STATE OF NORTH CAROLINA

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY_HAYWOOD

PROJECT DESCRIPTION WAYNESVILLE -INTERSECTION OF US 23 BUSINESS (N. MAIN ST.)

AND WALNUT ST.

INVENTORY

5888 EFERENCE 2

44625. PROJEC

CROSS SECTIONS

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APPENDICES DEVEN DESCRIPTION

APPENDIX	DESCRIPTION	<u>SHEETS</u>
Α	LAB RESULTS	18-21

STATION

10+00-14+08.41

10+60-14+80

14+80-16+00

16+00-18+80

18+80-22+80

10+44-11+64.88

15+00-17+10

11+50-12+77.52

144+00-16+26.21

10+00-14+00

14+00-16+45.95

10+50-11+00

II+00-I2+78.33

STATION

19+00-20+50

11+00-13+00

PLAN PROFILE

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SHEETS

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U–5888	1	23

CAUTION NOTICE

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CENERAL SOL 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 UN-PLACED TEST DATA CAN BE RELIED ON ONLY TO THE DECREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THES WATER LEVELS OR SOLL 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 WARANT OR GUARANTE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPNION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONSTRUCTIONS 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 OR OF OR AN EXTENSION OF TIME FOR ANY REASON RESULTING FOR THE ACTUAL CONTINUONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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

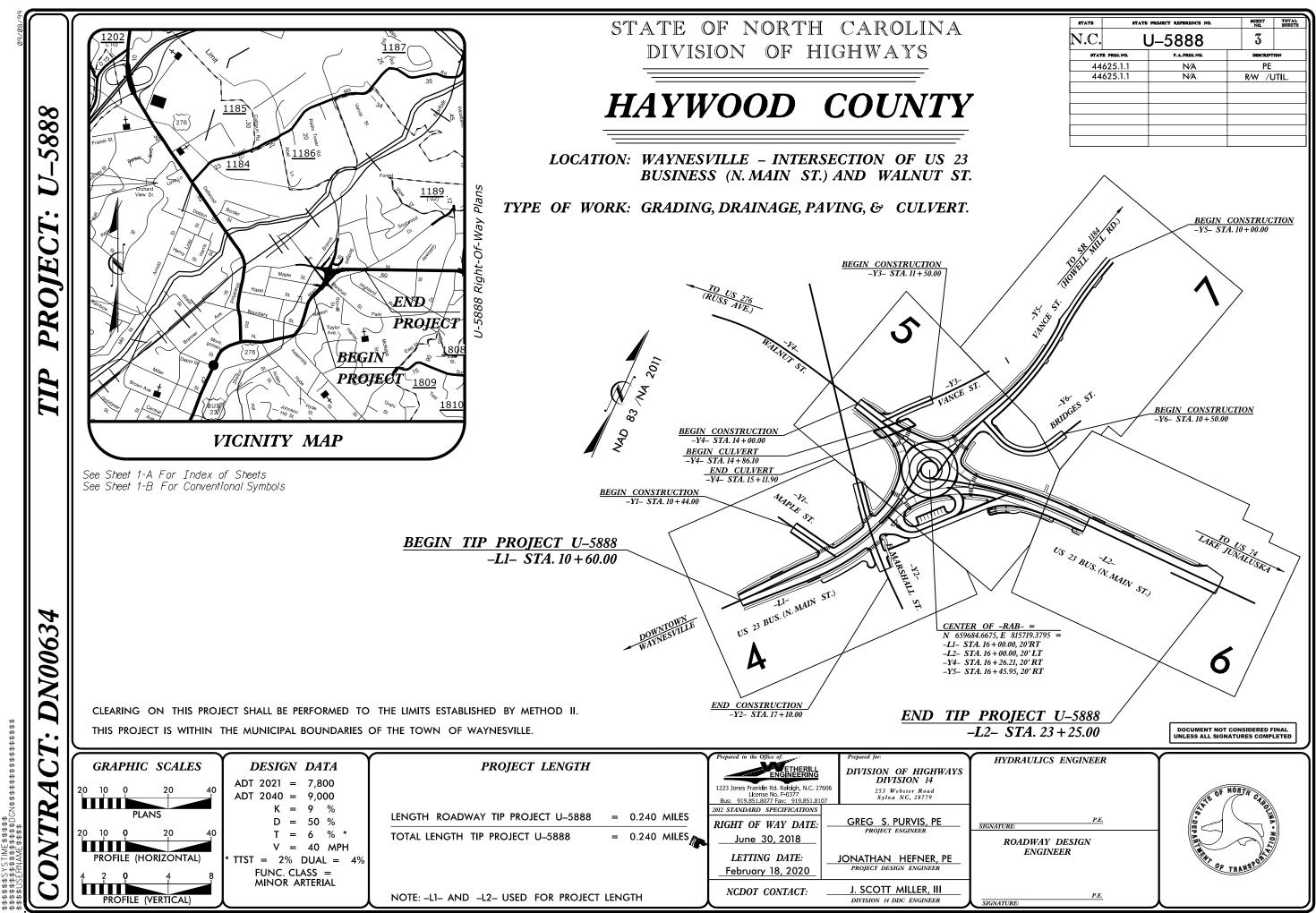
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	ADUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) (> 35% PASSING *200)	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	OF SLOPE.
STMBOL	MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
% PASSING SILT-	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
10 50 MX GRANULAR CLAY MUCK, 40 30 MX 50 MX 51 MN S0 LS COLY PEAT	PERCENTAGE OF MATERIAL	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
■200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING #40 SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
LL – – 40 MX 41 MN 46 MX 41 MN 46 MX 41 MN 46 MX 41 MN 46 MX 41 MN LITTLE OR LICH Y	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRAGS. FINE CITY OF CITY OF CITY OF CITY OF CITY OF CITY		(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAIOR CRAVELAND FINE SILIT OR CLATET SILIT CLATET MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	▼ STATIC WATER LEVEL AFTER <u>24</u> HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN, RATING FUEL LINE TO COOD FAIR TO DOOD FAIR TO DOOD UNCULTAR	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	PARENT MATERIAL.
AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITAB	LE	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	□ <u>⊃5 /8</u> 25	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH CONSISTENCY (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) 25/025 UIP & DIP DIRECTION WITH SOIL DESCRIPTION	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
		SEVERE ALL ROCK EXCEPT OUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE < 4 LOOSE 4 TO 10	SOIL SYMBOL SIDE SUPE INDICATOR	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR MEDIUM DENSE 10 TO 30 N/A	8	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
(NON-COHESTVE) UENSE 30 TU 50	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT CHAUGER BORING CONE PENETROMETER	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
		SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	INFERRED SOIL BOUNDARY	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF	
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0		COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2	WITH CURE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	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
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	TTTTT ALLUVIAL SOIL BOUNDARY A PIEZOMETER - SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053		HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	UNDERCUT ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	
(BLDR.) (COB.) (GR.) SHNU SHNU (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
	CL CLAY MOD MODERATELY 2- UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
	_ CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{\rm d}^{-}$ DRY UNIT WEIGHT CSE COARSE ORG ORGANIC	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u>	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	PROM CHIPS TO SEVERAL INCHES IN SIZE BY MUDERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	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
	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLIDA PEOLITRES OPVING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	BENCH MARK: •SEE NOTES
	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	
- MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: FEET
	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	NOTES
REQUIRES ADDITIONAL WATER TO	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	6' CONTINUOUS FLIGHT AUGER CORE SIZE:	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	ELEVATIONS DERIVED FROM GEOPAK AND THE .TIN FILE
		INDURATION	"U5888_LS_TIN.TIN" RECEIVED ON 12/14/17
PLASTICITY		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
PLASTICITY INDEX (PI) DRY STRENGTH	X CME-550X HARD FACED FINGER BITS	PURPTING WITH EINCED EREES NUMEROUS CRAINS.	
NON PLASTIC Ø-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM	CASING W/ ADVANCER	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
HIGHLY PLASTIC 26 OR MORE HIGH			
		BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	PORTABLE HOIST	BREAKS EASILY WHEN HIT WITH HAMMER.	
	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER TRICONE TUNGCARB. SOUNDING ROD	INDURATED BREAKS EASILY WHEN HIT WITH HAMMER. GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE: DIFFICULT TO BREAK WITH HAMMER.	
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.	PORTABLE HOIST	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE:	

PROJECT REFERENCE NO.

U-5888

2



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DATE: May 31, 2018 STATE PROJECT: 44625.1.1 (U-5888) FEDERAL PROJECT: N/A

DESCRIPTION:	Intersection of US 23 Business (N. Main St.) and Walnut St.
COUNTY:	HAYWOOD

SUBJECT: Geotechnical Report – Inventory, REV 1

S&ME, Inc. has completed a reconnaissance and subsurface investigation for the above roadway project and presents the following inventory. Plans, profiles, and cross-sections are included in this report.

Project Description

This report presents the findings for the proposed intersection modification of US 23 Business (N. Main Street) and Walnut Street to a roundabout in Haywood County, North Carolina. The investigation consisted of exploring US 23 Business (N. Main Street) (-L1- and -L2-), E. Marshal Street (-Y2-), the roundabout (-RAB-), Walnut Street (-Y4-), and Vance Street (-Y3- and -Y5-). One Shelton Creek culvert (Culvert No. 2) will be replaced at the Walnut Street (-Y4-) and Vance Street (-Y3-) intersection.

The geotechnical field investigation was conducted on February 26, 2018. One drill crew was used to drill, sample, and log the borings in this report. The drill rig used was a rubber tired ATV-mounted CME-550X and it was equipped with an automatic hammer. Standard Penetration Tests (SPT) were performed at selected locations and additional borings were advanced using continuous flight augers. Rod sounding was used at the proposed culvert replacement in conjunction with the SPT soil test borings. Representative soil samples (split-spoon and bulk) were collected for visual classification in the field and selected soil samples were submitted for laboratory analysis.

