PROJECT DESCRIPTION

THIS PROJECT CONSISTS IN PART OF CONSTRUCTING A BRIDGE FOR PROPOSED US 52 RAMP A OVER OHIO RIVER ROAD (CR 503). THE STRUCTURE AS PLANNED, IS A TWO-SPAN STRUCTURE USING MSE WALLS TO HOLD BACK THE ROADWAY EMBANKMENTS AND CONTAIN THE ABUTMENTS.

HISTORIC RECORDS

HISTORIC BORING RECORDS FOR THE AREA WERE REQUESTED FROM THE ODOT OFFICE OF GEOTECHNICAL ENGINEERING AND THE DISTRICT, HOWEVER, NO SUCH RECORDS EXISTED.

<u>GEOLOGY</u>

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BEDROCK IS OF THE MISSISSIPPIAN LOGAN FORMATION. GENERALLY, THIS FORMATION CONSISTS OF PRIMARILY SANDSTONE OR SANDY SILTSTONE WITH OCCASIONAL AREAS OF INTERBEDDED SHALE. HOWEVER, THE LITHOLOGY OF THE SANDSTONES VARIES BOTH LATERALLY AND VERTICALLY. BEDROCK OF THE PENNSYLVANIAN BREATHITT FORMATION CAN BE FOUND AT THE TOP OF THE SLOPES ROUGHLY ABOVE ELEVATION 770 IN THIS AREA.

RECONNAISSANCE

SEVERAL SITE RECONNAISSANCE VISITS WERE MADE BETWEEN AUGUST 2004 AND SEPTEMBER 2006. THE PROJECT AREA IS JUST NORTH OF THE OHIO RIVER AND IS WITHIN THE RIGHT OF WAY FOR BOTH OHIO RIVER ROAD (CR 503) AND US 52. THE ROCK CUT AT OHIO RIVER ROAD IS GENERALLY STABLE, WITH OCCASIONAL SMALL ROCK FALL EVENTS. THE GROUND COVER IN THE AREA IS MOWED GRASS WITH SMALL TREES AND BRUSH NEAR THE CULVERT INLETS.

SUBSURFACE EXPLORATION

THE FIELD EXPLORATION CONSISTED OF DRILLING A TOTAL OF SIX STRUCTURE BORINGS FOR THE PROPOSED BRIDGE AND MSE WALLS. BORINGS B-33 THROUGH B-36 WERE DRILLED FOR THE CURRENTLY PROPOSED STRUCTURE, AS INDICATED ON THE STRUCTURE SITE PLAN. THESE BORINGS WERE DRILLED BETWEEN JANUARY 26 AND FEBRUARY 1, 2007. BORINGS TR-62 AND TR-76 WERE DRILLED FOR A PREVIOUS DESIGN CONFIGURATION. THESE BORINGS WERE DRILLED BETWEEN MARCH 18 AND 30, 2005 USING AN ATV MOUNTED ROTARY DRILL RIG, USING 3 1/4 -INCH 1.D. HOLLOW STEM AUGERS TO ADVANCE THE HOLES THROUGH SOIL. DISTURBED SOIL SAMPLES WERE OBTAINED IN ACCORDANCE WITH THE STANDARD PENETRATION TEST (AASHTO T206) AT 1.5 TO 5.0-FOOT INTERVALS FOR THE FULL DEPTH OF THE SOIL PORTION OF THE BORINGS. UNDISTURBED SOIL SAMPLES WERE OBTAINED AT THE DEPTHS SHOWN ON THE LOGS AND IN THE PROFILE, IN ACCORDANCE WITH AASHTO T207. WHERE BEDROCK WAS ENCOUNTERED, THE BORINGS WERE ADVANCED AND THE ROCK WAS SAMPLED USING A TYPE NO SERIES CORE BARREL, WATER METHOD.

