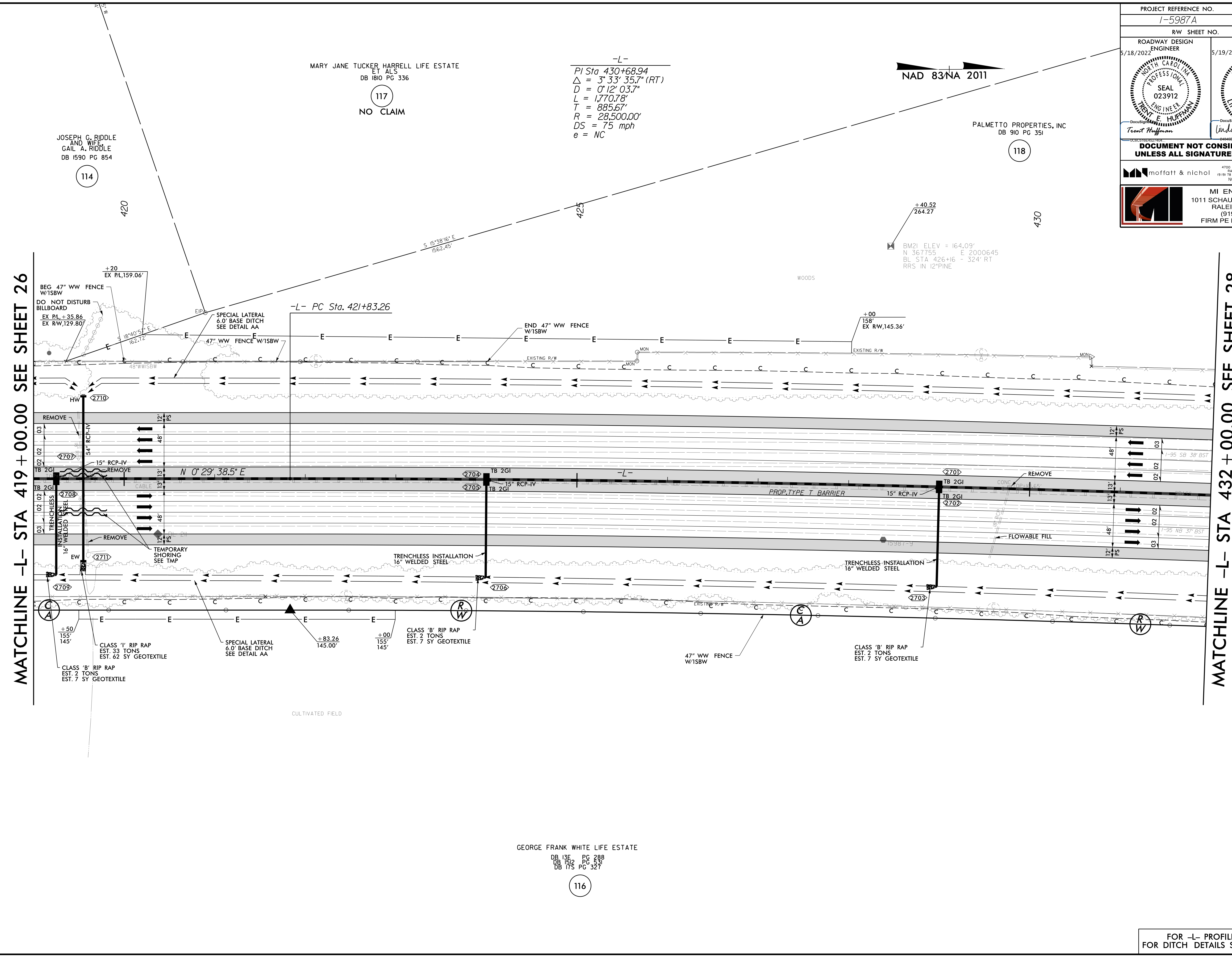


PROJECT REFERENCE NO. 1-5987A		SHEET NO. 27	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER 5/18/2022 Trent Hoffman		HYDRAULICS ENGINEER 5/19/2022 Linda J. J. J.	
SEAL 023912 Trent Hoffman		SEAL 33246 Linda J. J. J.	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
moffatt & nichol		4100 FALLS OF NEUSE ROAD, SUITE 300 RALEIGH, NORTH CAROLINA 27609 (919) 781-4626 VOICE (919) 781-4869 FAX NC License No.: F-0105	
MI ENGINEERING		1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671	



MATCHLINE -L- STA 419 + 00.00 SEE SHEET 26

MATCHLINE -L- STA 432 + 00.00 SEE SHEET 28

8.17.17.19  
5/2/2022  
D:\14611125\0500\_CAD\CAD\15987A\Roadway\Proj\15987A\_RDY\_PSH\_027.dgn

FOR -L- PROFILE SEE SHEET 66  
FOR DITCH DETAILS SEE SHEET 2D-3

8/17/99

PROJECT REFERENCE NO. 1-5987A		SHEET NO. 28	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER 5/18/2022 TERRY E. HUFFMAN		HYDRAULICS ENGINEER 5/19/2022 LINDA JOHNS	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
		<small>4100 FALLS OF NEUSE ROAD, SUITE 300 RALEIGH, NORTH CAROLINA 27609 (919) 781-4626 VOICE (919) 781-4869 FAX NC License No.: F-0105</small>	
		<b>MI ENGINEERING</b> 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671	

-L-  
 PI Sta 430+68.94  
 $\Delta = 3^{\circ} 33' 35.7''$  (RT)  
 $D = 0^{\circ} 12' 03.7''$   
 $L = 1,770.78'$   
 $T = 885.67'$   
 $R = 28,500.00'$   
 $DS = 75$  mph  
 $e = NC$

NAD 83/NA 2011

PALMETTO PROPERTIES, INC  
DB 910 PG 351

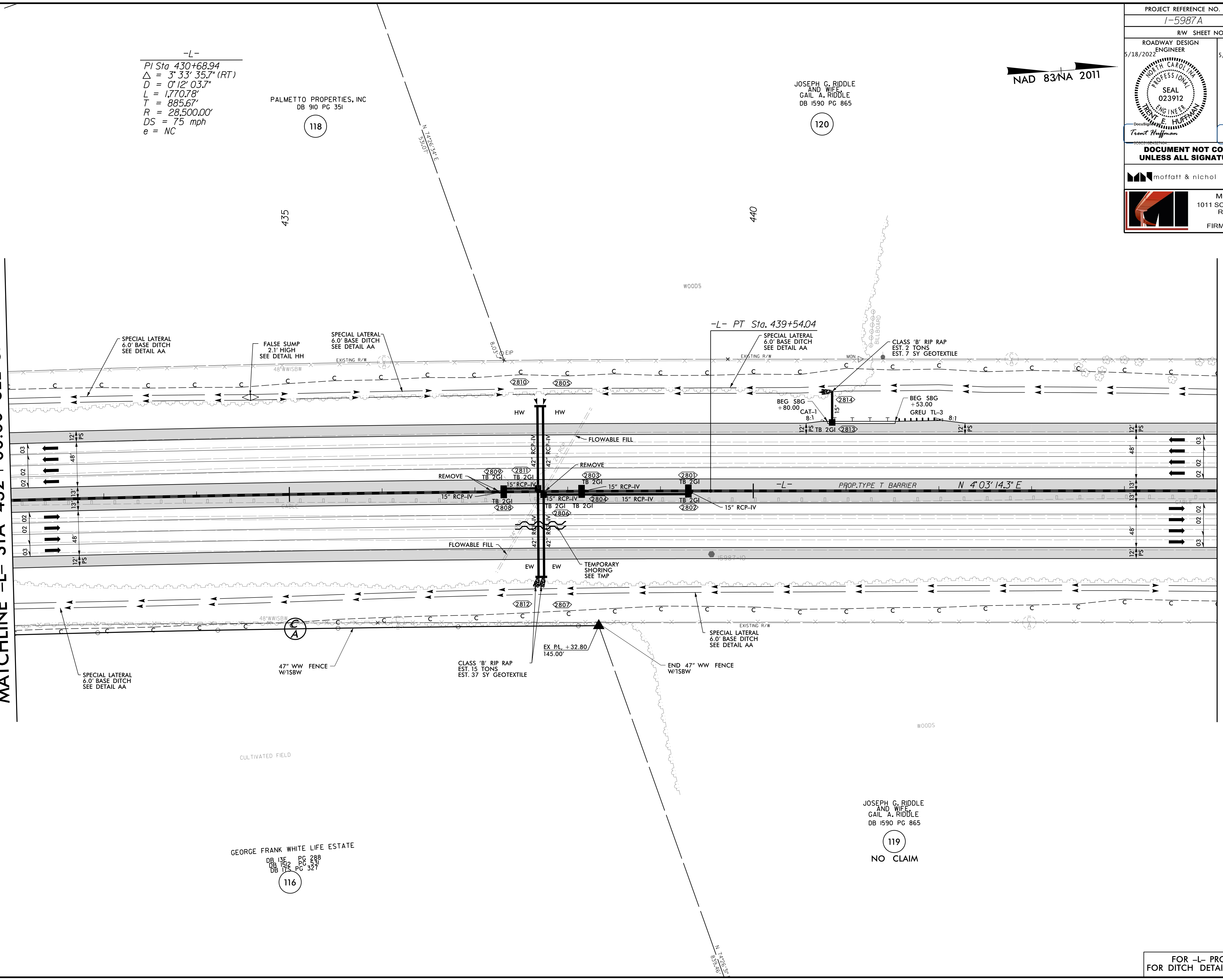
JOSEPH G. RIDDLE  
AND WIFE  
GAIL A. RIDDLE  
DB 1590 PG 865

GEORGE FRANK WHITE LIFE ESTATE  
DB 136 PG 288  
DB 152 PG 433  
DB 175 PG 327

JOSEPH G. RIDDLE  
AND WIFE  
GAIL A. RIDDLE  
DB 1590 PG 865

MATCHLINE -L- STA 432 + 00.00 SEE SHEET 27

MATCHLINE -L- STA 445 + 00.00 SEE SHEET 29



FOR -L- PROFILE SEE SHEET 67  
FOR DITCH DETAILS SEE SHEET 2D-3

8.17.19

PROJECT REFERENCE NO. 1-5987A		SHEET NO. 29	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022		
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
		4100 FALLS OF NEUSE ROAD, SUITE 300 RALEIGH, NORTH CAROLINA 27619 (919) 781-4626 VOICE (919) 781-4869 FAX NC License No.: F-0105	
		MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671	

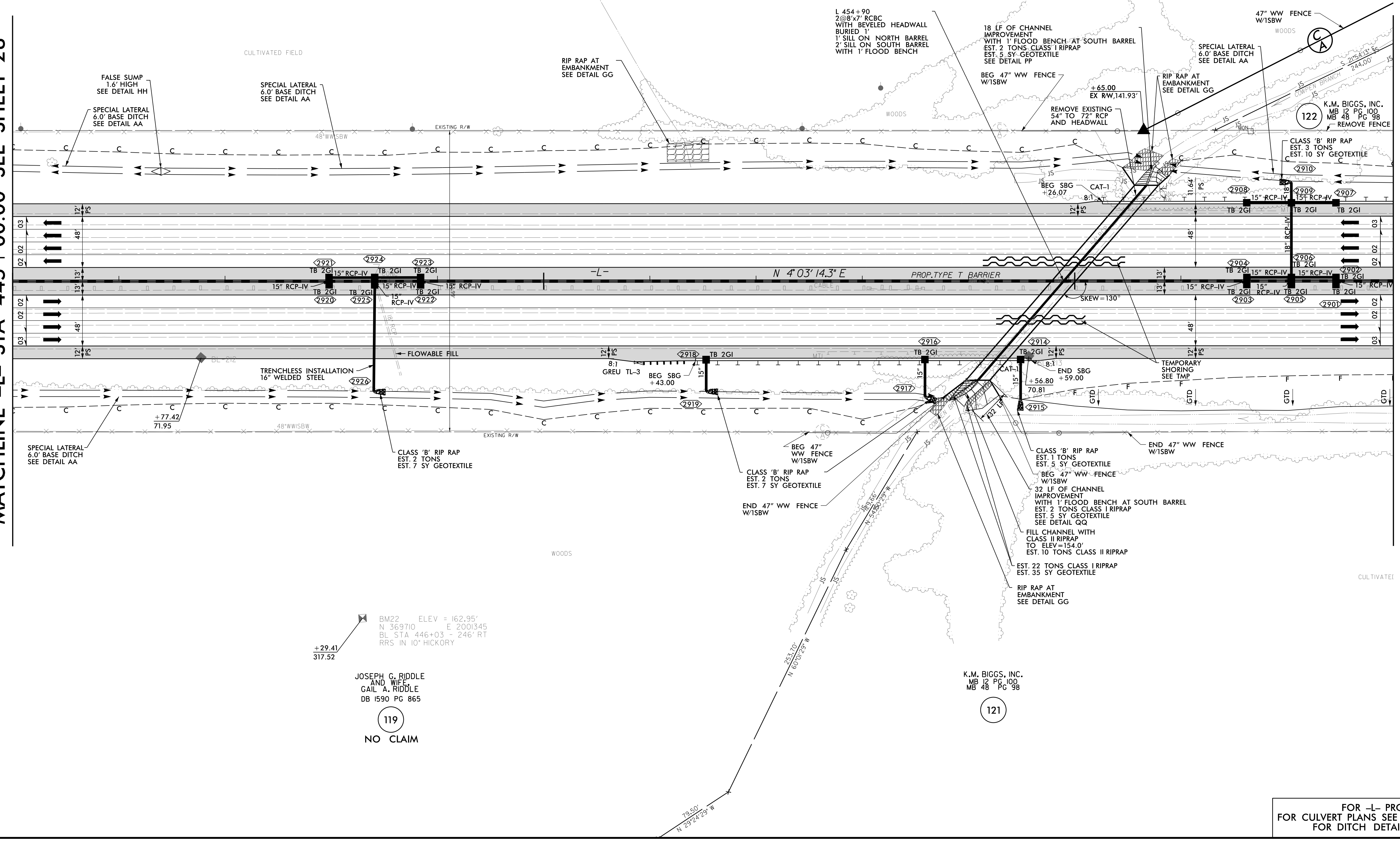
JOSEPH G. RIDDLE  
AND WIFE  
GAIL A. RIDDLE  
DB 1590 PG 865

120

NAD 83/NA 2011

MATCHLINE -L- STA 445 + 00.00 SEE SHEET 28

MATCHLINE -L- STA 458 + 00.00 SEE SHEET 30



BM22 ELEV = 162.95'  
N 369710 E 2001345  
BL STA 446+03 - 246' RT  
RRS IN 10' HICKORY

+29.41  
317.52

JOSEPH G. RIDDLE  
AND WIFE  
GAIL A. RIDDLE  
DB 1590 PG 865

119

NO CLAIM

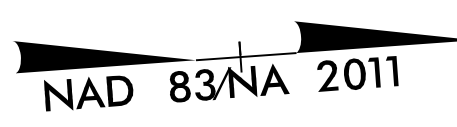
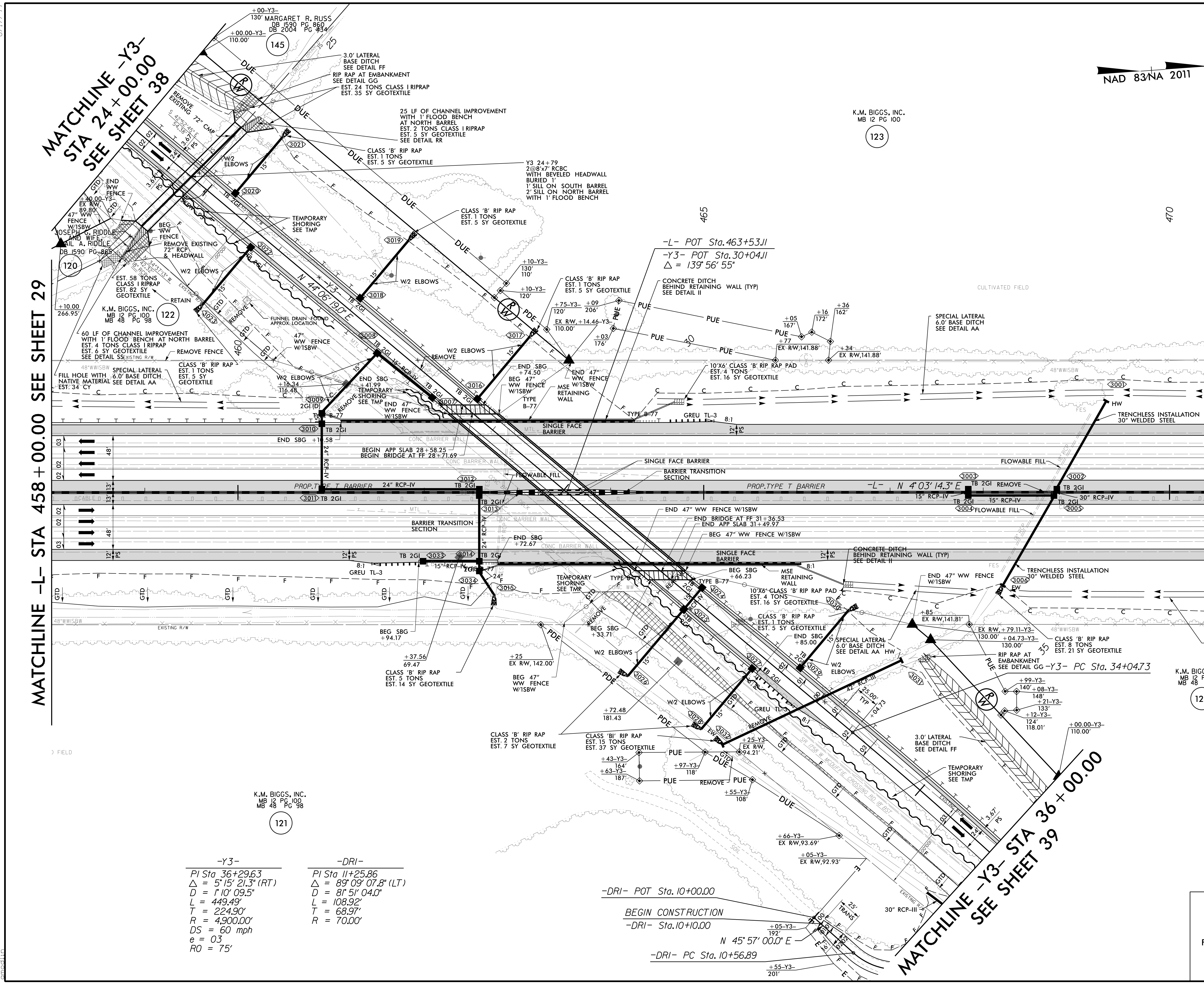
K.M. BIGGS, INC.  
MB 12 PG 100  
MB 48 PG 98

121

FOR -L- PROFILE SEE SHEET 68  
FOR CULVERT PLANS SEE C13-1 THRU C13-8  
FOR DITCH DETAILS SEE SHEET 2D-3

D:\2022\1125\0500\CAD\15987A\Roadway\Proj\15987A\_RDY\_PSH\_029.dgn

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 30
RW SHEET NO.	
ROADWAY DESIGN 5/18/2022 ENGINEER	HYDRAULICS 5/19/2022 ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER: P-0671	



MATCHLINE -L- STA 458 + 00.00 SEE SHEET 29

MATCHLINE -L- STA 472 + 00.00 SEE SHEET 31

MATCHLINE -Y3-  
STA 24 + 00.00  
SEE SHEET 38

MATCHLINE -Y3- STA 36 + 00.00  
SEE SHEET 39

-Y3-	-DRI-
PI Sta. 36+29.63	PI Sta. 11+25.86
$\Delta = 5^{\circ}15'21.3''$ (RT)	$\Delta = 89^{\circ}09'07.8''$ (LT)
D = 1'10'09.5"	D = 8'51'04.0"
L = 449.49'	L = 108.92'
T = 224.90'	T = 68.97'
R = 4,900.00'	R = 70.00'
DS = 60 mph	
e = 0.3	
RO = 75'	

-DRI- POT Sta. 10+00.00  
BEGIN CONSTRUCTION  
-DRI- Sta. 10+10.00  
N 45°57'00.0" E  
-DRI- PC Sta. 10+56.89

- PROPOSED PAVEMENT REMOVAL
- FOR -L- PROFILE SEE SHEET 69
- FOR -Y3- PROFILE SEE SHEET 89
- FOR -DRI- PROFILE SEE SHEET 90
- FOR STRUCTURE PLANS SEE S3-1 THRU S3-29
- FOR WALL PLANS SEE W-1 THRU W-11
- FOR CULVERT PLANS SEE C14-1 THRU C14-10
- FOR DITCH DETAILS SEE SHEET 2D-3

B:\6\2022\1125\0500\_CAD\15987A\Roadway\Proj\15987A\_RDY\_PSH\_030.dgn

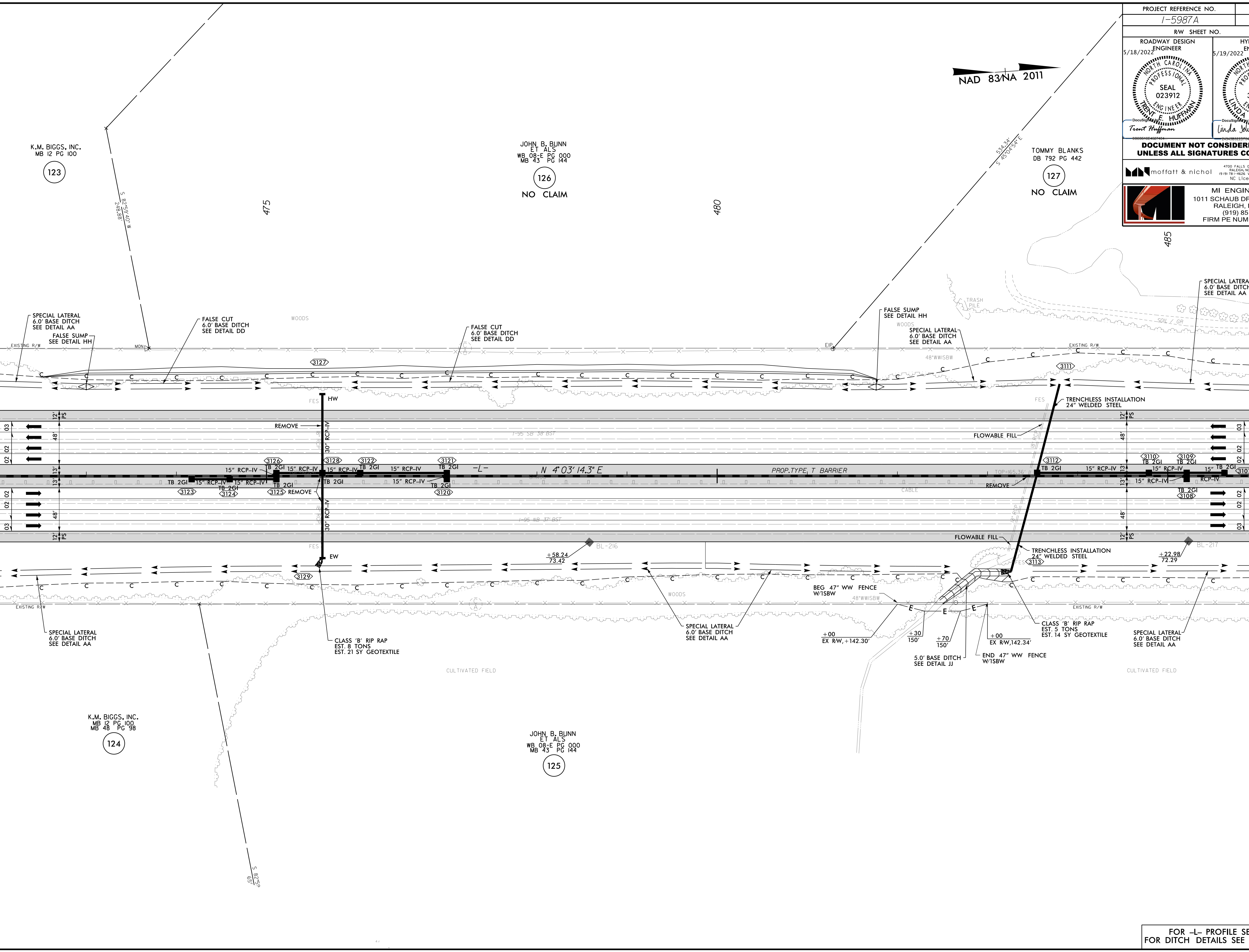
8/17/99

PROJECT REFERENCE NO. 1-5987A		SHEET NO. 31	
RW SHEET NO. 5/18/2022 ENGINEER		HYDRAULICS SHEET NO. 5/19/2022 ENGINEER	
<p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p>			
		<p>MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER: P-0671</p>	

NAD 83/NA 2011

MATCHLINE -L- STA 472 + 00.00 SEE SHEET 30

MATCHLINE -L- STA 486 + 00.00 SEE SHEET 32



K.M. BIGGS, INC.  
MB 12 PG 100  
123

JOHN B. BUNN  
ET ALS  
WB 08-E PG 000  
MB 43 PG 144  
126  
NO CLAIM

TOMMY BLANKS  
DB 792 PG 442  
127  
NO CLAIM

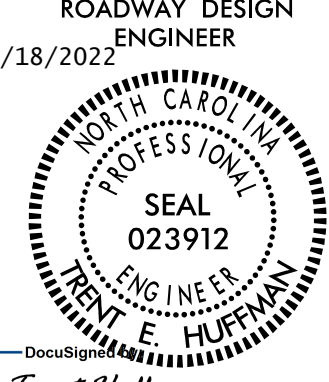
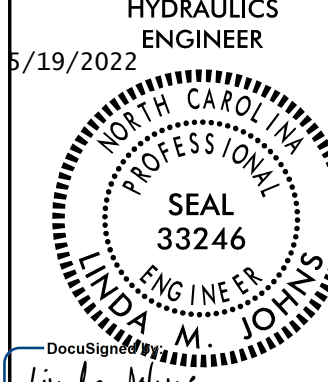


K.M. BIGGS, INC.  
MB 12 PG 100  
MB 48 PG 98  
124

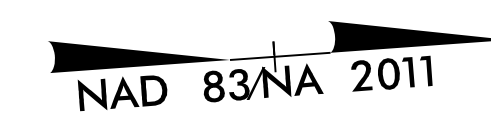
JOHN B. BUNN  
ET ALS  
WB 08-E PG 000  
MB 43 PG 144  
125

5/2/2022  
D:\1125\0500\CAD\15987A\Roadway\Proj\15987A\_RDY\_PSH\_031.dgn

FOR -L- PROFILE SEE SHEET 70  
FOR DITCH DETAILS SEE SHEET 2D-3

8.17.2022

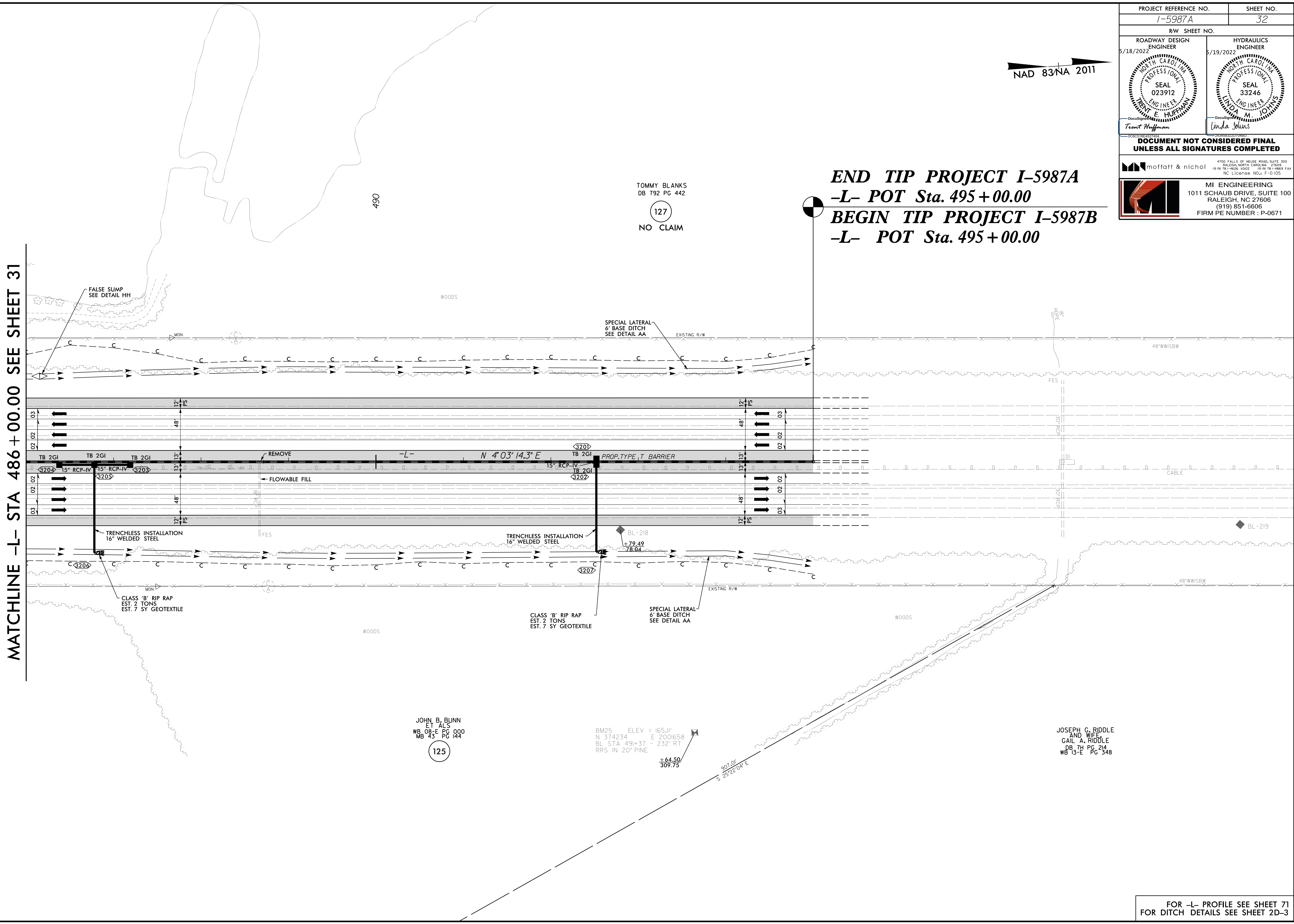
PROJECT REFERENCE NO. <b>I-5987A</b>	SHEET NO. <b>32</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
<p><b>DOCUMENT NOT CONSIDERED FINAL</b> <b>UNLESS ALL SIGNATURES COMPLETED</b></p>	
	
	



**END TIP PROJECT I-5987A**  
**-L- POT Sta. 495 + 00.00**  
**BEGIN TIP PROJECT I-5987B**  
**-L- POT Sta. 495 + 00.00**

TOMMY BLANKS  
 DB 792 PG 442  
 (127)  
 NO CLAIM

MATCHLINE -L- STA 486 + 00.00 SEE SHEET 31



JOHN B. BUNN  
 ET ALS  
 WB 08-E PG 000  
 MB 43 PG 144  
 (125)

BM25 ELEV = 165.11'  
 N 374234 E 2001658  
 BL STA 491+37 - 232' RT  
 RRS IN 20' PINE  
 +64.50  
 309.75

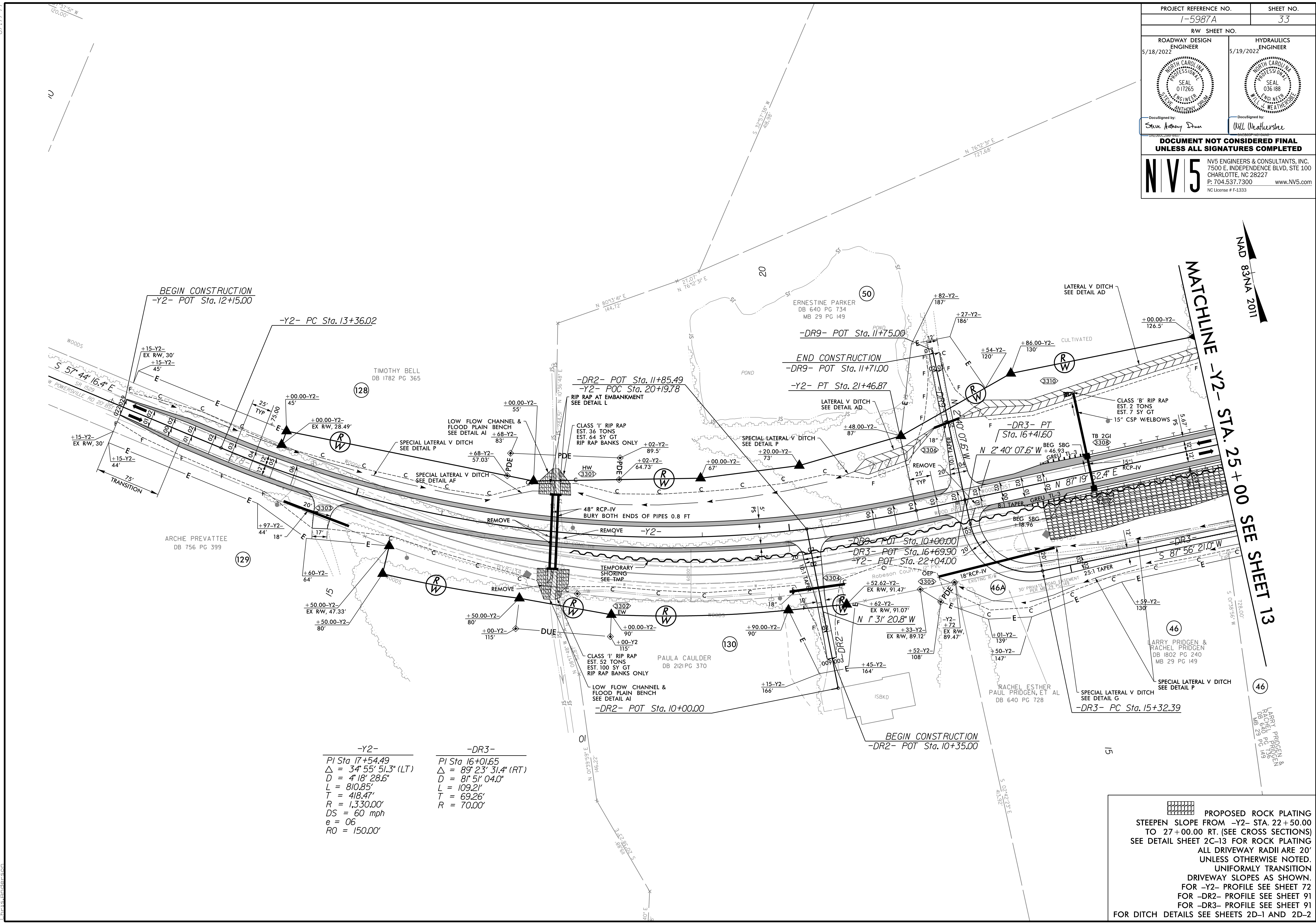
JOSEPH G. RIDDLE  
 AND WIFE  
 GAIL A. RIDDLE  
 DB 7H PG 214  
 WB 13-E PG 348

FOR -L- PROFILE SEE SHEET 71  
 FOR DITCH DETAILS SEE SHEET 2D-3

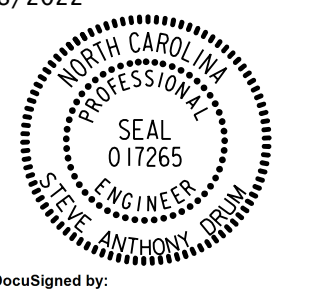

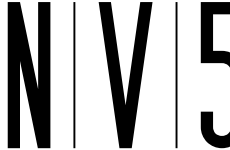
5/24/2022 11:25:05.00 CAD: I-5987A-Roadway\Proj\I-5987A-RDY\_PSH\_032.dgn

PROJECT REFERENCE NO. <b>1-5987A</b>		SHEET NO. <b>33</b>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER 5/18/2022		HYDRAULICS ENGINEER 5/19/2022	
DocuSigned by: <b>Steve Anthony Dren</b>		DocuSigned by: <b>Will Weathersee</b>	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
<b>NV5</b>		NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	

8.17.19  
 5/15/2022  
 R:\Projects\15987A\15987A\_RDY\_PSH\_033.dgn  
 Chris Anderson

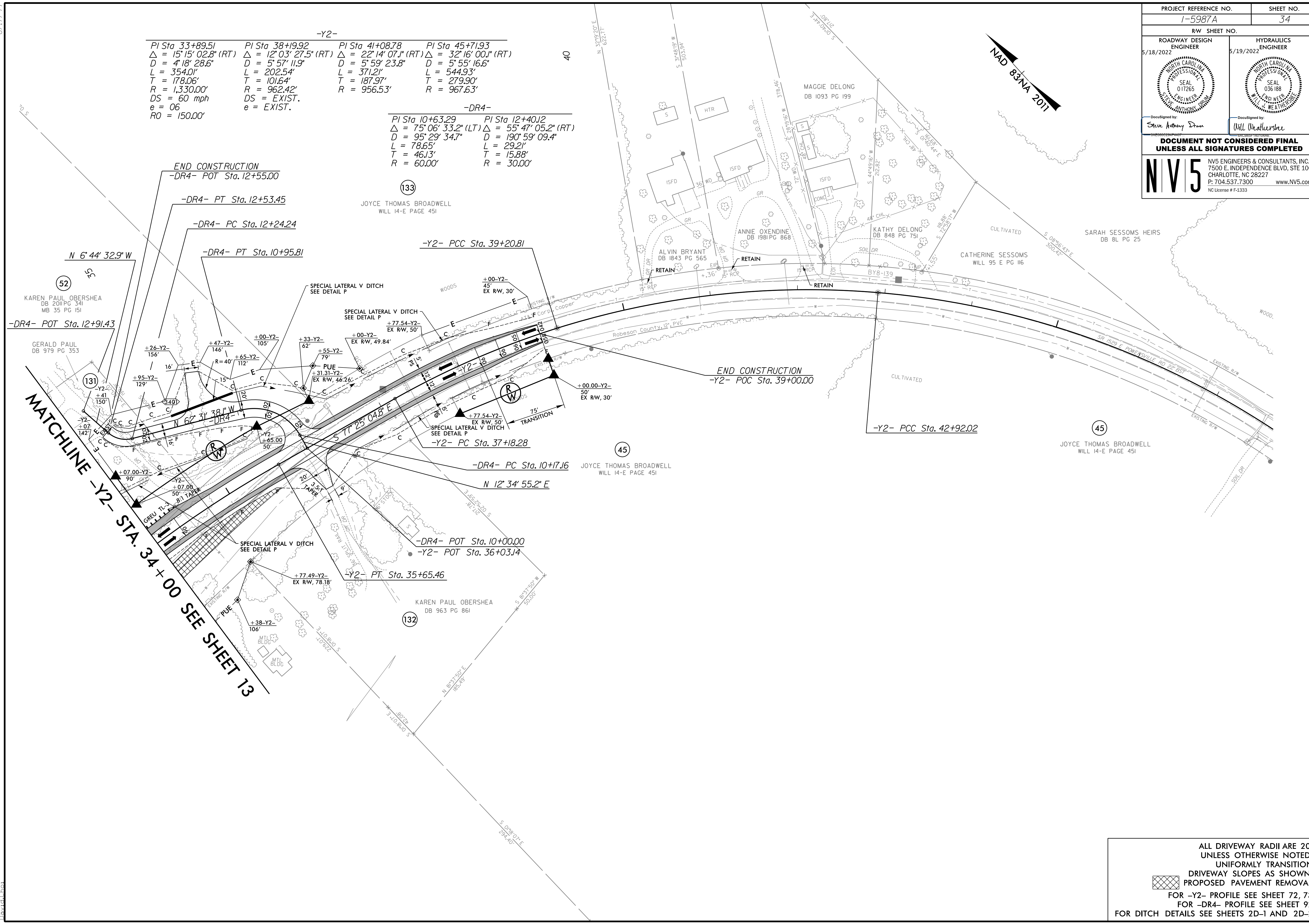


-Y2-	-DR3-
PI Sta 17+54.49	PI Sta 16+01.65
$\Delta = 34^{\circ} 55' 51.3"$ (LT)	$\Delta = 89^{\circ} 23' 31.4"$ (RT)
D = 4' 18" 28.6"	D = 8' 51" 04.0"
L = 810.85'	L = 109.21'
T = 418.47'	T = 69.26'
R = 1,330.00'	R = 70.00'
DS = 60 mph	
e = 06	
RO = 150.00'	

PROJECT REFERENCE NO. <b>1-5987A</b>		SHEET NO. <b>34</b>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER 5/18/2022		HYDRAULICS ENGINEER 5/19/2022	
			
Designed by <b>Steve Anthony Dean</b>		Designed by <b>Will Weatherman</b>	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
		NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	

-Y2-			
PI Sta 33+89.51 Δ = 15° 15' 02.8" (RT) D = 4' 18" 28.6" L = 354.01' T = 178.06' R = 1,330.00' DS = 60 mph e = 06 RO = 150.00'	PI Sta 38+19.92 Δ = 12° 03' 27.5" (RT) D = 5' 57" 11.9" L = 202.54' T = 101.64' R = 962.42' DS = EXIST. e = EXIST.	PI Sta 41+08.78 Δ = 22° 14' 07.1" (RT) D = 5' 59" 23.8" L = 371.21' T = 187.97' R = 956.53'	PI Sta 45+71.93 Δ = 32° 16' 00.1" (RT) D = 5' 55" 16.6" L = 544.93' T = 279.90' R = 967.63'

-DR4-	
PI Sta 10+63.29 Δ = 75° 06' 33.2" (LT) D = 95° 29' 34.7" L = 78.65' T = 46.13' R = 60.00'	PI Sta 12+40.12 Δ = 55° 47' 05.2" (RT) D = 190° 59' 09.4" L = 29.21' T = 15.88' R = 30.00'