The following alignments, totaling 0.42 miles, were investigated. Subsurface profiles and/or cross-sections of these alignments are included in this report.

Line	<u>S</u>	tatio	<u>n</u>
-RAB-	10 + 00	to	14 + 10
-L1-	10 + 60	to	15 + 50
-L2-	16+60	to	20+00
-Y2-	16 + 20	to	17 + 10
-Y3-	11 + 50	to	12+60
-Y4-	14+00	to	15+65
-Y5-	10 + 00	to	15 + 85

Areas of Special Geotechnical Interest

Alluvial Soils: The following borehole locations encountered alluvial soils: 1)

Line	Stations
-Y02-	16+75
-Y03-	12+22
-Y04-	14+64
-Y05-	11+93 to 1

Micaceous Soils: Micaceous soils were encountered at various depths and locations along the 2) proposed / existing alignments. Below is a summary of the locations where micaceous soils were noted by our field professional(s) at the time of drilling:

Line	Stations		
-L1-	12+00 to 15		
-L2-	14+90		
-Y2-	16+75		
-Y3-	12+22		
-Y4-	11+96 to 14		

3) Water wells: Seven water wells were found within or in close proximity to the proposed right of way at the following locations:

Lina	6
Line	<u>S</u>
-L2-	
-Y5-	

Physiography and Geology

The project corridor is located in western North Carolina in the Piedmont Physiographic Province of North Carolina in Waynesville. Commercial and residential properties exist adjacent to the project corridor. Topography along the project is rolling with elevations along the proposed corridor ranging between $2,615\pm$ to $2,645\pm$ feet (MSL).

Geologically the project area is located within the Coweeta Group of the Blue Ridge Belt and consists of Biotite Gneiss. These are metamorphic rock that were formed around the middle to late Proterozoic period. The Biotite Gneiss is characterized as inequigranular, locally abundant potassic feldspar and garnet; interlayered and gradational with calc-silicate rock, sillimanite-mica schist, mica schist, and amphibolite. Contains small masses of granitic rock.

The residual soils derived from these rocks can contain a high mica content in some locations. Through not encountered, weathered and crystalline rock typically underlay these residual soils at depth.

Water Bodies

The Shelton Creek generally runs from south to north through the project corridor. At the southern side of the project, Shelton Creek flows under W. Marshall Street (-Y2-) through a 7 feet by 5 feet culvert (Culvert No. 1) towards Walnut Street (-Y4-). Shelton Creek then flows north beneath Walnut Street (-Y4-) through

Stations and Offsets (ft)

16+16. 34 RT 16+42, 46 RT 16+68, 24 RT 17+09, 2 RT 17+41, 2 RT 19+76, 33 LT 14+41, 41 RT

Culvert No. 2 and continues to run parallel with Vance Street (-Y5-) to the east and crosses under Vance Street (-Y5-) through Culvert 3 before flowing beyond the project limits.

Soil Properties

Soils encountered during this investigation are separated into three categories: Alluvial, Roadway Embankment, and Residual soils.

Alluvial soils are found in the low lying areas from the nearby Shelton Creek and underlying roadway embankment material. These soils consist of brown, tan, gray, and black, very soft to very stiff, sandy silt (A-4), clayey silt (A-5) and very loose to loose, silty sand (A-2-4) and coarse sand (A-1-b) with varying amounts of organics, mica, and gravel.

Roadway Embankment soils are similar in nature to Residual soils and may be derived from nearby sources. These soils consist of gray, tan, brown, red, orange, yellow, and black, soft to medium stiff, sandy silt (A-4) and silty clay (A-7-6) and very loose to medium dense coarse sand (A-1-b) and silty sand (A-2-4/A-2-5). Varying amounts of clay and trace mica and gravel were encountered within the Roadway Embankment soils.

Residual soils are derived from the weathering of underlying rock in the area. These soils consist of gray, tan, brown, red, orange, yellow, black, and white, soft to stiff, sandy silt (A-4) and clayey silt (A-5) and very loose to medium dense silty sand (A-2-4/A-2-5). The Residual soils contained varying amounts of mica; from trace to highly micaceous.

Ground Water

Ground water measurements were taken in February 2018 during above average rainfall conditions. Ground water elevations ranged between 2,609.5 feet and 2,630.1 feet (MSL). Ground water was not encountered in many of the borings and recorded as dry, FIAD, or caved at the bottom of the boring cylinder. Ground water is not expected to cause any significant impacts.

Bulk Samples

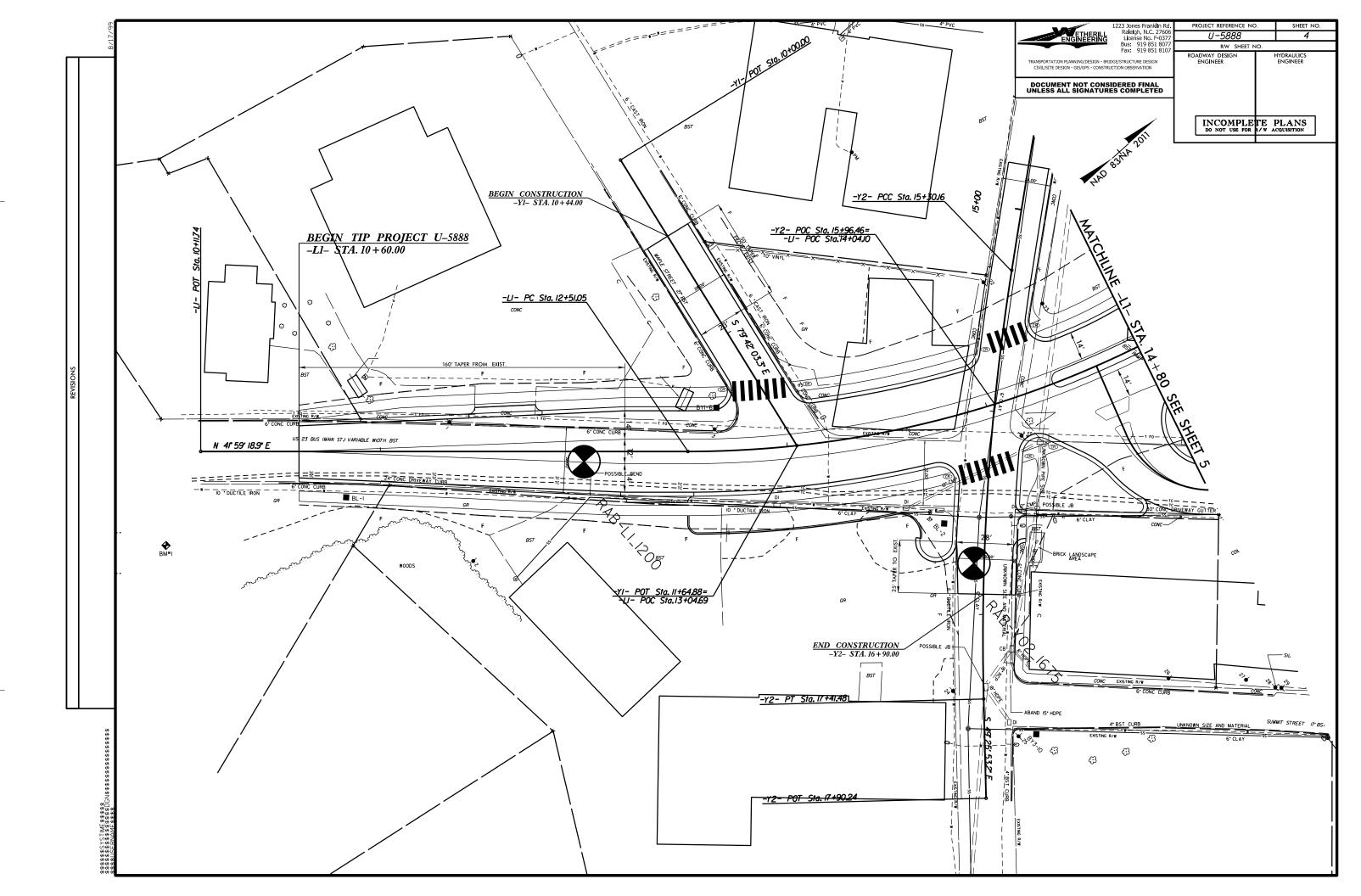
Two bulk samples were collected for CBR and Proctor testing at the following location:

