STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5857	1	

REFERENCE: R-5857

PROJECT: 47545

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	29+10 - 54+25	4,5	8-9
-LI-	19+09 - 42+20	6,7	10-11
-LRTL-	10+00 - 14+13	4	12
-Y-	17+00 - 24+12	4	12
-YI-	10+00 - 15+00	4,4A	12
-Y2-	10+00 - 14+15	4	12
-Y4-	13+85 - 18+58	6	13
-Y5-	10+00 - 23+00	6,6A	13

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	29+50	14
-L-	35+50	15
-L-	39+00 - 40+50	16
-L-	49+50	17
-L-	52+50	18
-Y-	17+00 - 23+00	19-21
-Y2-	12+00 - 14+00	22-23
-Y4-	15+50	24

APPENDIX A

TITLE	SHEETS
SUPPLEMENTAL BORING LOGS & LAB RESULTS	25-31

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *BRUNSWICK*

PROJECT DESCRIPTION *US 17 BUSINESS SOUTH OF SHALLOTTE AND US 17 BUSINESS NORTH OF SHALLOTTE. CONVERT INTERSECTIONS TO SUPERSTREETS*

INVENTORY – REVISED

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 (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

J. HOLLAND

E. UNOBE

INVESTIGATED BY *J. CRENSHAW*

DRAWN BY *J. HOLLAND*

CHECKED BY *J. WESSELL*

SUBMITTED BY *SCHNABEL ENG.*

DATE *MAY 2025*

Schnabel ENGINEERING

NORTH CAROLINA LICENSED SEAL 2504 GEOLOGIST JARED K. CRENSHAW

Signed by:
F325B40D4C25483...
SIGNATURE

05/28/2025
DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-5857	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

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	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
MATERIAL PASSING #40 LL	—		—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PI	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE MM: 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005
GRAIN SIZE IN.: 12 | 3

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT PLASTIC RANGE (PI) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

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.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

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
- 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT DPT DMT VST PMT TEST BORING
- AUGER BORING
- CORE BORING
- MW MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

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. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS
S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE ____" STEEL TEETH
- [ ] TRICONE ____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [ ] AUTOMATIC
- [ ] MANUAL

CORE SIZE:
- [ ] -B _____
- [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [X] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

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

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

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

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (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 (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK:

ELEVATION: FEET

NOTES:

BORING AND GROUND SURFACE ELEVATIONS OBTAINED FROM 'r5857a_ls_tin_190308.tin' AND 'r5857b_ls_tin_210615.tin' RECEIVED ON 8/20/2021

FIAD - FILLED IMMEDIATELY AFTER DRILLING
UCP - UNDIVIDED COASTAL PLAIN

DATE: 8-15-14

09/08/99

TIP PROJECT: R-5857

CONTRACT: C205073

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

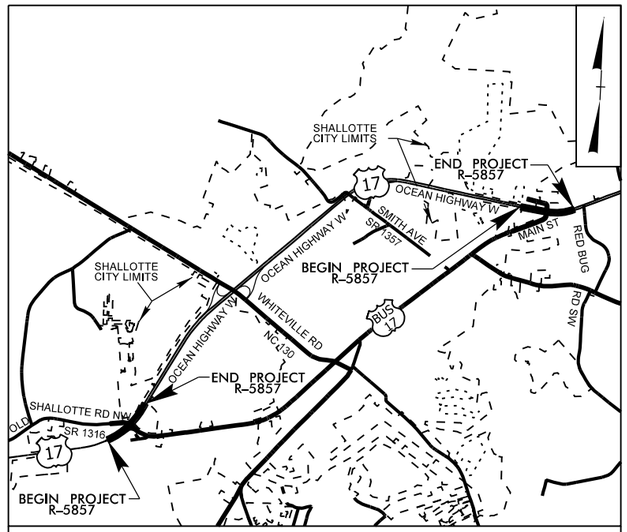
BRUNSWICK COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5857	1	

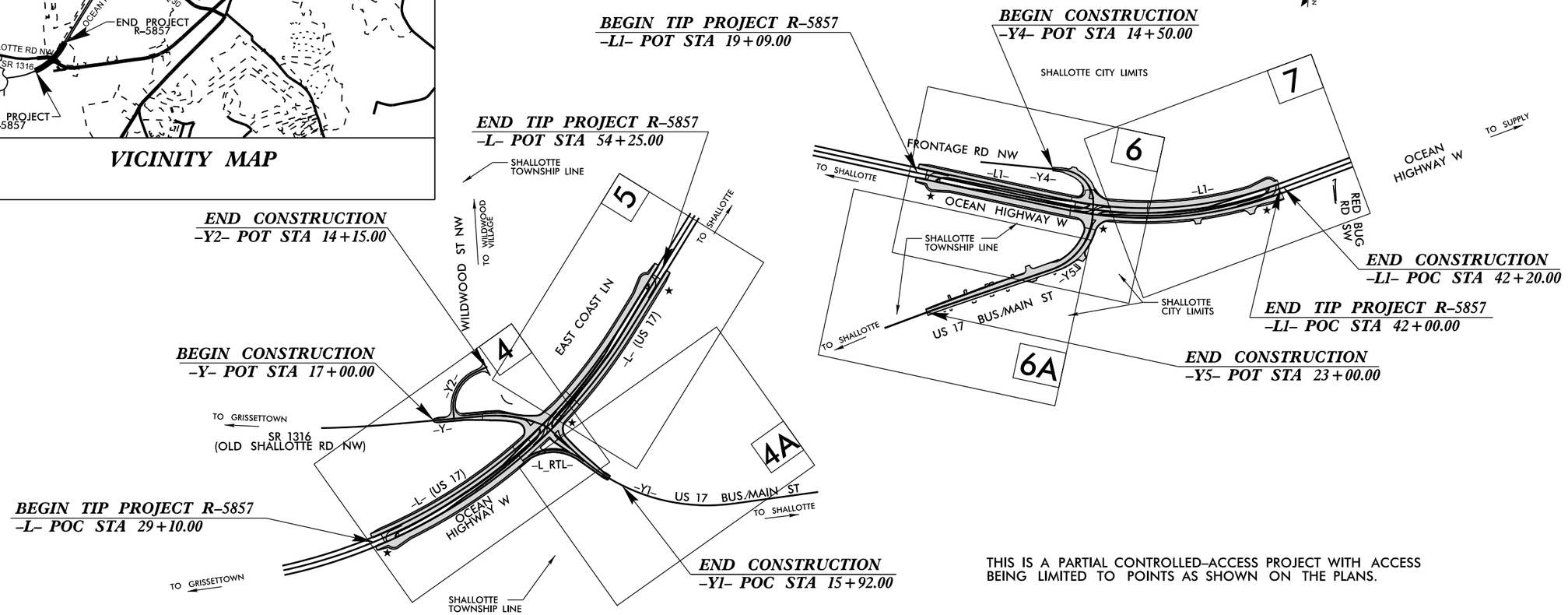
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
47545.1.1	NA	PE
47545.2.1	NA	ROW
47545.2.2	NA	UTIL
47545.3.1	NA	CONST

LOCATION: US 17 BUSINESS SOUTH OF SHALLOTTE AND US 17 BUSINESS NORTH OF SHALLOTTE. CONVERT INTERSECTIONS TO REDUCED CONFLICT INTERSECTIONS.

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND SIGNALS



VICINITY MAP



THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.

★ DENOTES SIGNAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2025 = 37,200
ADT 2042 = 46,000
K = 10 %
D = 60 %
T = 4 % *
V = 60 MPH
* TTST =1 DUAL =3
FUNC CLASS =
PRINCIPAL ARTERIAL

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT R-5857 = 0.910 MILES

TOTAL LENGTH OF TIP PROJECT R-5857 = 0.910 MILES

Prepared In the Office of:

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PH: (919) 662-1948 - FAX: (919) 662-2022
NC LICENSE NO. C-0910

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 21, 2023

LETTING DATE:
JULY 15, 2025

AYMAN L. ALQUDWAH, PE
PROJECT ENGINEER

DAVID GARRETT
PROJECT DESIGN ENGINEER

ZACHARY HOWARD, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA G. DALTON

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER AYMAN L. ALQUDWAH

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

$$$$SYSTIME$$$$
$$$$DGN$$$$
$$$$USERNAME$$$$

Schnabel ENGINEERING
Schnabel Engineering South, P.C.
1133 Military Cutoff Road, Suite 210 / Wilmington, NC 28405
T 910.769.1621
schnabel-eng.com

May 20, 2025

STATE PROJECT: 47545.1.1

TIP NUMBER: R-5857

COUNTY: Brunswick

DESCRIPTION: US 17 Business at US 17 South of Shallotte and US 17 Business North of Shallotte. Convert Intersections to Superstreets

SUBJECT: Geotechnical Roadway Inventory Report - REVISED

PROJECT DESCRIPTION

The R-5857 project is designed to improve traffic flow and ease congestion in the City of Shallotte, NC. The project consists of improvements to the intersections of US 17 at US 17 Business (Main Street)/Frontage Road N.W., north of Shallotte, and US 17 at US 17 Business (Main Street)/Old Shallotte Road (S.R. 1316), south of Shallotte in Brunswick County.

The field investigation was conducted in September, October, and November of 2021 with hand tools. Representative soil samples were collected and forwarded to an approved testing facility for soil quality analysis, AASHTO classification, and moisture content analyses.

The following alignments were investigated

Line	Station			Length (ft)
-L-	29+10	to	54+25	2,515
-L1-	19+09	to	42+20	2,311
-LRTL-	10+00	to	14+13	413
-Y-	17+00	to	24+12	712
-Y1-	10+00	to	15+00	500
-Y2-	10+00	to	14+15	415
-Y4-	13+85	to	18+58	473
-Y5-	10+00	to	23+00	1,300
			Total =	8,639 (≈ 1.6 miles)

Physiography and Geology

The project is located in the Coastal Plain Physiographic Province. Coastal Plain Formational deposits in the area have been identified as the Socastee Formation (upper Pleistocene), primarily comprised of reworked shells, fine gravel, coarse sand, and interbedded sand and clays with wood fragments. The Socastee Formation was not encountered during drilling. Topography along the project corridor is flat and poorly drained, with several unnamed streams crossing or running along proposed alignments.

Soil Properties

Soils encountered along the project corridor are divided into three categories based on origin: roadway embankment, alluvial soils, and Undivided Coastal Plain (UCP) soils.

Roadway embankment soils were encountered along the existing alignments. These soils consisted of very loose to very dense, sandy GRAVEL, silty SAND, and SAND (A-1-b, A-2-4). Roadway embankment soils observed field moistures ranged from moist to saturated. These soils were encountered at depths ranging from 0.1 to at least 6 feet. The moisture content of the roadway embankment soils was not tested.

Alluvial soils were encountered along the proposed -Y2- alignment consisting of medium dense, silty SAND (A-2-4), and soft to medium stiff, sandy CLAY (A-6). Alluvial soils observed field moistures ranged from moist to wet. These soils were encountered at depths from the ground surface to 4 feet. Within the cohesive alluvial soils, moisture content was 28.0%. The plasticity index (PI) within the cohesive sediment was 16.

UCP sediments were encountered throughout the project corridor. These sediments consisted of very loose to very dense, fine SAND and clayey to silty SAND (A-3, A- 2-4, A-2-6), medium stiff to stiff, SILT (A-4), and soft to very stiff, sandy and silty CLAY (A-6, A-7-6). UCP sediments observed field moistures ranged from moist to saturated. These sediments were encountered at depths from the ground surface to at least 6 feet. Within the cohesive UCP soils, moisture contents ranged from 16.0% to 56.0%. Plasticity indices (PI) within the cohesive sediments range from 11 to 67.

Ground Water

All borings were left open for a minimum of 24 hours to equilibrate with the surrounding conditions. Groundwater data were collected in September, October, and November of 2021, during a time of average precipitation. Groundwater elevations generally varied with topography and ranged from 12.0± to 46.0± feet above sea level.

AREAS OF SPECIAL GEOTECHNICAL INTEREST

A. The following sections contain cohesive soils which have the potential to cause embankment and or subgrade issues during construction. Soils with Plasticity Indices higher than 15 were encountered in the following sections.

Alignment	Station
-L-	31+75 to 34+25
-L-	39+00 to 41+25
-L-	45+25 to 53+25
-Y-	17+00 to 21+25
-Y1-	13+50 to 15+00
-Y2-	12+50 to 14+00

B. Alluvial soils were encountered in the following section.

Alignment	Begin Station	End station
-Y2-	**10+25**	**14+15**

C. Ponds occur in the following area within or near the proposed right of way.

Alignment	Begin Station	End Station	Offset
-L-	**51+00**	**52+00**	**±190' LT**

D. Wells located in the following areas within or near construction limits.

Alignment	Begin Station	Offset
-L-	**46+56**	**±189' LT**

E. Groundwater was encountered within 6 feet of proposed grade in the following areas.

Alignment	Station
-L-	29+10 to 54+25
-L1-	19+09 to 42+20
-Y-	17+00 to 23+52
-Y2-	10+00 to 14+15
-Y4-	13+85 to 18+03
-Y5-	10+54 to 23+00

Schnabel Engineering South, P.C.
1133 Military Cutoff Road, Suite 210
Wilmington, NC 28405

PROJECT REFERENCE NO.	SHEET NO.
R-5857	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER ATMAN I. ALOLOWAY

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA C. DALTON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY :

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RALEIGH, NORTH CAROLINA, (919) 854-1345
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FOR NORTH CAROLINA DEPT. OF TRANSPORTATION

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ENG FIRM LICENSE NO. C-690

-Y- PT Sta. 14+25.00
-Y2- PC Sta. 10+51.83
S 7° 58' 33.9" E
N 82° 11' 31.0" E
BY1-11
UNDIVIDED COASTAL PLAIN
-Y- POT Sta. 17+00.00
BEGIN CONSTRUCTION
-L- POC Sta. 29+10.00
BEGIN PROJECT TIP R-5857
-Y2- POT Sta. 10+00.00 =
-Y- POT Sta. 18+25.44
UNDIVIDED COASTAL PLAIN
-Y- PC Sta. 20+05.79
-Y2- POT Sta. 14+24.80
-Y2- POT Sta. 14+15.00
END CONSTRUCTION
N 62° 14' 14.7" E
-Y2- PT Sta. 13+39.81
ALLUVIAL
ALLUVIAL
UNDIVIDED COASTAL PLAIN
NAD 83/2011
UNDIVIDED COASTAL PLAIN
UNDIVIDED COASTAL PLAIN
-Y- PT Sta. 24+05.71
-Y- POT Sta. 24+11.60 =
-Y1- POT Sta. 10+00.00 =
-L- POC Sta. 42+05.99
S 69° 09' 56.0" E
ROADWAY EMBANKMENT
ROADWAY EMBANKMENT
-L LT-
-L-
-L RT-
-L RTL-
-Y1-
MATCH LINE -L- STA 43+50 SEE SHEET 5
S 50° 12' 13.6" E
-Y1- PC Sta. 12+56.93
-L RTL- PC Sta. 10+00.00 =
-L- POC 39+53.37' 54' RT
-L RTL- PT Sta. 14+12.62 =
-Y1- POC Sta. 13+12.52.5' RT
MATCH LINE -Y1- STA 13+50 SEE SHEET 4A
UNDIVIDED COASTAL PLAIN

BEGIN W.W. FENCE RESET +80.00 -L-
END W.W. FENCE RESET +95 -L- BEGIN PROP. W.W. FENCE
END PROP. W.W. FENCE +25.00, 123.35 RT. -L-
BEGIN W.W. FENCE

OLD SHALLOTTE RD. (SR 1316) -Y-
(NOT TO SCALE)
71/115 — 2025/2042 ADT (IN HUNDREDS)
305/356 US 17 -L- — 275/323 OCEAN HWY.
11/17 — 28/40 — 60/70 — 13/14
105/140
US 17 BUS. MAIN ST. -Y1-

TRAFFIC DIAGRAM FOR US 17 (OCEAN HWY.) AT OLD SHALLOTTE RD/US 17 BUS. (MAIN ST.)

SEE SHEETS 8 & 9 FOR -L- PROFILES
SEE SHEET 12 FOR -Y-, -Y1-, -Y2- & -L_RTL- PROFILES
SEE SHEET 2B-1 FOR DITCH DETAILS
SEE SHEET 2B-2 FOR CONC. ISLAND DETAILS

★ DENOTES SIGNAL
DENOTES PAVEMENT REMOVAL

5/14/99
5/27/2025
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5/14/99

PLANS PREPARED BY :
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PROJECT REFERENCE NO.	SHEET NO.
R-5857	4A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER AYMAN I. ALOLOWAY

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA C. DALTON

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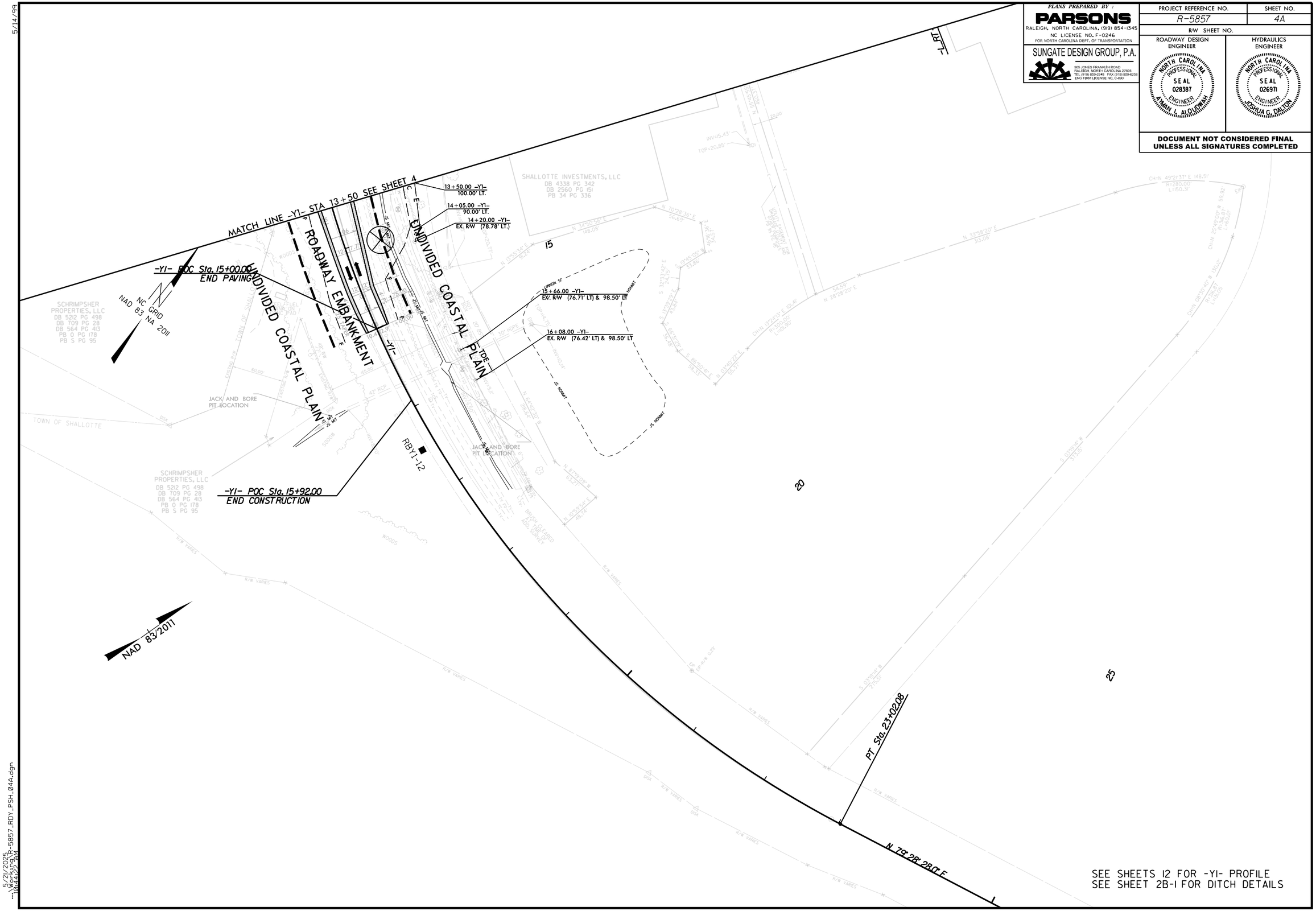