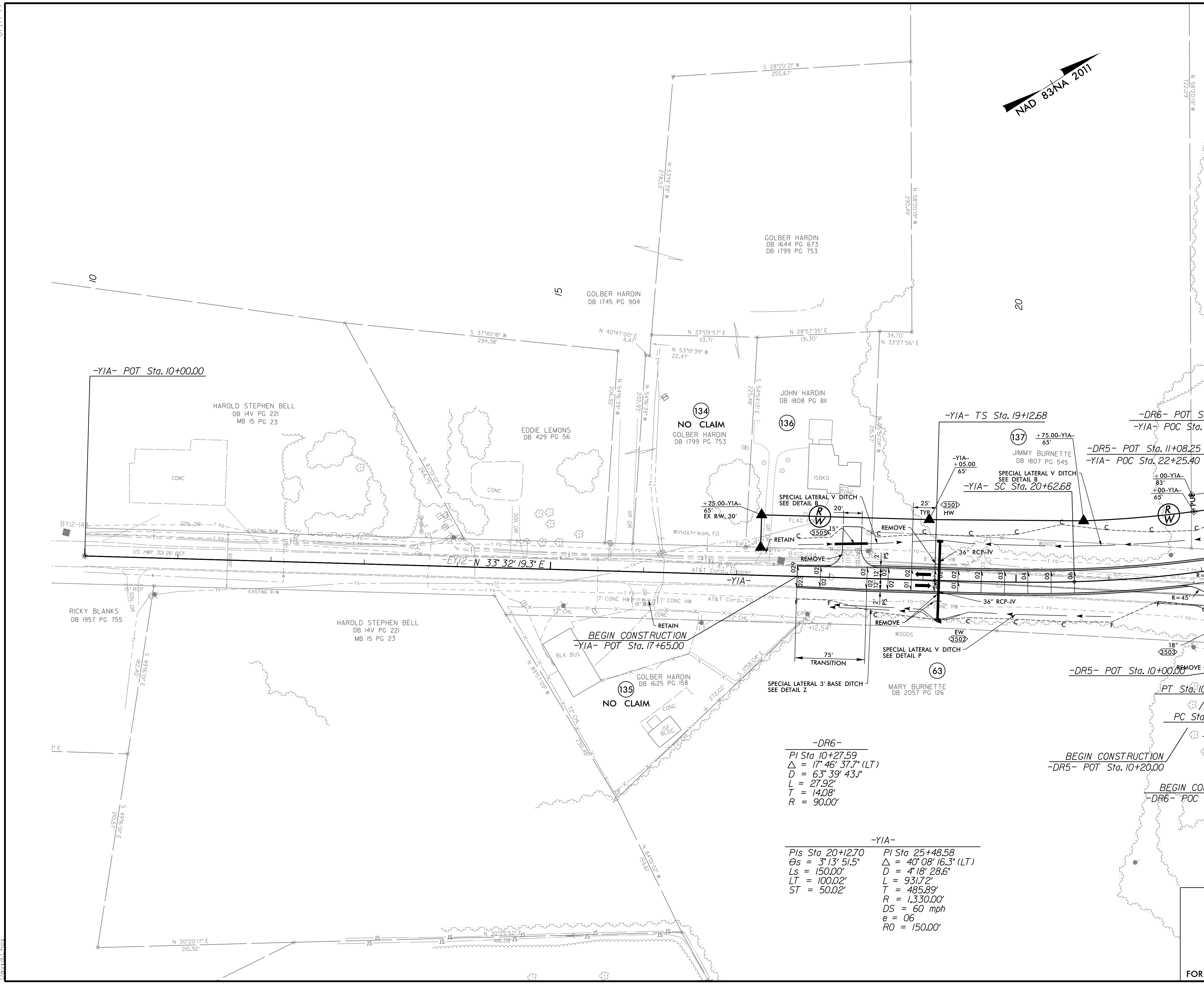
ALL DRIVEWAY RADII ARE 20'  
UNLESS OTHERWISE NOTED.  
UNIFORMLY TRANSITION  
DRIVEWAY SLOPES AS SHOWN.  
PROPOSED PAVEMENT REMOVAL  
FOR -Y2- PROFILE SEE SHEET 72, 73  
FOR -DR4- PROFILE SEE SHEET 92  
FOR DITCH DETAILS SEE SHEETS 2D-1 AND 2D-2

3/30/2022  
R:\Projects\15987A\RDY\_PSH\_034.dgn  
David



8/17/99

PROJECT REFERENCE NO. 1-5987A		SHEET NO. 35	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER 5/18/2022		HYDRAULICS ENGINEER 5/19/2022	
DocuSigned by: Steve Anthony Dean		DocuSigned by: Will Weatherbee	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
<b>NV5</b>		NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



MATCHLINE -YIA- STA. 23+00 SEE SHEET 17



**-DR6-**  
 PI Sta 10+27.59  
 $\Delta = 17' 46' 37.7''$  (LT)  
 $D = 63' 39' 43.1''$   
 $L = 27.92'$   
 $T = 14.08'$   
 $R = 90.00'$

**-YIA-**  
 PIs Sta 20+12.70 PI Sta 25+48.58  
 $\Delta s = 3' 13' 51.5''$   $\Delta = 40' 08' 16.3''$  (LT)  
 $Ls = 150.00'$   $D = 4' 18' 28.6''$   
 $LT = 100.02'$   $L = 931.72'$   
 $ST = 50.02'$   $T = 485.89'$   
 $R = 1,330.00'$   
 $DS = 60$  mph  
 $e = 06$   
 $RO = 150.00'$

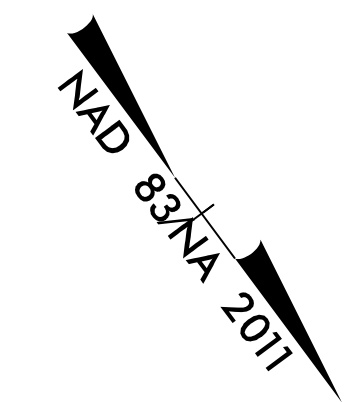
ALL DRIVEWAY RADII ARE 20'  
 UNLESS OTHERWISE NOTED.  
 UNIFORMLY TRANSITION  
 DRIVEWAY SLOPES AS SHOWN.  
 PROPOSED PAVEMENT REMOVAL  
 FOR -YIA- PROFILE SEE SHEET 74  
 FOR -DR5- PROFILE SEE SHEET 92  
 FOR -DR6- PROFILE SEE SHEET 93  
 FOR DITCH DETAILS SEE SHEETS 2D-1 AND 2D-2

3/30/2022  
 R:\Projects\15987A\_RDW\_PSH\_035.dgn  
 David

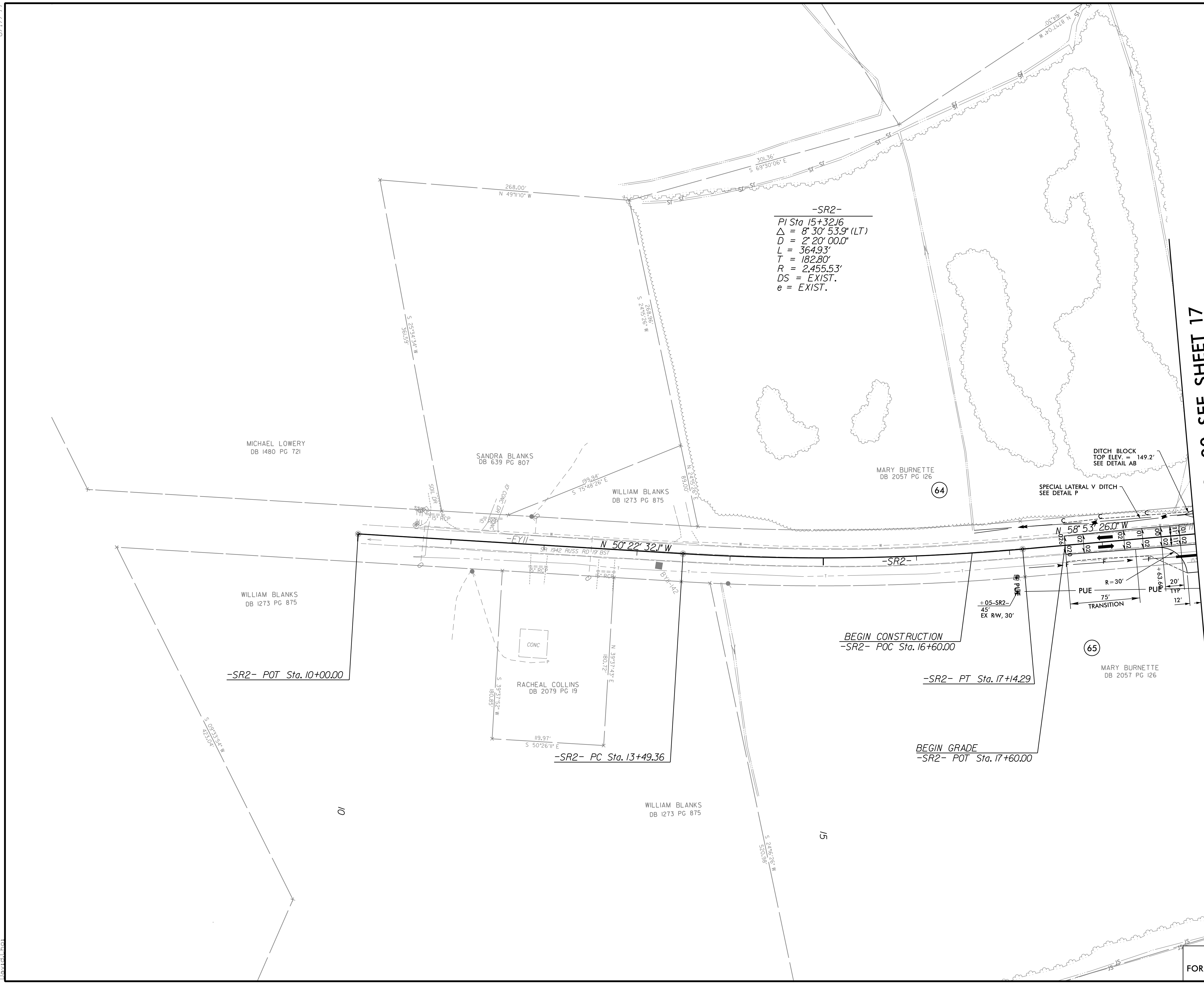
8/17/99

PROJECT REFERENCE NO.		SHEET NO.	
1-5987A		36	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER 5/18/2022		HYDRAULICS ENGINEER 5/19/2022	
			
DocuSigned by: Steve Anthony Dean		DocuSigned by: Will Weathersee	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
<b>NV5</b>		NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	

-SR2-  
 PI Sta 15+32.16  
 $\Delta = 8^{\circ} 30' 53.9" (LT)$   
 $D = 2^{\circ} 20' 00.0"$   
 $L = 364.93'$   
 $T = 182.80'$   
 $R = 2,455.53'$   
 $DS = EXIST.$   
 $e = EXIST.$



MATCHLINE -SR2- STA. 19 + 00 SEE SHEET 17



3/30/2022  
 R:\Projects\15987A\_R0Y\_PSH\_036.dgn  
 David

FOR -SR2- PROFILE SEE SHEET 76  
 FOR DITCH DETAILS SEE SHEETS 2D-1 AND 2D-2

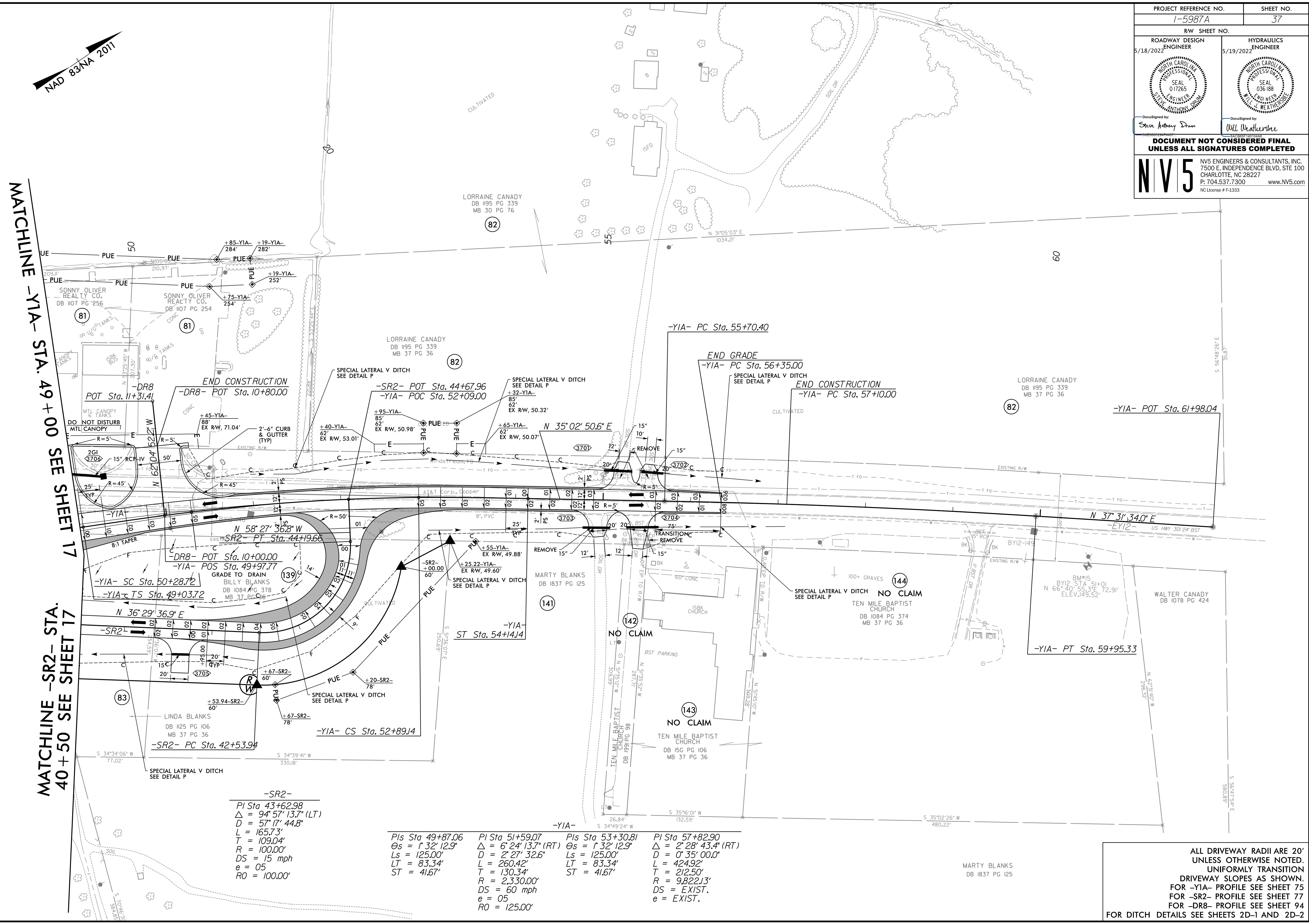
8.17.7.99



PROJECT REFERENCE NO. 1-5987A		SHEET NO. 37	
ROADWAY DESIGN ENGINEER 5/18/2022		HYDRAULICS ENGINEER 5/19/2022	
DocuSigned by: Steve Anthony Dren		DocuSigned by: Will Watershee	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
NV5		NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	

MATCHLINE -YIA- STA. 49 + 00 SEE SHEET 17

MATCHLINE -SR2- STA. 40 + 50 SEE SHEET 17



-SR2-  
 PI Sta 43+62.98  
 $\Delta = 94' 57'' 13.7''$  (LT)  
 $D = 57' 17'' 44.8''$   
 $L = 165.73'$   
 $T = 109.04'$   
 $R = 100.00'$   
 $DS = 15$  mph  
 $e = 05$   
 $RO = 100.00'$

PIs Sta 49+87.06  
 $\Theta_s = 1' 32'' 12.9''$   
 $L_s = 125.00'$   
 $LT = 83.34'$   
 $ST = 41.67'$

PI Sta 51+59.07  
 $\Delta = 6' 24'' 13.7''$  (RT)  
 $D = 2' 27'' 32.6''$   
 $L = 260.42'$   
 $T = 130.34'$   
 $R = 2,330.00'$   
 $DS = 60$  mph  
 $e = 05$   
 $RO = 125.00'$

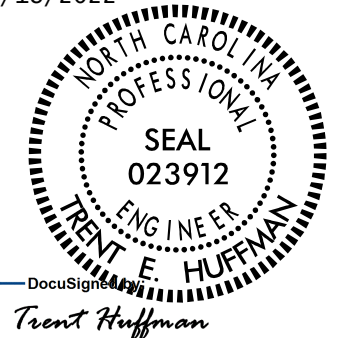
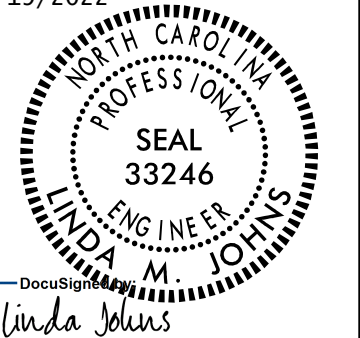


-YIA-  
 PIs Sta 53+30.81  
 $\Theta_s = 1' 32'' 12.9''$   
 $L_s = 125.00'$   
 $LT = 83.34'$   
 $ST = 41.67'$

PI Sta 57+82.90  
 $\Delta = 2' 28'' 43.4''$  (RT)  
 $D = 0' 35'' 00.0''$   
 $L = 424.92'$   
 $T = 212.50'$   
 $R = 9,822.13'$   
 $DS = EXIST.$   
 $e = EXIST.$

ALL DRIVEWAY RADII ARE 20'  
 UNLESS OTHERWISE NOTED.  
 UNIFORMLY TRANSITION  
 DRIVEWAY SLOPES AS SHOWN.  
 FOR -YIA- PROFILE SEE SHEET 75  
 FOR -SR2- PROFILE SEE SHEET 77  
 FOR -DR8- PROFILE SEE SHEET 94  
 FOR DITCH DETAILS SEE SHEETS 2D-1 AND 2D-2

3/30/2022  
 R:\Projects\15987A\RDY\_PSH\_037.dgn  
 David

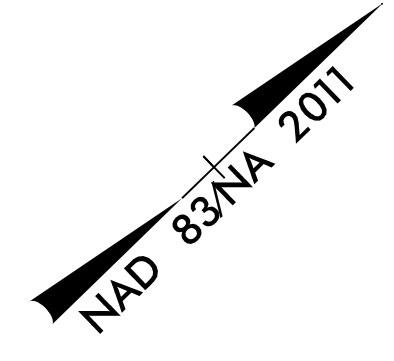
8/17/99

PROJECT REFERENCE NO. 1-5987A		SHEET NO. 38	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER 5/18/2022 Trent Hoffman		HYDRAULICS ENGINEER 5/19/2022 Linda Johns	
			
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
		<small>4700 FALLS OF NEUSE ROAD, SUITE 300 RALEIGH, NORTH CAROLINA 27609 (919) 781-4626 VOICE (919) 781-4869 FAX NC License No.: F-0105</small>	
		<b>MI ENGINEERING</b> 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671	

+06.97  
399.00

BM23 ELEV = 167.58'  
N 370.463 E 1999725  
BY17 STA 9+44 - 412' LT  
RRS IN 12" PINE

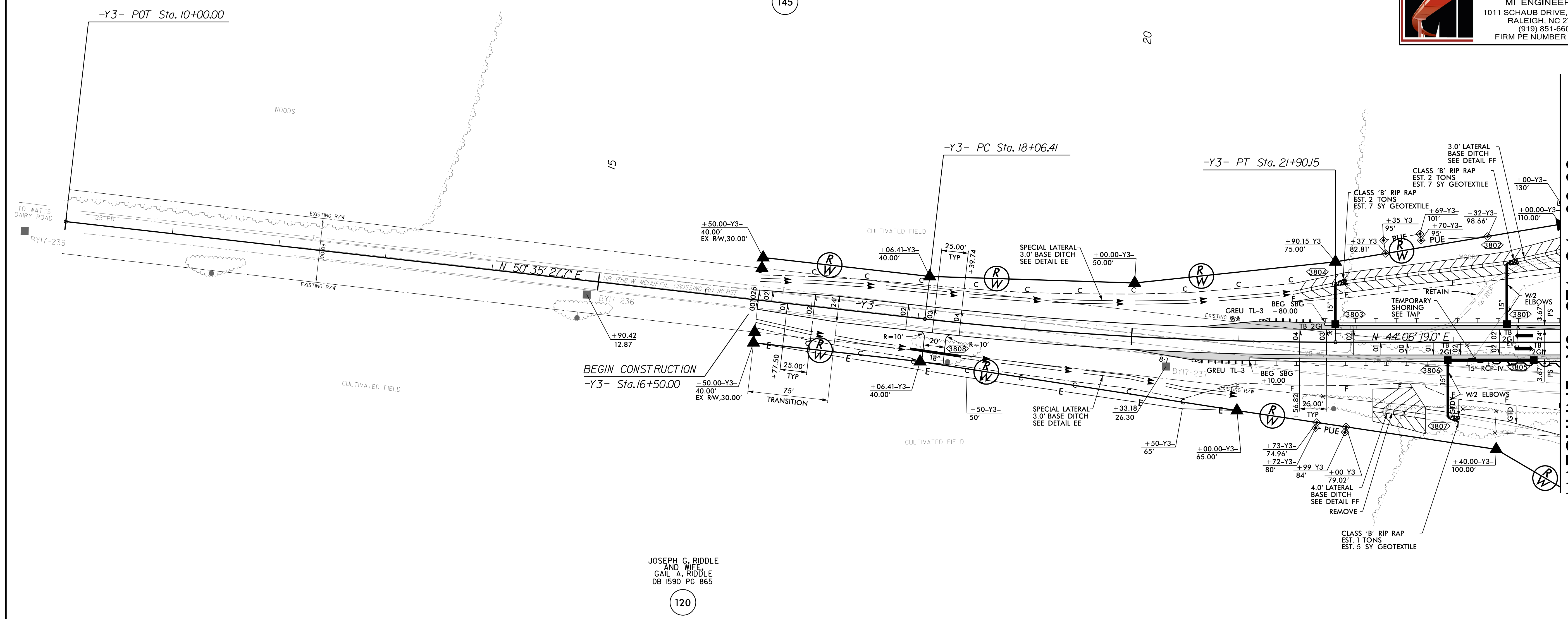
-Y3-  
PI Sta 19+98.48  
 $\Delta = 6' 29'' 08.7''$  (LT)  
D = 1' 41'' 24.5"  
L = 383.74'  
T = 192.08'  
R = 3,390.00'  
DS = 60 mph  
e = 04  
RO = 100'



MARGARET R. RUSS  
DB 1590 PG 860  
DB 2004 PG 434

145

20



JOSEPH G. RIDDLE  
AND WIFE  
GAIL A. RIDDLE  
DB 1590 PG 865

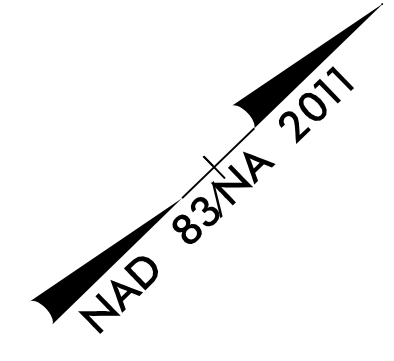
120

MATCHLINE -Y3- STA 24+00.00  
SEE SHEET 30

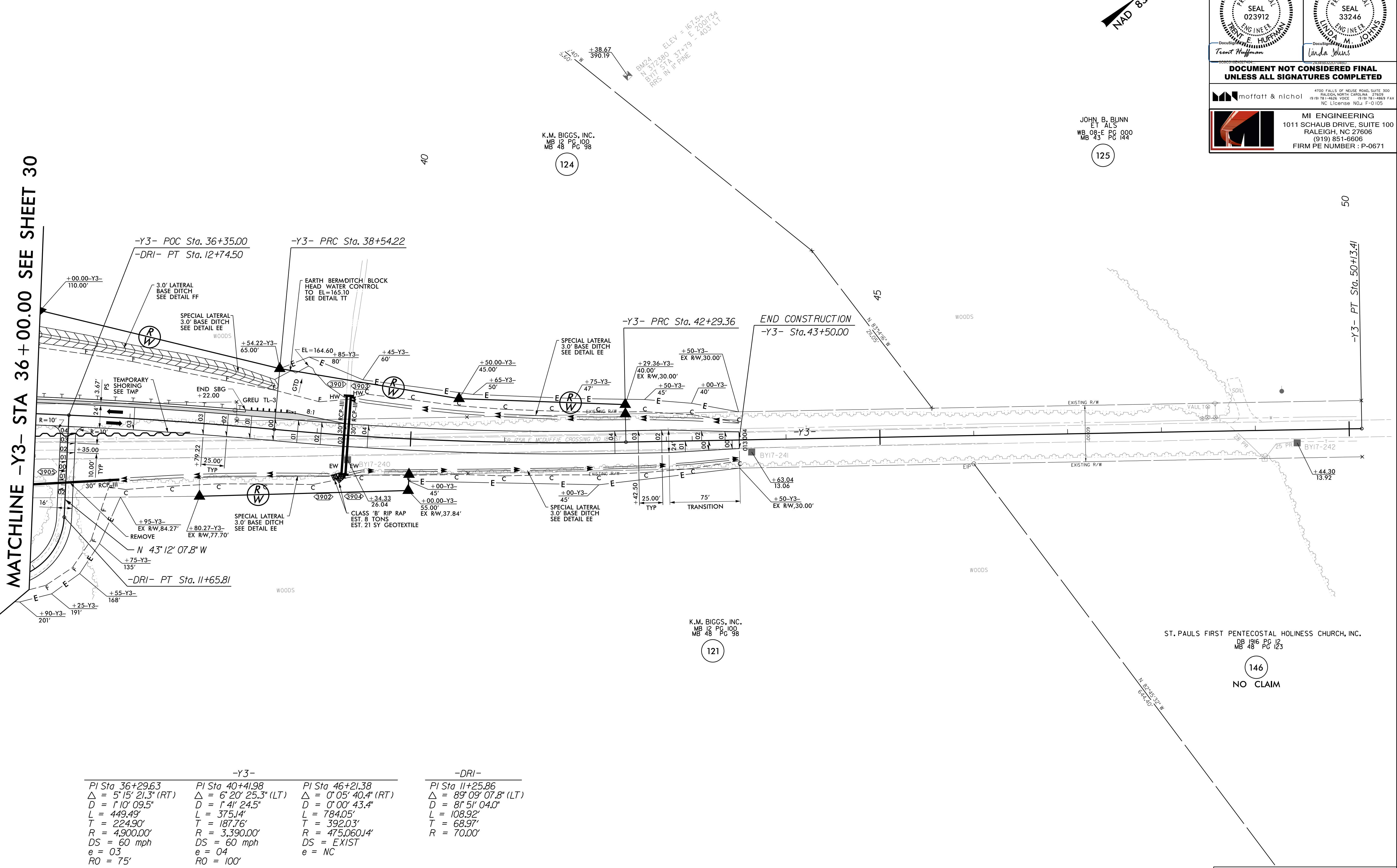
5/2/2022  
D:\161125\0500\CAD\15987A\Roadway\Proj\15987A\_RDY\_PSH\_038.dgn

8.17.19

PROJECT REFERENCE NO. <b>1-5987A</b>		SHEET NO. <b>39</b>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER 5/18/2022		HYDRAULICS ENGINEER 5/19/2022	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
		<small>4100 FALLS OF NEUSE ROAD, SUITE 300 RALEIGH, NORTH CAROLINA 27609 (919) 781-4626 VOICE (919) 781-4869 FAX NC License No.: F-0105</small>	
		<small>1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27606 (919) 851-6606 FIRM PE NUMBER : P-0671</small>	



MATCHLINE -Y3- STA 36 + 00.00 SEE SHEET 30



-Y3-			-DRI-		
PI Sta 36+29.63	PI Sta 40+41.98	PI Sta 46+21.38	PI Sta 11+25.86		
$\Delta = 5' 15' 21.3''$ (RT)	$\Delta = 6' 20' 25.3''$ (LT)	$\Delta = 0' 05' 40.4''$ (RT)	$\Delta = 89' 09' 07.8''$ (LT)		
D = 1' 10' 09.5"	D = 1' 41' 24.5"	D = 0' 00' 43.4"	D = 81' 51' 04.0"		
L = 449.49'	L = 375.14'	L = 784.05'	L = 108.92'		
T = 224.90'	T = 187.76'	T = 392.03'	T = 68.97'		
R = 4,900.00'	R = 3,390.00'	R = 475,060.14'	R = 70.00'		
DS = 60 mph	DS = 60 mph	DS = EXIST			
e = 03	e = 04	e = NC			
RO = 75'	RO = 100'				

FOR -Y3- PROFILE SEE SHEETS 89 & 90  
FOR -DRI- PROFILE SEE SHEET 90  
FOR DITCH DETAILS SEE SHEET 2D-3

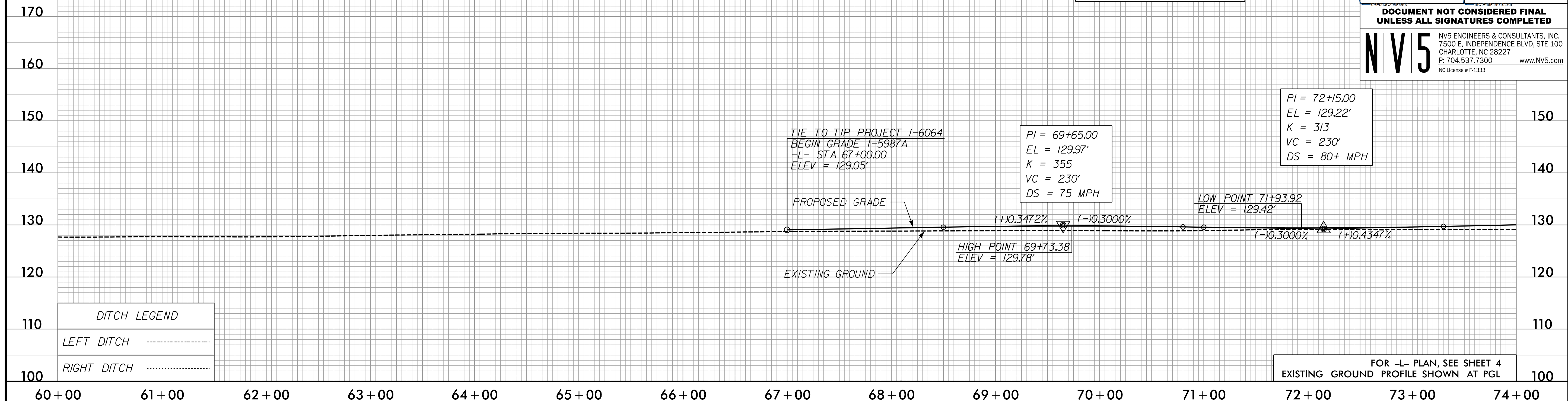
D:\2022\1125\0500\CAD\CAD\15987A\Roadway\Proj\15987A\_RDY\_PSH\_039.dgn

5/28/2022

# -L- SB

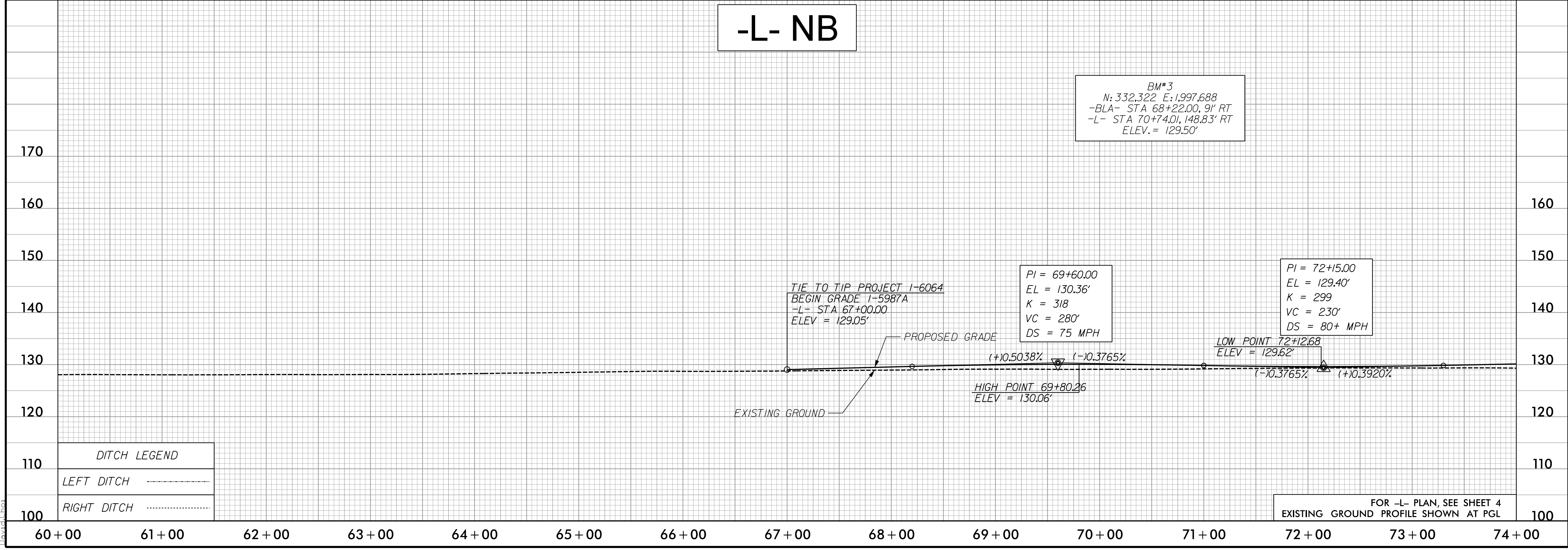
PROJECT REFERENCE NO. 1-5987A	SHEET NO. 40
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Dean	DocuSigned by: Will Mathershe
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<small>NV5 ENGINEERS &amp; CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333</small>	

BM\*3  
N: 332,322 E: 1,997,688  
-BLA- STA 68+22.00, 9' RT  
-L- STA 70+74.01, 148.83' RT  
ELEV. = 129.50'



# -L- NB

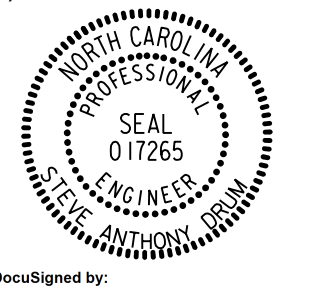
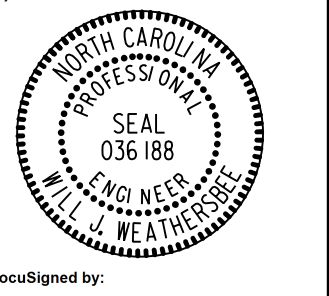
BM\*3  
N: 332,322 E: 1,997,688  
-BLA- STA 68+22.00, 9' RT  
-L- STA 70+74.01, 148.83' RT  
ELEV. = 129.50'

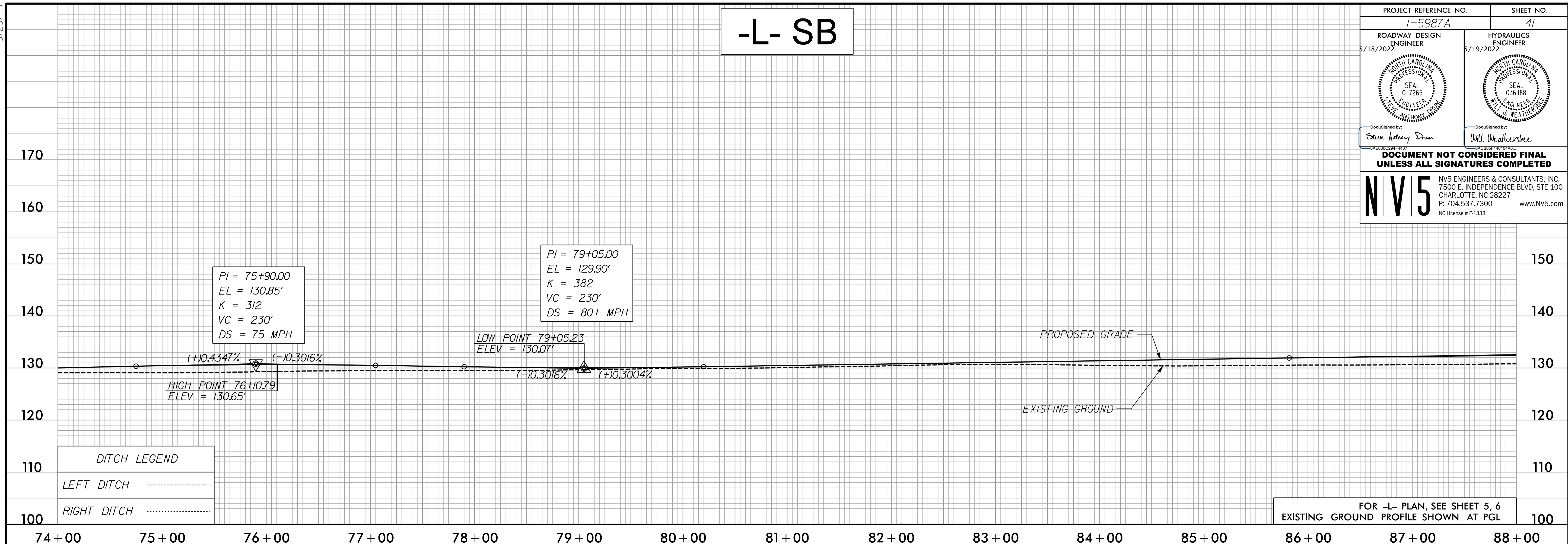


5/19/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_40.dgn  
David

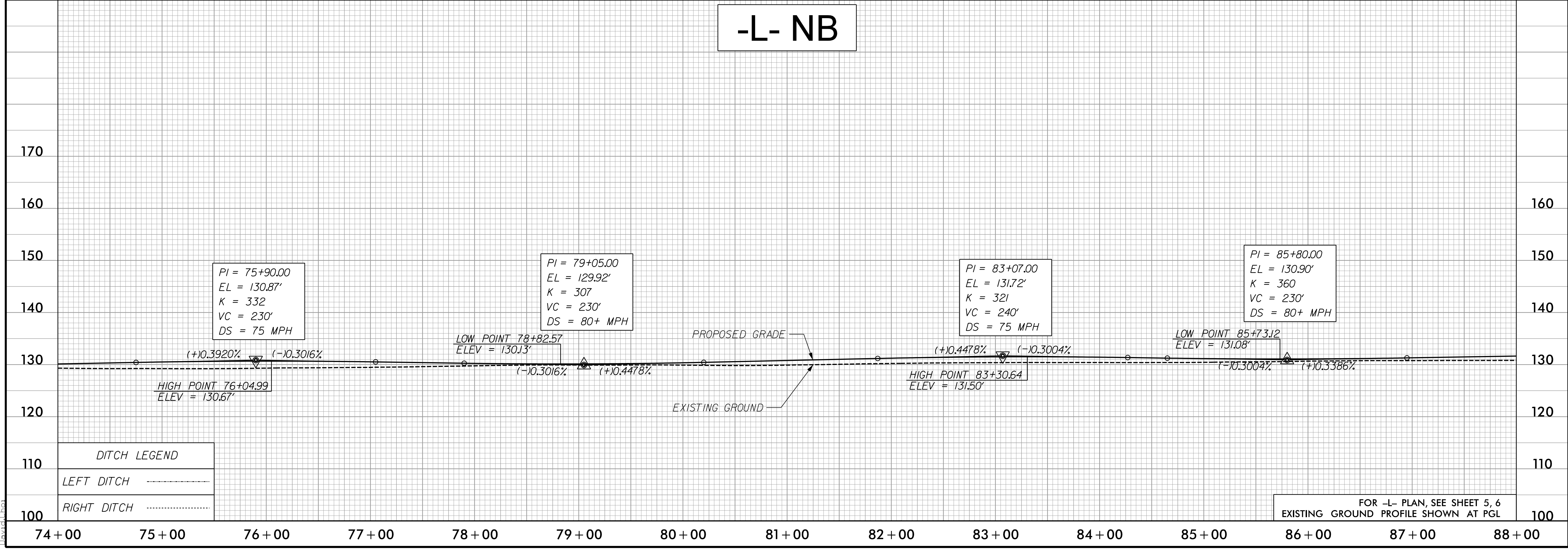
5/28/2022

# -L- SB

PROJECT REFERENCE NO. <b>1-5987A</b>	SHEET NO. <b>41</b>
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
DocuSigned by: <b>Steve Anthony Duan</b>	
DocuSigned by: <b>Will Weatherstone</b>	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



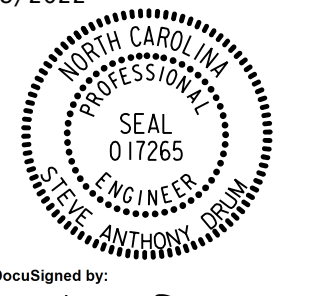
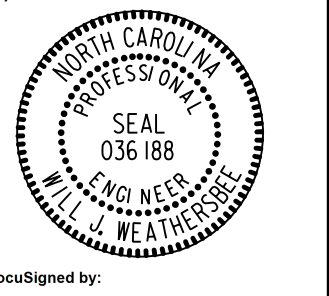

# -L- NB



7/19/2022  
C:\Users\David\Documents\Projects\15987A\_L\_RDY\_PSH\_PFL\_41.dgn  
David

5/28/2022

# -L- SB

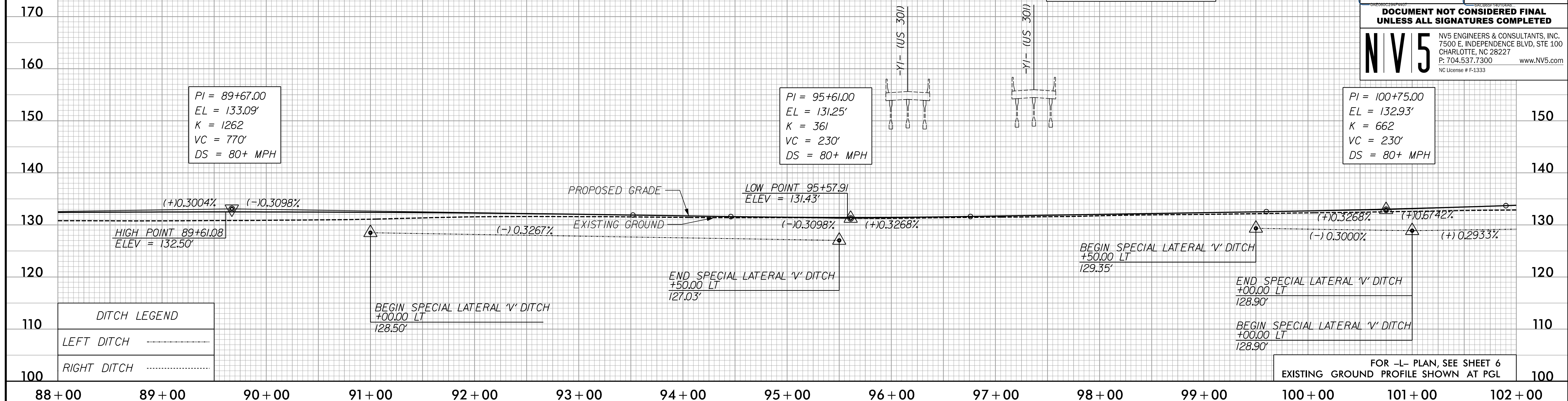
PROJECT REFERENCE NO. 1-5987A	SHEET NO. 42
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.nv5.com NC License # F-1333	

BM\*4  
 N: 334,909 E: 1,998,282  
 -BLA- STA 94+75.00, 1' LT  
 -L- STA 97+26.80, 62.53' RT  
 ELEV. = 128.58'

PI = 89+67.00  
 EL = 133.09'  
 K = 1262  
 VC = 770'  
 DS = 80+ MPH

PI = 95+61.00  
 EL = 131.25'  
 K = 361  
 VC = 230'  
 DS = 80+ MPH

PI = 100+75.00  
 EL = 132.93'  
 K = 662  
 VC = 230'  
 DS = 80+ MPH



DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

FOR -L- PLAN, SEE SHEET 6  
 EXISTING GROUND PROFILE SHOWN AT PGL

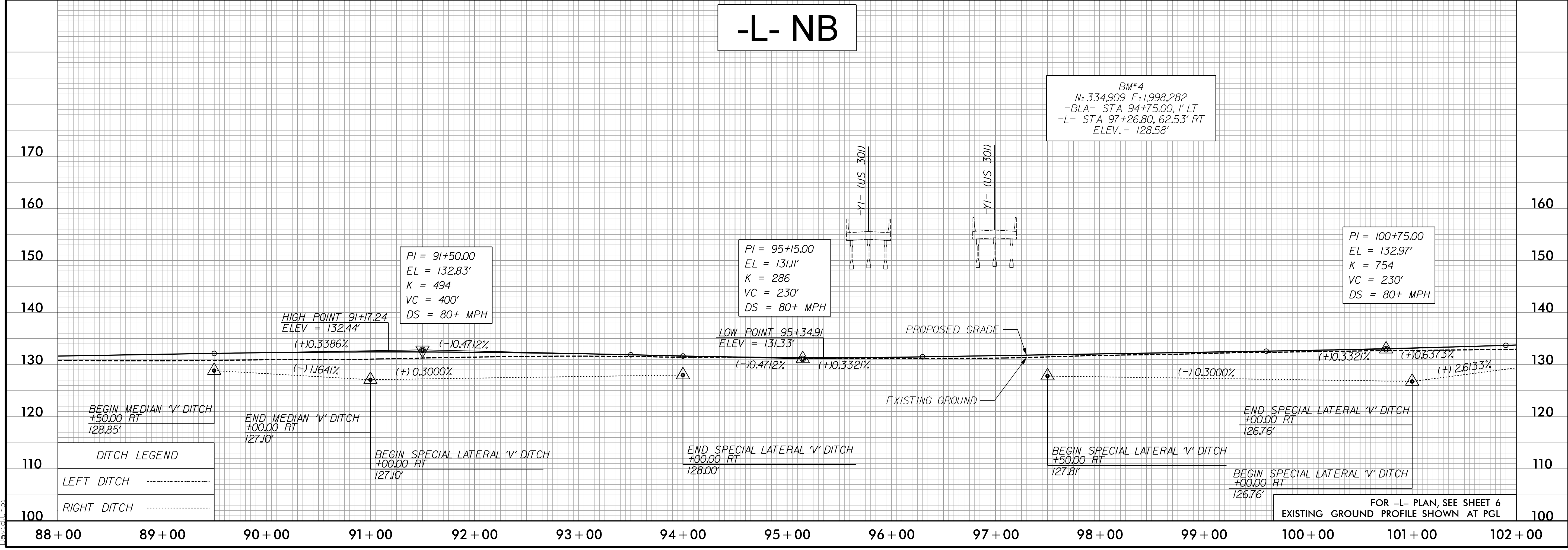
# -L- NB

BM\*4  
 N: 334,909 E: 1,998,282  
 -BLA- STA 94+75.00, 1' LT  
 -L- STA 97+26.80, 62.53' RT  
 ELEV. = 128.58'

