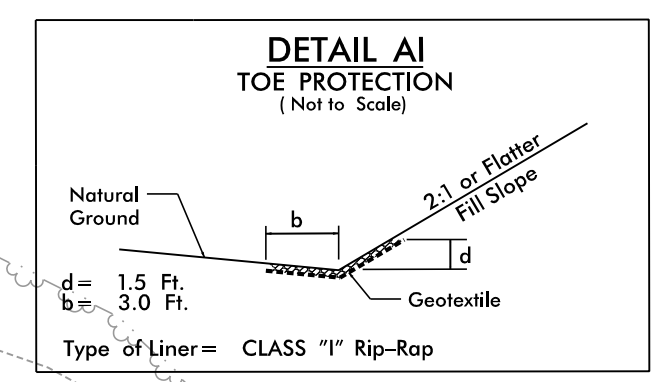
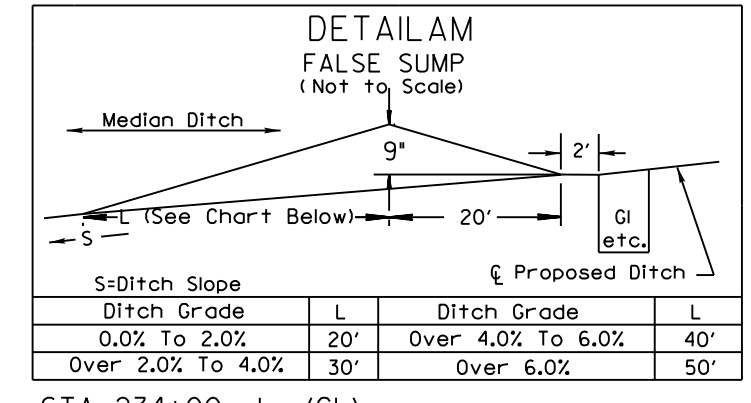
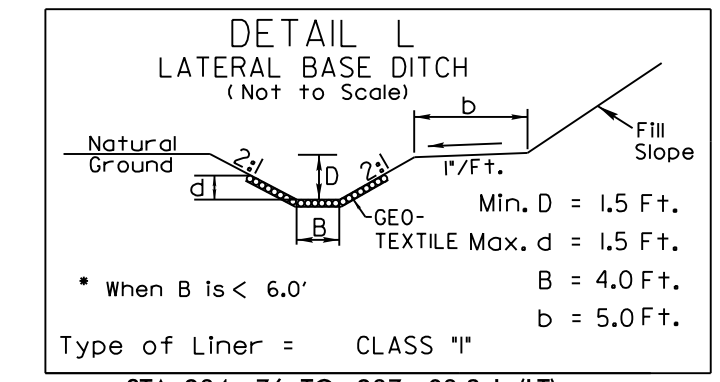
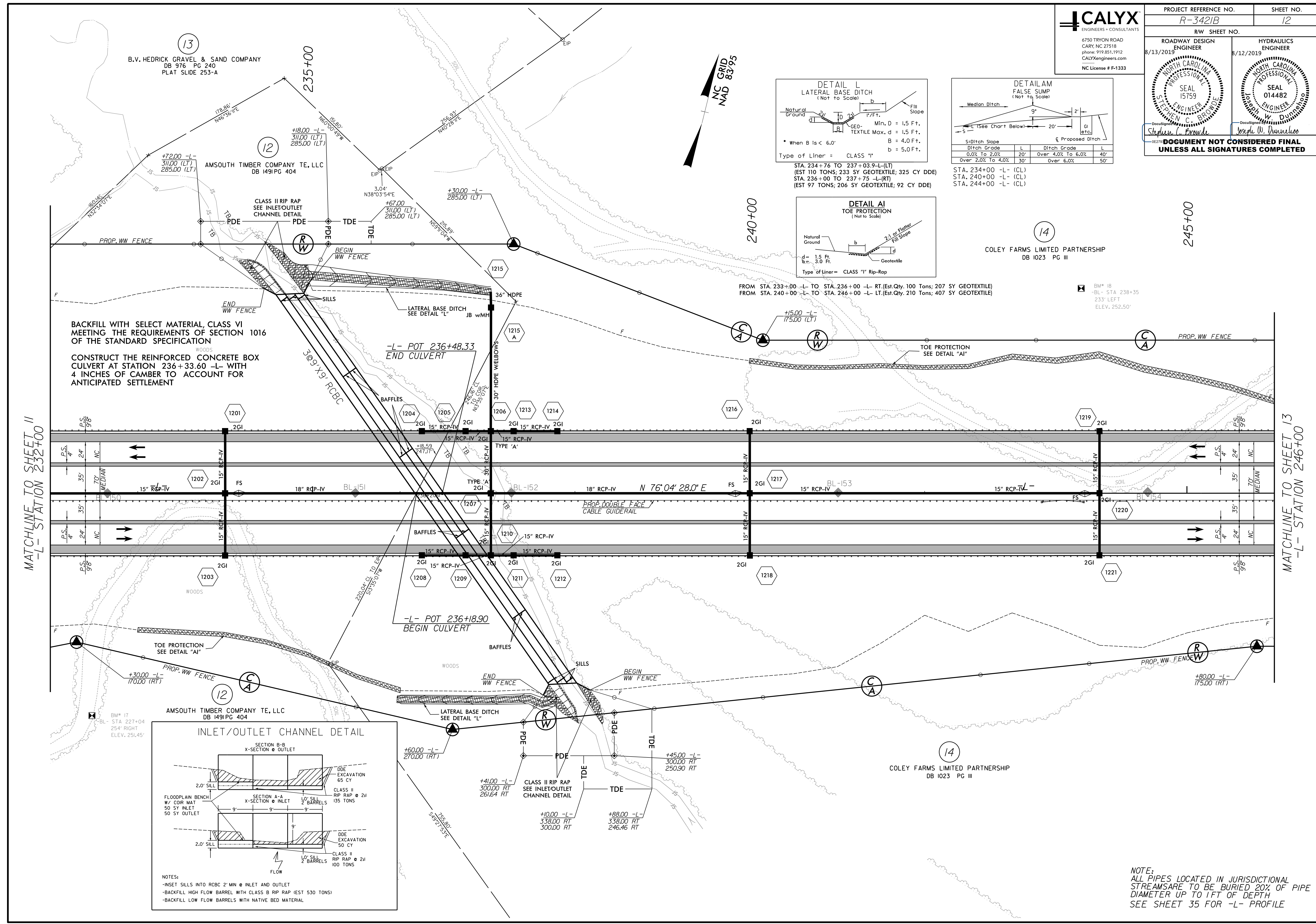


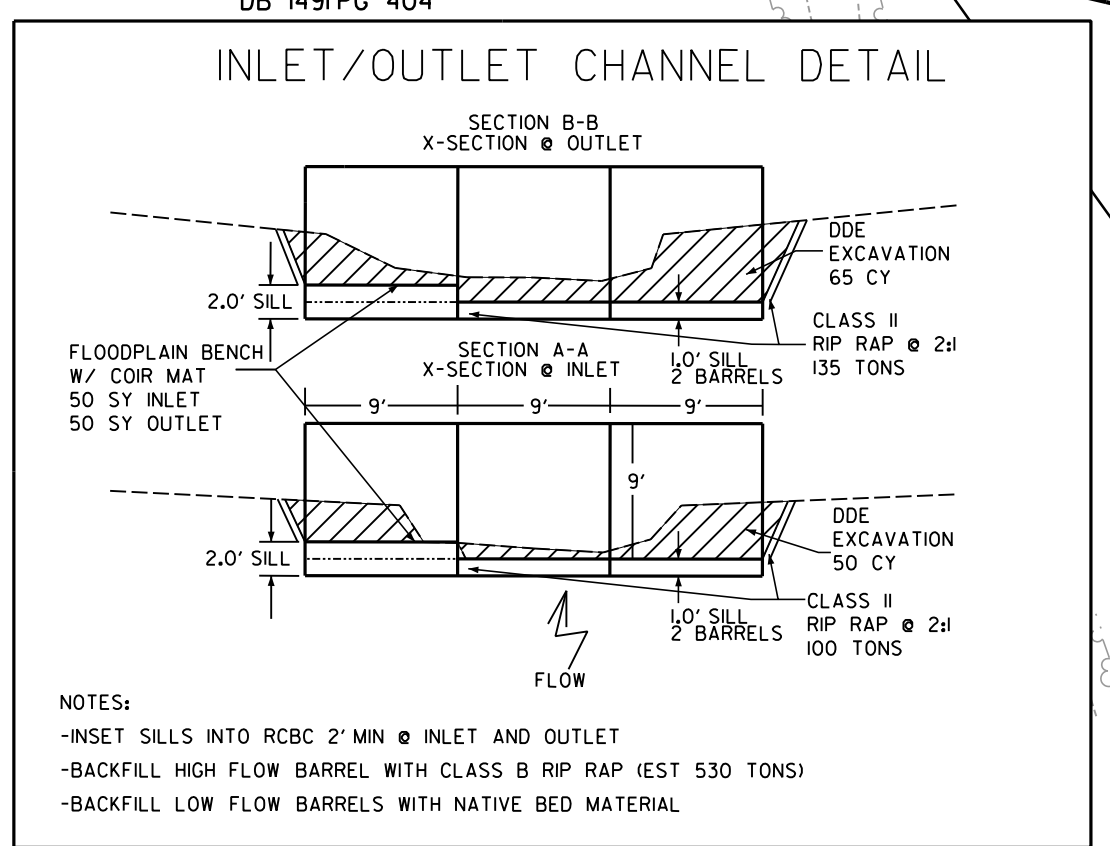
**CALYX**  
ENGINEERS + CONSULTANTS  
6750 TRYON ROAD  
CARY, NC 27518  
PHONE: 919.851.1912  
CALYXengineers.com  
NC License # F-1333

PROJECT REFERENCE NO. <b>R-3421B</b>	SHEET NO. <b>12</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 8/13/2019	HYDRAULICS ENGINEER 8/12/2019
<b>DOCUMENT NOT FOR CONSTRUCTION UNLESS ALL SIGNATURES COMPLETED</b>	



BACKFILL WITH SELECT MATERIAL, CLASS VI MEETING THE REQUIREMENTS OF SECTION 1016 OF THE STANDARD SPECIFICATION

CONSTRUCT THE REINFORCED CONCRETE BOX CULVERT AT STATION 236+33.60 -L- WITH 4 INCHES OF CAMBER TO ACCOUNT FOR ANTICIPATED SETTLEMENT



8/9/2019  
R:\Roadway\Proj\3421b\_rdy\_psh12.dgn  
emar.tn

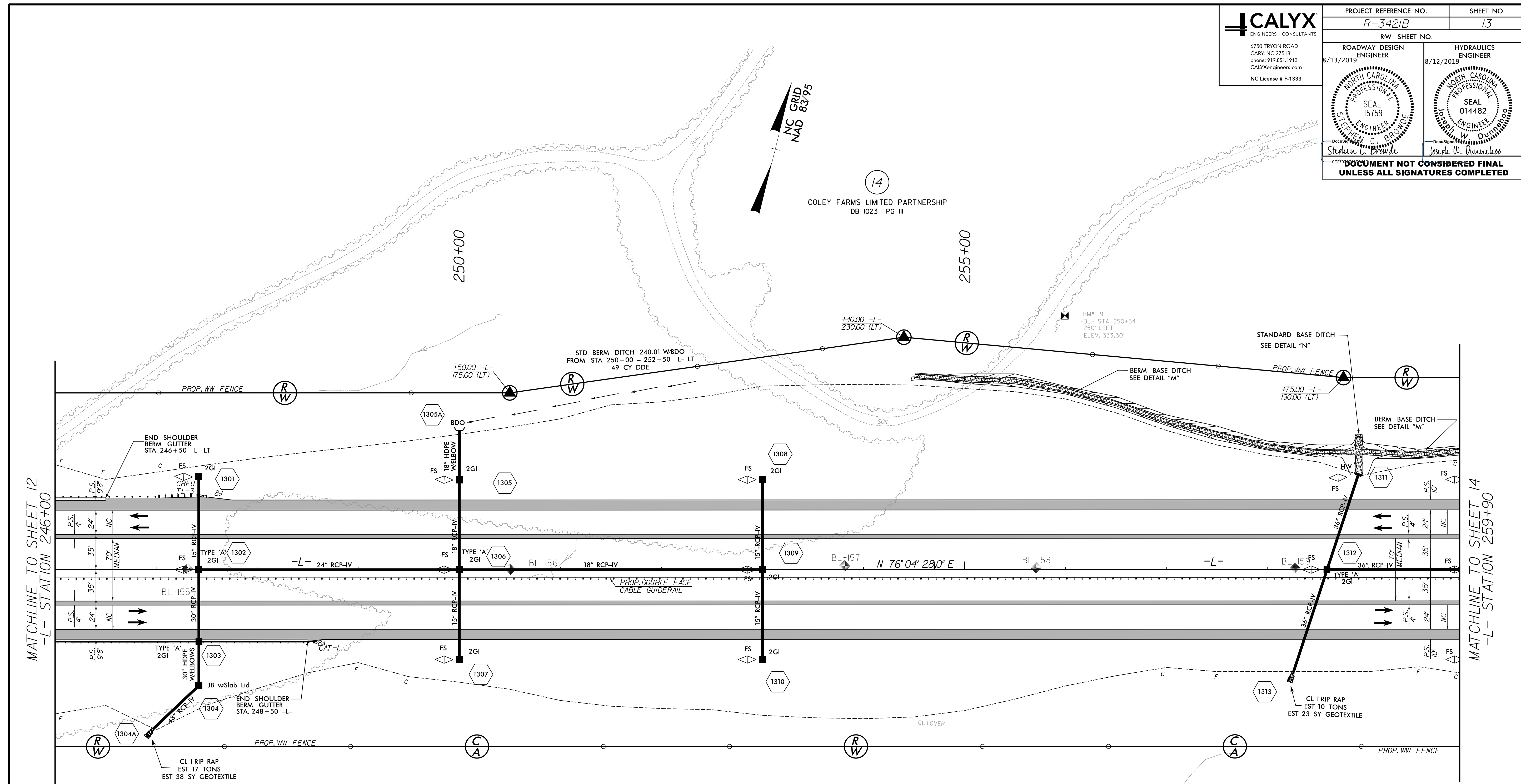
NOTE:  
ALL PIPES LOCATED IN JURISDICTIONAL STREAMS ARE TO BE BURIED 20% OF PIPE DIAMETER UP TO 1 FT OF DEPTH  
SEE SHEET 35 FOR -L- PROFILE



**CALYX**  
ENGINEERS + CONSULTANTS

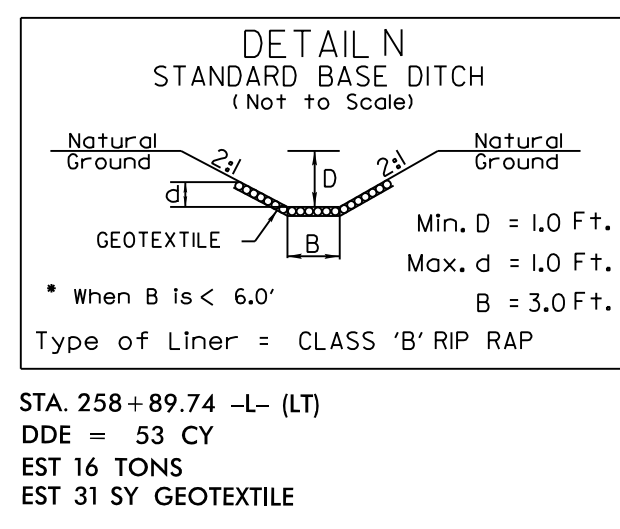
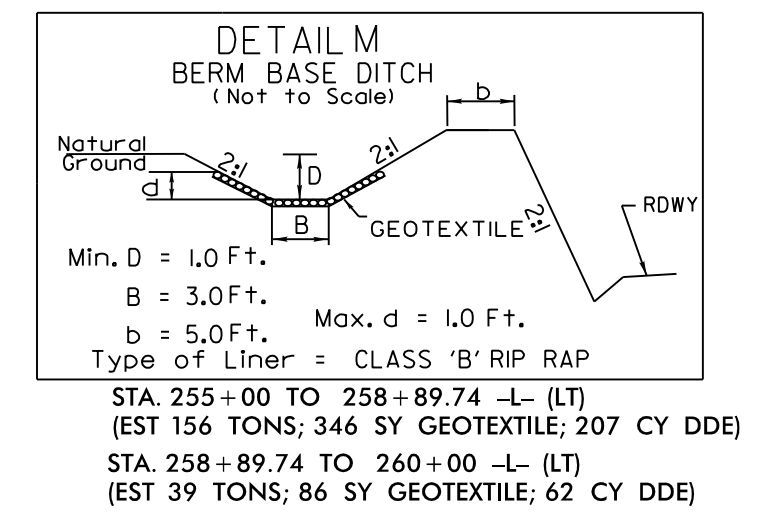
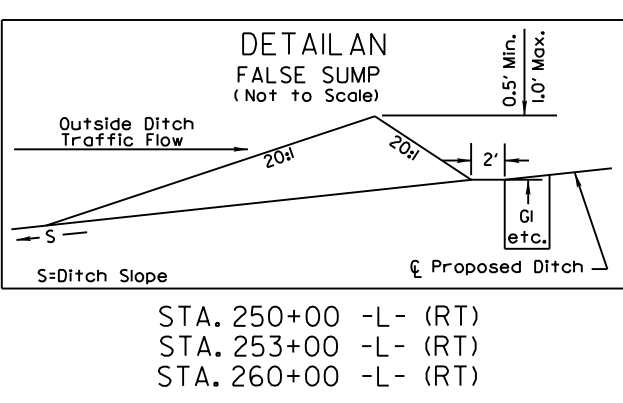
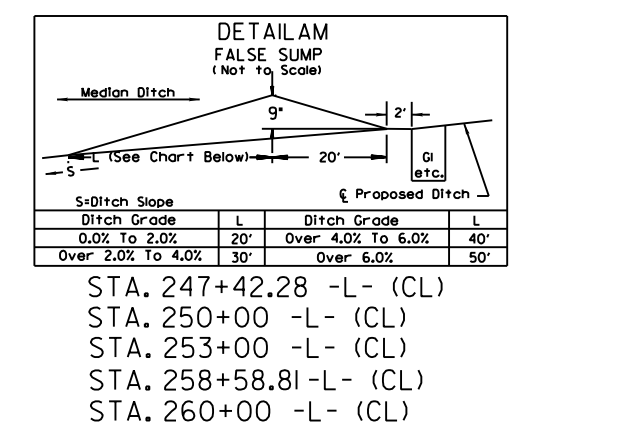
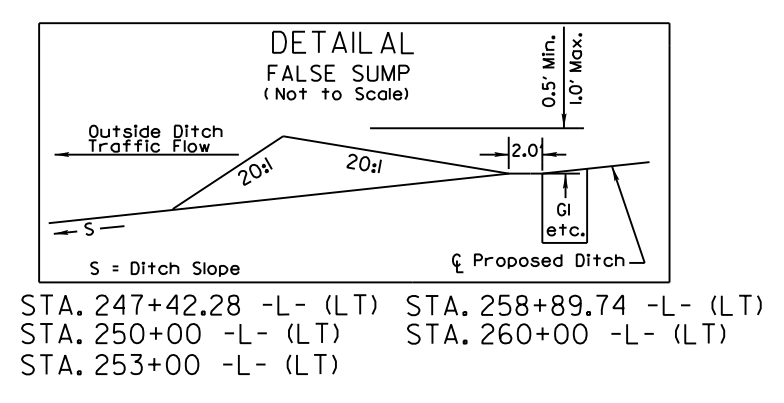
6750 TRYON ROAD  
CARY, NC 27518  
phone: 919.851.1912  
CALYXengineers.com  
NC License # F-1333

PROJECT REFERENCE NO. <b>R-3421B</b>		SHEET NO. <b>13</b>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER 8/13/2019		HYDRAULICS ENGINEER 8/12/2019	
<p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>			



MATCHLINE TO SHEET 12  
-L- STATION 246+00

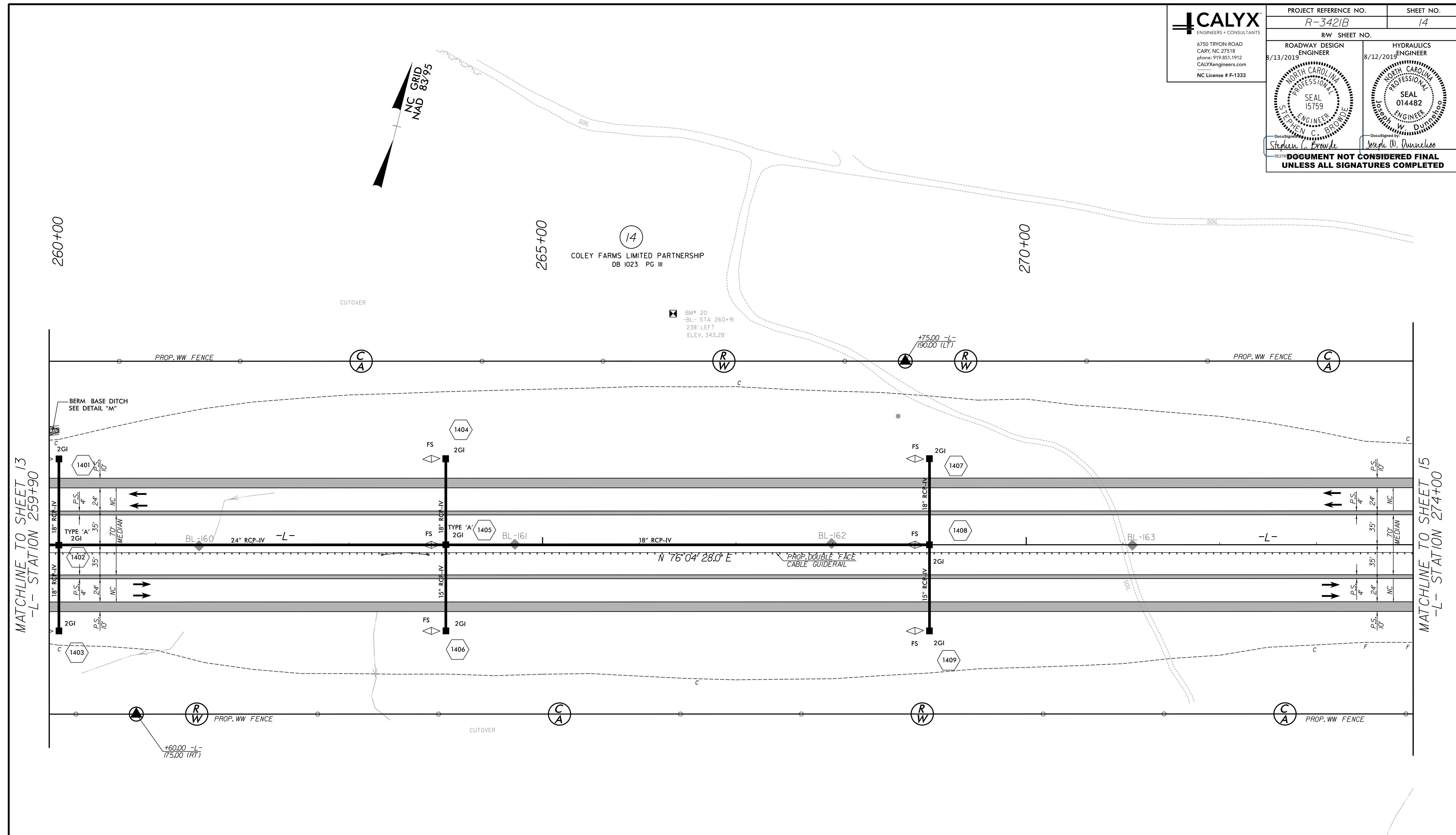
MATCHLINE TO SHEET 14  
-L- STATION 259+00



(14)  
COLEY FARMS LIMITED PARTNERSHIP  
DB 1023 PG III

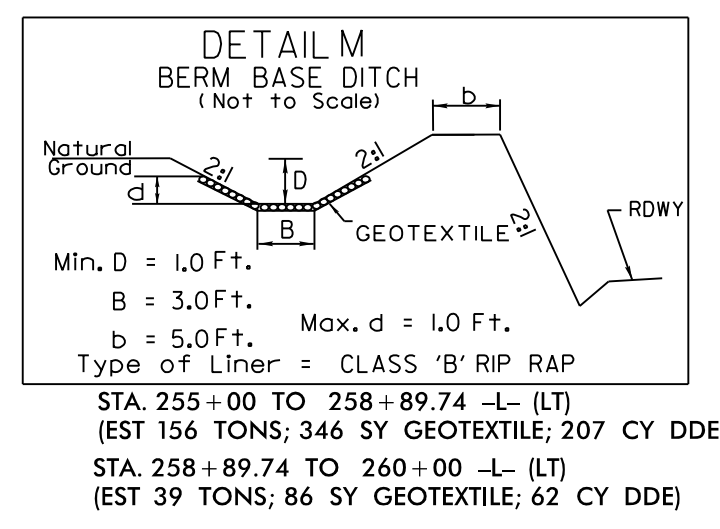
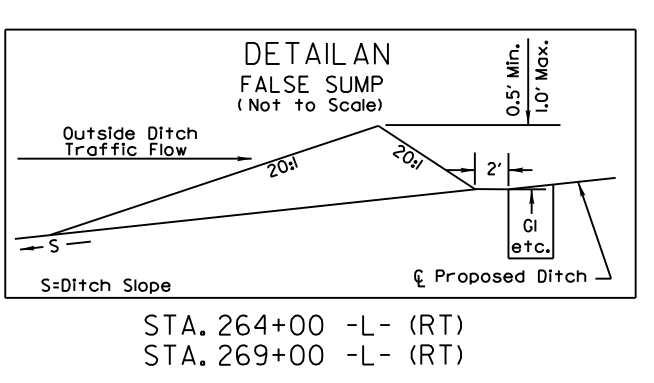
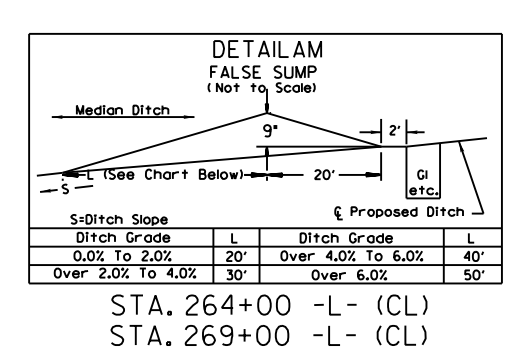
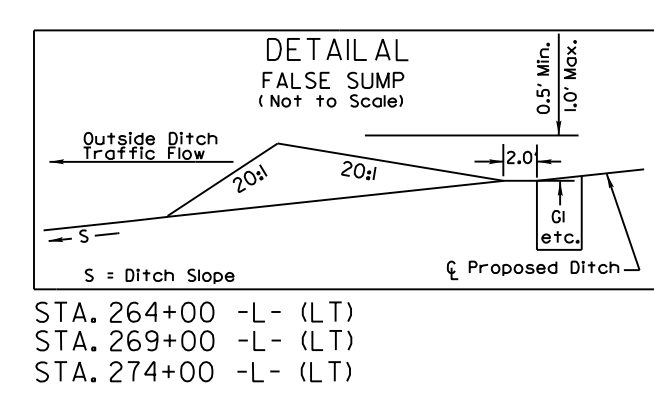
**NOTE:**  
ALL PIPES LOCATED IN JURISDICTIONAL STREAMS ARE TO BE BURIED 20% OF PIPE DIAMETER UP TO 1 FT OF DEPTH  
SEE SHEET 36 FOR -L- PROFILE

8/9/2019  
R:\Roadway\Proj\3421b-rdy-psih3.dgn  
emar-tn



MATCHLINE TO SHEET 13  
-L- STATION 259+90

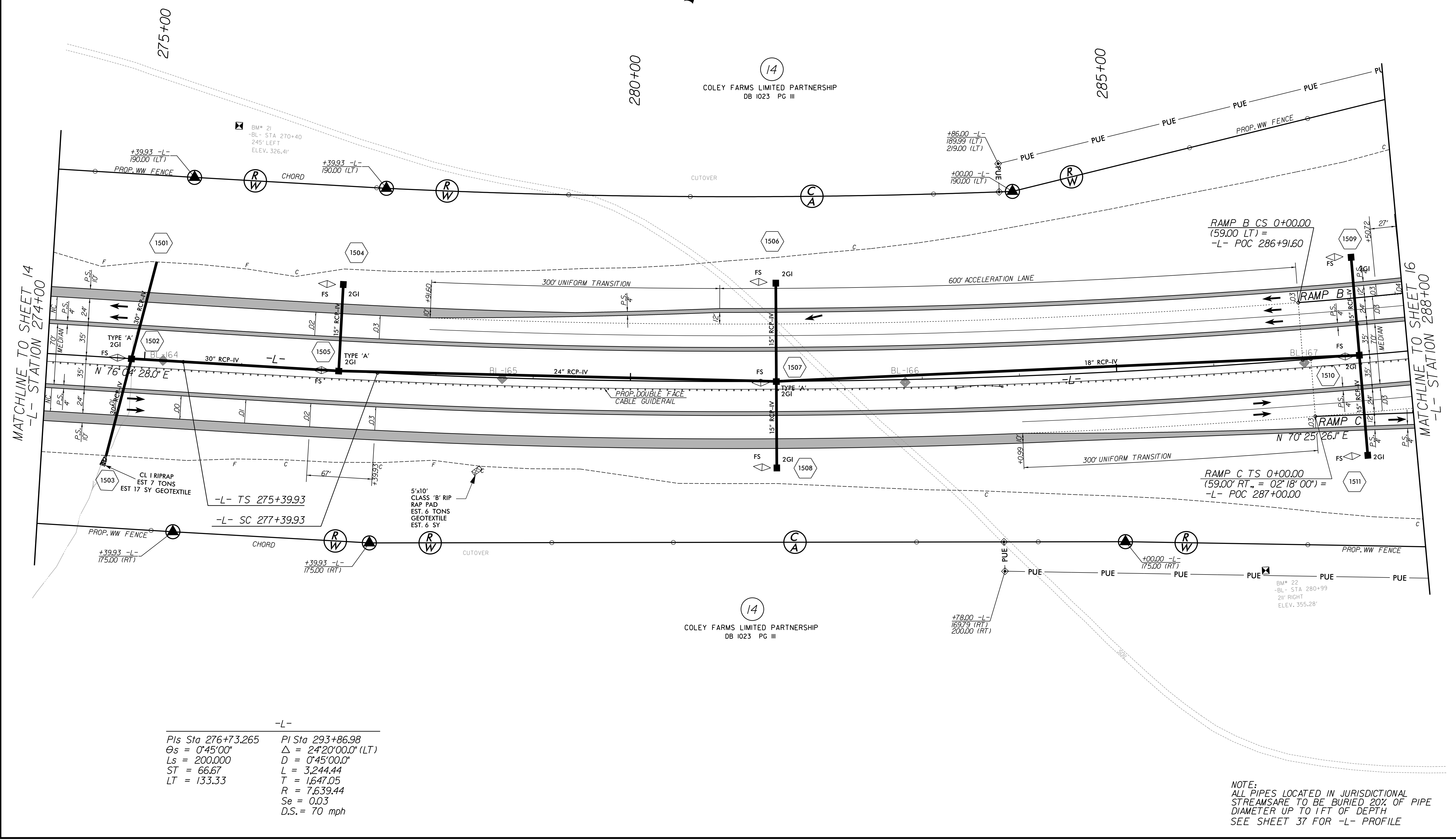
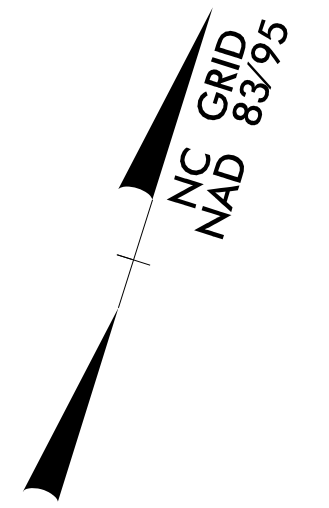
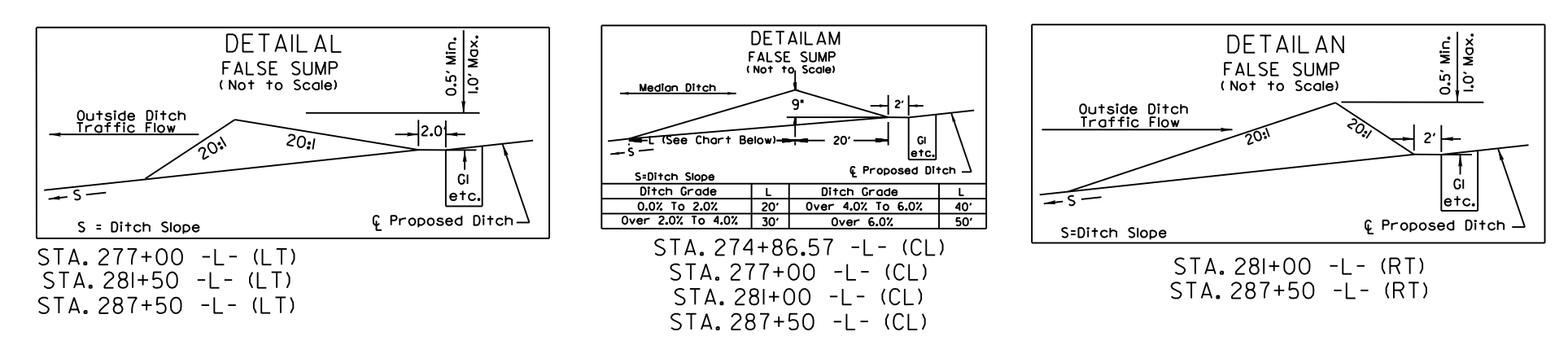
MATCHLINE TO SHEET 15  
-L- STATION 274+00



8/9/2019  
R:\Roadway\Proj\3421b\_rdy-ps14.dgn  
emar-tr

**NOTE:**  
ALL PIPES LOCATED IN JURISDICTIONAL  
STREAMS ARE TO BE BURIED 20% OF PIPE  
DIAMETER UP TO 1 FT OF DEPTH  
SEE SHEET 37 FOR -L- PROFILE





