ed to 5' c is compl	offset eted	. Bo with	ring v a	vas	ffer.	

			TEST BORING	Gι	.OG	ì							
							ORINO		0. 8	SCK	-2		
			PROJECT NAME	: Т	DOT	I-75 lı	nterchar	nge					
			LOCATION			-		esse	e				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO.	: 3	00-18	-0001					Sheet	2 of	2
Depth, feet	Graphic Log	Approx. Surface EI. (feet, MSL): Location: N 244089.1070 E 22 MATERIAL DESCRIF	204530.5385	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
			30.7_							3			
-32		RUN 2											
_					100	100							
_ _36		RUN 3	<u>35.</u> 7_		100	100							
		CORING TERMINATED AT 36.7 FBG	36.7 GS		100	100							
_	_												
-40 -	_												
_	_												
-44 -	_												
	_												
81/21/8 48	_												
(SWARE.GI	_												
	_												
I I	_												
1 I-75 INTER 													
300-18-000													
G REPORT	-												
Da Da Da Dri	mpletion te Starte te Comp led By: gged By	ed: 4/16/18 dr pleted: 4/16/18 ba MW / Bill Woods tru	emarks: Groundwate rilling activities. Bor ackfilled with cutting uck-mounted drillrig	ing gs.	was Borir	move ig wa	ed to 5' o s compl	offset leted	t. Bor with	ring v a	vas	ffer.	



			Т	EST BORIN	GΙ	.OG	ì							
						TES	ΤB	ORIN	G N	0. S	SCK	-3		
			TANY	PROJECT NAMI	Е: Т	DOT	I-75 l	ntercha	nge					
			MOWA	LOCATION	N: C	hatta	noog	ja, Tenn	esse	е				
			K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	.: 3	00-18	-000 1	l				Sheet	2 of	2
	t	bo				(%)		s	(tsf)	sət	(%)	lit	nit	dex
	n, fee	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 244112.9116 E 2204	681.1	Samples	very (RQD (%)	/alue	Pen	nt Fir	ntent	Liquid Limit	Plastic Limit	ity In
	Depth, feet	Grap	Location: N 244112.9116 E 2204	595.9045	Sar	Recovery (%)	RQ	SPT Values	[⊃] ocket Pen (tsf)	Percent Fines	Nater Content (%)	Liqui	Plast	Plasticity Index
		~~~~	MATERIAL DESCRIPTI	ON				0)	Å		Wat			
	_		BEGAN CORING AT 29.5 FBGS RUN 1	]										
	32-		Weathered Limestone, vertical fractures 29.5' - 35'	, stained from		90	15							
	52													
			RUN 2	33.6_										
			RUN 3	<u>34.5</u> <u>35.0</u>		78	0							
	_													
	36-		Weathered shale partings from 36' - 36.	7' 36.7										
F	_		LIMESTONE, gray, hard, argillaceous w partings	ith shale		100	84							
	_													
┢	_			39.5										
┢	40-		RUN 4											
$\left  \right $	_													
┢	_					100	100							
$\vdash$	_													
+	44 –			44.5										
+	_		CORING TERMINATED AT 44.5 FBGS											
+	_													
	_													
5/17/18	48-													
	_													
VARE	_													
N KSI	_													
-24.GF	52-													
EAT														
HANG	_													
TERC	_													
1-75 IN	56-													
-0001	- 50													
300-18														
ORT	_													
GREP	_													
Ц Е			Depth (ft.): <b>44.5</b>											
EOTEC		Starte Comp		ng activities. Bo pleted with Died										
ິ ≥	Drille	d By: ed By:	TSD / Richardson prov	ided by Neel-Sc			,							



[					TEST BO	RINO	GL	.OG	ì							
ļ							٦	ES	ΤB	ORIN	g N	0. 8	SCK	-4		
			TZC		PROJECT	NAME	: T	DOT	I-75 I	nterchar	nge					
					LOC	ATION	: C	hatta	noog	ja, Tenn	esse	e				
				Associates, L.L.C. CEI • Environmental	PROJE	CT NO.	: 30	00-18	-0001	l				Sheet	2 of	2
-	Depth, feet	Graphic Log	Approx. S Location:	Surface EI. (feet, MS N 244028.5120 E			Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
	Ō	0		MATERIAL DESC	RIPTION			Ř		S	Pod	Pe	Nate		٩	립
ľ			partings			30.5										
			RUN 2													
ł	-32-															
ł								100	100							
						35.5										
	-36-		RUN 3													
								100	100							
			CORING	TERMINATED AT 38 FE	3GS	38.0										
	-40-															
	-44-															
5/17/18																
	-48-															
RE.G																
<b>SWA</b>																
GPJ																
VT I-24	-52-															
NGE A																
RCHA																
SINTE																
01 1-7	-56-															
-18-00																
T 300																
EPOR																
OGR	-60-			T							<u> </u>					
NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT	Date Date Drille	Starte Comp d By:	oleted: 4	l/16/18 l/16/18 MW / Bill Woods	Remarks: Grou drilling activitie backfilled with truck-mounted	es. Bor cutting	ing gs. I	was Borir	move ng wa	s compl	' offs leted	et. B with	oring a	was		
۳Į	Logg	ed By		Buehler												

		T	EST BORING					3 N/	0.9	SCK	-5		
			PROJECT NAME						υ. ι		-J		
		<b>NDWA</b>						-	e				
			PROJECT NO.	: 30	00-18	-0001					Sheet	1 of	2
Depth, feet	Graphic Log	Location: N 244171.5853 E 2204	729.1542	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	ater Content (%)	Liquid Limit	Plastic Limit	Dlasticity Index
		ר ASPHALT (2.4 inches)	DN 0.2/							Ň			
_		BASESTONE (33.6 inches) A-1	3.0										
4 –		to olive brown, (FILL) A-2-7	yellowish brown 4.5	X			3-4-4			10.7			
		LEAN CLAY (CL), silty to very silty, yello light brown, (FILL) A-7-5	wish brown to	X			2-3-4			18.6			
8 –			8.0_	X			3-6-3			15.8			
		LEAN CLAY (CL), silty, light brown to bro A-7-5	own, soft to firm	X			4-4-4			21.5			
12- - - 16-				$\mathbf{X}$			5-7-7			15.1			
- - 20- -				$\times$			3-3-5			25.1			
 24		LEAN CLAY (CL), silty and sandy, wet, angular chert and gravel fragments A-7-5	very soft sticky,	$\mathbf{X}$			4-4-4			24.4			
 28				$\mathbf{X}$			1-0-0			25.7			
Date Date Drille	TEST BORING NO. SCK-5           TRANSITION Construction of the provided pr		was ere										

			TEST BORI										
				•	TES	T B	ORIN	<u>G N</u>	0. 8	SCK	-5		
			PROJECT NA	ME: 1	DOT	l-75 lı	ntercha	nge					
		<b>MOWA</b>	LOCATI	ON: (	Chatta	noog	a, Tenn	esse	е				
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT N	NO.: 3	800-18	8-0001					Sheet	2 of	2
Depth, feet	Graphic Log	Approx. Surface El. (feet, N Location: N 244171.5853	E 2204729.1542	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
										5			
- 32-    		AUGER REFUSAL AT 32.8 FB BEGAN CORING AT 32.8 FBG RUN 1 RUN 2			37	12							
					100	100							
 40- 		RUN 3	<u>39.</u>	.2									
 44 - 		RUN 4	44.	.7	100	100							
81/21/3 48-					100	100							
	╞╍┶	CORING TERMINATED AT 48.	48. 7 FBGS	.7									
PJ KSWARE	-	DRILLED CORE - 48.6 FBGS 0.1' IN HOLE											
- 25- 	-												
75 INTERCHA	-												
2-1 - 56 - 	-												
G REPORT 3	-												
Date	pletior Starte Comp ed By: ged By	bleted: 4/17/18 TSD / Richardson	Remarks: Groundw drilling activities. If completed with Die provided by Neel-S	Boring edrich	ywas D-50	back	filled wi	th cu	tting	s. Bo	ring	was ere	

				T	EST BC	RINC				ORINO	2 N/	0 9	SC K	-6		
					PROJECT							0. 3	JUN	-0		
			) VVA							ja, Tenno	•	e				
			ssociates, L.L.C.		PROJE							-	:	Sheet	1 of	2
Depth, feet	Graphic Log		urface El. (feet, l				Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Nater Content (%)	Liquid Limit	Plastic Limit	Diacticity Index
Dept	Grap		MATERIAL DE				Sa	Reco	RQ	SPT	Pocket	Perce	Water Co	Liqu	Plast	
		ASPHALT BASESTO A-1	(3.6) DNE (20.4 inches)			<u>0.3</u> ⁄ 2.0										
_		(FILL) A-2-7	DNE, very sandy, gra	-		n, 3.5_	$\square$	100		10-8-3			18.6			
4 -			AY (CL), very silty wit brown, gravel, (FILL)		eddish browr	to	X	100		3-4-5			20.6			
_		LEAN CL	AY (CL), with traces	of silt and	sand, yellow	6.5	X	100		3-3-3			24.8			
8 –		brown to I A-7-5	ight brown mottled gr	ray, moist	and soft	2	$\Delta$	100		2-2-2			18.4			
_						4	X	33		1-2-3			22.8			
- 12- -			Y (CH), light brown m own, light to medium			<u>12.0</u> st,										
_ _ 16_		A-7-5				Z	X	100		3-3-3			18.8			
-						Υ.										