PI = 91+50.00  
 EL = 132.83'  
 K = 494  
 VC = 400'  
 DS = 80+ MPH

PI = 95+15.00  
 EL = 131.11'  
 K = 286  
 VC = 230'  
 DS = 80+ MPH

PI = 100+75.00  
 EL = 132.97'  
 K = 754  
 VC = 230'  
 DS = 80+ MPH



DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

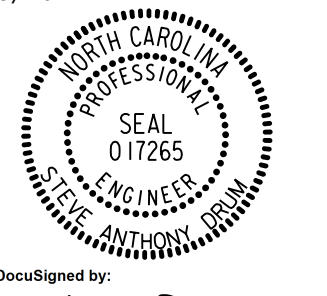

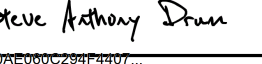
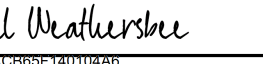

FOR -L- PLAN, SEE SHEET 6  
 EXISTING GROUND PROFILE SHOWN AT PGL

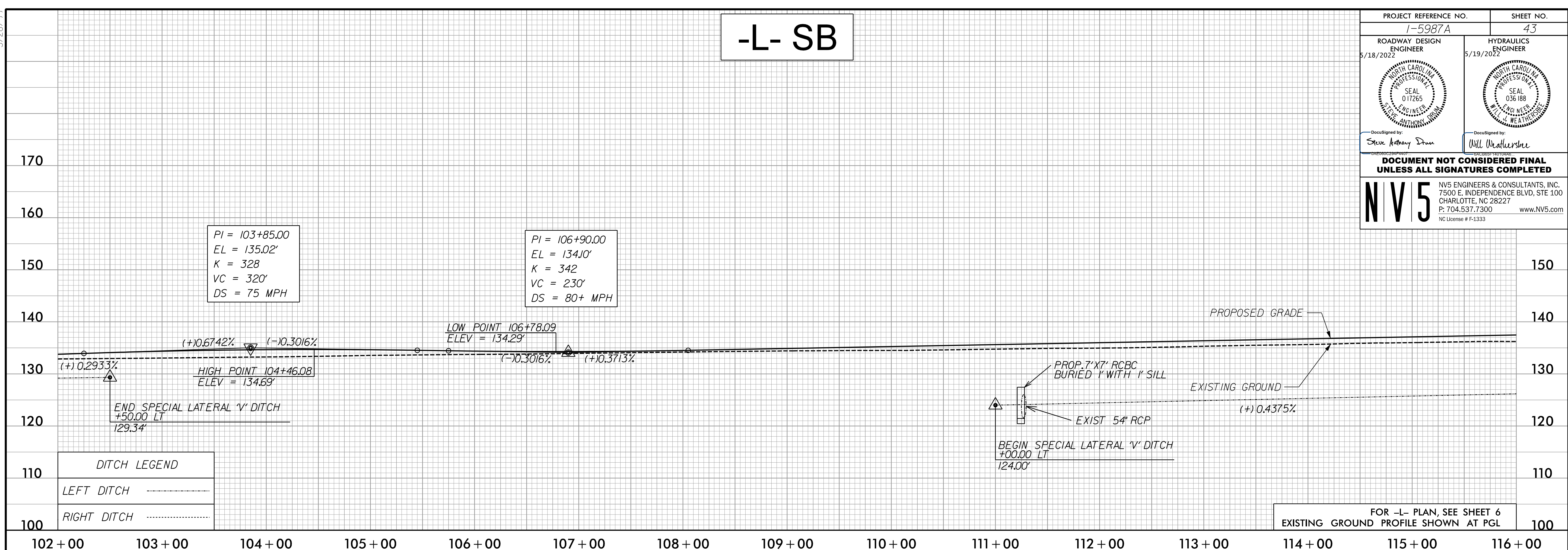
5/19/2022  
 P:\Projects\15987A\_PSH\_PFL\_42.dgn  
 David Johnson



5/28/2022

# -L- SB

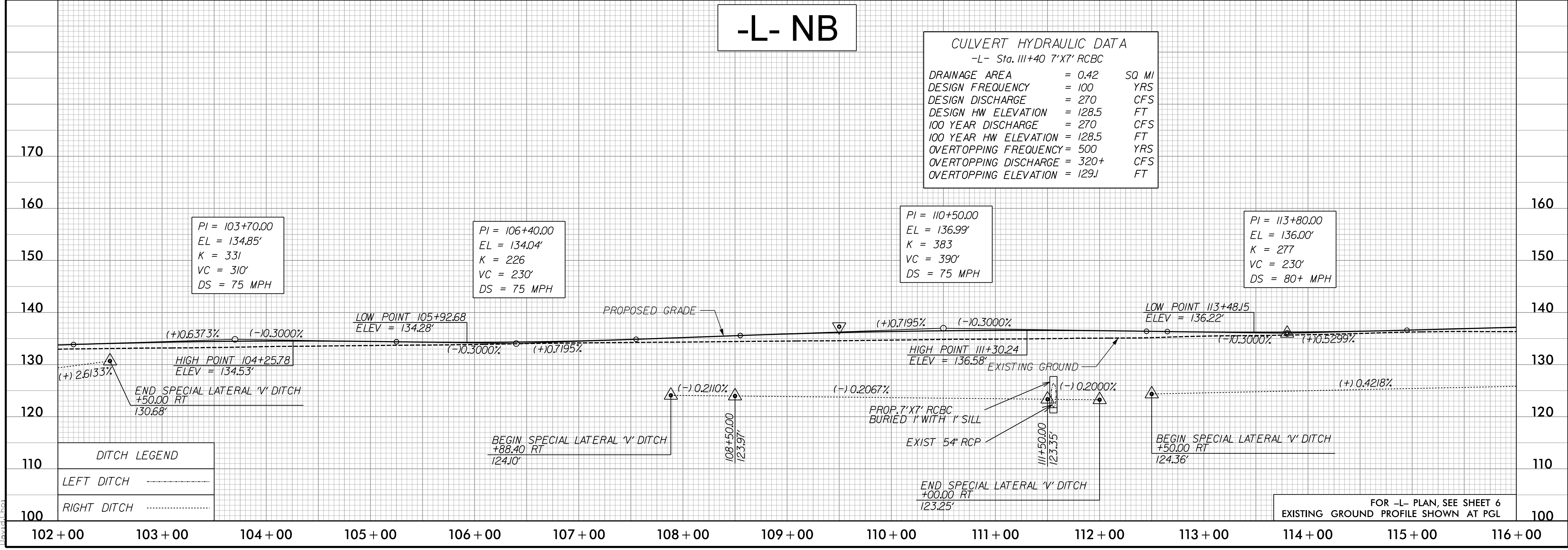
PROJECT REFERENCE NO. <b>1-5987A</b>	SHEET NO. <b>43</b>
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
DocuSigned by:  	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
 NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



# -L- NB

**CULVERT HYDRAULIC DATA**  
-L- Sta. 111+40 7'x7' RCBC




DRAINAGE AREA	= 0.42	SQ MI
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 270	CFS
DESIGN HW ELEVATION	= 128.5	FT
100 YEAR DISCHARGE	= 270	CFS
100 YEAR HW ELEVATION	= 128.5	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 320+	CFS
OVERTOPPING ELEVATION	= 129J	FT

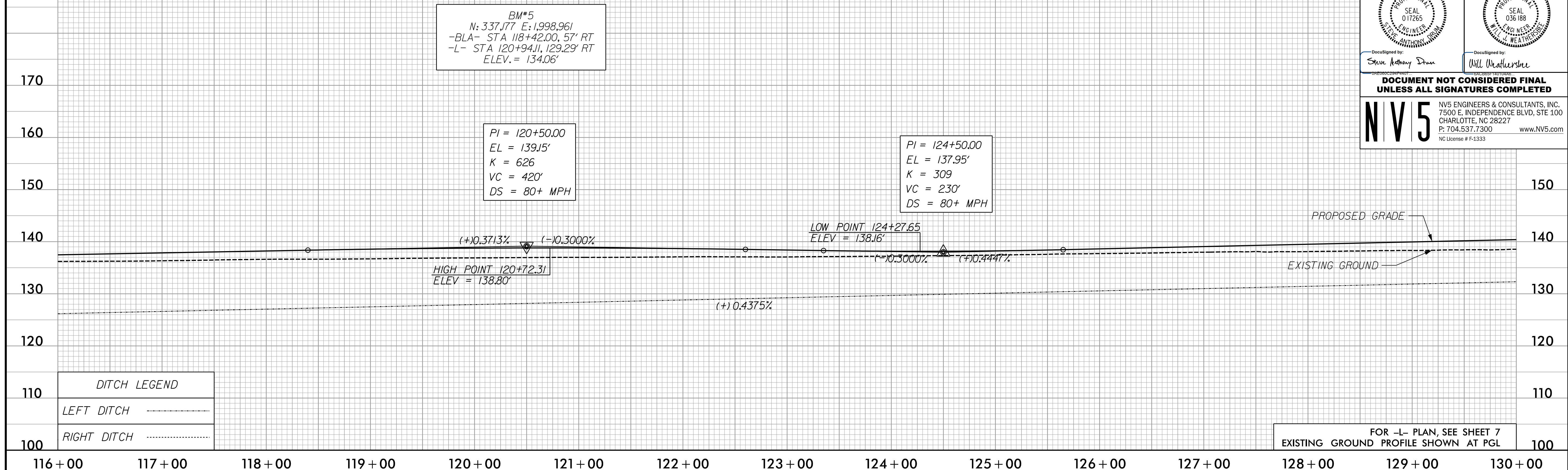


7/19/2022  
C:\Users\David\Documents\Projects\15987A\_RDY\_PSH\_PFL\_43.dgn  
David

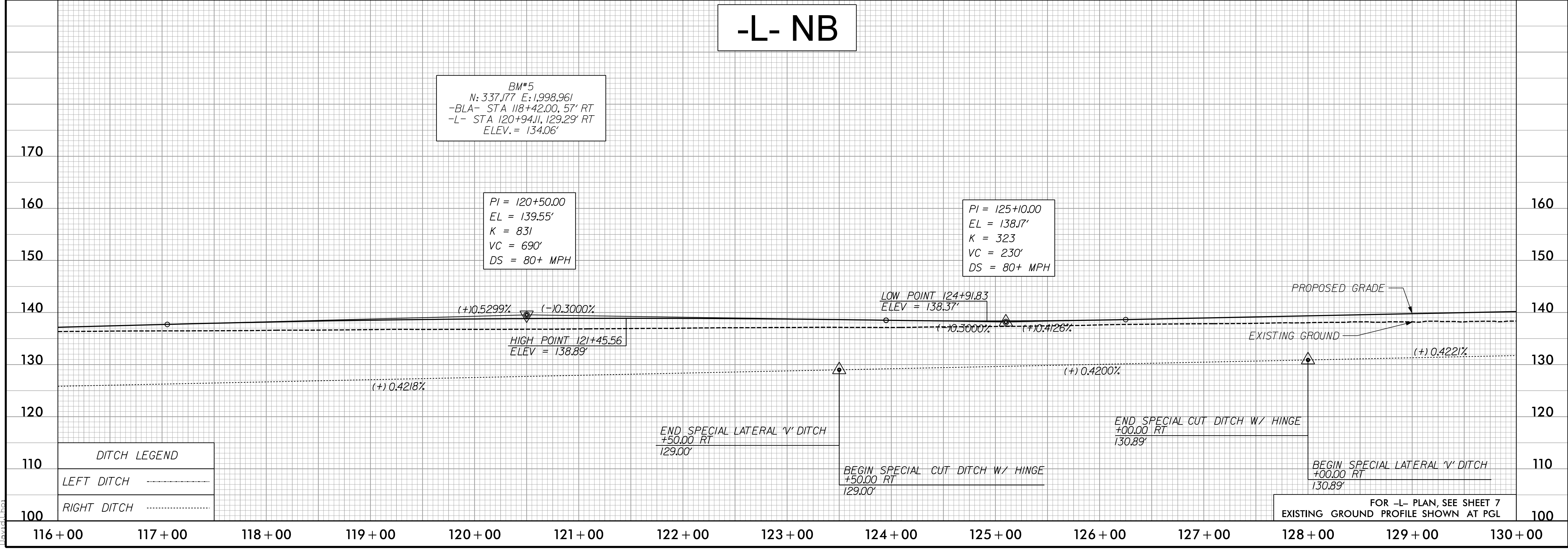
5/28/22

# -L- SB

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 44
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
	
DocuSigned by: Steve Anthony Dren	DocuSigned by: Will Weatherstone
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
 NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



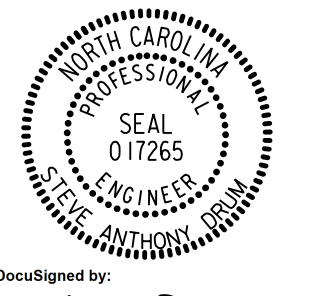
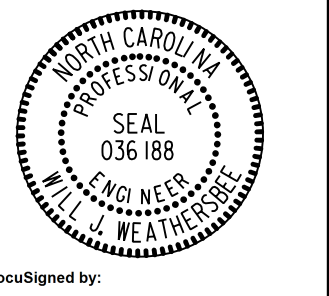

# -L- NB



3/30/2022  
P:\Projects\15987A\RDY\_PSH\_PFL\_44.dgn  
David

5/28/2022

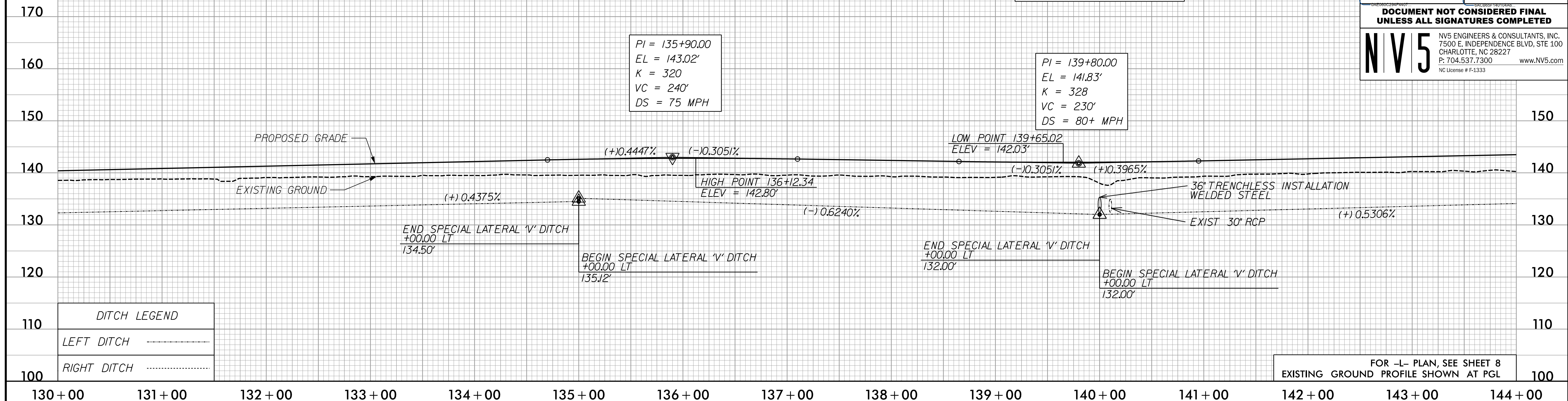
# -L- SB

PROJECT REFERENCE NO. <b>1-5987A</b>	SHEET NO. <b>45</b>
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 <b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	

BM\*6  
 N: 339,055 E: 1,999,458  
 -BLA- STA 137+85.00, 26' RT  
 -L- STA 140+36.57, 116.56' RT  
 ELEV. = 139.14'

PI = 135+90.00  
 EL = 143.02'  
 K = 320  
 VC = 240'  
 DS = 75 MPH

PI = 139+80.00  
 EL = 141.83'  
 K = 328  
 VC = 230'  
 DS = 80+ MPH



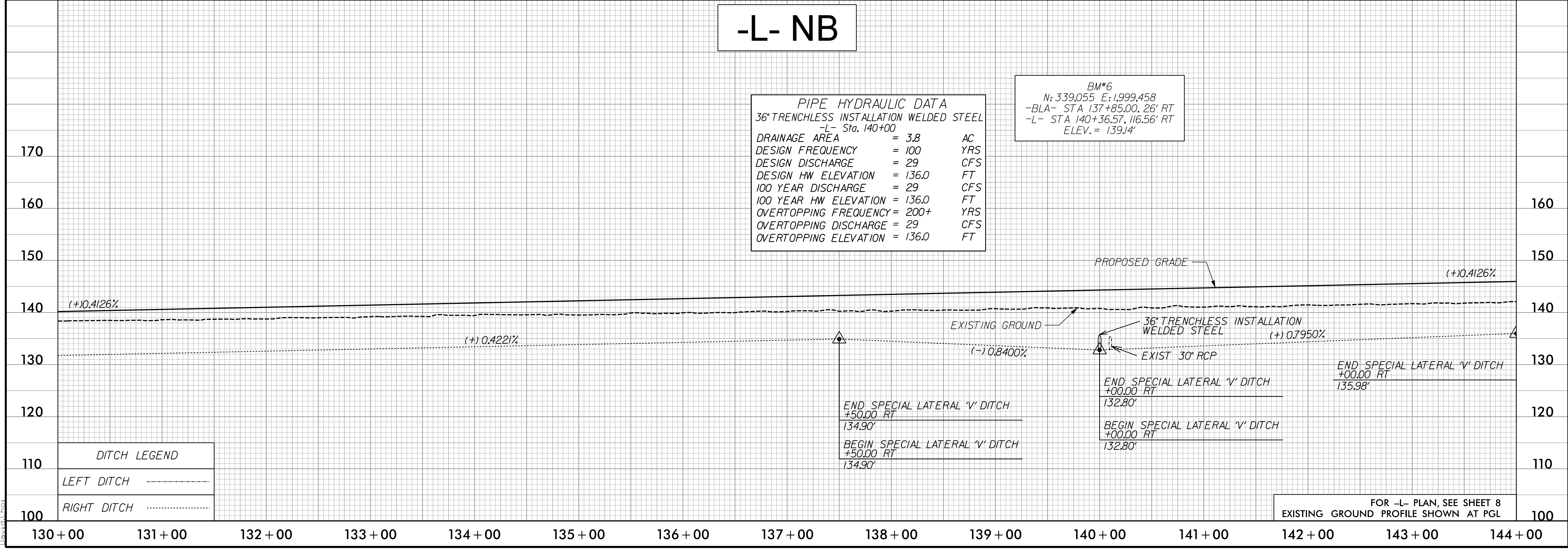
DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

# -L- NB

PIPE HYDRAULIC DATA  
 36" TRENCHLESS INSTALLATION WELDED STEEL  
 -L- Sta. 140+00

DRAINAGE AREA	= 3.8	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 29	CFS
DESIGN HW ELEVATION	= 136.0	FT
100 YEAR DISCHARGE	= 29	CFS
100 YEAR HW ELEVATION	= 136.0	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 29	CFS
OVERTOPPING ELEVATION	= 136.0	FT

BM\*6  
 N: 339,055 E: 1,999,458  
 -BLA- STA 137+85.00, 26' RT  
 -L- STA 140+36.57, 116.56' RT  
 ELEV. = 139.14'



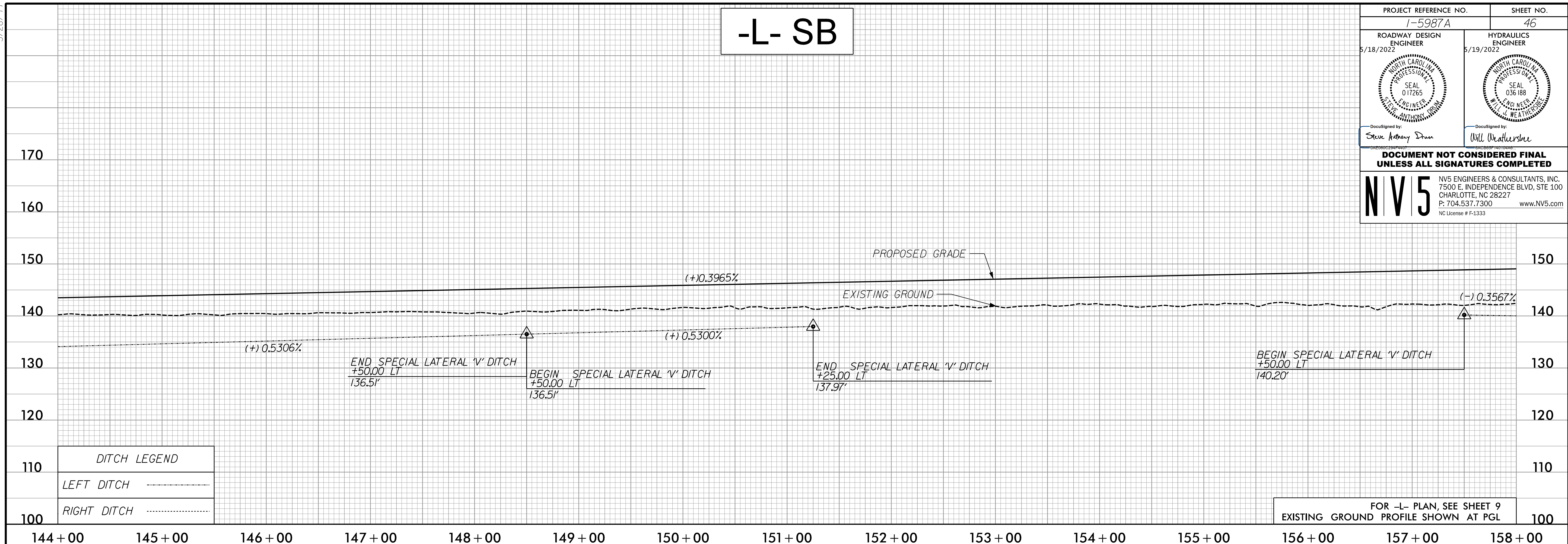
DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

3/30/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_45.dgn  
David Johnson

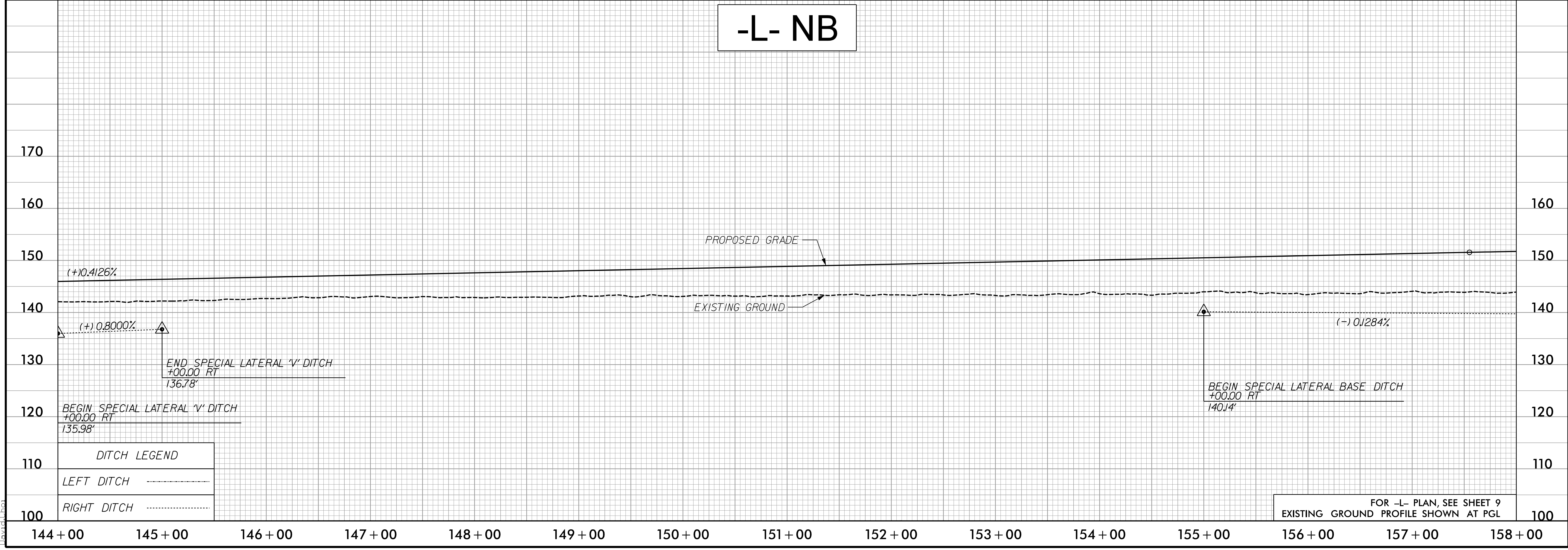
5/28/22

# -L- SB

PROJECT REFERENCE NO. I-5987A	SHEET NO. 46
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Duan	DocuSigned by: Will Weatherstone
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<small>NV5 ENGINEERS &amp; CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333</small>	



# -L- NB



7/19/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_46.dgn  
David Chilton

5/28/2022

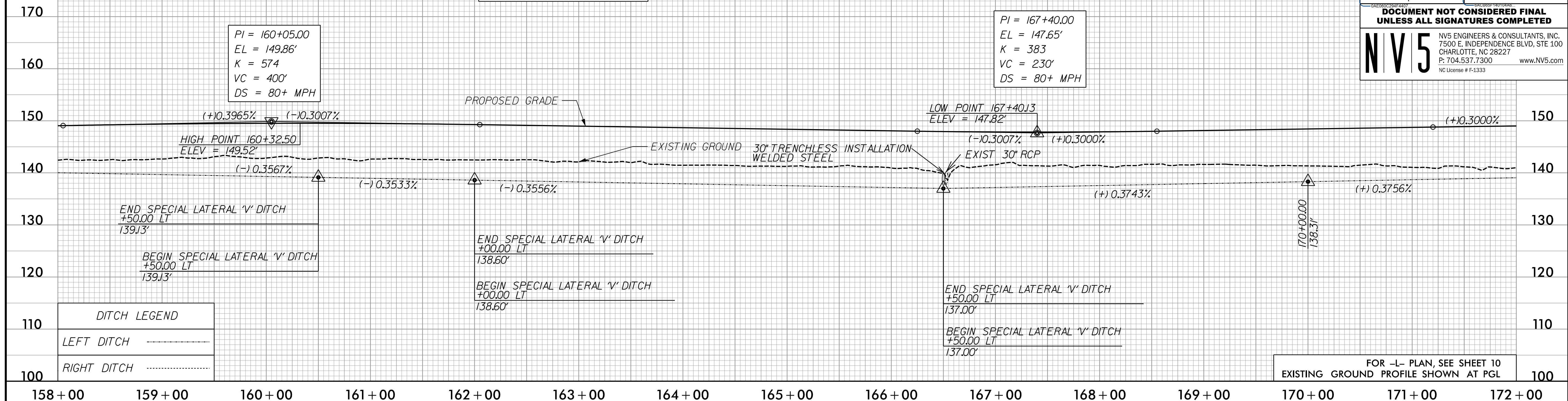
# -L- SB

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 47
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Druan	DocuSigned by: Will Matthews
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b>	NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333

BM#7  
N: 341.227 E: 2.000.067  
-BLA- STA 160+40.00, 32' RT  
-L- STA 162+91.69, 134.31' RT  
ELEV. = 143.25'

PI = 160+05.00  
EL = 149.86'  
K = 574  
VC = 400'  
DS = 80+ MPH

PI = 167+40.00  
EL = 147.65'  
K = 383  
VC = 230'  
DS = 80+ MPH



DITCH LEGEND

LEFT DITCH	-----
RIGHT DITCH	-----

FOR -L- PLAN, SEE SHEET 10  
EXISTING GROUND PROFILE SHOWN AT PGL

# -L- NB

BM#7  
N: 341.227 E: 2.000.067  
-BLA- STA 160+40.00, 32' RT  
-L- STA 162+91.69, 134.31' RT  
ELEV. = 143.25'

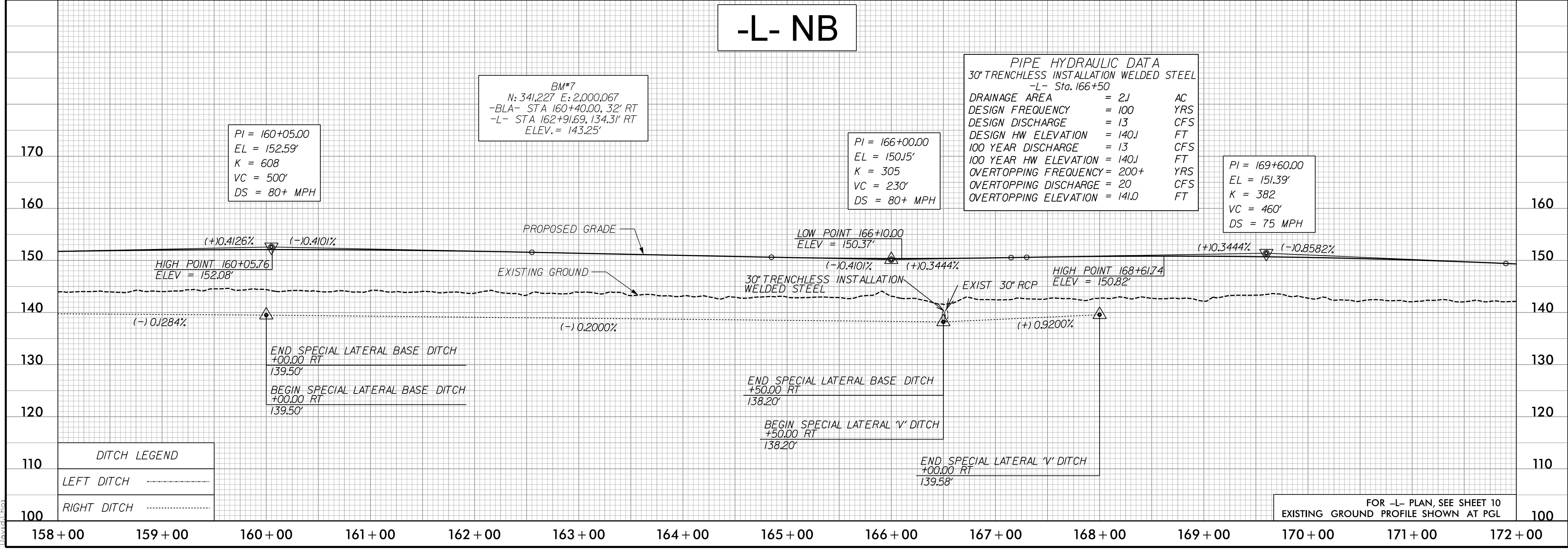
PI = 160+05.00  
EL = 152.59'  
K = 608  
VC = 500'  
DS = 80+ MPH

PI = 166+00.00  
EL = 150.15'  
K = 305  
VC = 230'  
DS = 80+ MPH

PIPE HYDRAULIC DATA  
30" TRENCHLESS INSTALLATION WELDED STEEL  
-L- Sta. 166+50

DRAINAGE AREA	= 2.1	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 13	CFS
DESIGN HW ELEVATION	= 140.1	FT
100 YEAR DISCHARGE	= 13	CFS
100 YEAR HW ELEVATION	= 140.1	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 20	CFS
OVERTOPPING ELEVATION	= 141.0	FT

PI = 169+60.00  
EL = 151.39'  
K = 382  
VC = 460'  
DS = 75 MPH



DITCH LEGEND

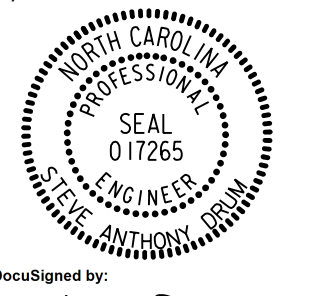
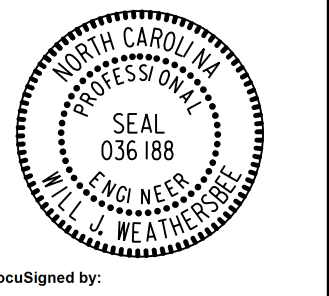
LEFT DITCH	-----
RIGHT DITCH	-----

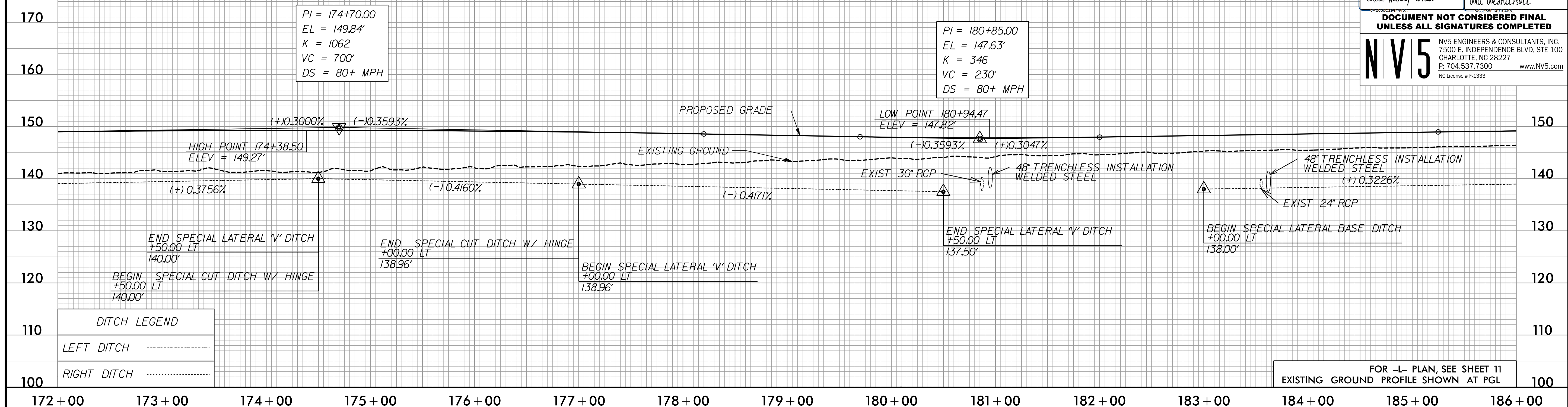
FOR -L- PLAN, SEE SHEET 10  
EXISTING GROUND PROFILE SHOWN AT PGL

5/19/2022  
P:\Projects\15987A\RDY\_PSH\_PFL\_47.dgn  
David

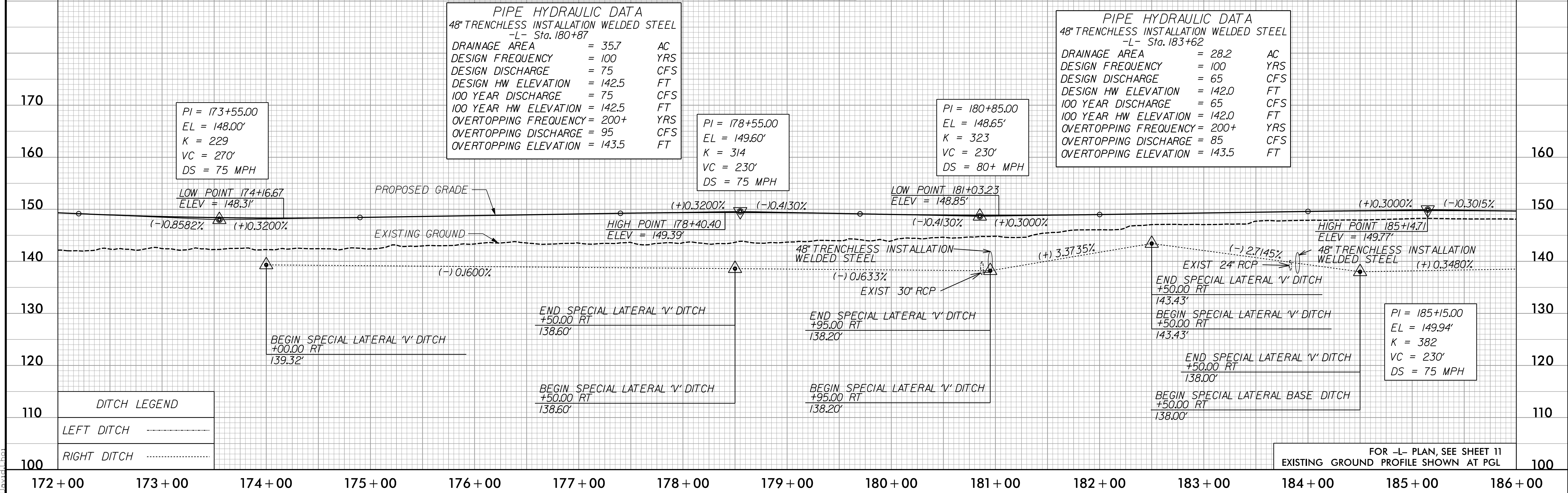
5/28/2022

# -L- SB

PROJECT REFERENCE NO. <b>1-5987A</b>	SHEET NO. <b>48</b>
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
DocuSigned by: <b>Steve Anthony Duan</b>	
DocuSigned by: <b>Will Matthews</b>	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



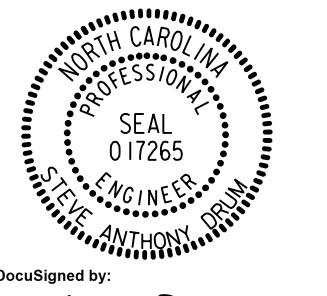
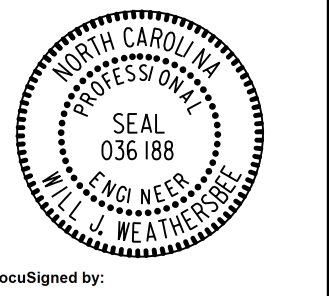
# -L- NB



5/19/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_48.dgn  
David Johnson

5/28/2022

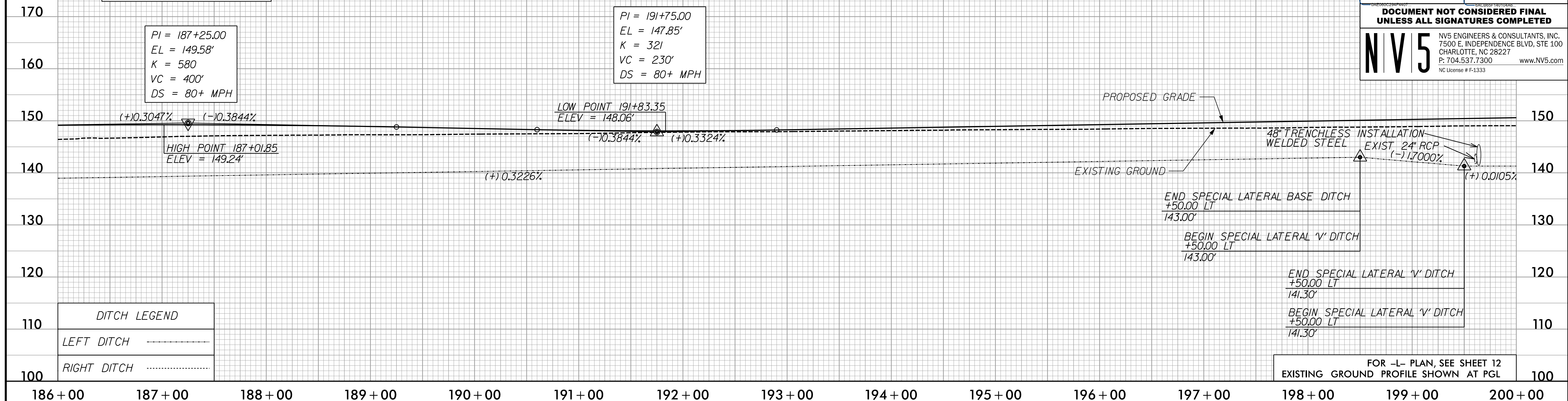
# -L- SB

PROJECT REFERENCE NO. <b>1-5987A</b>	SHEET NO. <b>49</b>
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	

BM\*8  
N: 343,921 E: 2,000,564  
-BLA- STA 187+86.00, 16' RT  
-L- STA 190+12.68, 115.60' RT  
ELEV. = 145.19'

PI = 187+25.00  
EL = 149.58'  
K = 580  
VC = 400'  
DS = 80+ MPH

PI = 191+75.00  
EL = 147.85'  
K = 321  
VC = 230'  
DS = 80+ MPH



DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

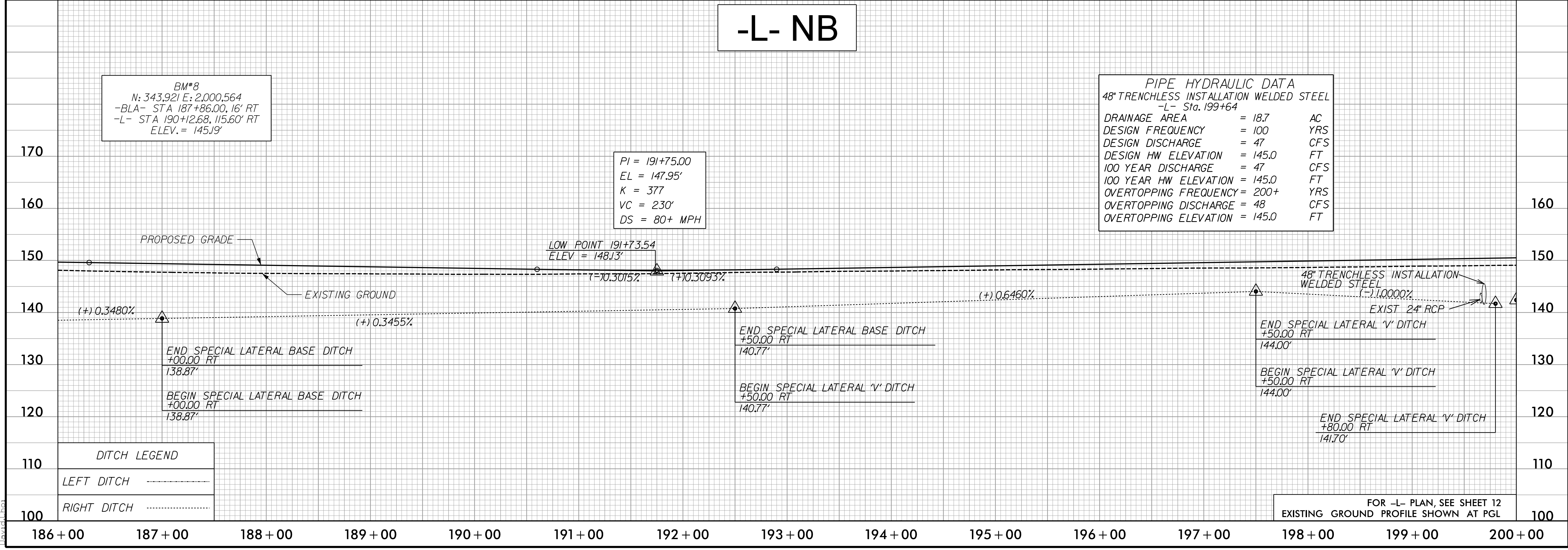
FOR -L- PLAN, SEE SHEET 12  
EXISTING GROUND PROFILE SHOWN AT PGL

# -L- NB

BM\*8  
N: 343,921 E: 2,000,564  
-BLA- STA 187+86.00, 16' RT  
-L- STA 190+12.68, 115.60' RT  
ELEV. = 145.19'

