

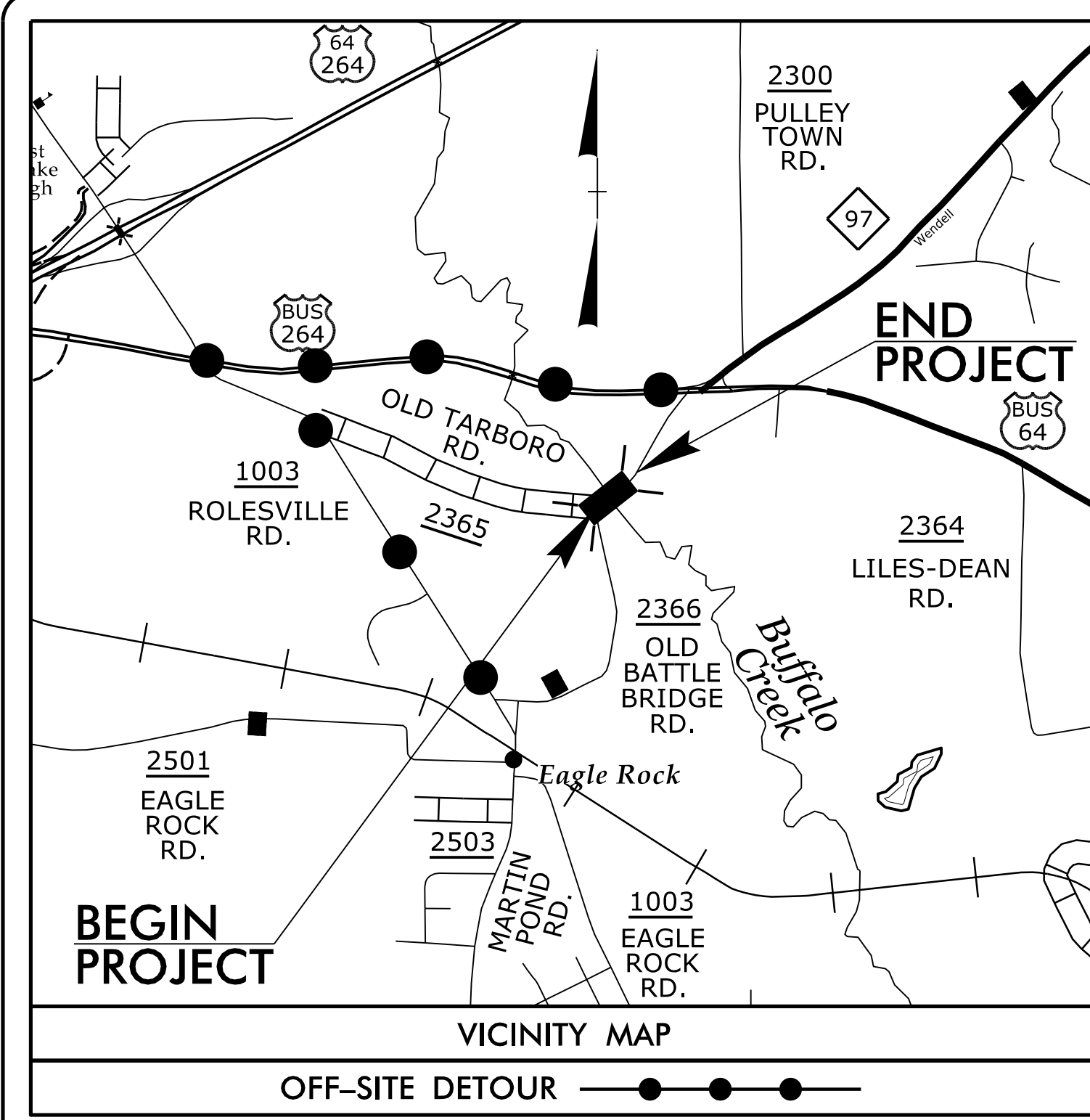
**This electronic collection of documents is provided  
for the convenience of the user  
and is Not a Certified Document –**

**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.**

09\_08/2019

**TIP PROJECT: 17BP.5.R.79**



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

NOTE:  
SR 2366 IS CURRENTLY  
CLOSED TO TRAFFIC.

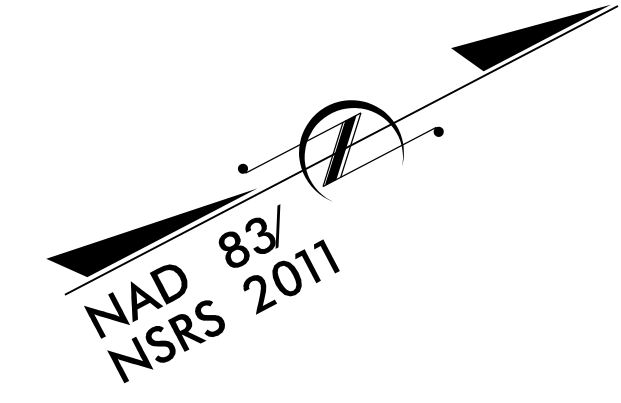
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**WAKE COUNTY**

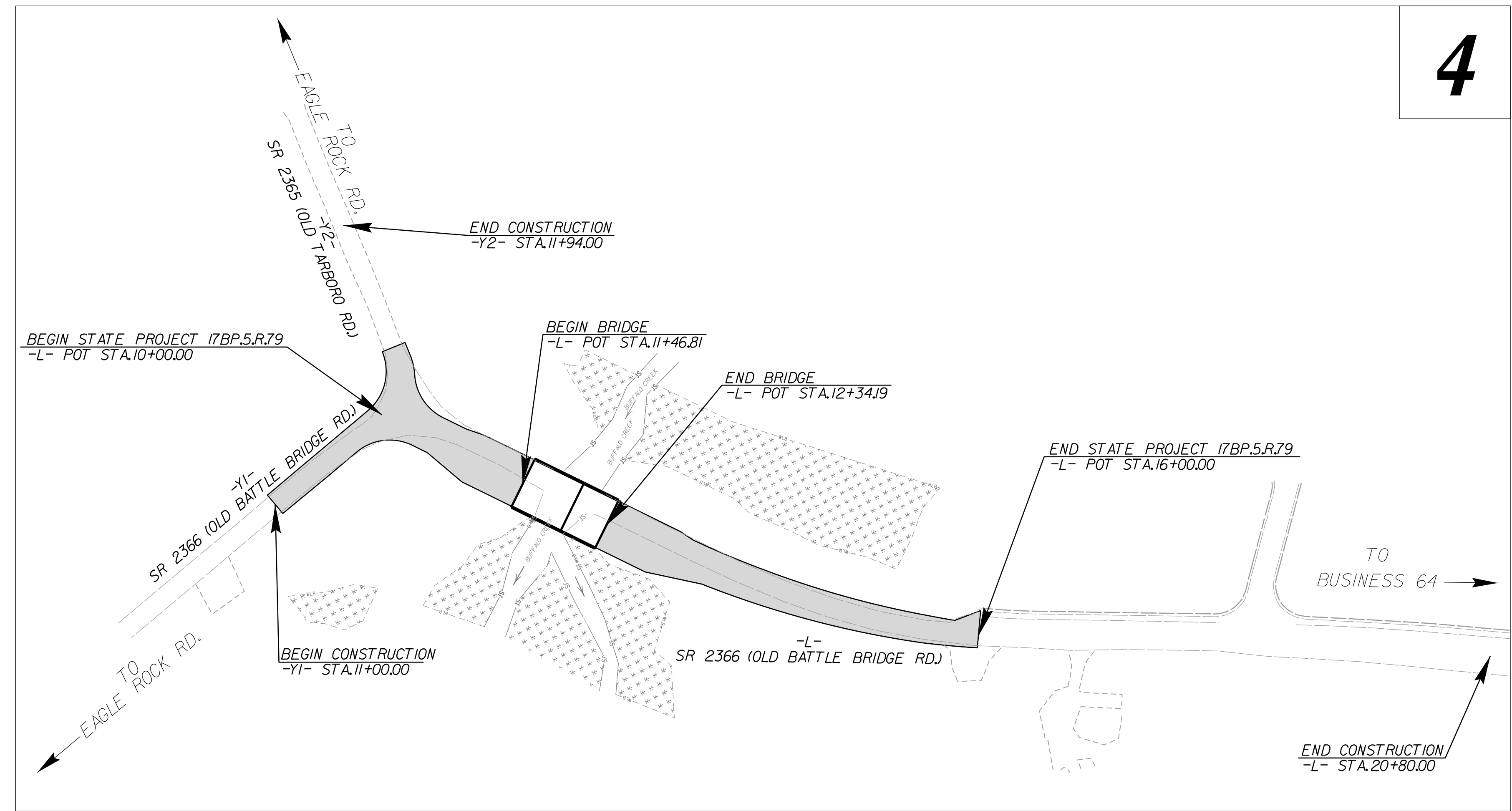
**LOCATION: BRIDGE NO. 216 OVER BUFFALO CREEK  
ON SR 2366 (OLD BATTLE BRIDGE RD.)**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.5.R.79	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
17BP.5.R.79	N/A	PE	
17BP.5.R.79	N/A	ROW	
17BP.5.R.79	N/A	UTILITIES	
17BP.5.R.79	N/A	CONSTRUCTION	

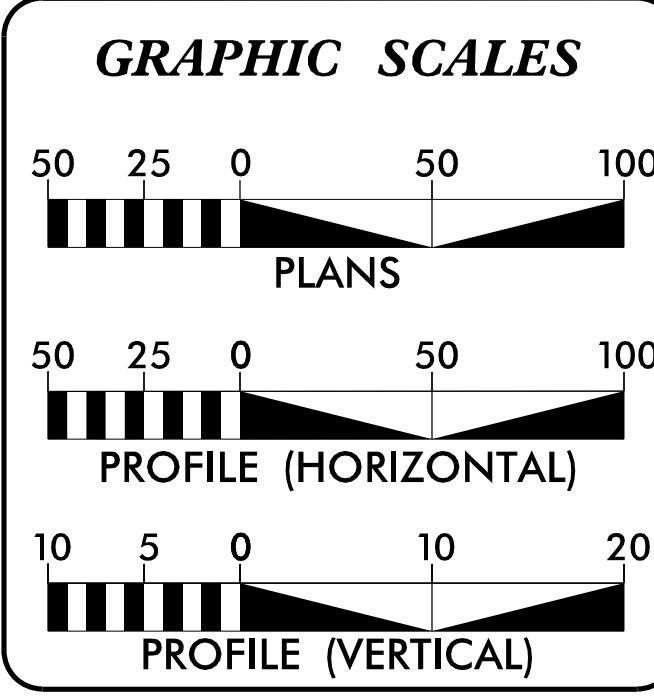


**4**



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

**CONTRACT:**



**DESIGN DATA**  
ADT = 2,000+ VPD  
V = 40 MPH  
CLASS = RURAL LOCAL  
SUBREGIONAL TIER

**PROJECT LENGTH**  
LENGTH ROADWAY STATE PROJECT 17BP.5.R.79 = 0.097 mi.  
LENGTH STRUCTURES STATE PROJECT 17BP.5.R.79 = 0.017 mi.  
TOTAL LENGTH STATE PROJECT 17BP.5.R.79 = 0.114 mi.

Prepared in the Offices of:

223 S. WEST ST., STE 1100  
RALEIGH, NC 27603  
T 919.380.8750

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

2018 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
OCTOBER 11, 2019

**RIGHT OF WAY COMPLETE:**  
JUNE 10, 2022

**LETTING DATE:**  
JULY 13, 2022

**ANDY YOUNG, PE**  
PROJECT ENGINEER

**MICHAEL BURNS, PE**  
PROJECT DESIGN ENGINEER

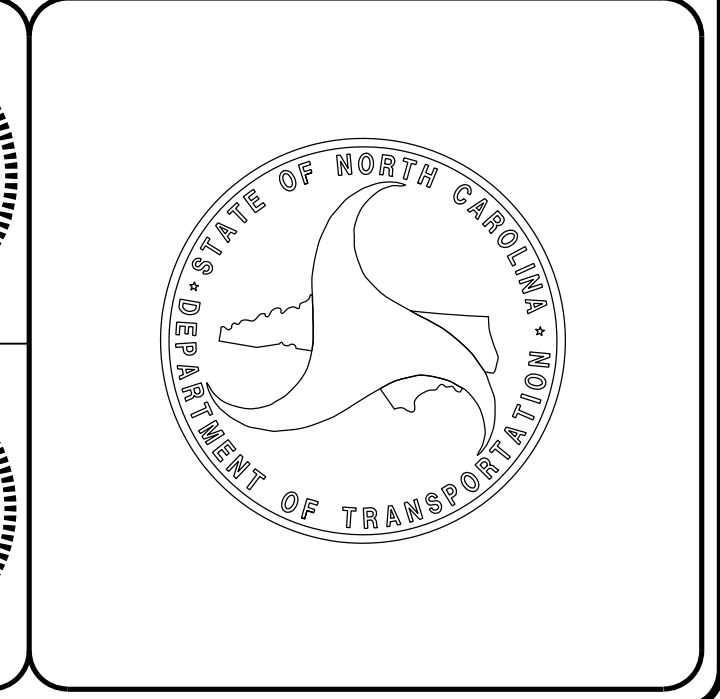
**LISA GILCHRIST, EI**  
NCDOT CONTACT

**HYDRAULICS ENGINEER**

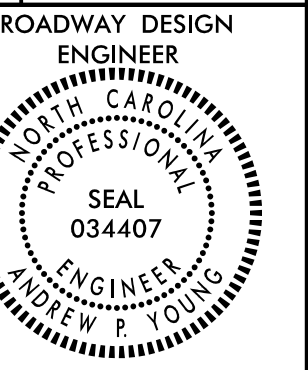
SIGNATURE: \_\_\_\_\_

**ROADWAY DESIGN ENGINEER**

SIGNATURE: \_\_\_\_\_



3/16/2022  
U:\Proj\910216-RDY-TSH.dgn  
USER:ayoung



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

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2C-1	GUARDRAIL INSTALLATION DETAIL
2C-2	STRUCTURE ANCHOR UNIT DETAIL
3B-1	ROADWAY SUMMARIES
3D-1	DRAINAGE SUMMARIES
3G-1	GEOTECHNICAL SUMMARIES
4	PLAN SHEET
5	PROFILE SHEET
TMP-1 THRU TMP-2	TRAFFIC MANAGEMENT PLANS
PMP-1	PAVEMENT MARKING PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
RF-1	REFORESTATION PLANS
UC-1 THRU UC-4	UTILITIES CONSTRUCTION PLANS
UO-1 THRU UO-2	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTION SUMMARY SHEET
X-1 THRU X-6	CROSS-SECTIONS
S-1 THRU S-26	STRUCTURE 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	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Super-elevation - Two Lane Pavement
225.09	Guide for Shoulder and Ditch Transition at Grade Separations
240.01	Guide for Berm Ditch Construction
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
DIVISION 4 - MAJOR STRUCTURES	
422.02	Bridge Approach Fills - Type II Modified Approach Fill
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Super-elevated Curve - Method I
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
840.24	Frames and Narrow Slot Sag Grates
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
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:

**GRADE LINE:  
GRADING AND SURFACING:**

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

**GRADING:**

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED OR FUTURE SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED 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 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

**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.

**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 WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

**END BENTS:**

THE SURVEYOR 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:  
CITY OF RALEIGH  
AT&T  
DUKE ENERGY  
PSNC  
SPECTRUM

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 CONTRACT.

# 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	(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-☠-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	E
Proposed Temporary Drainage Easement	TDE
Proposed Permanent Drainage Easement	PDE
Proposed Permanent Drainage/Utility Easement	DUE
Proposed Permanent Utility Easement	PUE
Proposed Temporary Utility Easement	TUE
Proposed Aerial Utility Easement	AUE

## ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	C
Proposed Slope Stakes Fill	F
Proposed Curb Ramp	CR
Existing Metal Guardrail	T
Proposed Guardrail	T
Existing Cable Guiderail	T
Proposed Cable Guiderail	T
Equality Symbol	⊕
Pavement Removal	⊗
VEGETATION:	
Single Tree	○
Single Shrub	○
Hedge	-----

Woods Line	-----
Orchard	○
Vineyard	□

## EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	CONC
Bridge Wing Wall, Head Wall and End Wall	CONC WW
MINOR:	
Head and End Wall	CONC HW
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	CB
Paved Ditch Gutter	-----
Storm Sewer Manhole	○
Storm Sewer	S

## 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	PH
H-Frame Pole	●
U/G Power Line Test Hole (SUE - LOS A)*	⊕
U/G Power Line (SUE - LOS B)*	P
U/G Power Line (SUE - LOS C)*	P
U/G Power Line (SUE - LOS D)*	P

## TELEPHONE:

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

## 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)*	P
U/G Water Line (SUE - LOS C)*	P
U/G Water Line (SUE - LOS D)*	P
Above Ground Water Line	A/G Water

## TV:

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

## GAS:

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

## SANITARY SEWER:

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

## MISCELLANEOUS:

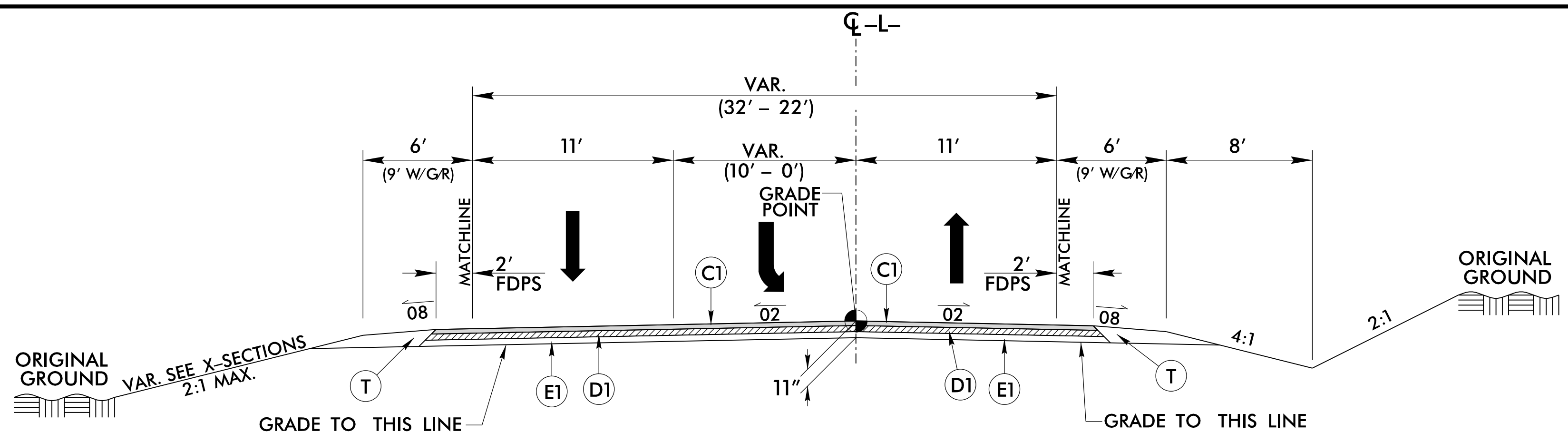
Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	⊕
Utility Unknown U/G Line (SUE - LOS B)*	UTL
U/G Tank; Water, Gas, Oil	□
Underground Storage Tank, Approx. Loc.	UST
A/G Tank; Water, Gas, Oil	□
Geoenvironmental Boring	⊕
Abandoned According to Utility Records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



5/14/99

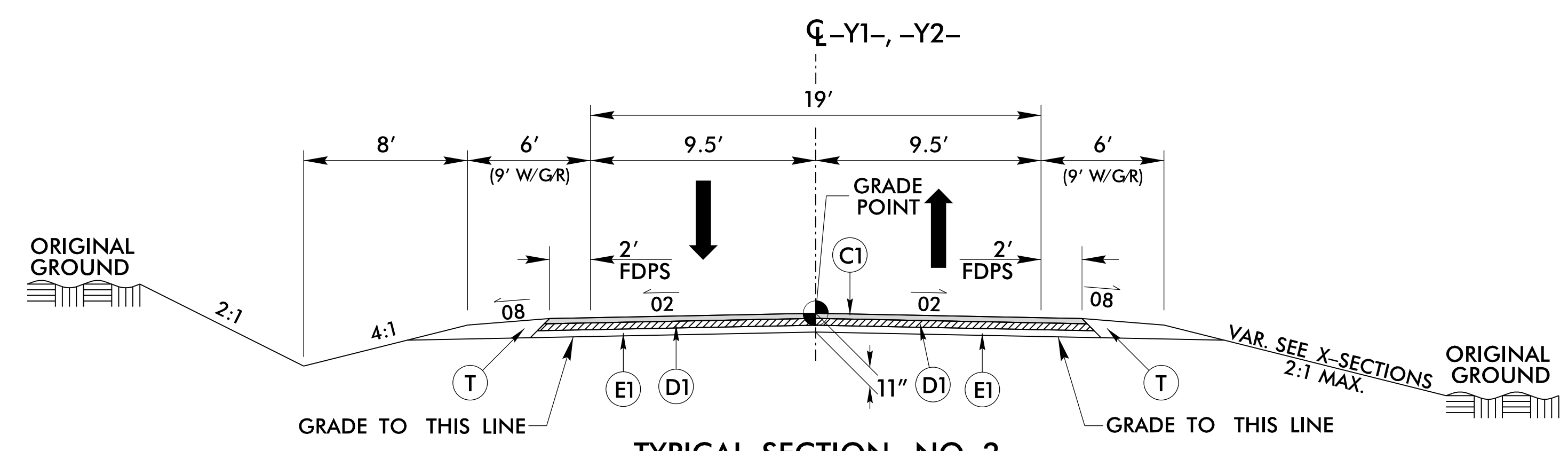
PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)	
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1 1/2" 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 2 1/2" 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 5 1/2" IN DEPTH.
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE THIS SHEET FOR WEDGING DETAIL)

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



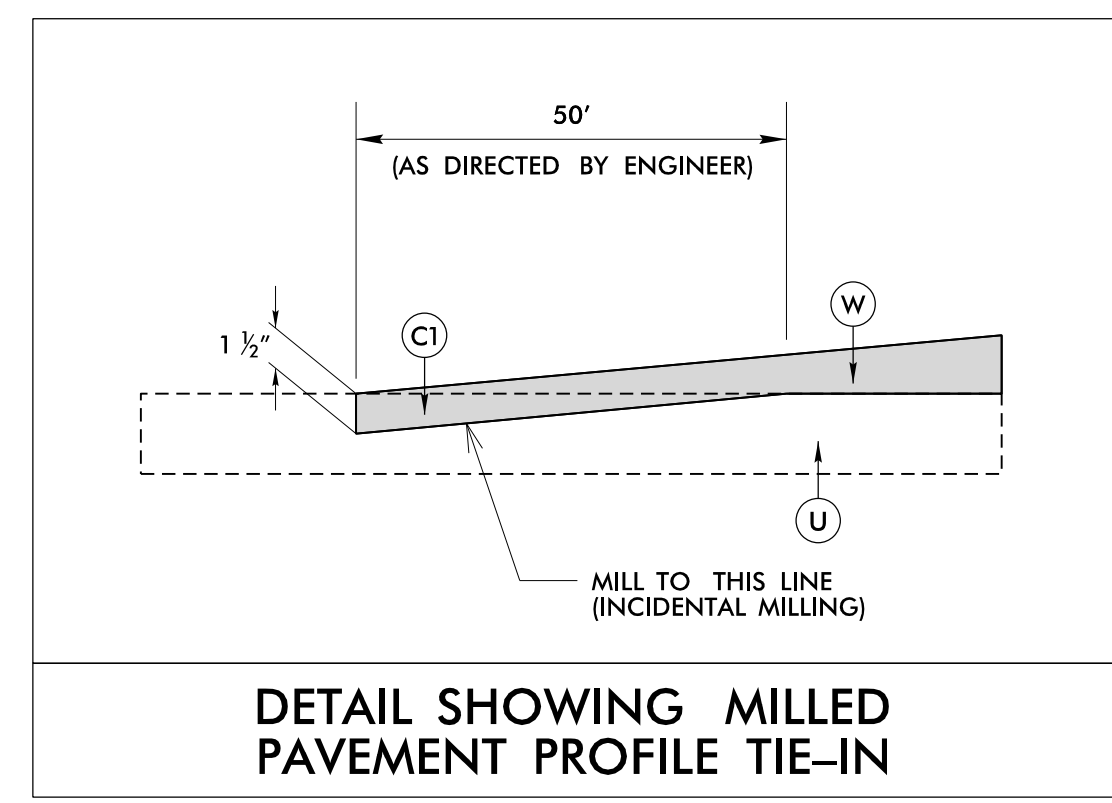
TYPICAL SECTION NO. 1

-L- STA. 10+00.00 TO -L- STA. 11+46.81 (BEGIN BRIDGE)  
-L- STA. 12+34.19 (END BRIDGE) TO -L- STA. 16+00.00

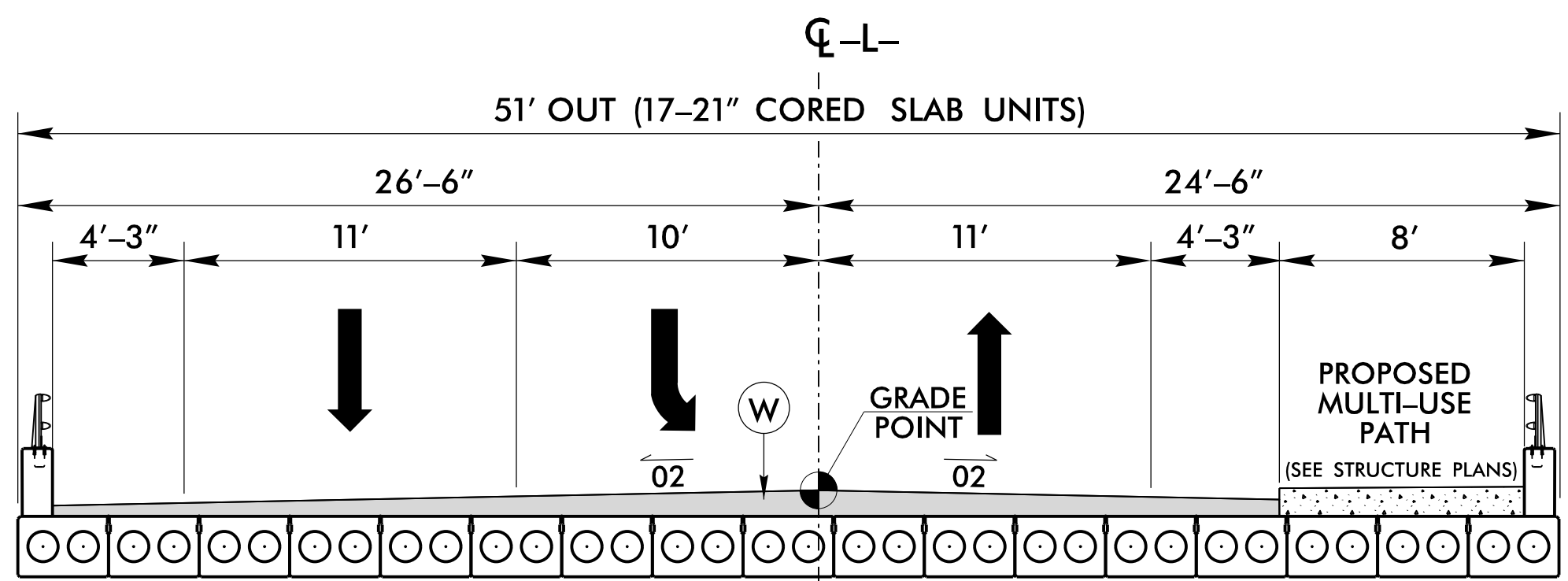


TYPICAL SECTION NO. 2

-Y1- STA. 11+00.00 TO -Y1- STA. 12+18.45  
-Y2- STA. 10+21.00 TO -Y2- STA. 10+70.68

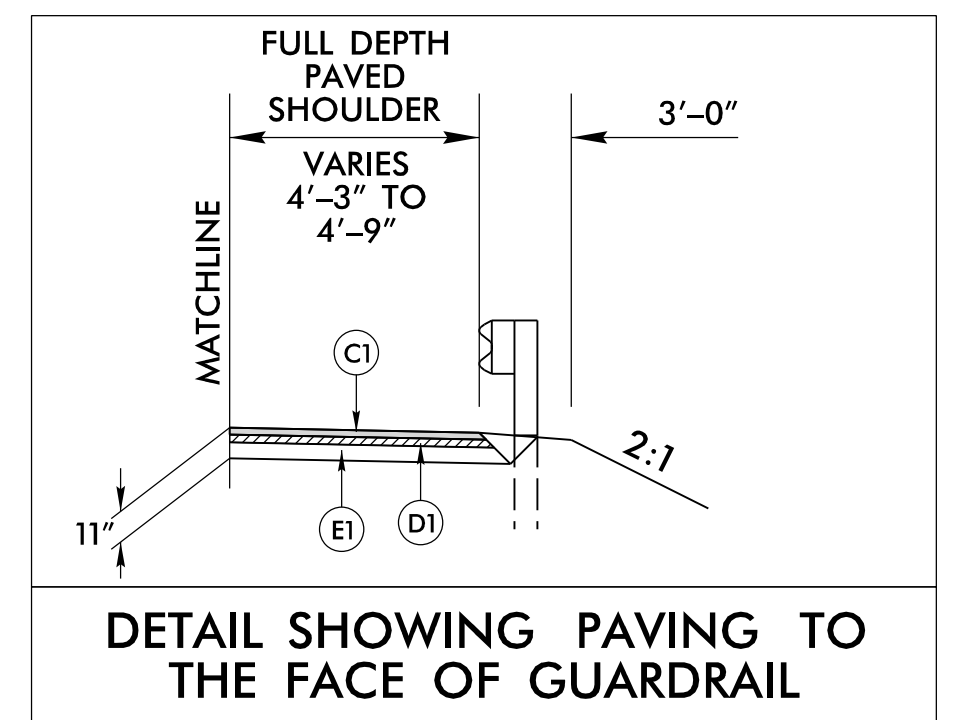


DETAIL SHOWING MILLED PAVEMENT PROFILE TIE-IN

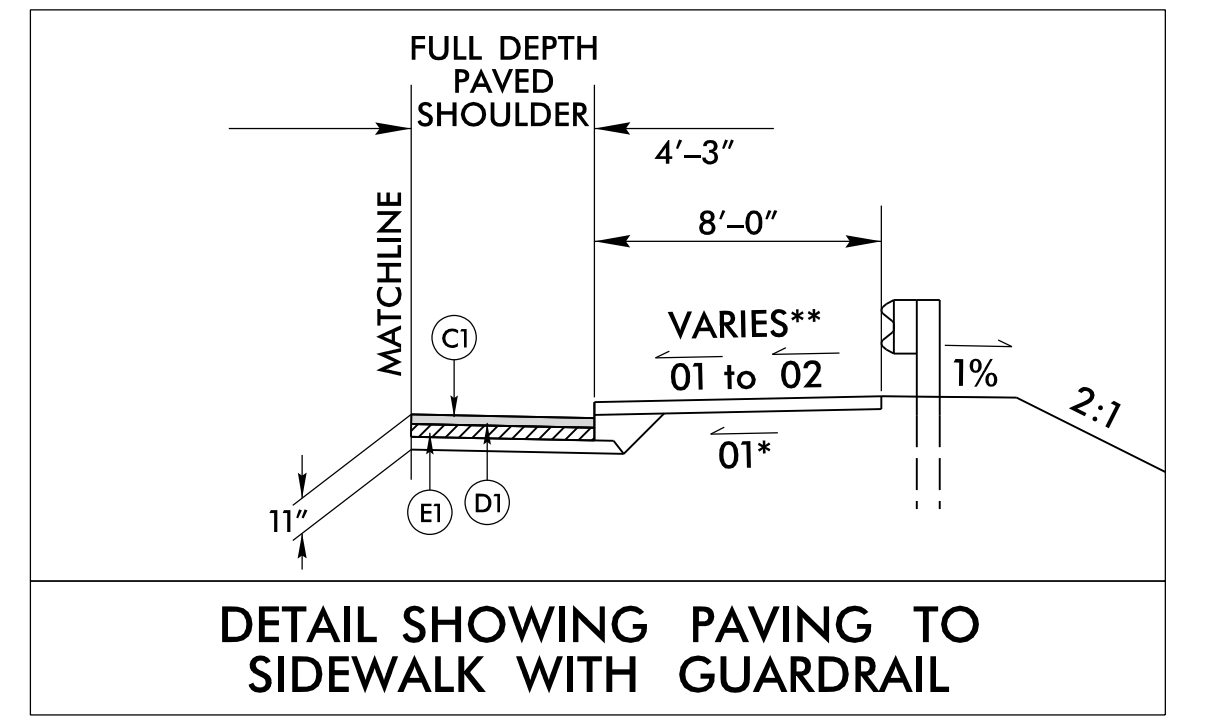


TYPICAL SECTION NO. 3

-L- STA. 11+46.81 (BEGIN BRIDGE) TO -L- STA. 12+34.19 (END BRIDGE)

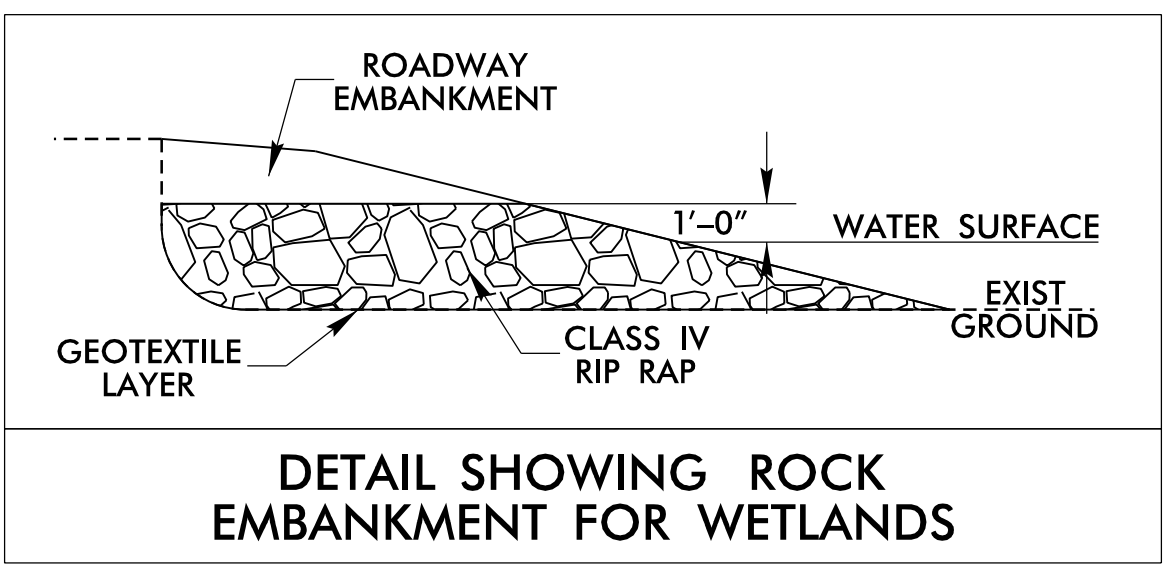


DETAIL SHOWING PAVING TO THE FACE OF GUARDRAIL

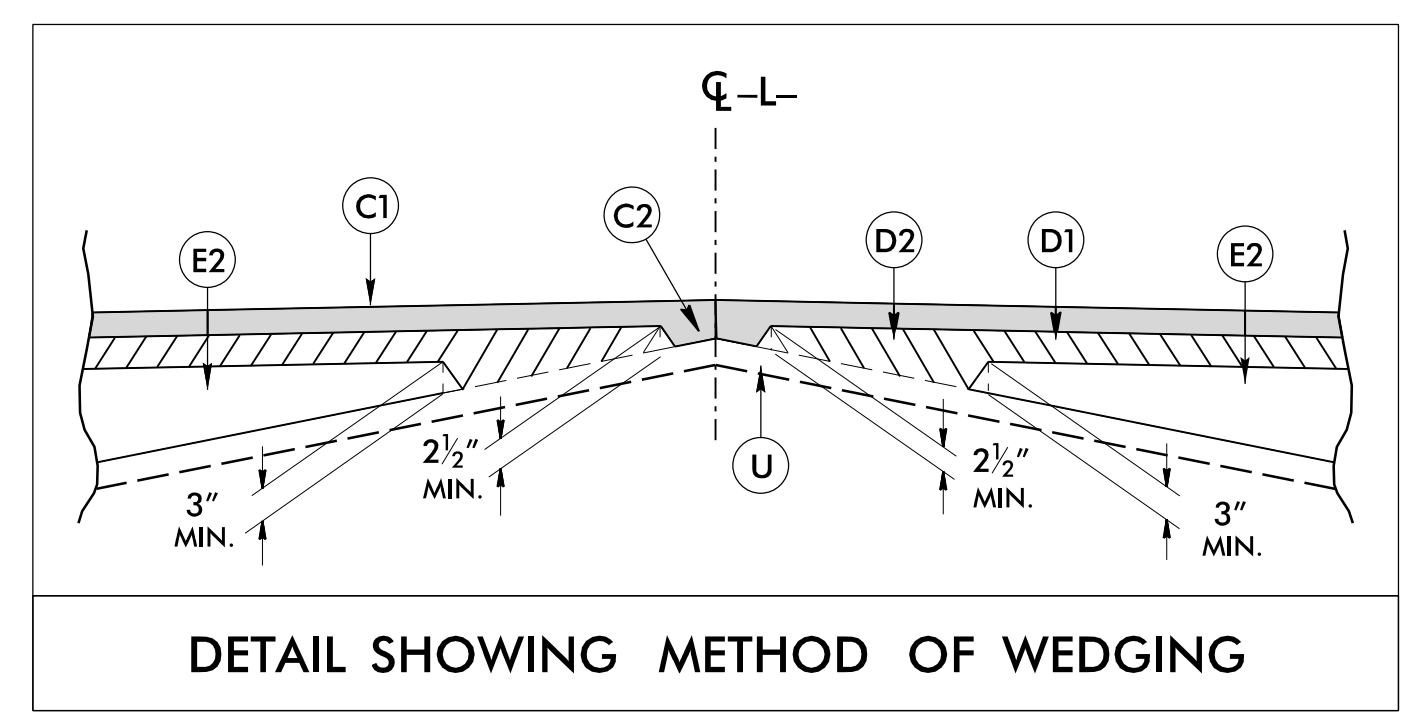


DETAIL SHOWING PAVING TO SIDEWALK WITH GUARDRAIL

\* SIDEWALK SLOPE IS 0.01 FOR SIDEWALK SHOWN OUTSIDE OF THE APPROACH SLABS ON EACH END OF BRIDGE  
\*\* SIDEWALK SLOPE TRANSITIONS FROM 0.01 TO 0.02 ON APPROACH SLAB AND MAINTAINS 0.02 ACROSS THE BRIDGE



DETAIL SHOWING ROCK EMBANKMENT FOR WETLANDS



DETAIL SHOWING METHOD OF WEDGING

PROJECT REFERENCE NO. 17BP.5.R.79	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER ANDREW P. YOUNG SEAL 034407 NORTH CAROLINA PROFESSIONAL ENGINEER	PAVEMENT DESIGN ENGINEER CLARK S. MORTON SEAL 22896 NORTH CAROLINA PROFESSIONAL ENGINEER
STEWART	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

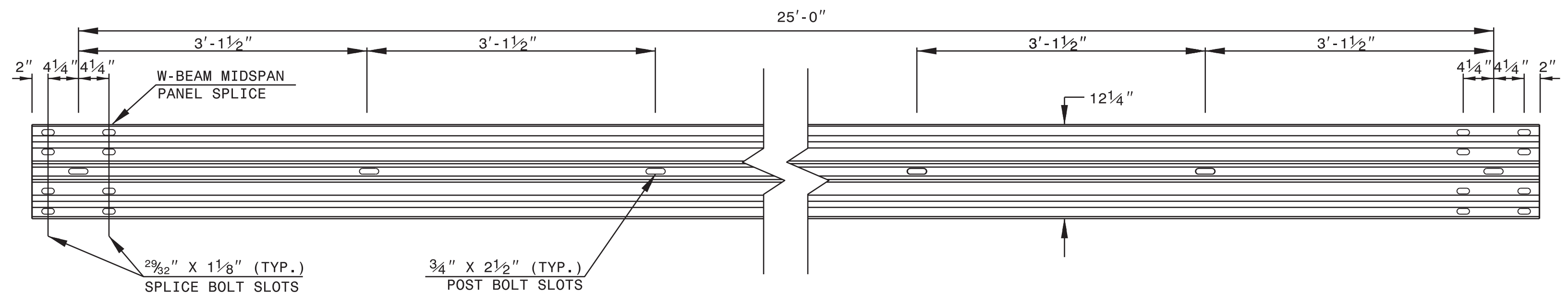
REVISIONS

3/16/2002 10:21:16.RDY\_TYP.dgn

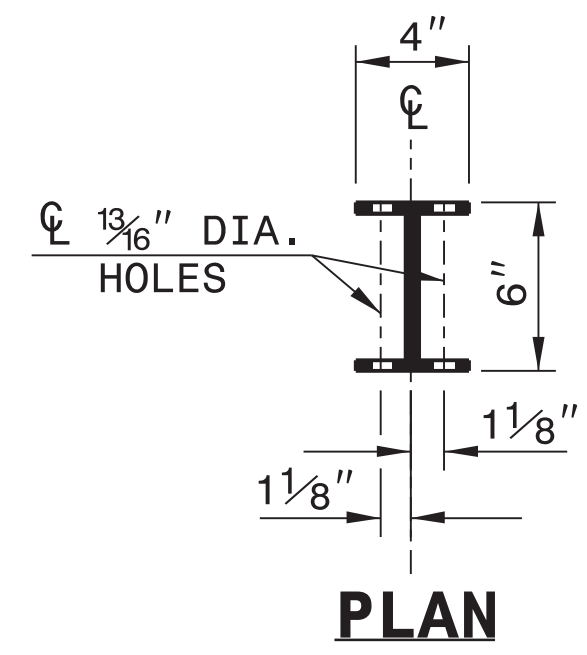
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

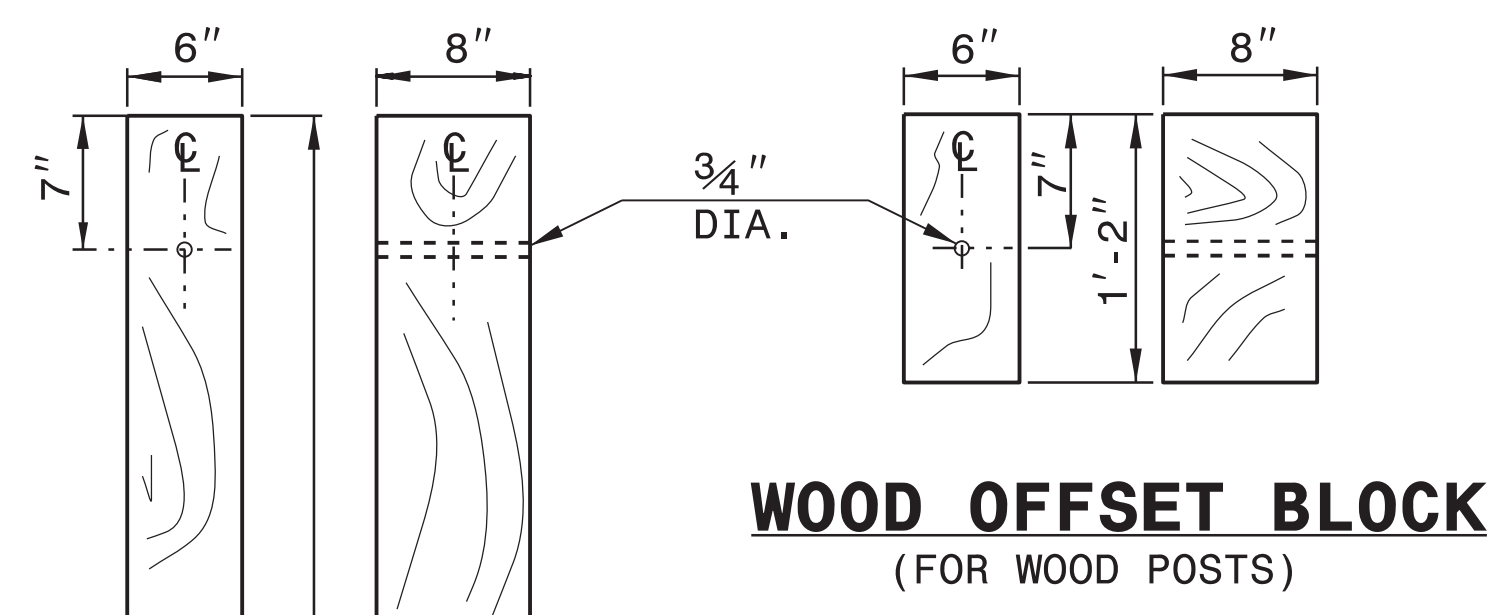
SHEET 6 OF 8  
**862D02**



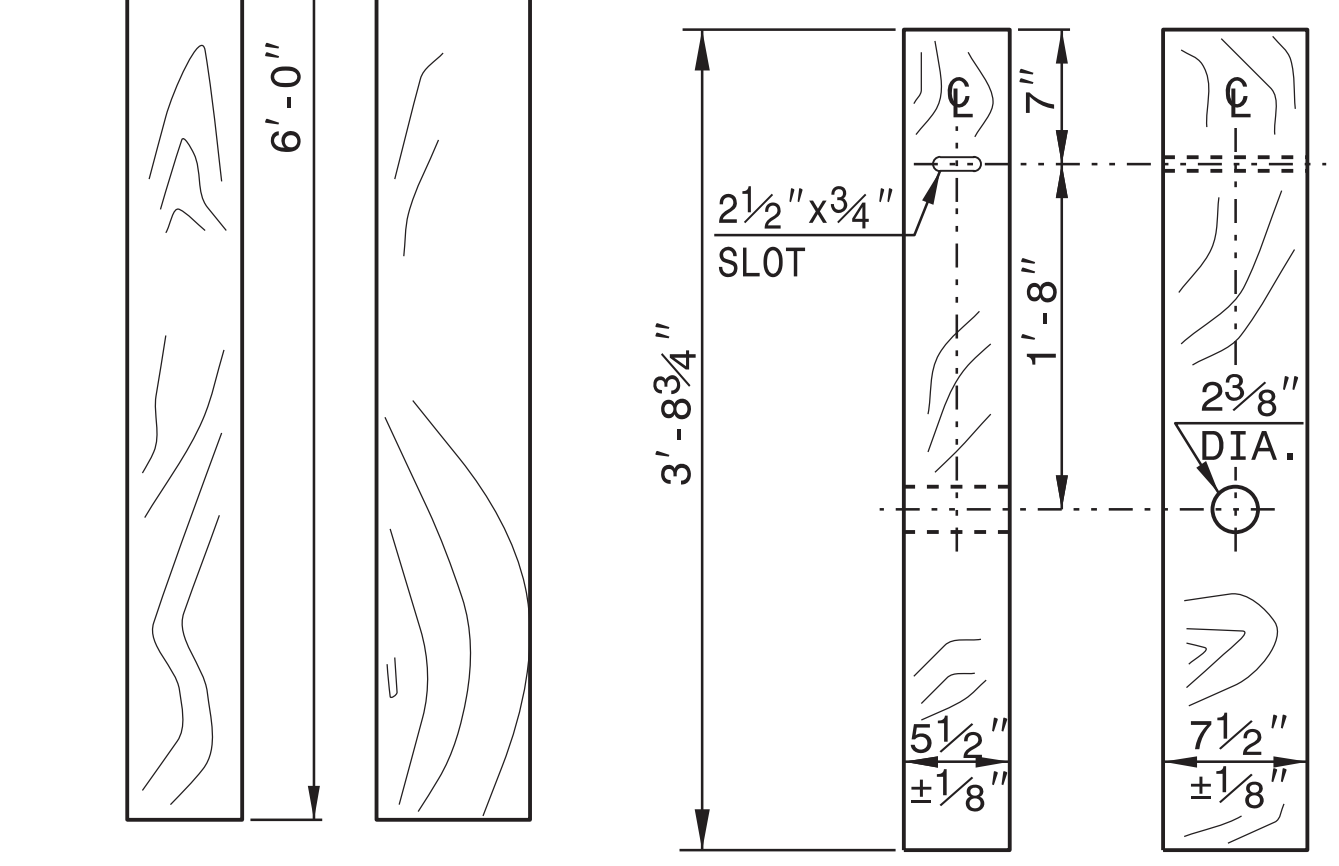
**STANDARD W-BEAM GUARDRAIL**



**PLAN**

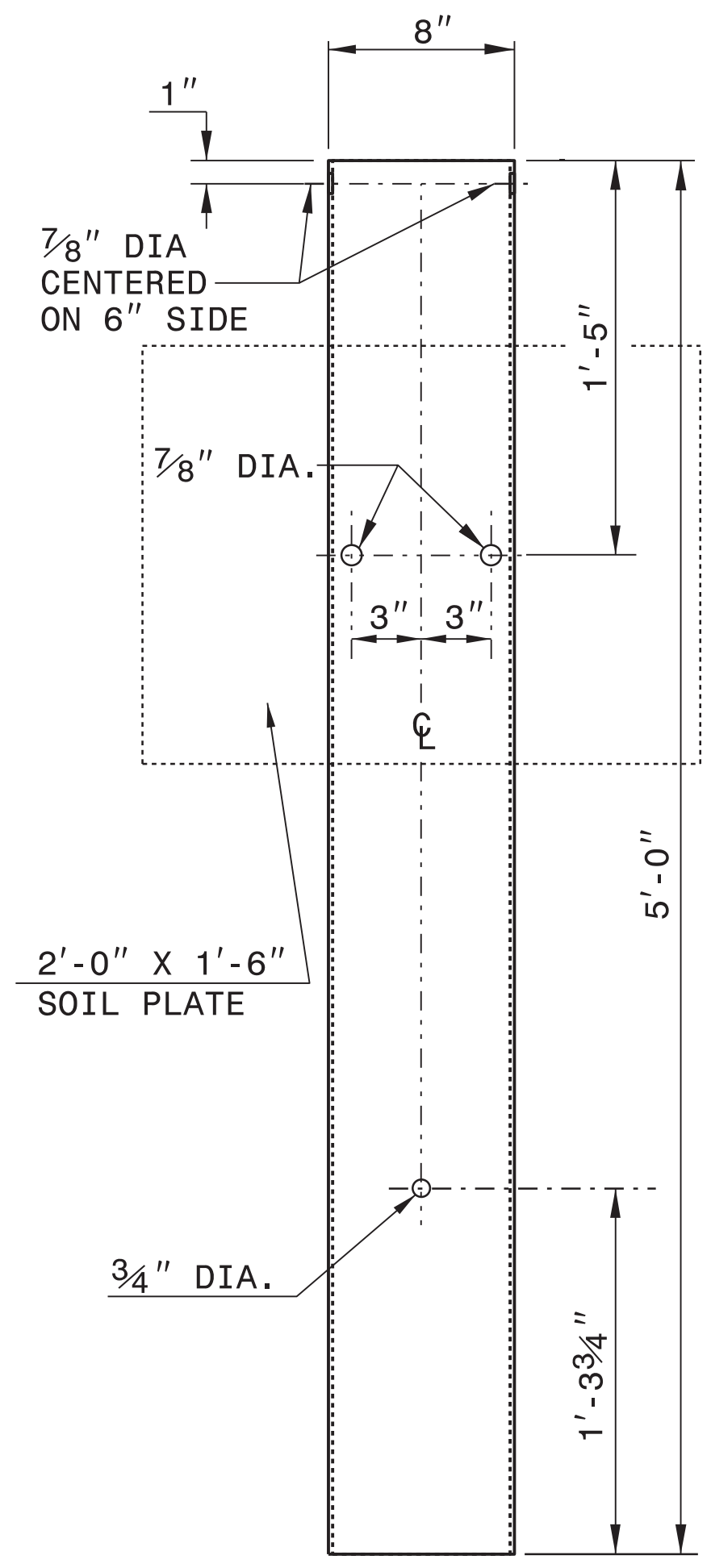


**WOOD OFFSET BLOCK  
(FOR WOOD POSTS)**

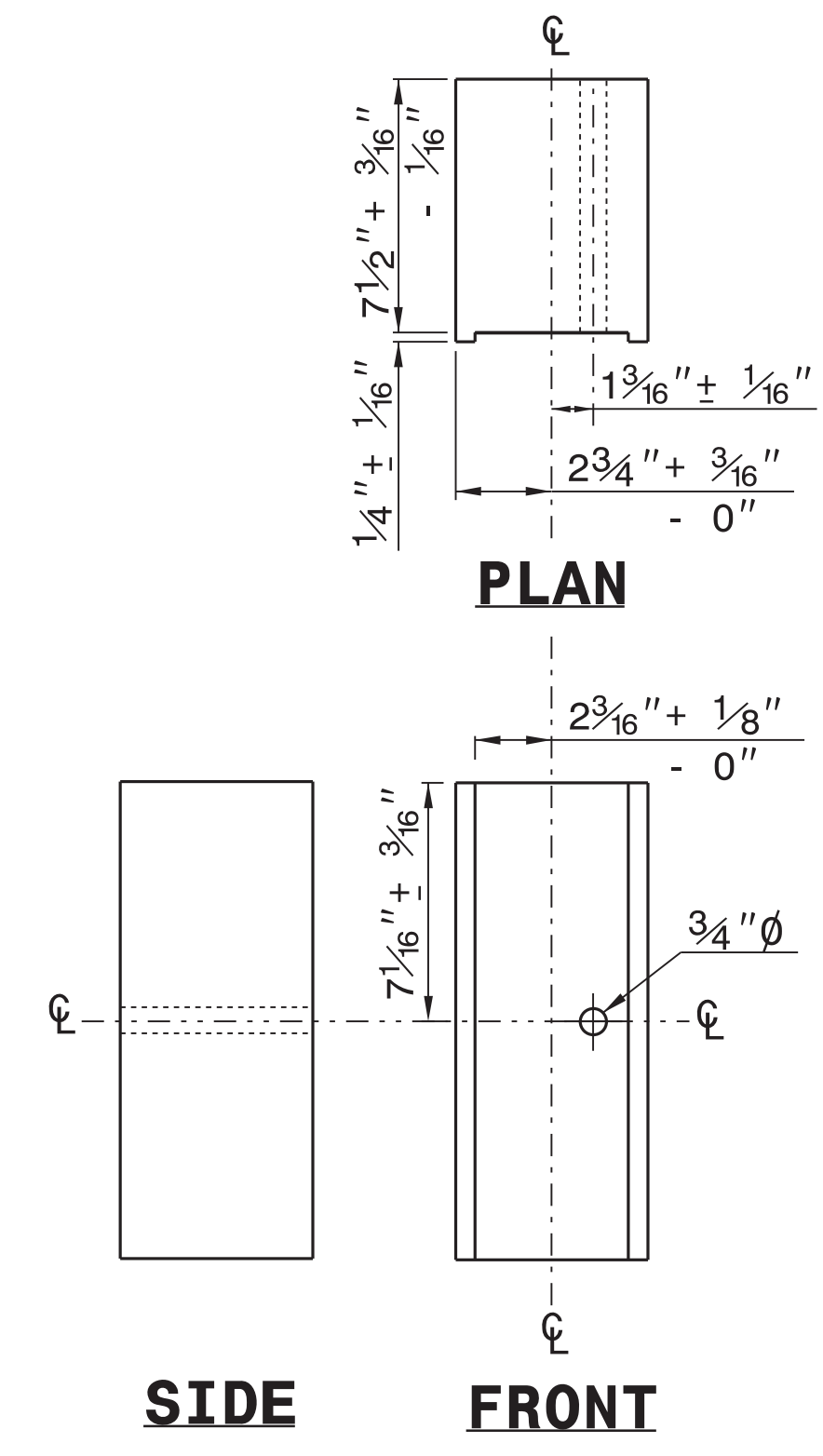


**STANDARD  
LINE POST**

**SHORT WOOD  
BREAKAWAY POST**



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

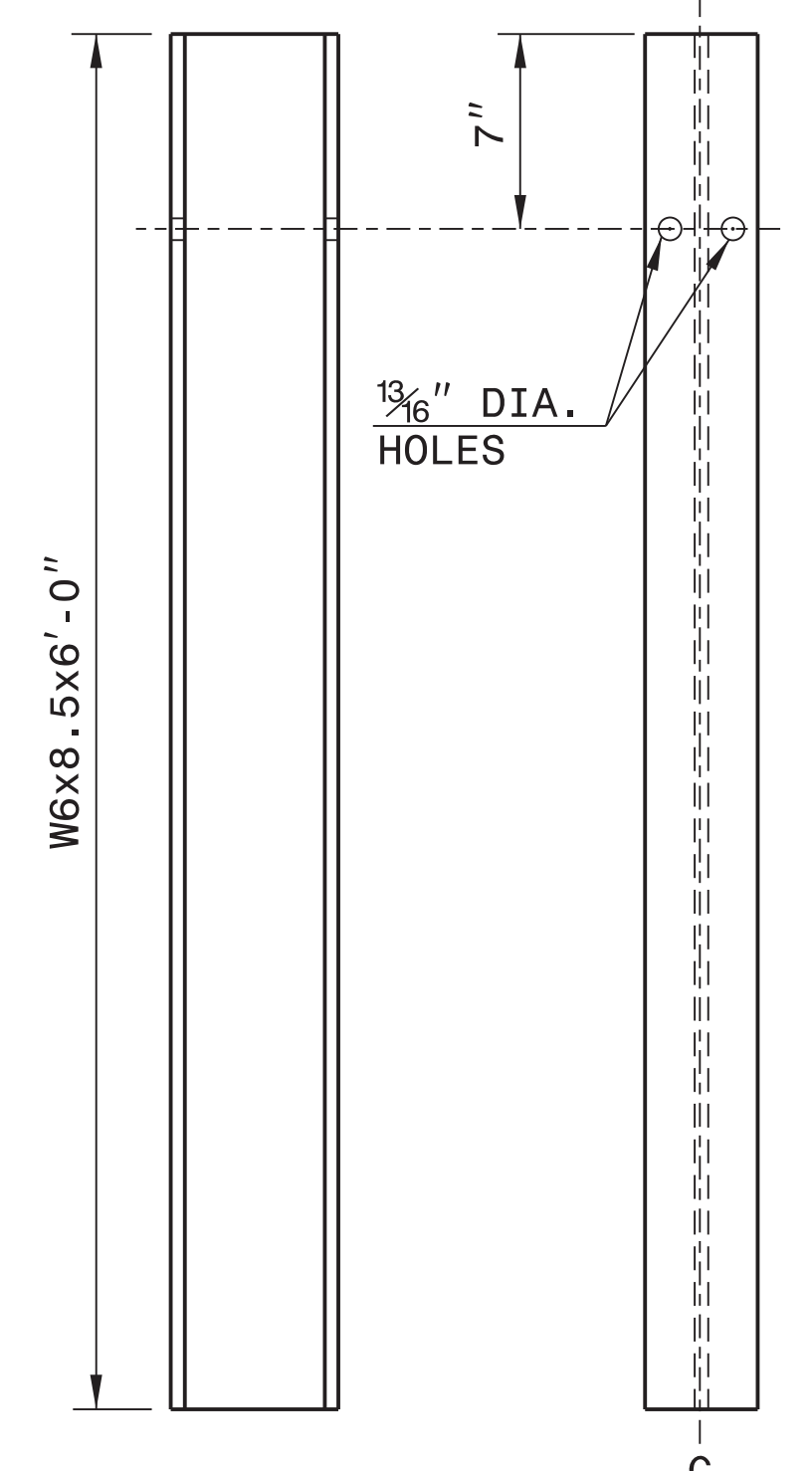


**PLAN**

**SIDE**

**FRONT**

**ROUTED  
OFFSET BLOCK**



**SIDE**

**FRONT**

**"W6" STEEL POST**

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.: \_\_\_\_\_



I4-DEC-2017 10:36 S:\Contracts\2018\Standard Drawings\Special Details\Lieu of Standard Drawings\Division 8\0862d0301.dgn Jhowerton AT:CSU-212855

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ROADWAY DETAIL DRAWING FOR <b>STRUCTURE ANCHOR UNITS</b> GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE	SHEET 1 OF 7 <b>862D03</b>
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> </div> <div style="width: 50%;"> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.</li> <li>*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11 1/2" IF CONCRETE BACKWALL IS NOT PRESENT.</li> <li>-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.</li> <li>-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).</li> <li>-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.</li> <li>-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.</li> </ul> </div> </div>		
<b>PLAN VIEW</b> <b>GUARDRAIL ANCHOR UNIT, TYPE III</b> <b>FOR ATTACHMENT TO RAIL ON BRIDGE</b>		

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ROADWAY DETAIL DRAWING FOR <b>STRUCTURE ANCHOR UNITS</b> GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER	SHEET 2 OF 7 <b>862D03</b>
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> </div> <div style="width: 50%;"> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>**POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.</li> <li>*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11 1/2" IF CONCRETE BACKWALL IS NOT PRESENT.</li> <li>-SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.</li> <li>-MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).</li> <li>-LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.</li> <li>-SEE SHEET 3 FOR POST SECTIONS 1 THRU 9.</li> </ul> </div> </div>		
<b>PLAN VIEW</b> <b>GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO</b> <b>RAIL ON BRIDGE - SUB REGIONAL TIER</b>		



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SEE TITLE BLOCK

ORIGINAL BY: J. HOWERTON	DATE: 06-22-12
MODIFIED BY:	DATE:
CHECKED BY:	DATE:
FILE SPEC.:	





8/17/99

COMPUTED BY: VHB DATE: 2/5/2020  
CHECKED BY: VHB DATE: 2/5/2020

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

PROJECT NO. SHEET NO.  
17BP.5.R.79 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)

Main data table with columns for LINE & STATION, OFFSET, STRUCTURE NUMBER, INVERT ELEVATION, MINIMUM REQUIRED SLOPE, DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC), R. C. PIPE CLASS IV, ENDWALLS, REINFORCED ENDWALLS, DRAINAGE STRUCTURE, QUANTITIES FOR DRAINAGE STRUCTURES, FRAME, GRATES, AND HOOD, CONCRETE TRANSITIONAL SECTION, OPEN THROAT C.B. STD., CONCRETE BRIDGE APPROACH D.I. STD., D.I. STD., D.I. FRAME AND GRATES STD., G.D.I. TYPE "A", G.D.I. TYPE "B", G.D.I. TYPE "D", G.D.I. (W.S. FLAT) FRAME WITH GRATE STD., G.D.I. (W.S. FLAT) FRAME W/ 2 GRATES STD., G.D.I. (W.S. SAG) FRAME W/ GRATE STD., G.D.I. (W.S. SAG) FRAME W/ 2 GRATES STD., G.D.I. (N.S. SAG) FRAME W/ GRATE STD., G.D.I. (N.S. SAG) FRAME W/ 2 GRATES STD., G.D.I. (N.S. FLAT) FRAME W/ GRATE STD., DRIVEWAY D.I. STD., FRAME W/ GRATE FOR DRIVEWAY STD., J.B. STD., ANGLED VANE GRATES AND FRAMES STD., T.B.J.B. STD., T.B.D.I. FOR STEEL GRATES STD., STEEL FRAME WITH TWO GRATES STD., TEMP STEEL PLATE COVER MASONRY DRAINAGE SPRING BOX STD., M.H. STD., M.H. FRAME AND COVER STD., CONVERT EXISTING C.B. TO J.B., CONVERT EXISTING C.B. TO D.I., CONVERT EXISTING D.I. TO J.B., CONVERT EXISTING J.B. TO D.I., ADJUST C.B., ADJUST D.I., 15" C.S. ELBOW, 18" C.S. ELBOW, 24" C.S. ELBOW, 30" C.S. ELBOW, 36" C.S. ELBOW, FLOWABLE FILL, CONCRETE COLLARS CL. "B" STD., CONCRETE AND BRICK PIPE PLUG STD., PIPE REMOVAL.

ABBREVIATIONS table listing items like C.A.A., C.B., C.S., D.I., G.D.I., H.D.P.E., J.B., M.H., N.S., P.V.C., R.C., T.B.D.I., T.B.J.B., W.S. and their corresponding descriptions.

REMARKS

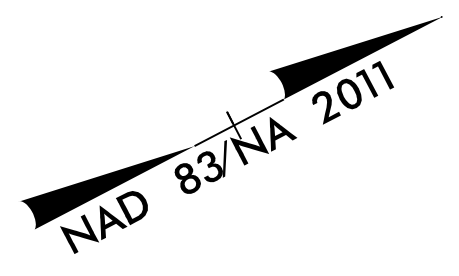
SHEET TOTALS and PROJECT TOTALS summary rows.

