

NOTE: SEE SHEET 2A 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.	50067.1.1 (U-5524)	1	14
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
50067.1.1	HPP-0627(7)	P.E.	
		RAW & UTIL.	

CONTENTS

LINE	STATION	PLAN	PROFILE	XSECT
-L-	10+00.00 TO 13+93.43	4	5	6
ROUND	10+00.00 TO 13+58.14	4	5	7-8
Y1	10+00.00 TO 13+53.07	4	5	9
Y2	10+00.00 TO 14+19.58	4	5	10
Y3	10+00.00 TO 13+16.89	4	5	11

**ROADWAY
SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 50067.1.1 (U-5524) F.A. PROJ. HPP-0627(7)
COUNTY ROBESON
PROJECT DESCRIPTION SR 1836 (WATER STREET) FROM SR 1600
(5TH STREET) TO 8TH STREET

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 1909 TOTTENHAM, NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

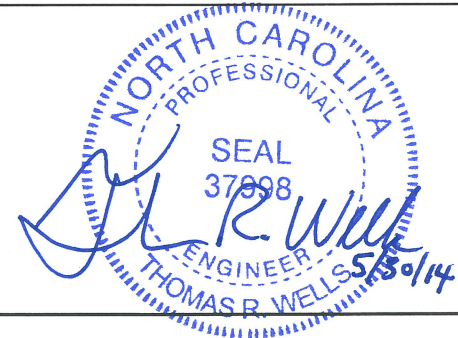
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND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

CONTRACT: ID: U-5224

PERSONNEL
S. WHICHARD
D. RHODES

INVESTIGATED BY D. GOODNIGHT
CHECKED BY T. WELLS
SUBMITTED BY KLEINFELDER
DATE MAY 2014



DRAWN BY: W. FELDER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

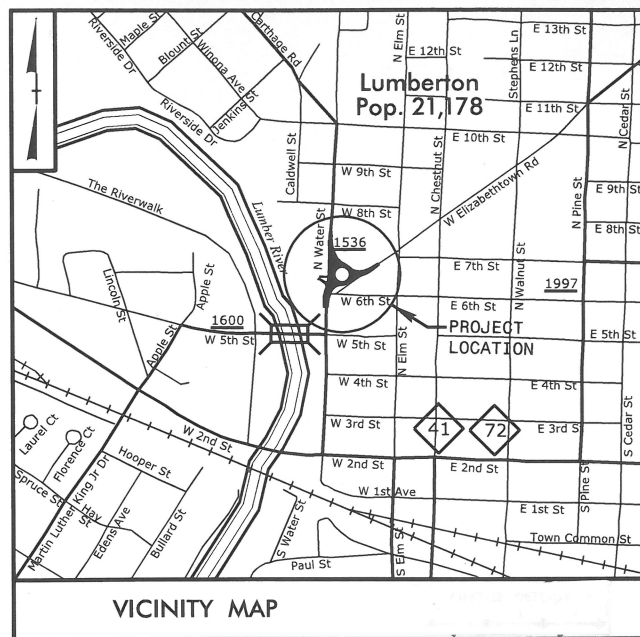
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS	
SOIL IS CONSIDERED TO BE THE 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 STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>		WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR , SUBANGULAR , SUBROUNDED , OR ROUNDED .		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, 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) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)		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, 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 DISLOGGED 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 (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. 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 (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. 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.	
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL CLASS. GRANULAR MATERIALS (≤ 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS 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 SYMBOL % PASSING #10, #40, #200 LIQUID LIMIT, PLASTICITY INDEX, GROUP INDEX USUAL TYPES OF MAJOR MATERIALS GEN. RATING AS A SUBGRADE PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30		MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. COMPRESSIBILITY SLIGHTLY COMPRESSIBLE, MODERATELY COMPRESSIBLE, HIGHLY COMPRESSIBLE PERCENTAGE OF MATERIAL ORGANIC MATERIAL, GRANULAR SOILS, SILT-CLAY SOILS, OTHER MATERIAL GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING, STATIC WATER LEVEL AFTER 24 HOURS, PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA, SPRING OR SEEP		WEATHERING FRESH, VERY SLIGHT, SLIGHT, MODERATE, MOD. SEV., SEVERE, VERY SEVERE, COMPLETE ROCK FRESH, CRYSTALLINE BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. 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. 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. 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. 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> 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, YIELDS SPT N VALUES > 100 BPF</i> ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> 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.		TERMS AND DEFINITIONS	
CONSISTENCY OR DENSENESS PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE), RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/F ²)		MISCELLANEOUS SYMBOLS ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION, SOIL SYMBOL, ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT, INFERRED SOIL BOUNDARY, INFERRED ROCK LINE, ALLUVIAL SOIL BOUNDARY, DIP & DIP DIRECTION OF ROCK STRUCTURES, TEST BORING, AUGER BORING, CORE BORING, MONITORING WELL, PIEZOMETER INSTALLATION, SLOPE INDICATOR INSTALLATION, CONE PENETROMETER TEST, SOUNDING ROD		ROCK HARDNESS VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. 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. CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. 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. 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.			
TEXTURE OR GRAIN SIZE U.S. STD. SIEVE SIZE OPENING (MM), BOULDER, COBBLE, GRAVEL, COARSE SAND, FINE SAND, SILT, CLAY		ABBREVIATIONS AR - AUGER REFUSAL, BT - BORING TERMINATED, CL - CLAY, CPT - CONE PENETRATION TEST, CSE - COARSE, DMT - DILATOMETER TEST, DPT - DYNAMIC PENETRATION TEST, e - VOID RATIO, F - FINE, FOSS. - FOSSILIFEROUS, FRAC. - FRACTURED, FRACTURES, FRAGS. - FRAGMENTS, HI. - HIGHLY, MED. - MEDIUM, MICA - MICAEOUS, MOD. - MODERATELY, NP - NON PLASTIC, ORG. - ORGANIC, PMT - PRESSUREMETER TEST, SAP. - SAPROLITIC, SD. - SAND, SANDY, SL. - SILT, SILTY, SLI. - SLIGHTLY, TCR - TRICONE REFUSAL, w - MOISTURE CONTENT, V - VERY, VST - VANE SHEAR TEST, WEA. - WEATHERED, Wt - UNIT WEIGHT, % - DRY UNIT WEIGHT, S - BULK, SS - SPLIT SPOON, ST - SHELBY TUBE, RS - ROCK, RT - RECOMPACTED TRIAXIAL, CBR - CALIFORNIA BEARING RATIO		ROCK HARDNESS			
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION		EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS, ADVANCING TOOLS, HAMMER TYPE, CORE SIZE, HAND TOOLS		FRACTURE SPACING TERM, SPACING			
PLASTICITY NONPLASTIC, LOW PLASTICITY, MED. PLASTICITY, HIGH PLASTICITY		INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED		BEDDING TERM, THICKNESS			
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.		NOTES:		FRAC. SPACING BENCH MARK: BORING ELEVATIONS OBTAINED USING U5524.TIN FILE DATED 1/13/2014. ELEVATION: N/A FT.			