PI = 191+75.00  
EL = 147.95'  
K = 377  
VC = 230'  
DS = 80+ MPH

PIPE HYDRAULIC DATA	
48" TRENCHLESS INSTALLATION WELDED STEEL -L- Sta. 199+64	
DRAINAGE AREA	= 18.7 AC
DESIGN FREQUENCY	= 100 YRS
DESIGN DISCHARGE	= 47 CFS
DESIGN HW ELEVATION	= 145.0 FT
100 YEAR DISCHARGE	= 47 CFS
100 YEAR HW ELEVATION	= 145.0 FT
OVERTOPPING FREQUENCY	= 200+ YRS
OVERTOPPING DISCHARGE	= 48 CFS
OVERTOPPING ELEVATION	= 145.0 FT



DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

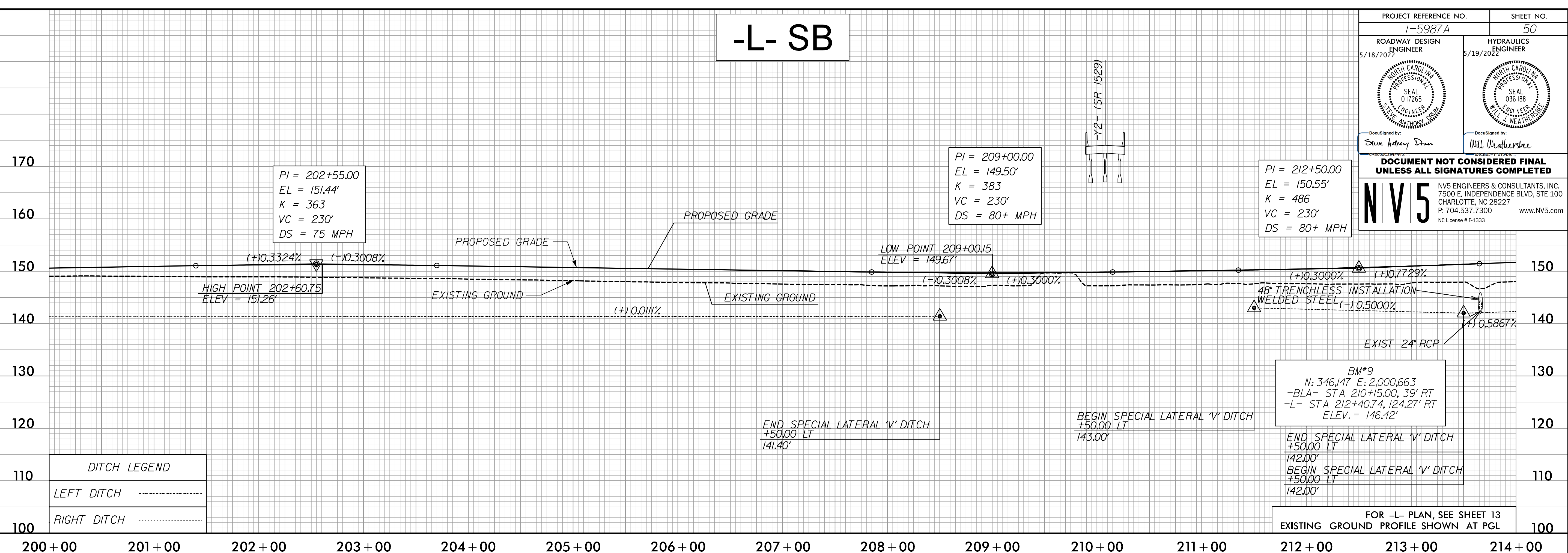
FOR -L- PLAN, SEE SHEET 12  
EXISTING GROUND PROFILE SHOWN AT PGL

3/10/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_49.dgn  
David Johnson

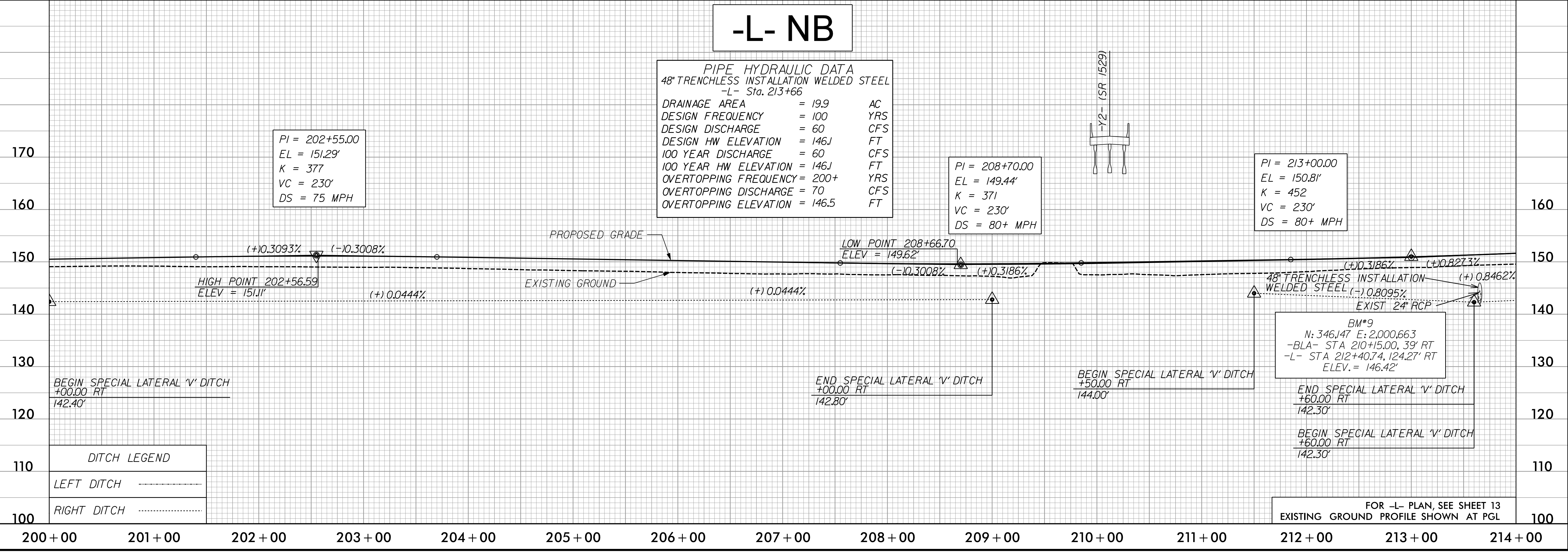
5/28/2022

# -L- SB

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 50
ROADWAY DESIGN ENGINEER 5/18/2022 NORTH CAROLINA PROFESSIONAL SEAL 017265 ERIC ANTHONY DREW	HYDRAULICS ENGINEER 5/19/2022 NORTH CAROLINA PROFESSIONAL SEAL 036188 WILL MEATERS
<p><b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b></p> <p><b>NV5</b> NV5 ENGINEERS &amp; CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333</p>	



# -L- NB



5/19/2022  
N:\Projects\15987A\_L\RDY\_PSH\_PFL\_50.dgn  
David Johnson



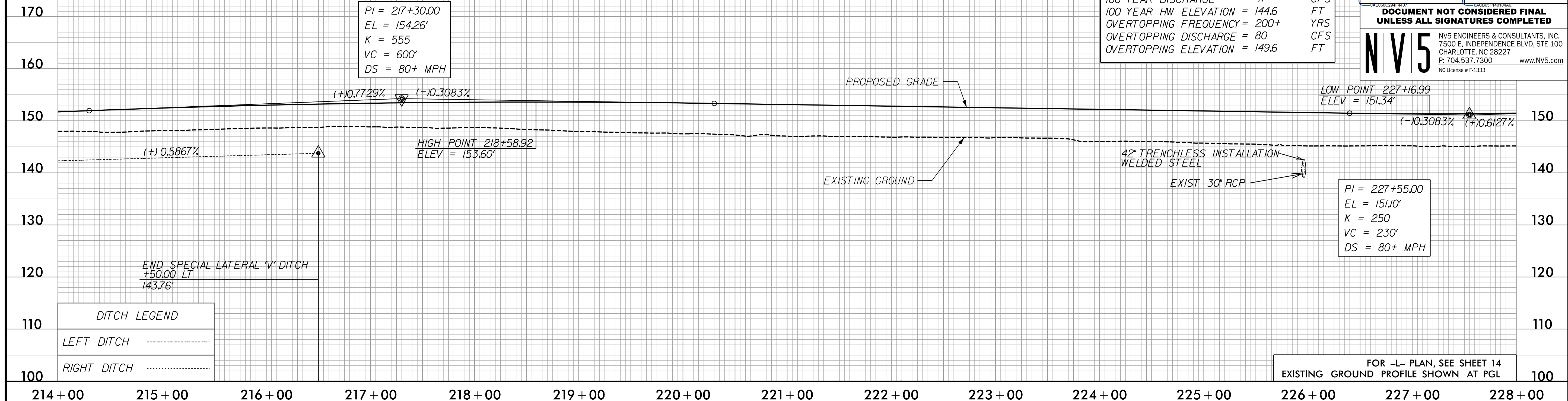
5/28/2022

# -L- SB

**PIPE HYDRAULIC DATA**  
42" TRENCHLESS INSTALLATION WELDED STEEL  
-L- Sta. 225+96

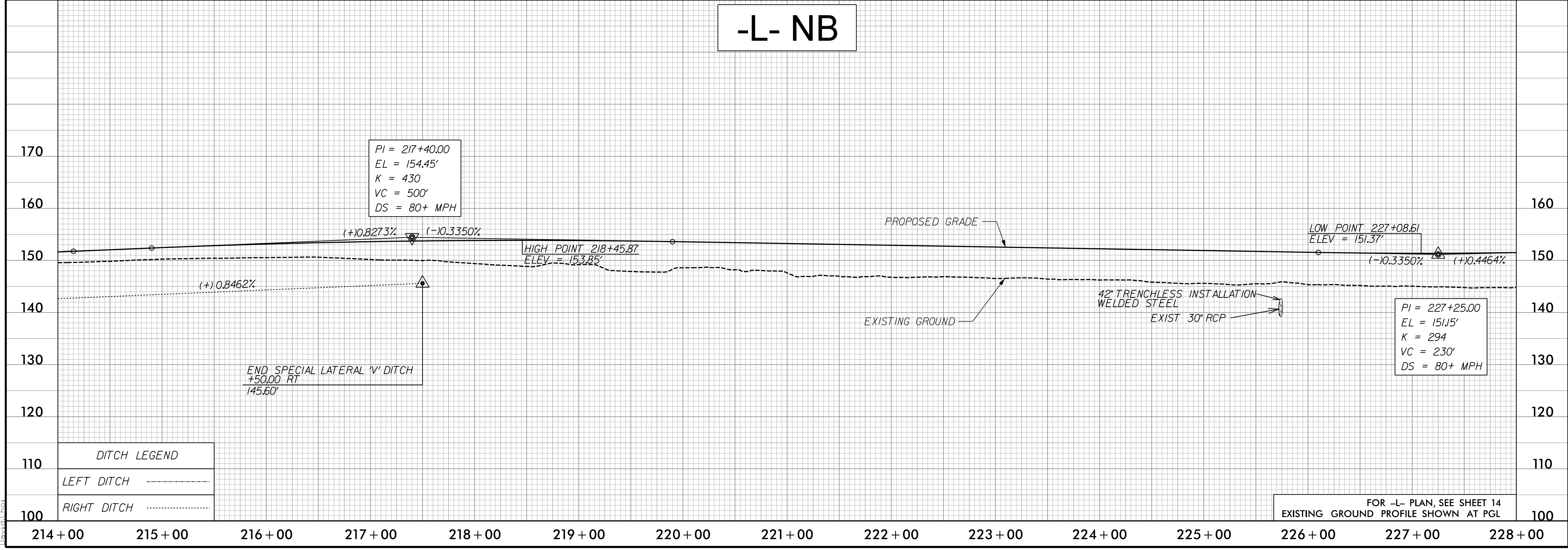
DRAINAGE AREA	= 20	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 47	CFS
DESIGN HW ELEVATION	= 144.6	FT
100 YEAR DISCHARGE	= 47	CFS
100 YEAR HW ELEVATION	= 144.6	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 80	CFS
OVERTOPPING ELEVATION	= 149.6	FT

PROJECT REFERENCE NO.	1-5987A	SHEET NO.	51
ROADWAY DESIGN ENGINEER	5/18/2022	HYDRAULICS ENGINEER	5/19/2022
DocuSigned by: Steve Anthony Duan		DocuSigned by: Will Weatherstone	
<b>DOCUMENT NOT CONSIDERED FINAL</b>			
<b>UNLESS ALL SIGNATURES COMPLETED</b>			
<b>NV5</b>	NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333		



# -L- NB

**Vertical Curve Data:**  
 PI = 227+55.00  
 EL = 151.10'  
 K = 250  
 VC = 230'  
 DS = 80+ MPH



3/30/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_51.dgn  
David Johnson

5/28/2022

# -L- SB

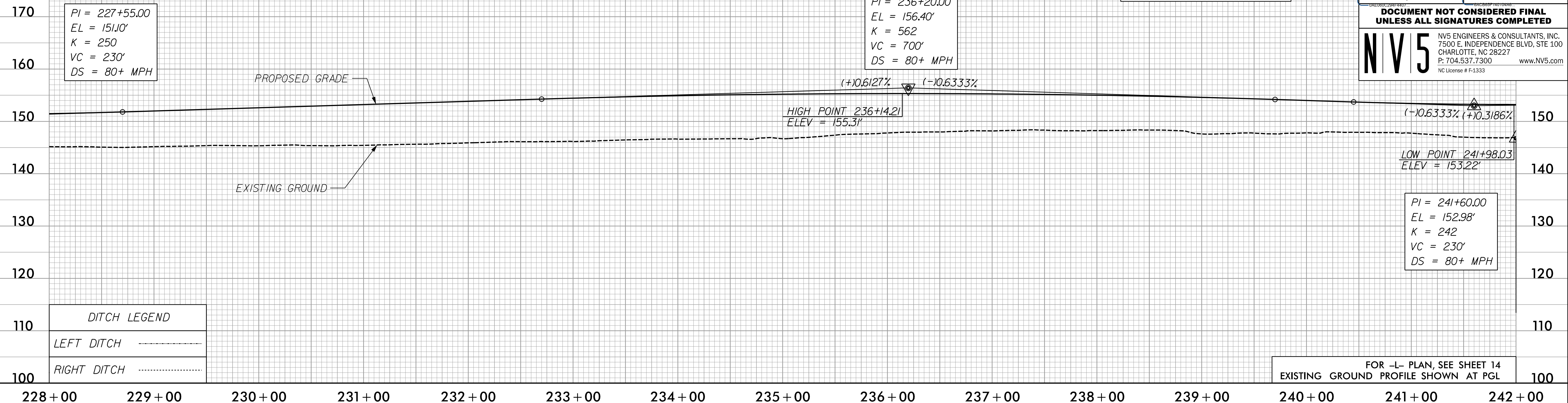
PROJECT REFERENCE NO. 1-5987A	SHEET NO. 52
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Dean	DocuSigned by: Will Mathersne
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	

BM\*10  
 N: 348,805 E: 2,000,799  
 -BLA- STA 236+77.00, 28' RT  
 -L- STA 239+01.82, 152.26' RT  
 ELEV. = 148.49'

PI = 227+55.00  
 EL = 151.10'  
 K = 250  
 VC = 230'  
 DS = 80+ MPH

PI = 236+20.00  
 EL = 156.40'  
 K = 562  
 VC = 700'  
 DS = 80+ MPH

PI = 241+60.00  
 EL = 152.98'  
 K = 242  
 VC = 230'  
 DS = 80+ MPH



DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

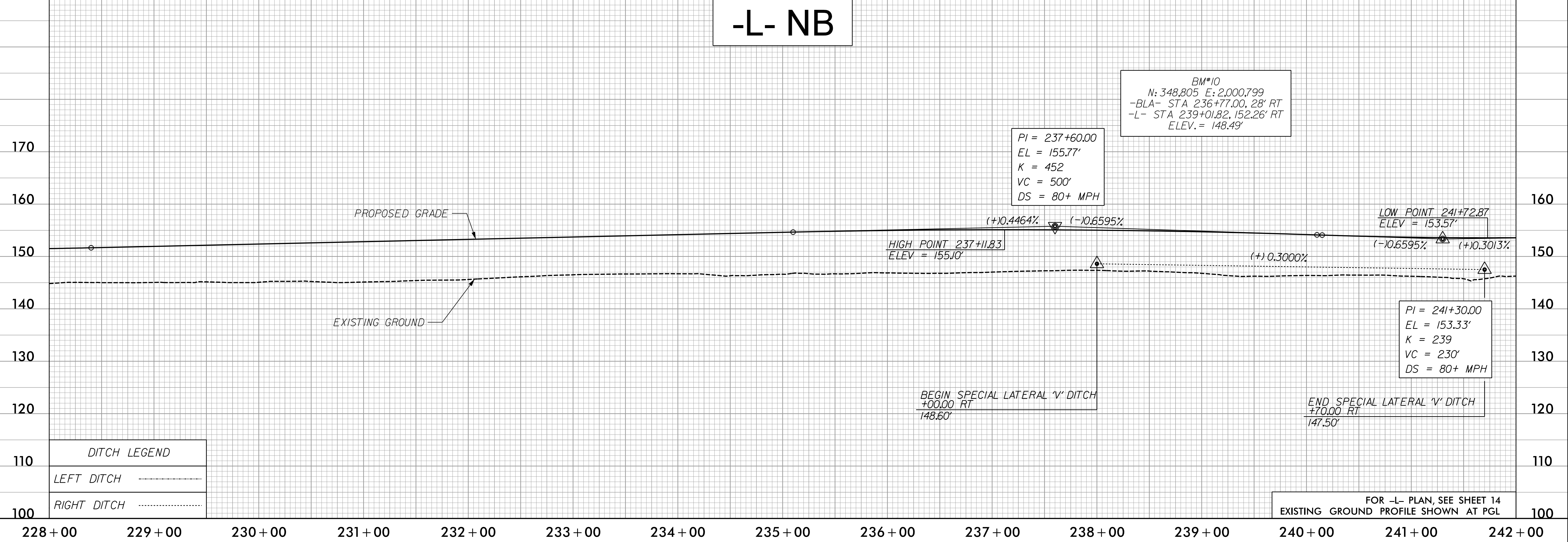
FOR -L- PLAN, SEE SHEET 14  
 EXISTING GROUND PROFILE SHOWN AT PGL

# -L- NB

BM\*10  
 N: 348,805 E: 2,000,799  
 -BLA- STA 236+77.00, 28' RT  
 -L- STA 239+01.82, 152.26' RT  
 ELEV. = 148.49'

PI = 237+60.00  
 EL = 155.77'  
 K = 452  
 VC = 500'  
 DS = 80+ MPH

PI = 241+30.00  
 EL = 153.33'  
 K = 239  
 VC = 230'  
 DS = 80+ MPH




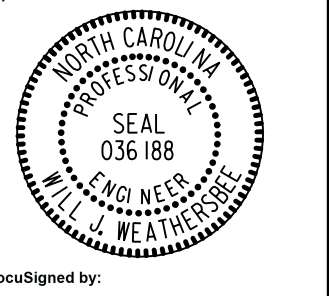
DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

FOR -L- PLAN, SEE SHEET 14  
 EXISTING GROUND PROFILE SHOWN AT PGL

3/30/2022  
 P:\Projects\15987A\_L\_RDY\_PSH\_PFL\_52.dgn  
 David

5/28/2022

# -L- SB

PROJECT REFERENCE NO. <b>1-5987A</b>	SHEET NO. <b>53</b>
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
<p><b>DOCUMENT NOT CONSIDERED FINAL</b> <b>UNLESS ALL SIGNATURES COMPLETED</b></p> <p><b>NV5</b> NV5 ENGINEERS &amp; CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333</p>	

**CULVERT HYDRAULIC DATA**  
-L- Sta. 242+92 8'X7' RCBC

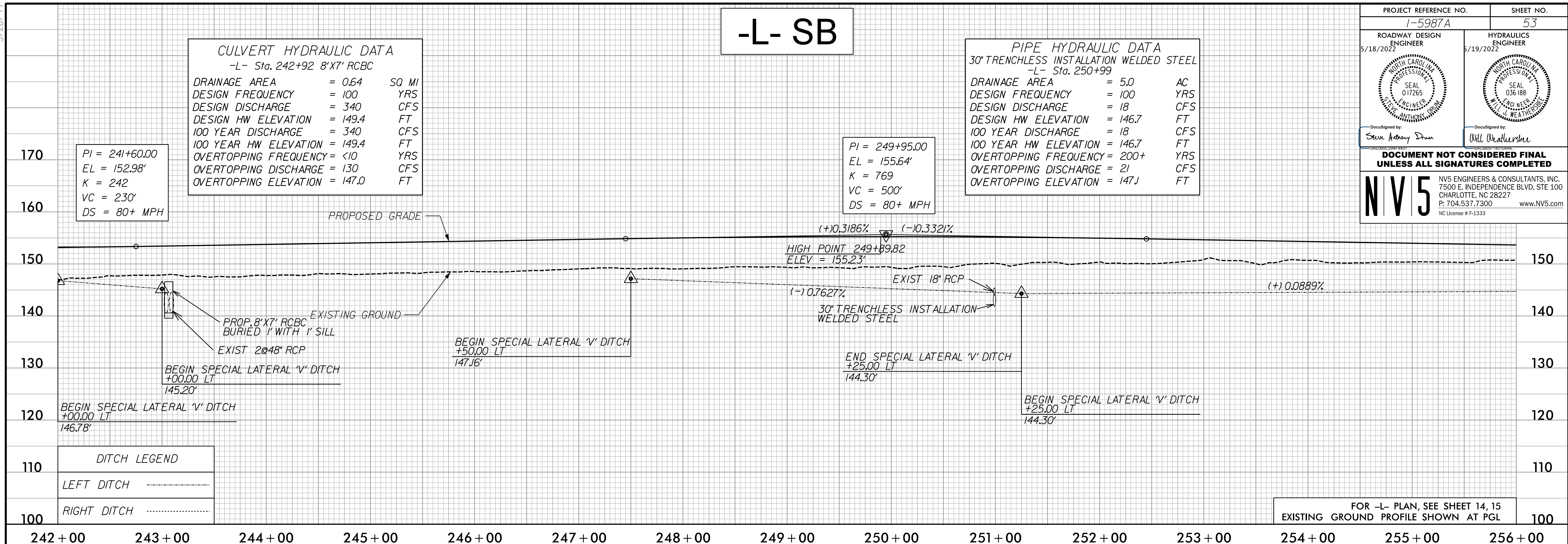
DRAINAGE AREA	= 0.64	SQ MI
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 340	CFS
DESIGN HW ELEVATION	= 149.4	FT
100 YEAR DISCHARGE	= 340	CFS
100 YEAR HW ELEVATION	= 149.4	FT
OVERTOPPING FREQUENCY	= <10	YRS
OVERTOPPING DISCHARGE	= 130	CFS
OVERTOPPING ELEVATION	= 147.0	FT

**PIPE HYDRAULIC DATA**  
30" TRENCHLESS INSTALLATION WELDED STEEL  
-L- Sta. 250+99

DRAINAGE AREA	= 5.0	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 18	CFS
DESIGN HW ELEVATION	= 146.7	FT
100 YEAR DISCHARGE	= 18	CFS
100 YEAR HW ELEVATION	= 146.7	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 21	CFS
OVERTOPPING ELEVATION	= 147.1	FT

PI = 241+60.00  
EL = 152.98'  
K = 242  
VC = 230'  
DS = 80+ MPH

PI = 249+95.00  
EL = 155.64'  
K = 769  
VC = 500'  
DS = 80+ MPH



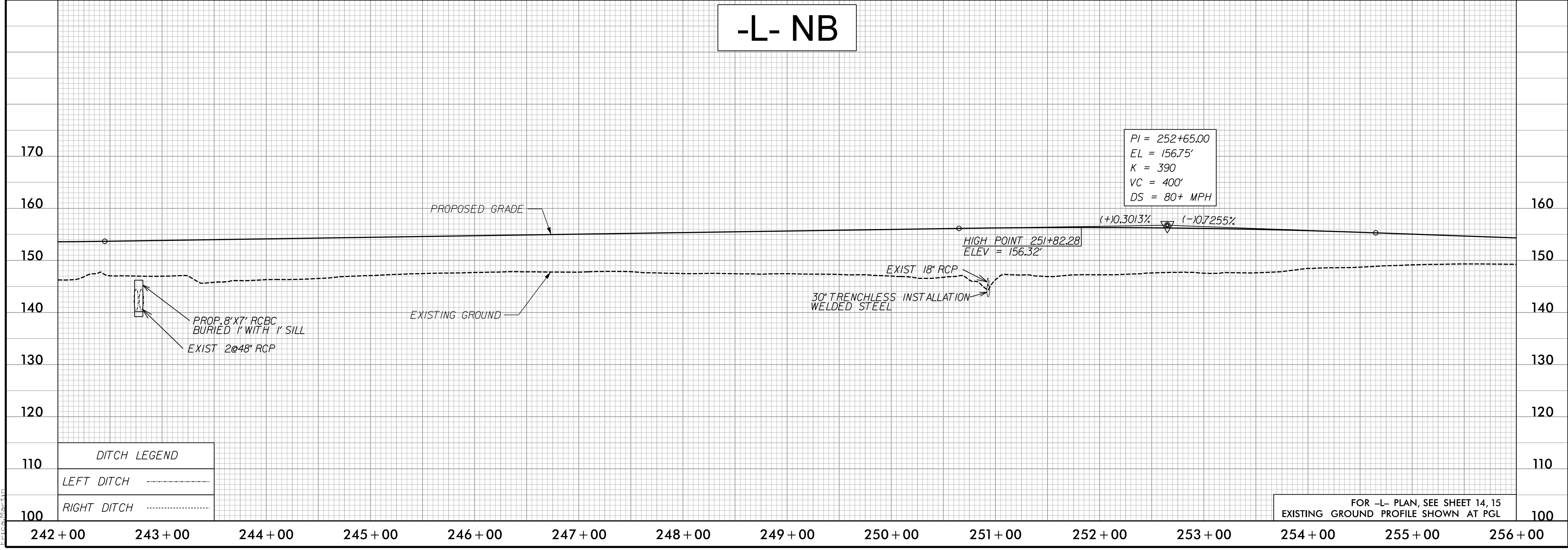
**DITCH LEGEND**

LEFT DITCH	-----
RIGHT DITCH	-----

FOR -L- PLAN, SEE SHEET 14, 15  
EXISTING GROUND PROFILE SHOWN AT PGL

# -L- NB

PI = 252+65.00  
EL = 156.75'  
K = 390  
VC = 400'  
DS = 80+ MPH



**DITCH LEGEND**

LEFT DITCH	-----
RIGHT DITCH	-----

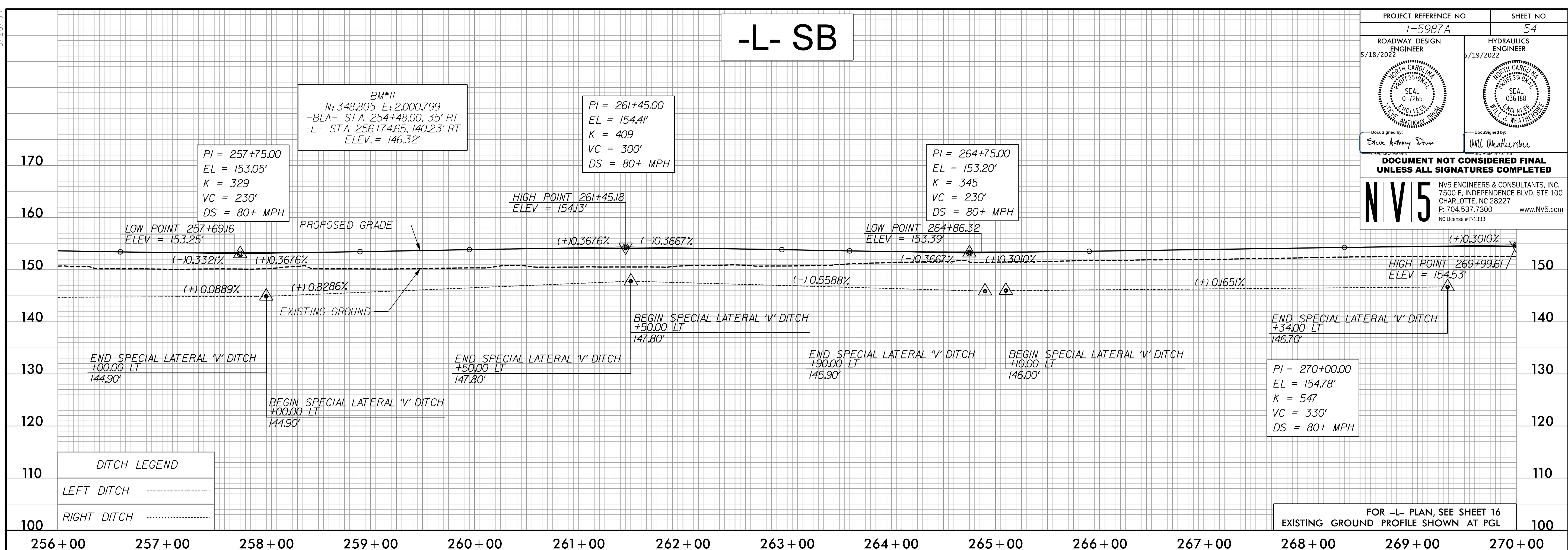
FOR -L- PLAN, SEE SHEET 14, 15  
EXISTING GROUND PROFILE SHOWN AT PGL

5/17/2022  
C:\Users\p\OneDrive\Projects\15987A\RDY\_PSH\_PFL\_53.dgn

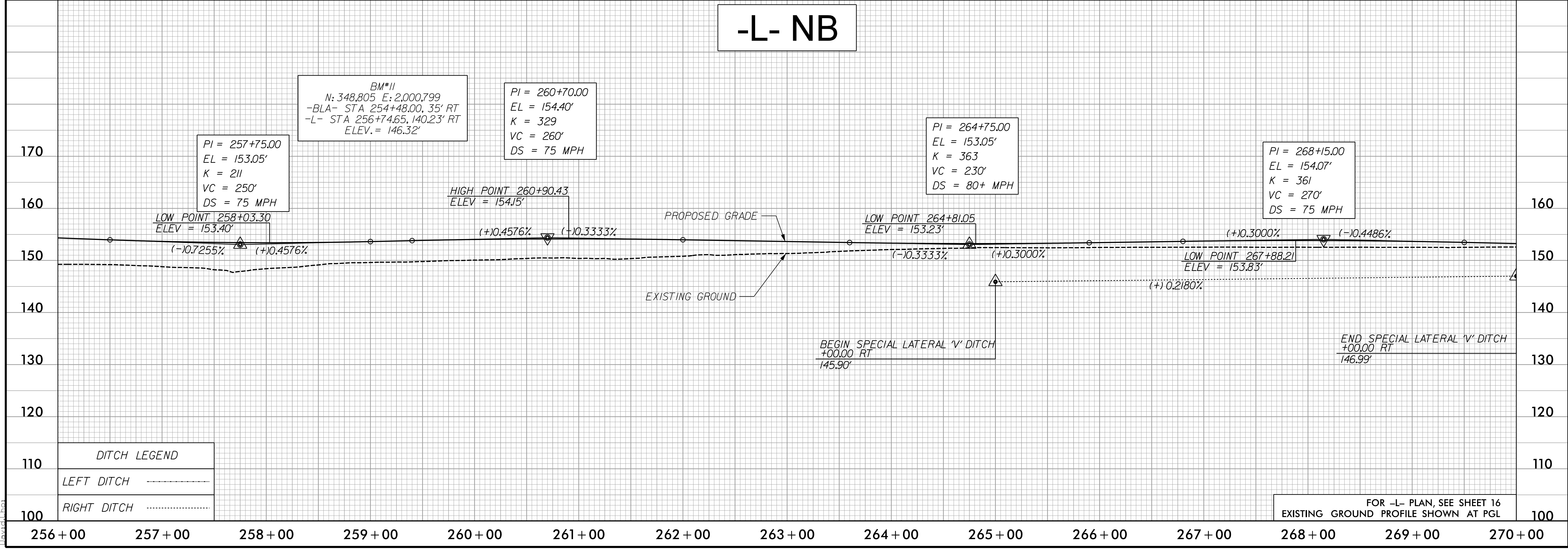
5/28/2022

# -L- SB

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 54
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Duan	
DocuSigned by: Will Mathersne	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



# -L- NB

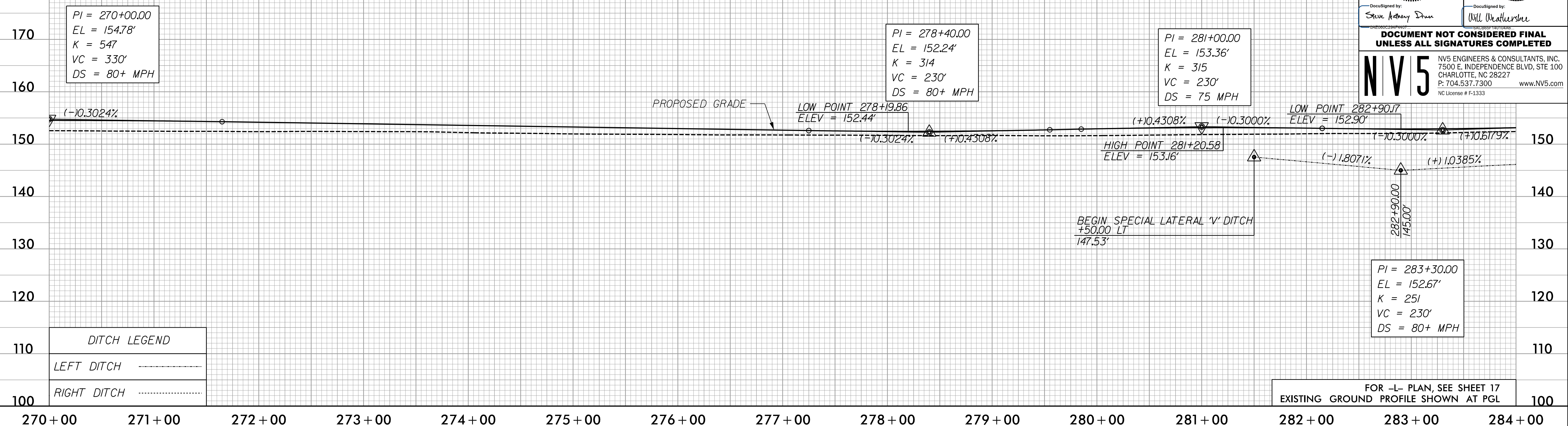


3/30/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_54.dgn  
David Johnson

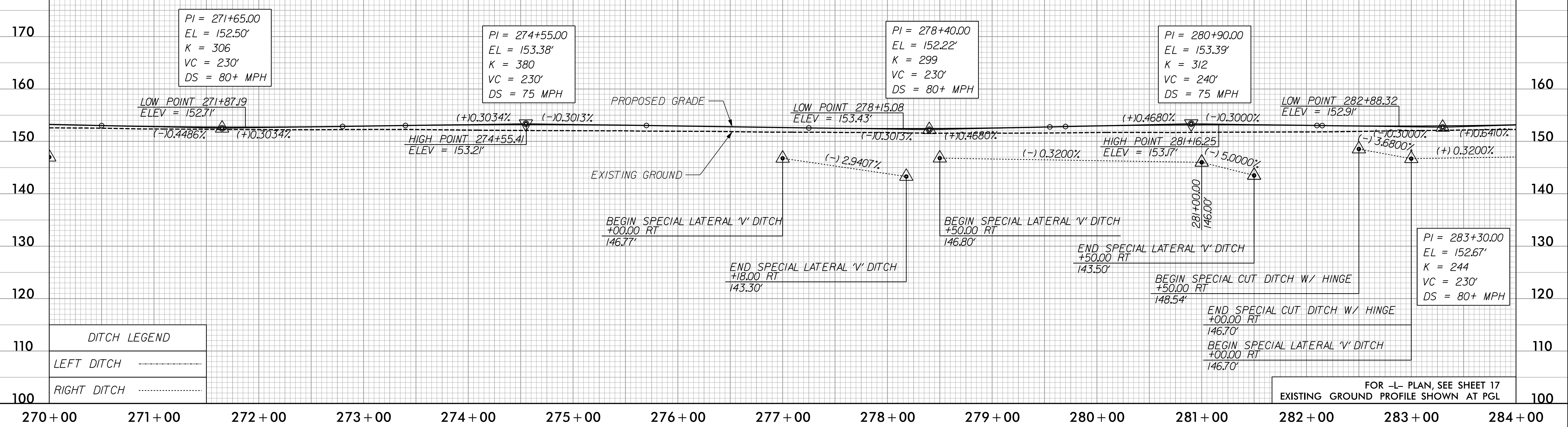
5/28/2022

# -L- SB

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 55
ROADWAY DESIGN ENGINEER 5/18/2022 NORTH CAROLINA PROFESSIONAL SEAL 017265 STEVE ANTHONY DRUM	HYDRAULICS ENGINEER 5/19/2022 NORTH CAROLINA PROFESSIONAL SEAL 036188 WILL WEATHERS
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



# -L- NB

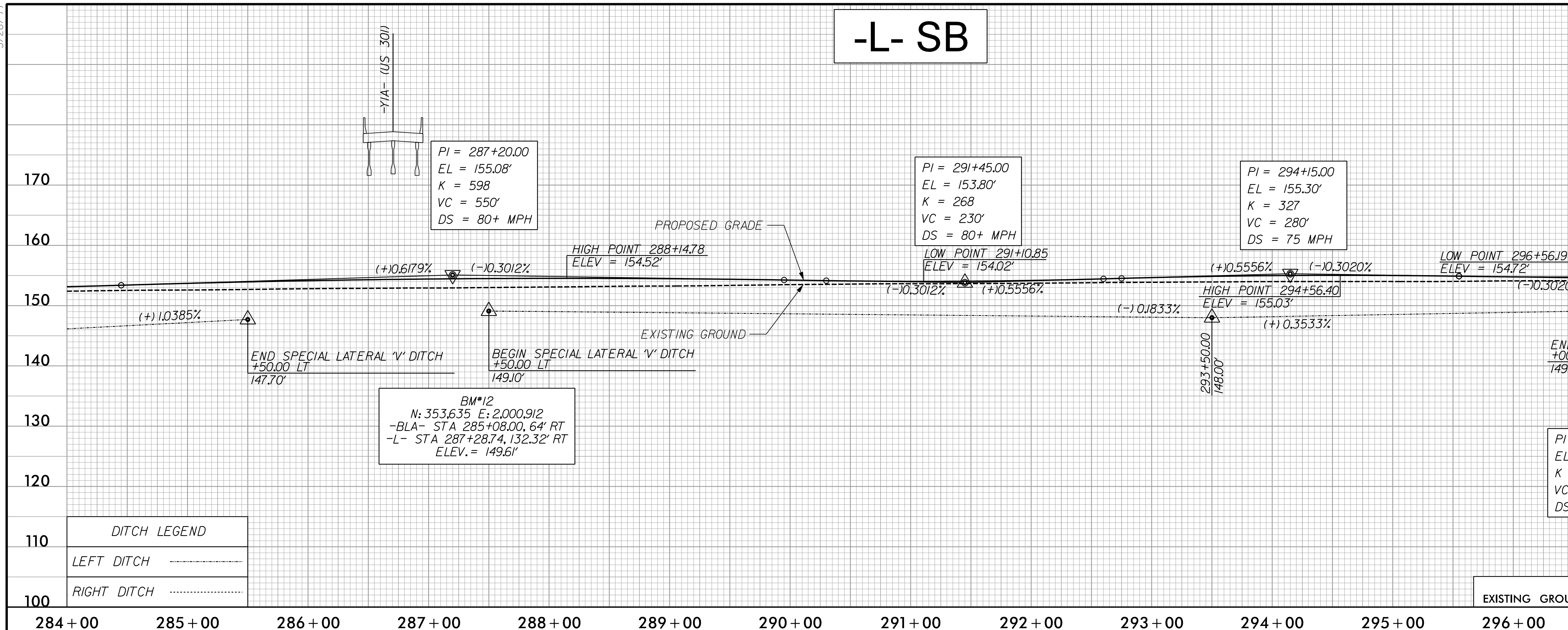


3/10/2022  
P:\Projects\15987A\_L\_RDY\_PSH\_PFL\_55.dgn  
DAVID CHOI

5/28/2022

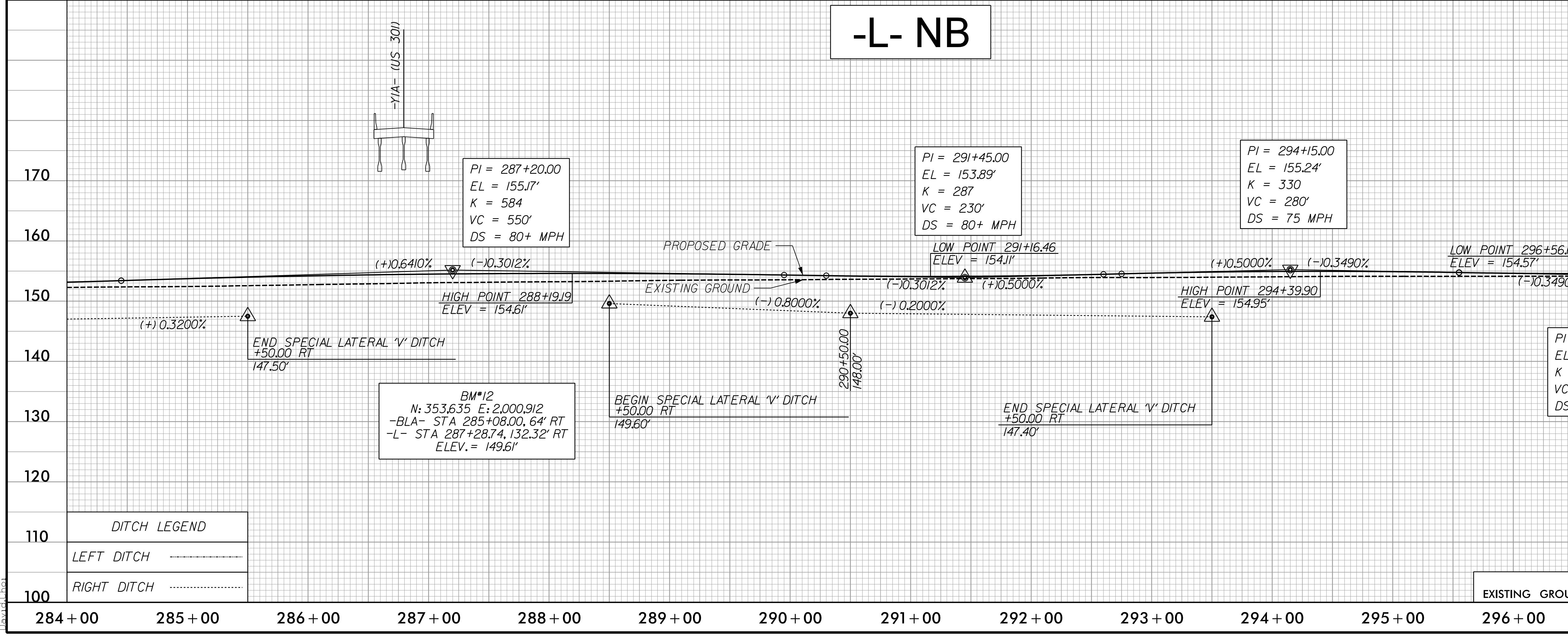
# -L- SB

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 56
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



