

CONTRACT: C201371 ID. R-2502A

# STATE OF NORTH CAROLINA

## DEPARTMENT OF TRANSPORTATION

### DIVISION OF HIGHWAYS

#### GEOTECHNICAL UNIT

# SUBSURFACE INVESTIGATION

STATE PROJECT 34438.1.1 I.D. NO. R-2502A

F.A. PROJECT \_\_\_\_\_

COUNTY RICHMOND

DESCRIPTION US 1 FROM SOUTH OF SR 1001

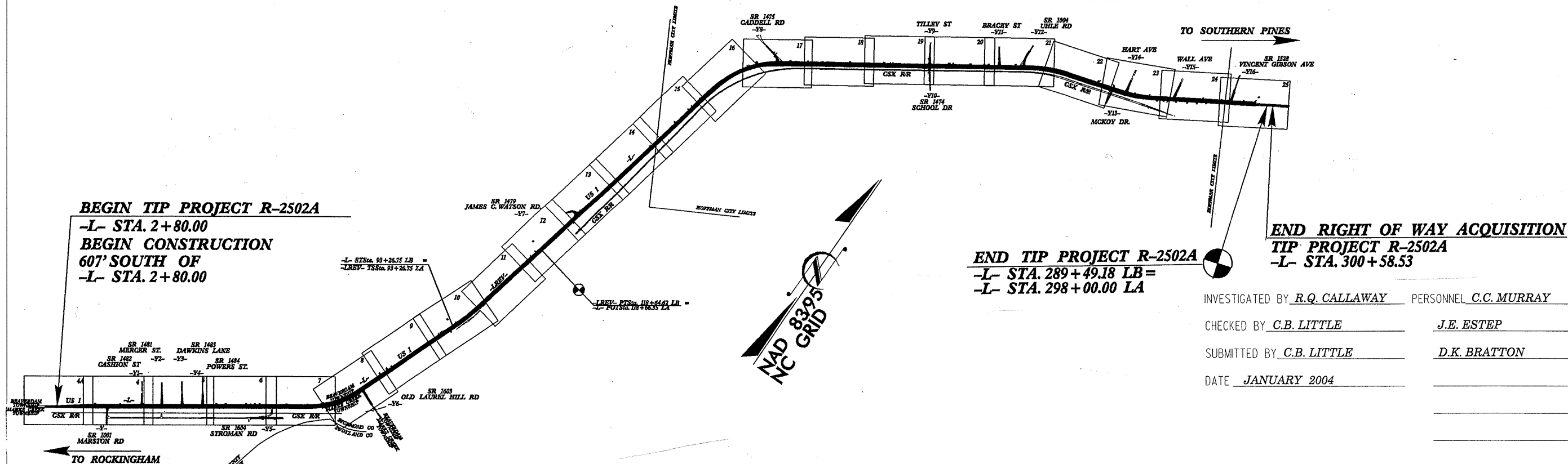
(MARSTON RD.) TO NORTH OF SR 1528

(VINCENT GIBSON AVE.) JUST NORTH OF HOFFMAN

#### CONTENTS:

LINE	STATION	SHEET NUMBERS	
		PLAN	PROFILE X-SECTS.
-L-	10+00.00 to 289+49.18	4-25	26-36
-Y-	13+25 to 13+75	4	37
-Y1-	10+32 to 11+50	4	37
-Y2-	10+75 to 12+00	5	37
-Y3-	10+32 to 11+50	5	37
-Y4-	10+32 to 12+00	5	37
-Y5-	10+50 to 16+50	6,7	37
-Y6-	12+50 to 13+67	8	38
-Y7-	10+32 to 17+30	12	38
-Y8-	10+32 to 12+50	17	38
-Y9-	10+32 to 11+50	20	38
-Y10-	12+75 to 13+14	20	38
-Y11-	10+50 to 11+50	21	38
-Y12-	10+32 to 12+50	21	39
-Y13-	12+70 to 13+07	23	39
-Y14-	10+33 to 11+75	23	39
-Y15-	10+35 to 13+00	24	39
-Y16-	10+34 to 12+00	25	39

"Refer to Sheet 2A for plan sheet layout at the time of investigation."



**BEGIN TIP PROJECT R-2502A**

-L- STA. 2+80.00  
**BEGIN CONSTRUCTION**  
 607' SOUTH OF  
 -L- STA. 2+80.00

**END TIP PROJECT R-2502A**

-L- STA. 289+49.18 LB=  
 -L- STA. 298+00.00 LA

**END RIGHT OF WAY ACQUISITION**

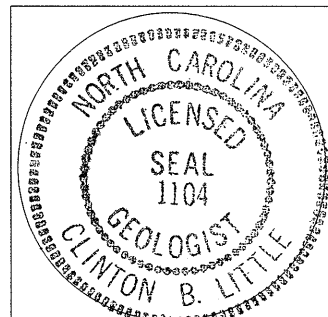
TIP PROJECT R-2502A  
 -L- STA. 300+58.53


INVESTIGATED BY R.Q. CALLAWAY PERSONNEL C.C. MURRAY  
 CHECKED BY C.B. LITTLE J.E. ESTEP  
 SUBMITTED BY C.B. LITTLE D.K. BRATTON  
 DATE JANUARY 2004

DRAWN BY: J.K. McClURE /R.Q. CALLAWAY

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SEAL 1-6-04  
  
 SIGNATURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2502A	1	39
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34438.1.1		PE	
34438.2.3		ROW, UTIL	
34438.3.3		CONST	

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2502A	2A	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34438.1.1		PE	

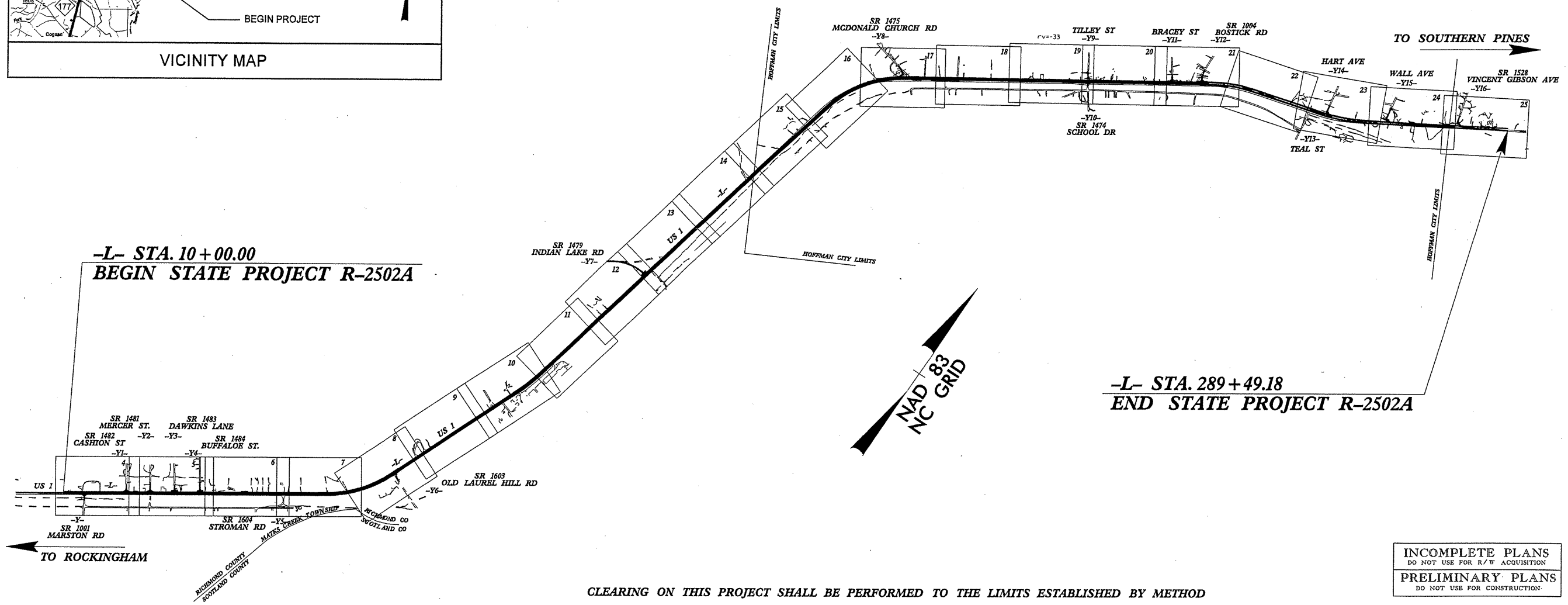
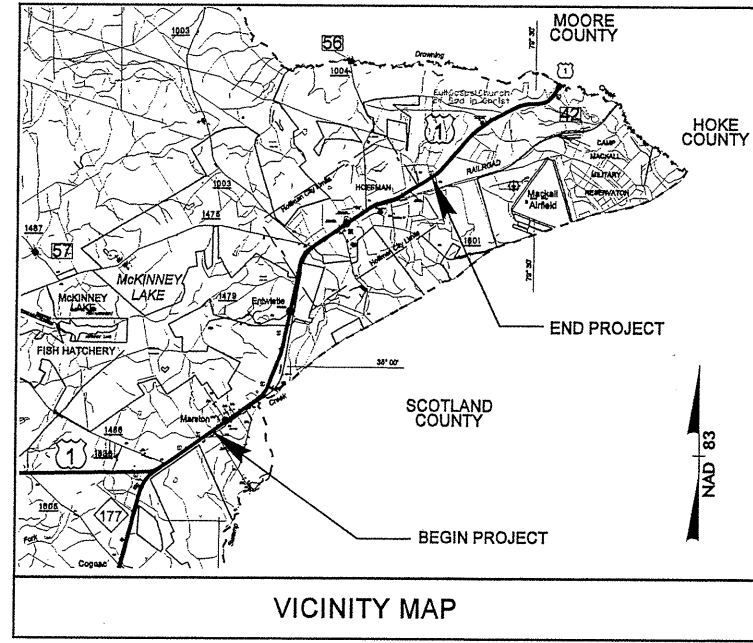
See Sheet 1-A For Index of Sheets

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**RICHMOND COUNTY**

LOCATION: US 1 FROM SOUTH OF SR 1001 (MARSTON RD)  
TO NORTH OF SR 1528 (VINCENT GIBSON AVE)  
JUST NORTH OF HOFFMAN  
TYPE OF WORK: GRADING, PAVING & DRAINAGE

CONTRACT: TIP PROJECT: R-2502A

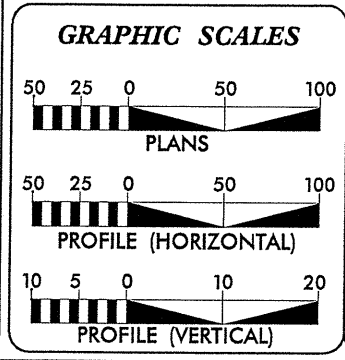


-L- STA. 10+00.00  
BEGIN STATE PROJECT R-2502A

-L- STA. 289+49.18  
END STATE PROJECT R-2502A

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD

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



**DESIGN DATA**

ADT 2006 =	10680
ADT 2025 =	17200
DHV =	11 %
D =	60 %
T =	10 % *
V =	60 MPH
* TTST 5 %	DUAL 5 %

**PROJECT LENGTH**

TOTAL LENGTH STATE PROJECT R-2502A 5.293 MI

Prepared for the North Carolina Department of Transportation In the Office of:

**WETHERILL ENGINEERING**  
559 Jones Franklin Rd. Suite 164  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN  
BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS  
CONSTRUCTION OBSERVATION

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 18, 2004	E. G. WETHERILL, PE PROJECT ENGINEER
LETTING DATE: JUNE 20, 2006	
PROD. LETTING DATE: JAN. 18, 2005	B. A. MAY, PE PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

**ROADWAY DESIGN ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

**DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA**

STATE DESIGN ENGINEER \_\_\_\_\_ P.E.

DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

APPROVED \_\_\_\_\_ P.E.  
DIVISION ADMINISTRATOR DATE \_\_\_\_\_

\*\*\*\*\*SYSTEMS\*\*\*\*\*  
\*\*\*\*\*PRINTED\*\*\*\*\*



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

MICHAEL F. EASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

December 11, 2003

**State Project:** 3448.1.1 (R-2502a)  
**Federal Project:**  
**County:** Richmond  
**Description:** US 1 From South of SR 1001 (Marston Rd.) to North of SR 1528 (Vincent Gibson Ave.) Just North of Hoffman. Grading, Paving and Drainage  
**Subject:** Geotechnical Report - Inventory

**Project Description**

This is a report of an English-units geotechnical investigation for a project that will upgrade a 5.3 mile section of Highway US 1 east of Rockingham in Richmond County. The CSX rail line runs parallel to the roadway for the length of the project. In the community of Hoffman, the roadway is on land claimed by the railroad as right of way.

The project starts in the community of Marston, just east of the Rockingham Speedway. The inclusion of 16 Y lines mostly just involving paving adds 3349 feet to the project for a total length of 5.93 miles. US-1 will be widened to four lanes or more and the intersections with adjacent roads will be improved.

The following lines were investigated:

-L- Line:	10+00 to 289+49	27,949ft
-Y-:	13+25 to 13+75	50ft
-Y1-:	10+32 to 11+50	118ft
-Y2-:	10+75 to 12+00	125ft
-Y3-:	10+32 to 11+50	118ft
-Y4-:	10+32 to 12+00	168ft
-Y5-:	10+50 to 16+50	650ft
-Y6-:	12+50 to 13+67	117ft
-Y7-:	10+32 to 17+30	700ft
-Y8-:	10+32 to 12+50	218ft
-Y9-:	10+32 to 11+50	118ft
-Y10-:	12+75 to 13+14	39ft
-Y11-:	10+50 to 11+50	100ft
-Y12-:	10+32 to 12+50	218ft
-Y13-:	12+70 to 13+07	37ft
-Y14-:	10+33 to 11+75	142ft
-Y15-:	10+35 to 13+00	265ft
-Y16-:	10+34 to 12+00	166ft

**Areas of Special Geotechnical Interest**

**Highly Plastic Soil**

Large intervals of the alignment are underlain by clayey sand soil that returns an A-2-6, A-2-7, A-6 or A-7 AASHTO classification. This stratum is largely impermeable, and the soil is often hard and dry. This material is usually covered by loose non-plastic sand. The intervals within 5 feet of finished grade that are indicated on the profile sheets are listed below.

**Intervals of Highly Plastic Soil Within 5' of Finished Grade.**

Interval	PI of Samples	Average PI
13+00 to 18+00	23,24,61,31	34
37+00 to 39+50	16,32	24
57+00 to 60+50	30,19,33,11,21,35	25
64+00 to 69+00	23,34,16	24
205+00 to 214+00	20,27,14,44	26
220+00 to 214+00	18, 21, 31	23
237+50 to 239+00	24,19	21
244+00 to 257+00	16,32,14,14,34	22

**High Groundwater**

No wetlands are identified on the plans but extensive intervals of groundwater within 5 feet of finished grade were identified, and are listed below. Comparison with the list above will show the correspondence between the shallow high PI soil intervals and the shallow groundwater.

**Intervals of Groundwater Within 5' of Finished Grade**

- 11+00 to 17+50
- 37+00 to 38+50
- 56+50 to 59+50
- 196+00 to 226+00
- 231+00 to 250+00
- 255+00 to 258+50

**Physiography and Geology**

The project is within the Piedmont physiographic province in the Carolina Slate Belt litho-tectonic province. Coastal plain sediments cover the area.

**Topographic Setting**

This path of the roadway is east-northeast, then northeast then east-northeast, following the crest of a ridge. The topography along the ridge top is rolling, with lows around 420' and highs around 440' until the end of the project, where the road drops to 410, starting the prolonged descent to Drowning Creek.

**Surface Drainage and Geomorphology**

This area has been interpreted to be a terrace or plain that has been dissected into remnant flat areas connected by narrow ridges. The beginning of this project is at an elevation of about 420 at the edge of a flat area that includes the community of Marston. Not far east the road bends to the northeast and skirts the upper ends of small valleys draining to the left and the right. Before reaching Hoffman, the roads bends back to the original heading on another remnant of the old plain, at an elevation of about 420'. The project is drained by the PeeDee River to the west, the Lumber River to the East, and the Little Pee Dee to the south.

**Surface Drainage**

Ordinarily, stream channels are assumed to start as little runoff features that gather rainwater into rivulets, which join eventually to form streams etc. The Pinehurst sand which occurs at the surface is so loose and so porous that rainwater must sink into the soil immediately. No gullies

or runoff erosion features are developed on the Pinehurst. Stream valleys do head up in topographic lows crossed by the road, but rather than the Pinehurst being thinner in these areas, the top of the Cretaceous seems to be lower. Water may be sinking through the Pinehurst to the clayey units at the top of the Cretaceous section, then through the subsurface to wetland outflows on the flanks of the ridge.

**Geology**

Only the Cretaceous and younger geology, (sand hills) is pertinent to this project.

**Soils Properties**

A general description follows immediately below, and a detailed description of the subsurface may be found under the segment descriptions in the **Geotechnical Descriptive Analysis** section, farther along in the report. Relationships from the drilling result in a tentative identification of two and possibly three sedimentary units in a stratigraphic column for the project. When the soils are divided on the basis of the field identification and then the soil test results are averaged, the Pinehurst average fits in the A-3 classification and the Middendorf average returns an A-2-6.

Formation	%coarse sand	%fine sand	%silt	%clay	PI	LL	%pass200	%pass 40
Pinehurst	64%	26.3%	3.8%	5.8%	NP	20	10.4%	61%
Middendorf	50%	18.8%	5.2%	25.7%	20	38	32%	66

**Pinehurst Formation:**

The soil assigned to this unit is non-plastic A-3, A-2-4 or A-1 sand, found at land surface. The Pinehurst is a named formation that occurs on ridge-tops in Richmond, Hoke, Scotland and Moore Counties. It is white or red unconsolidated, highly porous, usually with more than 50% coarse grains, almost no silt, and very little clay content. The accepted interpretation is that the unit was deposited as windblown sand, in dunes during the Eocene Epoch of the Tertiary Period, (50 to 30 million years ago). On this project it was commonly 10' thick or more.

**Middendorf, Clayey Sand:**

Medium dense, impermeable, clay supported clayey sand, usually wet, sometimes mottled was found below the Pinehurst unit, described above. No outcrop was identified, though it was found within 3' of the surface by drilling. AASHTO classifications of A-2-6, A-2-7, A6, and A-7 were established by analysis. When drilling was carried below the Pinehurst Formation, this clayey coarse sand was always found. The character of this unit is consistent with the description of the Middendorf Formation, a late Cretaceous stratigraphic unit, deposited about 83 million years ago in a lower coastal plain, delta, and near shore environment.

**Fluvial Unit:**

Below the Clayey Sand, (described above), a cross-bedded sandy unit with sand and clay beds deposited by fluvial processes has been encountered in outcrop elsewhere. In a few borings on this project, sandy rather than clayey soil was found below the A-6 and A-7 "Clayey Sand" and may be from this second Middendorf unit.

**Rock Properties**

No rock was found within the limits of this investigation.

**Groundwater Properties**

On this project, groundwater occurs in permeable poorly consolidated sand beds or layers over impermeable clay rich beds, as perched aquifers. Wherever the unit described above as "Clayey Sand" occurred, there was water measured in the boring. In intervals where drilling did not traverse the Pinehurst to an underlying unit, the borings were dry. Areas of shallow groundwater are listed in the Areas of Special Geotechnical Interest section above, this report.

**Geotechnical Descriptive Analysis of the Project**

The project was divided into 4 segments based on subsurface geology. **Segment 1** is the -L- line from the beginning of the project at -L-10+00 to -L- 120+00. **Segment 2** is the interval from -L-120+00 to -L-171+00. **Segment 3** runs from -L-171+00 to -L-259+00. **Segment 4** runs from -L-259+00 to the end at -L-290+00.

**Segment 1. Station -L-10+00 to -L- 120+00, (Including -Y- Lines).**

This segment begins in the community of Marston, not far east of the Rockingham speedway on US-1, and ends at SR 1479. This segment has loose non-plastic unconsolidated Pinehurst sand, generally less than 10' thick, over Middendorf clayey sand. There are intervals under the hilltops (listed immediately below) with sand thicker than 10' and no clayey sand, but the sense from the profile is that the clayey units probably are just below the reach of the borings.

**Physical Description**

The road begins on a remnant of a flat plain, and travels N55E up to -L- 58+00 where it leaves the plain for a ridge and turns north to N10E. It follows topography periodically rising as high as 440' elevation and falling to 425' elevation, until the end where it drops to an elevation of 411'.

Valley Bottom		Hilltops	
-L- Station	Elevation	-L- Station	Elevation
10+00	426	27+00	430
33+00	421	48+00	440
63+00	422	76+00	443
88+00	426	103+00	432
115+00	414		

**Cuts and Fills**

The significant (more than 5' thick) cuts and fills of this segment, are listed in the table below. Most of the segment will be built on or near existing grade with little fill or cut.

Cut			Fill		
From	To		From	To	
58+50	60+50	Left			
			61+50	64+50	Left and Right
64+50	67+50	Right			
			87+50	89+00	Left and Right
93+50	100+00	Left			

**Soil**

Two different and identifiable sand formations are found: The upper loose sand was identified as Pinehurst, the lower clayey unit was identified as Middendorf.

**Pinehurst Formation**

The uppermost material is A-2-4, A-1 or A-3 non-plastic sand from 3' to over 10' thick. This sand is non-plastic and usually very loose to loose. This material would be expected to be stable at slopes no steeper than the angle of repose for sand: 32 to 34 degrees, (about 2:1 horiz:vert). Coarse sand accounts for about 65% of this material, with clay usually around 5%.

**Middendorf**

The dominant soil type below the loose sand is clayey sand with coarse sub angular to sub rounded coarse quartz grains in a clay matrix. Layers or lenses of pure clay sampled as well and account for some of the extremely high PI values. Coarse sand accounts for about 50% of this unit, but clay is commonly 25% or more.

**Soil Plasticity**

The areas with PI values above 20 that are within 10' of finished grade, are listed below

Location	Grade +or -	Soil Class	Thickness	Consistency	PI
-L-14+00, to 17+50	-5'	A-7	10+	Stiff to V. Stiff	20 to 35
-L-35+00, to 40+50	-2 to -8'	A-7, A-6	5.0.+	Med Stiff to Hard	25 to 30
-L-57+00, to 61+00	-0 to -6'	A-7-6	2.0+	V.Stiff to Hard	20 to 30
-L-66+00, to 69+00	-5 to -8'	A-7-6	5.0+	Stiff to V. Stiff	20 to 30
-L-81+50 to 86+50	-8.0'	A-2-7	5.0+	Very Stiff	20to 35

**Fill Soil**

The existing road is built at grade in most places. Fill supported roadway was found at the following locations: No evidence of failure was seen in the existing roadbed.

Location	Thickness
39+50 to 42+50	5'
61+00 to 64+00	8'
86+50 to 88+50	15'

**Groundwater**

The areas where groundwater was measured within 5' of present ground surface are listed below.

Location	Depth Below Grade to Water
11+00 to 18+00	5' to 2'
37+00 to 40+50	5'
57+00 to 60+00	5' to 0'
68+00 to 69+00	3'

**Segment2:-L-120+00 to -L-171+00.**

This segment is a straight section underlain by loose dry sand, that traverses one broad hill.

**Physical Description**

This segment of the project continues from SR 1479 to -L- 171+00. The north-northeast bearing of the previous segment continues with this segment to the bend in the road just before Hoffman.

Valley Bottoms		Hilltops	
-L- Station	Elevation	-L- Station	Elevation
120+00	415	136+50	422
142+00	414	155+50	441
171+00	430		

**Soil**

**Alluvial Soil**

The Pinehurst formation is continuous on the surface of this segment, and is the only material that was found in the subsurface. It is possible that the topography above a base elevation of 415 to 420 is all Pinehurst sand. The soil samples were all A-1, A-2-4, or A-3, non-plastic, very loose to loose moist to dry.

**Cuts and Fills**

The significant (more than 5' thick) cuts and fills of this segment, are listed in the table below. Most of the segment will be built on or near existing grade with little fill or cut.

Cut			Fill	
From	To		From	To
121+50	126+00	Right		
134+00	140+00	Right		
145+00	148+00	Right		
121+50	126+00	Right		

**Groundwater**

This sand is so porous that water just sinks through it down to the impermeable layers of the underlying formation. No groundwater was measured in this segment.

**Segment 3:-L-171+00 to -L-259+00.**

This segment begins just at the bend in the road at Hoffman and continues to Hart Avenue, where the railroad bends away from the highway. This segment is characterized by loose non-plastic unconsolidated Pinehurst sand, generally less than 10' thick, underlain by Middendorf clayey sand. The segment is nearly flat and is characterized by high groundwater in most of the interval.

**Physical Description**

After traversing a curve at the beginning of the section, the road follows a bearing of N 55E from -L- 181 to -L- 240 where it then turns to a bearing of N72 E. It is on grade and slightly downhill.

Valley Bottoms		Hilltops	
-L- Station	Elevation	-L- Station	Elevation
		171+00	430
199+00	425	218+00	430
238+00	420	244+00	424
253+00	417	256+50	423
259+00	418		

**Cuts and Fills**

In general, cuts in the ditches for drainage will supply borrow for the roadway. The result is that the plan views show the segment mostly in cut, and the profiles show the segment all in fill.

**Soil**

The surface of the segment is covered by Pinehurst Formation, wind blown sand, lying above the Middendorf Fm, clayey sand.

**Pinehurst Formation**

The uppermost material is A-2-4, A-1 or A-3 non-plastic sand from about 8' to less than 2' thick. This sand is non-plastic and usually very loose to loose. Coarse sand accounts for about 65% of this material, with clay usually around 5%.

**Middendorf Formation**

The dominant soil type below the Pinehurst is clayey sand with coarse sub angular to sub rounded coarse quartz grains in a clay matrix. In this segment the usual soil classification is A-2-6 or A-2-7 with an occasional A-6 or A-7. Coarse sand accounts for about 50% of the samples, but clay is the distinguishing feature, commonly accounting for 25% of the sample.

**Soil Plasticity**

All of the borings in this segment found clayey sand within 10' of the surface with PI values ranging from 15 to 44, with blow count, (N), values of 10 to 15

-L-81+50 to 86+50	-8.0'	A-2-7	5.0+	Very Stiff	20 to 35
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**Fill Soil**

The existing road is built at grade in most places. No evidence of failure was seen in the existing roadbed.

**Groundwater**

The areas where groundwater was measured within 5' of present ground surface are listed below. There were areas with cattails in the ditches of the current roadway.

**Location**

191+00 to 225+00	
231+00 to 243+00	
256+00 to 259+00	erratic

**Segment4: -L-259+00 to -L-289+50.**

This segment is similar to segment 2. It is all sand with insignificant amounts of clay, loose to very loose and dry. The road traverses broad hills that may be all sand above the base elevation. This is the beginning of the gradual descent to Drowning Creek.

**Physical Description**

This segment is from -L- 259+00 to the end of the project at -L- 289+50. The segment begins at a bearing of N72E then at -L-261+00 changes to N55E and continues to the end.

Valley Bottoms		Hilltops	
-L- Station	Elevation	-L- Station	Elevation
259+00	420	269+00	430
275+50	410	284+0	430
293+00	407		

**Soil**

**Alluvial Soil**

The Pinehurst formation is continuous on the surface of this segment, and is the only material that was found in the subsurface. It is possible that the topography above a base elevation of 410 to 420 is all Pinehurst sand. The soil samples were all A-1, A-2-4, or A-3, non-plastic, very loose to loose moist to dry.

**Cuts and Fills**

The valley centered at -L- 275+00 will be filled from 271+00 to 282+00, receiving up to 10' of fill. This is the only significant fill or cut in the segment.

**Groundwater**

This sand is so porous that water just sinks through it to the impermeable layers of the underlying formation. No groundwater was measured in this segment.

**CLOSING STATEMENT**

If any significant changes are made in the design or location of the proposed roadway, the subsurface information and interpretations will have to be reviewed and modified as necessary.

Respectfully Submitted,



R.Q. Callaway

Project Geologist

**EARTHWORK BALANCE SHEET**  
Volumes in Cubic Yards

PROJECT R-2502A COUNTY RICHMOND DATE October 18, 2007 COMPILED BY: ABP SHEET 30 OF 39 SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE				
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. (+) 20%		ROCK	SUITABLE	UNSUIT.	TOTAL	
SUMMARY 1 - LEFT																
-L-	2+80.00 TO 32+80.00	3717				3717	1340		1340	1608				2109		2109
Y1-	11+35.00 TO 12+53.00	27				27	134		134	161	134					
Y2-	11+00.00 TO 12+69.00	8				8	286		286	343	335					
Y3-	11+15.00 TO 12+35.70	106				106							106			106
Y4-	10+70.00 TO 12+39.90	15				15	92		92	110	95					
SUBTOTAL SUMMARY 1		3873				3873	1852		1852	2222	564			2215		2215
SUMMARY 2 - LEFT																
-L-	32+80.00 TO 62+80.00	6774				6774	3877		3877	4652				2122		2122
SUBTOTAL SUMMARY 2		6774				6774	3877		3877	4652				2122		2122
SUMMARY 3 - LEFT																
-L-	62+80.00 TO 92+80.00	3763				3763	4078		4078	4894	1131					
SUBTOTAL SUMMARY 3		3763				3763	4078		4078	4894	1131					
SUMMARY 4 - LEFT																
-L-	92+80.00 TO 122+80.00	5707				5707	2988		2988	3586				2121		2121
Y7-	10+50.00 TO 12+62.59	329				329	150		150	180				149		149
SUBTOTAL SUMMARY 4		6036				6036	3138		3138	3766				2270		2270
SUMMARY 5 - LEFT																
-L-	122+80.00 TO 152+80.00	2441				2441	3602		3602	4322	1881					
SUBTOTAL SUMMARY 5		2441				2441	3602		3602	4322	1881					
SUMMARY 6 - LEFT																
-L-	152+80.00 TO 182+80.00	3329				3329	5066		5066	6079	2750					
Y8-	12+30.00 TO 14+50.00	92				92	329		329	395	303					
SUBTOTAL SUMMARY 6		3421				3421	5395		5395	6474	3053					

EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.