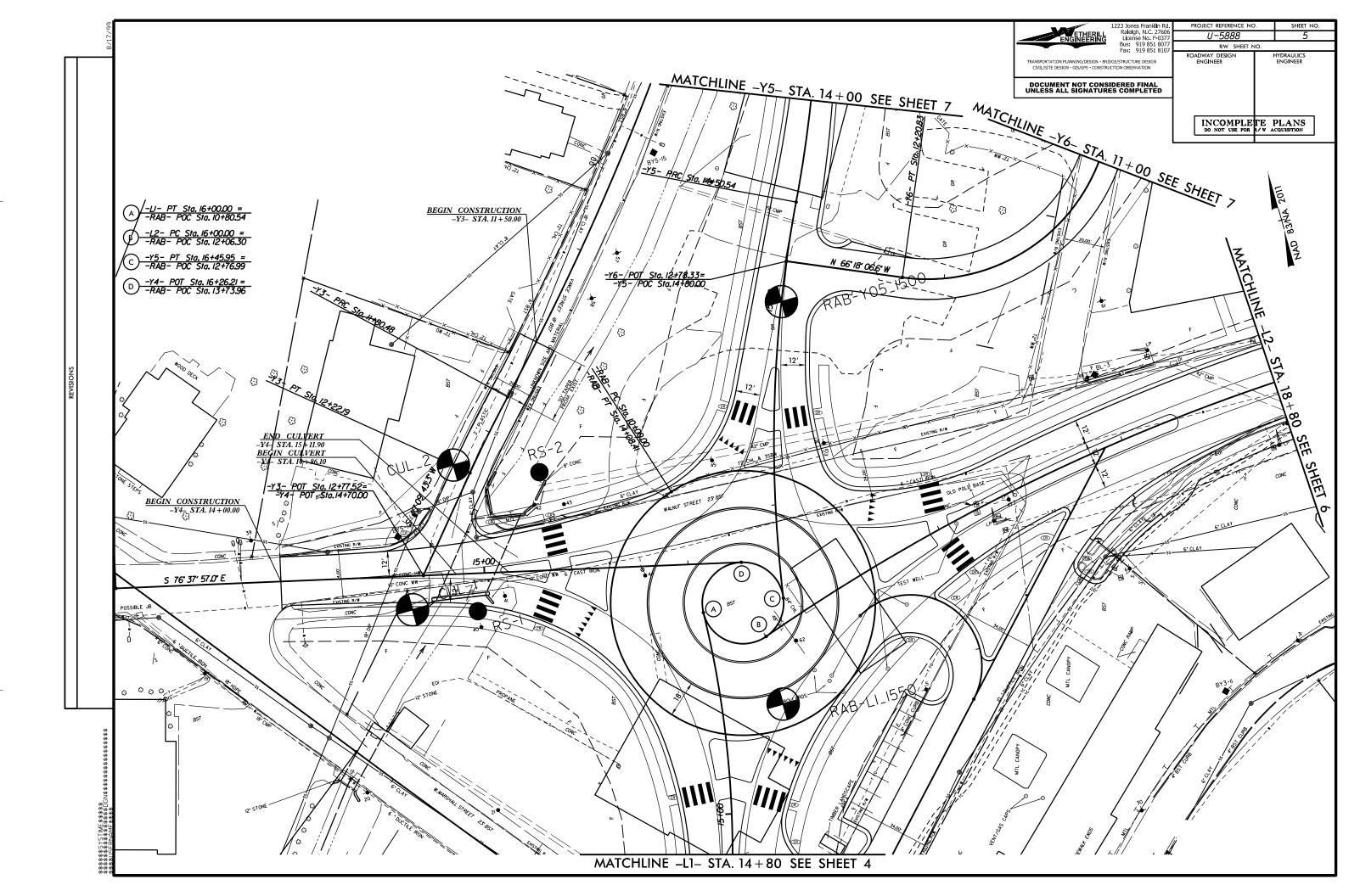
Sample No.	Line	Station & Offset	<u>Depth</u>	Test
BULK-1	-L1-	15+50, 30 RT	1.0 - 10.0'	Proctor, CBR
BULK-2	-Y5-	11+96, 16 RT	1.0 - 10.0'	Proctor, CBR