REVISIONS

3/16/2023 10:21:16.FDY\_SUM301.dgn

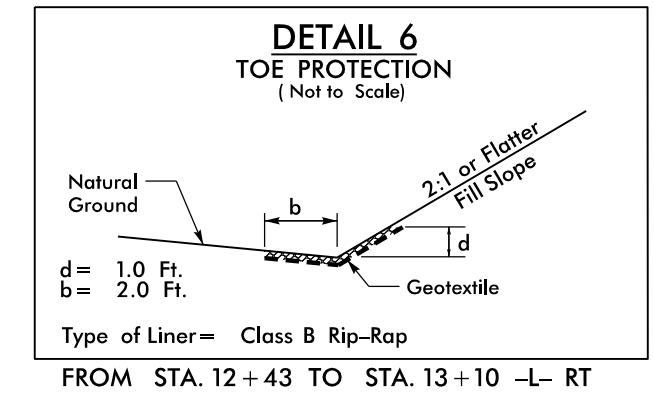
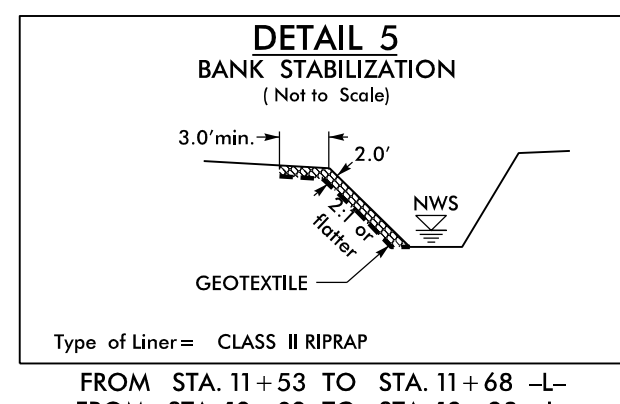
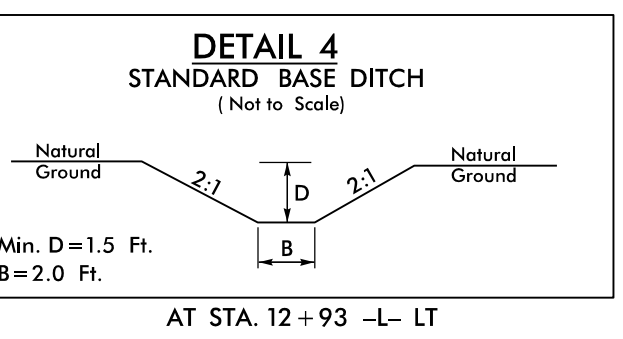
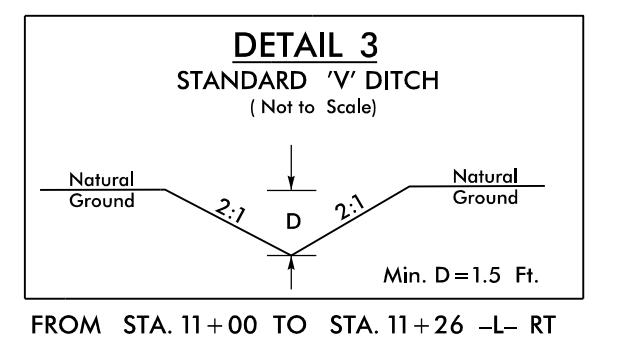
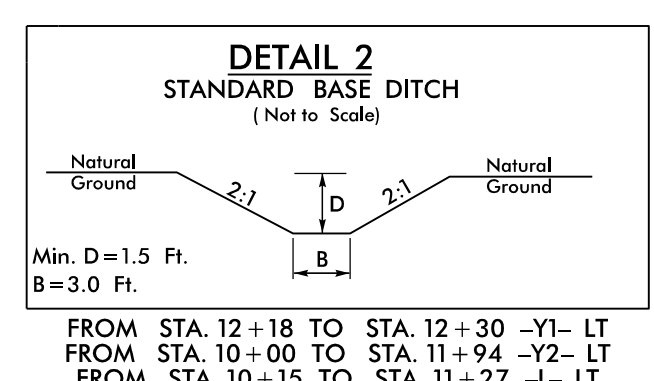
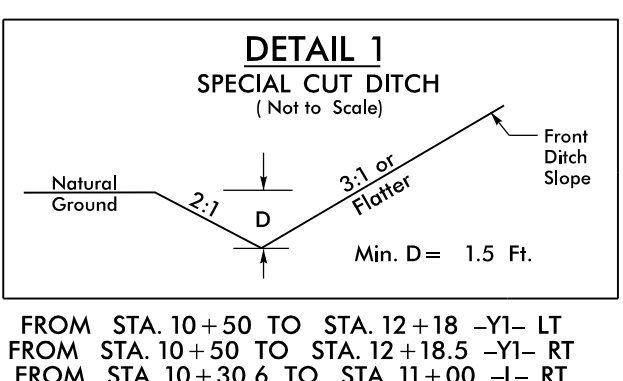
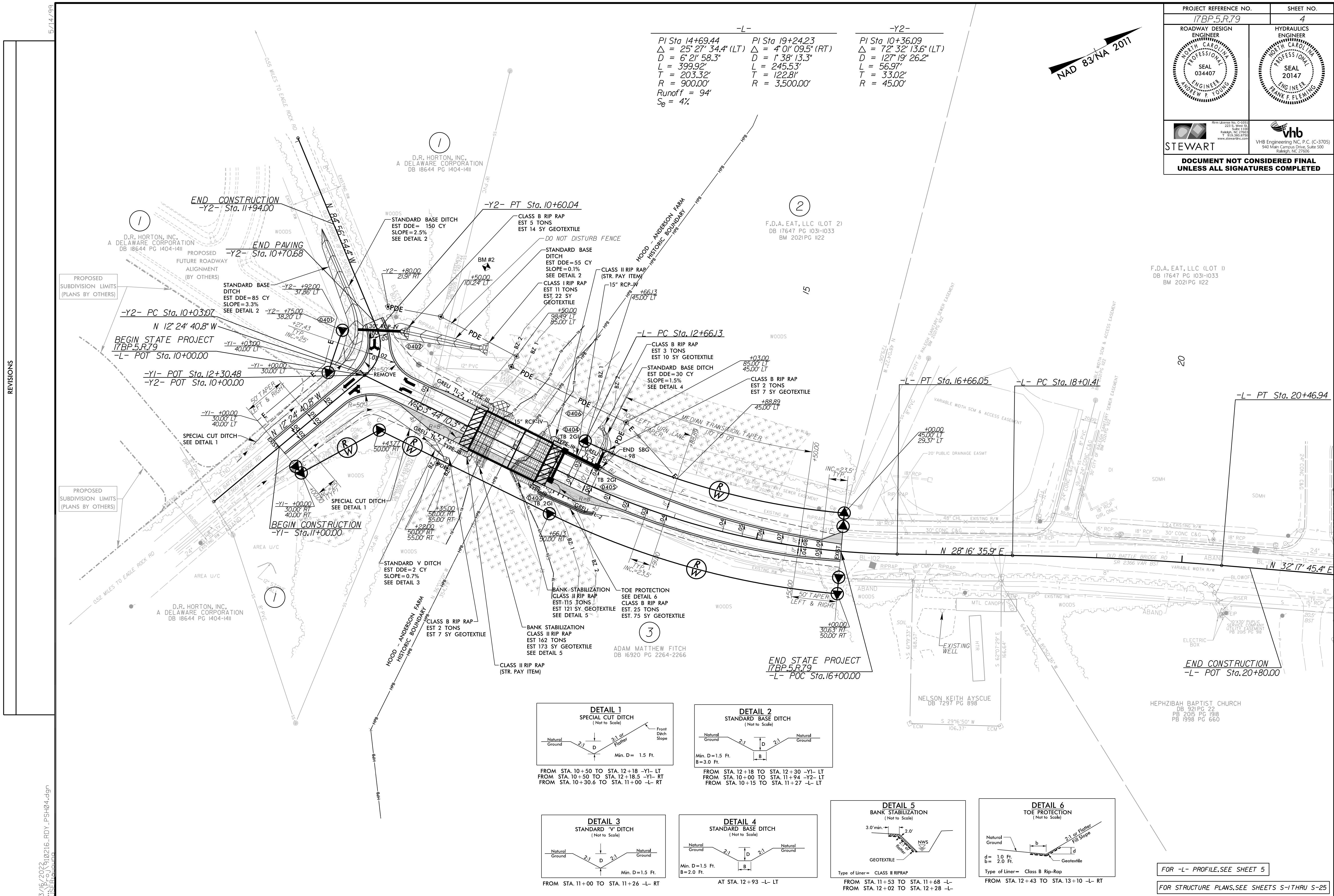






-L-

PI Sta. 14+69.44 Δ = 25° 27' 34.4" (LT) D = 6' 21' 58.3" L = 399.92' T = 203.32' R = 900.00' Runoff = 94' S <sub>e</sub> = 4%	PI Sta. 19+24.23 Δ = 4° 01' 09.5" (RT) D = 1' 38' 13.3" L = 245.53' T = 122.81' R = 3,500.00'	PI Sta. 10+36.09 Δ = 72° 32' 13.6" (LT) D = 127' 19' 26.2" L = 56.97' T = 33.02' R = 45.00'
--	--	--



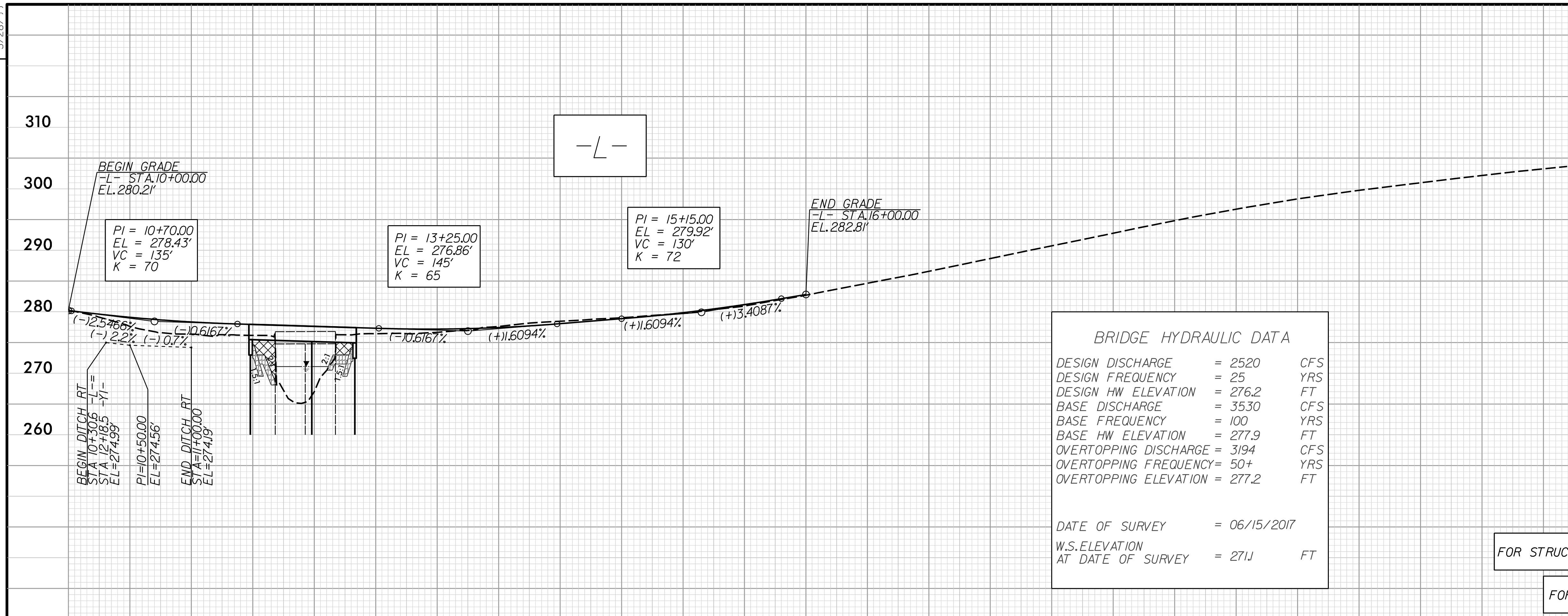
FOR -L- PROFILE, SEE SHEET 5  
FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-25

REVISIONS

3/16/2023 10:21:16.RDY\_PSH04.dgn  
17BP.5.R.79

5/28/99

PROJECT REFERENCE NO. 17BP.5.R.79	SHEET NO. 5
ROADWAY DESIGN ENGINEER ANDREW P. YOUNG PROFESSIONAL SEAL 034407 NORTH CAROLINA	HYDRAULICS ENGINEER FRANK F. FLEMING PROFESSIONAL SEAL 20147 NORTH CAROLINA
STEWART Firm License No. C-3523 223 S. West St. Raleigh, NC 27603 T. 919.336.4700 www.stewartinc.com	vhb VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



BRIDGE HYDRAULIC DATA

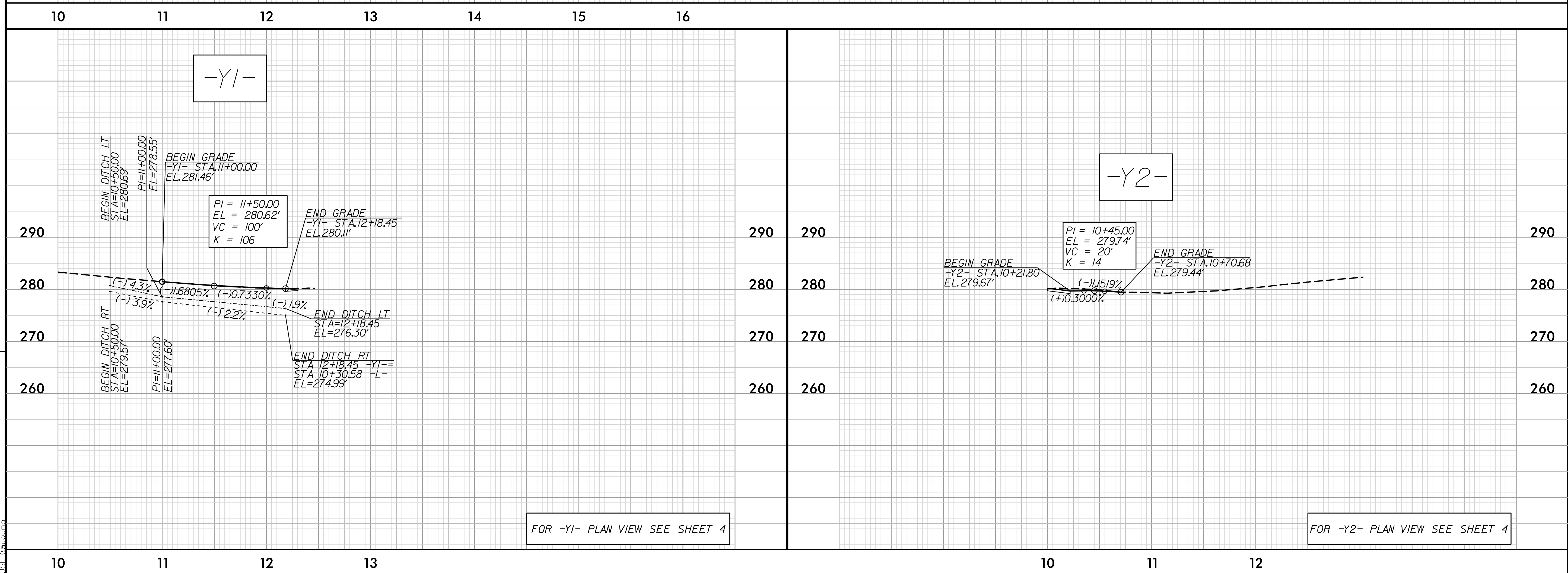
DESIGN DISCHARGE	= 2520	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 276.2	FT
BASE DISCHARGE	= 3530	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 277.9	FT
OVERTOPPING DISCHARGE	= 3194	CFS
OVERTOPPING FREQUENCY	= 50+	YRS
OVERTOPPING ELEVATION	= 277.2	FT

DATE OF SURVEY = 06/15/2017  
W.S. ELEVATION AT DATE OF SURVEY = 271.1 FT

FOR STRUCTURE PLANS, SEE S-1 THRU S-25

FOR -L- PLAN VIEW SEE SHEET 4

REVISIONS



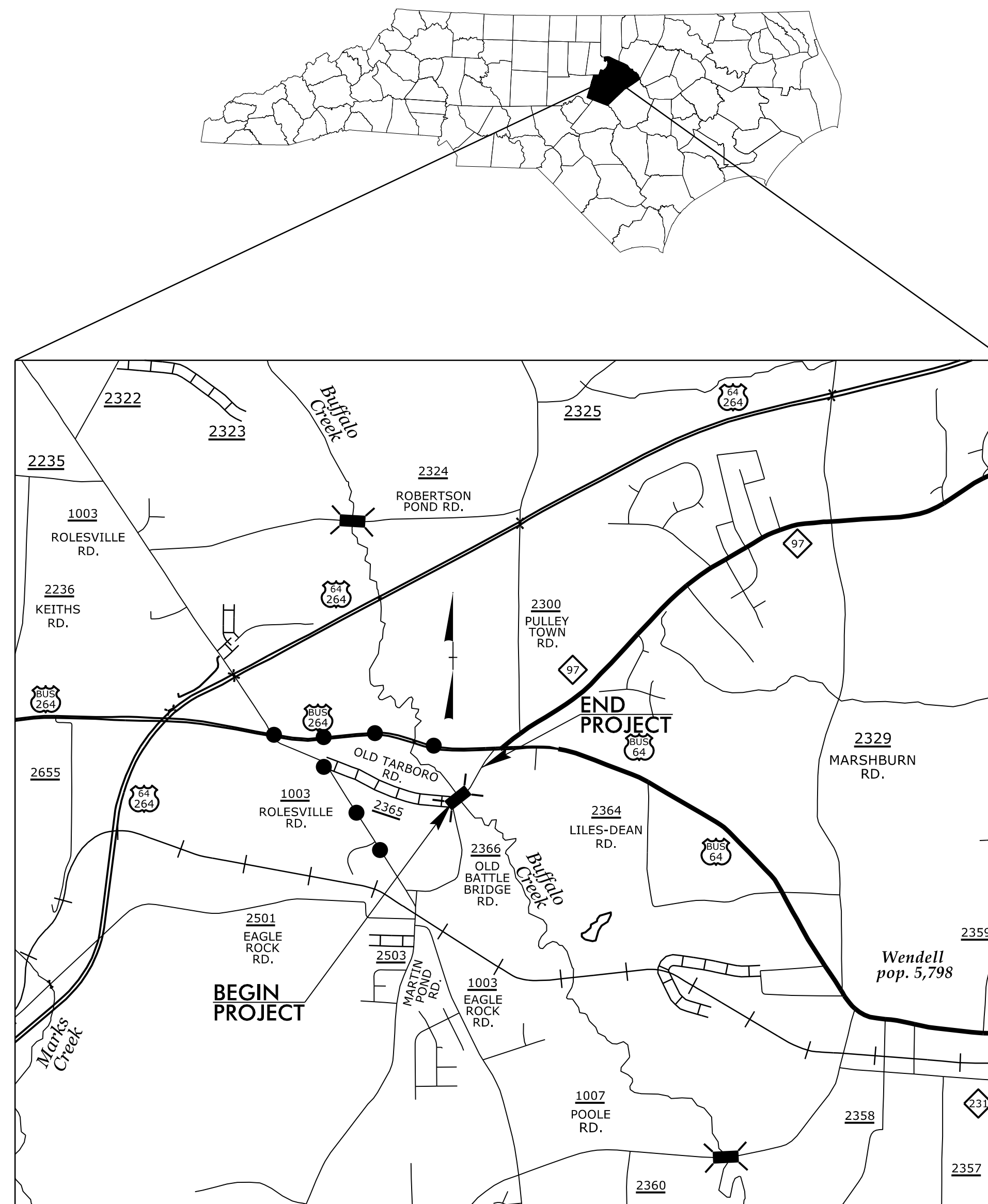
3/16/2009 10:21:16 AM PFL05.dgn



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**TRANSPORTATION MANAGEMENT PLAN**

**WAKE COUNTY**



**INDEX OF SHEETS**

SHEET NO.	TITLE
TMP-1	TITLE SHEET, VICINITY MAP, AND INDEX OF SHEETS
TMP-1A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, AND LEGEND
TMP-1B	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES, GENERAL NOTES, LOCAL NOTES, AND PHASING)
TMP-2	OFF-SITE DETOUR

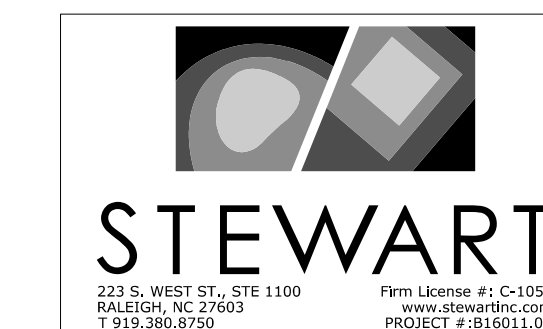
SHEET NO.  
TMP-1

**17BP.5.R.79**

**TIP PROJECT:**

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

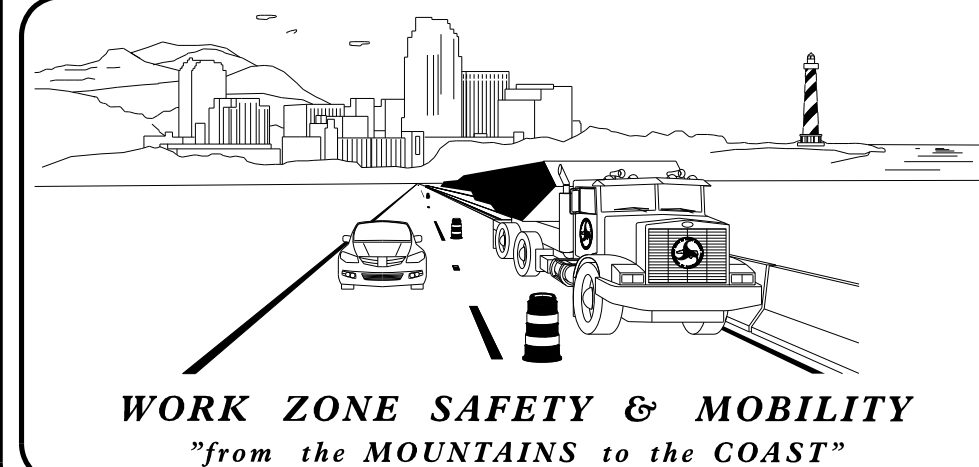
PLANS PREPARED BY:



APPROVED: \_\_\_\_\_

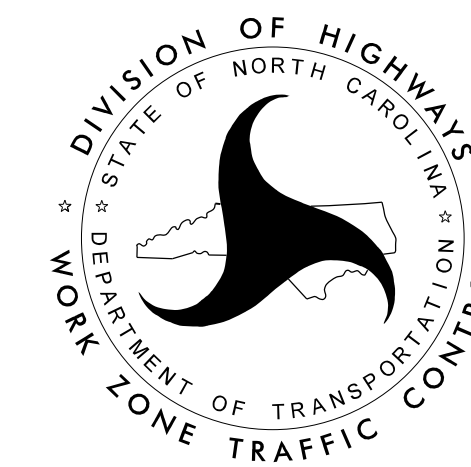
DATE: \_\_\_\_\_

SEAL



**N.C.D.O.T. WORK ZONE TRAFFIC CONTROL**  
1561 MAIL SERVICE CENTER (MSC) RALEIGH, NC 27699-1561  
750 N. GREENFIELD PARKWAY, GARNER, NC 27529 (DELIVERY)  
PHONE: (919) 814-5000 FAX: (919) 771-2745

ANDY YOUNG, PE TRAFFIC CONTROL PROJECT ENGINEER  
MICHAEL BURNS, PE TRAFFIC CONTROL DESIGN ENGINEER



3/16/2022  
\\TC\910216\_TC\_TMP\_01.dgn  
USER:ayoung

# ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - 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
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

# LEGEND

## GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- TEMP. SHORING (LOCATION PURPOSES ONLY)

- WORK AREA
- REMOVAL ASPHALT PAVEMENT

## SIGNALS

- EXISTING
- PROPOSED
- TEMPORARY

## PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

## TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM
- SKINNY DRUM
- TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW BOARD
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED ATTENUATOR (TMA)
- CHANGEABLE MESSAGE SIGN

## TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

## PAVEMENT MARKERS

- CRYSTAL/CRYSTAL
- CRYSTAL/RED
- YELLOW/YELLOW

## PAVEMENT MARKING SYMBOLS

- PAVEMENT MARKING SYMBOLS

3/16/2022  
TCP\910216-TC-TMP\_01A.dgn  
USER:rayoung

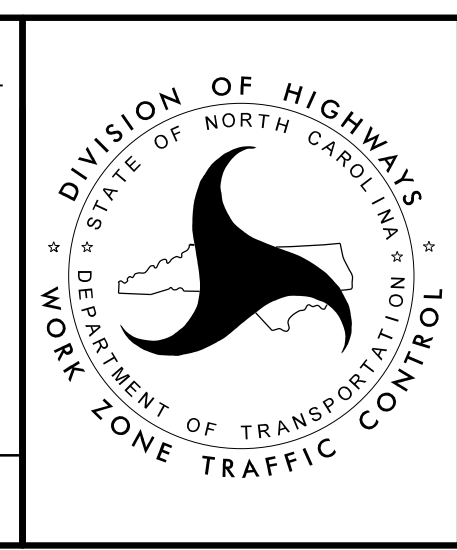
Firm License No. C-1051  
223 S. West St.  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

APPROVED: \_\_\_\_\_

DATE: \_\_\_\_\_

SEAL

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



ROADWAY STANDARD  
DRAWINGS & LEGEND



## MANAGEMENT STRATEGIES

DURING CONSTRUCTION OF PROPOSED STRUCTURE BRIDGE No. 216 OVER NORRIS CREEK, SR 2366 (OLD BATTLE BRIDGE RD.) WILL BE CLOSED TO THROUGH TRAFFIC.

ON SR 2366 (OLD BATTLE BRIDGE RD.) THE EXISTING DETOUR SIGNS WILL REMAIN DURING CONSTRUCTION.

ACCESS TO ALL RESIDENCES AND BUSINESSES WITHIN THE PROJECT LIMITS MUST BE MAINTAINED AT ALL TIMES.

## GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

### SIGNING

- A) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.
- B) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.  
  
COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.
- C) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

## LOCAL NOTES

1. ROAD IS CURRENTLY CLOSED TO THROUGH TRAFFIC. HOWEVER, NOTIFY THE ENGINEER AT LEAST 30 DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.
2. NOTIFY THE WAKE COUNTY SCHOOLS TRANSPORTATION DIRECTOR OF THE BRIDGE REMOVAL 30 DAYS PRIOR TO CONSTRUCTION. (CONFIRMING EXISTING ROAD CLOSURE)
3. NOTIFY THE WAKE COUNTY EMERGENCY MANAGEMENT SERVICES DIRECTOR OF THE BRIDGE REMOVAL 30 DAYS PRIOR TO CONSTRUCTION. (CONFIRMING EXISTING ROAD CLOSURE)

## PHASING

### STEP 1:

PROVIDE AND MAINTAIN CHANGEABLE MESSAGE SIGNS AT EACH END OF SR 2366 (OLD BATTLE BRIDGE RD.) AND AT SR 2365 (OLD TARBORO RD.) FOR FOURTEEN (14) CALENDAR DAYS PRIOR TO ROAD CLOSURE, AS SHOWN ON TMP-2.

### STEP 2:

USING RSD 1101.03, SHEET 1 OF 9, AND TMP-2, INSTALL ROAD CLOSURE AND DETOUR SIGNS. PLACE TYPE III BARRICADE TO CLOSE SR 2366 (OLD BATTLE BRIDGE RD.) / SR 2365 (OLD TARBORO RD.) TO THROUGH TRAFFIC AND DETOUR TRAFFIC OFF-SITE. REMOVE CHANGEABLE MESSAGE SIGNS ONCE DETOUR IS IN PLACE.

### STEP 3:

REMOVE THE EXISTING STRUCTURE.

### STEP 4:

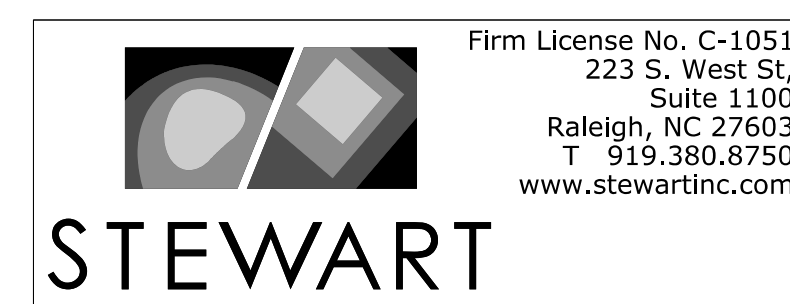
CONSTRUCT THE PROPOSED STRUCTURE AND ROADWAY.

### STEP 5:

PLACE FINAL PAVEMENT MARKINGS ACCORDING TO THE PAVEMENT MARKING PLANS.

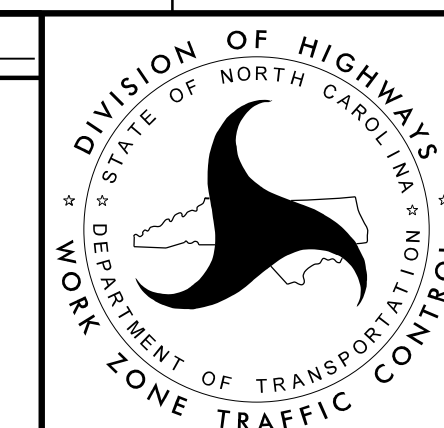
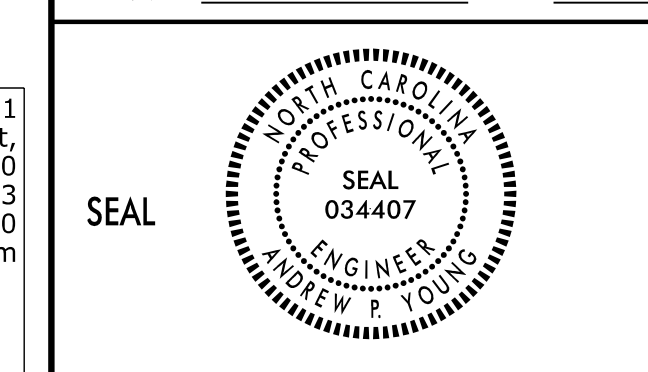
### STEP 6:

OPEN SR 2366 (OLD BATTLE BRIDGE RD.) TO TRAFFIC AND REMOVE ALL WORK ZONE TRAFFIC CONTROL DEVICES.

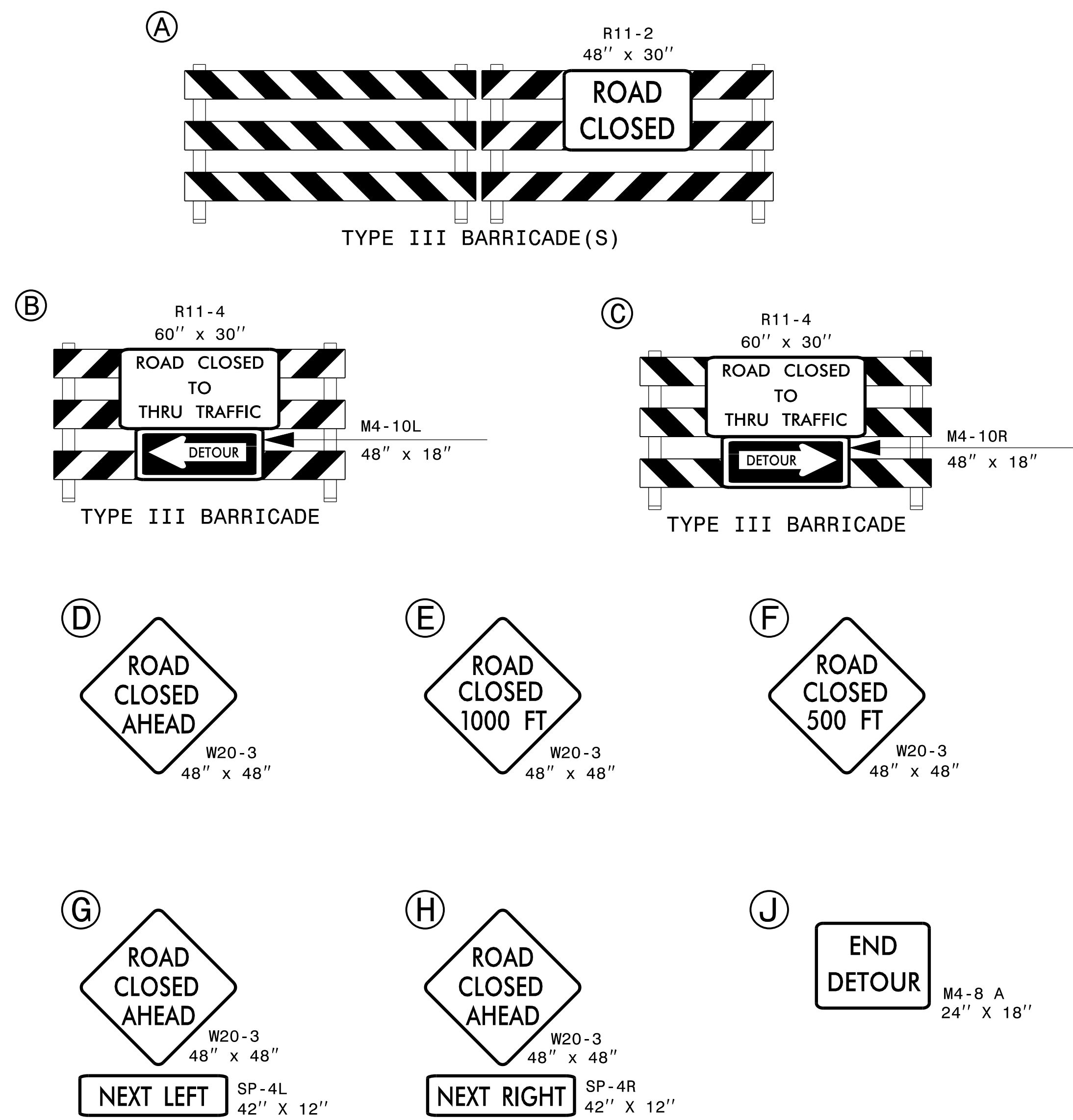
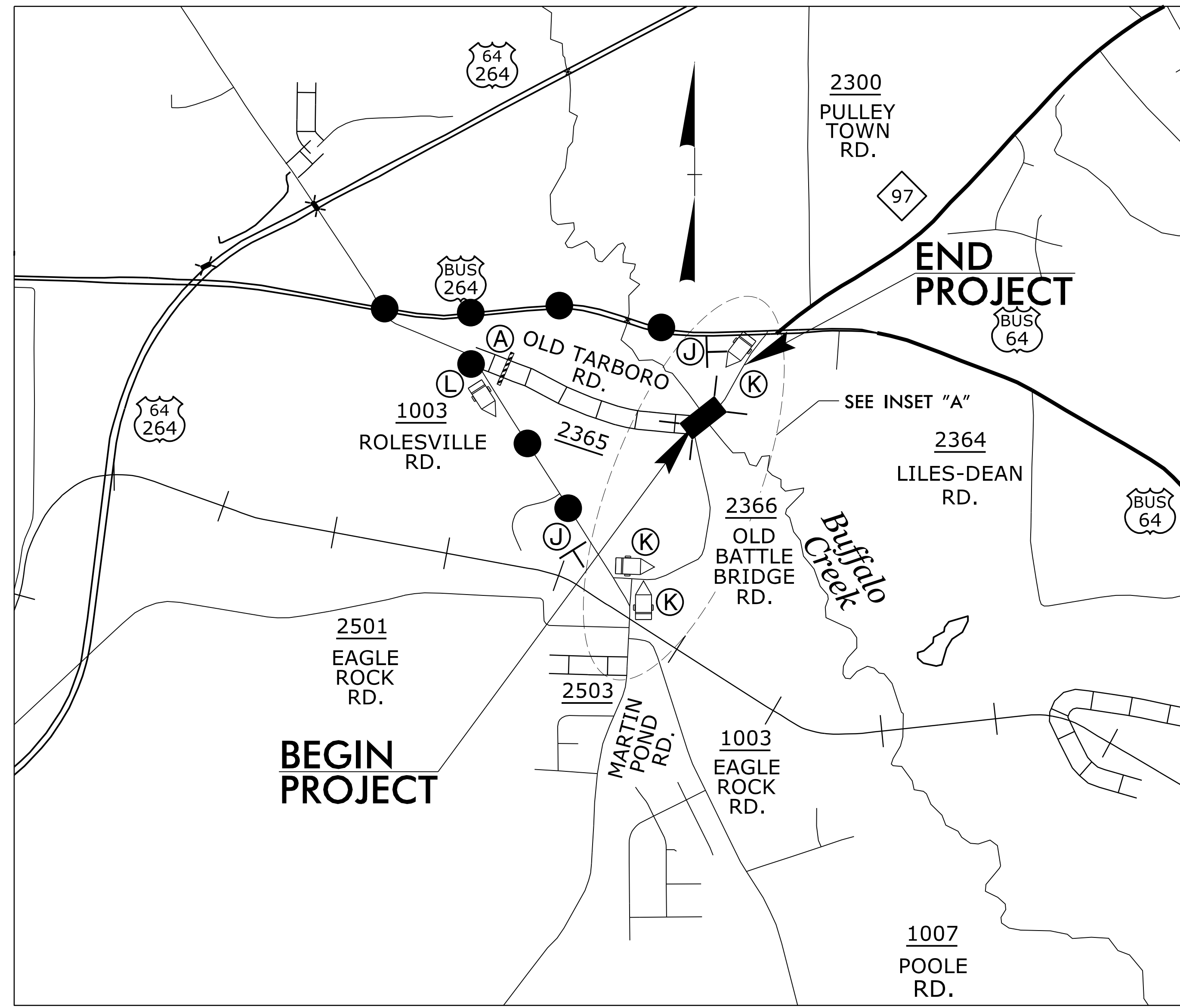


**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

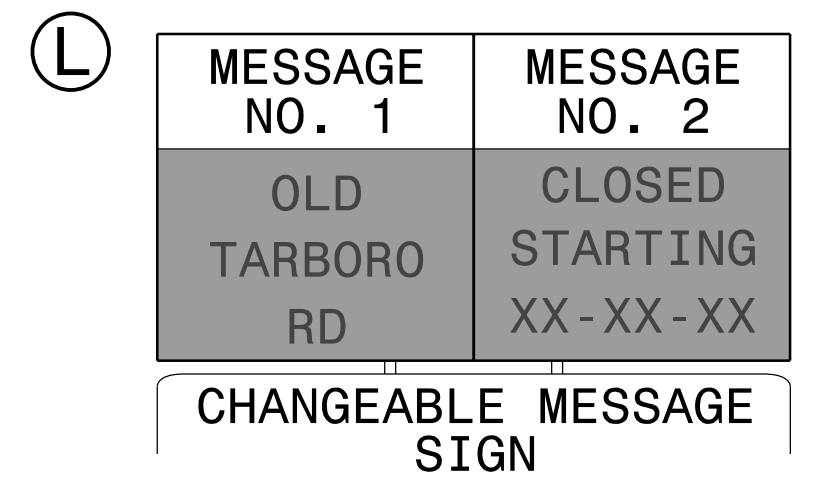
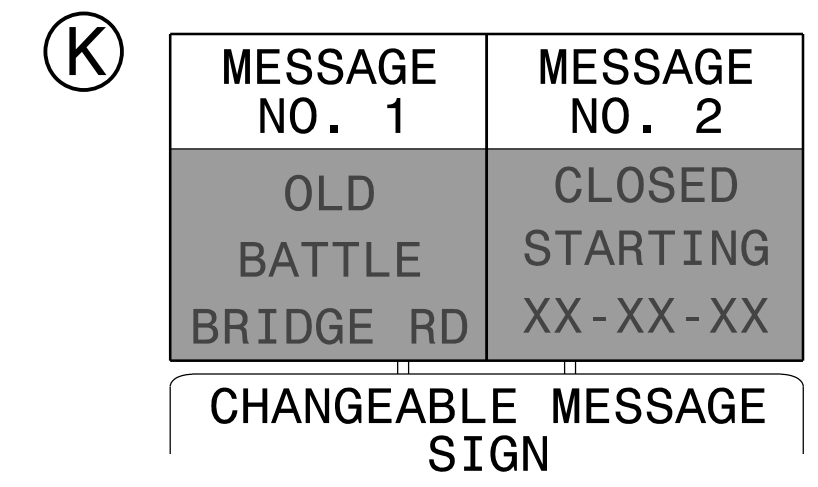
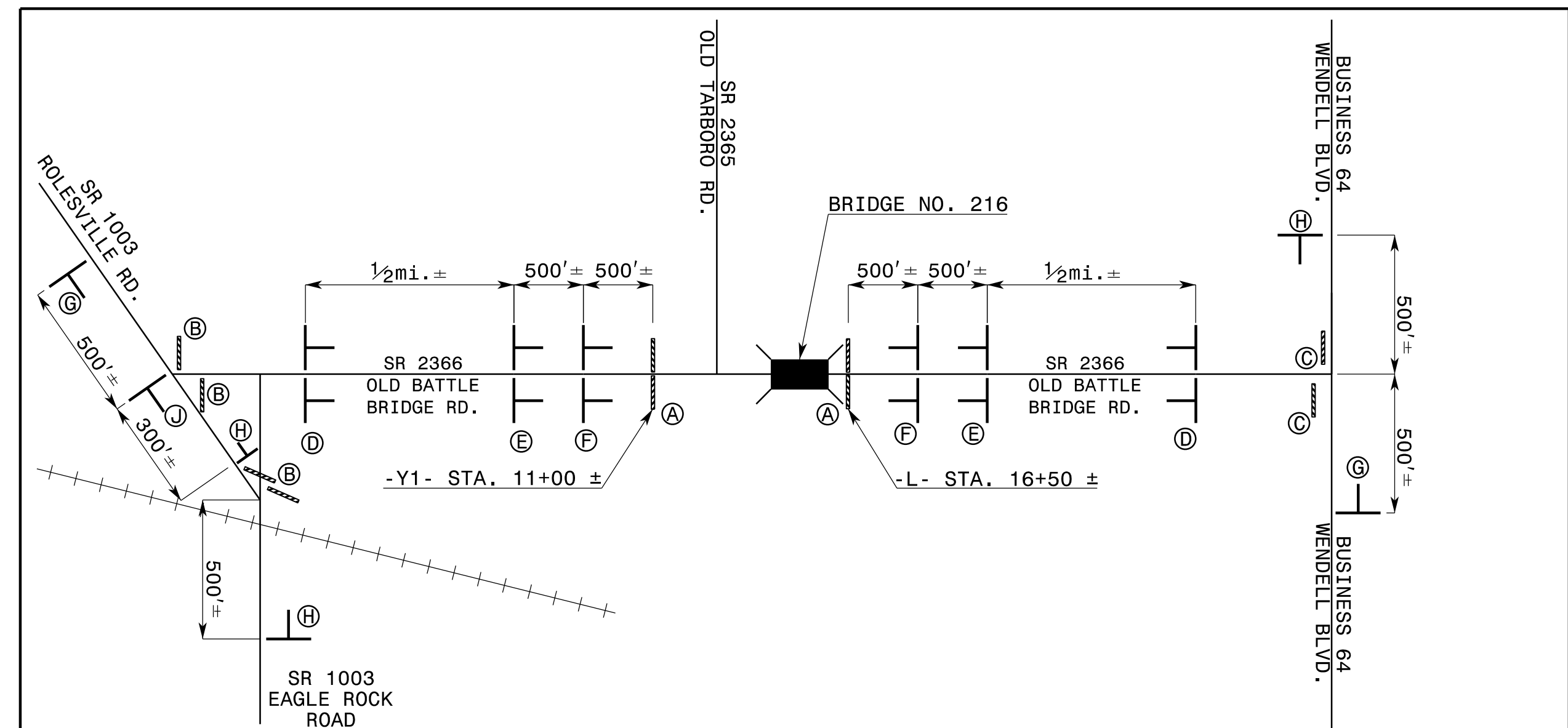
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_



**TRANSPORTATION  
OPERATIONS PLAN**



INSET A OFF-SITE DETOUR ROUTE



3/16/2022  
TC\910216-TC\_TMP\_02.dgn  
USER:rayoung

REFER TO ROADWAY STANDARD  
DRAWING 1101.03, SHEET 1 OF 9  
FOR APPLICABLE NOTES.

Firm License No. C-1051  
223 S. West St.  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

APPROVED: \_\_\_\_\_  
DATE: \_\_\_\_\_

SEAL

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

**OFF-SITE  
DETOUR**

**STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION**

**PAVEMENT MARKING PLAN  
WAKE COUNTY**

LOCATION: BRIDGE NO. 216 OVER BUFFALO CREEK ON SR 2366  
(OLD BATTLE BRIDGE RD.)

**TIP: 17BP.5.R.79**

**ROADWAY STANDARD DRAWING**

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - 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
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTILANE ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.05	PAVEMENT MARKINGS - TURN LANES
1205.08	PAVEMENT MARKINGS - SYMBOLS AND WORD MESSAGES
1205.09	PAVEMENT MARKINGS - PAINTED ISLANDS
1205.12	PAVEMENT MARKINGS - BRIDGES
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

**PAVEMENT MARKING SCHEDULE**

SYMBOL	DESCRIPTION
T1	WHITE EDGELINE (4", 90 MIL)
T2	WHITE SOLID LANE LINE (4", 90 MIL)
T4	3 FT. - 9 FT./SP WHITE MINISKIP (4", 90 MIL)
T13	YELLOW DOUBLE CENTER (4", 90 MIL)
T42	YELLOW DIAGONAL (8", 90 MIL)
T61	WHITE STOPBAR (24", 90 MIL)
T70	LEFT TURN ARROW (90 MIL)
MA	YELLOW & YELLOW, PERMANENT RAISED PAVEMENT MARKERS

**GENERAL NOTES**

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

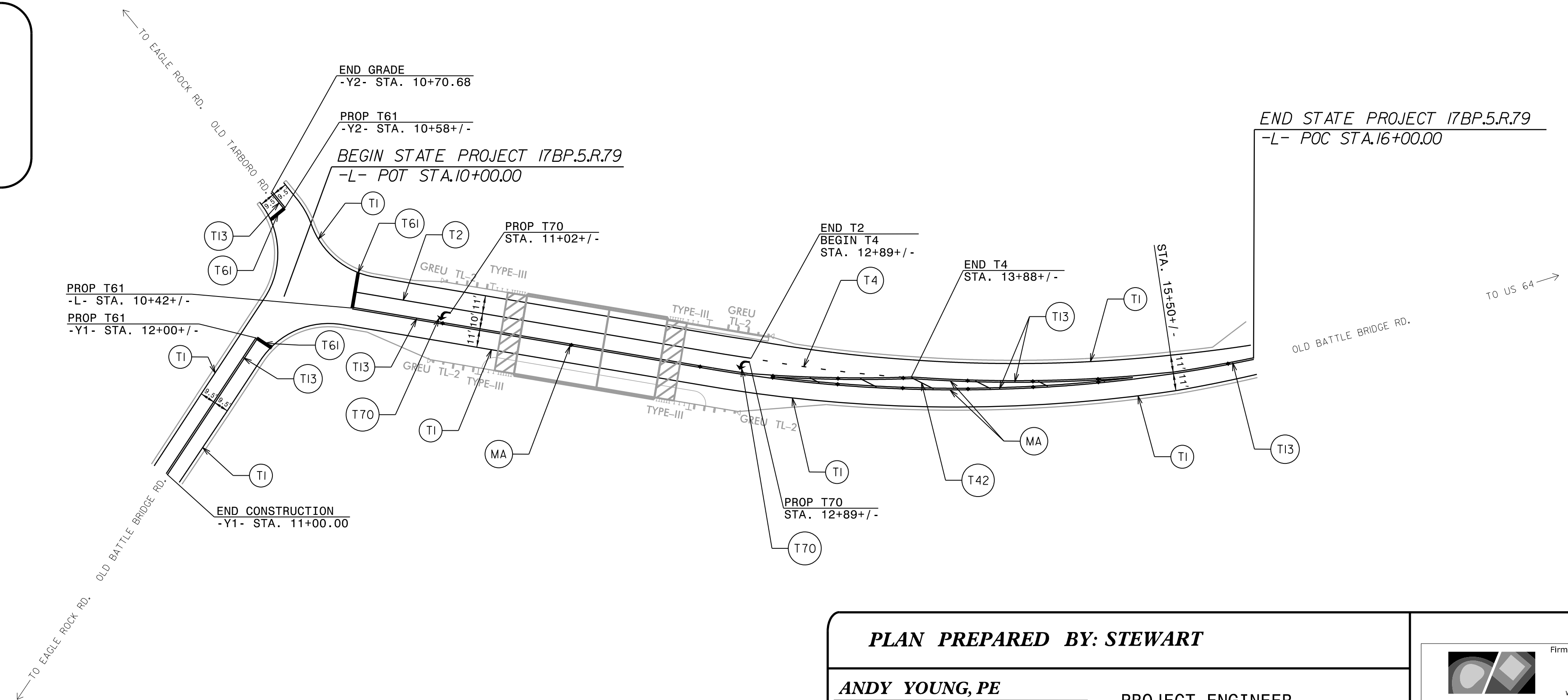
ROAD NAME	MARKING	MARKER
OLD BATTLE BRIDGE RD.	THERMO	RAISED

B) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

C) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS.

**RAISED PAVEMENT MARKERS**

TYP. SPACING	BEGIN STA.	END STA.
80'	10+42 +/-	12+89 +/-
40'	12+89 +/-	15+00 +/-
80'	15+00 +/-	16+00 +/-



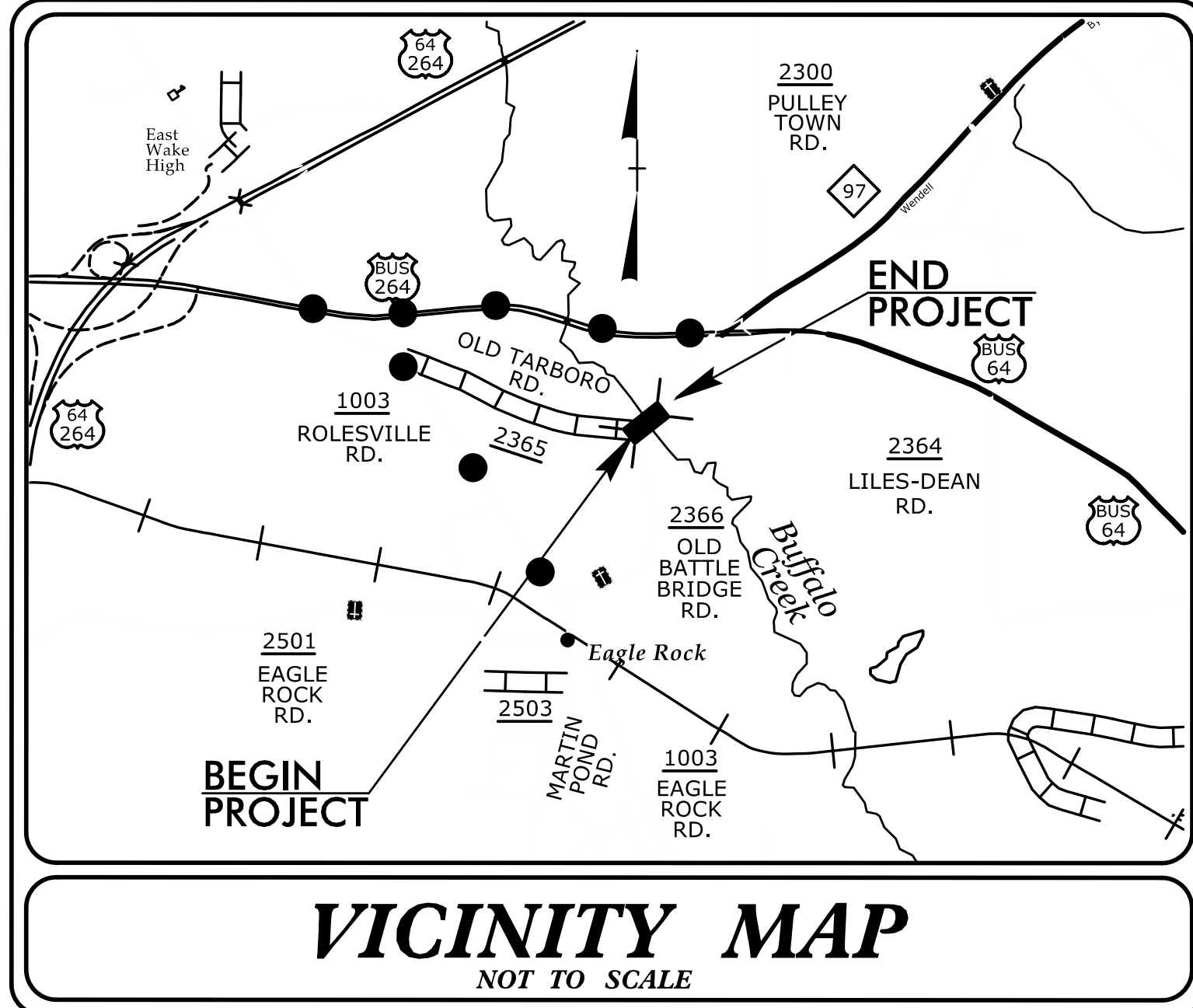
PLAN PREPARED BY: STEWART

**ANDY YOUNG, PE** PROJECT ENGINEER  
**MICHAEL BURNS, PE** PROJECT DESIGN ENGINEER



**CONTRACT:**

**TIP PROJECT: 17BP.5.R.79**

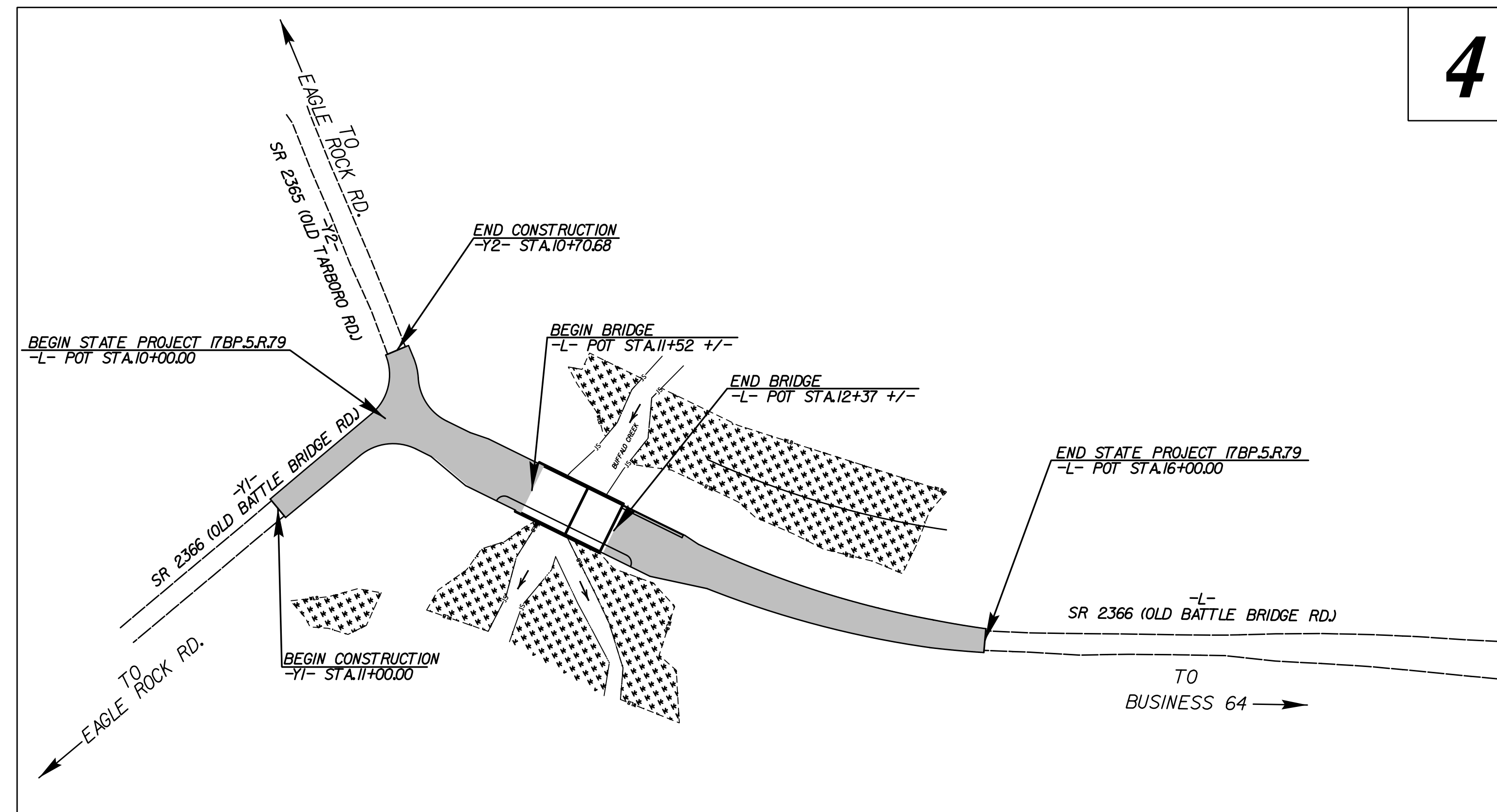


**VICINITY MAP**  
NOT TO SCALE

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**PLAN FOR PROPOSED  
HIGHWAY EROSION CONTROL**

**LOCATION: BRIDGE NO. 216 OVER BUFFALO CREEK  
ON SR 2366 (OLD BATTLE BRIDGE RD.)**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE**



4

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.5.R.79	EC-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
17BP.5.R.79	N/A	PE	
17BP.5.R.79	N/A	ROW	
17BP.5.R.79	N/A	UTILITIES	
17BP.5.R.79	N/A	CONSTRUCTION	

**EROSION AND SEDIMENT CONTROL MEASURES**

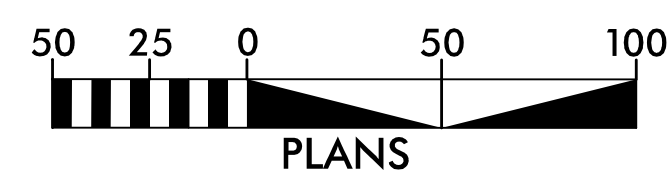
Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	
1630.05	Temporary Diversion	
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle / Coir Fiber Wattle	
	Wattle / Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	
1632.02	Type B	
1632.03	Type C	
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

THIS PROJECT CONTAINS  
EROSION CONTROL PLANS  
FOR CLEARING AND  
GRUBBING PHASE OF  
CONSTRUCTION.

THIS PROJECT HAS  
BEEN DESIGNED TO  
SENSITIVE WATERSHED  
STANDARDS.

ENVIRONMENTALLY  
SENSITIVE AREA(S) EXIST  
ON THIS PROJECT  
  
*Refer To E. C. Special Provisions  
for Special Considerations.*

**GRAPHIC SCALE**



THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH  
THE APPLICABLE REGULATIONS SET FORTH BY THE NCG-010000  
GENERAL CONSTRUCTION PERMIT EFFECTIVE APRIL 1, 2019  
AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF  
ENVIRONMENTAL QUALITY DIVISION OF WATER RESOURCES.



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

Prepared In the Office of:

**VHB ENGINEERING**

940 MAIN CAMPUS DRIVE, SUITE 500  
RALEIGH, NC 27606

Designed by:

**REID ROBOL, PE**

NAME

**3409**

LEVEL III CERTIFICATION NO.

**Roadway Standard Drawings**

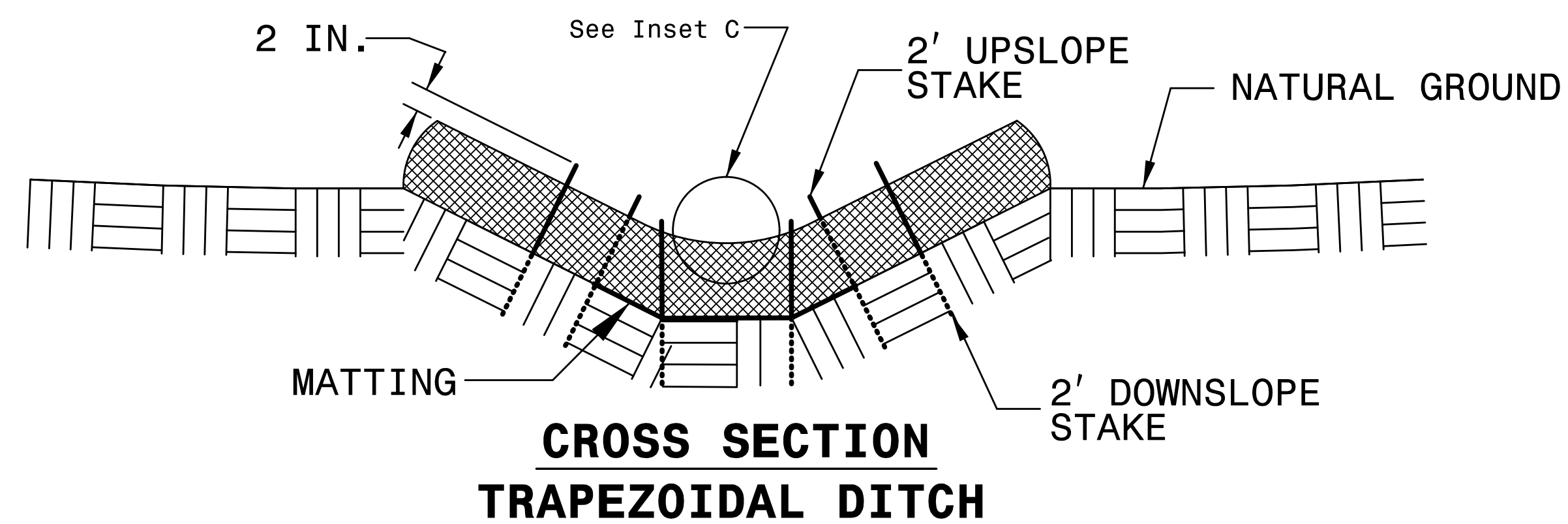
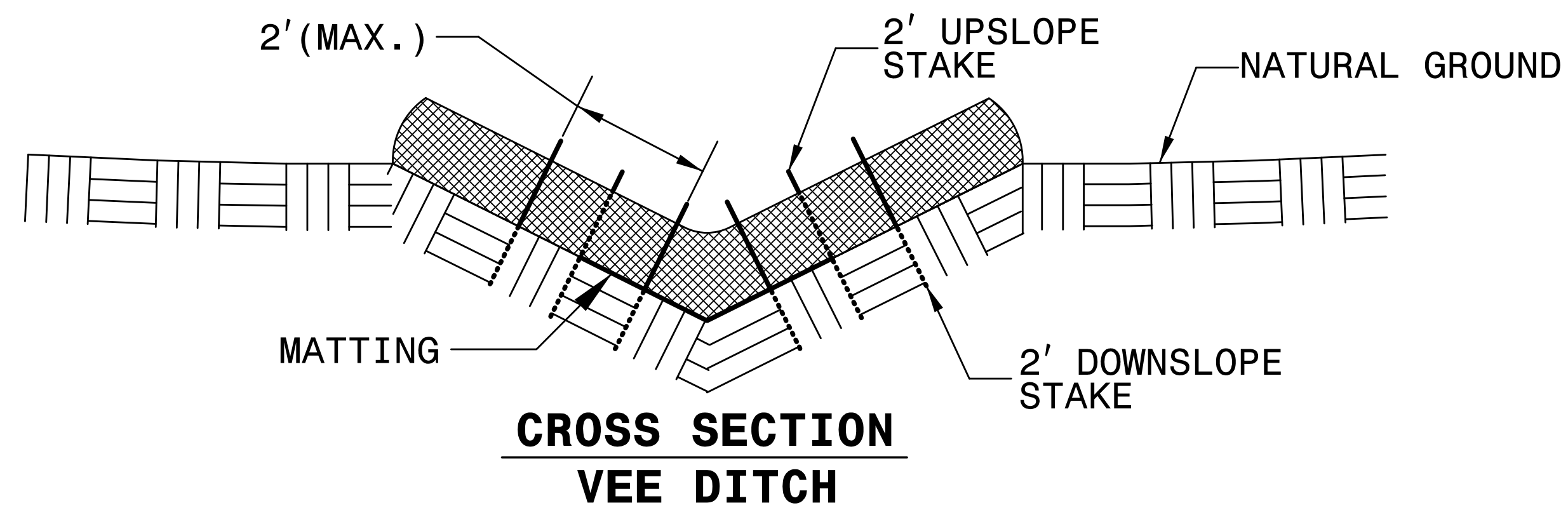
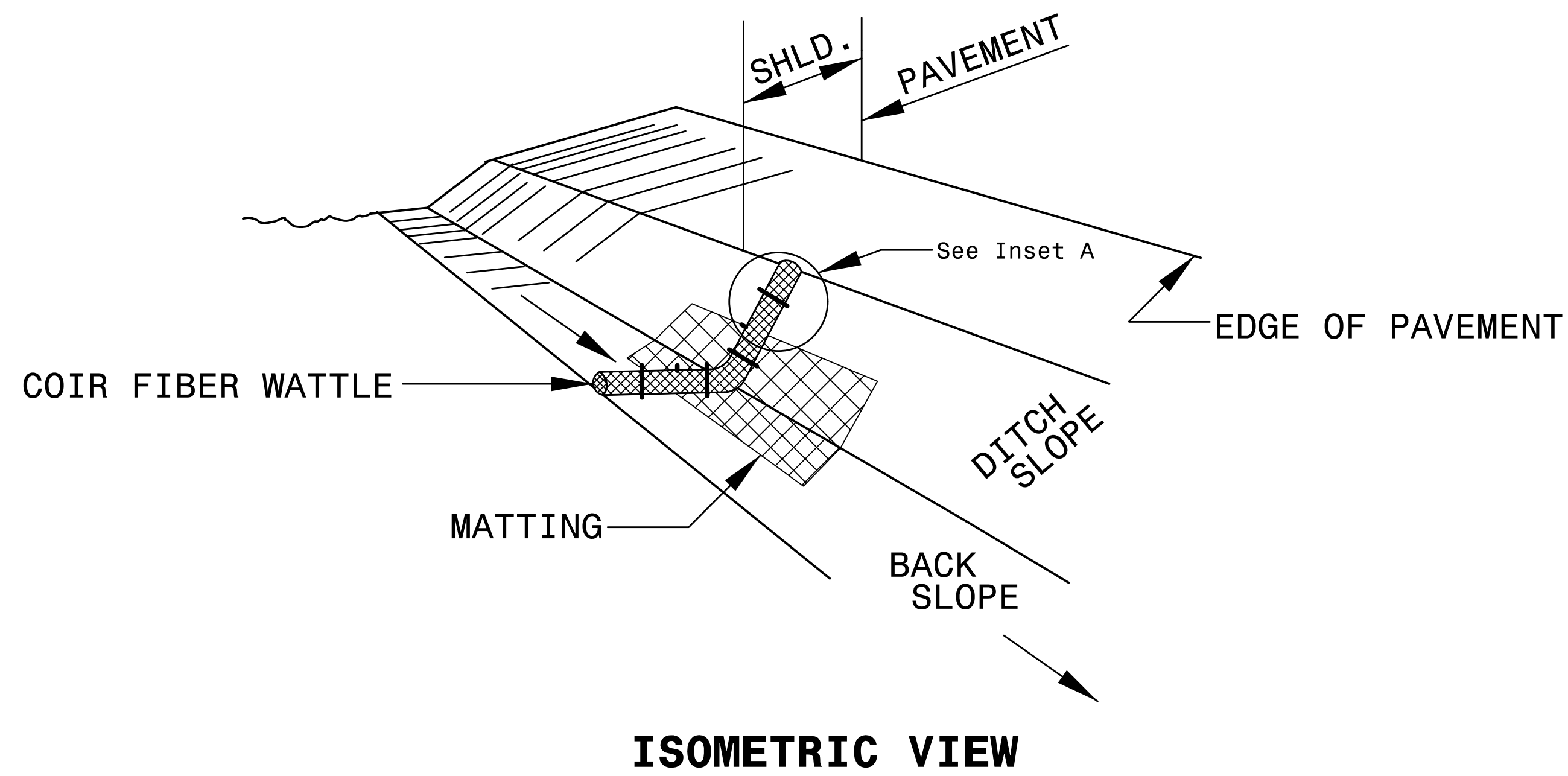
The following roadway english standards as appear in "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2018 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01 Railroad Erosion Control Detail	1632.01 Rock Inlet Sediment Trap Type A
1605.01 Temporary Silt Fence	1632.02 Rock Inlet Sediment Trap Type B
1606.01 Special Sediment Control Fence	1632.03 Rock Inlet Sediment Trap Type C
1607.01 Gravel Construction Entrance	1633.01 Temporary Rock Silt Check Type A
1622.01 Temporary Berms and Slope Drains	1633.02 Temporary Rock Silt Check Type B
1630.01 Riser Basin	1634.01 Temporary Rock Sediment Dam Type A
1630.02 Silt Basin Type B	1634.02 Temporary Rock Sediment Dam Type B
1630.03 Temporary Silt Ditch	1635.01 Rock Pipe Inlet Sediment Trap Type A
1630.04 Stilling Basin	1635.02 Rock Pipe Inlet Sediment Trap Type B
1630.05 Temporary Diversion	1640.01 Coir Fiber Baffle
1630.06 Special Stilling Basin	1645.01 Temporary Stream Crossing
1631.01 Matting Installation	



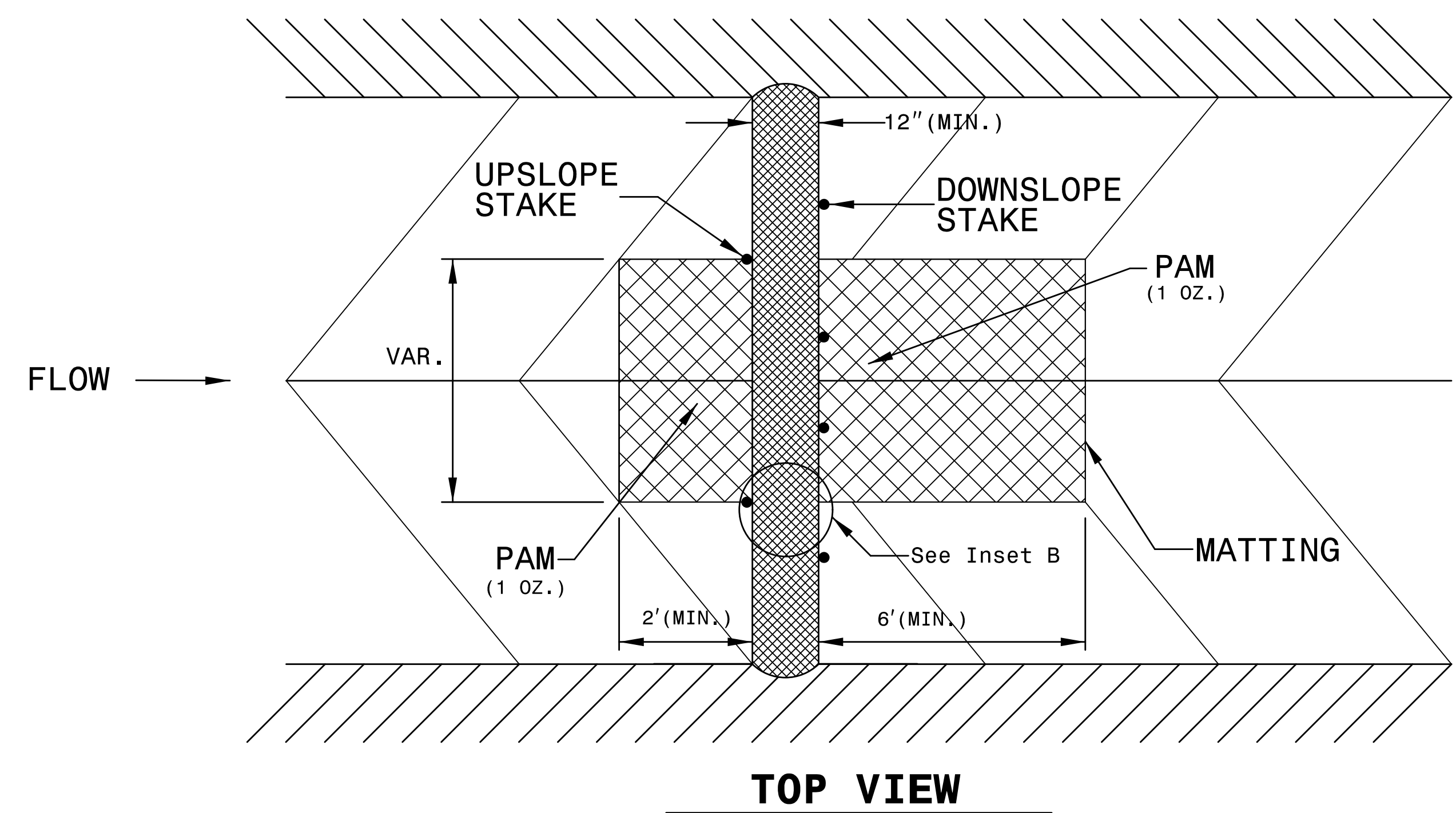
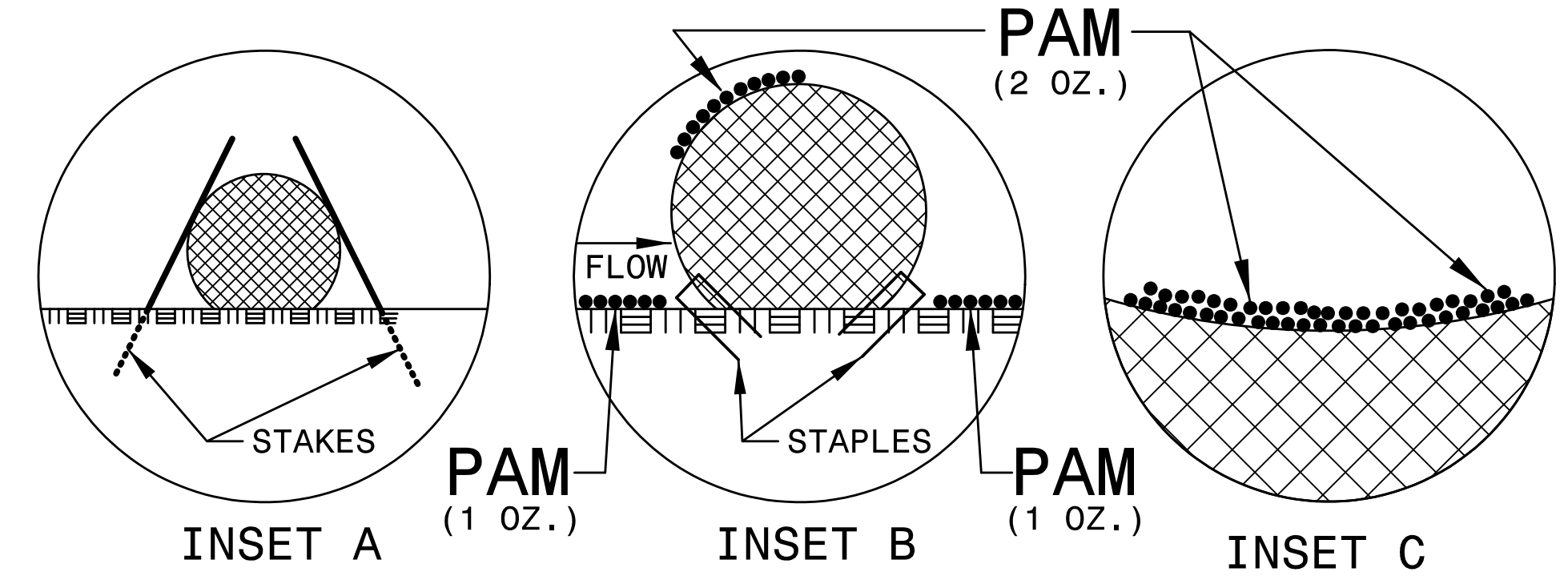
PROJECT REFERENCE NO. 17BP5R79	SHEET NO. EC-2A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

# COIR FIBER WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



**NOTES:**

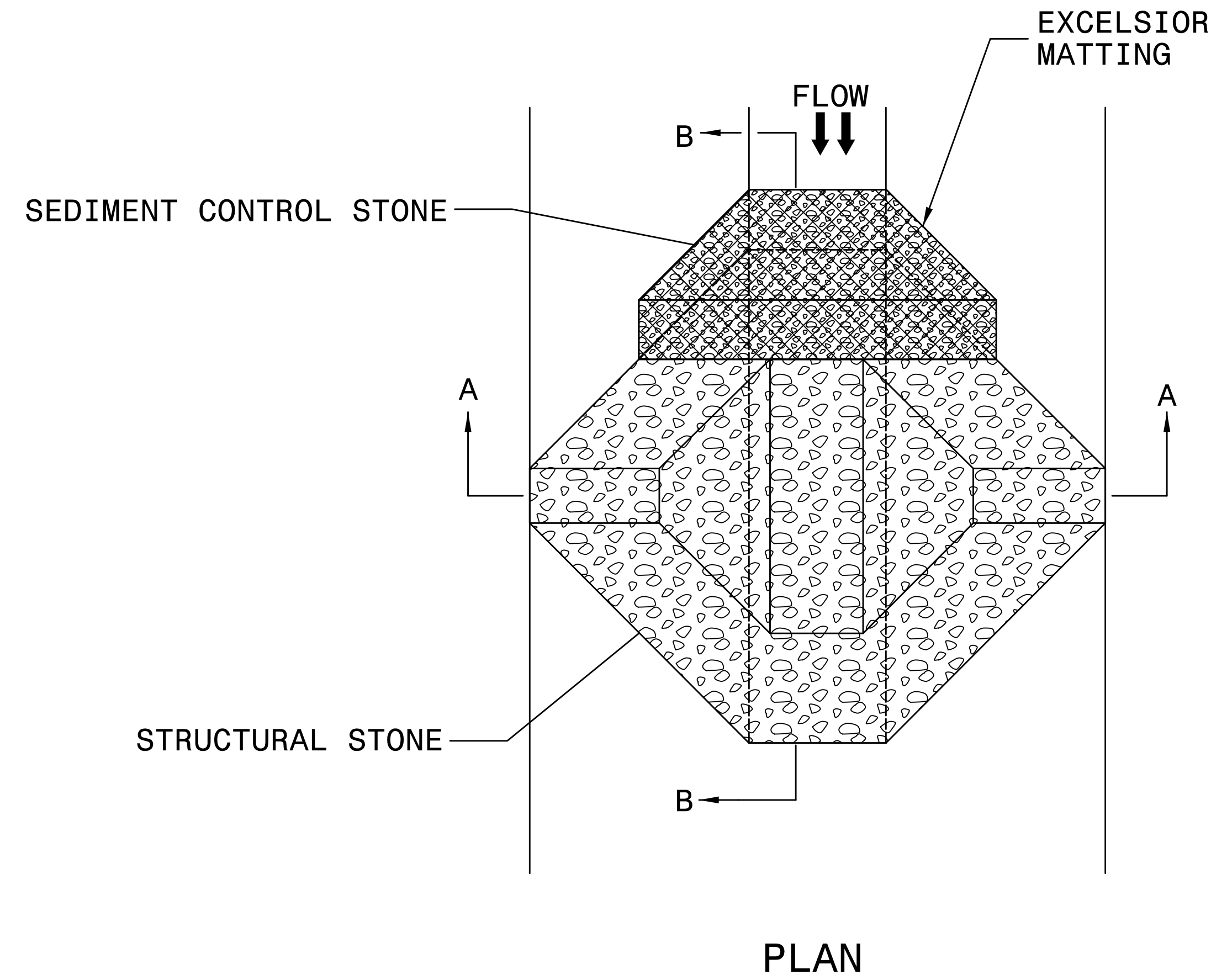
- USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE.
- USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.
- ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.
- INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.
- PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.
- INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.
- INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.
- PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.
- INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.





