

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5809	1	33

CONTENTS

LINE	STATION	PLAN
-L-	10+17-46+00	4-6
-RPA-	10+00-14+70	4
-RPB-	10+58-13+93	4
-RPC-	10+25-13+27	4
-RPD-	10+00-12+50	4
-Y-	10+00-13+30	4
-Y1-	10+00-11+96	5
-Y2-	10+70-14+97	5
-Y3-	10+00-14+15	5
-Y4-	10+50-15+78	6
-Y5-	10+00-15+00	6

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	15+00-44+00	7-12
-RPA-	12+50	13
-RPB-	12+00	13
-RPC-	11+95	14
-Y2-	13+50	14
-Y3-	12+00	14
-Y4-	13+85-15+00	15
-Y5-	11+00	16

APPENDICES

APPENDIX	TITLE	SHEETS
A	LABORATORY TEST RESULTS	17-18
B	DCP & DUAL MASS DCP DATA SHEETS	19-30

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY YADKIN
PROJECT DESCRIPTION US 601 FROM SR 1742
(SHARON DR) TO SR 1146 (LEE AVENUE)

INVENTORY

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 TOTT-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:

- 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.
- 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

K. CUTHBERTSON

INVESTIGATED BY ECS SOUTHEAST, LLP

DRAWN BY M. BREWER, P.E.

CHECKED BY M. WALKO, P.E.

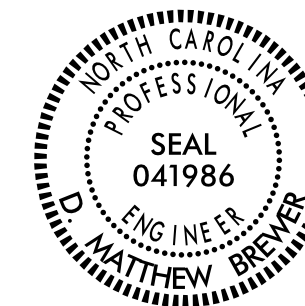
SUBMITTED BY ECS SOUTHEAST, LLP

DATE SEPTEMBER 2018

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SIGNATURE

9/14/18

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

REFERENCE: U-5809

PROJECT: 44382

**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, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</p>	<p>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. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p> <p style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p> <p style="text-align: center;">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</p> <p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <table border="1" style="width: 100%; font-size: small;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>> 10%</td> <td>> 20%</td> <td>HIGHLY</td> </tr> <tr> <td></td> <td></td> <td></td> <td>35% AND ABOVE</td> </tr> </table>	ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	> 10%	> 20%	HIGHLY				35% AND ABOVE	<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>WEATHERED ROCK (WR) - NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p> <p>CRYSTALLINE ROCK (CR) - FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p>NON-CRYSTALLINE ROCK (NCR) - FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP) - COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p> <p style="text-align: center;">WEATHERING</p> <p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SLI.) - ROCK GENERALLY 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.</p> <p>SLIGHT (SLI.) - 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.</p> <p>MODERATE (MOD.) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN 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 WITH FRESH ROCK.</p> <p>MODERATELY SEVERE (MOD. SEV.) - 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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>SEVERE (SEV.) - 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. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i></p> <p>VERY SEVERE (V SEV.) - 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. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i></p> <p>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 ALSO AN EXAMPLE.</p> <p style="text-align: center;">ROCK HARDNESS</p> <p>VERY HARD - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>MODERATELY HARD - CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p> <p>MEDIUM HARD - CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO FEEL 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>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 PIECES CAN BE BROKEN BY FINGER PRESSURE.</p> <p>VERY SOFT - CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</p>	<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>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.</p> <p>ARTESIAN - 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.</p> <p>CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>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.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MDT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>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 RUN AND EXPRESSED AS A PERCENTAGE.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>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.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (IN 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.</p> <p>STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>STRATA ROCK QUALITY DESIGNATION (SRQD) - 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.</p> <p>TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p> <p>BENCH MARK: N/A</p> <p style="text-align: right;">ELEVATION: FEET</p> <p>NOTES: SURVEY AND ROADWAY FILES PROVIDED BY TGS ENGINEERS</p>																																																																																																																																																																																																																																																																													
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GRAVEL, AND SAND</td><td>FINE SAND</td><td>SILTY OR CLAYEY GRAVEL AND SAND</td><td>SILTY</td><td>CLAYEY SOILS</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> </tr> <tr> <th>GEN. RATING AS SUBGRADE</th> <td colspan="7">EXCELLENT TO GOOD</td><td colspan="7">FAIR TO POOR</td><td>FAIR TO POOR</td><td>POOR</td><td>UNSUITABLE</td> <td></td><td></td><td></td><td></td> </tr> </table> <p style="text-align: center; font-size: x-small;">PI OF A-7.5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7.6 SUBGROUP IS > LL - 30</p>	GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)							ORGANIC MATERIALS			A-1	A-3	A-2	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	A-7.5	A-7.6	A-1, A-2	A-3	A-4, A-5	A-6, A-7	GROUP CLASS.	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TIP PROJECT: U-5809

CONTRACT:

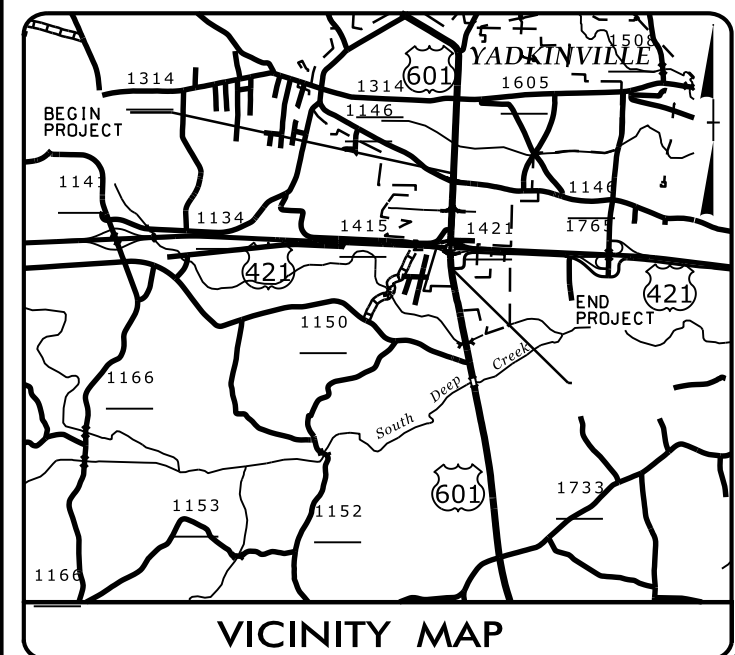
See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Plan Sheet Symbols

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

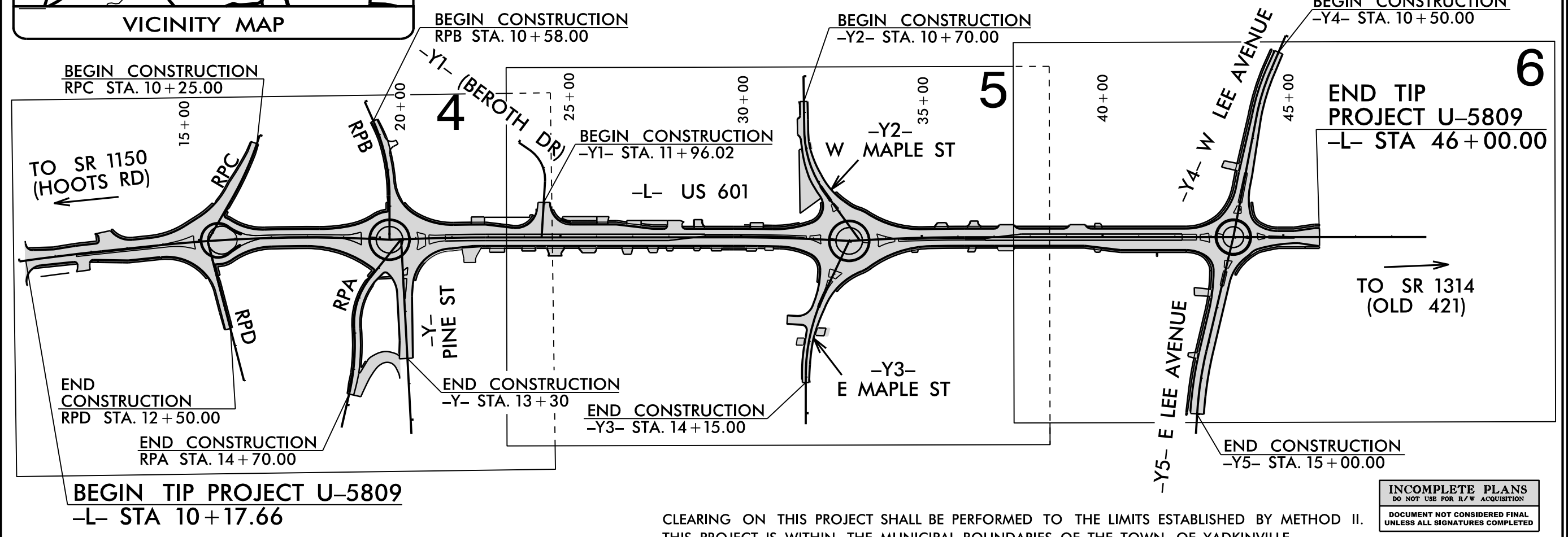
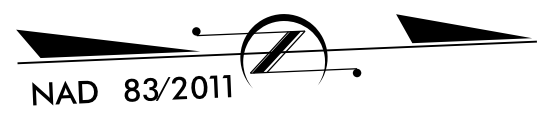
YADKIN COUNTY

LOCATION: US 601 FROM SR 1742 (SHARON DR) TO SR 1146 (LEE AVENUE)
TYPE OF WORK: GRADING, DRAINAGE, PAVING, CURB AND GUTTER, AND SIGNALS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5809	1	33
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
44382.1.1	N/A	PE	

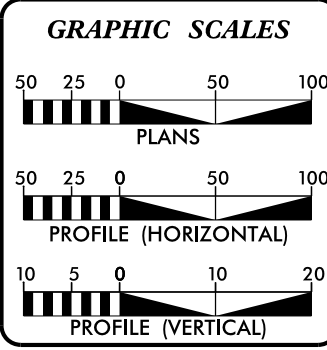


25% PLAN SUBMITTAL



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF YADKINVILLE.



DESIGN DATA

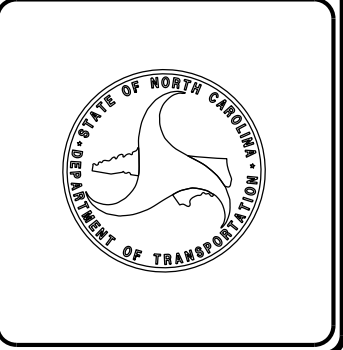
ADT 2017 =	18,000
ADT 2040 =	20,200
K =	7 %
D =	55 %
T =	4 % *
V =	40 MPH
* TTST = 2% DUAL = 2%	
FUNC CLASS =	MINOR ARTERIAL REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5809	=	0.678 MILES
TOTAL LENGTH TIP PROJECT U-5809	=	0.678 MILES

NCDOT CONTACT: RAMIE SHAW	
PLANS PREPARED BY:	PLANS PREPARED FOR:
TGS ENGINEERS 804-C N. LAFAYETTE ST SHELBY, NC 28150 PH 17041 476-0003 CORP. LICENSE NO. C-0275	NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION 11 801 Stokesville Rd North Wilkesboro, NC 28659
RIGHT OF WAY DATE: DECEMBER 2018	JIMMY L. TERRY, PE PROJECT ENGINEER
LETTING DATE: JUNE 2020	SANDRA G. MELVIN PROJECT DESIGN ENGINEER
2018 STANDARD SPECIFICATIONS	

HYDRAULICS ENGINEER	
SIGNATURE: _____	P.E.
ROADWAY DESIGN ENGINEER	
SIGNATURE: _____	P.E.





ECS Southeast, LLP

1812 Center Park Drive, Suite D
Charlotte, NC 28217
T 704.525.5152 | F 704.357.0023
www.ecslimited.com

September 14, 2018

WBS NO: 44382.1.1
TIP NO: U-5809
F.A. NUMBER: N/A
COUNTY: Yadkin
DESCRIPTION: US 601 from SR 1742 (Sharon Drive) to SR 1146 (Lee Avenue)

SUBJECT: Geotechnical Report – Inventory

Project Description

The project corridor runs along US 601 between SR 1742 (Sharon Drive) and SR 1146 (Lee Avenue) in Yadkinville, North Carolina. The project also includes the interchange of US 601 and US 421, and the intersections of US 601 with Pine Street, Beroth Drive, Maple Street, and Lee Avenue. We understand improvements to project corridor will consist of the addition of four (4) roundabouts with lane widening and associated sidewalk, curb, and gutter.

The following roads are included as part of this exploration:

<u>Line</u>	<u>Road Name</u>	<u>Station (±)</u>	<u>Offsets</u>
-L-	us 601	10+17 to 46+00	LT to RT
-RPA-	Ramp: US 421 WB to US 601 NB	10+00 to 14+70	LT to RT
-RPB-	Ramp: US 601 SB to US 421 WB	10+58 to 13+93	LT to RT
-RPC-	Ramp: US 421 EB to US 601 SB	10+25 to 13+27	LT to RT
-RDP-	Ramp: US 601 NB to US 421 EB	10+00 to 12+50	LT to RT
-Y-	Pine Street	10+00 to 13+30	LT to RT
-Y1-	Beroth Drive	10+00 to 11+96	LT to RT
-Y2-	W. Maple Street	10+70 to 14+97	LT to RT
-Y3-	E. Maple Street	10+00 to 14+15	LT to RT
-Y4-	W. Lee Avenue	10+50 to 15+78	LT to RT
-Y5-	E. Lee Avenue	10+00 to 15+00	LT to RT

A geotechnical field investigation was performed by ECS between August 9 and August 20, 2018. During this time period, a total of twenty-one (21) Hand Auger (HA) borings (7 pavement borings, 12 roadway

borings, and 2 retaining wall borings) were advanced with a hand auger. Hand auger DCP testing and Kessler DCP testing was performed in general accordance with applicable ASTM standards. Representative soil samples were collected for visual classification in the field and for analysis by ECS's testing laboratory.