_ 20_						2	X	100		6-5-4			32.1			
_																
24- -						2	X	100		2-3-4			25.5			
-			REFUSAL AT 26.8 FE CORING AT 26.8	3GS		26.8										
28-		partings	NE, gray, hard, argill igh angle fractures fro			29.8 _		100	87							
Date Date	pletion Starte Comp	leted: 4	9.8 //17/18 //18/18 /SD / Richardsor	com	rks: Ground Grou	Indwate es. Bor h Diedr	ing ich	was D-50	back	ncounte filled wit 2-1/4 in	th cu	tting	s. Bo	ring	was vere	<u>I</u>

[				TEST BORIN										
								ORIN		0. 8	SCK	-6		
				PROJECT NAME					-					
				LOCATION			-		esse	e				
			K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT NO	: 3	00-18	8-0001					Sheet	2 of	
	Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL) Location: N 244038.9095 E 2	204858.1862	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
-			MATERIAL DESCR								Na			
			RUN 2	31.1										
	-32-					100	76							
						100	10							
-			RUN 3	34.8_										
-	-36-													
						100	100							
						100	100							
	-40-		CORING TERMINATED AT 39.8 FE	39.8 3GS										
	-44-													
8														
5/17/	-48-													
E.GDT														
SWAR														
GPJ K														
AT I-24	-52-													
ANGE,														
ERCH,														
75 INT														
0001 -	-56-													
300-18-														
ORT 3														
GREP														
NEW GEOTECH LOG REPORT 300-18-0001 I-75 INTERCHANGE AT I-24.GPJ KSWARE.GDT 5/17/18	Date Date Drille	Starte	ed: 4/17/18 d bleted: 4/18/18 c TSD / Richardson p	emarks: Groundwat rilling activities. Bor ompleted with Died rovided by Neel-Sch	'ing 'ich	was D-50	back	filled wi	th cu	tting	s. Bo	ring	was ere	

CLAY (CH), Residual soil, brov chert nodules 5	PROJECT .): 695.9 2202343.0248 RIPTION firm to stiff, (FILL)	NO.: 3		nooga, Tenn -0001 (%) QW 19-21-8 9-7-6 4-4-4 1-2-4		Bercent Fines 3.4 3.4 17.5 26.1 24.6	Sheet Fidnid Limit	Plastic Limit	
cal • CEI • Environmental ox. Surface El. (feet, MSL tion: N 245416.7475 E 2 MATERIAL DESCR PHALT (9.6 inches) SESTONE (30 inches) IN CLAY (CL), brown and gray, 5 CLAY (CH), Residual soil, brow chert nodules	-): 695.9 2202343.0248 RIPTION		Recovery (%) 84	(%) GN LAS 19-21-8 9-7-6 4-4-4	Pocket Pen (tsf)	Percent Fines 3.4 Water Content (%) 5.21			
tion: N 245416.7475 E 2 MATERIAL DESCR PHALT (9.6 inches) SESTONE (30 inches) N CLAY (CL), brown and gray, 5	2202343.0248	<u>0.8</u> <u>3.3</u>	87 87 93	19-21-8 9-7-6 4-4-4	Pocket Pen (tsf)	3.4 17.5 26.1	Liquid Limit	Plastic Limit	
ESTONE (30 inches)	firm to stiff, (FILL)	.3.3	87 93	9-7-6 4-4-4		3.4 17.5 26.1			
N CLAY (CL), brown and gray, 5 5 CLAY (CH), Residual soil, brow		12.5	87 93	9-7-6 4-4-4		17.5 26.1			
CLAY (CH), Residual soil, brov		12.5	93	4-4-4		26.1			
chert nodules		12.5							
chert nodules		12.5	100	1-2-4		24.6			
chert nodules	1 wn and gray, moist to	12.5						۱ ۱	
			100	1-2-5		23.9			
			100	3-3-4		25.8			
			100	3-5-8		23.5			
			100	4-4-5		23.3			
	4/18/18 4/18/18 MW / Bill Woods	4/18/18 4/18/18 MW / Bill Woods truck-mounted d	4/18/18 4/18/18 MW / Bill Woods drilling activities. Boring backfilled with cuttings. I truck-mounted drillrig. E	(ft.): 55.5 4/18/18 4/18/18 4/18/18 MW / Bill Woods Remarks: Groundwater was No drilling activities. Boring was backfilled with cuttings. Borin truck-mounted drillrig. Elevato	(ft.): 55.5 4/18/18 4/18/18 MW / Bill Woods (ft.): 55.5 4/18/18 4/18/18 MW / Bill Woods	(ft.): 55.5 4/18/18 4/18/18 4/18/18 MW / Bill Woods	(ft.): 55.5 4/18/18 4/18/18 4/18/18	(ft.): 55.5 4/18/18 4/18/18 4/18/18 MW / Bill Woods	(ft.): 55.5 4/18/18 4/18/18 4/18/18 MW / Bill Woods A B B B B B B B B B B B B B B B B B B B

		-	TEST BORI								_		
							ORINO		0. 8	SCR	-1		
		KSWA	PROJECT NA					-	_				
		K. S. Ware & Associates, L.L.C.				-		essee	9				•
		Geotechnical • CEI • Environmental	PROJECT N	NO.: 3	_	-0001		<u>f</u>		-	Sheet	2 of	
Depth, feet	Graphic Log	Approx. Surface El. (feet, MSL): Location: N 245416.7475 E 220	695.9 )2343.0248	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESCRIP	TION					ď	ш.	Wat			₽
		AUGER REFUSAL AT 40.7 FBGS BEGAN CORING ART 40.7 FBGS RUN 1 LIMESTONE, gray, hard, argillaceous partings Zone of high angle fractures, stained f RUN 2 RUN 2 RUN 3 Stained weathered rock from 50.5' - 5	rom 44.5' - 45.5' 	5 55	100 0 94 98 96	60 84	5-6-9			20.5			
NEW GEOLECH LOG KEPOK Dat Dat Log Log	npletion e Starte e Comp led By: ged By:	d: 4/18/18 dri leted: 4/18/18 ba MW / Bill Woods tru	narks: Groundv Iling activities. E ckfilled with cut ck-mounted dril	Boring tings.	was Bo <mark>r</mark> ir	move ng wa	ed to 5.5 s compl	' offs eted	et. B with	oring a	was		

AY (CL), with chert	98 E 22022	PROJEC 677.9 211.5498 DN m dense, mo	1.0 ist, - 6.0 8.5			-	a, Tenno senie Ldo 6-5-7 3-5-8 5-3-2 2-2-2	Pocket Pen (tst)	Percent Fines	(%) 11.9 13.9 12.4 26.1	Liquid Limit	Plastic Limit Jo 1
CEI • Environmental Surface EI. (feet N 245224.769 MATERIAL E AY (CL), sandy W), fine, brown to b AY (CL), sandy, brown AY (CL), brown, firr AY (CL), brown to b	98 E 22022	677.9 211.5498 DN m dense, mo Dist, (FILL)	 		87 87 87 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 000 87 0000 87 0000 87 000 87 000 87 000 87 000 87 000 87 000 87 00		6-5-7 3-5-8 5-3-2	Pocket Pen (tsf)	Percent Fines	Mater Content (%)		
N 245224.769 MATERIAL E AY (CL), sandy W), fine, brown to b AY (CL), sandy, bro AY (CL), brown, firr	98 E 22022	211.5498	3.5 6.0 8.5	Samples Samples	87 87 20	RQD (%)	6-5-7 3-5-8 5-3-2	Pocket Pen (tsf	Percent Fines	11.9 13.9 12.4	Liquid Limit	Plastic Limit
W), fine, brown to b AY (CL), sandy, bro AY (CL), brown, firr	own, stiff, mo m, moist black, soft, n	Dist, (FILL)	3.5 6.0 8.5	$\times$	87		3-5-8 5-3-2			13.9		
AY (CL), sandy, bro AY (CL), brown, firr AY (CL), brown to b	own, stiff, mo m, moist black, soft, n	Dist, (FILL)	_ <u>3.5</u> _ <u>6.0</u> 	$\times$ $\times$ $\times$	87		3-5-8 5-3-2			13.9		
AY (CL), brown, firr	m, moist		 	$\times$	20		5-3-2			12.4		
AY (CL), brown to b	black, soft, n	noist, mottled	8.5	$\times$	-							
		noist, mottled		X	80		2-2-2			26.1		
AY (CL), with chert												
	t nodules, firr	n, moist	<u>13.5</u>	$\overline{\langle}$	100		4-3-5			18.6		
ORING AT 17.0 FI	BGS	ous	17.0 / / /   		100	100						
					90	90						
			_24.0									
					96	96						
TERMINATED AT	29.0 FBGS		29.0									
	CORING AT 17.0 F	arting (19') B TERMINATED AT 29.0 FBGS 29.0 Rema 4/11/18 Rema	CORING AT 17.0 FBGS         ONE, bluish gray, hard, argillaceous         arting (19')         arting (19')         B TERMINATED AT 29.0 FBGS         29.0         4/11/18	REFUSAL AT 17.0 FBGS       /         CORING AT 17.0 FBGS       /         ONE, bluish gray, hard, argillaceous       19.0         19.1/1       19.1/1         arting (19')       24.0         29.0       29.0         S TERMINATED AT 29.0 FBGS       29.0         29.0       Remarks:       Groundwate	REFUSAL AT 17.0 FBGS       /         CORING AT 17.0 FBGS       /         ONE, bluish gray, hard, argillaceous       19.0         19.1/       19.1/         arting (19')       24.0         29.0       29.0         S TERMINATED AT 29.0 FBGS       29.0         29.0       Remarks:         Groundwater w	REFUSAL AT 17.0 FBGS       /         CORING AT 17.0 FBGS       /         ONE, bluish gray, hard, argillaceous       19.0         100       19.1/         arting (19')       90         24.0       96         29.0       29.0         S TERMINATED AT 29.0 FBGS       29.0         29.0       Remarks:         Groundwater was N	REFUSAL AT 17.0 FBGS       /         CORING AT 17.0 FBGS       100         ONE, bluish gray, hard, argillaceous       19.0         arting (19')       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       96         96       96         29.0       29.0         S TERMINATED AT 29.0 FBGS       29.0         29.0       Remarks:       Groundwater was NOT er	REFUSAL AT 17.0 FBGS       /         CORING AT 17.0 FBGS       /         ONE, bluish gray, hard, argillaceous       19.0         100       100         arting (19')       90         90       90         90       90         90       90         91       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90       90         90	REFUSAL AT 17.0 FBGS       /         CORING AT 17.0 FBGS       /         ONE, bluish gray, hard, argillaceous       19.0         arting (19)       90         90       90         90       90         90       90         91       90         90       90         90       90         91       90         92.0       96         96       96         97       96         98       96         99       96         90       96         91       96         92       96         96       96         97       96         98       96         99       96         90       96         90       96         90       96         90       96         90       96         90       96         90       96         90       96         90       96         90       96         90       96         90       96         90	REFUSAL AT 17.0 FBGS       /         CORING AT 17.0 FBGS       /         ONE, bluish gray, hard, argillaceous       19.0         arting (19')       90         90       90         90       90         90       90         91       90         92.0       96         96       96         97       96         98       96         990       96         90       96         91       96         92.0       96         96       96         97       96         98       96         990       96         91       96         92.0       96         93       96         94       96         95       96         90       96         91       96         92.0       96         93       96         94       96         95       96         96       96         90       96         90       96         90       96         9	REFUSAL AT 17.0 FBGS       /         CORING AT 17.0 FBGS       /         ONE, bluish gray, hard, argillaceous       19.0         arting (19')       90         90       90         90       90         91       90         90       90         90       90         91       90         92       90         96       96         96       96         97       90         90       96         90       96         91       96         92       96         96       96         97       96         98       96         99       96         90       96         91       96         92       96         90       96         90       96         90       96         90       96         90       96         90       96         90       96         90       96         90       96         90       96         96	REFUSAL AT 17.0 FBGS       /         ONE, bluish gray, hard, argillaceous       19.0         arting (19')       90         90       90         90       90         91       90         90       90         90       90         91       90         92.0       96         96       96         97       96         98       96         99       96         90       96         96       96         97       96         98       96         99       96         90       96         96       96         97       96         98       96         99       96         90       96         96       96         97       96         98       96         99       96         90       96         90       96         90       96         90       96         90       96         90       96         96       96

		$\overline{7}$			PROJECT				ORINO nterchar		0.3	ъск	-3		
			WA			ATION: C				-	e				
			sociates, L.L.C.		PROJEC	T NO.: 3	00-18	8-0001	1				Sheet	1 of	2
Depth, feet	Graphic Log	Approx. Su Location:	nface El. (feet, l N 245041.6875	5 E 2202	339.3504	Samples	Recovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Water Content (%)	Liquid Limit	Plastic Limit	
		ASPHALT	MATERIAL DE (10.4 inches)	ESCRIPTI	ON					ш.		N			
			NE (38.4 inches)			_0.8_	72		30-19-6			4.0			
4		stiff, (FILL)	Y (CL), brown, gray	and olive	, moist firm to	_4.0_	87		3-3-9			17.4	33	17	
		A-7-5					100		3-5-6			21.6			
8							100		2-3-5			18.7			
12-   16- 							100		4-4-6			20.4			
20-		LEAN CLA near botton A-7-5	Y (CL), Residual so n, firm to stiff	oil, moist t	o slightly wet	19.0	93		1-2-5			20.0			
24-							100		4-5-6			18.1			
28-							100		470			25.0			
Comple Date St Date C Drilled Logged	tarte omp By:	leted: 4/*	.1 17/18 17/18 W / Bill Woods Jehler	pow com	arks: Groun ng activitie er. Boring v pleted with eel-Schaffe	vas back a truck-r	mov filled	ed to with	19.1' off cuttings	iset c . Bor	lue to ing v	o ove vas	rhea		

			TEST BOF	RING	LOG	Ì							
					TES	ΤB	ORIN	g N	0. 8	SCR	-3		
		XQWA	PROJECT N	IAME:	TDOT	I-75 I	nterchai	nge					
		<b>MOWA</b>	LOCA	LOCATION: Chattanooga, Tennessee									
		K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	PROJECT	PROJECT NO.: 300-18-0001						Sheet 2 of 2			
Depth, feet	Graphic Log	Approx. Surface El. (feet, MS Location: N 245041.6875 E	2202339.3504	Samulae	Becovery (%)	RQD (%)	SPT Values	Pocket Pen (tsf)	Percent Fines	Nater Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MATERIAL DESC	RIPTION		<					Š			
32 -      36 -		AUGER REFUSAL AT 33.7 BEGAN CORING AT 33.7 RUN 1 LIMESTONE, gray, hard, argillace partings Weathered shale parting from 34.	cous with shale	33.7 35.1   	100	43							
		RUN 2			100	98							
		RUN 3		<u>40.1</u>	- 100	90							
-44-		CORING TERMINATED AT 45.1		45.1	100	90							
	-												
5 INTERCHANGE	-												
GREPORT 300-18-00011-75	-												
O HO Com Date Date Date Date Logo	pletior Starte Comp ed By: ged By	bleted: 4/17/18 MW / Bill Woods	Remarks: Ground drilling activities power. Boring w completed with a by Neel-Schaffer	as Borin as bac a truck	g mov kfilled	ed to with	cuttings	fset c 5. Bor	lue to ing v	ove vas	rhea		

## APPENDIX D

## LABORATORY TESTING PROCEDURES

### LABORATORY TEST PROCEDURES

#### NATURAL MOISTURE CONTENT ASTM D 2216 / AASHTO T265

The moisture content of soil is an indicator of various physical properties, including strength and compressibility. The sample is weighed, then placed in an oven set to  $110^{\circ} \pm 5^{\circ}$ C until the free moisture evaporates. The dried sample is removed from the oven, allowed to cool, and weighed. The moisture content is computed by dividing the weight of evaporated water by the weight of the dry sample. The results, expressed as a percent, are presented on the respective boring logs.

#### GRAIN SIZE DISTRIBUTION ASTM D 422 / AASHTO T 88

The grain size distribution of soil particles is an indicator of certain physical properties including permeability, compaction characteristics, consolidation, shrinkage and swelling, liquefaction, and others. The soil specimen is dried and then passed through a series of nested sieves. The portion of sample retained on each sieve is weighed and the percent of the total sample retained is computed. For fine-grained soils, a hydrometer test is also performed where the grain size distribution is estimated by the rate at which soil particles suspended in water fall. The results are plotted on the Report of Particle Size Analysis of Soils sheets in Appendix G.

#### ATTERBERG LIMITS ASTM D 4318 / AASHTO T 89/T 90

Representative samples were subjected to Atterberg limits testing to determine the soil's plasticity characteristics. The plasticity index (PI) is the range of moisture content over which the soil deforms as a plastic material. The liquid limit (LL) marks the transition from the plastic state to the liquid state. The plastic limit (PL) marks the transition from the plastic state to the solid state.

