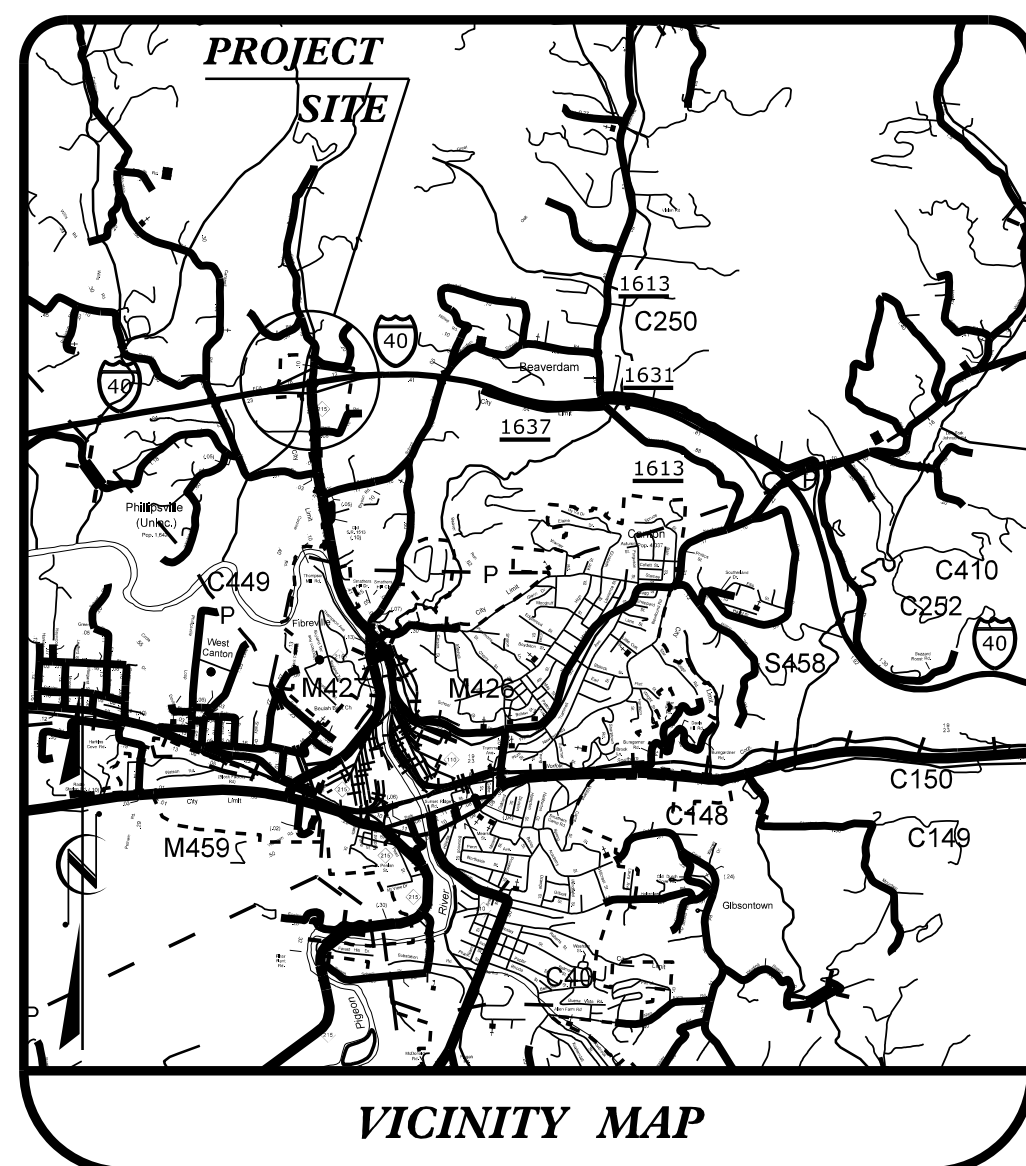


**TIP PROJECT: HB-0004**  
**CONTRACT: C204865**



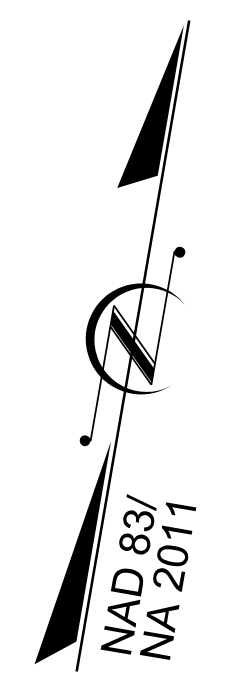
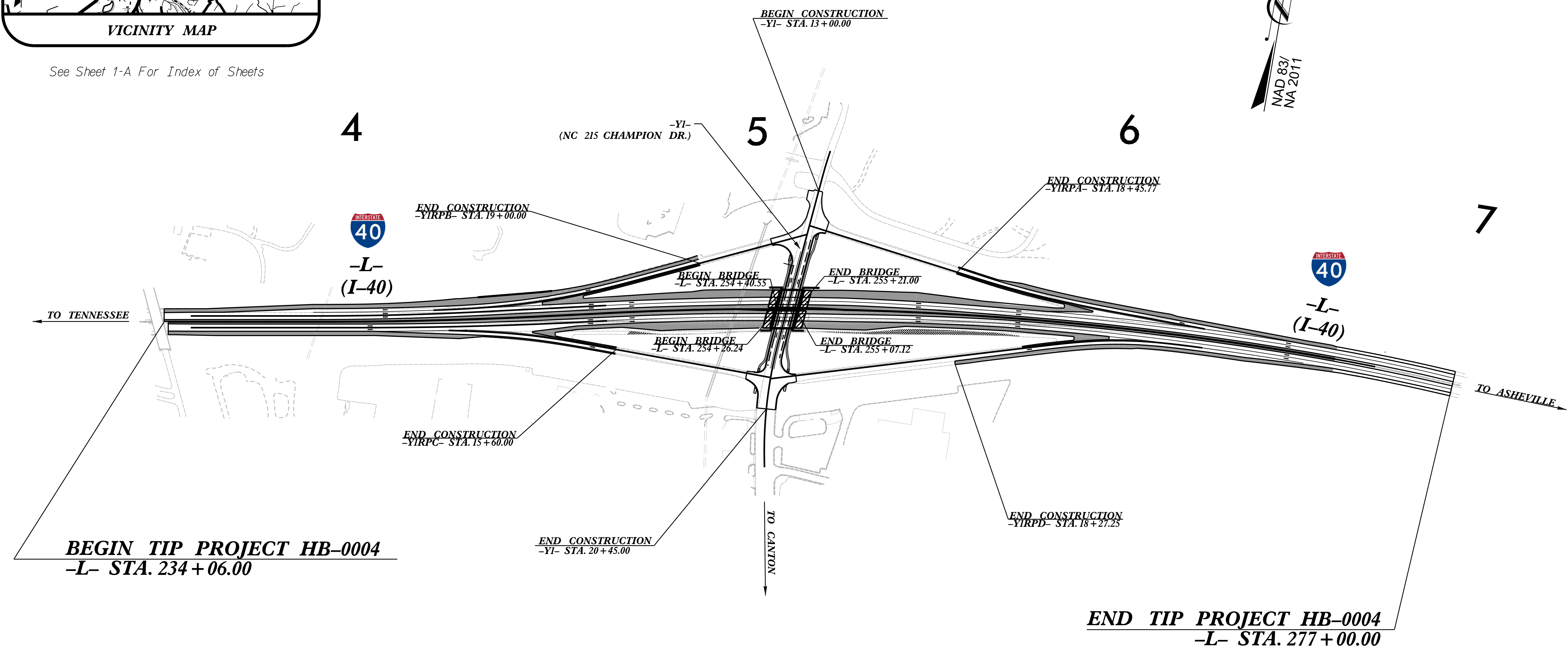
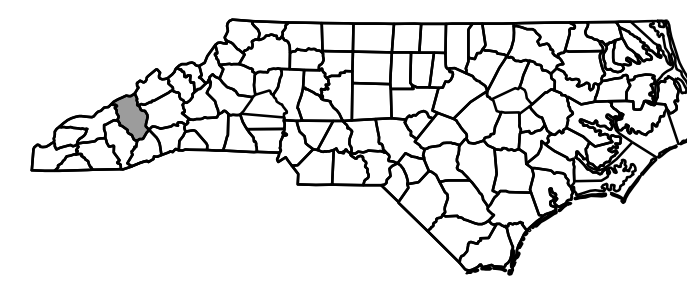
See Sheet 1-A For Index of Sheets

# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS **HAYWOOD COUNTY**

**LOCATION: BRIDGE NO. 430243 OVER  
NC 215 (CHAMPION DRIVE)**

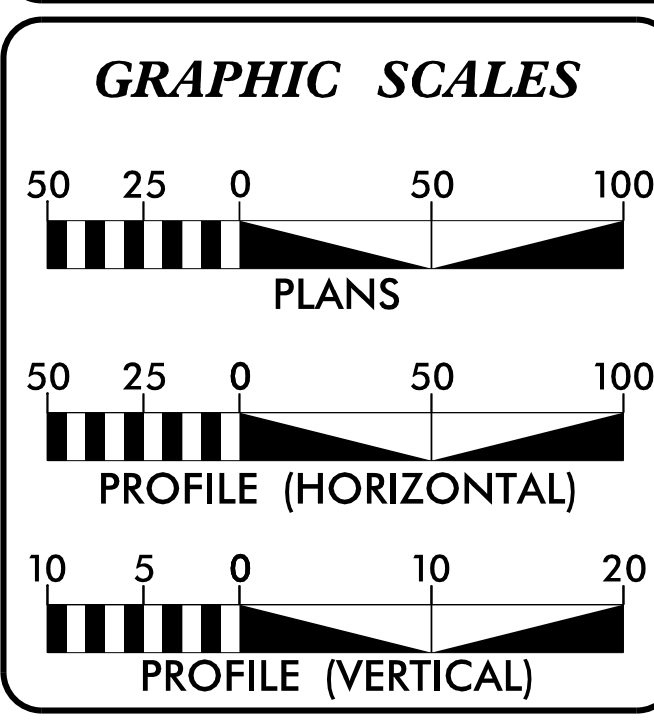
**TYPE OF WORK: GRADING, DRAINAGE, PAVING, & STRUCTURES.**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0004	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
49624.1.1		PE	
49624.2.1		RW, UTIL.	
49624.3.1		CONST.	



THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



**DESIGN DATA**

ADT 2024 =	61,100
ADT 2044 =	88,800
K =	8 %
D =	55 %
T =	20 % *
V =	70 MPH
* TTST =	16% DUAL = 4%
FUNC. CLASS =	INTERSTATE

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT HB-0004	=	0.798 MILES
LENGTH STRUCTURE TIP PROJECT HB-0004	=	0.015 MILES
TOTAL LENGTH TIP PROJECT HB-0004	=	0.813 MILES

Prepared in the Office of:  
**WETHERILL ENGINEERING**  
1223 Jones Franklin Rd. Raleigh, N.C. 27606  
License No. F-0377  
Bus: 919.851.8077 Fax: 919.851.8107

2024 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
SEPTEMBER 12, 2023

**LETTING DATE:**  
JULY 16, 2024

**NCDOT CONTACT:**

Prepared for:  
**DIVISION OF HIGHWAYS  
DIVISION 14**  
253 Webster Road  
Sylva NC, 28779

**GREG PURVIS, PE**  
PROJECT ENGINEER

**JONATHAN HEFNER, PE**  
PROJECT DESIGN ENGINEER

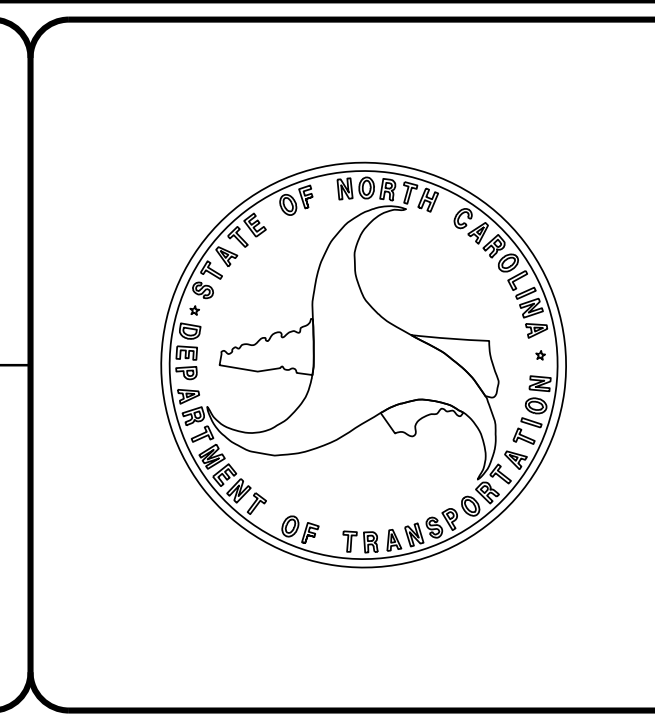
**ZACHARY SHULER, PE**  
DIVISION 14 BRIDGE PROGRAM MANAGER

**HYDRAULICS ENGINEER**  
6/11/2024

DocuSigned by:  
*Matthew L. Harvey*  
D6419C208794EE

**ROADWAY DESIGN ENGINEER** 6/11/2024

DocuSigned by:  
*Jonathan C. Hefner*  
0289A0D7E76E7A7E



6/11/2024  
I:\Projects\HB0004\_rdy\_psh\_01\_tsh.dgn  
User: jhefner

# INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1 THRU 2A-4	TYPICAL SECTIONS, PAVEMENT SCHEDULE, & MISCELLANEOUS DETAILS
2B-1 THRU 2B-3	ROADWAY DETAILS
2C-1 THRU 2C-4	SPECIAL DETAILS
2D-1 THRU 2D-3	DRAINAGE DETAILS
2G-1 THRU 2G-3	GEOTECHNICAL DETAILS
3B-1	ROADWAY SUMMARIES
3D-1 THRU 3D-3	DRAINAGE SUMMARIES
3G-1	GEOTECHNICAL SUMMARIES
4 THRU 14	PLAN AND PROFILE SHEETS
RW-1 THRU RW-5	RIGHT OF WAY SHEETS, SURVEY CONTROL SHEETS, PROPOSED ALIGNMENT CONTROL SHEET AND PROPOSED EASEMENT CONTROL SHEET
TMP-1 THRU TMP-31	TRANSPORTATION MANAGEMENT PLAN
PMP-1 THRU PMP-2	PAVEMENT MARKING PLAN
EC-1 THRU EC-9	EROSION CONTROL PLANS
RF-1	REFORESTATION DETAIL SHEET
SIGN-1 THRU SIGN-8	SIGNING PLANS
UC-1 THRU UC-7	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-06	UTILITIES BY OTHERS PLANS
X-1	CROSS SECTION INDEX
X-1A THRU X1-B	CROSS SECTION SUMMARY SHEETS
X-2 THRU X-39	CROSS SECTIONS
S-1 THRU S-5	STRUCTURE PLANS
C-1 THRU C-9	CULVERT PLANS
W-1 THRU W-4	RETAINING WALL PLANS

# 2024 ROADWAY ENGLISH STANDARD DRAWINGS

## 2024 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Contracts Standards and Development Unit -N. C. Department of Transportation - Raleigh, N. C., Dated January 16, 2024 are applicable to this project and by reference hereby are considered a part of these plans:

### STD.NO. TITLE

#### DIVISION 2 - EARTHWORK

- 200.03 Method of Clearing - Method III
- 225.01 Guide for Grading Subgrade - Interstate and Freeway
- 225.02 Guide for Grading Subgrade - Secondary and Local
- 225.04 Method of Obtaining Super-elevation - Two Lane Pavement
- 225.05 Method of Obtaining Super-elevation - Divided Highways
- 235.01 Embankment Monitoring

#### DIVISION 3 - PIPE CULVERTS

- 300.01 Method of Pipe Installation
- 310.10 Driveway Pipe Construction

#### DIVISION 4 - MAJOR STRUCTURES

- 423.03 Bridge Approach Fills - Type 2 Approach Fill for Bridge Abutment with MSE Wall

#### DIVISION 5 - SUBGRADE, BASES AND SHOULDERS

- 560.01 Method of Shoulder Construction - High Side of Super-elevated Curve - Method I
- 560.02 Method of Shoulder Construction - High Side of Super-elevated Curve - Method II

#### DIVISION 6 - ASPHALT BASES AND PAVEMENTS

- 665.01 Asphalt Shoulders - Milled Rumble Strips

#### DIVISION 8 - INCIDENTALS

- 815.02 Subsurface Drain
- 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
- 840.04 Concrete Open Throat Catch Basin - 12" thru 48" Pipe
- 840.05 Brick Open Throat Catch Basin - 12" thru 48" Pipe
- 840.17 Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
- 840.18 Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
- 840.19 Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
- 840.20 Frames and Wide Slot Flat Grates
- 840.22 Frames and Wide Slot Sag Grates
- 840.25 Anchorage for Frames - Brick or Concrete or Precast
- 840.26 Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
- 840.27 Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
- 840.28 Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
- 840.31 Concrete Junction Box - 12" thru 66" Pipe
- 840.32 Brick Junction Box - 12" thru 66" Pipe
- 840.35 Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
- 840.36 Traffic Bearing Grated Drop Inlet - for Steel (840.37) Double Frame and Grates
- 840.37 Steel Grate and Frame
- 840.41 Spring Box - Concrete or Brick
- 840.45 Precast Drainage Structure
- 840.46 Traffic Bearing Precast Drainage Structure
- 840.54 Manhole Frame and Cover
- 840.66 Drainage Structure Steps
- 840.72 Pipe Collar
- 846.01 Concrete Curb, Gutter and Curb & Gutter
- 846.04 Drop Inlet Installation in Shoulder Berm Gutter
- 848.01 Concrete Sidewalk
- 848.06 Curb Ramp
- 850.01 Concrete Paved Ditches
- 857.01 Precast Reinforced Concrete Barrier - 41" Single Faced
- 862.01 Guardrail Placement
- 862.02 Guardrail Installation
- 862.03 Structure Anchor Units
- 862.04 Anchoring End of Guardrail - for B-77 and B-83 Anchor Units
- 866.02 Woven Wire Fence - with Wood Post
- 876.01 Rip Rap in Channels and Ditches
- 876.02 Guide for Rip Rap at Pipe Outlets
- 876.04 Drainage Ditches with Class 'B' Rip Rap

# GENERAL NOTES

GENERAL NOTES: 2024 SPECIFICATIONS  
EFFECTIVE: 01-16-2024  
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 III.

## SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 & STD. NO. 225.05 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION 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 & STD. NO. 560.02

## 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. 848.03 AT LOCATIONS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.

## 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".

## END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

## UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE

TOWN OF CANTON (WATER/SEWER), DUKE ENERGY (POWER DISTRIBUTION)

DOMINION ENERGY (GAS), CHARTER (COMMUNICATIONS), AT&T (COMMUNICATIONS)

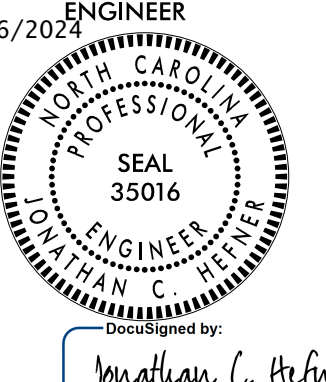
ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

## 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 ACCORDANCE WITH STD 848.06.

PROJECT REFERENCE NO. <i>HB-0004</i>	SHEET NO. <i>1A</i>
ROADWAY DESIGN ENGINEER 5/16/2024  Signed by: <i>Jonathan C. Heifer</i>	1223 Jones Franklin Rd. Raleigh, N.C. 27606 License No. F-0377 Bus: 919 851 8077 Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

# STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

## BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin (EIP)	○
Computed Property Corner	×
Existing Concrete Monument (ECM)	□
Parcel/Sequence Number	(23)
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-☠-s-
Potential Contamination Area: Soil	☠-s-☠-s-
Known Contamination Area: Water	☠-w-☠-w-
Potential Contamination Area: Water	☠-w-☠-w-
Contaminated Site: Known or Potential	☠ ?

## BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○
Well	○
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	WLB
Proposed Lateral, Tail, Head Ditch	▬
False Sump	▽

## RAILROADS:

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

## RIGHT OF WAY & PROJECT CONTROL:

Primary Horiz Control Point	○
Primary Horiz and Vert Control Point	●
Secondary Horiz and Vert Control Point	◆
Vertical Benchmark	⊕
Existing Right of Way Monument	△
Proposed Right of Way Monument (Rebar and Cap)	▲
Proposed Right of Way Monument (Concrete)	⊕
Existing Permanent Easement Monument	◇
Proposed Permanent Easement Monument (Rebar and Cap)	◆
Existing C/A Monument	△
Proposed C/A Monument (Rebar and Cap)	▲
Proposed C/A Monument (Concrete)	⊕
Existing Right of Way Line	▬
Proposed Right of Way Line	▬
Existing Control of Access Line	▬
Proposed Control of Access Line	▬
Proposed ROW and CA Line	▬
Existing Easement Line	▬
Proposed Temporary Construction Easement	▬
Proposed Temporary Drainage Easement	▬
Proposed Permanent Drainage Easement	▬
Proposed Permanent Drainage/Utility Easement	▬
Proposed Permanent Utility Easement	▬
Proposed Temporary Utility Easement	▬
Proposed Aerial Utility Easement	▬

## ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	▬
Proposed Slope Stakes Fill	▬
Proposed Curb Ramp	▬
Existing Metal Guardrail	▬
Proposed Guardrail	▬
Existing Cable Guiderail	▬
Proposed Cable Guiderail	▬
Equality Symbol	⊕
Pavement Removal	▬
VEGETATION:	
Single Tree	○
Single Shrub	○
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:

\* SUE - Subsurface Utility Engineering  
LOS - Level of Service - A,B,C or D (Accuracy)

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 Test Hole (SUE - LOS A)*	⊕
U/G Power Line (SUE - LOS B)*	▬
U/G Power Line (SUE - LOS C)*	▬
U/G Power Line (SUE - LOS D)*	▬

## TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	○
Telephone Pedestal	▬
Telephone Cell Tower	▬
U/G Telephone Cable Hand Hole	▬
U/G Telephone Test Hole (SUE - LOS A)*	⊕
U/G Telephone Cable (SUE - LOS B)*	▬
U/G Telephone Cable (SUE - LOS C)*	▬
U/G Telephone Cable (SUE - LOS D)*	▬
U/G Telephone Conduit (SUE - LOS B)*	▬
U/G Telephone Conduit (SUE - LOS C)*	▬
U/G Telephone Conduit (SUE - LOS D)*	▬
U/G Fiber Optics Cable (SUE - LOS B)*	▬
U/G Fiber Optics Cable (SUE - LOS C)*	▬
U/G Fiber Optics Cable (SUE - LOS D)*	▬

## WATER:

Water Manhole	○
Water Meter	○
Water Valve	⊗
Water Hydrant	⊕
U/G Water Line Test Hole (SUE - LOS A)*	⊕
U/G Water Line (SUE - LOS B)*	▬
U/G Water Line (SUE - LOS C)*	▬
U/G Water Line (SUE - LOS D)*	▬
Above Ground Water Line	▬

## TV:

TV Pedestal	□
TV Tower	⊗
U/G TV Cable Hand Hole	▬
U/G TV Test Hole (SUE - LOS A)*	⊕
U/G TV Cable (SUE - LOS B)*	▬
U/G TV Cable (SUE - LOS C)*	▬
U/G TV Cable (SUE - LOS D)*	▬
U/G Fiber Optic Cable (SUE - LOS B)*	▬
U/G Fiber Optic Cable (SUE - LOS C)*	▬
U/G Fiber Optic Cable (SUE - LOS D)*	▬

## GAS:

Gas Valve	◇
Gas Meter	⊕
U/G Gas Line Test Hole (SUE - LOS A)*	⊕
U/G Gas Line (SUE - LOS B)*	▬
U/G Gas Line (SUE - LOS C)*	▬
U/G Gas Line (SUE - LOS D)*	▬
Above Ground Gas Line	▬

## SANITARY SEWER:


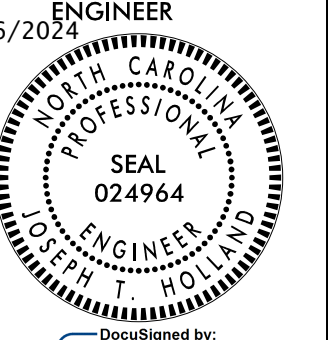

Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	▬
Above Ground Sanitary Sewer	▬
SS Force Main Line Test Hole (SUE - LOS A)*	⊕
SS Force Main Line (SUE - LOS B)*	▬
SS Force Main Line (SUE - LOS C)*	▬
SS Force Main Line (SUE - LOS D)*	▬

## MISCELLANEOUS:

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

6/2/2024

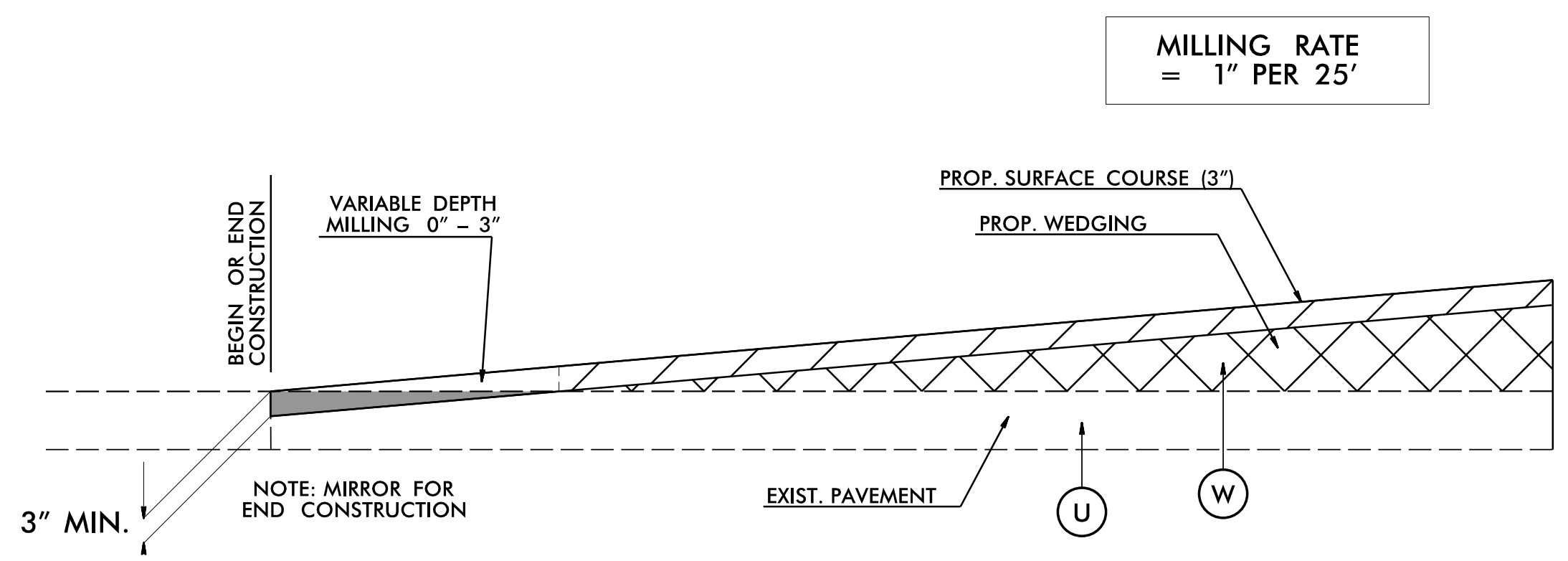
### FINAL PAVEMENT SCHEDULE

PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>2A-1</b>
ROADWAY DESIGN ENGINEER 5/16/2024 	PAVEMENT DESIGN ENGINEER 5/16/2024 
	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	

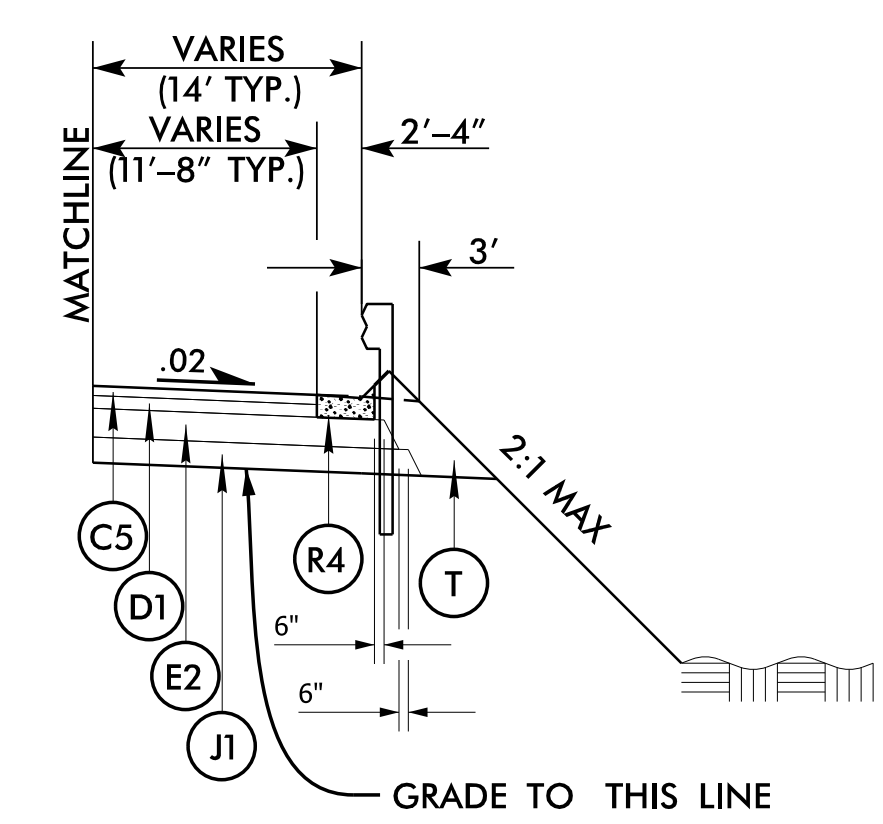
<b>B</b>	PROP. APPROX. 3/4" OPEN-GRADED ASPHALT FRICTION COURSE, TYPE FC-1 MODIFIED, AT AN AVERAGE RATE OF 90 LBS. PER SQ. YD.	<b>E1</b>	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	<b>R5</b>	EXPRESSWAY GUTTER
<b>C1</b>	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	<b>E2</b>	PROP. APPROX. 9 1/2" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 542 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	<b>S</b>	4" CONCRETE SIDEWALK.
<b>C2</b>	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	<b>E3</b>	PROP. APPROX. 13 1/2" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD. IN EACH OF THREE LAYERS.	<b>T</b>	EARTH MATERIAL.
<b>C3</b>	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	<b>E4</b>	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 5 1/2" IN DEPTH.	<b>U</b>	EXISTING PAVEMENT.
<b>C4</b>	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	<b>J1</b>	8" AGGREGATE BASE COURSE.	<b>V1</b>	MILLING ASPHALT PAVEMENT, 1 1/2" DEPTH.
<b>C5</b>	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	<b>R1</b>	SINGLE SLOPE CONCRETE BARRIER.	<b>V2</b>	MILLING ASPHALT PAVEMENT, 2 1/4" DEPTH.
<b>C6</b>	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	<b>R2</b>	SINGLE FACED CONCRETE BARRIER.	<b>W</b>	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAILS)
<b>D1</b>	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	<b>R3</b>	2'-6" CONCRETE CURB AND GUTTER.	<b>Y</b>	PROPOSED MILLED RUMBLE STRIPS
<b>D2</b>	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 2 1/2" IN DEPTH OR GREATER THAN 4" IN DEPTH.	<b>R4</b>	SHOULDER BERM GUTTER		

