10 BR. REFERENCE

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

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STRUCTURE SUBSURFACE INVESTIGATION

COUNTY PITT
PROJECT DESCRIPTION REPLACE BRIDGE NO. 730123
ON SR 1552 (TUCKER-BULLOCK ROAD) OVER
MEADOW BRANCH
SITE DESCRIPTION BRIDGE NO. 730123
AT - L - STA. 13 + 56.30

STATE PROJECT REFERENCE NO. SHEETS BR-0120

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 SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL 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 BORGHOLE. THE LABORATORY SAMPLE DATA AND THE IN STIU (IM-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS NDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS, AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:

 1. 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 HAVING 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 BUNCH, C. M. DUGGINS, W. T. TURNER, A. D. BUNCH, C. M. INVESTIGATED BY FIELDS, W. D. DRAWN BY NASH. A. A. SUBMITTED BY _ALEXANDER, M. J. NOVEMBER 2019

Prepared in the Office of: **Consulting Engineers and Scientists**



Matthew J. Alexander/19/2019

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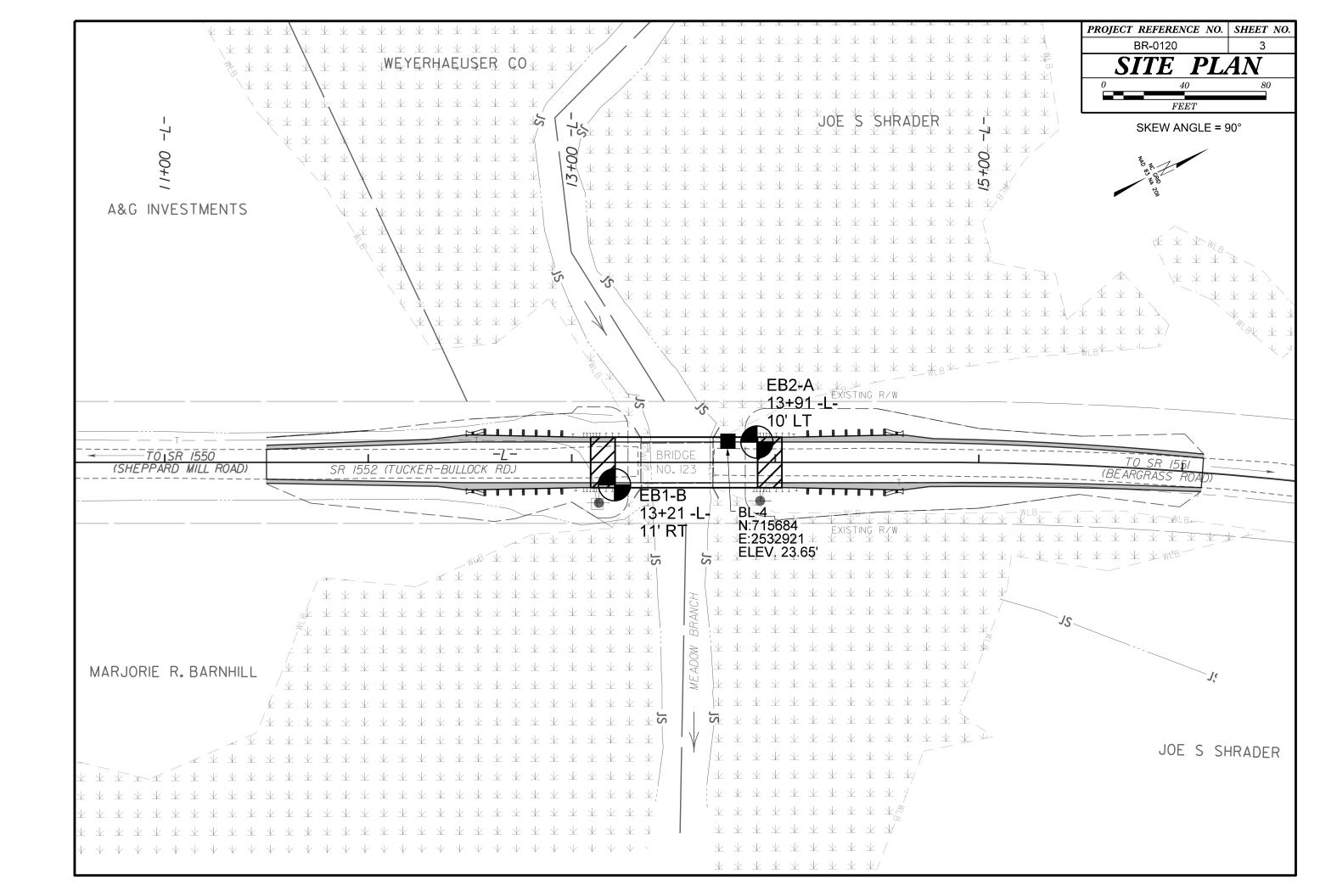
PROJECT REFERENCE NO. SHEET NO. 2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	<u>AQUIFER</u> - A WATER BEARING FORMATION OR STRATA.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEDUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
LLASS. (\$ 35% PASSING "200) (> 35% PASSING "200)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-4-3-4 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
7. PASSING	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, 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.
*10 50 MX GRANULAR SILI-	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*40 30 MX 50 MX 51 MN SOLS SOLS SOLS SOLS SOLS SOLS SOLS SOL	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING *40 40 MX 41 MN	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 10 MX 1	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 8 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOILS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STUME HAUSE. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER		CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	lacksquare static water level after 24 hours	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE		(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30	— O-MM► SPRING OR SEEP	WITH FRESH ROCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	POADWAY EMRANKMENT (RE) 25/025 DIP & DIP DIRECTION	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) STATES DIP & DIP DIRECTION OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
