

REFERENCE: B-5639

PROJECT: 45594

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY DUPLIN  
PROJECT DESCRIPTION BRIDGE NO. 36 ON  
US HIGHWAY 11 OVER MAXWELL CREEK  
AT -L- STATION 23+55  
BRIDGE NO. 36 DETOUR ON -LDET- OVER  
MAXWELL CREEK AT -L DET- STATION 18+59.5

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-5	PROFILES
6	CROSS SECTIONS
7-11	BORE LOGS
12	STE PHOTOS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5639	1	12

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 T07-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

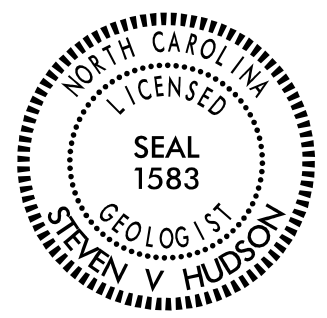
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-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 INDICATED 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 INTERPRETATIONS 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  
CATLIN PERSONNEL

INVESTIGATED BY S. V. HUDSON, LG  
 DRAWN BY S. V. HUDSON, LG  
 CHECKED BY J. L. STONE, LG  
 SUBMITTED BY S. V. HUDSON, LG  
 DATE OCTOBER 2019



DocuSigned by:  
  