09/09/15

TIP PROJECT: U-5524

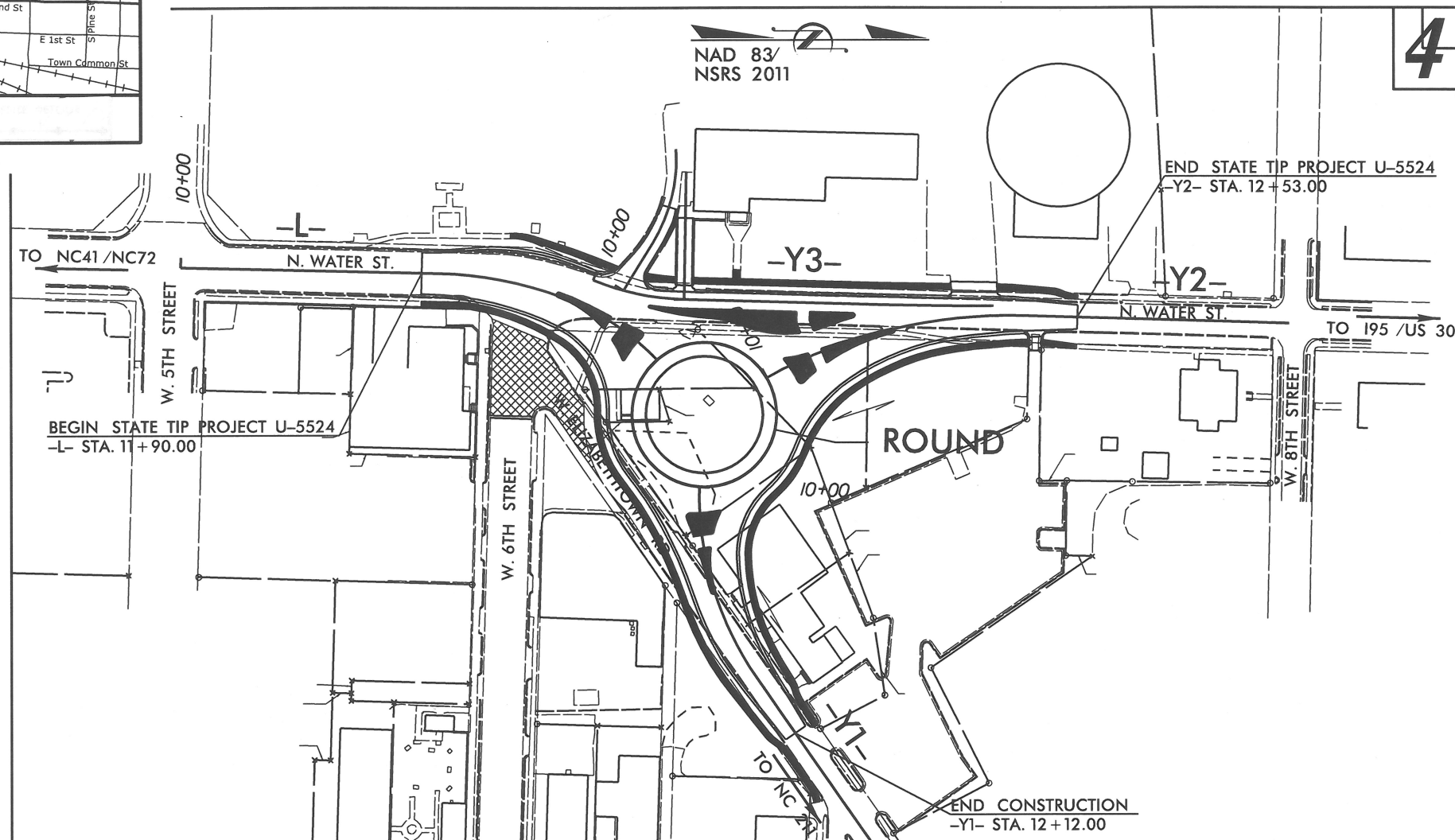
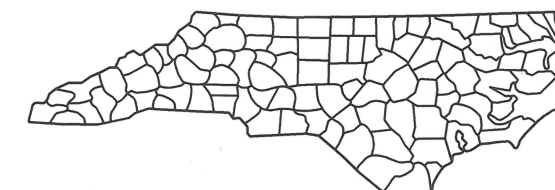


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ROBESON COUNTY

LOCATION: SR 1536 (WATER STREET) IMPROVEMENTS FROM SR 1600 (5TH STREET) TO 8TH STREET
TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING & PAVEMENT MARKINGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5524	2A	14
STATE WBS ELEMENT	F.A. PROJ. NO.	DESCRIPTION	
50067.1.1	HPP-0627(7)	PE	



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

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONTRACT:

<p>GRAPHIC SCALES</p> <p>50 25 0 50 100 PLANS</p> <p>50 25 0 50 100 PROFILE (HORIZONTAL)</p> <p>10 5 0 10 20 PROFILE (VERTICAL)</p>	<p>DESIGN DATA</p> <p>ADT 2013 = 12,700 ADT 2035 = 24,200 T = 6% V = 40 MPH (T = DUALS + TTST)</p> <p>FUNC CLASS = MINOR ARTERIAL</p>	<p>PROJECT LENGTH</p> <p>LENGTH ROADWAY TIP PROJECT U-5524 = 0.039 MILE</p>	<p>Prepared for: HIGHWAY DIVISION 6 558 Gillespie St. Fayetteville, NC 28301</p> <p>2012 STANDARD SPECIFICATIONS</p> <p>RIGHT OF WAY DATE: JULY 18, 2014</p> <p>LETTING DATE: MARCH 18, 2015</p>	<p>Prepared by: MULKEY ENGINEERS & CONSULTANTS P.O. Box 22127 Raleigh, N.C. 27626 (919) 851-1012 (919) 851-1018 (FAX) WWW.MULKEYINC.COM N.C. REG. P.E. 00001</p> <p>JOHNNY BANKS PROJECT MANAGER</p> <p>W. CRAIG PARKER, PE ROADWAY PROJECT DESIGN ENGINEER</p> <p>SCOTT PRIDGEN NCDOT CONTACT</p>	<p>HYDRAULICS ENGINEER</p> <p>SIGNATURE: _____ P.E.</p> <p>ROADWAY DESIGN ENGINEER</p> <p>SIGNATURE: _____ P.E.</p>	
--	--	--	---	--	---	--



May 30, 2014
File No. 20150154.001A | GSO14R0218

STATE PROJECT: 50067.1.1 (U-5524)
FEDERAL PROJECT: HPP-0627(7)
COUNTY: Robeson
DESCRIPTION: SR 1536 (Water Street) Improvements from SR 1600 (5th Street) to 8th Street

SUBJECT: Geotechnical Report – Inventory

PROJECT DESCRIPTION

The project is located in central Robeson County, North Carolina. This project consists of the reconstruction of Water Street, 5th Street, and Elizabethtown Road to construct a roundabout to replace the existing intersection.

The geotechnical investigation was conducted during April 2013. One drill machine, a CME 55 with an automatic hammer, was used during the investigation. Standard Penetration Tests were performed at selected locations. Representative soil samples were collected in the field for laboratory analysis by Kleinfelder Southeast, Inc.

The following alignments, totaling 0.039 mile, were investigated. Profiles and cross sections of these alignments are included in this report.

<u>LINE</u>	<u>STATIONS</u>
-L-	11+90 to 13+93.43
-Y1-	10+00 to 12+12
-Y2-	10+00 to 12+53
-Y3-	10+00 to 13+16.89
-ROUND-	10+00 to 13+58.14

AREAS OF SPECIAL GEOTECHNICAL INTEREST

Artificial Fill: Artificial fill was encountered at the following location:

<u>LINE</u>	<u>STATIONS</u>	<u>OFFSET</u>
-ROUND-	10+40 to 12+30	LT to RT

PHYSIOGRAPHY AND GEOLOGY

The project is located in the Coastal Plain Physiographic Province. The project corridor is comprised primarily of residential and commercial properties. The general topography of the site is gently sloping to level.

The geology of the project consists of tertiary to recent age coastal plain sediments. The project is located within the Duplin Formation based on the 1985 Geologic Map on North Carolina. Soils occurring along the project are derived from marine sediments deposited in the geologically recent past.