Site Description

The project corridor is comprised mainly of residential and commercial properties. The project is centered around the interchange of US 601 and US 421. At approximate Stations 14+23 -L-, 20+27 -L-, 32+98 -L-, and 43+61 -L- roundabouts will be constructed at the intersections with the various Y lines and ramps. Roadway improvements between Sharon Drive and Lee Avenue will be constructed along US 601.

The road elevations along the various alignments are generally sloping and range from approximately 898 to 967 feet. Soils encountered in the proposed widened areas generally consisted of surficial organic materials underlain by roadway embankment and residual soils. Based on the Roadway Plans provided to us by TGS Engineers, a majority of the new construction and widening will occur along -L- and at the roundabout locations. Mass grading will generally be limited to the existing shoulders and new pavement areas with cut and fill depths on the order of approximately 4 feet or less.

Areas of Special Geotechnical Interest

1) Artificial Fill: The following areas encountered artificial fill. Artificial fill poses risks associated with undetected deleterious inclusions or soft zones within the fill and/or deleterious materials at the virgin ground/fill interface.

<u>Line</u>	<u>Station (±)</u>	<u>Offsets</u>
-L-	39+50 to 41+50	RT

2) High Plasticity Soils: The following areas contain high plasticity soils with plasticity indices (PI's) in excess of 25. These soils have the potential to cause subgrade problems during construction, embankment stability or long term settlement problems:

<u>Line</u>	<u>Station (±)</u>	<u>Offsets</u>
-L-	43+50 to 44+50	LT to RT
-Y4-	13+00 to 14+50	LT to RT

- 3) **Wet or Saturated Soils:** The field exploration did not encounter soils with natural moisture contents in excess of the liquid limit or soils below the ground water table. During the field exploration, soils were labeled as wet at the following locations:

<u>Line</u>	<u>Station (±)</u>	<u>Offsets</u>
-L	15+50 to 16+50	RT
-L-	18+50 to 20+50	LT to RT
-L-	25+50 to 27+50	LT to RT
-L-	31+00 to 34+50	LT to RT
-L-	39+50 to 45+00	LT to RT
-RPA-	12+00 to 13+00	LT to RT
-RPC-	11+50 to 12+50	LT to RT
-Y2-	13+00 to 14+00	LT to RT
-Y3-	11+50 to 12+50	LT to RT
-Y4-	14+50 to 15+50	LT to RT

- 4) **Soft/Very Loose Soils:** The following areas contain relatively soft or very loose soils that have the potential for subgrade problems, embankment stability or long-term settlement problems during construction:

<u>Line</u>	<u>Station (±)</u>	<u>Offsets</u>
-L-	32+50 to 34+50	Lt to RT
-L-	40+00 to 43+00	RT
-Y4-	14+50 to 15+00	LT to RT
-Y5-	10+50 to 11+50	LT to RT

- 5) **Shallow Groundwater:** Shallow groundwater was not encountered within six feet of the proposed subgrade elevation at the locations explored on the project.

- 6) **Organic Soil:** Soils with little organic content with organic soil thicknesses in excess of 0.3 feet were not encountered at the locations explored on the project.

Physiography and Geology

The site is located in the Piedmont Province of North Carolina. According the Geological Map of North Carolina, 1985, the parent bedrock in this area is in the Cambrian/Late Proterozoic geologic age consisting primarily of Metagraywacke (CZma2). The parent bedrock was not encountered at the locations and depths explored on the project. The virgin soils encountered are the residual product of in-place chemical weathering of rock that was similar to the rock presently underlying the site.

In general, the topography along a majority of the corridor is sloping. Soils encountered in the project corridor generally consisted of roadway embankment soils underlain by residual soils.

Soil Properties

The subsurface conditions discussed below represent the subsurface conditions based on interpretation of the boring data using normally accepted geotechnical engineering judgments. The transitions between different soil strata are usually less distinct than those shown on the Borelogs. Sometimes the relatively small sample obtained in the field is insufficient to definitively describe the origin of the subsurface material. Although individual soil test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times.

Soils within the area of this project have been divided into four categories: pavement, artificial fill, roadway embankment and residual soils.

Pavement: A summary of the pavement sections encountered in the pavement core borings is listed below.

<u>Line</u>	<u>Station (±)</u>	<u>Offset</u>	<u>Asphalt Thickness (in)</u>	<u>ABC Thickness (in)</u>
-L-	15+00	15' RT	9	12
-L-	17+50	15' LT	11	10
-L-	19+61	13' RT	9	12
-L-	26+50	15' LT	12	3
-L-	32+00	15' RT	6.5	12
-L-	38+00	15' LT	6.5	9
-L-	44+00	15' RT	6.5	9

Artificial Fill: The artificial fill encountered generally consisted of soft, wet, sandy silt (A-4) and extends to a depth of approximately 1.0 foot below existing ground.

Roadway Embankment: The roadway embankment encountered generally consisted of loose, moist to wet, silty sand and clayey sand (A-2-4 and A-2-6), medium stiff to very stiff, moist to wet, fine sandy silt (A-4) and soft to stiff, moist to wet, moderately plastic silty clay (A-7-5/6) and was encountered at depths up to 6.0 feet below existing ground. Laboratory testing of the roadway embankment soils indicated a PI of 20.

Residual Soils: Residual soils throughout the project corridor are derived from the weathering of the underlying parent bedrock. A majority of the residual soils encountered generally consisted of very loose to medium dense, moist to wet, silty sand and clayey sand (A-2-4 and A-2-6), medium stiff to very stiff,

moist, sandy silt (A-4), stiff, wet, sandy clay (A-6), and medium stiff, moist, moderately to highly plastic silty clay (A-7-5 & A-7-6). Laboratory testing indicated PI's ranging from 20 to 32 for the A-7-5 and A-7-6 soils.

Groundwater Properties

Groundwater levels were measured in the borings both immediately after augering and, where applicable, after a stabilization period of at least 24 hours. At the time of drilling, ground water was not encountered in any of the borings. For safety reasons, several of the borings located in or in close proximity to the roadway were backfilled immediately after augering making stabilized water readings unobtainable.

No geotechnical profiles will be included as part of this inventory report.

Respectively submitted,



DocuSigned by:
D. Matthew Brewer
0EAF318632CF43A...
D. Matthew Brewer, P.E.
Senior Project Engineer
N.C. Registration No. 041986

DocuSigned by:
Michael J. Walko
99589EECD3814D9...
Michael J. Walko, P.E.
Principal Engineer

PROJECT REFERENCE NO. U-5809		SHEET NO. 4	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
TGS ENGINEERS 804-C N. LAFAYETTE ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275			

BEGIN TIP PROJECT U-5809
-L- STA 10+17.66

YADKINVILLE INVESTMENTS, LLC
ROCK HILL LAND & DEVELOPMENT, LLC
DB 829 PG 380

ARC SBYKLNCOOL, LLC
DB 1085 PG 125

-L- POC 15+23.65 =
RPC POT 13+27.64 =
RPD POT 10+00.00

STARWOOD INVESTMENTS
DB 358 PG 839

ROBERT A. GEIST
DB 295 PG 613

RPC PT 11+95.74

RPC.HA.1173R

BEGIN CONSTRUCTION
RPB STA 10+58.00

BEGIN CONSTRUCTION
RPC STA 10+25.00

RPB PC 10+63.09

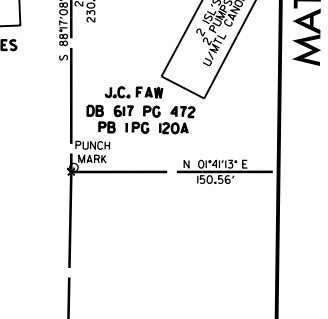
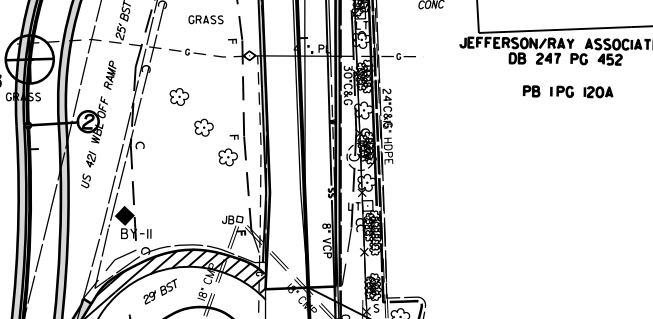
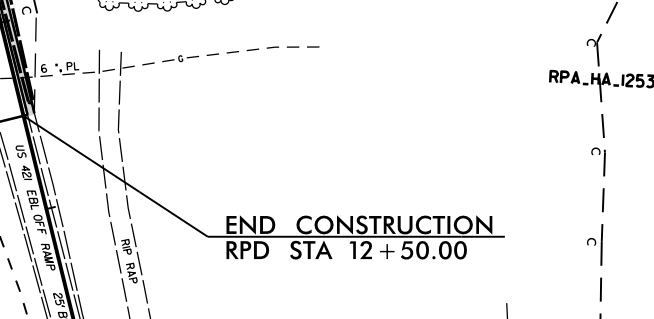
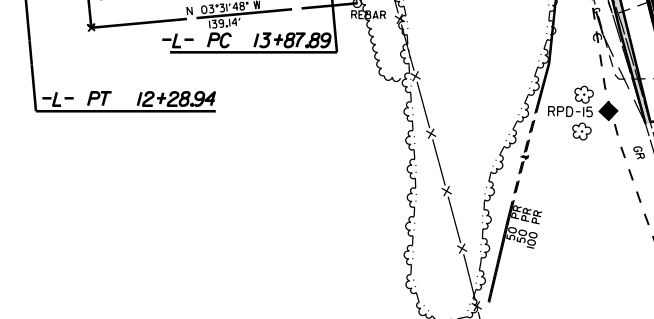
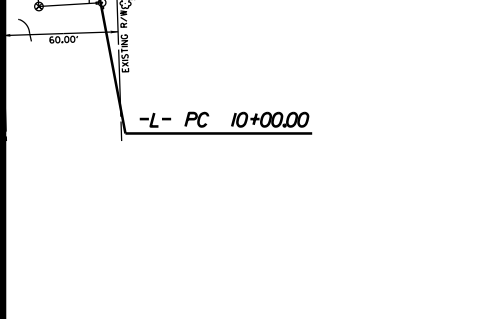
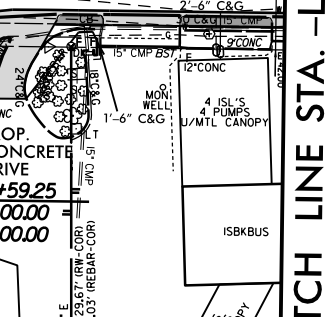
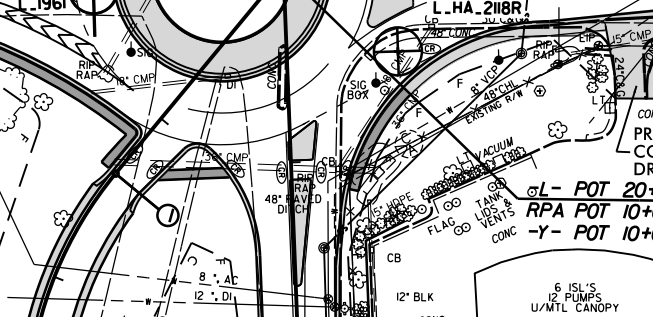
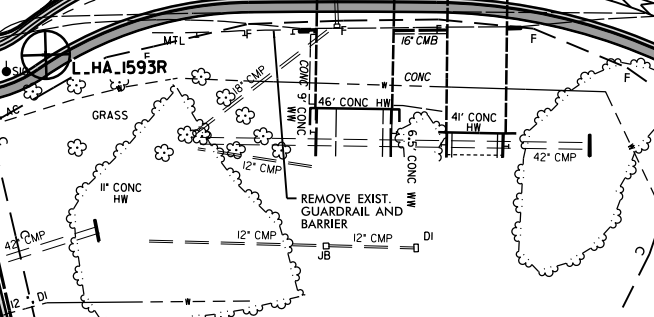
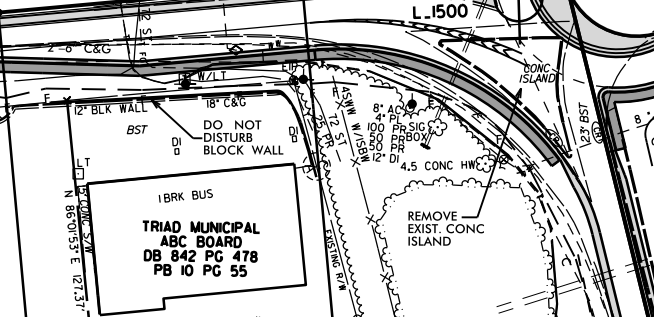
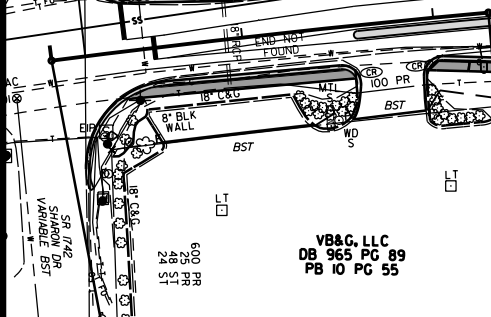
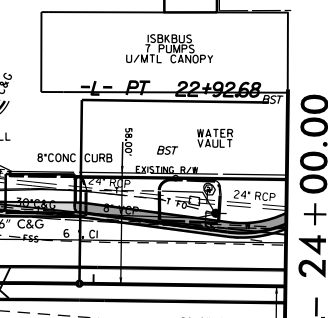
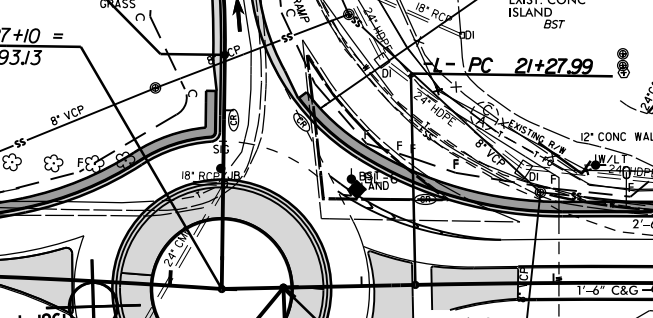
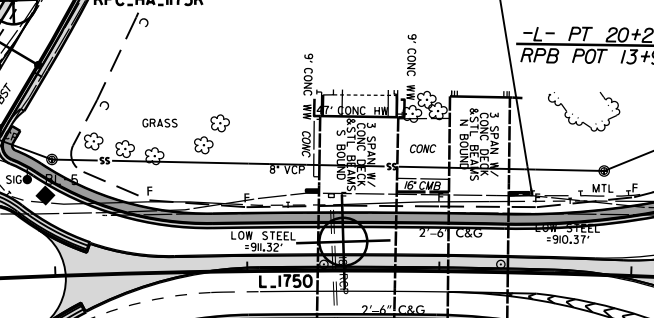
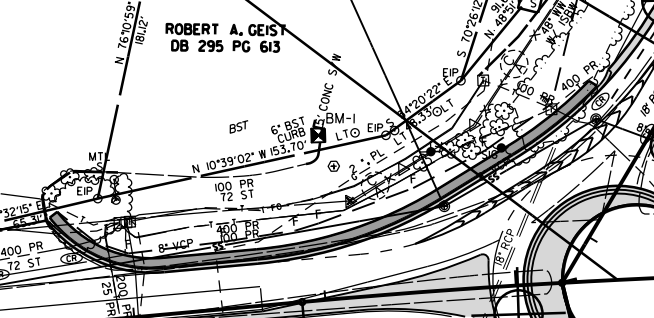
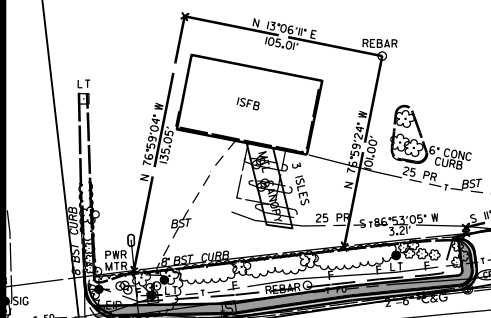
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-L- PT 20+27+10 =
RPB POT 13+93.13