SEE SHEETS 12 FOR -Y1- PROFILE
SEE SHEET 2B-1 FOR DITCH DETAILS

5/21/2025
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PROJECT REFERENCE NO.	SHEET NO.
R-5857	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
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HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA C. DALTON

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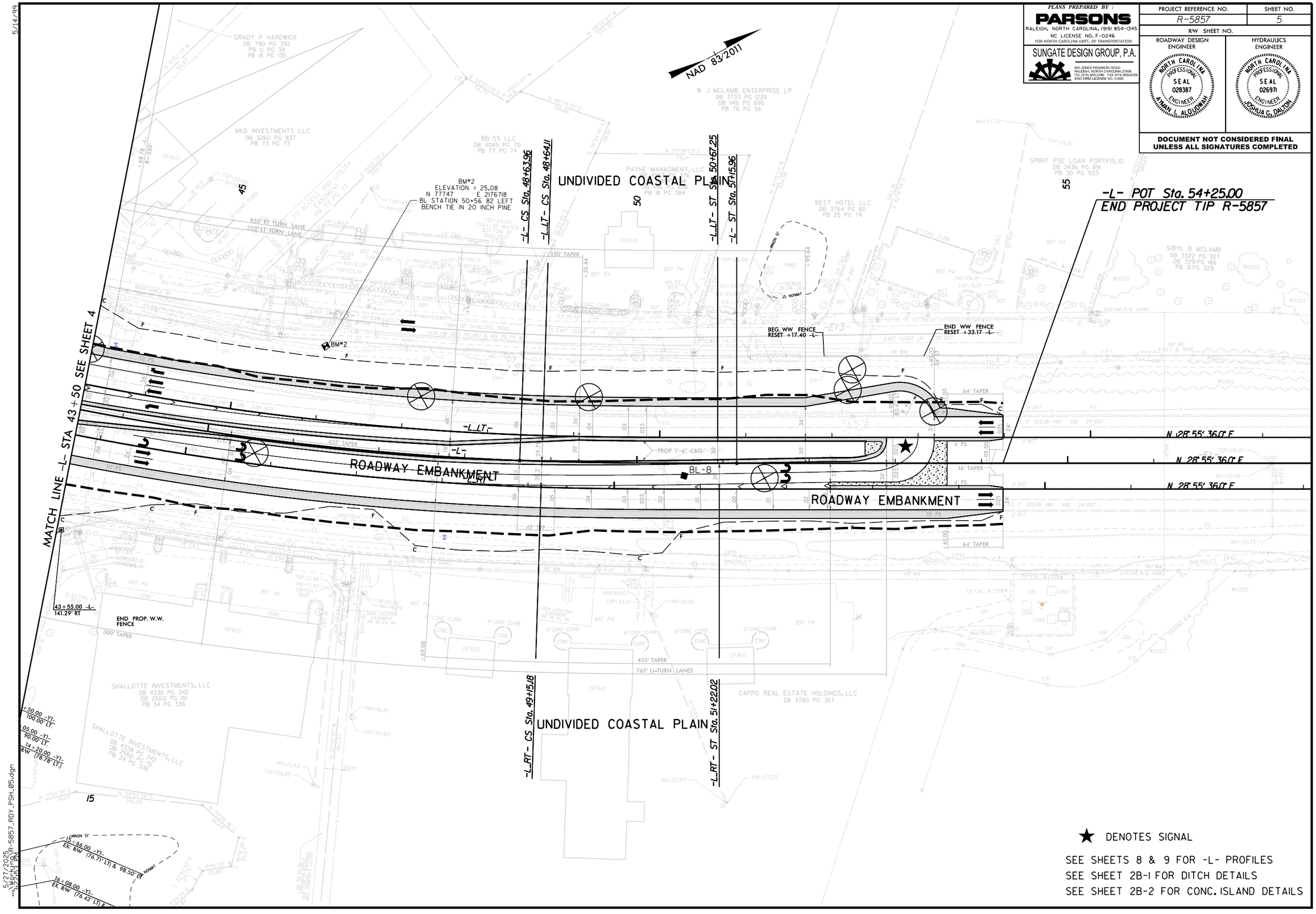

★ DENOTES SIGNAL

SEE SHEETS 8 & 9 FOR -L- PROFILES
SEE SHEET 2B-1 FOR DITCH DETAILS
SEE SHEET 2B-2 FOR CONC. ISLAND DETAILS

5/14/99

5/27/2025
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5/14/99

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PROJECT REFERENCE NO.	SHEET NO.
R-5857	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER AYMAN I. ALOLOWAY

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA C. DALTON

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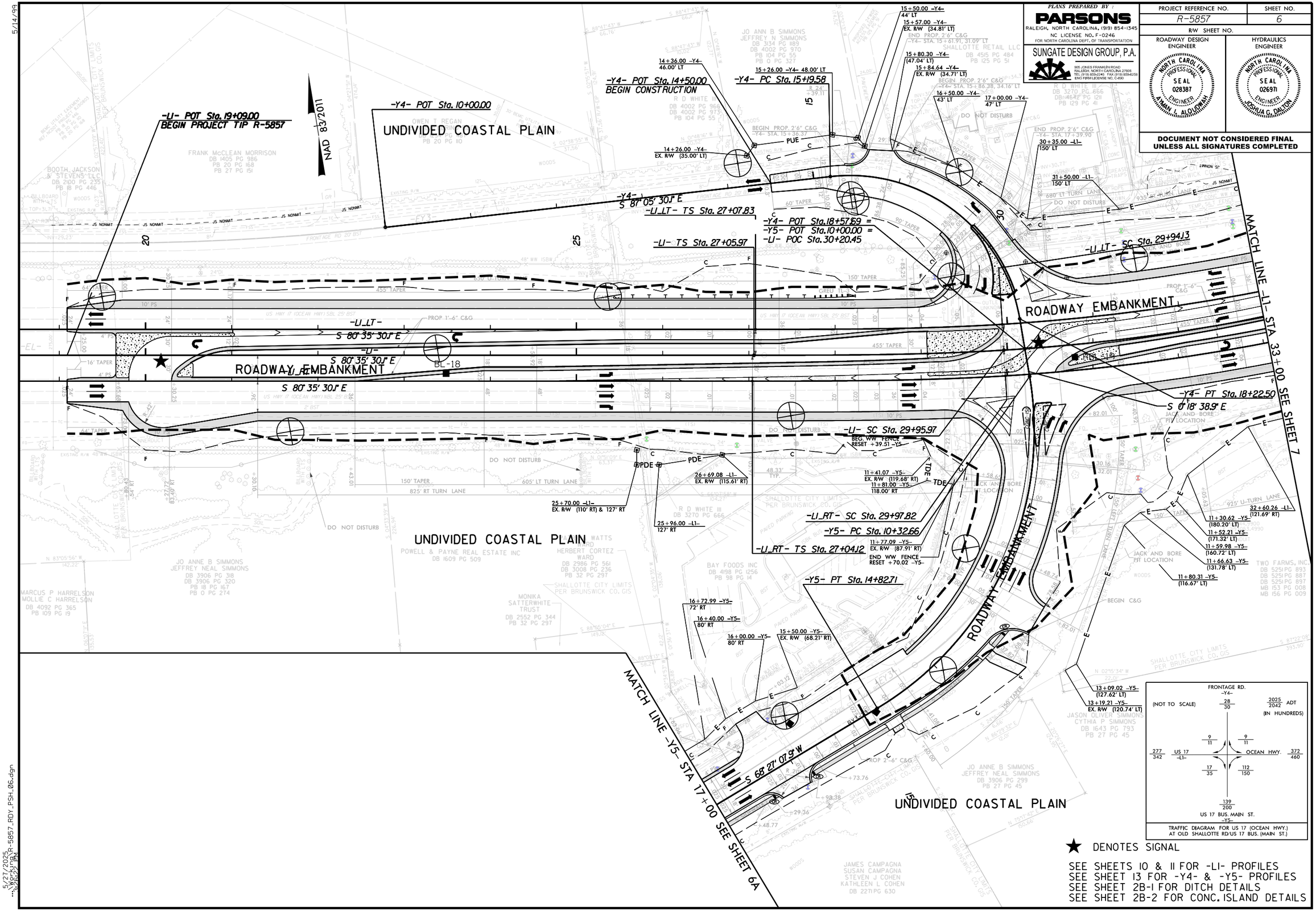

★ DENOTES SIGNAL

SEE SHEETS 10 & 11 FOR -L1- PROFILES
SEE SHEET 13 FOR -Y4- & -Y5- PROFILES
SEE SHEET 2B-1 FOR DITCH DETAILS
SEE SHEET 2B-2 FOR CONC. ISLAND DETAILS

5/21/2025
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PLANS PREPARED BY :
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ENG FIRM LICENSE NO. C-4590

PROJECT REFERENCE NO.	SHEET NO.
R-5857	6A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER AYMAN I. ALOLOWAY

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA C. DALTON

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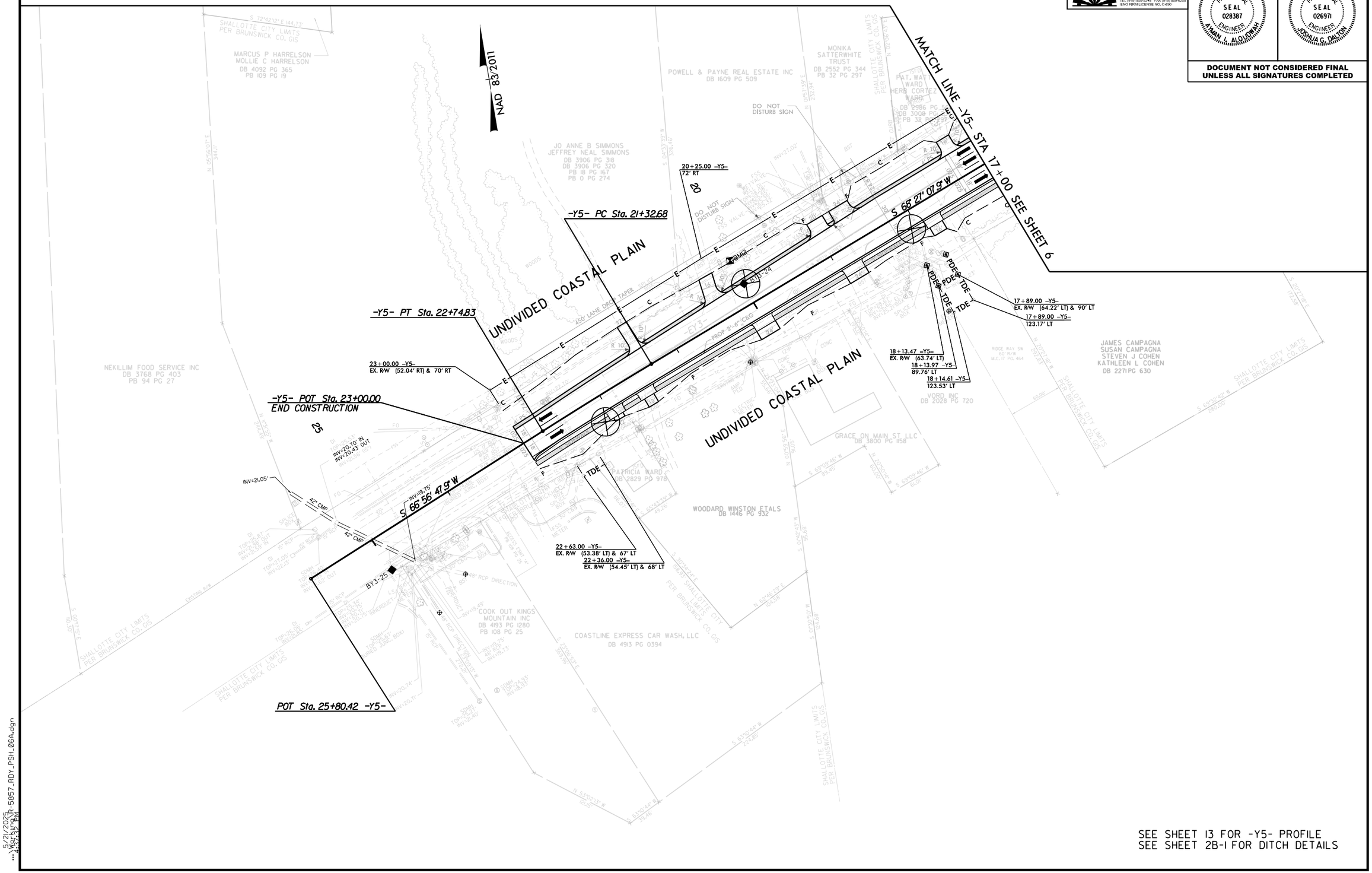

SEE SHEET 13 FOR -Y5- PROFILE
SEE SHEET 2B-1 FOR DITCH DETAILS

5/21/2025
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PLANS PREPARED BY :
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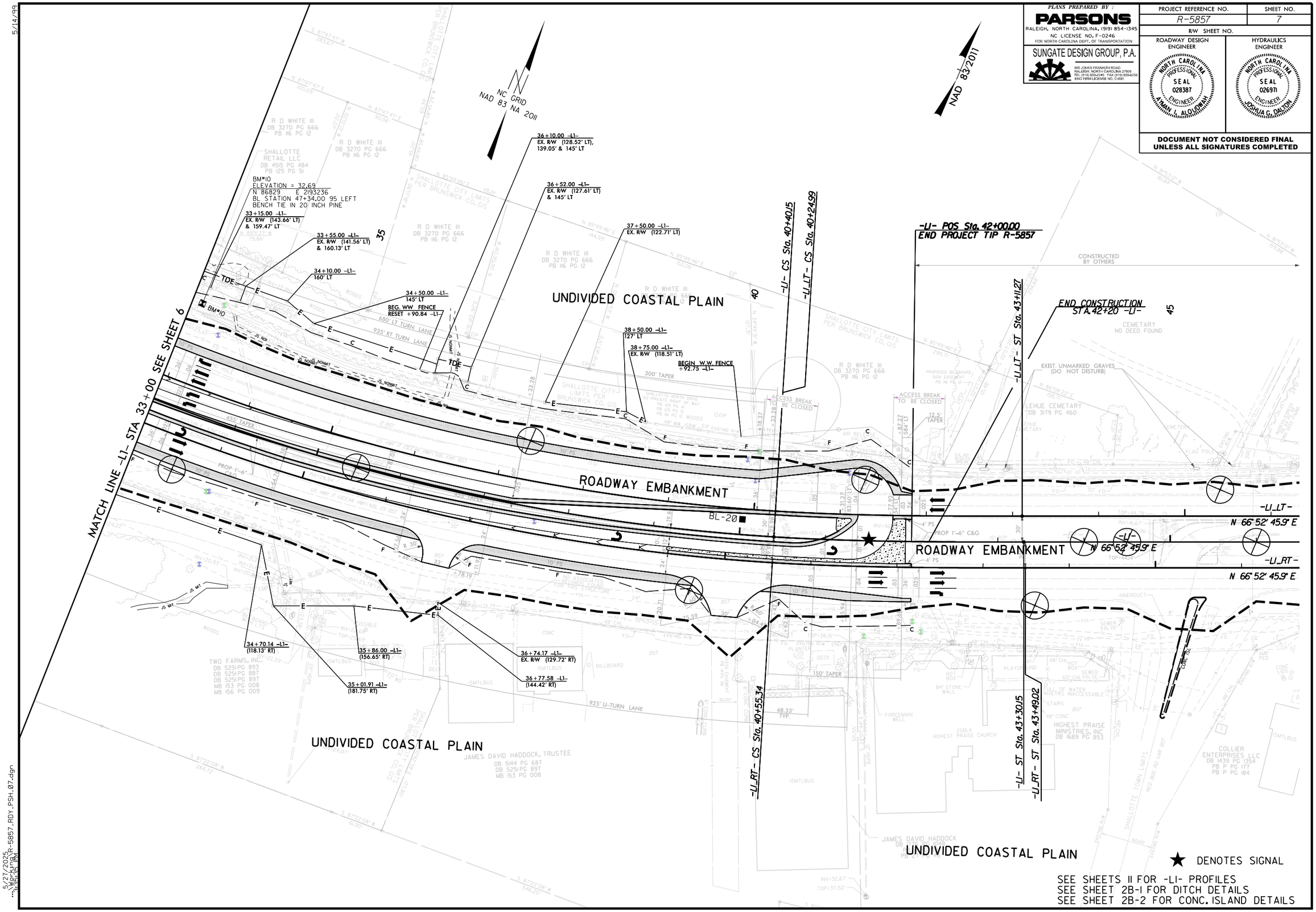
PROJECT REFERENCE NO.	SHEET NO.
R-5857	7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER AYMAN I. ALOLOWAN

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA C. DALTON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEETS 11 FOR -L1- PROFILES
SEE SHEET 2B-1 FOR DITCH DETAILS
SEE SHEET 2B-2 FOR CONC. ISLAND DETAILS

5/14/99

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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-5857	8

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER AMIN I. ALOUDMAN

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA C. DALTON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS

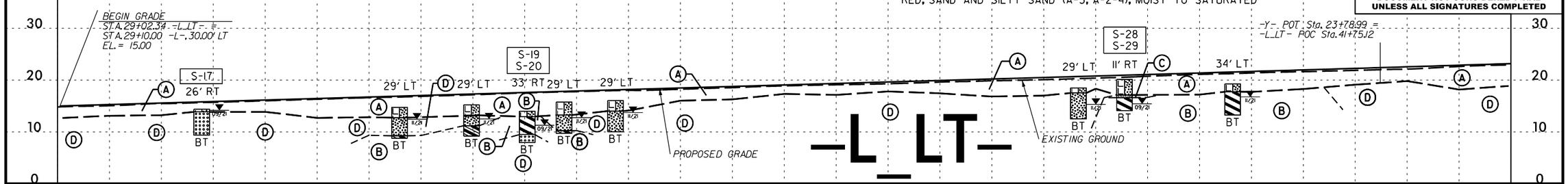
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-17	26' RT	30+38	0.5-1.0	A-3	NP	NP	24.8	68.2	1.9	5.2	99	96	8	17	-
S-19	33' RT	33+52	1.5-2.0	A-7-6(39)	61	43	2.8	14.0	27.2	56.0	100	99	85	30	-
S-20	33' RT	33+52	4.0-4.5	A-7-6(32)	54	36	0.9	18.0	27.4	53.8	100	100	85	29	-
S-28	11' RT	39+27	3.0-3.5	A-4	21	10	9.9	55.3	12.6	22.2	99	98	38	14	1.8
S-29	11' RT	39+27	3.5-4.0	A-7-6(36)	56	36	0.8	9.0	30.0	60.2	100	100	92	26	-