 01DB23BB746D469...  
 SIGNATURE DATE 1/15/2020

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

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																																																																																																																																																										
<p>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 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: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>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. 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 REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>										<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA. <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <b>ARGILLACEOUS</b> - 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. <b>ARTESIAN</b> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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 RUN AND EXPRESSED AS A PERCENTAGE. <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. <b>SILL</b> - 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. <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - 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. <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - 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. <b>TOPSOIL (TS)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																										
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<p><b>WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</b></p> <p><b>STATIC WATER LEVEL AFTER 24 HOURS</b></p> <p><b>PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</b></p> <p><b>SPRING OR SEEP</b></p>										<b>WEATHERING</b>										<b>FRESH</b>										<b>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</b>																																																																																																																																																										
<p><b>MISCELLANEOUS SYMBOLS</b></p> <p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p> <p>SOIL SYMBOL</p> <p>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p> <p>INFERRED SOIL BOUNDARY</p> <p>INFERRED ROCK LINE</p> <p>ALLUVIAL SOIL BOUNDARY</p> <p>DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</p> <p>SPT DMT TEST BORE</p> <p>AUGER BORING</p> <p>CORE BORING</p> <p>MONITORING WELL</p> <p>PIEZOMETER INSTALLATION</p> <p>SLOPE INDICATOR INSTALLATION</p> <p>CONE PENETROMETER TEST</p> <p>SOUNDING ROD</p> <p>TEST BORING WITH CORE</p> <p>SPT N-VALUE</p>										<b>MODERATE (MOD.)</b>										<b>VERY SLIGHT (V SL.)</b>										<b>VERY SLIGHT FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</b>																																																																																																																																																										
<p><b>RECOMMENDATION SYMBOLS</b></p> <p>UNDERCUT</p> <p>SHALLOW UNDERCUT</p> <p>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</p> <p>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p> <p>UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</p>										<b>SEVERE (SEV.)</b>										<b>SLIGHT (SL.)</b>										<b>ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</b>																																																																																																																																																										
