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## **CONTENTS**

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 $\sim$ う S A REFERENCE

**DESCRIPTION** TITLE SHEET LEGEND (SOIL & ROCK) SITE PLAN(S) AND PROFILE(S) BORE LOG(S) SOIL TEST RESULTS

# STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT** 

# **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY WAKE

PROJECT DESCRIPTION SR 1656 (TRINITY RD.) AT SR 1658 (YOUTH CENTER DR.) INTERSECTION IN RALEIGH. CONSTRUCT PEDESTRIAN TUNNEL UNDER 1656 (TRINITY RD.) SITE DESCRIPTION RETAINING WALLS 1-8 ALONG NORTH AND SOUTH

RAMPS TO PEDESTRIAN TUNNEL

# E L L 50143. PROJEC

STATE PROJECT REFERENCE NO. STATE SHEETS 13 N.C W-5522 1

#### CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (1991 707-6850, THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOCS, ROCK CORES AND SOLI TEST DATA A RE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-FLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL MOISTURE CONDITIONS MAY YARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

- NOTES: I. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C.DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT. 2. BY HAIVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

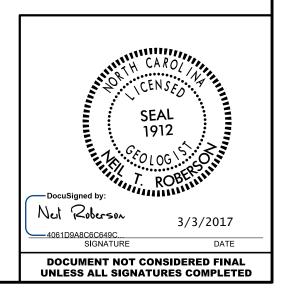
PERSONNEL

D.G. PINTER

O.B. OTI

J.R. SWARTLEY

INVESTIGATED BY <u>J.R. SWARTLEY</u> DRAWN BY \_J.R. SWARTLEY CHECKED BY \_\_\_\_\_. ROBERSON SUBMITTED BY <u>N.T. ROBERSON</u> DATE \_ FEBRUARY 2017