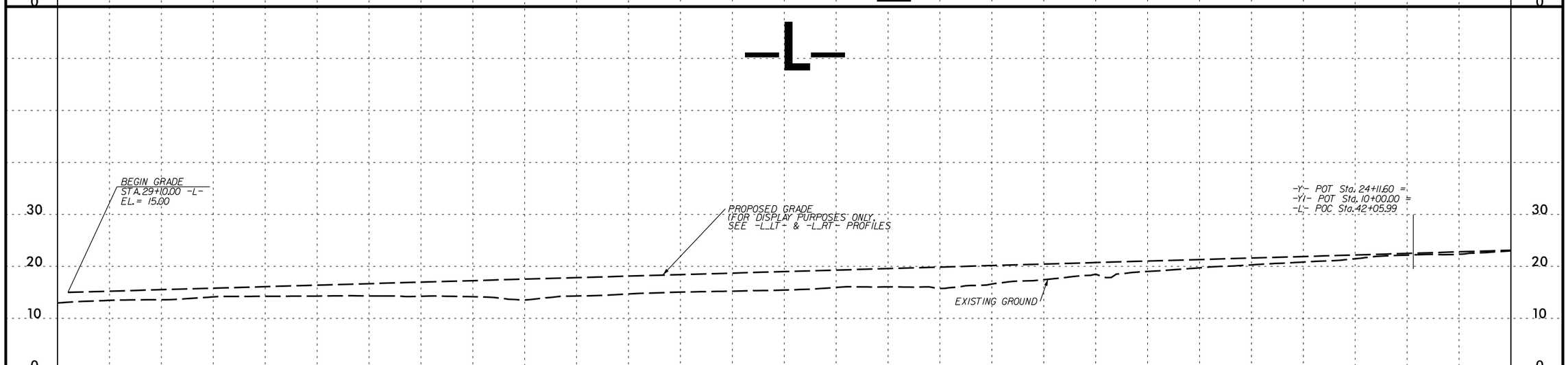
(A) **ROADWAY EMBANKMENT:** VERY LOOSE TO DENSE, GRAY, DARK GRAY, BROWN, TAN, AND ORANGE, SILTY SAND (A-2-4), CONTAINS ROOTS, MOIST TO SATURATED

(B) **UNDIVIDED COASTAL PLAIN:** SOFT TO VERY STIFF, ORANGE, GRAY, TAN, RED, AND BROWN, SANDY AND SILTY CLAY (A-6, A-7-6), MOIST TO WET

(C) **UNDIVIDED COASTAL PLAIN:** MEDIUM STIFF TO STIFF, DARK GRAY, SILT (A-4), MOIST

(D) **UNDIVIDED COASTAL PLAIN:** VERY LOOSE TO MEDIUM DENSE, GRAY, DARK GRAY, BROWN, TAN, ORANGE, AND RED, SAND AND SILTY SAND (A-3, A-2-4), MOIST TO SATURATED





SOIL TEST RESULTS

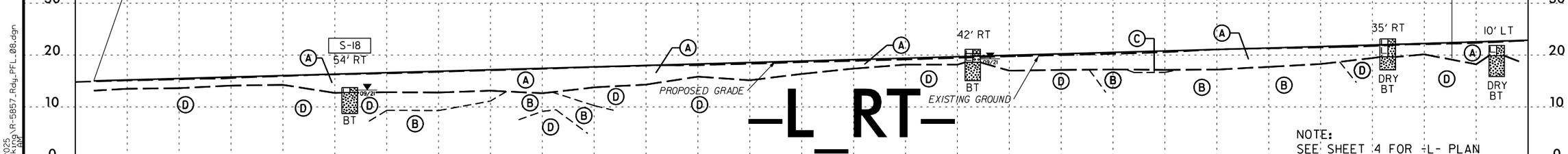
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-18	54' RT	31+64	1.0-1.5	A-2-4	20	4	18.6	54.5	9.6	17.3	100	94	30	21	-

(A) **ROADWAY EMBANKMENT:** VERY LOOSE TO DENSE, GRAY, DARK GRAY, BROWN, TAN, AND ORANGE, SANDY GRAVEL, SAND, AND SILTY SAND (A-1-b, A-3, A-2-4), CONTAINS ROOTS, MOIST TO SATURATED

(B) **UNDIVIDED COASTAL PLAIN:** SOFT TO VERY STIFF, ORANGE, GRAY, TAN, RED, AND BROWN, SANDY AND SILTY CLAY (A-6, A-7-6), MOIST TO WET

(C) **UNDIVIDED COASTAL PLAIN:** MEDIUM STIFF TO STIFF, DARK GRAY, SILT (A-4), MOIST

(D) **UNDIVIDED COASTAL PLAIN:** VERY LOOSE TO MEDIUM DENSE, GRAY, DARK GRAY, BROWN, TAN, ORANGE, AND RED, SAND AND SILTY SAND (A-3, A-2-4), MOIST TO SATURATED



NOTE:
SEE SHEET 4 FOR -L- PLAN

5/22/2025
R:\Roadway\R-5857_Rdy_PFL_08.dgn
8:29:14 AM

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-5857	9

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER KAMAN I. ALQUDMANI

HYDRAULICS ENGINEER

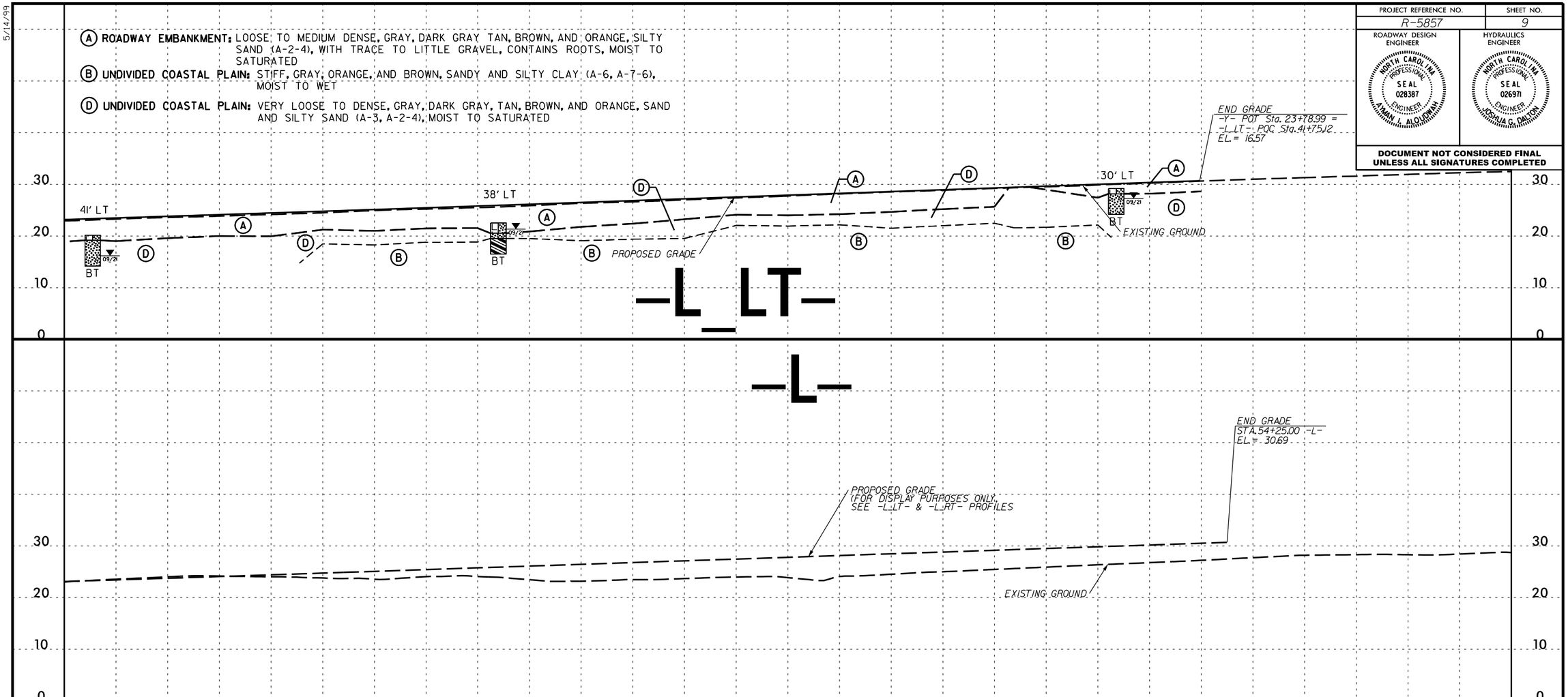
NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA C. DALTON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

(A) **ROADWAY EMBANKMENT:** LOOSE TO MEDIUM DENSE, GRAY, DARK GRAY TAN, BROWN, AND ORANGE, SILTY SAND (A-2-4), WITH TRACE TO LITTLE GRAVEL, CONTAINS ROOTS, MOIST TO SATURATED

(B) **UNDIVIDED COASTAL PLAIN:** STIFF, GRAY, ORANGE, AND BROWN, SANDY AND SILTY CLAY (A-6, A-7-6), MOIST TO WET

(D) **UNDIVIDED COASTAL PLAIN:** VERY LOOSE TO DENSE, GRAY, DARK GRAY, TAN, BROWN, AND ORANGE, SAND AND SILTY SAND (A-3, A-2-4), MOIST TO SATURATED



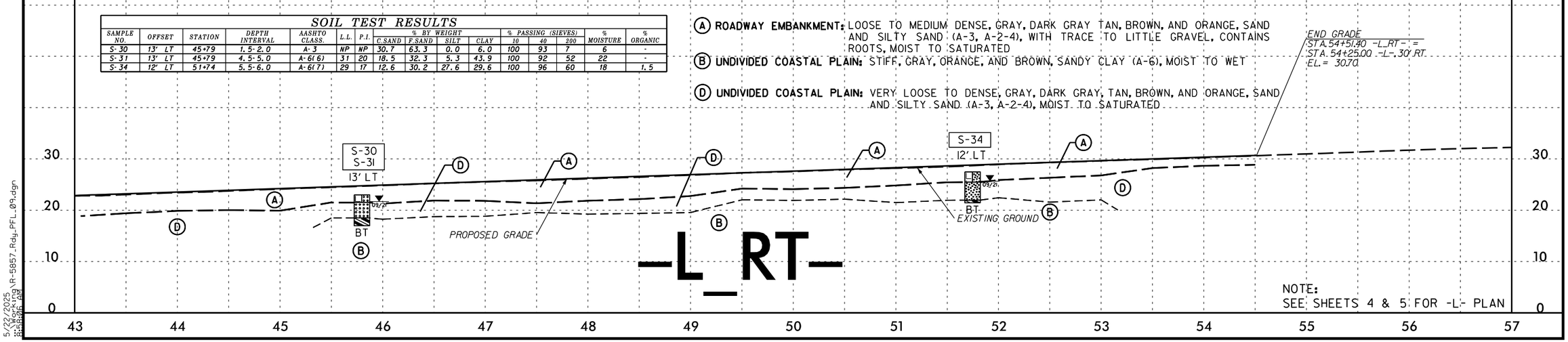
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-30	13' LT	45+79	1.5-2.0	A-3	NP	NP	30.7	63.3	0.0	6.0	100	93	7	6	-
S-31	13' LT	45+79	4.5-5.0	A-6(6)	31	20	18.5	32.3	5.3	43.9	100	92	52	22	-
S-34	12' LT	51+74	5.5-6.0	A-6(7)	29	17	12.6	30.2	27.6	29.6	100	96	60	18	1.5

(A) **ROADWAY EMBANKMENT:** LOOSE TO MEDIUM DENSE, GRAY, DARK GRAY TAN, BROWN, AND ORANGE, SAND AND SILTY SAND (A-3, A-2-4), WITH TRACE TO LITTLE GRAVEL, CONTAINS ROOTS, MOIST TO SATURATED

(B) **UNDIVIDED COASTAL PLAIN:** STIFF, GRAY, ORANGE, AND BROWN, SANDY CLAY (A-6), MOIST TO WET

(D) **UNDIVIDED COASTAL PLAIN:** VERY LOOSE TO DENSE, GRAY, DARK GRAY, TAN, BROWN, AND ORANGE, SAND AND SILTY SAND (A-3, A-2-4), MOIST TO SATURATED



NOTE:
SEE SHEETS 4 & 5 FOR -L- PLAN

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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-5857	10

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER KAMAL I. ALQUDMANI

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA G. DALTON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

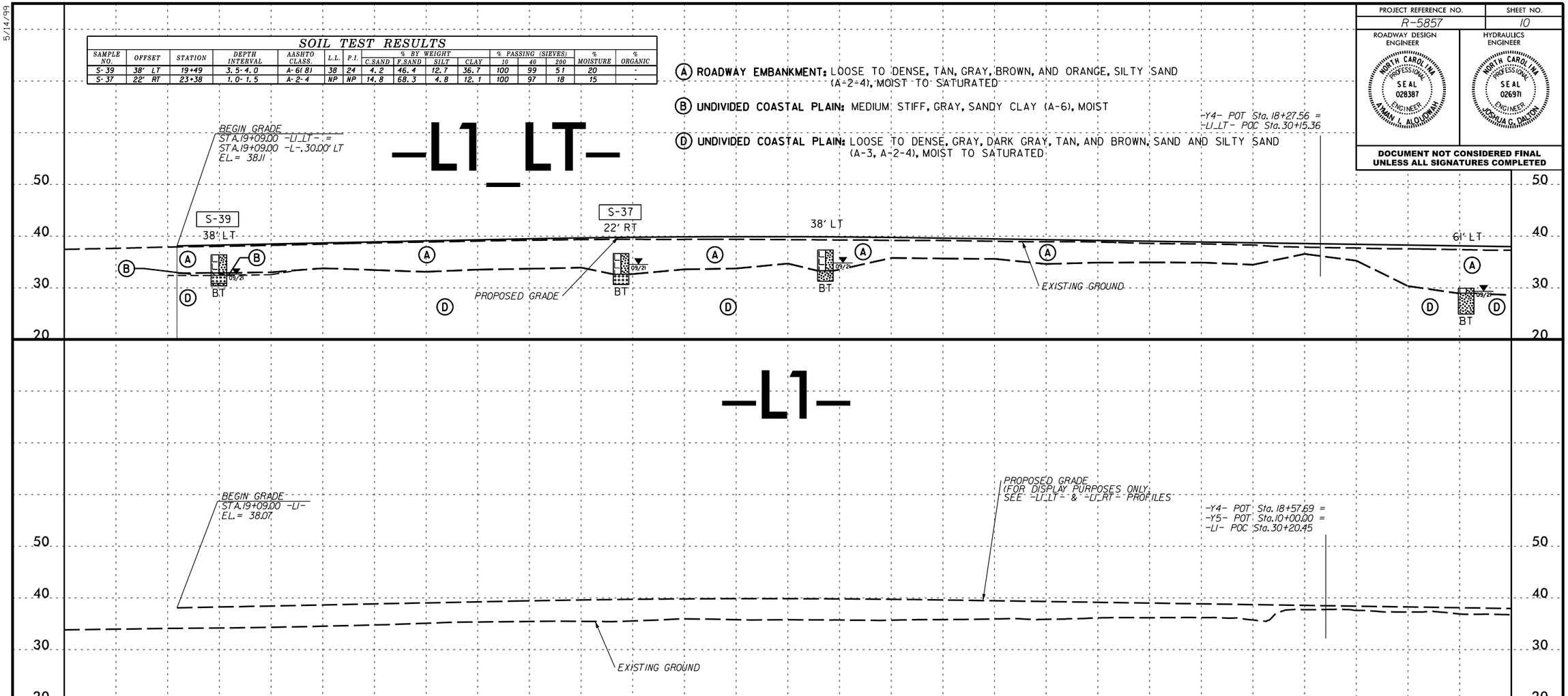
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-39	38' LT	19+49	3.5-4.0	A-6(8)	38	24	4.2	46.4	12.7	36.7	100	99	51	20	-
S-37	22' RT	23+38	1.0-1.5	A-2-4	NP	NP	14.8	68.3	4.8	12.1	100	97	18	15	-

(A) **ROADWAY EMBANKMENT:** LOOSE TO DENSE, TAN, GRAY, BROWN, AND ORANGE, SILTY SAND (A-2-4), MOIST TO SATURATED

(B) **UNDIVIDED COASTAL PLAIN:** MEDIUM STIFF, GRAY, SANDY CLAY (A-6), MOIST

(D) **UNDIVIDED COASTAL PLAIN:** LOOSE TO DENSE, GRAY, DARK GRAY, TAN, AND BROWN, SAND AND SILTY SAND (A-3, A-2-4), MOIST TO SATURATED



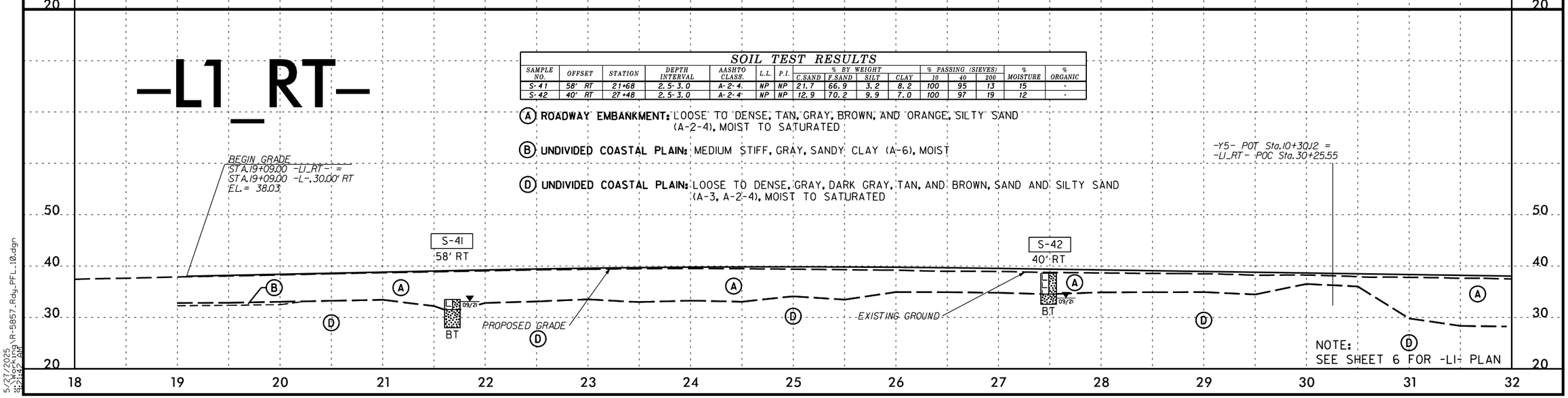
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-41	58' RT	21+68	2.5-3.0	A-2-4	NP	NP	21.7	66.9	3.2	8.2	100	95	13	15	-
S-42	40' RT	27+48	2.5-3.0	A-2-4	NP	NP	12.9	70.2	9.9	7.0	100	97	19	12	-

(A) **ROADWAY EMBANKMENT:** LOOSE TO DENSE, TAN, GRAY, BROWN, AND ORANGE, SILTY SAND (A-2-4), MOIST TO SATURATED

(B) **UNDIVIDED COASTAL PLAIN:** MEDIUM STIFF, GRAY, SANDY CLAY (A-6), MOIST

(D) **UNDIVIDED COASTAL PLAIN:** LOOSE TO DENSE, GRAY, DARK GRAY, TAN, AND BROWN, SAND AND SILTY SAND (A-3, A-2-4), MOIST TO SATURATED



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PROJECT REFERENCE NO.	SHEET NO.
R-5857	11

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER KAMAL I. ALOLIMAT

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA C. DALTON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

