SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

ROADWAY SUBSURFACE INVESTIGATION

COUNTY GUILFORD

PROJECT DESCRIPTION NC 68 AT SR 2129 (FOGLEMAN ROAD) TO NC 150 INTERSECTION IN OAK RIDGE INTERSECTION, INTERSECTION IMPROVEMENTS

INVENTORY

STATE PROJECT REFERENCE NO. R-572529

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 FILED 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 (9)9) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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 2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

E. FERREIRA, EI

CATLIN

EJ. EDMONDSON

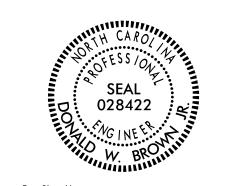
A. CLISTER

INVESTIGATED BY <u>E.</u> FERREIRA, EI

DRAWN BY _E. FERREIRA, EI

SUBMITTED BY __D. BROWN, PE

DATE _MARCH 2021



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4/13/2021

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO. SHEET NO. 2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO 1 206, ASTM DI586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, ASAHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SUTY 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. 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 PLAIM MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE NDICATES THE LEVEL AT WHICH NON-COASTAL PLAIM MATERIAL WOUL 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 PLAIM MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED NON-COASTAL PLAIM MATERIAL THAT WOULD YIELD SPT N VALUES >	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AGUIFER - 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.
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS CLASS. L S 352 PASSING *2000 C S 352 PASSING *	MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAQLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (WR) 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, GREISS, GABBRO, SCHIST, 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 SUFFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP CLASS. A·1 - a A·1-b A·1-b A·2 A·2 - b A·2-4 A·2 - b A·2-5 A·2-5 A·2-6 A·2-7 A·3 A·3-6 A·7 A·3-5 A·3 A·3-6 A·7 A·3-6 A·3 A·6, A·7	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	NON-CRYSTALLINE ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YELLO SPT REFUSAL IF TESTED. ROCK STAL PLAIN COASTAL PLAIN COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLO SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	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
X; PASSING	HIGHLY COMPRESSIBLE LL > 50 PERCENTAGE OF MATERIAL ORGANIC MATERIAL ORGANIC MATERIAL ORGANIC MATERIAL ORGANIC MATERIAL	SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED (CP) SHELL BEDS, ETC. WEATHERING FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	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.
MATERIAL PASSING *40 LL 40 MX 41 MN	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%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP - 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
FI 5 MX	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	OF A CRYSTALLINE NATURE. SLIGHT 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.	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.
OF MAJOR GRAVEL, AND SAND SAND GRAVEL AND SAND SOILS SOILS GEN. RATING AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE		MODERATE 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.	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,
PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS CONDISTENCY OR DENSENESS RANGE OF STANDARD RANGE OF UNCONFINED	SPRING OR SEEP MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAQLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	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.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE (N-VALUE) COMPRESSIVE STRENGTH (TONS/FT ²) GENERALLY VERY LOOSE 4 TO 10	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION → OF ROCK STRUCTURES SOIL SYMBOL SOIL SYMBOL SPI DATE THAT TEST BORING SLOPE INDICATOR INSTALLATION	IF TESTED, WOULD YIELD SPT REFUSAL SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	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.
GRANULAR	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT OF CORE BORING SOUNDING ROD	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE 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	MOTILED MOTI IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTILING 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.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5	INFERRED ROCK LINE MN MONITORING WELL TEST BORING WITH CORE TTTTT ALLUVIAL SOIL BOUNDARY PIEZOMETER INSTALLATION SPT N-VALUE	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 1000 BPF</u> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. DUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	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.
HARD > 30 > 4 TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE	UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE SHALLOW UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAV	CAN BE SCRATCHED BY KNIFE OR SHARP FICE, BREHNING 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.	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.
(BLDR.) (COB.) (GR.) (SAND SAND (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. COUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE 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 BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - DRY UNIT WEIGHT	BY MODERATE BLOWS. MEDIUM 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.	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.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE. COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE PLASTIC	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE SEMISOLID, REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE (PI) PL PLASTIC LIMIT	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO	FRACTURE SPACING BEDDING	BENCH MARK:
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT - REQUIRES ADDITIONAL WATER TO	EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: CME-45C CLAY BITS X AUTOMATIC MANUAL	TERM	ELEVATION: FEET NOTES:
- UNY - (U) ATTAIN OPTIMUM MOISTURE	G'CONTINUOUS FLIGHT AUGER CORE SIZE: X 8" HOLLOW AUGERS -B -H	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THICKLY LAMINATED 0.008 FEET THICKLY LAMINATED 0.008 FEET THICKLY LAMINATED 0.008 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THICKLY LAMINATED 0.008 FEET THICKLY LAMINATED	BORING ELEVATIONS GENERATED FROM FILE r5725_IS_TINTIN, DATED H/9/2018.
PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	CME-550	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. RUBBING WITH FINGER FREES NUMEROUS GRAINS: GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	HA = HAND AUGER BORING FIAD = FILLED IMMEDIATELY AFTER DRILLING
HIGHLY PLASTIC 16-25 MEDION HIGH COLOR	PORTABLE HOIST TRICONE STEEL TEETH X HAND AUGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. ORAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
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.	CORE BIT SOUNDING ROD VANE SHEAR TEST	INDURATED DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHAPP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1-



March 31, 2021

STATE PROJECT: 50474.1.1 (R-5725)

COUNTY: Guilford

DESCRIPTION: Intersection improvements at NC 68 at SR 2129 (Fogleman Road) to NC

150/Oak Ridge Road (S.R. 2137) in Oak Ridge.

SUBJECT: Roadway Subsurface Inventory

Project Description

The project consists of improvements to NC 68, located within the municipal boundaries of Oak Ridge in North Carolina. The total length of the project is approximately 0.53 miles, with 10 alignments as shown in the table below. The project corridor contains mainly commercial properties with some undeveloped land.

Alignment	Description	Beg/End Stations
-L1-	NC 68	11+50.00 to 21+17.15
-L2-	NC 68	10+00.00 to 39+50.00
-Y1-	Linville Road	10+50.00 to 13+62.65
-Y2A-	Oak Ridge Road	15+50.00 to 19+01.64
-Y2B-	Oak Ridge Road	10+00.00 to 18+00.00
-DR1-	Driveway	10+00.00 to 11+71.94
- DR2-	Driveway	10+00.00 to 11+70.00
- DR3-	Driveway	10+00.00 to 11+39.15
-RABT1-	Roundabout	10+00.00 to 12+51.33
-RABT2-	Roundabout	10+00.00 to 12+51.33

Plans call for the improvement of NC 68 (-L1- and -L2-), from approximately 68± feet south of its intersection with Fogleman Road to 1,070± feet north of its intersection with NC 150/Oak Ridge Road (Y2B). The improvements include widening the existing roadways, new concrete medians, two new roundabouts on the Y-lines, curb and gutter, and installation of sidewalks. The driveway leading to Oak Ridge Dentistry (DR3) will be realigned with a roundabout (-RABT1-) to connect to the new alignment. Linville Road (-Y1-) will be widened with an alignment shift and will also be connected to the roundabout (-RABT1-). Oak Ridge Road will be widened and will connect to a second roundabout (-RABT2-). The ramps on NC 68 heading south, west, and east will be removed, with new thru lanes and turn lane configurations.

A geotechnical field investigation was conducted for this project in February of 2021. Drilling was performed by Catlin of Williamsburg, NC using a track-mounted CME-55 drill rig. The drill rig was equipped with an automatic hammer with an efficiency of 94.7%. All drilling activities were supervised by Stewart personnel.

A total of 19 Standard Penetration Test (SPT) borings and 7 Hand Auger borings were performed for the project. Representative soil samples from select borings were collected in the field for laboratory analysis.

Physiography & Geology

The project site is located in Guilford County, North Carolina, which lies within the Piedmont Geologic Province of North Carolina. The site is part of the Charlotte Belt, adjacent to the Carolina Slate Belt region, which is generally characterized by low grade metamorphosed volcanic rock. Review of the

PROJECT REFERENCE NO.	SHEET NO.
R-5725	3A

Geologic Map of Region G, North Carolina (P. Albert Carpenter, 1982) shows that the site is underlain by Porphyritic granite (Pzpgr) north of the intersection of SR 150 and US 68, and the site is underlain by Mica gneiss and schist (mgs) south of the intersection.

Soil Properties

Soils encountered at the site include artificial fill, roadway embankment, alluvial, and residual soils.

Artificial fill was encountered on -L2- and -DR3- consisting of medium stiff (A-7-5) to and stiff silt (A-4), with a Plasticity Index (PI) of 26 to 32 and was moist.

Roadway embankment was encountered in borings along -L1-, -L2-, -Y2A-, -Y2B-, -Y1-, -DR1-, -DR2-, and -DR3-. The material was very loose to dense Silty SAND (A-2-4) and Clayey SAND (A-2-6 and A-2-7) and medium stiff to very stiff Sandy Lean CLAY (A-6) and Silty Plastic CLAY (A-7-5 and A-7-6). The samples were moist to wet. Laboratory test samples had PIs of 12 and 50.

Alluvial soil associated with a nearby creek was encountered along -L2- with material classified as very loose to medium stiff Silty SAND (A-2-4) and Clayey SAND (A-2-6) and soft Silty CLAY (A-7-5) and Sandy Lean CLAY (A-6). The samples were wet to saturated.

