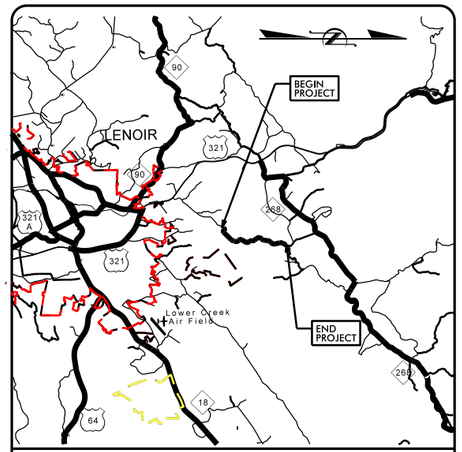
09/08/99

INDIAN GRAVE ROAD

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CALDWELL COUNTY

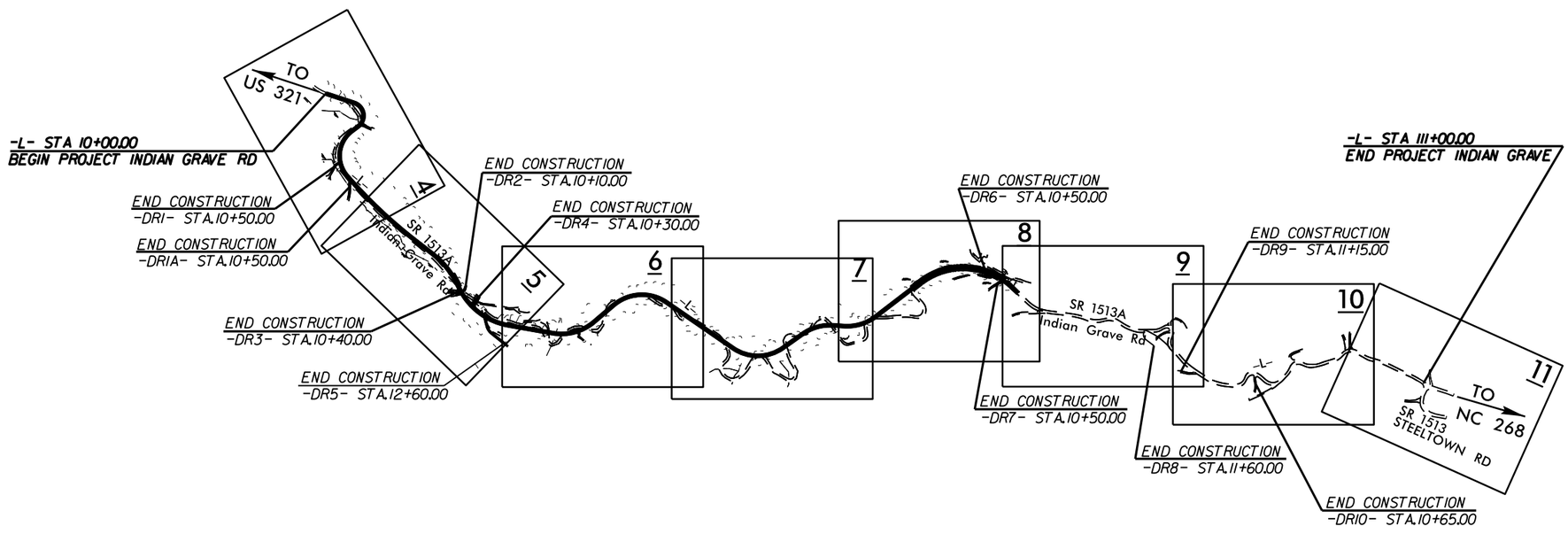
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	INDIAN GRAVE RD	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

LOCATION: SR 1513A – INDIAN GRAVE RD

TYPE OF WORK: GRADING, DRAINAGE, AND PAVING

NAD 27



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

V = 30 MPH

DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE AND HORIZONTAL STOPPING SIGHT DISTANCE

PROJECT LENGTH

Length Roadway Project {Indian Grave} = 1.91 Miles

Total Length State Project {Indian Grave} = 1.91 Miles

Plans Prepared By:
TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

2006 STANDARD SPECIFICATIONS

ROW DATE:

LETTING DATE:

Plans Prepared for:
NCDOT DIVISION 11
NCDOT Contact:
JOE L. LAWS, P.E.
DIVISION PROJECT MANAGER

CHARLES L. FLOWE, PE
PROJECT ENGINEER

W. CRAIG PARKER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

PROJECT:

29-MAR-2016 09:08
R:\Roadway\Projects\Secondary\Caldwell\SR1513A_Indian Grave Plans\Dgn\indiangrave_tsh.dgn
$$$$USERNAME$$$$

ENTERED BY: GK DATE: 02/11/16
CHECKED BY: DATE:

REVISIONS
DATE:

PROJECT REFERENCE NO.	SHEET NO.
SR-1513A	1-D

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

POLE DATA SHEET

CENTERLINE SHIFT STA's

OWNER OF THE POLE LINE: BREMCO

STATION	POLE NUMBER	DIST. FROM CENTER PRESENT ROAD		DIST. FROM CENTER PROJECT		DIST. FROM PROJECT AFTER MOVING		REMARKS
		LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	
20+67			17′		23′		25′	PP,3PW,TR,GW
25+37			12′		22′		25′	PP,2PW
31+08		22′		34′		25′		PP,6PW,TR,GW
35+29			56′		26′		25′	PP,4PW,3GW
53+22		24′		31′		25′		PP,2PW,GW
92+63			35′		35′		25′	PP,2PW
95+18			17′		15′		25′	PP,1PW,GW
97+87			33′		33′		25′	GW in fill
106+73			22′		22′		25′	PP,2PW,TR,GW,R
109+74		28′		31′		25′		PP,4PW,2GW
110+17			19′		17′		25′	PP,6PW,2GW

OWNER OF THE POLE LINE: AT&T

STATION	POLE NUMBER	DIST. FROM CENTER PRESENT ROAD		DIST. FROM CENTER PROJECT		DIST. FROM PROJECT AFTER MOVING		REMARKS
		LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	
14+52			9′		20′		25′	TP,PED
18+96			13′		21′		25′	PED
30+52			16′		19′		25′	TP,2TW,PED
92+63			35′		35′		25′	2TW
95+18			17′		15′		25′	2TW
109+74		28′		31′		25′		2TW
110+17			19′		17′		25′	2TW,PED

OWNER OF THE POLE LINE:

STATION	POLE NUMBER	DIST. FROM CENTER PRESENT ROAD		DIST. FROM CENTER PROJECT		DIST. FROM PROJECT AFTER MOVING		REMARKS
		LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	

STATION LEFT	STATION RIGHT
1+00	37+00
2+00	38+00
3+00	39+00
4+00	40+00
5+00	41+00
6+00	42+00
7+00	43+00
8+00	44+00
9+00	45+00
10+00	46+00
11+00	47+00
12+00	48+00
13+00	49+00
14+00	50+00
15+00	51+00
16+00	52+00
17+00	53+00
18+00	54+00
19+00	55+00
20+00	56+00
21+00	57+00
22+00	58+00
23+00	59+00
24+00	60+00
25+00	61+00
26+00	62+00
27+00	63+00
28+00	64+00
29+00	65+00
30+00	66+00
31+00	67+00
32+00	68+00
33+00	69+00
34+00	70+00
35+00	71+00
36+00	72+00

12/05/05
29-MAR-2016 09:08
R:\Road_Projects\Secondary\Caldwell\SR1513A_Indian Grove Plans\Dgn\SR1513A_rdy_1d.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
INDIAN GRAVE RD.	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

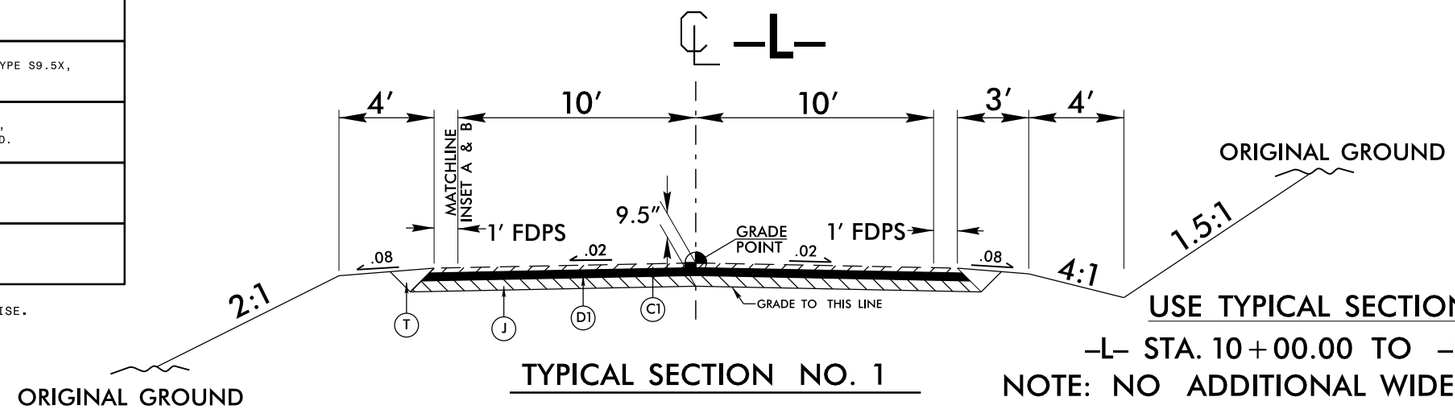
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

PAVEMENT SCHEDULE
(PRELIMINARY PAVEMENT DESIGN)

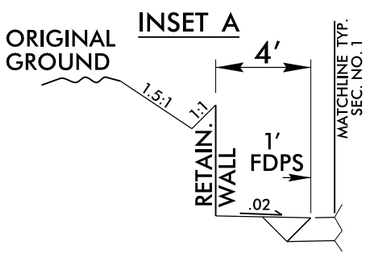
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5X, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
D1	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0X, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
J	PROP. 5" AGGREGATE BASE COURSE.
T	EARTH MATERIAL.

