

**TIP PROJECT: BP13-R026**

**CONTRACT: DM00428**

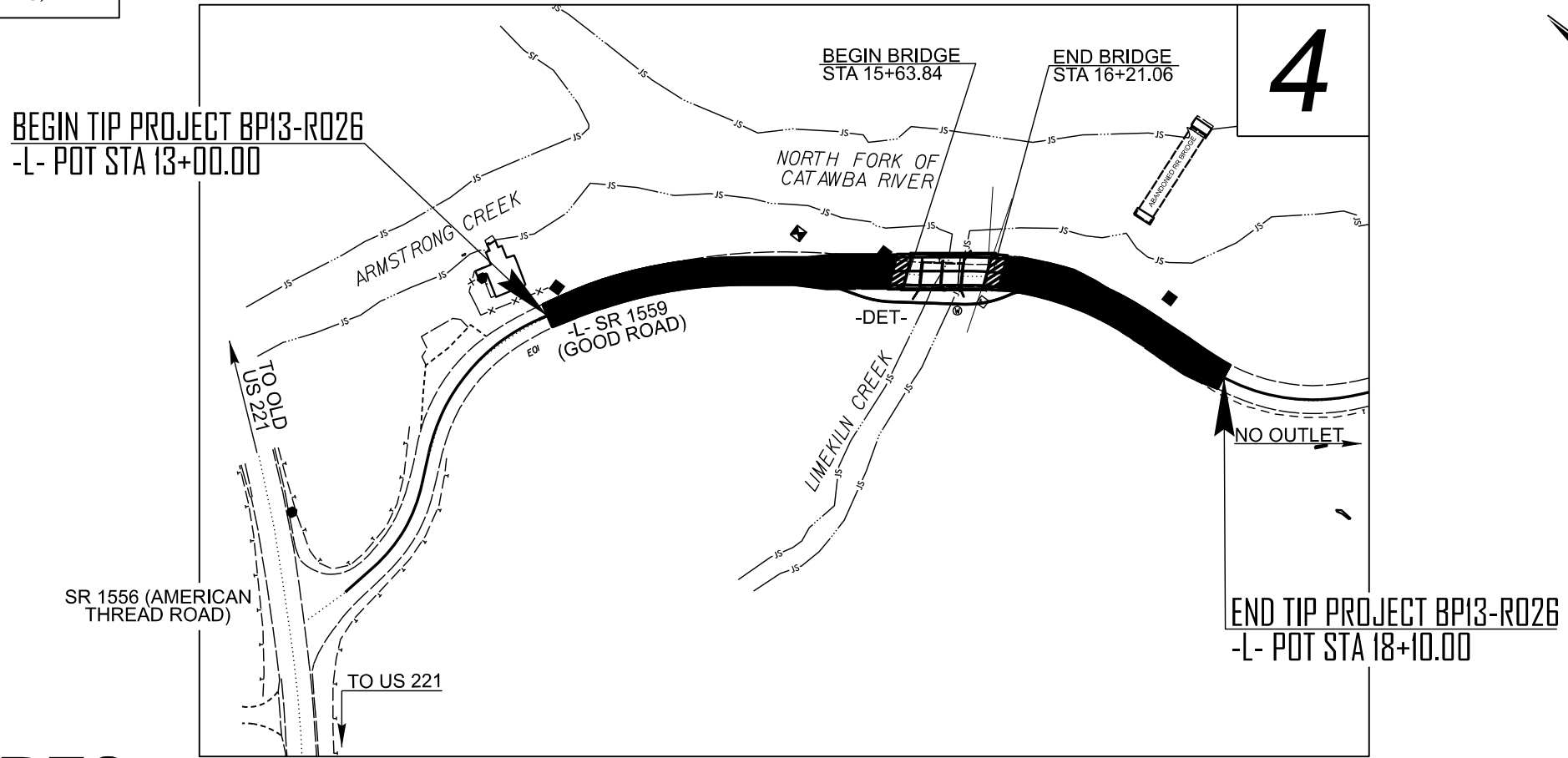
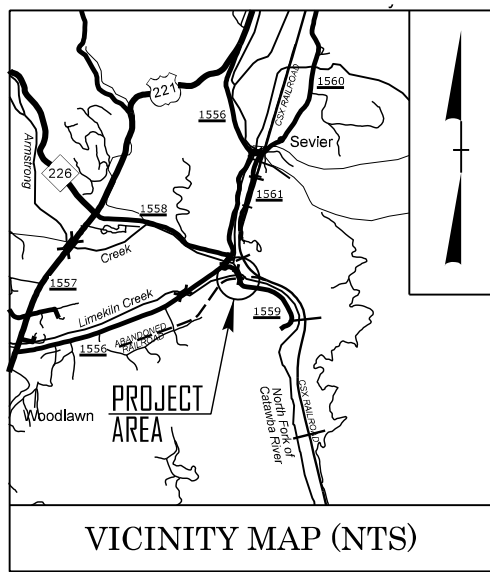
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# McDOWELL COUNTY

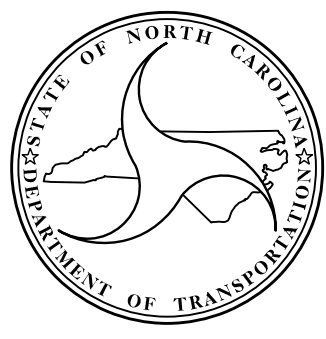
**LOCATION: REPLACE BRIDGE NO. 580194 ON SR 1559  
(GOOD ROAD) OVER LIMEKILN CREEK**

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


STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP13-R026		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
BP13.R026.1	-	P.E.	
BP13.R026.2	-	RW & UTIL.	
BP13.R026.3	-	CONST.	



