

REFERENCE: R-5726

PROJECT: 50218

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5726	1	53

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.

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY MOORE
PROJECT DESCRIPTION ROADWAY WIDENING FOR
NC 211 (-L-) FROM NC 73 TO SR 1241

INVENTORY

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	9+00 - 267+00.85	4 - 23	27 - 36
-Y1-	13+25.33 - 17+87.27	4	37
-Y3-	10+00 - 14+96.22	5	
-Y4-	10+00 - 18+25	5, 24	37
-Y8-	10+00 - 12+00	6	
-Y8A-	10+00 - 11+60.78	6	
-Y9-	10+00 - 13+80.76	6	
-Y10-	10+00 - 13+83.64	6	
-Y11-	10+00 - 14+03.44	7	
-Y12-	10+00 - 13+07.36	7	
-Y13-	12+55 - 13+37.24	9	
-Y14-	10+00 - 16+70	10, 25	38
-Y15-	10+00 - 13+40	13	
-Y16-	10+00 - 17+25	13, 26	38
-Y17-	10+00 - 13+65.82	14	
-Y18-	10+00 - 13+12.21	15, 16	
-Y19-	10+00 - 11+99.53	18	
-Y20-	10+00 - 14+86.47	19	
-Y21-	10+00 - 14+34.56	21	
-SBL-	10+00 - 28+26.20	22, 23	
-NBL-	10+00 - 22+24.76	22, 23	

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	17+00, 31+00, 34+50	39
-L-	62+50, 68+00, 169+00	40
-L-	184+50, 188+00	41
-L-	192+00, 195+00	42
-L-	198+00	43

APPENDICES

APPENDIX	STATION	SHEETS
A	LAB RESULTS	44 - 51

PERSONNEL

T. WILLIAMS

J. WILSON

T. HILL

C. CHANDLER

S. MITCHELL

INVESTIGATED BY S&ME, INC.

DRAWN BY C. CHANDLER

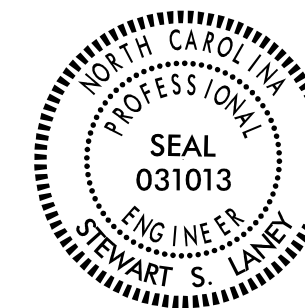
CHECKED BY S. MITCHELL

SUBMITTED BY S. LANEY

DATE JUNE 2018



9751 SOUTHERN PINE BLVD
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DocuSigned by:
Stewart S. Laney, PE 6/15/2018
76BB4AB1AB3B4CB SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL
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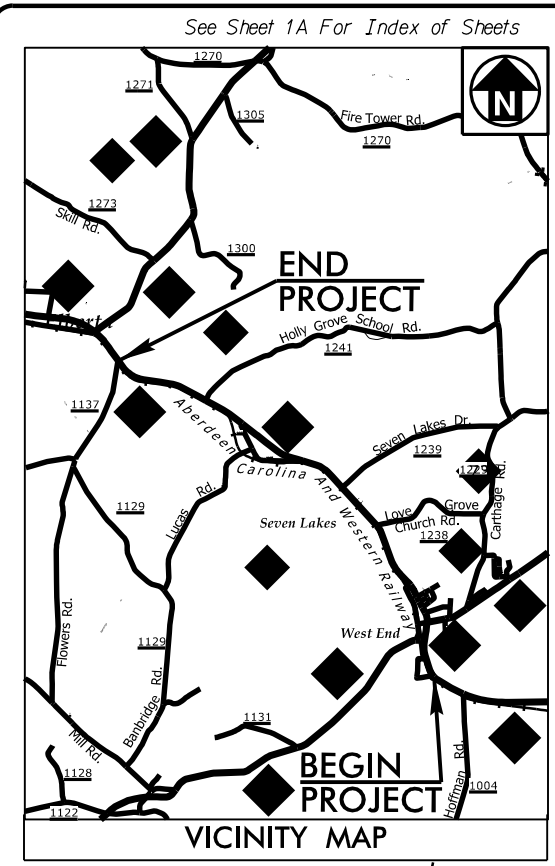
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																									
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>										<p>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 DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.																																																																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th colspan="5">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="5">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="5">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-2-4</th> <th>A-2-5</th> <th>A-2-6</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> <tr> <th>SYMBOL</th> <td colspan="5">[Pattern]</td> <td colspan="5">[Pattern]</td> <td colspan="5">[Pattern]</td> </tr> <tr> <th>% PASSING #10 #40 #200</th> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX</td> <td>51 MN 10 MX</td> <td>35 MX 35 MX</td> <td>35 MX 35 MX</td> <td>35 MX 35 MX</td> <td>35 MX 35 MX</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>36 MN 36 MN</td> <td>GRANULAR SOILS</td> <td>SILT-CLAY SOILS</td> <td>MUCK, PEAT</td> <td></td> </tr> </table>										GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)					SILT-CLAY MATERIALS (> 35% PASSING #200)					ORGANIC MATERIALS					GROUP CLASS.	A-1	A-3	A-2	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	SYMBOL	[Pattern]					[Pattern]					[Pattern]					% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX 35 MX	35 MX 35 MX	35 MX 35 MX	35 MX 35 MX	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT		<p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>										<p>CRISTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p>										<p>NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p>									
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<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p>SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</p>										<p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p>										<p>VERY SLIGHT (IV SLI) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p>																																																																									
PERCENTAGE OF MATERIAL										GROUND WATER										MODERATE (MOD.)										NON-COASTAL PLAIN SEDIMENTARY ROCK (CPI)																																																																									
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U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270																																																																																																	
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<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE. SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>										BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)								ABBREVIATIONS										HARD										MODERATELY HARD																																																											
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<p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>										<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>										<p>FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p>										<p>NOTES: * Elevations derived from geopak and the .tin file r5726-1s.tin.tin dated 10/02/17</p>																																																																									

09/08/19
 SYSTEM TIME: DDMMYY
 DDON: \$\$\$\$\$\$
 USERNAME: \$\$\$\$\$\$

TIP PROJECT: R-5726

CONTRACT:

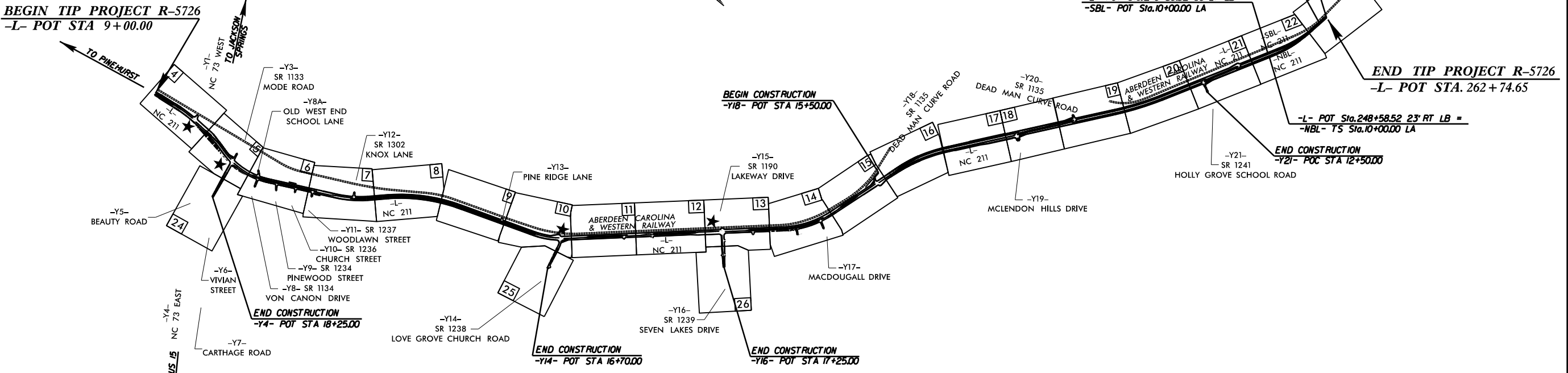


STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS
MOORE COUNTY

LOCATION: NC 211 FROM SOUTH OF NC 73 IN WEST END TO NORTH OF SR 1241 (HOLLY GROVE SCHOOL ROAD).

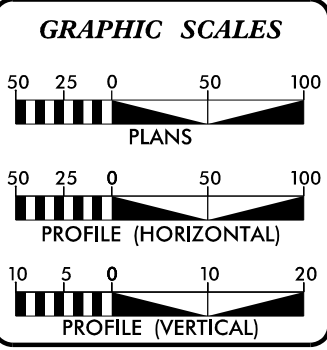
TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND SIGNALS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5726	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
50218.1.1		P.E.	



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ____.
 THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS

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



DESIGN DATA

ADT 2020 =	16,500
ADT 2040 =	21,300
K =	9 %
D =	55 %
T =	9 % *
V =	60 MPH
* (TTST 6% + DUAL 3%)	
FUNC CLASS =	MINOR ARTERIAL
REGIONAL TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5726 =	4.806 MILES
TOTAL LENGTH OF TIP PROJECT R-5726 =	4.806 MILES

TOTAL PROJECT LENGTH BASED ON -L- STATIONS.

PLANS PREPARED FOR THE NCDOT BY:

M M
 MOTT
 MACDONALD
 LICENSE NO. F-0669

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 19, 2018

LETTING DATE:
JUNE 16, 2020

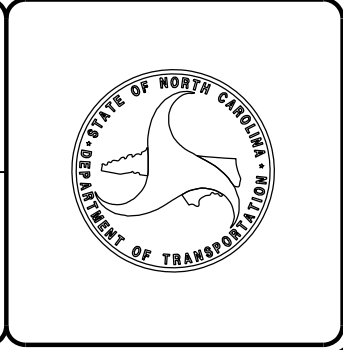
DAVID C. WALLER, PE PROJECT ENGINEER PEF ENGINEER
PADDY JORDAN PROJECT DESIGN ENGINEER PEF ENGINEER
GARY LOVERING, PE PROJECT ENGINEER NCDOT ROADWAY DESIGN

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.





June 1, 2018

STATE PROJECT: 50218.1.1 (R-5726)
 FEDERAL PROJECT: N/A
 COUNTY: Moore
 DESCRIPTION: Roadway Widening for NC 211 from NC 73 to SR 1241

SUBJECT: Geotechnical Report – Inventory

Project Description

This project consists of widening NC 211 in Moore County, North Carolina. The project begins just south of the NC 211 and NC 73 intersection and extends along NC 211 to just northwest of SR 1241 (Holly Grove School Road) in Moore County, North Carolina. The type of work being performed consists of grading, paving, and widening the existing NC 211. The widened section will consist of four lanes with a median.

Fieldwork was conducted in November of 2017 by S&ME, Inc. Standard Penetration Tests were performed at selected locations along the project. A Diedrich D-50 track-mounted drill machine with an automatic hammer was used to perform the SPT borings. Eighty-two SPT borings were performed at various offset locations along the following alignments: -L-, -Y1-, -Y3-, -Y4-, -Y8-, -Y8A-, -Y9-, -Y10-, -Y11-, -Y12-, -Y13-, -Y14-, -Y15-, -Y16-, -Y17-, -Y18-, -Y19-, -Y20-, -Y21-, -SBL- and -NBL-. Representative samples were collected for visual classification in the field and were submitted for laboratory analysis.

The following alignments were investigated. Subsurface profiles and selected cross sections of the following alignments are included in this report.

<u>Line</u>	<u>Stations (±)</u>
-L-	9+00 to 267+00.85
-Y1-	13+89 to 17+87.27
-Y3-	10+00 to 14+96.22
-Y4-	10+00 to 18+25
-Y8-	10+00 to 12+00
-Y8A-	10+00 to 11+60.78
-Y9-	10+00 to 13+80.76
-Y10-	10+00 to 13+83.64
-Y11-	10+00 to 14+03.44
-Y12-	10+00 to 13+07.36
-Y13-	12+55 to 13+37.24
-Y14-	10+00 to 16+70

-Y15-	10+00 to 13+40
-Y16-	10+00 to 17+25
-Y17-	10+00 to 13+65.82
-Y18-	10+00 to 13+12.21
-Y19-	10+00 to 11+99.53
-Y20-	10+00 to 14+86.47
-Y21-	10+00 to 14+34.56
-SBL-	10+00 to 28+26.20
-NBL-	10+00 to 22+24.76

Physiography and Geology

The project corridor is located within the Coastal Plain Physiographic Province in Moore County, North Carolina. Topography along the project is generally flat to gently sloping except along -L- Station (±) 172+50 to 188+00 where the ground is more steeply sloping. Natural ground elevations range from 569± to 635± feet above sea level along the above mentioned sections. Natural ground elevations range from 569± to 655± feet above sea level along the entire site. The project corridor is a combination of Commercial, Industrial as well as residential.

The area is underlain by roadway embankment, artificial fill, Coastal Plain sediments and Triassic soils. The Coastal Plain soils in this area are part of the Pinehurst and Middendorf Formations. Pinehurst Formation is Tertiary in age and consist of cross and rhythmically bedded medium to coarse grained sand and clayey sand. Middendorf Formation is Cretaceous in age and generally consist of sand, clayey sand, sandstone and mudstone. Residual soils and weathered rock of the Triassic Basin were encountered underlying the Middendorf formation. Triassic aged rocks consist of sedimentary conglomerates, sandstones and mudstones.

Soil & Rock Properties

Soils encountered during this investigation are separated into 5 categories: Roadway Embankment, Artificial Fill, Coastal Plain soils, Residual Triassic Basin soils, and Weathered Rock.

Roadway Embankment soils generally consist of brown, gray, and tan, loose to dense, silty sand (A-2-4) and clayey sand (A-2-6).

Artificial Fill soils consist of tan, brown, gray, and red, very loose to medium dense sand (A-1-b), very loose to loose sand (A-3), very loose to medium dense silty sand (A-2-4), very loose to medium dense clayey sand (A-2-6), and stiff sandy clay (A-6). PI of the artificial fill sands and silty sands ranges from non-plastic to 6.

Coastal Plain Middendorf Formation soils consist of tan, brown, gray, red, orange, pink, and white, very loose to medium dense sand (A-1-b), very loose to loose sand (A-3), very loose to dense silty sand (A-2-4), very loose to dense clayey sand (A-2-6 and A-2-7), hard sandy silt (A-4), medium stiff to hard sandy clay (A-6), medium stiff silty clay (A-7-5), and stiff to hard clay (A-7-6). The PI of the coastal plain cohesive soils ranges from 10 to 24.

Triassic residual soils were encountered in one boring and consisted of hard gray clay (A-7-6) with a PI of 16.

Weathered rock was encountered at elevation 527± ft on L near station 188+00 below the Triassic Basin soils and consisted of sandstone.

Ground Water

Ground water measurements were taken in November of 2017 during average rainfall conditions. Ground water elevations ranged from 563± to 567± feet above sea level.

Areas of Special Geotechnical Interest

1) Artificial Fill: Areas of artificial fill occur at the following locations.

<u>Line</u>	<u>Stations(±)</u>	<u>Offset</u>
-L-	15+00 to 18+10	LT
-L-	18+60 to 28+65	LT
-L-	29+00 to 35+80	RT
-L-	67+50 to 68+90	RT
-L-	117+00 to 138+00	RT
-L-	141+00 to 144+30	RT
-Y1-	16+70 to 17+87.27	LT and RT
-Y4-	14+50 to 16+25	RT
-Y16-	12+10 to 14+50	LT

2) Ponds: Two ponds occur on or within close proximity of right of way on this project. They are noted at the following locations:

<u>Line</u>	<u>Stations(±)</u>	<u>Offset</u>
-L-	186+60	LT
-L-	190+96	LT

3) Water wells: One well occurs within the right of way on this project. It is noted at the following location:

<u>Line</u>	<u>Station(±)</u>	<u>Offset</u>
-L-	145+73	RT

4) Septic System: A reported septic field is located within the right of way on this project. It is noted at the following approximate location:

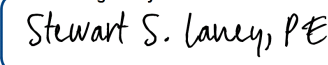
<u>Line</u>	<u>Station(±)</u>	<u>Offset</u>
-L-	132+00 to 134+45	RT

Bulk Samples

Three bulk samples were collected for CBR and Proctor testing at the following locations:

<u>Sample No.</u>	<u>Line</u>	<u>Stations & Offset</u>	<u>Depth</u>	<u>Test</u>
S-1	-L-	172+00, 20 RT	0.0-15.0 ft	Proctor, CBR
S-2	-L-	178+00, 20 RT	0.0-15.0 ft	Proctor, CBR
S-3	-L-	198+22, 8 RT	0.0-15.0 ft	Proctor, CBR

Respectfully Submitted,

DocuSigned by:

 75BB4AB1AB3B4CB...

Stewart Laney, PE
 Project Manager

8/17/99

-Y1-
PI Sta 11+66.15
Δ = 28° 40' 36.2" (RT)
D = 8° 48' 53.0"
L = 325.33'
T = 166.15'
R = 650.00'

NAD 83/NA 2011

PROJECT REFERENCE NO. R-5726 SHEET NO. 4

ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
M M PO Box 700
MOTT MAEDONALD Fuquay-Varina, NC 27526
www.mottmac.com/motmac

ORICA ICA Engineering, Inc.
5121 Kingdom Way,
Suite 100
Raleigh, NC 27607
NC License No. F-0258

FOR -L- PROFILE SEE SHEET 27
FOR -Y1- PROFILE SEE SHEET 38
FOR INTERSECTION DETAIL
SEE SHEET 2B-5

★ TRAFFIC SIGNAL

-L- POT Sta. 9+00.00
BEGIN MILLING & RESURFACING

COASTAL PLAIN

BEGIN CONSTRUCTION
-Y1- POT Sta. 16+70.00

ARTIFICIAL FILL

ARTIFICIAL FILL

ROADWAY EMBANKMENT

COASTAL PLAIN

-L- TS Sta. 13+55.17

ENVIRONMENTALLY SENSITIVE AREA

-L- SC Sta. 15+02.17

-L- CS Sta. 17+57.27

-Y1- POT Sta. 17+87.27 =
-L- POS Sta. 18+46.08

-L- ST Sta. 19+04.27

-L- TS Sta. 21+55.40

BEGIN TIP PROJECT R-5726
-L- STA. 9+00.00

PIs Sta 14+53.17	PI Sta 16+29.85	PIs Sta 18+06.28	PIs Sta 22+86.10
Os = 1° 49' 51.5"	Δ = 6° 21' 17.8" (RT)	Os = 1° 49' 51.5"	Os = 3° 44' 36.0"
Ls = 147.00'	D = 2° 29' 28.0"	Ls = 147.00'	Ls = 196.00'
LT = 98.01'	L = 255.10'	LT = 98.01'	LT = 130.70'
ST = 49.00'	T = 127.68'	ST = 49.00'	ST = 65.36'
	R = 2,300.00'		
	SE = 0.03		
	RO = 147'		

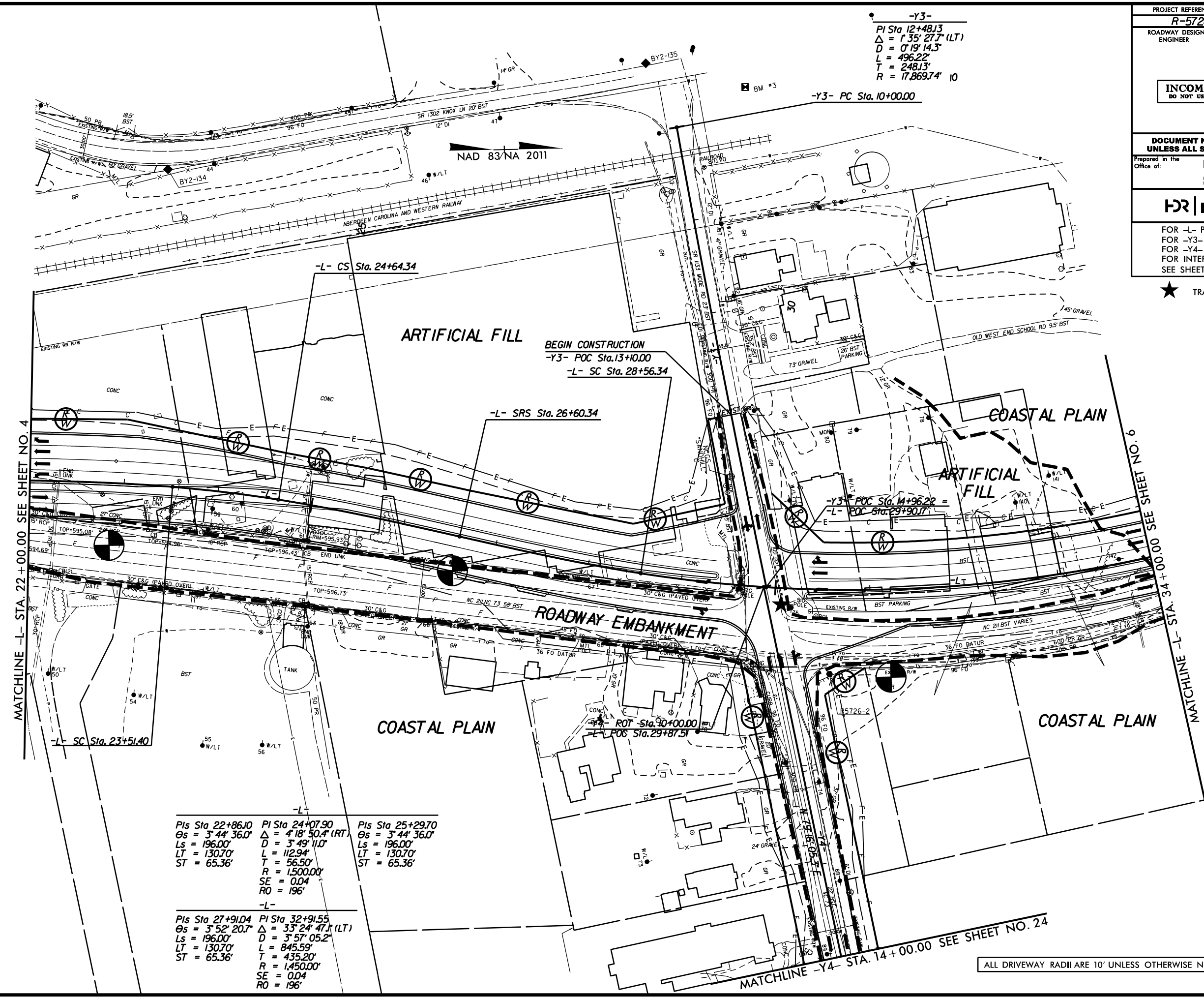
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

MATCHLINE -L- STA. 22 + 00.00 SEE SHEET NO. 5

SYTIME

8/17/99

PROJECT REFERENCE NO. R-5726		SHEET NO. 5	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
Prepared in the Office of: M M PO Box 700 MOTT MAEDONALD Fayetteville, NC 27526 www.mottmac.com/motcos			
FOR ICA ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258			
FOR -L- PROFILE SEE SHEET 27 FOR -Y3- PROFILE SEE SHEET 38 FOR -Y4- PROFILE SEE SHEET 39 FOR INTERSECTION DETAIL SEE SHEET 2B-5			



-Y3-
 PI Sta 12+48.13
 $\Delta = 1' 35' 27.7''$ (LT)
 $D = 0' 19' 14.3''$
 $L = 496.22'$
 $T = 248.13'$
 $R = 17,869.74' \ 10$

MATCHLINE -L- STA. 22+00.00 SEE SHEET NO. 4

MATCHLINE -L- STA. 34+00.00 SEE SHEET NO. 6

-L- Pis Sta 22+86.10 $\Theta_s = 3' 44' 36.0''$ $L_s = 196.00'$ $LT = 130.70'$ $ST = 65.36'$	PI Sta 24+07.90 $\Delta = 4' 18' 50.4''$ (RT) $D = 3' 49' 11.0''$ $L = 112.94'$ $T = 56.50'$ $R = 1,500.00'$ $SE = 0.04$ $RO = 196'$	Pis Sta 25+29.70 $\Theta_s = 3' 44' 36.0''$ $L_s = 196.00'$ $LT = 130.70'$ $ST = 65.36'$
-L- Pis Sta 27+91.04 $\Theta_s = 3' 52' 20.7''$ $L_s = 196.00'$ $LT = 130.70'$ $ST = 65.36'$	PI Sta 32+91.55 $\Delta = 3' 57' 05.2''$ (LT) $D = 3' 57' 05.2''$ $L = 845.59'$ $T = 435.20'$ $R = 1,450.00'$ $SE = 0.04$ $RO = 196'$	

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

*****SYTIME*****
*****CDGN*****

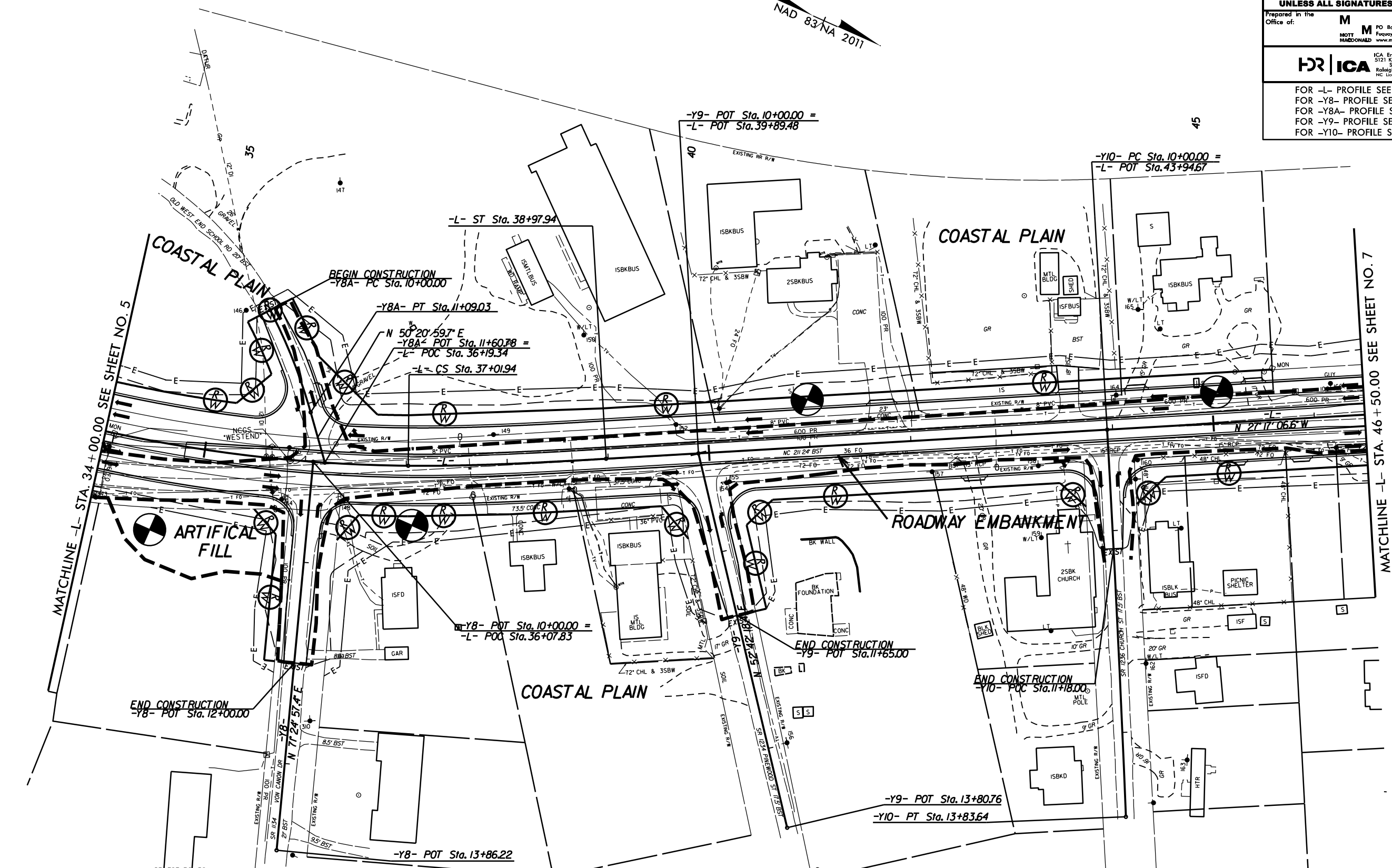
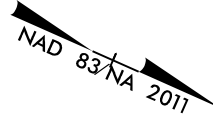
8/17/99

-L-
 PI Sta 32+91.55 Pls Sta 37+67.30
 $\Delta = 33^{\circ}24'47.1''$ (LT) $\Theta_s = 3^{\circ}52'20.7''$
 $D = 3^{\circ}57'05.2''$ $L_s = 196.00'$
 $L = 845.59'$ $LT = 130.70'$
 $T = 435.20'$ $ST = 65.36'$
 $R = 1,450.00'$
 $SE = 0.04$
 $RO = 196'$

-Y8A-
 PI Sta 10+54.71
 $\Delta = 1^{\circ}53'55.8''$ (RT)
 $D = 10^{\circ}54'48.5''$
 $L = 109.03'$
 $T = 54.71'$
 $R = 525.00'$

-Y10-
 PI Sta 11+91.82
 $\Delta = 0^{\circ}57'09.4''$ (RT)
 $D = 0^{\circ}14'53.9''$
 $L = 383.64'$
 $T = 191.82'$
 $R = 23,074.48'$

PROJECT REFERENCE NO. R-5726	SHEET NO. 6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared in the Office of:	M M PO Box 700 MOTT MACDONALD Fayetteville, NC 27526 www.mottmac.com/motmex
FOR ICA ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258	
FOR -L- PROFILE SEE SHEET 28 FOR -Y8- PROFILE SEE SHEET 39 FOR -Y8A- PROFILE SEE SHEET 39 FOR -Y9- PROFILE SEE SHEET 40 FOR -Y10- PROFILE SEE SHEET 40	




