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NOTE: SEE SHEET 2A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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

**ROADWAY**  
**SUBSURFACE INVESTIGATION**

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LINE	STATION	PLAN	PROFILE	XSECT
-L-	12+35-25+00	4-7	17	
-L-	25+00-39+00	7-10	18	21-25
-L-	39+00-42+75	10	19	
-Y3-	12+15-30+50	6, 11-14	20	

**BORE LOGS**  
SHEET 26

PROJ. REFERENCE NO. 33727.1.1 (B-4490) F.A. PROJ. BRNHS-0024(24)  
 COUNTY CUMBERLAND  
 PROJECT DESCRIPTION REPLACE BRIDGE NO. 116 OVER CSX RR,  
NORFOLK SOUTHERN RR, & HILLSBORO ST. ON NC 24210

**INVENTORY-REVISION**

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

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

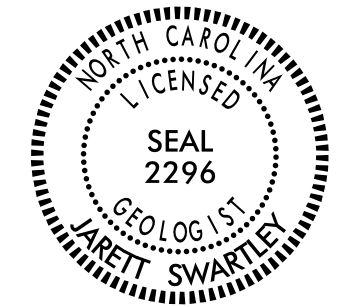
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT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

**CONTRACT: 33727 ID: B-4490**

**PERSONNEL**

- J.R. SWARTLEY
- R.E. SMITH
- H.R. CONLEY
- J.R. MATULA
- H.L. FROATS
- O.B. OTI
- S&ME, INC.

INVESTIGATED BY J.R. SWARTLEY  
 CHECKED BY N.T. ROBERSON  
 SUBMITTED BY N.T. ROBERSON  
 DATE JUNE 2015



DocuSigned by:  
Jarett Swartley 7/1/2015  
 7F355C20E754413 SIGNATURE DATE

DRAWN BY: T.T. WALKER, J.R. SWARTLEY

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

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
**GEOTECHNICAL ENGINEERING UNIT**  
**SUBSURFACE INVESTIGATION**  
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																															
SOIL IS CONSIDERED 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 (ASTM 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>										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.										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:										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 (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (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.																																																																																															
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GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED      GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED      GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED      SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>										TERM	SPACING	VERY WIDE	MORE THAN 10 FEET	WIDE	3 TO 10 FEET	MODERATELY CLOSE	1 TO 3 FEET	CLOSE	0.16 TO 1 FOOT	VERY CLOSE	LESS THAN 0.16 FEET	TERM	THICKNESS	VERY THICKLY BEDDED	4 FEET	THICKLY BEDDED	1.5 - 4 FEET	THINLY BEDDED	0.16 - 1.5 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET	THINLY LAMINATED	< 0.008 FEET																						
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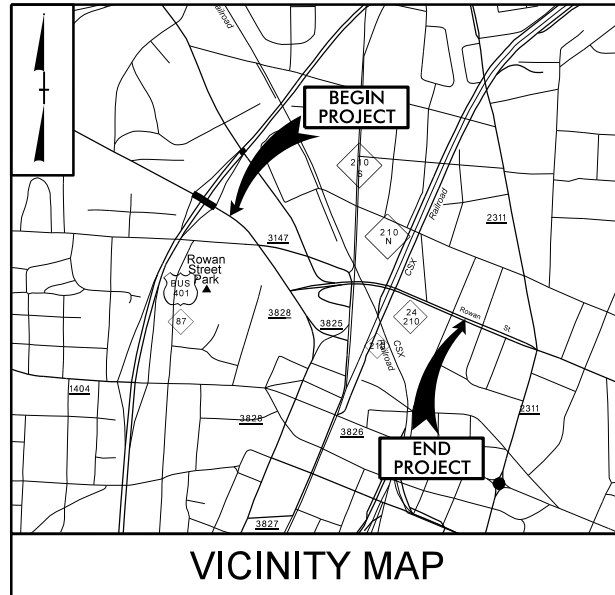
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4490	2A	26
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33727.1.1	BRNHS-0024(24)	P.E.	

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

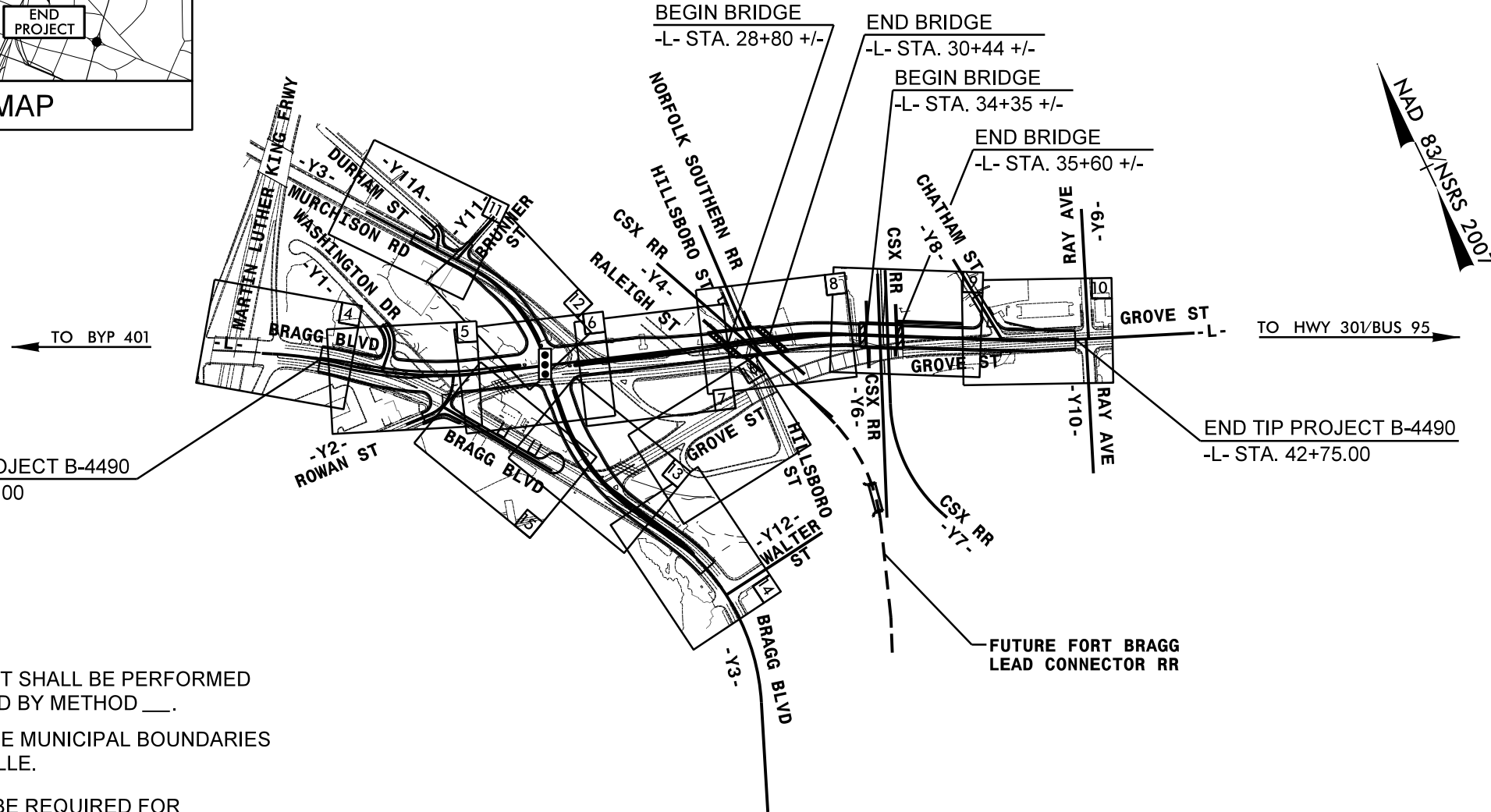
**CUMBERLAND COUNTY**

LOCATION: BRIDGE NO. 116 OVER CSX RR, NORFOLK SOUTHERN RR,  
AND HILLSBORO STREET ON NC 24/210

TYPE OF WORK: GRADING, PAVING, DRAINAGE, RETAINING WALL, AND STRUCTURE



VICINITY MAP



BEGIN TIP PROJECT B-4490  
-L- STA. 12+35.00

END TIP PROJECT B-4490  
-L- STA. 42+75.00

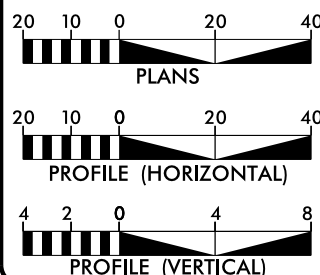
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD \_\_\_\_.

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF FAYETTEVILLE.

DESIGN EXCEPTIONS WILL BE REQUIRED FOR EXCEEDING MAXIMUM GRADE ON -L- AND THE SUPERELEVATION ALONG -L- THROUGH THE INTERSECTION WITH -Y3-

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

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = 34,813  
ADT 2035 = 47,596  
DHV = 10 %  
D = 55 %  
T = 3 % \*  
V = 40 MPH  
(\* TTST 1% + DUAL 2%)  
FUNC CLASS = URBAN  
PRINCIPAL ARTERIAL  
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4490 = 0.522 MILES  
LENGTH STRUCTURE TIP PROJECT B-4490 = 0.054 MILES  
TOTAL LENGTH TIP PROJECT B-4490 = 0.576 MILES

PLANS PREPARED BY:

**PARSONS BRINCKERHOFF**  
44 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
LICENSE NO. 1-4085

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
DECEMBER 20, 2013

LETTING DATE:  
DECEMBER 15, 2015

NCDOT CONTACT:

PLANS PREPARED FOR:

**DIVISION OF HIGHWAYS**  
1000 Birch Ridge Dr.  
Raleigh NC, 27610

TIM HAYES, PE  
PROJECT ENGINEER

BRIAN LUSK, PE  
PROJECT DESIGN ENGINEER

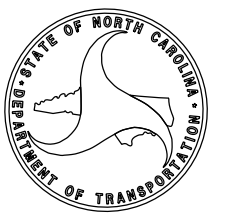
BRENDA MOORE, PE, CPM

HYDRAULICS ENGINEER

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

ROADWAY DESIGN ENGINEER

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



09/08/09

24-JUN-2015 13:48  
L:\Raleigh\investigation\TIP\B4490\_GEO\_RDWY\_REV\CADD\_GEO\RDWY\_REV\CADD\PlanProf\B-4490\_r\_dy\_tsh.dgn  
j\_r\_swarfley AT GEJ27225

TIP PROJECT: B-4490

CONTRACT: 33727



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY  
GOVERNOR

ANTHONY J. TATA  
SECRETARY

June 24, 2015

STATE PROJECT: 33727.1.1  
FEDERAL PROJECT: BRNHS-0024 (24)  
COUNTY: Cumberland  
DESCRIPTION: Replace Bridge No. 116 over CSX RR, Norfolk Southern RR, & Hillsboro St. on NC 24/210

SUBJECT: Geotechnical Report – Inventory – **Revision**

The Geotechnical Engineering Unit has completed a subsurface investigation for this project and presents the following inventory. **This report supersedes the previous one dated October, 2013 to show additional borings between -L- Sta. 28+50 and 33+00 which were requested by the Geotechnical Engineer for slope stability. Additional borings were performed in an alluvial region and artificial fill pile to find a more precise volume of these areas.** Plans, profiles, and cross sections will be submitted for this roadway project.

**Project Description**

This project lies along NC 24/210 (Rowan St.) within the city limits of Fayetteville in Cumberland County. The project begins at Bragg Blvd east of the interchange with US 401 (Martin Luther King Jr. Fwy.) and extends eastward where it merges with Rowan St. Rowan St. (-L-) will be realigned to the north to accommodate the two new replacement structures over CSX railroad, Norfolk Southern railroad, and Hillsboro St. A new intersection with Murchison Rd (NC 210) and the southern end of Bragg Blvd. occurs as -Y3-.

One NCDOT drill crew and geologist was used to assist in the subsurface investigation during September of 2013. A track mounted CME-55 was used during the field investigation. Additional borings were done in April of 2014 that were drilled by S&ME and logged by an NCDOT geologist. Standard Penetration Tests were performed at selected locations and additional borings were advanced using continuous flight augers and hand augers. In April of 2015 the Geotechnical Engineering Unit completed additional borings to delineate an Artificial Fill pile and alluvial region of soft silt. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by the Materials and Tests Unit.

The following alignments, totaling 0.923 miles, were investigated. Subsurface profiles and/or cross sections of these alignments are included in this report.

<u>Line</u>	<u>Stations</u>	
-L-	12+35	to 42+75
-Y3-	12+15	to 30+50

**Areas of Special Geotechnical Interest**

1) Highly plastic clays (PI>20) were encountered on the project at the following locations:

<u>Line</u>	<u>Station</u>	<u>Offset (ft)</u>
-L-	31+76	155 RT
-L-	37+30	53 LT
-L-	37+70	53 LT
-L-	38+20	60 LT
-L-	40+50	40 LT

2) The following section(s) contains relatively soft, organic soils, which have the potential for subgrade/embankment stability and/or long term settlement problems:

<u>Line</u>	<u>Station</u>	<u>Offset (ft)</u>
-L-	26+00	70 LT
-L-	31+76	155 RT
-L-	33+00	155 RT
-L-	35+85 to 36+75	50 LT to 90 LT

3) Artificial Fill: One area of artificial fill occurs at the following location:

<u>Line</u>	<u>Station</u>	<u>Offset (ft)</u>
-L-	36+70 to 37+85	60 LT to 100 LT

**Physiography and Geology**

The project is located in the western Coastal Plain physiographic province of North Carolina. A mixture of trees, shrubs, existing roads/driveways and fields are located along the project corridor. The project corridor is predominantly urban with commercial businesses located adjacent to the corridor. Topography along the project is flat to gently rolling with one steep slope at the eastern end slope of Bridge No. 116

The entire project is underlain by undivided coastal plain sediments and older Cretaceous aged soils belonging to the Cape Fear formation.