MATCHLINE TO SHEET 14  
-L- STATION 274+00

MATCHLINE TO SHEET 16  
-L- STATION 288+00

-L-

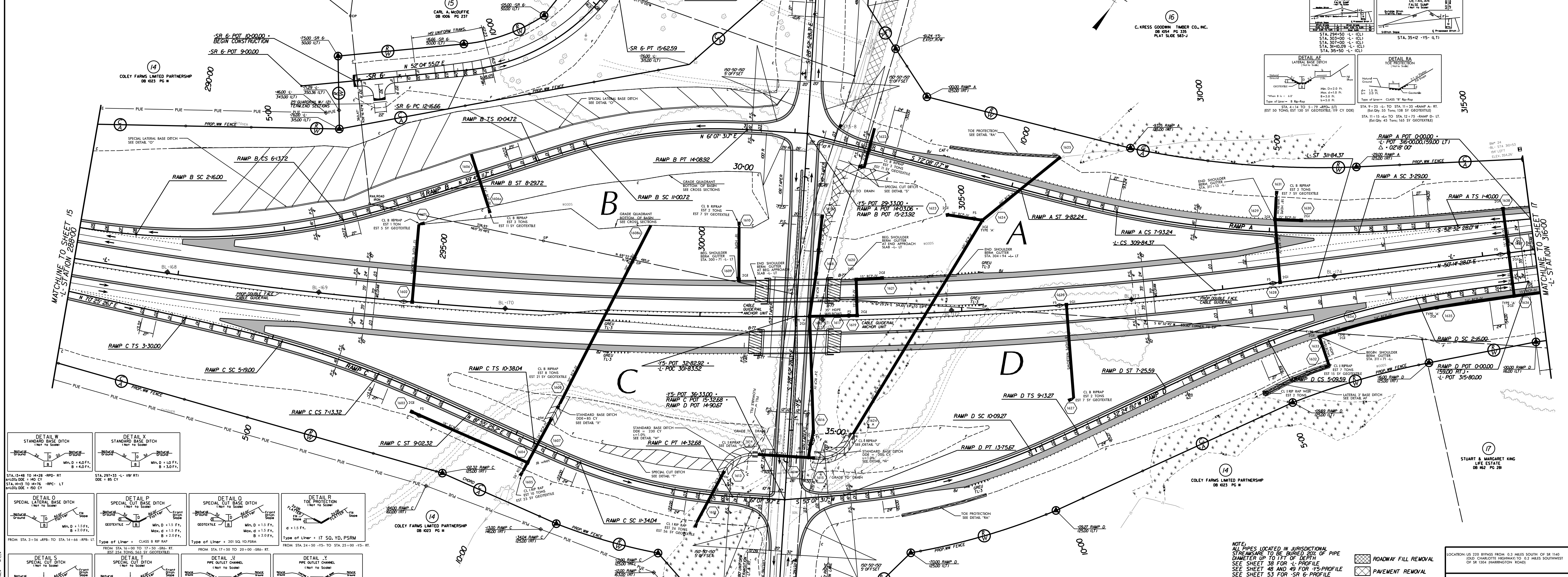
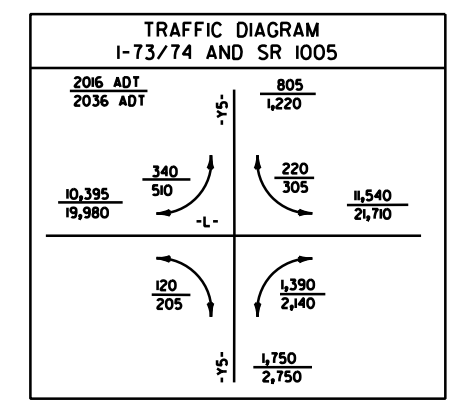
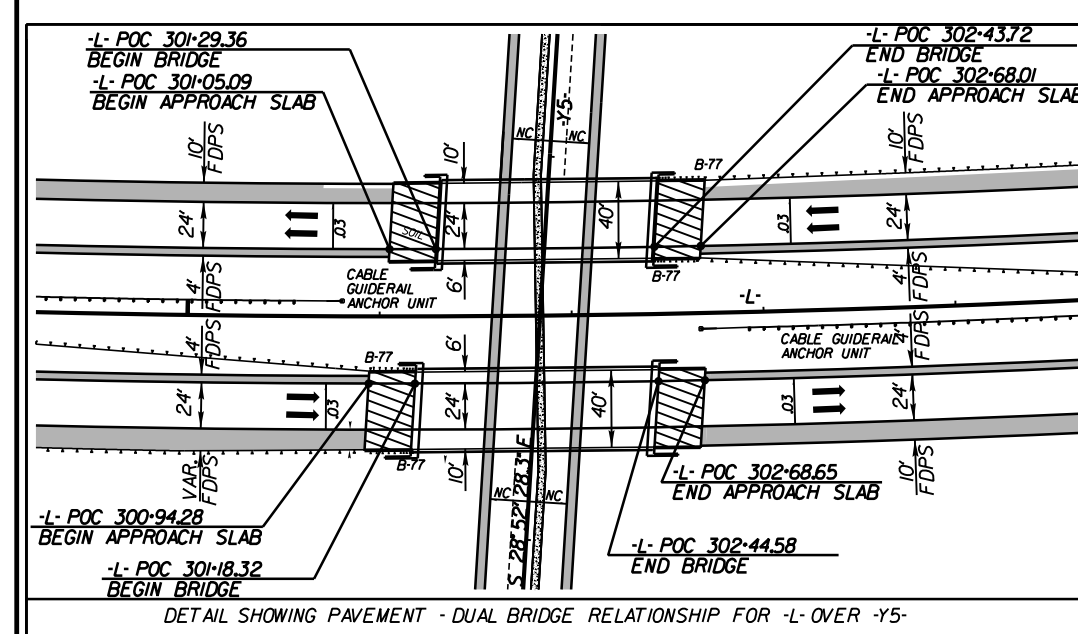
PIs Sta 276+73.265	PI Sta 293+86.98
$\theta_s = 0^\circ 45' 00''$	$\Delta = 24^\circ 20' 00.0''$ (LT)
$L_s = 200.000$	$D = 0^\circ 45' 00.0''$
$ST = 66.67$	$L = 3,244.44$
$LT = 133.33$	$T = 1,647.05$
	$R = 7,639.44$
	$Se = 0.03$
	$D.S. = 70$ mph

NOTE:  
ALL PIPES LOCATED IN JURISDICTIONAL  
STREAMS ARE TO BE BURIED 20% OF PIPE  
DIAMETER UP TO 1 FT OF DEPTH  
SEE SHEET 37 FOR -L- PROFILE

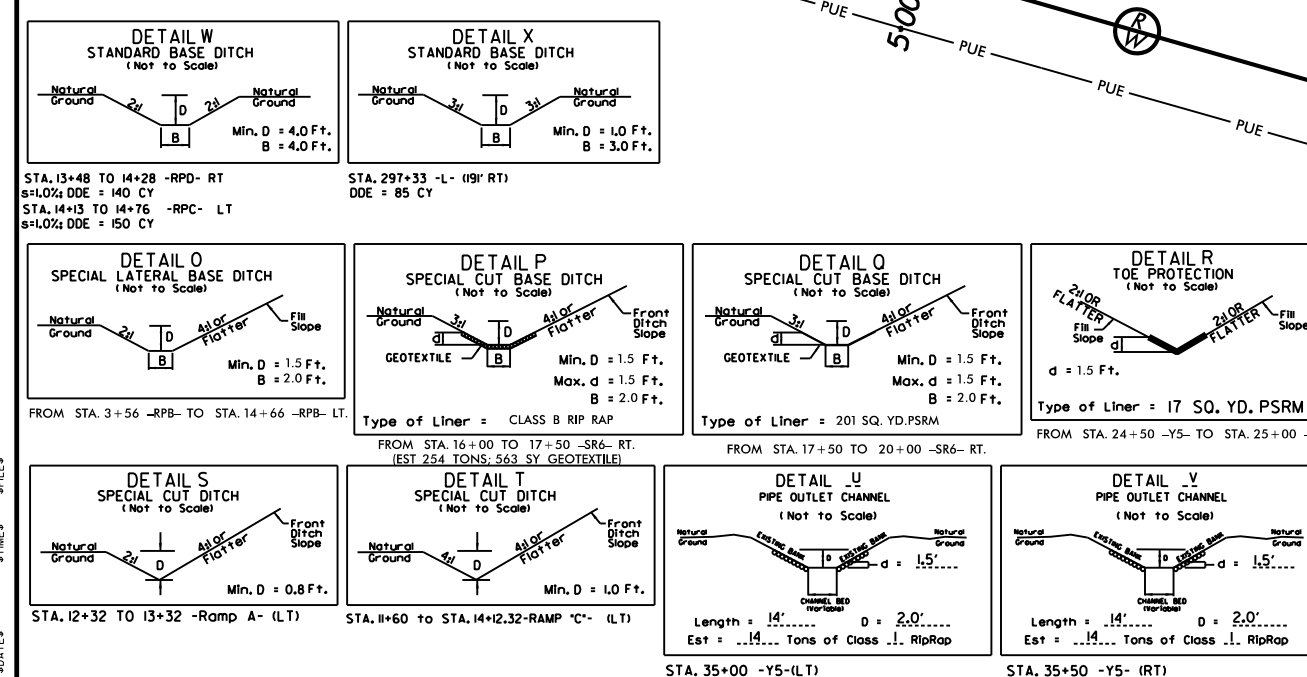
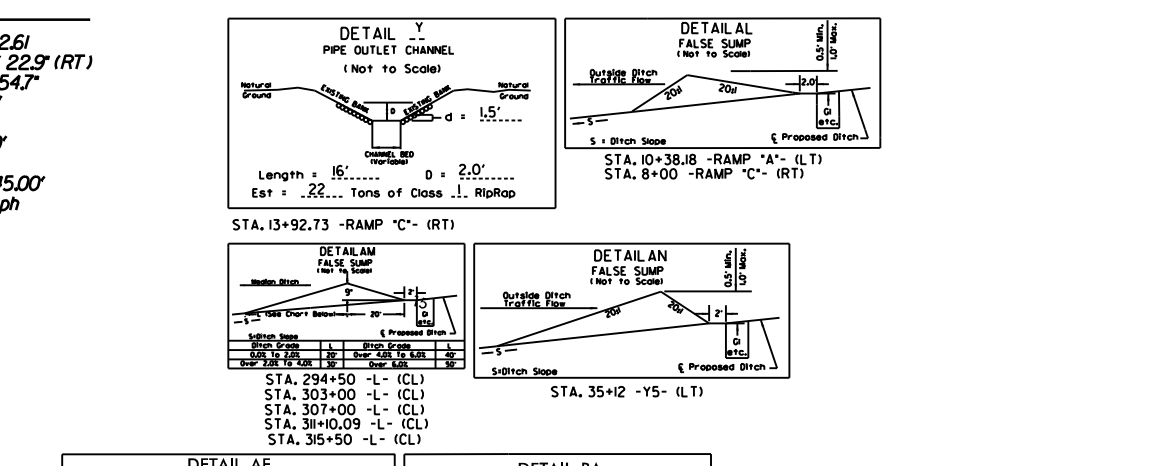


**REVISIONS**

CONSTRUCTION REVISION #2 - 9/29/2020 - DRAINAGE SYSTEM 1617 REVISED AND DRAINAGE STRUCTURE 1618A ADDED. DITCH W REVISED.
--



RAMP A		RAMP B		RAMP C		RAMP D	
PI Sta 23-8638 Δ = 245000 (LT) D = 145000 L = 24444 T = 164725 R = 103944 Se = 0.03 Ds = 70 mph	PI Sta 30-5104 Δ = 124500 (LT) D = 20000 L = 26000 T = 37038 R = 331404 Se = 0.04 Runoff = 10800 Ds = 60 mph	PI Sta 18-8785 Δ = 62546 (LT) D = 115000 L = 26000 T = 23049 R = 455366 Se = 0.04 Runoff = 10800 Ds = 60 mph	PI Sta 13-3373 Δ = 175300 (LT) D = 43000 (LT) L = 89100 T = 8243 R = 127324 Se = 0.04 Ds = 60 mph	PI Sta 4-5602 Δ = 250700 (LT) D = 18500 L = 63100 T = 63100 R = 190986 Se = 0.07 Ds = 60 mph	PI Sta 6-6227 Δ = 175337 (RT) D = 37000 L = 46424 T = 23327 R = 190986 Se = 0.07 Ds = 60 mph	PI Sta 11-0205 Δ = 250600 (LT) D = 175000 L = 96000 T = 3201 R = 127324 Se = 0.04 Ds = 60 mph	PI Sta 10-8459 Δ = 175300 (LT) D = 607000 L = 20864 T = 19055 R = 95453 Se = 0.04 Ds = 50 mph



**NOTE:**  
ALL PIPES LOCATED IN JURISDICTIONAL SPACES ARE TO BE BURIED 30" OF PIPE DIAMETER UP TO 1 FT OF DEPTH.  
SEE SHEET 38 FOR 'L' PROFILE.  
SEE SHEET 48 AND 49 FOR 'Y5' PROFILE.  
SEE SHEET 53 FOR 'SR 6' PROFILE.  
SEE SHEET 49 FOR 'RPA' PROFILE.  
SEE SHEET 50 FOR 'RPS' PROFILE.  
SEE SHEET 51 FOR 'RPS' PROFILE.  
SEE SHEET 52 FOR 'RPS' PROFILE.  
SEE SHEETS 52/THRU 53/54 FOR STRUCTURE PLANS.

**GRAPHIC SCALE**  
0 25 50 100  
PLANS

DESIGNED BY: JOHNNY BANKS  
CHECKED BY: STEVE BRONKRE, DATE: MAY 31, 2019



COMPUTED BY: WCB DATE: 5/23/2019  
 CHECKED BY: JRGO DATE: 5/23/2019  
 REVISED BY: JRGO DATE: 3/3/2020

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

PROJECT REFERENCE NO. R-3421A  
 SHEET NO. 3B-1

# SUMMARY OF EARTHWORK

IN CUBIC YARDS

CHAIN	BEGINNING STATION	ENDING STATION	UNCL. EXCA. C.Y.	EMBANK. +% C.Y.	BORROW C.Y.	WASTE C.Y.
<b>SUMMARY 1</b>						
-US74BUS-	34+00.00	64+00.00	18,968	8,855	0	10,113
<b>SUBTOTAL</b>			<b>18,968</b>	<b>8,855</b>	<b>0</b>	<b>10,113</b>
<b>SUMMARY 2</b>						
-US74BUS-	64+00.00	74+80.44	86,740	2,976	0	83,674
-I73-	74+80.44	88+15.00	103,114	34,106	0	69,008
-FLY-	5+31.50	40+30.37	1,409,368	11,083	0	1,398,285
<b>SUBTOTAL</b>			<b>1,599,222</b>	<b>48,165</b>	<b>0</b>	<b>1,551,057</b>
<b>SUMMARY 3</b>						
-I73-	88+46.00	100+65.58	353,889	229,388	0	124,501
-RPC-	12+50.00	37+95.81	905,314	48,130	0	857,184
-LPB-	1+51.68	11+98.45	23,671	146,645	122,974	0
-LPC-	2+18.73	15+51.45	141,251	58,000	0	83,251
<b>SUBTOTAL</b>			<b>1,424,125</b>	<b>482,163</b>	<b>122,974</b>	<b>1,064,936</b>
<b>SUMMARY 4</b>						
-I73-	102+80.35	128+00.00	573,191	40,063	0	533,128
-L2RTEXT-	10+00.00	24+00.00	19,654	25,315	5,661	0
-L2REVEXT-	24+00.00	38+21.74	19,801	10,525	0	9,276
<b>SUBTOTAL</b>			<b>612,646</b>	<b>75,903</b>	<b>5,661</b>	<b>542,404</b>
<b>SUMMARY 5</b>						
-L2-	38+00.00	53+29.48	35,963	63,716	27,753	0
-RPD-	2+66.99	21+71.05	148,244	7,343	0	140,901
<b>SUBTOTAL</b>			<b>184,207</b>	<b>71,059</b>	<b>27,753</b>	<b>140,901</b>
<b>SUMMARY 6</b>						
-RPA-	4+56.26	19+48.16	204,786	5,171	0	199,615
-L2CONN-	14+39.23	33+64.93	45,733	956	0	44,777
-US74BUS-	114+39.23	147+38.68	37,281	18,368	0	18,913
<b>SUBTOTAL</b>			<b>287,800</b>	<b>24,496</b>	<b>0</b>	<b>263,304</b>
<b>SUMMARY 7</b>						
XOVER1	7+43.06	21+50	120	754	0	0
XOVER1	25+75	36+00	210	533	0	0
XOVER2	30+00	48+00	111	7,529	0	0
<b>SUBTOTAL</b>			<b>441</b>	<b>10,579</b>	<b>0</b>	<b>0</b>
<b>SHEET TOTALS</b>			<b>4,127,409</b>	<b>721,220</b>	<b>166,527</b>	<b>3,572,715</b>
<b>LOSS DUE TO CLEARING AND GRUBBING</b>			<b>-25,000</b>			<b>-25,000</b>
<b>EARTH WASTE IN LIEU OF BORROW</b>					<b>-166,527</b>	<b>-166,527</b>
<b>R-3421A TOTAL</b>			<b>4,102,409</b>	<b>721,220</b>	<b>0</b>	<b>3,381,189</b>
<b>R-3421A SAY</b>			<b>4,103,000</b>			
<b>R-3421B SAY</b>			<b>3,195,000</b>		<b>767,000</b>	
<b>R-3421B EARTH WASTE IN LIEU OF BORROW</b>					<b>-767,000</b>	
					<b>0</b>	
<b>GRAND TOTAL</b>			<b>7,298,000</b>			<b>2,614,189</b>
UNCLASSIFIED EXCAVATION- ACCEPTABLE BUT NOT TO BE USED IN THE TOP 3' OF EMBANKMENT OR BACKFILL.						
-US74- 70+00 TO 74+50, -I73- 75+00 TO 82+50, -I73-90+00 TO 94+00, -FLY- 5+50 TO 23+00, -RPC- 14+50 TO 23+00, & -LPC- 7+00 TO 8+00 (1,106,000 CY) PER GEOTECH						
PAVEMENT STRUCTURE VOLUME= 22,750 C.Y.						
DDE= 3,150 C.Y.						
SHOULDER BORROW= 16,910 C.Y.						

3/3/2020  
 C:\cadd\cadd.com\fs\cloud\Projects\2014\140300\_NCDOT\TP\end\101\_R3421A\_US2200\_Roadway\Proj\R3421A\_rdy\_sum.dgn  
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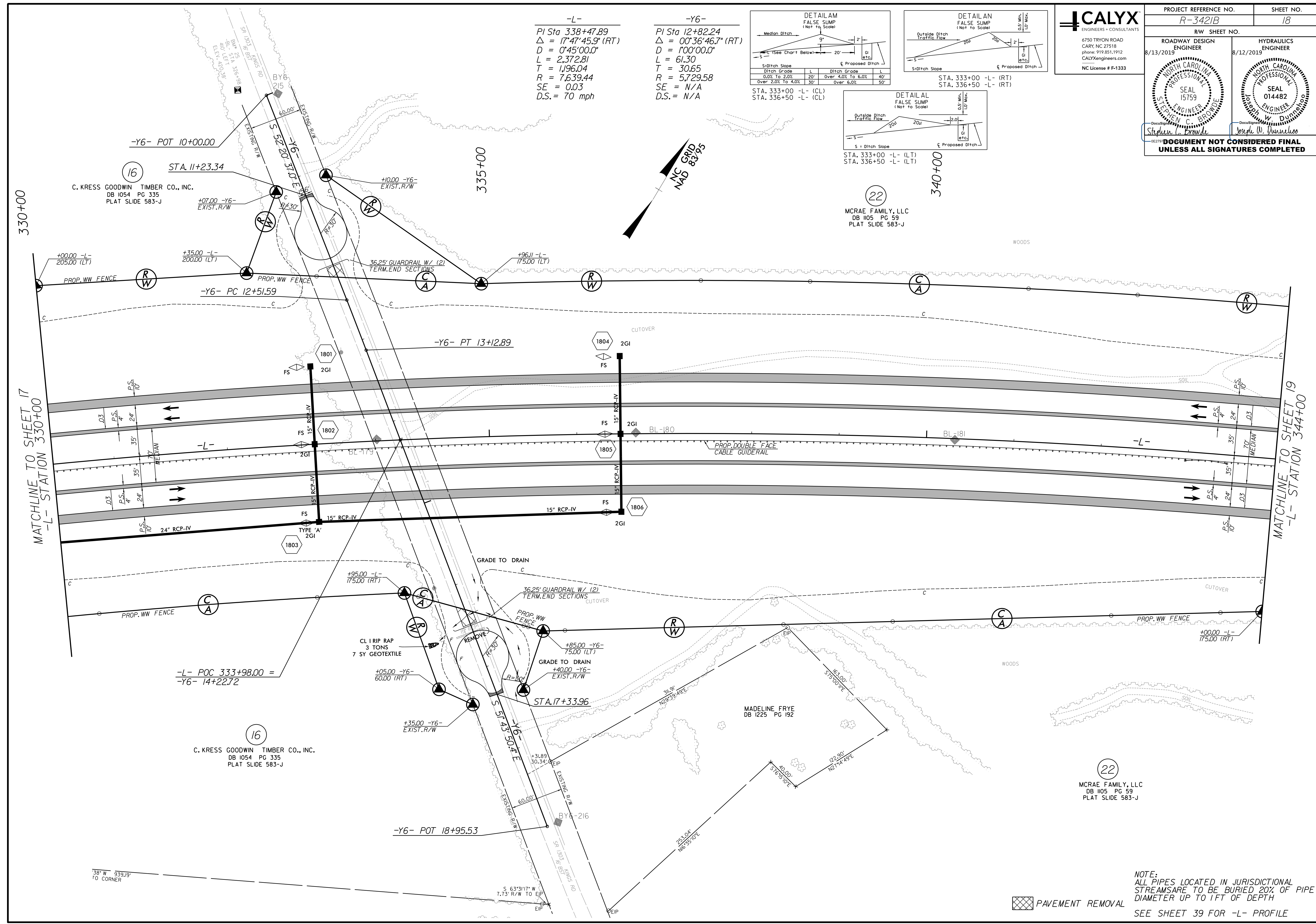
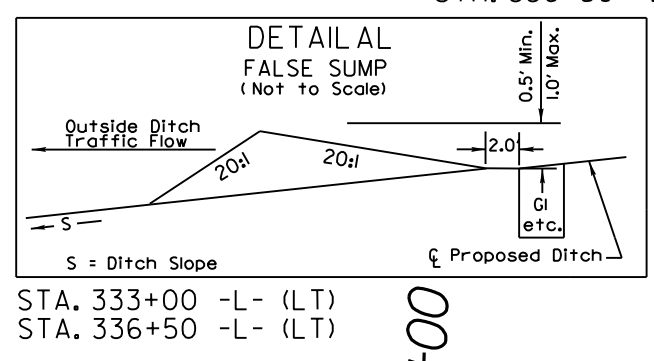
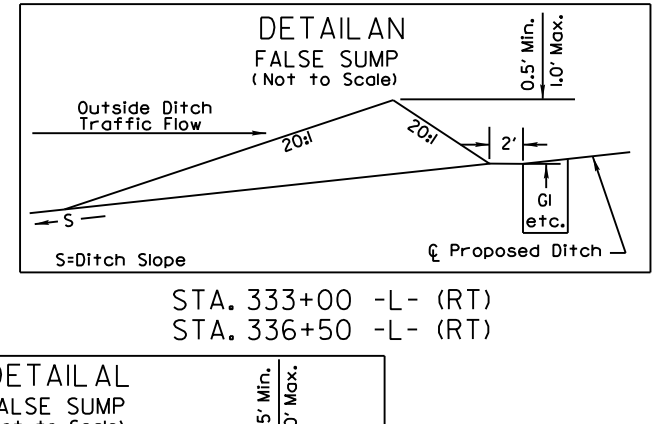
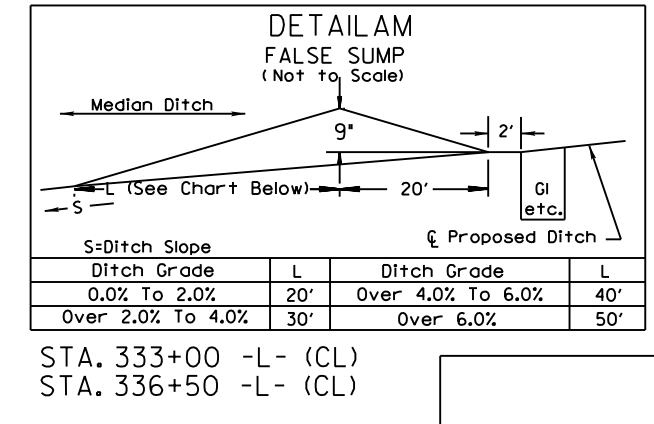


**CALYX**  
ENGINEERS + CONSULTANTS  
6750 TRYON ROAD  
CARY, NC 27518  
phone: 919.851.1912  
CALYXengineers.com  
NC License # F-1333

PROJECT REFERENCE NO. <b>R-3421B</b>	SHEET NO. <b>18</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 8/13/2019	HYDRAULICS ENGINEER 8/12/2019
<p>DocuSign <b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED</p>	

**-L-**  
PI Sta 338+47.89  
 $\Delta = 17^{\circ}47'45.9''$  (RT)  
 $D = 0^{\circ}45'00.0''$   
 $L = 2,372.81$   
 $T = 1,196.04$   
 $R = 7,639.44$   
 $SE = 0.03$   
 $D.S. = 70$  mph

**-Y6-**  
PI Sta 12+82.24  
 $\Delta = 00^{\circ}36'46.7''$  (RT)  
 $D = 1^{\circ}00'00.0''$   
 $L = 61.30$   
 $T = 30.65$   
 $R = 5,729.58$   
 $SE = N/A$   
 $D.S. = N/A$



MATCHLINE TO SHEET 17  
-L- STATION 330+00

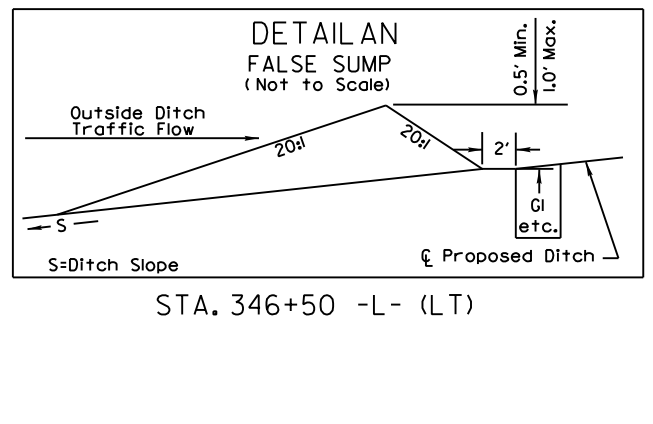
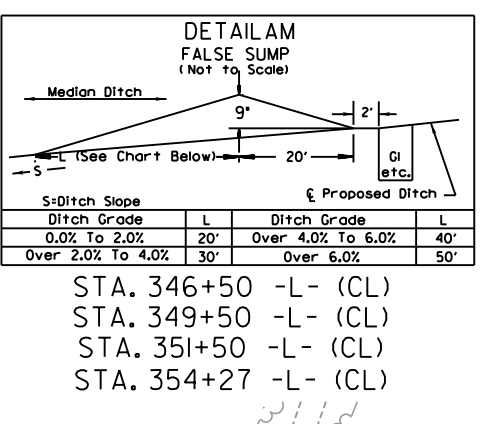
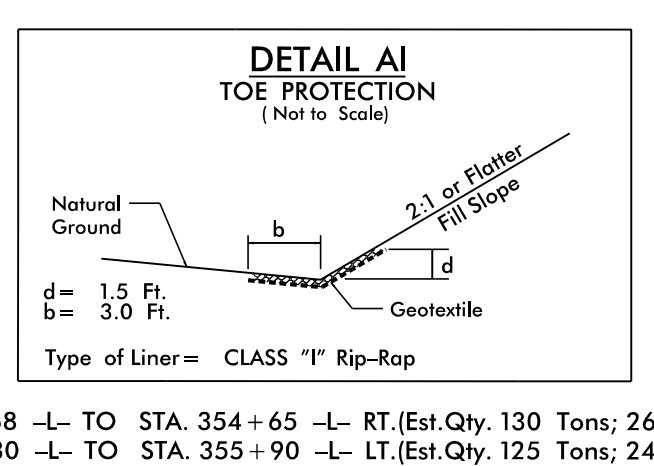
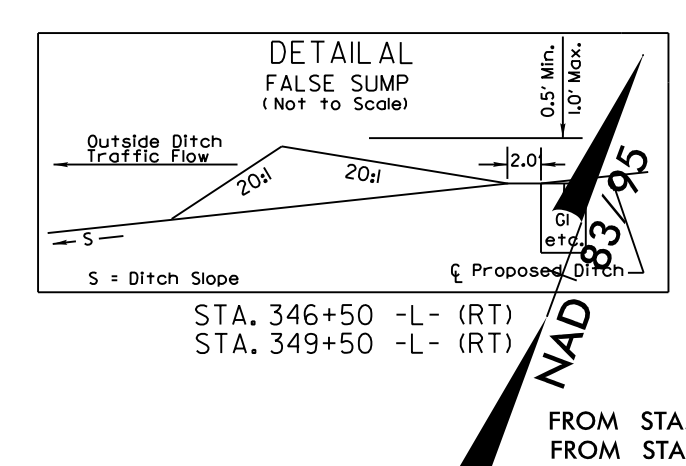
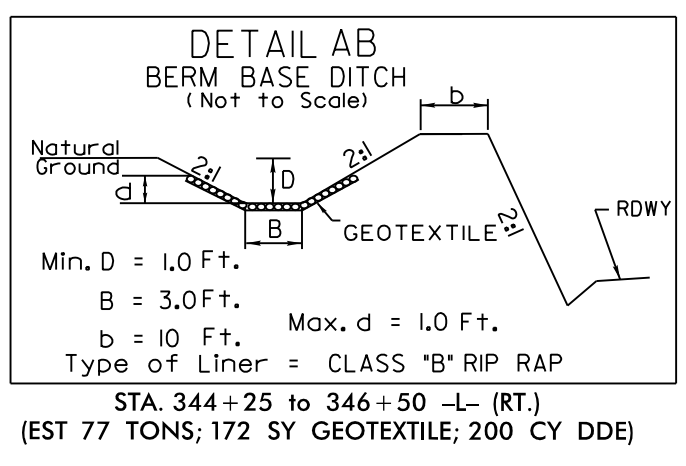
MATCHLINE TO SHEET 19  
-L- STATION 344+00

8/9/2019  
R:\Roadway\Proj\3421b-rdy-psh18.dgn  
emar.tn

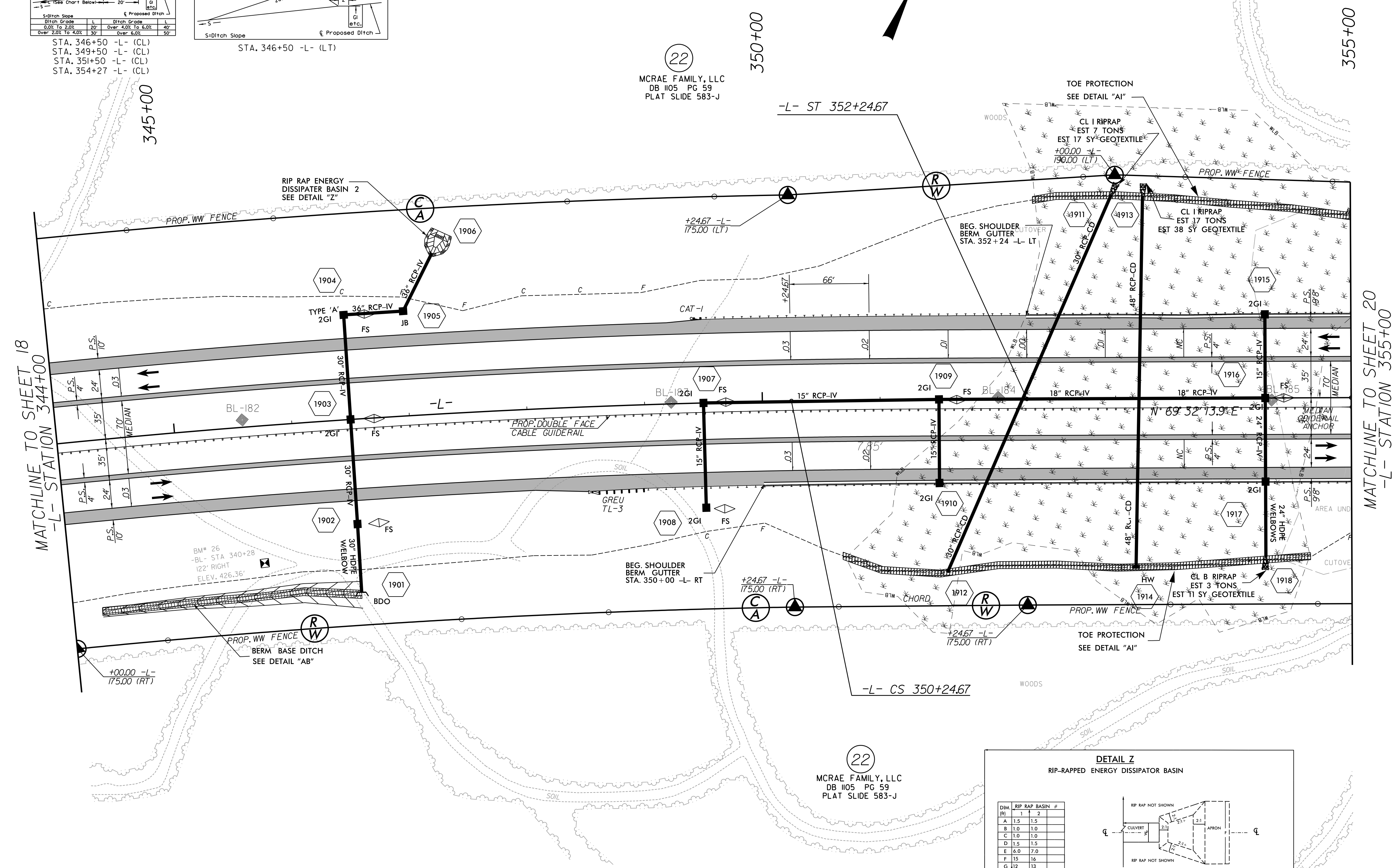
NOTE:  
ALL PIPES LOCATED IN JURISDICTIONAL  
STREAMS ARE TO BE BURIED 20% OF PIPE  
DIAMETER UP TO 1 FT OF DEPTH  
SEE SHEET 39 FOR -L- PROFILE

PAVEMENT REMOVAL





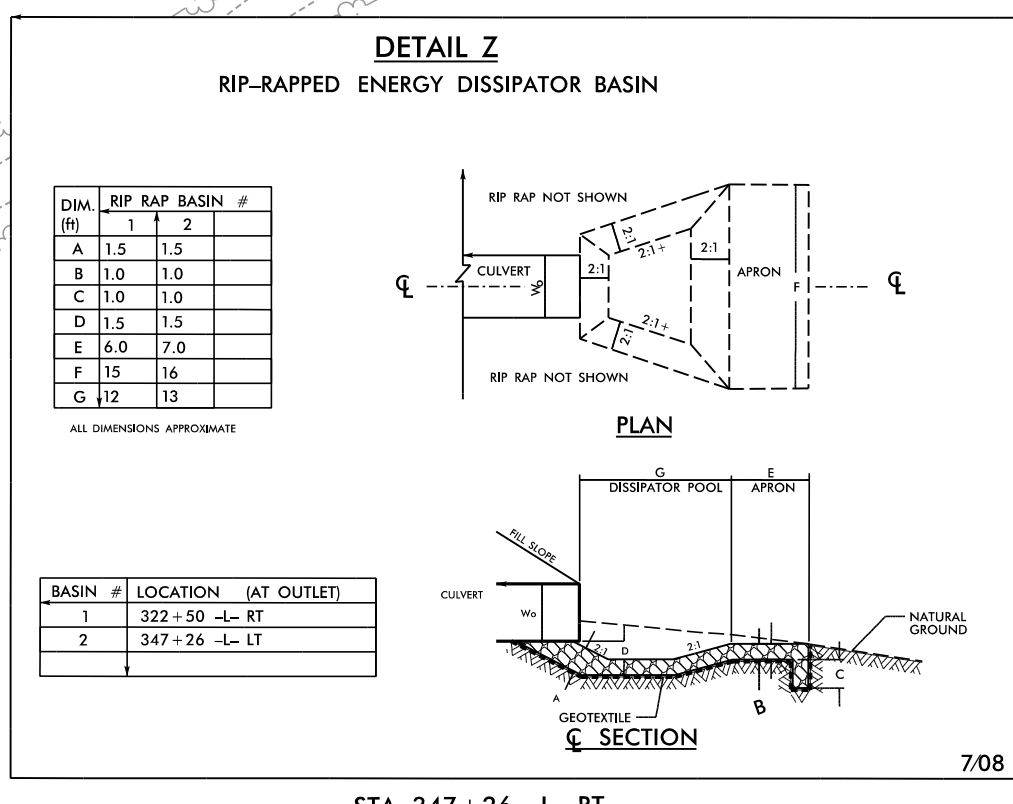
FROM STA. 350+68 -L- TO STA. 354+65 -L- RT. (Est. Qty. 130 Tons; 267 SY GEOTEXTILE)  
FROM STA. 352+30 -L- TO STA. 355+90 -L- LT. (Est. Qty. 125 Tons; 245 SY GEOTEXTILE)