## STRUCTURES

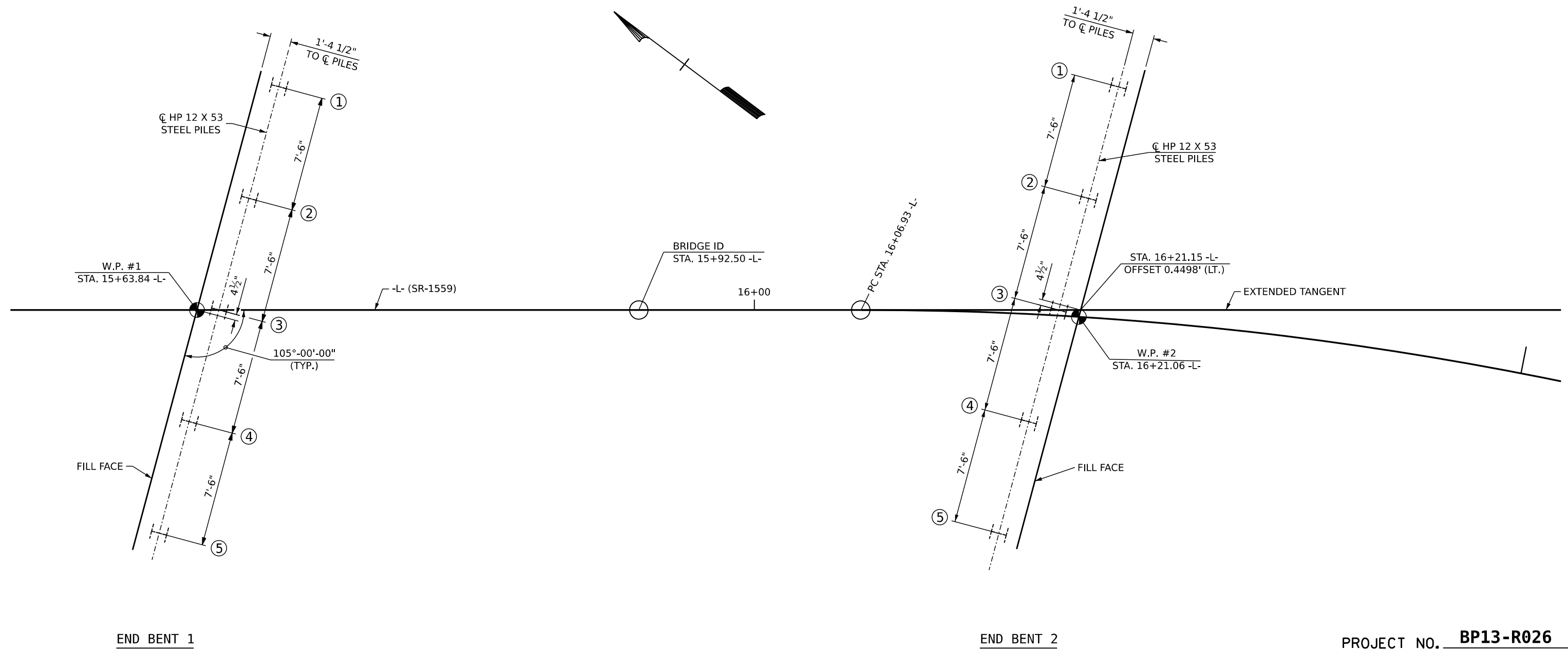
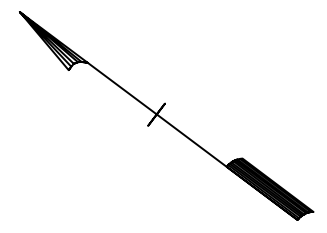


DESIGN DATA
ADT (2000) = 70
V = 15 MPH
FUNC CLASS = RURAL LOCAL SUBREGIONAL TIER

PROJECT LENGTH
LENGTH ROADWAY TIP PROJECT BP13-R026 = 0.086 MILES
LENGTH STRUCTURE TIP PROJECT BP13-R026 = 0.011 MILES
<b>TOTAL LENGTH TIP PROJECT BP13-R026 = 0.097 MILES</b>
PREPARED BY:  ms consultants, inc. 5444 Wade Park Blvd. Suite 100 Raleigh, NC 27607 NC License Number: C-3239

Prepared In the Office of: DIVISION OF HIGHWAYS STRUCTURES MANAGEMENT UNIT 1000 BIRCH RIDGE DR. RALEIGH, N.C. 27610	
2024 STANDARD SPECIFICATIONS	
LETTING DATE : DECEMBER 03, 2025	<b>MARK HILL</b> PROJECT ENGINEER  <b>JEFFREY KEPICH</b> PROJECT DESIGN ENGINEER





END BENT 1

END BENT 2

**FOUNDATION LAYOUT**

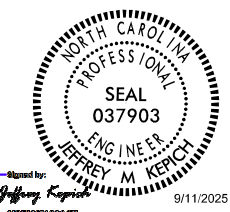
DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE

**NOTES:**

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.  
PILE EXCAVATION IS REQUIRED TO EXTEND ONE FOOT INTO INTACT BEDROCK.

PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
 STATION: **15+92.50 -L-**  
 SHEET 2 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 BRIDGE 194 ON SR-1559  
 OVER LIMEKILN CREEK  
 BETWEEN SR-1556 AND DEAD END



DRAWN BY :	J. KEPICH	DATE :	02/25
CHECKED BY :	L. SAMPLES	DATE :	07/25
DESIGN ENGINEER OF RECORD :	J. KEPICH	DATE :	02/25

\*\*\*\*\*SYSTEM\*\*\*\*\*  
 \*\*\*\*\*DGN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*



Drawn by: *Jeffrey Kepich*  
 9/11/2025  
 DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-02
1			3			TOTAL SHEETS
2			4			019

**SUMMARY OF PILE INFORMATION/INSTALLATION**

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Number of Piles per Line	Factored Resistance per Pile <b>KIPS</b>	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles **			Drilled-in Piles		
						Minimum Pile Tip (Tip No Higher Than) Elevation FT	Required Driving Resistance (RDR)* per pile <b>KIPS</b>	Pile Redrives Quantity EACH	Predrilling Length per Pile LIN FT	Predrilling Elevation (Elevation Not To Pre드릴 Below) FT	Maximum Predrilling Diameter INCHES	Pile Excavation (Bottom of Hole) Elevation FT	Pile Excavation Not in Soil per Pile LIN FT	Pile Excavation in Soil per Pile LIN FT
End Bent No. 1, Piles 1-5	5	165	1364.72	15			275					1353.20	4.1	6.4
End Bent No. 2, Piles 1-5	5	165	1363.81	15			275					1351.80	6.4	5.4
<b>TOTAL QUANTITY:</b>													52.5	59

\* RDR =  $\frac{\text{Factored Resistance} + \text{Factored Drag Load} + \text{Factored Dead Load}}{\text{Dynamic Resistance Factor}} + \text{Nominal Drag Load Resistance} + \text{Nominal Resistance from Scourable Material}$

\*\* Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

**PILE DESIGN INFORMATION**

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile <b>KIPS</b>	Factored Drag Load per Pile <b>KIPS</b>	Factored Dead Load * per Pile <b>KIPS</b>	Dynamic Resistance Factor	Nominal Drag Resistance per Pile <b>KIPS</b>	Nominal Scour Resistance per Pile <b>KIPS</b>
End Bent No. 1, Piles 1-5	162			0.60		
End Bent No. 2, Piles 1-5	162			0.60		

\* Factored Dead Load is factored weight of pile above the ground line.