Native residual soils were encountered in all borings except for borings DR1_1130 HA, L2_1690 HA, L2_1800 HA, L2_1900 HA, and Y2B_1612 HA. The soils types primarily consist of loose to very dense, Clayey SAND (A-2-6) and Silty SAND (A-2-4), and medium stiff to very stiff Sandy SILT (A-4), Silty CLAY (A-7-5 and A-7-6), and Clayey SILT (A-5). The samples were moist to wet. Laboratory testing on clay samples had PIs ranging from 25 to 26.

Rock Properties

Weathered rock nor bedrock was encountered in any of the 19 borings.

Groundwater

Of the 19 borings, groundwater was not encountered during the drilling process. Thirteen borings were left open for a 24+ hour stabilization period, and six borings were left open until the end of day, after which groundwater was measured in one boring at a depth of 5.6 feet below the current ground surface (el. $903.5\pm$ feet). Two hand auger borings had groundwater measured at depths of 2 and 4 feet below the current ground surface (el. $881.9\pm$ feet and $936.5\pm$ feet).

Areas of Special Geotechnical Interest

Alluvial Soils

Alluvial soil was encountered along the two alignments as shown below.

Alignment	Station	Offset (ft)
-L2-	17+00± to 19+00±	80-90± RT

Groundwater

Groundwater was encountered within 6 feet of finished grade in the following locations:

Alignment	Station
-L2-	39+00±
-Y2B-	14+80±

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Artificial Fill

Artificial fill was encountered at the following locations:

Alignment	Station	Offset (ft)
-L2-	10+00± to 13+00±	20-30± RT
-DR2-	10+60±	CL

Items of Interest

USTs, ASTs and gas pumps, or indictors thereof, were noted on the plans near the right-of-way at the following location(s):

Туре	Alignment	Station	Offset (ft)
Gas Valve	-L1-	39+10± to 39+42±	230± RT to 235± RT
Gas Valve	-L2-	20+80±	40± LT
UST	-L2-	24+88	80± RT
Gas Valve	-Y2A-	16+42±	27± LT

Ponds and Wetland Locations

Туре	Alignment	Station	Offset (ft)
Stream	-L2-	17+00±	80± RT

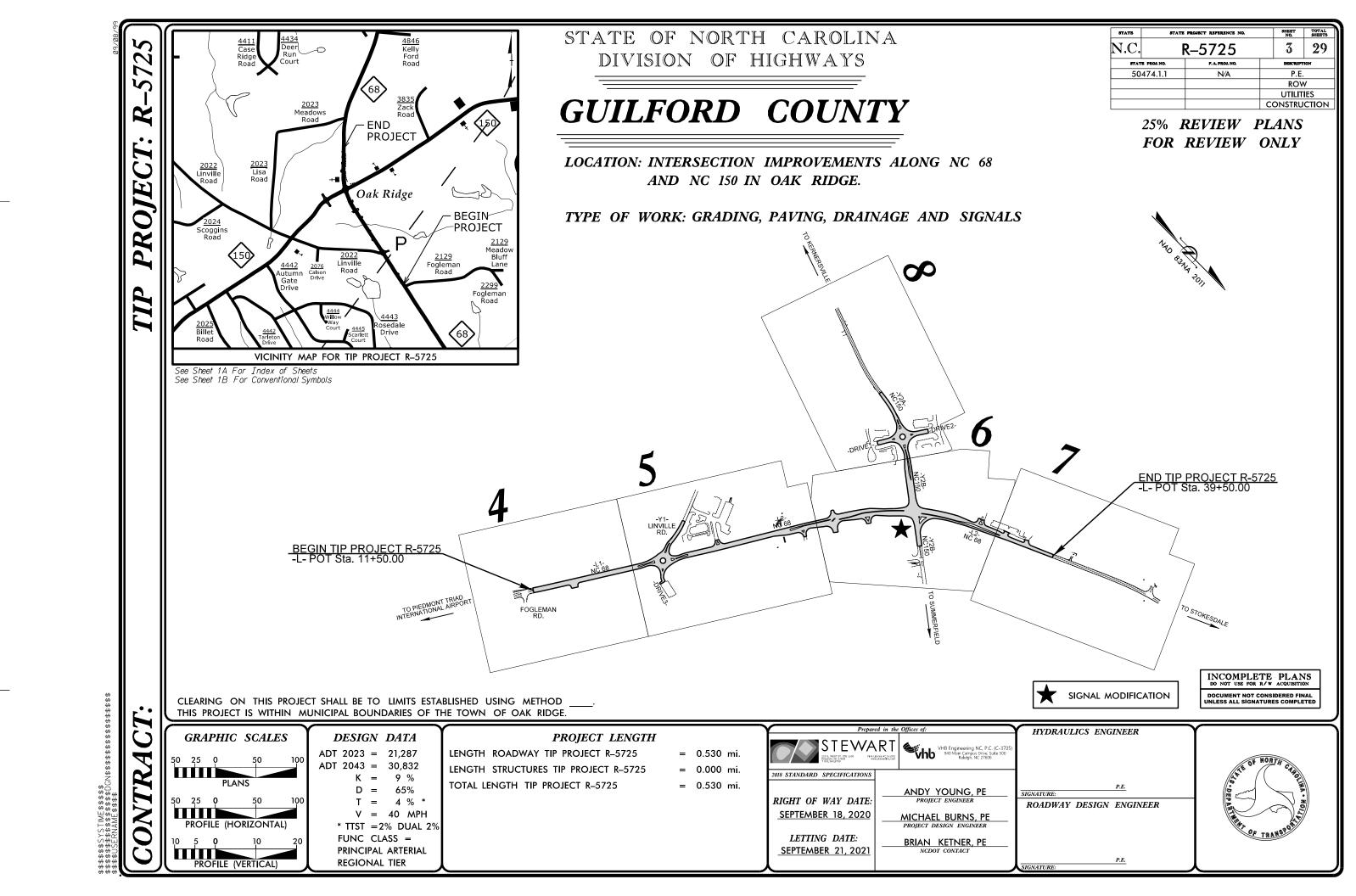
Soil with High Plasticity Indices

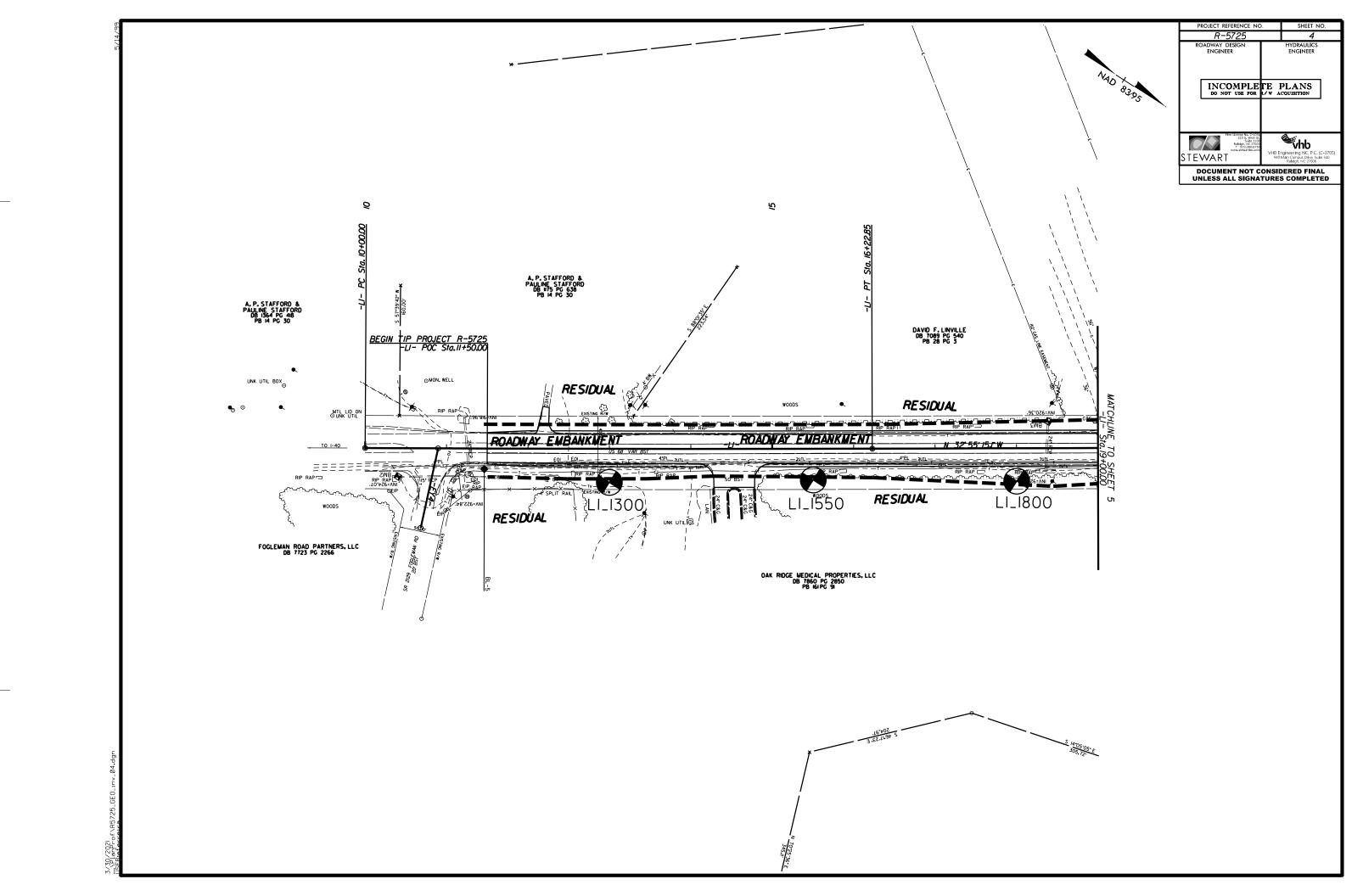
Based on laboratory testing, soil at the following locations was determined to be highly plastic (PI=26 to 35).

