PROJECT DESCRIPTION

THE PROJECT CONSISTS OF PLACING A STRUCTURE FOR PROPOSED RAMP C OVER THE NORFOLK SOUTHERN RAILROAD. THE STRUCTURE AS PLANNED, IS A THREE-SPAN STRUCTURE, WHICH UTILIZES MSE RETAINING WALLS TO HOLD BACK THE ROADWAY EMBANKMENT AND CONTAIN THE FORWARD ABUTMENT. IT IS UNDERSTOOD THAT A SPILL THROUGH SLOPE IS CURRENTLY PROPOSED AT THE REAR ABUTMENT LOCATION.

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.

GEOLOGY

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GENERALIZED GEOLOGICAL REFERENCES REPORT THAT THE SITE LIES ON THE EAST SIDE OF THE FLOOD PLAIN OF THE TEAYS STAGE, PORTSMOUTH RIVER, WHICH IS CURRENTLY THE EAST SIDE OF THE SCIOTO RIVER VALLEY. THIS AREA IS UNGLACIATED, HOWEVER THE SCIOTO RIVER VALLEY IS FILLED WITH ILLINOIAN AND WISCONSIN GLACIAL OUTWASH TO DEPTHS OF UP TO 90 FEET.

THE AREA OF THESE STRUCTURES IS CHARACTERIZED BY GENTLY TO MODERATELY SLOPING TOPOGRAPHY RISING FROM OF THE FLOODPLAIN OF THE SCIOTO RIVER. THE PROJECT AREA IS LOCATED IN THE SHAWNEE-MISSISSIPPIAN PLATEAU OF THE UNGLACIATED PORTION OF THE APPALACHIAN PLATEAU PHYSIOGRAPHIC REGION. THE SHAWNEE-MISSISSIPPIAN PLATEAU IS CHARACTERIZED BY DEVONIAN AGED TO PENNSYLVANIAN AGED ROCKS AND CONTAINS RESIDUAL, COLLUVIAL, ALLUVIAL, AND LACUSTRINE SOILS.

RECONNAISSANCE

SEVERAL SITE RECONNAISSANCE VISITS WERE MADE BETWEEN JUNE 2004 AND SEPTEMBER 2007. THE SURROUNDING AREA IS UTILIZED FOR AGRICULTURAL PURPOSES AND COMMERCIAL STORAGE. GROUND COVER IN THE PROJECT AREA CONSISTS OF GRASS, BRUSH, AND OCCASIONAL SMALL TREES.

SUBSURFACE EXPLORATION

THE SUBSURFACE EXPLORATION CONSISTED OF DRILLING A TOTAL OF ELEVEN BORINGS FOR THE RAMP C BRIDGE AND RETAINING WALLS. BORING B-1117A WAS DRILLED ON SEPTEMBER 19, 2005. ALL OTHER BORINGS CONSIDERED FOR THIS STRUCTURE WERE DRILLED FROM MARCH 15 TO OCTOBER 18, 2005. THE BORINGS WERE DRILLED WITH BOTH TRUCK AND ATV MOUNTED ROTARY DRILL RIGS, USING 3 1/4 -INCH 1.D. HOLLOW STEM AUGERS TO ADVANCE THE HOLES THROUGH SOIL. USING 3 1/4 -INCH I.D. HOLLOW SIEM AUGERS TO ADVANCE THE HOLES THROUGH SO 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 COPE BADDEL WATED MATEHON CORE BARREL, WATER METHOD.

EXPLORATION FINDINGS

BORINGS FOR THE PROPOSED BRIDGE GENERALLY ENCOUNTERED 1 TO 8 INCHES OF TOPSOIL AT THE GROUND SURFACE. BELOW THE TOPSOIL, BORINGS GENERALLY ENCOUNTERED COHESIVE SOILS CONSISTING OF SILT (A-4B) TO CLAY (A-7-6) TO DEPTHS RANGING FROM 8.0 TO 20.5 FEET BELOW THE GROUND SURFACE. BELOW THE COHESIVE SOILS, LAYERS OF COHESIONLESS SOILS CONFIGURED TO DEPTHS WITH COHESIVE SOILS, LAYERS OF COHESIONLESS SOILS CONSISTING OF GRAVEL WITH SAND (A-1-B) TO COARSE AND FINE SAND (A-3A) WERE GENERALLY ENCOUNTERED TO DEPTHS RANGING FROM 20.5 TO 33.0 FEET BELOW THE GROUND SURFACE, WHERE THE UNDERLYING BEDROCK WAS ENCOUNTERED.