GENERALLY VERY LOOSE 4 4	SOIL SYMBOL SPET DUT TEST BORING SLOPE INDICATOR INSTALLATION	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR MEDIUM DENSE 10 TO 30 N/A	_ ····· -	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
MAILERIAL DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY DENSE > 50 VERY SOFT < 2	INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5	MA - TECT BODING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0 MATERIAL STIFF 8 TO 15 1 TO 2	SINE INFERRED ROCK LINE MUNITURING WELL WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	TTTTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER INSTALLATION - SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPPOLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNCLASSIFIED EXCAVATION - TOTAL UNCLASSIFIED EXCAVATION -	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	LICED IN THE TOP 2 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO
BOULDER COBBLE GRAVEL SAND SAND SILT CLAY	SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	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
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE FIELD MOISTURE OURSE FOR STATE A MOISTURE OF SCALES OF SCA	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ m d}$ - DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u>	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE.	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
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC CEMICOLID. PEOLIDES DRVING TO	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE < - WET - (W) SEMI-SULIN, REGULARS TO HATTAIN OPTIMUM MOISTURE (PI) PL PLASTIC LIMIT	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	BENCH MARK: BL-4:-L- 13+76.70,10'LT
	EQUIPMENT USED ON SUBJECT PROJECT	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	N-7/5,684, E-2,532,92/ ELEVATION: 23.65 FEET
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	
SL _ SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6 CONTINUOUS FLIGHT AUGER CORE SIZE:	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
PLASTICITY	CME-55 CORE SIZE:	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS; FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST X CASING X ADVANCER HAND TOOLS: POST HOLE DIGGER	CDAING CAN BE CERABATED FROM CAMBLE WITH CTEEL PROPE.	