22  
MCRAE FAMILY, LLC  
DB 1105 PG 59  
PLAT SLIDE 583-J

22  
MCRAE FAMILY, LLC  
DB 1105 PG 59  
PLAT SLIDE 583-J

-L-  
PI Sta 338+47.89    PIs Sta 350+91.34  
Δ = 17°47'46" (RT)    θs = 0°45'00"  
D = 0°45'00.0"    Ls = 200.00"  
L = 2,372.81    ST = 66.67  
T = 1,196.04    LT = 133.33  
R = 7,639.44  
SE = 0.03  
D.S. = 70 mph



NOTE:  
ALL PIPES LOCATED IN JURISDICTIONAL STREAMS ARE TO BE BURIED 20% OF PIPE DIAMETER UP TO 1 FT OF DEPTH  
SEE SHEETS 40 FOR -L- PROFILE

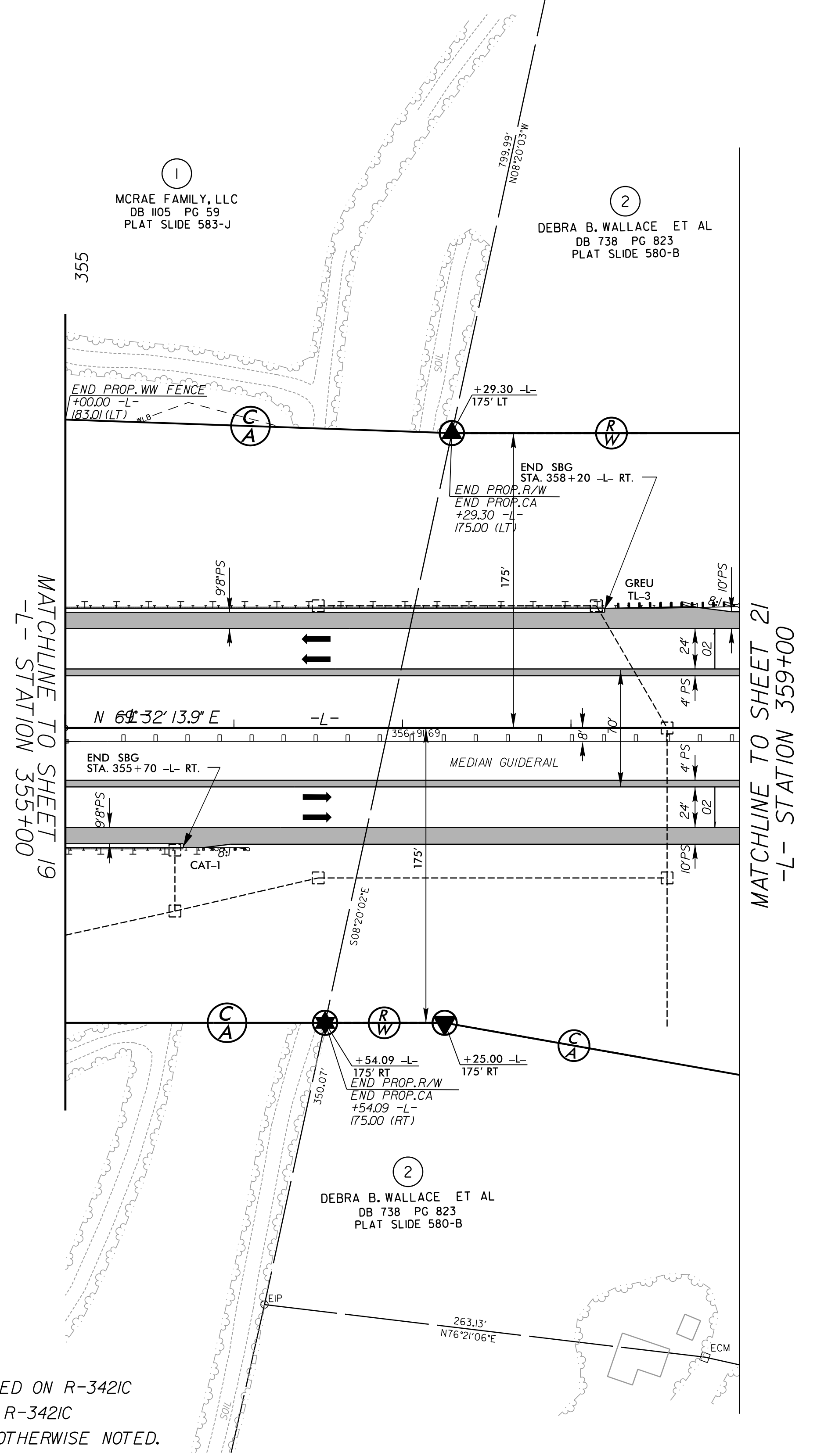


8/13/2019

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**CALYX**  
ENGINEERS + CONSULTANTS  
6750 TRYON ROAD  
CARY, NC 27518  
PHONE: 919.851.1912  
CALYXengineers.com  
NC License # F-1333

PROJECT REFERENCE NO. R-3421B	SHEET NO. 20
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 8/13/2019	HYDRAULICS ENGINEER
NOT A CERTIFIED DOCUMENT AS TO THE ORIGINAL DOCUMENT BUT ONLY AS TO THE REVISIONS. THIS DOCUMENT ORIGINALLY SIGNED AND SEALED BY: <i>Paul Atkinson</i> ON 3/6/13 THIS DOCUMENT IS ONLY CERTIFIED AS TO THE REVISIONS.	
DocuSigned by <i>Stephen C. Browde</i> ENGINEER NORTH CAROLINA SEAL 15759 STEPHEN C. BROWDE	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	



☐ DRAINAGE STRUCTURES AS PLACED ON R-3421C  
 --- DRAINAGE PIPES AS PLACED ON R-3421C  
 ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.  
 SEE SHEET NO. 41 FOR -L- PROFILE





PROJECT REFERENCE NO. <b>R-3421B</b>	SHEET NO. <b>21</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 8/13/2019	HYDRAULICS ENGINEER
NOT A CERTIFIED DOCUMENT AS TO THE ORIGINAL DOCUMENT BUT ONLY AS TO THE REVISIONS.	
THIS DOCUMENT ORIGINALLY SIGNED AND SEALED BY: <b>Paul Atkinson</b> ON <b>3/6/13</b> THIS DOCUMENT IS ONLY CERTIFIED AS TO THE REVISIONS.	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

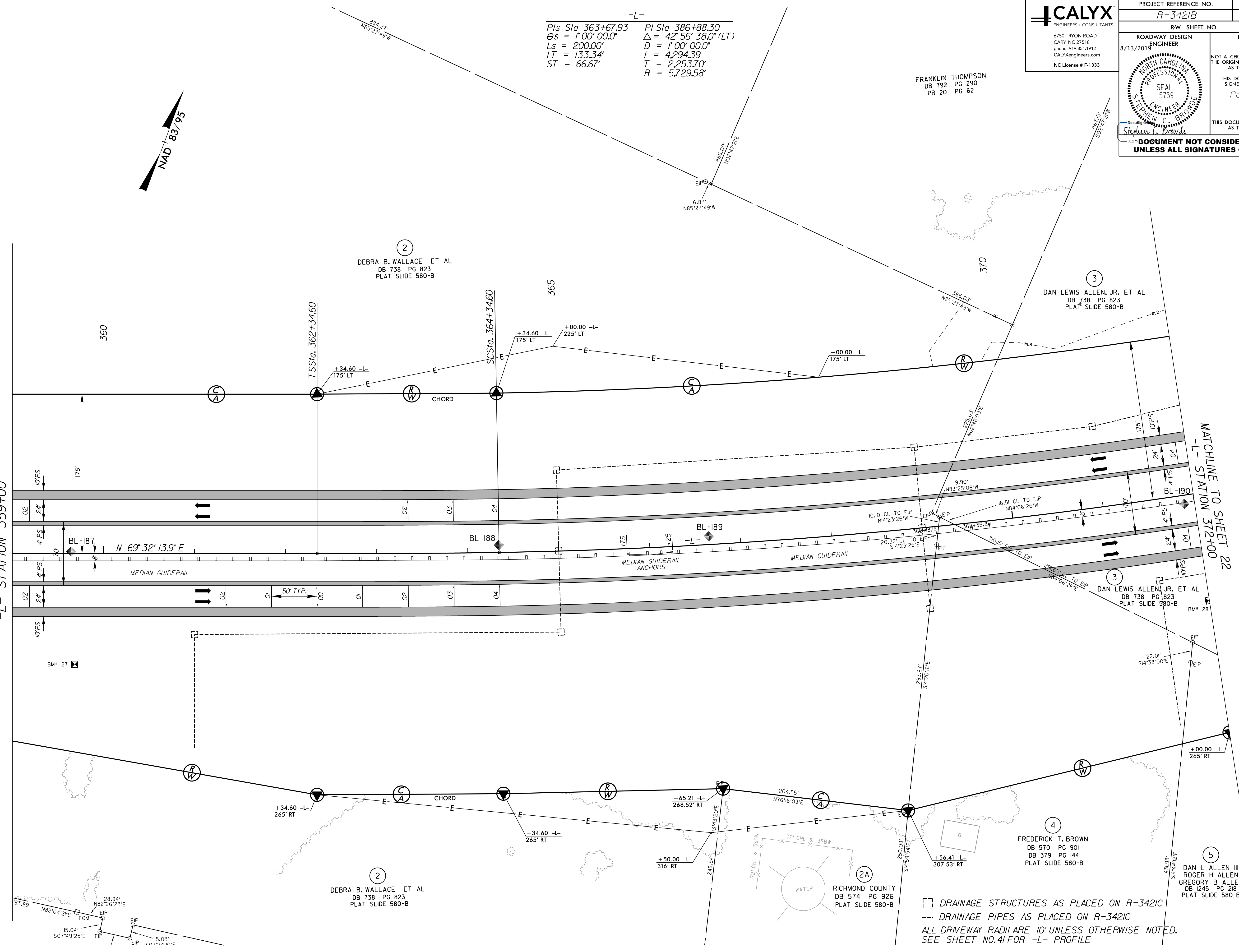
-L-

PIs Sta 363+67.93	PI Sta 386+88.30
$\Theta s = 1^{\circ}00'00.0''$	$\Delta = 42^{\circ}56'38.0''$ (LT)
$Ls = 200.00'$	$D = 1^{\circ}00'00.0''$
$LT = 133.34'$	$L = 4,294.39'$
$ST = 66.67'$	$T = 2,253.70'$
	$R = 5,729.58'$

FRANKLIN THOMPSON  
DB 792 PG 290  
PB 20 PG 62

MATCHLINE TO SHEET 20  
-L- STATION 359+00

MATCHLINE TO SHEET 22  
-L- STATION 372+00



BM\* 27

DEBRA B. WALLACE ET AL  
DB 738 PG 823  
PLAT SLIDE 580-B

FREDERICK T. BROWN  
DB 570 PG 901  
DB 379 PG 144  
PLAT SLIDE 580-B

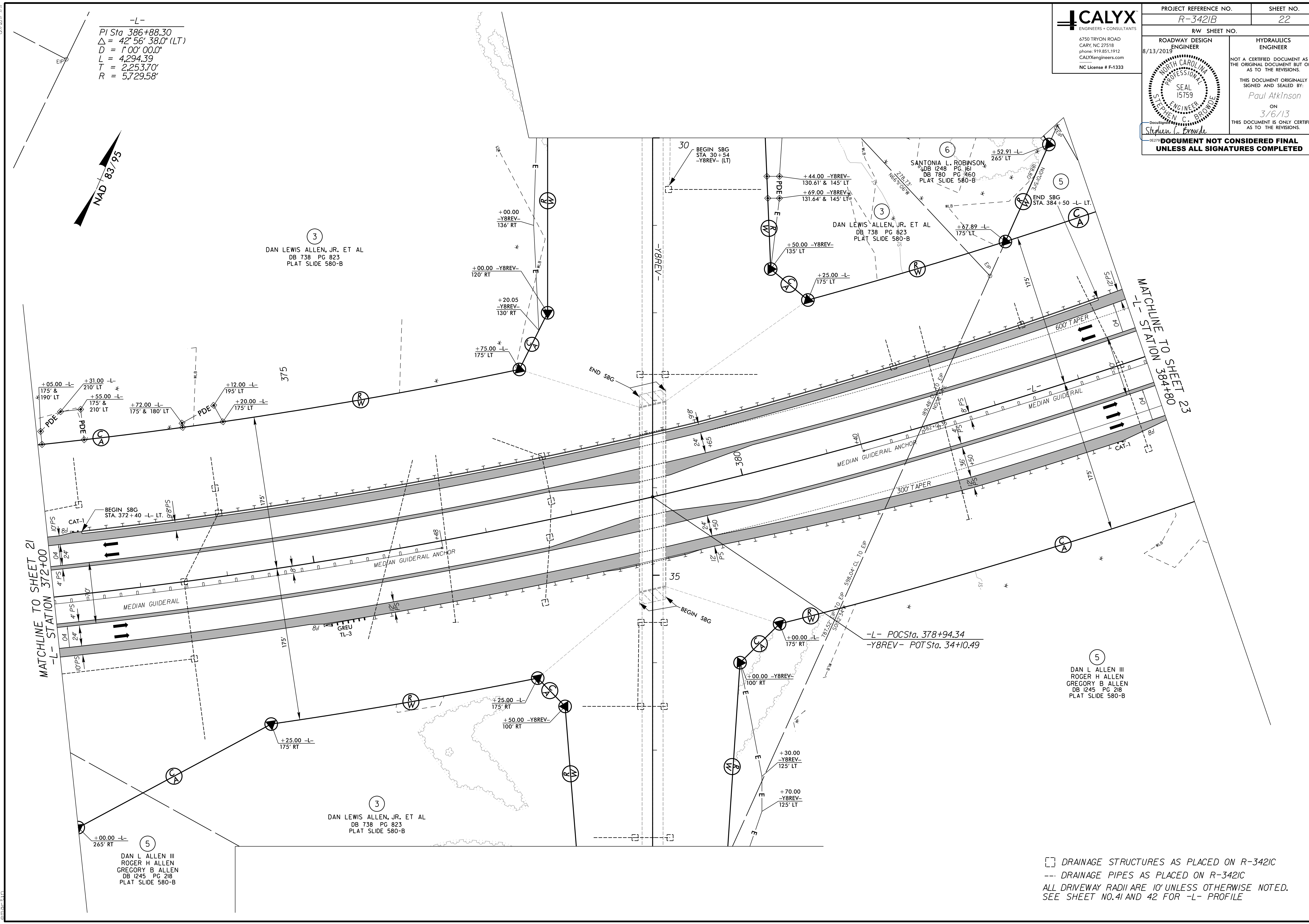
DAN L ALLEN III  
ROGER H ALLEN  
GREGORY B ALLEN  
DB 1245 PG 218  
PLAT SLIDE 580-B

DRAINAGE STRUCTURES AS PLACED ON R-3421C  
 DRAINAGE PIPES AS PLACED ON R-3421C  
 ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.  
 SEE SHEET NO. 41 FOR -L- PROFILE

8/13/2019  
 R:\Projects\2019\3421B\3421B\_r.dwg  
 psh21.dgn  
 psh21

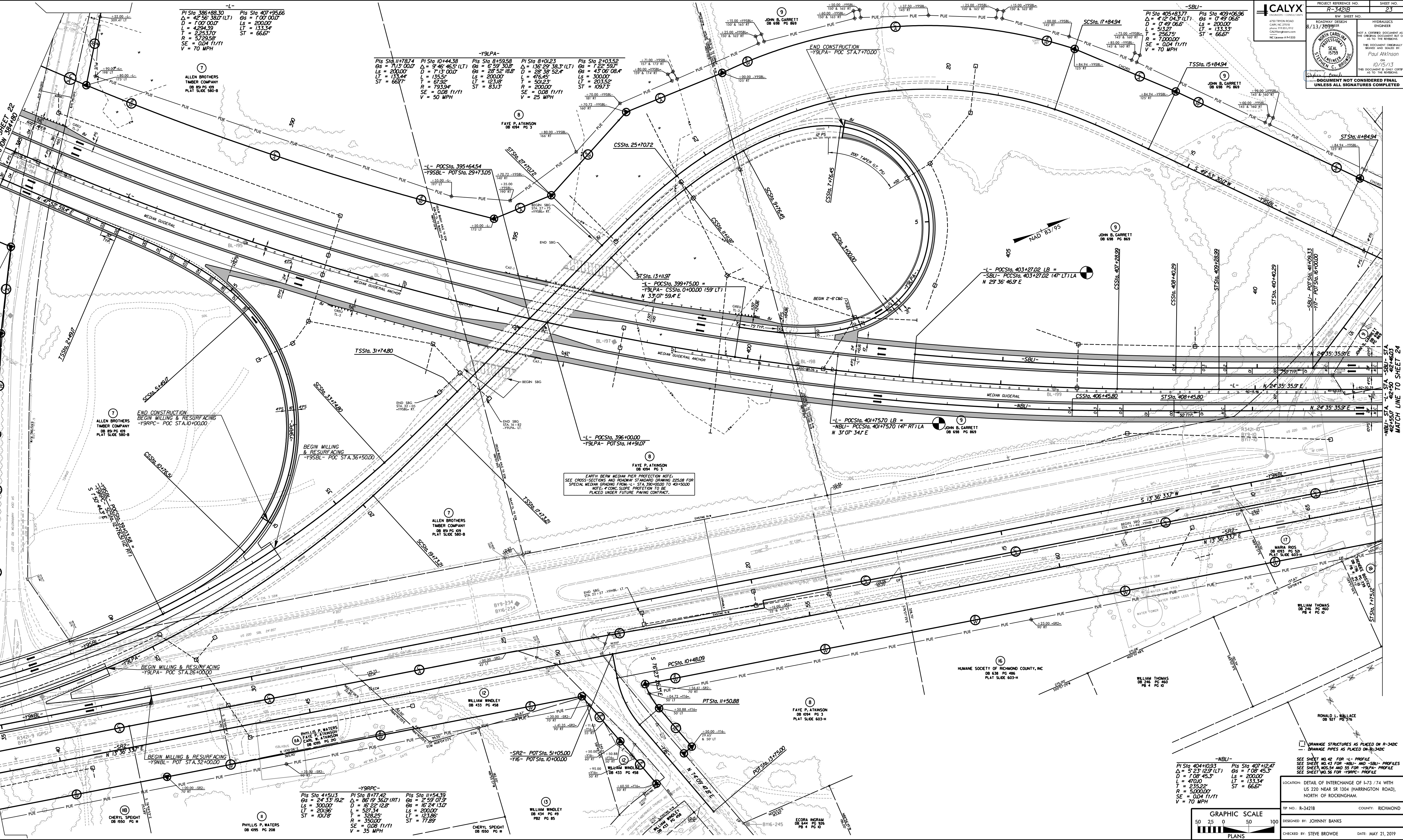
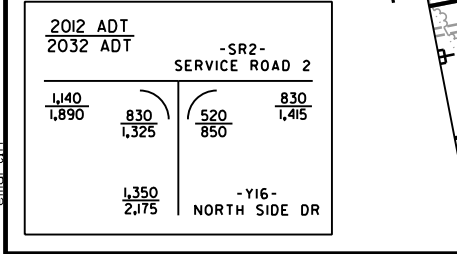
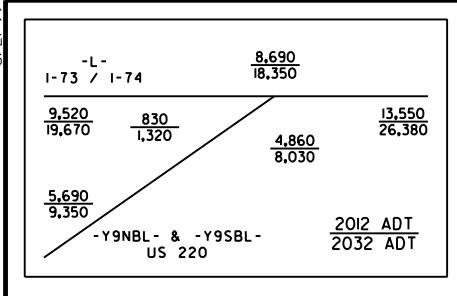


PROJECT REFERENCE NO. <i>R-3421B</i>		SHEET NO. <i>22</i>
RW SHEET NO.		
ROADWAY DESIGN ENGINEER 8/13/2015	HYDRAULICS ENGINEER	
NOT A CERTIFIED DOCUMENT AS TO THE ORIGINAL DOCUMENT BUT ONLY AS TO THE REVISIONS.		
THIS DOCUMENT ORIGINALLY SIGNED AND SEALED BY: <i>Paul Atkinson</i> ON <i>3/6/13</i> THIS DOCUMENT IS ONLY CERTIFIED AS TO THE REVISIONS.		
<p><i>Stephen C. Browde</i></p> <p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>		



B:\9\2015\Roadway\Proj\3421b\_rdu\_psh22.dgn





**CALYX**  
 PROJECT REFERENCE NO. R-34218  
 SHEET NO. 23  
 DATE: 05/13/2019  
 DRAWN BY: J. BANKS  
 CHECKED BY: S. BROWDE  
 PROJECT: DETAIL OF INTERCHANGE OF I-73/74 WITH US 220 NEAR SR 1304 (HARRINGTON ROAD), NORTH OF ROCKINGHAM

EARTH BERM MEDIAN PIER PROTECTION NOTE:  
 SEE CROSS-SECTIONS AND ROWWAY STANDARD DRAWING 2204B FOR SPECIAL MEDIAN GRADING FROM STA. 300+00.00 TO 40+500.00  
 NOTE: CONCRETE PROTECTION TO BE PLACED UNDER FUTURE PAVING CONTRACT.

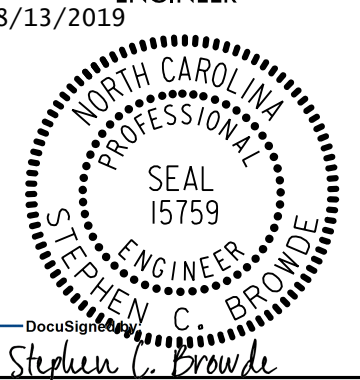
**GRAPHIC SCALE**  
 50 25 0 50 100  
 PLANS

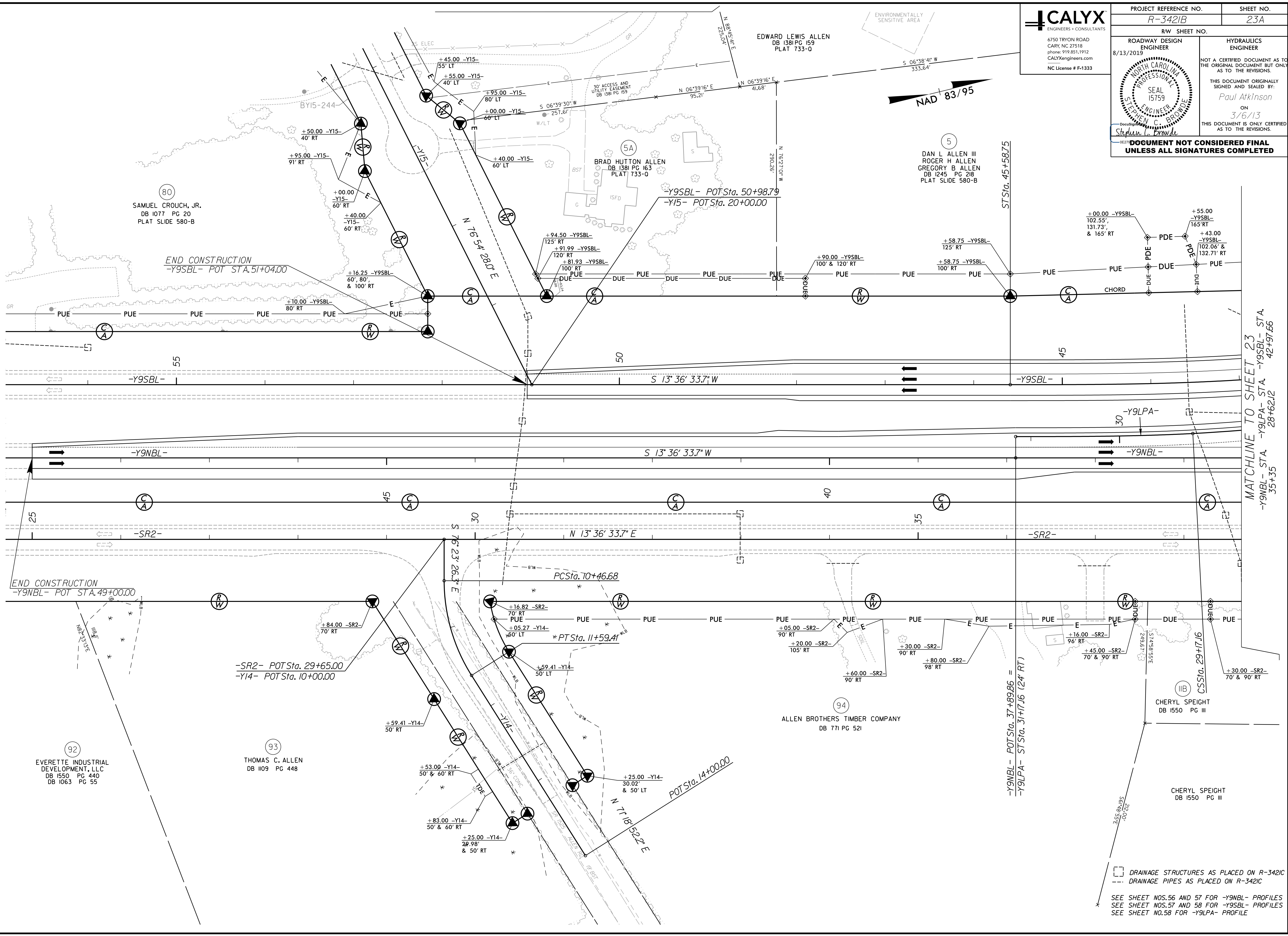
TP NO: R-34218 COUNTY: RICHMOND  
 DESIGNED BY: JOHNNY BANKS  
 CHECKED BY: STEVE BROWDE DATE: MAY 21, 2019



7/2/09

**CALYX**  
ENGINEERS + CONSULTANTS  
6750 TRYON ROAD  
CARY, NC 27518  
phone: 919.851.1912  
CALYXengineers.com  
NC License # F-1333

PROJECT REFERENCE NO. <b>R-3421B</b>	SHEET NO. <b>23A</b>
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER 8/13/2019	NOT A CERTIFIED DOCUMENT AS TO THE ORIGINAL DOCUMENT BUT ONLY AS TO THE REVISIONS. THIS DOCUMENT ORIGINALLY SIGNED AND SEALED BY: <i>Paul Atkinson</i> ON 3/6/13 THIS DOCUMENT IS ONLY CERTIFIED AS TO THE REVISIONS.
	
<p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>	



END CONSTRUCTION  
-Y9SBL- POT STA. 51+04.00

END CONSTRUCTION  
-Y9NBL- POT STA. 49+00.00

-SR2- POT Sta. 29+65.00  
-Y14- POT Sta. 10+00.00

POT Sta. 14+00.00

-Y9NBL- POT Sta. 37+89.86 =  
-Y9LPA- ST Sta. 31+17.16 (24' RT)

MATCHLINE TO SHEET 23  
-Y9NBL- STA. 35+35  
-Y9LPA- STA. 28+62.12  
-Y9SBL- STA. 42+97.66

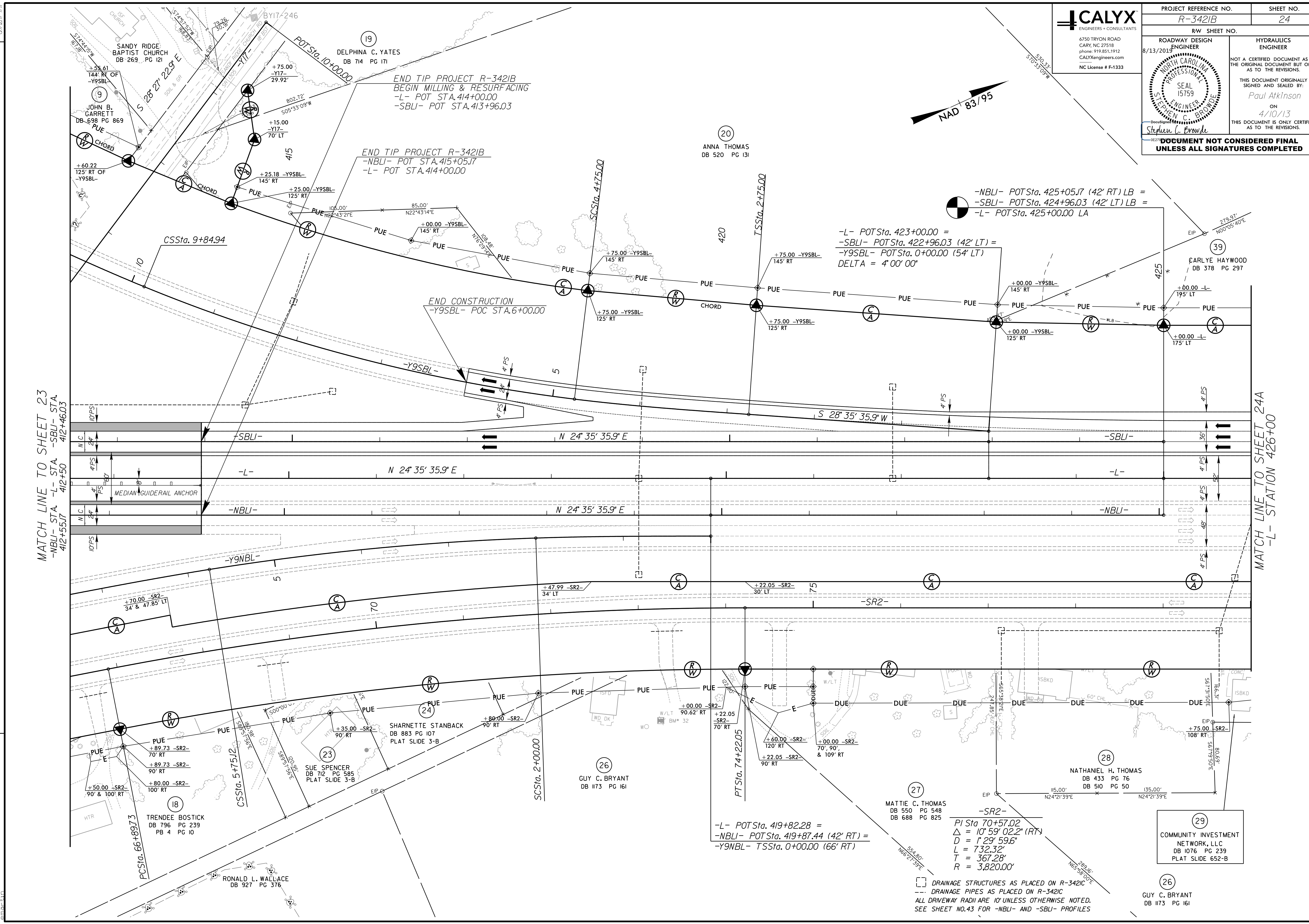
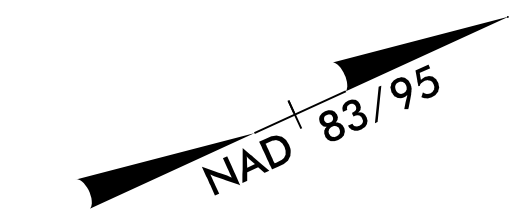
□ DRAINAGE STRUCTURES AS PLACED ON R-3421C  
--- DRAINAGE PIPES AS PLACED ON R-3421C  
SEE SHEET NOS. 56 AND 57 FOR -Y9NBL- PROFILES  
SEE SHEET NOS. 57 AND 58 FOR -Y9SBL- PROFILES  
SEE SHEET NO. 58 FOR -Y9LPA- PROFILE

R:\Projects\2019\Projects\3421b\_rdw\psh23a.dgn  
7/2/09  
S:\Projects\2019\Projects\3421b\_rdw\psh23a.dgn





PROJECT REFERENCE NO. R-3421B		SHEET NO. 24	
RW SHEET NO. 8/13/2013		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		NOT A CERTIFIED DOCUMENT AS TO THE ORIGINAL DOCUMENT BUT ONLY AS TO THE REVISIONS.	
SEAL 15759		THIS DOCUMENT ORIGINALLY SIGNED AND SEALED BY: Paul Atkinson ON 4/10/13	
STEPHEN C. BROWDE		THIS DOCUMENT IS ONLY CERTIFIED AS TO THE REVISIONS.	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			



MATCH LINE TO SHEET 23  
-NBLI- STA. -L- STA. -SBLI- STA.  
412+55.17 412+50 412+46.03

MATCH LINE TO SHEET 24A  
-L- STATION 426+00

-NBLI- POT Sta. 425+05.17 (42' RT) LB =  
-SBLI- POT Sta. 424+96.03 (42' LT) LB =  
-L- POT Sta. 425+00.00 LA

-L- POT Sta. 423+00.00 =  
-SBLI- POT Sta. 422+96.03 (42' LT) =  
-Y9SBL- POT Sta. 0+00.00 (54' LT)  
DELTA = 4' 00" 00"

-L- POT Sta. 419+82.28 =  
-NBLI- POT Sta. 419+87.44 (42' RT) =  
-Y9NBL- TSSSta. 0+00.00 (66' RT)

PI Sta 70+57.02  
Δ = 10° 59' 02.2" (RT)  
D = 1' 29' 59.6"  
L = 732.32'  
T = 367.28'  
R = 3,820.00'

☐ DRAINAGE STRUCTURES AS PLACED ON R-3421C  
--- DRAINAGE PIPES AS PLACED ON R-3421C  
--- ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.  
SEE SHEET NO.43 FOR -NBLI- AND -SBLI- PROFILES

REVISIONS

R:\9\2013\RA\Carroll\Proj\3421b\_rdu\_psh24.dgn  
enat10

29  
COMMUNITY INVESTMENT NETWORK, LLC  
DB 1076 PG 239  
PLAT SLIDE 652-B

26  
GUY C. BRYANT  
DB 1173 PG 161

28  
NATHANIEL H. THOMAS  
DB 433 PG 76  
DB 510 PG 50

27  
MATTIE C. THOMAS  
DB 550 PG 548  
DB 688 PG 825

26  
GUY C. BRYANT  
DB 1173 PG 161

24  
SHARNETTE STANBACK  
DB 883 PG 107  
PLAT SLIDE 3-B

23  
SUE SPENCER  
DB 712 PG 585  
PLAT SLIDE 3-B

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

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TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