BEDROCK WAS CONFIRMED BY CORING IN ALL BORINGS EXCEPT BORINGS B-1117A BEDROCK WAS CONFIRMED BY CORING IN ALL BORINGS EXCEPT BORINGS B-1117A AND B-1122A. BORINGS B-1117 AND B-1118, DRILLED FOR THE REAR ABUTMENT AND PIER 1, RESPECTIVELY, ENCOUNTERED SOFT TO MEDIUM HARD BLACK SHALE (SUNBURY SHALE) AT THE TOP OF ROCK. IN THESE BORINGS, BEDROCK WAS GENERALLY ENCOUNTERED AT DEPTHS RANGING FROM 20.5 TO 33.0 FEET BELOW THE GROUND SURFACE. IN THESE BORINGS, HARD TO VERY HARD SANDSTONE WAS ENCOUNTERED BELOW THE SHALE LAYERS, AT AN APPROXIMATE ELEVATION OF 515. BORINGS B-1119 AND B-1120, DRILLED FOR THE PIER 2 AND FORWARD ABUTMENT LOCATIONS, RESPECTIVELY, GENERALLY ENCOUNTERED HARD TO VERY HARD GRAY SANDSTONE AT THE TOP OF ROCK. IN THESE BORINGS, BEDROCK WAS GENERALLY ENCOUNTERED AT DEPTHS RANGING FROM 25.0 TO 26.0 FEET BELOW THE GROUND SURFACE. THE RECOVERY IN EACH CORE RUN VARIED BETWEEN 90 AND 100 PERCENT. THE ROCK OUALITY DESIGNATION (ROD) OF THE BEDROCK RANGED BETWEEN 17 AND 97 PERCENT WITH AN AVERAGE OF 60 OF THE BEDROCK RANGED BETWEEN 17 AND 97 PERCENT WITH AN AVERAGE OF 60 PERCENT, INDICATING FAIR QUALITY ROCK.

SEEPAGE WAS OBSERVED IN ALL OF THE BORINGS. SEEPAGE WAS FIRST OBSERVED AT DEPTHS RANGING FROM 10.0 TO 26.0 FEET BELOW THE GROUND SURFACE. MEASURABLE WATER LEVELS WERE OBSERVED IN ALL BORINGS EXCEPT TR-48 PRIOR TO ROCK CORING AT DEPTHS RANGING FROM 11.0 TO 28.1 FEET BELOW THE GROUND SURFACE.

		LEGEND			
	DES	CRIPTION	ODOT CLASS	CLASSI MECH./V	FIED ISUAL
000	Grave	l with Sand	A-1-b	8	17
	Grave	l with Sand and Silt	A-2-4	7	9
	Grave	l with Sand, Silt, and Clay	A-2-6	3	4
	Coars	e and Fine Sand	A-3a	4	8
	Sandy	Silt	A-4a	3	5
+ + + + + + + + +	silt		A-4b	2	3
	silt a	and Clay	A-6a	5	7
	Silty	Clay	A-6b	2	8
	Clay		A-7-6	5	5
			TOTAL	39	66
	Sands	tone	VISUAL		
	Shale		VISUAL		
	Weath	nered Sandstone	VISUAL		
	Weath	nered Shale	VISUAL		
	Topso	bil	VISUAL		
-	•	BORING LOCATION - PLAN VIEW			
		DRIVE SAMPLE AND/OR CORE BORING LO PLOTTED TO VERTICAL SCALE ONLY	DCATION		
W		INDICATES FREE WATER ELEVATION			
Z	7	INDICATES STATIC WATER ELEVATION			
	—TR	TOP OF ROCK			
	•	WATER CONTENT NEARLY EQUAL TO OR GREATER THAN LIQUID LIMIT			
х.	/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 0 Z = NUMBER OF BLOWS FOR THIRD 6	FANDARD INCHES 5 INCHES INCHES		
50	(n)	INDICATES NUMBER OF BLOWS (50) TO D BARREL SAMPLER A DEPTH OF (n) INCHES THAN THE NORMAL 6 INCH INCREMENT.	RIVE A SPLIT- 5 OTHER		