PROJECT REFERENCE NO. 17BP.5.R.79	SHEET NO. EC-2B
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

# TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)



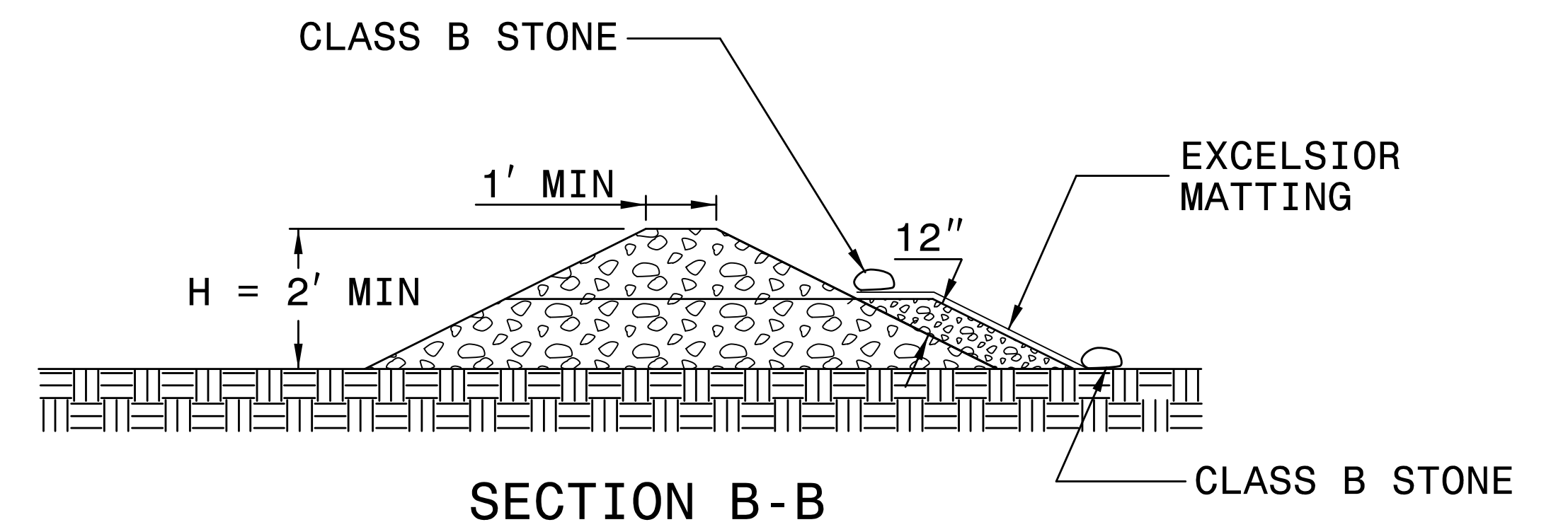
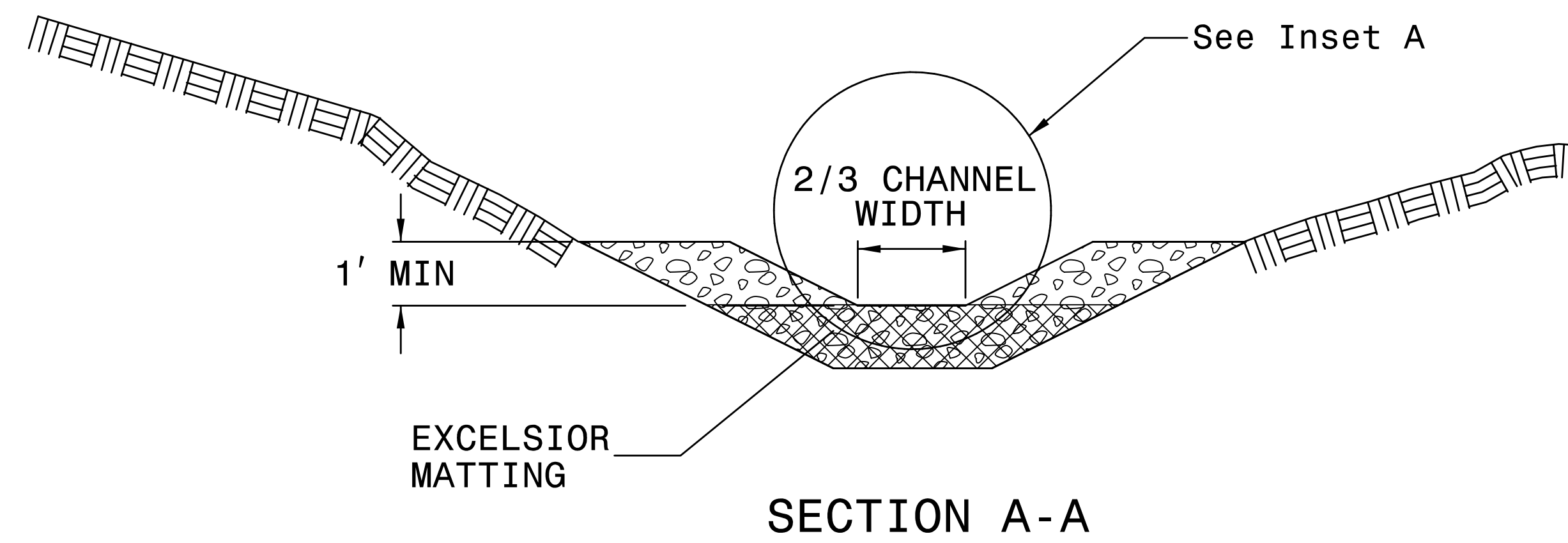
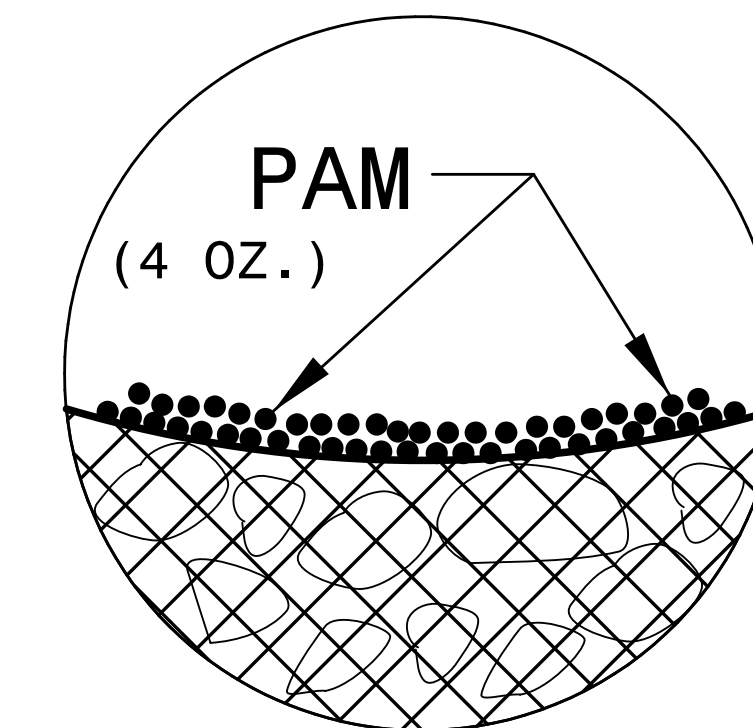
## NOTES:

INSTALL TEMPORARY ROCK SILT CHECK TYPE A IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1633.01.

USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH ROCK SILT CHECK.

INITIALLY APPLY 4 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



NOT TO SCALE



DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

---



---

PROJECT REFERENCE NO.	SHEET NO.
<i>17BP.5.R.79</i>	<i>EC-3B</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

# ***SOIL STABILIZATION TIMEFRAMES***

<i>SITE DESCRIPTION</i>	<i>STABILIZATION TIME</i>	<i>TIMEFRAME EXCEPTIONS</i>
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.





5/14/99

PROJECT REFERENCE NO. <b>17BP.5.R.79</b>	SHEET NO. <b>EC-05/CONST.04</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

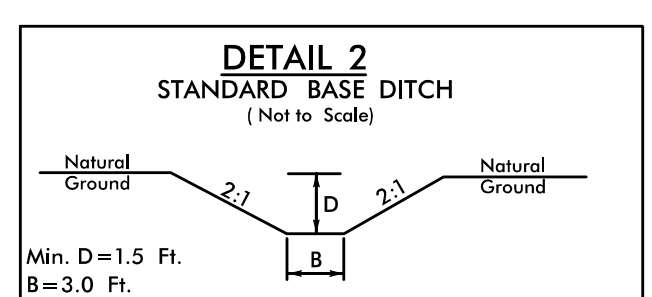
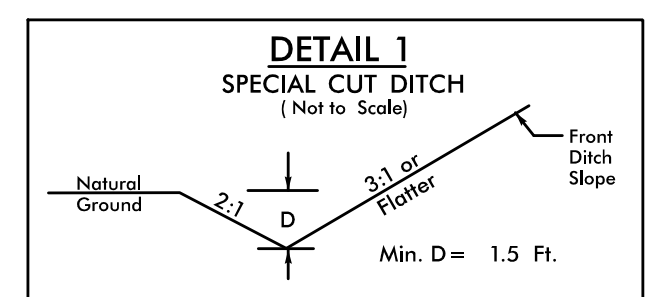
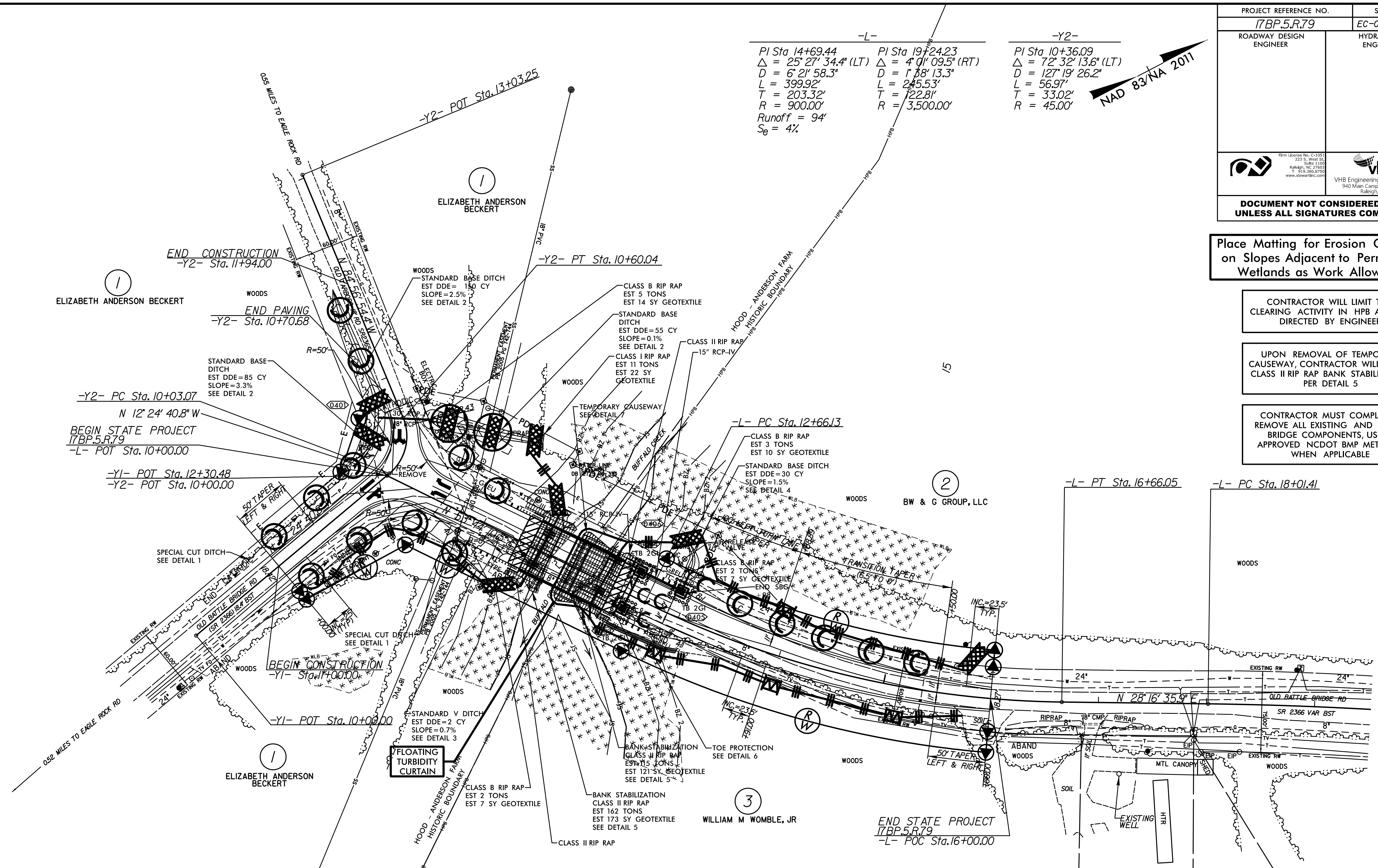
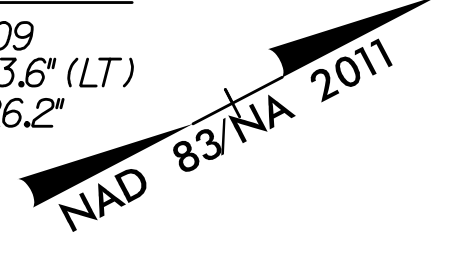
**Place Matting for Erosion Control on Slopes Adjacent to Permitted Wetlands as Work Allows.**

CONTRACTOR WILL LIMIT TREE CLEARING ACTIVITY IN HPB AREA AS DIRECTED BY ENGINEER

UPON REMOVAL OF TEMPORARY CAUSEWAY, CONTRACTOR WILL RETAIN CLASS II RIP RAP BANK STABILIZATION PER DETAIL 5

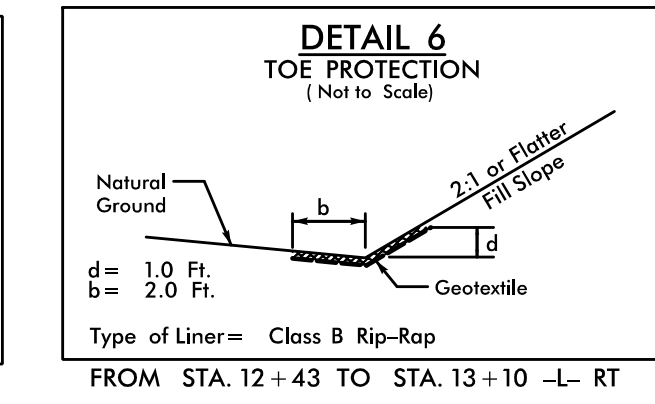
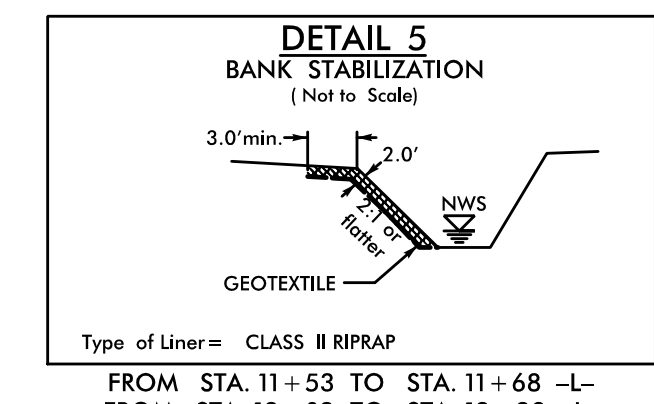
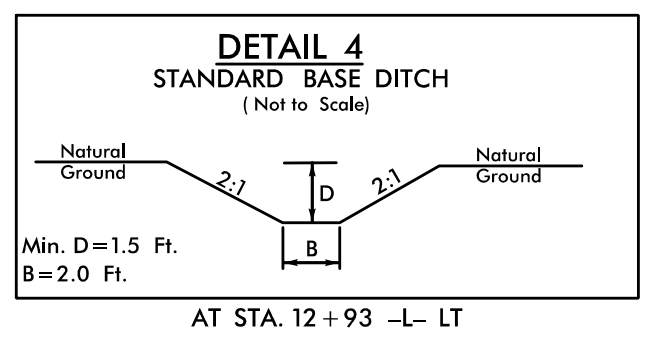
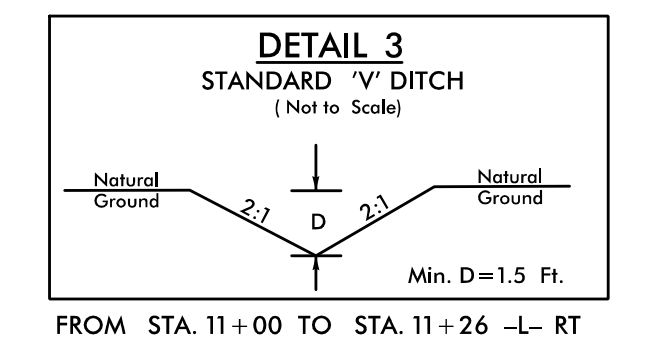
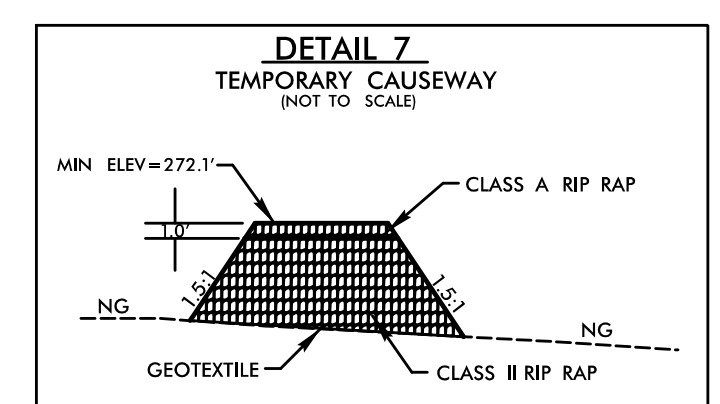
CONTRACTOR MUST COMPLETELY REMOVE ALL EXISTING AND OLDER BRIDGE COMPONENTS, USING APPROVED NCDOT BMP METHODS WHEN APPLICABLE

-L-	-Y2-	-Y2-
PI Sta 14+69.44	PI Sta 19+24.23	PI Sta 10+36.09
$\Delta = 25' 27' 34.4"$ (LT)	$\Delta = 4' 01' 09.5"$ (RT)	$\Delta = 72' 32' 13.6"$ (LT)
D = 6' 21' 58.3"	D = 1' 38' 13.3"	D = 127' 19' 26.2"
L = 399.92'	L = 245.53'	L = 56.97'
T = 203.32'	T = 122.81'	T = 33.02'
R = 900.00'	R = 3,500.00'	R = 45.00'
Runoff = 94'		
$S_e = 4\%$		



FROM STA. 10+50 TO STA. 12+18 -Y1- LT  
FROM STA. 10+50 TO STA. 12+18.5 -Y1- RT  
FROM STA. 10+30.6 TO STA. 11+00 -L- RT

FROM STA. 12+18 TO STA. 12+30 -Y1- LT  
FROM STA. 10+00 TO STA. 11+94 -Y2- LT  
FROM STA. 10+15 TO STA. 11+27 -L- LT



FROM STA. 11+00 TO STA. 11+26 -L- RT

AT STA. 12+93 -L- LT

FROM STA. 11+53 TO STA. 11+68 -L-  
FROM STA. 12+02 TO STA. 12+28 -L-

FROM STA. 12+43 TO STA. 13+10 -L- RT

REVISIONS

8/10/2002 REJ.EC.PSH4\_FINAL.dgn



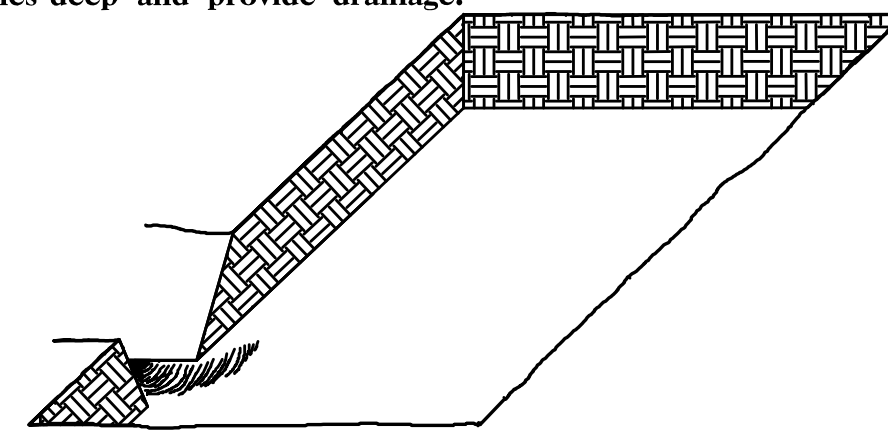
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.5.R.79	RF-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	

# PLANTING DETAILS

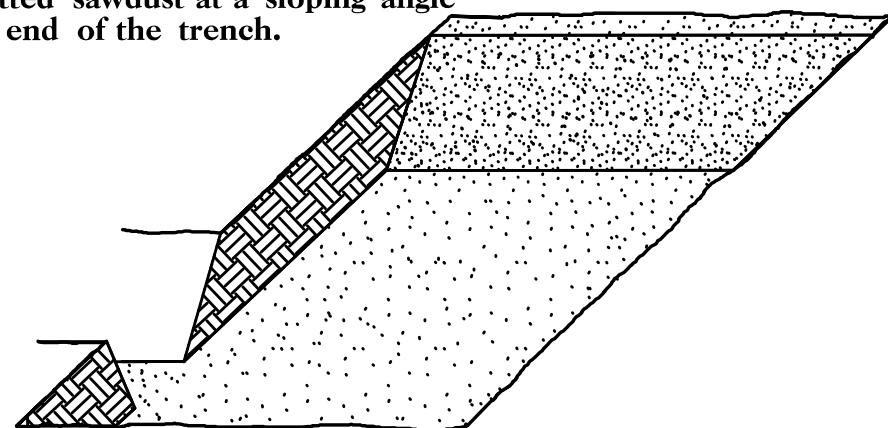
## SEEDLING / LINER BAREROOT PLANTING DETAIL

### HEALING IN

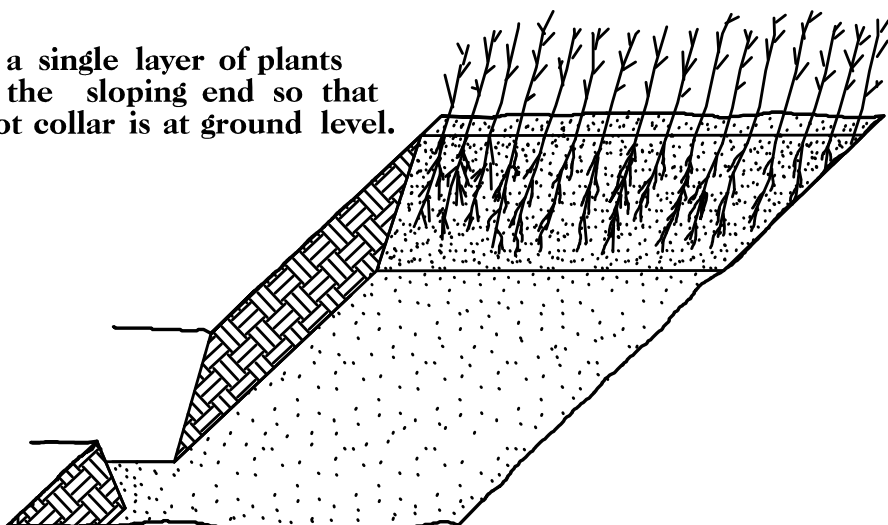
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



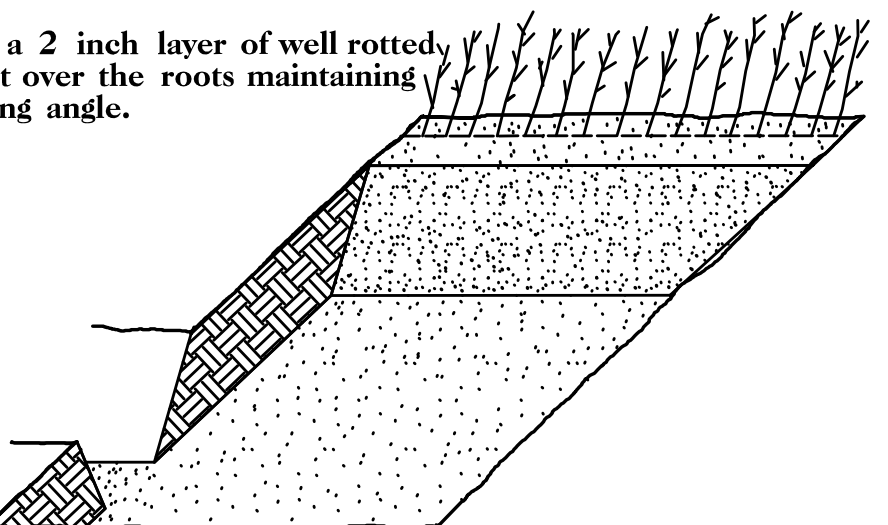
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

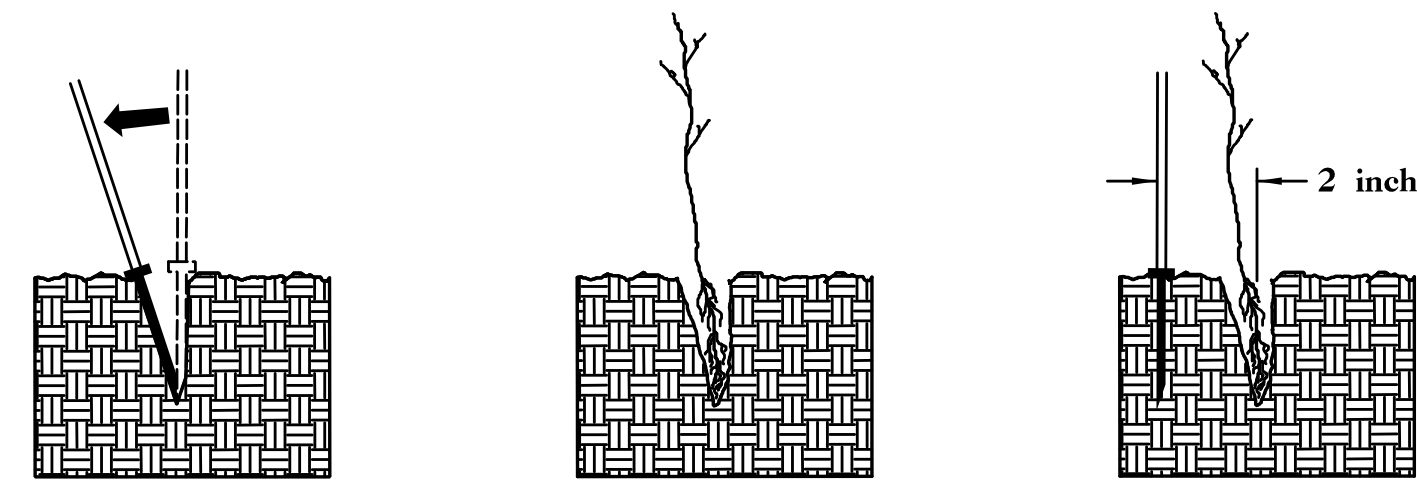


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

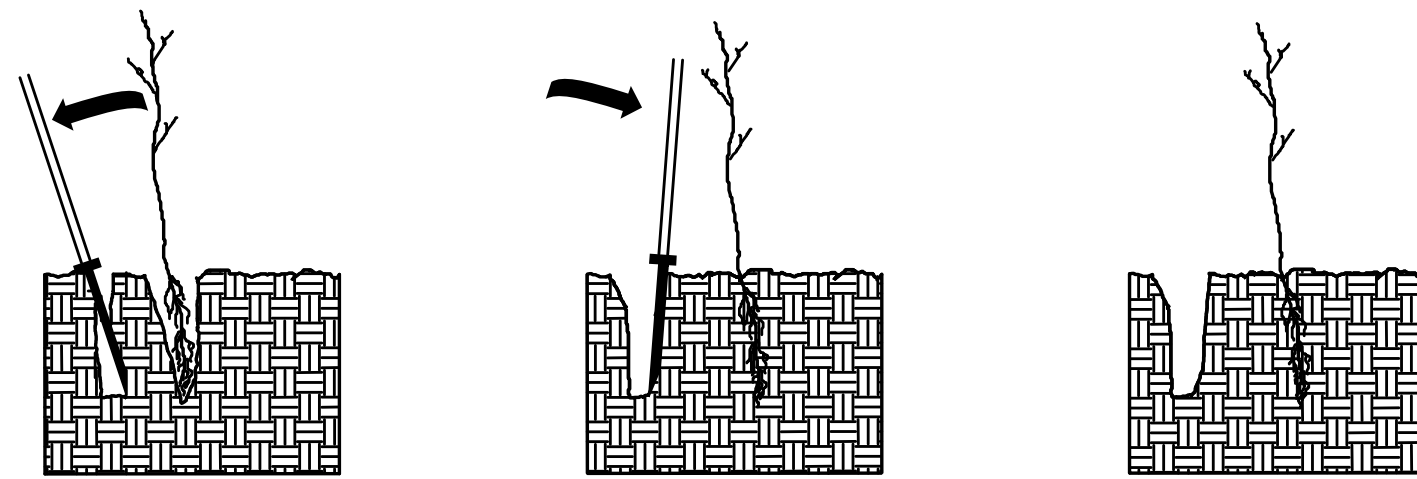


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

### DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



1. Insert planting bar as shown and pull handle toward planter.
2. Remove planting bar and place seedling at correct depth.
3. Insert planting bar 2 inches toward planter from seedling.



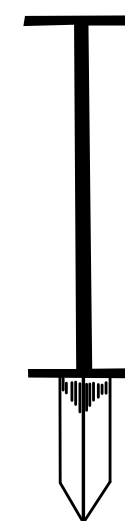
4. Pull handle of bar toward planter, firming soil at bottom.
5. Push handle forward firming soil at top.
6. Leave compaction hole open. Water thoroughly.

### PLANTING NOTES:

**PLANTING BAG**  
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.



**KBC PLANTING BAR**  
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.



**ROOT PRUNING**  
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

## REFORESTATION

- TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

### REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

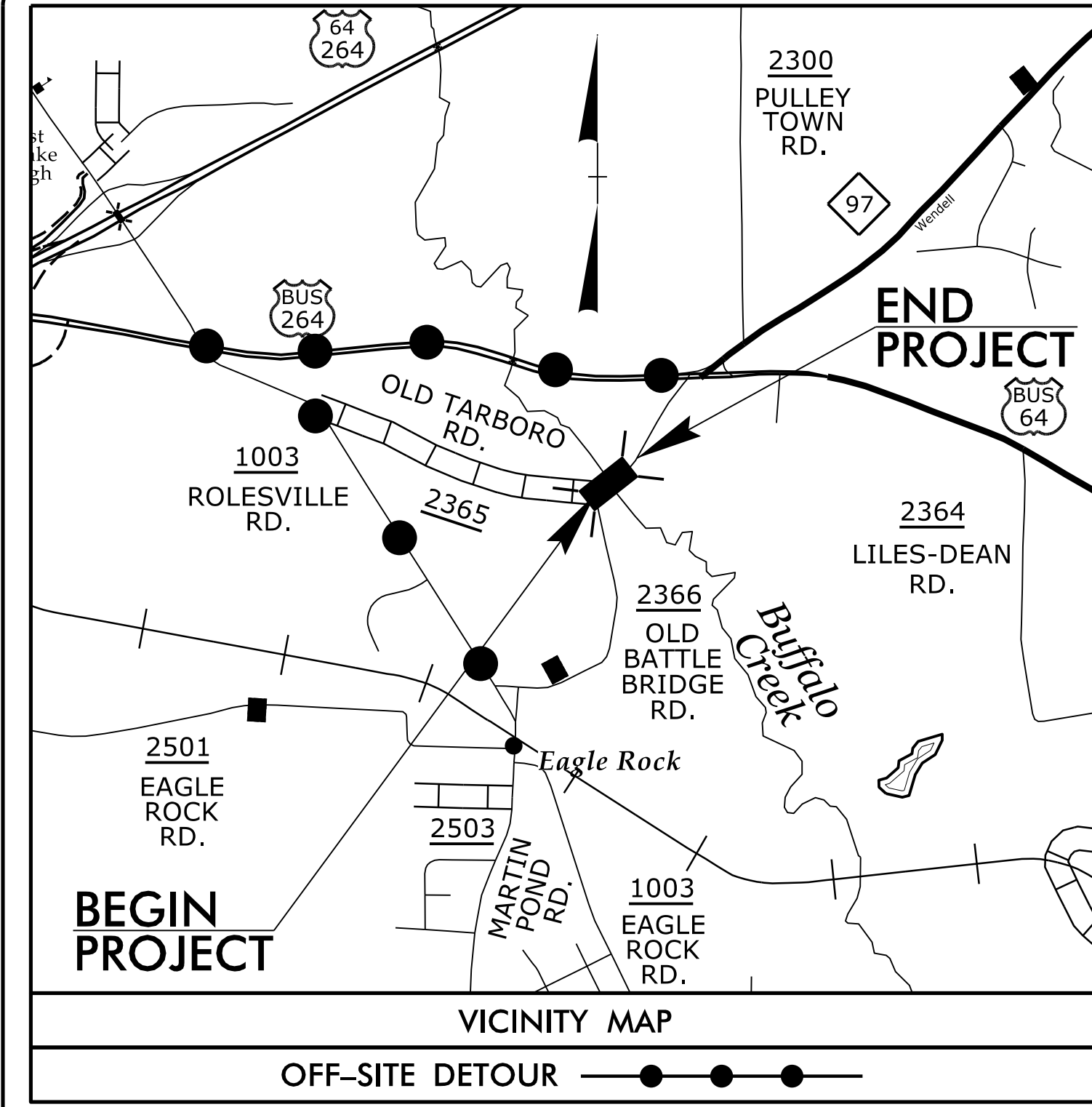
33%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in - 18 in BR
33%	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	12 in - 18 in BR
34%	BETULA NIGRA	RIVER BIRCH	12 in - 18 in BR

## REFORESTATION DETAIL SHEET

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

09.08/99

**TIP PROJECT: 17BP.5.R.79**



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

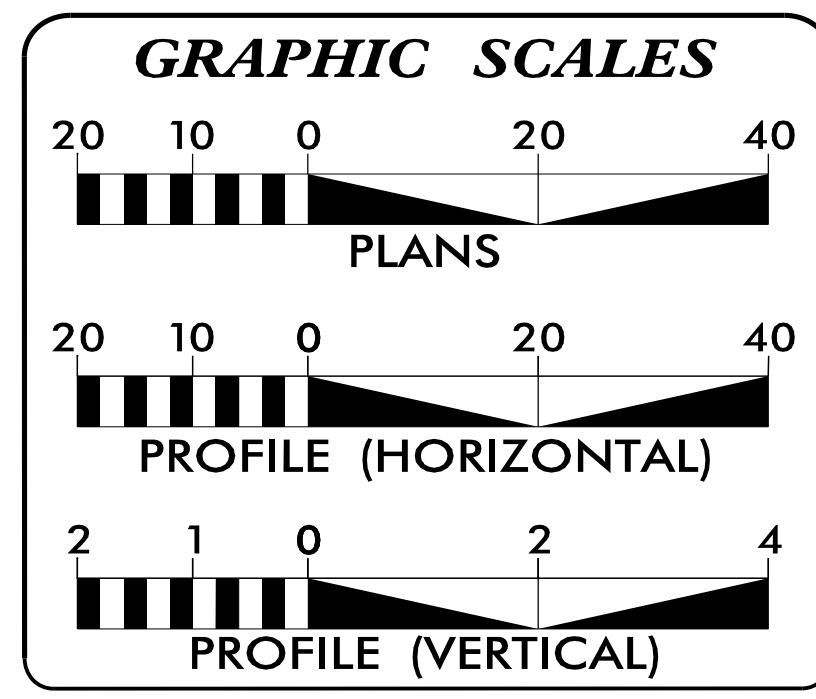
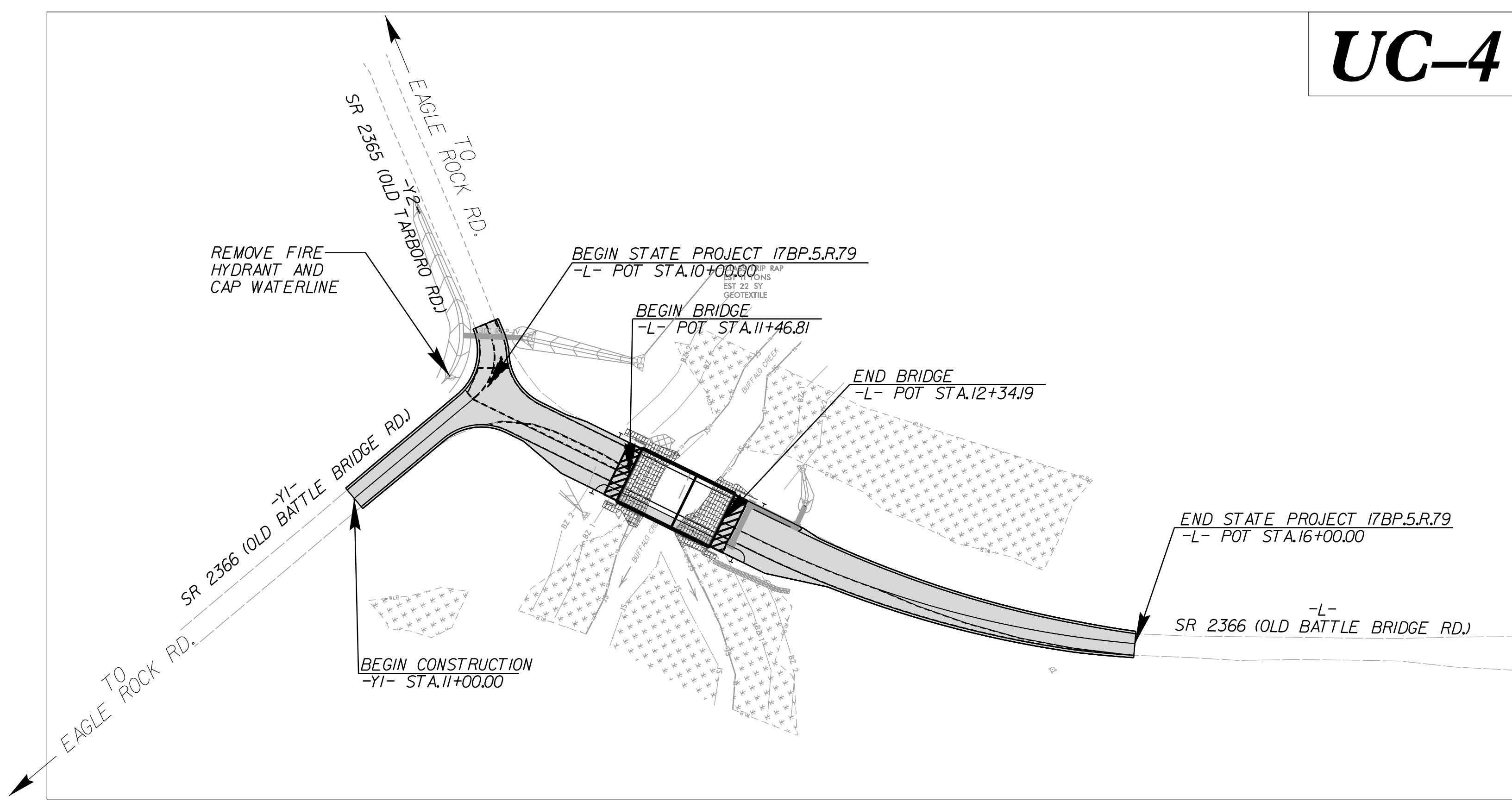
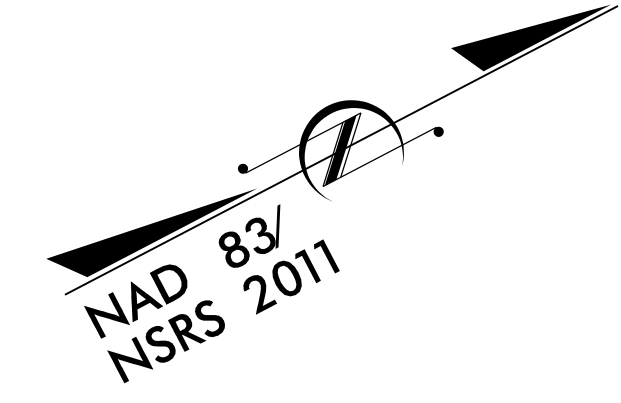
T.I.P. NO.	SHEET NO.
17BP.5.R.79	UC-1

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

**UTILITY CONSTRUCTION PLANS  
WAKE COUNTY**

**LOCATION: BRIDGE NO. 216 OVER BUFFALO CREEK  
ON SR 2366 (OLD BATTLE BRIDGE RD.)**

**TYPE OF WORK: FIRE HYDRANT REMOVAL & MANHOLE ADJUSTMENT**

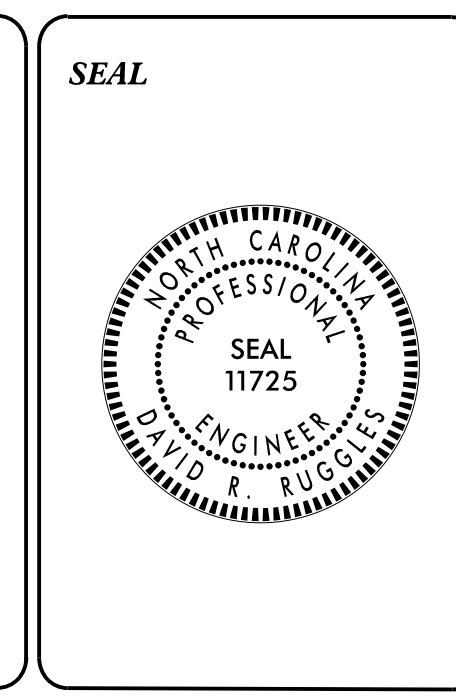


**INDEX OF SHEETS**

SHEET NO.	DESCRIPTION
UC-1	TITLE SHEET
UC-2	UTILITY SYMBOLOGY
UC-3	NOTES
UC-4	FIRE HYDRANT REMOVAL

**UTILITY OWNERS ON PROJECT**

- CITY OF RALEIGH



PREPARED IN THE OFFICE OF:

**STEWART**

223 S. WEST ST., STE 1100  
RALEIGH, NC 27603  
P. 919.960.8792

PLM License #: C-11051  
www.stewartinc.com  
PROJECT #: 031003

**DAVID RUGGLES, PE** PROJECT ENGINEER  
**VIVIAN CHUNG, PE** PROJECT DESIGN ENGINEER

2/11/2020  
17BP.5.R.79\_Wake\_216\_UC-1.dgn  
USER:VCHUNG

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# UTILITIES PLAN SHEET SYMBOLS

## PROPOSED WATER SYMBOLS

Water Line (Sized as Shown)	
11 1/4 Degree Bend	
22 1/2 Degree Bend	
45 Degree Bend	
90 Degree Bend	
Plug	
Tee	
Cross	
Reducer	
Gate Valve	
Butterfly Valve	
Tapping Valve	
Line Stop	
Line Stop with Bypass	
Blow Off	
Fire Hydrant	
Relocate Fire Hydrant	
Remove Fire Hydrant	
Water Meter	
Relocate Water Meter	
Remove Water Meter	
Water Pump Station	
RPZ Backflow Preventer	
DCV Backflow Preventer	
Relocate RPZ Backflow Preventer	
Relocate DCV Backflow Preventer	

## PROPOSED SEWER SYMBOLS

Gravity Sewer Line (Sized as Shown)	
Force Main Sewer Line (Sized as Shown)	
Manhole (Sized per Note)	
Sewer Pump Station	

## PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

Power Pole	
Telephone Pole	
Joint Use Pole	
Telephone Pedestal	
Utility Line by Others (Type as Shown)	
Trenchless Installation	
Encasement by Open Cut	
Encasement	

Thrust Block	
Air Release Valve	
Utility Vault	
Concrete Pier	
Steel Pier	
Plan Note	
Pay Item Note	

NOTE  
PAY ITEM

## EXISTING UTILITIES SYMBOLS

Power Pole		*Underground Power Line	
Telephone Pole		*Underground Telephone Cable	
Joint Use Pole		*Underground Telephone Conduit	
Utility Pole		*Underground Fiber Optics Telephone Cable	
Utility Pole with Base		*Underground TV Cable	
H-Frame Pole		*Underground Fiber Optics TV Cable	
Power Transmission Line Tower		*Underground Gas Pipeline	
Water Manhole		Aboveground Gas Pipeline	
Power Manhole		*Underground Water Line	
Telephone Manhole		Aboveground Water Line	
Sanitary Sewer Manhole		*Underground Gravity Sanitary Sewer Line	
Hand Hole for Cable		Aboveground Gravity Sanitary Sewer Line	
Power Transformer		*Underground SS Forced Main Line	
Telephone Pedestal		Underground Unknown Utility Line	
CATV Pedestal		SUE Test Hole	
Gas Valve		Water Meter	
Gas Meter		Water Valve	
Located Miscellaneous Utility Object		Fire Hydrant	
Abandoned According to Utility Records	AATUR	Sanitary Sewer Cleanout	
End of Information	E.O.I.		

\*For Existing Utilities  
Utility Line Drawn from Record (Type as Shown)  
Designated Utility Line (Type as Shown)

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**NOTES**


**GENERAL NOTES**

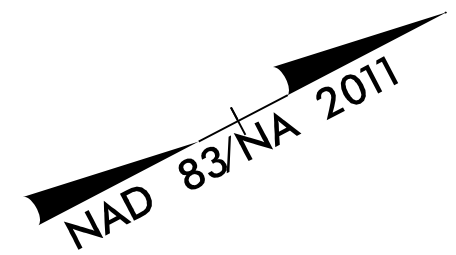
1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2018 AND APPLICABLE REQUIREMENTS OF THE CITY OF RALEIGH PUBLIC UTILITIES.
2. THE EXISTING UTILITIES BELONG TO THE CITY OF RALEIGH.
3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER RESOURCES, PUBLIC WATER SUPPLY SECTION. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.
4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.
5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND ONE WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPORTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.
6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE DEPARTMENT.
7. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.
8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.
9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

**WATER RELOCATION**

1. REMOVE FIRE HYDRANT AND CAP WATERLINE AS SHOWN ON PLANS. WORK TO BE DONE IN ACCORDANCE WITH PUBLIC UTILITIES HANDBOOK GUIDELINES.
2. BEFORE BEGINNING THIS WORK, CHECK WITH RESIDENT ENGINEER ON STATUS OF PROPOSED DEVELOPMENT ON PARCEL NO. 1.



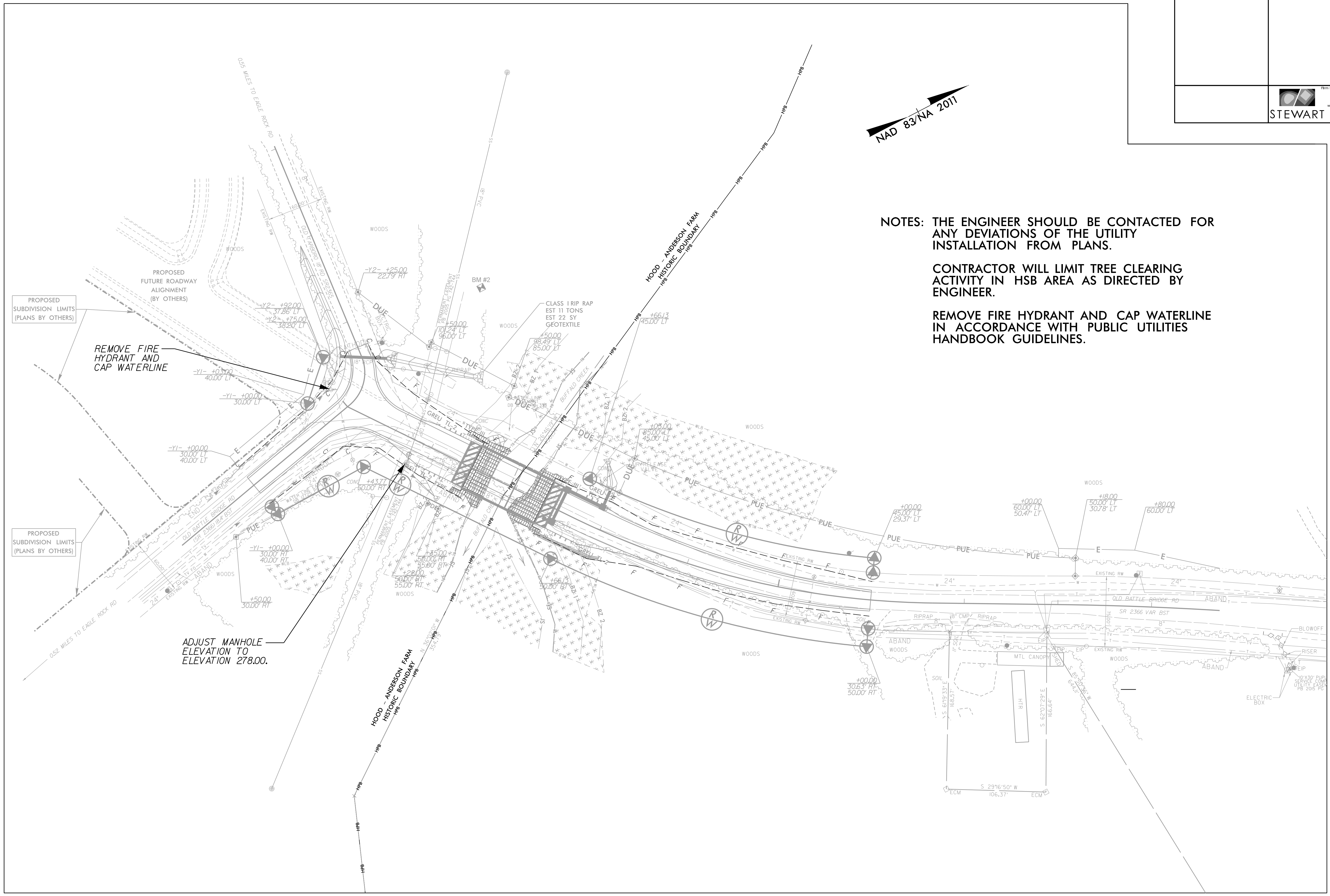
PROJECT REFERENCE NO. 17BP.5.R.79	SHEET NO. UC-4
	UTILITY ENGINEER
	 <small>           Firm License No. CA1093            223 S. West St.            Raleigh, NC 27603            T 919.840.9755            www.stewartinc.com         </small>



NOTES: THE ENGINEER SHOULD BE CONTACTED FOR ANY DEVIATIONS OF THE UTILITY INSTALLATION FROM PLANS.

CONTRACTOR WILL LIMIT TREE CLEARING ACTIVITY IN HSB AREA AS DIRECTED BY ENGINEER.

REMOVE FIRE HYDRANT AND CAP WATERLINE IN ACCORDANCE WITH PUBLIC UTILITIES HANDBOOK GUIDELINES.



PROPOSED SUBDIVISION LIMITS (PLANS BY OTHERS)

REMOVE FIRE HYDRANT AND CAP WATERLINE

PROPOSED SUBDIVISION LIMITS (PLANS BY OTHERS)

ADJUST MANHOLE ELEVATION TO ELEVATION 278.00.

REVISIONS

8.17.99

2/1/2020 5.R.79\_wake\_216\_UC-4.dgn  
 IIS:Rachana

09\_08/99

**TIP PROJECT: 17BP.5.R.79**

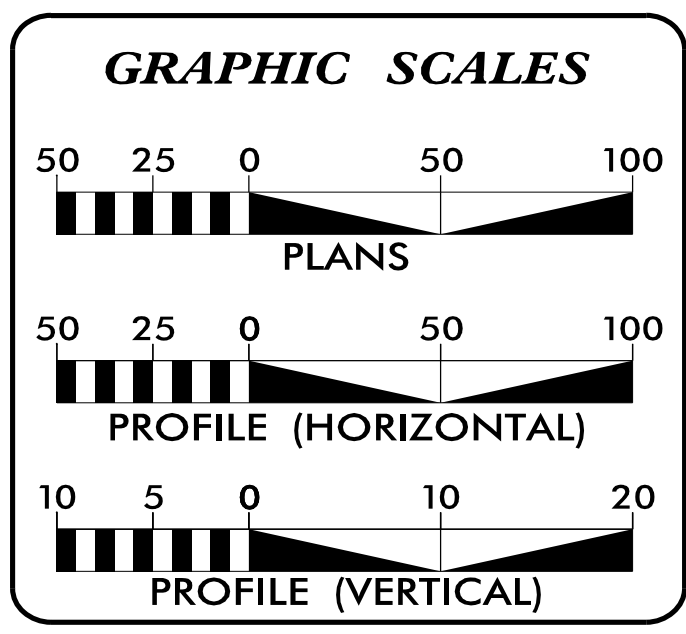
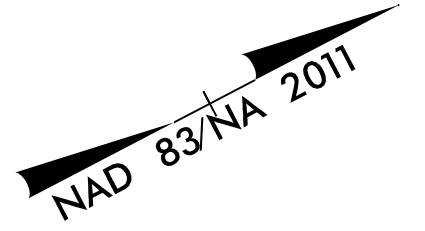
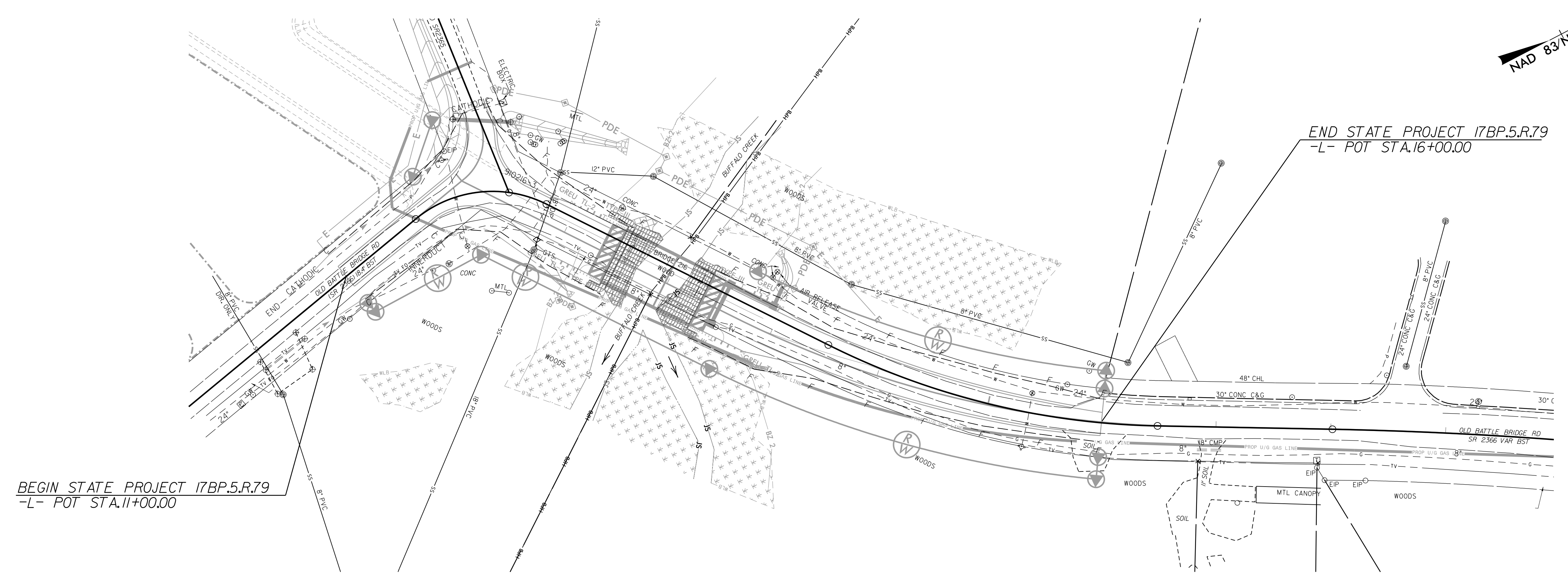
T.I.P. NO.	SHEET NO.
17BP.5.R.79	UO-1

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**UTILITIES BY OTHERS PLANS  
WAKE COUNTY**

**LOCATION: BRIDGE NO. 216 OVER BUFFALO CREEK  
ON SR 2366 (OLD BATTLE BRIDGE RD.)**

**TYPE OF WORK: GAS RELOCATION AND  
TELECOMMUNICATIONS RELOCATION**



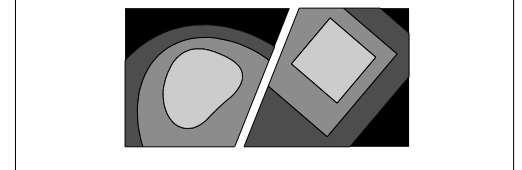
**INDEX OF SHEETS**

SHEET NO.	DESCRIPTION
UO-1	TITLE SHEET
UO-2	UTILITY BY OTHERS PLAN SHEET

**UTILITY OWNERS ON PROJECT**

(A) DOMINION ENERGY - GAS

PREPARED IN THE OFFICE OF:



**STEWART**

223 S. WEST ST., STE. 1100  
RALEIGH, NC 27603  
TEL: 919.900.8750

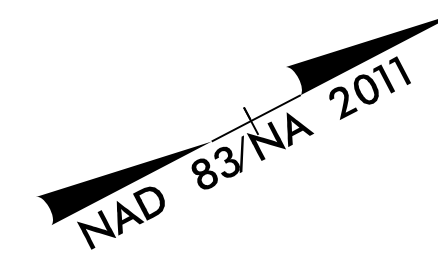
19th License # 1C-1051  
www.stewartinc.com  
PROJECT # 17.1001

**DAVID RUGGLES, PE** PROJECT ENGINEER  
**ELIZABETH PHELPS, PE** PROJECT DESIGN ENGINEER

4/5/2022  
I:\UB0\Proj\17BP.5.R.79\17BP.5.R.79\_UO-1\_TSH.dgn  
USER:delTouh

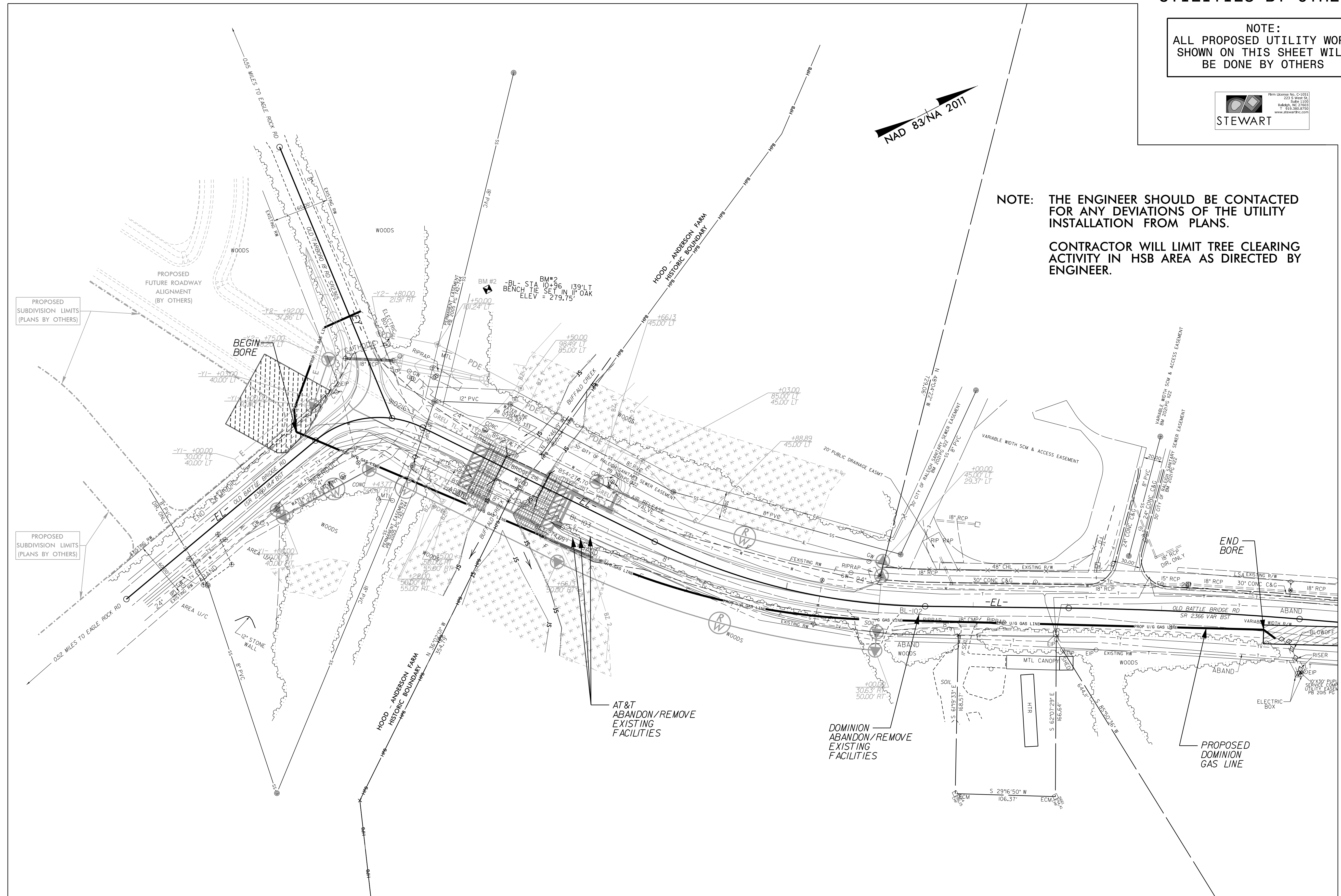
# UTILITIES BY OTHERS

NOTE:  
ALL PROPOSED UTILITY WORK  
SHOWN ON THIS SHEET WILL  
BE DONE BY OTHERS



NOTE: THE ENGINEER SHOULD BE CONTACTED FOR ANY DEVIATIONS OF THE UTILITY INSTALLATION FROM PLANS.

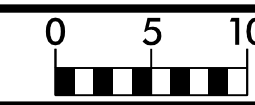
CONTRACTOR WILL LIMIT TREE CLEARING ACTIVITY IN HSB AREA AS DIRECTED BY ENGINEER.