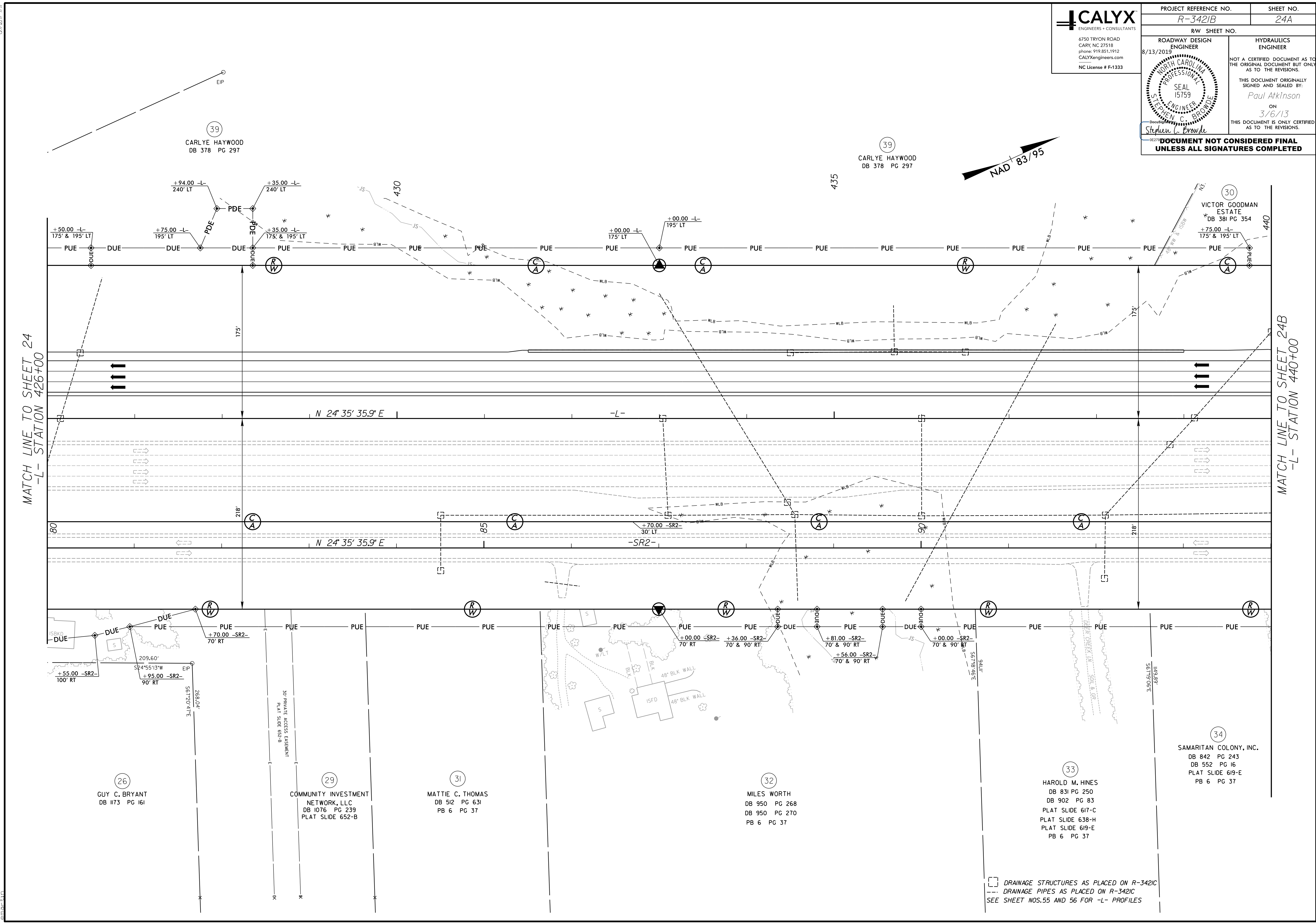
18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10

18  
TRENDÉE BOSTICK  
DB 796 PG 239  
PB 4 PG 10



PROJECT REFERENCE NO. <b>R-3421B</b>	SHEET NO. <b>24A</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 8/13/2019	HYDRAULICS ENGINEER
<p>NOT A CERTIFIED DOCUMENT AS TO THE ORIGINAL DOCUMENT BUT ONLY AS TO THE REVISIONS.</p> <p>THIS DOCUMENT ORIGINALLY SIGNED AND SEALED BY: <i>Paul Atkinson</i> ON 3/6/13 THIS DOCUMENT IS ONLY CERTIFIED AS TO THE REVISIONS.</p>	
<p>Documented by: <i>Stephen C. Browde</i></p> <p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>	



8/13/2019  
 R:\Projects\2019\Projects\3421b\_rdw\_psh24a.dgn  
 enb110

(26) GUY C. BRYANT  
DB 1173 PG 161

(29) COMMUNITY INVESTMENT NETWORK, LLC  
DB 1076 PG 239  
PLAT SLIDE 652-B

(31) MATTIE C. THOMAS  
DB 512 PG 631  
PB 6 PG 37

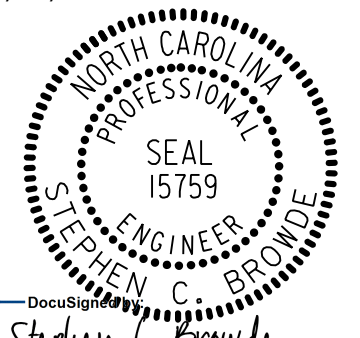
(32) MILES WORTH  
DB 950 PG 268  
DB 950 PG 270  
PB 6 PG 37

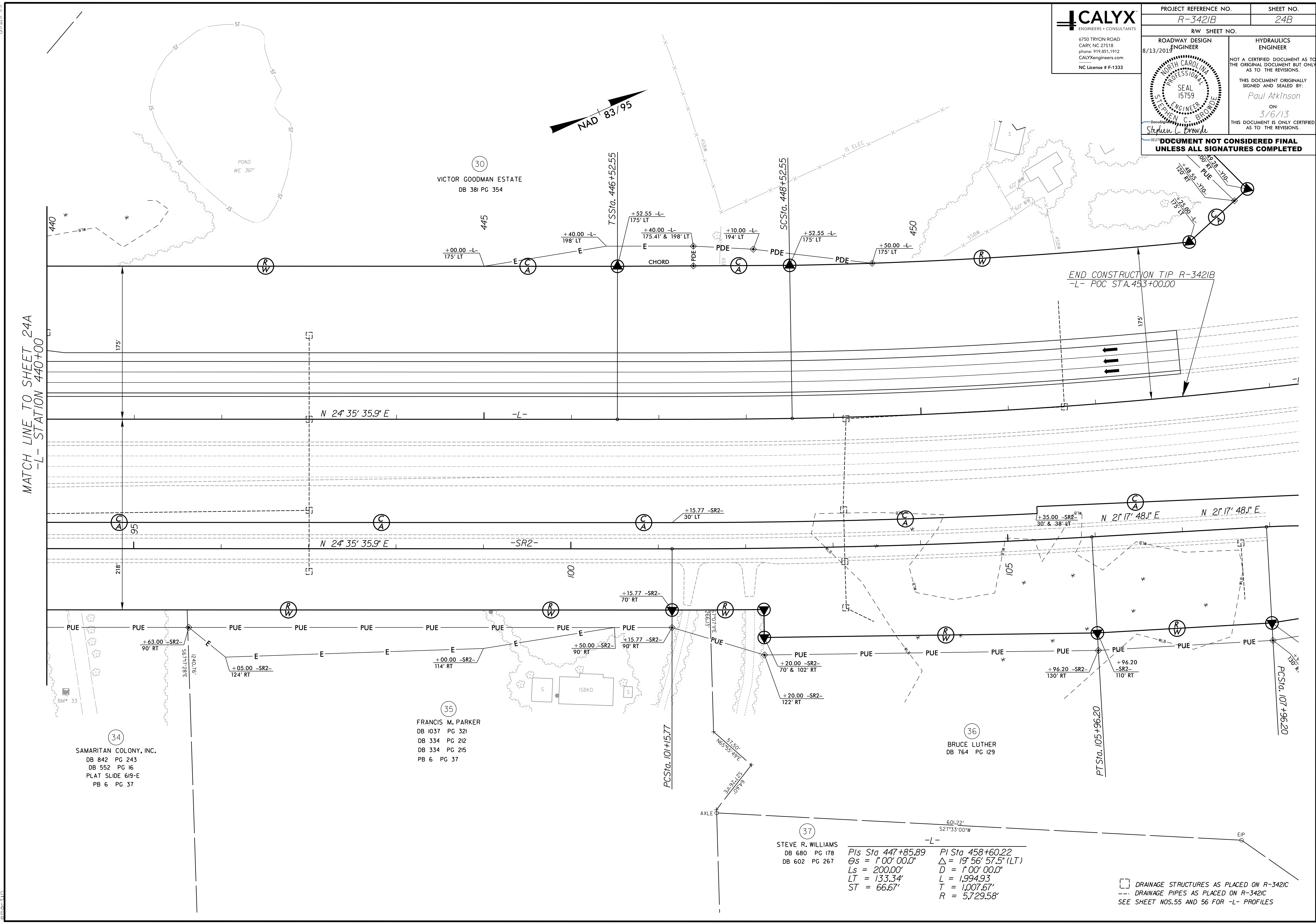
(33) HAROLD M. HINES  
DB 831 PG 250  
DB 902 PG 83  
PLAT SLIDE 617-C  
PLAT SLIDE 638-H  
PLAT SLIDE 619-E  
PB 6 PG 37

(34) SAMARITAN COLONY, INC.  
DB 842 PG 243  
DB 552 PG 16  
PLAT SLIDE 619-E  
PB 6 PG 37

[ ] DRAINAGE STRUCTURES AS PLACED ON R-3421C  
 --- DRAINAGE PIPES AS PLACED ON R-3421C  
 SEE SHEET NOS. 55 AND 56 FOR -L- PROFILES



PROJECT REFERENCE NO. <b>R-3421B</b>	SHEET NO. <b>24B</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 8/13/2019	HYDRAULICS ENGINEER
NOT A CERTIFIED DOCUMENT AS TO THE ORIGINAL DOCUMENT BUT ONLY AS TO THE REVISIONS.	
THIS DOCUMENT ORIGINALLY SIGNED AND SEALED BY: <b>Paul Atkinson</b> ON <b>3/6/13</b> THIS DOCUMENT IS ONLY CERTIFIED AS TO THE REVISIONS.	
	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

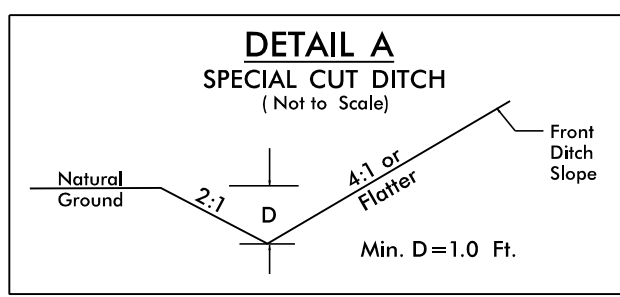


**PC Sta. 447+85.89**  
 $\Delta s = 1'00''00.0''$   
 $Ls = 200.00'$   
 $LT = 133.34'$   
 $ST = 66.67'$

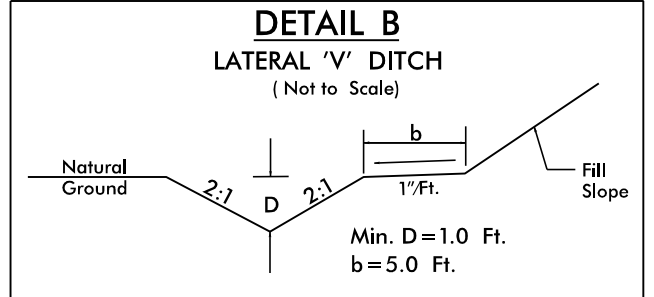
**PI Sta. 458+60.22**  
 $\Delta = 19'56''57.5''(LT)$   
 $D = 1'00''00.0''$   
 $T = 1,994.93'$   
 $R = 5,729.58'$

8/13/2019  
 R:\Projects\2019\Projects\R-3421B\rdw\psh24B.dgn  
 enat110





FROM STA. TO STA.  
STA. 16+50 to 18+00 -Y3- (LT)

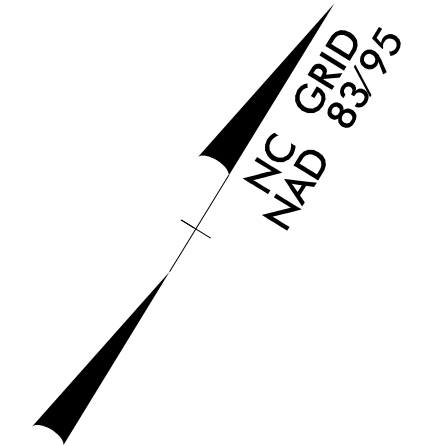


FROM STA. TO STA.  
STA. 16+84.60 to 19+00 -Y3- (RT) 110 CY DDE

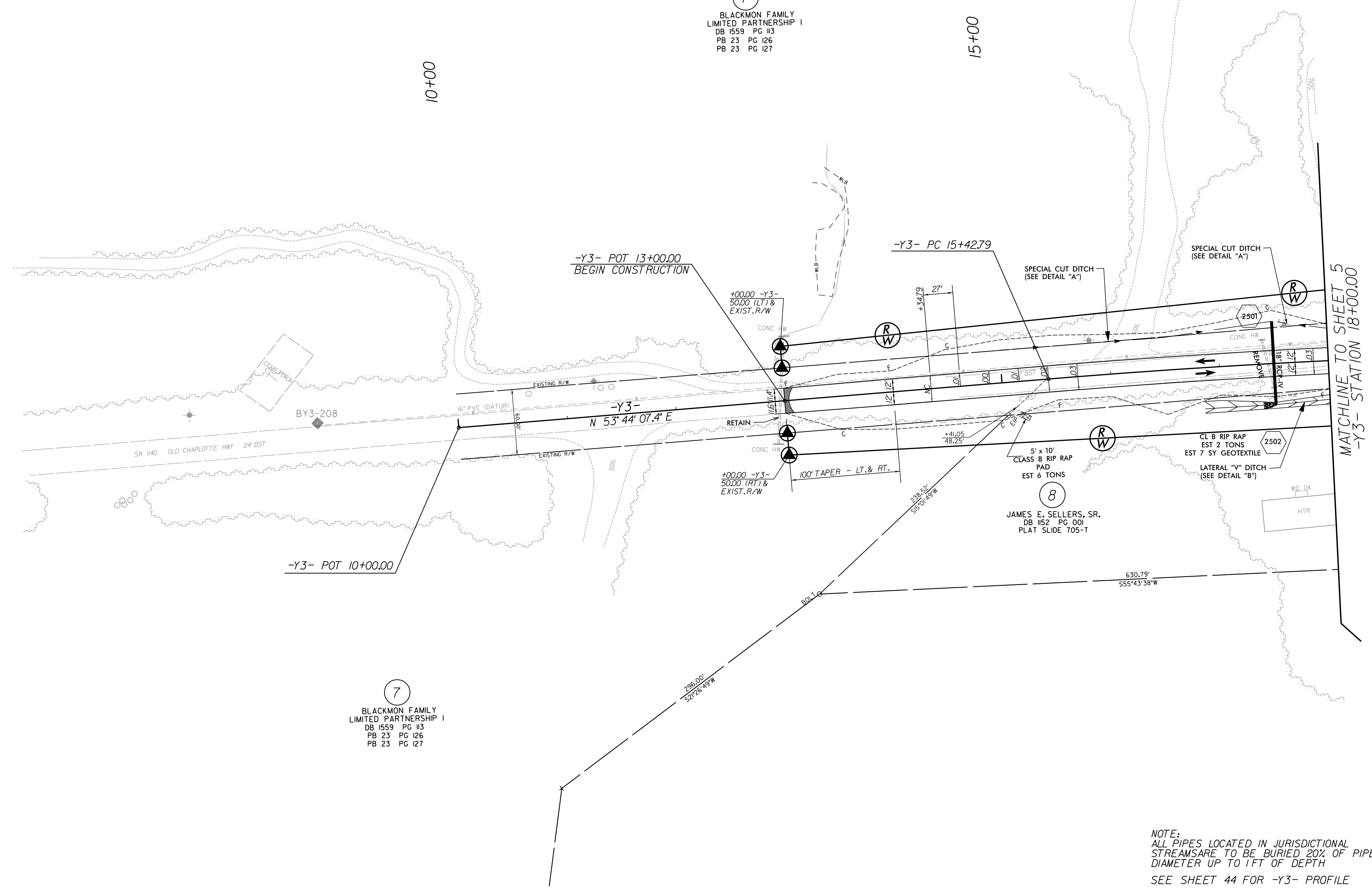
**CALYX**  
ENGINEERS + CONSULTANTS  
6750 TRYON ROAD  
CARY, NC 27518  
phone: 919.851.1912  
CALYXengineers.com  
NC License # F-1333

PROJECT REFERENCE NO. <i>R-3421B</i>		SHEET NO. 25
RW SHEET NO.		
ROADWAY DESIGN ENGINEER 8/13/2019	HYDRAULICS ENGINEER 8/12/2019	
DocuSigned by: <i>Stephen C. Broadie</i>	DocuSigned by: <i>Joseph W. Danneloo</i>	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>		

-Y3-  
PI Sta 21+23.43  
 $\Delta = 8'41'34.9''$  (RT)  
 $D = 0'45'00.0''$   
 $L = 1,159.07$   
 $T = 580.65$   
 $R = 7,639.44$   
 $Se = 0.03$   
Runoff = 81.00'  
D.S. = 60 mph



7  
BLACKMON FAMILY  
LIMITED PARTNERSHIP I  
DB 1559 PG 113  
PB 23 PG 126  
PB 23 PG 127



7  
BLACKMON FAMILY  
LIMITED PARTNERSHIP I  
DB 1559 PG 113  
PB 23 PG 126  
PB 23 PG 127

NOTE:  
ALL PIPES LOCATED IN JURISDICTIONAL  
STREAMS ARE TO BE BURIED 20% OF PIPE  
DIAMETER UP TO 1FT OF DEPTH  
SEE SHEET 44 FOR -Y3- PROFILE

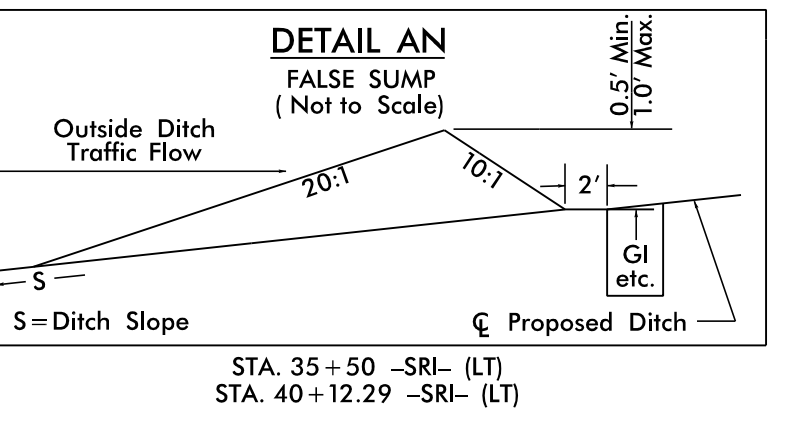
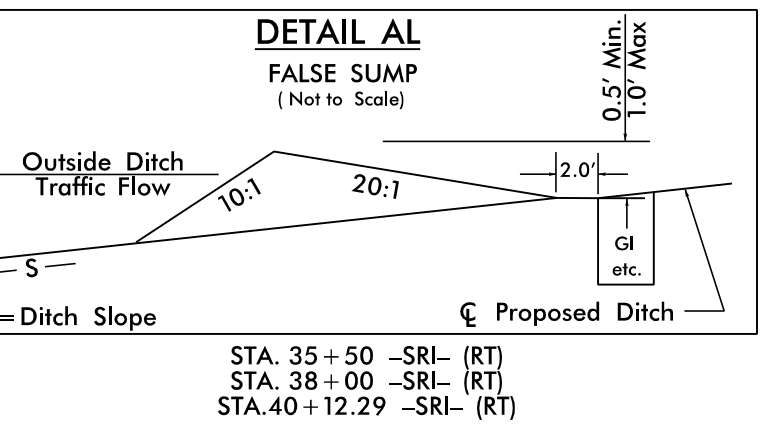
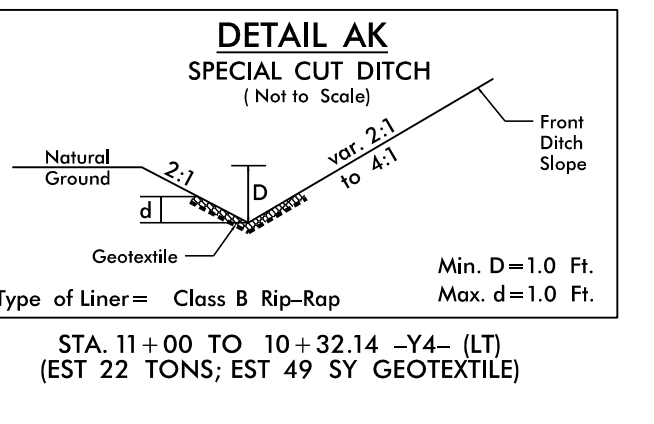
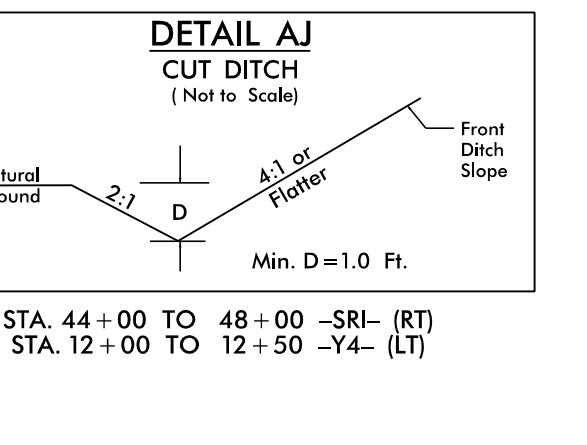
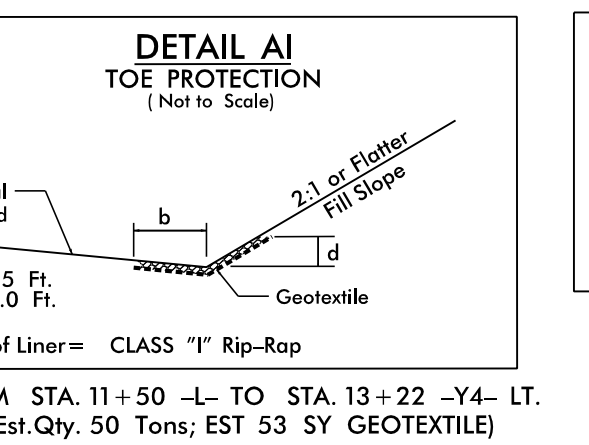
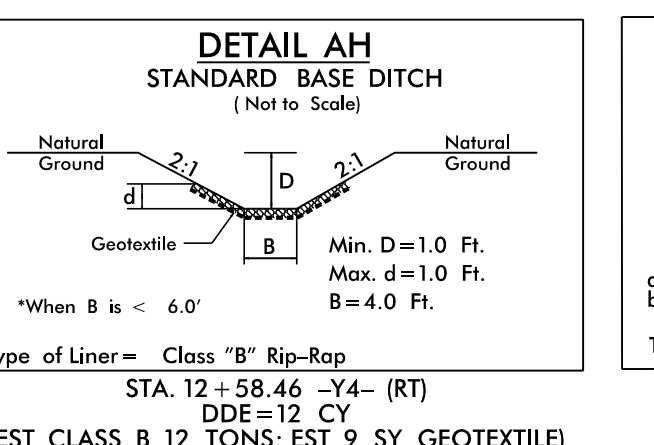
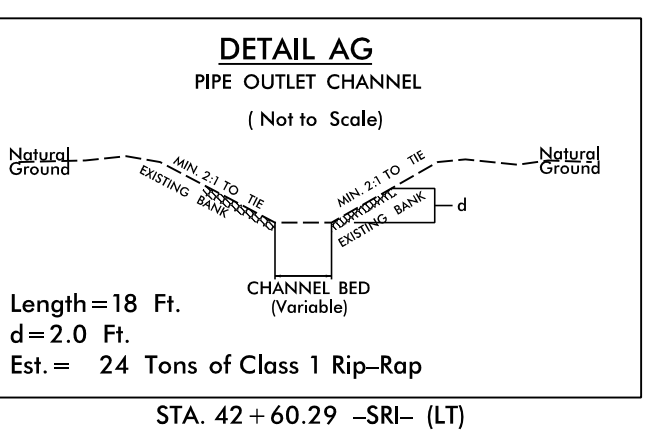
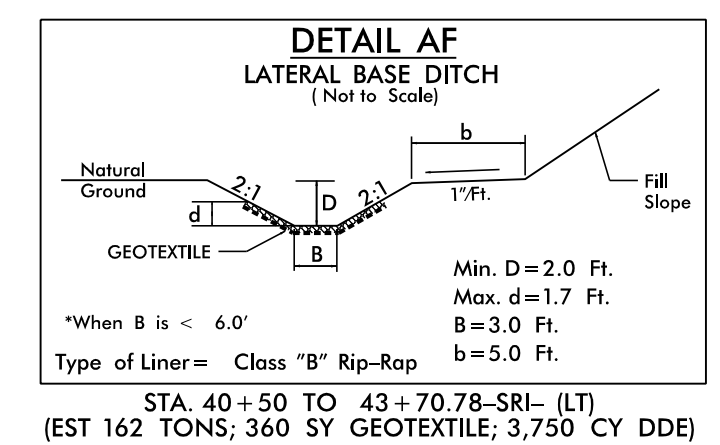
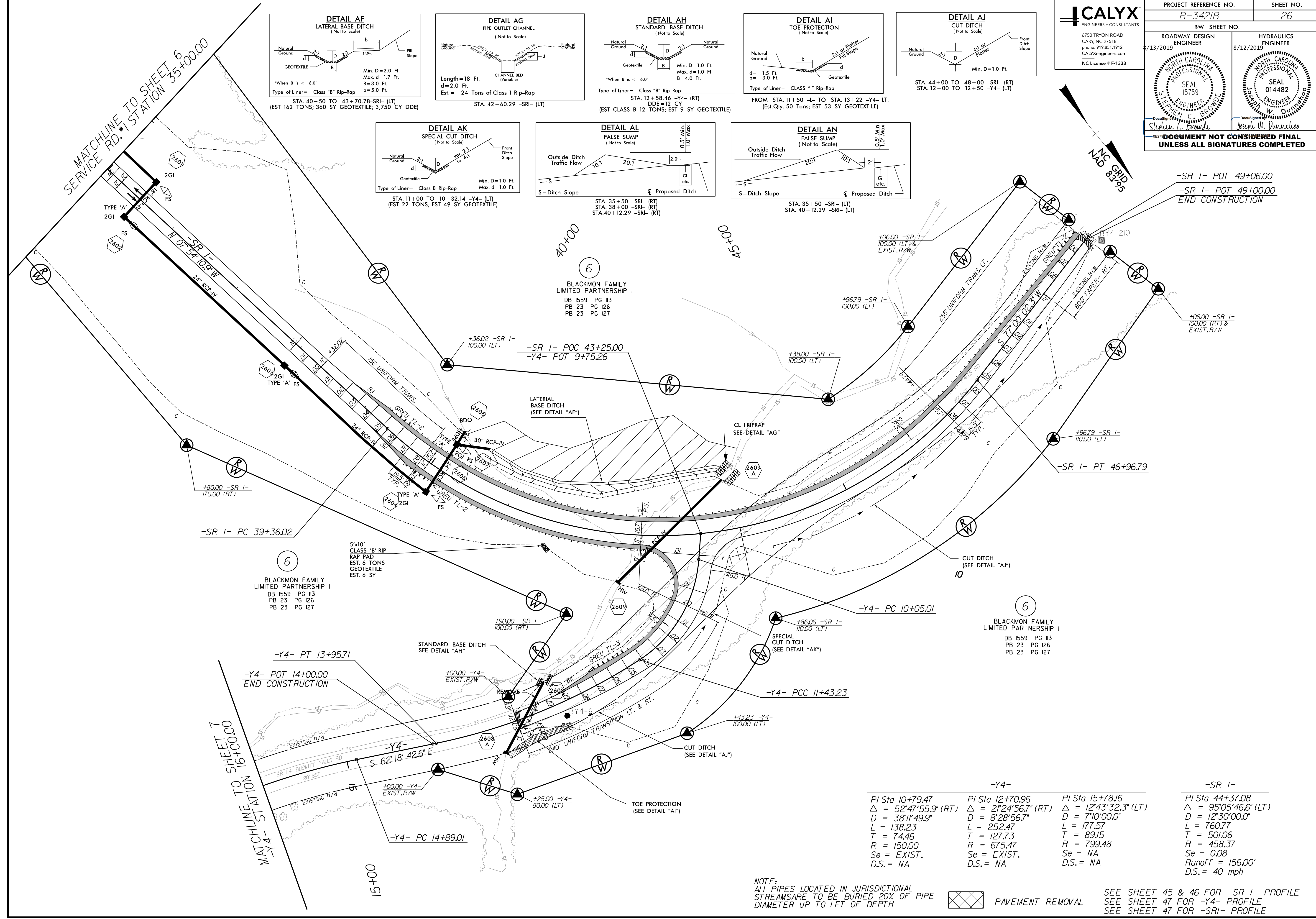


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CARY, NC 27518  
phone: 919.851.1912  
CALYXengineers.com  
NC License # F-1333

PROJECT REFERENCE NO. R-3421B	SHEET NO. 26
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 8/13/2019	HYDRAULICS ENGINEER 8/12/2019
SEAL 15759	SEAL 014482

DocuSigned By:  
Stephen C. Brundie  
Joseph W. Danneloo

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**



-Y4-	-SR I-
PI Sta 10+79.47 Δ = 52°47'55.9" (RT) D = 38"11'49.9" L = 138.23 T = 74.46 R = 150.00 Se = EXIST. D.S. = NA	PI Sta 12+70.96 Δ = 21°24'56.7" (RT) D = 8"28'56.7" L = 252.47 T = 127.73 R = 675.47 Se = EXIST. D.S. = NA
PI Sta 13+95.71 Δ = 124°33'32.3" (LT) D = 7"10'00.0" L = 177.57 T = 89.15 R = 799.48 Se = NA D.S. = NA	PI Sta 15+78.16 Δ = 95°05'46.6" (LT) D = 12"30'00.0" L = 760.77 T = 501.06 R = 458.37 Se = 0.08 Runoff = 156.00' D.S. = 40 mph
PI Sta 14+89.01 Δ = 12°30'00.0" L = 760.77 T = 501.06 R = 458.37 Se = 0.08 Runoff = 156.00' D.S. = 40 mph	PI Sta 44+37.08 Δ = 95°05'46.6" (LT) D = 12"30'00.0" L = 760.77 T = 501.06 R = 458.37 Se = 0.08 Runoff = 156.00' D.S. = 40 mph

NOTE:  
ALL PIPES LOCATED IN JURISDICTIONAL  
STREAMS ARE TO BE BURIED 20% OF PIPE  
DIAMETER UP TO 1 FT OF DEPTH

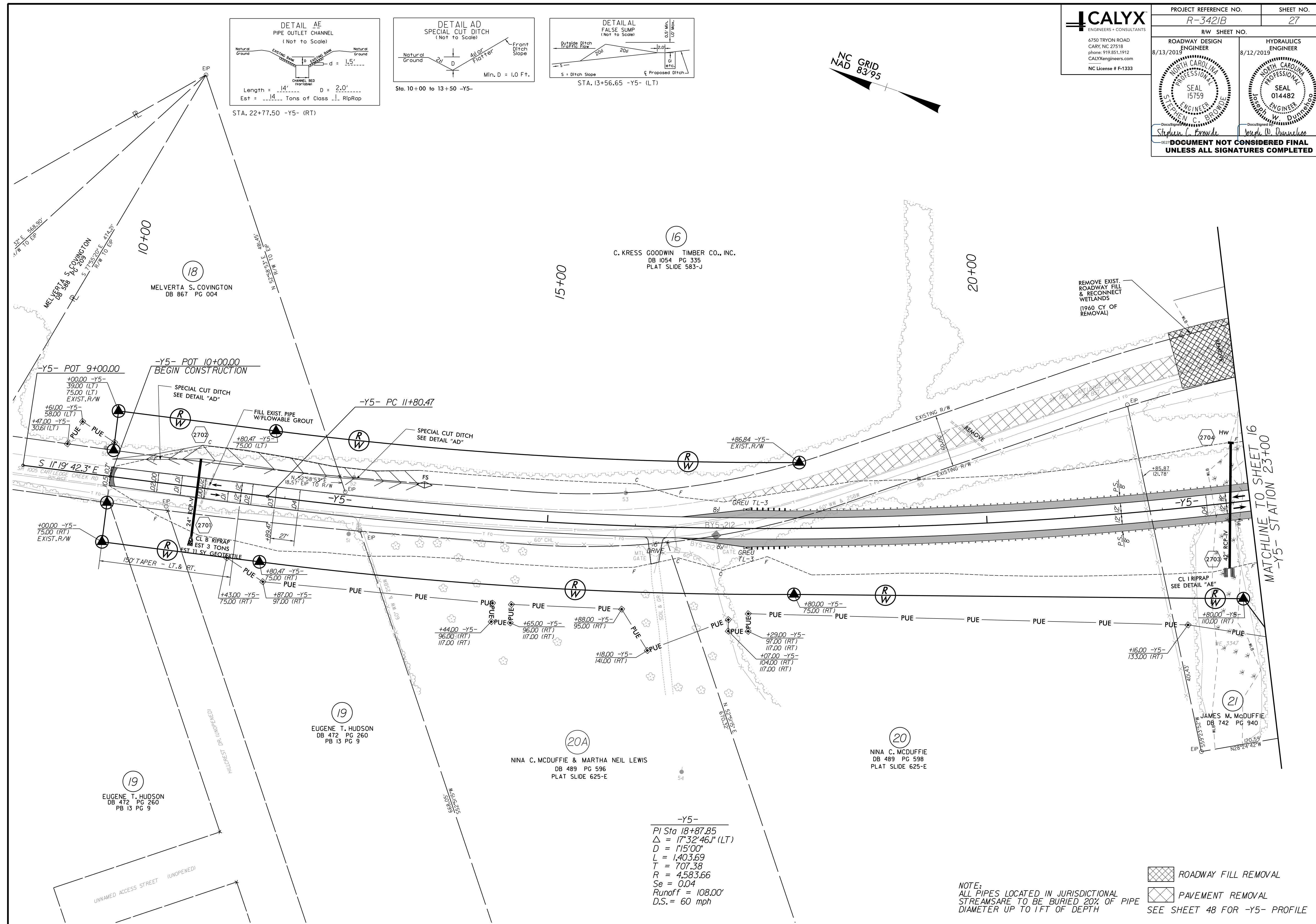
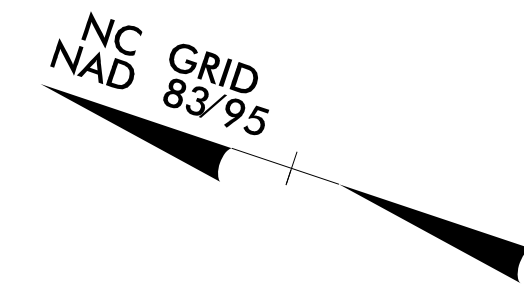
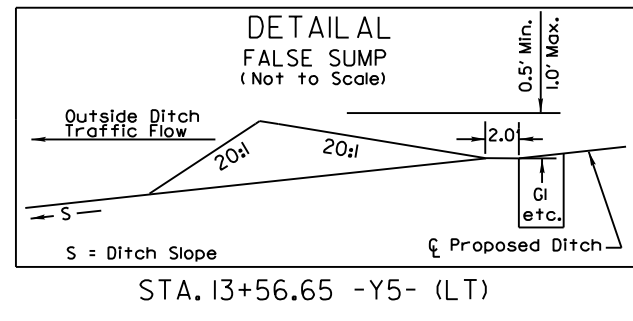
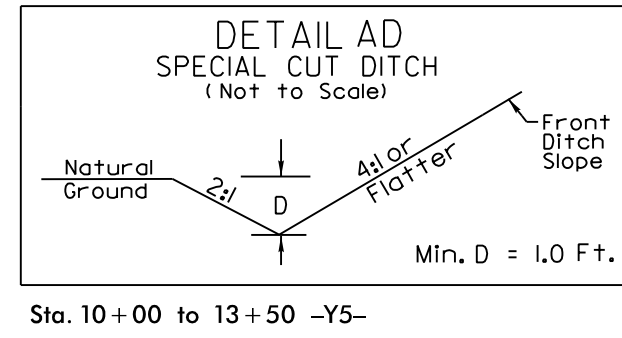
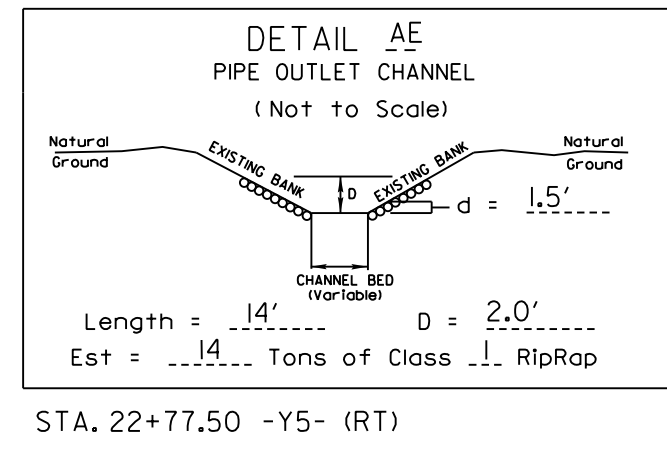