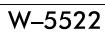


# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

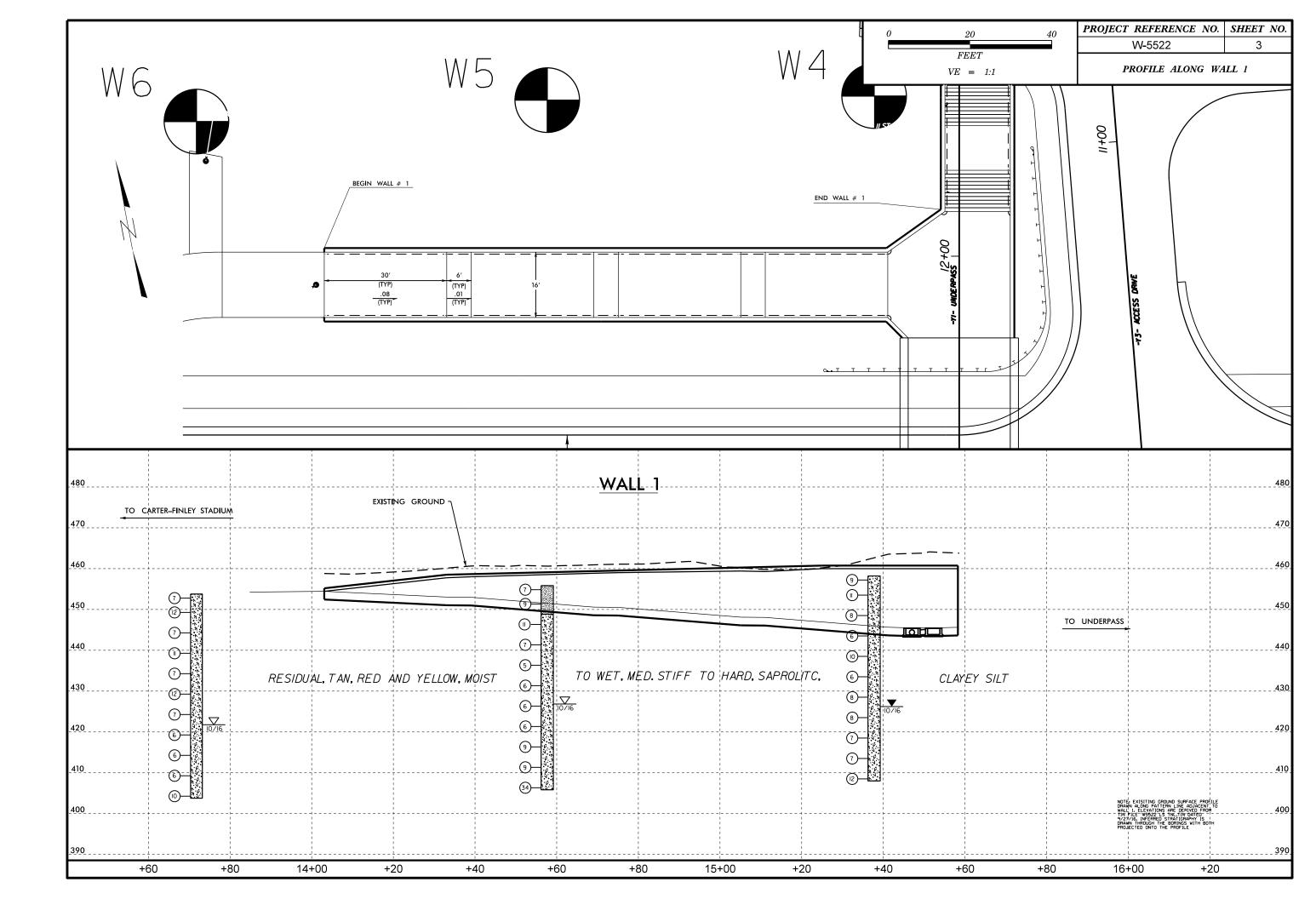
			SC	IL DE	SCRI	PTION							GF	RADATION						R	ROCK DES	CRIPTION
	CONSIDERED RATED WITH										WELL GRADED - INDICAT											DULD YIELD SPT REFUSAL IF TESTE TAL PLAIN MATERIAL WOULD YIELD
ACCORDI	NG TO THE	STANDARD	PENETRAT	ION TEST	(AASH	TO T 206	ASTM D	586). SOIL	CLASSIFIC	CATION	UNIFORMLY GRADED - IN GAP-GRADED - INDICATES						SPT REFUSAL	. IS PEN	NETRATION E	BY A SPLI	IT SPOON SAM	PLER EQUAL TO OR LESS THAN 0.1 SITION BETWEEN SOIL AND ROCK
CONSISTE	ASED ON TH NCY.COLOR.	TEXTURE.	MOISTURE,	AASHTO C	LASSIF	ICATION,	AND OTHE	R PERTINE	NT FACTOR				ANGULAR	ITY OF GRAI	٧S		REPRESENTED	BY A	ZONE OF WE	EATHERED	ROCK.	
	5 MINERALOO													SOIL GRAINS IS D	ESIGNATED E	BY THE TERMS:		ALS AR	FICEL	2	AS FOLLOWS	MATERIAL THAT WOULD YIELD SPT
	SI	OIL LE	GEND #	AND A	ASHT	O CLA	SSIFI	CATION			ANGULAR, SUBAN				TION		WEATHERED ROCK (WR)					IT IF TESTED.
GENERAL CLASS.		GRANULAR M				-CLAY MATE		ORC	GANIC MATERI	ALS				ICAL COMPOS		FIC	CRYSTALLINE		P.P.		O COARSE GR	AIN IGNEOUS AND METAMORPHIC RO REFUSAL IF TESTED. ROCK TYPE ING
GROUP		≤ 35% PASS	A-2		A-4	5% PASSING	_	A-1. A-2	A-4, A-5					N THEY ARE CONSID			ROCK (CR)		<u>XX</u>	GNEISS.	GABBRO, SCH	IST, ETC.
	A-1-a A-1-b		4 A-2-5 A-2	2-6 A-2-7			A-7-5, A-7-6	A-3	A-6, A-7					RESSIBILITY			NON-CRYSTAL ROCK (NCR)	LINE		SEDIME	ENTARY ROCK	AIN METAMORPHIC AND NON-COASTA THAT WOULD YEILD SPT REFUSAL
SYMBOL	000000000000000000000000000000000000000		44	323							SLIGH MODE!	HTLY CC	OMPRESSIBLE ' COMPRESSIBL	F	LL < 31 LL = 31	- 50	COASTAL PLA	IN				S PHYLLITE, SLATE, SANDSTONE, ETC IMENTS CEMENTED INTO ROCK, BUT
% PASSING	000000000000000000000000000000000000000				<u></u>				SILT-			LY COMP	PRESSIBLE		LL > 50		SEDIMENTARY (CP)			SPT RE		TYPE INCLUDES LIMESTONE, SANDS
*10 5 *40 3	50 MX 30 MX 50 MX	51 MN						GRANULAR SOILS	CLAY	MUCK. PEAT		P		<u>GE OF MATEF</u>							WEATH	ERING
	5 MX 25 MX		X 35 MX 35	MX 35 MX	36 MN	36 MN 36 M	1N 36 MN		SOILS		ORGANIC MATERIAL		GRANULAR SOILS	SILT - CLAY SOILS		R MATERIAL	FRESH				IT.FEW JOINTS	MAY SHOW SLIGHT STAINING. ROCK
MATERIAL PASSING #40											TRACE OF ORGANIC MA LITTLE ORGANIC MATT		2 - 3% 3 - 5%	3 - 5% 5 - 12%	TRACE LITTLE	1 - 10% 10 - 20%			R IF CRYSTA			
LL	-		X 41 MN 40					SOILS LITTL			MODERATELY ORGANIC		5 - 10%	12 - 20%	SOME	20 - 35%	(V SLI.)					OME JOINTS MAY SHOW THIN CLAY CO HINE BRIGHTLY, ROCK RINGS UNDER HA
PI	6 MX		X 10 MX 11				_	MODE	RATE	HIGHLY	HIGHLY ORGANIC		> 10%	> 20%	HIGHLY	35% AND ABOVE	-		CRYSTALLINE			
GROUP INDEX	0	0	0	4 MX	8 MX	12 MX 16 M	IX NO MX	amoun Orga		SOILS					TE: V AETE		SLIGHT (SLI.)					ND DISCOLORATION EXTENDS INTO RO N GRANITOID ROCKS SOME OCCASIONA
USUAL TYPES S OF MAJOR	GRAVEL, AND		SILTY OR CL GRAVEL AND		SIL 1 SOIL		LAYEY SOILS	MAT	TER					BORE HOLE IMMEDIA		( DRILLING		CRYSTA	ALS ARE DUL	.L AND DIS	COLORED. CRY	STALLINE ROCKS RING UNDER HAMMER
MATERIALS	SAND	SHILD		JHINU	501		30123				 			VEL AFTER 24			MODERATE (MOD.)					OLORATION AND WEATHERING EFFECTS
GEN. RATING AS SUBGRADE		EXCELLENT	to good		F	air to po	DR	FAIR TO POOR	POOR	UNSUITABLE				SATURATED ZONE, OF	WATER BEA	RING STRATA		DULL S	SOUND UNDER			OWS SIGNIFICANT LOSS OF STRENGTH
	F	PI OF A-7-5	SUBGROUP IS	≤ LL - 3	300;PIO	- A-7-6 SU	BGROUP IS	> LL - 30				SPRIM	NG OR SEEP				MODERATELY		FRESH ROCK.			STAINED. IN GRANITOID ROCKS, ALL F
			CONSIS	<b>FENCY</b>	OR	DENSE	NESS					1	MISCELLA	NEOUS SYMBO	DLS		SEVERE	AND DI	ISCOLORED AN	ND A MAJO	DRITY SHOW KA	OLINIZATION. ROCK SHOWS SEVERE L
PRIMARY S			ACTNESS			E OF STA			E OF UNC				JT (BE) 25/0	25 DIP & DIP DIF	FCTION		(MOD. SEV.)		AN BE EXCAV S <i>TED, WOULD</i>			'S PICK. ROCK GIVES "CLUNK" SOUND
		CO	NSISTENCY			(N-VALUE			(TONS/FT	2)	WITH SOIL DES	SCRIPT	ION	OF ROCK STRU			SEVERE					STAINED. ROCK FABRIC CLEAR AND E
GENERAL		VE	RY LOOSE LOOSE			< 4 4 TO 10					SOIL SYMBOL			DPT DMT TEST BOR		SLOPE INDICATOR	(SEV.)					I GRANITOID ROCKS ALL FELDSPARS A RONG ROCK USUALLY REMAIN.
GRANULA MATERIA		MED	IUM DENS	E		10 TO 3	2		N/A			ILL (AF			Ā	CONE PENETROMETER					N VALUES >	
(NON-CO		VE	DENSE RY DENSE			30 TO 5 > 50	0				THAN ROADWAY			AUGER BORING	$\mathbf{\Theta}$	TEST	VERY SEVERE					STAINED. ROCK FABRIC ELEMENTS AR IL STATUS, WITH ONLY FRAGMENTS OF