MATCHLINE -L- STA. 34+00.00 SEE SHEET NO. 5

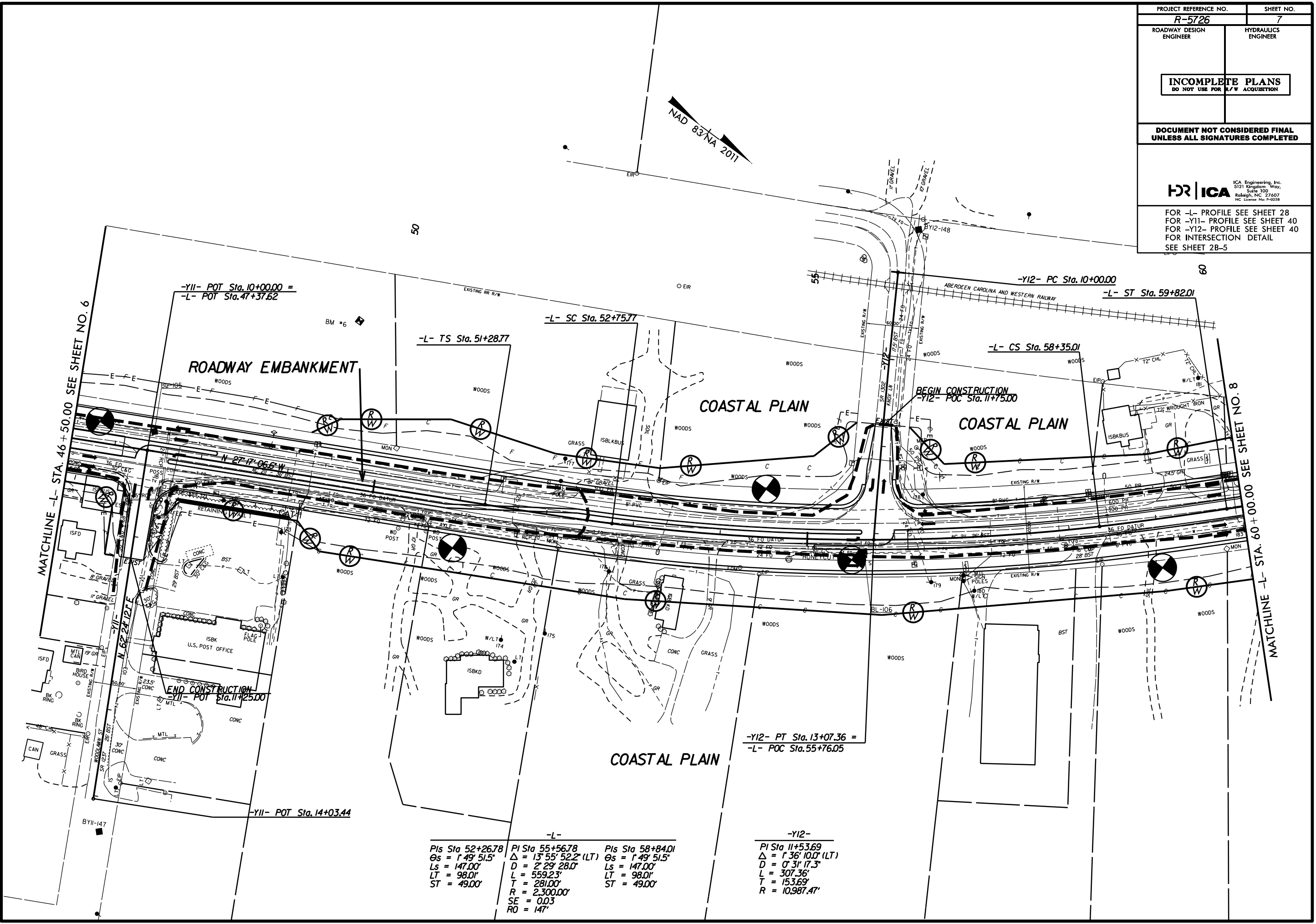
MATCHLINE -L- STA. 46+50.00 SEE SHEET NO. 7

 SYSTEMS TIME *****

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

8/17/99

PROJECT REFERENCE NO. R-5726	SHEET NO. 7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 <small>HICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258</small>	
FOR -L- PROFILE SEE SHEET 28 FOR -Y11- PROFILE SEE SHEET 40 FOR -Y12- PROFILE SEE SHEET 40 FOR INTERSECTION DETAIL SEE SHEET 2B-5	

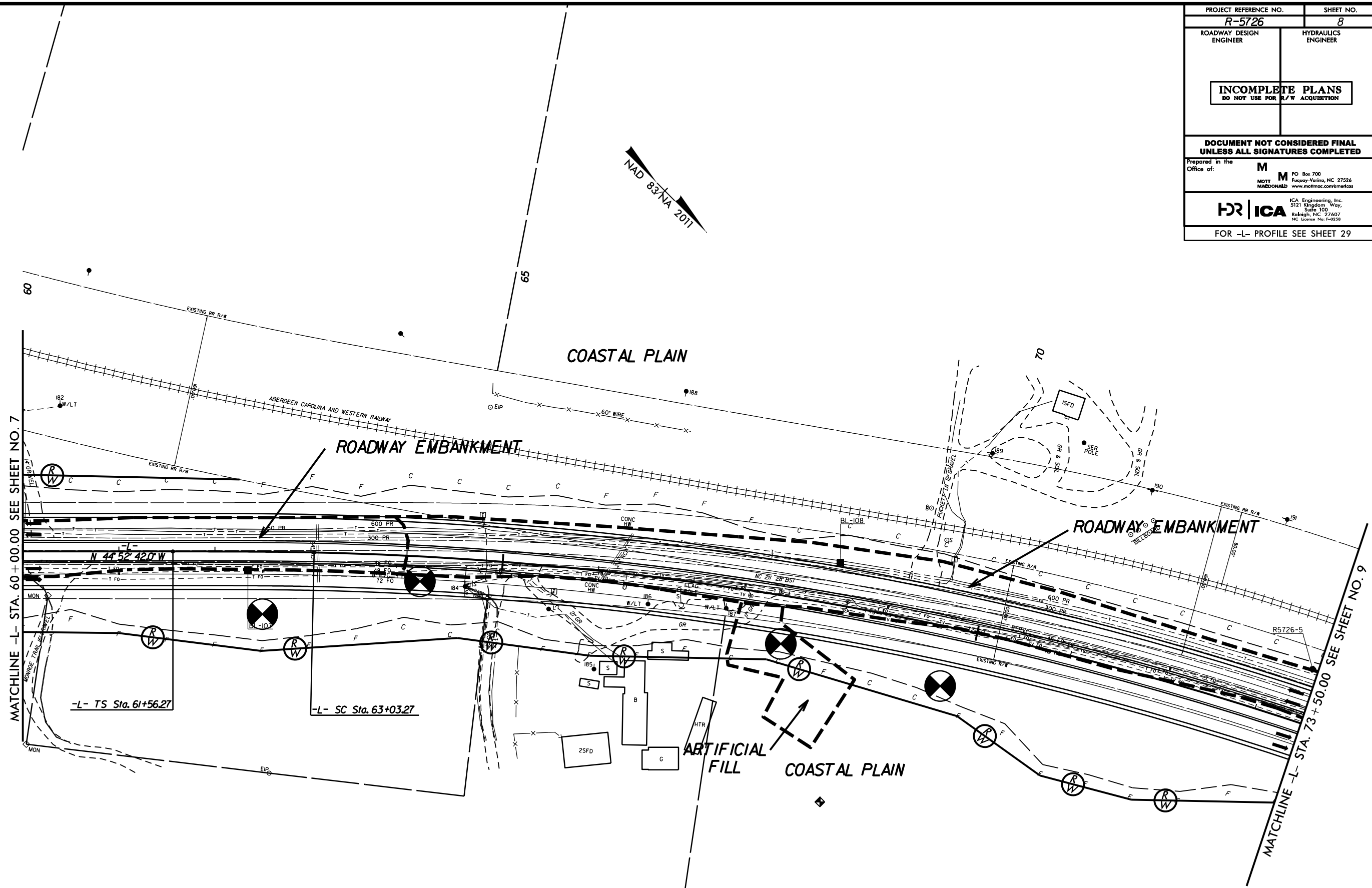


-L-		-Y12-	
PI Sta 52+26.78	PI Sta 55+56.78	PI Sta 58+84.01	PI Sta 11+53.69
Os = 1' 49' 51.5"	Δ = 13' 55' 52.2" (LT)	Os = 1' 49' 51.5"	Δ = 1' 36' 10.0" (LT)
Ls = 147.00'	D = 2' 29' 28.0"	Ls = 147.00'	D = 0' 31' 17.3"
LT = 98.01'	L = 559.23'	LT = 98.01'	L = 307.36'
ST = 49.00'	T = 281.00'	ST = 49.00'	T = 153.69'
	R = 2,300.00'		R = 10,987.47'
	SE = 0.03		
	RO = 147'		

*****SYTIME*****
 *****CDGN*****

8/17/99

PROJECT REFERENCE NO. R-5726		SHEET NO. 8	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
Prepared in the Office of:		M MOTT MAEDONALD PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com/motcos	
FOR ICA		ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258	
FOR -L- PROFILE SEE SHEET 29			



-L-	
PIs Sta 62+54.27	PI Sta 69+91.54
$\theta_s = 112^\circ 36.5'$	$\Delta = 22^\circ 22' 30.5" (RT)$
Ls = 147.00'	D = 1' 38' 47"
LT = 98.00'	L = 1,359.01'
ST = 49.00'	T = 688.27'
	R = 3,480.00'
	SE = 0.03
	RO = 147'

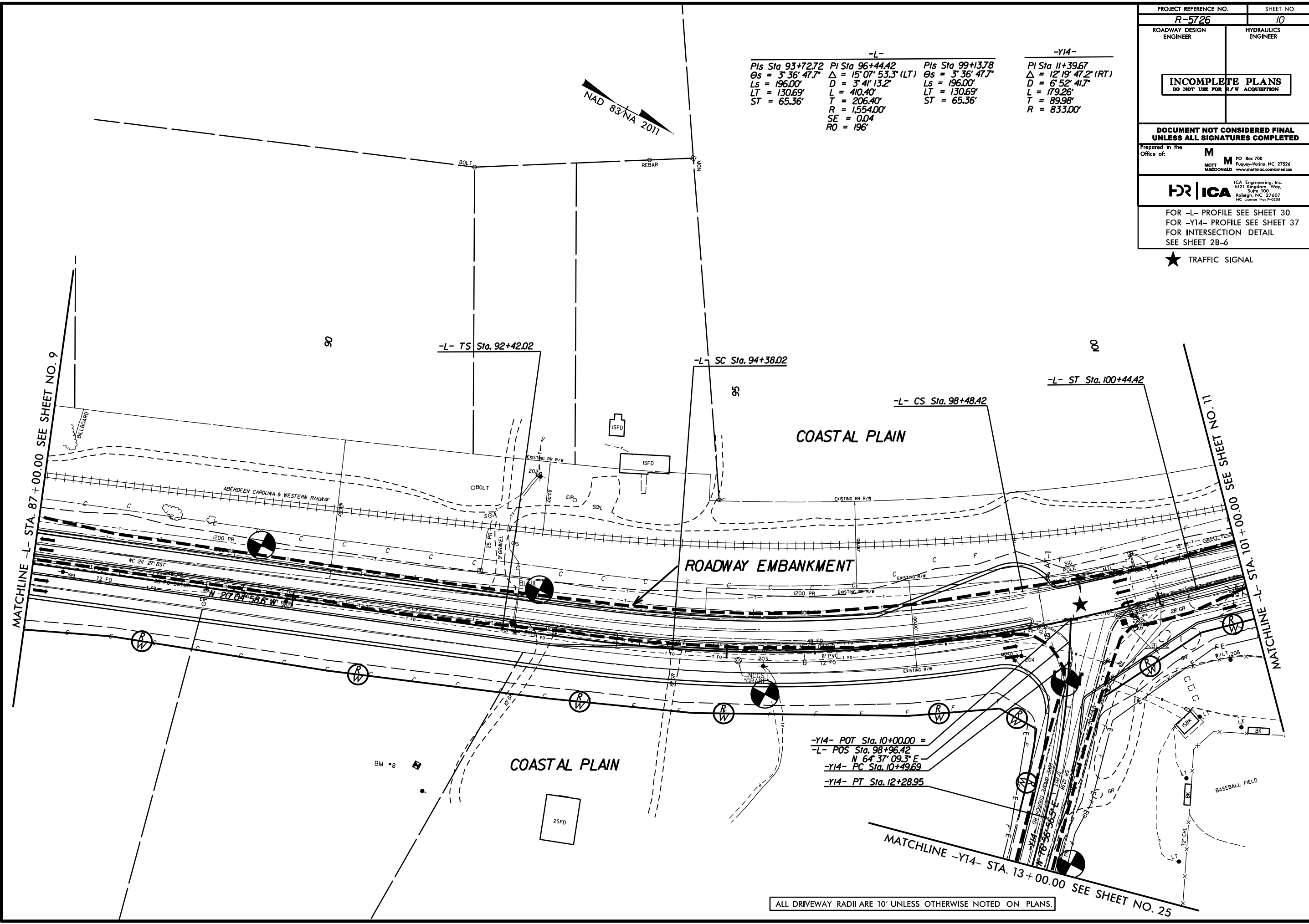
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

SYTIME\$\$\$\$\$
L19990817 10:00 AM
\$\$\$\$\$

8/17/99

PROJECT REFERENCE NO. R-5726		SHEET NO. 10	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
Prepared in the Office of:		M PO Box 700 M Fuquay-Varina, NC 27526 <small>MOTT MACDONALD www.mottmac.com/motmac</small>	
OR ICA		<small>ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258</small>	
FOR -L- PROFILE SEE SHEET 30 FOR -Y14- PROFILE SEE SHEET 37 FOR INTERSECTION DETAIL SEE SHEET 2B-6			
★ TRAFFIC SIGNAL			

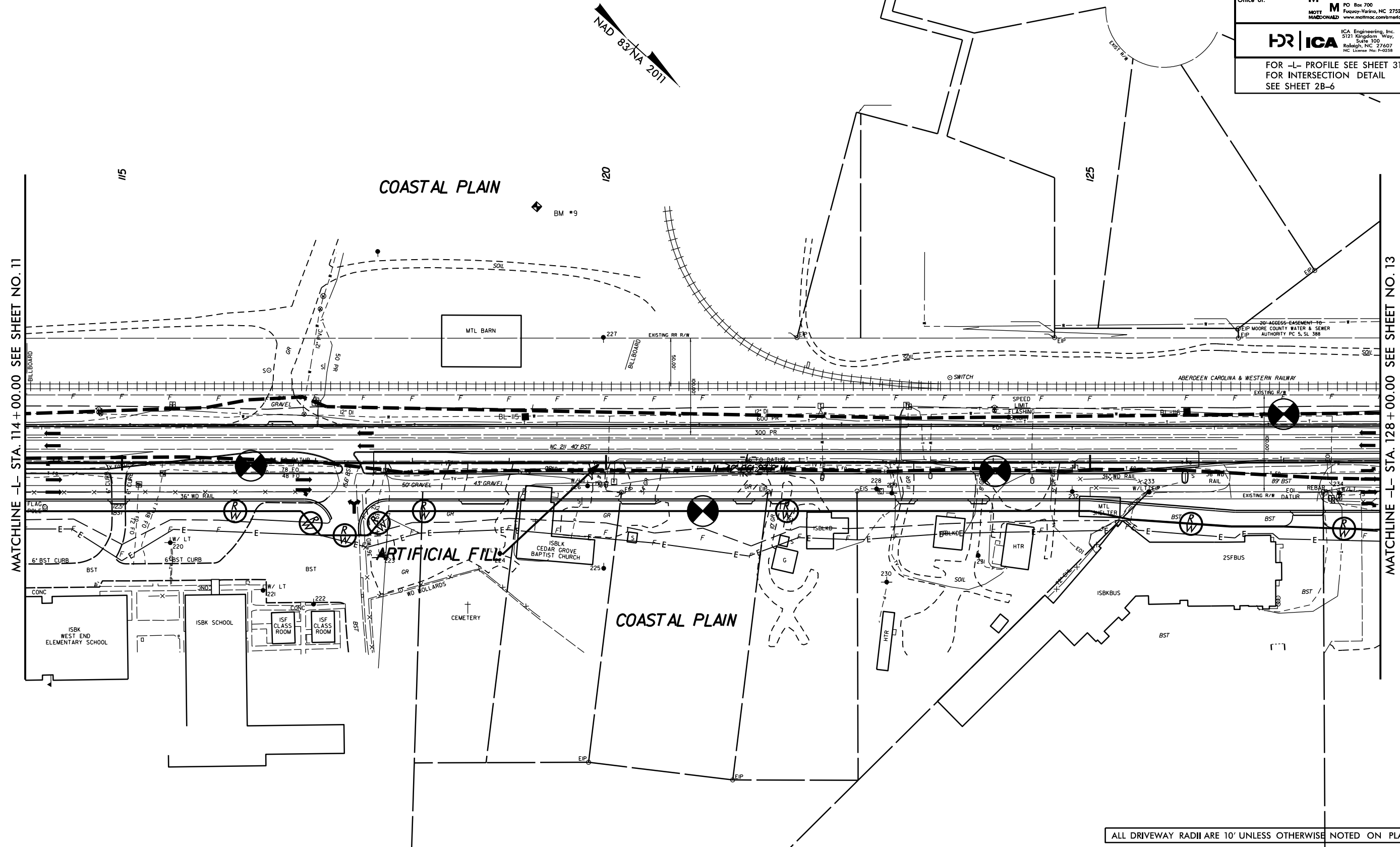
-L-			-Y14-	
PIs Sta 93+72.72	PI Sta 96+44.42	PIs Sta 99+13.78	PI Sta 11+39.67	
$\theta_s = 3^\circ 36' 47.7"$	$\Delta = 15^\circ 07' 53.3" (LT)$	$\theta_s = 3^\circ 36' 47.7"$	$\Delta = 12^\circ 19' 47.2" (RT)$	
$L_s = 196.00'$	$D = 3^\circ 41' 13.2"$	$L_s = 196.00'$	$D = 6^\circ 52' 41.7"$	
$LT = 130.69'$	$L = 410.40'$	$LT = 130.69'$	$L = 179.26'$	
$ST = 65.36'$	$T = 206.40'$	$ST = 65.36'$	$T = 89.98'$	
	$R = 1,554.00'$		$R = 833.00'$	
	$SE = 0.04$			
	$RO = 196'$			



*****SYTIME*****
*****CDGN*****

8/17/99

PROJECT REFERENCE NO. R-5726		SHEET NO. 12	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
Prepared in the Office of:		M M MOTT MAEDONALD PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com/motmacos	
		OR ICA ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258	
FOR -L- PROFILE SEE SHEET 31 FOR INTERSECTION DETAIL SEE SHEET 2B-6			



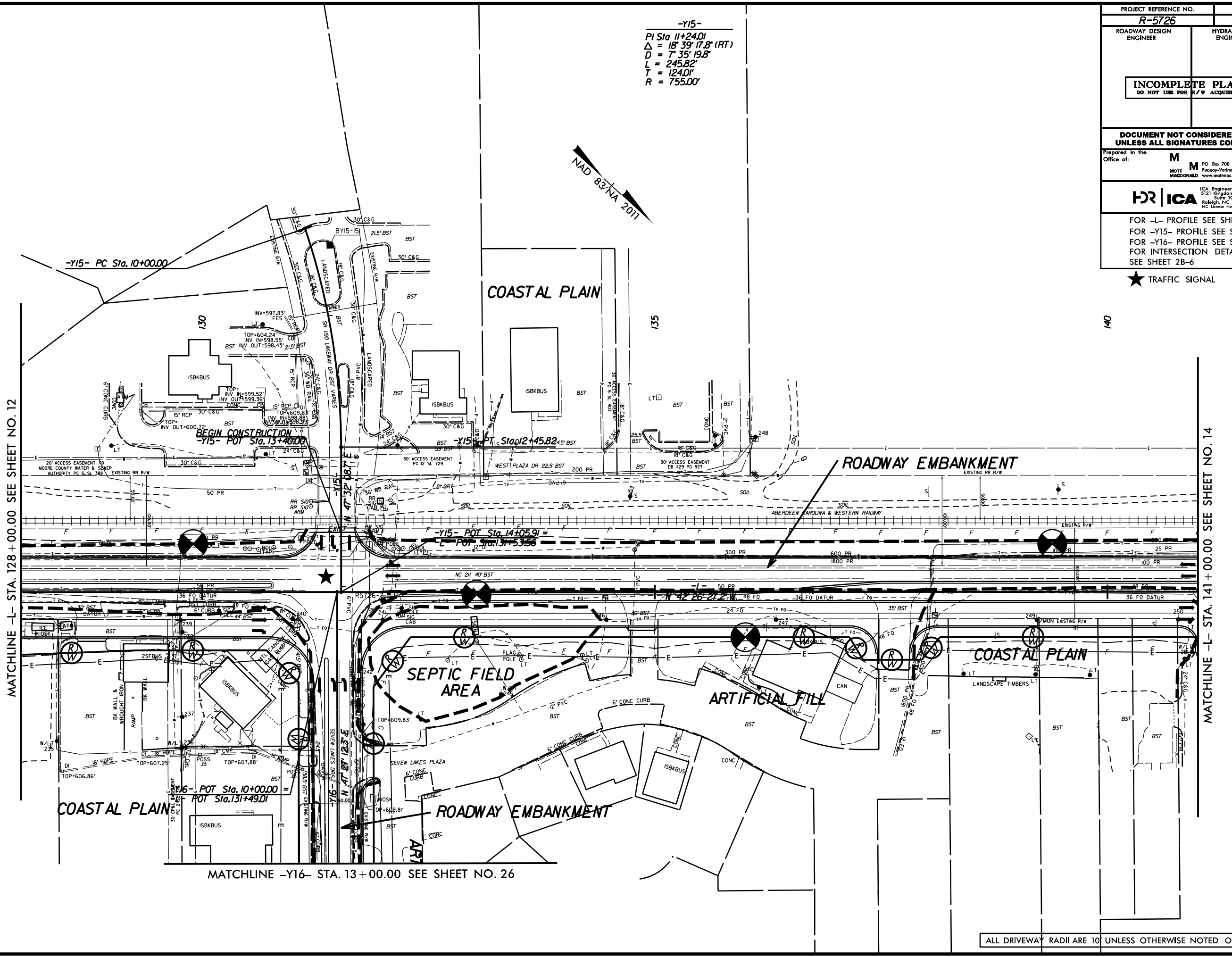
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

-Y15-
 PI Sta 11+24.01
 $\Delta = 18^{\circ} 39' 17.8" (RT)$
 $D = 7' 35" 19.8"$
 $L = 245.82'$
 $T = 124.01'$
 $R = 755.00'$



PROJECT REFERENCE NO. R-5726	SHEET NO. 13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared in the Office of: M M MOFFIT & MACDONALD PO Box 700 Fuquay-Varina, NC 27526 www.moffitmac.com/mofmac	
DR ICA <small>ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. E-0258</small>	
FOR -L- PROFILE SEE SHEET 31 FOR -Y15- PROFILE SEE SHEET 41 FOR -Y16- PROFILE SEE SHEET 41 FOR INTERSECTION DETAIL SEE SHEET 2B-6	
★ TRAFFIC SIGNAL	

MATCHLINE -L- STA. 128+00.00 SEE SHEET NO. 12



MATCHLINE -L- STA. 141+00.00 SEE SHEET NO. 14

MATCHLINE -Y16- STA. 13+00.00 SEE SHEET NO. 26

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

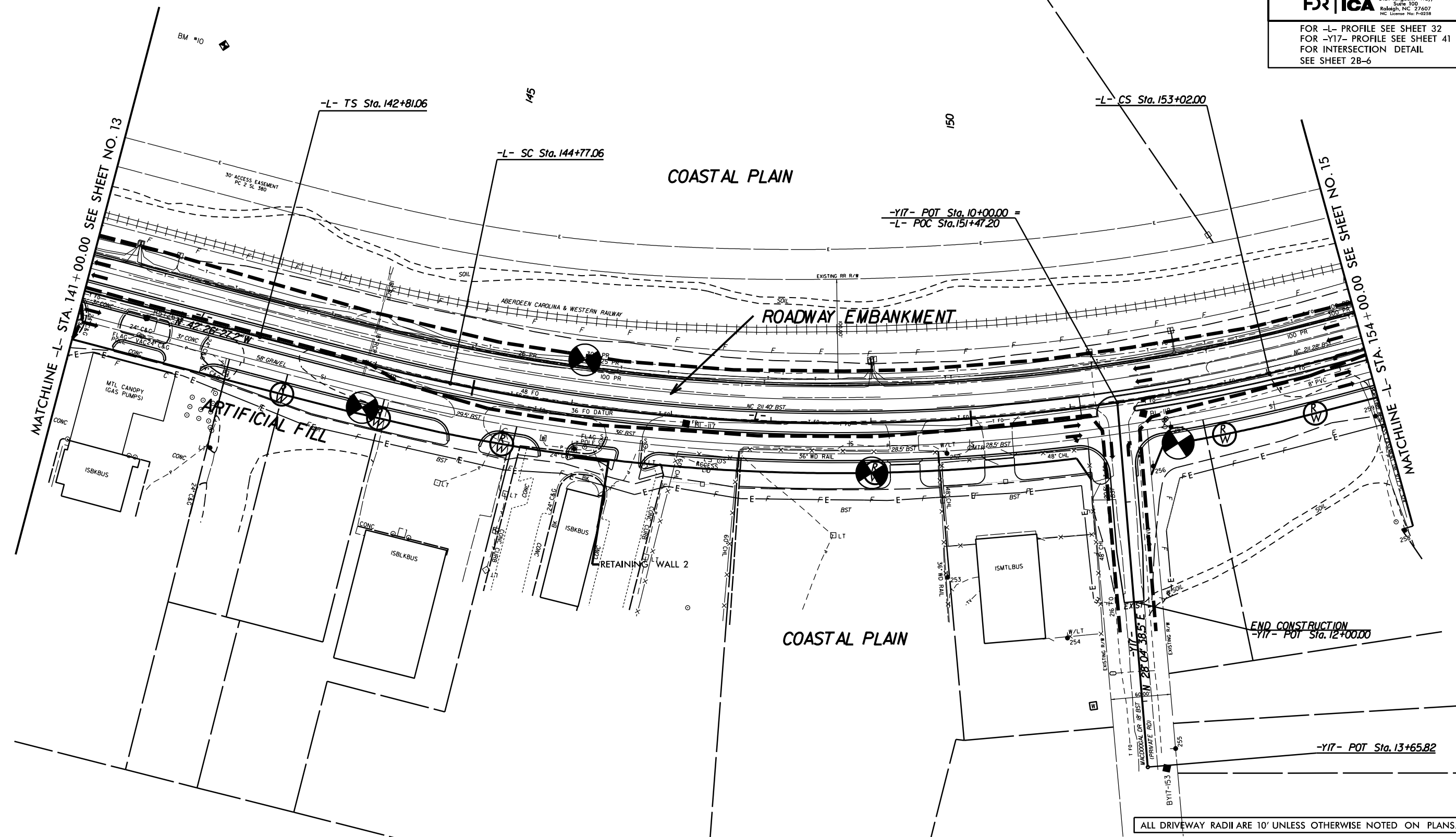
 SYSTEMS TIME *****

8/17/99

-L-

PIs Sta 144+11.74 Os = 2' 57" 18.9" Ls = 196.00' LT = 130.68' ST = 65.35'	PI Sta 148+96.13 Δ = 24' 52" 35.6' (LT) D = 3' 00" 56.0" L = 824.94' T = 419.07' R = 1,900.00' SE = 0.04 RO = 196'	PIs Sta 153+67.35 Os = 2' 57" 18.9" Ls = 196.00' LT = 130.68' ST = 65.35'
---	---	---

PROJECT REFERENCE NO. R-5726	SHEET NO. 14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
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	PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com/mottmac
OR ICA	
ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258	
FOR -L- PROFILE SEE SHEET 32 FOR -Y17- PROFILE SEE SHEET 41 FOR INTERSECTION DETAIL SEE SHEET 2B-6	



ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

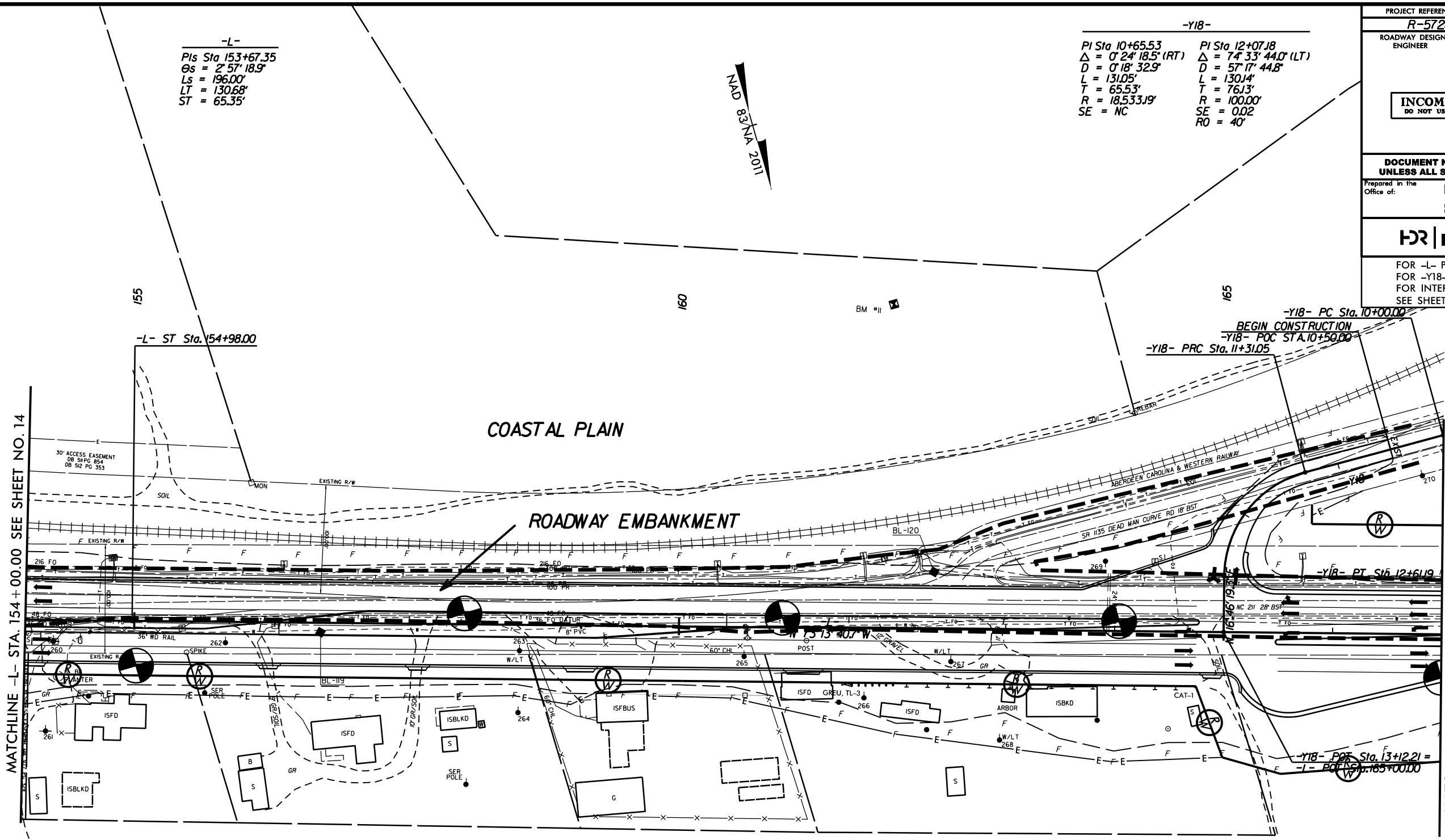
SYSTEMS TIME \$\$\$\$\$\$
DESIGN \$\$\$\$\$\$
PRINT \$\$\$\$\$\$