SOIL PROPERTIES

Soils encountered during this investigation are separated into three categories based on origin. They consist of roadway embankment, artificial fill, and undivided coastal plain sediments.


Roadway Embankment soils are present along the existing roadway (-L-, -Y1-, and -Y3-) to depths ranging from 3.0 to 5.5 feet below the existing ground surface in the project. These soils consist of moist, low non-plastic, loose to medium dense, brown, silty sands (A-2-4) and moist, medium plasticity, soft to stiff, red-tan to tan and gray, sandy clays (A-6). The plasticity index of the roadway embankment soils tested was 22.


Artificial Fill soils are present in a small isolated area along the proposed roadway (-ROUND-, and -Y2-). The artificial soils encountered consist of moist, medium dense, non-plastic, tan and brown, silty sand (A-2-4).

Undivided Coastal Plain (Duplin Formation) sediments are present along the existing roadways (-L-, -Y1-, and -Y3-) and proposed roadway (-ROUND-) in the project. The majority of these soils consist of moist to wet, non-plastic, very loose to medium dense, tan, gray, red, and orange-tan, silty sands (A-2-4). Minor amounts of moist to wet, low plasticity, very soft to very stiff, black and tan, sandy silts (A-4) with varying amounts of organic matter, and moist, medium plasticity, stiff to very stiff, tan, silty clays (A-7-6). The plasticity index of the residual soils tested ranged from 7 to 18.

GROUNDWATER

Groundwater was encountered at one location along the proposed roadway (-ROUND-) at an elevation of 117.9 feet (MSL).

Prepared by,

 Thomas R. Wells, P.E.
 Senior Professional


 Xavier C. Barrett, P.E.
 Principal Professional

TRW/XCB:cas

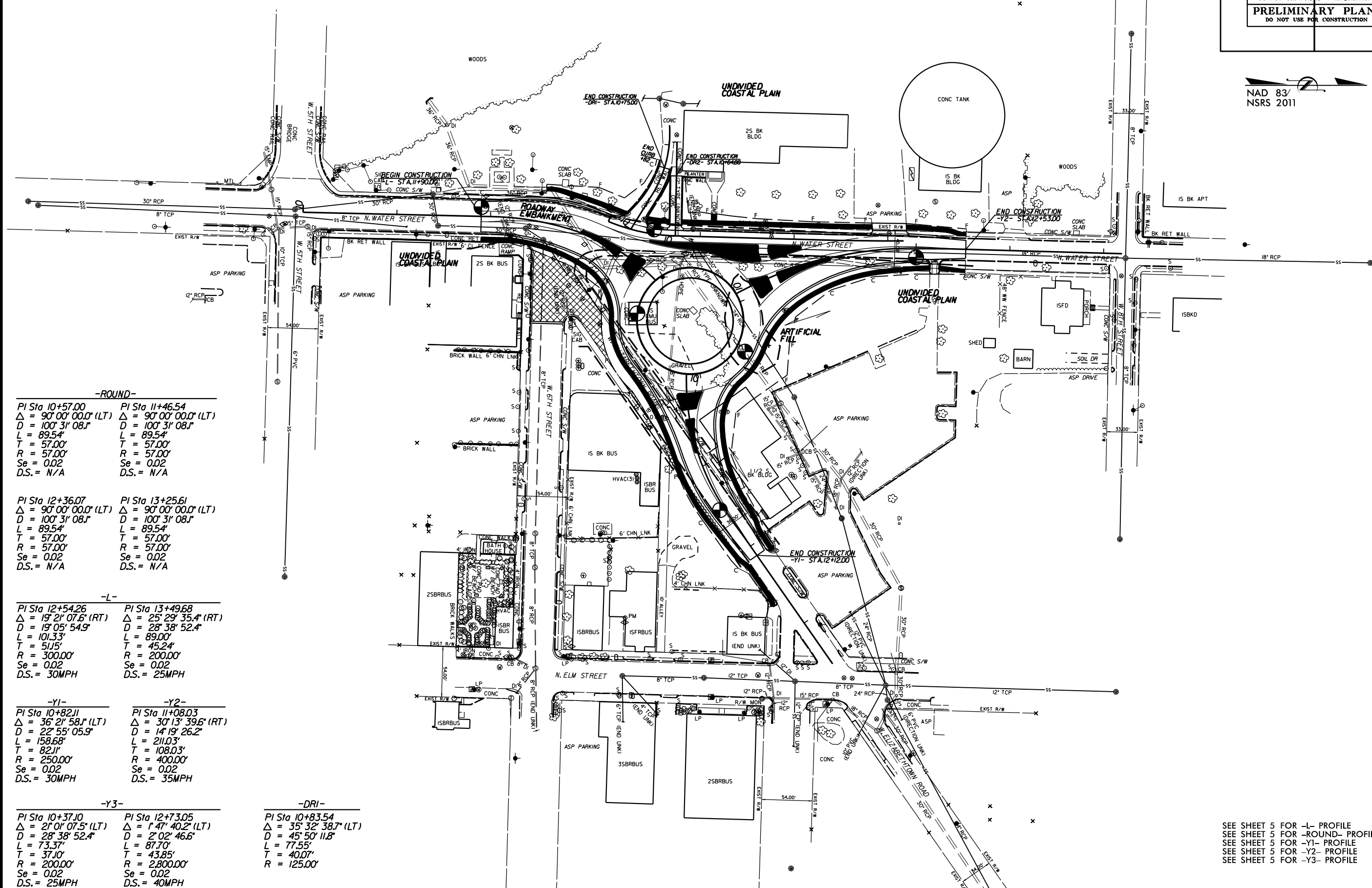
PROJECT REFERENCE NO.	SHEET NO.
50067.I.I.(U-5524)	3A

EARTHWORK BALANCE SHEET

8/17/99

MULKEY
ENGINEERS & CONSULTANTS
RD BOX 33137
RALEIGH, N.C. 27636
919 881-1913
919 881-1918 (FAX)
WWW.MULKEYINC.COM
NC License No. C-207

PROJECT REFERENCE NO. U-5524	SHEET NO. 4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



-ROUND-

PI Sta 10+57.00 Δ = 90° 00' 00.0" (LT) D = 100' 31' 08.1" L = 89.54' T = 57.00' R = 57.00' Se = 0.02 D.S. = N/A	PI Sta 11+46.54 Δ = 90° 00' 00.0" (LT) D = 100' 31' 08.1" L = 89.54' T = 57.00' R = 57.00' Se = 0.02 D.S. = N/A
--	--

PI Sta 12+36.07 Δ = 90° 00' 00.0" (LT) D = 100' 31' 08.1" L = 89.54' T = 57.00' R = 57.00' Se = 0.02 D.S. = N/A	PI Sta 13+25.61 Δ = 90° 00' 00.0" (LT) D = 100' 31' 08.1" L = 89.54' T = 57.00' R = 57.00' Se = 0.02 D.S. = N/A
--	--

-L-

PI Sta 12+54.26 Δ = 19° 21' 07.6" (RT) D = 19° 05' 54.9" L = 101.33' T = 51.5' R = 300.00' Se = 0.02 D.S. = 30MPH	PI Sta 13+49.68 Δ = 25° 29' 35.4" (RT) D = 28° 38' 52.4" L = 89.00' T = 45.24' R = 200.00' Se = 0.02 D.S. = 25MPH
--	--

-Y1- PI Sta 10+82.11 Δ = 36° 21' 58.1" (LT) D = 22° 55' 05.9" L = 158.68' T = 82.11' R = 250.00' Se = 0.02 D.S. = 30MPH	-Y2- PI Sta 11+08.03 Δ = 30° 13' 39.6" (RT) D = 14° 19' 26.2" L = 211.03' T = 108.03' R = 400.00' Se = 0.02 D.S. = 35MPH
--	---