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

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

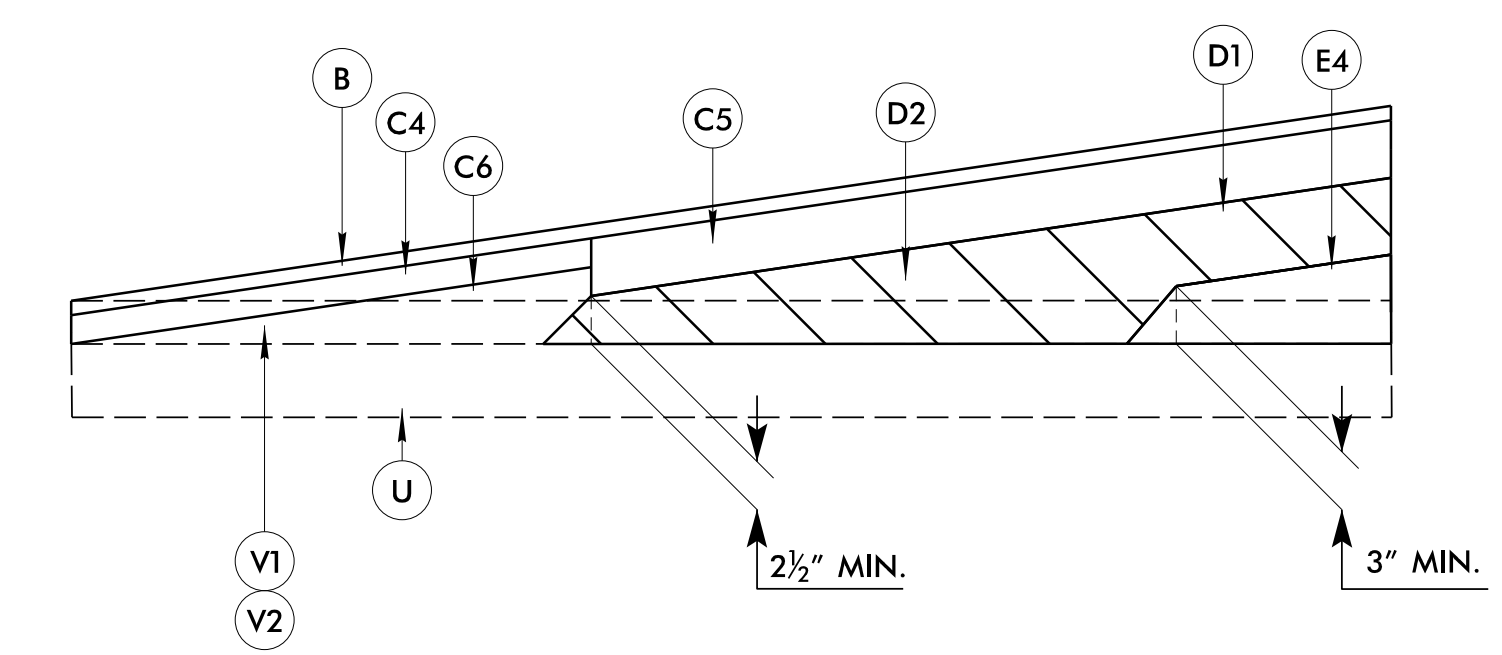
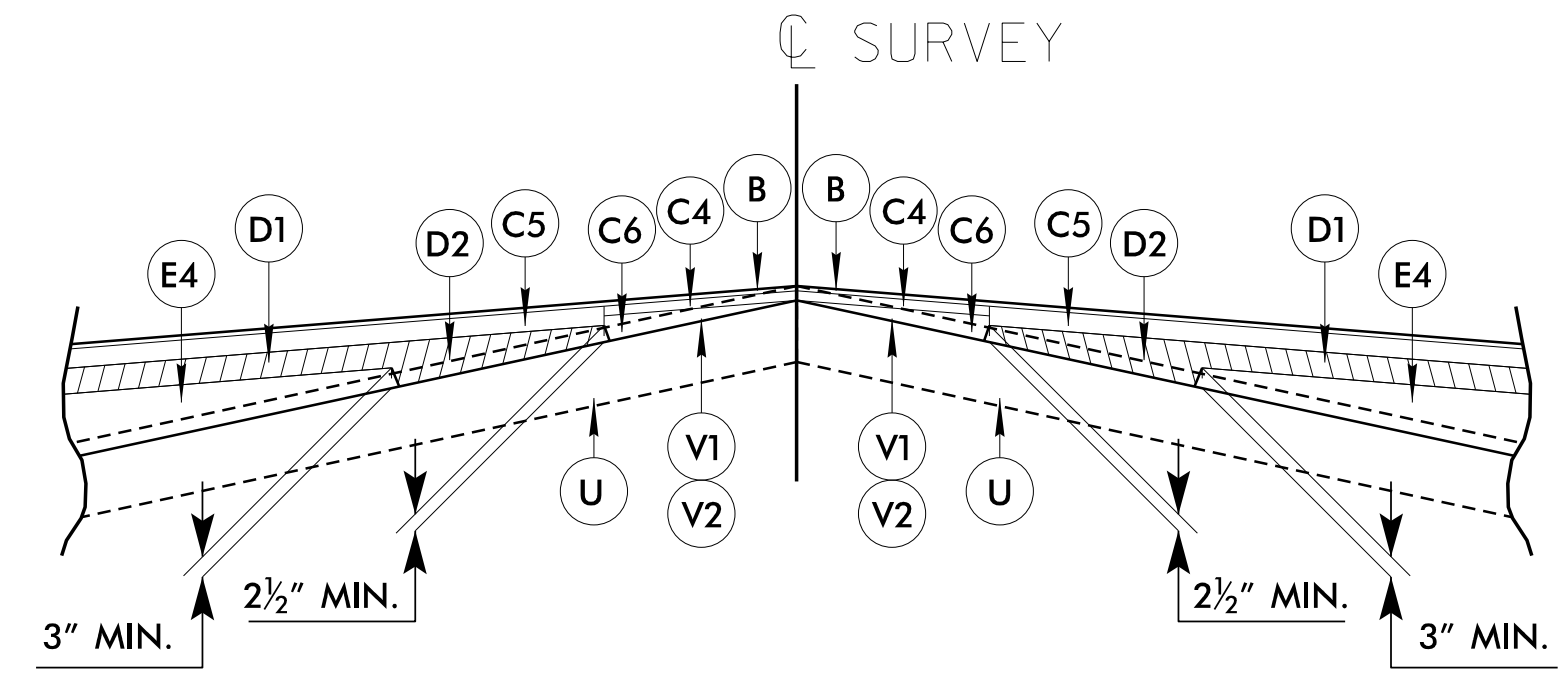
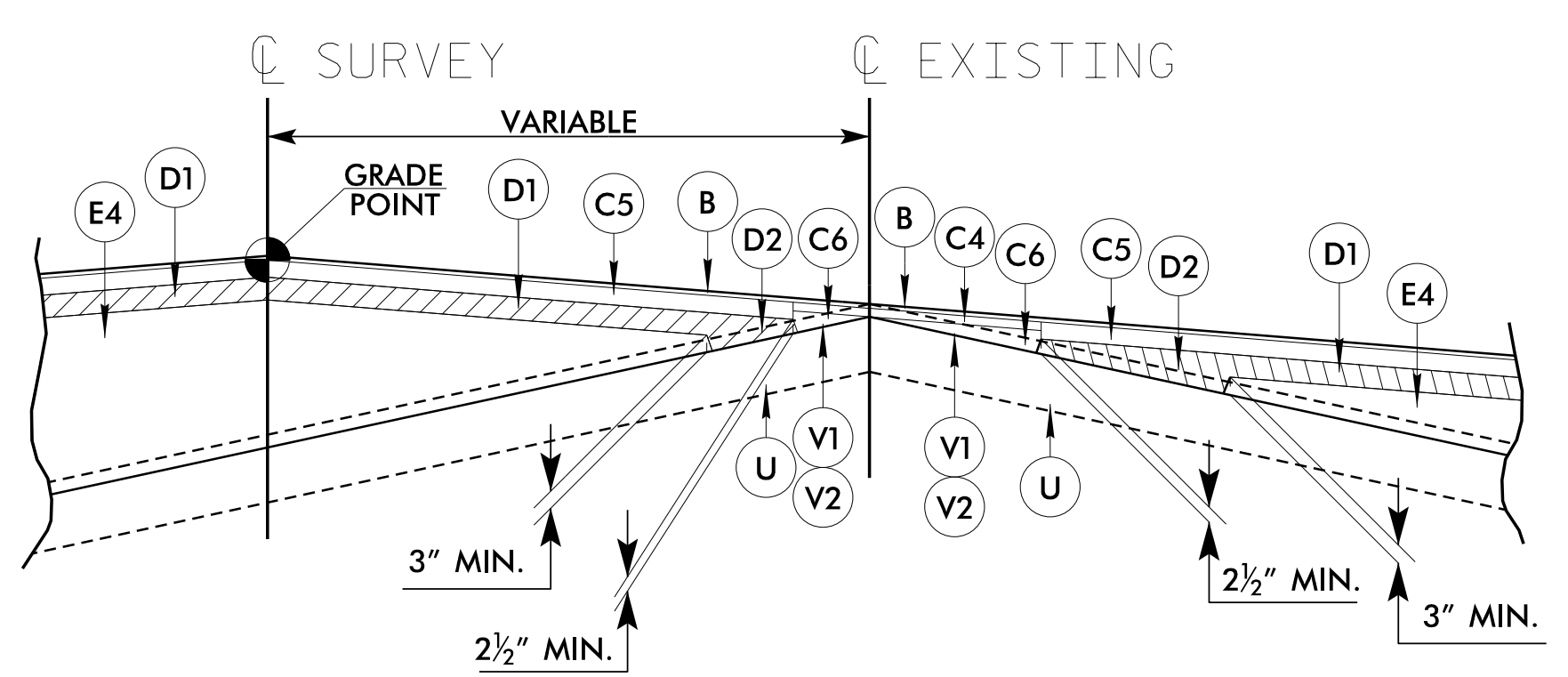


**INCIDENTAL MILLING DETAIL**



**SHOULDER BERM GUTTER DETAIL**

USE WITH TYPICAL SECTIONS NO. 1, 2, & 3  
 -L- STA. 239+50.00 TO STA. 243+26.00 LT.  
 -L- STA. 239+50.00 TO STA. 243+77.00 RT.  
 -L- STA. 253+42.00 TO STA. 253+93.00 RT.  
 -L- STA. 255+22.00 TO STA. 256+75.00 RT.  
 -YIRPA- STA. 11+70.00 TO STA. 16+19.00 RT.



**WEDGING DETAILS**


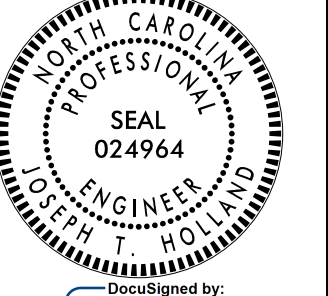
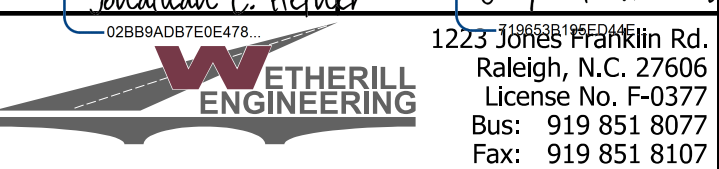
USE WITH TYPICAL SECTIONS NO. 2, 3, & 4

NOTE: MILLING IS V2 IN LOCATIONS WITH EXISTING OGAF

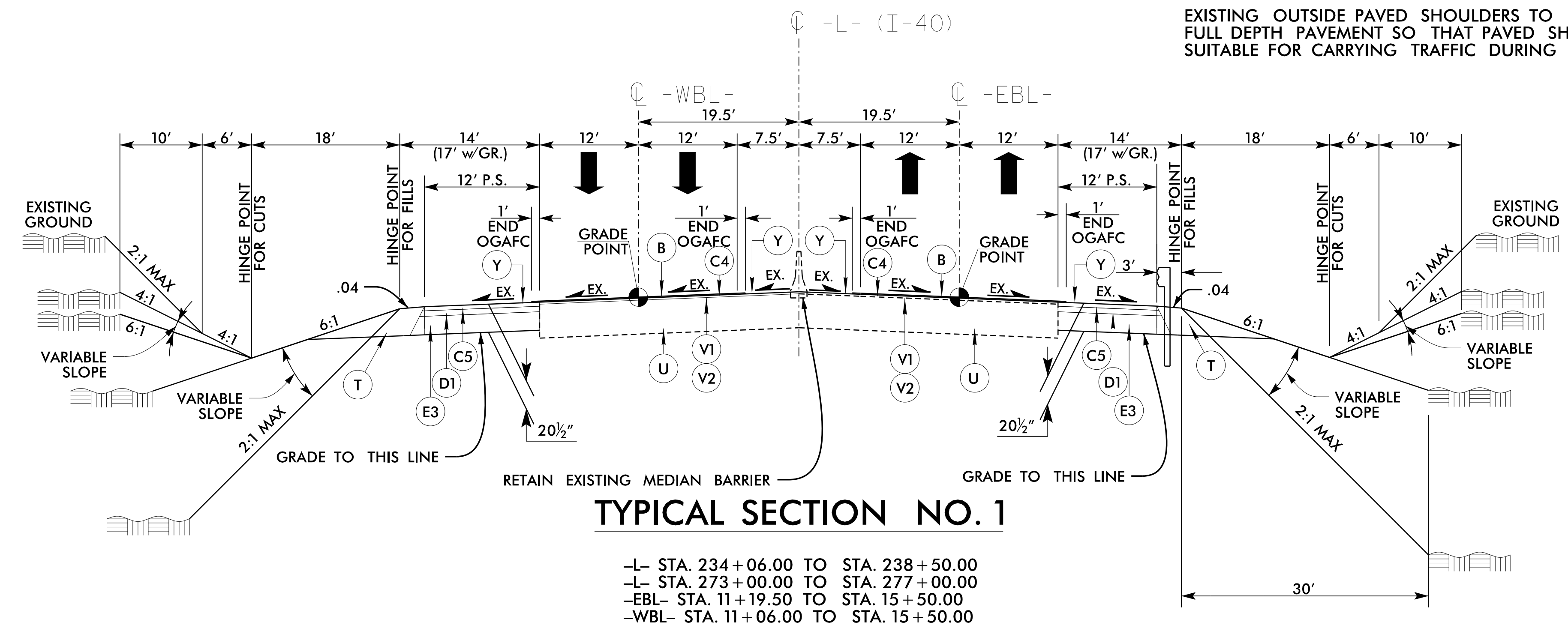
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6/2/99

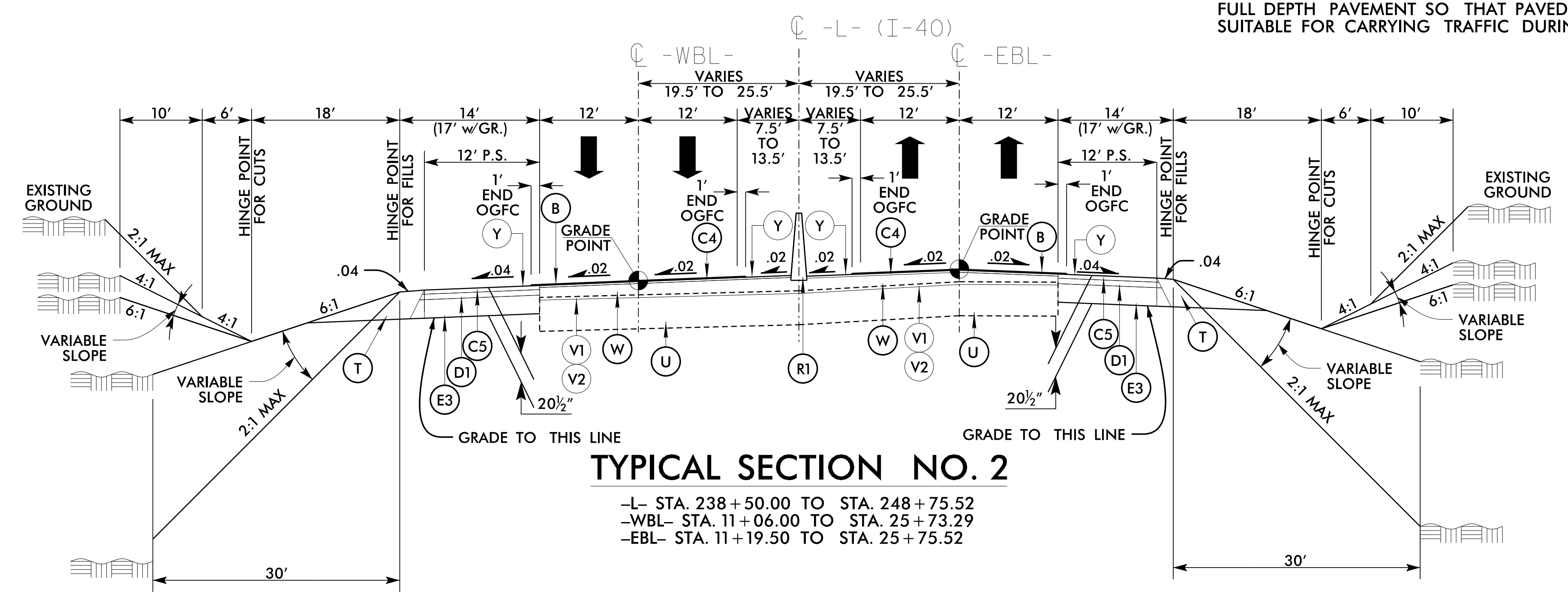
PAVEMENT SCHEDULE <small>(FINAL PAVEMENT DESIGN)</small>	
B	3/4" OGAFc TYPE FC-1 MOD.
C1	1 1/2" S9.5C
C2	3" S9.5C
C3	VAR. S9.5C
C4	1 1/2" 9.5D
C5	3" S9.5D
C6	VAR. S9.5D
D1	4" I19.0C
D2	VAR. I19.0C
E1	4" B25.0C
E2	9 1/2" B25.0C
E3	13 1/2" B25.0C
E4	VAR. B25.0C
J1	8" ABC
R1	SINGLE SLOPE CONCRETE BARRIER
R2	SINGLE FACED CONCRETE BARRIER
R3	2'-6" C & G
R4	SHOULDER BERM GUTTER
R5	EXPRESSWAY GUTTER
S	4" SIDEWALK
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V1	1 1/2" MILLING
V2	2 1/4" MILLING
W	WEDGING
Y	RUMBLE STRIP

PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>2A-2</b>
ROADWAY DESIGN ENGINEER 5/16/2024 	PAVEMENT DESIGN ENGINEER 5/16/2024 
	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

NOTE:  
MILLING IS V2 IN LOCATIONS WITH EXISTING OGAFc.  
EXISTING OUTSIDE PAVED SHOULDERS TO BE REPLACED WITH FULL DEPTH PAVEMENT SO THAT PAVED SHOULDERS WILL BE SUITABLE FOR CARRYING TRAFFIC DURING CONSTRUCTION.



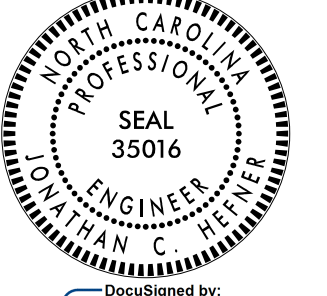
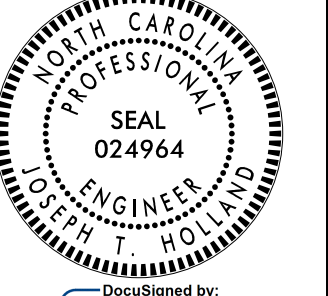

NOTE:  
MILLING IS V2 IN LOCATIONS WITH EXISTING OGAFc.  
EXISTING OUTSIDE PAVED SHOULDERS TO BE REPLACED WITH FULL DEPTH PAVEMENT SO THAT PAVED SHOULDERS WILL BE SUITABLE FOR CARRYING TRAFFIC DURING CONSTRUCTION.

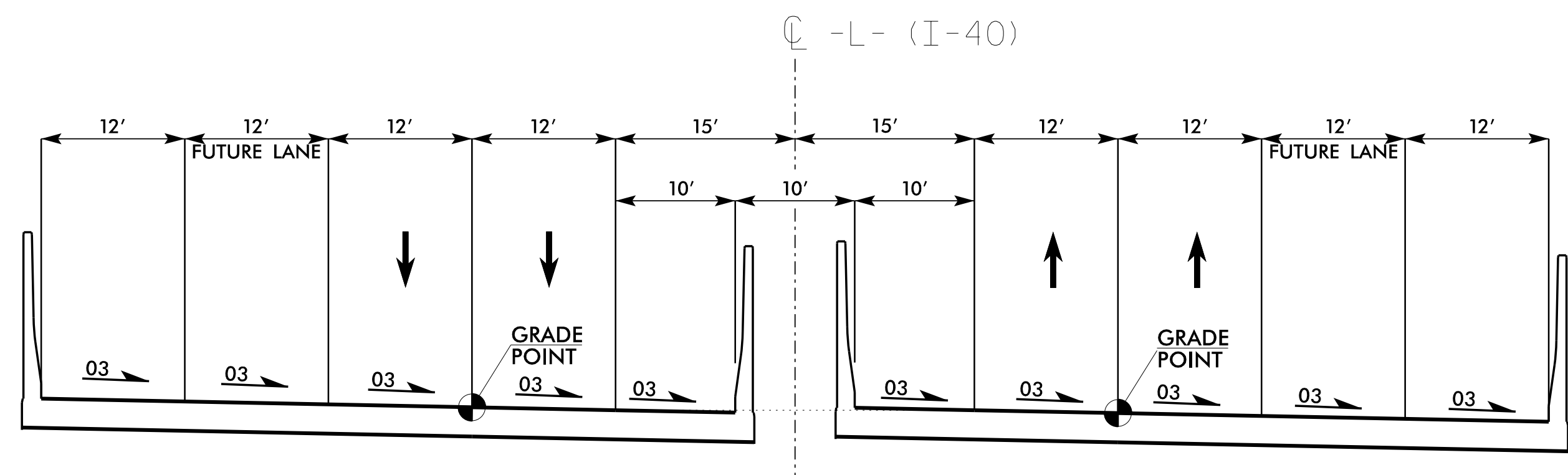


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6/22/99

PAVEMENT SCHEDULE <small>(FINAL PAVEMENT DESIGN)</small>	
B	3/4" OGAFc TYPE FC-1 MOD.
C1	1 1/2" S9.5C
C2	3" S9.5C
C3	VAR. S9.5C
C4	1 1/2" 9.5D
C5	3" S9.5D
C6	VAR. S9.5D
D1	4" I19.0C
D2	VAR. I19.0C
E1	4" B25.0C
E2	9 1/2" B25.0C
E3	13 1/2" B25.0C
E4	VAR. B25.0C
J1	8" ABC
R1	SINGLE SLOPE CONCRETE BARRIER
R2	SINGLE FACED CONCRETE BARRIER
R3	2'-6" C & G
R4	SHOULDER BERM GUTTER
R5	EXPRESSWAY GUTTER
S	4" SIDEWALK
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V1	1 1/2" MILLING
V2	2 1/4" MILLING
W	WEDGING
Y	RUMBLE STRIP

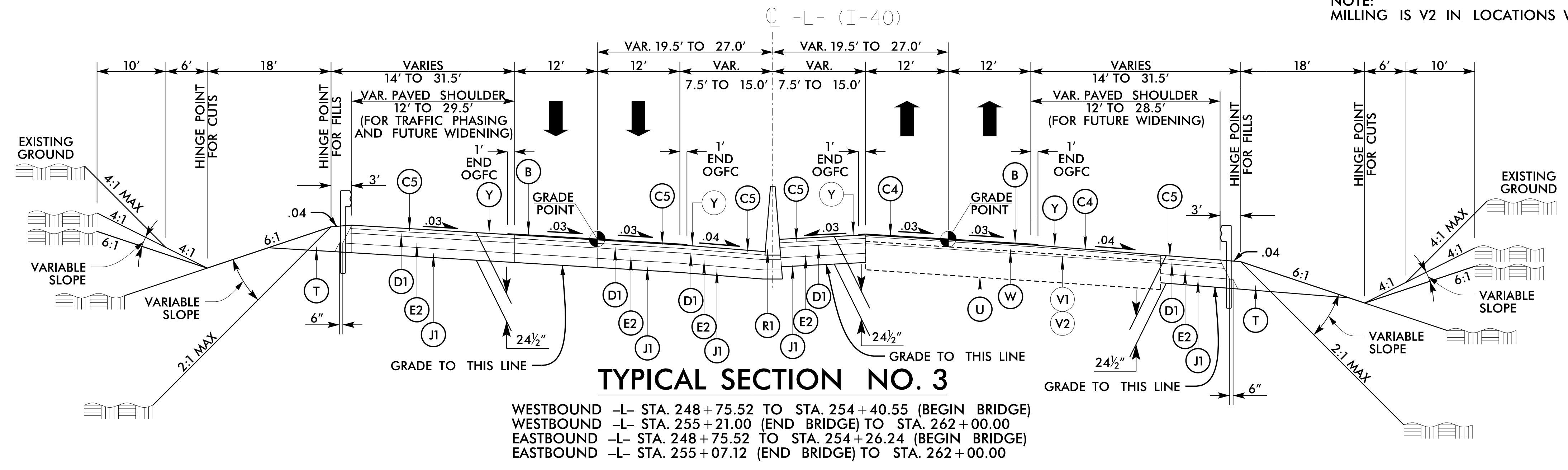
PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>2A-3</b>
ROADWAY DESIGN ENGINEER 5/16/2024 	PAVEMENT DESIGN ENGINEER 5/16/2024 
 WETHERILL ENGINEERING 1223 Jones Franklin Rd. Raleigh, N.C. 27606 License No. F-0377 Bus: 919 851 8077 Fax: 919 851 8107	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	



### BRIDGE TYPICAL SECTION

WESTBOUND -L- STA. STA. 254+40.55 (BEGIN BRIDGE) TO STA. 255+21.00 (END BRIDGE)  
 EASTBOUND -L- STA. STA. 254+26.24 (BEGIN BRIDGE) TO STA. 255+07.12 (END BRIDGE)

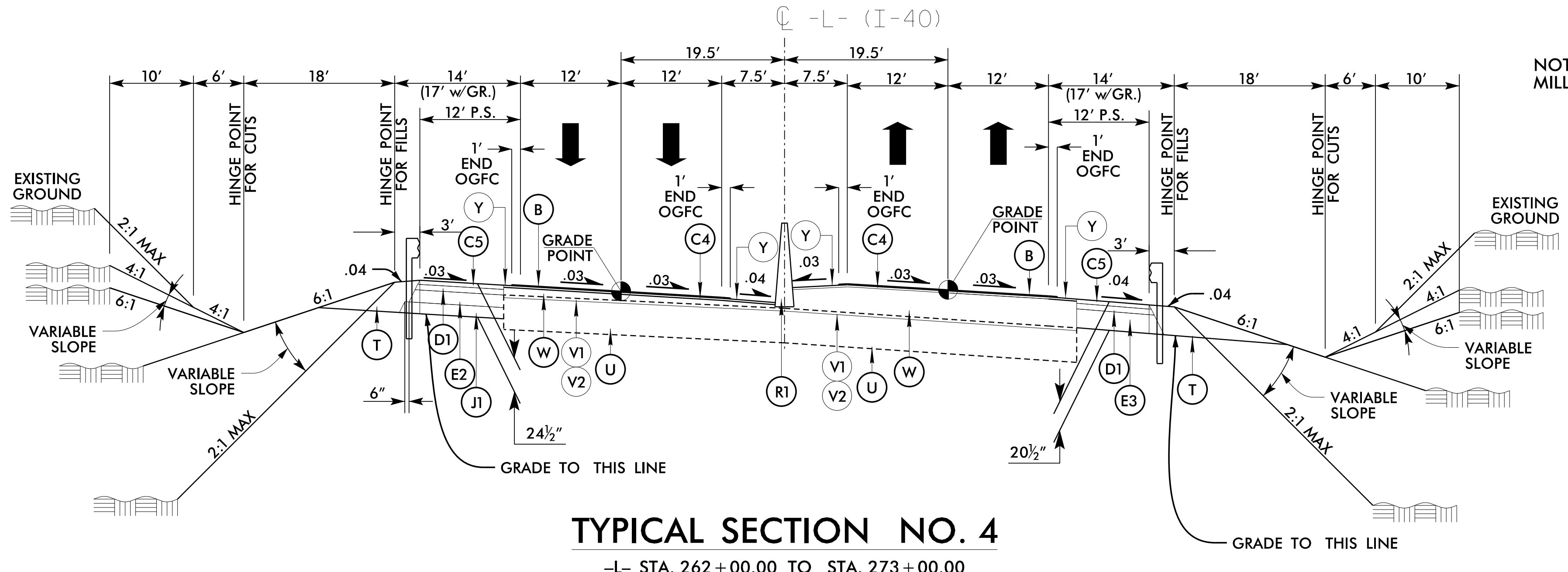
NOTE:  
MILLING IS V2 IN LOCATIONS WITH EXISTING OGAFc.



### TYPICAL SECTION NO. 3

WESTBOUND -L- STA. 248+75.52 TO STA. 254+40.55 (BEGIN BRIDGE)  
 WESTBOUND -L- STA. 255+21.00 (END BRIDGE) TO STA. 262+00.00  
 EASTBOUND -L- STA. 248+75.52 TO STA. 254+26.24 (BEGIN BRIDGE)  
 EASTBOUND -L- STA. 255+07.12 (END BRIDGE) TO STA. 262+00.00

NOTE:  
MILLING IS V2 IN LOCATIONS WITH EXISTING OGAFc.



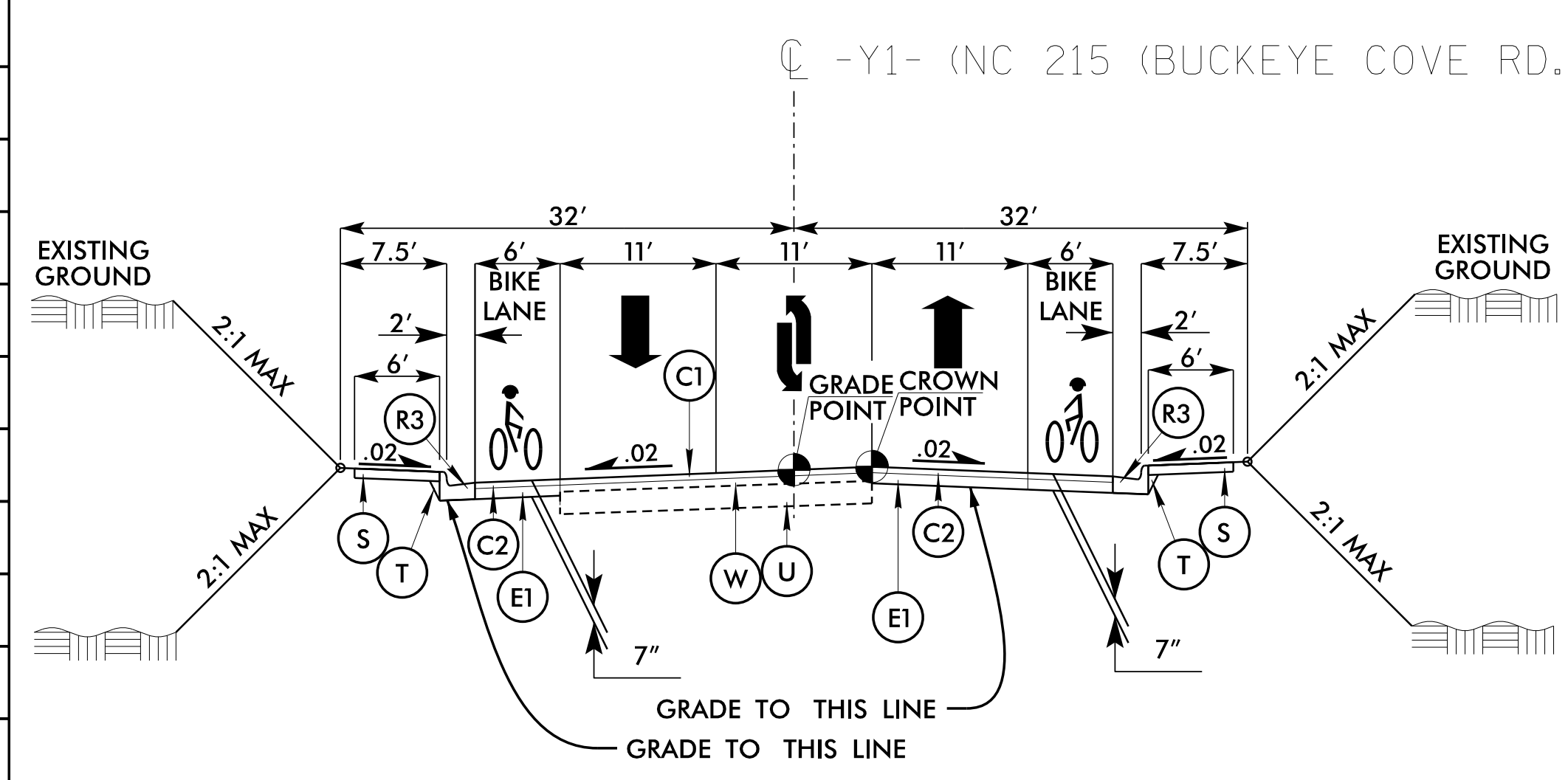
### TYPICAL SECTION NO. 4

-L- STA. 262+00.00 TO STA. 273+00.00

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5/16/2024  
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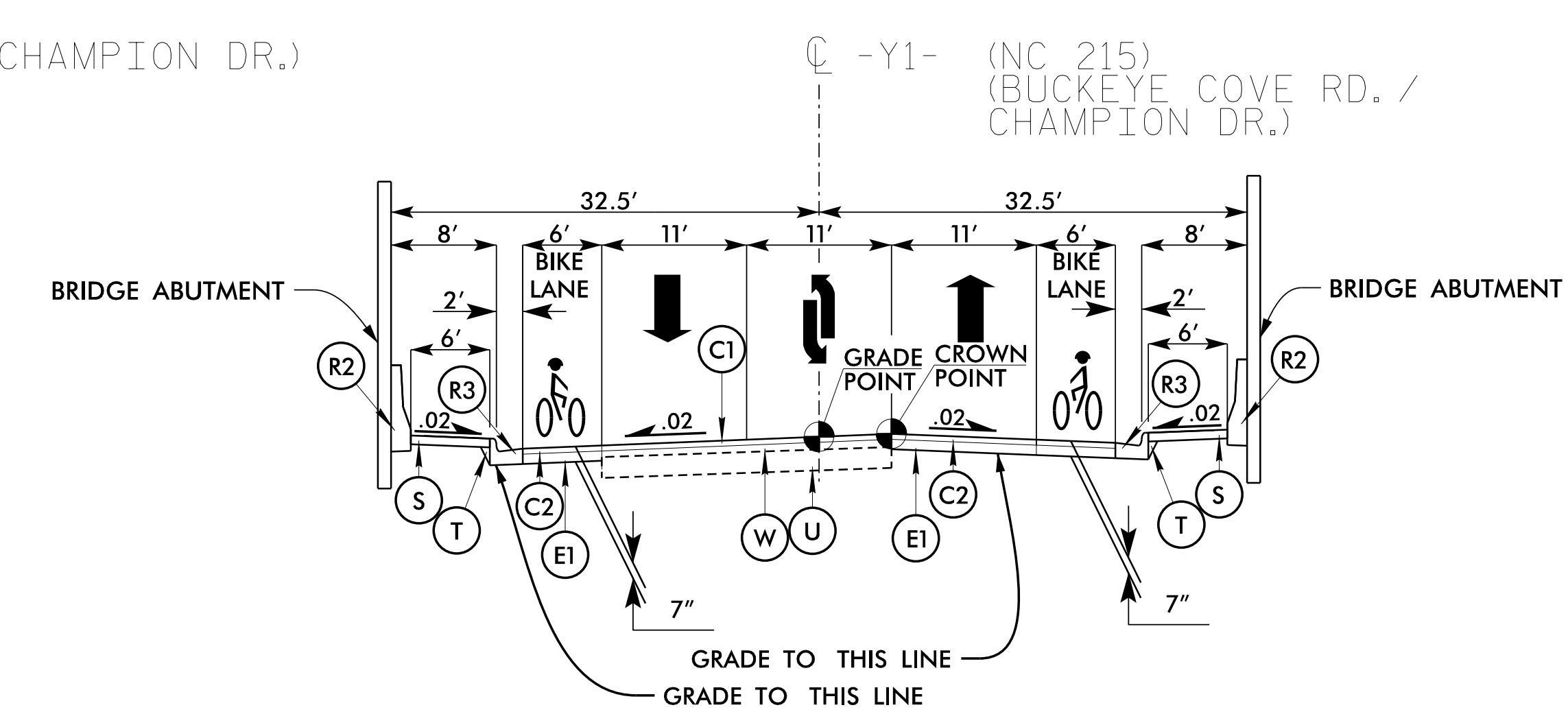
6/2/04

PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)	
B	3/4" OGAF C TYPE FC-1 MOD.
C1	1 1/2" S9.5C
C2	3" S9.5C
C3	VAR. S9.5C
C4	1 1/2" 9.5D
C5	3" S9.5D
C6	VAR. S9.5D
D1	4" I19.0C
D2	VAR. I19.0C
E1	4" B25.0C
E2	9 1/2" B25.0C
E3	13 1/2" B25.0C
E4	VAR. B25.0C
J1	8" ABC
R1	SINGLE SLOPE CONCRETE BARRIER
R2	SINGLE FACED CONCRETE BARRIER
R3	2'-6" C & G
R4	SHOULDER BERM GUTTER
R5	EXPRESSWAY GUTTER
S	4" SIDEWALK
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V1	1 1/2" MILLING
V2	2 1/4" MILLING
W	WEDGING
Y	RUMBLE STRIP



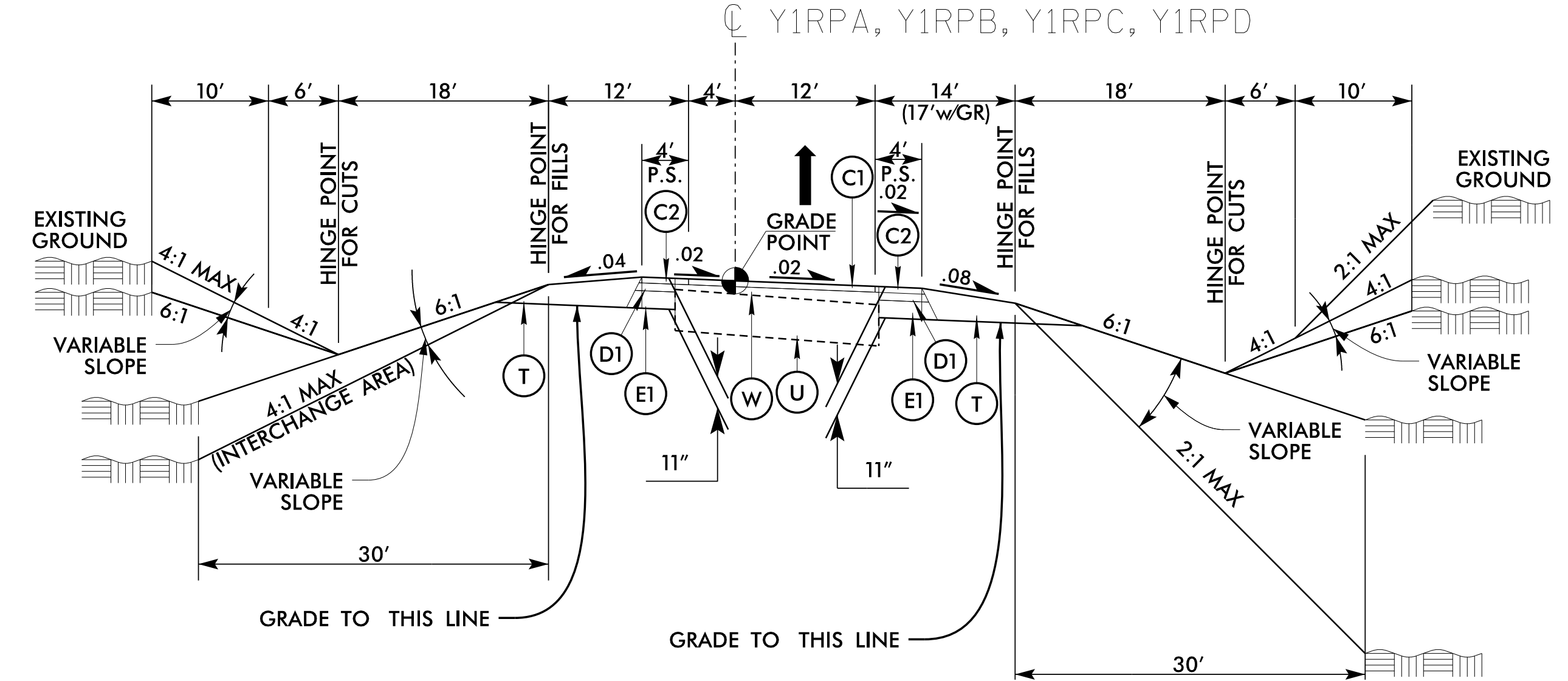
**TYPICAL SECTION NO. 5**

-Y1- STA. 15+50.00 TO STA. 16+40.30 RT  
 -Y1- STA. 15+50.00 TO STA. 16+23.45 LT  
 -Y1- STA. 17+88.73 TO STA. 18+60.00 RT  
 -Y1- STA. 17+71.64 TO STA. 18+60.00 LT



**TYPICAL SECTION NO. 6**

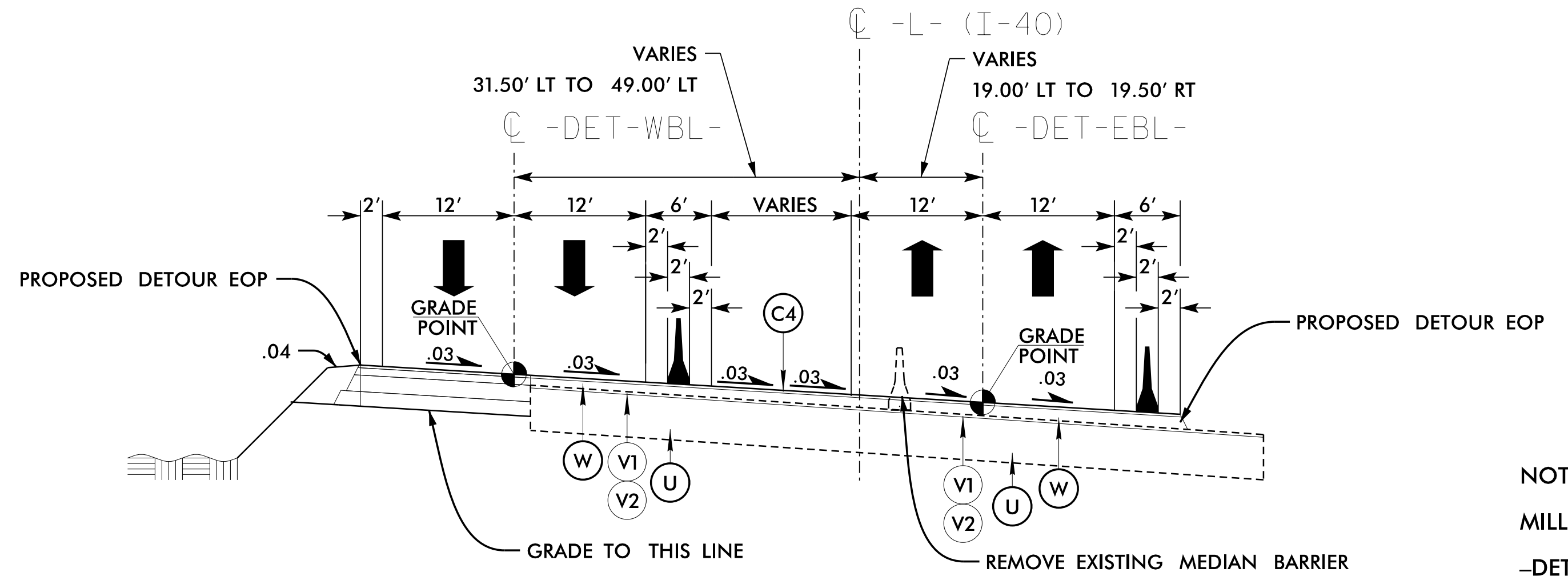
-Y1- STA. 16+40.30 TO STA. 17+88.73 RT  
 -Y1- STA. 16+23.45 TO STA. 17+71.64 LT



**TYPICAL SECTION NO. 7**

-Y1RPA- STA. 10+00.00 TO STA. 18+45.77  
 -Y1RPB- STA. 10+00.00 TO STA. 19+00.00 (REVERSE TYPICAL)  
 -Y1RPC- STA. 10+00.00 TO STA. 15+60.00  
 -Y1RPD- STA. 10+00.00 TO STA. 18+27.25 (REVERSE TYPICAL)

NOTE: USE MAINLINE PAVEMENT DESIGN (B, C4, D1, E3) TO BACK OF GORE.