EXPLORATION FINDINGS

ALL BORINGS, EXCEPT BORING TR-62, ENCOUNTERED 2 TO 5 INCHES OF TOPSOIL UNDERLAIN BY NATURAL SOILS. BORING TR-62 ENCOUNTERED 3 INCHES OF AGGREGATE BASE AT THE GROUND SURFACE. BORINGS B-33, B-34, TR-62, AND TR-76 ENCOUNTERED NATURAL COHESIVE SOIL DEPOSITS BELOW THE SURFACE MATERIAL, WHILE BORINGS B-35 AND B-36 ENCOUNTERED NATURAL GRANULAR SOIL DEPOSITS. THE NATURAL COHESIVE DEPOSITS CONSISTED OF HARD SILT AND CLAY (A-6A), STIFF TO HARD SANDY SILT (A-4A), AND VERY STIFF SILT (A-4B), WHILE THE GRANULAR SOIL DEPOSITS CONSISTED MAINLY OF MEDIUM DENSE TO VERY DENSE SANDY SILT (A-4A), AND VERY DENSE GRAVEL WITH SAND AND SILT (A-2-4). THE NATIVE SOIL DEPOSITS EXTENDED TO DEPTHS RANGING BETWEEN APPROXIMATELY 3.0 AND 13.0 FEET BELOW THE GROUND SURFACE, WHERE BEDROCK WAS ENCOUNTERED.

IN THE AREA OF THE PROPOSED STRUCTURE, BEDROCK WAS ENCOUNTERED IN ALL BORINGS. THE BEDROCK CONSISTED OF SOFT TO HARD, SLIGHTLY TO HIGHLY WEATHERED, ARGILLACEOUS SANDSTONE. SEVERELY WEATHERED, ARGILLACEOUS SANDSTONE WAS ENCOUNTERED IN BORINGS B-33, B-34, B-35, AND TR-62 ABOVE THE COMPETENT SANDSTONE. THE AMOUNT OF ROCK RECOVERED IN EACH CORE RUN VARIED BETWEEN 92 AND 100 PERCENT. THE ROCK OUALITY DESIGNATION (ROD) OF THE BEDROCK RANGED BETWEEN 60 AND 86 PERCENT WITH AN AVERAGE OF 73 PERCENT INDICATING FAIR TO GOOD ROCK.

SEEPAGE WAS NOT OBSERVED IN ANY OF THE BORINGS DRILLED FOR THIS STRUCTURE. THERE WERE NO MEASURABLE WATER LEVELS IN THE BORINGS PRIOR TO ROCK CORING.