**EARTHWORK BALANCE SHEET**  
Volumes in Cubic Yards

PROJECT R-2502A COUNTY RICHMOND DATE October 18, 2007 COMPILED BY: ABP SHEET 3E OF 39 SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. (+) 20%		ROCK	SUITABLE	UNSUIT.	TOTAL
SUMMARY 7 - LEFT															
-L-	182+80.00 TO 212+80.00	3260				3260	4919		4919	5903	2643				
-Y9-	11+50.00 TO 12+58.50	68				68	35		35	42			26	26	
SUBTOTAL SUMMARY 7		3328				3328	4954		4954	5945	2643		26	26	
SUMMARY 8 - LEFT															
-L-	212+80.00 TO 242+80.00	5548				5548	1934		1934	2321			3227	3227	
-Y11-	11+50.00 TO 12+65.60	42				42	48		48	58	16		303	303	
-Y12-	11+50.00 TO 13+66.70	322				322	16		16	19			303	303	
SUBTOTAL SUMMARY 8		5912				5912	1998		1998	2398	16		3530	3530	
SUMMARY 9 - LEFT															
-L-	242+80.00 TO 272+80.00	9509				9509	4161		4161	4993			4516	4516	
-Y14-	11+35.00 TO 12+77.40	335				335							335	335	
-Y15-	11+00.00 TO 13+67.90	6				6	1339		1339	1607	1601				
SUBTOTAL SUMMARY 9		9850				9850	5500		5500	6600	1601		4851	4851	
SUMMARY 10 - LEFT															
-L-	272+80.00 TO 289+49.10	3174				3174	10110		10110	12132	8958				
-Y16-	10+85.00 TO 12+54.80	352				352	6		6	7			345	345	
SUBTOTAL SUMMARY 10		3526				3526	10116		10116	12139	8958		345	345	
SUMMARY 11 - RIGHT															
-L-	2+80.00 TO 32+80.00	2703				2703	3899		3899	4679	1976				
-Y-	10+32.03 TO 10+65.00	23				23							23	23	
SUBTOTAL SUMMARY 11		2726				2726	3899		3899	4679	1976		23	23	
SUMMARY 12 - RIGHT															
-L-	32+80.00 TO 62+80.00	2736				2736	4127		4127	4952	2216				
-Y5-	10+50.00 TO 16+50.00	3792				3792							3792	3792	
-Y6-	10+32.00 TO 11+50.00	172				172	44		44	53			119	119	
SUBTOTAL SUMMARY 12		6700				6700	4171		4171	5005	2216		3911	3911	

EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

**EARTHWORK BALANCE SHEET**  
Volumes in Cubic Yards

PROJECT R-2502A COUNTY RICHMOND DATE October 18, 2007 COMPILED BY: ABP SHEET 3F OF 39 SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. (+) 20%		ROCK	SUITABLE	UNSUIT.	TOTAL
SUMMARY 13 - RIGHT															
-L-	62+80.00 TO 92+80.00	5972				5972	3295		3295	3954				2018	2018
Y10-	10+32.04 TO 10+70.0	22				22	3		3	4				18	18
SUBTOTAL SUMMARY 13		5994				5994	3298		3298	3958				2036	2036
SUMMARY 14 - RIGHT															
-L-	92+80.00 TO 122+80.00	7148				7148	668		668	802				6346	6346
SUBTOTAL SUMMARY 14		7148				7148	668		668	802				6346	6346
SUMMARY 15 - RIGHT															
-L-	122+80.00 TO 152+80.00	15477				15477	324		324	389				15088	15088
SUBTOTAL SUMMARY 15		15477				15477	324		324	389				15088	15088
SUMMARY 16 - RIGHT															
-L-	152+80.00 TO 182+80.00	6350				6350	2498		2498	2998				3352	3352
SUBTOTAL SUMMARY 16		6350				6350	2498		2498	2998				3352	3352
SUMMARY 17 - RIGHT															
-L-	182+800.00 TO 212+80.0	2870				2870	1473		1473	1768				1102	1102
Y10-	10+32.04 TO 10+70.0	22				22	3		3	4				18	18
SUBTOTAL SUMMARY 17		2892				2892	1476		1476	1772				1120	1120
SUMMARY 18 - RIGHT															
-L-	212+80.00 TO 242+80.0	4703				4703	418		418	502				4201	4201
SUBTOTAL SUMMARY 18		4703				4703	418		418	502				4201	4201
SUMMARY 19 - RIGHT															
-L-	242+80.00 TO 272+80.0	3787				3787	9013		9013	10816	7029				
Y13-	10+32.75 TO 10+70.0	37				37								37	37
SUBTOTAL SUMMARY 19		3824				3824	9013		9013	10816	7029			37	37
SUMMARY 20 - RIGHT															
-L-	272+80.00 TO 289+49.1	4405				4405	156		156	187				4218	4218
SUBTOTAL SUMMARY 20		4405				4405	156		156	187				4218	4218

EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

**EARTHWORK BALANCE SHEET**  
Volumes in Cubic Yards

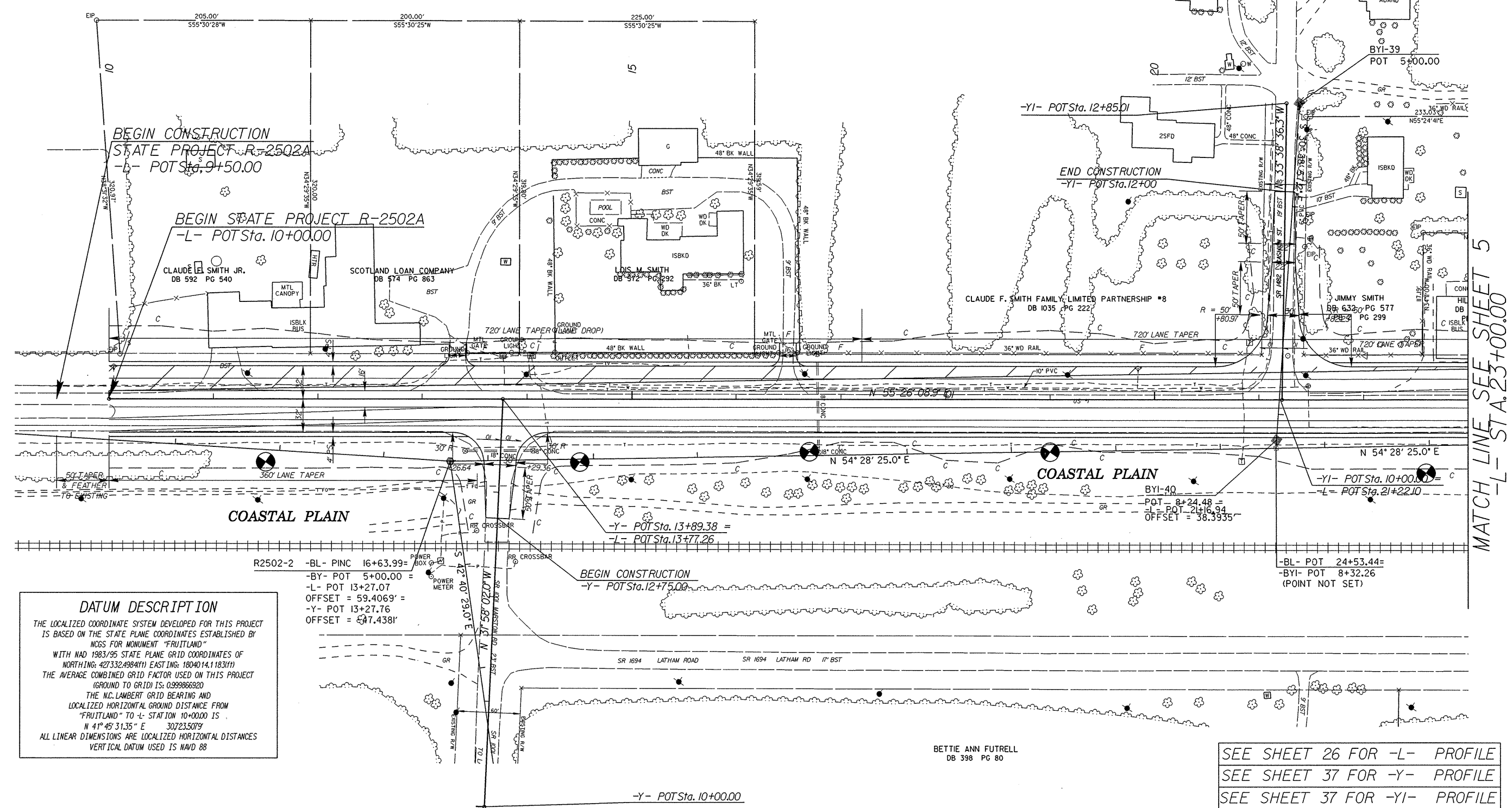
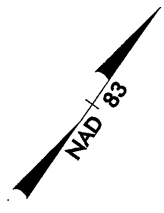
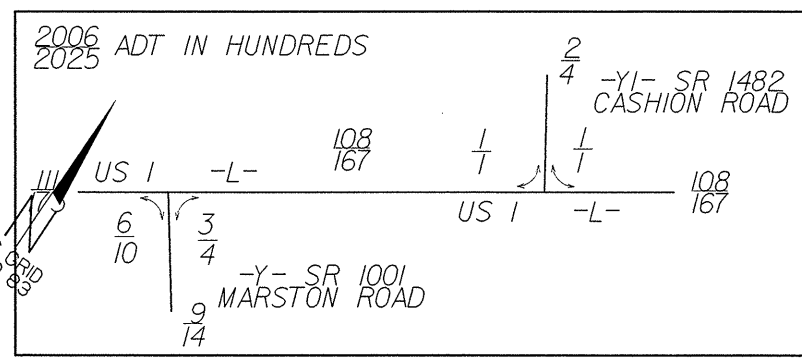
PROJECT R-2502A COUNTY RICHMOND DATE October 18, 2007 COMPILED BY: ABP SHEET 36 OF 39 SHEETS

RD10S01C

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. (+) 20%		ROCK	SUITABLE	UNSUIT.	TOTAL
	R-2502A PROJECT TOTAL	109143				109143	70431		70431	84520	31068		55691		55691
	R-2502B PROJECT TOTAL	76926				76926	111565		111565	133879	109190		52237		52237
	R-2502A/R-2502B TOTAL	186069				186069	181996		181996	218399	140258		107928		107928
	EST. SHLD. MATERIAL LOSS DUE C & G	-2000				-2000					29225				
	EST. WASTE TO REPL. BORROW										2000				
	R-2502A/R-2502B TOTAL	184069				184069					-107115		-107115		-107115
	EST. FOR REPL. TOPSOIL ON BORROW PITS										64368		141		141
	R-2502A/R-2502B TOTAL	184069									3218				141
	SAY	<b>188000</b>									<b>68000</b>				
	R-2502A						R-2502A & R-2502B								
	EST. UNDERCUT EXCAVATION = 3250 CY						EST. UNDERCUT EXCAVATION = 23850 CY								
	EST. DDE = 1712 CY						EST. DDE = 5275 CY								
	EST. SELECT MATERIAL CLASS II OR III = 1000 CY						EST. SELECT MATERIAL CLASS II OR III = 29000 CY								
	EST. SELECT MATERIAL CLASS IV = 500 TONS						EST. SELECT MATERIAL CLASS IV = 1000 TONS								
	EST. SOIL STABILIZATION FABRIC = 8000 SY						EST. SOIL STABILIZATION FABRIC = 17200 SY								

EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

PROJECT REFERENCE NO. R-2502A		SHEET NO. 4
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION		
		559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Fax: 919 851 8077 Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION		



REVISIONS

MATCH LINE SEE SHEET 5  
-L- STA. 23+00.00

**DATUM DESCRIPTION**  
 THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCOS FOR MONUMENT "FRUITLAND"  
 WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 427332.4984(11) EASTING: 1804014.1183(11)  
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999866920  
 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "FRUITLAND" TO -L- STATION 10+00.00 IS  
 N 41° 45' 31.35" E 30723.5079'  
 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES  
 VERTICAL DATUM USED IS NAVD 88

R2502-2 -BL- PINC 16+63.99=  
 -BY- POT 5+00.00 =  
 -L- POT 13+27.07  
 OFFSET = 59.4069' =  
 -Y- POT 13+27.76  
 OFFSET = 57.4381'

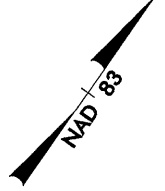
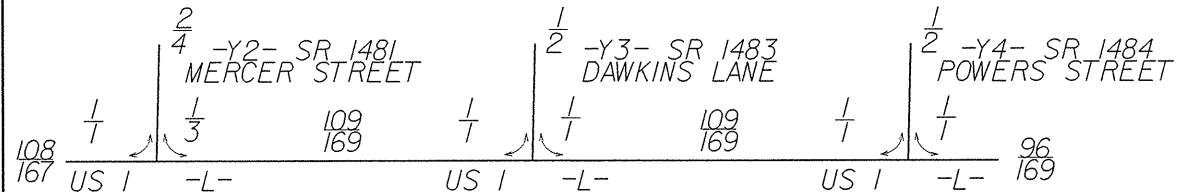
BETTIE ANN FUTRELL  
 DB 398 PG 80

SEE SHEET 26 FOR -L- PROFILE  
 SEE SHEET 37 FOR -Y- PROFILE  
 SEE SHEET 37 FOR -YI- PROFILE

8/17/09

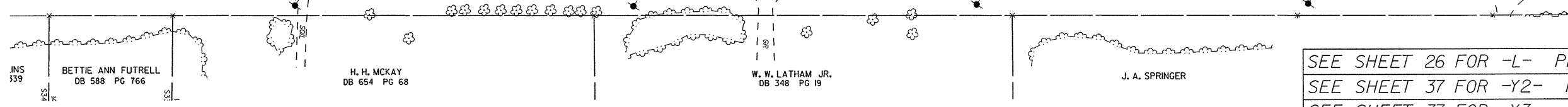
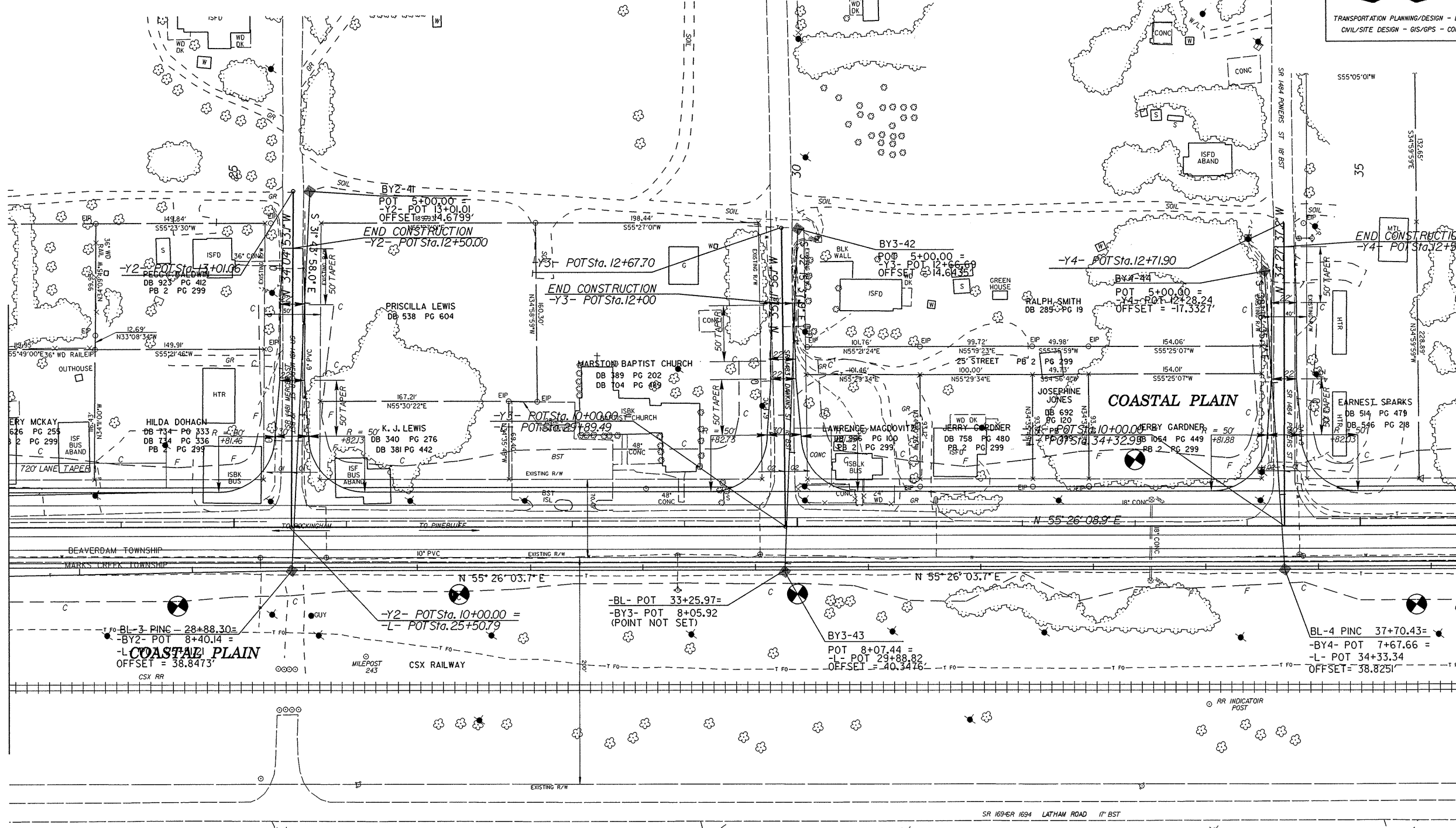
PROJECT REFERENCE NO. R-2502A		SHEET NO. 5
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION		
		559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27604 Bus: 919 851 8077 Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION		

2006 ADT IN HUNDREDS  
2025



MATCH LINE SEE SHEET 4  
-L- STA. 23+00.00


MATCH LINE SEE SHEET 6  
-L- STA. 36+00.00



SEE SHEET 26 FOR -L- PROFILE  
 SEE SHEET 37 FOR -Y2- PROFILE  
 SEE SHEET 37 FOR -Y3- PROFILE  
 SEE SHEET 37 FOR -Y4- PROFILE

8/17/05

REVISIONS

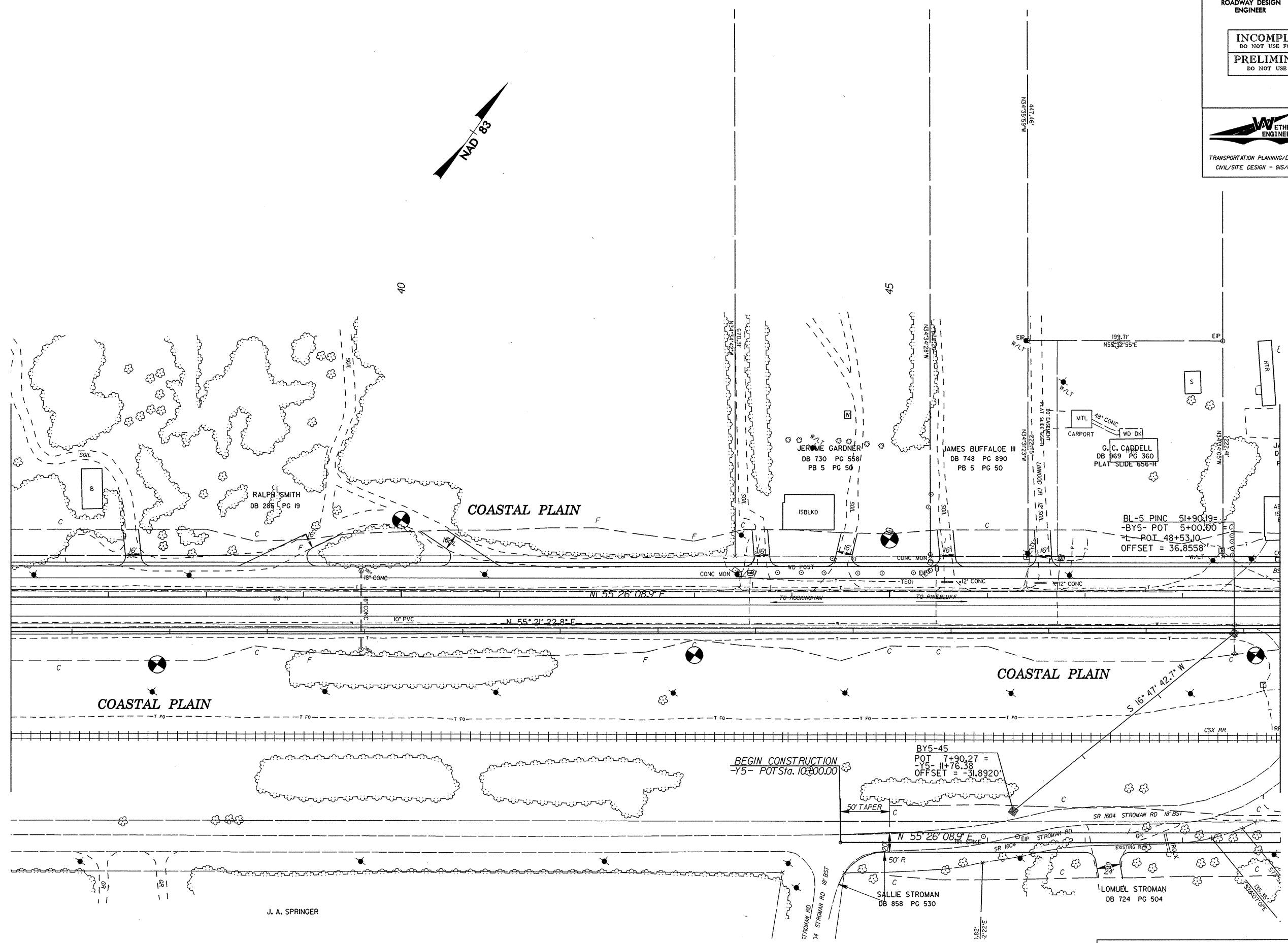
PROJECT REFERENCE NO. R-2502A	SHEET NO. 6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
	
<small>559 Jones Franklin Rd. Suite 164          Raleigh, N.C. 27606          Bus: 919 851 8077          Fax: 919 851 8107</small>	
<small>TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN          CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION</small>	

8/17/03

REVISIONS

MATCH LINE SEE SHEET 5  
-L- STA. 36+00.00

MATCH LINE SEE SHEET 7  
-L- STA. 49+00.00




BEGIN CONSTRUCTION  
-Y5- POT Sta. 10+00.00

BY5-45  
POT 7+90.27 =  
-Y5- II+76.38  
OFFSET = -31.8920'

BL-5 PINC 51+90.19 =  
-BY5- POT 5+00.00  
-L- POT 48+53.10  
OFFSET = 36.8558'

SEE SHEET 27 FOR -L- PROFILE  
SEE SHEET 37 FOR -Y5- PROFILE

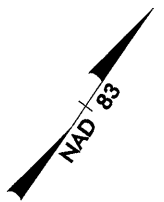
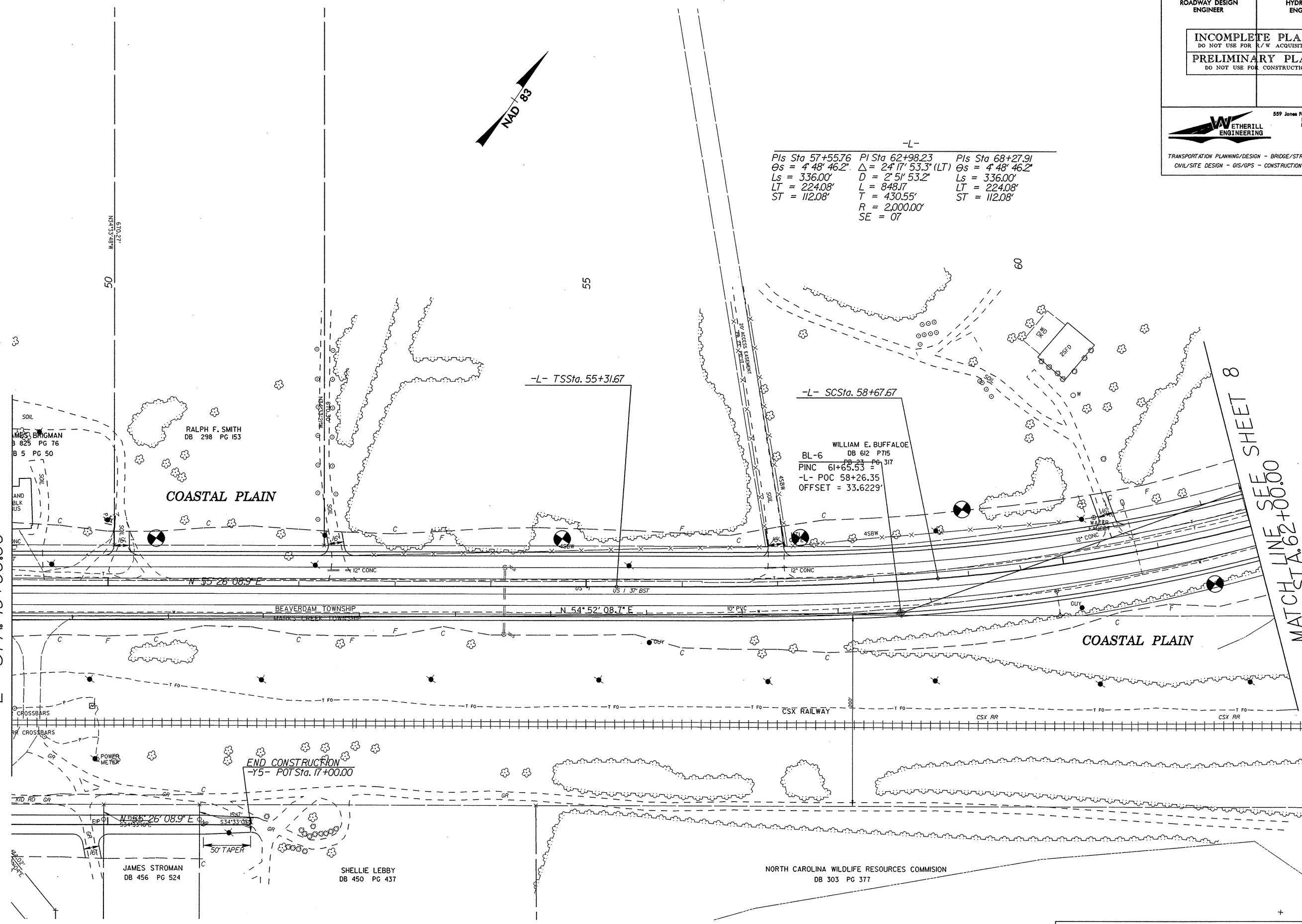
PROJECT REFERENCE NO. R-2502A	SHEET NO. 7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
	
<small>559 Jones Franklin Rd. Suite 144          Raleigh, N.C. 27606          Bus: 919 851 8077          Fax: 919 851 8107</small>	
<small>TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN          CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION</small>	

-L-

Pls Sta 57+55.76	Pl Sta 62+98.23	Pls Sta 68+27.91
$\theta_s = 4' 48'' 46.2''$	$\Delta = 2' 17'' 53.3''$ (LT)	$\theta_s = 4' 48'' 46.2''$
$L_s = 336.00'$	$D = 2' 51'' 53.2''$	$L_s = 336.00'$
$LT = 224.08'$	$L = 848.17'$	$LT = 224.08'$
$ST = 112.08'$	$T = 430.55'$	$ST = 112.08'$
	$R = 2,000.00'$	
	$SE = 07$	

MATCH LINE SEE SHEET 6  
-L- STA. 49+00.00

MATCH LINE SEE SHEET 8  
-L- STA. 62+00.00



REVISIONS

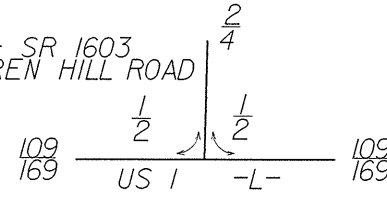
DATE: 08/17/94

SEE SHEET 27 FOR -L- PROFILE  
SEE SHEET 37 FOR -Y5- PROFILE

8/17/04

2006 ADT IN HUNDREDS  
2025

-Y6- SR 1603  
OLD LAUREN HILL ROAD



PROJECT REFERENCE NO. R-2502A SHEET NO. 8  
RW SHEET NO.  
ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER  
**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION  
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION  
WETHERILL ENGINEERING  
359 Jones Franklin Rd. Suite 164  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