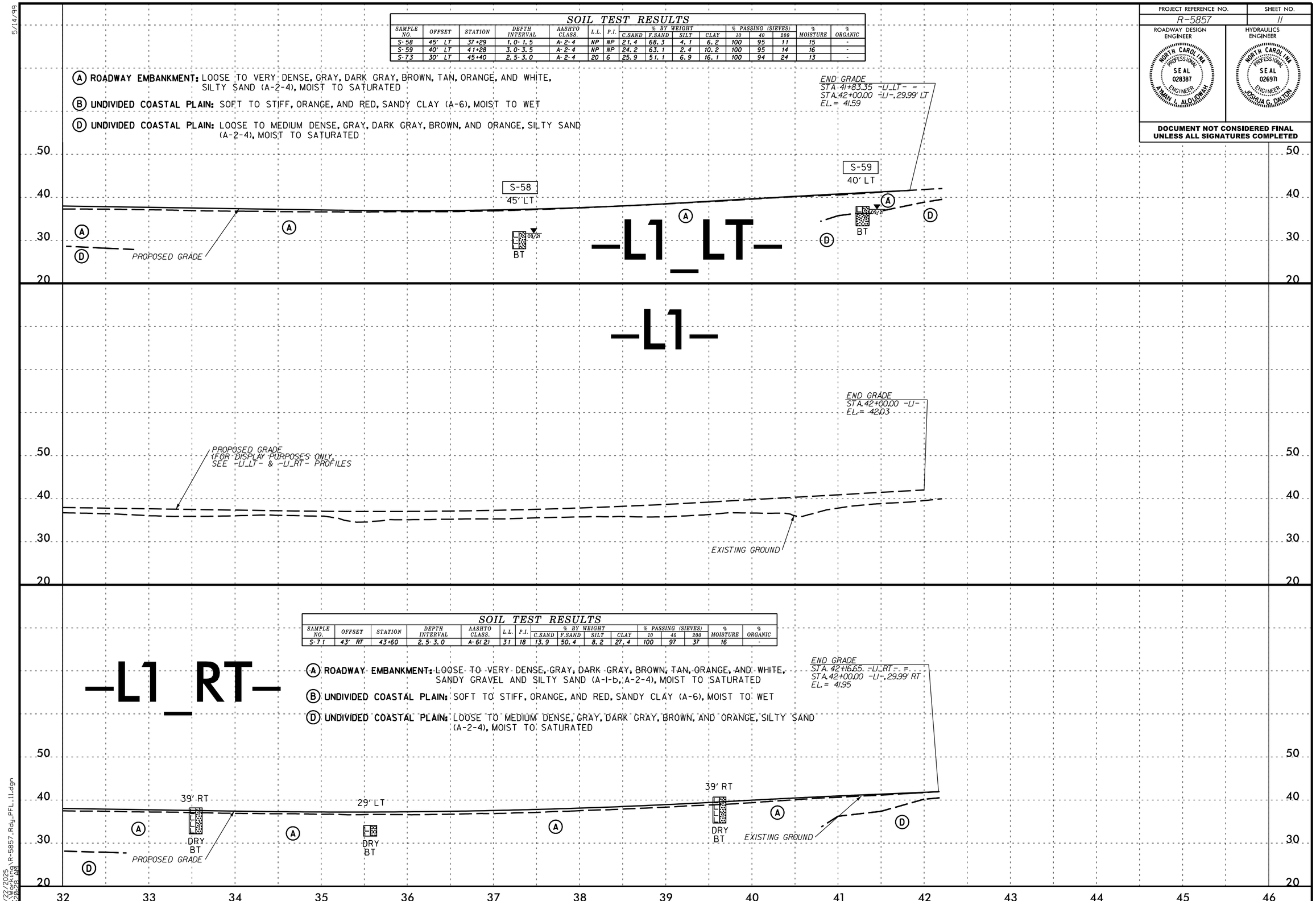
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-58	45' LT	37+29	1.0-1.5	A-2-4	NP	NP	21.4	68.3	4.1	6.2	100	95	11	15	-
S-59	40' LT	41+28	3.0-3.5	A-2-4	NP	NP	24.2	63.1	2.4	10.2	100	95	14	16	-
S-73	30' LT	45+40	2.5-3.0	A-2-4	20	6	25.9	51.1	6.9	16.1	100	94	24	13	-

(A) **ROADWAY EMBANKMENT:** LOOSE TO VERY DENSE, GRAY, DARK GRAY, BROWN, TAN, ORANGE, AND WHITE, SILTY SAND (A-2-4), MOIST TO SATURATED

(B) **UNDIVIDED COASTAL PLAIN:** SOFT TO STIFF, ORANGE, AND RED, SANDY CLAY (A-6), MOIST TO WET

(D) **UNDIVIDED COASTAL PLAIN:** LOOSE TO MEDIUM DENSE, GRAY, DARK GRAY, BROWN, AND ORANGE, SILTY SAND (A-2-4), MOIST TO SATURATED



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-71	43' RT	43+60	2.5-3.0	A-6(2)	31	18	13.9	50.4	8.2	27.4	100	97	37	16	-

(A) **ROADWAY EMBANKMENT:** LOOSE TO VERY DENSE, GRAY, DARK GRAY, BROWN, TAN, ORANGE, AND WHITE, SANDY GRAVEL AND SILTY SAND (A-1-b, A-2-4), MOIST TO SATURATED

(B) **UNDIVIDED COASTAL PLAIN:** SOFT TO STIFF, ORANGE, AND RED, SANDY CLAY (A-6), MOIST TO WET

(D) **UNDIVIDED COASTAL PLAIN:** LOOSE TO MEDIUM DENSE, GRAY, DARK GRAY, BROWN, AND ORANGE, SILTY SAND (A-2-4), MOIST TO SATURATED

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PROJECT REFERENCE NO.	SHEET NO.
R-5857	12

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER KAMAL I. ALOUDMAN

HYDRAULICS ENGINEER

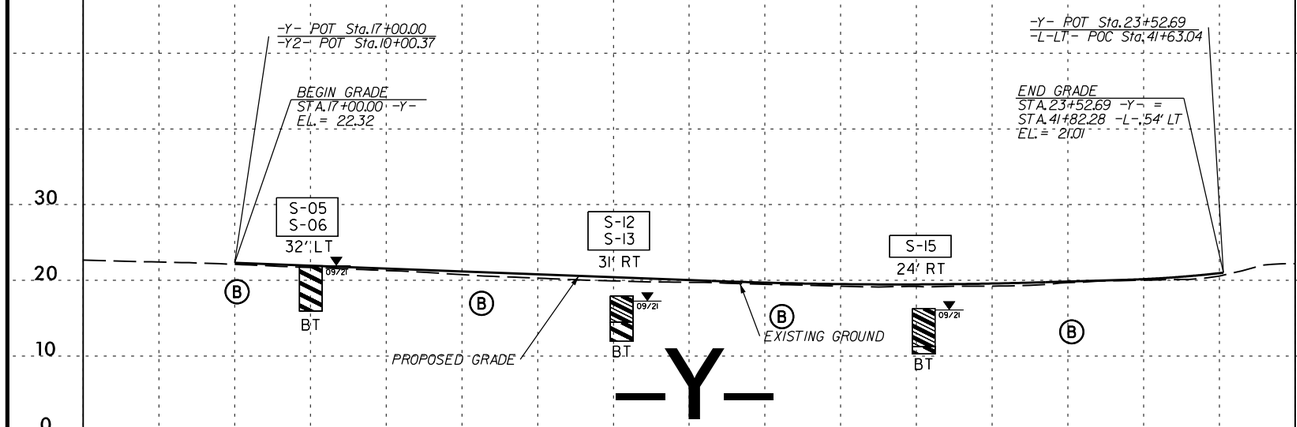
NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA G. DALTON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-05	32' LT	17+50	1.0-1.5	A-7-6(23)	50	32	3.7	24.9	24.1	47.3	100	99	73	34	-
S-06	32' LT	17+50	5.0-5.5	A-7-6(70)	87	67	1.1	7.5	25.8	65.6	100	100	93	49	-
S-12	31' RT	19+55	1.0-1.5	A-6(15)	35	24	3.7	27.7	35.6	32.9	100	99	73	18	-
S-13	31' RT	19+55	4.0-4.5	A-7-6(54)	79	57	2.5	13.0	16.6	67.9	100	99	86	56	-
S-15	24' RT	21+54	2.5-3.0	A-6(2)	27	14	20.3	41.4	11.9	26.4	100	92	41	21	2.8

(B) **UNDIVIDED COASTAL PLAIN:** MEDIUM STIFF TO VERY STIFF, GRAY, DARK GRAY, GREEN, ORANGE, AND RED, SANDY AND SILTY CLAY (A-6, A-7-6), MOIST TO WET



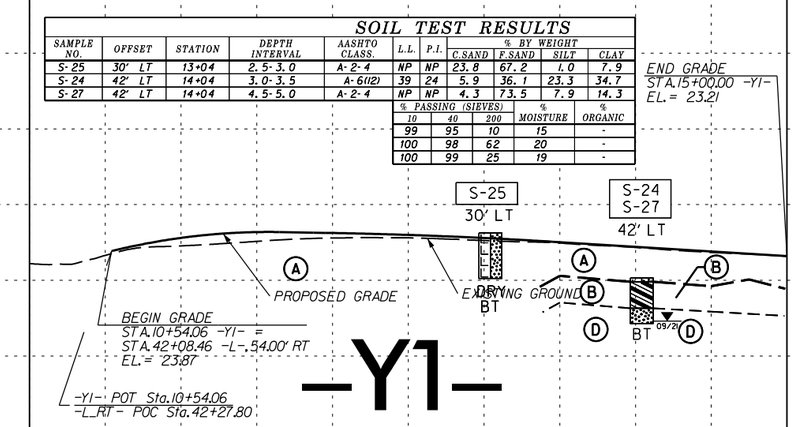
(A) **ROADWAY EMBANKMENT:** DENSE TO VERY DENSE, GRAY, BROWN, AND ORANGE, SILTY SAND (A-2-4), WITH TRACE GRAVEL, CONTAINS ROOTS, MOIST TO SATURATED

(B) **UNDIVIDED COASTAL PLAIN:** LOOSE TO MEDIUM STIFF, GRAY AND BROWN, SANDY CLAY (A-6), CONTAINS ROOTS, MOIST TO WET

(D) **UNDIVIDED COASTAL PLAIN:** LOOSE TO MEDIUM DENSE, GRAY AND BROWN, SILTY SAND (A-2-4), SATURATED

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-25	30' LT	13+04	2.5-3.0	A-2-4	NP	NP	23.8	67.2	1.0	7.9	99	95	10	15	-
S-24	42' LT	14+04	3.0-3.5	A-6(12)	39	24	5.9	36.1	23.3	34.7	100	98	62	20	-
S-27	42' LT	14+04	4.5-5.0	A-2-4	NP	NP	4.3	73.5	7.9	14.3	100	99	25	19	-



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-10	35' RT	10+74	3.5-4.0	A-4	24	8	6.8	61.5	10.3	21.3	100	99	35	23	-
S-11	35' RT	10+74	5.0-5.5	A-2-4	18	4	11.5	67.6	4.7	16.2	100	98	22	25	-
S-02	4' RT	13+71	1.0-1.5	A-6(7)	37	16	15.1	30.4	15.9	38.5	100	94	57	28	-
S-04	4' RT	13+71	5.0-5.5	A-2-6	25	12	20.1	50.4	4.0	25.5	100	93	31	16	-

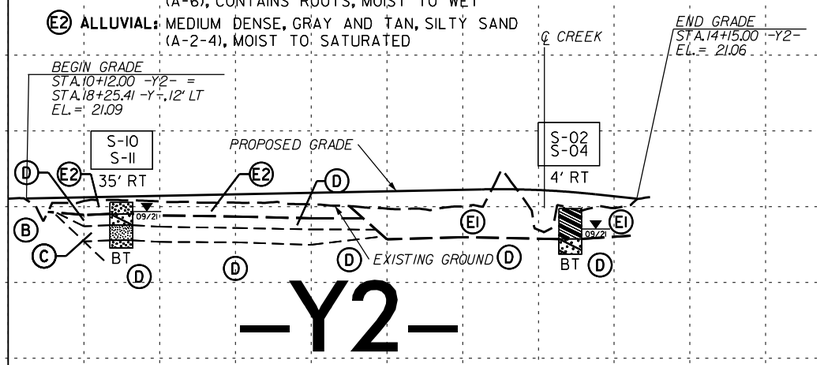
(B) **UNDIVIDED COASTAL PLAIN:** MEDIUM STIFF TO VERY STIFF, GRAY, DARK GRAY, GREEN, ORANGE, AND RED, SANDY AND SILTY CLAY (A-6, A-7-6), MOIST TO WET

(C) **UNDIVIDED COASTAL PLAIN:** MEDIUM STIFF TO STIFF, GRAY AND ORANGE, SILT (A-4), WITH SOME SAND, WET TO SATURATED

(D) **UNDIVIDED COASTAL PLAIN:** LOOSE TO MEDIUM DENSE, GRAY AND BROWN, SILTY AND CLAYEY SAND (A-2-4, A-2-6), WET TO SATURATED

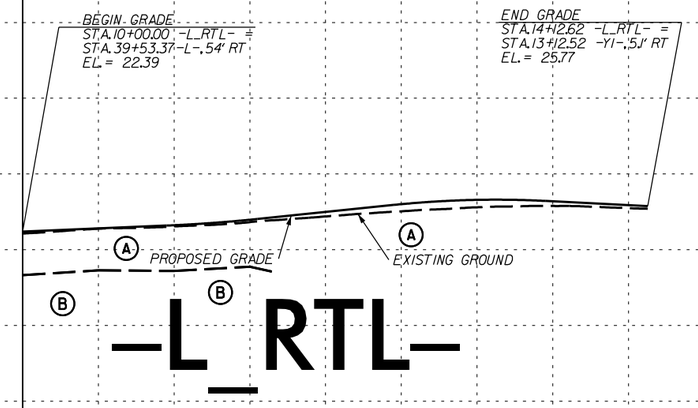
(E1) **ALLUVIAL:** SOFT TO MEDIUM STIFF, DARK GRAY, SANDY CLAY (A-6), CONTAINS ROOTS, MOIST TO WET

(E2) **ALLUVIAL:** MEDIUM DENSE, GRAY AND TAN, SILTY SAND (A-2-4), MOIST TO SATURATED



(A) **ROADWAY EMBANKMENT:** VERY LOOSE TO VERY DENSE, GRAY, DARK GRAY, BROWN, AND ORANGE, SILTY SAND (A-2-4), CONTAINS ROOTS, MOIST TO SATURATED

(B) **UNDIVIDED COASTAL PLAIN:** MEDIUM STIFF TO VERY STIFF, ORANGE, GRAY, TAN, RED, AND BROWN, SANDY AND SILTY CLAY (A-6, A-7-6), MOIST TO WET



NOTE:
SEE SHEET 4 FOR -Y-, -Y2-, & -L_RTL PLAN
SEE SHEETS 4 & 4A FOR -Y1- PLAN

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PROJECT REFERENCE NO.	SHEET NO.
R-5857	13

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER KAMAN J. ALOUDMAN

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA G. DALTON

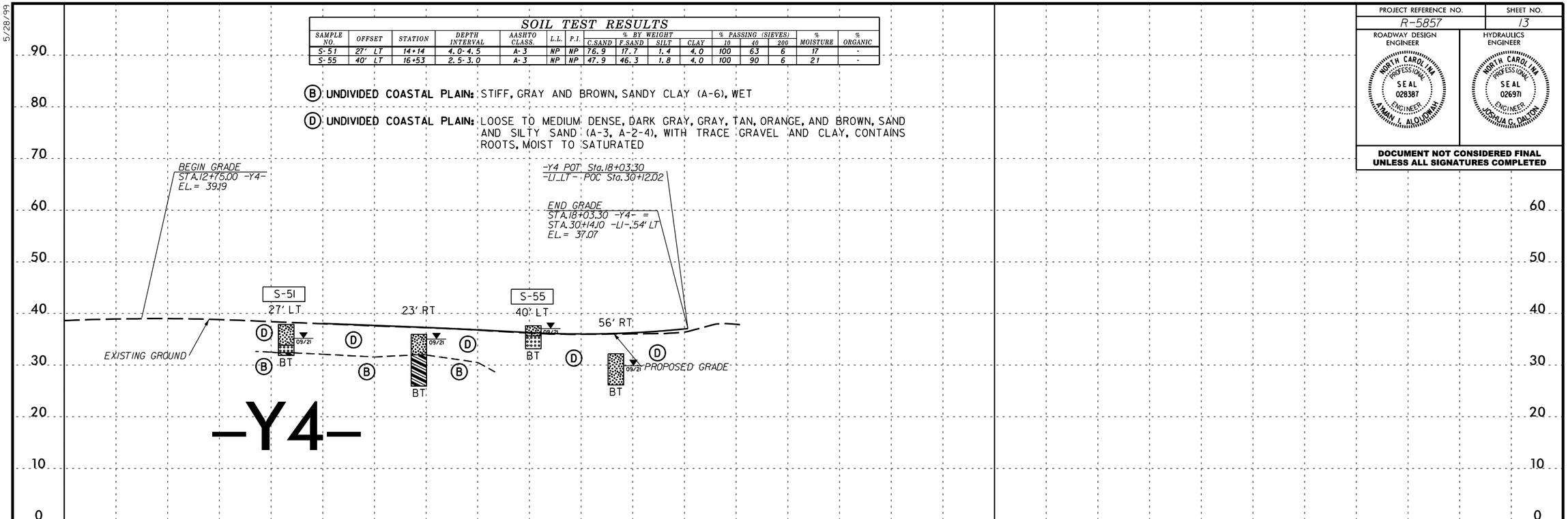
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-51	27' LT	14+14	4.0-4.5	A-3	NP	NP	76.9	17.7	1.4	4.0	100	63	6	17	-
S-55	40' LT	16+53	2.5-3.0	A-3	NP	NP	47.9	46.3	1.8	4.0	100	90	6	21	-

(B) **UNDIVIDED COASTAL PLAIN:** STIFF, GRAY AND BROWN, SANDY CLAY (A-6), WET

(D) **UNDIVIDED COASTAL PLAIN:** LOOSE TO MEDIUM DENSE, DARK GRAY, GRAY, TAN, ORANGE, AND BROWN, SAND AND SILTY SAND (A-3, A-2-4), WITH TRACE GRAVEL AND CLAY, CONTAINS ROOTS, MOIST TO SATURATED

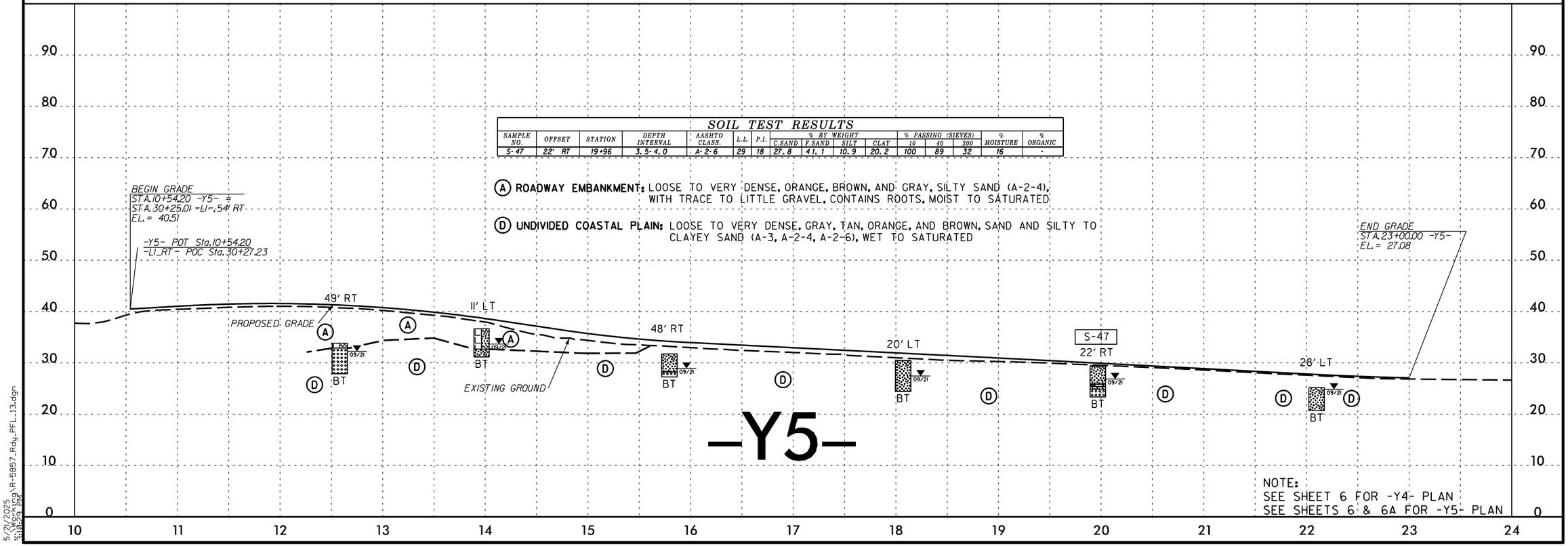


SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-47	22' RT	19+96	3.5-4.0	A-2-6	29	18	27.8	41.1	10.9	20.2	100	89	32	16	-