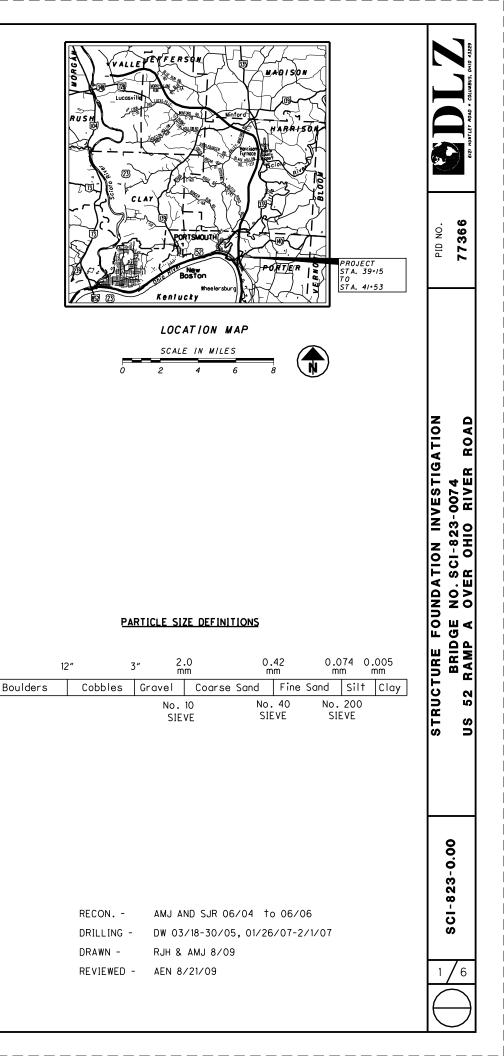
SPECIFICATIONS

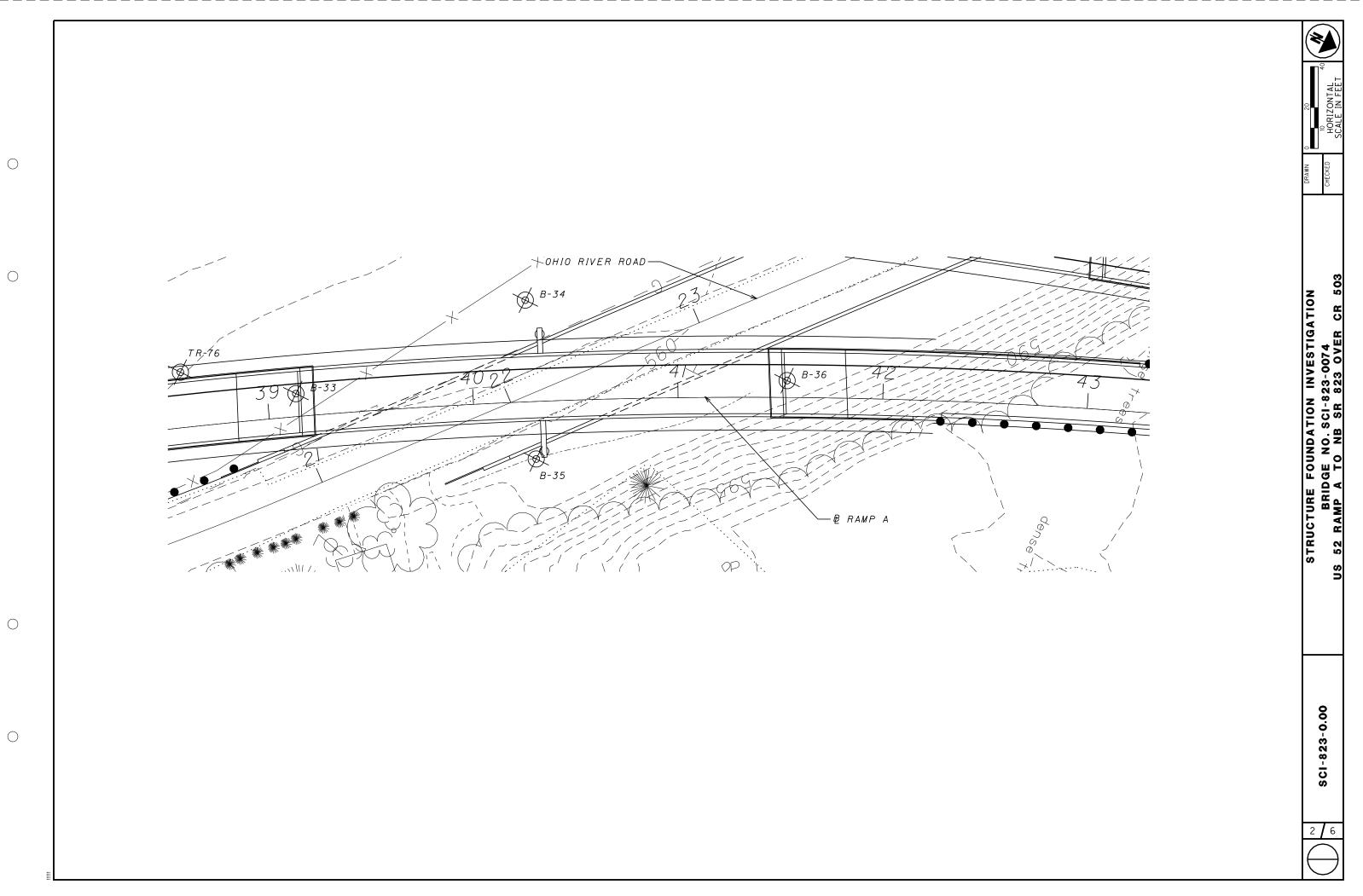
THIS GEOTECHNICAL EXPLORATION WAS PERFORMED IN ACCORDANCE WITH THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, OFFICE OF GEOTECHNICAL ENGINEERING, SPECIFICATIONS FOR GEOTECHNICAL EXPLORATIONS, DATED NOVEMBER 1995.