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

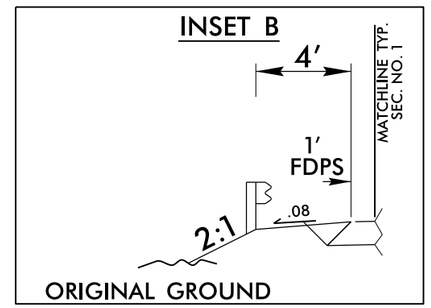


TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1 FOR:
–L– STA. 10+00.00 TO –L– STA. 111+00.00
NOTE: NO ADDITIONAL WIDENING FOR GUARDRAIL

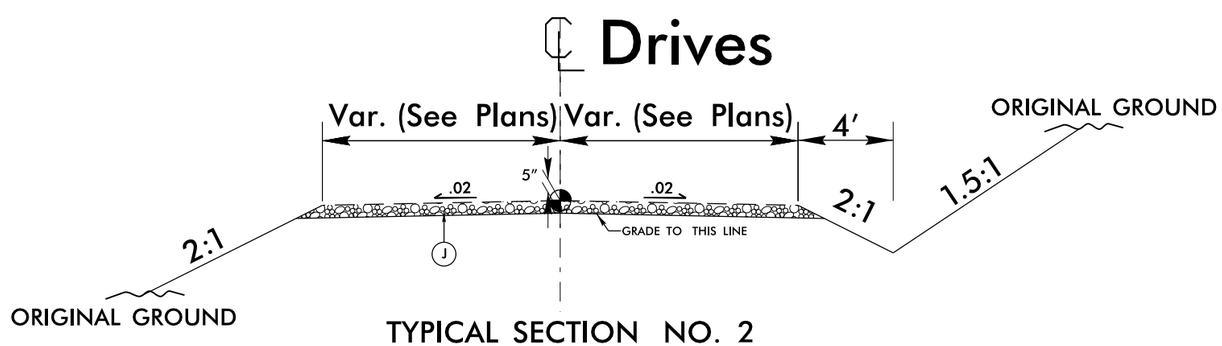


USE INSET A AS FOLLOWS:
–L– STA. 29+50+/– TO –L– STA. 30+64+/–



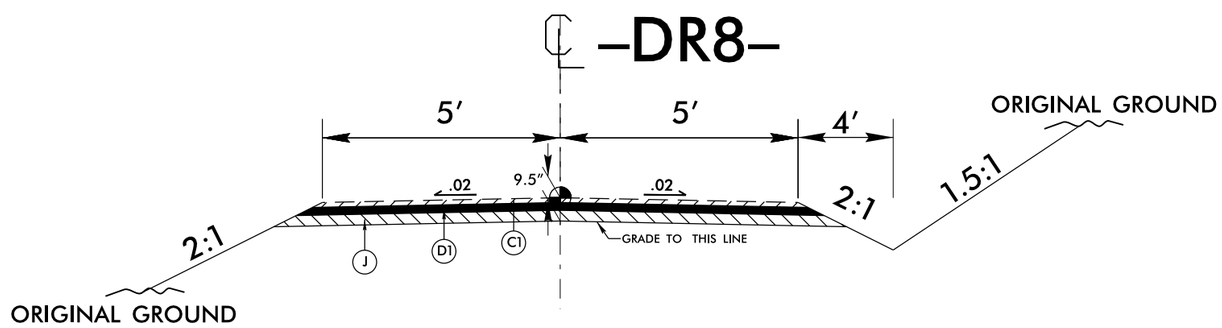
USE INSET B AS FOLLOWS:
REFER TO PLANS FOR LOCATIONS WHERE GUARDRAIL IS USED.

NOTE: EXTRA LENGTH POSTS WILL BE USED FOR ALL GUARDRAIL



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2 FOR:
–DR1– STA. 10+10.00 TO –DR1– STA. 10+50.00
–DR1A– STA. 10+10.00 TO –DR1A– STA. 10+50.00
–DR2– STA. 10+10.00 TO –DR2– STA. 10+52.42
–DR3– STA. 10+10.04 TO –DR3– STA. 10+40.00
–DR4– STA. 10+30.00 TO –DR4– STA. 10+80.77
–DR5– STA. 10+14.23 TO –DR5– STA. 12+60.00
–DR6– STA. 10+10.07 TO –DR6– STA. 10+50.00
–DR7– STA. 10+10.92 TO –DR7– STA. 10+50.00
–DR9– STA. 10+10.00 TO –DR9– STA. 11+15.00
–DR10– STA. 10+10.01 TO –DR10– STA. 10+65.00



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3 FOR:
–DR8– STA. 10+10.00 TO –DR8– STA. 11+60.00

6/2/99
29-MAR-2016 09:08
pw:\\pwdpw01.pw.dot.state.nc.us:PROJ\36250\PROD\36250_Indian Grave Plans\Dgn\indiangrave_typ.dgn
$$$$USERNAME$$$$

PROJ. REFERENCE NO.	SHEET NO.
Indian Grave Road	3-C

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	D. CLYDE KEYES
2	4	PAULINE H. WHITTINGTON
3	4	JOHN G WILEN
4	4	ROBERT A OLIVER
5	4	JAMES J HELTON
6	4	RALPH ROBERTS
7	4	JAMES CALVIN HELTON
8	4,5	BETTY H. EVERHARDT
9	5	PETER LLOYD
10	5	ALBERT M GREENE
11	5	MACK D GREENE
12	5	JAMES THOMAS WILLIAMS
13	5,6,7,8	GEORGE T CROWELL, JR.
14	6	MACK D GREENE
15	8	DAVID BRAKEFIELD
16	8	ALEN W SMITH
17	8,9	JERRY P SANDERS
18	8,9	WAYNE H STORE
19	9	THOMAS DEAN FORD
20	8,9	HENRY G LAWRENCE
21	9	JOSEPH S GONSMAN
22	9	GWENDOLYN C MIHALKA
23	9,10	DAVID NEAL DANCY
24	9,10	GLENN DALE WATSON
25	10	TERRY C BRADSHAW
26	10	JESSE C BRADSHAW
27	10	JOHN D ABEE
28	10	RICHARD C YACE
29	10,11	GEORGE L GREENE
30	10,11	GORDON ANDREW LAWING
31	11	THOMAS GREGORY CLARK

PARCEL No.	SHEET No.	PROPERTY OWNER NAME

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
11C.095050	3-C

Revised 3/25/2016

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

		NEW PIPES									EXISTING PIPES												
		C.S. PIPE In accordance with NCDOT 2012 Specifications																					
SIZE / TYPE / STATION	LOCATION (LT, RT, OR CL)'	12"	15"	18"	24"	30"	36"	42"	48"		12"	15"	18"	24"	30"	36"	42"	48"	PIPE REMOVAL	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	J.B. STD. 840.31 OR 840.32	REMARKS
11+67 -L-	CL			48'																			ADD PIPE
11+82 -L-	CL											38'							38				REMOVE PIPE
13+97 -L-	CL													39'					39				REMOVE WET PIPE
14+01 -L-	CL				59'														0				ADD WET PIPE
14+14 -L-	LT			28'							36'								36				REPLACE DRIVE PIPE
23+92 -L-	CL			52'															0				ADD PIPE
24+13 -L-	CL												41'						41				REMOVE PIPE
32+30 -L-	LT		46'																0				ADD DRIVE PIPE
33+74 -L-	RT				32'														0				ADD DRIVE PIPE
34+39 -L-	CL				31'														0				ADD PIPE
34+42 -L-	LT												31'						31				REMOVE PIPE
35+90 -L-	CL			64'															0				ADD PIPE
36+37 -L-	LT												32'						32				REMOVE PIPE
38+85 -L-	RT													29'					29				REMOVE WET PIPE
39+00 -L-	CL						128'												0				ADD WET PIPE WITH HEADWALL
41+52 -L-	RT												36'						36				REMOVE PIPE
41+96 -L-	RT												31'						31				REMOVE WET PIPE
42+11 -L-	CL				137'														0				ADD WET PIPE
49+83 -L-	RT												31'						31				REMOVE PIPE
49+87 -L-	CL			107'															0				ADD PIPE
54+42 -L-	RT													35'					35				REMOVE WET PIPE
55+14 -L-	RT												31'						31				REMOVE WET PIPE
55+29 -L-	CL					212'													0				ADD WET PIPE
57+56 -L-	CL					165'													0				ADD WET PIPE
57+69 -L-	RT													32'					32				REMOVE WET PIPE
60+46 -L-	CL												31'						31				REMOVE PIPE
60+50 -L-	CL			76'															0				ADD PIPE
63+47 -L-	RT												32'						0				DO NOT DISTURB
63+37 -L-	LT				58'														0			1	ADD WET PIPE & JB
63+53 -L-	CL			107'															0				ADD WET PIPE
63+87 -L-	CL			123'															0				ADD PIPE
64+57 -L-	RT												41'						0				DO NOT DISTURB
68+24 -L-	CL			153'															0				ADD PIPE
68+58 -L-	RT											41'							0				DO NOT DISTURB
~~72+95 -L-~~	~~CL~~												~~51~~						~~0~~				~~REMOVE PIPE~~
~~73+02 -L-~~	~~CL~~			~~67~~	-														~~0~~				~~ADD PIPE~~
~~75+71 -L-~~	~~RT~~		~~26~~																~~0~~				~~ADD DRIVE PIPE~~
81+19 -L- ALT2	CL			75'									31'						31				REPLACE PIPE
85+22 -L- ALT2	CL			69'									40'						40				REPLACE PIPE
88+96 -L- ALT2	LT												41'						0				DO NOT DISTURB
89+14 -L- ALT2	LT											41'							41				REMOVE PIPE
89+34 -L- ALT2	CL			108'															0				ADD PIPE
93+00 -L- ALT3	CL			59'									40'						40				REPLACE PIPE
97+09 -L- ALT3	CL			51'															0				ADD PIPE
97+31 -L- ALT3	CL											41'							41				REMOVE PIPE
101+33 -L- ALT3	LT			37'															0				ADD DRIVE PIPE
101+61 -L- ALT3	CL			47'															0				ADD PIPE
101+69 -L- ALT3	CL											41'							41				REMOVE PIPE
103+40 -L- ALT3	CL												80'						80				REMOVE PIPE
105+56 -L- ALT3	LT		36'																0				ADD DRIVE PIPE
105+60 -L- ALT3	LT											21'							21				REMOVE PIPE
105+84 -L- ALT3	LT		24'									29'							29				REPLACE DRIVE PIPE
106+11 -L- ALT3	RT		22'																0				ADD DRIVE PIPE
												0'							0				
110+03 -L- ALT1	CL			0'									0'						0				RETAIN
																			0				
SHEET TOTALS		0	128	1204	317	377	128	0	0	**2154**	36	252	569	135	0	0	0	0	**837**			1	