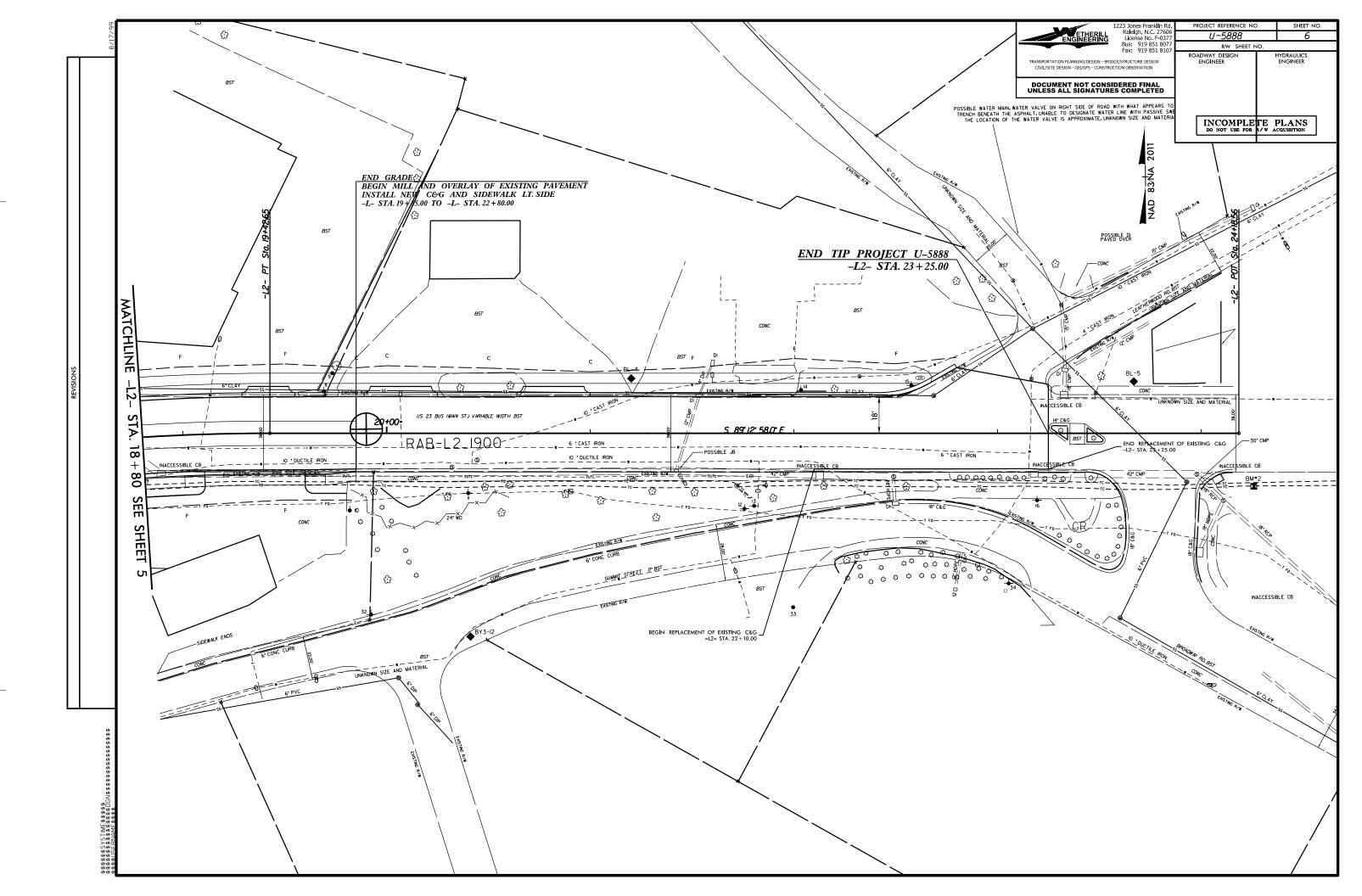
Respectfully Submitted,

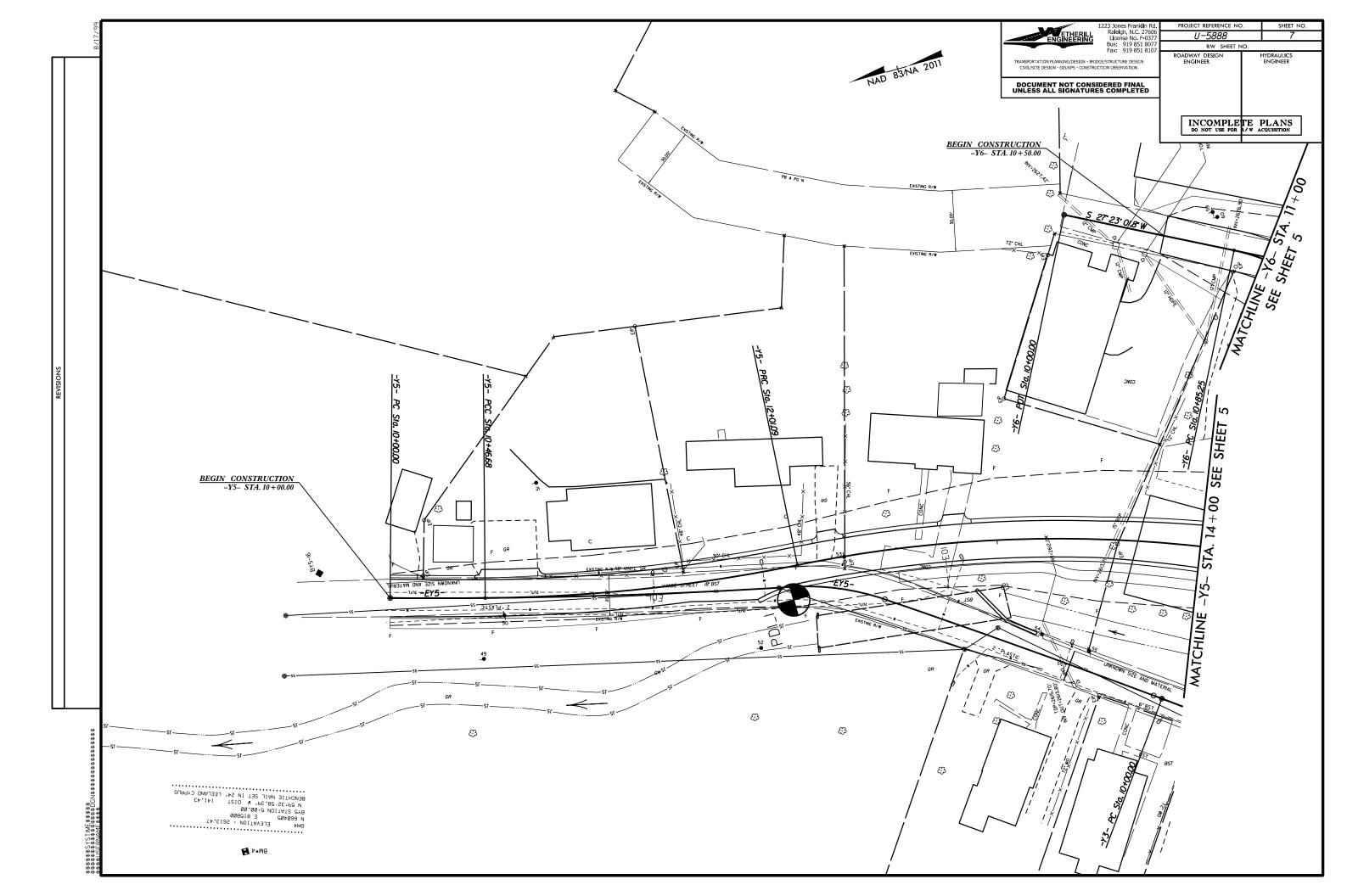
Robert E. Kral, PE Project Manager

Sheet 3B

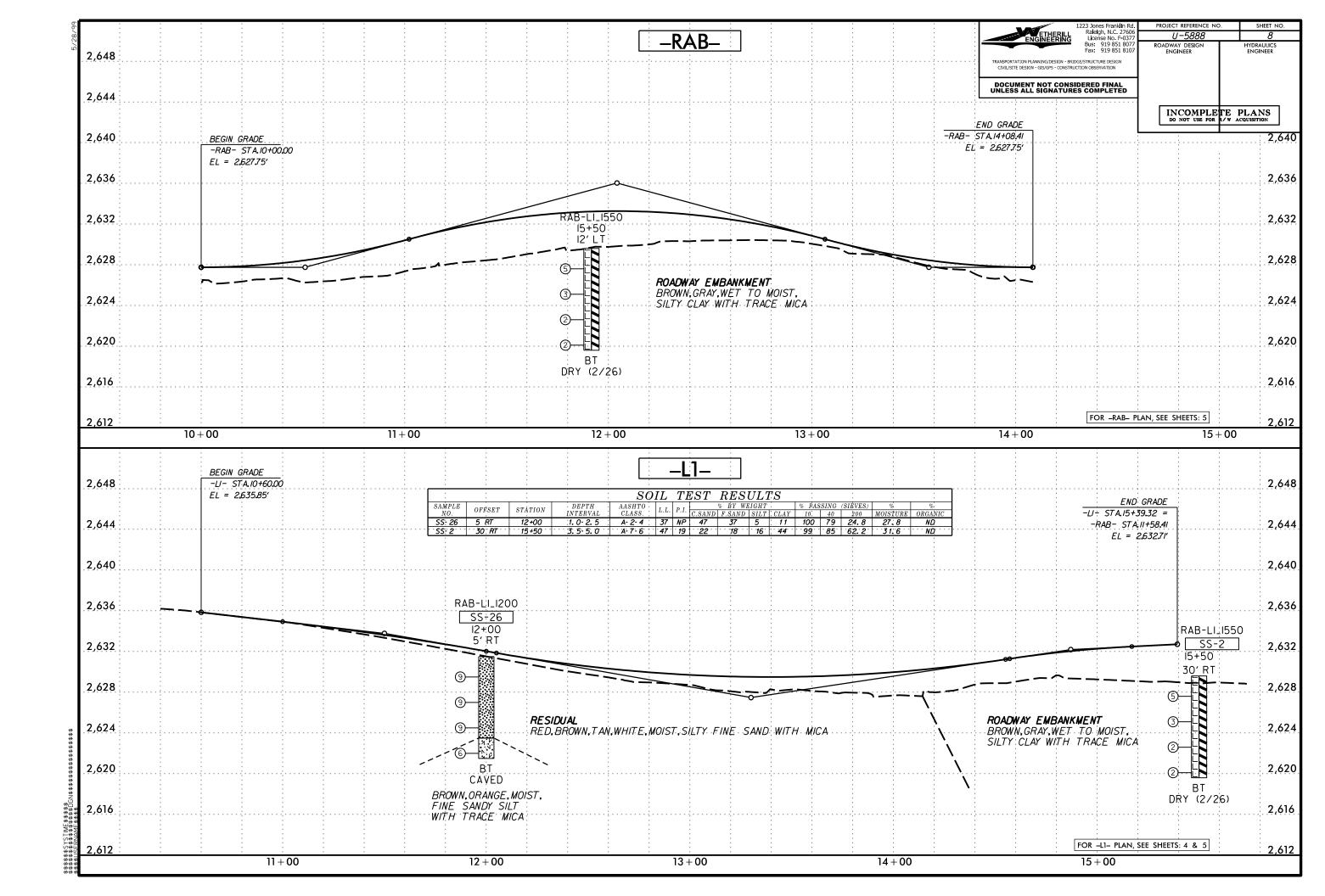




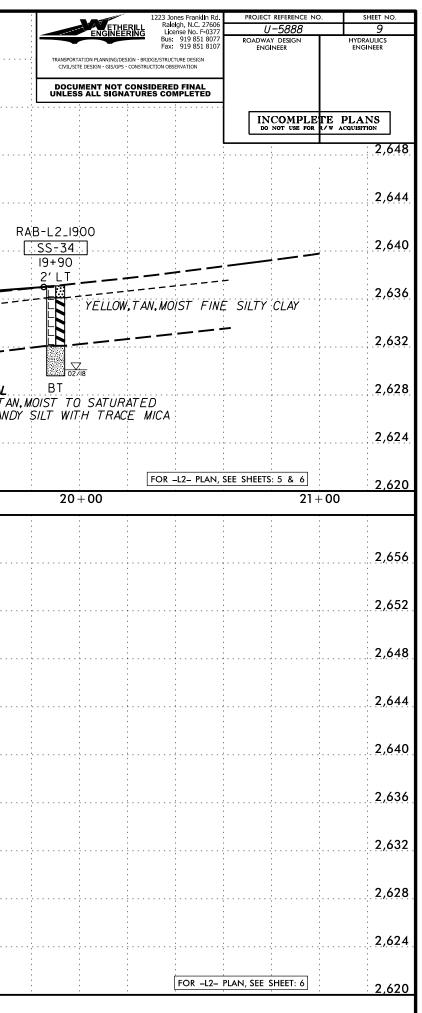