(A) **ROADWAY EMBANKMENT:** LOOSE TO VERY DENSE, ORANGE, BROWN, AND GRAY, SILTY SAND (A-2-4), WITH TRACE TO LITTLE GRAVEL, CONTAINS ROOTS, MOIST TO SATURATED

(D) **UNDIVIDED COASTAL PLAIN:** LOOSE TO VERY DENSE, GRAY, TAN, ORANGE, AND BROWN, SAND AND SILTY TO CLAYEY SAND (A-3, A-2-4, A-2-6), WET TO SATURATED



NOTE:
SEE SHEET 6 FOR -Y4- PLAN
SEE SHEETS 6 & 6A FOR -Y5- PLAN

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PROJ. REFERENCE NO.	SHEET NO.
R-5857	14

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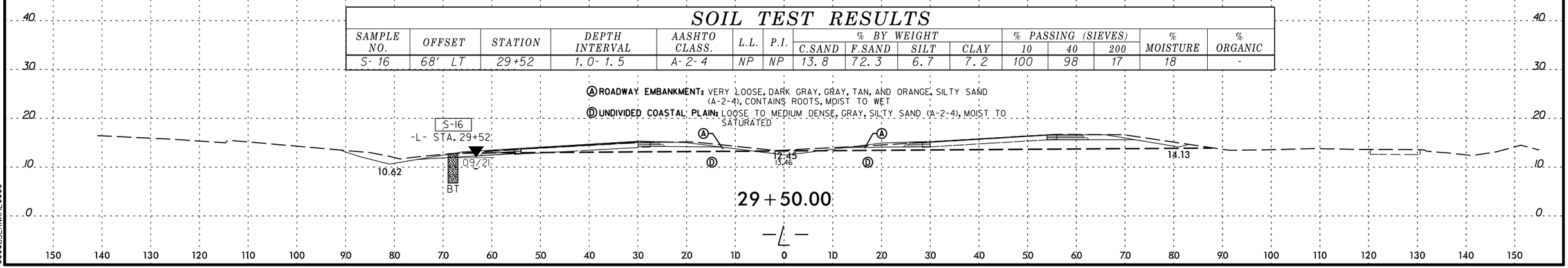
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-16	68' LT	29+52	1.0-1.5	A-2-4	NP	NP	13.8	72.3	6.7	7.2	100	98	17	18	-

Ⓐ **ROADWAY EMBANKMENT:** VERY LOOSE, DARK GRAY, GRAY, TAN, AND ORANGE, SILTY SAND (A-2-4), CONTAINS ROOTS, MOIST TO WET

Ⓓ **UNDIVIDED COASTAL PLAIN:** LOOSE TO MEDIUM DENSE, GRAY, SILTY SAND (A-2-4), MOIST TO SATURATED



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PROJ. REFERENCE NO.	SHEET NO.
R-5857	15

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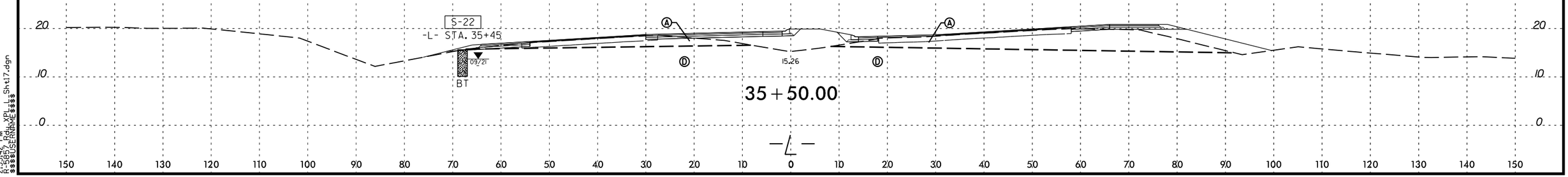
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-22	68' LT	35+45	3.5-4.0	A-2-4	NP	NP	11.9	78.3	1.5	8.2	100	97	11	18	-

Ⓐ **ROADWAY EMBANKMENT:** LOOSE TO VERY DENSE, GRAY, ORANGE AND WHITE, SILTY SAND (A-2-4), MOIST

Ⓓ **UNDIVIDED COASTAL PLAIN:** MEDIUM DENSE, GRAY, SILTY SAND (A-2-4), MOIST TO SATURATED



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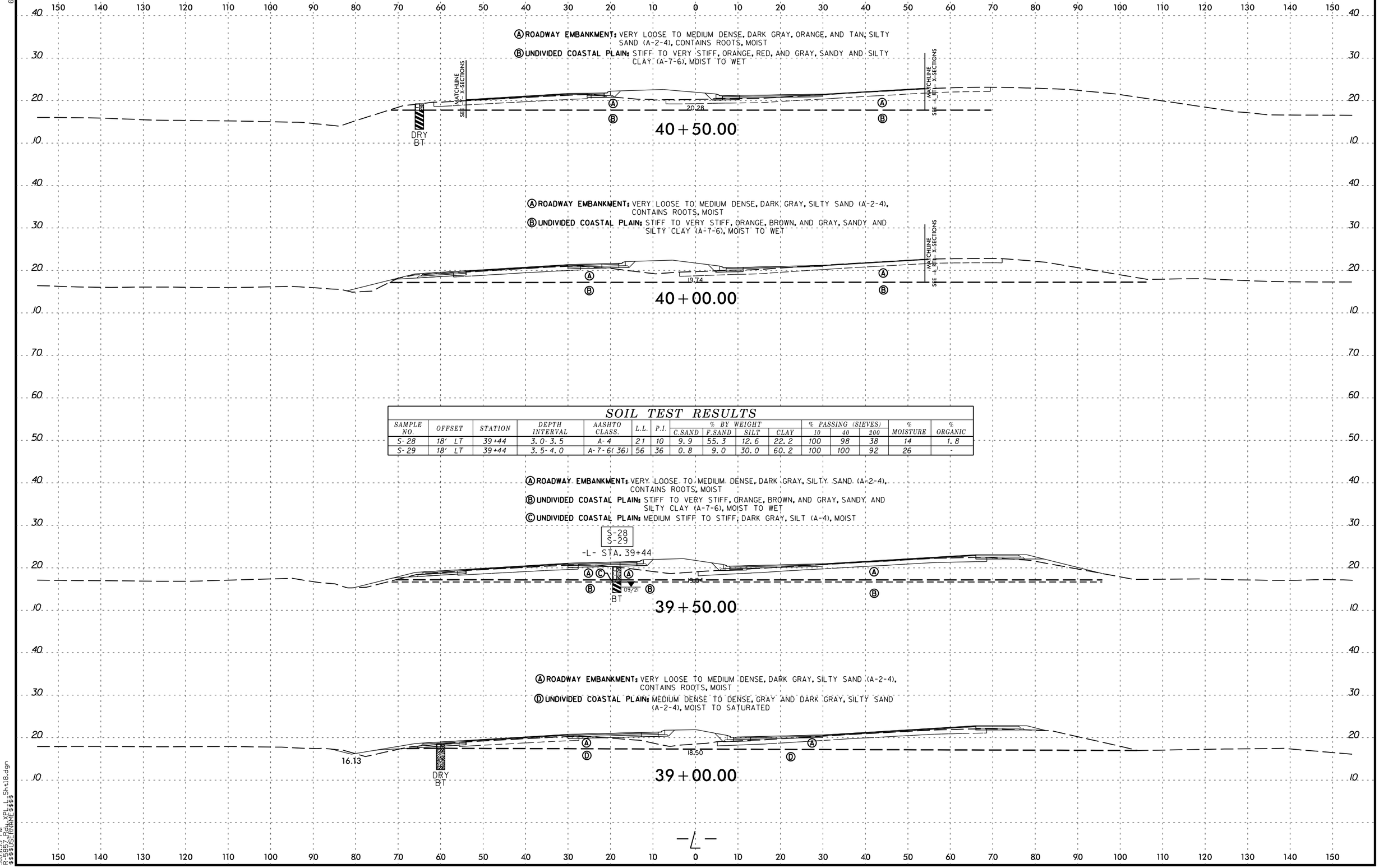


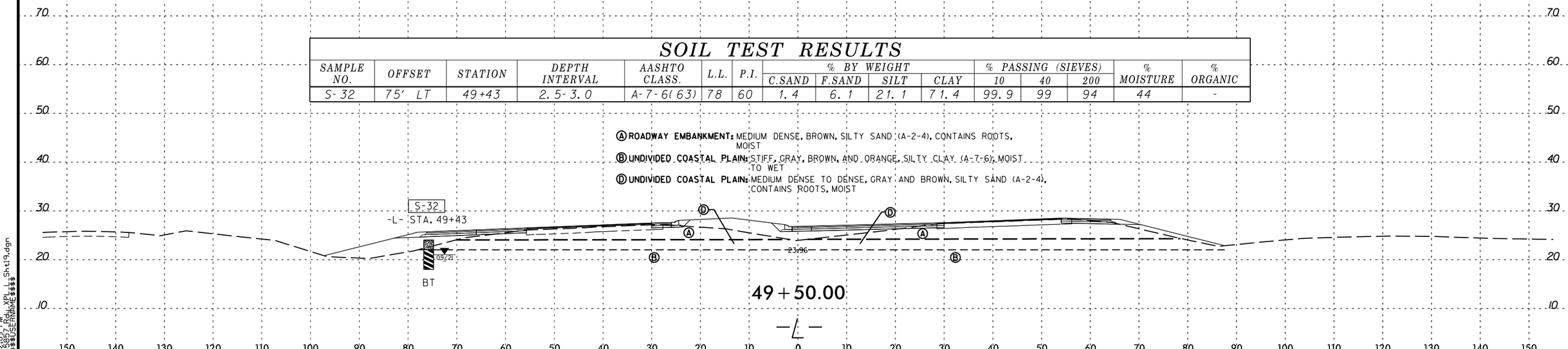
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-28	18' LT	39+44	3.0-3.5	A-4	21	10	9.9	55.3	12.6	22.2	100	98	38	14	1.8
S-29	18' LT	39+44	3.5-4.0	A-7-6(36)	56	36	0.8	9.0	30.0	60.2	100	100	92	26	-

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
R-5857	17

0 5 10



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-32	75' LT	49+43	2.5-3.0	A-7-6(63)	78	60	1.4	6.1	21.1	71.4	99.9	99	94	44	-

Ⓐ **ROADWAY EMBANKMENT:** MEDIUM DENSE, BROWN, SILTY SAND (A-2-4), CONTAINS ROOTS, MOIST

Ⓑ **UNDIVIDED COASTAL PLAIN:** STIFF, GRAY, BROWN, AND ORANGE, SILTY CLAY (A-7-6), MOIST TO WET

Ⓓ **UNDIVIDED COASTAL PLAIN:** MEDIUM DENSE TO DENSE, GRAY AND BROWN, SILTY SAND (A-2-4), CONTAINS ROOTS, MOIST

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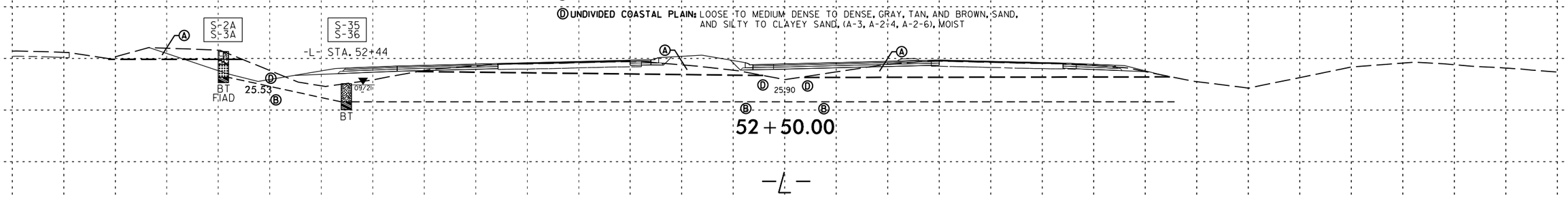
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-35	85' LT	52+44	1.0-1.5	A-2-4	NP	NP	27.2	52.3	10.4	10.1	99.9	91	22	16	1.5
S-36	85' LT	52+44	3.5-4.0	A-6(2)	24	12	19.3	42.9	14.4	23.5	99.9	91	42	30	-
S-2A	109' LT	52+50	2.0-2.5	A-2-6	22	11	39.5	37.3	3.7	19.5	99.9	84	25	-	-
S-3A	109' LT	52+50	5.0-5.5	A-6(3)	27	15	7.8	51.6	15.8	24.8	99.9	97	47	-	-

Ⓐ **ROADWAY EMBANKMENT:** LOOSE TO MEDIUM DENSE, DARK GRAY, SILTY SAND (A-2-4), CONTAINS ROOTS, MOIST TO SATURATED

Ⓑ **UNDIVIDED COASTAL PLAIN:** VERY SOFT TO MEDIUM STIFF, GRAY, SANDY CLAY (A-6), WET

Ⓓ **UNDIVIDED COASTAL PLAIN:** LOOSE TO MEDIUM DENSE TO DENSE, GRAY, TAN, AND BROWN, SAND, AND SILTY TO CLAYEY SAND, (A-3, A-2-4, A-2-6), MOIST



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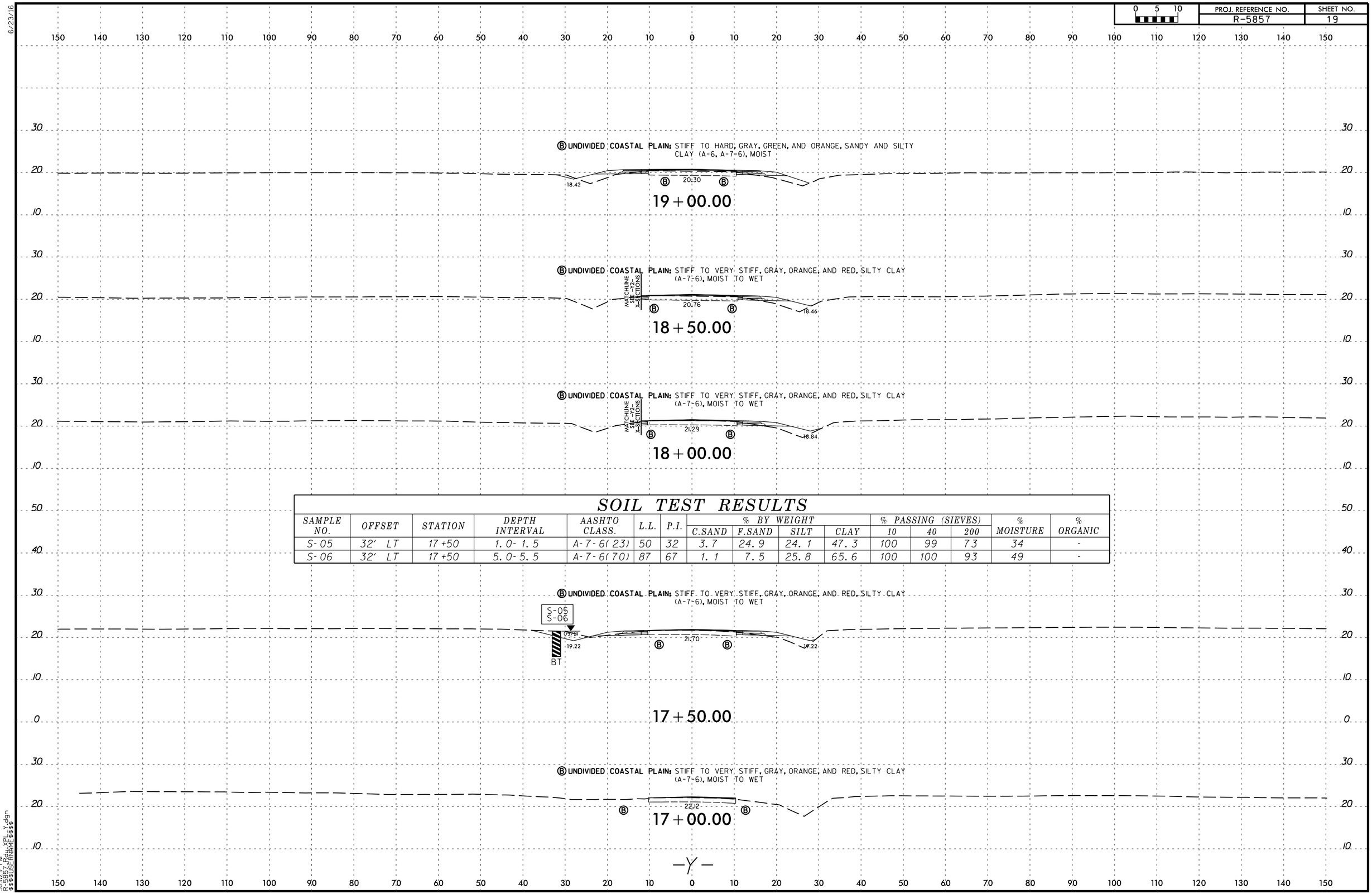

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-05	32' LT	17+50	1.0-1.5	A-7-6(23)	50	32	3.7	24.9	24.1	47.3	100	99	73	34	-
S-06	32' LT	17+50	5.0-5.5	A-7-6(70)	87	67	1.1	7.5	25.8	65.6	100	100	93	49	-

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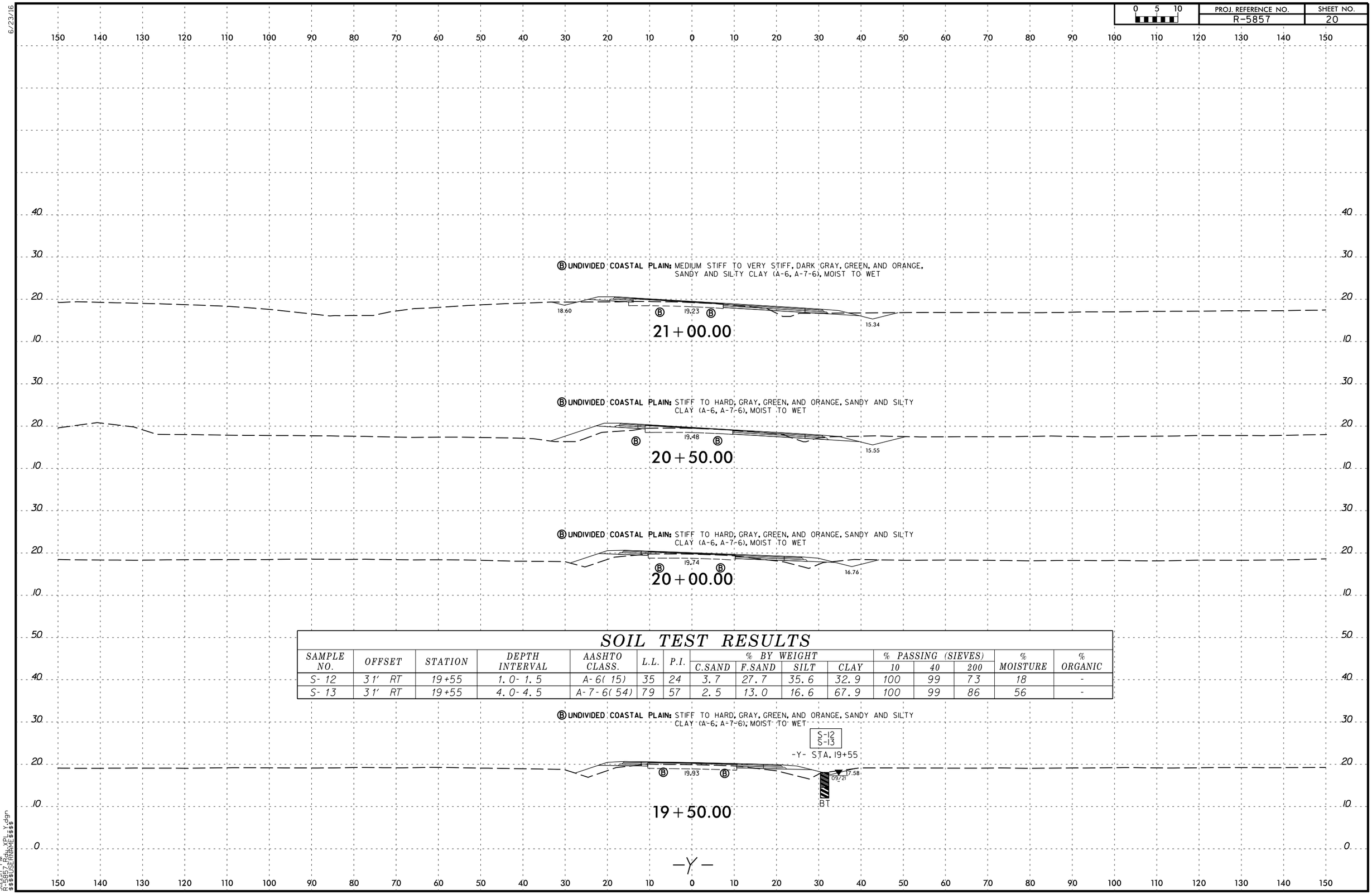