**SUMMARY OF PILE ACCESSORIES**

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates EACH	Steel Pile Points		
		Pipe Pile Cutting Shoes EACH	Pipe Pile Conical Points EACH	H-Pile Points EACH
End Bent No. 1, Piles 1-5				5
End Bent No. 2, Piles 1-5				5
<b>TOTAL QUANTITY:</b>				10

**SUMMARY OF DPT/PILE ORDER LENGTHS**

(Blank entries indicate item is not applicable to structure)

Dynamic Pile Testing (DPT)		
End Bent / Bent No (e.g., "Bent 1 - Bent 3")	DPT Test Pile Length FT	DPT Testing Quantity EACH
<b>TOTAL QUANTITY:</b>		

Pile Order Lengths for Concrete Piles	
End Bent / Bent No (e.g., "Bent 1 - Bent 3")	Pile Order Length Basis* EST or DPT

\* EST = Pile order lengths from estimated pile lengths; DPT = Pile order lengths based on Dynamic Pile Testing. For groups of end bents/bents with pile order lengths based on DPT testing, the first end bent/bent no. listed for each group is the representative end bent/bent with the DPT.

**NOTES:**

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Stephen C. Crockett, #048207) on 02-14-2025.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer may adjust the quantity for DPT Testing and Pipe Pile Plates when necessary.

PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
 STATION: **15+92.50 -L-**

SHEET 3 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**PILE FOUNDATION TABLES**



Drawn by: *Jeffrey Kerch*  
 250FC000002... 9/11/2025

DRAWN BY: J. KEPICH DATE: 02/25  
 CHECKED BY: L. SAMPLES DATE: 07/25  
 DESIGN ENGINEER OF RECORD: J. KEPICH DATE: 02/25



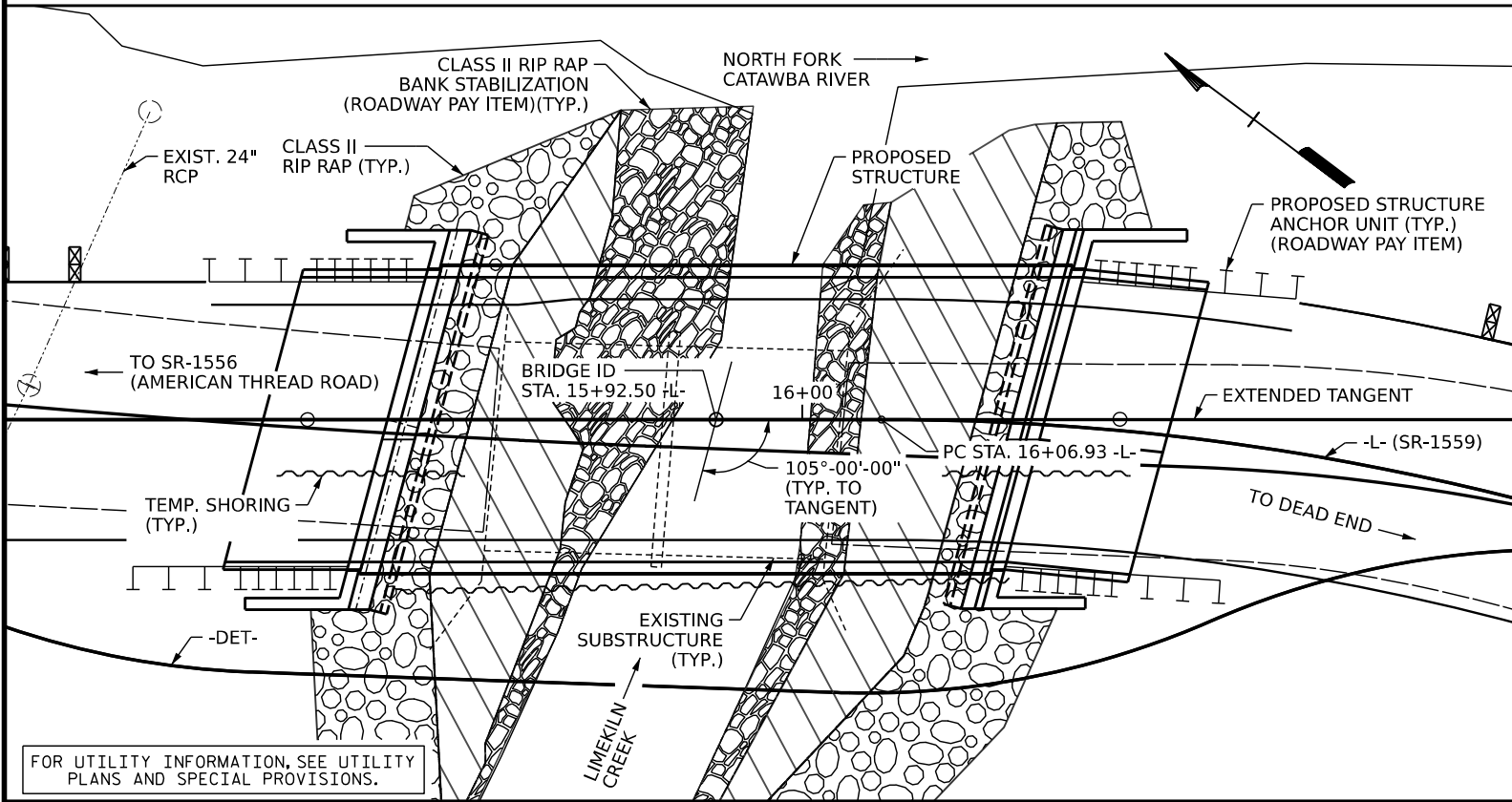
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			019
2			4			

### TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE @ STA. 15+92.50	ASBESTOS ASSESSMENT	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION 15+92.50	CLASS A CONCRETE	BRIDGE APPROACH SLABS AT STATION 15+92.50	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP12X53 STEEL PILES	HP 12 X 53 STEEL PILES		STEEL PILE POINTS	VERTICAL CONCRETE BARRIER RAIL	PLAIN RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLABS	
										NO.	LIN.FT.						EA.	LIN.FT.
SUPERSTRUCTURE	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	EA.			EA.	LIN.FT.	SQ.YDS.	SQ.YDS.	LUMP SUM		
							LUMP SUM						110.25			LUMP SUM	9	495.00
END BENT NO. 1			32.00	20.50		19.50		2373	5	5	75	5		65.00	73.00			
END BENT NO. 2			27.00	32.00		19.50		2373	5	5	75	5		83.00	93.00			
TOTAL	LUMP SUM	LUMP SUM	59.00	52.50	LUMP SUM	39.00	LUMP SUM	4746	10	10	150	10	110.25	148.00	166.00	LUMP SUM	9	495.00