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Boulders **SPECIFICATIONS**

AVAILABLE INFORMATION

RECON. -DRILLING -

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				 	B-1/17			B-1117 7.3′ LT								
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				<u>9/13</u> 3/	4/5	15	3/6/	5								
				3/	3/5 2/2	14	2/2/					7-		R-11	18	
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520	W/0/H 36 W0H/W0H/1 11/14/12 42/34/17 15	Existing SUR	5/4/3 5/4/4 FACE 16/15/20 14/19/20		2/2/2 W/0/H 2/1/1 4/9/9	
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Client: Tr	anSyst	ems, Inc	C.		-		Project: SCI-823-0.00						J	ob No.	0121-3	3070.03	3	Client:	TranSy	stems,	Inc.	47	_		Project: SCI-823-0.00
Depth (ft)	Elev. (ft)	lows per 6"	iecovery (in)	San	Less / Core	Hand Penetro- meter (tsf)	a. 3053700.3, 19.3 ft. R1 of US 23 Ramp C BL Date Driller WATER OBSERVATIONS: Water seepage at: 18.5' Water level at completion: None (Prior to coring) 11.0' (Includes drilling water) DESCRIPTION	- Aggregate	GR Sand	M. Sand	Sitt Clar	c Clay	STA Natural PL Bi	NDAR Moisti	D PENE Ire Cont	ETRATIO	ION (N) - ● L	Depth (ft)	Elev.	lows per 6"	ecovery (in)		Sample No. Less / Core	Hand Penetro- meter (tsf)	WATER OBSERVATIONS: Water seepage at: 26.0' Water level at completion: 23.0' (p 20.0' (ii) DESCRIPTION
0 _0.6 _ 	<u>565.3</u> 564.7- 562.3-	⁵ 55 344	4 11	1		- 4.5+	Topsoil - 7" Stiff gray SILTY CLAY (A-6b), trace gravel; contains shale fragments; damp. Hard brown SANDY SILT (A-4a), some gravel, little clay; damp.	28	16 -	- 15	<u>×</u> × 24 1	17		•		<u>0 4</u>	40 Plastic	0 — 0.7 — 	<u>562.6</u> -561.9	3 6 3 4	6 6 5 6		1		Topsoil = 8" POSSIBLE FILL: Loose to medium dense brow SANDY SILT (A-4a), little coarse gravel, trace of damp. @ 0.7'-2.5', contains roots.
5.5 - - -	-559.8-	533 33	12	3			Loose brown COARSE AND FINE SAND (A-3a), some gravel, some silty clay; dry to damp.	21	20 -	- 36	23		ð			Non-F	Plastic	5.5	-557.1	4 2 2 2	3 3		3		POSSIBLE FILL: Medium stiff gray SILTY CLA little gravel; contains organic material and sandstone fragments; moist.
10 - - -		³ 5 ⁴ 4 5	13 12	5									0 Q					10 — - -	-	2 2 2	2 2 4 4		5		
- 15	- 47 0	⁴ 7 ₉ ⁵ 3 ₂	10 8	6 7			(@ 13.5'-15.0', medium dense.							Þ				15 — —15.5 —	-547.1	2 4	9 5 5 12		6 7	3.0	Very stiff brown SILT (A-4b), little clay, little fine to coarse sand; contains coarse sand sean
-18.0	-547.3- -544.8-	1 2 1 50/4	8	8			Very loose dark brown GRAVEL WITH SAND (A-1-b), trace clay; wet. Severely weathered gray SHALE.					đ	<u></u>				 50+€			5 6 3 2	7 12		8		Loose to medium dense brown GRAVEL WITH (A-2-4), trace clay; moist to wet.
-22.5 	-542.8-						Medium hard gray SHALE; moderately weathered, thinly laminated, arenaceous, slightly fractured, contains ferric sandstone bands, fissile after desiccation. @ 22.5'-28.0', highly fractured. @ 28.8'-28.9', high angle fracture. @ 23.5'-27.8'-31', clay seams												-537.1	2 2 1	2 12		10		Very loose brown GRAVEL WITH SAND, SILT
- - 30-		Core 120"	Rec 120"	RQ 789	20 7 7 8 8 8 8		@ 29.2'-30.0', very fine sandstone.											- - - - -	-532.6	6 8	9 6		11		@ 28.5'-30.0', medium dense. Medium stiff gray SILT (A-4b), little fine to coar
32.5 	-532.8-						Bottom of Boring - 32.5'											33.0	-529.6	4 5 50/4	76		13 14	0.5	sand, trace to little clay; wet. Severely weathered black SHALE, carbonacec
-																		-	-	<u>50/3</u>	5 <u>3</u> 5 2		15 16		
40 — - -																		40 — - - -43.0 —	-519.6	;			_		Soft black SHALE; moderately weathered, cart
45 																		45 — 	514 f	Co 60	re Re " 60"	c 12	RQD R ⁴		Iaminated, moderately fractured. @ 43.0'-44.0', broken zone. @ 44.9'-45.0', decomposed.
 50 																		50 —	-						Bottom of Boring - 48.0'
- - 55 -																		- - 55 —	-						
- - - 60																		- - - 60	-						