8/17/99

-L-
 PIs Sta 153+67.35
 $\theta_s = 2^\circ 57' 18.9''$
 $L_s = 196.00'$
 $LT = 130.68'$
 $ST = 65.35'$

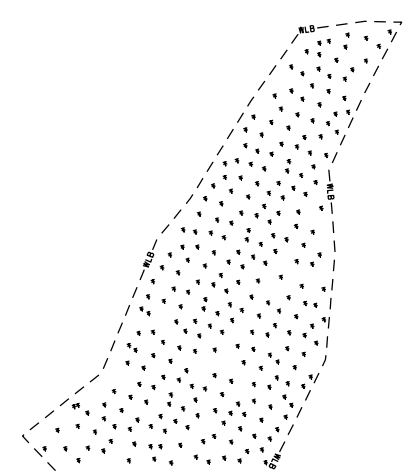
-Y18-
 PI Sta 10+65.53 PI Sta 12+07.18
 $\Delta = 0^\circ 24' 18.5''$ (RT) $\Delta = 74^\circ 33' 44.0''$ (LT)
 $D = 0^\circ 18' 32.9''$ $D = 57^\circ 17' 44.8''$
 $L = 131.05'$ $L = 130.14'$
 $T = 65.53'$ $T = 76.13'$
 $R = 18,533.19'$ $R = 100.00'$
 $SE = NC$ $SE = 0.02$
 $RO = 40'$

PROJECT REFERENCE NO. R-5726	SHEET NO. 15
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
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OR ICA ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258	
FOR -L- PROFILE SEE SHEET 32 FOR -Y18- PROFILE SEE SHEET 42 FOR INTERSECTION DETAIL SEE SHEET 28-6	



MATCHLINE -L- STA. 154+00.00 SEE SHEET NO. 14

MATCHLINE -L- STA. 167+00.00 SEE SHEET NO. 16



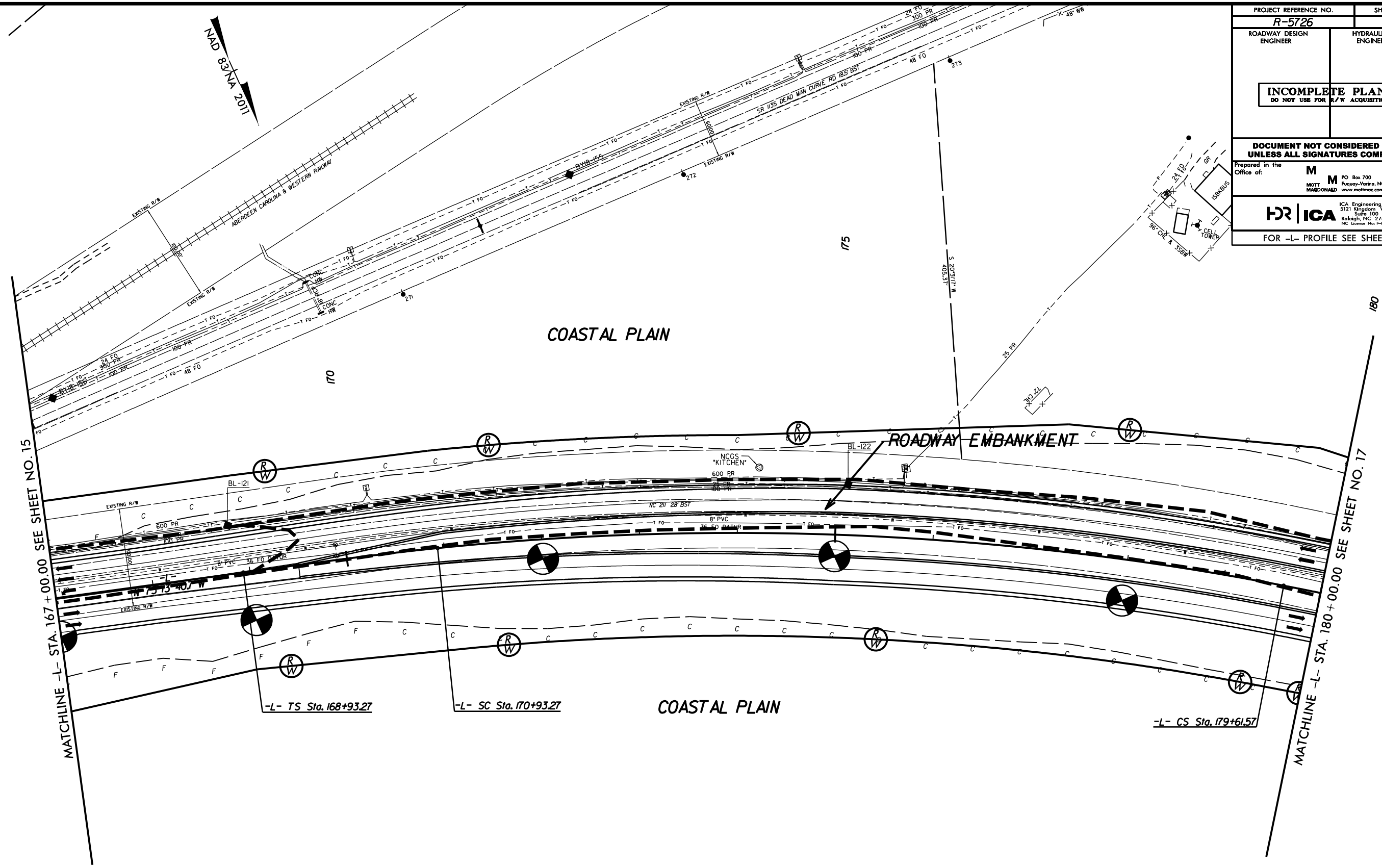
PAVEMENT REMOVAL
 ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

\$\$\$\$\$SYTIME\$\$\$\$\$
 \$\$\$\$\$\$DATE\$\$\$\$\$
 \$\$\$\$\$\$DRAWING\$\$\$\$\$

8/17/99



PROJECT REFERENCE NO. R-5726	SHEET NO. 16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
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ORICA ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258	
FOR -L- PROFILE SEE SHEET 33	



-L-

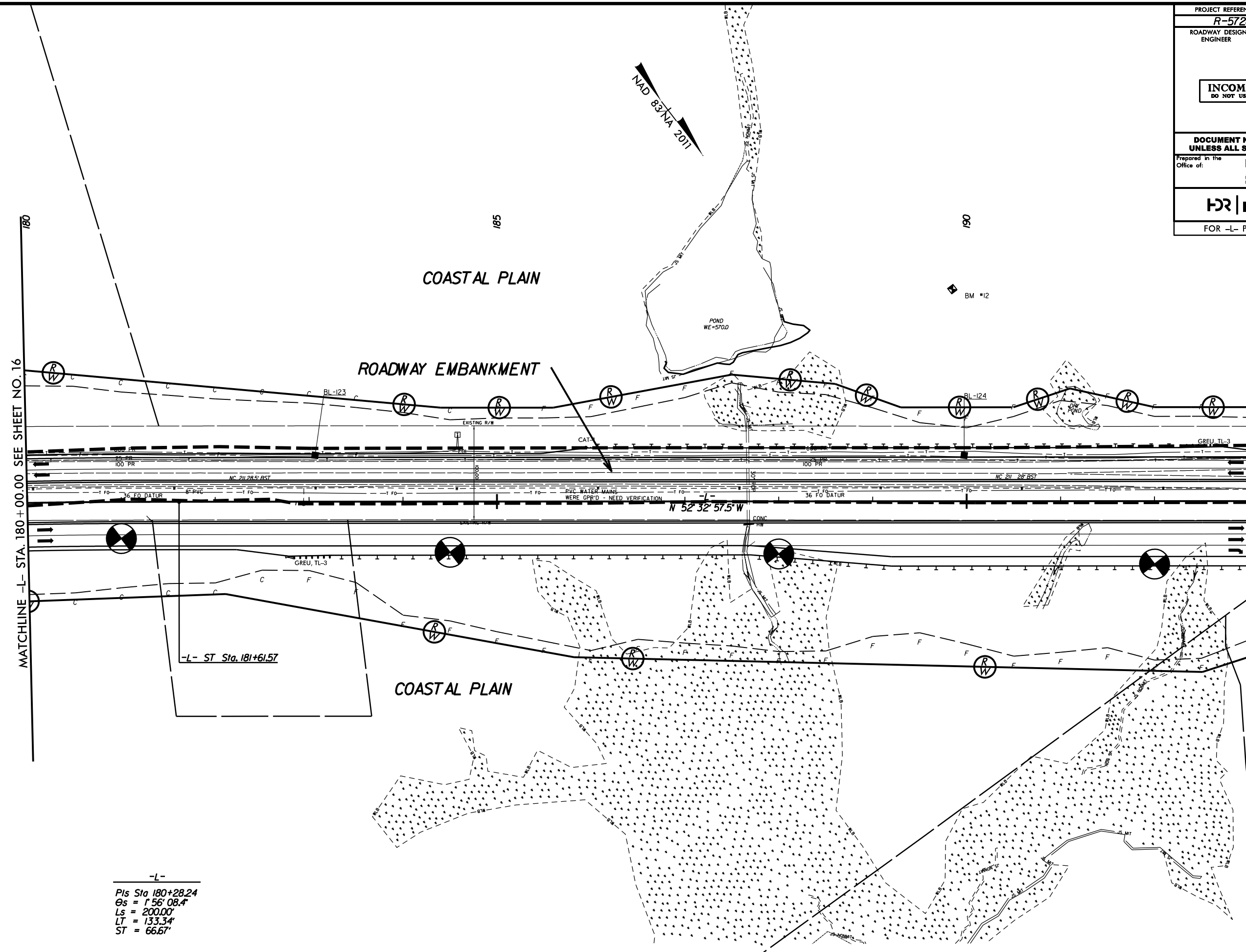
<i>Pis</i> Sta 170+26.61	<i>Pi</i> Sta 175+30.56	<i>Pis</i> Sta 180+28.24
$\Theta_s = 1^{\circ} 56' 08.4''$	$\Delta = 16^{\circ} 48' 26.4''$ (RT)	$\Theta_s = 1^{\circ} 56' 08.4''$
$L_s = 200.00'$	$D = 1^{\circ} 56' 08.4''$	$L_s = 200.00'$
$LT = 133.34'$	$L = 868.30'$	$LT = 133.34'$
$ST = 66.67'$	$T = 437.29'$	$ST = 66.67'$
	$R = 2,960.00'$	
	$SE = 0.05$	
	$RO = 200'$	

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

SYTIME
L:\PROJECTS\99\817\99\817.DWG

8/17/99

PROJECT REFERENCE NO. R-5726		SHEET NO. 17	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
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FOR ICA		ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258	
FOR -L- PROFILE SEE SHEET 33			



MATCHLINE -L- STA. 180+00.00 SEE SHEET NO. 16

MATCHLINE -L- STA. 193+00.00 SEE SHEET NO. 18

-L- ST Sta. 181+61.57

-L-
 Pts Sta 180+28.24
 $\theta_s = 1^\circ 56' 08.4''$
 $L_s = 200.00'$
 $LT = 133.34'$
 $ST = 66.67'$

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

SYTIME\$\$\$\$\$
L/10/2000
\$\$\$\$\$

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

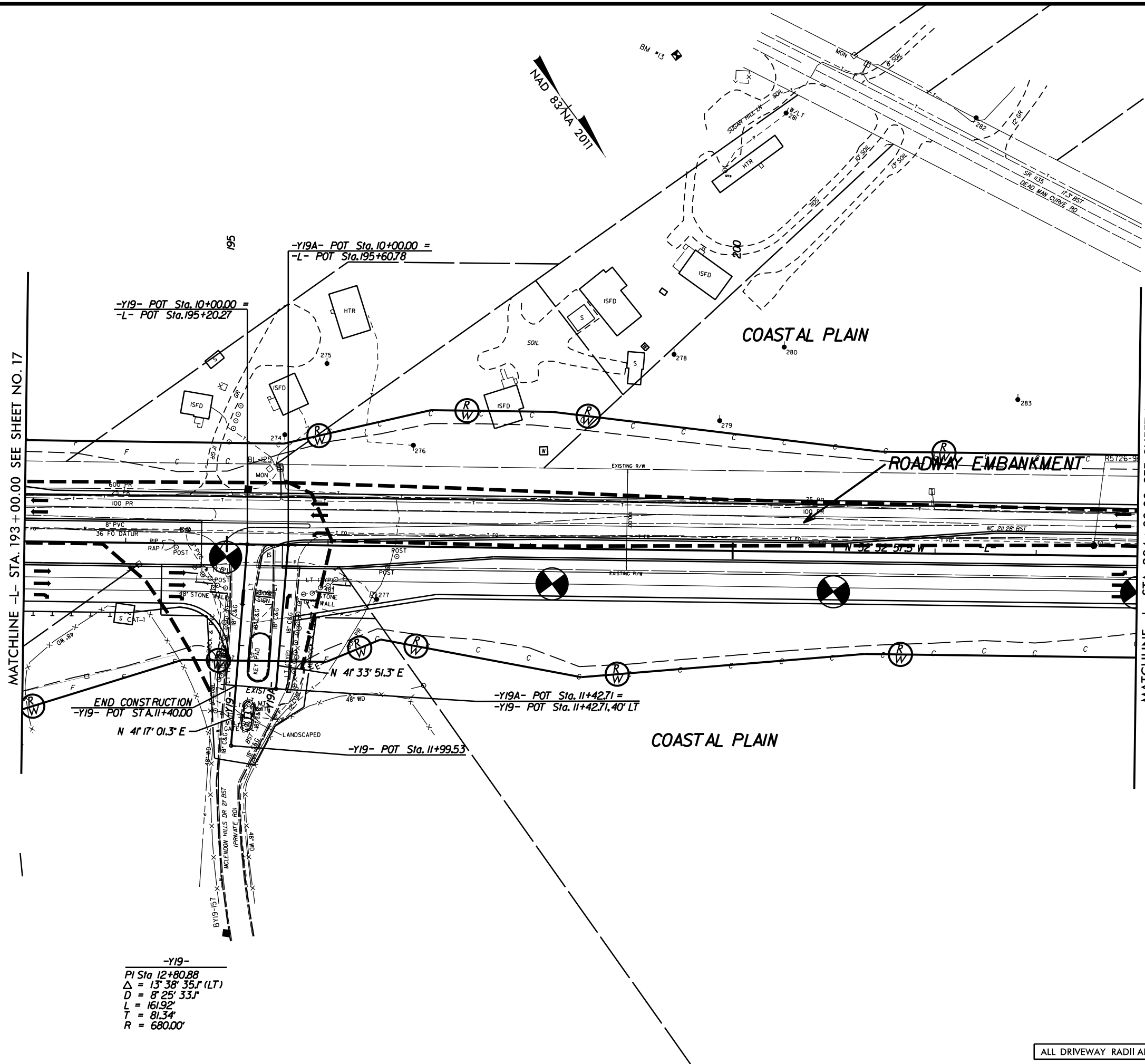
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
M M
MOTT MACDONALD
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Fuquay-Varina, NC 27526
www.mottmac.com/bcneticos

ICA
ICA Engineering, Inc.
5121 Kingdom Way,
Suite 100
Raleigh, NC 27607
NC License No. F-0258

FOR -L- PROFILE SEE SHEET 34
FOR -Y19- PROFILE SEE SHEET 42
FOR INTERSECTION DETAIL
SEE SHEET 2B-6

8/17/99
\$\$\$SYTIME\$\$\$
\$\$\$SYTIME\$\$\$

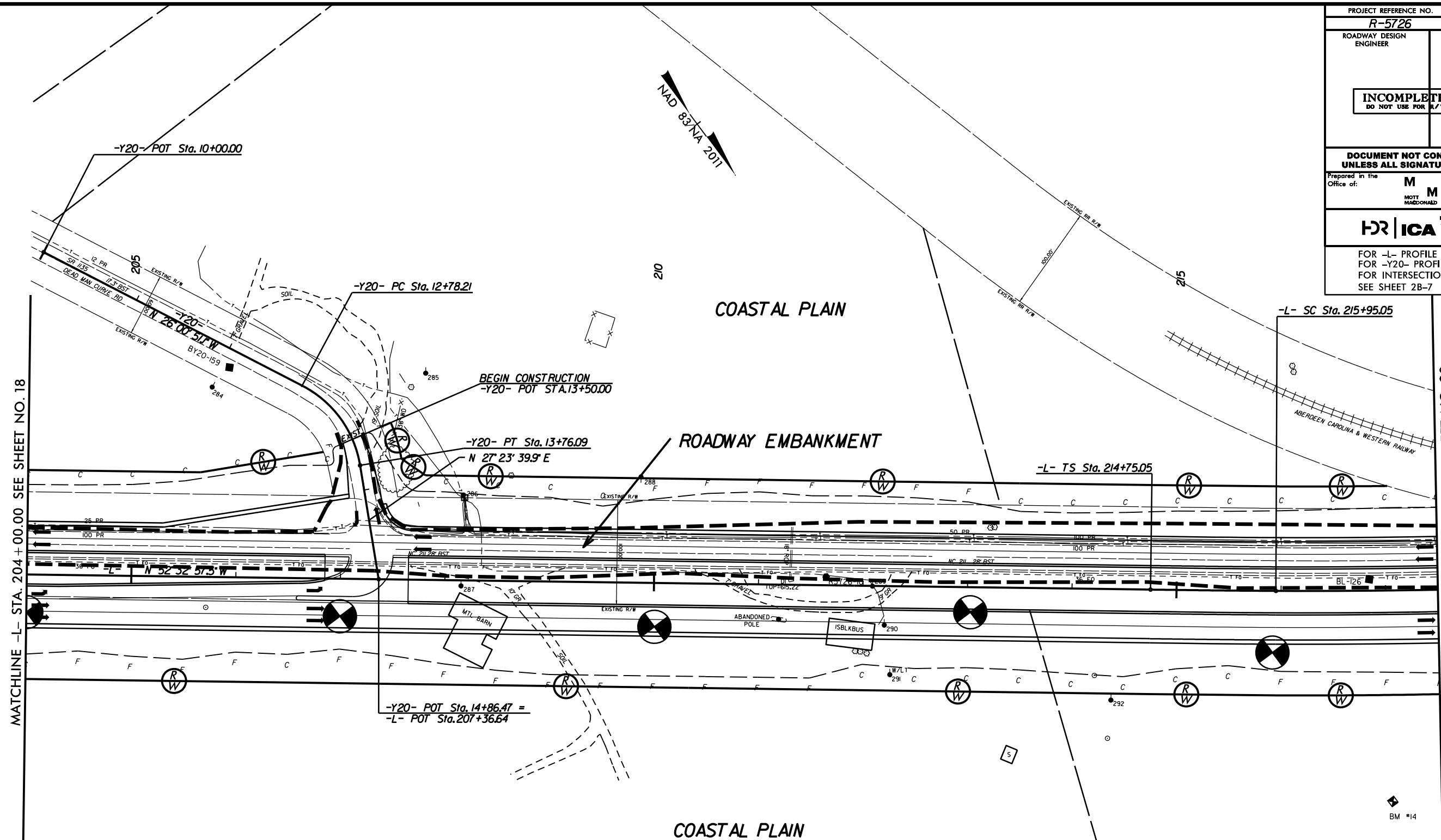


-Y19-
PI Sta 12+80.88
Δ = 13° 38' 35" (LT)
D = 8' 25' 33"
L = 161.92'
T = 81.34'
R = 680.00'

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

8/17/99

PROJECT REFERENCE NO. R-5726	SHEET NO. 19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
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ORICA ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258	
FOR -L- PROFILE SEE SHEET 34 FOR -Y20- PROFILE SEE SHEET 42 FOR INTERSECTION DETAIL SEE SHEET 2B-7	



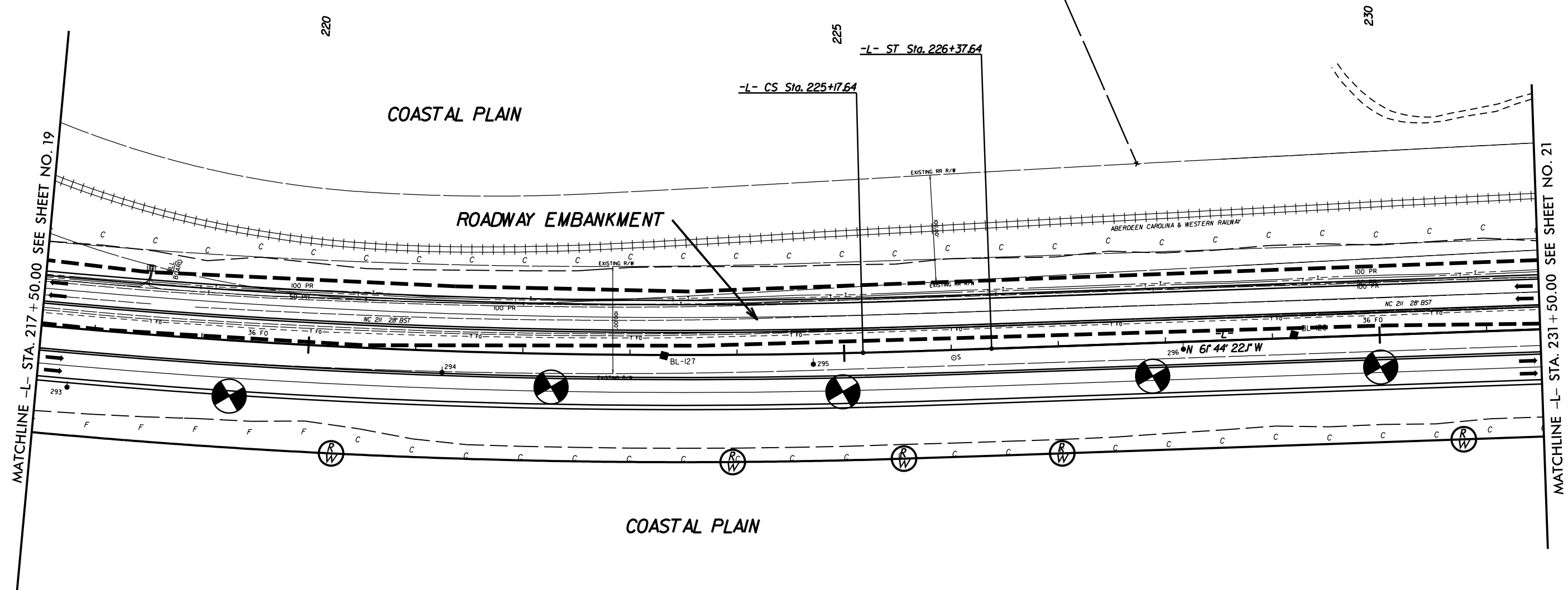
-L-		-Y20-	
PI Sta 215+55.05	PI Sta 220+57.12	PI Sta 13+31.03	
$\theta_s = 0^\circ 31' 44.0''$	$\Delta = 8^\circ 07' 56.7''$ (LT)	$\Delta = 53^\circ 24' 31.0''$ (RT)	
Ls = 120.00'	D = 0' 52' 53.3"	D = 54' 34' 02.7"	
LT = 80.00'	L = 922.59'	L = 97.88'	
ST = 40.00'	T = 462.07'	T = 52.82'	
	R = 6,500.00'	R = 105.00'	
	SE = 0.03		
	RO = 120'		

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

SYSTEMS TIME DESIGN

8/17/99

PROJECT REFERENCE NO. R-5726	SHEET NO. 20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared in the Office of:	M MOTT MACDONALD
	PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com/macticos
FOR ICA	ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258
FOR -L- PROFILE SEE SHEET 35	



-L-

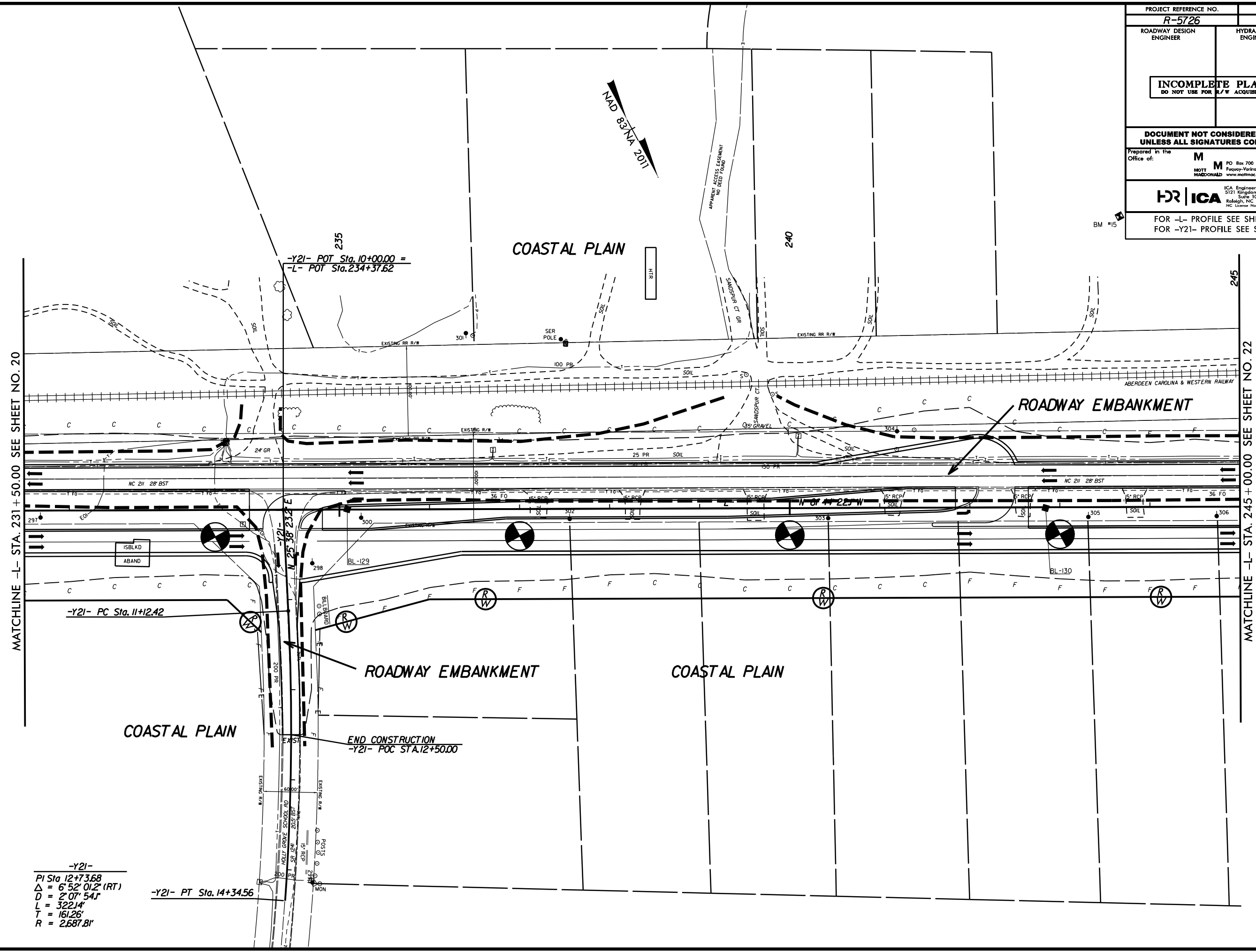
PI Sta 220+57.12	PIs Sta 225+57.64
$\Delta = 8^{\circ} 07' 56.7''$ (LT)	$\Theta_s = 0^{\circ} 31' 44.0''$
$D = 0^{\circ} 52' 53.3''$	$L_s = 120.00'$
$L = 922.59'$	$LT = 80.00'$
$T = 462.07'$	$ST = 40.00'$
$R = 6,500.00'$	
$SE = 0.03$	
$RO = 120'$	

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED ON PLANS.