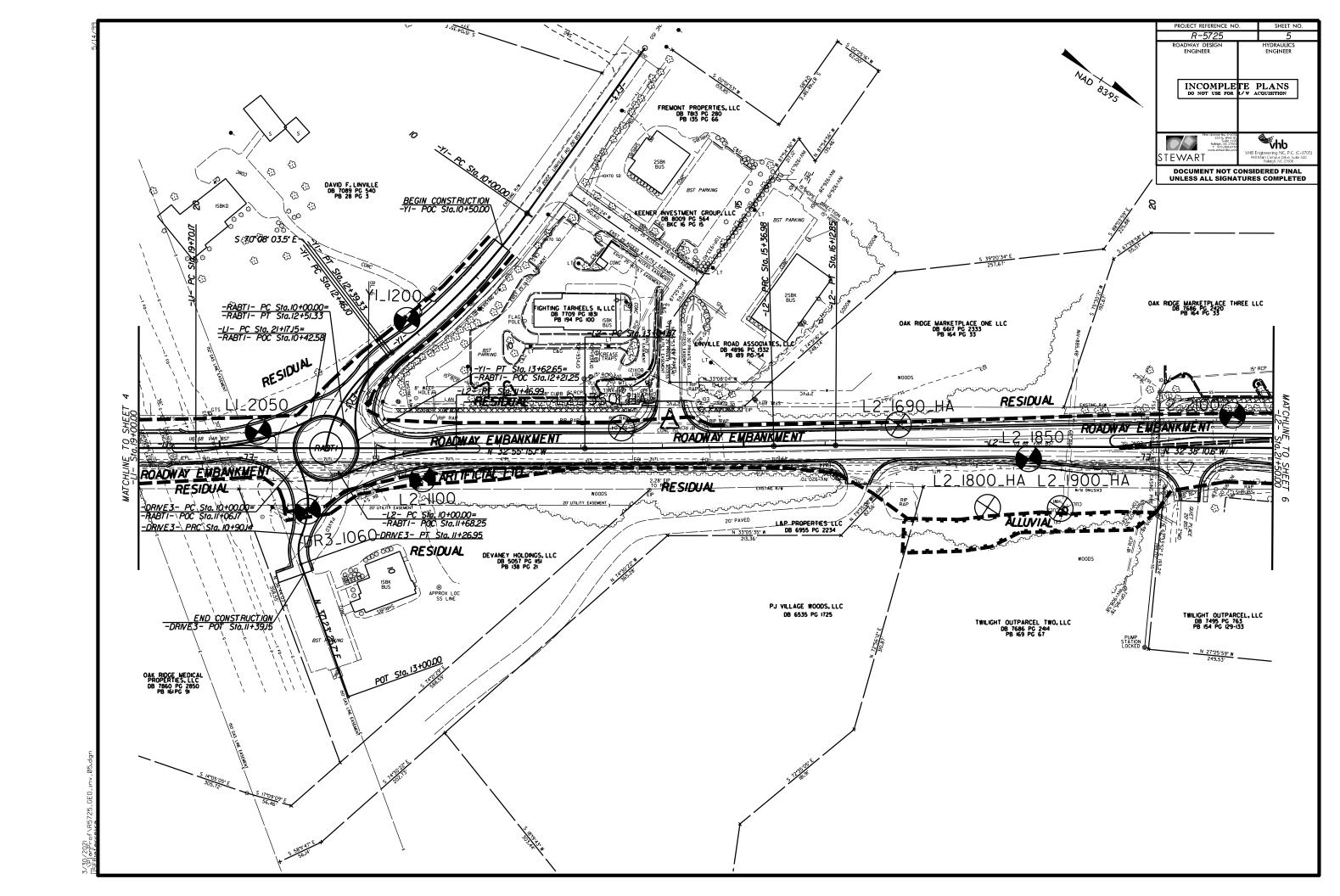
Alignment	Station	Offset (ft)
-L2-	11+00± to 15+00±	35± RT
-L2-	33+50± to 35+50±	29± LT
-L2-	38+00± to 39+50±	18± RT
-Y1-	12+00± to 13+00±	19± RT
-Y2B-	16+50± to 18+00±	46± LT
-DR3-	10+50± to 11+39±	CL

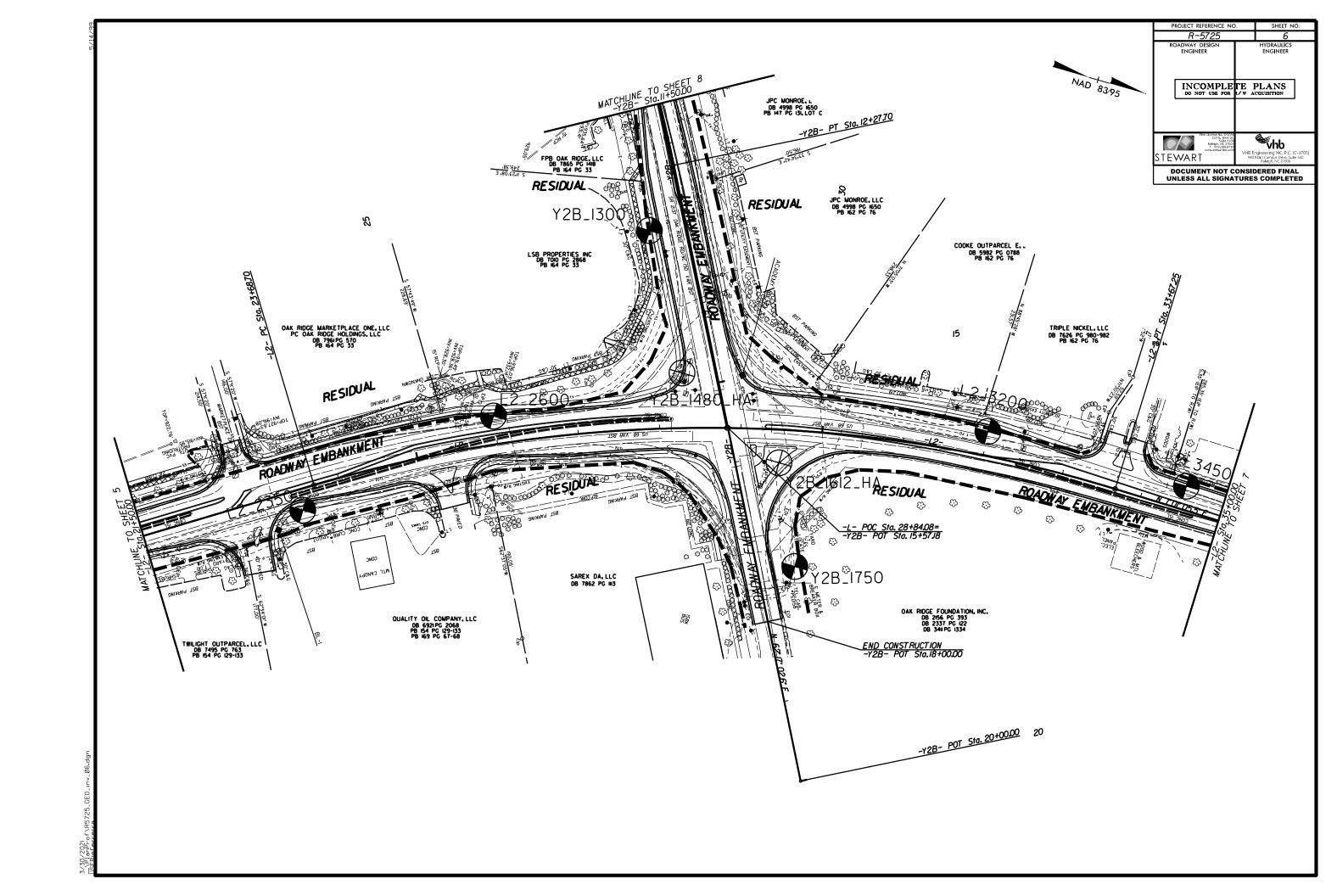
Based on laboratory testing, soil at the following locations was determined to be highly plastic (PI=35 or greater).