REVISIONS

MATCH LINE SEE SHEET 7  
-L- STA. 62+00.00

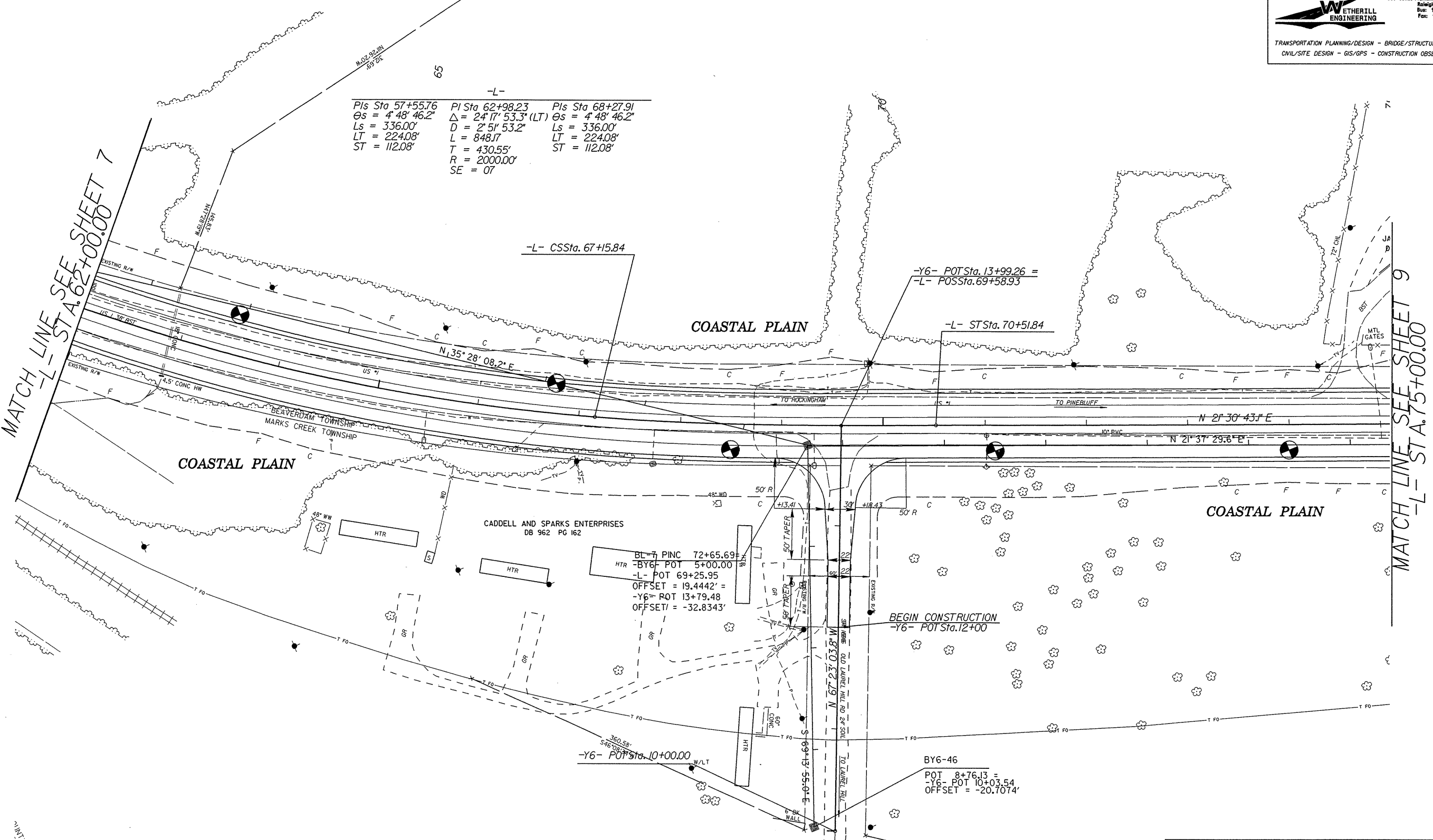
-L-		
PIs Sta 57+55.76	PI Sta 62+98.23	PIs Sta 68+27.91
$\theta_s = 4' 48'' 46.2''$	$\Delta = 24' 17'' 53.3''$ (LT)	$\theta_s = 4' 48'' 46.2''$
$L_s = 336.00'$	$D = 2' 51'' 53.2''$	$L_s = 336.00'$
$LT = 224.08'$	$L = 848.17'$	$LT = 224.08'$
$ST = 112.08'$	$T = 430.55'$	$ST = 112.08'$
	$R = 2000.00'$	
	$SE = 07'$	

-L- CSS Sta. 67+15.84

-Y6- POT Sta. 13+99.26 =  
-L- POS Sta. 69+58.93

-L- ST Sta. 70+51.84

MATCH LINE SEE SHEET 9  
-L- STA. 75+00.00



BL-7 PINC 72+65.69
-BY6- POT 5+00.00
-L- POT 69+25.95
OFFSET = 19.4442'
-Y6- POT 13+79.48
OFFSET = -32.8343'

BEGIN CONSTRUCTION  
-Y6- POT Sta. 12+00

BY6-46  
POT 8+76.13 =  
-Y6- POT 10+03.54  
OFFSET = -20.7074'


SEE SHEET 28 FOR -L- PROFILE  
SEE SHEET 38 FOR -Y6- PROFILE

\*\*\*\*\*SYSTEMS DESIGN\*\*\*\*\*  
\*\*\*\*\*PERMITS\*\*\*\*\*

MINI



8/17/04

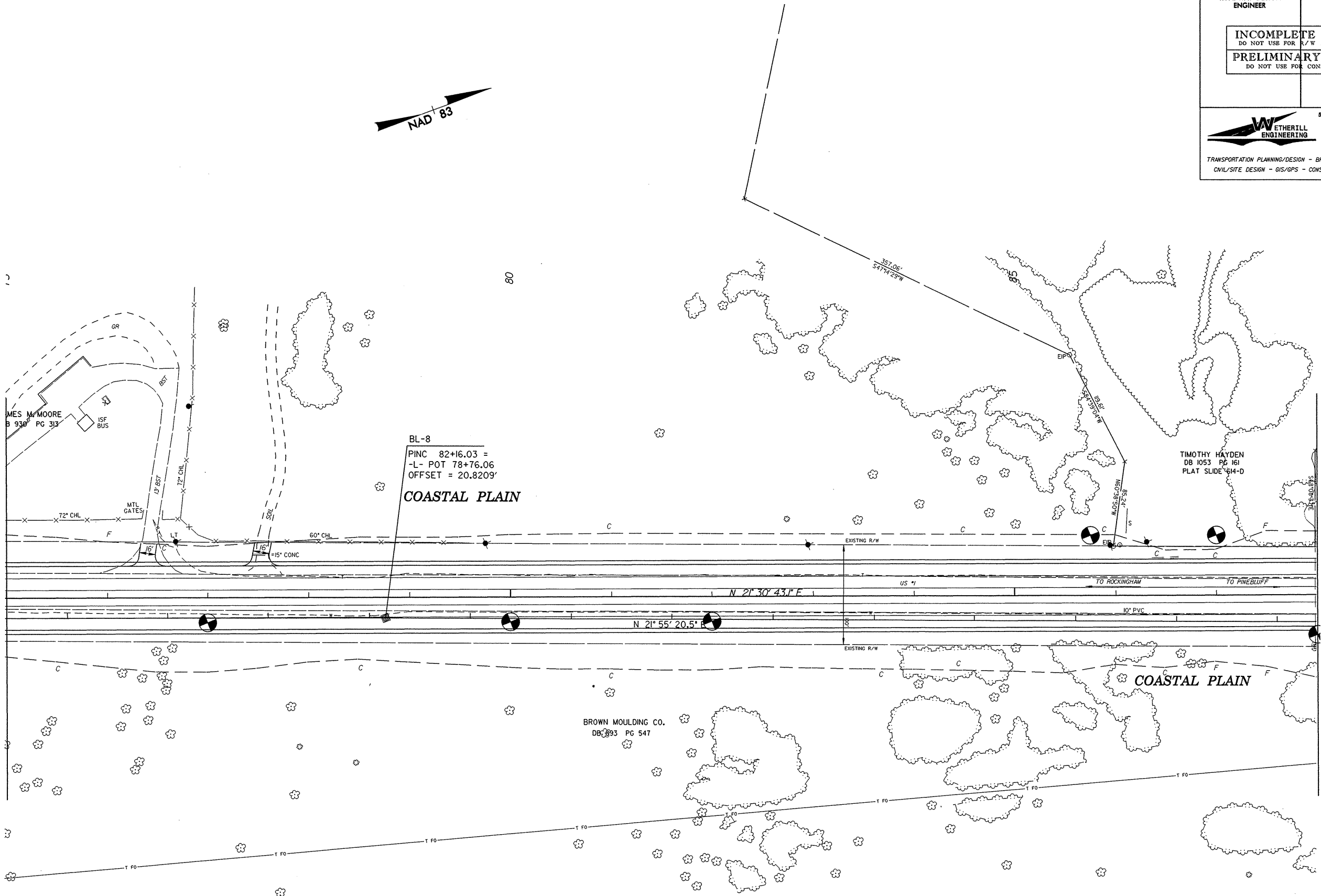
PROJECT REFERENCE NO. R-2502A	SHEET NO. 9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
	
559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	



REVISIONS

MAYCH LINE SEE SHEET 8  
-L- STA. 75+00.00

MAYCH LINE SEE SHEET 10  
-L- STA. 88+00.00



JAMES M. MOORE  
DB 930 PG 313

MTL GATES

BL-8  
 PINC 82+16.03 =  
 -L- POT 78+76.06  
 OFFSET = 20.8209'  
**COASTAL PLAIN**


TIMOTHY HAYDEN  
DB 1053 PG 161  
PLAT SLIDE 614-D

BROWN MOULDING CO.  
DB 893 PG 547

**COASTAL PLAIN**

SEE SHEET 28 FOR -L- PROFILE

\*\*\*\*\*  
 TIME \*\*\*\*\*  
 \*\*\*\*\*  
 \*\*\*\*\*  
 \*\*\*\*\*

PROJECT REFERENCE NO. R-2502A	SHEET NO. 10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
	
<small>559 Jones Franklin Rd. Suite 164          Raleigh, N.C. 27604          Bus: 919 851 8077          Fax: 919 851 8107</small>	
<small>TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN          CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION</small>	

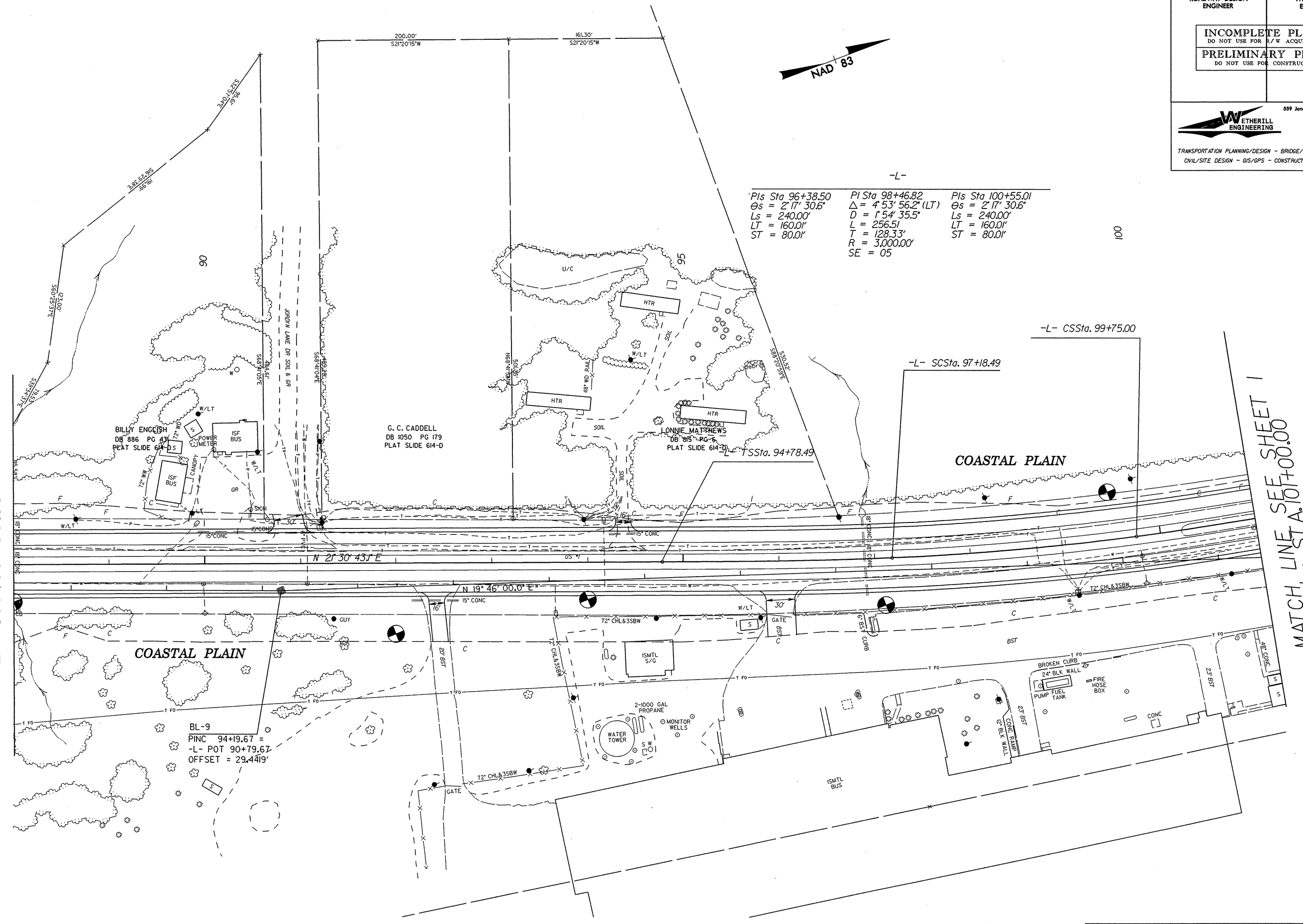


-L-

PIs Sta 96+38.50 Os = 2' 17" 30.6" Ls = 240.00' LT = 160.01' ST = 80.01'	PI Sta 98+46.82 $\Delta = 4' 53" 56.2" (LT)$ D = 1' 54" 35.5" L = 256.51' T = 128.33' R = 3,000.00' SE = 05	PIs Sta 100+55.01 Os = 2' 17" 30.6" Ls = 240.00' LT = 160.01' ST = 80.01'
--	---	---

MATCH LINE SEE SHEET 9  
-L- STA. 88+00.00

MATCH LINE SEE SHEET 1  
-L- STA. 101+00.00



BL-9  
 PINC 94+19.67 =  
 -L- POT 90+79.67  
 OFFSET = 29.449'

SEE SHEET 29 FOR -L- PROFILE

REVISIONS

8/17/93

\*\*\*\*\*SYTIME\*\*\*\*\*  
 \*\*\*\*\*IN \*\*\*\*\*  
 \*\*\*\*\*PLANNING \*\*\*\*\*  
 \*\*\*\*\*DESIGN \*\*\*\*\*



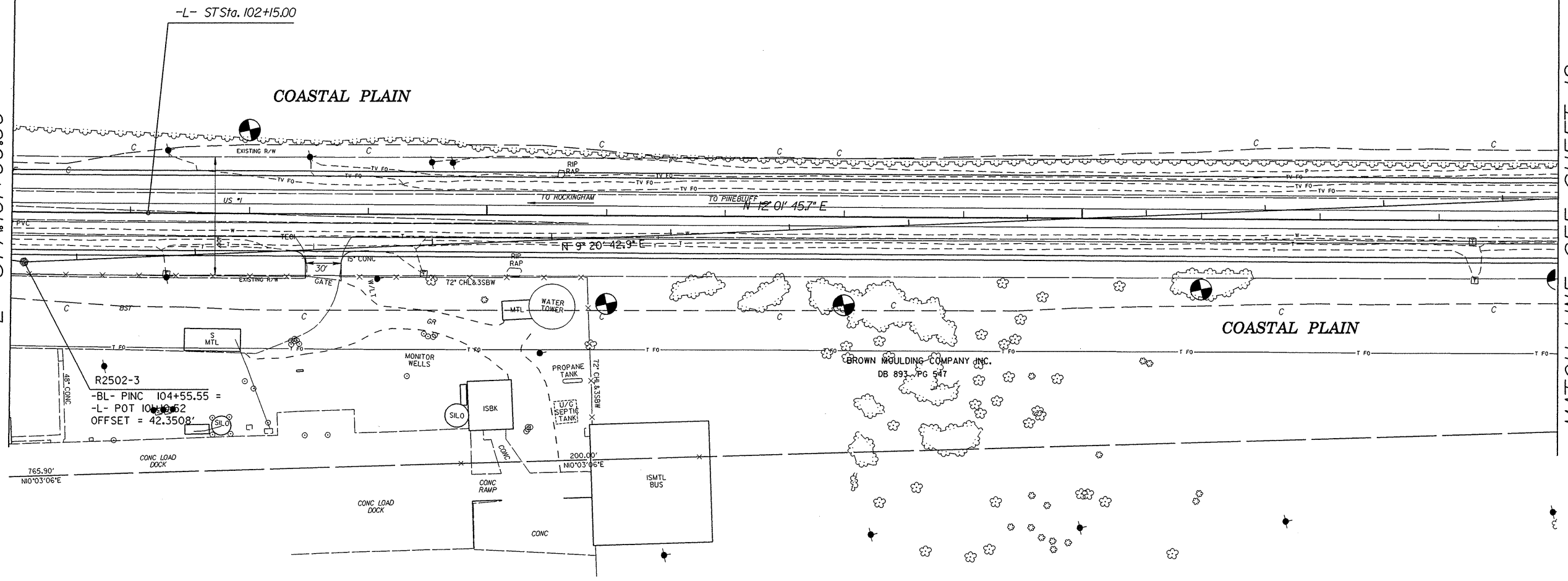
-L-

Pls Sta 96+38.50	PI Sta 98+46.82	Pls Sta 100+55.01
$\Theta_s = 2'17'30.6''$	$\Delta = 4'53'56.2''$ (LT)	$\Theta_s = 2'17'30.6''$
Ls = 240.00'	D = 1'54'35.5"	Ls = 240.00'
LT = 160.01'	L = 256.51'	LT = 160.01'
ST = 80.01'	T = 128.33'	ST = 80.01'
	R = 3,000.00'	
	SE = 05	

H. M. CADDELL  
DB 570 PG 171

MATCH LINE SEE SHEET 10  
-L- STA. 101+00.00


MATCH LINE SEE SHEET 12  
-L- STA. 114+00.00



R2502-3  
-BL- PINC 104+55.55 =  
-L- POT 104+56.62  
OFFSET = 42.3508'

BROWN BUILDING COMPANY INC.  
DB 893 PG 547

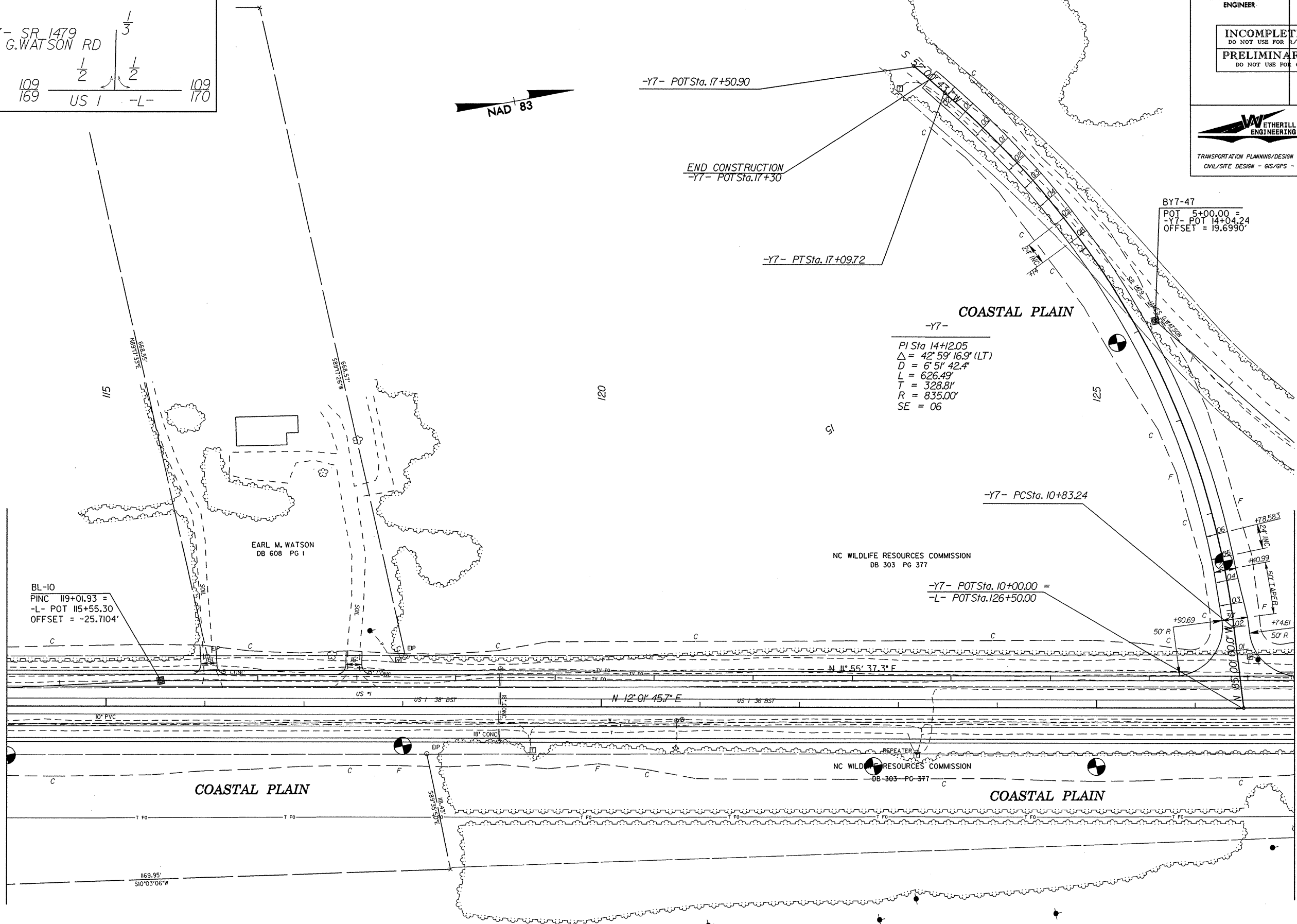
SEE SHEET 29 FOR -L- PROFILE

PROJECT REFERENCE NO. R-2502A	SHEET NO. 12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
	
<small>559 Jones Franklin Rd. Suite 164          Raleigh, N.C. 27606          Bus: 919 851 8077          Fax: 919 851 8107</small>	
<small>TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN          CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION</small>	

2006  
2025 ADT IN HUNDREDS

-Y7- SR 1479  
JAMES G. WATSON RD

109 169    1/2    1/2    109 170  
US 1    -L-



MATCH LINE SEE SHEET 11  
-L- STA. 14+00.00

MATCH LINE SEE SHEET 13  
-L- STA. 127+00.00

SEE SHEET 30 FOR -L- PROFILE  
SEE SHEET 38 FOR -Y7- PROFILE


REVISIONS

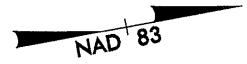
8/17/04

SYSTEMATIC DESIGN

8/17/09

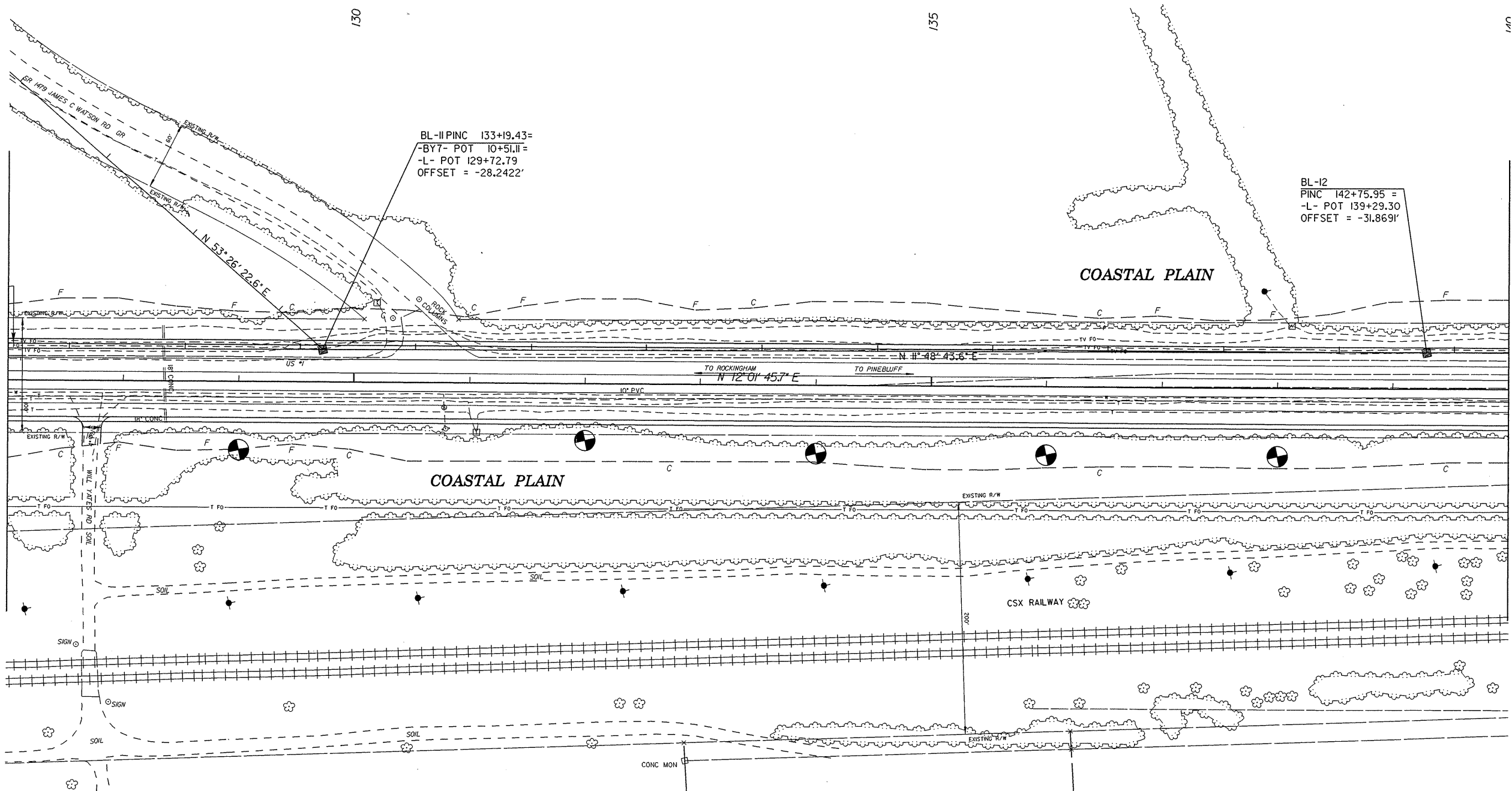
REVISIONS

PROJECT REFERENCE NO. R-2502A	SHEET NO. 13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
	
<small>559 Jones Franklin Rd. Suite 164          Raleigh, N.C. 27606          Bus: 919 851 8077          Fax: 919 851 8107</small>	
<small>TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN          CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION</small>	



MATCH LINE SEE SHEET 12  
-L- STA. 127+00

MATCH LINE SEE SHEET 14  
-L- STA. 140+00




BL-11 PINC 133+19.43 =  
 -BY7- POT 10+51.11 =  
 -L- POT 129+72.79  
 OFFSET = -28.2422'

BL-12  
 PINC 142+75.95 =  
 -L- POT 139+29.30  
 OFFSET = -31.8691'