<p><b>ABBREVIATIONS</b></p> <p>AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - COARSE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY</p> <p>MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY</p> <p>VST - VANE SHEAR TEST WEA. - WEATHERED W - UNIT WEIGHT W<sub>d</sub> - DRY UNIT WEIGHT</p> <p><b>SAMPLE ABBREVIATIONS</b></p> <p>S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO</p>										<b>SEVERE (SEV.)</b>										<b>MODERATELY SEVERE (MOD. SEV.)</b>										<b>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL</b>																																																																																																																																																										
<p><b>SOIL MOISTURE - CORRELATION OF TERMS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE SHRINKAGE LIMIT</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>										SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE	SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<b>VERY SEVERE (V SEV.)</b>										<b>MODERATELY SEVERE (MOD. SEV.)</b>										<b>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</b>																																																																																																																																											
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<p><b>EQUIPMENT USED ON SUBJECT PROJECT</b></p> <p>DRILL UNITS:</p> <p><input type="checkbox"/> CME-45C</p> <p><input checked="" type="checkbox"/> CME-55</p> <p><input checked="" type="checkbox"/> CME-550</p> <p><input type="checkbox"/> VANE SHEAR TEST</p> <p><input type="checkbox"/> PORTABLE HOIST</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>										<b>ROCK HARDNESS</b>										<b>VERY HARD</b>										<b>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</b>																																																																																																																																																										
<p>ADVANCING TOOLS:</p> <p><input type="checkbox"/> CLAY BITS</p> <p><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</p> <p><input type="checkbox"/> 8" HOLLOW AUGERS</p> <p><input type="checkbox"/> HARD FACED FINGER BITS</p> <p><input type="checkbox"/> TUNG-CARBIDE INSERTS</p> <p><input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</p> <p><input type="checkbox"/> TRICONE <input type="checkbox"/> STEEL TEETH</p> <p><input checked="" type="checkbox"/> TRICONE <input type="checkbox"/> 2 7/8" TUNG-CARB.</p> <p><input type="checkbox"/> CORE BIT</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>										<b>VERY HARD</b>										<b>HARD</b>										<b>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</b>																																																																																																																																																										
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<p><b>INDURATION</b></p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE</p> <p>MODERATELY INDURATED</p> <p>INDURATED</p> <p>EXTREMELY INDURATED</p>										<b>VERY HARD</b>										<b>HARD</b>										<b>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</b>																																																																																																																																																										
<p><b>BENCH MARK: ELEVATION &amp; LOCATIONS OBTAINED WITH RTK GPS</b></p> <p style="text-align: right;">ELEVATION: FEET</p>										<b>VERY HARD</b>										<b>HARD</b>										<b>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</b>																																																																																																																																																										
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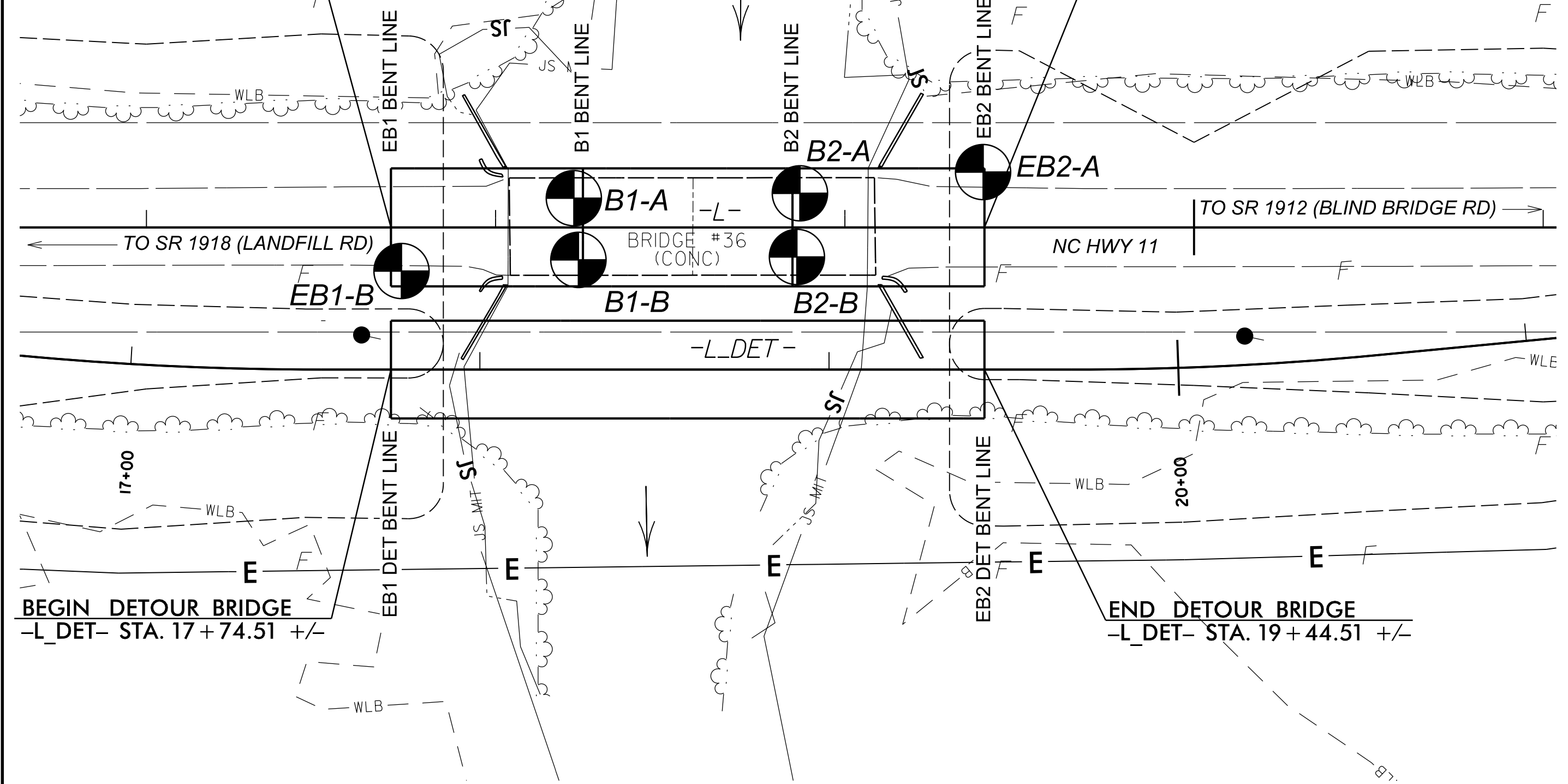
**BEGIN BRIDGE**  
-L- STA. 22+70.00 +/-