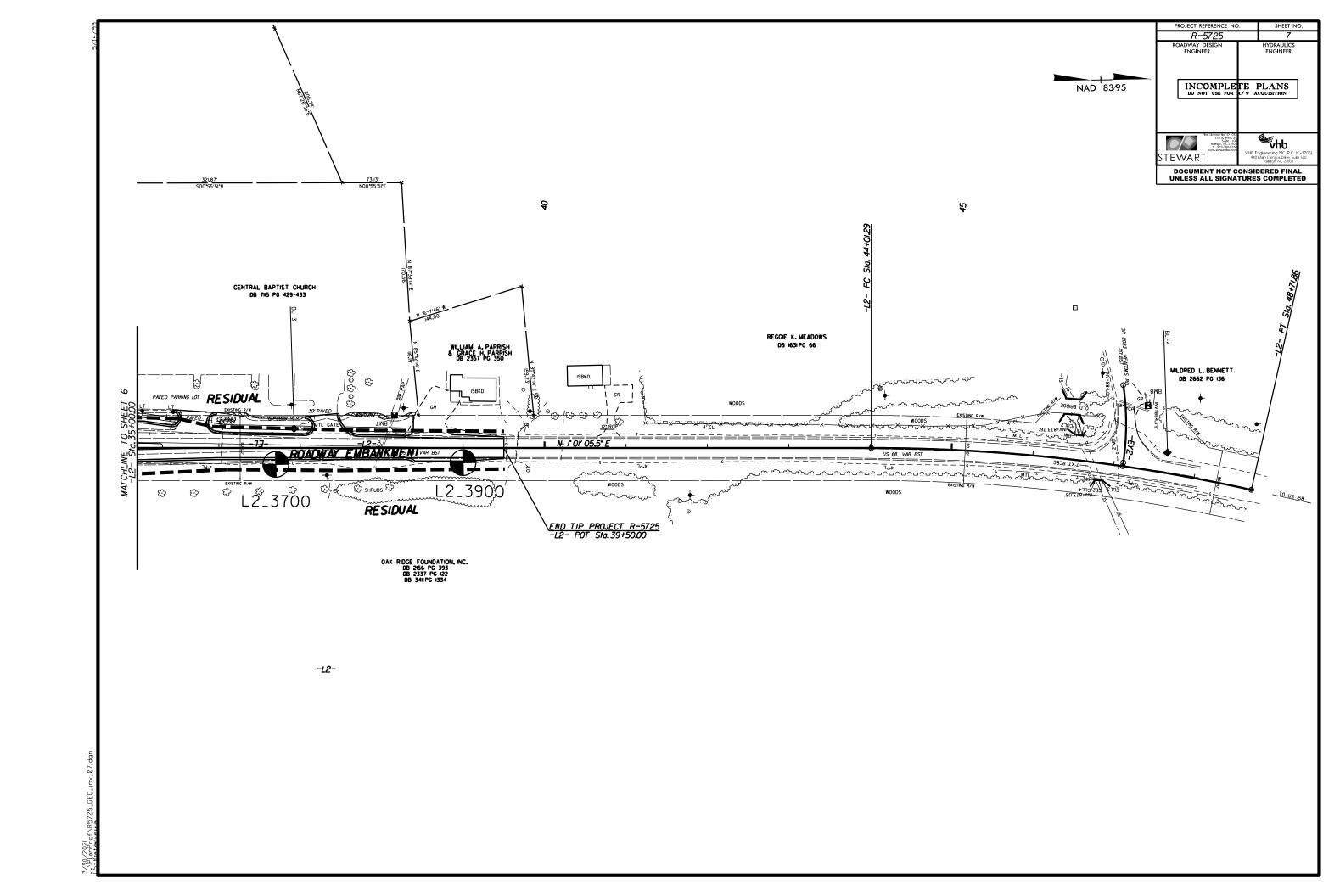
Alignment	Station	Offset (ft)
-Y2B-	11+50± to 13+50±	46± RT