To determine the liquid limit, a soil specimen is wetted until it is in a viscous fluid state. A portion of this soil is then placed in a brass cup of standardized dimensions, and a groove made through the middle of the soil specimen with a grooving tool of standardized dimensions. The cup is attached to a cam that lifts the cup 10 mm, and then allows the cup to fall and strike a rubber base of standardized hardness. The cam is rotated at about 2 drops per second until the two halves of the soil specimen come into contact with each other at the bottom of the groove along a distance of 13 mm. The number of blows required to make this degree of contact is recorded, and a portion of the specimen is subjected to a moisture content determination. Additional water is added to the remainder of the specimen, and the grooving process and cam action process repeated. The number of blows vs. moisture content is then plotted on semilogarithmic graph paper, and the moisture content corresponding to 25 blows is designated the liquid limit.

The plastic limit is the lowest moisture content at which the soil is sufficiently plastic to be manually rolled into threads 3 mm in diameter. It is determined by taking a pat of soil remaining from the liquid limit test, and repeatedly rolling, kneading, and air drying the specimen until the soil breaks into threads about 3 mm in diameter and 3 to 10 mm long. The moisture content of these soil threads is then determined, and is designated the plastic limit. The results of these tests are presented on the Boring Logs.

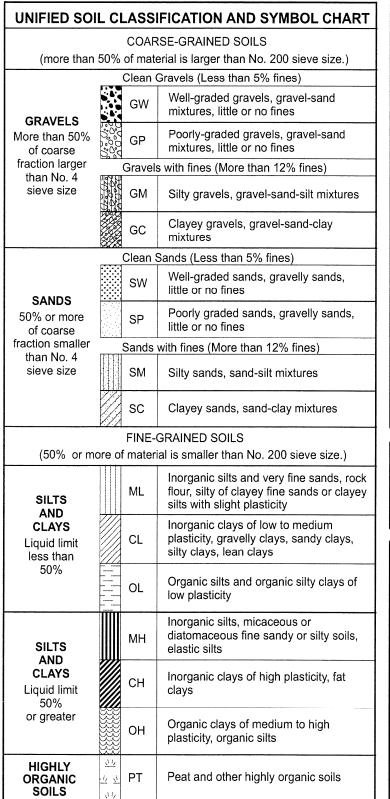
### LABORATORY TEST PROCEDURES (CONTINUED)

#### STANDARD PROCTOR COMPACTION ASTM D 698 / AASHTO T 99

Representative samples of soils from expected cut areas and pavement subgrade areas were obtained for a laboratory determination of compacted density at various moisture contents. This test is used to estimate the maximum density to which the soil may be compacted in the field with conventional construction equipment. The sample was divided into at least four separate portions. After each portion was air-dried or moistened to a different moisture content, it was compacted in three equal layers in a 4-inch diameter mold. Each layer was subjected to 25 blows of a 5.5-pound hammer falling 12 inches. Each compacted specimen had a known volume of 1/30 ft³. After compaction, the dry unit weight and moisture content of the samples were obtained and plotted on a graph of moisture content (abscissa) versus dry density (ordinate). A smooth curve was drawn from the data points. The test results, including the test method used, the origin of the sample, the maximum dry density, optimum moisture content, and the curve defining the moisture-density relationship are shown on the Report of Standard Proctor Test sheets in Appendix G.

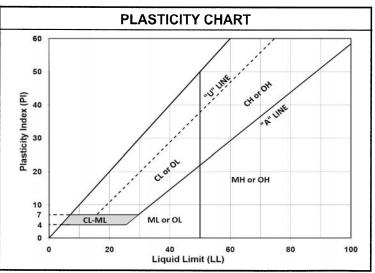
# APPENDIX E SOIL CLASSIFICATION CHARTS





## UNIFIED SOIL CLASSIFICATION SYSTEM

#### LABORATORY CLASSIFICATION CRITERIA $C_{u} = \frac{D_{60}}{D_{10}}$ greater than 4; $C_{c} = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3 GW GP Not meeting all gradation requirements for GW Atterberg limits below "A" GM Above "A" line with P.I. between line or P.I. less than 4 4 and 7 are borderline cases Atterberg limits above "A" requiring use of dual symbols GC line with P.I. greater than 7 $C_{u} = \frac{D_{60}}{D_{10}}$ greater than 4; $C_{c} = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3 SW SP Not meeting all gradation requirements for GW Atterberg limits below "A" Limits plotting in shaded zone SM line or P.I. less than 4 with P.I. between 4 and 7 are borderline cases requiring use Atterberg limits above "A" SC of dual symbols. 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



General Classification	Granular Materials							Silt-	Clay Mate	rials					
Ocheral Classification		35 percent	t or less o	f total sar	nple passi	ng No. 20	0 (75 μm	)	More th	han 35 pe	rcent of to	otal sample	e passing	No. 200 (	75 µm)
Group Classification	A-1		A-3 ^[1] A-		4-2		A	-4	A-5	A-6	А	-7			
Group Classification	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:						*			S	**	*			4	
No. 10 (2 mm)	50 max	1 /	[ ]	1						1003278					
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	361	min	36	min
Characteristics of fraction passing No. 40															
Liquid limit			Non-		$40 \max$	41 min	40 max	41 min	40 1	nax	41 min	40 r	nax	41	min
Plasticity index	6 max	6 max	Plastic	6 max	10 max	10 max	11 min	11 min	10 1	nax	$10 \max$	11 - 15	16 min	$\leq$ LL-30	>LL-3
Group Index			(	0			4 n	nax	8 n	nax	12 max	10 max	16 max	201	max
Usual types of significant constituent materials	nent Stone fragments, Fine gravel and sand sand Sand Silty or clayey g		gravel and sand Silty soi		Silty soils			Claye	y soils						
General rating as subgrade				Exceller	t to good						(	Good to fai	ir		

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	AASHTO CLASSIFICATION CHART	TZOTEL	lix E
I-75 interchange at I-24 Chattanooga, TN	PIN 114174.00 I-75 INTERCHANGE AT I-24 CHATTANOOGA, TENNESSEE	K. S. Ware & Associates, L.L.C. Geotechnical • CEI • Environmental	Append

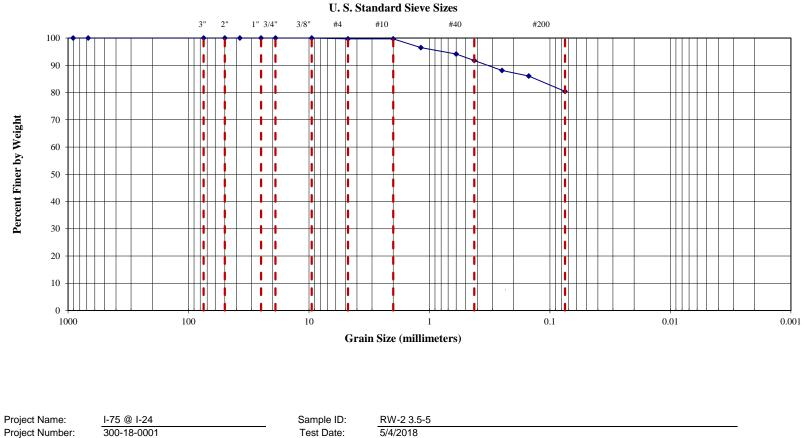
# APPENDIX F LABORATORY TEST RESULTS



REPC	REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136							
Project Name:	I-75 @ I-24		Sample ID:	RW-2 3.5-5				
Project Number:	300-18-0001	1	Test Date:	5/4/2018				
Sample Description:	Yellow Brow	'n						
Date Received:	4/26/2018							
Equipment Used:	Balance, Sie	eves, Oven, Water, Wett	ing Agent, Tare Containe	ers				
		Ν	o. 200 Wash					
Oven Dry Mass of Sa	Original Oven Dry Mass of Sample (grams):213.79Oven Dry Mass of Sample Retained on No. 200 (grams):39.33Percentage Passing No. 200 Sieve:81.6%							
Sieve Analysis								
Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve			
3 inch	75	0.00	0.00	0.0%	100.0%			
2 inch	50	0.00	0.00	0.0%	100.0%			
1.5 inch	37.5	0.00	0.00	0.0%	100.0%			
1 inch	25.0	0.00	0.00	0.0%	100.0%			
3/4 inch	19.0	0.00	0.00	0.0%	100.0%			
3/8 inch	9.5	0.00	0.00	0.0%	100.0%			
No. 4	4.75	0.61	0.61	0.3%	99.7%			
No. 10	2.00	0.00	0.61	0.3%	99.7%			
No. 16	1.18	6.88	7.49	3.5%	96.5%			
No. 30	0.60	5.07	12.56	5.9%	94.1%			
No. 40	0.425	5.13	17.69	8.3%	91.7%			
No. 60	0.250	7.72	25.41	11.9%	88.1%			
No. 100	0.150	4.44	29.85	14.0%	86.0%			
No. 200	0.075	12.03	41.88	19.6%	80.4%			

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018





 Project Name:
 1-75 @ 1-24
 Sample ID:
 KW-2 3.5-5

 Project Number:
 300-18-0001
 Test Date:
 5/4/2018

 Sample Description:
 Yellow Brown
 5/4/2018

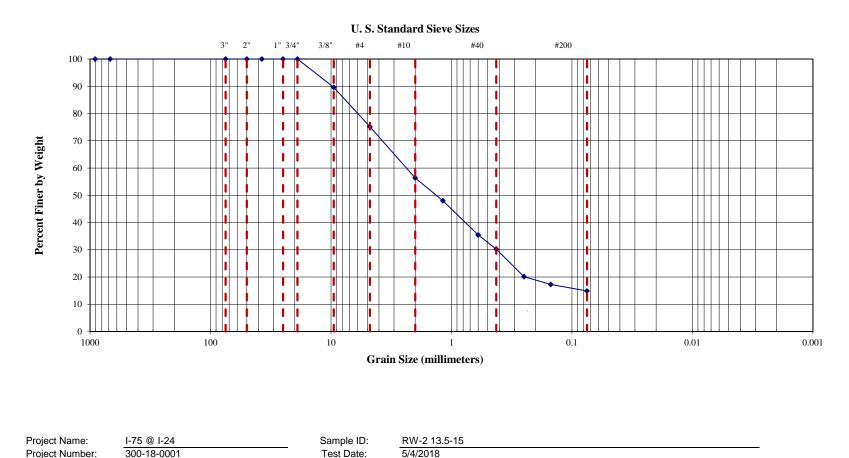
 Date Received:
 4/26/2018



REPC	REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136							
Project Name:	I-75 @ I-24		Sample ID:	RW-2 13.5-15				
Project Number:	300-18-000	1	Test Date:	5/4/2018				
Sample Description:	Light Brown							
Date Received:	4/26/2018							
Equipment Used:	Balance, Sie	eves, Oven, Water, Wett	ting Agent, Tare Containe	ers				
		Ν	o. 200 Wash					
Oven Dry Mass of Sa	Original Oven Dry Mass of Sample (grams):207.99Oven Dry Mass of Sample Retained on No. 200 (grams):178.10Percentage Passing No. 200 Sieve:14.4%							
Sieve Analysis								
Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve			
3 inch	75	0.00	0.00	0.0%	100.0%			
2 inch	50	0.00	0.00	0.0%	100.0%			