**Soil Properties**

Soils encountered at the project site include artificial fill, alluvial, Undivided Coastal Plain soils, and Cape Fear formational soils.

Artificial Fill is present left of -L- Sta. 36+70 to 37+85. This fill consists of orange, stiff, sandy clay with broken concrete fragments ranging in size up to 3 feet. Hand augers performed in the fill pile refused at 3.5' to 4.0'. The fill pile is approximately 25-45 feet wide and 6-8 feet high.

Alluvial soils consist of black and gray, moist to wet, very soft to soft, sandy silt with trace organics. Moisture content of this soil type taken at -L- Sta. 36+09, 68 LT is 27 %. Organic content of this soil type taken at -L- Sta. 36+00, 60 LT is 4 %.

Undivided Coastal Plain soils consist of orange, tan and gray, moist to saturated, very loose to med. dense, sand and silty sand (A-3, A-2-4), brown, tan and gray, moist to wet, soft to stiff, sandy clay and silty clay (A-6, A-7-6) and brown, very soft to soft clayey silt and sandy silt with trace to moderate amounts of organic matter.

Cape Fear formational soils occur beneath the Undivided Coastal Plain sediments. These soils consist of gray, saturated, med. dense to very dense sand, silty sand and clayey sand (A-1-b, A-3, A-2-4, A-2-6) and gray, wet, stiff to hard sandy and silty clay (A-6, A-7-6).

### **Groundwater**

Groundwater was encountered in most of the borings. Groundwater was generally found at an elevation between 90± and 95± feet. Groundwater near Cross Creek was found at or near the surface water elevation of Cross Creek. There is approximately 0.5' of surface water located within an alluvial region of soft silt at -L- Sta. 35+85 to 36+75, 60 LT to 100 LT.

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

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434 FAYETTEVILLE STREET  
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RALEIGH, NC 27601  
LICENSE NO. E-0165

VAIL FAMILY LIMITED PARTNERSHIP  
DB 4594 PG 225

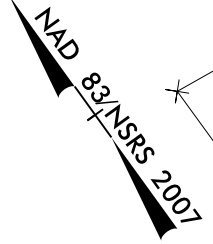
**-L- CURVE DATA**

PI Sta 11+89.76	PI Sta 16+18.86
$\Delta = 10^\circ 25' 53.3" (RT)$	$\Delta = 20^\circ 07' 11.6" (LT)$
$D = 3^\circ 34' 51.6"$	$D = 3^\circ 34' 51.6"$
$L = 291.30'$	$L = 561.85'$
$T = 146.05'$	$T = 283.85'$
$R = 1,600.00'$	$R = 1,600.00'$
$DS = 40 \text{ MPH}$	$DS = 40 \text{ MPH}$
$SE = \text{extst.}$	$SE = 2.0\%$
$RO = \text{exist.}$	$RO = 100'$

REQUIRES DESIGN EXCEPTION

LJ&T of FAYETTEVILLE, LLC  
DB 6541 PG 681

**BEGIN TIP PROJECT B-4490**  
**-L- STA. 12+35.00**



MARTIN LUTHER KING FRWY

MARTIN LUTHER KING FRWY

**BRAGG BLVD**

-L- POT Sta. 10+00.00

-L- PC Sta. 10+43.71

-L- PRC Sta. 13+35.01

MATCH LINE SEE SHEET 5  
-L- STA. 13+40.00

SEE SHEET No. 17 FOR -L- PROFILE

17-JUL-2014 08:38  
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 8/17/99

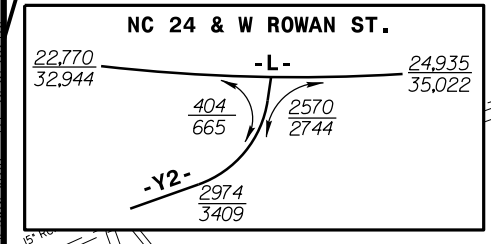
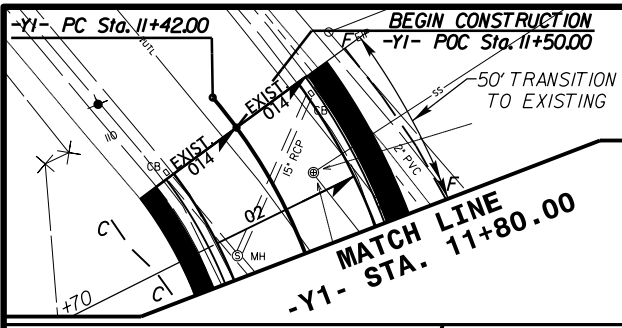
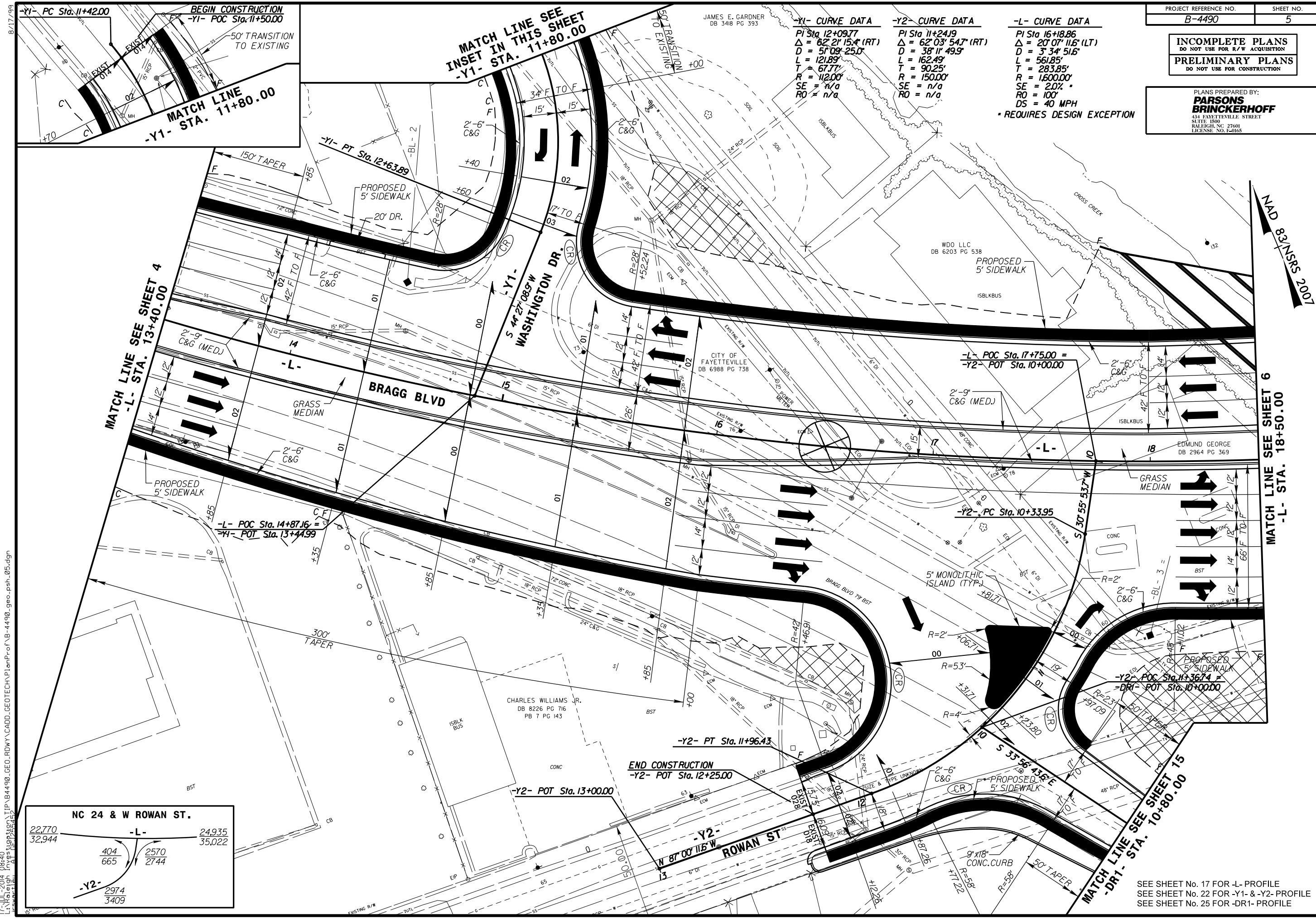


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-Y1- CURVE DATA	-Y2- CURVE DATA	-L- CURVE DATA
PI Sta 12+09.77	PI Sta 11+24.19	PI Sta 16+18.86
$\Delta = 62^\circ 21' 15.4" (RT)$	$\Delta = 62^\circ 03' 54.7" (RT)$	$\Delta = 20^\circ 07' 11.6" (LT)$
$D = 57^\circ 09' 25.0"$	$D = 38^\circ 11' 49.9"$	$D = 3^\circ 34' 51.6"$
$L = 121.89'$	$L = 162.49'$	$L = 561.85'$
$T = 67.77'$	$T = 90.25'$	$T = 283.85'$
$R = 112.00'$	$R = 150.00'$	$R = 1600.00'$
$SE = n/a$	$SE = n/a$	$SE = 2.0\%$
$RO = n/a$	$RO = n/a$	$RO = 100'$
		$DS = 40 MPH$



17-JUL-2014 08:40 L:\Raleigh\Investigations\TIP\B4490\_GEO\_ROWAN\_CADD\_GEO\TECH\Plan\Prof\B-4490-geo\_psh\_05.dgn

SEE SHEET No. 17 FOR -L- PROFILE  
SEE SHEET No. 22 FOR -Y1- & -Y2- PROFILE  
SEE SHEET No. 25 FOR -DR1- PROFILE

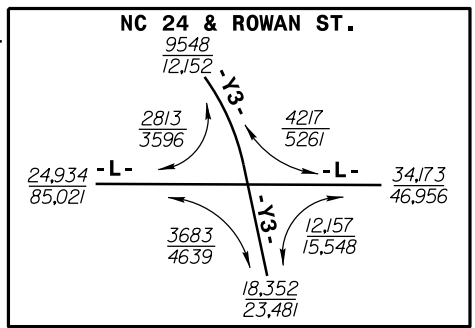


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-L- CURVE DATA	-Y3- CURVE DATA
PI Sta 16+18.86	PI Sta 17+09.63
$\Delta = 20^{\circ} 07' 11.6"$ (LT)	$\Delta = 43^{\circ} 13' 24.1"$ (RT)
D = 3' 34' 51.6"	D = 8' 48' 53.1"
L = 561.85'	L = 490.35'
T = 283.85'	T = 257.51'
R = 1600.00'	R = 650.00'
DS = 40 MPH	DS = 40mph
SE = 2.0 %	SE = 4.0%
RO = 100'	RO = 124'

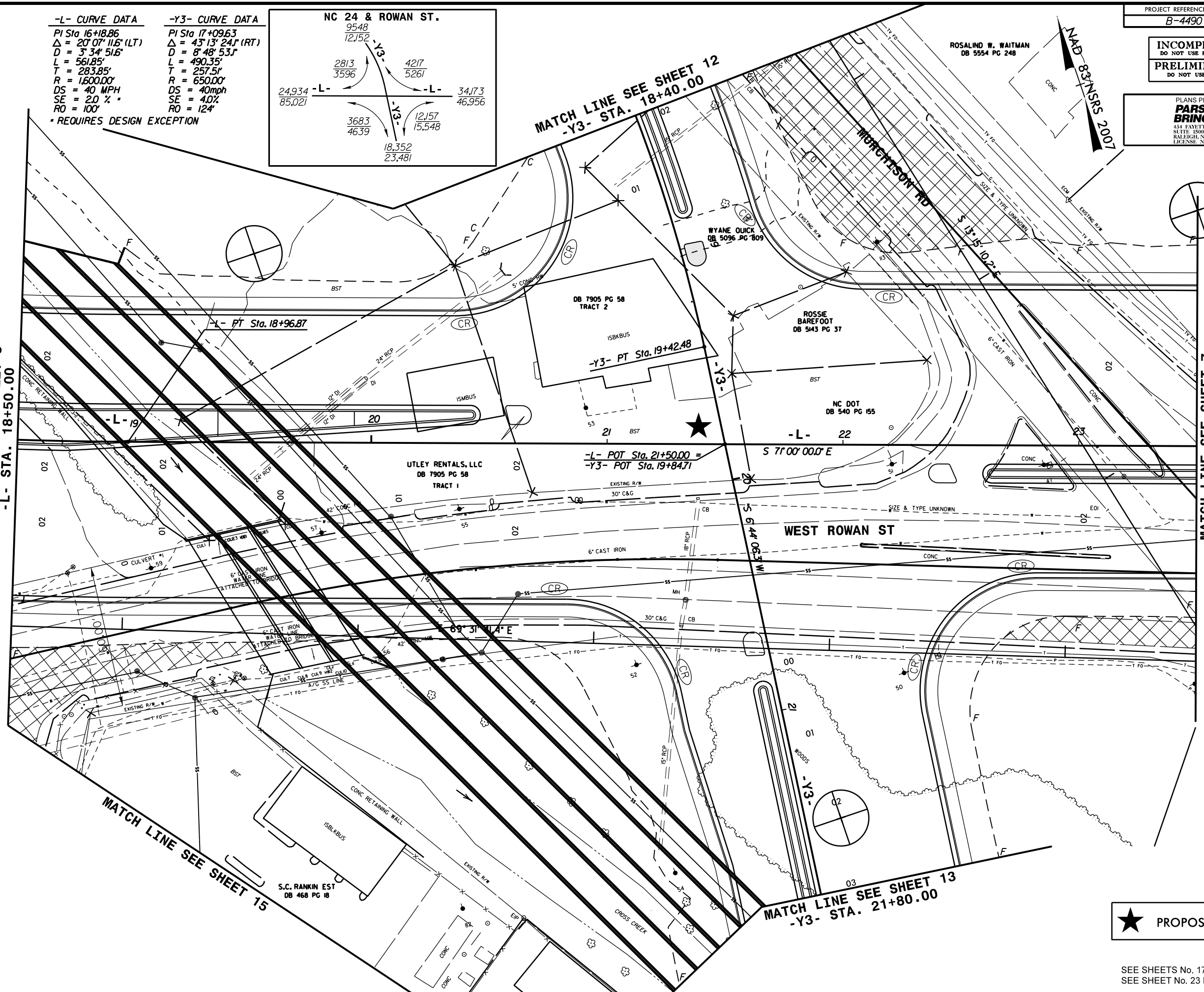
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MATCH LINE SEE SHEET 5  
-L- STA. 18+50.00