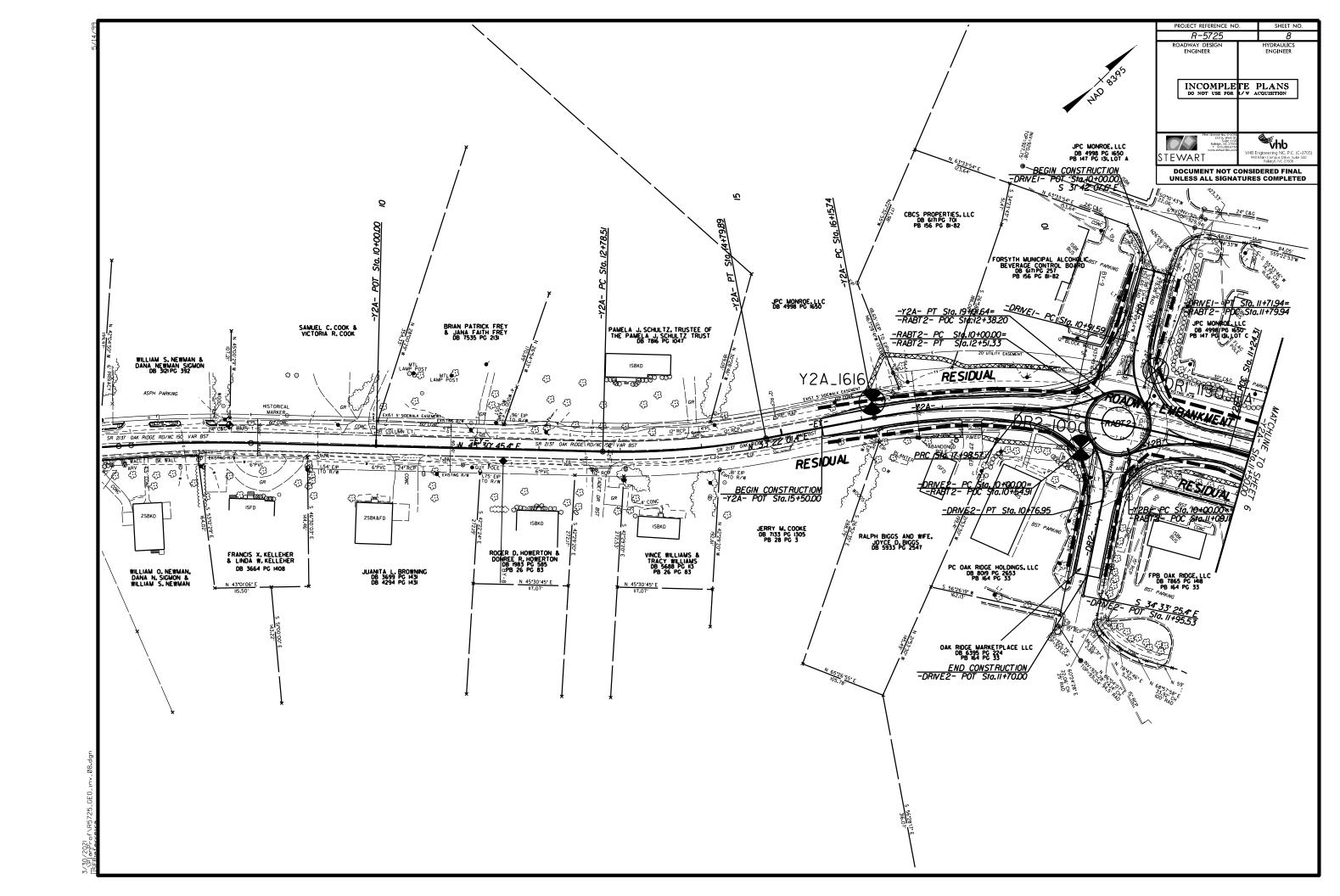


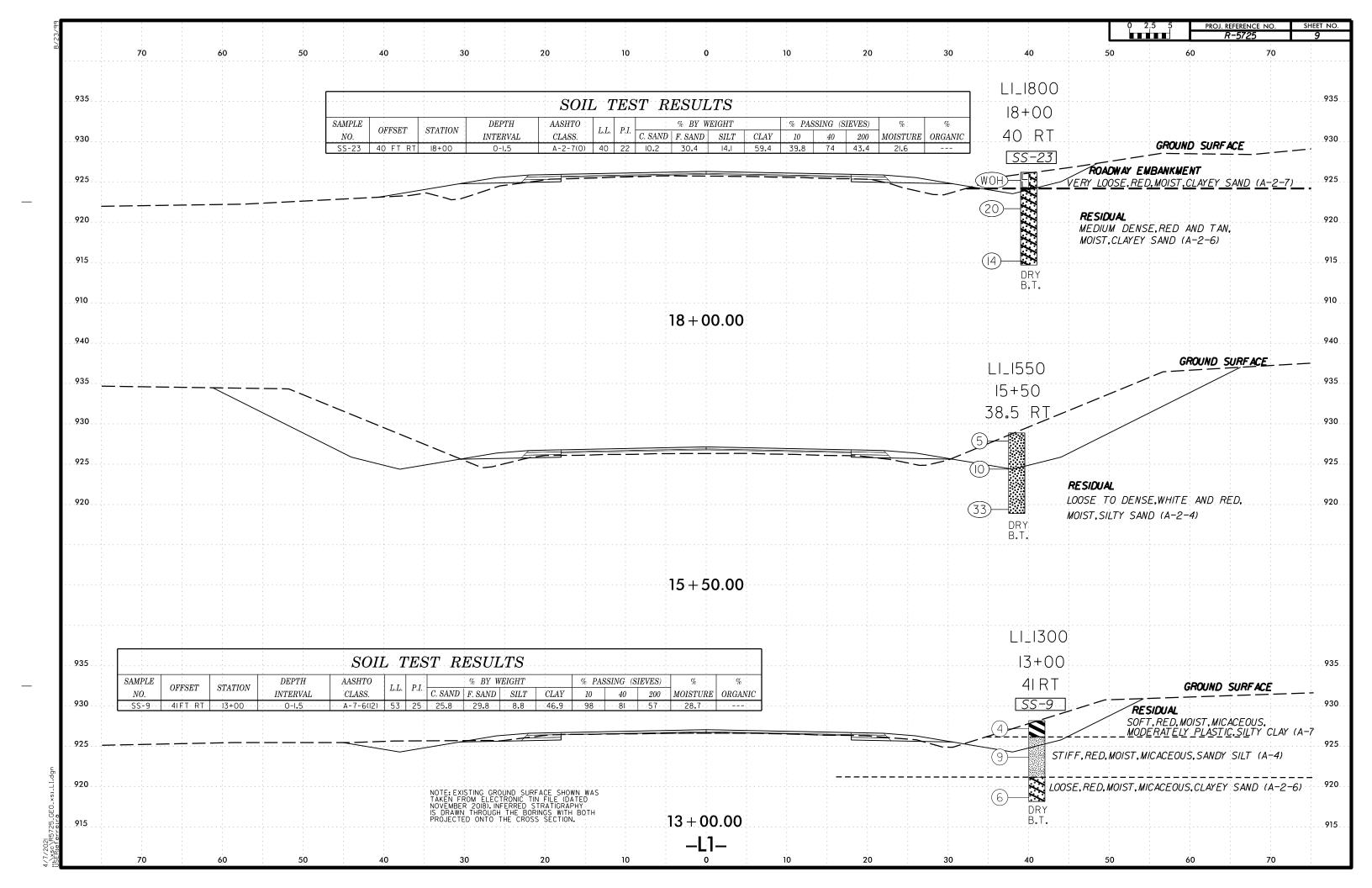


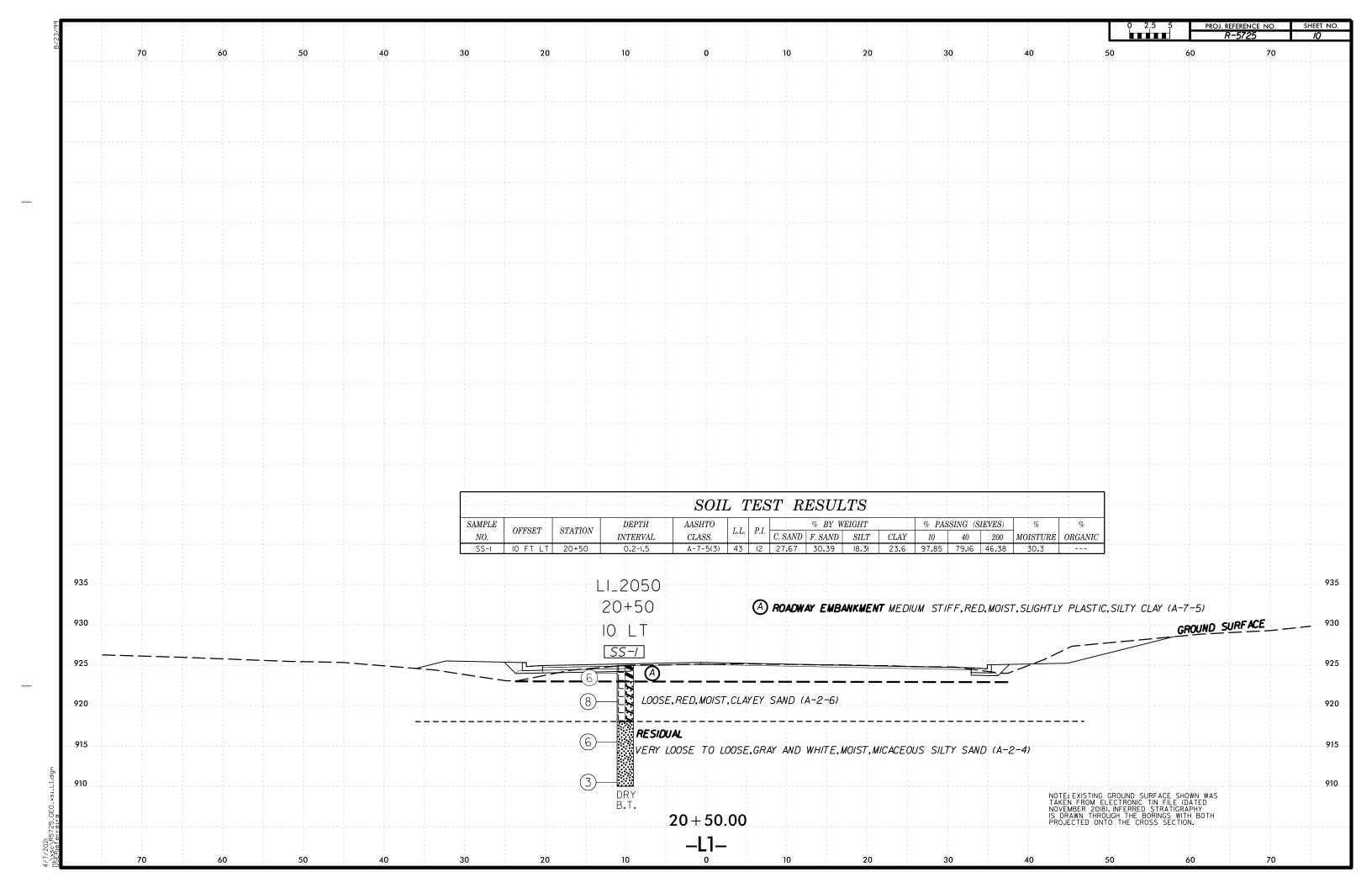