		-	RY SOFT			< 2			< 0.25		INFERRED SOIL	L BOUN	IDARY -	- CORE BORING	•	SOUNDING ROD	(V SEV.)	REMAIN	NING. SAPROL	ITE IS AN	EXAMPLE OF	ROCK WEATHERED TO A DEGREE THAT
GENERAL SILT-CL		MED	SOFT			2 TO 4 4 TO 8			0.25 TO 0			'K I INF	: <sup>MW</sup> C	) MONITORING W	a 📥	TEST BORING	COMPLETE					N. <u>IF TESTED, WOULD YIELD SPT N V</u> DISCERNIBLE, OR DISCERNIBLE ONLY
MATERIA	L		STIFF			8 TO 15	i		1 TO 2		_			PIEZOMETER	$\Psi$	WITH CORE	COMPERIE	SCATTE	ERED CONCEN	NTRATIONS.		BE PRESENT AS DIKES OR STRINGERS
(COHESIV	/E)	VE VE	RY STIFF HARD			15 TO 3 > 30	٥		2 TO 4 > 4		ALLUVIAL SOIL	L BOUN	IDARY 🛆	INSTALLATION	$\bigcirc$	- SPT N-VALUE		ALSO A	AN EXAMPLE.			
			TEXTI	JREO	r Gr	AIN S	IZE					R	RECOMMEN	DATION SYMB	OLS						ROCK HA	
U.S. STD. SIE	VE SIZE		4	10	40	60	200	270					CLASSIFIED E	XCAVATION -		SIFIED EXCAVATION -	VERY HARD				E GEOLOGIST'S	PICK. BREAKING OF HAND SPECIMEN PICK.
OPENING (MM	1)		4.76	2.00	0.42			0.053					SUITABLE WAS		USED I	ABLE, BUT NOT TO BE N THE TOP 3 FEET OF	HARD				OR PICK ONL	Y WITH DIFFICULTY. HARD HAMMER B
BOULDER		BBLE	GRAVEL		COARS SAND		F INE SAND		SILT	CLAY			CEPTABLE DEC	XCAVATION - GRADABLE ROCK	EMBAN	KMENT OR BACKFILL	MODERATELY		TACH HAND S			JGES OR GROOVES TO 0.25 INCHES DE
(BLDR.)		0B.)	(GR.)		(CSE. S	D.)	(F SD.	) (	SL.)	(CL.)			ABBF	REVIATIONS			HARD	EXCAVA	ATED BY HAR	RD BLOW OF		I'S PICK. HAND SPECIMENS CAN BE D
GRAIN MM SIZE IN.		75 3		2.0		0.25		0.05	0.005		AR - AUGER REFUSAL BT - BORING TERMINATED	n		MEDIUM - MICACEOUS		- VANE SHEAR TEST - WEATHERED	MEDIUM		DERATE BLOW		0.05 INCHES	DEEP BY FIRM PRESSURE OF KNIFE O
5120 114.		-	סודסזר					TEDMC			CL CLAY		MOD	MODERATELY	7-	UNIT WEIGHT	HARD	CAN BE	E EXCAVATED	) IN SMALL	. CHIPS TO PE	ICES 1 INCH MAXIMUM SIZE BY HARD
SOIL	MOISTURE :			<u> LU</u> ELD MOIS							CPT - CONE PENETRATION CSE COARSE	N TEST		NON PLASTIC ORGANIC	$\gamma_{d}$	DRY UNIT WEIGHT	COLT		OF A GEOLOG			IFE OR PICK. CAN BE EXCAVATED IN
	ERBERG LIN			DESCRIPT		GUI	DEFORF	IELD MOIS	STURE DES	CRIPTION	DMT - DILATOMETER TES		PMT -	PRESSUREMETER T		MPLE ABBREVIATIONS	SOFT	FROM (	CHIPS TO SE	EVERAL INCH	HES IN SIZE E	BY MODERATE BLOWS OF A PICK POIN
			-	SATURATI	ED -				WET, USU4		DPT - DYNAMIC PENETRAT e - VOID RATIO	TION TE		SAPROLITIC SAND, SANDY	S - I SS -	SPLIT SPOON	VEDV				INGER PRESSU	
LL		IIMIT		(SAT.)		FRO	M BELOW	THE GRO	UND WATE	R TABLE	F - FINE FOSS FOSSILIFEROUS			SILT, SILTY SLIGHTLY		SHELBY TUBE ROCK	VERY SOFT					ATED READILY WITH POINT OF PICK. FINGER PRESSURE. CAN BE SCRATCH
PLASTIC						SEM	ISOLID: F	EQUIRES D	DRYING TO		FRAC FRACTURED, FRAC	TURES	TCR -	TRICONE REFUSAL		RECOMPACTED TRIAXIAL		FINGER				
RANGE <			-	WET - (W	D			MUM MOIS			FRAGS FRAGMENTS HI HIGHLY		w - M V - VE	OISTURE CONTENT	CBR	<ul> <li>CALIFORNIA BEARING RATIO</li> </ul>		RACT	TURE SP			BEDDING
FLL.														ON SUBJECT	PROJE		VERY WID	2	MOR	SPACING RE THAN 10		TERM VERY THICKLY BEDDED
	OPTIMU		RE	MOIST -	(M)	SOL	ID; AT OF	NEAR OP	YTIMUM MO	ISTURE	DRILL UNITS:		ANCING TOOLS:		HAMMER		WIDE MODERATE			3 TO 10 FE 1 TO 3 FE		THICKLY BEDDED 1. THINLY BEDDED 0.1
SL .		AGE LIMIT						DITIONAL			CME-45C		CLAY BITS		X AU	TOMATIC MANUAL	CLOSE		Ø.	0.16 TO 1 F	тоот	VERY THINLY BEDDED 0.0
			-	DRY - (D	)			MUM MOIS	WATER TO	J			6" CONTINUOUS	S FLIGHT AUGER	CORE SI	ZE:	VERY CLO	δE	LESS	5 THAN 0.1	IG FEET	THICKLY LAMINATED 0.00 THINLY LAMINATED <
	1			PLAS	STICI	TY					CME-55	×	8 HOLLOW AL	JGERS	-в_	П-н					INDUR	
				PLASTIC				DR	RY STRENG	тн	× СМЕ-550		HARD FACED	FINGER BITS	□-N _		FOR SEDIMEN	TARY R	IOCKS, INDUR	ATION IS	THE HARDENI	NG OF MATERIAL BY CEMENTING, HE
	PLASTIC				0-5				VERY LOW		VANE SHEAR TEST		TUNGCARBID	E INSERTS			FRIABI	.E				INGER FREES NUMEROUS GRAINS; Y HAMMER DISINTEGRATES SAMPLE.
	GHTLY PLAS ERATELY PL				6-15 16-25				SLIGHT MEDIUM				CASING	W/ ADVANCER		OLS: ST HOLE DIGGER						SEPARATED FROM SAMPLE WITH ST
	ILY PLASTI				OR MO	RE			HIGH		PORTABLE HOIST			STEEL TEETH		ND AUGER	MODER	ATELY	INDURATED			WHEN HIT WITH HAMMER.
				CC	DLOR						۱ <sub>¬</sub>		TRICONE	TUNGCARB.		UNDING ROD	INDUR	ATED				FICULT TO SEPARATE WITH STEEL
DESCRIPT	IONS MAY 1	INCLUDE (	OLOR OR	COLOR C	OMBINA	TIONS (T	AN, RED,	YELLOW-BF	ROWN, BLUE	GRAY).			CORE BIT			NE SHEAR TEST						REAK WITH HAMMER.
MOI	DIFIERS SU	CH AS LI	GHT, DARK,	STREAKE	ED, ETC	ARE US	ED TO DE	SCRIBE A	PPEARANCE								EXTRE	MELY IN	NDURATED			BLOWS REQUIRED TO BREAK SAMPLE ACROSS GRAINS.