MATCH LINE SEE SHEET 12  
-Y3- STA. 18+40.00

MATCH LINE SEE SHEET 7  
-L- STA. 23+50.00



★ PROPOSED SIGNAL

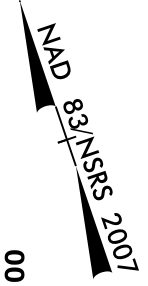
SEE SHEETS No. 17 & 18 FOR -L- PROFILE  
SEE SHEET No. 23 FOR -Y3- PROFILE

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 Project: B-4490

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**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

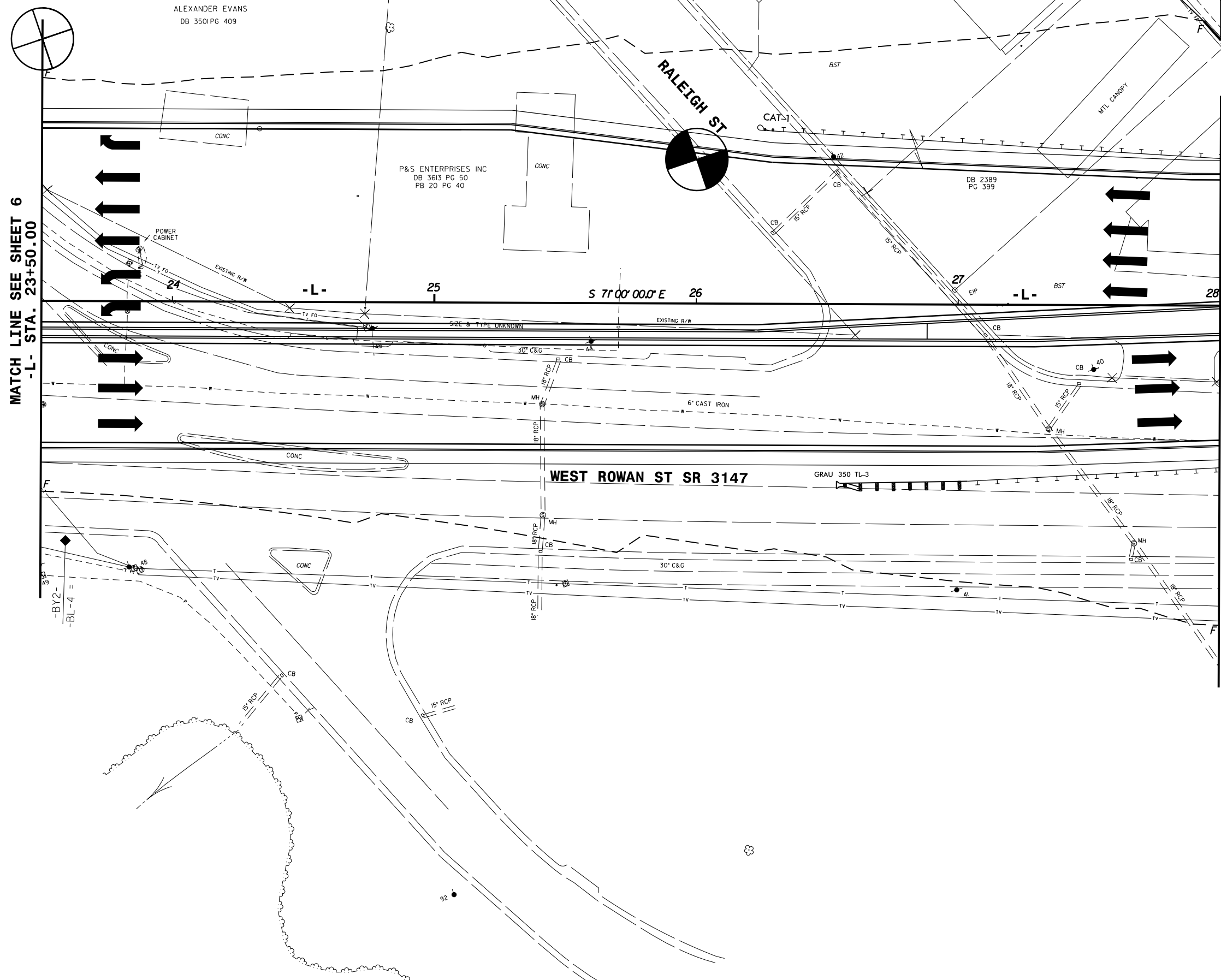
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MATCH LINE SEE SHEET 6  
-L- STA. 23+50.00

MATCH LINE SEE SHEET 8  
-L- STA. 28+00.00

BEGIN  
RETAINING WALL  
-L- STA. 27+93.27

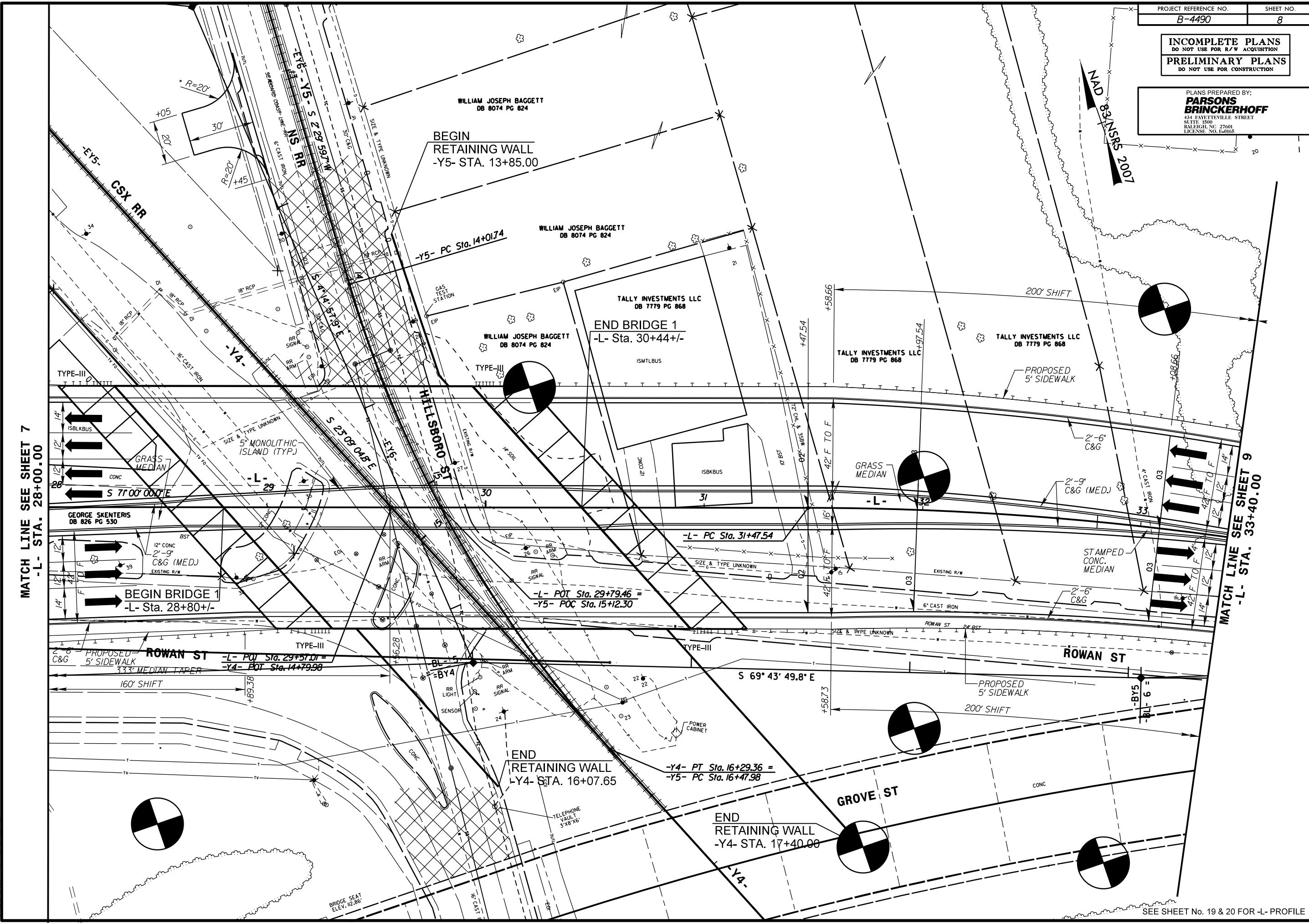
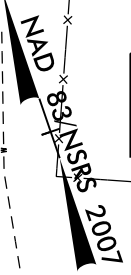


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 Project: B-4490

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SUITE 1500  
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MATCH LINE SEE SHEET 7  
-L- STA. 28+00.00

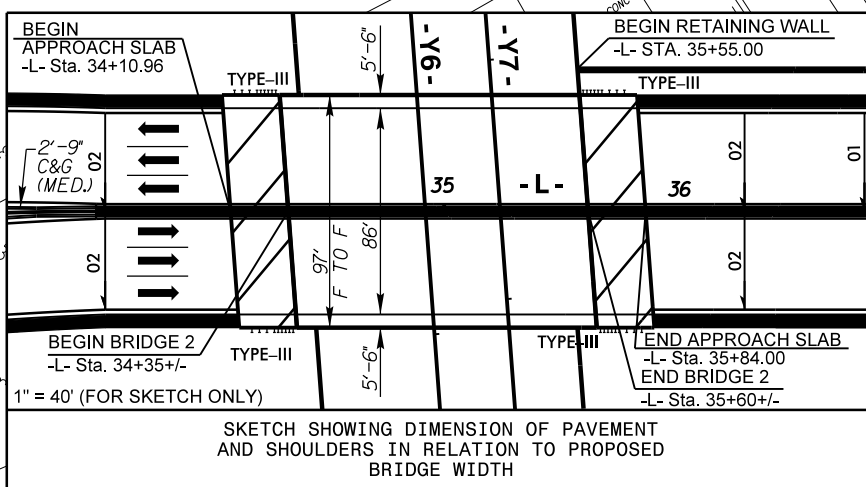
MATCH LINE SEE SHEET 9  
-L- STA. 33+40.00

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**-L-**  
 PI Sta 32+53.30  
 $\Delta = 8^\circ 38' 25.1''$  (RT)  
 $D = 4^\circ 05' 33.2''$   
 $L = 211.2'$   
 $T = 105.76'$   
 $R = 1,400.00'$   
 $DS = 40$  MPH  
 $SE = 2.0\%$   
 $RO = 100'$

**-Y7-**  
 PI Sta 18+02.27  
 $\Delta = 46^\circ 34' 26.5''$  (LT)  
 $D = 9^\circ 14' 28.5''$   
 $L = 503.98'$   
 $T = 266.85'$   
 $R = 620.00'$

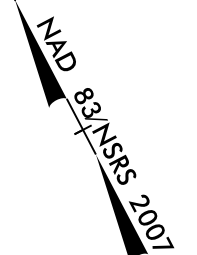
\* REQUIRES DESIGN EXCEPTION



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

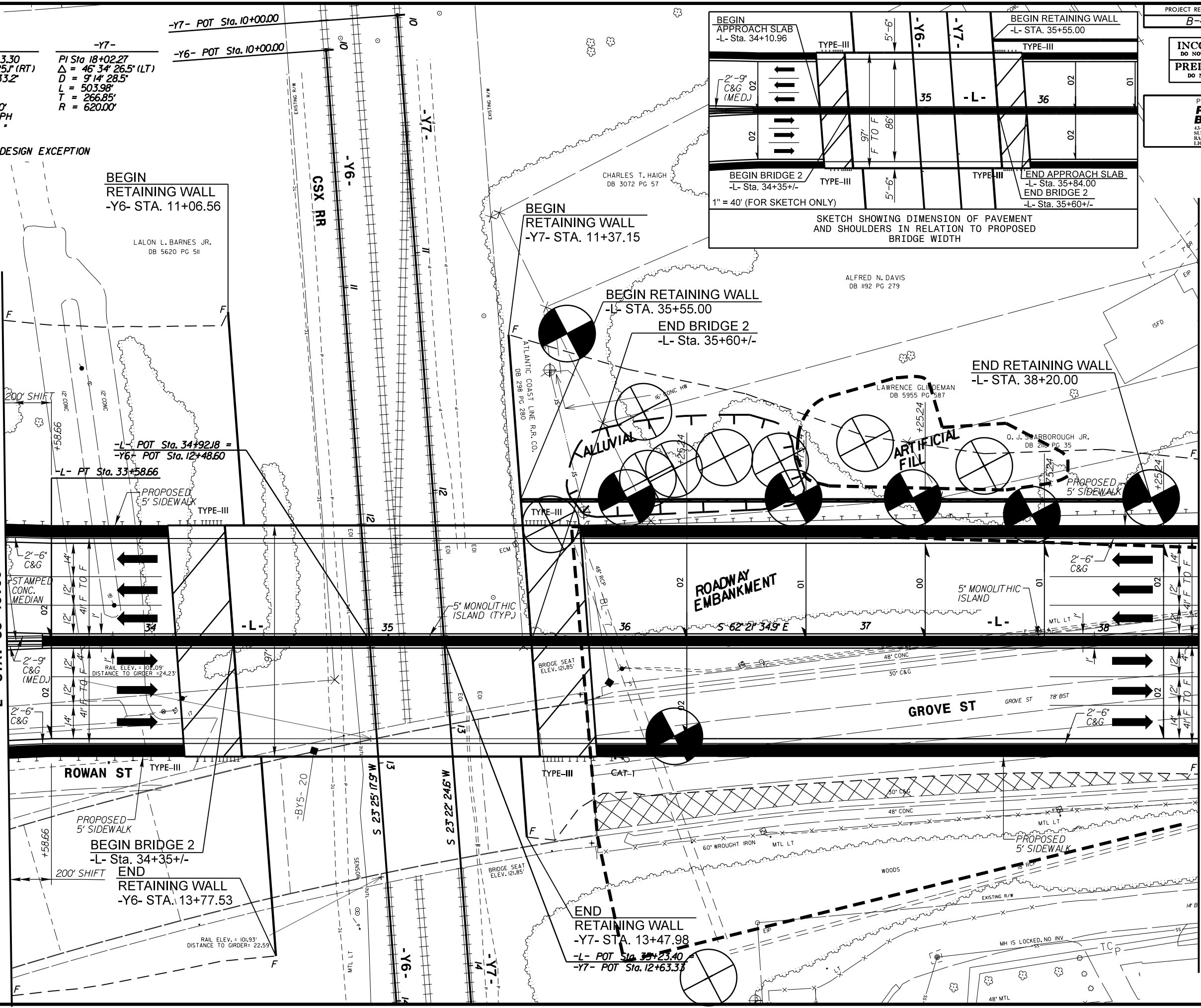
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

