

**This electronic collection of documents is provided  
for the convenience of the user  
and is Not a Certified Document –**

**The documents contained herein were originally issued  
and sealed by the individuals whose names and license  
numbers appear on each page, on the dates appearing  
with their signature on that page.**

**This file or an individual page  
shall not be considered a certified document.**

See Sheet 1A For Index of Sheets  
See Sheet 1B For Conventional Symbols

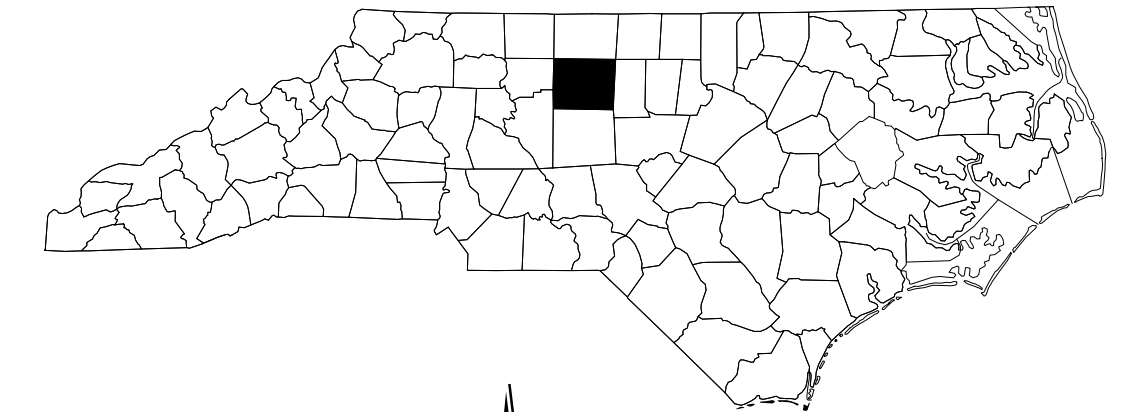
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**GUILFORD COUNTY**

**LOCATION: US 70 (BURLINGTON ROAD) FROM WEST OF  
SR 3045 (MT. HOPE CHURCH ROAD)/  
SR 2819 (MCLEANSVILLE ROAD) TO JUST EAST OF  
SR 2826 (BIRCH CREEK ROAD)**

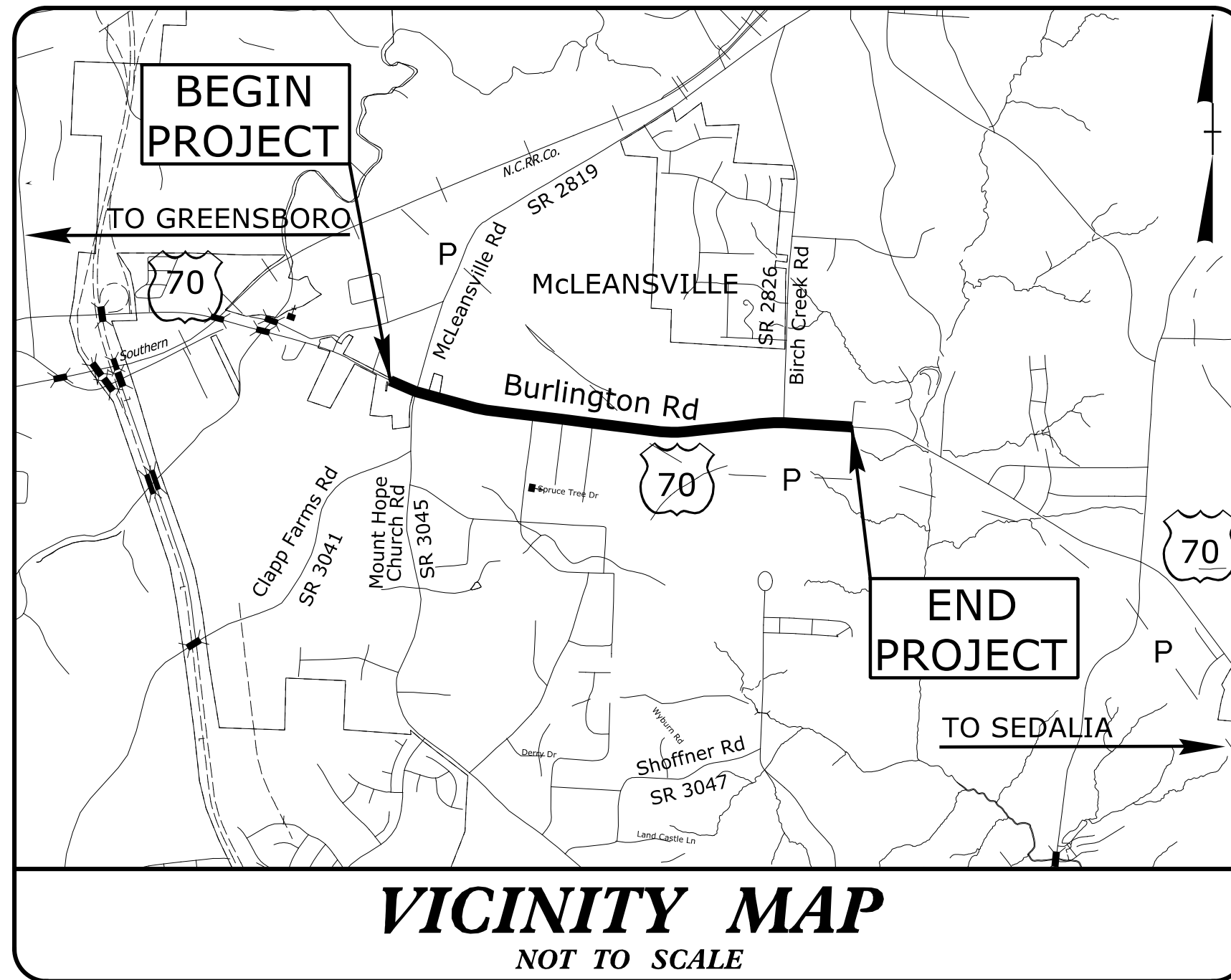
**TYPE OF WORK: GRADING, PAVING, DRAINAGE, SIGNALS AND CULVERT**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2581BA	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34840.1.4		PE	
34840.2.4		R/W, UTIL.	
34840.3.4		CONST.	

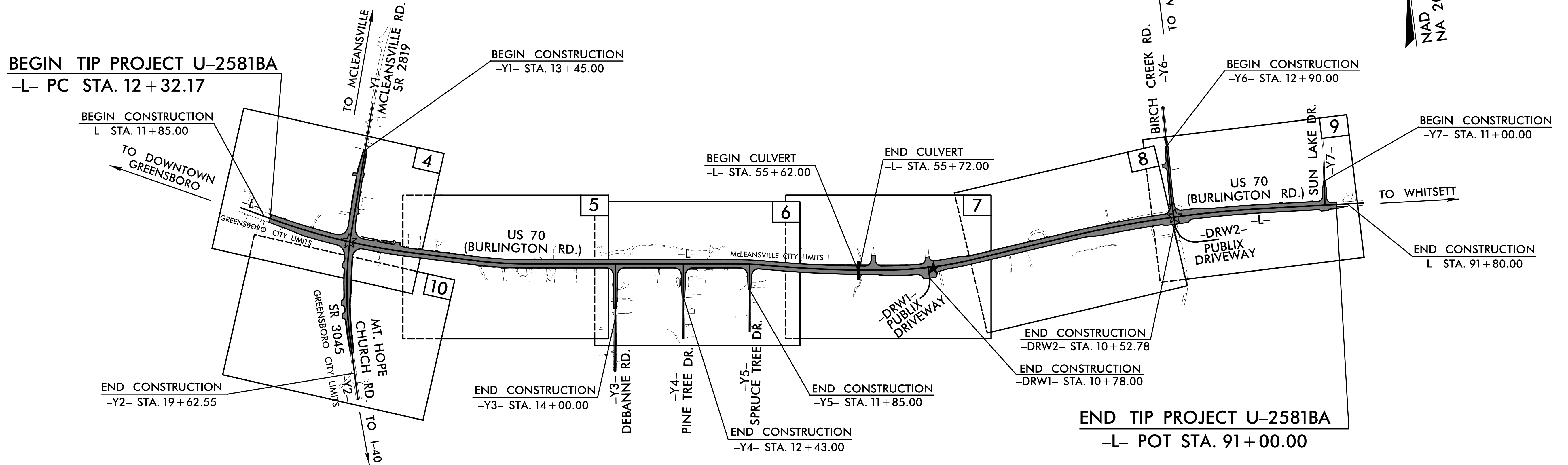


**TIP PROJECT: U-2581BA**

**CONTRACT: C204371**

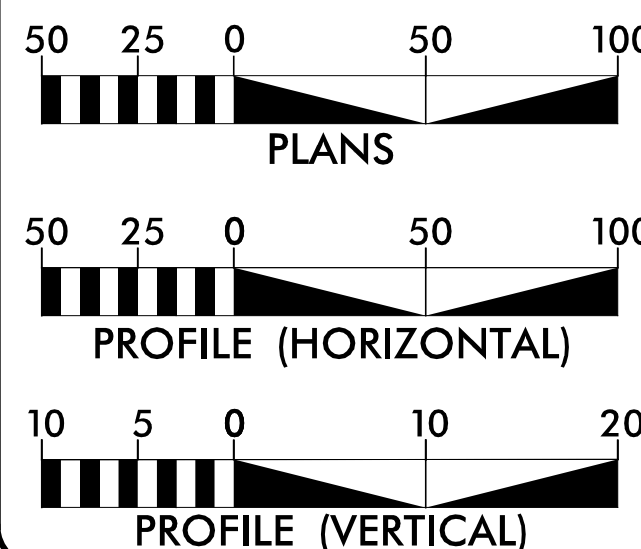


- ☆ EXISTING SIGNALS TO BE MODIFIED
- ★ PROPOSED SIGNAL



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

**GRAPHIC SCALES**



**DESIGN DATA**

ADT 2019 = 15,430  
ADT 2039 = 25,890  
K = 12 %  
D = 60 %  
T = 6 % \*  
V = 50 MPH  
\* (TTST 1 + DUAL 5)  
FUNC CLASS =  
PRINCIPAL ARTERIAL

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT U-2581BA = 1.490 MI.  
TOTAL LENGTH OF TIP PROJECT U-2581BA = 1.490 MI.

Prepared for the North Carolina Department of Transportation  
In the Office of:



VHB Engineering NC, P.C. (C-3705)  
940 Main Campus Drive, Suite 500  
Raleigh, NC 27606

**2018 STANDARD SPECIFICATIONS**

**RIGHT OF WAY DATE:**  
OCTOBER 31, 2018

**LETTING DATE:**  
OCTOBER 15, 2019

**NCDOT CONTACT**

**JIMMY GOODNIGHT, PE**  
PROJECT ENGINEER

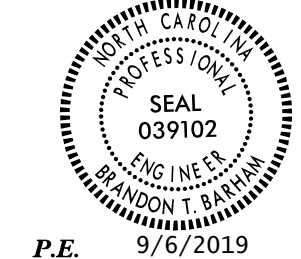
**JERRY JAVELLANA, PE**  
PROJECT DESIGN ENGINEER

**LAURA SUTTON, PE**

**HYDRAULICS ENGINEER**

DocuSigned by:  
**Brandon Barham**  
8051ED14728D415...

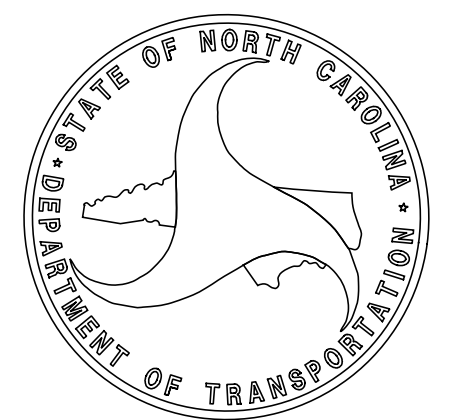
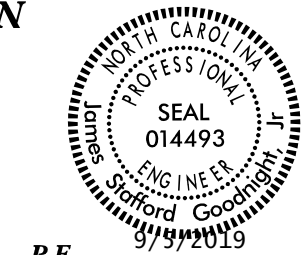
SIGNATURE:



**ROADWAY DESIGN ENGINEER**

DocuSigned by:  
**Jimmy Goodnight**  
64CB24C343AF4E8...

SIGNATURE:



# DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA



DocuSigned by:  
James Stafford Goodnight  
9/10/2019

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, STANDARD DRAWINGS, AND GENERAL NOTES
1B	CONVENTIONAL SYMBOLS
2A-1 THRU 2A-3	PAVEMENT SCHEDULE, TYPICAL SECTIONS
2C-1 THRU 2C-2	GUARDRAIL INSTALLATION
2G-1 THRU 2G-3	STANDARD TEMPORARY WALL
3B-1 THRU 3B-2	EARTHWORK SUMMARY, GUARDRAIL SUMMARY, REMOVAL OF EXISTING ASPHALT PAVEMENT, BREAKING OF EXISTING ASPHALT PAVEMENT
3D-1 THRU 3D-7	DRAINAGE SUMMARY
3G-1	SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION, SUMMARY OF SUBSURFACE DRAINAGE
3P-1	PARCEL INDEX
4 THRU 10	PLAN SHEETS
11 THRU 16	PROFILE SHEETS
RW-01 THRU RW-10	SURVEY CONTROL, EXISTING CENTERLINES, RIGHT OF WAY, EASEMENTS AND PROPERTY TIES
TMP-1 THRU TMP-17	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-10	PAVEMENT MARKING PLANS
EC-1 THRU EC-18	EROSION CONTROL PLANS
RF-1	REFORESTATION DETAIL SHEET
SIGN-1 THRU SIGN-10	SIGNING PLANS
SIG-1.0 THRU SIG-9.0	SIGNAL PLANS
SIG-M1 THRU SIG-M8	SIGNAL METAL POLE PLANS
SCP 1 THRU SCP 3	SIGNAL COMMUNICATION PLANS
UC-1 THRU UC-12	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-8	UTILITIES BY OTHERS PLANS
X-1A THRU X-1C	CROSS-SECTION INDEX AND SUMMARY SHEETS
X-1 THRU X-52	CROSS-SECTIONS
C-1 THRU C-8	CULVERT PLANS

2018 ROADWAY ENGLISH STANDARD DRAWINGS

EFF. 01-16-2018  
REV.

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" HIGHWAY DESIGN BRANCH - N. C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N. C., DATED JANUARY, 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO. TITLE

DIVISION 2 - EARTHWORK

- 200.02 METHOD OF CLEARING - METHOD II
- 225.02 GUIDE FOR GRADING SUBGRADE - SECONDARY AND LOCAL
- 225.04 METHOD OF OBTAINING SUPERELEVATION - TWO LANE PAVEMENT
- 225.06 METHOD OF GRADING SIGHT DISTANCE AT INTERSECTIONS

DIVISION 3 - PIPE CULVERTS

- 300.01 METHOD OF PIPE INSTALLATION
- 310.10 DRIVEWAY PIPE CONSTRUCTION

DIVISION 5 - SUBGRADE, BASES AND SHOULDERS

- 560.01 METHOD OF SHOULDER CONSTRUCTION - HIGH SIDE OF SUPERELEVATED CURVE - METHOD I

DIVISION 6 - ASPHALT BASES AND PAVEMENTS

- 654.01 PAVEMENT REPAIRS

DIVISION 8 - INCIDENTALS

- 815.02 SUBSURFACE DRAIN
- 815.03 PIPE UNDERDRAIN AND BLIND DRAIN
- 840.00 CONCRETE BASE PAD FOR DRAINAGE STRUCTURES
- 840.01 BRICK CATCH BASIN - 12" THRU 54" PIPE
- 840.02 CONCRETE CATCH BASIN - 12" THRU 54" PIPE
- 840.03 FRAME, GRATES AND HOOD - FOR USE ON STANDARD CATCH BASIN
- 840.14 CONCRETE DROP INLET - 12" THRU 30" PIPE
- 840.15 BRICK DROP INLET - 12" THRU 30" PIPE
- 840.16 DROP INLET FRAME AND GRATES - FOR USE WITH STD. DWG 840.14 AND 840.15
- 840.31 CONCRETE JUNCTION BOX - 12" THRU 66" PIPE
- 840.32 BRICK JUNCTION BOX - 12" THRU 66" PIPE
- 840.45 PRECAST DRAINAGE STRUCTURE
- 840.54 MANHOLE FRAME AND COVER
- 840.66 DRAINAGE STRUCTURE STEPS
- 840.71 CONCRETE AND BRICK PIPE PLUG
- 840.72 PIPE COLLAR
- 846.01 CONCRETE CURB, GUTTER AND CURB & GUTTER
- 848.01 CONCRETE SIDEWALK
- 848.02 DRIVEWAY TURNOUT - RADIUS TYPE
- 848.04 STREET TURNOUT
- 848.05 CURB RAMP - PROPOSED CURB & GUTTER
- 862.01 GUARDRAIL PLACEMENT
- 862.02 GUARDRAIL INSTALLATION
- 866.01 CHAIN LINK FENCE - 4', 5' AND 6' HIGH FENCE
- 876.01 RIP RAP IN CHANNELS
- 876.02 GUIDE FOR RIP RAP AT PIPE OUTLETS
- 876.04 DRAINAGE DITCHES WITH CLASS 'B' RIP RAP

GENERAL NOTES:

2018 SPECIFICATIONS  
EFFECTIVE: 01-16-2018  
REVISED:

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

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

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATIONS IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

SUBSURFACE DRAINS:

SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3 FOOT RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

STREET TURNOUT:

STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.04 USING THE RADII NOTED ON PLANS.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE DUKE ENERGY - POWER; SPECTRUM - CATV; AT&T, CENTURYLINK & VERIZON - COMMUNICATIONS; CITY OF GREENSBORO - WATER/SEWER.

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

RIGHT-OF-WAY MARKERS:

ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

CURB RAMPS

CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. CONSTRUCT ALL CURB RAMPS IN ACCORDANCE WITH STD 848.05 and/or 848.06.

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

# STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

## CONVENTIONAL PLAN SHEET SYMBOLS

12/2/2016

### BOUNDARIES AND PROPERTY:

State Line	_____
County Line	_____
Township Line	_____
City Line	_____
Reservation Line	_____
Property Line	_____
Existing Iron Pin	○ EIP
Computed Property Corner	_____ X
Property Monument	□ ECM
Parcel/Sequence Number	①23
Existing Fence Line	-X-X-X-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	-WLB-
Proposed Wetland Boundary	-WLB-
Existing Endangered Animal Boundary	-EAB-
Existing Endangered Plant Boundary	-EPB-
Existing Historic Property Boundary	-HPB-
Known Contamination Area: Soil	☠ S ☠
Potential Contamination Area: Soil	☠ S ☠
Known Contamination Area: Water	☠ W ☠
Potential Contamination Area: Water	☠ W ☠
Contaminated Site: Known or Potential	☠ ?

### BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○ S
Well	○ W
Small Mine	⊗
Foundation	□
Area Outline	□
Cemetery	□
Building	□
School	□
Church	□
Dam	▬

### HYDROLOGY:

Stream or Body of Water	_____
Hydro, Pool or Reservoir	□
Jurisdictional Stream	-JS-
Buffer Zone 1	-BZ 1-
Buffer Zone 2	-BZ 2-
Flow Arrow	←
Disappearing Stream	→
Spring	○
Wetland	▬
Proposed Lateral, Tail, Head Ditch	▬
False Sump	▬

### RAILROADS:

Standard Gauge	_____
RR Signal Milepost	○
Switch	□
RR Abandoned	_____
RR Dismantled	_____

### RIGHT OF WAY & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	◆
Primary Horiz Control Point	○
Primary Horiz and Vert Control Point	◆
Exist Permanent Easement Pin and Cap	◇
New Permanent Easement Pin and Cap	◆
Vertical Benchmark	⊠
Existing Right of Way Marker	△
Existing Right of Way Line	_____
New Right of Way Line	_____
New Right of Way Line with Pin and Cap	_____
New Right of Way Line with Concrete or Granite R/W Marker	_____
New Control of Access Line with Concrete C/A Marker	_____
Existing Control of Access	_____
New Control of Access	_____
Existing Easement Line	_____
New Temporary Construction Easement	_____
New Temporary Drainage Easement	_____
New Permanent Drainage Easement	_____
New Permanent Drainage / Utility Easement	_____
New Permanent Utility Easement	_____
New Temporary Utility Easement	_____
New Aerial Utility Easement	_____

### ROADS AND RELATED FEATURES:

Existing Edge of Pavement	_____
Existing Curb	_____
Proposed Slope Stakes Cut	-C-
Proposed Slope Stakes Fill	-F-
Proposed Curb Ramp	_____
Existing Metal Guardrail	_____
Proposed Guardrail	_____
Existing Cable Guiderail	_____
Proposed Cable Guiderail	_____
Equality Symbol	⊕
Pavement Removal	_____

### VEGETATION:

Single Tree	○
Single Shrub	○

*Note: Not to Scale*      \*S.U.E. = *Subsurface Utility Engineering*

Hedge	_____
Woods Line	_____
Orchard	_____
Vineyard	_____

### EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	_____
Bridge Wing Wall, Head Wall and End Wall	_____
MINOR:	
Head and End Wall	_____
Pipe Culvert	_____
Footbridge	_____
Drainage Box: Catch Basin, DI or JB	_____
Paved Ditch Gutter	_____
Storm Sewer Manhole	_____
Storm Sewer	_____

### UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	⊕
Power Line Tower	⊠
Power Transformer	⊠
U/G Power Cable Hand Hole	_____
H-Frame Pole	_____
U/G Power Line LOS B (S.U.E.*)	_____
U/G Power Line LOS C (S.U.E.*)	_____
U/G Power Line LOS D (S.U.E.*)	_____

### TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	⊕
Telephone Pedestal	□
Telephone Cell Tower	⊕
U/G Telephone Cable Hand Hole	_____
U/G Telephone Cable LOS B (S.U.E.*)	_____
U/G Telephone Cable LOS C (S.U.E.*)	_____
U/G Telephone Cable LOS D (S.U.E.*)	_____
U/G Telephone Conduit LOS B (S.U.E.*)	_____
U/G Telephone Conduit LOS C (S.U.E.*)	_____
U/G Telephone Conduit LOS D (S.U.E.*)	_____
U/G Fiber Optics Cable LOS B (S.U.E.*)	_____
U/G Fiber Optics Cable LOS C (S.U.E.*)	_____
U/G Fiber Optics Cable LOS D (S.U.E.*)	_____

### WATER:

Water Manhole	⊕
Water Meter	○
Water Valve	⊗
Water Hydrant	⊕
U/G Water Line LOS B (S.U.E.*)	_____
U/G Water Line LOS C (S.U.E.*)	_____
U/G Water Line LOS D (S.U.E.*)	_____
Above Ground Water Line	_____

### TV:

TV Pedestal	□
TV Tower	⊗
U/G TV Cable Hand Hole	_____
U/G TV Cable LOS B (S.U.E.*)	_____
U/G TV Cable LOS C (S.U.E.*)	_____
U/G TV Cable LOS D (S.U.E.*)	_____
U/G Fiber Optic Cable LOS B (S.U.E.*)	_____
U/G Fiber Optic Cable LOS C (S.U.E.*)	_____
U/G Fiber Optic Cable LOS D (S.U.E.*)	_____

### GAS:

Gas Valve	◇
Gas Meter	⊕
U/G Gas Line LOS B (S.U.E.*)	_____
U/G Gas Line LOS C (S.U.E.*)	_____
U/G Gas Line LOS D (S.U.E.*)	_____
Above Ground Gas Line	_____

### SANITARY SEWER:

Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	_____
Above Ground Sanitary Sewer	_____
SS Forced Main Line LOS B (S.U.E.*)	_____
SS Forced Main Line LOS C (S.U.E.*)	_____
SS Forced Main Line LOS D (S.U.E.*)	_____

### MISCELLANEOUS:

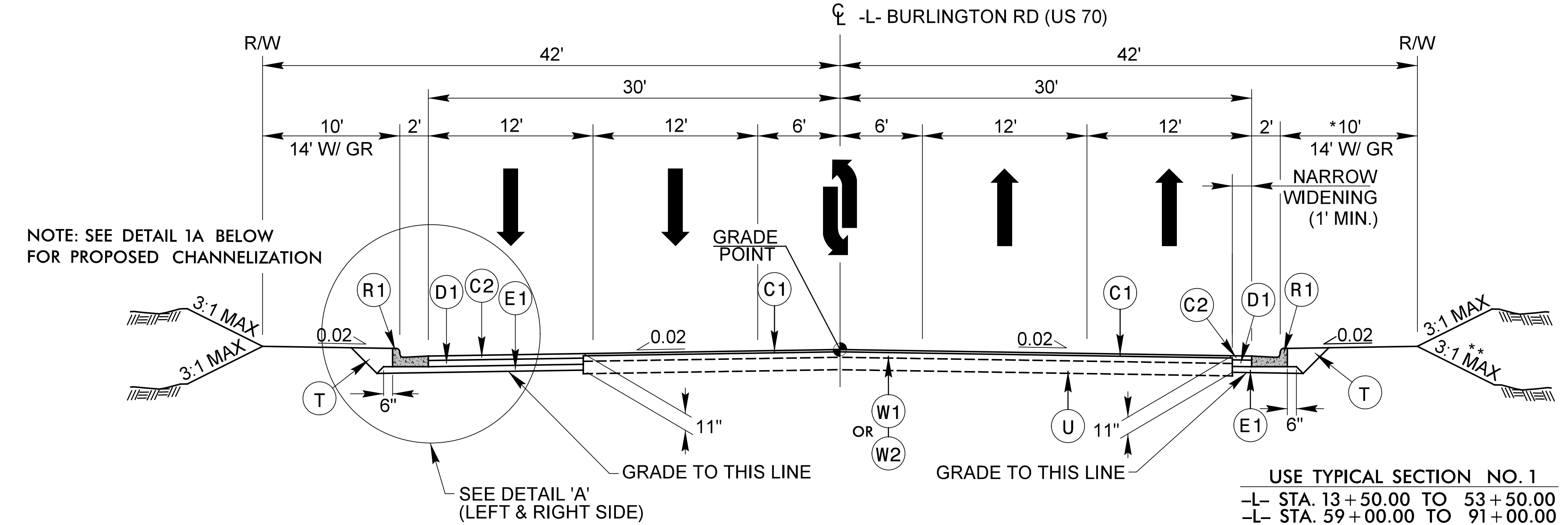
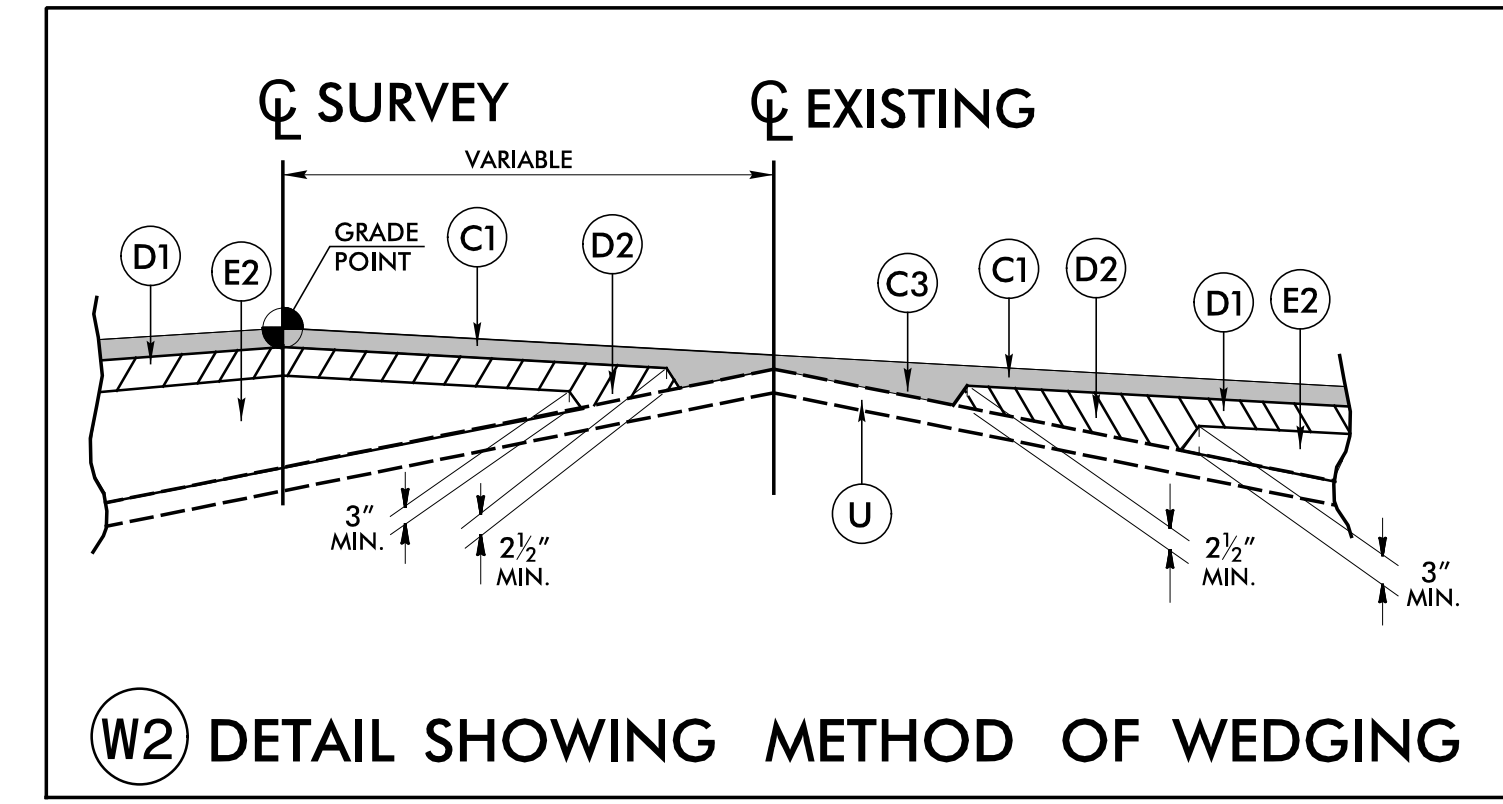
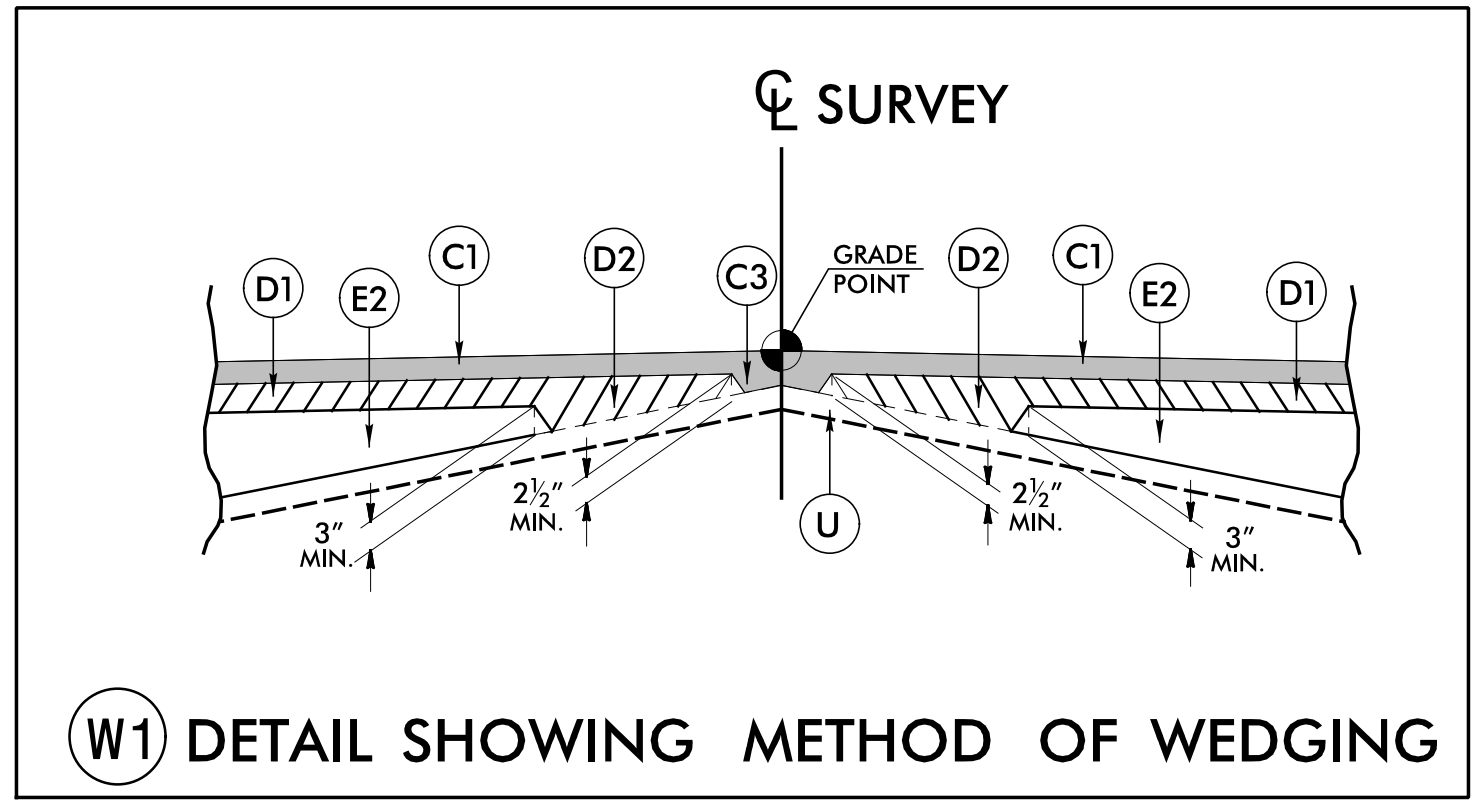
Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	⊕
Utility Unknown U/G Line LOS B (S.U.E.*)	_____
U/G Tank; Water, Gas, Oil	□
Underground Storage Tank, Approx. Loc.	⊕
A/G Tank; Water, Gas, Oil	□
Geoenvironmental Boring	⊕
U/G Test Hole LOS A (S.U.E.*)	○
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