BM. #1 - SPIKE IN 18" SYCAMORE, 27.14' LT. OF -L- STA. 14+85.22 EL. 1371.81



LOCATION SKETCH

#### HYDRAULIC DATA

DESIGN DISCHARGE = 1100 C.F.S.  
 FREQUENCY OF DESIGN DISCHARGE = 25 YRS.  
 DESIGN HIGH WATER ELEVATION = 1366.1  
 DRAINAGE AREA = 3.86 SQ. MI.  
 BASE DISCHARGE (Q100) = 1500 C.F.S.  
 BASE HIGH WATER ELEVATION = 1367.9

#### OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 2300 C.F.S.  
 FREQUENCY OF OVERTOPPING FLOOD = 500+ YRS.  
 OVERTOPPING FLOOD ELEVATION = 1368.40\*  
 \*AT STA. 17+00.00 -L-; LT. SHOULDER

#### 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.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OR WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, 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 15+92.50 -L-."
- THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 26 FT ON THE NORTH SIDE AND 44 FT ON THE SOUTH SIDE OF 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 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 DIFFERENCES 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 IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY ITEMS OF ANCHORED PORTABLE CONCRETE BARRIERS.

PROJECT NO. **BP13-R026**

**MCDOWELL** COUNTY

STATION: **15+92.50 -L-**

SHEET 4 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

#### GENERAL DRAWING

BRIDGE 194 ON SR-1559  
 OVER LIMEKILN CREEK  
 BETWEEN SR-1556 AND DEAD END



Signed by: *Jeffrey Kepich*  
 9/11/2025



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-04
1			3			TOTAL SHEETS
2			4			019

DRAWN BY: J. KEPICH DATE: 02/25  
 CHECKED BY: L. SAMPLES DATE: 07/25  
 DESIGN ENGINEER OF RECORD: J. KEPICH DATE: 02/25

\*\*\*\*\*SYTIME\*\*\*\*\*  
 \*\*\*\*\*DGN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*

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

LOAD TYPE	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								
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	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)	LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD	HL-93 (INVENTORY)	N/A	1	1.065	-	1.75	0.270	1.25	55'	EL	26.982	0.616	1.12	55'	EL	5.396	0.80	0.270	1.07	55'	EL	26.982		
	HL-93 (OPERATING)	N/A	.	1.452	-	1.35	0.270	1.61	55'	EL	26.982	0.616	1.45	55'	EL	5.396	N/A	-	-	-	-	-	-	
	HS-20 (INVENTORY)	36.000	2	1.335	48.043	1.75	0.270	1.56	55'	EL	26.982	0.616	1.34	55'	EL	5.396	0.80	0.270	1.33	55'	EL	26.982		
	HS-20 (OPERATING)	36.000	.	1.734	62.425	1.35	0.270	2.02	55'	EL	26.982	0.616	1.73	55'	EL	5.396	N/A	-	-	-	-	-	-	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500	.	2.802	37.830	1.4	0.270	4.09	55'	EL	26.982	0.616	3.81	55'	EL	5.396	0.80	0.270	2.80	55'	EL	26.982	
		SNGARBS2	20.000	.	2.175	43.506	1.4	0.270	3.18	55'	EL	26.982	0.616	2.76	55'	EL	5.396	0.80	0.270	2.18	55'	EL	26.982	
		SNAGRIS2	22.000	.	2.099	46.173	1.4	0.270	3.07	55'	EL	26.982	0.616	2.58	55'	EL	5.396	0.80	0.270	2.10	55'	EL	26.982	
		SNCOTTS3	27.250	.	1.397	38.065	1.4	0.270	2.04	55'	EL	26.982	0.616	1.91	55'	EL	5.396	0.80	0.270	1.40	55'	EL	26.982	
		SNAGGRS4	34.925	.	1.200	41.922	1.4	0.270	1.75	55'	EL	26.982	0.616	1.62	55'	EL	5.396	0.80	0.270	1.20	55'	EL	26.982	
		SNS5A	35.550	.	1.172	41.648	1.4	0.270	1.71	55'	EL	26.982	0.616	1.66	55'	EL	5.396	0.80	0.270	1.17	55'	EL	26.982	
		SNS6A	39.950	.	1.089	43.514	1.4	0.270	1.59	55'	EL	26.982	0.616	1.53	55'	EL	5.396	0.80	0.270	1.09	55'	EL	26.982	
	SNS7B	42.000	.	1.038	43.587	1.4	0.270	1.52	55'	EL	26.982	0.616	1.53	55'	EL	5.396	0.80	0.270	1.04	55'	EL	26.982		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	.	1.333	43.973	1.4	0.270	1.95	55'	EL	26.982	0.616	1.81	55'	EL	5.396	0.80	0.270	1.33	55'	EL	26.982	
		TNT4A	33.075	.	1.342	44.400	1.4	0.270	1.96	55'	EL	26.982	0.616	1.75	55'	EL	5.396	0.80	0.270	1.34	55'	EL	26.982	
		TNT6A	41.600	.	1.112	46.252	1.4	0.270	1.62	55'	EL	26.982	0.616	1.67	55'	EL	5.396	0.80	0.270	1.11	55'	EL	26.982	
		TNT7A	42.000	.	1.125	47.255	1.4	0.270	1.64	55'	EL	26.982	0.616	1.56	55'	EL	5.396	0.80	0.270	1.13	55'	EL	26.982	
		TNT7B	42.000	.	1.174	49.318	1.4	0.270	1.72	55'	EL	26.982	0.616	1.47	55'	EL	5.396	0.80	0.270	1.17	55'	EL	26.982	
		TNAGRIT4	43.000	.	1.111	47.786	1.4	0.270	1.62	55'	EL	26.982	0.616	1.42	55'	EL	5.396	0.80	0.270	1.11	55'	EL	26.982	
TNAGT5A		45.000	.	1.041	46.851	1.4	0.270	1.52	55'	EL	26.982	0.616	1.44	55'	EL	5.396	0.80	0.270	1.04	55'	EL	26.982		
TNAGT5B	45.000	3	1.023	46.020	1.4	0.270	1.49	55'	EL	26.982	0.616	1.35	55'	EL	5.396	0.80	0.270	1.02	55'	EL	26.982			
EMERGENCY VEHICLE (EV)	EV2	28.750	.	1.631	46.889	1.3	0.270	2.40	55'	EL	26.982	0.616	2.07	55'	EL	5.396	0.80	0.270	1.63	55'	EL	26.982		
	EV3	43.000	4	1.058	45.500	1.3	0.270	1.56	55'	EL	26.982	0.616	1.40	55'	EL	5.396	0.80	0.270	1.06	55'	EL	26.982		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