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-12	31' RT	19+55	1.0-1.5	A-6(15)	35	24	3.7	27.7	35.6	32.9	100	99	73	18	-
S-13	31' RT	19+55	4.0-4.5	A-7-6(54)	79	57	2.5	13.0	16.6	67.9	100	99	86	56	-

PROJ. REFERENCE NO.	SHEET NO.
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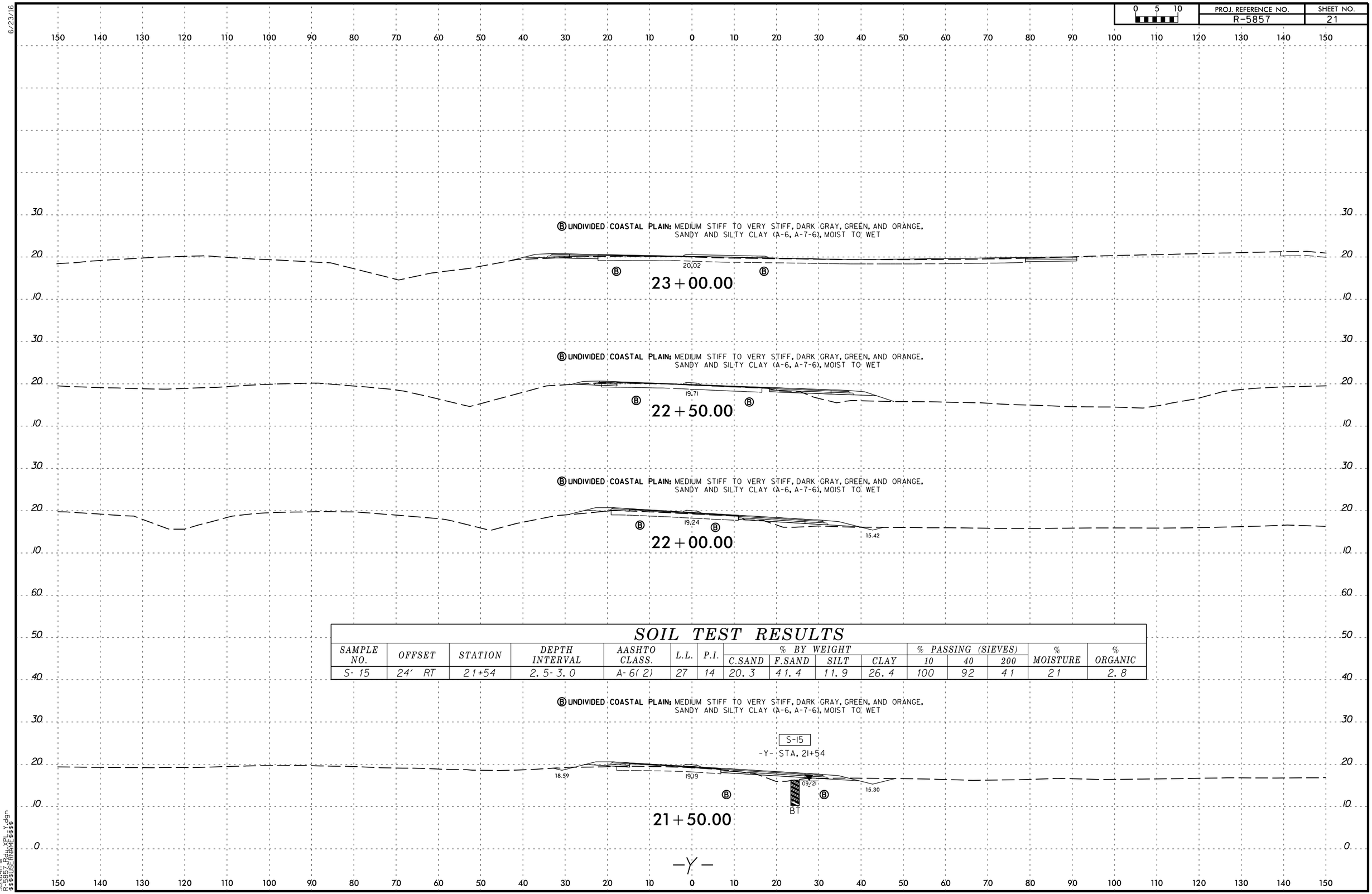
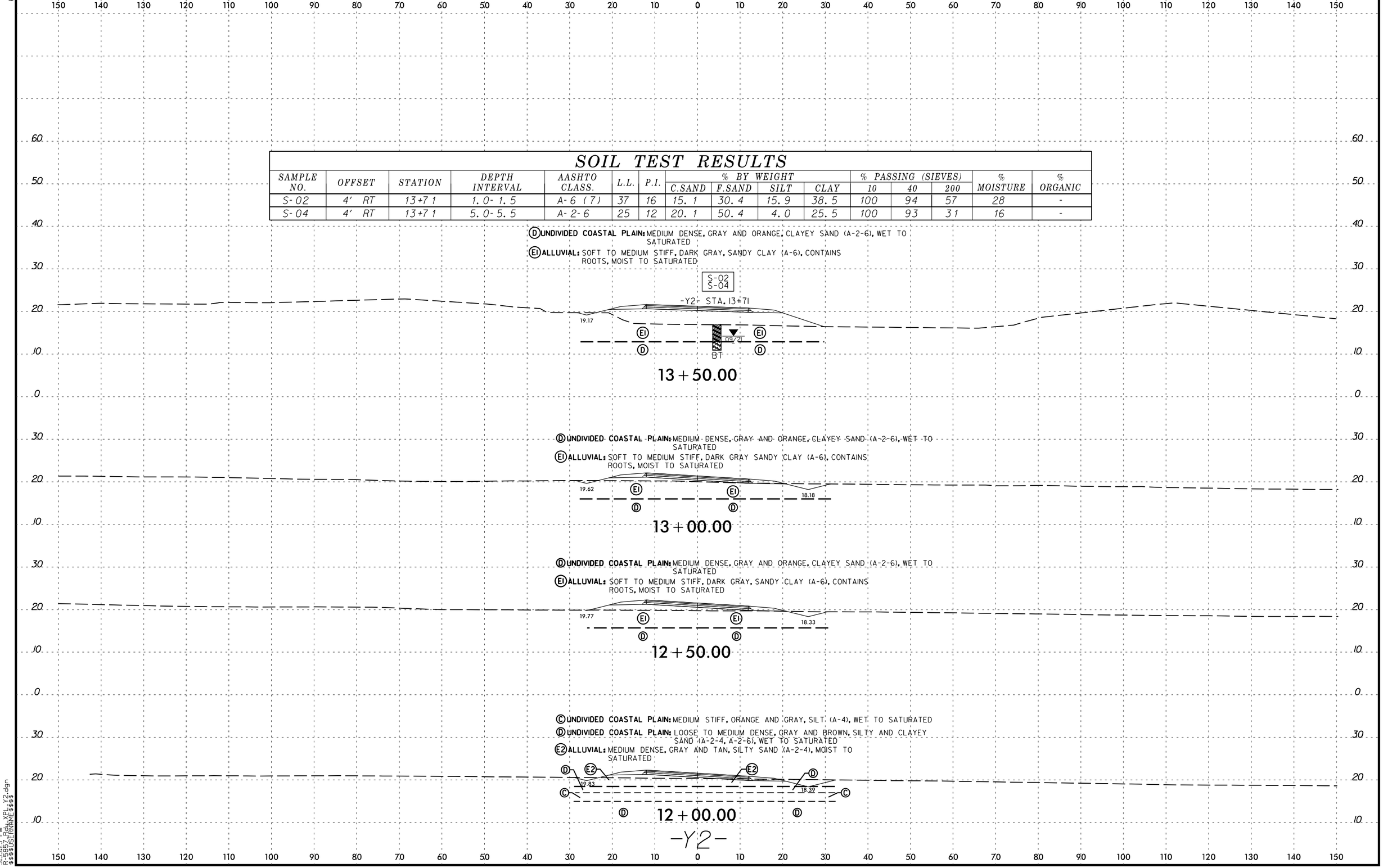


SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	% BY WEIGHT F.SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
S-15	24' RT	21+54	2.5-3.0	A-6(2)	27	14	20.3	41.4	11.9	26.4	100	92	41	21	2.8

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	% BY WEIGHT F.SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
S-02	4' RT	13+71	1.0-1.5	A-6 (7)	37	16	15.1	30.4	15.9	38.5	100	94	57	28	-
S-04	4' RT	13+71	5.0-5.5	A-2-6	25	12	20.1	50.4	4.0	25.5	100	93	31	16	-



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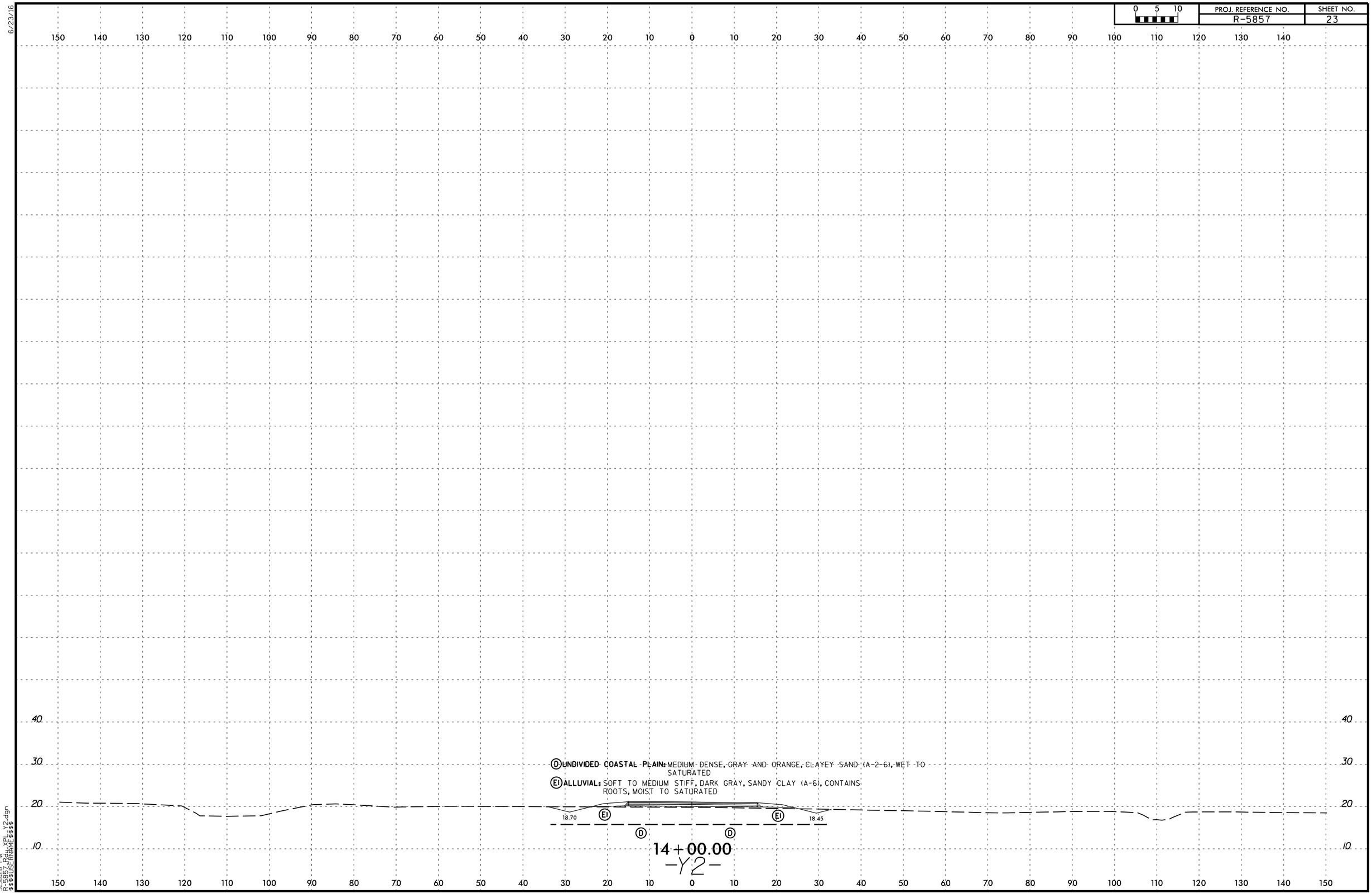

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PROJ. REFERENCE NO.	SHEET NO.
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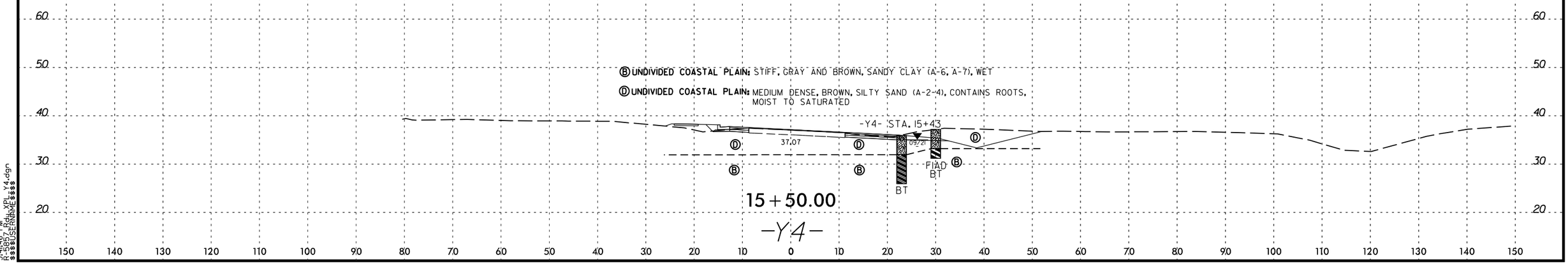

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STATE	STATE PROJECT REFERENCE NO.
N.C.	R-5857

REFERENCE: R-5857

PROJECT: 47545

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY BRUNSWICK

PROJECT DESCRIPTION US 17 BUSINESS SOUTH OF SHALLOTTE AND US 17 BUSINESS NORTH OF SHALLOTTE. CONVERT INTERSECTIONS TO SUPERSTREETS

APPENDIX A

SUPPLEMENTAL BORELOGS & LAB RESULTS COLLECTED OUTSIDE OF THE PROJECT LIMITS

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 47545.1.1	**TIP** R-5857	**COUNTY** BRUNSWICK	**GEOLOGIST** J.Holland
SITE DESCRIPTION US 17 BUSINESS SHALLOTTE. CONVERT INTERSECTIONS TO SUPERSTREETS			**GROUND WTR (ft)**
BORING NO. L1_4350	**STATION** 43+43	**OFFSET** 73 ft RT	**ALIGNMENT** L1 — **0 HR.** Dry
COLLAR ELEV. 42.8 ft	**TOTAL DEPTH** 6.0 ft	**NORTHING** 86,886	**EASTING** 2,194,262 — **24 HR.** 1.3
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A
DRILLER J. Holland	**START DATE** 09/27/21	**COMP. DATE** 09/28/21	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
45											
										42.8 GROUND SURFACE	0.0
								M		**ROADWAY EMBANKMENT** Loose to dense, orange, brown, and gray, silty SAND (A-2-4), moist to saturated	
										40.8	2.0
40							S-71	16%		**UNDIVIDED COASTAL PLAIN** Medium stiff, orange, red, and brown, sandy CLAY (A-6), moist to wet	
										36.8	6.0
										Boring Terminated at Elevation 36.8 ft sandy CLAY	

WBS 47545.1.1	**TIP** R-5857	**COUNTY** BRUNSWICK	**GEOLOGIST** J.Holland
SITE DESCRIPTION US 17 BUSINESS SHALLOTTE. CONVERT INTERSECTIONS TO SUPERSTREETS			**GROUND WTR (ft)**
BORING NO. L1_4400	**STATION** 44+00	**OFFSET** CL	**ALIGNMENT** L1 — **0 HR.** 4.0
COLLAR ELEV. 42.6 ft	**TOTAL DEPTH** 6.0 ft	**NORTHING** 86,976	**EASTING** 2,194,286 — **24 HR.** 2.6
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A
DRILLER J. Holland	**START DATE** 10/29/21	**COMP. DATE** 11/01/21	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
45										
										42.6 GROUND SURFACE 0.0
								M		**ROADWAY EMBANKMENT** Medium dense to dense, tan, gray, and orange, silty SAND (A-2-4), moist
										40.6 2.0
40										**UNDIVIDED COASTAL PLAIN** Soft to medium stiff, orange and red, sandy CLAY (A-6), moist to wet
								W		36.6 6.0
										Boring Terminated at Elevation 36.6 ft sandy CLAY

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 47545.1.1	**TIP** R-5857	**COUNTY** BRUNSWICK	**GEOLOGIST** J.Holland
SITE DESCRIPTION US 17 BUSINESS SHALLOTTE. CONVERT INTERSECTIONS TO SUPERSTREETS			**GROUND WTR (ft)**
BORING NO. L1_4450	**STATION** 44+50	**OFFSET** CL	**ALIGNMENT** L1 — **0 HR.** 4.0
COLLAR ELEV. 43.6 ft	**TOTAL DEPTH** 6.0 ft	**NORTHING** 86,996	**EASTING** 2,194,331 — **24 HR.** 3.9
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A
DRILLER J. Holland	**START DATE** 10/29/21	**COMP. DATE** 11/01/21	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
45										43.6 GROUND SURFACE	0.0
										ROADWAY EMBANKMENT Loose to medium dense, tan and gray, silty SAND (A-2-4), moist	
								M		41.6	2.0
										UNDIVIDED COASTAL PLAIN Soft to medium stiff, orange and red, sandy CLAY (A-6), moist to wet	
40								W		37.6	6.0
										Boring Terminated at Elevation 37.6 ft sandy CLAY	

WBS 47545.1.1	**TIP** R-5857	**COUNTY** BRUNSWICK	**GEOLOGIST** J.Holland
SITE DESCRIPTION US 17 BUSINESS SHALLOTTE. CONVERT INTERSECTIONS TO SUPERSTREETS			**GROUND WTR (ft)**
BORING NO. L1_4550	**STATION** 45+58	**OFFSET** 60 ft LT	**ALIGNMENT** L1 — **0 HR.** 3.4
COLLAR ELEV. 45.4 ft	**TOTAL DEPTH** 6.0 ft	**NORTHING** 87,094	**EASTING** 2,194,407 — **24 HR.** 3.8
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A
DRILLER J. Holland	**START DATE** 09/27/21	**COMP. DATE** 09/28/21	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
50										45.4 GROUND SURFACE 0.0
45								M		**ROADWAY EMBANKMENT** Loose to medium dense, gray, orange, red, and brown, silty SAND (A-2-4), moist
							S-73	13%		41.4 4.0
								W		**UNDIVIDED COASTAL PLAIN** Stiff, gray, orange, and red, sandy CLAY (A-6), wet
40										39.4 6.0
										Boring Terminated at Elevation 39.4 ft sandy CLAY