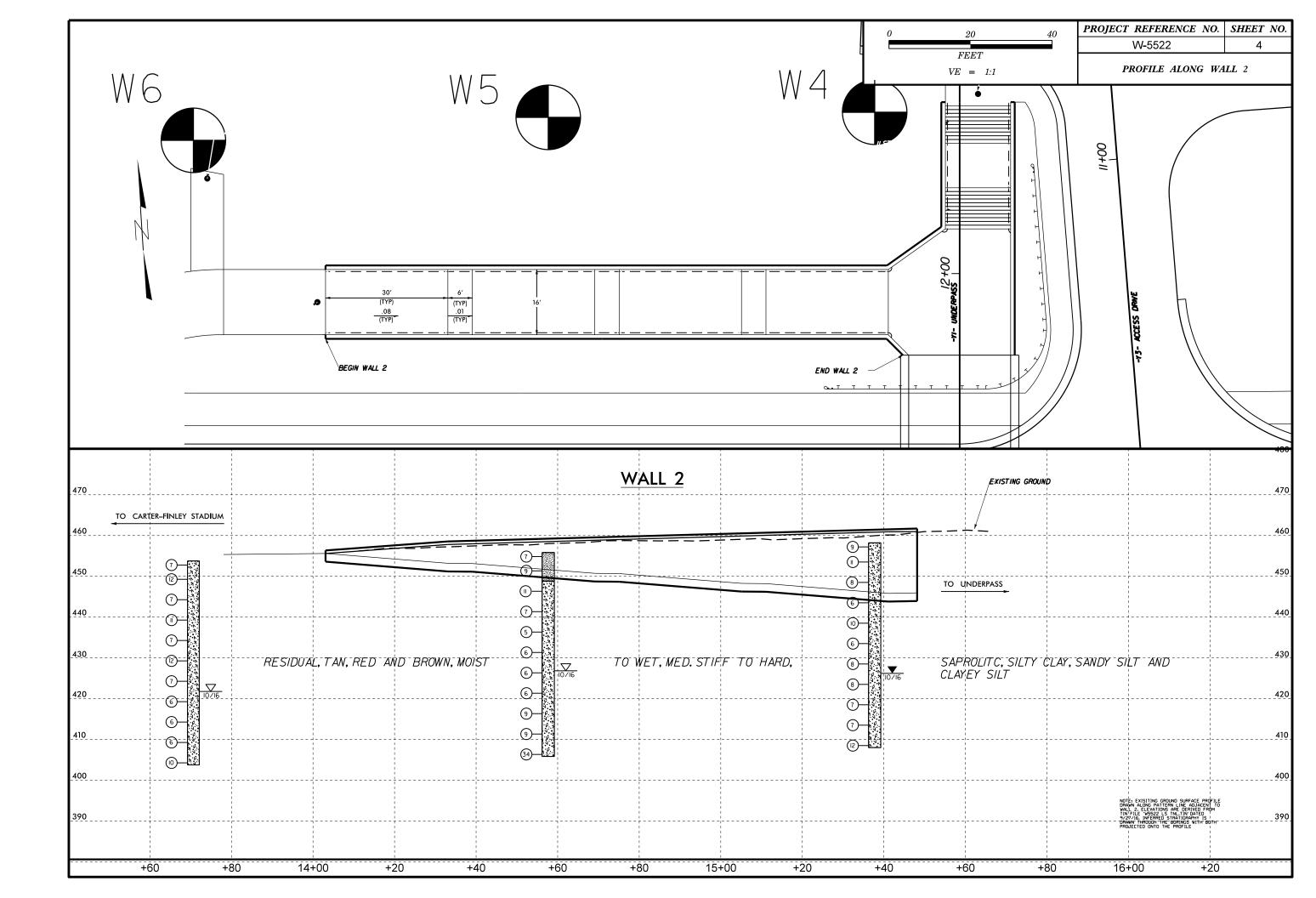
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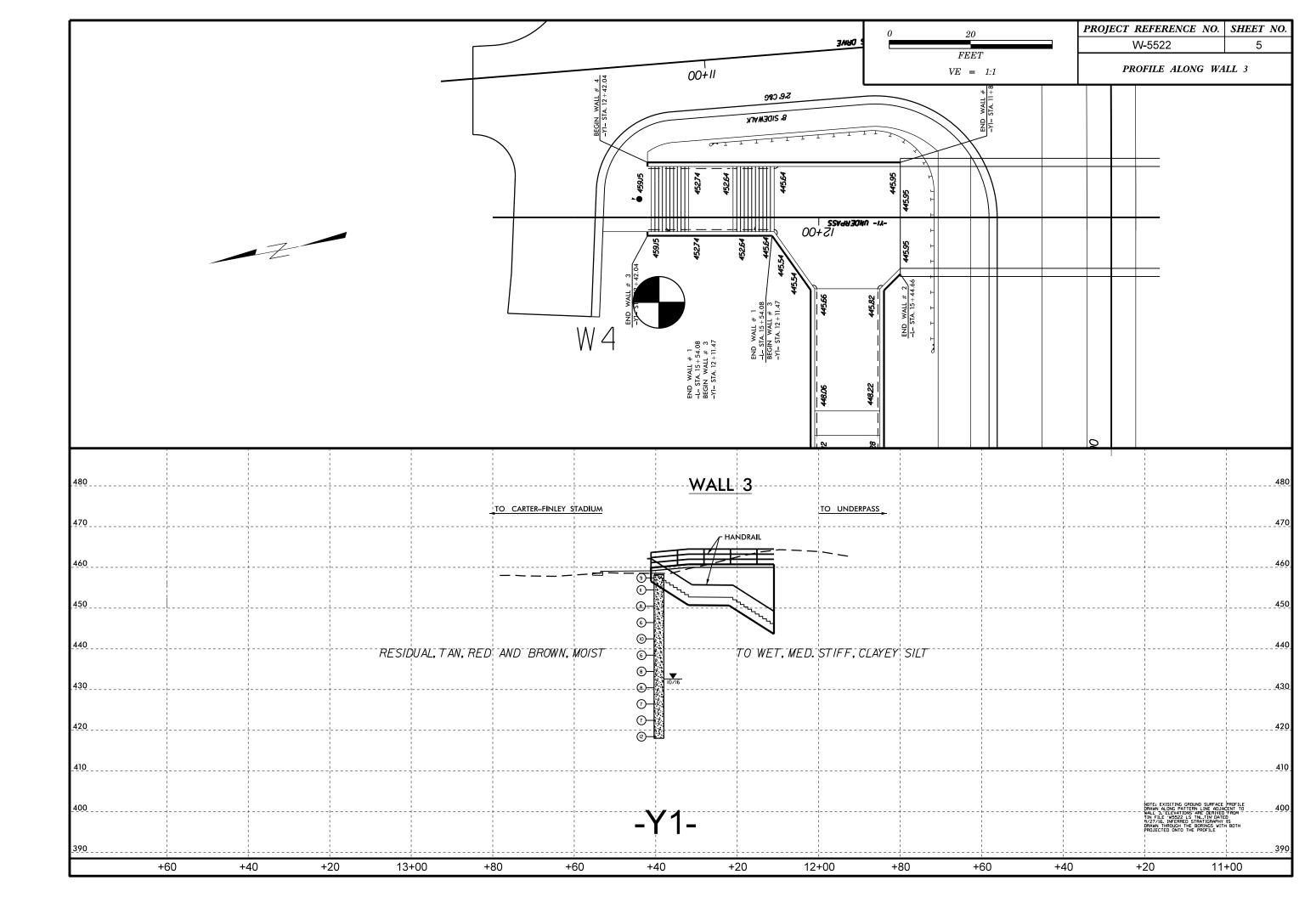