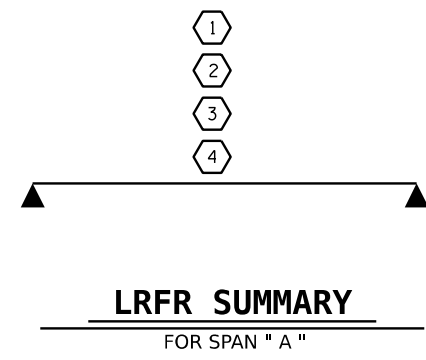
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

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

COMMENTS:

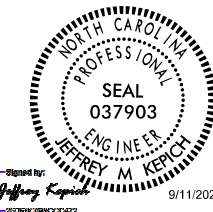
- 1.
- 2.
- 3.
- 4.

#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
4	EMERGENCY VEHICLE LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	
GIRDER LOCATION	
I - INTERIOR GIRDER EL - EXTERIOR LEFT GIRDER ER - EXTERIOR RIGHT GIRDER	



PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
 STATION: **15+92.50 -L-**  
 SHEET 5 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**LRFR SUMMARY FOR  
 55' CORED SLAB UNIT  
 75° SKEW & 105° SKEW**  
 (NON-INTERSTATE TRAFFIC)

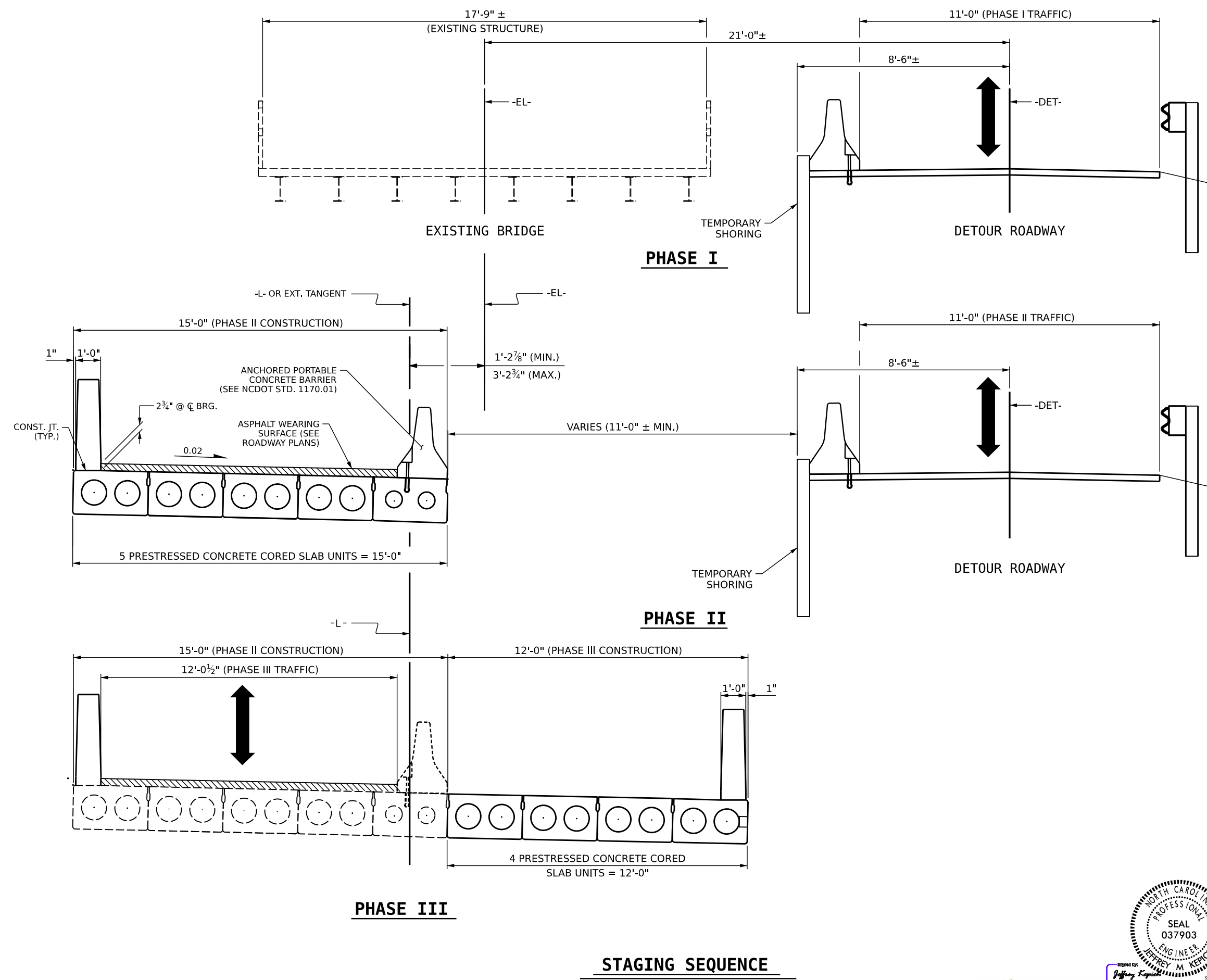


ASSEMBLED BY: J.M. KEPICH	DATE: 02/2025
CHECKED BY: L. SAMPLES	DATE: 07/2025
DRAWN BY: MAA 01/08	REV. 11/12/08RR
CHECKED BY: GM/DI 2/08	REV. 10/11/11
	REV. 04/23

ms consultants, inc.  
 5444 Wade Park Blvd.  
 Suite 160  
 Raleigh, NC 27607  
 NC License Number: C-3239

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

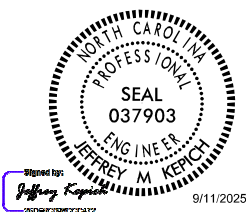
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-05
1			3			TOTAL SHEETS
2			4			019



PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
 STATION: **15+92.50 -L-**

