

SEE SHEET 3 FOR PLAN SHEET LAYOUT  
AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5746	1	9

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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

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

NOTES:

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

PERSONNEL

C.M. SWAFFORD

INVESTIGATED BY C. SWAFFORD

DRAWN BY C. SWAFFORD

CHECKED BY P. ZHANG

SUBMITTED BY P. ZHANG

DATE JULY, 2024

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	11+57.85 - 45+78.48	4-6	7-8
-Y6-	18+96.18 - 21+76.11	6	8

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	25+00	9

ROADWAY  
SUBSURFACE INVESTIGATION

COUNTY WAKE  
PROJECT DESCRIPTION US 401 (FAYETTEVILLE RD)  
FROM SR 1467/2839 (ALLEN ST) TO NORTH OF  
SR 1010 (TEN-TEN RD)

INVENTORY

REFERENCE: 54032.1.1

PROJECT: U-5746



SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

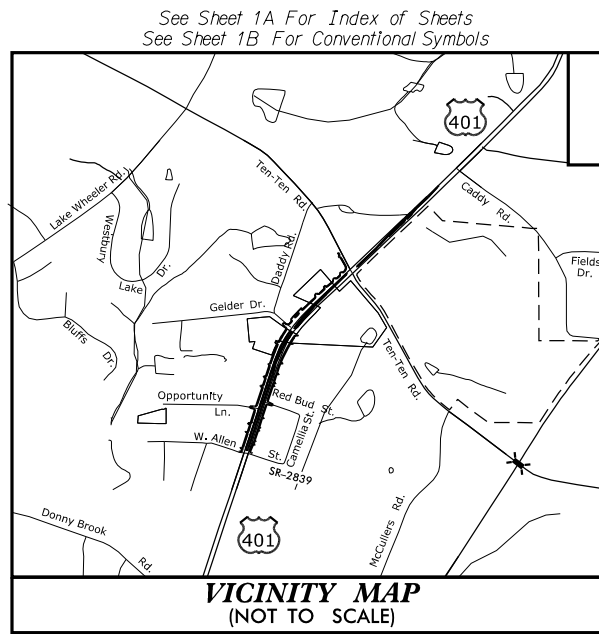


09/08/19

**TIP PROJECT: U-5746**

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**CONTRACT:**



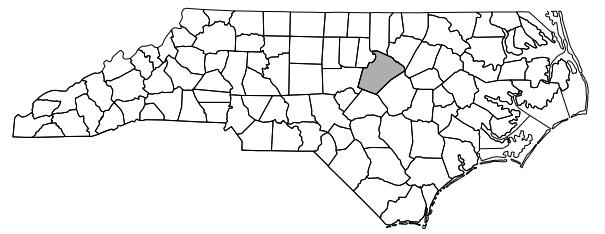
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**WAKE COUNTY**

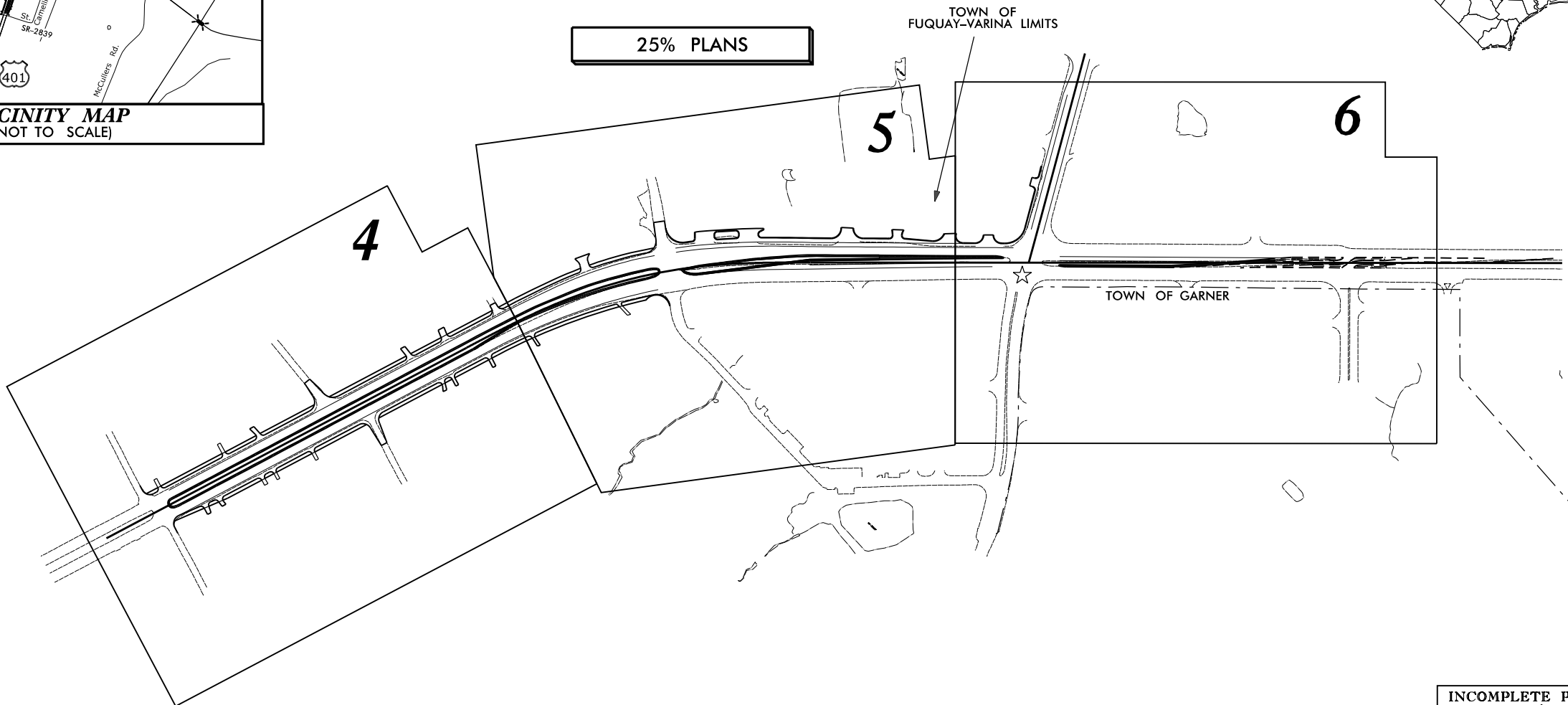
**LOCATION: US 401 (FAYETTEVILLE RD) FROM SR 1467/2839 (ALLEN ST) TO NORTH OF SR 1010 (TEN-TEN RD)**