**TYPICAL SECTION NO. 8**

-DET-EBL- STA. 260+00.00 TO STA. 265+31.00

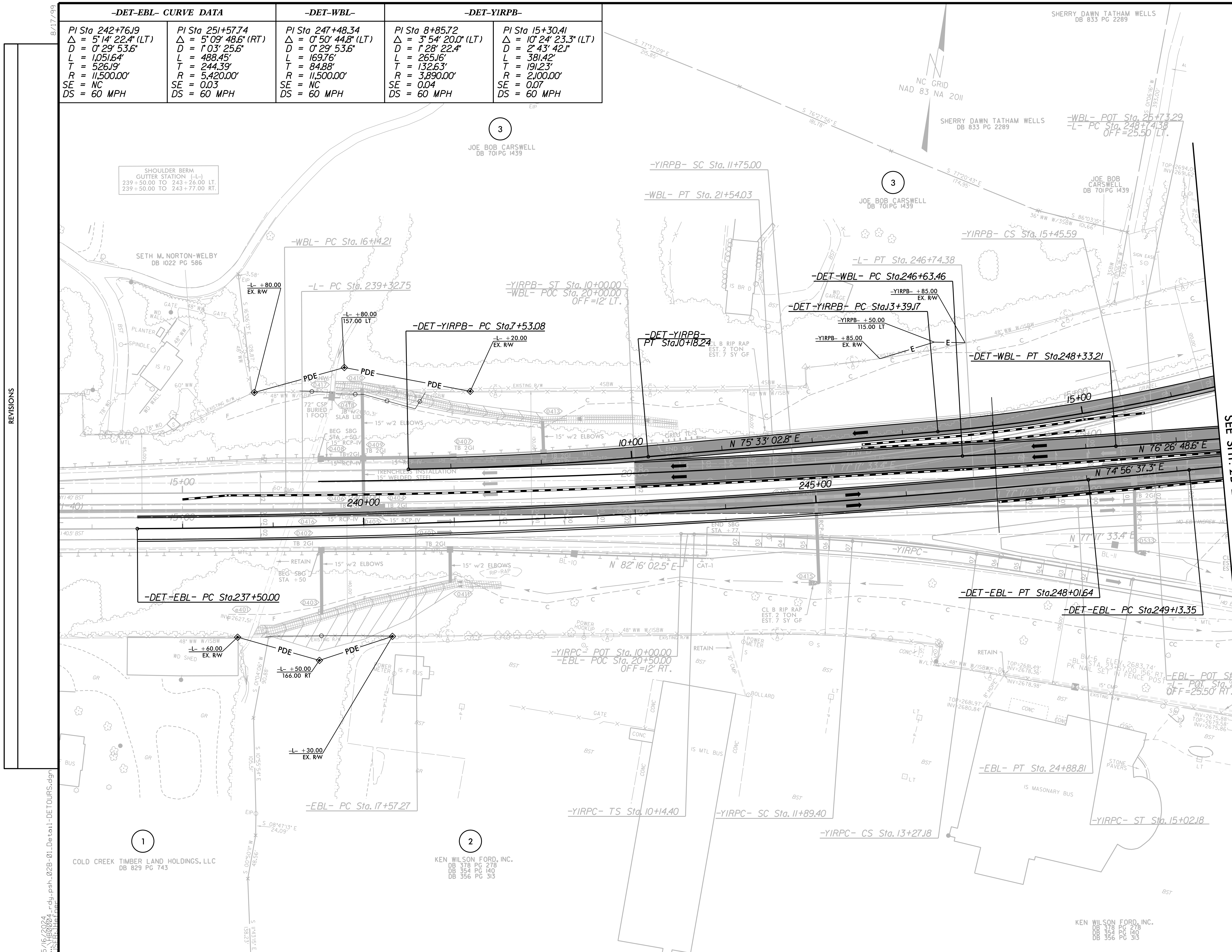
NOTES:  
 MILLING IS V2 IN LOCATIONS WITH EXISTING OGAF C.  
 -DET-WBL- WILL BE CONSTRUCTED TO PROPOSED FINISHED GRADE MINUS THE FINAL LIFT OF S9.5D

PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>2A-4</b>
ROADWAY DESIGN ENGINEER 5/16/2024 	PAVEMENT DESIGN ENGINEER 5/16/2024 
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

5/16/2024  
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 JCS:JCS

-DET-EBL- CURVE DATA		-DET-WBL-		-DET-YIRPB-	
PI Sta 242+76.19	PI Sta 251+57.74	PI Sta 247+48.34	PI Sta 8+85.72	PI Sta 15+30.41	
$\Delta = 5^{\circ}14'22.4"$ (LT)	$\Delta = 5^{\circ}09'48.6"$ (RT)	$\Delta = 0^{\circ}50'44.8"$ (LT)	$\Delta = 3^{\circ}54'20.0"$ (LT)	$\Delta = 10^{\circ}24'23.3"$ (LT)	
D = 0'29'53.6"	D = 1'03'25.6"	D = 0'29'53.6"	D = 1'28'22.4"	D = 2'43'42.1"	
L = 1,051.64'	L = 488.45'	L = 169.76'	L = 265.16'	L = 381.42'	
T = 526.19'	T = 244.39'	T = 84.88'	T = 132.63'	T = 191.23'	
R = 11,500.00'	R = 5,420.00'	R = 11,500.00'	R = 3,890.00'	R = 2,100.00'	
SE = NC	SE = 0.03	SE = NC	SE = 0.04	SE = 0.07	
DS = 60 MPH	DS = 60 MPH	DS = 60 MPH	DS = 60 MPH	DS = 60 MPH	

PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>2B-1</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 5/16/2024	HYDRAULICS ENGINEER 5/16/2024
Matthew C. Heifer	Matthew L. Harvey
 TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	



MATCHLINE  
-DET-EBL- STA. 249+50.00  
SEE SHT. 2B-2

REVISIONS

5/16/2024  
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SHOULDER BERM  
GUTTER STATION (-L-)  
239+50.00 TO 243+26.00 LT.  
239+50.00 TO 243+77.00 RT.

1

2

3

3

COLD CREEK TIMBER LAND HOLDINGS, LLC  
DB 829 PG 743

KEN WILSON FORD, INC.  
DB 378 PG 278  
DB 354 PG 140  
DB 356 PG 313

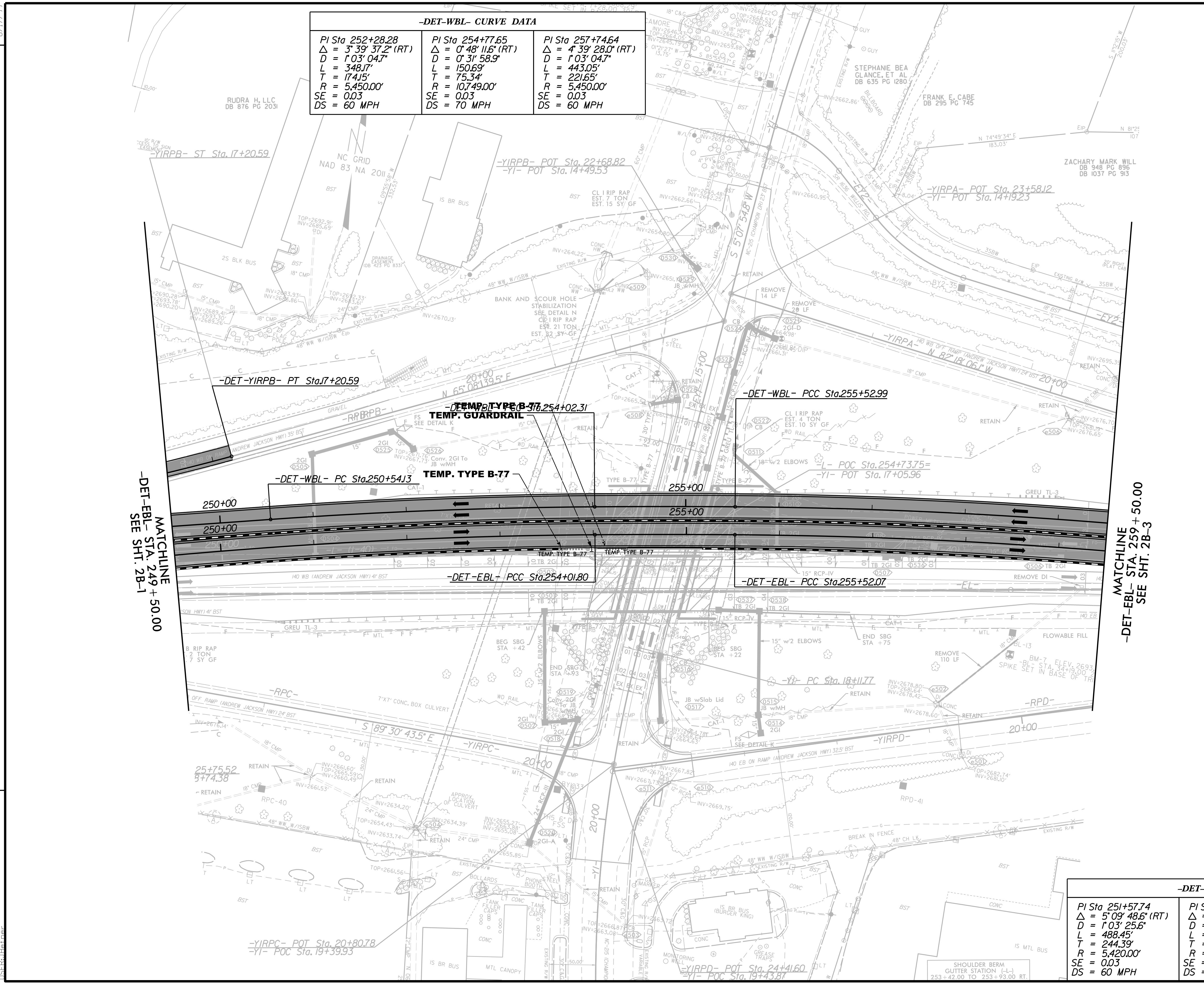
KEN WILSON FORD, INC.  
DB 378 PG 278  
DB 354 PG 140  
DB 356 PG 313



PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>2B-2</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 5/16/2024	HYDRAULICS ENGINEER 5/16/2024
Designed by: <b>Matthew C. Heifer</b>	Documented by: <b>Matthew L. Harve</b>
 1223 Jones Franklin Rd. Raleigh, N.C. 27606 License No. F-0377 Bus: 919 851 8077 Fax: 919 851 8107	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

**-DET-WBL- CURVE DATA**

<b>PI Sta 252+28.28</b> $\Delta = 3^{\circ} 39' 37.2" (RT)$ $D = 1^{\circ} 03' 04.7"$ $L = 348.17'$ $T = 174.15'$ $R = 5,450.00'$ $SE = 0.03$ $DS = 60 MPH$	<b>PI Sta 254+77.65</b> $\Delta = 0^{\circ} 48' 11.6" (RT)$ $D = 0^{\circ} 31' 58.9"$ $L = 150.69'$ $T = 75.34'$ $R = 10,749.00'$ $SE = 0.03$ $DS = 70 MPH$	<b>PI Sta 257+74.64</b> $\Delta = 4^{\circ} 39' 28.0" (RT)$ $D = 1^{\circ} 03' 04.7"$ $L = 443.05'$ $T = 221.65'$ $R = 5,450.00'$ $SE = 0.03$ $DS = 60 MPH$
--	--	--



MATCHLINE  
-DET-EBL- STA. 249 + 50.00  
SEE SHT. 2B-1

MATCHLINE  
-DET-EBL- STA. 259 + 50.00  
SEE SHT. 2B-3

**-DET-EBL- CURVE DATA**

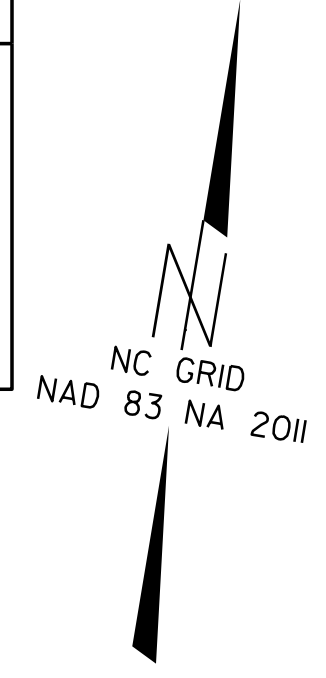
<b>PI Sta 251+57.74</b> $\Delta = 5^{\circ} 09' 48.6" (RT)$ $D = 1^{\circ} 03' 25.6"$ $L = 488.45'$ $T = 244.39'$ $R = 5,420.00'$ $SE = 0.03$ $DS = 60 MPH$	<b>PI Sta 254+76.93</b> $\Delta = 0^{\circ} 48' 11.6" (RT)$ $D = 0^{\circ} 32' 04.3"$ $L = 150.27'$ $T = 75.13'$ $R = 10,719.00'$ $SE = 0.03$ $DS = 70 MPH$	<b>PI Sta 258+79.34</b> $\Delta = 6^{\circ} 54' 39.2" (RT)$ $D = 1^{\circ} 03' 25.6"$ $L = 653.75'$ $T = 327.27'$ $R = 5,420.00'$ $SE = 0.03$ $DS = 60 MPH$
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REVISIONS

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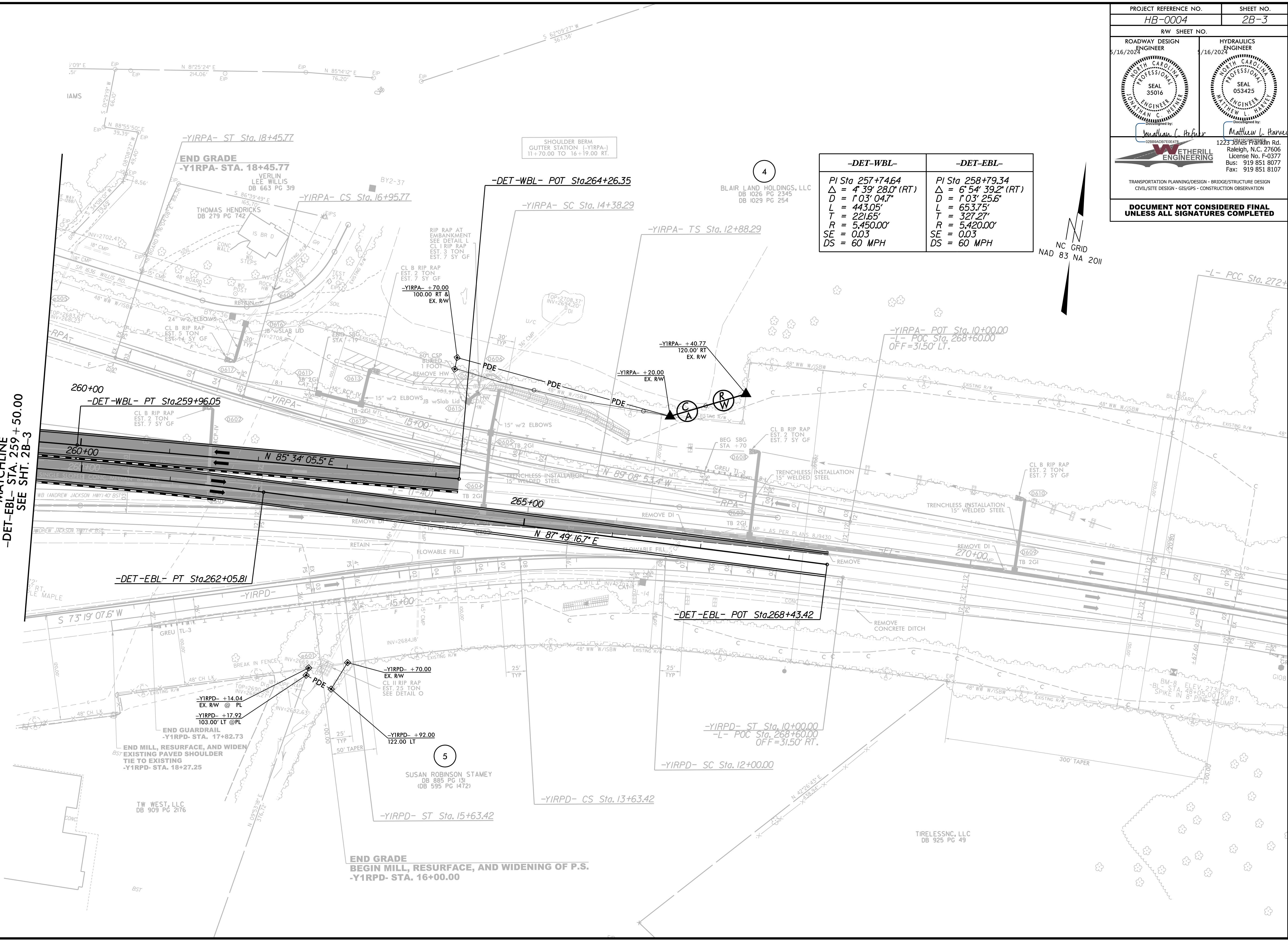
PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>2B-3</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 5/16/2024	HYDRAULICS ENGINEER 5/16/2024
 TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

-DET-WBL-	-DET-EBL-
PI Sta 257+74.64	PI Sta 258+79.34
$\Delta = 4' 39" 28.0" (RT)$	$\Delta = 6' 54" 39.2" (RT)$
$D = 1' 03' 04.7"$	$D = 1' 03' 25.6"$
$L = 443.05'$	$L = 653.75'$
$T = 221.65'$	$T = 327.27'$
$R = 5,450.00'$	$R = 5,420.00'$
$SE = 0.03$	$SE = 0.03$
$DS = 60 MPH$	$DS = 60 MPH$



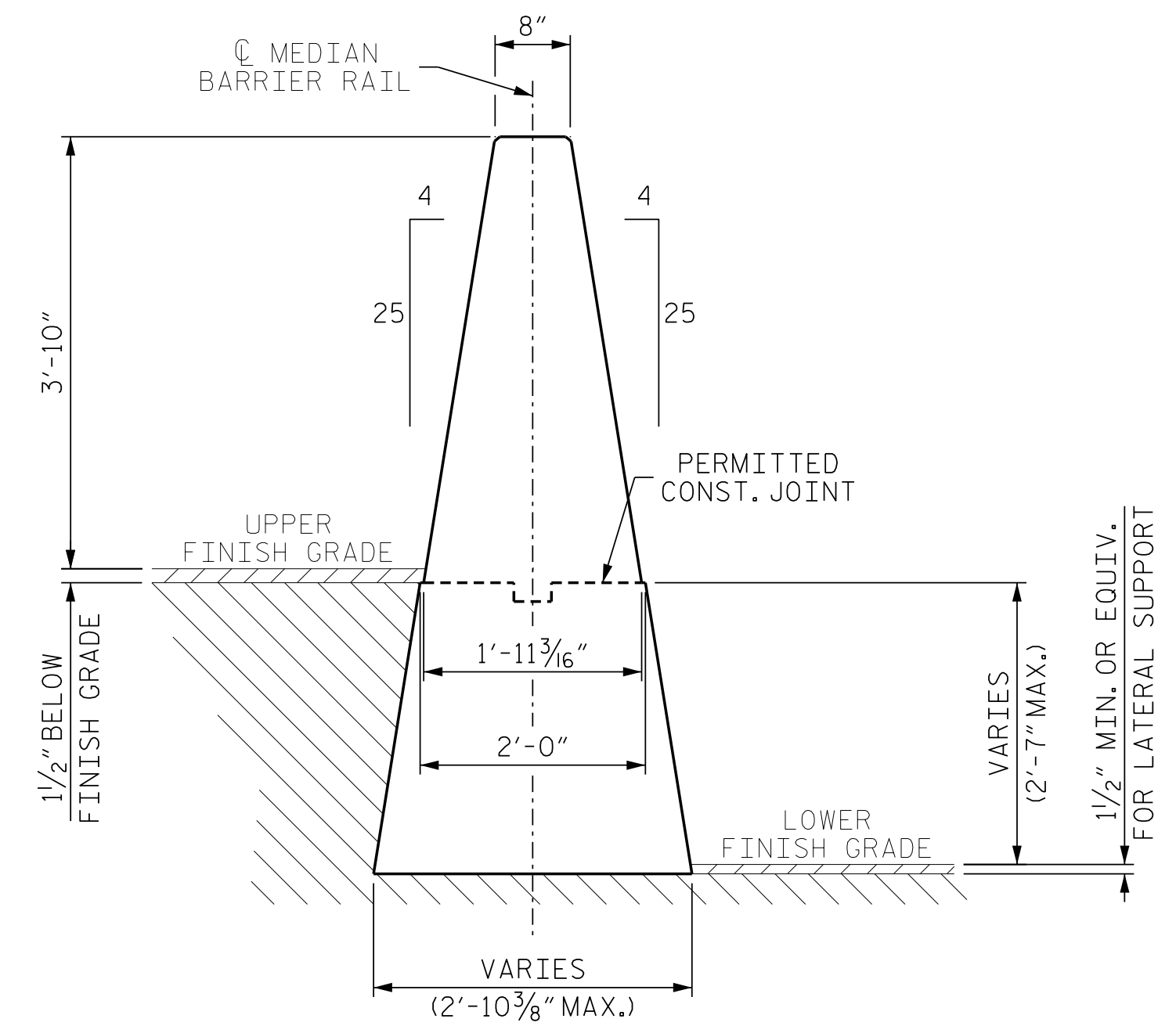
MATCHLINE  
 -DET-EBL- STA. 259+50.00  
 SEE SHT. 2B-3

REVISIONS

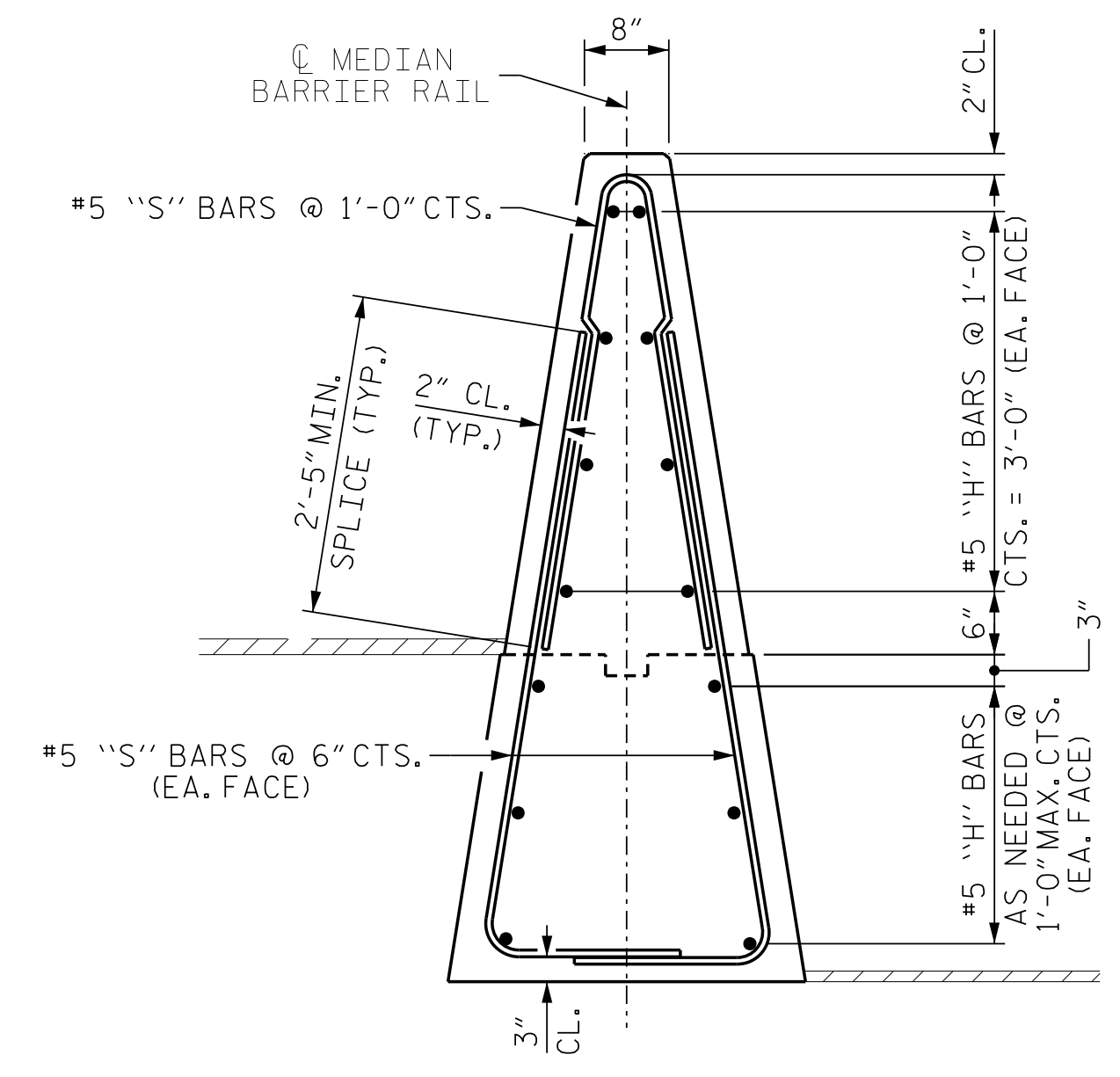


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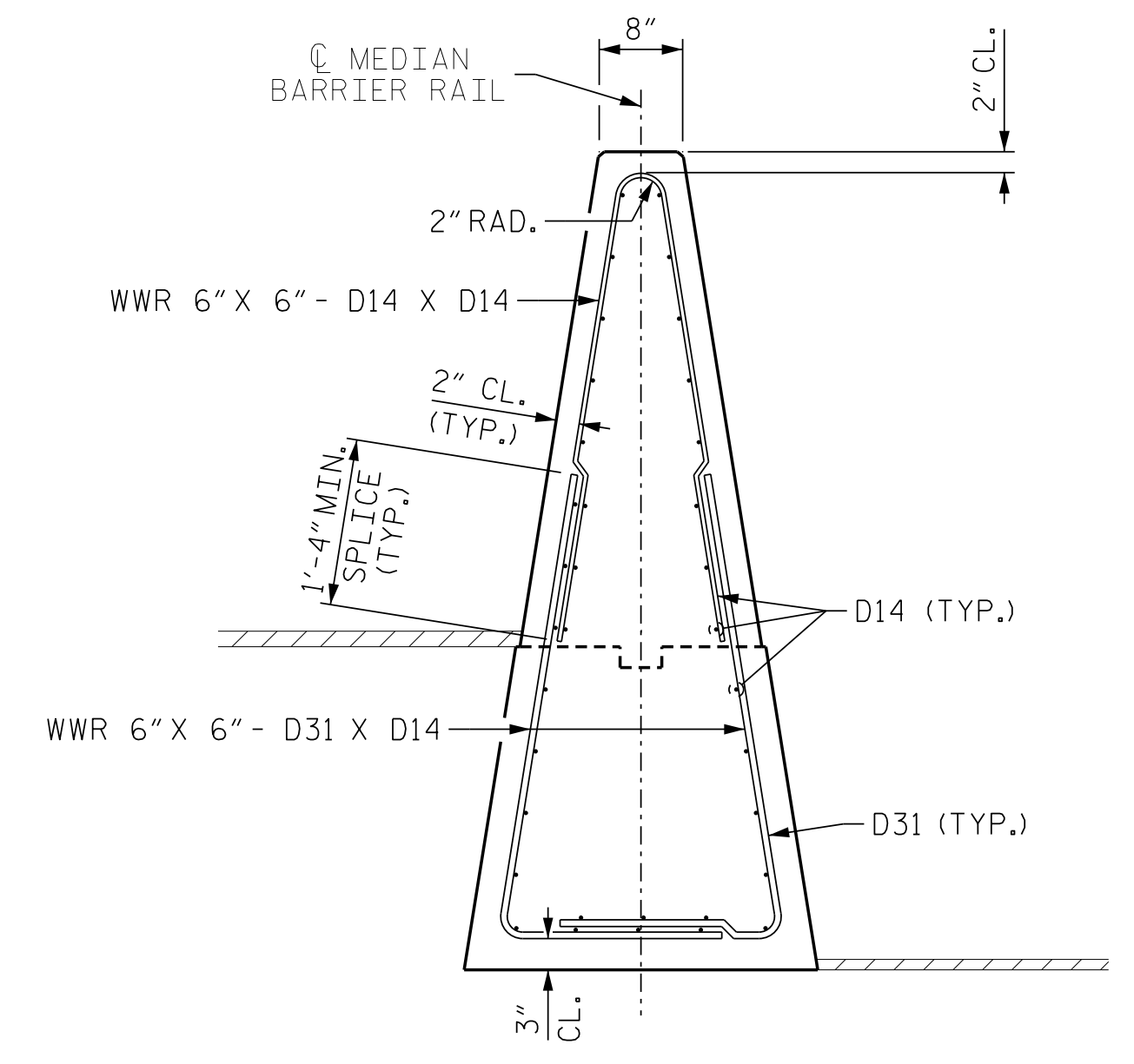
8.17.99



CONCRETE DETAILS



REINFORCEMENT DETAILS



WELDED WIRE FABRIC  
OPTIONAL REINFORCING

### SINGLE SLOPE CONCRETE BARRIER (2'-7" MAX. BIFURCATION)

SECTION SHOWN IS WITH RESPECT TO MAXIMUM 2'-7" BIFURCATION

**GENERAL NOTES:**

ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2024 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N.C. DEPARTMENT OF TRANSPORTATION

USE CLASS "AA" CONCRETE.

ALL EXPOSED CORNERS ON BARRIER SHALL BE CHAMFERED 3/4".

MAINTAIN 2" CLEAR COVER FOR ALL REINFORCING STEEL AND WELDED WIRE FABRIC UNLESS NOTED OTHERWISE.

REINFORCING STEEL (REBAR) SHALL MEET THE REQUIREMENTS OF ASTM A615, GRADE 60.

WELDED WIRE FABRIC SHALL MEET THE REQUIREMENTS OF ASTM A497, GRADE 70. ALL WIRES FOR WELDED WIRE FABRIC SHALL BE DEFORMED.

- #5 "S" BAR SPLICE 2'-5"
- #5 "H" BAR SPLICE 3'-2"
- D14 WELDED WIRE FABRIC SPLICE 1'-4"

ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT SHALL ASSURE THAT THE LONGITUDINAL ROADWAY STEEL WILL BE POSITIONED 1/2" ± AS DIMENSIONED ON THE PLANS WILL BE DEEMED SATISFACTORY.