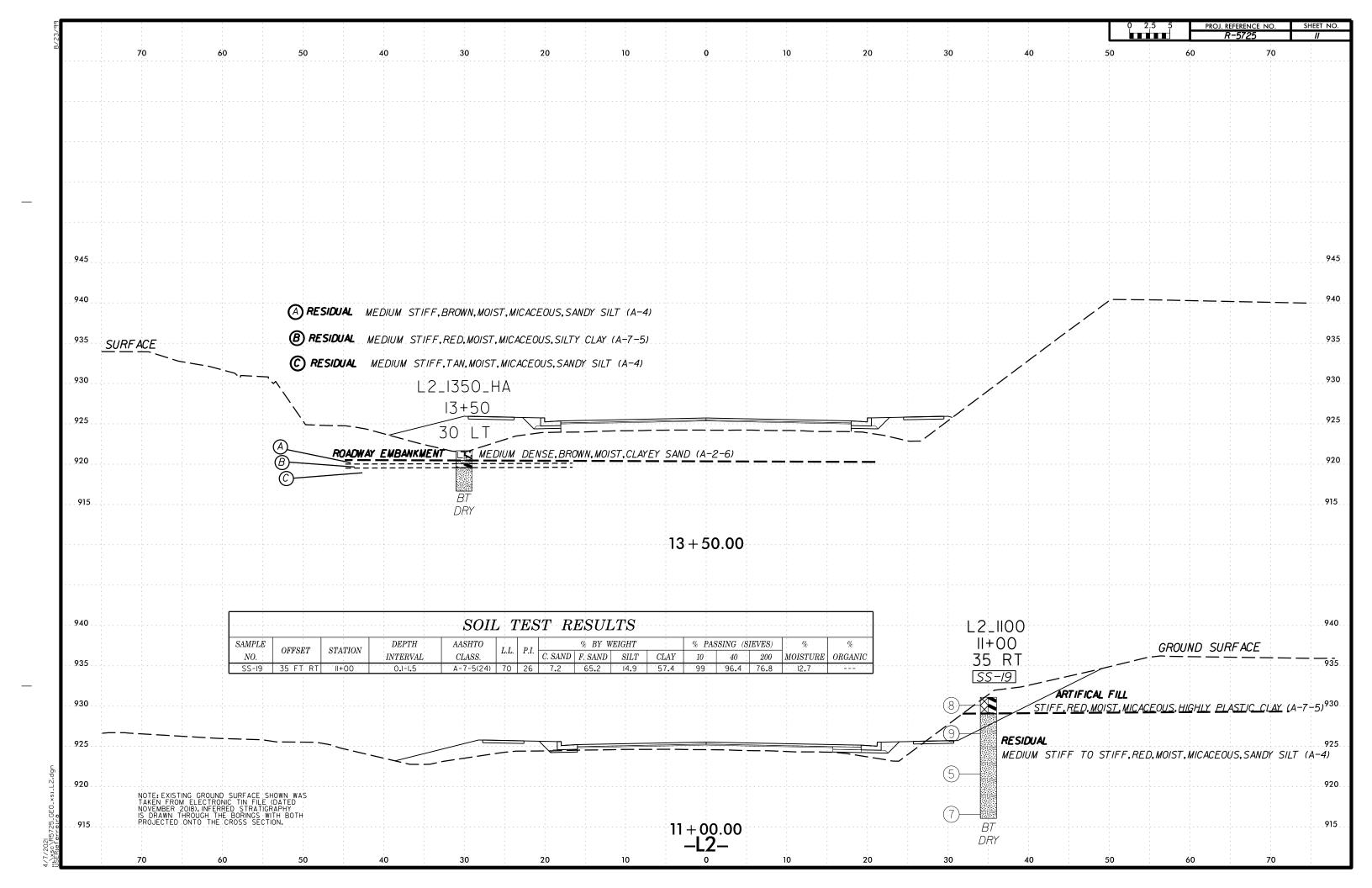


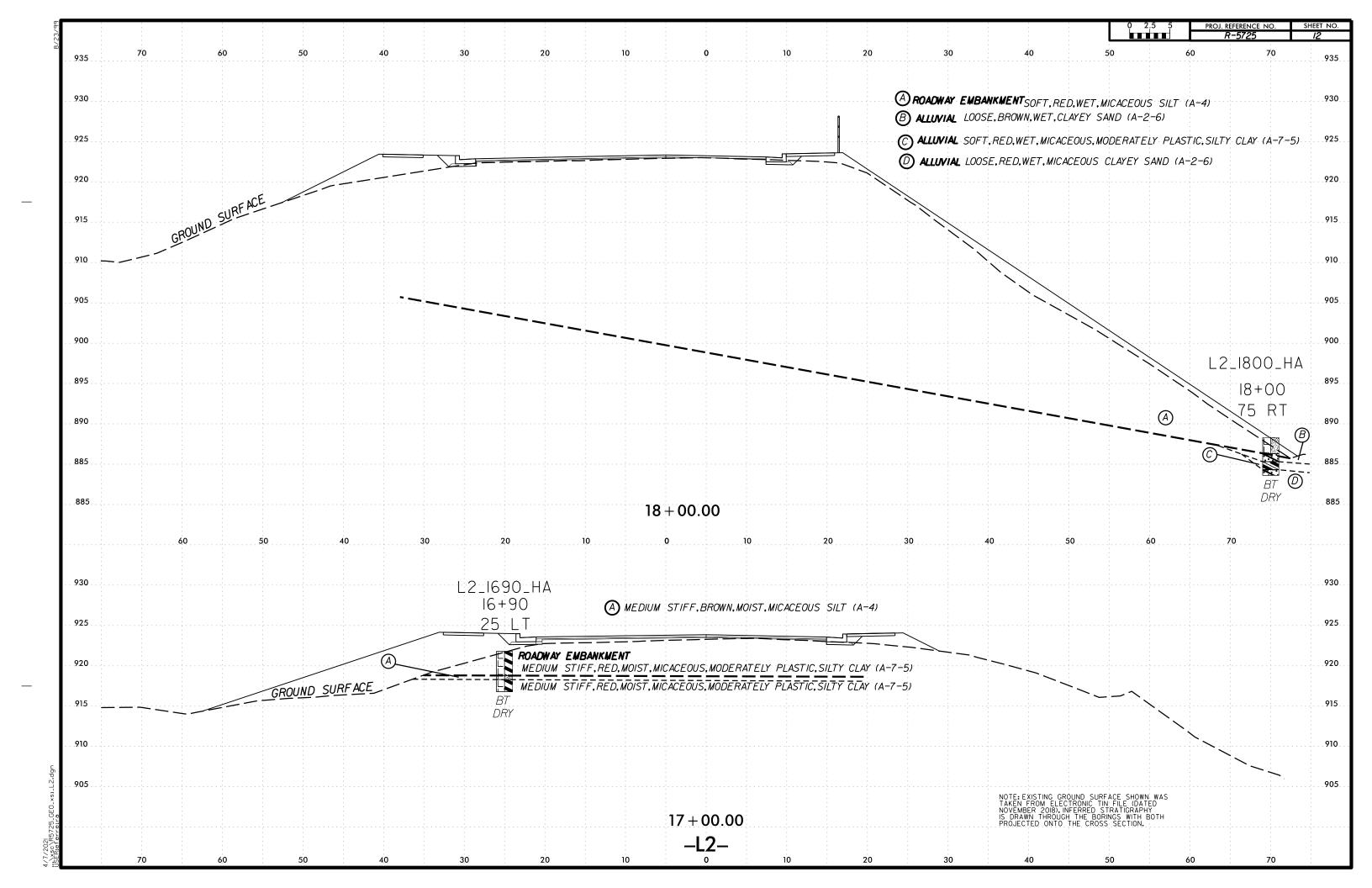


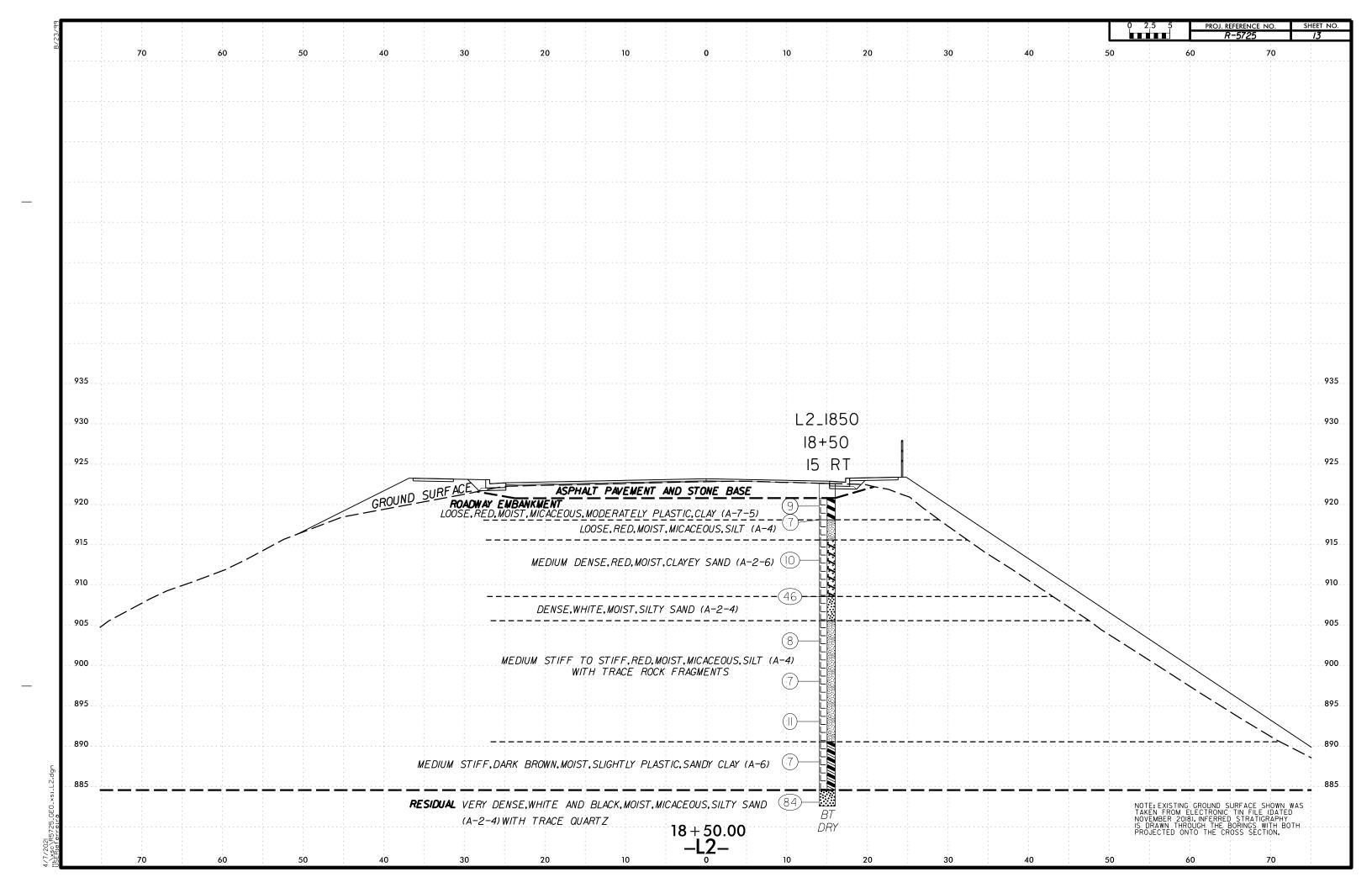