SYSTEMS TIME DESIGN

8/17/99

PROJECT REFERENCE NO. R-5726	SHEET NO. 21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared in the Office of: M M MOTT MACDONALD PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com/motmac	
DR ICA ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258	
FOR -L- PROFILE SEE SHEET 35 FOR -Y21- PROFILE SEE SHEET 39	



MATCHLINE -L- STA. 231+50.00 SEE SHEET NO. 20

MATCHLINE -L- STA. 245+00.00 SEE SHEET NO. 22

-Y21-
 PI Sta. 12+73.68
 $\Delta = 6^{\circ} 52' 01.2''$ (RT)
 $D = 2^{\circ} 07' 54.1''$
 $L = 322.14'$
 $T = 161.26'$
 $R = 2,687.81'$

-Y21- PT Sta. 14+34.56

END CONSTRUCTION
-Y21- POC STA. 12+50.00

-Y21- PC Sta. 11+12.42

-Y21- POT Sta. 10+00.00 =
-L- POT Sta. 234+37.62

SYSTEMS TIME DESIGN

8/17/99

PROJECT REFERENCE NO. R-5726		SHEET NO. 22	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
Prepared in the Office of:			
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		PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com/mrctos	
OR ICA			
FOR -L- PROFILE SEE SHEET 38			

-L-

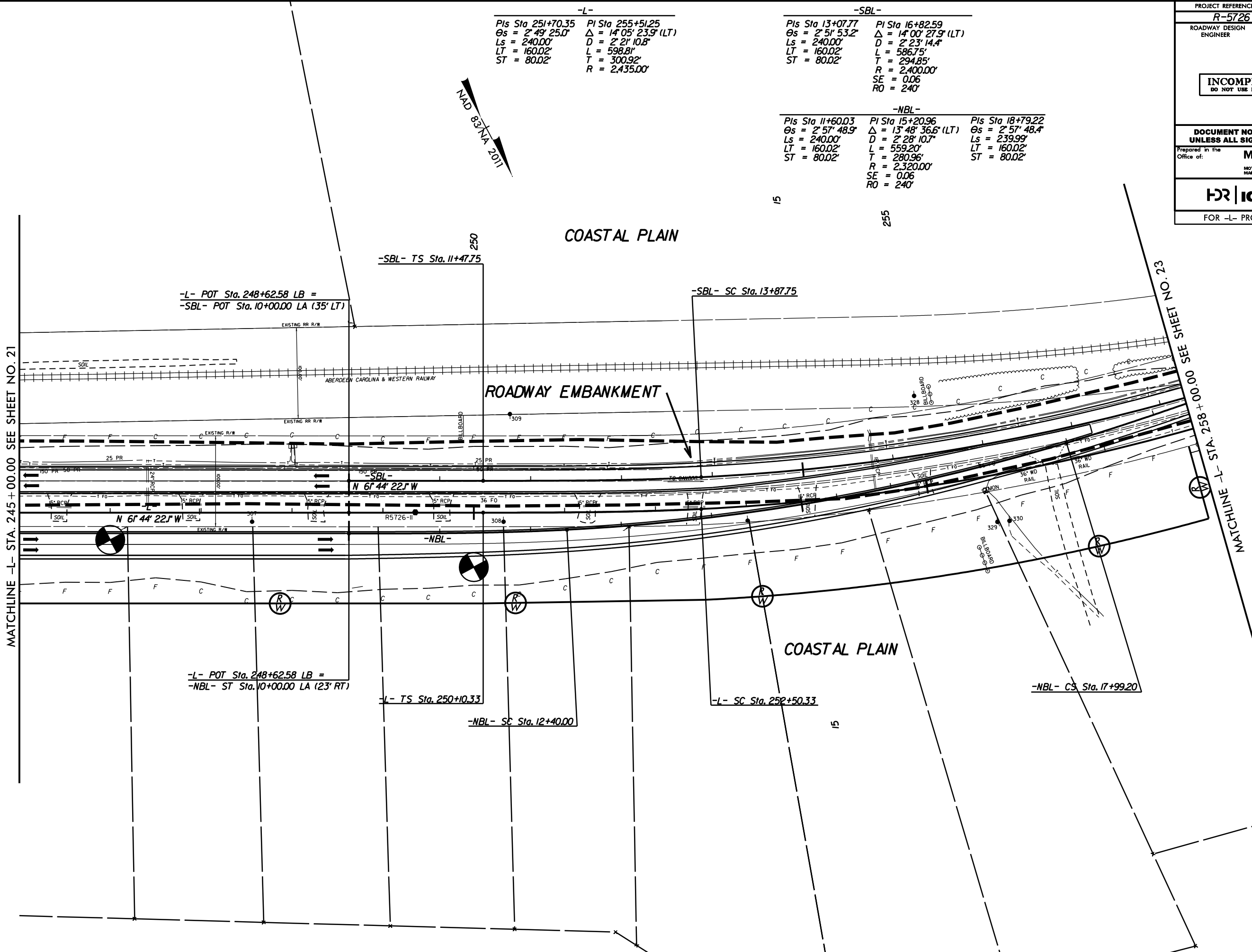
PIs Sta 251+70.35	PI Sta 255+51.25
$\theta_s = 2^\circ 49' 25.0"$	$\Delta = 14^\circ 05' 23.9"$ (LT)
LS = 240.00'	D = 2' 21' 10.8"
LT = 160.02'	L = 598.81'
ST = 80.02'	T = 300.92'
	R = 2,435.00'

-SBL-

PIs Sta 13+07.77	PI Sta 16+82.59
$\theta_s = 2^\circ 51' 53.2"$	$\Delta = 14^\circ 00' 27.9"$ (LT)
LS = 240.00'	D = 2' 23' 14.4"
LT = 160.02'	L = 586.75'
ST = 80.02'	T = 294.85'
	R = 2,400.00'
	SE = 0.06
	RO = 240'

-NBL-

PIs Sta 11+60.03	PI Sta 15+20.96	PIs Sta 18+79.22
$\theta_s = 2^\circ 57' 48.9"$	$\Delta = 13^\circ 48' 36.6"$ (LT)	$\theta_s = 2^\circ 57' 48.4"$
LS = 240.00'	D = 2' 28' 10.7"	LS = 239.99'
LT = 160.02'	L = 559.20'	LT = 160.02'
ST = 80.02'	T = 280.96'	ST = 80.02'
	R = 2,320.00'	
	SE = 0.06	
	RO = 240'	



\$\$\$\$SYTIME\$\$\$\$
\$\$\$\$PLANNING\$\$\$\$
\$\$\$\$DESIGN\$\$\$\$
\$\$\$\$CONSTRUCTION\$\$\$\$
\$\$\$\$OPERATION\$\$\$\$

8/17/99

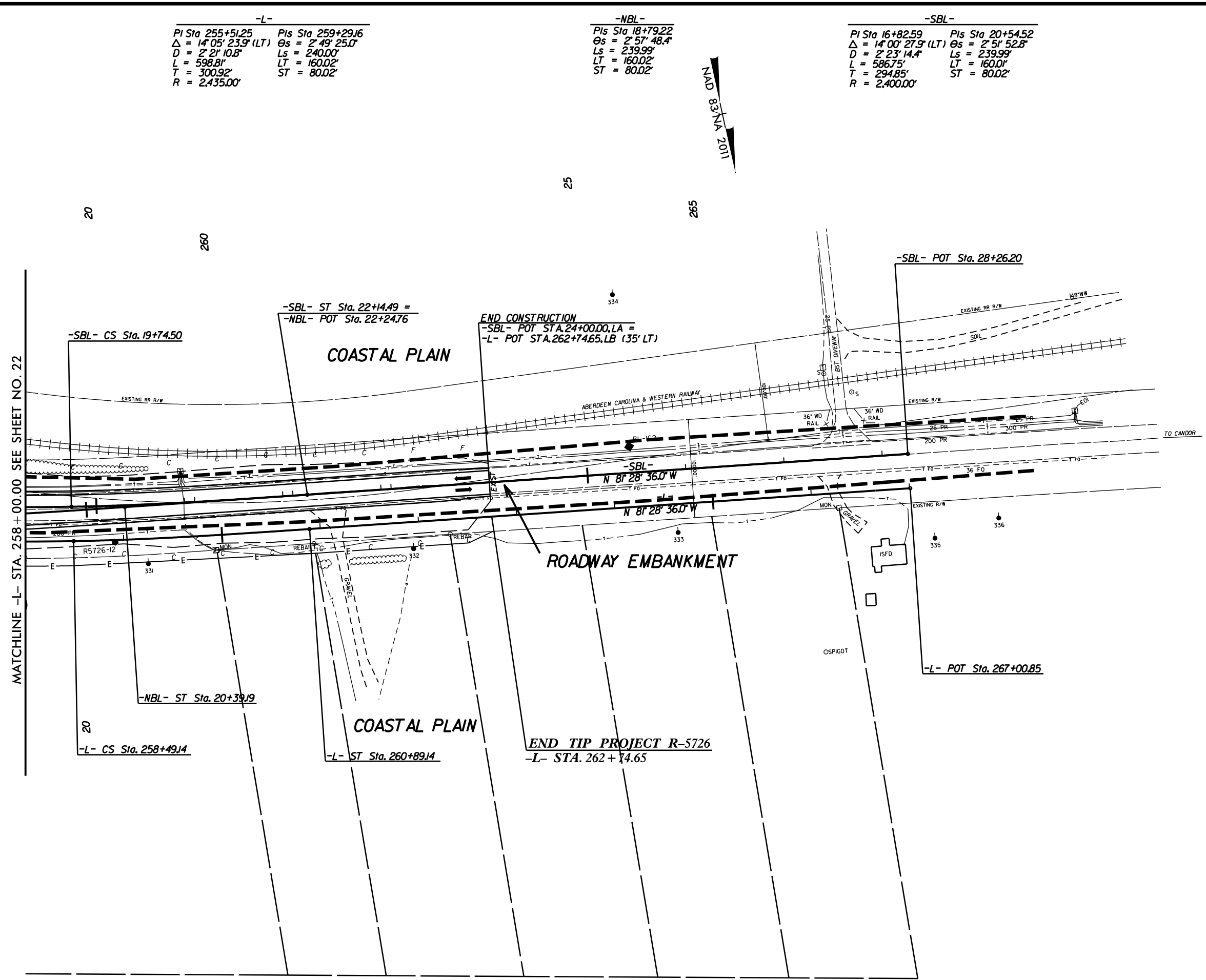
-L-
 PI Sta 255+51.25 PI Sta 259+29.16
 $\Delta = 14^{\circ}05'23.9"$ (LT) $\Theta_s = 2^{\circ}49'25.0"$
 $D = 2^{\circ}21'10.8"$ $L_s = 240.00'$
 $L = 598.81'$ $LT = 160.02'$
 $T = 300.92'$ $ST = 80.02'$
 $R = 2,435.00'$

-NBL-
 PI Sta 18+79.22
 $\Theta_s = 2^{\circ}57'48.4"$
 $L_s = 239.99'$
 $LT = 160.02'$
 $ST = 80.02'$

-SBL-
 PI Sta 16+82.59 PI Sta 20+54.52
 $\Delta = 14^{\circ}00'27.9"$ (LT) $\Theta_s = 2^{\circ}51'52.8"$
 $D = 2^{\circ}23'14.4"$ $L_s = 239.99'$
 $L = 586.75'$ $LT = 160.01'$
 $T = 294.85'$ $ST = 80.02'$
 $R = 2,400.00'$



PROJECT REFERENCE NO. R-5726	SHEET NO. 23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared in the Office of:	M MOTT MACDONALD
	PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com/america
OR ICA	ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258
FOR -L- PROFILE SEE SHEET 36	



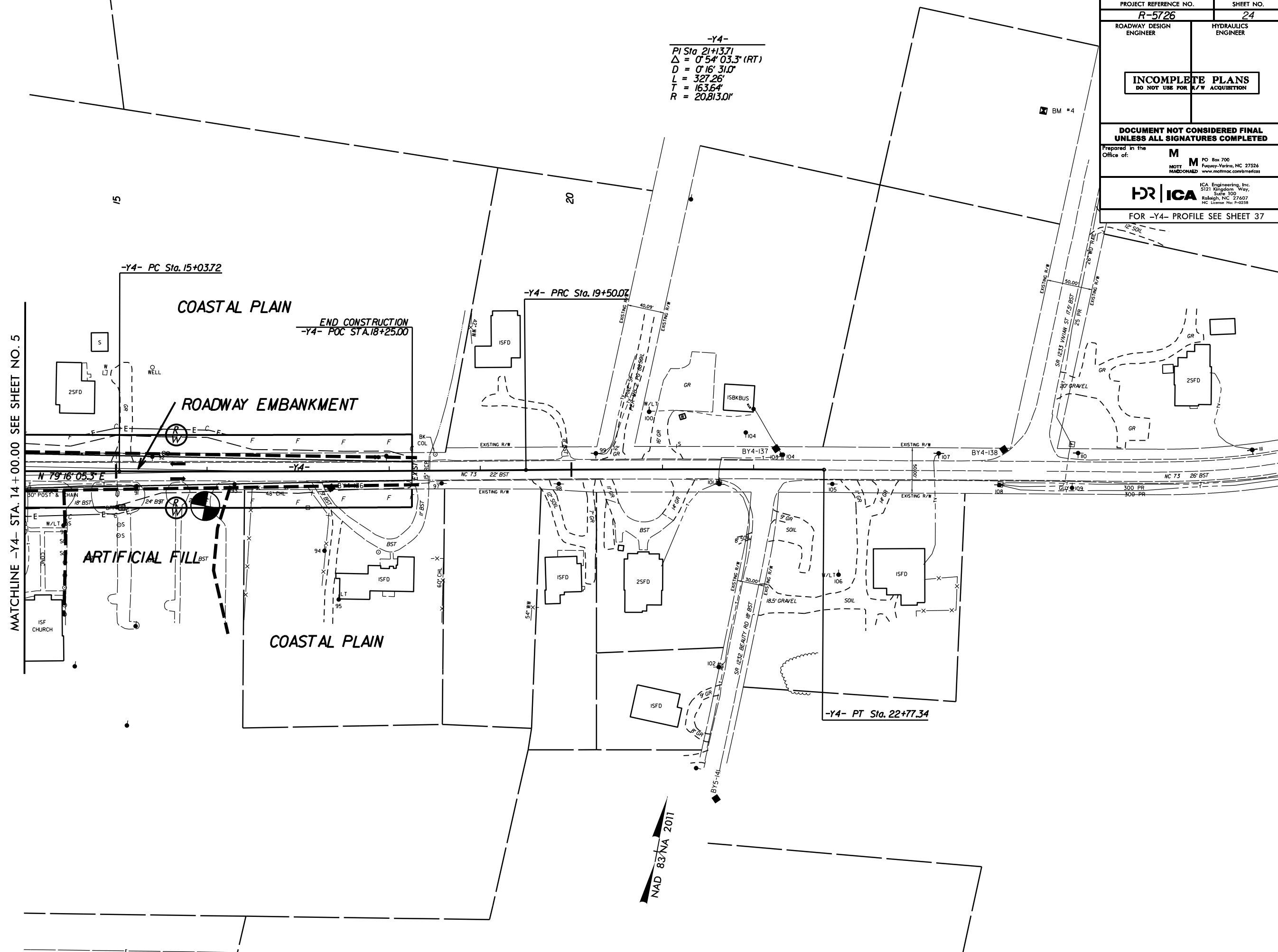
MATCHLINE -L- STA. 258 + 00.00 SEE SHEET NO. 22

SYSTEMS TIME \$\$\$\$\$\$
L/02 02/02/00
\$\$\$\$\$

8/17/99

PROJECT REFERENCE NO.		SHEET NO.	
R-5726		24	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER		
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
Prepared in the Office of:			
M MOTT MACDONALD		PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com/mertcos	
ICA		ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258	
FOR -Y4- PROFILE SEE SHEET 37			

-Y4-
PI Sta 21+13.71
 $\Delta = 0' 54' 03.3" (RT)$
D = 0' 16' 31.0"
L = 327.26'
T = 163.64'
R = 20,813.01'



MATCHLINE -Y4- STA. 14 + 00.00 SEE SHEET NO. 5

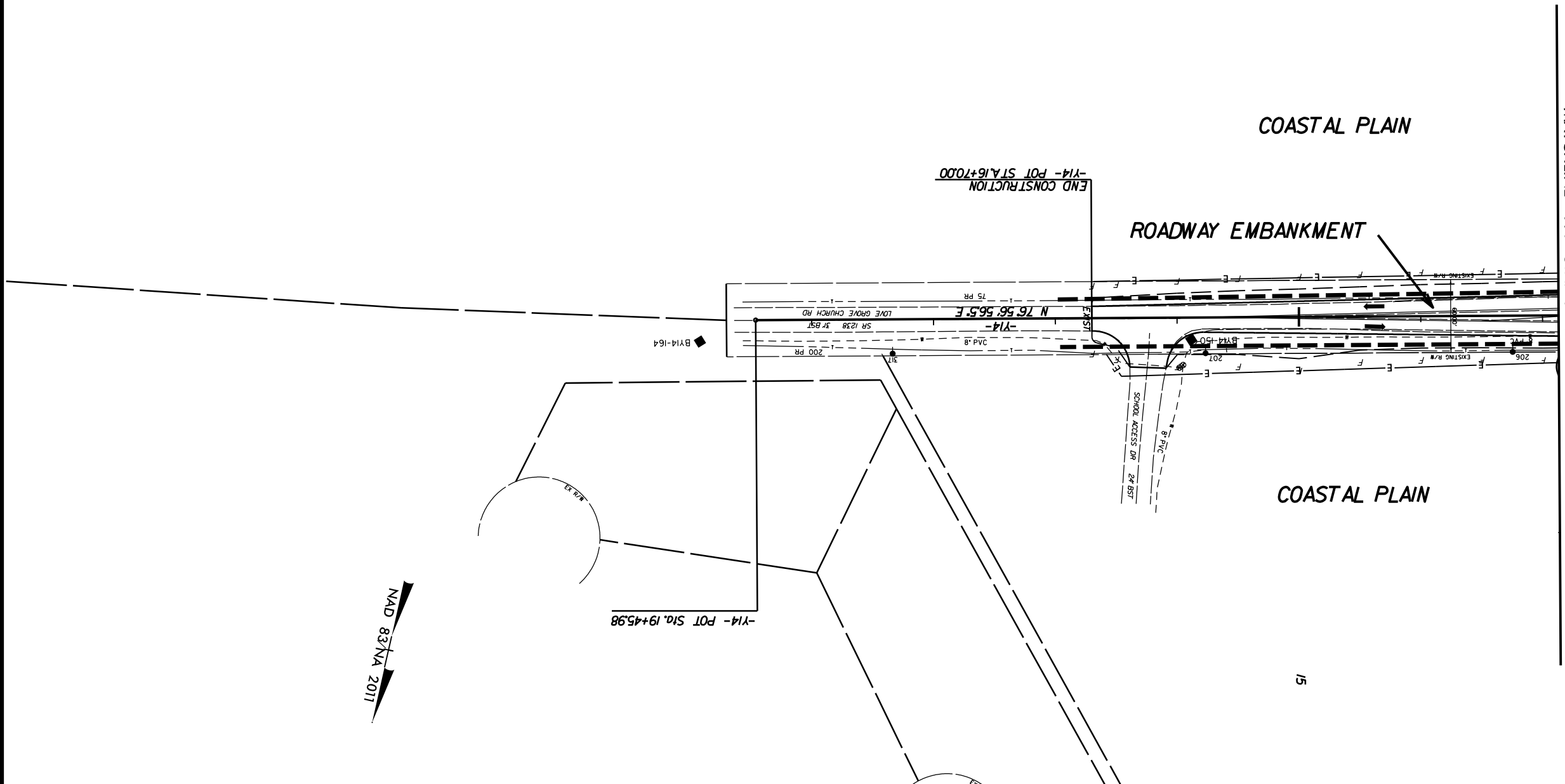
NAD 83 NA 2011

SYTIME

PROJECT REFERENCE NO. <i>R-5726</i>	SHEET NO. <i>25</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
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FOR ICA ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258	
FOR -Y14- PROFILE SEE SHEET 37	

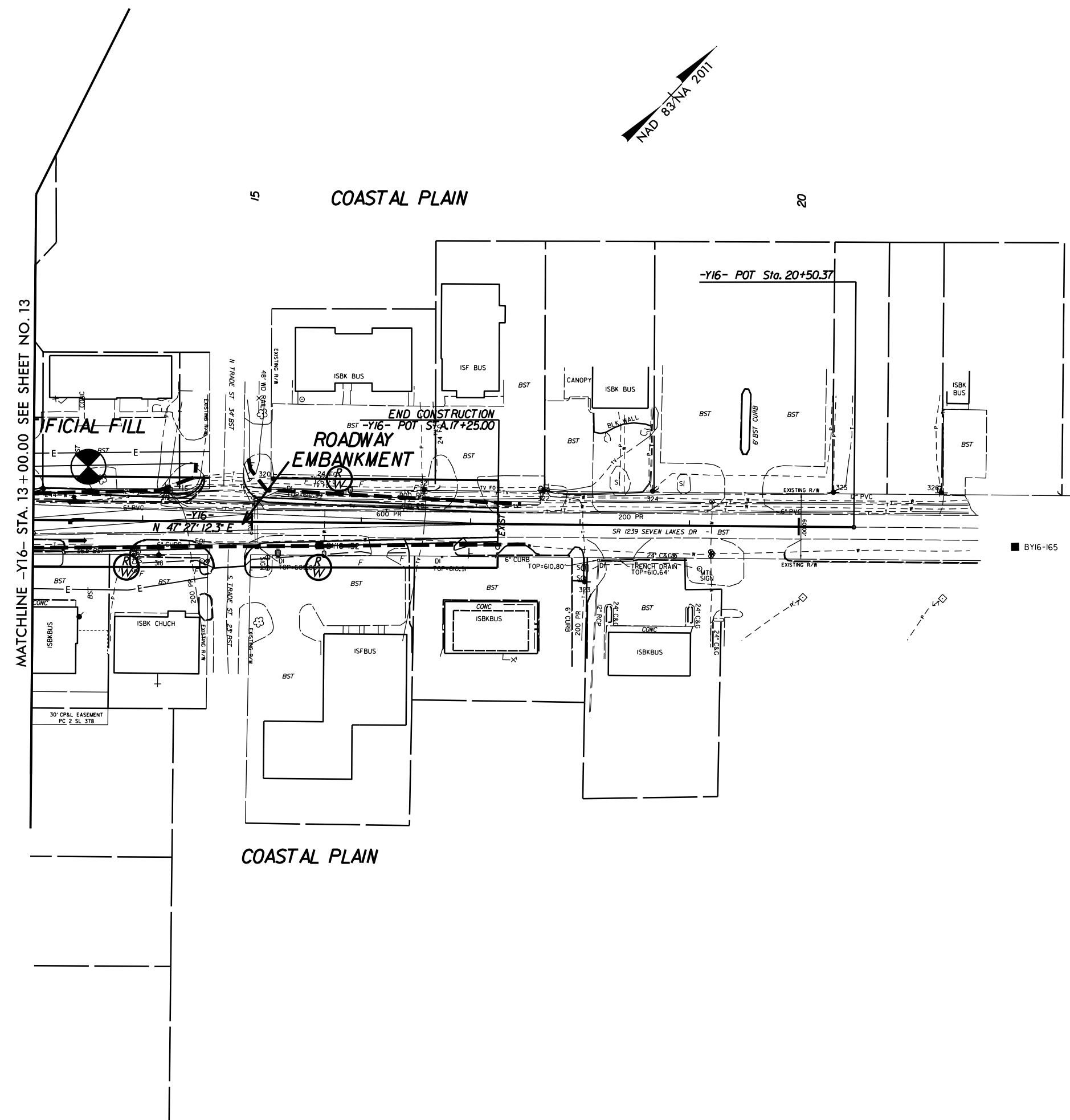
8/17/99

\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$DRAWING\$\$\$\$\$



8/17/99

PROJECT REFERENCE NO. R-5726	SHEET NO. 26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared in the Office of: MOTT MACDONALD	PO Box 700 Fuquay-Varina, NC 27526 www.mottmac.com/mrctos
FOR ICA	ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No. F-0258
FOR -Y16- PROFILE SEE SHEET 38	



\$\$\$\$\$ SYSTEMS TIME\$\$\$\$\$
\$\$\$\$\$ LAYOUT\$\$\$\$\$
\$\$\$\$\$ CHECK\$\$\$\$\$
\$\$\$\$\$ PRINT\$\$\$\$\$

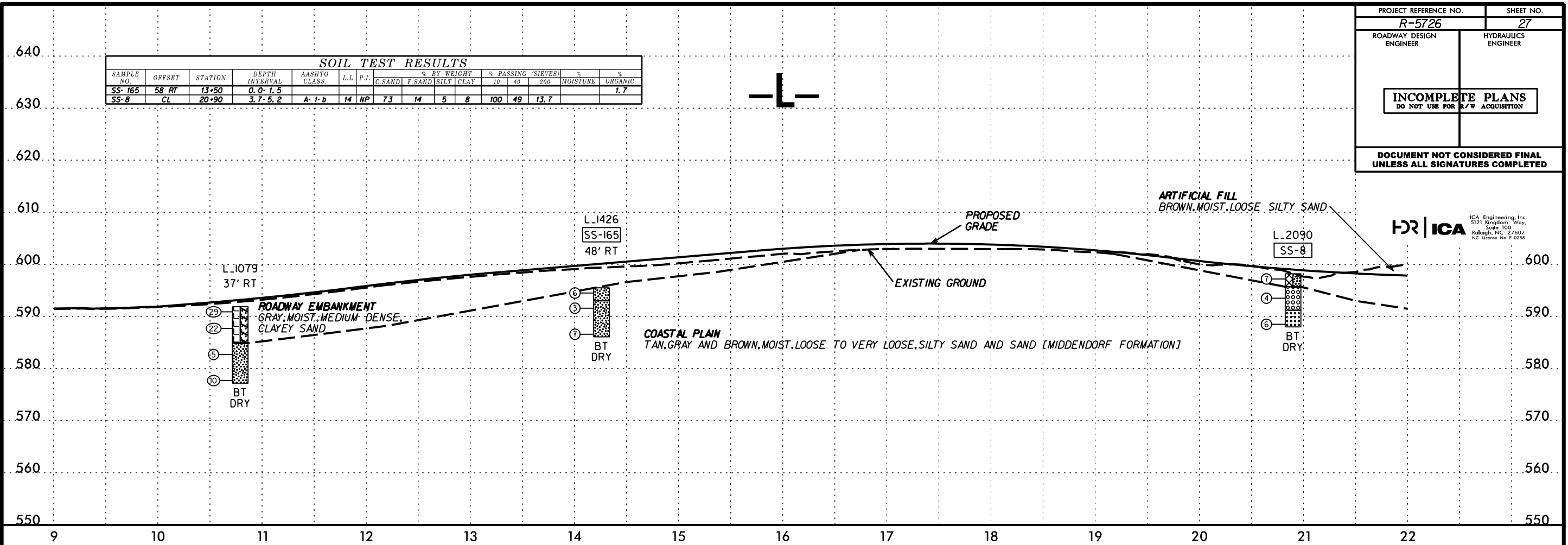
5/14/99

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

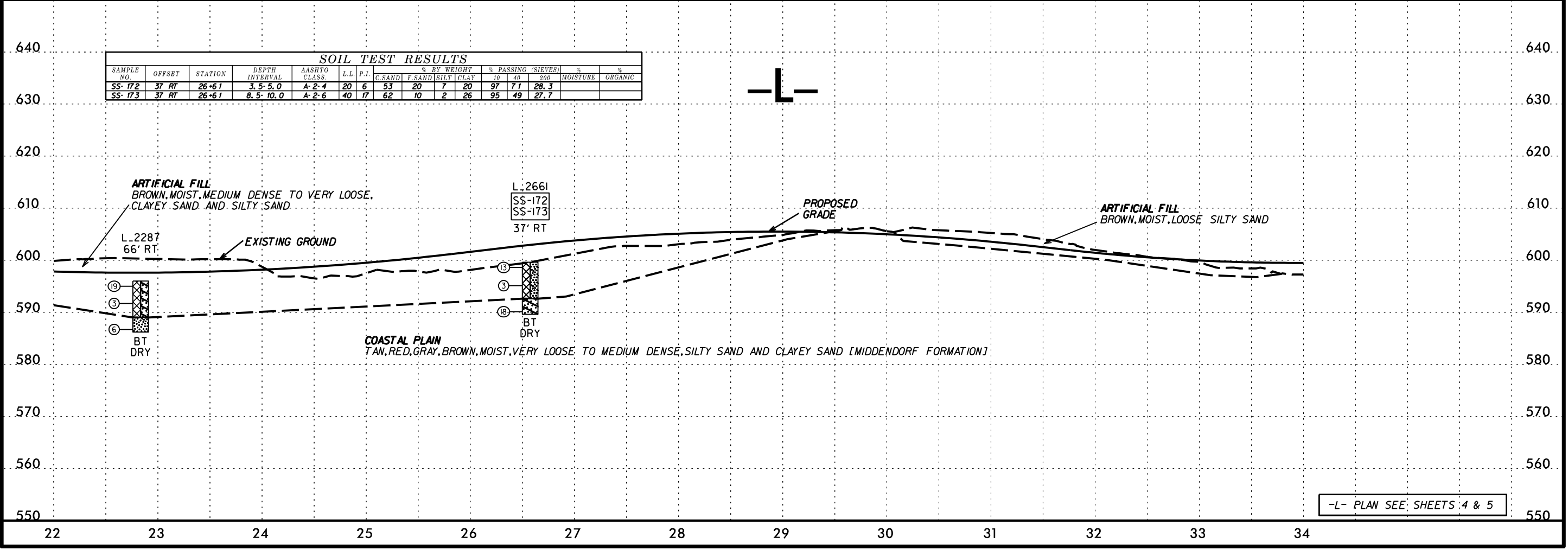
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)		%	%
							C SAND	F SAND	SILT	CLAY	10	40		
SS-165	58 RT	13+50	0.0-1.5	A-1-b	14	NP	73	14	5	8	100	49	13.7	1.7
SS-8	CL	20+90	3.7-5.2	A-1-b										



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)		%	%
							C SAND	F SAND	SILT	CLAY	10	40		
SS-172	37 RT	26+61	3.5-5.0	A-2-4	20	6	53	20	7	20	97	71	28.3	
SS-173	37 RT	26+61	8.5-10.0	A-2-6	40	17	62	10	2	26	95	49	27.7	

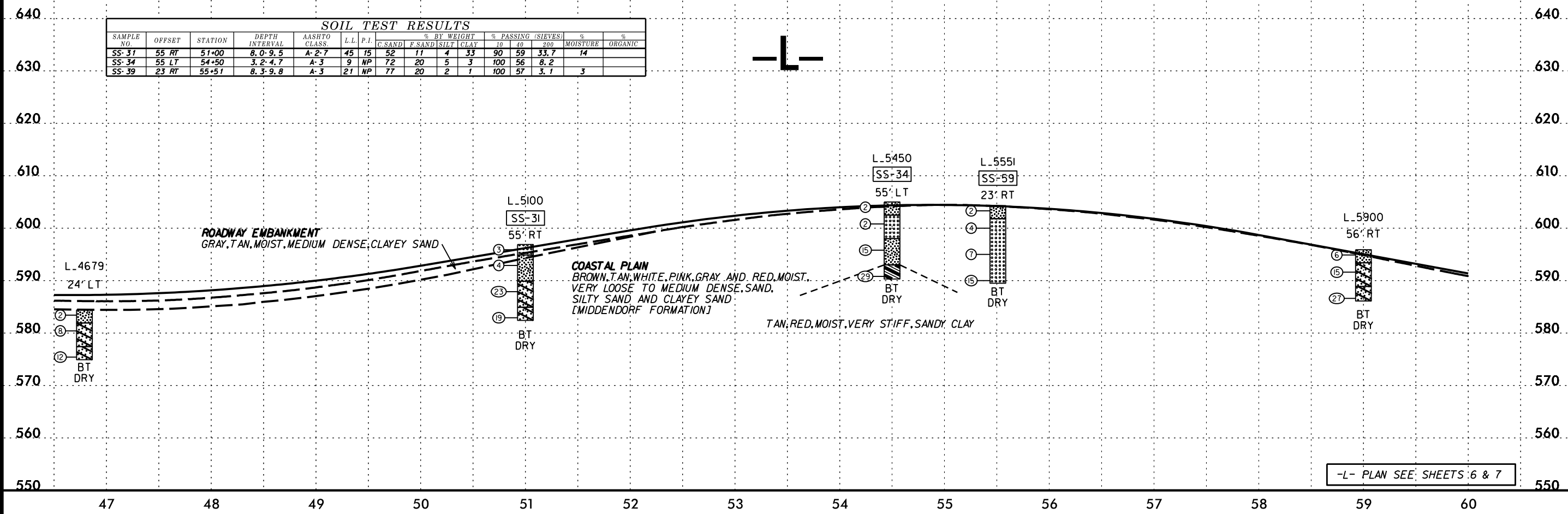
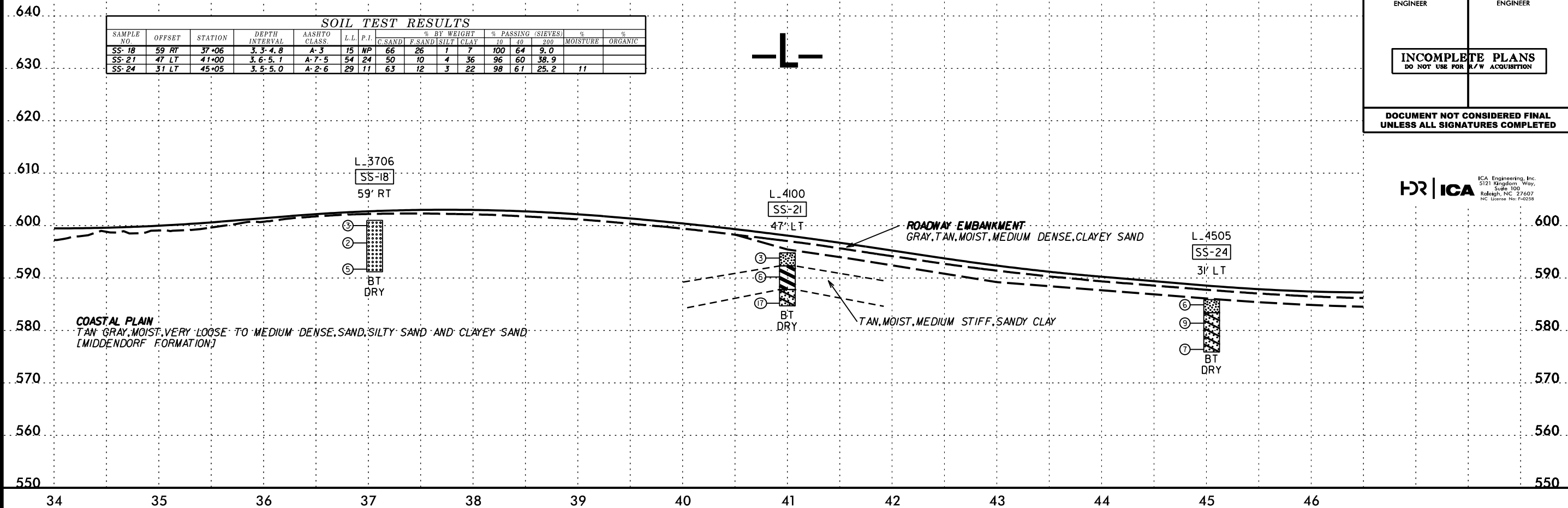