SEE SHEET 45 & 46 FOR -SR I- PROFILE  
SEE SHEET 47 FOR -Y4- PROFILE  
SEE SHEET 47 FOR -SR I- PROFILE





PROJECT REFERENCE NO. <b>R-3421B</b>		SHEET NO. <b>27</b>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER 8/13/2019		HYDRAULICS ENGINEER 8/12/2019	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			



REMOVE EXIST. ROADWAY FILL & RECONNECT WETLANDS (1960 CY OF REMOVAL)

MATCHLINE TO SHEET 16 -Y5- STATION 23+00

-Y5-  
PI Sta 18+87.85  
Δ = 17°32'46.1" (LT)  
D = 1'5"00"  
L = 1403.69  
T = 707.38  
R = 4583.66  
Se = 0.04  
Runoff = 108.00'  
D.S. = 60 mph

ROADWAY FILL REMOVAL  
 PAVEMENT REMOVAL  
SEE SHEET 48 FOR -Y5- PROFILE

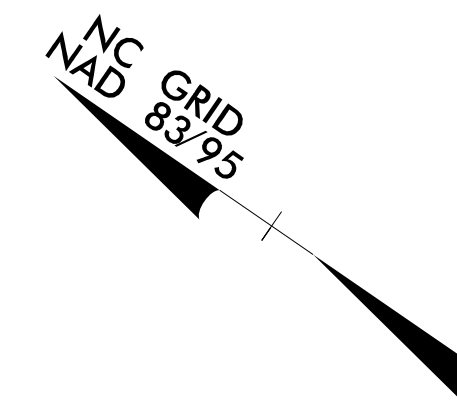
NOTE:  
ALL PIPES LOCATED IN JURISDICTIONAL STREAMS ARE TO BE BURIED 20% OF PIPE DIAMETER UP TO 1 FT OF DEPTH

8/9/2019 R:\Roadway\Proj\3421b\_rdy\_psh27.dgn emar:bn

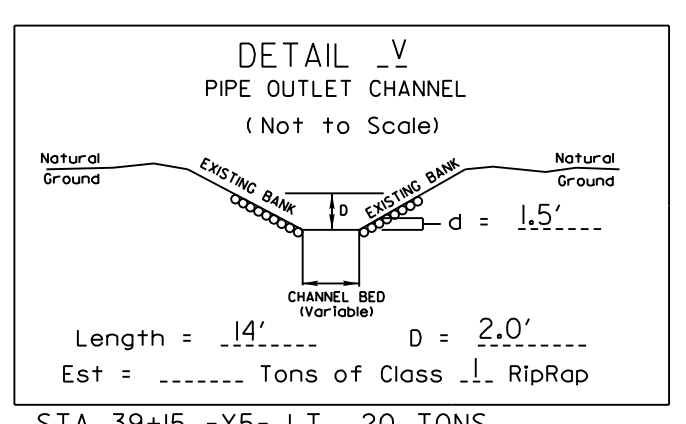
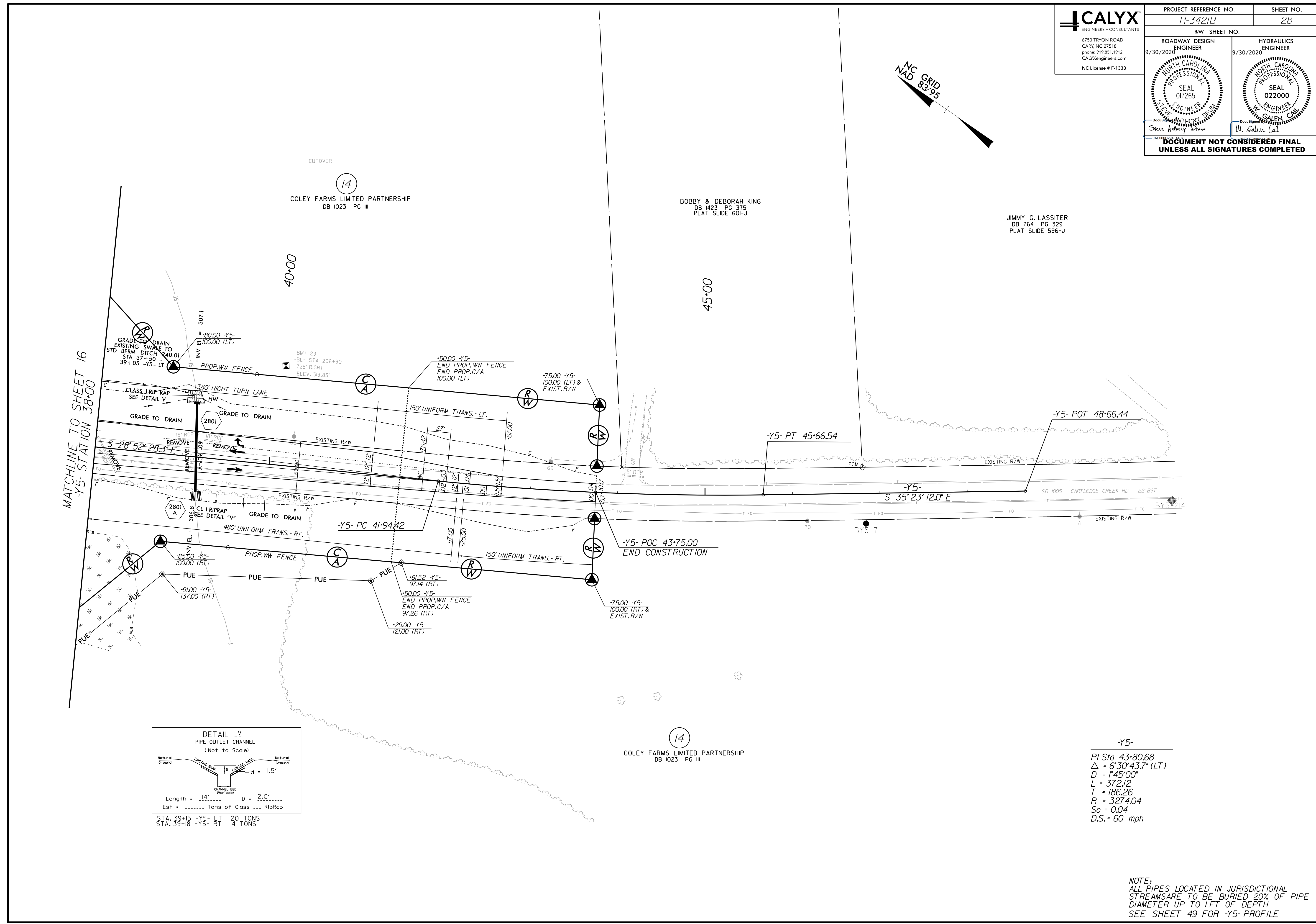


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ENGINEERS + CONSULTANTS  
6750 TRYON ROAD  
CARY, NC 27518  
phone: 919.851.1912  
CALYXengineers.com  
NC License # F-1333

PROJECT REFERENCE NO. <i>R-3421B</i>		SHEET NO. <i>28</i>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER 9/30/2020		HYDRAULICS ENGINEER 9/30/2020	
DocuSign Steve Anthony Abram		DocuSign W. Galen Cal	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			



CONSTRUCTION REVISION #2 - 9/29/2020 - ADDED GRADE TO DRAIN AT DRAINAGE STRUCTURE 2801.



-Y5-  
PI Sta 43+80.68  
 $\Delta = 6'30''43.7''$  (LT)  
D = 1'45'00"  
L = 372.12  
T = 186.26  
R = 3274.04  
Se = 0.04  
D.S. = 60 mph

NOTE:  
ALL PIPES LOCATED IN JURISDICTIONAL  
STREAMS ARE TO BE BURIED 20% OF PIPE  
DIAMETER UP TO 1 FT OF DEPTH  
SEE SHEET 49 FOR -Y5- PROFILE

9/29/2020  
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Abby Vogt

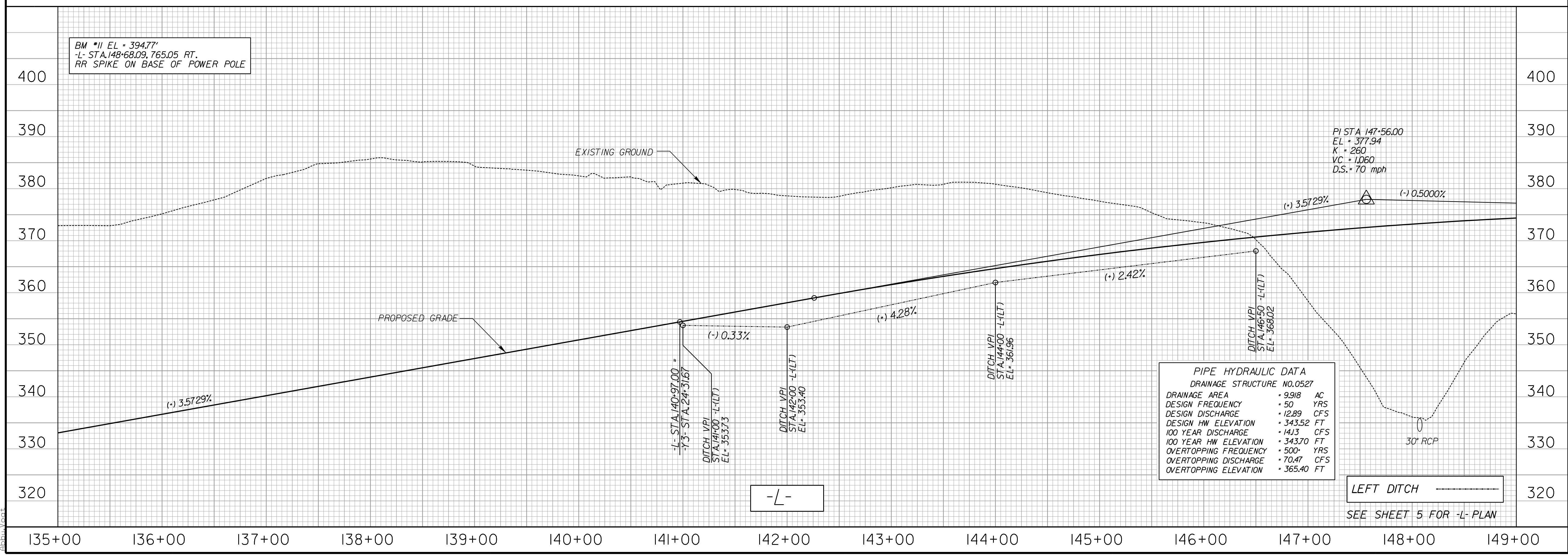
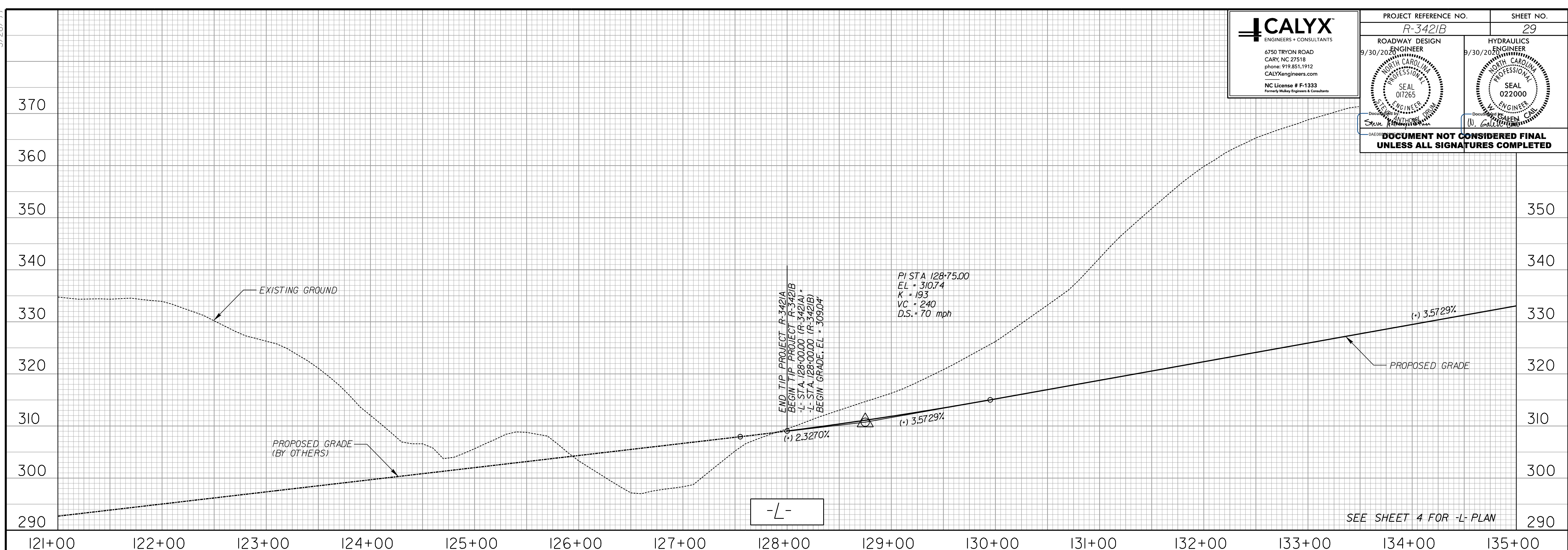


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PROJECT REFERENCE NO. <b>R-3421B</b>	SHEET NO. <b>29</b>
ROADWAY DESIGN 9/30/20 ENGINEER SEAL 017265	HYDRAULICS 9/30/20 ENGINEER SEAL 022000

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5/28/2020  
10:06:04 AM  
pfl

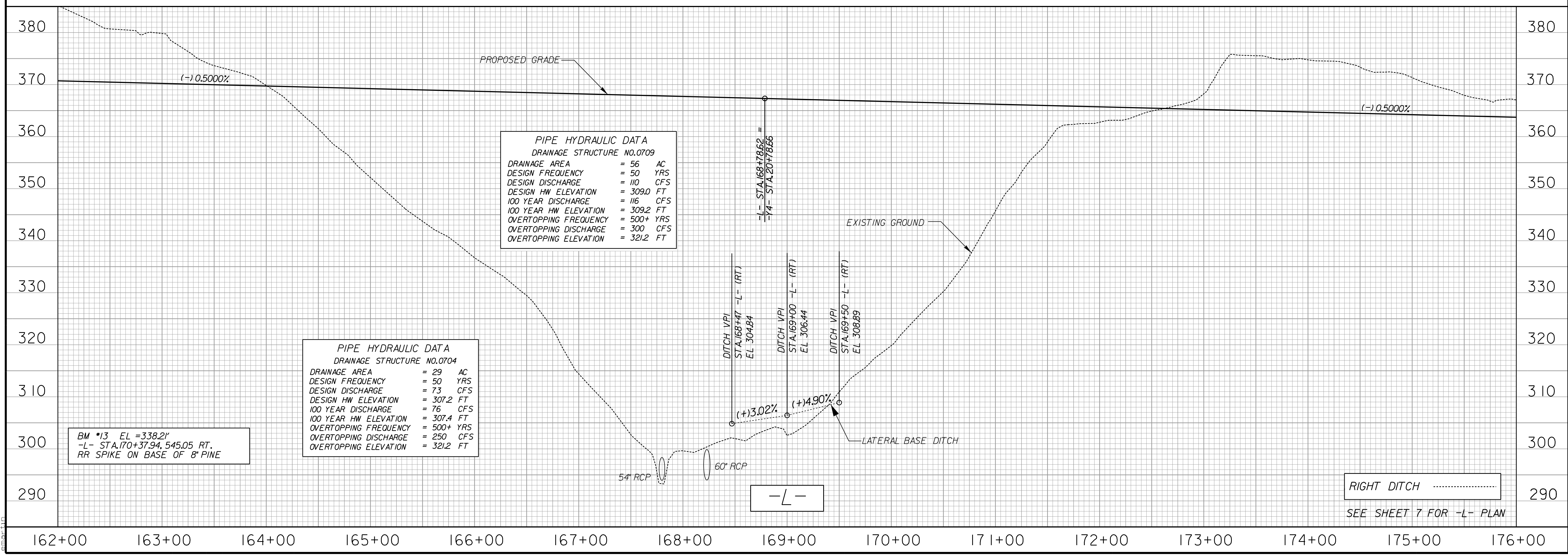
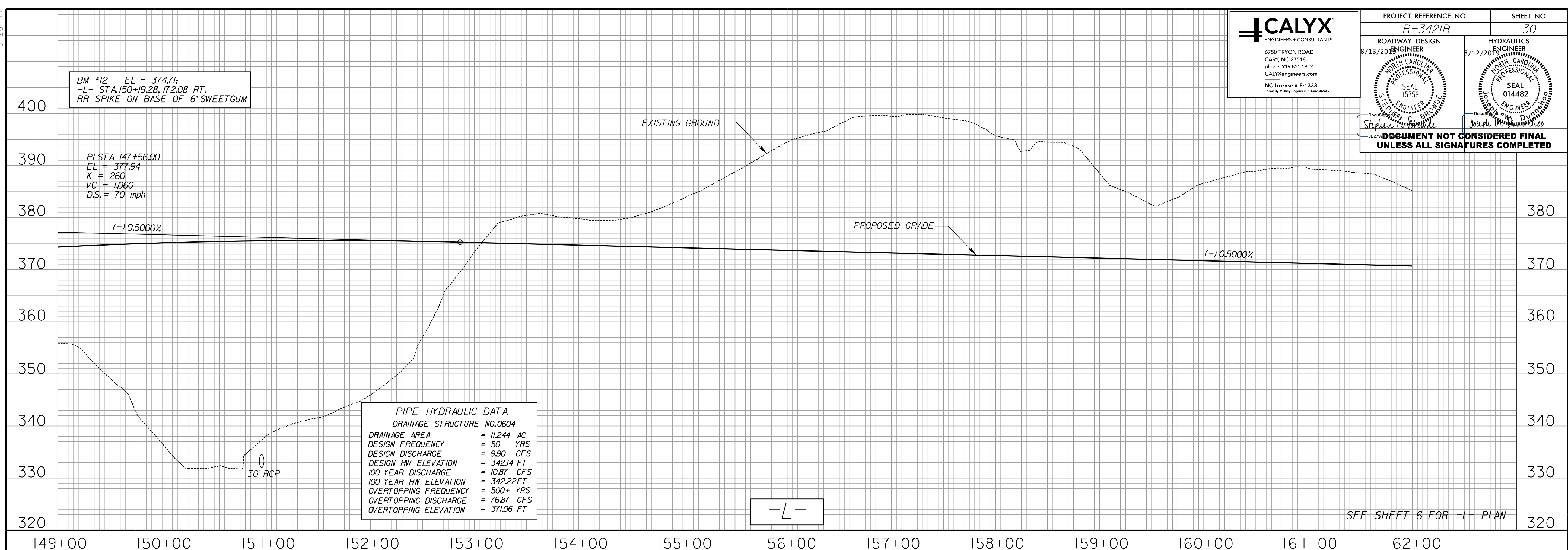


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PROJECT REFERENCE NO. <i>R-3421B</i>	SHEET NO. 30
ROADWAY DESIGN 8/13/2019 ENGINEER SEAL 15759 STEPHEN G. BRIDGES	HYDRAULICS 8/12/2019 ENGINEER SEAL 014482 JOSEPH P. BRUNO

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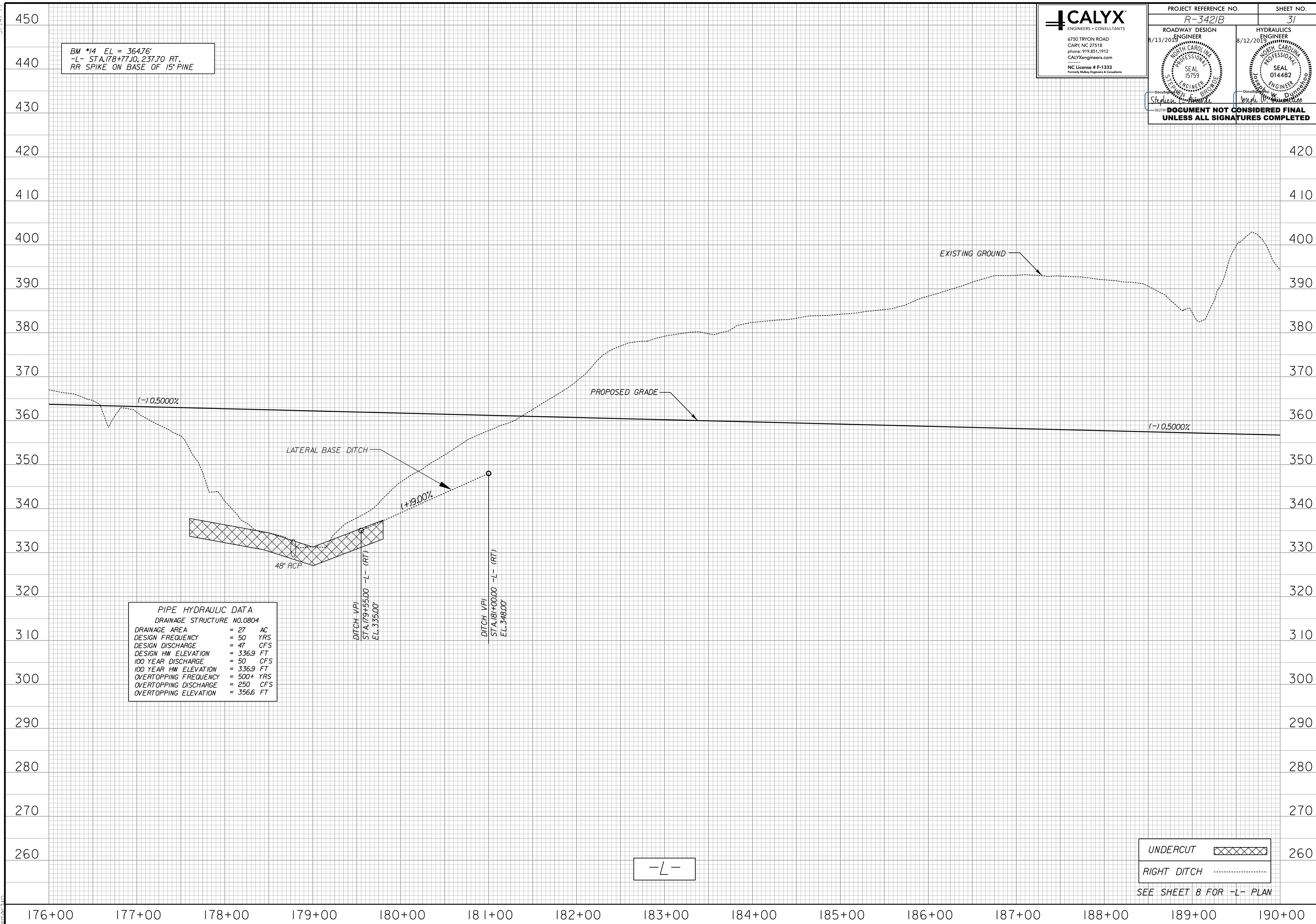


5/14/99

BM \*14 EL = 364.76'  
-L- STA.178+77.0, 237.70 RT.  
RR SPIKE ON BASE OF 15' PINE



PROJECT REFERENCE NO. <i>R-3421B</i>		SHEET NO. <i>31</i>
ROADWAY DESIGN 8/13/2019 ENGINEER SEAL 15759	HYDRAULICS 8/12/2019 ENGINEER SEAL 014482	
<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>		

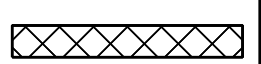



PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO.0804	
DRAINAGE AREA	= 27 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 47 CFS
DESIGN HW ELEVATION	= 336.9 FT
100 YEAR DISCHARGE	= 50 CFS
100 YEAR HW ELEVATION	= 336.9 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 250 CFS
OVERTOPPING ELEVATION	= 356.6 FT

DITCH VPI  
STA.179+55.00 -L- (RT)  
EL.335.00'

DITCH VPI  
STA.181+00.00 -L- (RT)  
EL.348.00'

-L-

UNDERCUT 

RIGHT DITCH 

SEE SHEET 8 FOR -L- PLAN

8/19/2019  
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5/14/99

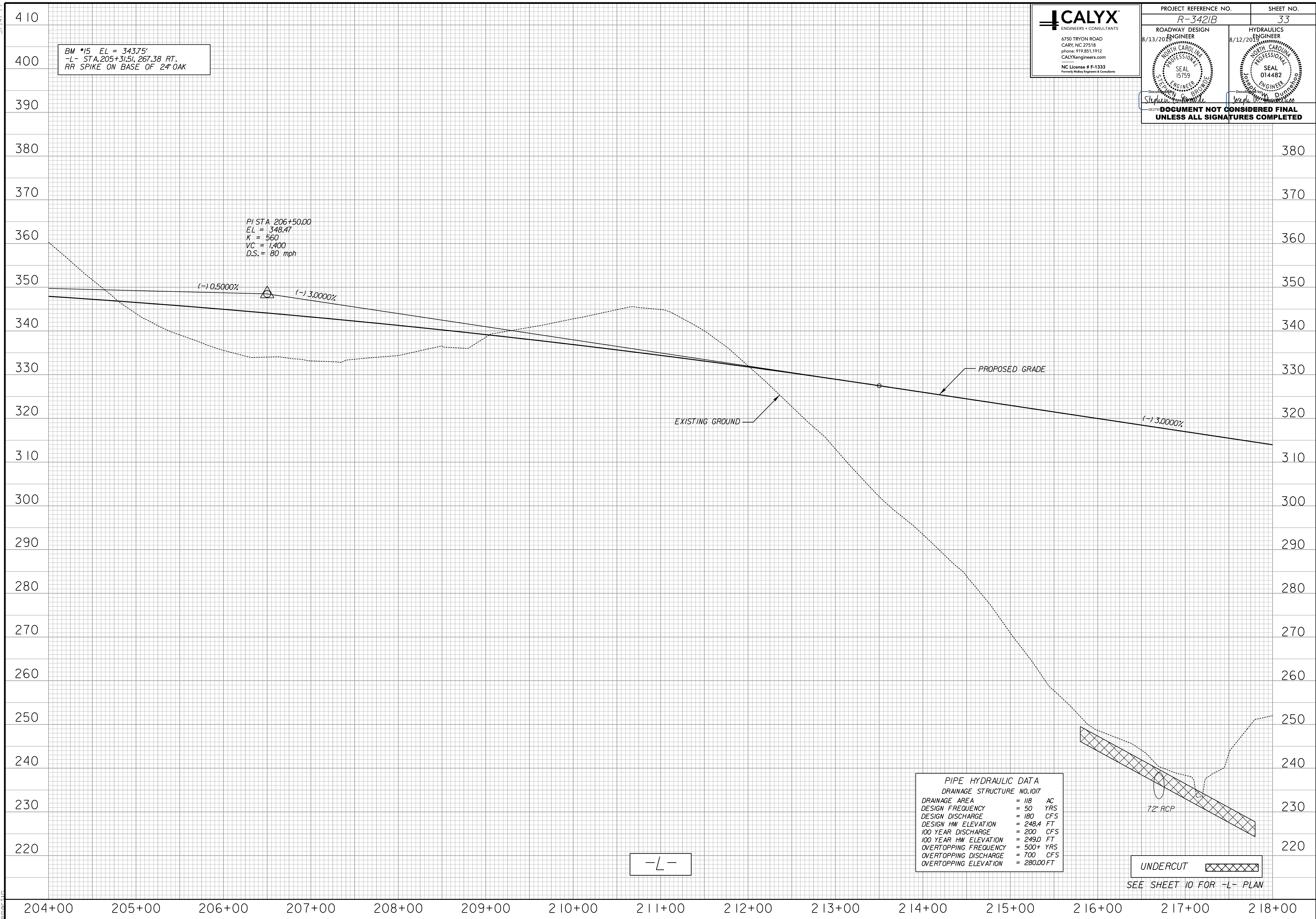
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6750 TRYON ROAD  
CARY, NC 27518  
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NC License # F-1333  
Professional Engineer & Consultants

PROJECT REFERENCE NO. <i>R-3421B</i>	SHEET NO. <i>33</i>
ROADWAY DESIGN 8/13/2019 ENGINEER SEAL 15759 STEFAN G. RICHMOND	HYDRAULICS 8/12/2019 ENGINEER SEAL 014482 WILLIAM J. HARRISON

DOCUMENT NOT CONSIDERED FINAL  
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BM \*15 EL = 343.75'  
-L- STA. 205+31.51, 267.38 RT.  
RR SPIKE ON BASE OF 24" OAK

PI STA: 206+50.00  
EL = 348.47  
K = 560  
VC = 1,400  
D.S. = 80 mph



PIPE HYDRAULIC DATA  
DRAINAGE STRUCTURE NO. 1017

DRAINAGE AREA	= 118 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 180 CFS
DESIGN HW ELEVATION	= 248.4 FT
100 YEAR DISCHARGE	= 200 CFS
100 YEAR HW ELEVATION	= 249.0 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 700 CFS
OVERTOPPING ELEVATION	= 280.00 FT

UNDERCUT

SEE SHEET 10 FOR -L- PLAN

-L-

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 WJH



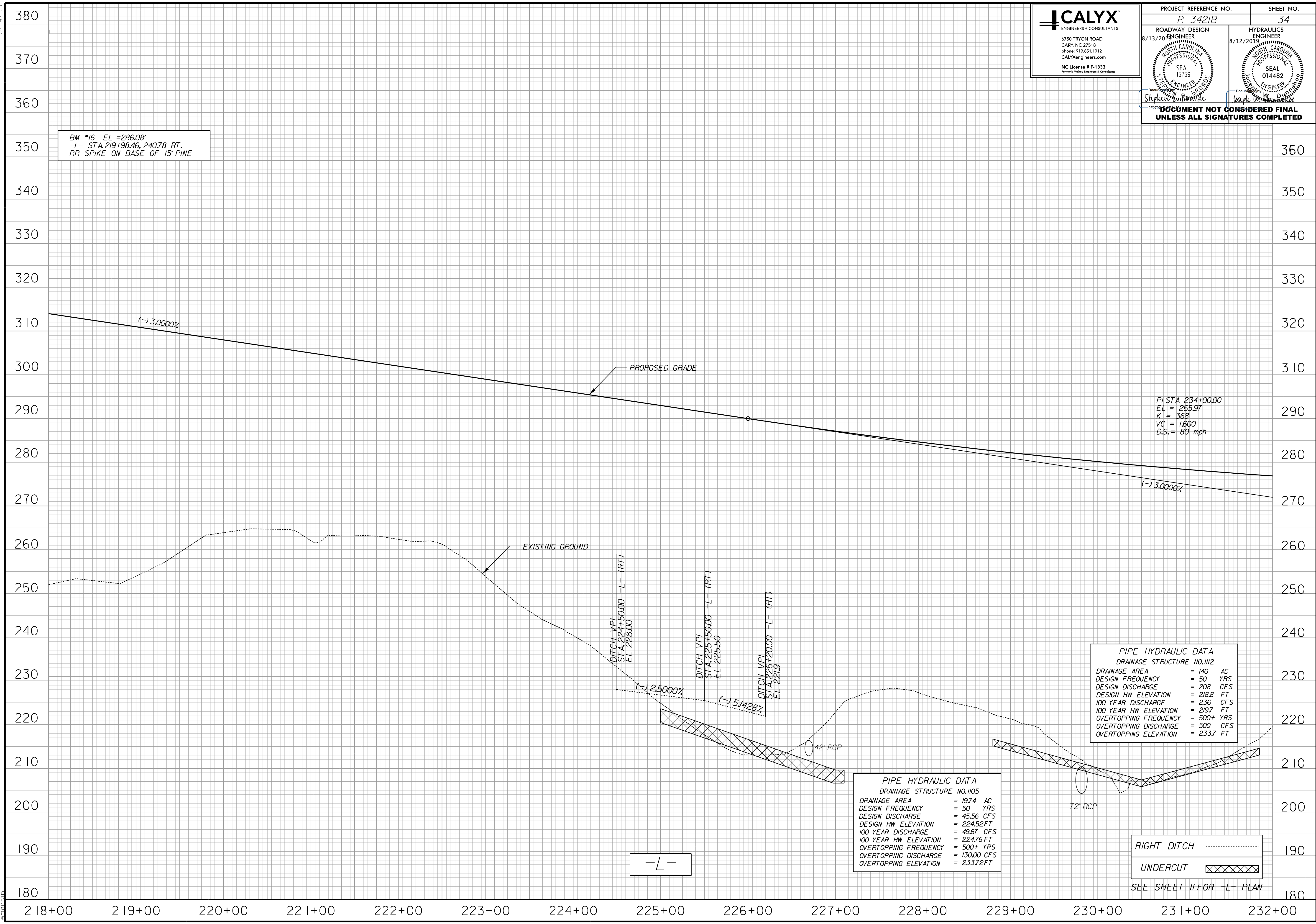
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Formerly H&M Engineers & Consultants

PROJECT REFERENCE NO. <i>R-3421B</i>	SHEET NO. 34
ROADWAY DESIGN 8/13/2019 ENGINEER SEAL 15759 STEPHEN J. BROWN	HYDRAULICS 8/12/2019 ENGINEER SEAL 014482 DAVID R. HARRIS

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

BM \*16 EL = 286.08'  
-L- STA. 219+98.46, 240.78 RT.  
RR SPIKE ON BASE OF 15' PINE



PI STA 234+00.00  
EL = 265.97  
K = 368  
VC = 1,600  
D.S. = 80 mph

PIPE HYDRAULIC DATA  
DRAINAGE STRUCTURE NO.1112

DRAINAGE AREA	= 140 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 208 CFS
DESIGN HW ELEVATION	= 218.8 FT
100 YEAR DISCHARGE	= 236 CFS
100 YEAR HW ELEVATION	= 219.7 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 500 CFS
OVERTOPPING ELEVATION	= 233.7 FT

PIPE HYDRAULIC DATA  
DRAINAGE STRUCTURE NO.1105

DRAINAGE AREA	= 19.74 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 45.56 CFS
DESIGN HW ELEVATION	= 224.52 FT
100 YEAR DISCHARGE	= 49.67 CFS
100 YEAR HW ELEVATION	= 224.76 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 130.00 CFS
OVERTOPPING ELEVATION	= 233.72 FT