-Y3- PI Sta 10+37.10 Δ = 21° 01' 07.5" (LT) D = 28° 38' 52.4" L = 73.37' T = 37.10' R = 200.00' Se = 0.02 D.S. = 25MPH	-Y2- PI Sta 12+73.05 Δ = 1° 47' 40.2" (LT) D = 2° 02' 46.6" L = 87.70' T = 43.85' R = 2,800.00' Se = 0.02 D.S. = 40MPH
---	---

-DRI-

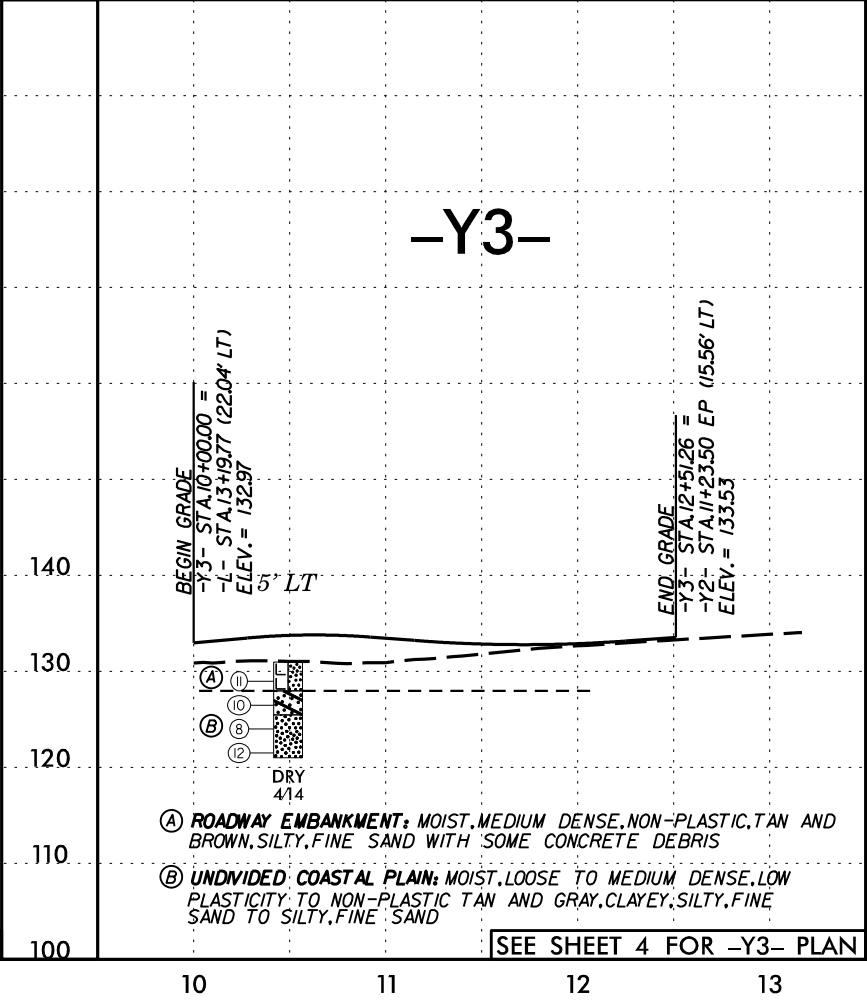
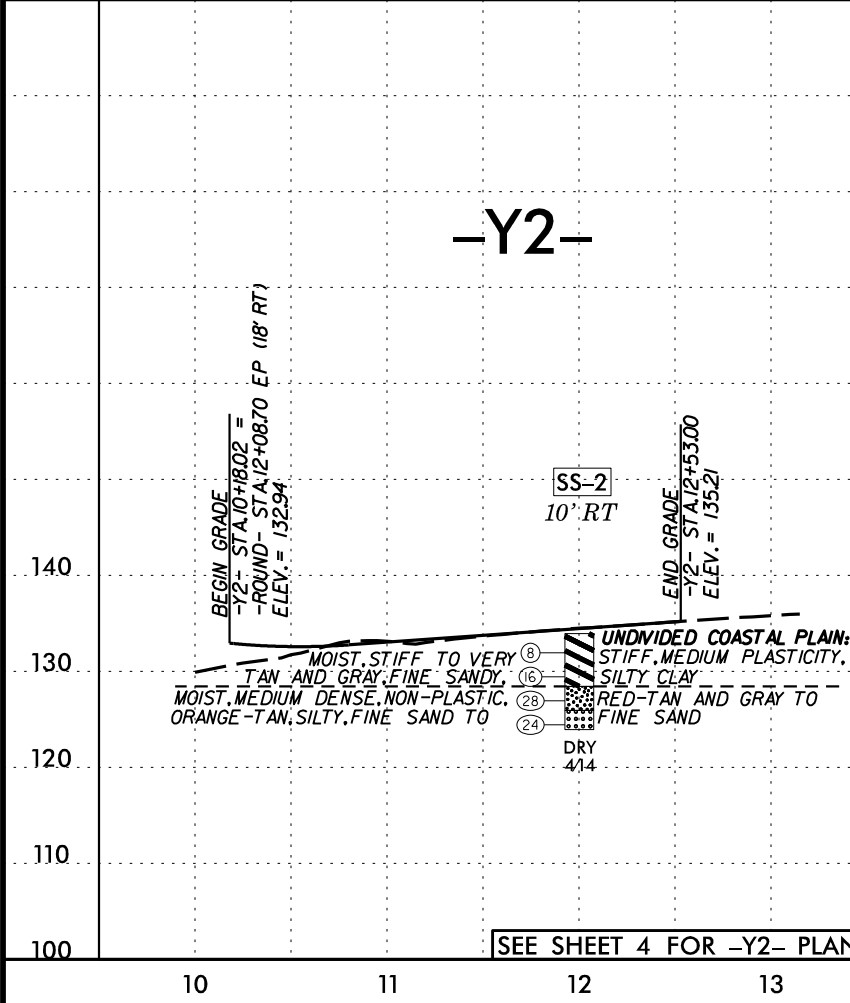
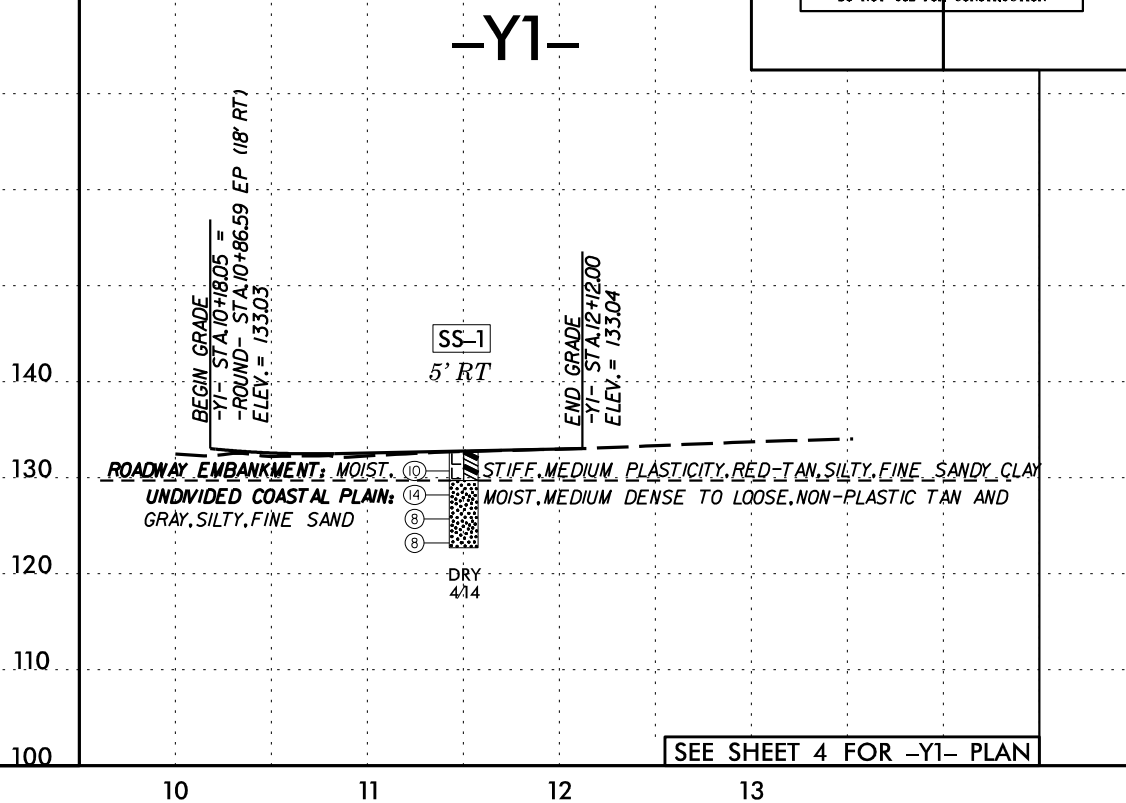
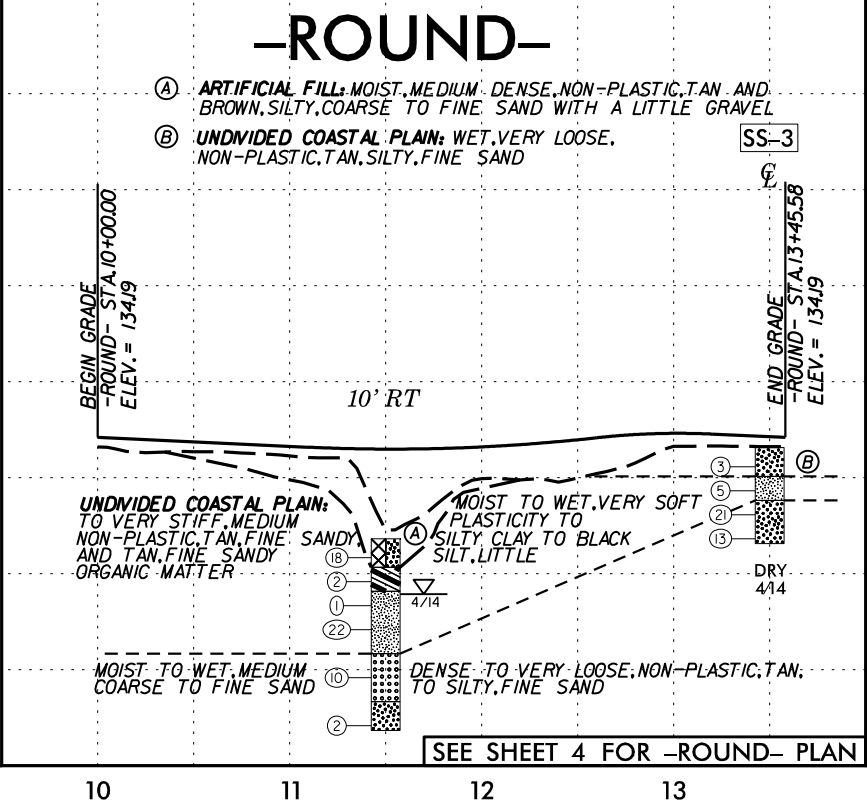
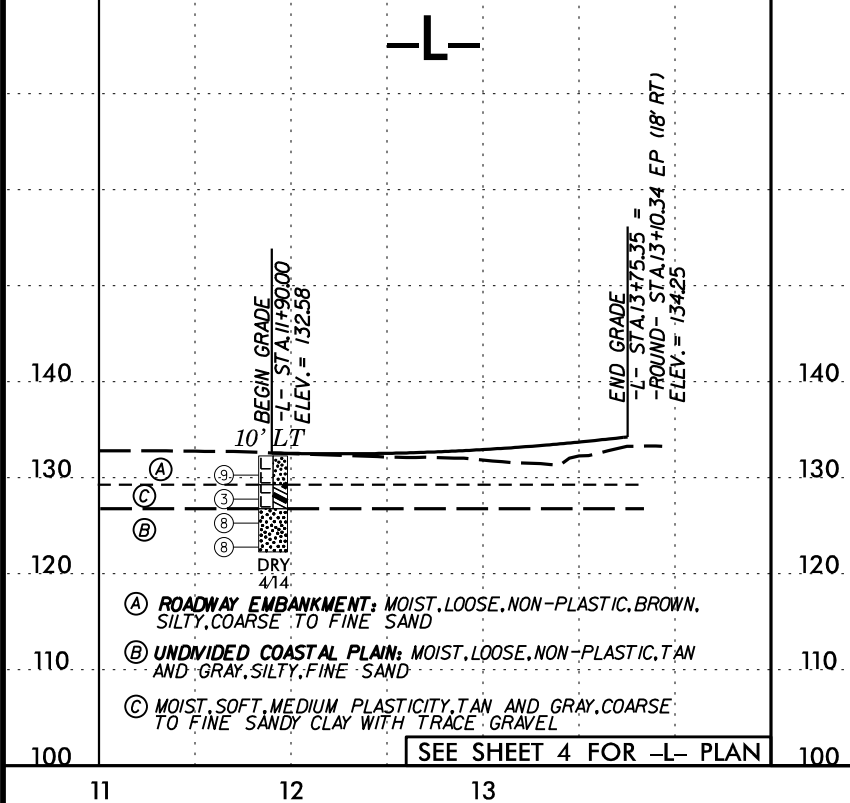
PI Sta 10+83.54 Δ = 35° 32' 38.7" (LT) D = 45° 50' 11.8" L = 77.55' T = 40.07' R = 125.00'