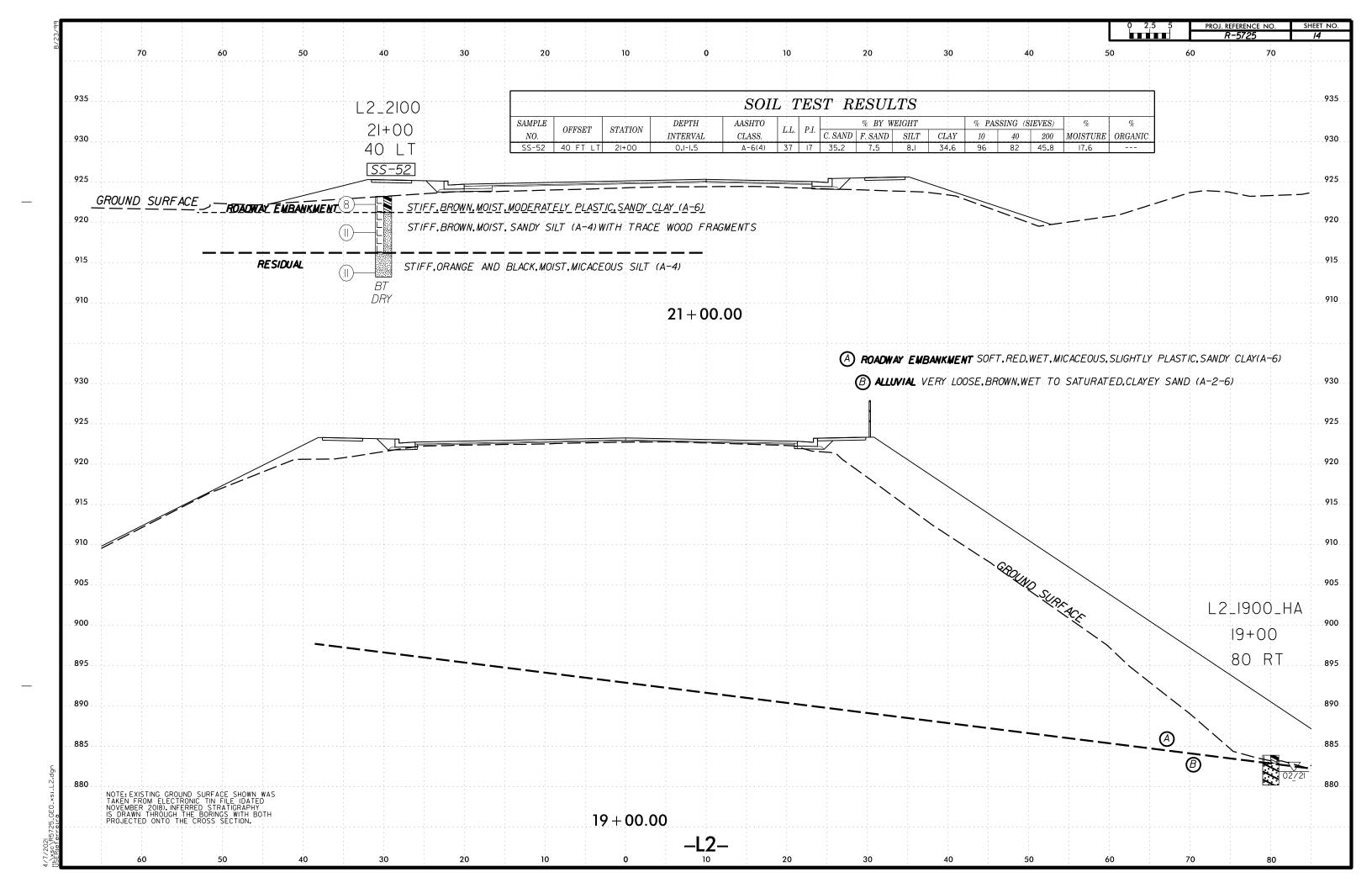


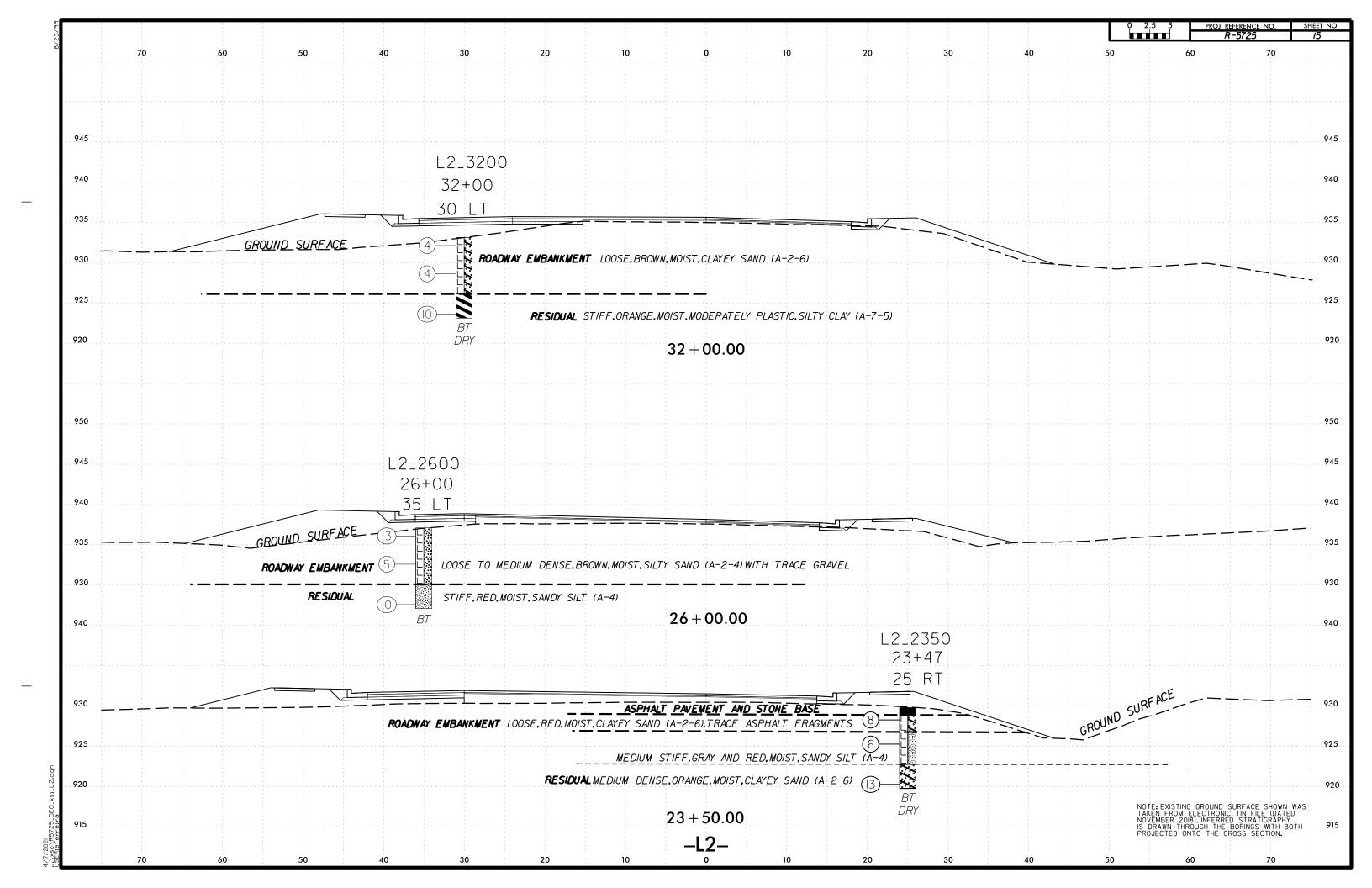


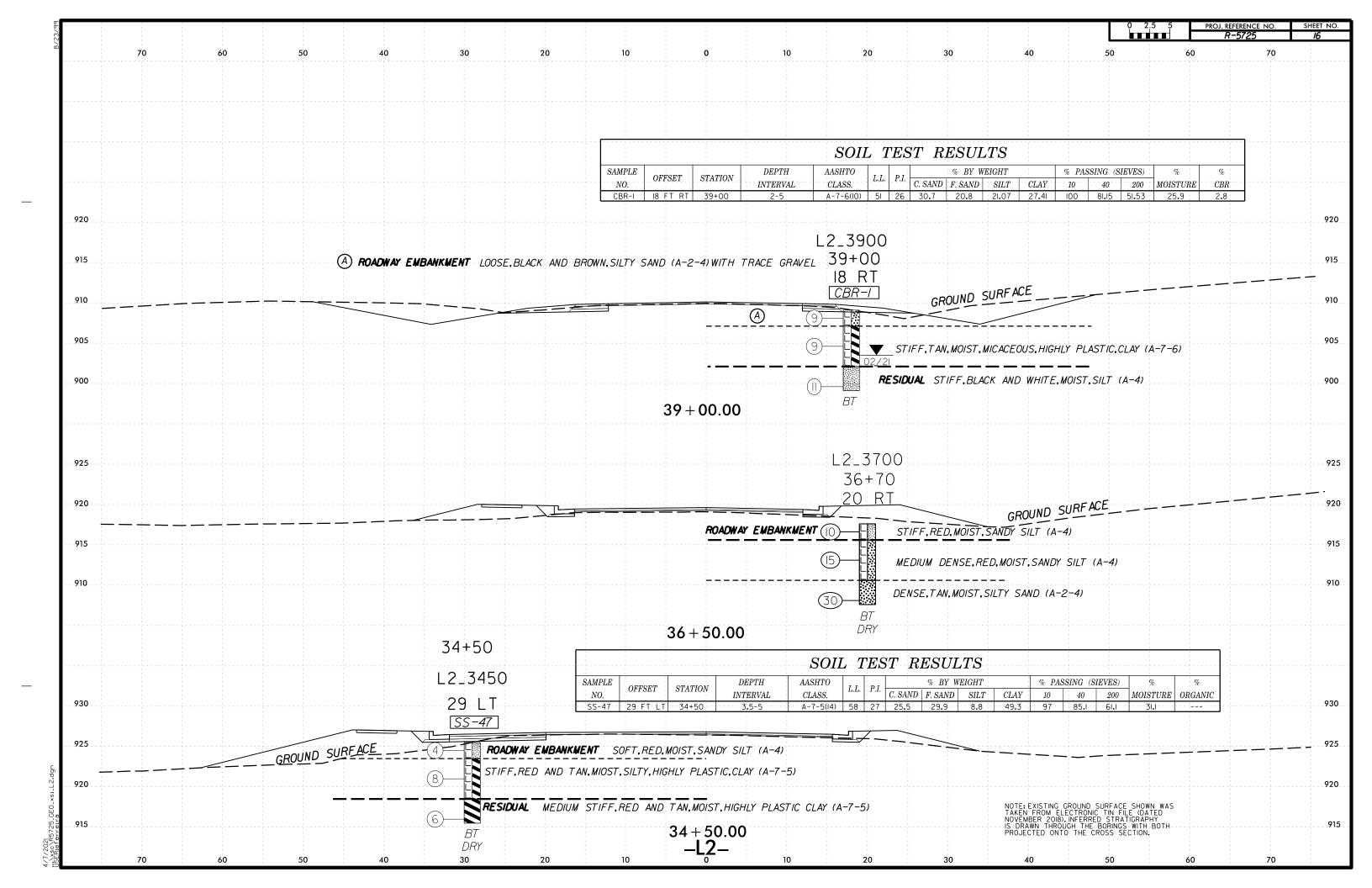