6/2/2019

# FINAL PAVEMENT SCHEDULE

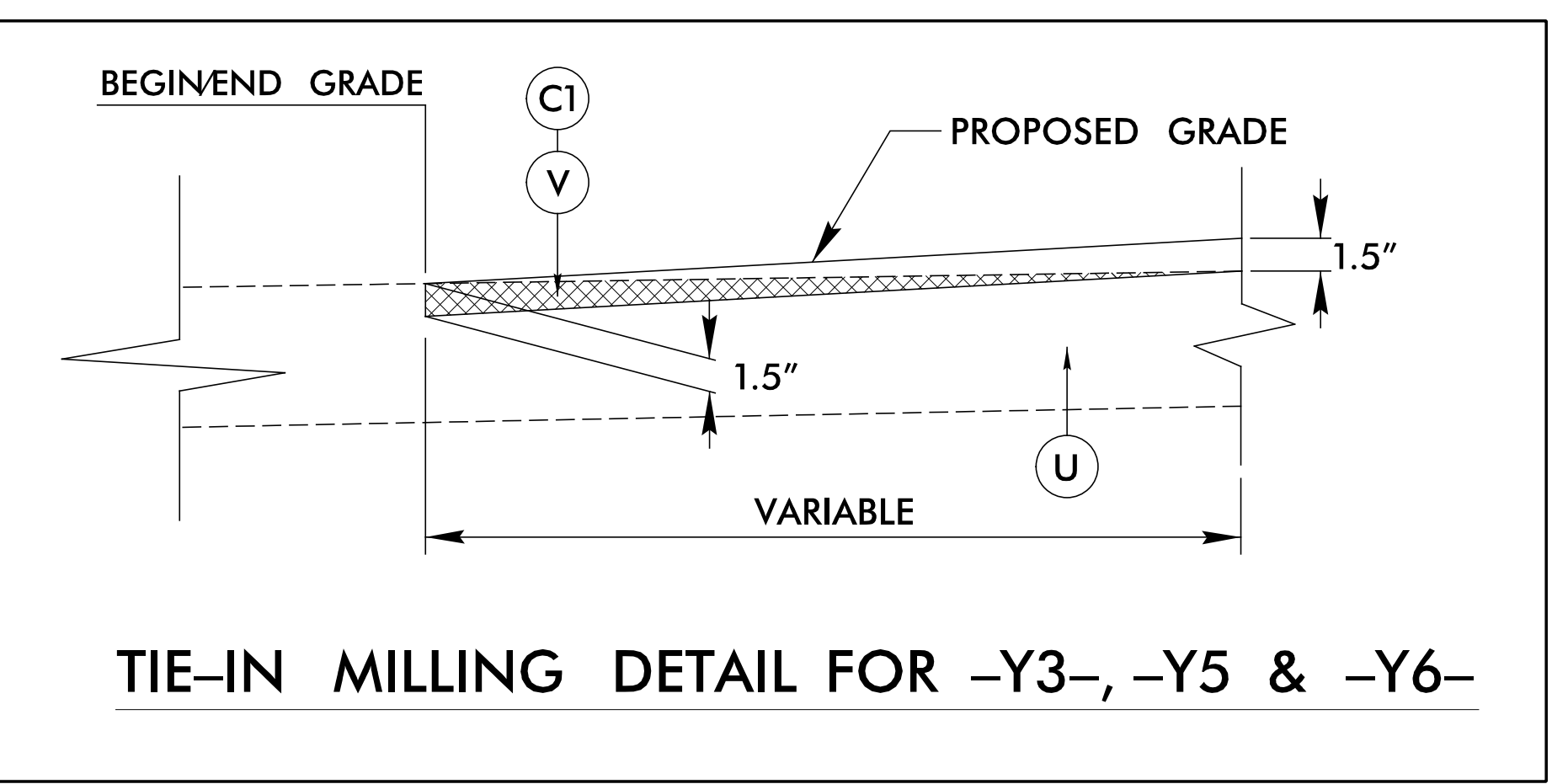
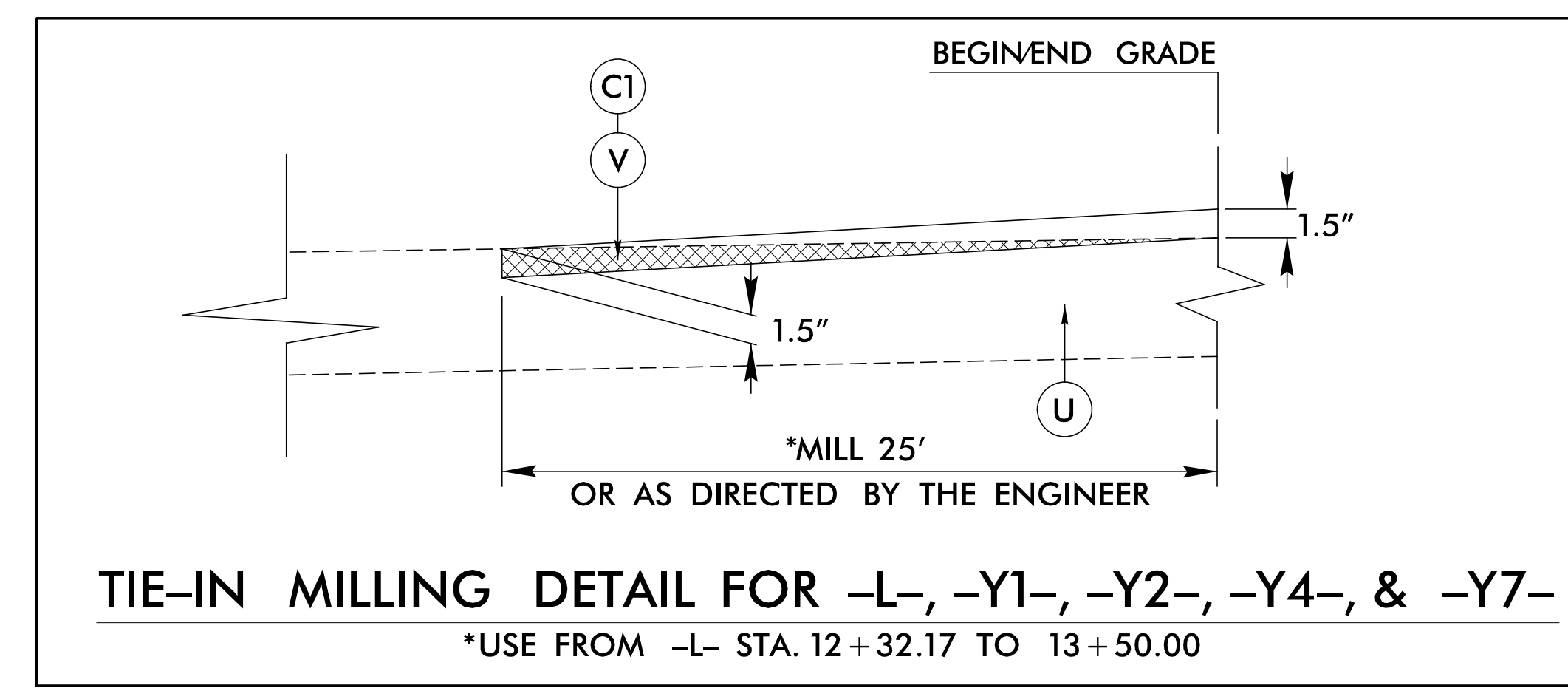
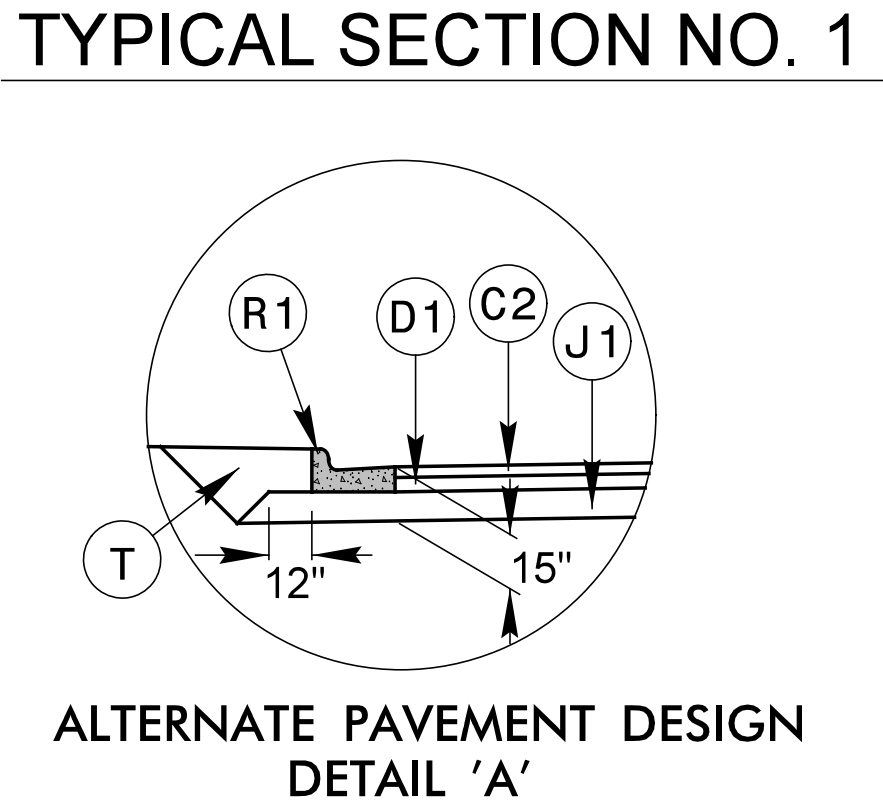
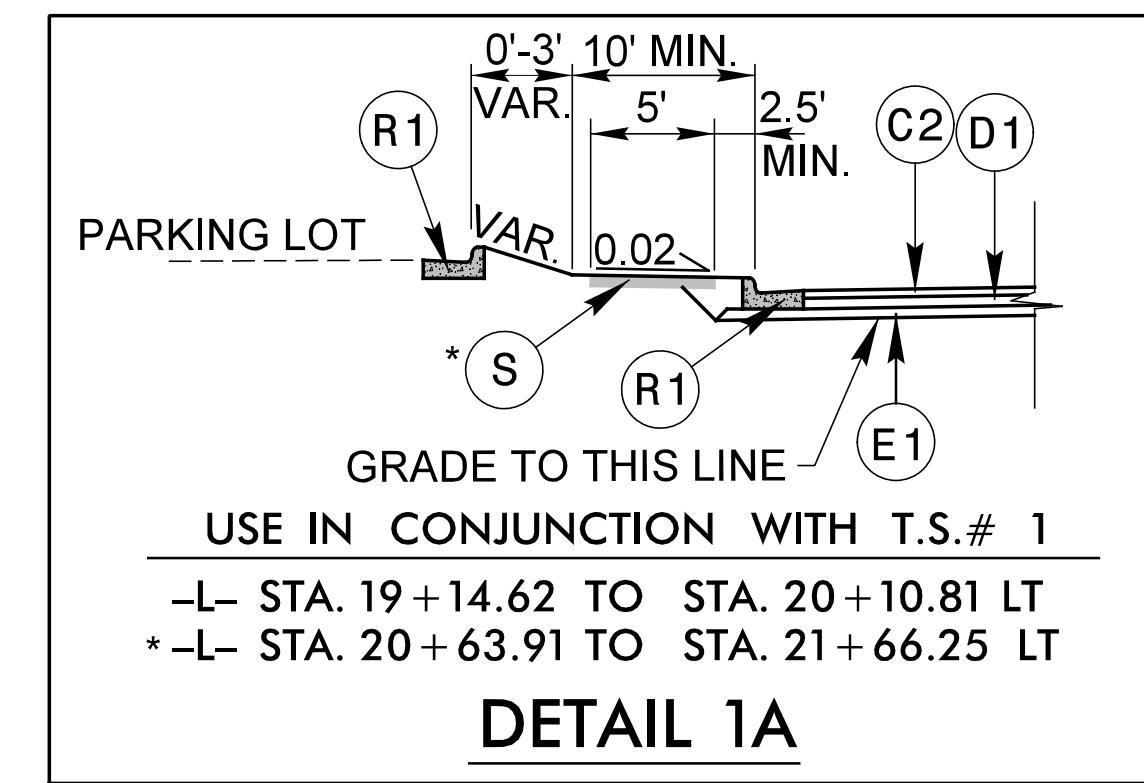
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH
J1	PROP. 8" AGGREGATE BASE COURSE
J2	PROP. 4" AGGREGATE BASE COURSE
L	CLASS IV SUBGRADE STABILIZATION
N	GEOTEXTILE FOR SOIL STABILIZATION
P1	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ. YD.
R1	2'-6" CONCRETE CURB AND GUTTER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING BITUMINOUS PAVEMENT, 0" TO 1.5"
W1	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)
W2	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

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



USE TYPICAL SECTION NO. 1  
 -L- STA. 13+50.00 TO 53+50.00  
 -L- STA. 59+00.00 TO 91+00.00  
 \* 6' BERM FROM -L- STA. 13+50.00 TO 15+50.00 RT  
 \*\* USE 2:1 AT THE FOLLOWING LOCATIONS  
 AT -L- STA. 15+00.00 RT  
 FROM -L- STA. 29+25.00 TO 29+50.00 RT

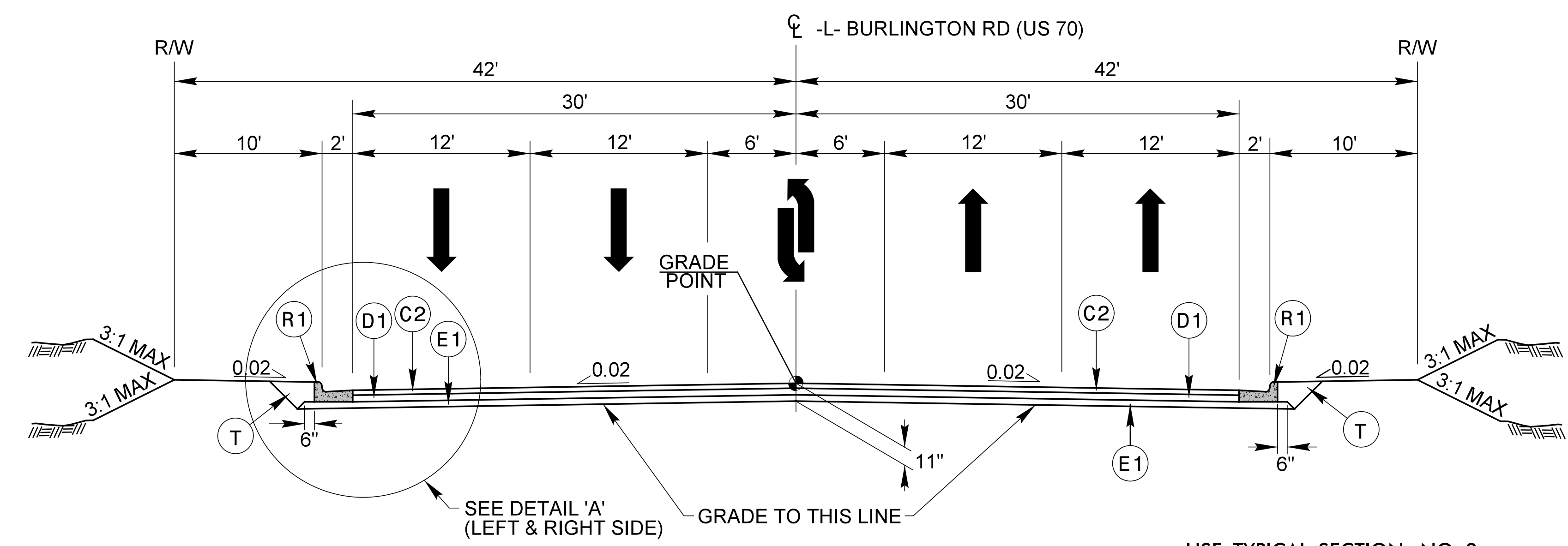
NOTES:  
 MILL 0"-1.5" AND RESURFACE WITH C1 AND NARROW WIDENING AT LEFT SIDE ONLY FROM -L- STA. 12+32.17 TO 13+50.00  
 SEE PLANS FOR LOCATIONS OF AUXILIARY LANES AND TAPERS  
 SHALLOW UNDERCUT 1' IN DEPTH AND REPLACE WITH L (SEE AGGREGATE SUBGRADE DETAIL ON SHEET 2A-3 FOR LOCATIONS WITHIN T.S. #1)



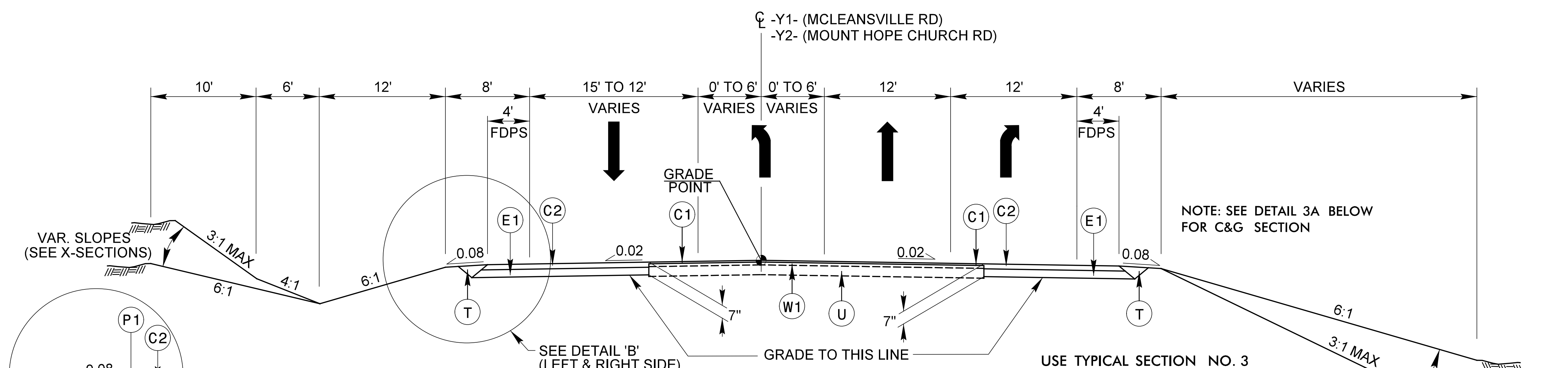
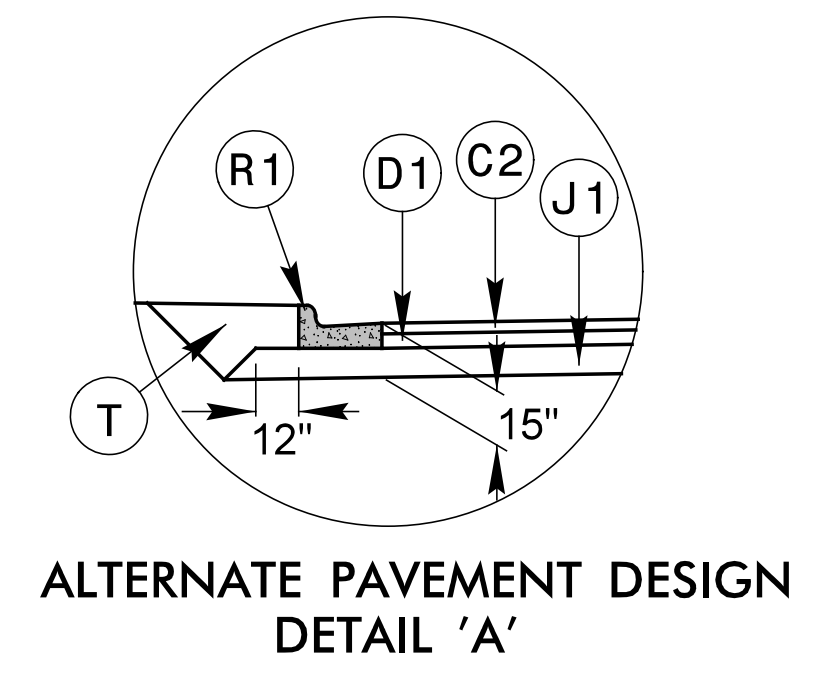
PROJECT REFERENCE NO. U-2581BA	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER SEAL 014493 Jimmy Goodnight	PAVEMENT DESIGN ENGINEER SEAL 031484 Vladimir G. Mitlev
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared by vhb VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27605	

7/22/2019 R:\Projects\2019\U-2581BA-rd-j\_tjip.dgn local\hsc

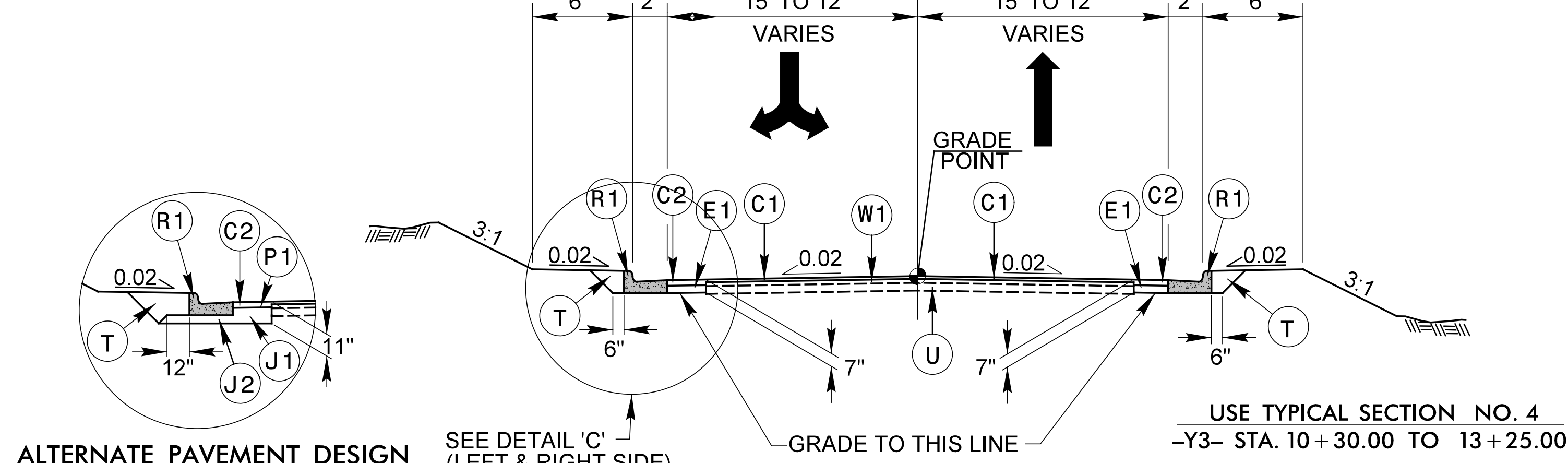
6/2/2018 R:\Projects\2018\U2581BA\_rdy\_tup.dgn



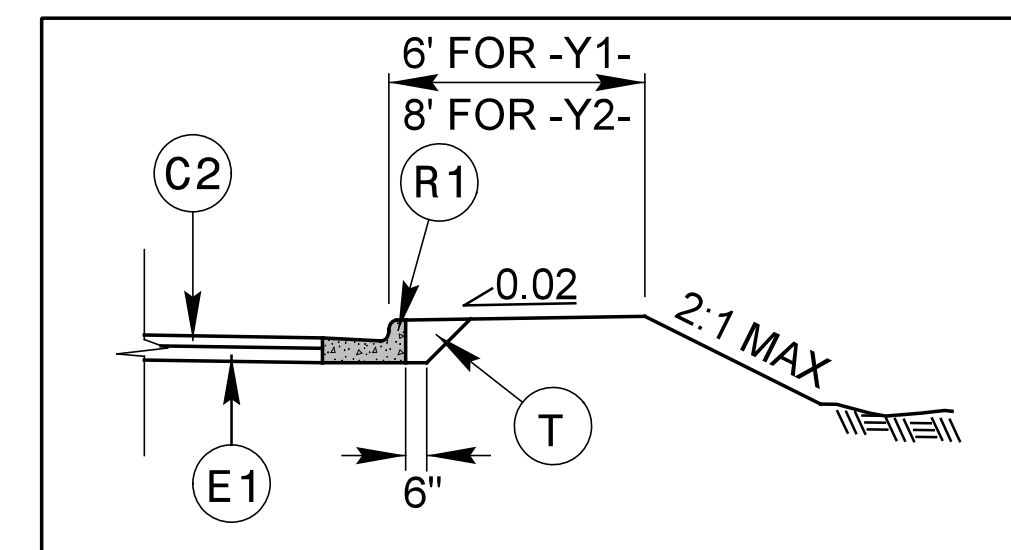
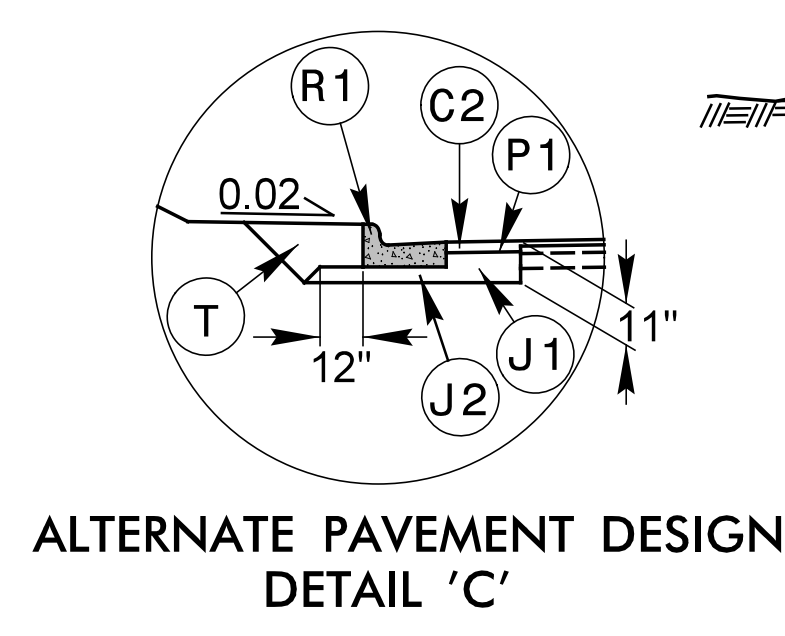
NOTE: SEE PLANS FOR LOCATIONS OF AUXILIARY LANES AND TAPERS **TYPICAL SECTION NO. 2** USE TYPICAL SECTION NO. 2 -L- STA. 53+50.00 TO 59+00.00



NOTE: SEE PLANS FOR LOCATIONS OF AUXILIARY LANES AND TAPERS **TYPICAL SECTION NO. 3** USE TYPICAL SECTION NO. 3 -Y1- STA. 13+45.00 TO 19+94.59 USE REV. OF TYPICAL SECTION NO. 3 -Y2- STA. 10+30.15 TO 18+14.00



NOTE: SEE PLANS FOR LOCATIONS OF AUXILIARY LANES AND TAPERS **TYPICAL SECTION NO. 4** USE TYPICAL SECTION NO. 4 -Y3- STA. 10+30.00 TO 13+25.00 NOTES: SHALLOW UNDERCUT 1' IN DEPTH AND REPLACE WITH (L) (SEE AGGREGATE SUBGRADE DETAIL ON SHEET 2A-3 FOR LOCATIONS WITHIN T.S. #4)