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 2% STEEL TEETH HAND AUGER	MODERATELY INDURATED ORALING CHIN BE SEPRICHED FROM SHIFTLE WITH SIEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	ACKER RENEGADE TRICONE TUNG, CARB. SOUNDING ROD	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; INDURATED DIFFICULT TO BREAK WITH HAMMER,	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT VANE SHEAR TEST	SHARP HAMMER BLOWS REQUIRED TO RREAK SAMPLE.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHARP HAMMER BLOWS REGULARD TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14
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				HOR	ZONTAL		FERENCE NO. SI	HEET NO.
	NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PRO	OJECTE	D	0	40	80 0 20 40 BR-0	0120	4
70	ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -L- TAKEN THE PROVIDED PROJECT TIN FILE (br120_ls_tin.tin) DATED 12/19/2018.			F	EET	VE = 2 $FEET$ $AT M$	NE PROFILE ALON BRIDGE NO. 730123	NG -L-
60								60
50								50
40			EB1-		EB2-A			40
			13+21 11' F		13+91 - 10' LT			
30			III P	×4	10 L1			30
				WS ELEV.17.85'— (10/2019)		ROADWAY EMBANKMENT, LOOSE, ORANGE, GRAY, TAN, WET TO SATURATED, SILTY FINE TO COARSE SAND, CLAYEY FINE SAND, TRACE ORGANICS		
20	ROADWAY EMBANKMENT, LOOSE, ORANGE, GRAY, TAN, WET, CLAYEY FINE TO COARS	E SAND	<u></u>	$-$ 1 \setminus r_{i}				– 20
	ALLUVIAL, MEDIUM STIFF, TAN, WET, SILTY CLAY, TRACE ORG					ALLUVIAL, VERU LOOSE, TAN, WET TO SATURATED, SILTY FINE TO	-	
10	LQOSE, TAN. WET, SILTY COARSE TO FINE SAM	.ND		`		COARSE SAND, TRACE ORGANICS		10
10								10
_	COASTAL PLAIN, SOFT TO STIFF, BLUE-GRAY, W	WET,		SILTY CLAY, FINE		TO COARSE SANDY CLAY, TRACE TO SOME SHELL FRAGMENTS,		
0								U
	INTERBEDDED SILTY FINE SAND LAYE	ERS		((YORKTOWN FORMATION)		
_10					3)			_10
			4	<u>-</u>	5			
<u>-20</u>	SOFT TO STIFF, BLUE-GRAY, WET, SILTY	CLAY,	8	TRACE SHELL (12	FRAGMEMTS, INTERBEDDED SILTY FINE SAND LAYERS,		-20
	CEMENTED SAND I	AYERS	3-		3	(BLACK CREEK FORMATION)		
-30		NIED	0/0.3	CLAYEY SAND,	- N	. +		-30
	MEDIUM STIFF, GRAY, WET, FINE TO COARSE SAND INTERBEDDED SILTY FINE SAND				70.9	CEMENTED SAND LAYERS		
-40			8		8 			-40
	LOOSE TO DENSE, DARK GRAY, GREEN-GRAY, WE		23-		21)	SILTY COARSE TO FINE SAND, TRACE TO LITTLE GLAUCONITE		
–50		(34)—		35)—			_50
				(7)			
-60	MEDIUM STIFF TO STIFF, DARK		9-1	wet, coarse	3	TO FINE SANDY CLAY		-60
	MEDIUM 511FF TO 511FF, DARK		27		22)	10 FIRE SANDI CLAI		
-70	MEDIUM DENSE TO VERY DENSE, DARK GRAY, SATURATED TO	O WET,	30-	CTTV COADCE	32)	TO FINE SAND, TRACE GLAUCONITE, CEMENTED SAND LAYER		–70
_, 0			0/0.8		ВТ			_,
00		, and the second			F1AD 10/19			90
- 80			28)					-80
			(15)—BI					
- 90	-		FIAD 10/19					–90
			10,713					
-100								-100
_110								_110
-120								_120
	11+00 $12+00$	13 +	00		14	1 + 00 15 + 00	16 + 00	-L-