**END BRIDGE**  
-L- STA. 24+40.00 +/-

22+00

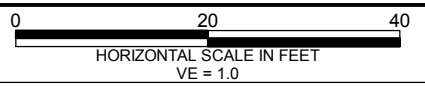
25+00

SKEW = 90°

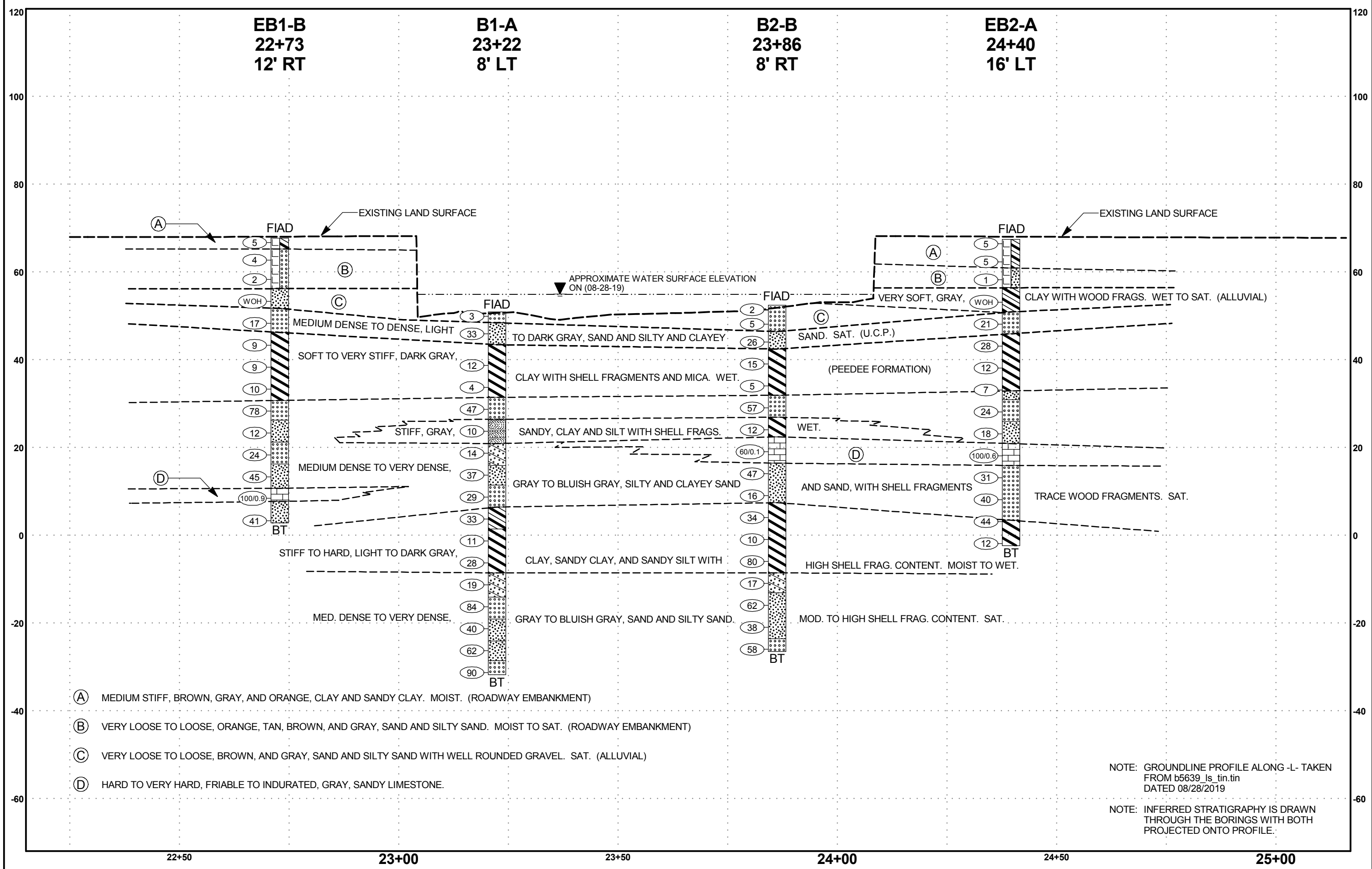


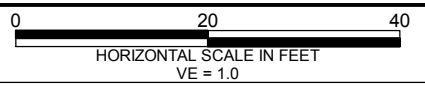
**BEGIN DETOUR BRIDGE**  
-L\_DET- STA. 17+74.51 +/-