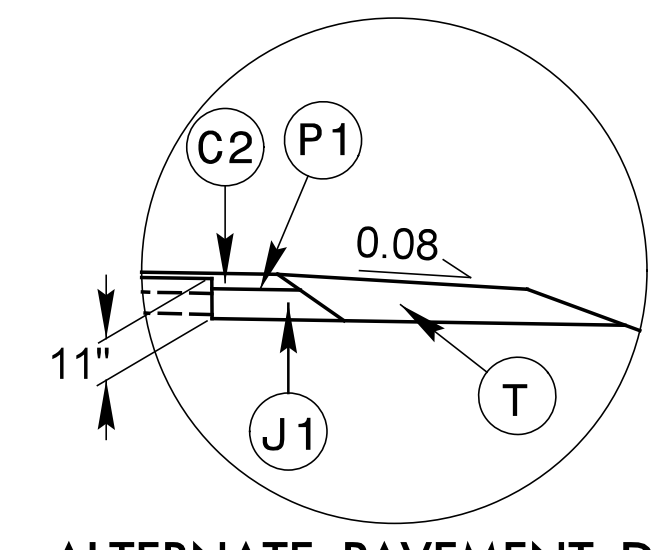
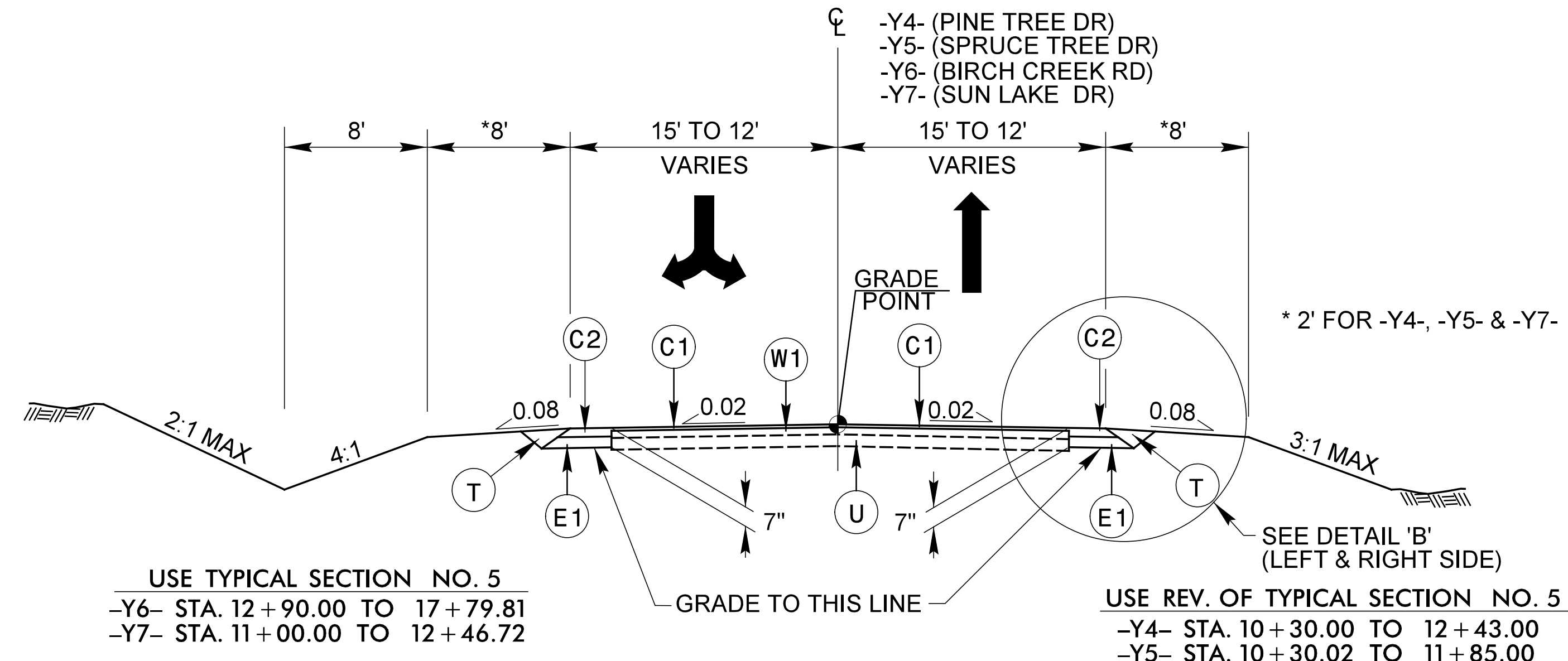


USE IN CONJUNCTION WITH T.S.# 3  
-Y1- 17+35.00 TO 19+87.40 RT  
-Y1- 14+50.00 TO 19+86.88 LT  
-Y2- 10+30.15 TO 15+17.26 RT  
-Y2- 10+40.16 TO 11+30.26 LT  
**DETAIL 3A**  
SEE ALSO DETAIL 'C' FOR ALTERNATE PAVEMENT DESIGN

PROJECT REFERENCE NO. <b>U-2581BA</b>	SHEET NO. <b>2A-2</b>
ROADWAY DESIGN ENGINEER  Jimmy Goodright	PAVEMENT DESIGN ENGINEER  Vladimir G. Mitlev
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
Prepared by  VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27605	
<b>FINAL PAVEMENT SCHEDULE</b>	
C1	1 1/2" TYPE S9.5B
C2	3" TYPE S9.5B
D1	4" TYPE I19.0C
E1	4" TYPE B25.0C
J1	8" ABC
J2	4" ABC
P1	PRIME COAT
L	CLASS IV SUBGRADE STABILIZATION
N	GEOTEXTILE FOR SOIL STABILIZATION
R1	2'-6" C&G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W1	WEDGING
W2	WEDGING

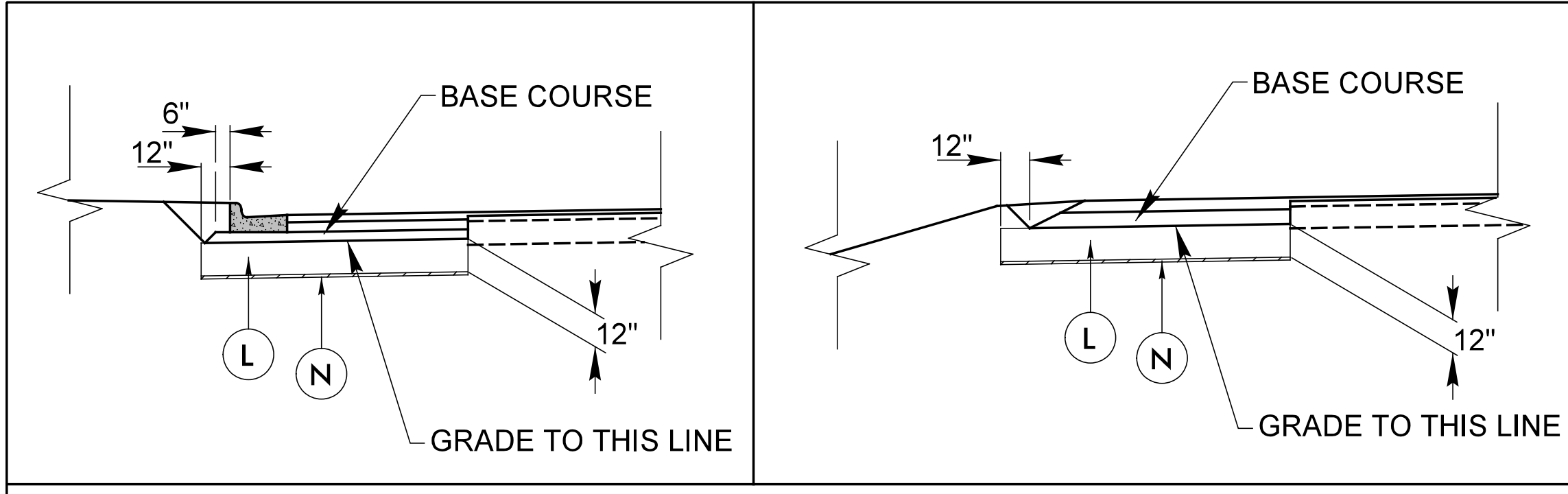
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

6/22/09



**TYPICAL SECTION NO. 5**

NOTES:  
 SHALLOW UNDERCUT 1' IN DEPTH AND REPLACE WITH (L)  
 (SEE AGGREGATE SUBGRADE DETAIL FOR LOCATIONS WITHIN T.S. #5)



**AGGREGATE SUBGRADE DETAIL**

USE AGGREGATE SUBGRADE DETAIL IN CONJUNCTION WITH T.S.# 1, 3, 4 & 5

-L- STA. 24+25.00 TO STA. 26+75.00 LT & RT	-Y1- STA. 13+50.00 TO STA. 16+75.00 LT & RT
-L- STA. 30+75.00 TO STA. 37+25.00 LT & RT	-Y1- STA. 18+75.00 TO STA. 19+75.00 LT & RT
-L- STA. 63+75.00 TO STA. 69+75.00 LT & RT	-Y2- STA. 12+25.00 TO STA. 18+25.00 LT & RT
-L- STA. 73+75.00 TO STA. 78+75.00 LT & RT	-Y3- STA. 10+25.00 TO STA. 13+25.00 LT & RT
-L- STA. 81+75.00 TO STA. 82+25.00 LT & RT	-Y5- STA. 10+75.00 TO STA. 11+75.00 LT & RT
-L- STA. 88+25.00 TO STA. 89+25.00 LT & RT	-Y6- STA. 16+25.00 TO STA. 17+75.00 LT & RT

NOTE:  
 FOR -DRW1- AND -DRW2- PAVEMENT COMPOSITION, USE TYPICAL SECTION NO. 2.  
 SEE PLAN SHEET 7 FOR -DRW1- AND PLAN SHEET 9 FOR -DRW2-.

PROJECT REFERENCE NO. <b>U-2581BA</b>	SHEET NO. <b>2A-3</b>
ROADWAY DESIGN ENGINEER  Jimmy Goodnight	PAVEMENT DESIGN ENGINEER  Vladimir G. Mitchenko
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared by  VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27605	
<b>FINAL PAVEMENT SCHEDULE</b>	
C1	1 1/2" TYPE S9.5B
C2	3" TYPE S9.5B
E1	4" TYPE B25.0C
J1	8" ABC
P1	PRIME COAT
L	CLASS IV SUBGRADE STABILIZATION
N	GEOTEXTILE FOR SOIL STABILIZATION
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W1	WEDGING

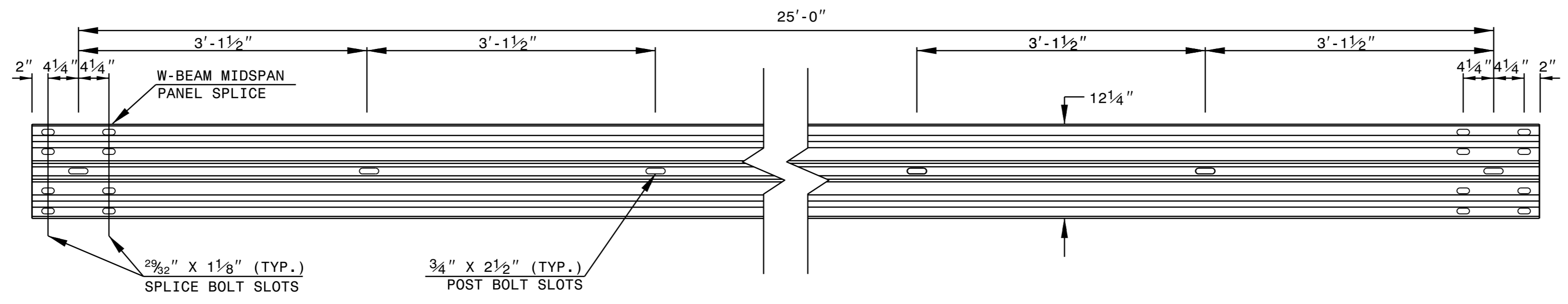
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

7/22/2018  
 R:\Projects\2018\U-2581BA\rdj\_tjg.dgn  
 localuser

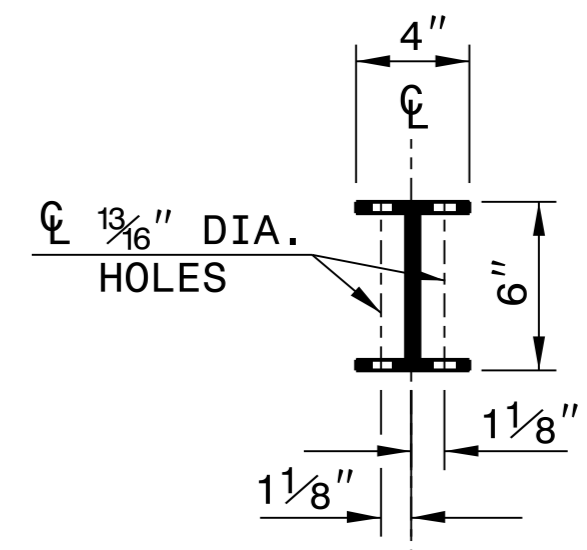
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

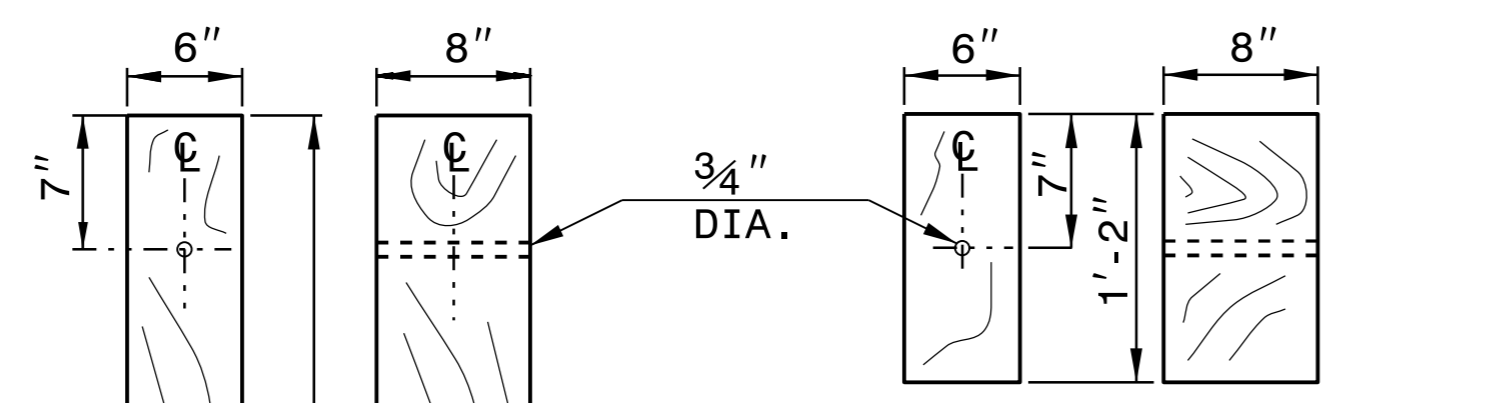
SHEET 6 OF 8  
**862D02**



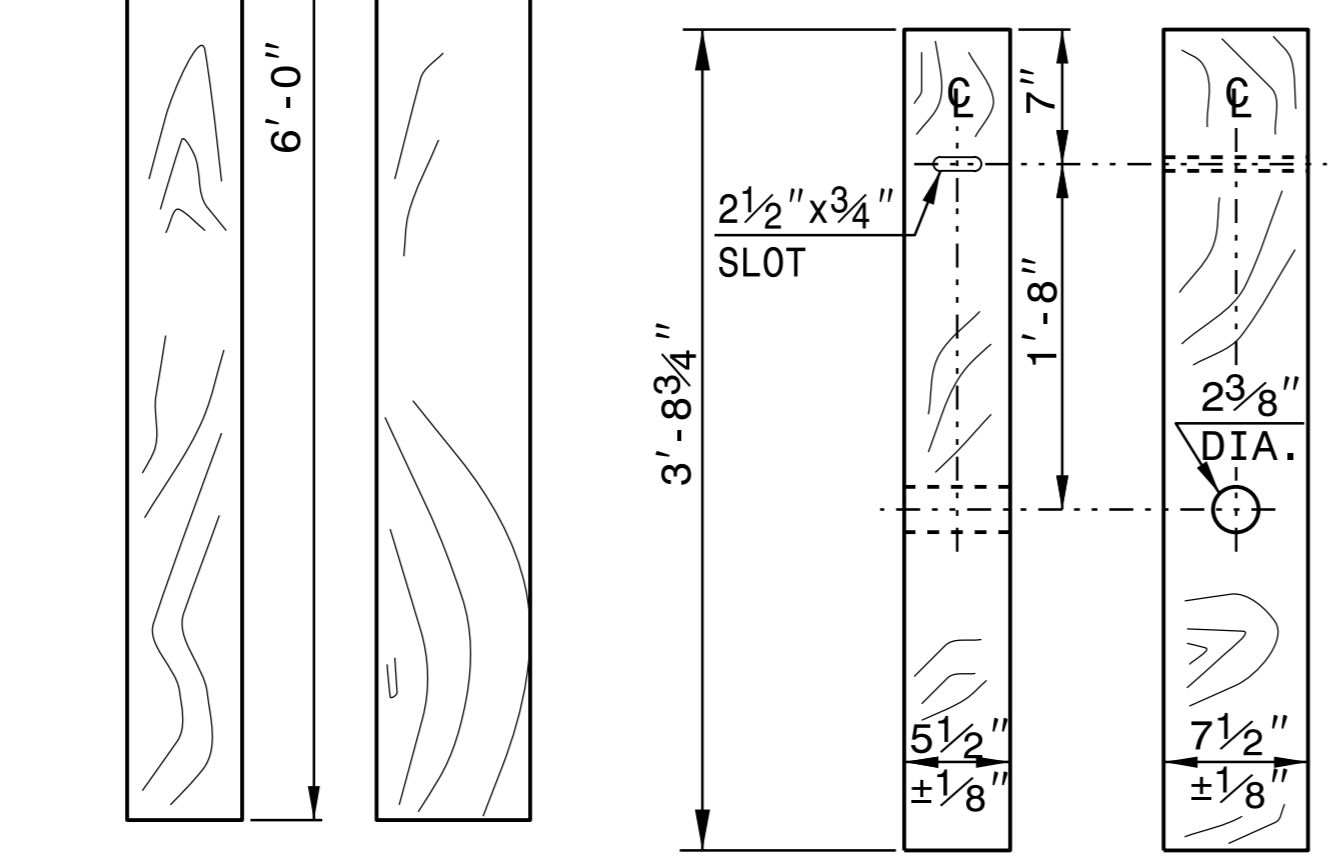
**STANDARD W-BEAM GUARDRAIL**



**PLAN**

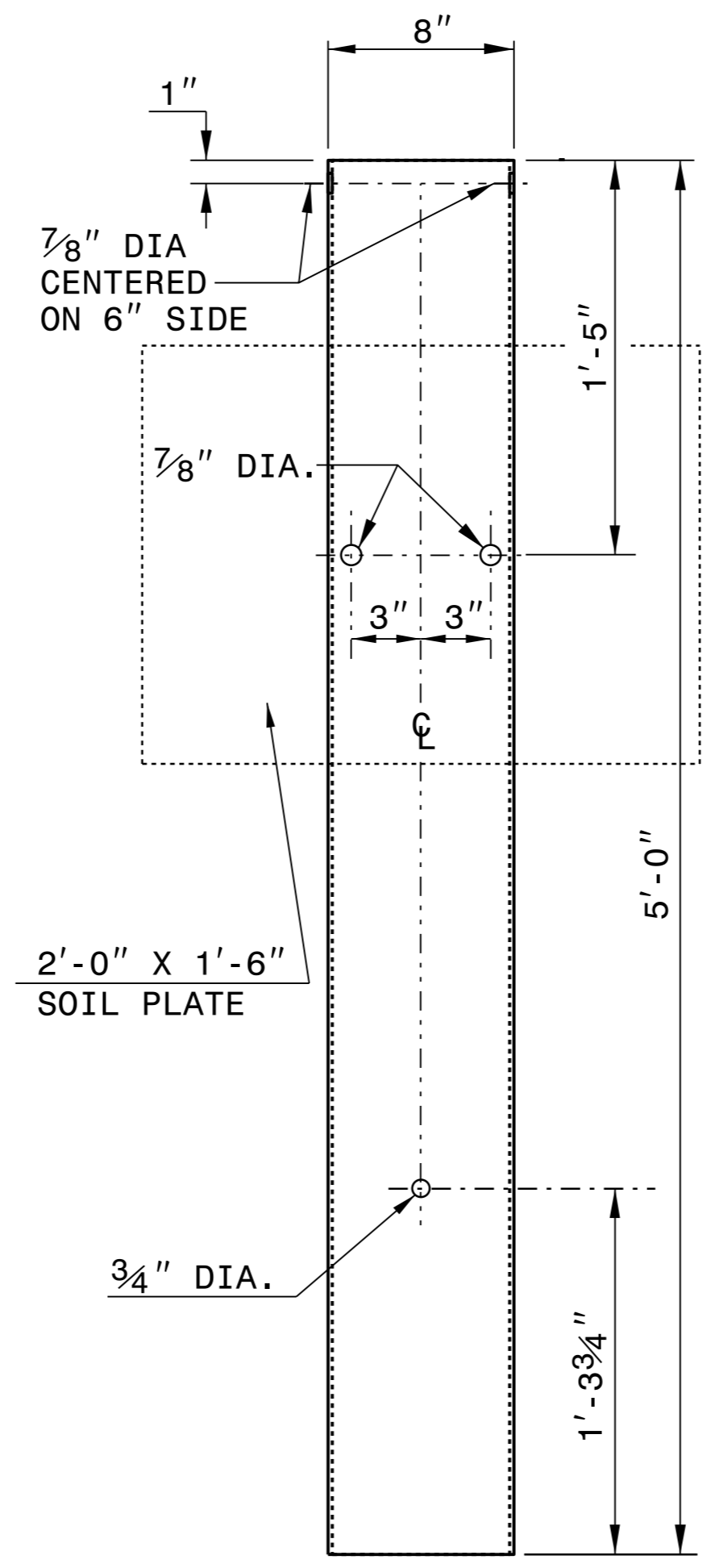


**WOOD OFFSET BLOCK  
(FOR WOOD POSTS)**

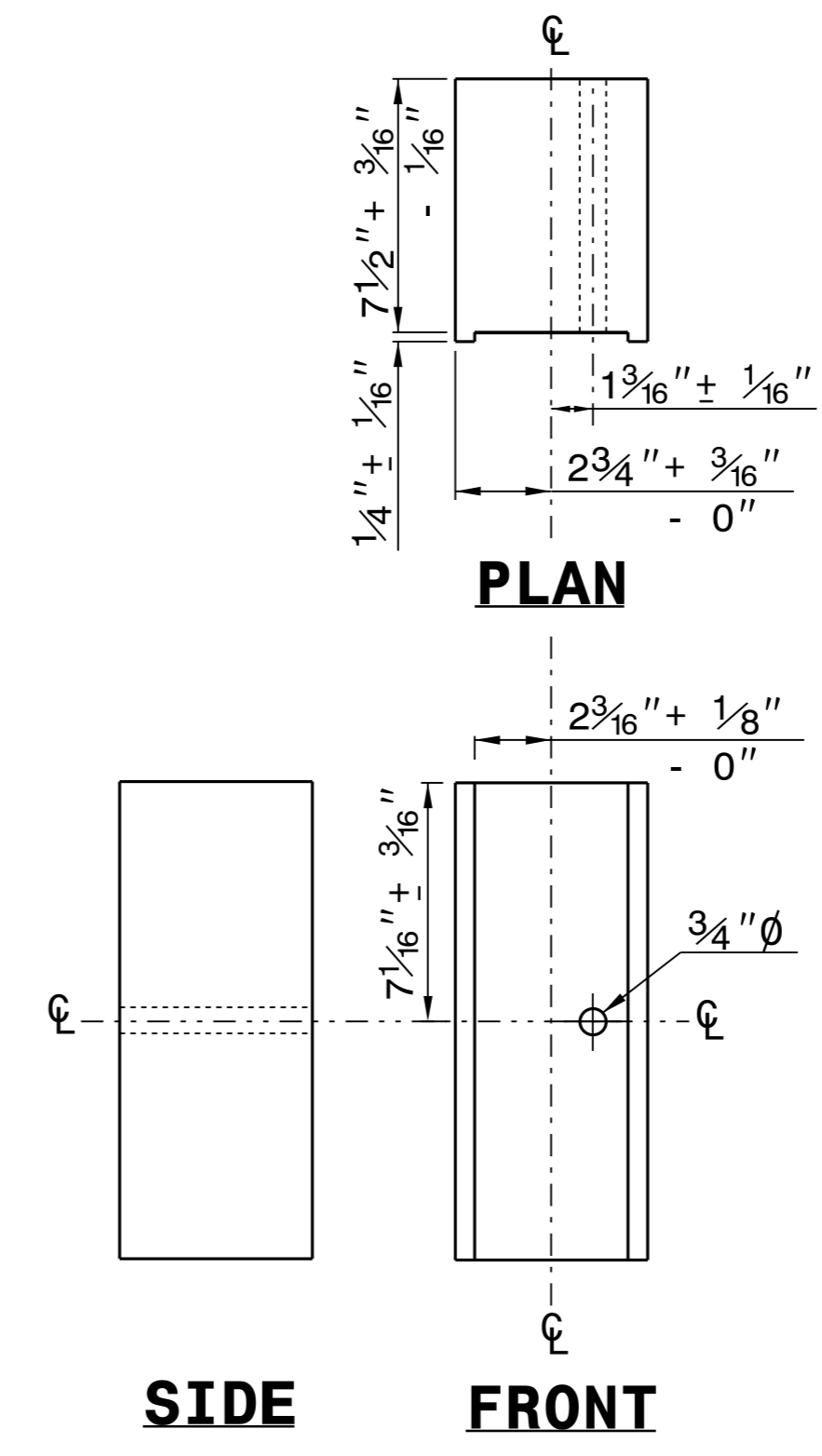


**STANDARD  
LINE POST**

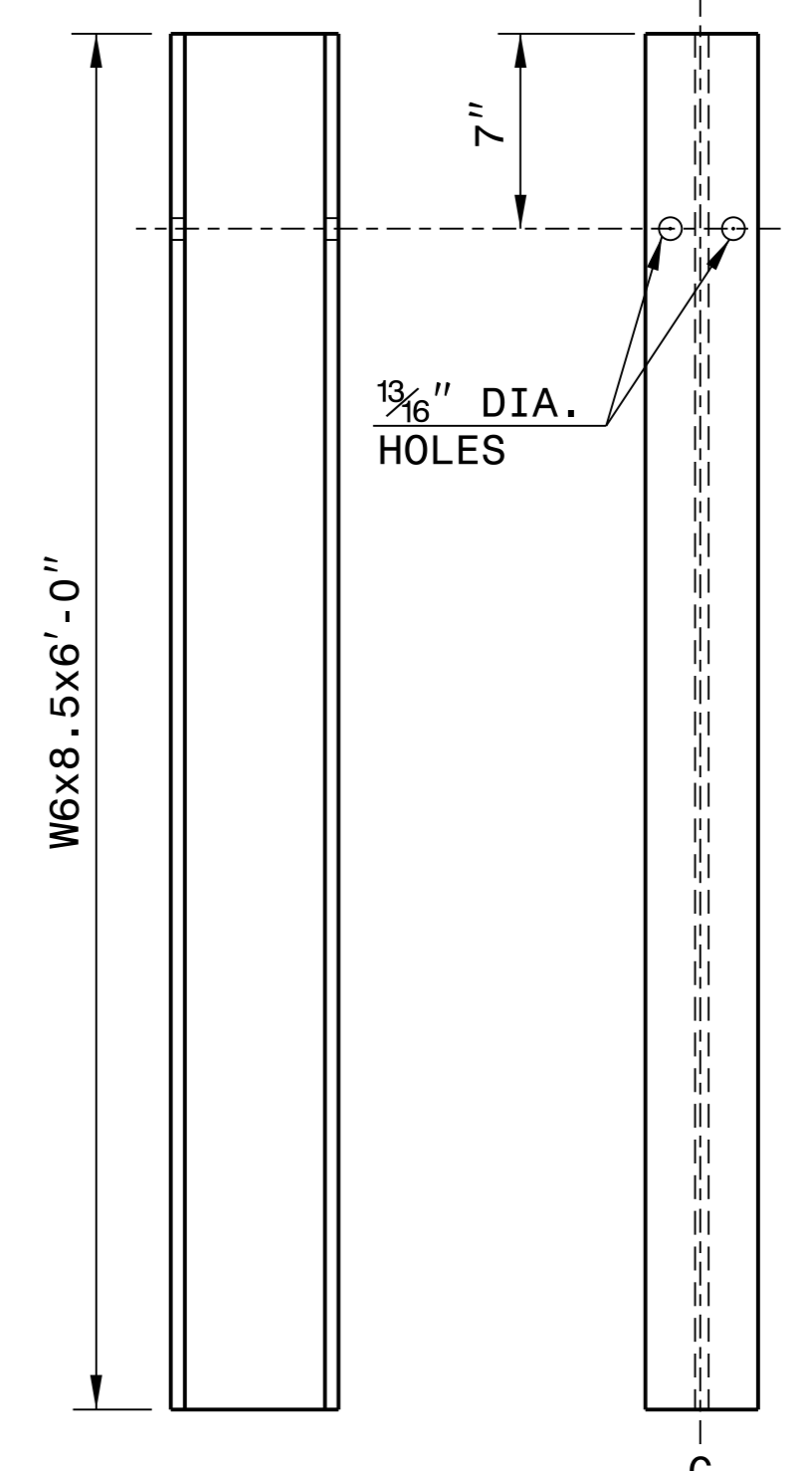
**SHORT WOOD  
BREAKAWAY POST**



**STEEL TUBE  
TS 6"x8"x0.1875"**



**ROUTED  
OFFSET BLOCK**



**"W6" STEEL POST**

**SYSTEM PARTS**

STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 6 OF 8  
**862D02**



**CONTRACTS STANDARDS  
AND DEVELOPMENT UNIT**  
Office 919-707-6950 FAX 919-250-4119

**SEE TITLE BLOCK**

ORIGINAL BY: J. HOWERTON DATE: 3-7-2018  
MODIFIED BY: DATE: \_\_\_\_\_  
CHECKED BY: DATE: \_\_\_\_\_  
FILE SPEC.: \_\_\_\_\_