REVISIONS

SEE SHEET 5 FOR -L- PROFILE
SEE SHEET 5 FOR -ROUND- PROFILE
SEE SHEET 5 FOR -Y1- PROFILE
SEE SHEET 5 FOR -Y2- PROFILE
SEE SHEET 5 FOR -Y3- PROFILE

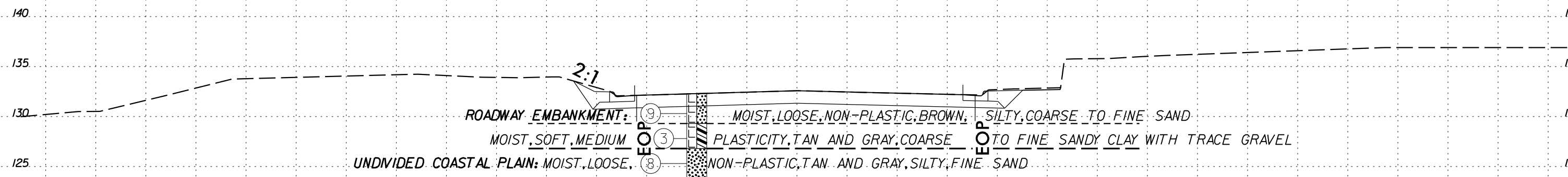
5/28/99

PROJECT REFERENCE NO. U-5524	SHEET NO. 5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