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**PARSONS BRINCKERHOFF**  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
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 LICENSE NO. E-6165



MATCH LINE SEE SHEET 8  
-L- STA. 33+40.00

MATCH LINE SEE SHEET 10  
-L- STA. 38+40.00

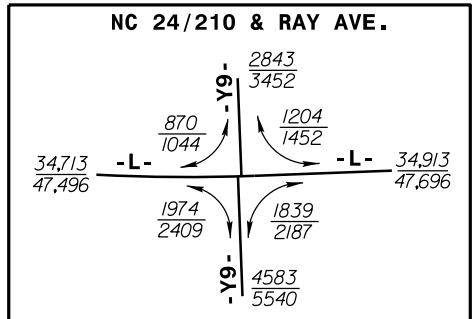
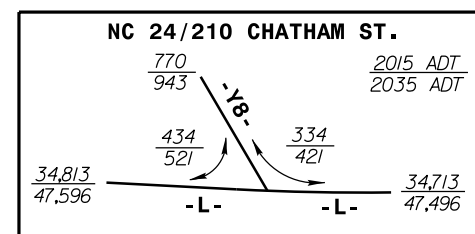
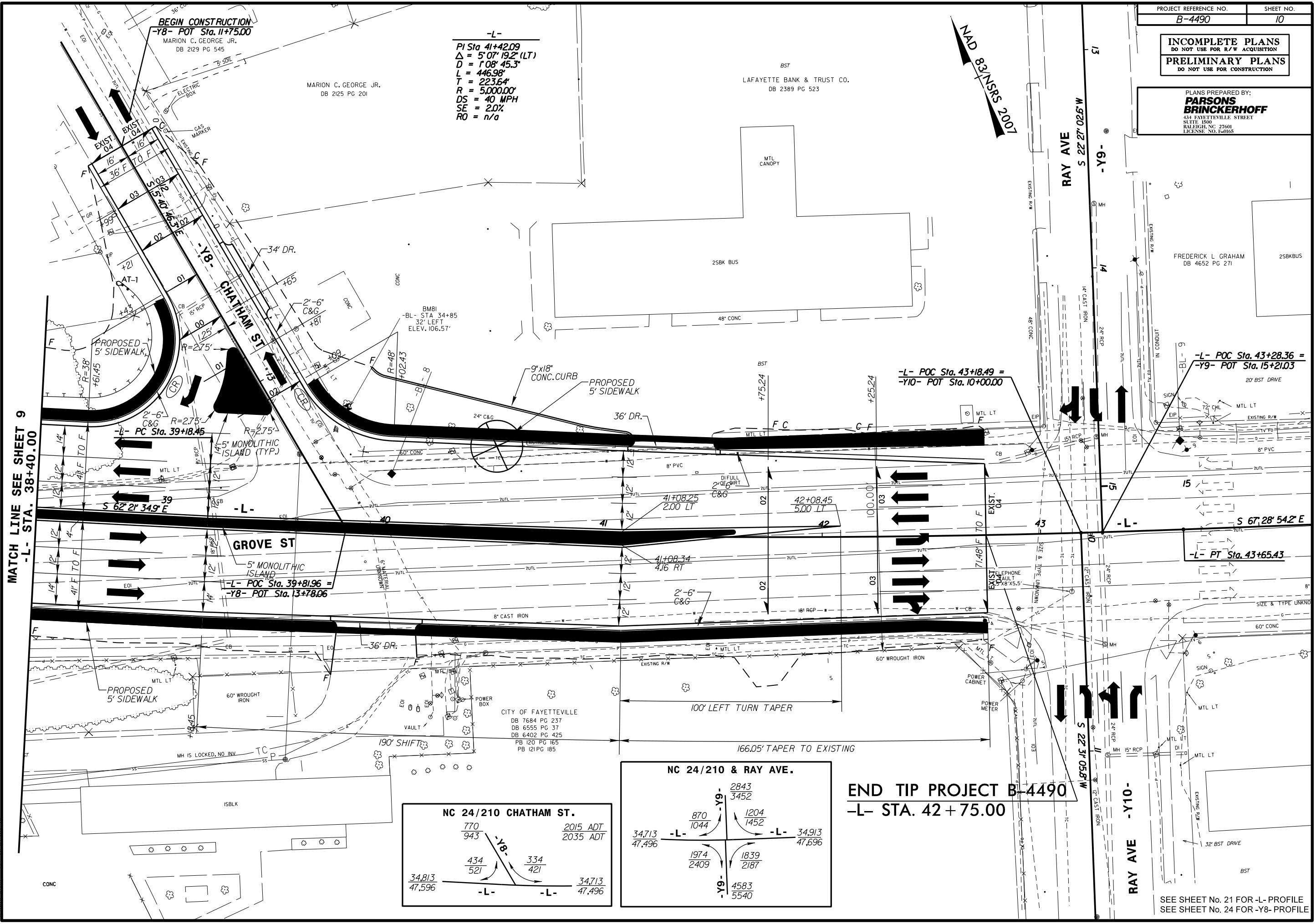


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 Project: B-4490 - ST 127725

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 User: jh  
 11/25/2014



MATCH LINE SEE SHEET 9  
 -L- STA. 38+40.00

SEE SHEET No. 21 FOR -L- PROFILE  
SEE SHEET No. 24 FOR -Y8- PROFILE

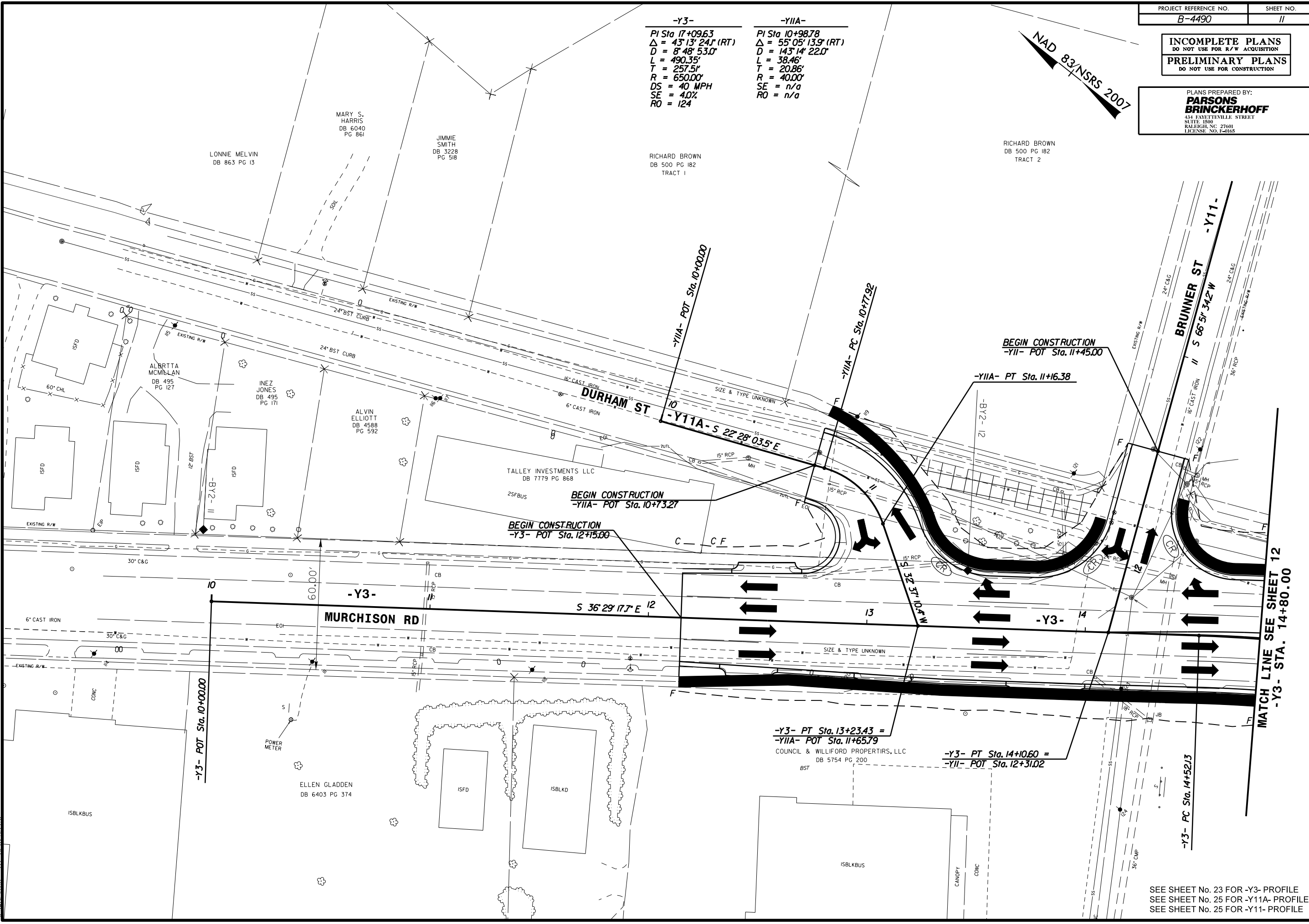
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-Y3-	-Y11A-
PI Sta 17+096.3	PI Sta 10+98.78
$\Delta = 43^\circ 13' 24.1''$ (RT)	$\Delta = 55^\circ 05' 13.9''$ (RT)
D = 8' 48" 53.0"	D = 143' 14" 22.0"
L = 490.35'	L = 38.46'
T = 257.51'	T = 20.86'
R = 650.00'	R = 40.00'
DS = 40 MPH	SE = n/a
SE = 4.0%	RO = n/a
RO = 124'	

**NAD 83/NSRS 2007**

8/17/99  
17-JUL-2014 08:47  
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Project: B-4490