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							Job No. 0121-3070.03	
Date Drilled: 9/*	19/08	5	RA	DAT	to 10N	1	/20/05	
, (prior to coring) (includes drilling water) N	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40	
own and gray e clay; _AY (A-6b), _arms; wet. TH SAND AND SILT _T, AND CLAY (A- arse eous.	0 53 53 53	2 13 33 12		13 9 9	70 15 17 15	15 10 9 (STRUCTURE FOUNDATION INVESTIGATION BRIDGE NO. SCI-823-1603 RAMP C OVER NORFOLK SOUTHERN RR	
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| in Svete | me inc | | | | | Project: SCI-823-0.00 |
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| Boring | E | 3-1117A | | L | ocation: | Sta. 3894+54.8, 63.4 ft. LT of US 23 Ramp C BL Date Drilled | 08/02/07
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 | | LOG OF: | Boring | 9
 | B-1118 | 3 | ٦
 | ocation: S | ta. 3896+55.5, 6.3 ft. RT of US 23 Ramp C BL |
| | | | San | ple | | WATER |
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 | T | San | nple
 | | WATER |
| | -6 | (ij | No | e | Hand
Penetro
meter | UBSERVATIONS: Water seepage at: 20.5'-30.5'
Water level at completion: 28.1' (Inside hollowstern augers) | ate
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 | STAN | IDARI | PENE | |
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 | Hand
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meter | UBSERVATIONS: Water seepage at: 11.8'-2
Water level at completion: 12.7' (r
15.6' (i |
| Elev.
(ft) | slows per | Recovery | Drive | ress / Co | (tsf) | DESCRIPTION | 6 Aggreg
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 | | Depth
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 | Recovery | Drive | ress / Co
 | (tsf) | DESCRIPTION |
| <u>81.7</u> | 13 ₁₀ | 49 | 1 | | 4.5+ | POSSIBLE FILL: Hard brown and gray SILT AND CLAY (A-
6a), little fine to coarse sand, trace to little
gravel; damp. | 6
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 | | 0 | <u>540.2</u> | 1 2
 | 40 | 1 |
 | 0.75 | No topsoil
Medium stiff to stiff brown SILT AND CLAY (A-
trace fine to coarse sand, trace gravel; moist. |
| F | 34 | 13 | 2 | | 4.0 | | 10
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 | | 5 | -540.7 | 5
 | 18 | |
 | | Very stiff brown CLAY (A-7-6), some silt, trace |
| | 3 ₅ | 8 | 3 | ет 1 | 4.0 | @ 8.0', medium stiff to stiff, some gravel. | 22
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 | 2.5 | |
| 551.2- | 2
2 | 2 | 4 | ST2 | 1.0 | POSSIBLE FILL: Medium stiff to stiff brownish gray |
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 | | 10 — | |
 | 3 18 | 4 |
 | 2.0 | @ 11.0'-11.8', very soft to soft. |
| | WOH
2 | 14 | 5 | | 1.0 | SILT
(A-4b), some clay, little fine to coarse sand, trace
gravel; trace organic material; moist. | 1
 | 5 –

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 | | 11.8- <u>-</u> | -534.4 | - ⁷ 5 g
 | 18 | 5ê | | | | | |
 | 0.25 | Loose to medium dense brown GRAVEL WITH
(A-2-4), trace clay; wet. |
| | 3 ² 2 | 10 | 6 | ST 3 | 1.0 | igg io.∪, uain gray. |
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 | | | -530.7 | 4 5
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| \$45.7- | ³ 2 4 | 16 | 7 | | 1.75 | Stiff brown SILTY CLAY (A-6b), trace fine to coarse
sand; moist. | 0
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 | | - | | 4 7 ₁ .
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 | | ittle silt, trace clay; wet. |
| | 54 | 16 | 8 | | 1.50 | @ 19.0', trace to little gravel. |
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 | 3 13 | 8 |
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| ×41.2- | WOH
WOH
2 | 14 | 9 | | | Very loose brown GRAVEL WITH SAND AND SILT (A-2-4),
some silty clay; wet. | 32
 | 28 –

 | 8 | 18 14
 | 4

 | | | | Non | -Plastic
 | | -20.5 | -525.7 | 17
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28
 | 3 10 | 9 | | | | | |
 | | Severely weathered black SHALE. |
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 | | - | E04 0 | 50/3
 | 3 | 10 | | | | | |
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| 535.2- | 9 | 19 | 116 | | | Dense to very dense brown and gray GRAVEL WITH SAND |
 | 16 _