1.5 inch	37.5	0.00	0.00	0.0%	100.0%			
1 inch	25.0	0.00	0.00	0.0%	100.0%			
3/4 inch	19.0	0.00	0.00	0.0%	100.0%			
3/8 inch	9.5	21.58	21.58	10.4%	89.6%			
No. 4	4.75	30.08	51.66	24.8%	75.2%			
No. 10	2.00	39.09	90.75	43.6%	56.4%			
No. 16	1.18	17.41	108.16	52.0%	48.0%			
No. 30	0.60	26.18	134.34	64.6%	35.4%			
No. 40	0.425	10.84	145.18	69.8%	30.2%			
No. 60	0.250	20.92	166.10	79.9%	20.1%			
No. 100	0.150	5.97	172.07	82.7%	17.3%			
No. 200	0.075	4.94	177.01	85.1%	14.9%			

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018





 Sample Description:
 Light Brown

 Date Received:
 4/26/2018



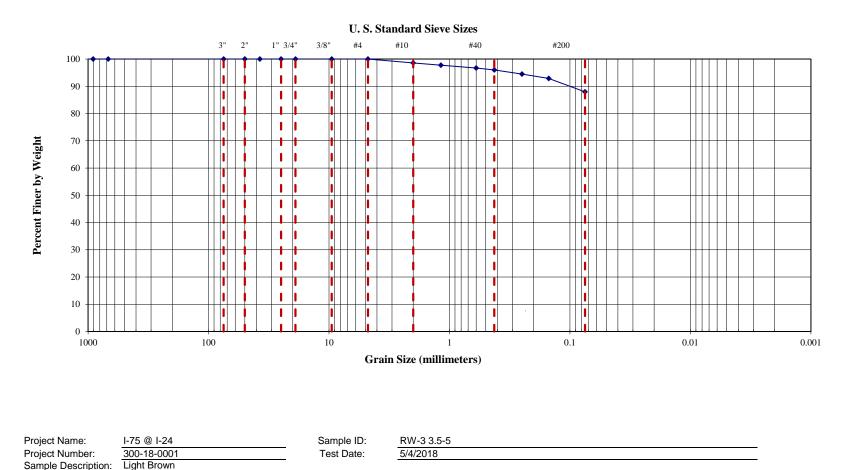
REPO	REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136							
Project Name:	I-75 @ I-24		Sample ID:	RW-3 3.5-5				
Project Number:	300-18-000		Test Date:	5/4/2018				
Sample Description: Light Brown								
Date Received:	4/26/2018							
Equipment Used:	Balance, Sie	eves, Oven, Water, Wett	ting Agent, Tare Containe	ers				
		Ν	o. 200 Wash					
Oven Dry Mass of Sa	Original Oven Dry Mass of Sample (grams):200.77Oven Dry Mass of Sample Retained on No. 200 (grams):24.32Percentage Passing No. 200 Sieve:87.9%							
Sieve Analysis								
Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve			
3 inch	75	0.00	0.00	0.0%	100.0%			
2 inch	50	0.00	0.00	0.0%	100.0%			
1.5 inch	37.5	0.00	0.00	0.0%	100.0%			
1 inch	25.0	0.00	0.00	0.0%	100.0%			
3/4 inch	19.0	0.00	0.00	0.0%	100.0%			
3/8 inch	9.5	0.00	0.00	0.0%	100.0%			
No. 4	4.75	0.00	0.00	0.0%	100.0%			
No. 10	2.00	2.89	2.89	1.4%	98.6%			
No. 16	1.18	1.62	4.51	2.2%	97.8%			
No. 30	0.60	2.15	6.66	3.3%	96.7%			
No. 40	0.425	1.37	8.03	4.0%	96.0%			
No. 60	0.250	3.07	11.10	5.5%	94.5%			
No. 100	0.150	3.25	14.35	7.1%	92.9%			
No. 200	0.075	9.85	24.20	12.1%	87.9%			

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018



Date Received:

#### REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D422 AND SIEVE ANALYS ASTM C136

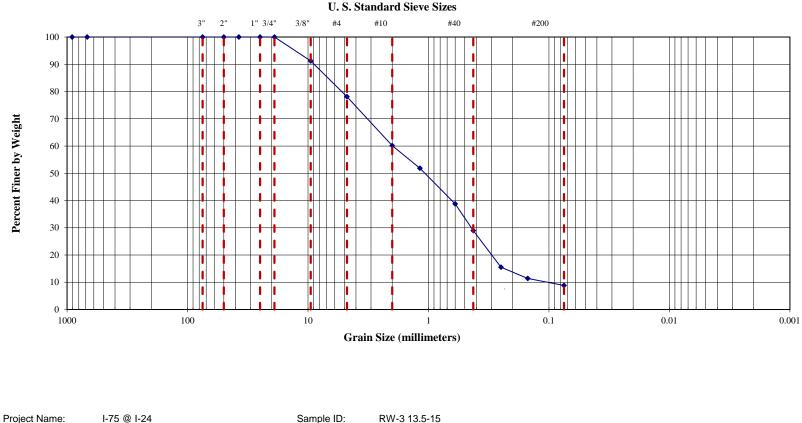




REPO	REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136						
Project Name:	I-75 @ I-24		Sample ID:	RW-3 13.5-15			
Project Number:	300-18-0001		Test Date:	5/4/2018			
Sample Description:							
Date Received: 4/26/2018							
Equipment Used:	Balance, Sie	eves, Oven, Water, Wett	ting Agent, Tare Containe	ers			
		Ν	o. 200 Wash				
Original Oven Dry M	ass of Sampl	e (grams):	429.09				
		ed on No. 200 (grams):	392.16				
Percentage Passing	•	(0)		•			
Sieve Analysis							
Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve		
3 inch	75	0.00	0.00	0.0%	100.0%		
2 inch	50	0.00	0.00	0.0%	100.0%		
1.5 inch	37.5	0.00	0.00	0.0%	100.0%		
1 inch	25.0	0.00	0.00	0.0%	100.0%		
3/4 inch	19.0	0.00	0.00	0.0%	100.0%		
3/8 inch	9.5	37.60	37.60	8.8%	91.2%		
No. 4	4.75	56.45	94.05	21.9%	78.1%		
No. 10	2.00	76.98	171.03	39.9%	60.1%		
No. 16	1.18	35.53	206.56	48.1%	51.9%		
No. 30	0.60	56.23	262.79	61.2%	38.8%		
No. 40	0.425	41.99	304.78	71.0%	29.0%		
No. 60	0.250	57.74	362.52	84.5%	15.5%		
No. 100	0.150	17.58	380.10	88.6%	11.4%		
No. 200	0.075	11.09	391.19	91.2%	8.8%		

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018





Project Name:	I-75 @ I-24	Sample ID:	RW-3 13.5-15
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Brown		
Date Received:	4/26/2018		

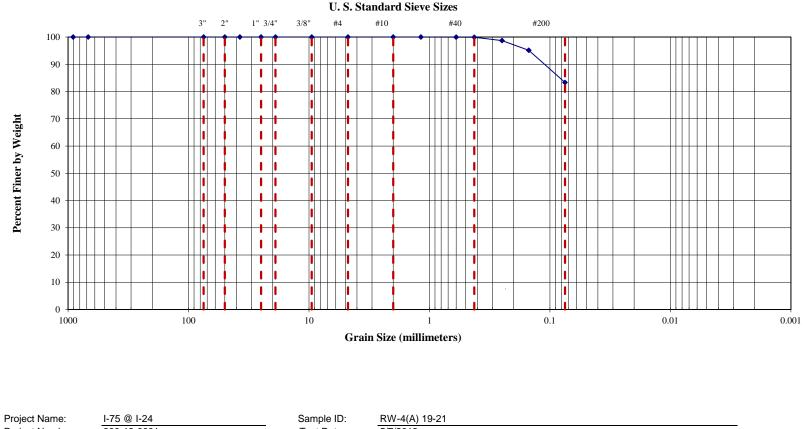
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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136						
Project Name:	I-75 @ I-24		Sample ID:	RW-4(A) 19-21		
Project Number:	300-18-0001	1	Test Date:	5/7/2018		
Sample Description:	Light Brown					
Date Received:	4/26/2018					
Equipment Used:	Balance, Sie	eves, Oven, Water, Wett	ting Agent, Tare Contain	ers		
		N	o. 200 Wash			
Original Oven Dry M	ass of Sampl	e (grams):	177.86			
		ed on No. 200 (grams):	30.66			
Percentage Passing	•	,		-		
		Si	eve Analysis			
Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve	
3 inch	75	0.00	0.00	0.0%	100.0%	
2 inch	50	0.00	0.00	0.0%	100.0%	
1.5 inch	37.5	0.00	0.00	0.0%	100.0%	
1 inch	25.0	0.00	0.00	0.0%	100.0%	
3/4 inch	19.0	0.00	0.00	0.0%	100.0%	
3/8 inch	9.5	0.00	0.00	0.0%	100.0%	
No. 4	4.75	0.00	0.00	0.0%	100.0%	
No. 10	2.00	0.00	0.00	0.0%	100.0%	
No. 16	1.18	0.00	0.00	0.0%	100.0%	
No. 30	0.60	0.10	0.10	0.1%	99.9%	
No. 40	0.425	0.02	0.12	0.1%	99.9%	
No. 60	0.250	2.21	2.33	1.3%	98.7%	
No. 100	0.150	6.35	8.68	4.9%	95.1%	
No. 200	0.075	20.99	29.67	16.7%	83.3%	

Submitted By:	M. Naser	Date:	5/7/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018





 Project Name:
 I-75 @ I-24
 Sample ID:
 RW-4(A) 19-21

 Project Number:
 300-18-0001
 Test Date:
 5/7/2018

 Sample Description:
 Light Brown
 5/7/2018
 5/7/2018

 Date Received:
 4/26/2018
 Fest Date:
 5/7/2018

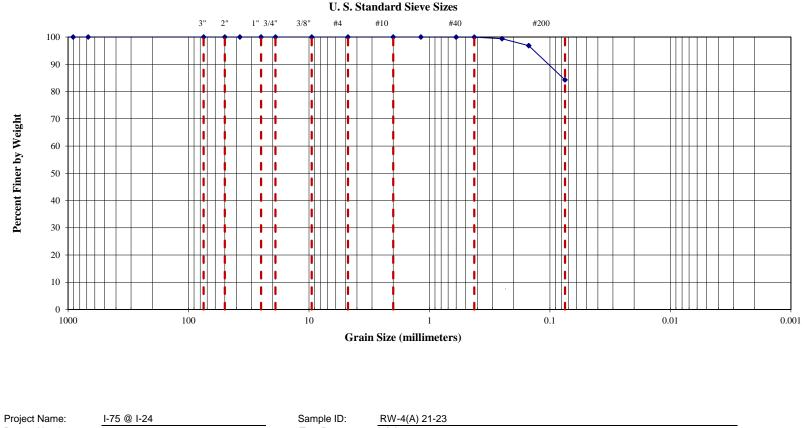
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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136					
Project Name:	I-75 @ I-24		Sample ID:	RW-4(A) 21-23	
Project Number:	300-18-000	1	Test Date:	5/7/2018	
Sample Description:	Light Brown				
Date Received:	4/26/2018				
Equipment Used:	Balance, Sie	eves, Oven, Water, Wett	ing Agent, Tare Containe	ers	
		Ν	o. 200 Wash		
Original Oven Dry Ma	ass of Sampl	e (grams):	123.26		
<b>o</b> ,		ed on No. 200 (grams):	19.79		
Percentage Passing	•			•	
		Si	eve Analysis		
Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	0.00	0.00	0.0%	100.0%
No. 4	4.75	0.00	0.00	0.0%	100.0%
No. 10	2.00	0.00	0.00	0.0%	100.0%
No. 16	1.18	0.00	0.00	0.0%	100.0%
No. 30	0.60	0.04	0.04	0.0%	100.0%
No. 40	0.425	0.03	0.07	0.1%	99.9%
No. 60	0.250	0.67	0.74	0.6%	99.4%
No. 100	0.150	3.17	3.91	3.2%	96.8%
No. 200	0.075	15.50	19.41	15.7%	84.3%

Submitted By:	M. Naser	Date:	5/7/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018





Project Name:I-75 @ I-24Sample ID:RW-4(A) 21-23Project Number:300-18-0001Test Date:5/7/2018Sample Description:Light Brown4/26/20185/7/2018

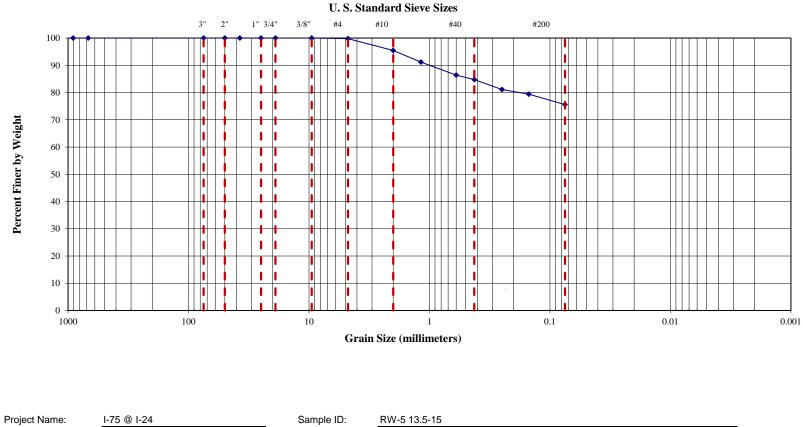
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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136					
Project Name:	I-75 @ I-24		Sample ID:	RW-5 13.5-15	
Project Number:	300-18-000	1	Test Date:	5/8/2018	
Sample Description:	Brown				
Date Received:	4/26/2018				
Equipment Used:	Balance, Sie	eves, Oven, Water, Wett	ing Agent, Tare Containe	ers	
		Ν	o. 200 Wash		
Original Oven Dry Mass of Sample (grams): 210.93					
		ed on No. 200 (grams):	51.26		
Percentage Passing	No. 200 Siev	re: <b>75.7%</b>			
		Si	eve Analysis		
Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	0.00	0.00	0.0%	100.0%
No. 4	4.75	0.46	0.46	0.2%	99.8%
No. 10	2.00	9.19	9.65	4.6%	95.4%
No. 16	1.18	9.00	18.65	8.8%	91.2%
No. 30	0.60	10.00	28.65	13.6%	86.4%
No. 40	0.425	3.55	32.20	15.3%	84.7%
No. 60	0.250	7.70	39.90	18.9%	81.1%
No. 100	0.150	3.55	43.45	20.6%	79.4%
No. 200	0.075	8.05	51.50	24.4%	75.6%

Submitted By:	M. Naser	Date:	5/8/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018





 Project Name:
 I-75 @ I-24
 Sample ID:
 RW-5 13.5-15

 Project Number:
 300-18-0001
 Test Date:
 5/8/2018

 Sample Description:
 Brown
 5/8/2018
 5/8/2018

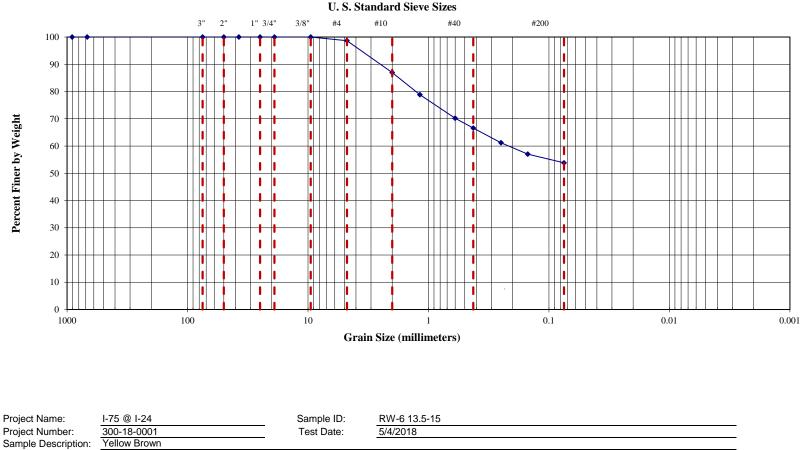
 Date Received:
 4/26/2018
 Fest Date:
 5/8/2018



REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136					
Project Name:	I-75 @ I-24		Sample ID:	RW-6 13.5-15	
Project Number:	300-18-000	1	Test Date:	5/4/2018	
Sample Description:					
Date Received:	4/26/2018				