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5746	3	9
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
54032.1.1	N/A	P.E.	



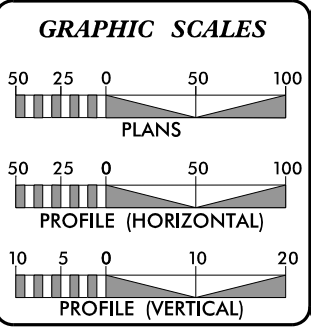
25% PLANS



THERE IS NO CONTROL OF ACCESS ON THIS PROJECT  
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III

☆ MODIFIED TRAFFIC SIGNAL

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



**DESIGN DATA**

ADT 2016 =	37,600
ADT 2040 =	60,200
K =	9 %
D =	70 %
T =	4 % *
V =	50 MPH
(* TTST 1% + DUAL 3%)	
FUNC CLASS =	RURAL ARTERIAL
STATEWIDE TIER	

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT U-5746 =	0.648 MILES
TOTAL LENGTH TIP PROJECT U-5746 =	0.648 MILES

Prepared by the Office of:  
**HDR** Engineering, Inc. of the Carolinas  
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601  
N.C.B.E.L.S. License Number: F-0116

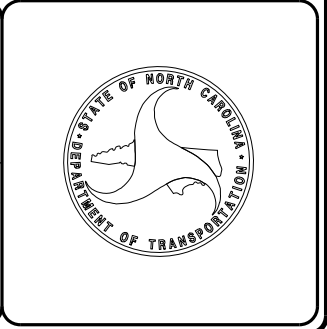
2018 STANDARD SPECIFICATIONS	PROJECT ENGINEER
RIGHT OF WAY DATE: MAY 17, 2019	CASEY HARRIS, PE
LETTING DATE: TBD	SEAN PEREIRA, EI PROJECT DESIGN ENGINEER
	BEN UPSHAW, PE NCDOT CONTACT

**HYDRAULICS ENGINEER**

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

**ROADWAY DESIGN ENGINEER**

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



June 26<sup>th</sup>, 2024

**STATE PROJECT: 54032.1.1**

**TIP NUMBER: U-5746**

**COUNTY: Wake**

**DESCRIPTION: US 401 (Fayetteville Rd) from SR 1467/2839 (Allen St) to North of SR 1010 (Ten-Ten Rd)**

**SUBJECT: Geotechnical Roadway Inventory report**

#### PROJECT DESCRIPTION

The U-5746 project is designed to improve traffic flow and ease congestion at the intersection of US 401 (Fayetteville Rd) and SR 1010 (Ten-Ten Rd) in Wake County. The project consists of widening a portion of US 401 and SR 1010 from SR 1467/2839 (Allen St) to north of SR 1010 (Ten-Ten Rd). There are no structures to be designed as part of this project. The total project length is approximately 0.8 miles.

The field investigation was conducted in March of 2019 using a track mounted CME 45C with an automatic hammer. Standard Penetration Tests (SPT) were performed at selected locations. Borings were cored through the pavement using a thin-walled core bit, and then advanced with hollow stem augers. Hand augers were advanced in areas where utilities or other existing site features made equipment access impractical. Representative soil samples were collected and forwarded to an approved NCDOT M&T testing facility for soil quality analysis, moisture content, and AASHTO classification.

The following alignments were explored. Subsurface profiles and/or cross-sections of these alignments are included in this report.

Line	Station
-L-	11+57 to 45+78
-Y6-	12+93 to 21+76

#### Physiography and Geology

The project is located along the boundary between the Piedmont and Coastal Plain Physiographic Provinces. Geologically, it is located in an area where upland terrace deposits and Middendorf Formation soils overlie Piedmont residual soils and rock of the Raleigh Belt. Topography in the area is characterized by well drained, gently rolling hills.