8/23/99

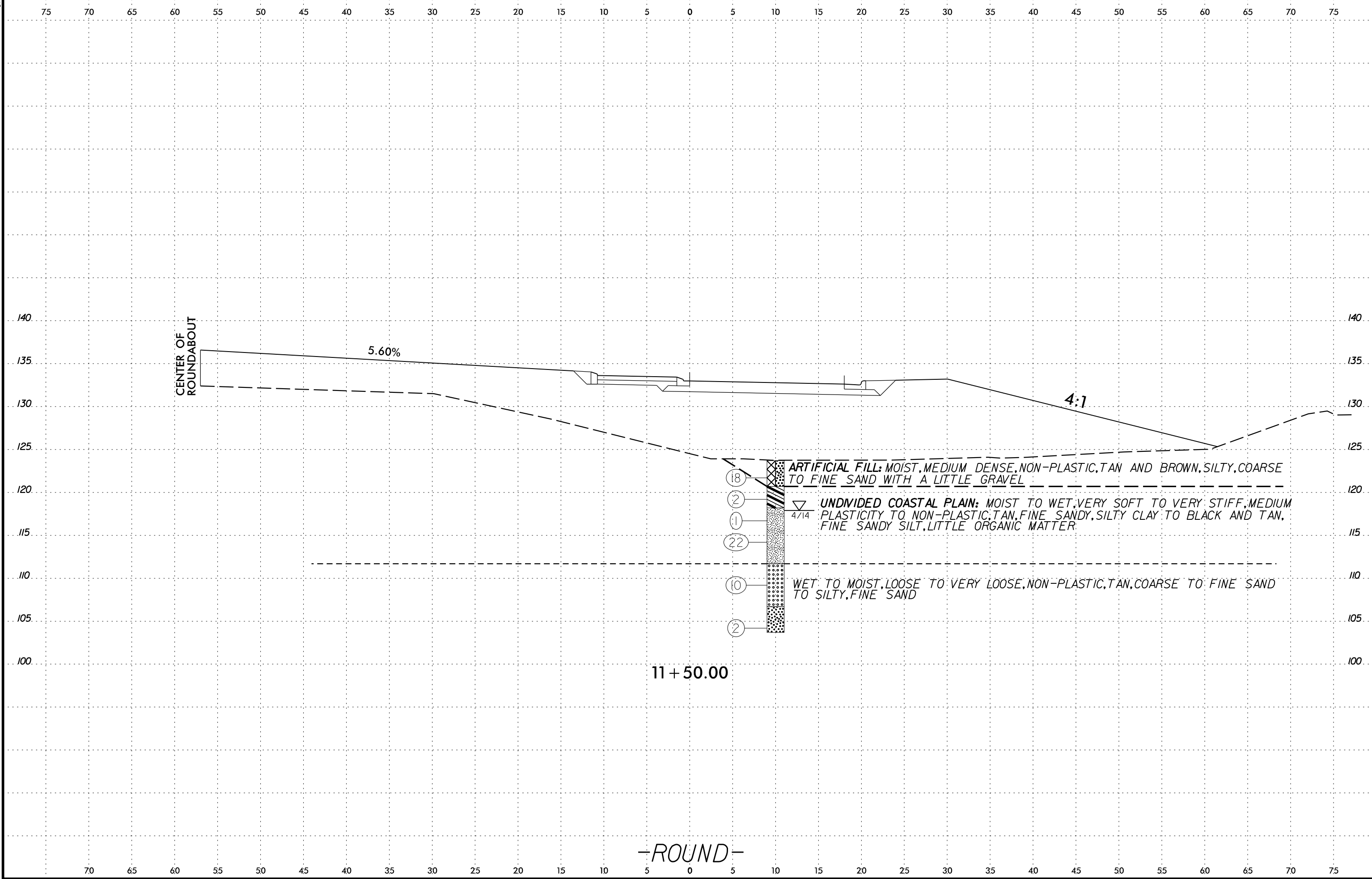
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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