MATCH LINE SEE SHEET 12  
-Y3- STA. 14+80.00

SEE SHEET No. 23 FOR -Y3- PROFILE  
SEE SHEET No. 25 FOR -Y11A- PROFILE  
SEE SHEET No. 25 FOR -Y11- PROFILE

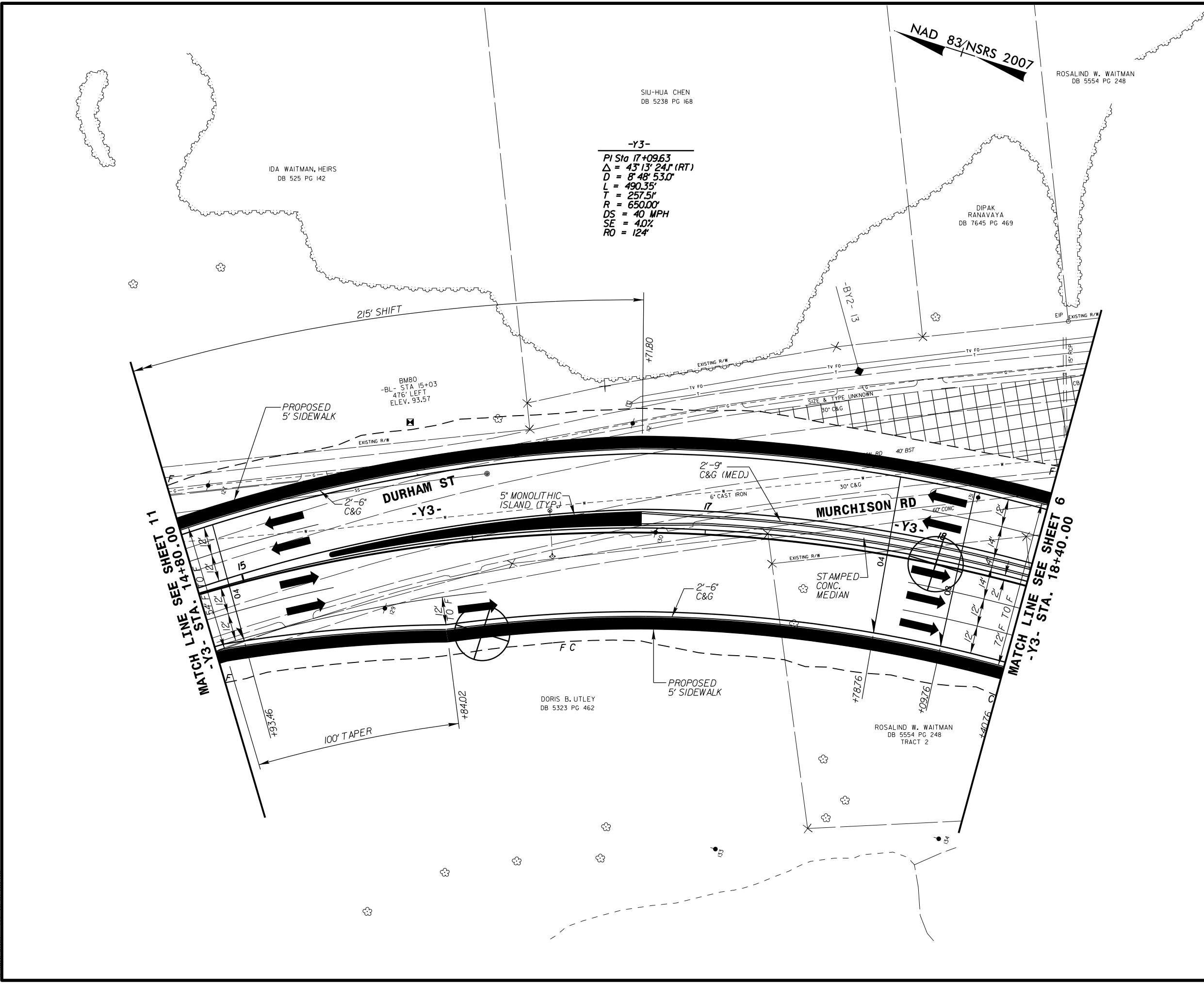


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8/17/99

MATCH LINE SEE SHEET 16

PROJECT REFERENCE NO.	SHEET NO.
B-4490	13

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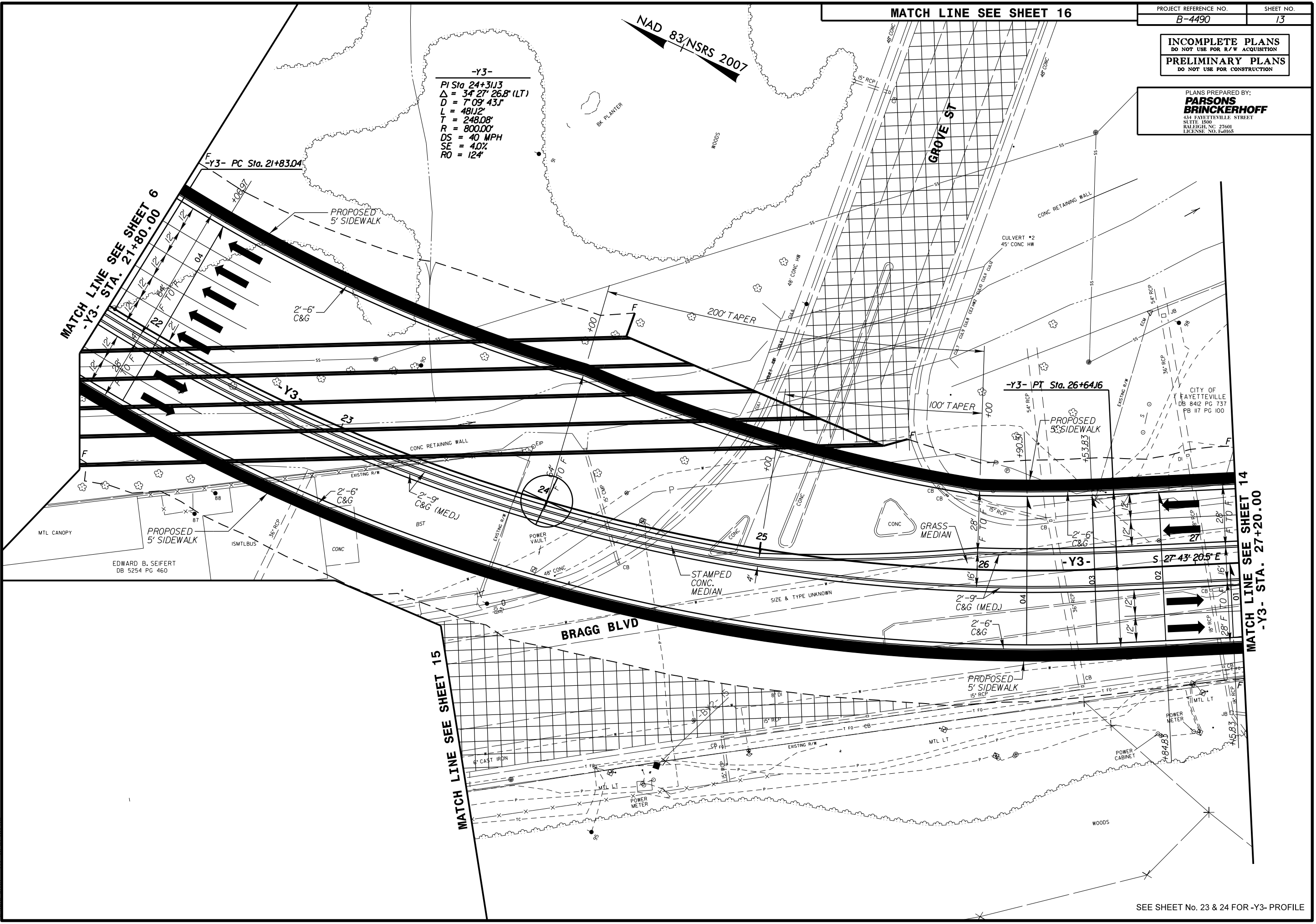
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**-Y3-**  
PI Sta 24+31.13  
 $\Delta = 34^\circ 27' 26.8" (LT)$   
 $D = 7^\circ 09' 43.1"$   
 $L = 481.2'$   
 $T = 248.08'$   
 $R = 800.00'$   
 $DS = 40 MPH$   
 $SE = 4.0\%$   
 $RO = 124'$

NAD 83/NSRS 2007

MATCH LINE SEE SHEET 6  
-Y3- STA. 21+80.00

MATCH LINE SEE SHEET 14  
-Y3- STA. 27+20.00



I7-JUL-2014 08:51  
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 13/07/2014 08:51

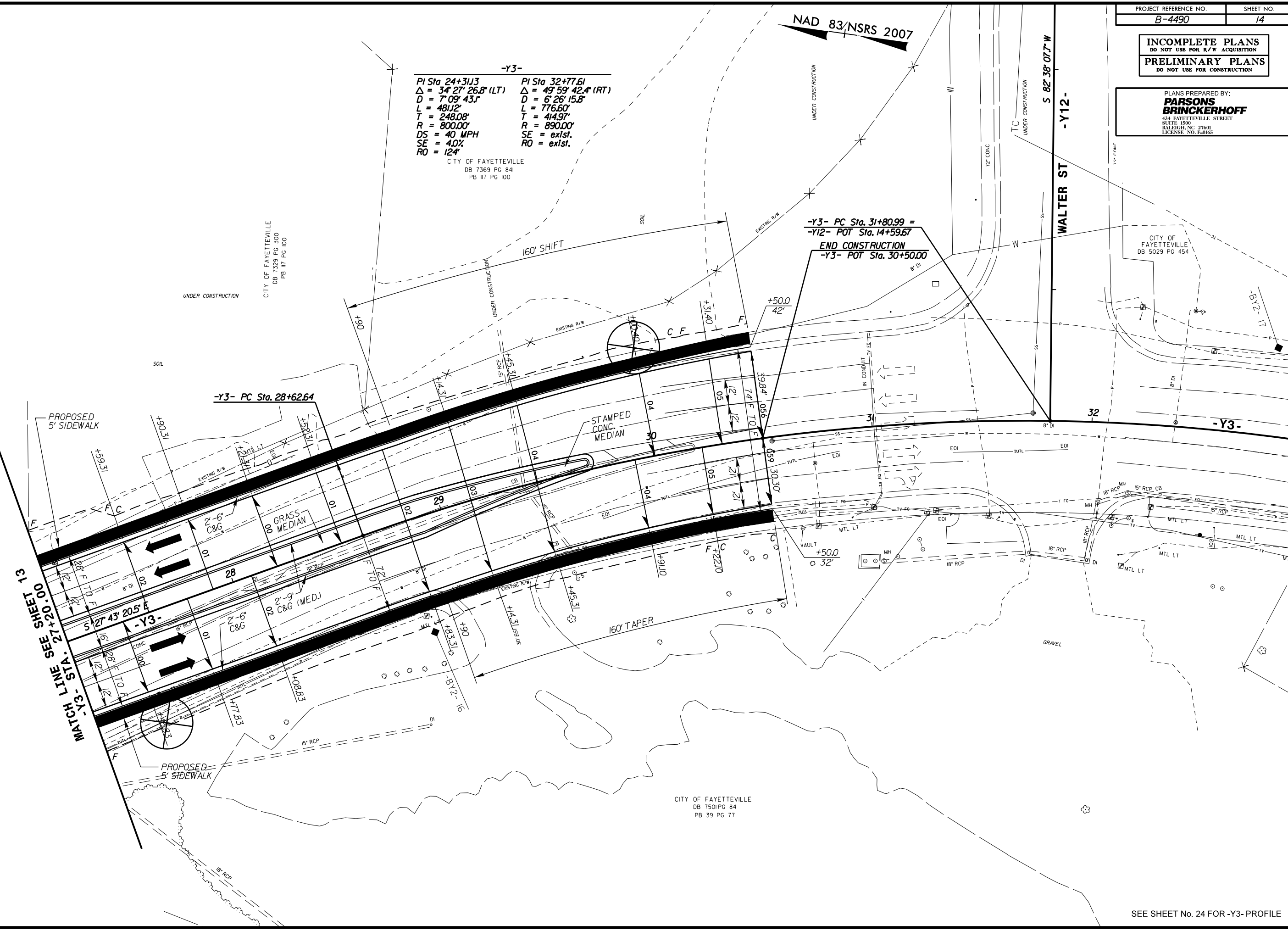
SEE SHEET No. 23 & 24 FOR -Y3- PROFILE

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 17-JUL-2014 08:52  
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 Project: B-4490  
 Sheet: 14



-Y3-

PI Sta 24+31.13	PI Sta 32+77.61
$\Delta = 34^{\circ} 27' 26.8''$ (LT)	$\Delta = 49^{\circ} 59' 42.4''$ (RT)
$D = 7^{\circ} 09' 43.1''$	$D = 6^{\circ} 26' 15.8''$
$L = 481.2'$	$L = 776.6'$
$T = 248.08'$	$T = 414.97'$
$R = 800.00'$	$R = 890.00'$
$DS = 40$ MPH	$SE =$ exist.
$SE = 4.0\%$	$RO =$ exist.
$RO = 124'$	

CITY OF FAYETTEVILLE  
DB 7369 PG 841  
PB 117 PG 100

CITY OF FAYETTEVILLE  
DB 7501 PG 84  
PB 39 PG 77

SEE SHEET No. 24 FOR -Y3- PROFILE

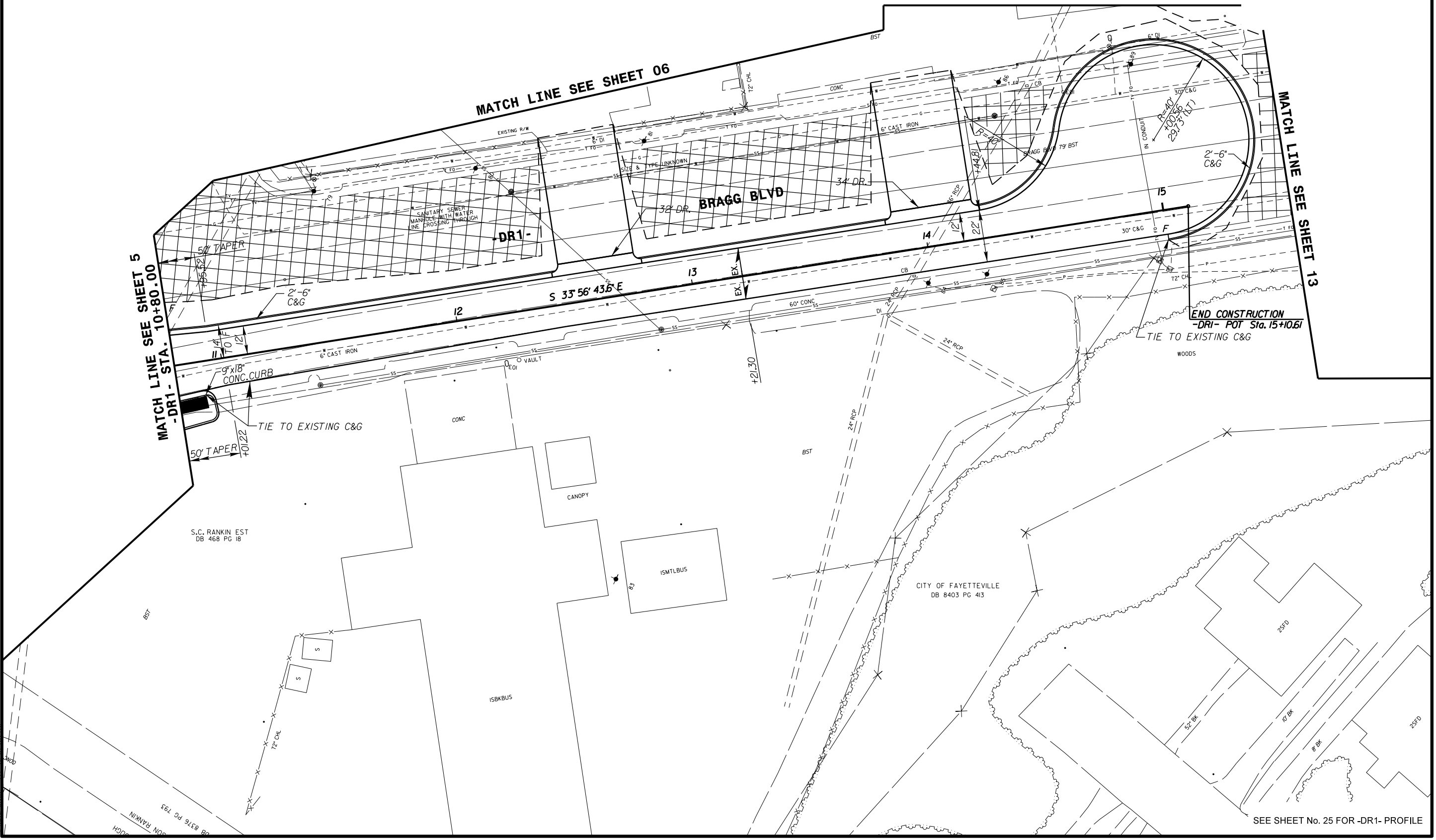
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SEE SHEET No. 25 FOR -DR1- PROFILE