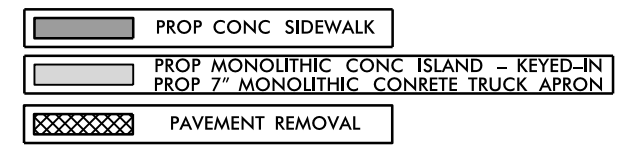
JANO CAPITAL
DB 465 PG 424
TOWN OF YADKINVILLE
DB 104 PG 763

BEROTH OIL COMPANY
DB 39 PG 33
DB 26 PG 444
PB 1PG 120C

-L- PT 22+92.68




- NOTES:**
1. UNLESS OTHERWISE NOTED ALL DRIVES ARE ASPHALT DRIVES.
 2. UNLESS OTHERWISE NOTED ALL CHANNELIZATION CURB IS 8" X 12" CONCRETE CURB. SEE DETAIL SHEET 2B- FOR LAYOUT.
 3. FOR CURVE DATA SEE DETAIL SHEET 2B-1
 4. SEE DETAIL SHEETS 2B- THRU 2B- FOR ROUNDABOUT LAYOUTS.

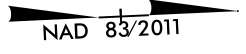


MATCH LINE STA. -L- 24+00.00
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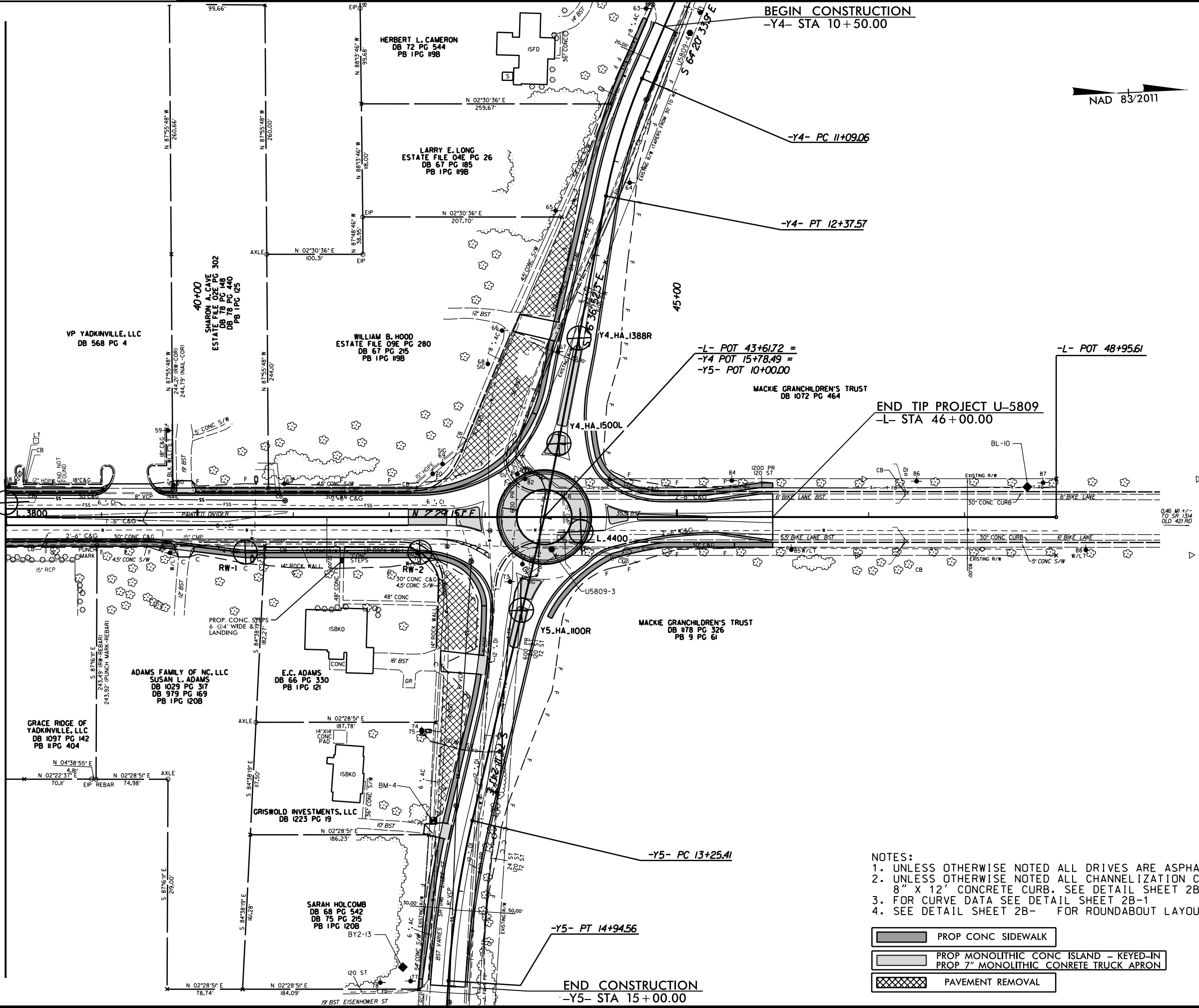
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PROJECT REFERENCE NO. U-5809	SHEET NO. 6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 TGS ENGINEERS 804-C N. LAFAYETTE ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	






REVISIONS
 14-SEP-2018, 11:33 AM
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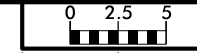
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 MATCH TO SHEET NO. 5



- NOTES:**
1. UNLESS OTHERWISE NOTED ALL DRIVES ARE ASPHALT DRIVES.
 2. UNLESS OTHERWISE NOTED ALL CHANNELIZATION CURB IS 8" X 12' CONCRETE CURB. SEE DETAIL SHEET 2B- FOR LAYOUT.
 3. FOR CURVE DATA SEE DETAIL SHEET 2B-1
 4. SEE DETAIL SHEET 2B- FOR ROUNDABOUT LAYOUT.

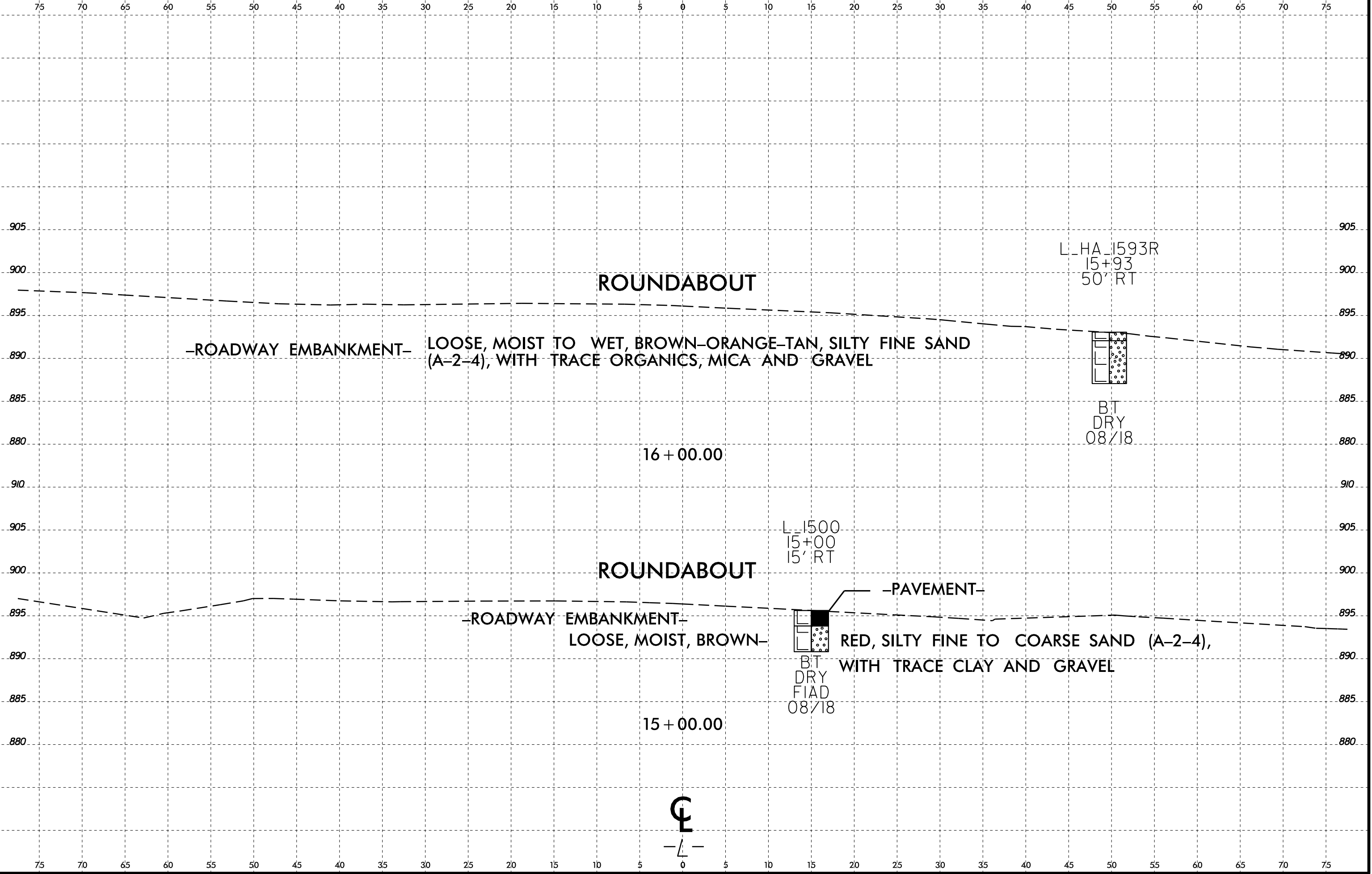
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	PROP MONOLITHIC CONC ISLAND - KEYED-IN PROP 7" MONOLITHIC CONCRETE TRUCK APRON
	PAVEMENT REMOVAL