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**CONSTRUCTION SEQUENCE**  
 (STAGED CONSTRUCTION)



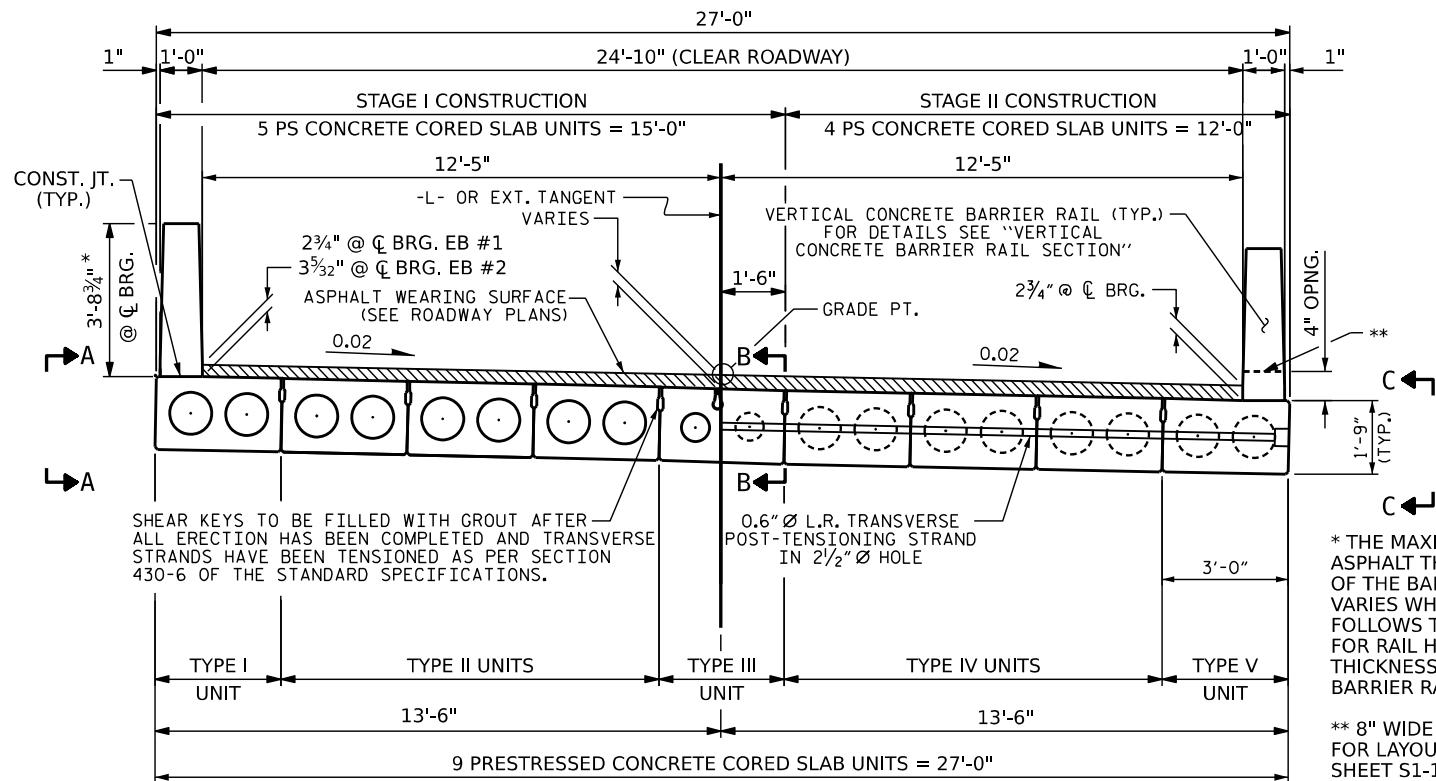
DRAWN BY : J.M. KEPICH DATE : 02/2025  
 CHECKED BY : L. SAMPLES DATE : 07/2025  
 DESIGN ENGINEER OF RECORD: J.M. KEPICH DATE : 02/2025

\*\*\*\*\*SYSTEM\*\*\*\*\*  
 \*\*\*\*\*DGN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

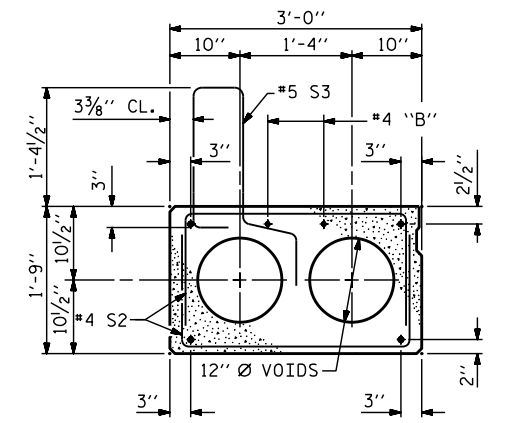
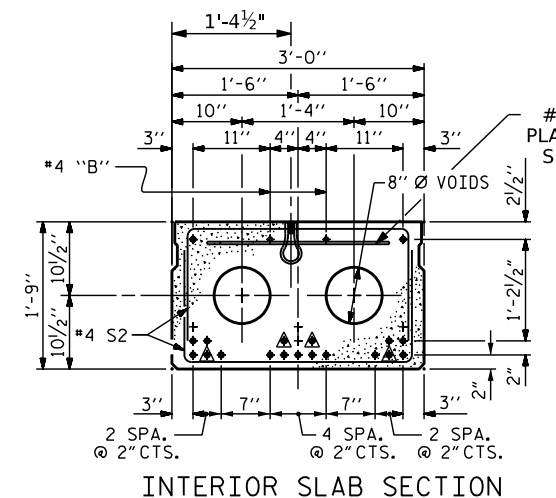
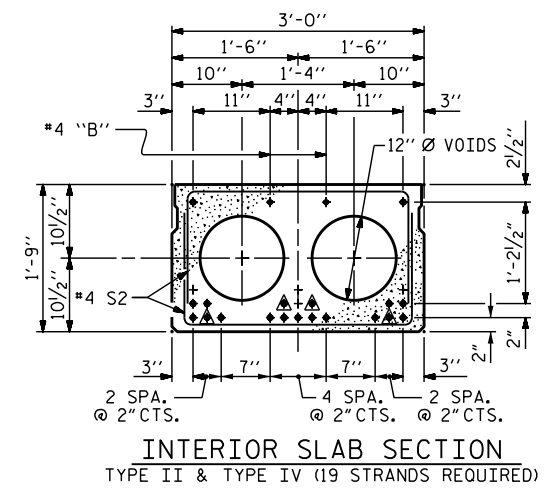
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			S1-06
2			4			019



**TYPICAL SECTION**  
FINAL BRIDGE (STAGE I AND II COMPLETED)  
(FOR VIEWS A-A, B-B AND C-C, SEE SHEET S1-08)

\* 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 "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.