GEOTECHNICAL BORING REPORT BORE LOG

WB	S 67	7120.1.1			TI	P BR-012	20	COU	NTY P	PITT			GEO	LOGIST	BUNCH, C.	C. M.			WBS 67	120.1.1			TIF	P BR-012	20	COUN	TY PITT				GEOLOGIST B	UNCH, C. N	М.	
SITE DESCRIPTION REPLACE BRIDGE NO. 730123 ON SR 1552 OVER MEADOW BRANCH						NCH	I	GROUND WTR (ft)						SITE DESCRIPTION REPLACE BRIDGE NO. 730123 ON SR 1552 (OW BRA	NCH	'	1		GROUN	ND WTR (ft)						
BOF	RING	NO. EB	31-B		S.	STATION 13+21 OFFSET			TATION 13+21 OFFSET					3+21 OFFSET 11 ft RT				ALIGNMENT -L- 0 HR. FIAD			BORING NO. EB1-B STATION 13+21						OFFSET 11 ft RT				ALIGNMENT -L-	0 HR.	FIAD	
COL	LAR	R ELEV.	24.1 ft		T	OTAL DEP	TH 108	.3 ft	NO	RTHING	715,6	03	EAS	TING 2,5	532,866	24	4 HR.	N/A	COLLAR	ELEV.	24.1 ft		тс	OTAL DEP	TH 108	.3 ft	NORTHIN	G 715,	603	E	EASTING 2,53	2,866	24 HR.	N/A
DRIL	L RIG	HAMMER	R EFF./DA	ATE TER	R92-0 A	CKER RENE	GADE 86%	02/15/201	9		DRILL N	METHOD	Mud Rotary			HAMMER	TYPE Aut	omatic	DRILL RIG	HAMMER	REFF./DA	TE TEF	R92-0 AC	KER RENE	GADE 869	6 02/15/2019		DRILL	METHO	D Mud R	otary	H.	AMMER TYPE	Automatic
DRII		R DUGO		/. T.	S ⁻	TART DAT	E 10/09	/19	co	MP. DA	TE 10/0	09/19	SURF	FACE WA	ATER DEPTI	H N/A			DRILLER			'. T.	ST	ART DAT	E 10/09	9/19	COMP. D	ATE 10	/09/19		SURFACE WAT	ER DEPTH	N/A	
ELE\ (ft)	DR EL (1	RIVE LEV (ft) DEP	t) 0.5	t 0.5ft		0	BLOW 25	S PER FO	OOT 75	100	SAMP. NO.	'/ (L O G ELEV. (IL AND ROCK	K DESCRI		DEPTH (ft)	ELEV DR EL (ft)	=V /f4		OW CO		0	BLOW 25	S PER FO	OT 75 10	SAMF NO.	² . мо	L O II G	SOIL	AND ROCK [DESCRIPTION	1
25																	_		-55						М	atch Line								
	22	2.3 1.	8 2	3	2							1 1	24.1		GROUND ROADWAY EI GE, GRAY, TA COARSI	MBANKMI AN, CLAYE	ENT	0.0	-57	7.7 81	.8	4	5	. l					w		DARK GR	AY, COARSI CLAY (con	ETO FINE SAN tinued)	NDY
20		‡				♥ 5							19.1			UVIAL -		5.0	-60	‡				. 📭				+	"		1.9			86.
15		7.3 1 6.	8 WC	DH 1	4	6 5			-			w	16.1		SILTY CLAY, SILTY COAR			8.0	-65	2.7 T 86 +	9	10	17		Q 27				Sat.	- - -	COAR	SE TO FINE ITE, CEMEN	GREEN, SILT SAND, TRACE TED SAND LA	E
	_12	2.3 [†] 11	.8 WC	DH 4	7				: : :			w i			COASTA GRAY, FINE T Y, SOME SHE		SE SANDY	, 10.0	-67	7.7	.8 10	11	19		j				Sat.			96.8 TO 97.	8 FEE I	
10		7.3 1 16	. 8			 . / .							8.1	•	YÖRKTOWN RAY, SILTY (•	16.0	-70	2.7 + 96	8						<u> </u>	\parallel						
5		+	2	1	4	\$ 5						w l		FRAG	GMENTS, INT FINE SANI	ERBEDDE	ED SILTY	L	-75	+ 30	40	60/0.3	3				100/0.	5 ♦	W					
0	_2	2.3 + 21	.8 2	1	3	4			-			w							-80	7.7 + 101	1.8 9	10	18		28	.:- 			w	-				
	-2	2.7 26	i.8	0	2	j			-											2.7 106	6.8	5	10	/	/									
-5		‡				1							}							+				♥15		.	.	+	W	-8- - -	Boring Te COA	rminated at E STAL PLAIN	levation -84.2 s	ft IN
-10		7.7 31 	.8 WC	DH 1	2	3			-			w I								Ī														
45		2.7 36	1.8	2	2				-			w l	\}					20.0		Ī														
-15		7.7 41	.8			<u> </u>			-				-14.9		FINE TO COA ENTED SAND CREEK FO	D LAYER	(BLACK	, 39.0		†														
-20		+	1		'	.∳8 			-			w					,			‡														
-25		2.7 † 46	2	1	2	∫ •3			-			w								‡														
GDT		27.7 ± 51	.8 100/	0.3				7-1		100/0.3	•	w %	- <u>26.9</u> -	_ ′		Y SAND		51.0		† †														
NC_DOT		32.7 56	5.8											INTE	FINE TO COA ERBEDDED S RS (BLACK CF	ARSE SAN	E SAND			+														
-35 -35		+	2	2	4	● 6.			-			w	*					04.0		‡														
-BRDG36	3	37.7 61	.8 2	3	5				-			w	-36.9		GRAY, GREEN O COARSE S GLAUC			<u> 61.0</u>		<u> </u>														
BR0120_GEO_GFO	-4	12.7 66	i.8 9	9	14				.			W								Ŧ														
BLE		17 7 + 74	٥				\						<u></u>							‡														
-50		7.7 7 71	13	3 13	21		34		-			w								†														
-55		52.7 76	3	3	4	• • • • • • • • • • • • • • • • • • •			.			w	-51.9	DARK	GRAY, COAR CL	RSE TO FI	NE SANDY	76.0		Ī														