-L- PLAN SEE SHEETS 4 & 5

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PROJECT REFERENCE NO. R-5726		SHEET NO. 28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION		
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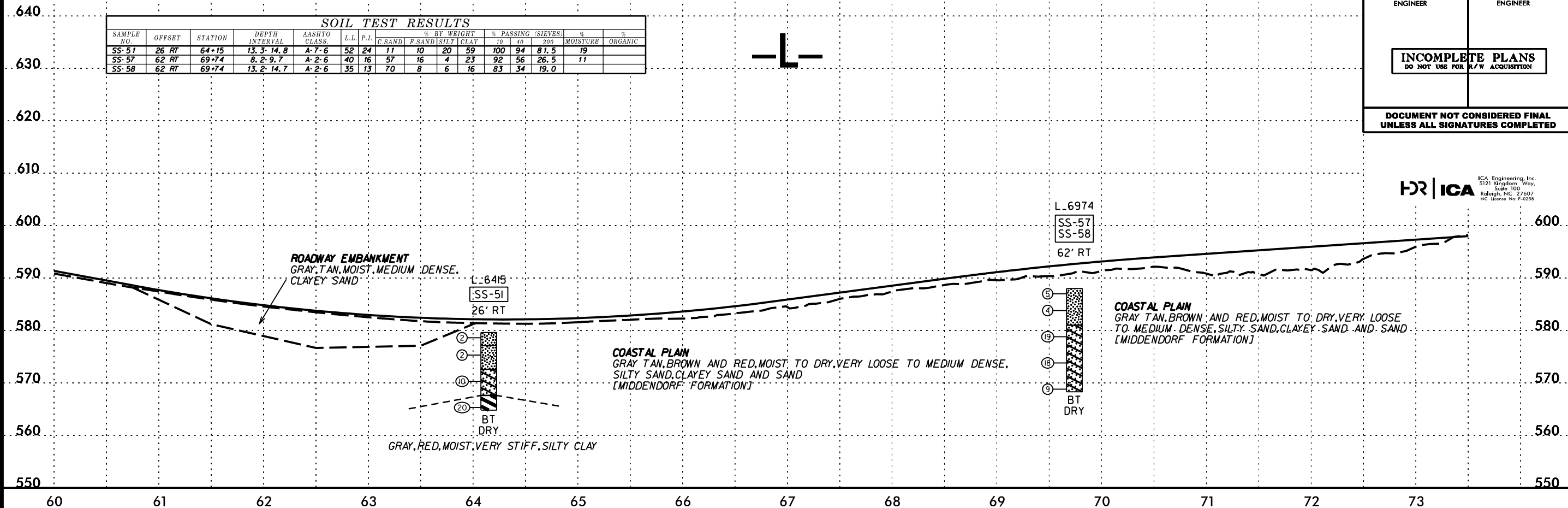
-L- PLAN SEE SHEETS 6 & 7

*****SYTIME*****
*****CDGN*****

5/14/99

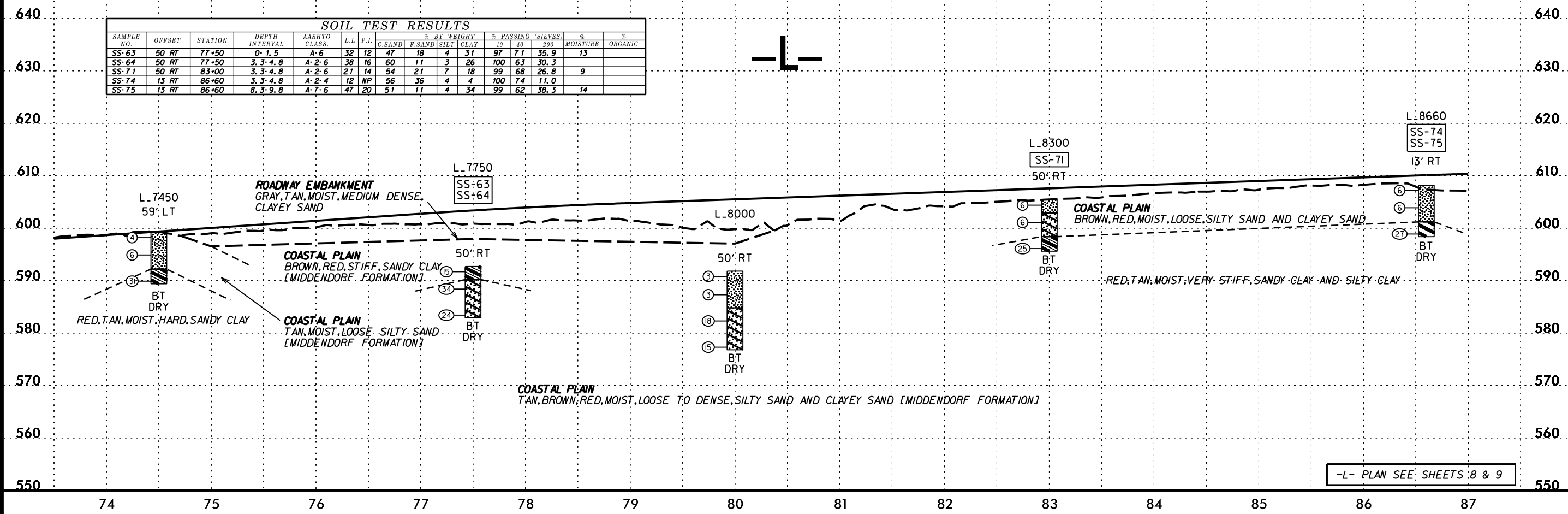
PROJECT REFERENCE NO. R-5726		SHEET NO. 29	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

SOIL TEST RESULTS														
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)		% MOISTURE	% ORGANIC
							C SAND	F SAND	SILT	CLAY	10	40		
SS-51	26 RT	64+15	13.3-14.8	A-7-6	52	24	11	10	20	59	100	94	81.5	19
SS-57	62 RT	69+74	8.2-9.7	A-2-6	40	16	57	16	4	23	92	56	26.5	11
SS-58	62 RT	69+74	13.2-14.7	A-2-6	35	13	70	8	6	16	83	34	19.0	



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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		
SS-63	50 RT	77+50	0-1.5	A-6	32	12	47	18	4	31	97	71	35.9	13
SS-64	50 RT	77+50	3.3-4.8	A-2-6	38	16	60	11	3	26	100	63	30.3	
SS-71	50 RT	83+00	3.3-4.8	A-2-6	21	14	54	21	7	18	99	68	26.8	9
SS-74	13 RT	86+60	3.3-4.8	A-2-4	12	NP	56	36	4	4	100	74	11.0	
SS-75	13 RT	86+60	8.3-9.8	A-7-6	47	20	51	11	4	34	99	62	38.3	14



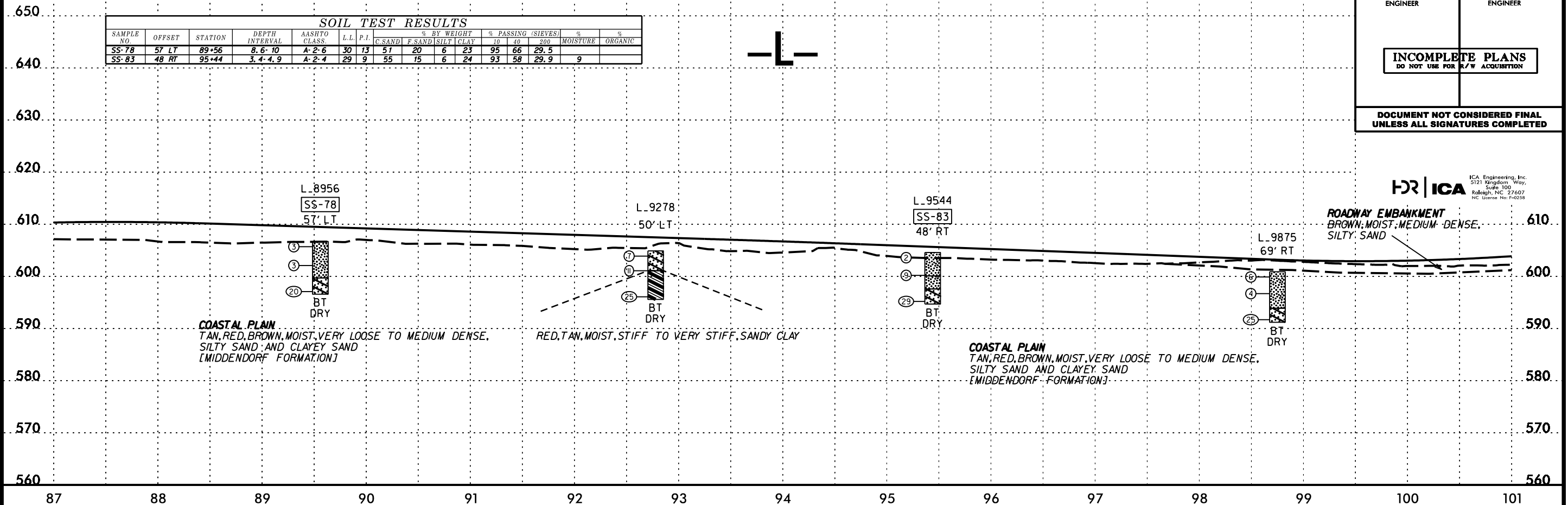
-L- PLAN SEE SHEETS 8 & 9

*****SYTIME*****
*****DGN*****
*****PRN*****

5/14/99

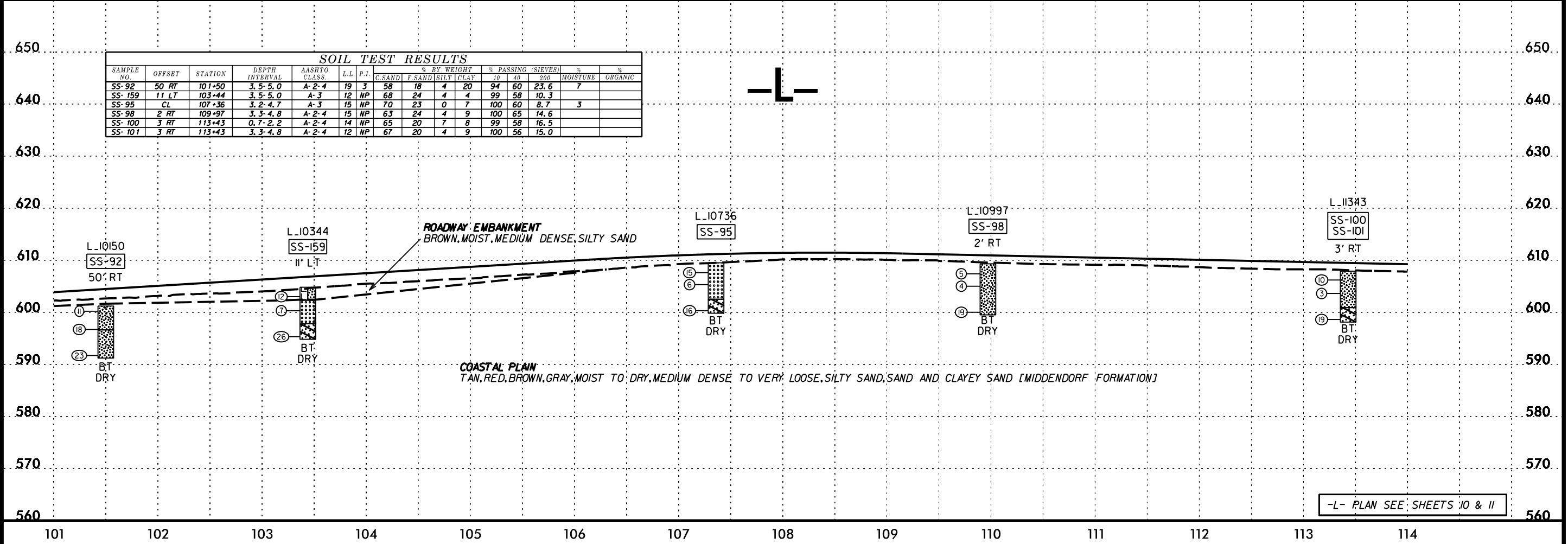
PROJECT REFERENCE NO. R-5726	SHEET NO. 30
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C SAND	F SAND	SILT	CLAY	10	40	200		
SS-78	57 LT	89+56	8.6-10	A-2-6	30	13	51	20	6	23	95	66	29.5		
SS-83	48 RT	95+44	3.4-4.9	A-2-4	29	9	55	15	6	24	93	58	29.9	9	



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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C SAND	F SAND	SILT	CLAY	10	40	200		
SS-92	50 RT	101+50	3.5-5.0	A-2-4	19	3	58	18	4	20	94	60	23.6	7	
SS-159	11 LT	103+44	3.5-5.0	A-3	12	NP	68	24	4	4	99	58	10.3		
SS-95	CL	107+36	3.2-4.7	A-3	15	NP	70	23	0	7	100	60	8.7	3	
SS-98	2 RT	109+97	3.3-4.8	A-2-4	15	NP	63	24	4	9	100	65	14.6		
SS-100	3 RT	113+43	0.7-2.2	A-2-4	14	NP	65	20	7	8	99	58	16.5		
SS-101	3 RT	113+43	3.3-4.8	A-2-4	12	NP	67	20	4	9	100	56	15.0		



-L- PLAN SEE SHEETS 10 & 11

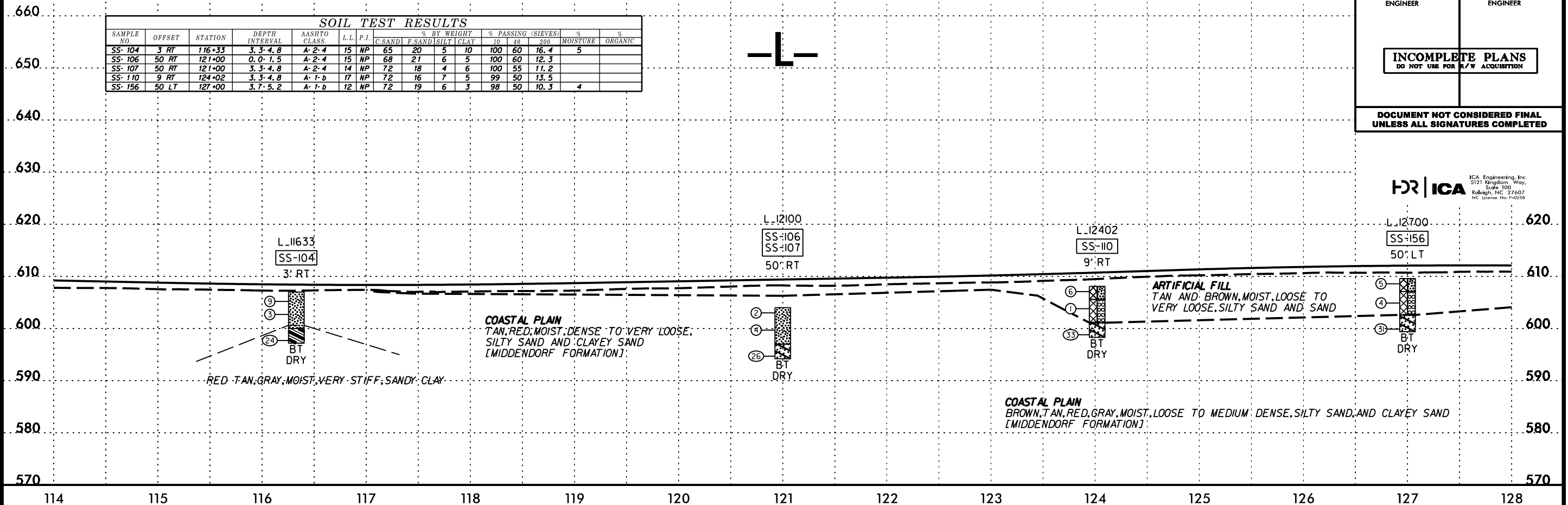
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*****CDGN*****

5/14/99

PROJECT REFERENCE NO. R-5726	SHEET NO. 31
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

SOIL TEST RESULTS

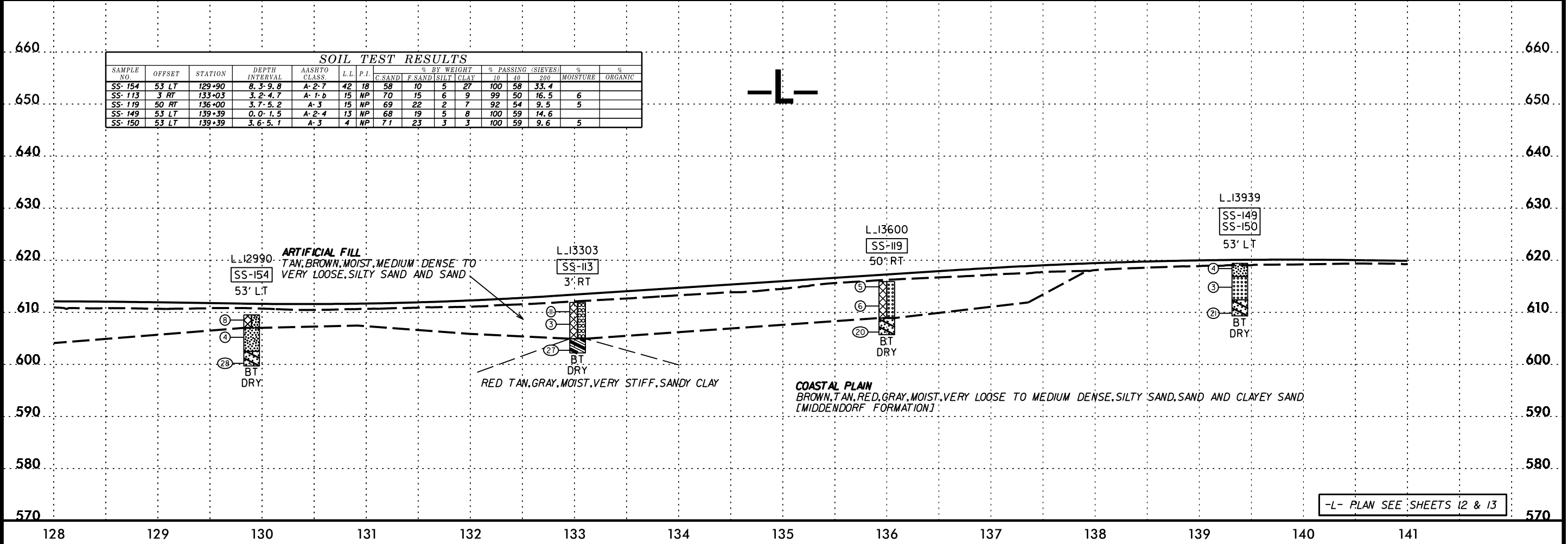
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)		% MOISTURE	% ORGANIC
							C SAND	F SAND	SILT	CLAY	10	40		
SS-104	3 RT	116+33	3.3-4.8	A-2-4	15	NP	65	20	5	10	100	60	16.4	5
SS-106	50 RT	121+00	0.0-1.5	A-2-4	15	NP	68	21	6	5	100	60	12.3	
SS-107	50 RT	121+00	3.3-4.8	A-2-4	14	NP	72	18	4	6	100	55	11.2	
SS-110	9 RT	124+02	3.3-4.8	A-1-b	17	NP	72	16	7	5	99	50	13.5	
SS-156	50 LT	127+00	3.7-5.2	A-1-b	12	NP	72	19	6	3	98	50	10.3	4



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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		
SS-154	53 LT	129+90	8.3-9.8	A-2-7	42	18	58	10	5	27	100	58	33.4	
SS-113	3 RT	133+03	3.2-4.7	A-1-b	15	NP	70	15	6	9	99	50	16.5	6
SS-119	50 RT	136+00	3.7-5.2	A-3	15	NP	69	22	2	7	92	54	9.5	5
SS-149	53 LT	139+39	0.0-1.5	A-2-4	13	NP	68	19	5	8	100	59	14.6	
SS-150	53 LT	139+39	3.6-5.1	A-3	4	NP	71	23	3	3	100	59	9.6	5



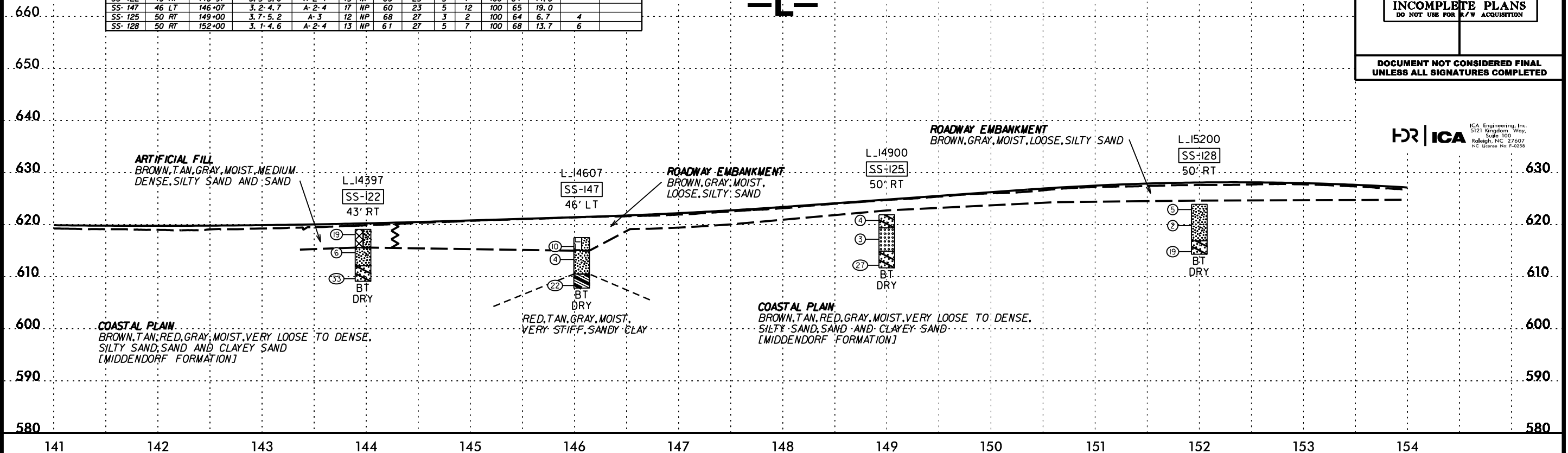
-L- PLAN SEE SHEETS 12 & 13

*****SYTIME*****
*****DGN*****

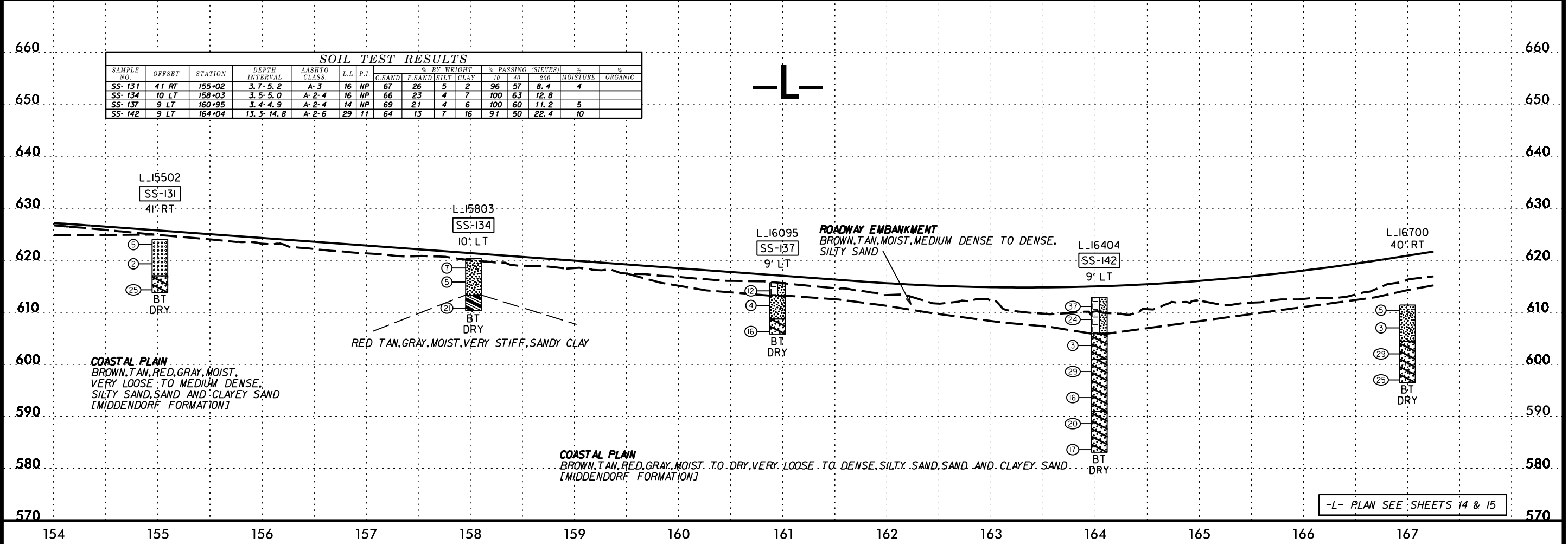
5/14/99

PROJECT REFERENCE NO. R-5726	SHEET NO. 32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
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				% PASSING (SIEVES)		% MOISTURE	% ORGANIC
							C SAND	F SAND	SILT	CLAY	10	40		
SS-122	43 RT	143+97	3.5-5.0	A-2-4	15	NP	63	25	5	7	100	61	14.8	
SS-147	46 LT	146+07	3.2-4.7	A-2-4	17	NP	60	23	5	12	100	65	19.0	
SS-125	50 RT	149+00	3.7-5.2	A-3	12	NP	68	27	3	2	100	64	6.7	4
SS-128	50 RT	152+00	3.1-4.6	A-2-4	13	NP	61	27	5	7	100	68	13.7	6



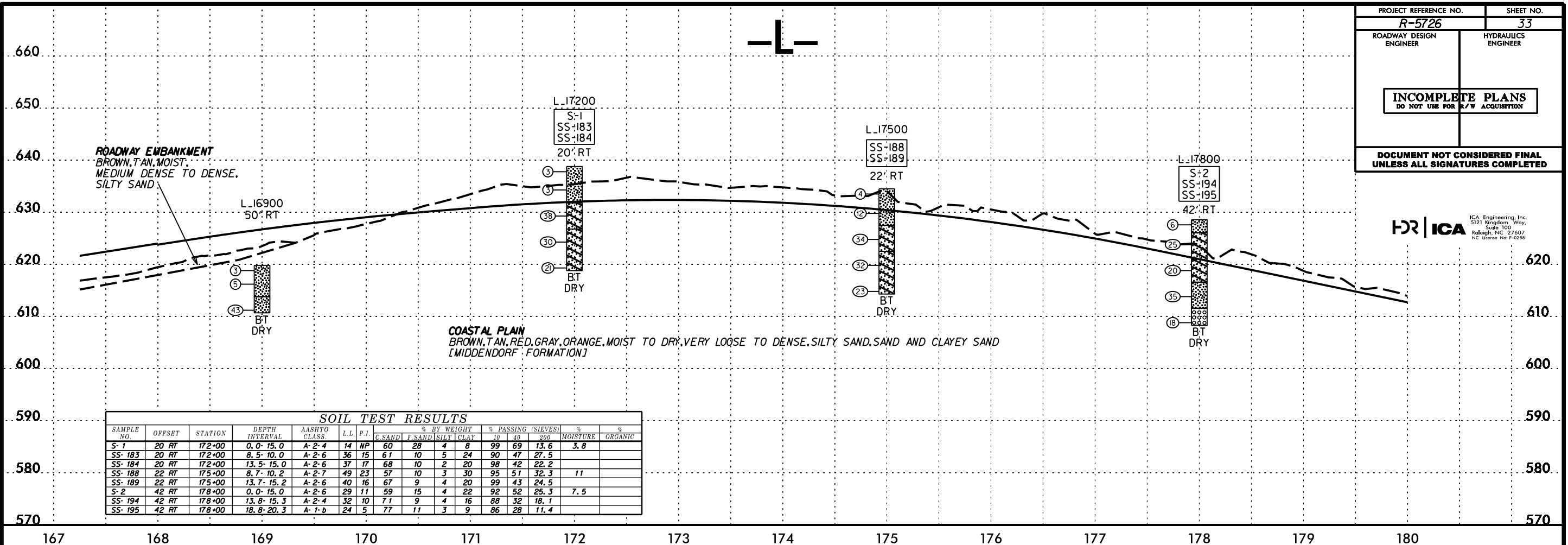
SOIL TEST RESULTS														
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)		% MOISTURE	% ORGANIC
							C SAND	F SAND	SILT	CLAY	10	40		
SS-131	41 RT	155+02	3.7-5.2	A-3	16	NP	67	26	5	2	96	57	8.4	4
SS-134	10 LT	158+03	3.5-5.0	A-2-4	16	NP	66	23	4	7	100	63	12.8	
SS-137	9 LT	160+95	3.4-4.9	A-2-4	14	NP	69	21	4	6	100	60	11.2	5
SS-142	9 LT	164+04	13.3-14.8	A-2-6	29	11	64	13	7	16	91	50	22.4	10