STATE OF  
NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

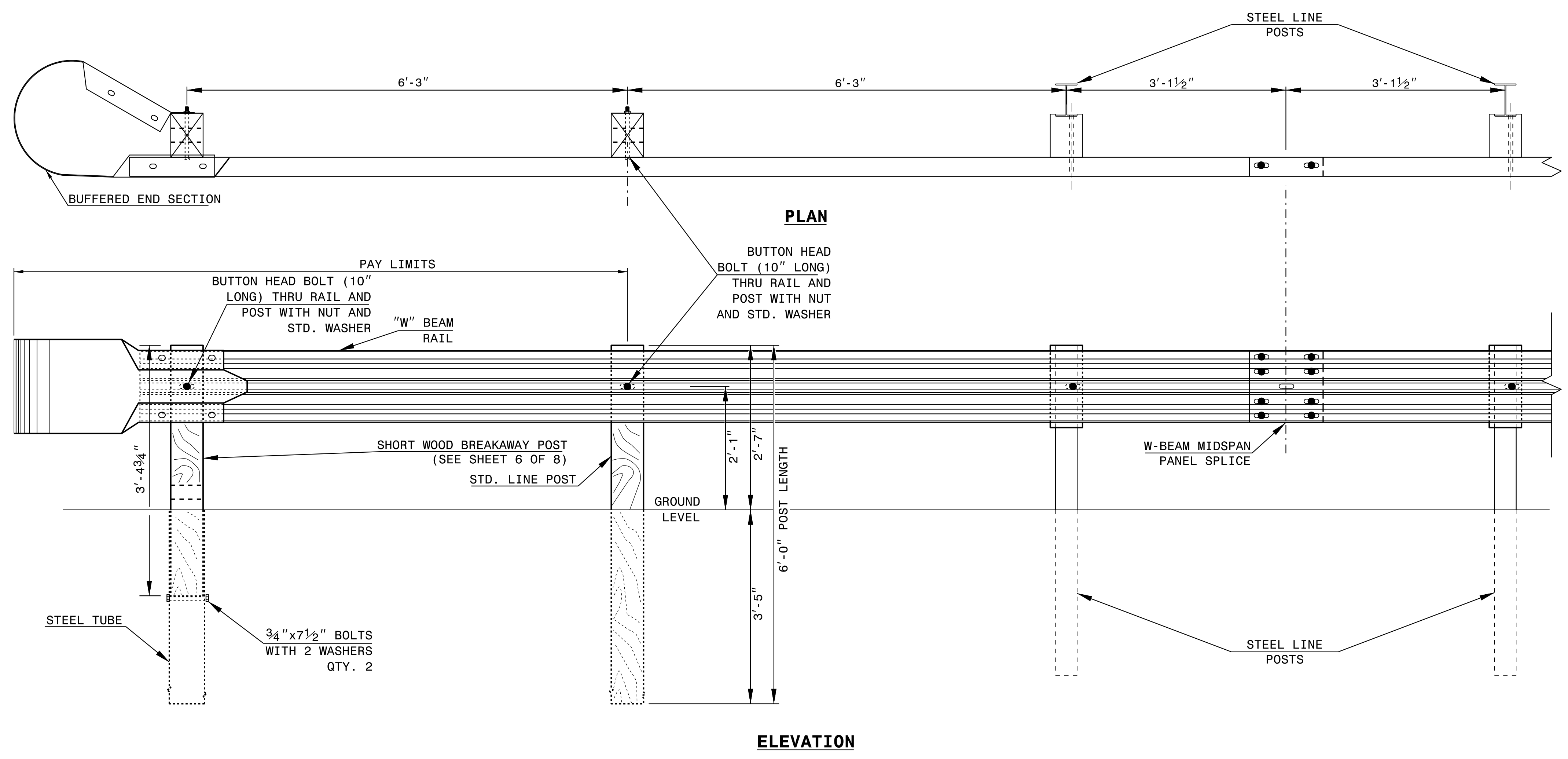
ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET OF

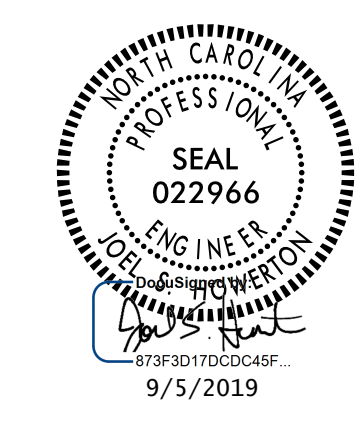
STATE OF  
NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET OF



**TRAILING END UNIT ASSEMBLY**  
**A.T. - 1 SYSTEM**

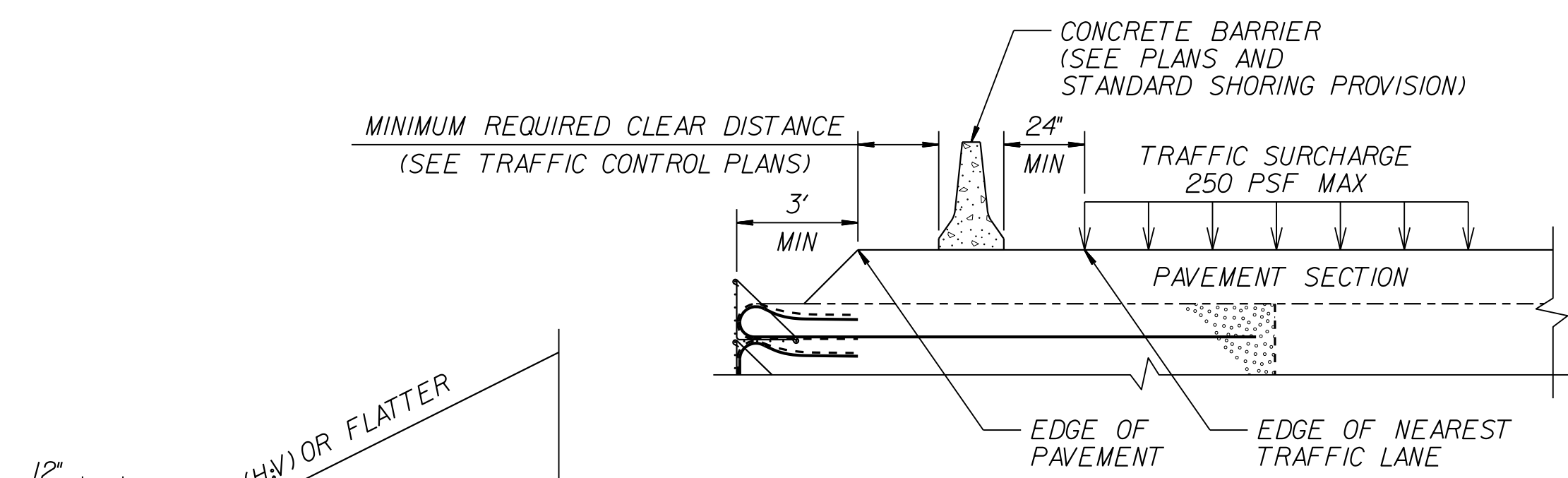


DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

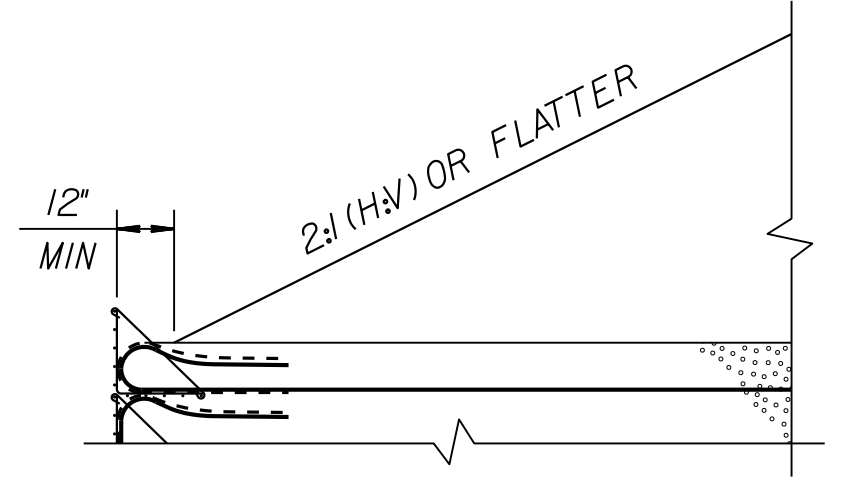
**CONTRACTS STANDARDS AND DEVELOPMENT UNIT**  
Office 919-707-6950 FAX 919-250-4119

**A.T. - 1 SYSTEM**

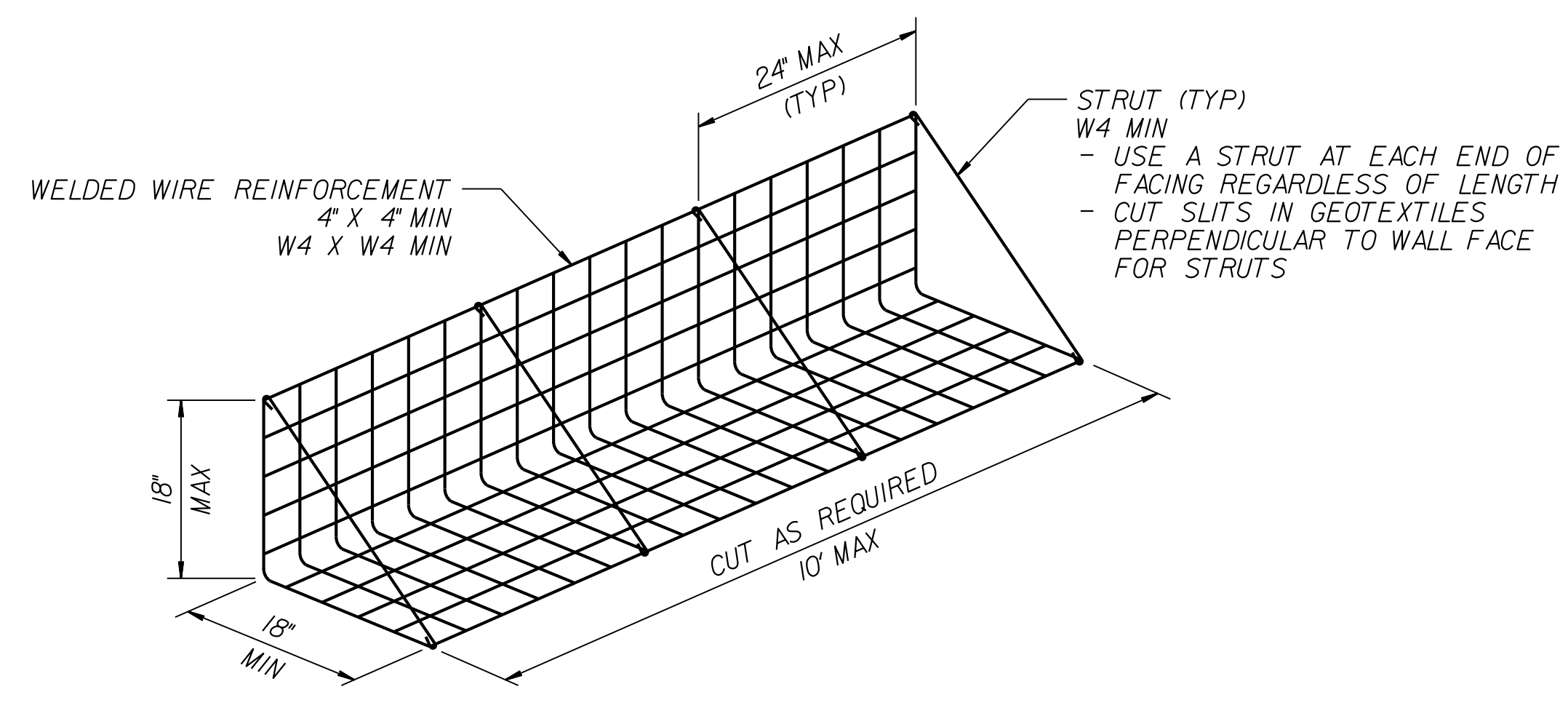
ORIGINAL BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 MODIFIED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 FILE SPEC.: \_\_\_\_\_



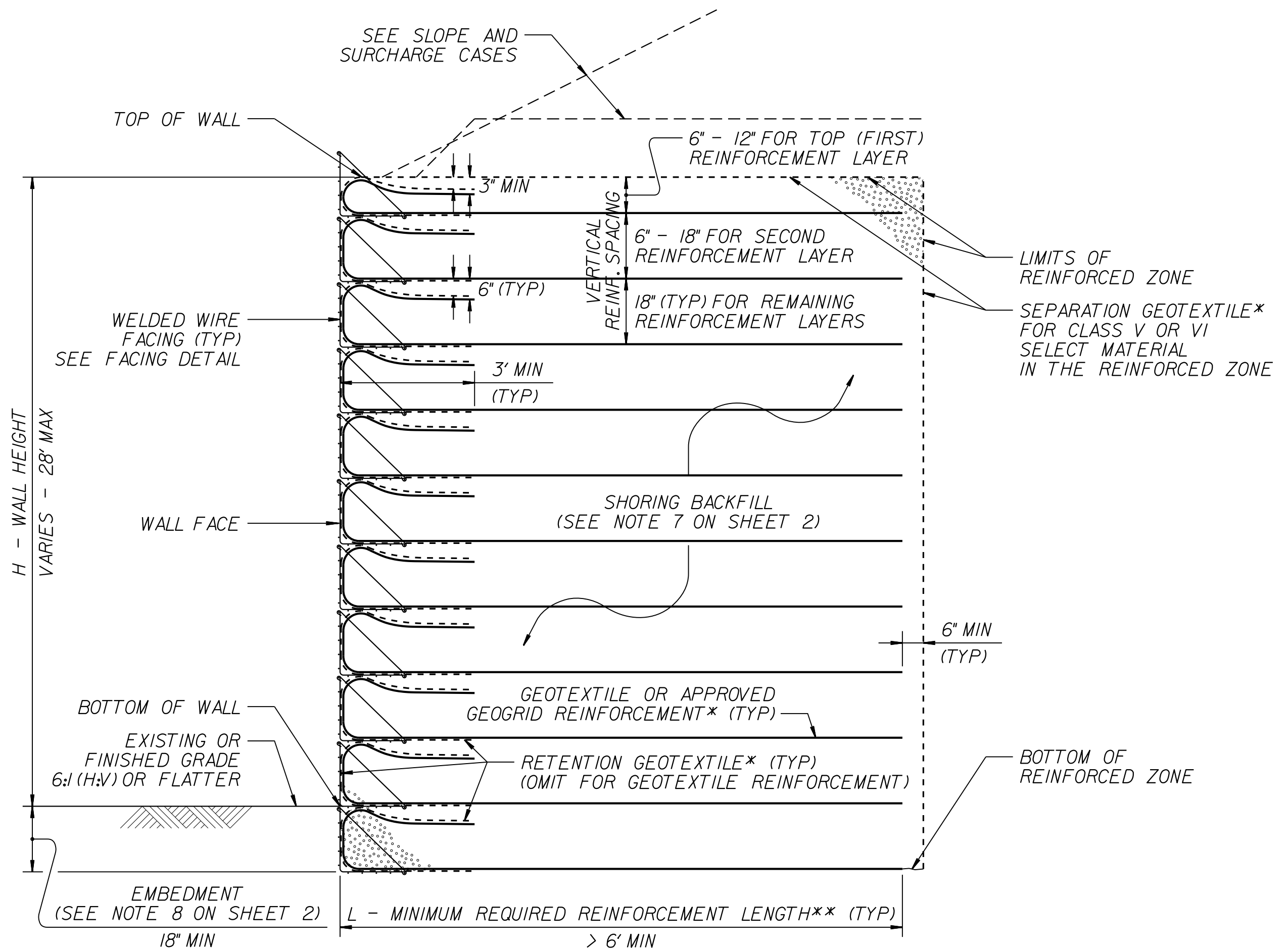
**SURCHARGE CASE**



**SLOPE CASE**

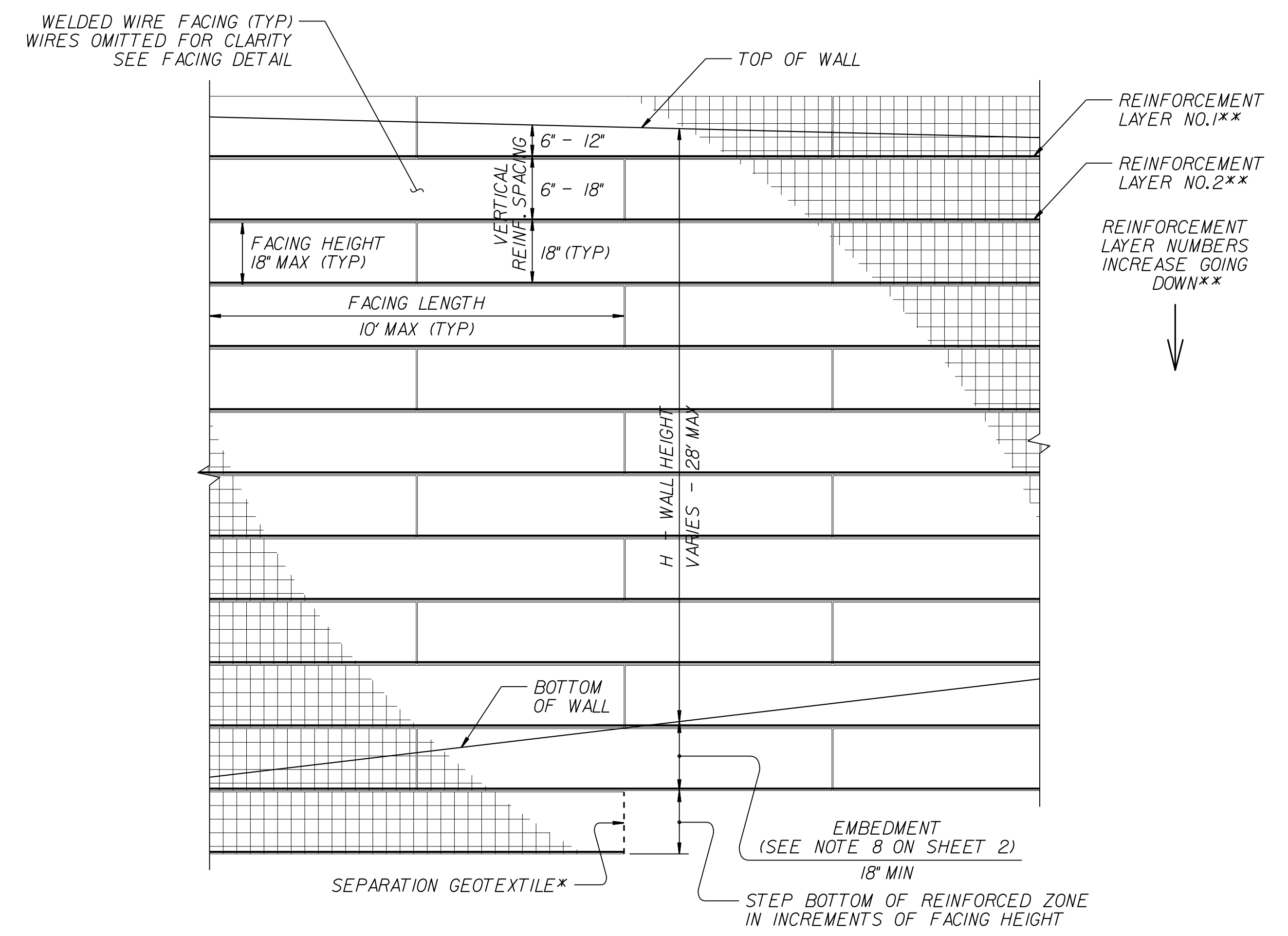


**FACING DETAIL**



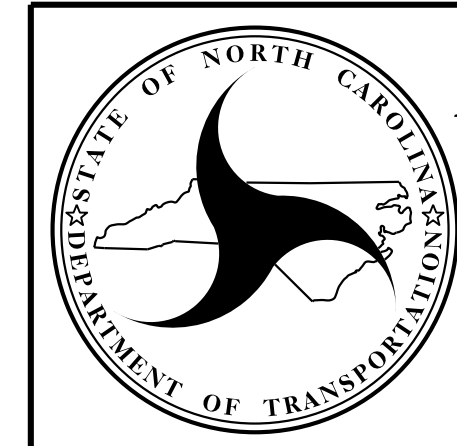
**STANDARD TEMPORARY WALL**

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)  
 \*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.  
 \*\*SEE REINFORCEMENT TABLES ON SHEET 3.



**STANDARD TEMPORARY WALL – PARTIAL ELEVATION**

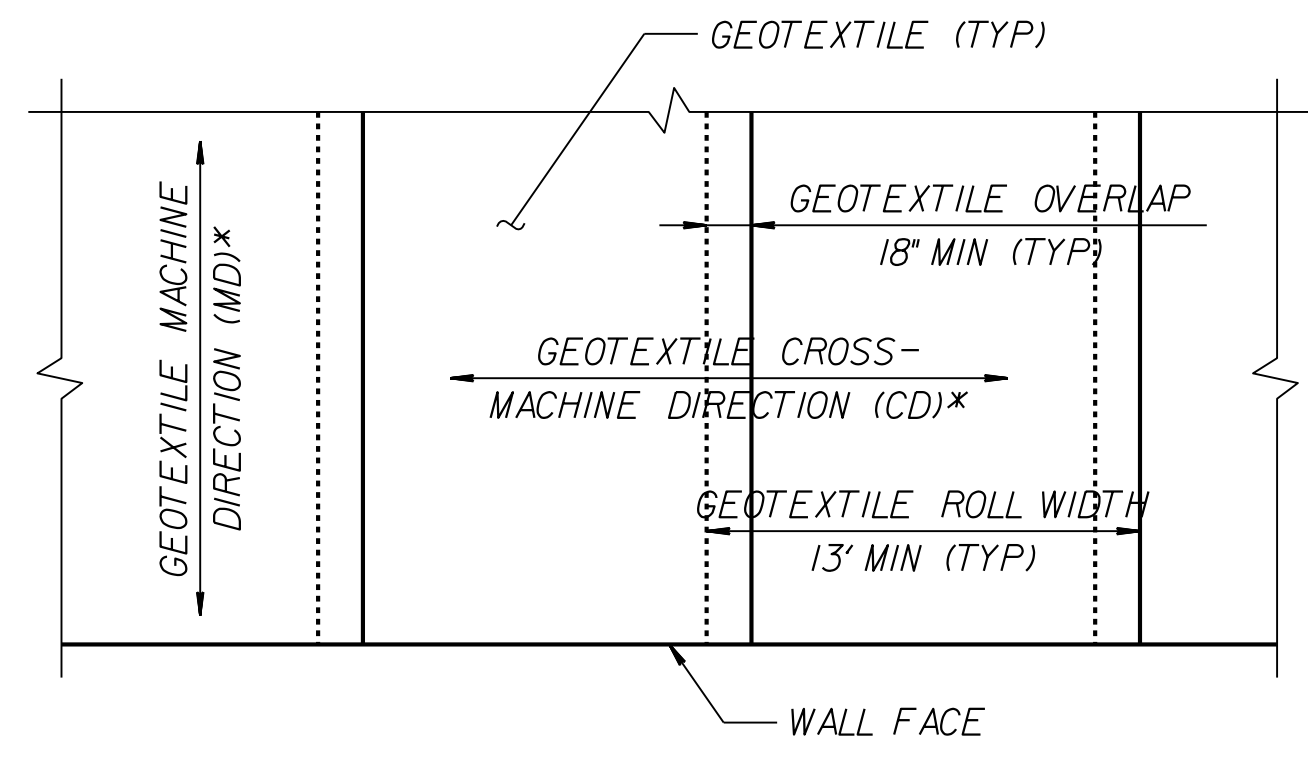
\*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.  
 \*\*SEE REINFORCEMENT TABLES ON SHEET 3.



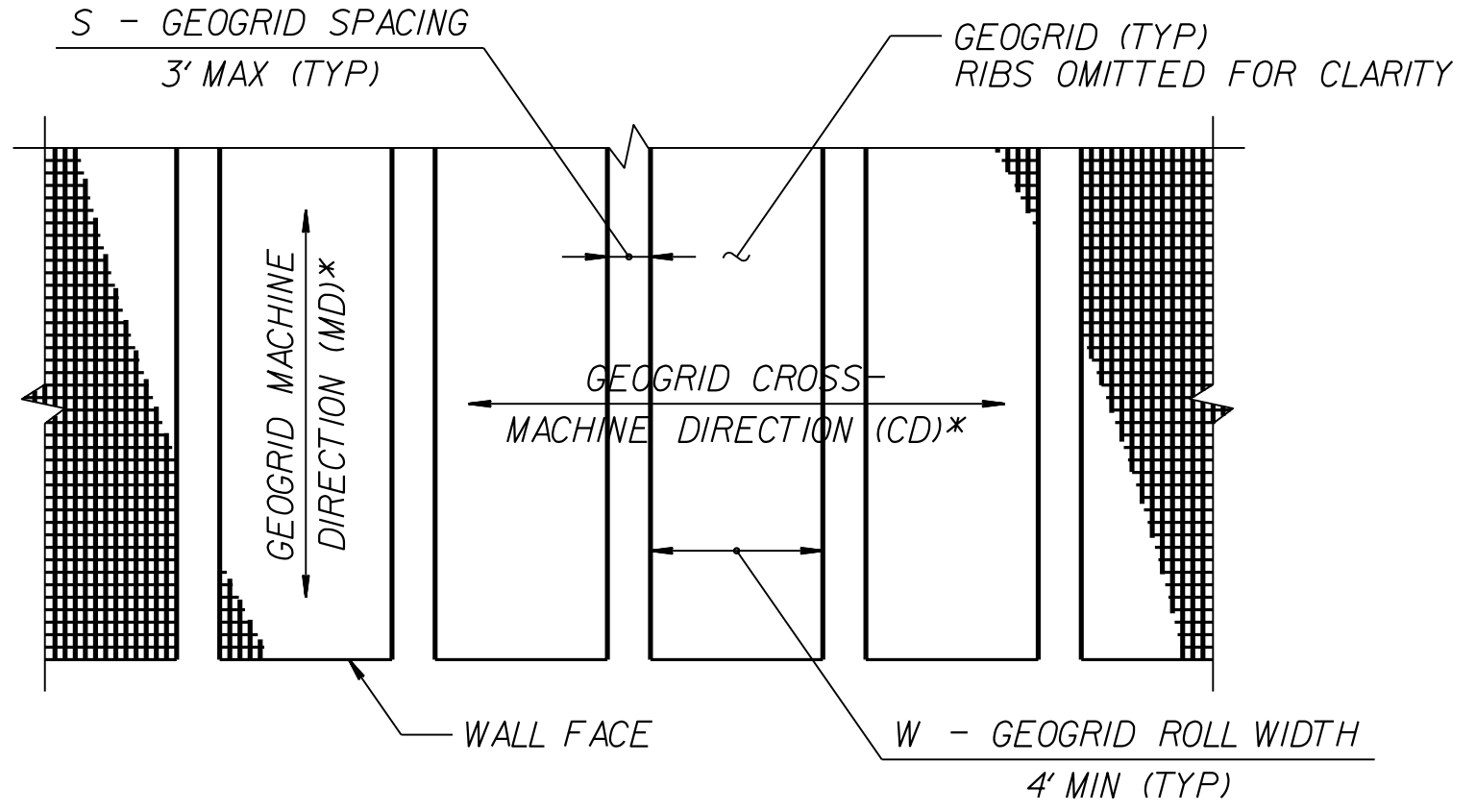
NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
**GEOTECHNICAL  
 ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.02

STANDARD  
 TEMPORARY WALL  
 SHEET 1 OF 3

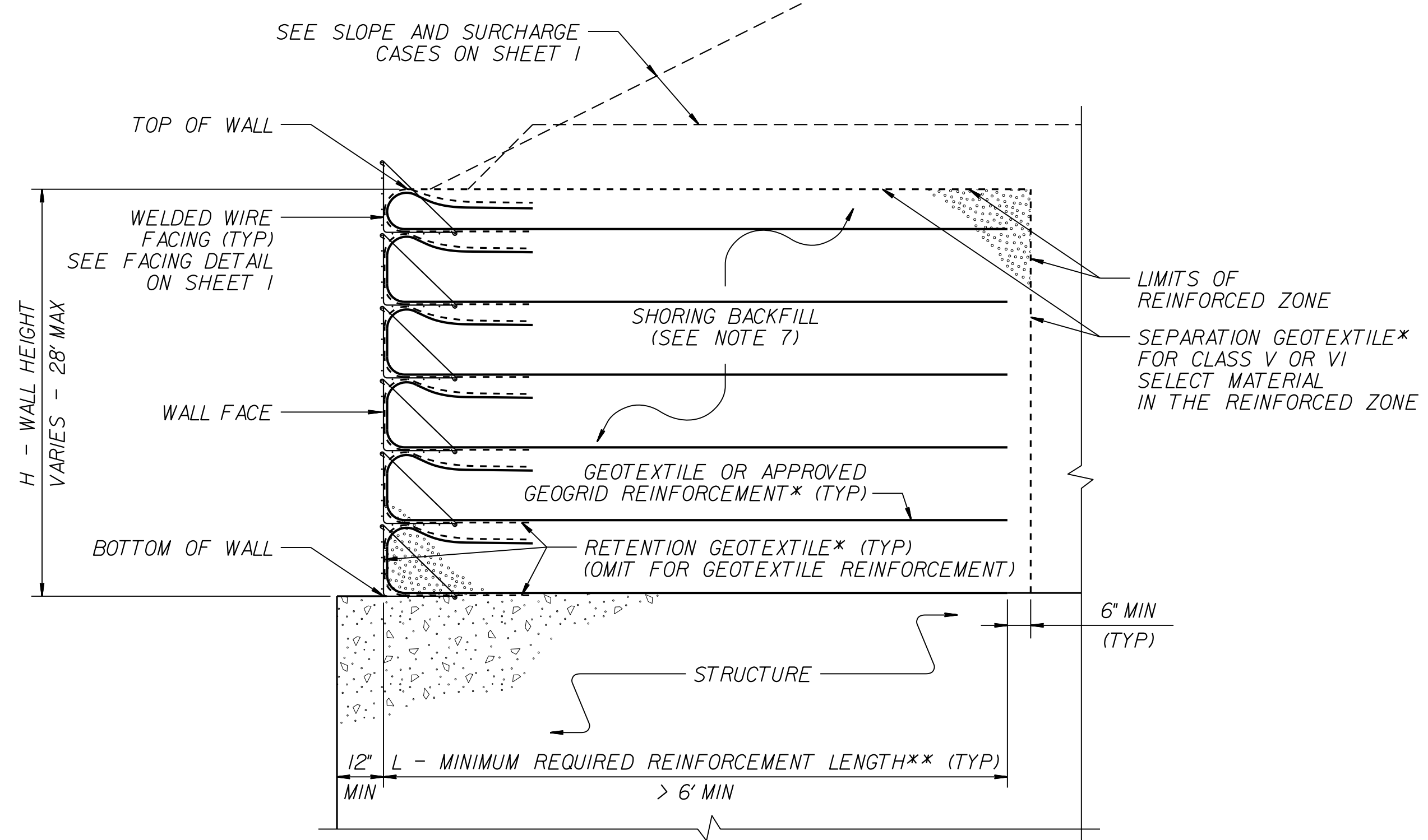


**GEOTEXTILE PLACEMENT**  
(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)



**GEOGRID PLACEMENT**  
(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT -  $\frac{W}{W+S} \times 100 \geq 80\%$ , SEE NOTE 11)

**GEOSYNTHETIC PLACEMENT DETAILS**  
(PLAN VIEW)  
\*SEE NOTE 12.




**TEMPORARY WALL ON STRUCTURE DETAIL**  
\*SEE GEOSYNTHETIC PLACEMENT DETAILS.  
\*\*SEE REINFORCEMENT TABLES ON SHEET 3.