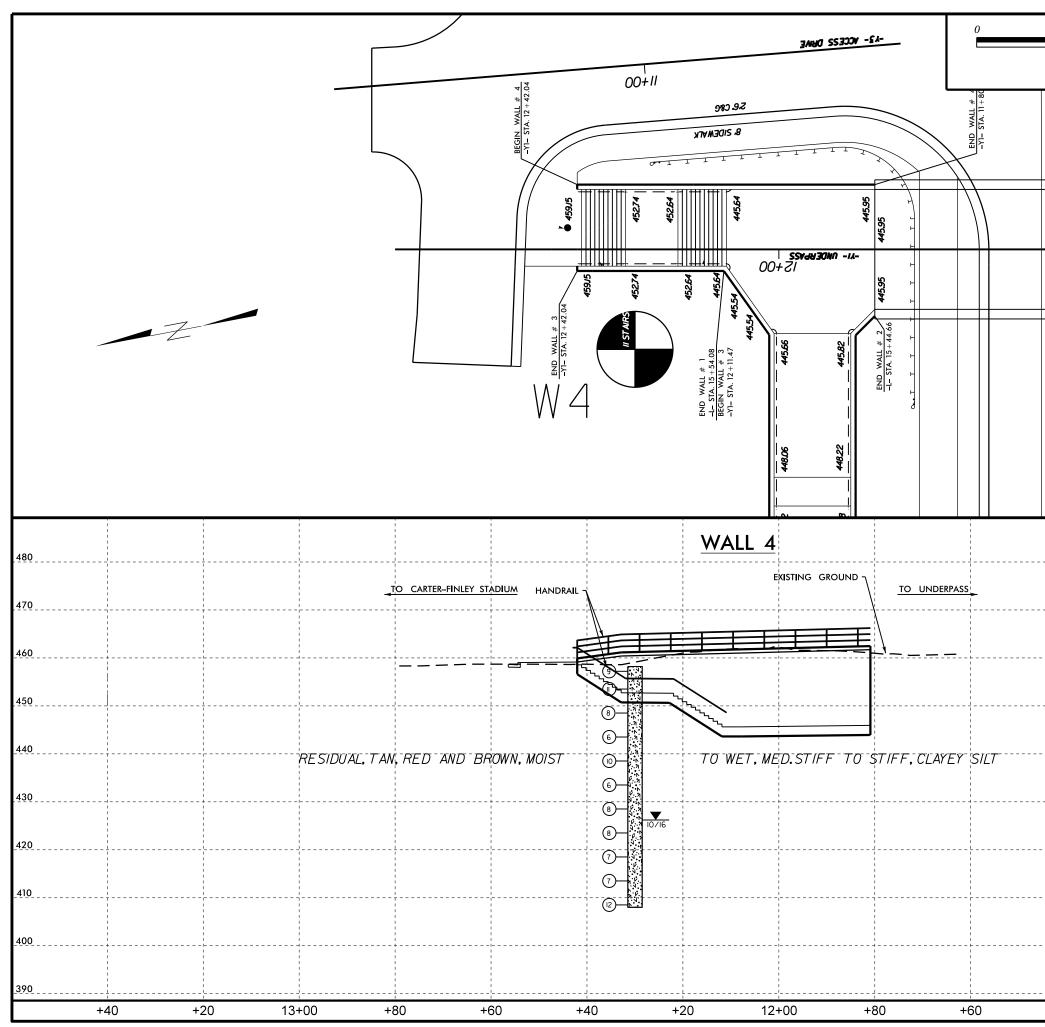
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D. AN INFERRED	TERMS AND DEFINITIONS
SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
FOOT PER 60 IS OFTEN	ADUIFER - A WATER BEARING FORMATION OR STRATA.
	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
CK THAT CLUDES GRANITE,	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
L PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
IF TESTED.	$\underline{\text{COLLUVIUM}}$ - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
MAY NOT YIELD TONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
	$\underline{\text{DIKE}}$ - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
RINGS UNDER	$\overline{\text{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
DATINGS IF OPEN, AMMER BLOWS IF	<u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
CK UP TO _ FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
S. IN Y. ROCK HAS AS COMPARED	<u>FLOAT</u> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
ELDSPARS DULL DSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
VIDENT BUT RE KAOLINIZED	<u>LEDGE</u> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
INE KHOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
E DISCERNIBLE STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
ONLY MINOR ALUES < 100 BPF	OF AN INTERVENING IMPERVIOUS STRATUM.
IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
. SAPROLITE IS	<u>ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF</u> ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
S REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
OWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
EP CAN BE ETACHED	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
R PICK POINT. BLOWS OF THE	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPT) - NUMBER OF BLOWS (N OR BPF)OF A 140 LB.HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
FRAGMENTS T. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
ED READILY BY	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: *see note
THICKNESS 4 FEET	
5 - 4 FEET	ELEVATION: FEET
6 - 1.5 FEET 3 - 0.16 FEET	NOTES:
8 - 0.03 FEET 0.008 FEET	*Elevations derived from geopak and the .tin file
0.000 ( 22 )	'W5522_ls_tnl.tin' dated 9/27/2016
AT, PRESSURE, ETC.	
EEL PROBE:	
PROBE;	
;	DATE: 8-15-14
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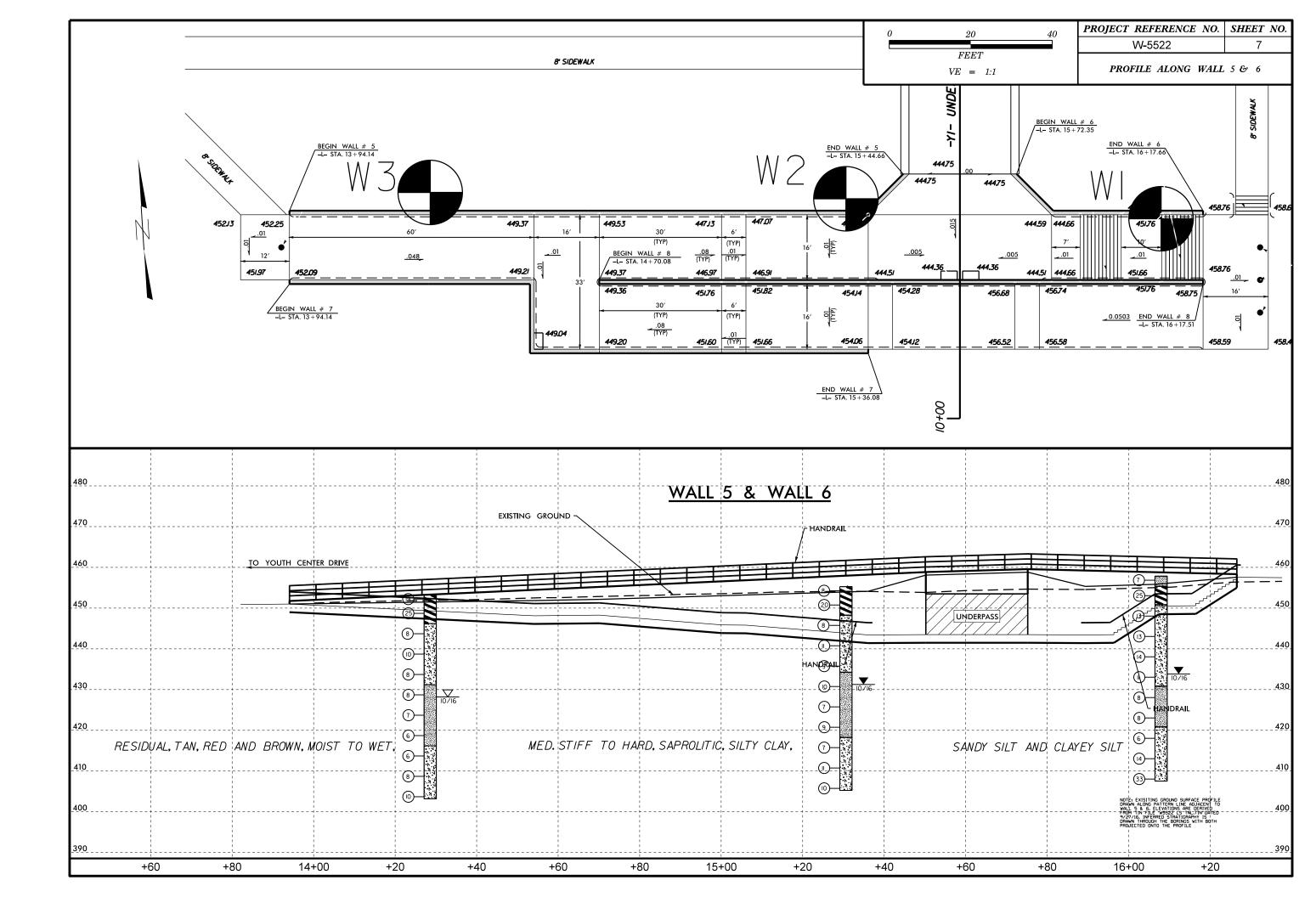