PROJECT REFERENCE NO.	SHEET NO.
INDIAN GRAVE RD	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

-L-

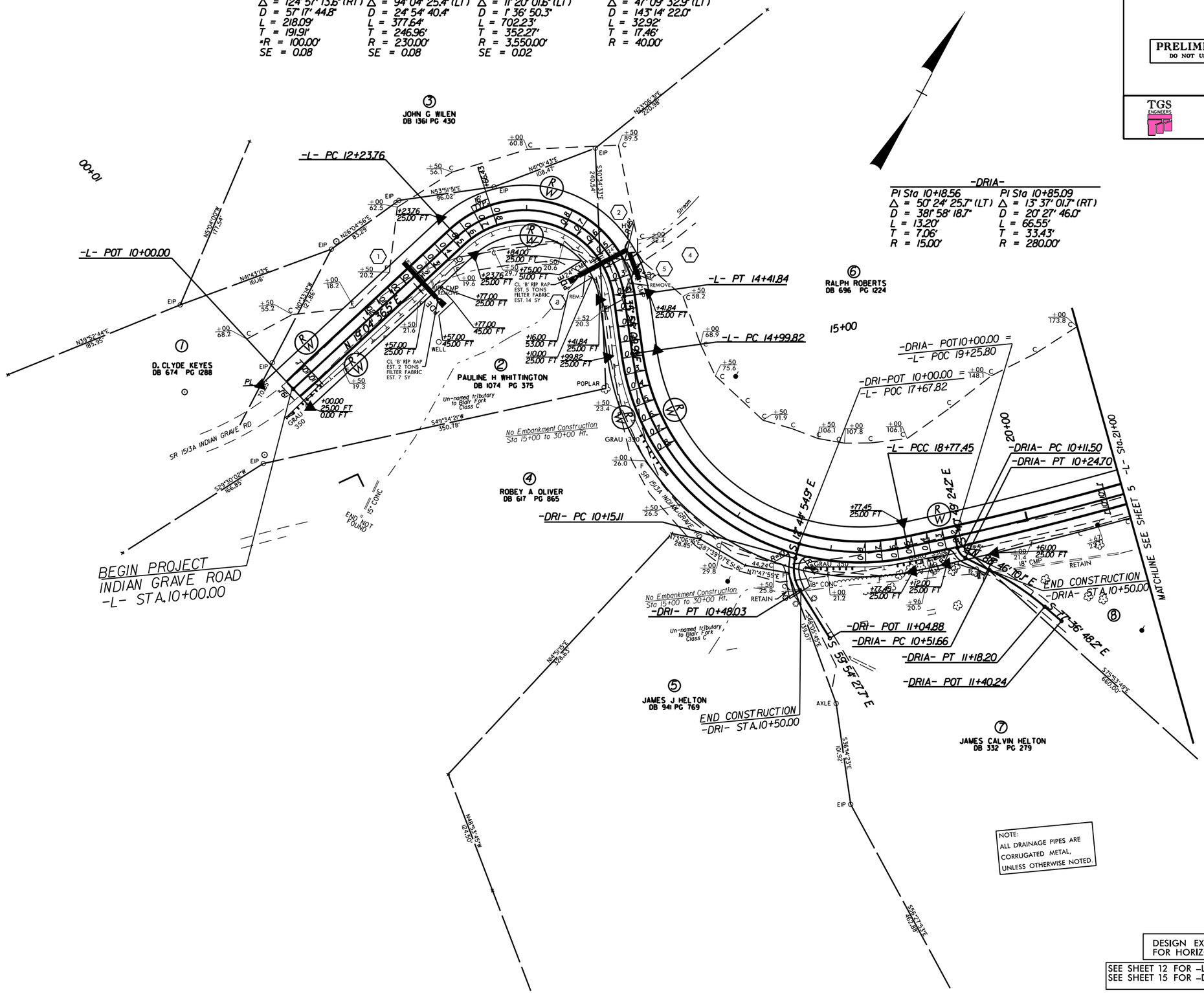
PI Sta 14+15.67	PI Sta 17+46.78	PI Sta 22+29.72
Δ = 124° 57' 13.6" (RT)	Δ = 94° 04' 25.4" (LT)	Δ = 11° 20' 01.6" (LT)
D = 57° 17' 44.8"	D = 24° 54' 40.4"	D = 1° 36' 50.3"
L = 218.09'	L = 377.64'	L = 702.23'
T = 191.91'	T = 246.96'	T = 352.27'
*R = 100.00'	R = 230.00'	R = 3,550.00'
SE = 0.08	SE = 0.08	SE = 0.02

-DRI-

PI Sta 10+32.57
Δ = 47° 09' 32.9" (LT)
D = 143° 14' 22.0"
L = 32.92'
T = 17.46'
R = 40.00'

-DRIA-

PI Sta 10+18.56	PI Sta 10+85.09
Δ = 50° 24' 25.7" (LT)	Δ = 13° 37' 01.7" (RT)
D = 381° 58' 18.7"	D = 20° 27' 46.0"
L = 13.20'	L = 66.55'
T = 7.06'	T = 33.43'
R = 15.00'	R = 280.00'



DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE

SEE SHEET 12 FOR -L- GRADE
SEE SHEET 15 FOR -DRI- & -DRIA- GRADE

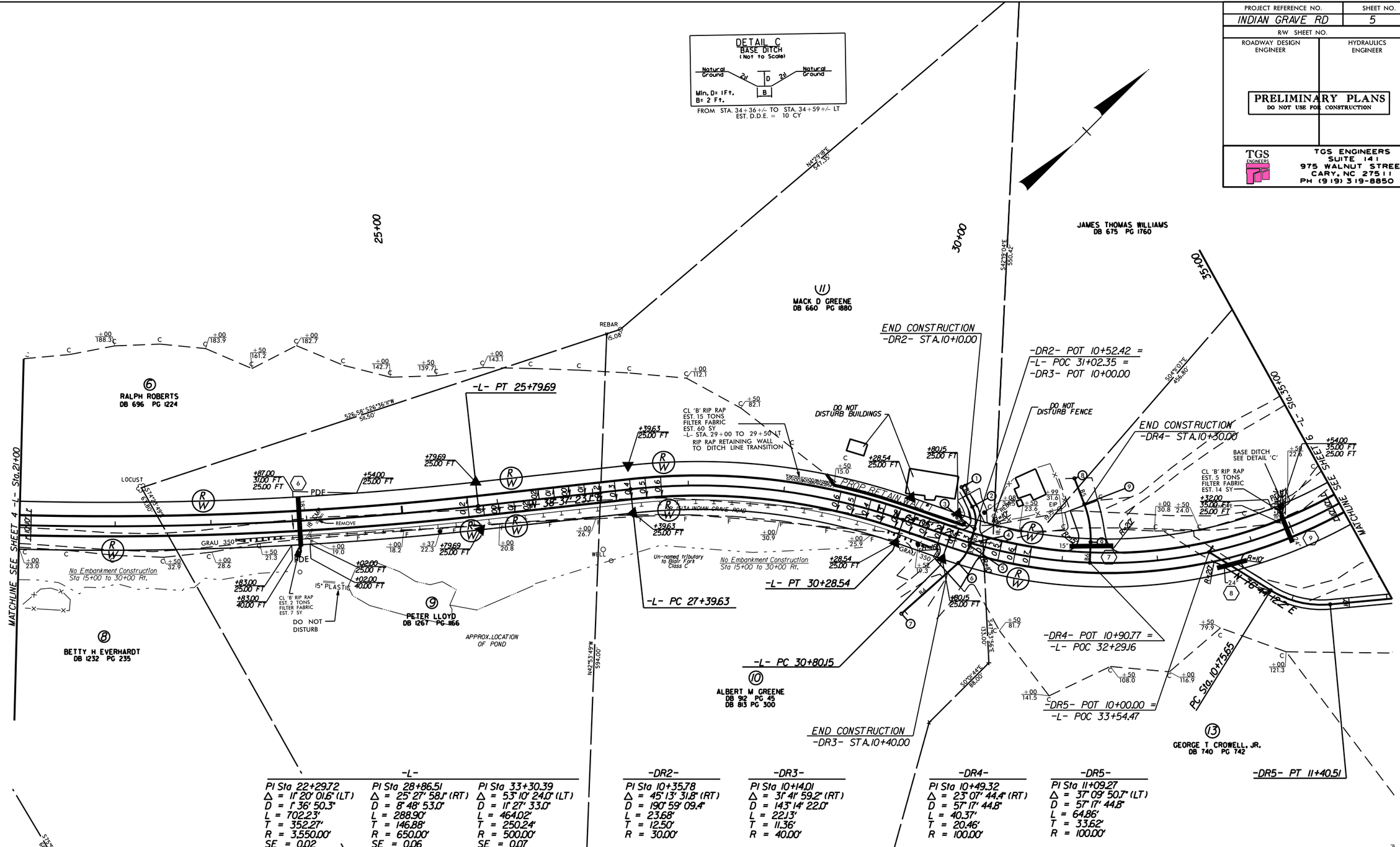
8/17/99

23-MAR-2016 09:08
R:\Roadway\Proj\$$$$\Secondary\Caldwell\SR1513A_Indian Grave Plans\Dgn\indiangrave_sht04.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
INDIAN GRAVE RD	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850