RIGHT DITCH .....  
UNDERCUT [XXXXXX]  
SEE SHEET 11 FOR -L- PLAN

-L-

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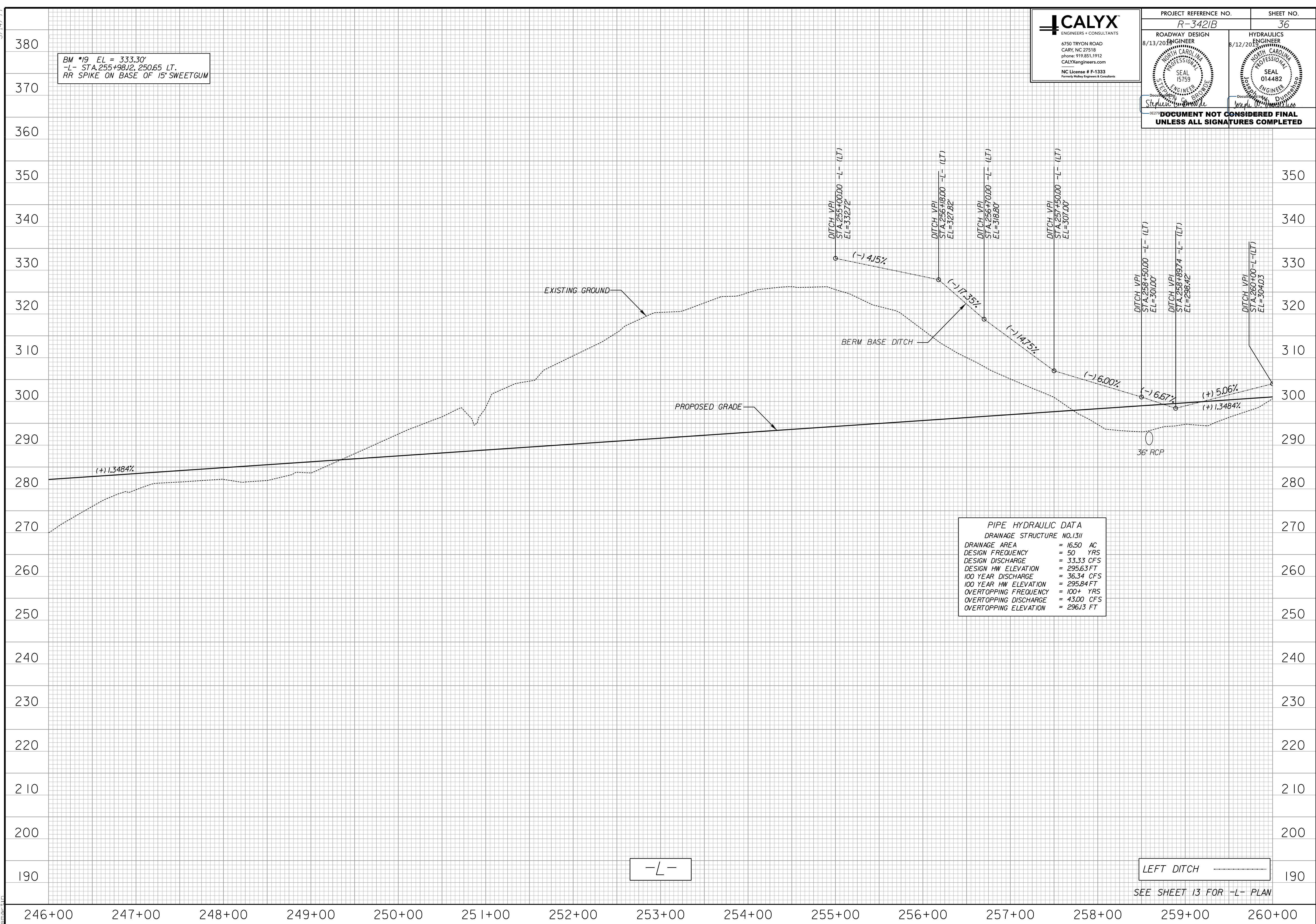
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PROJECT REFERENCE NO. <b>R-3421B</b>	SHEET NO. <b>36</b>
ROADWAY DESIGN 8/13/20 ENGINEER CARY, NC 27518 phone: 919.851.1912 CALYXengineers.com	HYDRAULICS 8/12/20 ENGINEER CARY, NC 27518 phone: 919.851.1912 CALYXengineers.com
SEAL 15759 Stephanie G. Berridge	SEAL 014482 Joseph W. Henderson

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BM \*19 EL = 333.30'  
 -L- STA.255+98.12, 250.65 LT.  
 RR SPIKE ON BASE OF 15' SWEETGUM



**PIPE HYDRAULIC DATA**  
DRAINAGE STRUCTURE NO.1311

DRAINAGE AREA	= 16.50 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 33.33 CFS
DESIGN HW ELEVATION	= 295.63 FT
100 YEAR DISCHARGE	= 36.34 CFS
100 YEAR HW ELEVATION	= 295.84 FT
OVERTOPPING FREQUENCY	= 100+ YRS
OVERTOPPING DISCHARGE	= 43.00 CFS
OVERTOPPING ELEVATION	= 296.13 FT

-L-

LEFT DITCH

SEE SHEET 13 FOR -L- PLAN

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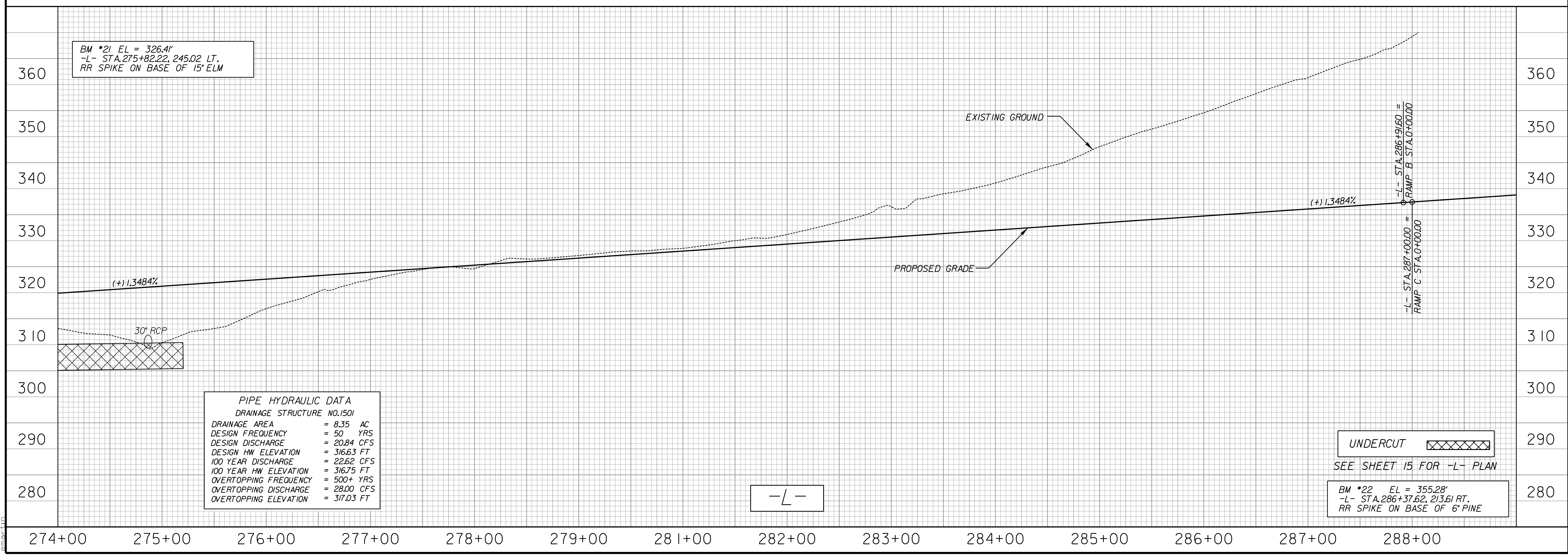
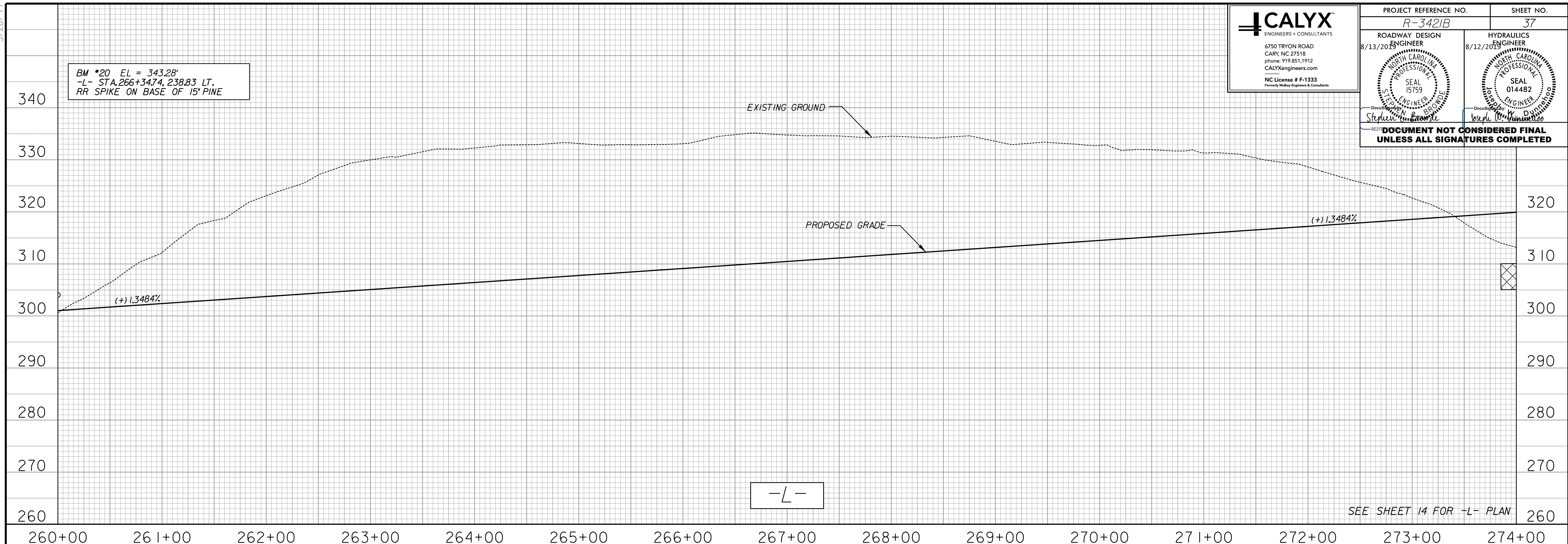


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Formerly H&M Engineers & Consultants

PROJECT REFERENCE NO. <i>R-3421B</i>	SHEET NO. 37
ROADWAY DESIGN 8/13/2019 SEAL 15759 STEPHEN B. BRUCE Professional Engineer North Carolina	HYDRAULICS 8/12/2019 SEAL 014482 JOSEPH W. DUNN Professional Engineer North Carolina

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**PIPE HYDRAULIC DATA**

DRAINAGE STRUCTURE NO.	1501
DRAINAGE AREA	= 8.35 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 20.84 CFS
DESIGN HW ELEVATION	= 316.63 FT
100 YEAR DISCHARGE	= 22.62 CFS
100 YEAR HW ELEVATION	= 316.75 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 28.00 CFS
OVERTOPPING ELEVATION	= 317.03 FT

UNDERCUT SEE SHEET 15 FOR -L- PLAN

BM \*22 EL = 355.28'  
-L- STA.286+37.62, 213.61 RT.  
RR SPIKE ON BASE OF 6\"/>

8/9/2019  
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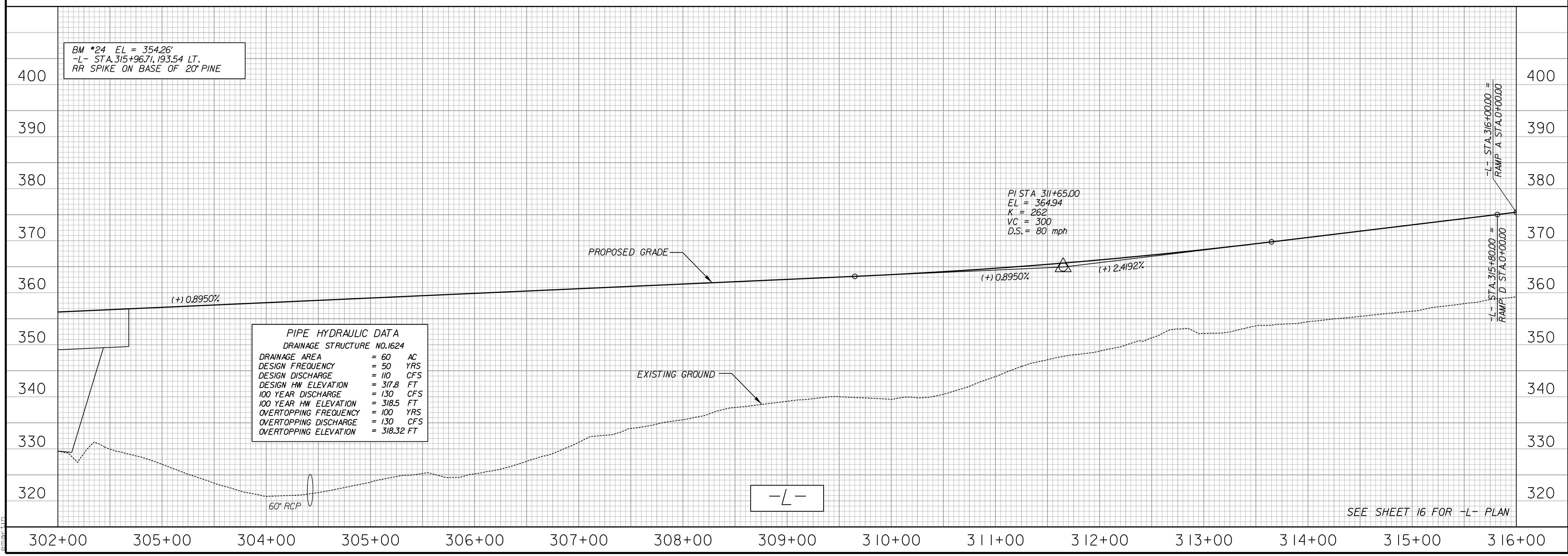
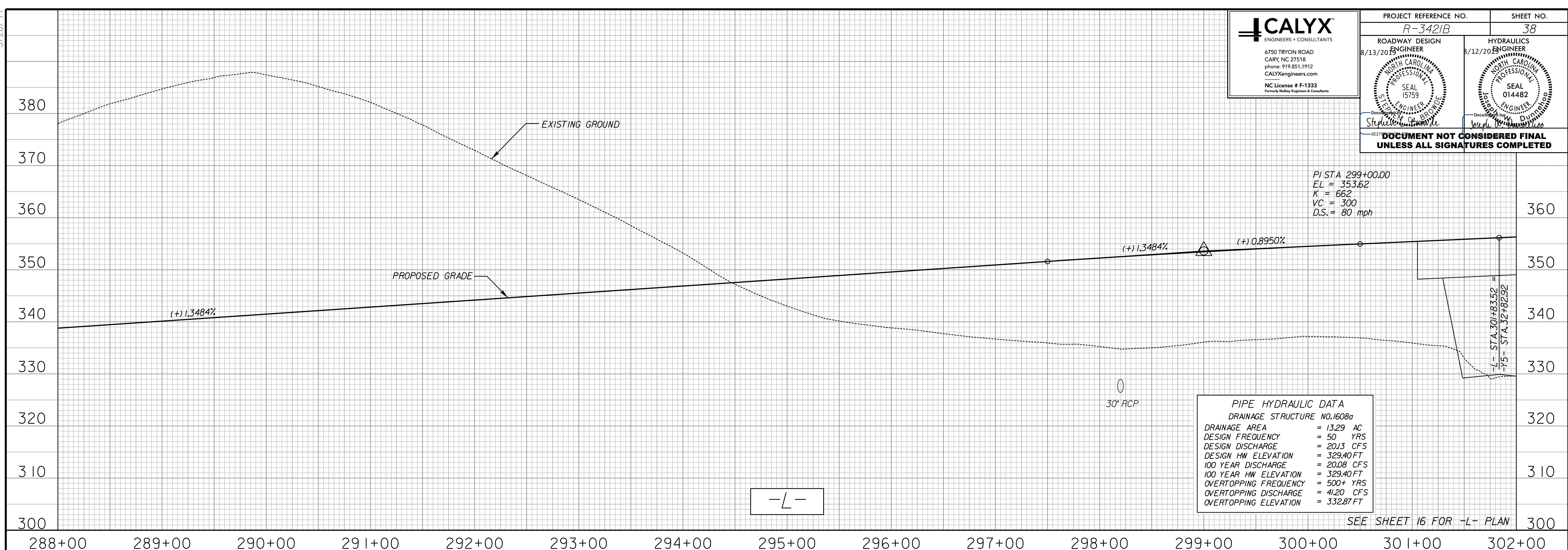


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PROJECT REFERENCE NO. <b>R-3421B</b>	SHEET NO. <b>38</b>
ROADWAY DESIGN 8/13/2018 ENGINEER SEAL 15759 Stipuliano, J. J.	HYDRAULICS 8/12/2018 ENGINEER SEAL 014482 Joseph, J. M.

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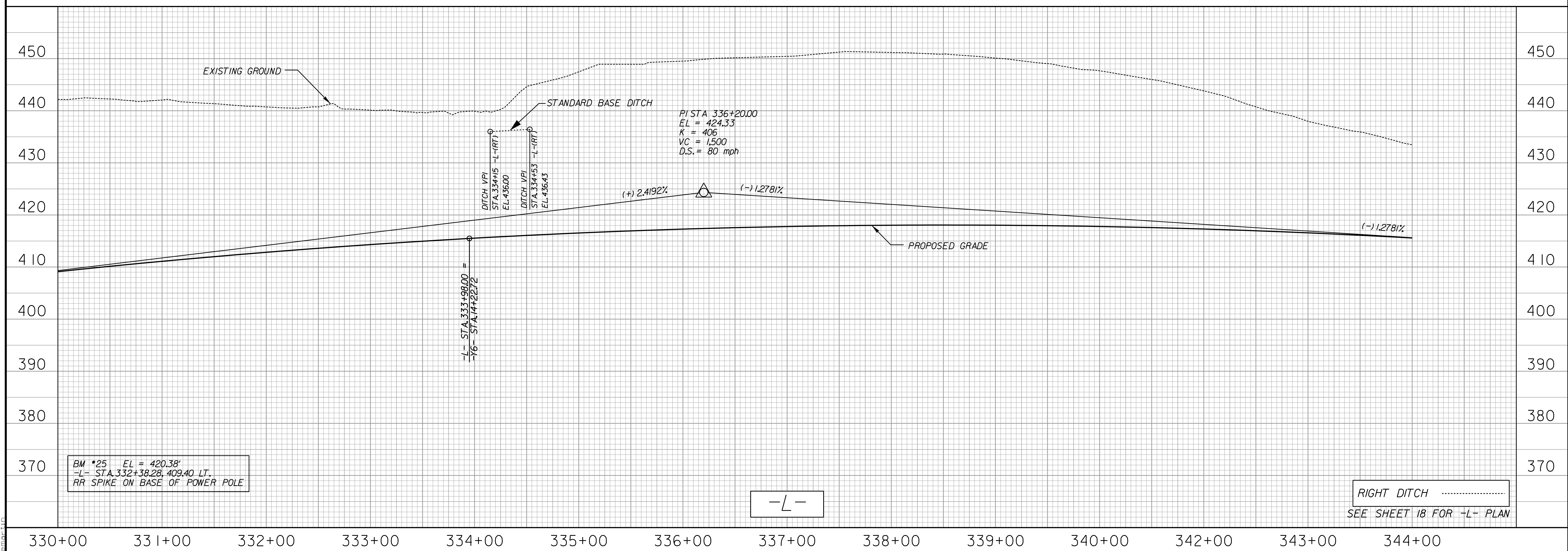
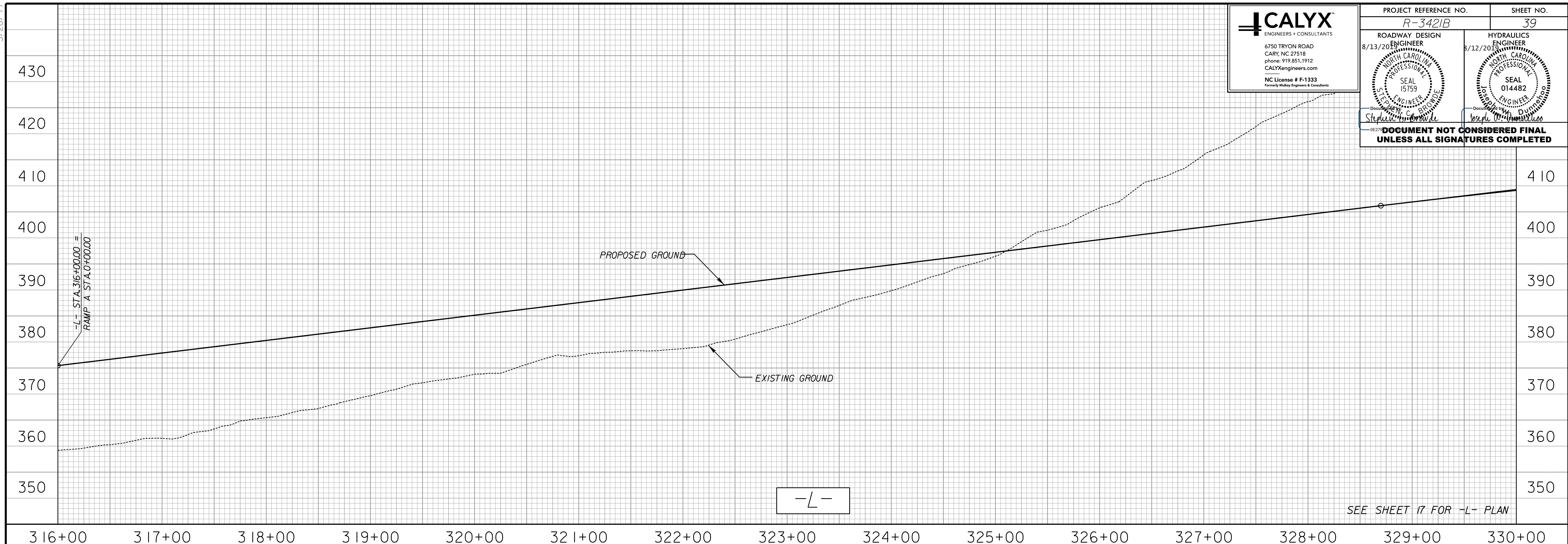


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PROJECT REFERENCE NO. <i>R-3421B</i>		SHEET NO. <i>39</i>
ROADWAY DESIGN 8/13/2010 ENGINEER SEAL 15759 STEPHEN C. BRIDGEMAN	HYDRAULICS 8/12/2010 ENGINEER SEAL 014482 JOSEPH M. HANCOCK	

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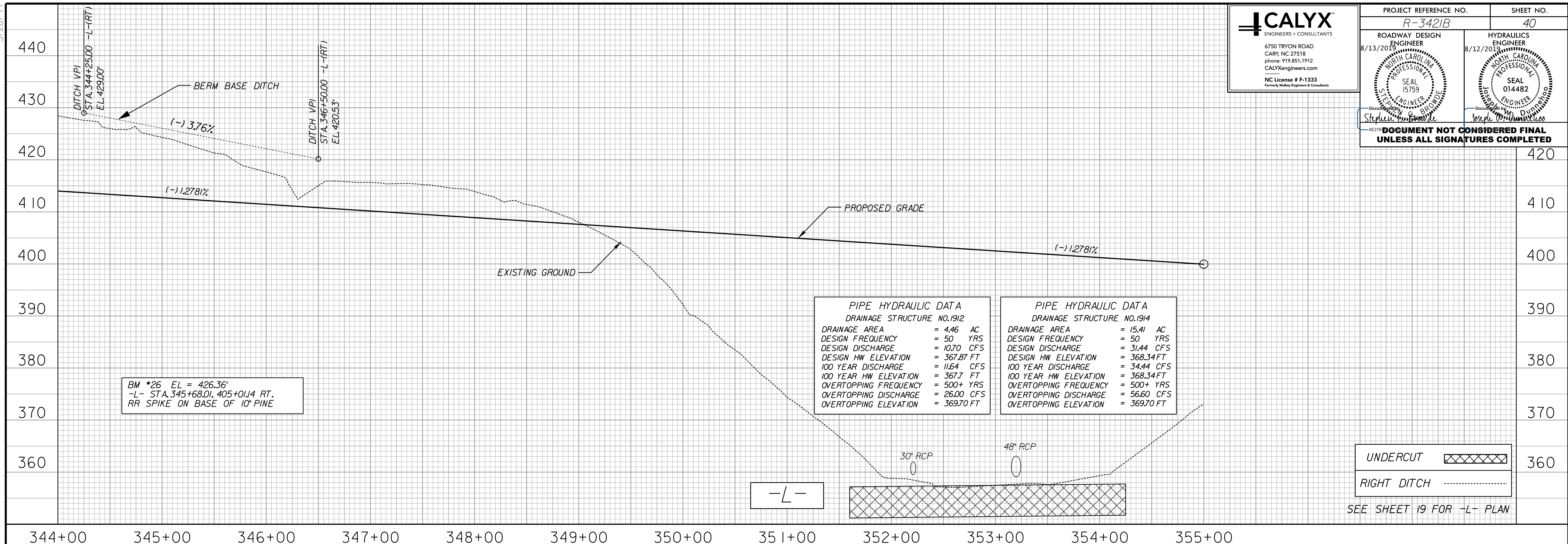
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PROJECT REFERENCE NO. <i>R-3421B</i>		SHEET NO. 40
ROADWAY DESIGN ENGINEER 8/13/2013 SEAL 15759 STEPHEN S. BRIDGEMAN	HYDRAULICS ENGINEER 8/12/2013 SEAL 014482 JOSEPH W. BRIDGEMAN	
<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>		




BM \*26 EL = 426.36'  
 -L- STA. 345+68.01, 405+01.14 RT.  
 RR SPIKE ON BASE OF 10' PINE

-L-

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CARY, NC 27518  
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NC License # F-1333

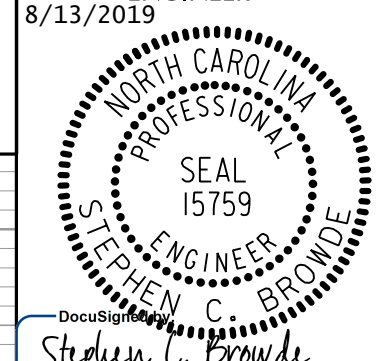
PROJECT REFERENCE NO.  
*R-3421B*

ROADWAY DESIGN ENGINEER  
8/13/2019

SHEET NO.  
*41*

HYDRAULICS ENGINEER

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*Paul Atkinson*  
ON  
*3/16/13*  
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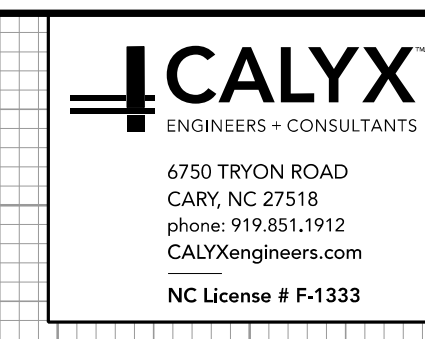
SEAL  
15759  
STEPHEN C. BROWDE  
ENGINEER

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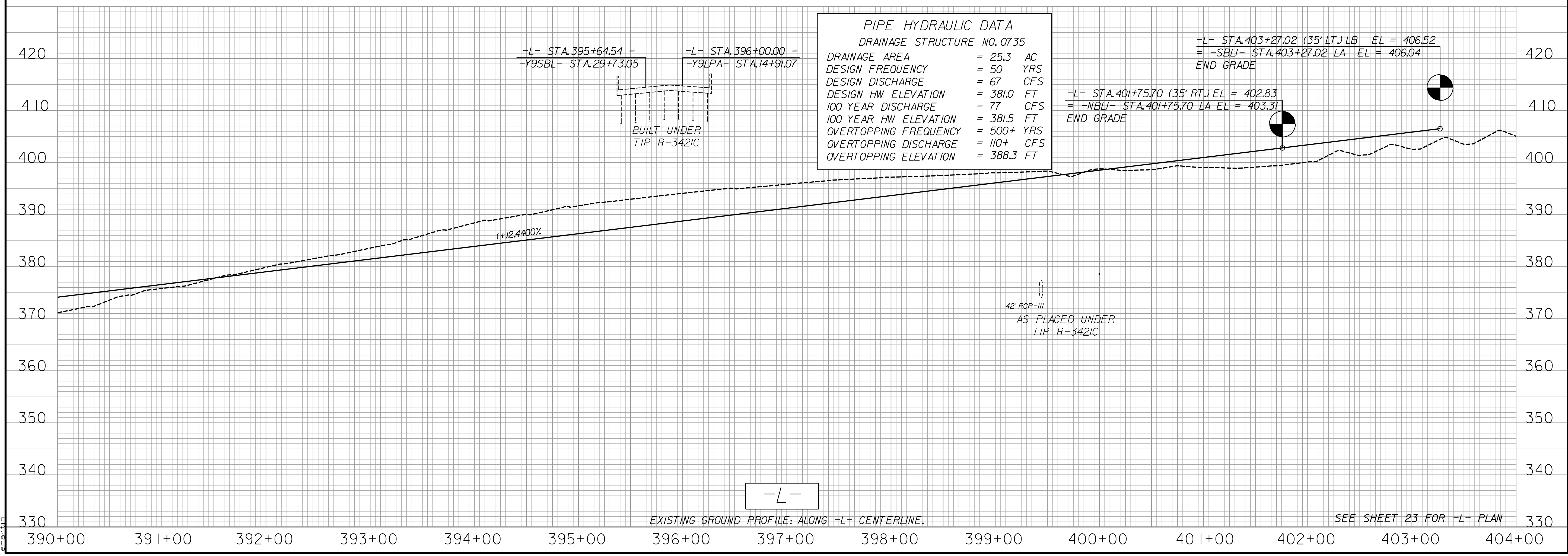
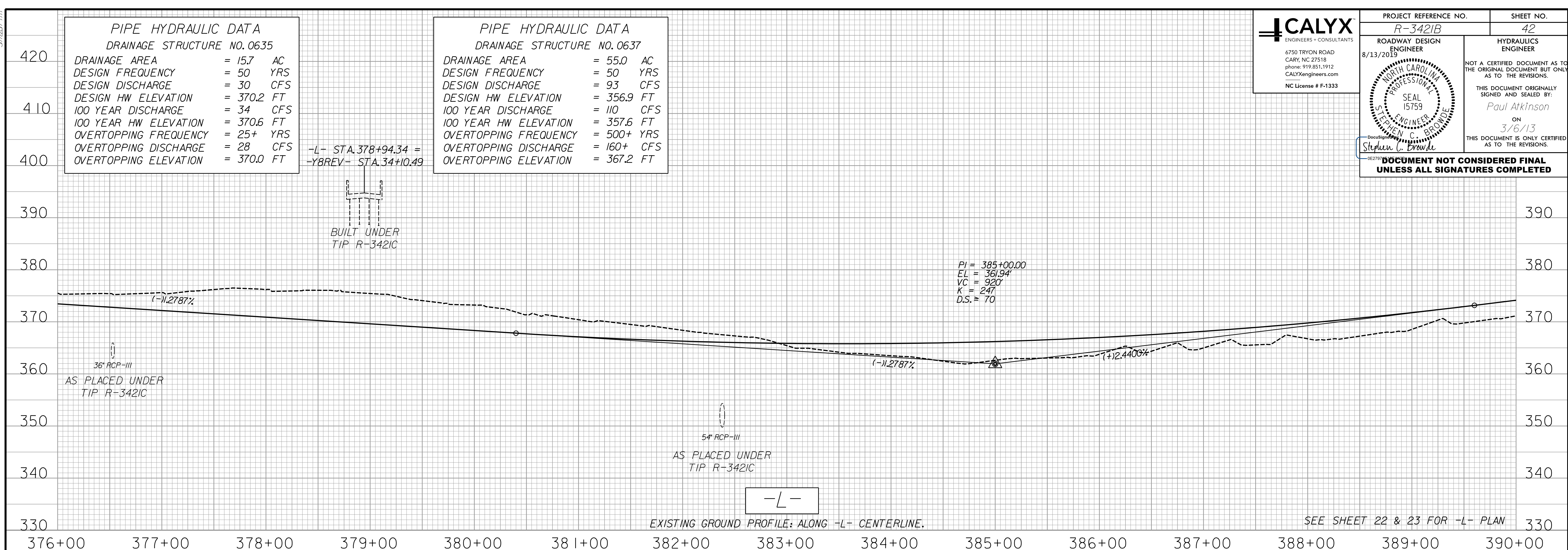
PROJECT REFERENCE NO. <b>R-3421B</b>	SHEET NO. <b>42</b>
ROADWAY DESIGN ENGINEER 8/13/2013	HYDRAULICS ENGINEER
SEAL 15759 STEPHEN C. BROUDE	NOT A CERTIFIED DOCUMENT AS TO THE ORIGINAL DOCUMENT BUT ONLY AS TO THE REVISIONS. THIS DOCUMENT ORIGINALLY SIGNED AND SEALED BY: <i>Paul Atkinson</i> ON 3/6/13 THIS DOCUMENT IS ONLY CERTIFIED AS TO THE REVISIONS.
<p>DocuSign <i>Stephen C. Broude</i></p> <p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>	

**PIPE HYDRAULIC DATA**  
DRAINAGE STRUCTURE NO. 0635

DRAINAGE AREA	= 15.7 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 30 CFS
DESIGN HW ELEVATION	= 370.2 FT
100 YEAR DISCHARGE	= 34 CFS
100 YEAR HW ELEVATION	= 370.6 FT
OVERTOPPING FREQUENCY	= 25+ YRS
OVERTOPPING DISCHARGE	= 28 CFS
OVERTOPPING ELEVATION	= 370.0 FT

**PIPE HYDRAULIC DATA**  
DRAINAGE STRUCTURE NO. 0637

DRAINAGE AREA	= 55.0 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 93 CFS
DESIGN HW ELEVATION	= 356.9 FT
100 YEAR DISCHARGE	= 110 CFS
100 YEAR HW ELEVATION	= 357.6 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 160+ CFS
OVERTOPPING ELEVATION	= 367.2 FT