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 | | 25.0 | -021.2 | | | | |
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 | | Medium hard black SHALE; moderately weather
carbonaceous, laminated, slightly to moderately
fractured. |
| - | 20 | 10 | 12 | | | (A-1-b), little silty clay; wet. |
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 | | - | | Core
 | Rec | RQ | 2 R1
 | | @ 28.9'-29.1', broken zone. |
| 7 | 42
16 | 14 | 13 | | | Severely weathered black SHALE. |
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 | | 30 —
—30.6 —
_ | -515.6 |
 | | 787 | •
 | | Hard gray SANDSTONE; very fine to fine grain |
| | 30/2 | 12 | | | | Bottom of Boring - 31.7' |
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 | | slightly to moderately weathered, micaceous, the
bedded, slightly fractured.
@ 30.8', 33.6', 33.7', 34.8', low angle clay filled
fractures. |
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 | | 35.0 | -511.2 |
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 | | @ 30.8'-33.8', calcareous.
Bottom of Boring - 35.0' |
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OG OF:	Boring		rr-47		L	ocation: Sta.	. 3898+88.1, 20.9 ft. RT of US 23 Ramp C BL Date Drilled:	03/17/0	5										LOG OF	Borin	g	TR-48			Loca	ition: Sta.	. 3897+72.5, 52.7 ft. RT of US 23 Ramp C BL
			_	San No	iple).	Hand	WATER OBSERVATIONS: Water seepage at: 13.0'-18.0'	H	GF			Η	_			DEVI	TD 4 -						S	ample No.	_	Hand	WATER OBSERVATIONS: Water seepage at: 16.0'-1
Depth (ft)	Elev. (ft)	s per 6"	very (in)		s / Core	Penetro- meter (tsf)	Water level at completion: 18.0' (prior to coring) 9.0' (includes drilling water)	gregate	Sand	Sand		<u>N</u>	Natu P	stanL uralMo ºL ⊢	DARD	e Cont	ent, %	ION (N) - ● LL	Depth (ft)	Elev. (ft)	s per 6"	very (in)		s / Core	P	enetro- meter (tsf)	Water level at completion: 8.0' (inc
).1	543.1 -543.0-	Blow	Reco	Drive	Pres		DESCRIPTION	₽ ₽	0' %	й % %	: 15 * %	ё %		Blow 10	/s per 20	foot - 30	, O	40	0-	546.3	Blow	Reco			8		DESCRIPTION
_	0.0.0	1 2 4	10	1		1.5	Stiff to very stiff brown and gray CLAY (A-7-6), trace fine sand; damp to moist. @ 1.0'-2.5', slightly organic.						\bigcirc						-	540.0	22	3 14		1			FILL: Loose black GRAVEL WITH SAND (A-1-t mostly coal fragments and cinders; damp.
		2 4 5	13	2		2.5								0						-543.3		4 1		2			FILL: Very loose gray and black SILT AND CLA little fine to coarse sand; contains roots, coal an cinder fragments; damp.
_		4 6 10	15	3		4.5	@ 6.0'-7.5', hard.	0	0 -	- :	2 48	50		N	•			+	5.5 	-540.8	WOH	3 16		3		2.5	Very stiff brown SILT (A-4b), some clay, trace fi sand; moist.
,— ,	-535.1-	1 3 2	10	4		0.5	Medium stiff brown SANDY SILT (A-4a), trace gravel, trace clay; moist to wet.							Y						-538.3	2 5 7	7 17		4		3.5	Very stiff brown and gray CLAY (A-7-6), trace fi sand; damp to moist.
-		2 2 2	7	5		-							Ĭ						-		2 5	3 15		5		3.5	
.0	-530.1-	мо ^н	18	6			Very loose brown COARSE AND FINE SAND (A-3a), little silty clay; wet.	0	2 -	- 8	3 1	5	Non-P	lastic			•			-533.3	- 1	2 5		6			Very loose brown GRAVEL WITH SAND (A-1-b silt, trace clay; moist to wet.
-		WOH WOH	18	7															-		1	1 8		7			
0. 	-525.1-	11 14 12	10	8		1.5	Stiff brown GRAVEL WITH SAND AND SILT (A-2-4), little clay; moist.	30	11 -	_ 2	4 22	13		\setminus					-		6	7 10		в			@ 18.5', medium dense; moist.
1.0	-522.1-	42 34 17	12	9		-	Very stiff to hard dark gray SANDY SILT (A-4a), little clay, little gravel; damp to moist.	15	9 -	- 3	5 26	15				97					2 7 30	15		9			@ 21.0', dense, trace gravel, trace clay.
.0	-520.1-	4 10 21	11	10			Severely weathered black SHALE, carbonaceous.	29	23 -	- 3	1 12	5					Nore	-Plastic	-23.5	-522.8	20 15	12		10			Severely weathered black SHALE.
5— ;.5—	-516.6-	50/4	4	_ 11			Hard gray SANDSTONE; very fine to fine grained,	_									\$	50+0		-521.3							Soft to medium hard black SHALE; carbonaceo slightly weathered, very thinly bedded, highly fractured.
_							slightly weathered, argillaceous, micaceous, massive, slightly fractured. @ 26.7'-28.4', healed vertical fracture.												_		Core	Rec	R		1		@ 25.3'-25.6', 26.0'-26.4', broken. @ 27.1'-27.2', sandstone seam.
		Core 120"	Rec 120"	RQI 74%	R1		@ 30.0'-30.2', healed vertical fracture. @ 30.2'-32.4', 34.7'-35.4', high angle bedding. @ 31.8'-32.4, broken zone with thin clay seam. @ 33.1'-33.6', low angle healed fracture. @ 33.1'-33.6', high angle healed fracture. @ 33.7', highly weathered fracture.												- 30.0 - -	- 516.:							Hard gray SANDSTONE; very fine to fine grain argillaceous, micaceous, slightly weathered, ma slightly fractured .
							@ 33.7'-34.0', very argillaceous.													-511.3	-						Bottom of Boring - 35.0'
<i>i</i> 6.5	-506.6-						Bottom of Boring - 36.5'	-											-								
40 —																			_ 40 —								
_																			-								
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	Date Drilled: 3/21/05														307	0.0	3			٦	NWA	CKED		
Date Drilled: 3/2	Date Drilled: 3/21/05 GRADATION tilling water)																				DR/	CHEO		
'-18.0' (includes drilling water)	gregate	Sand	Sand	Sand	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL → LL Blows per foot - ○ 8 % % 10 20 30 40														(N) ●					
N	¥ %	ن %	W %	Ч	% Si	% CI			10	Blov	vs p	20 1 T	fo	ot 3	0		40		-					
1-b); contains																				I				
LAY (A-6a), and								þ																
e fine							R																	
e fine	0	0	-	2	43	55	i		k	Þ			•							-	NOI	1	RR	
1-b), little									Į)											LIGAT		ERN	
				4-				ø													NVEST	3-1603	OUTH	
	37 52	27	-	17	1	9 7	C								1	lor	-P1	asi			I NO	CI-823	DLK S	
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ained, massive,																					TRUC		RAMP	
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Client:	TranSys	tems, In	с.				Project: SCI-823-0.00							Job No. 0121-3070.03	Client: 1	ranSys	tems, Ir	1C.
LOG OF	: Boring]	B-1119			Location: St	a. 3898+99.1, 24.8 ft. LT of US 23 Ramp C BL Date Drilled: 7	/18/05	5						LOG OF	Boring		B-1
Depth	Elev.	ler 6"	(II)	Sai N	ole Core	Hand Penetro- meter	WATER OBSERVATIONS: Water seepage at: 10.0'-25.0' Water level at completion: 12.0' (prior to coring) 5.0' (inside hollowstem augers)	egate		GRA				STANDARD PENETRATION (N) Natural Moisture Content, % -	Depth	Elev.	er 6"	
(ft)	(ft) 542.0	Blows	Recove	Drive	Press /	(tsf)	DESCRIPTION	% Aggn	ະ ເ ເ ເ ເ ເ ເ ເ ເ เ เ เ เ เ เ เ เ เ เ เ	% M. S	% F. Sa	% Silt	% Clay	PL ⊢ LL Blows per foot - ○ 10 20 30 40	(ft) 0	(ft) 542.7	Blows p	
0.3 	541.7+	6 6 5	7	1		3.0	Topsoil - 4" Very stiff brown SANDY SILT (A-4a), little clay, trace gravel; possible organic; damp.								-0.4	-542.3-	3 5 7	+
	-539.0	4 5 7	12	2		4.5+	Hard brown CLAY (A-7-6), trace fine to coarse sand, trace gravel; damp.							9	-		36	<u> </u>
5.5	-536.5-	4 4 5	12	3		2.0	Stiff to very stiff brown SILTY CLAY (A-6b), "and" fine to coarse sand, trace gravel; moist.	9	11	_	32	22	26		5.5 	-537.2-	2 5	$\frac{1}{1}$
—8.0— - 10—	-534.0-	3 3 3 3	10	4			Very loose to loose brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; wet.	46	18	-	9	18	9	∲			1 2	+
- - -13.0—	-529.0-		8	5										6		-532.2-	332	2
15 —	-	1 1 2	14	6			Very loose to loose brown COARSE AND FINE SAND (A- 3a), little gravel, trace clay; trace silt; wet.							¢.			1	╞
- - 	-524.0-	² 4 3	12	7				12	47	-	22	1	•	Non-Plastic	-		8 7 6	1
	521.5	589	13	8			Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), little clay; contains sandstone fragments; wet.	36	22	-	11	18	13	Nor-Plastic			7 29 10	1
	_	4 5 17	12	9			Medium dense to dense brown COARSE AND FINE SAND (A- 3a), little silt, little clay; contains sandstone fragments; moist.	14	6	-	48	20	12	Non-Plastic		510 7	14 22 18	1
	-517.0-	7 17 19	14	10	,		Ven/ hard draw SANDSTONE' year fine to fine drained									-019.7-	10 12	+ ¥
-	-	Core 60"	Rec 59"	RG 30'	2D %R-1		moderately to highly weathered, argillaceous, micaceous, thinly bedded to medium bedded, highly fractured, iron-staining @ 28.7'-28.9', high angle fractures.								26.0 	-516.7-	50/5	$\frac{1}{2}$
30.0	512.0						Bottom of Boring - 30.0'								-20.0	514.2		