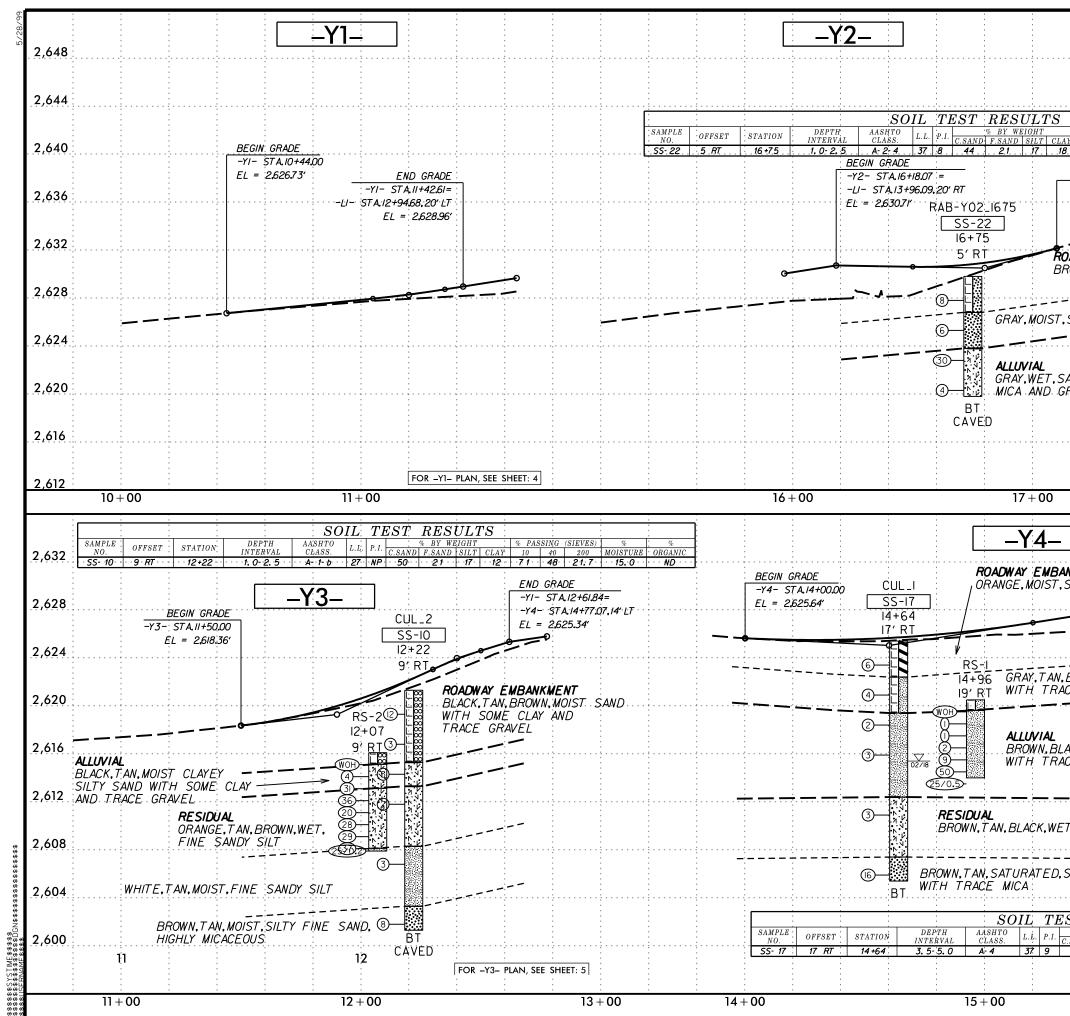


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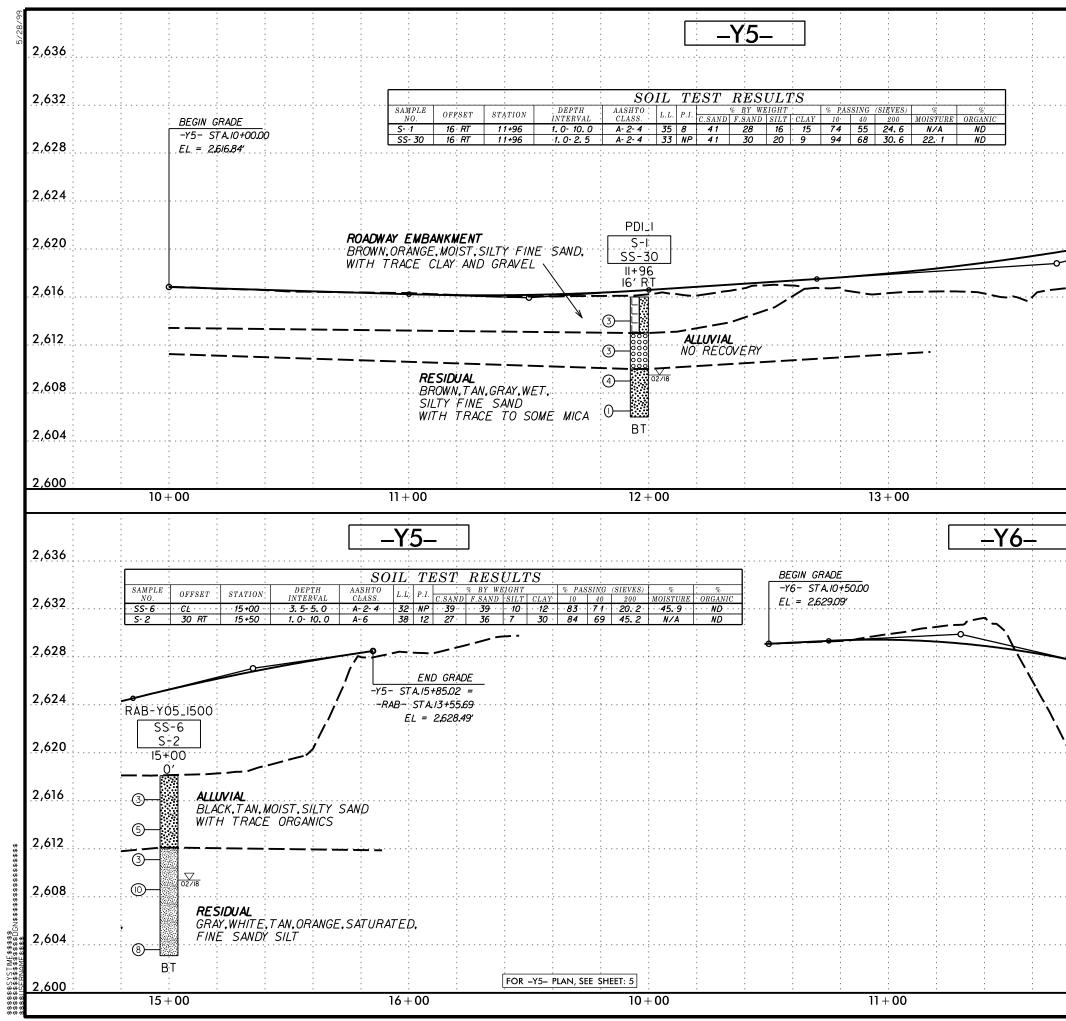


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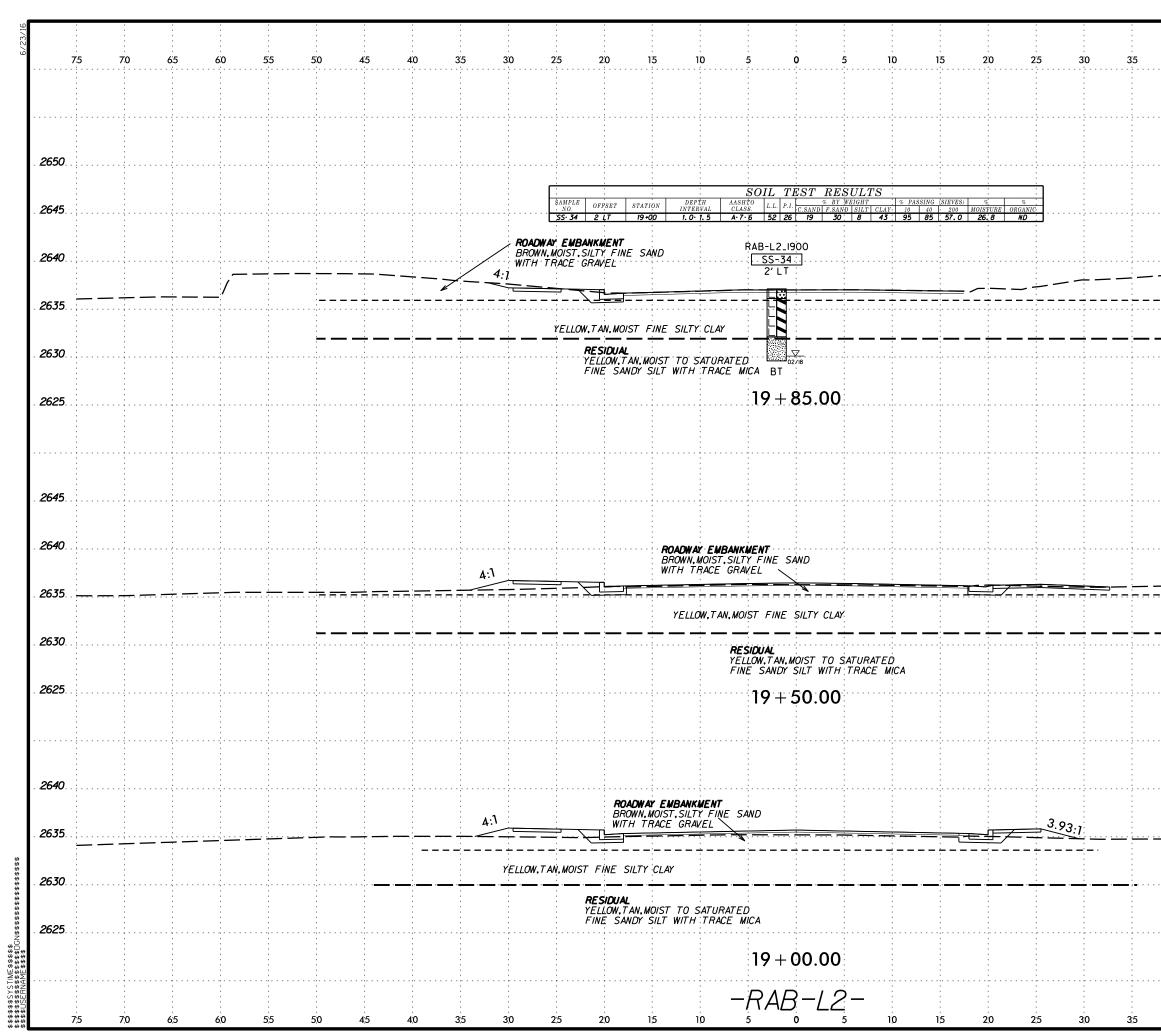