**NOTES:**

- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:  
UNIT WEIGHT,  $\gamma = 120$  PCF  
FRICTION ANGLE,  $\phi = 30$  DEGREES  
COHESION,  $c = 0$  PSF
- DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
- USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER IS ABOVE BOTTOM OF REINFORCED ZONE.
- DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
- EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
- DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
- GEOGRIDS ARE TYPICALLY APPROVED FOR ULTIMATE TENSILE STRENGTHS IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) OR SHORT-TERM DESIGN STRENGTHS FOR A 3-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM:  
[connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Manual.aspx](http://connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Manual.aspx)  
DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

- IF THE WEBSITE DOES NOT LIST A SHORT-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID, USE A SHORT-TERM DESIGN STRENGTH EQUAL TO THE ULTIMATE TENSILE STRENGTH DIVIDED BY 3.5 FOR THE GEOGRID REINFORCEMENT.
- FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
  - AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:  
-  $W$  (REINFORCEMENT ROLL WIDTH)  $\geq$  (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND  
- REINFORCEMENT STRENGTH IN CD  $\geq$  MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
  - SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM:  
[connect.ncdot.gov/resources/Geological/Pages/Geotech\\_Forms\\_Details.aspx](http://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx)
  - DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
  - FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
  - DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
  - CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
  - FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
  - FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.

<b>PROJECT REFERENCE NO.</b> U-2581BA	<b>SHEET NO.</b> 2G-3
GEOTECHNICAL ENGINEER  ENGINEER	ENGINEER
Designated by: Scott A. Hadden 7/1/2019 <small>Signature</small>	<small>Date</small>
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H - WALL HEIGHT (FT)																									
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
SLOPE CASE	> 0	CLASS II, TYPE I, CLASS III, CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27	
SURCHARGE CASE	> 0 TO 7 FOR H < 20' > 0 TO 10 FOR H ≥ 20'	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	17	17	18	19	19	20	21	22	
		A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21	
		CLASS II, TYPE I OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	14	15	15	16	16	17	17	18	18	19	20	
	> 7 FOR H < 20' > 10 FOR H ≥ 20'	CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	8	8	9	9	10	10	11	12	13	13	14	14	15	15	16	17	17	18	19	19		

**L - MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)**  
(FOR ALL REINFORCEMENT TYPES)

WALL HEIGHT (H) + EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 - 4	3
4 - 5.5	4
5.5 - 7	5
7 - 8.5	6
8.5 - 10	7
10 - 11.5	8
11.5 - 13	9
13 - 14.5	10
14.5 - 16	11
16 - 17.5	12
17.5 - 19	13
19 - 20.5	14
20.5 - 22	15
22 - 23.5	16
23.5 - 25	17
25 - 26.5	18
26.5 - 28	19
28 - 29.5	20

\*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

**GEOTEXTILE REINFORCEMENT**  
ULTIMATE TENSILE STRENGTH (LB/FT)

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

**GEOGRID REINFORCEMENT**  
SHORT-TERM DESIGN STRENGTH (LB/FT)  
(SEE NOTE 10 ON SHEET 2.)

**MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD**  
(SEE NOTE 9 ON SHEET 2.)  
\*SEE PARTIAL ELEVATION ON SHEET 1 FOR REINFORCEMENT LAYER NUMBERING.



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

STANDARD DETAIL NO. 1801.02
STANDARD TEMPORARY WALL SHEET 3 OF 3
DATE: 11-19-13

DIVISION OF HIGHWAYS  
 STATE OF NORTH CAROLINA

**SUMMARY OF EARTHWORK**  
 IN CUBIC YARDS

STATION	STATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT +%	BORROW	WASTE
<b>PHASE I</b>						
-L- LT 12+32.17	42+00.00	2,556		3,634	2,494	1,416
-Y1- 13+45.00	19+94.59	548		518	450	480
	<b>SUBTOTAL</b>	<b>3,104</b>		<b>4,152</b>	<b>2,944</b>	<b>1,896</b>
-L- LT 42+00.00	48+50.00	50		1,456	1,406	
-L- 48+50.00	52+00.00	368		994	626	
-L- RT 52+00.00	72+00.00	310	1,800	16,994	16,684	1,800
-Y4- LT 10+30.00	12+43.00	4		143	139	
-DRW1- 10+42.00	10+78.00	235		36		199
	<b>SUBTOTAL</b>	<b>967</b>	<b>1,800</b>	<b>19,623</b>	<b>18,855</b>	<b>1,999</b>
-L- RT 72+00.00	91+80.00	1,816		3,124	1,834	526
-DRW2- 10+42.00	10+52.78	146		4		142
	<b>SUBTOTAL</b>	<b>1,962</b>		<b>3,128</b>	<b>1,834</b>	<b>668</b>
	<b>PHASE I SUBTOTAL</b>	<b>6,033</b>	<b>1,800</b>	<b>26,903</b>	<b>23,633</b>	<b>4,563</b>
<b>PHASE II</b>						
-L- RT 12+32.17	42+00.00	891		3,221	2,672	342
-Y2- 10+30.15	18+14.00	960		775	564	749
-Y3- 10+30.00	13+25.00	82		77	74	79
	<b>SUBTOTAL</b>	<b>1,933</b>		<b>4,073</b>	<b>3,310</b>	<b>1,170</b>
-L- RT 42+00.00	48+50.00	14		458	444	
-L- LT 52+00.00	72+00.00	739		4,703	4,100	136
-L- LT 56+20.00 DRIVEWAY	57+30.00			806	806	
-Y4- RT 10+30.00	12+43.00	32		91	59	
-Y5- 10+30.02	11+85.00	54		42		12
	<b>SUBTOTAL</b>	<b>839</b>		<b>6,100</b>	<b>5,409</b>	<b>148</b>
-L- LT 72+00.00	91+00.00	545		3,151	2,928	322
-Y6- 12+90.00	17+79.81	433		1,028	595	
-Y6- 14+19.00 DRIVEWAY	14+45.00			16	16	
-Y7- 11+00.00	12+46.72	28		16		12
	<b>SUBTOTAL</b>	<b>1,006</b>		<b>4,211</b>	<b>3,539</b>	<b>334</b>
	<b>PHASE II SUBTOTAL</b>	<b>3,778</b>		<b>14,384</b>	<b>12,258</b>	<b>1,652</b>
	<b>SUMMARY TOTALS</b>	<b>9,811</b>	<b>1,800</b>	<b>41,287</b>	<b>35,891</b>	<b>6,215</b>
MATERIAL FOR SHOULDER CONSTRUCTION				12	12	
LOSS DUE TO CLEARING & GRUBBING		-3,500			3,500	
SELECT GRANULAR MATERIAL IN LIEU OF BORROW				-2,160	-2,160	
ADDITIONAL UNDERCUT EXCAVATION			200	240	240	200
WASTE IN LIEU OF BORROW					-365	-365
	<b>PROJECT TOTALS</b>	<b>6,311</b>	<b>2,000</b>	<b>39,379</b>	<b>37,118</b>	<b>6,050</b>
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT					1,856	
	<b>GRAND TOTAL</b>	<b>6,311</b>	<b>2,000</b>		<b>38,974</b>	
	<b>SAY</b>	<b>6,400</b>	<b>2,000</b>		<b>39,100</b>	

PAVEMENT ALTERNATE 1 STRUCTURE VOLUME 23,040 CY

STATION	STATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT +%	BORROW	WASTE
<b>EARTHWORK TOTALS FOR ALTERNATE PAVEMENT DESIGN</b>						
<b>SUMMARY TOTALS</b>		<b>9,811</b>	<b>1,800</b>	<b>41,287</b>	<b>35,891</b>	<b>6,215</b>
ADJ. FOR ALTERNATE PAVEMENT DESIGN		1,877		-3,058	-4,887	48
MATERIAL FOR SHOULDER CONSTRUCTION				552	552	
LOSS DUE TO CLEARING & GRUBBING		-3,500			3,500	
SELECT GRANULAR MATERIAL IN LIEU OF BORROW				-2,160	-2,160	
ADDITIONAL UNDERCUT EXCAVATION			200	240	240	200
WASTE IN LIEU OF BORROW					-413	-413
	<b>PROJECT TOTALS</b>	<b>8,188</b>	<b>2,000</b>	<b>36,861</b>	<b>32,723</b>	<b>6,050</b>
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT					1,636	
	<b>GRAND TOTAL</b>	<b>8,188</b>	<b>2,000</b>		<b>34,359</b>	
	<b>SAY</b>	<b>8,200</b>	<b>2,000</b>		<b>34,400</b>	

PAVEMENT ALTERNATE 2 STRUCTURE VOLUME 31,760 CY

EST. DDE = 70 CUBIC YARDS

ESTIMATED 1,800 CY OF UNCLASSIFIED EXCAVATION PER GEOTECH RECOMMENDATION ACCEPTABLE BUT NOT TO BE USED IN THE TOP 3 FT OF EMBANKMENT OR BACKFILL

ESTIMATED 2,850 CY AND ADDITIONAL OF 300 CY AS CONTINGENCY OF SHALLOW UNDERCUT PER GEOTECH RECOMMENDATION

CLASS IV SUBGRADE STABILIZATION TO REPLACE SHALLOW UNDERCUT (PER GEOTECH RECOMMENDATION) = 6,200 TONS

NOTE:  
 APPROXIMATE QUANTITIES ONLY, UNCLASSIFIED EXCAVATION, BORROW EXCAVATION, FINE GRADING, CLEARING AND GRUBBING, BREAKING OF EXISTING PAVEMENT, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING".

5/9/2018 7:30:20 AM R:\Projects\2581BA\2581BA\_rdy\_sum.dgn localuser

5/9/2018

COMPUTED BY: EM DATE: 07-18-2019  
 CHECKED BY: JBJ DATE: 07-19-2019

PROJECT REFERENCE NO. SHEET NO.  
 U-2581BA 3B-2

# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.  
 TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.  
 FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.  
 W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.  
 G = GATING IMPACT ATTENUATOR TYPE 350  
 NG = NON-GATING IMPACT ATTENUATOR TYPE 350

## GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS									
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	TYPE B-77	GREU TL-3	GREU MEDIAN	XIII	CAT-1	VI MOD	BIC	AT-1	EA	G					NG								
-L-	53+40.00	57+05.00	RT	365.00'			54+40.00	56+10.00	14'	14' BERM																												
-L-	55+60.00	56+41.13	LT	65.50'	50.00'		DRIVEWAY	55+60.00	14'	14' BERM																												
TOTAL				430.50'																																		
DEDUCTION FOR ANCHORS				-112.50'																																		
PROJECT TOTAL				318.00'	50.00'																																	
SAY				325'	50'																																	
ADDITIONAL GUARDRAIL POST = 5 EACH																																						

DEDUCTION FOR ANCHORS: (GREU, TL-3) 2 @ 50' = 100.00'  
 (CAT-1) 1 @ 6.25' = 6.25'  
 (AT-1) 1 @ 6.25' = 6.25'  
 TOTAL DEDUCTIONS = 112.50'

### REMOVAL OF EXISTING ASPHALT PAVEMENT

LINE	BEGIN STATION	END STATION	LOCATION	SQ. YD.
-L-	25+15.28	28+15.74	RT	75.93
-L-	29+50.00	37+49.30	RT	560.35
-L-	38+38.86	42+62.67	RT	307.13
-L-	43+26.19	47+31.00	RT	352.18
-L-	52+14.07	54+50.00	LT	284.59
-L-	58+50.00	60+45.72	LT	254.42
-L-	65+00.00	67+50.00	LT	116.95
-L-	73+37.90	78+93.56	LT	606.91
-L-	63+12.08	65+00.00	LT	77.92
-L-	67+50.00	68+00.00	LT	18.45
-L-	79+02.00	79+24.00	RT	66.34
TOTAL				2,721.17
SAY				2,730

### BREAKING OF EXISTING ASPHALT PAVEMENT

LINE	BEGIN STATION	END STATION	LOCATION	SQ. YD.
-L-	28+15.74	29+50.00	RT	93.33
-L-	54+00.00	58+50.00	LT	1,653.24
TOTAL				1,746.57
SAY				1,750

7/24/2018  
 R:\Projects\U-2581BA\rdj\_sum.dgn  
 localuser

COMPUTED BY: VHB DATE: 07/02/2019
CHECKED BY: VHB DATE: 07/18/2019

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO. SHEET NO.
U2581BA 3D-1

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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

Table with columns for LINE & STATION, OFFSET, STRUCTURE NUMBER, INVERT ELEVATION, MINIMUM REQUIRED SLOPE, Drainage Pipe, C. S. PIPE, R. C. PIPE CLASS III, R. C. PIPE CLASS IV, ENDWALLS, REINFORCED ENDWALLS, DRAINAGE STRUCTURE, QUANTITIES FOR DRAINAGE STRUCTURES, FRAME, GRATES, AND HOOD, CONCRETE TRANSITIONAL SECTION, and PIPE REMOVAL. Includes a SHEET TOTALS row at the bottom.

ABBREVIATIONS
C.A.A. CORRUGATED ALUMINIUM ALLOY
C.B. CATCH BASIN
C.S. CORRUGATED STEEL
D.I. DROP INLET
G.D.I. GRATED DROP INLET
H.D.P.E. HIGH DENSITY POLYETHYLENE
J.B. JUNCTION BOX
M.H. MANHOLE
N.S. NARROW SLOT
P.V.C. POLYVINYL CHLORIDE
R.C. REINFORCED CONCRETE
T.B.D.I. TRAFFIC BEARING DROP INLET
T.B.J.B. TRAFFIC BEARING JUNCTION BOX
W.S. WIDE SLOT

SHEET TOTALS

COMPUTED BY: VHB DATE: 07/02/2019  
CHECKED BY: VHB DATE: 07/18/2019

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

PROJECT NO. SHEET NO.  
U2581BA 3D-2

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.  
See "Standard Specifications For Roads and Structures, Section 300-5".

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

Table with columns for Line & Station, Offset, Structure Number, Invert Elevation, Minimum Required Slope, Pipe Material (RCP, CSP, CAAP, HDPE, PVC), Pipe Size (12-84 inches), Endwalls, Reinforced Endwalls, Drainage Structure, Quantities for Drainage Structures, Frame, Grates, and Hood, Concrete Transitional Section, and Remarks. Includes a SHEET TOTALS row at the bottom.



COMPUTED BY: VHB DATE: 07/02/2019
CHECKED BY: VHB DATE: 07/18/2019

PROJECT NO. SHEET NO.
U2581BA 3D-3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

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

Table with columns for Line & Station, Offset, Structure Number, Invert Elevation, Minimum Required Slope, Drainage Pipe, C.S. Pipe, R.C. Pipe Class III, R.C. Pipe Class IV, Endwalls, Reinforced Endwalls, Drainage Structure, Quantities for Drainage Structures, Frame, Grates, and Hood, Concrete Transitional Section, and Remarks. Includes a SHEET TOTALS row at the bottom.





Z8024

COMPUTED BY: VHB DATE: 07/02/2019  
CHECKED BY: VHB DATE: 07/18/2019

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

PROJECT NO. SHEET NO.  
U2581BA 3D-6

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.  
See "Standard Specifications For Roads and Structures, Section 300-5".

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

Table with columns for Line & Station, Offset, Structure Number, Invert Elevation, Minimum Required Slope, Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC), C. S. PIPE, R. C. PIPE CLASS III, R. C. PIPE CLASS IV, Endwalls, Reinforced Endwalls, Drainage Structure, Quantities for Drainage Structures, Frame, Grates, and Hood, Concrete Transitional Section, and Pipe Removal. Includes a 'SHEET TOTALS' row at the bottom.

ABBREVIATIONS table listing codes and their corresponding materials or components, such as C.A.A. for Corrugated Aluminium Alloy, C.B. for Catch Basin, etc.

REMARKS



COMPUTED BY: S.E. Mitchell DATE: 7/23/19  
 CHECKED BY: S.S. Laney DATE: 7/23/19

(2-16-16)

PROJECT NO.  
U-2581BA

SHEET NO.  
3G-1

**STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS**

**SUMMARY OF SUBSURFACE DRAINAGE**

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
L	90+75	91+25	RT	SD	100
Y3	13+00	14+00	RT	SD	200
Y4	11+00	12+00	CL	SD	200
CONTINGENCY					200
<b>TOTAL LF:</b>					<b>700</b>

\*UD = Underdrain  
 \*BD = Blind Drain  
 \*SD = Subsurface Drain

**SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION**

LINE	Station	Station	Aggregate Type* ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
L	24+25	26+75	ASU	12	200	400	800		
L	30+75	37+25	ASU	12	950	1700	2800		
L	63+75	69+75	ASU	12	150	300	700		
L	73+75	78+75	ASU	12	350	650	1450		
L	81+75	82+25	ASU	12	50	100	100		
L	88+25	89+25	ASU	12	150	250	400		
Y1	13+50	16+75	ASU	12	250	400	800		
Y1	18+75	19+75	ASU	12	100	200	400		
Y2	12+25	18+25	ASU	12	300	500	1100		
Y3	10+25	14+25	ASU	12	250	450	750		
Y5	10+75	11+75	ASU	12	50	50	100		
Y6	16+25	17+75	ASU	12	50	50	150		
CONTINGENCY			ASU	12	300	1750	900		
<b>TOTAL CY/TONS/SY:</b>					<b>3150</b>	<b>6800</b>	<b>10450**</b>	<b>0</b>	<b>0</b>

\*ASU = Aggregate Subgrade  
 \*AST = Aggregate Stabilization  
 \*\*Total square yards of "Geotextile for Soil Stabilization" is only the estimated quantity for ASU/AST and may only represent a portion of the geotextile quantity shown in the Item Sheets of the Proposal.

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

## PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	MCLEANSVILLE LIONS CLUB
2	4, 5, 10	SPENCE & ROBINSON REAL ESTATE, LLC
3	4	LARRY MICHAEL OVERBY
4	4	WHITE & WHITE INVESTMENTS, LLC
5	4, 5	LADY LUCK, LLC
6	5	ARLEY GLENN REESE, JR.
7	5	WILLIAM H. OVERBY, BEATRICE OVERBY
8	5	RONNIE D. OVERBY AND LARRY M. OVERBY
9	5	ARLEY G. REESE, JR., FONDA T. REESE
9A	5	ARLEY GLENN REESE, JR., FONDA T. REESE
10	5	RONNIE D. OVERBY
11	5	BEVERLY B. HANKS, ROGER LYRICK HANKS
12	5	LARRY W. MCMASTERS, DELORES O. MCMASTERS
13	5	BOBBIE L. LYNN
14	5	ROBERT C. MASON, THERESA RICH
15	5	ISIAH HICKMAN
16	5	RONNIE D. OVERBY
16A	5	RONNIE D. OVERBY
17	5, 6	RICKY N. SMITH
18	6	DAVID D. HARRIS, KRISTIE H. HARRIS
19	6	TIMOTHY A. AYERS, NORMA J. AYERS
20	6	ROBERT C. MCDONALD
21	6	RONNIE D. OVERBY
22	6	TONYA D. COLE
23	6	RONNIE D. OVERBY
24	6	DEBORAH O. WAY, JAMES N. WAY, JR.
25	6	FRED E. BURGIN, KATHY M. BURGIN, JAMES G. ALLRED, JUDY B. ALLRED
26	6	RONNIE D. OVERBY
26A	6	RONNIE OVERBY
27	6	DARRYL L. BEAN, TERESA M. BEAN
28	6	GERALD D. POWELL, HAZEL J. POWELL
29		NOT USED
30	6	CLONNIE J. OVERBY BURKE
31	6, 7	TRIAD WORSHIP CENTER CHURCH OF GOD
32	7	GLORIA POOLE
33	7	MARY T. WEDDINGTON
34	7	DAVID T. TURNER, MARY T. WEDDINGTON
35	7	PIERRE A. GORIA, CAROLYN E. GORIA
36	7	ASHTON PLACE HEALTHCARE PROPERTIES LLC
37	7, 8, 9	CALVARY BAPTIST CHURCH, INC. OF MCLEANSVILLE
38	7, 8	THOMAS GILMER LOWDERMILK
39		NOT USED
40		NOT USED
41		NOT USED
42		NOT USED
43	6, 7, 8, 9	PUBLIX SUPER MARKETS, INC.
44	9	MORRIS E. CARTER AND WIFE, BARBARA G. CARTER

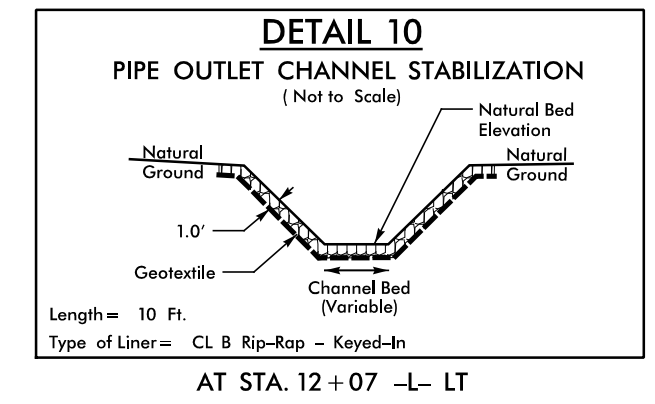
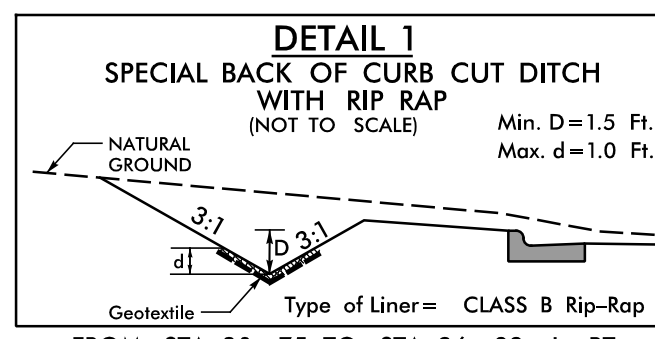
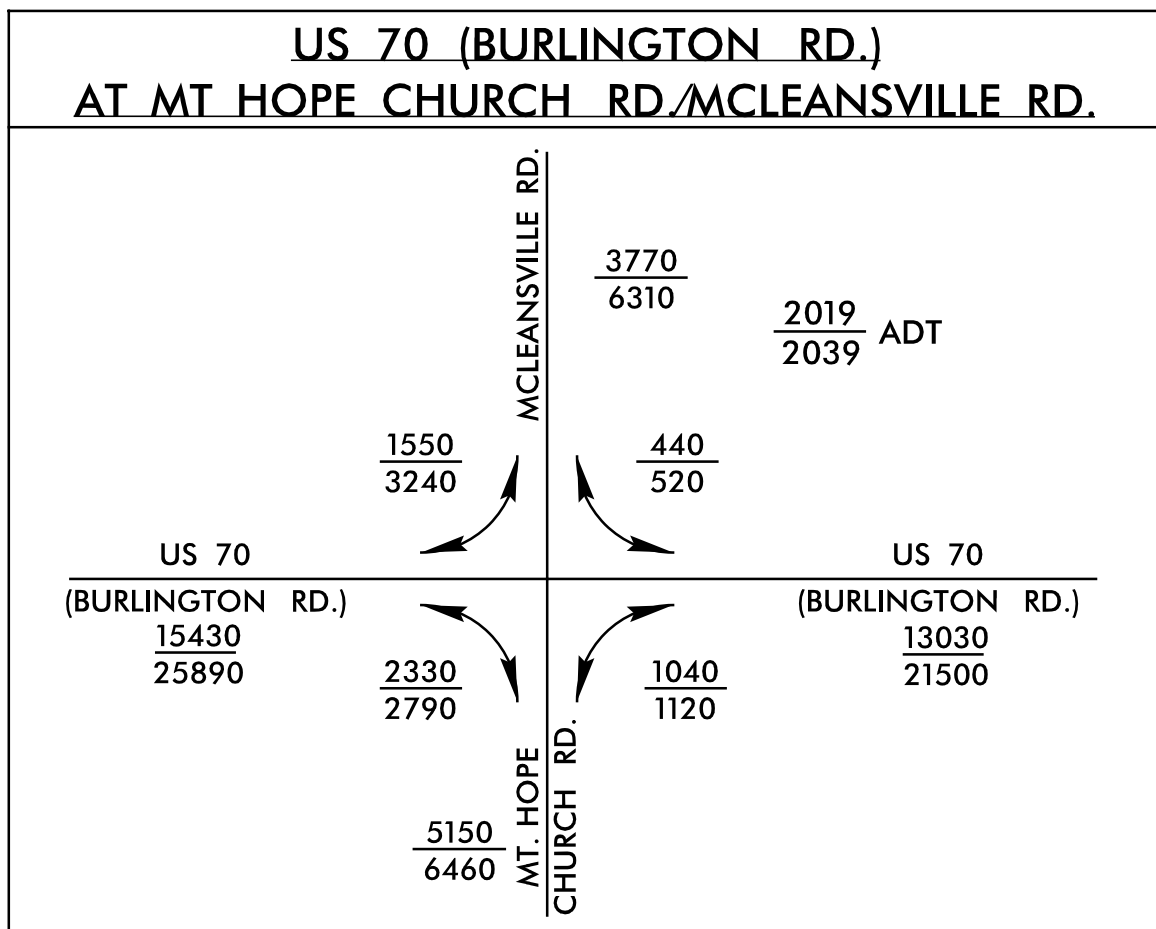
PARCEL No.	SHEET No.	PROPERTY OWNER NAME
45	9	SOUTHERN NET, INC.
46	9	MORRIS PHILIP ALLISON, SARA LYN SZOSTAK
47	9	MORRIS PHILIP ALLISON, SARA LYN SZOSTAK
48	9	MORRIS PHILIP ALLISON, SARA LYN SZOSTAK
49	9	MORRIS PHILIP ALLISON, SARA LYN SZOSTAK
50	9	MORRIS PHILIP ALLISON, SARA LYN SZOSTAK
51	9	AHMAD H. HAMZE
52	10	BOYD LEE SUMMERS, JERRY LANCE SUMMERS
53	1, 10	MT. PLEASANT METHODIST CHURCH
54	6	DELORES O. MCMASTERS, BARBARA O. COOK, RONNIE D. OVERBY, DEBORAH O. WAY, CONNIE O. MISENHEIMER, SHIRLEY OVERBY, CHARLES R. OVERBY, JR.
55	4	THOMAS EDWARD PAYNE
56	4	ONE WAY BAPTIST CHURCH
57	4	THOMAS EDWARD PAYNE, TONI DUKE PAYNE
58	6	ROGER SCOTT APPLE, TONILYN J. APPLE
(NO CLAIM)		
59	6	DONNA G. BATES WITT
(NO CLAIM)		
60	6	DONALD G. BATES, ERNESTINE C. BATES
61	6	BARBARA SUE GAULDIN
62	6	RACHEL M. LEVENS
63	6	RACHEL M. LEVENS
64	5	MILDRED O. ALLRED
65	6	BRIAN KELLY, PATRICIA KELLY

-L- CURVE DATA

PI Sta 17+66.41  
Δ = 12° 58' 11" (LT)  
D = 1'13" 08.6"  
L = 1,063.91'  
T = 534.24'  
R = 4,700.00'  
SE = 0.025  
RO = 105'  
INC = 42'

-Y2- CURVE DATA

PI Sta 13+49.93  
Δ = 14° 39' 42.3" (LT)  
D = 2° 06' 23.3"  
L = 696.04'  
T = 349.93'  
R = 2,720.00'  
SE = 0.04  
RO = 144'



BEGIN CONSTRUCTION  
-Y1- POT Sta. 13+45.00

55  
THOMAS EDWARD PAYNE  
DB 3829 PG 416  
PB 98 PG 89

56  
ONE WAY  
BAPTIST CHURCH  
DB 4354 PG 1434  
PB 113 PG 25

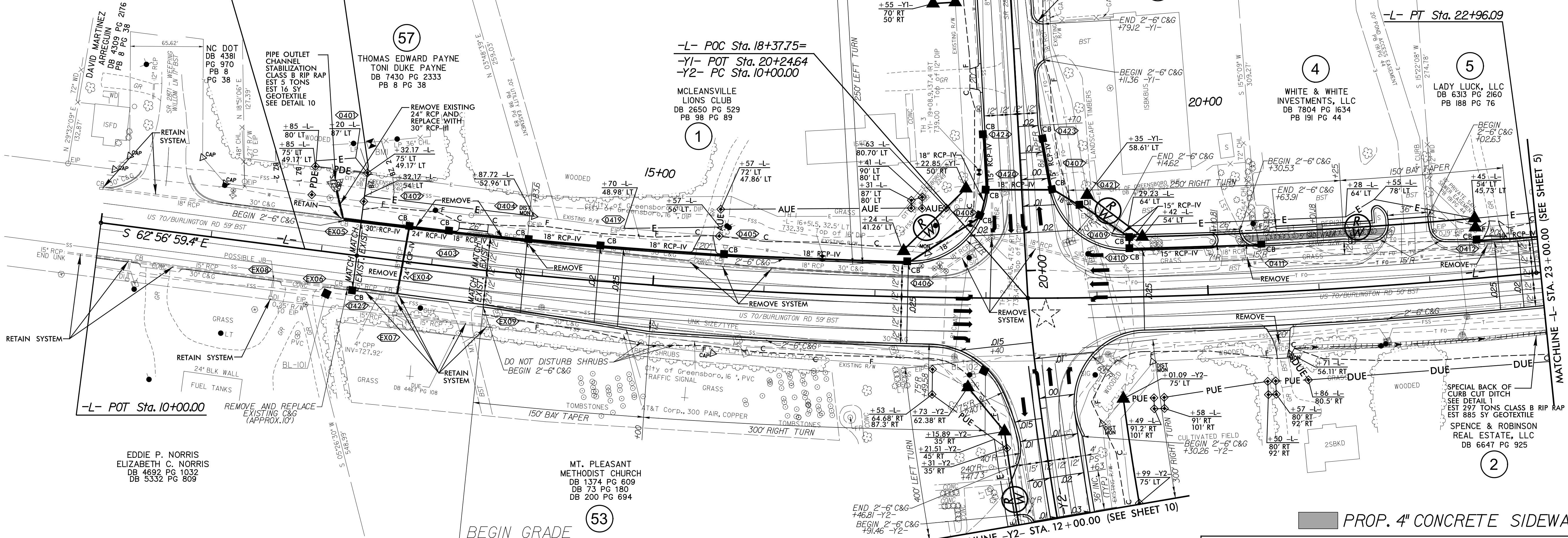
PROJECT REFERENCE NO. U-2581BA SHEET NO. 4  
RW SHEET NO. HYDRAULICS ENGINEER  
ROADWAY DESIGN ENGINEER  
SEAL 014493  
9/9/2019  
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED  
vhb  
VH8 Engineering NC, P.C. (C-3705)  
940 W. Campus Drive, Suite 200  
Raleigh, NC 27606

BEGIN TIP PROJECT U-2581BA

-L- PC STA. 12+32.17  
BEGIN MILL/RESURFACE  
BEGIN WIDENING (LT SIDE ONLY)