SEE SHEET 30 FOR -L- PROFILE

\*\*\*\*\*  
 SYSTEMS TIME \*\*\*\*\*  
 DESIGN \*\*\*\*\*  
 \*\*\*\*\*

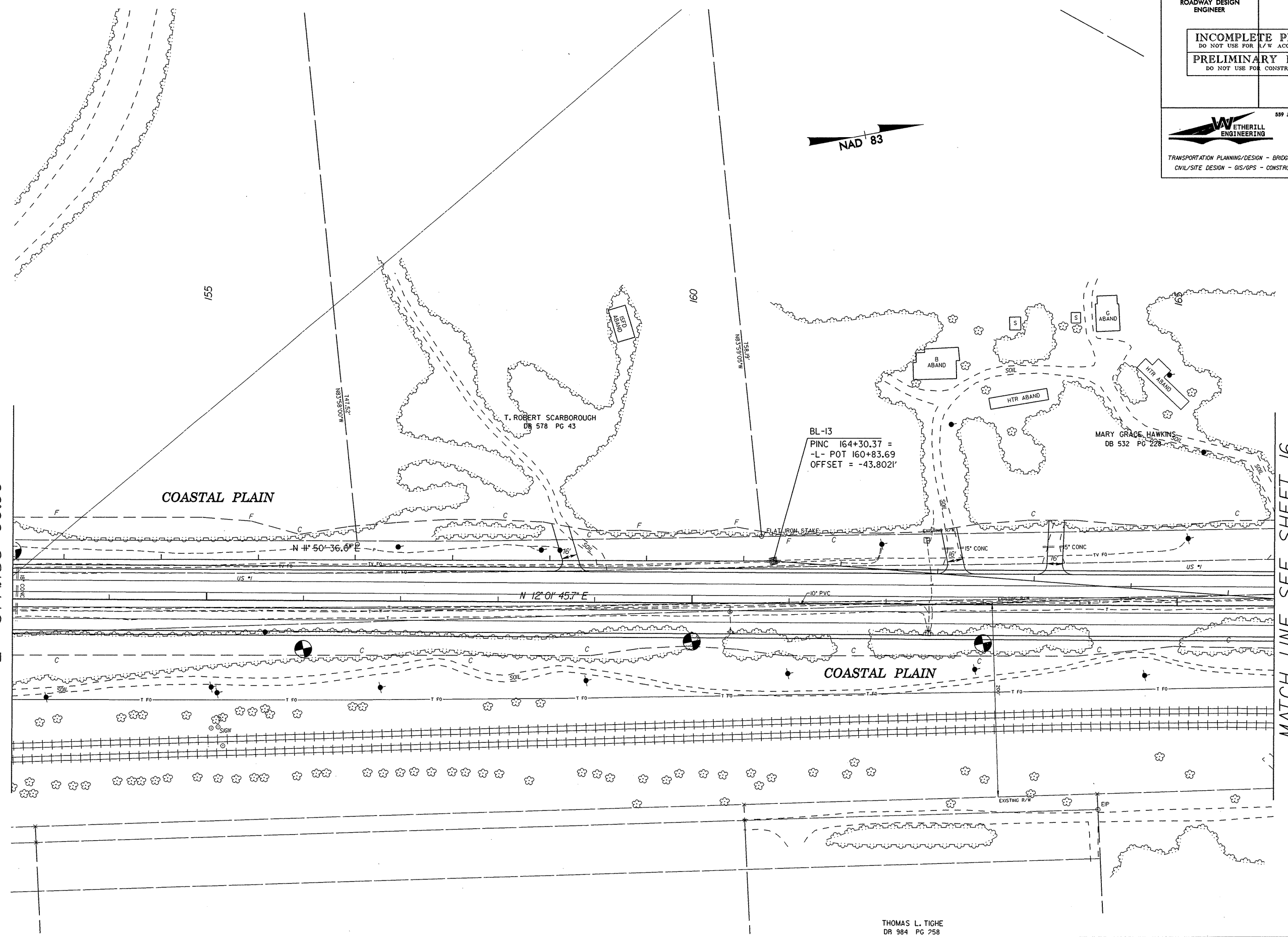


PROJECT REFERENCE NO. R-2502A	SHEET NO. 15
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
	
<small>599 Jones Franklin Rd, Suite 164          Raleigh, N.C. 27606          Tel: 919 851 8077          Fax: 919 851 8107</small>	
<small>TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN          CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION</small>	



MATCH LINE SEE SHEET 14  
-L- STA. 153+00.00

MATCH LINE SEE SHEET 16  
-L- STA. 166+00.00




REVISIONS

\*\*\*\*\*SYSTEMS\*\*\*\*\*  
\*\*\*\*\*ADON\*\*\*\*\*  
\*\*\*\*\*PRINT\*\*\*\*\*

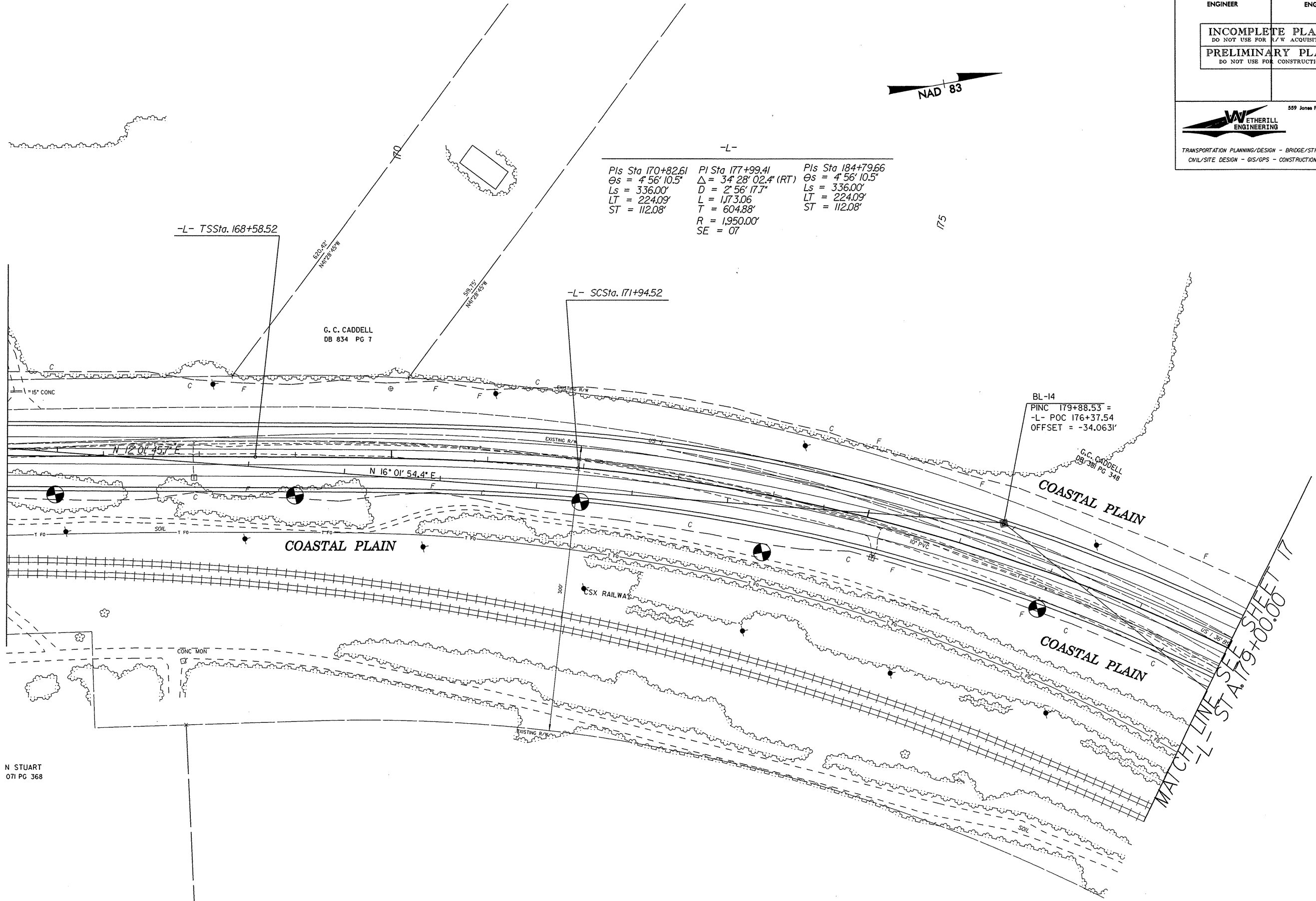
THOMAS L. TICHE  
DB 984 PG 258

SEE SHEET 31 FOR -L- PROFILE

PROJECT REFERENCE NO. R-2502A	SHEET NO. 16
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
	
<small>559 Jones Franklin Rd. Suite 164          Raleigh, N.C. 27606          Bus: 919 851 8077          Fax: 919 851 8107</small>	
<small>TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN          CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION</small>	

8/17/95

MATCH LINE SEE SHEET 15  
 -L- STA. 166+00.00



-L-

PIs Sta 170+82.61 Os = 4' 56' 10.5" Ls = 336.00' LT = 224.09' ST = 112.08'	PI Sta 177+99.41 Δ = 34° 28' 02.4" (RT) D = 2' 56' 17.7" L = 173.06' T = 604.88' R = 1,950.00' SE = 07	PIs Sta 184+79.66 Os = 4' 56' 10.5" Ls = 336.00' LT = 224.09' ST = 112.08'
--	--	--



BL-14  
 PINC 179+88.53 =  
 -L- POC 176+37.54  
 OFFSET = -34.0631'

SEE SHEET 32 FOR -L- PROFILE

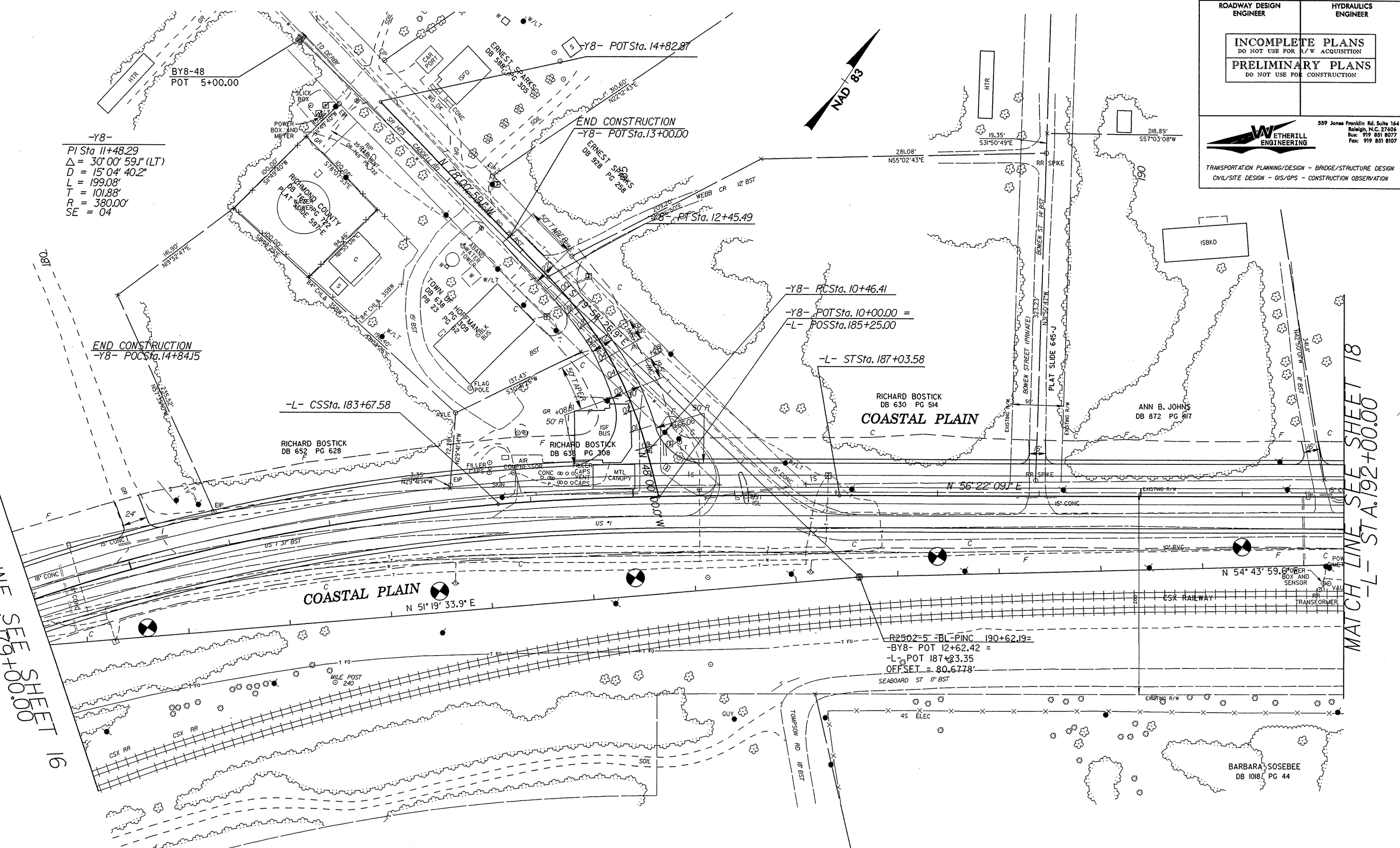
SYSTEMS TIME  
 11/17/95 10:58 AM  
 11/17/95 10:58 AM



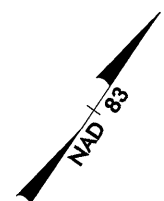
8/17/14

REVISIONS

MATCH LINE SEE SHEET 16  
-L- STA. 179+00.00



-Y8-  
PI Sta 11+48.29  
Δ = 30° 00' 59.1" (LT)  
D = 15' 04' 40.2"  
L = 199.08'  
T = 101.88'  
R = 380.00'  
SE = 04




-L-		
PIs Sta 170+82.61	PI Sta 177+99.41	PIs Sta 184+79.66
Os = 4' 56' 10.5"	Δ = 34° 28' 02.4" (RT)	Os = 4' 56' 10.5"
LS = 336.00'	D = 2' 56' 17.7"	LS = 336.00'
LT = 224.09'	L = 1773.06	LT = 224.09'
ST = 112.08'	T = 604.88'	ST = 112.08'
COMMISSION	R = 1950.00'	
	SE = 07	

2006 ADT IN HUNDREDS																																																																																																										
-Y8- SR 1475 CADDELL ROAD	<table style="text-align: center; border: none;"> <tr><td>109</td><td></td><td>13</td><td></td><td>23</td><td></td><td>107</td></tr> <tr><td>170</td><td></td><td>20</td><td></td><td>36</td><td></td><td>166</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	109		13		23		107	170		20		36		166																																																																																											
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170		20		36		166																																																																																																				
US 1	-L-																																																																																																									

SEE SHEET 32 FOR -L- PROFILE  
SEE SHEET 38 FOR -Y8- PROFILE

MATCH LINE SEE SHEET 18  
-L- STA. 192+00.00

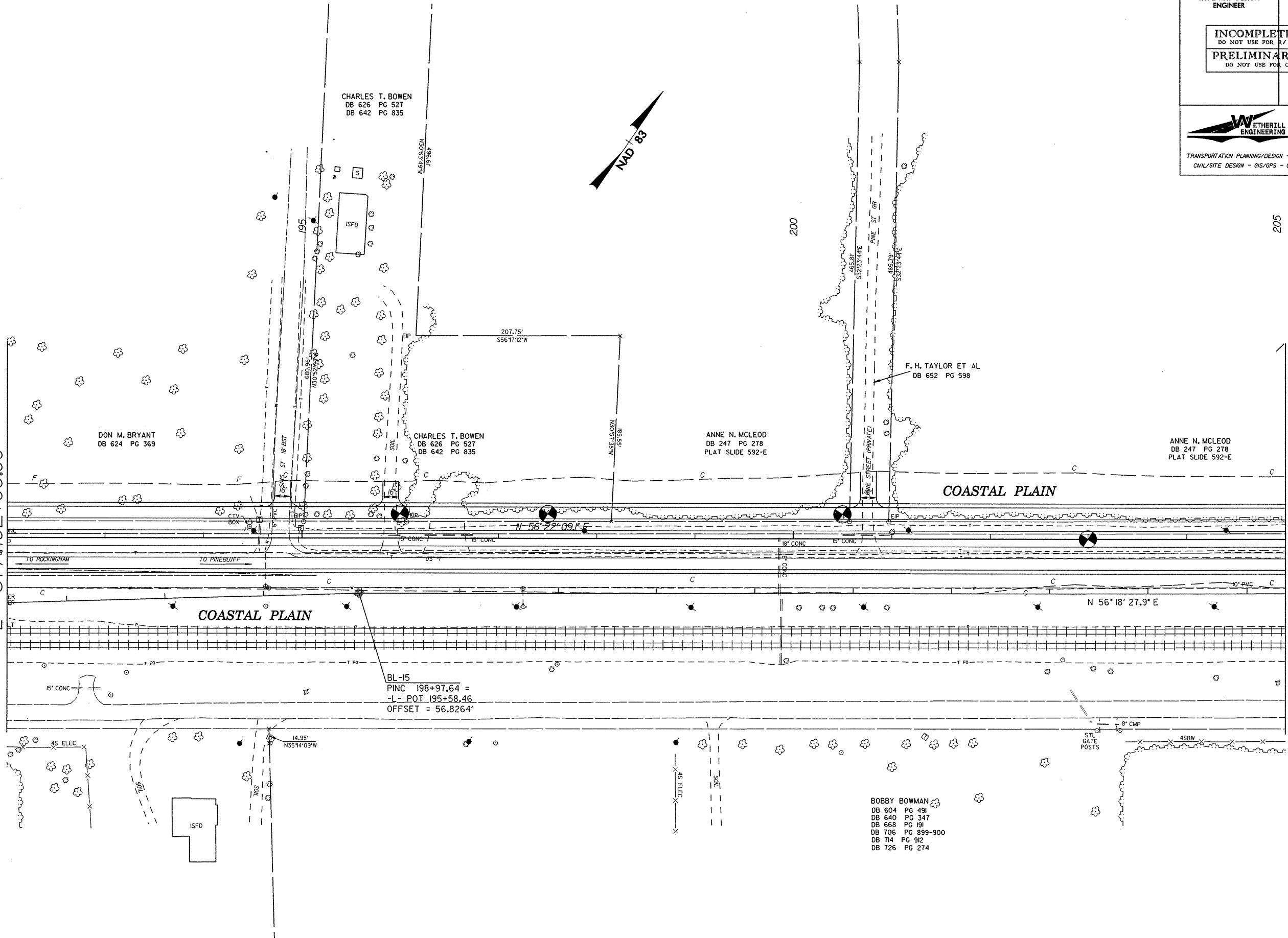
8/17/04

PROJECT REFERENCE NO. R-2502A	SHEET NO. 18
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
	
559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	

REVISIONS

MATCH LINE SEE SHEET 17  
-L- STA. 192+00.00

MATCH LINE SEE SHEET 19  
-L- STA. 205+00.00



CHARLES T. BOWEN  
 DB 626 PG 527  
 DB 642 PG 835

DON M. BRYANT  
 DB 624 PG 369

CHARLES T. BOWEN  
 DB 626 PG 527  
 DB 642 PG 835

ANNE N. MCLEOD  
 DB 247 PG 278  
 PLAT SLIDE 592-E

F. H. TAYLOR ET AL  
 DB 652 PG 598


ANNE N. MCLEOD  
 DB 247 PG 278  
 PLAT SLIDE 592-E

BOBBY BOWMAN  
 DB 604 PG 491  
 DB 640 PG 347  
 DB 668 PG 191  
 DB 706 PG 899-900  
 DB 714 PG 912  
 DB 726 PG 274

BL-15  
 PINC 198+97.64 =  
 -L- POT 195+58.46  
 OFFSET = 56.8264'

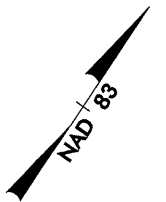
SEE SHEET 33 FOR -L- PROFILE

#####  
 SYSTEM#####  
 USER#####

PROJECT REFERENCE NO. R-2502A	SHEET NO. 19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
	
559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	

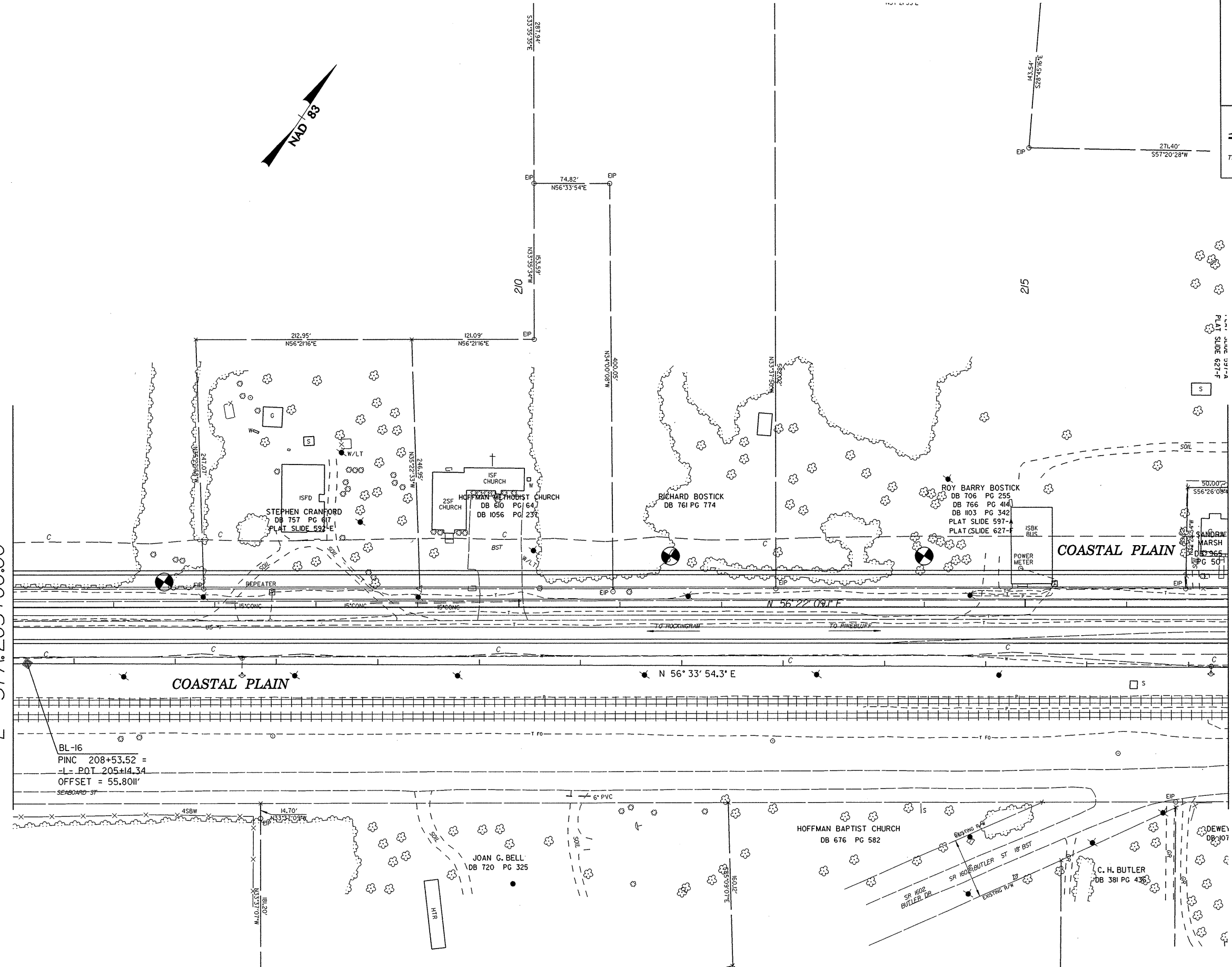
8/17/95

REVISIONS




MATCH LINE SEE SHEET 18  
-L- STA. 205+00.00

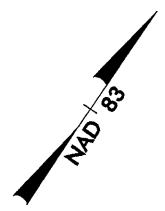
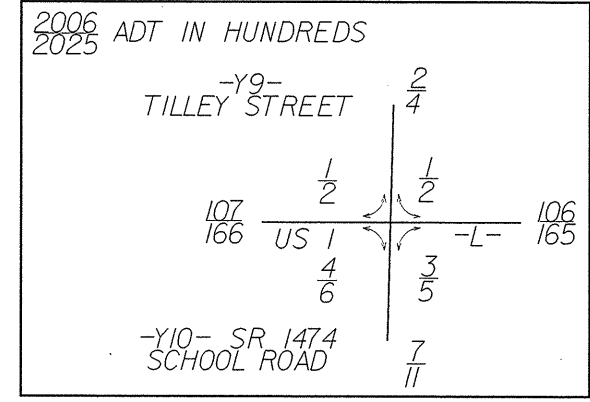
MATCH LINE SEE SHEET 20  
-L- STA. 217+00.00



BL-16  
 PINC 208+53.52 =  
 -L- POT 205+14.34  
 OFFSET = 55.8011'  
 SEABOARD ST

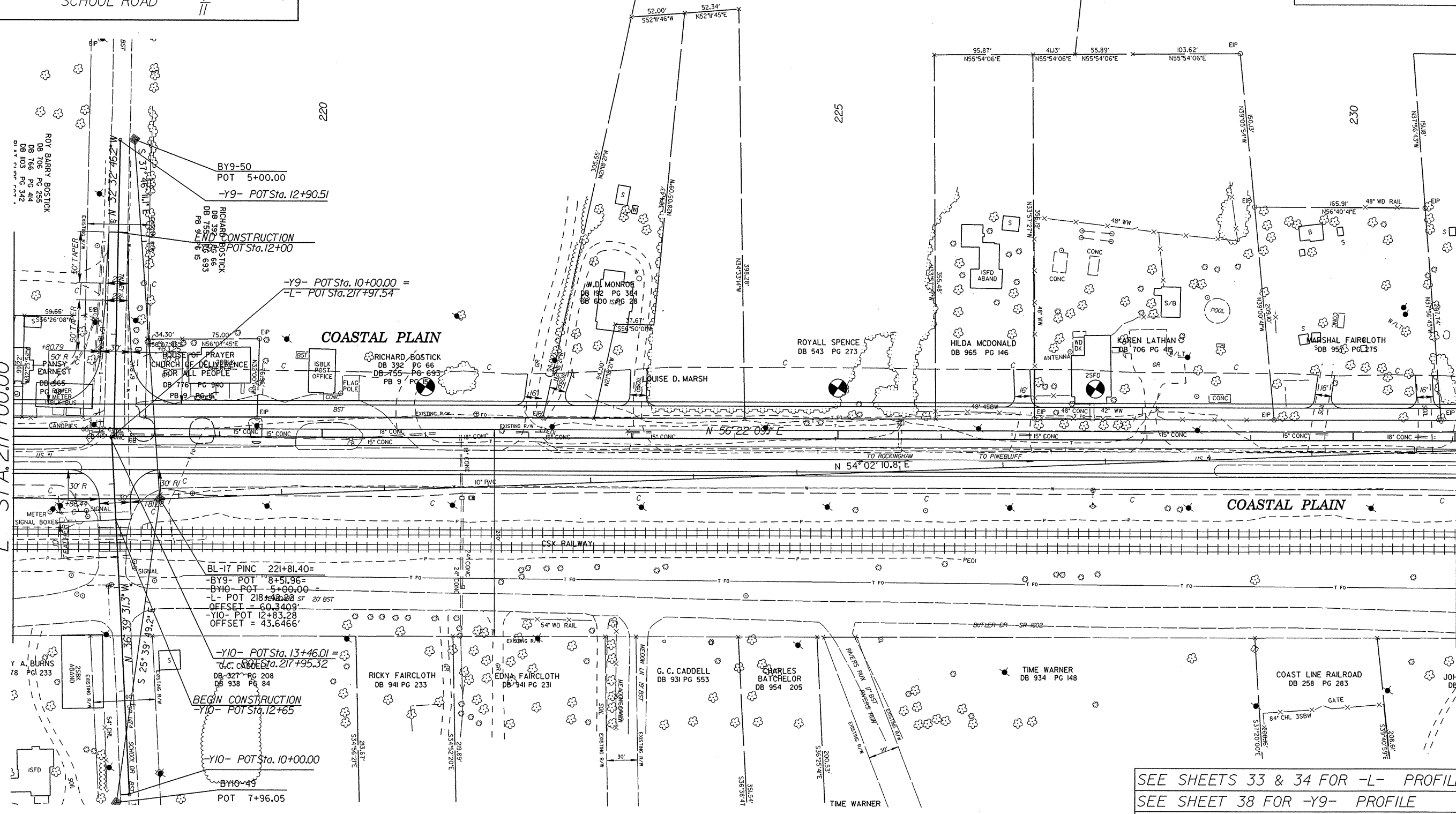
SEE SHEET 33 FOR -L- PROFILE

PROJECT REFERENCE NO. R-2502A	SHEET NO. 20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
	
<small>559 Jones Franklin Rd. Suite 164          Raleigh, N.C. 27604          Bus: 919 851 8077          Fax: 919 851 8107</small>	
<small>TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN          CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION</small>	



MATCH LINE SEE SHEET 19  
-L- STA. 217+00.00

MATCH LINE SEE SHEET 21  
-L- STA. 231+00.00



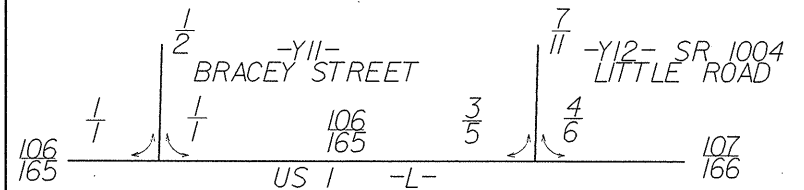
SEE SHEETS 33 & 34 FOR -L- PROFILE  
 SEE SHEET 38 FOR -Y9- PROFILE  
 SEE SHEET 38 FOR -Y10- PROFILE