CENTER OF ROUNDABOUT

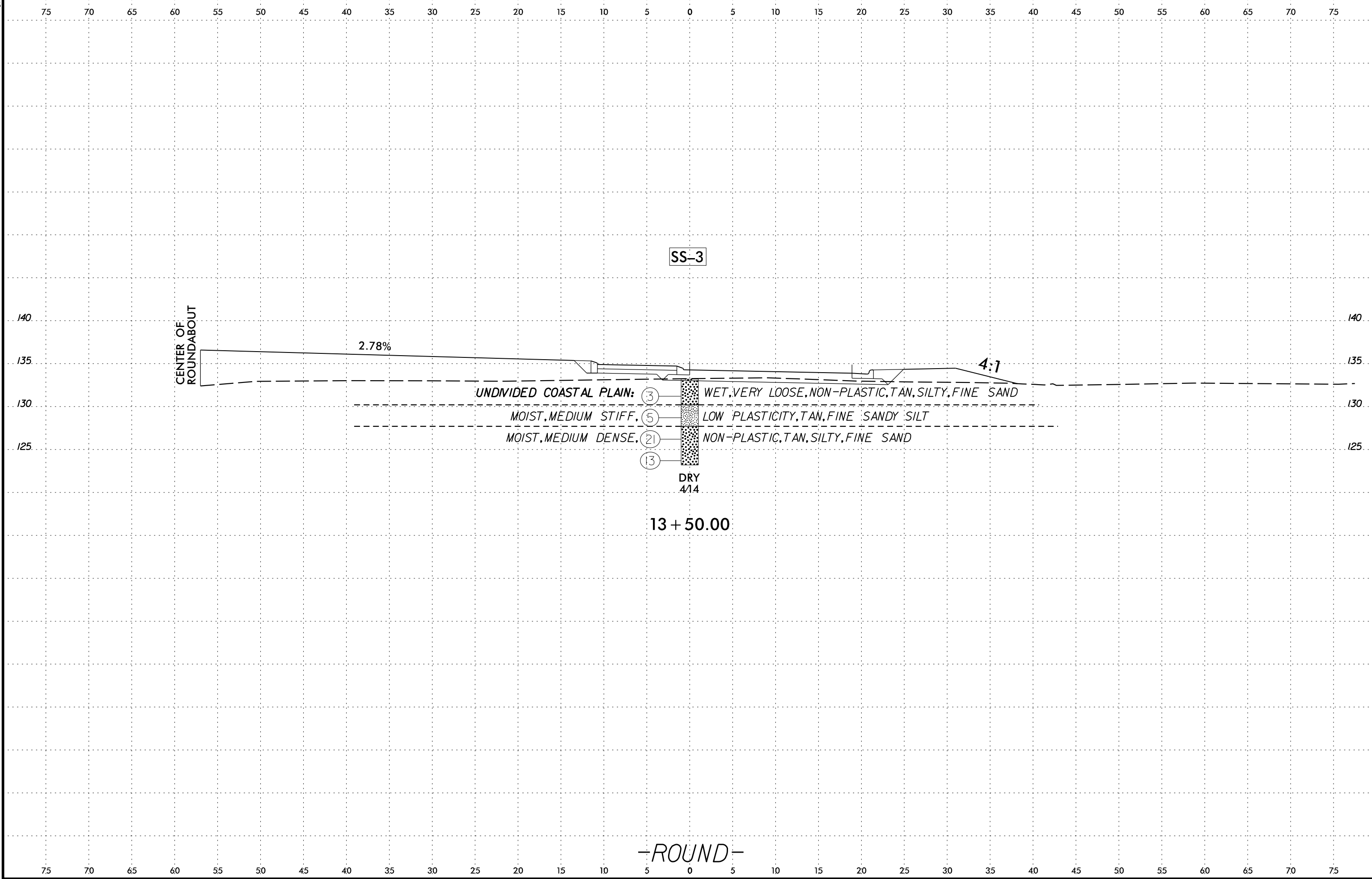
5.60%

4:1

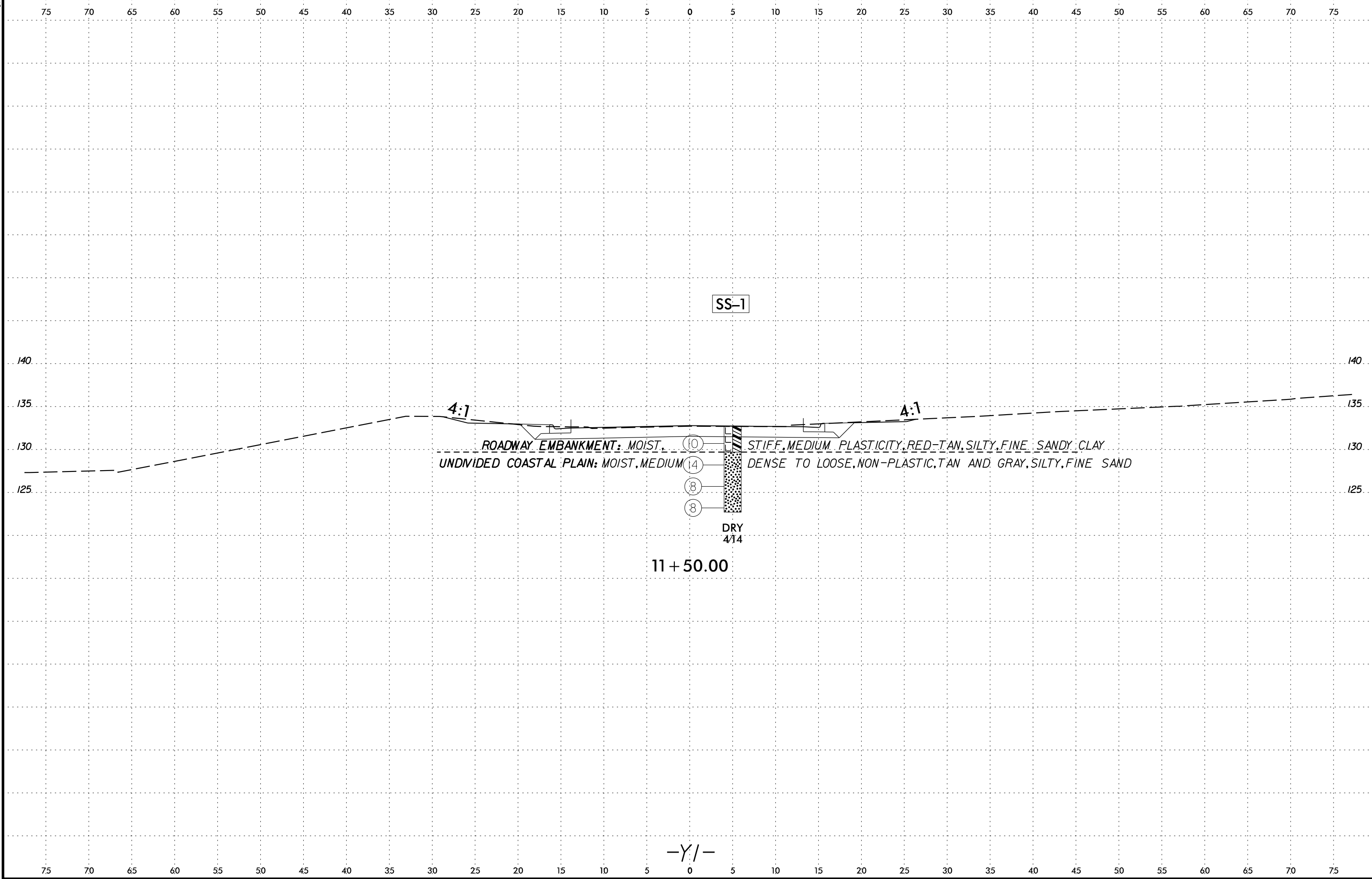
11 + 50.00

-ROUND-

- ⑱ ARTIFICIAL FILL: MOIST, MEDIUM DENSE, NON-PLASTIC, TAN AND BROWN, SILTY, COARSE TO FINE SAND WITH A LITTLE GRAVEL
- ②
- ① 4/14 UNDIVIDED COASTAL PLAIN: MOIST TO WET, VERY SOFT TO VERY STIFF, MEDIUM PLASTICITY TO NON-PLASTIC, TAN, FINE SANDY, SILTY CLAY TO BLACK AND TAN, FINE SANDY SILT, LITTLE ORGANIC MATTER
- ⑳
- ⑩ WET TO MOIST, LOOSE TO VERY LOOSE, NON-PLASTIC, TAN, COARSE TO FINE SAND TO SILTY, FINE SAND
- ②



-ROUND-



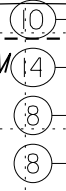
SS-1

4:1

4:1

ROADWAY EMBANKMENT: MOIST
UNDIVIDED COASTAL PLAIN: MOIST, MEDIUM

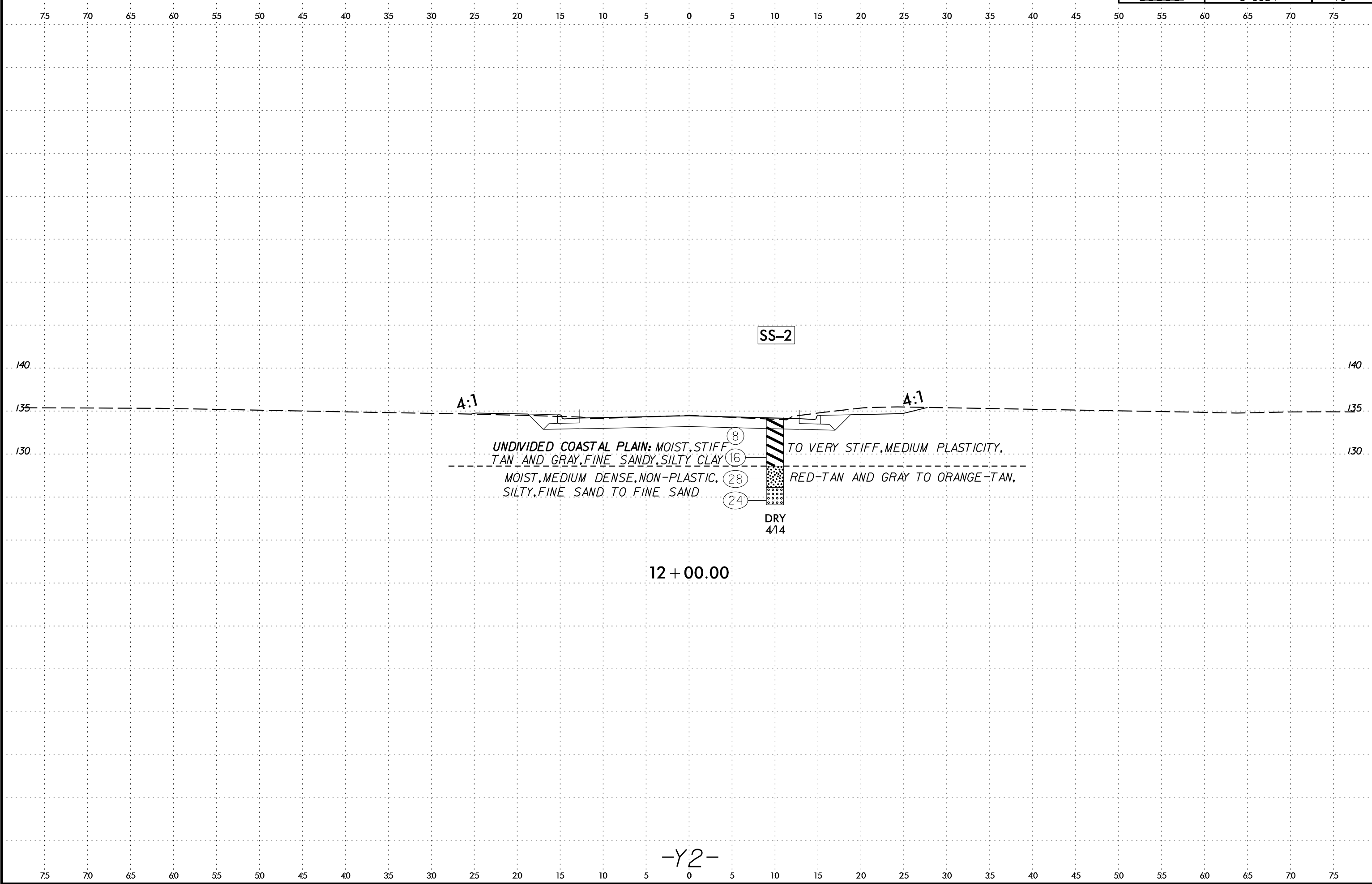
STIFF, MEDIUM PLASTICITY, RED-TAN, SILTY, FINE SANDY CLAY
DENSE TO LOOSE, NON-PLASTIC, TAN AND GRAY, SILTY, FINE SAND