6/23/16



PROJ. REFERENCE NO.
U-5809

SHEET NO.
7

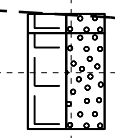


ROUNDABOUT

-ROADWAY EMBANKMENT-

LOOSE, MOIST TO WET, BROWN-ORANGE-TAN, SILTY FINE SAND (A-2-4), WITH TRACE ORGANICS, MICA AND GRAVEL

L_HA_1593R
15+93
50' RT



BT
DRY
08/18

16 + 00.00

ROUNDABOUT

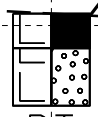
-ROADWAY EMBANKMENT-

LOOSE, MOIST, BROWN-

-PAVEMENT-

RED, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE CLAY AND GRAVEL

L_1500
15+00
15' RT



BT
DRY
FIAD
08/18

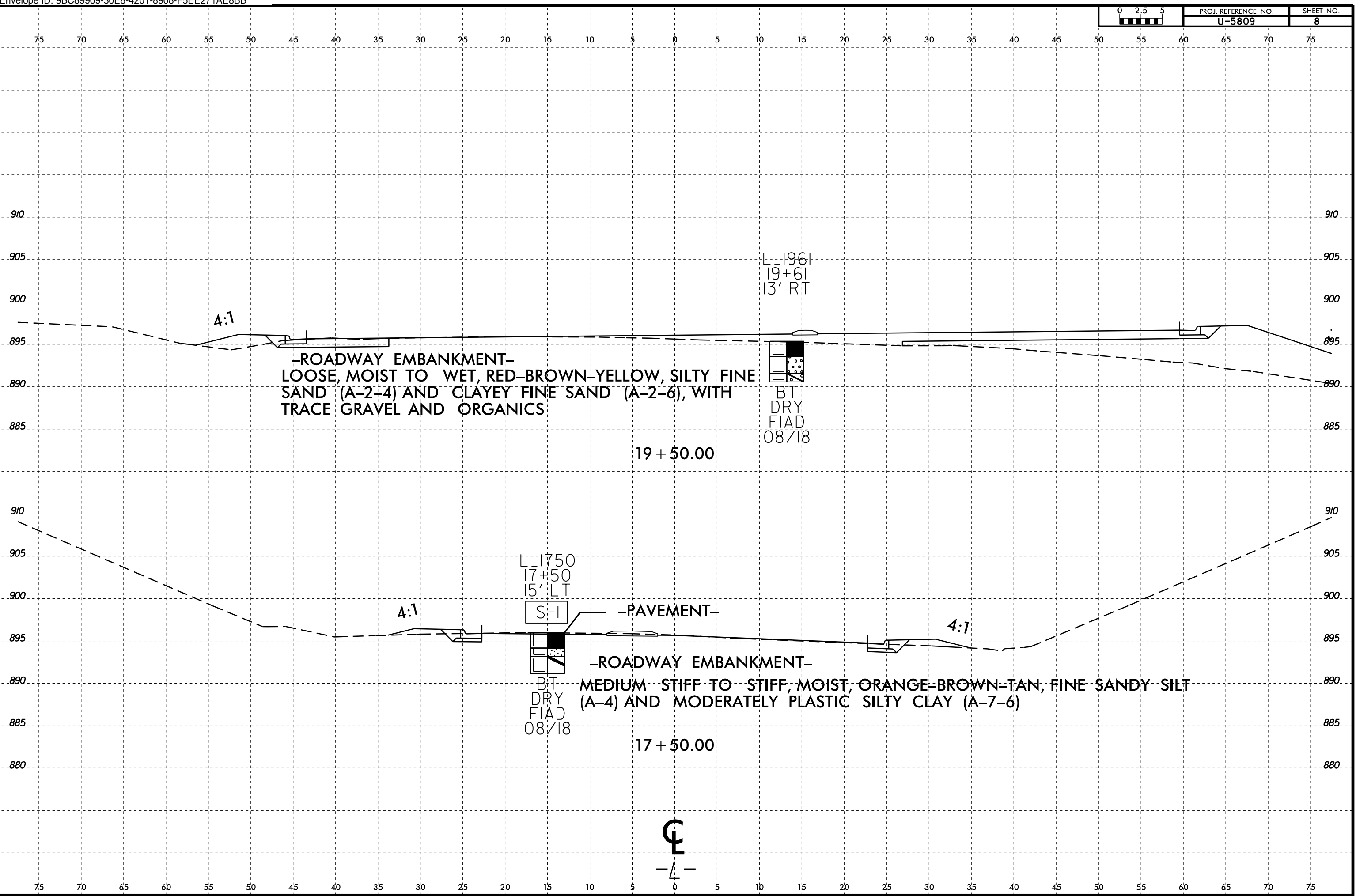
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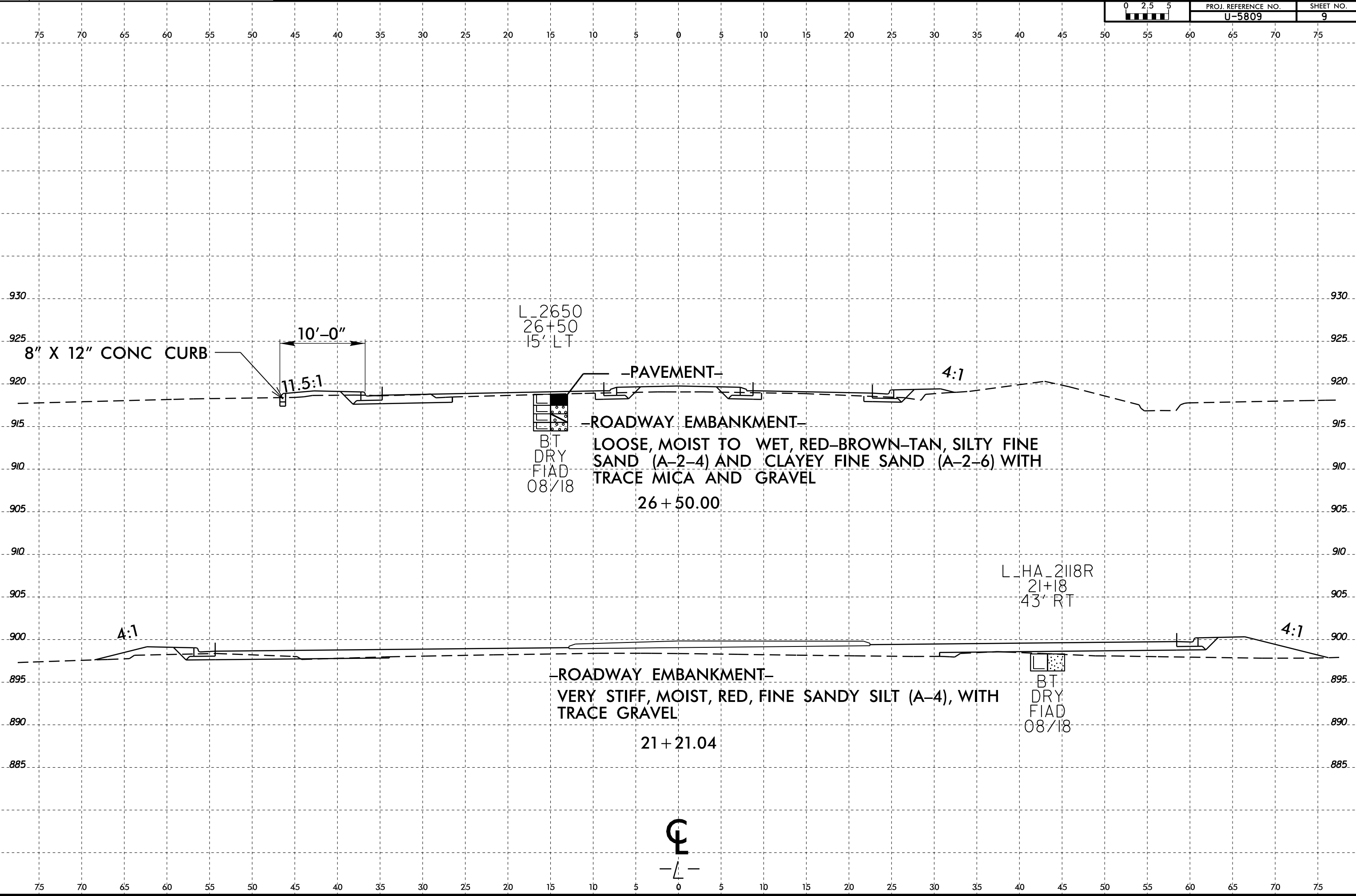
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930 925 920 915 910 905 900 895 890 885

8" X 12" CONC CURB

10'-0"
11.5:1

L_2650
26+50
15' LT

BT
DRY
FIAD
08/18

-PAVEMENT-

-ROADWAY EMBANKMENT-

LOOSE, MOIST TO WET, RED-BROWN-TAN, SILTY FINE SAND (A-2-4) AND CLAYEY FINE SAND (A-2-6) WITH TRACE MICA AND GRAVEL

26 + 50.00

4:1

L_HA_2118R
21+18
43' RT

BT
DRY
FIAD
08/18

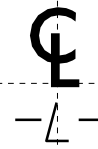
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21 + 21.04

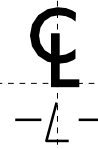
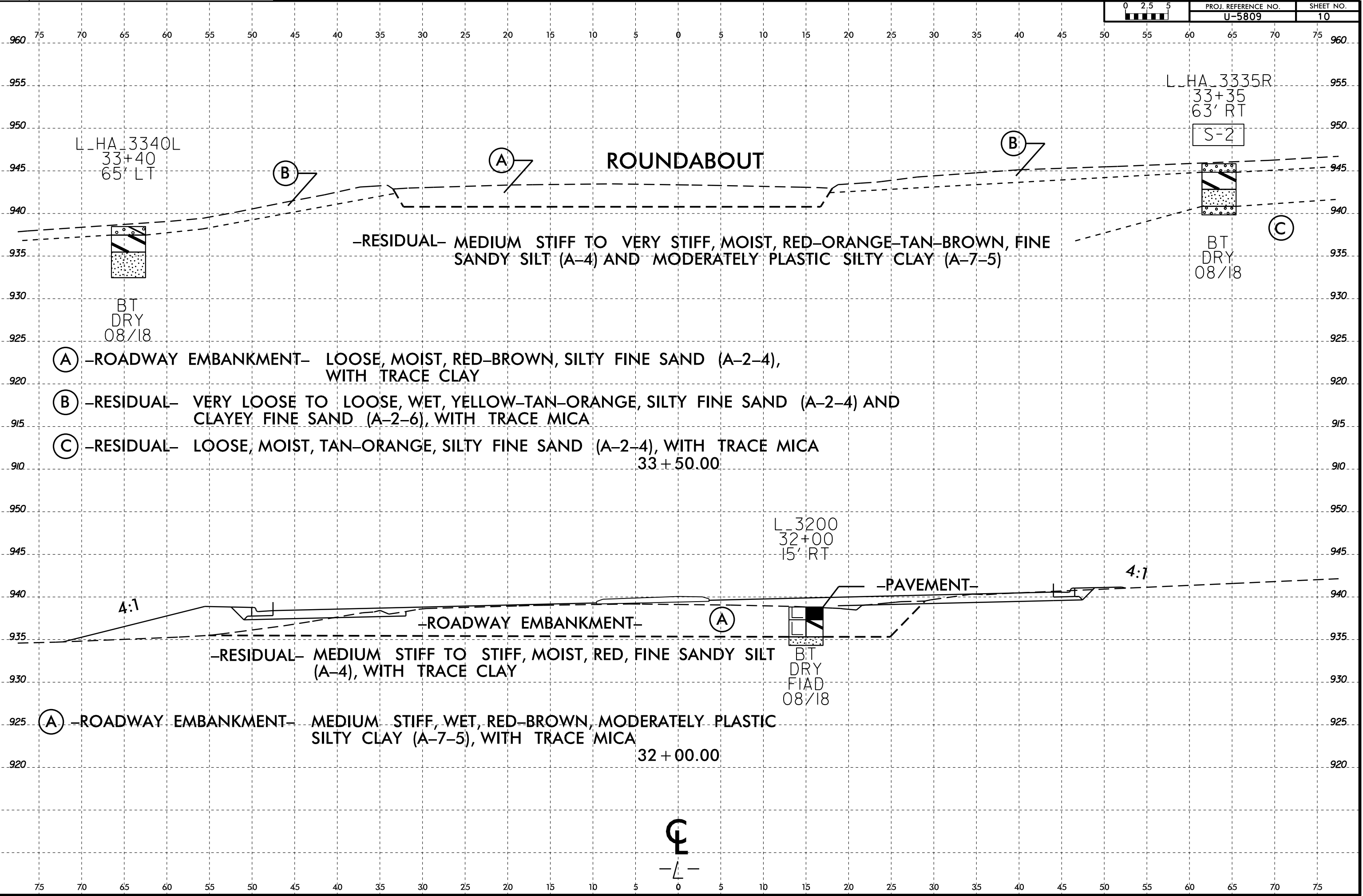
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4:1