#### Soil Properties

Soils encountered on the project site include roadway embankment and residual soils. Due to the shallow drilling depth of the borings, no weathered rock or crystalline rock was encountered.

Roadway embankment soils are present in the borings advanced on the shoulders and in the pavement of the existing roadways and typically consists of fine to coarse silty sand, clayey sand (A-2-4, A-2-6/7), clay (A-7-6), silt (A-4), and sand and gravel (A-1-b). These soils range from dry to moist in moisture content and vary in thickness from 1.0 to 2.9 feet.

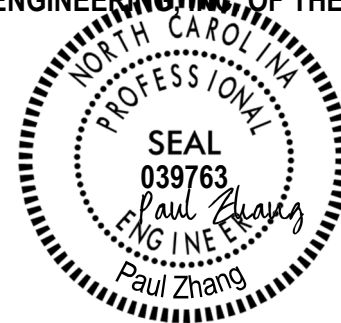
Residual soils consisting of very loose to medium dense, coarse to fine sand and clayey to silty sand (A-3, A-2-4, A-2-6/7), medium stiff silt (A-4), and soft to very stiff, sandy clay (A-6, A-7-5/6) were encountered throughout the area. These soils range in moisture content from 11 to 21 percent, with Plasticity Index (PI) values between 13 and 16, and vary in thickness from less than one foot to 10.3 feet.

#### Ground Water


Borings were left open for at least 24 hours if possible to allow ground water levels within the borehole to equilibrate with the surrounding hydrologic conditions. Due to safety concerns, some of the borings had to be backfilled immediately after completion and no 24 hour water level could be obtained. Groundwater elevations ranged from approximately 415 feet to 386 feet. It should be noted that the groundwater levels fluctuate depending on seasonal factors such as precipitation and temperature. As such, soil moisture and groundwater conditions at other times may vary or be different from those described in this report.