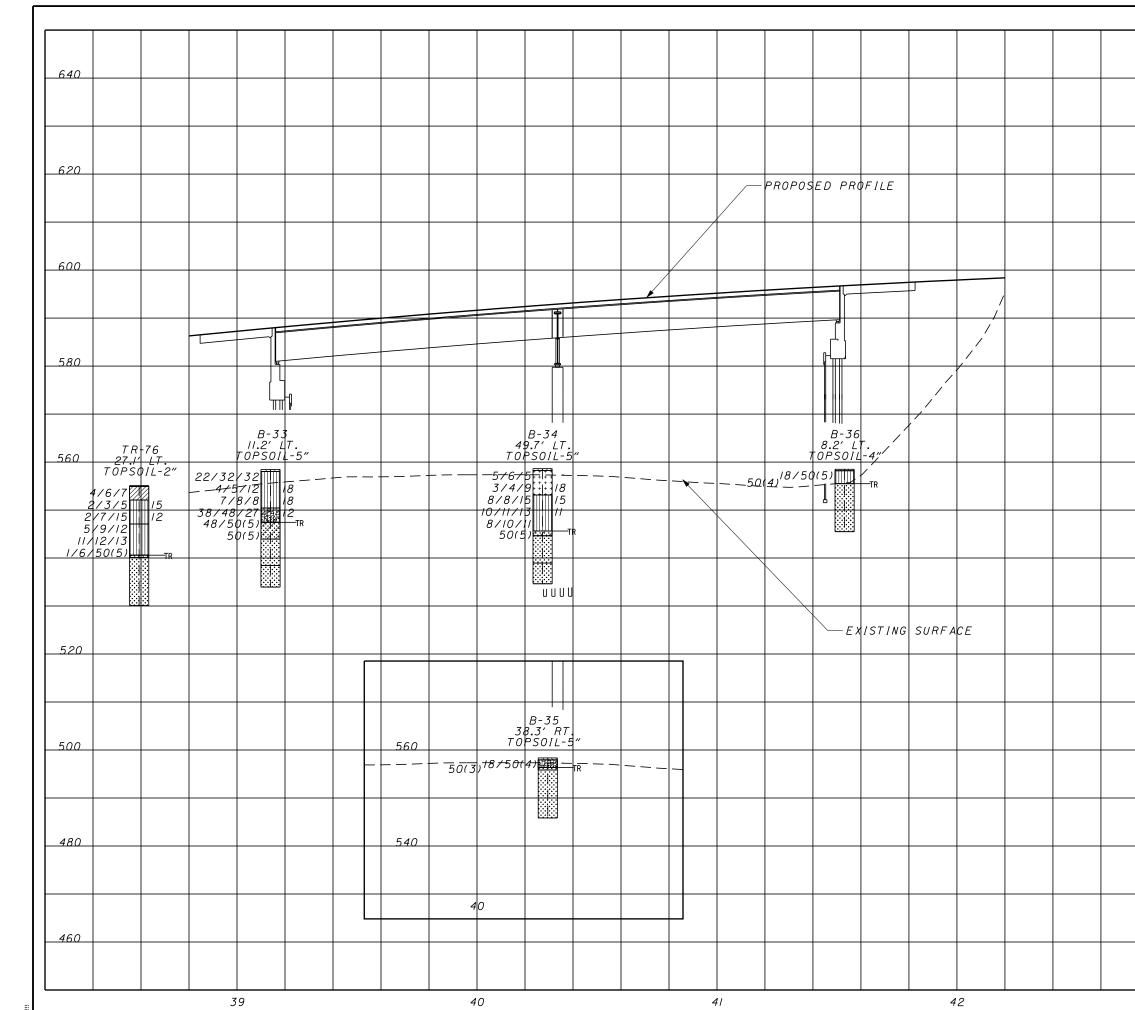
AVAILABLE INFORMATION

ALL AVAILABLE SOIL AND BEDROCK INFORMATION THAT CAN BE CONVENIENTLY SHOWN ON THE SOIL PROFILE SHEETS HAS BEEN SO REPORTED. ADDITIONAL SUBSURFACE EXPLORATIONS MAY HAVE BEEN MADE TO STUDY SOME SPECIAL ASPECT OF THE PROJECT. COPIES OF THIS DATA, IF ANY, MAY BE INSPECTED IN THE DISTRICT DEPUTY DIRECTOR'S OFFICE, THE OFFICE OF GEOTECHNICAL ENGINEERING AT 1600 WEST BROAD STREET OR THE OFFICE OF STRUCTURAL ENGINEERING AT 1980 WEST BROAD STREET.

	LEGEND			
DES	CRIPTION	ODOT CLASS	CLASSI MECH./V	
Grave Grave	el with Sand (A-1-b)	A-1-b	1	6
Grave and S	el with Sand Silt (A-2-4)	A-2-4	4	4
Coar	se and Fine Sand (A-3a)	A-3a	2	6
Sand	y Silt (A-4a)	A-4a	10	20
*** *** ***	(A-4b)	A-4b	5	9
silt	and Clay (A-6a)	A-6a	4	32
silty	/ Clay (A-6b)	A-6b	3	2
		TOTAL	29	79
Sand	Istone	VISUAL		
Weat	thered Sandstone	VISUAL		
Shal	е	VISUAL		
Silt:	stone	VISUAL		
Тор	soil	VISUAL		
- \$ -	BORING LOCATION - PLAN VIEW DRIVE SAMPLE AND/OR CORE BORING L	OCATION		
	PLOTTED TO VERTICAL SCALE ONLY			
w ———	INDICATES FREE WATER ELEVATION			
▽	INDICATES STATIC WATER ELEVATION			
——TR	INDICATES THE TOP OF ROCK ELEVATIO	N		
X/Y/Z	FIGURES BESIDE THE BORING IN PROFILE INDICATE THE NUMBER OF BLOWS FOR S PENETRATION TEST X = NUMBER OF BLOWS FOR FIRST 6 Y = NUMBER OF BLOWS FOR SECOND Z = NUMBER OF BLOWS FOR THIRD 6	TANDARD INCHES 6 INCHES		
50 (n)	INDICATES NUMBER OF BLOWS (50) TO D BARREL SAMPLER A DEPTH OF (n) INCHES THAN THE NORMAL 6 INCH INCREMENT.			







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640				
620				
<u> 600 </u>				
580				
560				
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520				
500				
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460				
44		 3	4	