LOG OF:	Boring		B-1120		L	ocation: St	ta. 3900+39.5, 19.1 ft. RT of US 23 Ramp C BL
				Sam No.	ple		WATER OBSERVATIONS: Water economy at: 11 0' 1
		-	<u></u>			Hand Penetro-	Water scepage at: 11.0 1 Water level at completion: 11.0 (
Depth	Elev.	per 6	<u>F</u>		/ Col	meter	5.0 (in
(11)	(11)	lows		Live	ress	(051)	DESCRIPTION
-o.2	542.7 -542.3-				₽.		Topsoil - 5"
-		3 5		1		4.5+	Very stiff to hard brown CLAY (A-7-6), "and" si trace fine to coarse sand: damp.
_		7	9				
_		³ 6		2		3.25	
-5.5	-537.2-	7	15				
		2 5		3			moist to wet.
_		4	12				
_		12		4			
10 — 0.5 —	-532.2-	4					Loose brown GRAVEL WITH SAND (A.1.b)
		33		5			LOUSE DIOWN GRAVEL WITH SAND (A-1-D), S
_		2					
-		1		6			
15 —							
		⁸ 7	,	7			
_		- 0					
-		7 29		8			@ 18.5'-22.5', dense.
20 —		10					
		14 22	_	9			
23.0—	-519.7-	10					Medium dense brown GRAVEL WITH SAND
-		10 12	14	10			(A-2-6); contains sandstone fragments; moist.
25 — 6 0 —	-516 7-						
- 0.0	-010.7-	50/5	6	11			Severely weathered brown SANDSTONE.
28 5	-514 2-						
	014.2						Hard gray SANDSTONE; very fine to fine grain
30 —		Core	Rec	RQD	R-1		laminated to medium bedded, moderately to h
_		60"	54"	17%			fractured. @ 32.8'-33.1', broken.
3.5-	-509.2-						
25							Bottom of Boring - 33.5'
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Project: SCI-823-0.00