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 47545.1.1	**TIP** R-5857	**COUNTY** BRUNSWICK	**GEOLOGIST** J.Holland
SITE DESCRIPTION US 17 BUSINESS SHALLOTTE. CONVERT INTERSECTIONS TO SUPERSTREETS			**GROUND WTR (ft)**
BORING NO. L1_4600	**STATION** 46+00	**OFFSET** CL	**ALIGNMENT** L1 — **0 HR.** Dry
COLLAR ELEV. 45.4 ft	**TOTAL DEPTH** 6.0 ft	**NORTHING** 87,055	**EASTING** 2,194,469 — **24 HR.** 4.5
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A
DRILLER J. Holland	**START DATE** 10/29/21	**COMP. DATE** 11/01/21	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
50										
										45.4 GROUND SURFACE 0.0
45								M		**ROADWAY EMBANKMENT** Loose, to medium dense, tan, gray, and orange, silty SAND (A-2-4), moist
										43.4 2.0
								W		**UNDIVIDED COASTAL PLAIN** Loose to medium dense, gray and dark gray, silty SAND (A-2-4), wet to saturated
40								Sat.		39.4 6.0
										Boring Terminated at Elevation 39.4 ft silty SAND

WBS 47545.1.1	**TIP** R-5857	**COUNTY** BRUNSWICK	**GEOLOGIST** J.Holland
SITE DESCRIPTION US 17 BUSINESS SHALLOTTE. CONVERT INTERSECTIONS TO SUPERSTREETS			**GROUND WTR (ft)**
BORING NO. L1_4750	**STATION** 47+46	**OFFSET** 72 ft RT	**ALIGNMENT** L1 — **0 HR.** 3.0
COLLAR ELEV. 44.4 ft	**TOTAL DEPTH** 4.0 ft	**NORTHING** 87,046	**EASTING** 2,194,632 — **24 HR.** 1.2
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A
DRILLER J. Holland	**START DATE** 09/27/21	**COMP. DATE** 09/28/21	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
45										
										44.4 GROUND SURFACE 0.0
								M		**ALLUVIAL** Loose to medium dense, gray and brown, silty SAND (A-2-4), moist to saturated
										40.4 4.0
										Boring Terminated at Elevation 40.4 ft silty SAND

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 47545.1.1	**TIP** R-5857	**COUNTY** BRUNSWICK	**GEOLOGIST** J.Holland	
SITE DESCRIPTION US 17 BUSINESS SHALLOTTE. CONVERT INTERSECTIONS TO SUPERSTREETS				**GROUND WTR (ft)**
BORING NO. L1_4950	**STATION** 49+55	**OFFSET** 75 ft LT	**ALIGNMENT** L1	**0 HR.** 2.7
COLLAR ELEV. 44.0 ft	**TOTAL DEPTH** 6.0 ft	**NORTHING** 87,264	**EASTING** 2,194,767	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A	
DRILLER J. Holland	**START DATE** 09/27/21	**COMP. DATE** 09/28/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
45										44.0 GROUND SURFACE	0.0
								M		**ROADWAY EMBANKMENT** Loose to medium dense, silty SAND (A-2-4), moist	
										41.0	3.0
							S-68	16%		**UNDIVIDED COASTAL PLAIN** Soft to medium stiff, orange and red, sandy CLAY (A-6), moist to wet	
40							S-69	25%			
										38.0	6.0
										Boring Terminated at Elevation 38.0 ft sandy CLAY	

WBS 47545.1.1	**TIP** R-5857	**COUNTY** BRUNSWICK	**GEOLOGIST** J.Holland	
SITE DESCRIPTION US 17 BUSINESS SHALLOTTE. CONVERT INTERSECTIONS TO SUPERSTREETS				**GROUND WTR (ft)**
BORING NO. L1_5150	**STATION** 51+52	**OFFSET** 80 ft LT	**ALIGNMENT** L1	**0 HR.** Dry
COLLAR ELEV. 45.5 ft	**TOTAL DEPTH** 2.0 ft	**NORTHING** 87,345	**EASTING** 2,194,946	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A	
DRILLER J. Holland	**START DATE** 09/27/21	**COMP. DATE** 09/28/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
50										45.5 GROUND SURFACE 0.0
45								M		**ROADWAY EMBANKMENT** Medium dense, gray and orange, silty SAND (A-2-4), moist
										43.5 2.0
										Boring Terminated at Elevation 43.5 ft silty SAND

NCDOT BORE DOUBLE R-5867_GEO_LOGS_POSTLAB.GPJ NC_DOT.GDT 5/27/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 47545.1.1	**TIP** R-5857	**COUNTY** BRUNSWICK	**GEOLOGIST** J.Holland
SITE DESCRIPTION US 17 BUSINESS SHALLOTTE. CONVERT INTERSECTIONS TO SUPERSTREETS			**GROUND WTR (ft)**
BORING NO. L1_5350	**STATION** 53+56	**OFFSET** 65 ft RT	**ALIGNMENT** L1 — **0 HR.** Dry
COLLAR ELEV. 42.9 ft	**TOTAL DEPTH** 6.0 ft	**NORTHING** 87,292	**EASTING** 2,195,191 — **24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A
DRILLER J. Holland	**START DATE** 09/27/21	**COMP. DATE** 09/28/21	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
45										42.9 GROUND SURFACE	0.0
								M		**ROADWAY EMBANKMENT** Loose to medium dense, brown and tan, silty SAND (A-2-4), moist	
40								Sat.		36.9	6.0
										Boring Terminated at Elevation 36.9 ft silty SAND	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 47545.1.1	**TIP** R-5857	**COUNTY** BRUNSWICK	**GEOLOGIST** J.Holland
SITE DESCRIPTION US 17 BUSINESS SHALLOTTE. CONVERT INTERSECTIONS TO SUPERSTREETS			**GROUND WTR (ft)**
BORING NO. Y6_1215	**STATION** 12+20	**OFFSET** 31 ft LT	**ALIGNMENT** Y6 — **0 HR.** 3.2
COLLAR ELEV. 44.7 ft	**TOTAL DEPTH** 6.0 ft	**NORTHING** 86,820	**EASTING** 2,194,481 — **24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A
DRILLER J. Holland	**START DATE** 09/27/21	**COMP. DATE** 09/28/21	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
45										44.7 GROUND SURFACE	0.0
								M		**ROADWAY EMBANKMENT** Medium dense, orange, brown, and gray, silty SAND (A-2-4), with trace gravel, moist to saturated	
								M			
								M			
40										39.7	5.0
							S-65	14%		**UNDIVIDED COASTAL PLAIN** Soft to medium stiff, orange, gray and brown, silty SAND (A-2-4), wet	
										38.7	6.0
										Boring Terminated at Elevation 38.7 ft silty SAND	

NCDOT BORE DOUBLE R-5867_GEO_LOGS_POSTLAB.GPJ NC_DOT.GDT 5/27/25

US 17 Business South of Shallotte and US 17 Business North of Shallotte. Convert Intersections to Superstreets.

SOIL TEST RESULTS -L1-

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL (ft)	AASHTO CLASS.	L.L	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-71	43+43	73' RT	2.5-3.0'	A-6(2)	31	18	13.9	50.4	8.2	27.4	100.0	97.0	37.0	16	-
S-73	45+40	30' LT	2.5-3.0'	A-2-4	20	6	25.9	51.1	6.9	16.1	100.0	94.0	24.0	13	-
S-68	49+50	75' LT	3.0-3.5'	A-6(0)	24	11	16.9	51.3	10.4	21.3	100.0	96.0	35.0	16	-
S-69	49+50	75' LT	4.5-5.0'	A-6(7)	39	24	11.0	43.5	10.8	34.6	100.0	96.0	47.0	25	-

US 17 Business South of Shallotte and US 17 Business North of Shallotte. Convert Intersections to Superstreets.

SOIL TEST RESULTS -Y6-

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL (ft)	AASHTO CLASS.	L.L	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-65	12+20	31' LT	5.5-6.0'	A-2-4	19	7	23.4	45.4	12.9	18.3	100.0	93.0	34.0	14	-

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5857	1	

REFERENCE: R-5857

PROJECT: 47545

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	39+00 - 40+50	4
-Y-	17+00 - 23+00	5-7
-Y2-	12+00 - 14+00	8-9

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *BRUNSWICK*

PROJECT DESCRIPTION *US 17 BUSINESS SOUTH OF SHALLOTTE AND US 17 BUSINESS NORTH OF SHALLOTTE. CONVERT INTERSECTIONS TO SUPERSTREETS*

RECOMMENDATIONS - REVISED

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 (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

J. HOLLAND

E. UNOBE

INVESTIGATED BY *J. CRENSHAW*

DRAWN BY *J. HOLLAND*

CHECKED BY *J. WESSELL*

SUBMITTED BY *SCHNABEL ENG.*

DATE *MAY 2025*

Schnabel ENGINEERING

NORTH CAROLINA LICENSED SEAL 2504 GEOLOGIST JARED K. CRENSHAW

Signed by:
Jared K. Crenshaw
F325B40D4C25483...
SIGNATURE

05/28/2025
DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-5857	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

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	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
MATERIAL PASSING #40 LL	—		—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PI	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE MM: 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005
GRAIN SIZE IN.: 12 | 3

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT PLASTIC RANGE (PI) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

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.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

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
- 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT DPT DMT VST PMT TEST BORING
- AUGER BORING
- CORE BORING
- MW MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

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. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS
S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE ____" STEEL TEETH
- [ ] TRICONE ____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [ ] AUTOMATIC
- [ ] MANUAL

CORE SIZE:
- [ ] -B _____
- [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [X] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

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

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

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

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (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 (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK:

ELEVATION: FEET

NOTES:

BORING AND GROUND SURFACE ELEVATIONS OBTAINED FROM 'r5857a_ls_tin_190308.tin' AND 'r5857b_ls_tin_210615.tin' RECEIVED ON 8/20/2021

FIAD - FILLED IMMEDIATELY AFTER DRILLING
UCP - UNDIVIDED COASTAL PLAIN

DATE: 8-15-14

09/08/99

TIP PROJECT: R-5857

CONTRACT: C205073

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

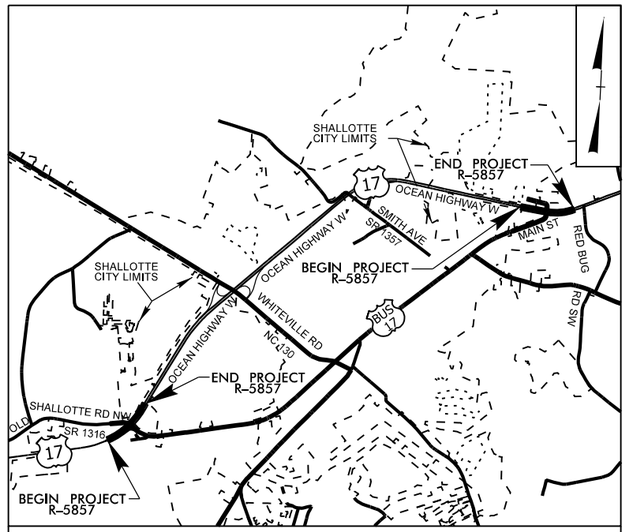
BRUNSWICK COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5857	1	

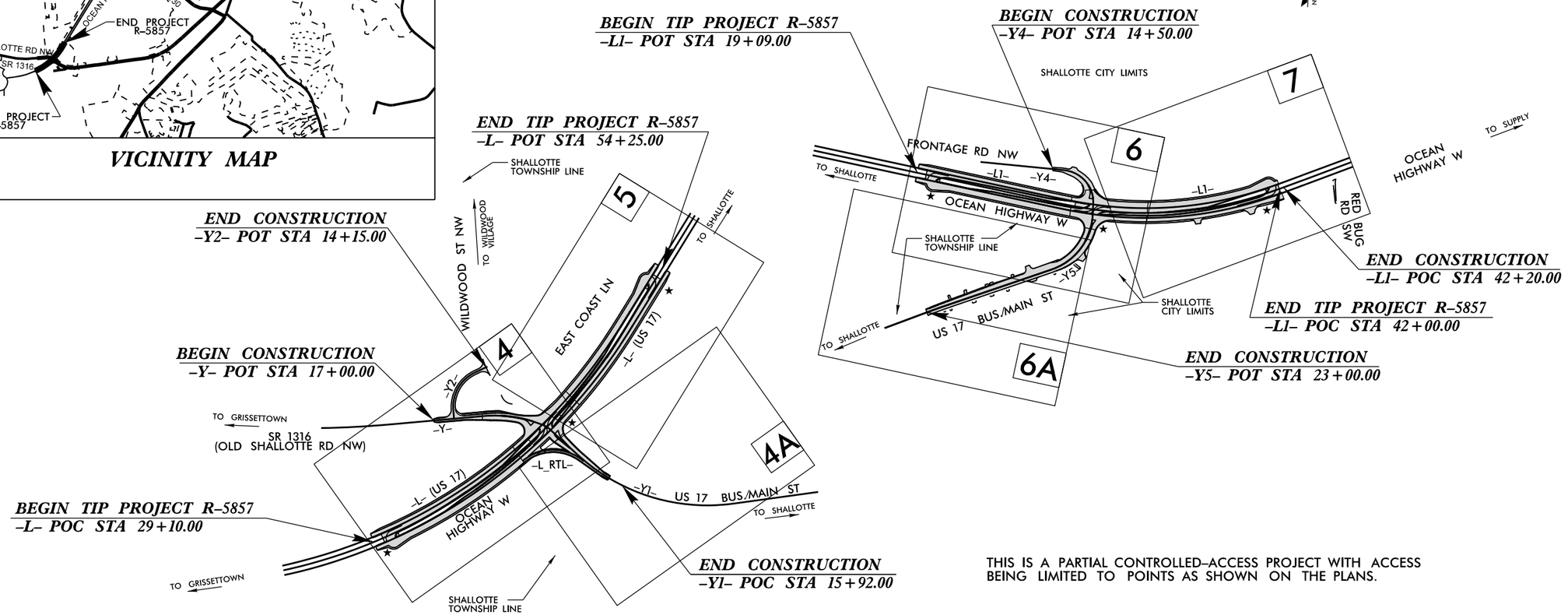
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
47545.1.1	NA	PE
47545.2.1	NA	ROW
47545.2.2	NA	UTIL
47545.3.1	NA	CONST

LOCATION: US 17 BUSINESS SOUTH OF SHALLOTTE AND US 17 BUSINESS NORTH OF SHALLOTTE. CONVERT INTERSECTIONS TO REDUCED CONFLICT INTERSECTIONS.

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND SIGNALS



VICINITY MAP



THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.

★ DENOTES SIGNAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2025 = 37,200
ADT 2042 = 46,000
K = 10 %
D = 60 %
T = 4 % *
V = 60 MPH
* TTST =1 DUAL =3
FUNC CLASS =
PRINCIPAL ARTERIAL

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT R-5857 = 0.910 MILES

TOTAL LENGTH OF TIP PROJECT R-5857 = 0.910 MILES

Prepared In the Office of:

PARSONS
2309 Gateway Centre Blvd, Suite 217
Morrisville, NC 27560
Phone: 919-469-3340 Fax: 919-463-5210
NC LICENSE NO. F-0699
FOR NORTH CAROLINA DEPT. OF TRANSPORTATION

SUNGATE DESIGN GROUP, P.A.
121 S. JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27603
PH: (919) 662-1948 - FAX: (919) 662-2022
NC LICENSE NO. C-0910

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 21, 2023

LETTING DATE:
JULY 15, 2025

AYMAN L. ALQUDWAH, PE
PROJECT ENGINEER

DAVID GARRETT
PROJECT DESIGN ENGINEER

ZACHARY HOWARD, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 026971 ENGINEER JOSHUA G. DALTON

SIGNATURE: P.E.

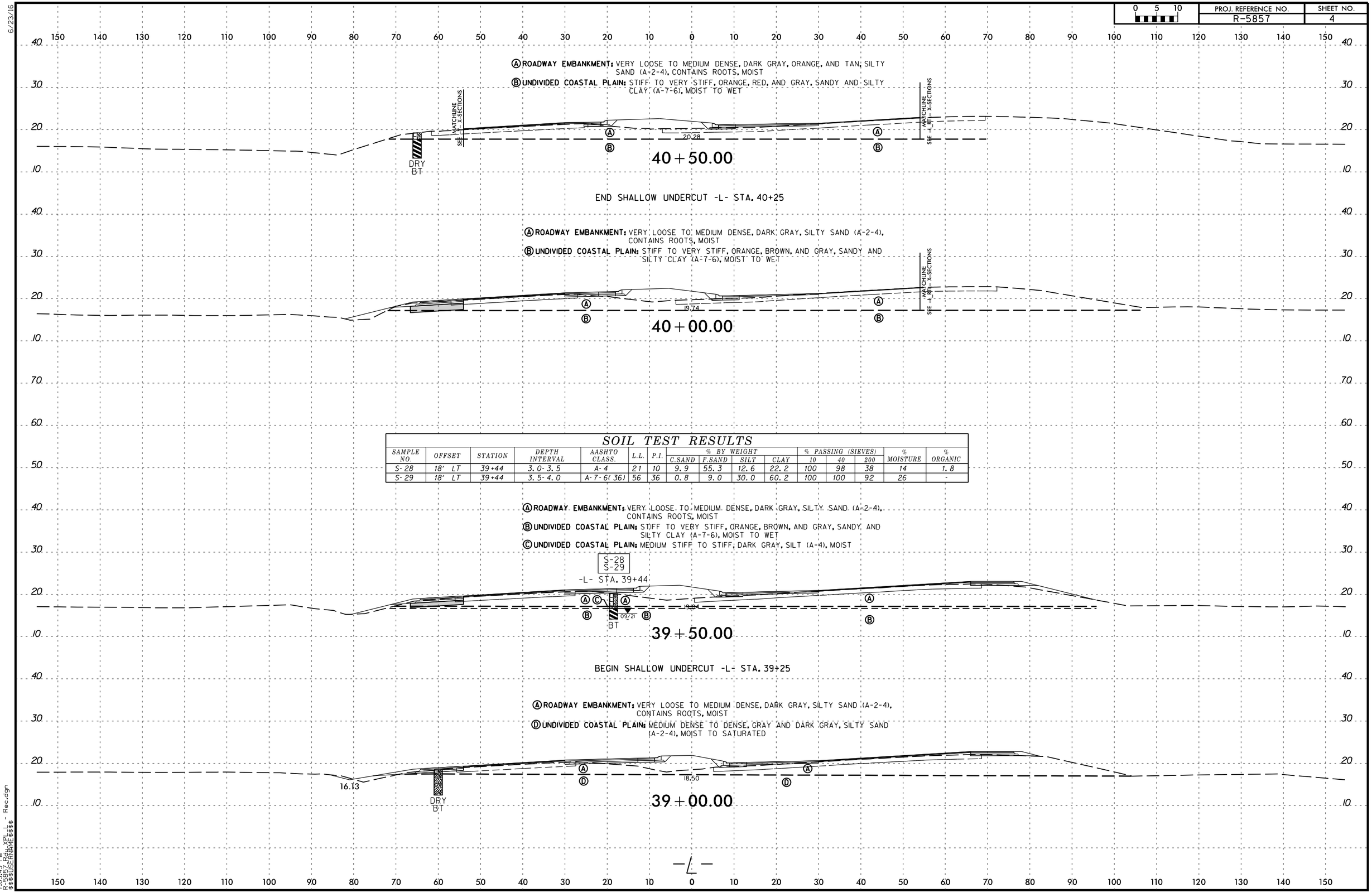
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028387 ENGINEER AYMAN L. ALQUDWAH

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

$$$$SYSTIME$$$$
$$$$DGN$$$$
$$$$USERNAME$$$$



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-28	18' LT	39+44	3.0-3.5	A-4	21	10	9.9	55.3	12.6	22.2	100	98	38	14	1.8
S-29	18' LT	39+44	3.5-4.0	A-7-6(36)	56	36	0.8	9.0	30.0	60.2	100	100	92	26	-