\*\* 8" WIDE DRAIN BLOCKOUT (HEIGHT VARIES). FOR LAYOUT SEE STAGE II 'PLAN OF UNIT' ON SHEET S1-10.

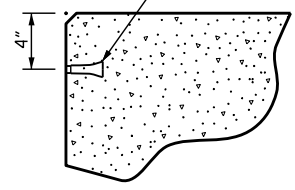


▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

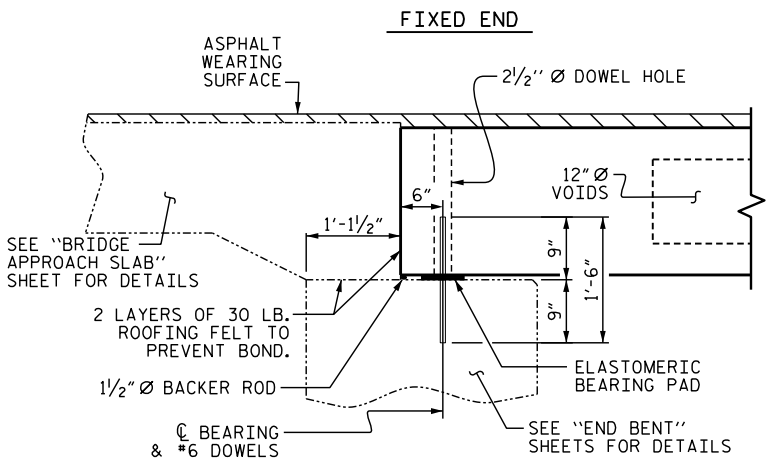
**DEBONDING LEGEND**

FOR STRUCTURAL CONCRETE INSERT DETAIL & SPACING SEE "ANCHORAGE DETAIL AND LAYOUT FOR ANCHORED PORTABLE CONCRETE PARAPET" SHEET S1-11.

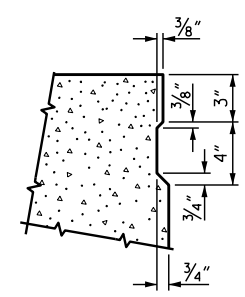
PERMITTED THREADED INSERT CAST IN OUTSIDE FACE OF EXTERIOR UNIT AND RECESSED 3/8" SIZE TO BE DETERMINED BY CONTRACTOR.



**0.6" Ø LOW RELAXATION STRAND LAYOUT**

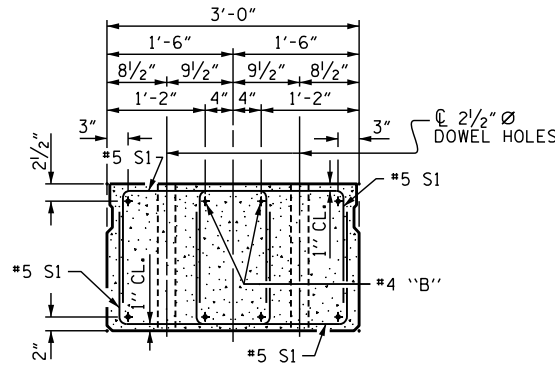


**SECTION AT END BENT**



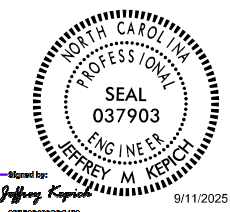
**SHEAR KEY DETAIL**

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



**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.



PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
STATION: **15+92.50 -L-**  
SHEET 1 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 1'-9"  
PRESTRESSED CONCRETE  
CORED SLAB UNIT  
105° SKEW

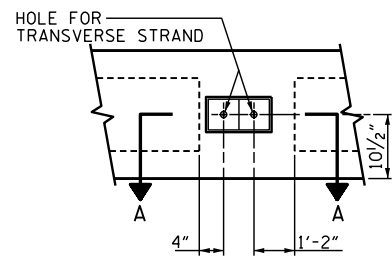
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

TOTAL SHEETS: 019

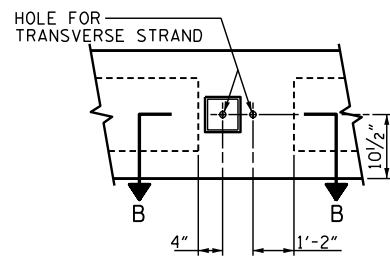
ASSEMBLED BY: J.M. KEPICH	DATE: 02/2025
CHECKED BY: L. SAMPLES	DATE: 07/2025
DRAWN BY: DGE 5/09	REV. 8/14 MAA/THC
CHECKED BY: BCH 6/09	REV. 5/23 BNB/AAI



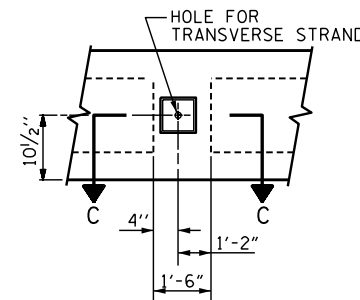
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



VIEW A-A

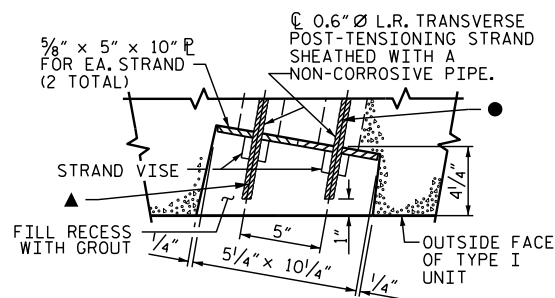


VIEW B-B



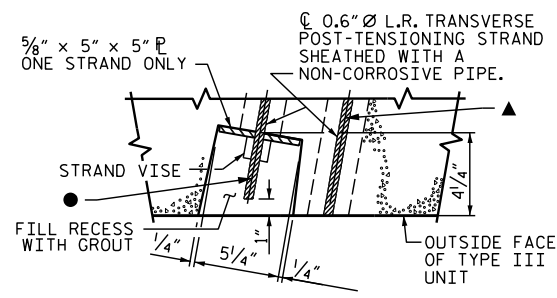
VIEW C-C

- STRAND GROUP #1 TO PASS THROUGH 5 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE I CONSTRUCTION)
- ▲ STRAND GROUP #2 TO PASS THROUGH ALL 9 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE II CONSTRUCTION)