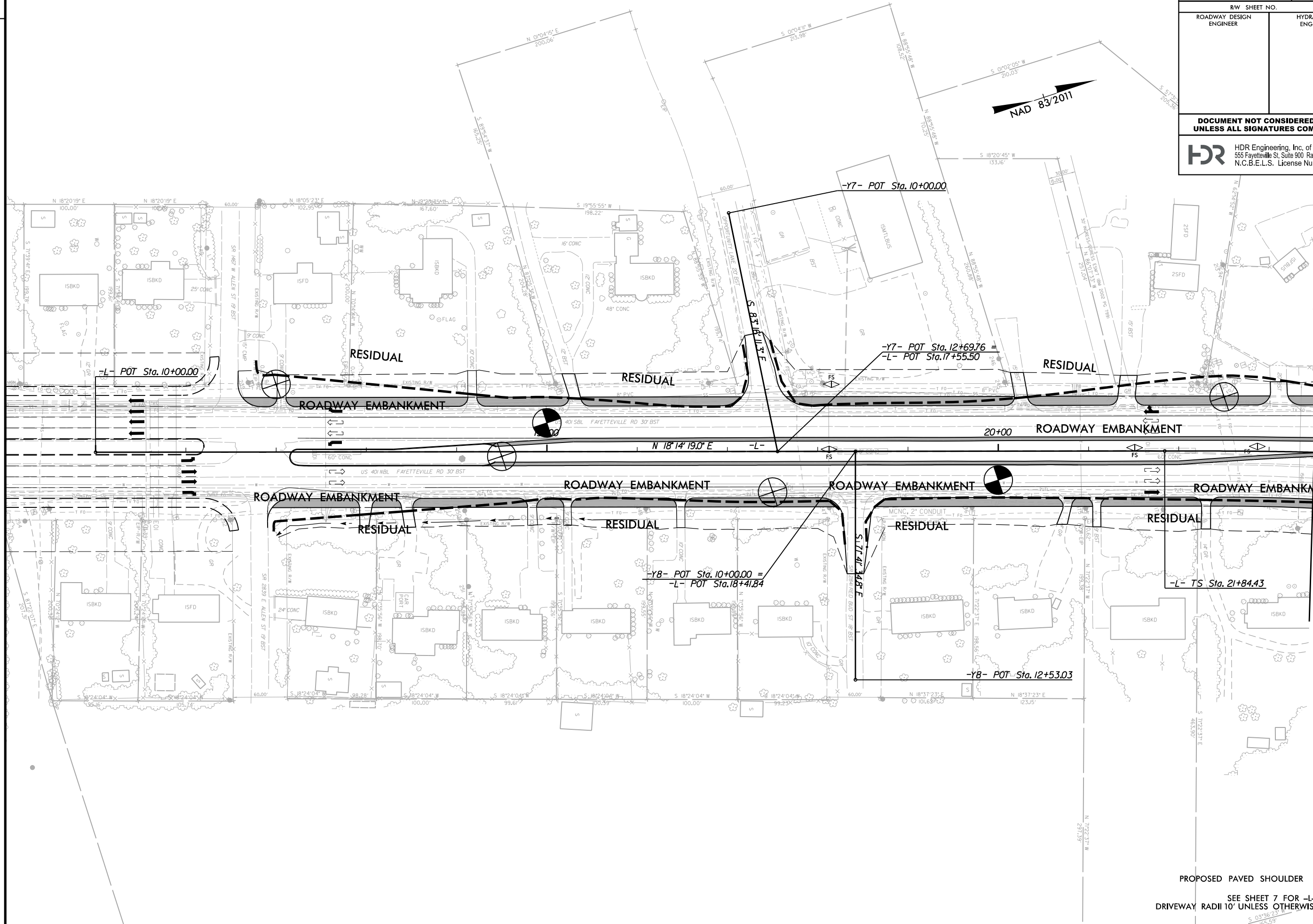
Sincerely,

HDR ENGINEERING, INC. OF THE CAROLINAS



Paul Zhang, Ph.D., P.E.  
Senior Geotechnical Project Manager


PROJECT REFERENCE NO.		SHEET NO.	
U-5746		4	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
 HDR Engineering, Inc. of the Carolinas 555 Fayetteville St. Suite 900 Raleigh, N.C. 27601 N.C.B.E.L.S. License Number: F-0116			

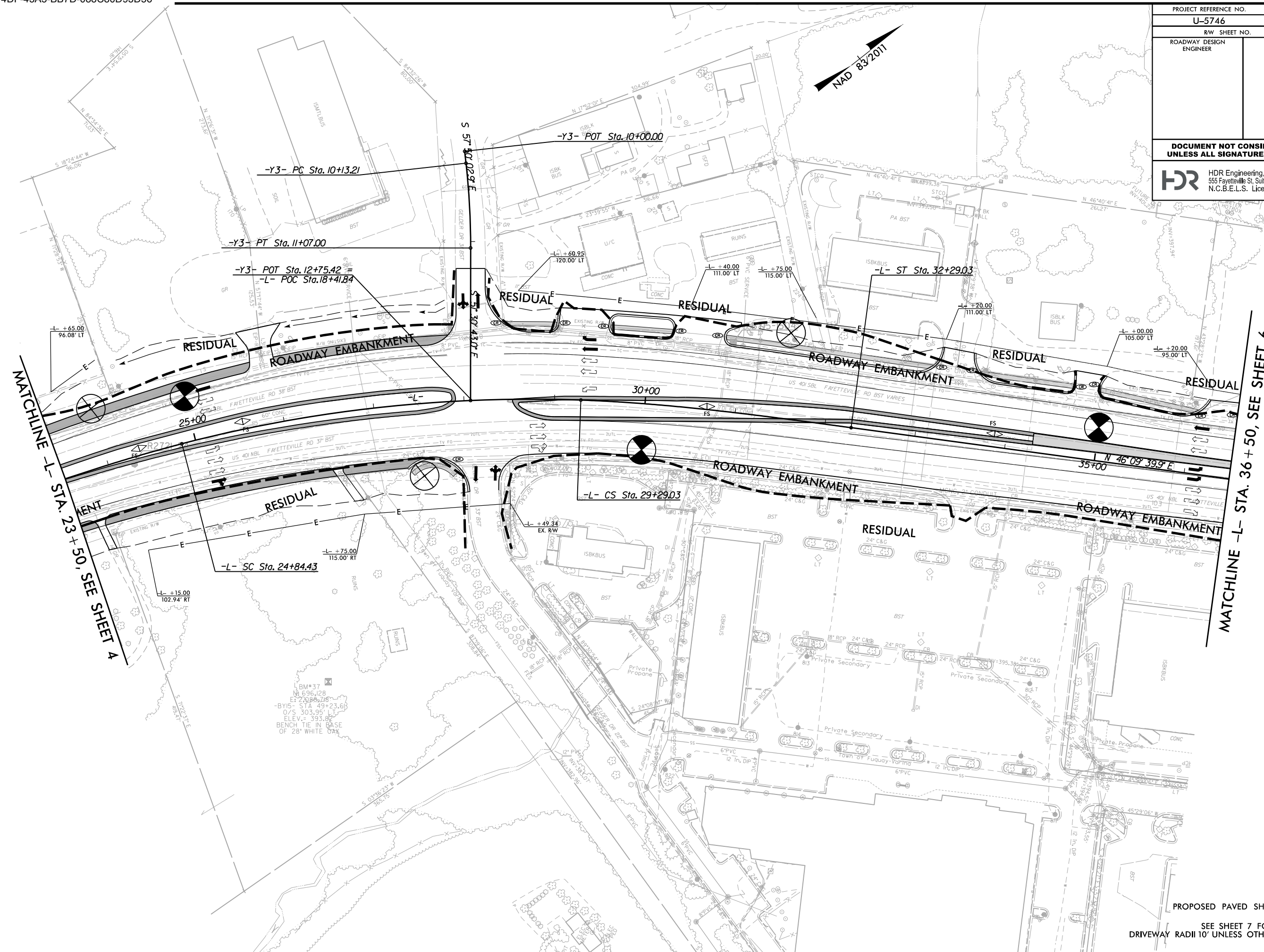


MATCHLINE -L- STA. 23 + 50, SEE SHEET 5

PROPOSED PAVED SHOULDER   
 SEE SHEET 7 FOR -L- PROFILE  
 DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED


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 REVISIONS

PROJECT REFERENCE NO.		SHEET NO.	
U-5746		5	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
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MATCHLINE -L- STA. 23 + 50, SEE SHEET 4