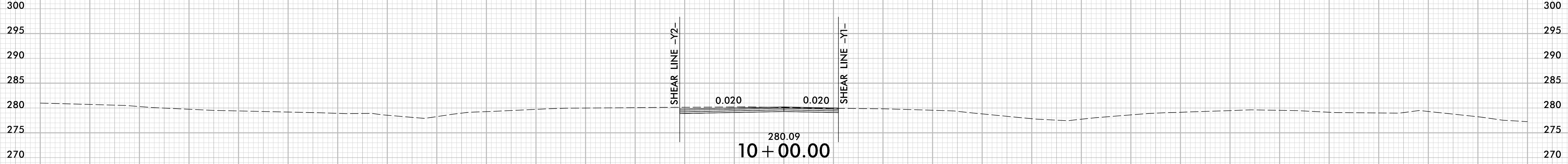
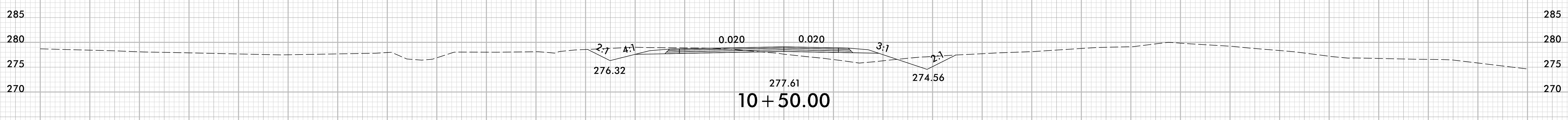
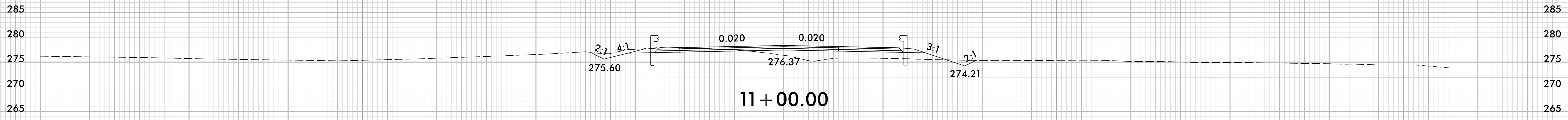
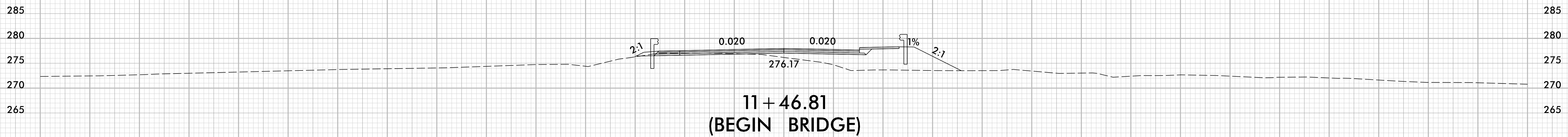
REVISIONS

4/5/2022 10:10:21.6.U0-2.dgn  
 11/15/2022 10:10:21.6.U0-2.dgn





150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

## CROSS-SECTION SUMMARY

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT

Station	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
L		
10+00.00	0	0
10+50.00	80	28
11+00.00	72	72
11+46.81	26	129

**Approximate quantities only. Unclassified excavation, fine grading, clearing and grubbing, breaking of existing pavement and removal of existing pavement will be paid for at the lump sum price for "Grading".**

Station	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
L		
12+34.19	0	0
12+50.00	8	32
13+00.00	49	45
13+50.00	73	6
14+00.00	67	2
14+50.00	52	10
15+00.00	42	16
15+50.00	38	9
16+00.00	43	2

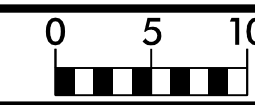
Station	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
Y1		
11+00.00	0	0
11+50.00	76	12
12+00.00	89	11
12+18.45	32	4

Station	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
Y2		
10+21.00	0	0
10+60.00	113	0
10+70.68	27	0

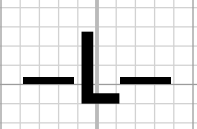
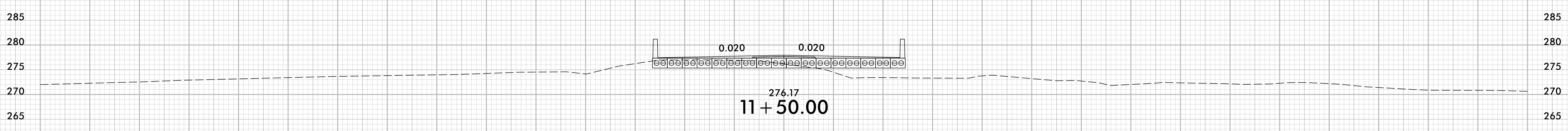
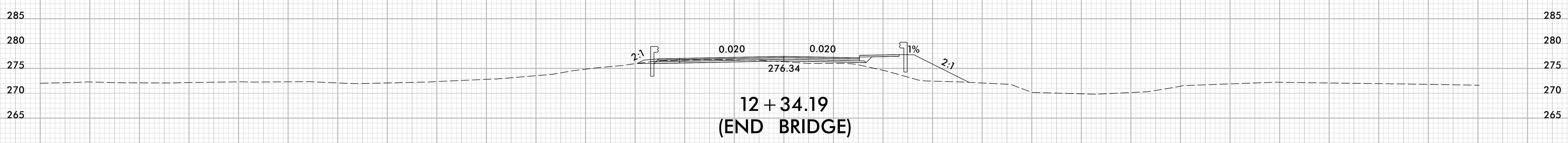
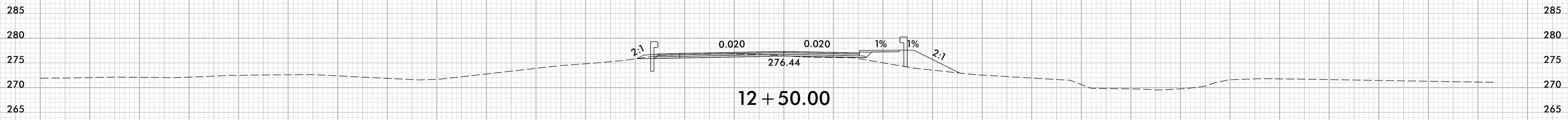
REVISIONS

8/17/99

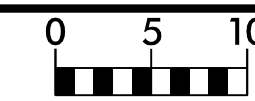
2/13/2000  
11:56:00  
USF:\b\wall  
0216\_P0Y\_XPL\_X1A.dgn



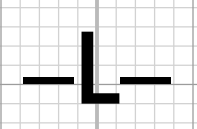
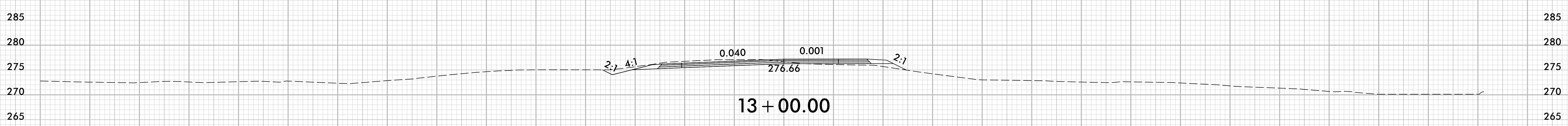
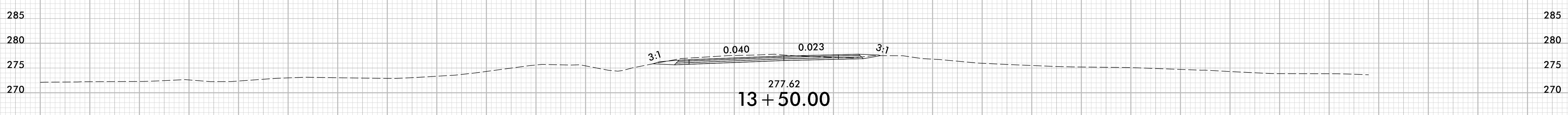
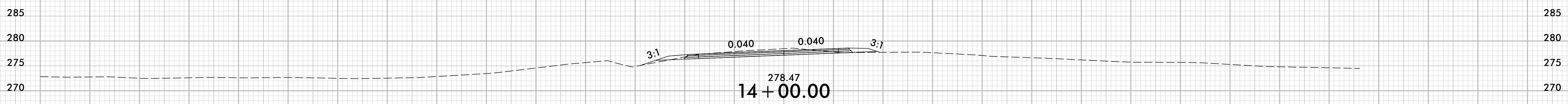
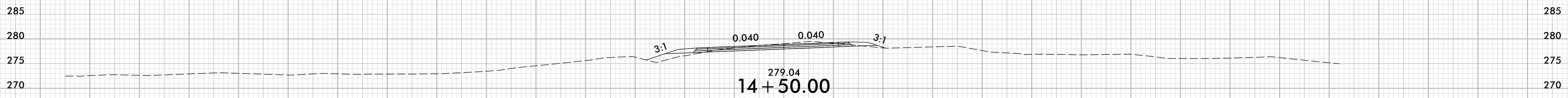
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



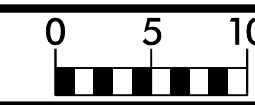
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



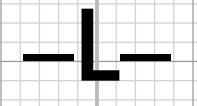
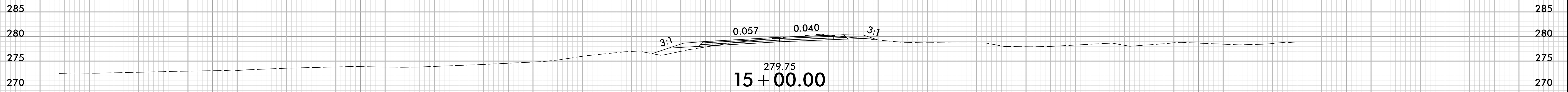
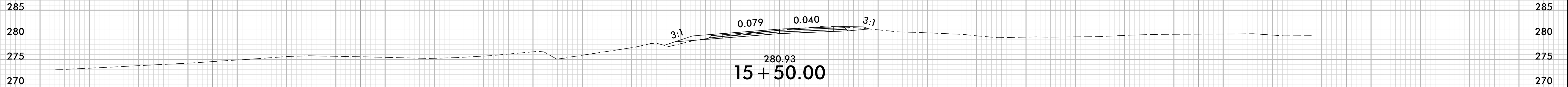
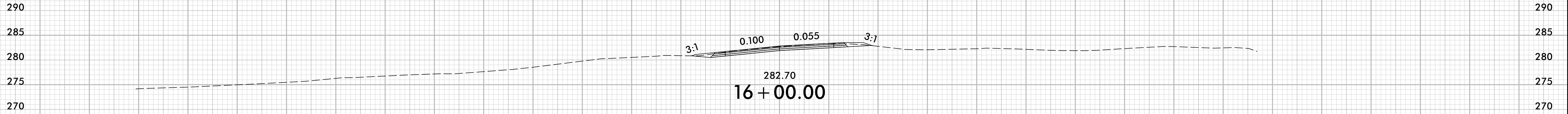
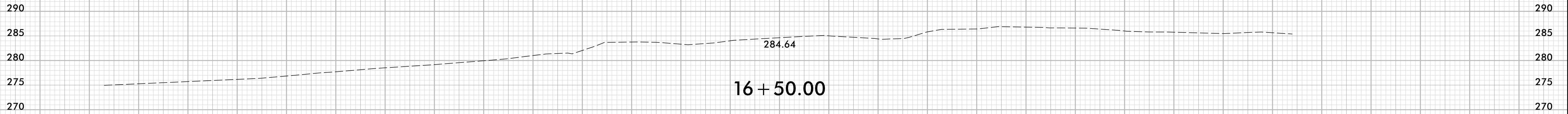
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

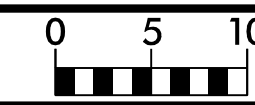


150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

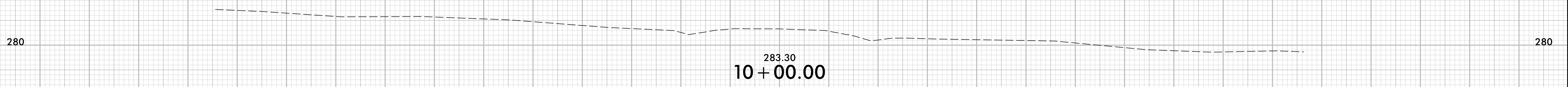
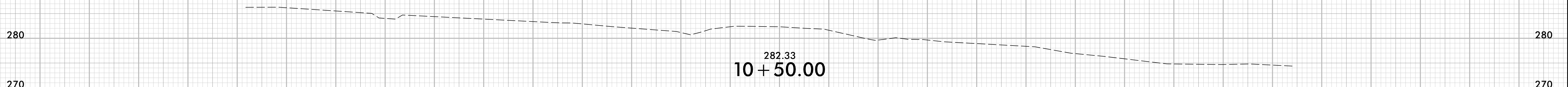
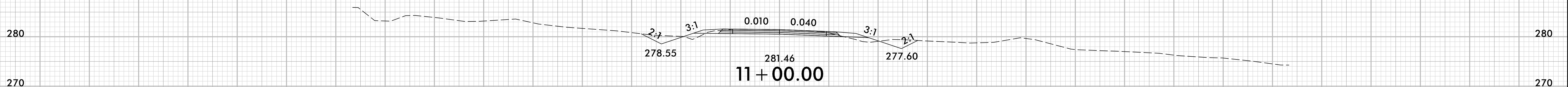
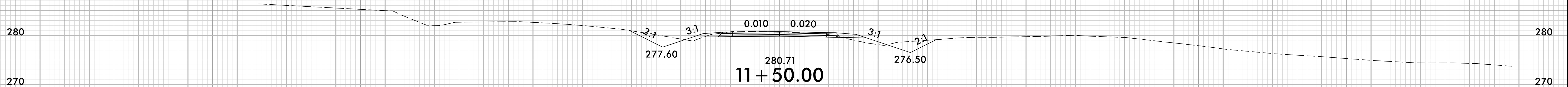
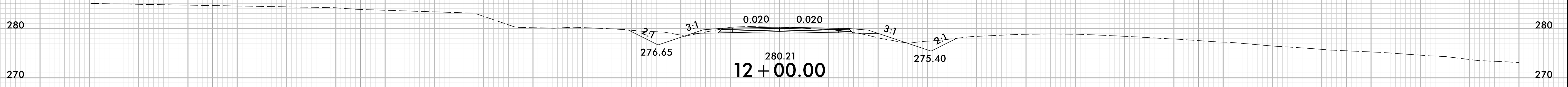
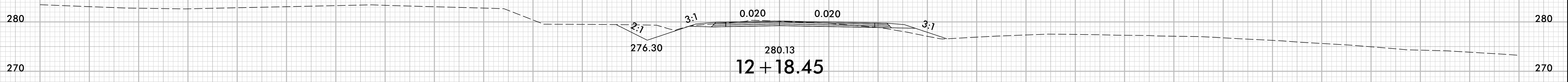


150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



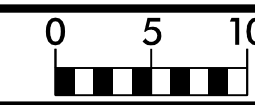


150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

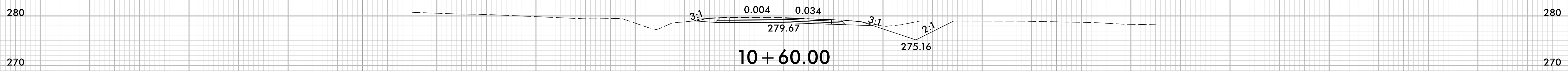


-Y1-

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



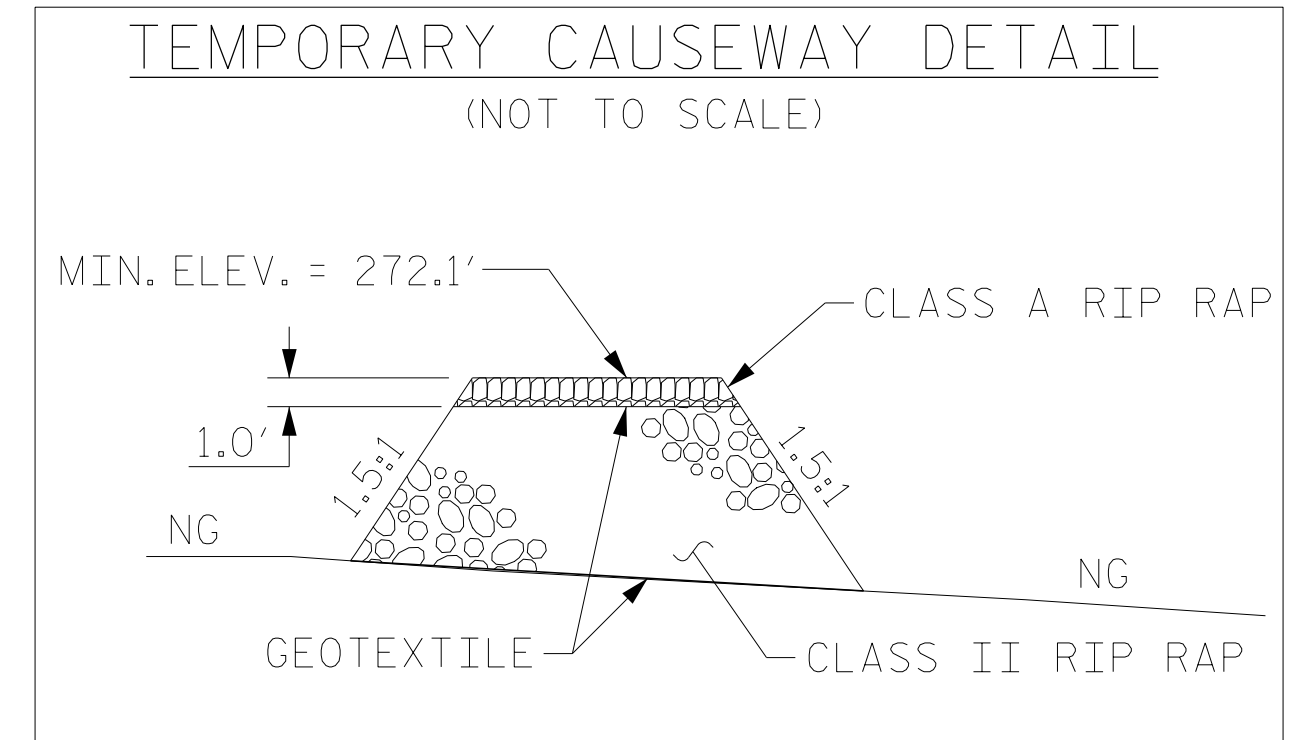
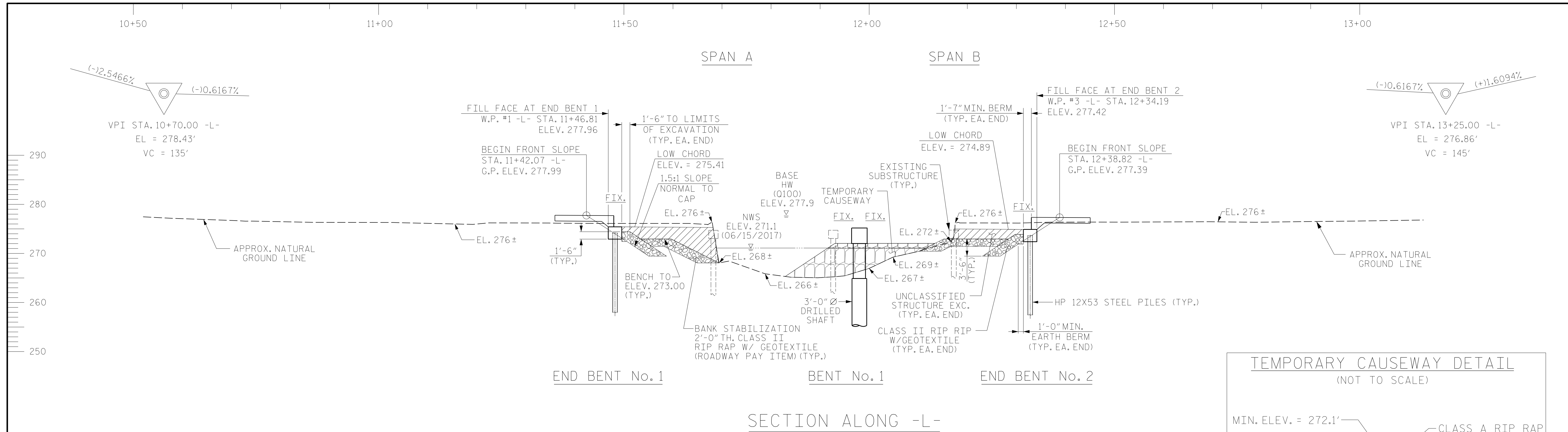
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



10 + 60.00

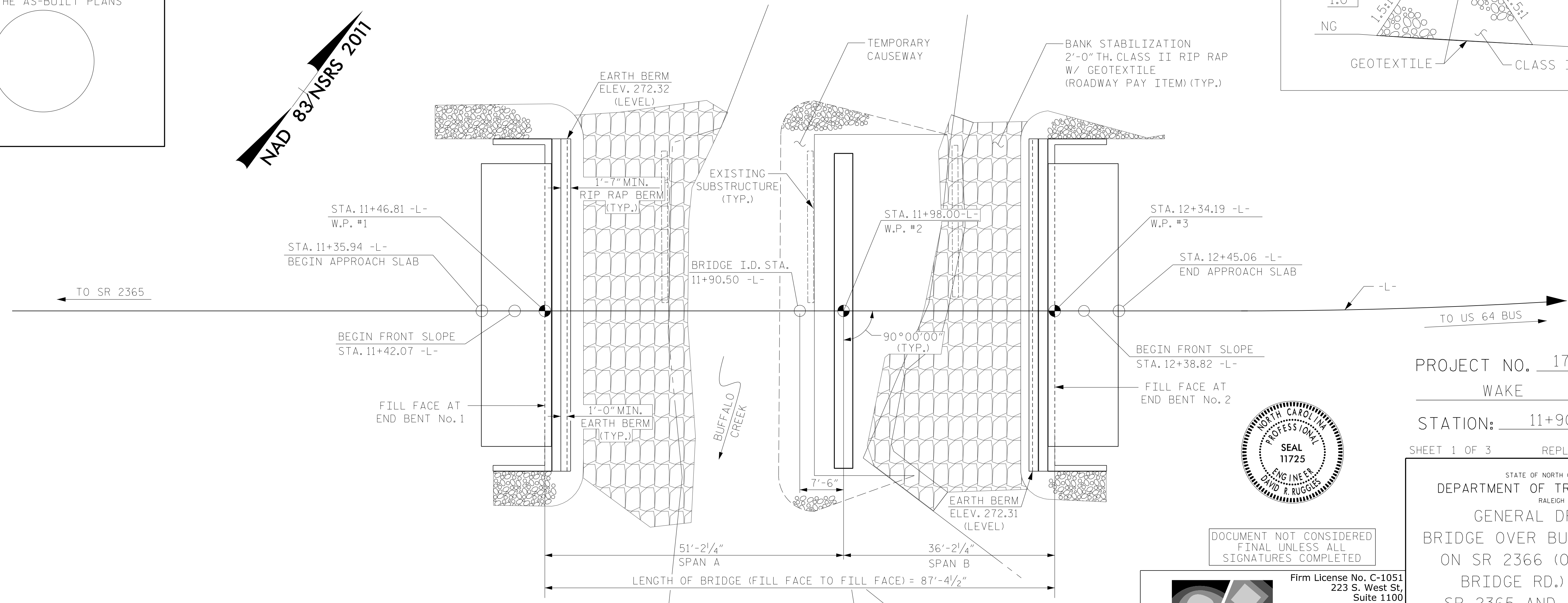
-Y2-

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

**NAD 83/NSRS 2011**



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**STEWART**

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

PROJECT NO. 17BP.5.PE.79  
WAKE COUNTY  
STATION: 11+90.50 -L-  
SHEET 1 OF 3 REPLACES BRIDGE 910216

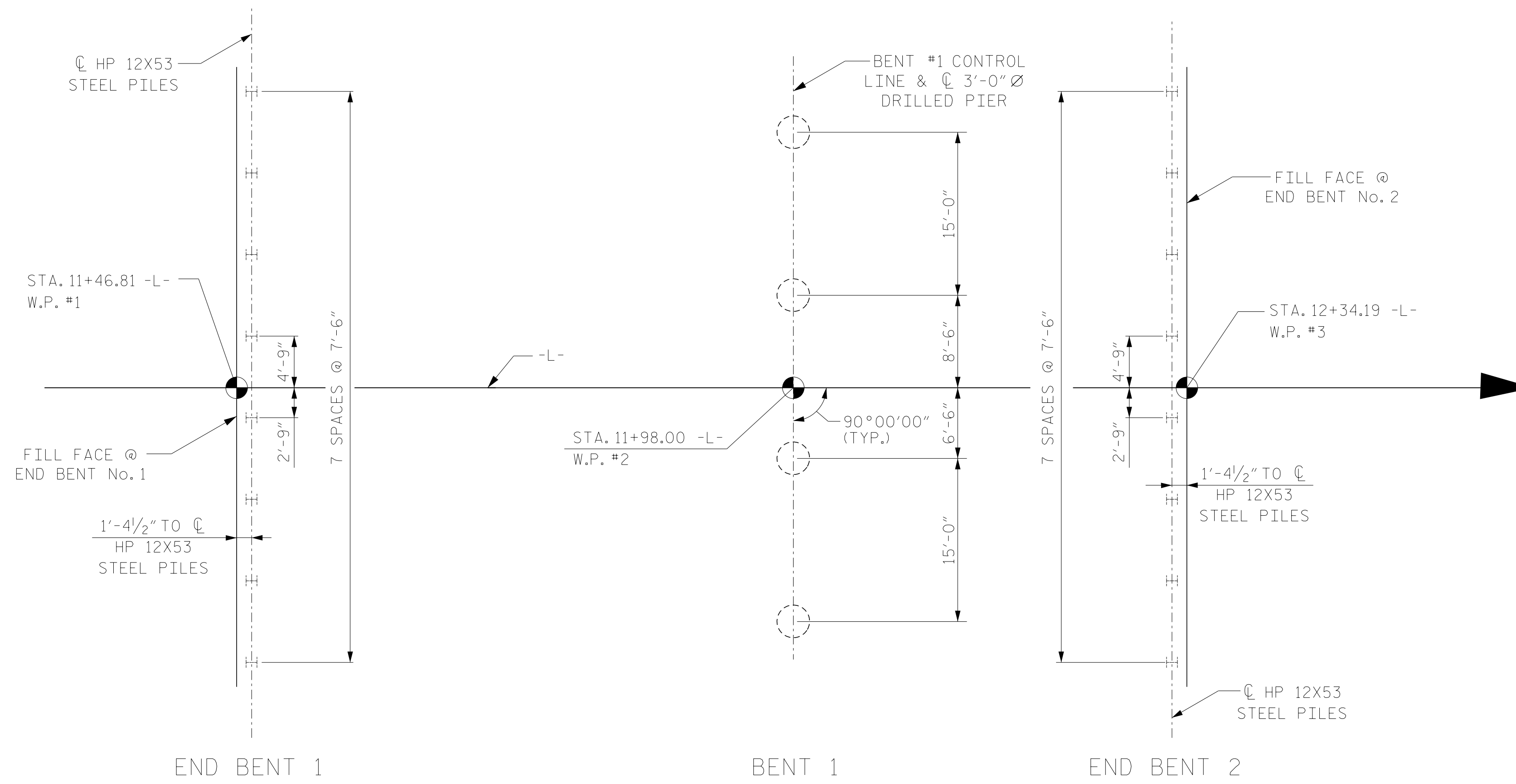
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
GENERAL DRAWING  
BRIDGE OVER BUFFALO CREEK  
ON SR 2366 (OLD BATTLE  
BRIDGE RD.) BETWEEN  
SR 2365 AND US 64 BUS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

WAKE 216

\$\$\$\$SYTIME\$\$\$  
\$\$\$\$DGN\$\$\$  
\$\$\$\$USERNAME\$\$\$



FOUNDATION LAYOUT

ALL BENTS ARE PARALLEL

FOUNDATION NOTES

- 1) FOR PILES, SEE SPECIAL PROVISIONS.
- 2) PILES AT END BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 75 TONS PER PILE.
- 3) PILES AT END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 60 TONS PER PILE.
- 4) DRIVE PILES AT END BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 125 TONS PER PILE.
- 5) DRIVE PILES AT END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 100 TONS PER PILE.
- 6) STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO.1 AND END BENT NO.2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- 7) FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- 8) DRILLED PIERS AT BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 290 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 60 TSF.
- 9) INSTALL DRILLED PIERS AT BENT NO.1 (LEFT) TO A TIP ELEVATION NO HIGHER THAN 246 FT WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 7 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
- 10) INSTALL DRILLED PIERS AT BENT NO.1 (RIGHT) TO A TIP ELEVATION NO HIGHER THAN 226 FT WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 3 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.
- 11) PERMANENT STEEL CASINGS ARE REQUIRED FOR DRILLED PIERS AT BENT NO.1. DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 257 FT (LT) AND 238 (RT) WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
- 12) INSTALL PERMANENT STEEL CASINGS AT BENT NO.1 BY VIBRATING, SCREWING, OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION 254 FT.
- 13) SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
- 14) THE SCOUR CRITICAL ELEVATION FOR BENT NO.1 IS ELEVATION 252 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

NAD 83 NSRS 2011

PROJECT NO. 17BP.5.PE.79

WAKE COUNTY

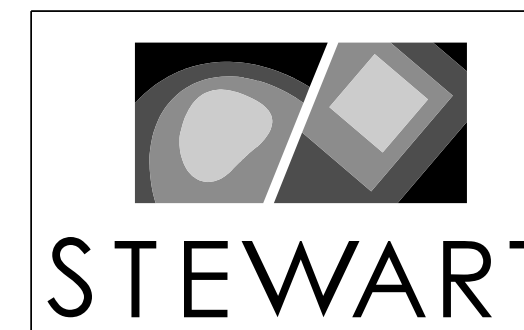
STATION: 11+90.50 -L-

SHEET 2 OF 3



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

FOUNDATION LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			26

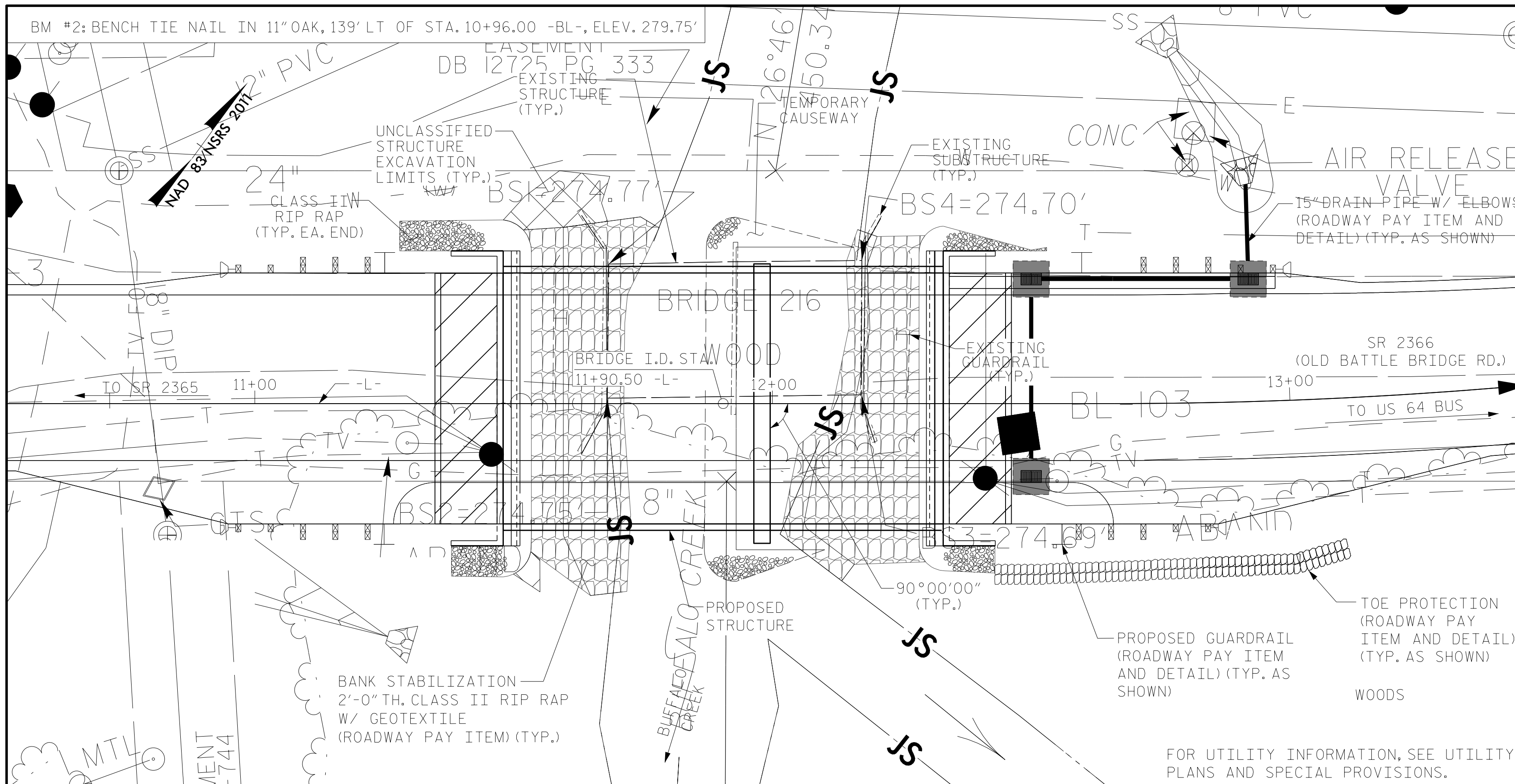
DRAWN BY: V. CHUNG	DATE: 11-19
CHECKED BY: E. PHELPS	DATE: 12-19
DESIGN ENGINEER OF RECORD: D. RUGGLES	DATE: 12-19

WAKE 216

\$\$\$\$SYTIME\$\$\$\$  
\$\$\$\$DGN\$\$\$\$  
\$\$\$\$USERNAME\$\$\$\$







LOCATION SKETCH

**GENERAL NOTES:**  
 ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.  
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.  
 THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.  
 THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18 - EVALUATING SCOUR AT BRIDGES."  
 THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCE BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.  
 REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.  
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.  
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.  
 FOR FALSEWORK AND FRAMEWORK, SEE SPECIAL PROVISIONS.  
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.  
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.  
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.  
 ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.  
 THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 45'± LEFT SIDE AND 40'± RIGHT SIDE OF THE CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.  
 THE EXISTING STRUCTURE #910216 CONSISTING OF TWO (2) STEEL I-GIRDER SPANS @ 25'-3" & 25'-3" (51'-0" TOTAL LENGTH), 24'-2" CLEAR ROADWAY WIDTH AND TIMBER FLOOR WITH AN ASPHALT WEARING SURFACE ON TIMBER CAPS & TIMBER PILES LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED IN ITS ENTIRETY. IF COMPLETE REMOVAL OF EXISTING TIMBER PILES CANNOT BE ACCOMPLISHED THE PILES WILL BE PINCHED OFF A MINIMUM OF ONE FOOT BELOW THE MUD LINE. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR ROAD CLOSURE.  
 FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.  
 INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 11+86.00 -L-".  
 CRANE SHALL NOT BE PLACED ON NATURAL GROUND WITHIN HISTORIC PROPERTY BOUNDARY ON SOUTH SIDE OF THE BRIDGE.

TOTAL BILL OF MATERIAL

	CONSTRUCTION MAINTENANCE & REMOVAL OF TEMP. ACCESS	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	3'-0" DIA. DRILLED PIERS NOT IN SOIL	3'-0" DIA. DRILLED PIERS IN SOIL	PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIER	SID TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	HP 12X53 STEEL PILES	STEEL PILE POINTS	
	LUMP SUM	LUMP SUM	LUMP SUM	LINE FT.	LINE FT.	LINE FT.	EACH	EACH	LUMP SUM	CY	LUMP SUM	LBS	LBS	EACH	No.	LF	EACH
SUPERSTRUCTURE											LUMP SUM						
END BENT No. 1									LUMP SUM	18.9		2,898		8	8	240	8
BENT No. 1				40.0	80.0	98.0	1	1		25.3		15,153	2,451				
END BENT No. 2										18.9		2,898		8	8	220	8
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	40.0	80.0	98.0	1	1	LUMP SUM	63.1	LUMP SUM	20,949	2,451	16	16	460	16

HYDRAULIC DATA	
DESIGN DISCHARGE	2520 CFS
FREQUENCY OF DESIGN FLOOD	25 YR.
DESIGN HIGHWATER ELEV.	276.2 FT.
DRAINAGE AREA	12.8 SQ. MI.
BASE DISCHARGE (Q100)	3530 CFS
BASE HIGHWATER ELEV.	277.9 FT.

OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	3194 CFS
FREQUENCY OF OVERTOPPING FLOOD	50+ YR.
OVERTOPPING FLOOD ELEV.	* 277.2 FT.

\* OVERTOPPING AT STA. 12+92.70 -L-

TOTAL BILL OF MATERIAL (CONT'D)

	2 BAR METAL RAIL	1'-2" X 2'-9 1/2" CONCRETE PARAPET	1'-2" X 3'-8" CONCRETE PARAPET	RIP RAP CLASS II	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 1'-9" PRESTRESSED CONCRETE CORED SLAB
	LF	LF	LF	TON	SY	LUMP SUM	No., LF
SUPERSTRUCTURE	155.25	85.125	85.125			LUMP SUM	34, 1,445
END BENT No. 1				70	75		
BENT No. 1							
END BENT No. 2				50	55		
TOTAL	155.25	85.125	85.125	120	130	LUMP SUM	34, 1,445

PROJECT NO. 17BP.5.PE.79  
 WAKE COUNTY  
 STATION: 11+90.50 -L-  
 SHEET 3 OF 3



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Firm License No. C-1051  
 223 S. West St., Suite 1100  
 Raleigh, NC 27603  
 T 919.380.8750  
 www.stewartinc.com

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING BRIDGE OVER BUFFALO CREEK ON SR 2366 (OLD BATTLE BRIDGE RD.) BETWEEN SR 2365 AND US 64 BUS					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-4
					TOTAL SHEETS 26

DRAWN BY: V. CHUNG DATE: 11-19  
 CHECKED BY: E. PHELPS DATE: 12-19  
 DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

WAKE 216

\$\$\$\$SYTIME\$\$\$\$  
 \$\$\$DGN\$\$\$  
 \$\$\$USERNAME\$\$\$

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	1.67	--	1.75	0.240	1.67	50'	EL	24.5	0.240	3.47	50'	EL	9.5	0.80	0.240	2.10	50'	EL	24.5		
	HL-93(0pr)	N/A	--	2.17	--	1.35	0.240	2.17	50'	EL	24.5	0.240	4.62	50'	EL	9.5	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	2.08	74.880	1.75	0.240	2.08	50'	EL	24.5	0.240	4.15	50'	EL	9.5	0.80	0.240	2.61	50'	EL	24.5		
	HS-20(0pr)	36.000	--	2.70	97.200	1.35	0.240	2.70	50'	EL	24.5	0.240	5.50	50'	EL	9.5	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	4.28	57.780	1.4	0.240	5.15	50'	EL	24.5	0.240	11.67	50'	EL	9.5	0.80	0.240	4.28	50'	EL	24.5	
		SNGARBS2	20.000	--	3.36	67.200	1.4	0.240	4.05	50'	EL	24.5	0.240	8.49	50'	EL	9.5	0.80	0.240	3.36	50'	EL	24.5	
		SNAGRIS2	22.000	--	3.25	71.500	1.4	0.240	3.91	50'	EL	24.5	0.240	7.98	50'	EL	9.5	0.80	0.240	3.25	50'	EL	24.5	
		SNCOTTS3	27.250	--	2.12	57.770	1.4	0.240	2.56	50'	EL	24.5	0.240	5.62	50'	EL	9.5	0.80	0.240	2.12	50'	EL	24.5	
		SNAGGRS4	34.925	--	1.84	64.262	1.4	0.240	2.22	50'	EL	24.5	0.240	4.82	50'	EL	9.5	0.80	0.240	1.84	50'	EL	24.5	
		SNS5A	35.550	--	1.80	63.990	1.4	0.240	2.17	50'	EL	24.5	0.240	5.02	50'	EL	9.5	0.80	0.240	1.80	50'	EL	24.5	
	TTST	SNS6A	39.950	--	1.68	67.116	1.4	0.240	2.02	50'	EL	24.5	0.240	4.63	50'	EL	9.5	0.80	0.240	1.68	50'	EL	24.5	
		SNS7B	42.000	--	1.60	67.200	1.4	0.240	1.93	50'	EL	24.5	0.240	4.69	50'	EL	9.5	0.80	0.240	1.60	50'	EL	24.5	
		TNAGRIT3	33.000	--	2.06	67.980	1.4	0.240	2.48	50'	EL	24.5	0.240	5.53	50'	EL	9.5	0.80	0.240	2.06	50'	EL	24.5	
		TNT4A	33.075	--	2.08	68.796	1.4	0.240	2.50	50'	EL	24.5	0.240	5.27	50'	EL	9.5	0.80	0.240	2.08	50'	EL	24.5	
		TNT6A	41.600	--	1.72	71.552	1.4	0.240	2.08	50'	EL	24.5	0.240	5.12	50'	EL	9.5	0.80	0.240	1.72	50'	EL	24.5	
		TNT7A	42.000	--	1.75	73.500	1.4	0.240	2.11	50'	EL	24.5	0.240	4.70	50'	EL	9.5	0.80	0.240	1.75	50'	EL	24.5	
	TNT7B	42.000	--	1.83	76.860	1.4	0.240	2.20	50'	EL	24.5	0.240	4.46	50'	EL	9.5	0.80	0.240	1.83	50'	EL	24.5		
	TNAGRIT4	43.000	--	1.73	74.390	1.4	0.240	2.08	50'	EL	24.5	0.240	4.28	50'	EL	9.5	0.80	0.240	1.73	50'	EL	24.5		
	TNAGT5A	45.000	--	1.62	72.900	1.4	0.240	1.95	50'	EL	24.5	0.240	4.42	50'	EL	9.5	0.80	0.240	1.62	50'	EL	24.5		
	TNAGT5B	45.000	3	1.59	71.550	1.4	0.240	1.91	50'	EL	24.5	0.240	4.04	50'	EL	9.5	0.80	0.240	1.59	50'	EL	24.5		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	$\gamma_{DC}$	$\gamma_{DW}$
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

# CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

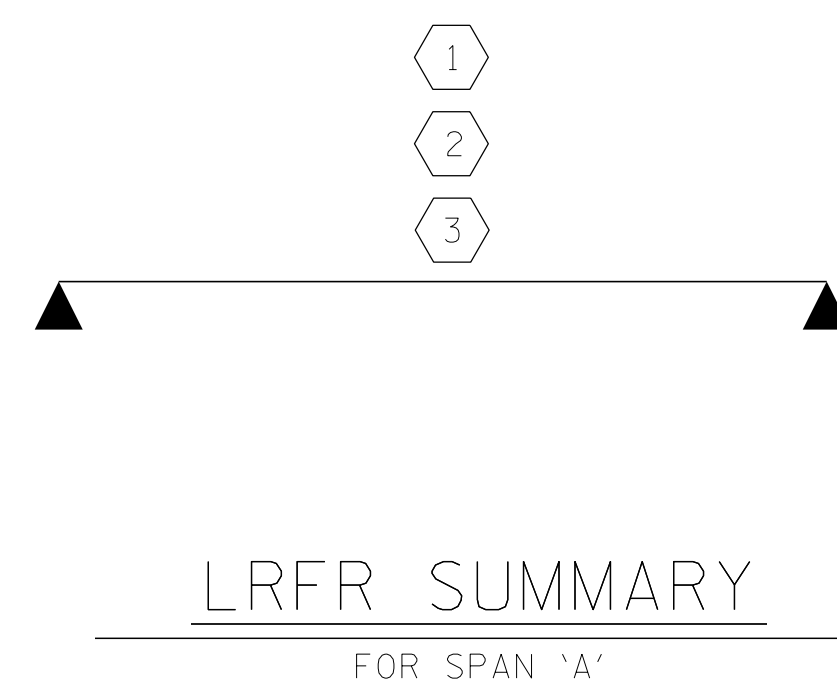
3 LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

---

GIRDER LOCATION

I - INTERIOR GIRDER  
EL - EXTERIOR LEFT GIRDER  
ER - EXTERIOR RIGHT GIRDER



PROJECT NO. 17BP.5.PE.79

WAKE COUNTY

STATION: 11+90.50 -L-

SHEET 1 OF 2



DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

LRFR SUMMARY FOR  
50' CORED SLAB UNIT  
90° SKEW  
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

\$\$\$SYSTEMTIME\$\$\$  
\$\$\$DGN\$\$\$  
\$\$\$USERNAME\$\$\$

WAKE 216

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	1.31	--	1.75	0.260	1.31	35'	EL	17.0	0.260	3.33	35'	EL	24.0	0.80	0.260	1.59	35'	EL	17.0		
	HL-93(0pr)	N/A	--	1.70	--	1.35	0.260	1.70	35'	EL	17.0	0.260	4.70	35'	EL	27.5	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	1.74	62.640	1.75	0.260	1.74	35'	EL	17.0	0.260	4.10	35'	EL	27.5	0.80	0.260	2.11	35'	EL	17.0		
	HS-20(0pr)	36.000	--	2.25	81.000	1.35	0.260	2.25	35'	EL	13.5	0.260	5.39	35'	EL	27.5	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.94	39.690	1.4	0.260	3.65	35'	EL	17.0	0.260	10.09	35'	EL	27.5	0.80	0.260	2.94	35'	EL	17.0	
		SNGARBS2	20.000	--	2.49	49.800	1.4	0.260	3.09	35'	EL	13.5	0.260	7.73	35'	EL	27.5	0.80	0.260	2.49	35'	EL	13.5	
		SNAGRIS2	22.000	--	2.46	54.120	1.4	0.260	3.05	35'	EL	13.5	0.260	7.43	35'	EL	27.5	0.80	0.260	2.46	35'	EL	13.5	
		SNCOTTS3	27.250	--	1.47	40.058	1.4	0.260	1.82	35'	EL	17.0	0.260	4.98	35'	EL	27.5	0.80	0.260	1.47	35'	EL	17.0	
		SNAGGRS4	34.925	--	1.35	47.149	1.4	0.260	1.67	35'	EL	17.0	0.260	4.55	35'	EL	27.5	0.80	0.260	1.35	35'	EL	17.0	
		SNS5A	35.550	--	1.31	46.571	1.4	0.260	1.63	35'	EL	17.0	0.260	4.84	35'	EL	27.5	0.80	0.260	1.31	35'	EL	17.0	
	TTST	SNS6A	39.950	--	1.26	50.337	1.4	0.260	1.57	35'	EL	17.0	0.260	4.51	35'	EL	27.5	0.80	0.260	1.26	35'	EL	17.0	
		SNS7B	42.000	3	1.20	50.400	1.4	0.260	1.49	35'	EL	17.0	0.260	4.61	35'	EL	27.5	0.80	0.260	1.20	35'	EL	17.0	
		TNAGRIT3	33.000	--	1.56	51.480	1.4	0.260	1.94	35'	EL	17.0	0.260	5.43	35'	EL	27.5	0.80	0.260	1.56	35'	EL	17.0	
		TNT4A	33.075	--	1.57	51.928	1.4	0.260	1.95	35'	EL	17.0	0.260	5.04	35'	EL	27.5	0.80	0.260	1.57	35'	EL	17.0	
		TNT6A	41.600	--	1.35	56.160	1.4	0.260	1.68	35'	EL	17.0	0.260	4.87	35'	EL	27.5	0.80	0.260	1.35	35'	EL	17.0	
		TNT7A	42.000	--	1.40	58.800	1.4	0.260	1.74	35'	EL	17.0	0.260	4.58	35'	EL	27.5	0.80	0.260	1.40	35'	EL	17.0	
TNT7B	42.000	--	1.39	58.380	1.4	0.260	1.73	35'	EL	17.0	0.260	4.46	35'	EL	27.5	0.80	0.260	1.39	35'	EL	17.0			
TNAGRIT4	43.000	--	1.39	59.770	1.4	0.260	1.73	35'	EL	13.5	0.260	4.33	35'	EL	27.5	0.80	0.260	1.39	35'	EL	13.5			
TNAGT5A	45.000	--	1.29	58.050	1.4	0.260	1.60	35'	EL	17.0	0.260	4.72	35'	EL	27.5	0.80	0.260	1.29	35'	EL	17.0			
TNAGT5B	45.000	--	1.24	55.800	1.4	0.260	1.55	35'	EL	17.0	0.260	4.06	35'	EL	27.5	0.80	0.260	1.24	35'	EL	17.0			

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	$\gamma_{DC}$	$\gamma_{DW}$
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

# CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

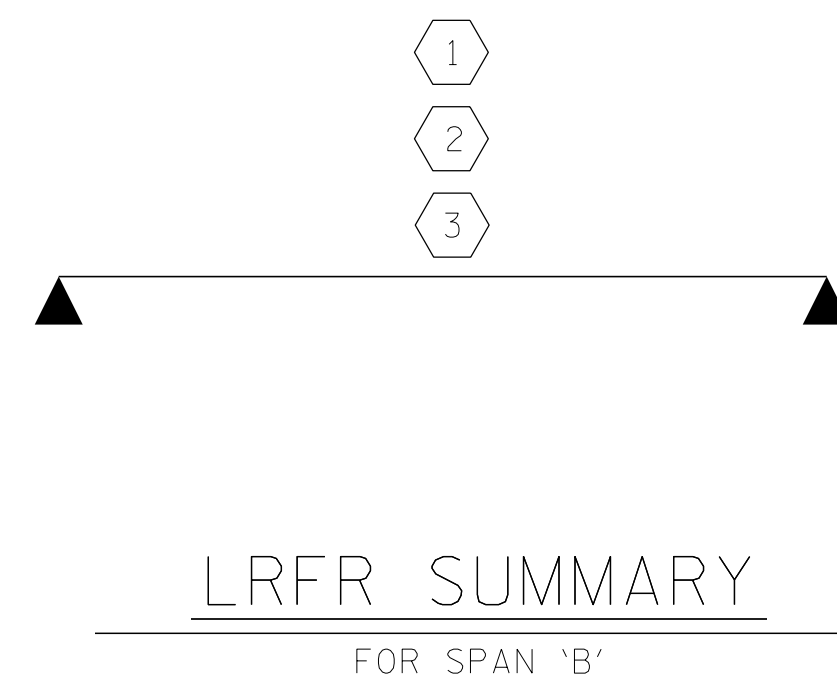
2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER  
EL - EXTERIOR LEFT GIRDER  
ER - EXTERIOR RIGHT GIRDER



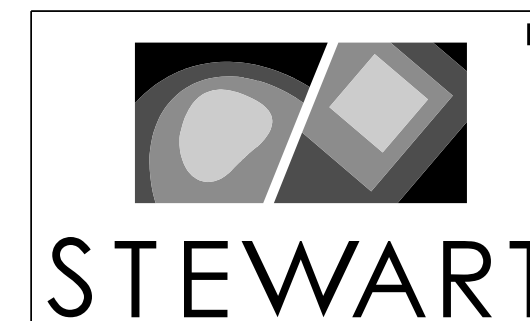
PROJECT NO. 17BP.5.PE.79  
WAKE COUNTY  
STATION: 11+90.50 -L-

SHEET 2 OF 2



DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

LRFR SUMMARY FOR  
35' CORED SLAB UNIT  
90° SKEW  
(NON-INTERSTATE TRAFFIC)

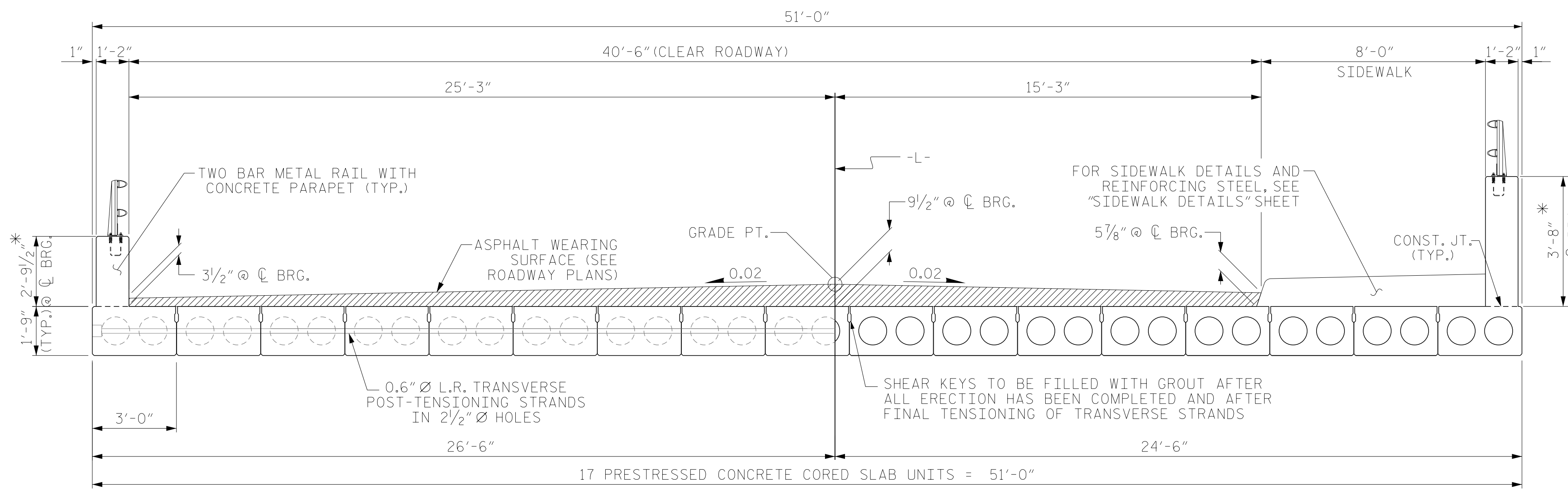
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

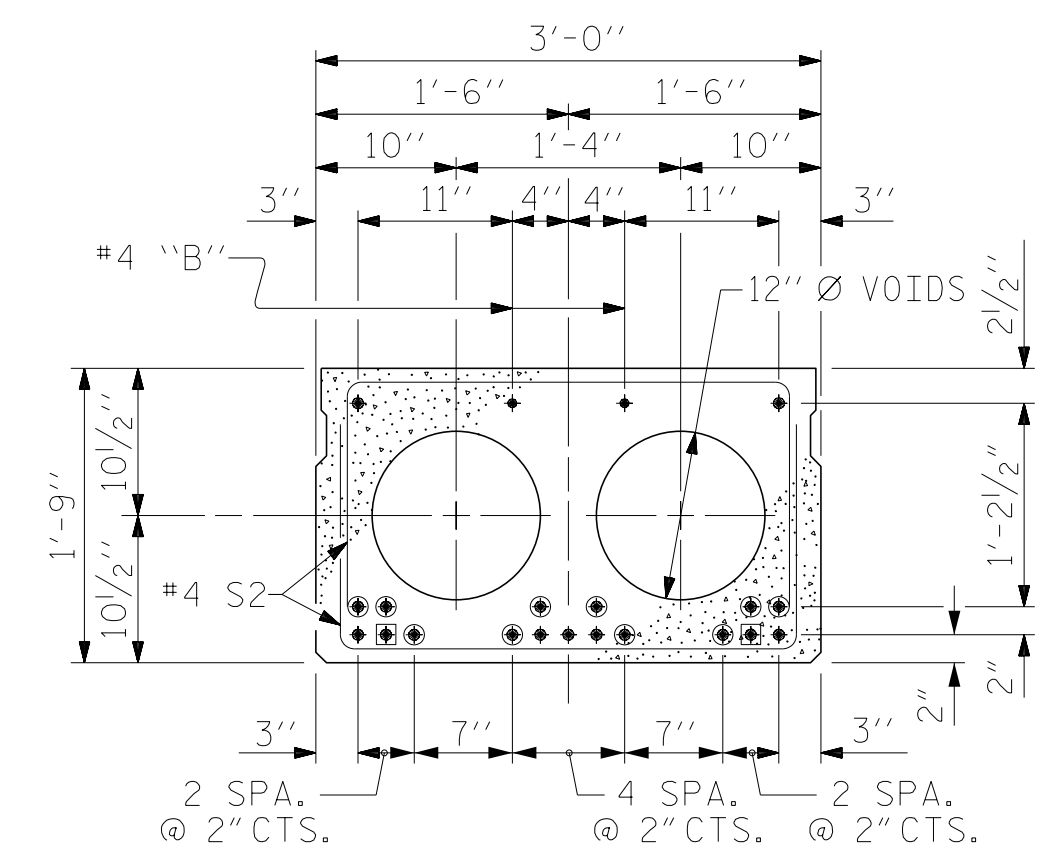
\$\$\$SYSTEMTIME\$\$\$  
\$\$\$DGN\$\$\$  
\$\$\$USERNAME\$\$\$

WAKE 216

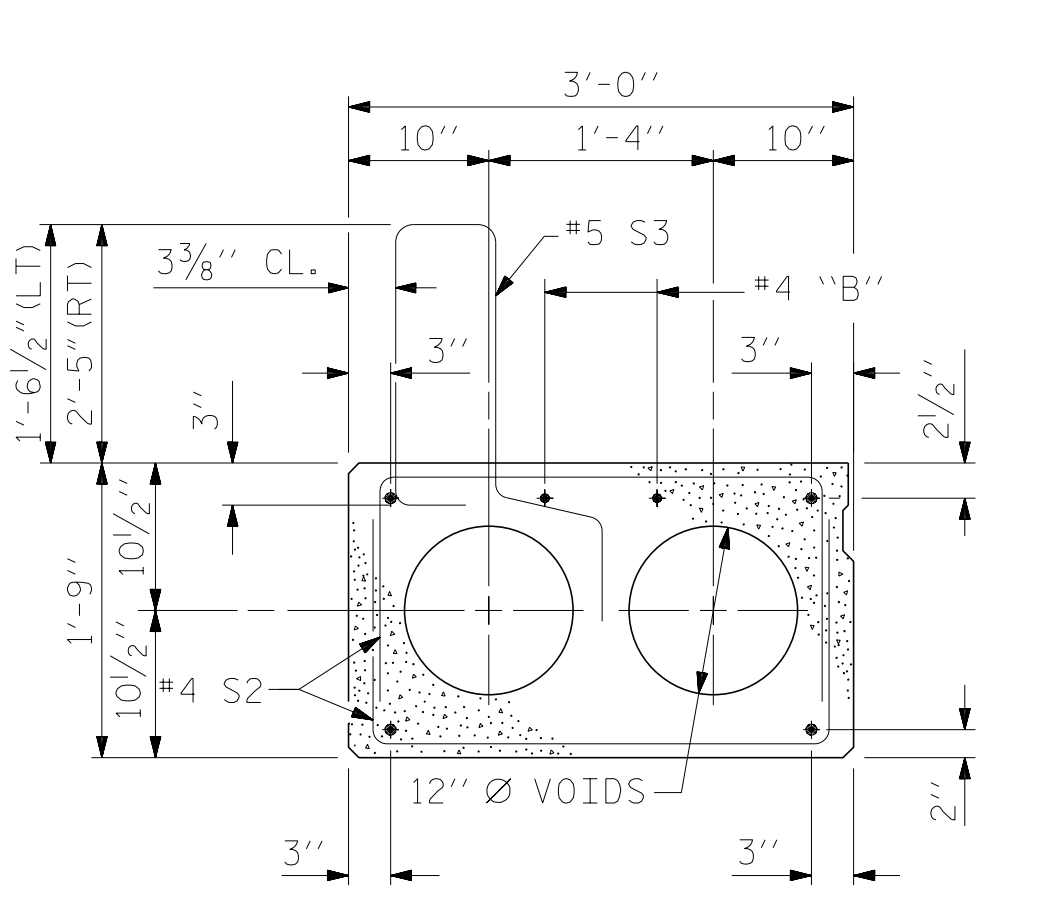




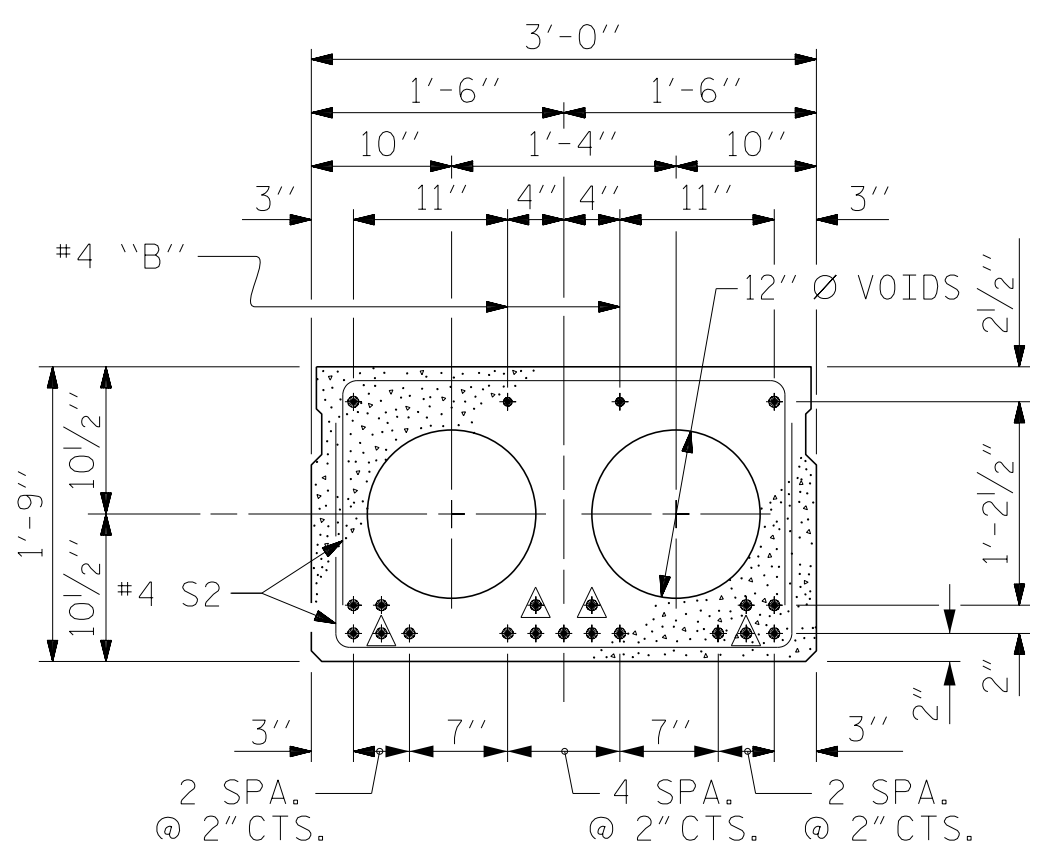
HALF SECTION AT INTERMEDIATE DIAPHRAGMS  
 HALF SECTION THROUGH VOIDS  
**TYPICAL SECTION**  
 \* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN, THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "SECTION THRU PARAPET AND RAIL" DETAIL.



**INTERIOR SLAB SECTION (35' UNIT)**  
 (9 STRANDS REQUIRED)



**EXT. SLAB SECTION**  
 (FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

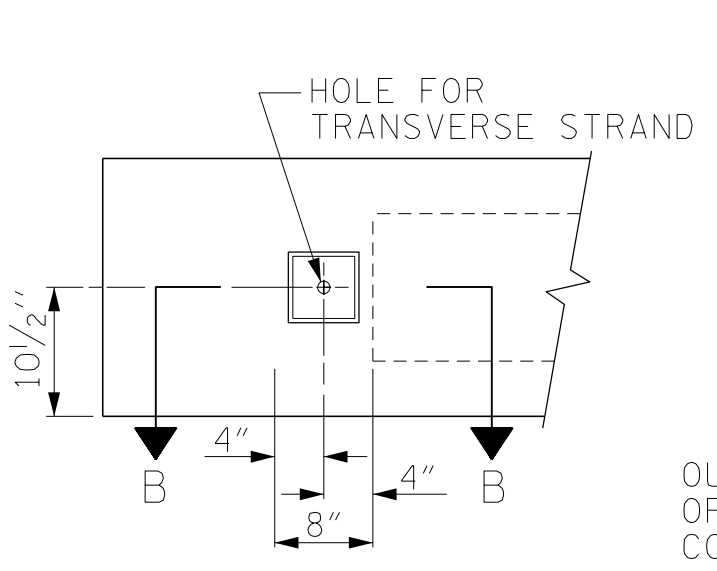


**INTERIOR SLAB SECTION (50' UNIT)**  
 (19 STRANDS REQUIRED)

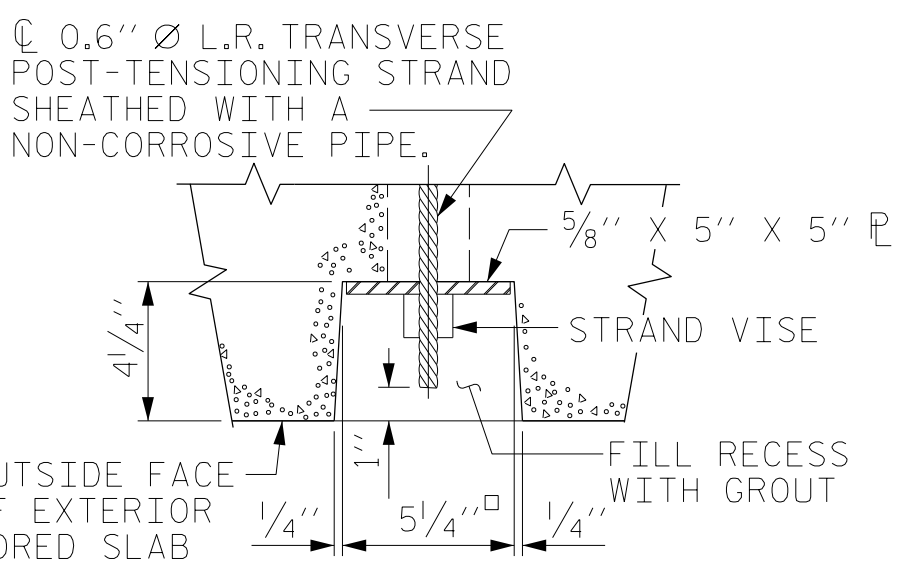
**0.6" Ø LOW RELAXATION STRAND LAYOUT**

- DEBONDING LEGEND**
- ▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
  - BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.
  - ⊙ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

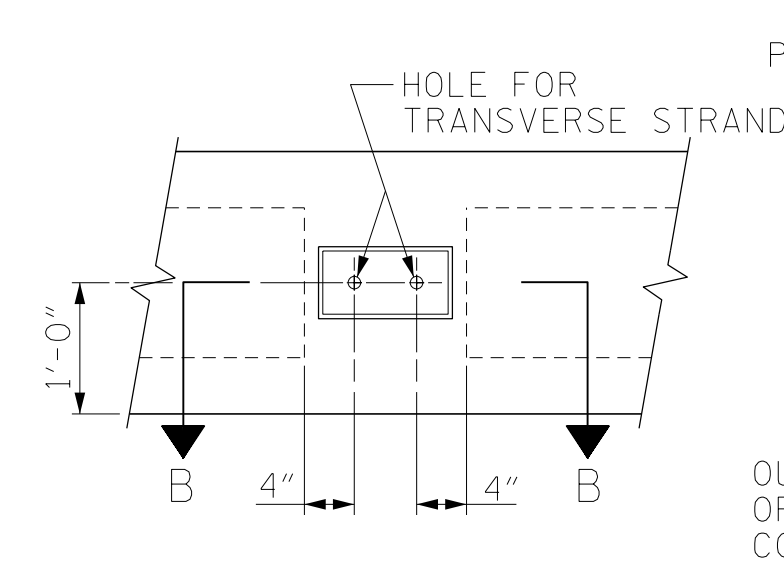
**DEBONDING LEGEND**



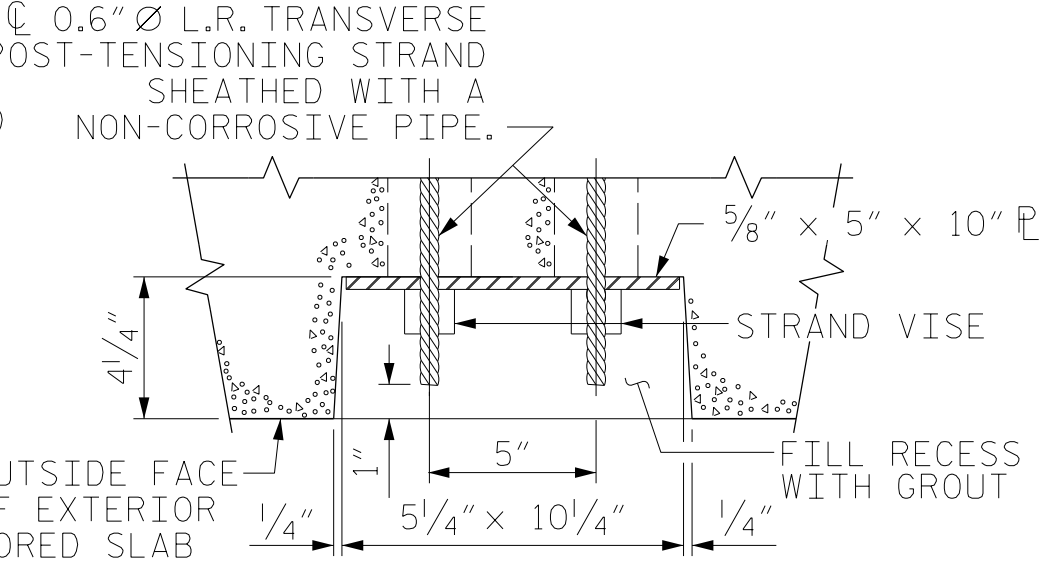
**ELEVATION VIEW**



**SECTION B-B**



**ELEVATION VIEW**



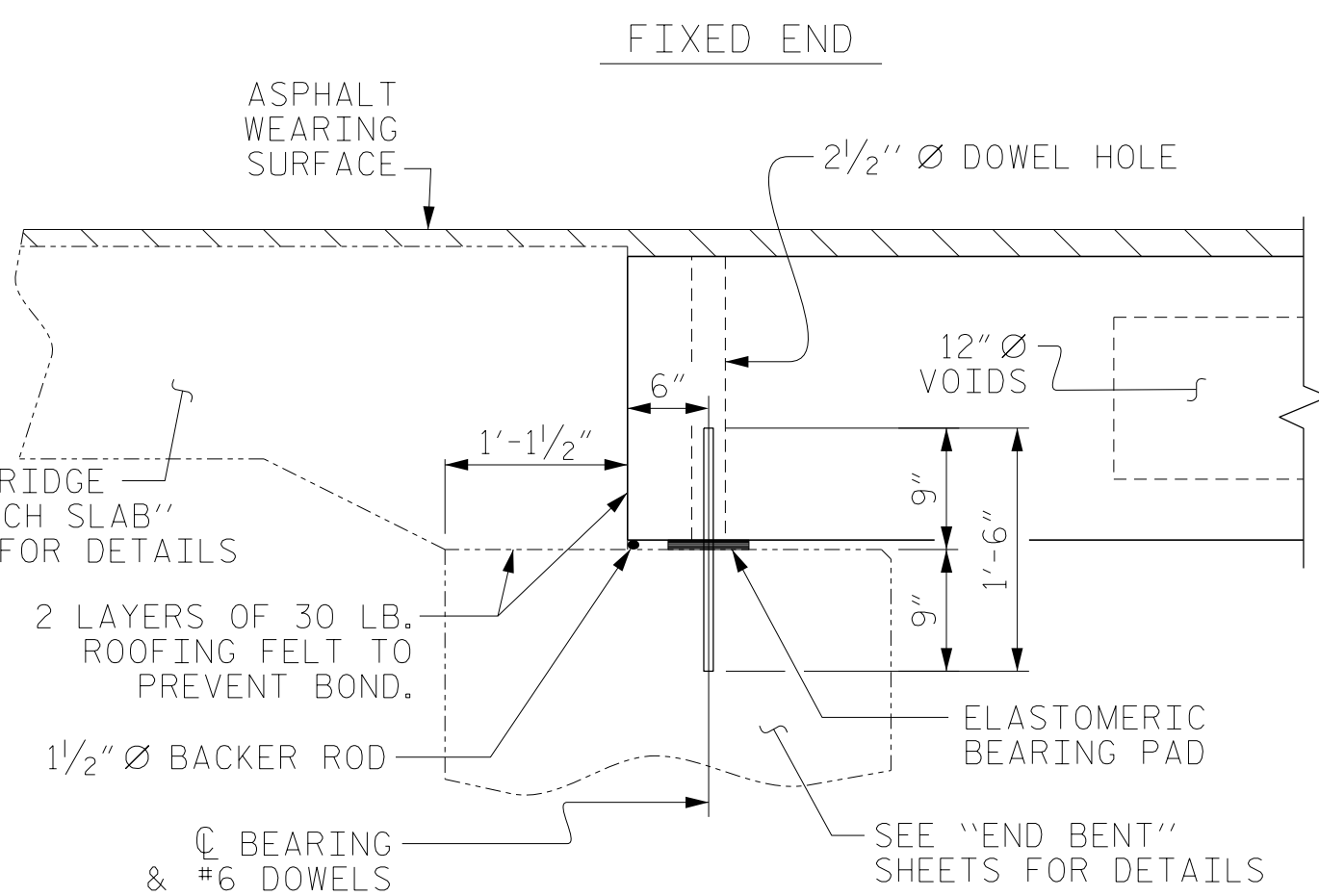
**SECTION B-B**

**GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS**

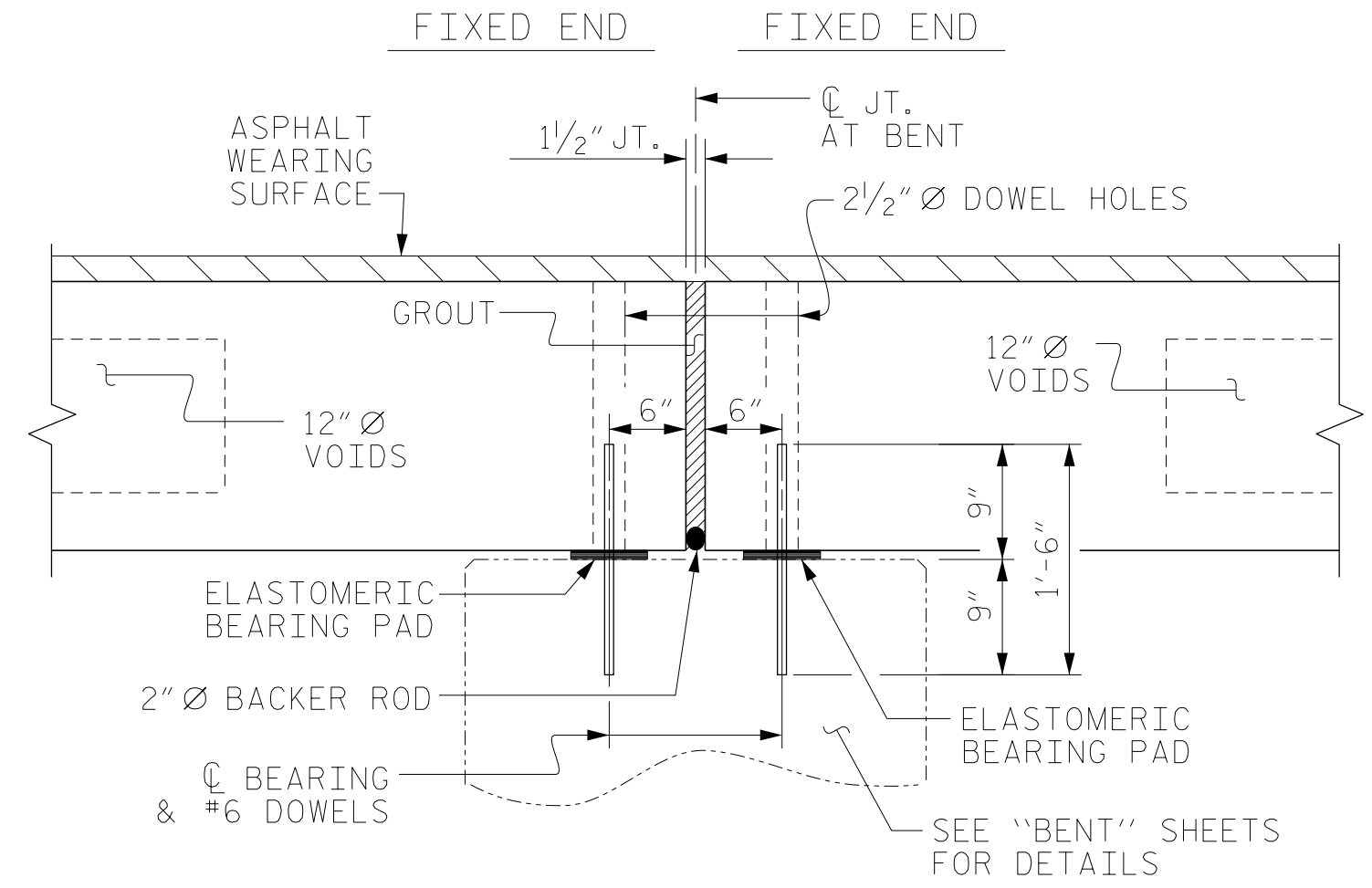
SEE SHEETS S-7 AND S-8 FOR GROUTED RECESS LOCATIONS IN CORED SLABS  
 NOTE: DETAIL APPLICABLE FOR BEGINNING AND END OF GIRDER STRAND LOCATIONS

**GROUTED RECESS AT END OF POST-TENSIONED STRAND CORED SLABS**

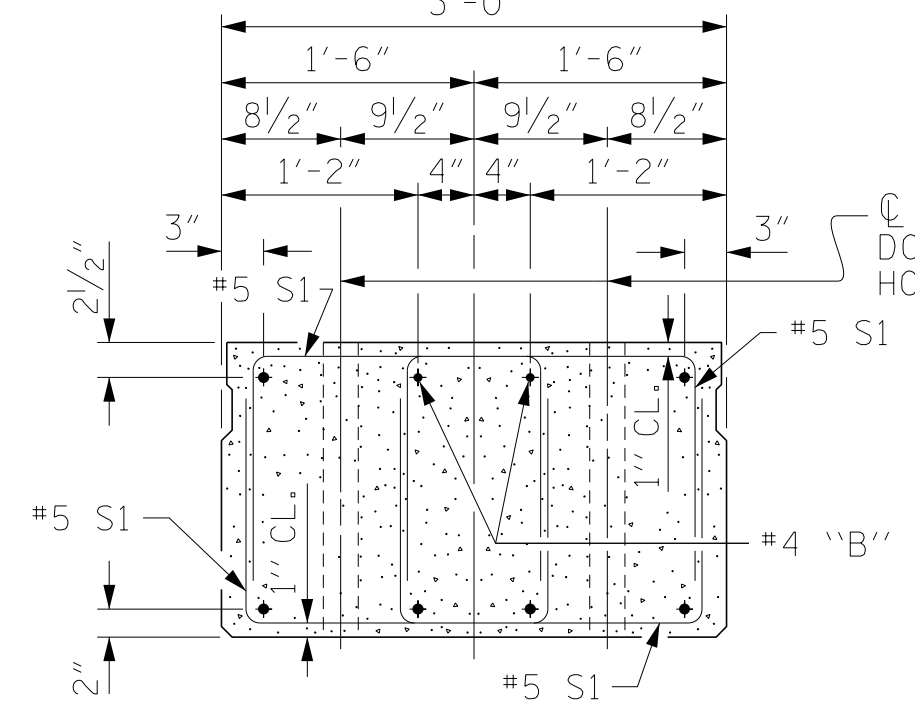
SEE SHEETS S-7 AND S-8 FOR GROUTED RECESS LOCATIONS IN CORED SLABS  
 NOTE: DETAIL APPLICABLE FOR THIRD POINT STAND LOCATIONS