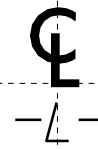
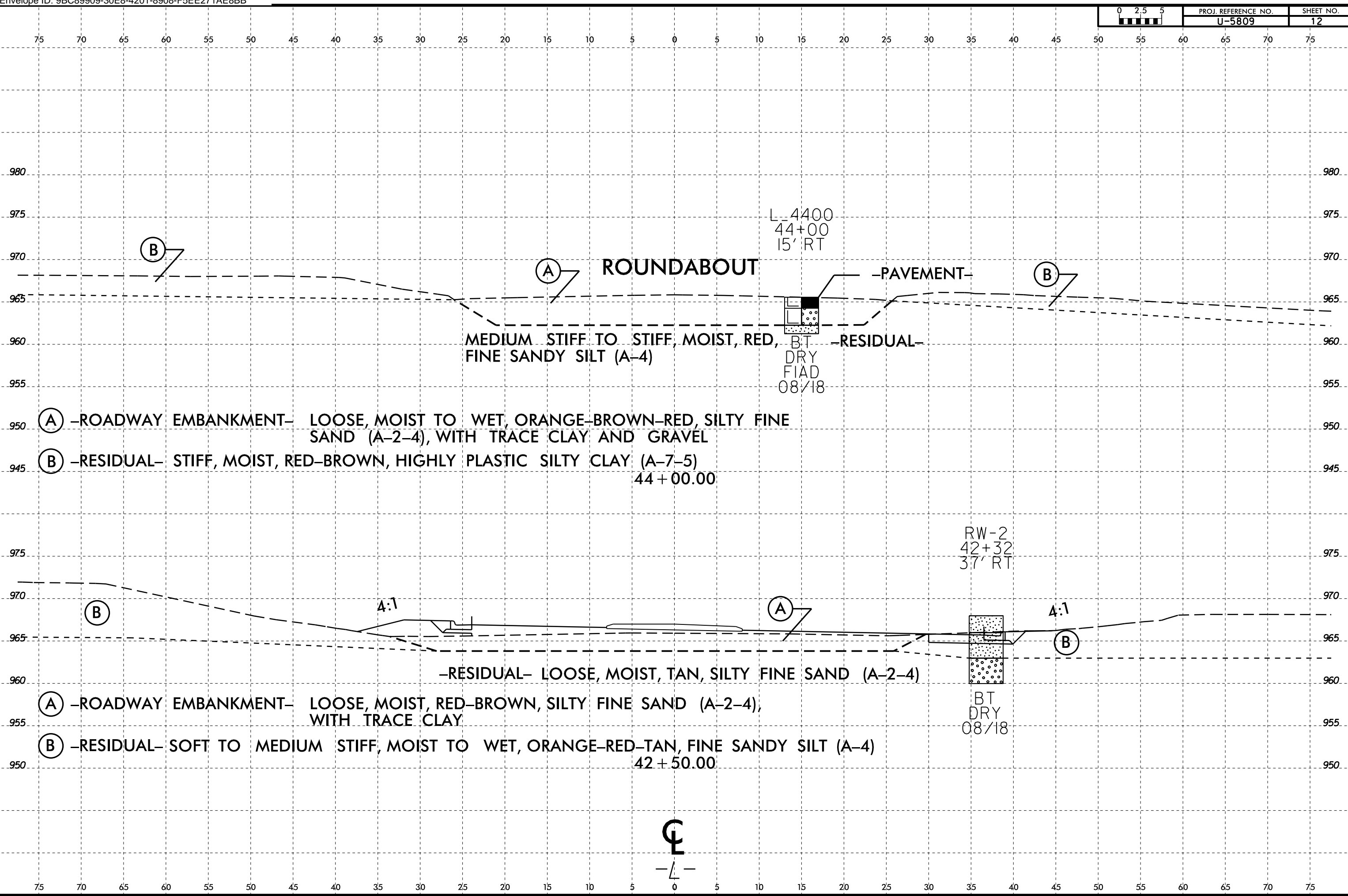


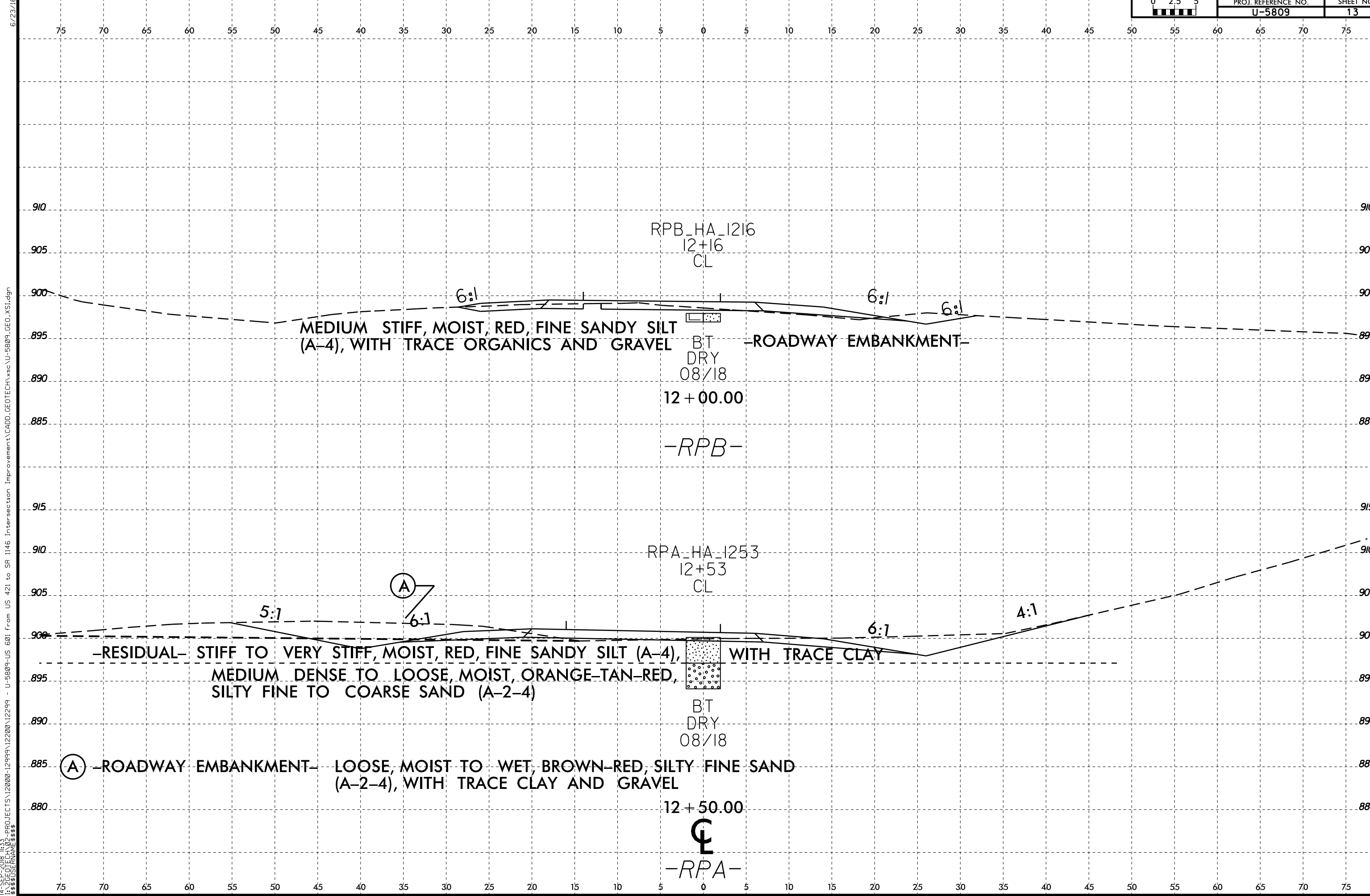
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6/23/16
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MEDIUM STIFF, MOIST, RED, FINE SANDY SILT (A-4), WITH TRACE ORGANICS AND GRAVEL

RPB_HA_1216
12+16
CL

ROADWAY EMBANKMENT

BT
DRY
08/18
12 + 00.00

RPB

RPA_HA_1253
12+53
CL

RESIDUAL STIFF TO VERY STIFF, MOIST, RED, FINE SANDY SILT (A-4), WITH TRACE CLAY
MEDIUM DENSE TO LOOSE, MOIST, ORANGE-TAN-RED, SILTY FINE TO COARSE SAND (A-2-4)

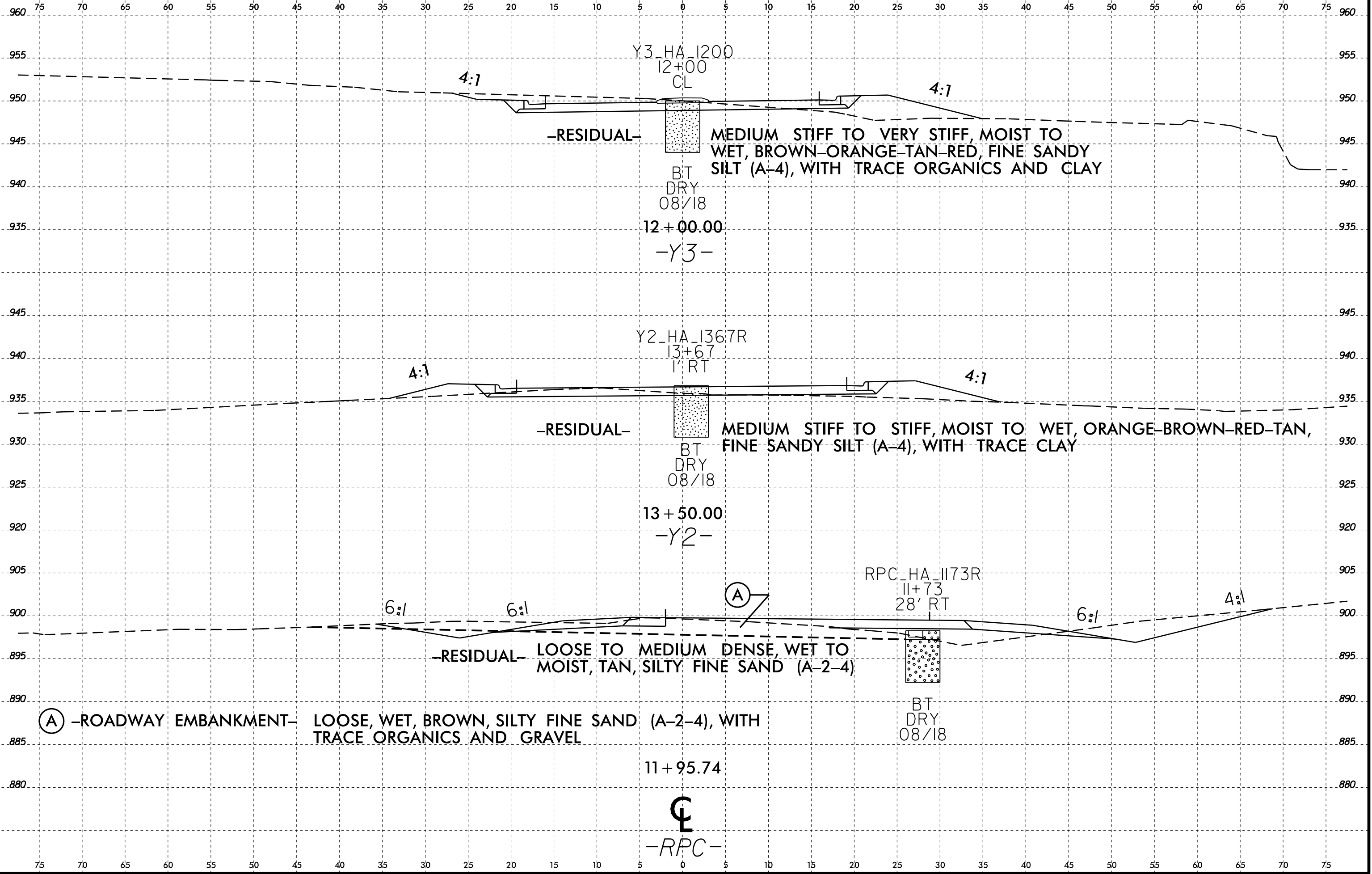
BT
DRY
08/18

ROADWAY EMBANKMENT LOOSE, MOIST TO WET, BROWN-RED, SILTY FINE SAND (A-2-4), WITH TRACE CLAY AND GRAVEL

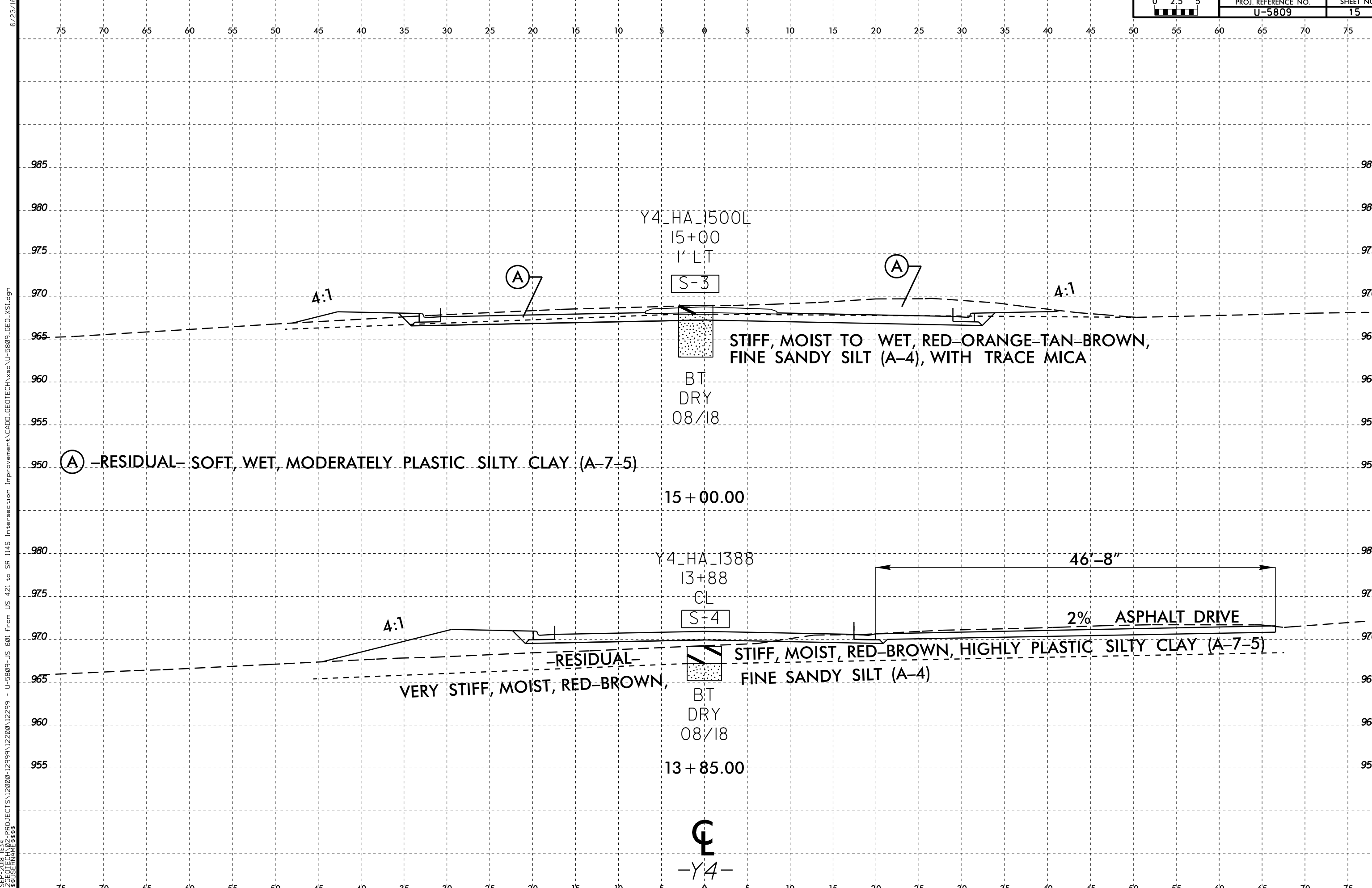
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RPA