FOR -L- PLAN, SEE SHEET 17  
EXISTING GROUND PROFILE SHOWN AT PGL

# -L- NB

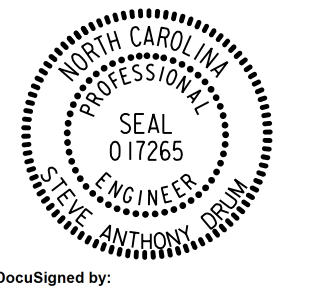
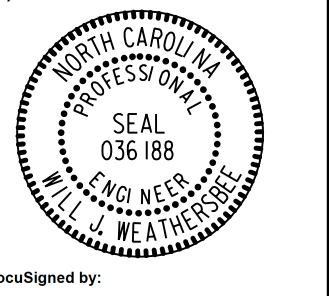



FOR -L- PLAN, SEE SHEET 17  
EXISTING GROUND PROFILE SHOWN AT PGL

5/19/2022  
C:\Users\David\Documents\Projects\15987A\_RDY\_PSH\_PFL\_56.dgn

5/28/2022

# -L- SB

PROJECT REFERENCE NO. <b>1-5987A</b>	SHEET NO. <b>57</b>
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
DocuSigned by: <b>Steve Anthony Dean</b> <b>Will Matthews</b>	
<b>DOCUMENT NOT CONSIDERED FINAL</b> <b>UNLESS ALL SIGNATURES COMPLETED</b>	
 <b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300      www.NV5.com <small>NC License # F-1333</small>	

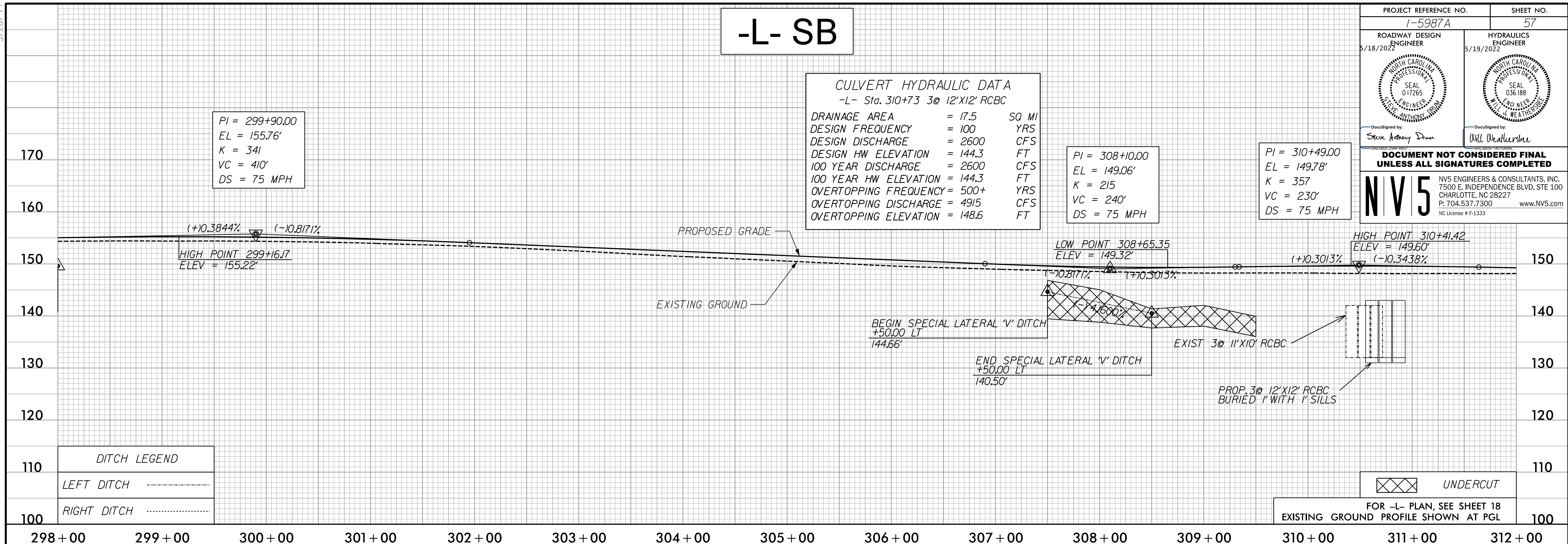
**CULVERT HYDRAULIC DATA**  
 -L- Sta. 310+73 3@ 12'X12' RCBC

DRAINAGE AREA	= 17.5	SQ MI
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 2600	CFS
DESIGN HW ELEVATION	= 144.3	FT
100 YEAR DISCHARGE	= 2600	CFS
100 YEAR HW ELEVATION	= 144.3	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 4915	CFS
OVERTOPPING ELEVATION	= 148.6	FT

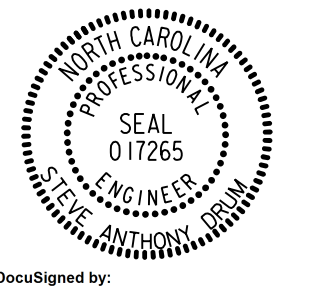
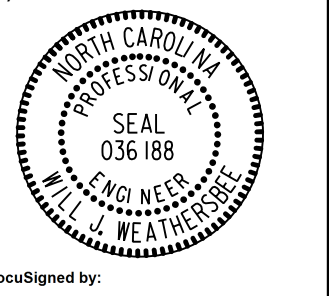
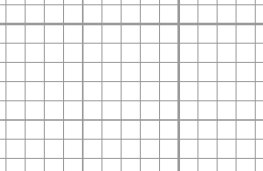
PI = 299+90.00  
 EL = 155.76'  
 K = 341  
 VC = 410'  
 DS = 75 MPH

PI = 308+10.00  
 EL = 149.06'  
 K = 215  
 VC = 240'  
 DS = 75 MPH

PI = 310+49.00  
 EL = 149.78'  
 K = 357  
 VC = 230'  
 DS = 75 MPH



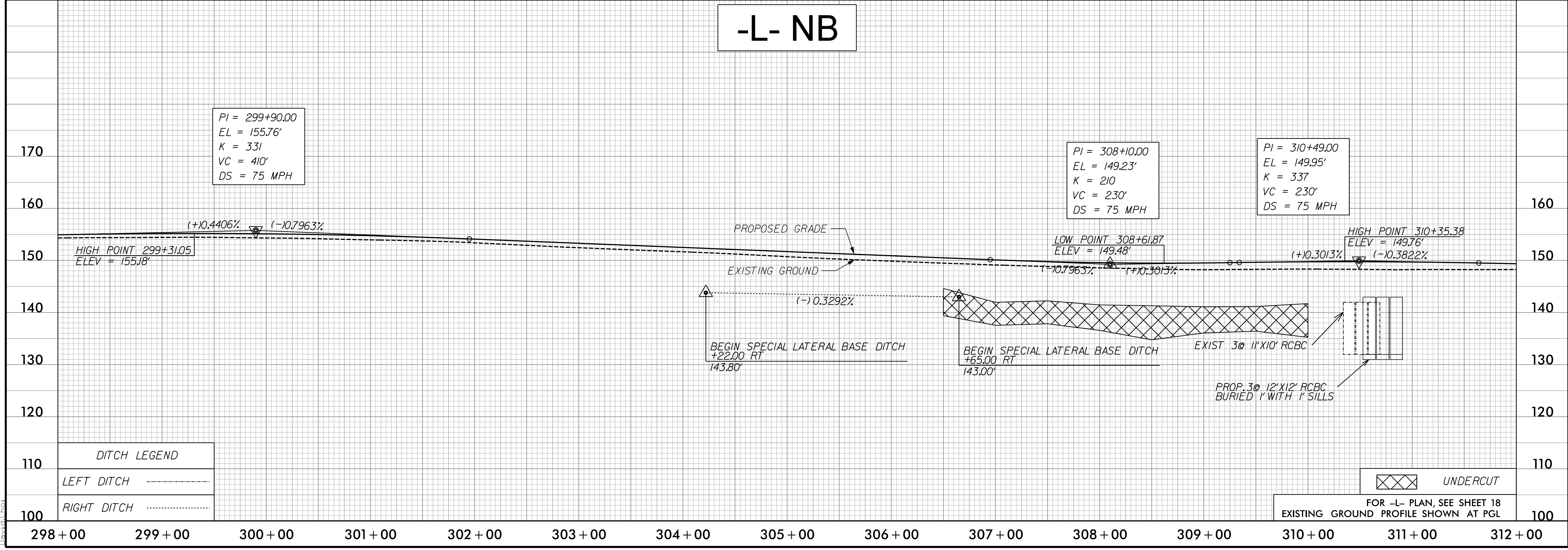
# -L- NB

PROJECT REFERENCE NO. <b>1-5987A</b>	SHEET NO. <b>57</b>
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
DocuSigned by: <b>Steve Anthony Dean</b> <b>Will Matthews</b>	
<b>DOCUMENT NOT CONSIDERED FINAL</b> <b>UNLESS ALL SIGNATURES COMPLETED</b>	
 <b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300      www.NV5.com <small>NC License # F-1333</small>	

PI = 308+10.00  
 EL = 149.23'  
 K = 210  
 VC = 230'  
 DS = 75 MPH

PI = 310+49.00  
 EL = 149.95'  
 K = 337  
 VC = 230'  
 DS = 75 MPH


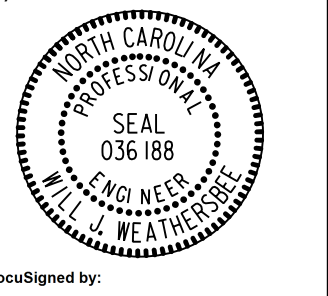
PI = 299+90.00  
 EL = 155.76'  
 K = 331  
 VC = 410'  
 DS = 75 MPH

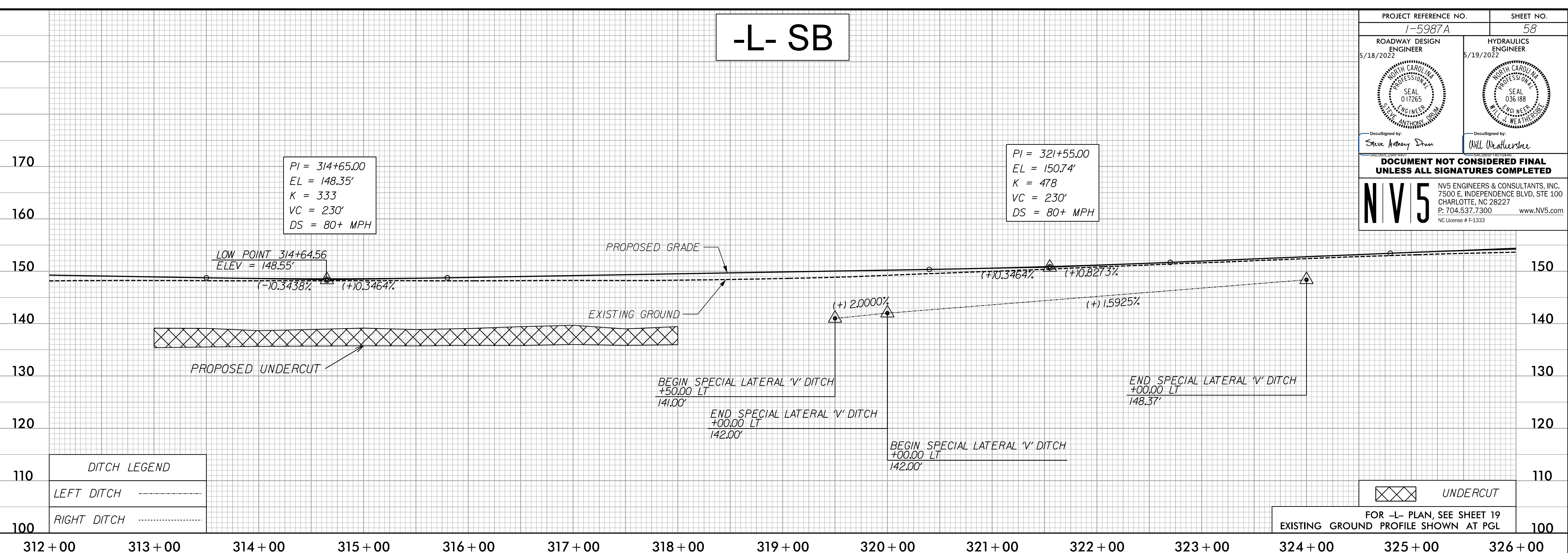


3/19/2022  
 P:\Projects\15987A\_RDY\_PSH\_PFL\_57.dgn  
 David

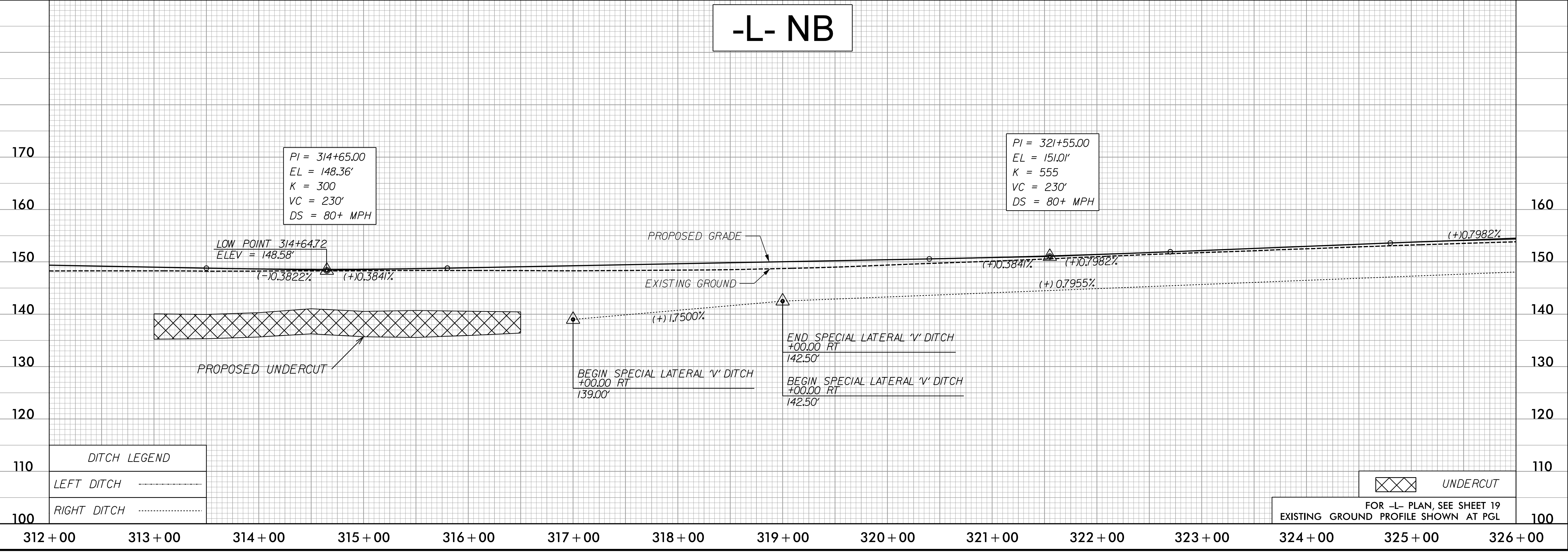
5/28/2022

# -L- SB

PROJECT REFERENCE NO. <b>1-5987A</b>	SHEET NO. <b>58</b>
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
DocuSigned by: <b>Steve Anthony Dean</b>	
DocuSigned by: <b>Will Matthews</b>	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



# -L- NB



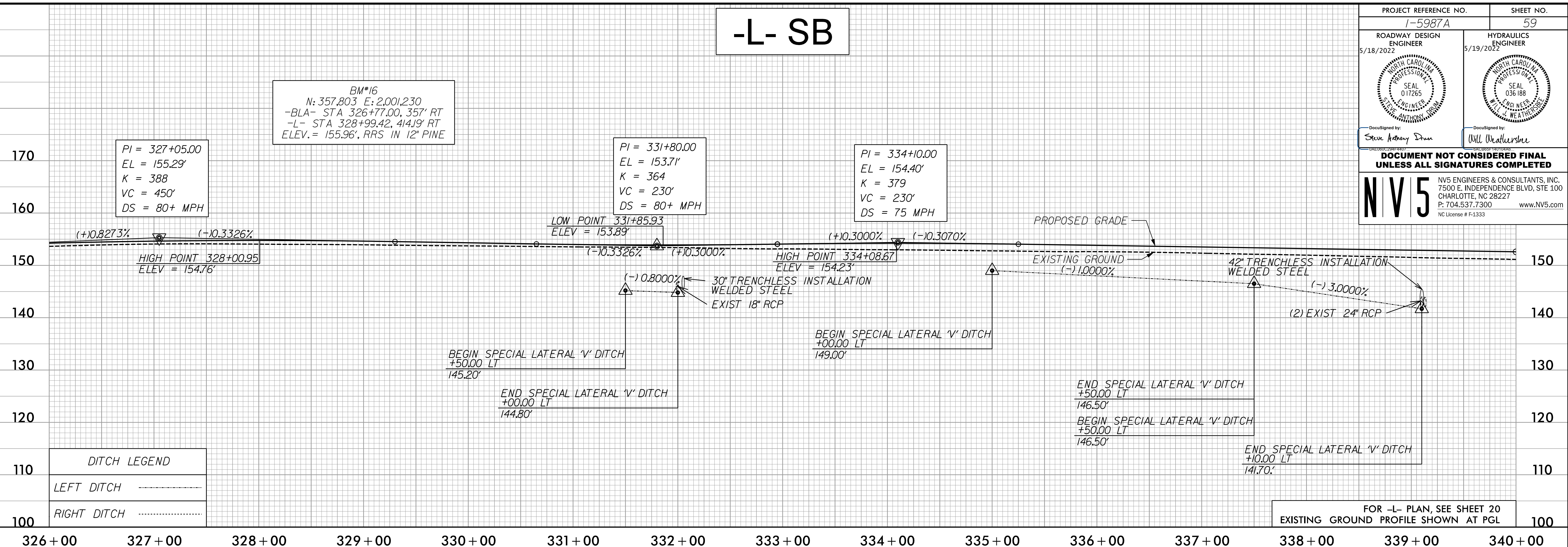
5/18/2022  
C:\Users\David\Documents\Projects\15987A\_RDY\_PSH\_PFL\_58.dgn



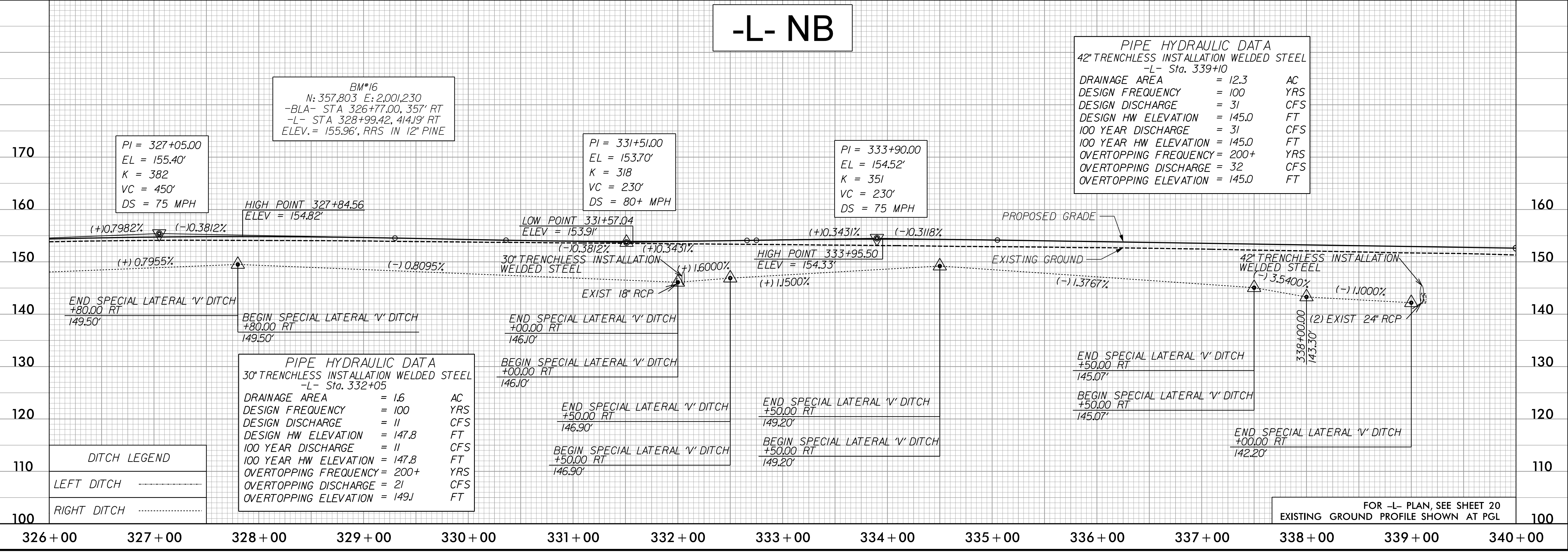
5/28/2022

# -L- SB

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 59
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Duan	DocuSigned by: Will Weatherstue
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



# -L- NB

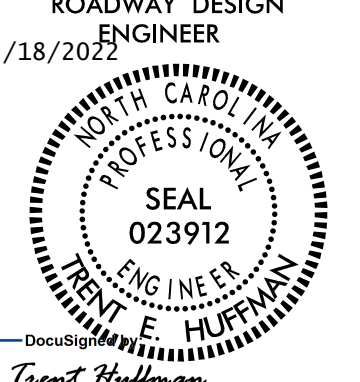
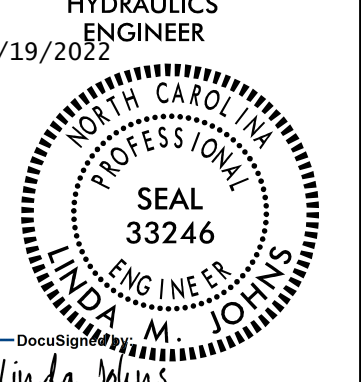


5/19/2022  
N:\Projects\15987A\_PSH\_PFL\_59.dgn  
David

5/28/2012


# -L- SB

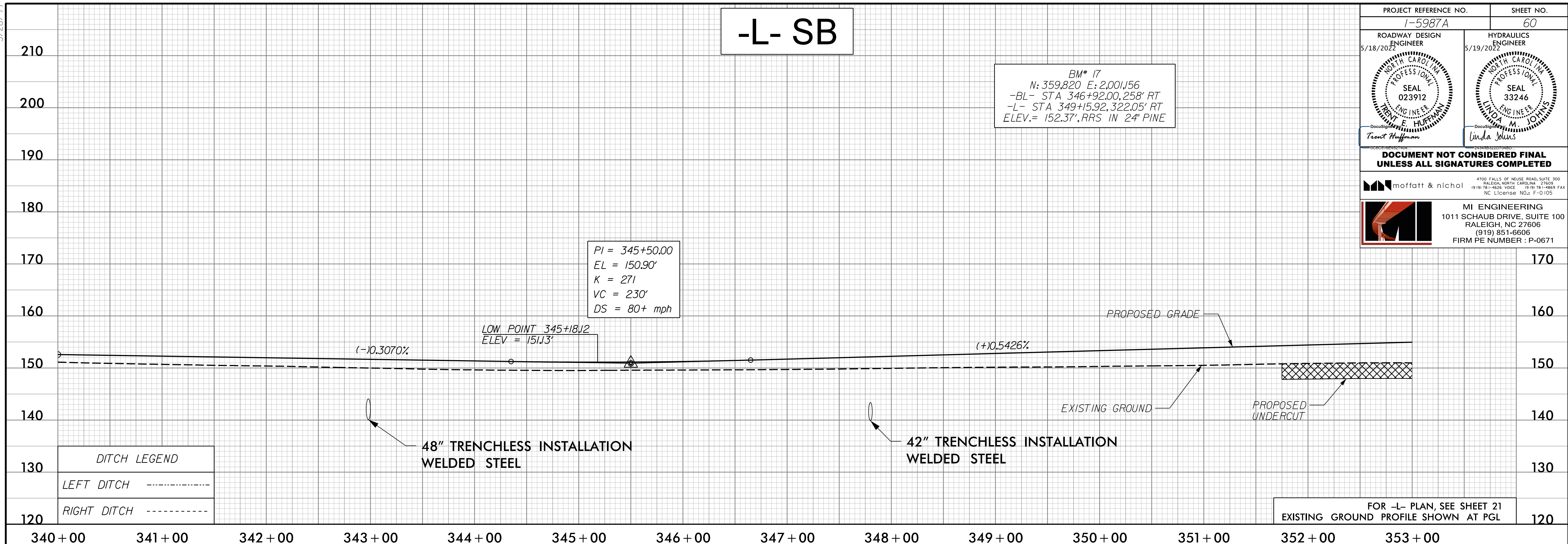
BM\* 17  
 N: 359,820 E: 2,001,156  
 -BL- STA 346+92.00, 258' RT  
 -L- STA 349+15.92, 322.05' RT  
 ELEV. = 152.37', RRS IN 24" PINE

PROJECT REFERENCE NO. <b>1-5987A</b>	SHEET NO. <b>60</b>
ROADWAY DESIGN ENGINEER 5/18/2012 	HYDRAULICS ENGINEER 5/19/2012 

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

 **MOFFATT & NICHOL**  
 4700 FALLS OF NEUSE ROAD, SUITE 100  
 RALEIGH, NORTH CAROLINA 27608  
 (919) 851-6600 VOIC. (919) 851-7488 FAX  
 NC License No.: F-0 105

 **MI ENGINEERING**  
 1011 SCHAUB DRIVE, SUITE 100  
 RALEIGH, NC 27608  
 (919) 851-6606  
 FIRM PE NUMBER : P-0671



FOR -L- PLAN, SEE SHEET 21  
 EXISTING GROUND PROFILE SHOWN AT PGL

# -L- NB

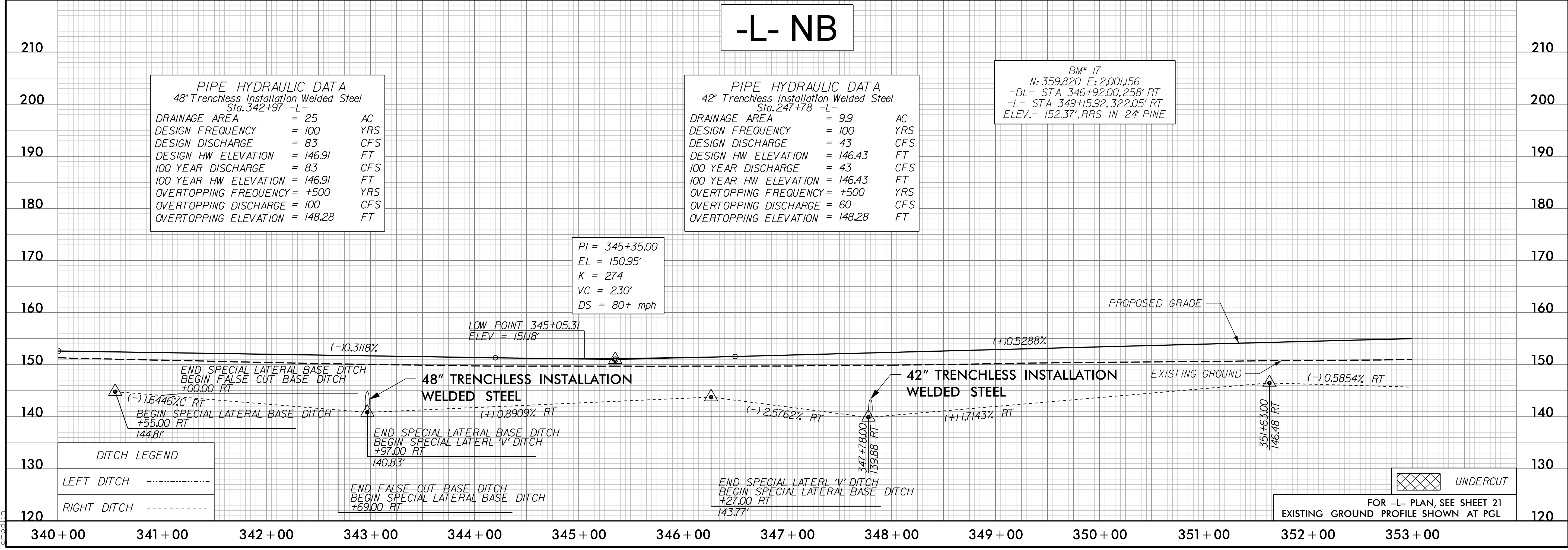
BM\* 17  
 N: 359,820 E: 2,001,156  
 -BL- STA 346+92.00, 258' RT  
 -L- STA 349+15.92, 322.05' RT  
 ELEV. = 152.37', RRS IN 24" PINE

**PIPE HYDRAULIC DATA**  
 48" Trenchless Installation Welded Steel  
 Sta. 342+97 -L-

DRAINAGE AREA	= 25	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 83	CFS
DESIGN HW ELEVATION	= 146.91	FT
100 YEAR DISCHARGE	= 83	CFS
100 YEAR HW ELEVATION	= 146.91	FT
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= 100	CFS
OVERTOPPING ELEVATION	= 148.28	FT

**PIPE HYDRAULIC DATA**  
 42" Trenchless Installation Welded Steel  
 Sta. 247+78 -L-

DRAINAGE AREA	= 9.9	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 43	CFS
DESIGN HW ELEVATION	= 146.43	FT
100 YEAR DISCHARGE	= 43	CFS
100 YEAR HW ELEVATION	= 146.43	FT
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= 60	CFS
OVERTOPPING ELEVATION	= 148.28	FT



FOR -L- PLAN, SEE SHEET 21  
 EXISTING GROUND PROFILE SHOWN AT PGL



0:\4\2012\125\0500\CAD\15987A\Roadway\Proj\15987A\_RDY\_PSH\_PFL\_060.dgn  
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5/28/2022

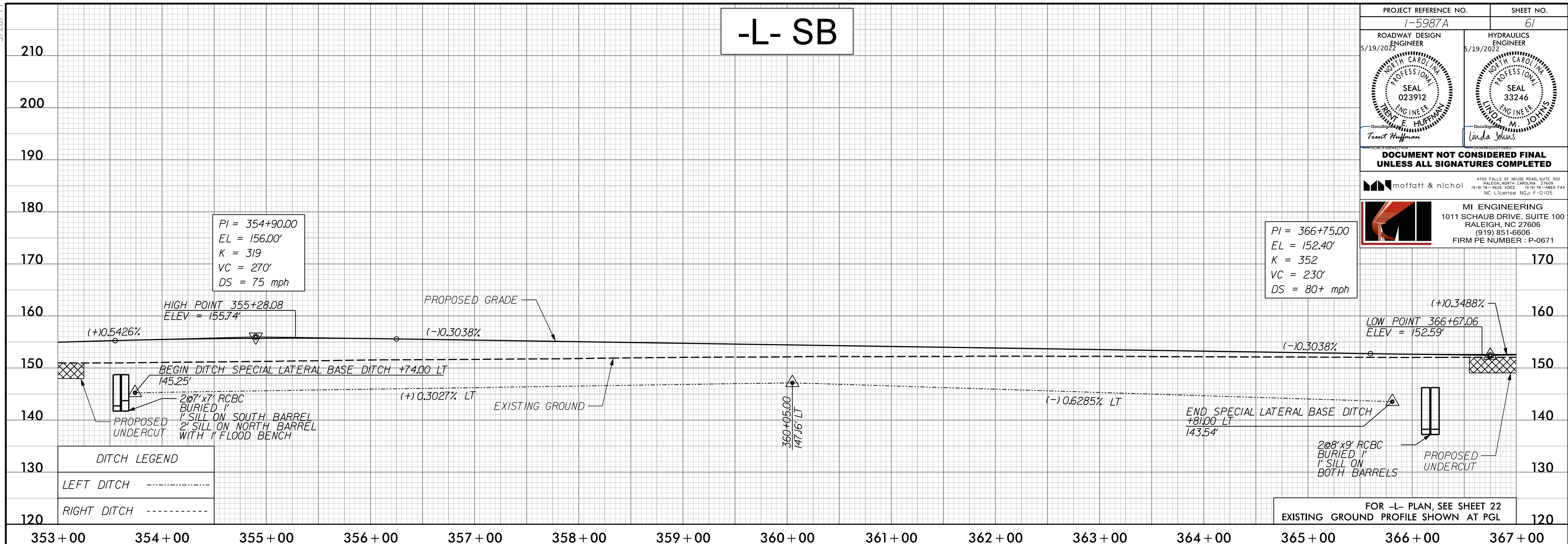
# -L- SB

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 61
ROADWAY DESIGN ENGINEER 5/19/2022 Trent Hoffman	HYDRAULICS ENGINEER 5/19/2022 Linda Johns

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

moffatt & nichol  
4700 FALLS OF WELLS ROAD, SUITE 100  
RALEIGH, NORTH CAROLINA 27608  
(919) 851-6600  
NC License No.: F-0105

MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27608  
(919) 851-6606  
FIRM PE NUMBER: P-0671



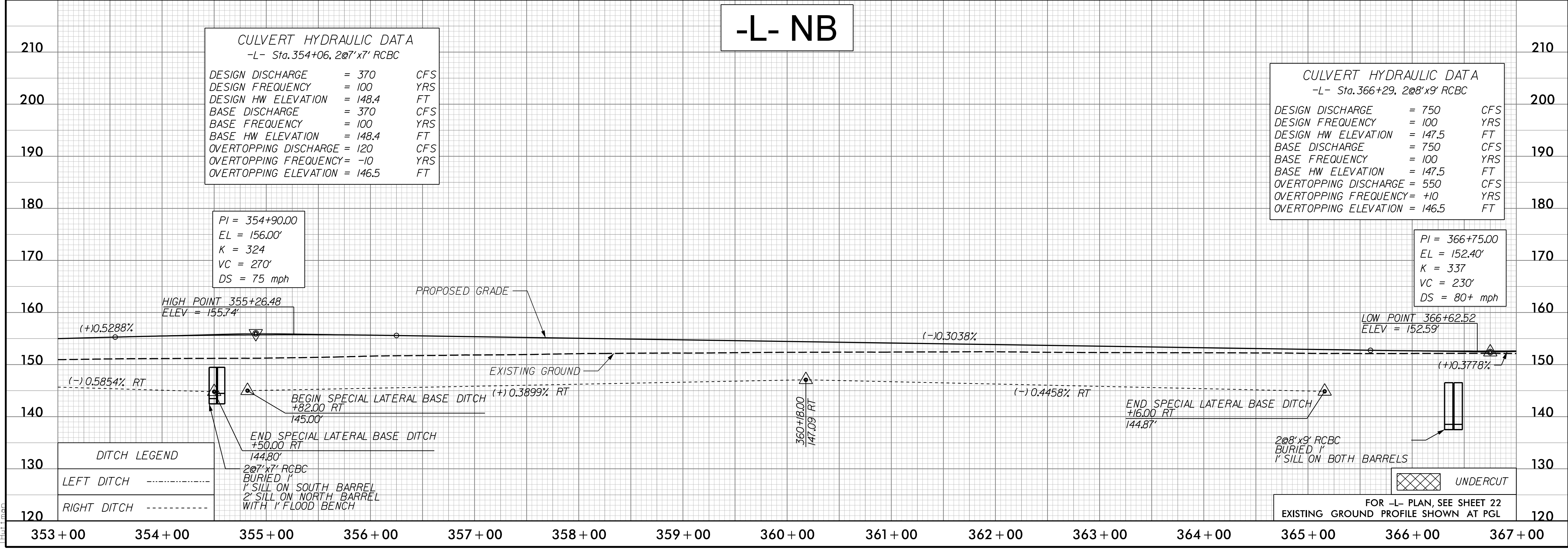
# -L- NB

**CULVERT HYDRAULIC DATA**  
-L- Sta. 354+06, 2@7'x7' RCBC

DESIGN DISCHARGE	= 370	CFS
DESIGN FREQUENCY	= 100	YRS
DESIGN HW ELEVATION	= 148.4	FT
BASE DISCHARGE	= 370	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 148.4	FT
OVERTOPPING DISCHARGE	= 120	CFS
OVERTOPPING FREQUENCY	= -10	YRS
OVERTOPPING ELEVATION	= 146.5	FT

**CULVERT HYDRAULIC DATA**  
-L- Sta. 366+29, 2@8'x9' RCBC

DESIGN DISCHARGE	= 750	CFS
DESIGN FREQUENCY	= 100	YRS
DESIGN HW ELEVATION	= 147.5	FT
BASE DISCHARGE	= 750	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 147.5	FT
OVERTOPPING DISCHARGE	= 550	CFS
OVERTOPPING FREQUENCY	= +10	YRS
OVERTOPPING ELEVATION	= 146.5	FT

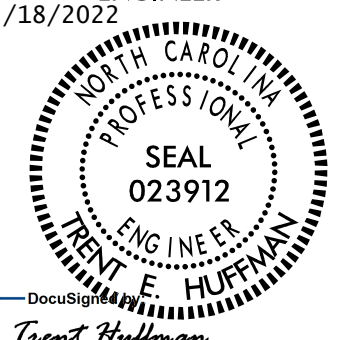
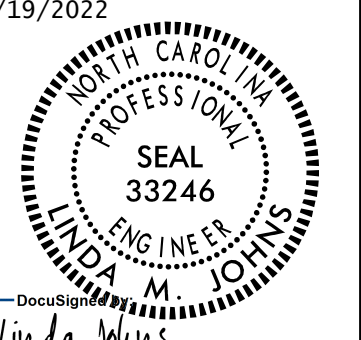


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5/28/2022

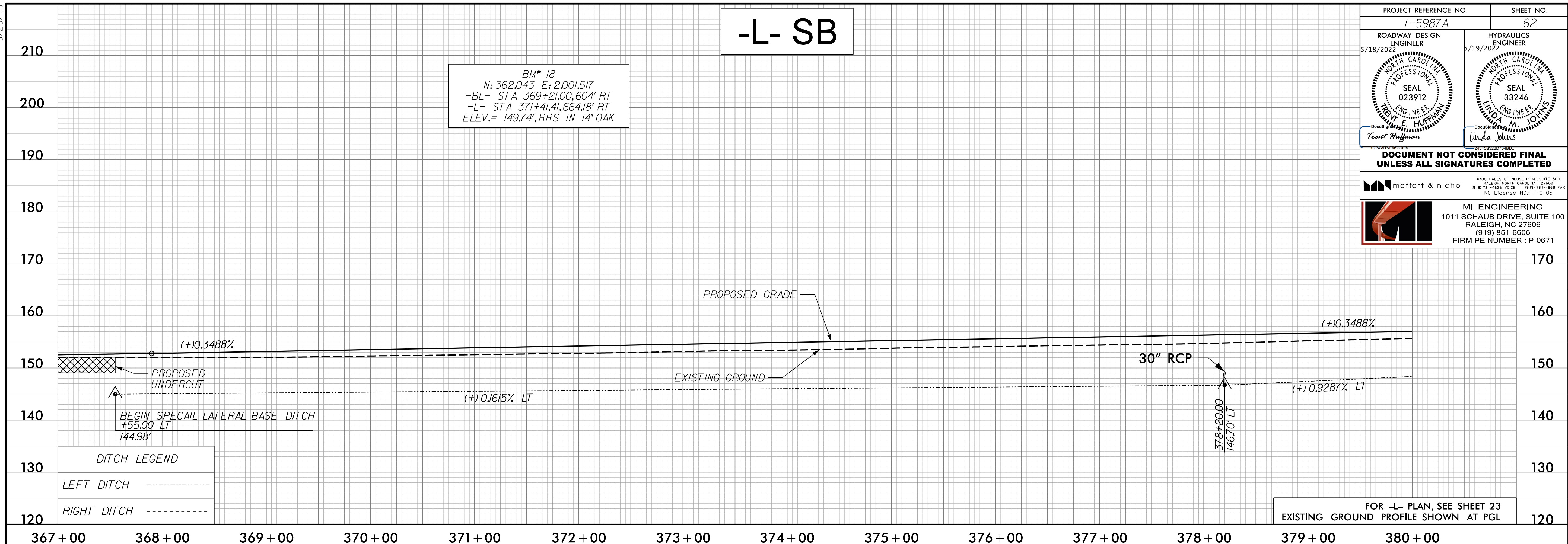
# -L- SB

BM\* 18  
 N: 362.043 E: 2.001.517  
 -BL- STA 369+21.00, 604' RT  
 -L- STA 371+41.41, 664.18' RT  
 ELEV.= 149.74', RRS IN 14" OAK

PROJECT REFERENCE NO. <b>1-5987A</b>	SHEET NO. <b>62</b>
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 

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

 <b>moffatt &amp; nichol</b>	<small>4700 FALLS OF NEUSE ROAD, SUITE 100 RALEIGH, NORTH CAROLINA 27608 (919) 851-6606 VOIC. (919) 851-6606 FAX NC License No.: F-0105</small>
	<b>MI ENGINEERING</b> 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27608 (919) 851-6606 FIRM PE NUMBER: P-0671



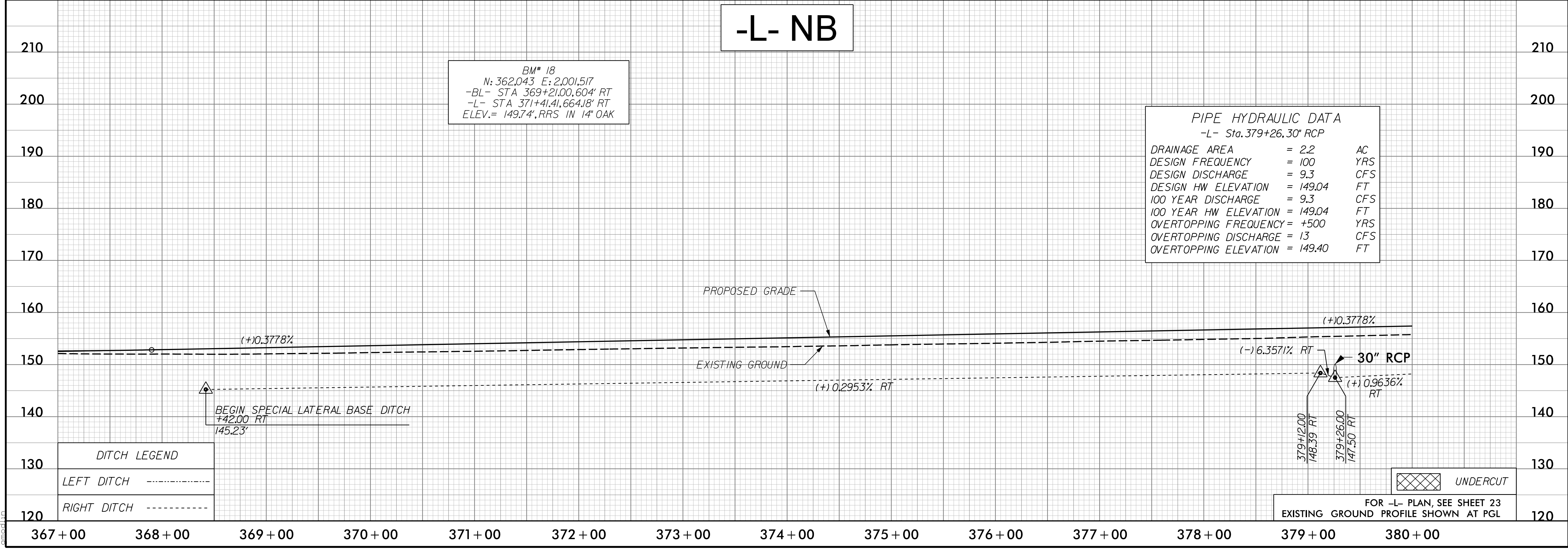
DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