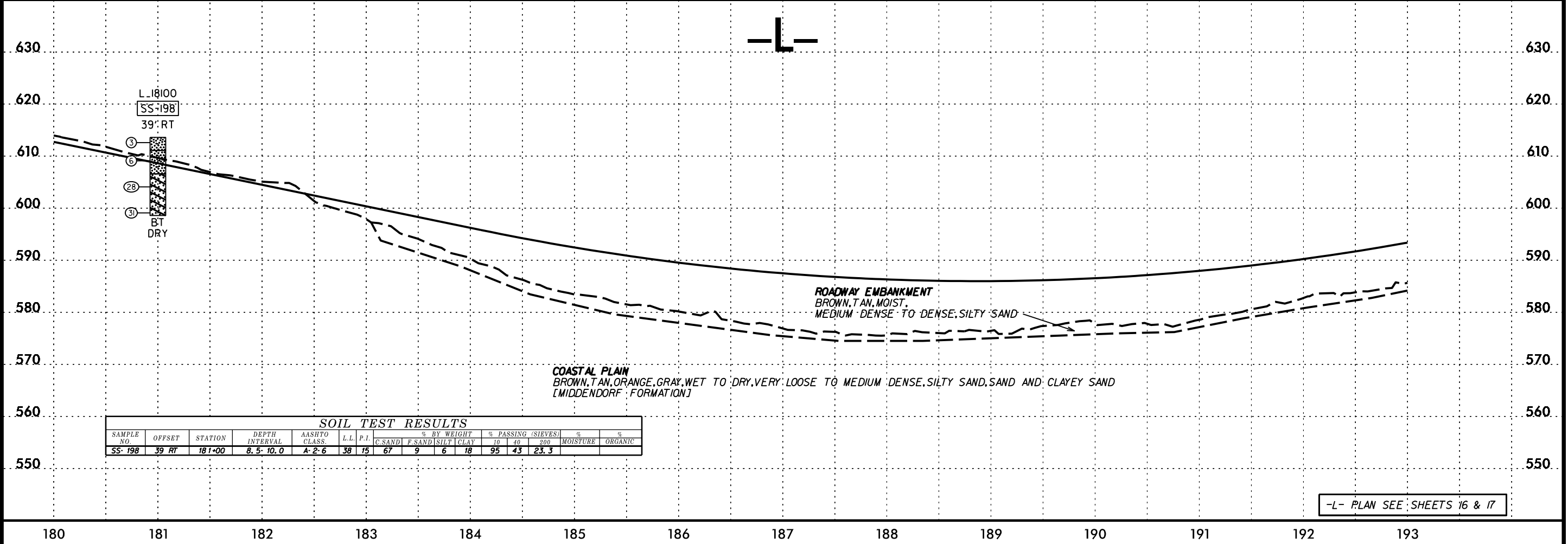
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5/14/99

PROJECT REFERENCE NO. R-5726	SHEET NO. 33
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
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				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-1	20 RT	172+00	0.0-15.0	A-2-4	14	NP	60	28	4	8	99	69	13.6	3.8	
SS-183	20 RT	172+00	8.5-10.0	A-2-6	36	15	61	10	5	24	90	47	27.5		
SS-184	20 RT	172+00	13.5-15.0	A-2-6	37	17	68	10	2	20	98	42	22.2		
SS-188	22 RT	175+00	8.7-10.2	A-2-7	49	23	57	10	3	30	95	51	32.3	11	
SS-189	22 RT	175+00	13.7-15.2	A-2-6	40	16	67	9	4	20	99	43	24.5		
S-2	42 RT	178+00	0.0-15.0	A-2-6	29	11	59	15	4	22	92	52	25.3	7.5	
SS-194	42 RT	178+00	13.8-15.3	A-2-4	32	10	71	9	4	16	88	32	18.1		
SS-195	42 RT	178+00	18.8-20.3	A-1-b	24	5	77	11	3	9	86	28	11.4		



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		
SS-198	39 RT	181+00	8.5-10.0	A-2-6	38	15	67	9	6	18	95	43	23.3		

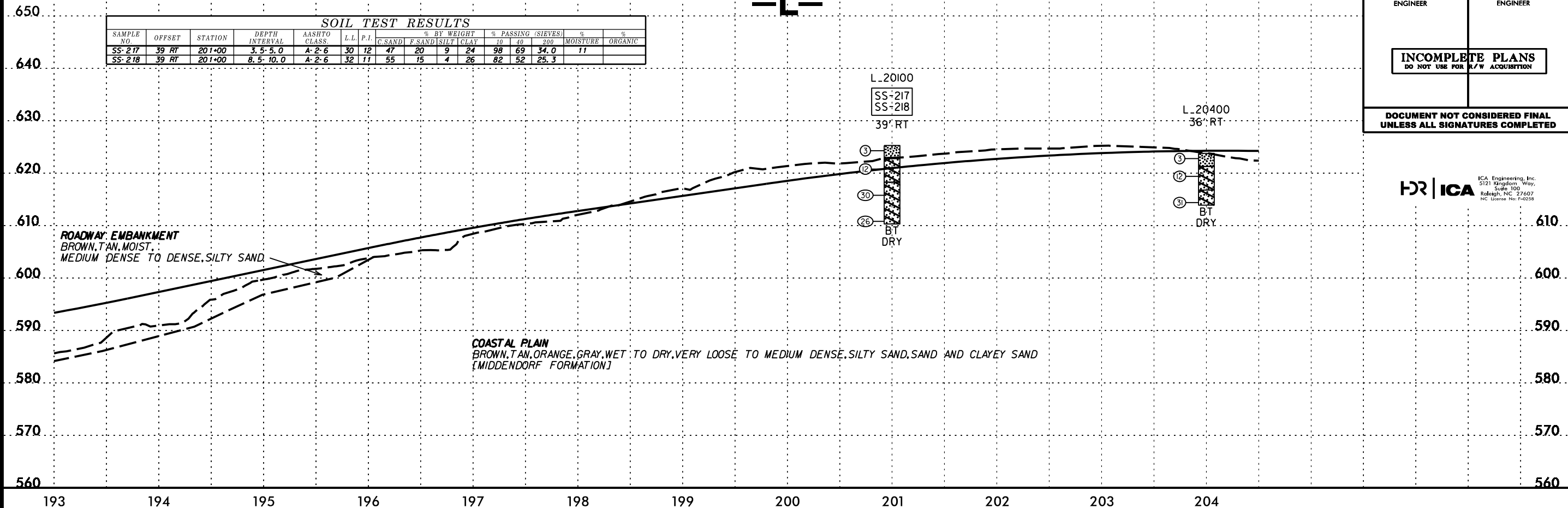
-L- PLAN SEE SHEETS 16 & 17

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5/14/99

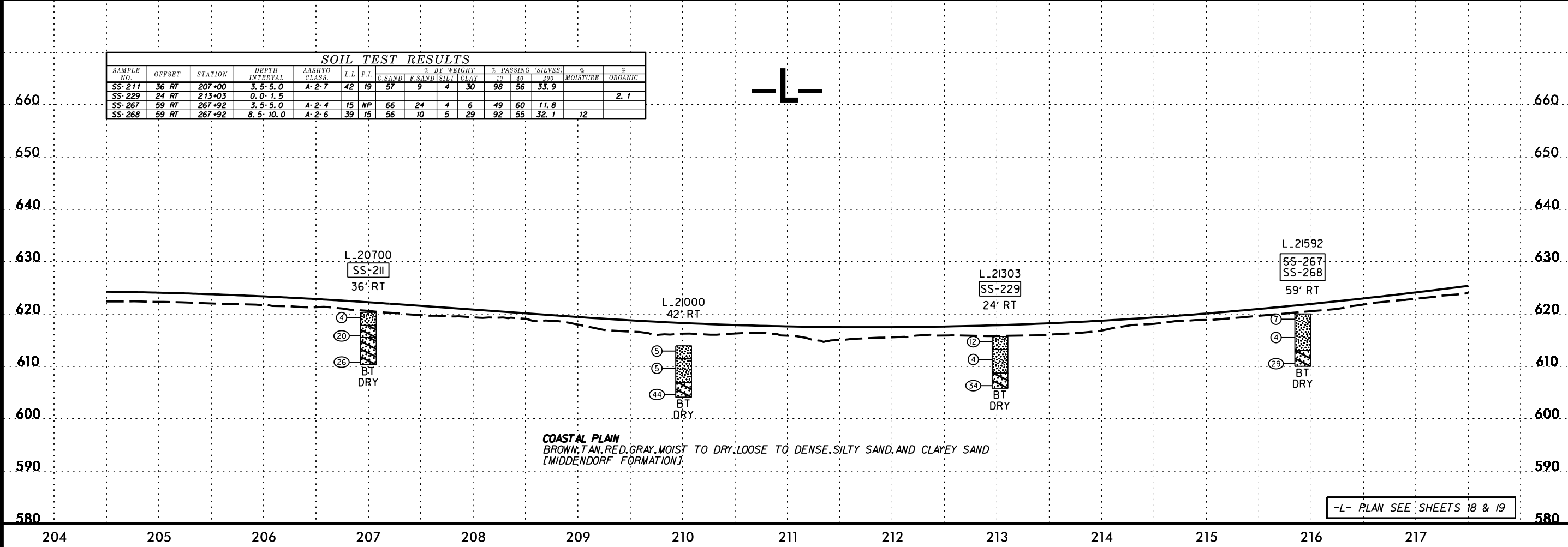
PROJECT REFERENCE NO. R-5726	SHEET NO. 34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			MOISTURE	ORGANIC
							C SAND	F SAND	SILT	CLAY	10	40	200		
SS-217	39 RT	201+00	3.5-5.0	A-2-6	30	12	47	20	9	24	98	69	34.0	11	
SS-218	39 RT	201+00	8.5-10.0	A-2-6	32	11	55	15	4	26	82	52	25.3		



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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		
SS-211	36 RT	207+00	3.5-5.0	A-2-7	42	19	57	9	4	30	98	56	33.9		
SS-229	24 RT	213+03	0.0-1.5											2.1	
SS-267	59 RT	267+92	3.5-5.0	A-2-4	15	NP	66	24	4	6	49	60	11.8		
SS-268	59 RT	267+92	8.5-10.0	A-2-6	39	15	56	10	5	29	92	55	32.1	12	



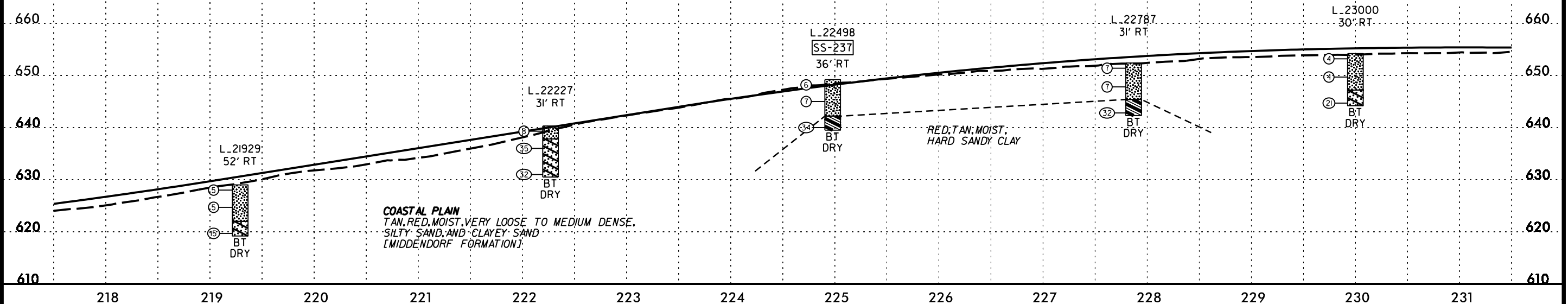
-L- PLAN SEE SHEETS 18 & 19

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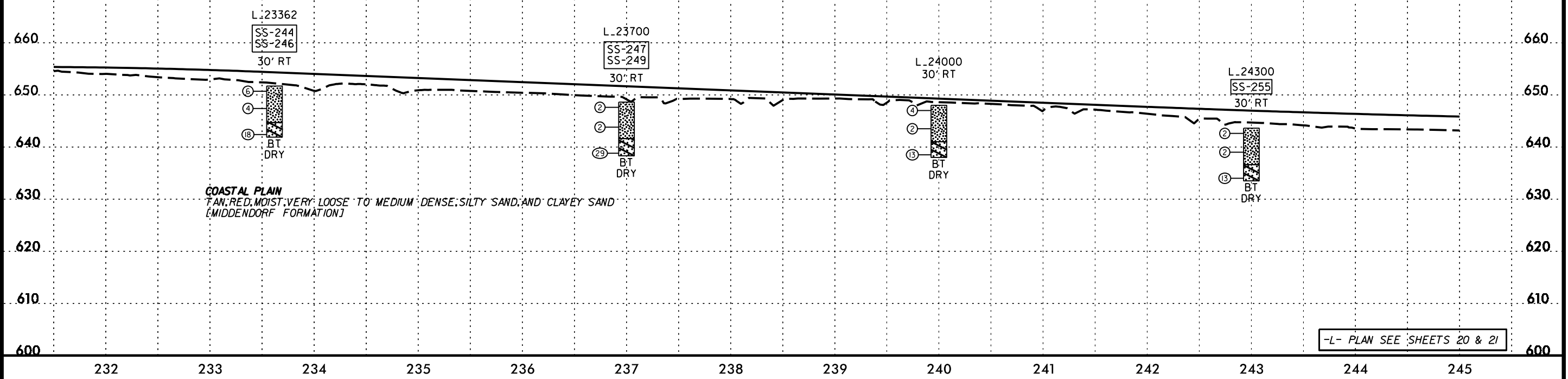
5/14/99

PROJECT REFERENCE NO. R-5726	SHEET NO. 35
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
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				% PASSING (SIEVES)		%	%
							C SAND	F SAND	SILT	CLAY	10	40		
SS-237	36 RT	224+98	8.2-9.7	A-6	31	11	45	23	7	25	100	73	35.6	12



SOIL TEST RESULTS														
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)		%	%
							C SAND	F SAND	SILT	CLAY	10	40		
SS-246	30 RT	233+62	8.3-9.8	A-2-6	35	14	50	20	4	26	99	68	30.9	15
SS-247	30 RT	237+00	0.0-1.5	A-2-4	11	NP	63	27	5	5	100	70	12.1	
SS-249	30 RT	237+00	8.8-10.3	A-2-6	33	15	59	14	2	25	99	64	27.7	12
SS-255	30 RT	243+00	8.6-10.1	A-2-6	31	13	56	18	1	25	99	63	27.2	13



-L- PLAN SEE SHEETS 20 & 21

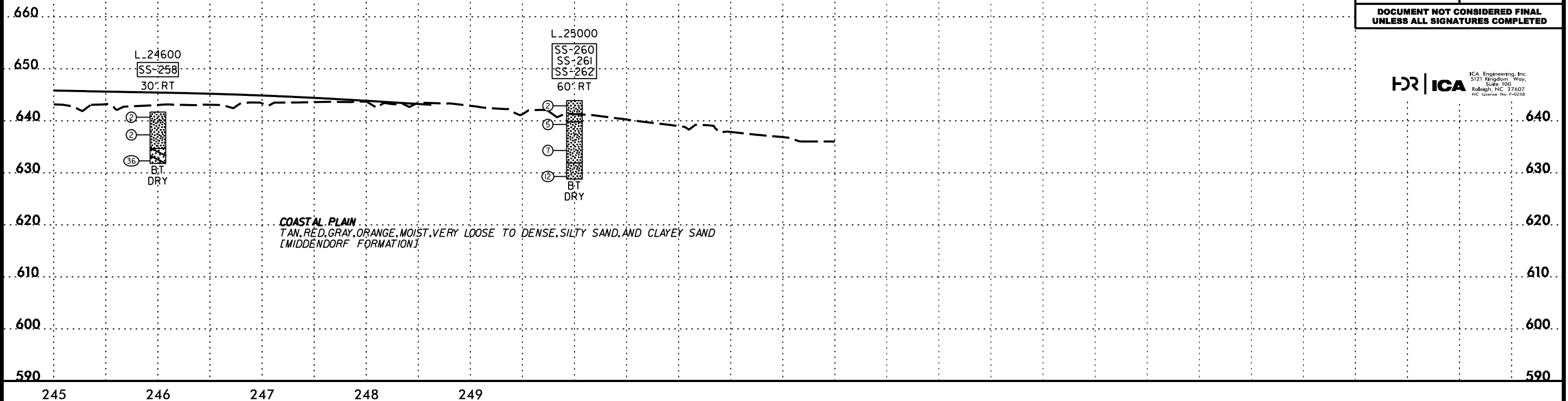
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*****CDN*****

5/14/99

PROJECT REFERENCE NO. R-5726		SHEET NO. 36	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

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		
SS-258	30 RT	246+00	8.4-9.9	A-2-6	37	16	61	11	3	25	95	52	27.3	10
SS-260	60 RT	250+00	3.6-5.1	A-2-4	15	NP	58	27	3	12	97	65	16.1	6
SS-261	60 RT	250+00	8.6-10.1	A-2-4	24	8	55	24	2	19	100	68	23.2	11
SS-262	60 RT	250+00	13.6-15.1	A-2-4	26	8	69	11	5	15	93	49	19.1	

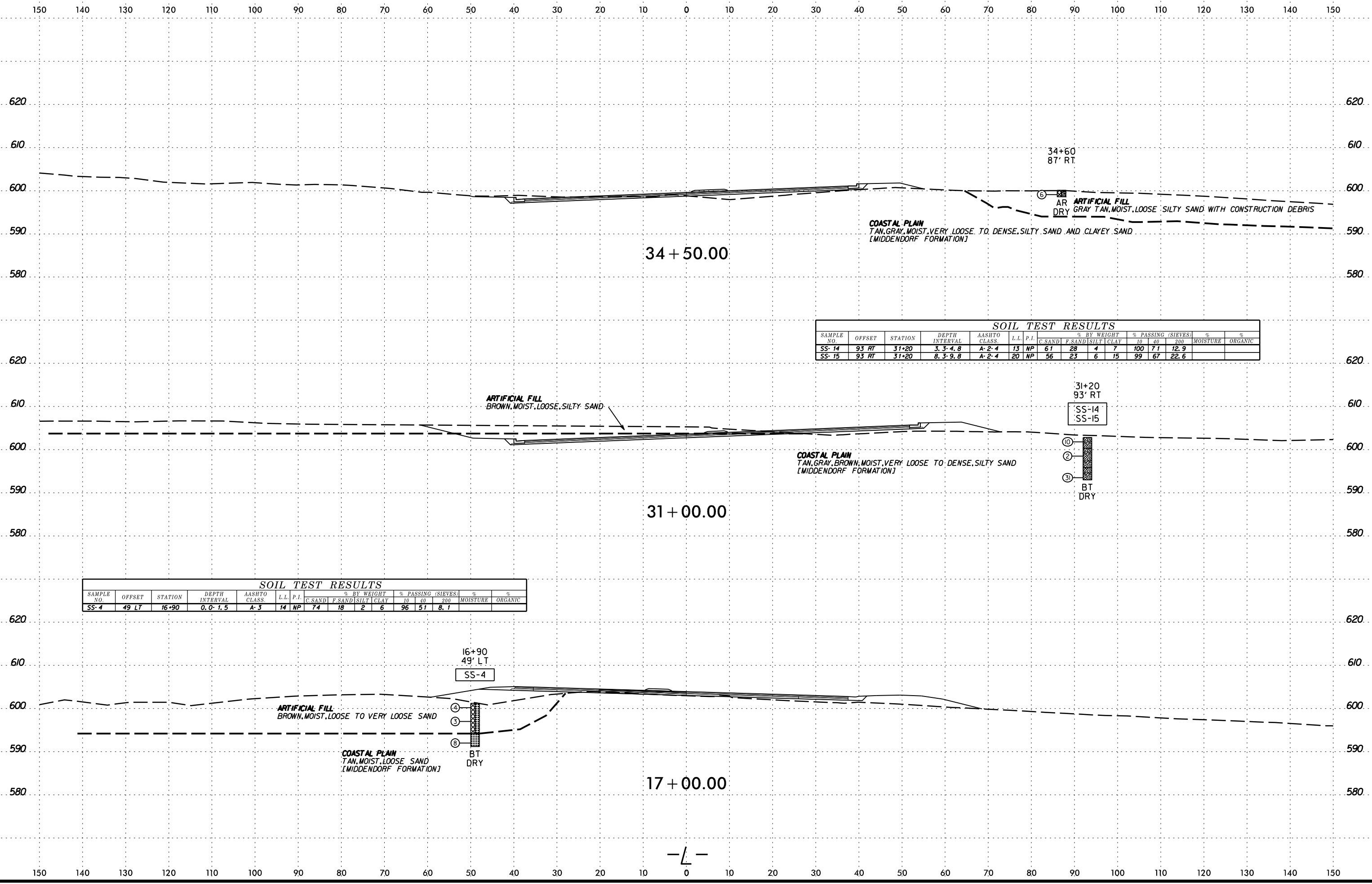
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-L- PLANS SEE SHEETS 22 & 23



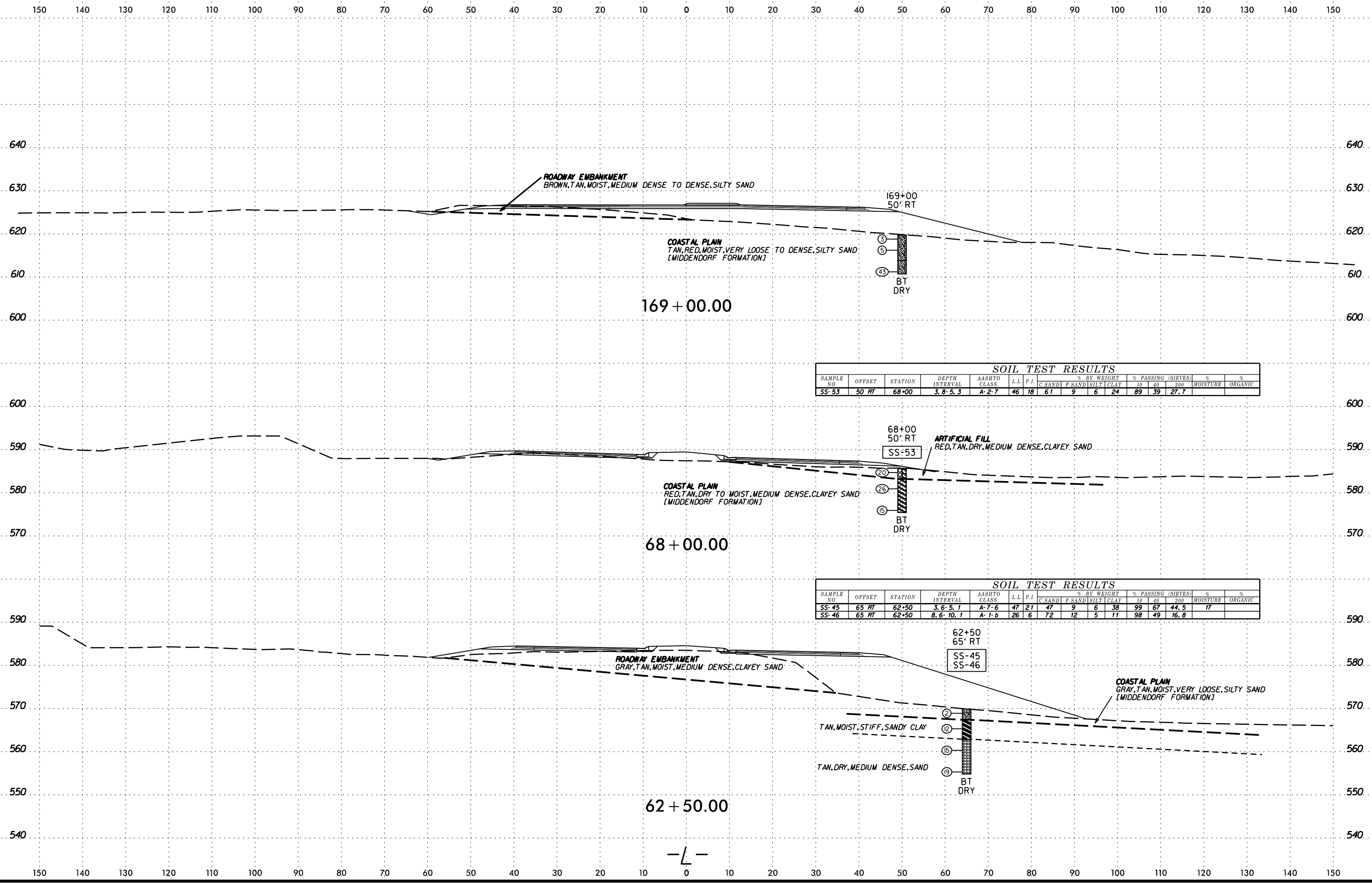
SOIL TEST RESULTS

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		
SS-4	49 LT	16+90	0.0-1.5	A-3	14	NP	74	18	2	6	96	51	8.1	

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		
SS-14	93 RT	31+20	3.3-4.8	A-2-4	13	NP	61	28	4	7	100	71	12.9	
SS-15	93 RT	31+20	8.3-9.8	A-2-4	20	NP	56	23	6	15	99	67	22.6	

DATE PLOTTED: 6/23/16



169 + 00.00

68 + 00.00

62 + 50.00

SOIL TEST RESULTS

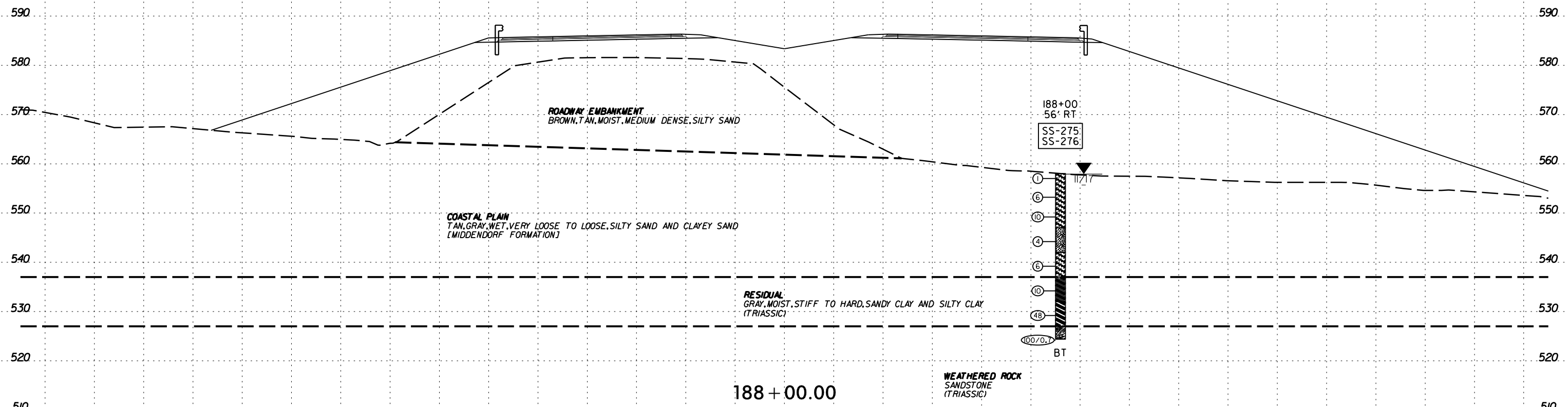
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)		% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40		
SS-53	50 RT	68+00	3.8-5.3	A-2-7	46	18	61	9	6	24	89	39	27.7	

SOIL TEST RESULTS

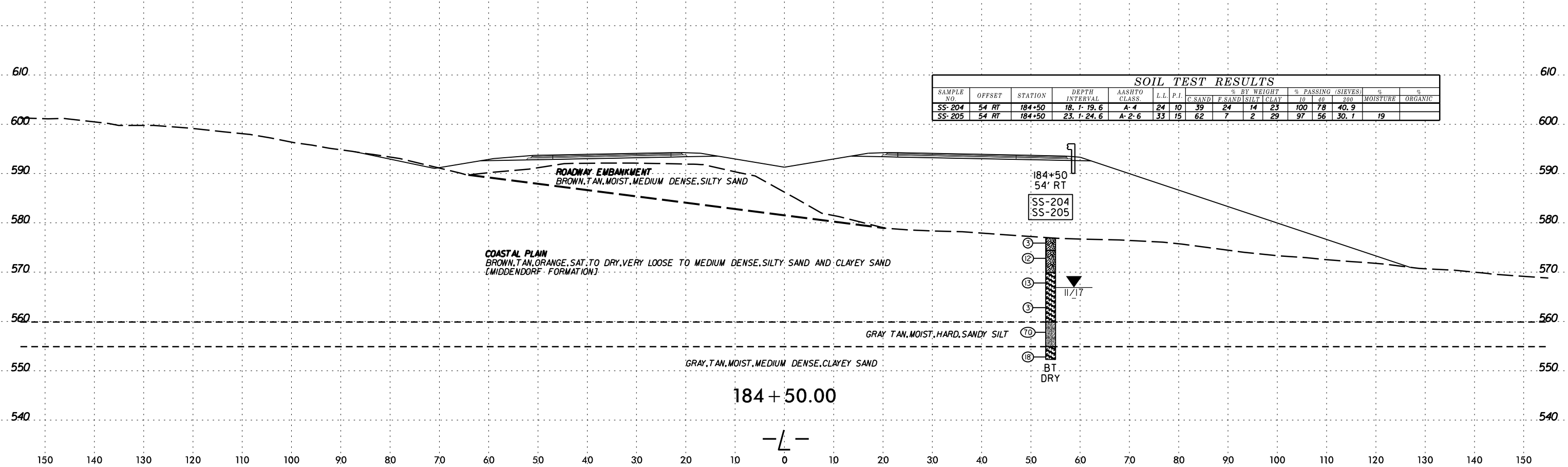
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)		% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40		
SS-45	65 RT	62+50	3.6-5.1	A-7-6	47	21	47	9	6	38	99	67	44.5	17
SS-46	65 RT	62+50	8.6-10.1	A-1-b	26	6	72	12	5	11	98	49	16.8	