**INCOMPLETE PLANS**  
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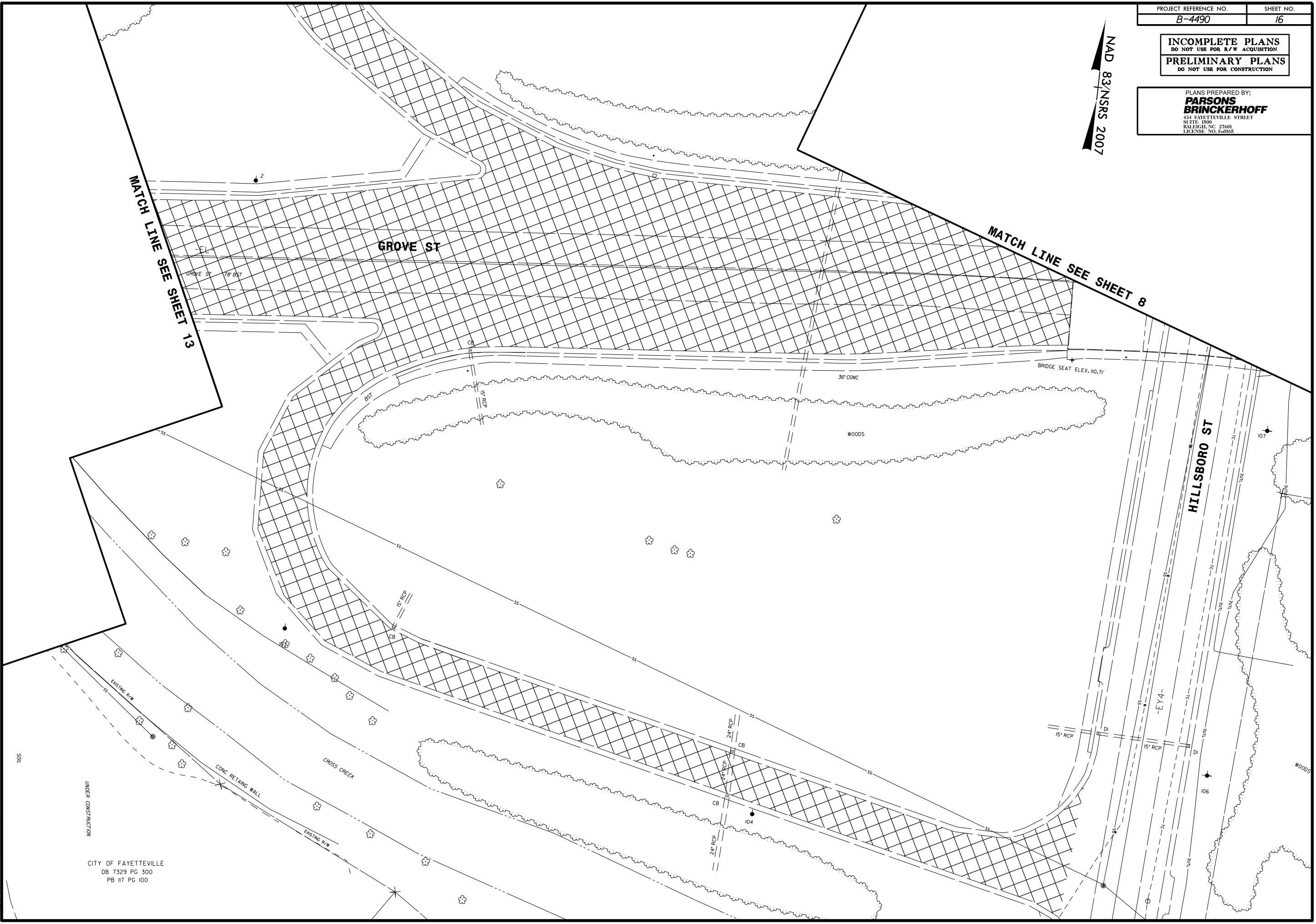
**PRELIMINARY PLANS**  
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LICENSE NO. E-0165

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MATCH LINE SEE SHEET 13

MATCH LINE SEE SHEET 8



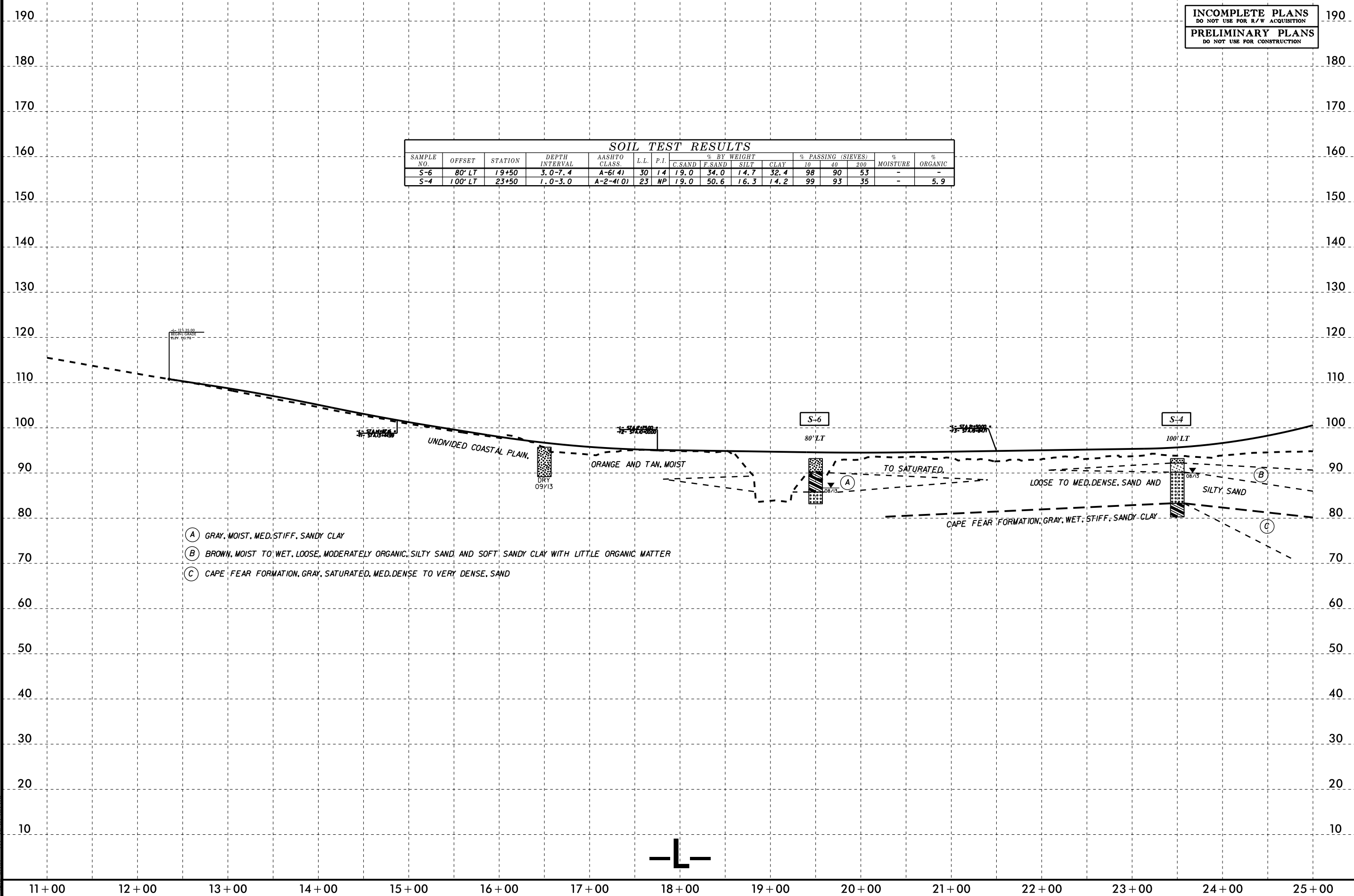
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**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION

**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

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-6	80' LT	19+50	3.0-7.4	A-6(4)	30	14	19.0	34.0	14.7	32.4	98	90	53	-	-
S-4	100' LT	23+50	1.0-3.0	A-2-4(0)	23	NP	19.0	50.6	16.3	14.2	99	93	35	-	5.9

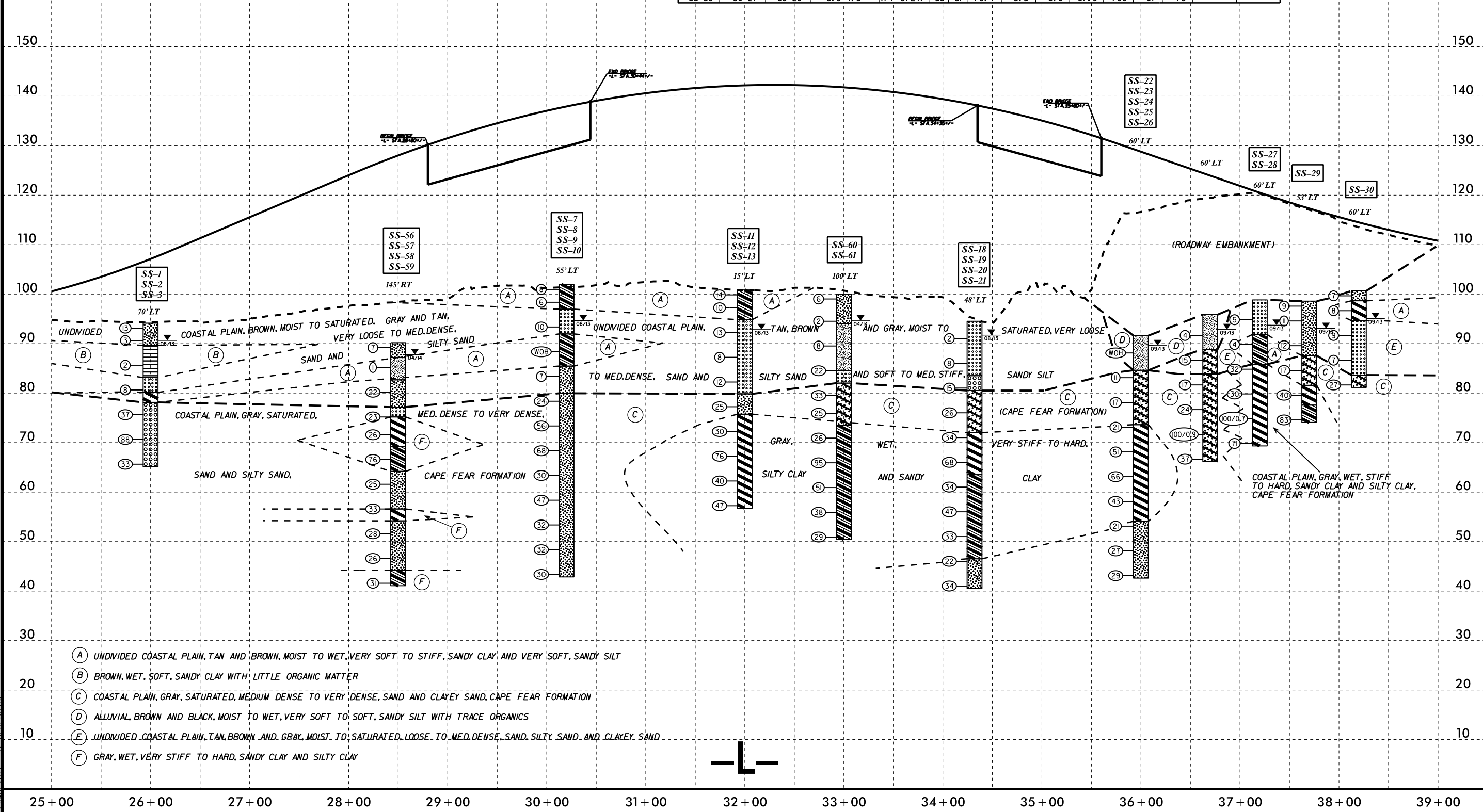


- (A) GRAY, MOIST, MED. STIFF, SANDY CLAY
- (B) BROWN, MOIST TO WET, LOOSE, MODERATELY ORGANIC, SILTY SAND AND SOFT SANDY CLAY WITH LITTLE ORGANIC MATTER
- (C) CAPE FEAR FORMATION, GRAY, SATURATED, MED. DENSE TO VERY DENSE, SAND