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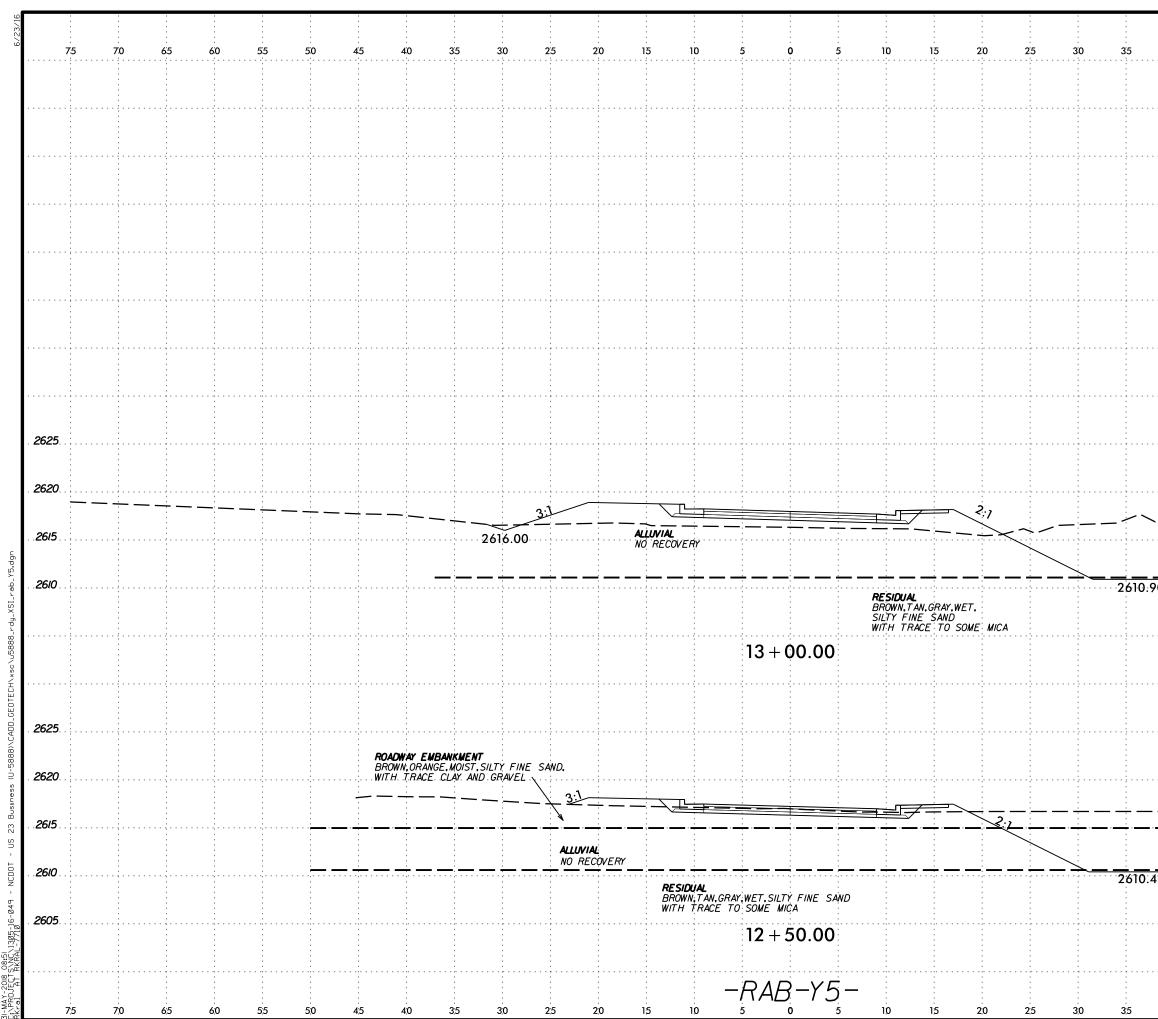
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	2615						# # # 	ROWN, ORAN	VGE.MOIST CLAY A	SILTY FII ND GRAVE	ve sand.			ALLUVIAL 10 RECOV	ERY						` 					
	2610						# # # # # #	ROWN. OR AN	NGE, MOIST 	, SILTY FII ND GRAVE	ve sand.			******	ERY GRAY,WET. TO SOM	SILTY FIN E MICA					~~ 					
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	2610						н В — — —	ROWN, ORAN		SILTY FII ND GRAVE	VE SAND.			******	GRAY.WET. TO SOM		IE SAND				~~					
	2610						н В — — —	ROWN, ORAN		SILTY FII	ve sand.			******	GRAY.WET. TO SOM		IE SAND				~~					
	2610						н В — — —			SILTY FII	ve sand.			******	GRAY.WET. TO SOM		IE SAND							7		
	2610						н В — — —			SILTY FII	ve sand.			******	GRAY.WET. TO SOM		IE SAND				~ 					
	2610						н В — — —			SILTY FII	ve sand.			******	GRAY.WET. TO SOM		IE SAND				~					
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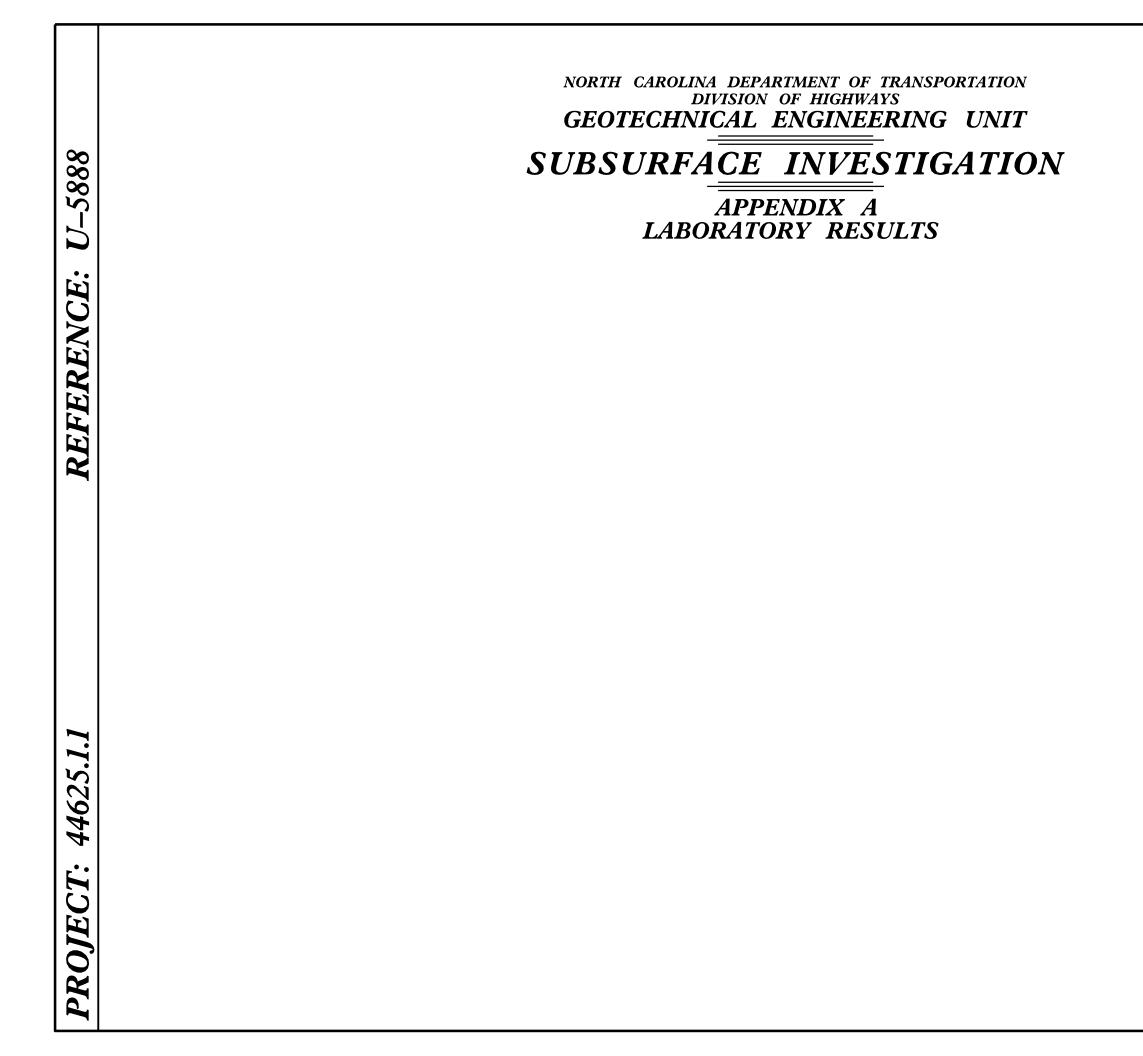
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2	2615						ROADWAY EMBA BROWN, ORANGE, WITH TRACE CL	MOIST,SILT LAY AND GF	Y FINE SAND, RAVEL						———		<u>``</u>				
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# U-5888

1305-16-049

44625.1.1

RAB-L1

15 + 50

1.5" 1"3/4" 1/2"3/8"

Raleigh, NC

WEI

US 23 Business (U-5888)

#4

1/2"

16%

ND

38

27%

×

10

As Defined by NCDOT

#10

Project #:

Project Name:

State Project #:

Sample Description:

Client Name:

Address:

Alignment

Station #:

100%

90%

80%

70%

60%

50%

30%

20%

10%

0%

Gravel

Liquid Limit

100

Gravel

Coarse Sand

Apparent Relative Density

Coarse Sand

Hard & Durable

References / Comments / Deviations:

Karen Warner

Technician Name

Rob Kral

Technical Responsibility

Description of Sand & Gravel Particles:

Maximum Particle Size

a 40%

**Particle Size Analysis of Soils** 

AASHTO T88 as Modified by NCDOT

S&ME, Inc. 9751 Southern Pine Blvd., Charlotte, NC 28273

RAB-L1-1550

#40 #60 #100 #200 #270

0.1

Fine Sand

Silt

Clay

23%

30%

26

Silt

Laboratory Technician

Position

Project Manager

Position

Silt

Clay

7%

Weathered & Friable

30 RT

F.A. Project No:

Boring #:

Offset:

#20

Particle Size (mm)

Coarse Sand

Plastic Limit

Fine Sand

Rounded

118-06-0305

Certification No.

Signatur

ND=Not Determined.

Soft

Moisture Content

Soil Mortar (-#10 Sieve)

36%

Fine Sand

1

< 75 mm and > 2.00 mm

< 2.00 mm and >0.25 mm



3/16/18

3/5-16/18

2/26/18

1.0 - 10.0'

0.001

6%

25%

45.2%

12

30%

Х

3/16/2018

Date

3/28/2018

Date

0 A-6 (3)

U-5888

Sample Date:

Depth (ft):

< 0.25 mm and > 0.05 mm

< 0.05 and > 0.005 mm

< 0.005 mm

Clay

0.01

% Passing #200

Angular

Plastic Index

Report Date:

TIP NO:

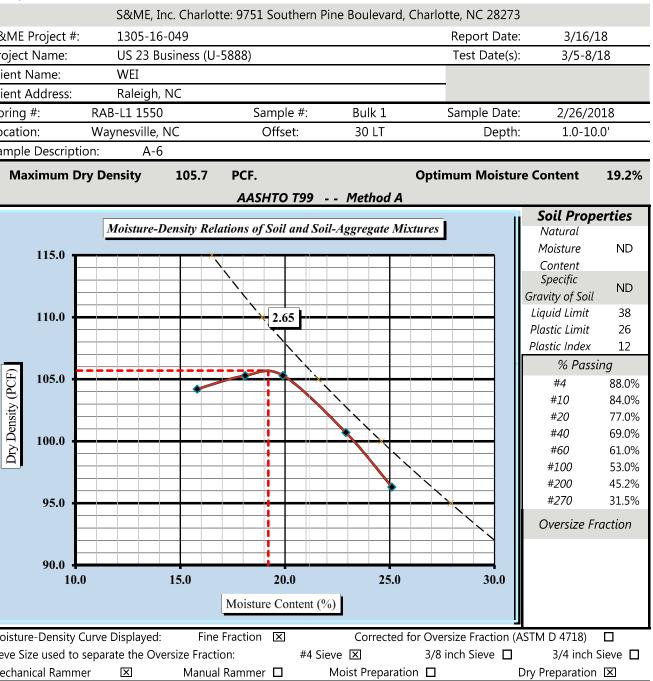
Test Date(s):

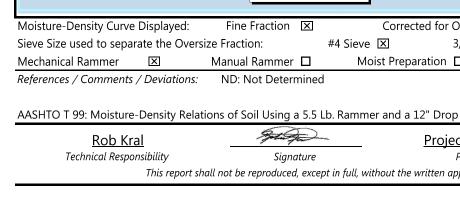
Form No. TR-D698-2 Revision No. : 1

Revision Date: 07/25/17

#### Quality Assurance

· ·			
	S&ME, I	nc. Charlot	te: 9751 Southerr
S&ME Project #:	1305-16	6-049	
Project Name:	US 23 B	usiness (U-	5888)
Client Name:	WEI		
Client Address:	Raleigh,	NC	
Boring #:	RAB-L1 1550	)	Sample #:
Location:	Waynesville,	NC	Offset:
Sample Descripti	on: A-6	)	
Maximum D	ry Density	105.7	PCF.
_			AASHTO T99
	Moisture-1	Density Rel	ations of Soil and
115.0			· · · · · · · · · · · · · · · · · · ·
115.0		*	
115.0		*	





S&ME. Inc.

