

CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

# 7988 Centerpoint Drive, Suite 100 Indianapolis, IN 46256 (317) 849-4990 Fax (317) 849-4278

#### **TEST BORING LOG**

Page **1** of **2** 

CLI	EN					-						BORING#_	BH6-1
	ROJECT NAME Target Grouting Areas - Site 2226 ROJECT LOCATION North of Brazil, Indiana											Northing	1571032
PR	OJE	CT LOCATION	North of Bra	zil, India	na							Easting	2945928
												JOB#	86.05957.0016
			DRILLING and SAM	IPLING INF	ORMAT	ION		ſſ					TEST DATA
	Date	e Started	9/13/13	Hammer V	Vt		140	lbs.					
	Date	e Completed	9/13/13	Hammer D	rop _		30	in.					
	Drill	Foreman	W. Bates	Spoon Sar	npler OI		2.0	in.				nts	
	Insp	ector	J. Noel	Rock Core	Dia.		2.0	_in.				eme	
	Bori	ng Method _	HSA	Shelby Tul	be OD			in.		hics phics		etratic . Incr	
Г			6 60. 50. 50. 50. 50. 50. 50. 50. 50. 50. 5		#				ype	Sampler Graphics Recovery Graphics	ater	Standard Penetration Test, Blows per 6 in. Increments	
		SOIL	CLASSIFICATION		Stratum Elevation,	Stratum Depth, ft	ith le, ft	Sample No.	Sample Type	npler	Groundwater	ndard ws pe	Remarks
		SURFACE	ELEVATION 701.27	75	Stra	Stra Dep	Depth Scale,	San No.	San	San	G.	Star Blov	Rei
3	/ X	Asphalt		/	700.8	0.5	111		00			0.4.0	
-][	$/ \downarrow$	SILTY CLAY LO	DAM, brown and gray r ky, non-effervescent	nottled,			_	1	SS	A		8-4-6	
	//	•	•				_ =	2	SS	X		4-3-4	·
I	//						5 -						
4	//						-	3	SS	X		4-5-8	
]	//						-	4	SS	X		4-5-8	
4	//						10 -						
上	//				688.3	13.0		5	SS	X		3-2-2	Moist from 11-12.5 ft
1	M	LOAM, brown (	7.5YR 5/4, broken, dry	/), //:			=	6	SS			18-21-21	
1	ДД	non-plastic, nor with rocks and p	n-sticky, effervescent, ( pebbles	(tili tabric)	685.8	15.5	15 -						
E		SANDSTONE, sand with mica	gray, weathered, fine to	o very fine				7	SS	X		39-50/0.3'	
#	-:4		gray, fine to very fine g	 rained	682.8	18.5	-	RC-1	RC				RQD=0%, RC-1 from 18.6 ft to 20.0 ft
킈		with interbedded		gramoa,			20 -	RC-2		H			RQD=26%, RC-2 from 20.0 ft to 25.0 ft
=	: : :						_						
$\exists$									ĺ				
$\exists$							25 -	RC-3		H			DOD-200/ DC 2 from 25 0 ft to 20 0 ft
$\exists$	: : :						:	HC-3	RC				RQD=30%, RC-3 from 25.0 ft to 30.0 ft
킠							-						
且							30 -	1		LE	•		
	: : :							TRC-4	RC				RQD=34%, RC-4 from 30.0 ft to 35.0 ft
극	9	 COAL			668.8	32.5	-	3					
		- <del>-</del>			666.1	35.2	35 -	1					
	3	UNDERCLAY,	gray				35	RC-5	RC				RQD=96%, RC-5 from 35.0 ft to 40.0 ft
3							-	1					
	X							=					
[	الاست	Sample Typ	e			<u>D</u>	epth to	Groun	dwate	T.			Boring Method
		- Driven Split Sp - Pressed Shelb			_	Noted or		g Tool	s .			t. +	HSA - Hollow Stem Augers CFA - Continuous Flight Augers
(	CA .	- Continuous Fli				At Comp After	neuon	_ hour	·s			t. t.	DC - Driving Casing MD - Mud Drilling
		- Rock Core - Cuttings			麗 (	Cave De	epth					t.	HA - Hand Auger



### **TEST BORING LOG**

CLIENT	IDNR - Site	2226								BORING#	BH6-1
	Target Gro		as - Si	te 222						Northing	1571032
PROJECT LOCATION		_			· · · · · · · · · · · · · · · · · · ·					Easting	2945928
										JOB#	86.05957.0016
	DRILLING and SA	MPLING INF	ORMAT	ION							TEST DATA
Date Started	9/13/13	Hammer V	Vt		140	_lbs.					
Date Completed	9/13/13	Hammer D	rop _		30	_in.					
Drill Foreman _	W. Bates	Spoon Sar	npler Ol	o	2.0	_in.				ist,	
Inspector	J. Noel	Rock Core	Dia.		2.0	_in.				on Te	
Boring Method	HSA	Shelby Tul	oe OD			_in.	41	phics aphics		n. Incr	
SOI	IL CLASSIFICATION		ım tion, ft	ш, <del>Ц</del>	, ff	e e	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	arks
	(continued)		Stratum Elevation, 1	Stratum Depth, ft	Depth Scale,	Sample No.	Samp	Samp	Grou	Stand	Remarks
UNDERCLAY	, gray		660.8	40.5		RC-6					RQD=66%, RC-6 from 40.0 ft to 45.0 ft
SHALE, black	, with thin sand interbed	ds			_						
						_					
					45 -	RC-7	RC	H			RQD=100%, RC-7 from 45.0 ft to 50.0 ft
					_						
					50 -	RC-8	BC.	Н			RQD=82%, RC-8 from 50.0 ft to 55.0 ft
1000						= 1	110		ŀ		NQD-82 %, NC-8 IIOIII 30.0 II to 33.0 II
			647.3	54.0	_				ŀ		
SANDSTONE	, gray, with interbedded	shale		0	55 -			Ш	İ		
			040.0	F7.4		RC-9	RC		l		RQD=22%, RC-9 from 55.0 ft to 60.0 ft
COAL			643.9	57.4	-	3					
			641.3	60.0	60 -	=					
SHALE, black		/	640.9 640.5	60.4 60.8	00 -	RC-10	RC				RQD=54%, RC-10 from 60.0 ft to 65.0 ft
SHALE, black	, clayey		639.5 639.2	61.8 62.1	-						
	, gray and white, fine to	medium	636.3	65.0							
grained			1000.0	00.0	65 -			П			Grouted hole at completion. Capped with
UNDERCLAY Bottom of Tes	, light gray t Boring at 65.0 ft										bentonite chips and plugged with concrete.
Dottom of res	t borning at 00.0 it										
				<u> </u>	<u></u>	<u> </u>					
Sample Ty					epth to			er			Boring Method
SS - Driven Split S ST - Pressed Shell	by Tube			loted or at Comp		g Iool	s _			t. t.	HSA - Hollow Stem Augers CFA - Continuous Flight Augers
CA - Continuous FI RC - Rock Core	light Auger		<b>▼</b> A	fter		_ hour	s _		f	t.	DC - Driving Casing MD - Mud Drilling
CU - Cuttings CT - Continuous To	ube		≅iC	ave De	pth		-		f	t.	HA - Hand Auger
C1 - Continuous II	ube										Page <b>2</b> of <b>2</b>



#### **TEST BORING LOG**

CLIENT	IDNR - Site 2226								BORING#_	BH6-2
PROJECT NAME	Target Grouting Area	as - Si	te 222	26					Northing _	1571395
PROJECT LOCATION	North of Brazil, India	na							Easting _	2945943
									JOB#	86.05957.0016
	DRILLING and SAMPLING INF	ORMAT	ION							TEST DATA
Date Started	<b>9/16/13</b> Hammer V	Vt.		140	lbs.					
	<b>9/16/13</b> Hammer D		•	30	l l					
	W. Bates Spoon Sar		)						st,	
<u>-</u>	S. Bruder Rock Core	-		2.0					Tes	
Boring Method	HSA Shelby Tul				in.		sics		ration	
		<del></del>				) e	Graphics y Graphics	<u></u>	eneti	
SOIL	CLASSIFICATION	m ion, ft	E #.	# #	<u>e</u>	Sample Type	ler Gr	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	arks
SURFACE	ELEVATION 695.046	Stratum Elevation, t	Stratum Depth, ft	Depth Scale,	Sample No.	Samp	Sampler G Recovery	Groun	Stand Blows	Remarks
SILTY CLAY, da	ark brown, with sand			=						
1//				4						
SUTV CLAY by	rown, moist, with trace sand	691.0	4.0	=						
SILTY CLAY, DI	rown, moist, with trace saild			5 =						
<u> </u>										
#/				=						
/				10 📑						
#/										
∄/]										
<u> </u>		680.5	14.5	15 —						
SHALE, gray, w	/eatnered			13 -						
		676.5	18.5							
Interbedded SH	ALE and SANDSTONE, gray,	070.3	10.5	=						
slightly weather	ed, moderately hard, broken			20 -	RC-1	RC				RQD=52%, RC-1 from 19.6 ft to 24.6 ft
				=						
				=			Ш			
		668.9	26.4	25 —	RC-2	RC				RQD=10%, RC-2 from 24.6 ft to 29.6 ft
VOID - Open		667.4	26.1				ı			Lost water at 26.1 ft
—	SE - clay, sandy clay, interbedded		27.6	_						
shale and sand	stone fragments			30 -	DC 1		H			DOD-OW DO O firm CO O F A A A A A
				00 =	RC-3	RC	Ш	1		RQD=0%, RC-3 from 29.6 ft to 34.6 ft
				=						
		660.8	34.2	=			Ц	<b>®</b>		
UNDERCLAY,	light gray			35 —	RC-4	RC				RQD=72%, RC-4 from 34.6 ft to 39.6 ft
	OCTONIC Balta and a district and a d	658.0	37.0							
SHALEY SAND	OSTONE, light gray, unweathered, d, fissile	655.8	39.2					ĺ		
		1		_	<u></u>	<u> </u>	H			
Sample Type SS - Driven Split Sp		a N		pth to C Drilling				.7 f	it.	<u>Boring Method</u> HSA - Hollow Stem Augers

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

▼ After \_\_\_\_ hours

☑ Cave Depth

CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger



#### **TEST BORING LOG**

CLIENT	IDNR - Site 2	2226								BORING#_	BH6-2
PROJECT NAME _	Target Grou	ting Area	as - Si	te 222	26					Northing _	1571395
PROJECT LOCATIO	N North of Bra	zil, India	na							Easting _	2945943
										JOB#	86.05957.0016
	DRILLING and SAM	IPLING INF	ORMAT	ION		-					TEST DATA
Date Started	9/16/13	Hammer W	∕t.		140	lbs.					
Date Completed	9/16/13	Hammer D			30						
Drill Foreman	W. Bates	Spoon San	npler OI	)	2.0					st, ts	
Inspector	S. Bruder	Rock Core	Dia.		2.0	in.				n Tei	
Boring Method	_HSA	Shelby Tub	e OD			in.		cs nics		ratio	
							ed	raph Grap	jej.	enet 6 in.	
sc	IL CLASSIFICATION		r fon, ft	Ε#.	Ħ	e	le Ty	ler G	dwaf	ard F per	<u>چ</u>
	(continued)		Stratum Elevation,	Stratum Depth, ft	Depth Scale,	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SHALE, dark sandstone lar	gray, unweathered, soft,	fissile, few			111	RC-5	RC				RQD=38%, RC-5 from 39.6 ft to 44.6 ft
Salidstolle lai	milations				-						After Run #5, water level 33.7 in drill rods
					45 -	RC-6	RC	-			RQD=46%, RC-6 from 44.6 ft to 49.6 ft
=======================================			645.3	49.7							
	APSE - VOIDS, small opents of sandy shale and sa				50 -	RC-7	RC				RQD=6%, RC-7 from 49.6 ft to 54.6 ft Lost water at 49.7 ft
- I illed, I agine	its of salidy shale and so	andstone			=			ΙГ			Less Water at 45.7 It
					55 —	RC-8	RC	F			RQD=0%, RC-8 from 54.6 ft to 59.6 ft
								Ш			
					=			Ш			
SHALE dark	gray, unweathered, soft		635.2	59.8	60 -	RC-9	RC				RQD=14%, RC-9 from 59.6 ft to 64.6 ft
	g,,				=						
					=						
Bottom of Te	st Boring at 64.6 ft	·	630.4	64.6	=						Install 2 in. PVC with 10 ft screen to 63.7 ft,
	st Borning at 6 He it										Bentonite chips 1.0 to 19.6 ft.
	Sample Type SS - Driven Split Spoon   ● Not						u dwate	<u></u> E	<u> </u>	<u>!</u>	Boring Method
							s _	<u>33.</u>	<b>7</b> f		HSA - Hollow Stern Augers CFA - Continuous Flight Augers
CA - Continuous I			<ul> <li>         ∑ At Completion ft.     </li> <li>         ∑ After hours ft.     </li> </ul>								DC - Driving Casing
RC - Rock Core CU - Cuttings	- 1		☑ Cave Depthft.								MD - Mud Drilling HA - Hand Auger
CT - Continuous	lube										Page <b>2</b> of <b>2</b>



### **TEST BORING LOG**

CLIENT		IDNR - Site	2226								BORING#_	BH6-3
PROJEC	CT NAME	Target Grou	ıting Area	ıs - Si	te 222						Northing _	1571795
PROJEC	CT LOCATION	North of Bra	azil, India	na							Easting _	2945942
											JOB#	86.05957.0016
		DRILLING and SAM	MPLING INF	ORMAT	10N		г					TEST DATA
Date	Started	9/12/13	Hammer W	/t		140	_lbs.					
Date	Completed	9/12/13	Hammer D	rop		30	_					
Drill F	oreman	W. Bates	Spoon San	npler OE	)	2.0	_ _in.				st, Its	
Inspe	ector	S. Bruder	Rock Core	Dia.		2.0	_in.				n Te	
Borin	g Method _	HSA	Shelby Tub	e OD			_in.		ics hics		Penetration Test, 6 in. Increments	
								be	raph	je.	enel 6 in.	
	SOIL	CLASSIFICATION		um ition, ft	um n, ft	ه, <del>۱۱</del>	e e	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	arks
-	SURFACE	ELEVATION 690.3	63	Stratum Elevation,	Stratum Depth, ft	Depth Scale,	Sample No.	Samp	Samp	Grou	Stand	Remarks
=//s	SILTY CLAY, br	rown, moist										
							3					
$\mathbb{R}^{1}$							=					
						5 -						
$\frac{1}{2}$												
1/1						10 -						
1/1							1					
1/1						_	_					
				674.9	15.5	15 -	=					
#ITs	SANDY SILT W	ith gravel and clay, bro	 own, hard	074.5	13.3	13	=					
4		-	•			-						
111				671.2	19.2							
		light gray, unweathere d, highly broken, clay s				20 -	-RC-1 -RC-2	RC RC	IF			RQD=0%, RC-1 from 19.2 ft to 20.0 ft RQD=0%, RC-2 from 20.0 ft to 25.0 ft
_]∷	•											·
=======================================							=					
<b>∃∷</b> I						25 -	-  - BC-3	RC	H			DOD-200/ DO 2 from 25 0 ft to 20 0 ft
###				663.2	27.2		_RC-3	RC				RQD=30%, RC-3 from 25.0 ft to 30.0 ft
- 0	COAL, black					-	_					
				659.8	30.6	30 -						
	JNDERCLAY, I	ight gray, soft		0.800	30.0		RC-4	RC				RQD=72%, RC-4 from 30.0 ft to 35.0 ft
	·					_	=					
料				656.1	34.3		=					
TI∷IS n	SANDSTONE, I moderately hard	light gray, unweathere d, very fine grained, th	ed, in claystone	653.6	00.0	35 -	RC-5	RC				RQD=78%, RC-5 from 35.0 ft to 40.0 ft
	moderately hard, very fine grained, thin claystone laminations				36.8	_	=					
	SHALE, dark gr sandstone lamii	ray, unweathered, soft nations	, some				=					
	Sample Type			1	D.	pth to	Groun	dwata	r		<u> </u>	Boring Method
	Driven Split Sp	oon		<u>•</u> N	loted or				<u></u>	fi	t.	HSA - Hollow Stem Augers
ST - F	Pressed Shelby Continuous Flig	y Tube		ΔV	t Comp		•	-	51.	4 f	t.	CFA - Continuous Flight Augers DC - Driving Casing
RC - F	Rock Core	Jile Augei		¥ A ₩ C	fter Cave De	nth	_ hour	s -		fi		MD - Mud Drilling
	Cuttings Continuous Tul	be		*** C	ave De	Pu I		-		''	••	HA - Hand Auger Page <b>1</b> of <b>2</b>



### **TEST BORING LOG**

CLIENT									BORING#_	
PROJECT NAME									Northing _	1571795
PROJECT LOCATION	North of Brazil, India	ana							Easting _	2945942
								_	JOB#_	86.05957.0016
	DRILLING and SAMPLING INF	FORMAT	TION		ſ	r				TEST DATA
Date Started	9/12/13 Hammer	<b>/</b> ∕t		140	_lbs.					
Date Completed	9/12/13 Hammer I	Orop _		30	_in.				l	
Drill Foreman	W. Bates Spoon Sa	mpler Ol	o	2.0	_in.				st,	
Inspector	S. Bruder Rock Core				- 1				n Te	
Boring Method _	HSA Shelby Tu	be OD	-		_in.		cs jcs		ration	
<u></u>		T	T	Т		Be .	raphi Srapł	ja	enet 3 in.	·
SOIL	. CLASSIFICATION	on, ff		#	φ.	e Ty	er G	dwat	ard P	\$
	(continued)	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	ampl o.	Sample Type	Sampler Graphics Recovery Graphic	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
- CHAIE dork as		<u>∞</u> ⊞	ω <sub>Ω</sub>	ت ا		<del></del>	ØΥ	9	<u>∞ m</u>	
sandstone lami	ray, unweathered, soft, some nations			] :	RC-6	RC				RQD=36%, RC-6 from 40.0 ft to 45.0 ft
				-			Ш			
#				45 -			Ш			
				45	RC-7	RC				RQD=78%, RC-7 from 45.0 ft to 50.0 ft
				-	}					
		640.9	49.5	:	]					
	light gray, unweathered,			50 -	RC-8	BC.	Н			RQD=80%, RC-8 from 50.0 ft to 55.0 ft
moderately hard	d, (rooted sandstone)	638.2	52.2	:	100	INC	.	Δ		1 NQD=60 %, NC-6 HOIT 50.0 It to 55.0 It
SANDY SHALE	E, dark gray, unweathered, soft			-						
VOID - Filled		635.9	54.5	55 -			F			Landaureten at 54 5 6
JULY VOID - Filled				33	RC-9	RC	Ш			Lost water at 54.5 ft RQD=0%, RC-9 from 55.0 ft to 60.0 ft
				-			П			
训件					†		Ш			
		629.2	61.2	60 -	RC-10	RC	H			RQD=54%, RC-10 from 60.0 ft to 65.0 ft
COAL, black		628.7	61.7							
UNDERCLAY,		626.6	63.8	-:	]					
<del></del>	ray, unweathered, soft	625.4	65.0	65 -	_		Ц			
Bottom of Test	Boring at 65.0 ft									Insert plugged shale trap to top of rock, chips to 15.0 ft, grout to 2.0 ft, chips to 1.0
				1						ft, then concrete
				]						
Sample Type	2		De	epth to	Groun	dwate	er			Boring Method

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Noted on Drilling Tools

☑ At Completion

▼ After \_\_\_\_ 

\_ hours \_ ft.



### **TEST BORING LOG**

CLIEN	IT	IDNR - Site	2226							_	BORING#_	BH6-4
PROJ	JECT NAME Target Grouting Areas - Site 2226  JECT LOCATION North of Brazil, Indiana										Northing _	1572169
PROJ	ECT LOCATION	North of B	azil, India	na							Easting _	2945947
		<del></del>								_	JOB#	86.05957.0016
		DRILLING and SA	MPLING INF	ORMAT	ION		г					TEST DATA
Da	te Started	9/12/13	Hammer V	√t		140	_lbs.	:				
Da	te Completed	9/12/13	Hammer D	rop _		30	in.					
Dri	II Foreman	W. Bates	Spoon San	npler O[		2.0	_in.				est, nts	
Ins	pector	S. Bruder	Rock Core	Dia.		2.0	in.				on Terre	
Во	ring Method _	HSA	Shelby Tub	e OD		ww	_in.		ohics		netrati n. Inc	
	SOIL	CLASSIFICATION		Stratum Elevation, ft	m, f	# "		Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	arks
	SURFAC	E ELEVATION 687.0	013	Stratu	Stratum Depth, ft	Depth Scale,	Sample No.	Samp	Samp	Groun	Stand	Remarks
1	SILTY CLAY w	ith trace sand and roo	ck fragments		-		-		Π			
<b>I</b> /												
- 1//						=						
∄//						5 -	}					
∄/						-	1					
∦/						=	1					
∄/						10 -						
- ₩/						-						
1/						=						
1/						15 —						
<b>3</b> 5.1	CLAYEY SILT	uith sand and gravel,	 brown.	671.0	16.0	-	1					
311	slightly moist		,			-	}					
		<del></del>		667.4	19.6 20.1	20 -	RC-1	RC	H			RQD=0%, RC-1 from 18.8 ft to 19.6 ft
	SANDSTONE, weathered, mo	brown and gray, sligh derately hard	ntiy j	1000.9	20.1	20	RC-2	RC				RQD=58%, RC-2 from 19.6 ft to 24.6 ft
=	SHALE, dark g	ray, unweathered, mo	derately	663.5	23.5							
	sandstone (ver	ninated and bedded wi y fine grained)	ntn 	000.0	20.0	-	_					
1	Interbedded Sh	HALE and SANDSTO	NE			25 -	RC-3	RC				RQD=70%, RC-3 from 24.6 ft to 29.6 ft
#						] =	1					
							}					
1				655.9	31.1	30 -	RC-4	RC		҄		RQD=23%, RC-4 from 29.6 ft to 39.6 ft
1	VOID - Open					]	1			¥		Lost water at 31.1 ft
1						=	1					
1,1				651.7	35.3	35 -	1					
	VOID - Filled	light gray and light be		650.9	36.1	:	1					
	UNDERCLAY,	ngit gray and light be	aye, suit	647.7	20.0	-:	=					
当	<b>\</b>			647.7 f	39.3		1		Ц			
99	Sample Typ - Driven Split Sp			aa. k	<u>De</u> loted or	pth to (			<u>r</u>	f	4	<u>Boring Method</u> HSA - Hollow Stem Augers
ST	- Pressed Shelb	y Tube		_	iotea or it Comp		y 100	is _	31.	3 f		CFA - Continuous Flight Augers
RC	<ul><li>Continuous Fl</li><li>Rock Core</li></ul>	ight Auger		▼ A		41.	hou	rs _		f	ft.	DC - Driving Casing MD - Mud Drilling
CU CT	- Cuttings - Continuous Tu	ıbe		äa (	Cave De	eptn		-		1	t.	HA - Hand Auger Page <b>1</b> of <b>2</b>



### **TEST BORING LOG**

CLIENT PROJECT NAME PROJECT LOCATION  Date Started Date Completed Drill Foreman Inspector	Target Gro	uting Areas azil, Indian	DRMAT t op _ pler OE	ION	140 30 2.0	lbs. in. in.				BORING # Northing Easting JOB #	BH6-4 1572169 2945947 86.05957.0016 TEST DATA
	CLASSIFICATION (continued) gray, unweathered, m		Stratum C.75	Stratum 5. Depth, ft		Sample ui	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
hard, fine grain UNDERCLAY, laminations	ed	الــــــــــــــــــــــــــــــــــــ	647.4	39.6	onth to (						Boring Method

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Noted on Drilling Tools

▼ After \_\_\_\_ \_\_ hours

HSA - Hollow Stern Augers CFA - Continuous Flight Augers

DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger



### **TEST BORING LOG**

CLIENT	IDNR - Site 2226							BORING#_	BH6-5
PROJECT NAME	Target Grouting Area	as - Si	te 222	26				Northing _	1572687
PROJECT LOCATION	North of Brazil, India	na						Easting	2945940
								JOB#	86.05957.0016
	DRILLING and SAMPLING INF	ORMAT	ION		[F				TEST DATA
Date Started	<b>9/11/13</b> Hammer V	Vt		<b>140</b> lb	s.				
Date Completed	9/11/13 Hammer D	rop _		<b>30</b> in	.				
Drill Foreman	W. Bates Spoon Sar	npler Ol	)	<b>2.0</b> in	.			st,	
Inspector	S. Bruder Rock Core	Dia.		<b>2.0</b> in	.			n Te	
Boring Method	HSA Shelby Tub	oe OD		in	.	S	hics	tratic	
		#			4	rpe iraph	Grap ter	ene 6 in.	
SOI	L CLASSIFICATION	Stratum Elevation, f	um h, ft	th e, ft ple	H	Sample Type Sampler Gran	Recovery Graphics Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SURFAC	E ELEVATION 680.972	Strati	Stratum Depth, ft	Depth Scale,	. ON .	Sam	Grou	Stan	Rem
10 in. Topsoil		680.2	0.8	=					
SILTY CLAY, I	brown, moist			=					
<b>1</b> /1									
3//				5 –					
<u> </u>									
<b>1</b> /1									
				10 —					
]//									
#4		666.5	14.5	15 —					
SILTY CLAY V	with rock fragments, brown, hard	664.1	16.9						
LOAM, yellowi	ish brown (10YR 5/6), slightly	663.6	17.4		C-1 F	кс П			RQD=16%, RC-1 from 16.9 ft to 20.0 ft
Imoist, slightly	plastic, non-effervescent, few								
	gray (10YR 5/1), moist, plastic,	660.8	20.2	20 <del>-</del>	C-2 F	<sub>₹C</sub> H			RQD=0%, RC-2 from 20.0 ft to 25.0 ft
leffervescent				Ė					
	, brown and gray, moist, plastic, estone fragments								
#4		656.0	25.0	25 -		, F			DOD-000/ DO 2 from 05 0 ft to 00 0 ft
	gray, unweathered, moderately dstone laminations	654.7	26.3		C-3 F	₹C			RQD=60%, RC-3 from 25.0 ft to 30.0 ft
SHALE, dark (	gray, unweathered, soft								
<u> </u>		651.1	29.9	30 -		_			
	, dark and light gray, unweathered, ird, with shale laminations (rooted			~ ±R	C-4 F	RC			RQD=72%, RC-4 from 30.0 ft to 35.0 ft
⊐ ∷∷  sandstoné), th	inly bedded with soft shale from 35								
ft to 35.6 ft				=					
<b>∃</b> ∷]				35 <del> </del>	C-5 F	RC			RQD=58%, RC-5 from 35.0 ft to 40.0 ft
<u> </u>									
SHALE dark	gray, unweathered, moderately	642.5	38.5	=					
		641.0	40.0	oth to C		oter			Dair - NAAhad
<u>Sample Ty</u> SS - Driven Split S		<u>@</u> N		oth to Gro Drilling T			1	ft.	<u>Boring Method</u> HSA - Hollow Stem Augers
ST - Pressed Shell CA - Continuous F	by Tube	ŽΑ	t Comp	•		4	1.1	ft.	CFA - Continuous Flight Augers DC - Driving Casing
RC - Rock Core	ngnt Augo	¥ A	After Cave De		ours			ft. ft,	MD - Mud Drilling
CU - Cuttings CT - Continuous T	ube	Total C	Jave De	μui				11,	HA - Hand Auger Page <b>1</b> of <b>2</b>



#### **TEST BORING LOG**

CLIENT	IDNR - Site 2226								BORING#_	BH6-5
	Target Grouting Area	ıs - Si	te 222						Northing _	1572687
PROJECT LOCATION	North of Brazil, India	na							Easting _	2945940
								_	JOB#	86.05957.0016
	DRILLING and SAMPLING INFO	ORMAT	TON		-					TEST DATA
Date Started Date Completed Drill Foreman Inspector Boring Method	9/11/13         Hammer W           9/11/13         Hammer D           W. Bates         Spoon Sam           S. Bruder         Rock Core           HSA         Shelby Tub	rop _ npler OI Dia		2.0 2.0	in. in. in.		phics aphics		Standard Penetration Test, Blows per 6 in. Increments	
SOIL	. CLASSIFICATION (continued)	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	tandard Per	Remarks
disintergrated a  Interbedded SH light gray, unwe NVOID: 0.4 ft MINE COLLAP sandstone, very sandstone, sha	ghly crushed/intensely t 40 ft  IALE and SANDSTONE, gray and eathered, moderately hard, fissile  SE: interbedded shale and y soft, dark gray shale, coal,	び 面 636.9 636.5	44.1 44.5	45	Ø <u>Ž</u>		S A S A S A S A S A S A S A S A S A S A	<u>\(\text{\tint{\text{\tint{\text{\tin}\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tex{\tex</u>	S E	RQD=74%, RC-6 from 40.0 ft to 45.0 ft  Lost water at 44.1 ft RQD=0%, RC-7 from 45.0 ft to 50.0 ft  Plugged hole in top of rock, backfilled with bentonite chips
Sample Typ	e		De	epth to	Groun	dwate	er			Boring Method

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Noted on Drilling Tools **41.1** ft. 