Equipment Used:		eves, Oven, Water, Wett	ing Agent, Tare Containe	ers	
		Ν	o. 200 Wash		
Original Oven Dry Ma	ass of Sampl	e (grams):	209.53		
<b>.</b> .		ed on No. 200 (grams):	96.59		
Percentage Passing	•	(0)		•	
		Si	eve Analysis		
Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve
3 inch	75	0.00	0.00	0.0%	100.0%
2 inch	50	0.00	0.00	0.0%	100.0%
1.5 inch	37.5	0.00	0.00	0.0%	100.0%
1 inch	25.0	0.00	0.00	0.0%	100.0%
3/4 inch	19.0	0.00	0.00	0.0%	100.0%
3/8 inch	9.5	0.00	0.00	0.0%	100.0%
No. 4	4.75	2.83	2.83	1.4%	98.6%
No. 10	2.00	24.52	27.35	13.1%	86.9%
No. 16	1.18	16.98	44.33	21.2%	78.8%
No. 30	0.60	18.10	62.43	29.8%	70.2%
No. 40	0.425	7.59	70.02	33.4%	66.6%
No. 60	0.250	11.30	81.32	38.8%	61.2%
No. 100	0.150	8.72	90.04	43.0%	57.0%
No. 200	0.075	6.70	96.74	46.2%	53.8%

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018





Project Name:	I-75 @ I-24	Sample ID:	RW-6 13.5-15
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Yellow Brown		
Date Received:	4/26/2018		



REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136						
Project Name:	I-75 @ I-24		Sample ID:	RW-6 33.5-35		
Project Number:	300-18-0002	1	Test Date:	5/4/2018		
Sample Description:	Light Brown					
Date Received:	4/26/2018					
Equipment Used:	Balance, Sie	eves, Oven, Water, Wett	ing Agent, Tare Containe	ers		
		Ν	o. 200 Wash			
Original Oven Dry Mass of Sample (grams):107.56Oven Dry Mass of Sample Retained on No. 200 (grams):78.64Percentage Passing No. 200 Sieve:26.9%						
		Si	eve Analysis			
Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve	
3 inch	75	0.00	0.00	0.0%	100.0%	
2 inch	50	0.00	0.00	0.0%	100.0%	
1.5 inch	37.5	0.00	0.00	0.0%	100.0%	
1 inch	25.0	0.00	0.00	0.0%	100.0%	
3/4 inch	19.0	0.00	0.00	0.0%	100.0%	
3/8 inch	9.5	0.00	0.00	0.0%	100.0%	
No. 4	4.75	4.02	4.02	3.7%	96.3%	
No. 10	2.00	13.36	17.38	16.2%	83.8%	
No. 16	1.18	7.31	24.69	23.0%	77.0%	
No. 30	0.60	10.40	35.09	32.6%	67.4%	
No. 40	0.425	10.12	45.21	42.0%	58.0%	
No. 60	0.250	24.19	69.40	64.5%	35.5%	
No. 100	0.150	4.65	74.05	68.8%	31.2%	
No. 200	0.075	5.27	79.32	73.7%	26.3%	

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018



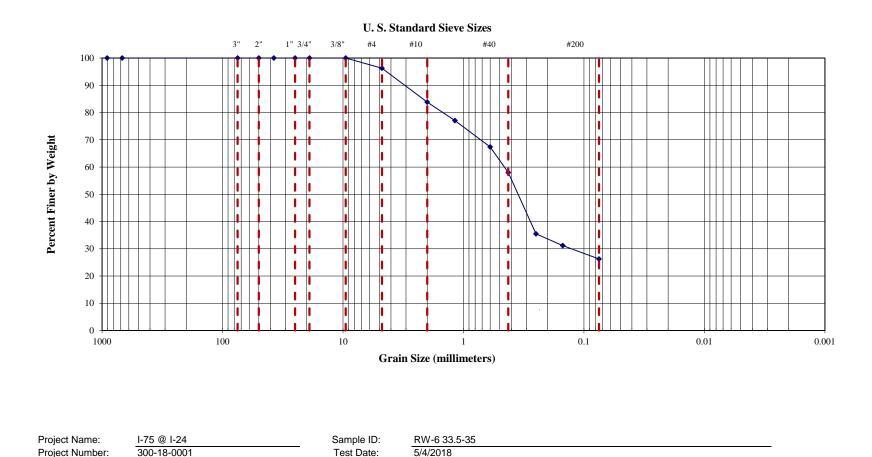
Sample Description:

Date Received:

Light Brown

4/26/2018

#### REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D422 AND SIEVE ANALYS ASTM C136



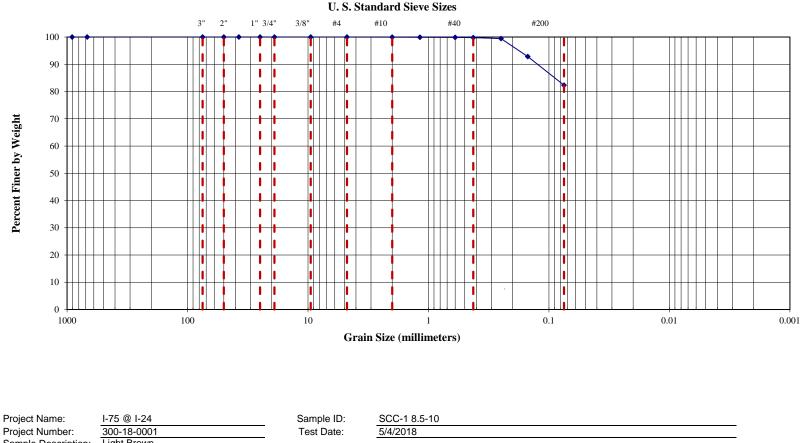
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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136						
Project Name:	I-75 @ I-24		Sample ID:	SCC-1 8.5-10		
Project Number:	300-18-000		Test Date:	5/4/2018		
Sample Description:						
Date Received:	4/26/2018					
Equipment Used:	Balance, Sie	eves, Oven, Water, Wett	ing Agent, Tare Containe	ers		
		Ν	o. 200 Wash			
Original Oven Dry Ma	ass of Sampl	e (grams):	211.67			
0		ed on No. 200 (grams):	37.65			
Percentage Passing	•	(0)		•		
		Si	eve Analysis			
Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve	
3 inch	75	0.00	0.00	0.0%	100.0%	
2 inch	50	0.00	0.00	0.0%	100.0%	
1.5 inch	37.5	0.00	0.00	0.0%	100.0%	
1 inch	25.0	0.00	0.00	0.0%	100.0%	
3/4 inch	19.0	0.00	0.00	0.0%	100.0%	
3/8 inch	9.5	0.00	0.00	0.0%	100.0%	
No. 4	4.75	0.00	0.00	0.0%	100.0%	
No. 10	2.00	0.13	0.13	0.1%	99.9%	
No. 16	1.18	0.01	0.14	0.1%	99.9%	
No. 30	0.60	0.13	0.27	0.1%	99.9%	
No. 40	0.425	0.16	0.43	0.2%	99.8%	
No. 60	0.250	0.78	1.21	0.6%	99.4%	
No. 100	0.150	13.99	15.20	7.2%	92.8%	
No. 200	0.075	22.22	37.42	17.7%	82.3%	

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018





Project Name:	I-75 @ I-24	Sample ID:	SCC-1 8.5-10
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		

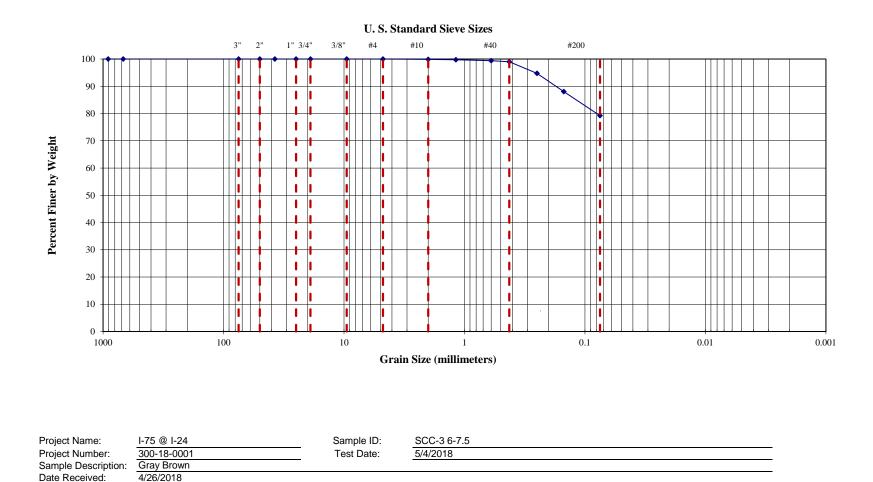


REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136							
Project Name:	I-75 @ I-24		Sample ID:	SCC-3 6-7.5			
Project Number:	300-18-000	1	Test Date:	5/4/2018			
Sample Description:	Gray Brown						
Date Received:	4/26/2018						
Equipment Used:	Balance, Sie	eves, Oven, Water, Wett	ting Agent, Tare Containe	ers			
		Ν	o. 200 Wash				
Oven Dry Mass of Sa	Original Oven Dry Mass of Sample (grams):159.38Oven Dry Mass of Sample Retained on No. 200 (grams):33.27Percentage Passing No. 200 Sieve:79.1%						
			eve Analysis				
Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve		
3 inch	75	0.00	0.00	0.0%	100.0%		
2 inch	50	0.00	0.00	0.0%	100.0%		
1.5 inch	37.5	0.00	0.00	0.0%	100.0%		
1 inch	25.0	0.00	0.00	0.0%	100.0%		
3/4 inch	19.0	0.00	0.00	0.0%	100.0%		
3/8 inch	9.5	0.00	0.00	0.0%	100.0%		
No. 4	4.75	0.00	0.00	0.0%	100.0%		
No. 10	2.00	0.23	0.23	0.1%	99.9%		
No. 16	1.18	0.18	0.41	0.3%	99.7%		
No. 30	0.60	0.59	1.00	0.6%	99.4%		
No. 40	0.425	0.61	1.61	1.0%	99.0%		
No. 60	0.250	6.77	8.38	5.3%	94.7%		
No. 100	0.150	10.68	19.06	12.0%	88.0%		
No. 200	0.075	14.07	33.13	20.8%	79.2%		

Remarks : _____

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018





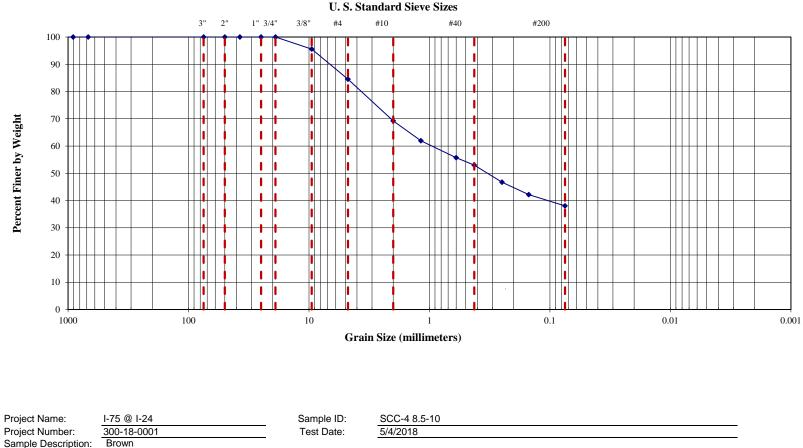


REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136						
Project Name:	I-75 @ I-24		Sample ID:	SCC-4 8.5-10		
Project Number:	300-18-000	1	Test Date:	5/4/2018		
Sample Description:						
Date Received:	4/26/2018					
Equipment Used:	Balance, Sie	eves, Oven, Water, Wett	ing Agent, Tare Contain	ers		
		N	o. 200 Wash			
Original Oven Dry Mass of Sample (grams):       263.13         Oven Dry Mass of Sample Retained on No. 200 (grams):       182.24         Percentage Passing No. 200 Sieve: <b>30.7%</b>						
		Si	eve Analysis			
Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve	
3 inch	75	0.00	0.00	0.0%	100.0%	
2 inch	50	0.00	0.00	0.0%	100.0%	
1.5 inch	37.5	0.00	0.00	0.0%	100.0%	
1 inch	25.0	0.00	0.00	0.0%	100.0%	
3/4 inch	19.0	0.00	0.00	0.0%	100.0%	
3/8 inch	9.5	11.63	11.63	4.4%	95.6%	
No. 4	4.75	29.12	40.75	15.5%	84.5%	
No. 10	2.00	40.18	80.93	30.8%	69.2%	
No. 16	1.18	19.25	100.18	38.1%	61.9%	
No. 30	0.60	16.37	116.55	44.3%	55.7%	
No. 40	0.425	7.11	123.66	47.0%	53.0%	
No. 60	0.250	16.48	140.14	53.3%	46.7%	
No. 100	0.150	12.00	152.14	57.8%	42.2%	
No. 200	0.075	10.93	163.07	62.0%	38.0%	

Remarks : _____

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018





Sample Description: Date Received:

4/26/2018

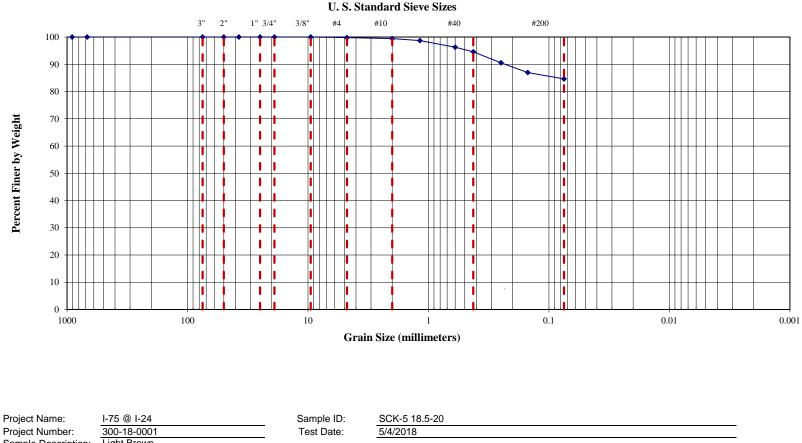
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REPORT OF MATERIAL IN SOILS FINER THAN NO. 200 SIEVE, ASTM D1140 AND SIEVE ANALYSIS ASTM C136							
Project Name:	I-75 @ I-24		Sample ID:	SCK-5 18.5-20			
Project Number:	300-18-000	1	Test Date:	5/4/2018			
Sample Description:	Light Brown						
Date Received:	4/26/2018						
Equipment Used:	Balance, Sie	eves, Oven, Water, Wett	ing Agent, Tare Containe	ers			
		Ν	o. 200 Wash				
Oven Dry Mass of Sa	Original Oven Dry Mass of Sample (grams):221.84Oven Dry Mass of Sample Retained on No. 200 (grams):35.09Percentage Passing No. 200 Sieve:84.2%						
		Si	eve Analysis				
Sieve Size	Diameter (mm)	Mass Retained on Sieve (grams)	Cumulative Mass Retained on Sieve (grams)	Percent Retained on Sieve	Total Percent Passing Sieve		
3 inch	75	0.00	0.00	0.0%	100.0%		
2 inch	50	0.00	0.00	0.0%	100.0%		
1.5 inch	37.5	0.00	0.00	0.0%	100.0%		
1 inch	25.0	0.00	0.00	0.0%	100.0%		
3/4 inch	19.0	0.00	0.00	0.0%	100.0%		
3/8 inch	9.5	0.00	0.00	0.0%	100.0%		
No. 4	4.75	0.52	0.52	0.2%	99.8%		
No. 10	2.00	0.72	1.24	0.6%	99.4%		
No. 16	1.18	1.69	2.93	1.3%	98.7%		
No. 30	0.60	5.37	8.30	3.7%	96.3%		
No. 40	0.425	3.78	12.08	5.4%	94.6%		
No. 60	0.250	8.90	20.98	9.5%	90.5%		