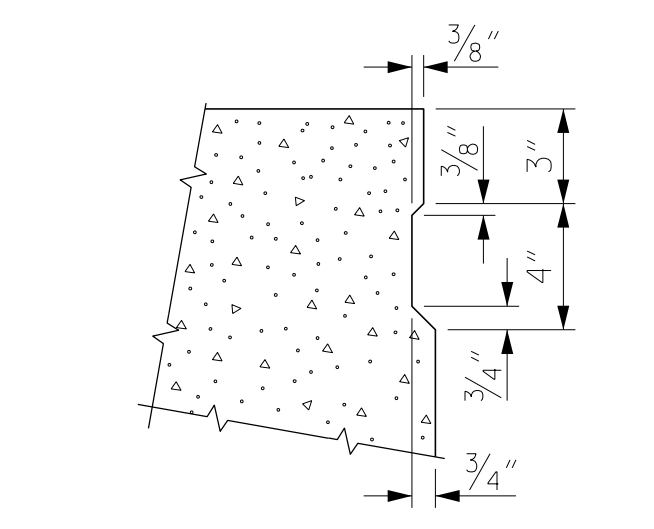
**SECTION AT END BENT**



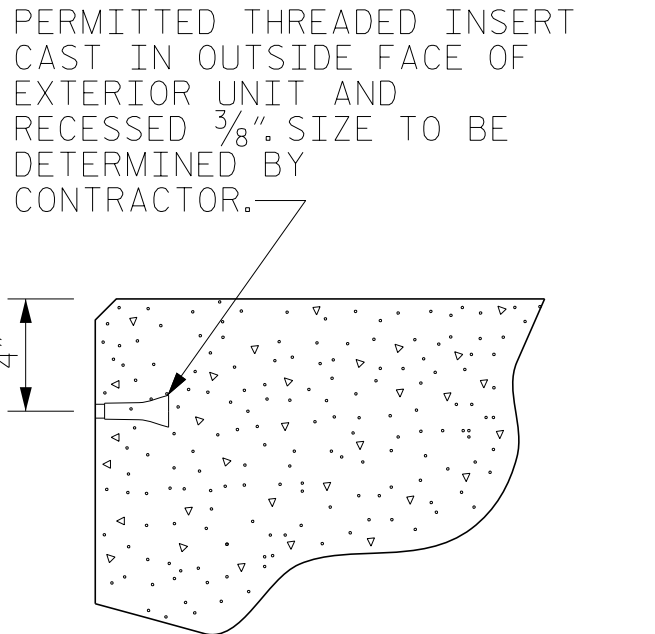
**SECTION AT BENT**



**END ELEVATION**  
 SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.)  
 INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



**SHEAR KEY DETAIL**  
 NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.



**THREADED INSERT DETAIL**



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



Firm License No. C-1051  
 223 S. West St,  
 Suite 1100  
 Raleigh, NC 27603  
 T 919.380.8750  
 www.stewartinc.com

PROJECT NO. 17BP.5.PE.79  
 WAKE COUNTY  
 STATION: 11+90.50 -L-  
 SHEET 1 OF 4

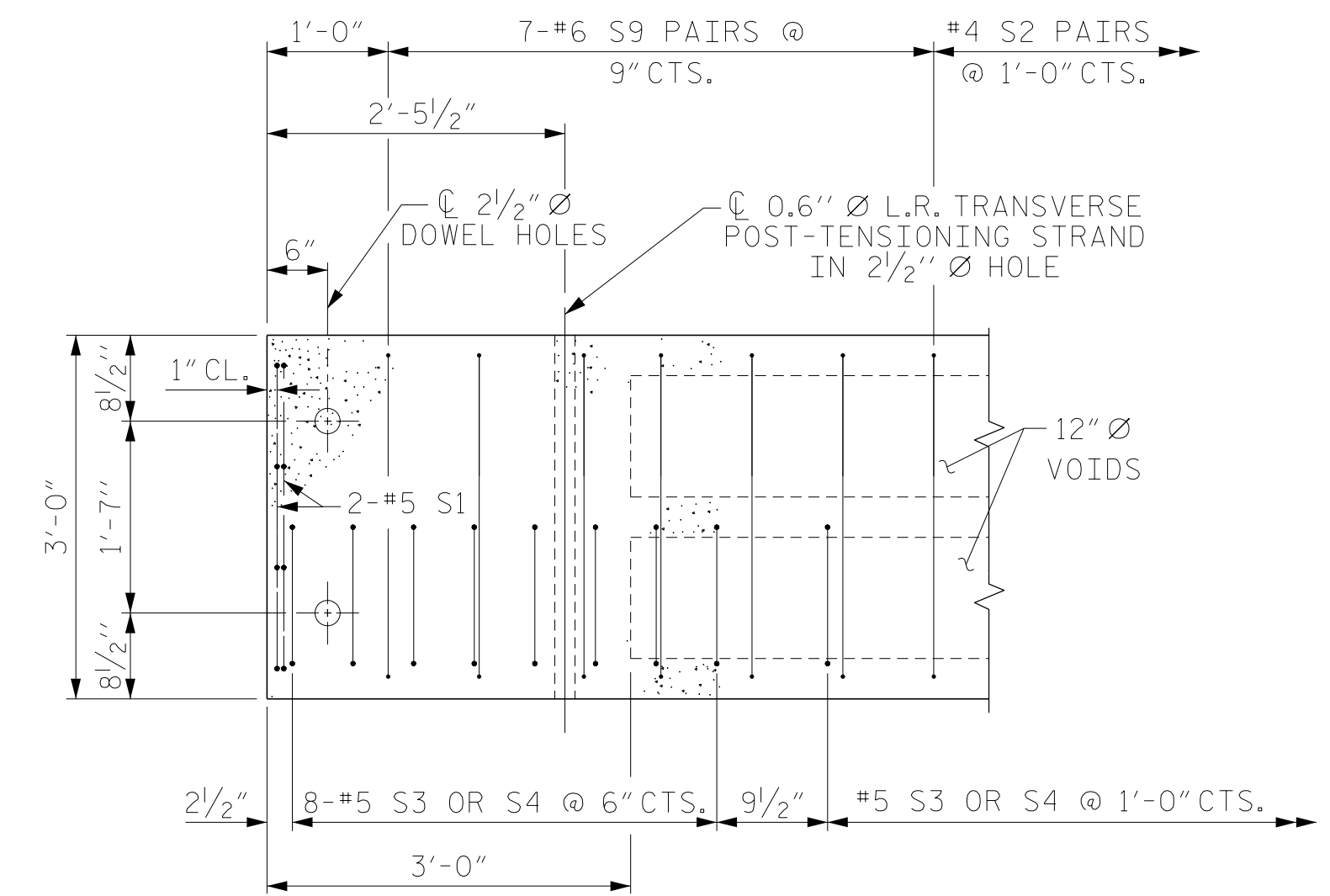
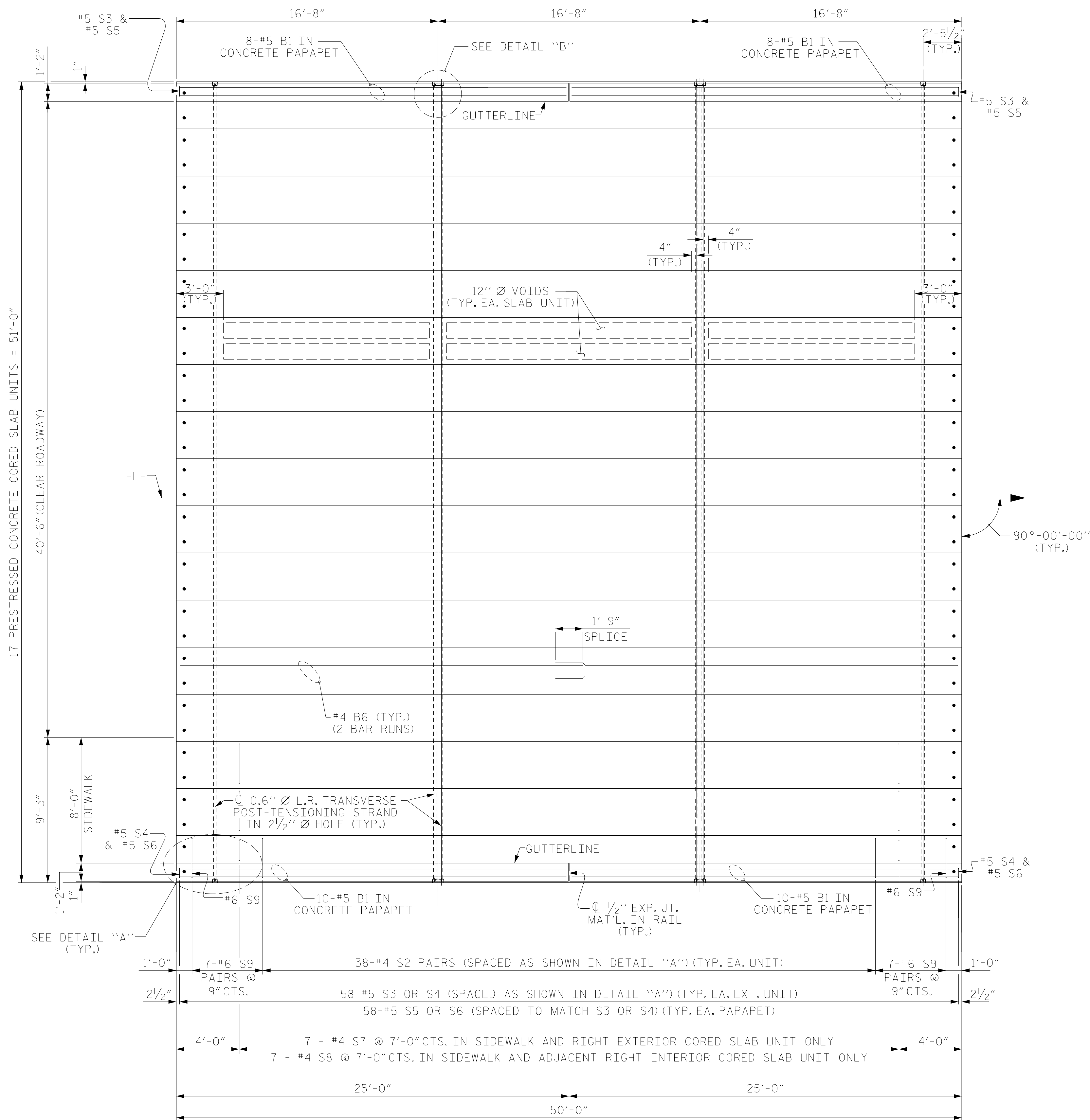
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: V. CHUNG DATE: 11-19  
 CHECKED BY: E. PHELPS DATE: 12-19  
 DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

WAKE 216

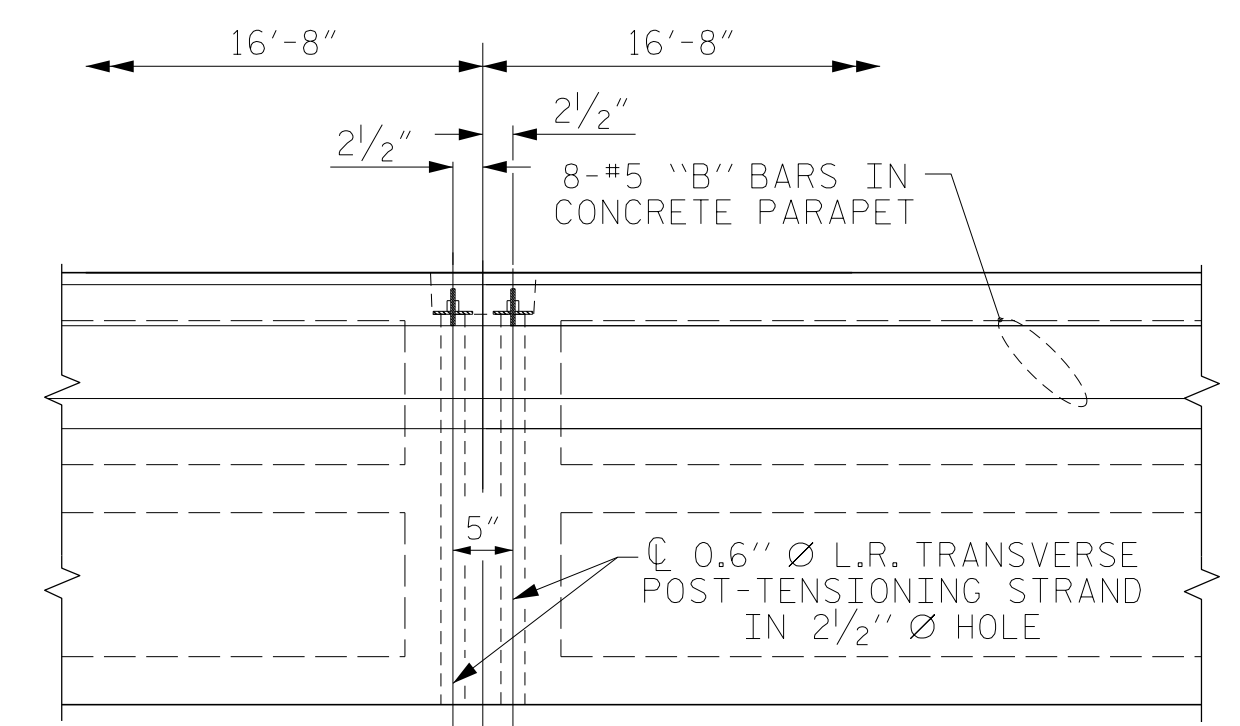
\$\$\$\$SYTIME\$\$\$\$  
 \$\$\$DGN\$\$\$  
 \$\$\$USERNAME\$\$\$



**DETAIL "A"**

(TYPICAL EACH END OF UNIT)

NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 OR S4 BARS. BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES



**DETAIL "B"**

#4 S2 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

**PLAN OF UNIT**

NOTE: FOR DETAILS & REINFORCING STEEL IN SIDEWALK, SEE "SIDEWALK DETAILS" SHEET.

PROJECT NO. 17BP.5.PE.79

WAKE COUNTY

STATION: 11+90.50 -L-

SHEET 2 OF 4



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**STEWART**

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SPAN A PLAN OF 50' UNIT 40'-6" CLEAR ROADWAY 90° SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-8					TOTAL SHEETS 26

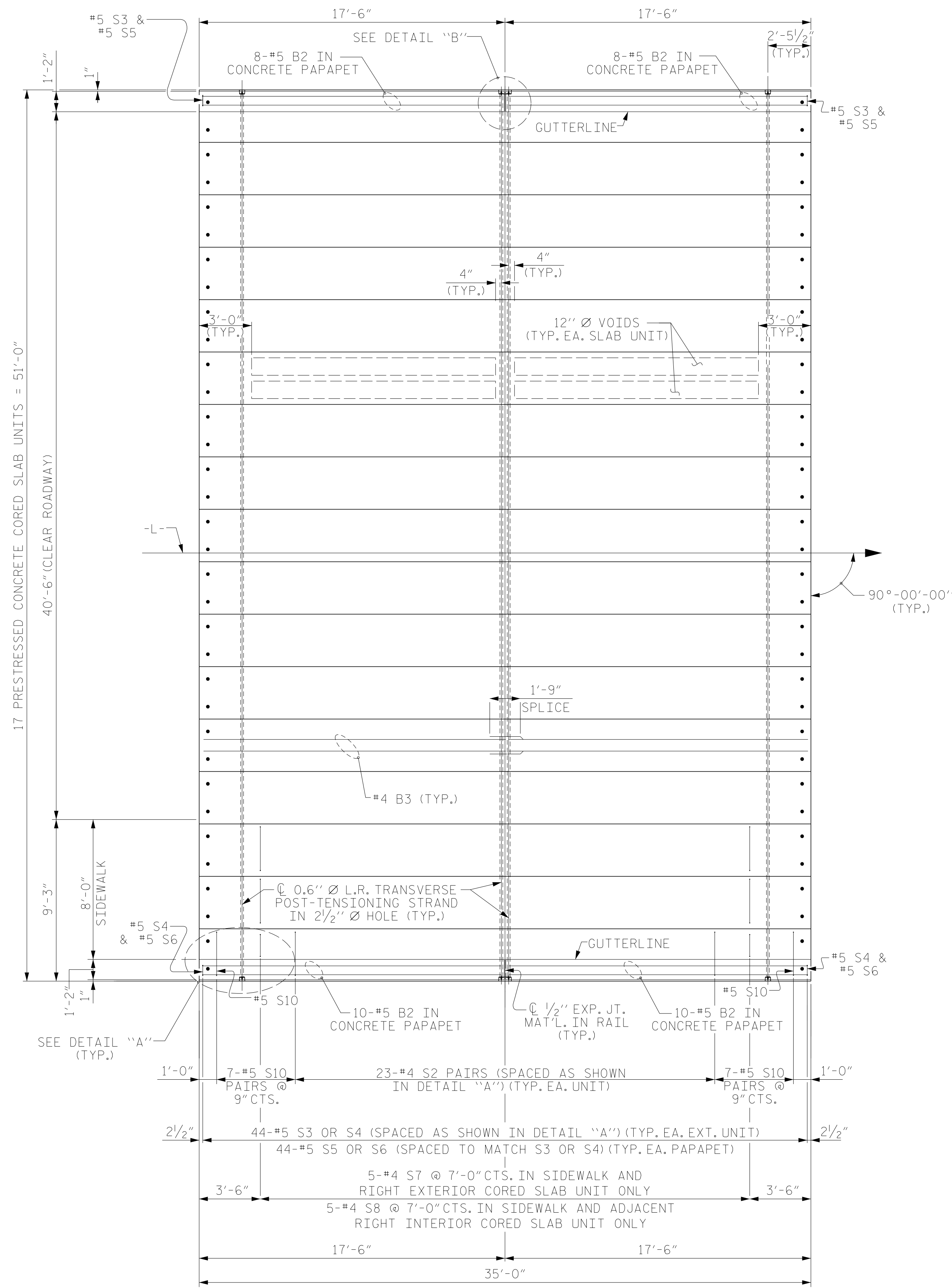
DRAWN BY: V. CHUNG DATE: 11-19

CHECKED BY: E. PHELPS DATE: 12-19

DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

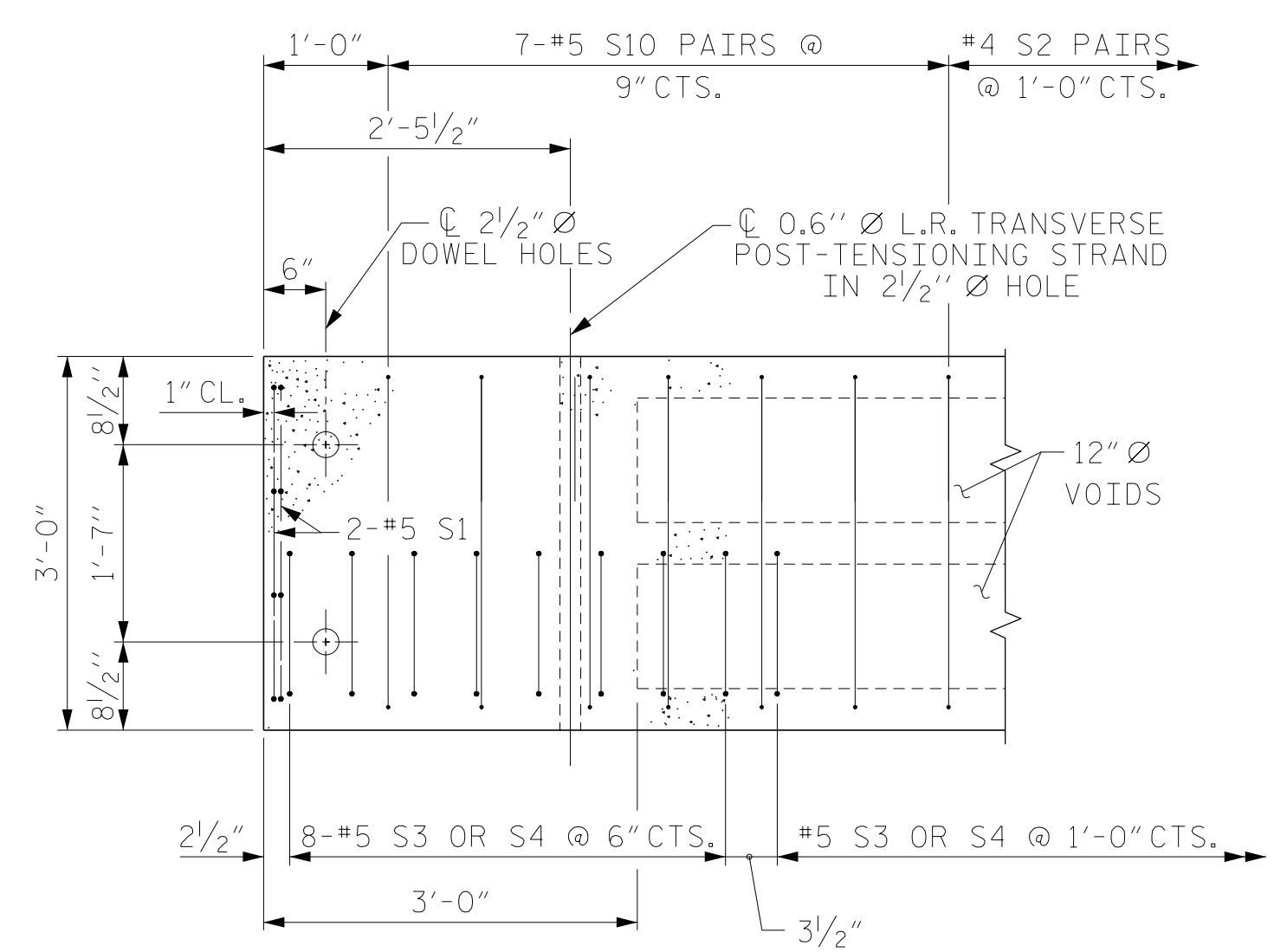
WAKE 216

\$\$\$SYTIME\$\$\$  
\$\$\$DGN\$\$\$  
\$\$\$USERNAME\$\$\$



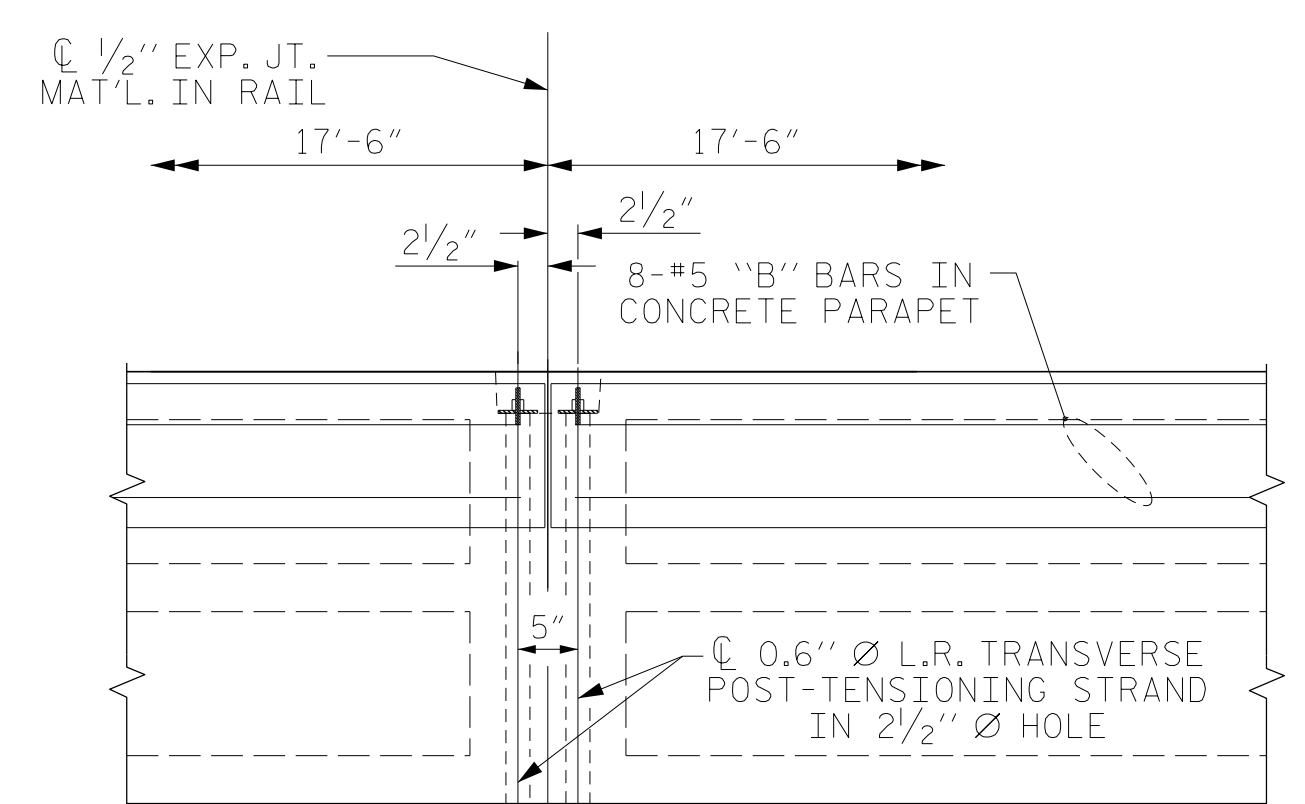
PLAN OF UNIT

NOTE: FOR DETAILS & REINFORCING STEEL IN SIDEWALK, SEE "SIDEWALK DETAILS" SHEET.



DETAIL "A"

(TYPICAL EACH END OF UNIT)  
 NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 OR #5 S4 BARS. BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2 1/2" TRANSVERSE POST-TENSIONING STRAND HOLES



DETAIL "B"

#4 S2 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2 1/2" TRANSVERSE POST-TENSIONING STRAND HOLES

PROJECT NO. 17BP.5.PE.79

WAKE COUNTY

STATION: 11+90.50 -L-

SHEET 3 OF 4



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STEWART  
 Firm License No. C-1051  
 223 S. West St., Suite 1100  
 Raleigh, NC 27603  
 T 919.380.8750  
 www.stewartinc.com

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SPAN B PLAN OF 35' UNIT 40'-6" CLEAR ROADWAY 90° SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-9					TOTAL SHEETS 26

DRAWN BY: V. CHUNG	DATE: 11-19
CHECKED BY: E. PHELPS	DATE: 12-19
DESIGN ENGINEER OF RECORD: D. RUGGLES	DATE: 12-19

WAKE 216

\$\$\$SYTIME\$\$\$  
 \$\$\$DGN\$\$\$  
 \$\$\$USERNAME\$\$\$

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER, SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

ALL REINFORCING STEEL IN CONCRETE PARAPETS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE CONCRETE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN CONCRETE PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

THE #4 S11 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

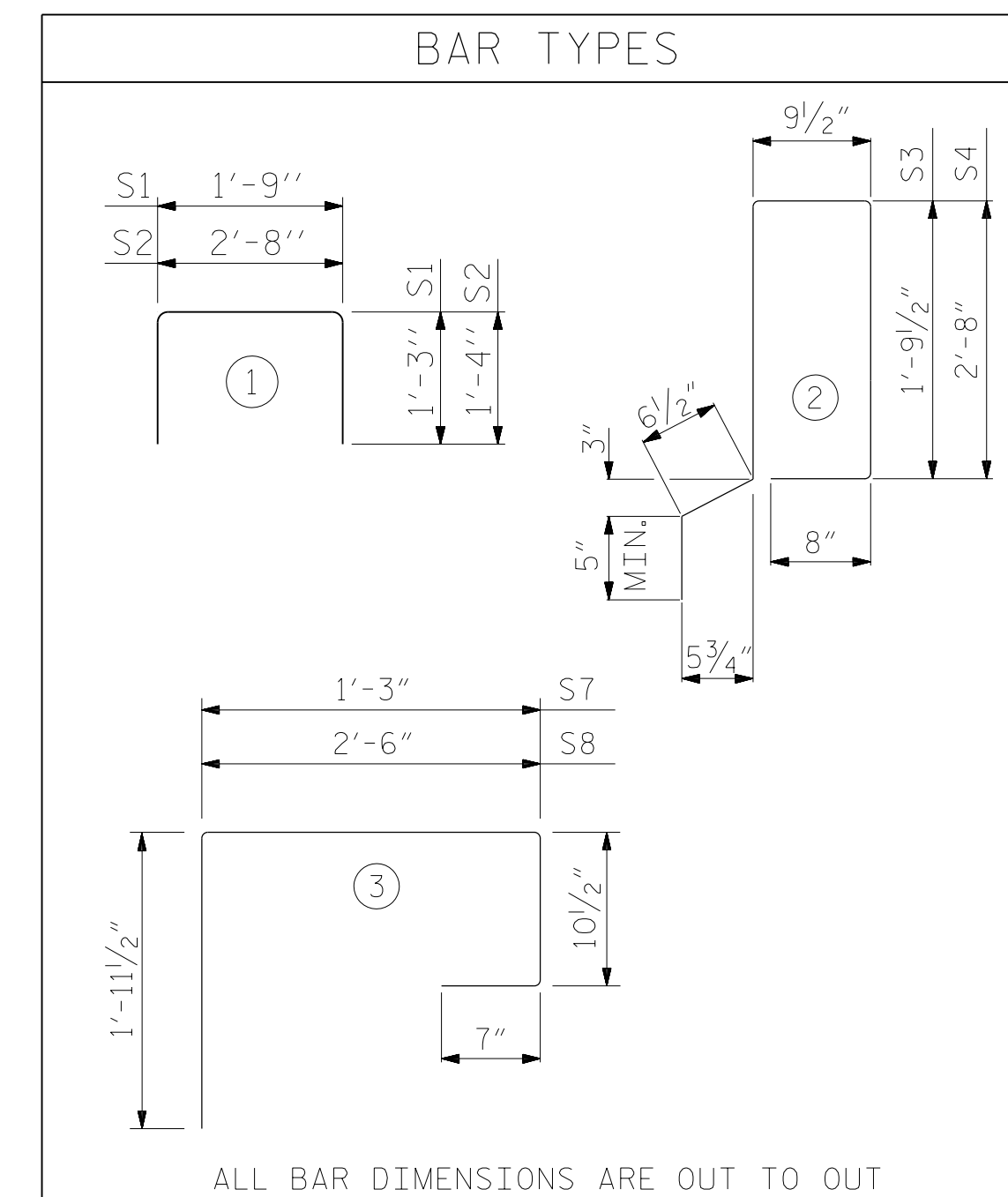
THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

BILL OF MATERIAL FOR ONE 50' CORED SLAB UNIT									
				LEFT EXTERIOR UNIT		RIGHT EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT
B6	4	#4	STR	25'-9"	69	25'-9"	69	25'-9"	69
S1	8	#5	1	4'-3"	35	4'-3"	35	4'-3"	35
S2	76	#4	1	5'-4"	271	5'-4"	271	5'-4"	271
S9	28	#6	1	5'-4"	224	5'-4"	224	5'-4"	224
* S3	58	#5	2	6'-0"	363	--	--	--	--
* S4	58	#5	2	--	--	7'-9"	469	--	--
* S7	7	#4	3	--	--	4'-8"	22	--	--
* S8	14	#4	3	--	--	--	--	5'-11"	55
REINFORCING STEEL				LBS.	599		599		599
* EPOXY COATED REINFORCING STEEL				LBS.	363		491		55
6500 P.S.I. CONCRETE				CU. YDS.	7.1		7.1		7.1
0.6" Ø L.R. STRANDS				No.	19		19		19

GRADE 270 STRANDS	
AREA ( SQUARE INCHES )	0.6" Ø L.R.
ULTIMATE STRENGTH ( LBS. PER STRAND )	58,600
APPLIED PRESTRESS ( LBS. PER STRAND )	43,950



BILL OF MATERIAL FOR ONE 35' CORED SLAB UNIT									
				LEFT EXTERIOR UNIT		RIGHT EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT
B3	2	#4	STR	34'-9"	46	34'-9"	46	34'-9"	46
S1	8	#5	1	4'-3"	35	4'-3"	35	4'-3"	35
S2	46	#4	1	5'-4"	164	5'-4"	165	5'-4"	165
S10	28	#5	1	5'-4"	156	5'-4"	156	5'-4"	156
* S3	44	#5	2	6'-0"	275	--	--	--	--
* S4	44	#5	2	--	--	7'-9"	356	--	--
* S7	5	#4	3	--	--	4'-8"	16	--	--
* S8	10	#4	3	--	--	--	--	5'-11"	40
REINFORCING STEEL				LBS.	401		401		401
* EPOXY COATED REINFORCING STEEL				LBS.	275		372		40
5000 P.S.I. CONCRETE				CU. YDS.	5.1		5.1		5.1
0.6" Ø L.R. STRANDS				No.	9		9		9

DEAD LOAD DEFLECTION AND CAMBER	
50' CORED SLAB UNIT	3'-0" x 1'-9" 0.6" Ø L.R. STRAND
CAMBER ( SLAB ALONE IN PLACE )	1 1/2" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/2" ↓
FINAL CAMBER	1" ↑

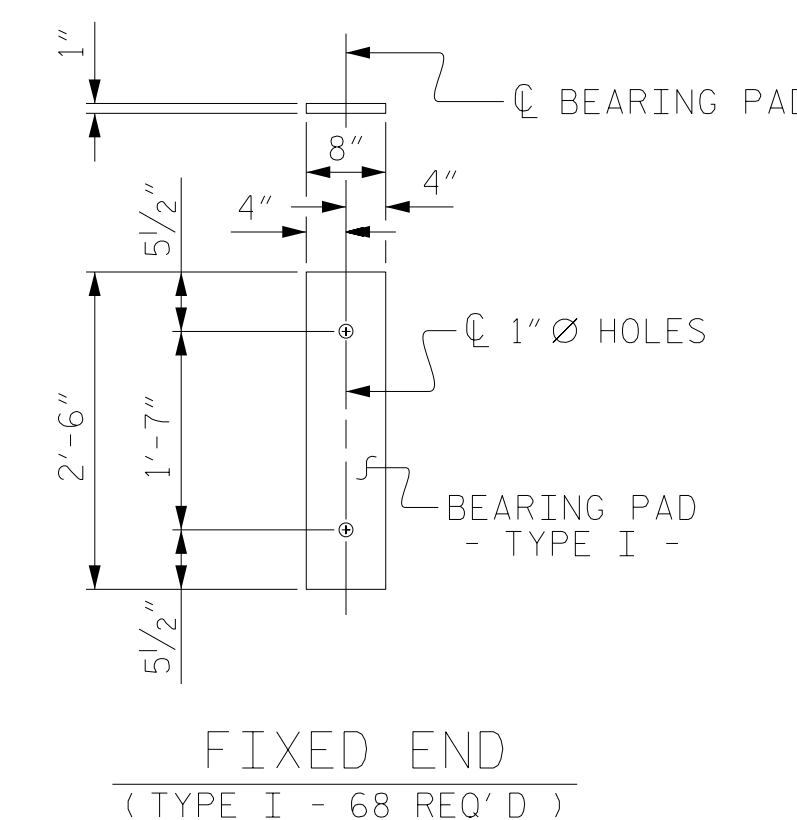
\*\* INCLUDES FUTURE WEARING SURFACE

CONCRETE RELEASE STRENGTH	
UNIT	PSI
50' UNITS	4900
35' UNITS	4000

DEAD LOAD DEFLECTION AND CAMBER	
35' CORED SLAB UNIT	3'-0" x 1'-9" 0.6" Ø L.R. STRAND
CAMBER ( SLAB ALONE IN PLACE )	1/4" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/8" ↓
FINAL CAMBER	1/8" ↑

\*\* INCLUDES FUTURE WEARING SURFACE

CORED SLABS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
50' UNIT			
EXTERIOR C.S.	2	50'-0"	100'-0"
INTERIOR C.S.	15	50'-0"	750'-0"
TOTAL	17	-	850'-0"
35' UNIT			
EXTERIOR C.S.	2	35'-0"	70'-0"
INTERIOR C.S.	15	35'-0"	525'-0"
TOTAL	17	-	595'-0"



ELASTOMERIC BEARING DETAILS  
ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

PROJECT NO. 17BP.5.PE.79  
WAKE COUNTY  
STATION: 11+90.50 -L-

SHEET 4 OF 4



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

STEWART

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
3'-0" X 1'-9"  
PRESTRESSED CONCRETE  
CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

WAKE 216

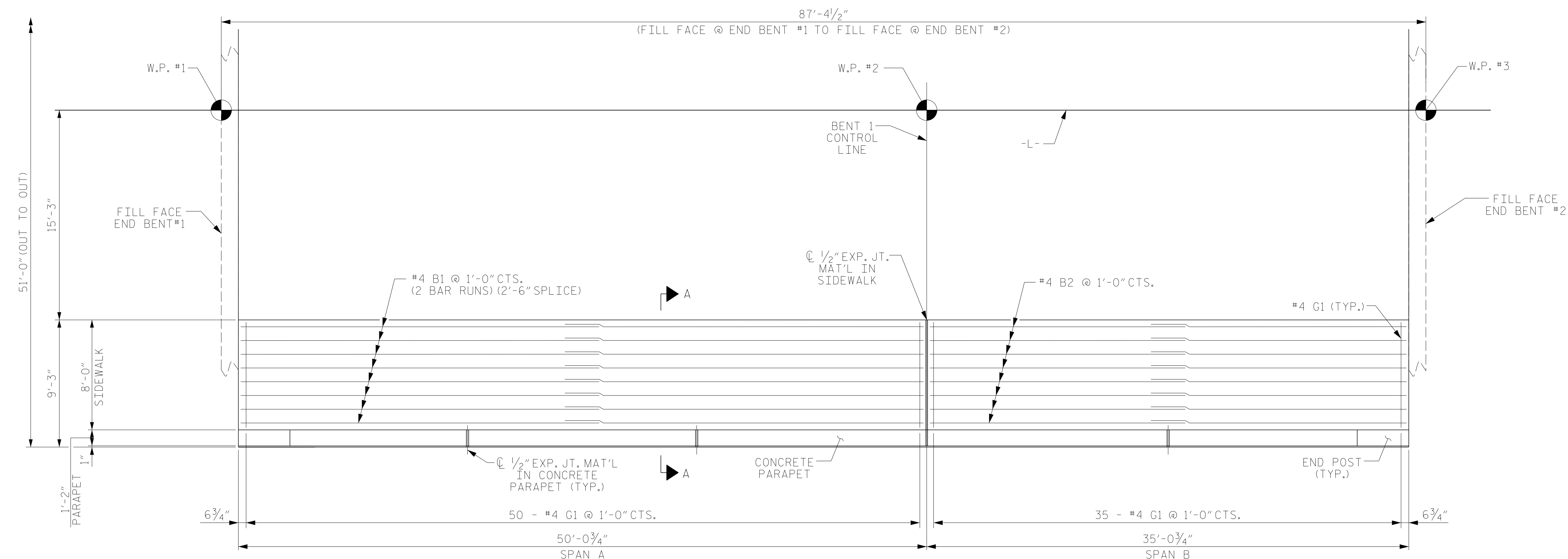
\$\$\$\$SYTIME\$\$\$\$  
\$\$\$\$DGN\$\$\$\$  
\$\$\$\$USERNAME\$\$\$\$



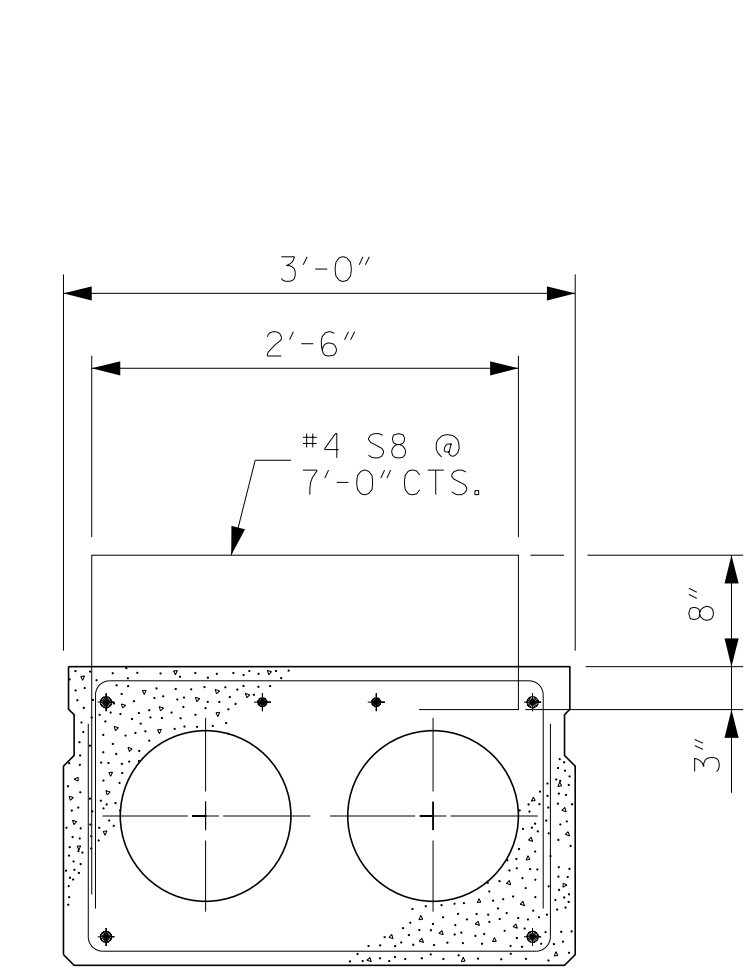
BILL OF MATERIAL  
FOR RIGHT SIDEWALK

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	16	#4	STR	26'-1"	279
*B2	8	#4	STR	34'-9"	186
*G1	85	#4	STR	7'-6"	426

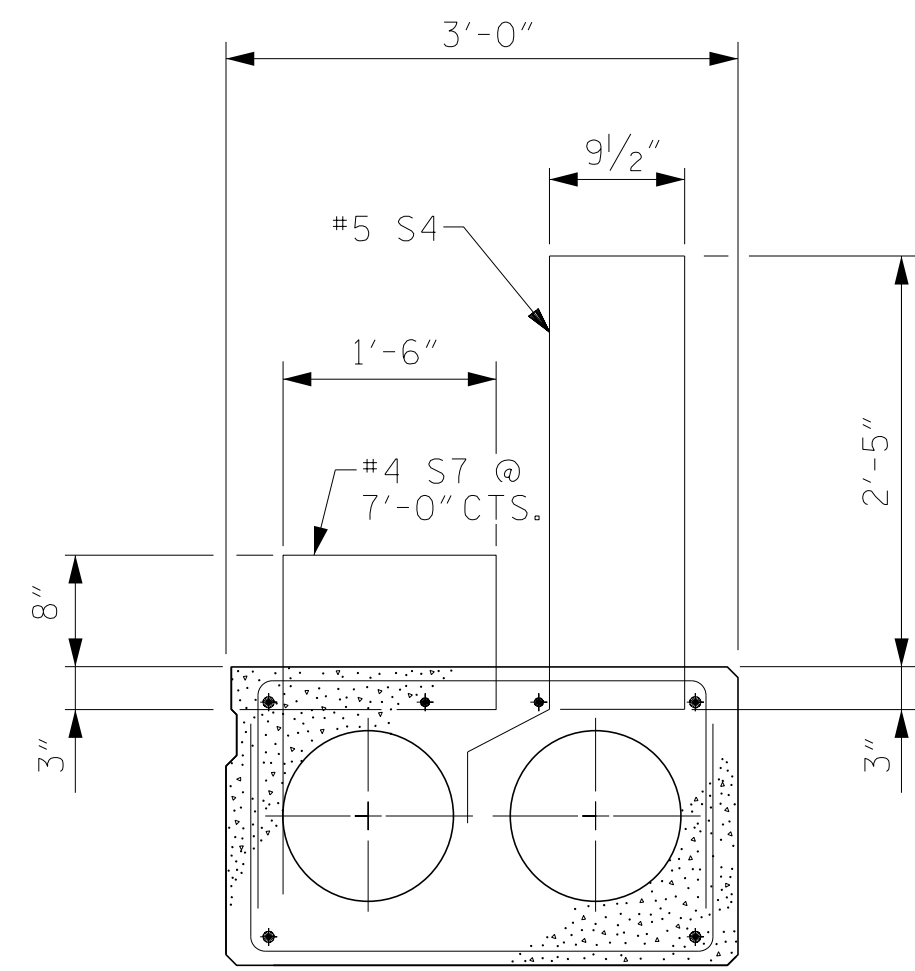
\* EPOXY COATED REINFORCING STEEL 891 LBS.  
CLASS AA CONCRETE 27.0 CU.YDS.



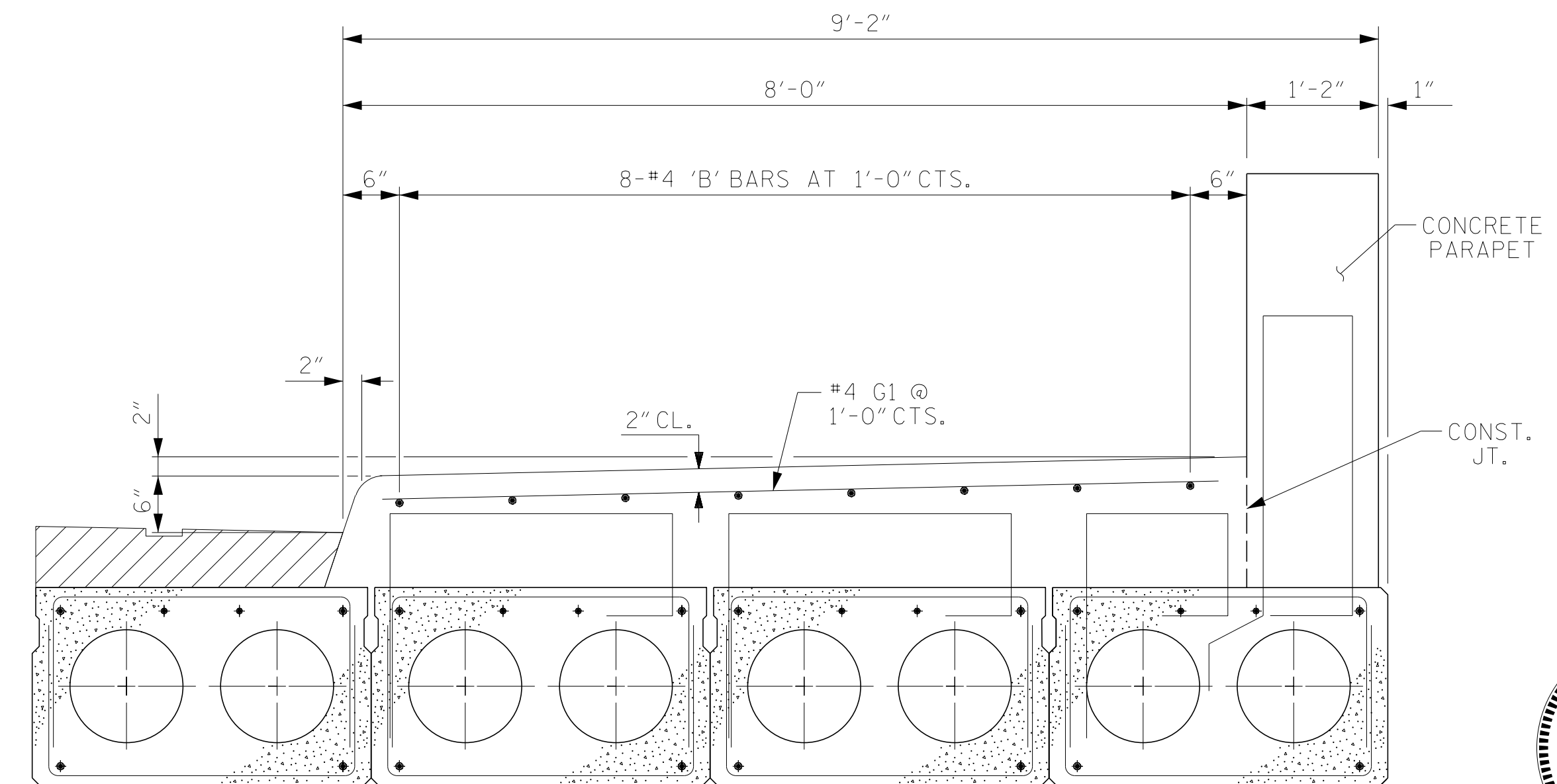
PLAN OF SIDEWALK - RIGHT SIDE



RIGHT INTERIOR CORED SLAB SECTION  
STRAND LAYOUT NOT SHOWN  
(INTERIOR CORED SLAB SECTION ADJACENT TO EXTERIOR CORED SLAB SECTION)



RIGHT EXTERIOR CORED SLAB SECTION  
STRAND LAYOUT NOT SHOWN



SECTION A-A THRU SIDEWALK  
PARAPET STEEL NOT SHOWN FOR CLARITY



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STEWART  
Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

PROJECT NO. 17BP.5.PE.79  
WAKE COUNTY  
STATION: 11+90.50 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SIDEWALK DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

WAKE 216

\$\$\$\$SYSTEM\$\$\$\$  
\$\$\$\$DGN\$\$\$\$  
\$\$\$\$USERNAME\$\$\$\$

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFB BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 155.25 LIN. FT.

PROJECT NO. 17BP.5.PE.79

WAKE COUNTY

STATION: 11+90.50 -L-

SHEET 1 OF 5

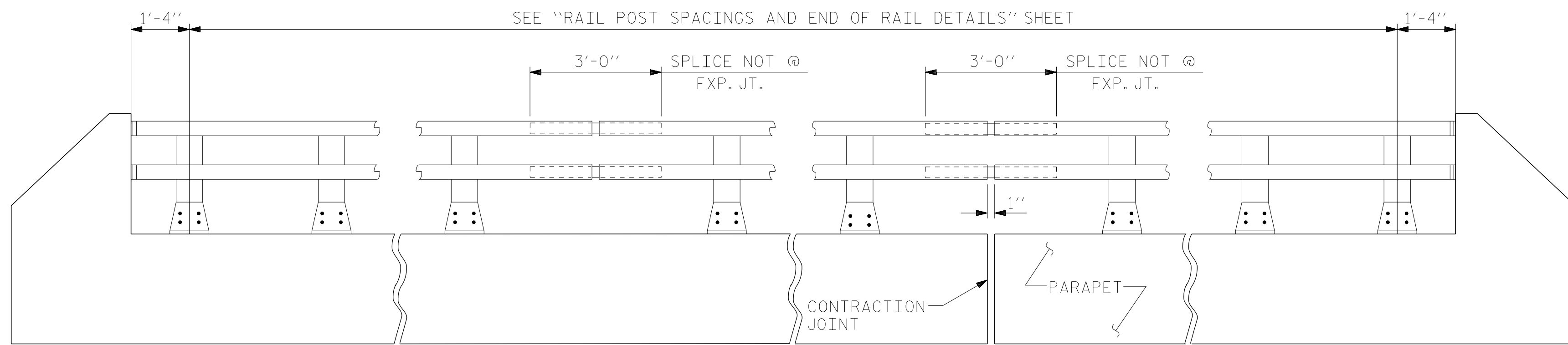


DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

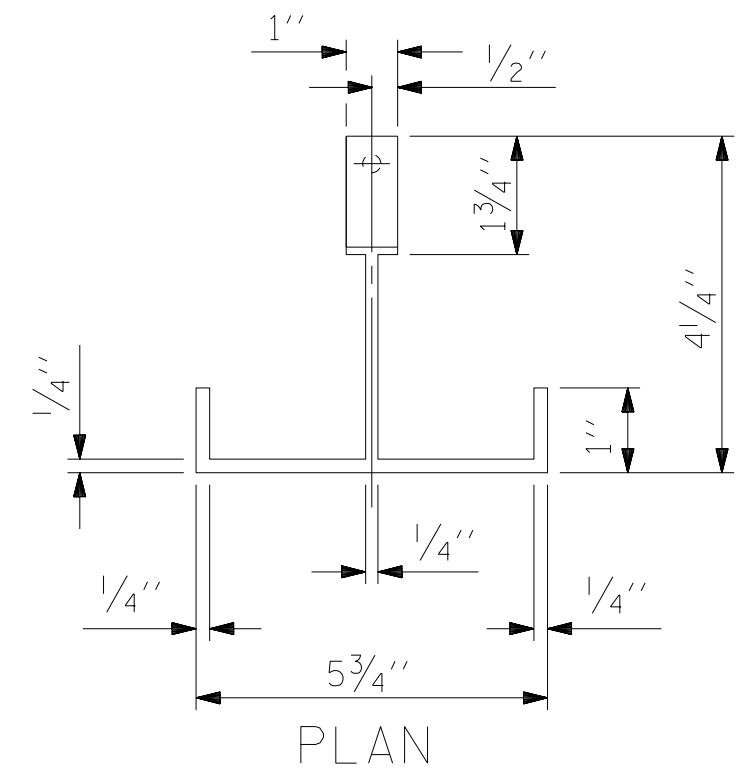
STEWART

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
2 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-12
					TOTAL SHEETS 26

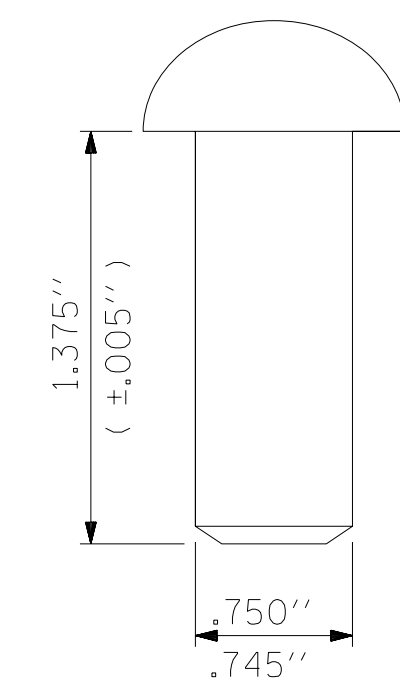


ELEVATION

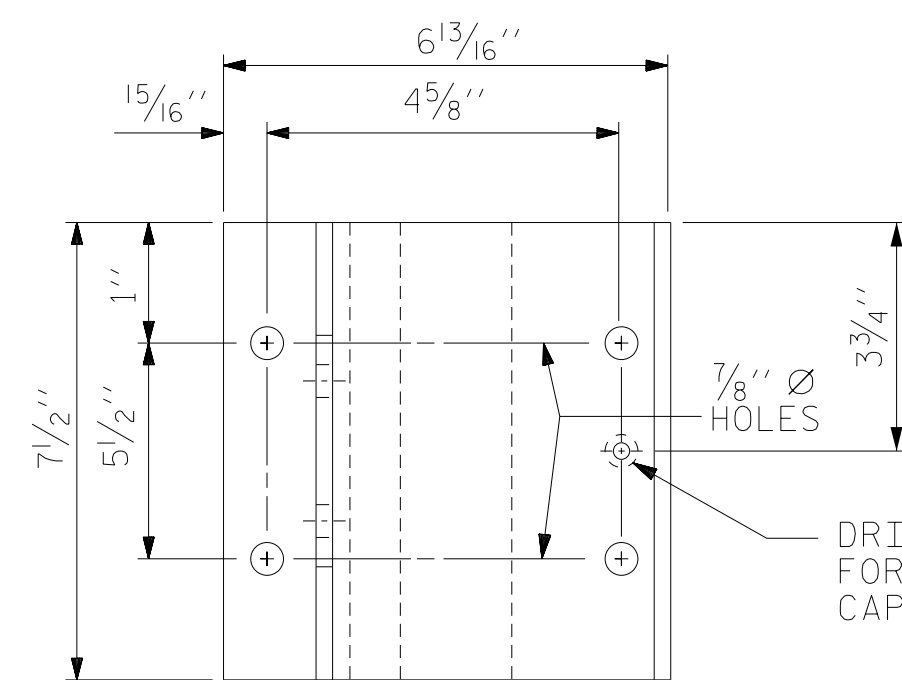
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



PLAN

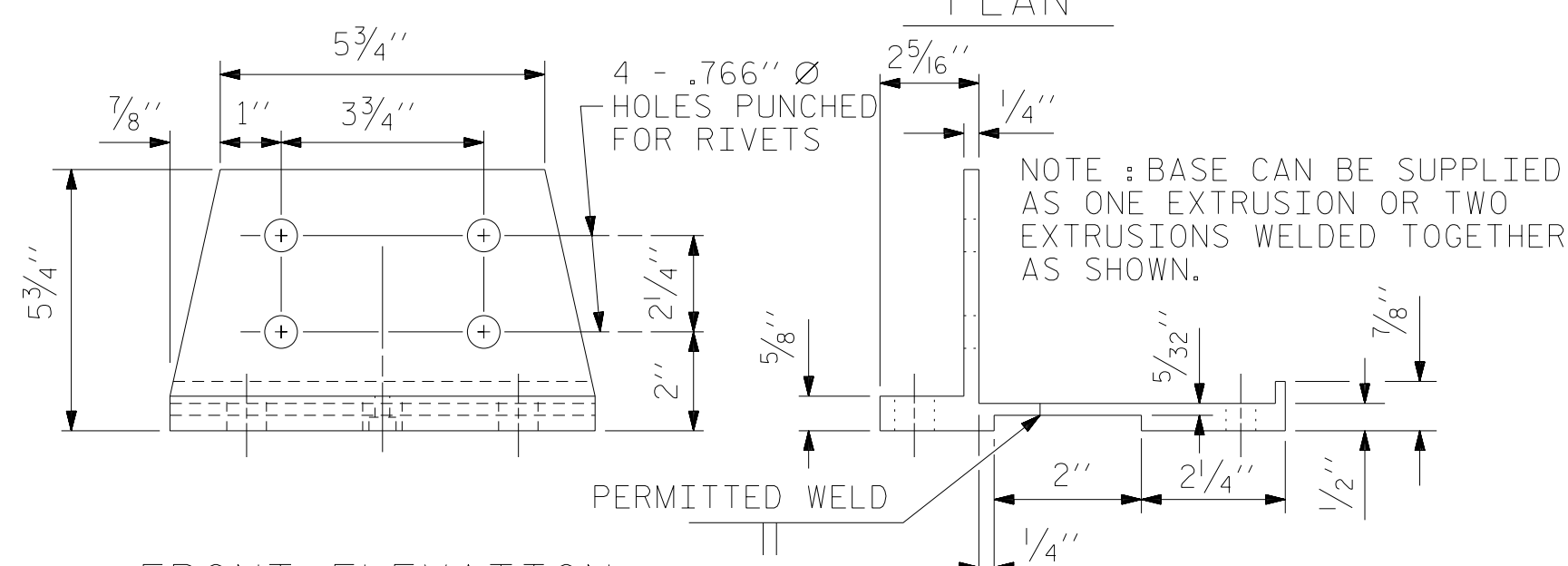


RIVET DETAIL



PLAN

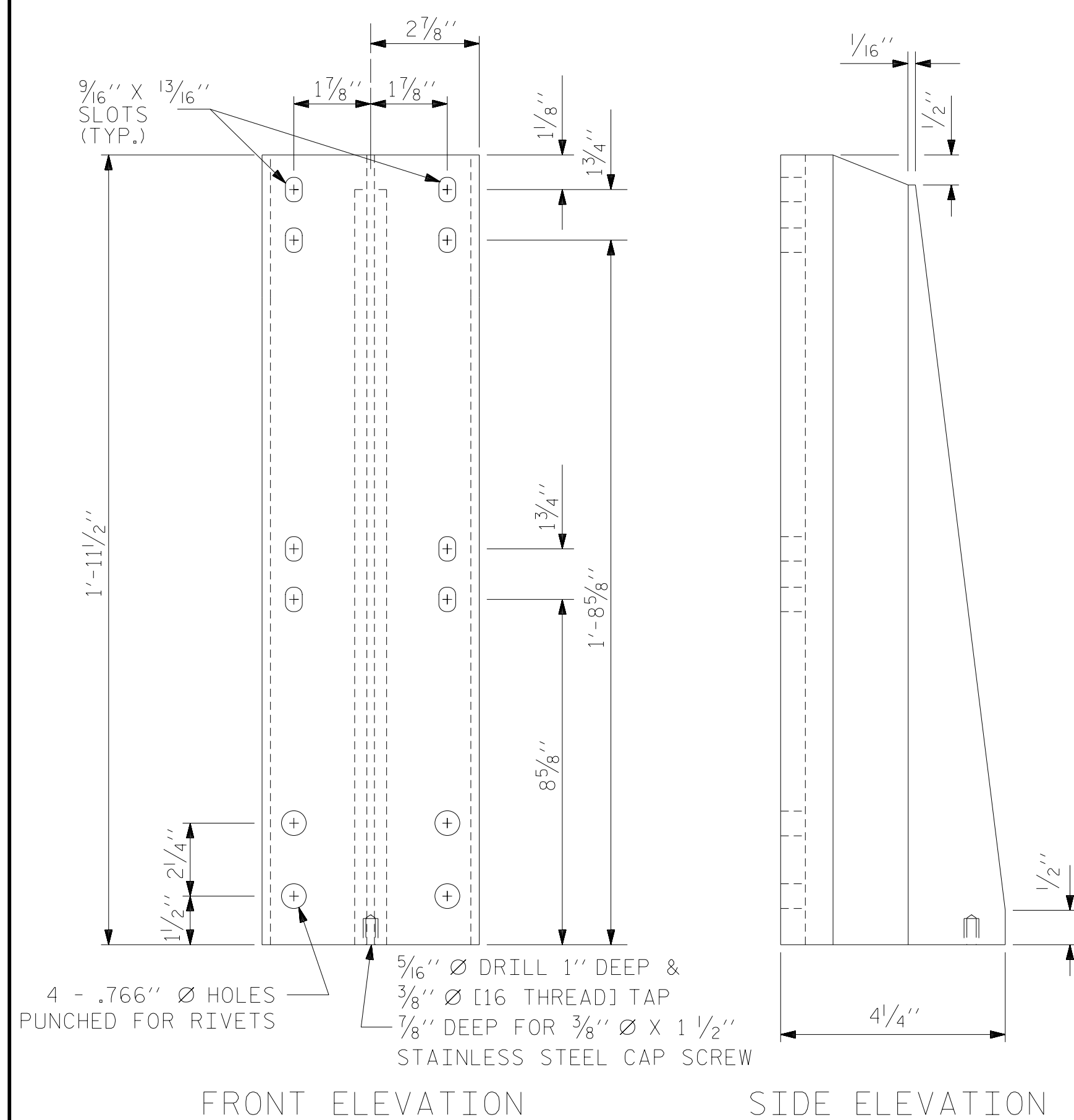
DRILL & COUNTER BORE FOR 3/8" Ø [16 THREAD] CAP SCREW



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



FRONT ELEVATION

SIDE ELEVATION

DETAILS OF POST

4 - .766" Ø HOLES PUNCHED FOR RIVETS  
5/16" Ø DRILL 1" DEEP & 3/8" Ø [16 THREAD] TAP  
7/8" DEEP FOR 3/8" Ø X 1 1/2" STAINLESS STEEL CAP SCREW

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

WAKE 216

\$\$\$\$SYSTEMTIME\$\$\$\$  
\$\$\$\$\$DGN\$\$\$\$  
\$\$\$\$\$USERNAME\$\$\$\$

NOTES

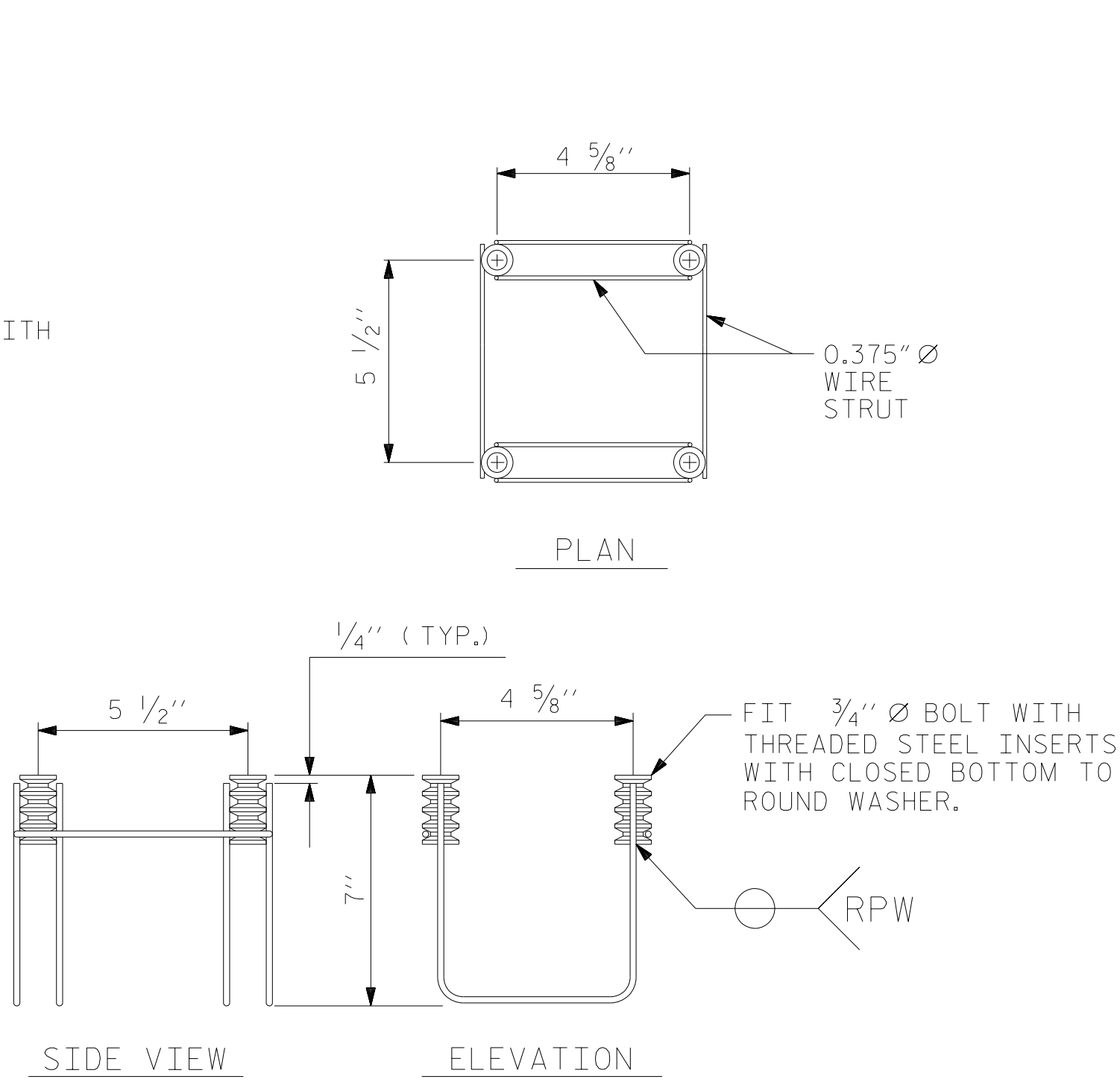
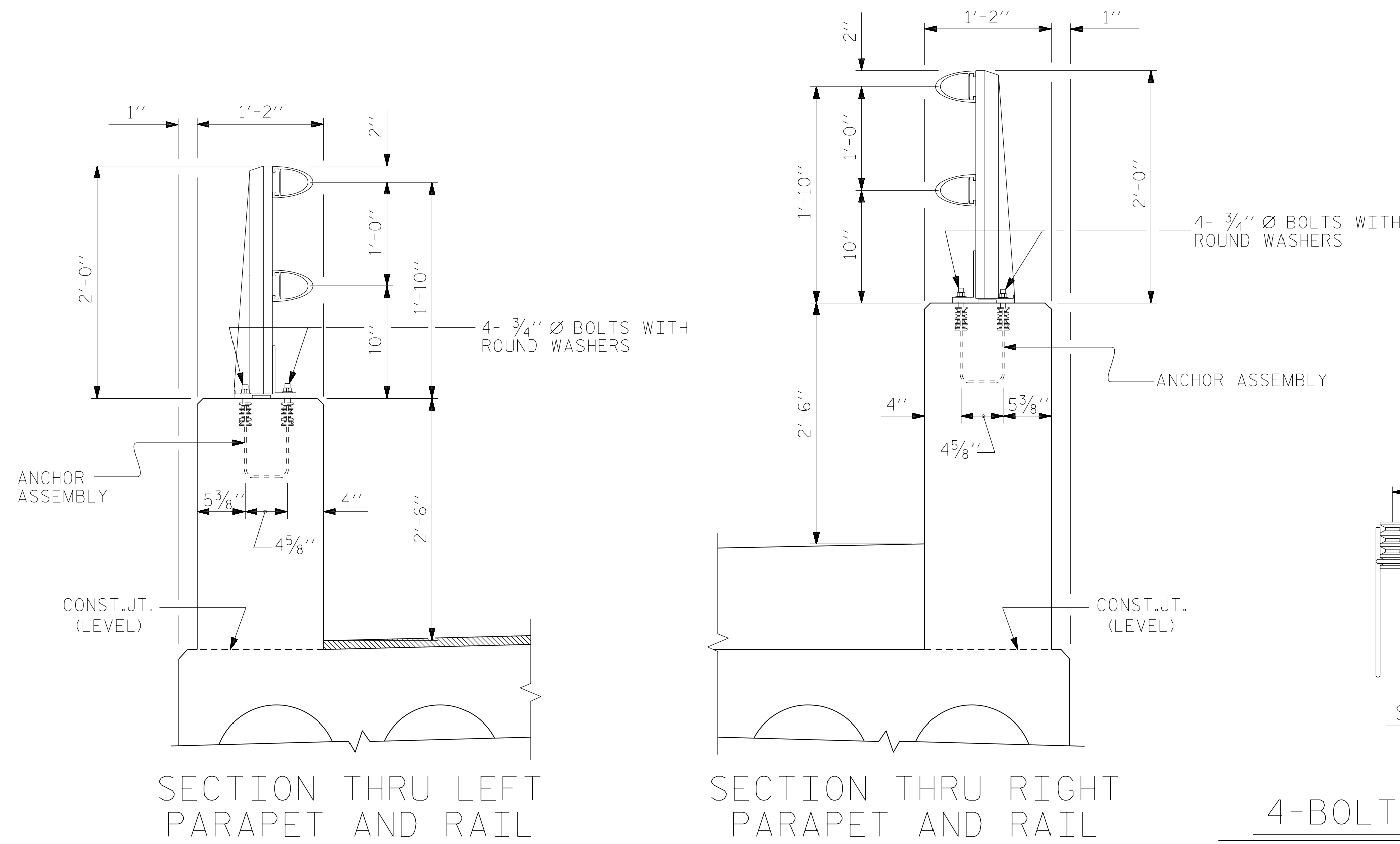
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

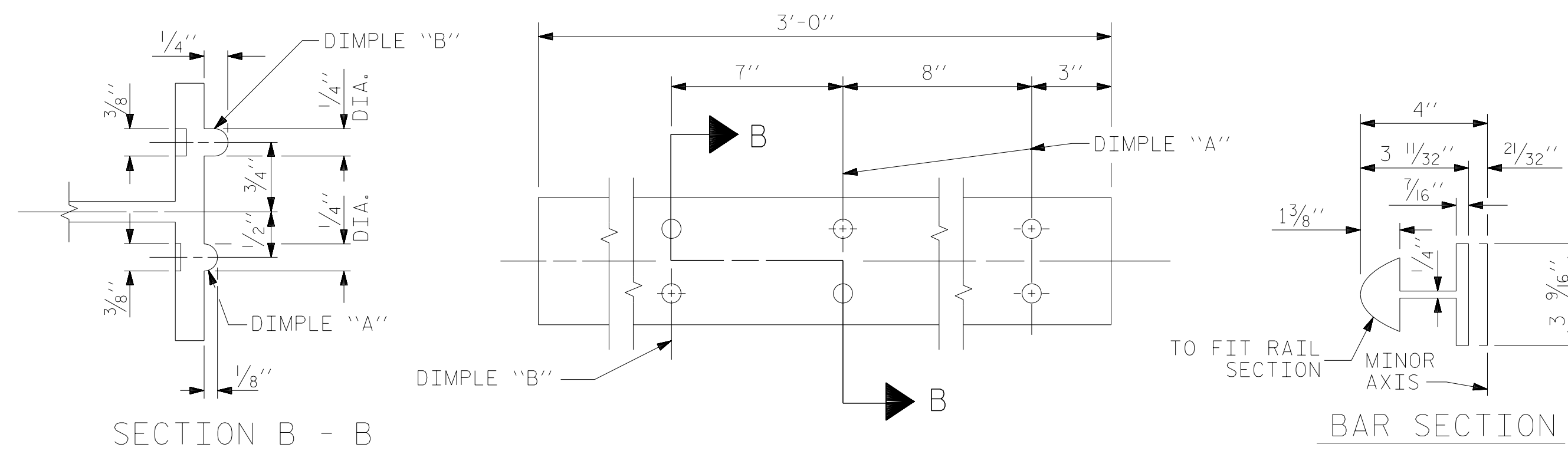
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