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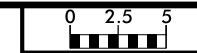
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-Y4-

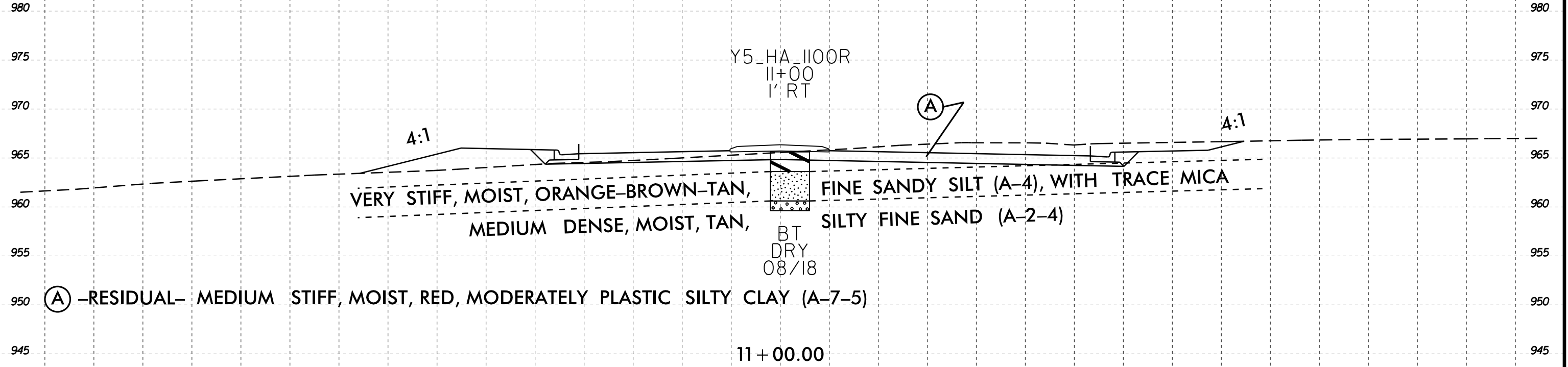
6/23/16



PROJ. REFERENCE NO.
U-5809

SHEET NO.
16

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4:1
VERY STIFF, MOIST, ORANGE-BROWN-TAN,
MEDIUM DENSE, MOIST, TAN,
FINE SANDY SILT (A-4), WITH TRACE MICA
SILTY FINE SAND (A-2-4)

Y5_HA_1100R
11+00
1' RT

A

4:1

BT
DRY
08/18

A -RESIDUAL- MEDIUM STIFF, MOIST, RED, MODERATELY PLASTIC SILTY CLAY (A-7-5)

11+00.00

☪
-Y5-

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

I:\4-SEP-2018 11:34
I:\GEO\TECH\102-PROJECTS\12000-12999\12200\12299 - U-5809-US 601 From US 421 to SR 1146 Intersection Improvement\CADD\GEO\TECH\XSEC\U-5809_GEO_XSI.dgn
\$\$\$\$\$USERNAME\$\$\$\$\$

PROJECT REFERENCE NO.	SHEET NO.
U-5809	17

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

SUBSURFACE INVESTIGATION

**APPENDIX A
LABORATORY TEST RESULTS**

REFERENCE: U-5809

PROJECT: 44382

Prepared in the Office of:



ECS SOUTHEAST, LLP
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1078

SOIL TEST RESULTS

BORING NO.	SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
L_1750	S-1	15' LT	17+50 -L-	2.8 - 4.8'	A-7-6(9)	42	20	17.3	25.5	6.8	50.4	97.0	88.0	59.0	23.6	-
L_HA_3335R	S-2	63' RT	33+35 -L-	1.0 - 3.0'	A-7-5(19)	56	20	6.1	18.7	16.0	59.2	100.0	97.0	80.0	34.1	-
Y4_HA_1388	S-3	CL	13+88 -Y4-	0.7 - 2.0'	A-7-5(30)	66	32	10.4	14.7	7.7	67.2	100.0	94.0	77.0	32.1	-
Y4_HA_1500L	S-4	1' LT	15+00 -Y4-	0.2 - 1.0'	A-7-6(14)	46	20	13.7	17.1	13.0	56.2	97.0	88.0	71.0	26.7	-

LAB TECHNICIAN: DILLON KESTNER

NCDOT CERTIFICATION NO. 135-01-0816

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

SUBSURFACE INVESTIGATION

APPENDIX B

DCP & DUAL MASS DCP DATA SHEETS

REFERENCE: U-5809

PROJECT: 44382

Prepared in the Office of:



ECS SOUTHEAST, LLP
1812 CENTER PARK DRIVE, SUITE D
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NC REGISTERED
ENGINEERING
FIRM # F-1078

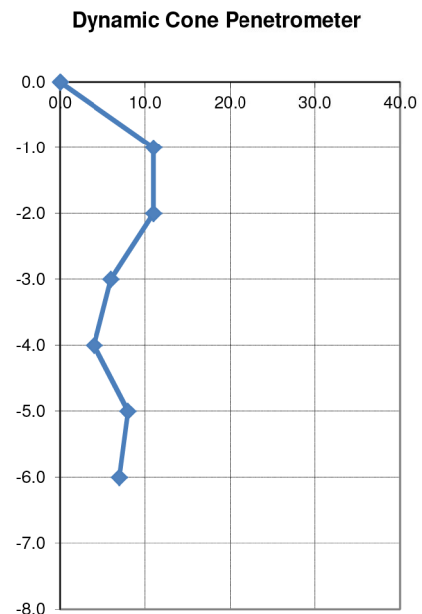
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Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring L_HA_1593R **Alignment** L
Station 15+93 **Offset** 50' RT

Depth*	Soil Description
0.4 ft	Surficial Organic Soils
0.4 - 1 ft	Roadway Embankment: Loose, Moist, Brown, Silty Fine SAND (A-2-4) with trace organics
1 - 6 ft	Roadway Embankment: Loose, Moist to Wet, Orange-Tan, Silty Fine SAND (A-2-4) with trace mica and gravel
Hand Auger Terminated at 6.0 ft	

*Depths are measured below soil subgrade.
 **Groundwater not encountered.

Dyanmic Cone Penetrometer Measurements per Drive Increments				
Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	16	12	10	11.0
-2.0	12	11	11	11.0
-3.0	8	7	5	6.0
-4.0	6	4	4	4.0
-5.0	8	8	9	8.0
-6.0	8	7	8	7.0



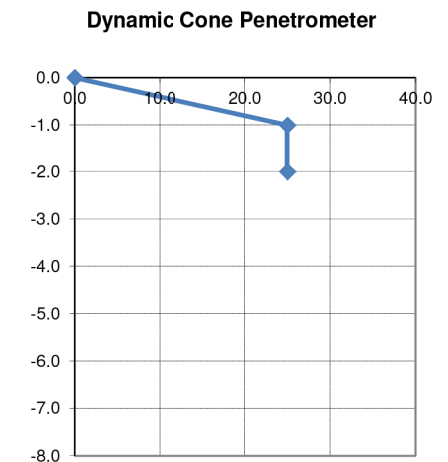
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Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring L_HA_2118R **Alignment** L
Station 21+18 **Offset** 43' RT

Depth*	Soil Description
0.1 ft	Surficial Organic Soils
0.1 - 2 ft	Roadway Embankment: Very Stiff, Moist, Red, Fine Sandy SILT (A-4) with gravel
Hand Auger Refusal at 2.0 feet	

*Depths are measured below soil subgrade.
 **Groundwater not encountered.

Dyanmic Cone Penetrometer Measurements per Drive Increments				
Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	25+	-	-	25.0
-2.0	25+	-	-	25.0



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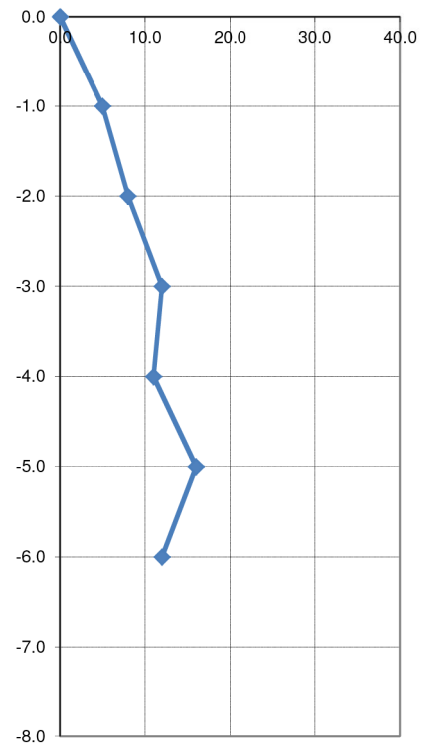
Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring L_HA_3335R **Alignment** L
Station 33+35 **Offset** 63' RT

Depth*	Soil Description
0.1 ft	Surficial Organic Soils
0.1 - 1 ft	Residual: Loose, Wet, Orange-Tan, Silty Fine SAND (A-2-4) with trace clay
1 - 3 ft	Medium Stiff, Moist, Red, Moderately Plastic Silty CLAY (A-7-5(19))
3 - 5 ft	Stiff, Moist, Red-Orange-Tan, Fine Sandy SILT (A-4)
5 - 6 ft	Loose, Moist, Tan-Orange, Silty Fine SAND (A-2-4) with trace mica
Hand Auger Terminated at 6.0 feet	

*Depths are measured below soil subgrade.
 **Groundwater not encountered.

Dyanmic Cone Penetrometer Measurements per Drive Increments				
Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	4	4	7	5.0
-2.0	6	8	8	8.0
-3.0	12	14	11	12.0
-4.0	10	10	12	11.0
-5.0	13	11	22	16.0
-6.0	8	12	12	12.0

Dynamic Cone Penetrometer



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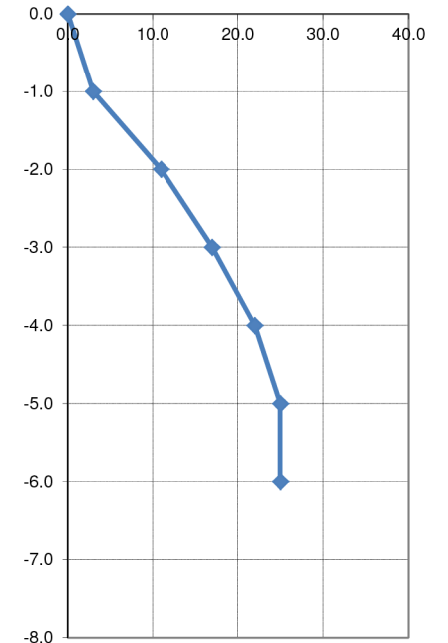
Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring L_HA_3340L **Alignment** L
Station 33+40 **Offset** 65' LT

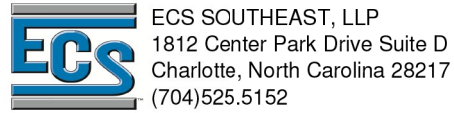
Depth*	Soil Description
0.5 ft	Surficial Organic Soils
0.5 - 1 ft	Residual: Very Loose, Wet, Yellow-Tan, Clayey Fine SAND (A-2-6)
1 - 3 ft	Medium Stiff to Stiff, Moist, Orange-Red-Brown, Moderately Plastic Silty CLAY (A-7-5)
3 - 6 ft	Very Stiff, Moist, Orange-Red, Fine Sandy SILT (A-4)
Hand Auger Terminated at 6.0 feet	

*Depths are measured below soil subgrade.
 **Groundwater not encountered.