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Date Drilled: 7	/18/0	5	204		101	1	_																	DR	분		
'-19.0' ' (prior to coring) (inside hollowstem augers) N	Aggregate	C. Sand	A. Sand	. Sand		Clay		Na	S atu P	T/ Ira		DA	RI	DF re	Co	NE ont	TF en	₹ A	тю % Ц	DN - L	(N	D					
	8	%	8	% ₽	8	%	Ļ	-		10		•8	20 1		- T	30) T	П	4	0		_					
silt,	•	1	-	2	44	53				C			•							-							
	0	0	-	2	49	49					5				+					-							
ND CLAY (A-2-6);	16	30	-	20	14	20			Ģ	/		•	ł					4									
some clay; wet.								9	b															TION		ב	
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										2	9	/			ł									NOI	CI-82		
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9, SILT, AND CLAY t.													0	X			/	ł						FOU	—	בש	
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Client: Tr	anSyste Boring	ms, Inc			٦.	nation: Sta	Project: SCI-823-0.00	d: 03/17/	05				Job No. 0121-3070.03	Client:	TranSys	tems, In	C. B 1121		1	ation: Sta	Project: SCI-823-0.00
Depth (ft)	Elev. (ft)	vs per 6"	overy (in)	San No	ss / Core	Hand Penetro- meter (tsf)	UNATER OBSERVATIONS: Water seepage at: 13.5'-19.0' Water level at completion: 16.0' (prior to coring) 5.0' (includes drilling water)		Sand	RAD	ATION Sand	iay -	STANDARD PENETRATION (N) Natural Moisture Content, % - • PL	Depth (ft)	Elev. (ft)	ws per 6"	overy (in)	Sampl No.	ss / Core e	Hand Penetro- meter (tsf)	OBSERVATIONS: Water seepage at: 16.0 Water level at completion: 16.0 9.0
0.1	543.1 543.0-	2 2 1	Rec		Pres		DESCRIPTION Topsoil - 1" FILL: Very loose brown and black GRAVEL WITH SAND (A-1-b), some silty clay; contains roots; damp.	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	8	W %	<u>т 8</u>	с %	Blows per foot - () 10 20 30 40	0.3=	539.0 -538.7	8 3 4	Rec		Pre	4.5+	DESCRIPTIO Topsoil - 4" FILL: Hard dark brown SILT AND CLAY (A- fine to coarse sand, little gravel; damp.
	-	2 2 2 2	4	2			@ 1.0-2.5', organic odor.	44	19	- 1	13 16	8	▶		-535.5	3 4 5	8	2		-	FILL: Medium stiff brown SANDY SILT (A-4 clay, trace gravel; wet.
-	537.6-	3 3 3	18	3		2.0	Stiff to very stiff brown SILT AND CLAY (A-6a), little fine to coarse gravel, trace fine to coarse sand; damp to moist.							5.5	-533.5	³ 4 ₃	13	3		1.0	Stiff gray SILT AND CLAY (A-6a), trace to lit to coarse sand, trace gravel; moist.
	534.6-	2 6 6	12	4			Medium dense brown and gray GRAVEL WITH SAND (A-1-b), little silty clay; moist.							10 —	•	2 2 2 2 2	16	4		1.25	
-	529.6-	² 11 7	11	5			Loose brown GRAVEL WITH SAND (A-1-b), some silt	56	3 15	-	9 16	4	Non-Plastic		-526.0		17	5		1.0	Very loose brown GRAVEL WITH SAND, Si
_	-	⁴ 3 5 4	8	6 7			trace clay; wet.	33	3 31	- 1	13 20	3	● Non-Plastic	15 —		¹ 4 9	10	7			@ 16.0'-17.5', medium dense.
<u>_</u>	524.1-	4 16 15 20	12	8			@ 18.0', heaving sand. Dense light brown GRAVEL WITH SAND AND SILT (A-2-4), trace to little alow: maint to wat							—18.0— 	-521.0	9 9 13	12	8			Medium dense brown COARSE AND FINE clay, trace gravel; wet.
-	-	14 19 20	8	9											-517.5	12 11 11	13	9		·	Severely weathered gray SANDSTONE.
5	517.6-	5 5 12	14	10			@ 23.0, gray.	30	0 11	- 2	24 25	10			-514.0	33 50/4	8	10			Very hard gray SANDSTONE; very fine to fi
ר. -	516.1-	50/3	3	11			micaceous. Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive. slightly fractured.						↓ ↓↓↓↓↓↓↓↓ 5 0+€	-	-	Core 60"	Rec 57"	RQD 65%	R1		bedded, moderately fractured. (@ 25.3'-25.4', 26.3'-26.4', 29.1'-29.5', filled fractures. (@ 29.7'-30.0', calcareous.
-+		Core	Rec	RQ	8 R1		@ 29.4',31.4',35.9', very thin clay seams. @ 29.8',30.8', thin clay seams. @ 31.6'-32.0', broken zone with clay and rock fragments.							30.0	509.0						Bottom of Boring - 30.0
		120	110	637			@ 33.4'-33.7', day seam. @ 33.7'-34.2', cross bedded.														
7.0	506.1-						Bottom of Boring - 37.0'														
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BL Date Drilled: 7/1	9/05	5					Job No. 0121-3070.03	DRAW	CHECKE
16.0'-21.0' 16.0' (prior to coring) 9.0' (inside hollowstern augers) PTION	Aggregate	C. Sand	M. Sand	F. Sand	NOI ⁻	Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○		Ľ
	8	*	8	*	8	8	10 20 30 40		
Y (A-6a), little	16	9	-	7	38	30			
(A-4a), some	7	16	-	24	31	22	││ │ _@ ● ┼┼┤ │ │ │ │ │ │ │ │ │ │ │ │		
to little fine D, SILT, AND CLAY (A- INE SAND (A-3a), some	2	4	-	6	57	31		DN INVESTIGATION	I-823-1603 LK Southern Rr
:. to fine grained, pous, medium lied							© © 50 *	TURE FOUNDATIC	BRIDGE NO. SCI C OVER NORFOI
30.0'								STRUC	RAMP
									SCI-823-10.13
								10	<u>/ 11</u>