REVISIONS

8/17/09

8.17.19

2006  
2025  
ADT IN HUNDREDS

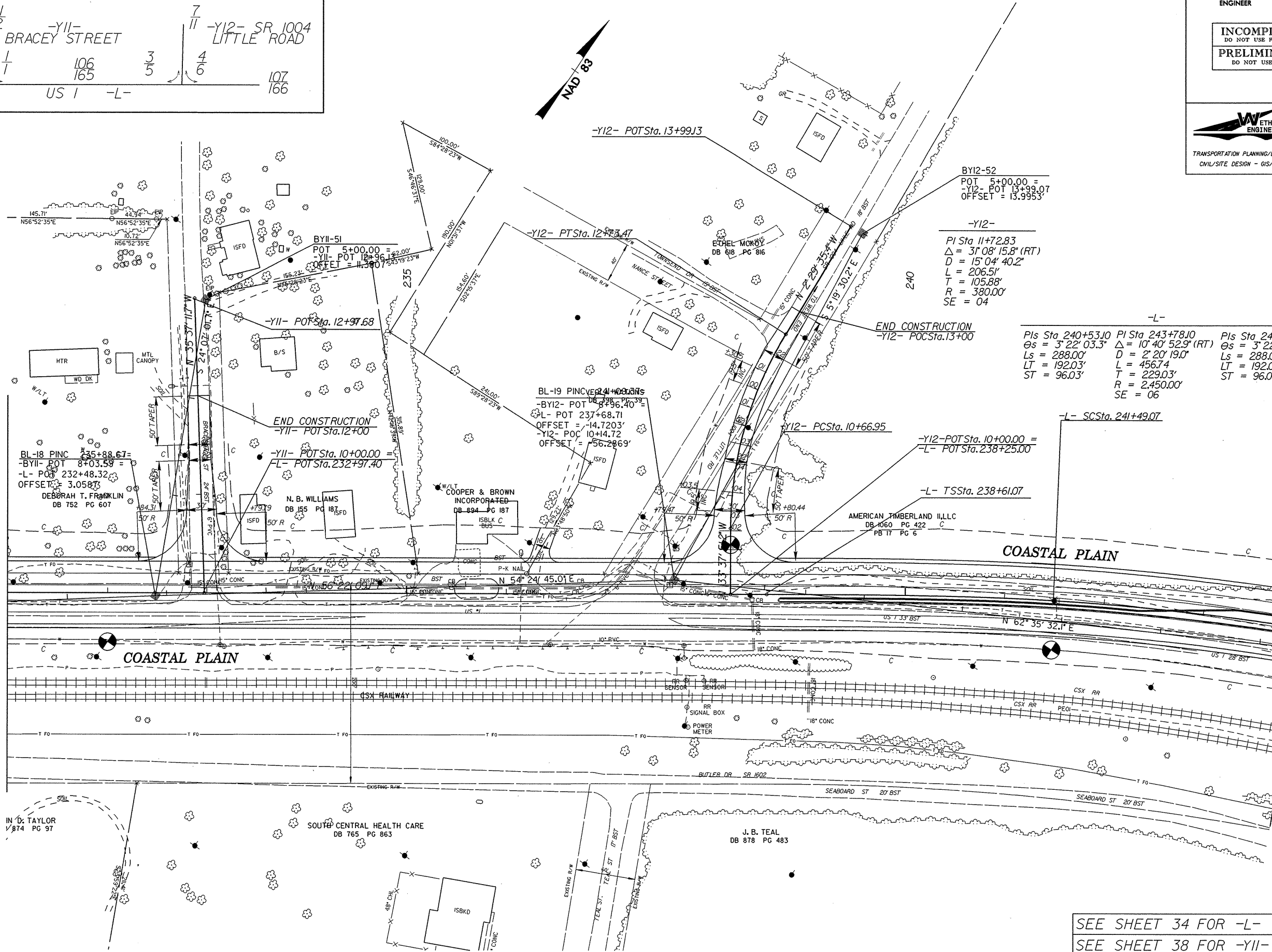


PROJECT REFERENCE NO. R-2502A	SHEET NO. 21
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
<small>559 Jones Franklin Rd, Suite 164          Raleigh, N.C. 27606          Bus: 919 851 8077          Fax: 919 851 8107</small>	
<small>TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN          CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION</small>	


REVISIONS

MATCH LINE SEE SHEET 20  
-L- STA. 231+00.00

MATCH LINE SEE SHEET 22  
-L- STA. 244+00.00

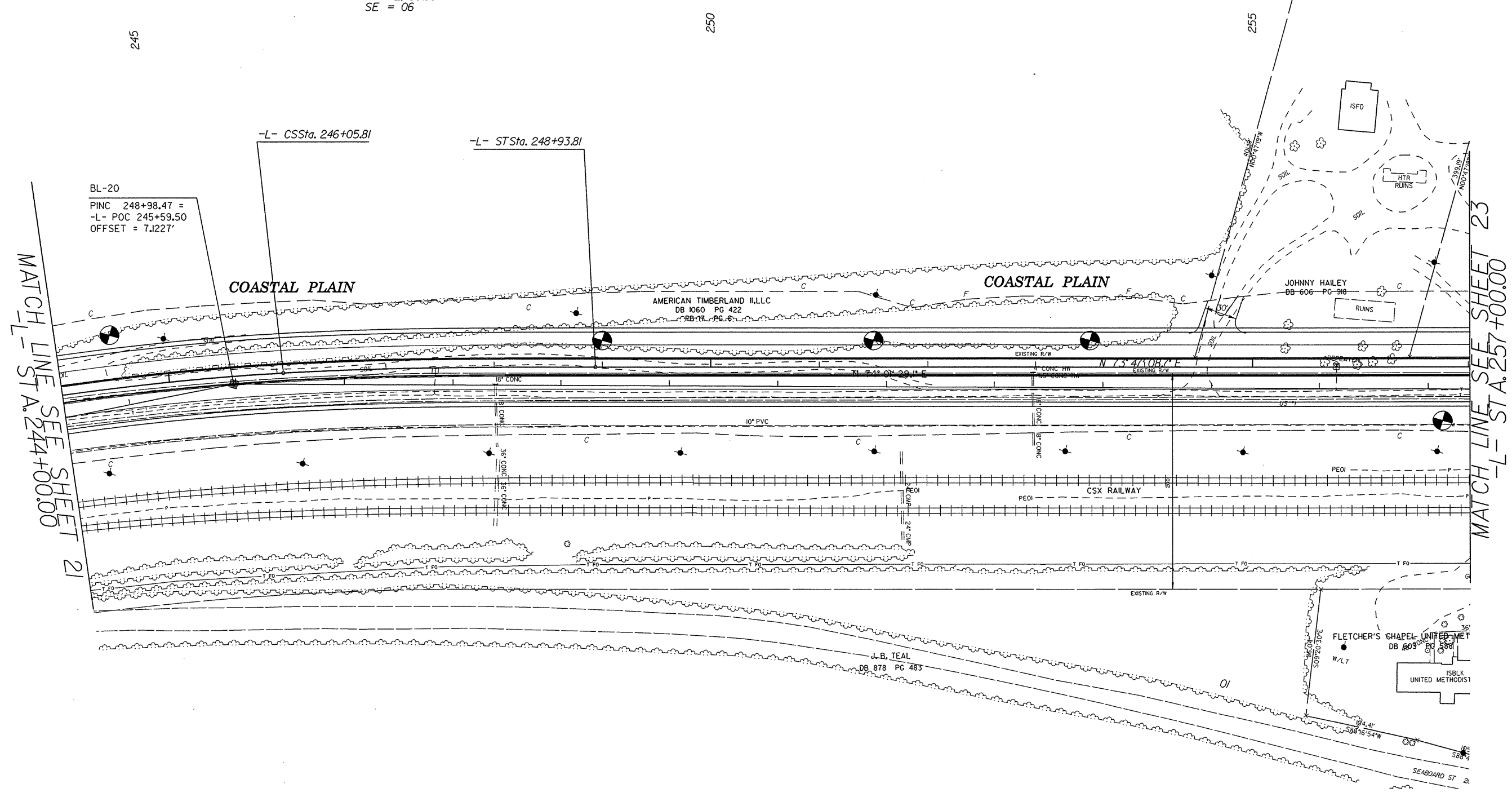


SEE SHEET 34 FOR -L- PROFILE  
 SEE SHEET 38 FOR -YII- PROFILE  
 SEE SHEET 39 FOR -YI2- PROFILE

PROJECT REFERENCE NO. R-2502A	SHEET NO. 22
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
	
<small>559 Jones Franklin Rd. Suite 164          Raleigh, N.C. 27606          Bus: 919 851 8077          Fax: 919 851 8107</small>	
<small>TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN          CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION</small>	

-L-

PIs Sta 240+53.10 Θs = 3° 22' 03.3" Ls = 288.00' LT = 192.03' ST = 96.03'	PI Sta 243+78.10 Δ = 10° 40' 52.9" (RT) D = 2' 20' 19.0" L = 456.74 T = 229.03' R = 2,450.00' SE = 06	PIs Sta 247+01.84 Θs = 3° 22' 03.3" Ls = 288.00' LT = 192.03' ST = 96.03'
---	---	---

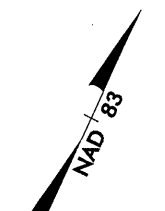
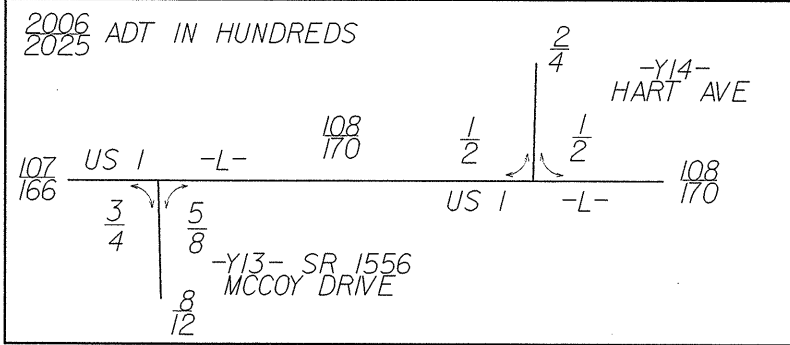


REVISIONS

8/17/94

\*\*\*\*\*SYTIME\*\*\*\*\*  
\*\*\*\*\*DONS\*\*\*\*\*  
\*\*\*\*\*US\*\*\*\*\*

SEE SHEET 35 FOR -L- PROFILE



-L-  
Pis Sta 260+59.41 Δ = 10' 17' 49.3" (LT)  
Os = 2' 24' 44.8" D = 2' 00' 37.4"  
Ls = 240.00' L = 512.19'  
LT = 160.01' T = 256.79'  
ST = 80.01' R = 2.850.00'  
SE = 05

-L-  
Pis Sta 263+96.18 Δ = 10' 17' 49.3" (LT)  
Os = 2' 24' 44.8" D = 2' 00' 37.4"  
Ls = 240.00' L = 512.19'  
LT = 160.01' T = 256.79'  
ST = 80.01' R = 2.850.00'  
SE = 05

-L-  
Pis Sta 267+31.60 Δ = 10' 17' 49.3" (LT)  
Os = 2' 24' 44.8" D = 2' 00' 37.4"  
Ls = 240.00' L = 512.19'  
LT = 160.01' T = 256.79'  
ST = 80.01' R = 2.850.00'  
SE = 05

-Y13-  
PI Sta 11+97.98  
Δ = 8' 38' 28.5" (LT)  
D = 15' 04' 40.2"  
L = 57.31'  
T = 28.71'  
R = 380.00'

BL-21 PINK 261+07.81 =  
-L- POT 257+69.59  
OFFSET = 20.9439'  
-Y13- POT 13+19.13  
OFFSET = 49.2208'

-L- TSSSta. 258+99.39  
-L- POSSta. 261+23.27

BY14-55  
POT 9+03.34  
-L- POC 261+42.53  
OFFSET = 13.9006'  
-Y14- POT 12+41.62  
OFFSET = 17.3141'

BL-22  
PINK 271+15.39 =  
-L- POC 267+68.92  
OFFSET = 62.0381'

COASTAL PLAIN

COASTAL PLAIN

BEGIN CONSTRUCTION  
-Y13- POT Sta. 92+55

-Y13- PTSta. 12+26.59

-Y13- PCSta. 11+69.27

-Y13- POTSta. 10+00.00

BY13-53  
POT 8+23.00

INEZ THOMAS  
DB 345 PG 347


MATCH LINE SEE SHEET 22  
-L- STA. 257+00.00

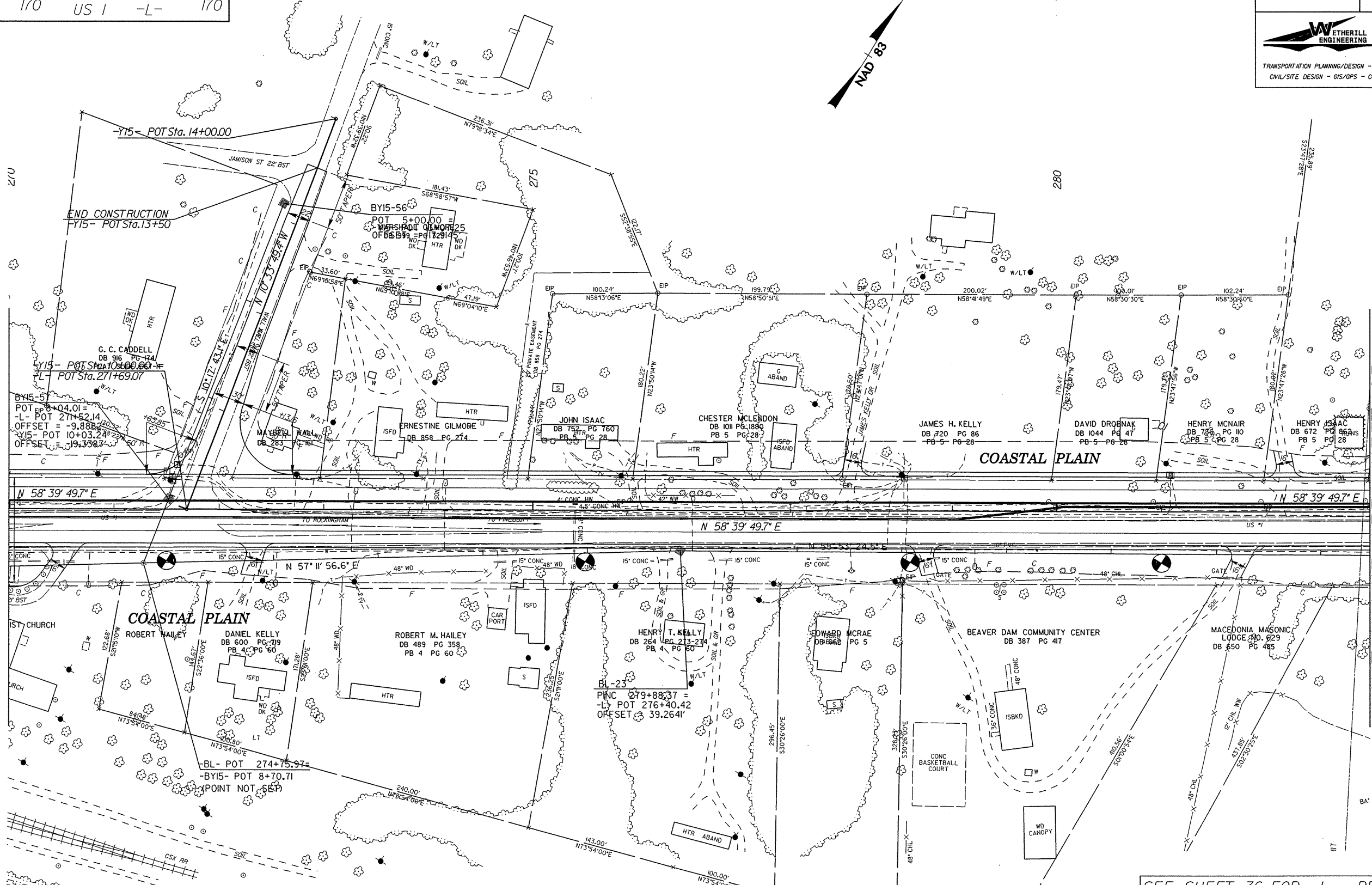
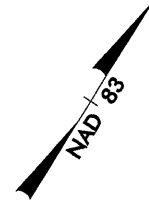
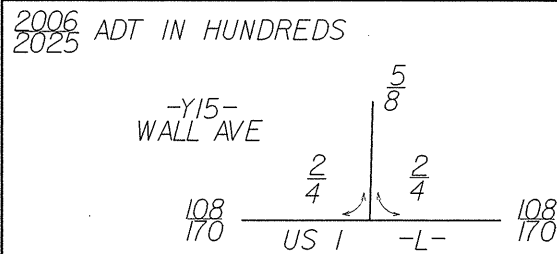
MATCH LINE SEE SHEET 24  
-L- STA. 270+00.00

SEE SHEET 35 FOR -L- PROFILE  
SEE SHEET 39 FOR -Y13- PROFILE  
SEE SHEET 39 FOR -Y14- PROFILE

REVISIONS

DATE: 08/17/14  
BY: [Signature]

PROJECT REFERENCE NO. R-2502A		SHEET NO. 24	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION			
		559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION			



MATCH LINE SEE SHEET 23  
-L- STA. 270+00.00

MATCH LINE SEE SHEET 25  
-L- STA. 283+00.00


SEE SHEET 36 FOR -L- PROFILE  
SEE SHEET 39 FOR -Y15- PROFILE

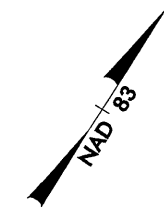
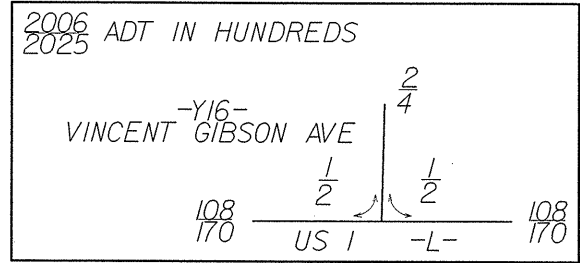
REVISIONS

\*\*\*\*\*SYTIME\*\*\*\*\*  
\*\*\*\*\*CDGN\*\*\*\*\*  
\*\*\*\*\*\*\*\*\*\*



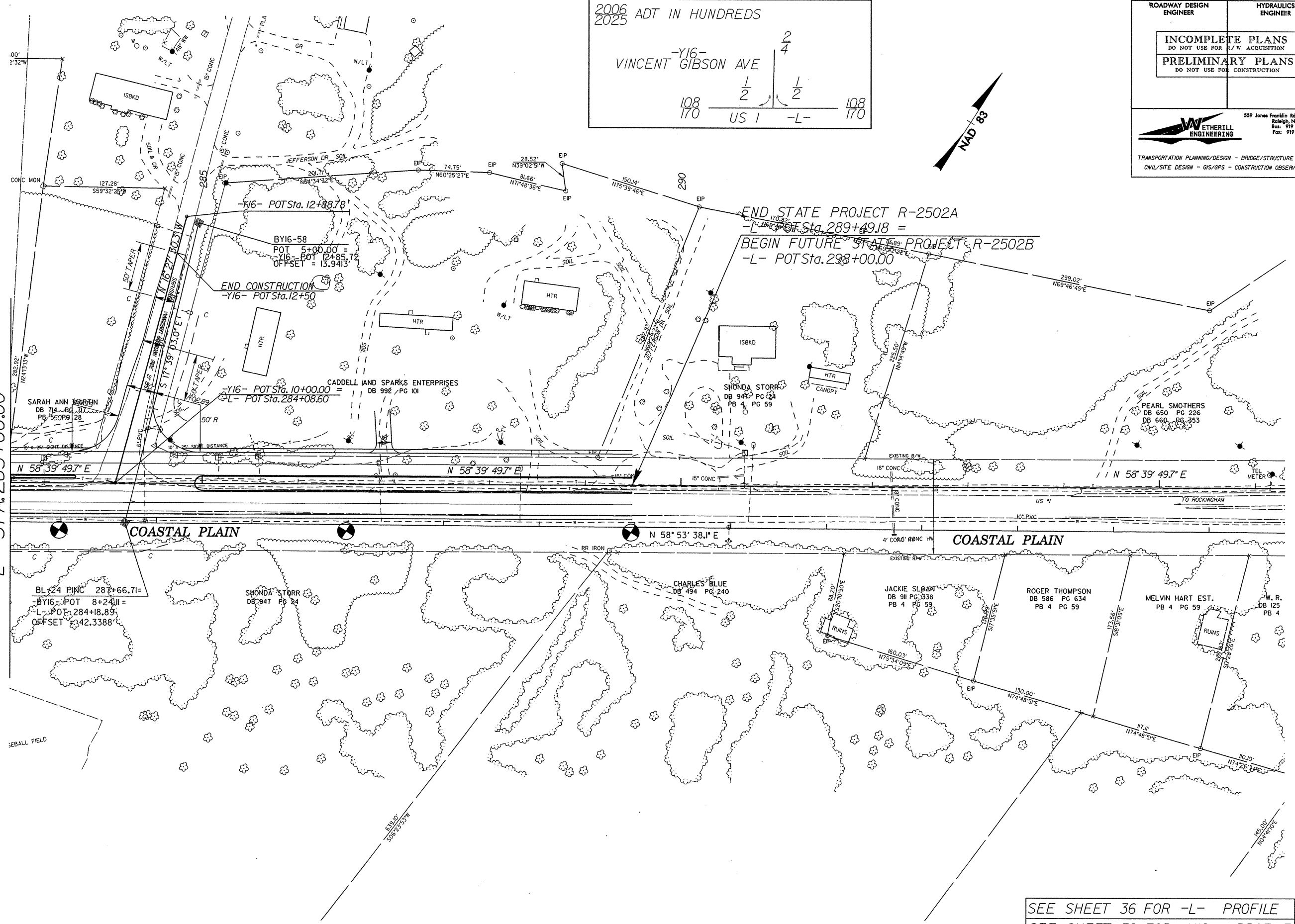
8/17/05

PROJECT REFERENCE NO. R-2502A		SHEET NO. 25	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION			
		559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Fax: 919 851 8077 Fax: 919 851 8107	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION			



MATCH LINE SEE SHEET 24  
 -L- STA. 283+00.00

REVISIONS



END STATE PROJECT R-2502A  
 -L- POT Sta. 289+49.18 =  
 BEGIN FUTURE STATE PROJECT R-2502B  
 -L- POT Sta. 298+00.00

-Y16- POT Sta. 12+88.78  
 BY16-58  
 POT = 5+00.00  
 -Y16- POT = 12+85.72  
 OFFSET = 15.9413  
 END CONSTRUCTION  
 -Y16- POT Sta. 12+50

SARAH ANN MORSTEIN  
 DB 714 PG 20  
 PB 550 PG 28  
 -Y16- POT Sta. 10+00.00  
 -L- POT Sta. 284+08.60

BL 24 PINC 287+66.71 =  
 -Y16- POT 8+24.11 =  
 -L- POT 284+18.89  
 OFFSET = 42.3388

SEE SHEET 36 FOR -L- PROFILE  
 SEE SHEET 39 FOR -Y16- PROFILE

\*\*\*\*\*  
 SYSTEMS DESIGN  
 \*\*\*\*\*

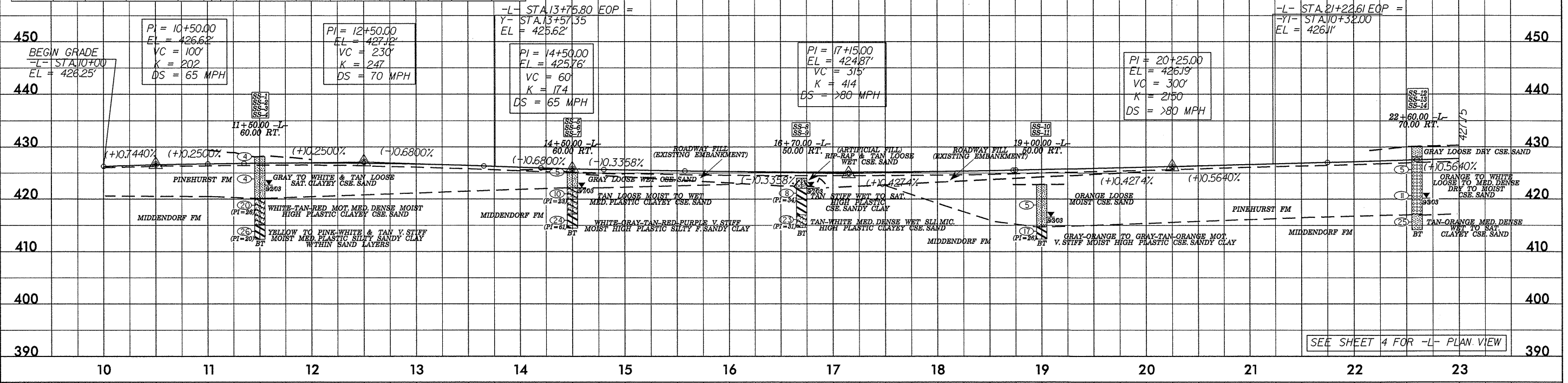
**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PL	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1	60' RT	11+60	0.00-1.60	A-2-4(0)	18	NP	69.0	19.9	4.0	7.0	100	61	12	-	-
SS-2	60' RT	11+60	4.30-5.80	A-2-4(0)	18	NP	68.7	14.8	3.4	13.1	98	61	17	-	-
SS-3	60' RT	11+60	9.30-10.80	A-2-7(2)	43	28	69.4	11.6	4.0	25.2	98	58	29	-	-
SS-4	60' RT	11+60	14.80-16.80	A-7-6(8)	42	20	29.0	22.5	14.3	34.2	100	77	65	-	-
SS-5	60' RT	14+60	0.00-1.60	A-2-4(0)	15	NP	69.4	20.5	5.0	5.0	100	54	12	-	-
SS-6	60' RT	14+60	4.70-5.70	A-2-7(1)	41	23	68.5	13.4	2.0	26.2	88	50	26	-	-
SS-7	60' RT	14+60	9.20-10.70	A-7-6(44)	80	61	1.6	32.2	15.9	50.3	100	99	72	-	-
SS-8	60' RT	16+70	2.90-5.40	A-7-6(6)	66	34	62.5	8.9	6.4	32.2	93	68	37	-	-
SS-9	60' RT	16+70	7.90-9.40	A-2-7(2)	62	31	61.5	13.6	1.8	23.1	97	45	25	-	-
SS-10	60' RT	17+00	3.90-5.40	A-2-4(0)	19	NP	60.8	28.5	4.7	6.0	100	70	12	-	-
SS-11	60' RT	17+00	8.90-10.40	A-7-6(5)	44	26	41.6	16.9	5.2	36.2	97	72	41	-	-
SS-12	70' RT	22+60	4.50-6.00	A-1-1(0)	17	NP	72.2	21.6	2.1	4.0	100	47	8	-	-
SS-13	70' RT	22+60	9.50-10.00	A-1-1(0)	30	NP	83.0	14.8	1.2	1.0	100	39	3	-	-
SS-14	70' RT	22+60	14.50-16.00	A-2-4(0)	27	10	68.6	20.3	2.0	19.1	95	58	21	-	-

BM #5 EL = 410.11'  
 N 45° 35' 35" E L 1828696.507  
 RR SPIKE IN BASE OF 12' SWEET GUM TREE  
 -L- STA 6#+23.23 OFF 193.46 LT.