Dyanmic Cone Penetrometer Measurements per Drive Increments				
Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	3	3	4	3.0
-2.0	12	12	10	11.0
-3.0	14	17	18	17.0
-4.0	18	20	25	22.0
-5.0	25+	-	-	25.0
-6.0	25+	-	-	25.0

Dynamic Cone Penetrometer





Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring RW-1 **Alignment** L
Station 40+50 **Offset** 37' RT

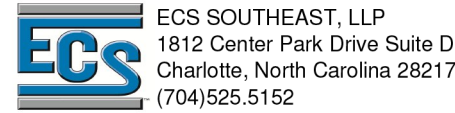
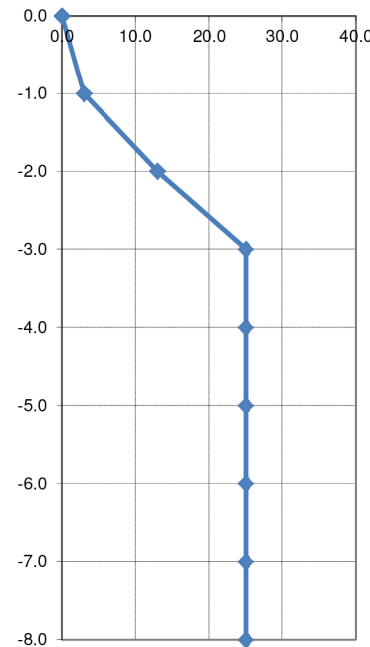
Depth*	Soil Description
0.2 ft	Surficial Organic Soils
0.2 - 1 ft	Artificial Fill: Soft, Wet, Brown, Fine Sandy SILT (A-4) with trace organics
1 - 2 ft	Residual: Stiff, Wet, Orange-Tan, Fine Sandy CLAY (A-6) with trace organics
2 - 4 ft	Very Stiff, Moist, Red-Orange-Tan, Fine Sandy SILT (A-4)
4 - 8 ft	Medium Dense, Moist, Red-Orange-Tan, Silty Fine to Coarse SAND (A-2-4)
Hand Auger Terminated at 8.0 feet	

*Depths are measured below soil subgrade.

**Groundwater not encountered.

Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	2	2	4	3.0
-2.0	6	11	16	13.0
-3.0	25+	-	-	25.0
-4.0	25+	-	-	25.0
-5.0	25+	-	-	25.0
-6.0	25+	-	-	25.0
-7.0	18	25+	-	25.0
-8.0	15	25+	-	25.0

Dynamic Cone Penetrometer



Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring RW-2 **Alignment** L
Station 42+32 **Offset** 37' RT

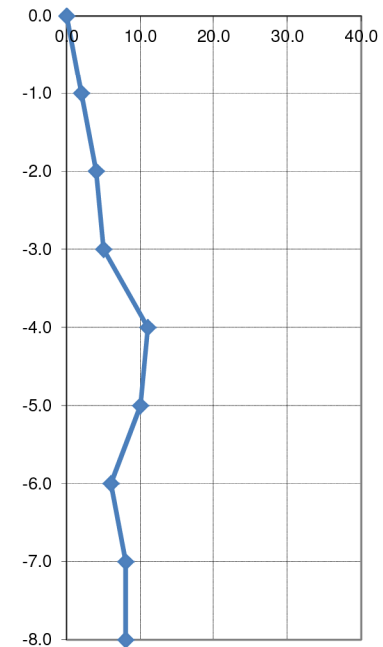
Depth*	Soil Description
0.2 ft	Surficial Organic Soils
0.2 - 2 ft	Residual: Soft to Medium Stiff, Wet, Red, Fine Sandy SILT (A-4) with trace mica and clay
2 - 5 ft	Medium Stiff, Moist, Orange-Red-Tan, Fine Sandy SILT (A-4)
5 - 8 ft	Loose, Moist, Tan, Silty Fine SAND (A-2-4)
Hand Auger Terminated at 8.0 feet	

*Depths are measured below soil subgrade.

**Groundwater not encountered.

Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	3	2	3	2.0
-2.0	7	4	5	4.0
-3.0	4	4	6	5.0
-4.0	11	9	13	11.0
-5.0	11	10	11	10.0
-6.0	8	6	7	6.0
-7.0	6	8	8	8.0
-8.0	7	8	9	8.0

Dynamic Cone Penetrometer



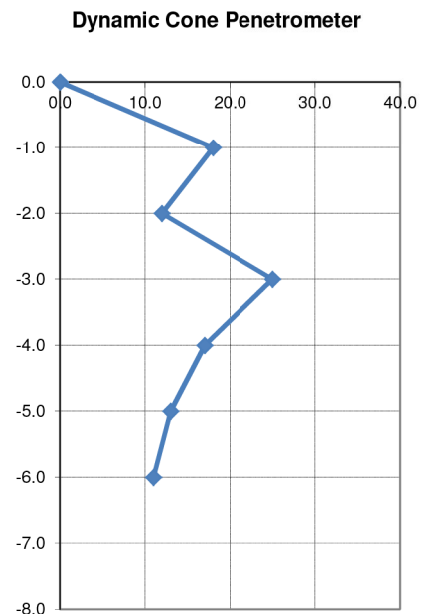
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Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring RPA_HA_1253 **Alignment** RPA
Station 12+53 **Offset** CL

Depth*	Soil Description
0.2 ft	Surficial Organic Soils
0.2 - 3 ft	Residual: Stiff to Very Stiff, Moist, Red, Fine Sandy SILT (A-4) with trace clay
3 - 6 ft	Medium Dense to Loose, Moist, Orange-Tan-Red, Silty Fine to Coarse SAND (A-2-4)
Hand Auger Terminated at 6.0 feet	

*Depths are measured below soil subgrade.
 **Groundwater not encountered.

Dyanmic Cone Penetrometer Measurements per Drive Increments				
Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	12	12	25	18.0
-2.0	8	11	13	12.0
-3.0	11	25+	-	25.0
-4.0	13	16	18	17.0
-5.0	13	15	12	13.0
-6.0	8	11	11	11.0



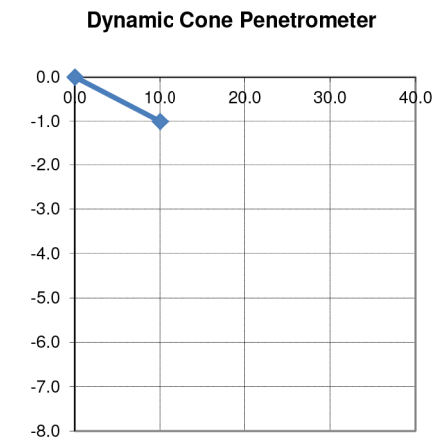
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Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring RPB_HA_1216 **Alignment** RPB
Station 12+16 **Offset** CL

Depth*	Soil Description
0	Surficial Organic Soils
0 - 1 ft	Roadway Embankment: Medium Stiff, Moist, Red, Fine Sandy SILT (A-4) with trace organics and gravel
Hand Auger Refusal at 1.0 foot	

*Depths are measured below soil subgrade.
 **Groundwater not encountered.

Dyanmic Cone Penetrometer Measurements per Drive Increments				
Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	4	6	14	10.0



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Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring RCP_HA_1173R **Alignment** RPC
Station 11+73 **Offset** 28' RT

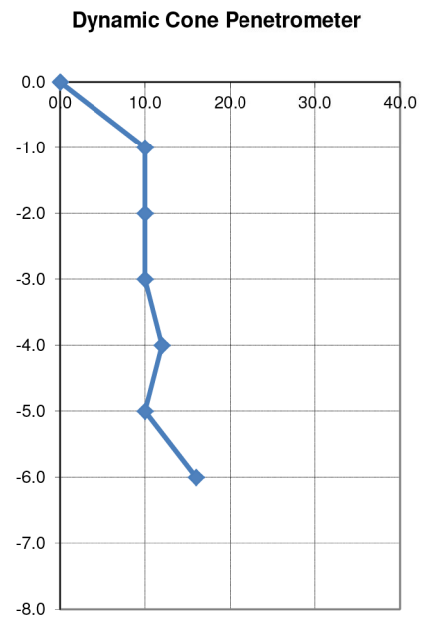
Depth*	Soil Description
0	Surficial Organic Soils
0 - 1 ft	Roadway Embankment: Loose, Wet, Brown, Silty Fine SAND (A-2-4) with trace organics and gravel
1 - 6 ft	Residual: Loose to Medium Dense, Wet to Moist, Tan, Silty Fine SAND (A-2-4)

Hand Auger Terminated at 6.0 feet

*Depths are measured below soil subgrade.

**Groundwater not encountered.

Dyanmic Cone Penetrometer Measurements per Drive Increments				
Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	8	10	11	10.0
-2.0	8	10	11	10.0
-3.0	12	11	10	10.0
-4.0	12	11	13	12.0
-5.0	11	11	10	10.0
-6.0	15	16	17	16.0



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Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring Y2_HA_1367R **Alignment** Y2
Station 13+67 **Offset** 1' RT

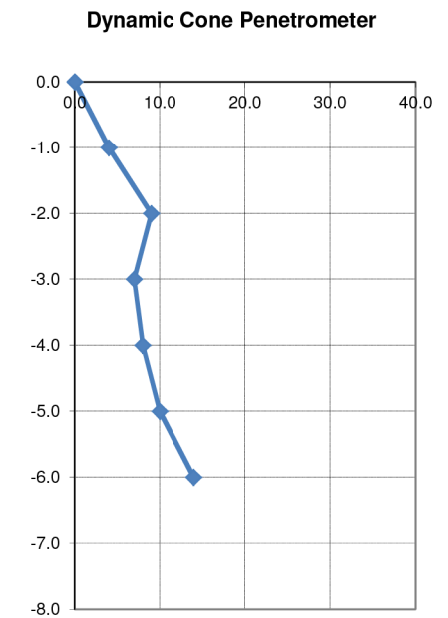
Depth*	Soil Description
0.2 ft	Surficial Organic Soils
0.2 - 2 ft	Residual: Medium Stiff, Wet to Moist, Orange-Brown-Red, Fine Sandy SILT (A-4)
2 - 6 ft	Medium Stiff to Stiff, Moist, Orange-Red-Tan, Fine Sandy SILT (A-4) with trace clay

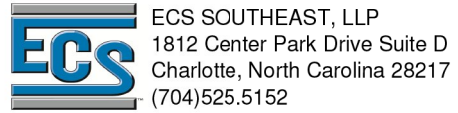
Hand Auger Terminated at 6.0 feet

*Depths are measured below soil subgrade.

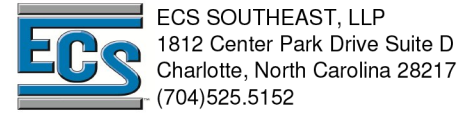
**Groundwater not encountered.

Dyanmic Cone Penetrometer Measurements per Drive Increments				
Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	4	4	5	4.0
-2.0	9	12	7	9.0
-3.0	4	6	8	7.0
-4.0	5	7	10	8.0
-5.0	7	10	10	10.0
-6.0	12	14	14	14.0





Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring Y3_HA_1200 **Alignment** Y3
Station 12+00 **Offset** CL



Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring Y4_HA_1388 **Alignment** Y4
Station 13+88 **Offset** CL

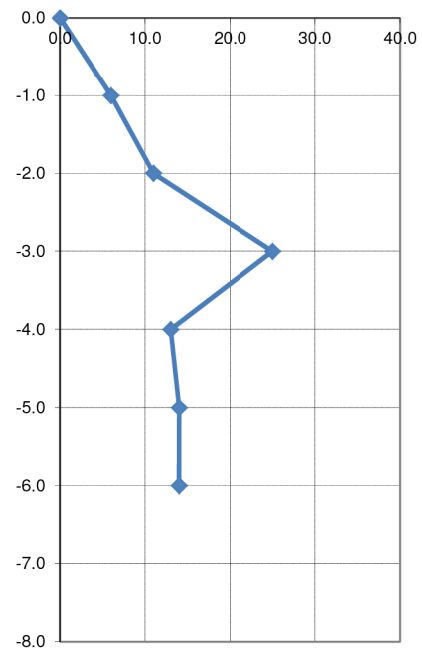
Depth*	Soil Description
0.2 ft	Surficial Organic Soils
0.2 - 1 ft	Residual: Medium Stiff, Wet, Brown, Fine Sandy SILT (A-4) with organics
1 - 3 ft	Medium Stiff to Stiff, Moist, Orange-Tan-Red, Fine Sandy SILT (A-4) with trace clay
3 - 6 ft	Very Stiff to Stiff, Moist, Red, Fine Sandy SILT (A-4)
Hand Auger Terminated at 6.0 feet	

*Depths are measured below soil subgrade.

**Groundwater not encountered.

Dyanmic Cone Penetrometer Measurements per Drive				
Increments				
Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	7	6	6	6.0
-2.0	8	11	12	11.0
-3.0	25+	-	-	25.0
-4.0	16	12	15	13.0
-5.0	20	15	14	14.0
-6.0	14	14	15	14.0

Dynamic Cone Penetrometer



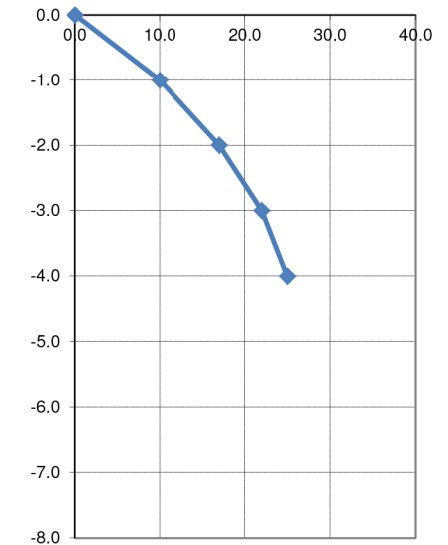
Depth*	Soil Description
0.7 ft	Surficial Organic Soils
0.7 - 2 ft	Residual: Stiff, Moist, Red-Brown, Highly Plastic Silty CLAY (A-7-5(28))
2 - 4 ft	Very Stiff, Moist, Red, Fine Sandy SILT (A-4)
Hand Auger Refusal at 4.0 feet	

*Depths are measured below soil subgrade.