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-1	70' LT	26+00	7.5-9.0	A-6(10)	37	18	9.9	29.9	21.7	38.4	98	93	66	-	5.2
SS-2	70' LT	26+00	12.5-14.0	A-7-6(14)	49	20	7.7	31.1	45.0	16.2	100	97	70	-	-
SS-3	70' LT	26+00	17.5-19.0	A-1-b(10)	18	NP	82.1	11.6	1.2	5.1	90	30	6	-	-
SS-56	145' RT	28+50	0.0-1.5	A-2-4(0)	25	10	31.7	40.9	5.0	22.4	97	81	31	-	-
SS-57	145' RT	28+50	4.0-5.5	A-4(0)	25	3	12.8	52.3	16.6	18.3	100	94	41	-	-
SS-58	145' RT	28+50	17.6-19.1	A-7-5(7)	49	16	27.1	26.0	32.7	14.2	100	82	53	-	-
SS-59	145' RT	28+50	37.6-39.1	A-2-4(0)	33	NP	51.9	33.6	10.5	4.1	96	63	17	-	-
SS-7	55' LT	30+20	2.6-4.1	A-6(5)	32	16	31.1	18.2	16.3	34.4	97	75	52	-	-
SS-8	55' LT	30+20	12.6-14.1	A-6(7)	31	16	7.5	37.0	15.1	40.4	100	97	62	-	-
SS-9	55' LT	30+20	17.6-19.1	A-2-4(0)	23	NP	5.9	75.0	9.0	10.1	100	100	26	-	-
SS-10	55' LT	30+20	22.6-24.1	A-2-4(0)	37	NP	62.7	16.7	12.5	8.1	97	54	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-11	15' LT	32+00	0.0-1.5	A-6(5)	35	18	29.7	23.3	12.6	34.4	97	77	49	-	-
SS-12	15' LT	32+00	22.6-24.1	A-2-4(0)	36	NP	55.3	27.3	11.3	6.1	91	53	20	-	-
SS-13	15' LT	32+00	27.6-29.1	A-7-6(6)	41	12	11.9	36.2	33.7	18.2	100	95	60	-	-
SS-60	100' LT	33+00	9.5-11.0	A-4(0)	20	6	31.5	31.3	17.2	20.1	99	80	42	-	-
SS-61	100' LT	33+00	19.5-21.0	A-2-6(2)	40	18	43.8	24.2	17.0	15.0	98	70	34	-	-
SS-18	48' LT	34+32	17.5-19.0	A-2-6(0)	40	13	51.8	24.1	18.1	6.1	96	63	28	-	-
SS-19	48' LT	34+32	22.5-24.0	A-7-6(5)	43	15	20.7	39.8	31.4	8.1	100	89	49	-	-
SS-20	48' LT	34+32	32.5-34.0	A-6(2)	40	13	25.8	42.0	24.1	8.1	100	90	39	-	-
SS-21	48' LT	34+32	47.5-49.0	A-2-4(0)	33	NP	66.0	23.7	8.3	2.0	97	62	13	-	-
SS-22	60' LT	36+00	2.5-4.0	A-4(2)	25	9	23.6	29.8	28.3	18.3	100	87	52	-	3.8
SS-23	60' LT	36+00	7.5-9.0	A-2-6(0)	35	13	47.3	28.8	15.7	8.1	85	58	24	-	-
SS-24	60' LT	36+00	17.5-19.0	A-7-5(10)	46	16	7.5	39.4	45.0	8.1	100	97	64	-	-
SS-25	60' LT	36+00	27.5-29.0	A-7-6(4)	46	20	44.8	16.4	25.6	13.2	97	64	40	-	-
SS-26	60' LT	36+00	37.5-39.0	A-2-4(0)	31	9	32.9	41.2	18.8	7.1	100	92	32	-	-
SS-27	60' LT	37+20	8.0-9.5	A-6(7)	30	13	1.8	40.0	29.7	28.4	100	99	70	-	-
SS-28	60' LT	37+20	18.0-19.5	A-7-6(9)	43	19	24.4	24.8	38.7	12.2	100	85	57	-	-
SS-29	53' LT	37+70	13.0-14.5	A-2-7(2)	41	22	50.5	16.0	15.2	18.3	93	60	33	-	-
SS-30	60' LT	38+20	3.0-4.5	A-7-6(24)	55	31	16.4	8.5	8.0	67.0	100	91	76	-	-

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



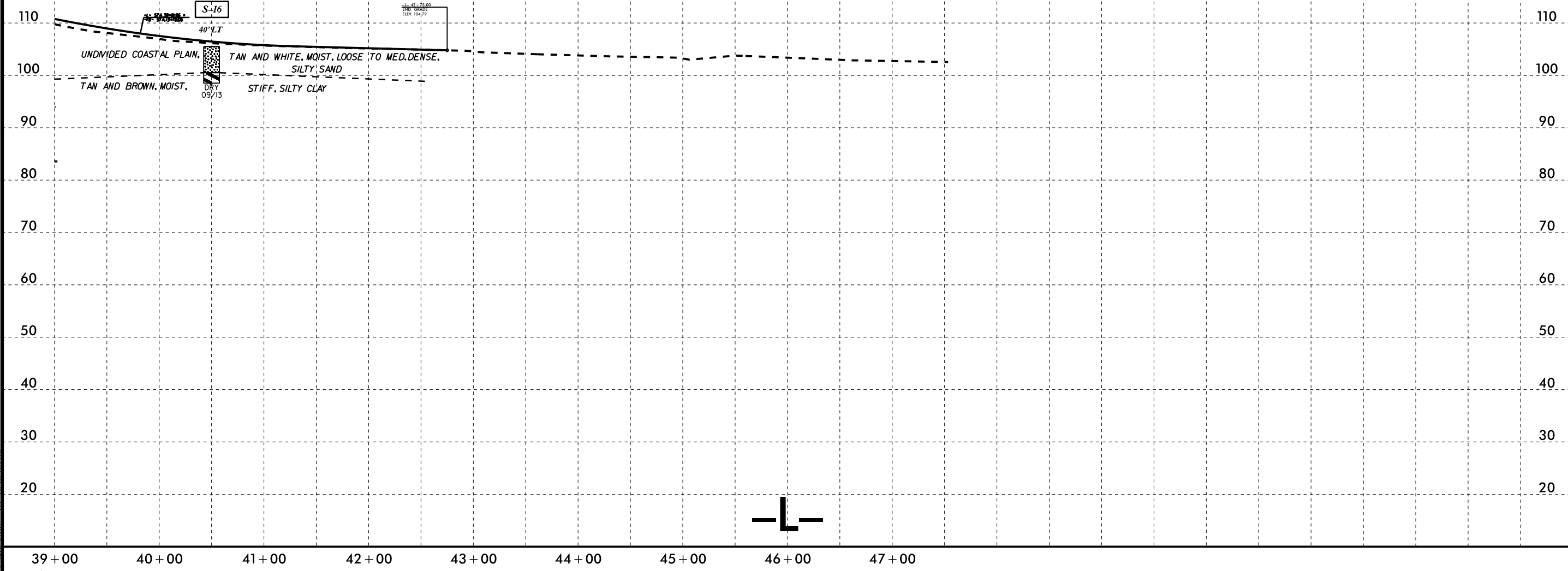
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**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION

**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-16	40' LT	40+50	5.0-7.0	A-7-6(18)	43	24	12.3	10.3	14.7	62.7	100	93	79	-	-



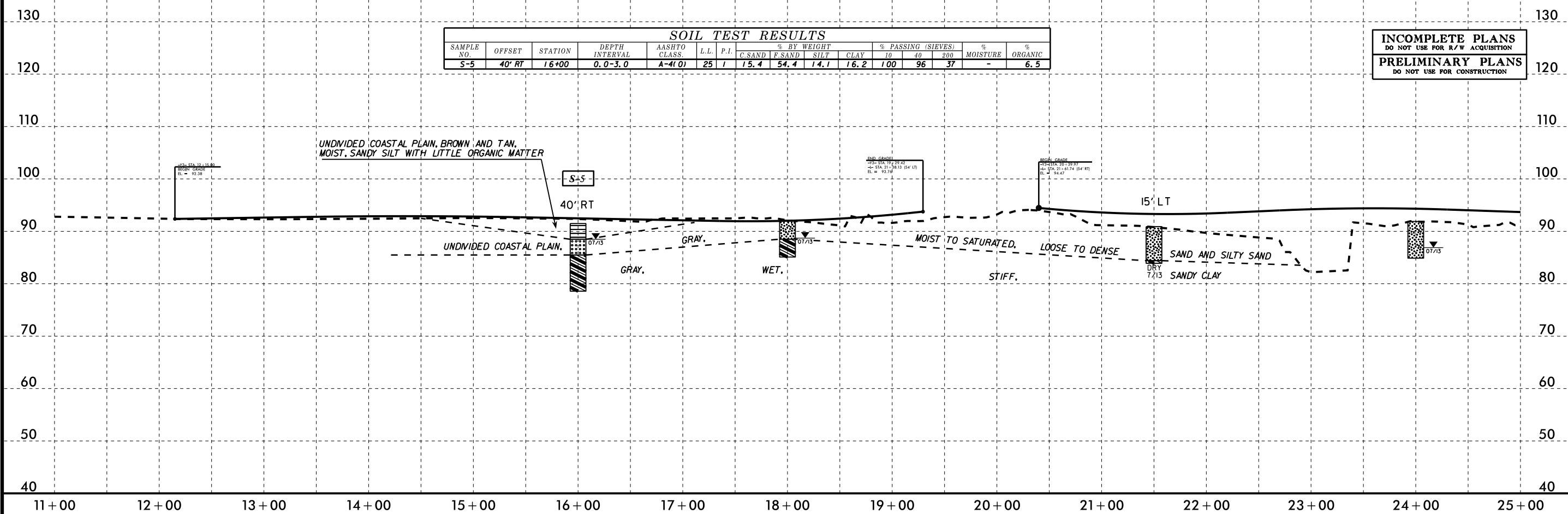
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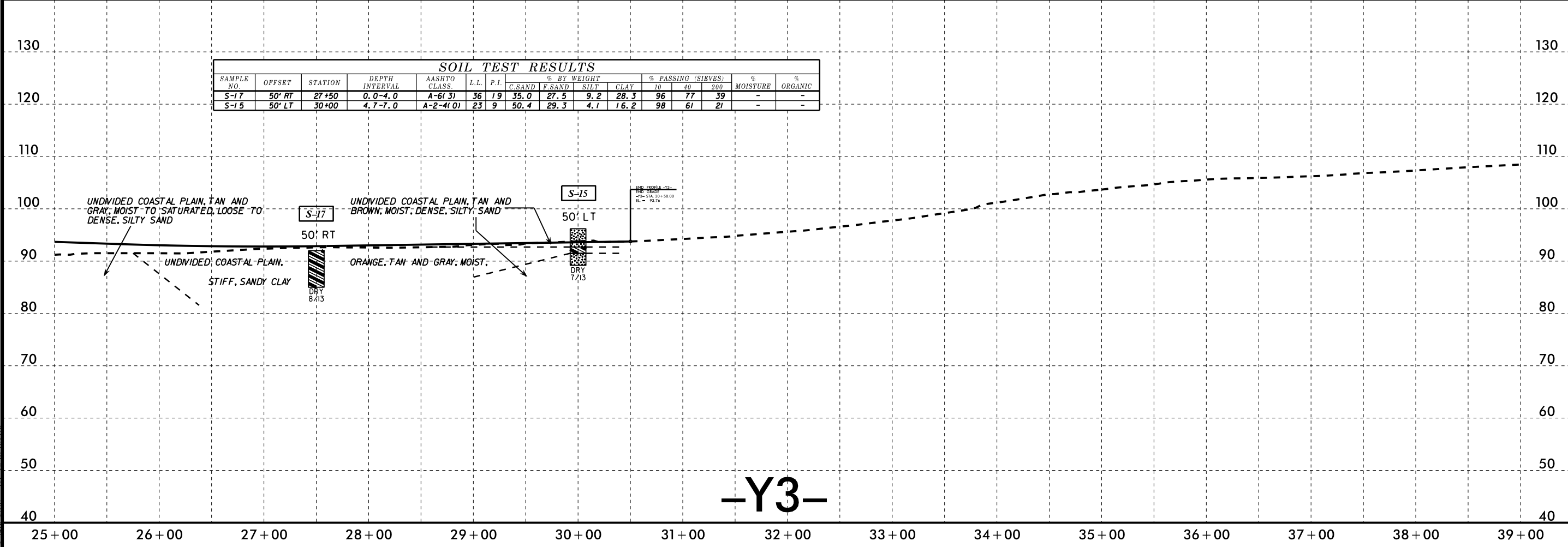
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-5	40' RT	16+00	0.0-3.0	A-4(0)	25	1	15.4	54.4	14.1	16.2	100	96	37	-	6.5