No. 100	0.150	7.93	28.91	13.0%	87.0%		
No. 200	0.075	5.19	34.10	15.4%	84.6%		

Submitted By:	M. Naser	Date:	5/4/2018
Reviewed By:	D. Hodnett	Date:	5/9/2018





Project Name:	I-75 @ I-24	Sample ID:	SCK-5 18.5-20
Project Number:	300-18-0001	Test Date:	5/4/2018
Sample Description:	Light Brown		
Date Received:	4/26/2018		

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350 Cal Batsel Road Bowling Green, Kentucky 42101 tel: 270-842-1070 fax: 615-256-5873

#### **REPORT OF UNCONFINED COMPRESSION TEST, ASTM D2166**

Proje Sam Date Equi	ect Name: ect Number: pple Description: e Received: ipment Used: <b>Wet Density (pcf):</b>	I-75 @ I-24 300-18-0001 Brown Oven, Ohaus 3kg Scale, Metal Tares 128.7	Sample ID: Test Date: s, Model 7691 S/N 2147, Sar Initial Height (in)	·
	Dry Density (pcf):		Initial Diameter (in)	
I	Moisture Content: Deg of Sat.:		Specific Gravity	:
	Qu=	1.4 KSF		
	1.6 1.4 1.2 1 0.8 0.6 0.4 0.2 0 -0.2	Strain vs. Stress		
		Strain (%)		

Remarks :

Submitted By:	Z. Shannon	Date:	5/8/2018	
Reviewed By:	D, Hidnett	Date:	5/9/2018	-

# APPENDIX G ROCK CORE PHOTOGRAPHS



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
B-92 Box 1 of 1	1	35 – 39.7	100	100
	2	39.7 – 44.7	100	100
	3	44.7 – 46.7	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
B-93 Box 1 of 1	1	7 – 11	80	45
	2	11 – 16	98	90
	3	16 – 21	98	96



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-21 Box 1 of 1	1	12 – 15.9	100	100
	2	15.9 – 20	100	85
	3	20 – 22	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-22 Box 1 of 1	1	14 – 15.5	100	100
	2	15.5 – 20.5	100	100
DOX TOTT	3	20.5 – 25.5	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-23 Box 1 of 1	1	11.4 – 15.4	100	78
	2	15.4 – 20.4	100	100
	3	20.4 – 23.4	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-24(A) Box 1 of 1	1	28 – 30.6	100	85
	2	30.6 - 35.5	100	94
	3	35.5 – 40.5	98	94



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-31 Box 1 of 1	1	22.8 – 25.6	100	79
	2	25.6 - 30.6	100	98
	3	30.6 – 35.6	100	96



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-32 Box 1 of 1	1	19.4 – 20.6	100	100
	2	20.6 – 25.5	100	96
DOX 1 OF 1	3	25.5 – 30.5	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-34 Box 1 of 2	1	21.1 – 25.7	100	83
	2	25.7 – 30.7	94	72
	3	30.7 – 35.7	100	98



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BN-34 Box 2 of 2	3	30.7 – 35.7	100	98
	4	35.7 – 36.7	100	40
	5	36.7 – 40.6	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BS-22 Box 1 of 1	1	16 – 20.5	100	98
	2	20.5 – 25.4	100	100
	3	25.4 – 27	100	88



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BS-24 Box 1 of 2	1	13 – 13.4	31	0
	2	13.4 – 16	100	84
	3	16 – 21	100	98
	4	21 – 24.3	100	42



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BS-24 Box 2 of 2	5	24.3 – 29.3	98	96



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
BS-32 Box 1 of 1	1	12.9 – 15.7	100	82
	2	15.7 – 20.7	100	100
	3	20.7 – 23.1	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
	1	27.9 – 29.5	69	0
	2	29.5 – 30.2	14	0
BS-33	3	30.2 – 31	100	100
Box 1 of 1	4	31 – 34.5	100	63
	5	34.5 – 39.5	100	92
	6	39.5 – 42.2	100	93



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
007.0	1	50 – 59	95	95
CSX-2 Box 1 of 1	2	59 – 64	100	100
	3	64 – 69	90	90



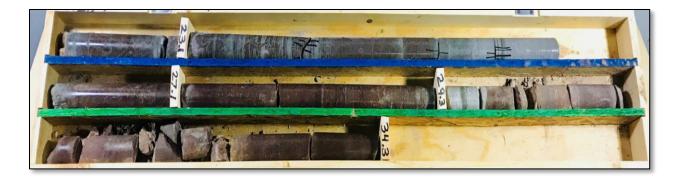
Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
CSX-3 Box 1 of 1	1 and 2	57.9 – 60.3	50	0
	3	60.3 - 64.7	100	100
	4	64.7 – 69.7	100	100
	5	69.7 – 72.7	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
M-1	1	30.1 – 34.9	100	88
Box 1 of 1	2	34.9 – 39.9	100	92



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
	1	8.1 – 13.1	100	96
M-2 Box 1 of 2	2	13.1 – 18.1	100	52
	3	18.1 – 23.1	100	56



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
M-2	3	18.1 – 23.1	100	56
	4	23.1 – 27.1	100	100
Box 2 of 2	5	27.1 – 29.3	100	100
	6	29.3 - 34.3	48	48



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
MCB-1 Box 1 of 1	1	27.2 – 28.6	100	43
	2	28.6 – 33.4	88	50
	3	33.4 – 38.4	100	100
	4	38.4 - 42.4	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
MCB-2 Box 1 of 1	1	31.1 – 34.9	95	87
	2	34.9 – 39.9	98	84
	3	39.9 – 42.1	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCC-1 Box 1 of 1	1	17.5 – 20	96	84
	2	20 – 25	98	94
	3	25 – 27.5	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
	1	4 – 6	70	70
	2	6 – 11	0	0
SCC-2	3	11 – 16	0	0
Box 1 of 1	4	16 – 21	78	34
	5	21 – 26	100	100
	6	26 – 31	98	90



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCC-3 Box 1 of 1	1	14.3 – 15.6	100	100
	2	15.6 – 20.5	100	92
	3	20.5 – 25.6	100	88



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCC-4A	1	17.2 – 19.6	96	75
	2	19.6 – 20.5	100	100
Box 1 of 1	3	20.5 – 25.4	98	94
	4	25.4 – 27.3	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCK-1 Box 1 of 1	1	29.8 – 34.3	93	91
	2	34.3 – 39.3	100	92
	3	39.3 – 44.3	100	92



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCK-2 Box 1 of 1	1	26.2 - 30.7	96	96
	2	30.7 – 35.7	100	100
	3	35.7 – 36.7	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCK-3	1	29.5 – 33.6	90	15
	2	33.6 – 34.5	78	0
Box 1 of 1	3	34.5 – 39.5	100	84
	4	39.5 – 44.5	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
	1	28 – 30.5	80	90
SCK-4 Box 1 of 1	2	30.5 – 35.5	100	100
	3	35.5 – 38	100	100

HIN 1 11 11 15 PULL / R 2.3 REC 0.7 PULL 3 R 5-9 Rac 5-2 G 0-2 PULL 4 RAN 4.0 RECT 3.9 L 4.1

Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCK-5	1	32.8 – 34.7	37	12
	2	34.7 – 39.2	100	100
Box 1 of 1	3	39.2 – 44.7	100	100
		44.7 – 48.7	100	100



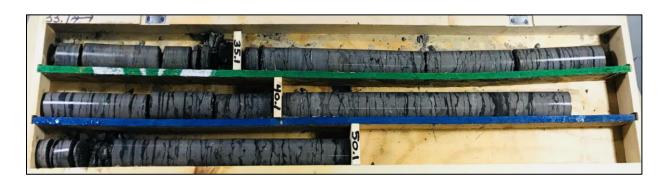
Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCK-6 Box 1 of 1	1	26.8 - 29.8	100	87
	2	29.8 - 34.8	100	76
DOX T OF T	3	34.8 – 39.8	100	100



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCR-1 Box 1 of 1	1	40.7 – 45.5	94	60
	2	45.5 – 50.5	98	84
	3	50.5 – 55.5	96	82



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
SCR-2 Box 1 of 1	1	17 – 19	100	100
	2	19 – 24	90	90
	3	24 – 29	96	96



Boring	Run	Depth (feet)	Recovery (%)	RQD (%)
005.0	1	33.7 – 35.1	100	43
SCR-3 Box 1 of 1	2	35.1 – 40.1	100	98
	3	40.1 – 45.1	100	90

# APPENDIX H TRAFFIC DATA

#### TENNESSEE DEPARTMENT OF TRANSPORTATION STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO.:	IM/NH-75-1(131): 33005-0176-44		ROUTE:	I-24 @ I-75
COUNTY:	HAMILTO	N	CITY:	CHATTANOOGA
PROJECT PIN NU	JMBER:	114174.00		
PROJECT DESCR	RIPTION:	I-24 @ I-75 INTERCHANGE	MODIFICA	ATION [DESIGN BUILD]
		[1] I-24 AVERAGE TRAFFIC	C DATA	
		[2] I-75 AVERAGE TRAFFIC	C DATA	
	5440000	5012- 10. M (200 20.2)		

#### **DIVISION REQUESTING:**

MAINTENANCE	S S	AVEMENT DESIGN TRUCTURES	
S.T.I.D. PROG. DEVELOPMENT & ADM. PUBLIC TRANS. & AERO.	Т	URVEY & ROADW RAFFIC SIGNAL D THER	
YEAR PROJECT PROGRAMMED FOR PROJECTED LETTING DATE:		2020	 

# TRAFFIC ASSIGNMENT:

									SIGN DWAY		SIGN RAGE
	BASE Y	EAR		DESIGN YEAR				% TRUCKS		DAILY LOADS	
	AADT	YEAR	AADT	DHV	%	YEAR	DIR.DIST.	DHV	AADT	FLEX	RIGID
[1]	118,410	2020	146,100	13,465	9	2040	50-50	12	18	5,680	8,972
[2]	101,260	2040	127,360	12,067	9	2040	53-47	12	18	5,030	7,952

REQUESTED BY:	NAME	ROBERT ROGERS DATE 6/15/17
	DIVISION	REGION II DESIGN
	ADDRESS	4005 CROMWELL ROAD
		CHATTANOOGA TN 37421
REVIEWED BY:	SUITE 1000, J	ATION MANAGER I
APPROVED BY:		

PLEASE FURNISH THE 2020-2040 TRAFFIC DATA AND ADL'S FOR PAVEMENT DESIGN FOR THE INTERCHANGE MODIFICATION AS SHOWN IN THE ATTACHED FUNCTIONAL LAYOUTS.