FOR -L- PLAN, SEE SHEET 23  
EXISTING GROUND PROFILE SHOWN AT PGL

# -L- NB

BM\* 18  
 N: 362.043 E: 2.001.517  
 -BL- STA 369+21.00, 604' RT  
 -L- STA 371+41.41, 664.18' RT  
 ELEV.= 149.74', RRS IN 14" OAK

PIPE HYDRAULIC DATA		
-L- Sta. 379+26.30' RCP		
DRAINAGE AREA	= 2.2	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 9.3	CFS
DESIGN HW ELEVATION	= 149.04	FT
100 YEAR DISCHARGE	= 9.3	CFS
100 YEAR HW ELEVATION	= 149.04	FT
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= 13	CFS
OVERTOPPING ELEVATION	= 149.40	FT



DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----



FOR -L- PLAN, SEE SHEET 23  
EXISTING GROUND PROFILE SHOWN AT PGL

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5/28/24

# -L- SB

PROJECT REFERENCE NO. I-5987A	SHEET NO. 63
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022

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

**MI ENGINEERING**  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27608  
(919) 851-6606  
FIRM PE NUMBER: P-0671

BM\* 19  
N: 363,434 E: 2,001,151  
-BL- STA 383+07.00, 224' RT  
-L- STA 385+29.77, 286.20' RT  
ELEV.= 153.20', RRS IN 24" PINE

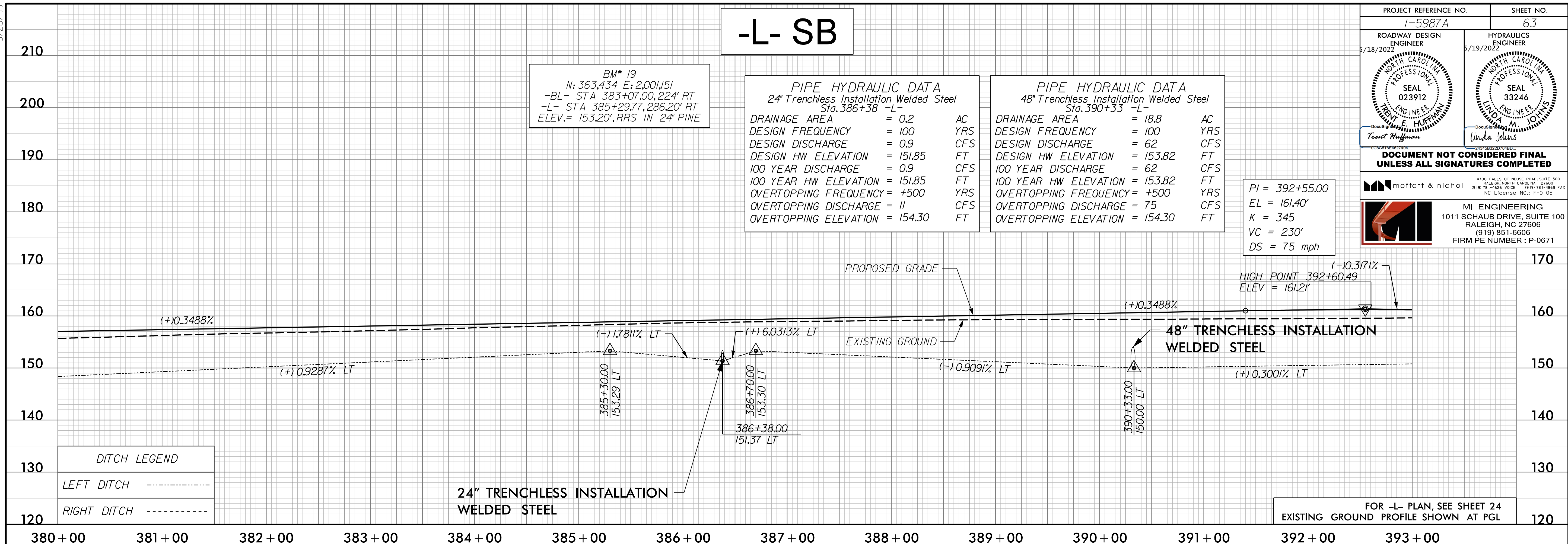
**PIPE HYDRAULIC DATA**  
24" Trenchless Installation Welded Steel  
Sta. 386+38 -L-

DRAINAGE AREA	= 0.2	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 0.9	CFS
DESIGN HW ELEVATION	= 151.85	FT
100 YEAR DISCHARGE	= 0.9	CFS
100 YEAR HW ELEVATION	= 151.85	FT
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= 11	CFS
OVERTOPPING ELEVATION	= 154.30	FT

**PIPE HYDRAULIC DATA**  
48" Trenchless Installation Welded Steel  
Sta. 390+33 -L-

DRAINAGE AREA	= 18.8	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 62	CFS
DESIGN HW ELEVATION	= 153.82	FT
100 YEAR DISCHARGE	= 62	CFS
100 YEAR HW ELEVATION	= 153.82	FT
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= 75	CFS
OVERTOPPING ELEVATION	= 154.30	FT

PI = 392+55.00  
EL = 161.40'  
K = 345  
VC = 230'  
DS = 75 mph

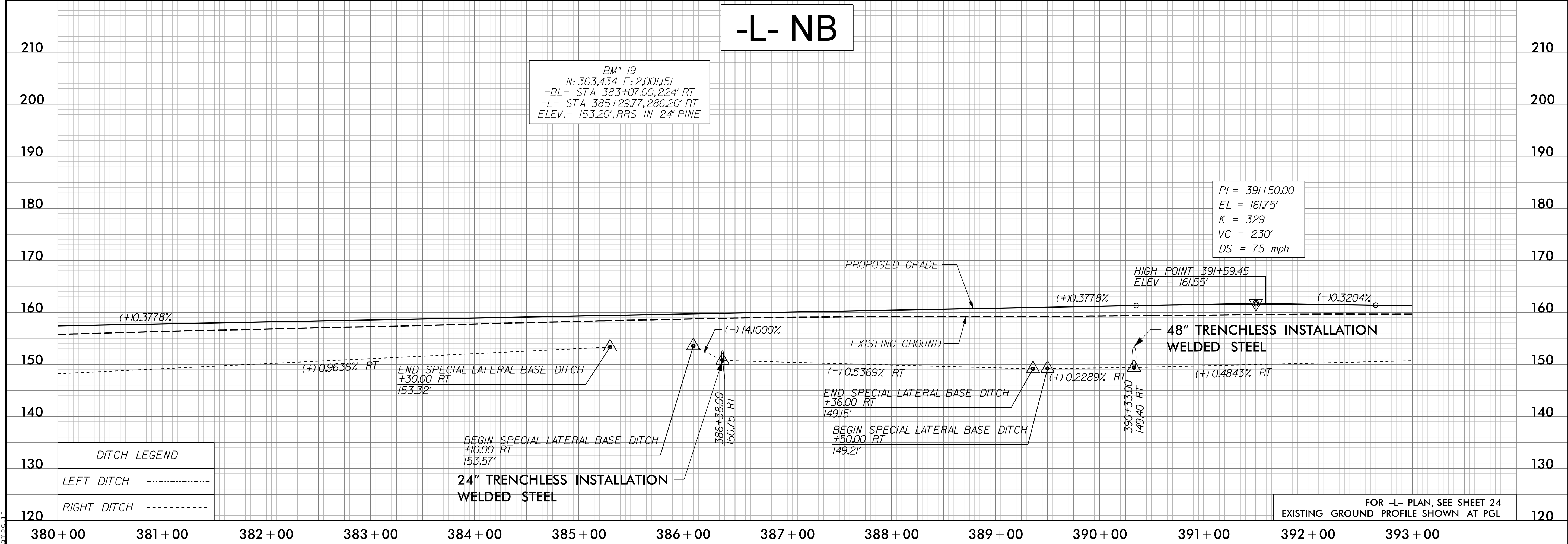


FOR -L- PLAN, SEE SHEET 24  
EXISTING GROUND PROFILE SHOWN AT PGL

# -L- NB

BM\* 19  
N: 363,434 E: 2,001,151  
-BL- STA 383+07.00, 224' RT  
-L- STA 385+29.77, 286.20' RT  
ELEV.= 153.20', RRS IN 24" PINE

PI = 391+50.00  
EL = 161.75'  
K = 329  
VC = 230'  
DS = 75 mph

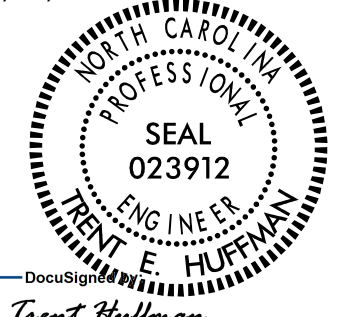



FOR -L- PLAN, SEE SHEET 24  
EXISTING GROUND PROFILE SHOWN AT PGL

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5/28/2022

# -L- SB

PROJECT REFERENCE NO. I-5987A	SHEET NO. 64
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 

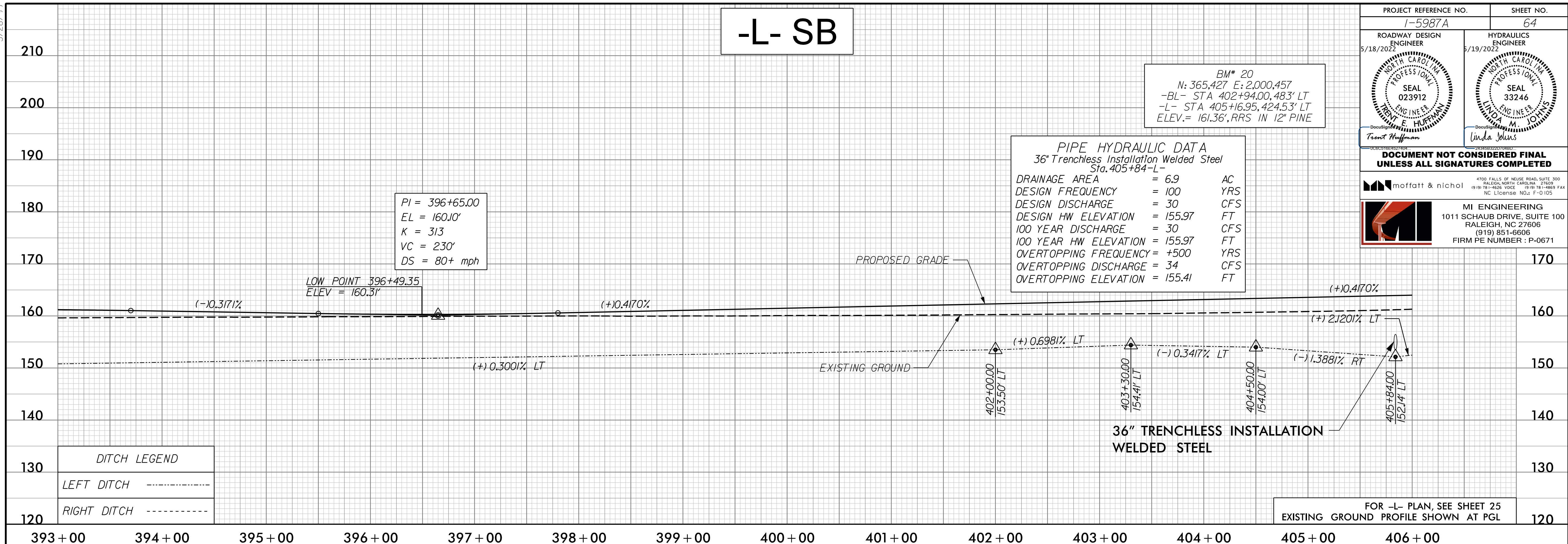
BM# 20  
N: 365,427 E: 2,000,457  
-BL- STA 402+94.00, 483' LT  
-L- STA 405+16.95, 424.53' LT  
ELEV.= 161.36', RRS IN 12" PINE

**PIPE HYDRAULIC DATA**  
36" Trenchless Installation Welded Steel  
Sta. 405+84'-L-

DRAINAGE AREA	= 6.9	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 30	CFS
DESIGN HW ELEVATION	= 155.97	FT
100 YEAR DISCHARGE	= 30	CFS
100 YEAR HW ELEVATION	= 155.97	FT
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= 34	CFS
OVERTOPPING ELEVATION	= 155.41	FT

PI = 396+65.00  
EL = 160.10'  
K = 313  
VC = 230'  
DS = 80+ mph

LOW POINT 396+49.35  
ELEV = 160.31'



**DITCH LEGEND**

LEFT DITCH	-----
RIGHT DITCH	-----

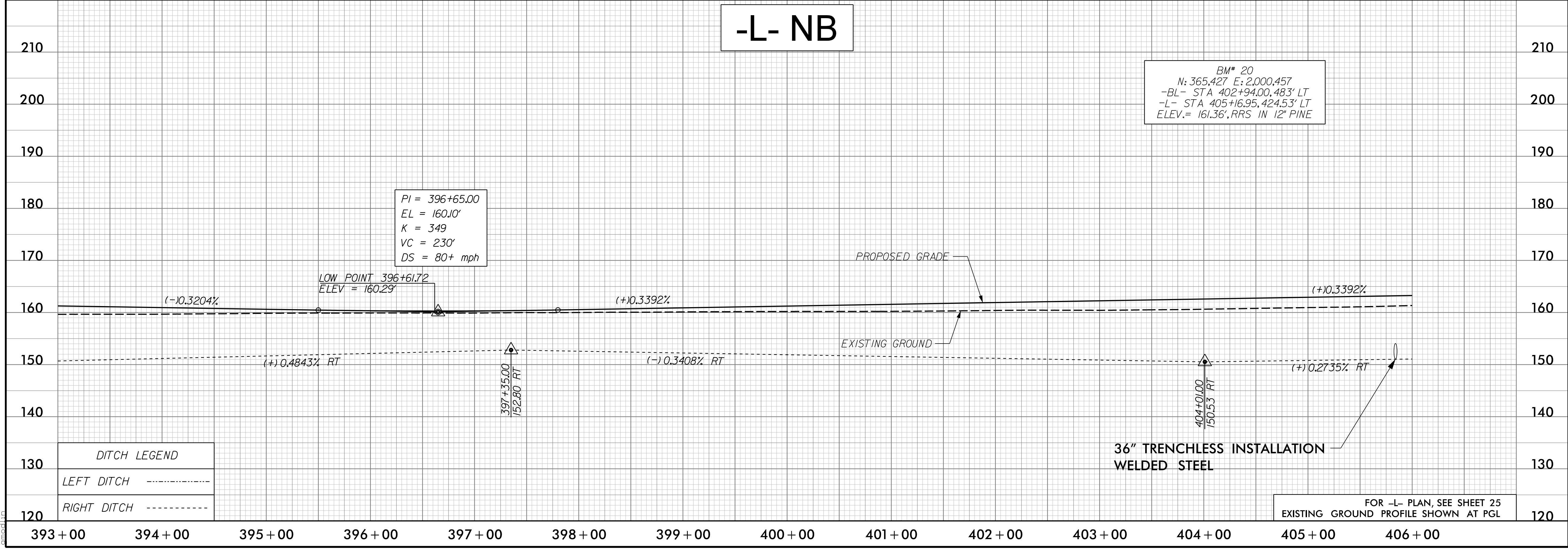
FOR -L- PLAN, SEE SHEET 25  
EXISTING GROUND PROFILE SHOWN AT PGL

# -L- NB

BM# 20  
N: 365,427 E: 2,000,457  
-BL- STA 402+94.00, 483' LT  
-L- STA 405+16.95, 424.53' LT  
ELEV.= 161.36', RRS IN 12" PINE

PI = 396+65.00  
EL = 160.10'  
K = 349  
VC = 230'  
DS = 80+ mph

LOW POINT 396+61.72  
ELEV = 160.29'



**DITCH LEGEND**

LEFT DITCH	-----
RIGHT DITCH	-----

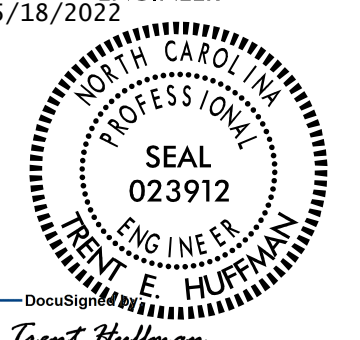



FOR -L- PLAN, SEE SHEET 25  
EXISTING GROUND PROFILE SHOWN AT PGL

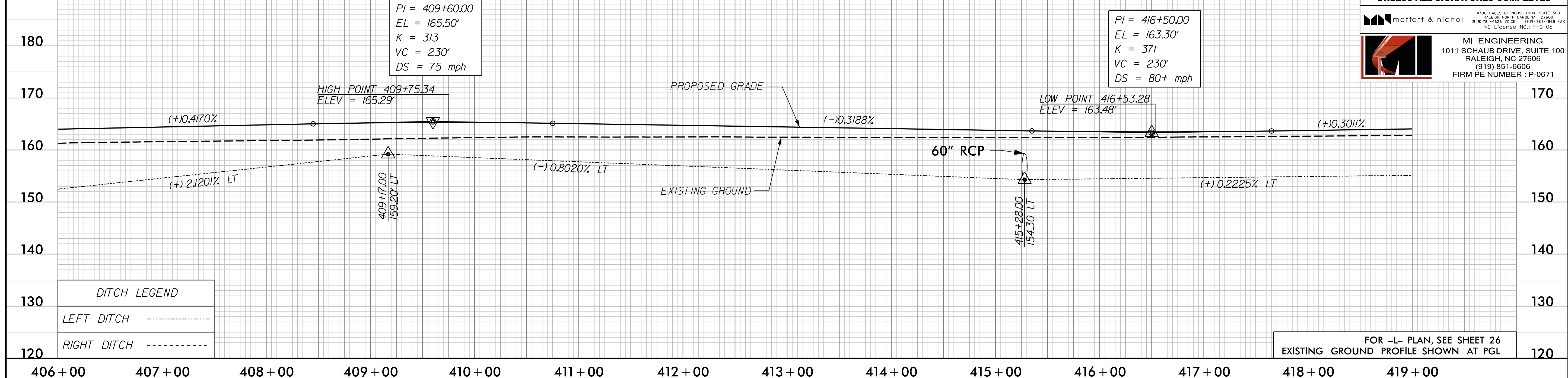
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5/28/22

# -L- SB

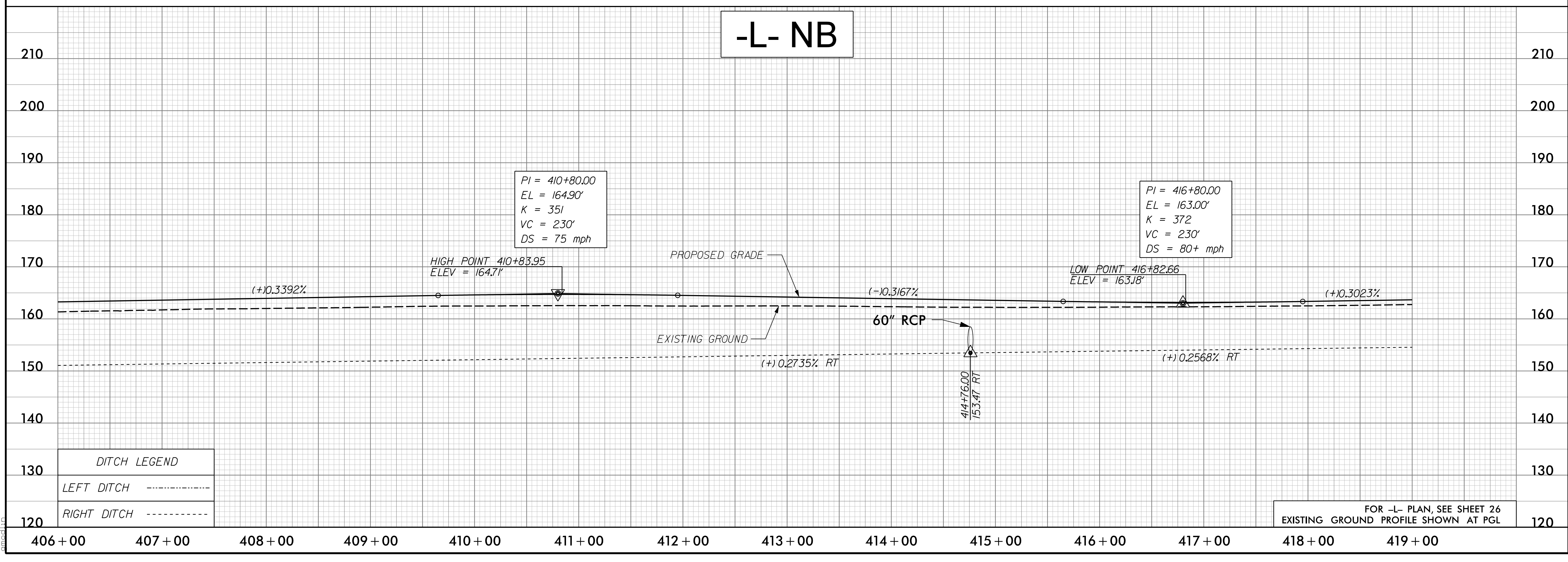
PIPE HYDRAULIC DATA		
-L- Sta. 415+02, 60" RCP		
DRAINAGE AREA	= 426	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 140	CFS
DESIGN HW ELEVATION	= 159.84	FT
100 YEAR DISCHARGE	= 140	CFS
100 YEAR HW ELEVATION	= 159.84	FT
OVERTOPPING FREQUENCY	= -500	YRS
OVERTOPPING DISCHARGE	= 160	CFS
OVERTOPPING ELEVATION	= 160.20	FT

PROJECT REFERENCE NO. I-5987A	SHEET NO. 65
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
 	
<small>4700 FALLS OF NEUSE ROAD, SUITE 300 RALEIGH, NORTH CAROLINA 27609 919 851-6606 VOIC 919 851-6608 FAX NC License No.: F-0 105</small>	
<b>MI ENGINEERING</b> 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27608 (919) 851-6606 FIRM PE NUMBER: P-0671	



# -L- NB

PIPE HYDRAULIC DATA		
-L- Sta. 416+02, 60" RCP		
DRAINAGE AREA	= 426	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 140	CFS
DESIGN HW ELEVATION	= 159.84	FT
100 YEAR DISCHARGE	= 140	CFS
100 YEAR HW ELEVATION	= 159.84	FT
OVERTOPPING FREQUENCY	= -500	YRS
OVERTOPPING DISCHARGE	= 160	CFS
OVERTOPPING ELEVATION	= 160.20	FT



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5/28/2022

**PIPE HYDRAULIC DATA**  
-L- Sta. 419+55, 54" RCP

DRAINAGE AREA	= 28.3	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 93	CFS
DESIGN HW ELEVATION	= 159.88	FT
100 YEAR DISCHARGE	= 93	CFS
100 YEAR HW ELEVATION	= 159.88	FT
OVERTOPPING FREQUENCY	= -500	YRS
OVERTOPPING DISCHARGE	= 105	CFS
OVERTOPPING ELEVATION	= 160.20	FT

# -L- SB

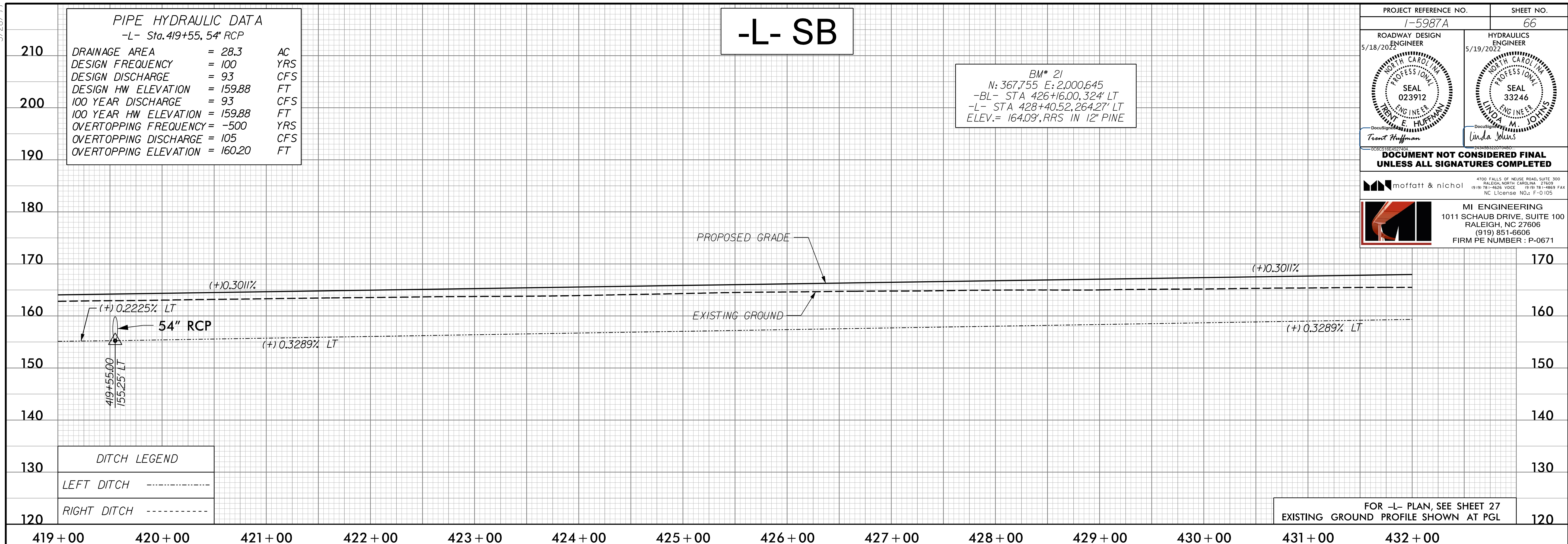
BM\* 21  
N: 367.755 E: 2,000.645  
-BL- STA 426+16.00, 324' LT  
-L- STA 428+40.52, 264.27' LT  
ELEV. = 164.09', RRS IN 12" PINE

PROJECT REFERENCE NO.	1-5987A	SHEET NO.	66
ROADWAY DESIGN ENGINEER	5/18/2022	HYDRAULICS ENGINEER	5/19/2022

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

moffatt & nichol  
4700 FALLS OF WELLS ROAD, SUITE 100  
RALEIGH, NORTH CAROLINA 27609  
(919) 851-6606 VOIC (919) 851-6606 FAX  
NC License No.: F-0105

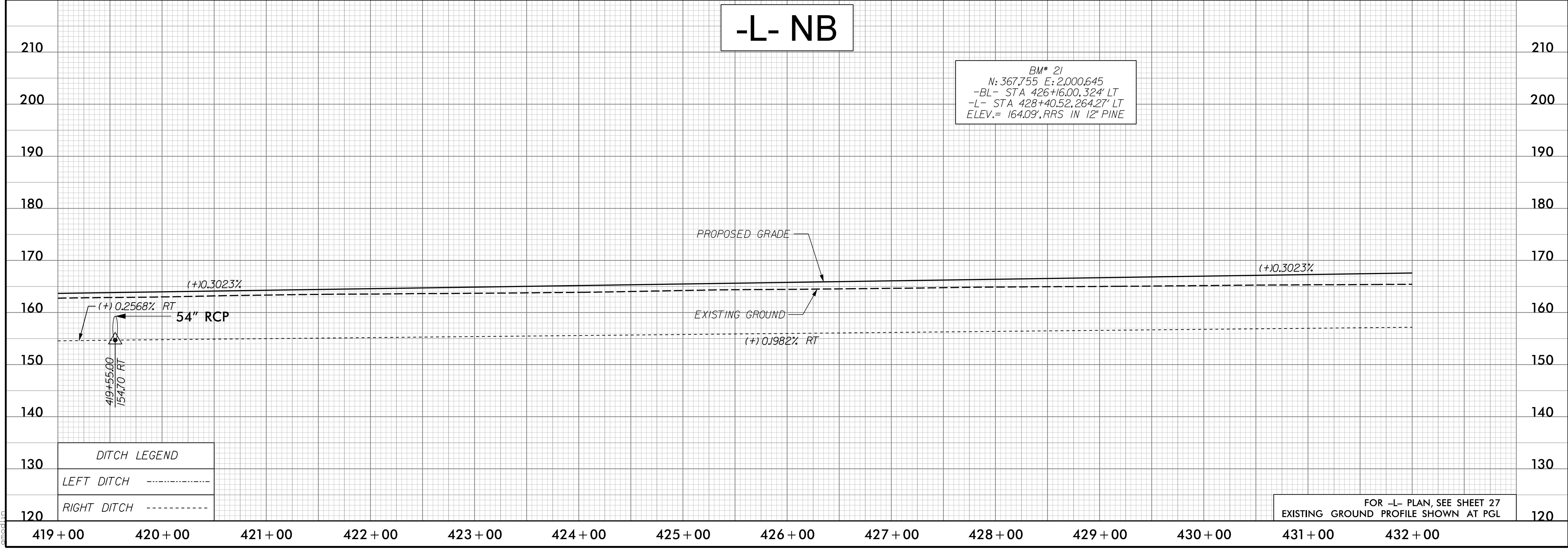
MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27608  
(919) 851-6606  
FIRM PE NUMBER: P-0671



FOR -L- PLAN, SEE SHEET 27  
EXISTING GROUND PROFILE SHOWN AT PGL

# -L- NB

BM\* 21  
N: 367.755 E: 2,000.645  
-BL- STA 426+16.00, 324' LT  
-L- STA 428+40.52, 264.27' LT  
ELEV. = 164.09', RRS IN 12" PINE



FOR -L- PLAN, SEE SHEET 27  
EXISTING GROUND PROFILE SHOWN AT PGL

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5/28/2022

# -L- SB

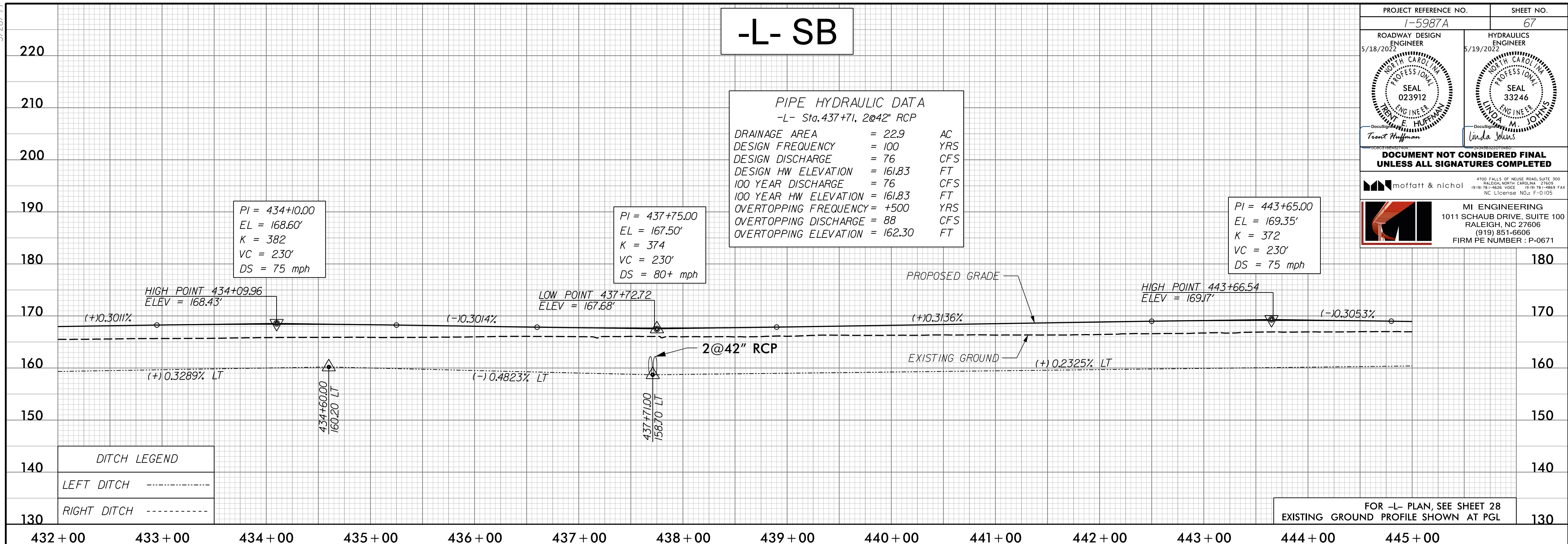
**PIPE HYDRAULIC DATA**  
 -L- Sta. 437+71, 2@42" RCP

DRAINAGE AREA	= 22.9	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 76	CFS
DESIGN HW ELEVATION	= 161.83	FT
100 YEAR DISCHARGE	= 76	CFS
100 YEAR HW ELEVATION	= 161.83	FT
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= 88	CFS
OVERTOPPING ELEVATION	= 162.30	FT

PROJECT REFERENCE NO. I-5987A	SHEET NO. 67
ROADWAY DESIGN ENGINEER 5/18/2022 Trent Hoffman	HYDRAULICS ENGINEER 5/19/2022 Linda Johns
SEAL 023912 NORTH CAROLINA PROFESSIONAL ENGINEER	SEAL 33246 NORTH CAROLINA PROFESSIONAL ENGINEER

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

moftatt & nichol	MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27608 (919) 851-6606 FIRM PE NUMBER: P-0671
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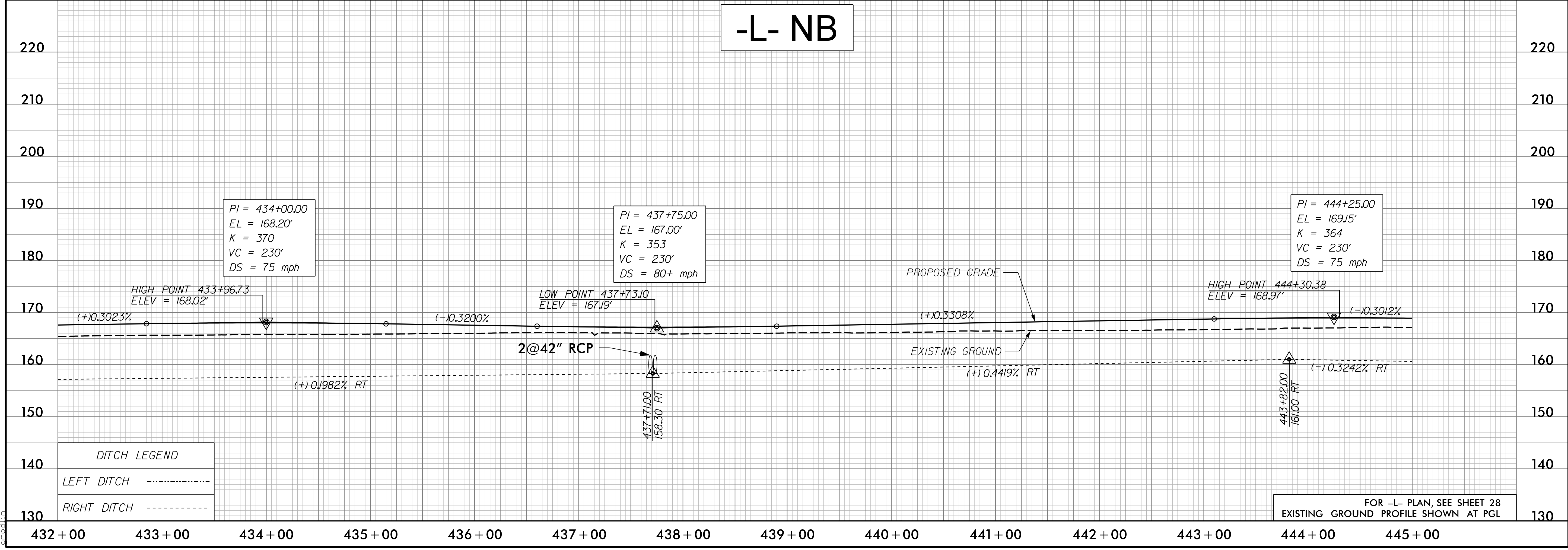


# -L- NB

PI = 434+00.00  
 EL = 168.20'  
 K = 370  
 VC = 230'  
 DS = 75 mph

PI = 437+75.00  
 EL = 167.00'  
 K = 353  
 VC = 230'  
 DS = 80+ mph

PI = 444+25.00  
 EL = 169.15'  
 K = 364  
 VC = 230'  
 DS = 75 mph



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5/28/2022

# -L- SB

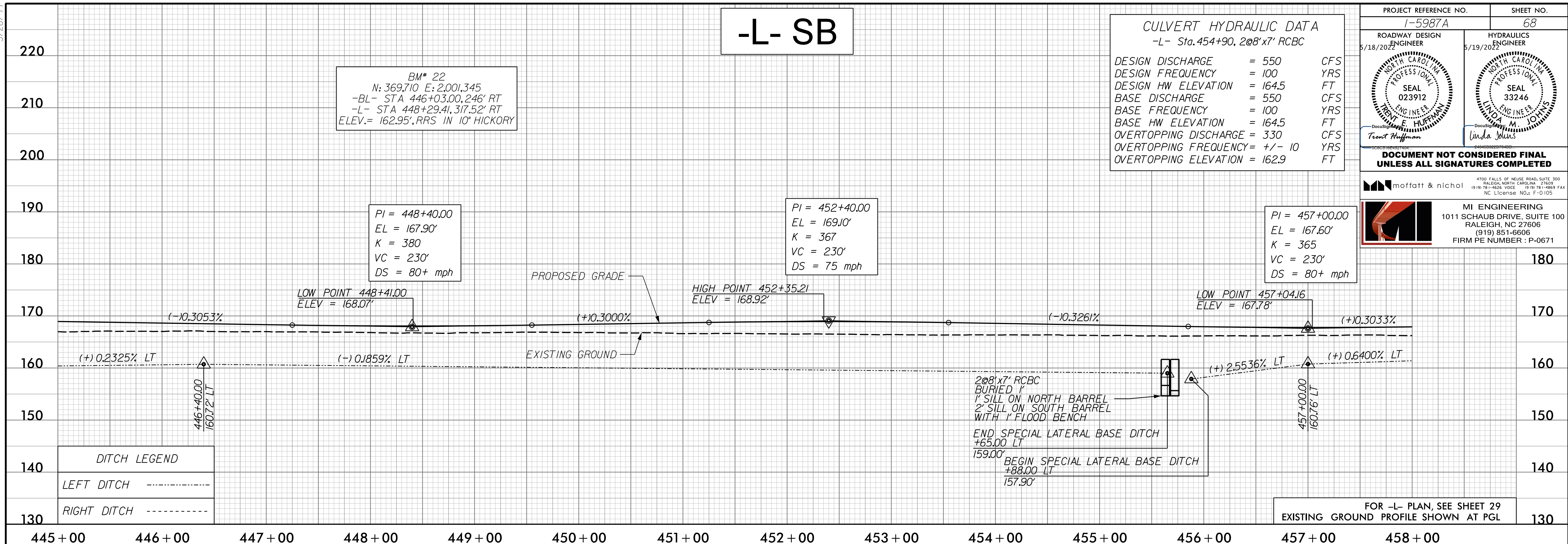
**CULVERT HYDRAULIC DATA**  
-L- Sta. 454+90, 208'x7' RCBC

DESIGN DISCHARGE	= 550	CFS
DESIGN FREQUENCY	= 100	YRS
DESIGN HW ELEVATION	= 164.5	FT
BASE DISCHARGE	= 550	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 164.5	FT
OVERTOPPING DISCHARGE	= 330	CFS
OVERTOPPING FREQUENCY	= +/- 10	YRS
OVERTOPPING ELEVATION	= 162.9	FT

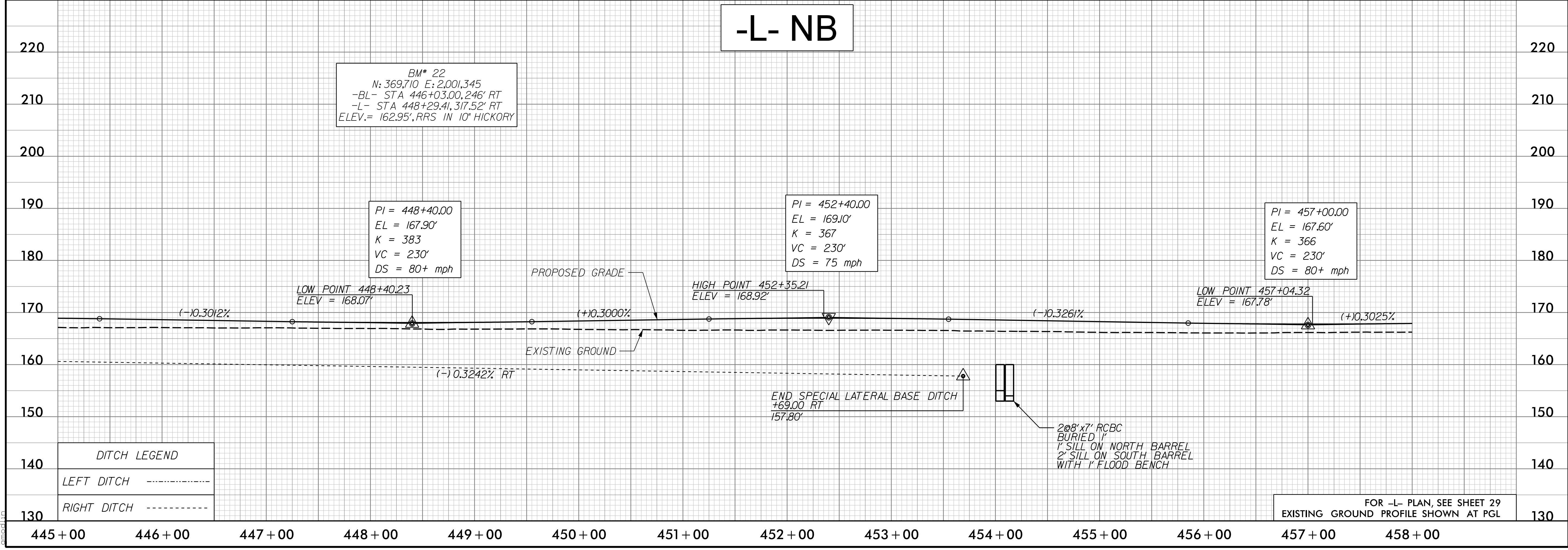
PROJECT REFERENCE NO.	1-5987A	SHEET NO.	68
ROADWAY DESIGN ENGINEER	5/18/2022	HYDRAULICS ENGINEER	5/19/2022