**Groundwater not encountered.

Dyanmic Cone Penetrometer Measurements per Drive				
Increments				
Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	12	10	11	10.0
-2.0	13	15	20	17.0
-3.0	17	20	24	22.0
-4.0	21	25+	-	25.0

Dynamic Cone Penetrometer





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Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring Y4_HA_1500L **Alignment** Y4
Station 15+00 **Offset** 1' LT

Depth*	Soil Description
0.2 ft	Surficial Organic Soils
0.2 - 1 ft	Residual: Soft, Wet, Red, Moderately Plastic Silty CLAY (A-7-6(14))
1 - 2 ft	Stiff, Wet, Red, Fine Sandy SILT (A-4) with trace mica
2 - 6 ft	Stiff, Moist, Orange-Tan-Brown, Fine Sandy SILT (A-4)

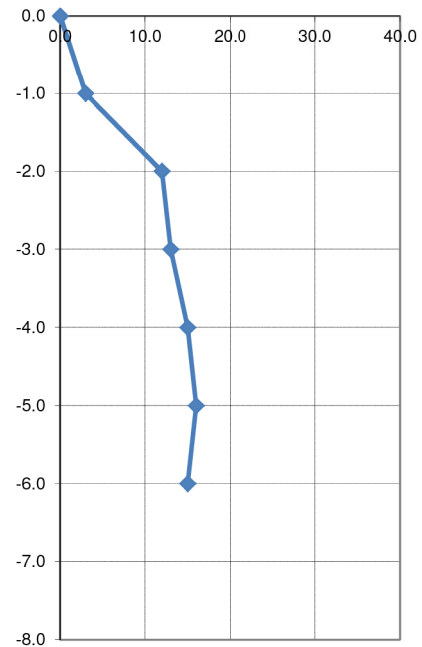
Hand Auger Terminated at 6.0 feet

*Depths are measured below soil subgrade.

**Groundwater not encountered.

Dyanmic Cone Penetrometer Measurements per Drive Increments				
Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	4	3	4	3.0
-2.0	8	11	14	12.0
-3.0	14	15	11	13.0
-4.0	5	12	18	15.0
-5.0	12	17	15	16.0
-6.0	12	14	17	15.0

Dynamic Cone Penetrometer



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Client TGS Engineers
Project U-5809 - US 601
Location Yadkinville, North Carolina
Job No. 12299
Boring Y5_HA_1100R **Alignment** Y5
Station 11+00 **Offset** 1' RT

Depth*	Soil Description
0.2 ft	Surficial Organic Soils
0.2 - 2 ft	Residual: Medium Stiff, Moist, Red, Moderately Plastic Silty CLAY (A-7-5)
2 - 5 ft	Very Stiff, Moist, Orange-Brown-Tan, Fine Sandy SILT (A-4) with trace mica
5 - 6 ft	Medium Dense, Moist, Tan, Silty Fine SAND (A-2-4)

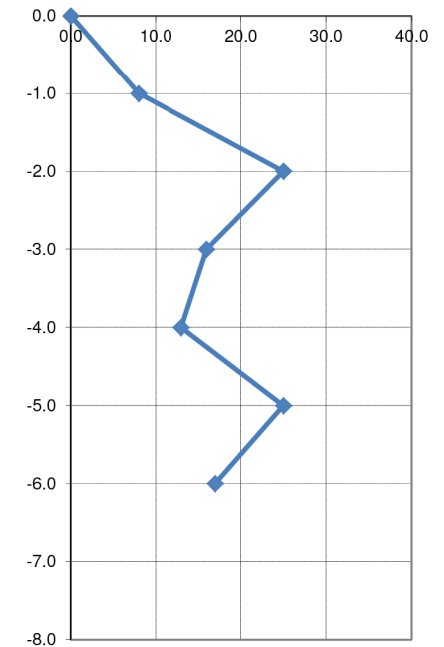
Hand Auger Terminated at 6.0 feet

*Depths are measured below soil subgrade.

**Groundwater not encountered.

Dyanmic Cone Penetrometer Measurements per Drive Increments				
Depth	0" to 2"	2" to 3.75"	3.75" to 5.5"	Average
0.0	-	-	-	0.0
-1.0	4	6	11	8.0
-2.0	11	25+	-	25.0
-3.0	13	15	17	16.0
-4.0	8	12	15	13.0
-5.0	18	25+	-	25.0
-6.0	14	16	19	17.0

Dynamic Cone Penetrometer



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5809	1	6

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

**STRUCTURE
SUBSURFACE INVESTIGATION**

COUNTY YADKIN
PROJECT DESCRIPTION US 601 FROM SR 1742
(SHARON DRIVE) TO SR 1146 (LEE AVENUE)
SITE DESCRIPTION TEMPORARY SHORING

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2, 2A	LEGEND (SOIL & ROCK)
3	BORING LOCATION PLAN
4-6	BORE LOGS

PERSONNEL
P. TOMASIC, G.I.T

INVESTIGATED BY CG2, PLLC
DRAWN BY M. BREWER, P.E.
CHECKED BY R. KRAL, P.E.
SUBMITTED BY CG2, PLLC
DATE JANUARY 2024

CAUTION NOTICE

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 - 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.

Prepared in the Office of:



**CAROLINAS
GEOTECHNICAL
GROUP**
2400 CROWNPOINT EXECUTIVE DRIVE
SUITE 800
CHARLOTTE, NC 28227
(980) 339-8684



DocuSigned by:
D. Matthew Brewer 1/5/2024
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REFERENCE: U-5809

PROJECT: 44382

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
(PAGE 1 OF 2)

SOIL DESCRIPTION										GRADATION									
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, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6										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. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS									
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.									
GROUP CLASS. A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-3 A-4, A-5 A-6, A-7										MINERALOGICAL COMPOSITION									
SYMBOL										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.									
% PASSING #10 #40 #200										COMPRESSIBILITY									
MATERIAL PASSING #40 LL PI										SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50									
GROUP INDEX										PERCENTAGE OF MATERIAL									
USUAL TYPES OF MAJOR MATERIALS										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL									
GEN. RATING AS SUBGRADE										TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE									
PI OF A-7-5 SUBGROUP IS <= LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30										GROUND WATER									
CONSISTENCY OR DENSENESS										MISCELLANEOUS SYMBOLS									
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES SOIL SYMBOL SPT DMT VST TEST BORING ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT AUGER BORING INFERRED SOIL BOUNDARY CORE BORING INFERRED ROCK LINE MONITORING WELL ALLUVIAL SOIL BOUNDARY PIEZOMETER INSTALLATION									
TEXTURE OR GRAIN SIZE										RECOMMENDATION SYMBOLS									
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053										UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK									
GRAIN SIZE MM 305 75 2.0 0.25 0.05 0.005 IN. 12 3										ABBREVIATIONS									
SOIL MOISTURE - CORRELATION OF TERMS										AR - AUGER REFUSAL MED. - MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA - MICACEOUS WEA. - WEATHERED CL. - CLAY MOD. - MODERATELY ? - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC ? - DRY UNIT WEIGHT CSE. - COARSE PMT - PRESSUREMETER TEST DMT - DILATOMETER TEST SAP. - SAPROLITIC DPT - DYNAMIC PENETRATION TEST SD. - SAND, SANDY e - VOID RATIO SL. - SILT, SILTY F - FINE SLLI. - SLIGHTLY FOSS. - FOSSILIFEROUS TCR - TRICONE REFUSAL FRAC. - FRACTURED, FRACTURES w - MOISTURE CONTENT FRAGS. - FRAGMENTS v - VERY HI. - HIGHLY									
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										SAMPLE ABBREVIATIONS									
LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE										S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO									
PL PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE										EQUIPMENT USED ON SUBJECT PROJECT									
OM OPTIMUM MOISTURE SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE										DRILL UNITS: CME-45C ADVANCING TOOLS: CLAY BITS HAMMER TYPE: AUTOMATIC MANUAL CME-55 6' CONTINUOUS FLIGHT AUGER CORE SIZE: B H N CME-550 8" HOLLOW AUGERS VANE SHEAR TEST HARD FACED FINGER BITS PORTABLE HOIST TUNG-CARBIDE INSERTS MOBILE B29 TRICONE STEEL TEETH TRICONE TUNG-CARB. CORE BIT									
PLASTICITY										HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST									
PLASTICITY INDEX (PI) DRY STRENGTH																			
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH																			
COLOR																			
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.																			





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SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS (PAGE 2 OF 2)

ROCK DESCRIPTION

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:

WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)		FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)		FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SL.)	ROCK GENERALLY 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.
SLIGHT (SL.)	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.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN 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 WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	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. <u>IF TESTED, WOULD YIELD SPT REFUSAL</u>
SEVERE (SEV.)	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. <u>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</u>
VERY SEVERE (V SEV.)	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. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>
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 ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROOVED 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 PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

BEDDING

TERM	SPACING	TERM	THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET
		THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.	AQUIFER - 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 A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
ARTESIAN - 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.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.	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.
DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.	FLOAT - 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.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
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.
PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
ROCK QUALITY DESIGNATION (ROD) - 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.	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
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.	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
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.	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
STRATA ROCK QUALITY DESIGNATION (SRQD) - 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.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: N/A

ELEVATION: FEET

NOTES:

GEOTECHNICAL BORING REPORT BORE LOG

WBS 44382.1.1		TIP U-5809		COUNTY YADKIN		GEOLOGIST P. Tomasic, G.I.T.										
SITE DESCRIPTION US 601 from SR 1742 (Sharon Drive) to SR 1146 (Lee Avenue)							GROUND WTR (ft)									
BORING NO. TS-2		STATION 19+10		OFFSET 305 ft LT		ALIGNMENT -L-	0 HR. 14.0									
COLLAR ELEV. 895.3 ft		TOTAL DEPTH 34.0 ft		NORTHING 866,473		EASTING 1,509,368	24 HR. 11.7									
DRILL RIG/HAMMER EFF/DATE CG29022 Mobile B-29 86% 04/08/2022				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER D. Demby		START DATE 10/31/23		COMP. DATE 10/31/23		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
900																
895	894.3	1.0	2	1	3	4							M	895.3	TOPSOIL = 3 INCHES	0.0
890	891.8	3.5	1	2	2	4							M	889.8	ROADWAY EMBANKMENT Soft, Brown-Tan-Orange, Fine Sandy SILT (A-4), with trace mica, organics, and gravel	5.5
	889.3	6.0	2	2	3	5							M		Medium Stiff, Red-Orange-Gray, Silty CLAY (A-7), with trace mica, organics, and gravel	
885	886.8	8.5	3	4	4	8							M	886.3	RESIDUAL Medium Stiff to Very Stiff, Orange-Gray-White, Fine Sandy SILT (A-4), with trace mica and quartz fragments	9.0
	881.8	13.5	3	8	9	17							M			
880	876.8	18.5	3	6	7	13							M			
	871.8	23.5	3	3	5	8							M			
875	866.8	28.5	40	60/0.1						100/0.6			M	866.8	WEATHERED ROCK Brown-Gray-White, (METAGRAYWACKE)	28.5
	861.8	33.5	100/0.5							100/0.5			M	861.3	Boring Terminated at Elevation 861.3 ft In Weathered Rock (METAGRAYWACKE)	34.0

NCDOT BORE SINGLE U-5809_PLAN UPDATE_GEO.GPJ_NC_DOT.GDT 1/3/24

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 44382.1.1	TIP U-5809	COUNTY YADKIN	GEOLOGIST P. Tomasic, G.I.T.
SITE DESCRIPTION US 601 from SR 1742 (Sharon Drive) to SR 1146 (Lee Avenue)			GROUND WTR (ft)
BORING NO. TS-3	STATION 18+84	OFFSET 374 ft LT	ALIGNMENT -L-
COLLAR ELEV. 898.7 ft	TOTAL DEPTH 45.8 ft	NORTHING 866,469	EASTING 1,509,302
DRILL RIG/HAMMER EFF/DATE CG29022 Mobile B-29 86% 04/08/2022		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER D. Demby	START DATE 10/31/23	COMP. DATE 10/31/23	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)			
900															898.7	0.0	TOPSOIL = 3 INCHES	
	897.7	1.0															ROADWAY EMBANKMENT	
895	895.2	3.5	3	4	4												Soft to Medium Stiff, Brown-Orange-White, Fine Sandy SILT (A-4), with trace mica and organics	
	892.7	6.0	2	2	2													
890	890.2	8.5	1	3	2												Soft to Medium Stiff, Red-Tan-Gray, Silty CLAY (A-7), with trace organics, and trace to little mica	
			1	1	1													
885	885.2	13.5	1	1	1												Soft, Brown-Gray-Orange, SILT (A-5), with little mica	
880	880.2	18.5	14	5	5												Stiff, Gray-Brown, Fine Sandy, Silty CLAY (A-7), with little mica, trace organics and gravel	
875	875.2	23.5	3	5	4													
870	870.2	28.5	7	7	15												RESIDUAL	
																		Very Stiff to Hard, Gray-Black-White, Fine Sandy SILT (A-4), with little mica, trace quartz fragments
865	865.2	33.5	22	28	64													
860	860.2	38.5	100/0.5															WEATHERED ROCK
																		Brown-Gray-White, (METAGRAYWACKE)
855	855.2	43.5	60/0.1															CRYSTALLINE ROCK
																		(METAGRAYWACKE)
	852.9	45.8	60/0.0															Boring Terminated with Standard Penetration Test Refusal at Elevation 852.9 ft In Crystalline Rock (METAGRAYWACKE)

NCDOT BORE SINGLE U-5809_PLAN UPDATE_GEO.GPJ_NC_DOT.GDT 1/3/24