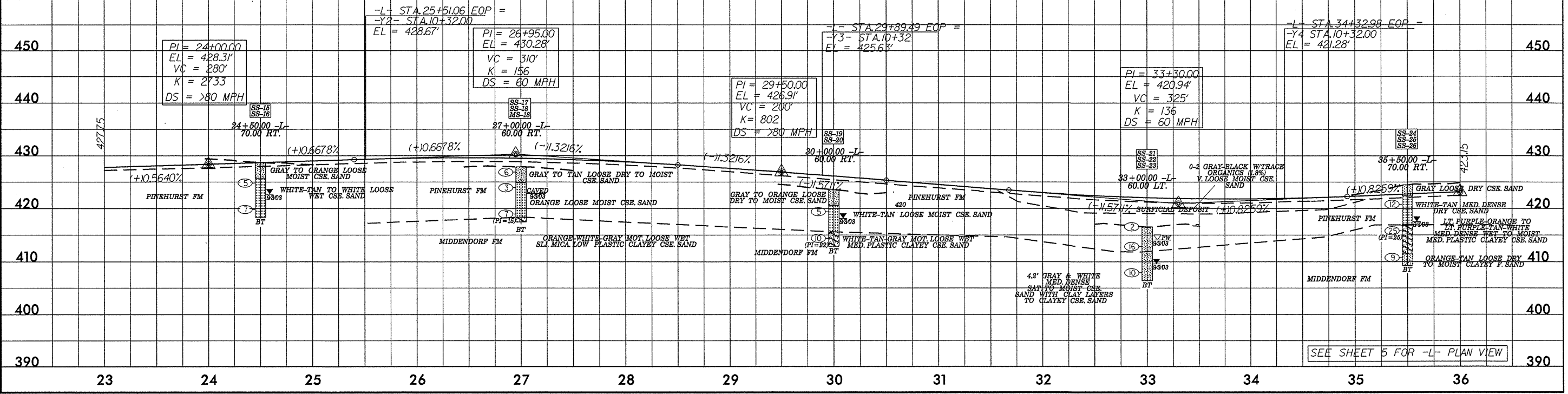
**WETHERILL ENGINEERING**  
 TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO. **R-2502A** SHEET NO. **26**  
 ROADWAY DESIGN ENGINEER  
 HYDRAULICS ENGINEER  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION  
**INCOMPLETE PLANS**  
 DO NOT USE FOR R/W ACQUISITION



**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PL	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-15	70' RT	24+60	3.90-5.40	A-3(0)	21	NP	63.8	31.9	1.3	3.0	100	68	6	-	-
SS-16	70' RT	24+60	8.90-10.40	A-3(0)	20	NP	72.7	23.3	2.9	1.0	100	63	6	-	-
SS-17	60' RT	27+00	3.90-5.40	A-3(0)	21	NP	62.9	29.4	2.7	6.0	100	63	10	-	-
MS-18	60' RT	27+00	9.50-10.40	A-3(0)	0	0	0.0	0.0	0.0	0.0	0	0	0	17.7	-
SS-18	60' RT	27+00	9.50-10.40	A-2-6(0)	33	15	63.9	25.3	1.7	19.1	100	69	24	-	-
SS-19	60' RT	30+00	4.20-5.70	A-3(0)	18	NP	67.5	26.2	3.3	3.0	100	69	9	-	-
SS-20	60' RT	30+00	9.20-10.70	A-2-6(2)	34	22	43.9	27.2	1.8	27.2	100	78	31	-	-
SS-21	60' LT	33+00	0.00-1.50	A-2-4(0)	18	NP	66.1	25.7	2.2	6.0	100	61	11	-	1.80
SS-22	60' LT	33+00	3.70-5.20	A-2-4(0)	18	NP	68.7	33.5	3.8	4.0	100	70	11	-	-
SS-23	60' LT	33+00	8.70-10.20	A-2-4(0)	23	NP	50.2	30.4	4.3	16.1	100	79	20	-	-
SS-24	70' RT	35+60	3.70-5.20	A-3(0)	16	NP	71.2	23.1	1.6	4.0	100	61	8	-	-
SS-25	70' RT	35+60	8.70-10.20	A-2-7(1)	46	25	66.3	11.4	2.2	20.1	89	37	21	-	-
SS-26	70' RT	35+60	13.70-15.20	A-2-4(0)	25	NP	19.6	69.0	1.3	10.1	100	96	12	-	-

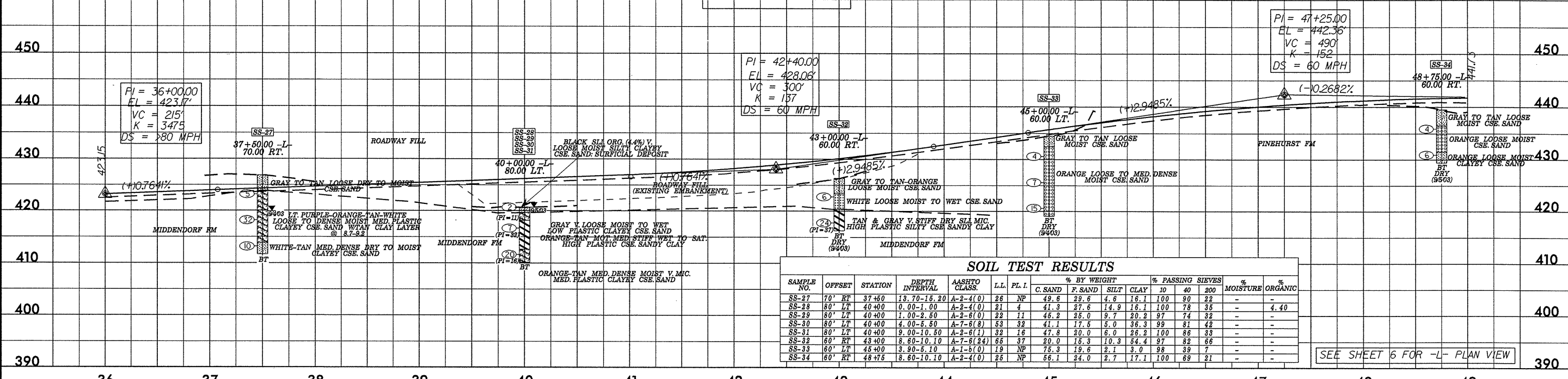


DATE: 11/15/11 TIME: 10:00 AM

BM #5 EL = 410.11  
 N 45.3535.457 E 1828696.507  
 RR SPIKE IN BASE OF 12" SWEET GUM TREE  
 -L- STA 64+23.23 OFF 193.46 LT.

WETHERILL ENGINEERING  
 559 Jones Franklin Rd. Suite 164  
 Raleigh, N.C. 27608  
 Tel: 919.851.8077  
 Fax: 919.851.8107

PROJECT REFERENCE NO. R-2502A SHEET NO. 27  
 ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION  
**INCOMPLETE PLANS**  
 DO NOT USE FOR R/W ACQUISITION

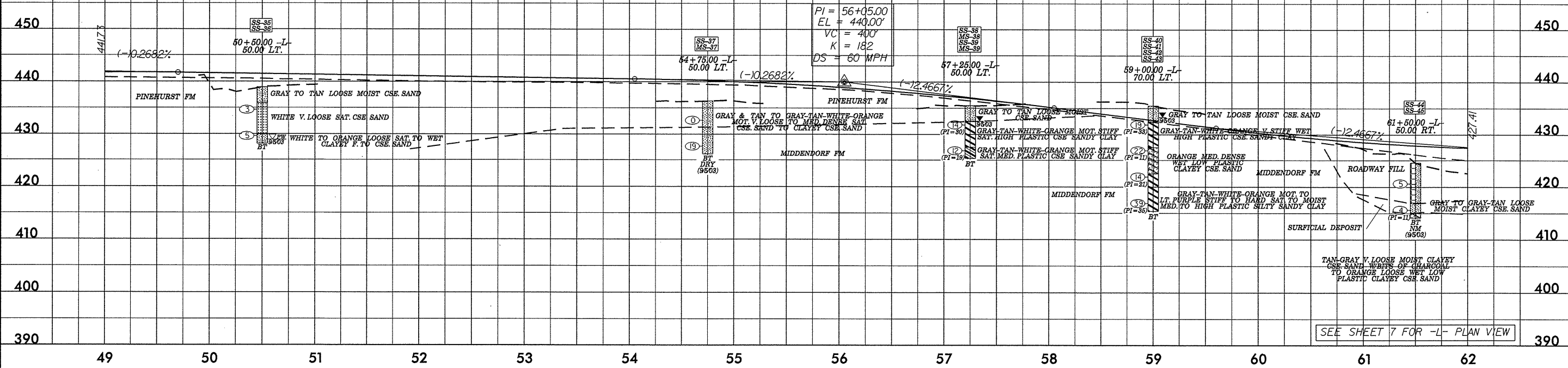


### SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PL I.	% BY WEIGHT				% PASSING SIEVES		% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40		
SS-27	70' RT	37+50	13.70-15.20	A-2-4(0)	26	NP	49.6	29.6	4.6	16.1	100	90	22	-
SS-28	80' LT	40+00	0.00-1.00	A-2-4(0)	21	4	41.3	27.6	14.9	16.1	100	78	35	4.40
SS-29	80' LT	40+00	1.00-2.50	A-2-6(0)	22	11	45.2	25.0	9.7	20.2	97	74	32	-
SS-30	80' LT	40+00	4.00-5.50	A-7-6(8)	53	32	41.1	17.5	5.0	36.3	99	81	42	-
SS-31	80' LT	40+00	9.00-10.50	A-2-6(1)	32	16	47.8	20.0	6.0	26.2	100	86	33	-
SS-32	60' RT	43+00	8.60-10.10	A-7-6(24)	65	37	20.0	15.3	10.3	54.4	97	82	66	-
SS-33	60' LT	45+00	3.90-5.10	A-1-5(0)	19	NP	75.3	19.6	2.1	3.0	98	39	7	-
SS-34	80' RT	48+75	8.60-10.10	A-2-4(0)	25	NP	66.1	24.0	2.7	17.1	100	89	21	-

### SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PL I.	% BY WEIGHT				% PASSING SIEVES		% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40		
SS-35	50' LT	50+50	4.30-5.80	A-3(0)	18	NP	61.3	34.0	1.7	3.0	100	67	7	-
SS-36	50' LT	50+50	9.30-10.80	A-2-4(0)	21	4	43.4	36.7	6.7	14.1	100	74	24	-
MS-37	50' LT	54+75	3.70-5.20	A-2-4(0)	26	8	58.3	18.8	3.8	19.2	99	87	24	15.1
MS-38	50' LT	57+25	3.70-5.20	A-2-4(0)	26	8	0.0	0.0	0.0	0.0	0	0	0	17.5
SS-38	50' LT	57+25	3.70-5.20	A-7-6(6)	48	30	47.4	14.9	5.4	32.3	100	75	39	-
MS-39	50' LT	57+25	8.70-10.20	A-2-4(0)	26	8	0.0	0.0	0.0	0.0	0	0	0	18.7
SS-39	50' LT	57+25	8.70-10.20	A-6(2)	39	19	44.4	20.8	4.6	30.2	100	63	36	-
SS-40	70' LT	59+00	3.60-5.10	A-7-6(6)	53	33	53.8	9.5	4.4	32.3	100	66	37	-
SS-41	70' LT	59+00	8.60-10.10	A-2-6(0)	29	11	67.3	13.1	2.4	17.1	100	63	21	-
SS-42	70' LT	59+00	13.60-15.10	A-7-6(9)	42	21	31.0	17.9	16.7	34.3	100	81	57	-
SS-43	70' LT	59+00	18.60-20.10	A-7-6(24)	60	35	10.7	21.8	19.2	48.4	100	94	73	-
SS-44	50' RT	61+50	3.90-5.40	A-2-4(0)	21	3	53.4	26.7	6.7	14.1	99	66	23	-
SS-45	50' RT	61+50	8.90-10.40	A-2-6(0)	28	11	54.2	24.4	3.2	18.1	99	72	23	-



5/28/11

BM \*5 EL = 410.1'  
N 4535.35457' E 1828696.507'  
RR SPIKE IN BASE OF 12" SWEET GUM TREE  
-L- STA 64+23.23 OFF 193.46 LT.

**WETHERILL ENGINEERING**  
559 Jones Franklin Rd. Suite 164  
Raleigh, N.C. 27606  
Tel: 919 651 8077  
Fax: 919 651 8107

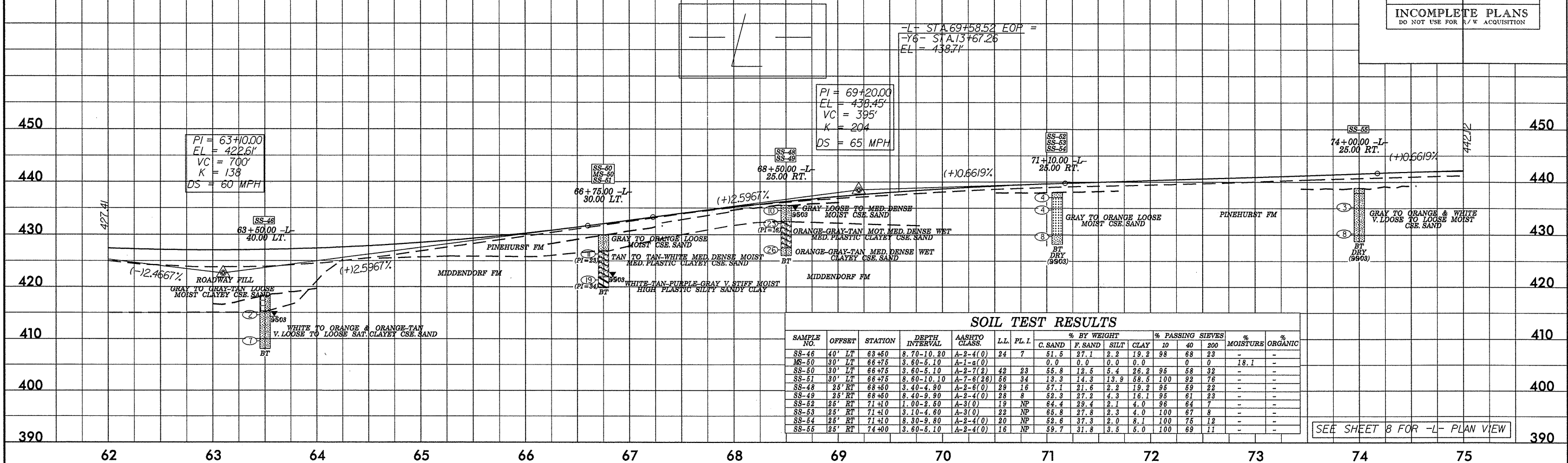
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CML/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO. R-2502A  
SHEET NO. 28

ROADWAY DESIGN ENGINEER  
HYDRAULICS ENGINEER

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

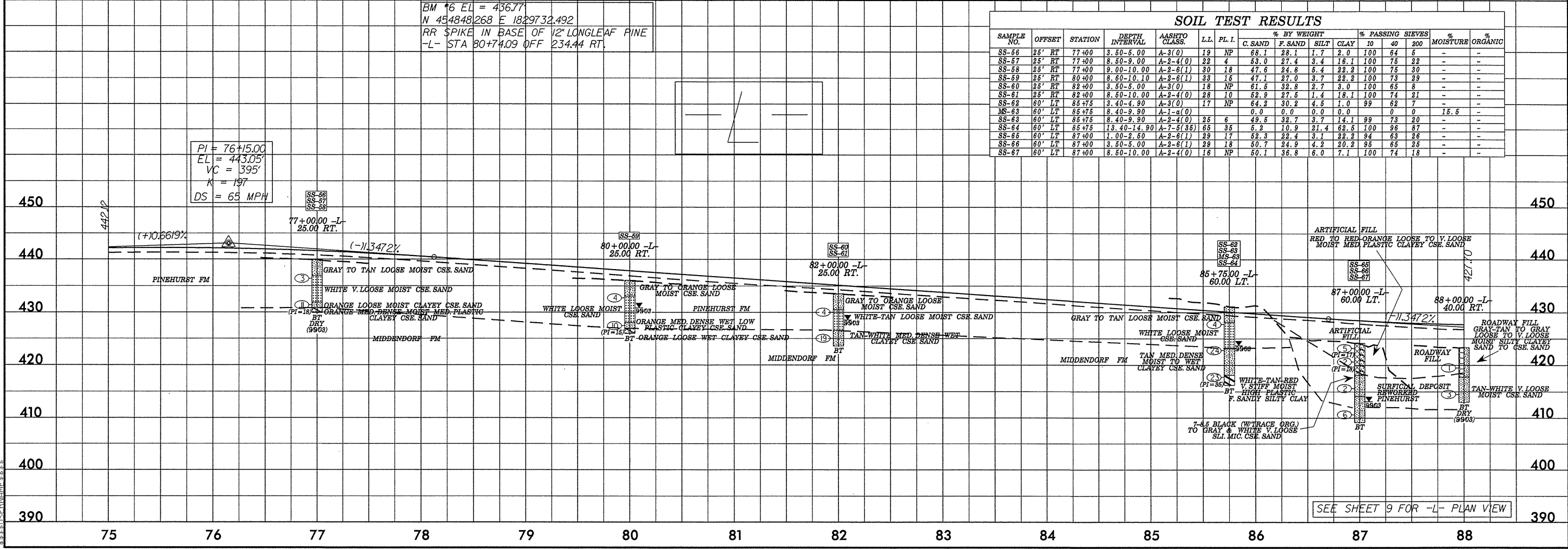
INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION



**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PL I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-46	40' LT	63+50	8.70-10.30	A-2-4(0)	24	7	51.5	27.1	2.2	19.2	98	68	23	-	-
MS-60	30' LT	66+75	3.60-5.10	A-1-a(0)			0.0	0.0	0.0	0.0	0	0	18.1	-	
SS-50	30' LT	66+75	3.60-5.10	A-2-7(2)	42	23	55.8	12.5	5.4	26.2	95	58	32	-	
SS-51	30' LT	66+75	8.60-10.10	A-7-6(26)	66	34	13.3	14.3	13.9	58.5	100	92	76	-	
SS-48	25' RT	68+50	3.40-4.90	A-2-6(0)	29	16	57.1	21.6	2.2	19.2	95	59	22	-	
SS-49	25' RT	68+50	8.40-9.90	A-2-4(0)	28	8	52.3	27.2	4.3	16.1	95	61	23	-	
SS-52	25' RT	71+10	1.00-2.50	A-3(0)	19	NP	64.4	29.4	2.1	4.0	96	64	7	-	
SS-53	25' RT	71+10	3.10-4.60	A-3(0)	22	NP	65.8	27.8	2.3	4.0	100	67	8	-	
SS-54	25' RT	71+10	8.30-9.80	A-2-4(0)	20	NP	52.6	37.3	2.0	8.1	100	75	12	-	
SS-55	25' RT	74+00	3.60-5.10	A-2-4(0)	16	NP	59.7	31.8	3.5	5.0	100	69	11	-	

SEE SHEET 8 FOR -L- PLAN VIEW



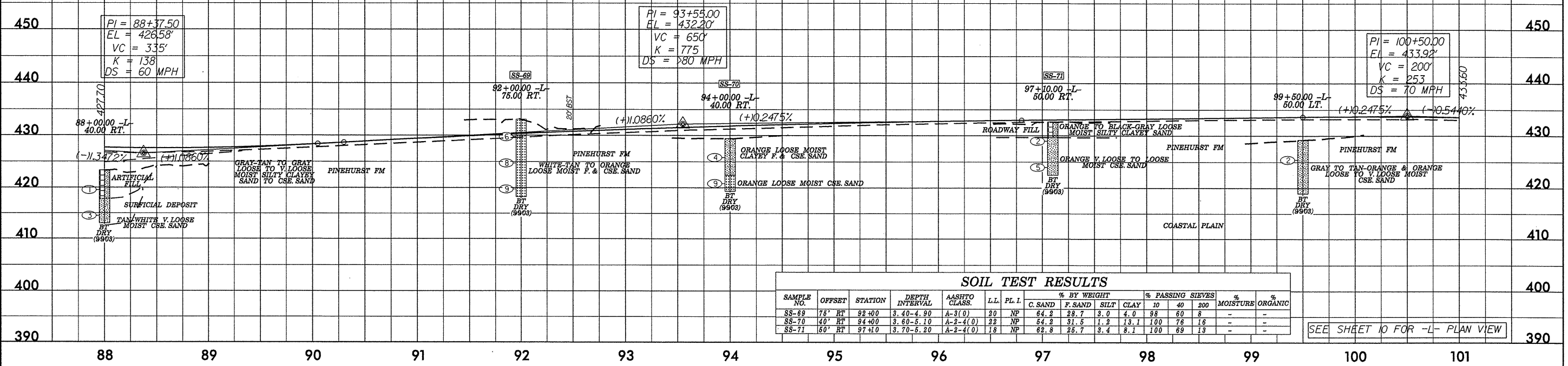
**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PL I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-56	25' RT	77+00	3.50-5.00	A-3(0)	19	NP	68.1	28.1	1.7	2.0	100	64	5	-	
SS-57	25' RT	77+00	8.50-9.00	A-2-4(0)	23	4	53.0	27.4	3.4	16.1	100	75	22	-	
SS-58	25' RT	77+00	9.00-10.00	A-2-6(1)	30	18	47.6	24.8	5.4	22.2	100	75	30	-	
SS-59	25' RT	80+00	8.60-10.10	A-2-6(1)	33	15	47.1	27.0	3.7	22.2	100	73	29	-	
SS-60	25' RT	82+00	3.50-5.00	A-3(0)	18	NP	61.5	32.8	2.7	3.0	100	65	8	-	
SS-61	25' RT	82+00	8.50-10.00	A-2-4(0)	28	10	52.9	27.5	1.4	18.1	100	74	21	-	
SS-62	60' LT	85+75	3.40-4.90	A-3(0)	17	NP	64.2	30.2	4.5	1.0	99	62	7	-	
MS-63	60' LT	85+75	8.40-9.90	A-1-a(0)			0.0	0.0	0.0	0.0	0	0	15.5	-	
SS-63	60' LT	85+75	8.40-9.90	A-2-4(0)	25	6	49.5	32.7	3.7	14.1	99	73	20	-	
SS-64	60' LT	85+75	13.40-14.90	A-7-5(35)	65	35	5.2	10.9	21.4	62.5	100	96	87	-	
SS-65	60' LT	87+00	1.00-2.50	A-2-6(1)	29	17	52.3	22.4	3.1	22.2	94	63	26	-	
SS-66	60' LT	87+00	3.50-5.00	A-2-6(1)	29	18	50.7	24.9	4.2	20.2	95	65	25	-	
SS-67	60' LT	87+00	8.50-10.00	A-2-4(0)	16	NP	50.1	36.8	6.0	7.1	100	74	18	-	

SEE SHEET 9 FOR -L- PLAN VIEW

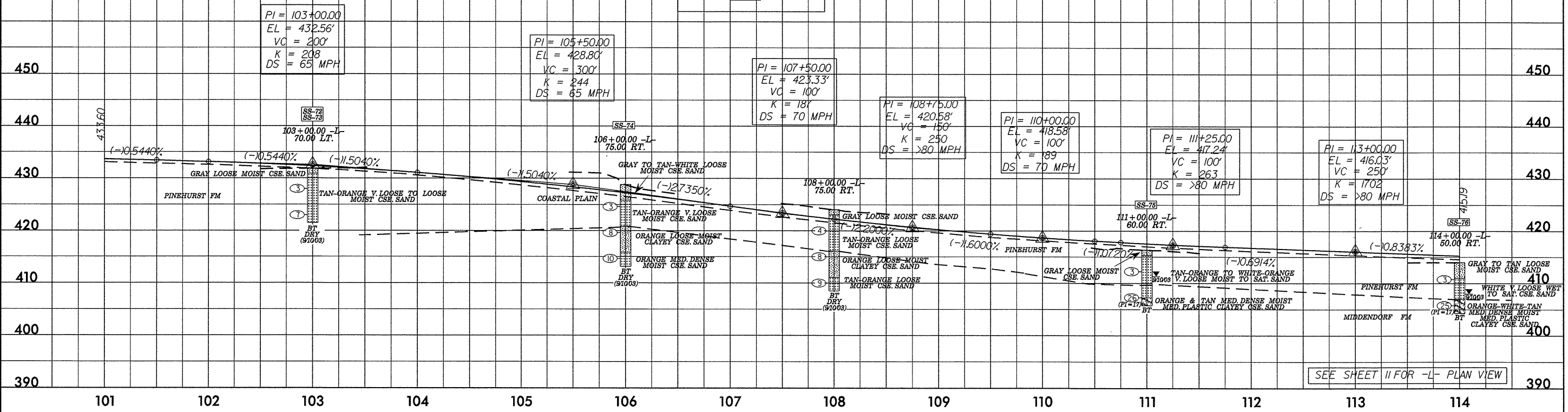
\*\*\*\*\*VC TIME\*\*\*\*\*  
\*\*\*\*\*USE IN NAME\*\*\*\*\*

BM \*7 EL = 431.98'  
 N 456850.427 E 1829995.149  
 RR SPIKE IN BASE OF 10' PINE TREE  
 -L- STA 100+70.27 OFF 288.44 LT.



BM \*7 EL = 431.98'  
 N 456850.427 E 1829995.149  
 RR SPIKE IN BASE OF 10' PINE TREE  
 -L- STA 100+70.27 OFF 288.44 LT.

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PL I.	% BY WEIGHT				% PASSING SIEVES		% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40		
SS-72	70' LT	103+400	3.90-5.40	A-3(0)	21	NP	68.4	26.4	2.1	3.0	100	57	7	-
SS-73	70' LT	103+400	3.90-10.40	A-3(0)	19	NP	62.5	31.4	2.1	4.0	100	63	8	-
SS-74	75' RT	106+400	9.20-10.70	A-2-4(0)	24	7	62.5	29.9	3.4	14.1	100	71	21	-
SS-75	60' RT	111+400	9.10-10.60	A-2-6(1)	30	17	61.0	26.9	3.9	18.1	100	70	25	-
SS-76	50' RT	114+400	8.20-9.70	A-2-6(1)	29	17	62.8	26.5	1.5	20.2	100	71	23	-



SEE SHEET 10 FOR -L- PLAN VIEW

SEE SHEET 11 FOR -L- PLAN VIEW

5/28/14

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-76	60' RT	114+00	8.20-9.70	A-2-6(1)	29	17	52.8	25.5	1.5	20.2	100	71	23	-	-
SS-77	60' RT	125+00	1.00-2.50	A-3(0)	21	NP	58.8	32.9	1.3	7.1	100	75	9	-	-
SS-78	60' RT	125+00	8.90-5.40	A-3(0)	25	NP	55.2	41.2	1.5	2.0	100	77	5	-	-
SS-79	60' RT	125+00	8.90-10.40	A-1-b(0)	25	NP	87.1	7.8	2.1	3.0	100	30	5	-	-
SS-80	60' RT	125+00	13.90-15.40	A-2-4(0)	17	NP	61.3	30.5	4.1	4.0	100	68	11	-	-
SS-81	60' RT	125+00	19.90-21.40	A-3(0)	20	NP	61.3	33.4	4.3	1.0	100	68	9	-	-

BM \*8 EL = 411.87'  
 N 458549.708 E 1830771.296  
 RR SPIKE IN BASE OF 15" LONG LEAF PINE  
 -L- STA 118+94.35 OFF 185.18 RT.

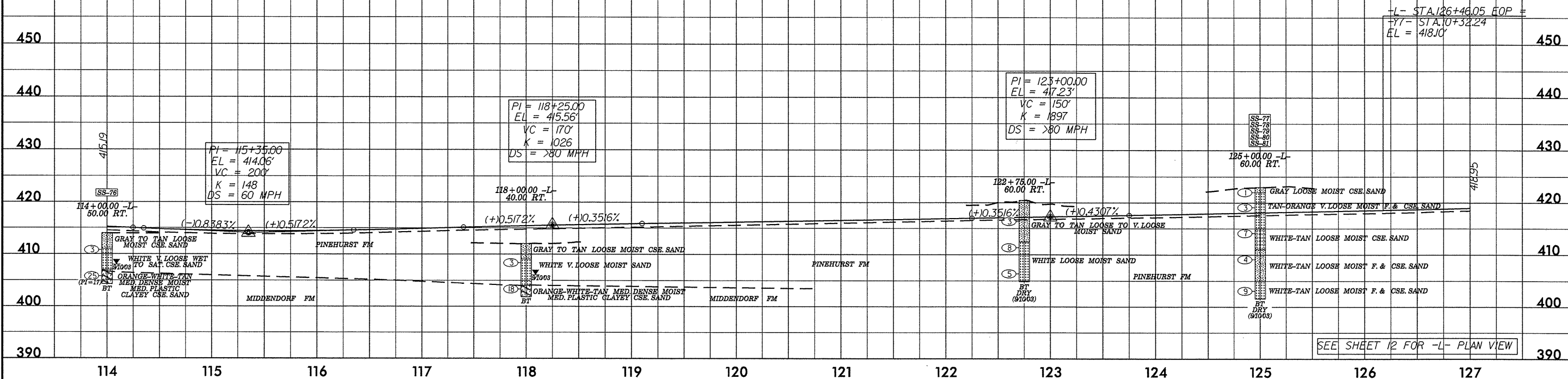
**ETHERILL ENGINEERING**  
 559 Jones Franklin Rd. Suite 164  
 Raleigh, N.C. 27605  
 Phone: 919 851 8077  
 Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO. **R-2502A** SHEET NO. **30**  
 ROADWAY DESIGN ENGINEER  
 HYDRAULICS ENGINEER

**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

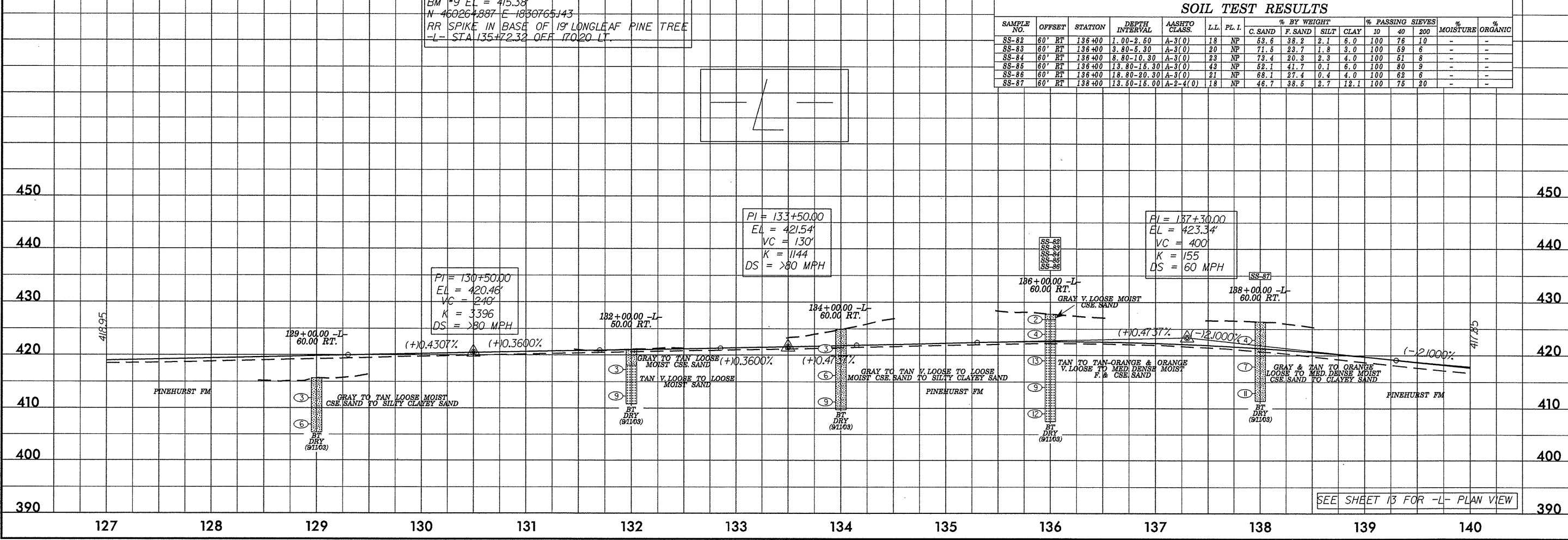
**INCOMPLETE PLANS**  
 DO NOT USE FOR R/W ACQUISITION



BM \*9 EL = 415.38'  
 N 460264.887 E 1830765.143  
 RR SPIKE IN BASE OF 19" LONG LEAF PINE TREE  
 -L- STA 135+72.32 OFF 170.20 LT.