-DR2- ALIGNMENT		-DR3- ALIGNMENT		-DR4- ALIGNMENT	
1	-DR2- POT 10+00.00	5	-DR3- PC 10+02.66	8	-DR4- POT 10+00.00
2	-DR2- PC 10+23.29	6	-DR3- PT 10+24.79	9	-DR4- PC 10+28.86
3	-DR2- PT 10+46.97	7	-DR3- POT 11+04.30	10	-DR4- PT 10+69.23
4	-DR2- POT 10+62.42	B3	S 28° 27' 16.3" E	B5	S 66° 06' 44.3" E
B1	S 73° 40' 47.8" E	B4	S 3° 14' 42.9" W	B6	S 42° 58' 59.9" E
B2	S 28° 27' 16.0" E				

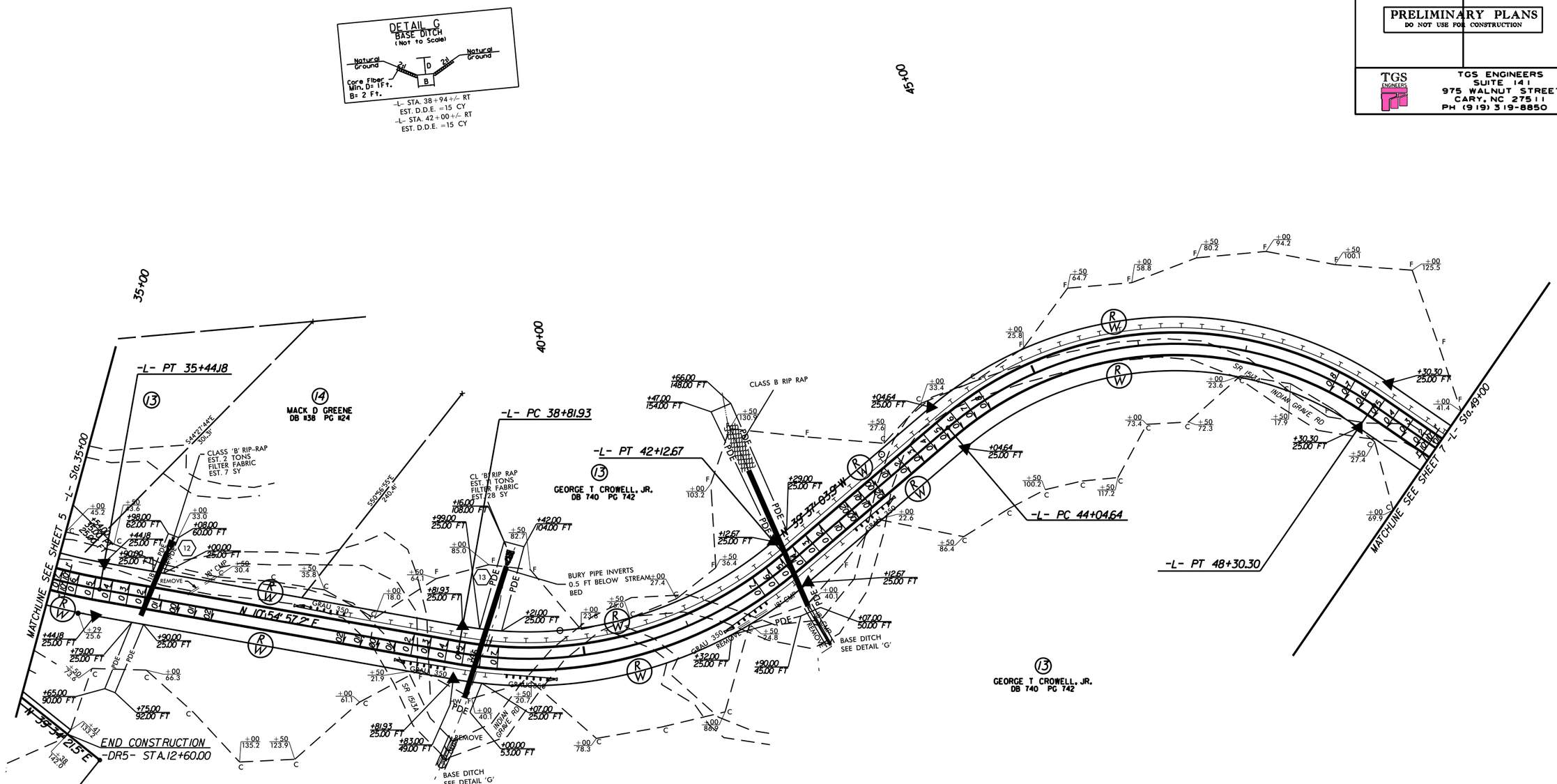
SEE SHEET 12 FOR -L- GRADE
SEE SHEET 16 FOR -DR2-, -DR3-, -DR4-, & -DR5- GRADES

8/17/99
02-MAY-2016 10:15
R:\Roadway\Proj\R5131_Secondary\Caldwell\SR15131A_Indian Grave Plans\Dgn\IndianGrave_Sht05.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
INDIAN GRAVE RD	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850



PI Sta 33+30.39	PI Sta 40+58.92	PI Sta 46+54.21
Δ = 53° 10' 24.0" (LT)	Δ = 50° 32' 01.1" (LT)	Δ = 75° 02' 30.4" (RT)
D = 11° 27' 33.0"	D = 15° 16' 43.9"	D = 17° 37' 46.1"
L = 464.02'	L = 330.74'	L = 425.66'
T = 250.24'	T = 177.00'	T = 249.57'
R = 500.00'	R = 375.00'	R = 325.00'
SE = 0.07	SE = 0.07	SE = 0.08

SEE SHEET 13 FOR -L- GRADE
SEE SHEET 16 FOR -DR5- GRADE

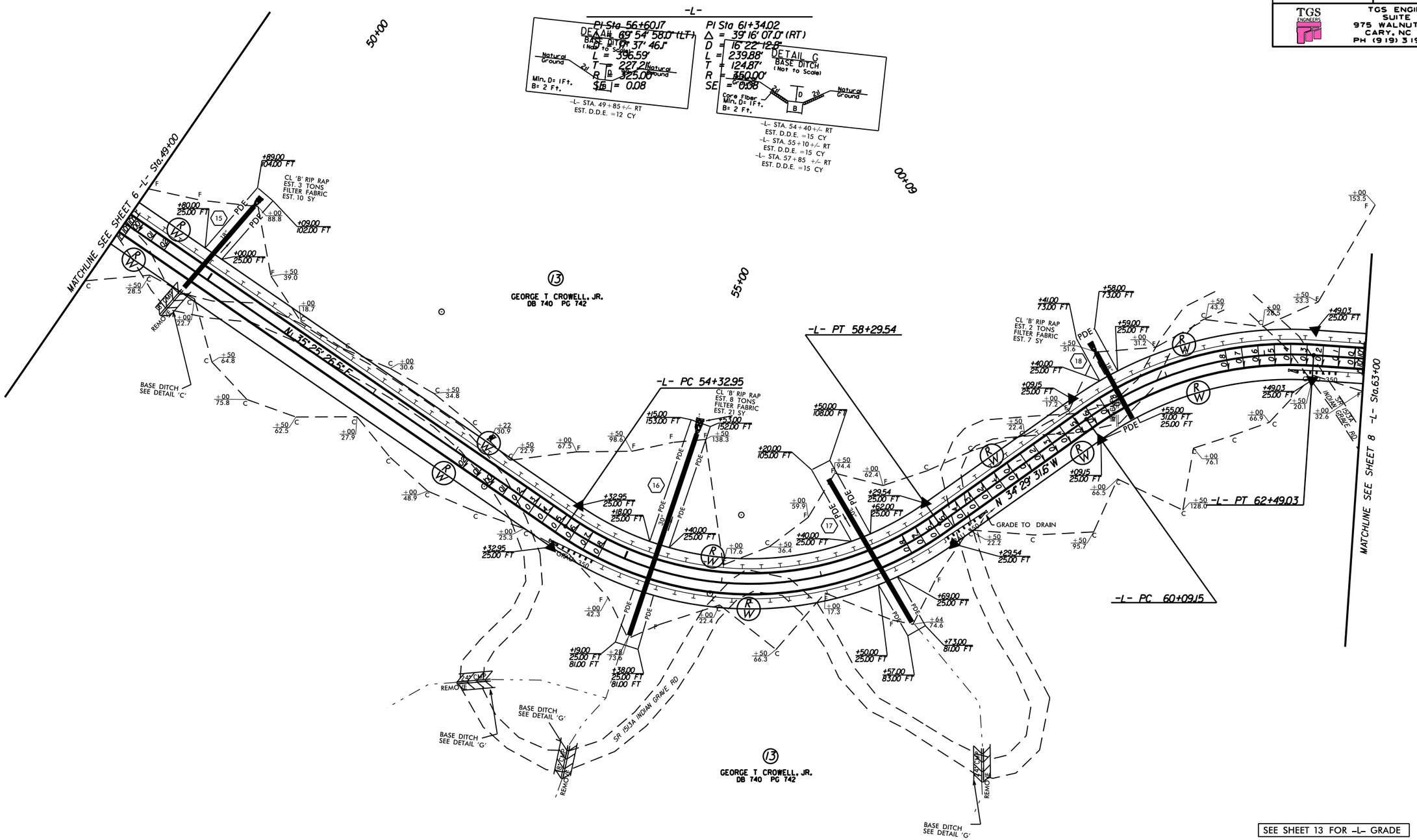
8/17/99
29-MAR-2016 09:08
R:\Roadway\Proj\Secondary\Caldwell\SR1513A_Indian Grove Plans\Dgn\IndianGrove_Sh06.dgn
$$$$USERNAME$$$$