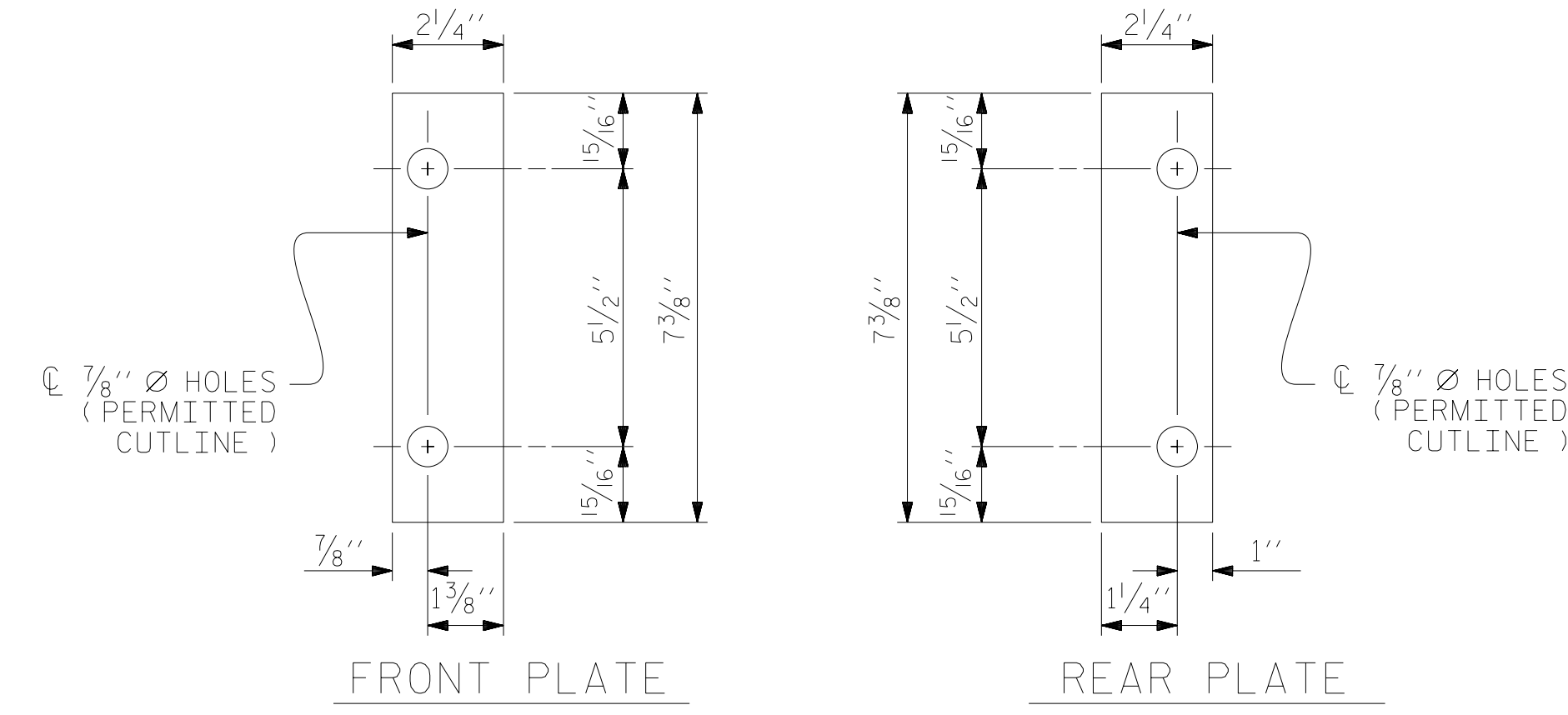


4-BOLT METAL RAIL ANCHOR ASSEMBLY

( 26 ASSEMBLIES REQUIRED )

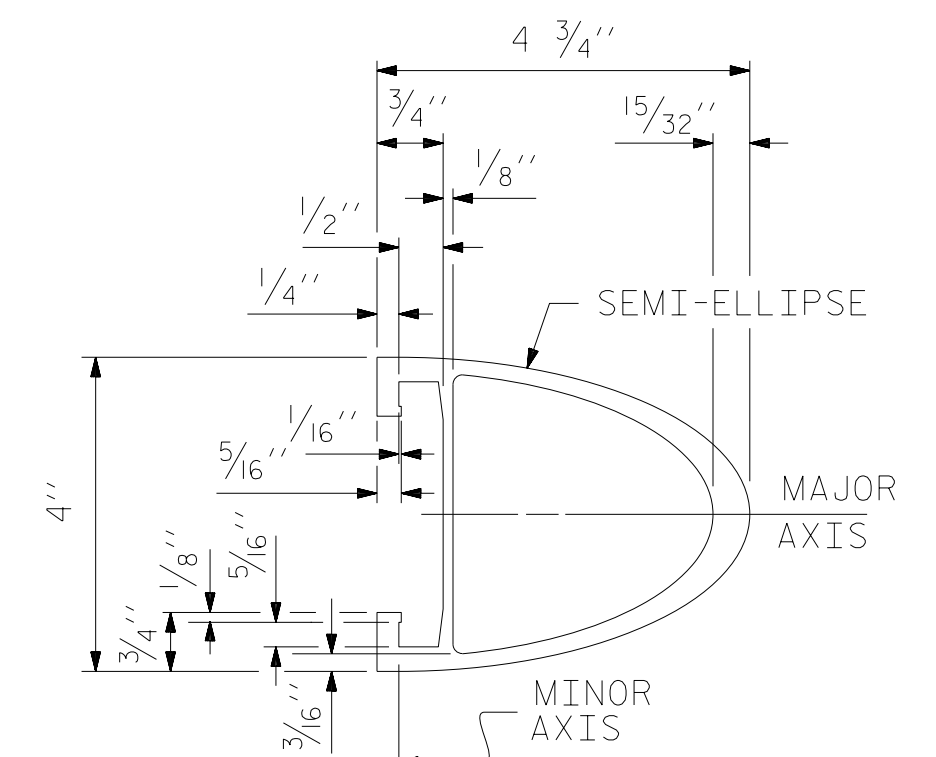


EXPANSION BAR DETAILS

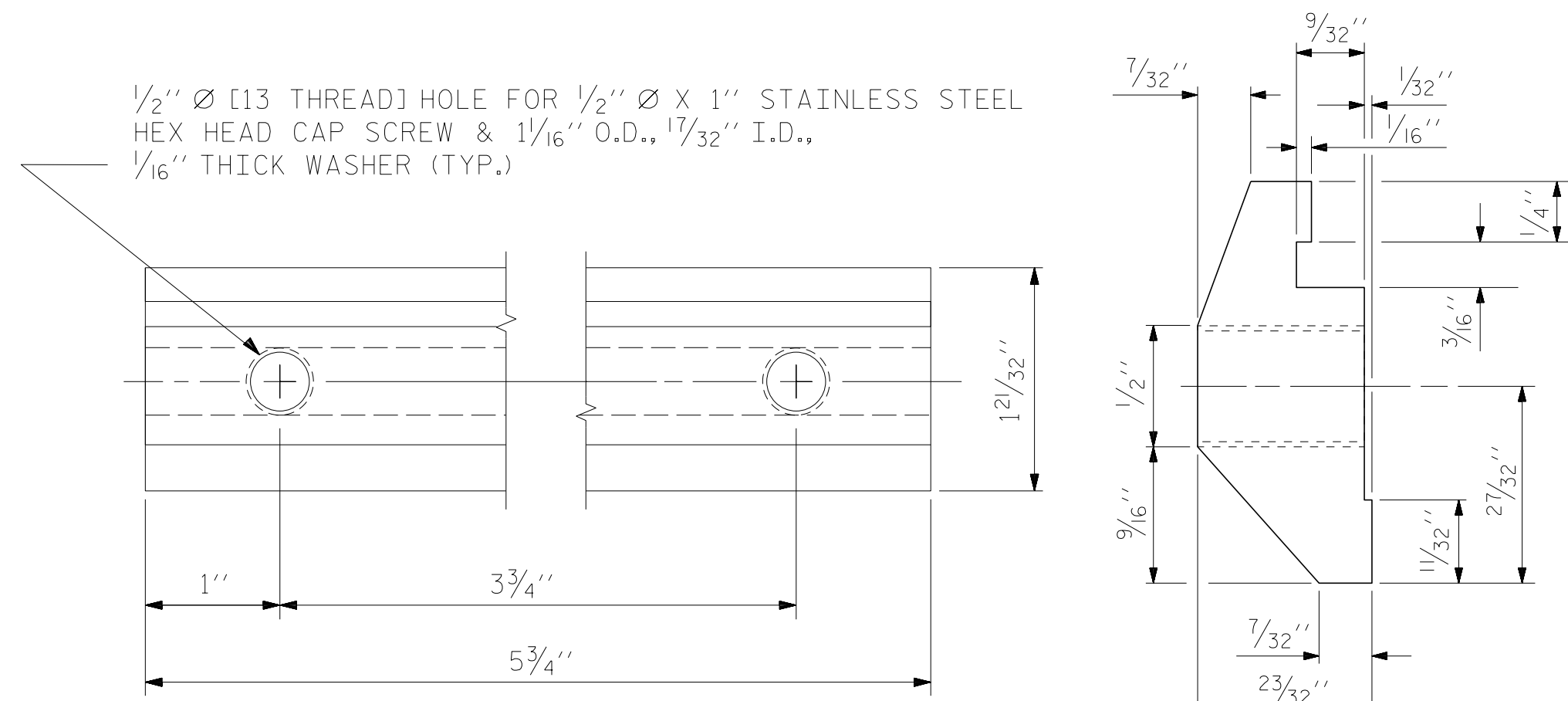


SHIM DETAILS

NOTE : SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

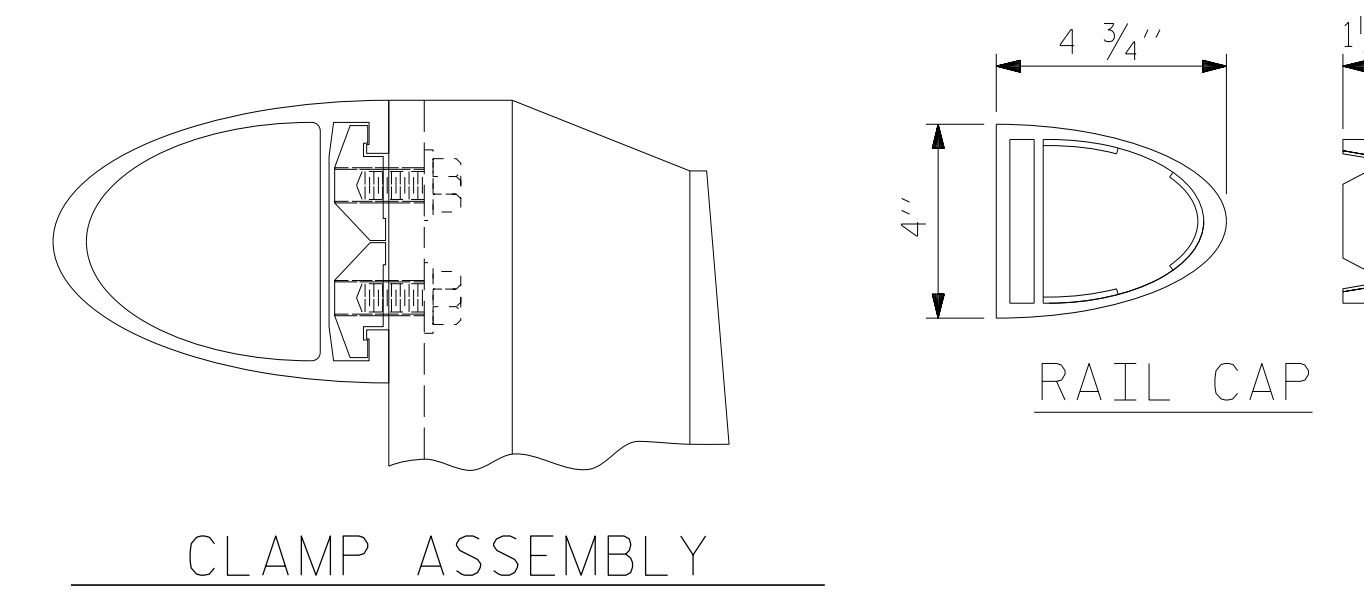


RAIL SECTION



CLAMP BAR DETAIL

( 4 REQUIRED PER POST )



CLAMP ASSEMBLY



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

STEWART

PROJECT NO. 17BP.5.PE.79

WAKE COUNTY

STATION: 11+90.50 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD

2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

WAKE 216  
\$\$\$\$SYTIME\$\$\$\$  
\$\$\$\$DGN\$\$\$\$  
\$\$\$\$USERNAME\$\$\$\$

NOTES

STRUCTURAL CONCRETE INSERT

- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1/2".
  - 1 - 3/4" Ø X 1 1/8" BOLT WITH WASHER, BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 1/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
  - WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

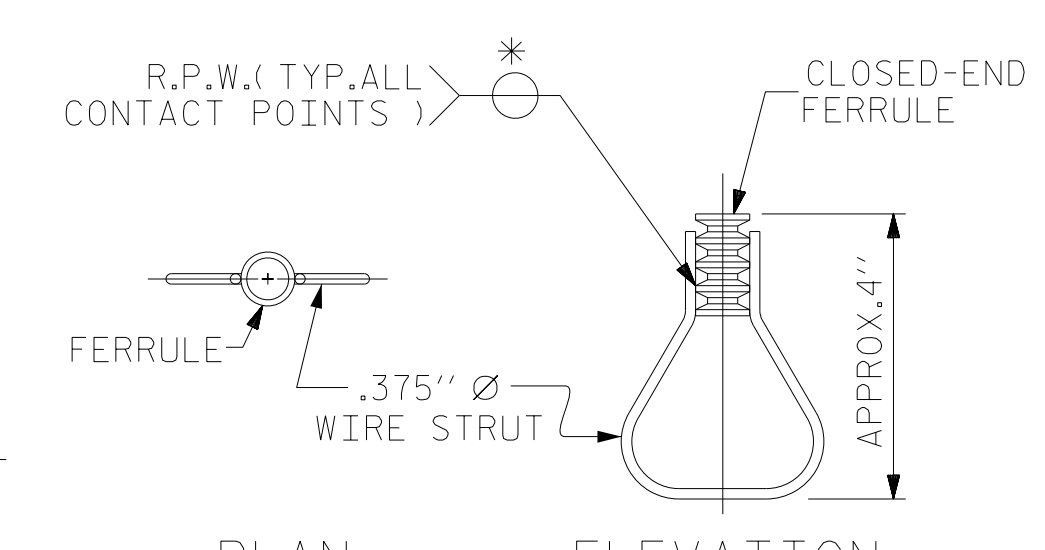
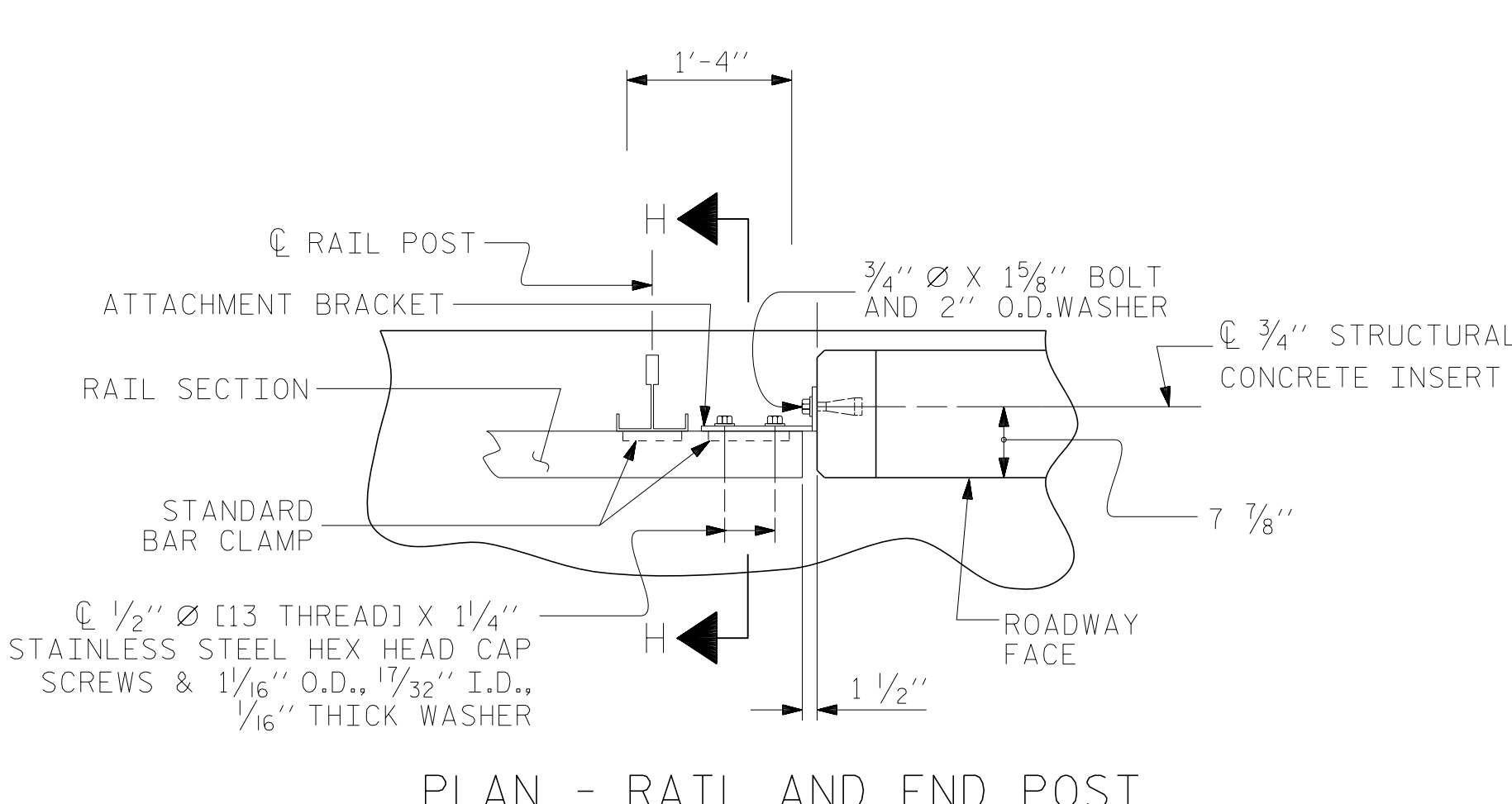
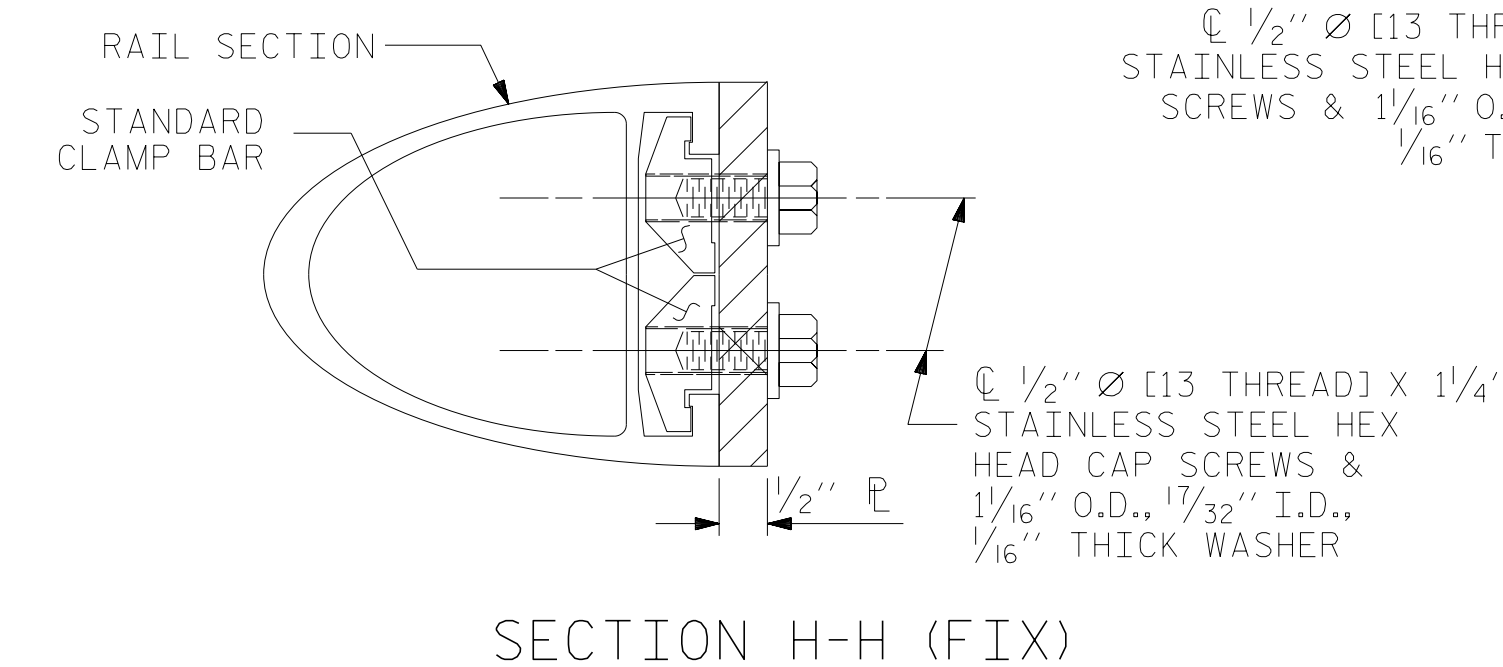
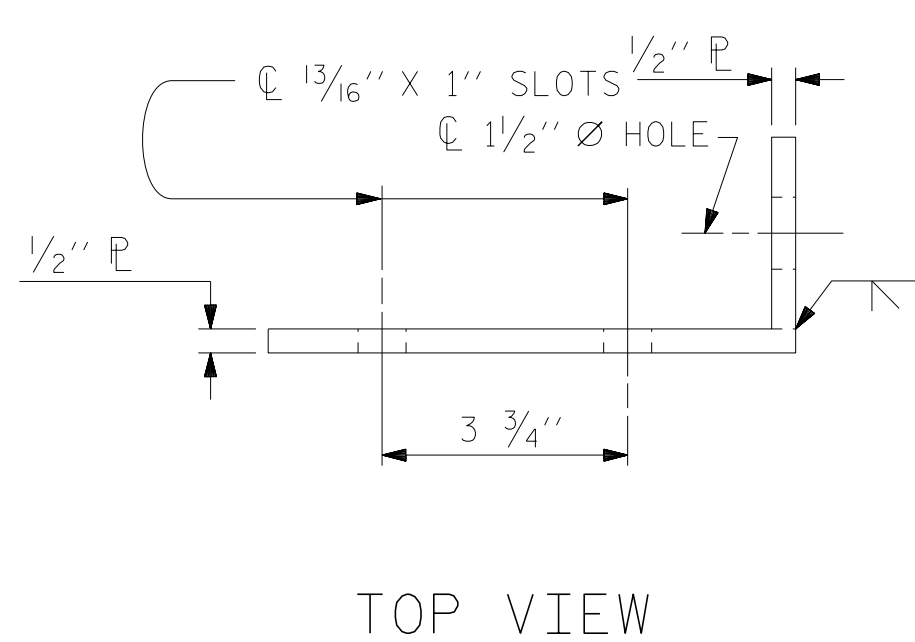
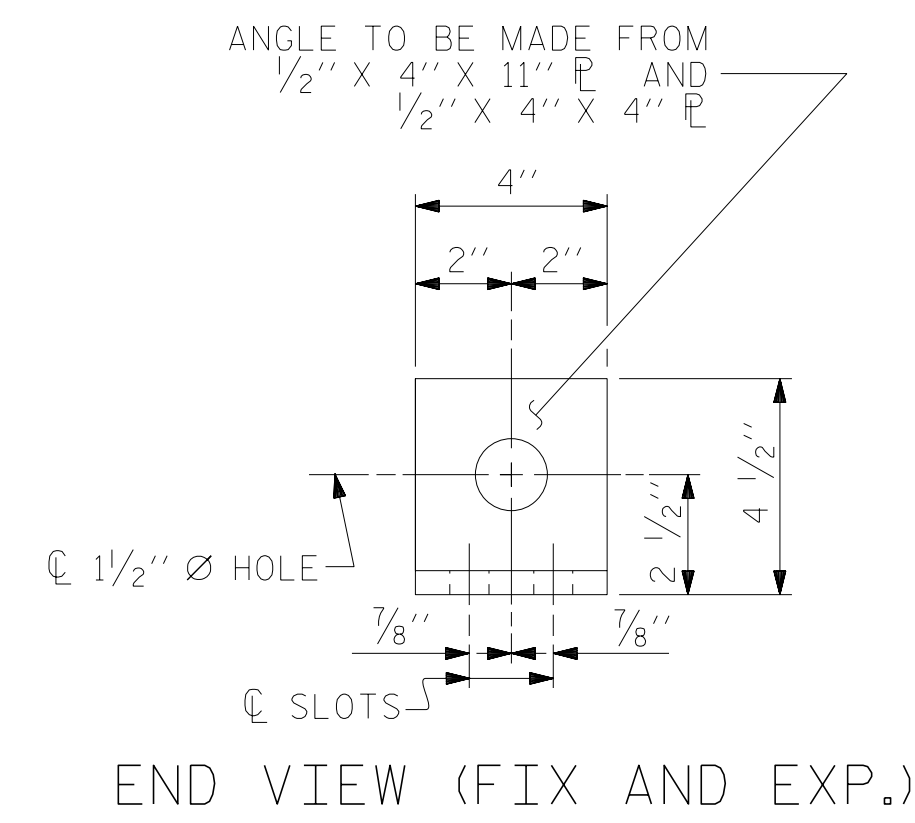
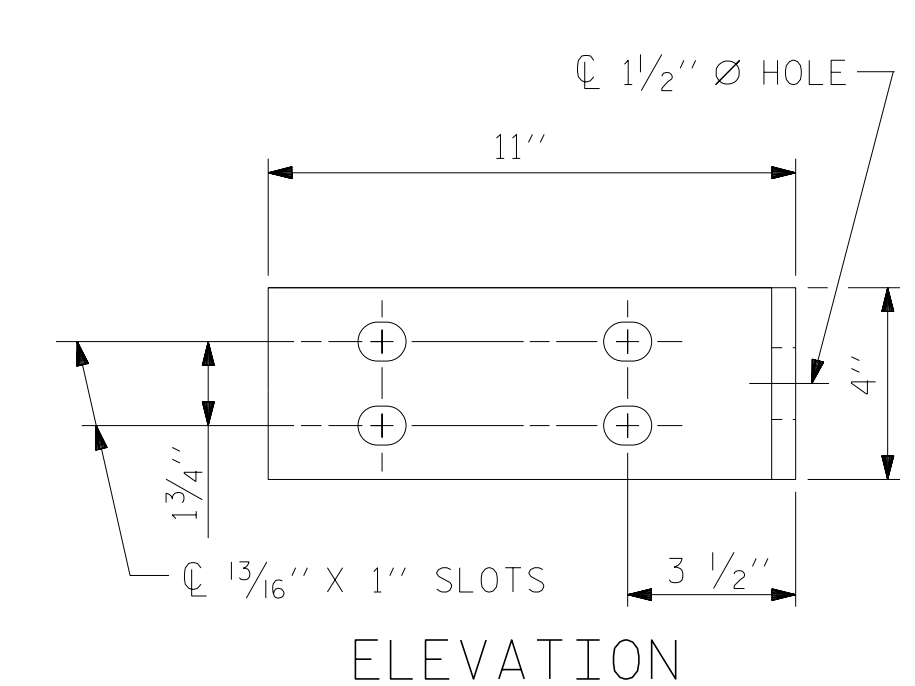
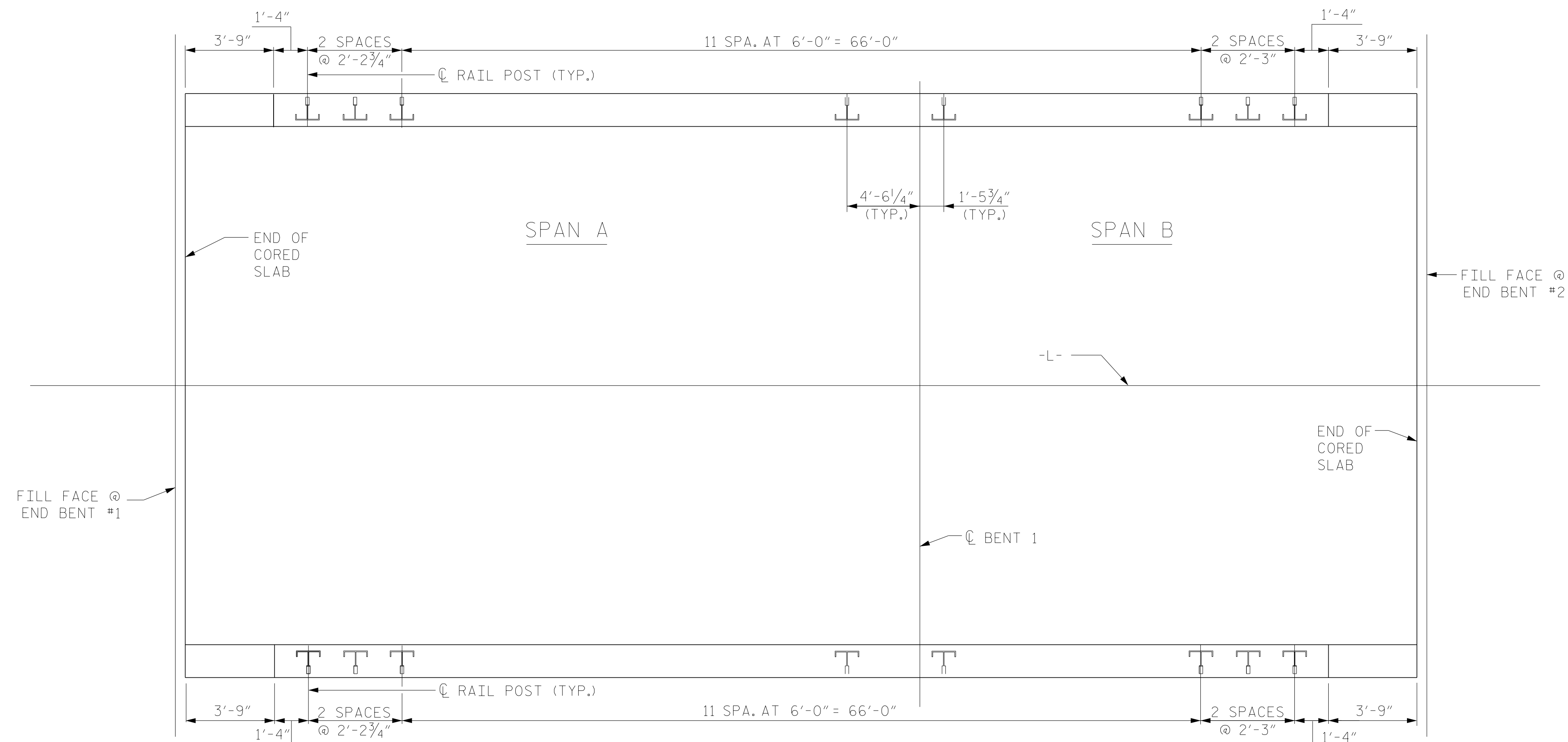
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 1/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 1/8" BOLT SHALL HAVE N. C. THREADS.
  - CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
  - STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
  - 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 1/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 1/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



STRUCTURAL CONCRETE INSERT

\* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

PROJECT NO. 17BP.5.PE.79  
WAKE COUNTY  
STATION: 11+90.50 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
RAIL POST SPACINGS  
AND  
END OF RAIL DETAILS  
FOR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			26

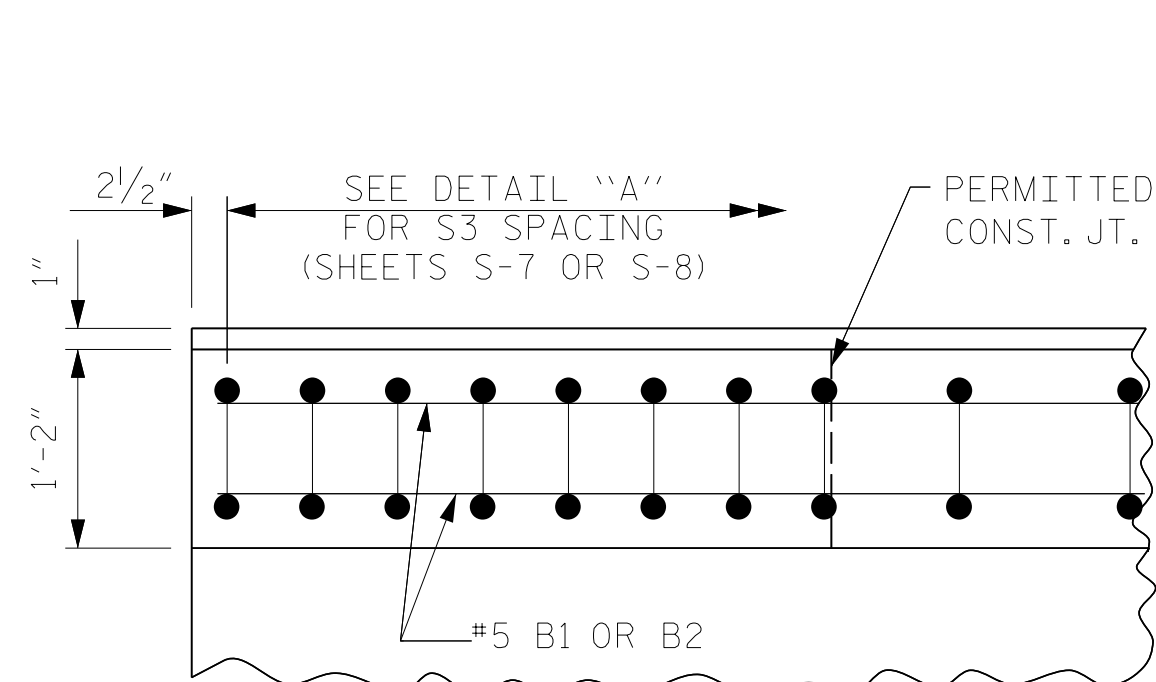
DETAILS FOR ATTACHING METAL RAIL TO END POST

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

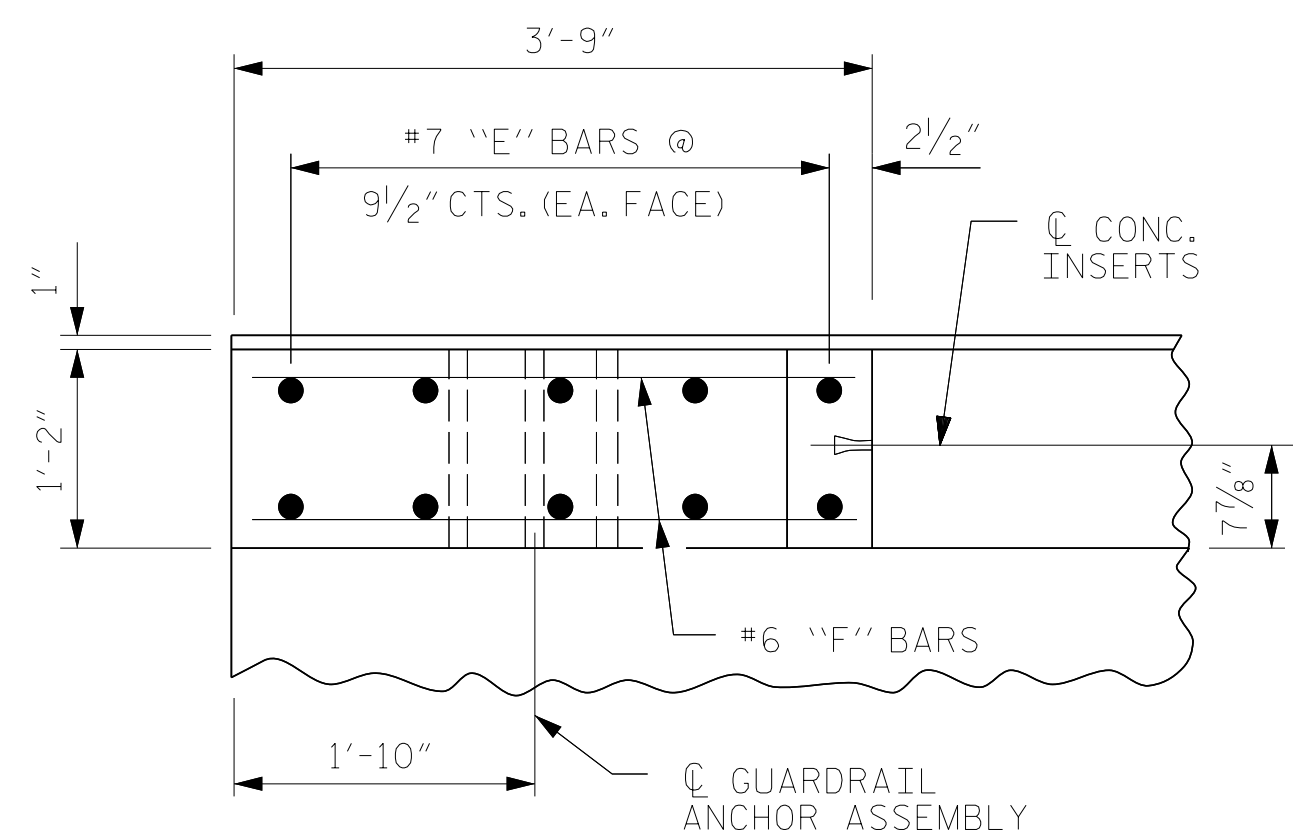
WAKE 216

\$\$\$\$SYTIME\$\$\$\$  
\$\$\$\$DGN\$\$\$\$  
\$\$\$\$USERNAME\$\$\$\$

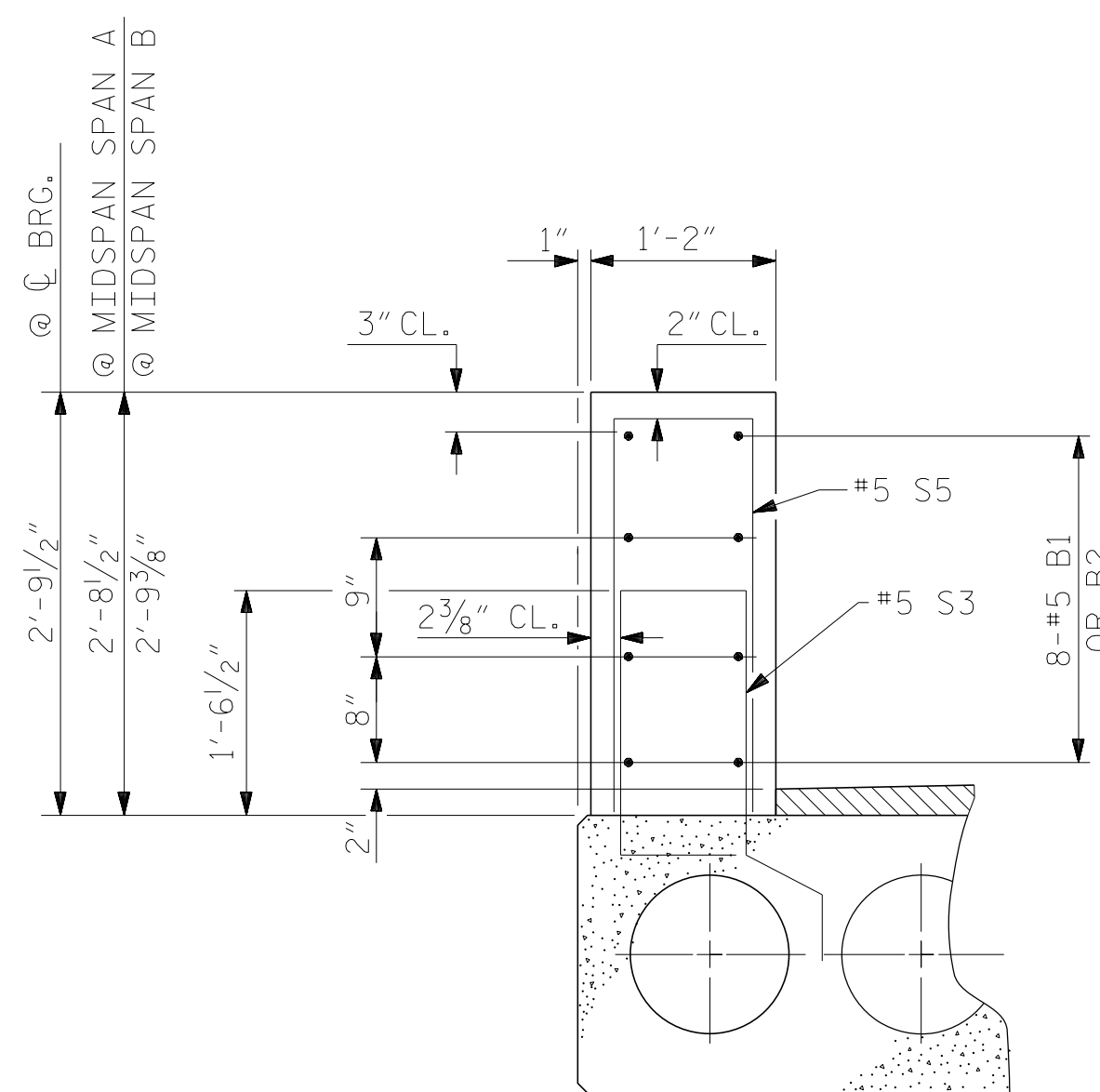




PLAN OF LEFT PARAPET



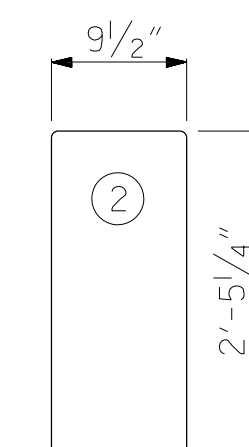
PLAN OF END POST



TWO BAR METAL RAIL LEFT PARAPET SECTION

THE HEIGHT OF THE PARAPET VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.

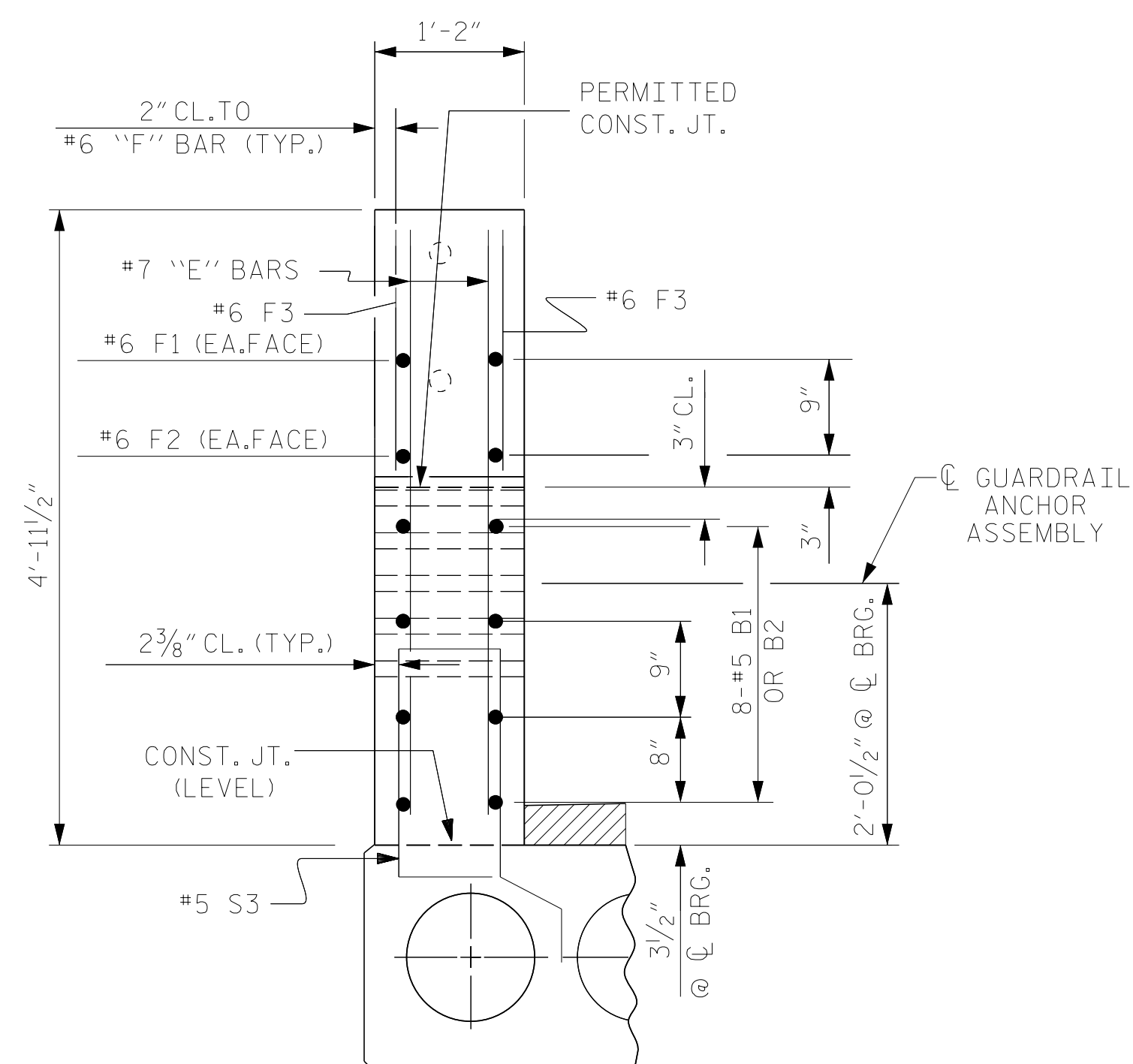
BAR TYPE



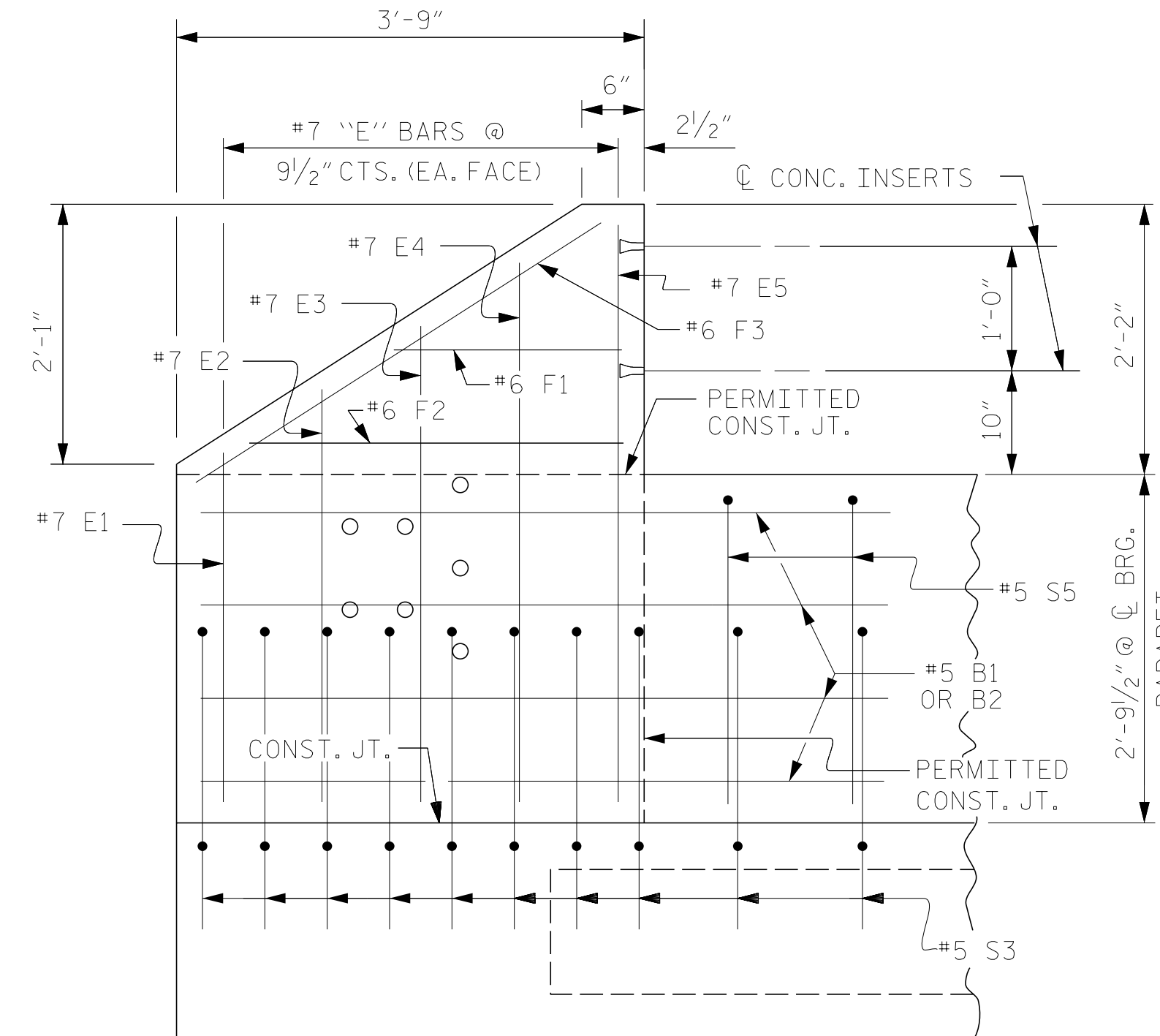
BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR LEFT PARAPET & END POSTS

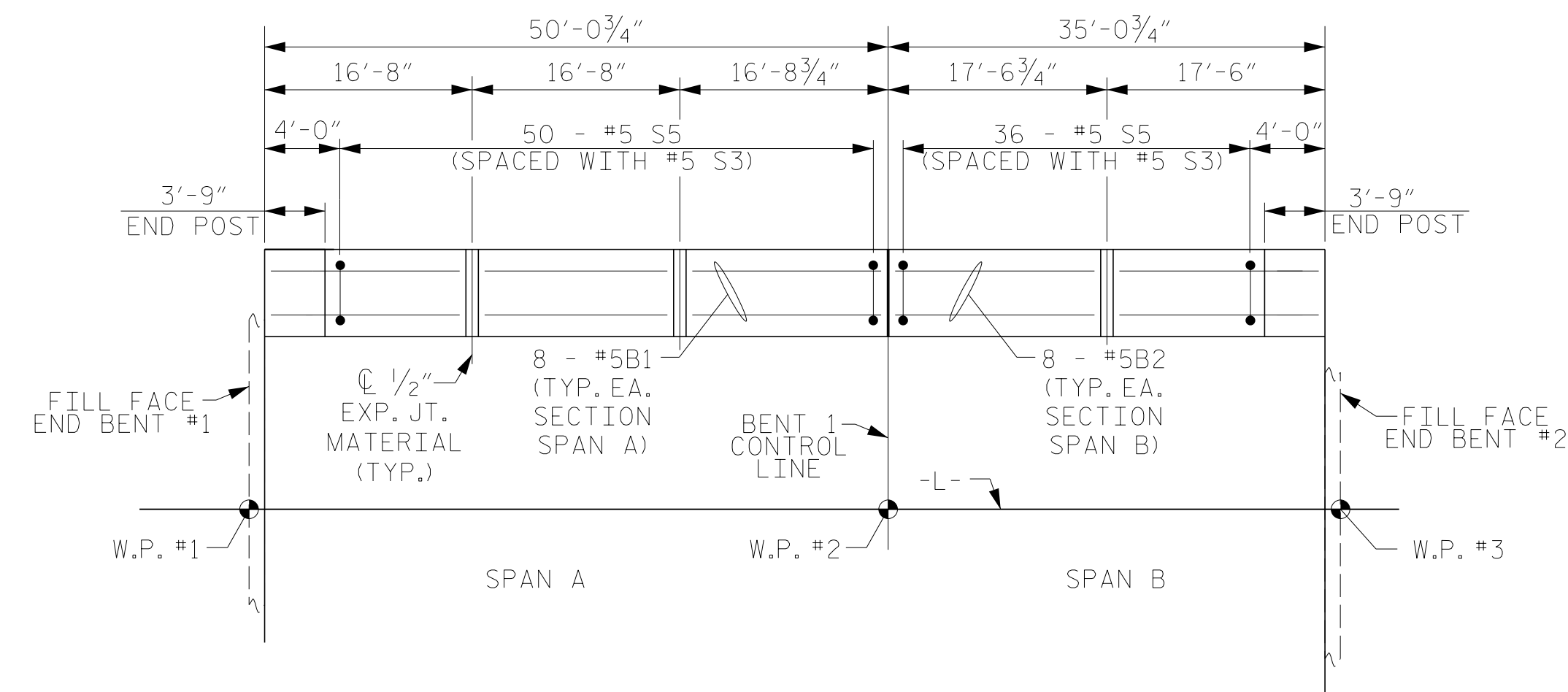
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	24	# 5	STR	17'-2"	409
*B2	16	# 5	STR	16'-4"	286
*E1	4	# 7	STR	2'-9"	22
*E2	4	# 7	STR	3'-3"	27
*E3	4	# 7	STR	3'-10"	31
*E4	4	# 7	STR	4'-4"	35
*E5	4	# 7	STR	4'-7"	38
*F1	4	# 6	STR	1'-10"	11
*F2	4	# 6	STR	3'-0"	18
*F3	4	# 6	STR	3'-9"	23
*S5	86	# 5	2	5'-8"	508
*EPOXY COATED REINFORCING STEEL				LBS.	1,408
CLASS AA CONCRETE				CU.YDS.	11.6
TOTAL LIN. FT. OF CONCRETE PARAPET					85.13



END VIEW



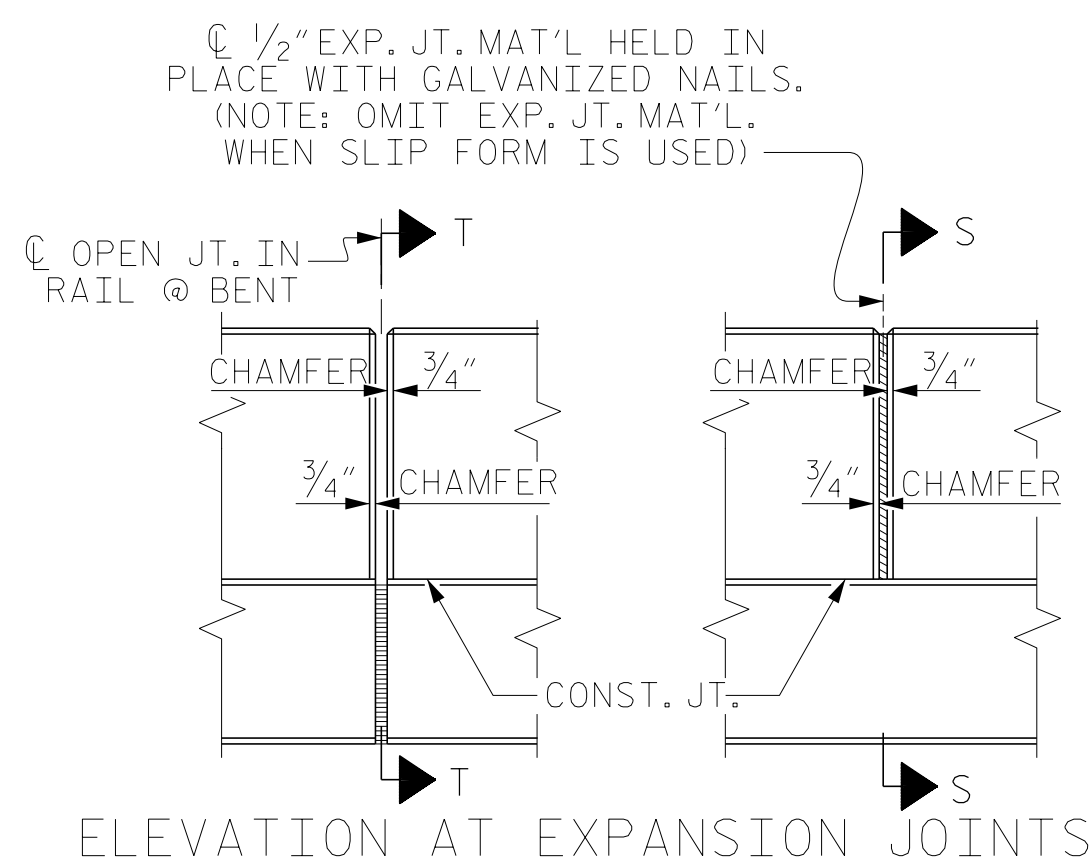
ELEVATION



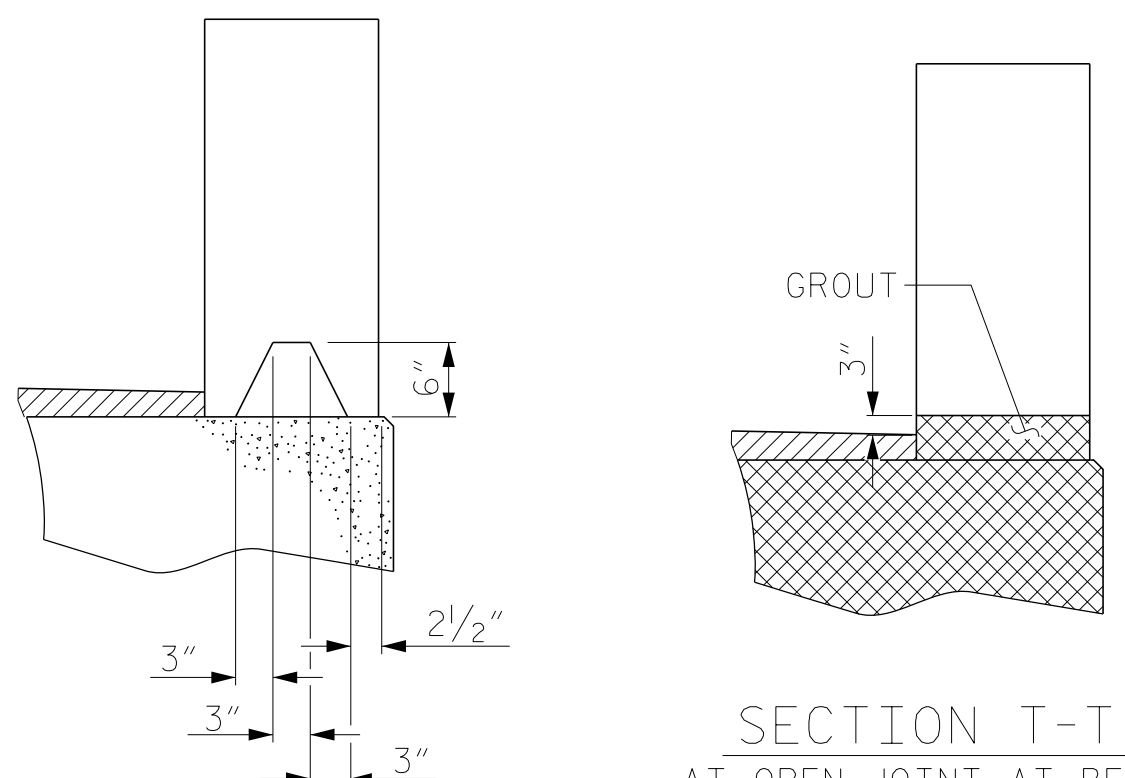
PLAN OF LEFT PARAPET

FOR SPACING OF #5S3 BARS OUTSIDE OF END POST, SEE SHEETS S-7 OR S-8

LEFT PARAPET AND END POST FOR TWO BAR RAIL



ELEVATION AT EXPANSION JOINTS



SECTION S-S AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

SECTION T-T

AT OPEN JOINT AT BENT (THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)

GUTTERLINE ASPHALT THICKNESS & LEFT PARAPET HEIGHT

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	PARAPET HEIGHT @ MID-SPAN
50' UNITS	2 1/2"	2'-8 1/2"
35' UNITS	3 3/8"	2'-9 3/8"

PROJECT NO. 17BP.5.PE.79

WAKE COUNTY

STATION: 11+90.50 -L-

SHEET 4 OF 5



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

STEWART

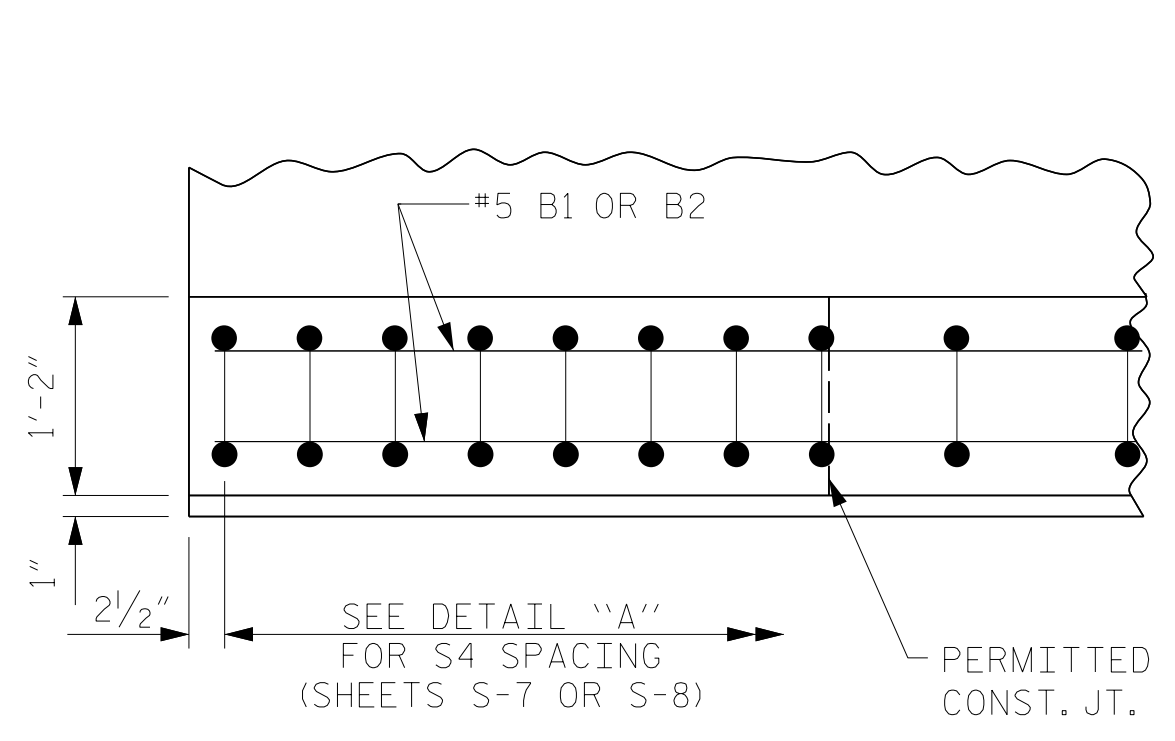
LEFT PARAPET AND END POST FOR 2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS 26
2			4			

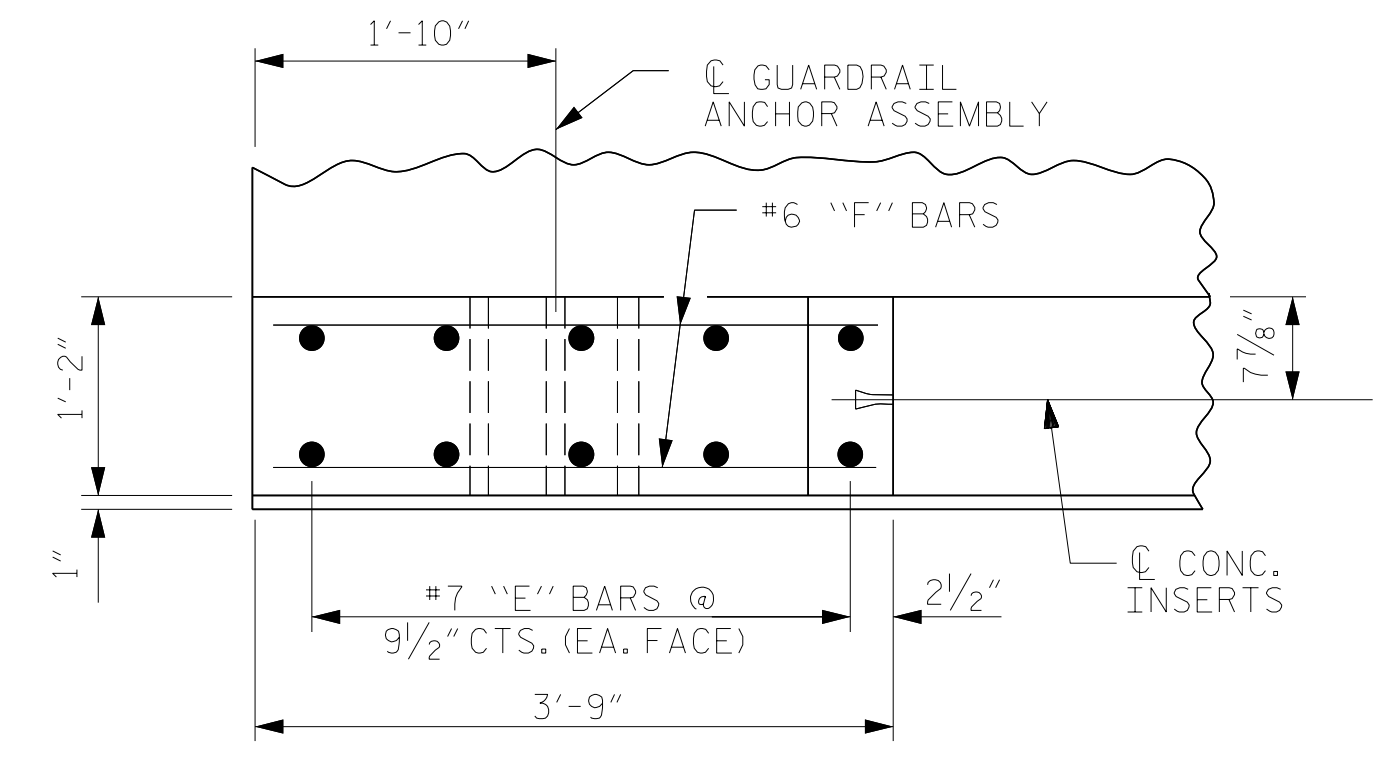
WAKE 216

\$\$\$\$SYTIME\$\$\$\$  
\$\$\$\$DGN\$\$\$\$  
\$\$\$\$USERNAME\$\$\$\$

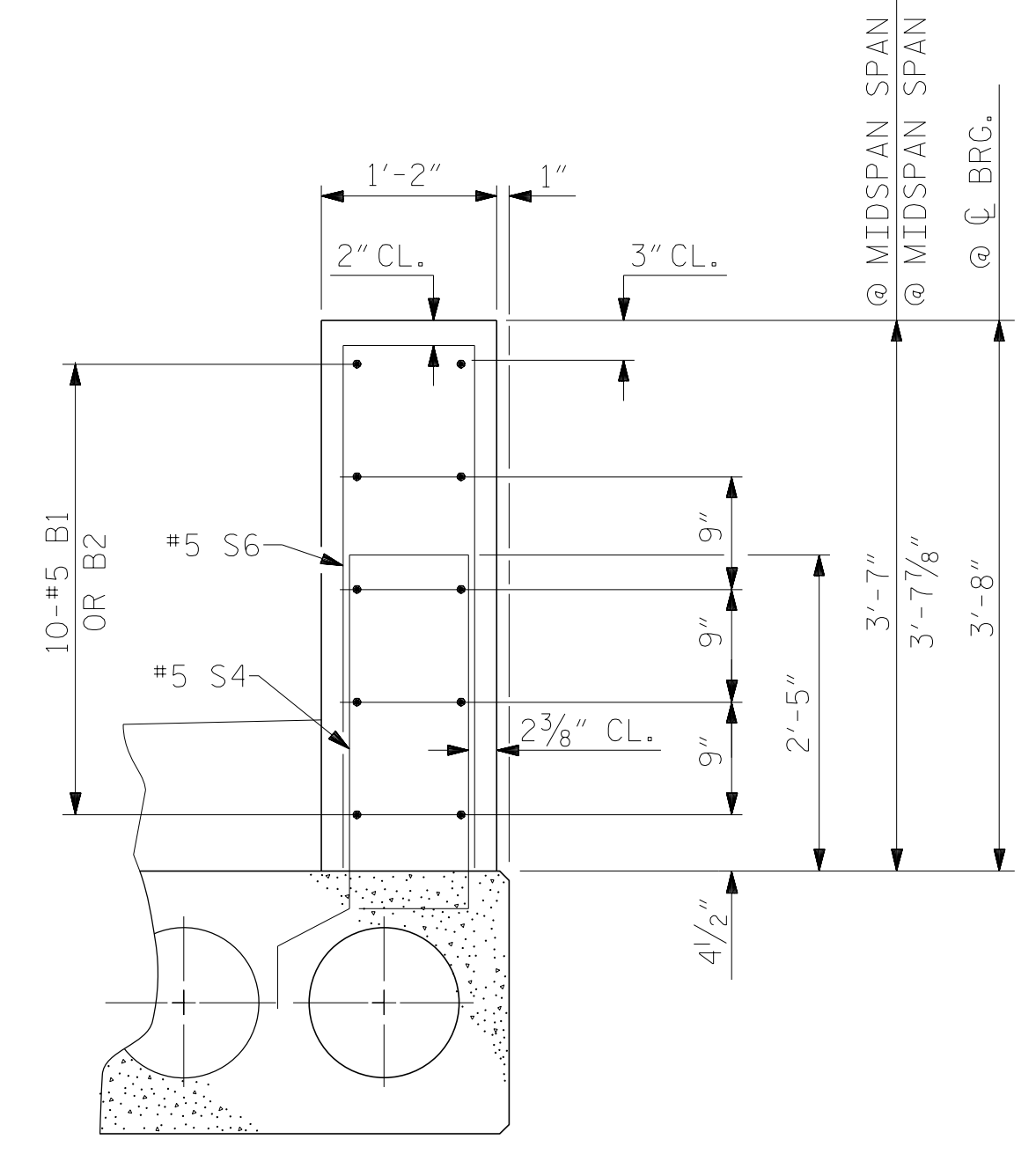
DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19