THIS TRAFFIC IS BASED ON TWO PREVIOUS PROJECTS PREPARED FOR PAVEMENT DESIGN [I-75 @ S.R. 8] DATED 4/5/2017 AND FOR ENVIRONMENTAL [I-24 @ I-75] DATE 9/24/2014. THESE TWO PROJECTS WERE COMBINED INTO THIS PROJECT. AADT'S, DHV'S AND ADL'S ARE INCLUDED.

DHV'S ARE NOT REQUIRED FOR SIDE ROADS LESS THAN 1000 AADT.

NOTE: FOR BRIDGE REPLACEMENT PROJECTS, ADLS ARE NOT REQUIRED FOR ADTS OF 1000 OR LESS AND PERCENTAGE OF TRUCKS OF 7% OR LESS. SEE ATTACHMENTS FOR TURNING MOVEMENTS AND/OR OTHER DETAILS. (REV. 2/2)

#### TENNESSEE DEPARTMENT OF TRANSPORTATION STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO.: IM/NH-75-1(131) : 33005-0176-44 RC COUNTY: HAMILTON CI PROJECT DESCRIPTION: I-24 @ I-75 INTERCHANGE MODIFICATION.

#### Interstate

Pavement Structural Design

# Calculation of Equivalent Daily 18 Kip Single Axle Loads

		ADT		Flexible		Rigid	
Ту	be Vehicle	(No. Counted)		18-kip Factor	ADL	18-kip Factor	ADL
Pass. c	ars and						
motorc	ycles (1-2)	73,707		0.001	74	0.001	74
Pick-up	, Panel,						
Van	(3)	34,743		0.004	139	0.005	174
	Buses (4)	423	1	0.300	127	0.300	127
Sing.	2-axle,				· · · · · · · · · · · · · · · · · · ·		
	6-tire (5)	2,658		0.170	452	0.170	452
Unit	3-axle or				1 · · · · · · · · · · · · · · · · · · ·		
	more (6-7)	1,561		0.700	1,093	1.000	1,561
	4-axle (8)	608		0.700	426	0.780	474
Comb.	5-axle or						
	more (9-13)	18,555		1.100	20,411	1.780	33,028
	Totals						
(20	30 AADT)	132,255			22,720		35,889

Suggested Percentage	es of Trucks in D	esign Lane						
	4 Lane	6 Lane	_	8 Lane				
5,000 or less ADT	90%	75%		70%				
5,000 - 10,000 ADT	80%	70%		65%				
10,000 - 15,000 ADT	75%	65%		60%				
15,000 - 20,000 ADT	75%	65%		55%				
20,000 - 30,000 ADT	70%	60%		50%				
30,000 Plus ADT	65%	60%		50%				
	No. of Lanes:			8 TO 10				
	% Trucks in Des	sign Lane:		50%				
	ADL in Design L	ane:						
	FLEX:	0.5	Х	0.50	Х	22720.2	=	5,680
	RIGID:	0.5	Х	0.50	Х	35889.3	Ξ	8,972
ADL Calculations By:	TONY ARMSTR	ONG /				Date	e:	6/23/2017