REFER TO ROADWAY STANDARD DRAWING NO. 854.01 FOR EXPANSION AND CONTRACTION JOINT FILLER AND OTHER SPECIFICATIONS

6/3/2024



DocuSigned by:  
John Arthur Ditzworth  
021382269228438

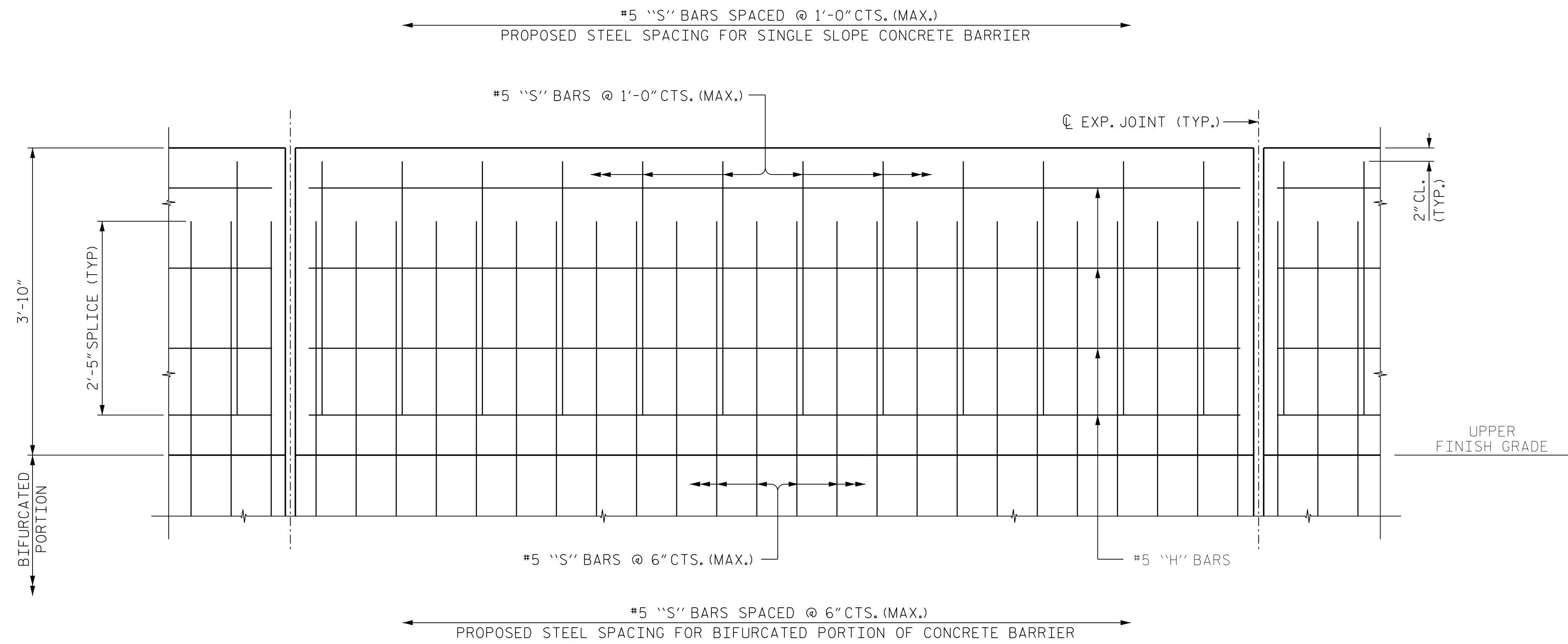
**WETHERILL ENGINEERING**  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 License No. F-0377  
 Bus: 919 851 8077  
 Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

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

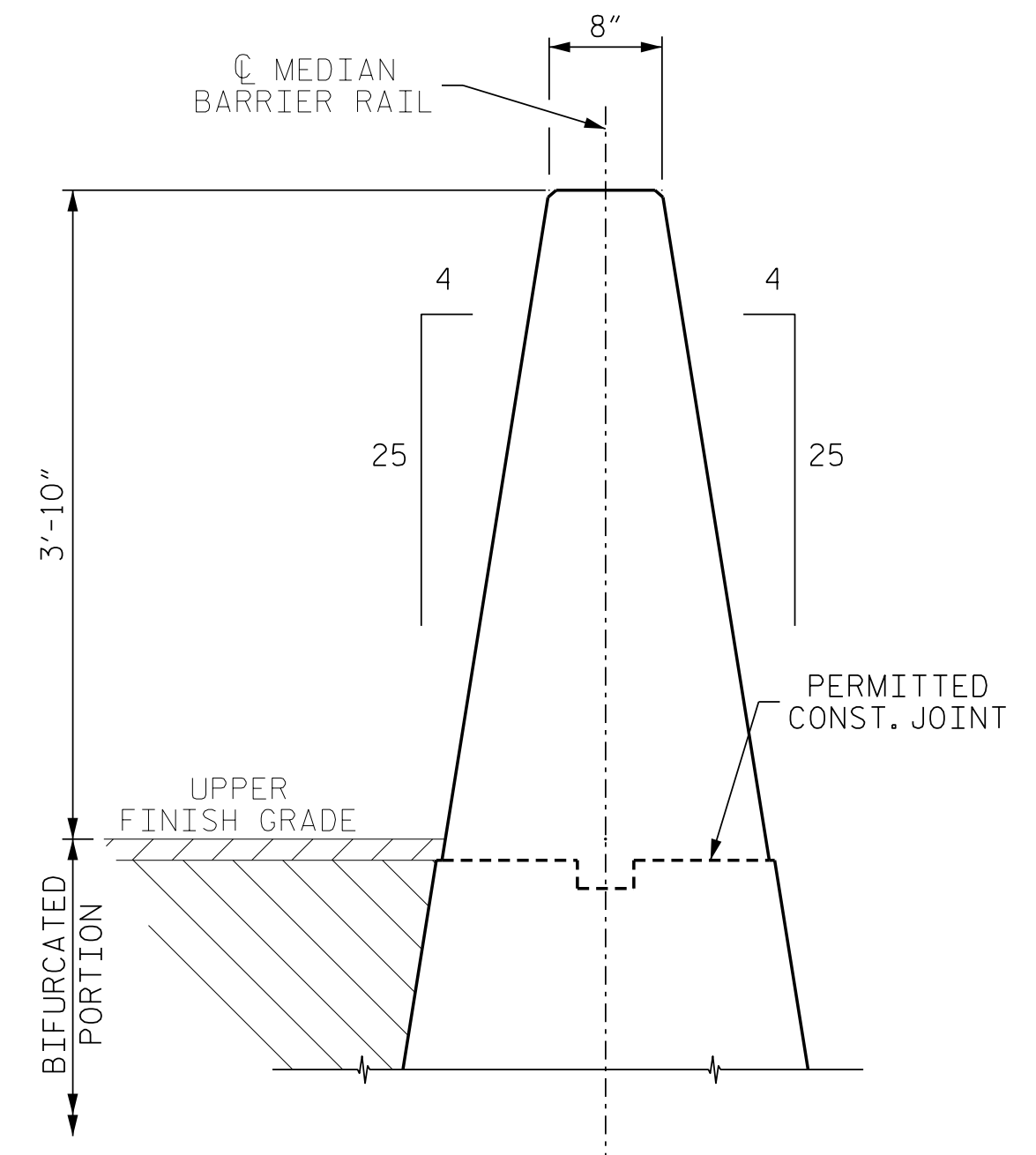
### SINGLE SLOPE CONCRETE BARRIER (46" MIN. HEIGHT) SHEET 1 OF 2

ORIGINAL BY: _____	DATE: _____
MODIFIED BY: _____	DATE: _____
CHECKED BY: _____	DATE: _____
FILE SPEC.: _____	

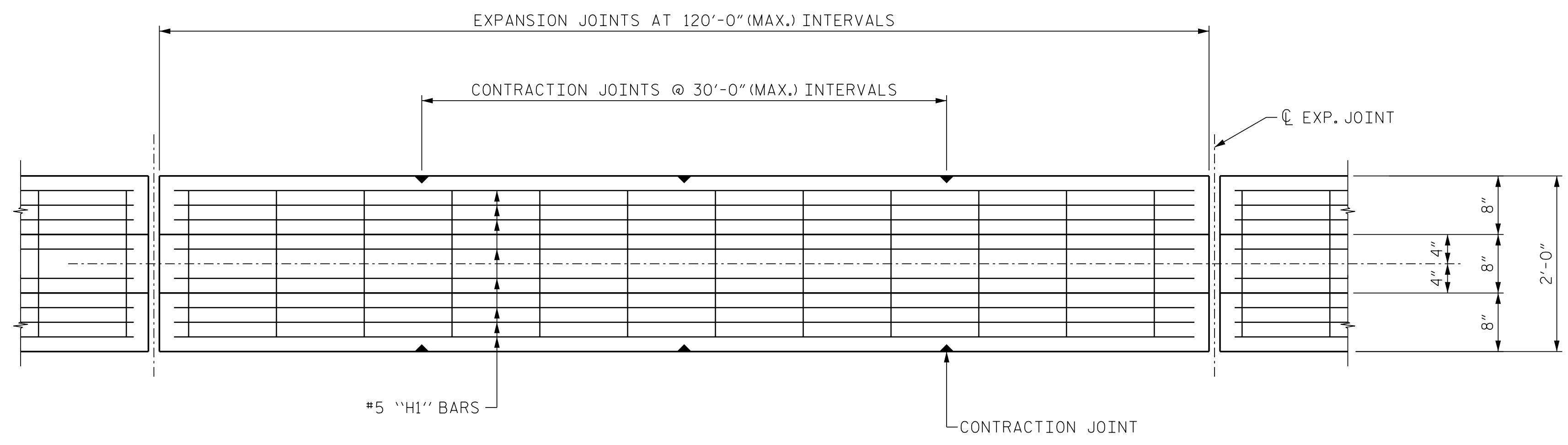


### ELEVATION

3'-10" MEDIAN BARRIER REINFORCEMENT SHOWN  
FOR REINFORCEMENT IN BIFURCATED SECTION, SEE "SINGLE SLOPE CONCRETE BARRIER DETAILS" SHEET 1 OF 2



### BARRIER SECTION



### PLAN VIEW

5/16/2024



DocuSigned by:  
John Arthur Dismore  
021382269228438

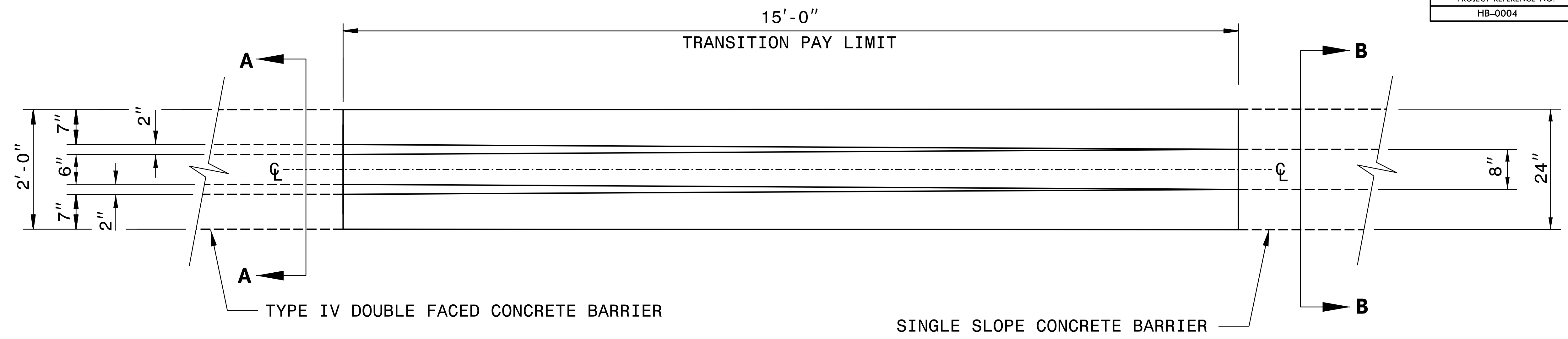
**WETHERILL ENGINEERING**  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 License No. F-0377  
 Bus: 919 851 8077  
 Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

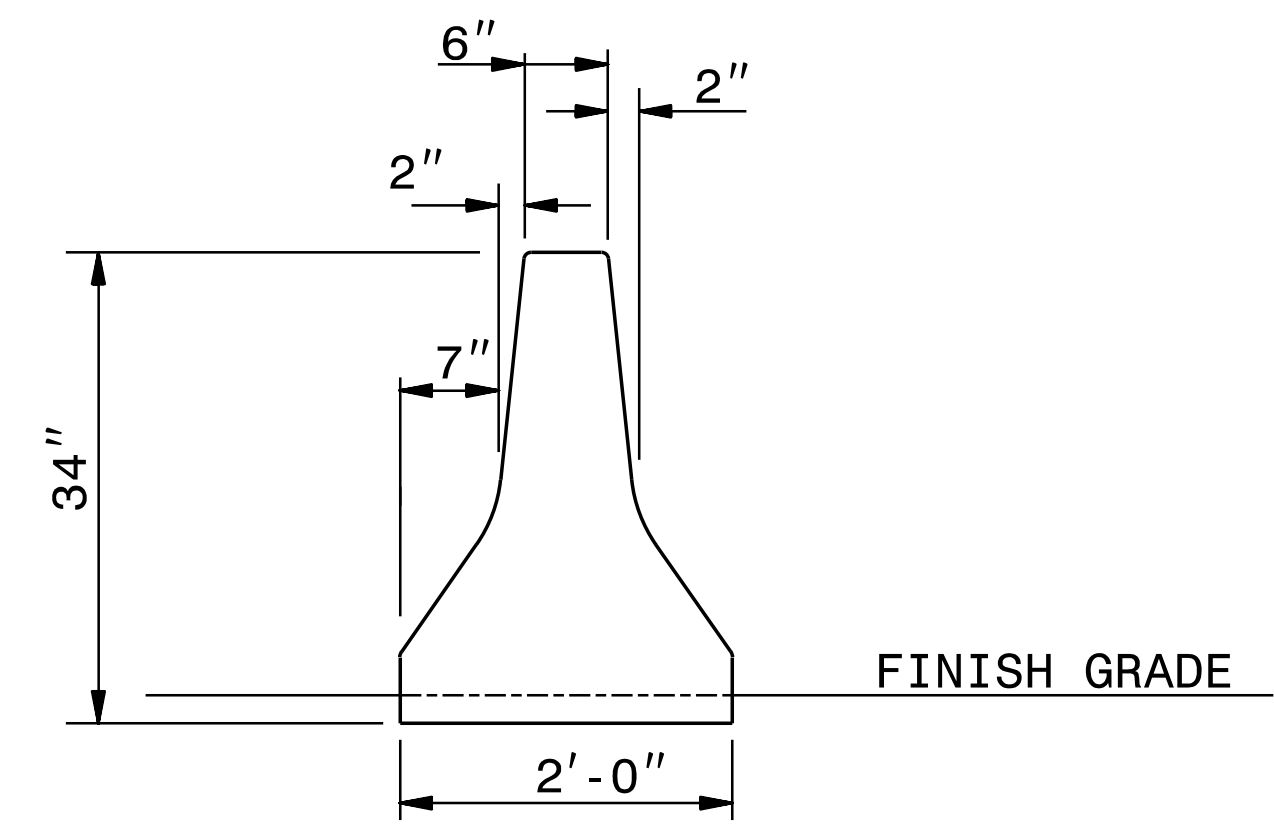
**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

**SINGLE SLOPE  
CONCRETE BARRIER  
(46" MIN. HEIGHT)  
SHEET 2 OF 2**

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CHECKED BY: _____	DATE: _____
FILE SPEC.: _____	

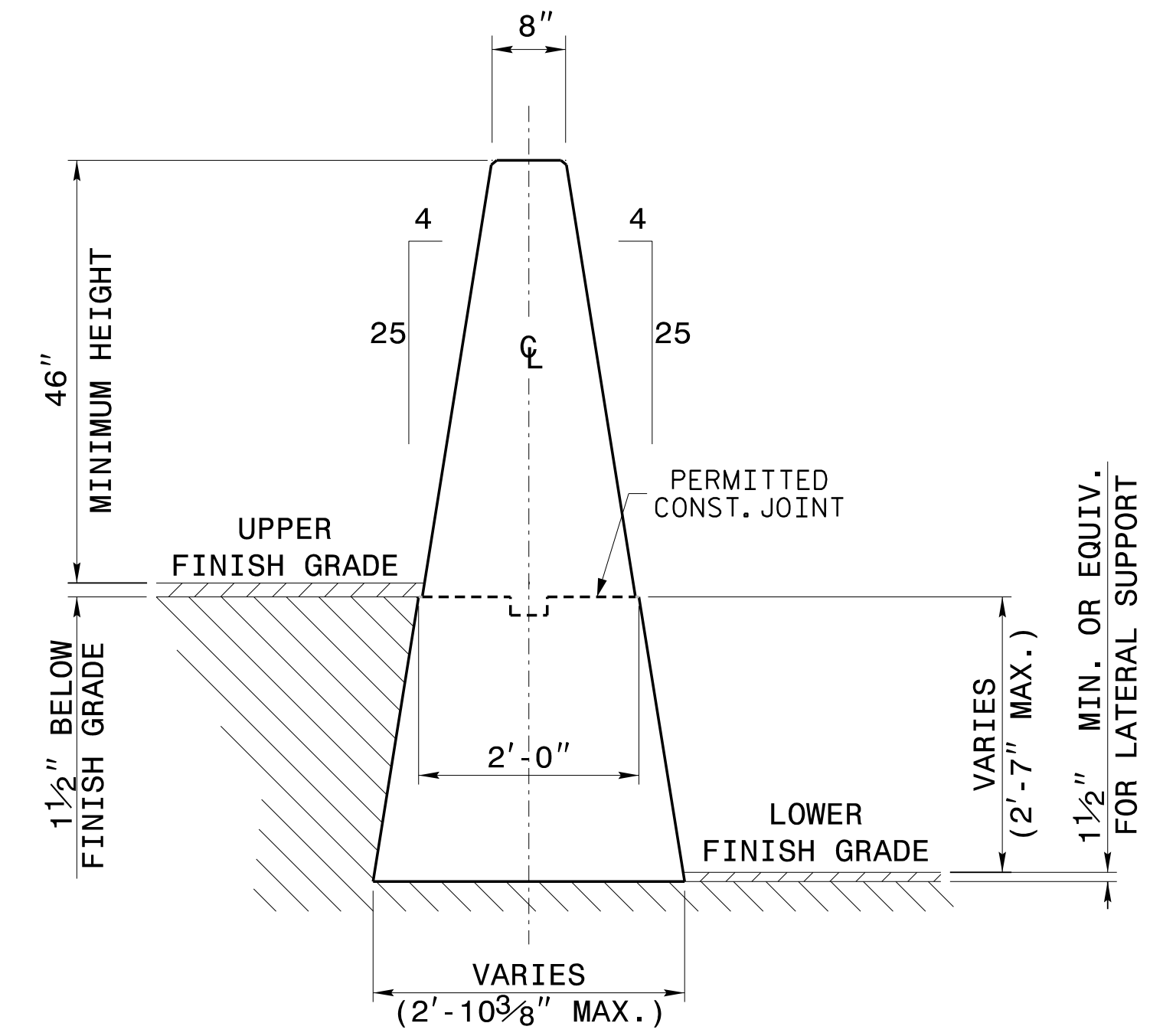


**TRANSITION FROM TYPE IV DOUBLE FACED CONCRETE BARRIER  
TO SINGLE SLOPE CONCRETE BARRIER**



**SECTION A-A**

**TYPE IV DOUBLE FACED CONCRETE BARRIER**



**SECTION B-B**

**SINGLE SLOPE CONCRETE BARRIER**

**NOTES:**  
 SEE SPECIAL DETAILS PERTAINING TO SINGLE SLOPE BARRIERS FOR CONSTRUCTION METHODS AND STEEL PLACEMENT.  
 SEE ROADWAY DETAILS AND ROADWAY STANDARD DRAWINGS FOR TYPE IV DOUBLE FACED CONCRETE BARRIER CONSTRUCTION METHODS AND STEEL PLACEMENT.  
 DIMENSIONS OF TYPE IV DOUBLE FACED CONCRETE BARRIER ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED.

5/16/2024



DocuSigned by:  
John Arthur D'Worth

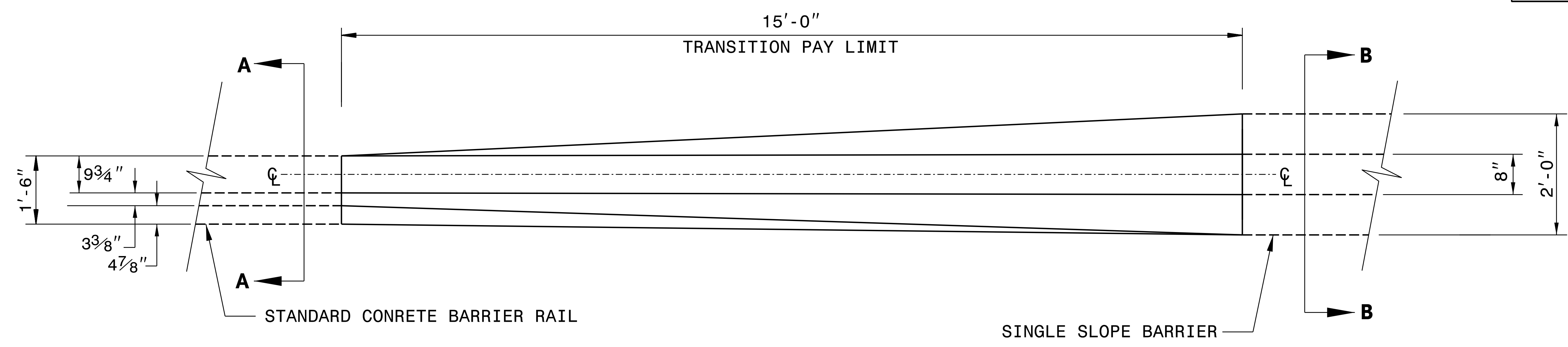
**WETHERILL ENGINEERING**  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 License No. F-0377  
 Bus: 919 851 8077  
 Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

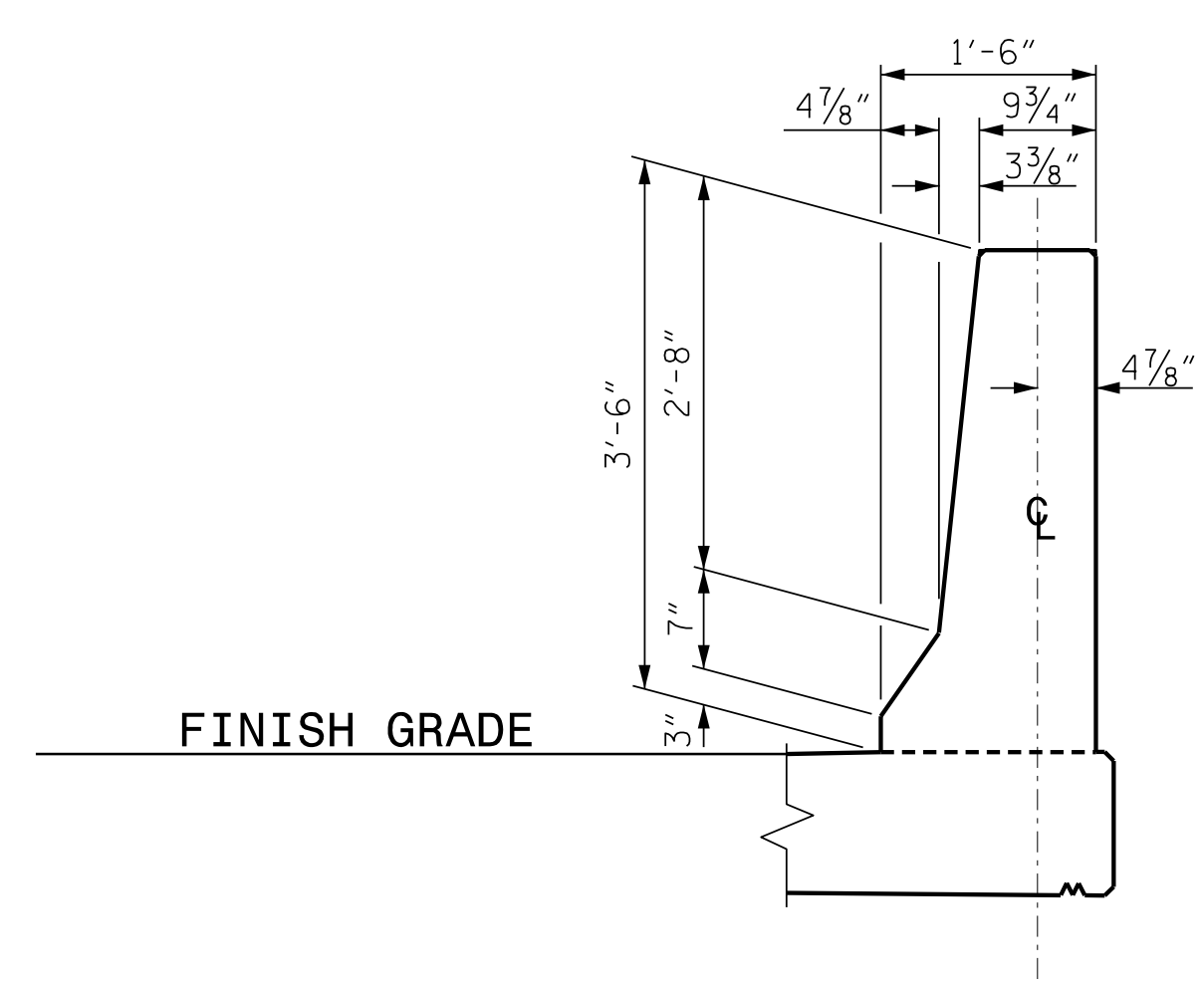
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**SINGLE SLOPE  
CONCRETE BARRIER  
TRANSITION**

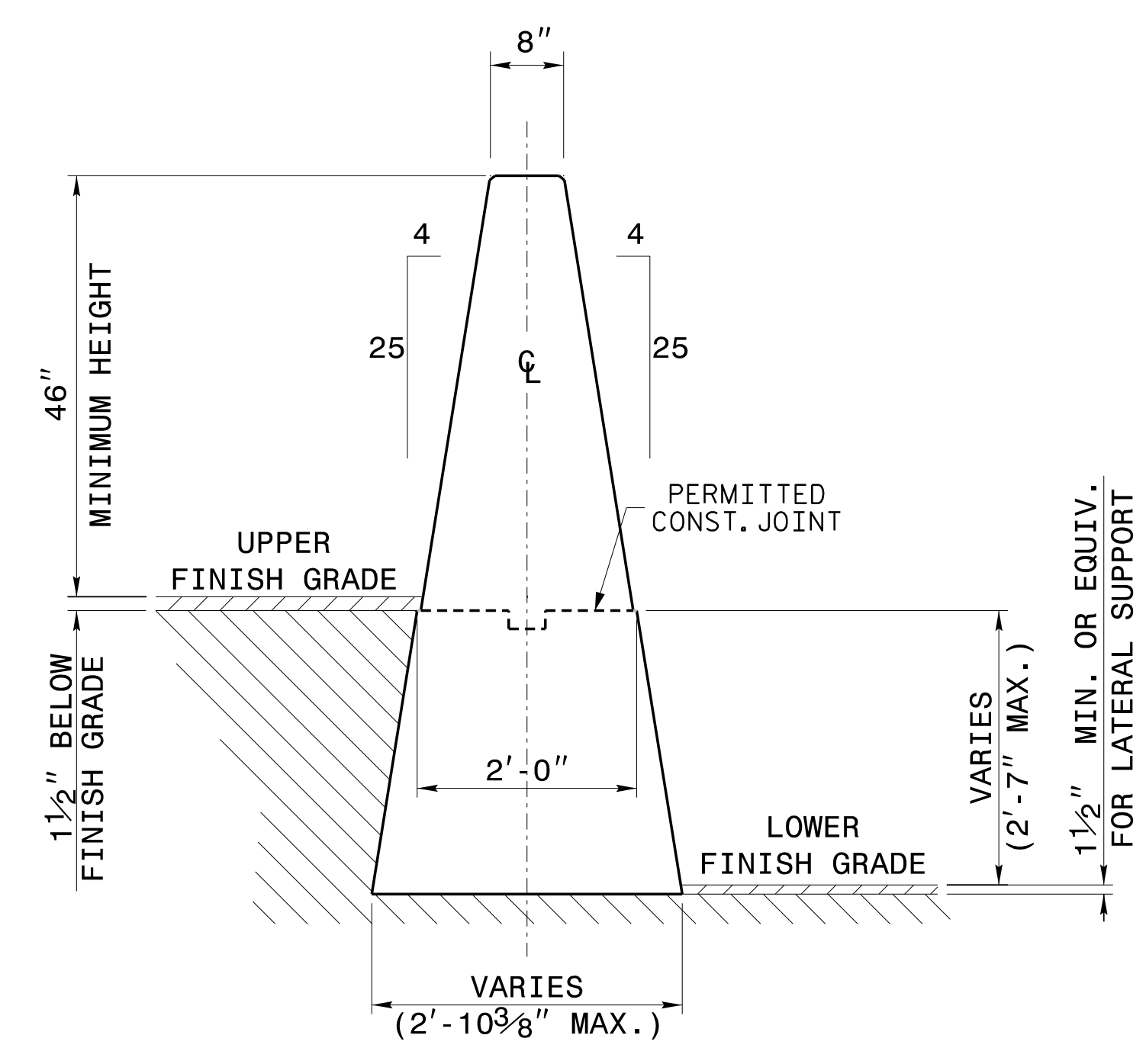
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**TRANSITION FROM STANDARD CONCRETE BARRIER BRIDGE RAIL  
TO SINGLE SLOPE BARRIER**



**SECTION A-A**  
**STANDARD CONCRETE BARRIER BRIDGE RAIL**



**SECTION B-B**  
**SINGLE SLOPE CONCRETE BARRIER**

**NOTES:**  
SEE SPECIAL DETAILS PERTAINING TO SINGLE SLOPE BARRIERS FOR CONSTRUCTION METHODS AND STEEL PLACEMENT.

SEE STRUCTURE PLANS FOR CONCRETE BARRIER RAIL CONSTRUCTION METHODS AND STEEL PLACEMENT.

DIMENSIONS OF CONCRETE BARRIER RAIL ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED.

5/16/2024



DocuSigned by:  
John A. Ditzworth  
021382269228438

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Raleigh, N.C. 27606  
License No. F-0377  
Bus: 919 851 8077  
Fax: 919 851 8107