PLAN OF RIGHT PARAPET



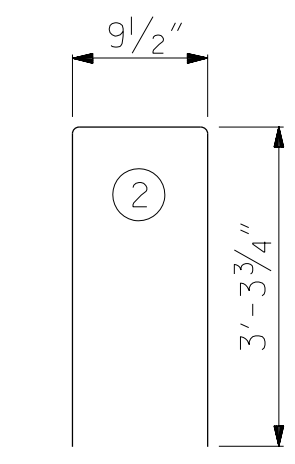
PLAN OF END POST



TWO BAR METAL RAIL RIGHT PARAPET SECTION

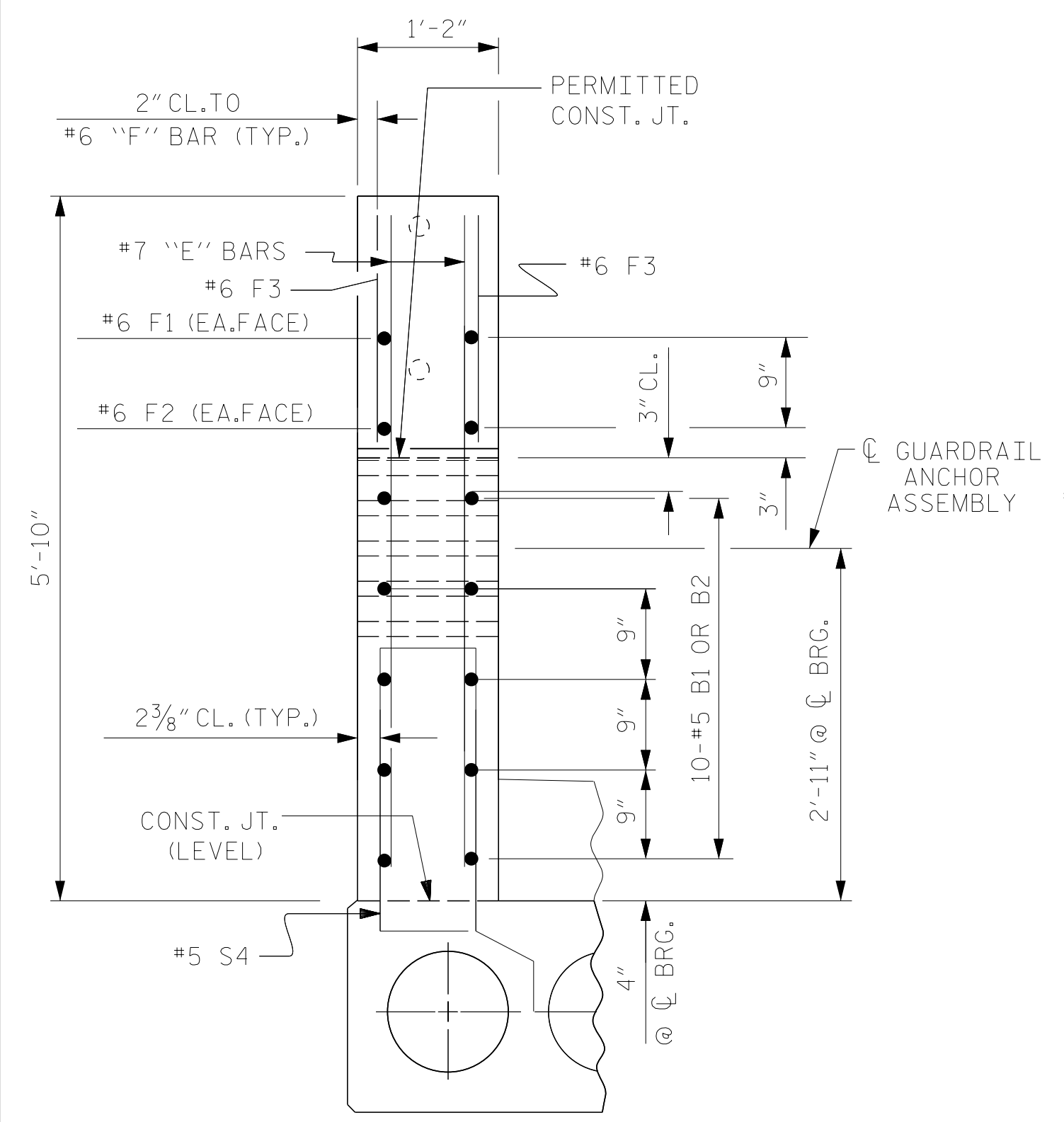
THE HEIGHT OF THE PARAPET VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE

BAR TYPE

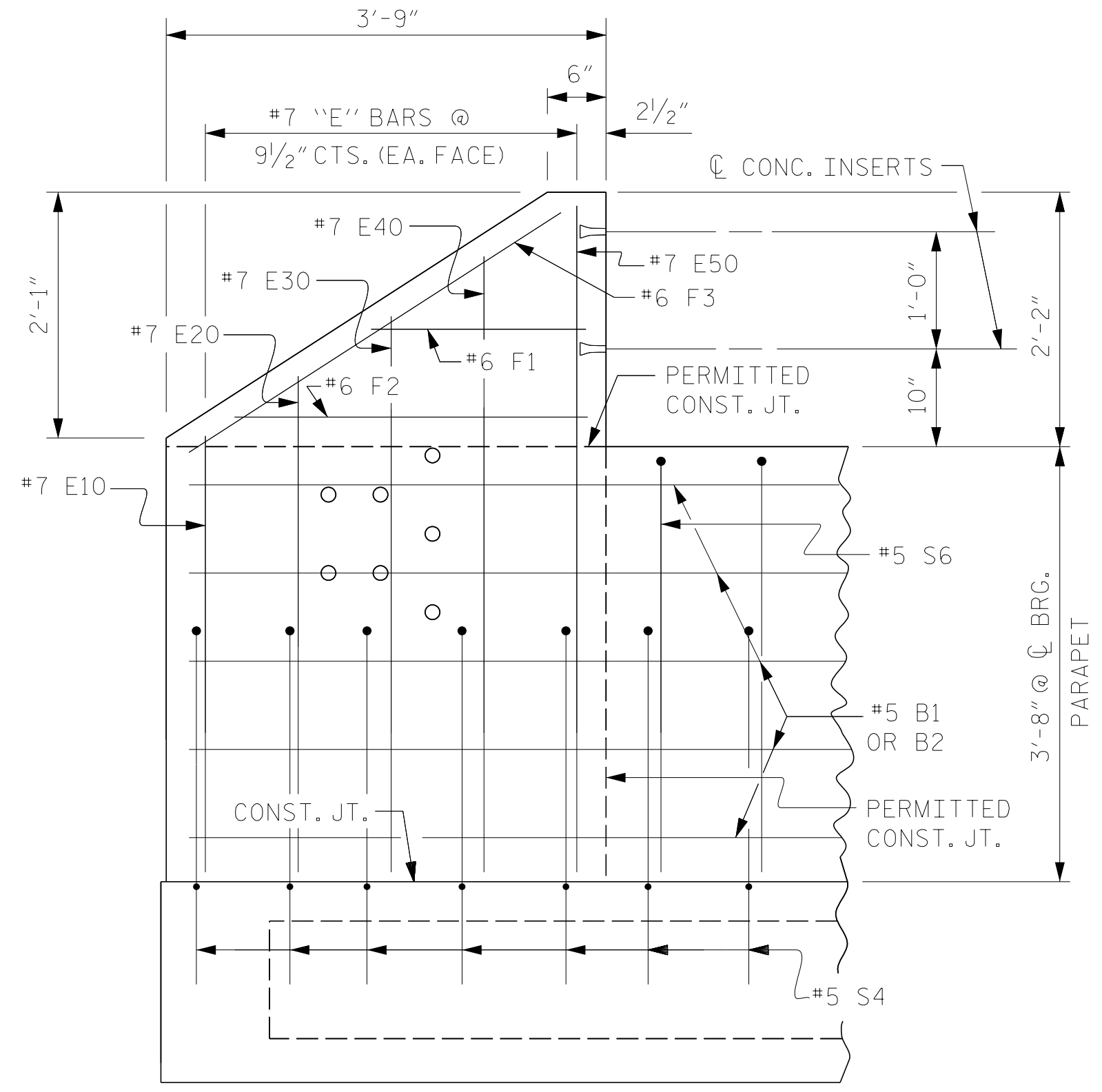


BAR DIMENSIONS ARE OUT TO OUT

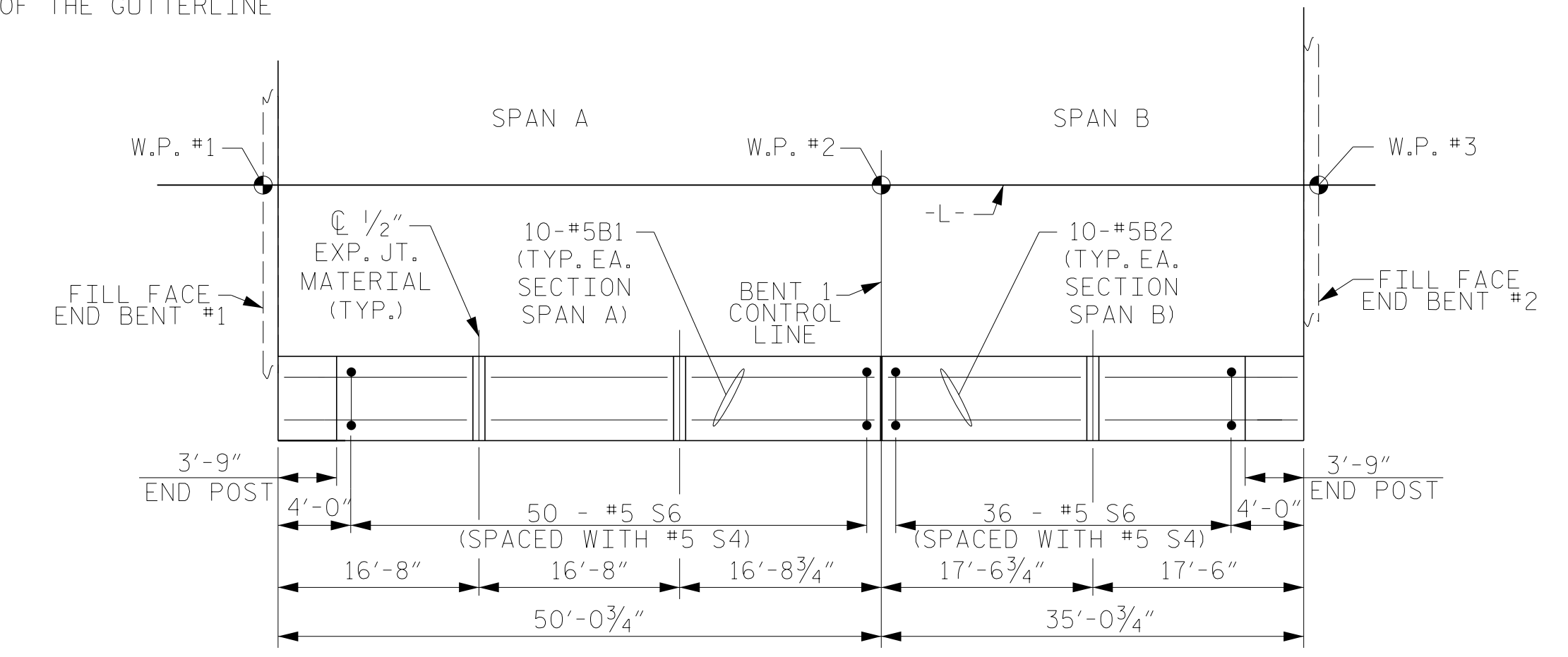
BILL OF MATERIAL FOR RIGHT PARAPET & END POSTS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	30	# 5	STR	16'-4"	511
*B2	20	# 5	STR	17'-2"	358
*E10	4	# 7	STR	3'-8"	30
*E20	4	# 7	STR	4'-2"	34
*E30	4	# 7	STR	4'-8"	38
*E40	4	# 7	STR	5'-2"	42
*E50	4	# 7	STR	5'-6"	45
*F1	4	# 6	STR	1'-10"	11
*F2	4	# 6	STR	3'-0"	18
*F3	4	# 6	STR	3'-9"	23
*S6	86	# 5	2	7'-5"	665
*EPOXY COATED REINFORCING STEEL				LBS.	1,775
CLASS AA CONCRETE				CU.YDS.	15.1
TOTAL LIN. FT. OF CONCRETE PARAPET					85.13



END VIEW



ELEVATION



PLAN OF RIGHT PARAPET

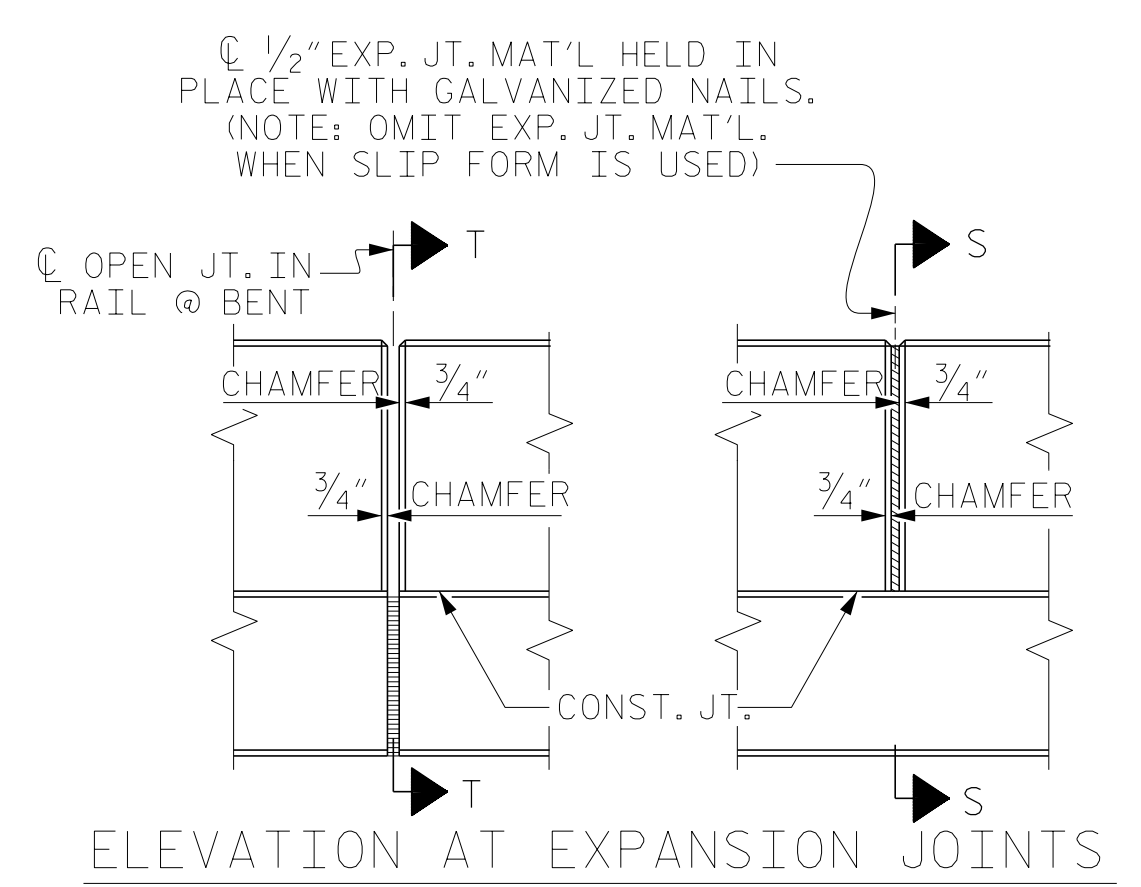
FOR SPACING OF #5S4 BARS OUTSIDE OF END POST, SEE SHEETS S-7 OR S-8

RIGHT PARAPET AND END POST FOR TWO BAR RAIL

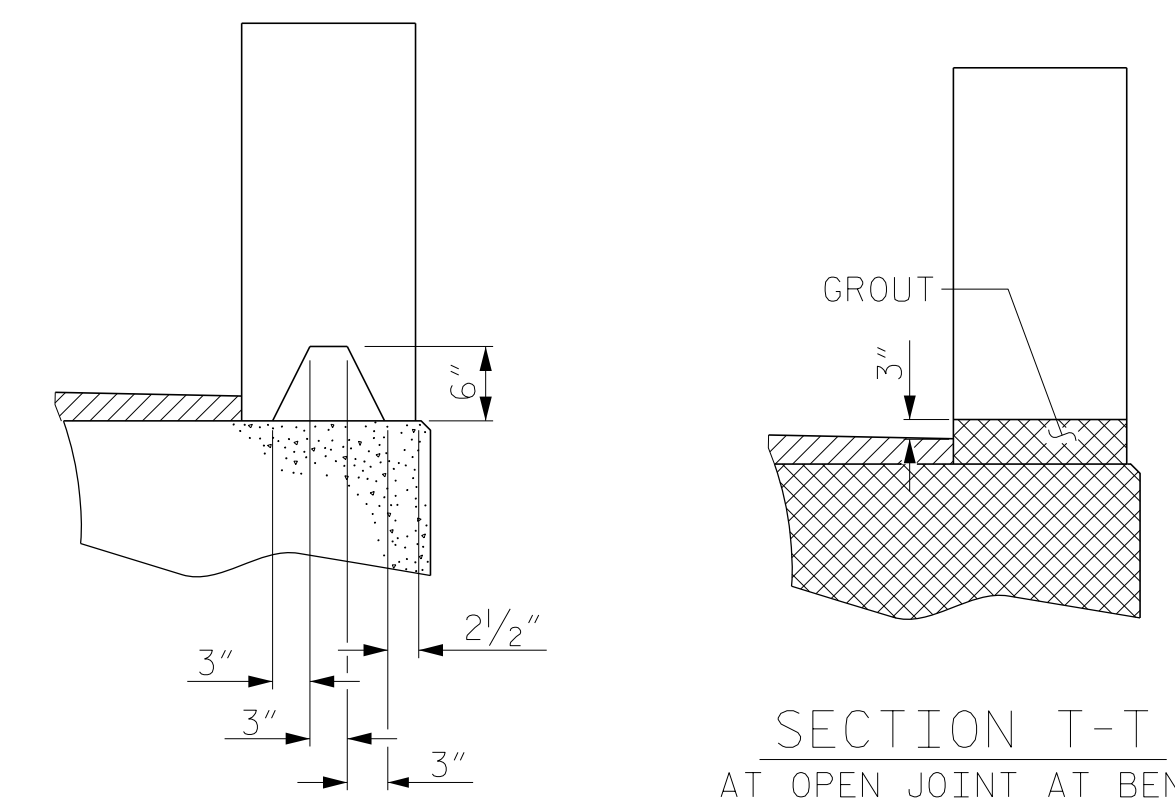
GUTTERLINE ASPHALT THICKNESS & RIGHT PARAPET HEIGHT

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	PARAPET HEIGHT @ MID-SPAN
50' UNITS	4 7/8"	3'-7"
35' UNITS	5 3/4"	3'-7 7/8"

NOTE: ASPHALT OVERLAY THICKNESS COMPUTED AT LOCATION WHERE SIDEWALK AND ASPHALT MEET



ELEVATION AT EXPANSION JOINTS



SECTION T-T

SECTION S-S



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STEWART  
Firm License No. C-1051  
223 S. West St., Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

PROJECT NO. 17BP.5.PE.79  
WAKE COUNTY  
STATION: 11+90.50 -L-  
SHEET 5 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

RIGHT PARAPET AND END POST FOR 2 BAR METAL RAIL

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-16  
TOTAL SHEETS 26

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

WAKE 216

\$\$\$\$SYTIME\$\$\$\$  
\$\$\$\$DGN\$\$\$\$  
\$\$\$\$USERNAME\$\$\$\$

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

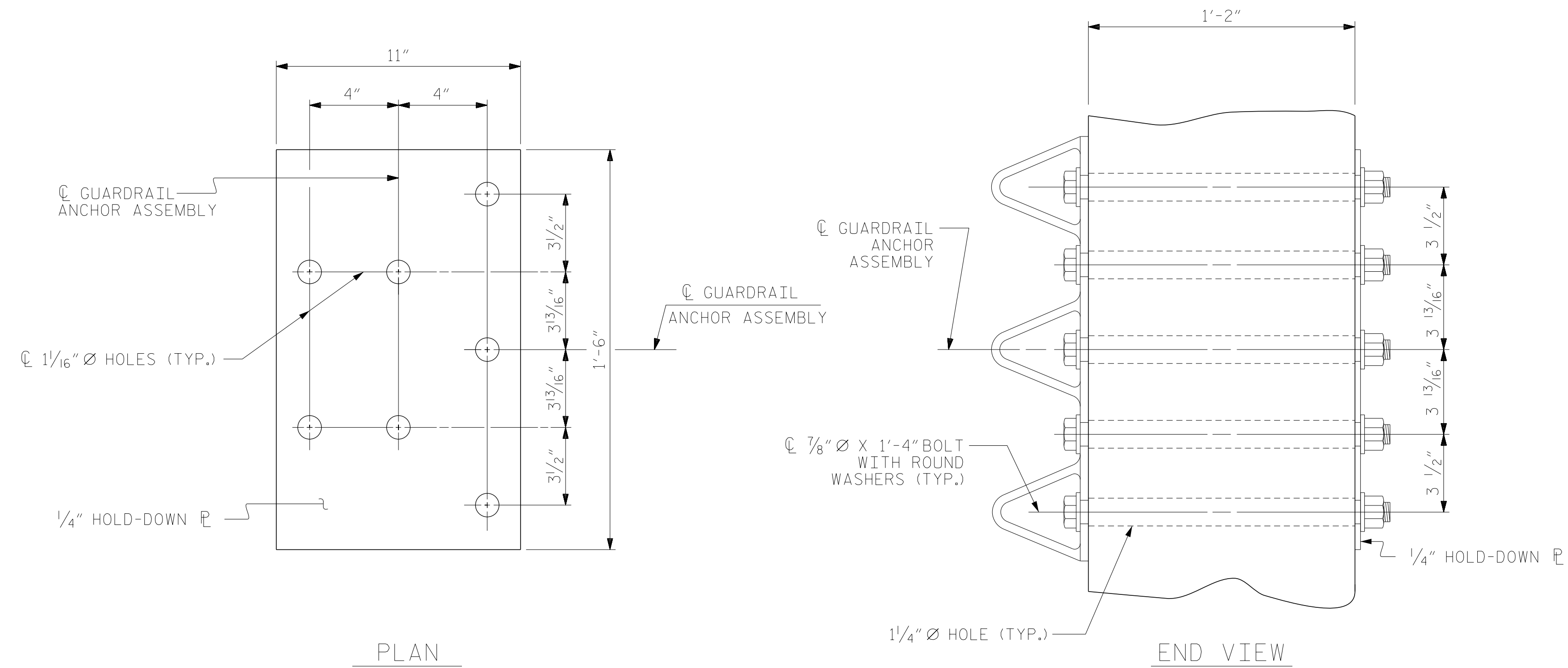
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

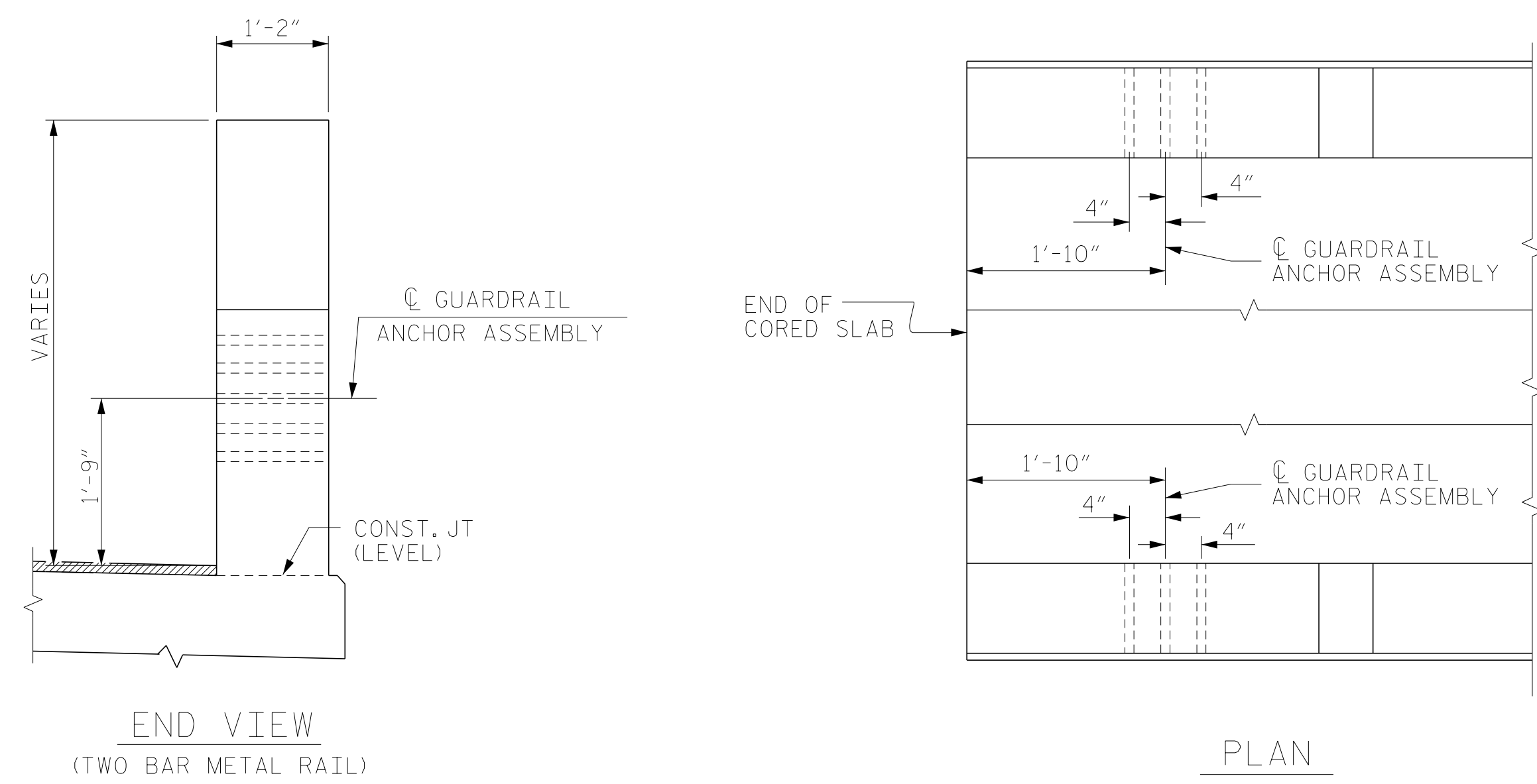
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

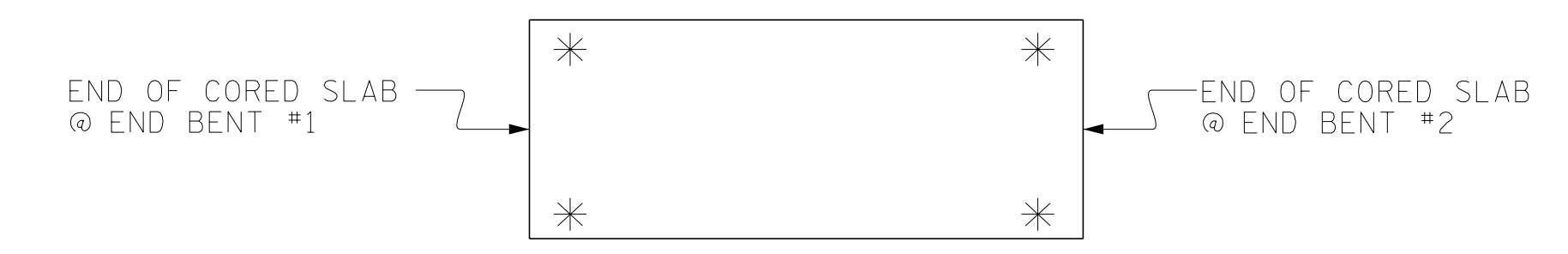
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF GUARDRAIL ANCHOR AT END POST



SKETCH SHOWING POINTS OF ATTACHMENT  
\* LOCATION OF GUARDRAIL ATTACHMENT

PROJECT NO. 17BP.5.PE.79  
WAKE COUNTY  
STATION: 11+90.50 -L-



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
GUARDRAIL ANCHORAGE  
DETAILS FOR  
2 BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-17
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

WAKE 216

\$\$\$SYSTEMTIME\$\$\$  
\$\$\$DGN\$\$\$  
\$\$\$USERNAME\$\$\$

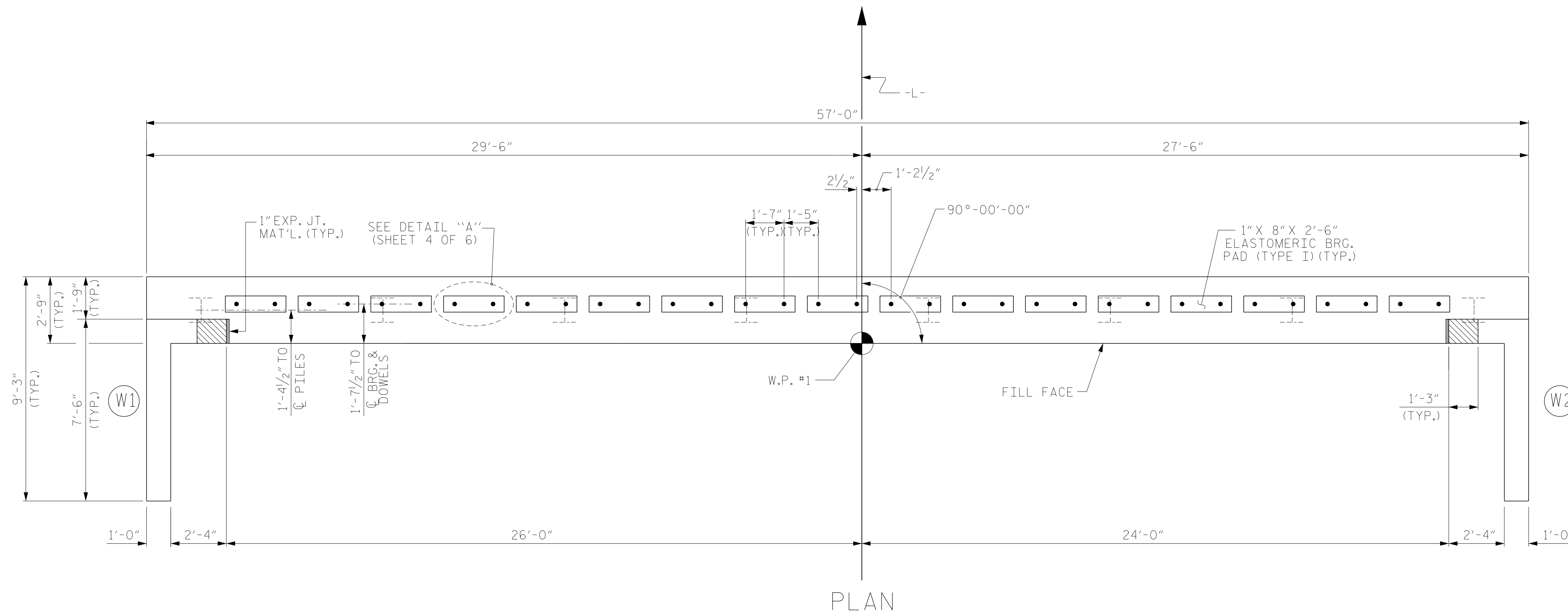
NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

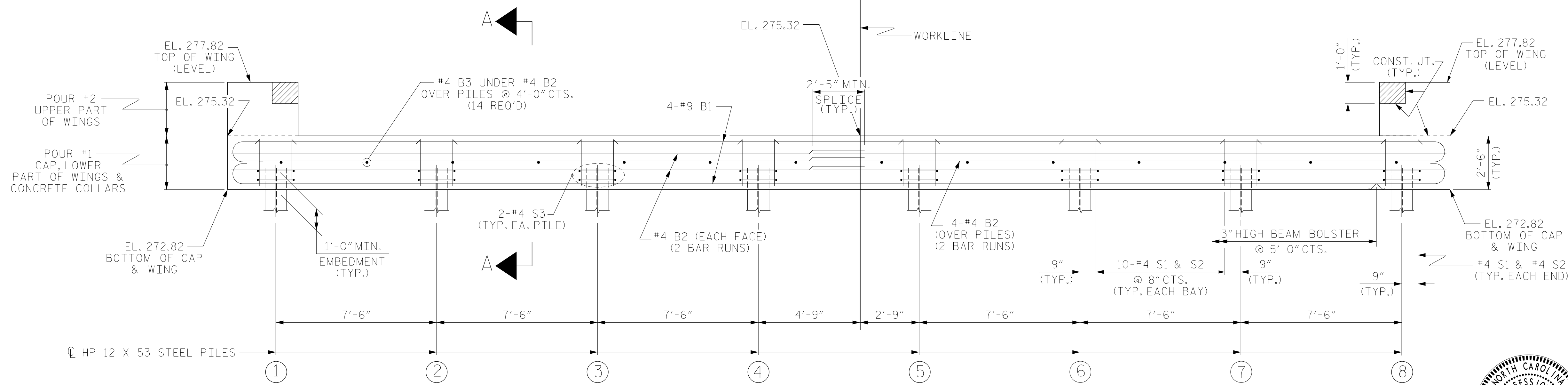
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPlice DETAILS, SEE SHEET 4 OF 6.

FOR WING DETAILS, SEE SHEET 3 OF 6.



PLAN



ELEVATION

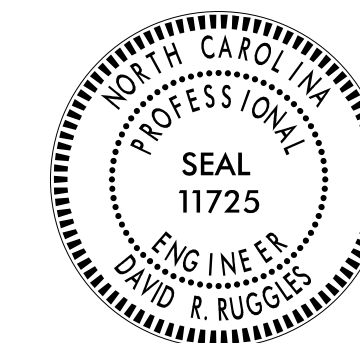
WINGS NOT SHOWN FOR CLARITY.  
FOR SECTION A-A, SEE SHEET 4 OF 6.  
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 6.

PROJECT NO. 17BP.5.PE.79

WAKE COUNTY

STATION: 11+90.50 -L-

SHEET 1 OF 6



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

STEWART

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

WAKE 216

\$\$\$\$SYTIME\$\$\$\$  
\$\$\$\$DGN\$\$\$\$  
\$\$\$\$USERNAME\$\$\$\$

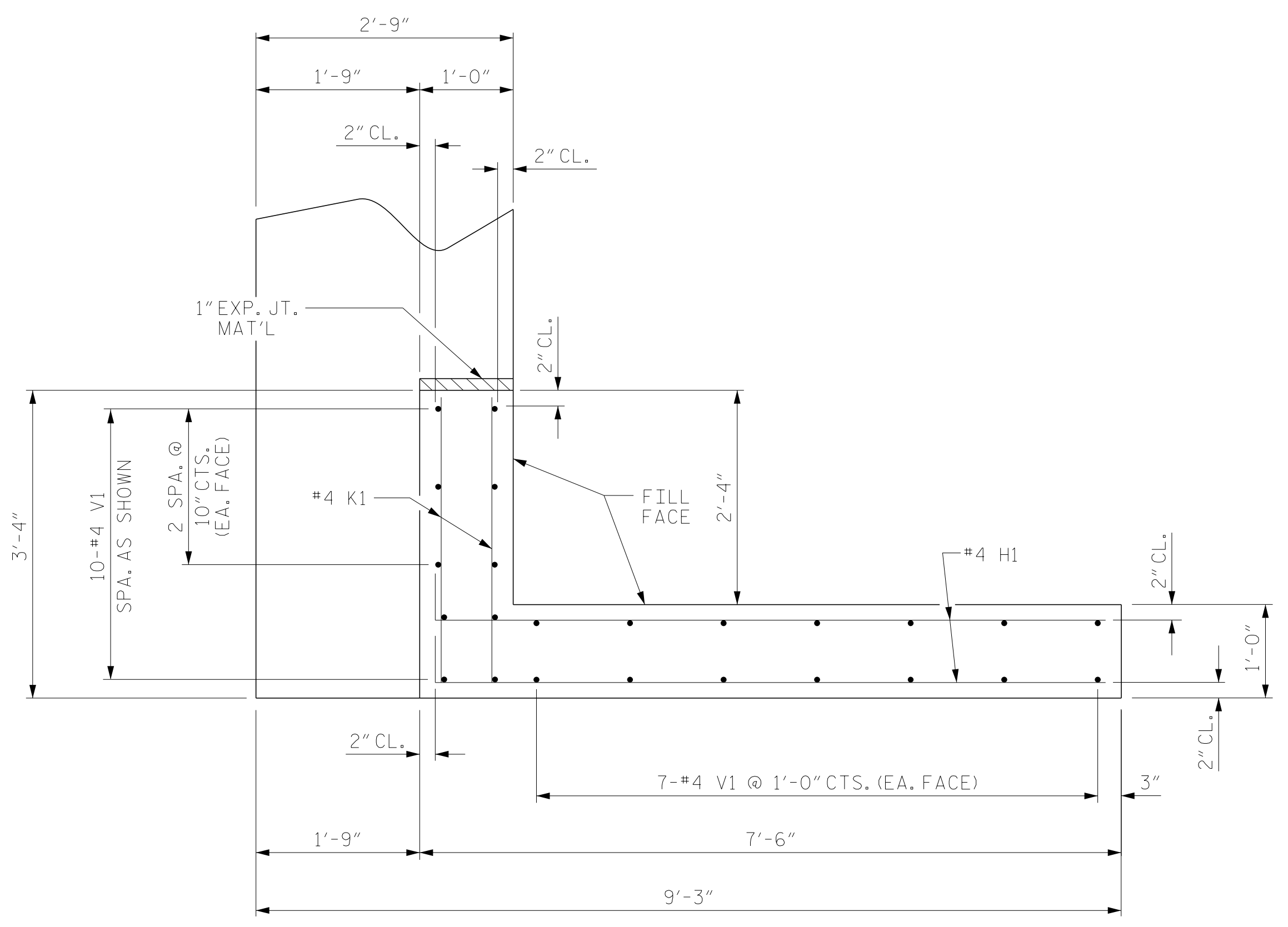




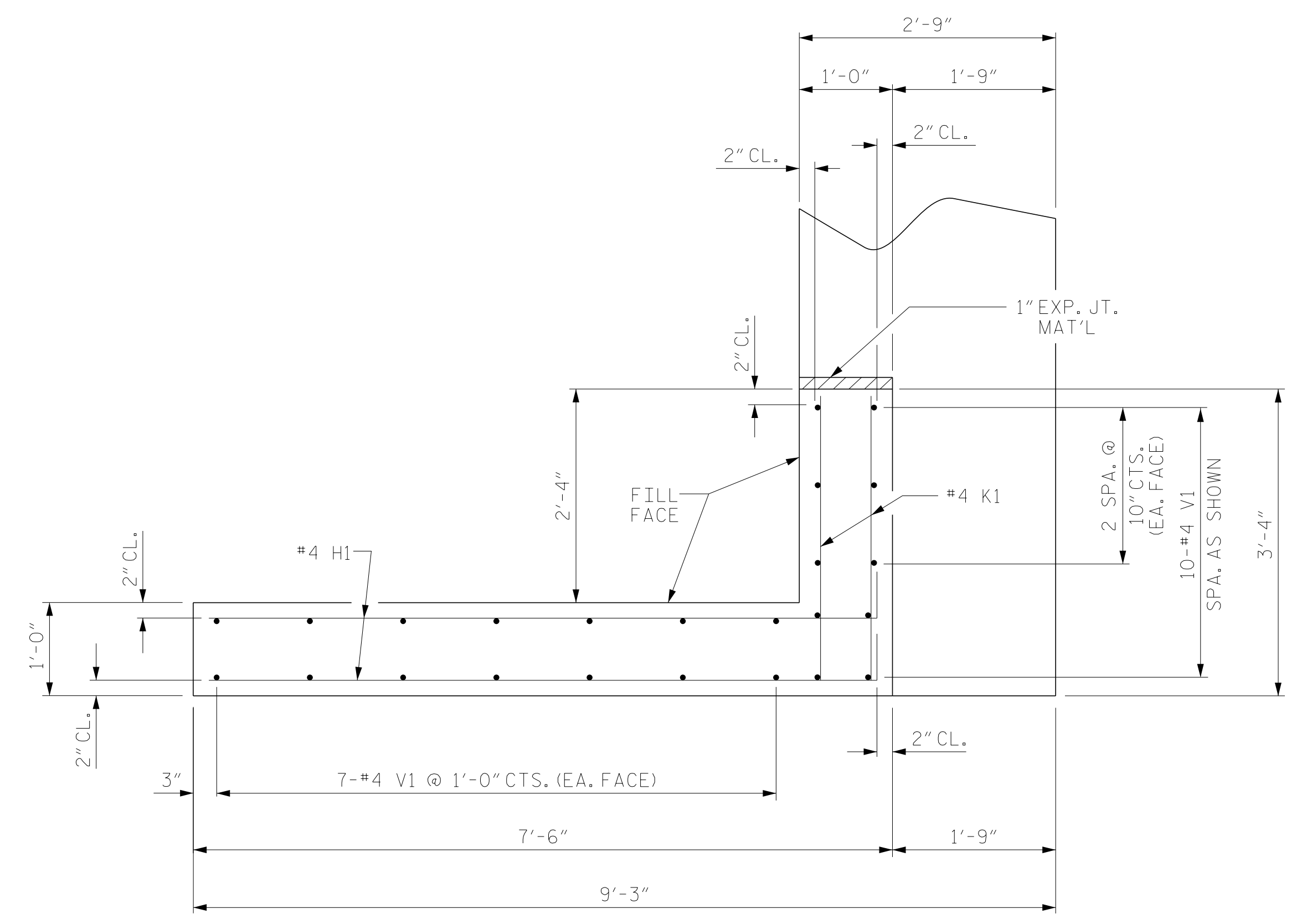
WAKE 216

\$\$\$SYTIME\$\$\$  
\$\$\$DGN\$\$\$  
\$\$\$USERNAME\$\$\$

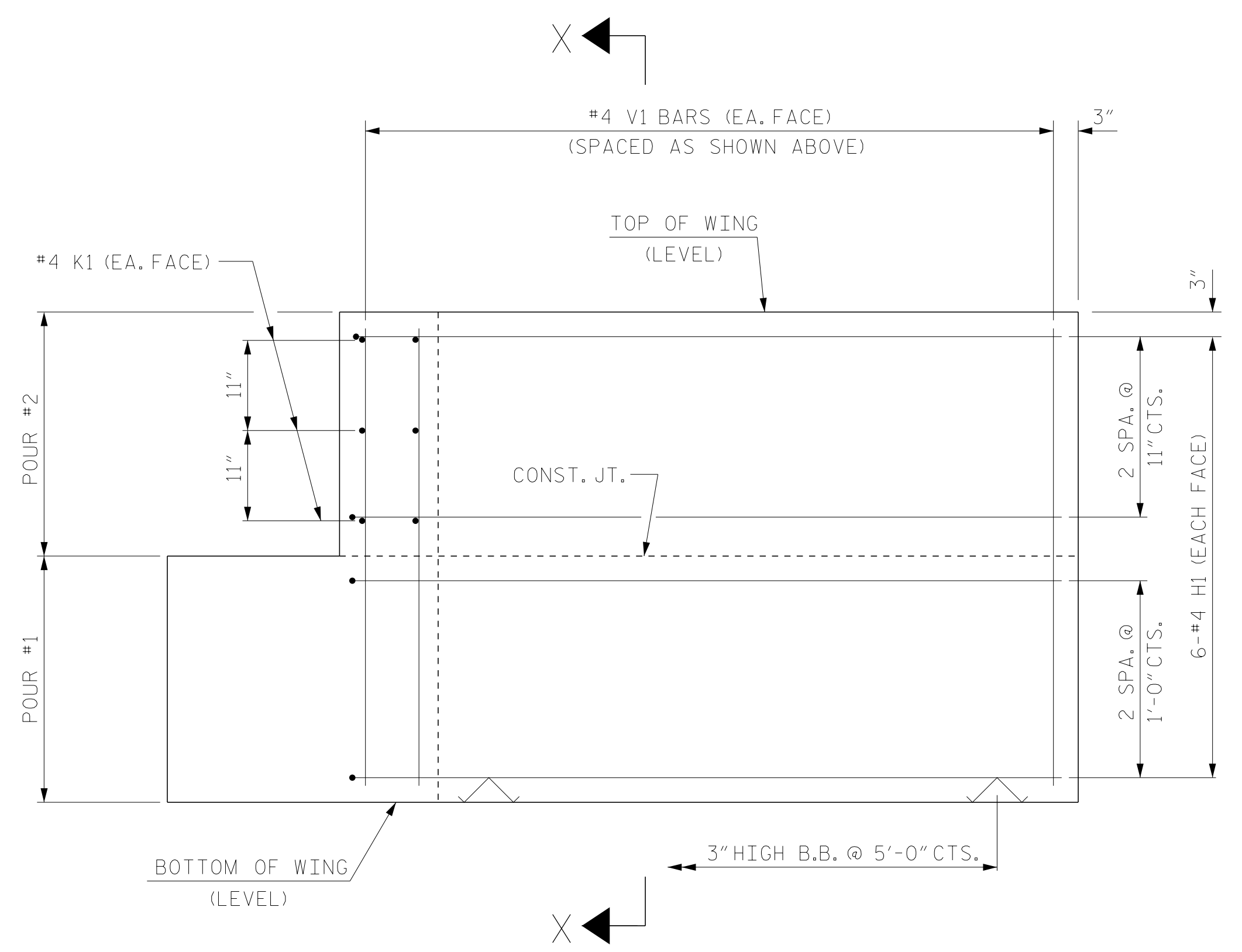
DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19



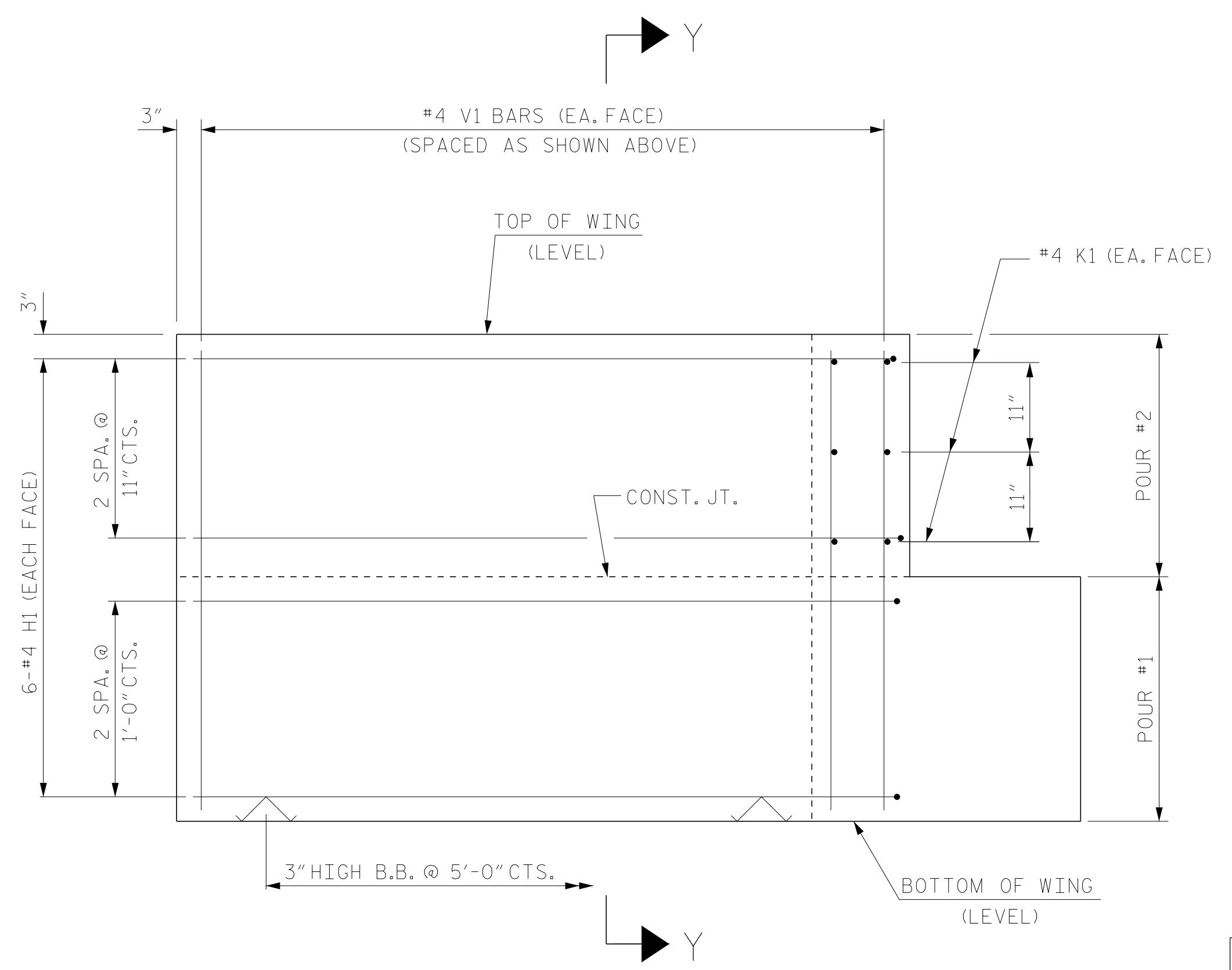
PLAN OF WING (W1)



PLAN OF WING (W2)

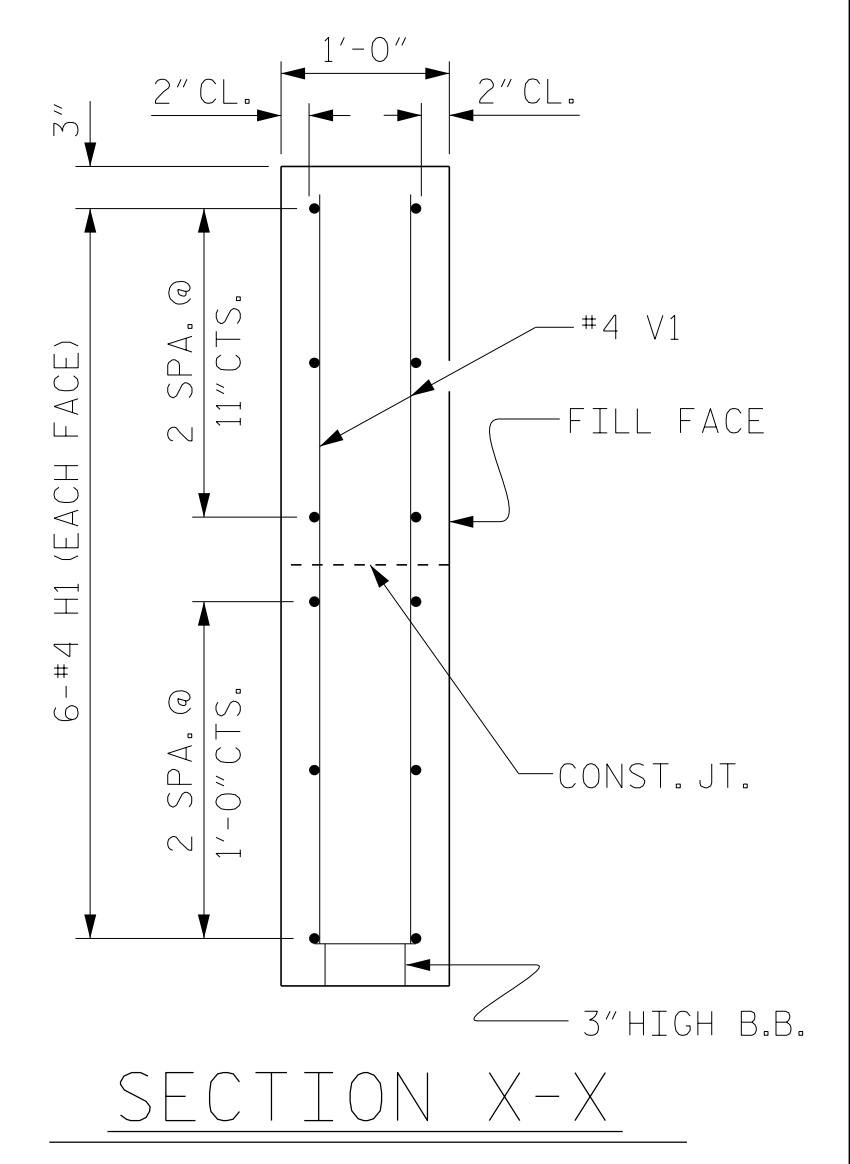


ELEVATION OF WING (W1)

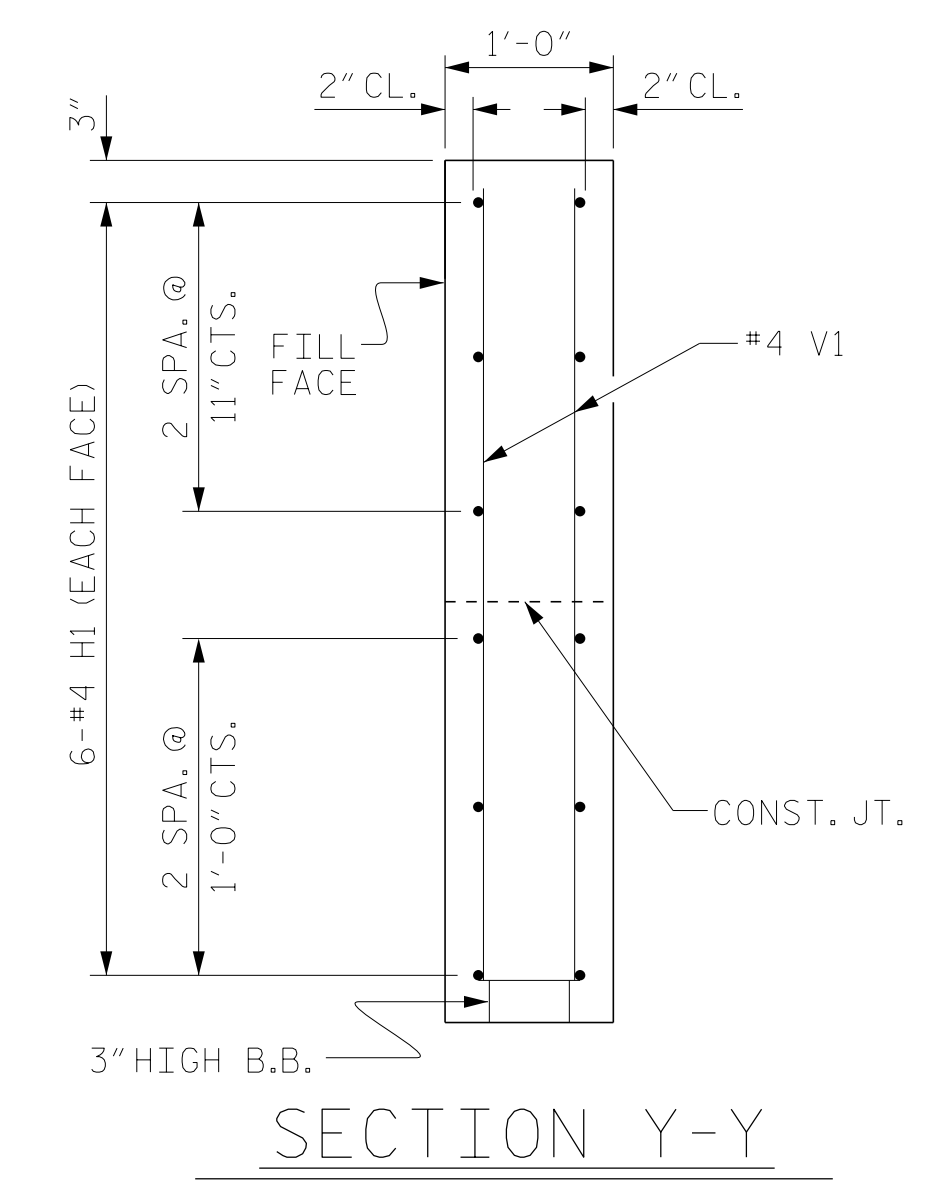


ELEVATION OF WING (W2)

WING DETAILS



SECTION X-X



SECTION Y-Y



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STEWART  
Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

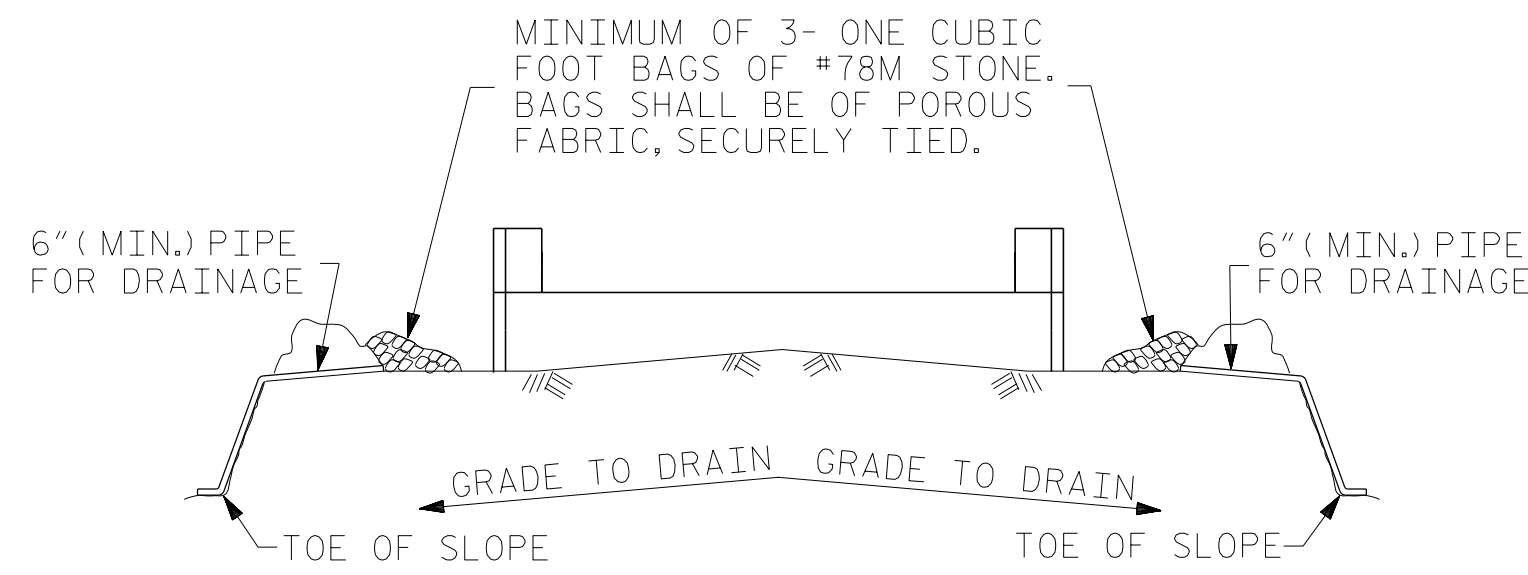
PROJECT NO. 17BP.5.PE.79  
WAKE COUNTY  
STATION: 11+90.50 -L-  
SHEET 3 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT  
WING DETAILS

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-20  
TOTAL SHEETS 26

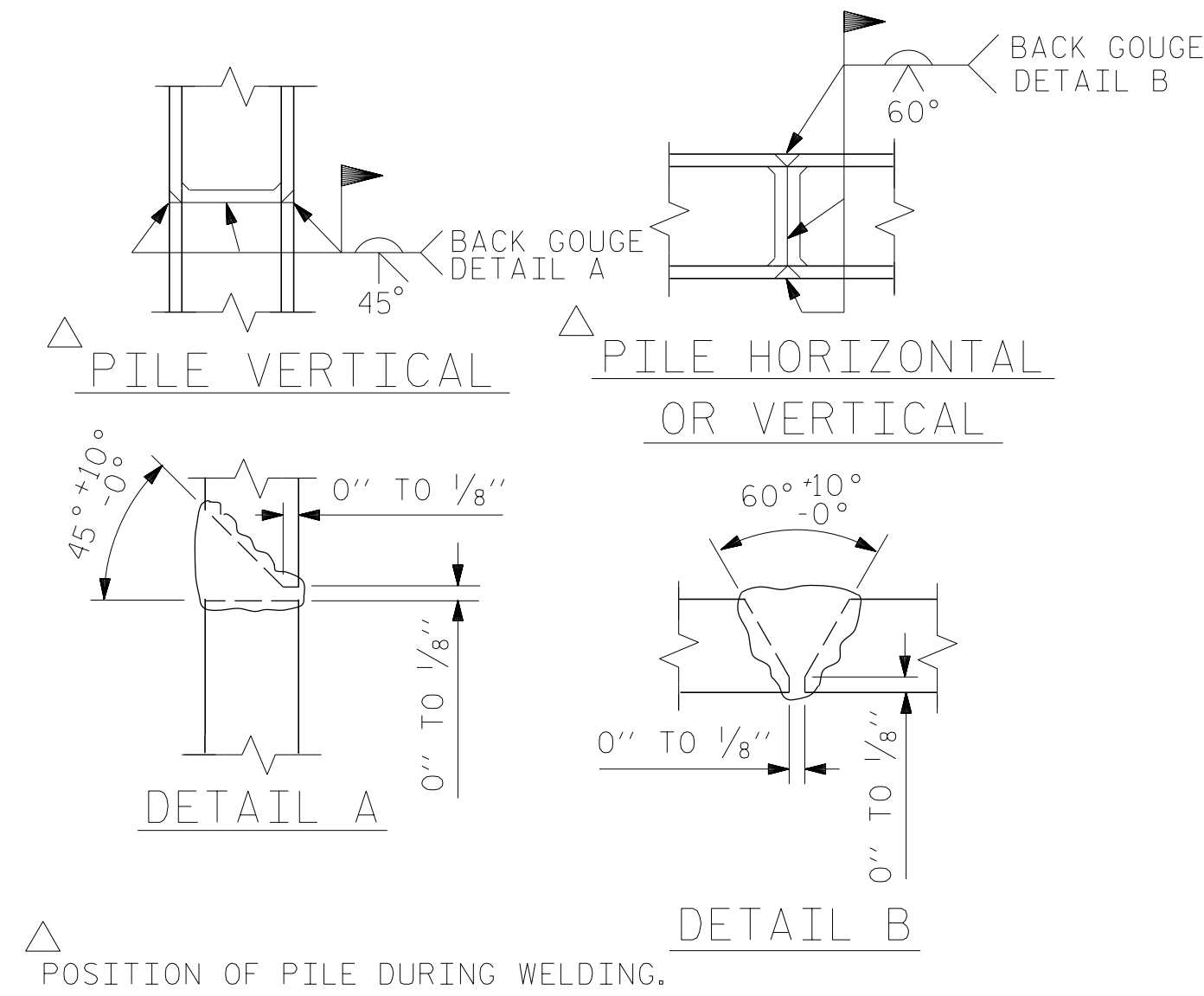


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

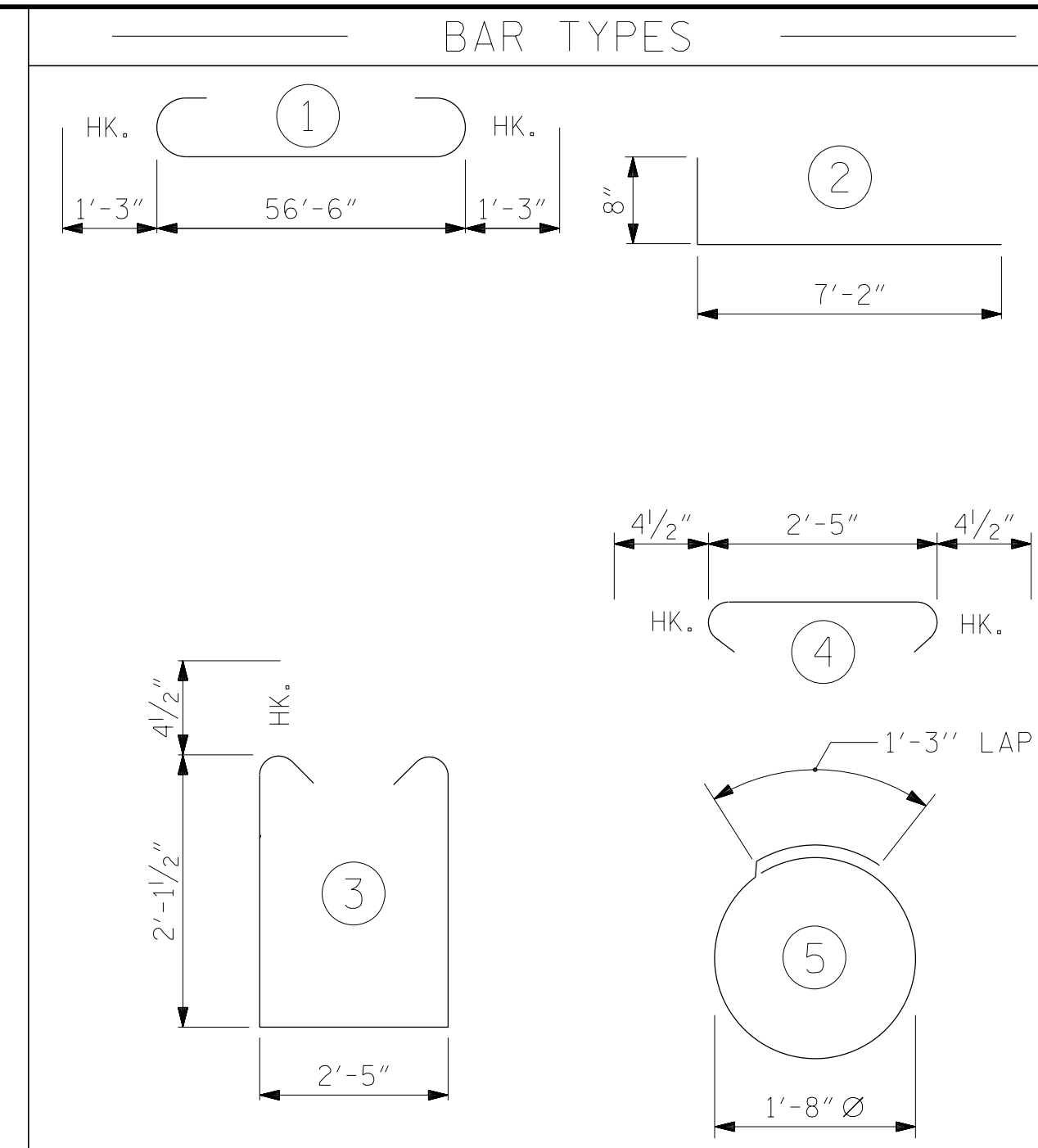
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT



### PILE SPLICE DETAILS

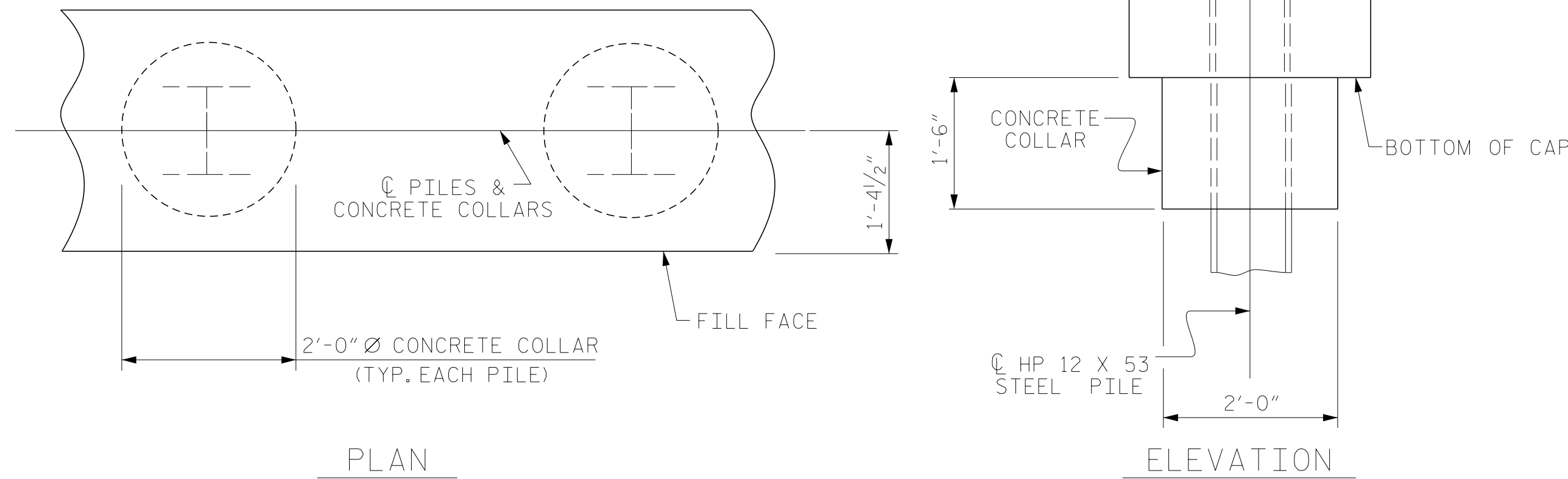


ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 1		END BENT No. 2	
HP 12 X 53 STEEL PILES	NO: 8	HP 12 X 53 STEEL PILES	NO: 8
LIN. FT.= 240		LIN. FT.= 220	
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	NO: 8	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	NO: 8
STEEL PILE POINTS	NO: 8	STEEL PILE POINTS	NO: 8

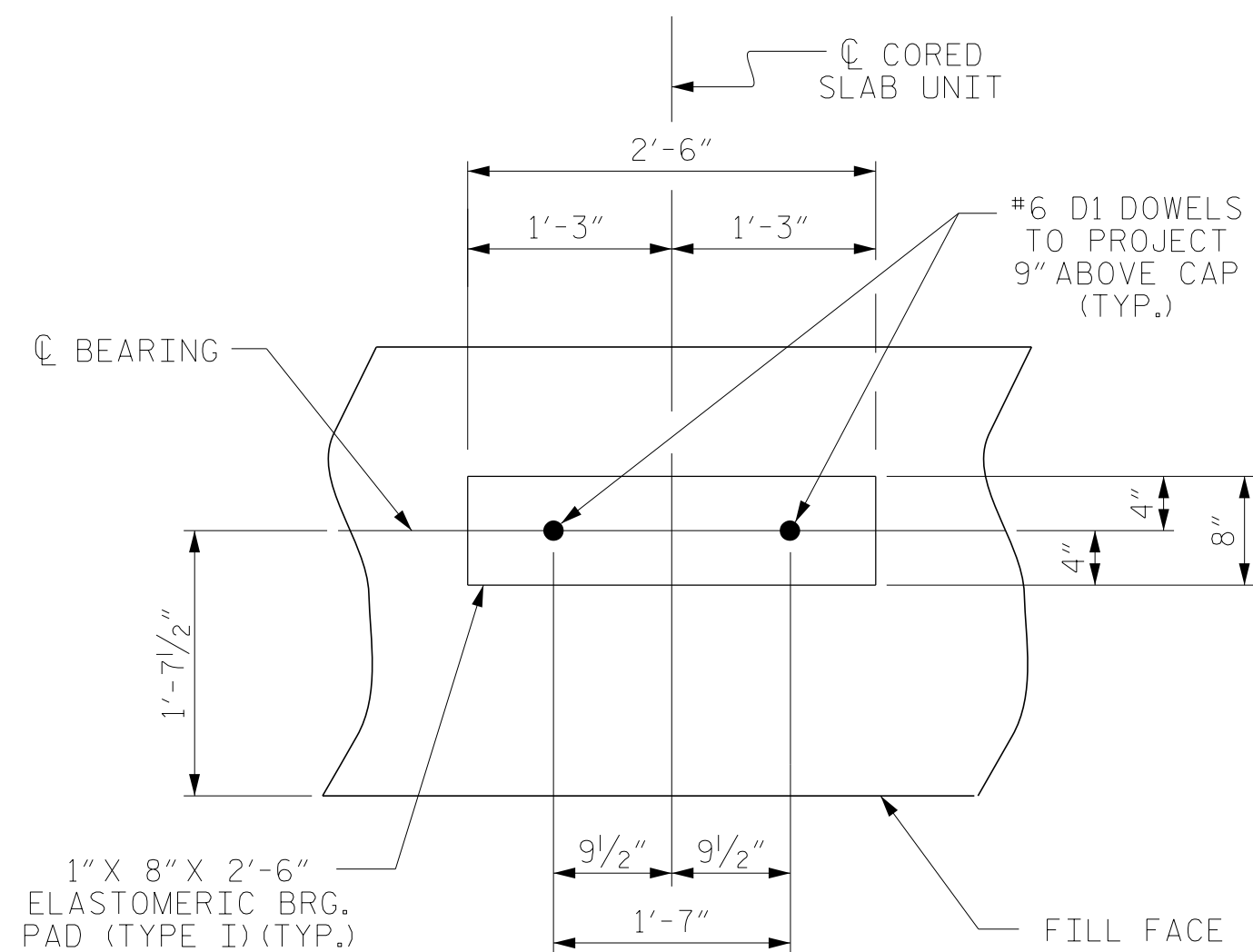
### BILL OF MATERIAL FOR ONE END BENT

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	59'-0"	1605
B2	16	#4	STR	29'-7"	316
B3	14	#4	STR	2'-5"	23
D1	34	#6	STR	1'-6"	77
H1	24	#4	2	7'-10"	126
K1	12	#4	STR	2'-11"	23
S1	72	#4	3	7'-5"	357
S2	72	#4	4	3'-2"	152
S3	16	#4	5	6'-6"	69
V1	48	#4	STR	4'-8"	150
REINFORCING STEEL (FOR ONE END BENT)					2898 LBS.
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					17.1 C.Y.
POUR #2 UPPER PART OF WINGS					1.8 C.Y.
TOTAL CLASS A CONCRETE					18.9 C.Y.