▼ After \_\_\_\_\_ \_ hours ■ Cave Depth



### **TEST BORING LOG**

Page 1 of

CLIE	NT	IDNR - Site								BORING#_	BH6-6
	JECT NAME		<del>-</del>		te 222	26				Northing _	1572993
PRO	JECT LOCATION	North of Bra	azil, India	ına						Easting _	2945933
										JOB#	86.05957.0016
		DRILLING and SAM	IPLING INF	ORMAT	TON		I		1		TEST DATA
D	ate Started	9/3/13	Hammer V	Vt		140 lbs.					
D	ate Completed	9/4/13	Hammer D	Orop _		<b>30</b> in.					
D		W. Bates	Spoon Sar	mpler OI	o	<b>2.0</b> in.				est, nts	
lr	spector	S. Bruder	Rock Core	Dia.		<b>2.0</b> in.				eme	
В	oring Method	HSA	Shelby Tul	be OD		in.		nics ohics		etration .	
Г				#			ype	Srapl Grap	ater	Pene 6 in	
	SOIL	CLASSIFICATION		fion,	۳, بر # #	Se #	ole T	oler ( very	ndwa	dard s per	arks
	SURFACE	ELEVATION 676.8	14	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft Sample	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
		th gravel and rock frag	gments,	675.3	1.5		-			0.7.44	
	hbrown and gray SANDY SHALE					1	SS	Å		8-7-14	
		,, g,,		ľ		= 2	ss	X		17-19-30	
				670.3	6.5	5					
1	SHALE, gray			0.0.0	0.0	= 3	∫ SS	X		17-24-50/0.1'	
1				667.8	9.0	1 1	ss	×		50/0,5'	Auger refusal at 9.0 ft
	SHALE, dark gra	ay, unweathered, mod	erately			10 -RC-	RC RC				RQD=0%, RC-1 from 9.0 ft to 9.8 ft RQD=54%, RC-2 from 9.8 ft to 14.8 ft
						RC-					
				663.0	13.8						
_	COAL					15 -RC-	3 RC				RQD=0%, RC-3 from 14.8 ft to 19.8 ft
						=	]				1 tab 6 %, 1 to 6 % on 1 1 4.0 to 10.0 to
=											
= 3	<b>L</b>			656.8	20.0	20 =	1 50	1			DOD-00% DO 45 40 0 % 4- 04 0 %
		calcareous, light gray, ioderately hard, fine gi	rained	655.5	21.3	<sup>20</sup>	4 RC				RQD=82%, RC-4 from 19.8 ft to 24.8 ft
1	SHALE, light gra	ay, unweathered, soft, and sandsto	thinly								
丰	(underclay)	idy shale and sandstol	ie			25 - 50	_				
1						- RC-	5 RC				RQD=66%, RC-5 from 24.8 ft to 29.8 ft
						=					
非	SANDSTONE I	ight gray, unweathere		647.6	29.2	30 = =					
1	: moderately hard	I, moderately fractured earns, fine grained, w	l, some			RC-	6 RC				RQD=78%, RC-6 from 29.8 ft to 34.8 ft
1	: Clay and shale s	earris, fine grained, w	eli sorteu							,	
1									⊻		
1						35	7 RC				RQD=82%, RC-7 from 34.8 ft to 39.8 ft
<b>=</b>  :						] =					
]:	: :										
<u> </u>	Sample Type	<u> </u>		<u> J</u>	L De	pth to Grou	ndwate	er	L	<u> </u>	Boring Method
	6 - Driven Split Spo	oon			loted or	Drilling Too		Non			HSA - Hollow Stem Augers
C/	ST - Pressed Shelby Tube  CA - Continuous Flight Auger  ✓ After hours								<u>0</u> f	t. t.	CFA - Continuous Flight Augers DC - Driving Casing
	C - Rock Core J - Cuttings			_	Cave De		., 3			t.	MD  - Mud Drilling HA  - Hand Auger
C	Γ - Continuous Tub	oe e									Page <b>1</b> of <b>3</b>



### **TEST BORING LOG**

CLIENT IDNR - Site 2226		BORING:	#BH6-6
PROJECT NAME Target Grouting Area		<del>-</del>	1572993
PROJECT LOCATION North of Brazil, Indian			2945933
		JOB#	86.05957.0016
DRILLING and SAMPLING INFO	ORMATION		TEST DATA
Date Started 9/3/13 Hammer W	t <b>140</b> _lbs.		
Date Completed 9/4/13 Hammer Dr			
· · · · · · · · · · · · · · · · · · ·	pler OD in.		
	Diain.	Test	
Boring Method HSA Shelby Tube		S CS ation	
Borning Metricu		Sample Type Sampler Graphics Recovery Graphics Groundwater Standard Penetration Test, Blows per 6 in. Increments	
SOIL CLASSIFICATION	t # #	r Gra vatel d Pe	ω
	Stratum Elevation, f Stratum Depth, ft Depth Scale, ft Sample No.	Sampler Grap Recovery Gra Groundwater Standard Pen Blows per 6 ir	Remarks
	Stranger Stranger Stranger Scanger Sca	Sta Grd Blo	, a
SANDSTONE, light gray, unweathered, moderately hard, moderately fractured, some	<u> </u> RC-8 F	RC	RQD=96%, RC-8 from 39.8 ft to 44.8 ft
clay and shale seams, fine grained, well sorted	-   -		
<b>∃</b> ∷:			
<b>∃</b> !:}	45 -RC-9 F	c T	RQD=86%, RC-9 from 44.8 ft to 49.8 ft
<u>∃</u> ∷!			
333			
<u> </u>	50 -RC-10 F	, H	RQD=70%, RC-10 from 49.8 ft to 54.8 ft
1			1000-7070, 100-10 Hull 49.0 H to 34.0 H
<b>∃</b> [::]			
<u> </u>			
	55 -RC-11 F	C	RQD=76%, RC-11 from 54.8 ft to 59.8 ft
<b>-</b> 1∷:			
1			
리:::	60 -RC-12 F	RC -	RQD=98%, RC-12 from 59.8 ft to 64.8 ft
<b>1</b> :::			
<b>1</b>			
<u> </u>	65 - 50 40 5		
<u> </u>	05	C	RQD=68%, RC-13 from 64.8 ft to 69.8 ft
∃I∷I			
<b>引</b> :引			
<b>∄∷</b> !	70 RC-14 F	c	RQD=66%, RC-14 from 69.8 ft to 74.8 ft
<b>∄</b> ∷	=		
<b>∃</b> ∷:			
<b>∄∷</b> }	75 RC-15 F	ec H	RQD=50%, RC-15 from 74.8 ft to 79.8 ft
<b>1</b>			. 13.5 0070, 10-10 Hom 74.0 H to 75.6 H
<b>引</b> :::			
<u> </u>			
Sample Type	Depth to Groundw	ater_	Boring Method

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Noted on Drilling Tools

▼ After \_\_\_\_ hours

፱ Cave Depth

None ft. \_\_\_\_\_\_\_ft.

\_\_\_\_\_ ft. \_\_ ft.



### **TEST BORING LOG**

LIENT IDNR - Site 2226  ROJECT NAME Target Grouting Areas - Site 2226						BORING#_				
	OJECT NAME Target Grouting Areas - Site 2226								Northing _	1572993
ROJECT LOCATION	North of Brazil, India	ana							Easting _	2945933
						-		_	JOB#	86.05957.0016
	DRILLING and SAMPLING IN	FORMA	ΓΙΟΝ		_					TEST DATA
Date Started	<b>9/3/13</b> Hammer	Wt.		140 ı	bs.					
Date Completed	<b>9/4/13</b> Hammer	Drop _		<b>30</b> i						
Drill Foreman _	W. Bates Spoon Sa	mpler O	o	<b>2.0</b> i	n.				st,	
Inspector	S. Bruder Rock Cor	e Dia.		<b>2.0</b> i	n.				an Te	
Boring Method	ibe OD		i	n.		nics phics		tratic Incr	, ra	
	T #	T	T T		ype	Sampler Graphics Recovery Graphics	ater	Standard Penetration Test, Blows per 6 in. Increments		
SOI	L CLASSIFICATION	ation,	m H	Depth Scale, ft Sample		Sample Type	pler (	Groundwater	dard 's per	Remarks
	(continued)	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale,	Sam No.	Sam	Sam	Grou	Stan Blow	Rem
SANDSTONE	light gray, unweathered, rd, moderately fractured, some					RC				RQD=56%, RC-16 from 79.8 ft to 84.8 ft
clay and shale	seams, fine grained, well sorted									
				] =						
<b>1</b>			85 4	C-17	RC				RQD=80%, RC-17 from 84.8 ft to 89.8 ft	
<u> </u>				=			Ш			
				90 🗐	C-18	RC	П			RQD=78%, RC-18 from 89.8 ft to 94.8 ft
3:::				=						
3::3							Ш			
3:::				95	C-19	RC				RQD=72%, RC-19 from 94.8 ft to 99.8 ft
<b>=</b>  :::				上上						
		E77.0	00.0							
Bottom of Tes	t Boring at 99.8 ft	577.0	99.8							Grouted hole at completion, plugged with
										bentonite chips
						<u> </u>	Ш			
Sample Ty	ne		De	epth to G	mun	dwate	ar .			Boring Method

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

None ft. Noted on Drilling Tools **34.0** ft. 

▼ After \_\_\_\_ hours \_\_\_\_ ft.

\_\_\_\_ ft.



### **TEST BORING LOG**

CLIE	IDNR - Site 2226								BORING#_	BH6-7
PRC	JECT NAME Target Grouting Area	as - Si	te 222						Northing _	1573407
PRC	JECT LOCATION North of Brazil, India	na							Easting _	2945949
									JOB#	86.05957.0016
	DRILLING and SAMPLING INF	ORMAT	TON		r					TEST DATA
Ε	Date Started 9/4/13 Hammer V	Vt		140	lbs.					
Е	Date Completed 9/14/13 Hammer D	гор _		30	in.					
	Orill Foreman <u><b>W. Bates</b></u> Spoon San	npler Ol	o	2.0	in.				st,	
li	nspector S. Bruder Rock Core	Dia.		2.0	in.				n Te	
E	foring Method HSA Shelby Tub	oe OD			in.		ics hics		tratio	
Г		T #	<u> </u>		-	/be	iraph Grap	ter	ene 6 in.	
	SOIL CLASSIFICATION	ion, f	€ #_	_ # <u>_</u>	<u>a</u>	ile T	iler G	dwa	lard F	rks
	SURFACE ELEVATION 688.394	Stratum Elevation, f	Stratum Depth, ft	Depth Scale, 1	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
事/	SILTY CLAY, brown, moist	O, III	0, 11		0, 2		ΪÏ		0, E	
∄/				_						
∄/				=						
∄/				5 -						
1/				-						
1	/  	680.4	8.0	_						
1	SHALE, gray, soft	678.4	10.0	10 —						Auger refusal at 10.0 ft
E	SHALE, gray and dark gray, soft, broken				RC-1	RC				RC-1 from 10.0 ft to 15.0 ft
▐				_						
1	<del></del>	672.4	45.0				Ш			
圭	SHALE, dark gray, slightly weathered, soft,	673.4	15.0	15 —	RC-2	RC				RQD=56%, RC-2 from 15.0 ft to 20.0 ft
]	highly broken, thin sandstone laminations	270.0								
1	SHALE, brownish gray, unweathered, soft, fissile	670.3	18.1	_						
]	=			20 -						
1		666.6	21.8		RC-3	RC				RQD=28%, RC-3 from 20.0 ft to 25.0 ft
1	SHALE, brownish gray, soft, broken, thinly bedded with sandstone (2 in.)									
1		663.4	25.0	25 —			27.5			
1	SHALE, dark gray, unweathered, moderately			25	RC-4	RC				RQD=70%, RC-4 from 25.0 ft to 30.0 ft
1	hard, slightly broken	650.0	20.5							
非	VOID - Open	659.9	28.5	=						Lost water at 28.5 ft
		657.9	30.5	30 —	RC-5	RC				RQD=0%, RC-5 from 30.0 ft to 40.0 ft
1	MINE COLLAPSE: highly broken, brownish gray shale, sections of unweathered, moderately									
	broken, shale, small open voids			=						
1	<b>f</b>			35 -						
				=						
╢	<b>f</b>			-						
	1									
	Sample Type			pth to (			r			Boring Method
	S - Driven Split Spoon Γ - Pressed Shelby Tube		loted or at Comp	-	g Tool:	s _	48	f 0 f		HSA - Hollow Stem Augers CFA - Continuous Flight Augers
C,	A - Continuous Flight Auger C - Rock Core		at Comp After		hour	s .	-ru,	. <u>u</u> f		DC - Driving Casing MD - Mud Drilling
C	J - Cuttings		Cave De			-		f		MD - Mud Drilling HA - Hand Auger
C	T - Continuous Tube									Page <b>1</b> of <b>2</b>



### **TEST BORING LOG**

CLIENT	IDNR - Site 222	6								BORING#	BH6-7
PROJECT NAME Target Grouting Areas - Site 2226										Northing _	1573407
PROJECT LOCATION										Easting	2945949
										JOB#	86.05957.0016
	DRILLING and SAMPLII	NG INF	ORMAT	TION		_					TEST DATA
Date Started	<b>9/4/13</b> Har	mmer W	∕t.		140	lbs.					
		mmer D				_					
Drill Foreman	oon San	-			_				15, 3t	·	
Inspector		ck Core								Tek men	
Boring Method	<b>HSA</b> She	elby Tub	e OD			_in.		ics hics		tration	
			#			T	ype	Sampler Graphics Recovery Graphics	ater	Standard Penetration Test, Blows per 6 in. Increments	
SOIL	_ CLASSIFICATION		Stratum Elevation, fl	Stratum Depth, ft	e, #	ble	Sample Type	pler (	Groundwater	dard s per	Remarks
	(continued)		Strat	Strat Dept	Depth Scale,	Sample No.	Sam	Sam	Grou	Stan	Rem
MINE COLLAR	SE: highly broken, brownish of unweathered, moderately	n gray			=	RC-6	RC				RQD=0%, RC-6 from 40.0 ft to 45.0 ft
broken, shale,	small open voids	у			-			П			
					:			Ш			
					45 –	RC-7	RC				RQD=0%, RC-7 from 45.0 ft to 47.8 ft
								Ш	ӯ		
			638.9	49.5		RC-8	RC		Ť		RQD=0%, RC-8 from 47.8 ft to 50.0 ft
COAL, black			637.9	50.5	50 -	RC-9	RC				RQD=34%, RC-9 from 50.0 ft to 55.0 ft
SHALE, grayisl	h brown, broken, soft (under	rclay)	635.4	53.0	] _:						,
SHALE, grayisl	h brown, unweathered, mod	erately			-						
Bottom of Test	y) Boring at 55,0 ft		633.4	55.0	55 -						Abandon hole with shale trap at 10.0 ft, bentonite chips to 1.0 ft, then concrete to surface
		1									
Sample Typ				<u>De</u> loted on	pth to			Ĺ	f		Boring Method

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

48.0 ft. \_ hours ▼ After \_\_\_\_

☑ Cave Depth \_\_ ft.



## **TEST BORING LOG**

CLIENT	IDNR - Site 222	26								BORING#_	BH6-8
PROJECT NAME	Target Groutin	g Area	s - Si	te 222	6					Northing _	1573758
PROJECT LOCATION	North of Brazil	, India	1a							Easting _	2945949
										JOB#	86.05957.0016
	DRILLING and SAMPL	ING INFO	ORMAT	ION							TEST DATA
Date Started	<b>9/15/13</b> Ha	ammer W	′t		140	lbs.					
Date Completed	<b>9/15/13</b> Ha	ammer Dr	rop _		30	in.					
Drill Foreman	W. Bates Sp	oon Sam	pler OE		2.0	_in.				st, nts	
Inspector	S. Bruder Ro	ock Core	Dia.		2.0	_in.				on Te emer	
Boring Method	<b>HSA</b> Sh	nelby Tub	e OD			_in.		hics phics		Penetration Test, 6 in. Increments	
SOIL	CLASSIFICATION		um ation, fit	um h, ft	9, ff	ple	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SURFAC	E ELEVATION 668.29		Stratum Elevation,	Stratum Depth, ft	Depth Scale,	Sample No.	Sam	Sam	Grou	Stand	Rem
SILTY CLAY wi	th trace sand and rock				:						
	•••				-						
<u> </u>					5 -						
#/					:	1					
∄/]						1					
					10						
]/			656.8	11.5	10 -						
SHALE, gray ar	nd brown, soft				_						
I OAM brown (	10YR 4/13), brown, moist		654.5	13.8	:	RC-1	RC				RQD=0%, RC-1 from 13.8 ft to 15.3 ft
	nd brown, moderately weat	- — — –	653.0	15.3	15 -	RC-2					RQD=80%, RC-2 from 15.3 ft to 20.3 ft
soft			650.6	17.7	_	1					·
	inweathered, soft		649.4	18.9				Ш			
fissile, thin sand	sh gray, unweathered, sof dstone laminations	τ,	646.9	21.4	20 -	RC-3	RC	Н			RQD=60%, RC-3 from 20.3 ft to 25.3 ft
	ray, unweathered, soft, fiss	sile,	010.0	21.1		=	110				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
partial water los	ss at 22 ft					1					
-					25 -		DO				DOD-C49/ DO 4 5 05 0 5 4 5 00 0 5
						TRU-4	RC				RQD=64%, RC-4 from 25.3 ft to 30.3 ft
			638.0	30.3	30 -						
moderately hard	ark gray, unweathered, d	Ĭ la	637.5 636.2	30.8 32.1		RC-5	RC				RQD=0%, RC-5 from 30.3 ft to 35.3 ft Lost water at 30.8 ft
VOID - Open					-						
	SE - Interbedded SHALE a dark gray, slightly weather				35 -	]		且			
fissile, broken a	at 35.3 ft, 40.3 ft, 43.2 ft, n	no drop				RC-6	RC				RQD=38%, RC-6 from 35.3 ft to 40.3 ft
					-	=					
<u> </u>				L		1					
Sample Type SS - Driven Split Sp	<del>-</del>		øa. N	<u>De</u> loted or	pth to			<u>er</u>	f	<del>t</del>	<u>Boring Method</u> HSA - Hollow Stern Augers
ST - Pressed Shelby	y Tube			t Comp		y IWI	- د	46.	. <u>5</u> f		CFA - Continuous Flight Augers
CA - Continuous Flig RC - Rock Core	grit Auger			fter Cave De		_ hour	s _			t. t.	DC - Driving Casing MD - Mud Drilling
CU - Cuttings CT - Continuous Tu	be		mag €	ave De	Pui		-		'	ι.	HA - Hand Auger Page <b>1</b> of <b>2</b>



### **TEST BORING LOG**

CLIENT	IDNR - Site 2226							_	BORING#_	BH6-8
PROJECT NAME	Target Grouting	Areas - S							Northing _	1573758
PROJECT LOCATIO	N North of Brazil, I	ndiana							Easting _	2945949
									JOB#	86.05957.0016
	DRILLING and SAMPLING	G INFORMAT	ΓΙΟΝ		r=					TEST DATA
Date Started	<b>9/15/13</b> Ham	mer Wt.		140_	bs.					
Date Completed	<b>9/15/13</b> Ham	mer Drop		30_	in.					
Drill Foreman	W. Bates Spoo	n Sampler O	D	2.0	in.				sst,	
Inspector	S. Bruder Rock	Core Dia.		2.0	in.				on Te	
Boring Method	<b>HSA</b> Shell	oy Tube OD			in.		ohics aphics		Penetration Test, 6 in. Increments	
so	IL CLASSIFICATION	Stratum Elevation, ft	r, ft	, ff	e e	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	arks .
	(continued)	Stratu	Stratum Depth, ft	Depth Scale,	Sample No.	Sam	Sam	Grou	Stand	Remarks
SANDSTONE fissile, broken	PSE - Interbedded SHALE and E, dark gray, slightly weathered I at 35.3 ft, 40.3 ft, 43.2 ft, no d en voids noted			45 –	₹C-7 ₹C-8	RC RC		⊽		RQD=85%, RC-7 from 40.3 ft to 45.3 ft  RQD=0%, RC-8 from 45.3 ft to 50.3 ft
SHALE with (	c, unweathered, fissile  COAL, black  rnish gray and gray, soft, fissile	613.3		55 —	RC-9	RC				RQD=26%, RC-9 from 50.3 ft to 55.3 ft
crushed at 57	of t (underclay)	608.0	60.3							RQD=42%, RC-10 from 55.3 ft to 60.3 ft  Installed shale trap with capped pipe to 13.8 ft, chips to 12.0 ft, grout to 3.0 ft, chips to 1.0 ft, concrete then topsoil
Sample To SS - Driven Split S ST - Pressed She CA - Continuous I RC - Rock Core CU - Cuttings CT - Continuous	Spoon Iby Tube Flight Auger	Ĭ.	Noted or At Comp		Tools			1		Boring Method  HSA - Hollow Stem Augers  CFA - Continuous Flight Augers  DC - Driving Casing  MD - Mud Drilling  HA - Hand Auger  Page 2 of 2



### **TEST BORING LOG**

CLIENT	IDNR - Site 2226						_	BORING#_	BH6-9
PROJECT NAME	Target Grouting Are		Northing _	1574166					
PROJECT LOCATION	North of Brazil, Indi	ana						Easting _	2945974
							_	JOB#	86.05957.0016
	DRILLING and SAMPLING IN	FORMATI	ON						TEST DATA
Date Started	9/11/13 Hammer	Wf.	1	140 lbs.					
		Drop							
Drill Foreman		ampler OD		1				÷, w	
Inspector		e Dia.		<b>2.0</b> in.				Tes	
Boring Method	HSA Shelby T	_				SS		ation	
Dorling Mounted					۵	aphic	L	in. Ir	
SOI	L CLASSIFICATION	Stratum Elevation, ft	h, ft	h, e, ft ple	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SURFAC	E ELEVATION 646.565	Strat	Stratum Depth, ft	Depth Scale, ft Sample No.	Sam	Sam	Grou	Stan	Кещ
SHALE, brown	n, weathered								
		643.2	3.4	4					
	fissile, with some sandstone			RC-1	RC				RQD=0%, RC-1 from 3.4 ft to 4.7 ft
lenses (less th	an 1 centimeter thick)			5	RC				RQD=50%, RC-2 from 4.7 ft to 9.7 ft
				=					
		637.4	9.2	=					
MINE COLLA	PSE, dark gray, shale with some	_		10 - RC-3	RC				Lost water at 9.2 ft
sandstone lens	ses (less than 1 centimeter thick), proken)			=		ıF			RQD=0%, RC-3 from 9.7 ft to 14.7 ft
	,			=		П			
		631.6	15.0	,, <u>}</u>					Small filled voids with collapse rock in RC-3.
MINE COLLA	PSE, dark black shale, with coal	_		15 - RC-4	RC				RQD=0%, RC-4 from 14.7 ft to 19.7 ft Filled open void from 15-18.6 ft. Pushed
and angular sa	andstone gravel			Ę		Ш	ĕ		with water pressure.
SHALE grayt	o dark gray, clayey (underclay)	_ 628.0	18.6	=		Ш			
- GG SI IALL, gray t	o dark gray, dayey (driderday)			20 -RC-5	RC				RQD=30%, RC-5 from 19.7 ft to 24.7 ft
				=					
<u> </u>				=					
<u> </u>				25					
SHALE light of		_ 620,8	25.8	25 RC-6	RC				RQD=64%, RC-6 from 24.7 ft to 29.7 ft
	gray (arroor ordy)			4					
				=					
				30 -RC-7	RC				RQD=64%, RC-7 from 29.7 ft to 34.7 ft
		_ 614.6	32.0	且					
SHALE, light (	gray to dark gray, coal trace			]					
1				35 -RC-8	RC	H			RQD=62%, RC-8 from 34.7 ft to 39.7 ft
				3,00	1			1	7. 0270, 1.0 0 HOIII 04.7 IL 10 05.7 IL
1			1	크					
				=					
Sample Ty	<u>pe</u>		<u>Dep</u>	th to Groun	dwate			-	Boring Method
SS - Driven Split S	poon	■ Na	oted on I	Drillina Too	ls	17.	<b>0</b> f	ft	HSA - Hollow Stern Augers

SS - Driven Spill Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

▼ After \_\_\_\_ hours ☑ Cave Depth

ft.

CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger



### **TEST BORING LOG**

PROJECT NAME Target Grouting Areas - Site 2226 N		
- "	Northing	1574166
	Easting	2945974
)L	IOB#	86.05957.0016
DRILLING and SAMPLING INFORMATION		TEST DATA
Date Started 9/11/13 Hammer Wt. 140 lbs.		
Date Completed 9/11/13 Hammer Drop30 in.		
Drill Foreman W. Bates Spoon Sampler OD in.	ast,	
Inspector <u>C. Bishop</u> Rock Core Dia. <u>2.0</u> in.	an Te	
Boring Method HSA Shelby Tube ODin. gg	Standard Penetration Test, Blows per 6 in. Increments	
Sraph ater	ene 6 in.	
	lard F	arks
SOIT Crassition  (coutinned)  Stratum  Stratum  Stratum  Countinued)  Scale it	Stand	Remarks
SHALE, light gray to dark gray, coal trace 605.6 41.0 RC-9 RC		RQD=64%, RC-9 from 39.7 ft to 44.7 ft
SANDY SHALE, light gray, thinly bedded with		
siltstone		
45 -RC-10 RC		RQD=56%, RC-10 from 44.7 ft to 49.7 ft
596.9 49.7		
Bottom of Test Boring at 49.7 ft		Plugged core hole with shale trap, backfilled with bentonite chips, plugged at the surface
		with concrete.
Sample Type Depth to Groundwater		Boring Method

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Noted on Drilling Tools ∑ At Completion

▼ After \_\_\_\_ hours \_ft. ■ Cave Depth



### **TEST BORING LOG**

	and SAMI LING IN	ORMAT			_	Easting _ JOB # _	2945984 86.05957.0016 TEST DATA		
Date Started 9/15/13  Date Completed 9/15/13  Drill Foreman W. Bates Inspector S. Brude Boring Method HSA	Rock Core Shelby Tul	orop _ npler OE Dia	)	140 lbs.  30 in.  2.0 in.  in.  ## older SO	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SURFACE ELEVATION  SILTY SAND and GRAVEL,  SILTY SAND, brown, moist,  SILTY SAND, brown, moist,  SANDY SHALE, grayish brown weathered  SANDSTONE, light gray, un moderately hard, moderately grained  Bottom of Test Boring at 35.	fine to coarse  et, fine to coarse  wn, soft, slightly  weathered, fractured, fine	<ul><li>6 並</li><li>627.3</li><li>625.8</li><li>623.3</li><li>621.1</li><li>613.8</li><li>594.2</li></ul>	で当 2.0 3.5 6.0 8.2 15.5	10 RC- 10 RC- 20 RC- 30 RC- 35 RC-	SS SS SS RC RC			が高 7-5-3 4-2-2 2-4-6	RQD=73%, RC-1 from 9.0 ft to 10.1 ft RQD=86%, RC-2 from 10.1 ft to 15.1 ft RQD=88%, RC-3 from 15.1 ft to 20.1 ft RQD=66%, RC-4 from 20.1 ft to 25.1 ft RQD=66%, RC-5 from 25.1 ft to 30.1 ft RQD=66%, RC-6 from 30.1 ft to 35.1 ft RQD=68%, RC-6 from 30.1 ft to 35.1 ft Grouted hole at completion by tremie. Plugged at the surface with concrete.

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger RC - Rock Core CU - Cuttings CT - Continuous Tube

\_\_\_\_**6.0**\_ ft. Noted on Drilling Tools **6.9** ft. \_\_\_\_\_ ft. ▼ After \_\_\_\_ hours

\_\_\_ ft. HSA - Hollow Stem Augers CFA - Continuous Flight Augers

DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger



### **TEST BORING LOG**

Page 1 of 2

CLI	ENT		IDNR - Site	2226								BORING#_	BH6-11
PR	OJEC1	T NAME			as - Si							Northing _	1574964
PR	OJECT	T LOCATION	North of Bra	azil, India	ana							Easting _	2945981
												JOB#	86.05957.0016
			DRILLING and SAM	MPLING INF	FORMAT	ION		G					TEST DATA
	Date S	Started	9/15/13	Hammer \	<b>∕</b> ∕t		140	_lbs.					
	Date Completed 9/15/13 Hammer D			Orop _		30	_in.						
	Drill Fo	oreman	W. Bates	Spoon Sa	mpler OI	·	2.0	_in.				est, nts	
	Inspec	ctor	S. Bruder	Rock Core	e Dia.		2.0	_in.				on Teme	
	Boring	Method _	HSA	Shelby Tu	be OD			_in.	a)	aphics raphics	_	netrati in. Inci	
		SOIL	CLASSIFICATION		Stratum Elevation, ft	um h, ft	e, #	ple	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
		SURFACE	ELEVATION 644.8	34	Strati	Stratum Depth, ft	Depth Scale,	Sample No.	Sam	Sam	Grou	Stan	Rem
1	SI	LT with sand	and gravel, brown to d	lark brown									
킙						4.0	-						
1	// si	LTY CLAY wi	th trace sand and rock		640.8	4.0	5 -						
3		agments, brov					3						
$\exists$							_	1					
=					634.8	10.0		1					
1	/ s	ANDY CLAY,	dark brown, very mois	 st	-		10 -						
#		ANDSTONE,			632.8	12.0	_	1			∇		Auger refusal at 13.7 ft
1	-:				631.1	13.7 14.5		DC 4	DC				RQD=0%, RC-1 from 13.7 ft to 14.5 ft
4	\S/ \m	oderately hard	brown, slightly weathe d, medium grained, we	ell sorted			15 -	-RC-1 -RC-2	RC RC	П			RQD=92%, RC-1 from 14.5 ft to 14.5 ft
=	S/	ANDSTONE,	light gray, with gray sa weathered, moderately	andstone				=					
=	m	edium grained	d, well sorted	y Haru,			-	=					
=							20 -	RC-3	RC				RQD=76%, RC-3 from 19.5 ft to 24.5 ft
=								]					·
$\exists$	: : :						-	=					
							25 -	_ _RC-4		Н			DOD-049/ DO 45 24 5 54 20 5 5
=							20	_RC-4	RC	Ш			RQD=94%, RC-4 from 24.5 ft to 29.5 ft
긬							-						
								1					
크							30 -	RC-5	RC				RQD=80%, RC-5 from 29.5 ft to 34.5 ft
							-	∄					
4								=					
4							35 -	RC-6	RC				RQD=88%, RC-6 from 34.5 ft to 39.5 ft
#								=					Lost water at 35.0 ft
$\exists$								]					
1						<u> </u>	<u> </u>	<u> </u>	<u> </u>	H			
ç	SS - D	<u>Sample Typ</u> Oriven Split Sp			<b>a</b> N			Groun na Tool		<u>er</u>	f	ft.	<u>Boring Method</u> HSA - Hollow Stem Augers
9	SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger				Δ̈́	<ul><li>Noted on Drilling Tools</li><li>✓ At Completion</li><li>12.6</li></ul>						ft.	CFA - Continuous Flight Augers DC - Driving Casing
F	RC - R	Rock Core	grit Auger		_	After Cave De	anth	_ hour	s .			ft. ft.	MD - Mud Drilling
		Cuttings Continuous Tu	be		rër (	Jave De	ypu I				'		HA - Hand Auger Page <b>1</b> of <b>2</b>



### **TEST BORING LOG**

CLIENT IDNR - Site 2220	ĵ							BORING#_	BH6-11
PROJECT NAME Target Grouting	Areas -			Northing _	1574964				
PROJECT LOCATION North of Brazil,	Indiana							Easting _	2945981
								JOB# _	86.05957.0016
DRILLING and SAMPLIN	NG INFORM	ATION		-					TEST DATA
Date Started 9/15/13 Har	nmer Wt.		140	lbs.					
	OD _	in.				st,			
Inspector S. Bruder Roo					n Te				
Boring Method HSA She	elby Tube OD			in.		ics hics		tratio	
	#	. T	T		/be	iraph Grap	ter	ene. 6 in.	
SOIL CLASSIFICATION	E	E, #	#	e Se	ole Ty	oler G	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	arks
(continued)	Stratum Elevation f	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Grou	Stand	Remarks
SANDSTONE, light gray, with gray sandston Iaminations, unweathered, moderately hard	one L			RC-7	RC				RQD=76%, RC-7 from 39.5 ft to 44.5 ft
medium grained, well sorted	,								
<b>∄</b> ∷:			],, ]			-			
<u>]:::</u>			45 -	RC-8	RC				RQD=76%, RC-8 from 44.5 ft to 49.5 ft
<u>]</u> :::									
= :::	595.	3 49.5							
Bottom of Test Boring at 49.5 ft						THE PROPERTY OF THE PROPERTY O			Grouted hole at completion, plugged at the surface with bentonite chips covered by concrete.
		1	1 1						
		,							
					l				
					ı			1	
					ı				
					li				
Sample Type		<u> </u>	epth to G	roun	dwate	<u> </u>	<u>L_</u>		Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube

CA - Continuous Flight Auger RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools

▼ After \_ \_ hours

**12.6** ft.

\_\_\_ ft. \_ft.



## **TEST BORING LOG**

CLI	ENT	IDNR - Site 2	2226								BORING#_	BH6-12
	ROJECT NAME Target Grouting Areas - Site 2226									Northing _	1575368	
	OJECT LOCATION		zil, India	na							Easting _	2945986
											JOB#	86.05957.0016
		DRILLING and SAM	IPLING INF	ORMAT	ION		п					TEST DATA
	Date Started	9/9/13	Hammer V	Vt.		140	lbs.					
	Date Completed	9/9/13	Hammer D	rop _		30	in.					
	Drill Foreman	npler OI	)	2.0	_in.				st,			
	Inspector	S. Bruder	Rock Core	Dia.		2.0	in.				n Te	
	Boring Method _	HSA	Shelby Tub	oe OD			_in.		cs		ratio	
Г				T				be De	raph	Je.	enet 6 in.	
	SOIL	. CLASSIFICATION		n on, ft	ہ #	#	Φ	e Ty	er G	dwat	ard P	<u>४</u>
F	SURFACI	E ELEVATION 663.37	77	Stratum Elevation,	Stratum Depth, ft	Depth Scale, f	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
3	, XI	ith trace sand and rock				-						
]/	fragments, brov	wn, moist				-						
$\blacksquare$	/											
∄						5 -						
1							_					
∄	<b>/</b> /						]					
4	4			653.4	10.0	10 -	1					
1	SHALE, brown,			651.9	11.5							
1	SHALE, dark g	ray, slightly weathered,	very sort			-	1					
1						15 –	RC-1	RC	H			RQD=0%, RC-1 from 13.6 ft to 14.6 ft
#	Management of the					'	RC-2	RC				RQD=44%, RC-2 from 14.6 ft to 19.6 ft
1				645.6	17.8	-						
1	SANDY SHALE	E, dark gray, unweathe	red, soft									
1						20 -	RC-3	RC				RQD=100%, RC-3 from 19.6 ft to 24.6 ft
1												
1	the base and the			638.8	24.6							
4	SHALE, dark g	ray, unweathered, with	 thin	030.0	24.0	25 –	RC-4	RC				RQD=74%, RC-4 from 24.6 ft to 29.6 ft
	sandstone lami	nations, fissile										
1						-	]					
1				632.7	30.7	30 -	RC-5	RC				RQD=44%, RC-5 from 29.6 ft to 34.6 ft
4	SANDSTONE,	dark gray, unweathere	 d,	631.1	32.3		10-3					110D-44 /0, 110-3 110111 25.0 11 to 34.0 11
1	moderately har			630.3	33.1	-	=			⊽		
1	moderately har	E, dark gray, unweathe d	rea,   			25	]		屸	<u>*</u>		Lost water at 33.1 ft
	COAL with SH.	ALE				35 -	RC-6	RC				RQD=16%, RC-6 from 34.6 ft to 39.6 ft
二				625.1	38.3	-	]					
=	SHALE, dark g	ray, unweathered, mod	 lerately	020.1	30.3	;	]		F			
4	Sample Typ		-	1	J De	pth to	Groun	dwate	r II		1	Boring Method
	SS - Driven Split Sp	oon .		<b>●</b> N	loted or			ls _		f		HSA - Hollow Stem Augers
	ST - Pressed Shelb CA - Continuous Fli			_	t Comp	letion			33.			CFA - Continuous Flight Augers DC - Driving Casing
F	RC - Rock Core CU - Cuttings	.g,ge.		¥ A ¥a C	ifter Cave De	pth	_ hour	rs _			t. t.	MD - Mud Drilling HA - Hand Auger
	CT - Cuttings CT - Continuous Tu	ıbe				p		_		— '		Page 1 of 2



## **TEST BORING LOG**

PROJECT LOCATION		IDNR - Site	2226								BORING#	BH6-12
PRO	JECT NAME	Target Grou	uting Are	as - Si							Northing _	1575368
PRO	JECT LOCATION	North of Br	azil, India	ına							Easting	2945986
											JOB#	86.05957.0016
		DRILLING and SAI	MPLING INF	ORMAT	ION		г					TEST DATA
D	ate Started	9/9/13	Hammer V	Vt.		140	lbs.					
D	ate Completed	9/9/13	Hammer D			-	(i					
D	rill Foreman	W. Bates	Spoon Sar	npler Ol	)	2.0	in.				st,	
ln	spector	S. Bruder	Rock Core				- }				n Tei	
В	oring Method _	HSA	Shelby Tul	be OD			_in.		nics ohics		Standard Penetration Test, Blows per 6 in. Increments	
				T			<u> </u>	ype	Sampler Graphics Recovery Graphics	ater	Pene	
	SOIL	. CLASSIFICATION		Stratum Elevation, 1	E, H	ئ ب	ple	Sample Type	pler (	Groundwater	dard s per	arks
		(continued)		Strati	Stratum Depth, ft	Depth Scale,	Sample No.	Sam	Sam	Grou	Stan	Remarks
1	hard, fissile			<del> </del>			RC-7		-	_		RQD=36%, RC-7 from 39.6 ft to 44.6 ft
1							]		ľ			
	CUAL E dods			619.8 618.8	43.6 44.6							
1		ray, slightly weathered ray (brownish gray), ur		10.10.0	44.0	45 -	RC-8	RC	H			RQD=38%, RC-8 from 44.6 ft to 49.6 ft
	soft, sandstone approximately 4	seam, highly broken a	at									·
量				614.9	48.5	-	1		ł			
=	SHALE, dark gr	ray, slightly weathered	, very soft,			50 ~	RC-9	DO.	H			DOD 50% DO 01 40 0 % 54 0 %
1				1		] :	RC-9	RC.				RQD=50%, RC-9 from 49.6 ft to 54.6 ft
				0000	F0.0							
	SANDY SHALE		 red.	609.6	53.8							
1	moderately hard		,			55 -	RC-10	RC				RQD=84%, RC-10 from 54.6 ft to 59.6 ft
1				] .		_:						
				000.0	F0.0							
1				603.6	59.8	60 -	RC-11	RC				RQD=78%, RC-11 from 59.6 ft to 64.6 ft
1	moderately hard sandstone sear	d, very fine grained, wi	th									
1	Barrastorio soar	110				-						
1						65 -	RC-12	BC.	Н			RQD=70%, RC-12 from 64.6 ft to 69.6 ft
1								110				1 (QD=70%, NC=12 IIGH 04.0 II (0 09.0 II
1						-						
]						70						
						70 ~	RC-13	B RC	H		i 	RQD=86%, RC-13 from 69.6 ft to 74.6 ft
1						-					,	
				588.8	74.6		1					
	Bottom of Test	Boring at 74.6 ft							П			Set 2 in. PVC piezometer screened from 30
												ft to 40 ft. Shale trap at 13.6 ft.
	Correla T			<u> </u>	<u> </u>	-41- 1:	<u></u>		<u> 11</u>	<u></u>		
	Sample Type - Driven Split Sp	oon		<b>●</b> N	<u>De</u> loted on	pth to Drillin			<u> </u>	f	t.	<u>Boring Method</u> HSA - Hollow Stem Augers
ST	- Pressed Shelb - Continuous Flig	y Tube		ΔĀ	t Comp		-	-	33.	<b>6</b> f	t.	CFA - Continuous Flight Augers DC - Driving Casing
RC	- Rock Core	giit Augui		Mar C	fter ave De	nth	_ hour	s _		f	t. t.	MD - Mud Drilling
	<ul><li>Cuttings</li><li>Continuous Tu</li></ul>	be		mã C	ave De	μuι		-		¹	ι.	HA - Hand Auger



### **TEST BORING LOG**

CLIENT	IDNR - Site 2226 Target Grouting Ar	oae Si	to 222					_	BORING#_	BH6-13 1575688
	North of Brazil, Ind									2945993
PROJECT LOCATION	North of Brazil, ind	iaiia							Easting _ JOB# _	86.05957.0016
	DRILLING and SAMPLING II	NFORMA	TION		le.					TEST DATA
Date Started	<b>9/10/13</b> Hamme	· Wt		140	lbs.					
Date Completed	9/10/13 Hammer	Drop _		30	in.					
Drill Foreman		ampler Ol			li i				est, ints	
		re Dia.					vo.		ion T	
Boring Method	HSA Shelby 1	ube OD			in.	Φ	aphics raphic	<u>.</u>	netrati in. Inc	
SOIL	CLASSIFICATION	m ion, ft	m, ft	#,	<u>a</u>	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	s X
SURFACE	ELEVATION 670.843	Stratum Elevation, 1	Stratum Depth, ft	Depth Scale,	Sample No.	Samp	Samp Recov	Groun	Stand	Remarks
SILTY CLAY, b	rown, moist									
-\$/}				-						
1/1				_ =						
<b>]</b> //				5 -						
<u> </u>				]						
1/				. =						
3//				10 -						
<b>3</b> /)								Δ		
		656.1	14.7							Auger refusal at 14.7 ft
LOAM, light bro	wnish gray (10YR 6/2), and ver	_		15	RC-1	RC				RQD= %, RC-1 from 14.7 ft to 19.7 ft
soft, dark gray s	snaie			=	İ		Ш			
				20 –	RC-2	RC	┢			RQD= %, RC-2 from 19.7 ft to 24.7 ft
		648.2	22.6	=			Ш			
COAL, black, de	epth estimated						Ш			
				25 –	RC-3	RC	╊			RQD= %, RC-3 from 24.7 ft to 26.7 ft
CANDY CHAIR	(underslaw) light grov	<b>-</b> 644.1	26.7		RC-4	RC	H			·
unweathered, s	E (underclay), light gray, oft			=	KU-4	KC	H			RQD=100%, RC-4 from 26.7 ft to 29.7 ft
				30 -	RC-5	RC	Н			RQD=62%, RC-5 from 29.7 ft to 34.7 ft
				=						
CUALE dod:	ray unweathered act come	_ 637.7	33.1							
sandstone lami	ray, unweathered, soft, some nations			35 =	RC-6	DC.	H			DOD-78% DC 6 from 24.7 ft to 20.7 ft
					NU-0	ΝÜ				RQD=78%, RC-6 from 34.7 ft to 39.7 ft
				=						
			<u></u>	=						
Sample Type				pth to G			<u>*</u>			Boring Method
SS - Driven Split Sp ST - Pressed Shelb	y Tube		Noted or At Comp	Drilling letion	10019	· -	12.	f 0_f		HSA - Hollow Stem Augers CFA - Continuous Flight Augers
CA - Continuous Flig RC - Rock Core	ght Auger	<b>y</b> /	After		hours	s _		f	t.	DC - Driving Casing MD - Mud Drilling
CU - Cuttings CT - Continuous Tu	be	藺 (	Cave De	pιn		-		f	t.	HA - Hand Auger Page <b>1</b> of <b>2</b>



## **TEST BORING LOG**

PROJECT LOCATION North of Brazil, Indiana Easing 2945993  BOILLING and SAMPLING INFORMATION TEST DATA  Date Started 9/10/13 Hammer Wt. 140 lbs. Date Completed 9/10/13 Hammer Drop 30 in. Drill Foreman W. Bates Spoon Sampler OD 2.0 in. Inspector S. Bruder Rock Core Dia 2.0 in. Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION USE SHALE, dark gray, unweathered, moderately hard, with shale laminations (rooted sandstone) Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, with shale laminations (rooted gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, sissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE and SANDSTONE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE and SANDSTONE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE and SANDSTONE, dark gray, unweathered, moderately hard, fissile G20.0 50.8 SHALE	CLIENT	IDNR - Site 2226							BORING#_	BH6-13
DRILLING and SAMPLING INFORMATION   TEST DATA	PROJECT NAME	Target Grouting	Areas - S						Northing _	1575688
Date Started 9/10/13 Hammer Wt. 140 lbs. Date Completed 9/10/13 Hammer Drop 30 in. Inspector S. Bruder Rock Core Dia. 2.0 in. Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION (continued) Fig. 30 gray of the sandstone laminations (rooted sandstone laminations (rooted sandstone) Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, with shale laminations (rooted gray unweathered, moderately hard, fissile G20.0 50.8 617.8 53.0 Fig. 30 gray in the sandstone) Fig. 30 gray in the sandstone laminations (rooted gray unweathered, moderately hard, fissile G20.0 50.8 50.0 RC-9 RC RC RC RC RC RC RC RC RC RC RC RC RC	PROJECT LOCATION	North of Brazil,	ndiana						Easting _	2945993
Date Started 9/10/13 Hammer Wt. 140 lbs. Date Completed 9/10/13 Hammer Drop 30 in. Drill Foreman W. Bates Spoon Sampler OD 2.0 in. Inspector S. Bruder Rock Core Dia. 2.0 in. Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION USE OF SHALE, dark gray, unweathered, soft, some sandstone laminations  SHALE, dark gray, unweathered, moderately hard, with shale laminations (rooted sandstone)  Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, with shale laminations (rooted sandstone)  COAL, black 617.8 53.0									JOB#	86.05957.0016
Date Completed 9/10/13 Hammer Drop 30 in.  Drill Foreman W. Bates Spoon Sampler OD 2.0 in.  Inspector S. Bruder Rock Core Dia. 2.0 in.  Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION 5 Hammer Drop 30 in.  (continued) 5 Hammer Drop 2.0 in.  SOIL CLASSIFICATION 5 Hammer Drop 2.0 in.  SOIL CLASSIFICATION 5 Hammer Drop 2.0 in.  SANDSTONE, dark gray, unweathered, soft, some sandstone laminations (rooted incorporately hard, with shale laminations (rooted incorporately hard, sissile 620.0 50.8 50 RC-9 RC  COAL, black 617.8 53.0 FRC-9 RC		DRILLING and SAMPLIN	G INFORMA	TION		r				TEST DATA
Drill Foreman W. Bates Spoon Sampler OD 2.0 in. Inspector S. Bruder Rock Core Dia.  Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION Understand Shelby Tube OD in.  SOIL CLASSIFICATION Understand Shelby Tube OD in.  SHALE, dark gray, unweathered, soft, some sandstone laminations  SHALE, dark gray, unweathered, moderately hard, with shale laminations (rooted parameters) Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, with shale laminations (rooted parameters) Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, fissile 620.0 50.8 50 RC-9 RC  COAL, black 617.8 53.0 RC-9 RC	Date Started	<b>9/10/13</b> Ham	mer Wt		<b>140</b> lbs	-				
Inspector S. Bruder Rock Core Dia.  Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION	Date Completed	<b>9/10/13</b> Ham								
SHALE, dark gray, unweathered, soft, some sandstone laminations  SANDSTONE, dark gray, unweathered, moderately hard, with shale laminations (rooted sandstone)  Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, fissile  COAL, black  RC-7 RC  RC-8 RC  RQD=70%, RC-7 from 39.7 ft to 44.7 ft to 49.7 ft to 54.7 ft to 54.7 ft to 54.7 ft	Drill Foreman	W. Bates Spo	n Sampler C	D	<b>2.0</b> in.				st,	
SHALE, dark gray, unweathered, soft, some sandstone laminations  SANDSTONE, dark gray, unweathered, moderately hard, with shale laminations (rooted sandstone)  Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, fissile  COAL, black  RC-7 RC  RC-8 RC  RQD=70%, RC-7 from 39.7 ft to 44.7 ft to 49.7 ft to 54.7 ft to 54.7 ft	Inspector	S. Bruder Roc	Core Dia.		<b>2.0</b> in.				on Te emei	
SHALE, dark gray, unweathered, soft, some sandstone laminations  SANDSTONE, dark gray, unweathered, moderately hard, with shale laminations (rooted sandstone)  Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, fissile  COAL, black  RC-7 RC  RC-8 RC  RQD=70%, RC-7 from 39.7 ft to 44.7 ft to 49.7 ft to 54.7 ft to 54.7 ft to 54.7 ft	Boring Method _	<b>HSA</b> She	y Tube OD		in.		hics phics		etratic	
SHALE, dark gray, unweathered, soft, some sandstone laminations  SANDSTONE, dark gray, unweathered, moderately hard, with shale laminations (rooted sandstone)  Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, fissile  COAL, black  RC-7 RC  RC-8 RC  RQD=70%, RC-7 from 39.7 ft to 44.7 ft to 49.7 ft to 54.7 ft to 54.7 ft to 54.7 ft	SOIL	. CLASSIFICATION	rm ttion, ft	m, t	e, ff	JL ole Type	oler Grap	ndwater	dard Pen s per 6 in	arks
SHALE, dark gray, unweathered, soft, some sandstone laminations  RC-7 RC  RQD=70%, RC-7 from 39.7 ft to 44.7 ft and sandstone laminations  RQD=70%, RC-7 from 39.7 ft to 44.7 ft and sandstone laminations (rooted sandstone)  Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, fissile  COAL, black  RQD=70%, RC-7 from 39.7 ft to 44.7 ft and 49.7 ft to 49.7 ft and 49.7 ft to 49.7 ft and 49.7 ft to 54.7 ft  RC-8 RC  RQD=70%, RC-8 from 44.7 ft to 49.7 ft and 49.7 ft to 54.7 ft  RQD=28%, RC-9 from 49.7 ft to 54.7 ft  RQD=28%, RC-9 from 49.7 ft to 54.7 ft		(continued)	Stratu	Strati	Scale Samp	Sam	Sam	Grou	Stand Blow	Rem
SANDSTONE, dark gray, unweathered, moderately hard, with shale laminations (rooted sandstone)  Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, fissile  COAL, black  626.1 44.7 45.6 45 RC-8 RC  RQD=70%, RC-8 from 44.7 ft to 49.7 ft to 49.7 ft to 49.7 ft to 54.7 ft to 54.7 ft to 54.7 ft	SHALE, dark gr	ray, unweathered, soft, some			1					RQD=70%, RC-7 from 39.7 ft to 44.7 ft
SANDSTONE, dark gray, unweathered, moderately hard, with shale laminations (rooted sandstone)  Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, fissile  COAL, black  625.2 45.6 45 RC-8 RC  RQD=70%, RC-8 from 44.7 ft to 49.7 ft to 49.7 ft to 49.7 ft to 49.7 ft to 54.7 ft  RQD=28%, RC-9 from 49.7 ft to 54.7 ft	sandstone iamii	nations			=					
SANDE TONE, dark gray, driveathered, moderately hard, with shale laminations (rooted sandstone)  Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, fissile  COAL, black  617.8 53.0					=					
sandstone) Interbedded SHALE and SANDSTONE, dark gray, unweathered, moderately hard, fissile  COAL, black  617.8 53.0  RC-9 RC  RQD=28%, RC-9 from 49.7 ft to 54.7 ft	SANDSTONE,	dark gray, unweathered,	4	45.6	45 -RC	-8 RC				RQD=70%, RC-8 from 44.7 ft to 49.7 ft
gray, unweathered, moderately hard, fissile 620.0 50.8 50 RC-9 RC RQD=28%, RC-9 from 49.7 ft to 54.7 ft 617.8 53.0	sandstone)		'		=					
620.0 50.8 50 RC-9 RC RQD=28%, RC-9 from 49.7 ft to 54.7 ft	Interbedded SH gray, unweathe	IALE and SANDSTONE, dar ered, moderately hard, fissile								
		-	620.0	50.8	50 -RC	-9 RC				RQD=28%, RC-9 from 49.7 ft to 54.7 ft
	COAL, black		617.8	53.0	l i					
		ray, unweathered, moderatel	616.8	54.0						
hard			/1615.8	55.0	55 -RC-	10 RC		i		RQD=22%, RC-10 from 54.7 ft to 59.7 ft
SHALE, dark gray, unweathered, soft, fissile, 613.6 57.2	SHALE, dark gr	ray, unweathered, soft, fissil	613.6	57.2	<u>E</u>					
with coal laminations / SHALE, dark gray and light gray, unweathered, 611.1 59.7		- <b></b>	 ed   611 1	50.7						
Soft  Bottom of Test Boring at 59.7 ft  Grouted hole at completion. Plugged with bentonite chips covered with concrete at the surface.	soft			59.7						bentonite chips covered with concrete at the
									:	
							Ш			
Sample Type Depth to Groundwater Boring Method							_			
SS - Driven Split Spoon  ST - Pressed Shelby Tube  Noted on Drilling Tools  At Completion  ↑ At Completion  12.0 ft.  HSA - Hollow Stem Augers  CFA - Continuous Flight Auger		_		•	ools _				CFA - Continuous Flight Augers	
CA - Continuous Flight Auger  RC - Rock Core  After hours ft. DC - Driving Casing ft. MD - Mud Drilling		Ā	▼ After hours f							
CU - Cuttings	CU - Cuttings	ibe	幫	Cave De	epth	-		ft	t.	HA - Hand Auger