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-82	60' RT	136+00	1.00-2.50	A-3(0)	18	NP	53.6	38.2	2.1	5.0	100	76	10	-	-
SS-83	60' RT	136+00	3.80-5.30	A-3(0)	20	NP	71.5	23.7	1.8	3.0	100	59	6	-	-
SS-84	60' RT	136+00	8.80-10.30	A-3(0)	23	NP	73.4	20.3	2.3	4.0	100	51	8	-	-
SS-85	60' RT	136+00	13.80-15.30	A-3(0)	43	NP	52.1	41.7	0.1	5.0	100	80	9	-	-
SS-86	60' RT	136+00	18.80-20.30	A-3(0)	21	NP	68.1	27.4	0.2	4.0	100	62	6	-	-
SS-87	60' RT	136+00	13.50-15.00	A-2-4(0)	18	NP	46.7	38.5	2.7	12.1	100	75	20	-	-



SEE SHEET 13 FOR -L- PLAN VIEW

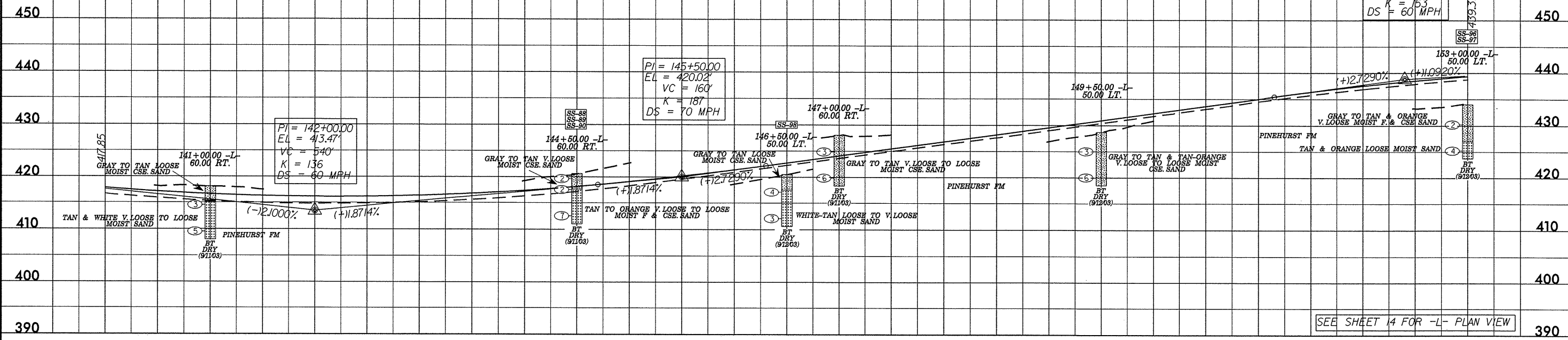
PRELIMINARY PLANS  
 DO NOT USE FOR CONSTRUCTION  
 INCOMPLETE PLANS  
 DO NOT USE FOR R/W ACQUISITION

BM \*10 EL = 434.27'  
 N 461882.490 E 1831071.554  
 RR SPIKE IN BASE OF 15" PINE TREE  
 -L- STA 152+18.42 OFF 199.69 LT.

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-88	60' RT	144+60	1.00-2.50	A-2-4(0)	19	NP	58.7	31.4	2.9	7.1	100	67	12	-	-
SS-89	60' RT	144+60	3.10-4.60	A-3(0)	16	NP	89.8	34.8	1.4	4.0	100	67	8	-	-
SS-90	60' RT	144+60	8.10-9.60	A-3(0)	21	NP	89.9	31.0	1.0	8.1	100	71	10	-	-
SS-98	60' LT	149+60	3.40-4.90	A-3(0)	23	NP	88.1	36.9	1.0	4.0	100	74	7	-	-
SS-96	60' LT	163+00	3.80-5.30	A-2-4(0)	19	NP	49.0	38.2	3.7	9.1	100	80	17	-	-
SS-97	60' LT	163+00	8.80-10.30	A-3(0)	20	NP	64.7	27.2	1.0	7.1	100	89	9	-	-

PI = 152+40.00  
 EL = 438.85'  
 VC = 250'  
 K = 153  
 DS = 60 MPH



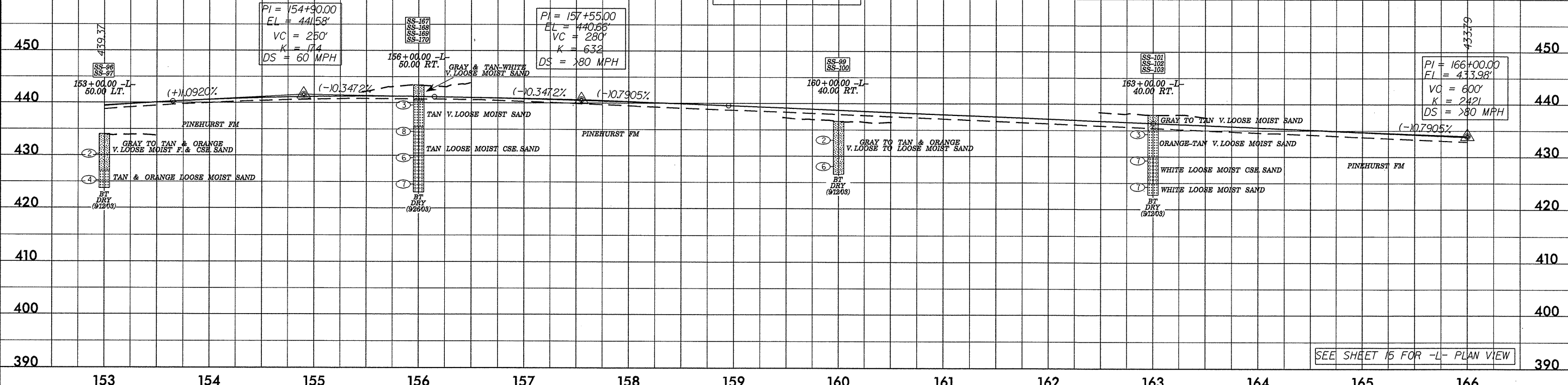
SEE SHEET 14 FOR -L- PLAN VIEW

BM \*11 EL = 433.54'  
 N 463238.077 E 1831657.334  
 RR SPIKE IN BASE OF TELEGRAPH POLE  
 -L- STA 166+64.91 OFF 97.69 RT.

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-98	50' LT	153+00	3.80-5.30	A-2-4(0)	19	NP	49.0	38.2	3.7	9.1	100	80	17	-	-
SS-97	50' LT	153+00	8.80-10.30	A-3(0)	20	NP	64.7	27.2	1.0	7.1	100	69	9	-	-
SS-167	50' RT	156+00	3.90-4.40	A-3(0)	18	NP	69.4	25.4	0.2	5.0	100	61	7	-	-
SS-168	50' RT	156+00	8.90-9.40	A-1-b(0)	24	NP	89.4	7.4	0.2	3.0	100	33	3	-	-
SS-169	50' RT	156+00	13.90-14.40	A-1-b(0)	18	NP	71.5	23.5	2.0	3.0	100	50	6	-	-
SS-170	50' RT	156+00	18.90-19.40	A-1-b(0)	18	NP	82.8	11.1	1.1	5.0	100	32	7	-	-
SS-99	40' RT	160+00	3.60-5.10	A-2-4(0)	19	NP	63.3	25.2	3.4	8.1	100	62	14	-	-
SS-100	40' RT	160+00	8.60-10.10	A-2-4(0)	19	NP	65.9	24.5	1.5	8.1	100	64	11	-	-
SS-101	40' RT	163+00	3.70-5.20	A-3(0)	17	NP	70.9	19.9	1.2	8.1	100	64	10	-	-
SS-102	40' RT	163+00	8.70-10.20	A-1-b(0)	18	NP	88.7	10.0	1.3	0.0	100	33	2	-	-
SS-103	40' RT	163+00	13.70-15.20	A-3(0)	13	NP	66.6	31.1	1.2	2.0	100	66	6	-	-

PI = 166+00.00  
 EL = 433.98'  
 VC = 600'  
 K = 2421  
 DS = >80 MPH



SEE SHEET 15 FOR -L- PLAN VIEW

5/28/17

### SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-104	40' RT	166+60	3.20-4.70	A-2-4(0)	17	NP	69.4	31.6	4.1	5.0	87	62	11	-	-
SS-105	35' RT	172+00	3.70-5.20	A-2-4(0)	20	NP	64.5	19.7	3.7	12.1	87	53	15	-	-
SS-106	35' RT	172+00	8.70-10.20	A-2-6(1)	36	20	61.6	13.2	2.0	23.2	98	66	28	-	-
SS-107	35' RT	174+00	13.70-15.20	A-2-4(0)	25	7	69.1	12.0	4.8	14.1	100	61	20	-	-
SS-108	60' RT	174+00	3.70-5.20	A-1-5(0)	16	NP	75.4	17.6	3.9	3.0	98	41	8	-	-
MS-109	60' RT	174+00	8.70-10.20				0.0	0.0	0.0	0.0	0	0	0	15.4	-
SS-109	60' RT	174+00	8.70-10.20	A-2-6(2)	39	23	57.3	14.1	2.5	26.2	100	58	39	-	-
SS-110	60' RT	174+00	13.70-15.20	A-2-7(2)	48	25	63.2	9.6	2.0	26.2	100	67	28	-	-
MS-111	40' RT	177+00	3.60-5.10				0.0	0.0	0.0	0.0	0	0	0	18.8	-
SS-111	40' RT	177+00	3.60-5.10	A-7-6(12)	44	26	20.6	27.6	13.5	38.3	100	89	57	-	-
SS-112	40' RT	177+00	8.60-10.10	A-2-6(0)	32	11	52.6	19.5	5.7	22.2	98	72	28	-	-

BM #11 EL = 433.54  
 N 463238.077 E 1831657.334  
 RR SPIKE IN BASE OF TELEGRAPH POLE  
 -L- STA 166+64.9 OFF 97.89 RT.

**WETHERILL ENGINEERING**  
 559 Jones Franklin Rd. Suite 164  
 Raleigh, N.C. 27606  
 Phone: 919.851.8077  
 Fax: 919.851.8107

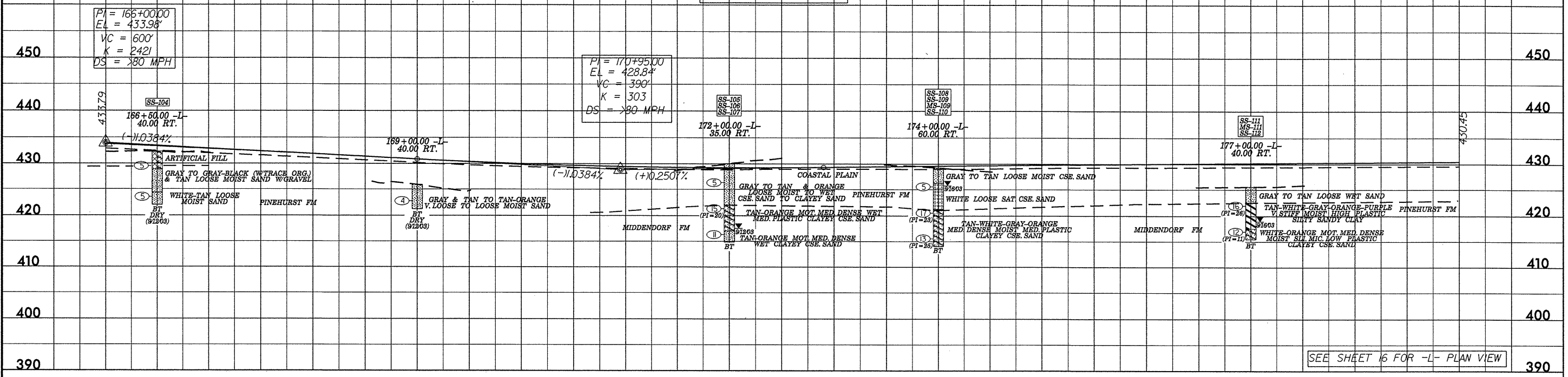
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO. **R-2502A** SHEET NO. **32**

ROADWAY DESIGN ENGINEER  
 HYDRAULICS ENGINEER

**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

**INCOMPLETE PLANS**  
 DO NOT USE FOR R/W ACQUISITION

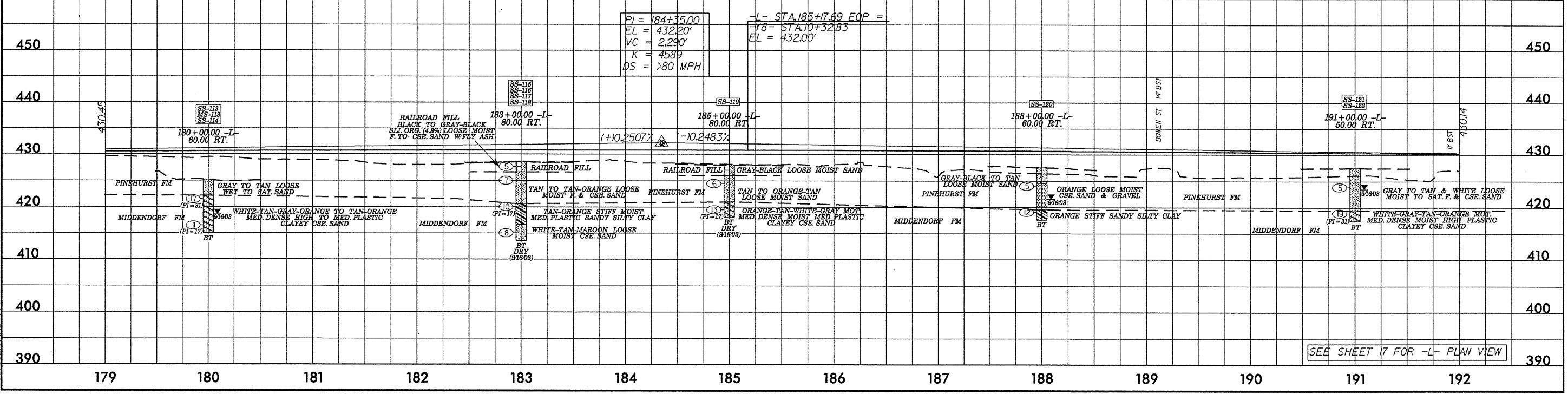


SEE SHEET 16 FOR -L- PLAN VIEW

BM #12 EL = 426.38  
 N 464732.568 E 1832734.469  
 RR SPIKE IN BASE OF POWER POLE  
 -L- STA 187+03.76 OFF 219.64 RT.

### SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
MS-113	60' RT	180+00	3.70-5.20				0.0	0.0	0.0	0.0	0	0	0	16.4	-
SS-113	60' RT	180+00	3.70-5.20	A-2-7(4)	52	31	59.1	8.6	3.1	29.3	96	52	32	-	-
SS-114	60' RT	180+00	8.70-10.20	A-2-6(1)	37	17	67.7	8.6	3.5	20.2	100	50	24	-	-
SS-115	80' RT	183+00	1.00-2.00	A-2-4(0)	22	NP	67.2	22.8	4.9	5.0	94	54	11	-	-
SS-116	80' RT	183+00	3.60-5.10	A-2-4(0)	18	NP	63.1	23.8	4.0	9.1	98	62	14	-	-
SS-117	80' RT	183+00	8.60-10.10	A-6(9)	34	17	19.4	13.8	52.7	14.1	99	88	67	-	-
SS-118	80' RT	183+00	13.60-15.10	A-2-4(0)	29	9	80.2	6.7	4.0	9.1	88	22	12	-	-
SS-119	80' RT	185+00	8.60-10.00	A-2-6(1)	37	17	68.5	8.2	2.1	21.2	98	47	24	-	-
SS-120	60' RT	188+00	3.60-5.10	A-1-6(0)	18	NP	75.6	16.7	3.6	4.0	97	45	9	-	-
SS-121	60' RT	191+00	3.60-5.10	A-2-4(0)	18	NP	69.4	20.3	3.3	7.1	98	53	12	-	-
SS-122	50' RT	191+00	8.60-10.10	A-2-7(3)	46	31	58.7	13.2	1.9	26.2	97	63	28	-	-

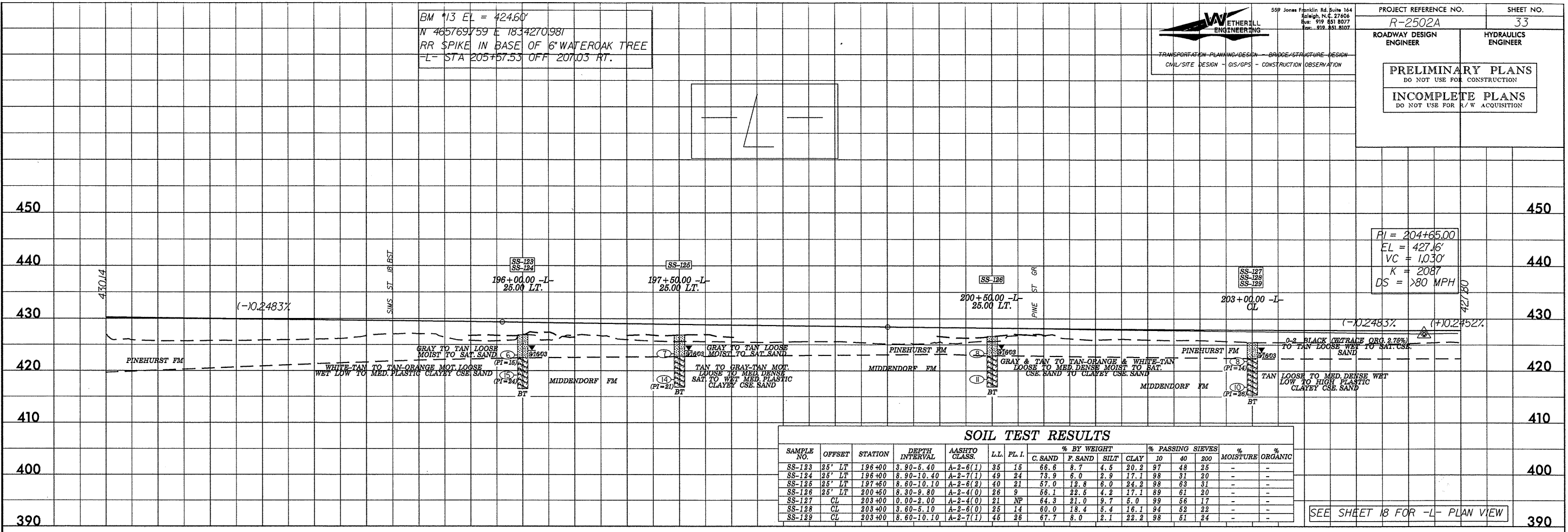


SEE SHEET 17 FOR -L- PLAN VIEW

\*\*\*\*\*SYSTEMS\*\*\*\*\*  
\*\*\*\*\*DESIGN\*\*\*\*\*  
\*\*\*\*\*DATE\*\*\*\*\*



BM #13 EL = 424.60'  
 N 465769.759 E 1834270.981  
 RR SPIKE IN BASE OF 6" WATEROAK TREE  
 -L- STA 205+57.53 OFF 201.03 FT.

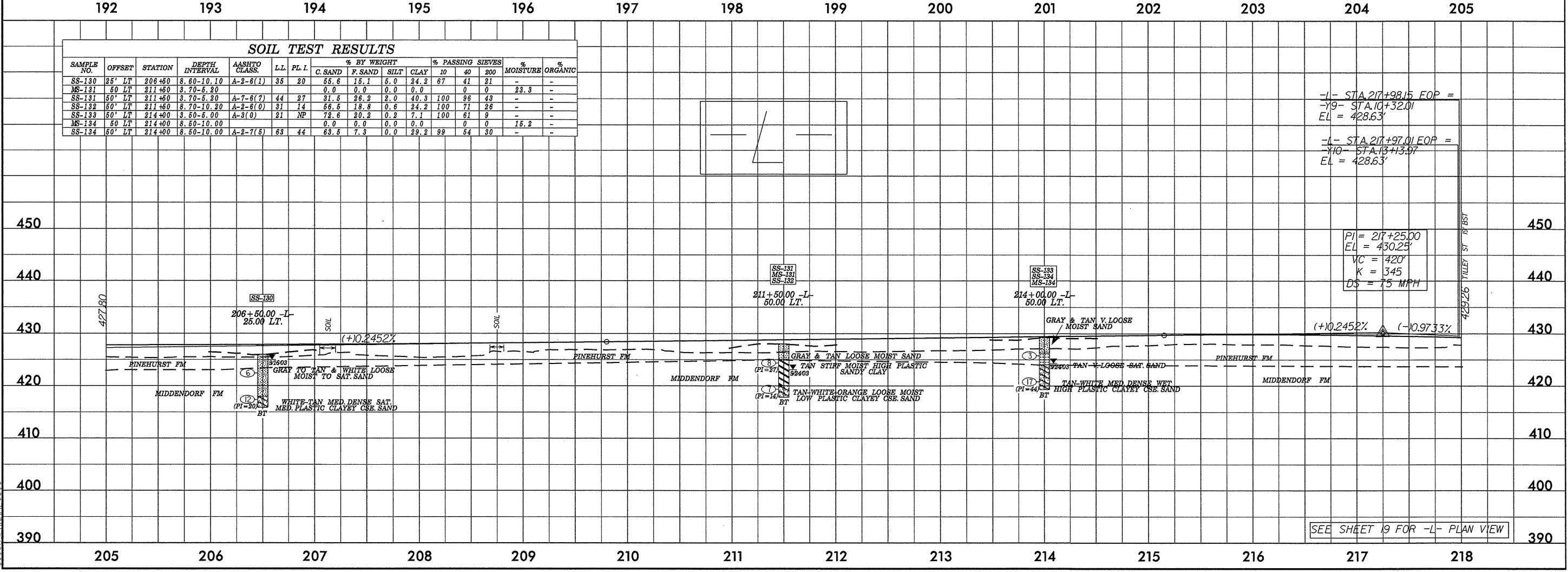


SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-123	25' LT	196+00	3.90-5.40	A-2-6(1)	35	16	66.6	8.7	4.5	20.2	97	48	25	-	-
SS-124	25' LT	196+00	8.90-10.40	A-2-7(1)	49	24	73.9	6.0	2.9	17.1	98	31	20	-	-
SS-125	25' LT	197+50	8.60-10.10	A-2-6(2)	40	21	57.0	12.8	6.0	24.2	98	63	31	-	-
SS-126	25' LT	200+50	8.30-9.80	A-2-4(0)	26	9	56.1	22.5	4.2	17.1	89	61	20	-	-
SS-127	CL	203+00	0.00-2.00	A-2-4(0)	21	NP	64.3	21.0	9.7	5.0	99	56	17	-	-
SS-128	CL	203+00	3.60-5.10	A-2-6(0)	25	14	60.0	18.4	5.4	16.1	94	52	22	-	-
SS-129	CL	203+00	8.60-10.10	A-2-7(1)	45	26	67.7	8.0	2.1	22.2	98	51	24	-	-

SEE SHEET 18 FOR -L- PLAN VIEW

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-130	25' LT	206+50	8.60-10.10	A-2-6(1)	35	20	55.6	15.1	5.0	24.2	67	41	21	-	-
MS-131	60' LT	211+50	3.70-5.20	A-2-6(1)	35	20	0.0	0.0	0.0	0.0	0	0	0	23.3	-
SS-131	60' LT	211+50	3.70-5.20	A-7-6(7)	44	27	31.5	26.2	2.0	40.3	100	96	43	-	-
SS-132	60' LT	211+50	8.70-10.20	A-2-6(0)	31	14	66.6	18.8	0.6	24.2	100	71	26	-	-
SS-133	60' LT	214+00	3.60-5.00	A-3(0)	21	NP	72.6	20.2	0.2	7.1	100	61	9	-	-
MS-134	60' LT	214+00	8.60-10.00	A-2-6(0)	31	14	0.0	0.0	0.0	0.0	0	0	0	15.2	-
SS-134	60' LT	214+00	8.60-10.00	A-2-7(5)	63	44	63.5	7.3	0.0	22.2	99	54	30	-	-

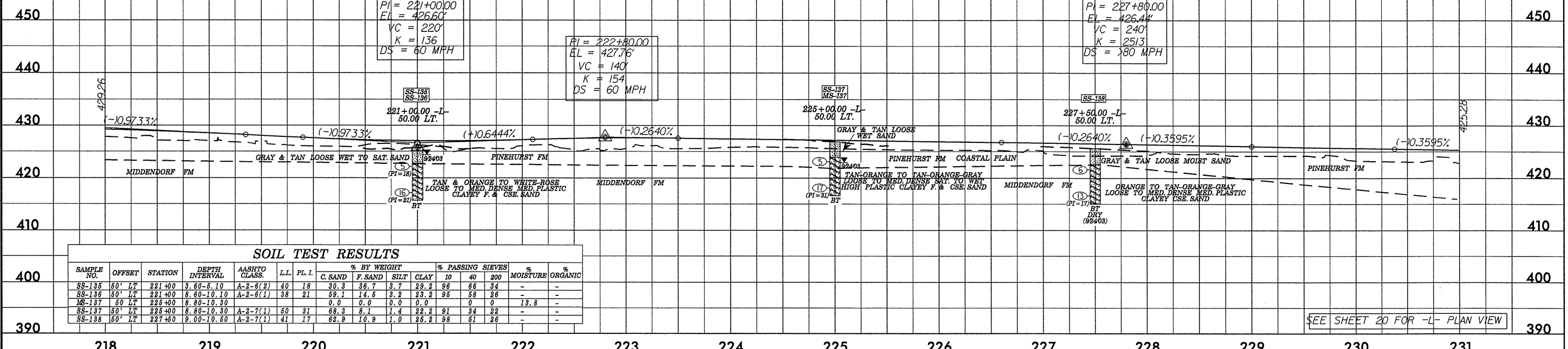
-L- STA 217+98.15 FOP =  
 -Y9- STA. 10+32.01  
 EL = 428.63'  
 -L- STA 217+97.01 FOP =  
 -Y10- STA. 13+13.97  
 EL = 428.63'



SEE SHEET 19 FOR -L- PLAN VIEW

\*\*\*\*\* TIME \*\*\*\*\*  
 \*\*\*\*\* DATE \*\*\*\*\*  
 \*\*\*\*\* ENGINE \*\*\*\*\*

BM #14 EL = 427.18'  
 N 466917.419 E 1835411.110  
 RR SPIKE IN BASE OF POWER POLE  
 -L- STA 221+42.45 OFF 17.09 LT.