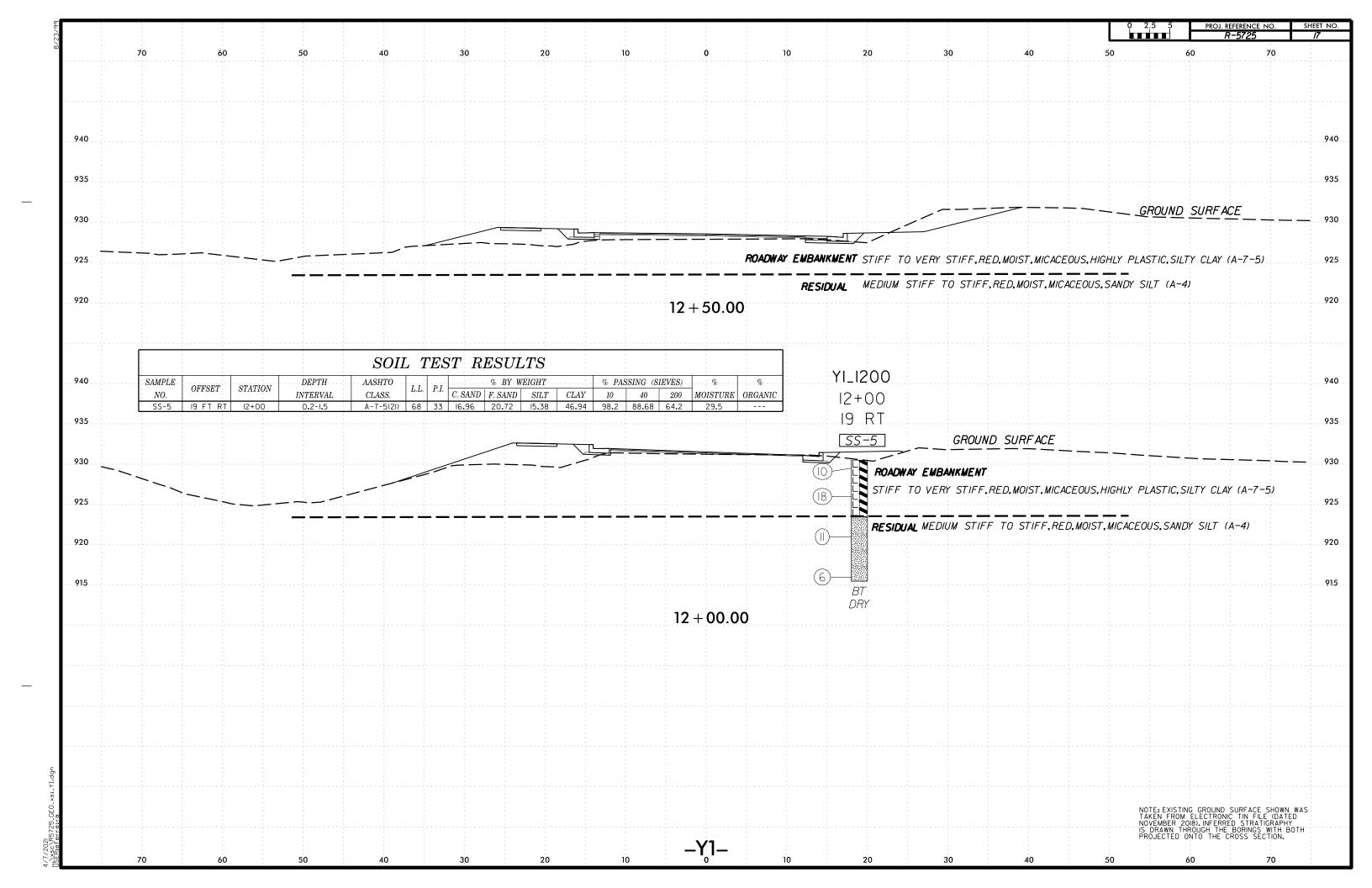


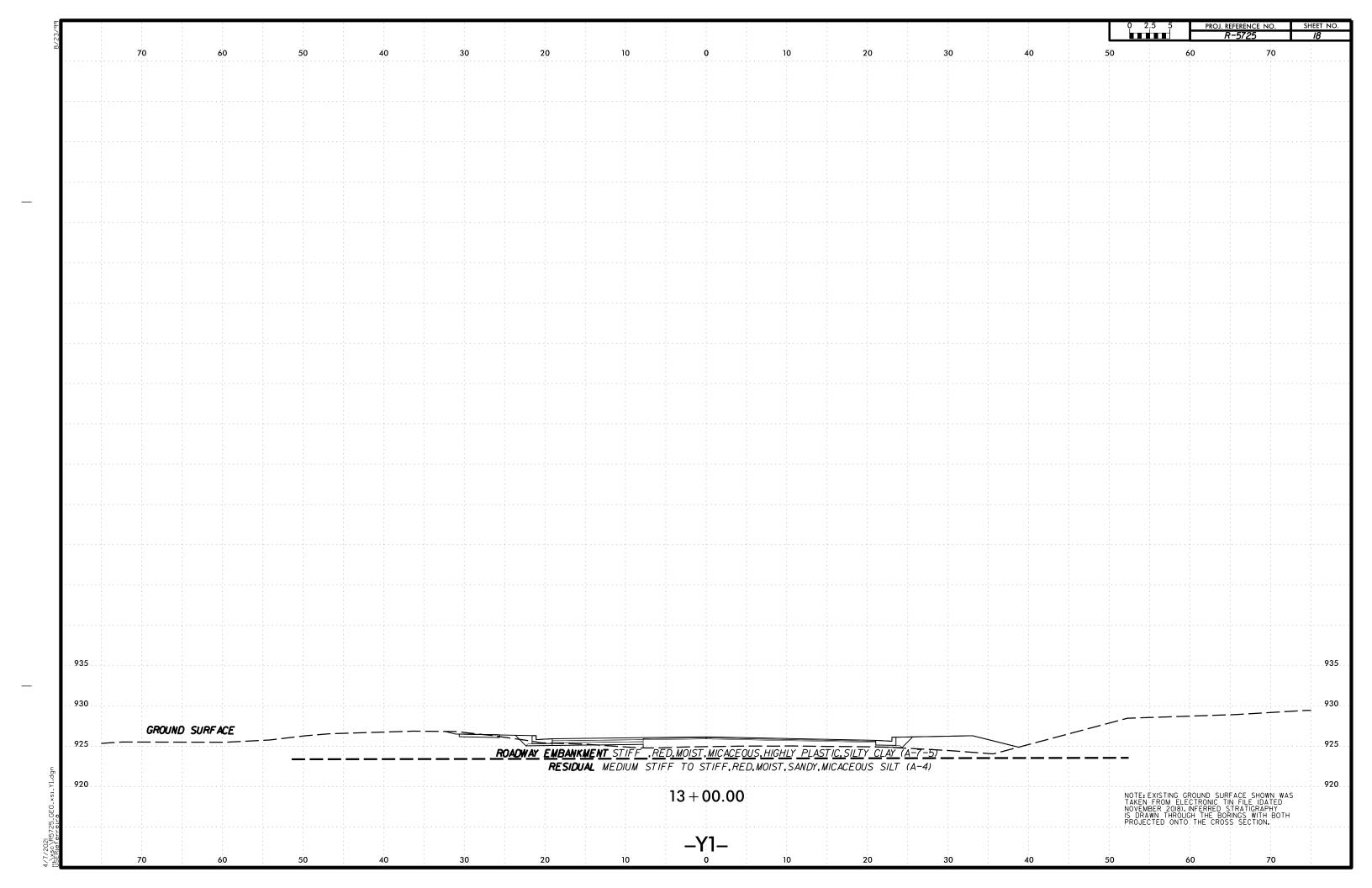












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