### **TEST BORING LOG**

CLIENT	IDNR - Site 2226								BORING#	BH6-14
PROJECT NAME		as - Si	te 222						Northing	1576156
PROJECT LOCATION	North of Brazil, Indi	ana							Easting	2945998
									JOB#	86.05957.0016
	DRILLING and SAMPLING IN	FORMAT	ION		-					TEST DATA
Date Started	9/10/13 Hammer	Wt		140_	lbs.					
Date Completed	9/10/13 Hammer	Drop _		<b>30</b> _i	in. ∥					
Drill Foreman	W. Bates Spoon Sa	mpler O	)	<b>2.0</b> i	in.				st, nts	
Inspector	S. Bruder Rock Cor	e Dia.		2.0	in.				in Te	
Boring Method	HSA Shelby Tu	ube OD			in.	a.	phics aphics		netratic	
SOIL	_ CLASSIFICATION	Stratum Elevation, ft	um h, ft	b, ft	ble	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SURFAC	E ELEVATION 670.383	Strati	Stratum Depth, ft	Depth Scale,	Sample No.	Sam	Sam	Grou	Stan Blow	Rem
SILTY CLAY w	ith trace sand, brown, moist				1	ss			4-3-4	
<b>}</b> //				1		•			,	
				5	2	SS			3-3-4	
SILTY CLAY W	ith trace sand and rock fragments	663.9	6.5		3	SS	X		4-4-4	
SANDY SILTY	CLAY, brown, very moist	660.9	9.0 9.5	10	4	SS			3-3-4	
SANDY LOAM	, light yellowish brown (10YR 6/4) effervescent, slightly plastic	,		'	5	SS	X		23-39-50/0.4'	
	sinoi voodonių ongrialy pladad			-}						
-  -  -  -		655.5	14.9	15		RC				RQD=0%, RC-1 from 13.9 ft to 15.0 ft
SANDY LOAM effervescent, li	i, light brownish gray (10YR 6/2), mestone fragments at 20 ft			] 	RC-2	RC	2.			RQD=0%, RC-2 from 15.0 ft to 20.0 ft
<b></b>							Ш			
<u> </u>				20 =						
				) ~~ j	RC-3	RC	Ш			RQD=0%, RC-3 from 20.0 ft to 25.0 ft
<b></b>				-						
		_ 645.4	25.0	25						
GLACIAL TILL	, fragments of sandstone, shale			20	₹C-4	RC				RQD= %, RC-4 from 25.0 ft to 27.0 ft
				-	RC-5	RC				RQD= %, RC-5 from 27.0 ft to 30.0 ft
		_ 640.6	29.8	30			Ш			
SHALE, dark g	ray, soft, few thin sandstone	639.0	31.4	30 =	RC-6	RC				RQD=60%, RC-6 from 30.0 ft to 35.0 ft
SANDSTONE	with shale laminations, dark gray	636.9	33.5	=						
	athered, moderately hard gray, unweathered, soft	636.4	34.0	]						
COAL, black	iray, unweathered, soit	634.6	35.8	35	RC-7	RC				RQD=44%, RC-7 from 35.0 ft to 40.0 ft
4	unweathered, soft	632.3	38.1	=						
COAL, black		631.3	39.1	=						
Sample Typ	ne.		De	pth to G	round	wate	r	<u> </u>	<u> </u>	Boring Method
SS - Driven Split Sp	oon	<u>•</u> N		Drilling			<u>.                                    </u>	f	t.	HSA - Hollow Stem Augers
ST - Pressed Shelb CA - Continuous FI		_	t Comp			_		f		CFA - Continuous Flight Augers DC - Driving Casing
RC - Rock Core	ignit / rugoi	_	fter Cave De		hours	-		f		MD - Mud Drilling
CU - Cuttings CT - Continuous Tu	ube	ا تعید	De	h		-		— '	••	HA - Hand Auger Page <b>1</b> of <b>2</b>



### **TEST BORING LOG**

CLIENT	IDNR - Site	2226								BORING#_	BH6-14
	Target Grouting Areas - Site 2226									Northing _	1576156
PROJECT LOCATION	_	-								Easting _	2945998
										JOB#	86.05957.0016
	DRILLING and SA	MPLING INF	ORMAT	NOF		-					TEST DATA
Date Started	9/10/13	Hammer V	Vt.		140	lbs.					
	9/10/13										
Drill Foreman	W. Bates									st, ts	
Inspector	S. Bruder		e Dia.		2.0	in.				n Tei	
Boring Method	HSA	Shelby Tu	be OD		10 FE	_in.		ics hics		ratio	
			Т				be	raph Grap	re.	enet 6 in.	
SOIL	CLASSIFICATION		n, ft	ε#.	#	e e	le Ty	ler G	dwaf	ard F	<del>چ</del>
	(continued)		Stratum Elevation, 1	Stratum Depth, ft	Depth Scale,	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SHALE, gray, s	soft, disintergrated at	39.2 ft to	100 111	0, 1	1 0,	RC-8			_		RQD=80%, RC-8 from 40.0 ft to 45.0 ft
39.8 ft		. —	628.4	42.0	-						
SHALE, gray, u	ınweathered, modera tone laminations	tely hard,	626.0	44.4	:						
Interbedded Sh	IALE and SANDSTO	NE, gray,	020.0		45 -	RC-9	RC	-			RQD=70%, RC-9 from 45.0 ft to 50.0 ft
unweathered, r	moderately hard				-	10-3	1.0				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
					-			ł			
					50 -			L			
					-	RC-10	RC				RQD=78%, RC-10 from 50.0 ft to 55.0 ft
					-	]					
			615.4	55.0	55 -	7					
Bottom of Test	Boring at 55.0 ft				55 -						
				}	,						
							1				
Sample Typ	ж			⊥ D∈	epth to	Groun	dwate	<u>ll</u>	<u> </u>	<u> </u>	Boring Method
SS - Driven Split Sp	poon			loted or	n Drillin			_		t.	HSA - Hollow Stem Augers
ST - Pressed Shelb CA - Continuous Fl			_	At Comp After		hour	- -e		f f	t. +	CFA - Continuous Flight Augers DC - Driving Casing
RC - Rock Core CU - Cuttings			_	Cave De		_ 11001	٠.		_	t. t.	MD - Mud Drilling HA - Hand Auger
CT - Continuous Tu	ube										Page <b>2</b> of <b>2</b>



	7.70			Fax	( (317	) 84	9-42	178		
CLIENT	IDNR - Site	e 2227							BORING#	BH7-1
PROJECT NAME		outing Area	as - Si	ite 222	27				Northing	1571005
PROJECT LOCATIO									Easting	2943926
									JOB#	86.05957.0016
	DRILLING and S	AMPLING INF	ORMAT	ΓΙΟΝ						TEST DATA
Date Started _	9/18/13	Hammer V	Vt		140	lbs.				
Date Completed	9/18/13	Hammer [	Orop _		30	in.				
Drill Foreman	W. Bates	Spoon Sar	mpler Ol	D	2.0	in.			st,	
Inspector	S. Bruder	Rock Core	e Dia.		2.0	in.			n Te	
Boring Method	HSA	Shelby Tu	be OD			in.		hics	tratio	
	DIL CLASSIFICATION	.789	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics Recovery Graphics Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SANDY SILT	, dark brown, with grave, brown, slightly moist,	, with gravel	650.9	0.9 3.6	- - - -	1	SS		7-7-8	
CLAY LOAM moist, plastic	, yellowish brown (10), , non-effervescent 	′R 6/6), 	645.7	6.1	5 -	RC-1 RC-2				RQD=?%, RC-1 from 3.6 ft to 4.6 ft RQD=62%, RC-2 from 4.6 ft to 9.6 ft
SANDSTONE moderately ha	E, light gray, unweathe	 ered, 	643.4	8.4	10 -	RC-3	RC			RQD=54%, RC-3 from 9.6 ft to 14.6 ft
SHALE, dark sandstone lar	gray, unweathered, sominations	oft, thin			15	RC-4	RC			RQD=78%, RC-4 from 14.6 ft to 19.6 ft

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core

SANDSTONE, dark gray, unweathered, moderately hard, rooted structures

SHALE, dark gray, unweathered, soft, fissile

SHALE, dark gray, unweathered, soft, fissile

VOID - MINE COLLAPSE, filled, shale and some

RC - Rock Core CU - Cuttings CT - Continuous Tube

coal fragments

 Depth to Groundwater

 ♠ Noted on Drilling Tools
 ft.

 ✓ At Completion
 33.8
 ft.

 ▼ After
 hours
 ft.

 ✓ Cave Depth
 ft.
 ft.

RC-8

RC

RC-5 RC

RC-6 RC

⊐RC-7 RC

 $\nabla$ 

628.3

623.3

622.2

617.2

612.2

23.5

28.5

29.6

34.6

25

30 -

35

Boring Method

HSA - Hollow Stem Augers

CFA - Continuous Flight Augers

DC - Driving Casing

MD - Mud Drilling HA - Hand Auger

RQD=22%, RC-5 from 19.6 ft to 24.6 ft

Retrieved 0.3 ft core from previous run

RQD=66%, RC-6 from 24.6 ft to 29.6 ft

RQD=0%, RC-7 from 29.6 ft to 34.6 ft

RQD=78%, RC-8 from 34.6 ft to 39.6 ft

Set 2 in. PVC with 10 ft screen to 37.5 ft

Lost water at 29.6 ft

2

### **TEST BORING LOG**



PROJECT NAME Target Grouting Areas - Site 2227 PROJECT LOCATION North of Brazil, Indiana  DRILLING and SAMPLING INFORMATION Date Started 9/18/13 Hammer Drop 30 in. Drill Foreman W. Bates Spoon Sampler OD 2.0 in. Inspector S. Bruder Rock Core Dia. 2.0 in. SOIL CLASSIFICATION FORMATION HASA Shelty Tube OO 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	CLIENT	IDNR - Site	2227								BORING#	BH7-1
PROJECT LOCATION North of Brazil, Indiana    Date Started				as - Si	te 222							1571005
DRILLING and SAMPLING INFORMATION  Date Started 9/18/13 Hammer Wt. 140 lbs.  Date Completed 9/18/13 Hammer Drop 30 in.  Drill Foreman W. Bates Spoon Sampler OD 2.0 in.  Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION Ucontinued)  SOIL CLASSIFICATION  W. Bates Solve Tube OD in.  SOIL CLASSIFICATION  W. Bates Shelby Tube OD in.  SOIL CLASSIFICATION  W. Bates Shelby Tube OD in.  SOIL CLASSIFICATION  W. Bates Shelby Tube OD in.  SOIL CLASSIFICATION  W. Bates Shelby Tube OD in.  SOIL CLASSIFICATION  W. Bates Shelby Tube OD in.  SOIL CLASSIFICATION  W. Bates Shelby Tube OD in.  SOIL CLASSIFICATION  W. Bates Shelby Tube OD in.  SOIL CLASSIFICATION  W. Bates Shelby Tube OD in.  SOIL CLASSIFICATION  W. Bates Shelby Tube OD in.  SOIL CLASSIFICATION  W. Bates Shelby Tube OD in.  W. Bates Shelby Tube OD in.  SOIL CLASSIFICATION  W. Bates Shelby Tube OD in.		_	_									
Date Started 9/18/13 Hammer Wt. 140 lbs.  Date Completed 9/18/13 Hammer Drop 30 in.  Drill Foreman W. Bates Spoon Sampler OD 2.0 in.  Inspector S. Bruder Rock Core Dia. 2.0 in.  Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION Samble Odd Decoration (continued) Solution (continued) Started Decoration (continued) Solution (continued) Started Decoration (conti												86.05957.0016
Date Completed 9/18/13 Hammer Drop 30 in.  Drill Foreman W. Bates Spoon Sampler OD 2.0 in.  Inspector S. Bruder Rock Core Dia. 2.0 in.  Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION Samble Or Or Or Or Or Or Or Or Or Or Or Or Or		DRILLING and SA	MPLING INF	ORMAT	TION		-					TEST DATA
Drill Foreman W. Bates Spoon Sampler OD 2.0 in. Inspector S. Bruder Rock Core Dia. 2.0 in. Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION Samble Top Standard Depth, A Standard Penetration Test, Penetration Test, Penetration Test, Penetration Test, Penetration Test, Penetration Test, Penetration Test, Penetration Test, Penetration Test, Penetration Test, Penetration Test, Penetration Test, Penetration Test, Pe	Date Started	9/18/13	Hammer W	√t		140	lbs.					
Inspector S. Bruder Rock Core Dia. Stratum Debth, ft Debth, ft Recovery Graphics Standard Penetration Temperature Standard Penetratu	Date Completed	9/18/13	Hammer D	rop _		30	in.					
	Drill Foreman	W. Bates	Spoon San	npler Ol	o _	2.0	in.				est, nts	
	Inspector	S. Bruder	Rock Core	Dia.		2.0	in.				on Te	
	Boring Method _	HSA	Shelby Tub	oe OD			in.		ohics aphics		etratic	
	SOIL	. CLASSIFICATION		ion, ft	E #	¥	e	le Type	ler Grap ery Gra	dwater	ard Pen per 6 ir	रू १
		(continued)		Stratur	Stratu Depth	Depth Scale	Samp No.	Samp	Samp Recov	Groun	Stand	Rema
	Bottom of Test	Boring at 39.6 ft										

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools **33.8** ft. ∑ At Completion
 ☐ ▼ After \_\_\_\_ hours \_\_\_\_\_ ft.

\_ ft.



CLIENT	IDNR - Site	2227								BORING#	BH7-2
PROJECT NAME			as - Si	te 222	27					Northing	1570995
PROJECT LOCATIO										Easting	2944288
		,								JOB#	86.05957.0016
	DRILLING and SA	AMPLING INF	ORMAT	ION		_					TEST DATA
Date Started	10/2/13	Hammer V	Vt		140	lhs					
Date Completed	10/2/13	Hammer D			30						
Drill Foreman	W. Bates	Spoon San		<u> </u>	2.0					s, řt	
Inspector	S. Bruder	Rock Core		_	2.0					Tes	
Boring Method	HSA	Shelby Tuk	-					SS		ation ncrei	
							e e	aphic iraphi	<u>.</u>	enetri in. Ir	
so	IL CLASSIFICATION		n ion, ft	ε τ.	, ft	<u>e</u>	Sample Type	ler Gr /ery G	Groundwater	ard Poper 6	x <del>X</del>
SURFAC	CE ELEVATION 676	.968	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, f	Sample No.	Samp	Sampler Graphics Recovery Graphics	Grour	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SANDY SILTY	Y CLAY, brown, moist										
<b>]</b> //					=						
1/1					_						
<b>]</b> //					5 —						
#4			670.0	7.0							
SANDY SILTY	Y CLAY, brown, very r	noist			-						
<b>∄</b> //					10 —						
1/1					-						
14			664.0	13.0	-						
SHALE, gray											
#					15 —						
_											
CLAVEY CHA			658.5	18.5		DC 4	DC				DOD-00/ DC 4 from 40 5 ft to 40 5 ft
CLATET SHA	ALE, dark gray and bro	wii, very soit			20 —	RC-1 RC-2		H			RQD=0%, RC-1 from 18.5 ft to 19.5 ft RQD=18%, RC-2 from 19.5 ft to 24.5 ft
			655.1	21.9							
COAL, black					-						
					25 —	50.0	50	Ш			DOD 500/ DO 0 / 04 5 // 00 5 //
			650.1	26.9	25 -	RC-3	RC		⊽		RQD=52%, RC-3 from 24.5 ft to 29.5 ft Lost water at 24.5 ft
UNDERCLAY			030.1	20.9	_				<u>*</u>		
<b>3</b>			647.8	29.2				Ш			
SANDSTONE	E, light beige, moderate ered, thin clay laminati	ely hard, ions			30 —	RC-4	RC				RQD=26%, RC-4 from 29.5 ft to 34.5 ft
1			645.1	31.9							
	gray, slightly weathere from 34.0-35.5 ft, thi				=						
laminations	•				35 —	RC-5	RC				RQD=38%, RC-5 from 34.5 ft to 39.5 ft
1					=	0-3					7.00 0070, 1.0-0 Holli 04.0 H to 00.0 H
1					_						
1					_						
Sample Ty	p <u>e</u>		-	<u>De</u>	pth to C	roun	dwate	er			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools

▼ After \_\_\_\_ hours

**26.7** ft.

\_\_\_\_\_ ft. \_ ft.

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger

2





PROJECT NAME Target Grouting Areas - Site 2227 PROJECT LOCATION North of Brazil, Indiana  DRILLING and SAMPLING INFORMATION  Date Started 10/2/13 Hammer Wt. 140 lbs. Date Completed 10/2/13 Hammer Drop 30 in. Drill Foreman W. Bates Spoon Sampler OD 2.0 in. Inspector S. Bruder Rock Core Dia. 2.0 in. Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION Utility Starts of the starts of t	
DRILLING and SAMPLING INFORMATION   TEST DATA	
DRILLING and SAMPLING INFORMATION   TEST DATA	
Date Started         10/2/13         Hammer Wt.         140 lbs.           Date Completed         10/2/13         Hammer Drop         30 in.	
Date Completed 10/2/13 Hammer Drop 30 in.	
Date Completed 10/2/13 Hammer Drop 30 in.	
W D (	
Inspector S. Bruder Rock Core Dia. 2.0 in.	
Desire Method USA	
Boring Method HSA Shelby Tube ODin.   ඉුවු   ඕ වු	
o o o o o o o o o o o o o o o o o o o	
Boring Method HSA Shelph Line OD Stratum Depth, ft Bookery Graphics Sample Type Standard Penetratic Blows per 6 in. Increments	
Solf Crassition  Stratum Stratum Stratum Stratum Stratum Stratum Stratum Stratum Obepth, ft No. Sample T Scale, ft S	
SHALE, dark gray, slightly weathered, soft,   636.5   40.5   RC-6   RQD=74%, RC-6   from 39.5 ft to   Ifissile, broken from 34.0-35.5 ft, thin sandstone   Image: Record   RQD=74%, RC-6   RQD	) 44.5 ft
SHALEY SANDSTONE, gray, slightly weathered,	
RQD=64%, RC-7 from 44.5 ft to	) 49.5 ft
SANDY SHALE, dark gray, unweathered, slightly	
fissile	
UNDERCLAY, gray, soft 626.4 50.6 50 RC-8 RC RQD=60%, RC-8 from 49.5 ft to	54.5 ft
SHALE, dark gray, soft, fissile, with plant fossils	
55 RC-9 RC RQD=24%, RC-9 from 54.5 ft to	59.5 ft
617.5   59.5   Set well at 58.6 ft	
Bottom of Test Boring at 59.5 ft	
Sample Type Depth to Groundwater Boring Me	ethod

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools **26.7** ft. \_\_\_\_\_ ft.

▼ After \_\_\_\_ hours \_ ft.



CLIENT PROJECT NAME PROJECT LOCATION  Date Started Date Completed Drill Foreman Inspector	Target Grouting Are	ORMAT  Wt Drop _ mpler OI	ΓΙΟΝ		lbs. in. in.			_ _ _ _	BORING # _ Northing _ Easting _ JOB # _	BH7-3 1570992 2944729 86.05957.0016 TEST DATA
	HSA Shelby Tu  CLASSIFICATION  E ELEVATION 680.907	Stratum O Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
fragments SANDSTONE, weathered, mod	lark brown, with sand and rock light gray and gray, slightly derately hard light brown, slightly weathered,	664.9 662.1	16.0 18.8 24.1	25	RC-1 RC-2 RC-3	RCRC		፟፟፟፟፟፟፟		RQD=0%, RC-1 from 19.2 ft to 20.0 ft RQD=7%, RC-2 from 20.0 ft to 25.0 ft RQD=53%, RC-3 from 25.0 ft to 30.0 ft
SANDSTONE, moderately han SHALE, dark g	ray, soft	652.9 650.9 650.0	28.0 30.0 30.9 36.5	35	RC-4 RC-5					RQD=14%, RC-4 from 30.0 ft to 35.0 ft  RQD=20%, RC-5 from 35.0 ft to 40.0 ft
Sample Typ		640.9	40.0	oth to G	round	ducto	<u> </u>			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools **3.8** ft. ∑ At Completion ▼ After \_\_\_\_\_ hours \_\_\_\_ ft. 

\_ ft.





CLIENT	IDNR - Site 2	227								BORING#	BH7-3	
PROJECT NAME	Target Grout		as - Si						_	Northing	1570992	
PROJECT LOCATION										Easting	2944729	
		•								JOB#	86.05957.0016	
	DRILLING and SAMI	PLING INF	ORMAT	ION							TEST DATA	
Date Started	9/18/13	Hammer V	Vt		140	lbs						
		Hammer D			30	- 11						
Drill Foreman		Spoon San		)		- 11				÷, s		
Inspector		Rock Core				- 11				ד Tes ment		
Boring Method _		Shelby Tub	_			_ in.		cs soje		ratior Incre		
			T				be	raphi Sraph	e.	enet 3 in.		
SOIL	CLASSIFICATION		n on, ft	u#.	#	υ	e Tyl	er Gr	dwat	ard P per (	\$ <del>X</del>	
	(continued)		Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, f	Sample No.	Sample Type	Sampler Graphics Recovery Graphic	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks	
Interbedded SH	HALE and SANDSTONE ared, moderately hard, fis	, light			-	RC-6	RC				RQD=42%, RC-6 from 40.0 ft to 45.0 ft	
gray, unweame	red, moderately hard, his	ssile			-			Ш				
					-	1		Ш				
					45 -	RC-7	RC	Ш			RQD=60%, RC-7 from 45.0 ft to 50.0 ft	
SHALE dark of	 ray, unweathered, soft, f		633.9	47.0	_	1		Ш				
OF IZEE, dark g	ray, unweathered, sort, r	133110			-			Ш				
#					50	RC-8	RC	Н			RQD=72%, RC-8 from 50.0 ft to 55.0 ft	
1					-			Ш				
						]		Ш				
ــــــــــــــــــــــــــــــــــــــ			625.3	55.6	55 -	RC-9	RC	H			DOD-569/ DO 0 from 55 0 ft to 60 0 ft	
SANDSTONE,	dark gray, unweathered d, with shale laminations	, rooted			-	KC-9	RC	Ш			RQD=56%, RC-9 from 55.0 ft to 60.0 ft	
structures	u, with shale laminations	s, rooted			-	1		Ш				
<b>=</b>  :::					60 -			Ш				
3			619.1	61.8	-	RC-10	RC	Ш			RQD=49%, RC-10 from 60.0 ft to 64.5 ft	
COAL, black					_	}		Ш				
			616.3 615.8	64.6 65.1	65 -	RC-11	RC	Н			RQD=38%, RC-11 from 64.5 ft to 70.0 ft	
UNDERCLAY,	<u>gray                                    </u>	/	010.0	00.1	55	RC-11	KC	Ш			RQD-36%, RC-11 IIOIII 04.5 II to 70.0 II	
1	,				-			Ш				
1			610.9	70.0	70			Ш				
Bottom of Test	Boring at 70.0 ft				70 -			П			Grouted hole at completion, plugged with	
											chips, patched with concrete	
Sample Typ	Δ			De	pth to (	2round	hwate	ur III			Boring Method	

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools **3.8** ft. \_\_\_\_ ft.