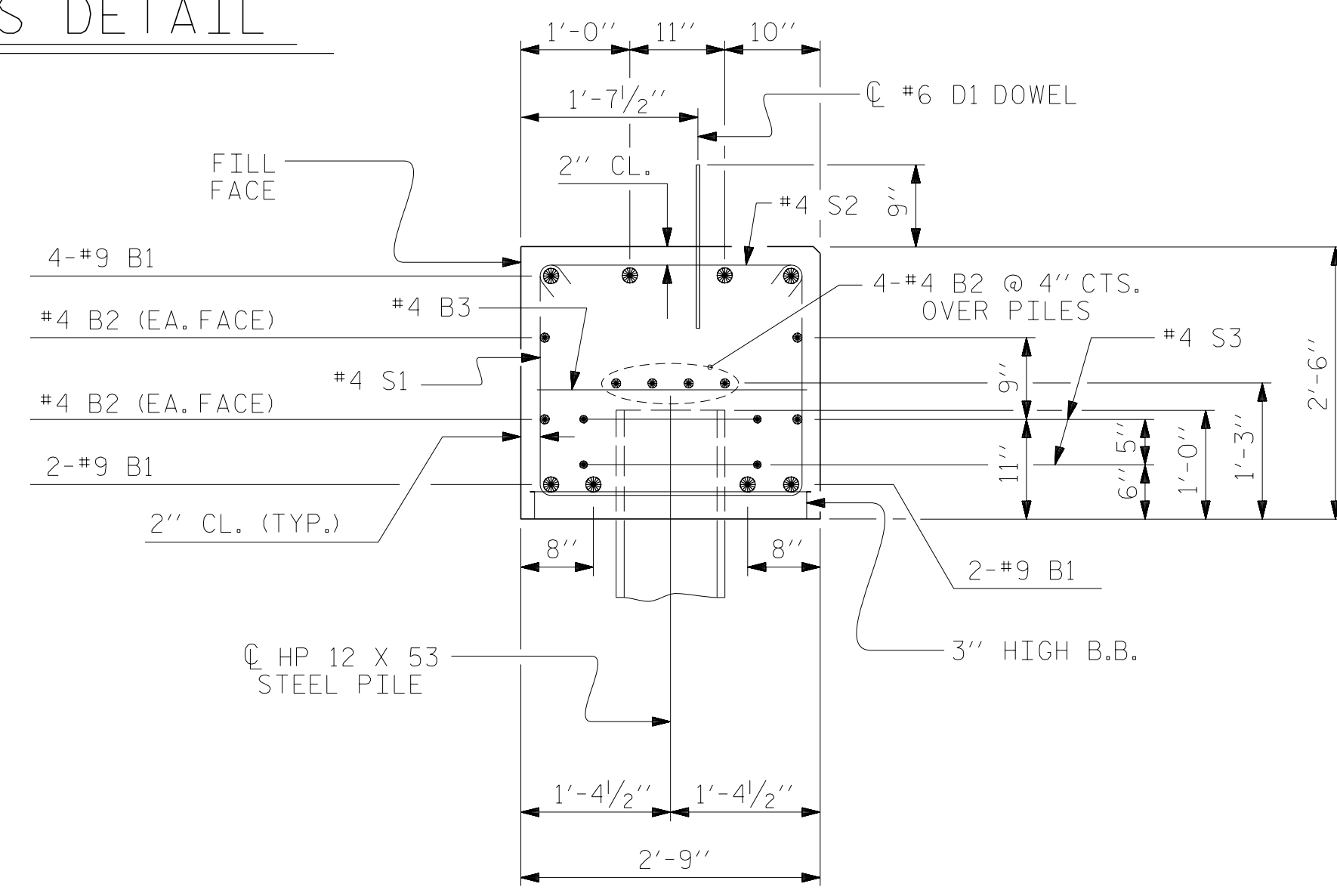


### CORROSION PROTECTION FOR STEEL PILES DETAIL

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

PROJECT NO. 17BP.5.PE.79

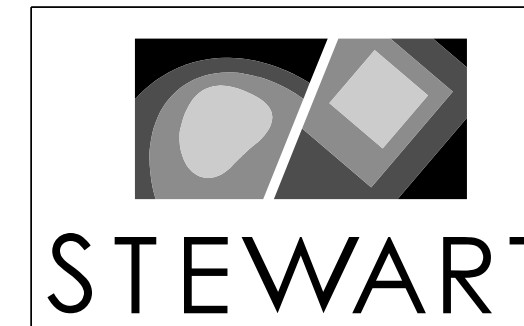
WAKE COUNTY

STATION: 11+90.50 -L-

SHEET 4 OF 6



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



Firm License No. C-1051  
223 S. West St.  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2  
DETAILS

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	
S-21	TOTAL SHEETS 26

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

WAKE 216

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

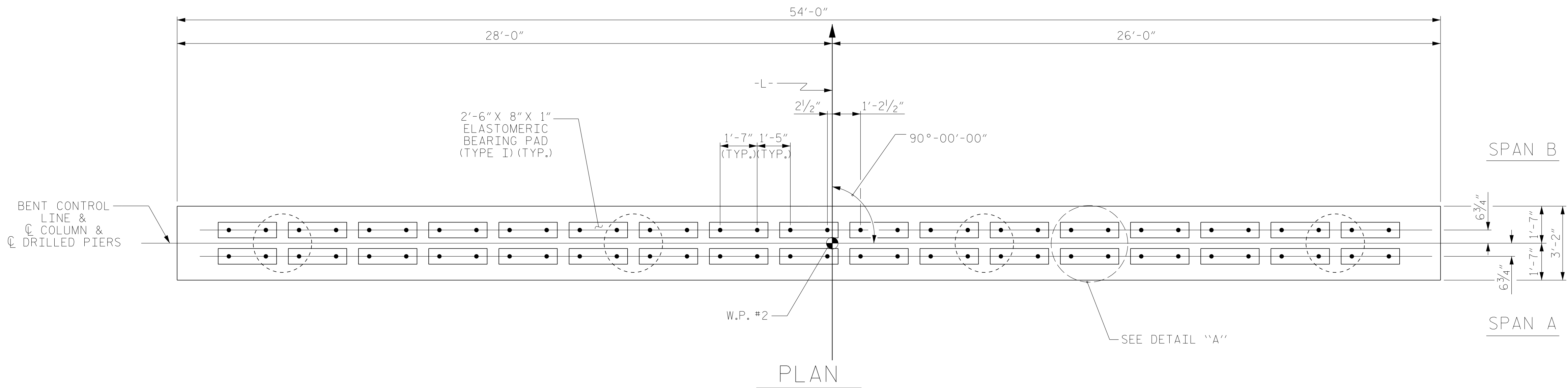
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

★INVERT ALTERNATE STIRRUPS.

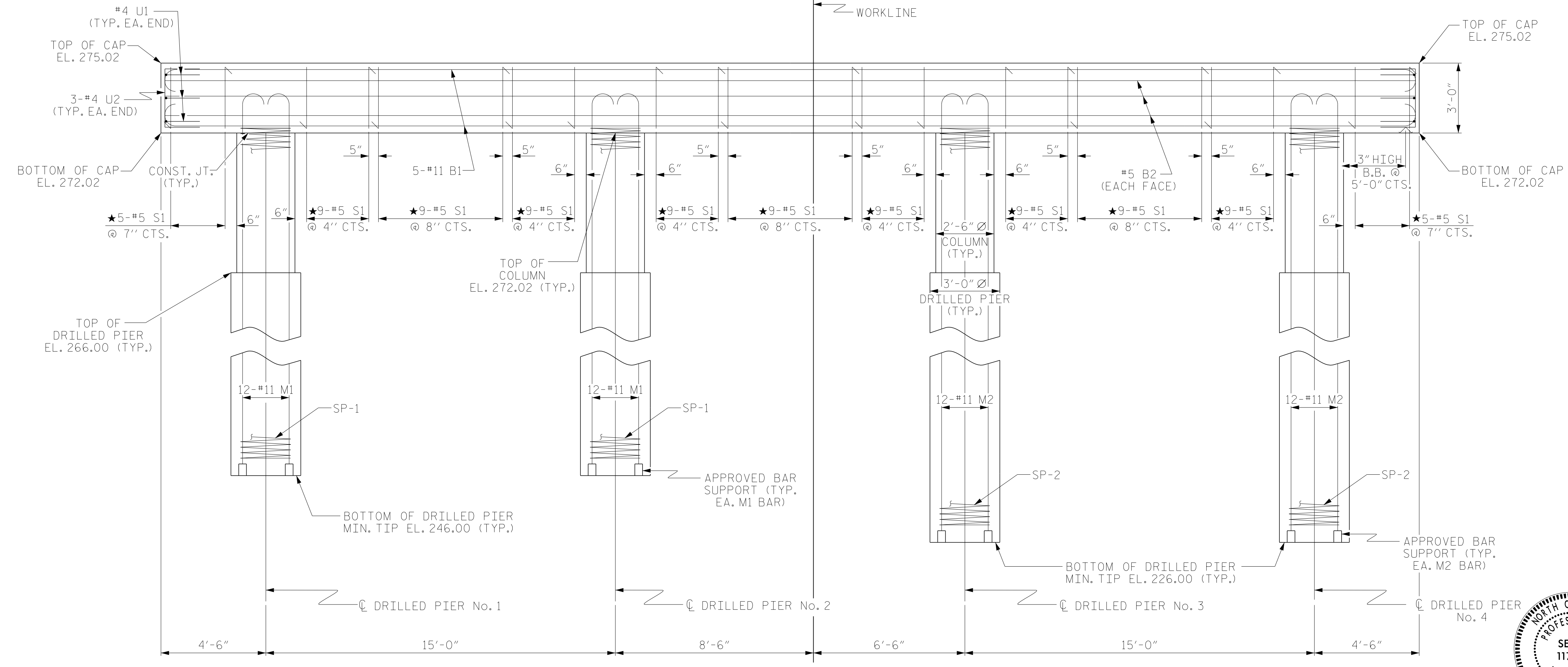
THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

DRILLED PIERS SHALL BE TERMINATED ONE FOOT ± ABOVE NORMAL WATER SURFACE ELEVATION FOR SHAFTS LOCATED IN WATER.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

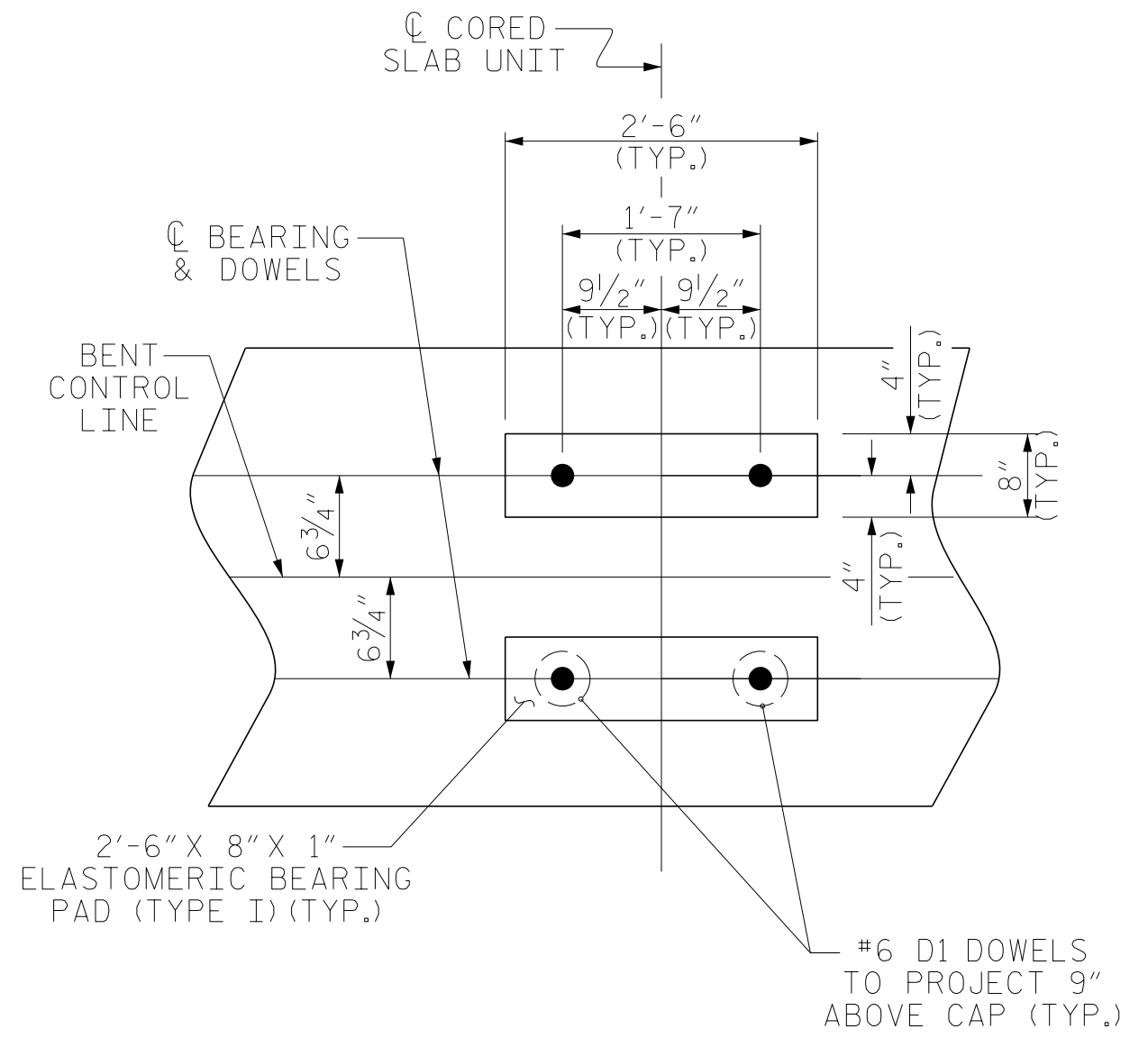


PLAN



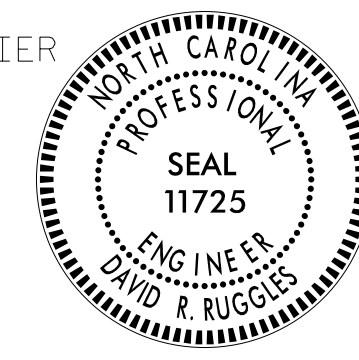
ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH DRILLED PIER UNLESS OTHERWISE NOTED.



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STEWART  
Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

PROJECT NO. 17BP.5.PE.79  
WAKE COUNTY  
STATION: 11+90.50 -L-  
SHEET 5 OF 6

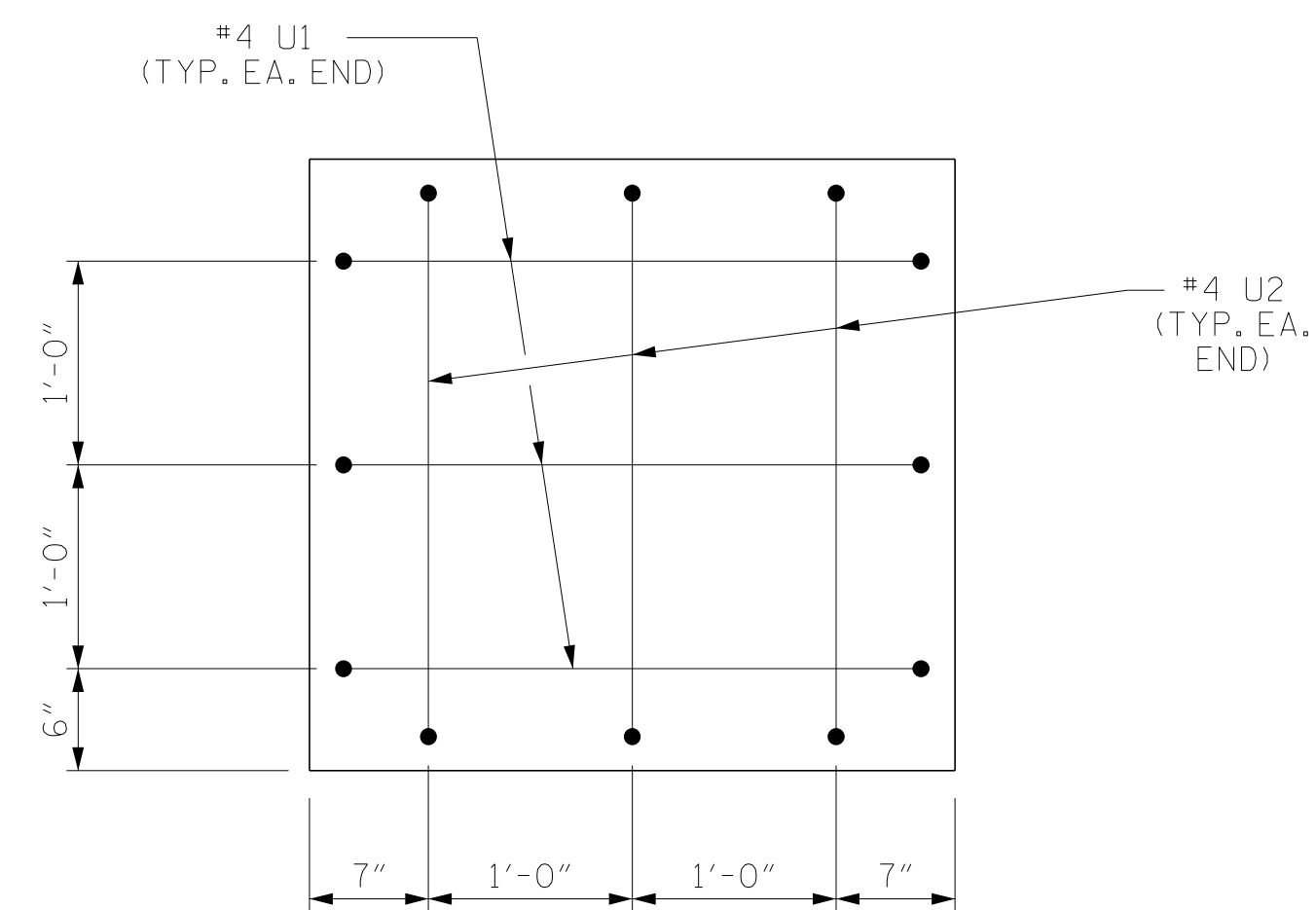
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT No. 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-22					TOTAL SHEETS 26

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

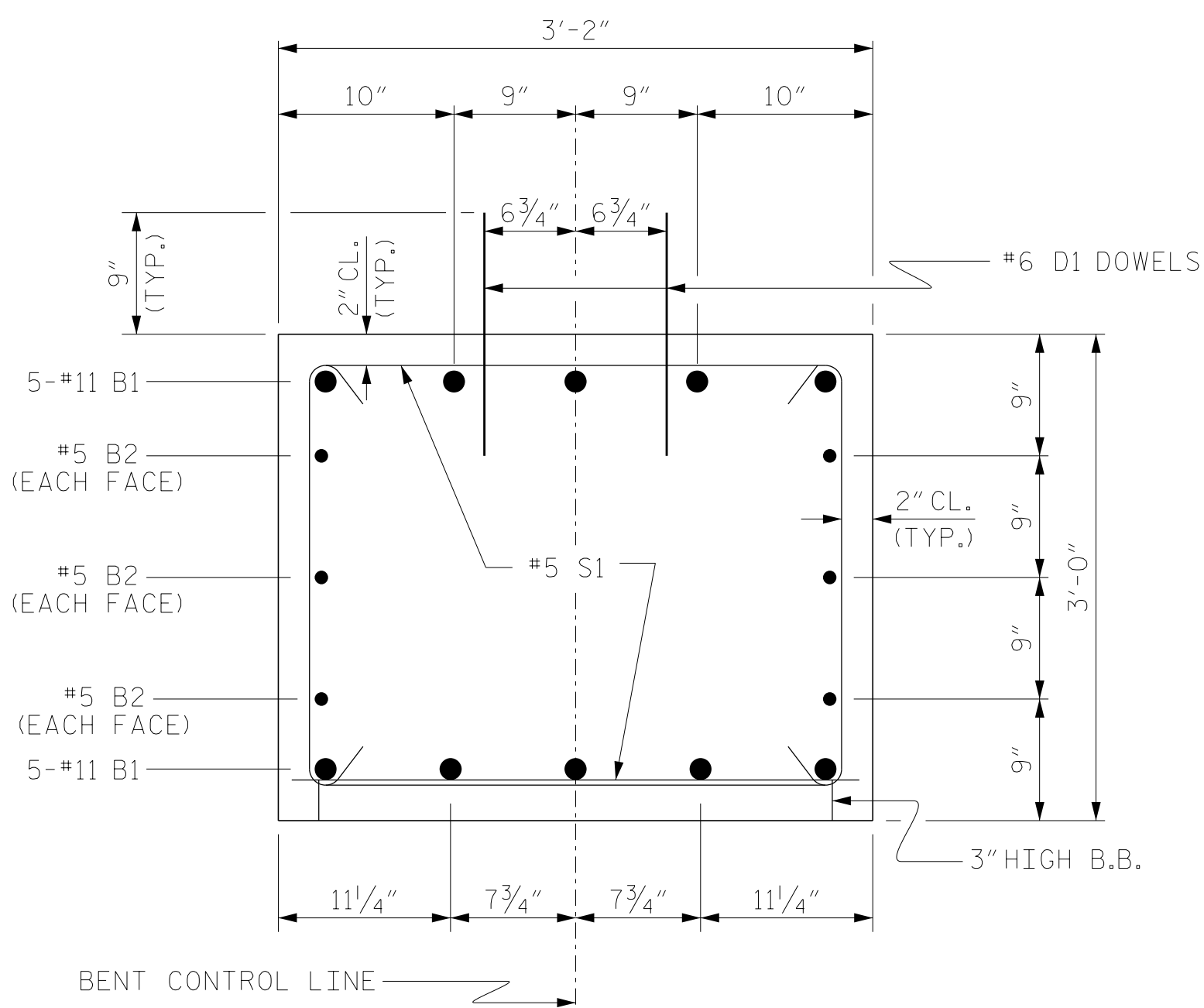
WAKE 216

\$\$\$\$SYSTEMTIME\$\$\$\$  
\$\$\$\$DGN\$\$\$\$  
\$\$\$\$USERNAME\$\$\$\$

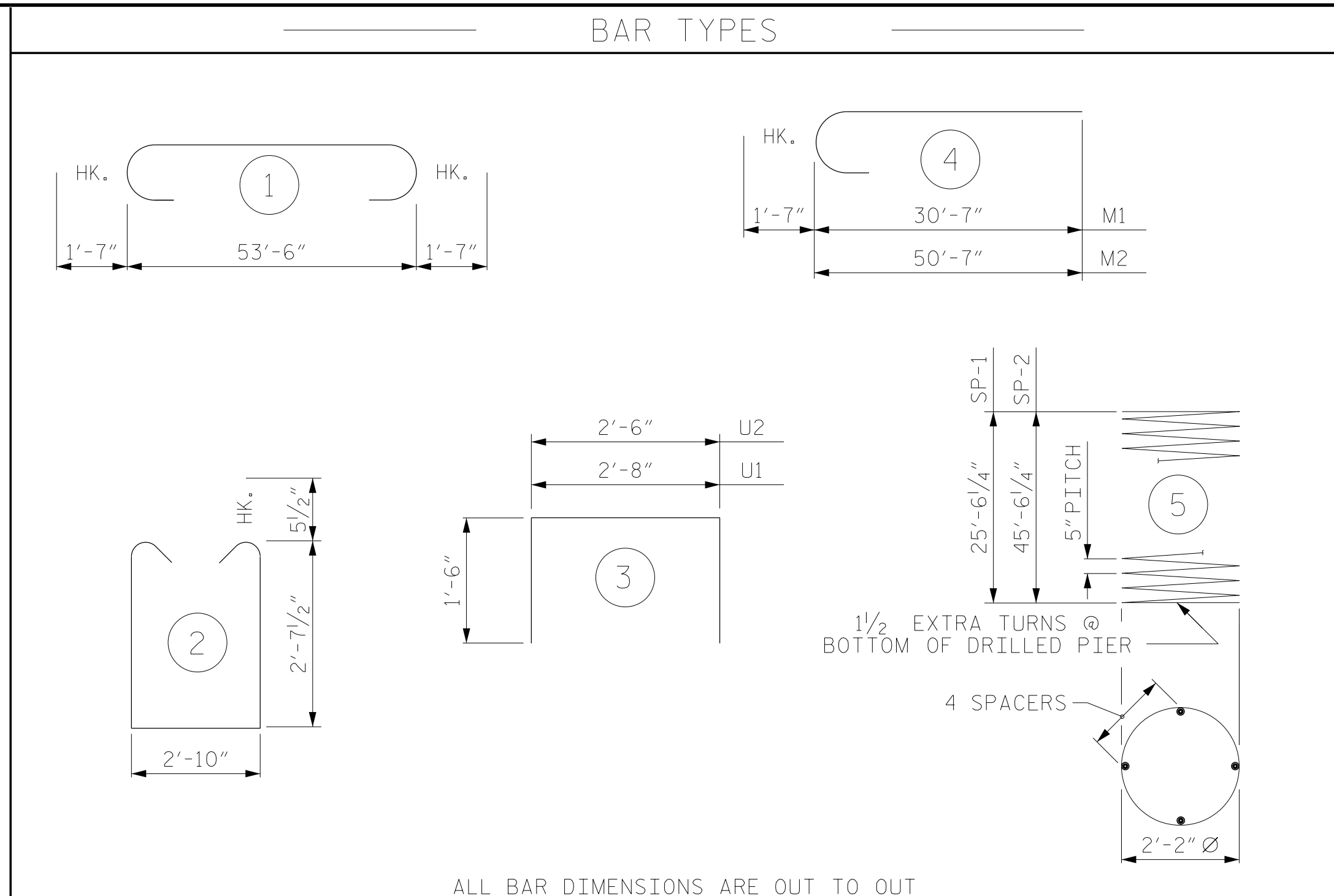




END OF CAP VIEW  
(TYPICAL BOTH ENDS)



SECTION THRU CAP



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL  
FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	56'-8"	3011
B2	6	#5	STR	53'-8"	336
D1	68	#6	STR	1'-6"	153
M1	24	#11	4	32'-2"	4102
M2	24	#11	4	52'-2"	6652
S1	91	#5	2	9'-0"	854
U1	6	#4	3	5'-8"	23
U2	6	#4	3	5'-6"	22

REINFORCING STEEL  
(FOR ONE BENT) 15,153 LBS.

SP-1	2	#5	5	427'-8"	892
SP-2	2	#5	5	747'-2"	1559

SPIRAL REINFORCING STEEL  
(FOR ONE BENT) 2,451 LBS.

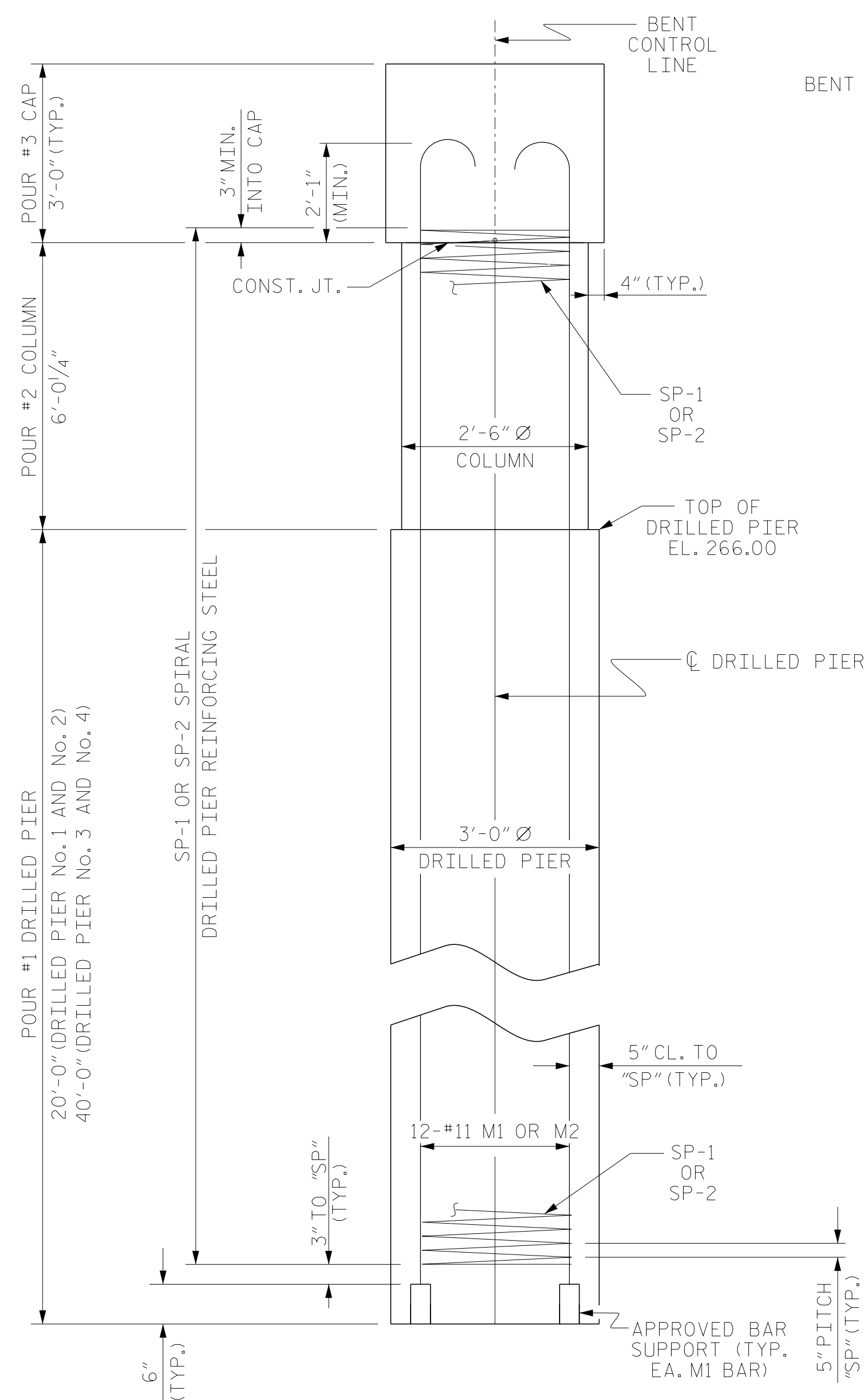
\* THE SP-1 AND SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR

CLASS A CONCRETE BREAKDOWN  
(FOR ONE BENT)

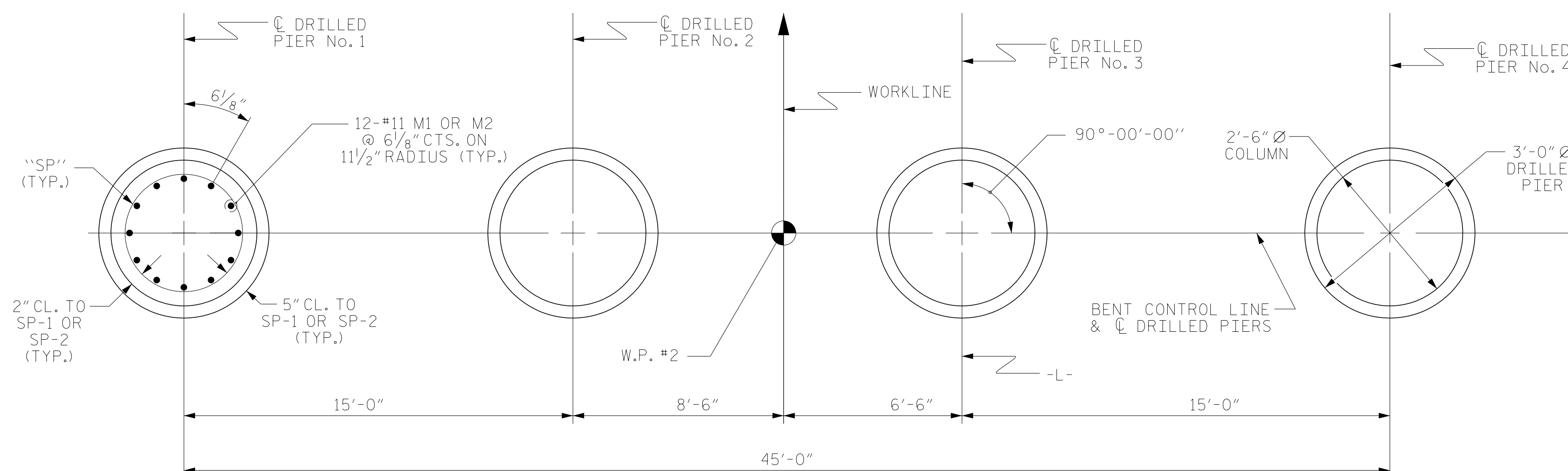
POUR #2 (COLUMN)	6.3 C.Y.
POUR #3 (CAP)	19.0 C.Y.
<b>TOTAL CLASS A CONCRETE</b>	<b>25.3 C.Y.</b>

DRILLED PIERS:  
(FOR ONE BENT)

DRILLED PIER CONCRETE	31.4 C.Y.
POUR #1 (DRILLED PIERS)	31.4 C.Y.
3'-0" Ø DRILLED PIER NOT IN SOIL	40.0 LIN. FT.
3'-0" Ø DRILLED PIER IN SOIL	80.0 LIN. FT.
PERMANENT STEEL CASING FOR 3'-0" Ø DRILLED PIER	98.0 LIN. FT.
CSL TUBES	504.0 LIN. FT.
SID INSPECTIONS	1 EA.
CSL TESTING	1 EA.



END ELEVATION



PLAN OF DRILLED PIERS



DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

STEWART

PROJECT NO. 17BP.5.PE.79  
WAKE COUNTY  
STATION: 11+90.50 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
BENT No. 1

REVISIONS

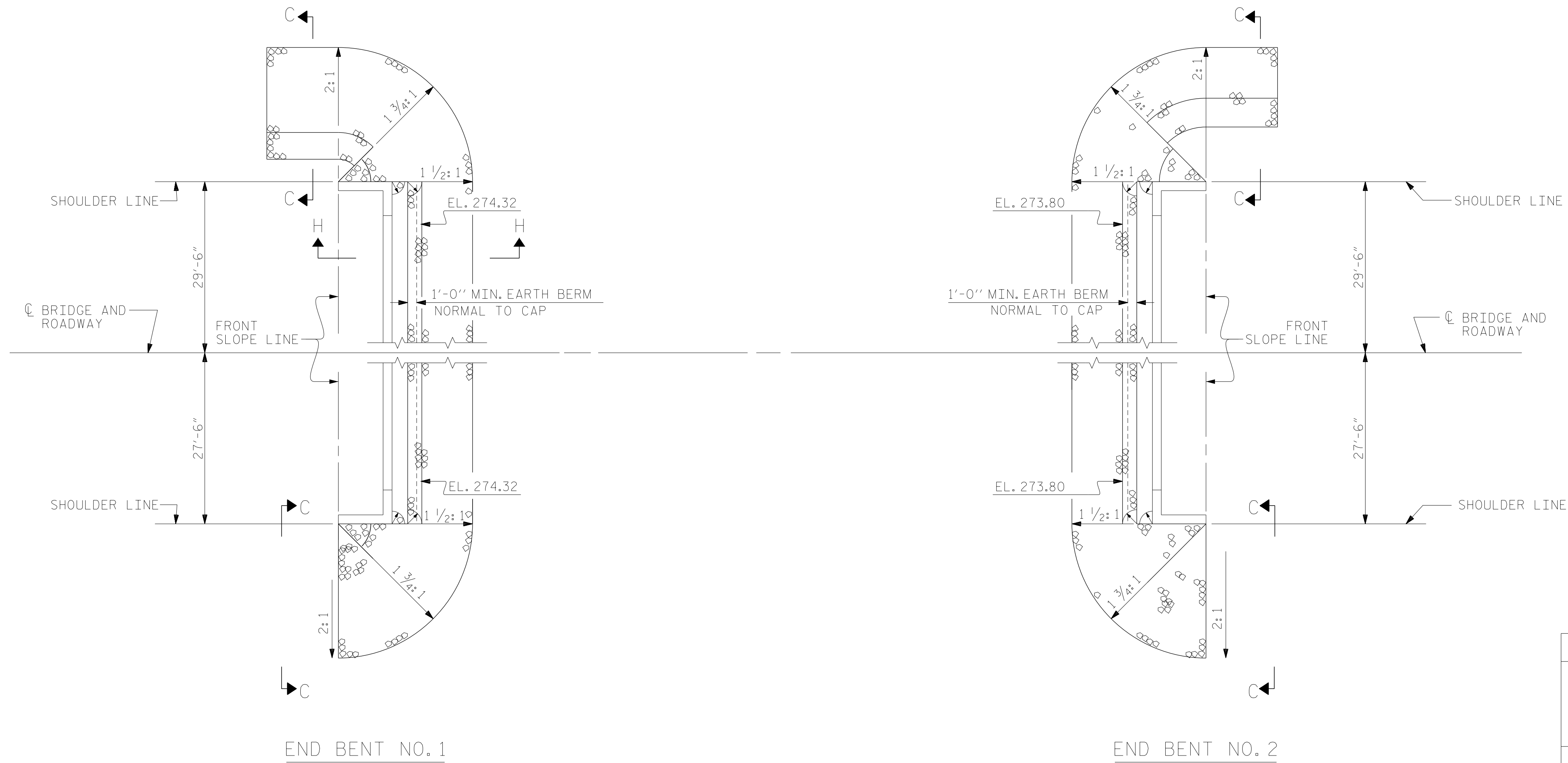
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.

S-23  
TOTAL SHEETS  
26

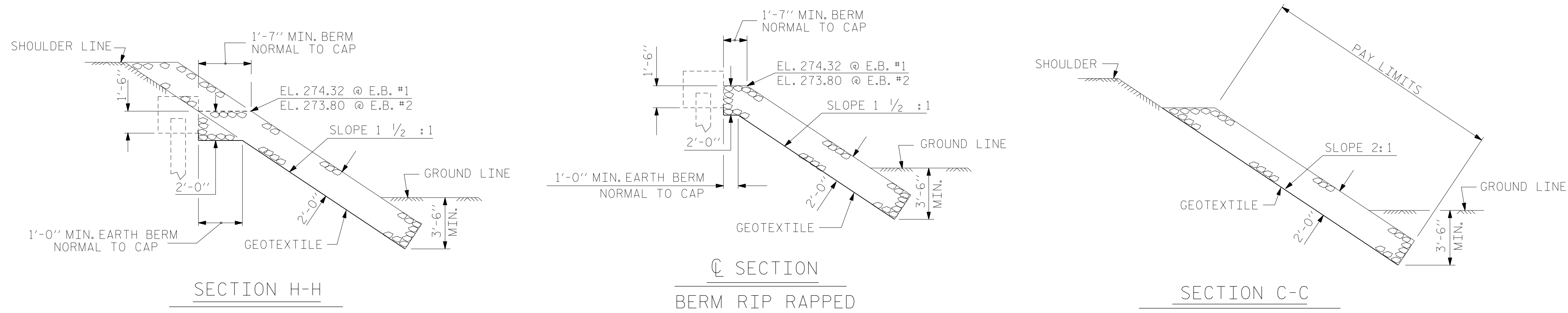
DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

NOTES :  
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



ESTIMATED QUANTITIES		
BRIDGE @ STA. 11+90.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	70	75
END BENT 2	50	55

PLAN OF RIP RAP



SECTION H-H

SECTION C-C

SECTION BERM RIP RAPPED



DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

PROJECT NO. 17BP.5.PE.79  
WAKE COUNTY  
STATION: 11+90.50 -L-

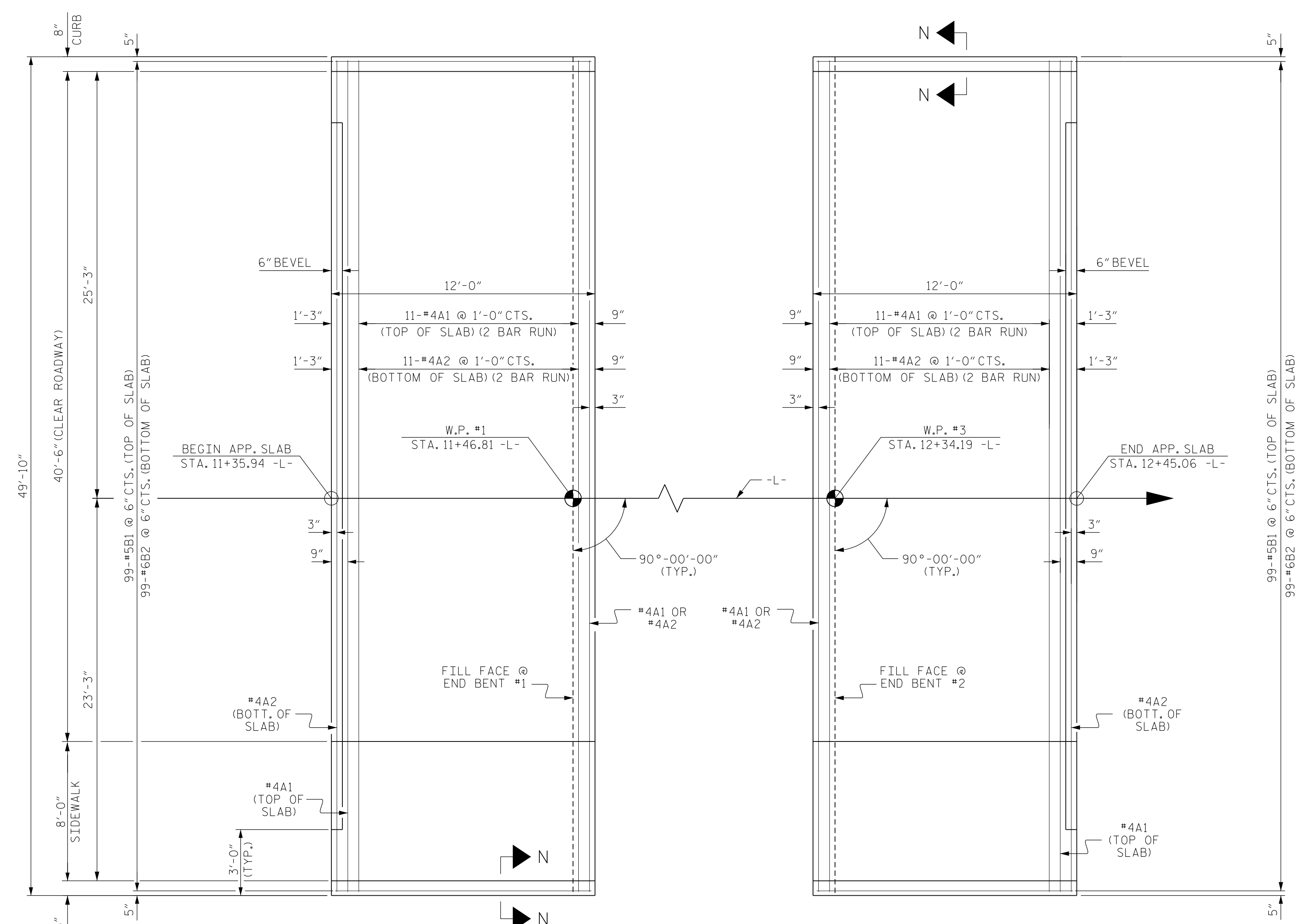
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
RIP RAP DETAILS

**STEWART**  
Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			26

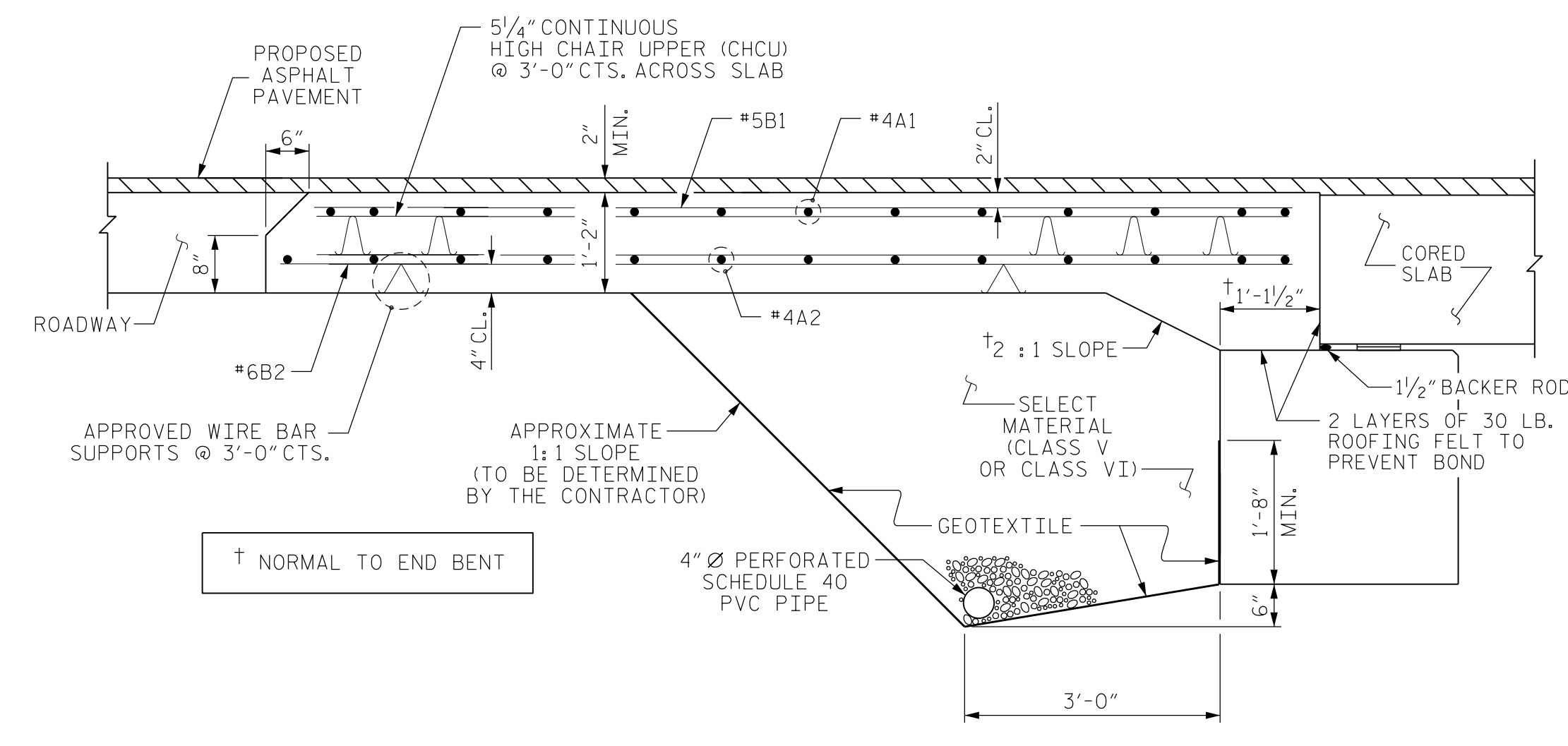
WAKE 216

\$\$\$SYSTEMTIME\$\$\$  
\$\$\$DGN\$\$\$  
\$\$\$USERNAME\$\$\$  
DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19



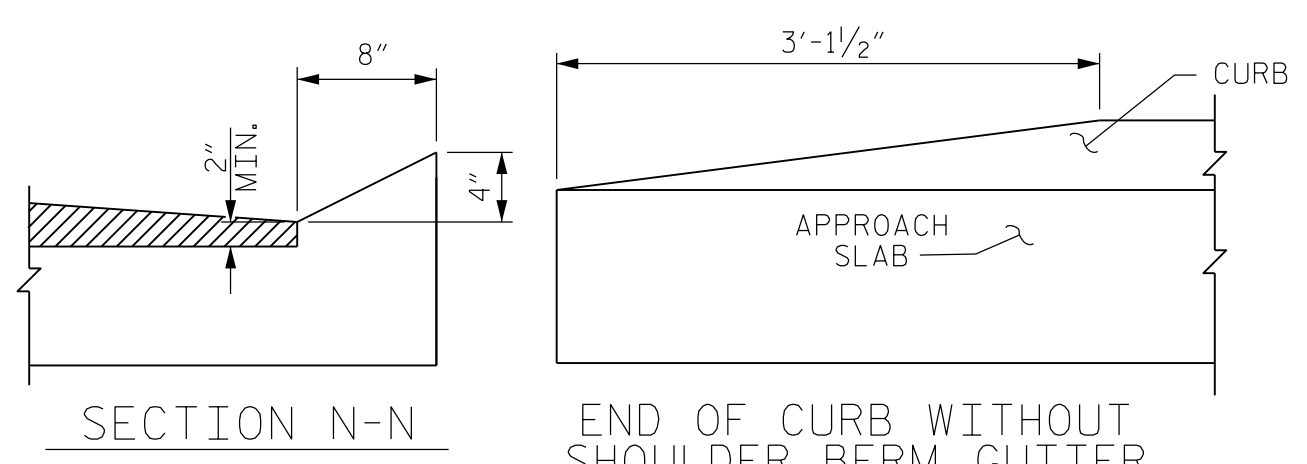
PLAN @ END BENT #1 PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB

(TYPE II - MODIFIED APPROACH FILL)

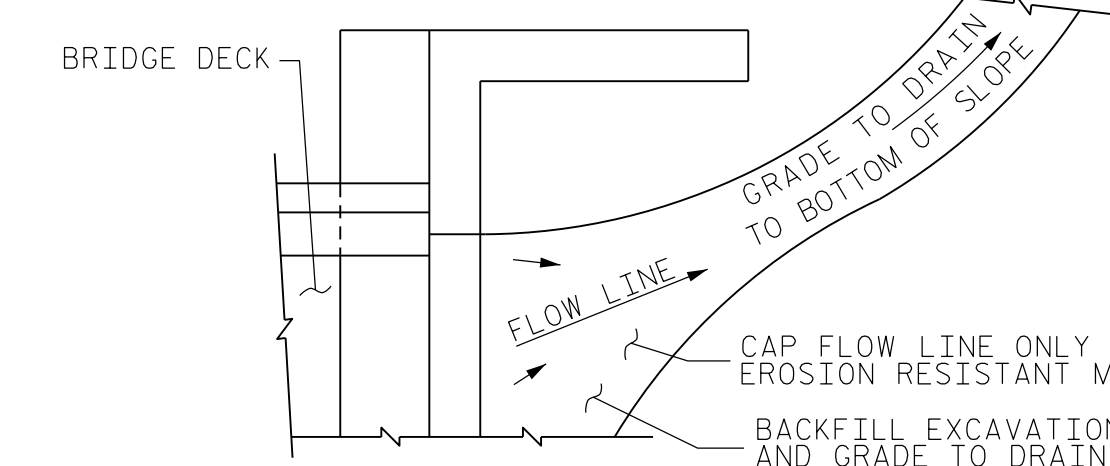


CURB DETAILS

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

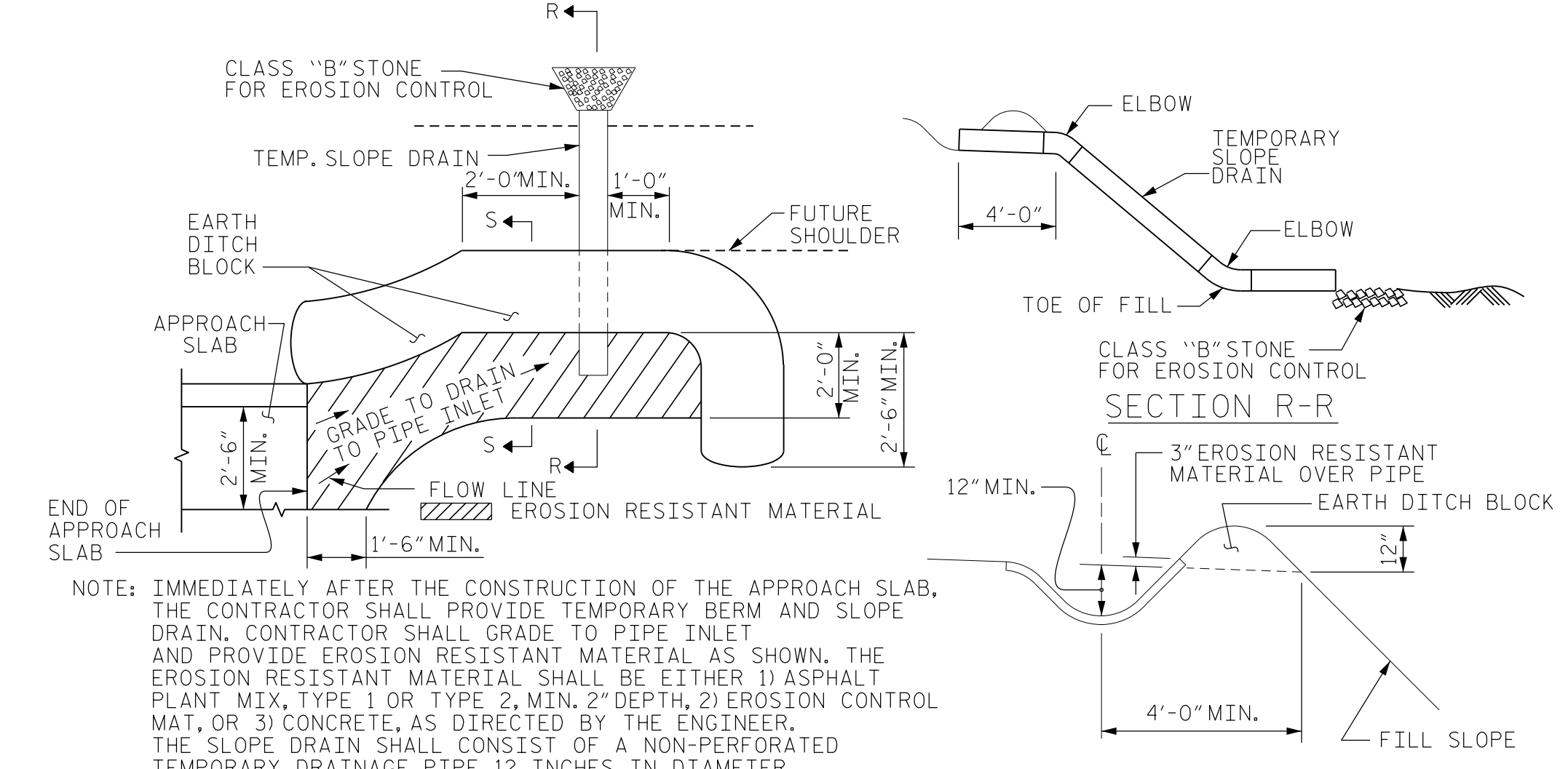
NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.  
 GEOTEXTILE SHALL BE TYPE I IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.  
 SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.  
 SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.  
 FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.  
 AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.  
 APPROACH SLAB GROOVING IS NOT REQUIRED.  
 FOR VARIABLE SLOPE ON APPROACH SLAB SIDEWALK, SEE SHEET S-25.



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL



TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	26	#4	STR	25'-9"	447
A2	26	#4	STR	25'-8"	446
*B1	99	#5	STR	11'-2"	1153
B2	99	#6	STR	11'-8"	1735
*B3	8	#4	STR	11'-8"	62
*G1	12	#4	STR	7'-6"	60
*U1	6	#4	1	5'-0"	20

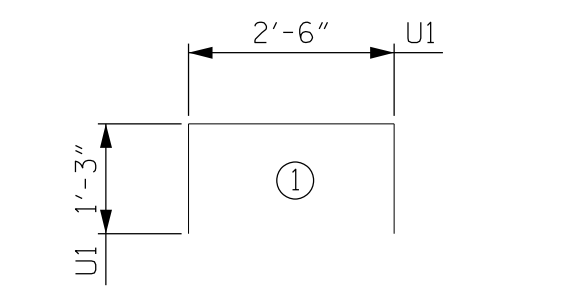
REINFORCING STEEL LBS. 2181  
 \* EPOXY COATED REINFORCING STEEL LBS. 1742

CLASS AA CONCRETE

POUR 1	28.0 C.Y.
POUR 2 (SIDEWALK)	3.8 C.Y.
TOTAL	31.8 C.Y.

BAR TYPES

ALL DIMENSIONS ARE OUT TO OUT



PROJECT NO. 17BP.5.PE.79  
 WAKE COUNTY  
 STATION: 11+90.50 -L-  
 SHEET 1 OF 2



DocuSigned by:  
 David Ruggles 6/29/2022  
 C462788DF412422

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



Firm License No. C-1051  
 223 S. West St,  
 Suite 1100  
 Raleigh, NC 27603  
 T 919.380.8750  
 www.stewartinc.com

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER)  
 90° SKEW

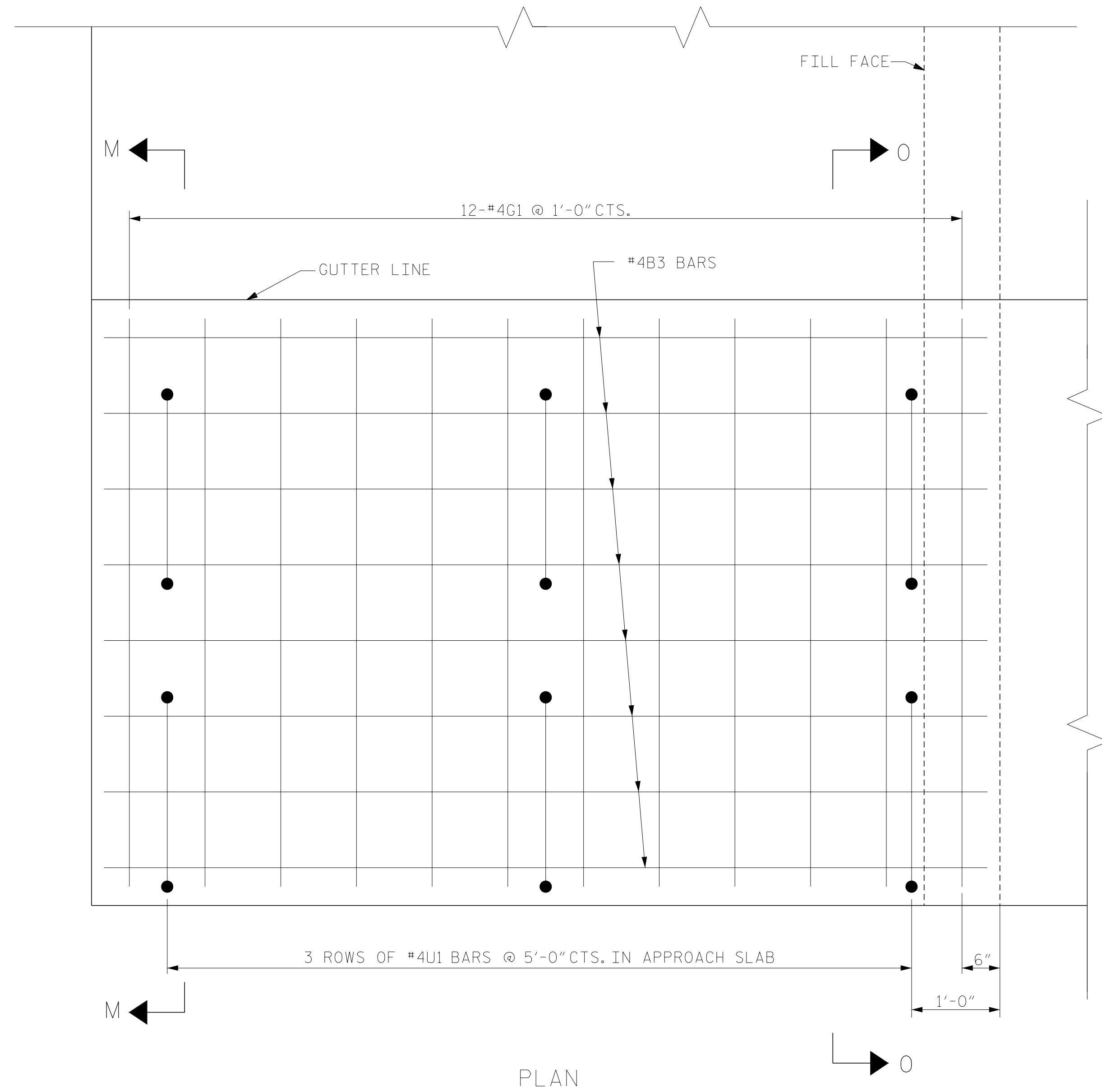
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1	JCW	6/29/22	3		
2			4		

TOTAL SHEETS 26

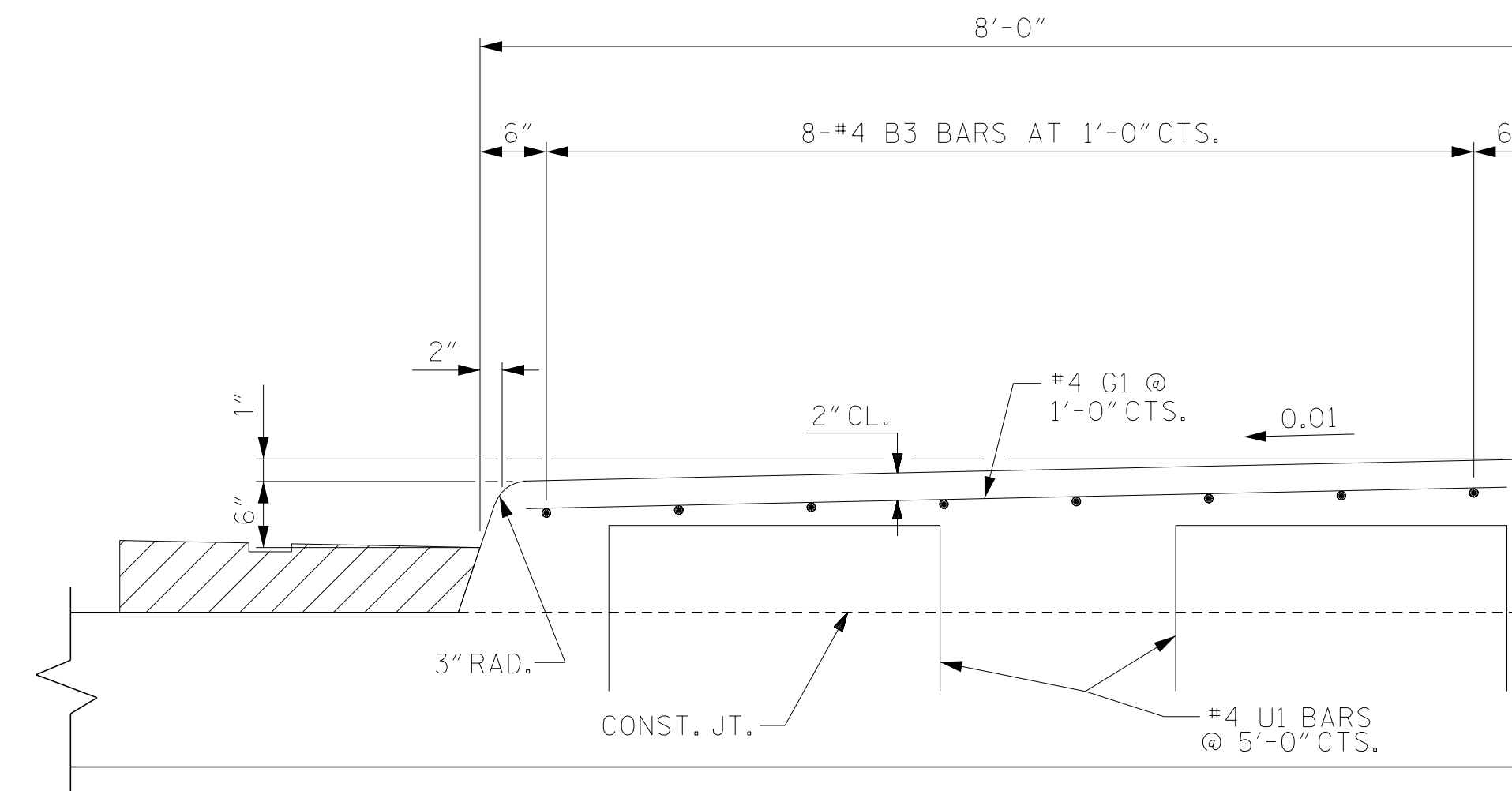
DRAWN BY: V. CHUNG DATE: 11-19  
 CHECKED BY: E. PHELPS DATE: 12-19  
 DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

WAKE 216  
 6/29/2022  
 \\400\_025\_910216\_SMJ\_AS01.dgn  
 USER:dfault

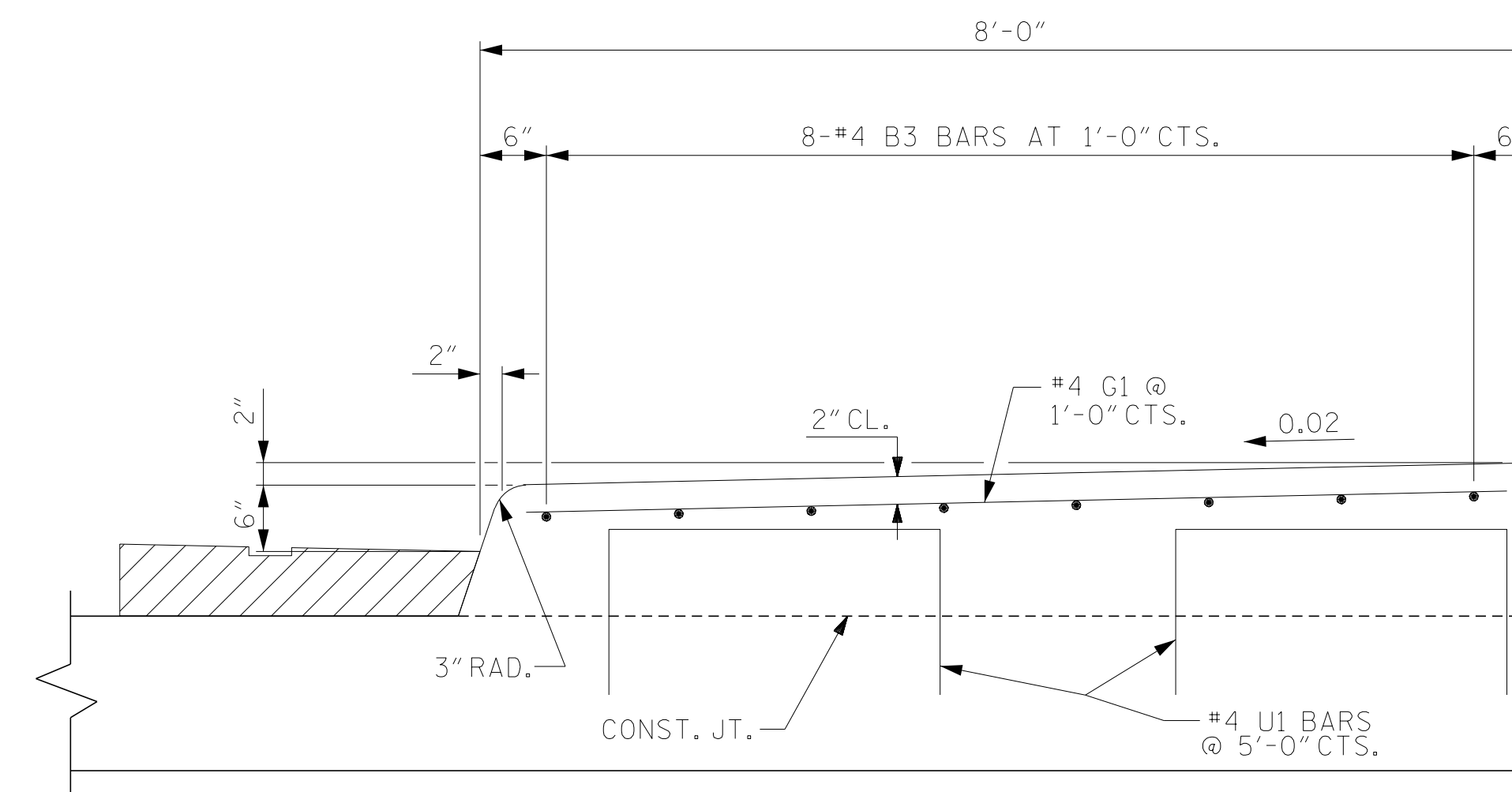
NOTE:  
SECTION M-M (WITH 1% SLOPE) IS TAKEN AT BEGIN APPROACH SLAB AT END BENT 1 AND AT END APPROACH SLAB AT END BENT 2.  
SECTION O-O (WITH 2% SLOPE) IS TAKEN AT BACK OF FACE OF END BENT BACKWALL. APPROACH SLAB SIDEWALK CROSS SLOPE VARIES FROM 1% TO 2% AT EACH END OF BRIDGE.



DETAILS OF RIGHT SIDEWALK ON APPROACH SLAB



SECTION M-M



SECTION O-O

SIDEWALK DETAILS

PROJECT NO. 17BP.5.PE.79  
WAKE COUNTY  
STATION: 11+90.50 -L-

SHEET 2 OF 2



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Firm License No. C-1051  
223 S. West St,  
Suite 1100  
Raleigh, NC 27603  
T 919.380.8750  
www.stewartinc.com

STEWART

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			26

DRAWN BY: V. CHUNG DATE: 11-19  
CHECKED BY: E. PHELPS DATE: 12-19  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 12-19

\$\$\$SYSTEMTIME\$\$\$  
\$\$\$DGN\$\$\$  
\$\$\$USERNAME\$\$\$

WAKE 216



## STANDARD NOTES

### DESIGN DATA:

SPECIFICATIONS	-----	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	-----	SEE PLANS
IMPACT ALLOWANCE	-----	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	--	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	--	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	--	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	---	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	-----	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	---	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	-----	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	-----	30 LBS. PER CU. FT. (MINIMUM)

### MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

### CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

### CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED  $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO  $1\frac{1}{2}$ " RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A  $\frac{1}{4}$ " FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A  $\frac{1}{4}$ " RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

### DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

### ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

### REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

### STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE  $\frac{7}{8}$ "  $\emptyset$  SHEAR STUDS FOR THE  $\frac{3}{4}$ "  $\emptyset$  STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 -  $\frac{7}{8}$ "  $\emptyset$  STUDS FOR 4 -  $\frac{3}{4}$ "  $\emptyset$  STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF  $\frac{7}{8}$ "  $\emptyset$  STUDS ALONG THE BEAM AS SHOWN FOR  $\frac{3}{4}$ "  $\emptyset$  STUDS BASED ON THE RATIO OF 3 -  $\frac{7}{8}$ "  $\emptyset$  STUDS FOR 4 -  $\frac{3}{4}$ "  $\emptyset$  STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST  $\frac{5}{16}$ " IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY  $\frac{1}{16}$ " INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

### HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINISHES AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

### SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN

# PROPOSED ALIGNMENT CONTROL SHEET

L

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	746123.393	2176404.234							
LINE			N 53°44'10.3" E	266.13					
PC	746280.809	2176618.815							
CURVE			N 41°00'23.1" E	396.64	25°27'34.4"(LT)	06°21'58.3"	399.92	203.32	900.00
PT	746580.125	2176879.065							
LINE			N 28°16'35.9" E	135.37					
PC	746699.339	2176943.192							
CURVE			N 30°17'10.6" E	245.48	04°01'09.5"(RT)	01°38'13.3"	245.53	122.81	3500.00
PT	746911.311	2177066.990							
LINE			N 32°17'45.4" E	172.34					
POT	747056.989	2177159.070							

Y1

POINT	N	E	BEARING	DIST
POT	745898.300	2176453.771		
LINE			N 12°24'40.8" W	230.48
POT	746123.393	2176404.234		

Y2

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	746123.393	2176404.234							
LINE			N 12°24'40.8" W	3.07					
PC	746126.391	2176403.575							
CURVE			N 48°40'47.6" W	53.24	72°32'13.6"(LT)	127°19'26.2"	56.97	33.02	45.00
PT	746161.544	2176363.589							
LINE			N 84°56'54.4" W	243.21					
POT	746182.959	2176121.322							

REVISIONS

05/14/2020 16:37  
 C:\Users\jg\OneDrive\Documents\Working\910216\1s-rw02d-1.dgn  
 216\80-Drawings\Bridg

**NOTES:**

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
2. THE PROPOSED ALIGNMENT CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATINO REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.