DATE PLOTTED: 06/23/16

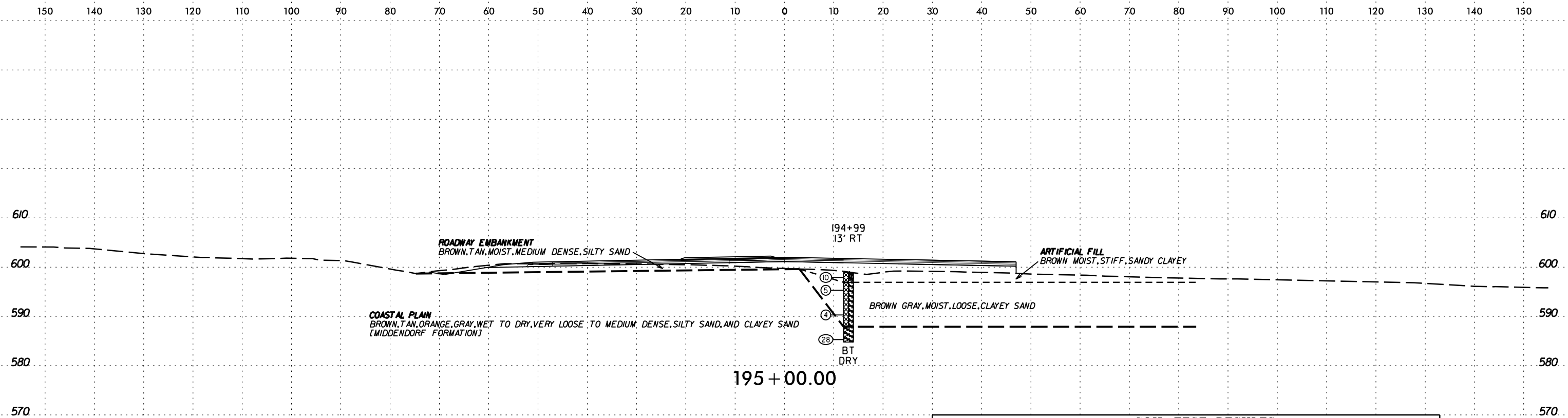
SOIL TEST RESULTS														
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)		% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40		
SS-275	56 RT	188+00	27.8-29.3	A-7-6	42	16	5	30	21	44	100	97	70.4	
SS-276	56 RT	188+00	32.8-34.3	A-2-4	40	5	41	35	10	14	100	87	26.7	



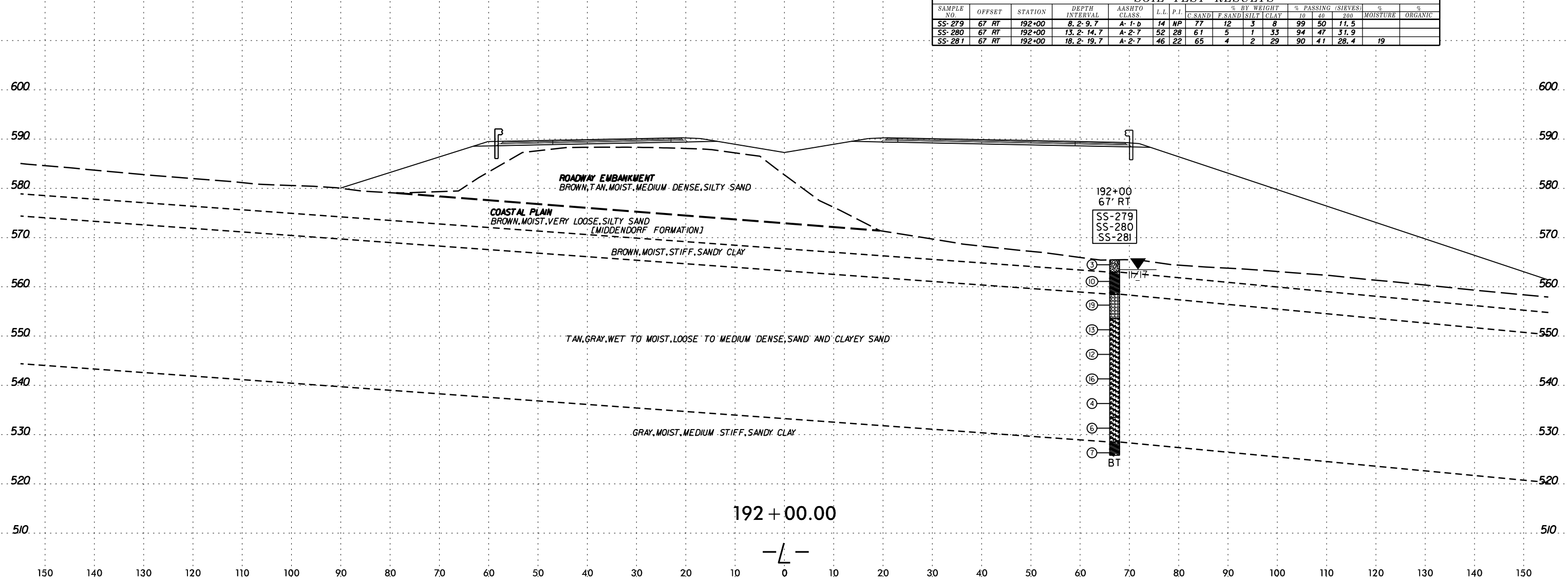
SOIL TEST RESULTS														
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)		% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40		
SS-204	54 RT	184+50	18.1-19.6	A-4	24	10	39	24	14	23	100	78	40.9	
SS-205	54 RT	184+50	23.1-24.6	A-2-6	33	15	62	7	2	29	97	56	30.1	19



SECTION ON PLAN

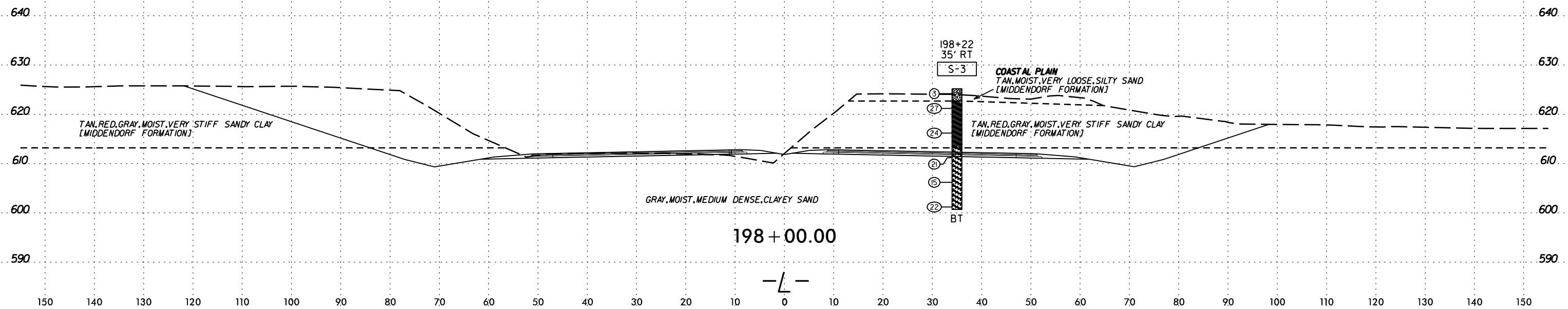


SOIL TEST RESULTS														
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)		% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40		
SS-279	67 RT	192+00	8.2-9.7	A-1-b	14	NP	77	12	3	8	99	50	11.5	
SS-280	67 RT	192+00	13.2-14.7	A-2-7	52	28	61	5	1	33	94	47	31.9	
SS-281	67 RT	192+00	18.2-19.7	A-2-7	46	22	65	4	2	29	90	41	28.4	19



SCALE: VERTICAL 1"=10'; HORIZONTAL 1"=40'

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



SUMMARY OF LABORATORY TEST DATA

Soil Classification and Gradation



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project No.: 6235-17-033 S&ME Project Name: Roadway Widening for NC 211 Date Report: 2/27/2018

State Project No.: 50218.1.1 County: Moore Date Tested:

Federal ID No.: N/A TIP No.: R-5726

Client Name: Mott MacDonald Client Address: Raleigh, NC

Boring No.	Sample No.	Station #:	Offset	Alignment	Sample Depth (ft)	AASHTO Classification	Total % Passing					Total Mortar Fraction (%)				LL	PL	PI	Moist. %
							Sieve #					Coarse Sand	Fine Sand	Silt	Clay				
							10	40	60	200	270								
L_1690	SS-4	16+90	49 LT	L	0.0-1.5	A-3 (0)	96	51	25	8.1	7.3	74	18	2	6	14	0	NP	
L_2090	SS-8	20+90	CL	L	3.7-5.2	A-1-b (0)	100	49	27	13.7	13.0	73	14	5	8	14	0	NP	
L_2661	SS-172	26+61	37 RT	L	3.5-5.0	A-2-4 (0)	97	71	46	28.3	26.7	53	20	7	20	20	14	6	
L_2661	SS-173	26+61	37 RT	L	8.5-10.0	A-2-6 (0)	95	49	36	27.7	26.9	62	10	2	26	40	23	17	
L_3120	SS-14	31+20	93 RT	L	3.3-4.8	A-2-4 (0)	100	71	39	12.9	10.8	61	28	4	7	13	0	NP	
L_3120	SS-15	31+20	93 RT	L	8.3-9.8	A-2-4 (0)	99	67	44	22.6	20.6	56	23	6	15	20	0	NP	
L_3706	SS-18	37+06	59 RT	L	3.3-4.8	A-3 (0)	100	64	34	9.0	7.7	66	26	1	7	15	0	NP	
L_4100	SS-21	41+00	47 LT	L	3.6-5.1	A-7-5 (4)	96	60	48	38.9	38.3	50	10	4	36	54	30	24	
L_4505	SS-24	45+05	31 LT	L	3.5-5.0	A-2-6 (0)	98	61	36	25.2	24.5	63	12	3	22	29	18	11	10.7
L_5100	SS-31	51+00	55 RT	L	8.0-9.5	A-2-7 (1)	90	59	43	33.7	32.9	52	11	4	33	45	30	15	13.5
L_5450	SS-34	54+50	55 LT	L	3.2-4.7	A-3 (0)	100	56	28	8.2	7.8	72	20	5	3	9	0	NP	
L_5551	SS-39	55+51	23 RT	L	8.3-9.8	A-3 (0)	100	57	23	3.1	2.6	77	20	2	1	21	0	NP	2.5
L_6250	SS-45	62+50	65 RT	L	3.6-5.1	A-7-6 (5)	99	67	52	44.5	43.8	47	9	6	38	47	26	21	16.9
L_6250	SS-46	62+50	65 RT	L	8.6-10.1	A-1-b (0)	98	49	27	16.8	16.0	72	12	5	11	26	20	6	
L_6415	SS-51	64+15	26 RT	L	13.3-14.8	A-7-6 (21)	100	94	89	81.5	79.1	11	10	20	59	52	28	24	18.6
L_6800	SS-53	68+00	50 RT	L	3.8-5.3	A-2-7 (0)	89	39	35	27.7	26.5	61	9	6	24	46	28	18	
L_6974	SS-57	69+74	62 RT	L	8.2-9.7	A-2-6 (0)	92	56	40	26.5	25.3	57	16	4	23	40	24	16	10.9
L_6974	SS-58	69+74	62 RT	L	13.2-14.7	A-2-6 (0)	83	34	25	19.0	18.3	70	8	6	16	35	22	13	
L_7750	SS-63	77+50	50 RT	L	0-1.5	A-6 (1)	97	71	51	35.9	34.4	47	18	4	31	32	20	12	13.2
L_7750	SS-64	77+50	50 RT	L	3.3-4.8	A-2-6 (0)	100	63	40	30.3	29.4	60	11	3	26	38	22	16	
L_8300	SS-71	83+00	50 RT	L	3.3-4.8	A-2-6 (0)	99	68	46	26.8	25.0	54	21	7	18	21	7	14	9.4
L_8660	SS-74	86+60	13 RT	L	3.3-4.8	A-2-4 (0)	100	74	44	11.0	7.9	56	36	4	4	12	0	NP	
L_8660	SS-75	86+60	13 RT	L	8.3-9.8	A-7-6 (3)	99	62	49	38.3	37.5	51	11	4	34	47	27	20	14.4
L_8956	SS-78	89+56	57 LT	L	8.6-10	A-2-6 (0)	95	66	47	29.5	27.8	51	20	6	23	30	17	13	
L_9544	SS-83	95+44	48 RT	L	3.4-4.9	A-2-4 (0)	93	58	42	29.9	28.2	55	15	6	24	29	20	9	9.2
L_10150	SS-92	101+50	50 RT	L	3.5-5.0	A-2-4 (0)	94	60	39	23.6	22.3	58	18	4	20	19	16	3	
L_10344	SS-159	103+44	11 LT	L	3.5-5.0	A-3 (0)	99	58	32	10.3	8.2	68	24	4	4	12	0	NP	
L_10736	SS-95	107+36	CL	L	3.2-4.7	A-3 (0)	100	60	30	8.7	7.1	70	23	0	7	15	0	NP	3.1
L_10997	SS-98	109+97	2 RT	L	3.3-4.8	A-2-4 (0)	100	65	37	14.6	12.8	63	24	4	9	15	0	NP	
L_11343	SS-100	113+43	3 RT	L	0.7-2.2	A-2-4 (0)	99	58	35	16.5	14.8	65	20	7	8	14	0	NP	
L_11343	SS-101	113+43	3 RT	L	3.3-4.8	A-2-4 (0)	100	56	33	15.0	13.4	67	20	4	9	12	0	NP	
L_11633	SS-104	116+33	3 RT	L	3.3-4.8	A-2-4 (0)	100	60	35	16.4	15.0	65	20	5	10	15	0	NP	5.1
L_12100	SS-106	121+00	50 RT	L	0.0-1.5	A-2-4 (0)	100	60	32	12.3	10.6	68	21	6	5	15	0	NP	
L_12100	SS-107	121+00	50 RT	L	3.3-4.8	A-2-4 (0)	100	55	28	11.2	9.8	72	18	4	6	14	0	NP	
L_12402	SS-110	124+02	9 RT	L	3.3-4.8	A-1-b (0)	99	50	28	13.5	12.2	72	16	7	5	17	0	NP	

SUMMARY OF LABORATORY TEST DATA

Soil Classification and Gradation



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project No.: 6235-17-033 S&ME Project Name: Roadway Widening for NC 211 Date Report: 2/27/2018

State Project No.: 50218.1.1 County: Moore Date Tested:

Federal ID No.: N/A TIP No.: R-5726

Client Name: Mott MacDonald Client Address: Raleigh, NC

Boring No.	Sample No.	Station #:	Offset	Alignment	Sample Depth (ft)	AASHTO Classification	Total % Passing Sieve #					Total Mortar Fraction (%)				LL	PL	PI	Moist. %
							10	40	60	200	270	Coarse Sand	Fine Sand	Silt	Clay				
L_12700	SS-156	127+00	50 LT	L	3.7-5.2	A-1-b (0)	98	50	27	10.3	8.5	72	19	6	3	12	0	NP	3.5
L_12990	SS-154	129+90	53 LT	L	8.3-9.8	A-2-7 (1)	100	58	42	33.4	32.5	58	10	5	27	42	24	18	
L_13303	SS-113	133+03	3 RT	L	3.2-4.7	A-1-b (0)	99	50	30	16.5	15.1	70	15	6	9	15	0	NP	6.0
L_13600	SS-119	136+00	50 RT	L	3.7-5.2	A-3 (0)	92	54	29	9.5	8.3	69	22	2	7	15	0	NP	5.1
L_13939	SS-149	139+39	53 LT	L	0.0-1.5	A-2-4 (0)	100	59	32	14.6	13.2	68	19	5	8	13	0	NP	
L_13939	SS-150	139+39	53 LT	L	3.6-5.1	A-3 (0)	100	59	29	9.6	6.1	71	23	3	3	4	0	NP	
L_14397	SS-122	143+97	43 RT	L	3.5-5.0	A-2-4 (0)	100	61	37	14.8	12.4	63	25	5	7	15	0	NP	
L_14607	SS-147	146+07	46 LT	L	3.2-4.7	A-2-4 (0)	100	65	40	19.0	17.2	60	23	5	12	17	0	NP	
L_14900	SS-125	149+00	50 RT	L	3.7-5.2	A-3 (0)	100	64	32	6.7	4.9	68	27	3	2	12	0	NP	3.5
L_15200	SS-128	152+00	50 RT	L	3.1-4.6	A-2-4 (0)	100	68	39	13.7	12.0	61	27	5	7	13	0	NP	6.4
L_15502	SS-131	155+02	41 RT	L	3.7-5.2	A-3 (0)	96	57	32	8.4	6.3	67	26	5	2	16	0	NP	3.6
L_15803	SS-134	158+03	10 LT	L	3.5-5.0	A-2-4 (0)	100	63	34	12.8	11.2	66	23	4	7	16	0	NP	
L_16095	SS-137	160+95	9 LT	L	3.4-4.9	A-2-4 (0)	100	60	31	11.2	10.0	69	21	4	6	14	0	NP	4.5
L_16404	SS-142	164+04	9 LT	L	13.3-14.8	A-2-6 (0)	91	50	33	22.4	21.3	64	13	7	16	29	18	11	10.2
L_17200	SS-183	172+00	20 RT	L	8.5-10.0	A-2-6 (0)	90	47	35	27.5	26.5	61	10	5	24	36	21	15	
L_17200	SS-184	172+00	20 RT	L	13.5-15.0	A-2-6 (0)	98	42	31	22.2	21.3	68	10	2	20	37	20	17	
L_17500	SS-188	175+00	22 RT	L	8.7-10.2	A-2-7 (2)	95	51	41	32.3	31.4	57	10	3	30	49	26	23	10.5
L_17500	SS-189	175+00	22 RT	L	13.7-15.2	A-2-6 (0)	99	43	33	24.5	23.5	67	9	4	20	40	24	16	
L_17800	SS-194	178+00	42 RT	L	13.8-15.3	A-2-4 (0)	88	32	26	18.1	17.2	71	9	4	16	32	22	10	
L_17800	SS-195	178+00	42 RT	L	18.8-20.3	A-1-b (0)	86	28	20	11.4	10.7	77	11	3	9	24	19	5	
L_18100	SS-198	181+00	39 RT	L	8.5-10.0	A-2-6 (0)	95	43	31	23.3	22.4	67	9	6	18	38	23	15	
L_18450	SS-204	184+50	54 RT	L	18.1-19.6	A-4 (1)	100	78	61	40.9	37.1	39	24	14	23	24	14	10	
L_18450	SS-205	184+50	54 RT	L	23.1-24.6	A-2-6 (0)	97	56	37	30.1	29.7	62	7	2	29	33	18	15	18.6
L_18800	SS-275	188+00	56 RT	L	27.8-29.3	A-7-6 (11)	100	97	95	70.4	65.5	5	30	21	44	42	26	16	
L_18800	SS-276	188+00	56 RT	L	32.8-34.3	A-2-4 (0)	100	87	59	26.7	23.6	41	35	10	14	40	35	5	
L_19200	SS-279	192+00	67 RT	L	8.2-9.7	A-1-b (0)	99	50	23	11.5	11.0	77	12	3	8	14	0	NP	
L_19200	SS-280	192+00	67 RT	L	13.2-14.7	A-2-7 (2)	94	47	37	31.9	31.6	61	5	1	33	52	24	28	
L_19200	SS-281	192+00	67 RT	L	18.2-19.7	A-2-7 (0)	90	41	32	28.4	28.0	65	4	2	29	46	24	22	19.2
L_20100	SS-217	201+00	39 RT	L	3.5-5.0	A-2-6 (0)	98	69	52	34.0	32.2	47	20	9	24	30	18	12	10.6
L_20100	SS-218	201+00	39 RT	L	8.5-10.0	A-2-6 (0)	82	52	37	25.3	24.4	55	15	4	26	32	21	11	
L_20700	SS-211	207+00	36 RT	L	3.5-5.0	A-2-7 (1)	98	56	42	33.9	33.2	57	9	4	30	42	23	19	12.0
L_21592	SS-267	215+92	59 RT	L	3.5-5.0	A-2-4 (0)	99	60	34	11.8	9.5	66	24	4	6	15	0	NP	
L_21592	SS-268	215+92	59 RT	L	8.5-10.0	A-2-6 (0)	92	55	40	32.1	31.3	56	10	5	29	39	24	15	12.0
L_22498	SS-237	224+98	36 RT	L	8.2-9.7	A-6 (0)	100	73	55	35.6	31.9	45	23	7	25	31	20	11	12.1
L_23362	SS-246	233+62	30 RT	L	8.3-9.8	A-2-6 (0)	99	68	50	30.9	29.6	50	20	4	26	35	21	14	15.3

SUMMARY OF LABORATORY TEST DATA

Soil Classification and Gradation



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project No.:	6235-17-033	S&ME Project Name:	Roadway Widening for NC 211	Date Report:	2/27/2018
State Project No.:	50218.1.1	County:	Moore	Date Tested:	
Federal ID No.:	N/A	TIP No.:	R-5726		
Client Name:	Mott MacDonald		Client Address: Raleigh, NC		

Boring No.	Sample No.	Station #:	Offset	Alignment	Sample Depth (ft)	AASHTO Classification	Total % Passing					Total Mortar Fraction (%)				LL	PL	PI	Moist. %	
							Sieve #					Coarse Sand	Fine Sand	Silt	Clay					
							10	40	60	200	270									
L_23700	SS-247	237+00	30 RT	L	0.0-1.5	A-2-4 (0)	100	70	37	12.1	10.4	63	27	5	5	11	0	NP		
L_23700	SS-249	237+00	30 RT	L	8.8-10.3	A-2-6 (0)	99	64	41	27.7	26.8	59	14	2	25	33	18	15	12.3	
L_24300	SS-255	243+00	30 RT	L	8.6-10.1	A-2-6 (0)	99	63	44	27.2	26.2	56	18	1	25	31	18	13	12.7	
L_24600	SS-258	246+00	30 RT	L	8.4-9.9	A-2-6 (0)	95	52	37	27.3	26.2	61	11	3	25	37	21	16	10.1	
L_25000	SS-260	250+00	60 RT	L	3.6-5.1	A-2-4 (0)	97	65	41	16.1	14.6	58	27	3	12	15	0	NP	5.6	
L_25000	SS-261	250+00	60 RT	L	8.6-10.1	A-2-4 (0)	100	68	45	23.2	21.5	55	24	2	19	24	16	8	10.5	
L_25000	SS-262	250+00	60 RT	L	13.6-15.1	A-2-4 (0)	93	49	29	19.1	18.3	69	11	5	15	26	18	8		
Y14_1273	SS-89	12+73	42 LT	Y14	3.3-4.8	A-3 (0)	99	55	29	9.3	8.8	71	20	2	7	14	0	NP		
Y16_1350	SS-117	13+50	49 LT	Y16	8.3-9.8	A-6 (2)	100	74	53	38.6	37.8	47	15	4	34	40	24	16	16.3	
L_17200	S-1	172+00	20 RT	L	0.0-15.0	A-2-4 (0)	99	69	40	13.6	11.5	60	28	4	8	14	0	NP	3.8	
L_17800	S-2	178+00	42 RT	L	0.0-15.0	A-2-6 (0)	92	52	38	25.3	23.8	59	15	4	22	29	18	11	7.5	
L_19822	S-3	198+22	8 RT	L	0.0-15.0	A-2-6 (0)	96	57	42	30.6	28.9	56	14	6	25	32	19	13	11.6	

References / Comments / Deviations: ND=Not Determined.

AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT AASHTO T89: Determining the Liquid Limit of Soils
 AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils AASHTO T265: Laboratory Determination of Moisture Content of Soils
 AASHTO M145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Mal Krajan, ET
 Technician Name:


 Signature

104-01-0703
 Certification #

Stewart Laney, PE
 Technical Responsibility:

Project Manager
 Position

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



AASHTO T 193

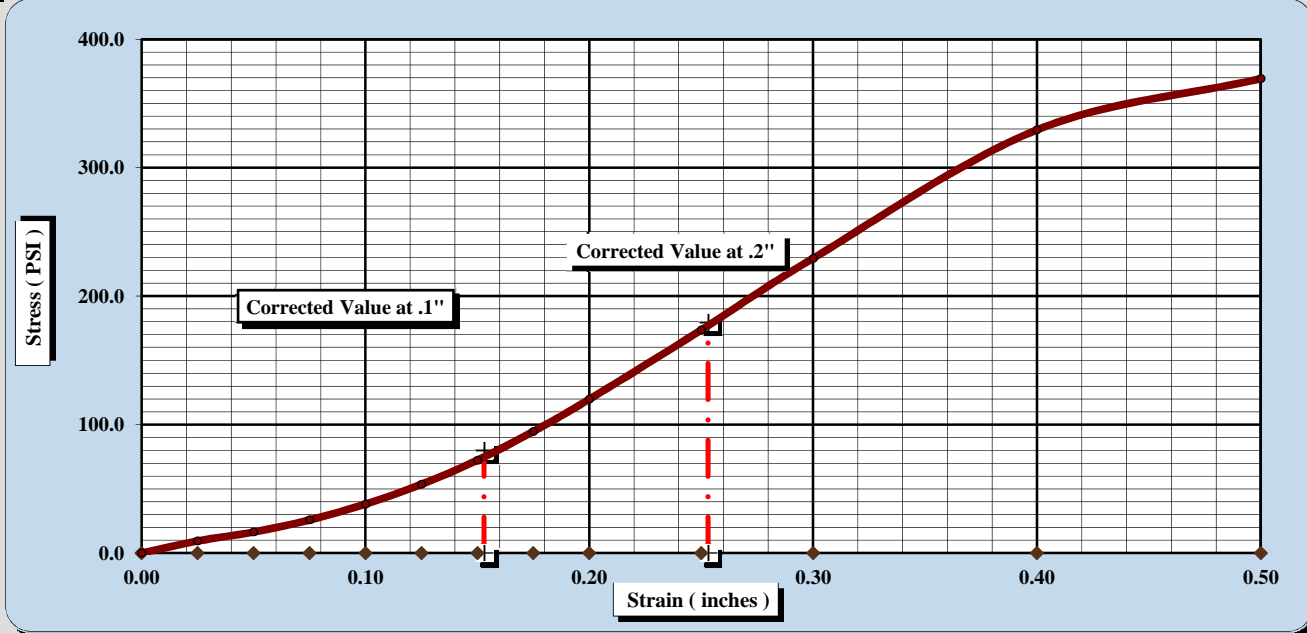
S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273

Project #:	6235-17-033	Report Date:	1/28/18
Project Name:	Roadway Widening For NC 211	Test Date(s):	1/5-10/18
Client Name:	MottMcDonald		
Client Address:	Fuquay-Varina, NC		
Boring #:	L-17200	Sample #:	Bulk A
Station:	172+00	Sample Date:	12/3/17
		Offset:	20 RT
		Elevation:	0-15'

Sample Description: A-2-4

AASHTO T99 Method A	Maximum Dry Density:	111.8 PCF	Optimum Moisture Content:	10.8%
	Line 20: Use an alternate description here if applicable		% Retained on the 3/4" sieve:	0.0%

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in.	3.8	CBR at 0.1 in.	8.0
CBR at 0.2 in.	8.0	CBR at 0.2 in.	12.0



CBR Sample Preparation: Performed on the fine fraction
Grading was in accordance with the above method and compacted using the 6" diameter CBR mold.

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	56	Final Dry Density (PCF)	112.6
Initial Dry Density (PCF)	112.6	Moisture Content (top 1" after soaking)	14.3%
Moisture Content of the Compacted Specimen	10.4%	Percent Swell	0.0%
Percent Compaction	100.7%		

Soak Time:	96 hours	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	51.0
Liquid Limit	14	Plastic Index	NP	Assumed Apparent Relative Density	2.650

Notes/Deviations/References:

Stewart Laney _____ Project Manager _____
Technical Responsibility Signature Position Date

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MOISTURE - DENSITY REPORT



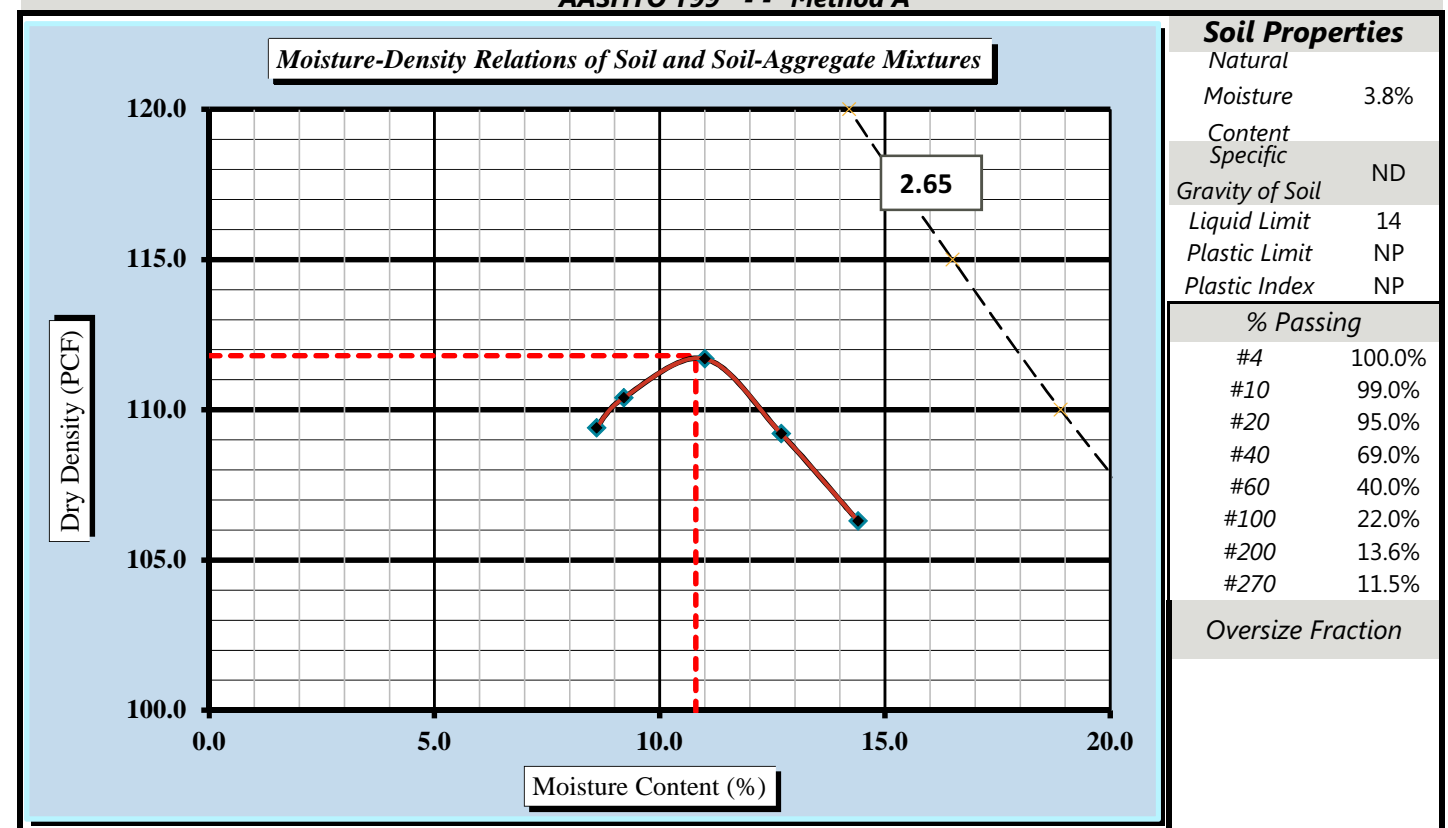
Quality Assurance

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

S&ME Project #:	6235-17-033	Report Date:	1/28/18
Project Name:	Roadway Widening for NC 211	Test Date(s):	1/2-4/18
Client Name:	MottMacDonald		
Client Address:	Fuquay-Varina, NC		
Boring #:	L-17200	Sample #:	S-1
Station:	172+00	Sample Date:	11/10/2017
		Offset:	20 RT
		Depth:	0-15'