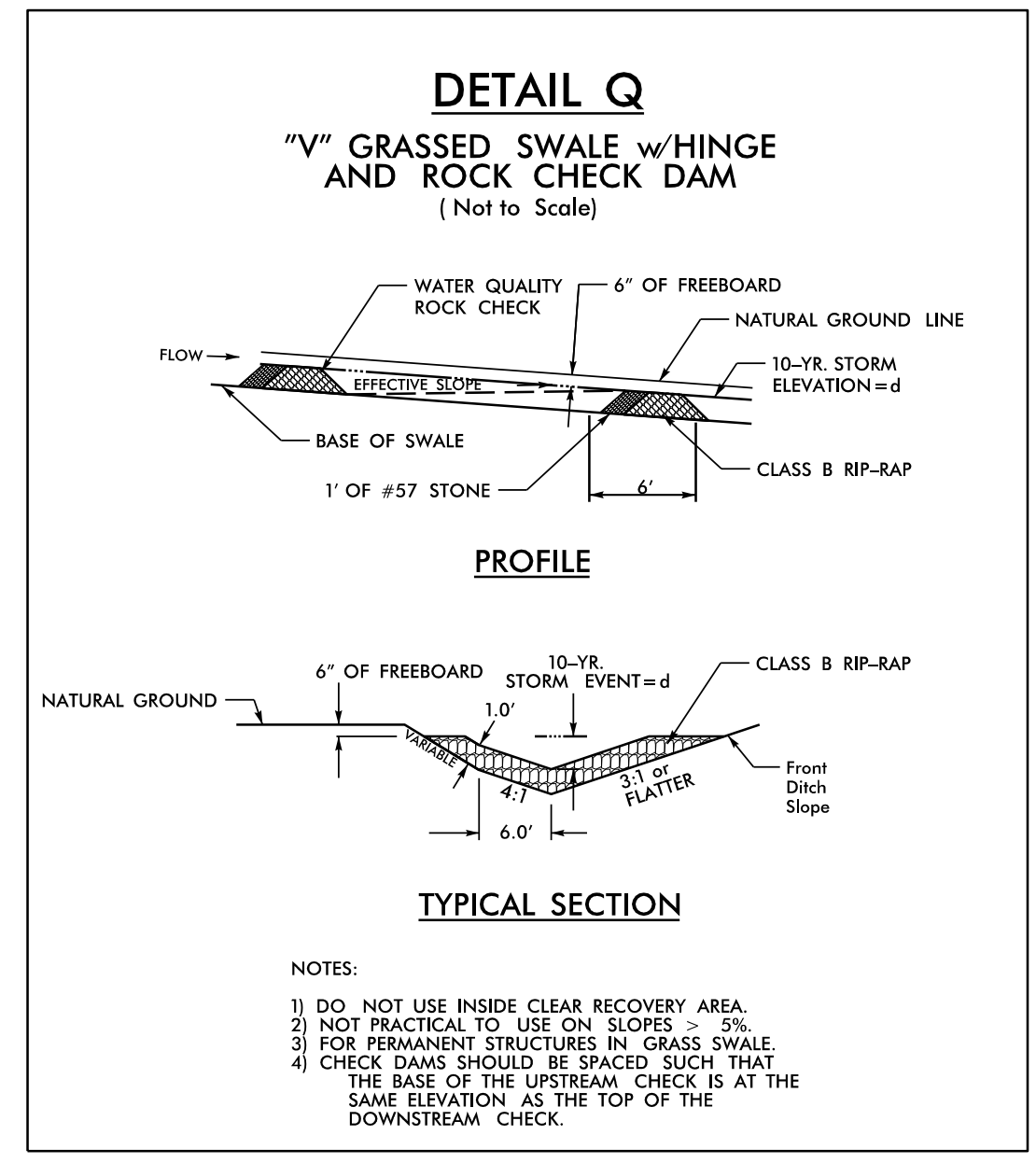
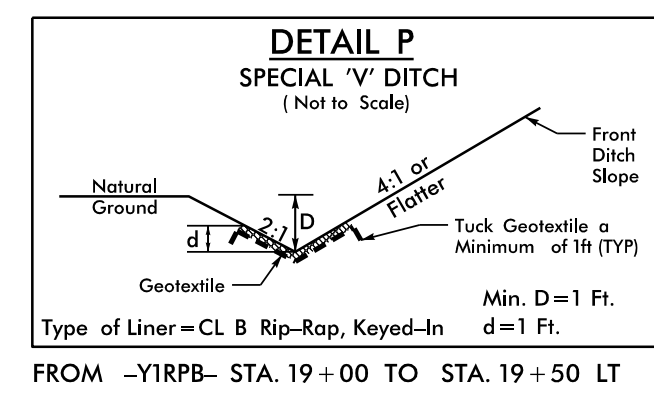
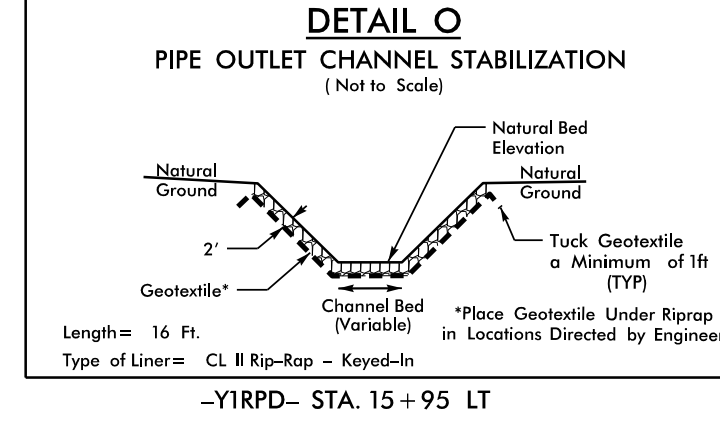
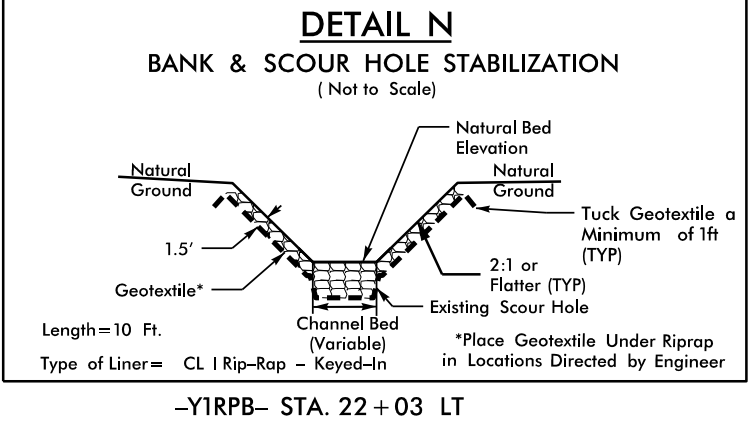
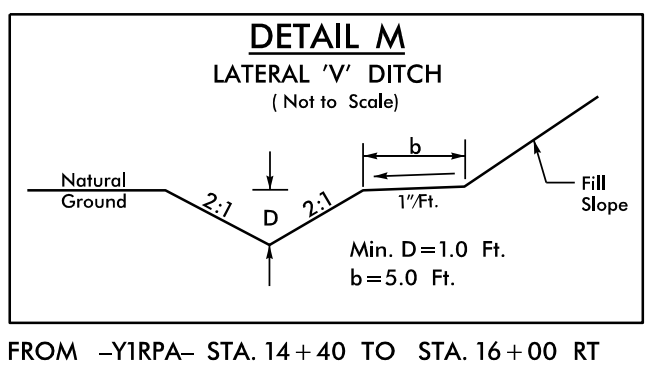
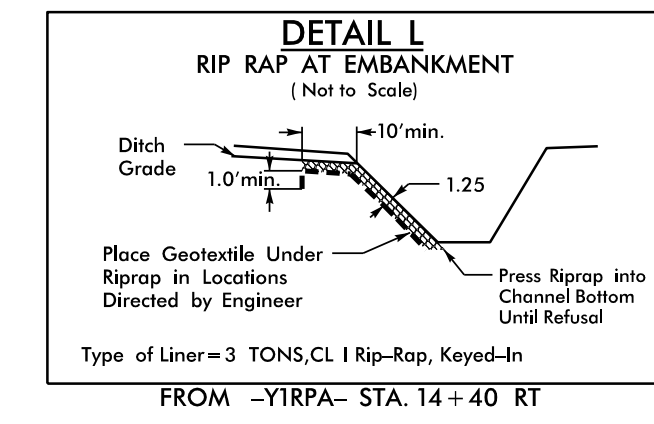
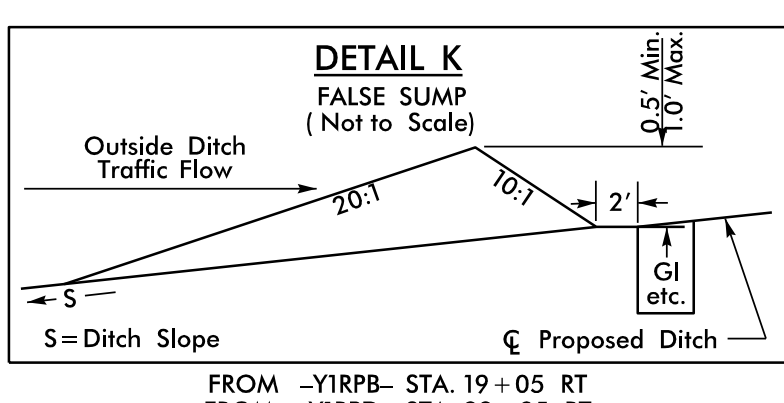
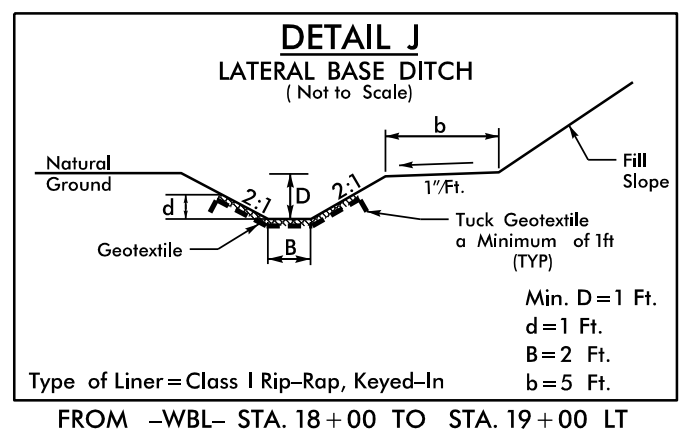
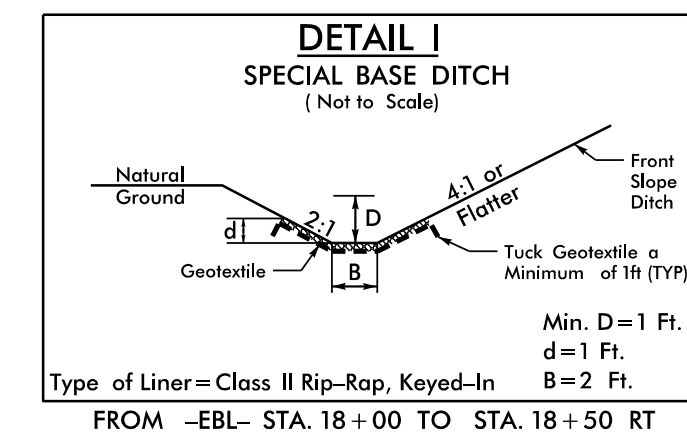
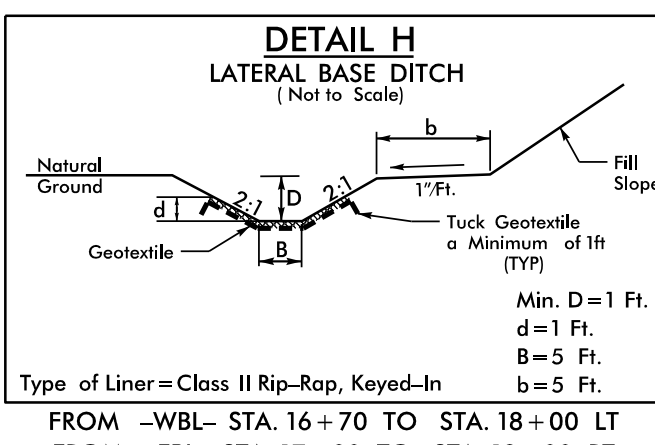
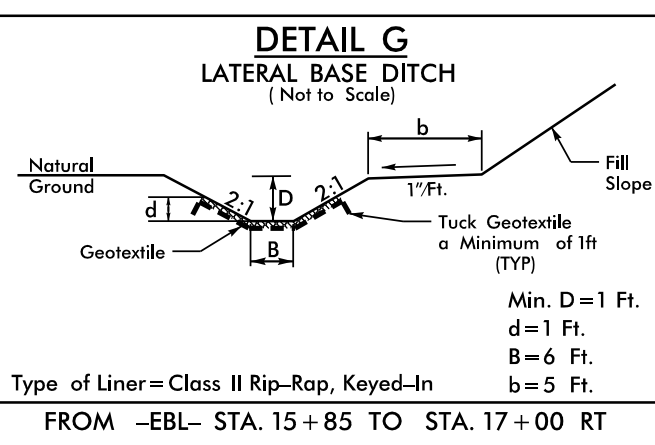
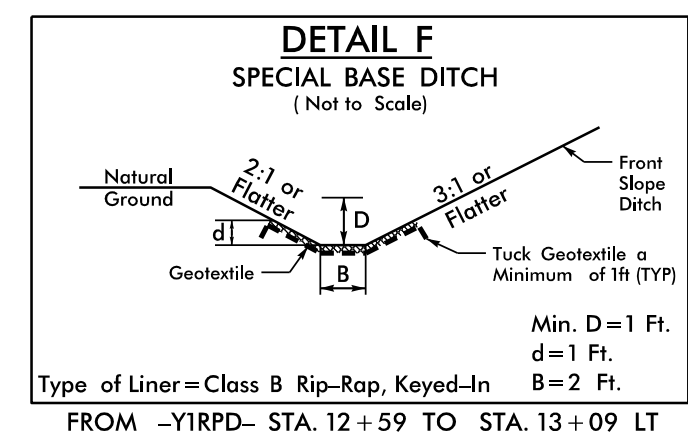
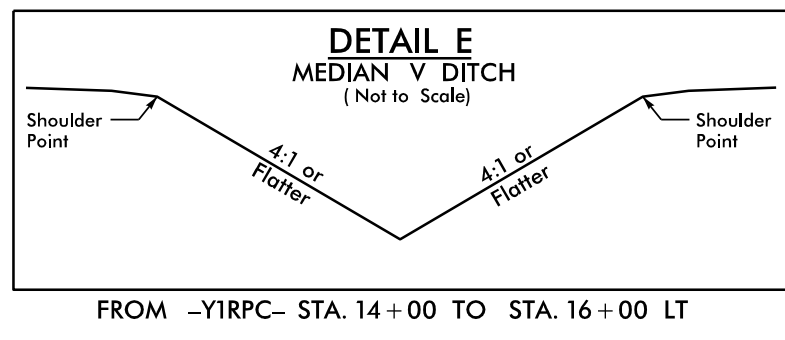
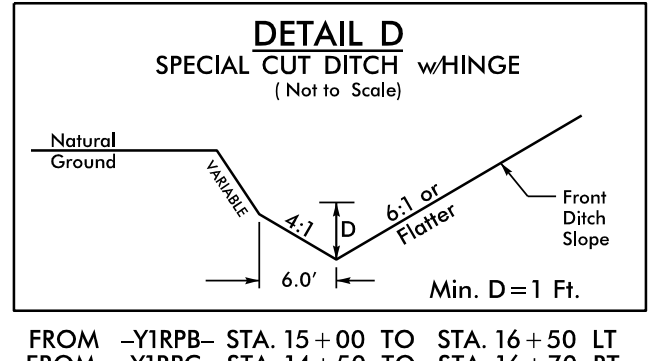
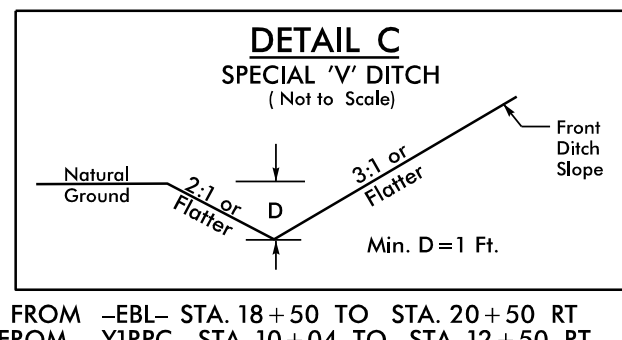
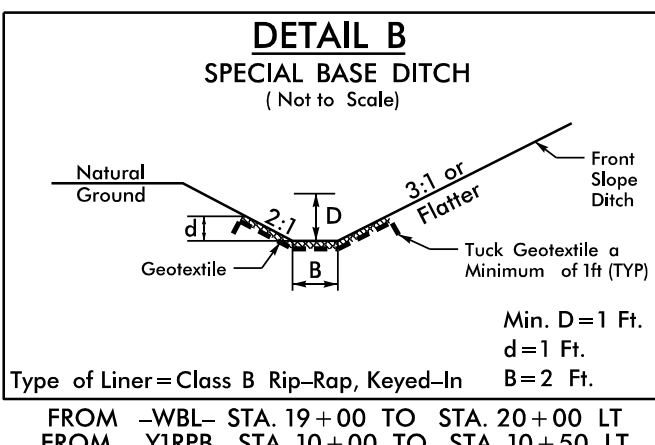
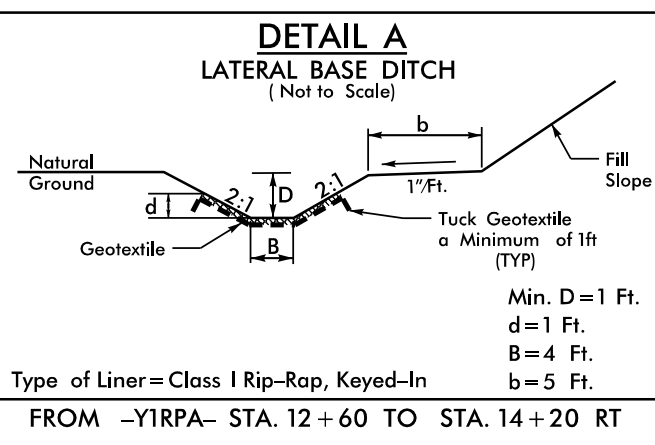
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

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UNLESS ALL SIGNATURES COMPLETED**

**SINGLE SLOPE  
CONCRETE BARRIER  
TRANSITION**

ORIGINAL BY: _____	DATE: _____
MODIFIED BY: _____	DATE: _____
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FILE SPEC.: _____	

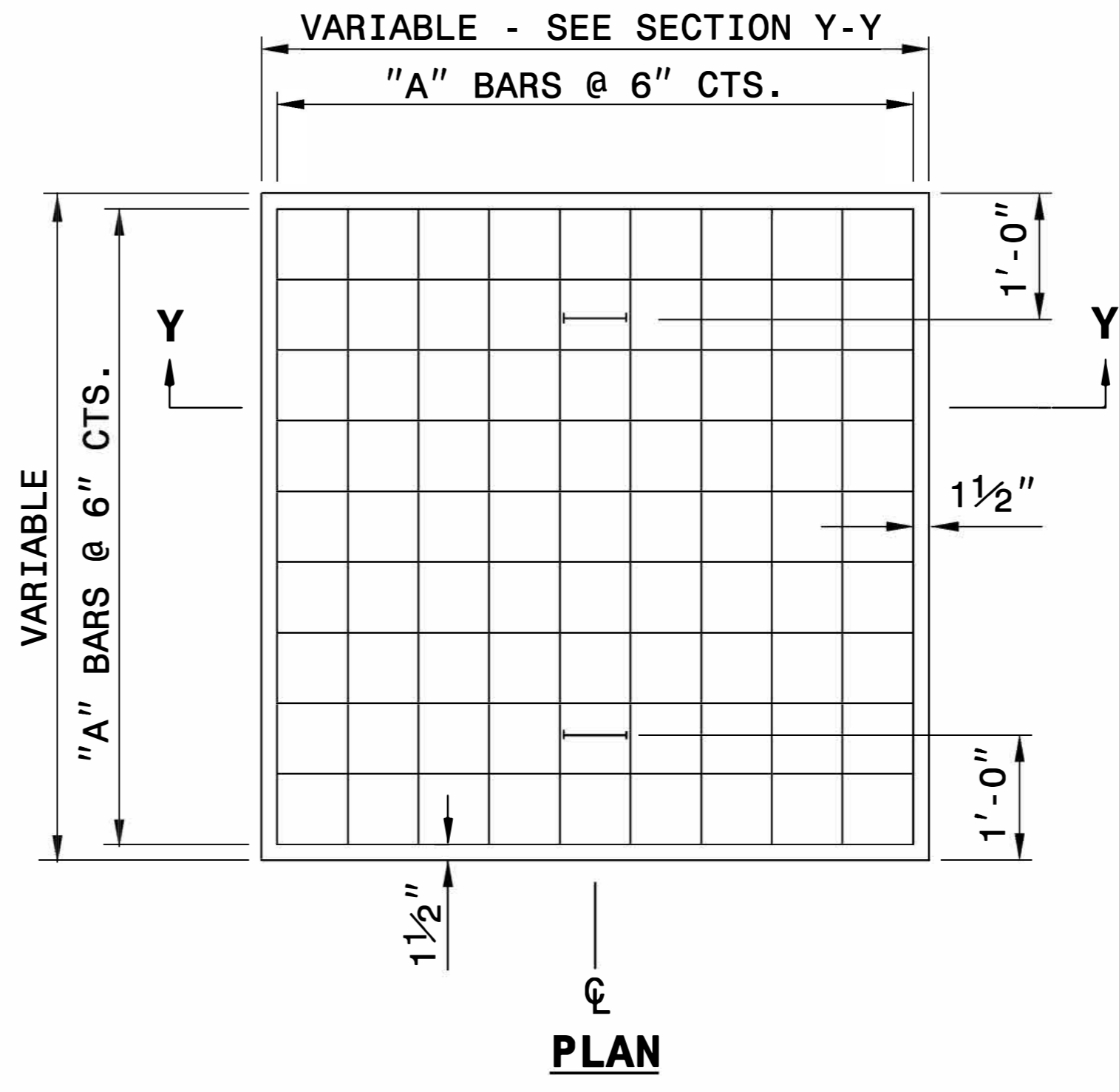
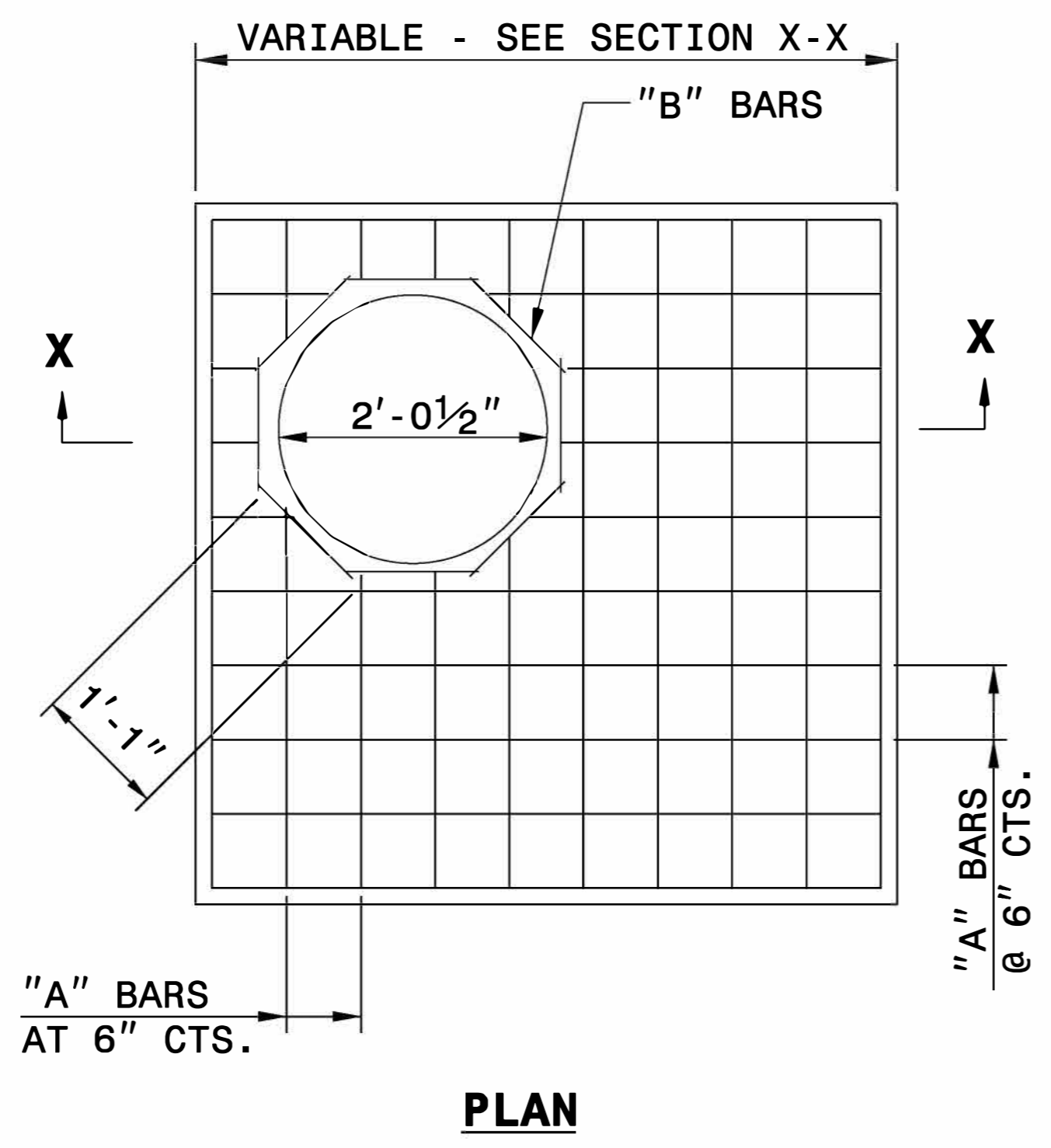
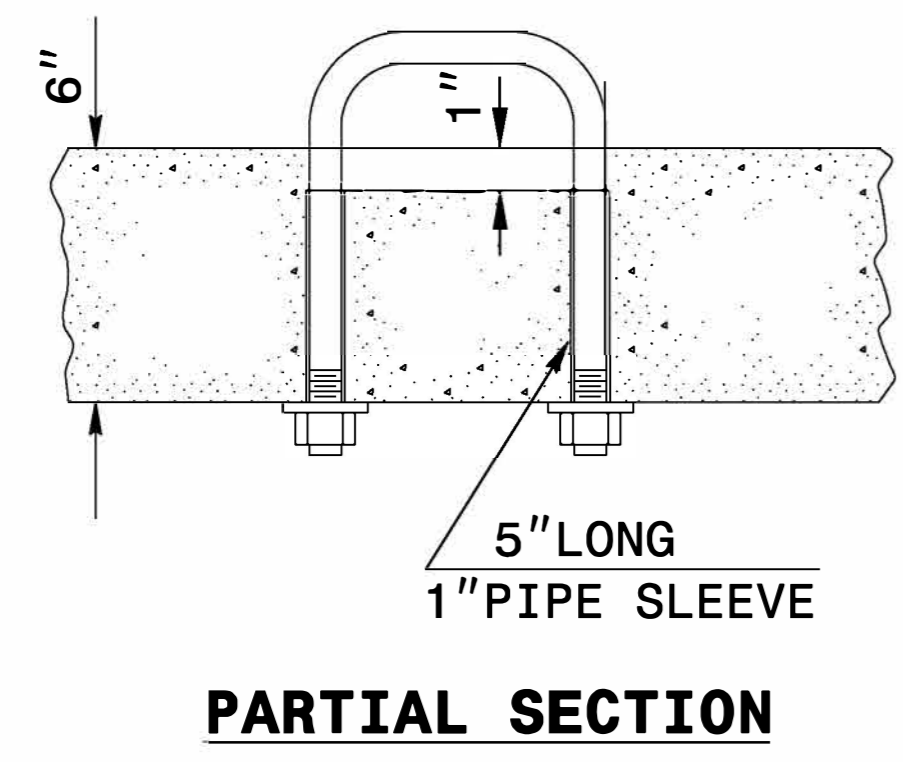
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PROJECT REFERENCE NO. <i>HB-0004</i>	SHEET NO. <i>2D-1</i>
RW SHEET NO.	
HYDRAULICS ENGINEER 5/16/2024  Matthew L. Harve 1223 JONES FRANKLIN Rd. Raleigh, N.C. 27606 License No. F-0377 Bus: 919 851 8077 Fax: 919 851 8107	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	
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REVISIONS

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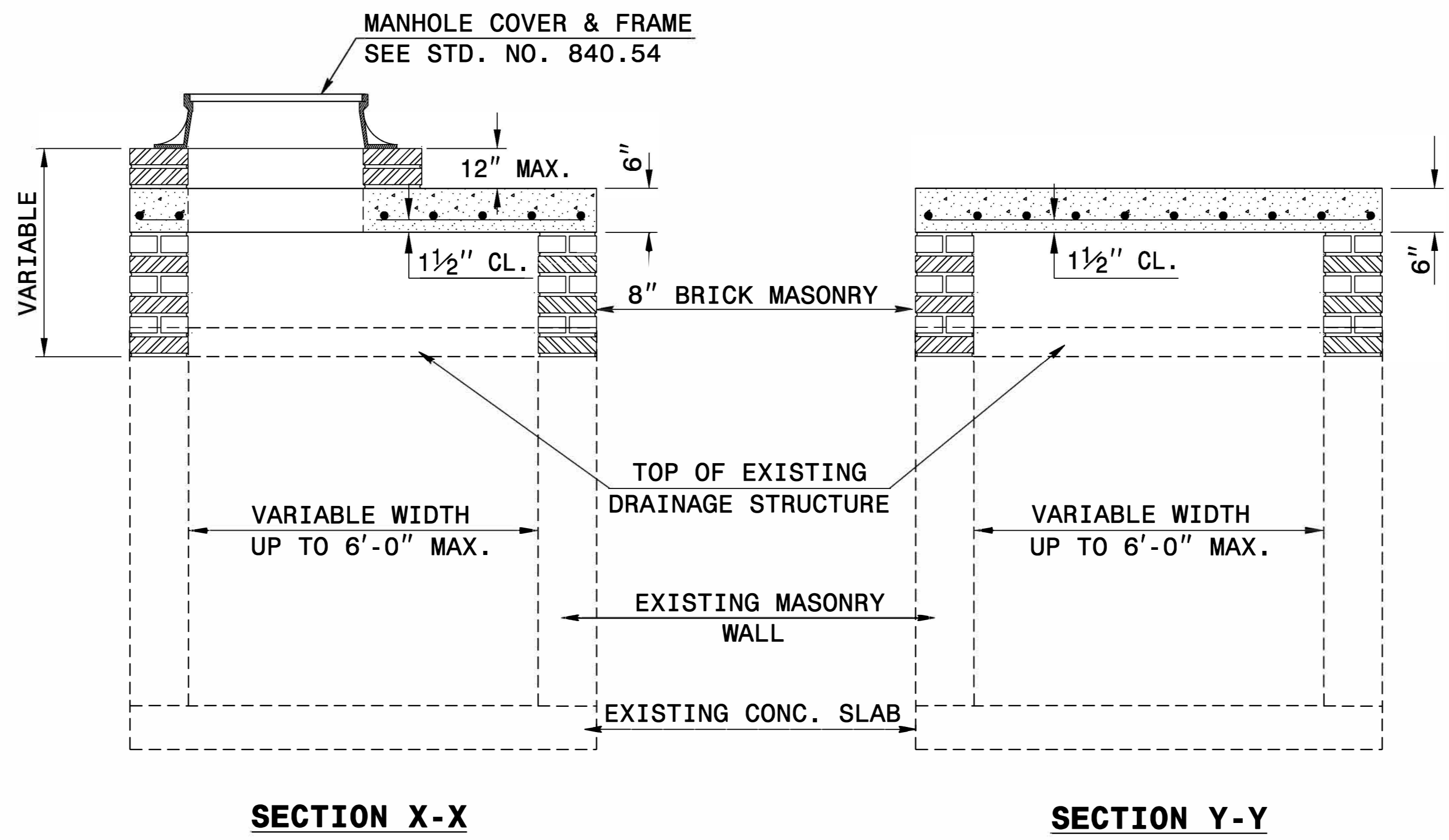
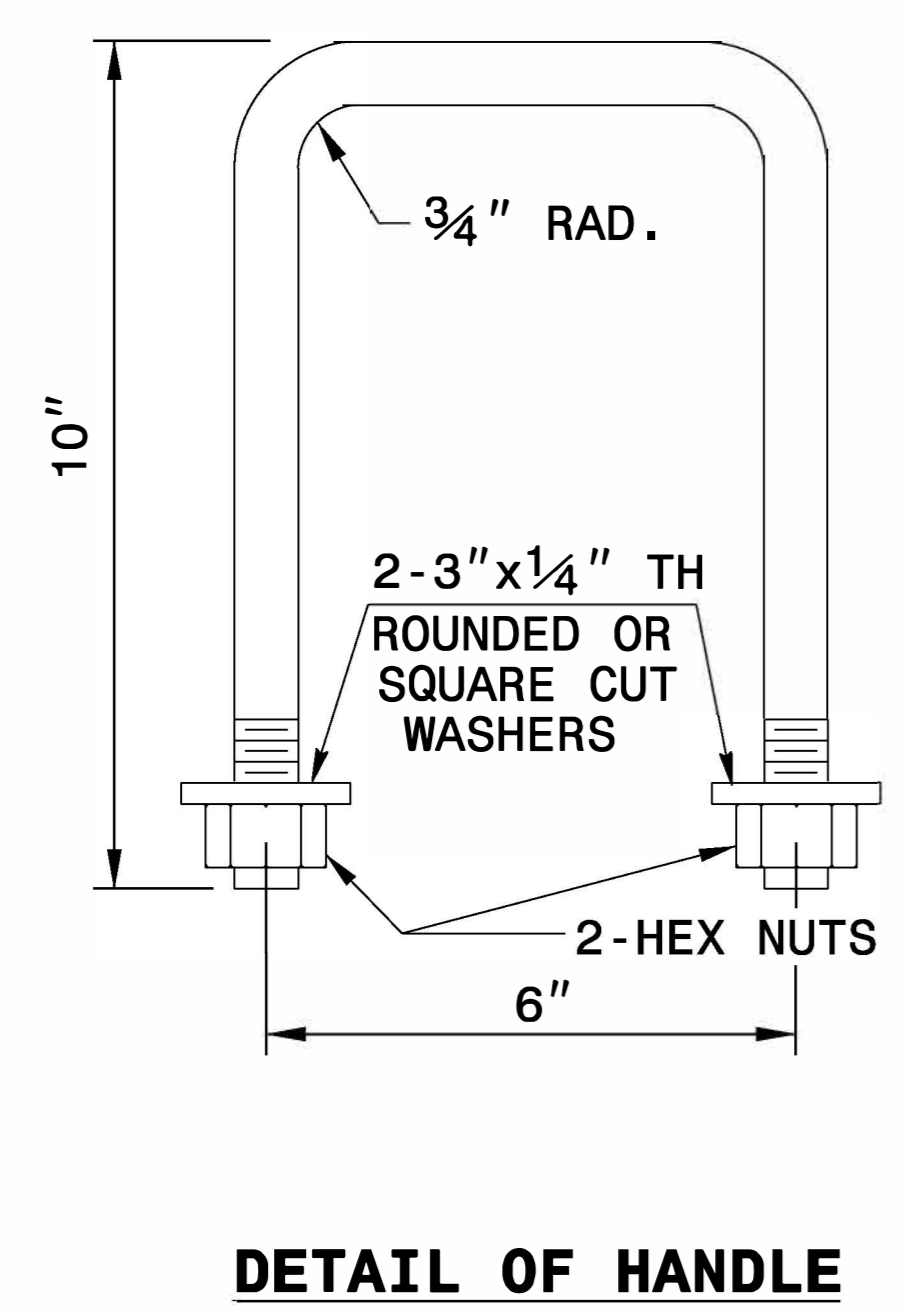
**GENERAL NOTES:**

CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

THE DIMENSIONS FOR THE EXISTING BOXES ARE APPROXIMATE AND MAY VARY SLIGHTLY.

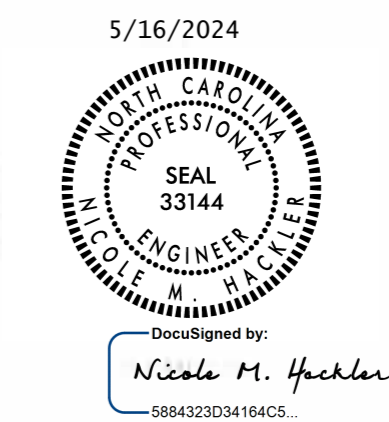
DETAIL INTENDED FOR NON-TRAFFIC BEARING DRAINAGE STRUCTURES.

<b>BILL OF MATERIALS</b>				
<b>REINFORCING STEEL</b>				
CODE	SIZE	QTY.	LENGTH	REINF. STEEL LBS.
A	#4	20	4'-6"	60.12
B	#4	8	1'-1"	5.79
<b>TOTAL</b>				<b>65.91 *</b>
<b>MASONRY</b>				CU YDS
TOP SLAB CONCRETE CLASS "B"				.4326 *
BRICK MASONRY PER FT HT (MIN)				.4111



**\* NOTE:**  
 QUANTITIES BASED ON 3'-6" X 3'-6" DRAINAGE STRUCTURE. ADJUST QUANTITIES FOR LARGER STRUCTURES AND MANHOLE CONSTRUCTION.

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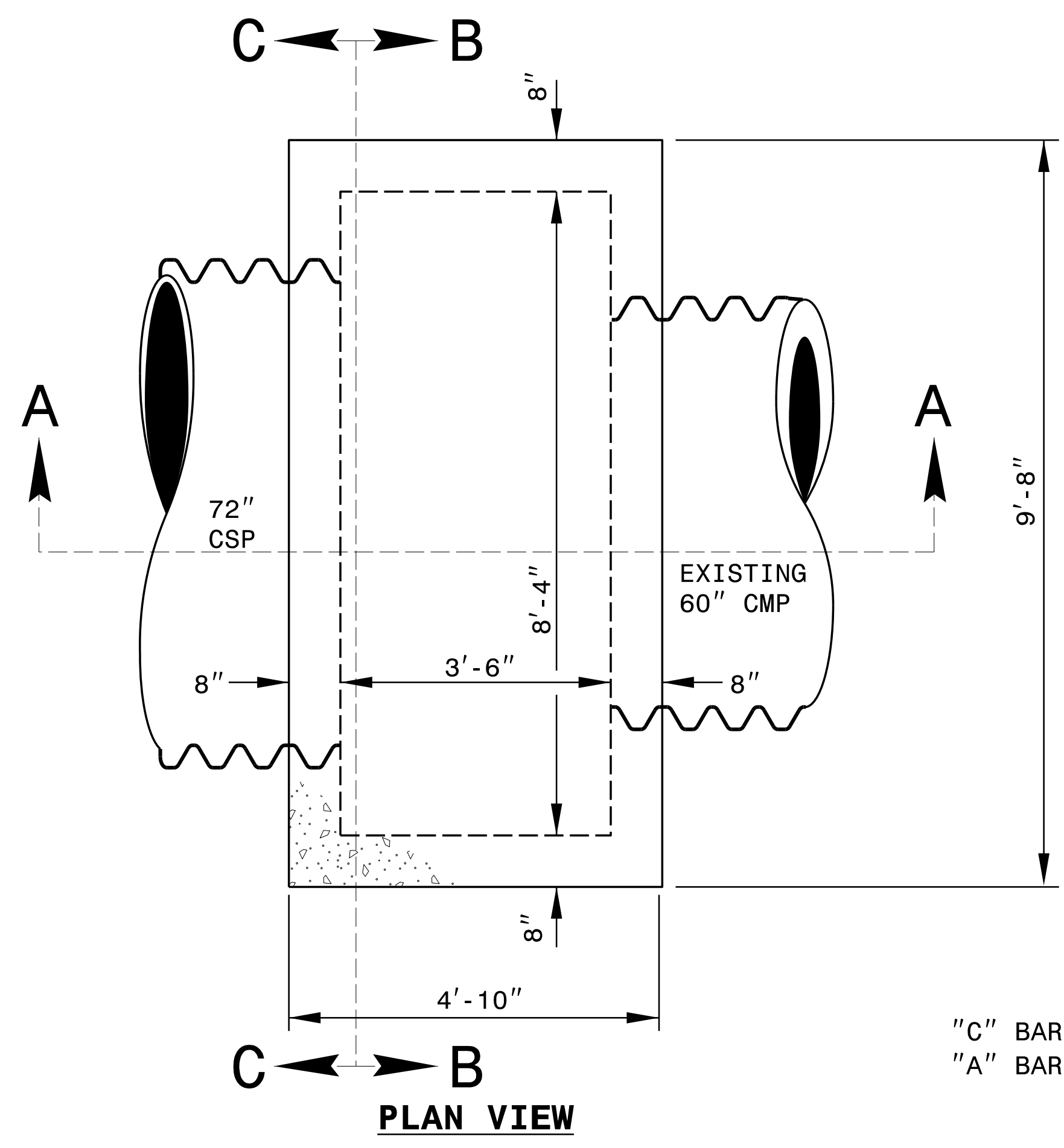
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**CONTRACT STANDARDS  
AND DEVELOPMENT UNIT**  
 Office 919-707-6950 FAX 919-250-4119

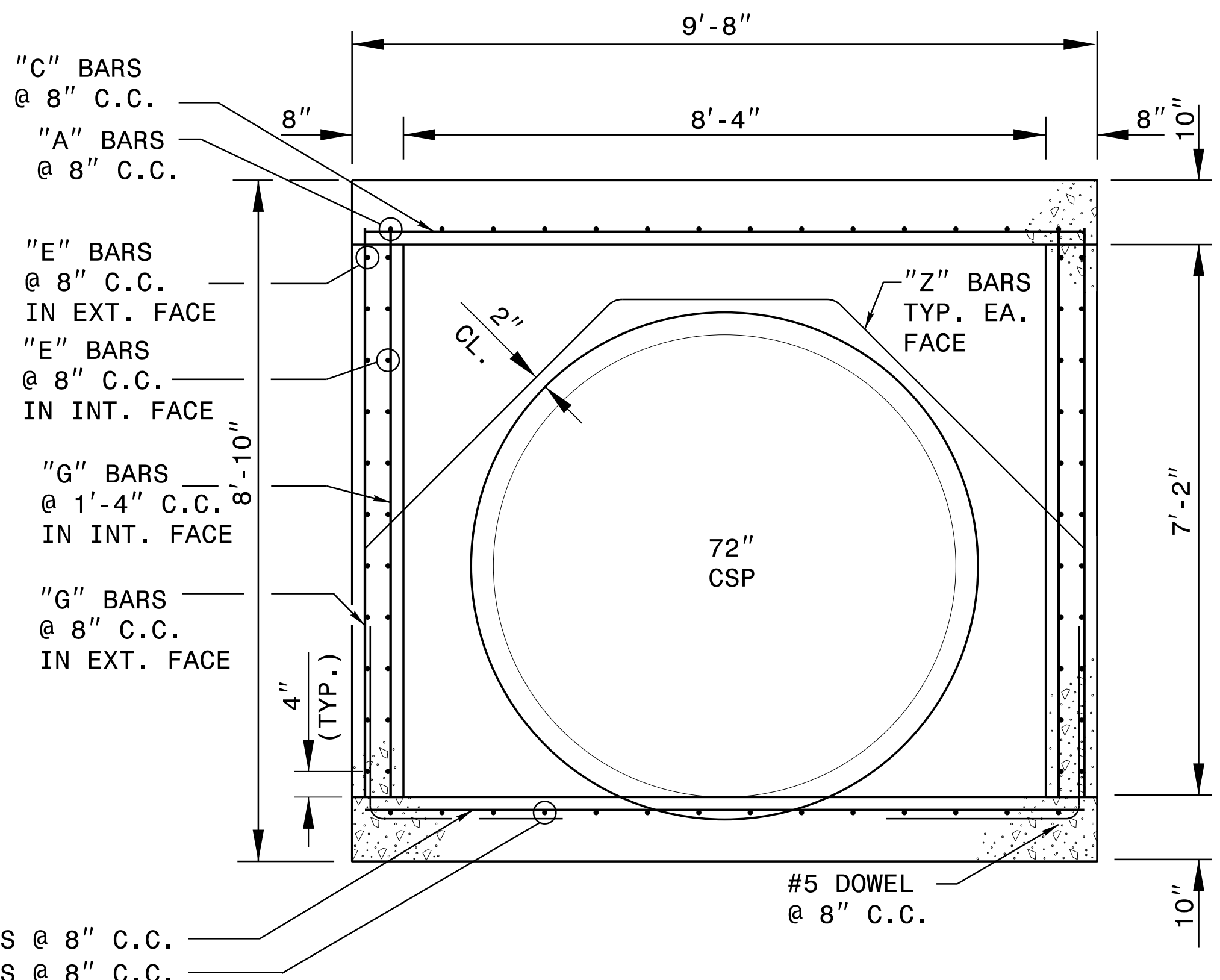
**DETAIL TO CONVERT EXISTING  
DI, CB, OTCB or GI  
TO JUNCTION BOX  
(MANHOLE OPTIONAL)**