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

**MI ENGINEERING**  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27608  
(919) 851-6606  
FIRM PE NUMBER: P-0671



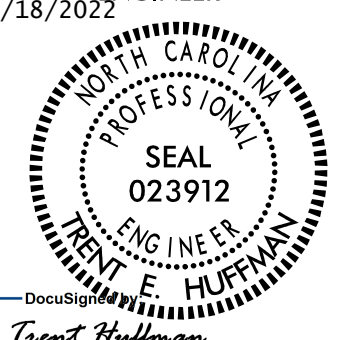

# -L- NB



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5/28/2012

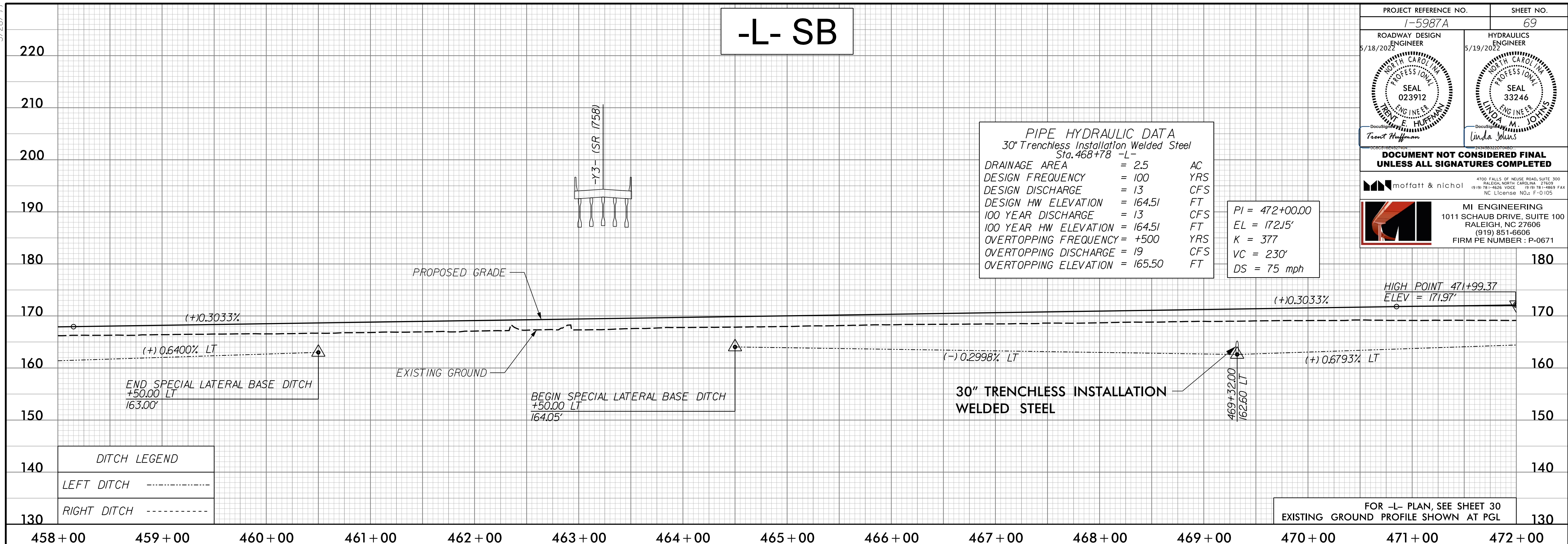
# -L- SB

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 69
ROADWAY DESIGN ENGINEER 5/18/2012 	HYDRAULICS ENGINEER 5/19/2012 

**PIPE HYDRAULIC DATA**  
30" Trenchless Installation Welded Steel  
Sta. 468+78 -L-

DRAINAGE AREA	= 2.5	AC
DESIGN FREQUENCY	= 100	YRS
DESIGN DISCHARGE	= 13	CFS
DESIGN HW ELEVATION	= 164.51	FT
100 YEAR DISCHARGE	= 13	CFS
100 YEAR HW ELEVATION	= 164.51	FT
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= 19	CFS
OVERTOPPING ELEVATION	= 165.50	FT

PI = 472+00.00  
EL = 172.15'  
K = 377  
VC = 230'  
DS = 75 mph



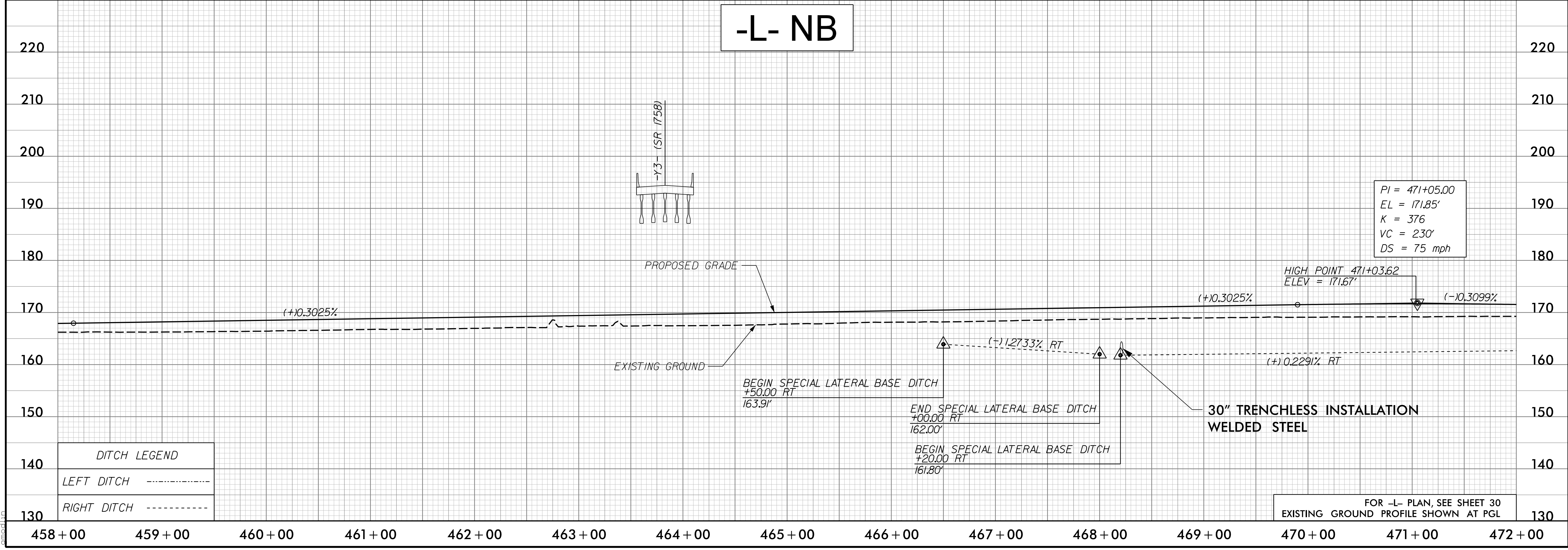
**DITCH LEGEND**

LEFT DITCH	-----
RIGHT DITCH	-----

FOR -L- PLAN, SEE SHEET 30  
EXISTING GROUND PROFILE SHOWN AT PGL

# -L- NB

PI = 471+05.00  
EL = 171.85'  
K = 376  
VC = 230'  
DS = 75 mph



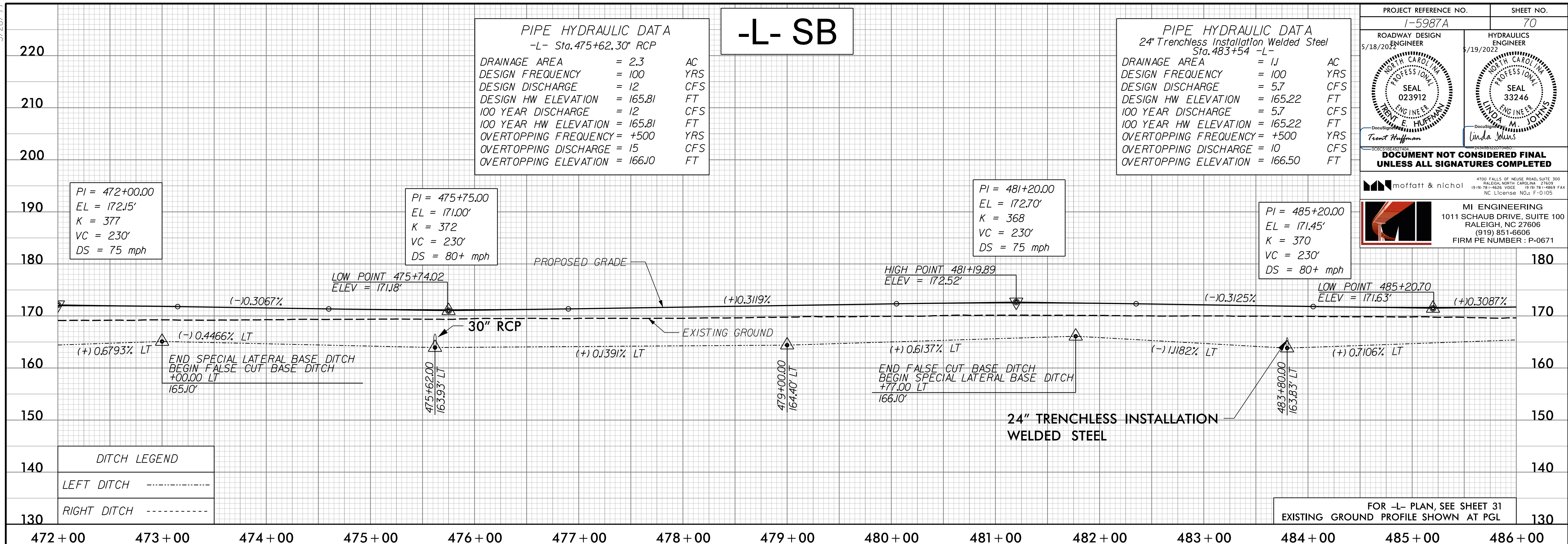
**DITCH LEGEND**

LEFT DITCH	-----
RIGHT DITCH	-----

FOR -L- PLAN, SEE SHEET 30  
EXISTING GROUND PROFILE SHOWN AT PGL

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5/28/2022



PROJECT REFERENCE NO. 1-5987A SHEET NO. 70

ROADWAY DESIGN ENGINEER 5/18/2022

HYDRAULICS ENGINEER 5/19/2022

SEAL 023912 ENGINEER T. HUFFMAN

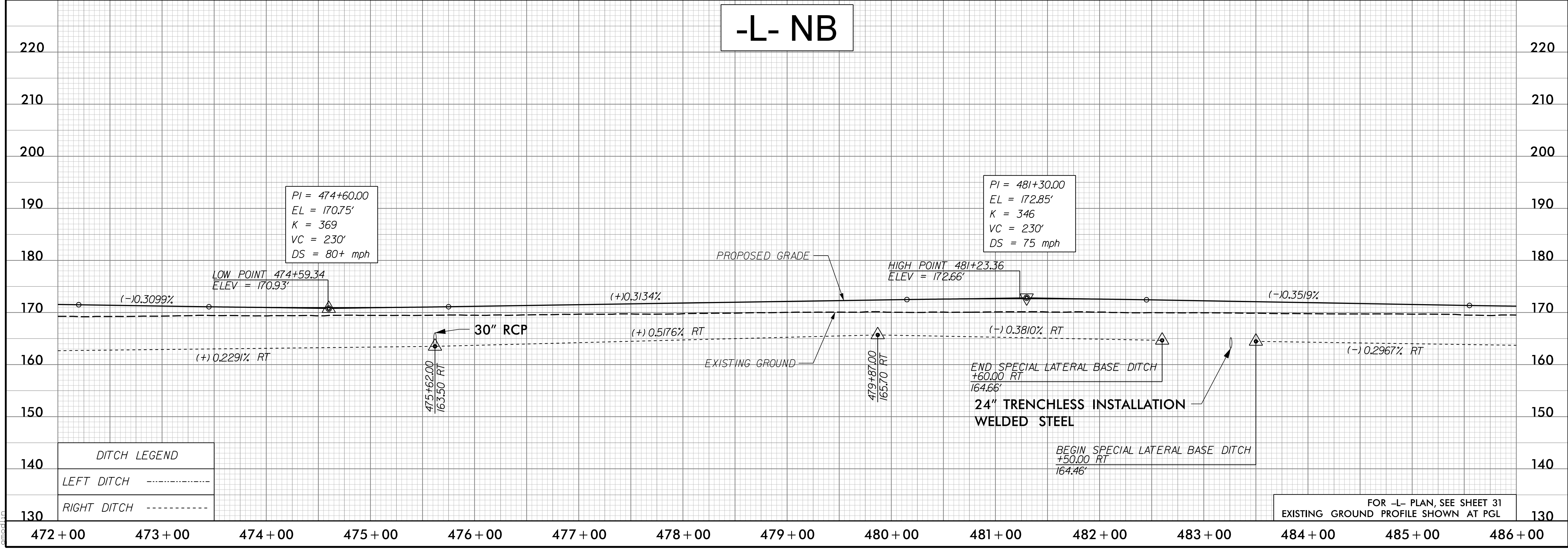
SEAL 33246 ENGINEER L. JOHNS

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

moftatt & nichol

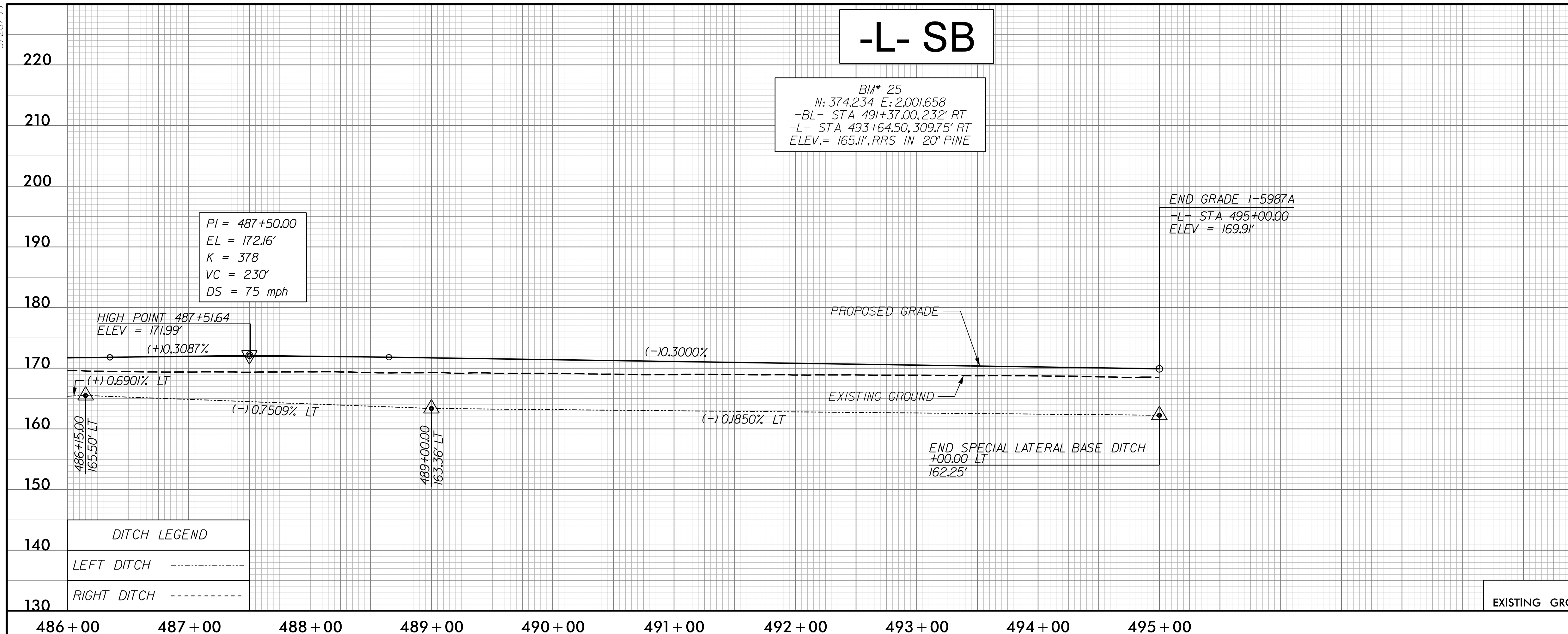
MI ENGINEERING  
1011 SCHAUB DRIVE, SUITE 100  
RALEIGH, NC 27608  
(919) 851-6606  
FIRM PE NUMBER: P-0671

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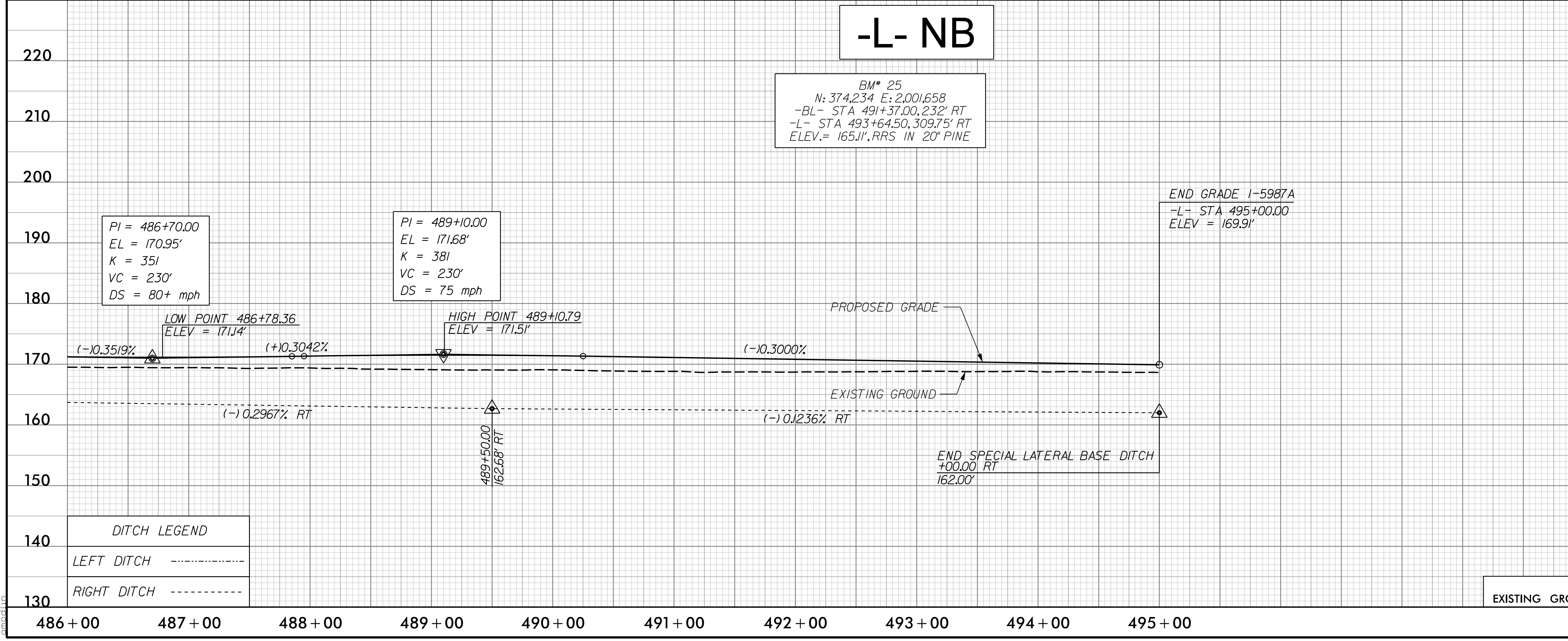


5/28/2022

PROJECT REFERENCE NO. I-5987A	SHEET NO. 71
ROADWAY DESIGN ENGINEER 5/18/2022 Trent Huffman	HYDRAULICS ENGINEER 5/19/2022 Linda Johns
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
4700 FALLS OF NEUSE ROAD, SUITE 100 RALEIGH, NORTH CAROLINA 27615-3000 (919) 851-6606 VOIC (919) 851-6600 FAX NC License No.: F-0105	
	MI ENGINEERING 1011 SCHAUB DRIVE, SUITE 100 RALEIGH, NC 27608 (919) 851-6606 FIRM PE NUMBER: P-0671



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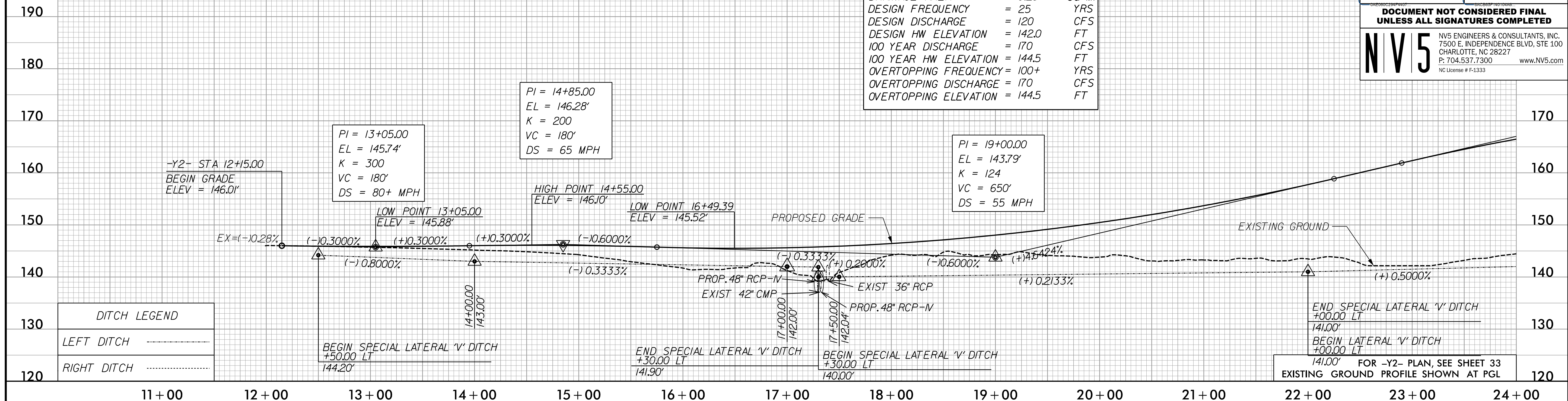
5/28/2022

# -Y2-

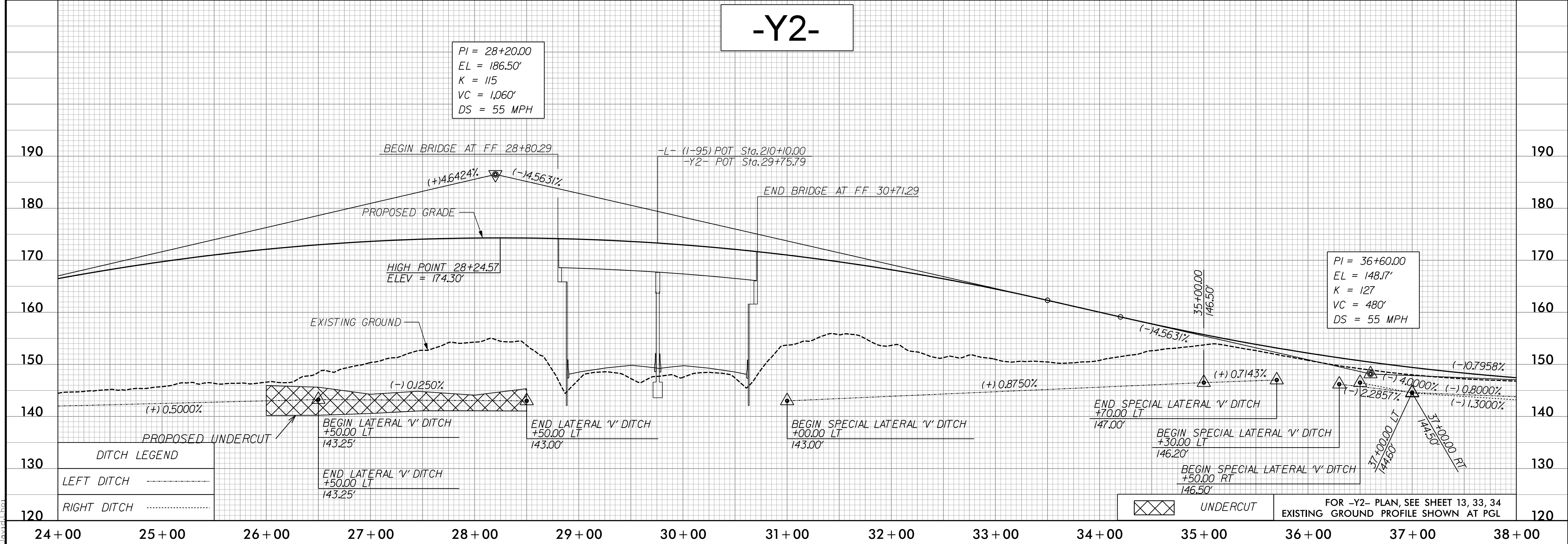
PROJECT REFERENCE NO. 1-5987A	SHEET NO. 72
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Duan	DocuSigned by: Will Mathershe
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	

**PIPE HYDRAULIC DATA**  
-Y2- Sta. 17+35.2 @ 48" RCP-N

DRAINAGE AREA	= 0.28	SQ MI
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 120	CFS
DESIGN HW ELEVATION	= 142.0	FT
100 YEAR DISCHARGE	= 170	CFS
100 YEAR HW ELEVATION	= 144.5	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 170	CFS
OVERTOPPING ELEVATION	= 144.5	FT



# -Y2-





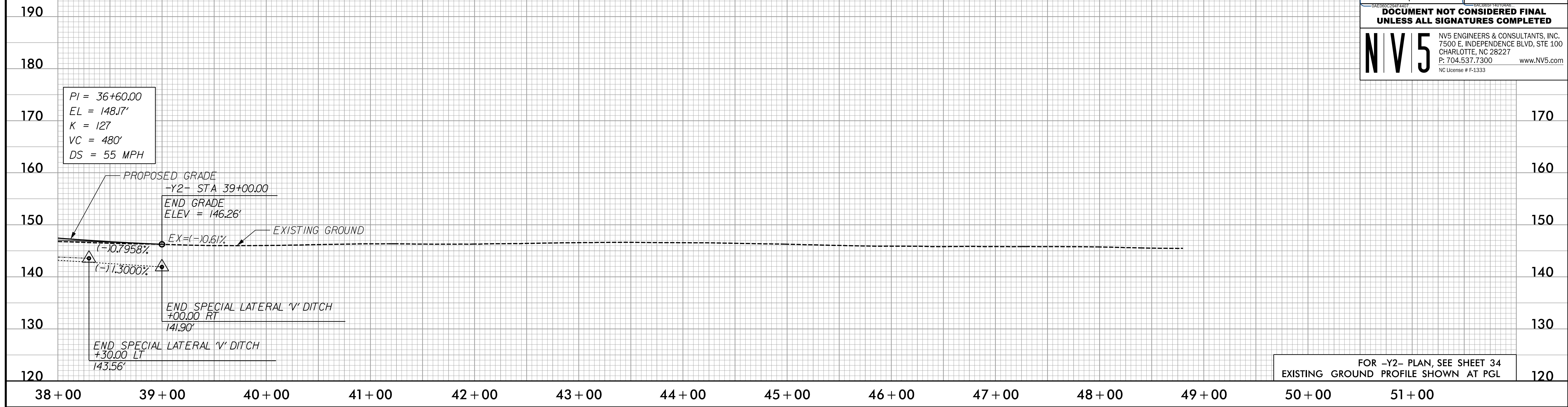
5/19/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_72.dgn  
David Johnson

5/28/22

DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

-Y2-

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 73
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
DocuSigned by: Steve Anthony Dren	DocuSigned by: Will Weatherstone
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



FOR -Y2- PLAN, SEE SHEET 34  
EXISTING GROUND PROFILE SHOWN AT PGL

3/30/2022  
David  
C:\Users\David\Documents\Projects\15987A\_RDY\_PSH\_PFL\_73.dgn

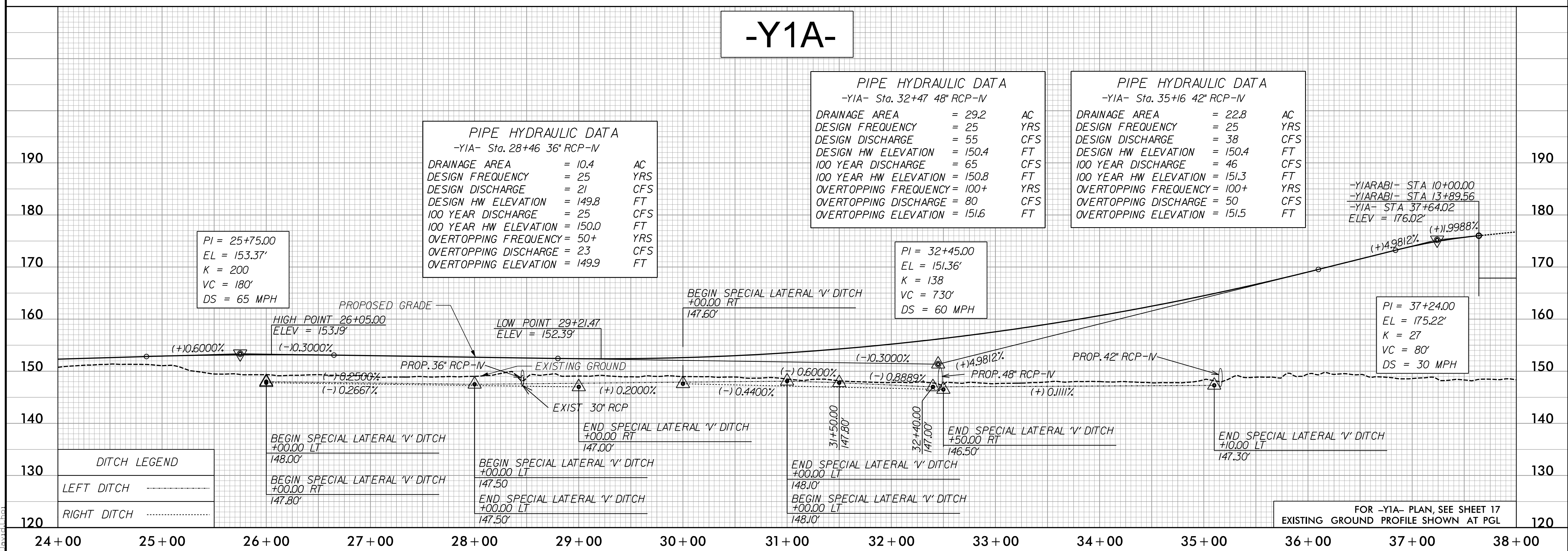
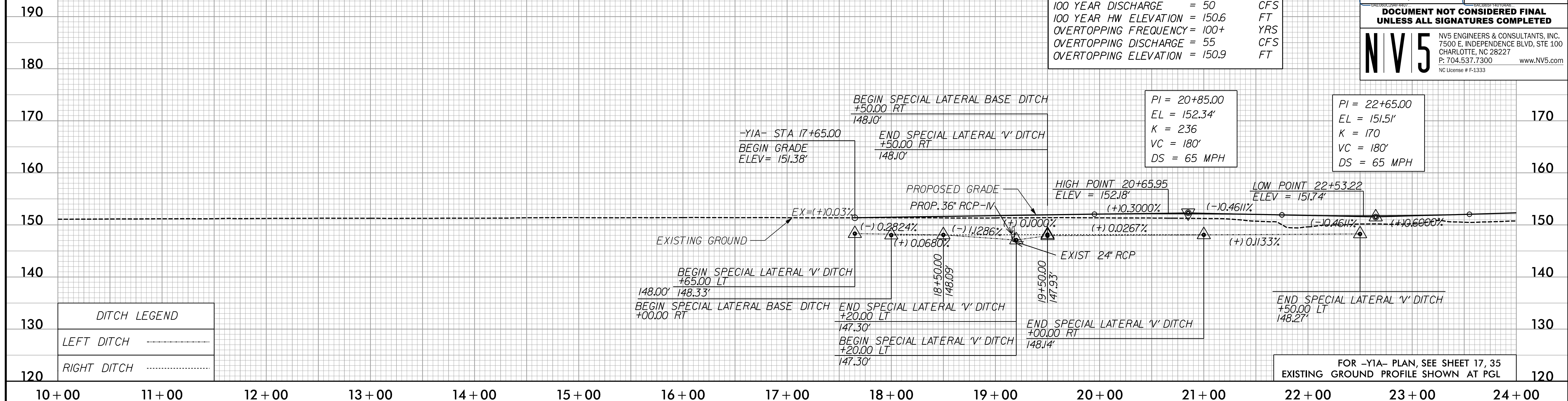
5/28/2022

# -Y1A-

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 74
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Dean	DocuSigned by: Will Weatherstone
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	

**PIPE HYDRAULIC DATA**  
-Y1A- Sta. 19+15 36" RCP-IV

DRAINAGE AREA	= 24.4	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 42	CFS
DESIGN HW ELEVATION	= 150.2	FT
100 YEAR DISCHARGE	= 50	CFS
100 YEAR HW ELEVATION	= 150.6	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 55	CFS
OVERTOPPING ELEVATION	= 150.9	FT

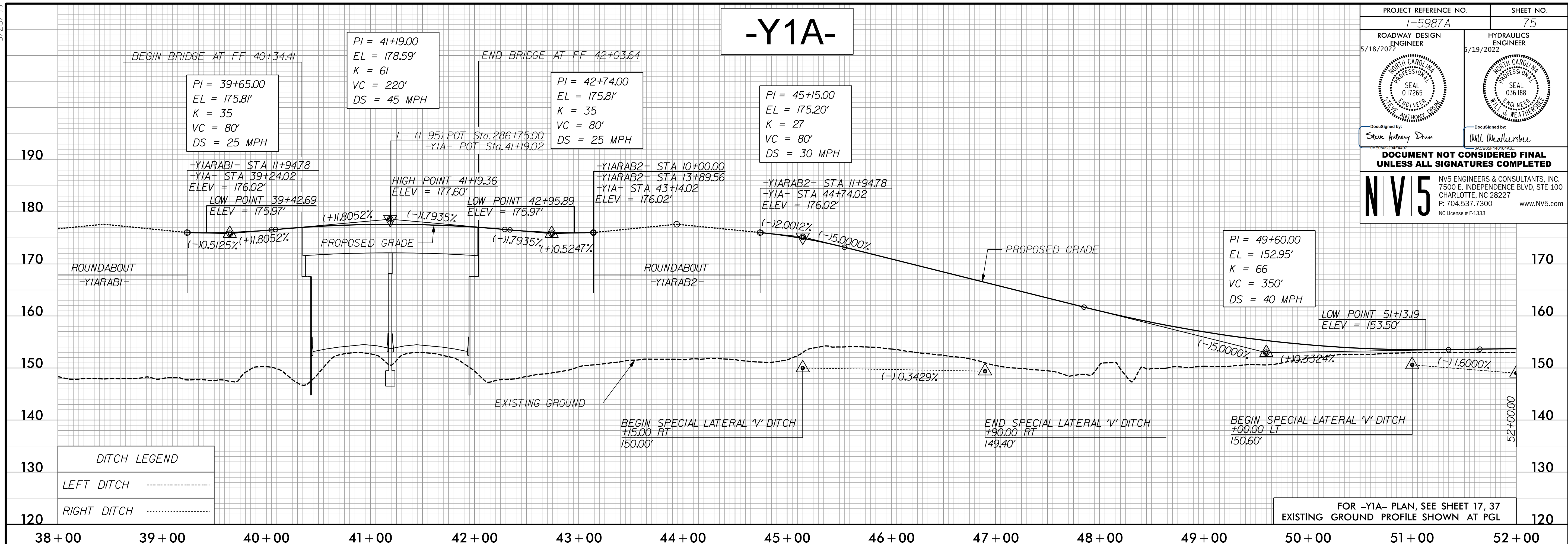


5/19/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_74.dgn  
David

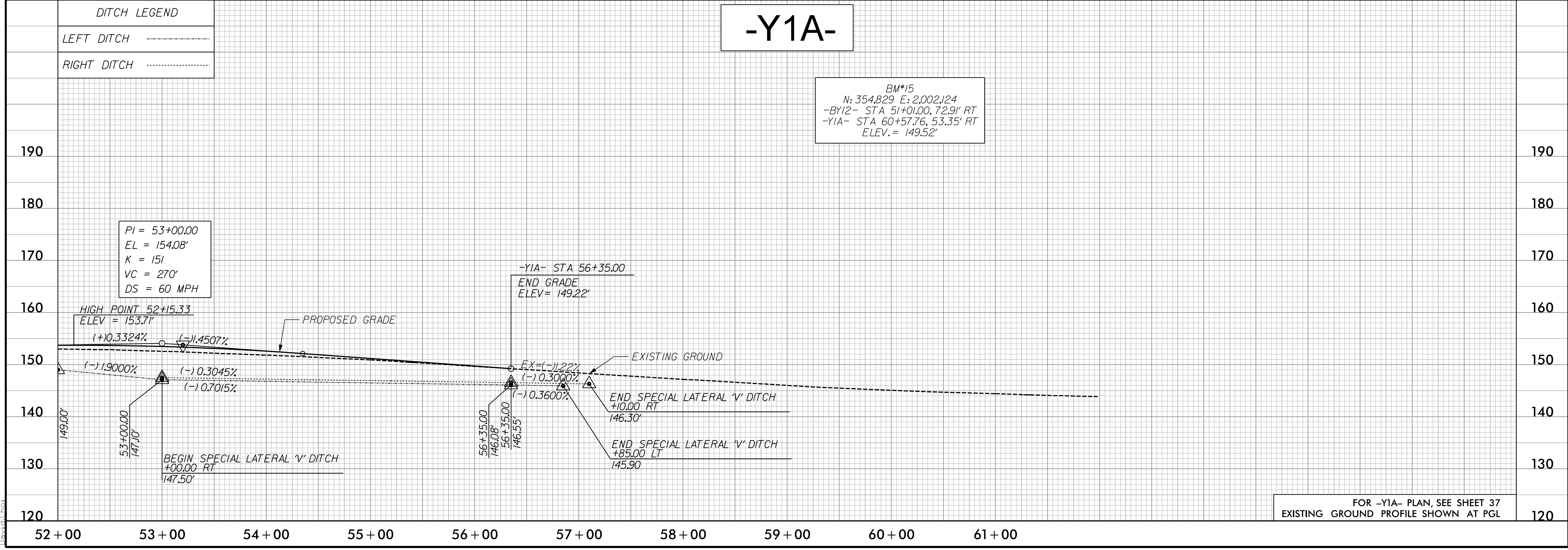


5/28/2022

PROJECT REFERENCE NO. I-5987A	SHEET NO. 75
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Duan	DocuSigned by: Will Weatherman
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	






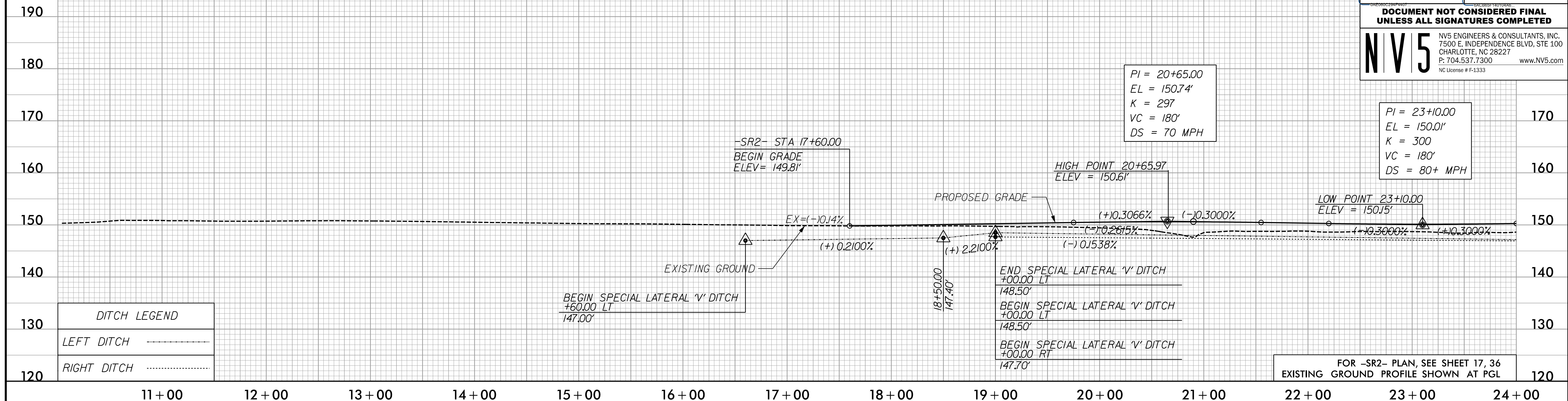
3/30/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_75.dgn  
David Johnson



5/28/2022

# -SR2-

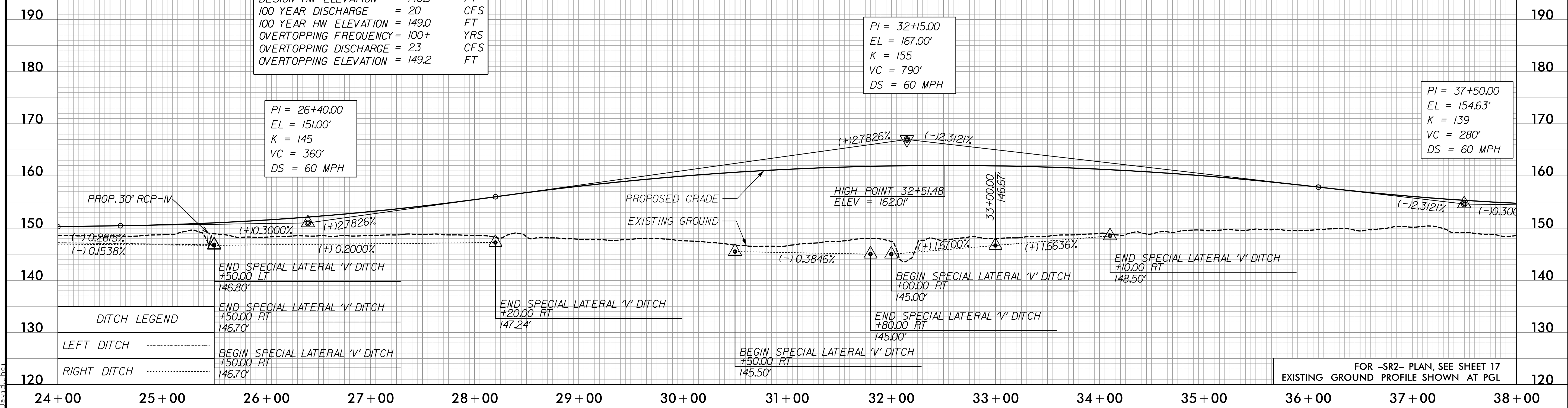
PROJECT REFERENCE NO. 1-5987A	SHEET NO. 76
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.nv5.com NC License # F-1333	



DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

# -SR2-

PIPE HYDRAULIC DATA		
-SR2- Sta. 25+45 30" RCP-IV		
DRAINAGE AREA	= 50	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 18	CFS
DESIGN HW ELEVATION	= 148.9	FT
100 YEAR DISCHARGE	= 20	CFS
100 YEAR HW ELEVATION	= 149.0	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 23	CFS
OVERTOPPING ELEVATION	= 149.2	FT



DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

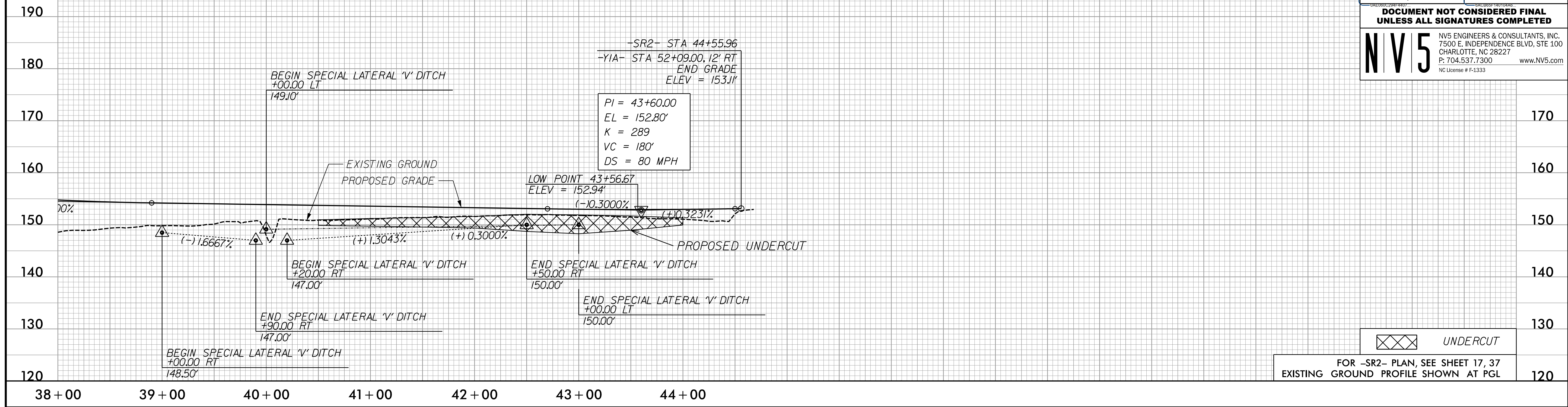
3/30/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_76.dgn  
David Johnson