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Boring RAB-L1 1550 NCDOT Classification.xls

S&ME,Inc. - Corporate

Raleigh, NC. 27616

#### **MOISTURE - DENSITY REPORT**



**Project Manager** Position This report shall not be reproduced, except in full, without the written approval of S&ME, Inc.

3/28/2018 Date

Boring RAB-L1-1550 (1-10') Proctor.xlsx Page 1 of 1

Form No. TR-D1883-T193-3 Revision No. 2 Revision Date: 08/11/17

### **CBR** (CALIFORNIA BEARING RATIO) **OF LABORATORY COMPACTED SOIL**



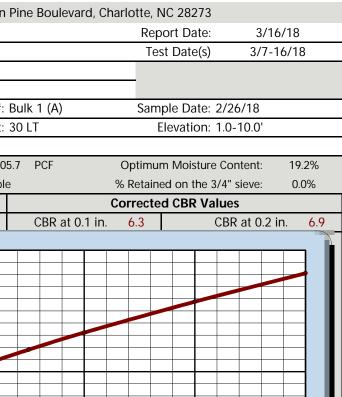
Form No. TR-D1883-T193-3 Revision No. 2 Revision Date: 08/11/17

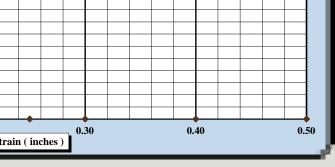
## **CBR** (CALIFORNIA BEARING RATIO) **OF LABORATORY COMPACTED SOIL**

			AASHTC	) T 193				
	S&ME, Inc. Cha	rlotte: 9751 S	Southern	Pine Boul	evard, C	harlotte, N	IC 28273	
roject #: 130	)5-16-049					Rep	ort Date:	3/16/18
	23 Business (U-5	888)						3/7-16/18
-		,					. ,	
	eigh, NC							
	-	S	ample #:	Bulk 1 (B)		Sam	ple Date: 2/2	6/18
5			-					
-								
		imum Drv Der	nsity: 105	5.7 PCF		Optimur	n Moisture Coi	ntent: 19.2%
		-	•					
		-						
			6.6	CBR	at 0.1 in	1		
			0.0	OBIT		0.7	001	
200.0								
Project Name:    US 23 Business (U-5888)    Test Date(s)    3/7-16/18      Client Name:    WEI        Client Address:    Raleigh, NC        Boring #:    RAB-L1-1550    Sample #: Bulk 1 (B)    Sample Date: 2/26/18      Location:    Raleigh, NC    Offset: 30 LT    Elevation: 1.0-10.0'      Sample Description:    A-6      AASHTO T99    Method A    Maximum Dry Density: 105.7 PCF    Optimum Moisture Content: 19.2%      Line 20:    Use an alternate discription here if applicable    % Retained on the 3/4" sieve: 0.0%      Uncorrected CBR Values      CBR at 0.1 in.    5.9    CBR at 0.2 in. 6.6								
S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273      troject Name:    US 23 Business (U-5888)      Test Date(s)    3/7-16/18      Dient Name:    WEI      Dient Mate:    Optimum Molsture Content:    192%      CBR Sample Preparation:    Set Cash at 0.2 In    6.6      Dient Mate:    Gene at 0.								
l ∞								
0.0		<b>↓ ↓ ↓</b>		•				
0.00	0.10			in ( inches )			0.40	0.50
				(				
BR Sample Preparation	: Performed a	on the fine frac	tion					
The er	ntire gradation wa	s used and cor	npacted in	a 6" CBR r	nold in a	ccordance v	vith	
	Before Soaking	g						
		)					-	
,	3							
Moisture Content of th	ne Compacted Spe	cimen		Mois	ture Con	tent (top 1"	after soaking)	
Percent C	Compaction		100.0%		F	Percent Swe	ell	1.0%
Soak Time:	: 96 Hours	Surcharge	e Weiaht	10.0		Surcha	rae Wt. per s	a. Ft. 51.0
		•	-		A		• •	•
-								
IOLES/DEVIALIONS/RELEIE	inces.							
		67	3					
<u>Rob Kra</u>	<u>1</u>	- John -	Te-		<u>Pro</u>	ject Mana	ager	<u>3/28/201</u>
Technical Respons	sibility	Signa	ture			Position		Date
	5							
	-	ot be reproduced	l, except in f	ull without t	he written	approval of	S&ME, Inc.	

				,	AASHT	O T 19	3							
	S&	&ME, Inc. C	Charlotte:	9751 So	uthern	Pine E	Bouleva	ard, Cl	harlott	e, NC	28273			
Project #:	1305-1	6-049								Report	t Date:		3/16/18	}
Project Name:	US 23	Business (l	J-5888)							Test D	Date(s)	3,	/7-16/1	8
Client Name:	WEI													
Client Address	s: Raleigh	n, NC												
Boring #:	RAB-L1-155	50		San	nple #:	Bulk 1	(A)		S	ample	e Date: 2	/26/18		
	-	,			Offset:	30 LT				Elev	ation: 1	.0-10.0	)'	
Sample Descri	iption: A-	-6												
AASHTO T99	Method A	N	1aximum E	Dry Densi	ty: 10	)5.7 P	CF		-					9.2%
Li	ne 20: Use ar	n alternate o	discription	here if ap	oplicabl	е			% Ret	ained	on the 3/	4" sieve	e: C	0.0%
	Uncorre	cted CBR	Values						Corre	cted (	CBR Val	ues		
CBR at 0.1 i	n. 6.3		CBR at (	).2 in.	6.9	C	BR at (	0.1 in.	6.3	3	C	BR at 0	).2 in.	6.9
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			Specimen			٦	Noistur			•	ter soakiı	ng)		
	Percent Com	paction		Ģ	99.7%			Р	Percent	Swell			1.0	%
So	ak Time:	96 Hours	Sur	charge V	Neight	1	0.0		Sur	charg	e Wt. pe	r sq. Ft	. 5	51.0
Liq	uid Limit	38		Plastic	: Index		12	A	ssumed	Appare	ent Relativ	e Densit	y 2	.650
Notes/Deviation	ns/Reference	S:												
Client Address:    Raleigh, NC      Boring #:    RAB-L1-1550      Sample Description:    A-6      AASHTO T99    Method A      Maximum Dry Density:    105.7    PCF    Optimum Molsture Content:    19      Line 20:    Use an alternate discription here if applicable    % Retained on the 3/4" siew:    0      Uncorrected CBR Values    Corrected CBR Values    Corrected CBR Values      CBR at 0.1 in    6.3    CBR at 0.2 in.    6.9      CBR at 0.1 in    6.3    CBR at 0.2 in.    6.9      CBR at 0.1 in    6.3    CBR at 0.2 in.    6.9      CBR at 0.1 in    6.3    CBR at 0.2 in.    6.9      CBR at 0.1 in    6.3    CBR at 0.2 in.    6.9      CBR at 0.1 in    6.3    CBR at 0.2 in.    6.9      CBR at 0.1 in    6.3    CBR at 0.2 in.    6.9      CBR at 0.1 in    6.3    CBR at 0.2 in.    6.9      CBR at 0.1 in    6.3    CBR at 0.2 in.    6.9      CBR at 0.1 in    6.3    CBR at 0.2 in.    6.9      CBR at 0.1 in.    6.3    CBR at 0.2 in.    6.9 <t< td=""><td></td></t<>														
	Rob Kral		يحر	Boting	Ð	•		Proi	iect M	lanad	er		3/28/2	2018
		ty		Signatur	re			<u></u>		•	<u></u>			
	-	-	ll not be ren	0		full with	out the u	written			ME, Inc.		2.31	
S&ME, Inc Co		nis report sha	II not be rep	3201	except in Spring F eigh, NC	Forest R	oad	written			ME, Inc. 2-L1-1550	(1-10')	CBR (A) Page 1	







1305-16-049

44625.1.1

Raleigh, NC

RAB-Y05

11+96

WEI

US 23 Business (U-5888)

Project #:

Project Name:

State Project #:

Sample Description:

Client Name:

Address:

Alignment

Station #:

**Particle Size Analysis of Soils** 

AASHTO T88 as Modified by NCDOT

S&ME, Inc. 9751 Southern Pine Blvd., Charlotte, NC 28273

PDI-1

16 RT

F.A. Project No:

Boring #:

Offset:



3/16/18

3/5-16/18

2/26/18

1.0 - 10.0'

0 A-2-4 (0)

U-5888

Report Date:

TIP NO:

Sample Date:

Depth (ft):

Test Date(s):