▼ After \_\_\_\_ hours \_ ft.



CLIENT	IDNR - Site	e 2227								BORING#	BH7-4
PROJECT NAME		outing Area	as - Si	te 222	27					Northing	1570983
PROJECT LOCATION		_								Easting	2945152
		,							_	JOB#	86.05957.0016
	DRILLING and SA			TION						_	
		AWPLING INF	URIVIA	ION		Ī					TEST DATA
Date Started	9/17/13	Hammer V	Vt		140						
Date Completed	9/17/13	Hammer D	rop _		30	in.					
Drill Foreman	W. Bates	Spoon Sar	npler Ol	o		- 11				est, ints	
Inspector	S. Bruder	Rock Core	Dia.		2.0	in.				on Tr	
Boring Method _	HSA	Shelby Tul	oe OD			in.		ohics aphics		netratio n. Incr	
SOIL	CLASSIFICATION		n on, ft	_ <del>=</del>	Ħ	<b>0</b>	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	\$ <del>\$</del>
SURFAC	E ELEVATION 679	.596	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale,	Sample No.	Sampl	Sample Recov	Groun	Standa Blows	Remarks
SILTY CLAY, b	prown, moist, with sai	nd	,								
					_						
1/					=				⊻		
]//			070.0		5 -						
#/	 gray, moist, with trace	 sand and	673.6	6.0	]						
rock fragments		o dana ana	671.1	8.5							
SANDY SILT, I	orown, slightly moist		669.6	10.0							
SANDSTONE,	brown, weathered				10 -						
CANIDOTONIE			667.6	12.0	=						
moderately har	light brown, slightly v d, highly broken, very	fine grained,									
well sorted, thir	n claystone lamination	ns at 17.2 ft			15	RC-1 RC-2	RC RC	-			RQD=29%, RC-1 from 13.6 ft to 14.8ft RQD=8%, RC-2 from 14.8 ft to 19.8 ft
						NO-2	110				100 -070, 100-2 110111 14.0 11 to 19.0 11
			661.6	18.0	_						
SANDSTONE, moderately har	light gray, unweathe	red,						Æ			
引:::					20	RC-3	RC				RQD=62%, RC-3 from 19.8 ft to 24.8 ft
<u> </u>					=						
<b>1</b>											
SANDA SHVI E		orod coft	654.6	25.0	25	RC-4	RC	H			RQD=70%, RC-4 from 24.8 ft to 29.8 ft
thinly laminated	d with sandstone	icicu, soit,									
=											
					30 —			Ш			
						RC-5	RC				RQD=90%, RC-5 from 29.8 ft to 34.8 ft
-											
SANDSTONE	dark gray, unweathe		646.0	33.6							
moderately har	d, thin shale laminati	ons	644.5	35.1	35 📑	RC-6	RC				RQD=36%, RC-6 from 34.8 ft to 39.8 ft
	ray, unweathered, so	oft, fissile	642.9	36.7							
COAL, black											
<u>-                                    </u>					<u> </u>			Ш			
Sample Typ				Do	onth to G	round	dwata	r			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools **3.3** ft. 

▼ After \_\_\_\_ hours \_\_\_\_ ft. \_ ft.

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger

2



CLIENT	IDNR - Site 222	7					BORING#	BH7-4
PROJECT NAME			ite 222	27		Northing	1570983	
PROJECT LOCATION		_					Easting	2945152
							JOB#	86.05957.0016
	DRILLING and SAMPLI	NG INFORMA	ΓΙΟΝ				_	TEST DATA
Date Started				140 lbs.				
		mmer Wt						
Date Completed		mmer Drop		30 in.			5.40	
Drill Foreman		oon Sampler O	Ь —				Test	
Inspector		ck Core Dia.		2.0 in.		, so	tion	
Boring Method _	<b>HSA</b> She	elby Tube OD		in.		phics aphic	n. Inc	
SOIL	_ CLASSIFICATION	n, ft	_=	# o	Sample Type	Sampler Graphics Recovery Graphics Groundwater	Standard Penetration Test, Blows per 6 in. Increments	ŝ
	(continued)	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft Sample	ample	ample ecove	andal ows p	Remarks
	(continued)				_	% <u>%</u> ⊕	₩ <u>₩</u>	
UNDERCLAY,	gray and light gray	638.8	40.8	RC-	7 RC			RQD=70%, RC-7 from 39.8 ft to 44.8 ft
		634.5	45.1	45				
Interbedded Sh	HALE and SANDSTONE, light	ht		45 -RC-	8 RC			RQD=70%, RC-8 from 44.8 ft to 49.8 ft
	ered, moderately hard, fissile		47.2	] =				
hard and soft,	ray, unweathered, moderate sandstone laminations	ery		=				
				50 -RC-	9 RC	H		RQD=28%, RC-9 from 49.8 ft to 54.8 ft
				=				
##		624.8	54.8	55 - 50		Ш		
SHALEY SAND	DSTONE, dark gray, unweat	thered,		PC-	IØ RC			RQD=86%, RC-10 from 54.8 ft to 59.8 ft
- Inoderately flai	u			=				
<u> </u>				60 -RC-	II RC			RQD=96%, RC-11 from 59.8 ft to 64.8 ft
1111								
				=				
<u> </u>				65 50	4	Ш		
				RC-	12 RC			RQD=64%, RC-12 from 64.8 ft to 69.8 ft
<u> </u>								
COAL, black		610.9	68.7					
- DIACK		000.4	74.5	70 RC-	  3 RC			RQD=54%, RC-13 from 69.8 ft to 74.8 ft
UNDERCLAY,		608.1 607.1	71.5 72.5	=				
	unweathered, soft			=				
1		604.8	74.8	1_	4			
Bottom of Test	Boring at 74.8 ft							Grouted hole at completion, plugged with concrete and chips
								S. S. S. S. G. G. H. G. H. P.
Sample Typ	e	1	De	epth to Grou	ndwate	<u> </u>	I.	Boring Method

RC - Rock Core

CU - Cuttings CT - Continuous Tube

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

Depth to Groundwater Noted on Drilling Tools

**3.3** ft. ∑ At Completion
 ☐

\_ ft.

▼ After \_\_\_\_ hours \_\_\_\_ ft. 

Boring Method



CLIEN	PROJECT NAME   IDNR - Site 2227   Target Grouting Areas - Site 2227								_	BORING#_	BH7-5
		outing Are	as - Si	te 222					Northing	1570969	
PROJ	ECT LOCATION		_							Easting	2945505
			·							JOB#	86.05957.0016
		DRILLING and S	SAMPLING IN	FORMAT	ΓΙΟΝ						TEST DATA
Da	te Started	9/17/13	Hammer	Wt.		<b>140</b> lbs	i.				
Da	te Completed	9/17/13	Hammer	Drop		<b>30</b> in.					
	II Foreman	W. Bates	Spoon Sa		D		ll l			ts st	
Ins	pector	S. Bruder	Rock Cor			<b>2.0</b> in.	ll l			n Teg	
	ring Method	HSA	Shelby Tu			in.		SS		atior	
							۾ اِ	aphic ìraph	<u></u>	enetr	
	SOIL	_ CLASSIFICATION		Stratum Elevation, ft	h, ff	e, ft ple	No. Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
	SURFAC	E ELEVATION 690	0.108	Stratu	Stratum Depth, ft	Depth Scale, ft Sample	No.	Sam	Grou	Stan	Rem
	SANDY SILT, gwith gravel and	gray and brown, sligl I clay	htly moist,			= 1	SS	X		3-3-3	
111				_ 687.1	3.0						
∦/	sand	prown and gray, mois	st, with trace			5 - 2	SS	X	⊽	3-2-3	
#/	CII TV CI AV K	orown, moist, with tra		_ 684.1	6.0		S			3-3-4	
∄/	gravel and rock	fragments	ace sanu,			-				3-3-4	
#/							ss	X		2-2-3	
∄/,						10 =			٠		
#h/1	CLAYEY SANI	 ) brown wet		678.1	12.0		SS	X		0-0-0	
				676.1	14.0		s			16-50/0.4'	
1:::		brown, decomposed		675.1 674.4	15.0 15.7	15	=			10 00/0.1	RQD=50%, RC-1 from 15.0 ft to 20.0 ft
1	moderately wea	OSTONE, brown and athered, moderately				= = = = = = = = = = = = = = = = = = =					
7	Interpedded St	nations HALE and SANDST(	ONE gray	671.1	19.0						
1	moderately har	d, fissile		<u>-</u> []		20					
$\blacksquare$	SANDY SHALE few sandstone	E, dark gray, unweat	hered, soft,				-2 RC				RQD=74%, RC-2 from 20.0 ft to 25.0 ft
1	1CW Sandstone	ianinations									
						25					
						RC	-3 RC				RQD=98%, RC-3 from 25.0 ft to 30.0 ft
1						=					
1						30	-4 RC	H			RQD=68%, RC-4 from 30.0 ft to 35.0 ft
				657.6	32.5						
	COAL, black								Ī		
3				654.1	36.0	35	-5 RC	Н			RQD= not recorded, RC-5 from 35.0 ft to
	UNDERCLAY,	light gray		-	55.5	=					40.0 ft

Sample Type

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Depth to Groundwater

**11.0**\_ft. Noted on Drilling Tools

**4.6** ft.

▼ After 12 hours

**33.4** ft.

Boring Method





CLIENT	IDNR - Site	2227						BORING#	BH7-5	
PROJECT NAME	Target Gro	outing Area	as - Si	te 222					Northing _	1570969
PROJECT LOCATION	North of B	razil, India	na						Easting	2945505
		·							JOB#	86.05957.0016
	DRILLING and SA	AMPI ING INF	ORMAT	ION					_	TEST DATA
Data Otastad				1011	440					TEGT BATTA
Date Started	9/17/13	Hammer V			140 lbs.					
Date Completed	9/17/13 W. Bates	Hammer D			30_in.					
Drill Foreman _		Spoon Sar	-	<i>_</i>	2.0 in.				Test	
Inspector	S. Bruder HSA	Rock Core	-		2.0 in.		. v		tion	
Boring Method	пон	Shelby Tub	be OD		in.		phics		n. In	
SOU	L CLASSIFICATION		, <del>1</del>			Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	0
301	L CLASSII ICATION		tum	tum th, ft	th le, ft	eldı	pler over	wpur	ndarc vs pe	Remarks
	(continued)		Stratum Elevation, 1	Stratum Depth, ft	Depth Scale, ft Sample	San	San Rec	Go	Star Blov	Ren
CHALE area	unweathered, soft, thi		649 4	40.7		RC				RQD=64%, RC-6 from 40.0 ft to 45.0 ft
with sandstone			1648.3	41.8	] =		Н			
SHALE, dark g	gray, unweathered, so	ft, thin			]		Н			
Saliusione iam	iriations				45 -RC-	7 RC	Н			RQD=44%, RC-7 from 45.0 ft to 50.0 ft
							Н			The Trys, the Thom loss it is ease it
<b>=</b>			641.4	48.7	=		Н			
SHALEY SAN	DSTONE, dark gray, ord, rooted structures	unweathered,			50 =		Ш			
- Inoderately flai	ru, rooteu structures				RC-	RC	Н			RQD=82%, RC-8 from 50.0 ft to 55.0 ft
<u> </u>					-		Н			
<b>=</b>  ::					=		Н			
<b>1</b>					55RC-9	RC	Ħ			RQD=40%, RC-9 from 55.0 ft to 60.0 ft
COAL block of	shale seam from 59.6		633.0	57.1	=		Н			
COAL, black, s	snale seam from 59.0	-59.9 11					Н			
SHALE, gray a			630.1 629.2	60.0 60.9	60 <del>-</del>	0 RC	Н			RQD=84%, RC-10 from 60.0 ft to 65.0 ft
	ERCLAY, light beige					110	Н			100 - 04 /0, 100 - 10 Holli 00.0 It to 00.0 It
			626.6	63.5			Н			
SANDSTONE,	light beige, unweathe	ered,	625.1	65.0	65			7		
\	Boring at 65.0 ft									Grouted hole at completion, plugged with chips and concrete
	-									oripo and contract
Sample Typ					epth to Groun			n f		Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger RC - Rock Core

CU - Cuttings CT - Continuous Tube

**11.0**\_ft. Noted on Drilling Tools ∑ At Completion **4.6** ft. **33.4** ft.

▼ After 12 hours 



CLIEN	NT	IDNR - Site 22	227							BORING#	BH7-6
		Target Grouti		ıs - Si	te 222	27				Northing	1570944
		North of Braz	_							Easting	2946412
										JOB#	86.05957.0016
		DRILLING and SAMP	I INC INE		ION				_	_	TEST DATA
					ION						IEST DATA
	te Started		Hammer W			140_lbs.					
	te Completed		Hammer D			30_ in.					
	ill Foreman _		Spoon San		) <u> </u>	<b>2.0</b> in.				est, ents	
	spector		Rock Core	· <del>-</del>		<b>2.0</b> _ in.		"		on T reme	
Во	ring Method _	HSA S	Shelby Tub	e OD	-	in.	ø.	phics aphics		netrati in. Inci	
	SOIL	L CLASSIFICATION		Stratum Elevation, ft	ım , ft	t, ft ole	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	arks
	SURFAC	E ELEVATION 692.356		Stratu	Stratum Depth, ft	Depth Scale, ft Sample No.	Samp	Samp	Grour	Stanc	Remarks
1/	SILTY CLAY, b	orown, moist				=					
∄//						-					
$\mathbb{I}/$						=					
$\frac{1}{2}$						5 🚽					
$\frac{1}{2}$											
$\mathbb{I}/$						<del> </del>					
∄//						10 -					
$\frac{1}{2}$											
∄/						=					
$\frac{1}{2}$				677.4	15.0						
1/	SANDY CLAY,	brown, moist		011.4	13.0	15 —					
∄/,											
1/						=					
₹/				672.4	20.0	20 —					
$\frac{1}{2}$	SILTY CLAY, by rock fragments	prown, mosit, with trace s	and and			=					
$\mathbb{Y}_{/}$						-					
#/	SILTY CLAY, o			668.4	24.0	-					
$\mathbb{Y}/$						25 —					
4	Augered to 29			665.4	27.0						
				663.4	29.0						
1	VOID, dry, 41/4	4 center bit dropped to 33	.5 ft.			30 📑					
1											
1	L			658.9	33.5						
	Blind drilled - 3	3.5 to 39.1 ft				35 —					
						-					
				653.3	39.1						
<u> </u>	Sample Typ	<u> </u>			Dο	pth to Ground	dwate	<u>                                      </u>			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools **42.6** ft. 

\_\_\_ ft.

\_ft.

▼ After \_\_\_\_\_ hours 

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger





PROJECT NAME Target Grouting Areas - Site 2227  North of Brazil, Indiana  DRILLING and SAMPLING INFORMATION  Date Started 9/19/13 Hammer Wt. 140 lbs. Date Completed 9/19/13 Hammer Drop 30 in. Inspector S. Bruder Rock Core Dia 2.0 in. Boring Method HSA Shelby Tube OD - in.  SOIL CLASSIFICATION	LIENT	IDNR - Site 2227							BORING#	BH7-6
PROJECT LOCATION   North of Brazil, Indiana   Easing   JOB #   86.05957.0016	ROJECT NAME	Target Grouting Are	eas - Si	ite 222	27				Northing	1570944
Date Started   9/19/13									Easting	2946412
Date Started 9/19/13										86.05957.0016
Date Completed 9/19/13 Hammer Drop 30 in.  Drill Foreman W. Bates Spoon Sampler OD 2.0 in.  Inspector S. Bruder Rock Core Dia.  Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION Engraph of the first state of th		DRILLING and SAMPLING IN	FORMAT	TION						TEST DATA
Date Completed 9/19/13 Hammer Drop 30 in.  Drill Foreman W. Bates Spoon Sampler OD 2.0 in.  Inspector S. Bruder Rock Core Dia.  Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION Engraph of the first state of th	Date Started	9/19/13 Hammer	Wt.		<b>140</b>	bs.				
Drill Foreman W. Bates Spoon Sampler OD 2.0 in. Inspector S. Bruder Rock Core Dia. 2.0 in. Boring Method HSA Shelby Tube OD in. SOIL CLASSIFICATION Solid Continued)  SOIL CLASSIFICATION Special Spec	Date Completed	9/19/13 Hammer	Drop		<b>30</b> i	n.				
MINE COLLAPSE - shaley sandstone and small voids  UNDERCLAY, light gray  45  RC-3  RC  RC  RC  RC  RC  RC  RC  RC  RC  R	· -			D					st, ts	
MINE COLLAPSE - shaley sandstone and small voids  UNDERCLAY, light gray  45  RC-3  RC  RC  RC  RC  RC  RC  RC  RC  RC  R	Inspector	S. Bruder Rock Cor	e Dia.		<b>2.0</b> i	n.			n Te	
MINE COLLAPSE - shaley sandstone and small voids  UNDERCLAY, light gray  45  RC-3  RC  RC  RC  RC  RC  RC  RC  RC  RC  R	Boring Method	HSA Shelby To	ube OD		<b></b> _i	n.		Pics Pics	tratio	
MINE COLLAPSE - shaley sandstone and small voids  UNDERCLAY, light gray  45  RC-3  RC  RC  RC  RC  RC  RC  RC  RC  RC  R			T #	1			/be	Sraph Grap Iter	Penel 6 in.	
MINE COLLAPSE - shaley sandstone and small voids  UNDERCLAY, light gray  45  RC-3  RC  RC  RC  RC  RC  RC  RC  RC  RC  R	SOIL	CLASSIFICATION	fion, 1	Ē, £	#	<u>a</u>	ole T)	yer G	dard F	arks
MINE COLLAPSE - shaley sandstone and small voids  UNDERCLAY, light gray  45  RC-3  RC  RC  RC  RC-2  RC  RC  RC-2  RC  RC  RC-3  RC  RC  RC-3  RC  RC-3  RC  RC-3  RC  RC-3  RC  RC-3  RC  RC  RC  RC-3  RC  RC  RC  RC  RC  RC  RC  RC  RC  R		(continued)	Stratu	Stratu	Depth	No.	Samp	Samp Reco Groun	Stand	Rema
UNDERCLAY, light gray  45 RC-3 RC  SANDY SHALE, dark gray, unweathered, moderately hard  SHALE, dark gray, unweathered, moderately hard  SHALE, dark gray, unweathered, moderately hard  SHALE, dark gray, unweathered, moderately hard  SHALE, dark gray, unweathered, moderately hard  649.6  42.8  A7.9  45 RC-3 RC  RQD=32%, RC-3 from 45.0 ft to 50.  RQD=52%, RC-4 from 50.0 ft to 55.  RQD=68%, RC-5 from 55.0 ft to 60.  RQD=100%, RC-6 from 60.0 ft to 68.		SE - shaley sandstone and small					RC			NO RQD, RC-1 from 39.1 ft to 40.0 ft
SANDY SHALE, dark gray, unweathered, moderately hard, thin sandstone laminations, fissile  SANDSTONE, dark gray, unweathered, moderately hard  635.4  SHALE, dark gray, unweathered, moderately hard  628.8  63.6  SHALE, dark gray, unweathered, moderately hard  628.8  63.6  SHALE, dark gray, unweathered, moderately hard	voids		_ 649.6	42.8	<u>∃</u> F	C-2 '	RC	立		RQD=38%, RC-2 from 40.0 ft to 45.0 ft
SANDY SHALE, dark gray, unweathered, moderately hard  SHALEY SANDSTONE, dark gray, unweathered, moderately hard  SHALE, dark gray, unweathered, moderately hard  SHALE, dark gray, unweathered, moderately hard  SHALE, dark gray, unweathered, moderately hard  RC-3 RC  RC-3 RC  RQD=32%, RC-3 from 45.0 ft to 50.  RQD=52%, RC-4 from 50.0 ft to 60.  RQD=68%, RC-5 from 55.0 ft to 60.  RQD=100%, RC-6 from 60.0 ft to 68.	UNDERCLAY, II	ght gray						Ш		
SANDY SHALE, dark gray, unweathered, moderately hard, thin sandstone laminations, fissile  RC-4 RC  RQD=52%, RC-4 from 50.0 ft to 55.  RQD=68%, RC-5 from 55.0 ft to 60.  RQD=68%, RC-5 from 60.0 ft to 60.  RQD=100%, RC-6 from 60.0 ft to 60.  RQD=100%, RC-6 from 60.0 ft to 60.  RQD=100%, RC-6 from 60.0 ft to 60.  RQD=100%, RC-6 from 60.0 ft to 60.					45 <del> </del> F	RC-3 I	RC			RQD=32%, RC-3 from 45.0 ft to 50.0 ft
SANDY SHALE, dark gray, unweathered, moderately hard, thin sandstone laminations, fissile  RC-4 RC  RQD=52%, RC-4 from 50.0 ft to 55.  RQD=68%, RC-5 from 55.0 ft to 60.  RQD=68%, RC-5 from 60.0 ft to 60.  RQD=100%, RC-6 from 60.0 ft to 60.  RQD=100%, RC-6 from 60.0 ft to 60.  RQD=100%, RC-6 from 60.0 ft to 60.  RQD=100%, RC-6 from 60.0 ft to 60.			644 5	47.0						
fissile    SHALE, dark gray, unweathered, moderately   SHALE, dark gray, unweathered, moderately hard   SHALE, dark gray, unweathered, moderately   SHALE, dark gray, unweathered, moderat	SANDY SHALE	, dark gray, unweathered,	_	47.5						
SHALE, dark gray, unweathered, moderately hard    SHALE, dark gray, unweathered, moderately hard		, thin sandstone laminations,			50 -			H		DOD 50% DO 46 50 0 % 55 0 %
SHALEY SANDSTONE, dark gray, unweathered, moderately hard  635.4 57.0						(C-4) I	RC			RQD=52%, RC-4 from 50.0 ft to 55.0 ft
SHALEY SANDSTONE, dark gray, unweathered, moderately hard  635.4 57.0 RC-5 RC RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC-5										
SHALEY SANDSTONE, dark gray, unweathered, moderately hard  635.4 57.0 RC-5 RC RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC RC-5 RC-5					55					
SHALEY SANDSTONE, dark gray, unweathered, moderately hard  60 RC-6 RC  RQD=100%, RC-6 from 60.0 ft to 68			635.4	57.0	<sup>33</sup>	RC-5 I	RC			RQD=68%, RC-5 from 55.0 ft to 60.0 ft
moderately hard  60 RC-6 RC  RQD=100%, RC-6 from 60.0 ft to 68	SHALEY SAND	STONE, dark gray, unweathered	— I	37.0						
RQD=100%, RC-6 from 60.0 ft to 68	moderately hard									
SHALE, dark gray, unweathered, moderately	<u> </u>				60 <del> </del> F	RC-6 I	RC			RQD=100%, RC-6 from 60.0 ft to 65.0 ft
SHALE, dark gray, unweathered, moderately	<u> </u>									
→ hard         65 <del>-                                     </del>	###		628.8	63.6						
RC-7 RC		ay, unweathered, moderately			65 -	00.7		H		DOD-000/ DO 7 from 05 0 ft to 70 0 ft
	#					(C-7) I	RC			RQD=86%, RC-7 HOIH 65.0 II to 70.0 II
	#									
622.4 70.0 70 -			622.4	70.0	70 =					
Bottom of Test Boring at 70.0 ft  Plugged hole with 5 bags of chips ar capped with concrete	Bottom of Test F	Boring at 70.0 ft			10					Plugged hole with 5 bags of chips and
Capped with Concrete										Support with controller
Sample Type Depth to Groundwater Boring Method	0					1	unt -			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core CU - Cuttings CT - Continuous Tube Noted on Drilling Tools **42.6** ft. \_\_\_\_ ft.

 ∑ At Completion ▼ After \_\_\_\_\_ hours \_ ft.