**END DETOUR BRIDGE**  
-L\_DET- STA. 19+44.51 +/-

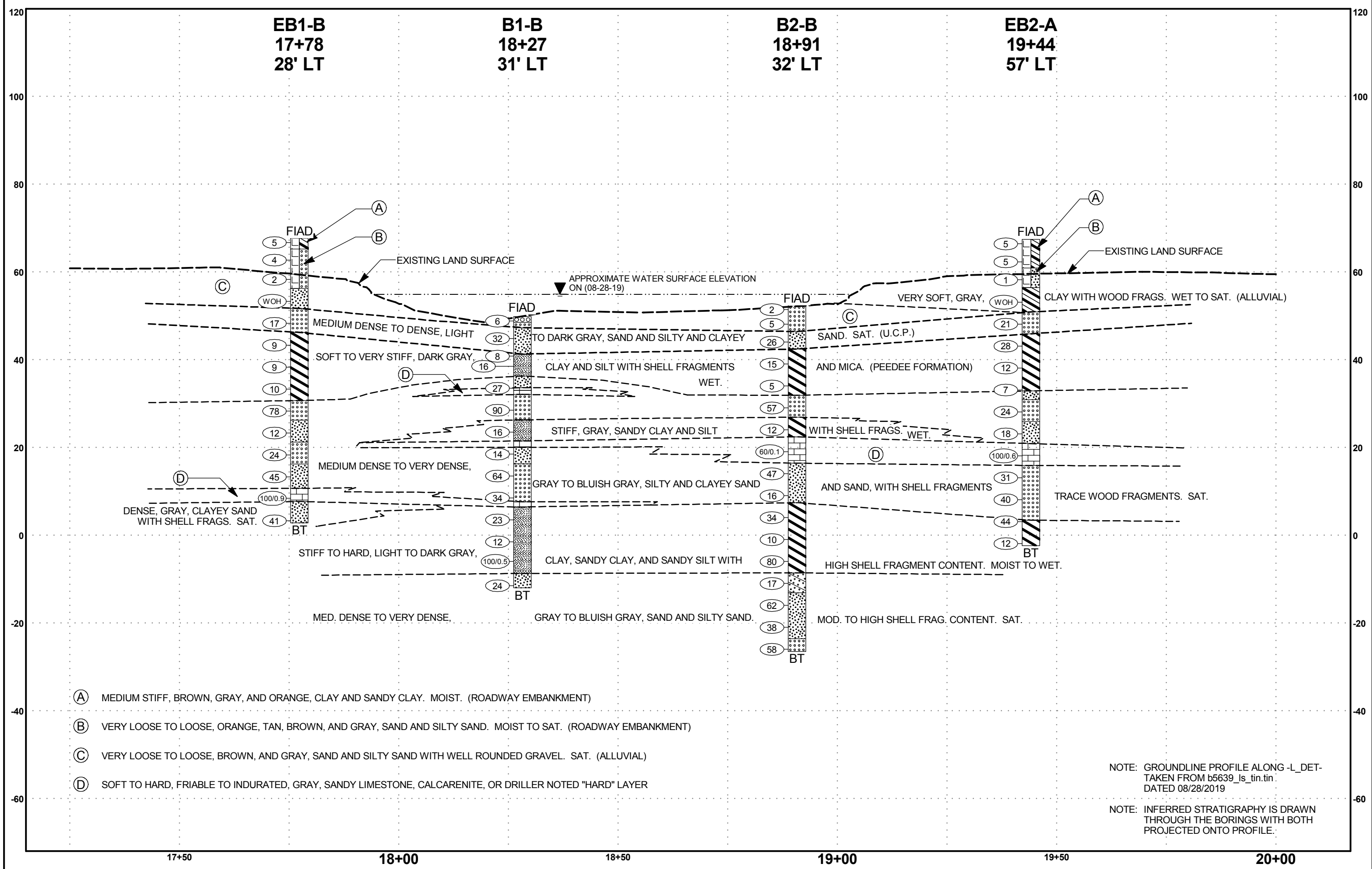


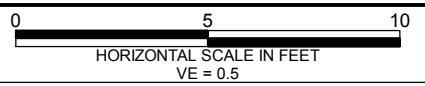
# PROFILE THROUGH BORINGS PROJECTED ALONG -L-



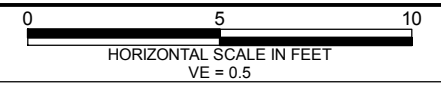
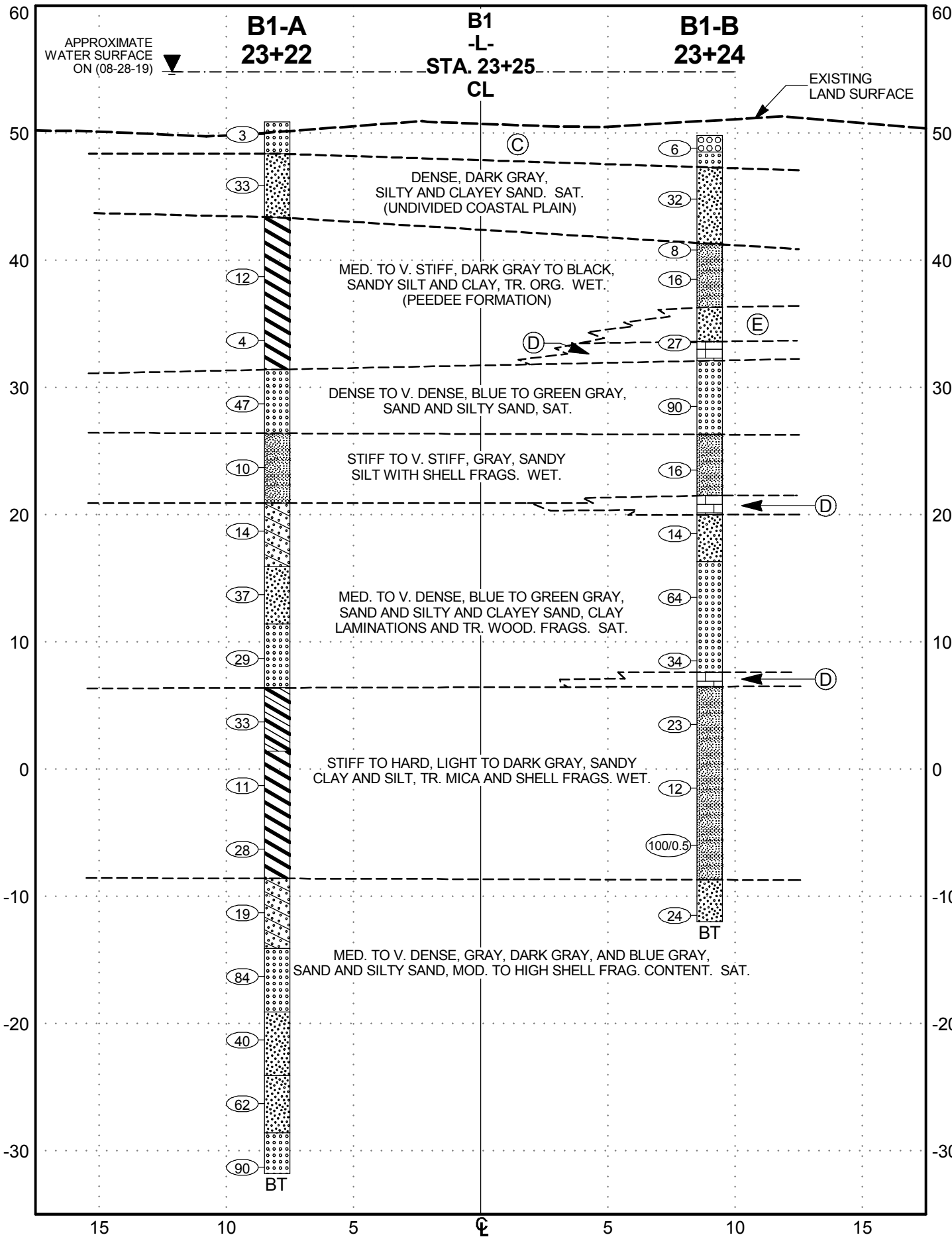