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
INDIAN GRAVE RD	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

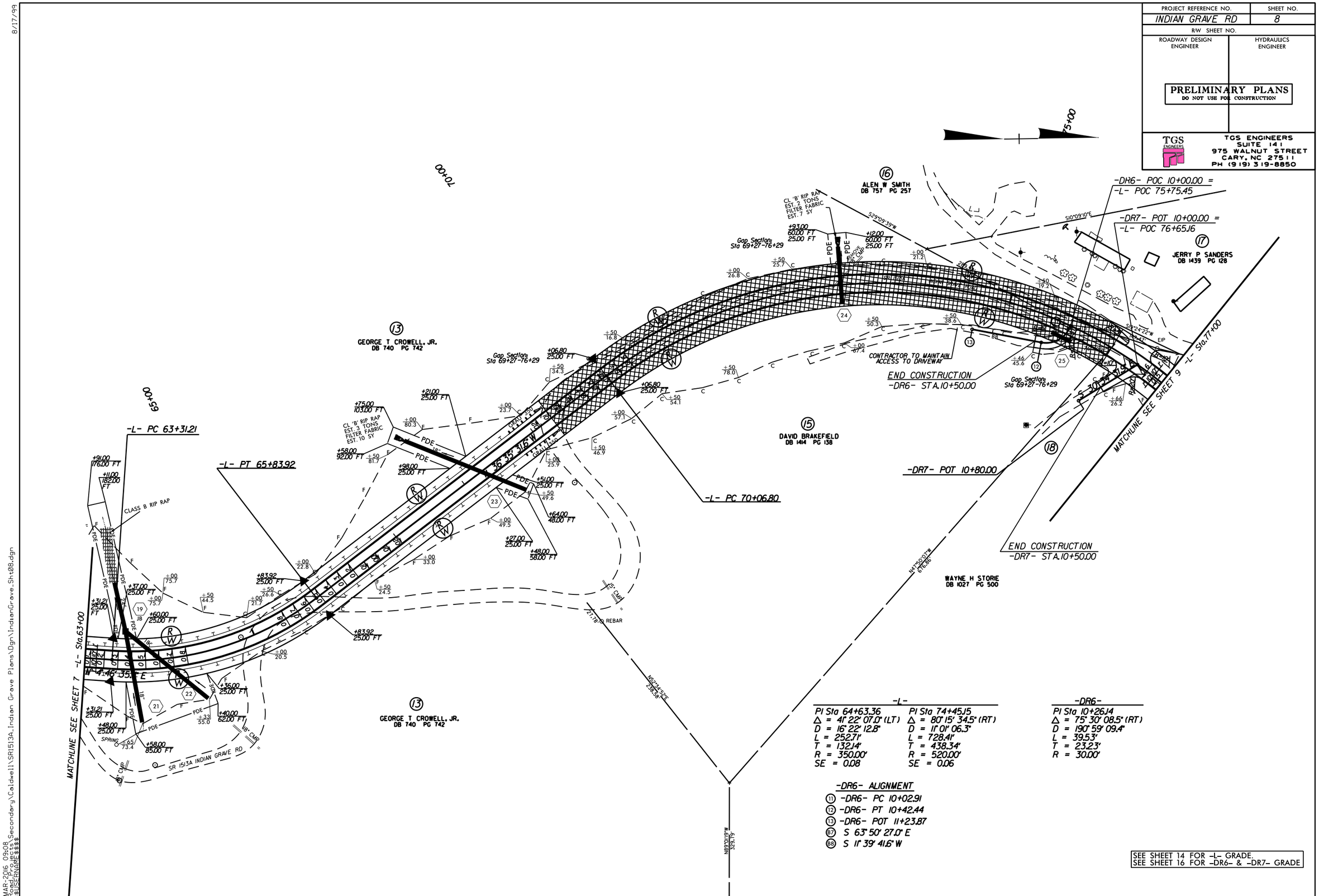


23-MAR-2016 09:08
R:\Roadway\Proj\Secondary\Caldwell\SR1513A_Indian Grove Plans\Dgn\IndianGrove_Sht07.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
INDIAN GRAVE RD	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850



-L-	
PI Sta 64+63.36	PI Sta 74+45.15
Δ = 41° 22' 07.0" (LT)	Δ = 80° 15' 34.5" (RT)
D = 16° 22' 12.8"	D = 11° 01' 06.3"
L = 252.71'	L = 728.41'
T = 132.14'	T = 438.34'
R = 350.00'	R = 520.00'
SE = 0.08	SE = 0.06

-DR6-
PI Sta 10+26.14
Δ = 75° 30' 08.5" (RT)
D = 190° 59' 09.4"
L = 39.53'
T = 23.23'
R = 30.00'

-DR6- ALIGNMENT

(11) -DR6- PC 10+02.91
(12) -DR6- PT 10+42.44
(13) -DR6- POT 11+23.87
(87) S 63° 50' 27.0" E
(88) S 11° 39' 41.6" W

SEE SHEET 14 FOR -L- GRADE.
SEE SHEET 16 FOR -DR6- & -DR7- GRADE

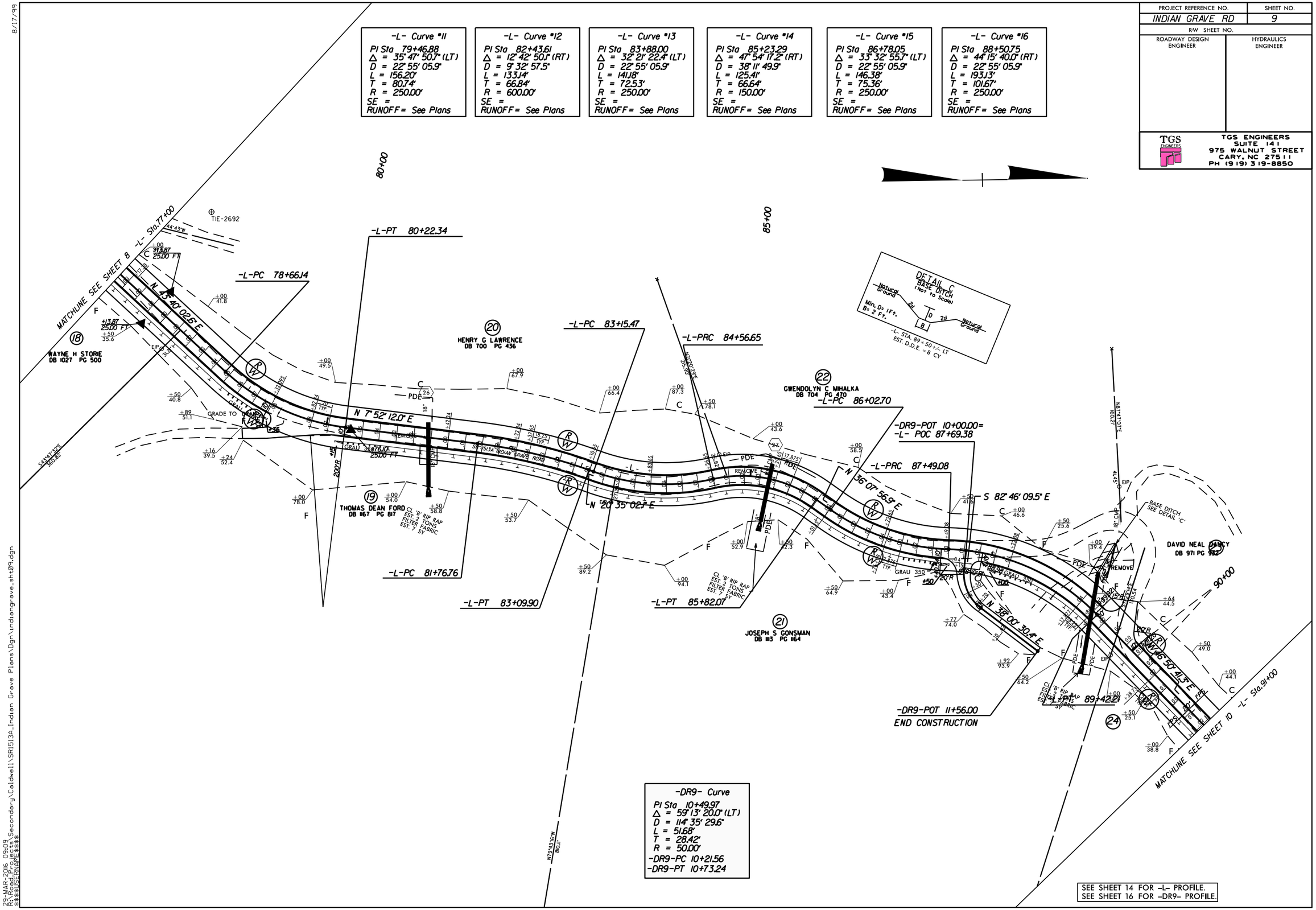
8/17/99

23-MAR-2016 09:08
R:\Roadway\Proj\R-5705_Secondary\Caldwell\SR1513A_Indian Grave Plans\Dgn\IndianGrave_Sh08.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
INDIAN GRAVE RD	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

-L- Curve #11	-L- Curve #12	-L- Curve #13	-L- Curve #14	-L- Curve #15	-L- Curve #16
PI Sta 79+46.88	PI Sta 82+43.61	PI Sta 83+88.00	PI Sta 85+23.29	PI Sta 86+78.05	PI Sta 88+50.75
Δ = 35° 47' 50.7" (LT)	Δ = 12° 42' 50.1" (RT)	Δ = 32° 21' 22.4" (LT)	Δ = 47° 54' 17.2" (RT)	Δ = 33° 32' 55.7" (LT)	Δ = 44° 15' 40.0" (RT)
D = 22° 55' 05.9"	D = 9° 32' 57.5"	D = 22° 55' 05.9"	D = 38° 11' 49.9"	D = 22° 55' 05.9"	D = 22° 55' 05.9"
L = 156.20'	L = 133.14'	L = 141.18'	L = 125.41'	L = 146.38'	L = 193.13'
T = 80.74'	T = 66.84'	T = 72.53'	T = 66.64'	T = 75.36'	T = 101.67'
R = 250.00'	R = 600.00'	R = 250.00'	R = 150.00'	R = 250.00'	R = 250.00'
SE =	SE =	SE =	SE =	SE =	SE =
RUNOFF= See Plans	RUNOFF= See Plans	RUNOFF= See Plans	RUNOFF= See Plans	RUNOFF= See Plans	RUNOFF= See Plans



-DR9- Curve
PI Sta 10+49.97
Δ = 59° 13' 20.0" (LT)
D = 114° 35' 29.6"
L = 51.68'
T = 28.42'
R = 50.00'
-DR9-PC 10+21.56
-DR9-PT 10+73.24

SEE SHEET 14 FOR -L- PROFILE.
SEE SHEET 16 FOR -DR9- PROFILE.