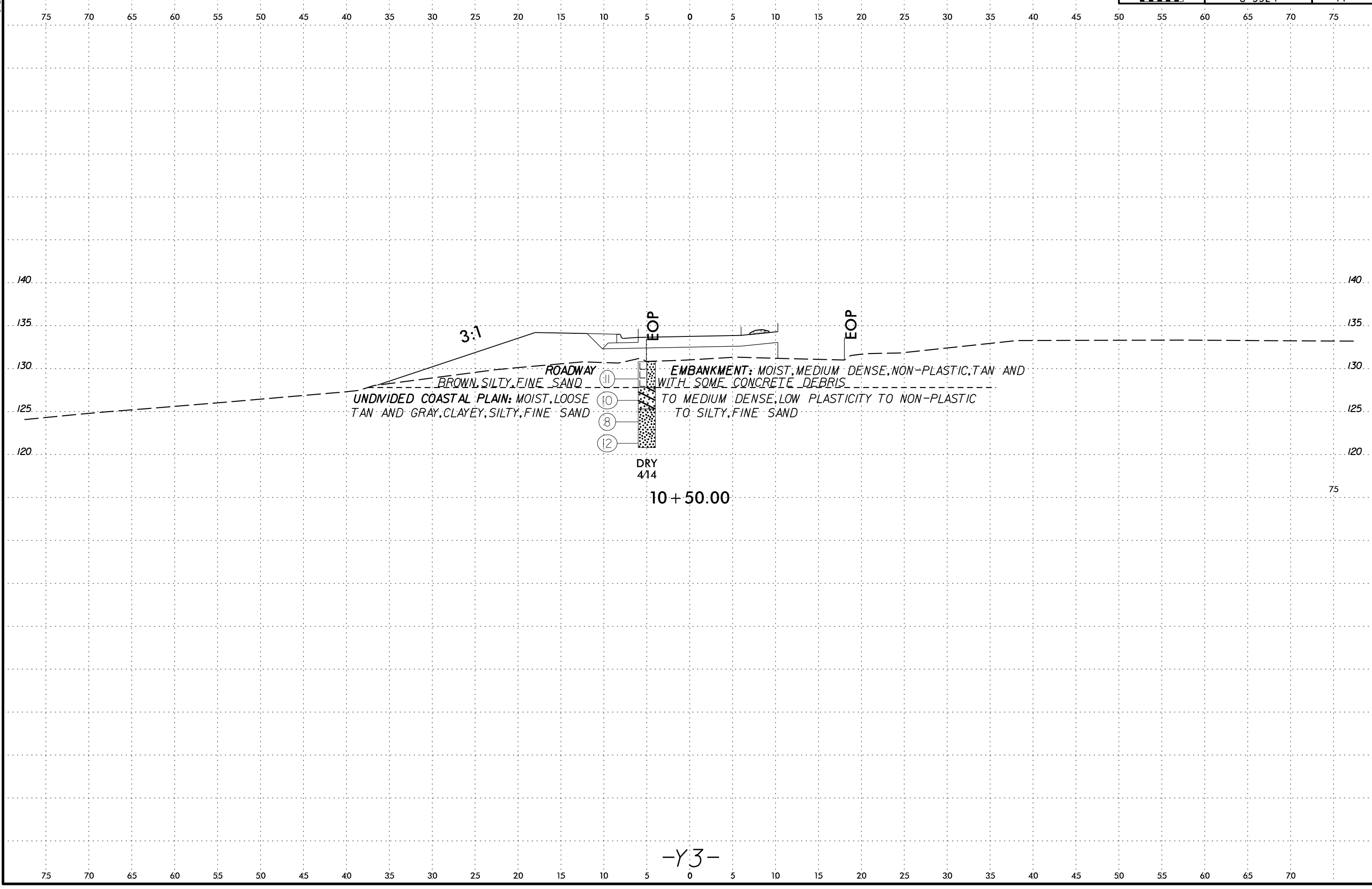


DRY
4/4

11 + 50.00

-Y/-





UNDIVIDED COASTAL PLAIN: MOIST, LOOSE
TAN AND GRAY, CLAYEY, SILTY, FINE SAND

BROWN, SILTY, FINE SAND

ROADWAY

EMBANKMENT: MOIST, MEDIUM DENSE, NON-PLASTIC, TAN AND
WITH SOME CONCRETE DEBRIS
TO MEDIUM DENSE, LOW PLASTICITY TO NON-PLASTIC
TO SILTY, FINE SAND

- 11
- 10
- 8
- 12

DRY
4/14

10+50.00

SUMMARY OF LABORATORY TEST DATA

PROJECT NO. 50067.1.1 (U-5524)

FA NO. HPP-0627(7)

COUNTY: ROBESON

SR 1536 (WATER STREET) IMPROVEMENTS FROM SR 1600 (5TH STREET) TO 8TH STREET

Sample No.	Boring Number	Station	Offset	Alignment	Sample Depth (ft.)	Natural Moisture Content (%)	AASHTO Class (Group Index)	N-Value (blows/ ft.)	Atterberg Limits			Gradation Results							
									L.L.	P.L.	P.I.	Pass #10 Sieve	Pass #40 Sieve	Pass #200 Sieve	Retained #270 Sieve	Coarse Sand (%)	Fine Sand (%)	Silt (%)	Clay (%)
SS-1	Y1_			-Y1-	1.0-2.5	19.6	A-6(4)	10	38	16	22	100	99	39	63	2.5	60.7	3.7	33.1
SS-2	Y2_			-Y2-	3.5-5.0	19.0	A-7-6(4)	16	41	23	18	100	99	42	62	4.0	57.6	5.6	32.8
SS-3	ROUND_			-ROUND-	3.5-5.0	17.9	A-4(0)	5	25	18	7	100	99	36	69	2.5	66.1	8.1	23.3

SS = Split-Barrel Sample (ASTM-D-1586) ST = Shelby Tube (Undisturbed) Sample

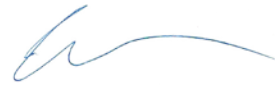
S = Grab Sample

NP -- Non Plastic

NA-- Non Applicable

Page: 1 of 1

Lab Technician: NCDOT Certification No.: 109-06-1003



Jonathon Creech