# PROFILE THROUGH BORINGS PROJECTED ALONG -L\_DET-

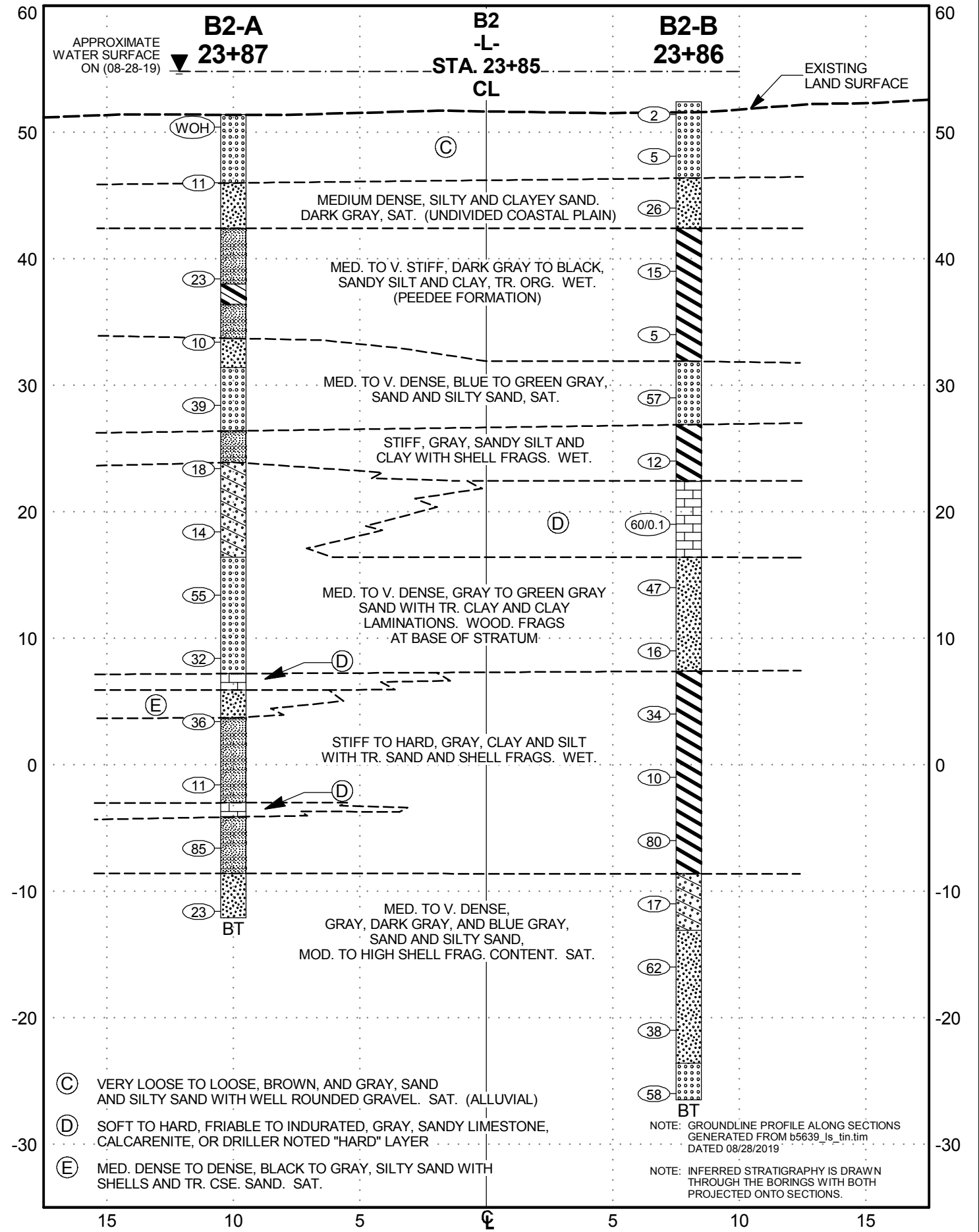
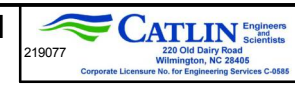