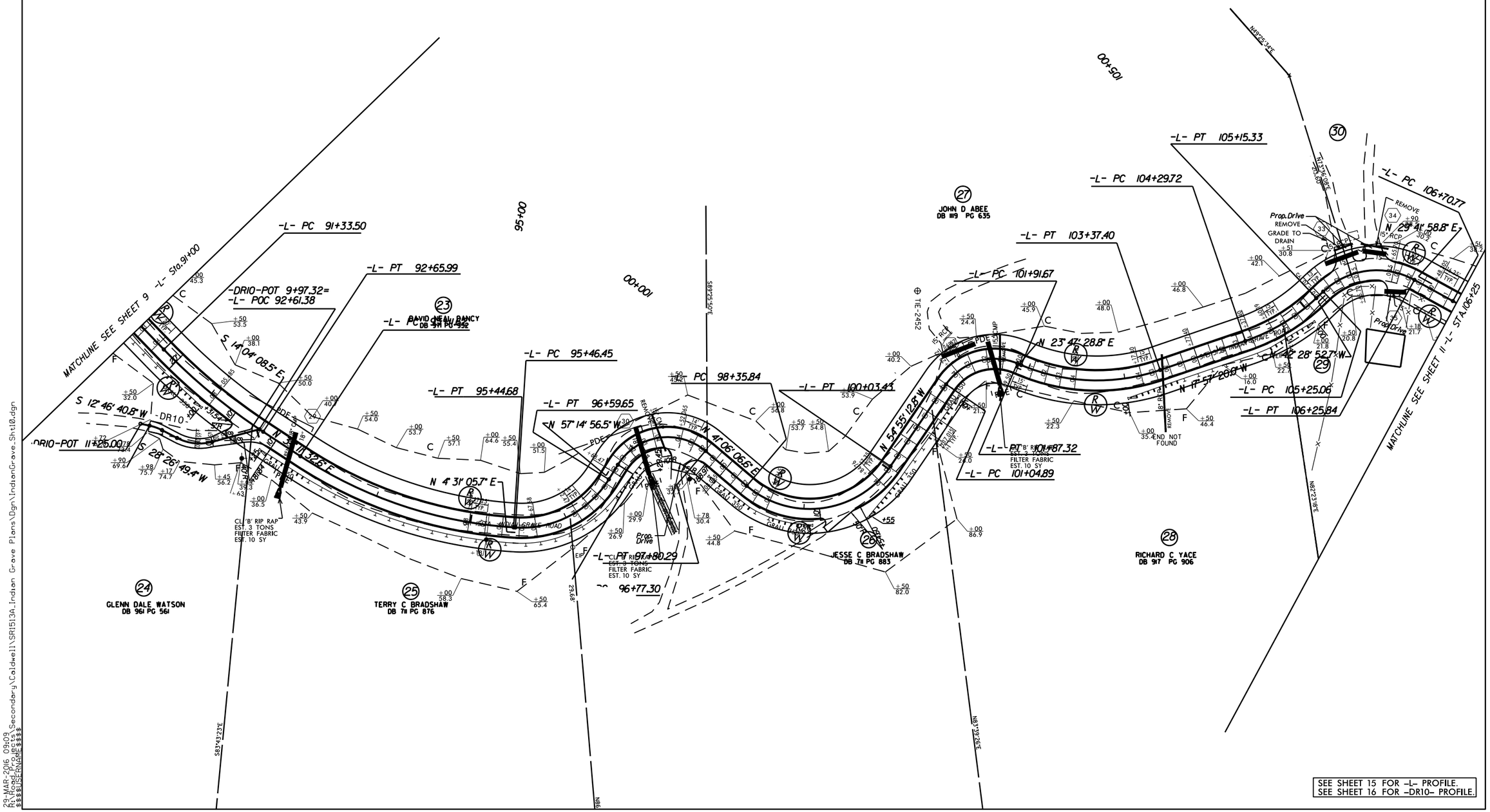
8/17/99

29-MAR-2016 09:09
R:\Road\Projects\Secondary\Caldwell\SR1513A_Indian Grave Plans\Dgn\indiangrave_sht09.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
INDIAN GRAVE RD	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

-L- Curve #1(ALT 3)	-L- Curve #2(ALT 3)	-L- Curve #3(ALT 3)	-L- Curve #1(ALT 3)	-L- Curve #4(ALT 3)	-L- Curve #5(ALT 3)	-L- Curve #6(ALT 3)	-L- Curve #7(ALT 3)	-L- Curve #8(ALT 3)
PI Sta 92+00.02	PI Sta 94+30.83	PI Sta 96+09.25	PI Sta 97+46.75	PI Sta 99+46.95	PI Sta 101+54.10	PI Sta 102+67.94	PI Sta 104+73.19	PI Sta 105+83.37
Δ = 12° 39' 08.6" (LT)	Δ = 29° 40' 26.9" (LT)	Δ = 61° 46' 02.1" (LT)	Δ = 98° 21' 03.1" (RT)	Δ = 96° 01' 19.4" (LT)	Δ = 78° 42' 41.6" (RT)	Δ = 41° 44' 48.8" (LT)	Δ = 24° 31' 32.7" (LT)	Δ = 72° 10' 51.5" (RT)
D = 9° 32' 57.5"	D = 12° 43' 56.6"	D = 54° 34' 02.7"	D = 95° 29' 34.7"	D = 57° 17' 44.8"	D = 95° 29' 34.7"	D = 28° 38' 52.4"	D = 28° 38' 52.4"	D = 71° 37' 11.0"
L = 132.50'	L = 233.06'	L = 113.19'	L = 102.99'	L = 167.59'	L = 82.43'	L = 145.72'	L = 85.61'	L = 100.78'
T = 66.52'	T = 119.21'	T = 62.80'	T = 69.45'	T = 111.10'	T = 49.21'	T = 76.27'	T = 43.47'	T = 58.32'
R = 600.00'	R = 450.00'	R = 105.00'	R = 60.00'	R = 100.00'	R = 60.00'	R = 200.00'	R = 200.00'	R = 80.00'
SE = See Plans	SE = See Plans	SE = See Plans	SE = See Plans	SE = See Plans	SE = See Plans	SE = See Plans	SE = See Plans	SE = See Plans
RUNOFF = See Plans	RUNOFF = See Plans	RUNOFF = See Plans	RUNOFF = See Plans	RUNOFF = See Plans	RUNOFF = See Plans	RUNOFF = See Plans	RUNOFF = See Plans	RUNOFF = See Plans



SEE SHEET 15 FOR -L- PROFILE.
SEE SHEET 16 FOR -DR10- PROFILE.

8/17/99
29-MAR-2016 09:09
R:\Road_Projects\Secondary\Caldwell\SR1513A_Indian Grave Plans\Dgn\IndianGrave_Sht10.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
INDIAN GRAVE RD	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TGS ENGINEERS
TGS ENGINEERS
SUITE 141
975 WALNUT STREET
CARY, NC 27511
PH (919) 319-8850