MATCHLINE -L- STA. 36 + 50, SEE SHEET 6

PROPOSED PAVED SHOULDER 

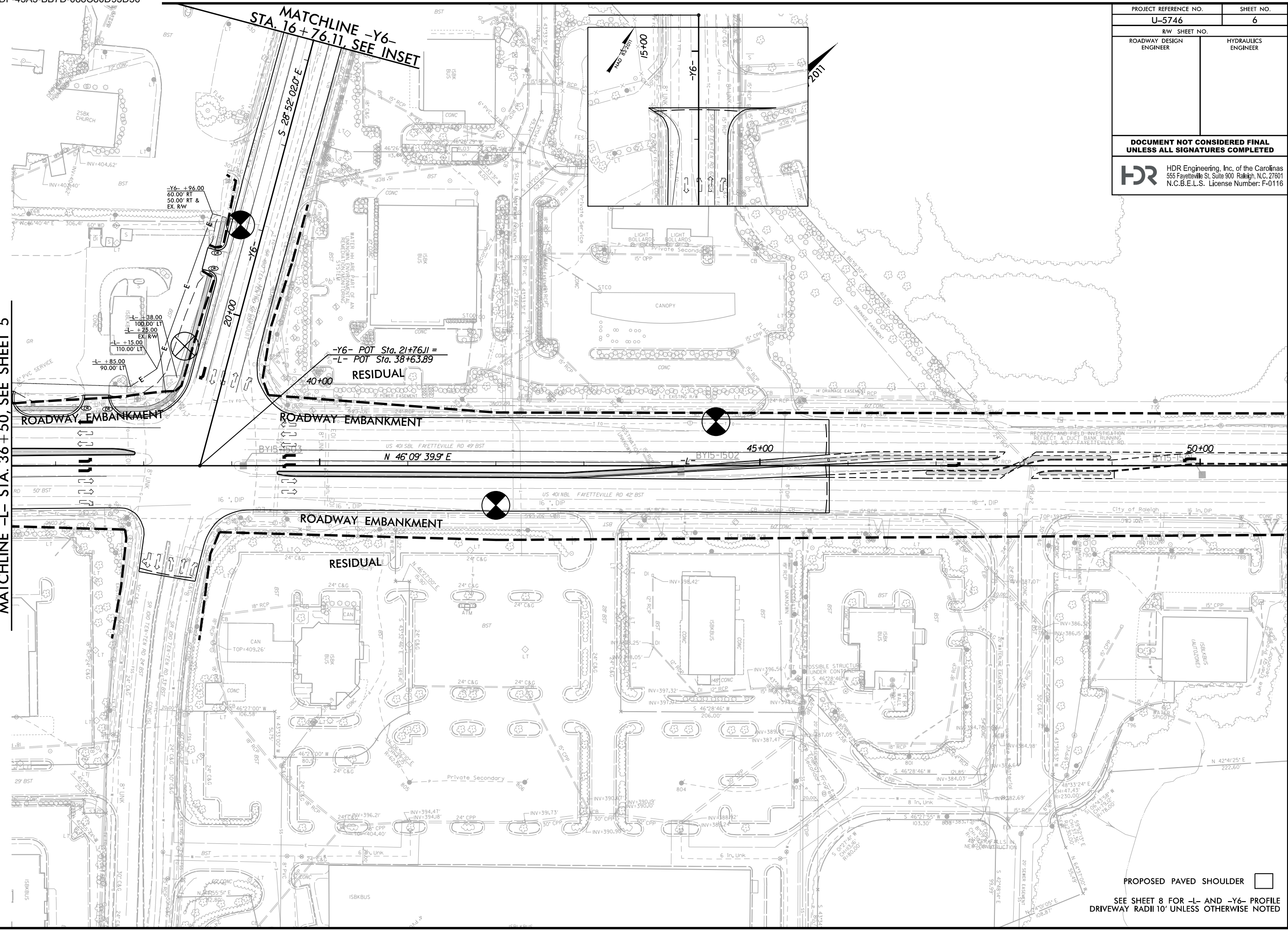
SEE SHEET 7 FOR -L- PROFILE  
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED

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 REVISIONS

PROJECT REFERENCE NO.		SHEET NO.	
U-5746		6	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
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MATCHLINE -L- STA. 36 + 50, SEE SHEET 5