BEGIN CONSTRUCTION  
-L- POT Sta. 11+85.00

-L- POC Sta. 18+37.75=  
-Y1- POT Sta. 20+24.64  
-Y2- PC Sta. 10+00.00



57  
THOMAS EDWARD PAYNE  
TONI DUKE PAYNE  
DB 7430 PG 2333  
PB 8 PG 38

1  
MCLEANSVILLE  
LIONS CLUB  
DB 2650 PG 829  
PB 98 PG 89

3  
LARRY MICHAEL OVERBY  
DB 3983 PG 562  
PB 105 PG 114

4  
WHITE & WHITE  
INVESTMENTS, LLC  
DB 7804 PG 1634  
PB 191 PG 44

5  
LADY LUCK, LLC  
DB 6313 PG 2160  
PB 188 PG 76

EDDIE P. NORRIS  
ELIZABETH C. NORRIS  
DB 4692 PG 1032  
DB 5332 PG 809

MT. PLEASANT  
METHODIST CHURCH  
DB 1374 PG 609  
DB 73 PG 180  
DB 200 PG 694

BEGIN GRADE  
END MILL/RESURFACE  
-L- POC STA. 13+50.00

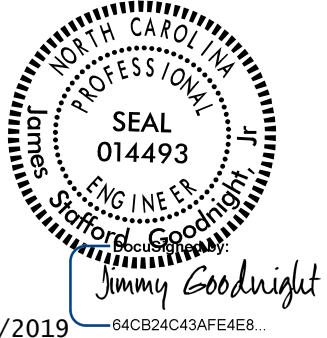


EXISTING TRAFFIC SIGNAL TO BE MODIFIED

PROP. 4" CONCRETE SIDEWALK  
FOR -L- PROFILE SEE SHEET II  
FOR -Y1- & -Y2- PROFILES SEE SHEET 14

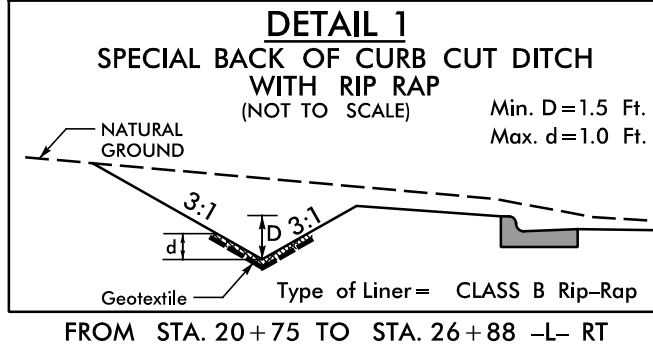
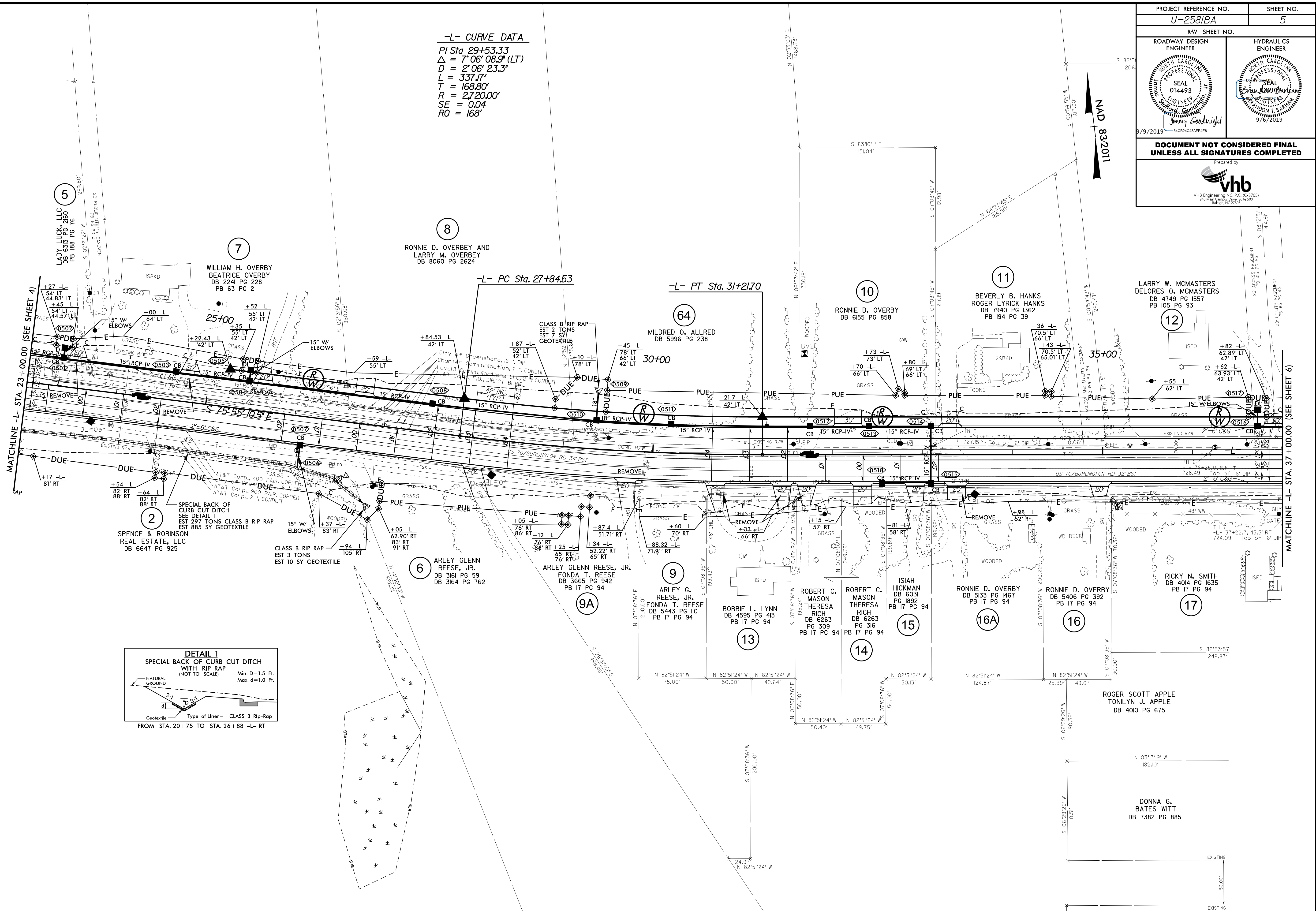
REVISIONS

8/28/2019  
R:\Projects\U-2581BA\_rdu\_rsh04.dgn



PROJECT REFERENCE NO. <b>U-2581BA</b>		SHEET NO. <b>5</b>	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
			
9/9/2019		9/9/2019	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
Prepared by 			
<small>VH8 Engineering NC, P.C. (C-3705) 940 W. Campus Drive, Suite 200 Raleigh, NC 27606</small>			

**-L- CURVE DATA**  
 PI Sta. 29+53.33  
 $\Delta = 7^{\circ}06'08.9''$  (LT)  
 $D = 2^{\circ}08'23.3''$   
 $L = 337.17'$   
 $T = 168.80'$   
 $R = 2720.00'$   
 $SE = 0.04$   
 $RO = 168'$



FOR -L- PROFILE SEE SHEET II

REVISIONS

8/17/19

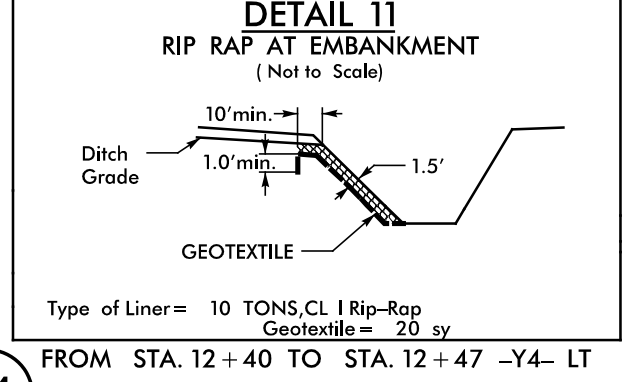
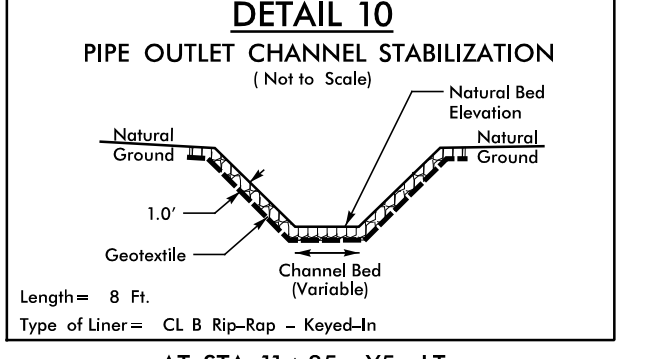
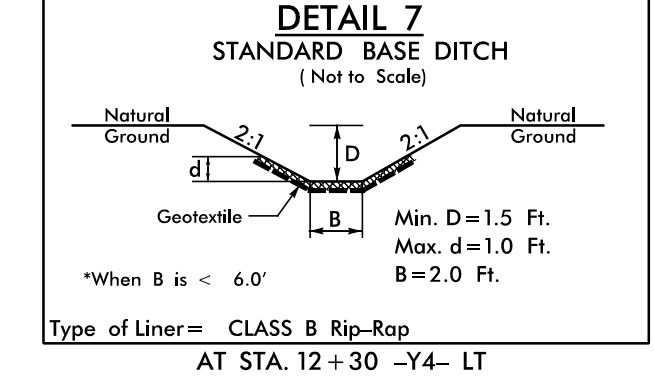
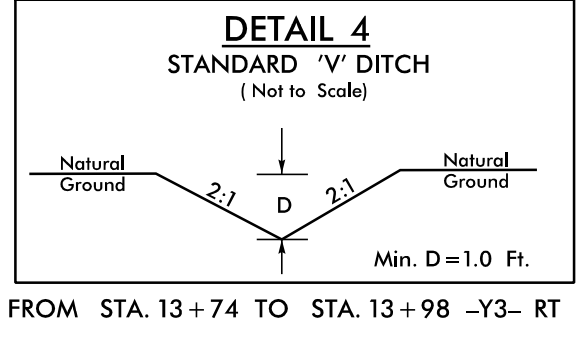
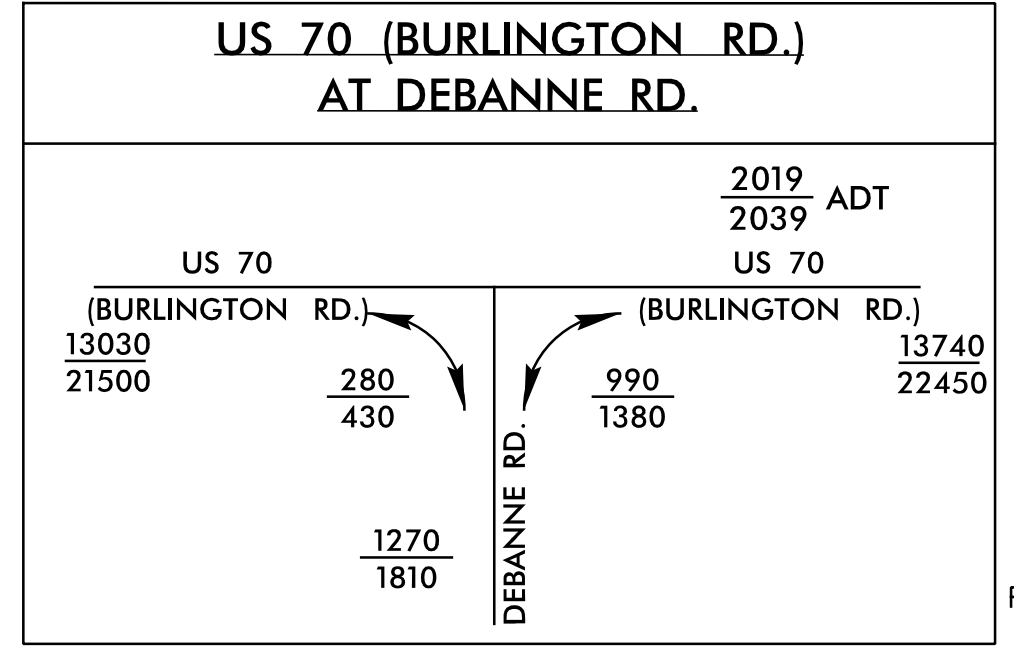
7/24/2019  
 R:\Roadway\Proj\U2581BA\_rdu\_psh05.dgn

8.17.17.99

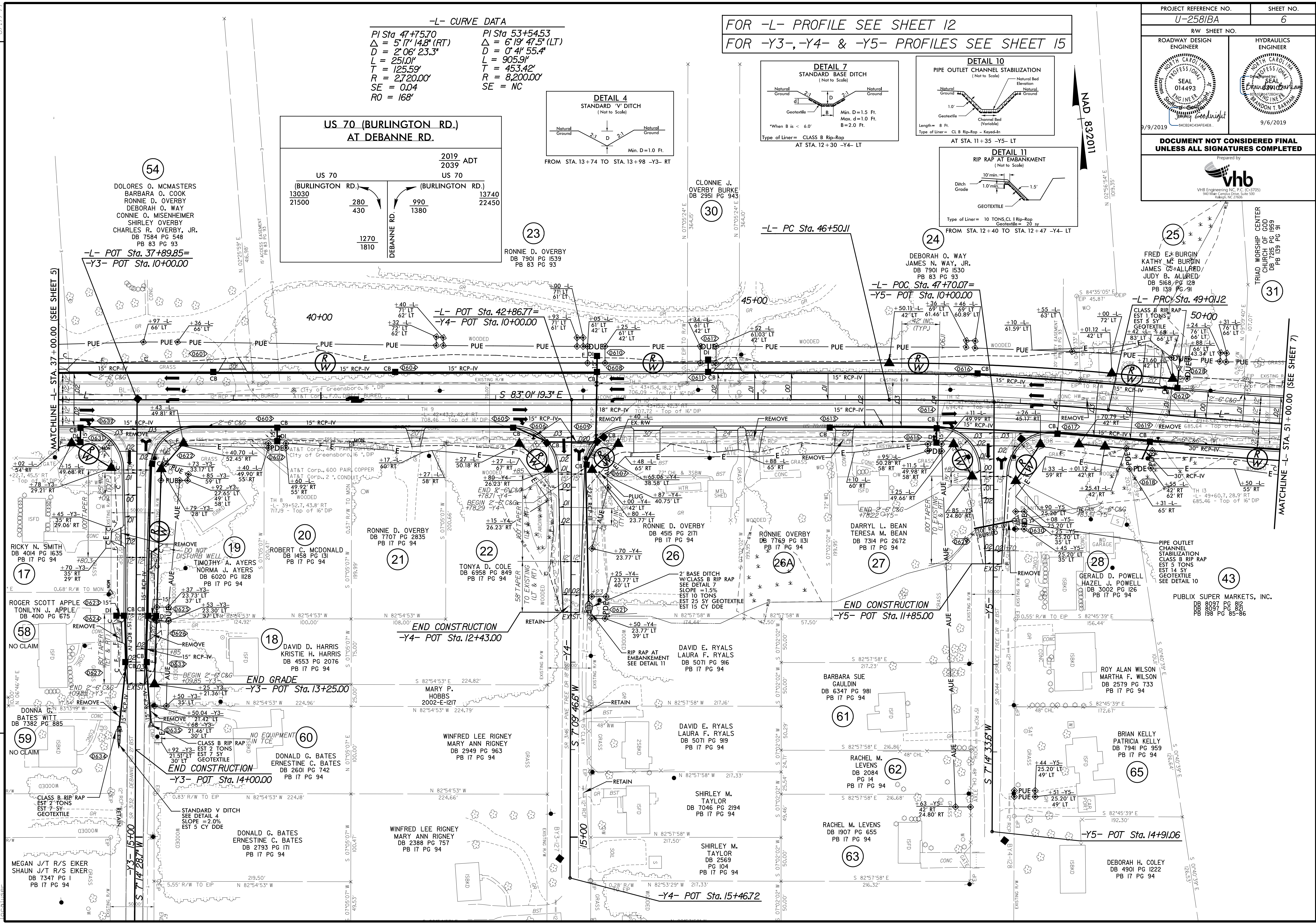
-L- CURVE DATA

PI Sta 47+75.0	PI Sta 53+54.53
$\Delta = 5^{\circ}17'14.8''$ (RT)	$\Delta = 6^{\circ}19'47.5''$ (LT)
D = 2'06" 23.3'	D = 0'41" 55.4'
L = 251.0'	L = 905.9'
T = 125.59'	T = 453.42'
R = 27200.0'	R = 8200.00'
SE = 0.04	SE = NC
RO = 168'	

FOR -L- PROFILE SEE SHEET 12  
 FOR -Y3-, -Y4- & -Y5- PROFILES SEE SHEET 15



PROJECT REFERENCE NO. U-2581BA SHEET NO. 6  
 RW SHEET NO.  
 ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER  
 SEAL 014493  
 9/9/2019 9/6/2019  
 DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED  
 Prepared by vhb  
 VHB Engineering NC, P.C. (C-3705)  
 9400 Wilkes Center Drive, Suite 200  
 Raleigh, NC 27606  
 TRIAD WORSHIP CENTER CHURCH OF GOD DB 726 PG 959 PB 159 PG 91  
 FRED E. BURGIN KATHY M. BURGIN JAMES M. ALLRED JUDY B. ALLRED DB 5168 PG 129 PB 139 PG 91



REVISIONS

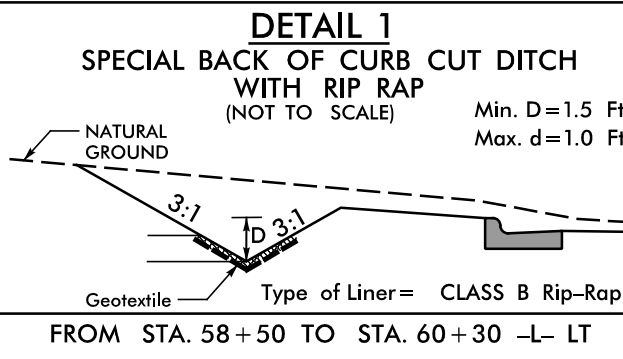
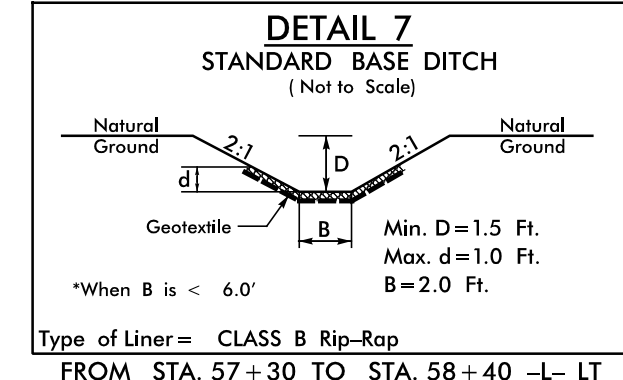
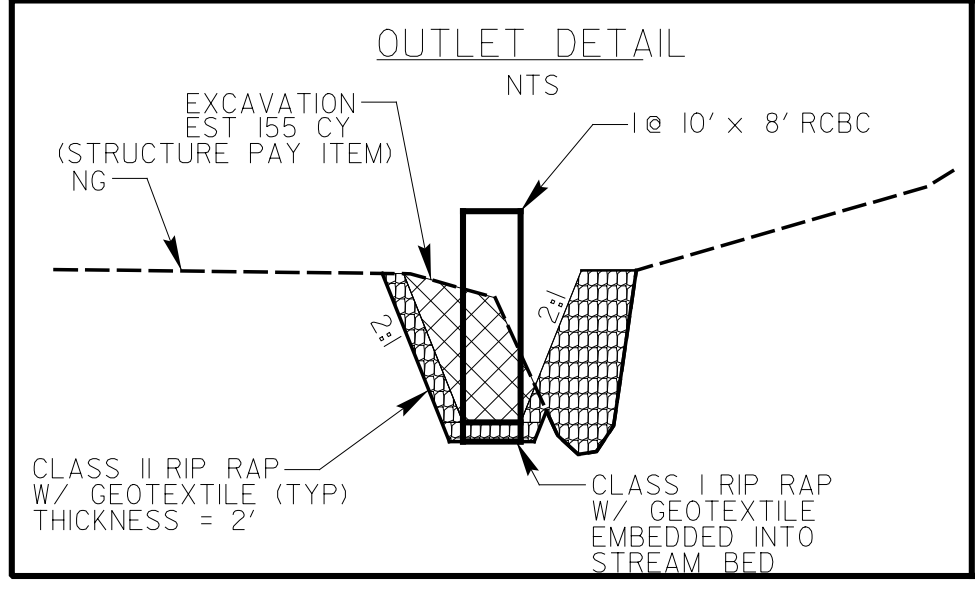
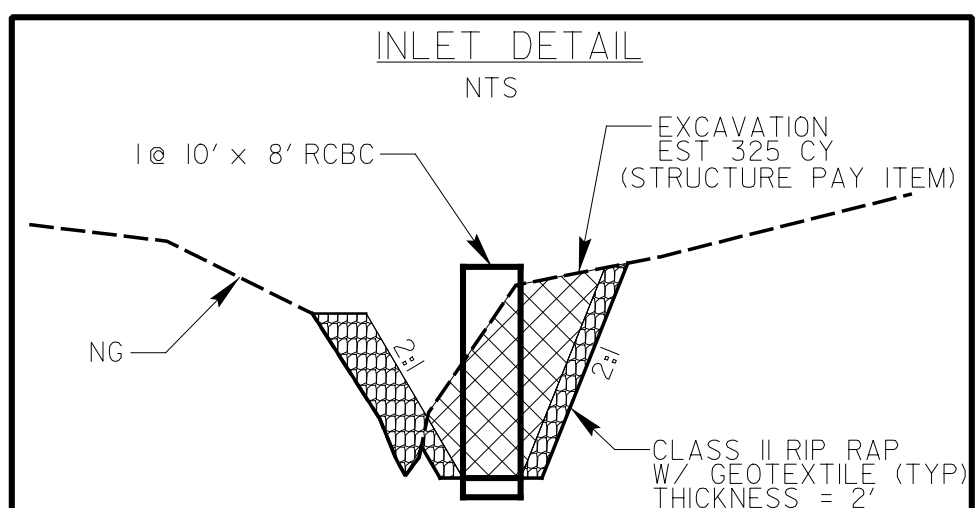
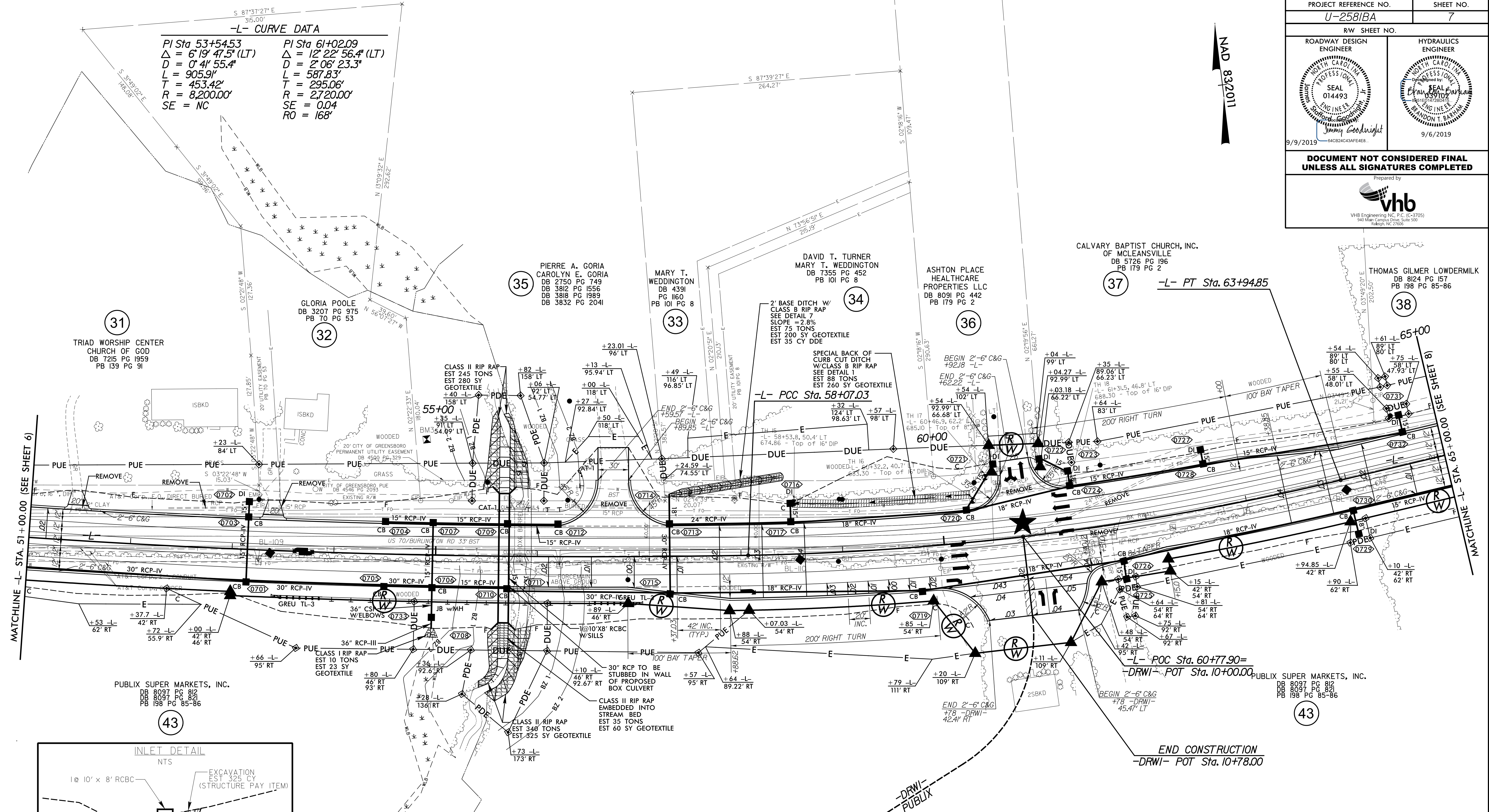
7/24/2019 R:\Roadway\Proj\U2581BA\_rdy\_psh06.dgn

PROJECT REFERENCE NO. <b>U-2581BA</b>		SHEET NO. <b>7</b>	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		SEAL 014493 JIMMY GOODNIGHT STATE OF NORTH CAROLINA 9/9/2019	
		SEAL 014493 CHRISTOPHER BARRON STATE OF NORTH CAROLINA 9/6/2019	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
Prepared by <b>vhb</b> VHB Engineering NC, P.C. (C-3705) 9400 Wilkes Center Drive, Suite 200 Raleigh, NC 27606			

NAD 83/2011

**-L- CURVE DATA**

PI Sta 53+54.53	PI Sta 61+02.09
$\Delta = 6^{\circ}19'47.5"$ (LT)	$\Delta = 12^{\circ}22'56.4"$ (LT)
$D = 0^{\circ}4'55.4"$	$D = 2^{\circ}06'23.3"$
$L = 905.9'$	$L = 587.83'$
$T = 453.42'$	$T = 295.06'$
$R = 8,200.00'$	$R = 2,720.00'$
SE = NC	SE = 0.04
	RO = 168'






★ PROPOSED TRAFFIC SIGNAL

FOR -L- PROFILE SEE SHEET 12  
FOR -DRWI- PROFILE SEE SHEET 16  
FOR CULVERT PLANS SEE SHEETS C-1 THRU C-8

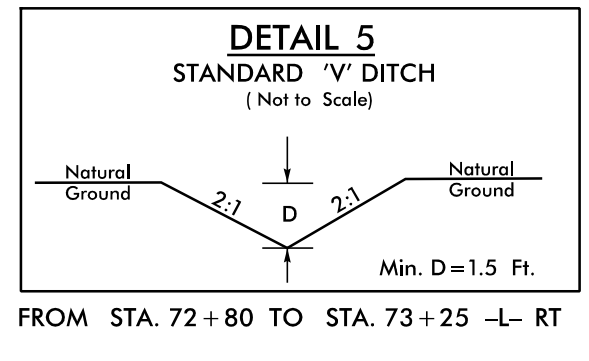
REVISIONS

8/17/19  
R:\Projects\2019\U-2581BA\Pro\U-2581BA\_rdu\_pah07.dgn

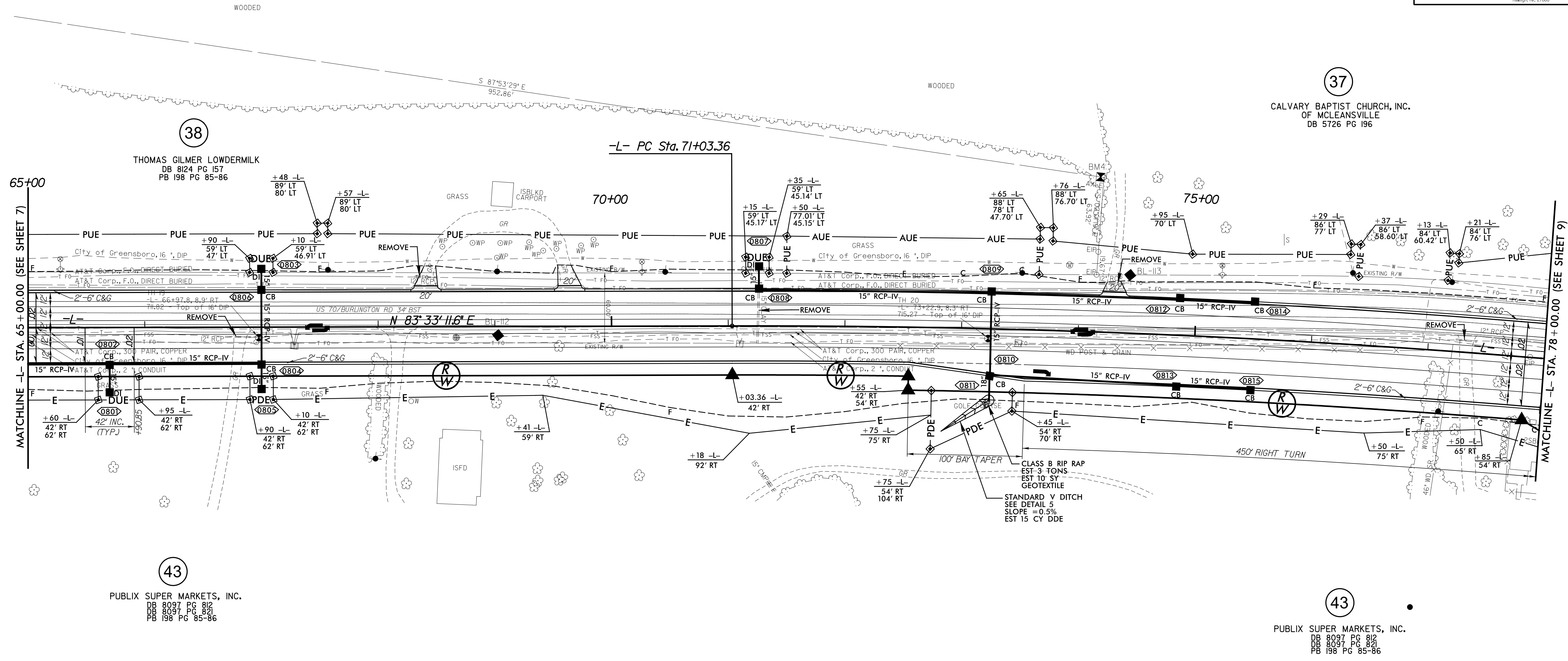
8/17/19

PROJECT REFERENCE NO. <b>U-2581BA</b>	SHEET NO. <b>8</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER 
9/9/2019	9/6/2019
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
Prepared by  VHB Engineering NC, P.C. (C-3705) 940 West Campus Drive, Suite 200 Raleigh, NC 27608	