CL	IENT	2227						_	BORING#_	BH7-7	
PR	OJECT NAME	Target Gro	uting Are	as - Si	te 222	27			_	Northing _	1570932
PR	OJECT LOCATION	North of Br	azil, India	na					_	Easting _	2946741
									_	JOB#	86.05957.0016
		DRILLING and SA	MPLING INF	ORMAT	TION	١					TEST DATA
	Date Started	9/19/13	Hammer V	Νt		<b>140</b> lbs.					
	Date Completed	9/20/13	Hammer [	Orop _		<b>30</b> in.					
	Drill Foreman	W. Bates	Spoon Sai	mpler OI	o _	<b>2.0</b> in.				st, nts	
	Inspector	S. Bruder	Rock Core	e Dia.		<b>2.0</b> in.				n Te emer	
	Boring Method _	HSA	Shelby Tu	be OD		in.		ohics aphics		ietratic	
	SOIL	CLASSIFICATION		Stratum Elevation, ft	E,	e, ft	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
	SURFACE	ELEVATION 687.8	345	Stratu	Stratum Depth, ft	Depth Scale, ft Sample No.	Sam	Sam	Grou	Stand	Rem
7	11 in. Topsoil			686.9	0.9	1					
3	SILT, light brow	n and brown		684.8	3.0	= 1	SS	X		6-4-4	
=	CLAYEY SILT,	gray with brown				5 - 2	SS			5-4-4	
3				679.8	8.0	3	SS			5-6-6	
=	SILTY CLAY, gi	ttle sand			10 = 4	SS			4-4-6		
4				674.8	13.0	5	SS	X		4-4-4	
4	SILTY CLAY, bi	rown and gray				15 6	SS			4-6-10	
] 				669.8	18.0	7	SS			5-6-8	
1	SILTY CLAY, gi and rock fragme	ray with brown, with to ents, with little sand a	race sand t 21.0 ft			20 = 8	SS	X		5-8-10	
] 				664.8	23.0	= 9	SS			6-8-8	
1	SILTY CLAY, bi fragments	rown, with some sand	and rock	004.0	00.0	25 10	SS			5-17-20	
<u> </u>	SILTY SAND, b	rown, moist, with clay	and rock	661.8	26.0	11	SS			8-11-17	
						30 = 12	SS			9-17-18	
	·			654.8	33.0	13	SS			9-11-17	
非		<u>gray, weathered</u>		653.8	34.0	14	SS	×		55/0.5'	RQD=0%, RC-1 from 34.0 ft to 35.0 ft
	SANDSTONE, light gray, unweathered, moderately hard, thinly laminated with shale, broken			650.9	36.9	35	RC RC				RQD=16%, RC-2 from 35.0 ft to 40.0 ft
	COAL, black, void or loose coal from 39.0-39.5 ft and from 39.5-40.0 ft										Lost water at 36.9 ft Depth to groundwater is 39.7 ft after Run #3
<b></b> Ŀ	Sample Type	<u> </u>		1		pth to Groun	dwate	er			Boring Method
	SS - Driven Split Spo	oon				Drilling Tool	s _		ft		HSA - Hollow Stem Augers
	ST - Pressed Shelby CA - Continuous Flig								CFA - Continuous Flight Augers DC - Driving Casing		
F	RC - Rock Core CU - Cuttings	, ,		_	fter Cave De	hour pth	s _ -		ft ft		MD - Mud Drilling HA - Hand Auger

RC - Rock Core CU - Cuttings CT - Continuous Tube

Page **1** of



CL	IENT	IDNR - Site	2227								BORING#	BH7-7
PR	OJECT NAME	Target Gro	outing Area	as - Si	te 222	27					Northing _	1570932
	OJECT LOCATION		razil, India	na							Easting	2946741
											JOB#	86.05957.0016
		DRILLING and SA	AMPLING INF	ORMAT	TON							TEST DATA
	Date Started	9/19/13	Hammer V	Vt		140	lbs					
		9/20/13	Hammer D			30	- 1					
		W. Bates	Spoon Sar		)		- 1				st, ts	
		S. Bruder	Rock Core	-		2.0	- II				n Tes	
		HSA	Shelby Tub	oe OD			in.		S ics		ratior Incre	
F				1	ı	1		ЭС	aphi Frapt	-e	enet 3 in.	
	SOIL	CLASSIFICATION		Stratum Elevation, ft	ے ≠	#	Θ	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	र्
ľ		(continued)		ratun	Stratum Depth, ft	Depth Scale, f	Sample No.	ampl	amp	uno	anda	Remarks
$\exists$		(continued)		が 面 646.8	が <u></u> 41.0	_	-		ΰŘ	Ō	<u> </u>	_
	UNDERCLAY,		0-45.8 ft	040.6	41.0		RC-3	RC	Ш			RQD=80%, RC-3 from 40.0 ft to 45.0 ft
#	<b>A</b>					-			Ш			
	Ħ.					45 -			Ш			
	SHALE dork or	ay, unweathered, so		641.8	46.0	10	RC-4	RC	Ш			RQD=64%, RC-4 from 45.0 ft to 50.0 ft
4	SHALE, dark gr	ay, unweamered, so	iii, iissiie			-			Ш			
#						-			Ш			
1						50 -	RC-5	RC	П			RQD=72%, RC-5 from 50.0 ft to 55.0 ft
1						_			Ш			
#						-			Ш			
4						55 -	RC-6	RC	H			RQD=60%, RC-6 from 55.0 ft to 60.0 ft
1						-	110-0	ito	Ш			100 /0, 100 io ii ii ii ii ii ii ii ii ii ii ii ii
1						-			Ш			Lost water again at 59.5 ft
#	SANDSTONE	gray, unweathered, r		628.3 627.3	59.5 60.5	60 -			Ш			
1	structures, sma	<u>   void </u>					RC-7	RC	Ш			RQD=20%, RC-7 from 60.0 ft to 65.0 ft
큐	MINE COLLAPS and 65 5-67 0 ft	SE, open voids from t, filled voids-shale	57.5-59.0 ft			-			Ш			
1		,				-			Ш			
큠						65 -	RC-8	RC	П	፟፟፟፟፟፟		RQD=18%, RC-8 from 65.0 ft to 70.0 ft
1						-						Water at 66.2 ft after Run #9
3				617.0	70.0				Ш			Set well at 68.1 ft, see diagram
	COAL, with sha	- — — — — — — - le		617.8	70.0	70 -	RC-9	RC	Н			RQD=20%, RC-9 from 70.0 ft to 75.0 ft
	COAL, black			616.2 615.2	71.6 72.6	=						
1	SANDSTONE, I	peige, slightly weath	ered,	614.0	73.8							
#	moderately hard			612.8	75.0	75 -						
	UNDERCLAY, be Bottom of Test I	<u> </u>										

Sample Type

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools **65.8** ft. 

\_ ft.

▼ After \_\_\_\_\_ hours \_\_\_\_\_ ft. 

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger

**Boring Method** 



CLIENT	IDNR - Site 2227							BORING#	BH7-8
PROJECT NAME		as - Si	te 222	27				Northing	1570923
PROJECT LOCATION								Easting	2947092
								JOB#	86.05957.0016
	DRILLING and SAMPLING INF	ORMAT	ION					_	TEST DATA
D-4- 04-4-4			1011	140 11					TEOT DATA
Date Started	<b>9/23/13</b> Hammer \ <b>9/25/13</b> Hammer [			140 lbs. 30 in.					
·								5.40	
Drill Foreman			<i></i>	2.0 in. 2.0 in.				Test	
Inspector		-				" s		tion	
Boring Method _	HSA Shelby Tu			in.		iphics aphic		netra in. In	
SOIL	. CLASSIFICATION	Stratum Elevation, ft	E#.	, # le	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	arks
SURFACE	ELEVATION 686.897	Stratu	Stratum Depth, ft	Depth Scale, ft Sample	Samp	Samp	Grour	Stanc Blows	Remarks
SANDY SILT, li	ght brown			=					
<u>-</u>									
SILTY CLAY, d		681.9	5.0						
SILTY CLAY, d	ark brown, moist	.   001.0	0.0	5 —					
<del></del> 1/ /I				] ]					
				10 🚽					
							፟፟፟፟፟		
<b></b>							_		
		671.9	15.0	15 —					
SILTY CLAY, g rock fragments	ray, slightly moist, trace sand and								
<b></b>   / /				]					
				]					
∄/∤				20 🚽					
1/1				]					
COAL and SHA	- — — — — — — — — — — — ALE, approximate depth	663.9	23.0						
OOAL and only	ALE, approximate deptir			25 =					
		659.9	27.0						
UNDERCLAY,	- — — — — — — — — — — — — — — gray								
SHALE dark gr	ay, unweathered, soft, thin	658.1	28.8 30.0	RC-	1 RC	П			RQD=75%, RC-1 from 28.8 ft to 30.0 ft
sandstone lamin	<u>nations</u>	1	00.0	30 -RC-		П			RQD=80%, RC-2 from 30.0 ft to 35.0 ft
SHALEY SAND	OSTONE, dark gray, unweathered, d, very fine grained								
	-, · -: , · · · · · · · · · · · · · · · · · ·								
<u> </u>				35 -					DOD-049/ DO 2 frage 05 0 ft to 40 0 ft
<u> </u>				RC-	3 RC				RQD=94%, RC-3 from 35.0 ft to 40.0 ft
<u> </u>				=					
<u> </u>									
Sample Type	<u> </u>		<u>De</u>	pth to Grou	ndwate	er			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools **12.0** ft. 

▼ After \_\_\_\_ hours \_\_\_\_\_ ft. \_ ft.

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger



CLIE	NT	IDNR - Site	2227							_	BORING#_	BH7-8
PRO	JECT NAME	Target Gro	outing Area	as - Si	te 222	27				_	Northing _	1570923
PRO	JECT LOCATION		_							_	Easting	2947092
										_	JOB#	86.05957.0016
		DRILLING and SA	AMPLING INF	ORMAT	TION							TEST DATA
D	ate Started	9/23/13	Hammer V	Vt.		140	lbs.					
		9/25/13	Hammer D			30	- 1					
	rill Foreman	W. Bates	Spoon Sar		)		1				+ <del>;</del> 8	
	spector	S. Bruder	Rock Core			2.0					n Tes	
	oring Method _	HSA	Shelby Tul						nics ohics		tratior	
				#				ype	Graph Grap	ater	Pene r 6 in.	
-	SOIL	_ CLASSIFICATION		Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
۱.,	1	(continued)		Stra	Str	Sca	Sal	Sal	Sa Re	စ်	Sta	8
		OSTONE, dark gray, d, very fine grained	unweathered,			=	RC-4	RC				RQD=74%, RC-4 from 40.0 ft to 45.0 ft
<u> </u>				643.2	43.7	=						
4	COAL			641.6	45.3	45 —						
	SHALE, black		/	641.2	45.7	=	RC-5	RC				RQD=82%, RC-5 from 45.0 ft to 50.0 ft
	UNDERCLAY,	light gray and light be	eige			_						
<b>X</b> E												
				636.1	50.8	50 -	RC-6	RC				RQD=82%, RC-6 from 50.0 ft to 55.0 ft
4	moderately har	light gray, unweathe d, very fine grained, t	rea, thinly bedded	634.7	52.2	=						
1	with light gray s			632.4	54.5	=						
1	=	eige, unweathered, s ray and black, unwea		1		55 _	RC-7	RC	Н			RQD=48%, RC-7 from 55.0 ft to 60.0 ft
1	fissile, thin san	dstone laminations				=						
=						=						
4						60 —						
1						=	RC-8	RC				RQD=38%, RC-8 from 60.0 ft to 65.0 ft
1						=						
1						_ =						
1				620.4	66.5	65 —	RC-9	RC				RQD=16%, RC-9 from 65.0 ft to 70.0 ft
3	COAL, black					=						
$\exists$	1					=						
	LINDERGLAY			616.8	70.1	70 -	RC-10	DC.	Н			RQD=56%, RC-10 from 70.0 ft to 75.0 ft
	UNDERCLAY,	shaley, dark gray/bla	icn, suit			-	- 10	, 1.0				1140-30 /0, 110-10 HOIII 70.0 IL to 73.0 IL
				612.7	74.0	=						
#	SANDY SHALE	 E, gray, unweathered	, moderately	612.7	74.2 75.0	75 —						
	hard											Grouted hole at completion, plugged with chips, patched with concrete
	Bottom of Test	Boring at 75.0 ft										Supply pateriod with controller
╚	1					<u> </u>	<u> </u>					

Sample Type

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools **12.0** ft. ∑ At Completion
 ☐

\_ ft.

▼ After \_\_\_\_ hours \_\_\_\_\_ ft. 

**Boring Method** 



CLIENT						_	BORING#_	BH7-9	
PROJECT NAME	Target Grouting Area	as - Si	te 222	27				Northing _	1570911
PROJECT LOCATION	North of Brazil, India	ına					_	Easting _	2947433
								JOB#	86.05957.0016
	DRILLING and SAMPLING INF	ORMAT	TON						TEST DATA
Date Started	<b>9/25/13</b> Hammer V	Vt.		<b>140</b> lbs.					
Date Completed	<b>9/25/13</b> Hammer D	Drop —		<b>30</b> in.					
Drill Foreman	W. Bates Spoon Sar	mpler OI	o	<b>2.0</b> in.				st, ts	
Inspector	S. Bruder Rock Core	Dia.		<b>2.0</b> in.				n Te	
Boring Method _	<b>HSA</b> Shelby Tu	be OD	-	in.		cs nics		ratio	
		1	ı	T T		aphi	Ē	enet 3 in.	
SOIL	CLASSIFICATION	Ju, ft	_ =	<b>≠</b>   <sub>0</sub>	Tyle	er Gr	lwate	ird P	ķs
SURFACI	E ELEVATION 685.547	Stratum Elevation, f	Stratum Depth, ft	Depth Scale, ft Sample	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SANDY SILT, b	prown, slightly moist, trace gravel			<u> </u>	SS			7-5-5	
-1111/11		682.5	3.0	<u> </u>	- 00			, 00	
SILTY CLAY, g			5 = 2	ss			4-5-8		
				3	ss			3-3-5	
		075.0	40.5	4	ss			3-4-5	
SANDY SILT, Q	gray and brown, slightly moist,	675.0	10.5	10 =	ss			32-38-42	
with gravel and	trace clay			5	_			32-30-42	
1111		671.3	14.2	= 6	ss			12-22-28	
SILTY SAND, g	gray, moist, with gravel	669.0	16.5	15					
COAL, decomp	oosed	668.5	17.0		SS	X		13-7-10	
UNDERCLAY,	gray			8	SS			13-11-22	
		664.5	21.0	20 = 8	- 33			13-11-22	
SHALE, dark gi	ray and gray, unweathered, soft, laminations from 28.8 ft, fissile	004.0	21.0	9	ss			15-35-50/0.3'	
	•			=					
				25 -RC-	1 RC 2 RC	Н			RQD=88%, RC-1 from 24.4 ft to 25.2 ft RQD=82%. RC-2 from 25.2 ft to 30.2 ft
				RC-	2 100	Ш			11QD=0270, 11Q-2 HOIII 23.2 It to 30.2 It
						Ш			
<u>-</u>		655.0	30.5	30 =		Ш			
	E, gray and dark gray,			RC-	3 RC	Ш			RQD=98%, RC-3 from 30.2 ft to 35.2 ft
unweathered									
		650.4	35.1	35 —					
COAL, black		649.1	36.4	35 — RC-	4 RC				RQD=64%, RC-4 from 35.2 ft to 40.2 ft
SANDY SHALE	E, dark gray, unweathered			] =					
SII TSTONE II	ght gray/beige, unweathered	646.8	38.7 39.1						
Sample Type		1	De	pth to Grou	ndwate	er		<u> </u>	Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools ∑ At Completion
 ☐ \_\_\_\_ ft.

**41.6** ft. ▼ After 12 hours 





CLIENT PROJECT NA PROJECT LO  Date Starte Date Comp Drill Forem Inspector Boring Met	Target Gr CATION North of E  DRILLING and S  d 9/25/13  eleted 9/25/13  an W. Bates  S. Bruder	CAMPLING INFOI Hammer Wt. Spoon Samp Rock Core D Shelby Tube	RMATI	ION	27 140    30	bs. n. n.		8	_	Standard Penetration Test, Blows per 6 in. Increments  Responsible to the standard Penetration Test, Blows per 6 in. Increments	BH7-9 1570911 2947433 86.05957.0016 TEST DATA
SAND	SOIL CLASSIFICATION (continued)  / SHALE, grayish beige, sof		Stratum Elevation, ft	Stratum Depth, ft		No.	Sample Type	П	Groundwater	Standard Per Blows per 6 i	हूं है है है है है है है है है है है है है
SHALE hard, the hard, the same states and the same states are same states and the same states are same states and the same states are same sta	E, dark gray, unweathered, n E, light beige, unweathered, n inly bedded with very fine s STONE, light beige, unweath ately hard	6 noderately6 / moderately andstone6	533.5 532.6 529.2	52.0 52.9 56.3	45   R	RC-6	RC RC RC	-	¥		RQD=80%, RC-6 from 45.2 ft to 50.2 ft  RQD=100%, RC-7 from 50.2 ft to 55.2 ft  RQD=76%, RC-8 from 55.2 ft to 60.2 ft  RQD=96%, RC-9 from 60.2 ft to 65.2 ft
thin sal	Y SHALE, dark gray, unweat ndstone laminations	thered, soft,	617.0 610.3	68.5 75.2	70	C-10	RC				RQD=58%, RC-10 from 65.2 ft to 70.2 ft Retrieved 0.2 ft core from previous run  RQD=42%, RC-11 from 70.2 ft to 75.2 ft  Grouted hole at completion, plugged with chips, patched with concrete
San	nple Type	'		De	pth to Gr	ound	wate	r			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Depth to Groundwater Noted on Drilling Tools ft.

\_ ft. **41.6** ft. ▼ After 12 hours 





CLIENT	<b>IDNR - Site 2228</b>							BORING #	BH8-1
PROJECT NAME Target Grouting Areas - Site 2228							_	Northing	1570840
	ON North of Brazil, Indi							Easting	2949822
								JOB#	86.05957.0016
	DRILLING and SAMPLING IN	FORMAT	ΓΙΟΝ						TEST DATA
Date Started	<b>9/26/13</b> Hammer	Wt.		<b>140</b> lbs.					
Date Completed				<b>30</b> in.					
Drill Foreman	W. Bates Spoon S		D					ts st	
Inspector	S. Bruder Rock Co			<b>2.0</b> in.				Tes meni	
Boring Method	HSA Shelby T			in.		SS		atior	
					ي ا	aphic iraph	<u></u>	enetr	
S	OIL CLASSIFICATION	ion, ft	   E <sup>#</sup> .	# <u>e</u>	le Tyr	ler Gr /ery G	Groundwater	ard P	ırks
SURFA	ACE ELEVATION 701.497	Stratum Elevation, fl	Stratum Depth, ft	Depth Scale, ft Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groun	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SILTY CLAY	/, light brown and brown, moist	698.5	3.0	<u>-</u> <u>-</u> 1	ss			6-5-5	
SILTY CLAY	/, brown and gray, moist, trace grave	- I	3.0	= 2	ss			3-3-4	
				5 - 3	SS			3-3-5	
<b>1</b> /1		692.5	9.0	-					
SANDSTON	IE, brown, decomposed			10 = 4	SS			13-38-50/0.3'	
<u> </u>	,,	_ 689.9	11.6	5	SS	X		14-21-39	
SHALE, gray	y, weathered								
SHALE dark	 k gray, unweathered, soft, siltstone	_ 687.2	14.3	15 —RC-1	RC				RQD=100%, RC-1 from 14.3 ft to 15.0 ft
laminae at 2	4.5 ft			RC-2					RQD=94%, RC-2 from 15.0 ft to 20.0 ft
-				=					
				20RC-3	RC	П			RQD=70%, RC-3 from 20.0 ft to 25.0 ft
				=					
				=					
COAL, black		676.6	24.9	25 -RC-4	1 RC	Н			RQD=28%, RC-4 from 25.0 ft to 30.0 ft
									100 20%, 100 4 110111 20.0 10 to 00.0 10
<b>-</b>		673.1	28.4						
UNDERCLA	Y, light gray, soft, shaley			30 =		Ш			
				RC-5	RC				RQD=42%, RC-5 from 30.0 ft to 35.0 ft
		_ 668.7	32.8	=					
SHALE, gray	y, unweathered, soft, fissile, sandy								
				35RC-6	RC				RQD=58%, RC-6 from 35.0 ft to 40.0 ft
				=					
Sample T			De	epth to Groun	dwate	er	<u> </u>		Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger





CLIENT	IDNR - Site 2	2228								BORING#_	BH8-1
PROJECT NAME Target Grouting Areas - Site 2228  PROJECT LOCATION North of Brazil, Indiana									Northing	1570840	
	_	_								Easting	2949822
									_	JOB#	86.05957.0016
	DRILLING and SAM	IPLING INF	ORMAT	ION						<del>-</del>	TEST DATA
Date Started	9/26/13	Hammer V			140	lbs					
	9/26/13	Hammer D			30						
	W. Bates	Spoon San		<u> </u>						÷į o	
	S. Bruder	Rock Core	•	_	2.0					Tes	
	HSA	Shelby Tuk	-					s s		ation	
		- Cricity run					Φ	aphic raphi	_	enetra in. Ir	
SOIL	CLASSIFICATION		Stratum Elevation, ft	ב≠	¥	(I)	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Š
	(continued)		ratun evatik	Stratum Depth, ft	Depth Scale,	Sample No.	ample	ample	rounc	anda	Remarks
CHALE gray u	nweathered, soft, fissil	o condu	が 直 660.9	が <u>Ğ</u> 40.6		ഗ് ž RC-7		ώğ.	Ō	<u>₩</u>	RQD=90%, RC-7 from 40.0 ft to 45.0 ft
	gray, unweathered, mo		000.9	40.0		KC-1	RC				RQD-90%, RC-7 Holli 40.0 It to 45.0 It
hard, rooted	<b>5</b> - <b>5</b> , ,	,									
COAL, black			657.2	44.3	45			le			
			654.4	47.4	• =	RC-8	RC				RQD=54%, RC-8 from 45.0 ft to 50.0 ft
UNDERCLAY	- — — — — — — — - light gray, sandy		654.4	47.1							
	3 - 3 - 3 , , 3		GE 1 E	50.0							
Bottom of Test	Boring at 50.0 ft		651.5	50.0	50 —			Н			
	g										
Sample Type	<u> </u>			<u>De</u>	pth to G	roun	<u>dwate</u>	<u>r</u>			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools 