MATCHLINE -Y6- STA. 16 + 76.11, SEE INSET



PROPOSED PAVED SHOULDER

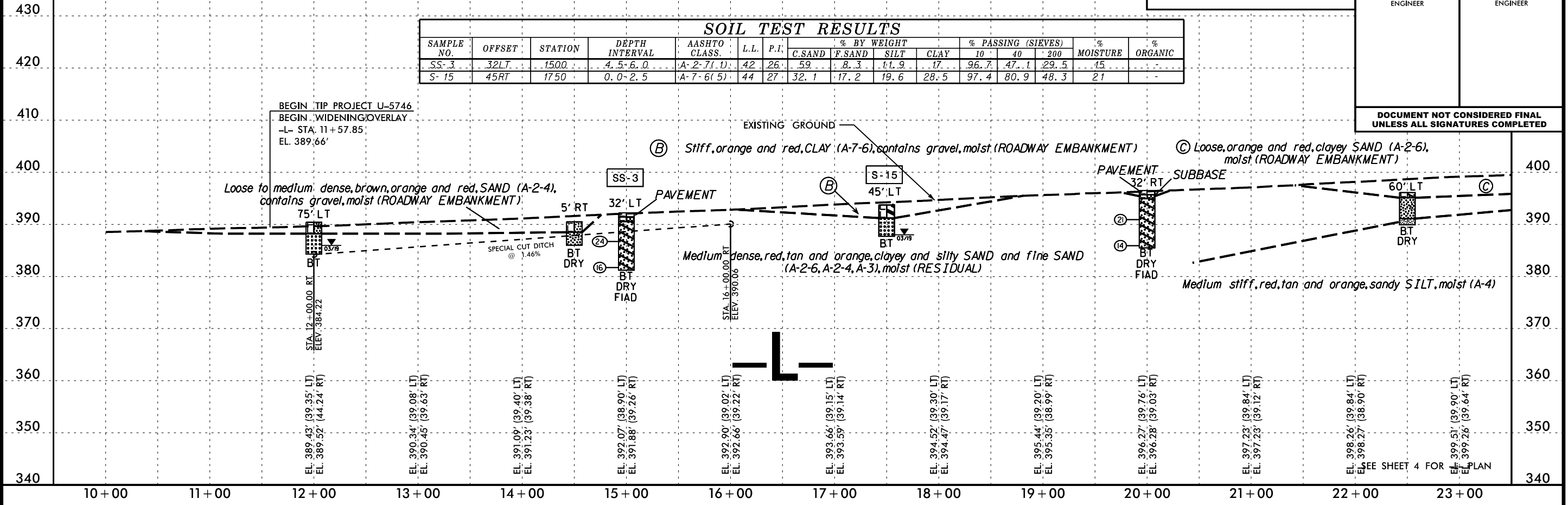
SEE SHEET 8 FOR -L- AND -Y6- PROFILE  
 DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED

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PROJECT REFERENCE NO.	SHEET NO.
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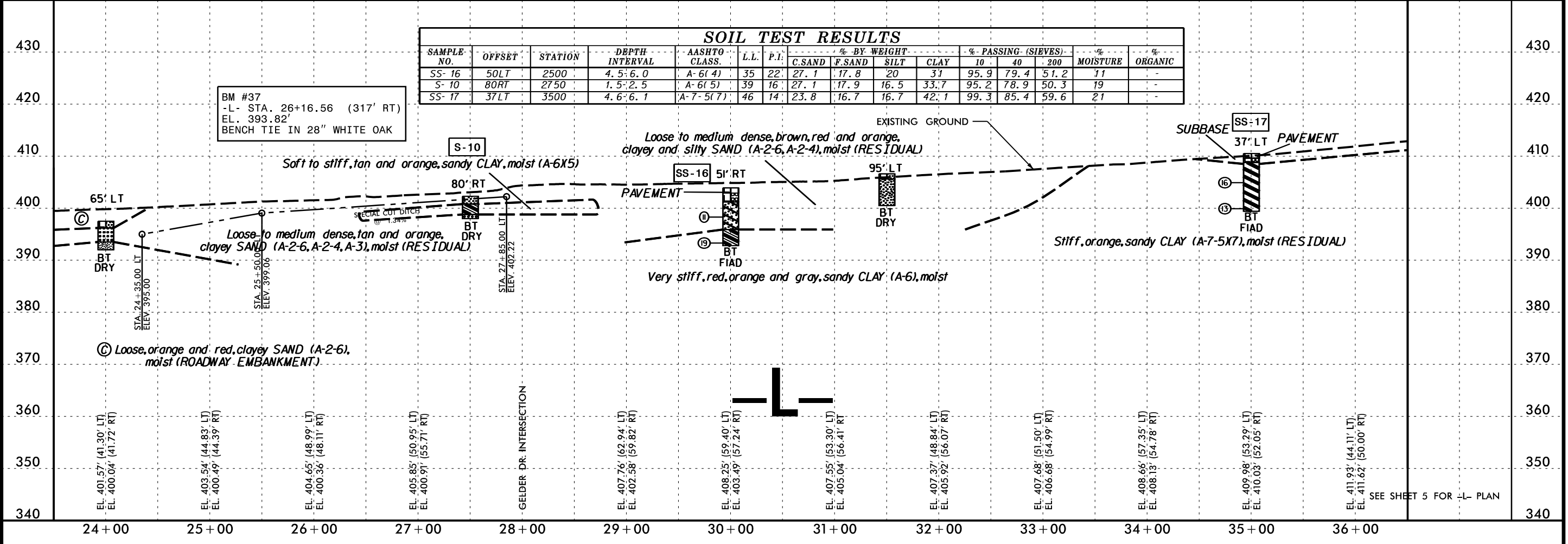
### SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-3	32'LT	1500	4.5-6.0	A-2-7(1)	42	26	59	8.3	11.9	17	96.7	47.1	29.5	15	-
S-15	45'RT	1750	0.0-2.5	A-7-6(5)	44	27	32.1	17.2	19.6	28.5	97.4	80.9	48.3	21	-