ORIGINAL BY: T.S.S.	DATE: NOV. 1997
MODIFIED BY: T.S.S.	DATE: FEB. 2000
CHECKED BY:	DATE:
FILE SPEC.: ds174:/usr/details/stand/boxtojbe.dgn	

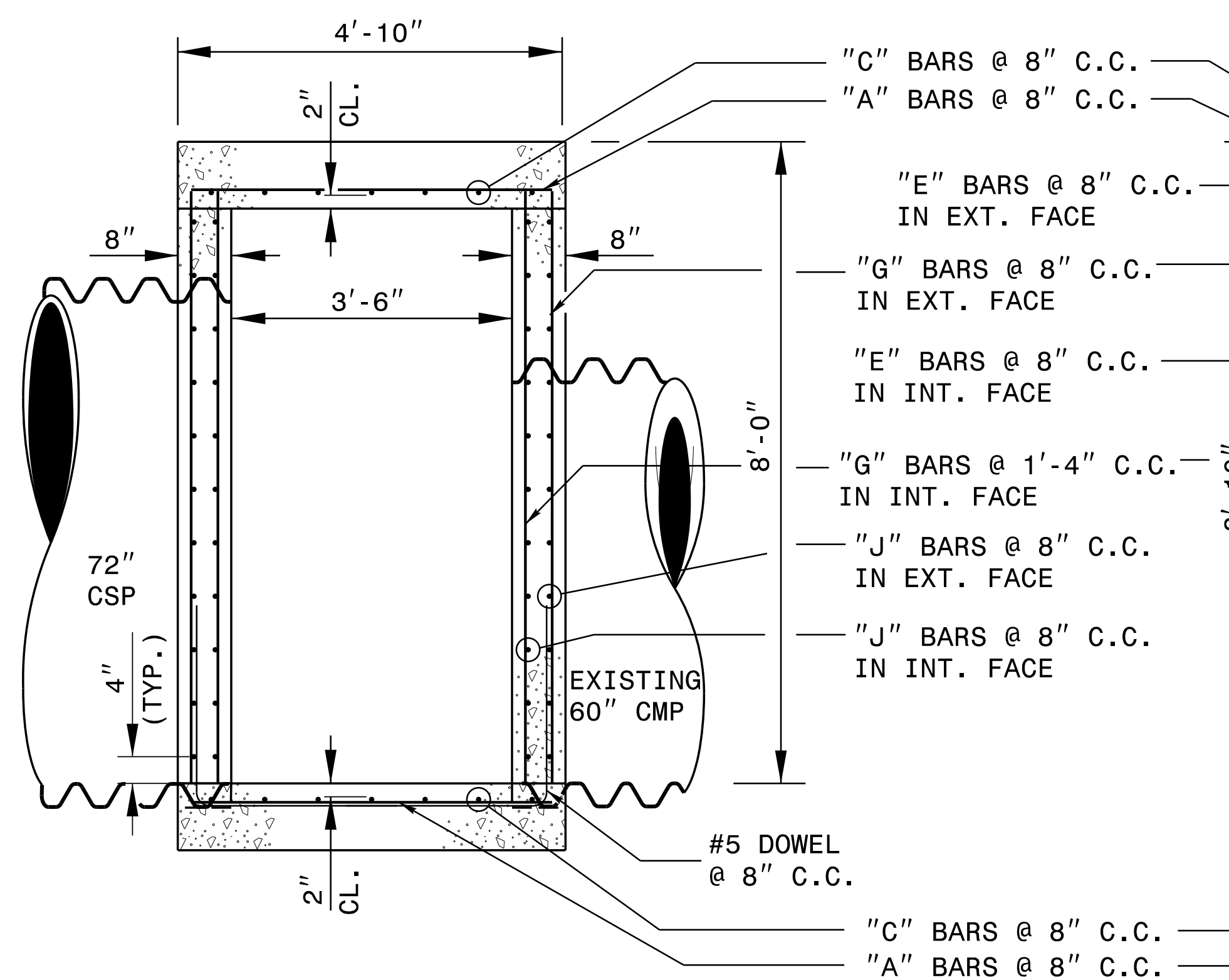




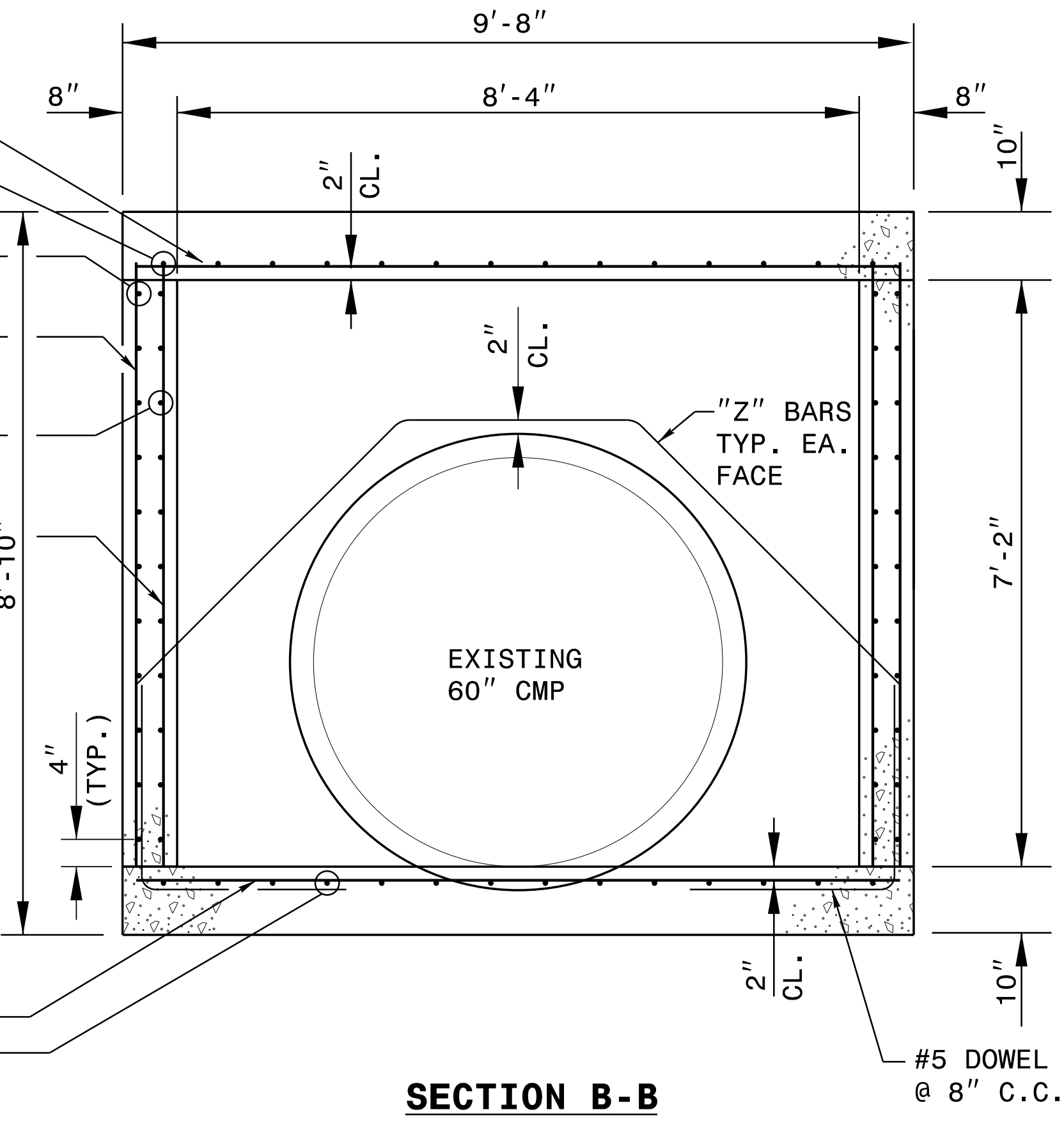
**PLAN VIEW**



**SECTION C-C**



**SECTION A-A**

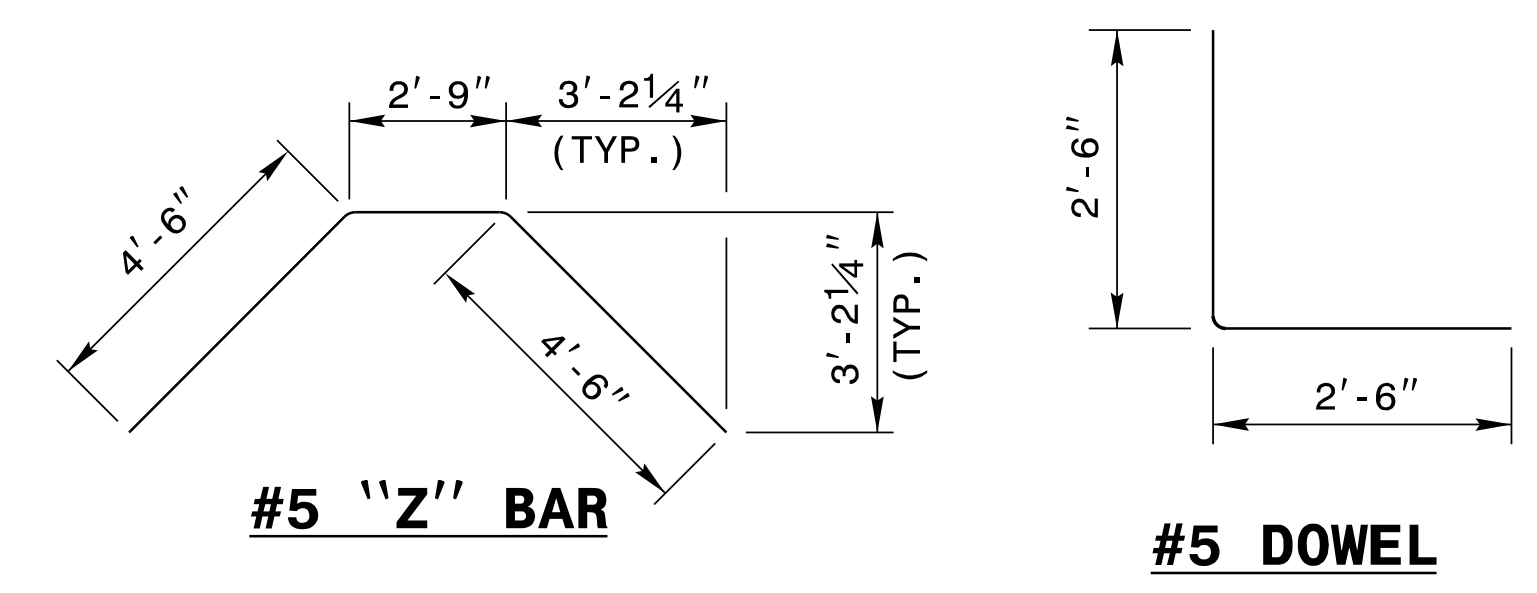


**SECTION B-B**

**GENERAL NOTES:**  
 USE CLASS "B" CONCRETE THROUGHOUT.  
 USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.  
 CHAMFER ALL EXPOSED CORNERS 1".  
 BOX DIMENSIONS MAY BE FIELD ADJUSTED AS DIRECTED BY THE ENGINEER.  
 DRAWING NOT TO SCALE.  
 2" MINIMUM CONCRETE COVERAGE ON ALL REBAR.

BILL OF MATERIAL				
BAR	NO.	SIZE	LENGTH	WEIGHT
A	28	#5	4'-6"	131
C	14	#5	9'-4"	136
E	44	#5	4'-6"	207
G	60	#5	7'-4"	459
J	44	#5	9'-4"	428
Z	4	#4	11'-9"	31
DOWEL	40	#5	5'-0"	209
TOTAL REINF. STEEL			(LBS.)	1,601
TOTAL CLASS "B" CONCRETE *			(CU. YDS.)	7.5

\* NO DEDUCTIONS HAVE BEEN MADE FOR PIPES.



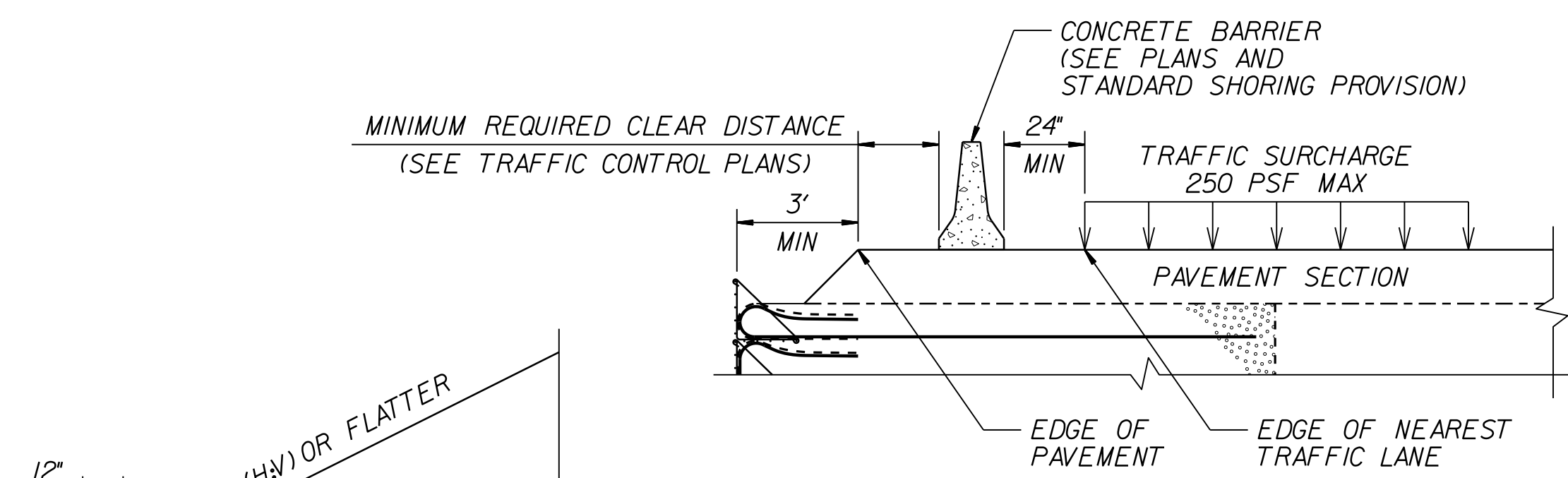
1223 Jones Franklin Rd.  
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TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

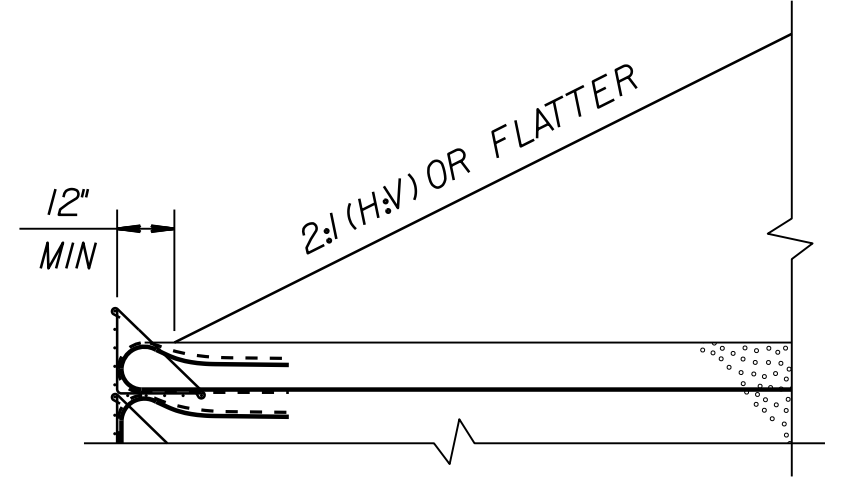
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 UNLESS ALL SIGNATURES COMPLETED**

**SPECIAL JUNCTION BOX  
 W/ SLAB LID**

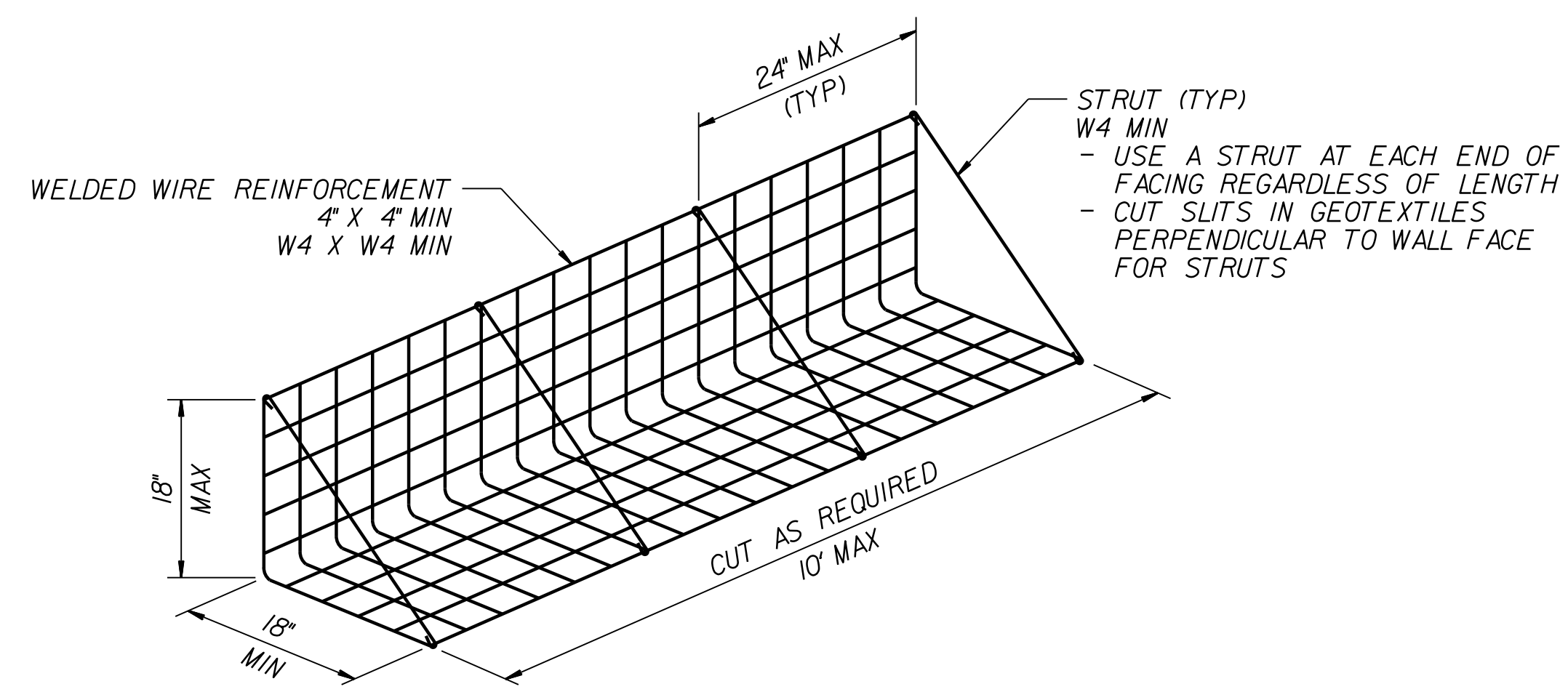
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 CHECKED BY: J. DILWORTH DATE: 4/24



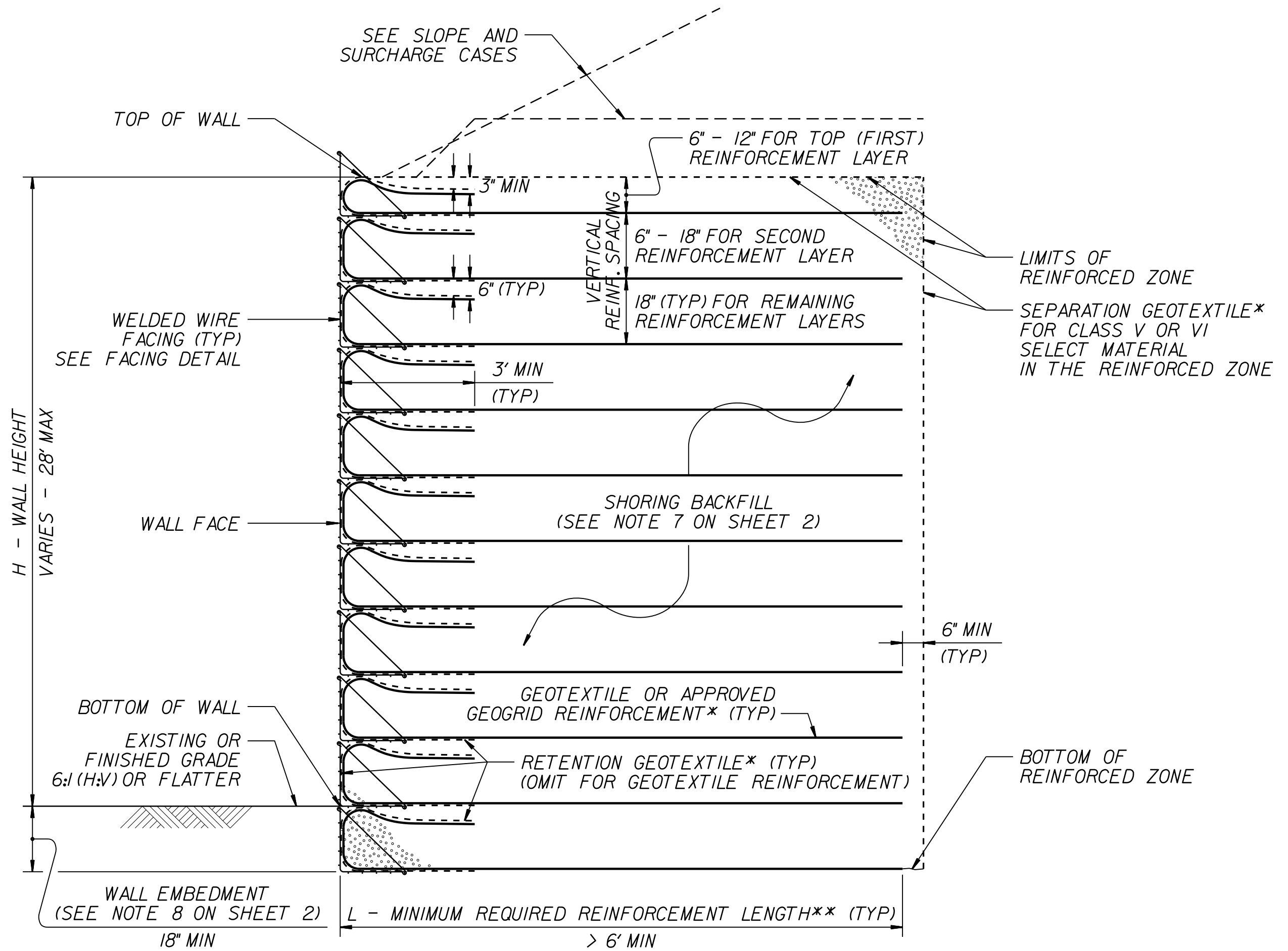
**SURCHARGE CASE**



**SLOPE CASE**

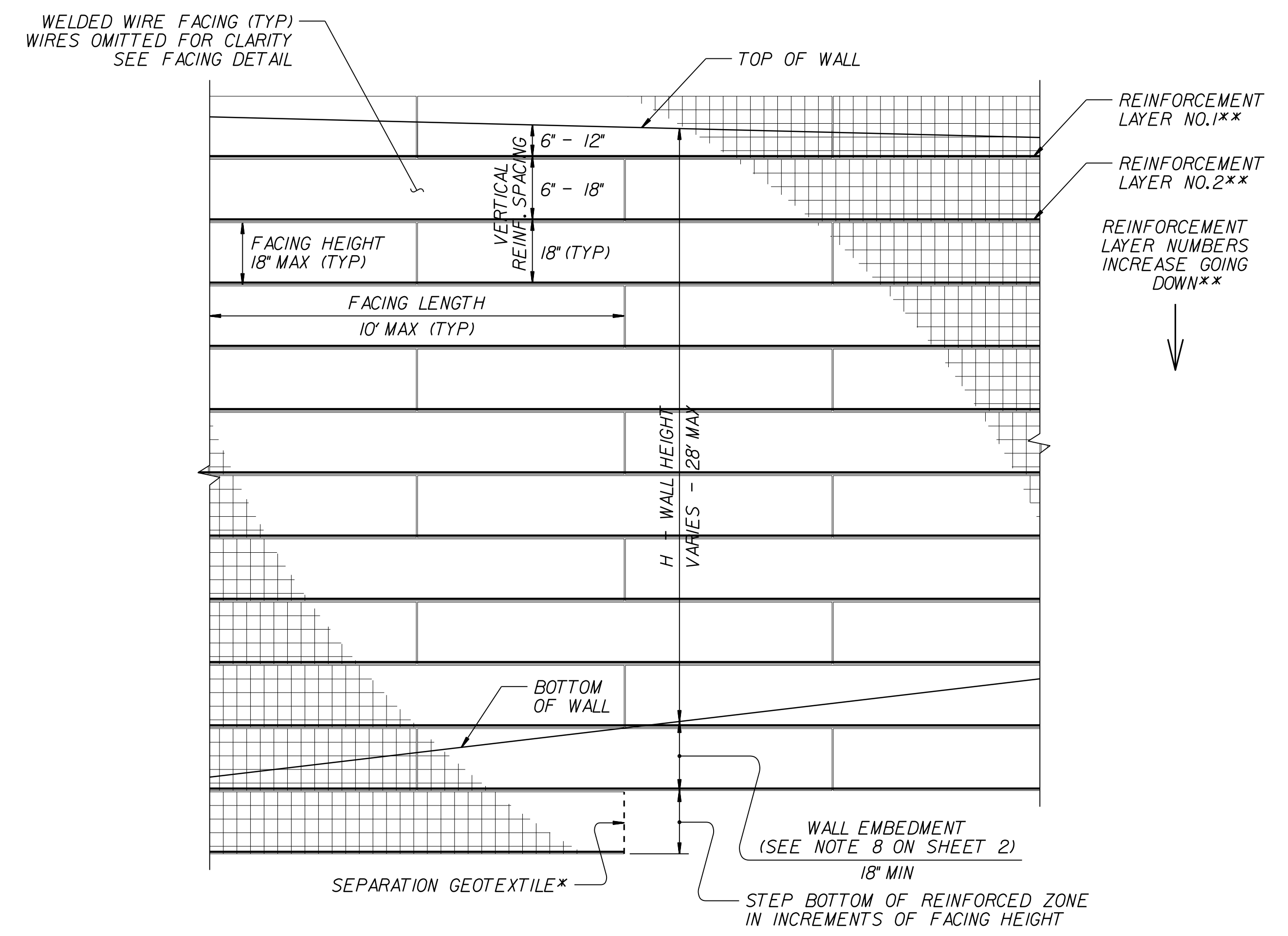


**FACING DETAIL**



**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**

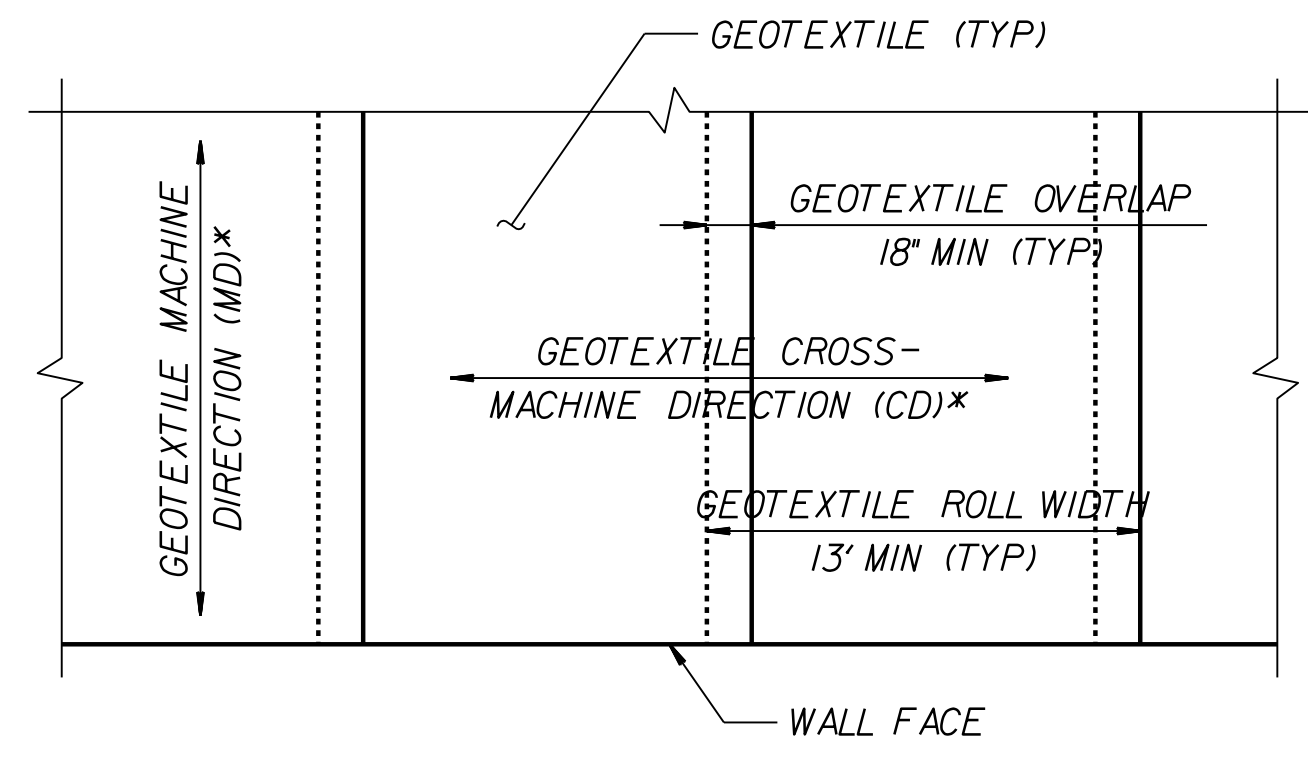
\*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.  
 \*\*SEE REINFORCEMENT TABLES ON SHEET 3.



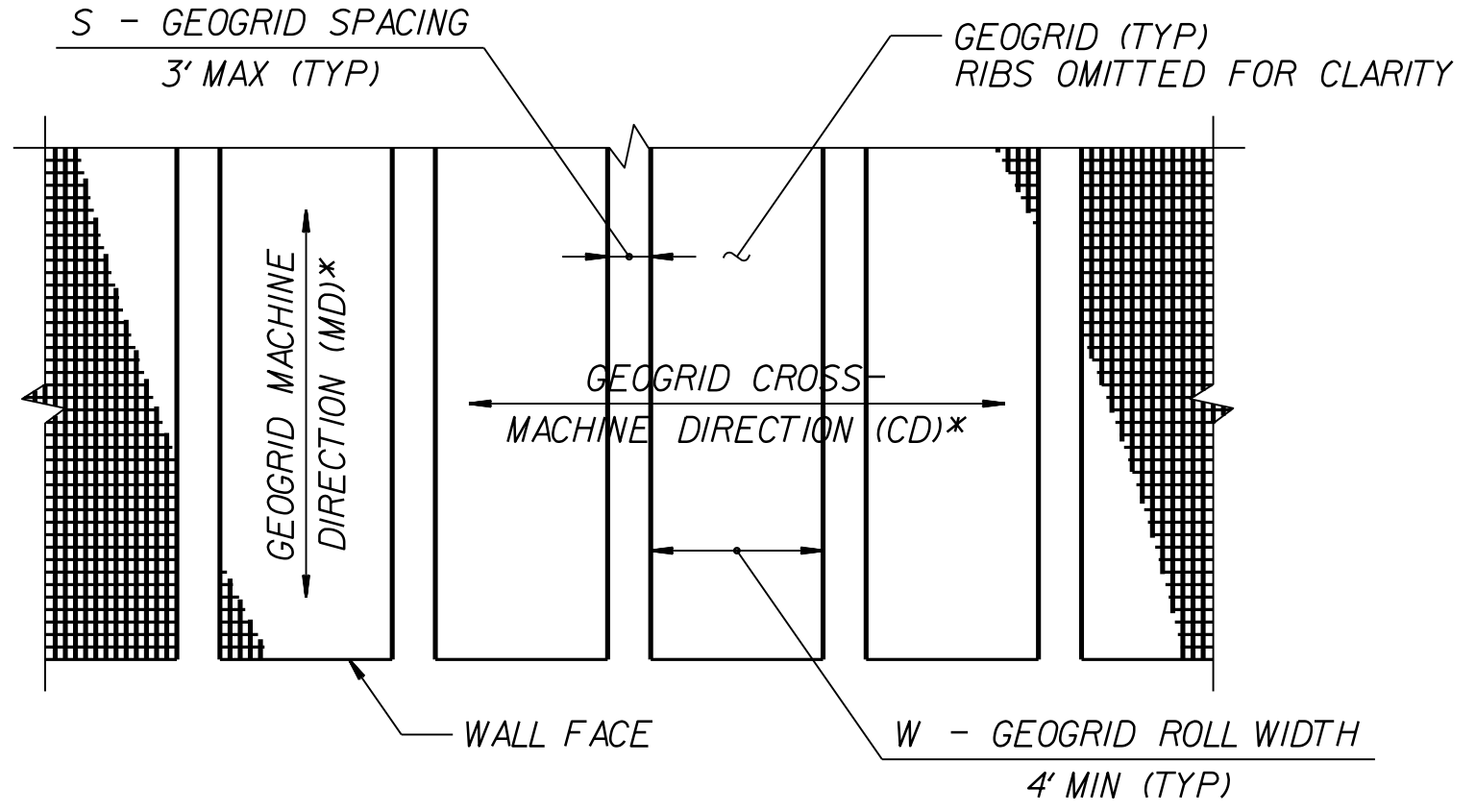
NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
**GEOTECHNICAL  
 ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.02

STANDARD  
 TEMPORARY WALL  
 SHEET 1 OF 3

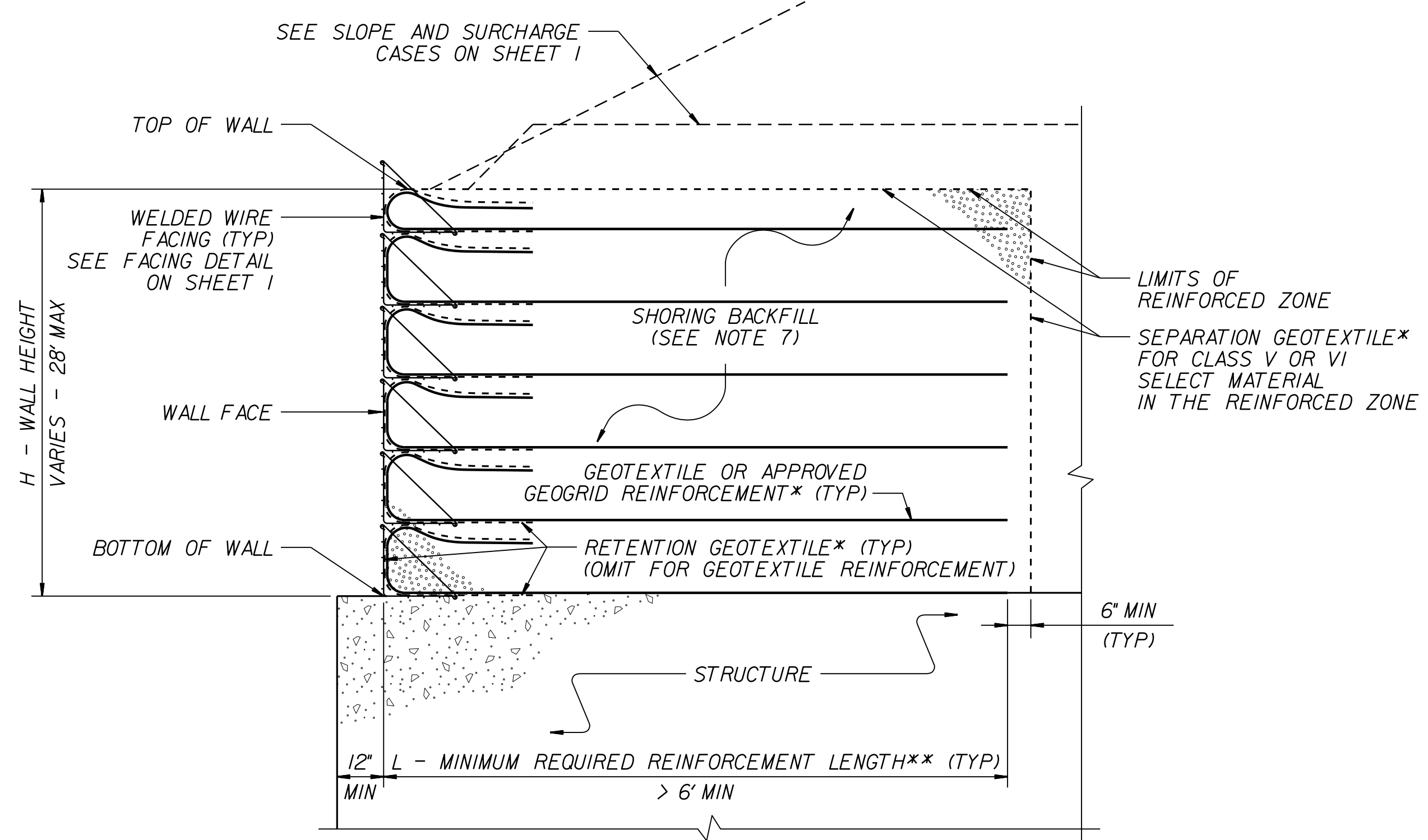


**GEOTEXTILE PLACEMENT**  
(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)



**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.



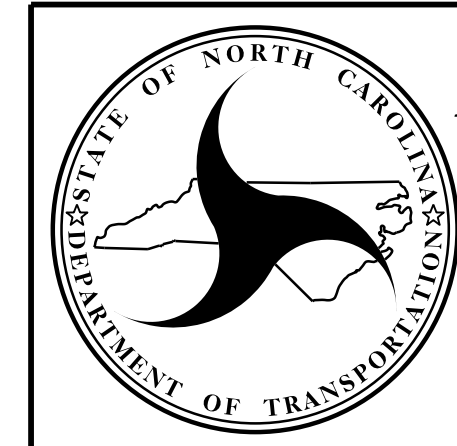
**TEMPORARY WALL ON STRUCTURE DETAIL**  
\*SEE GEOSYNTHETIC PLACEMENT DETAILS.  
\*\*SEE REINFORCEMENT TABLES ON SHEET 3.