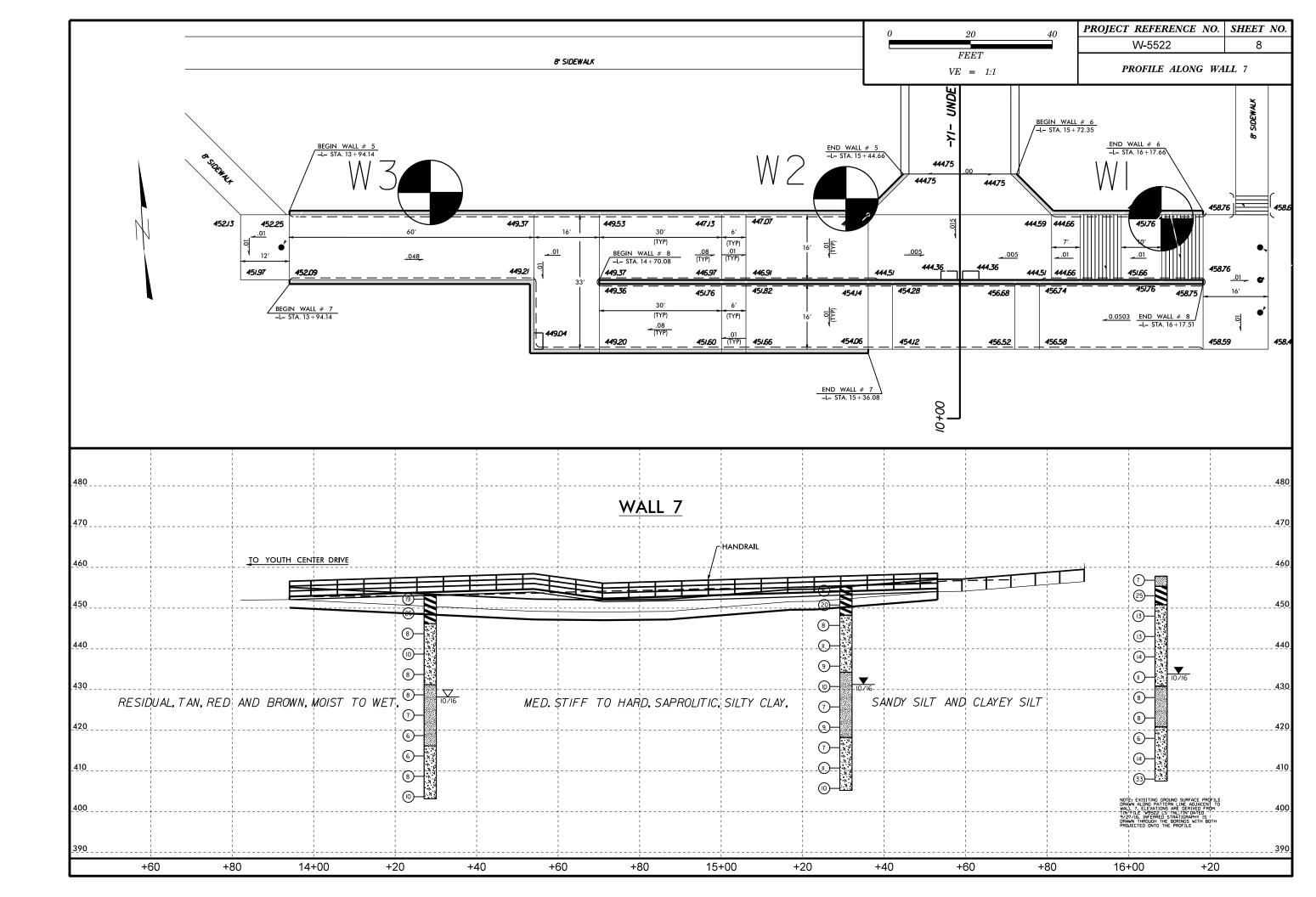


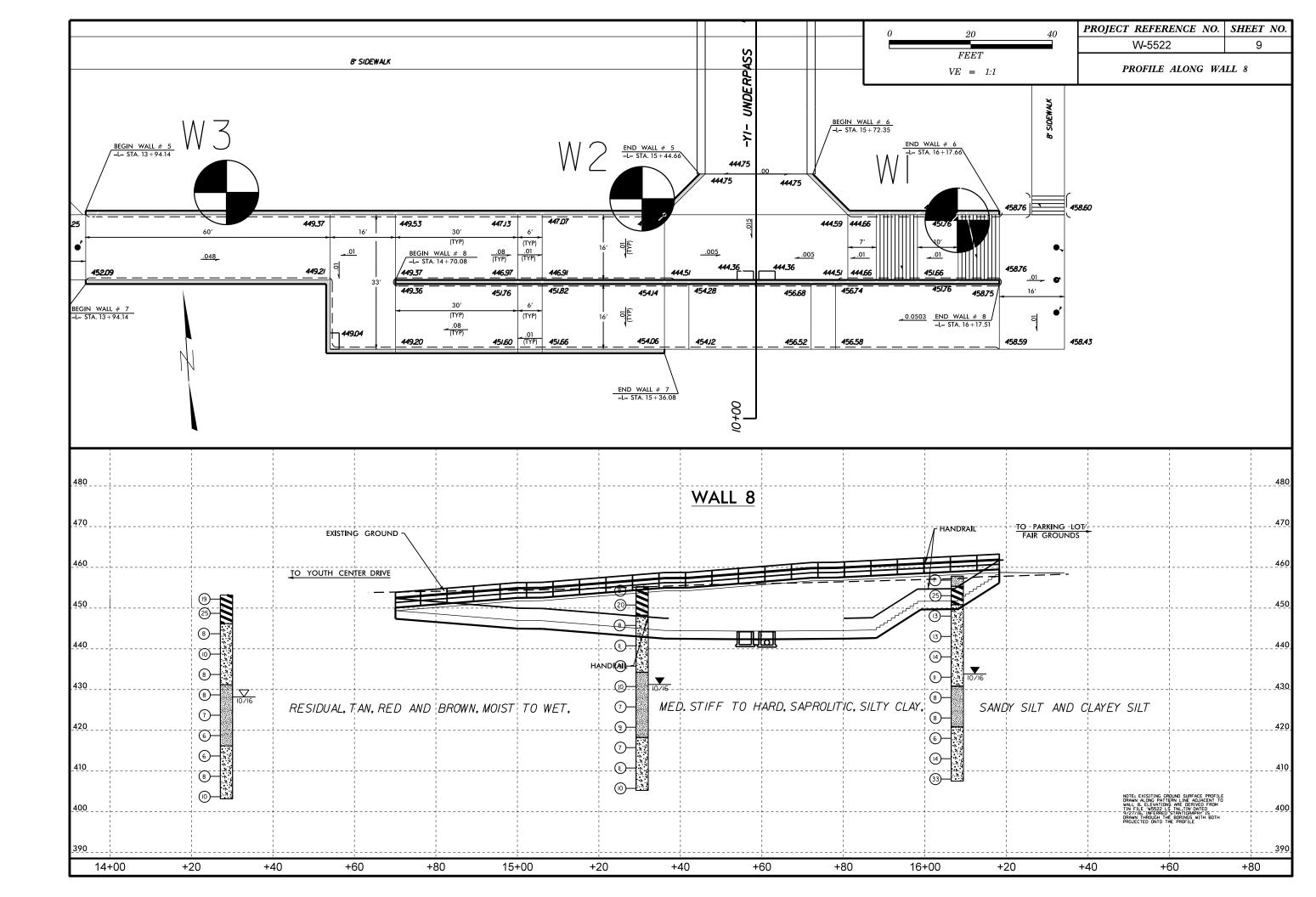




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	EET			_				
VE	= 1	:1				ROFILE ALC	DNG WA	LL 4
		0						
				1				480
							·	480
				-		 	·	470
·								460
							·	450
								440
						 	·	430
				; 				420
								410
   	   			     	NOT DRA WAL	E: EXISITING GROUND SUF WN ALONG PATTERN LINE L 4. ELEVATIONS ARE D FILE W9522 ES TNLTIN 7/16. INFERRED STRATIG WN THROUGH THE BORING JECTED ONTO THE PROFIL	RFACE PROFILE ADJACENT TO RIVED FROM	400
					9/2 DRA PRO	7/16. INFERRED STRATIG WN THROUGH THE BORING JECTED ONTO THE PROFIL	APHY IS I S WITH BOTH _E I I	
								390
+4	10		+	20	11-	+00	+80	