Northing   PROJECT LOCATION   North of Brazil, Indiana   2950365	CLIENT	IDNR - Site 2228							BORING#	BH8-2
PROJECT LOCATION   North of Brazil, Indiana   Easing   JOB #   36.05957.0016   R6.05957.0016   R6.05957.0016   R6.05957.0016   R6.05957.0016   Residual			as - Si	te 222	28			_	_	
DRILLING and SAMPLING INFORMATION   TEST DATA   TEST		-								
Date Started 9/26/13 Hammer Wt. 140 lbs. Date Completed 9/26/13 Hammer Drop 30 in. Drill Forenan W. Bates Spoon Sampler OD 2.0 in. Inspector S. Bruder Rock Core Dia 2.0 in. Boring Method HSA Shelby Tube OD in.  SULFACE ELEVATION 706.889 Sa in 15 S in									-	
Date Completed 9/26/13		DRILLING and SAMPLING INF	ORMAT	ION						TEST DATA
Date Completed 9/26/13	Date Started	<b>9/26/13</b> Hammer V	Vt.		<b>140</b> lbs.					
Drill Foreman   W. Bates   Spoon Sampler OD   2.0   in.   Inspector   S. Bruder   Rock Care Dia.   2.0   in.   Single Property   Single	_									
Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   SURFACE ELEVATION 706.889   Solic CLASSIFICATION   Soli				)					ts st	
SILTY CLAY, brown, moist, trace sand and few gravel  SILTY CLAY, brown, moist, trace sand and few gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and few gravel  689.9 17.0 688.6 18.3 687.9 19.0 RC-1 from 18.3 ft to 19.5 ft RQD=0%, RC-1 from 18.3 ft to 19.5 ft RQD=40%, RC-2 from 19.5 ft to 24.5 ft RQD=40%, RC-2 from 19.5 ft to 24.5 ft RQD=90%, RC-3 from 24.5 ft to 29.5 ft RQD=90%, RC-3 from 24.5 ft to 34.5 ft RQD=78%, RC-4 from 29.5 ft to 34.5 ft RQD=78%, RC-4 from 29.5 ft date rate at 34.5 ft after Run #6	_								Tes	
SILTY CLAY, brown, moist, trace sand and few gravel  SILTY CLAY, brown, moist, trace sand and few gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and few gravel  689.9 17.0 688.6 18.3 687.9 19.0 RC-1 from 18.3 ft to 19.5 ft RQD=0%, RC-1 from 18.3 ft to 19.5 ft RQD=40%, RC-2 from 19.5 ft to 24.5 ft RQD=40%, RC-2 from 19.5 ft to 24.5 ft RQD=90%, RC-3 from 24.5 ft to 29.5 ft RQD=90%, RC-3 from 24.5 ft to 34.5 ft RQD=78%, RC-4 from 29.5 ft to 34.5 ft RQD=78%, RC-4 from 29.5 ft date rate at 34.5 ft after Run #6	•		-				s s		atior ocre	
SILTY CLAY, brown, moist, trace sand and few gravel  SILTY CLAY, brown, moist, trace sand and few gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and few gravel  689.9 17.0 688.6 18.3 687.9 19.0 RC-1 from 18.3 ft to 19.5 ft RQD=0%, RC-1 from 18.3 ft to 19.5 ft RQD=40%, RC-2 from 19.5 ft to 24.5 ft RQD=40%, RC-2 from 19.5 ft to 24.5 ft RQD=90%, RC-3 from 24.5 ft to 29.5 ft RQD=90%, RC-3 from 24.5 ft to 34.5 ft RQD=78%, RC-4 from 29.5 ft to 34.5 ft RQD=78%, RC-4 from 29.5 ft date rate at 34.5 ft after Run #6						g g	aphic ìraphi	Į.	enetra	
SILTY CLAY, brown, moist, trace sand and few gravel  SILTY CLAY, brown, moist, trace sand and few gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and few gravel  689.9 17.0 688.6 18.3 687.9 19.0 RC-1 from 18.3 ft to 19.5 ft RQD=0%, RC-1 from 18.3 ft to 19.5 ft RQD=40%, RC-2 from 19.5 ft to 24.5 ft RQD=40%, RC-2 from 19.5 ft to 24.5 ft RQD=90%, RC-3 from 24.5 ft to 29.5 ft RQD=90%, RC-3 from 24.5 ft to 34.5 ft RQD=78%, RC-4 from 29.5 ft to 34.5 ft RQD=78%, RC-4 from 29.5 ft date rate at 34.5 ft after Run #6	SOI	L CLASSIFICATION	um ation, ft	H, H	e, ft ple	ple Typ	pler Gr	ındwate	dard P.	ıarks
SILTY CLAY, brown, moist, trace sand and few gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SHALE, gray, weathered  689.9 17.0  SHALE, black, with coal  COAL, black  UNDERCLAY, light gray/light beige  684.4 22.5  UNDERCLAY, light gray/light beige  680.6 26.3  SHALE, dark gray, unweathered, soft, fissile  672.4 34.5 1  SHALEY SANDSTONE, gray, unweathered, for1.7 35.5 RC-5 RC  Water at 34.5 ft after Run #6	SURFAC	CE ELEVATION 706.889	Strat	Strat	Scal Sam Sam	Sam	Sam	Grou	Stan Blow	Rem
SILTY CLAY, brown, moist, trace sand and few gravel    SILTY CLAY, brown, moist, ittle sand and trace gravel	SILTY CLAY,	brown, moist								
SILTY CLAY, brown, moist, trace sand and few gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SHALE, gray, weathered  689.9  17.0  SHALE, black, with coal  COAL, black  UNDERCLAY, light gray/light beige  684.4  22.5  UNDERCLAY, light gray/light beige  25 RC-3 RC  WALE, dark gray, unweathered, soft, fissile  30 RC-4 RC  RQD=90%, RC-1 from 18.3 ft to 19.5 ft RQD=40%, RC-2 from 19.5 ft to 24.5 ft  RQD=90%, RC-3 from 24.5 ft to 29.5 ft  RQD=90%, RC-3 from 24.5 ft to 39.5 ft  RQD=14%, RC-4 from 29.5 ft to 34.5 ft  RQD=14%, RC-5 from 34.5 ft to 39.5 ft  Water at 34.5 ft after Run #6	<b>→</b> 1/ /1									
SILTY CLAY, brown, moist, trace sand and few gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SHALE, gray, weathered  689.9  17.0  SHALE, black, with coal  COAL, black  UNDERCLAY, light gray/light beige  684.4  22.5  UNDERCLAY, light gray/light beige  25 RC-3 RC  WALE, dark gray, unweathered, soft, fissile  30 RC-4 RC  RQD=90%, RC-1 from 18.3 ft to 19.5 ft RQD=40%, RC-2 from 19.5 ft to 24.5 ft  RQD=90%, RC-3 from 24.5 ft to 29.5 ft  RQD=90%, RC-3 from 24.5 ft to 39.5 ft  RQD=14%, RC-4 from 29.5 ft to 34.5 ft  RQD=14%, RC-5 from 34.5 ft to 39.5 ft  Water at 34.5 ft after Run #6	1/1									
SILTY CLAY, brown, moist, trace sand and few gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  689.9 17.0  689.9 17.0  689.9 17.0  688.6 18.3  687.9 19.0  COAL, black  COAL, black  UNDERCLAY, light gray/light beige  684.4 22.5  UNDERCLAY, light gray/light beige  680.6 26.3  SHALE, dark gray, unweathered, soft, fissile  672.4 34.5  SHALEY SANDSTONE, gray, unweathered, moderately hard, rooted  MINE COLLAPSE - VOID, 1.5 ft open void, then mine collapse, followed by 1.0 pen voids, then mine collapse, followed by 1.0 pen voids, then	<b></b> 1 / 1				5 =					
SILTY CLAY, brown, moist, trace sand and few gravel    10			609.0		<u> </u>					
SILTY CLAY, brown, moist, little sand and trace gravel  SILTY CLAY, brown, moist, little sand and trace gravel  SHALE, gray, weathered  689.9  17.0  689.9  17.0  689.9  17.0  689.9  17.0  688.6  18.3  FC-1  COAL, black  COAL, black  UNDERCLAY, light gray/light beige  684.4  22.5  G88.6  684.4  22.5  G88.6  COAL, black  COAL, black  COAL, black  COAL, black  COAL, black  RCD=0%, RC-1 from 18.3 ft to 19.5 ft RQD=40%, RC-2 from 19.5 ft to 24.5 ft RQD=40%, RC-2 from 19.5 ft to 24.5 ft RQD=90%, RC-3 from 24.5 ft to 29.5 ft RQD=78%, RC-4 from 29.5 ft to 34.5 ft RQD=78%, RC-4 from 29.5 ft to 34.5 ft Water at 34.5 ft after Run #6  RQD=14%, RC-5 from 34.5 ft to 39.5 ft Water at 34.5 ft after Run #6	SILTY CLAY,	brown, moist, trace sand and few	090.9	0.0						
SILTY CLAY, brown, moist, little sand and trace gravel  SHALE, gray, weathered  SHALE, black, with coal  COAL, black  UNDERCLAY, light gray/light beige  688.4  22.5  UNDERCLAY, light gray/light beige  680.6  SHALE, dark gray, unweathered, soft, fissile  SHALE, black, with coal  RC-1 RC  RC-2 RC  RC-2 RC  RC-2 RC  RQD=90%, RC-3 from 18.3 ft to 19.5 ft RQD=90%, RC-3 from 19.5 ft to 24.5 ft RQD=90%, RC-3 from 29.5 ft to 29.5 ft RQD=14%, RC-5 from 34.5 ft to 39.5 ft Water at 34.5 ft after Run #6	<del></del> 1/ 1 °				10 -					
SILTY CLAY, brown, moist, little sand and trace gravel  SHALE, gray, weathered  SHALE, black, with coal  COAL, black  UNDERCLAY, light gray/light beige  688.4  22.5  UNDERCLAY, light gray/light beige  680.6  SHALE, dark gray, unweathered, soft, fissile  SHALE, black, with coal  RC-1 RC  RC-2 RC  RC-2 RC  RC-2 RC  RQD=90%, RC-3 from 18.3 ft to 19.5 ft RQD=90%, RC-3 from 19.5 ft to 24.5 ft RQD=90%, RC-3 from 29.5 ft to 29.5 ft RQD=14%, RC-5 from 34.5 ft to 39.5 ft Water at 34.5 ft after Run #6	<b>1</b> /1									
SILTY CLAY, brown, moist, little sand and trace gravel  SHALE, gray, weathered SHALE, black, with coal COAL, black  UNDERCLAY, light gray/light beige  689.9  17.0  688.6  687.9  19.0  RC-1 RC 20 RC-2 RC  WINDERCLAY, light gray/light beige  880.6  680.6	<b>→</b> [ / ]									
SHALE, gray, weathered   689.9   17.0   689.9   17.0   688.6   18.3   19.0   RC-1   RC   RC   RC   RC   RC   RC   RC   R		hrown moist little sand and trace	692.9	14.0						
SHALE, gray, weathered SHALE, black, with coal COAL, black  UNDERCLAY, light gray/light beige  25 RC-3 SHALE, dark gray, unweathered, soft, fissile  CF2.4 SHALE, SANDSTONE, gray, unweathered, moderately hard, rooted  MINE COLLAPSE -VOID, 1.5 ft open void, then mine collapse, followed by 1.0 open voids, then		brown, moist, inde sand and trace			15 —					
SHALE; SANDSTONE, gray, unweathered, moderately hard, rooted MINE COLLAPSE -VOID, 1.5 ft open voids, then mine collapse, followed by 1.0 open voids, then mine collapse, followed by 1.0 open voids, then mine collapse, followed by 1.0 open voids, then mine collapse, followed by 1.0 open voids, then mine collapse, followed by 1.0 open voids, then mine collapse, followed by 1.0 open voids, then mine collapse, followed by 1.0 open voids, then	SHALE gray									
COAL, black  UNDERCLAY, light gray/light beige  25 RC-3 RC  SHALE, dark gray, unweathered, soft, fissile  SHALEY SANDSTONE, gray, unweathered, moderately hard, rooted  MINE COLLAPSE -VOID, 1.5 ft open void, then mine collapse, followed by 1.0 open voids, then						1 RC				ROD=0% RC-1 from 18 3 ft to 19 5 ft
UNDERCLAY, light gray/light beige  25 RC-3 RC  SHALE, dark gray, unweathered, soft, fissile  30 RC-4 RC  RQD=90%, RC-3 from 24.5 ft to 29.5 ft  RQD=78%, RC-4 from 29.5 ft to 34.5 ft  RQD=78%, RC-4 from 29.5 ft to 34.5 ft  RQD=14%, RC-5 from 34.5 ft to 39.5 ft  Water at 34.5 ft after Run #6		, with codi	<u>'</u>			-	H			
UNDERCLAY, light gray/light beige  25 RC-3 RC  SHALE, dark gray, unweathered, soft, fissile  30 RC-4 RC  RQD=90%, RC-3 from 24.5 ft to 29.5 ft  RQD=78%, RC-4 from 29.5 ft to 34.5 ft  RQD=78%, RC-4 from 29.5 ft to 34.5 ft  RQD=14%, RC-5 from 34.5 ft to 39.5 ft  Water at 34.5 ft after Run #6			004.4	00.5						
SHALE; SANDSTONE, gray, unweathered, official of	UNDERCLAY		684.4	22.5	=					
SHALE, dark gray, unweathered, soft, fissile  30 RC-4 RC  RQD=78%, RC-4 from 29.5 ft to 34.5 ft  RQD=14%, RC-5 from 34.5 ft to 39.5 ft Water at 34.5 ft after Run #6  Wine Collapse, followed by 1.0 open voids, then		,g g yg g -					Ш			
30 RC-4 RC  RQD=78%, RC-4 from 29.5 ft to 34.5 ft  872.4 671.7 35.2 35 RC-5 RC  MINE COLLAPSE -VOID, 1.5 ft open void, then mine collapse, followed by 1.0 open voids, then	7 <b>9</b>		680.6	26.3	25RC-3	RC				RQD=90%, RC-3 from 24.5 ft to 29.5 ft
SHALEY SANDSTONE, gray, unweathered, moderately hard, rooted MINE COLLAPSE -VOID, 1.5 ft open void, then mine collapse, followed by 1.0 open voids, then	SHALE, dark of	gray, unweathered, soft, fissile			_=					
SHALEY SANDSTONE, gray, unweathered, moderately hard, rooted MINE COLLAPSE -VOID, 1.5 ft open void, then mine collapse, followed by 1.0 open voids, then										
SHALEY SANDSTONE, gray, unweathered, moderately hard, rooted  MINE COLLAPSE -VOID, 1.5 ft open void, then mine collapse, followed by 1.0 open voids, then	-				30 -RC-4	RC	П			RQD=78%, RC-4 from 29.5 ft to 34.5 ft
SHALEY SANDSTONE, gray, unweathered, moderately hard, rooted  MINE COLLAPSE -VOID, 1.5 ft open void, then mine collapse, followed by 1.0 open voids, then										
SHALEY SANDSTONE, gray, unweathered, moderately hard, rooted  MINE COLLAPSE -VOID, 1.5 ft open void, then mine collapse, followed by 1.0 open voids, then										
Water at 34.5 ft after Run #6    MINE COLLAPSE -VOID, 1.5 ft open void, then					35 - 50 /		Н			DOD 449/ DO 54 04 5 9/ 00 5 9/
MINE COLLAPSE -VOID, 1.5 ft open void, then mine collapse, followed by 1.0 open voids, then			7	00.2	33   RC-{	RC RC				
	MINE COLLAR	PSE -VOID, 1.5 ft open void, then			]					
Collapse, then 1.0 ft open void and collapse										
Sample Type Depth to Groundwater Boring Method		· · · · · · · · · · · · · · · · · · ·		D-	oth to Groun	dwata	r	<u> </u>	<u> </u>	Roring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger





PROJ	DJECT NAME Target Grouting Areas - Site 2228  DJECT LOCATION North of Brazil, Indiana  DRILLING and SAMPLING INFORMATION								 BORING # _ Northing _ Easting _ JOB #	# BH8-2 1570821 2950365 86.05957.0016	
Da Da Dri	sequence, 2-6 in followed by mine SHALEY SAND moderately hard UNDERCLAY, I SANDY SHALE moderately hard	DRILLING and S 9/26/13 9/26/13 W. Bates S. Bruder HSA  CLASSIFICATION  (continued) n. open voids from 4 e collapse  STONE, dark gray, d ight gray, soft i, light gray, unweath	AMPLING INF Hammer V Hammer D Spoon San Rock Core Shelby Tub	ORMATOR OR  Stratum Depth, ft	140 30 2.0 2.0 	lbs. in. in. in. on No. RC-6	Sample Type	Sampler Graphics Recovery Graphics			
	Sample Type					epth to C		dusto			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools \_\_\_\_\_ ft. \_\_\_\_ ft.

▼ After \_\_\_\_ hours \_\_ 



CLIENT	IDNR - Site 2228							BORING#_	BH8-3
PROJECT NAME	Target Grouting A	reas - Si	te 222	28				Northing _	1570809
PROJECT LOCATION								Easting	2950743
								JOB#	86.05957.0016
	DRILLING and SAMPLING	INFORMAT	ΓΙΟΝ						TEST DATA
Date Started	<b>9/26/13</b> Hamm	er Wt.		<b>140</b> lbs.					
Date Completed		er Drop		<b>30</b> in.					
Drill Foreman		Sampler Ol	D	<b>2.0</b> in.				+ <del>,</del> v	
Inspector		Core Dia.	_	<b>2.0</b> in.				Tes	
Boring Method		Tube OD		in.		s s		ation	
					پِ اِ	aphic iraphi	-	enetra in. Ir	
SOIL	CLASSIFICATION	Stratum Elevation, ft	E,	e, ft	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SURFAC	E ELEVATION 710.653	Stratu	Stratum Depth, ft	Depth Scale, ft Sample	Sam	Sam	Grou	Stan	Rem
SILTY CLAY, b	prown, moist			=					
<b>→</b> 1/ /									
1//				5 🚽					
				<u> </u>					
				10 =					
				]					
<b></b> 1/									
T/4		694.7	16.0	15 —					
SILTY CLAY, b	olack, moist, trace coal fragmen	ts693.2	17.5						
CLAYEY SHAL (underclay)	.E, gray, soft, slightly weathered	d			1				
(underclay)				20 -RC-	-1	H			RQD=80%, RC-1 from 18.6 ft to 19.6 ft RQD=14%, RC-2 from 19.6 ft to 24.6 ft
		688.6	22.1		2	Ш			
COAL, decomp	oosed, broken - no recovery			=		Ш			
		686.1	24.6			Ш			
	ray/black, broken, trace coal	684.7	26.0	25RC-	3 RC	Ш			RQD=68%, RC-3 from 24.6 ft to 29.6 ft
UNDERCLAY,	light gray, soft, slightly weather	I		]		Ш			
SANDSTONE		682.4 681.1	28.3			Ш			
	d, very fine grained	_/	29.0	30 -RC-	4 RC	Н			RQD=34%, RC-4 from 29.6 ft to 34.6 ft
MINE COLLAR	PSE-SANDSTONE, light gray, red, moderately hard, with clay	670.0	22.5			Ш			Lost water at 30.0 ft
laminations		678.2	32.5						
MINE COLLAF	SE-CLAYEY SHALE, light gray	'1	34.0	25	4.				
	atnered, soft PSE-SHALE, dark gray/black,	_ ] 675.0	35.7	35	5 RC				RQD=70%, RC-5 from 34.6 ft to 39.6 ft
unweathered, s	soft			=					Water after Run #8 at 36.3 ft
	PSE-SANDSTONE, gray, moderately hard	672.0	38.7						
Sample Typ	<u>e</u>		De	pth to Grou	ndwate	<u>er</u>			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools





CLIENT	IDNR - Site	2228							_ B	ORING#_	BH8-3
	Target Gro		as - Si	te 222	28					orthing _	1570809
PROJECT LOCATION	N North of B	razil, India	ına						_ E	asting _	2950743
									_ J	OB#	86.05957.0016
	DRILLING and SA	AMPLING INF	ORMA	ΠΟN		_					TEST DATA
Date Started	9/26/13	Hammer V	Vt.		140	lbs.					
Date Completed	9/26/13	Hammer [	_		30	- 1					
Drill Foreman _	W. Bates	Spoon Sar		o	2.0	in.				st, its	
Inspector	S. Bruder	Rock Core	Dia.		2.0	in.				an Te emer	
Boring Method	HSA	Shelby Tu	be OD			in.		hics phics		Standard Penetration Test, Blows per 6 in. Increments	
001			<b>#</b>				ype	Sampler Graphics Recovery Graphics	ater	Pene r 6 in	_
SOI	L CLASSIFICATION		Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	oven	Groundwater	ndard vs pe	Remarks
	(continued)		Stra	Stra	Dep Sca	San No.	San	San Rec	G	Star	Ren
MINE COLLAI	PSE-SHALE, dark gra eathered, soft, broken,	y, small 0.5 ft			-	RC-6	RC				RQD=18%, RC-6 from 39.6 ft to 44.6 ft
void at 39.1 ft,	additional 6 in. voids,	trace coal			-			IF			
10111 44.5-45.6	o it				45			Ш			
SANDSTONE		 eathered	665.1	45.6	45 –	RC-7	RC	Ш			RQD=78%, RC-7 from 44.6 ft to 49.6 ft
moderately ha	rd, very fine grained	oati ioi oa,			-			Ш			
			661.1	49.6	=						Set piezometer at 48.8 ft with 10 ft screen
Bottom of Tes	t Boring at 49.6 ft										Get piezemeter at 40.0 it with 10 it soreen
Sample Typ	<u>oe</u>		•	<u>De</u>	pth to (	Ground	dwate	<u>er</u>			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools \_\_\_\_\_ ft. ▼ After \_\_\_\_ hours \_\_\_\_ ft.

☑ Cave Depth ft.



CLIE	NT	IDNR - Si	te 2228						_	BORING#_	BH8-4
PRO	JECT NAME	Target G	routing Area	as - Si	te 222	28				Northing _	1570777
PRO	JECT LOCATION	North of I	Brazil, India	na					_	Easting	2951208
										JOB#	86.05957.0016
		DRILLING and	SAMPLING INF	ORMAT	ΓΙΟΝ						TEST DATA
П	ate Started	10/1/13	Hammer V	Vt		<b>140</b> lbs.					
	ate Completed	10/1/13	Hammer D			30 in.					
	rill Foreman	W. Bates	Spoon Sar	' -	)					s, te	
	spector	J. Noel	Rock Core	•		<b>2.0</b> in.				n Tes ment	
	oring Method	HSA	_ Shelby Tub	-		in.		<u>8.8</u>		atior	
_							٥	aphic	_	enetr in. I	
	SOIL	. CLASSIFICATION	N	Stratum Elevation, ft	m, f	r, ft	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	arks
1	SURFACI	E ELEVATION 71	5.998	Stratu	Stratum Depth, ft	Depth Scale, ft Sample No.	Sam	Sam	Grou	Stand	Remarks
$\parallel$	SILT LOAM, gr non-plastic, stic	ay (10YR 5/1, brok cky, non-effervesce	en, dry), nt			= 1	SS			10-6-5	
	CLAY, reddish 6/1, broken, mo	gray mottled (10YR) jist), plastic, sticky	R 5/3 to 10YR	713.0	3.0 5.5	5 2	ss			1-2-1	
#/	SILTY CLAY, b	rown (10YR 5/3, br htly sticky	roken, moist),	7 10.0	0.0	= 3	SS			4-4-4	
$\frac{1}{2}$						10 = 4	SS			2-2-3	Mottled brown and gray 8.5-10 ft
1/						5	ss			3-4-5	
	COAL			701.2	14.8	15 - 6	SS	X		2-3-5	
				698.0	18.0	7	SS	X		3-6-7	
	UNDERCLAY,	gray (gley 17/1, bro	oken, dry)			20 = 8	SS	X		6-7-12	
				693.0	23.0	9	SS			6-9-25	
#	SHALE, dark gi	ray, laminated, with	i plant fossiis			25 -RC-	RC RC				RQD=43%, RC-1 from 23.6 ft to 25.0 ft RQD=36%, RC-2 from 25.0 ft to 30.0 ft
1				687.5	28.5			Н			
#	SHALE, black			686.3	29.7			Ш			
	SANDSTONE,	fine grained				30RC-3	RC				RQD=86%, RC-3 from 30.0 ft to 35.0 ft
	SHALEY COAL		· <u>-</u>	680.2 679.9	35.8 36.1	35RC-4	RC				RQD=88%, RC-4 from 35.0 ft to 40.0 ft
	CLAYSTONE (	UNDERCLAY), gra		677.8	38.2						
丰	SHALE, gray										

Sample Type

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools ft.

\_ ft. ▼ After \_\_\_\_ hours \_ ft.

ft. **Boring Method** 

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger





Northing   SPROJECT LOCATION   North of Brazil, Indiana   Season   John   Joh	CLIENT	IDNR - Site 22	28							_	BORING#_	BH8-4
Date Started 10/1/13 Hammer Wt. 140 lbs.  Date Completed 10/1/13 Hammer Drop 30 in.  Drill Foreman W. Bates Spoon Sampler OD 2.0 in.  Inspector J. Noel Rock Core Dia. 2.0 in.  Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION USE OF SIGN OF SI	<u>-                                    </u>			s - Si	te 222	28				_		
DRILLING and SAMPLING INFORMATION  Date Started  10/1/13  Hammer Wt.  140  Ibs.  Date Completed  10/1/13  Hammer Drop  30  in.  Inspector  J. Noel  Rock Core Dia.  Solic CLASSIFICATION  (continued)  SHALE, gray  SHALE, black, with sandstone laminations  SHALE, black, with sandstone laminations  DRILLING and SAMPLING INFORMATION  TEST DATA	PROJECT LOCATION	North of Braz	il, Indiar	na						_	Easting _	2951208
Date Started 10/1/13 Hammer Wt. 140 lbs.  Date Completed 10/1/13 Hammer Drop 30 in.  Drill Foreman W. Bates Spoon Sampler OD 2.0 in.  Inspector J. Noel Rock Core Dia. 2.0 in.  Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION Forest For										_	JOB#	86.05957.0016
Date Completed 10/1/13 Hammer Drop 30 in.  Drill Foreman W. Bates Spoon Sampler OD 2.0 in.  Inspector J. Noel Rock Core Dia. 2.0 in.  Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION Fig. 1 for the first of the fi		DRILLING and SAMP	LING INFO	ORMAT	ION		_					TEST DATA
Drill Foreman W. Bates Spoon Sampler OD 2.0 in. Inspector J. Noel Rock Core Dia. 2.0 in. Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION Signature of the state	Date Started	<b>10/1/13</b> +	lammer W	t		140	lbs.					
Inspector J. Noel Rock Core Dia. 2.0 in. Boring Method HSA Shelby Tube OD in.  SOIL CLASSIFICATION	Date Completed	10/1/13	Hammer Dr	op _		30	in.					
SHALE, gray SHALE, black, with sandstone laminations  SHALE, black, with sandstone laminations  45 RC-5 RC RC RQD=64%, RC-5 from 40.0 ft to 45.0 ft Water level after Run #10 at 41.4 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  Lost water at 48.7 ft Drilling through collapse zone 48.7 ft RQD=0%, RC-7 from 50.0 ft to 55.0 ft  MINE COLLAPSE-White SANDSTONE and black SHALE, laminated, fine grained	Drill Foreman	W. Bates	Spoon Sam	pler OE		2.0	in.				st, its	
SHALE, gray SHALE, black, with sandstone laminations  SHALE, black, with sandstone laminations  45 RC-5 RC RC RQD=64%, RC-5 from 40.0 ft to 45.0 ft Water level after Run #10 at 41.4 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  Lost water at 48.7 ft Drilling through collapse zone 48.7 ft RQD=0%, RC-7 from 50.0 ft to 55.0 ft  MINE COLLAPSE-White SANDSTONE and black SHALE, laminated, fine grained	Inspector	J. Noel	Rock Core	Dia		2.0	_in.				n Te	
SHALE, gray SHALE, black, with sandstone laminations  SHALE, black, with sandstone laminations  45 RC-5 RC RC RQD=64%, RC-5 from 40.0 ft to 45.0 ft Water level after Run #10 at 41.4 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  Lost water at 48.7 ft Drilling through collapse zone 48.7 ft RQD=0%, RC-7 from 50.0 ft to 55.0 ft  MINE COLLAPSE-White SANDSTONE and black SHALE, laminated, fine grained	Boring Method _	<b>HSA</b> S	Shelby Tub	e OD			in.		nics ohics		tratio	
SHALE, gray SHALE, black, with sandstone laminations  SHALE, black, with sandstone laminations  45 RC-5 RC RC RQD=64%, RC-5 from 40.0 ft to 45.0 ft Water level after Run #10 at 41.4 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  Lost water at 48.7 ft Drilling through collapse zone 48.7 ft RQD=0%, RC-7 from 50.0 ft to 55.0 ft  MINE COLLAPSE-White SANDSTONE and black SHALE, laminated, fine grained				#				ype	Grap Grag	ater	Pene 6 in.	
SHALE, gray SHALE, black, with sandstone laminations  SHALE, black, with sandstone laminations  45 RC-5 RC RC RQD=64%, RC-5 from 40.0 ft to 45.0 ft Water level after Run #10 at 41.4 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  Lost water at 48.7 ft Drilling through collapse zone 48.7 ft RQD=0%, RC-7 from 50.0 ft to 55.0 ft  MINE COLLAPSE-White SANDSTONE and black SHALE, laminated, fine grained	SOIL	. CLASSIFICATION		um Ition,	E, t	b, ft	əle	ole T	oler (	ndwa	dard s per	arks
SHALE, gray SHALE, black, with sandstone laminations  RC-5 RC  RQD=64%, RC-5 from 40.0 ft to 45.0 ft Water level after Run #10 at 41.4 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  Lost water at 48.7 ft Drilling through collapse zone 48.7 ft RQD=0%, RC-7 from 50.0 ft to 55.0 ft  RC-7 RC  RC-8 RC  RC-9		(continued)		Stratu Eleva	Stratı Deptl	Deptl Scale	Sam No.	Sam	Sam	Grou	Stand	Rem
MINE COLLAPSE-VOID	SHALE, gray					-	_	RC				RQD=64%, RC-5 from 40.0 ft to 45.0 ft
MINE COLLAPSE-VOID  MINE COLLAPSE-VOID  MINE COLLAPSE-VOID  MINE COLLAPSE-White SANDSTONE and black SHALE, laminated, fine grained  RC-6 RC  RC-6 RC  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  RC-7 RC  RC-7 RC  RC-7 RC  RC-8 RC  RC-7 RC  RC-7 RC  RC-7 RC  RC-8 RC  A8.8  49.2  49.3  FRC-7 RC  RC-7 RC  RC-7 RC  RC-8 RC  RC-9 RC  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  Lost water at 48.7 ft  Drilling through collapse zone 48.7 ft  RQD=0%, RC-7 from 50.0 ft to 55.0 ft	SHALE, black, v	with sandstone lamination	ns						Ш			Water level after Run #10 at 41.4 ft
MINE COLLAPSE-VOID  MINE COLLAPSE-VOID  MINE COLLAPSE-VOID  MINE COLLAPSE-White SANDSTONE and black SHALE, laminated, fine grained  RC-6 RC  RC-6 RC  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  RC-7 RC  RC-7 RC  RC-7 RC  RC-8 RC  RC-7 RC  RC-7 RC  RC-7 RC  RC-8 RC  A8.8  49.2  49.3  FRC-7 RC  RC-7 RC  RC-7 RC  RC-8 RC  RC-9 RC  RQD=20%, RC-6 from 45.0 ft to 50.0 ft  Lost water at 48.7 ft  Drilling through collapse zone 48.7 ft  RQD=0%, RC-7 from 50.0 ft to 55.0 ft	1					-			Ш			
MINE COLLAPSE-VOID  MINE COLLAPSE-SHALE  MINE COLLAPSE-VOID  MINE COLLAPSE-White SANDSTONE and black SHALE, laminated, fine grained  667.3  48.7  48.8  49.2  49.3  FC-7  RC  RC  ARC  ARC  ARC  ARC  ARC  ARC						45 -	RC-6	RC	H			RQD=20%, RC-6 from 45.0 ft to 50.0 ft
MINE COLLAPSE-VOID  MINE COLLAPSE-SHALE  MINE COLLAPSE-VOID  MINE COLLAPSE-VOID  MINE COLLAPSE-VOID  MINE COLLAPSE-White SANDSTONE and black SHALE, laminated, fine grained  MINE COLLAPSE-White SANDSTONE and black SHALE, laminated, fine grained  Lost water at 48.7 ft Drilling through collapse zone 48.7 ft RQD=0%, RC-7 from 50.0 ft to 55.0 ft									Ш			
MINE COLLAPSE-SHALE   666.7   49.3   50   RC-7   RC   MINE COLLAPSE-White SANDSTONE and black SHALE, laminated, fine grained   55   55   RC-7   RC   FRC-7   RC						-			Ш			
RQD=0%, RC-7 from 50.0 ft to 55.0 ft  WINE COLLAPSE-VOID  MINE COLLAPSE-White SANDSTONE and black SHALE, laminated, fine grained				666.8	49.2	50 -		Б0	HE			
MINE COLLAPSE-White SANDSTONE and black SHALE, laminated, fine grained				666.7	49.3		RC-/	RC	Ш			RQD=0%, RC-7 from 50.0 ft to 55.0 ft
			and			-			Ш			
RQD=0%, RC-8 from 55.0 ft to 60.0 ft	black SHALE, la	aminated, fine grained				- - -			Ш			
						-	RC-8	RC	Ш			RQD=0%, RC-8 from 55.0 ft to 60.0 ft
						-						
						-						
60						60 -	RC-9	RC	Н			RQD=8%, RC-9 from 60.0 ft to 65.0 ft
654.0 62.0				654.0	62.0				Ш			
MINE COLLAPSE-SHALEY CLAYSTONE,			NE,						Ш			
649 6 66 4 65 TRC-10 RC RQD=24%, RC-10 from 65.0 ft to 70.0 ft						65 -	DC 40	, DC	Ш			DOD-049/ DC 40 from 05 0 ft to 70 0 ft
TRC-10 RC						-	RC-10	RC	Ш			RQD=24%, RC-10 110111 65.0 It to 70.0 It
SHALE, black, laminated  Set well at 67.3 ft				5.5	J		1					Set well at 67.3 ft
646.0 70.0 <sub>70</sub> = <b>I</b>	1			646.0	70.0	70 -						
Bottom of Test Boring at 70.0 ft	Bottom of Test	Boring at 70.0 ft				. 5						
Sample Type Depth to Groundwater Boring Method	Sample Type	Δ			Dο	nth to (	Groupe	twate	<u>                                     </u>			Roring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools