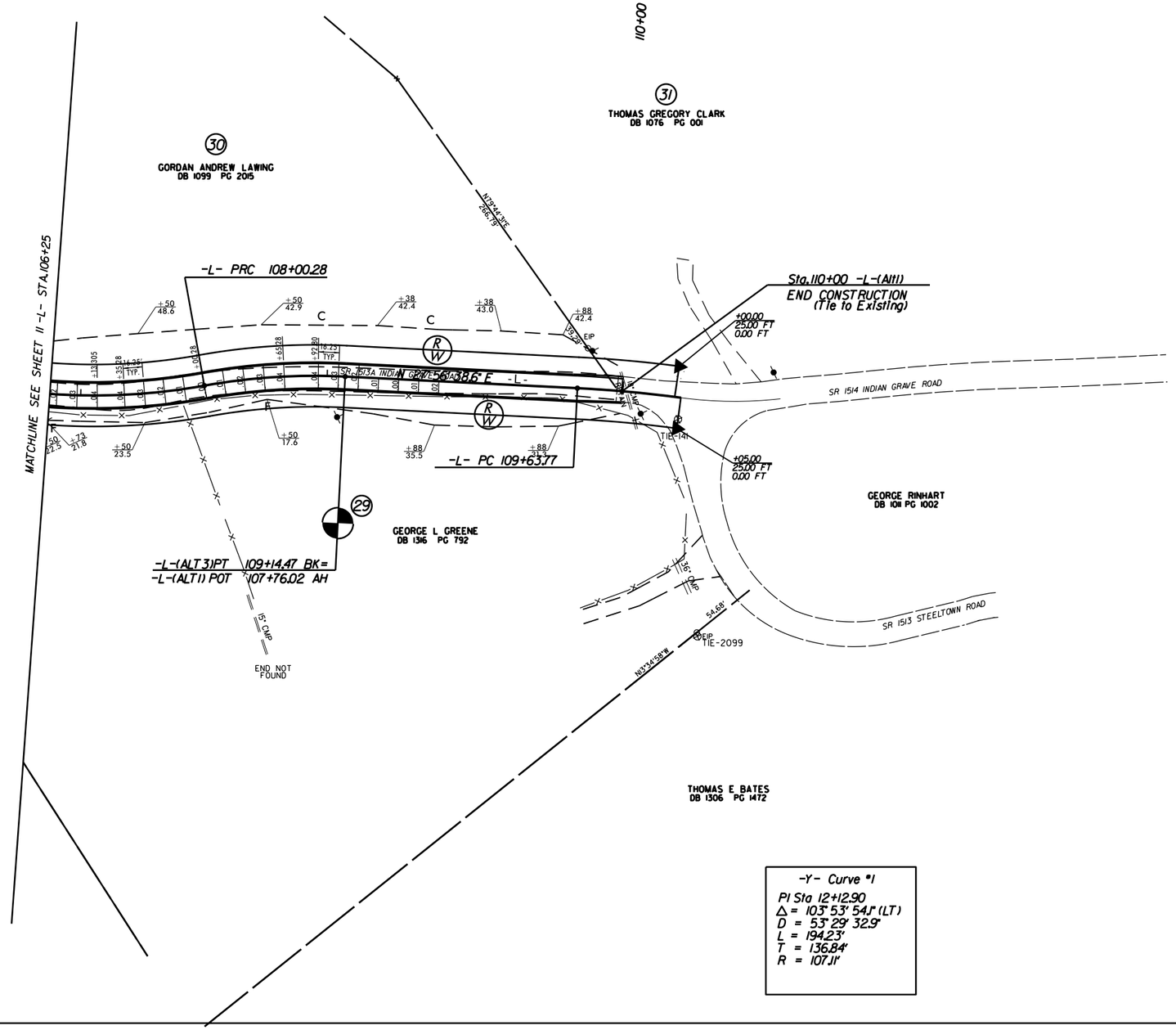
-L- Curve #9(ALT 3)
PI Sta 107+35.89
Δ = 14° 50' 27.3" (LT)
D = 11° 27' 33.0"
L = 129.51'
T = 65.12'
R = 500.00'
SE = See Plans
RUNOFF = See Plans

-L- Curve #10(ALT 3)
PI Sta 108+57.63
Δ = 13° 05' 07.0" (RT)
D = 11° 27' 33.0"
L = 114.19'
T = 57.34'
R = 500.00'
SE = See Plans
RUNOFF = See Plans

-L- Curve #15
PI Sta 110+05.88
Δ = 4° 49' 19.9" (RT)
D = 5° 43' 46.5"
L = 84.16'
T = 42.11'
R = 1,000.00'
SE = See Plans
RUNOFF = See Plans

-L- Curve #16
PI Sta 110+88.32
Δ = 14° 09' 57.9" (LT)
D = 17° 37' 46.1"
L = 80.35'
T = 40.38'
R = 325.00'
SE = See Plans
RUNOFF = See Plans

-DR11-
PI Sta 11+15.00
Δ = 52° 28' 34.6" (LT)
D = 229° 10' 59.2"
L = 22.90'
T = 12.32'
R = 25.00'
PC 11+02.68
PT 11+25.57



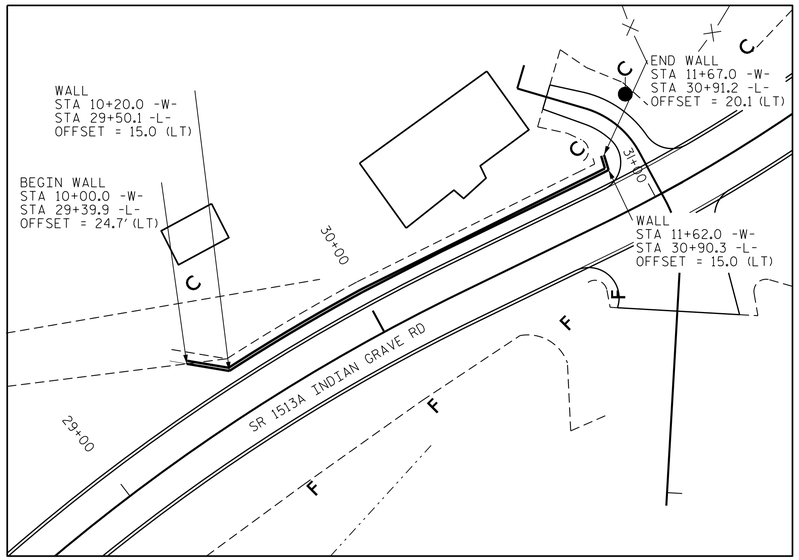
-Y- Curve #1
PI Sta 12+12.90
Δ = 103° 53' 54.1" (LT)
D = 53° 29' 32.9"
L = 194.23'
T = 136.84'
R = 107.11'

SEE SHEET 15 FOR -L- & -Y- PROFILES.
SEE SHEET 16 FOR -DR11- PROFILE.

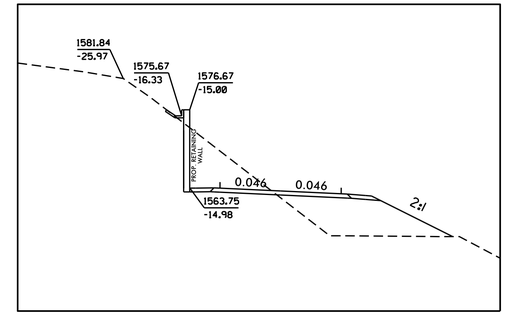
8/17/99
29-MAR-2016 09:09
R:\Road_Projects\Secondary\Caldwell\SR1513A_Indian Grove Plans\Dgn\IndianGrove_Sht11.dgn
$$$$USERNAME$$$$

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS Michael H. Stephens C4476820923 14CC... 4/19/2016	
SIGNATURE DATE	SIGNATURE DATE

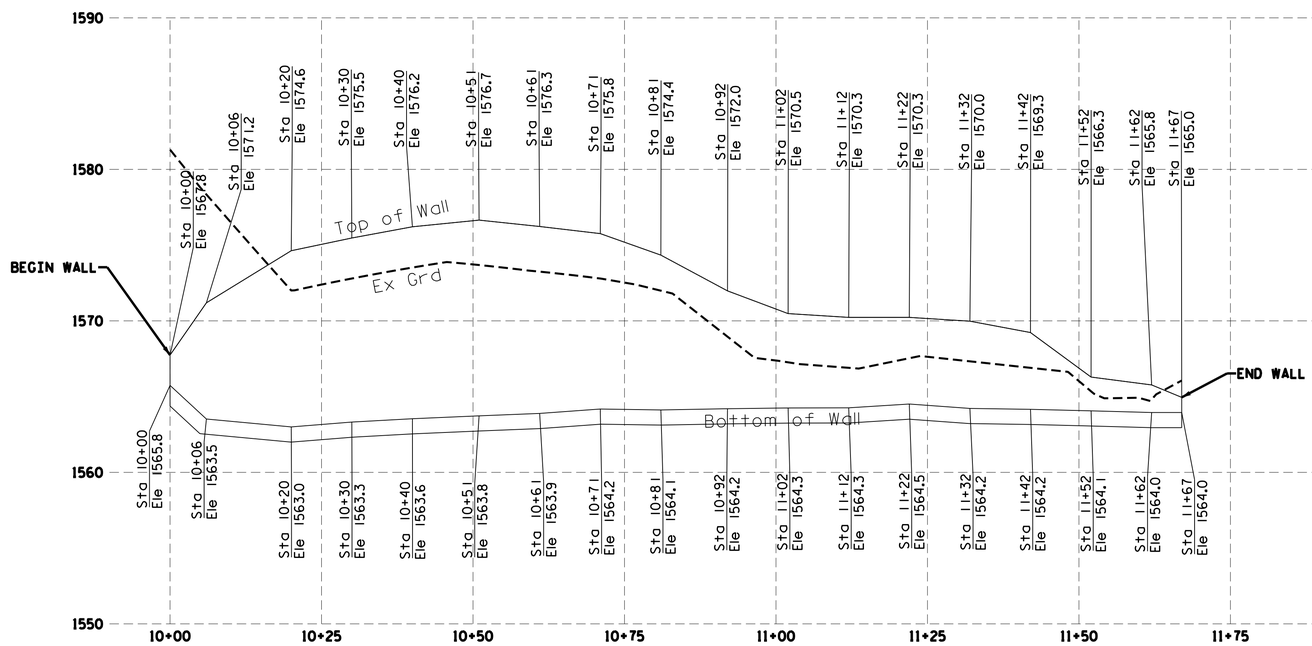
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



WALL NO. 1 PLAN VIEW



CROSS SECTION @ STA 29+50
RETAINING WALL NO. 1



WALL NO. 1 ENVELOPE

FRONT SLOPE WALL EMBEDMENT

SLOPE IN FRONT OF STRUCTURES		MINIMUM EMBEDMENT DEPTH
HORIZONTAL	FOR WALLS	H/20
	FOR ABUTMENTS	H/10
3.0H:1.0V	WALLS	H/10
2.5H:1.0V	WALLS	H/8.5
2.0H:1.0V	WALLS	H/7
1.5H:1.0V	WALLS	H/5
1.25H:1.0V	WALLS	H/4
1.0H:1.0V	WALLS	H/3

NOTE:
1) MAINTAIN A MINIMUM BENCH WIDTH OF 4.0 IN FRONT OF THE WALL FOR ITS ENTIRE LENGTH.
2) MINIMUM EMBEDMENT DEPTH OF 2 FT, UNLESS LARGER DEPTHS DICTATED BY THE ABOVE TABLE.
3) MAXIMUM SLOPE OF 1H:1V WILL BE MAINTAINED ON FRONT SLOPES FOR THE ENTIRE LENGTH OF THE WALL.
4) SUBMITT WITH THE WALL DESIGN INTERNAL, EXTERNAL, AND GLOBAL STABILITY ANALYSISES.