5/28/22

DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

# -SR2-

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 77
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Duan	DocuSigned by: Will Weatherstone
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



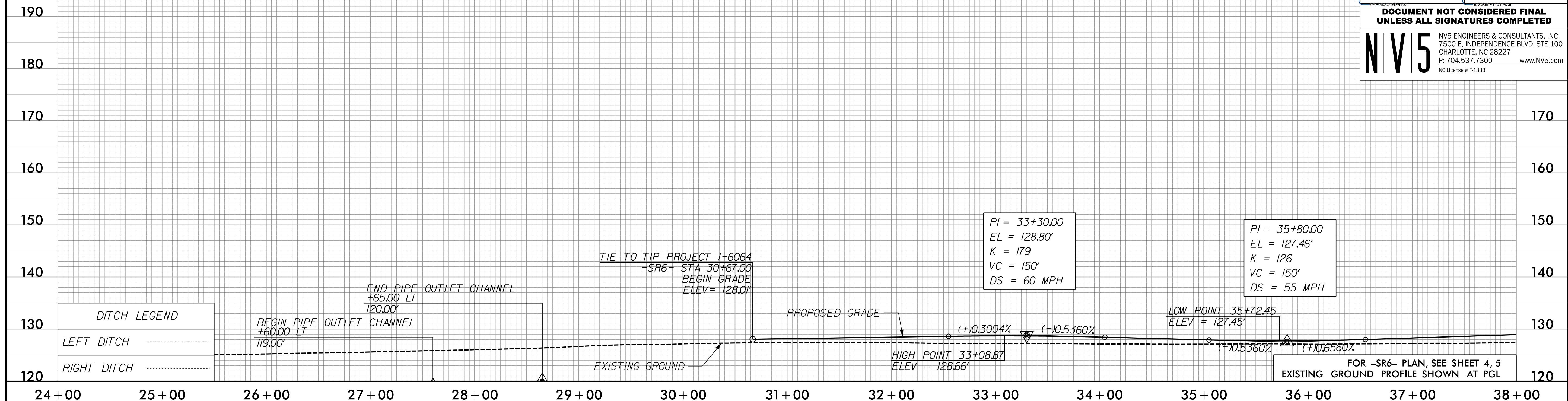
FOR -SR2- PLAN, SEE SHEET 17, 37  
EXISTING GROUND PROFILE SHOWN AT PGL

3/30/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_77.dgn  
David

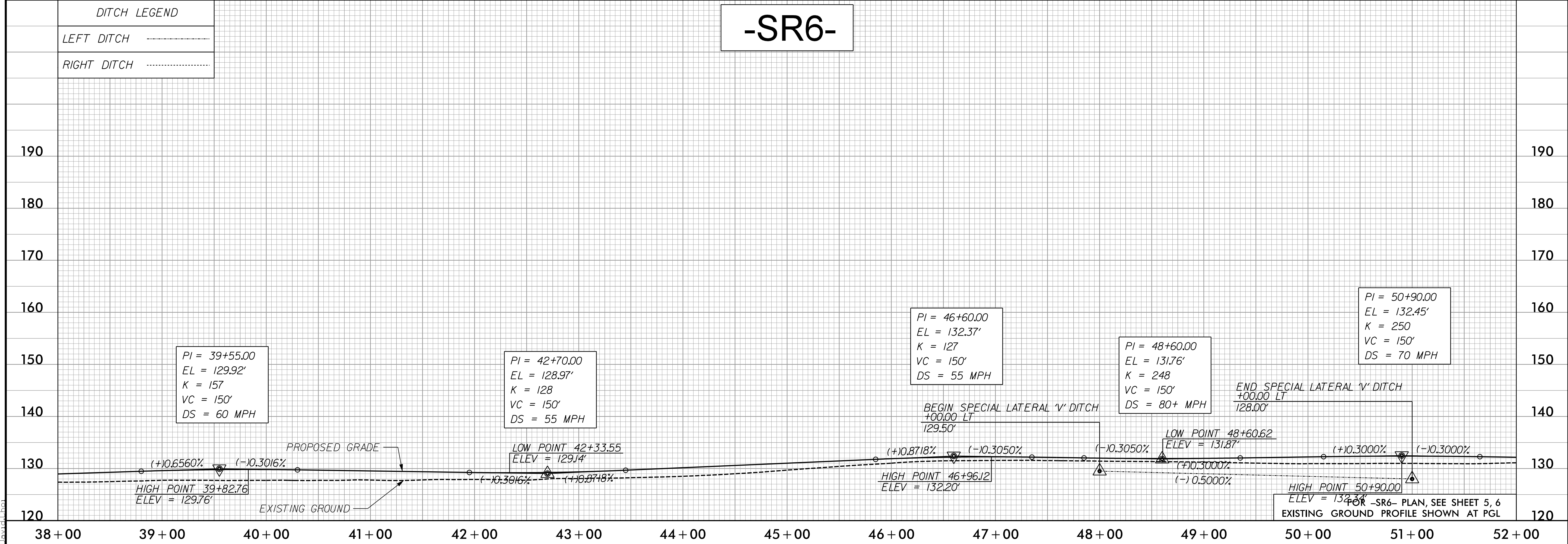
5/28/22

# -SR6-

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 78
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Duan	DocuSigned by: Will Weatherstone
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



# -SR6-



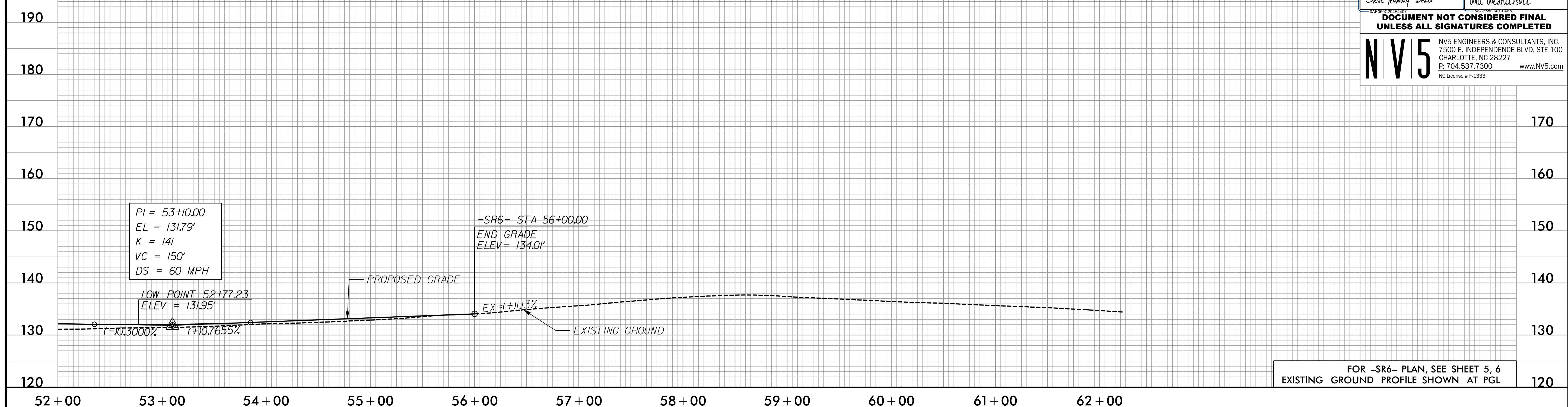
5/18/2022  
David Johnson

5/28/22

DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

# -SR6-

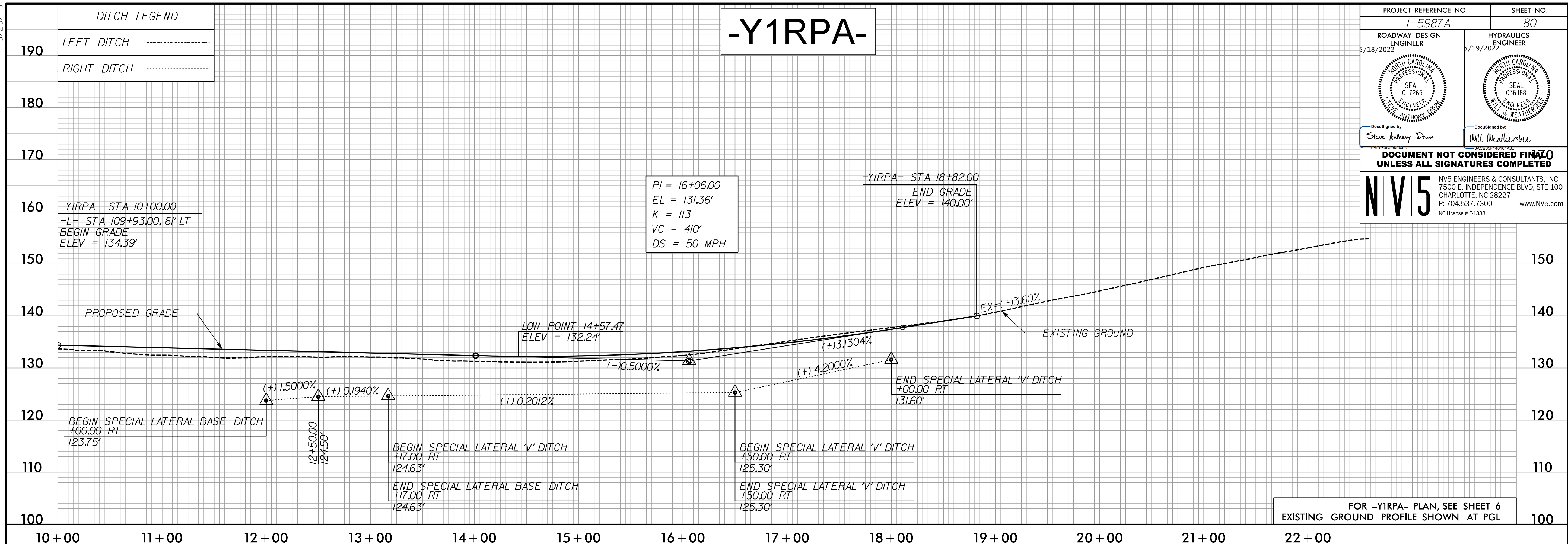
PROJECT REFERENCE NO. 1-5987A	SHEET NO. 79
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Dean	DocuSigned by: Will Weatherman
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



FOR -SR6- PLAN, SEE SHEET 5, 6  
EXISTING GROUND PROFILE SHOWN AT PGL

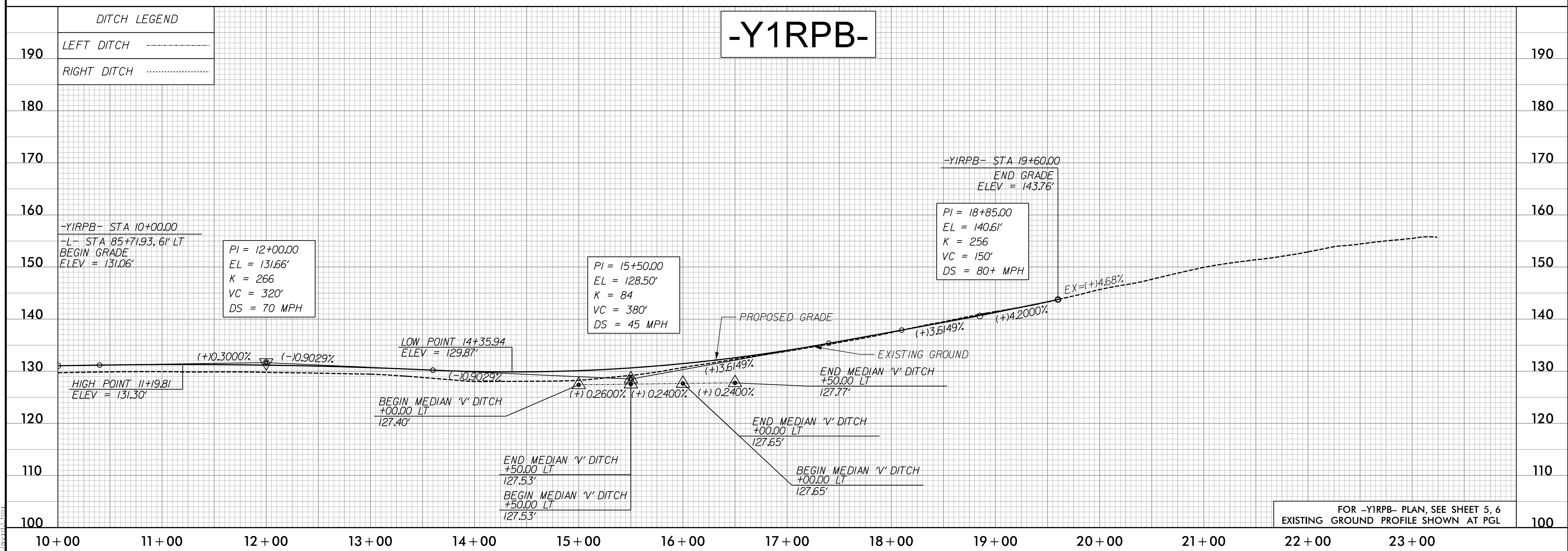
3/30/2022  
David  
C:\Users\David\Documents\Projects\15987A\_RDY\_PSH\_PFL\_79.dgn

5/28/2022



PROJECT REFERENCE NO. <b>1-5987A</b>	SHEET NO. <b>80</b>
ROADWAY DESIGN ENGINEER 5/18/2022 <i>Steve Anthony Duan</i>	HYDRAULICS ENGINEER 5/19/2022 <i>Will Mathews</i>
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	

5/18/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_80.dgn  
David

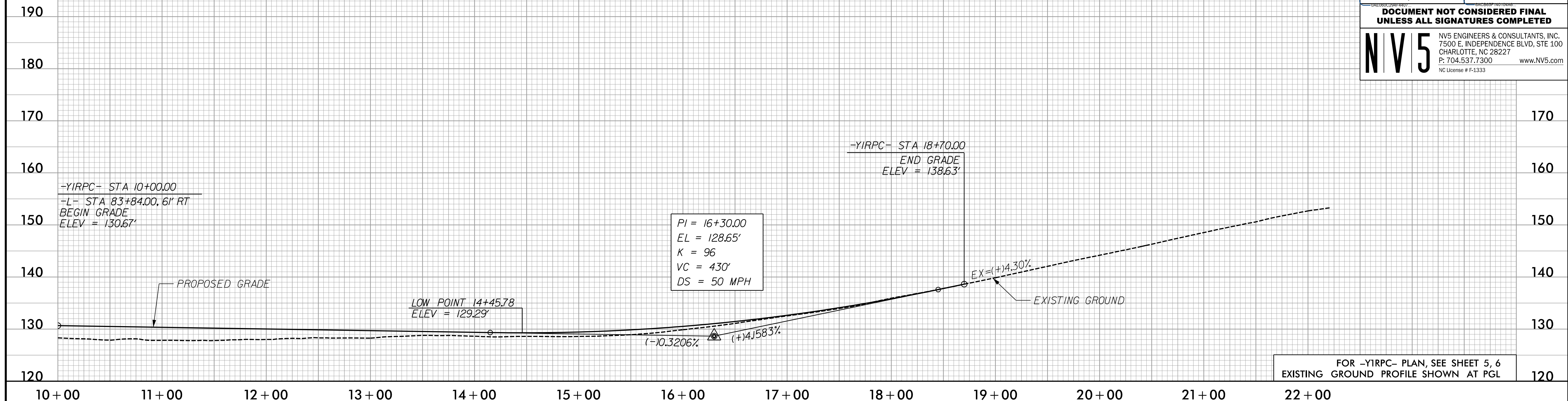


5/28/22

DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

# -Y1RPC-

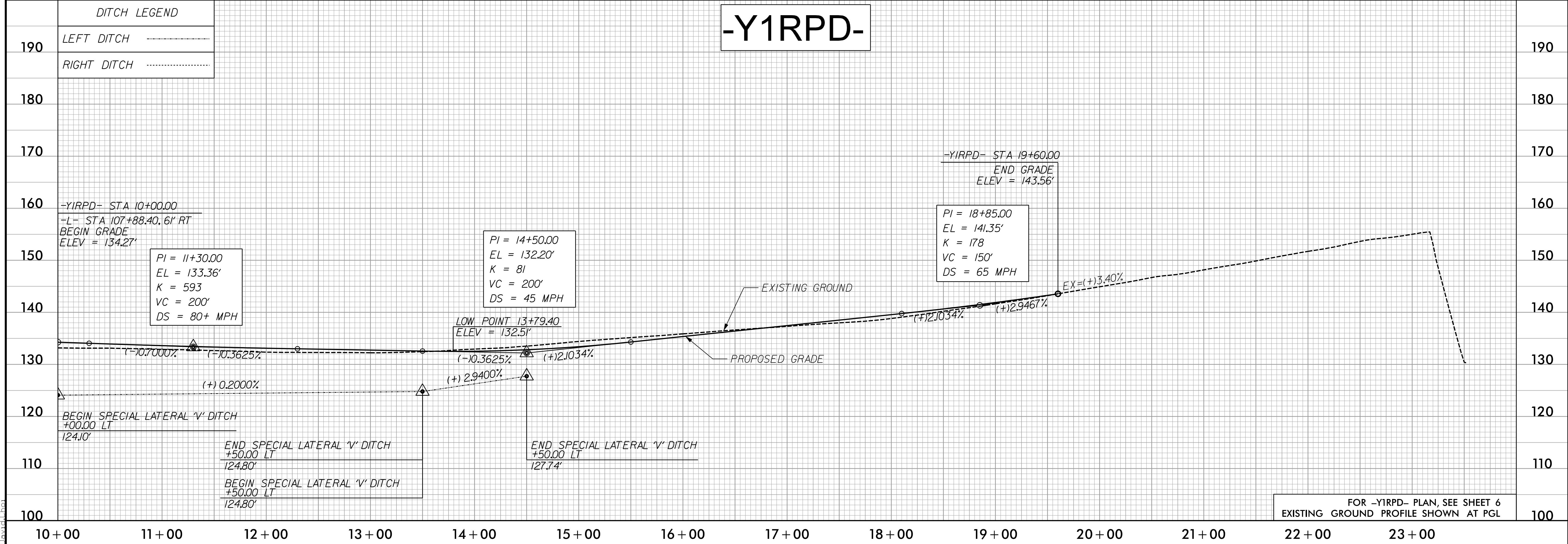
PROJECT REFERENCE NO. 1-5987A	SHEET NO. 81
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Dean	DocuSigned by: Will Weatherstone
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

# -Y1RPD-

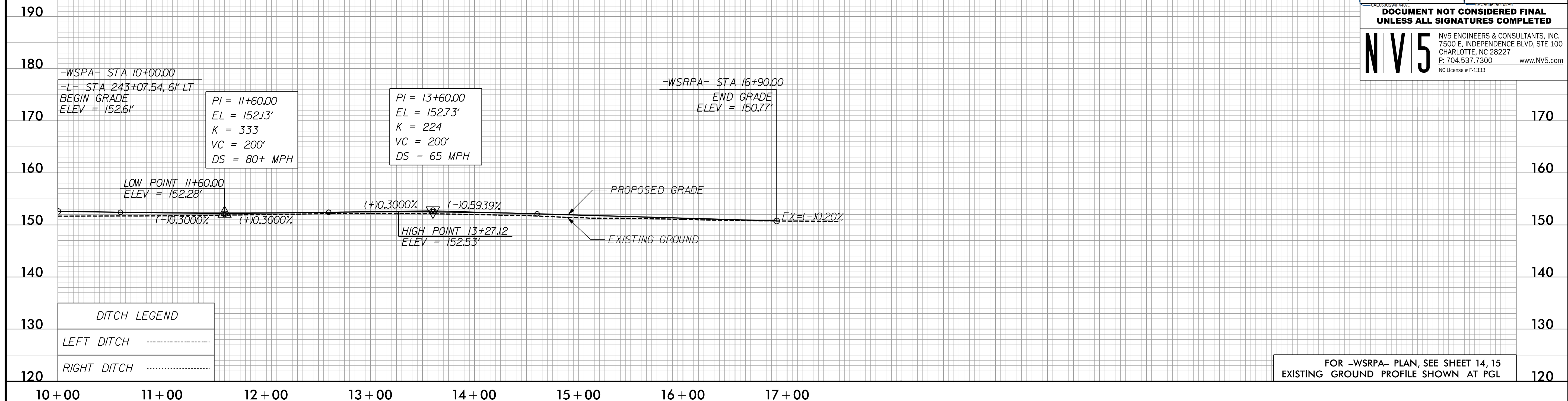
5/19/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_81.dgn  
David Chilton



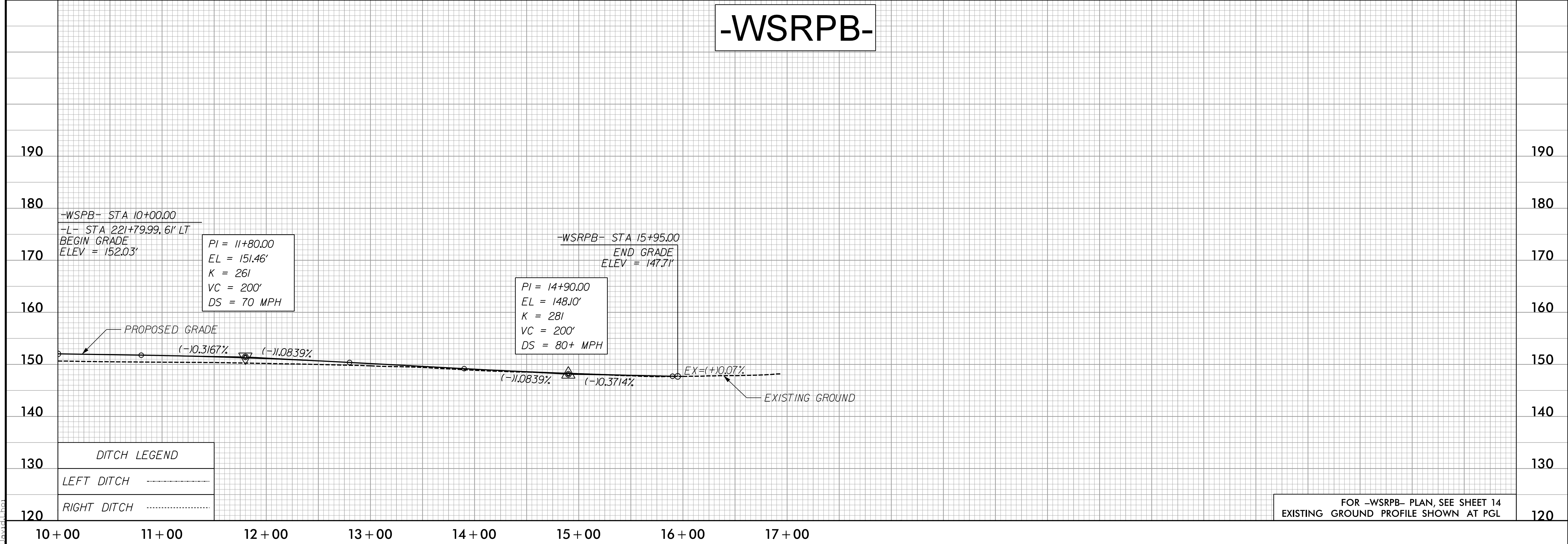
5/28/22

# -WSRPA-

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 82
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Dean	DocuSigned by: Will Weatherstone
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<small>NV5 ENGINEERS &amp; CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333</small>	



# -WSRPB-

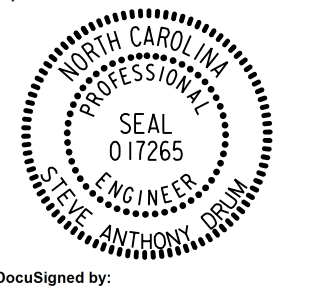
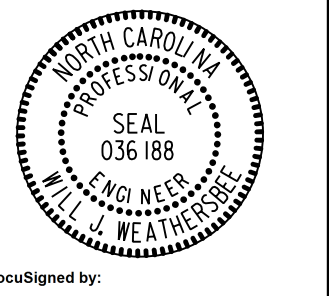


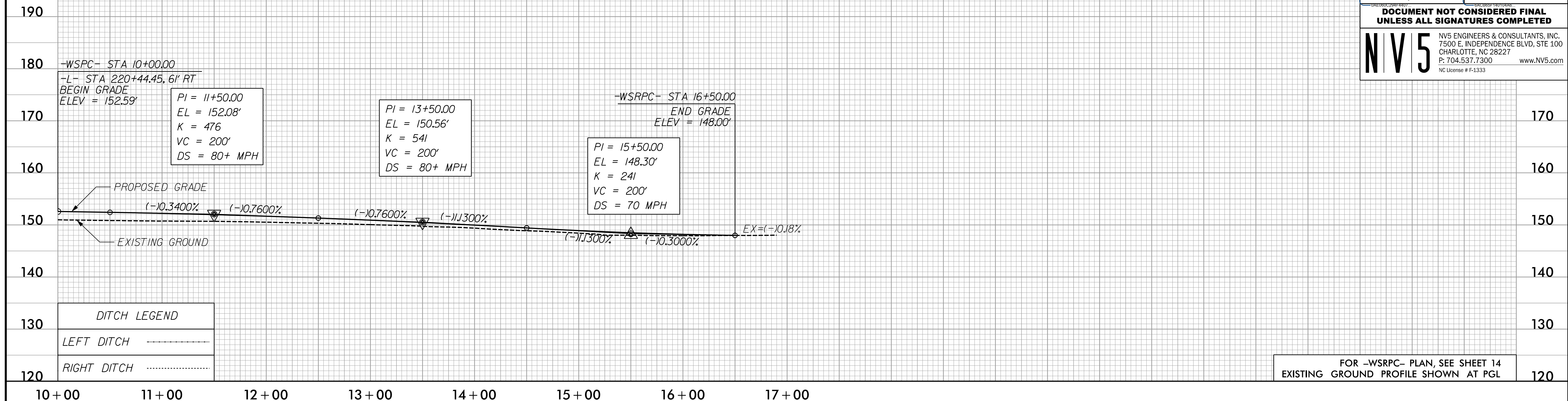
3/10/2022  
David  
David



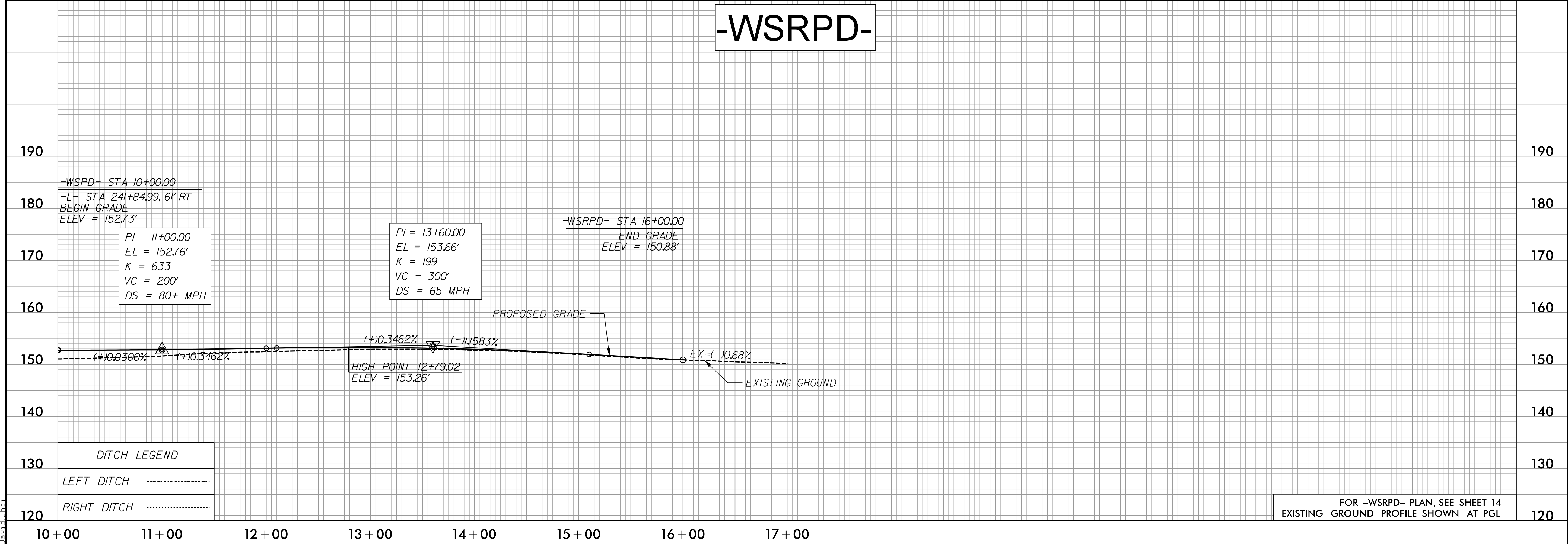
5/28/2022

# -WSRPC-

PROJECT REFERENCE NO. <b>1-5987A</b>	SHEET NO. <b>83</b>
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
<p>DocuSigned by: <i>Steve Anthony Dean</i></p> <p>DocuSigned by: <i>Will Matthews</i></p>	
<p><b>DOCUMENT NOT CONSIDERED FINAL</b> <b>UNLESS ALL SIGNATURES COMPLETED</b></p>	
<p><b>NV5</b> NV5 ENGINEERS &amp; CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333</p>	





# -WSRPD-



5/19/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_83.dgn  
David

5/28/22

# -Y1ARPA-

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 84
ROADWAY DESIGN ENGINEER 5/18/2022 	HYDRAULICS ENGINEER 5/19/2022 
DocuSigned by: Steve Anthony Duan	
DocuSigned by: Will Matthews	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	

-Y1ARPA- STA 10+00.00  
 -L- STA 305+88.00, 61' LT  
 BEGIN GRADE  
 ELEV = 150.03'

PI = 15+00.00  
 EL = 153.53'  
 K = 200  
 VC = 200'  
 DS = 65 MPH

PI = 17+90.00  
 EL = 152.66'  
 K = 166  
 VC = 380'  
 DS = 65 MPH

HIGH POINT 15+40.00  
 ELEV = 153.32'

LOW POINT 16+49.70  
 ELEV = 153.16'

DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

BEGIN SPECIAL LATERAL 'V' DITCH  
 +00.00 RT  
 148.07'

END SPECIAL LATERAL 'V' DITCH  
 +50.00 RT  
 148.40'

FOR -Y1ARPA- PLAN, SEE SHEET 17, 18  
 EXISTING GROUND PROFILE SHOWN AT PGL

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00

# -Y1ARPA-

-Y1ARPA- STA 29+04.89  
 END GRADE  
 ELEV = 174.89'

PROPOSED GRADE

(+)1.9939%

(-)0.8800%

EXISTING GROUND

BEGIN LATERAL 'V' DITCH  
 +50.00 RT  
 150.45'

END LATERAL 'V' DITCH  
 +50.00 RT  
 149.57'

DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

FOR -Y1ARPA- PLAN, SEE SHEET 17  
 EXISTING GROUND PROFILE SHOWN AT PGL

24+00 25+00 26+00 27+00 28+00 29+00

5/19/2022  
 P:\Projects\15987A\_PSH\_PFL\_84.dgn  
 David

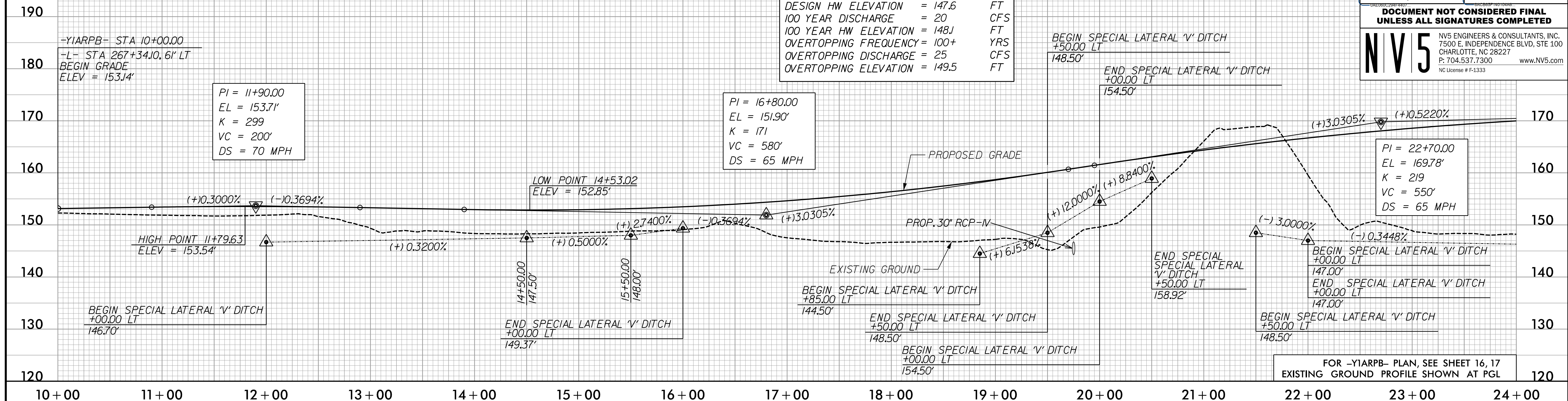
5/28/2022

DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

# -Y1ARPB-

PIPE HYDRAULIC DATA		
-Y1ARPB- Sta. 19+77 30" RCP-IV		
DRAINAGE AREA	= 4.6	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 18	CFS
DESIGN HW ELEVATION	= 147.6	FT
100 YEAR DISCHARGE	= 20	CFS
100 YEAR HW ELEVATION	= 148.1	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 25	CFS
OVERTOPPING ELEVATION	= 149.5	FT

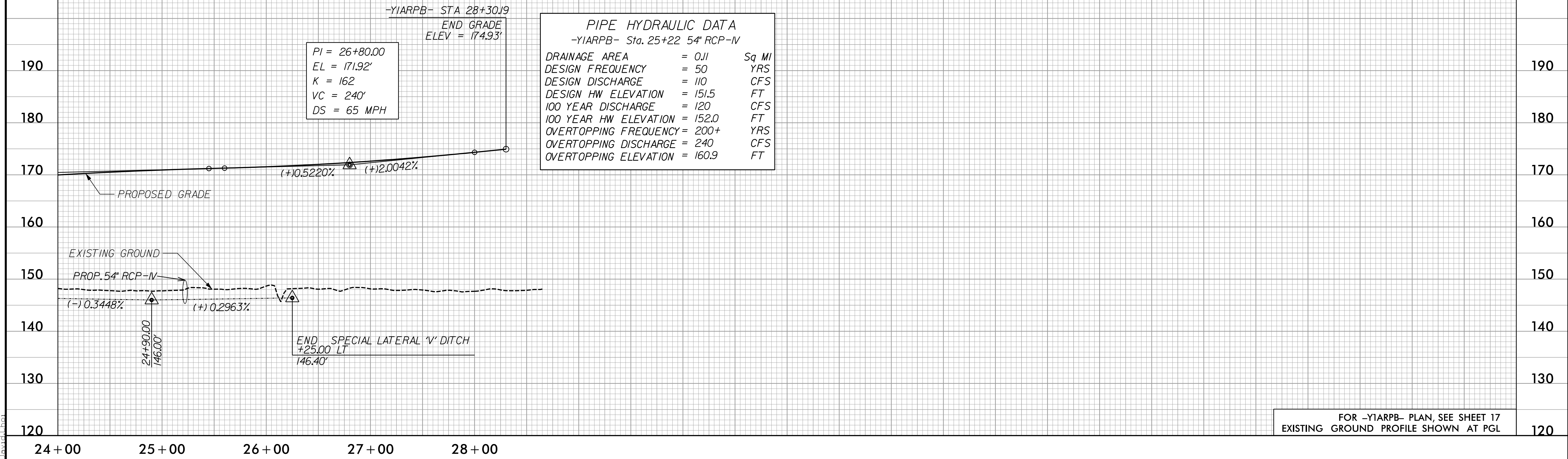
PROJECT REFERENCE NO. 1-5987A	SHEET NO. 85
ROADWAY DESIGN ENGINEER 5/18/2022	HYDRAULICS ENGINEER 5/19/2022
DocuSigned by: Steve Anthony Dean	DocuSigned by: Will Mathersne
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>NV5</b> NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333	



DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

# -Y1ARPB-

PIPE HYDRAULIC DATA		
-Y1ARPB- Sta. 25+22 54" RCP-IV		
DRAINAGE AREA	= 0.11	Sq MI
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 110	CFS
DESIGN HW ELEVATION	= 151.5	FT
100 YEAR DISCHARGE	= 120	CFS
100 YEAR HW ELEVATION	= 152.0	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 240	CFS
OVERTOPPING ELEVATION	= 160.9	FT



FOR -Y1ARPB- PLAN, SEE SHEET 16, 17  
EXISTING GROUND PROFILE SHOWN AT PGL

3/10/2022  
P:\Projects\15987A\_RDY\_PSH\_PFL\_85.dgn  
David

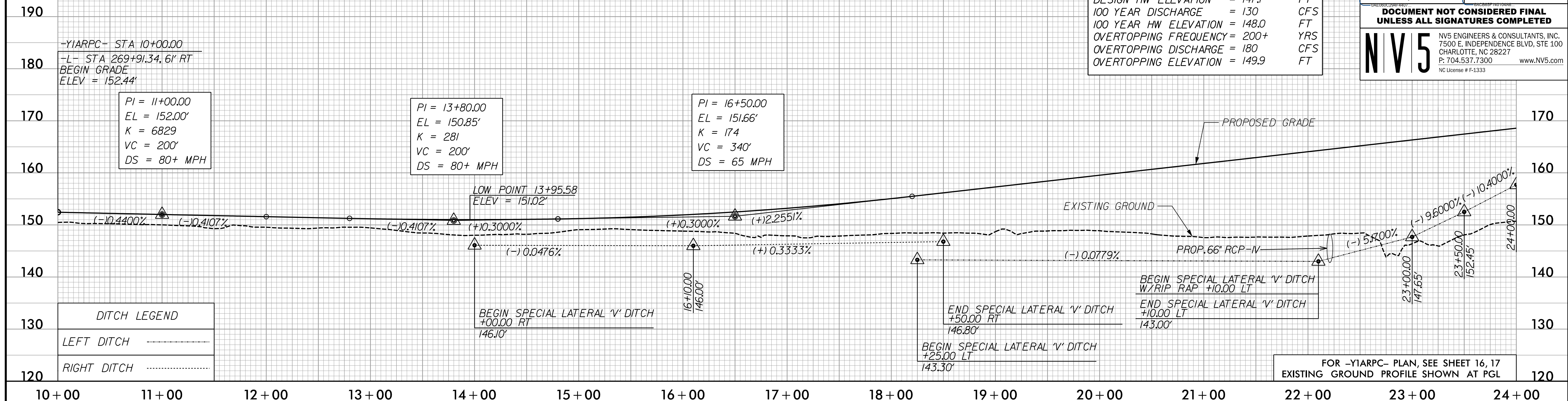
5/28/2022

# -Y1ARPC-

PROJECT REFERENCE NO. 1-5987A	SHEET NO. 86
ROADWAY DESIGN ENGINEER 5/18/2022 SEAL 017265 STEVE ANTHONY DRUM	HYDRAULICS ENGINEER 5/19/2022 SEAL 036188 WILL WEATHERSHE
<p><b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED</p>	
<p><b>NV5</b> NV5 ENGINEERS &amp; CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333</p>	

**PIPE HYDRAULIC DATA**  
-Y1ARPC- Sta. 22+21.66" RCP-IV

DRAINAGE AREA	= 0.14	Sq MI
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 120	CFS
DESIGN HW ELEVATION	= 147.7	FT
100 YEAR DISCHARGE	= 130	CFS
100 YEAR HW ELEVATION	= 148.0	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 180	CFS
OVERTOPPING ELEVATION	= 149.9	FT

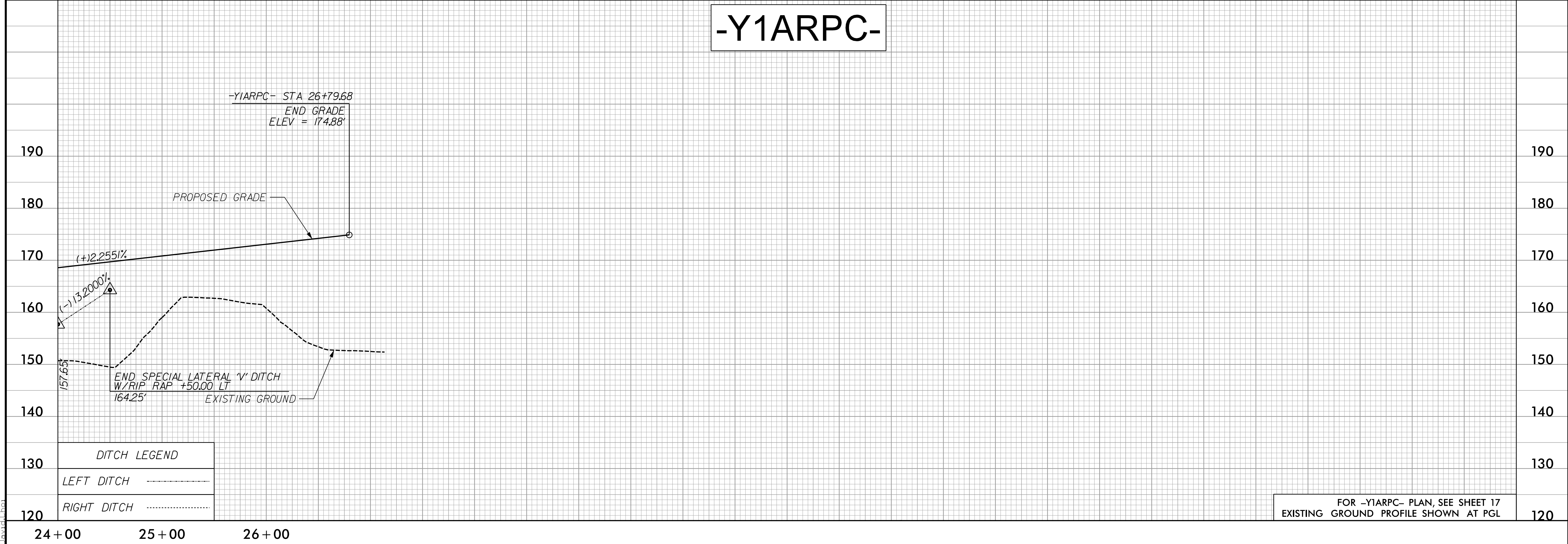


**DITCH LEGEND**

LEFT DITCH	-----
RIGHT DITCH	-----

FOR -Y1ARPC- PLAN, SEE SHEET 16, 17  
EXISTING GROUND PROFILE SHOWN AT PGL

# -Y1ARPC-



**DITCH LEGEND**

LEFT DITCH	-----
RIGHT DITCH	-----

FOR -Y1ARPC- PLAN, SEE SHEET 17  
EXISTING GROUND PROFILE SHOWN AT PGL

3/10/2022  
 P:\Projects\15987A\_PSH\_PFL\_86.dgn  
 David