**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 OR FLOOD ELEVATION 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.
- WALL 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 FOR GEOGRID REINFORCEMENT ARE APPROVED FOR SHORT TERM DESIGN STRENGTHS (3-YEAR DESIGN LIFE) IN THE MD AND CD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM: [connect.ncdot.gov/resources/Geological/Pages/Products.aspx](http://connect.ncdot.gov/resources/Geological/Pages/Products.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

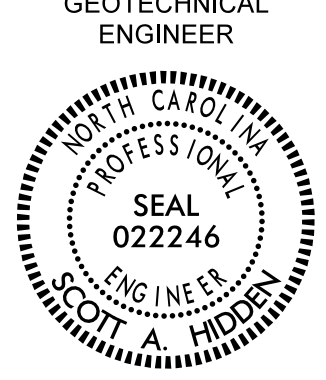
- FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
- AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:  
- W (REINFORCEMENT 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.



NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
  
GEOTECHNICAL  
ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD  
TEMPORARY WALL  
SHEET 2 OF 3

<b>PROJECT REFERENCE NO.</b> HB-0004		<b>SHEET NO.</b> 2G-3
GEOTECHNICAL ENGINEER  SEAL 022246 SCOTT A. HOLDEN ENGINEER		ENGINEER
DocuSigned by: Scott A. Holden 05/06/2024 <small>7780C48989FC6A3 SIGNATURE DATE</small>		<small>SIGNATURE 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) + WALL 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.

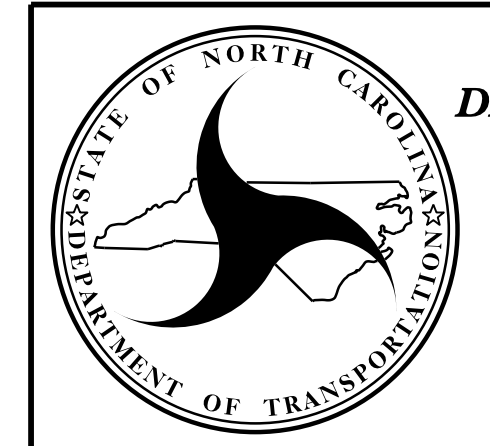
REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	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**

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





VEE/JHP/RS3

COMPUTED BY: mlh DATE: 9/14/2023  
CHECKED BY: kba DATE: 3/11/2024

PROJECT NO. HB-0004 SHEET NO. 3D-2

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, Top Elevation, Invert Elevation, Minimum Required Slope, Side Drain Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP Pipe), C.S. Pipe, R.C. Pipe Class III, R.C. Pipe Class IV, Quantities for Drainage Structures, Frame, Grates, and Hood, Concrete Transitional Section, Open Throat, Concrete Bridge Approach, D.I. Frame and Grates, D.I. Type A, D.I. Type B, D.I. Type D, D.I. (W.S. Flat) Frame with Grate, D.I. (W.S. Sag) Frame w/ Grate, J.B. STD., T.B.D.I. for Steel Grates, Steel Frame with Two Grates, Temp Steel Plate Cover Masonry Drainage, M.H. Frame and Cover, Convert Existing D.I. to J.B. w/ M.H., Convert Existing C.B. to D.I., Convert Existing D.I. to J.B., Adjust C.B., Adjust D.I., 15" Side Drain Pipe Elbow, 18" Side Drain Pipe Elbow, 24" Side Drain Pipe Elbow, Flowable Fill, Concrete Collars, Concrete and Brick Pipe Plug, Concrete and Brick Pipe Plug, Pipe Removal. Includes SHEET TOTALS and PROJECT TOTALS rows.

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

REMARKS

SHEET TOTALS: 232 32 68 ... 361  
PROJECT TOTALS: 812 96 68 ... 471

WEI-JPCXKL3

COMPUTED BY: mih DATE: 9/14/2023  
CHECKED BY: kba DATE: 3/11/2024

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

PROJECT NO. HB-0004 SHEET NO. 3D-3

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 54 INCHES & OVER)

Table with columns: LINE & STATION, SIZE, THICKNESS OR GAUGE, OFFSET, STRUCTURE NUMBER, TOP ELEVATION, INVERT ELEVATION, MINIMUM REQUIRED SLOPE, Side Drain Pipe (RCP, CSP, CAAP, HDPE, PVC, or PP PIPE), C. S. PIPE, R. C. PIPE CLASS III, R. C. PIPE CLASS IV, R. C. PIPE CLASS V, ENWALLS, REINFORCED ENDWALLS, DRAINAGE STRUCTURE, QUANTITIES FOR DRAINAGE STRUCTURES, FRAME, GRATES, AND HOOD, CONCRETE TRANSITIONAL SECTION, PIPE REMOVAL, ABBREVIATIONS, and REMARKS.

SHEET TOTALS and PROJECT TOTALS summary table.



COMPUTED BY: DM MULLEN, PE DATE: 11/8/2023  
 CHECKED BY: SC CLARK, PE DATE: 11/8/2023

PROJECT REFERENCE NO. SHEET NO.  
 HB-0004 36-1

## DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA (2-3-23)

SUMMARY OF SUBSURFACE DRAINAGE					
LINE	STATION	STATION	LOCATION (LT/RT/CL)	DRAIN TYPE (UD/BD/SD)	LENGTH (LF)
CONTINGENCY				SD	400
<b>TOTAL</b>					<b>400</b>

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

SUMMARY OF AGGREGATE SUBGRADE / STABILIZATION									
LINE	STATION	STATION	Aggregate Type* ASU(1/2)/AST	Aggregate Thickness 18" for ASU(2) (INCHES)	Shallow Undercut (CY)	Class IV Subgrade Stabilization (TONS)	Geotextile for Subgrade Stabilization (SY)	Stabilizer Aggregate (TONS)	Class IV Aggregate Stabilization (TONS)
CONTINGENCY			ASU	12	200	400	600		
<b>TOTAL (CY/TONS/SY):</b>					<b>200</b>	<b>400**</b>	<b>600**</b>		

\*ASU(1/2) = Aggregate Subgrade (Type 1 or 2)  
 \*AST = Aggregate Stabilization  
 \*\*Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Subgrade Stabilization" are only the estimated quantities for ASU(1/2)/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.



-L- CURVE DATA	-WBL- CURVE DATA	-EBL- CURVE DATA	-YIRPB- CURVE DATA	-YIRPC- CURVE DATA
PI Sta 243+03.65 $\Delta = 2'53"26.2" (LT)$ $D = 0'23"23.2"$ $L = 741.62'$ $T = 370.89'$ $R = 14,700.00'$ SE = NC DS = 70 MPH	PI Sta 18+84.18 $\Delta = 2'53"26.2" (LT)$ $D = 0'32"07.7"$ $L = 539.82'$ $T = 269.97'$ $R = 10,700.00'$ SE = RC DS = 70 MPH	PI Sta 21+23.12 $\Delta = 2'53"26.2" (LT)$ $D = 0'23"42.5"$ $L = 731.53'$ $T = 365.84'$ $R = 14,500.00'$ SE = NC DS = 70 MPH	PI Sta 11+05.62 $\Delta = 0'28"08.4"$ $\Theta_s = 2'00"19.5"$ $L_s = 175.00'$ $LT = 105.62'$ $ST = 69.40'$	PI Sta 13+60.64 $\Delta = 8'29"36.0" (LT)$ $D = 2'17"30.6"$ $L = 370.59'$ $T = 185.64'$ $R = 2,500.00'$
			PI Sta 16+03.93 $\Theta_s = 2'00"19.3"$ $L_s = 175.00'$ $LT = 116.67'$ $ST = 58.34'$	PI Sta 12+58.31 $\Delta = 3'37"16.0" (RT)$ $D = 2'37"41.7"$ $L = 137.78'$ $T = 68.91'$ $R = 2,180.00'$
			PI Sta 11+31.08 $\Theta_s = 2'17"59.0"$ $L_s = 175.00'$ $LT = 116.68'$ $ST = 58.34'$	PI Sta 13+85.52 $\Theta_s = 2'17"59.0"$ $L_s = 175.00'$ $LT = 116.68'$ $ST = 58.34'$

PROJECT REFERENCE NO. **HB-0004** SHEET NO. **4**

RW SHEET NO.

ROADWAY DESIGN ENGINEER  
5/16/2024

HYDRAULICS ENGINEER  
5/16/2024

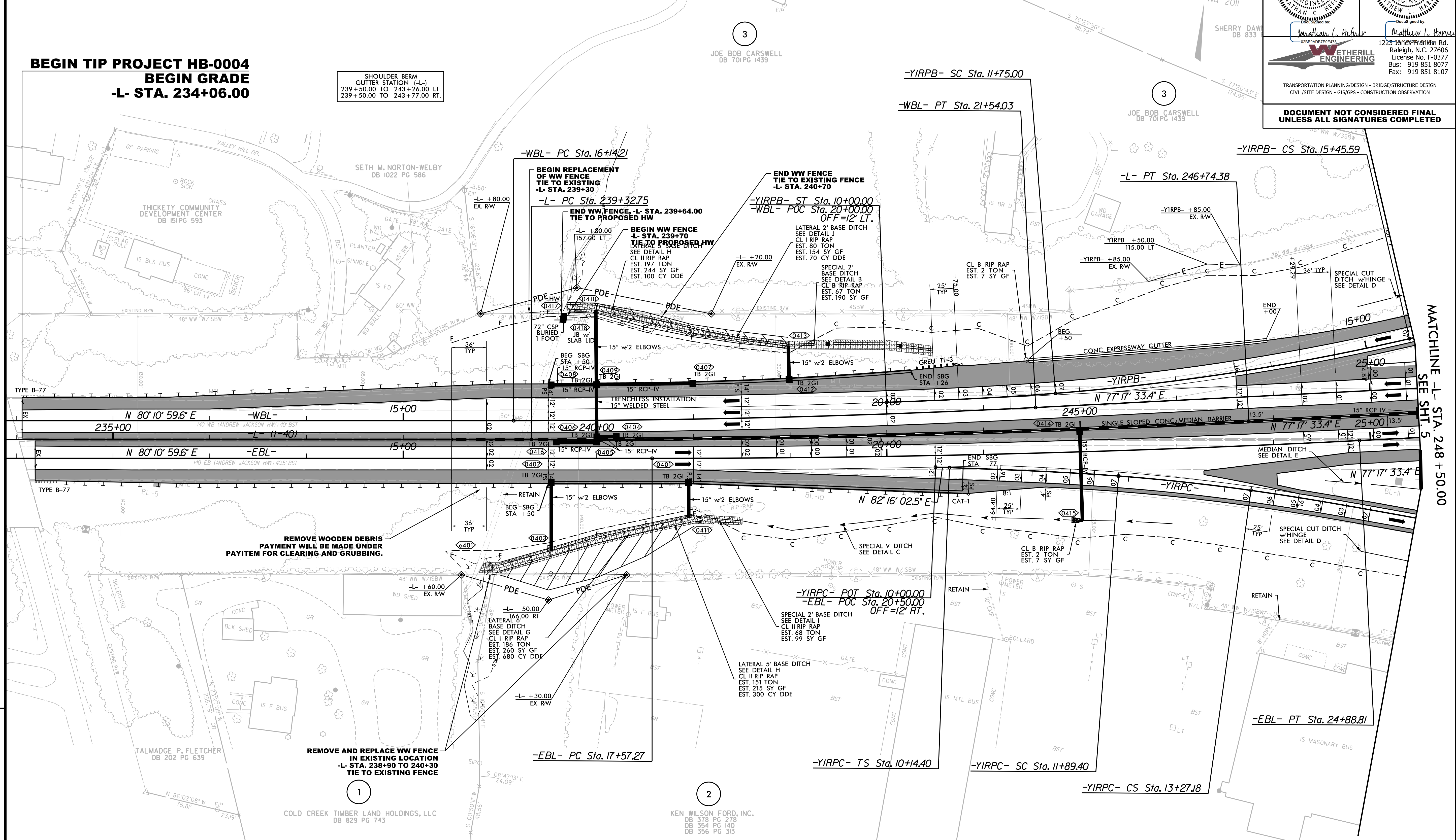
Professional Engineer Seal: Matthew L. Hance, License No. 053425

Professional Engineer Seal: Matthew L. Hance, License No. 053425

WETHERILL ENGINEERING  
1223 JONES FRANKLIN Rd.  
Raleigh, N.C. 27606  
License No. F-0377  
Bus: 919 851 8077  
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

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



**BEGIN TIP PROJECT HB-0004  
BEGIN GRADE  
-L- STA. 234+06.00**

SHOULDER BERM  
GUTTER STATION (-L-)  
239+50.00 TO 243+26.00 LT.  
239+50.00 TO 243+77.00 RT.

**BEGIN REPLACEMENT  
OF WW FENCE  
TIE TO EXISTING  
-L- STA. 239+30**

**-L- PC Sta. 239+32.75  
END WW FENCE -L- STA. 239+64.00  
TIE TO PROPOSED HW**

**BEGIN WW FENCE  
-L- STA. 239+70  
TIE TO PROPOSED HW**

**END WW FENCE  
TIE TO EXISTING FENCE  
-L- STA. 240+70**

**-YIRPB- ST Sta. 10+00.00  
-WBL- POC Sta. 20+00.00  
OFF=12' LT.**

**-YIRPB- SC Sta. 11+75.00**

**-WBL- PT Sta. 21+54.03**

**-L- PT Sta. 246+74.38**

**-YIRPB- CS Sta. 15+45.59**

**REMOVE WOODEN DEBRIS  
PAYMENT WILL BE MADE UNDER  
PAYITEM FOR CLEARING AND GRUBBING.**

**REMOVE AND REPLACE WW FENCE  
IN EXISTING LOCATION  
-L- STA. 238+90 TO 240+30  
TIE TO EXISTING FENCE**

**-EBL- PC Sta. 17+57.27**

**-YIRPC- POT Sta. 10+00.00  
-EBL- POC Sta. 20+50.00  
OFF=12' RT.**

**-YIRPC- TS Sta. 10+14.40**

**-YIRPC- SC Sta. 11+89.40**

**-YIRPC- CS Sta. 13+27.18**

**-EBL- PT Sta. 24+88.81**

FOR -WBL- PROFILE, SEE SHEET: 8  
FOR -EBL- PROFILE, SEE SHEET: 8  
FOR -YIRPB- PROFILE, SEE SHEET: 13  
FOR -YIRPC- PROFILE, SEE SHEET: 13

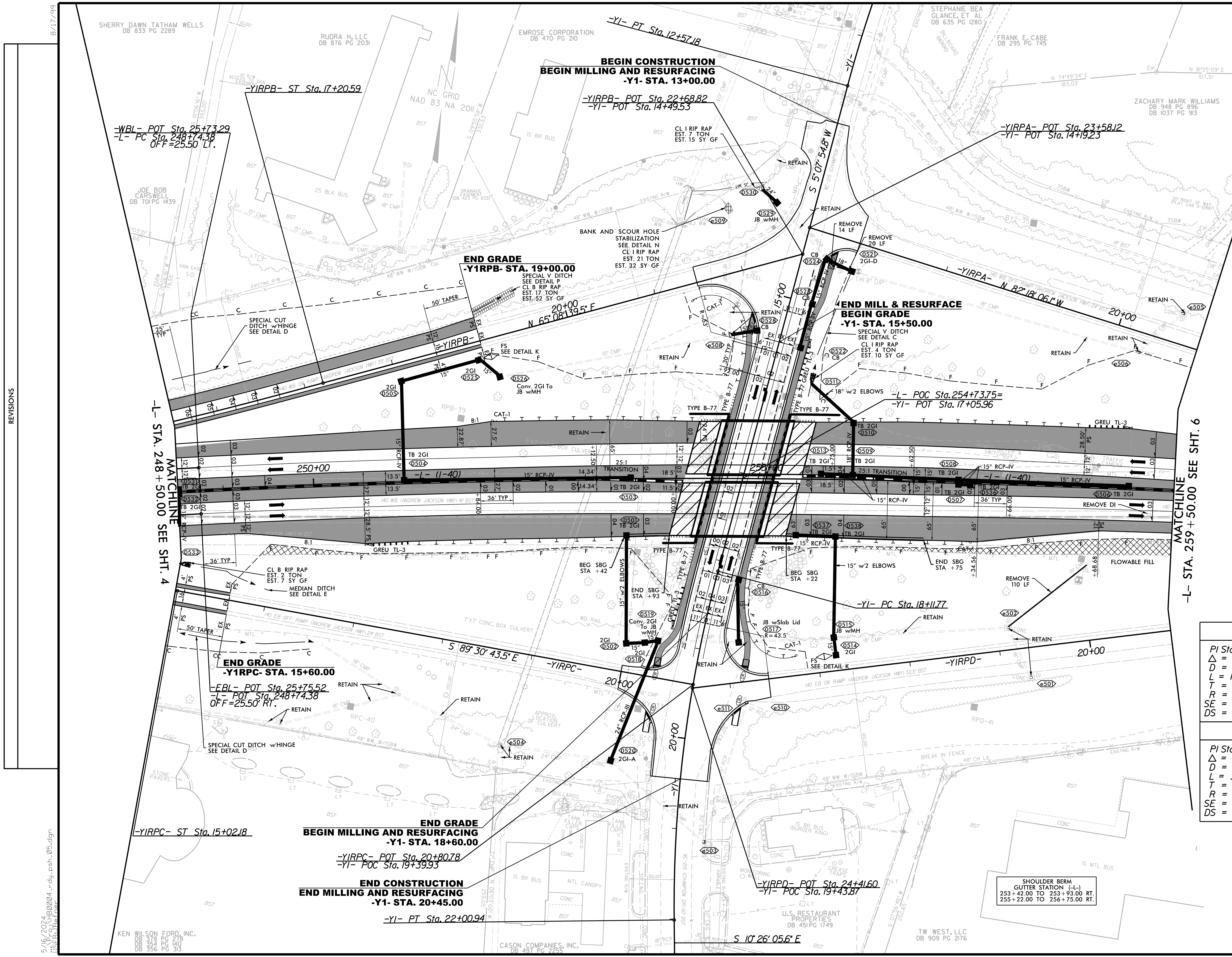
REVISIONS

MATCHLINE -L- STA. 248+50.00  
SEE SH. 5

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PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>5</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 5/16/2024	HYDRAULICS ENGINEER 5/16/2024
 1223 JONES FRANKLIN Rd. Raleigh, N.C. 27606 License No. F-0377 Bus: 919 851 8077 Fax: 919 851 8107	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	

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



**-L- CURVE DATA**

PI Sta 260+41.79	$\Delta = 12' 27' 11.2''$ (RT)
D = 0' 32' 07.7"	L = 2,325.62'
T = 1,167.41'	R = 1,0700.00'
SE = .03	DS = >70 MPH

**-YI- CURVE DATA**

PI Sta 11+57.74	PI Sta 20+07.56
$\Delta = 7' 58' 03.9''$ (LT)	$\Delta = 15' 34' 00.5''$ (LT)
D = 4' 00' 00.0"	D = 4' 00' 00.0"
L = 199.19'	L = 389.17'
T = 99.76'	T = 195.79'
R = 1,432.39'	R = 1,432.39'
SE = EXIST	SE = EXIST
DS = EXIST	DS = 50 MPH

**-YIRPB- CURVE DATA**

PI Sta 13+60.64	PIs Sta 16+03.93
$\Delta = 8' 29' 36.0''$ (LT)	$\Theta_s = 2' 00' 19.3''$
D = 2' 17' 30.6"	Ls = 175.00'
L = 370.59'	LT = 116.67'
T = 185.64'	ST = 58.34'
R = 2,500.00'	
SE = .07	
DS = 65 MPH	

- FOR -WBL- PROFILE, SEE SHEET: 8
- FOR -EBL- PROFILE, SEE SHEET: 8
- FOR -L- PROFILE, SEE SHEETS: 9-10
- FOR -YI- PROFILE, SEE SHEET: 12
- FOR -YIRPA- PROFILE, SEE SHEET: 12
- FOR -YIRPB- PROFILE, SEE SHEET: 13
- FOR -YIRPC- PROFILE, SEE SHEET: 13
- FOR -YIRPD- PROFILE, SEE SHEET: 14

SHOULDER BERM  
GUTTER STATION (-L-)  
253+42.00 TO 253+93.00 RT.  
255+22.00 TO 256+75.00 RT.

REVISIONS

5/16/2024 HB0004\_rdy\_psh\_05.dgn  
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KEN WILSON FORD, INC.  
1223 JONES FRANKLIN RD.  
RALEIGH, NC 27606  
919 851 8077

CASON COMPANIES, INC.  
1223 JONES FRANKLIN RD.  
RALEIGH, NC 27606  
919 851 8077

TW WEST, LLC  
1223 JONES FRANKLIN RD.  
RALEIGH, NC 27606  
919 851 8077

8/17/2024

-L- CURVE DATA	-YIRPA- CURVE DATA	-YIRPD- CURVE DATA
PI Sta 260+41.79 $\Delta = 12' 27'' 11.2'' (RT)$ $D = 0' 32'' 07.7''$ $L = 2,325.62'$ $T = 1,167.41'$ $R = 10,700.00'$ $SE = .03$ $DS = >70 \text{ MPH}$	PI Sta 15+67.09 $\Delta = 4' 19'' 34.2'' (RT)$ $D = 1' 40'' 48.8''$ $L = 257.47'$ $T = 128.80'$ $R = 3,410.00'$ $SE = .05$ $DS = 65 \text{ MPH}$	PI Sta 17+45.77 $\Delta = 1' 15'' 36.6''$ $D = 1' 40'' 48.8''$ $L = 257.47'$ $T = 128.80'$ $R = 3,410.00'$ $SE = .05$ $DS = 65 \text{ MPH}$
	PI Sta 12+25.26 $\Delta = 0' 32'' 12.1''$ $\Theta_s = 3' 52'' 18.1''$ $L = 200.00'$ $LT = 125.26'$ $ST = 74.83'$	PI Sta 14+30.12 $\Delta = 6' 19'' 35.8'' (LT)$ $D = 3' 52'' 16.8''$ $L = 163.42'$ $T = 81.79'$ $R = 1,480.00'$ $SE = .08$ $DS = 60 \text{ MPH}$

PROJECT REFERENCE NO. **HB-0004** SHEET NO. **6**

RW SHEET NO.

ROADWAY DESIGN ENGINEER  
 5/16/2024  
 SEAL 35016  
 MATTHEW L. HARVEY

HYDRAULICS ENGINEER  
 5/16/2024  
 SEAL 053425  
 MATTHEW L. HARVEY

WETHERILL ENGINEERING  
 1223 JONAS FRANKLIN Rd.  
 Raleigh, N.C. 27606  
 License No. F-0377  
 Bus: 919 851 8077  
 Fax: 919 851 8107

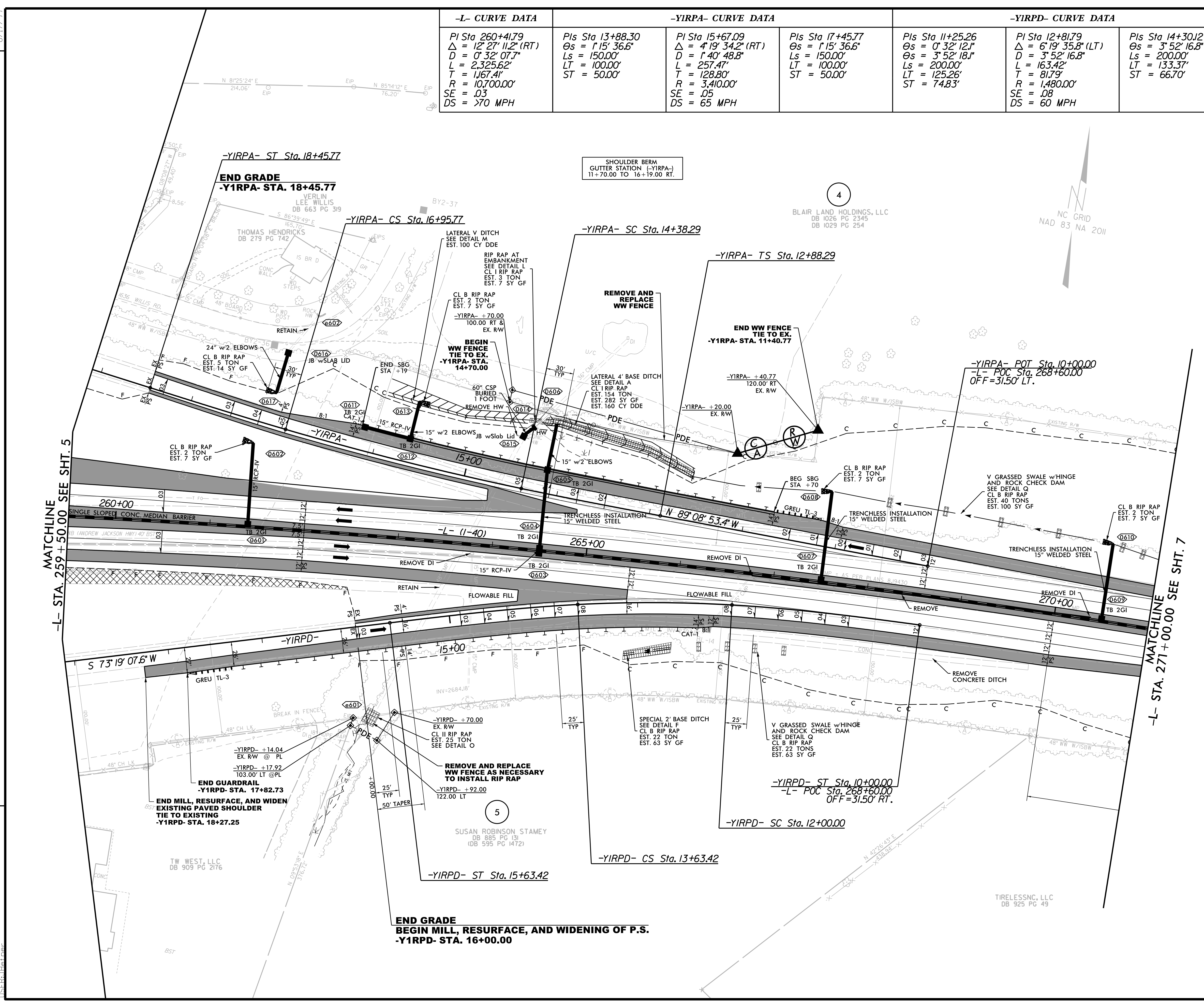
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

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

REVISIONS

MATCHLINE -L- STA. 259 + 50.00 SEE SHT. 5

MATCHLINE -L- STA. 271 + 00.00 SEE SHT. 7



SHOULDER BERM  
GUTTER STATION (-YIRPA-)  
11+70.00 TO 16+19.00 RT.

4

BLAIR LAND HOLDINGS, LLC  
DB 1026 PG 2345  
DB 1029 PG 254



5

SUSAN ROBINSON STAMEY  
DB 885 PG 131  
(DB 595 PG 1472)


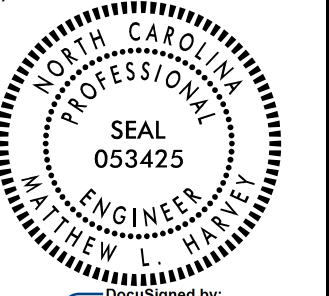

END GRADE  
BEGIN MILL, RESURFACE, AND WIDENING OF P.S.  
-YIRPD- STA. 16+00.00

TIRELESSNC, LLC  
DB 925 PG 49

FOR -L- PROFILE, SEE SHEETS: 9-11  
FOR -YIRPA- PROFILE, SEE SHEET: 12  
FOR -YIRPD- PROFILE, SEE SHEET: 14

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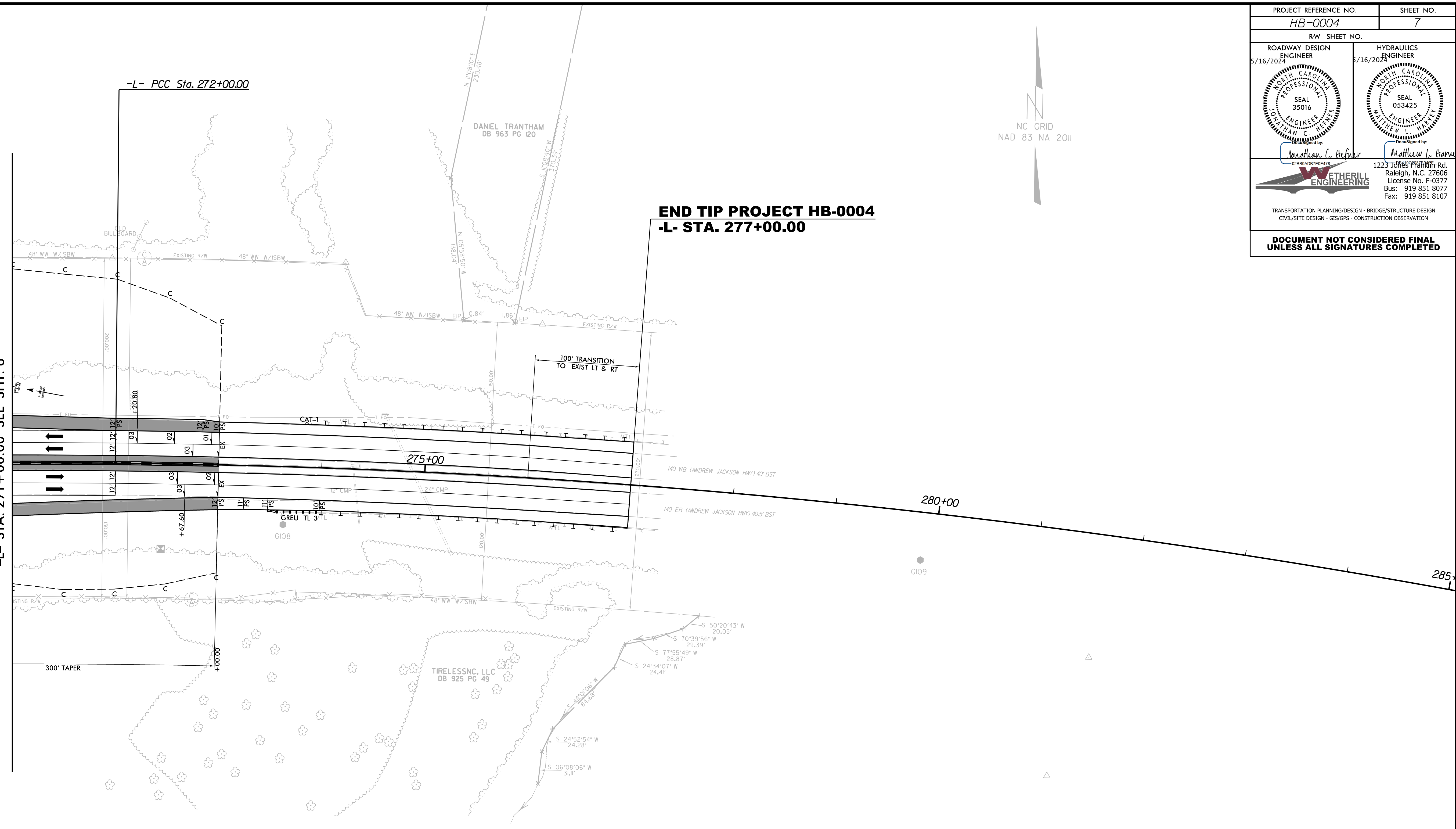
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PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>7</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 5/16/2024	HYDRAULICS ENGINEER 5/16/2024
	
DocuSigned by: <i>Matthew C. Harvey</i>	DocuSigned by: <i>Matthew L. Harvey</i>
 <b>WETHERILL ENGINEERING</b> 1223 Jones Franklin Rd. Raleigh, N.C. 27606 License No. F-0377 Bus: 919 851 8077 Fax: 919 851 8107	
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	



**END TIP PROJECT HB-0004  
-L- STA. 277+00.00**

MATCHLINE  
-L- STA. 271+00.00 SEE SHT. 6



-L- CURVE DATA	
PI Sta 260+41.79	PI Sta 278+85.64
$\Delta = 12^\circ 27' 11.2''$ (RT)	$\Delta = 10^\circ 15' 25.7''$ (RT)
$D = 0^\circ 32' 07.7''$	$D = 0^\circ 45' 00.0''$
$L = 2,325.62'$	$L = 1,367.62'$
$T = 1,167.41'$	$T = 685.64'$
$R = 10,700.00'$	$R = 7,639.44'$
$SE = .03$	$SE = .03$
$DS = >70$ MPH	$DS = 70$ MPH

FOR -L- PROFILE, SEE SHEET: 11

REVISIONS

5/16/2024  
5/16/2024  
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5/28/2024

**PIPE HYDRAULIC DATA**  
-L- Sta.239+23

DRAINAGE AREA	= 117	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 200	CFS
DESIGN HW ELEVATION	= 2638.1	FT
100 YEAR DISCHARGE	= 240	CFS
100 YEAR HW ELEVATION	= 2641.8	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 415	CFS
OVERTOPPING ELEVATION	= 2665.0	FT

**-WBL-**  
I-40 WESTBOUND

**WETHERILL ENGINEERING**  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
License No. F-0377  
Bus: 919 851 8077  
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>8</b>
ROADWAY DESIGN ENGINEER 5/16/2024	HYDRAULICS ENGINEER 5/16/2024
DocuSigned by: <b>Jonathan C. Heffner</b>	DocuSigned by: <b>Matthew L. Harver</b>