Client: T	ranSyst	ems, Inc					Project: SCI-823-0.00						Job No	o. 0121-	3070.0	3	Client: 1	FranSyst	ems, Ind	2				Project: SCI-823-0.00
G OF:	Boring		TR-76			ocation: Sta	38+59.2, 27.1 ft LT of US 52 Ramp A BL Date Drilled:	3/30/05									LOG OF:	Boring		B-33				39+14.0, 11.2 ft. LT of US 52 Ramp A BL
epth t)	Elev. (ft) 555.1	Blows per 6"	Recovery (in)	Sam No Pulve	Press / Core d	Hand Penetro- meter (tsf)	WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 4.0' (includes drilling water) DESCRIPTION	% Aggregate		% M. Sand % F. Sand			ral Moist L ⊢−−− Blows p	RD PENI ture Cont per foot - 20 ;	tent, % 1 - \	- •	Depth (ft)	Elev. (ft) 558.4	Blows per 6"	Recovery (in)		Press / Core o	Hand Penetro- meter (tsf)	WATER OBSERVATIONS: Water seepage at: No Water level at completion: No 10 DESCRIPTIO
_	-554.9 -	4 6 7	12	1		4.5+	Topsoli - 2" Hard brown SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; damp.						Ø				0.¥ 	-558.0 -	22 32 32	18	1		3.0	 Topsoil - 5" Very stiff brown SANDY SILT (A-4a), little to gravel, trace to little clay; contains sandston fragments; dry to damp.
5.0 5 —	002.1	2 3 5	10	2		4.0	Very stiff to hard brown SANDY SILT (A-4a), trace to little clay, little gravel; damp.	15	10 -	- 11	47 17	C		H			5		4 5 12	18	2		2.25	
_ 	-547.1 -	2 7 15	17	3		-	Medium dense brown SANDY SILT (A-4a), trace clay,	16	23 -	- 21	30 10		$ \bullet\rangle$	¥ T			- - 8.0	-550.4 -	7 8 8	18	3		1.5	@ 6.0' stiff, moist.
- 10 —		5 9 12		4			little gravel; damp.							Ŕ			- 10 — —11.0 —	547.4	38 48 27 48	18	4		1.5	trace clay; dry to damp.
-		''12 13 1		5										6			-		50/5	4	5			Severely weathered brown SANDSTONE,
 	-540.6 - -540.1 -			6	-		Severely weathered brown SANDSTONE. Hard brown SANDSTONE; very fine to fine grained, moderately to highly weathered, medium bedded, moderately fractured. @ 16.4-16.8', 17.3', 18.4', filled fractures. @ 19.4' gray @ 20.9'-21.3', fractured.									50+ C	14.5 15 _ _ _ _	-543.9		Rec 116"		R1		Soft to medium hard brown and gray SAND fine to medium grained, highly weathered, argiilaceous, laminated, highly fractured, co clay seams. @ 14.7'-15.1', lost recovery.
20 — - -		Core 120"	Rec 120"	RQI 64%	1 R1		@ 19.6', qu = 11,036 psi.										—20.0— — —	-538.4 -	_ 120"	0110	60%			Medium hard to hard gray SANDSTONE; t slightly weathered, micaceous, argillaceou bedded, slightly fractured. @ 20.8'-21.3', qu = 9,284 psl.
-25.0 	-530.1 -						Bottom of Boring - 25.0'										24.5 25 	-533.9						Bottom of Boring - :