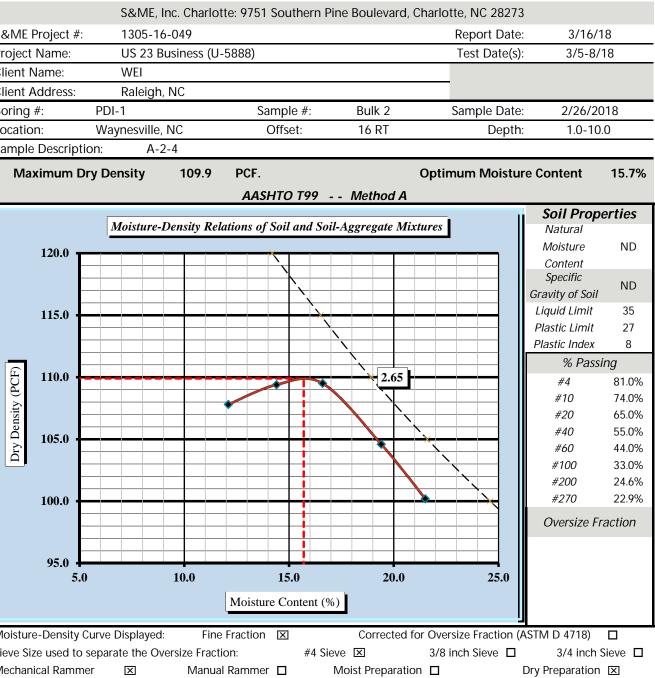
Revision Date: 07/25/17

Form No. TR-D698-2

Revision No. : 1

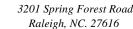
## **MOISTURE - DENSITY REPORT**

Maximum Di	ry Density 109.9	PCF.
Sample Description	on: A-2-4	
Location:	Waynesville, NC	Offset:
Boring #:	PDI-1	Sample #:
Client Address:	Raleigh, NC	
Client Name:	WEI	
Project Name:	US 23 Business (U	-5888)
S&ME Project #:	1305-16-049	
	S&ME, Inc. Charlo	tte: 9751 Southerr
Quality / issuitance		



Moisture-Density Curve	Displayed:	Fine Fraction	X	
Sieve Size used to separ	rate the Overs	size Fraction:		#4
Mechanical Rammer	X	Manual Rammer		
References / Comments	/ Deviations:	ND: Not Deterr	ninec	1
AASHTO T 99: Moisture	-Density Rela	tions of Soil Using a	a 5.5 l	_b. F
Rob Kr	al	Speries	D	_
Technical Respo		Signa	ature	
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S&ME,Inc. - Corporate



	1.5" 1"3/4"	1/2'3/8"	#4	#10	#20	#40	#60	#100	#200	#270				
100%		+ + +	+	+		+	+	+		+				
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0%		10		+	1		+	0	.1		0.0	<u>      .</u> 1		0.001
100		10			Particl	e Size (	mm)	Ū	••		0.0	•		0.001
	As Defin								Sand					0.05 mm
	avel			$d \ge 2.00$					ilt Iarr		<		nd > 0.0	
Maximum Pa	e Sand article Size	1/2		and >0.25	Coars	e San	d	U.	lay	30%	Silt	< 0	.005 m	<u>n</u> 12%
Gravel		26			Fine S					21%	Clay			11%
Apparent Re	lative Density	NI	)		Moist	ure C	onter	nt			% Pass	ing #	200	24.6%
Liquid Limi	t	35			Plasti	e Lim	it			27	Plastic	[ndex		8
					l Mort			sieve)						
		41%	1	Fine		28	<u>%</u>			Silt	16%		Clay	15%
-	of Sand & Gra & Durable	vel Partio	cles:	Rour	ided Soft					Weat	Ar nered & F	igular		
	omments / Devia		ND=N	ot Determ						weat	leleu & r	Tiable		
1119010110057 00			112 11											
	aren Warner			<u>118-06</u>		-		L	abora	atory Tec	<u>chnician</u>		<u>3/</u>	<u>16/2018</u>
Te	echnician Name			Certifica	tion No.					Position				Date
	Rob Kral			Both	Z	2			Pro	ject Mar	ager		3/	28/2018
Techr	ical Responsibility			Signa	ıture					Position				Date
	Th	is report sh	all not be	reproduced	d, except	t in full,	witho	it the wr	itten a <u>j</u>	pproval of S	&ME, Inc.			

Boring PDI 1 NCDOT Classification.xls

Sheet 20

&  $\parallel \equiv$ 

Rammer and a 12" Drop

Project Manager Position This report shall not be reproduced, except in full, without the written approval of S&ME, Inc. 3/28/2018 Date

Boring PDI -1 (1-10') Proctor.xlsx Page 1 of 1

Form No. TR-D1883-T193-3 Revision No. 2 Revision Date: 08/11/17

### **CBR** (CALIFORNIA BEARING RATIO) **OF LABORATORY COMPACTED SOIL**



Form No. TR-D1883-T193-3 Revision No. 2 Revision Date: 08/11/17

## **CBR** (CALIFORNIA BEARING RATIO) **OF LABORATORY COMPACTED SOIL**

					110	нто т	т 102								
	58.1	VIE Inc (	Charlotte:	0751				وررمار	rd C	harlotte		08073			
roject #:	1305-16		Jildi lotte.	9751	South		He bot	lieva	ru, c				2/14	/10	
roject #:			1 5000)									Date:	3/16/18 3/7-16/18		
roject Name:	WEI	usiness (l	J-5888)								Test D	ale(s)	3/7-1	0/18	
Client Address: Coring #: PD	Raleigh,	NC				#. D.	JL 2 /F	<u>,</u>		6.0		Data: 2/2	( /10		
3				3			ulk 2 (E	5)		52		Date: 2/2			
	eigh, NC				Olis	et: 16	DRI				Elev	ation: 1.0	- 10.0		
ample Descripti	on: A-2 <i>Aethod A</i>		<u>ланіна праві Г</u>			100.0	PCF			Ontin		laistura Ca		15 70/	
			/laximum [	-	-	109.9	PUF					loisture Co		15.7%	
	20: Use an a		-	nere II	applic	able						on the 3/4"		0.0%	
	Uncorrect	tea CBR		2.2 :	0.7	_			1			BR Value		- 07	
CBR at 0.1 in.	8.2	<u> </u>	CBR at (	).2 in.	9.7		CBR	at 0	. I In.	8.2		CBF	R at 0.2 i	n. 9.7	
300.0						- T						<b>I</b> 1			
200.0															
Stress (PSI)															
Less (															
Str															
100.0															
								_							
0.0															
0.00		0.10			0.20	Stuain	(inches		.30			0.40		0.50	
						Stram	( inches	;)						_	
BR Sample Prepa	ration:	Perform	ed on the f	ine frad	ction										
	The entire g	gradation	was used a	and cor	mpacte	d in a	6" CBR	mola	l in a	ccordand	e with				
	Ве	efore Soal	king												
Compactive	e Effort (Blo	ws per La	iyer)		56						After	Soaking			
Initia	Initial Dry Density (PCF)					109.5				Dry Den:	sity (P0	ty (PCF) 1			
Moisture Conten	t of the Co	f the Compacted Specimen			15.0%			isture	Con	tent (top	) 1" aft	er soaking)	) 1	8.6%	
Per	cent Compa	action			99.6	%			F	Percent S	Swell			1.1%	
Soak	Time: 9	6 Hours	Sur	charge	e Weig	nht	10.0	)		Surc	harde	Wt. per s	sa. Ft.	50.9	
Liquid		35		-	stic Inc	-	8		A		•	nt Relative E	•	2.650	
lotes/Deviations/l															
IOLES/DEVIALIOUS/I	References:														
				6	>	Ň									
Rol	<u>b Kral</u>			John	<del>p</del>	<u> </u>	_		<u>Pro</u>	ject Ma	anage	<u>er</u>	<u>3/2</u>	8/2018	
Technical	Responsibility			Signa	ature					Position	ו			Date	
				5	illui o										
	This	report sha	ll not be rep	0		t in full	without	the w	ritten	approval	of S&N	IE, Inc.			
S&ME, Inc Corpo		report sha	ll not be rep	roduced	d, except		without est Road		ritten	approval		1E, Inc. 1g PD1-1 (1	-10) CBR	(B).xlsx	

	ллсит	ОТ 193						
S&ME Inc Ch	rlotte: 9751 Southerr		harlotta NC 28273					
	inotte: 9751 Southerr	I Pille Doulevalu, C		2/1//10				
Project #: 1305-16-049		Report Date:	3/16/18					
Project Name: US 23 Business (U-5	0888)		Test Date(s)	3/7-16/18				
Client Name: WEI								
Client Address: Raleigh, NC								
Boring #: PDI-1		: Bulk 2 (A)	Sample Date: 2/26					
Location: Raleigh, NC	Offset	: 16 RT	Elevation: 1.0-7	10.0'				
Sample Description: A-2-4								
	5 5	09.9 PCF	Optimum Moisture Con					
Line 20: Use an alternate dise		le	% Retained on the 3/4" s					
Uncorrected CBR Va			Corrected CBR Values					
CBR at 0.1 in. 10.5 C	BR at 0.2 in. 11.6	CBR at 0.1 in.	10.5 CBR	at 0.2 in. 11.0				
400.0	T T T T T T T_			<b>_]</b>				
300.0								
Stre								
100.0								
	0.20	0.30	0.40	0.50				
	St	rain ( inches )						
CBR Sample Preparation: Performed The entire gradation wa	on the fine fraction	n a 6" CPD mold in a	cordance with					
Before Soakin								
Compactive Effort (Blows per Layer	5		After Soaking					
Initial Dry Density (PCF)	110.7	Final I	,					
Moisture Content of the Compacted Spe			tent (top 1" after soaking)	110.0 (aking) 18.2%				
Percent Compaction	100.8%		Percent Swell	0.8%				
·								
Soak Time: 96 Hours	Surcharge Weight		Surcharge Wt. per so	•				
Liquid Limit 35	Plastic Index	K 8 A	Assumed Apparent Relative De	ensity 2.650				
Notes/Deviations/References:								
Dob Kral	Billion	Dro	iact Managar	2/20/2010				
Rob Kral	Clanation	<u> </u>	ject Manager Position	<u>3/28/2018</u>				
Technical Responsibility	Signature	full without the writter		Date				
inis report shall n	ot be reproduced, except in	iun without the Written	αμριονάι οι S&IVIE, INC.					
S&ME, Inc Corporate	3201 Spring I		Boring PD1-1 (1-					
	Raleigh, N	C. 27616		Page 1 of 1				