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

END GRADE  
-WBL- STA.25+73.29 =  
-L- STA.248+74.38  
EL = 2684.18

PI = 24+00.00  
EL = 2680.72'  
VC = 180'  
K = 292  
V = >70MPH

PI = 20+50.00  
EL = 2675.89'  
VC = 90'  
K = 196  
V = >70MPH

PI = 18+50.00  
EL = 2674.05'  
VC = 180'  
K = 331  
V = >70MPH

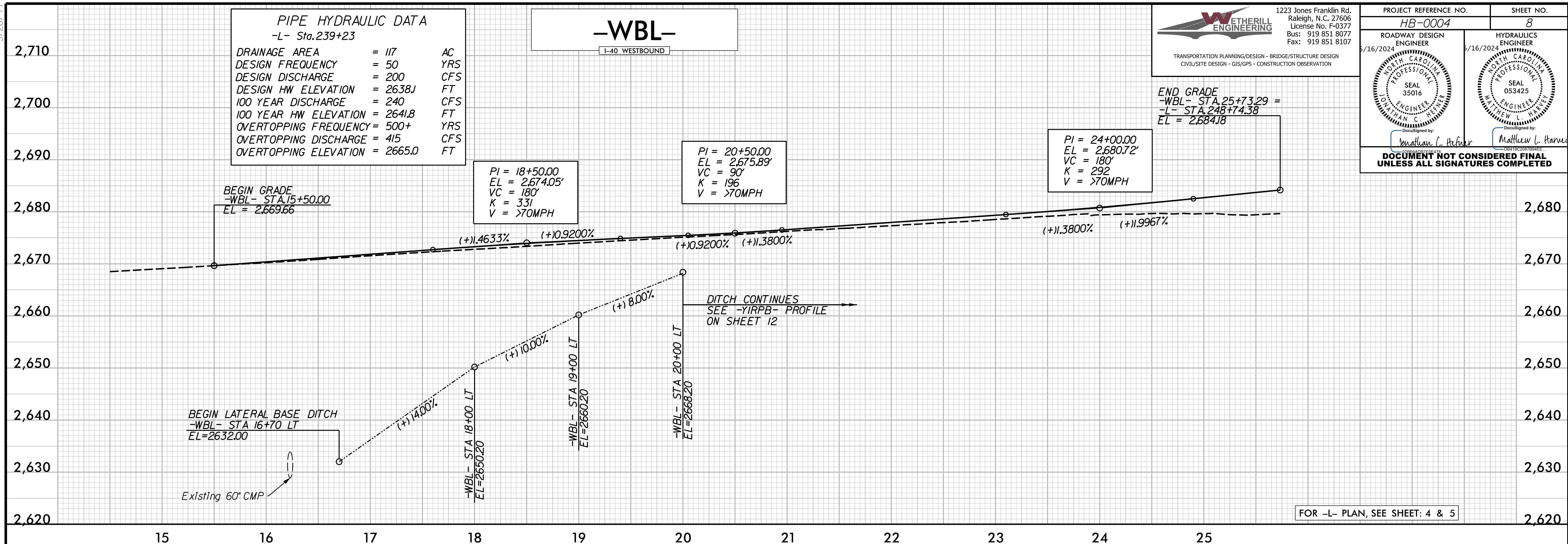
BEGIN GRADE  
-WBL- STA.15+50.00  
EL = 2669.66

BEGIN LATERAL BASE DITCH  
-WBL- STA.16+70 LT  
EL=2632.00

Existing 60° CMP

DITCH CONTINUES  
SEE -YIRPB- PROFILE  
ON SHEET 12

FOR -L- PLAN, SEE SHEET: 4 & 5



**-EBL-**  
I-40 EASTBOUND

PI = 24+00.00  
EL = 2681.67'  
VC = 100'  
K = 498  
V = >70MPH

END GRADE  
-EBL- STA.25+75.52 =  
-L- STA.248+74.38  
EL = 2684.48

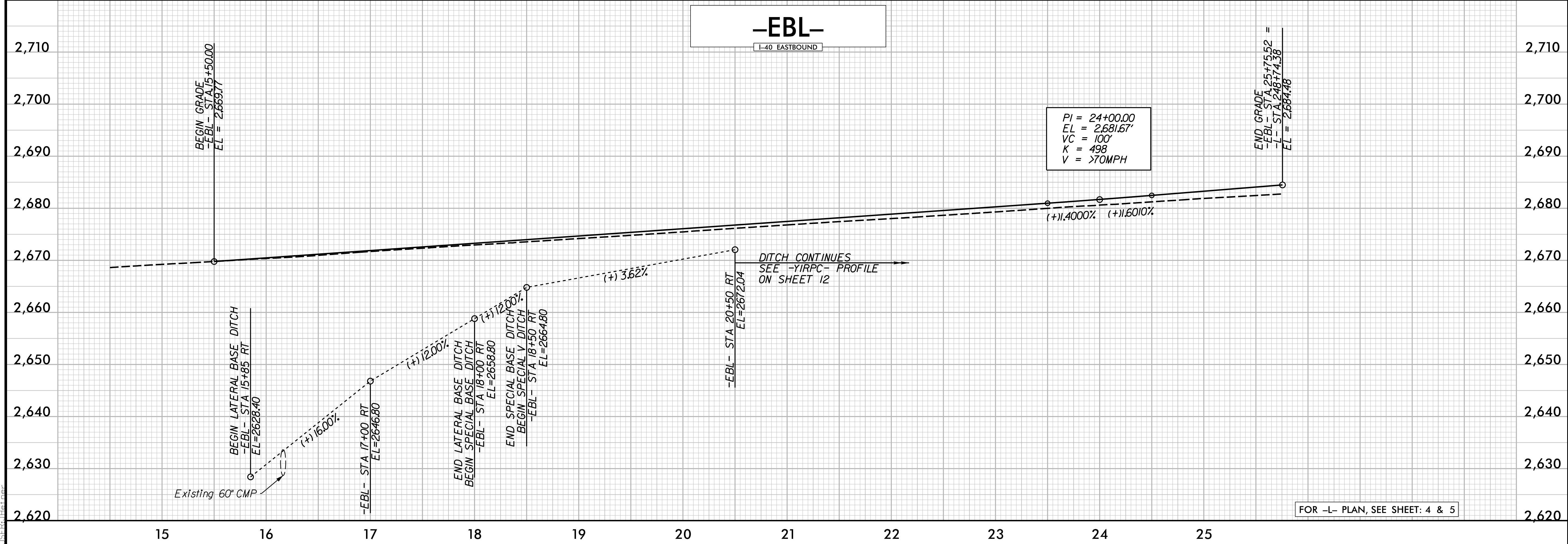
BEGIN GRADE  
-EBL- STA.15+50.00  
EL = 2669.17

BEGIN LATERAL BASE DITCH  
-EBL- STA.15+85 RT  
EL=2628.40

Existing 60° CMP

DITCH CONTINUES  
SEE -YIRPC- PROFILE  
ON SHEET 12

FOR -L- PLAN, SEE SHEET: 4 & 5



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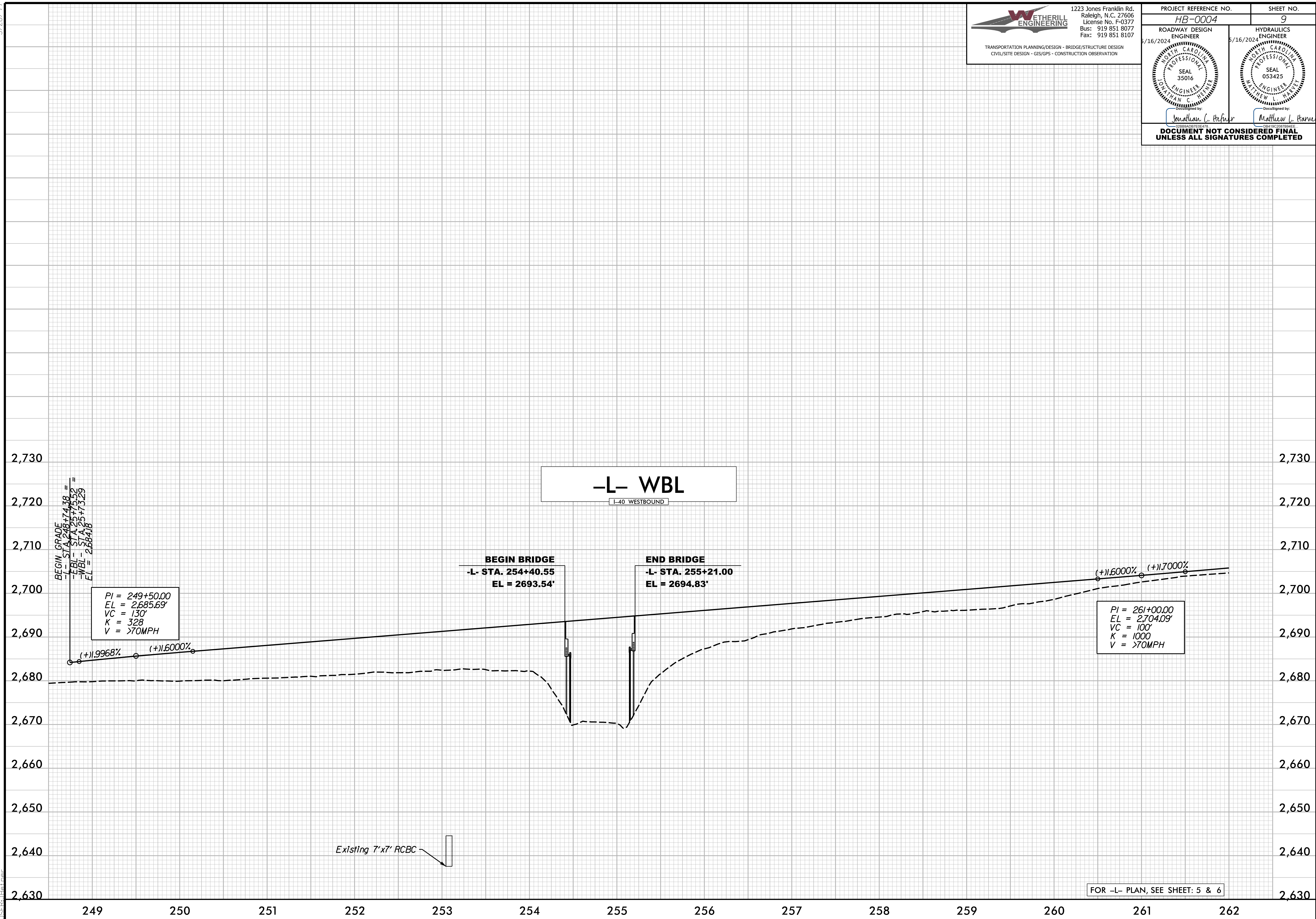
**WETHERILL ENGINEERING**  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 License No. F-0377  
 Bus: 919 851 8077  
 Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN • BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN • GIS/GPS • CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO. <b>HB-004</b>	SHEET NO. <b>9</b>
ROADWAY DESIGN ENGINEER 5/16/2024	HYDRAULICS ENGINEER 5/16/2024
DocuSigned by: <i>Jonathan C. Refior</i>	DocuSigned by: <i>Matthew L. Horne</i>

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**-L- WBL**  
 I-40 WESTBOUND

PI = 249+50.00  
 EL = 2685.69'  
 VC = 130'  
 K = 328  
 V = >70MPH

**BEGIN BRIDGE**  
 -L- STA. 254+40.55  
 EL = 2693.54'

**END BRIDGE**  
 -L- STA. 255+21.00  
 EL = 2694.83'

PI = 261+00.00  
 EL = 2704.09'  
 VC = 100'  
 K = 1000  
 V = >70MPH

Existing 7'x7' RCBC

FOR -L- PLAN, SEE SHEET: 5 & 6



5/28/24

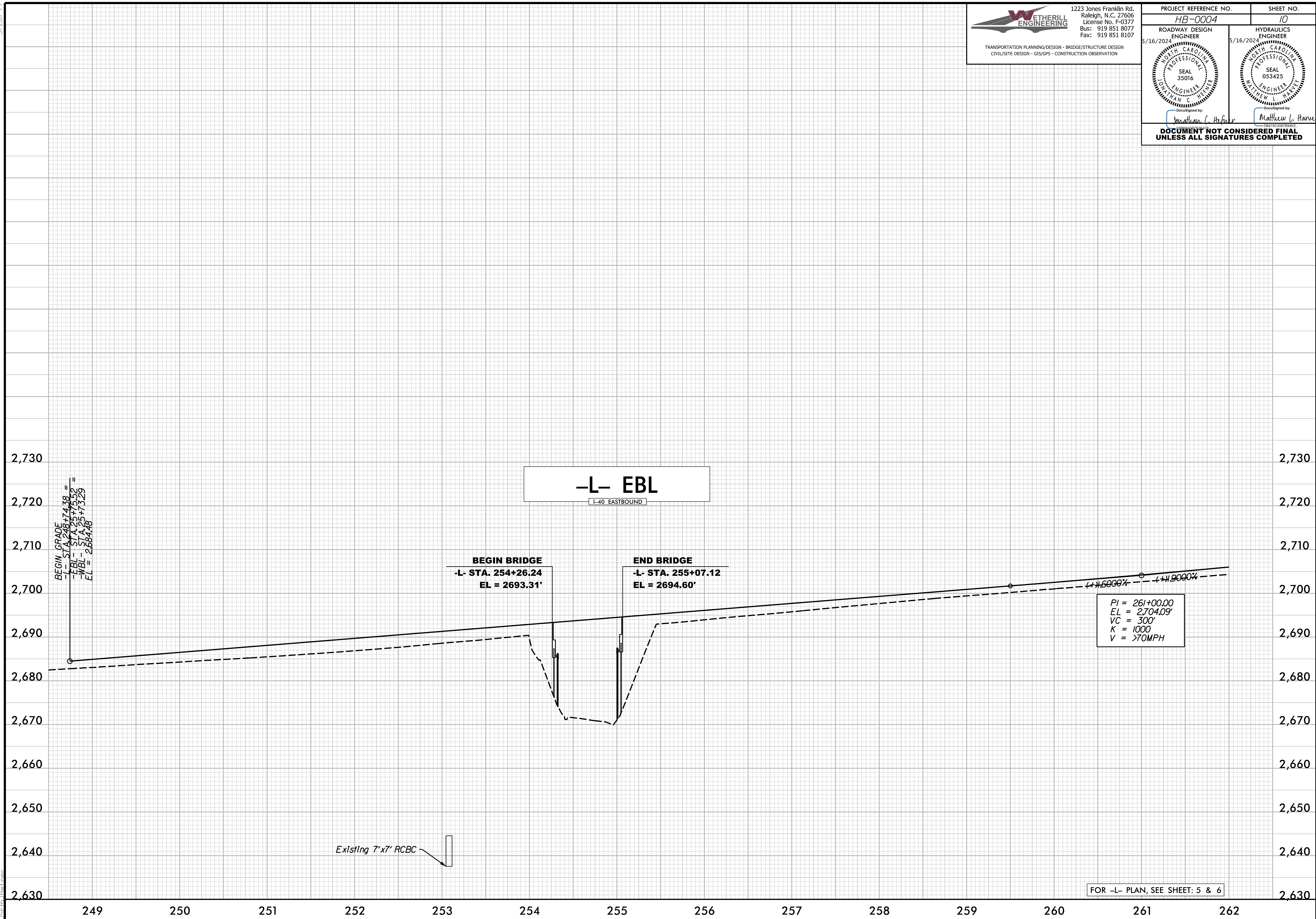
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PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>10</b>
ROADWAY DESIGN ENGINEER 5/16/2024	HYDRAULICS ENGINEER 5/16/2024
DocuSigned by: <i>Jonathan C. Hefner</i>	DocuSigned by: <i>Matthew L. Harve</i>

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5/16/2024 10:04:10 AM



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# -L- WBL

I-40 WESTBOUND

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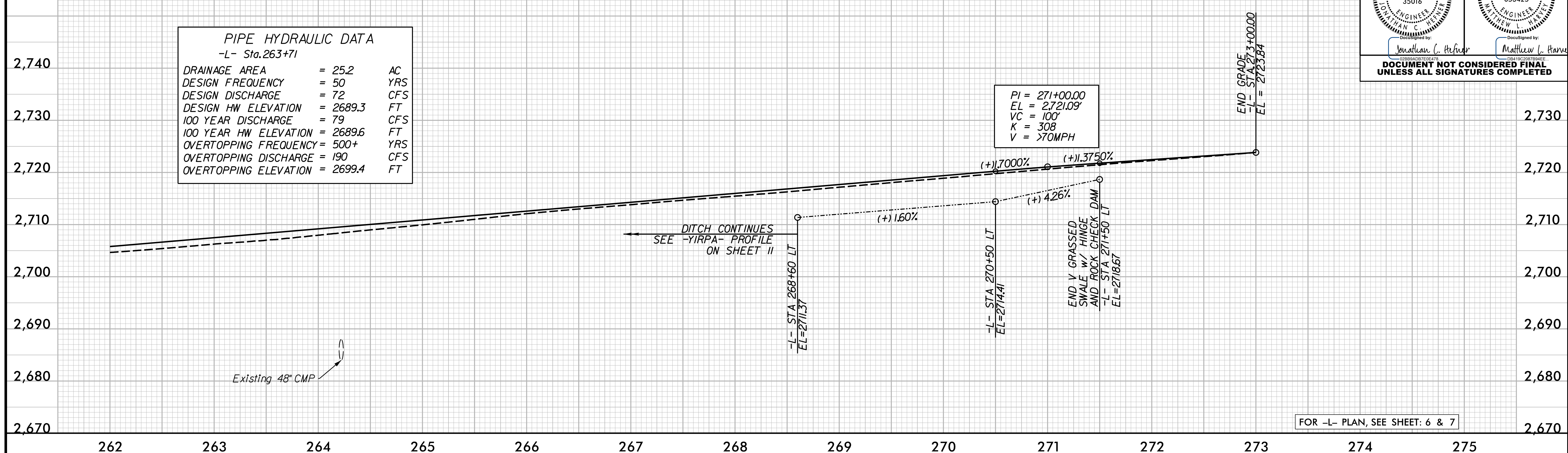
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 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>11</b>
ROADWAY DESIGN ENGINEER 5/16/2024	HYDRAULICS ENGINEER 5/16/2024
Documented by: <i>Jonathan C. Heffner</i>	Documented by: <i>Matthew L. Harvey</i>

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DRAINAGE AREA	= 25.2	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 72	CFS
DESIGN HW ELEVATION	= 2689.3	FT
100 YEAR DISCHARGE	= 79	CFS
100 YEAR HW ELEVATION	= 2689.6	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 190	CFS
OVERTOPPING ELEVATION	= 2699.4	FT

PI = 271+00.00  
 EL = 2721.09'  
 VC = 100'  
 K = 308  
 V = >70MPH

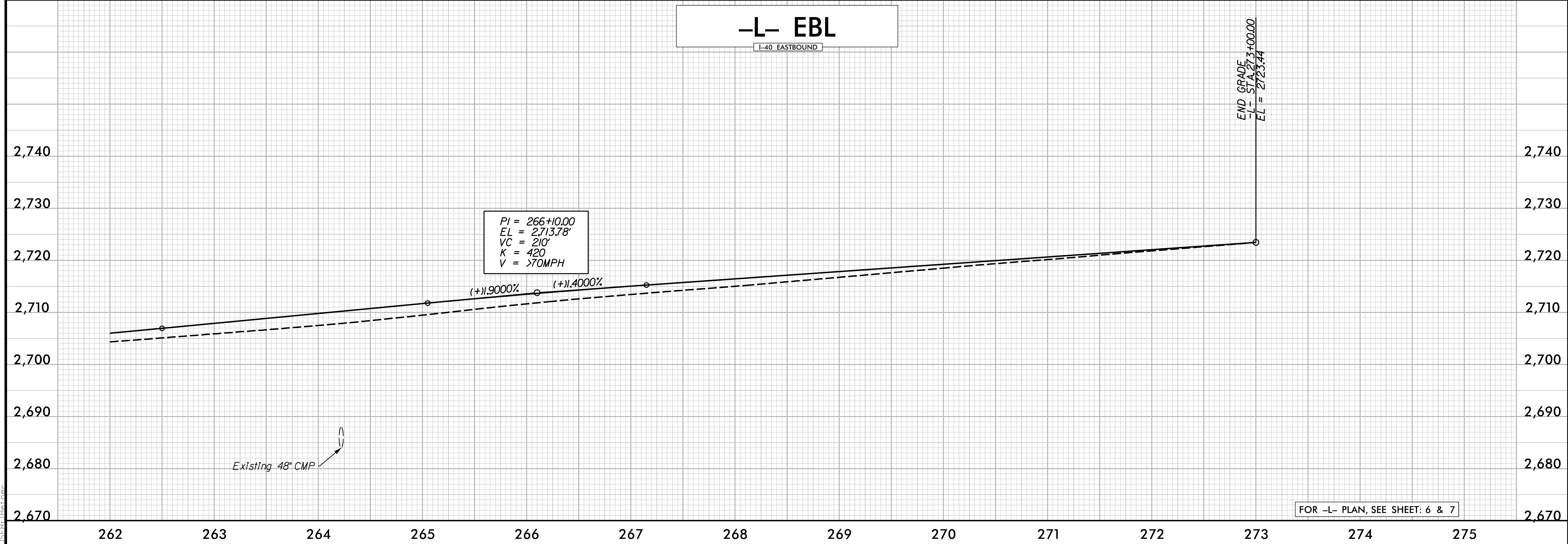


FOR -L- PLAN, SEE SHEET: 6 & 7

# -L- EBL

I-40 EASTBOUND

PI = 266+10.00  
 EL = 2713.78'  
 VC = 210'  
 K = 420  
 V = >70MPH



FOR -L- PLAN, SEE SHEET: 6 & 7

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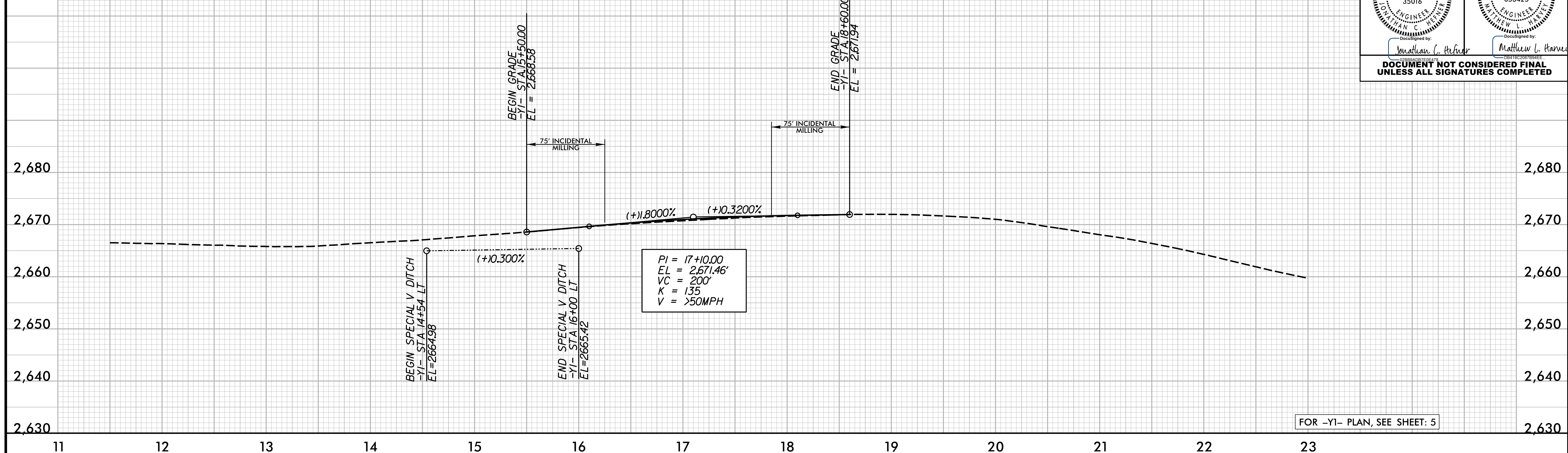
# -Y1-

NC 215 (CHAMPION DR.)

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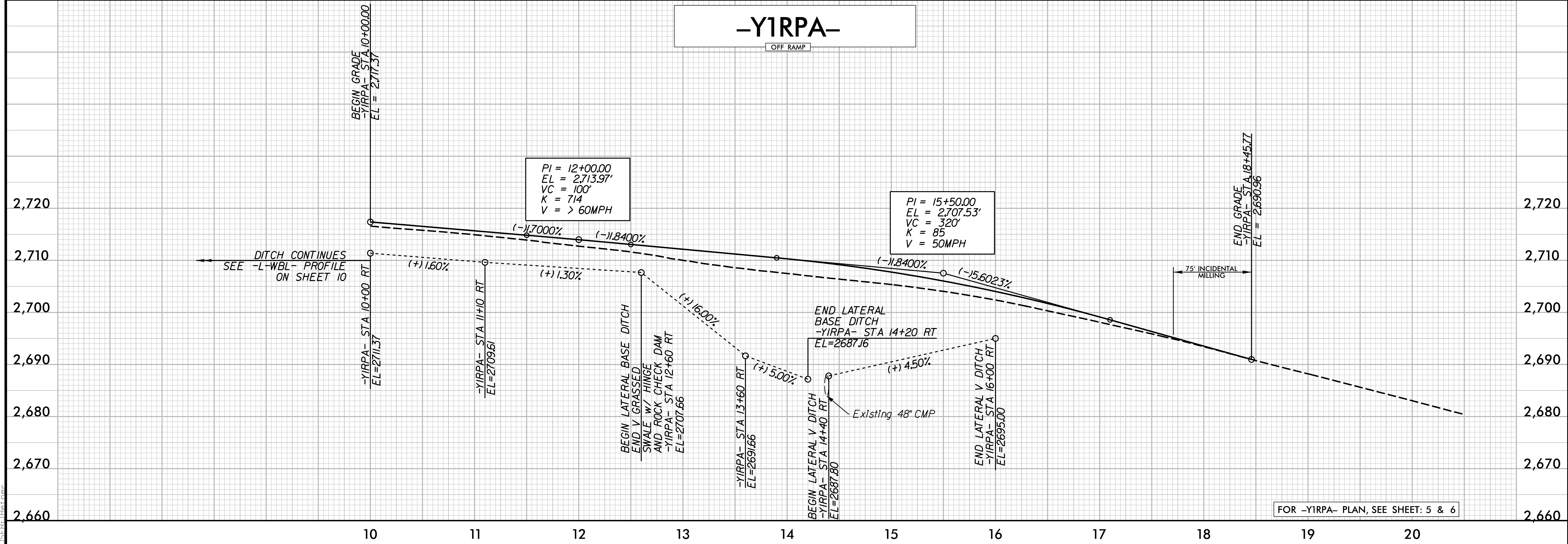
PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>12</b>
ROADWAY DESIGN ENGINEER 5/16/2024	HYDRAULICS ENGINEER 5/16/2024
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FOR -Y1- PLAN, SEE SHEET: 5

# -YIRPA-

OFF RAMP



FOR -YIRPA- PLAN, SEE SHEET: 5 & 6

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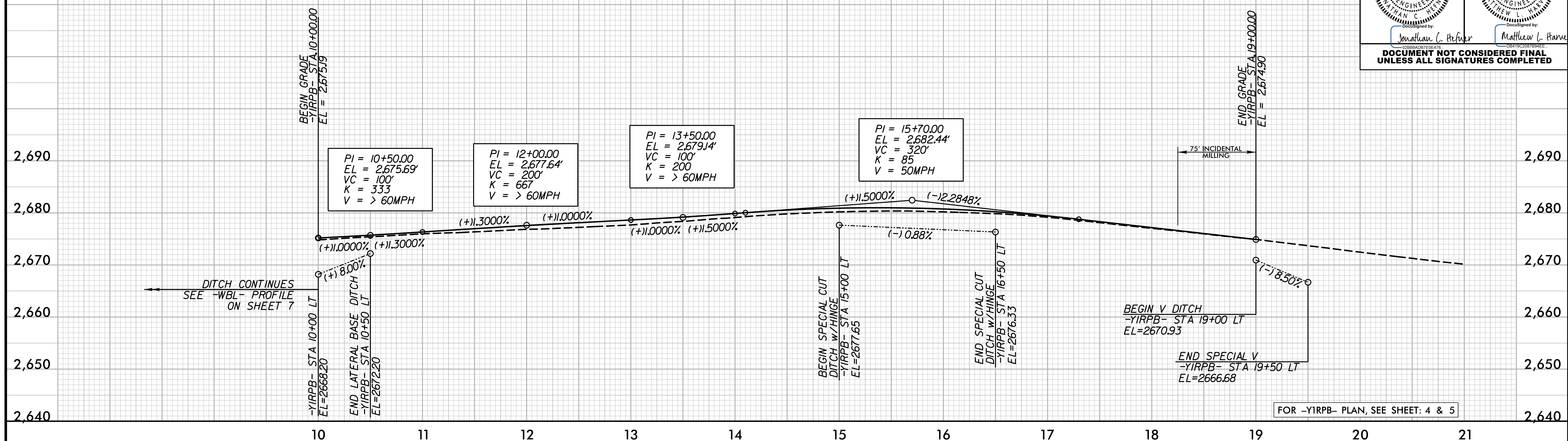
# -Y1RPB-

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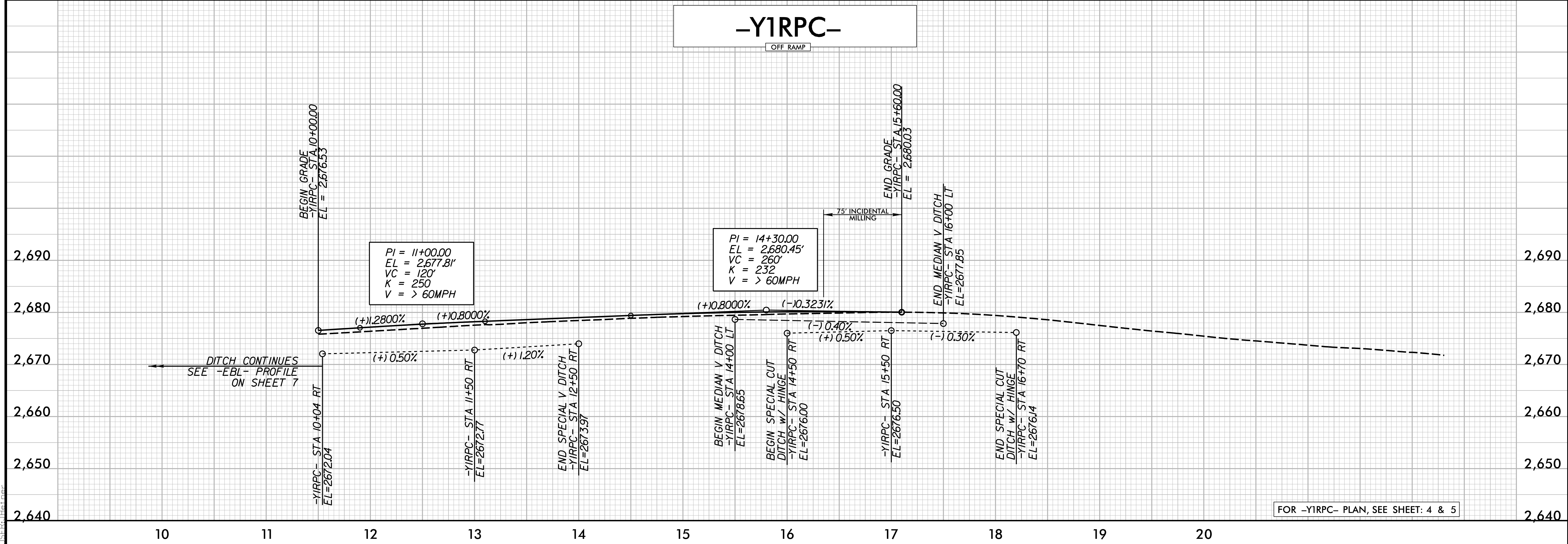
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>13</b>
ROADWAY DESIGN ENGINEER 5/16/2024	HYDRAULICS ENGINEER 5/16/2024
SEAL 35016 JONATHAN C. HEFNER	SEAL 053425 MATTHEW L. HARVEY
DESIGNED BY: Jonathan C. Heffner	
CHECKED BY: Matthew L. Harvey	
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# -Y1RPC-

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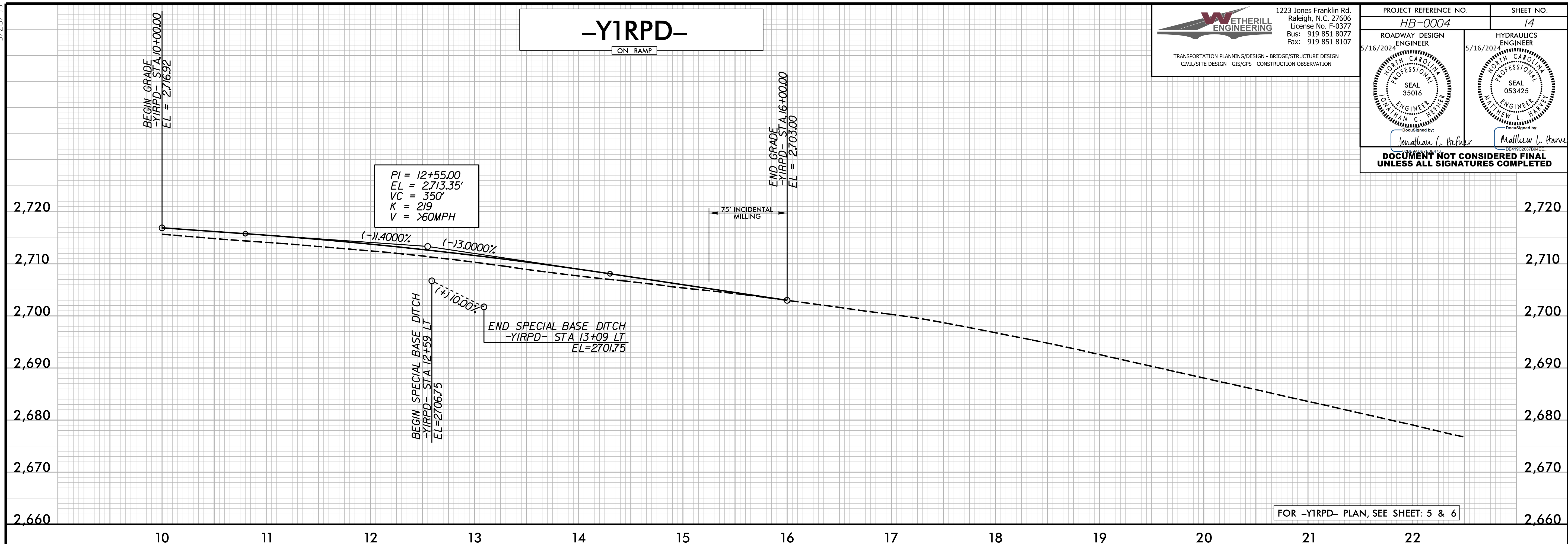
# -YIRPD-

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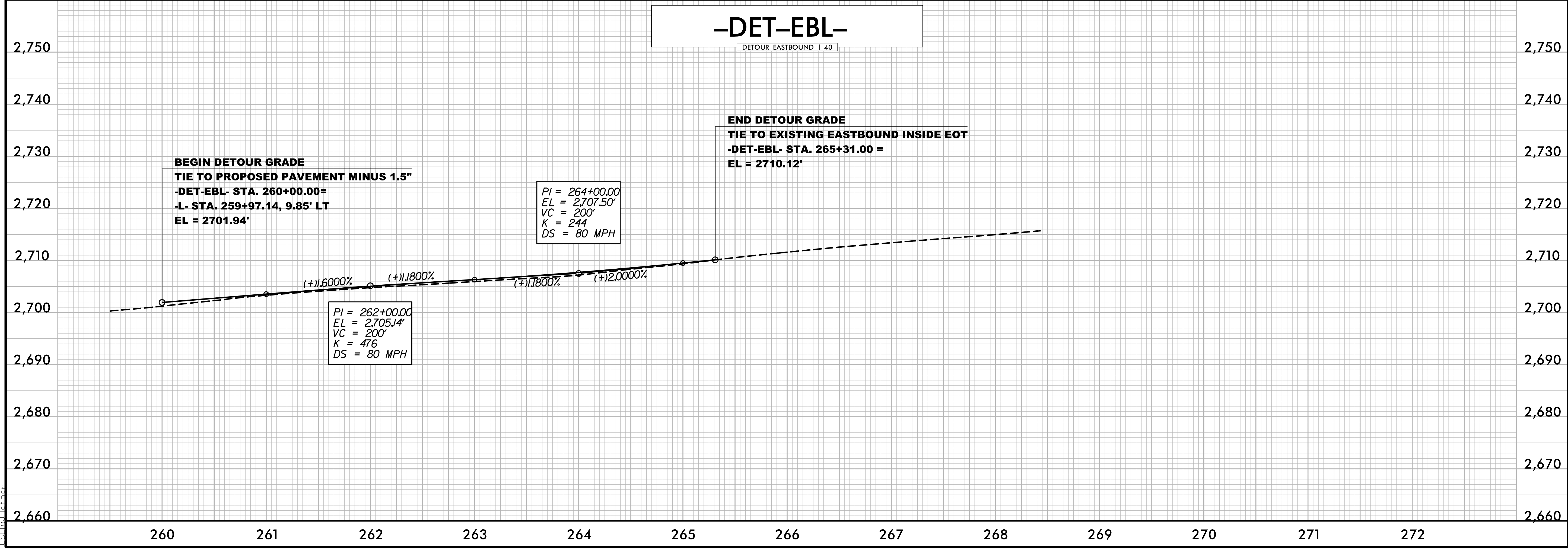
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 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO. <b>HB-0004</b>	SHEET NO. <b>14</b>
ROADWAY DESIGN ENGINEER 5/16/2024	HYDRAULICS ENGINEER 5/16/2024
 Jonathan C. Heifer 1001952001000000	 Matthew L. Harve 1001952001000000
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# -DET-EBL-

DETOUR EASTBOUND I-40



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