1000000000000000000000000000000000000	Client: Trans	nSyster	ns, Inc. P	1152		1.0	cation: Ct-	Project: SCI-823-0.00	d 10/19/00	105		to	10/1/	Job No. 0121-3070.03
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Depth Ele (ft) (ft	ev. t)	ows per 6"	(ii) (iii)	Samp No.	ess / Core and	Hand Penetro- meter (tsf)	WATER OBSERVATIONS: Water seepage at: 15.5'-20.5' Water level at completion: 21.6' (prior to coring) 13.9' (inside hollowstem augers) DESCRIPTION		C. Sand Bu Sond M Sond	M. Sand		N	STANDARD PENETRATION (N) atural Moisture Content, % - • PL
- -	0.3563 567 	33.0 52.7- 8	₫ 12,	82 18	<u>ح</u> 1	ž	4.5+	Topsoil - 3" FILL: Very stiff to hard brownish gray SILTY CLAY (A- 6b), trace fine to coarse sand, trace gravel; damp.	×	88	× ×	8 2		
-13 -67.5 -7 -8 -7	5	57.5- 8	18 7 9 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	18 18 10 18	2 3 4		4.0	POSSIBLE FILL: Medium dense brown GRAVEL WITH SAND (A-1-b), trace clay; dry to damp.	32	43 -	- 19	6		Non-Plastic
20		7 	12 12 7 8 4 5	11 14 16	5 6 7			Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; moist.						
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		\$2.0-2	, 8 11 27 50/3	<u>18</u> 9	8 9			Severely weathered gray SHALE. Very soft to medium hard gray SHALE interbedded with SANDSTONE; very fine to fine grained, highly weathered to decomposed micaceous think laminated						50*
30.0 633.0	- 25 - -		Core 120"	Rec 120"	RQD 50%	R1		to medium bedded, highly fractured to broken.						
35 - 62% 82% R2 carbonaceous, laminated, moderately fractured. -37.0 -626.0 - <t< td=""><td>- 30.0 - 533 - - - - - - - - - - - - - - - - - -</td><td>33.0- 30.1-</td><td></td><td></td><td></td><td></td><td></td><td>@ 29.3'-32.9', light gray. Very soft to medium hard gray SHALE; highly weathered to decomposed, micaceous, medium bedded, broken. @ 30.5'-32.9', calcareous. @ 32.0'-32.7', lost recovery. Medium hard black SHALE; highly weathered,</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	- 30.0 - 533 - - - - - - - - - - - - - - - - - -	33.0- 30.1-						@ 29.3'-32.9', light gray. Very soft to medium hard gray SHALE; highly weathered to decomposed, micaceous, medium bedded, broken. @ 30.5'-32.9', calcareous. @ 32.0'-32.7', lost recovery. Medium hard black SHALE; highly weathered,						
	35 — - 	26.0-	Core 60"	Rec 52"	RQD 82%	R2		carbonaceous, laminated, moderately fractured. @ 35.6', low angle fracture. Bottom of Boring - 37.0'						
	- 40													
	- 45 — - -													
	- 50													
	- 55													
	60													

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