**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	LL	PL I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-135	60' LT	221+400	3.60-5.10	A-2-6(2)	40	18	30.3	36.7	3.7	29.2	96	66	34	-	-
SS-136	50' LT	221+400	8.60-10.10	A-2-6(1)	38	21	59.1	14.5	3.2	23.2	95	58	26	-	-
SS-137	50' LT	225+400	8.80-10.30	A-2-7(1)	50	31	68.3	8.1	1.4	22.2	91	34	22	13.8	-
SS-137	50' LT	225+400	8.80-10.30	A-2-7(1)	50	31	68.3	8.1	1.4	22.2	91	34	22	-	-
SS-138	50' LT	227+60	9.00-10.60	A-2-7(1)	41	17	62.9	10.9	1.0	25.2	98	51	26	-	-

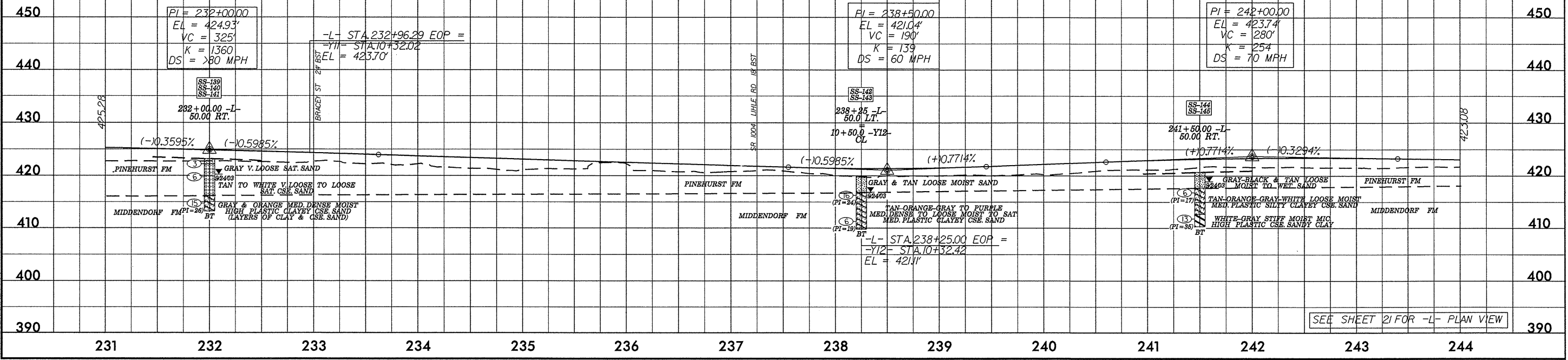
SEE SHEET 20 FOR -L- PLAN VIEW

BM #15 EL = 420.15'  
 N 467501.258 E 1836950.079  
 RR SPIKE IN BASE OF 22' PINE TREE  
 -L- STA 237+47.19 OFF 249.14 RT.

**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	LL	PL I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-139	50' RT	232+400	1.00-2.50	A-1-6(0)	14	NP	76.6	14.8	3.5	5.0	99	43	10	-	-
SS-140	50' RT	232+400	3.50-5.00	A-1-6(0)	15	NP	78.5	16.4	2.0	3.0	98	42	6	-	-
SS-141	50' RT	232+400	8.50-10.00	A-2-7(3)	45	26	48.7	18.0	4.0	29.2	98	64	35	-	-
SS-142	CL	10+60	3.50-5.10	A-2-7(2)	45	24	54.6	12.8	2.3	30.2	93	53	31	-	-
SS-143	CL	10+60	8.50-10.10	A-2-6(1)	34	19	55.6	15.1	2.0	26.2	95	67	28	-	-
SS-144	50' RT	241+60	3.90-5.40	A-2-6(1)	29	17	46.4	21.0	10.5	22.2	94	62	34	-	-
SS-145	50' RT	241+60	8.90-10.40	A-1-6(6)	52	35	47.4	16.1	0.2	36.3	97	70	36	-	-

SEE SHEET 21 FOR -L- PLAN VIEW



5/28/11

### SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PL	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-146	50' LT	244+50	3.60-5.10	A-2-6(1)	32	16	64.4	10.6	2.8	22.2	95	48	25	-	-
SS-147	50' LT	244+60	8.60-10.10	A-2-7(3)	48	32	57.8	13.3	0.7	28.2	98	61	29	-	-
SS-148	25' LT	249+00	4.60-6.10	A-4(0)	20	NP	3.6	0.0	83.3	13.1	69.6	67	67	-	-
SS-149	25' LT	249+00	9.60-11.10	A-2-6(0)	31	14	40.5	38.7	0.6	22.2	98	73	25	-	-
SS-150	25' LT	251+50	4.50-6.00	A-2-6(0)	33	14	64.5	14.1	0.2	21.2	99	64	22	-	-
SS-151	25' LT	251+50	9.50-11.00	A-2-4(0)	27	10	61.4	30.1	1.3	17.1	97	66	22	-	-
SS-152	25' LT	253+50	3.60-5.10	A-2-4(0)	20	NP	61.2	22.8	5.9	10.1	96	61	17	-	-
SS-154	50' RT	256+75	6.50-8.00	A-7-6(9)	56	34	41.1	15.1	1.4	42.3	97	69	44	-	-

BM #16 EL = 417.68'  
 N 468°49'33" E 1838260.012  
 RR SPIKE IN BASE OF 12" PINE TREE  
 -L- STA 253+72.57 OFF 28.09 LT.

**ETHERILL ENGINEERING**  
 TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

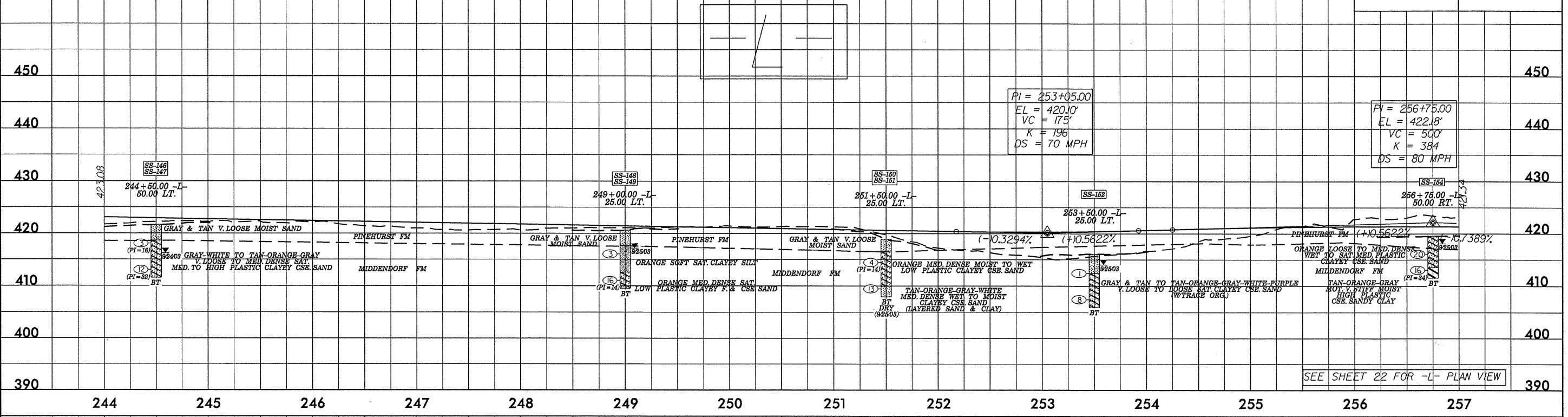
559 Jones Franklin Rd. Suite 164  
 Raleigh, N.C. 27606  
 Fax: 919.851.8077  
 Tel: 919.851.8107

PROJECT REFERENCE NO. **R-2502A** SHEET NO. **35**

ROADWAY DESIGN ENGINEER  
 HYDRAULICS ENGINEER

**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

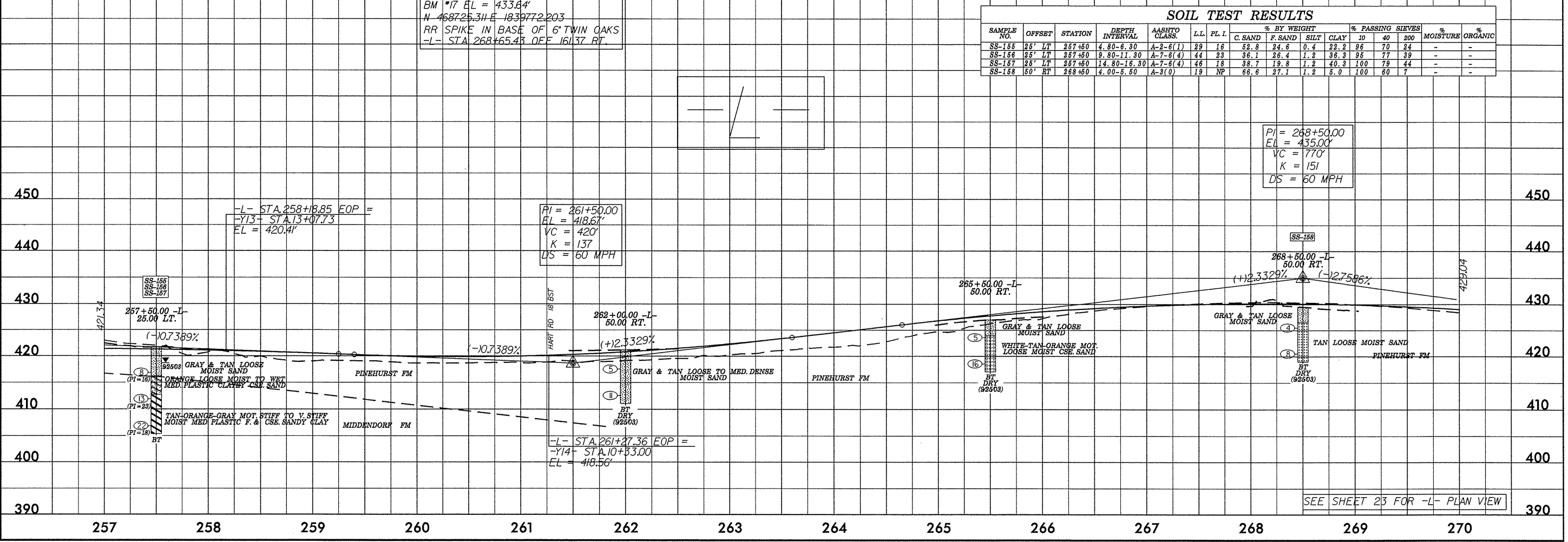
**INCOMPLETE PLANS**  
 DO NOT USE FOR R/W ACQUISITION



BM #17 EL = 433.64'  
 N 468°25'31" E 1839772.203  
 RR SPIKE IN BASE OF 6" TWIN OAKS  
 -L- STA 268+65.43 OFF 161.37 RT.

### SOIL TEST RESULTS

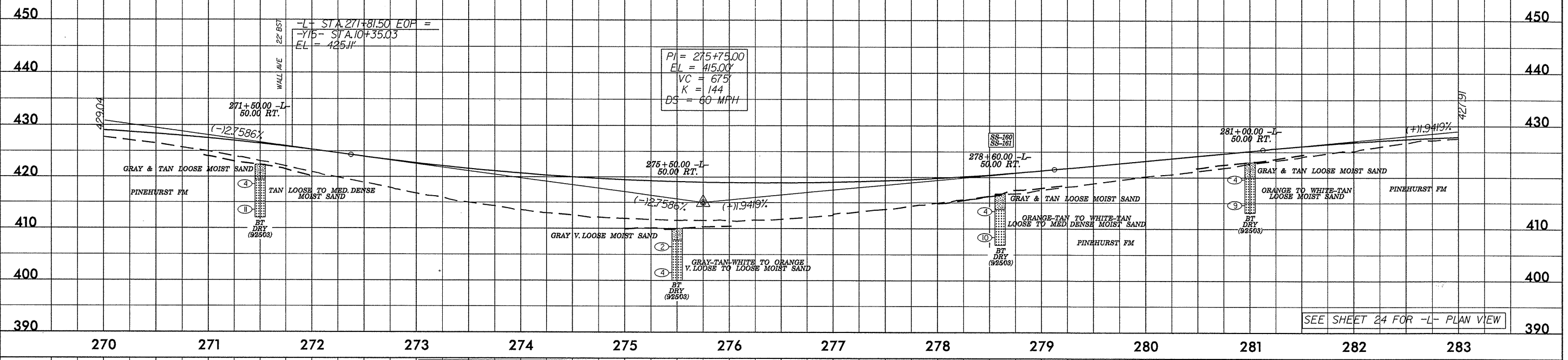
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PL	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-155	25' LT	257+50	4.80-6.30	A-2-6(1)	29	16	52.8	24.6	0.4	22.2	95	70	24	-	-
SS-156	25' LT	257+50	9.80-11.30	A-7-6(4)	44	23	36.1	26.4	1.2	36.3	95	77	39	-	-
SS-157	25' LT	257+50	14.80-16.30	A-7-6(4)	46	18	38.7	19.8	1.2	40.3	100	78	44	-	-
SS-158	50' RT	268+50	4.00-5.50	A-3(0)	19	NP	66.6	27.1	1.2	5.0	100	60	7	-	-



\*\*\*\*\* TIME \*\*\*\*\*  
 \*\*\*\*\* DON'T \*\*\*\*\*  
 \*\*\*\*\* \*\*\*\*\*

**SOIL TEST RESULTS**

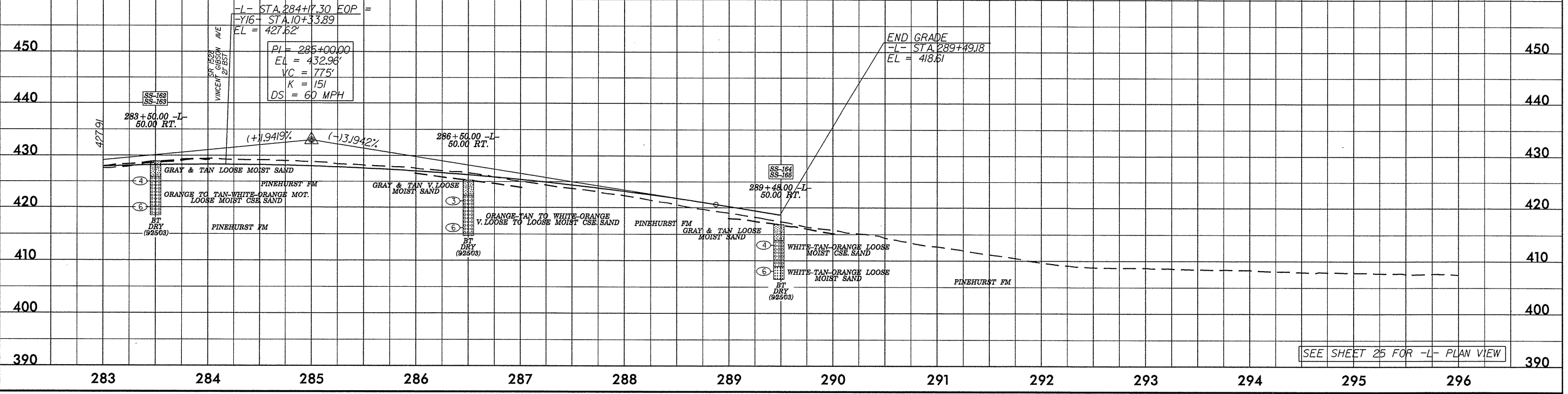
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PL I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-160	50' RT	278+60	3.40-4.90	A-3(0)	17	NP	67.9	27.0	0.7	5.0	100	60	8	-	-
SS-161	50' RT	278+60	8.40-9.90	A-3(0)	20	NP	64.6	31.4	0.1	4.0	100	71	8	-	-



BM #18 EL = 428.08'  
 N 470003.200 E 1840950.126  
 RR SPIKE IN BASE OF POWER POLE  
 -L- STA 285+39.35 OFF 319.52 FT

**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PL I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-162	50' RT	283+50	3.90-4.40	A-1-b(0)	21	NP	73.7	21.0	0.3	5.0	99	47	6	-	-
SS-163	50' RT	283+50	8.90-9.40	A-1-b(0)	20	NP	71.8	21.0	0.2	7.1	100	47	8	-	-
SS-164	50' RT	289+48	3.90-4.40	A-1-b(0)	23	NP	75.1	18.6	0.2	6.0	100	46	6	-	-
SS-165	50' RT	289+48	8.90-9.40	A-3(0)	20	NP	67.6	24.2	0.2	8.1	100	64	8	-	-



\*\*\*\*\* TIME \*\*\*\*\*  
 \*\*\*\*\* DATE \*\*\*\*\*  
 \*\*\*\*\* NAME \*\*\*\*\*

5/28/11

### SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ASHTO CLASS	L.L.	P.L.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-5	60' RT	14+60	0.00-1.60	A-2-4(0)	15	NP	69.4	20.6	6.0	5.0	100	54	12	-	-
SS-6	60' RT	14+60	4.70-5.70	A-2-7(1)	41	23	58.6	18.4	2.0	26.2	88	50	26	-	-
SS-7	60' RT	14+60	9.20-10.70	A-7-6(44)	80	61	1.6	32.2	15.9	50.3	100	99	72	-	-

**WETHERILL ENGINEERING**  
 559 Jones Franklin Rd. Suite 164  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107

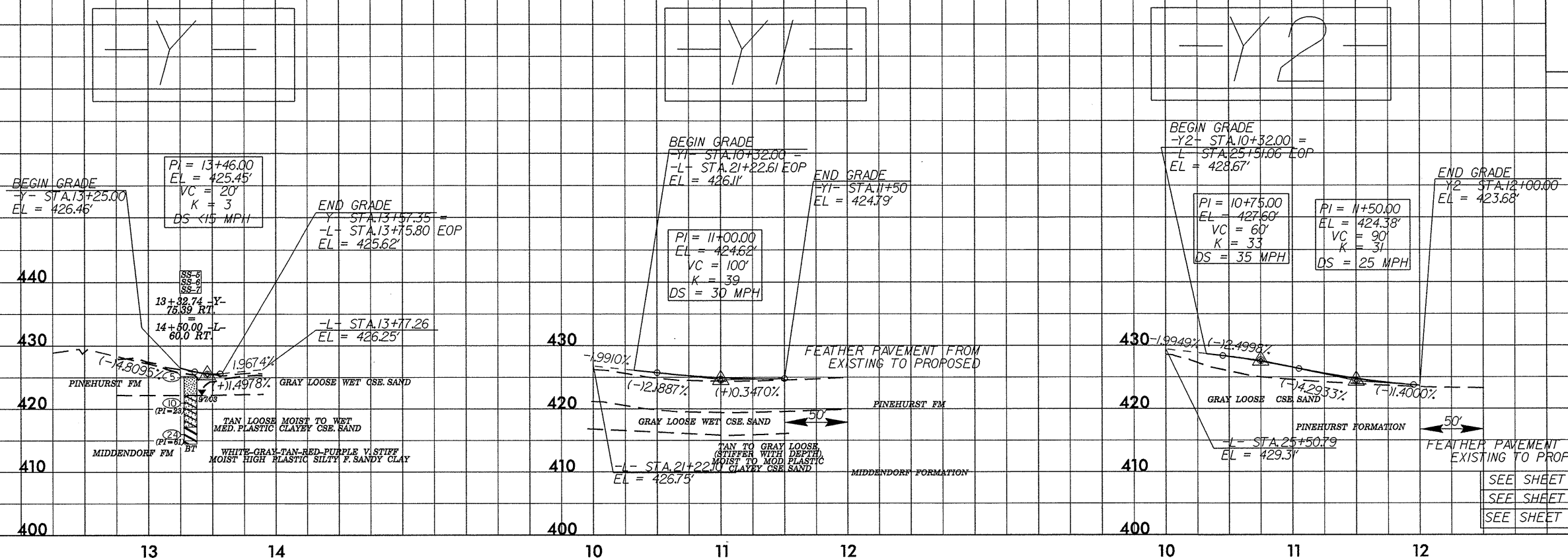
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO. **R-2502A** SHEET NO. **37**

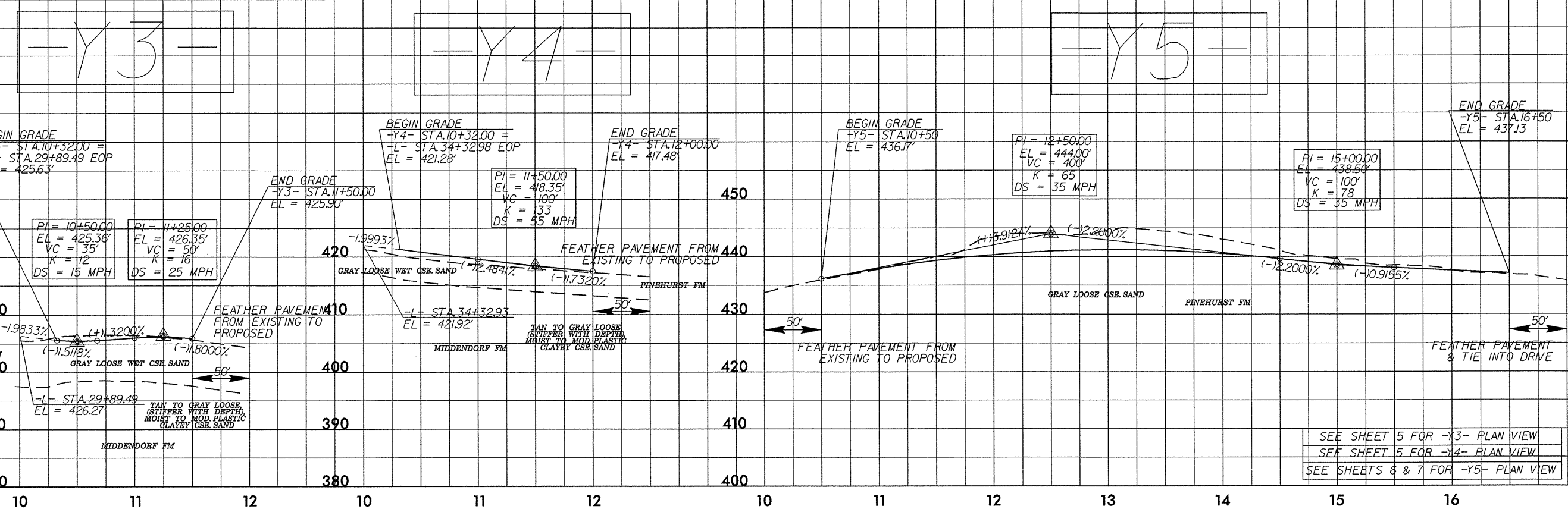
ROADWAY DESIGN ENGINEER  
 HYDRAULICS ENGINEER

**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION



SEE SHEET 4 FOR -Y- PLAN VIEW  
 SEE SHEET 4 FOR -Y1- PLAN VIEW  
 SEE SHEET 5 FOR -Y2- PLAN VIEW



SEE SHEET 5 FOR -Y3- PLAN VIEW  
 SEE SHEET 5 FOR -Y4- PLAN VIEW  
 SEE SHEETS 6 & 7 FOR -Y5- PLAN VIEW

5/28/11

SOIL TEST RESULTS													
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ASHTO CLASS.	LL	PL	% BY WEIGHT				% MOISTURE	% ORGANIC	
							C. SAND	F. SAND	SILT	CLAY			
SS-91	CL	11+50	3.50-5.00	A-3(0)	17	NP	60.7	33.1	1.2	5.0	100	68	8
SS-92	CL	11+50	8.50-10.00	A-3(0)	18	NP	63.4	30.6	1.9	4.0	100	70	8
SS-93	25' LT	14+00	1.00-2.50	A-2-4(0)	19	NP	68.4	25.0	2.5	9.1	100	72	13
SS-94	25' LT	14+00	3.70-5.20	A-2-4(0)	19	NP	67.7	28.3	0.9	13.1	100	72	15
SS-95	25' LT	14+00	8.70-10.20	A-3(0)	18	NP	67.4	25.3	1.2	6.0	100	63	8

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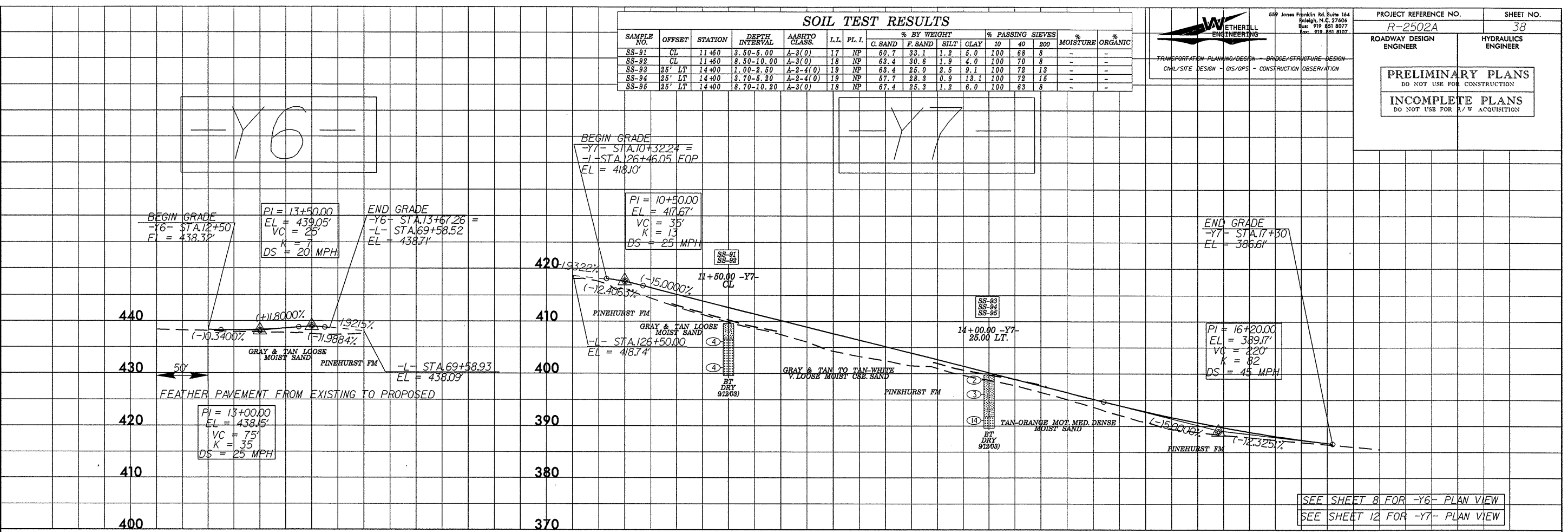
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO. **R-2502A** SHEET NO. **38**

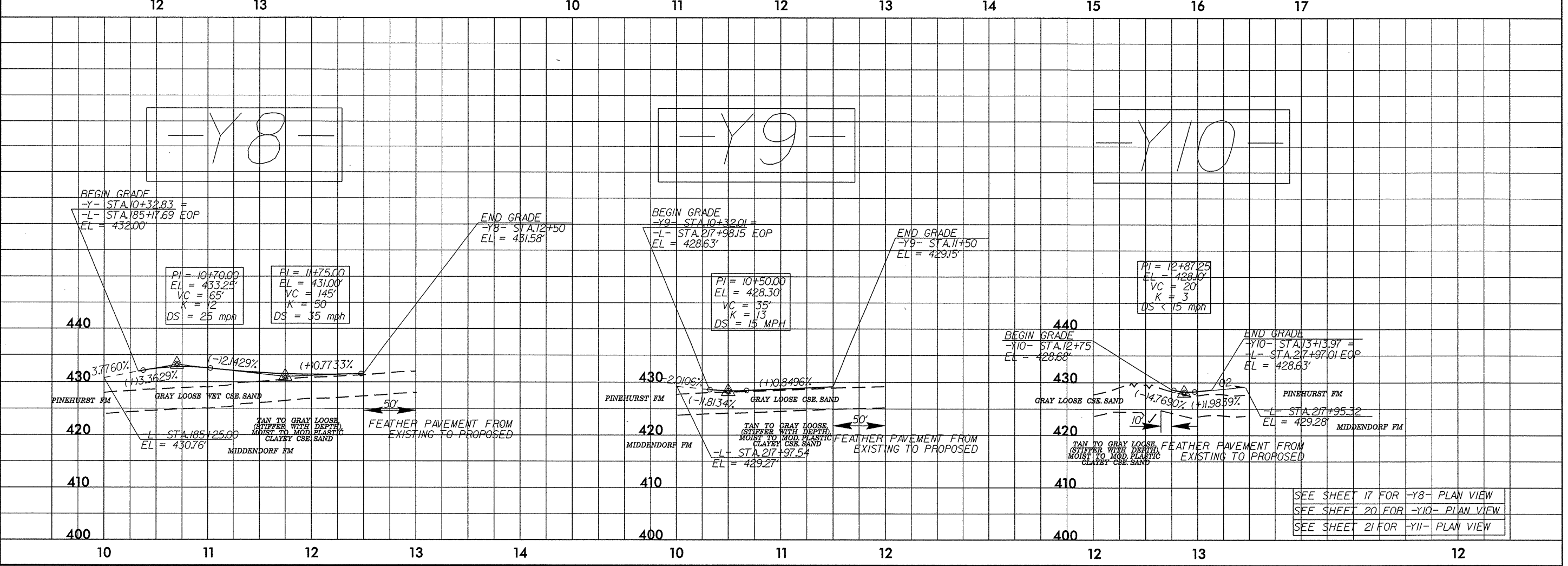
ROADWAY DESIGN ENGINEER  
 HYDRAULICS ENGINEER

**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

**INCOMPLETE PLANS**  
 DO NOT USE FOR R/W ACQUISITION



SEE SHEET 8 FOR -Y6- PLAN VIEW  
 SEE SHEET 12 FOR -Y7- PLAN VIEW



SEE SHEET 17 FOR -Y8- PLAN VIEW  
 SEE SHEET 20 FOR -Y10- PLAN VIEW  
 SEE SHEET 21 FOR -Y11- PLAN VIEW

VERTICAL CURVE DATA  
 STATIONING  
 ELEVATIONS