Reviewed By:(REV. 7-1-14]	han	AL	Z	$\Delta$		Date		/23/17

ROUTE NO.: I-24 [1]

CITY:CHATTANOOGA

#### TENNESSEE DEPARTMENT OF TRANSPORTATION STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO.: IM/NH-75-1(131) : 33005-0176-44 RC COUNTY: HAMILTON CI PROJECT DESCRIPTION: I-24 @ I-75 INTERCHANGE MODIFICATION.

ROUTE NO.<u>: I-75 [2]</u> CITY:CHATTANOOGA

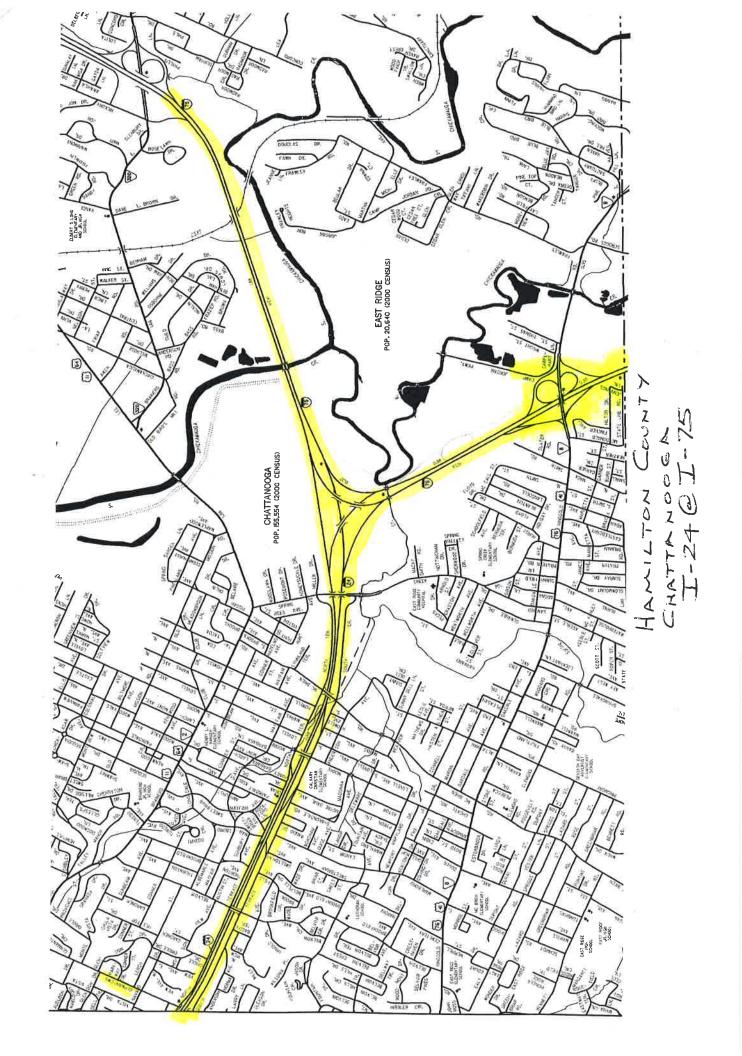
#### Interstate

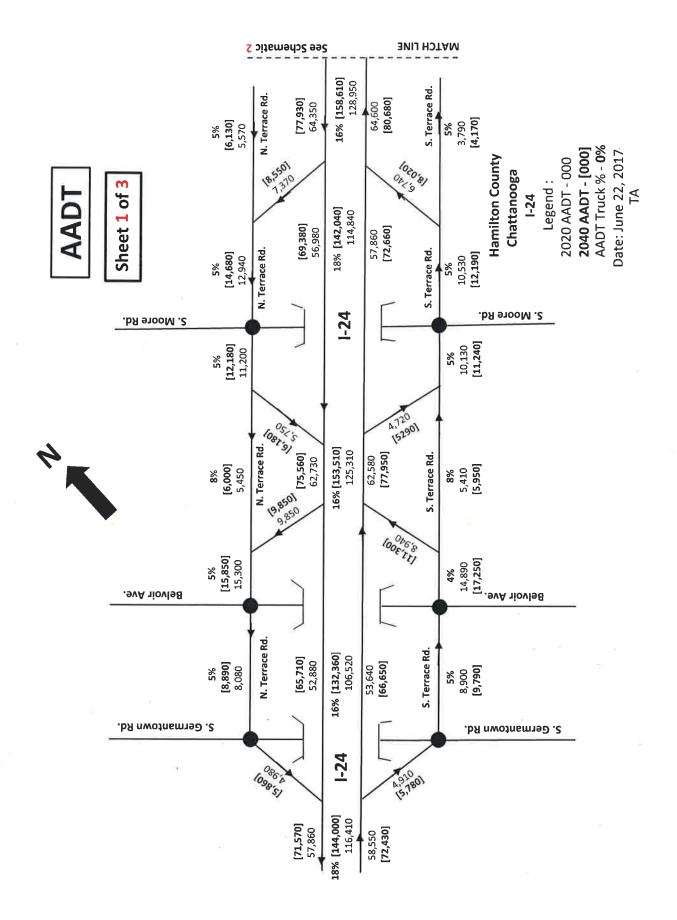
#### Pavement Structural Design

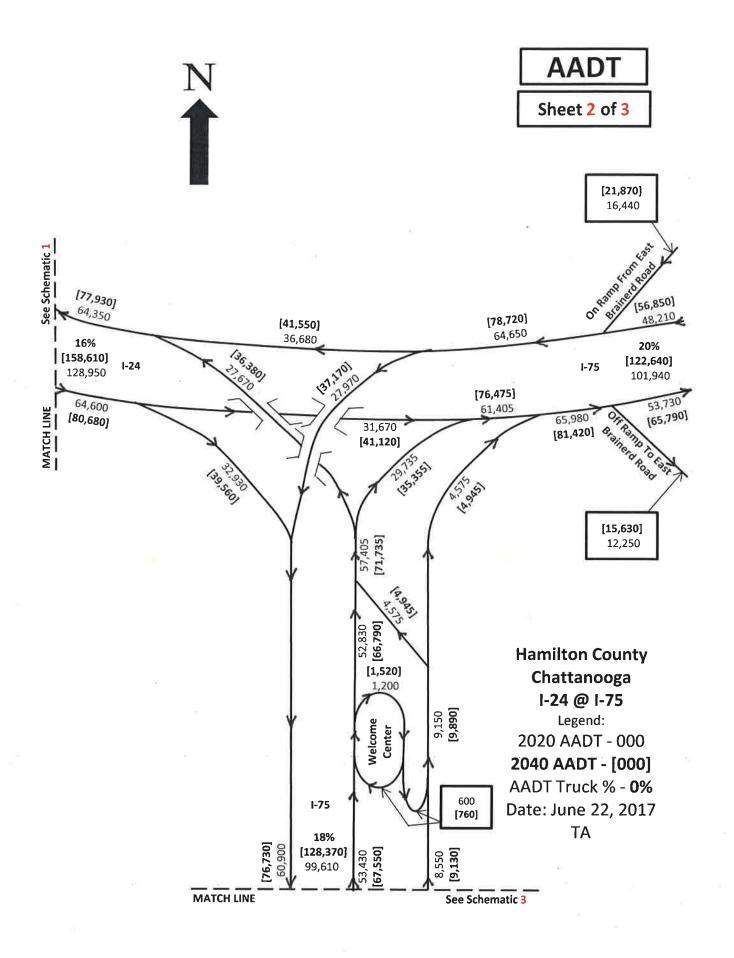
# Calculation of Equivalent Daily 18 Kip Single Axle Loads

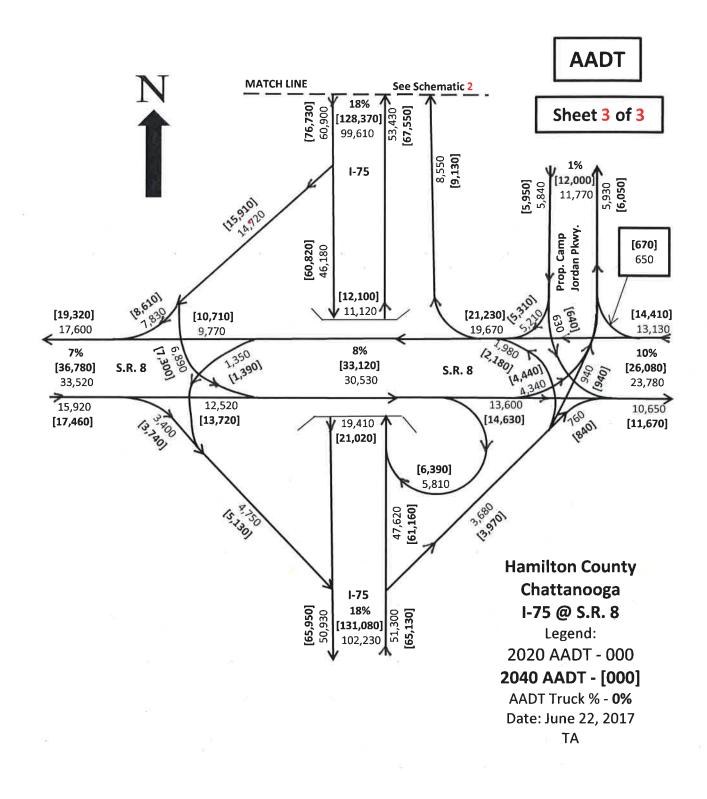
		ADT	Flexible		Rigid	
Ту	pe Vehicle	(No. Counted)	18-kip Factor	ADL	18-kip Factor	ADL
Pass. c	ars and					
motorc	ycles (1-2)	58,367	0.001	58	0.001	58
Pick-up	, Panel,					
Van	(3)	34,922	0.004	140	0.005	175
	Buses (4)	412	0.300	124	0.300	124
Sing.	2-axle,				0	
	6-tire (5)	2,423	0.170	412	0.170	412
Unit	3-axle or					
	more (6-7)	960	0.700	672	1.000	960
	4-axle (8)	582	0.700	407	0.780	454
Comb.	5-axle or					
	more (9-13)	16,644	1.100	18,308	1.780	29,626
	Totals					
(20	30 AADT)	114,310		20,121		31,809

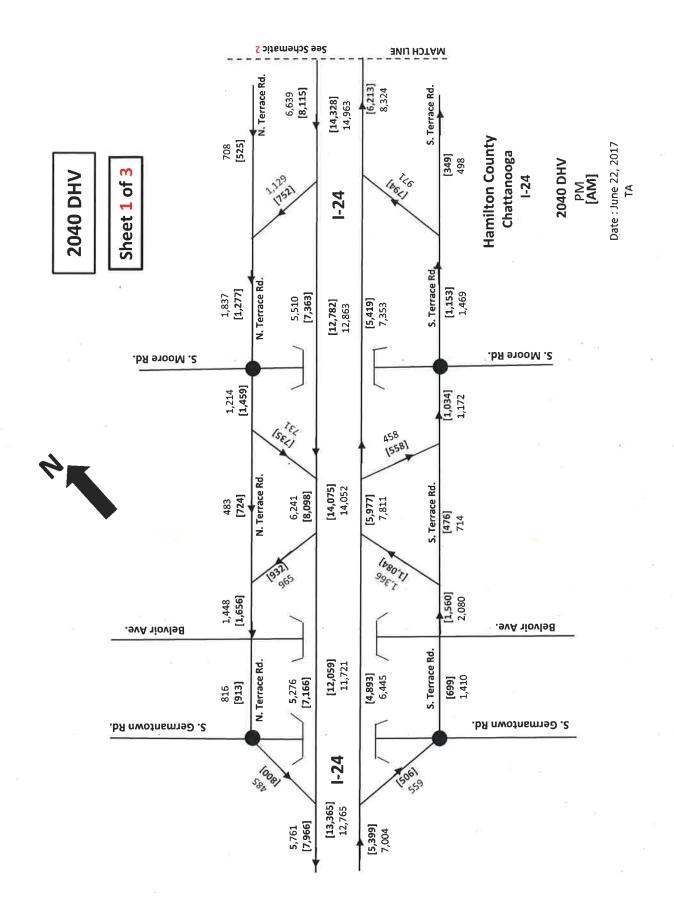
#### Suggested Percentages of Trucks in Design Lane 4 Lane 6 Lane 8 Lane 5,000 or less ADT 90% 70% 75% 5,000 - 10,000 ADT 80% 70% 65% 10,000 - 15,000 ADT 60% 75% 65% 15,000 - 20,000 ADT 75% 65% 55% 20,000 - 30,000 ADT 70% 60% 50% 30.000 Plus ADT 65% 60% 50% No. of Lanes: 10 % Trucks in Design Lane: 50% ADL in Design Lane: FLEX: 0.5 Х 0.50 20121.4 5,030 Х = RIGID: 0.5 Х 0.50 Х 31808.8 = 7,952 6/23/2017 ADL Calculations By: TONY ARMSTRONG Date: Reviewed By: Date: [REV. 7-1-14]

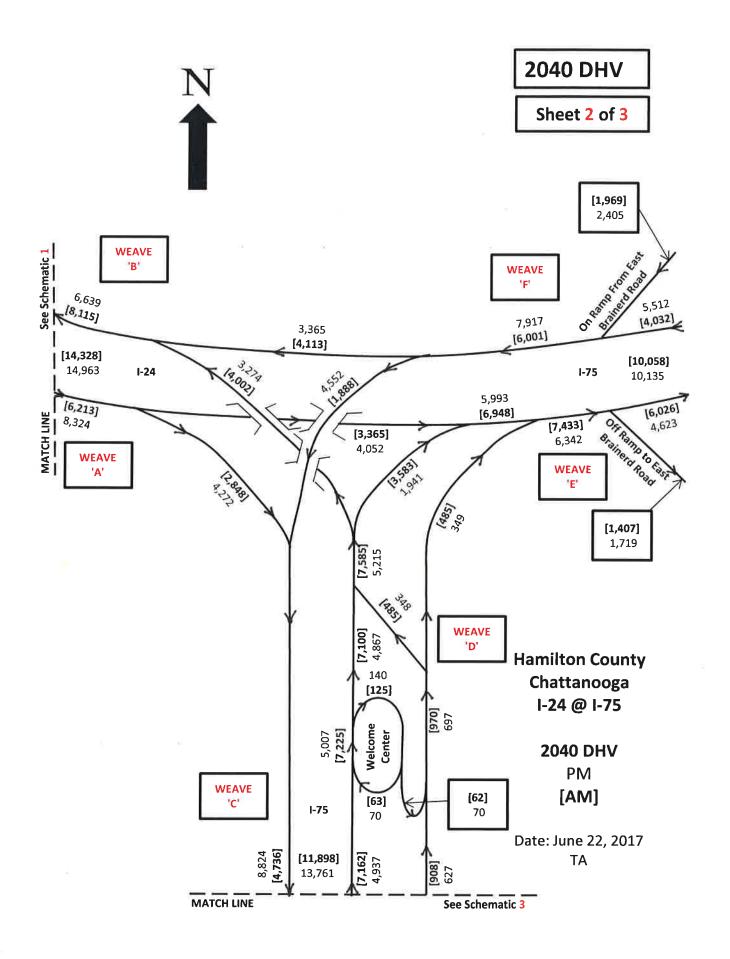


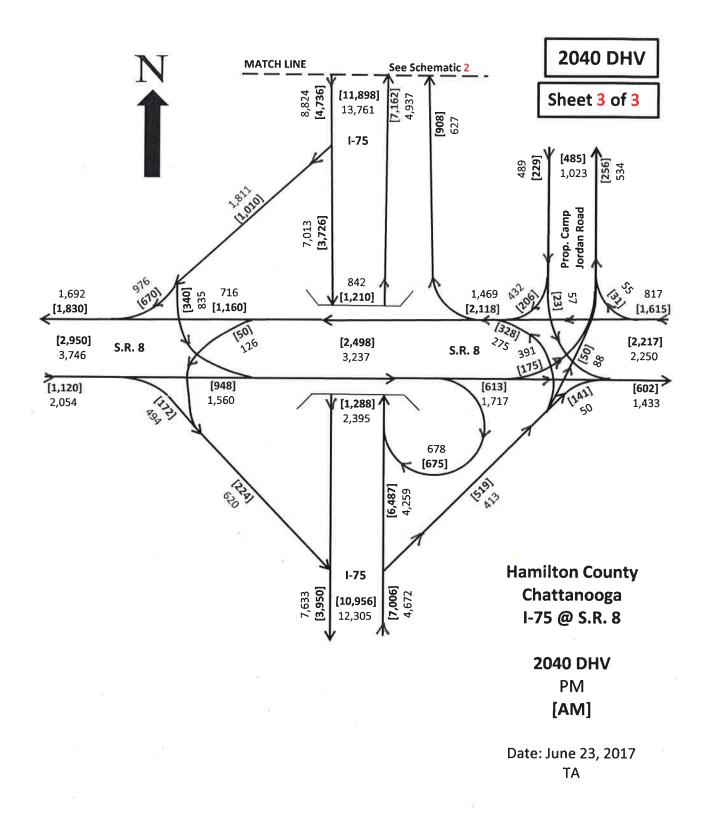


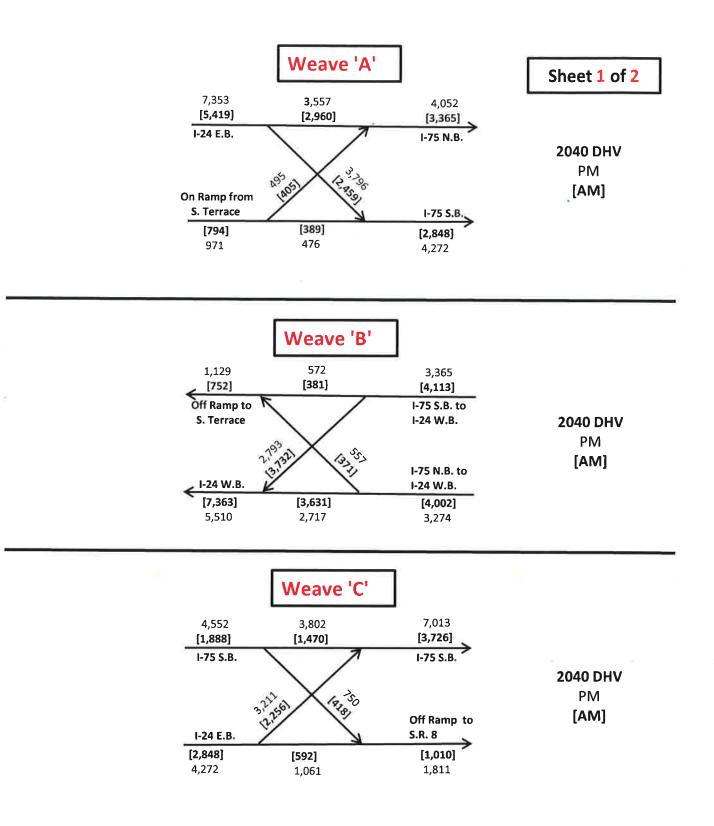




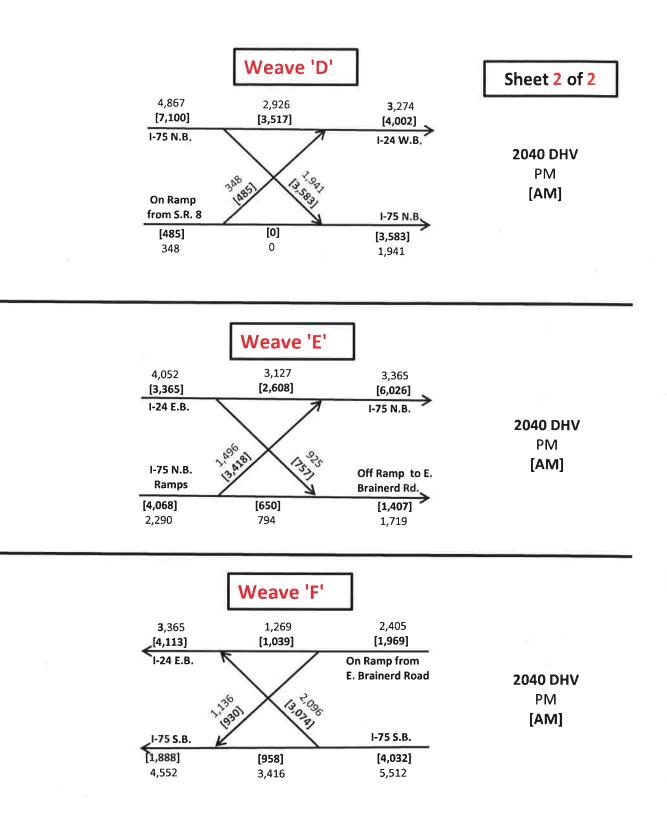








#### See DHV Sheet 2 of 3 for WEAVE Locations.



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