**CROSS SECTION  
BENT 1  
SKEW = 90°**



**CROSS SECTION  
BENT 2  
SKEW = 90°**



- (C) VERY LOOSE TO LOOSE, BROWN, AND GRAY, SAND AND SILTY SAND WITH WELL ROUNDED GRAVEL. SAT. (ALLUVIAL)
- (D) SOFT TO HARD, FRIABLE TO INDURATED, GRAY, SANDY LIMESTONE, CALCARENITE, OR DRILLER NOTED "HARD" LAYER
- (E) MED. DENSE TO DENSE, BLACK TO GRAY, SILTY SAND WITH SHELLS AND TR. CSE. SAND. SAT.

NOTE: GROUNDLINE PROFILE ALONG SECTIONS GENERATED FROM b5639\_Is\_tin.tim DATED 08/28/2019

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO SECTIONS.

# GEOTECHNICAL BORING REPORT BORE LOG

<b>WBS:</b> 45594.1.1		<b>TIP:</b> B-5639		<b>COUNTY:</b> DUPLIN		<b>GEOLOGIST:</b> C. FUTRAL	
<b>SITE DESCRIPTION:</b> BRIDGE NO. 36 ON -L- (US HWY 11) OVER MAXWELL CREEK AT -L- STATION 23+55							<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> EB1-B		<b>STATION:</b> 22+73		<b>OFFSET:</b> 12 ft RT		<b>ALIGNMENT:</b> -L-	
<b>COLLAR ELEV.:</b> 67.7 ft		<b>TOTAL DEPTH:</b> 64.9 ft		<b>NORTHING:</b> 408,391		<b>EASTING:</b> 2,309,945	
<b>DRILL RIG/HAMMER EFF./DATE:</b> CAT1303 CME-550 94% 09/26/2018				<b>DRILL METHOD:</b> Mud Rotary		<b>HAMMER TYPE:</b> AUTOMATIC	
<b>DRILLER:</b> D.T. Chalmers, Jr.		<b>START DATE:</b> 08/23/19		<b>COMP. DATE:</b> 08/23/19		<b>SURFACE WATER DEPTH:</b> N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. #	MOI	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
70																	
	67.7	0.0	2	3	2										67.7	GROUND SURFACE	0.0
65	63.7	4.0	2	2	2										65.2	ROADWAY EMBANKMENT BROWN TO ORANGE, CLAY ORANGE, TAN, AND BROWN, F. SAND	2.5
60	59.3	8.4	1	1	1												
55	54.3	13.4	WOH	WOH	WOH										56.2	ALLUVIAL BROWN, SILTY, F. SAND	11.5
50	49.3	18.4	3	9	8										51.7	UNDIVIDED COASTAL PLAIN LIGHT GRAY, F. SAND	16.0
45	44.3	23.4	5	5	4										46.2	COASTAL PLAIN DARK GRAY, SANDY CLAY AND CLAY, MICA AND WOOD FRAGS. AT BASE OF STRATUM (PEEDEE FORMATION)	21.5
40	39.3	28.4	5	5	4												
35	34.3	33.4	2	4	6												
30	29.3	38.4	24	33	45										30.7	GRAY AND OLIVE GREEN, F. AND CSE. SAND	37.0
25	24.3	43.4	4	5	7										26.2	GRAY, CLAYEY, F. SAND WITH HIGH SHELL FRAG. CONTENT	41.5
20	19.3	48.4	5	9	15										21.2	GRAY, F. AND CSE. SAND WITH HIGH SHELL FRAG. CONTENT AND TR. CLAY	46.5
15	14.3	53.4	11	16	29										16.2	GRAY, CLAYEY, F. AND CSE. SAND WITH SHELL FRAGS.	51.5
10	9.3	58.4	7	93/0.4											10.7	GRAY, SANDY LIMESTONE	57.0
5	4.3	63.4	9	17	24										7.7	GRAY, CLAYEY, F. AND CSE. SAND WITH SHELL FRAGS.	60.0
															2.8		64.9