ESTIMATED WALL QUANTITY

RETAINING WALL	✱ 1,535 SQUARE FEET

✱ WALL AREA IS MEASURED USING THE DESIGN HEIGTH "H"

PROJECT NO.: SR1513A
CALDWELL COUNTY
STATION: 29+39.9
SHEET 1 OF 3

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

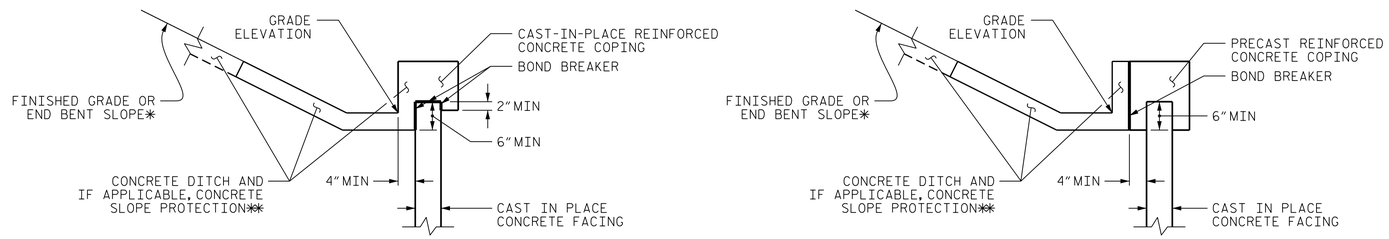
SOIL NAIL
RETAINING WALL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-1
2			4			

PREPARED BY: MHS	DATE: 4/15/16
REVIEWED BY: SCC	DATE: 4/15/16

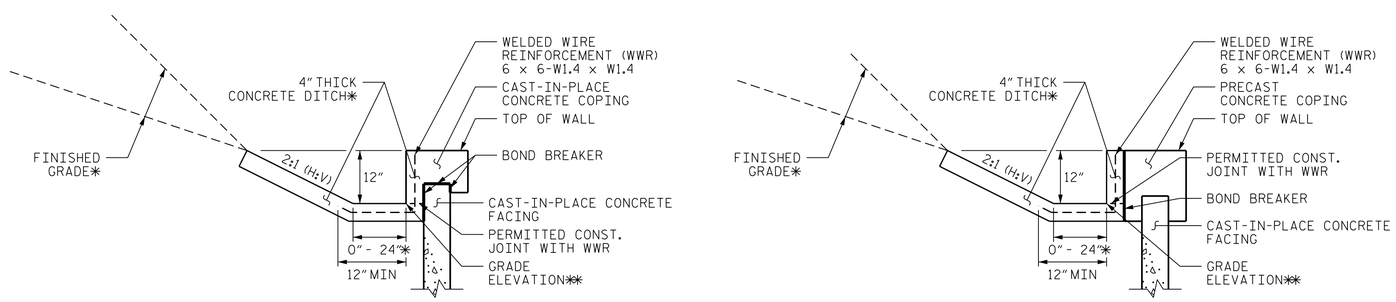
GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS DocuSigned by: Michael H. Stephens C447682092314CC... 4/19/2016	
SIGNATURE DATE	SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



COPING DETAILS

*SEE PLANS FOR FINISHED GRADE OR END BENT SLOPE DETAILS.
**SEE CONCRETE DITCH BEHIND WALL DETAILS.



CONCRETE DITCH BEHIND WALL WITH CONCRETE COPING

*SEE ROADWAY PLANS FOR CONCRETE DITCH AND FINISHED GRADE DETAILS.
**SEE WALL ENVELOPE FOR GRADE ELEVATIONS.

FOR CONCRETE DITCHES, SEE SECTION 850 OF THE STANDARD SPECIFICATIONS.

PROJECT NO.: SR1513A
CALDWELL COUNTY
STATION: 29+39.9
SHEET 3 OF 3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SOIL NAIL RETAINING WALL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	W-2
2	-	-	4	-	-	

PREPARED BY: MHS	DATE: 4/15/16
REVIEWED BY: SCC	DATE: 4/15/16

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS

DocuSigned by: Michael H. Stephens C447682092314CC...

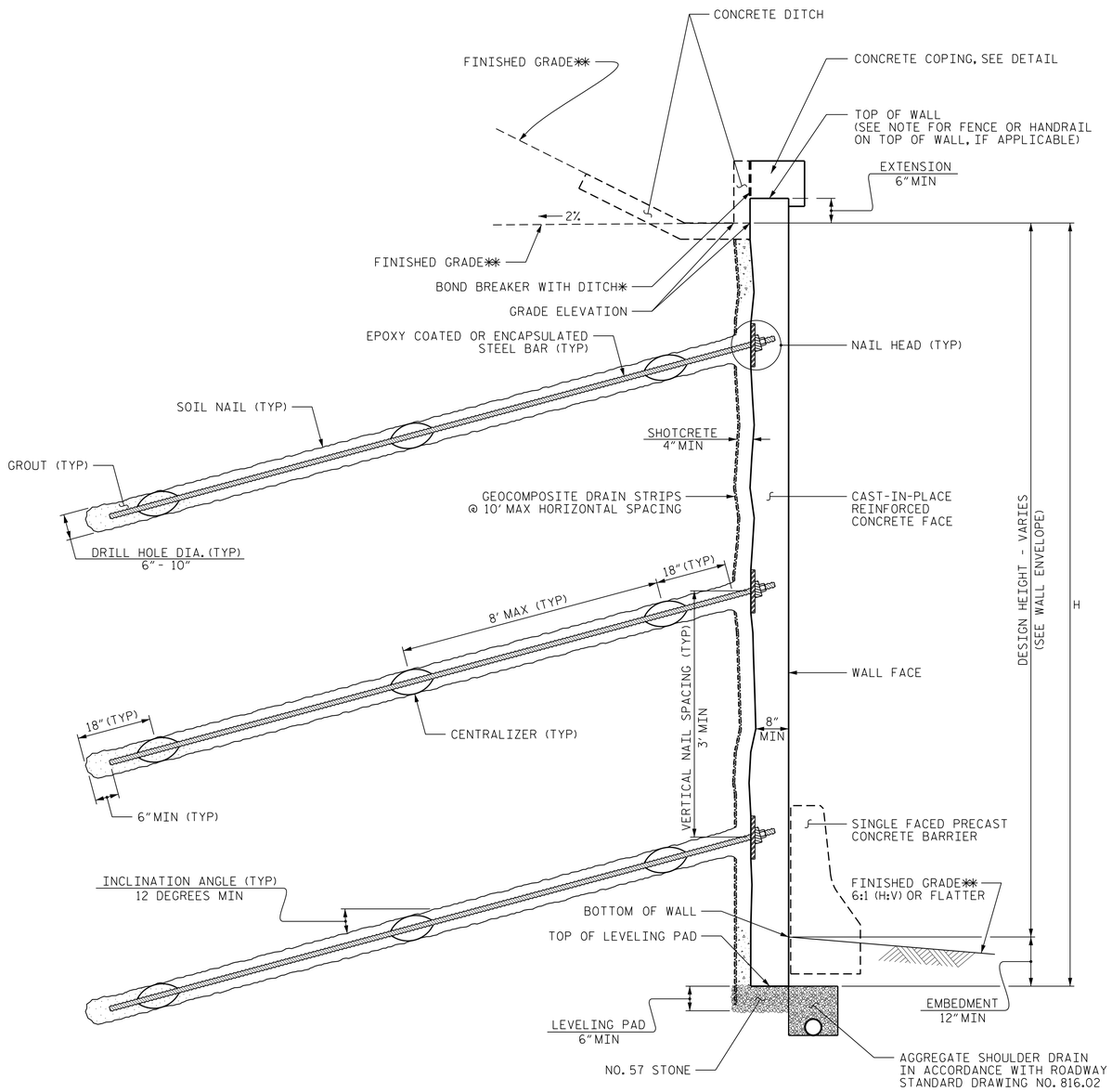
4/19/2016

SIGNATURE DATE

ENGINEER

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SOIL NAIL WALL - TYPICAL SECTION

*SEE CONCRETE DITCH BEHIND WALL DETAILS.
**SEE PLANS FOR FINISHED GRADE.

NOTES:

FOR SOIL NAIL RETAINING WALLS, SEE SOIL NAIL RETAINING WALLS PROVISION.

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

A FENCE OR HANDRAIL IS REQUIRED ON TOP OF RETAINING WALL NO. 1. SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.

A ASHLAR ARCHITECTURAL FINISH IS REQUIRED FOR THE CAST-IN-PLACE REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 1.

A CONCRETE COPING IS REQUIRED FOR RETAINING WALL NO. 1, SEE DETAILS. END SECTIONS OF THE COPING SHALL BE CAST-IN-PLACE.

BEFORE BEGINNING SOIL NAIL WALL DESIGN FOR RETAINING WALL NO. 1, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. 1 FOR THE FOLLOWING:
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 75 YEARS
3) MINIMUM EMBEDMENT ELEVATION = 1 FT OR AS INDICATED ON THE FRONT SLOPE EMBEDMENT TABLE
4) IN-SITU ASSUMED MATERIAL PARAMETERS:
UNIT WEIGHT, γ = 120 LB/CF
FRICTION ANGLE, ϕ = 30 DEGREES
COHESION, c = 0 LB/SF

DESIGN RETAINING WALL NO. 1 FOR A PIPE EXTENDING THROUGH THE WALL AS SHOWN. VERIFY PIPE LOCATION AND ELEVATION BEFORE BEGINNING SOIL NAIL WALL DESIGN OR CONSTRUCTION.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH SOIL NAILS FOR RETAINING WALL NO. 1.

PROJECT NO.: SR1513A

CALDWELL COUNTY

STATION: 29+39.9

SHEET 2 OF 3

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SOIL NAIL RETAINING WALL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	W-2
2	-	-	4	-	-	

PREPARED BY: MHS	DATE: 4/15/16
REVIEWED BY: SCC	DATE: 4/15/16