CLIEN	IT	IDNR - Si	te 2228								BORING#_	BH8-5
PROJ	ECT NAME	Target G	routing Area	as - Si	te 222	28					Northing	1571358
PROJ	ECT LOCATION	_	Brazil, India								Easting	2951227
			,								JOB#	86.05957.0016
		DRILLING and	SAMPLING INF	ORMAT	TON							TEST DATA
Da	te Started	9/27/13	Hammer V	Vt		140	lhs					
	te Completed	9/27/13	Hammer D			30	-					
	II Foreman	W. Bates	_ Spoon Sar		)		_				s 't	
	pector	S. Bruder	Rock Core	•	_	2.0	- I				Tes	
	ring Method	HSA	_ Shelby Tub	-					s S		ation	
	ing weaton _	110/1	_ Onciby rus				-""	υ	aphic raphi	_	in. Ir	
	SOIL	_ CLASSIFICATIOI	N	Stratum Elevation, ft	um h, ft	ь, Э, ff	ple	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
	T	E ELEVATION 70		Strati	Stratum Depth, ft	Depth Scale,	Sample No.	Sam	Sam	Grou	Stan Blow	Rem
₩/	SILTY CLAY, b	prown and gray, mo	ist			-						
#/				701.2	3.0	-						
1/	SILTY CLAY, b	orown, moist				_ =						
₹/						5 -						
₩/						_	1					
1/						-						
∄/				693.2	11.0	10 -	1					
#/	SILTY CLAY.	orown, moist, trace	- — — — — — sand and	093.2	11.0	-						
1/.	gravel			691.2	13.0	-	-					
3:::	SANDSTONE,	light gray and brow derately hard, very	n, slightly				-					
1	L			688.4	15.8	15 -	RC-1	RC				RQD=58%, RC-1 from 14.9 ft to 19.9 ft
1		E, light gray, slightly stone laminations	weathered,			_						
1	ŕ			004.0	40.0	-						
4	SANDSTONE.	 light gray, unweath	- — — — — — nered.	684.6	19.6	20 -	RC-2	DC	H			RQD=18%, RC-2 from 19.9 ft to 24.9 ft
1:::	moderately har	d, thin claystone la				-	KU-2	RC				RQD=16%, RC-2 HOIII 19.9 It to 24.9 It
<b>∃</b> ∷::	fissile			680.7	23.5	-						
	COAL, black											
				678.1	26.1	25 —	RC-3	RC	П			RQD=20%, RC-3 from 24.9 ft to 29.9 ft
	UNDERCLAY,	light beige				_	1					
						-						
						30 -	RC-4	RC	Н			RQD=88%, RC-4 from 29.9 ft to 34.9 ft
						-	ICC-4	, KC				RQD=86%, RC-4 HOIII 29.9 It to 34.9 It
						=						
#	SVIDSTOVIC	brownish gray, mo		670.0 669.1	34.2 35.1	25						
1	weathered, mo	derately hard and s		1		35 —	RC-5	RC				RQD=84%, RC-5 from 34.9 ft to 39.9 ft
#	grained					=						
#	SHALE, light g	ray and beige, unw hinly bedded with fi	eathered, soft, ine grained			-	1					
-=	sandstone	,	J : .==	664.4	39.8	-						

Sample Type SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Depth to Groundwater

Noted on Drilling Tools ft. \_ ft.

▼ After \_\_\_\_ hours \_ ft. ft. **Boring Method** 

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger





CL	IENT	IDNR - Sit	e 2228							_	BORING#_	BH8-5
PR	OJECT NAME	Target Gr	outing Area	as - Si	te 222	28					Northing	1571358
	OJECT LOCATION	_	Brazil, India								Easting	2951227
			•							_	JOB#	86.05957.0016
		DRILLING and S	SAMPLING INF	ORMAT	TION							TEST DATA
	Date Started	9/27/13	Hammer V	\/ <del>+</del>		140	lhe					
		9/27/13	Hammer D			30	- 11					
	·	W. Bates	Spoon Sar		<u> </u>		- 1				÷ř. v	
		S. Bruder					- II				n Tes	
		HSA	-				in.		ics hics		Standard Penetration Test, Blows per 6 in. Increments	
ſ					1			þe	iraph Grap	Ę	Penel 6 in.	
	SOIL	CLASSIFICATION		Ejon, f	E #	= :	<u>e</u>	le Ty	oler G	dwa	ard F	arks
		(continued)		Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics Recovery Graphic	Groundwater	Stanc Blows	Remarks
=		, dark gray, unweat d, thin sandstone lar					RC-6	RC				RQD=64%, RC-6 from 39.9 ft to 44.9 ft
4	trace coal	ı, tilli sanustone lai	minations,			-						
				659.7	44.5	-						
1	SANDY SHALE	, gray, unweathered	d, moderately	658.2	46.0	45 -	RC-7	RC	I			RQD=94%, RC-7 from 44.9 ft to 49.9 ft
_	SANDSTONE,	gray, unweathered,	moderately			_						
=	hard, shaley sed	ctions				-						
∄.	::: ::			653.6	50.6	50 -	RC-8	RC	H			RQD=84%, RC-8 from 49.9 ft to 54.9 ft
=	SANDSTONE, I moderately hard	light gray, unweathe d	ered,									
3				649.7	54.5		-					
4	SHALEY SAND	STONE, gray, unw	 eathered,	049.7	34.3	55 -	RC-9	DC.	H			RQD=72%, RC-9 from 54.9 ft to 59.9 ft
=	moderately hard	d				-	ICC-9	NO	Ш			NGD-12%, NC-9 HOIII 34.9 It to 39.9 It
_	:::: :::			646.0	58.2	-						
_	SANDSTONE, I moderately hard	light gray, unweathe d	ered,			60 -			Ш			
1	::: :::			642.7	61.5	=	RC-10	RC	Ш			RQD=62%, RC-10 from 59.9 ft to 64.9 ft
4	SHALE, gray, so			641.6 640.6	62.6	-	1		Ш			
1	SANDSTONE, I	light gray, unweathe d	ered,	040.6	63.6	-			IF			
1	SHALE, dark gr	ay/black, clayey, bro	oken			65 -	RC-11	RC				RQD=100%, RC-11 from 64.9 ft to 69.9 ft
4	SANDSTONE	ight gray, unweathe		637.2	67.0	_	1		Ш			
=	moderately hard	d, fine grained	J. Cu,	004.0	00.0	-						
1	Bottom of Test I	Boring at 69.9 ft		634.3	69.9	-			П			Grouted hole at completion, plugged with
		-										chips, patched with concrete

Sample Type SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger RC - Rock Core

CU - Cuttings CT - Continuous Tube

Depth to Groundwater Noted on Drilling Tools \_\_\_\_\_ ft. \_\_\_\_ ft. ▼ After \_\_\_\_ hours \_\_ \_\_\_\_ ft. ft.



CLIENT	IDNR - Site 2228							BORING#	BH8-6
PROJECT NAME		eas - Si	ite 222					Northing	1571824
PROJECT LOCATION								Easting	2951249
								JOB#	86.05957.0016
	DRILLING and SAMPLING IN	FORMAT	ΓΙΟΝ						TEST DATA
Date Started	<b>10/1/13</b> Hammer	Wt.		140 lbs.					
Date Completed	<b>10/1/13</b> Hammer			<b>30</b> in.					
Drill Foreman	W. Bates Spoon Sa		D D	<b>2.0</b> in.				ts st	
Inspector	S. Bruder Rock Co			<b>2.0</b> in.				Teg men	
Boring Method	<b>HSA</b> Shelby T	ube OD		<b></b> _ in.		SS		ation	
			1	I I	<u>g</u>	aphi Srapt	e	enet 3 in.	
SOI	L CLASSIFICATION	Stratum Elevation, ft	Stratum Depth, ft	th e, ft iple	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SURFAC	E ELEVATION 700.582	Straf	Stra	Depth Scale, ft Sample	Sam	Sarr Rec	Grou	Star Blov	Ren
SILTY CLAY, I	prown, moist, trace sand								
II / _ /I									
				5 —					
				] ]			□		
				10 🚽					
				-					
				] ]					
T/4		684.6	16.0	15 —					
SILTY CLAY, I	prown and gray, moist, trace sand	683.6	17.0						
¬= \		-				Ш			
SHALEV SANI	 DSTONE, gray, moderately	_ 680.6	20.0	20 -RC-	RC RC	Н			RQD=0%, RC-1 from 19.1 ft to 20.0 ft RQD=16%, RC-2 from 20.0 ft to 25.0 ft
weathered, mo	derately hard			RC-2	2 110				100 100, NC-2 110111 20.0 It to 23.0 It
<b>司</b>									
CANDYCHAL		676.1	24.5 25.0	25		Ш			
Weathered, sof	E, dark gray, moderately t		20.0	RC-	RC				RQD=16%, RC-3 from 25.0 ft to 30.0 ft
COAL, black		672.8	27.8						
UNDERCLAY,	light gray, soft			=					
-				30	RC	Н			RQD=94%, RC-4 from 30.0 ft to 35.0 ft
SANDY SHAI		_ 669.0	31.6						
moderately har				=					
				35					
1				RC-	RC				RQD=92%, RC-5 from 35.0 ft to 40.0 ft
1		662.6	38.0	=					
	unweathered, soft and moderately Istone seam at 48.9 ft								
Sample Typ			De	pth to Grour	dwate	er	•	1	Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools **6.5** ft. 

\_\_\_\_ ft.

\_ ft.

▼ After \_\_\_\_ hours 

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger





	ENT DJECT NAME			ıs - Si	te 222					_	BORING # _	BH8-6 1571824
	DJECT LOCATION		_							_	Easting	2951249
1110	OLOT LOOATION	- HOIGH OF BIGZ	ii, iiiaia	iiu						_	JOB#	86.05957.0016
		DRILLING and SAMP	LING INF	ORMAT	ION							TEST DATA
	Date Started	<b>10/1/13</b>	Hammer W	/t.		140	lbs.					
	Date Completed		lammer D			30	- 11					
	Orill Foreman		Spoon San		)	2.0	- 11				st, ts	
lı	nspector		Rock Core			2.0	· II				Tes ח	
	Boring Method _		Shelby Tub	e OD			in.		nics phics		tratior	
	SOIL	. CLASSIFICATION		#,				Туре	Graph y Grap	/ater	d Pene er 6 in.	0
F	3012	(continued)		Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics Recovery Graphic	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
#	CUALE grov u		doratalı	ts iii	St D	Ğ Ğ	1 1		ΝŘ	Ō	₩ <u>₩</u>	_
1	hard, thin sand	inweathered, soft and mo stone seam at 48.9 ft	derately			=	RC-6	RC	Ш			RQD=94%, RC-6 from 40.0 ft to 45.0 ft
1						-			Ш			
#						45 -						
1						-	RC-7	RC	Ш			RQD=86%, RC-7 from 45.0 ft to 50.0 ft
1						_			Ш			
1						:			Ш			
1						50 -	RC-8	RC	П			RQD=74%, RC-8 from 50.0 ft to 55.0 ft
非				648.0	52.6	_			Ш			
1:	SANDSTONE,	gray, slightly weathered, d, thinly bedded with shal	۵			=			Ш			
∄: :		a, thinly bodded with orial	C			55 -	RC-9	RC	Н			RQD=38%, RC-9 from 55.0 ft to 60.0 ft
1:						=	1.0-3	110	Ш			11QD=3070, 11O=3 11OH1 33.0 11 to 00.0 11
1				641.9	58.7	=			Ш			
4	<del></del>	, dark gray, unweathered	d, soft	640.6	60.0	60 -			Æ			
3	SANDSTONE, moderately hard	light gray, unweathered, d, very fine grained				-	RC-10	RC	Ш			RQD=78%, RC-10 from 60.0 ft to 65.0 ft
∄:		., , g				-			Ш			
3									Ш			
1:						65 -	RC-11	RC	П			RQD=98%, RC-11 from 65.0 ft to 70.0 ft
∄:						_			Ш			
3									Ш			
7	Bottom of Test	Boring at 70.0 ft		630.6	70.0	70 -			H			Grout hole at completion, plugged with
	Bottom or root	Borning at 10.0 it							Ш			chips, patched with concrete
									$\  \ $			
									$\  \ $			
	Sample Type	<u></u>			De	pth to (	Ground	dwate	r			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools **6.5** ft. 

▼ After \_\_\_\_ hours \_\_\_\_ ft. \_ ft.



CLIENT	IDNR - Site 2228							BORING#	BH8-7
PROJECT NAME		eas - Si	ite 222					Northing	1572073
PROJECT LOCATION								Easting	2951240
								JOB#	86.05957.0016
	DRILLING and SAMPLING IN	FORMA <sup>-</sup>	ΓΙΟΝ						TEST DATA
Date Started	<b>9/30/13</b> Hammer	Wt.		140 lbs.					
Date Completed	<b>9/30/13</b> Hammer			<b>30</b> in.					
Drill Foreman	W. Bates Spoon Sa		D D	<b>2.0</b> in.				st, ts	
Inspector	S. Bruder Rock Cor			<b>2.0</b> in.				Teg men	
Boring Method	<b>HSA</b> Shelby To	ube OD		<b></b> _in.		cs nics		ration	
		T		I I	e e	raphi Srapt	ē	enet 3 in.	
SOI	L CLASSIFICATION	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft Sample	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SURFAC	CE ELEVATION 696.909	Stra	Stra	Depth Scale, Sample	San	San Rec	Gro	Star Blov	Ren
SILTY SAND,	brown, trace clay								
<u> </u>									
111									
<b>11.11.</b>		_ 690.9	6.0	5 🚽					
SILTY CLAY,	brown, moist, trace sand			<u> </u>					
				10 =					
				=					
				15 🚽					
				]					
<b>3</b> /		678.2	18.7						
MINE COLLA	PSE-SANDSTONE, light beige,			20 -RC-	1 RC				RQD=0%, RC-1 from 18.7 ft to 20.0 ft
pieces of coal	with crushed shale, clay and smal	'		RC-2	RC	IF			RQD=0%, RC-2 from 20.0 ft to 25.0 ft
				] ]		Ш	⊻		Depth to groundwater 22.2 ft after Run #6
				]					Deptir to groundwater 22.2 it after Null #0
		671.9	25.0	25 = RC-3	B RC	Н			RQD=28%, RC-3 from 25.0 ft to 30.0 ft
	PSE-SHALEY SANDSTONE, light	670.7	26.2		, KC				RQD=26 %, RC-3 Holli 23.0 It to 30.0 It
gray, slightly w	eathered, soft and moderately	668.1	28.8						
hard, broken a		-	20.0	=					Lost water at 28.8 ft
THE COLLAR	-3L-VOID			30RC-4	RC				RQD=50%, RC-4 from 30.0 ft to 35.0 ft
		_ 664.4	32.5	l <u>d</u>					
UNDERCLAY	, beige, soft								
-183				35		H			DOD 7494 DO 54 - 07-0 54 - 10-5 5
					RC				RQD=74%, RC-5 from 35.0 ft to 40.0 ft
				=					
		657.8 656.9	39.1 40.0						
Sample Tyr	<u>De</u>	1.50.0	•	pth to Grour	ndwate	er	'	1	Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools **22.4** ft. ∑ At Completion

\_ ft.

▼ After \_\_\_\_ hours \_\_\_\_\_ ft. 

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger



## **TEST BORING LOG**



7988 Centerpoint Drive, Suite 100 Indianapolis, IN 46256 (317) 849-4990 Fax (317) 849-4278

CLIENT	IDNR - Site 22	28								BORING#_	BH8-7
	Target Grouti		s - Si	te 222	28				_	Northing _	1572073
PROJECT LOCATION	_	_								Easting	2951240
									_	JOB#	86.05957.0016
	DRILLING and SAMP	I ING INE		ION					_	_	TEST DATA
				ION		ſ					TEST DATA
·		lammer W			140_I						
		lammer Di			<b>30</b> _i	l II					
		Spoon Sam	•	· _	<b>2.0</b> i	l II				est, ents	
Inspector		Rock Core			<b>2.0</b> i	n.		<b>"</b>		on T reme	
Boring Method _	HSA S	Shelby Tub	e OD		i	n.	4)	phics aphics		netrati in. Inc	
SOIL	CLASSIFICATION		n, ft	L#	Ħ	4)	э Туре	er Gra ery Gr	lwater	rd Per	ks
	(continued)		Stratum Elevation, ft	Stratum Depth, ft	Depth Scale,	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
COAL, black							RC				RQD=100%, RC-6 from 40.0 ft to 45.0 ft
SANDY SHALE	, brown, unweathered,										Set well at 41.7 ft
moderately hard	1										33.00
Dottom of Tool	Davisas et 45 0 ft		651.9	45.0	45 -						
Bottom of Test	Boring at 45.0 ft										
								$  \   \  $			
								$  \   \  $			
Sample Type				De	pth to Gr	round	dwate	r			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger RC - Rock Core

CU - Cuttings CT - Continuous Tube

Noted on Drilling Tools ∑ At Completion **22.4** ft. ▼ After \_\_\_\_ hours \_\_\_\_ ft. \_ ft.



CLIENT IDNR - Site 2228											BORING#_	BH8-8
PROJECT NAME Target Grouting Areas - Site 2228											Northing	1572533
PROJECT LOCATION North of Brazil, India										Easting	2951248	
									_	JOB#	86.05957.0016	
DRILLING and SAMPLING INFO			ORMATION								TEST DATA	
Date Started 10/3/13 Hammer W			Vt. <b>140</b> lbs.									
Date Completed 10/3/13 Hammer D					30	.						
•					.				s بــُـد			
		V. BatesSpoon Sampler OD2.0in.6. BruderRock Core Dia.2.0in.									Tes	
		ube ODin.					s S		ation			
Stielby Tub						a)	aphic raphi	_	netra in. Ir			
		. CLASSIFICATION		Stratum Elevation, ft	E #.	_ #,	<u>o</u>	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	irks
		ELEVATION 690.791		Stratu	Stratum Depth, ft	Depth Scale,	Sample No.	Samp	Samp Reco	Groun	Stand	Remarks
ASPHALT, subbase			689.5	1.3							Hand clear to 5.0 ft	
∄/	SILTY CLAY, b	rown, moist				_	1	HA				
$\mathbb{I}$	<b>/</b>						2	НА	H			
1/	<b>/</b>			685.3	5.5	5 —			H			
$\exists V$	SILTY CLAY, b	rown and gray, moist,	trace sand				3	SS			3-4-5	
$\exists V$	and grand											
				680.3	10.5	10 —	4	SS			2-3-7	
#	SILTY CLAY, b	rown, slightly moist, so	ome sand	000.0	10.0	-	5	cc			10 15 17	
<b></b> 1 /	and gravel					_	5	SS	A		13-15-17	
1							6	SS			10-13-16	
$\frac{1}{2}$						15 —				•		
14	<del></del>			673.8	17.0		7	SS		-	9-4-6	Water at 15.8 ft Run #7
<b>1</b> 1	SILTY SAND, g	gray, moist, trace clay		0740	40.5	-						
#	SANDY SHALE	gray, decomposed		671.3 670.6	19.5 20.2	20 —	8	SS	X		16-18-50/0.4'	
	MINE COLLAP	SE-SANDSTONE and					RC-1	RC				RQD=18%, RC-1 from 20.7 ft to 25.2 ft
7	light gray, slight	tly weathered, moderates, sections of highly br	tely hard, roken									Lost water at 22.1 ft
	sandstone	o, doducino di riigiliy bi	OROT			=						
	3					25 —	RC-2	RC	Ħ			RQD=7%, RC-2 from 25.2 ft to 30.2 ft
	<b>C</b>											•
7												
				660.2	30.6	30 —			Ш			
		SE-SANDY SHALE, d	lark gray	659.7	31.1		RC-3	RC				RQD=94%, RC-3 from 30.2 ft to 35.2 ft
	SANDY UNDER	t) RCLAY, light beige	J			_						
	<b>3</b>			656.0	34.8	35 —						
1	SANDY SHALE	E, dark gray, unweathe	ered,	655.4	35.4		RC-4	RC				RQD=76%, RC-4 from 35.2 ft to 40.2 ft
#	=	 E, light gray, unweathe	<sup>]</sup> red, soft			=						
#		hard, thinly bedded w				=						
4	Sample Type				Dρ	pth to C	aroun.	dwate	<b>1 2</b>			Boring Method

SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger

RC - Rock Core

CU - Cuttings CT - Continuous Tube

\_16.0\_ft. Noted on Drilling Tools \_\_\_\_\_ ft.

▼ After \_\_\_\_ hours \_\_\_\_ ft. 

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling
HA - Hand Auger





CLIENT PROJECT NAME PROJECT LOCATION  Date Started Date Completed Drill Foreman Inspector Boring Method	Target Grouting Areas - Site 2228  North of Brazil, Indiana  DRILLING and SAMPLING INFORMATION  10/3/13							Ø		BORING # _ Northing _ Easting _ JOB # _	BH8-8 1572533 2951248 86.05957.0016 TEST DATA
	CLASSIFICATION (continued)		Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics Recovery Graphic	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
and moderately sandstone  SHALEY SAND unweathered, n  SANDSTONE, moderately hard  Line Sandstone  SANDSTONE, moderately hard  CLAY, dark gra  SHALE, dark gra	gray, unweathered, m shale laminations y, very soft	vith	648.1 645.6 623.3 622.0 621.1 620.6	42.7 45.2 67.5 68.8 69.7 70.2	50	RC-5 RC-6 RC-7 RC-8 RC-10	RC RC RC				RQD=32%, RC-5 from 40.2 ft to 42.7 ft  RQD=68%, RC-6 from 42.7 ft to 45.2 ft Core block  RQD=74%, RC-7 from 45.2 ft to 50.2 ft  RQD=96%, RC-8 from 50.2 ft to 55.2 ft  RQD=84%, RC-9 from 55.2 ft to 60.2 ft  RQD=90%, RC-10 from 60.2 ft to 65.2 ft  RQD=44%, RC-11 from 65.2 ft to 70.2 ft

Sample Type SS - Driven Split Spoon ST - Pressed Shelby Tube CA - Continuous Flight Auger RC - Rock Core

CU - Cuttings CT - Continuous Tube

Depth to Groundwater ● Noted on Drilling Tools <u>16.0</u> ft. \_\_\_\_\_ft. \_\_\_\_ ft.

▼ After \_\_\_\_ hours \_ ft. Boring Method