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

**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION



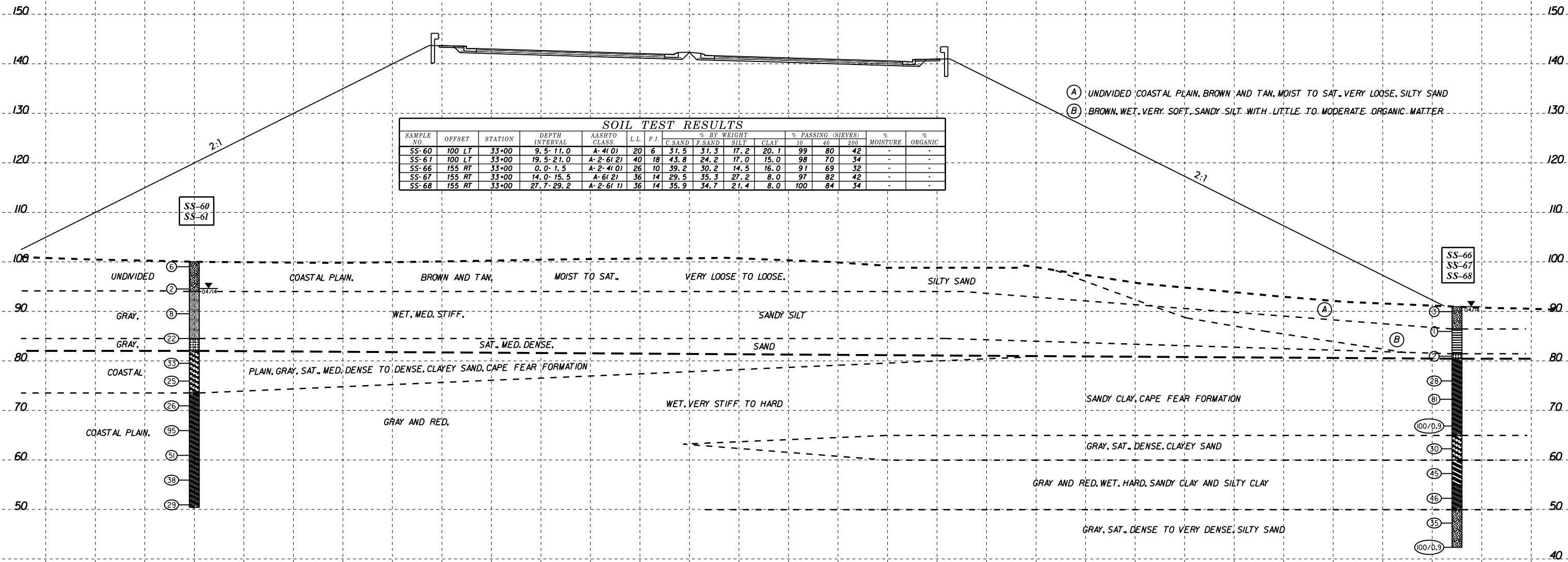
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-17	50' RT	27+50	0.0-4.0	A-6(3)	36	19	35.0	27.5	9.2	28.3	96	77	39	-	-
S-15	50' LT	30+00	4.7-7.0	A-2-4(0)	23	9	50.4	29.3	4.1	16.2	98	61	21	-	-



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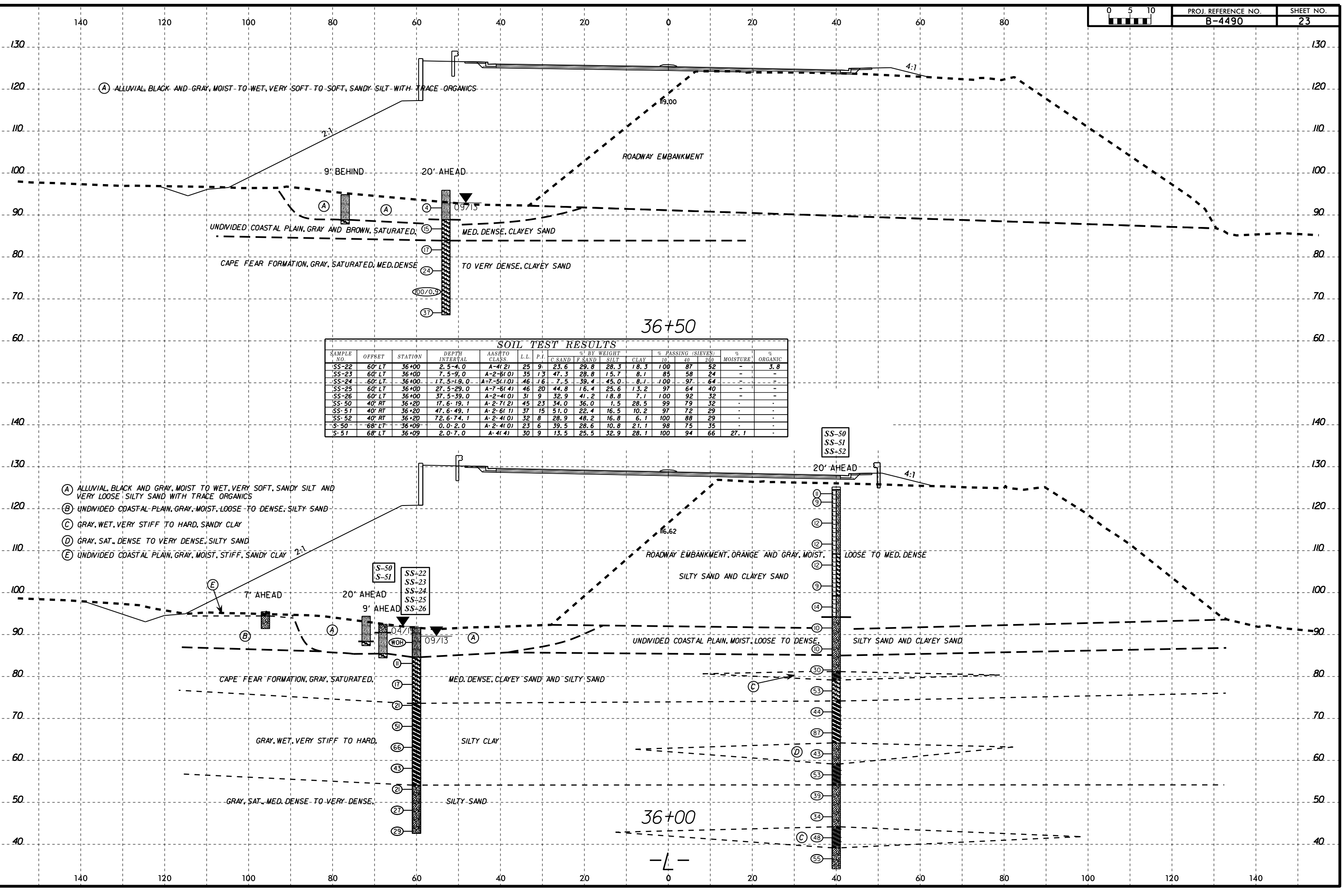
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							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-60	100 LT	33+00	9.5-11.0	A-4(1)	20	6	31.5	31.3	17.2	20.1	99	80	42	-	-
SS-61	100 LT	33+00	19.5-21.0	A-2-6(2)	40	18	43.8	24.2	17.0	15.0	98	70	34	-	-
SS-66	155 RT	33+00	0.0-1.5	A-2-4(0)	26	10	39.2	30.2	14.5	16.0	91	69	32	-	-
SS-67	155 RT	33+00	14.0-15.5	A-6(2)	36	14	29.5	35.3	27.2	8.0	97	82	42	-	-
SS-68	155 RT	33+00	27.7-29.2	A-2-6(1)	36	14	35.9	34.7	21.4	8.0	100	84	34	-	-

(A) UNDIVIDED COASTAL PLAIN, BROWN AND TAN, MOIST TO SAT., VERY LOOSE TO LOOSE, SILTY SAND  
 (B) BROWN, WET, VERY SOFT, SANDY SILT WITH LITTLE TO MODERATE ORGANIC MATTER

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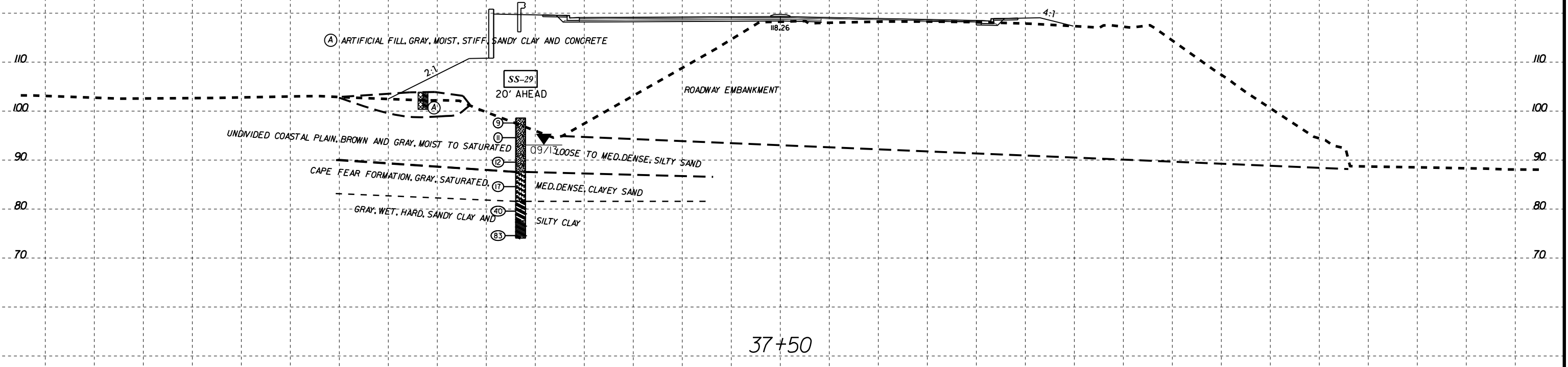
**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	L.L.	P.I.	% BY WEIGHT			% PASSING (SIEVES)			% MOISTURE	% ORGANIC	
							C. SAND	F. SAND	SILT	10	40	200			
SS-22	60' LT	36+00	2.5-4.0	A-4(2)	25	9	23.6	29.8	28.3	18.3	100	87	52	-	3.8
SS-23	60' LT	36+00	7.5-9.0	A-2(51.0)	35	13	47.3	28.8	15.7	8.1	85	58	24	-	-
SS-24	60' LT	36+00	17.5-19.0	A-7(51.0)	46	16	7.5	39.4	45.0	8.1	100	97	64	-	-
SS-25	60' LT	36+00	27.5-29.0	A-7(51.4)	46	20	44.8	16.4	25.6	13.2	97	64	40	-	-
SS-26	60' LT	36+00	37.5-39.0	A-2(41.0)	31	9	32.9	41.2	18.8	7.1	100	92	32	-	-
SS-50	40' RT	36+20	17.6-19.1	A-2(71.2)	45	23	34.0	36.0	1.5	28.5	99	79	32	-	-
SS-51	40' RT	36+20	47.6-49.1	A-2(61.1)	37	15	51.0	22.4	16.5	10.2	97	72	29	-	-
SS-52	40' RT	36+20	72.6-74.1	A-2(41.0)	32	8	28.9	48.2	16.8	6.1	100	88	29	-	-
S-50	68' LT	36+09	0.0-2.0	A-2(41.0)	23	6	39.5	28.6	10.8	21.1	98	75	35	-	-
S-51	68' LT	36+09	2.0-7.0	A-4(4)	30	9	13.5	25.5	32.9	28.1	100	94	66	27.1	-

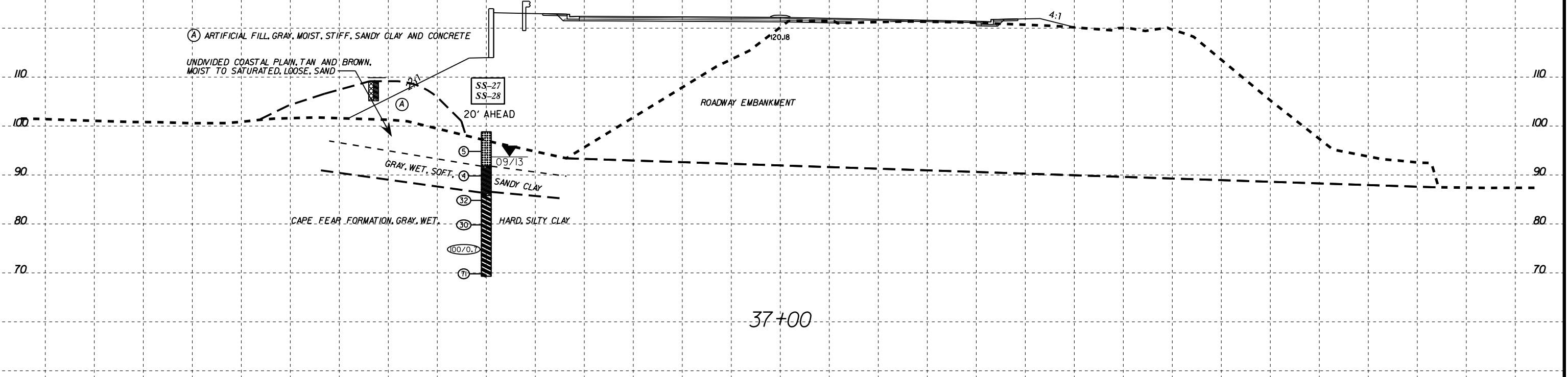
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 AT 6/27/2015

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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-29	53' LT	37+70	13.0-14.5	A-2-T(2)	41	22	50.5	16.0	15.2	18.3	93	60	33	-	-



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-27	60' LT	37+20	8.0-9.5	A-6(7)	30	13	1.8	40.0	29.7	28.4	100	99	70	-	-
SS-28	60' LT	37+20	18.0-19.5	A-7-6(9)	43	19	24.4	24.8	38.7	100	85	57	-	-	

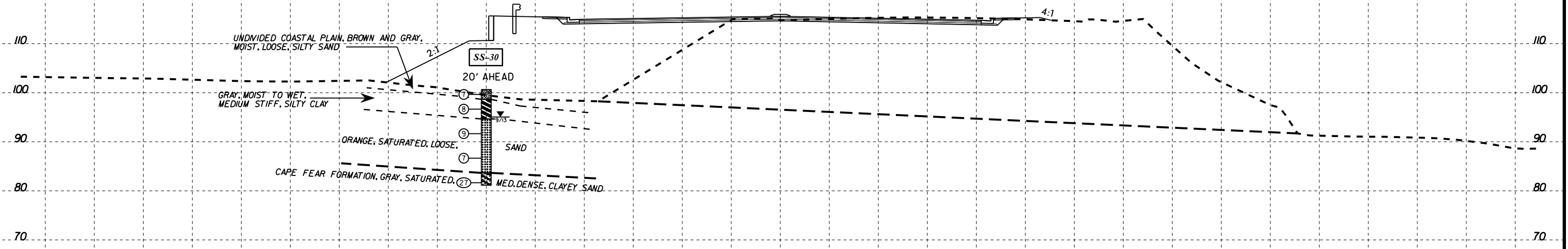


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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-30	60' LT	38+20	3.0-4.5	A-7-6(24)	55	31	16.4	8.5	8.0	67.0	100	91	76	-	-



38+00

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