Sample Description: A-2-4

Maximum Dry Density	111.8 PCF.	Optimum Moisture Content	10.8%
AASHTO T99 - - Method A			



Soil Properties	
Natural Moisture Content	3.8%
Specific Gravity of Soil	ND
Liquid Limit	14
Plastic Limit	NP
Plastic Index	NP
% Passing	
#4	100.0%
#10	99.0%
#20	95.0%
#40	69.0%
#60	40.0%
#100	22.0%
#200	13.6%
#270	11.5%
Oversize Fraction	

Moisture-Density Curve Displayed: Fine Fraction Corrected for Oversize Fraction (ASTM D 4718)
Sieve Size used to separate the Oversize Fraction: #4 Sieve 3/8 inch Sieve 3/4 inch Sieve
Mechanical Rammer Manual Rammer Moist Preparation Dry Preparation

References / Comments / Deviations: ND: Not Determined

AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Stewart Laney _____ Project Manager _____
Technical Responsibility Signature Position Date

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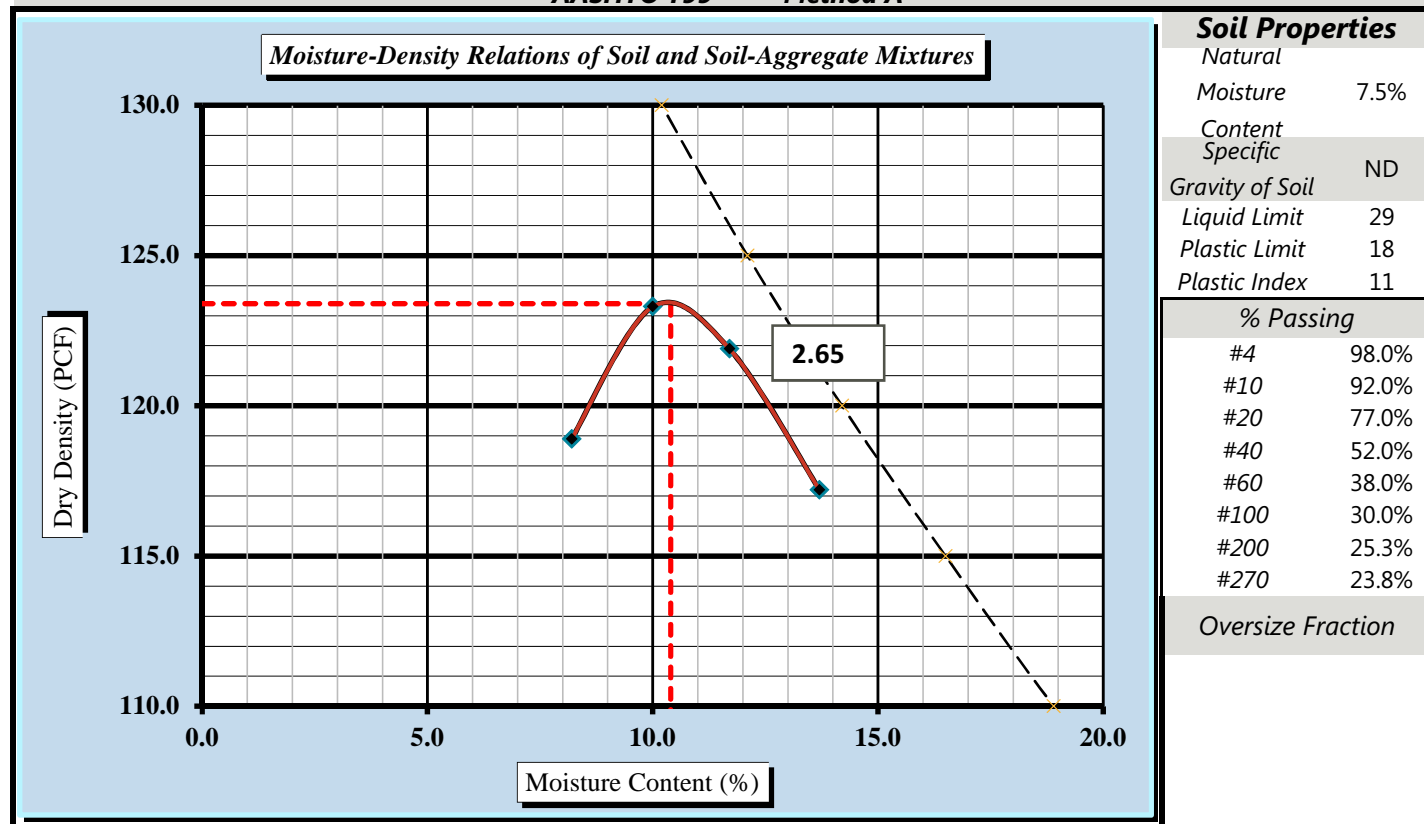
MOISTURE - DENSITY REPORT



Quality Assurance

S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273			
S&ME Project #:	6235-17-033	Report Date:	1/28/18
Project Name:	Roadway Widening for NC 211	Test Date(s):	1/2-4/18
Client Name:	MottMacDonald		
Client Address:	Fuquay-Varina, NC		
Boring #:	L-17800	Sample #:	S-2
Station:	178+00	Sample Date:	11/10/2017
		Offset:	20 RT
		Depth:	0-15'
178+00	A-2-6		

Maximum Dry Density 123.4 PCF. Optimum Moisture Content 10.4%
AASHTO T99 - - Method A



Moisture-Density Curve Displayed: Fine Fraction Corrected for Oversize Fraction (ASTM D 4718)
 Sieve Size used to separate the Oversize Fraction: #4 Sieve 3/8 inch Sieve 3/4 inch Sieve
 Mechanical Rammer Manual Rammer Moist Preparation Dry Preparation
 References / Comments / Deviations: ND: Not Determined

AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Stewart Laney
 Technical Responsibility

Signature

Project Manager
 Position

Date

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CBR (CALIFORNIA BEARING RATIO) OF LABORATORY COMPACTED SOIL

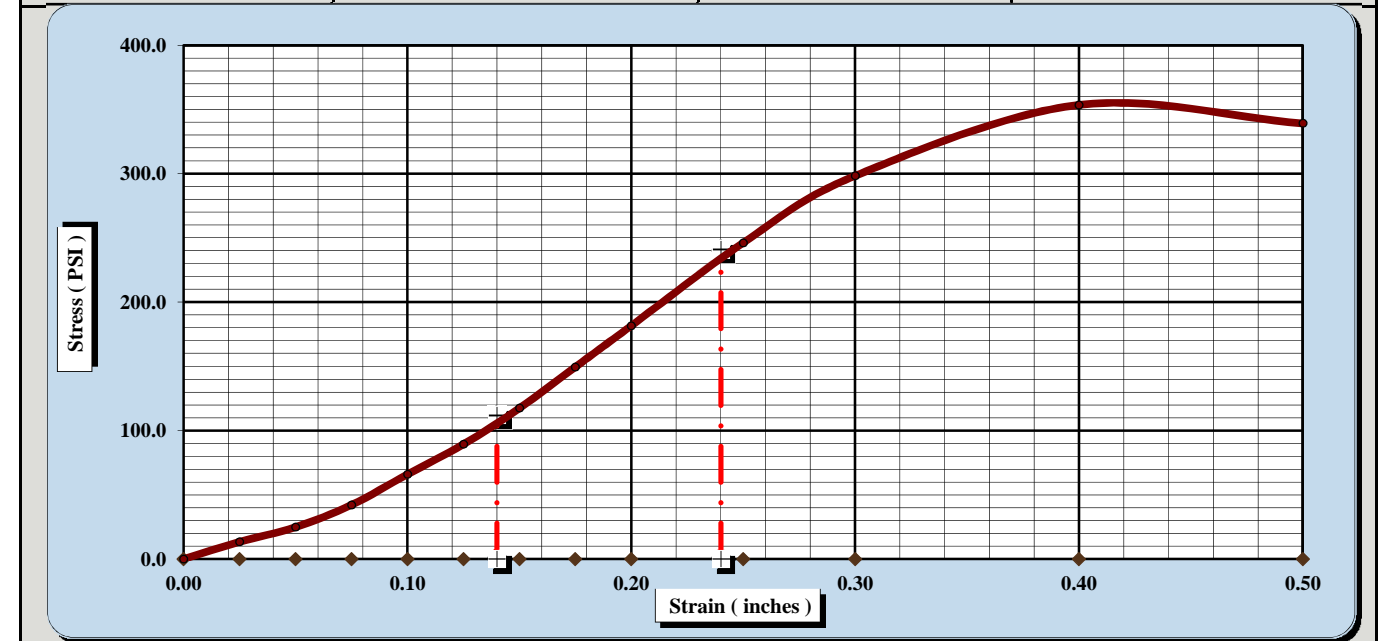


AASHTO T 193

S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273			
Project #:	6235-17-033	Report Date:	1/28/18
Project Name:	Roadway Widening For NC 211	Test Date(s)	1/5-10/18
Client Name:	MottMcDonald		
Client Address:	Fuquay-Varina, NC		
Boring #:	L-17200	Sample #:	S-1 B
Station:	172+00	Sample Date:	12/3/17
		Offset:	20 RT
		Elevation:	0-15'
Sample Description:	A-2-4		

AASHTO T99 Method A Maximum Dry Density: 111.8 PCF Optimum Moisture Content: 10.8%
 Line 20: Use an alternate description here if applicable % Retained on the 3/4" sieve: 0.0%

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in.	6.6	CBR at 0.1 in.	11.2
CBR at 0.2 in.	12.1	CBR at 0.2 in.	16.1



CBR Sample Preparation: Performed on the fine fraction
 Grading was in accordance with the above method and compacted using the 6" diameter CBR mold.

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	56	Final Dry Density (PCF)	113.0
Initial Dry Density (PCF)	113.0	Moisture Content (top 1" after soaking)	14.3%
Moisture Content of the Compacted Specimen	10.5%	Percent Swell	0.0%
Percent Compaction	101.0%		

Soak Time: 96 hours Surcharge Weight 10.0 Surcharge Wt. per sq. Ft. 51.0
 Liquid Limit 14 Plastic Index NP Assumed Apparent Relative Density 2.650

Notes/Deviations/References:

Stewart Laney
 Technical Responsibility

Signature

Project Manager
 Position

Date

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



AASHTO T 193

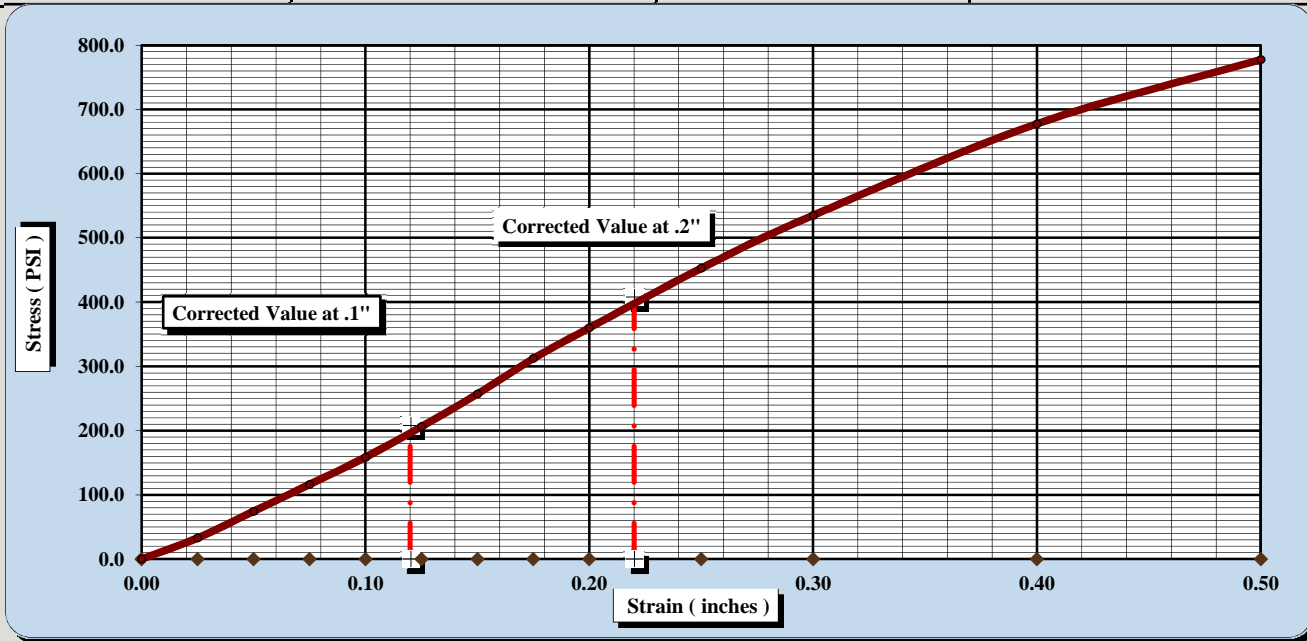
S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273

Project #:	6235-17-033	Report Date:	1/28/18
Project Name:	Roadway Widening for NC 211	Test Date(s)	1/4-9/18
Client Name:	MottMacDonald		
Client Address:	Fuquay-Varina, NC		
Boring #:	L-17800	Sample #:	S-2 B
		Sample Date:	12/4/17
Location:	Borehole	Offset:	20 RT
		Elevation:	0-15'

Sample Description: A-2-6

AASHTO T99 Method A	Maximum Dry Density:	123.4 PCF	Optimum Moisture Content:	10.4%
	Line 20: Use an alternate description here if applicable		% Retained on the 3/4" sieve:	0.0%

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in.	15.9	CBR at 0.1 in.	20.8
CBR at 0.2 in.	24.0	CBR at 0.2 in.	27.2



CBR Sample Preparation: Performed on the fine fraction
Grading was in accordance with the above method and compacted using the 6" diameter CBR mold.

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	56	Final Dry Density (PCF)	124.8
Initial Dry Density (PCF)	124.5	Moisture Content (top 1" after soaking)	10.8%
Moisture Content of the Compacted Specimen	10.1%	Percent Swell	0.0%
Percent Compaction	100.9%		

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	29	Plastic Index	11	umed Apparent Relative Density	2.650

Notes/Deviations/References:

Stewart Laney

Technical Responsibility

Signature

Project Manager

Position

Date

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

AASHTO T 193

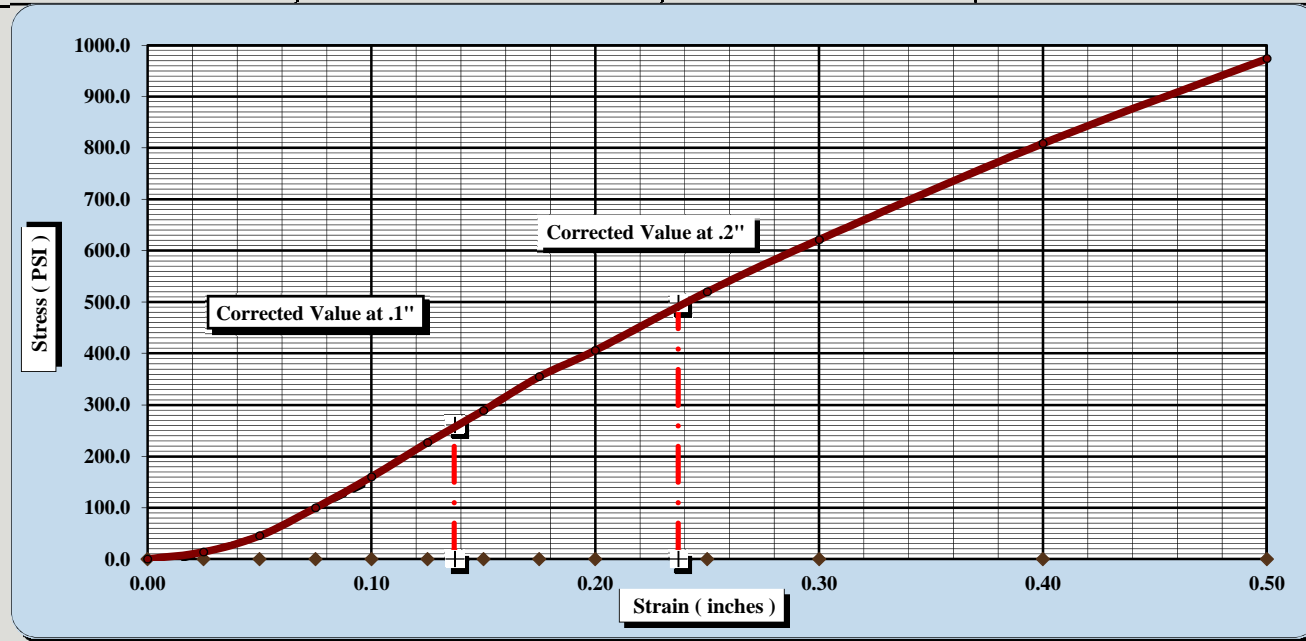
S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273

Project #:	6235-17-033	Report Date:	1/28/18
Project Name:	Roadway Widening for NC 211	Test Date(s)	1/4-9/18
Client Name:	MottMacDonald		
Client Address:	Fuquay-Varina, NC		
Boring #:	L-17800	Sample #:	S-2 A
		Sample Date:	12/4/17
Station:	178+00	Offset:	20 RT
		Elevation:	0-15'

Sample Description: A-2-6

AASHTO T99 Method A	Maximum Dry Density:	123.4 PCF	Optimum Moisture Content:	10.4%
	Line 20: Use an alternate description here if applicable		% Retained on the 3/4" sieve:	0.0%

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in.	16.0	CBR at 0.1 in.	26.2
CBR at 0.2 in.	27.1	CBR at 0.2 in.	33.2



CBR Sample Preparation: Performed on the fine fraction
Grading was in accordance with the above method and compacted using the 6" diameter CBR mold.

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	56	Final Dry Density (PCF)	124.8
Initial Dry Density (PCF)	124.6	Moisture Content (top 1" after soaking)	10.9%
Moisture Content of the Compacted Specimen	10.1%	Percent Swell	0.0%
Percent Compaction	100.9%		

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	29	Plastic Index	11	umed Apparent Relative Density	2.650

Notes/Deviations/References:

Stewart Laney

Technical Responsibility

Signature

Project Manager

Position

Date

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

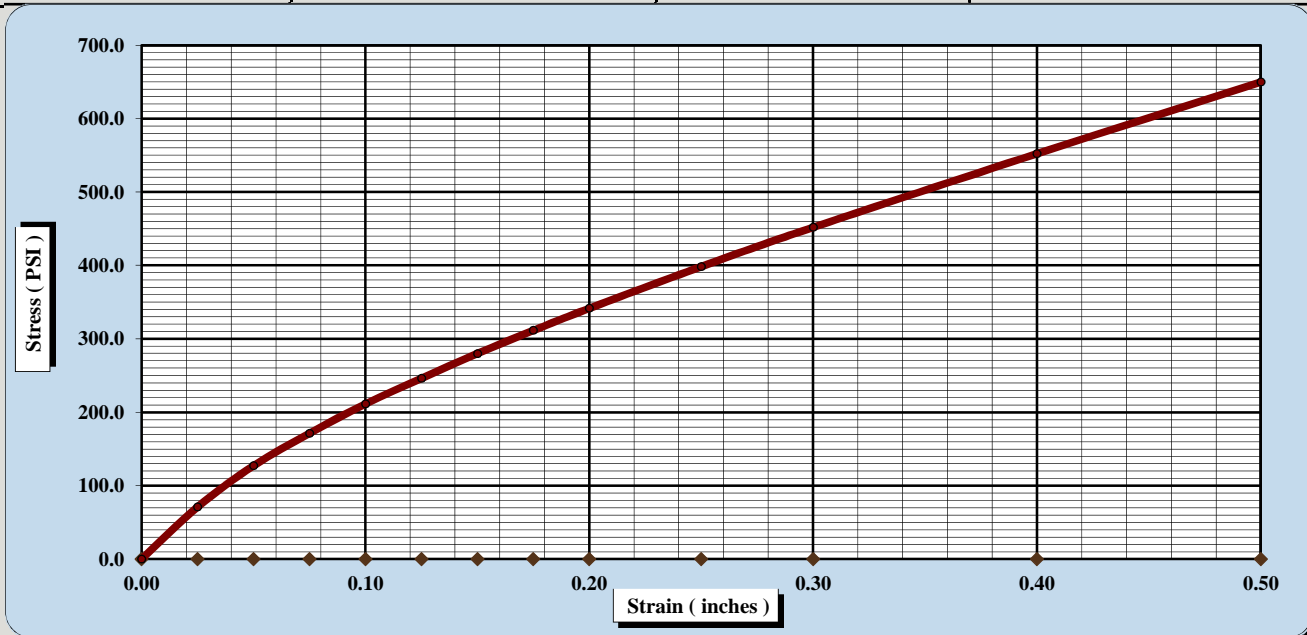


AASHTO T 193

S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273		
Project #:	6235-17-033	Report Date: 1/28/18
Project Name:	Roadway Widening for NC 211	Test Date(s) 1/4-8/18
Client Name:	MottMacDonald	
Client Address:	Fuquay-Varina, NC	
Boring #:	L-19822	Sample #: S-3 A
		Sample Date: 11/10/17
Location:	Borehole	Offset: 8 RT
		Elevation: 0-15'
Sample Description: A-2-6		

AASHTO T99 Method A	Maximum Dry Density: 120.9 PCF	Optimum Moisture Content: 11.4%
Line 20: Use an alternate description here if applicable	% Retained on the 3/4" sieve: 0.0%	

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in.	21.1	CBR at 0.1 in.	21.1
CBR at 0.2 in.	22.8	CBR at 0.2 in.	22.8



CBR Sample Preparation: Performed on the fine fraction
Grading was in accordance with the above method and compacted using the 6" diameter CBR mold.

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	56	Final Dry Density (PCF)	121.4
Initial Dry Density (PCF)	121.3	Moisture Content (top 1" after soaking)	12.5%
Moisture Content of the Compacted Specimen	11.1%	Percent Swell	0.1%
Percent Compaction	100.4%		

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	32	Plastic Index	13	Assumed Apparent Relative Density	2.650

Notes/Deviations/References:

Stewart Laney _____ Project Manager _____
Technical Responsibility Signature Position Date

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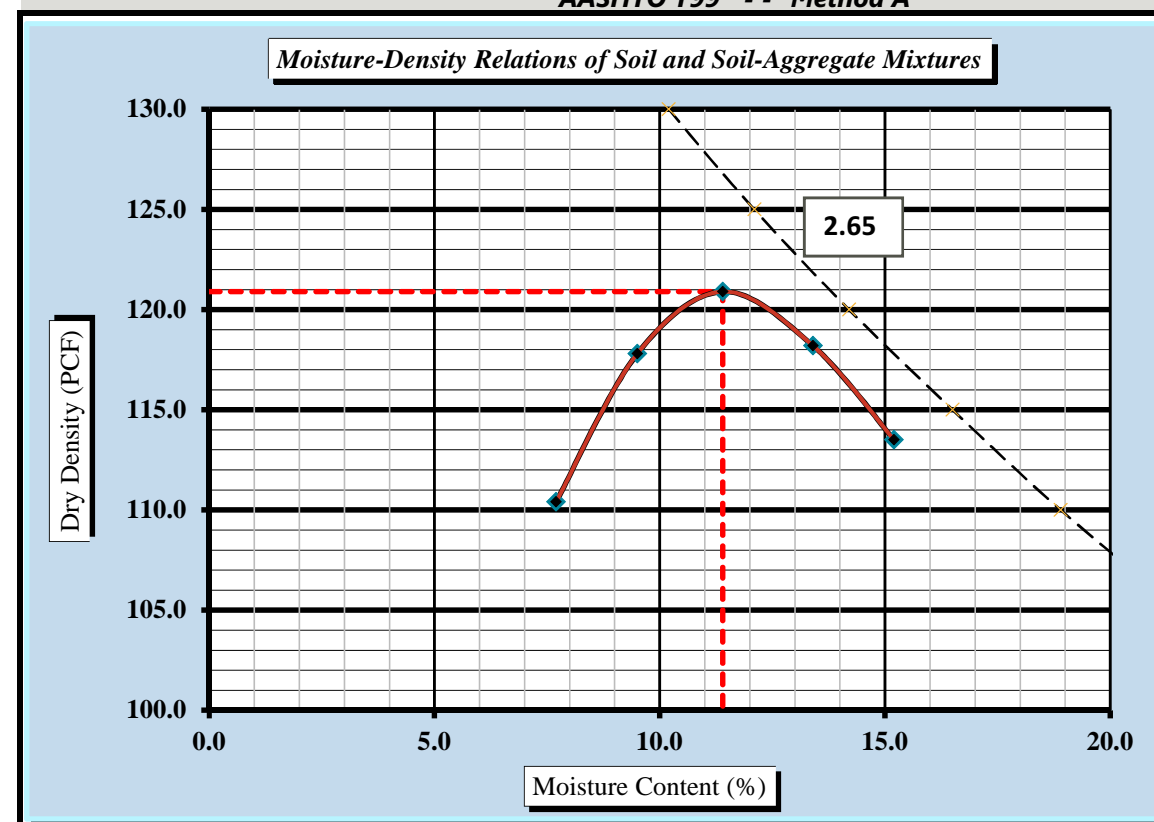
MOISTURE - DENSITY REPORT



Quality Assurance

S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273		
S&ME Project #:	6235-17-033	Report Date: 1/28/18
Project Name:	Roadway Widening for NC 211	Test Date(s) 1/2-5/18
Client Name:	MottMacDonald	
Client Address:	Fuquay-Varina, NC	
Boring #:	L-19822	Sample #: S-3
		Sample Date: 11/10/2017
Station:	198+22	Offset: 8 RT
		Depth: 0-15'
Sample Description: A-2-6		

Maximum Dry Density	120.9	PCF.	Optimum Moisture Content	11.4%
AASHTO T99 - - Method A				



Soil Properties	
Natural Moisture Content	11.6%
Specific Gravity of Soil	2.650
Liquid Limit	32
Plastic Limit	19
Plastic Index	13
% Passing	
#4	99.0%
#10	96.0%
#20	82.0%
#40	57.0%
#60	42.0%
#100	36.0%
#200	30.6%
#270	28.9%
Oversize Fraction	

Moisture-Density Curve Displayed: Fine Fraction Corrected for Oversize Fraction (ASTM D 4718)
Sieve Size used to separate the Oversize Fraction: #4 Sieve 3/8 inch Sieve 3/4 inch Sieve
Mechanical Rammer Manual Rammer Moist Preparation Dry Preparation

References / Comments / Deviations: ND: Not Determined

AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

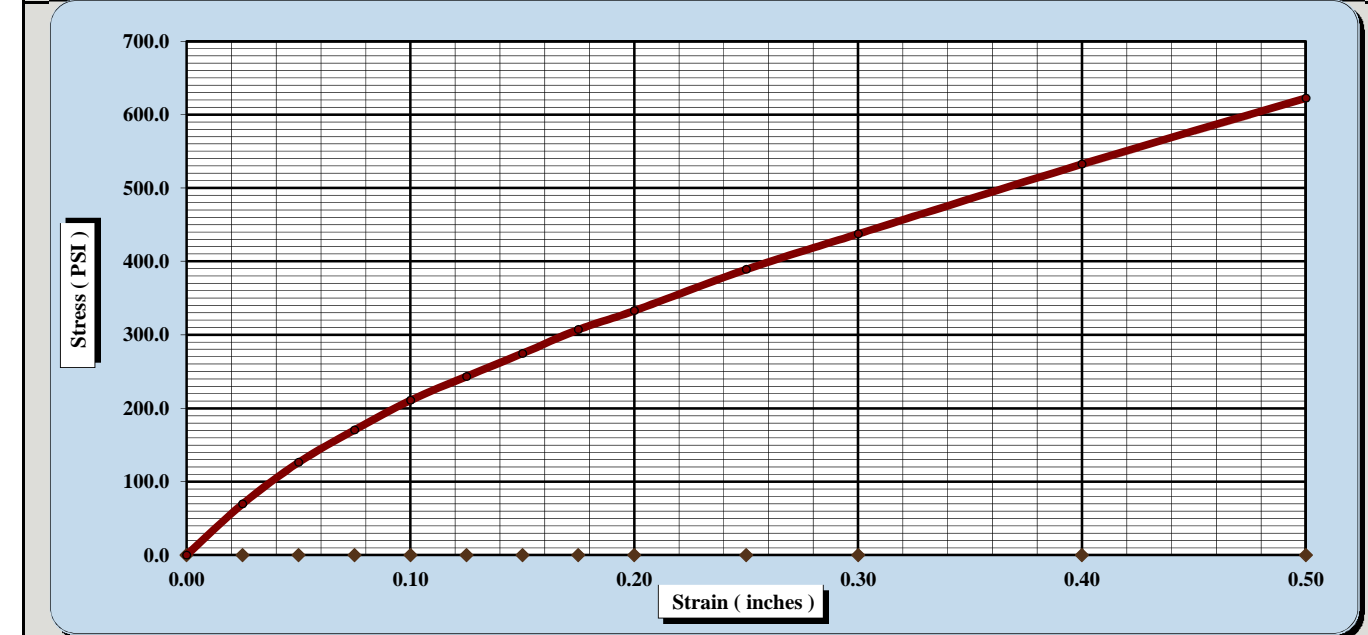
Stewart Laney _____ Project Manager _____
Technical Responsibility Signature Position Date

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AASHTO T 193

S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273			
Project #:	6235-17-033	Report Date:	1/28/18
Project Name:	Roadway Widening for NC 211	Test Date(s)	1/4-9/18
Client Name:	MottMacDonald		
Client Address:	Fuquay-Varina, NC		
Boring #:	L-19822	Sample #:	S-3 B
		Sample Date:	12/4/17
Location:	Borehole	Offset:	8 RT
		Elevation:	0-15'
Sample Description:	A-2-6		
AASHTO T99	Method A	Maximum Dry Density:	120.9 PCF
		Optimum Moisture Content:	11.4%
	Line 20: Use an alternate description here if applicable	% Retained on the 3/4" sieve:	0.0%

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in.	21.1	CBR at 0.2 in.	22.2
		CBR at 0.1 in.	21.1
		CBR at 0.2 in.	22.2



CBR Sample Preparation: *Performed on the fine fraction*
Grading was in accordance with the above method and compacted using the 6" diameter CBR mold.

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	56	Final Dry Density (PCF)	121.2
Initial Dry Density (PCF)	121.0	Moisture Content (top 1" after soaking)	13.0%
Moisture Content of the Compacted Specimen	11.3%	Percent Swell	0.1%
Percent Compaction	100.1%		

Soak Time:	96 hrs.	Surcharge Weight	10.0	Surcharge Wt. per sq. Ft.	50.9
Liquid Limit	32	Plastic Index	13	Assumed Apparent Relative Density	2.650

Notes/Deviations/References:

<u>Stewart Laney</u>	_____	<u>Project Manager</u>	_____
Technical Responsibility	Signature	Position	Date

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