GEOTECHNICAL BORING REPORT BORE LOG

WBS 67120.1.1	TIP BR-0120 COUNTY PITT		GEOLOGIST BUNCH, C. M.	WBS 67120.1.1 TIP BR-0120 COUNT	TY PITT	GEOLOGIST BUNCH, C. M.
SITE DESCRIPTION REPLACE E	BRIDGE NO. 730123 ON SR 1552 OVER MEAI	ADOW BRANCH	GROUND WTR (ft)	SITE DESCRIPTION REPLACE BRIDGE NO. 730123 ON SR 1552 O	OVER MEADOW BRANCH	GROUND WTR (ft
BORING NO. EB2-A	STATION 13+91 OFFSET	T 10 ft LT	ALIGNMENT -L- 0 HR. FIAD	BORING NO. EB2-A STATION 13+91	OFFSET 10 ft LT	ALIGNMENT -L- 0 HR. FIAD
COLLAR ELEV. 24.2 ft	TOTAL DEPTH 93.5 ft NORTHII	ING 715,676	EASTING 2,532,877 24 HR. N/A	COLLAR ELEV. 24.2 ft TOTAL DEPTH 93.5 ft	NORTHING 715,676	EASTING 2,532,877 24 HR. N/A
DRILL RIG/HAMMER EFF./DATE TER	92-0 ACKER RENEGADE 86% 02/15/2019	DRILL METHOD Mud	Rotary HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 86% 02/15/2019		d Rotary HAMMER TYPE Automatic
DRILLER DUGGINS, W. T.		DATE 10/09/19	SURFACE WATER DEPTH N/A	DRILLER DUGGINS, W. T. START DATE 10/09/19	COMP. DATE 10/09/19	SURFACE WATER DEPTH N/A
ELEV CHI		SAMP. L O NO. MOI G	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)	DRIVE CHAPTER DEPTH BLOW COUNT BLOWS PER FOO	75 100 NO. MOI G	SOIL AND ROCK DESCRIPTION
25 20 17.2 7.0 WOH 1 15 12.2 12.0 WOH 1 10 7.2 17.0 2 2 5 22 22.0 2 2	11 12	Sat. Sat	P24.2 GROUND SURFACE ROADWAY EMBANKMENT ORANGE, GRAY, TAN, CLAYEY FINE SAND TAN, SILTY FINE TO COARSE SAND, TRACE ORGANICS ALLUVIAL TAN, SILTY FINE TO COARSE SAND, TRACE ORGANICS 14.2 COASTAL PLAIN BLUE-GRAY, FINE TO COARSE SANDY CLAY, SOME SHELL FRAGMENTS (YORKTOWN FORMATION) 8.2 BLUE-GRAY, SILTY CLAY, TRACE TO LITTLE SHELL FRAGMENTS, INTERBEDDED SILTY FINE SAND LAYERS	-57.8 82.0		DARK GRAY, COARSE TO FINE SANDY CLAY General Sand Sand Sand Sand Sand Sand Sand Sand
-5 -7.8 -32.0 -10 -12.8 -37.0 -12.0	2		-11.8 — BLUE-GRAY, FINE TO COARSE SANDY 36.0			
-15 2 1 -17.8 42.0 1 5 -22.8 47.0	7		CLAY, TRACE SHELL FRAGMENTS -16.8			- - - - - - - -
-25	15/0.4	W M M M M M M M M M M M M M M M M M M M				
-40		Sat. Sat.	-38.3 DARK GRAY, GREEN-GRAY, SILTY COARSE TO FINE SAND, LITTLE GLAUCONITE .			

SITE PHOTOGRAPHS

REPLACE BRIDGE NO. 730123 ON SR 1552 (TUCKER-BULLOCK ROAD) OVER MEADOW BRANCH



FROM END BENT 1 LOOKING UPSTATION



END BENT 1 RIGHT LOOKING UPSTREAM