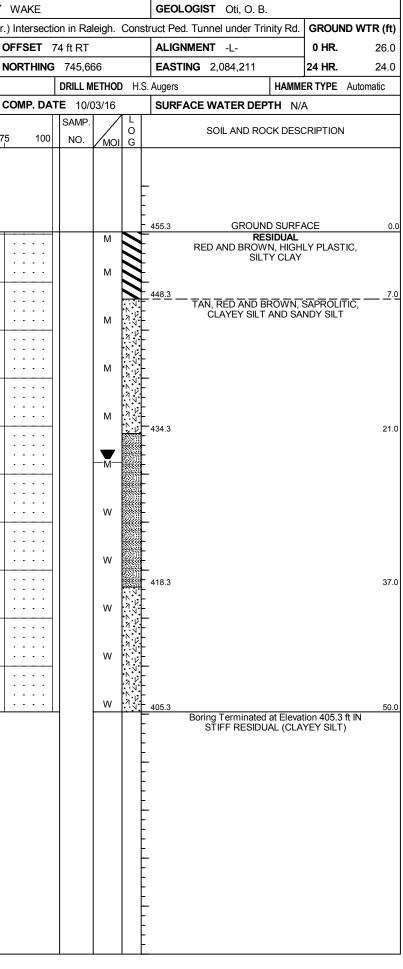




# GEOTECHNICAL BORING REPORT BORE LOG

																	UG											ı ——										_	
WBS								IP V							WA								IST O	-					5014						W-55				NTY \
				I SF	R 165	6 (Tr	<u> </u>					outh	Cent		-				gh. (	Cons	struct Pe				nity Rd.	-	ND WTR (ft)		DESCR		I SR <sup>·</sup>	1656 (		-			-	th Cent	
BORI							_	TATI									79 ft R1				-		ENT -L			0 HR.	25.0		ING NO						TION				OF
COLL	LAF	RELE	<b>EV</b> . 4	57.8	ft		<b>T</b>	ΟΤΑΙ	L DE	PTH	50.	3 ft			NORT	HING	745,						2,084	4,288		24 HR.	24.0	COL	LAR EL	<b>EV.</b> 4	55.3 ft			TOT	AL DE	PTH	50.01	ft	NO
DRILL	LRIC	G/HAM	IMER E	FF./D/	ATE	RFOC	067 C	CME-5	50X 8	35%	07/12/	2016								Н.:	S. Augers				HAMM	IER TYPE	Automatic	DRILL	RIG/HAI	MMER EI	FF./DAT	E RF	00067	' CME	-550X	85% 0	)7/12/20	16	
DRIL								TAR	r da'		10/0					P. DA	<b>TE</b> 10		/16		SURF	ACE	E WATI	ER DEF	TH N/	/A		DRIL	LER P					STA	rt da		10/03/		CC
ELEV (ft)	1 -	RIVE LEV (ft)	DEPTI (ft)			COU .5ft		0		25	BLOW	/S PI 5(			75	100	SAMF NO.		моі	L O G	ELEV. (1	ft)	SOIL	AND RC	CK DES	CRIPTION	l DEPTH (ft)	ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	·	OW CC 0.5ft		ft (	)	В 25		PER FC	DOT 75
<u>460</u> 455		57.8 - - - 54.0 -		5		3	4		7 .	-	· · · · · · · · · · · · · · · · · · ·	-	· · ·	  	  	 	SS-1		M			- Ri	TAN A			ANDY SILT		<u>460</u> 455	455.3	Ŧ	4	3	5						· · · ·
450	4	49.0 - -	- - - 8.8.	4		6	7			/ / 	· · · ·	-	· · ·	· · ·	· · ·	 	SS-2	2	М	2727	450.8 	TA				SAPROLI ANDY SILT		450	451.8	= <u>3.5</u> - - - - - - - - - - - - - - -	6	8	12			•20	· · · · · ·		· · · ·
445	4	- 44.0 - -	13.8	5		6	7		•   • •   13	- - 3- -	· · · ·	-	· · ·	· · ·	· · · · · · · · · · · · · · · · · · ·	   			M	77777	-							445	441.8	- - - - 13.5	3	4	4		·  - · ·  - · ·   ·		· · · · · ·		· · · ·
440	4;	39.0 - -	18.8	4		6	8		· • 1.	- 4 -			· · · · · · · ·	· · ·	   	  	SS-3	3	М	7 7 7 7 7 7 2 7 2 7 2	 - -							440	436.8	- - - 18.5	3	3	6		• 11 • 1 • • 1 • • 1 • • 1 •		· · · · · · · · · · · · · · · · · · ·		· · · · ·
430		34.0	-	4		4	7		•] • •11 []	- - -		•	· · · · · ·	· · · · ·	· · · · · · · · · · · · · · · · · · ·				м	マ ム ス ム マ ム ス ス	430.8						27.0		431.8	- - - 23.5	3	4	6		· · · ·	· · ·	· · · · · · · · · · · · · · · · · · ·		· · · ·
425		29.0 - - 24.0	28.8	2		3	5		 ●8 -   	- - -	  	• • •	· · · · ·	· · · · ·	   		SS-4	. '	w		- - - -							425	426.8	- - - 28.5 -	2	3	4		• • • • • •	· · · · · · · · ·	· · · · ·		· · · · ·
420	4	- - 19.0	38.8	1		3	5		<b>6</b> 8 - 1	- - -	· · · ·		· · ·	· · ·	· · ·		SS-5		w	シマト	420.8						37.0	420	421.8	- <u>33.5</u> 	1	3	6		· [· ·	· · ·	· · · · ·		· · · ·
415	4	- - 14.0 -	43.8	2		5	9			- - -	· · · ·		· · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · ·	· · · · · · · · · · · · · · · · · · ·			w	77777 72777	- - 							415		- <u>38.5</u>	2	3	4		• • • •		· · · · ·		
410	4(	- - 09.0	48.8	8		13	20		· · ·	\ . \		-	· · ·	· · ·	  	 		,	w	7 2 2 2 2 2 Z	- - - 407.5		·			ation 407.5	50.3	410	411.8	+ + +	2	4	7		• • • • • • • • • • • • • • • • • • •		· · · · ·		· · · ·
																					-		HĀRD	RESIDU	JAL (CL4	AYEY SILT	")		-		3	4	6		<u>+</u>	<u> </u>			<u> </u>

#### SHEET 10



# GEOTECHNICAL BORING REPORT BORE LOG

Bit Description       95 1983 (True) P241 95 1989 (P241 95 1989 P241 P24 198 198 198 198 198 198 198 198 198 198	WBS 50143.1.FD1	TIP W-5522 COUNTY WAKE	GEOLOGIST Oti, O. B.					ти	<b>P</b> W-5522	COUNTY WA			CEC		
DORMAN (V)         STATUM (V-2)         PFET 73:07         AUDMENT (- - - - - - - - - - - - - - - - - - -												Deleigh			
COLLARELY, 40/21         TOTAL DEPTH 50/21         MORTING 74/50/21         EATTING 2/06/50/2         24/18         PTOL         DOULTING 1/2012         Autrilian 2/2012         Autri							SK 1000 (					-			
DBL IG WARKER EP ADT         DBL IG WA	-						-0.0.4								
DRLLB         PARE D         START DATE         LOW/D         COMP DATE         USE/ACE         NAME         Description         Start         Composition         Start         Composition         Start         Composition         Start															
Ling         Party         EX.WOM         R.OW COMPT															
00       00 <td< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>FACE WATER DEPTH N/A</th><th>N</th></td<>														FACE WATER DEPTH N/A	N
4502       0.0       0       7       12       0.0       0	ELEV (ft)         ELEV (ft)         DEPTH         BLOW COOL           (ft)         0.5ft         0.5ft         0.5ft	0.5ft 0 25 50 75 100	SOIL AND ROCK DESCRI		ELEV (ft)	ELEV (ft)	0.5ft 0.5ft						O I G	SOIL AND ROCK DESC	RIPTION
49.1       49.2       7       11       41       42       43       7       11       44       44       7       4       5       6       40       4	455		F 453.2 GROUND SURFACE	E 0.0	460	458.2 0.0							- 458.2	GROUND SURFA	CE 0.
1       1	450 449.7 3.5		M RESIDUAL TAN, RED AND BROWN, H	HIGHLY	455	+	3 3	6				м		<b>RESIDUAL</b> TAN, RED AND BROWN, S	
4447       45       3       3       5       - <td></td> <td></td> <td>446.2</td> <td>7.0</td> <td></td> <td></td> <td>4 5</td> <td>6</td> <td></td> <td></td> <td></td> <td>6 M</td> <td>2 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7</td> <td></td> <td></td>			446.2	7.0			4 5	6				6 M	2 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7		
440       430 - 113       - <td< td=""><td>444.7 + 0.5</td><td>5</td><td></td><td></td><td>450</td><td>449.5 - 8.7</td><td>2 4</td><td>4</td><td><math display="block">\begin{array}{c c} \mathbf{I} \\ \mathbf{I} \\ \mathbf{P}^{\mathbf{B}} \\ \mathbf{P}^{\mathbf{B}} \\ \mathbf{I} \\ \mathbf{I} \\ \mathbf{P}^{\mathbf{B}} \\ \mathbf{I} \\ </math></td><td></td><td></td><td>м</td><td>7 7 7 7 7 4 7 7 7 7</td><td></td><td></td></td<>	444.7 + 0.5	5			450	449.5 - 8.7	2 4	4	$\begin{array}{c c} \mathbf{I} \\ \mathbf{I} \\ \mathbf{P}^{\mathbf{B}} \\ \mathbf{P}^{\mathbf{B}} \\ \mathbf{I} \\ \mathbf{I} \\ \mathbf{P}^{\mathbf{B}} \\ \mathbf{I} \\ $			м	7 7 7 7 7 4 7 7 7 7		
433       434 7       19,5       2       4	440 439.7 13.5 - 3 4	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	M 12-22		445	444.5 <del>+</del> 13.7	2 3	3			· ·	м	2 2 7 7 7 4 7 4 7 4 7 4		
430       420       2       3       4       6       60       6 </td <td>435 434.7 18.5</td> <td></td> <td></td> <td></td> <td>440</td> <td>439.5 + 18.7</td> <td></td> <td></td> <td><b>▼</b> · · · · · · · · · · · · · · · · · · ·</td> <td>.    </td> <td></td> <td></td> <td>2,2,2,2 2,5,2,5, 1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,</td> <td></td> <td></td>	435 434.7 18.5				440	439.5 + 18.7			<b>▼</b> · · · · · · · · · · · · · · · · · · ·	.			2,2,2,2 2,5,2,5, 1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,		
425       424 - 7 - 28.5       -		$\left \begin{array}{c c c c c c c c c c c c c c c c c c c$			405	+++++++++++++++++++++++++++++++++++++++	3 4	6	. <b>●</b> 10	.		м	ト イ イ イ イ イ イ イ イ イ イ イ イ		
420       424,7       2       3       4<		$  \cdot \cdot$			435	434.5 + 23.7	1 3	3		.	55-	7 M	× × × × × × × ×		
420       419.7       33.5       -	425 424.7 28.5 2 3				430	429.5 28.7	2 3	5				м	× × × × × ×		
415 414.7 38.5 416.2 37.0 416.2 37.0 417.0 416.2 37.0 416.2 37.0 417.0 416.2 37.0 417.0 417.0 417.0 418	420 419.7 33.5				425	424.5 33.7									
410       409,7       43.5       404,7       48.5       404,7       48.6       403.2       50.0         405       404,7       48.5       40.0       403.2       50.0       401       409.5       48.7       410       409.5       48.7       410       409.5       48.7       410       409.5       48.7       410       409.5       48.7       410       409.5       48.7       410       409.5       48.7       410       409.5       48.7       410       409.5       48.7       410       409.5       48.7       410       409.5       48.7       410       409.5       48.7       410       409.5       48.7       400.5       40.0       50         W       W       W       W       W       W       403.2       50.0       W					420		2 3	5		· · · · · · · · · · · · · · · · · · ·		W	7 7 7 7 7 7 7 7 1 1 1 1		
410       409.7       43.5       -	414.7 38.5 WOH 2	$\left  \left  \begin{array}{c} \P^{\circ} \cdot \cdot \cdot \right  \cdot \cdot \cdot \cdot \left  \cdot \cdot \cdot \cdot \right  + \cdot \cdot \cdot \right  \right  \right $				419.5 + 38.7 + + +	2 3	4	· · ·	.		w	- - - - - - - - - - - - - -		
405     404.7     48.5             405     3     4     6           1     3     4     6           1              1             1             1             1             1             1              1               1               1              1 <td>410 409.7 43.5 2 3</td> <td></td> <td>W 12</td> <td></td> <td>415</td> <td>414.5 43.7</td> <td>1 2</td> <td>5</td> <td>· · · · · · · · · · · · · · · · · · ·</td> <td></td> <td>     </td> <td>10 W</td> <td></td> <td></td> <td></td>	410 409.7 43.5 2 3		W 12		415	414.5 43.7	1 2	5	· · · · · · · · · · · · · · · · · · ·		 	10 W			
Boring Terminated at Elevation 403.2 ft IN	405 404.7 48.5 3 4				410	409.5 48.7	3 5	7				- W			50
			Boring Terminated at Elevation	n 403.2 ft IN					<b>●</b> 12				- 408.0	Boring Terminated at Elevat STIFF RESIDUAL (CLA)	on 408.0 ft IN /EY SILT)
						+ + + + +									
						+									
						+									
						+ + +									
						+							-		