6/23/16
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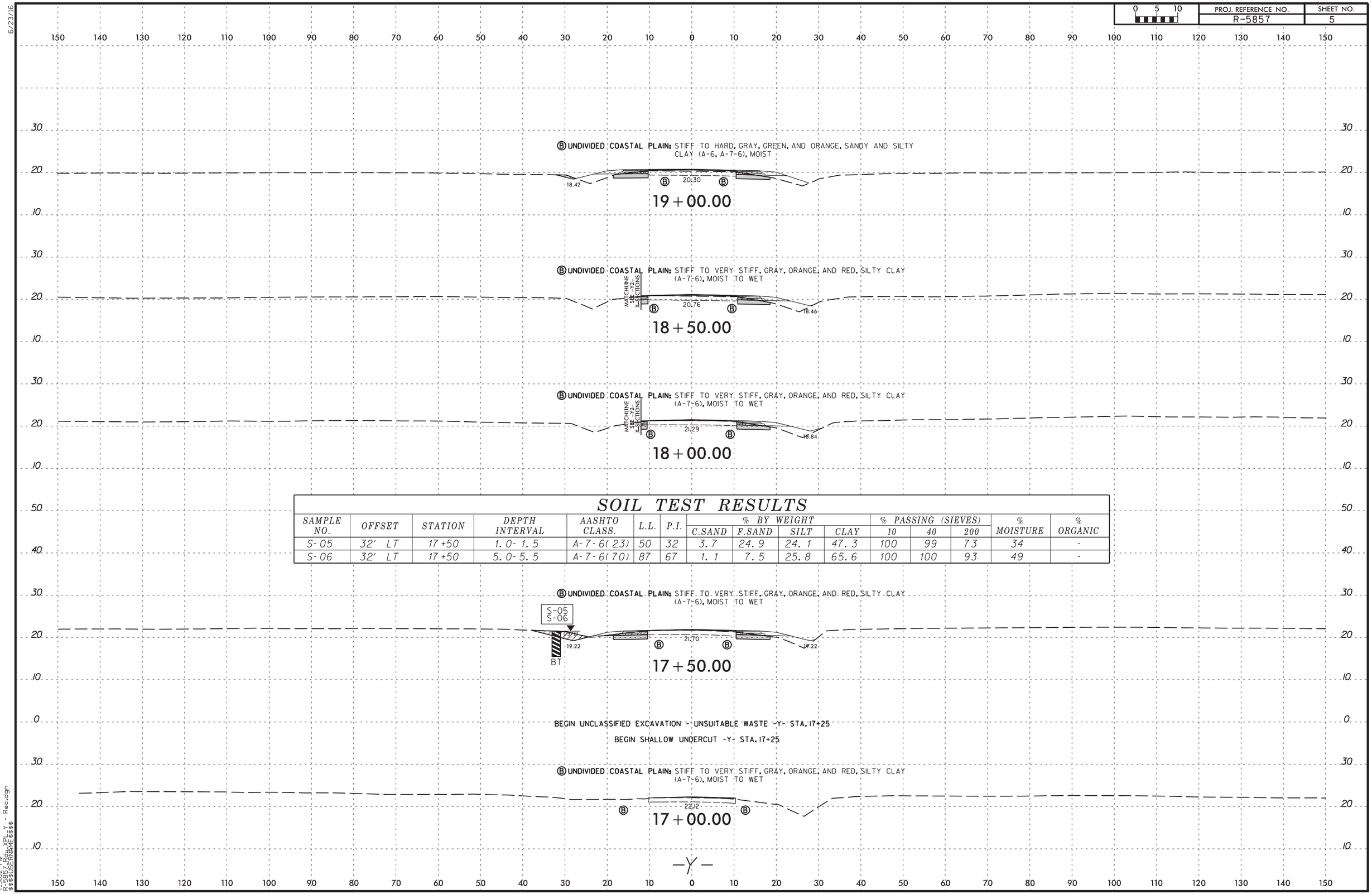

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-05	32' LT	17+50	1.0-1.5	A-7-6(23)	50	32	3.7	24.9	24.1	47.3	100	99	73	34	-
S-06	32' LT	17+50	5.0-5.5	A-7-6(70)	87	67	1.1	7.5	25.8	65.6	100	100	93	49	-

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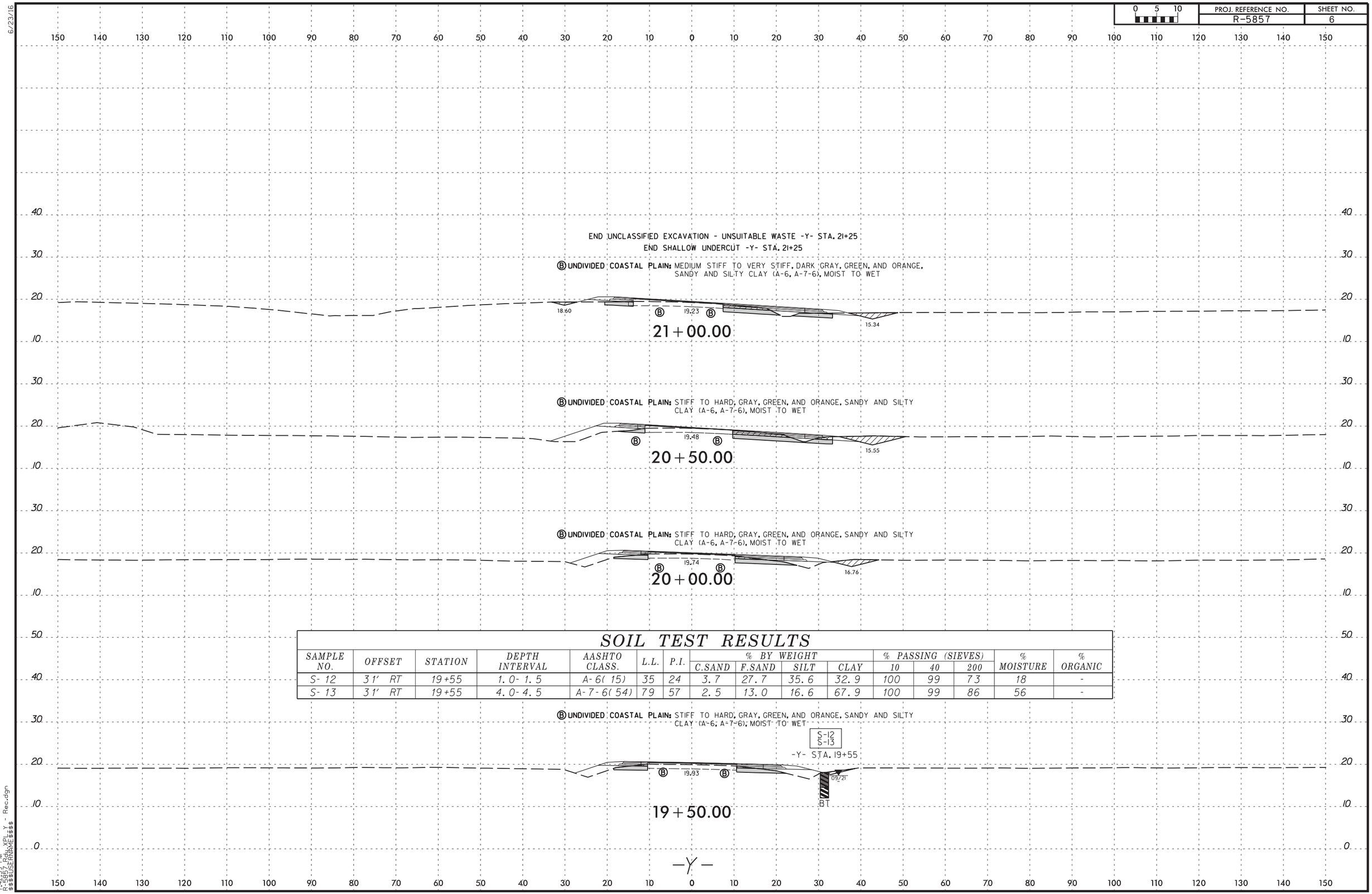

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-12	31' RT	19+55	1.0-1.5	A-6(15)	35	24	3.7	27.7	35.6	32.9	100	99	73	18	-
S-13	31' RT	19+55	4.0-4.5	A-7-6(54)	79	57	2.5	13.0	16.6	67.9	100	99	86	56	-

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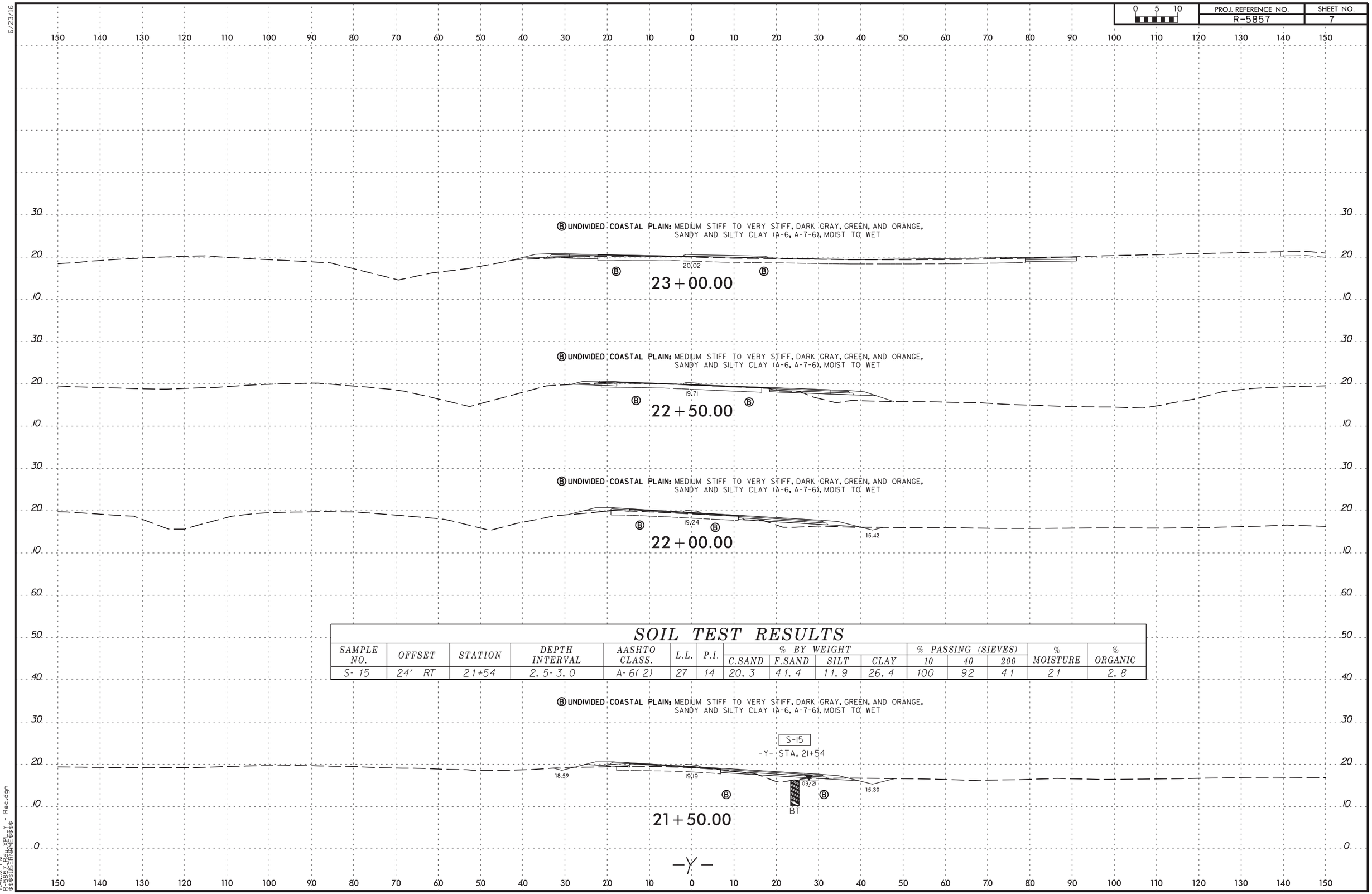
PROJ. REFERENCE NO.	SHEET NO.
R-5857	7



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-15	24' RT	21+54	2.5-3.0	A-6(2)	27	14	20.3	41.4	11.9	26.4	100	92	41	21	2.8

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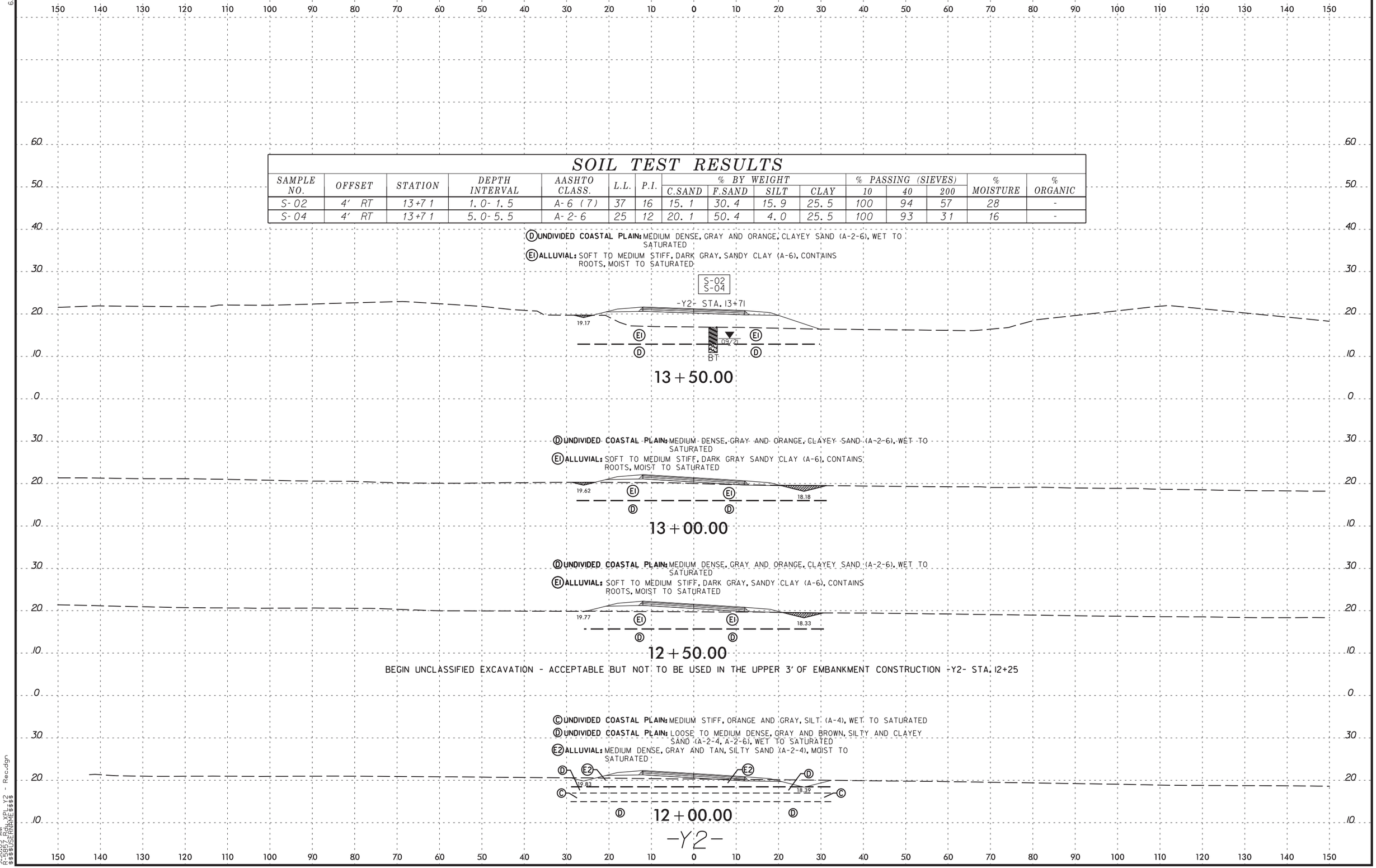
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-02	4' RT	13+71	1.0-1.5	A-6 (7)	37	16	15.1	30.4	15.9	25.5	100	94	57	28	-
S-04	4' RT	13+71	5.0-5.5	A-2-6	25	12	20.1	50.4	4.0	25.5	100	93	31	16	-



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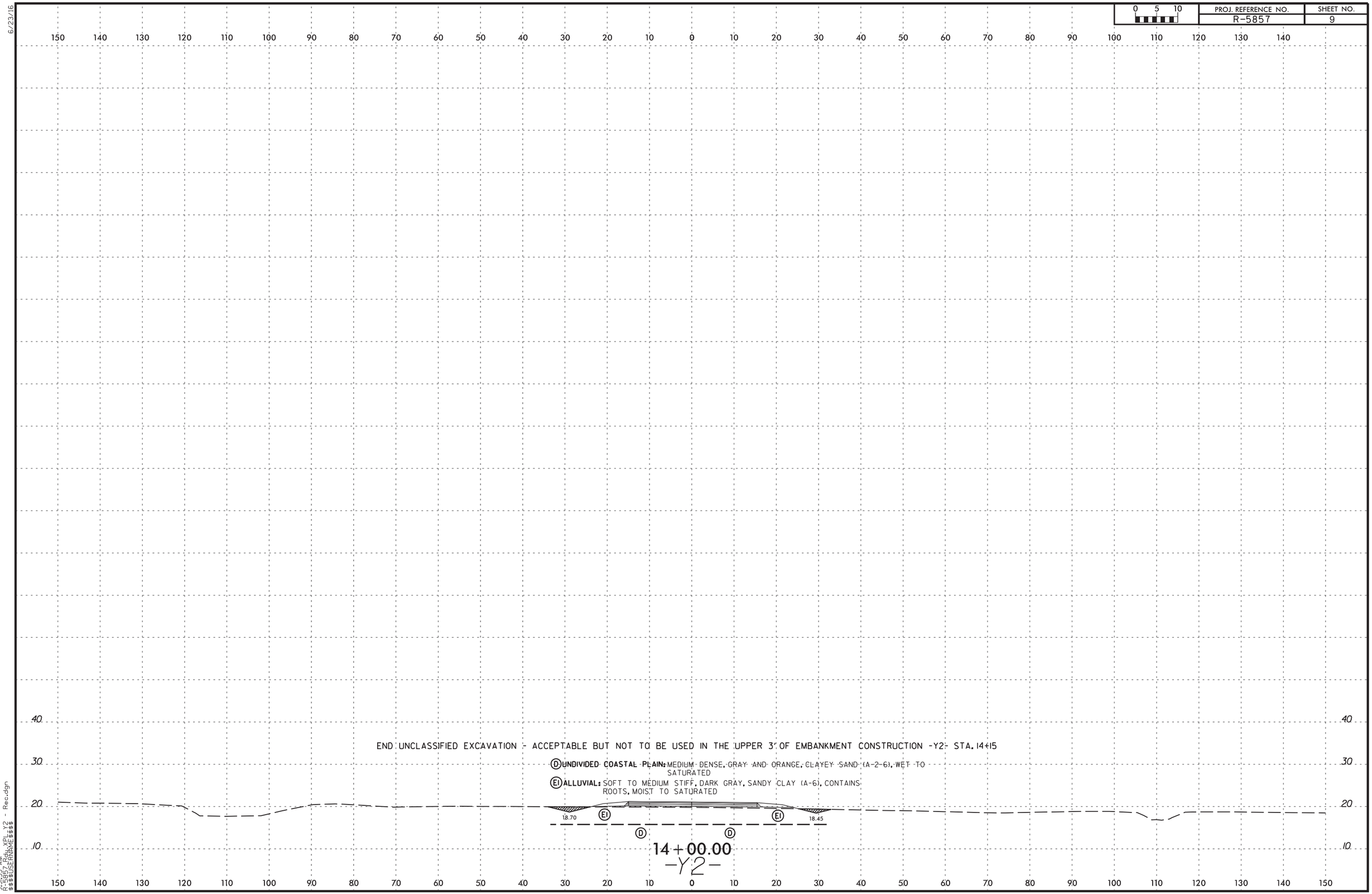

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