NCDOT BORE DOUBLE: B5639\_GEO\_BRDG\_MAXWELL\_CATLIN.GPJ NCDOT\_CATLIN.GDT\_10/24/19





# GEOTECHNICAL BORING REPORT BORE LOG



<b>WBS:</b> 45594.1.1		<b>TIP:</b> B-5639		<b>COUNTY:</b> DUPLIN		<b>GEOLOGIST:</b> K. SWAIN	
<b>SITE DESCRIPTION:</b> BRIDGE NO. 36 ON -L- (US HWY 11) OVER MAXWELL CREEK AT -L- STATION 23+55							<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> B1-B		<b>STATION:</b> 23+24		<b>OFFSET:</b> 9 ft RT		<b>ALIGNMENT:</b> -L-	
<b>COLLAR ELEV.:</b> 49.8 ft		<b>TOTAL DEPTH:</b> 61.8 ft		<b>NORTHING:</b> 408,440		<b>EASTING:</b> 2,309,931	
<b>DRILL RIG/HAMMER EFF./DATE:</b> CAT4425 CME-55 87% 01/16/2019				<b>DRILL METHOD:</b> Mud Rotary		<b>HAMMER TYPE:</b> AUTOMATIC	
<b>DRILLER:</b> J. EDMONDSON		<b>START DATE:</b> 10/03/19		<b>COMP. DATE:</b> 10/03/19		<b>SURFACE WATER DEPTH:</b> 5.7ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. # RESULT	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
55															
50	49.8	0.0	2	3	3										
45	45.8	4.0	12	14	18										
40	41.8	8.0	3	3	5										
35	39.5	10.3	7	8	8										
30	34.5	15.3	4	10	17										
25	29.5	20.3	10	17	73										
20	24.5	25.3	5	6	10										
15	19.5	30.3	4	5	9										
10	14.5	35.3	22	29	35										
5	9.5	40.3	10	15	19										
0	4.5	45.3	10	9	14										
-5	-0.5	50.3	4	5	7										
-10	-5.5	55.3	100/0.5												
	-10.5	60.3	6	8	16										

<b>WBS:</b> 45594.1.1		<b>TIP:</b> B-5639		<b>COUNTY:</b> DUPLIN		<b>GEOLOGIST:</b> K. SWAIN	
<b>SITE DESCRIPTION:</b> BRIDGE NO. 36 ON -L- (US HWY 11) OVER MAXWELL CREEK AT -L- STATION 23+55							<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> B2-A		<b>STATION:</b> 23+87		<b>OFFSET:</b> 10 ft LT		<b>ALIGNMENT:</b> -L-	
<b>COLLAR ELEV.:</b> 51.4 ft		<b>TOTAL DEPTH:</b> 63.5 ft		<b>NORTHING:</b> 408,498		<b>EASTING:</b> 2,309,899	
<b>DRILL RIG/HAMMER EFF./DATE:</b> CAT4425 CME-55 87% 01/16/2019				<b>DRILL METHOD:</b> Mud Rotary		<b>HAMMER TYPE:</b> AUTOMATIC	
<b>DRILLER:</b> J. EDMONDSON		<b>START DATE:</b> 10/02/19		<b>COMP. DATE:</b> 10/02/19		<b>SURFACE WATER DEPTH:</b> 4.1ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. # RESULT	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
55															
50	51.4	0.0													
45	47.0	4.4	1	6	5										
40	39.4	12.0	10	12	11										
35	34.4	17.0	2	3	7										
30	29.4	22.0	13	19	20										
25	24.4	27.0	5	7	11										
20	19.4	32.0	4	5	9										
15	14.4	37.0	16	26	29										
10	9.4	42.0	18	17	15										
5	4.4	47.0	13	16	20										
0	-0.6	52.0	4	5	6										
-5	-5.6	57.0	62	54	31										
-10	-10.6	62.0	5	9	14										

NCDOI BORE DOUBLE: B5639\_GEO\_BRDG\_MAXWELL\_CATLIN\_GPI\_NGDOT\_CATLIN\_GDT\_10/25/19







BRIDGE NO. 36 ON US 11 OVER MAXWELL CREEK



BRIDGE NO. 36 DETOUR OVER MAXWELL CREEK

NOTES: SITE PHOTOS OBTAINED FROM BRIDGE SCOUR REPORTS  
300036\_2019\_B5639\_MaxwellCreek\_US11.pdf AND  
300036\_2019\_B5639DET\_MaxwellCreek\_US11.pdf  
PROVIDED BY NCDOT