NAD 832011



**-L- CURVE DATA**  
 PI Sta 78+31.90  
 $\Delta = 101^{\circ}2'58.5"$  (RT)  
 $D = 0^{\circ}42'10.9"$   
 $L = 1,453.20'$   
 $T = 728.53'$   
 $R = 8,150.00'$   
 SE = NC



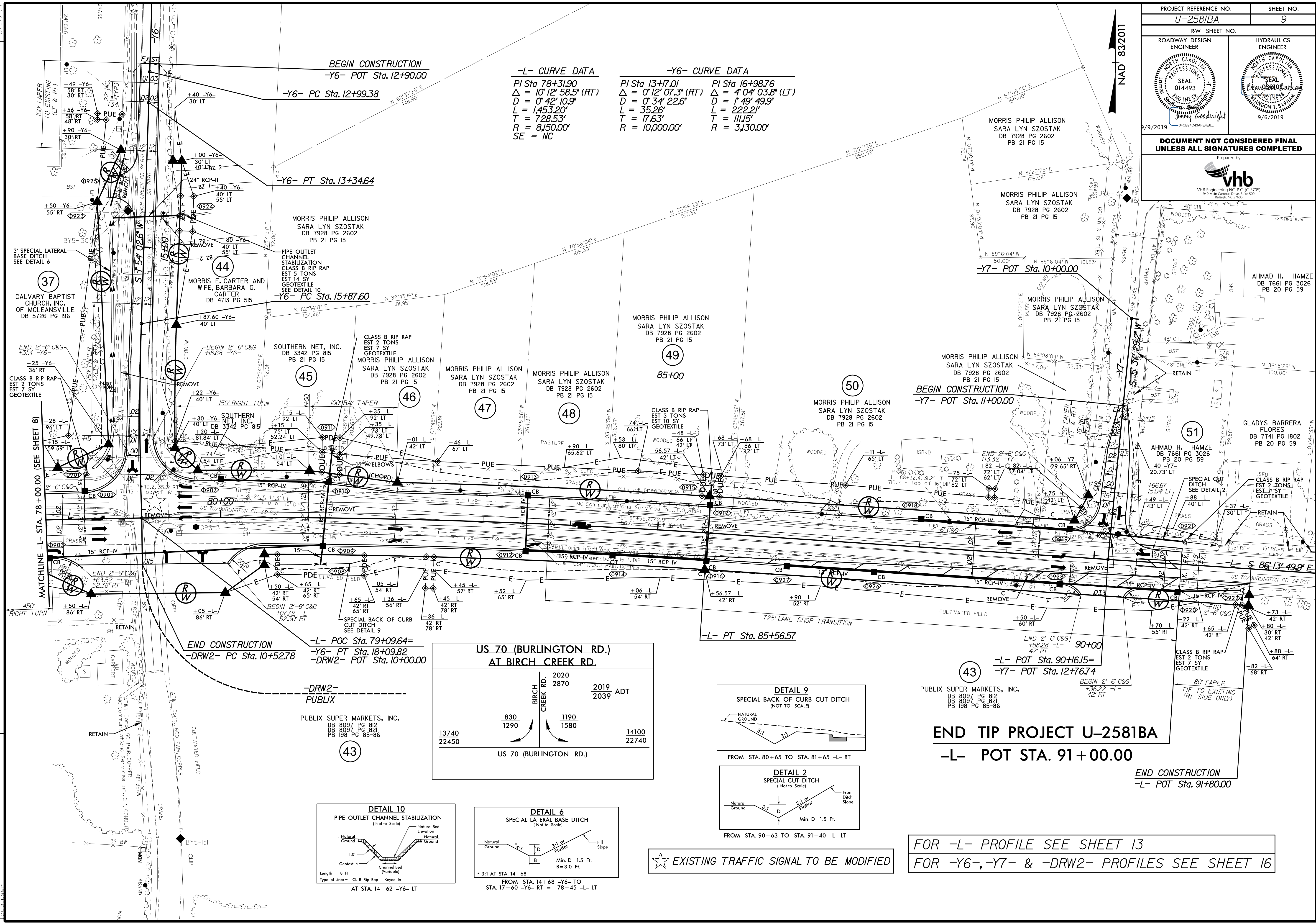
REVISIONS

FOR -L- PROFILE SEE SHEET 13

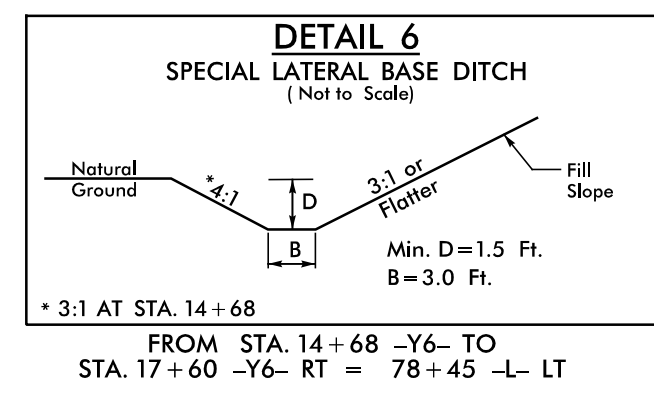
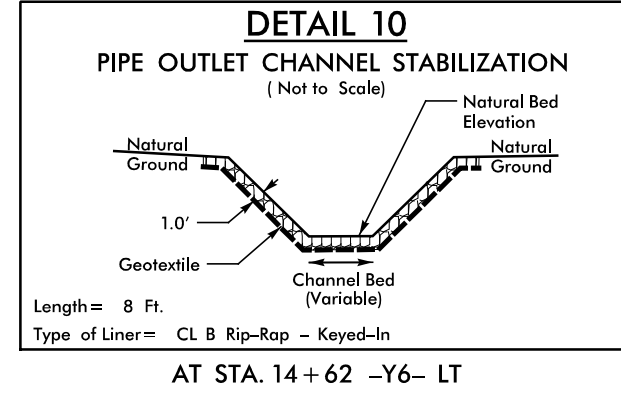
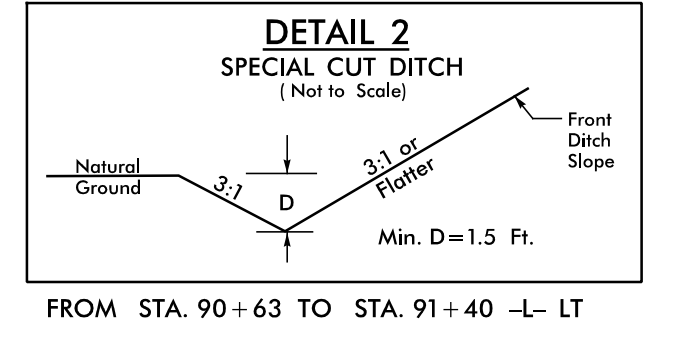
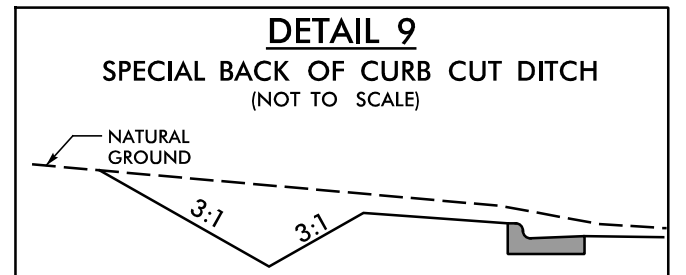
8/27/2019  
R:\Roadway\Proj\U2581BA\_rdu\_psh08.dgn  
localuser

PROJECT REFERENCE NO. <b>U-2581BA</b>		SHEET NO. <b>9</b>	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		PROFESSIONAL SEAL 014493 NORTH CAROLINA PROFESSIONAL ENGINEER SARA LYN SZOSTAK DB 7928 PG 2602 PB 21 PG 15 9/9/2019	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
Prepared by <b>vhb</b> VHB Engineering, Inc. P.C. (C-3705) 9400 Wilkes Center Drive, Suite 200 Raleigh, NC 27606			

-L- CURVE DATA		-Y6- CURVE DATA	
PI Sta 78+31.90	$\Delta = 10^\circ 12' 58.5" (RT)$	PI Sta 13+7.01	$\Delta = 0^\circ 12' 07.3" (RT)$
$D = 0^\circ 42' 10.9"$	$L = 1,453.20'$	$D = 0^\circ 34' 22.6"$	$L = 35.26'$
$T = 728.53'$	$R = 8,150.00'$	$T = 17.63'$	$R = 10,000.00'$
$SE = NC$		PI Sta 16+98.76	$\Delta = 4^\circ 04' 03.8" (LT)$
		$D = 1^\circ 49' 49.9"$	$L = 222.21'$
		$T = 111.15'$	$R = 3,130.00'$



US 70 (BURLINGTON RD.) AT BIRCH CREEK RD.			
	2020 2870	2019 2039	ADT
830 1290		1190 1580	
13740 22450		14100 22740	



**END TIP PROJECT U-2581BA**  
-L- POT STA. 91+00.00

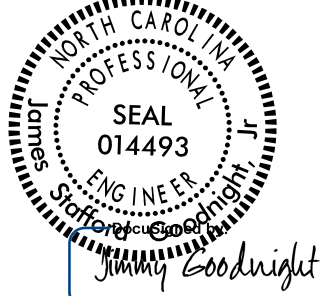


**END CONSTRUCTION**  
-L- POT STA. 91+80.00

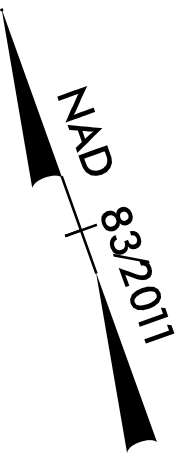
FOR -L- PROFILE SEE SHEET 13  
FOR -Y6-, -Y7- & -DRW2- PROFILES SEE SHEET 16

EXISTING TRAFFIC SIGNAL TO BE MODIFIED

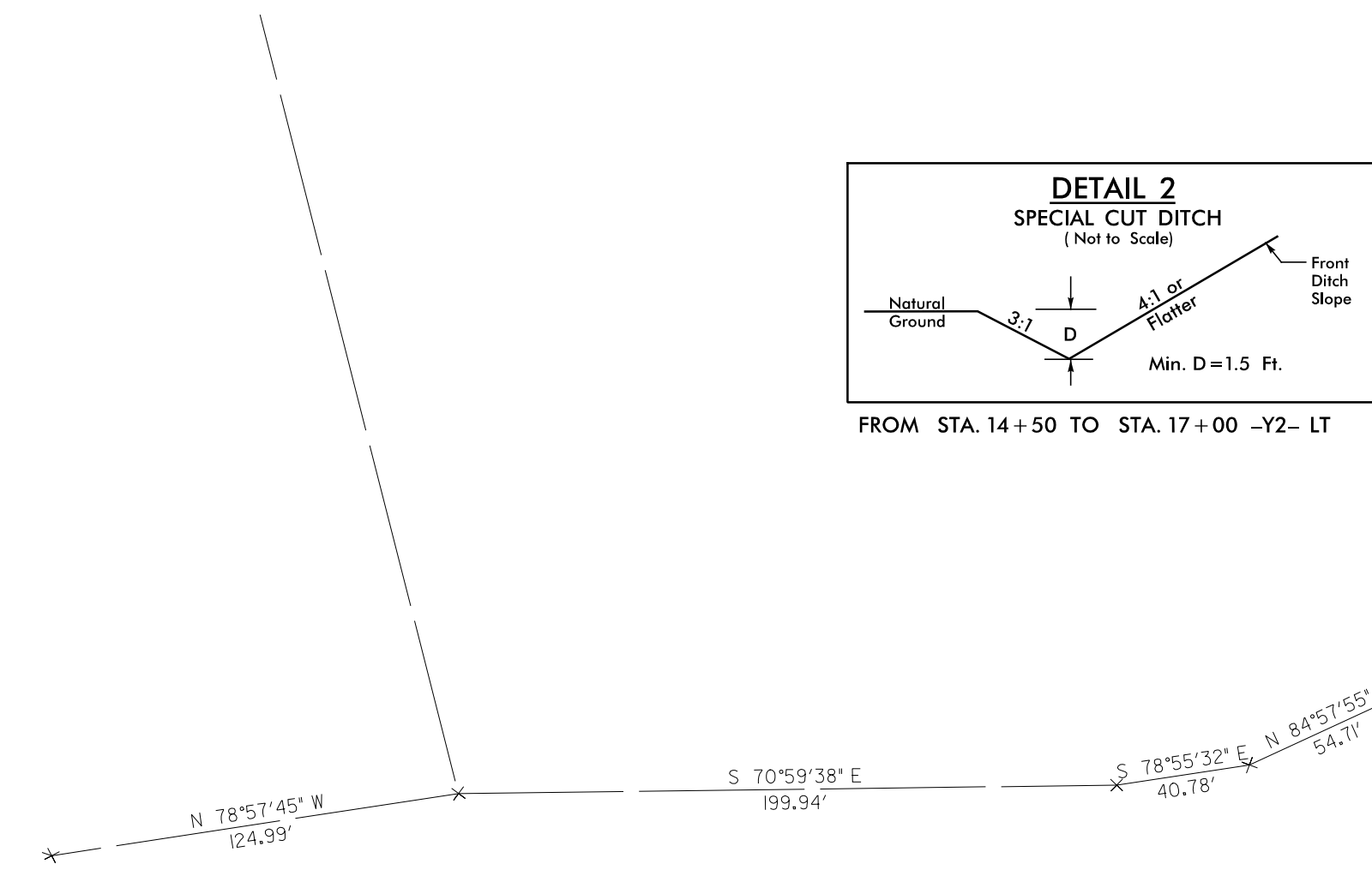
REVISIONS

R:\Roadway\Proj\U2581BA\_rdu\_psh09.dgn  
9/27/2019 10:00 AM

PROJECT REFERENCE NO. <b>U-2581BA</b>	SHEET NO. <b>10</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER 
9/9/2019	9/6/2019
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
Prepared by  vhb VH8 Engineering NC, P.C. (C-3705) 940 W. Campus Drive, Suite 200 Raleigh, NC 27606	



REVISIONS

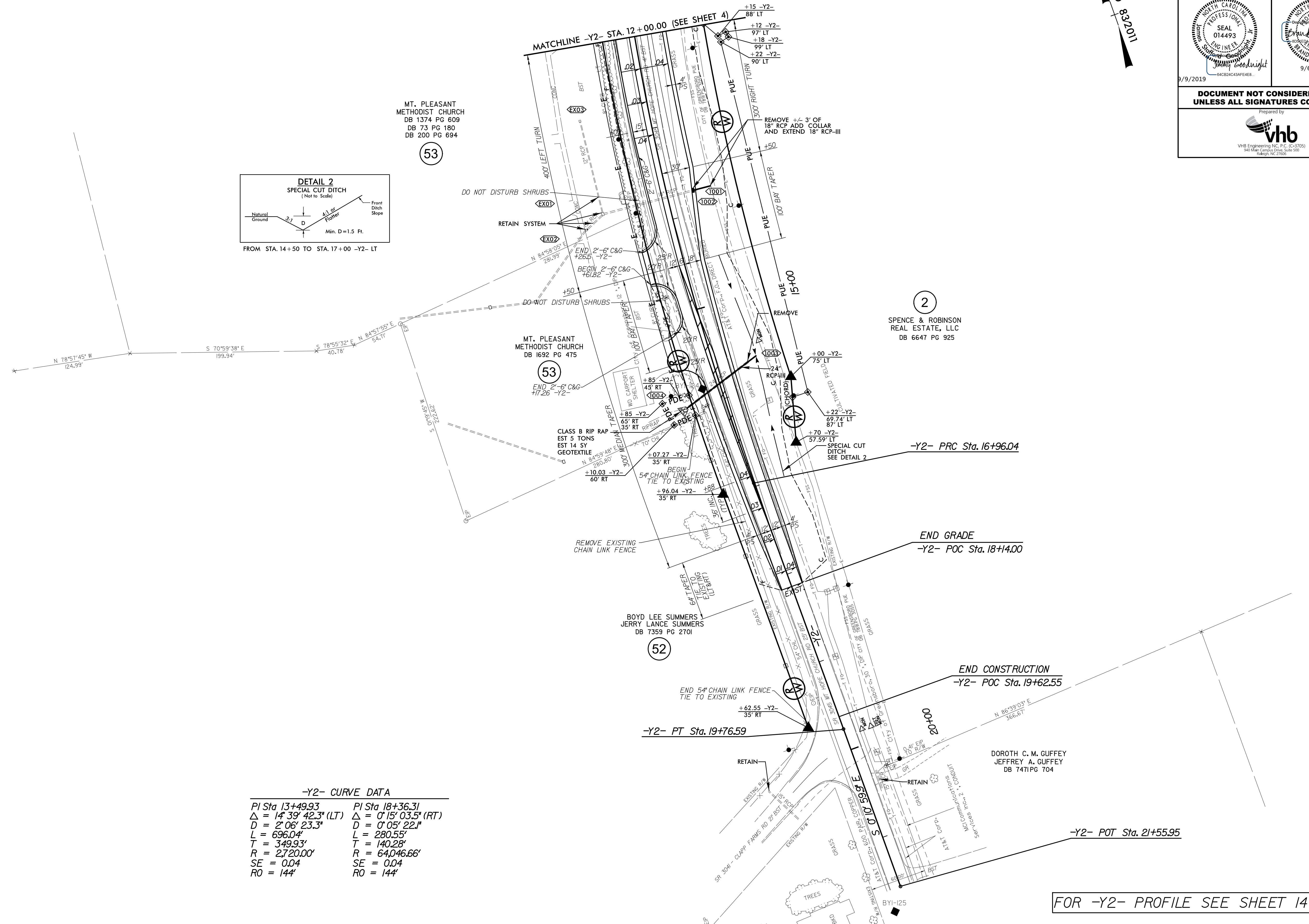


**DETAIL 2  
SPECIAL CUT DITCH**  
(Not to Scale)

FROM STA. 14+50 TO STA. 17+00 -Y2- LT

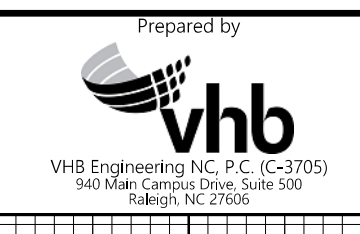
**-Y2- CURVE DATA**

PI Sta 13+49.93	PI Sta 18+36.31
$\Delta = 14^{\circ} 39' 42.3"$ (LT)	$\Delta = 0^{\circ} 15' 03.5"$ (RT)
$D = 2^{\circ} 06' 23.3"$	$D = 0^{\circ} 05' 22.1"$
$L = 696.04'$	$L = 280.55'$
$T = 349.93'$	$T = 140.28'$
$R = 2,720.00'$	$R = 64,046.66'$
$SE = 0.04$	$SE = 0.04$
$RO = 144'$	$RO = 144'$



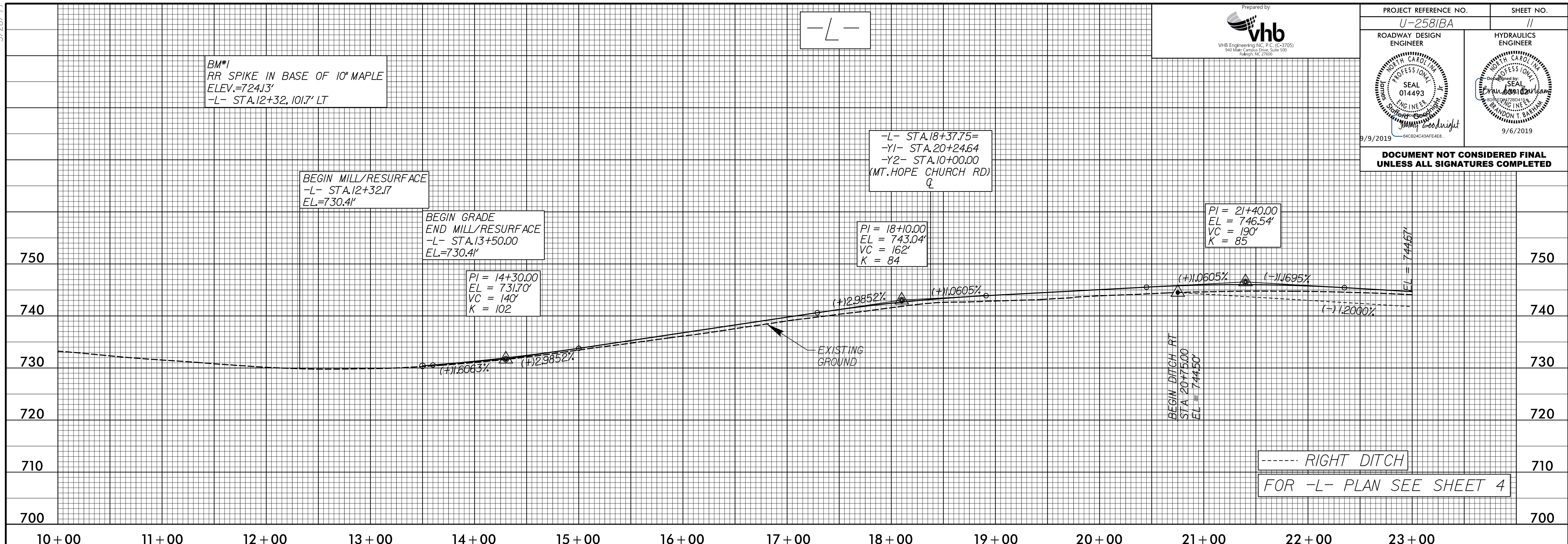
FOR -Y2- PROFILE SEE SHEET 14

5/28/2019



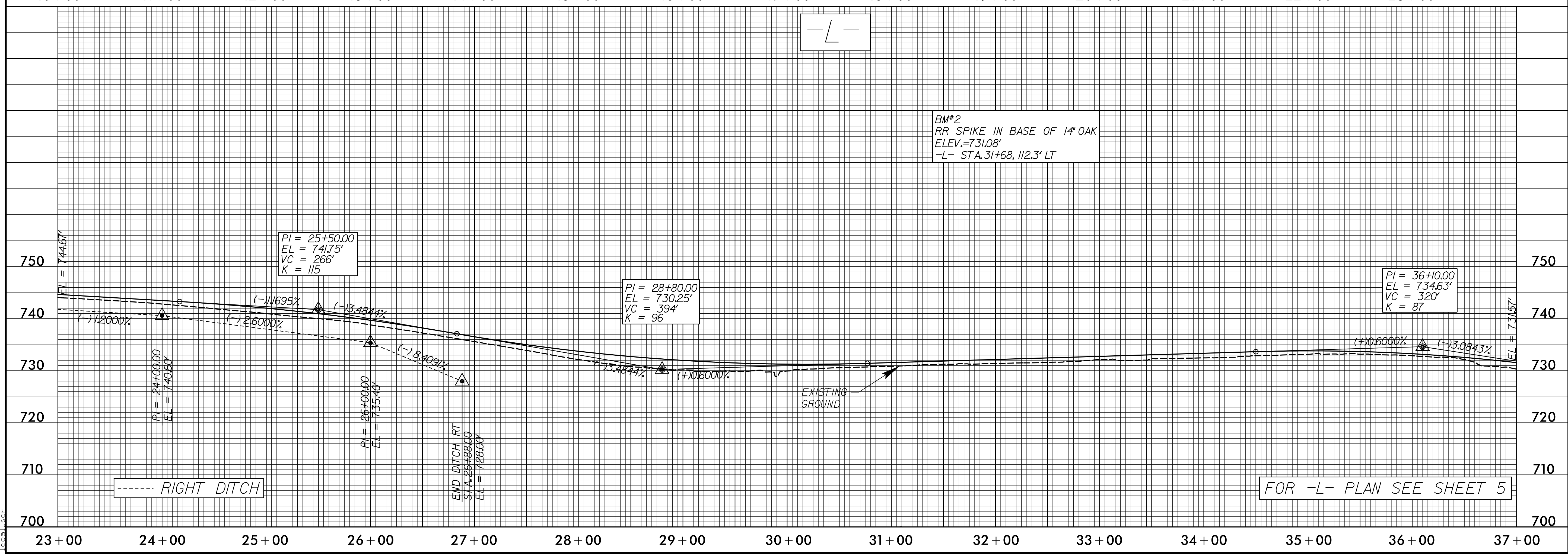
PROJECT REFERENCE NO. U-2581BA	SHEET NO. 11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
9/9/2019	9/6/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



RIGHT DITCH FOR -L- PLAN SEE SHEET 4

7/10/2019 R:\Projects\2019\U-2581BA\_rdy\_pfl11.dgn



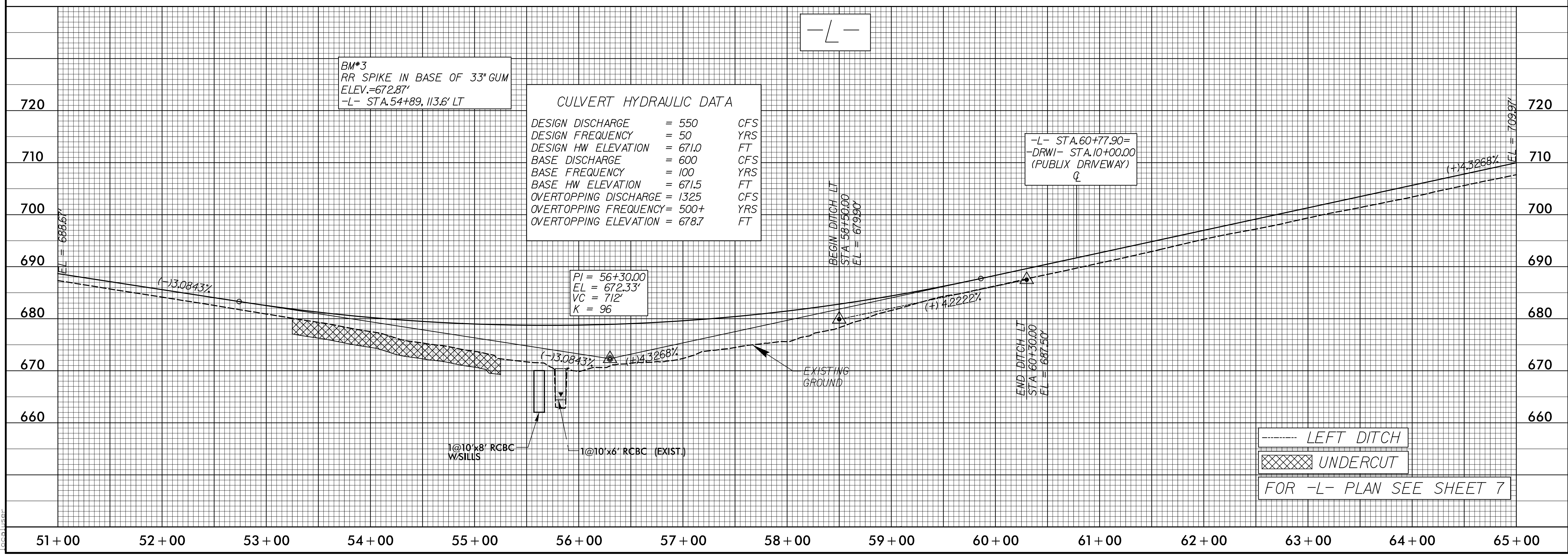
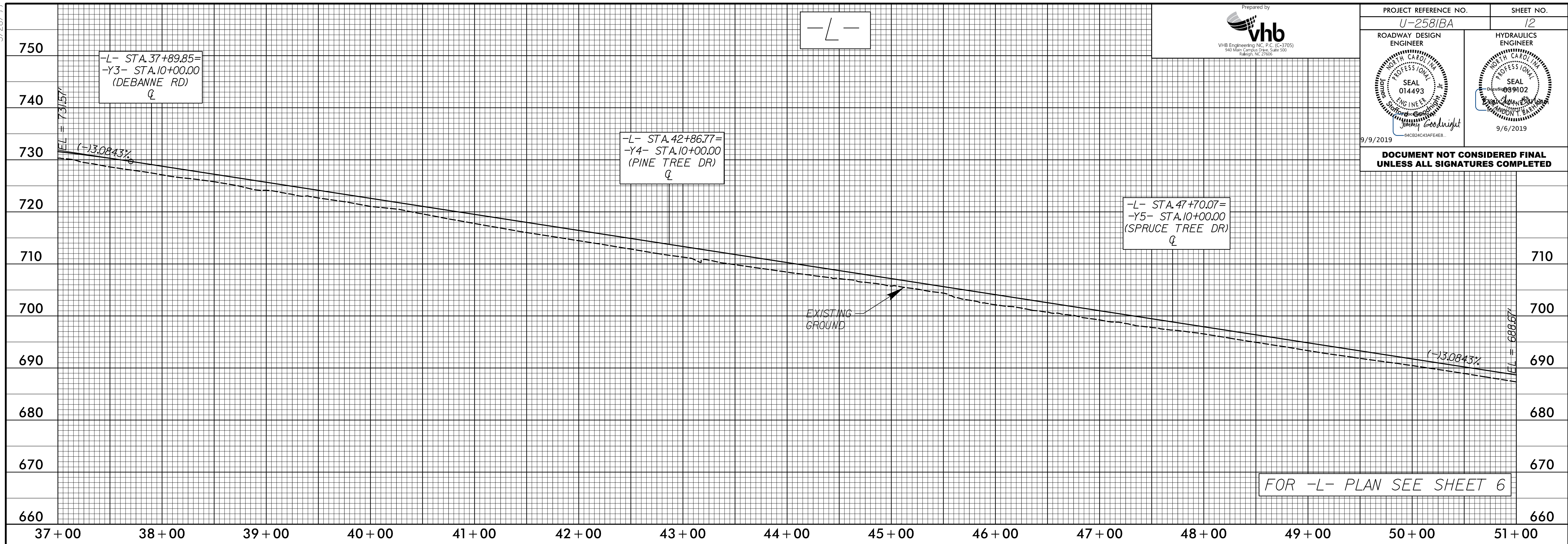
RIGHT DITCH FOR -L- PLAN SEE SHEET 5