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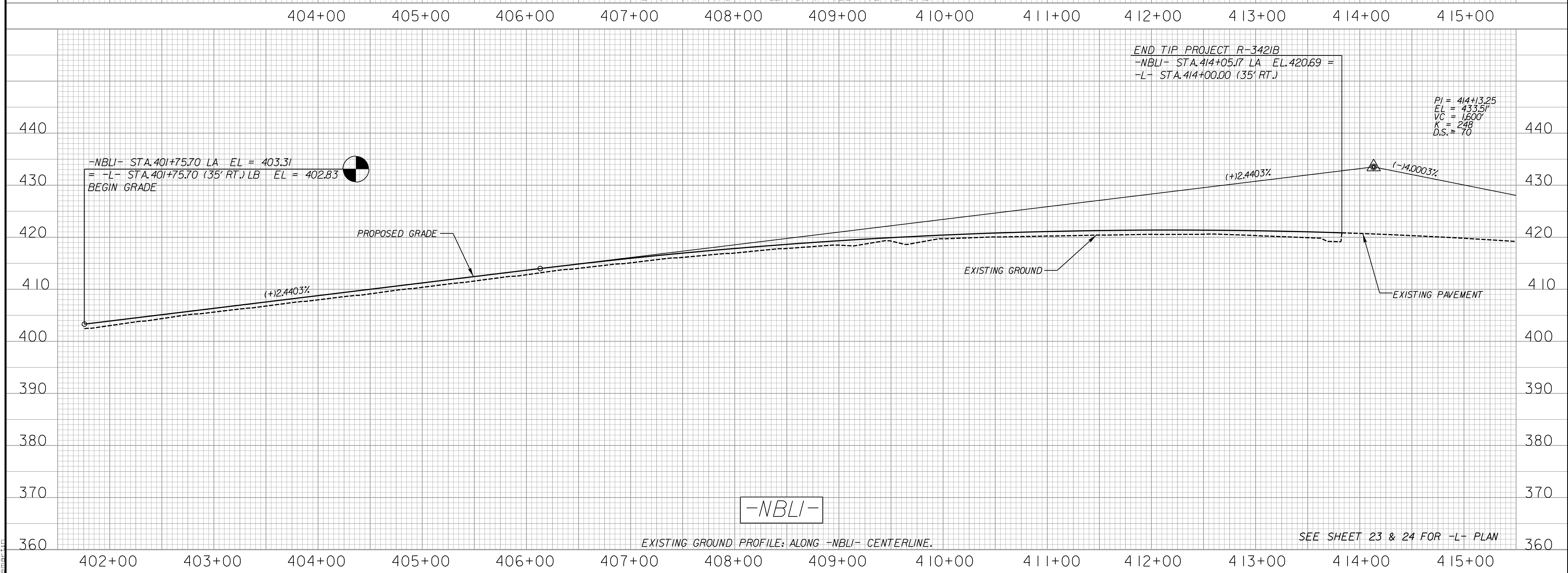
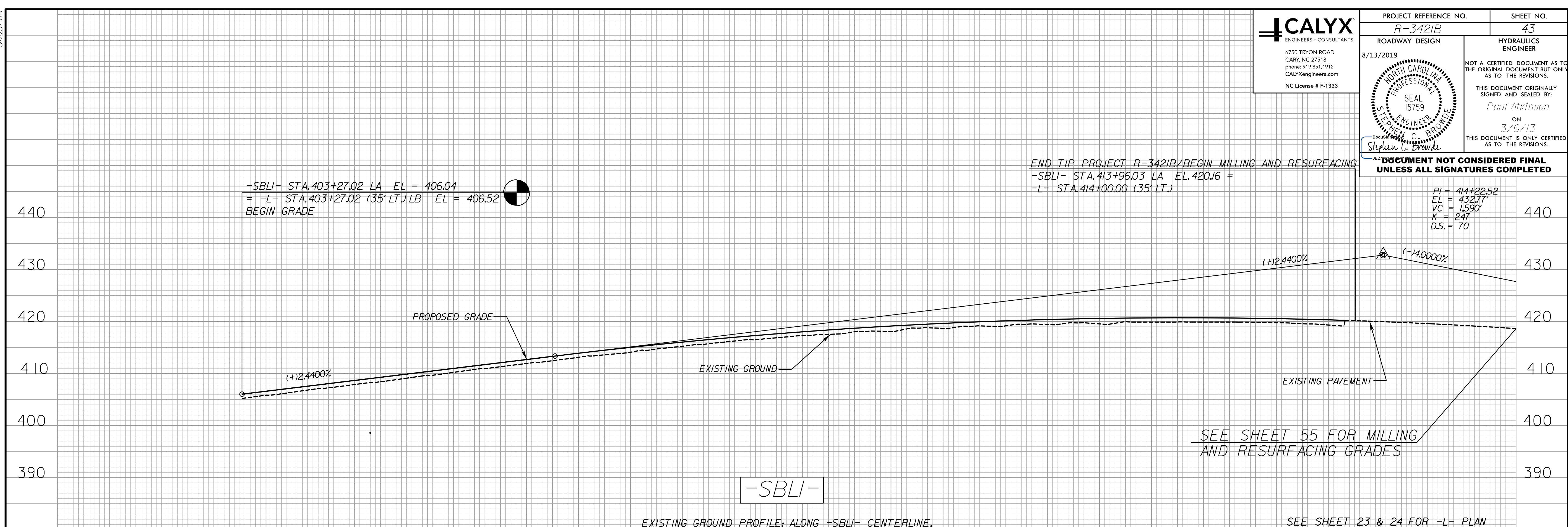


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PROJECT REFERENCE NO. <i>R-3421B</i>	SHEET NO. <i>43</i>
ROADWAY DESIGN 8/13/2019	HYDRAULICS ENGINEER
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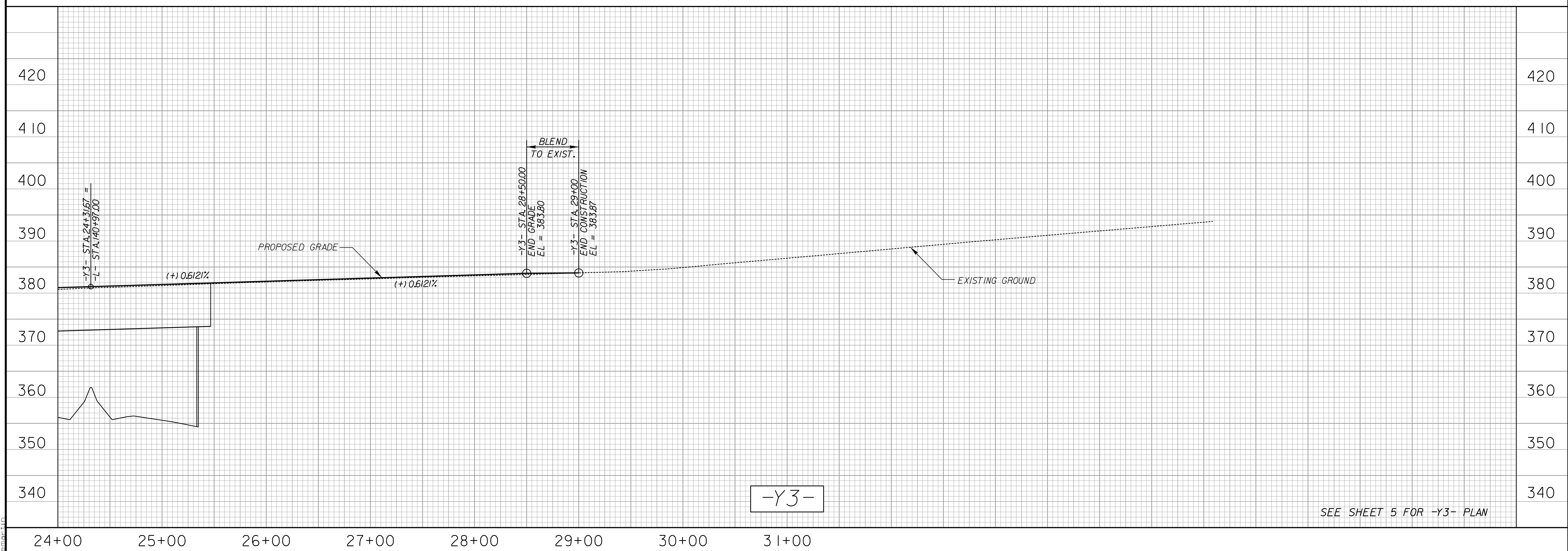
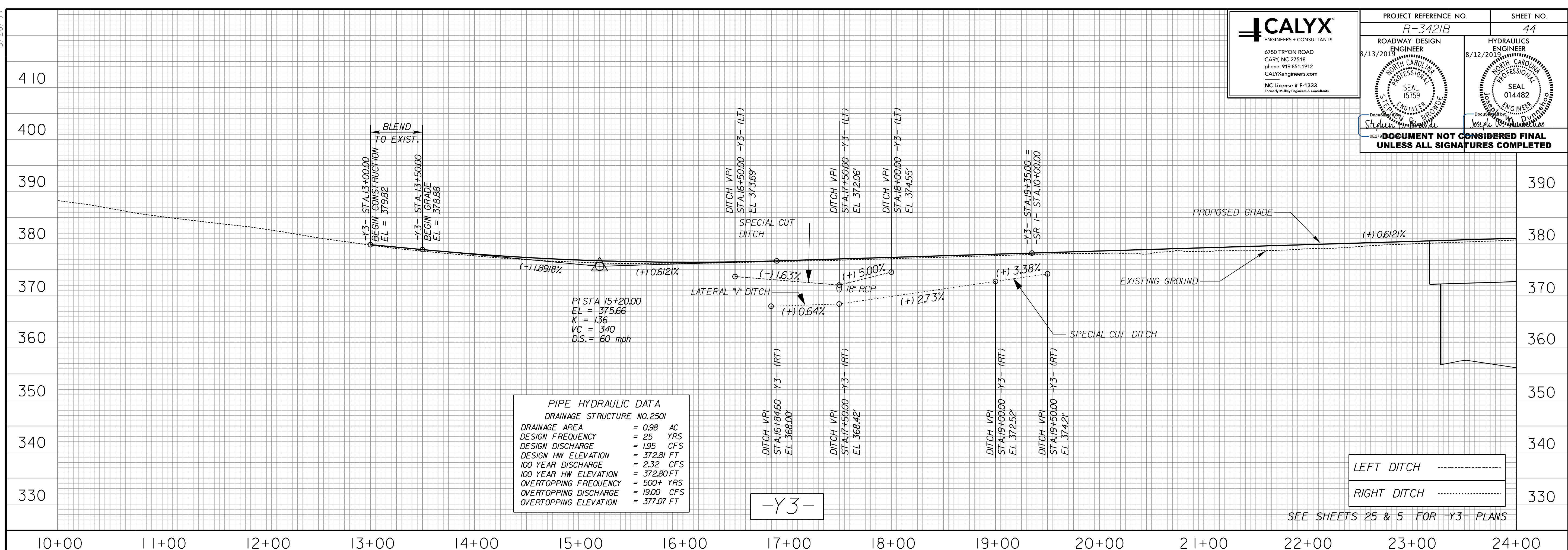
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5/28/19



PROJECT REFERENCE NO. <b>R-3421B</b>		SHEET NO. <b>44</b>
ROADWAY DESIGN ENGINEER 8/13/2019 SEAL 15759	HYDRAULICS ENGINEER 8/12/2019 SEAL 014482	
<p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>		



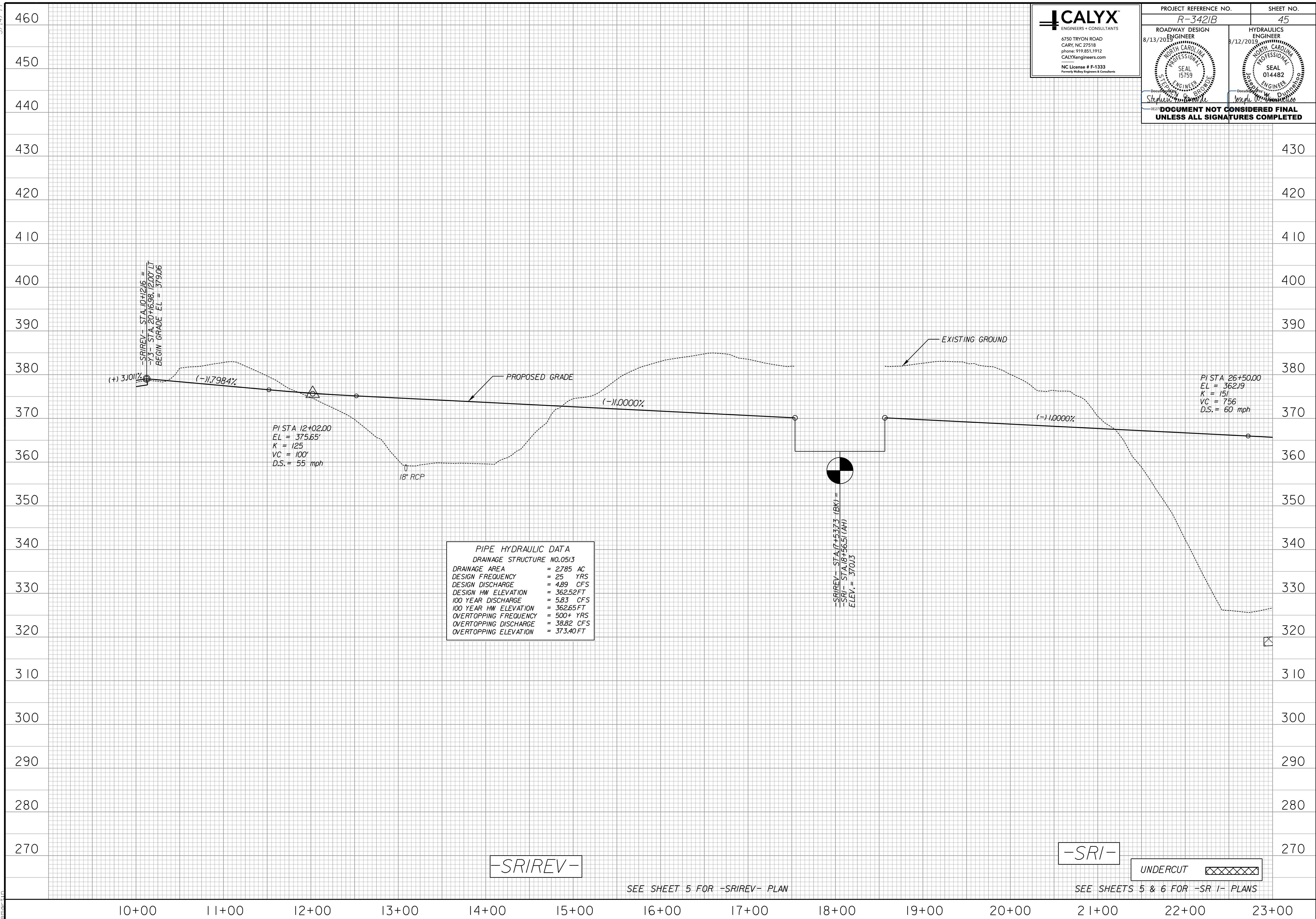
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PROJECT REFERENCE NO. <i>R-3421B</i>		SHEET NO. <i>45</i>
ROADWAY DESIGN 8/13/2019 SEAL 15759 8/12/2019 SEAL 014482	HYDRAULICS ENGINEER 8/12/2019 SEAL 014482	
<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>		



PI STA 12+02.00  
EL = 375.65'  
K = 125  
VC = 100'  
D.S. = 55 mph

18" RCP

PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 0513	
DRAINAGE AREA	= 2785 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 4.89 CFS
DESIGN HW ELEVATION	= 362.52 FT
100 YEAR DISCHARGE	= 5.83 CFS
100 YEAR HW ELEVATION	= 362.65 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 38.82 CFS
OVERTOPPING ELEVATION	= 373.40 FT

-SR IREV- STA 17+53.73 (BK) =  
-SRI- STA 18+56.51 (AH)  
ELEV. = 370.13

PI STA 26+50.00  
EL = 362.19  
K = 151  
VC = 756  
D.S. = 60 mph

-SR IREV-

-SRI-

UNDERCUT

SEE SHEET 5 FOR -SR IREV- PLAN

SEE SHEETS 5 & 6 FOR -SRI- PLANS

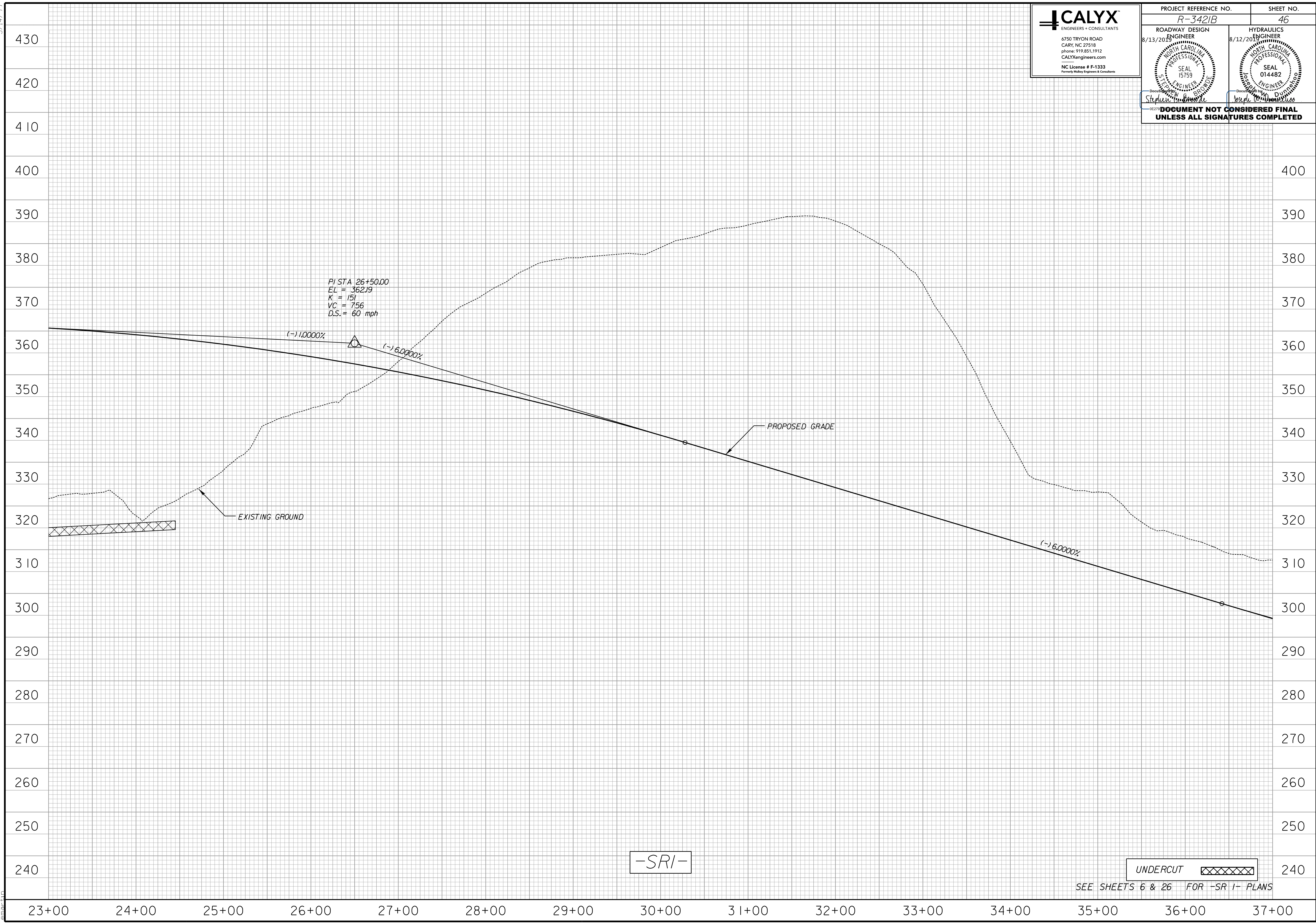
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PROJECT REFERENCE NO. <i>R-3421B</i>	SHEET NO. 46
ROADWAY DESIGN 8/13/2019 ENGINEER SEAL 15759 STEPHEN B. BRUNO	HYDRAULICS 8/12/2019 ENGINEER SEAL 014482 JOSEPH M. BRUNO

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-SR I-

UNDERCUT (hatched area)

SEE SHEETS 6 & 26 FOR -SR I- PLANS

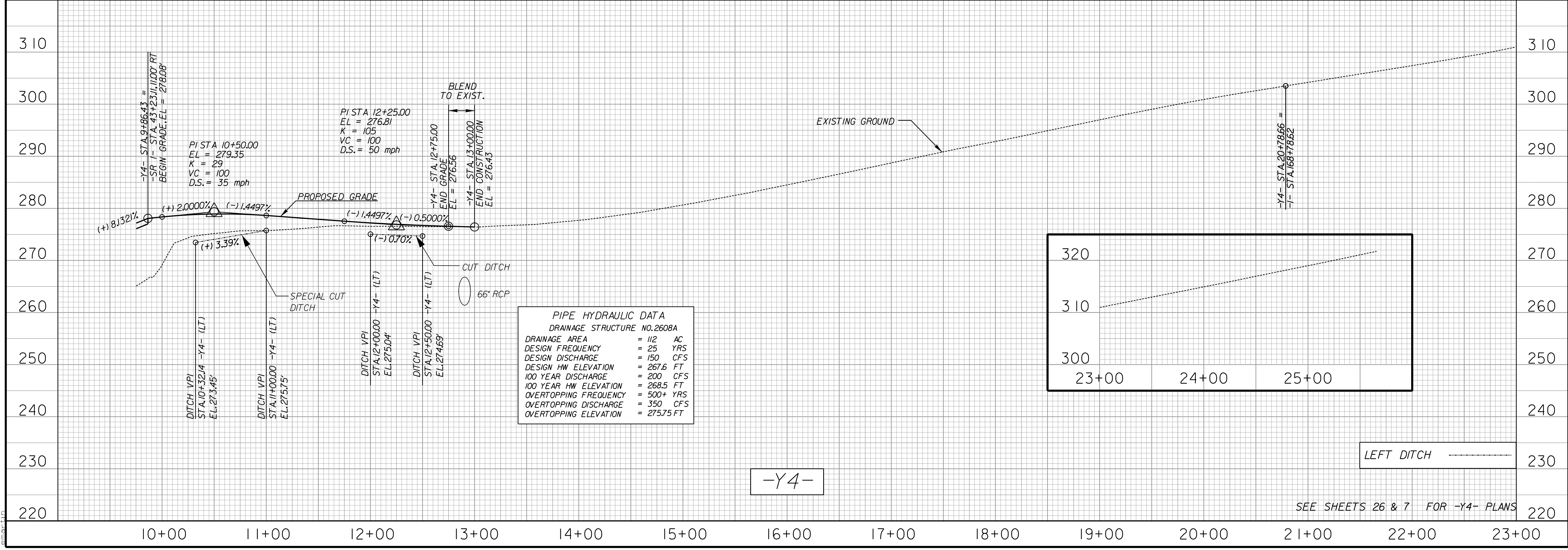
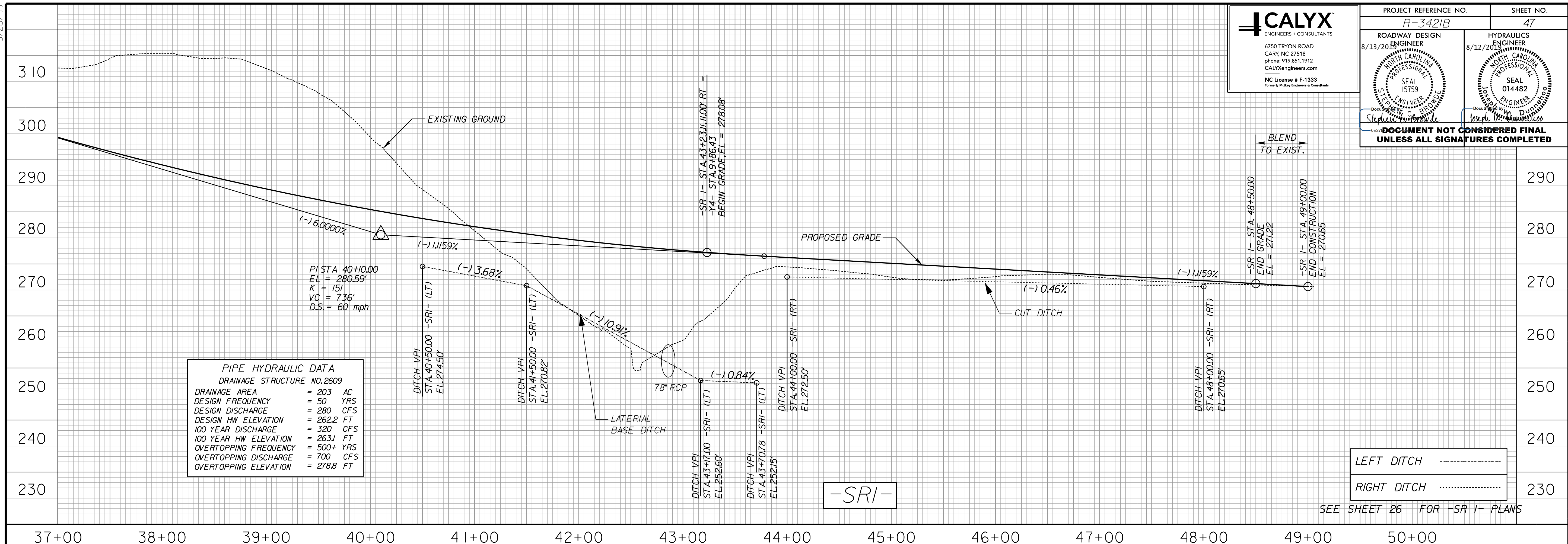


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6750 TRYON ROAD  
CARY, NC 27518  
phone: 919.851.1912  
CALYXengineers.com  
NC License # F-1333  
Professional Engineer & Consultant

PROJECT REFERENCE NO. <b>R-3421B</b>	SHEET NO. <b>47</b>
ROADWAY DESIGN 8/13/2013 ENGINEER SEAL 15759 NORTH CAROLINA PROFESSIONAL ENGINEER Stefan C. Berridge	HYDRAULICS 8/12/2013 ENGINEER SEAL 014482 NORTH CAROLINA PROFESSIONAL ENGINEER Joseph R. Williams

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**



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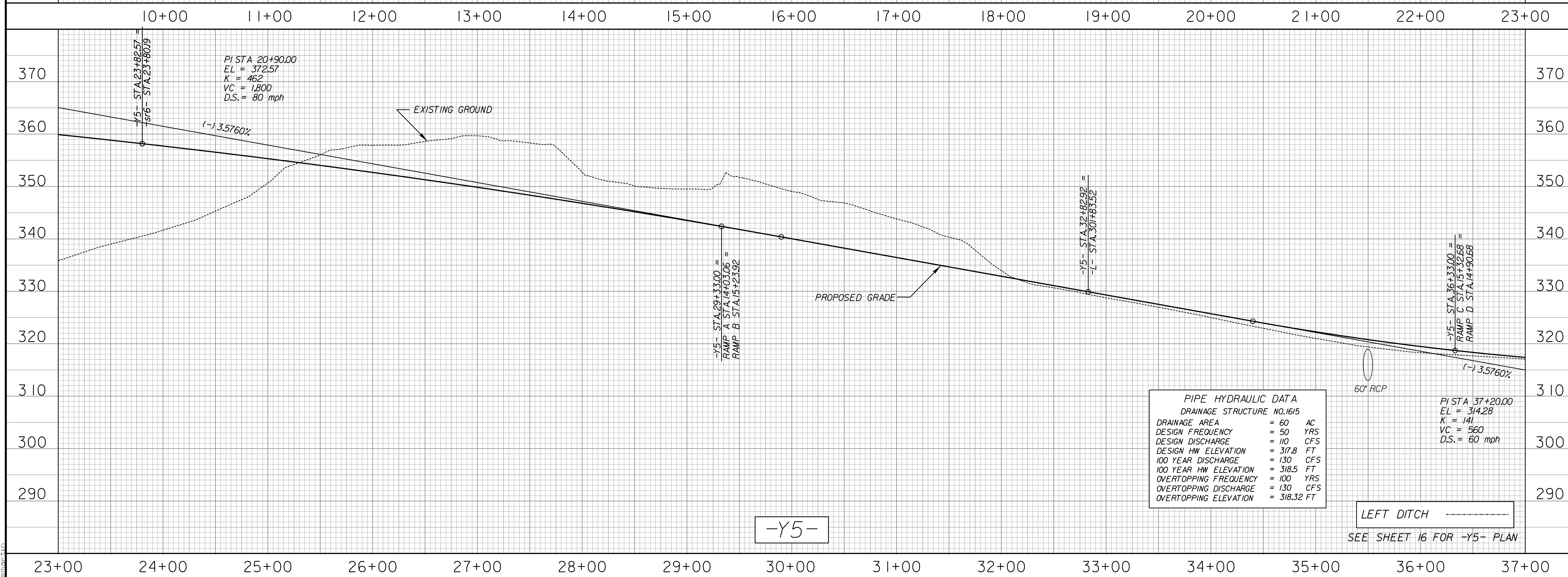
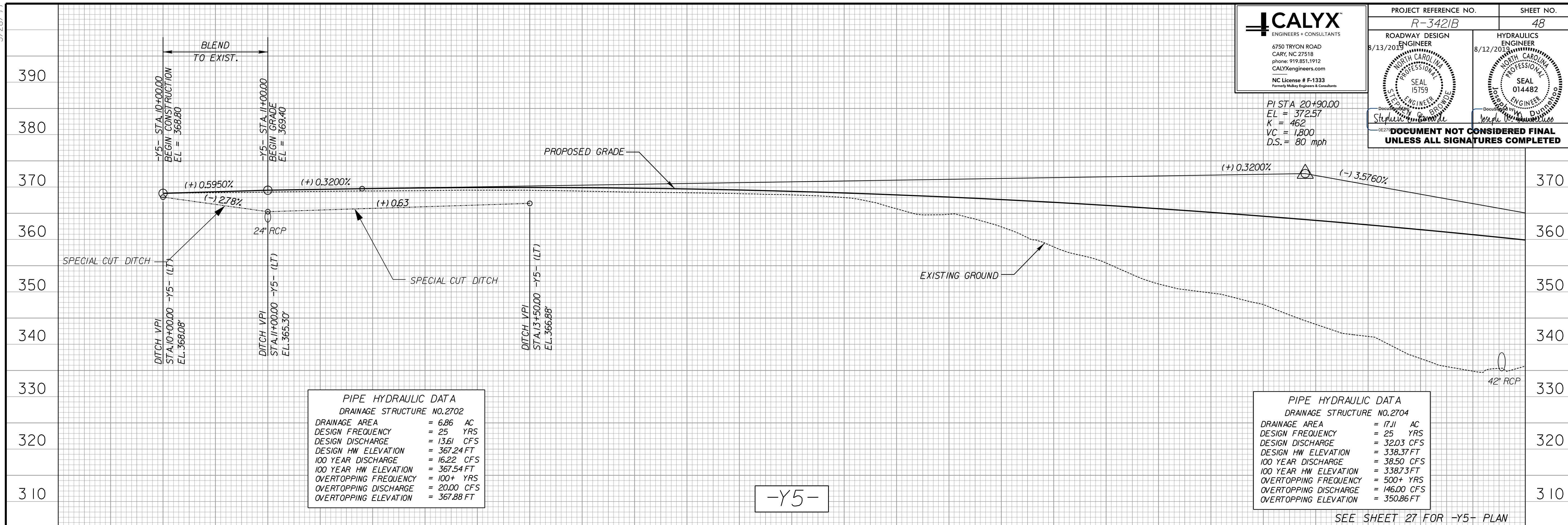
5/28/2019



PROJECT REFERENCE NO. R-3421B		SHEET NO. 48
ROADWAY DESIGN 8/13/2018 SEAL 15759	HYDRAULICS 8/12/2018 SEAL 014482	

PI STA 20+90.00  
 EL = 372.57  
 K = 462  
 VC = 1,800  
 D.S. = 80 mph

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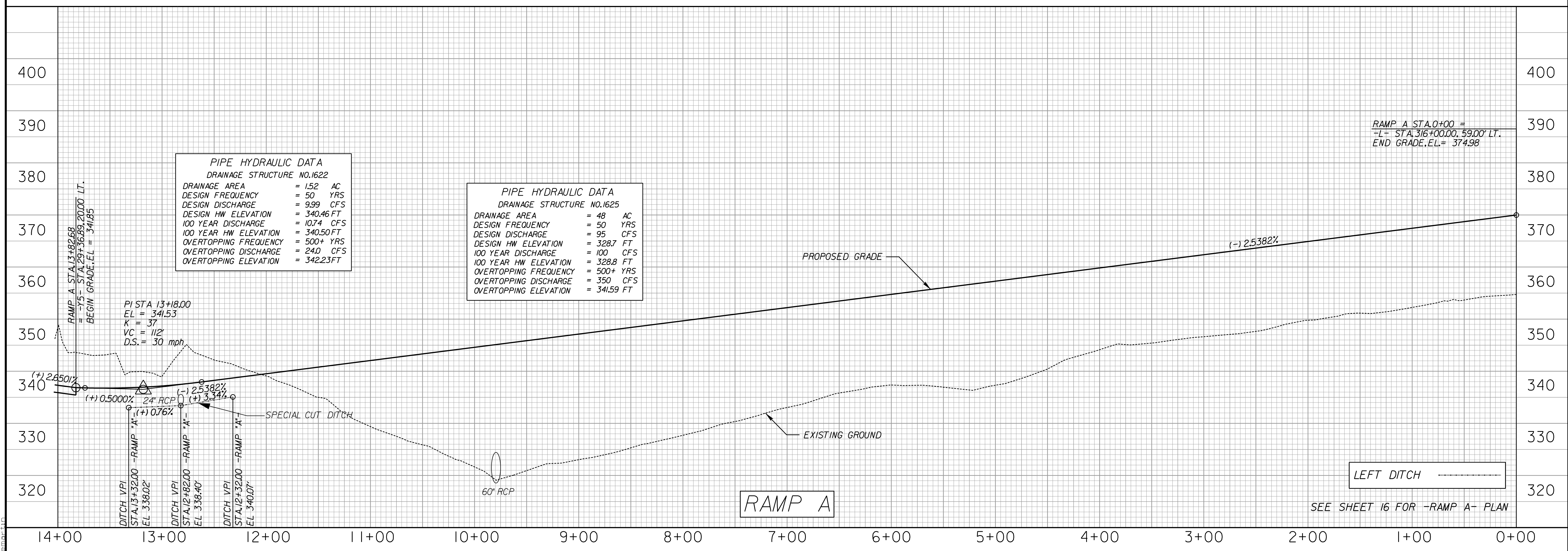
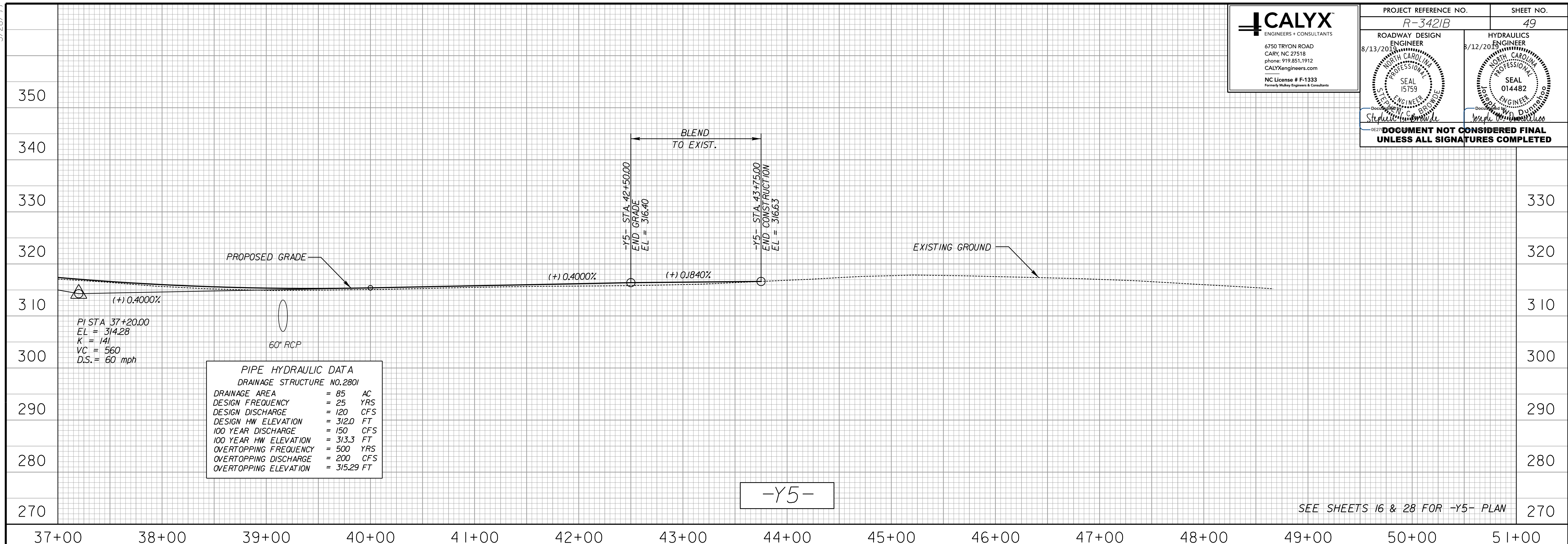