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Job No. 0121-3070.03 Dete Drilled: 02/01/07 GRADATION (prior to coring) (midde holicwstem augers, netuckes drilling water) GRADATION (%) STANDARD PENETRATION (N) Natural Moleture Content, % - • PL PL - - - 13 13 - 10 48 17 - - SILT (A-2-4), ne 28 26 - 17 28 5 - - - - 60+0 - 50+0 - 76 50+0 - 60+0 - 80+0 - 76 - 50+0 - 76 - 50+0 - 76 - 50+0 - - - 60+0 -							_	_																	Т	0	٦
GRADATION (inside hollowstern augers, notudes drilling water) GRADATION B Boost Strained, nhy STANDARD PENETRATION (N) Natural Moisture Content, % - PL - 10 20 30 40 13 13 - 10 48 17 13 13 - 10 48 17 13 13 - 10 48 17 13 13 - 10 48 17 13 13 - 10 48 17 13 13 - 10 48 17 13 13 - 10 48 17 13 13 - 10 48 17 13 13 - 10 48 17 10 28 28 - 17 28 5 10 20 - 50 50 50 10 28 28 - 17 28 5 10 20 50 50 50	Date Drilled:	02/01/	7	 			_		ſ	Jo	b	No).	01	21	-30	070	0.03	3		_	_		DRAWN		HECKE	
me 13 13 13 13 14 17 10 48 17 10 <td< td=""><td></td><td>_</td><td></td><td></td><td></td><td>Clay</td><td></td><td>Nat</td><td>tura PL</td><td>al I</td><td>Mc ⊢</td><td>oist</td><td>ure</td><td>• C</td><td>on</td><td>ter</td><td>ıt,</td><td>% ⊣</td><td>-</td><td></td><td>I) ●</td><td></td><td></td><td></td><td></td><td>0</td><td></td></td<>		_				Clay		Nat	tura PL	al I	Mc ⊢	oist	ure	• C	on	ter	ıt,	% ⊣	-		I) ●					0	
	SILT (A-2-4), laceous. DNE; very ins	13	13	10	48	17				•						300)75 5	0+				_	DAILVIE NO. 301-023-00/4 MD A TO ND 6D 823 0VED 0D	MP A IO NB SK 823 UVER CR

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Client: T					-		Project: SCI-823-0.00							IJ	ob No	o. 012 [.]	1-3070.0	3	-
LOG OF:	Boring	1	B-34	Com		Location: Sta	. 40+27.4, 49.7 ft. LT of US 52 Ramp A BL Date Drilled: WATER	01/26/	07	GRA									4
				Samı No.		Hand	OBSERVATIONS: Water seepage at: None		Τ										
Depth	Elev.	ar 6"	(ii)		Sore	Penetro- meter	Water level at completion: None (prior to coring) 8.6' (inside hollowstem augers, includes drilling water)	aate		2 2	Þ						NETRAT	• •	
(ft) 0	(ft) 558.6	Blows per 6"	Recovery	Drive	Press / Core	(tsf)	DESCRIPTION	% Aggregate	Sec. 7%	% M. Sand	% F. Sar	% Silt	% Clay	PL BI 10	ows p	xer foot 20	-	LL) 40	
-0.¥ 	-558.2 -	5 6 5	18	1		3.0	Topsoil - 5" Very stiff brown SILT (A-4b), some fine to coarse sand, little clay, trace gravel; damp to moist.							G	,				
5 —		3 4 9	18	2		2.0		6	1:	2 -	12	54	16		ł				
-5.5	-553.1 -	8 8 15	18	3		2.5	Very stiff brown SANDY SILT (A-4a), little gravel, trace clay; contains sandstone fragments; damp to moist.												
 10		10 11 13	18	4		-		13	3 2	3 –	21	36	7		,				
 -13.0	EAE 8	8 10 11	18	5		-													
	544.6 -	50/5	3	6			Severely weathered brownish gray SANDSTONE.											╢╁	4
15 — 							Soft to medium hard brown and gray SANDSTONE; very fine to medium fine grained, highly weathered, argillaceous, laminated, highly fractured, contains clay seams, iron stained.												
 	-538.9 -	Core 120"	Rec 120"	RQD 65%	R1		Medium hard to hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, micaceous, laminated to thinly bedded, slightly fractured. @ 20.1'-20.7', qu = 5.450 psi, Er = 326,649 psi.	_											
 	-534.6 -						@ 20.1-20.7', qu = 5,450 psi, Er = 325,549 psi. Bottom of Boring - 24.0'												
_	1																		