### 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-16	50'LT	2500	4.5-6.0	A-6(4)	35	22	27.1	17.8	20	31	95.9	79.4	51.2	11	-
S-10	80'RT	2750	1.5-2.5	A-6(5)	39	16	27.1	17.9	16.5	33.7	95.2	78.9	50.3	19	-
SS-17	37'LT	3500	4.6-6.1	A-7-5(7)	46	14	23.8	16.7	16.7	42.1	99.3	85.4	59.6	21	-



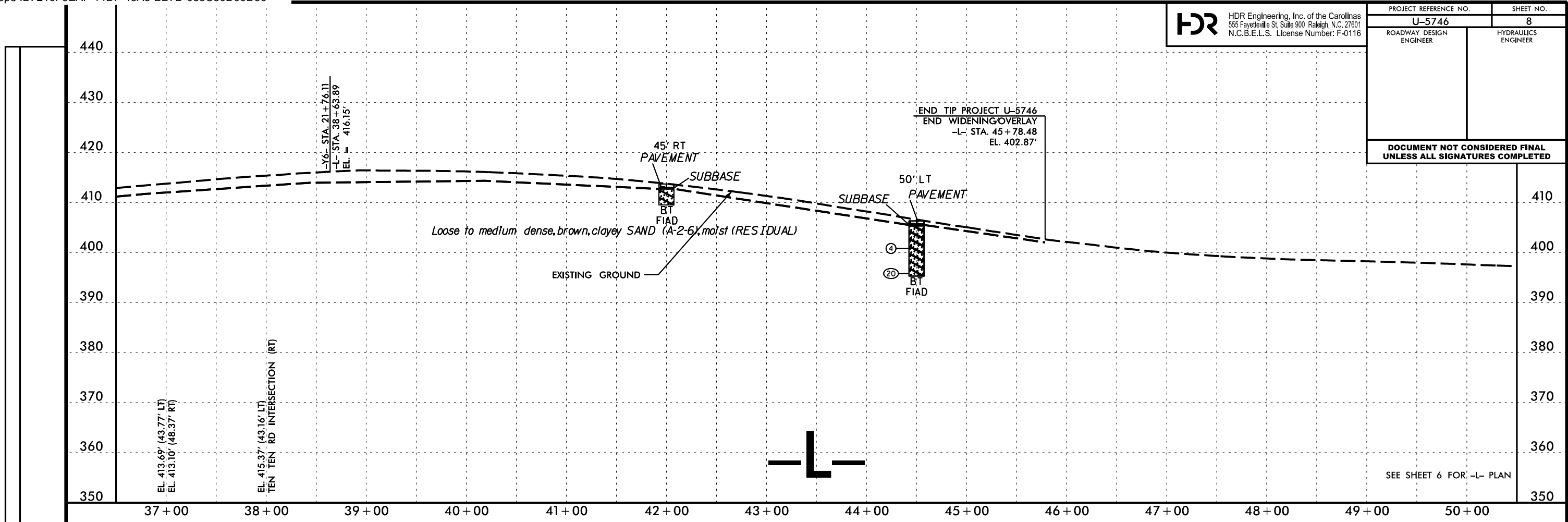
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 TIME: \$TIME\$  
 PENTABLE: \$PENTBL\$

REVISIONS

SEE SHEET 5 FOR -L- PLAN

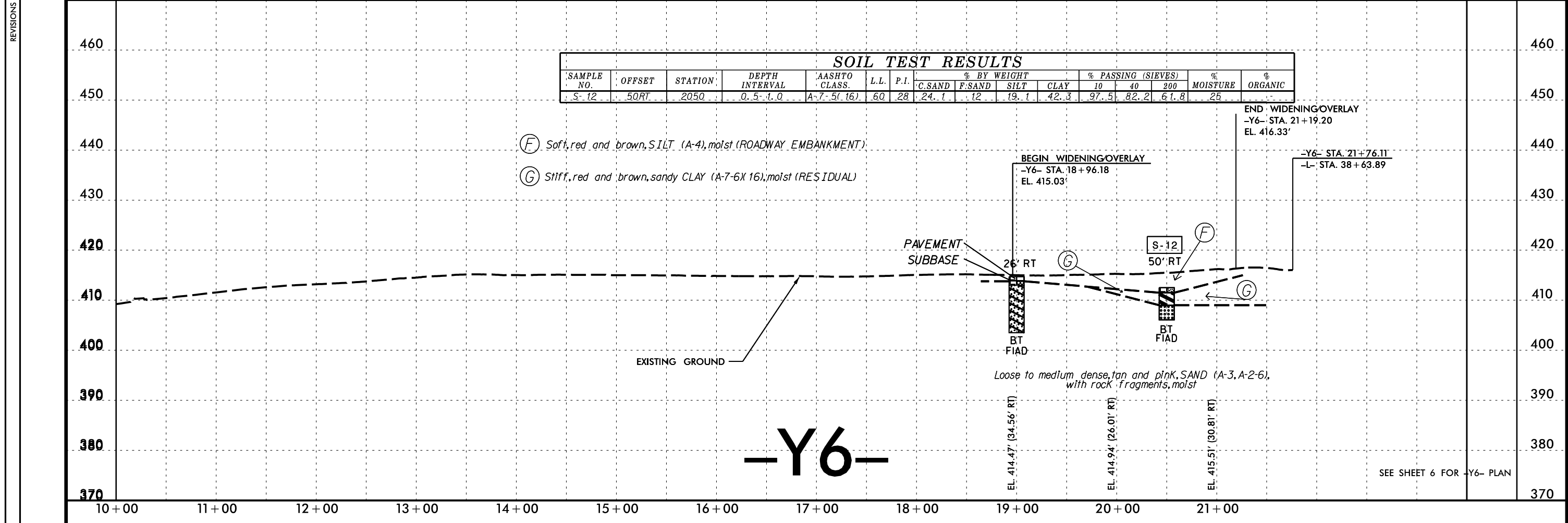


PROJECT REFERENCE NO. <b>U-5746</b>	SHEET NO. <b>8</b>
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<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	