5/28/19



PROJECT REFERENCE NO. U-2581BA	SHEET NO. 12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
SEAL 014493	SEAL 089102
9/9/2019	9/6/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



7/19/2019 R:\Projects\U-2581BA\_rdy\_p\112.dgn



5/28/19

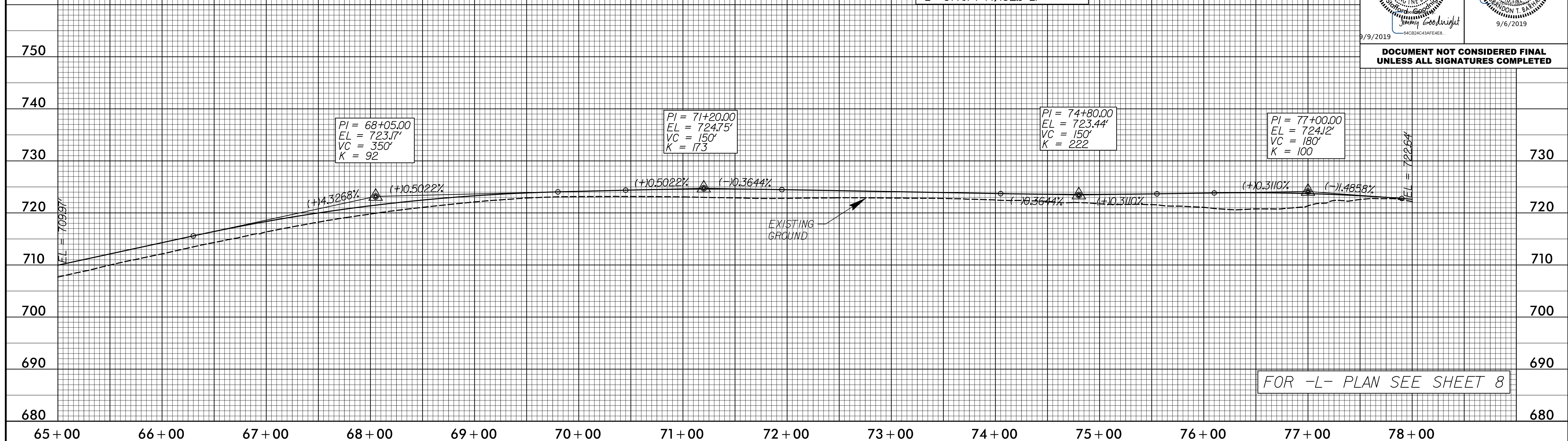
-L-



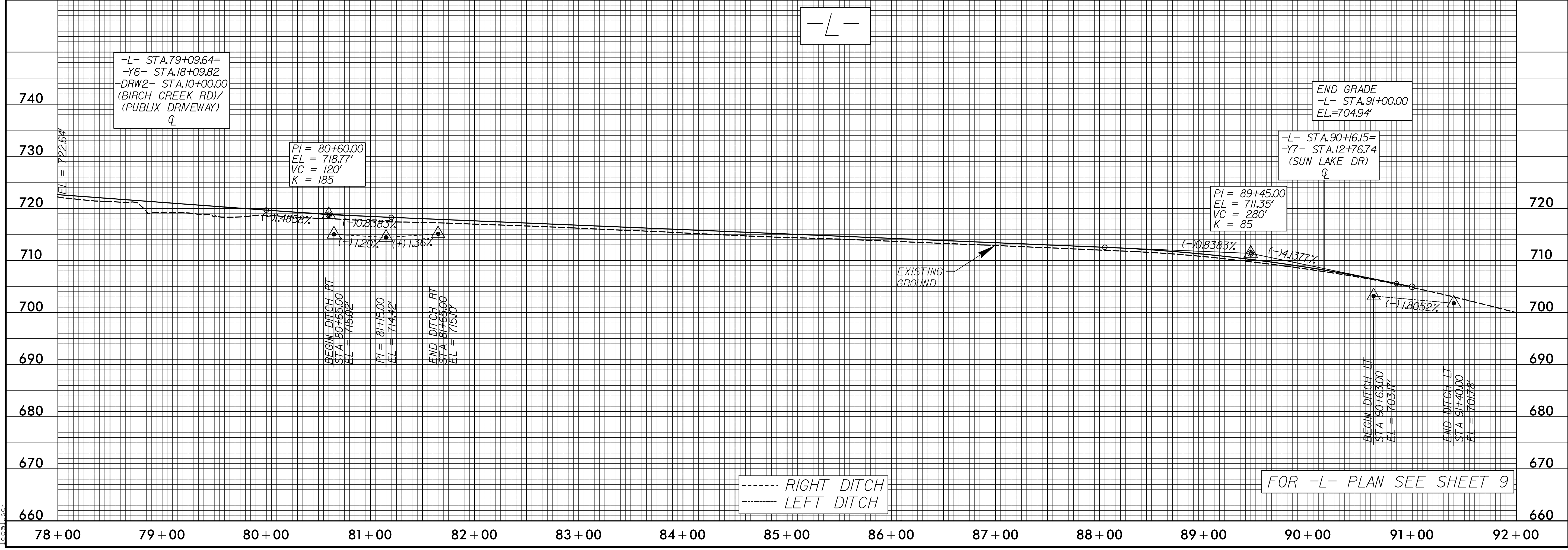
PROJECT REFERENCE NO. U-2581BA	SHEET NO. 13
ROADWAY DESIGN ENGINEER SEAL 014493 JIMMY GOODNIGHT	HYDRAULICS ENGINEER SEAL 039102 THOMAS T. BARRON
9/9/2019	

BM\*4  
RR SPIKE IN BASE OF 3" OAK  
ELEV.=727.48'  
-L- STA.74+14, 132.9' LT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



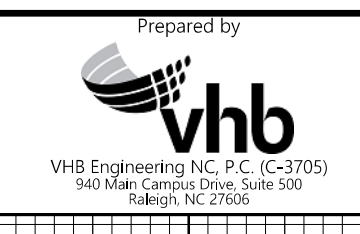
-L-



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

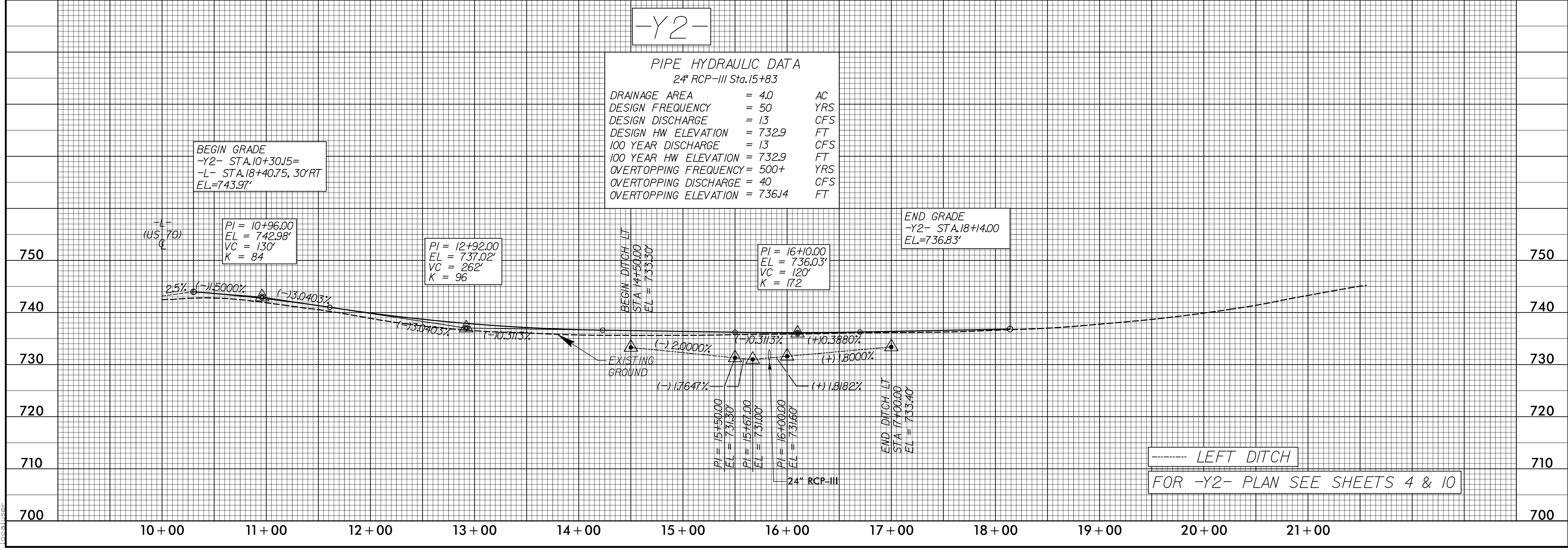
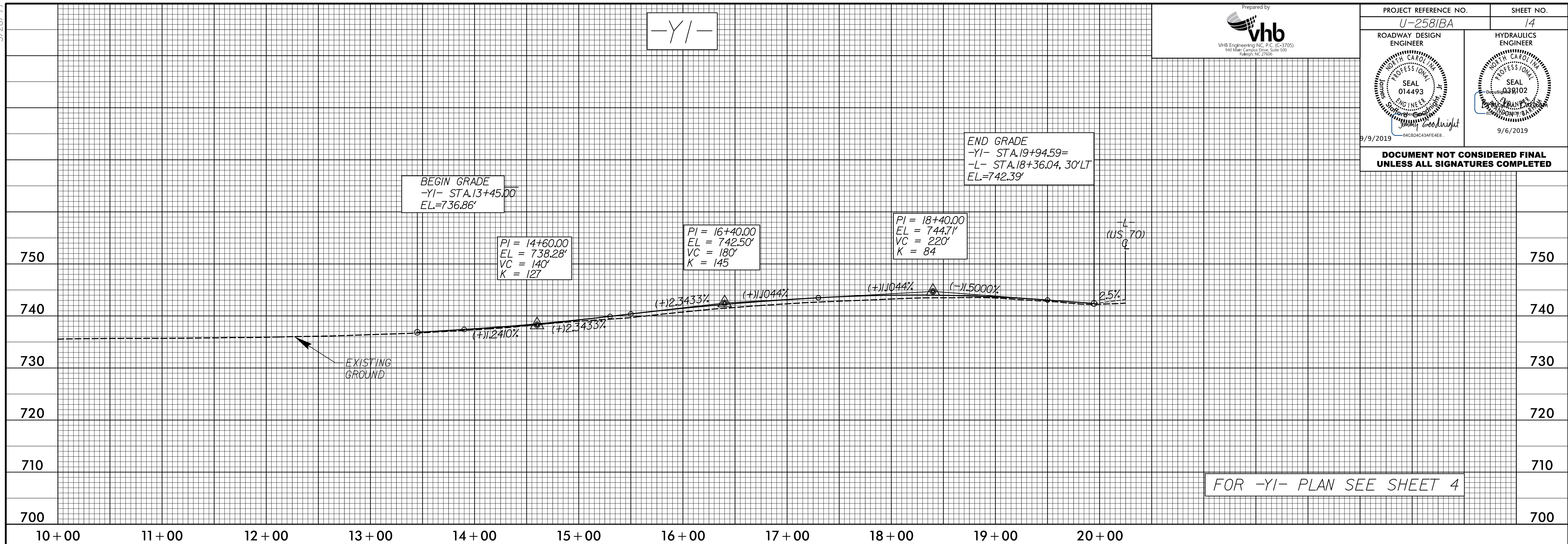
7/10/2019 R:\Projects\U-2581BA\_rdy\_p113.dgn

5/28/19



PROJECT REFERENCE NO. U-2581BA	SHEET NO. 14
ROADWAY DESIGN ENGINEER SEAL 014493 9/9/2019	HYDRAULICS ENGINEER SEAL 030102 9/6/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



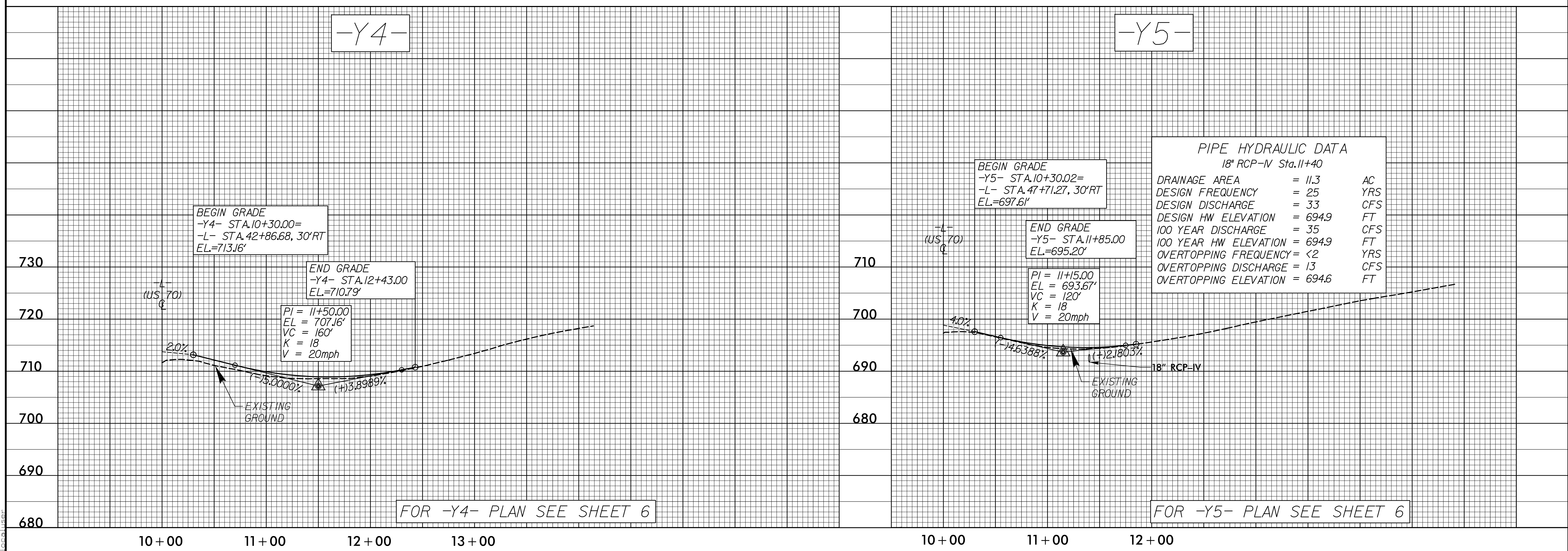
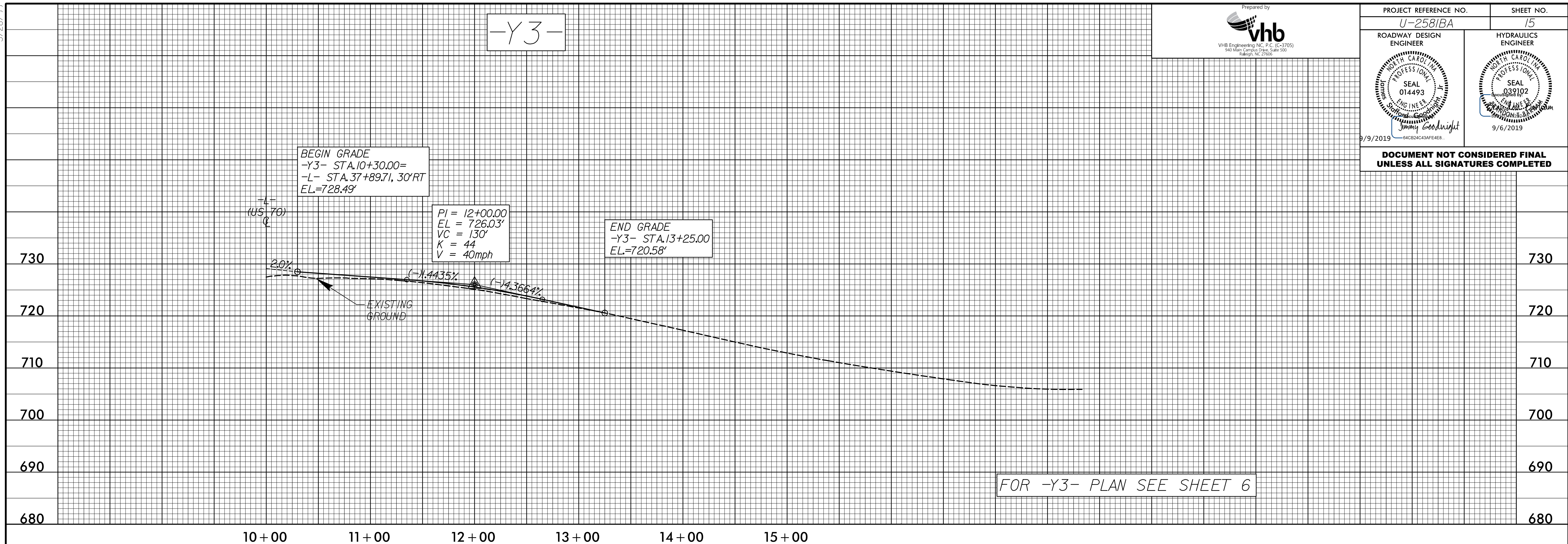
7/10/2019 R:\Projects\2019\U-2581BA\_rdy\_p114.dgn

5/28/19



PROJECT REFERENCE NO. U-2581BA	SHEET NO. 15
ROADWAY DESIGN ENGINEER SEAL 014493 9/9/2019	HYDRAULICS ENGINEER SEAL 039102 9/6/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



**PIPE HYDRAULIC DATA**  
18" RCP-IV Sta.11+40

DRAINAGE AREA	= 11.3	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 33	CFS
DESIGN HW ELEVATION	= 694.9	FT
100 YEAR DISCHARGE	= 35	CFS
100 YEAR HW ELEVATION	= 694.9	FT
OVERTOPPING FREQUENCY	= <2	YRS
OVERTOPPING DISCHARGE	= 13	CFS
OVERTOPPING ELEVATION	= 694.6	FT

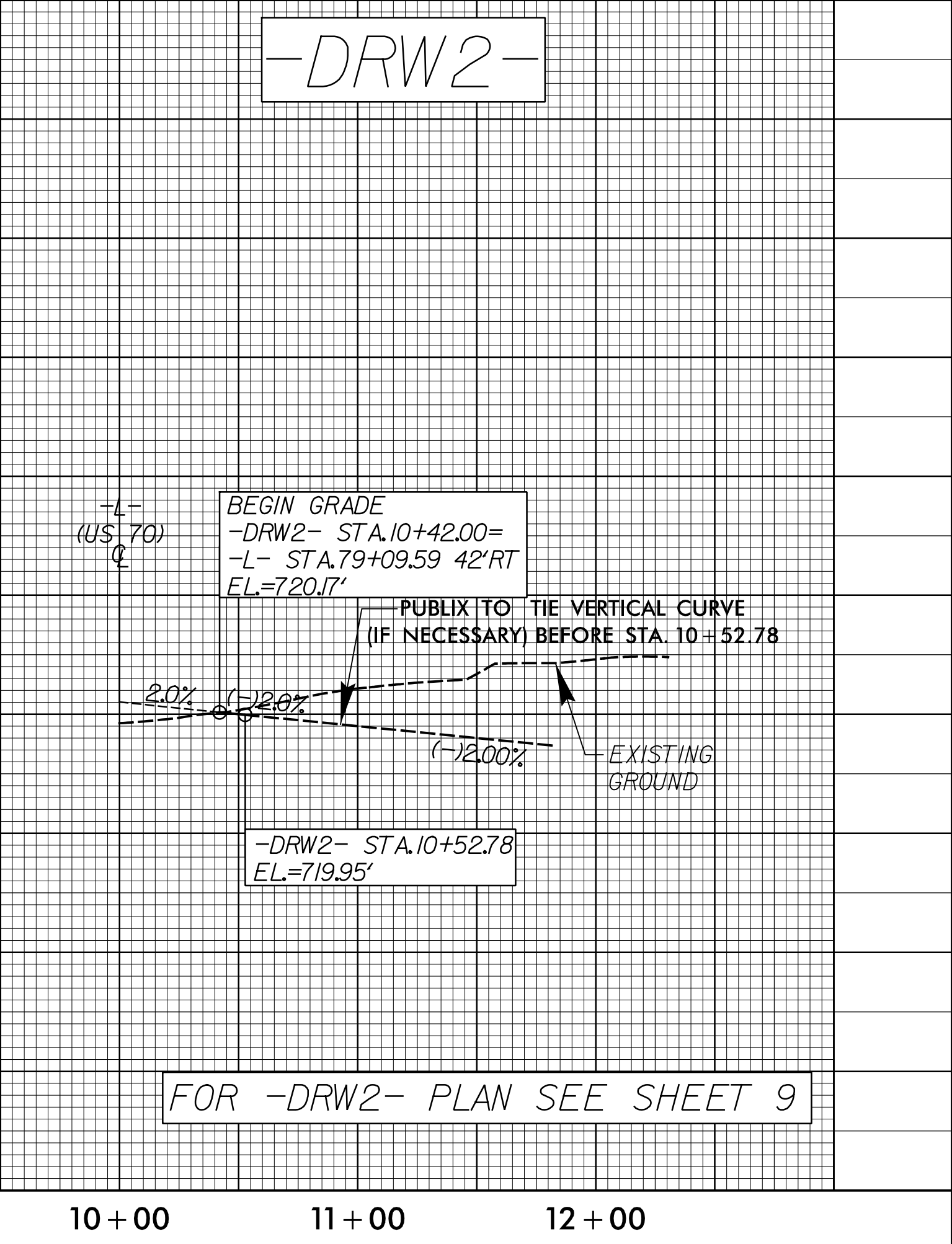
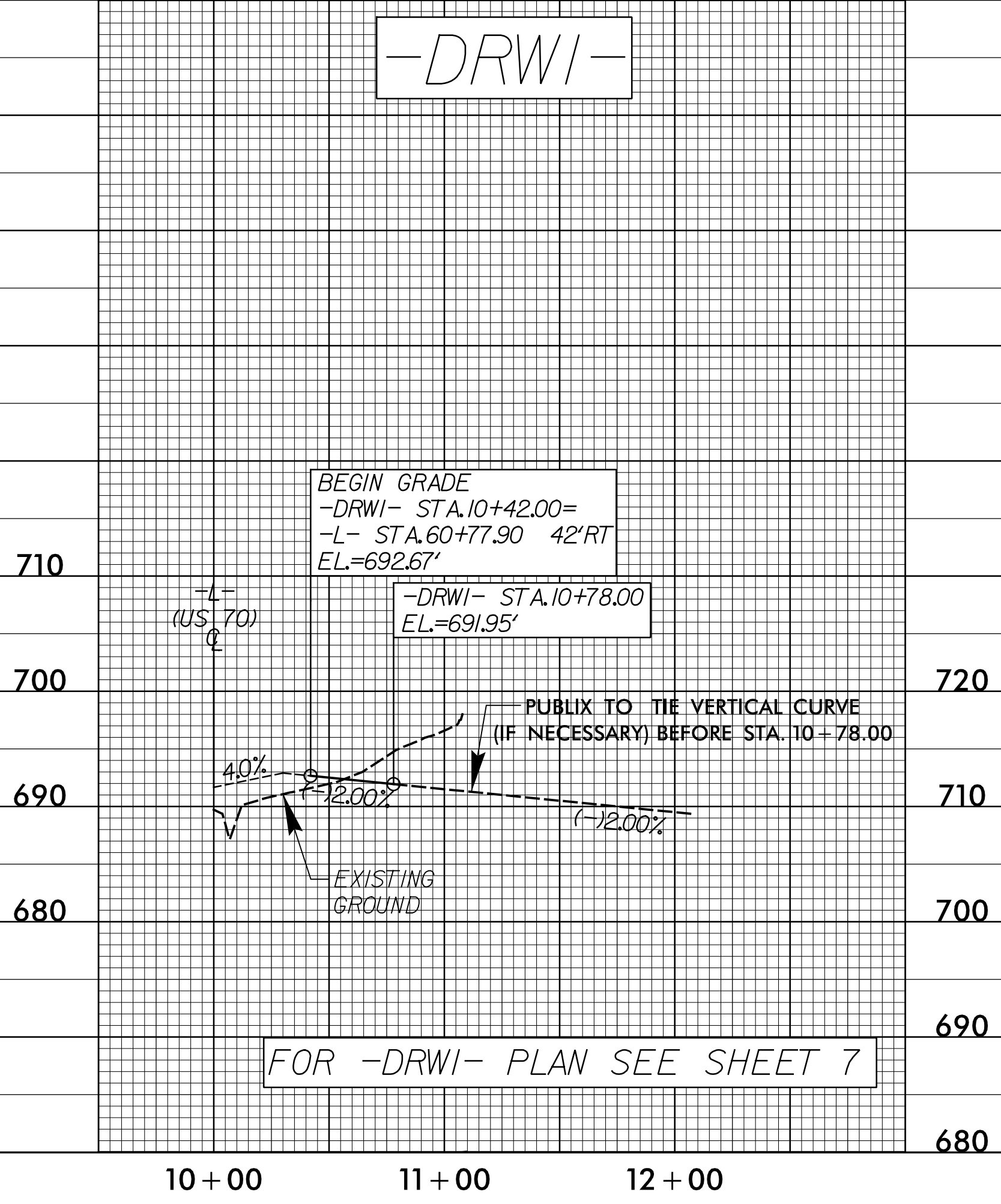
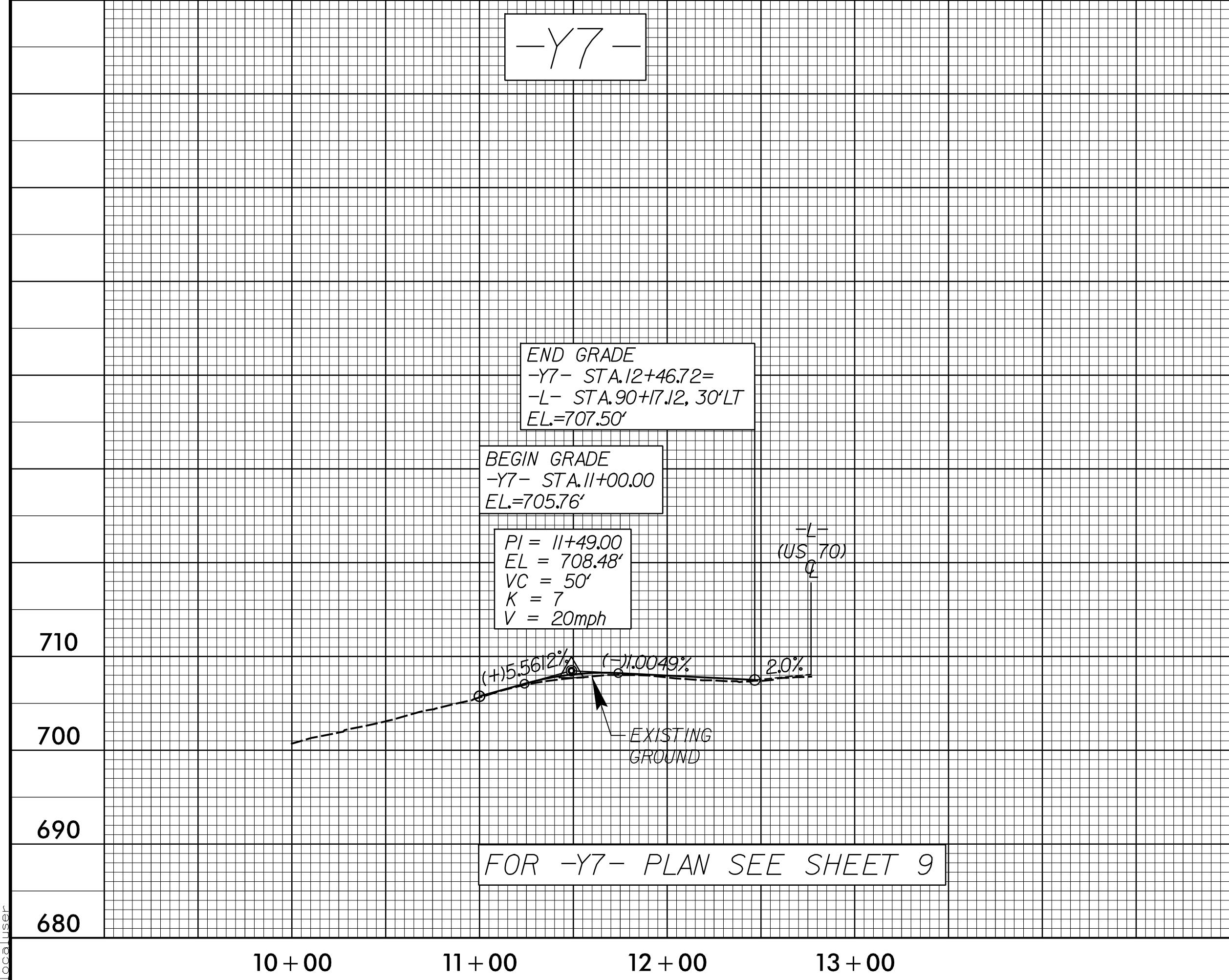
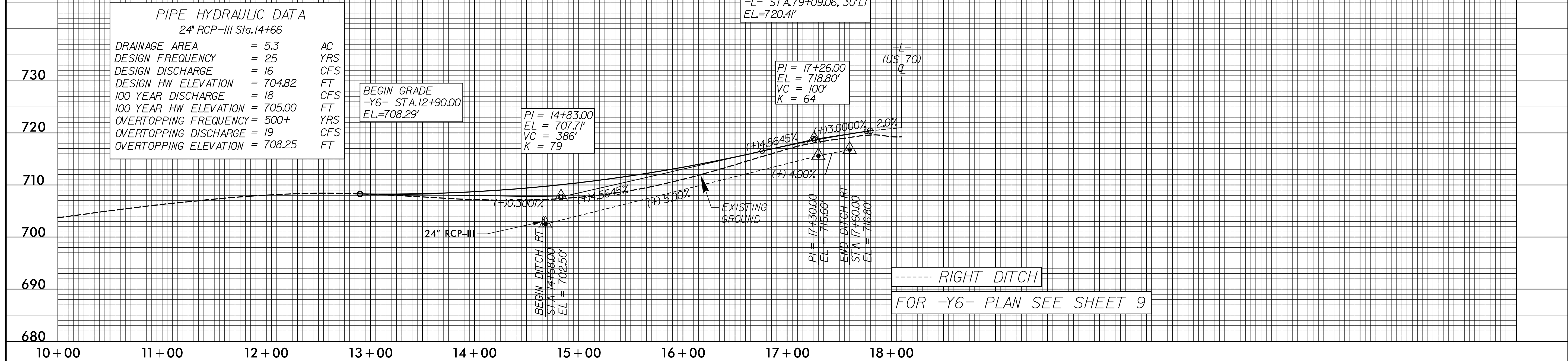
7/10/2019  
R:\Projects\U-2581BA-rdy-p\115.dgn  
Local User

5/28/19



PROJECT REFERENCE NO. U-2581BA	SHEET NO. 16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
9/9/2019	9/6/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



7/10/2019  
R:\Projects\U-2581BA\_rdy\_p\116.dgn