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PROJECT REFERENCE NO. <b>R-3421B</b>		SHEET NO. <b>49</b>
ROADWAY DESIGN ENGINEER 8/13/2013 SEAL 15759 STEPHEN C. BRYAN	HYDRAULICS ENGINEER 8/12/2013 SEAL 014482 JOSEPH W. DUNN	

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UNLESS ALL SIGNATURES COMPLETED**

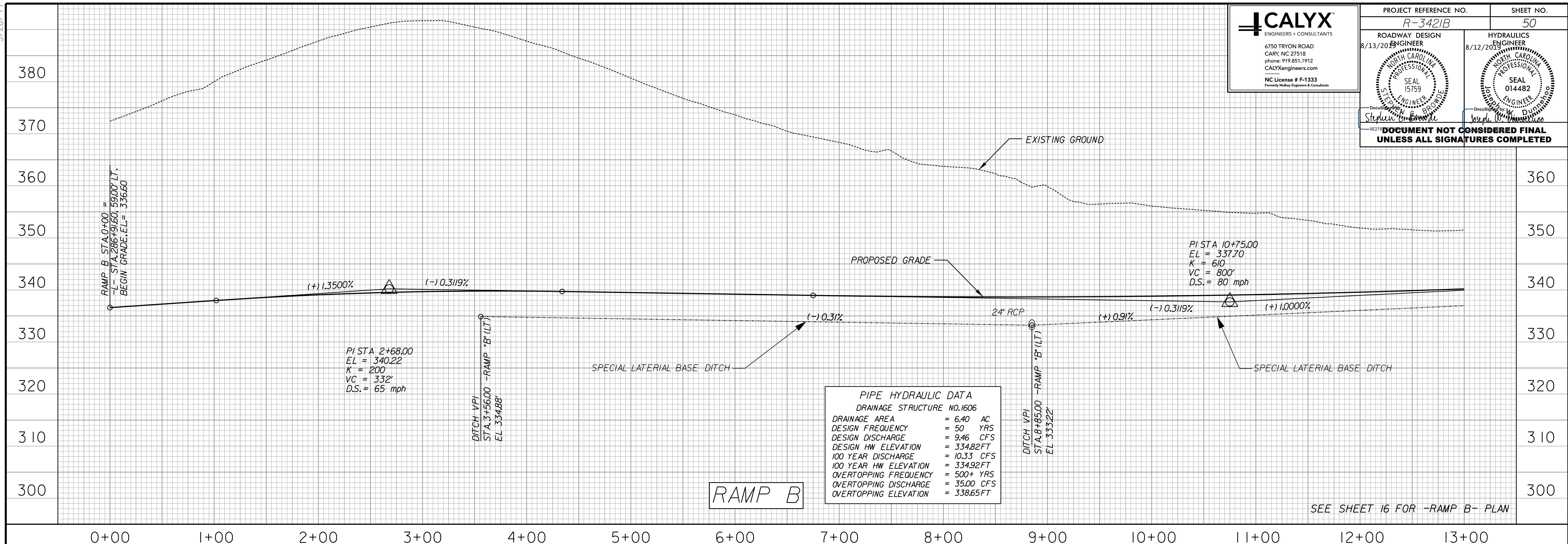


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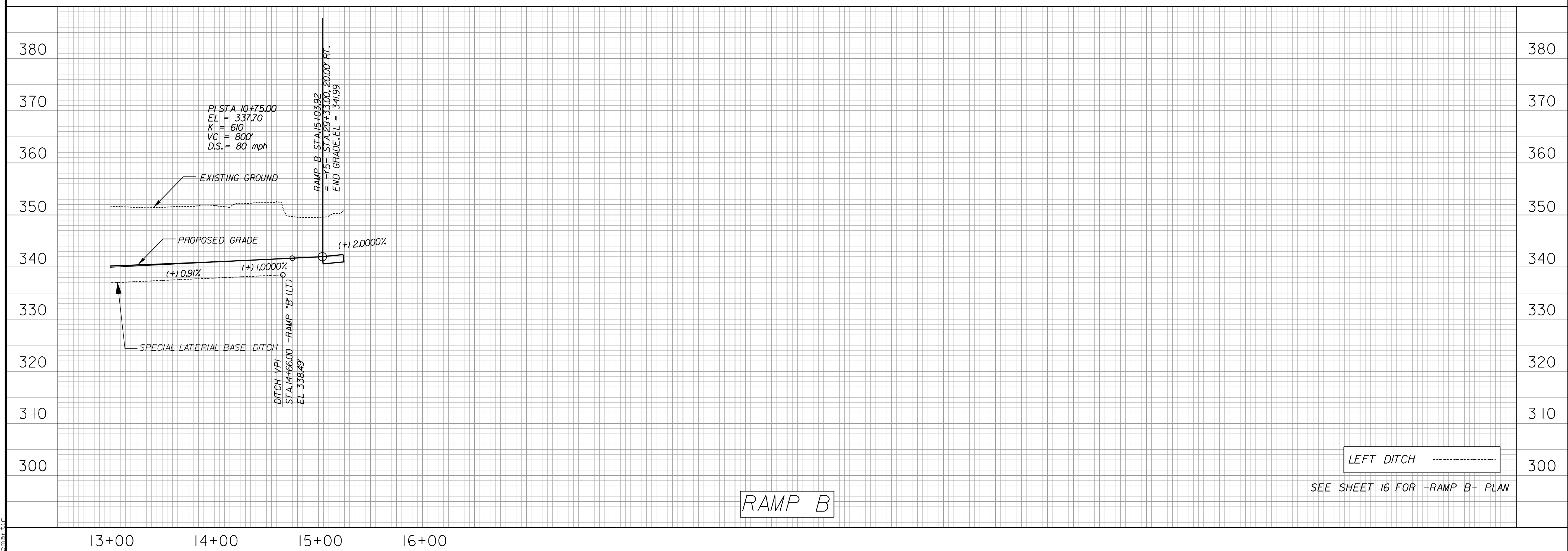


PROJECT REFERENCE NO. <b>R-3421B</b>		SHEET NO. <b>50</b>
ROADWAY DESIGN 8/13/2019 ENGINEER SEAL 15759	HYDRAULICS 8/12/2019 ENGINEER SEAL 014482	
<p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>		



**PIPE HYDRAULIC DATA**  
DRAINAGE STRUCTURE NO.1606

DRAINAGE AREA	= 6.40 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 9.46 CFS
DESIGN HW ELEVATION	= 334.82FT
100 YEAR DISCHARGE	= 10.33 CFS
100 YEAR HW ELEVATION	= 334.92FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 35.00 CFS
OVERTOPPING ELEVATION	= 338.65FT



LEFT DITCH

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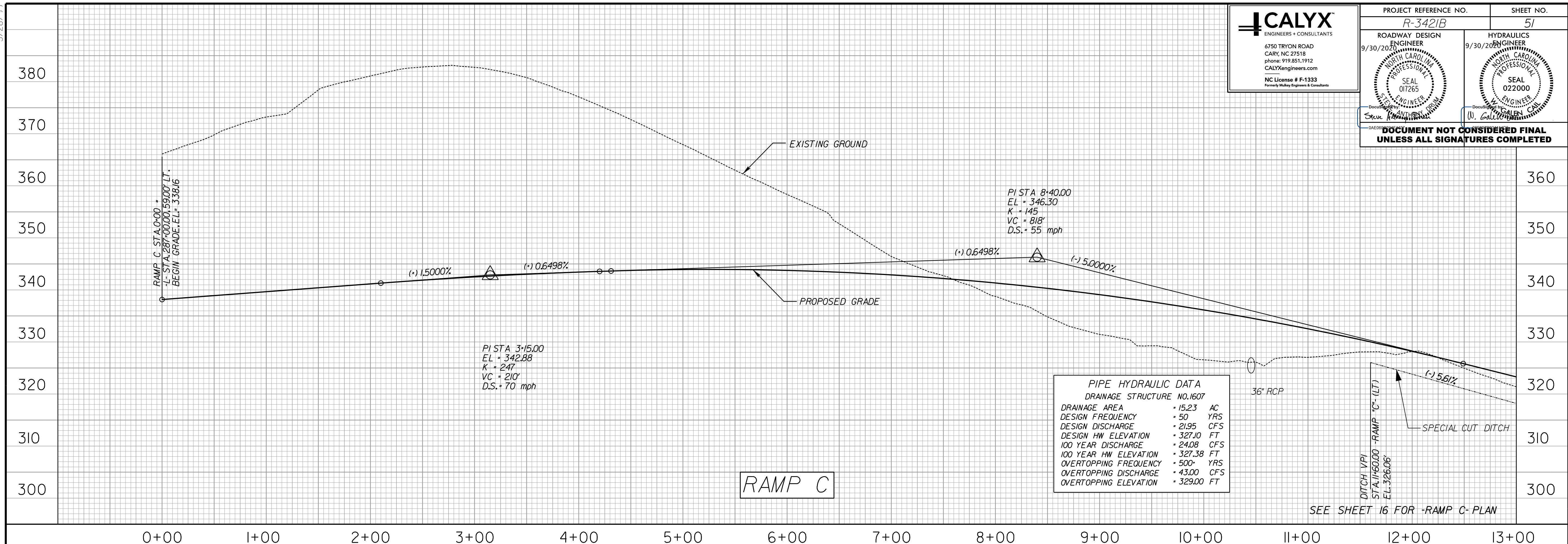


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PROJECT REFERENCE NO. <b>R-3421B</b>		SHEET NO. <b>51</b>
ROADWAY DESIGN ENGINEER 9/30/2006 SEAL 017265 NORTH CAROLINA PROFESSIONAL ENGINEER	HYDRAULICS ENGINEER 9/30/2006 SEAL 022000 NORTH CAROLINA PROFESSIONAL ENGINEER	

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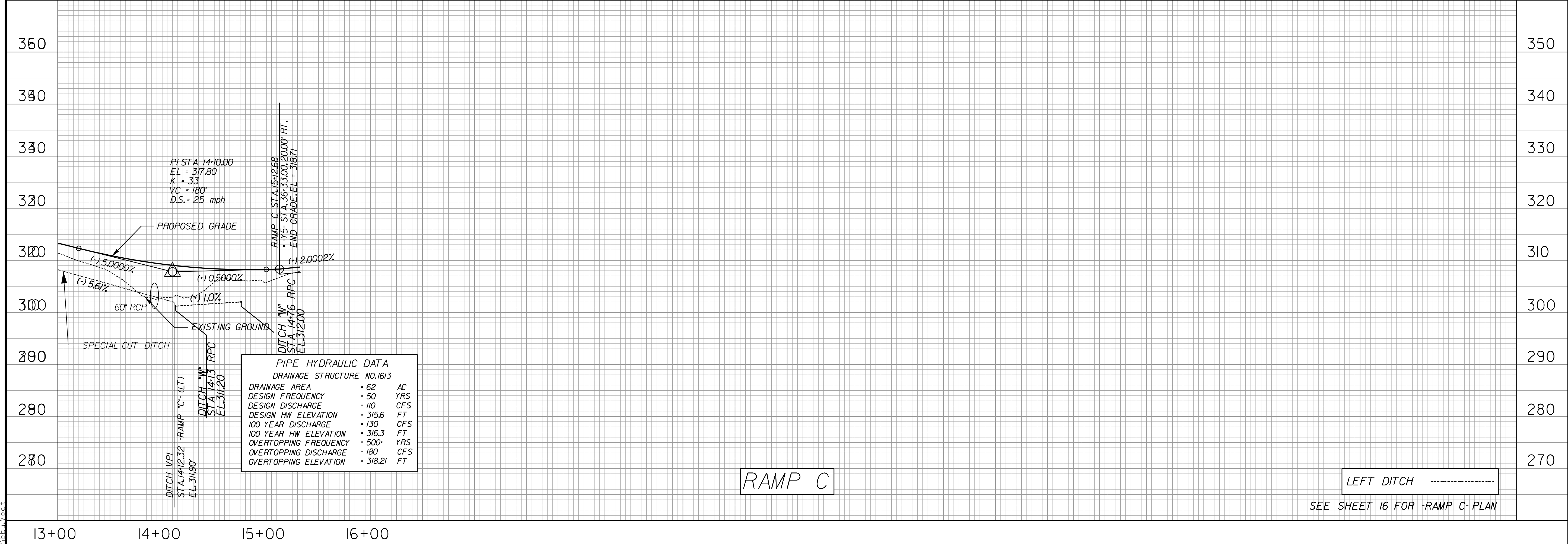


**PIPE HYDRAULIC DATA**  
DRAINAGE STRUCTURE NO.1607

DRAINAGE AREA	15.23	AC
DESIGN FREQUENCY	50	YRS
DESIGN DISCHARGE	2195	CFS
DESIGN HW ELEVATION	327.10	FT
100 YEAR DISCHARGE	24.08	CFS
100 YEAR HW ELEVATION	327.38	FT
OVERTOPPING FREQUENCY	500	YRS
OVERTOPPING DISCHARGE	43.00	CFS
OVERTOPPING ELEVATION	329.00	FT

**PIPE HYDRAULIC DATA**  
DRAINAGE STRUCTURE NO.1613

DRAINAGE AREA	62	AC
DESIGN FREQUENCY	50	YRS
DESIGN DISCHARGE	110	CFS
DESIGN HW ELEVATION	315.6	FT
100 YEAR DISCHARGE	130	CFS
100 YEAR HW ELEVATION	316.3	FT
OVERTOPPING FREQUENCY	500	YRS
OVERTOPPING DISCHARGE	180	CFS
OVERTOPPING ELEVATION	318.21	FT



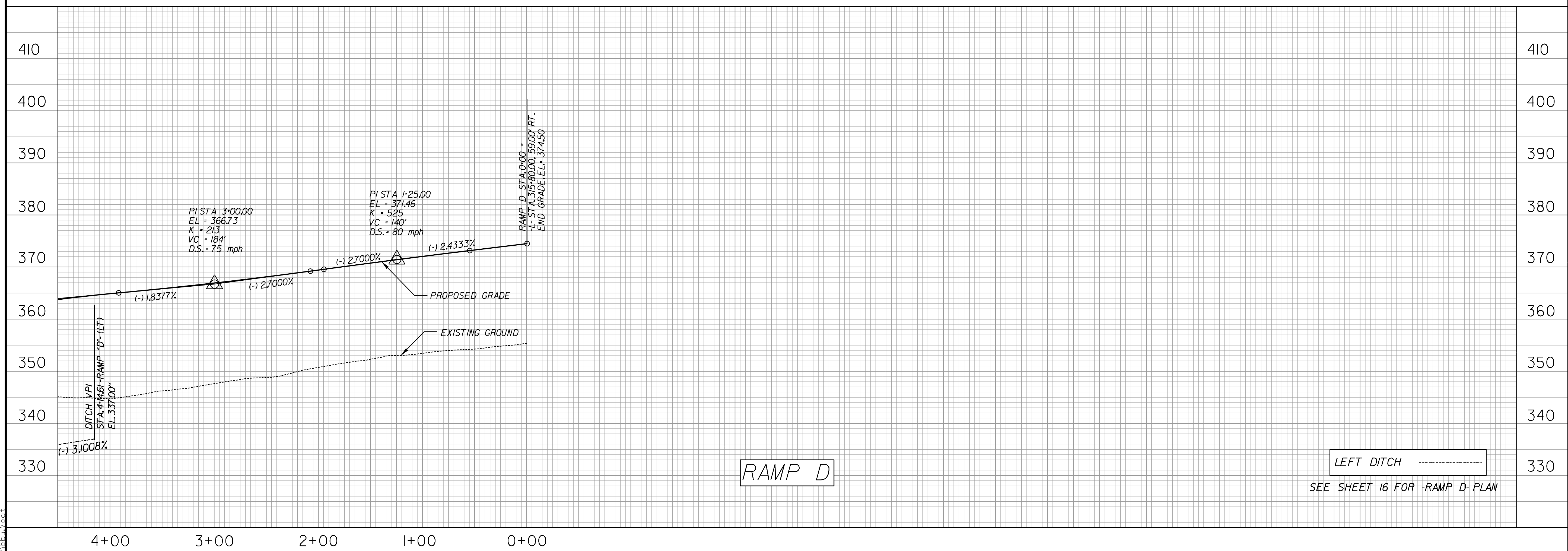
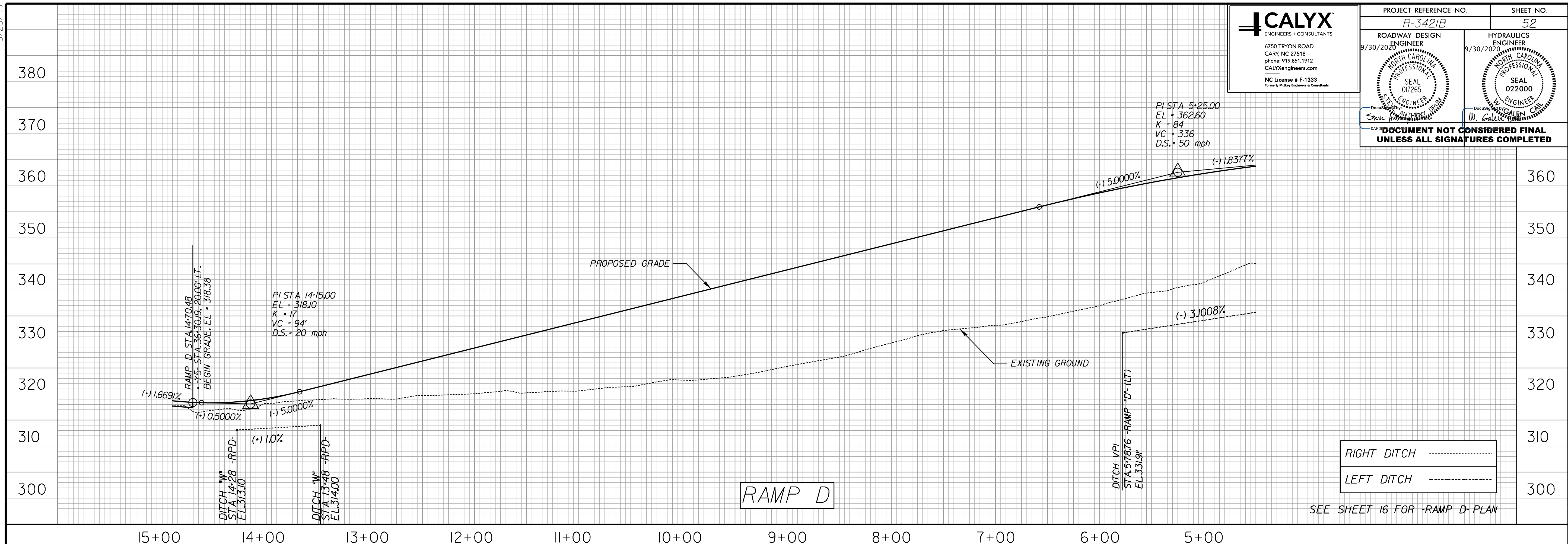
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LEFT DITCH  
SEE SHEET 16 FOR RAMP C-PLAN

5/28/99



PROJECT REFERENCE NO. <b>R-3421B</b>		SHEET NO. <b>52</b>
ROADWAY DESIGN ENGINEER 9/30/2020	HYDRAULICS ENGINEER 9/30/2020	
SEAL 017265	SEAL 022000	
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dabb





6750 TRYON ROAD  
CARY, NC 27518  
phone: 919.851.1912  
CALYXengineers.com  
NC License # F-1333

PROJECT REFERENCE NO.  
**R-3421B**

ROADWAY DESIGN  
ENGINEER  
8/13/2013

SHEET NO.  
**54**

HYDRAULICS  
ENGINEER

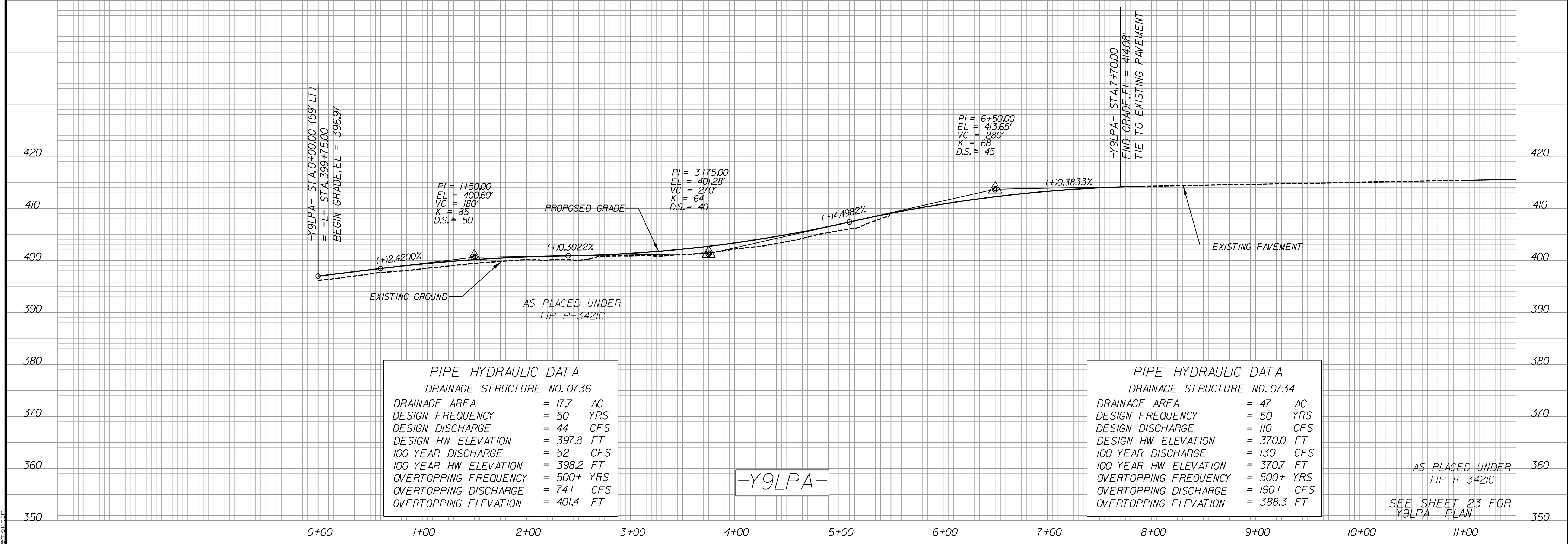
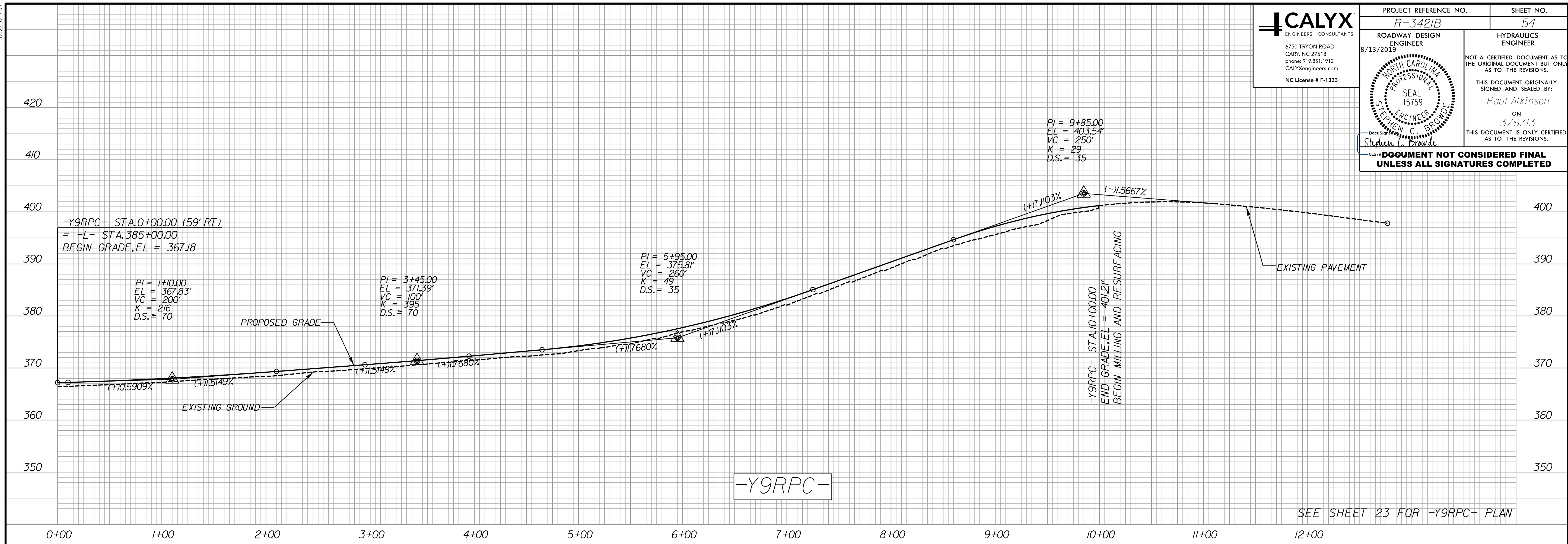
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THIS DOCUMENT ORIGINALLY SIGNED AND SEALED BY:  
*Paul Atkinson*

ON  
**3/6/13**

THIS DOCUMENT IS ONLY CERTIFIED AS TO THE REVISIONS.

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UNLESS ALL SIGNATURES COMPLETED



**PIPE HYDRAULIC DATA**  
DRAINAGE STRUCTURE NO. 0736

DRAINAGE AREA	= 17.7	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 44	CFS
DESIGN HW ELEVATION	= 397.8	FT
100 YEAR DISCHARGE	= 52	CFS
100 YEAR HW ELEVATION	= 398.2	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 74+	CFS
OVERTOPPING ELEVATION	= 401.4	FT

**PIPE HYDRAULIC DATA**  
DRAINAGE STRUCTURE NO. 0734

DRAINAGE AREA	= 47	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 110	CFS
DESIGN HW ELEVATION	= 370.0	FT
100 YEAR DISCHARGE	= 130	CFS
100 YEAR HW ELEVATION	= 370.7	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 190+	CFS
OVERTOPPING ELEVATION	= 388.3	FT

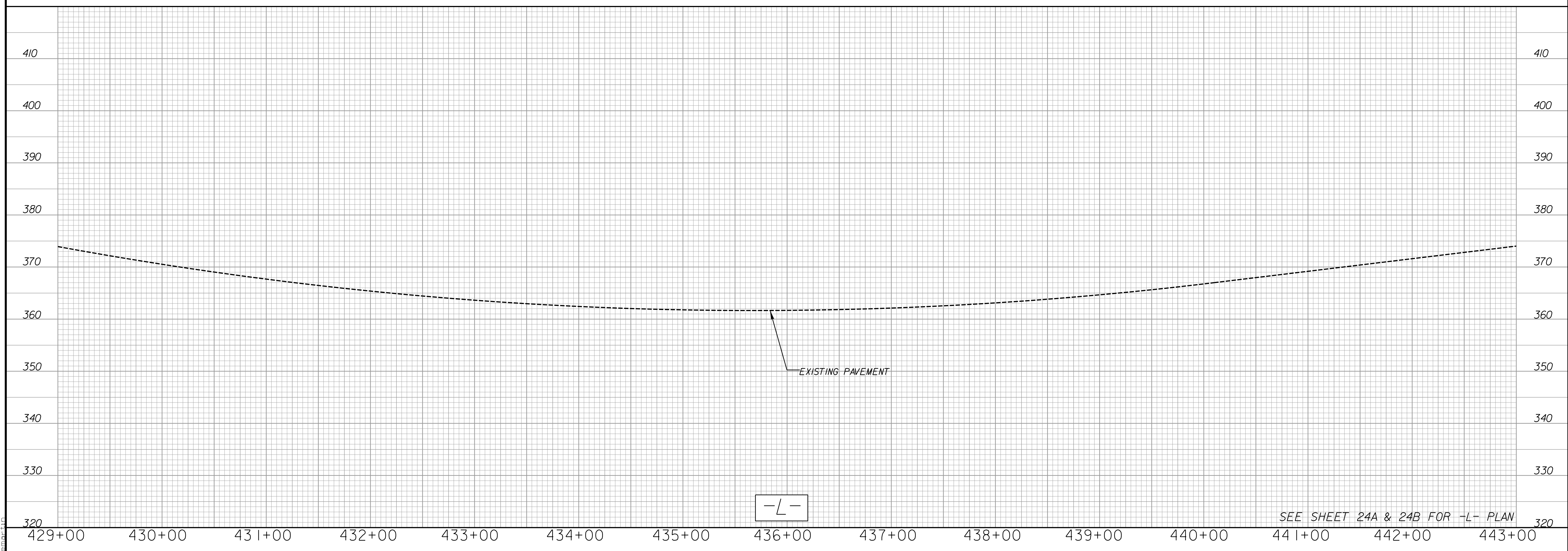
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 5/22/2013



5/28/99

<p>6750 TRYON ROAD CARY, NC 27518 phone: 919.851.1912 CALYXengineers.com NC License # F-1333</p>	PROJECT REFERENCE NO. <i>R-3421B</i>	SHEET NO. <i>55</i>
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**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

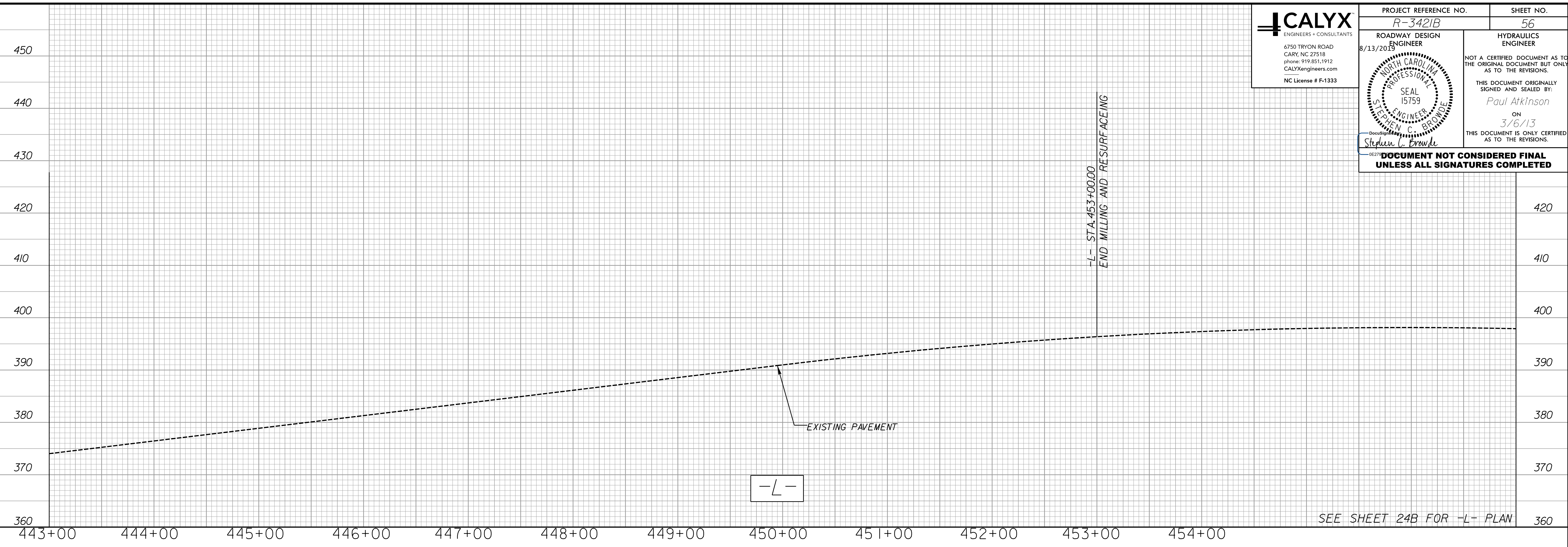


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PROJECT REFERENCE NO. <i>R-3421B</i>	SHEET NO. <i>56</i>
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<p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>	



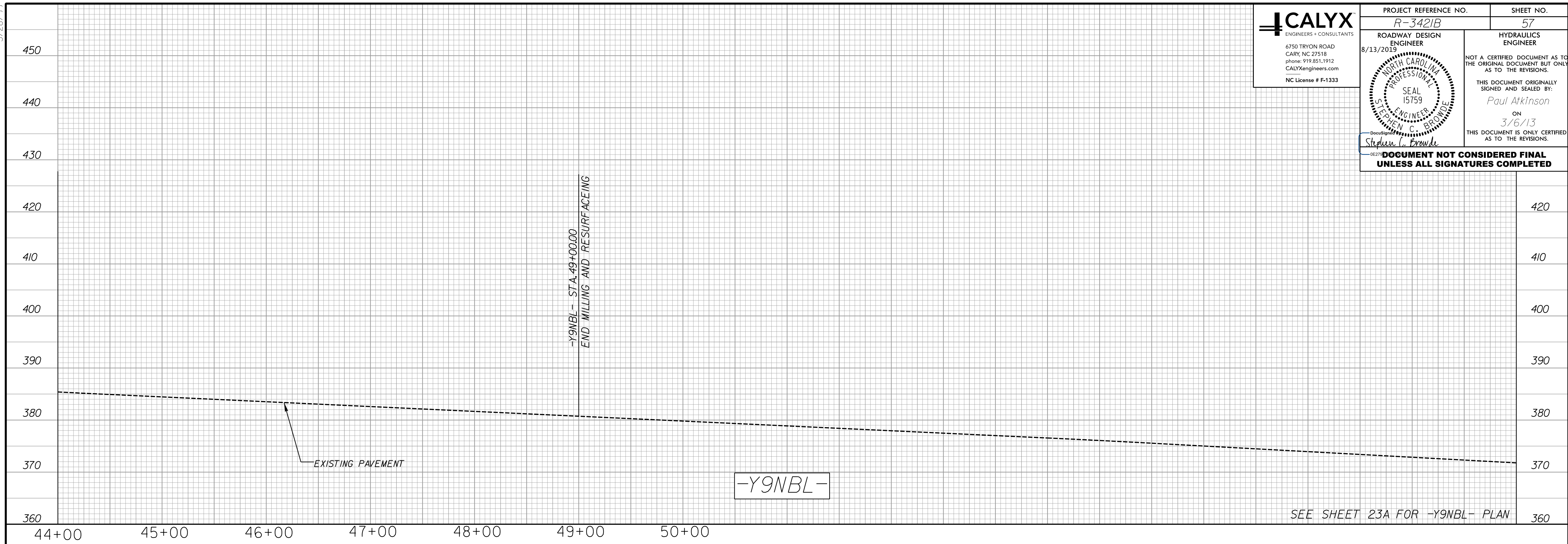
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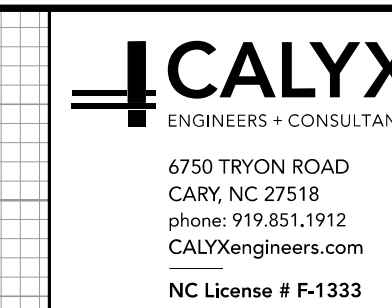


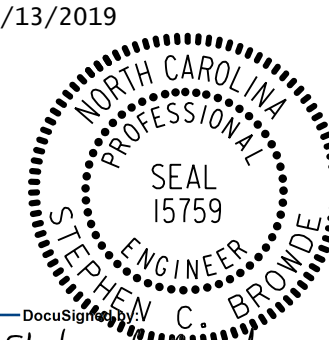
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<p>DocuSign <i>Stephen C. Browde</i></p> <p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>	



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PROJECT REFERENCE NO. <i>R-3421B</i>	SHEET NO. <i>58</i>
ROADWAY DESIGN ENGINEER 8/13/2019	HYDRAULICS ENGINEER
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