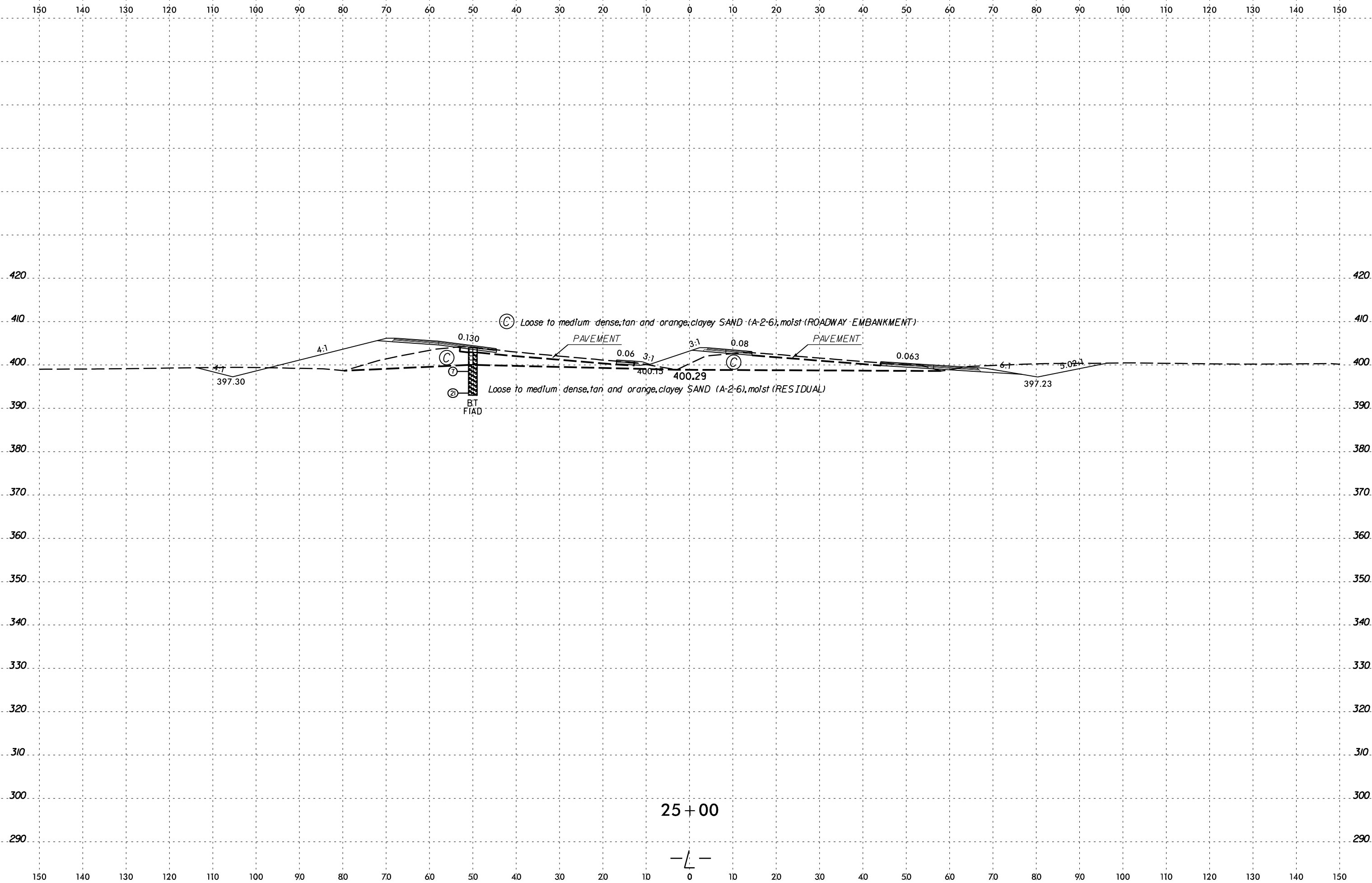
**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-12	50RT	2050	0.5-1.0	A-7-5(16)	60	28	24.1	12	19.1	42.3	97.5	82.2	61.8	25	



PLOT DRIVER: \$PLTDVRS\$  
 USER: \$USER\$  
 FILE: \$FILE\$  
 DATE: \$DATE\$  
 TIME: \$TIME\$  
 PENTABLE: \$PENTBL\$

REVISIONS



PLOT DRIVER: \$PLTDRV\$  
 USER: \$USER\$  
 FILE: \$PWPVAVULTPATIDESC\$

PENTABLE: \$PENTBL\$  
 TIME: \$TIME\$

DATE: \$DATE\$

25 + 00