Client: 1					۰.		Project: SCI-823-0.00
LOG OF:	Boring		B-35	Sam No	ole		40+29.1, 28.3 ft. RT of US 52 Ramp A BL WATER OBSERVATIONS:
Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Drive	Press / Core	Hand Penetro- meter (tsf)	Water seepage at: None Water level at completion: None 1.8' (in Inc DESCRIPTION
-0.2=	558.4 -558.0 -		-		-		Topsoil - 5"
-2.0		18 50/4	10	1			Very dense gray GRAVEL WITH SAND AND SIL contains sandstone fragments; damp.
-2.5	-556.4 - -555.9 -	50/3	1	2			Severely weathered gray SANDSTONE.
- 5 —							Medium hard to hard gray SANDSTONE; fine gra slightly to moderately weathered, argillaceous, micaceous, thinly bedded, slightly to moderately fractured.
-		Core 120"	Rec 120"	RQD 85%	R1		@ 7.5'-8.2', contains clay seams. @ 8.4'-8.9', qu = 10,892 psi, Er = 1,616,616 psi.
10 —							@ 10.2'-10.4', day seam.
-12.5	-545.9 -						Bottom of Boring - 12.5'
15 —							
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e (prior to coring) (inside hollowstem augers, notudes drilling water) N STANDARD PENETRATION (N) Natural Moisture Content, % - • PL PL PL PL PL PL PL PL PL PL PL PL PL PL	e GRADATION e (prior to coring) (inside hollowstern augers, ncludes drilling water) N N SILT (A-2-4); grained, iv si.							Job N	ю.	012	1-3	070.	03			1	NM	K E D	N LO
e (prior to coring) (inside hollowstern augers, netudes drilling water) N STANDARD PENETRATION (N) Natural Moisture Content, % - PL PL PL PL Blows per foot - 10 20 30 40 SILT (A-2-4); grained, iv si.	• (chor to coving) (tripicto holiowstein augers, motivides duiling water) STANDARD PENETRATION (N) Netural Moisture Content, % - • PL	Date Drilled: 02/	01/0														DRAWN	U I I I	
ା		e (prior to coring) (inside hollowstem augers, ncludes drilling water) N SILT (A-2-4); grained, Iy		6		% Clay	Natura PL	Moi:	sture	o Co	onte	nt, % 1 (ะ - ว	-)> ■ ■ ■	+		10. SCI-823-0074	A TO NB SR 823 OVER CR 503

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Client: Tr	ranSyste	ms, Inc.					Project SCI-823-0.00								Job No. 0121-3070.03
LOG OF:	Boring		B-36		L	ocation: Sta	41+53.2, 8.2 ft. LT of US 52 Ramp A BL Date Drilled: 01	/31/0							
				Sam No	ple	Hand Penetro-	WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring)	-	<u>ہ</u>	BRAD	DATIO	NC		5	STANDARD PENETRATION (N)
(ft)	Elev. (ft) 558.5	Blows per 6"	Recovery (in)	Drive	Press / Core	meter (tsf)	1.2' (nside hollowing) Includes drilling water)	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Sit	% Clay	Natu P	ural Moisture Content, % - PL → ILL Blows per foot - 10 20 30 40
-0.8 	-558.2 -	18 50/5	4	1			Topsoil - 4" Very dense gray SANDY SILT (A-4a), little clay; contains sandstone fragments; dry.								50
- 5 - - - - 10 - -	-555.5 -	50/4 Core 120"	2 Rec 110"	_ 2 RQD 86%	R1		Medium hard to hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, micaceous, thinly bedded, slightly to moderately fractured, iron staining. @ 3.0'-4.1', lost recovery. @ 6.7'-7.5', high angle fracture. @ 6.6'-8.7', clay seam. @ 9.6'-10.0', qu = 908 psi.	-							\$0+ (
- 15 — - - - 20 — - - - - - - - - - - - - - - - - - - -							Bottom of Boring - 13.0'								

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DRAWN	CHECKED
STRUCTURE FOUNDATION INVESTIGATION	BRIDGE NO. SCI-823-0074 US 52 RAMP A TO NB SR 823 OVER CR 503
	SCI-823-0.00
6	$\int \frac{1}{2}$