### SHEET 11

# GEOTECHNICAL BORING REPORT BORE LOG

DORSING DA. V/G         EXAMPLENT 14.         PIRE         P	
LOBINO No. Ye5         STATION 16-35:         OPFERT 101LT         ALGMENT 4_         PHR 200         COUND 01.00         WE         STATION 13-72         OPFERT 101LT         ALGMENT 4_           COULARE LEW, 40.861         TOTAL DEPTH 50.1         MORTING 44.564         CATINE 30.20.41         DOUBLER HW 40.861         FAITUR 2000.01         DESCRIPTION 13-72         OPFERT 101LT         ALGMENT 4_         EASING 10:50.1         EASING 10:50.1         OPFERT 101LT         ALGMENT 4_         EASING 10:50.1         OPFERT 101LT         ALGMENT 4_         EASING 10:50.1         EASING 10:50.1 <th>ROUND WTR</th>	ROUND WTR
COLLARELY         45.5.1         TOTAL DEPTH 50.01         NORTHNO 745.54         EATTHO 2.04.01         CollareLLY         45.5.1         TOTAL DEPTH 50.01         MORTHNO 745.63         EATTHO 2.04.01           BUIL BROWNER FORM COLD         COLLARELY         45.5.1         TOTAL DEPTH 50.01         DBLLETKO 15.5         COMP. DATE         100010         Start         Start         Start         Start         DBLLETKO 15.5         COMP. DATE         100010         Start         Start         DBLLETKO 15.5         COMP. DATE         100010         Start         DBLETKO 15.5         COMP. DATE         100010         Start         DBLETKO 15.5         COMP. DATE         100010         Start         Start         DBLETKO 15.5         COMP. DATE         100010         Start	<b>0 HR.</b> 3
UPUL INFORMATION FEED ALT IN DOT (C) 64:000 40: 000 2001         DRUL RETHON 15.4 rpgs         HAMMER PYPE Actornet         DRUL RETHON 706 4000 46: 000 2001         DRUL RETHON 756 4000 2001	<b>4 HR.</b> 5.
Della Prinz, D.G.         START DATE         1000/16         COMP.DATE         1000/16         COMP.DATE         1000/16         SuperAcce watter DepTint         NA           LSD         DIMAGE         DOWNOONT         BLOWS PERTON         BLOWS PERTON <td< th=""><th></th></td<>	
Inter Dev         Dev <thdev< th="">         Dev         <thdev< th=""> <thdev<< th=""><th>TYPE Automatio</th></thdev<<></thdev<></thdev<>	TYPE Automatio
10       10       0.0       0.38 <th0< th=""><th></th></th0<>	
455       466       0       2       3       4       - <th>IPTION</th>	IPTION
455       0.0       2       3       4       4       5       3       4       5       3       4       5       3       4       5       3       4       6       7 <th>F</th>	F
402       3.5       - <td></td>	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
443       3       5       6         445       - </td <td></td>	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
440       -	
437       1       2       3       3       4       7	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
422.3       33.5       -<	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	
412.3     43.5     3     4     5	
$410 \qquad 405  405.3  48.5 \qquad 10  10  10  10  10  10  10  10$	
407.3 + 48.5 Boring Terminated at Elevation (SN)	n 403.8 ft IN
T 7 12 22	Y SILT)
Image: Construction of the second	

## SHEET 12

	SOIL TEST RESULTS														
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	<i>P</i> . <i>I</i> .	C CAND		WEIGHT	OL AV		SING (S.	<i>,</i>	% MOISTURE	% ORGANIC
SS- 1	79' RT	16 +07	3. 8- 5. 3	A-7-5(30)	71	37	C.SAND 9.9	<i>F.SAND</i> 17.5	SILT 10. 2	CLAY 62.4	10 96	40 91	200 74	-	-
SS- 2	79′ RT	16 +07	8.8-10.3	A-5(0)	47	NP	13.3	47.1	21.5	18.1	99	91	52	-	-
SS- 3	79' RT	16 +07	18.8-20.3	A- 5( 0)	42	NP	15.7	48.5	23.7	12.1	95	86	49	-	-
SS- 4	79′ RT	16 +07	28.8-30.3	A-4(0)	39	NP	13.1	59.8	19.0	8.1	97	90	40	-	-
SS- 5	79′ RT	16 +07	38.8-40.3	A- 5( 0)	43	NP	17.7	51.2	19.0	12.1	91	80	42	-	-
SS- 6	111' LT	15+38	3.7-5.2	A- 5( 5)	44	7	11.9	33.4	26.5	28.2	100	94	64	-	-
SS- 7	111' LT	15+38	23.7-25.2	A- 5( 0)	49	NP	21.6	37.9	28.5	12.1	95	80	50	-	-
SS- 8	110' LT	14 +58	8.5-10.0	A-5(3)	42	5	12.5	39.9	29.5	18.1	98	91	58	-	-
SS- 9	110' LT	14 +58	28.5-30.0	A- 5( 0)	45	NP	23.2	33.6	29.1	14.1	92	77	50	-	-
SS- 10	111' LT	15+38	43.7-45.2	A-5(0)	44	NP	15.5	52.2	18.2	14.1	92	83	42	-	-