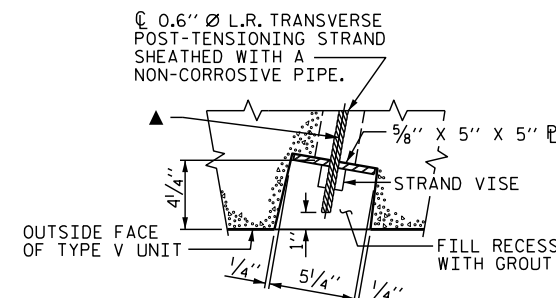
SECTION A-A  
(TYPE I UNIT)

← UPSTATION



SECTION B-B  
(TYPE III UNIT)

← UPSTATION



SECTION C-C  
(TYPE V UNIT)

← UPSTATION

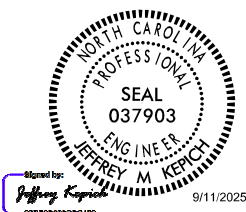
GROUTED RECESS AT END OF POST-TENSIONED STRAND CORED SLABS

PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
 STATION: **15+92.50 -L-**

SHEET 2 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**3'-0" X 1'-9"**  
**PRESTRESSED CONCRETE**  
**CORED SLAB UNIT**



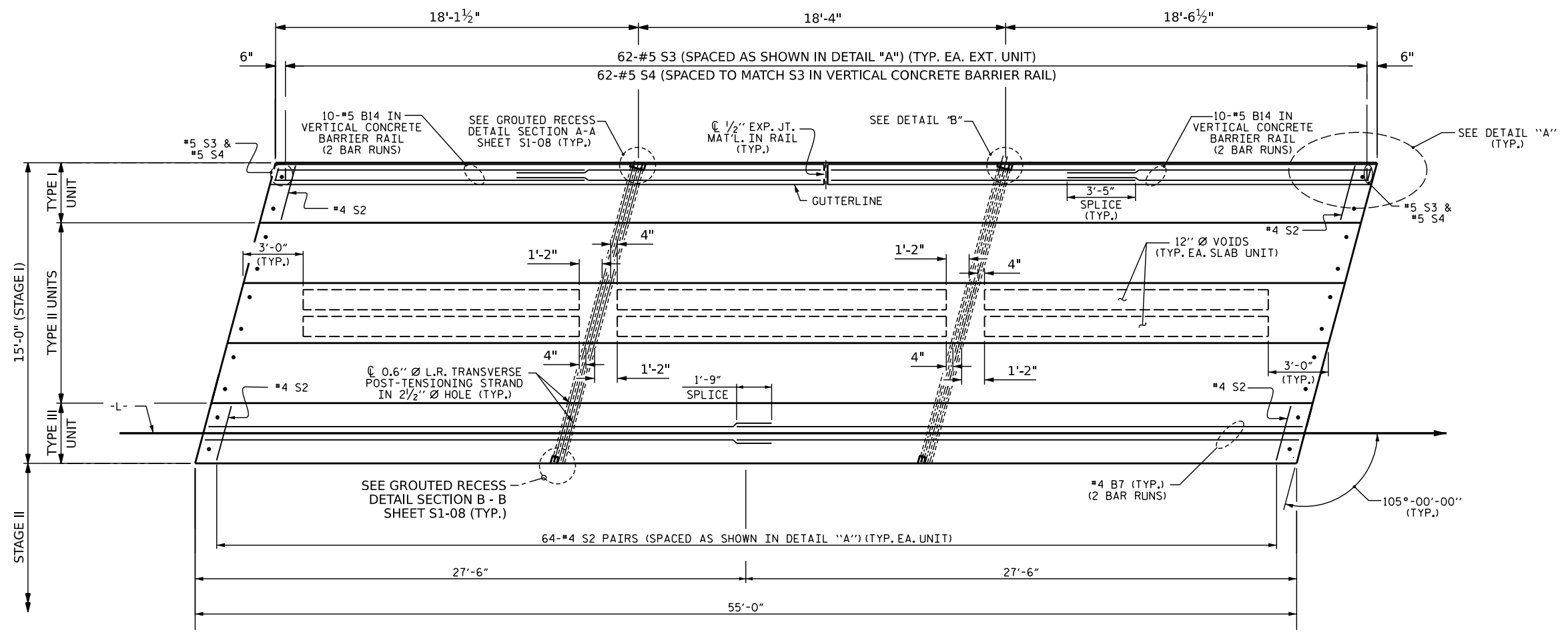
DRAWN BY : J.M. KEPICH DATE : 02/2025  
 CHECKED BY : L. SAMPLES DATE : 07/2025  
 DESIGN ENGINEER OF RECORD: J.M. KEPICH DATE : 02/2025

ms consultants, inc.  
 5444 Wade Park Blvd.  
 Suite 160  
 Raleigh, NC 27607  
 NC License Number : C-3239

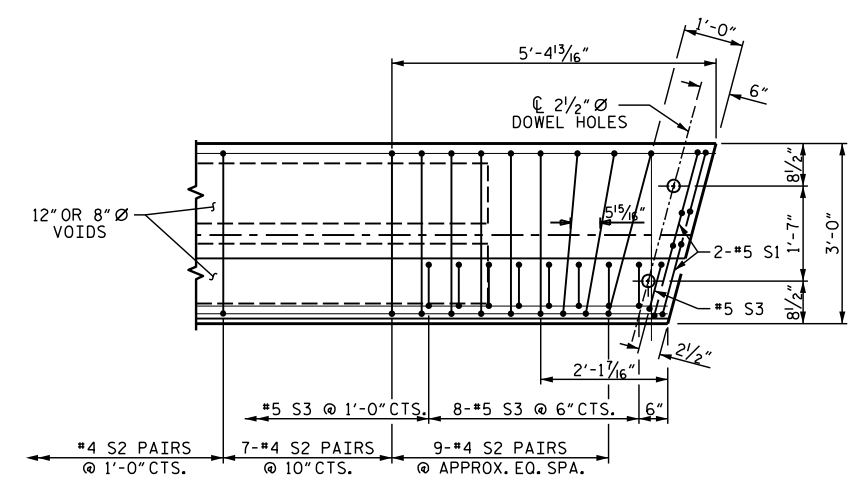
Marked by: Jeffrey M. Kerch  
 9/11/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

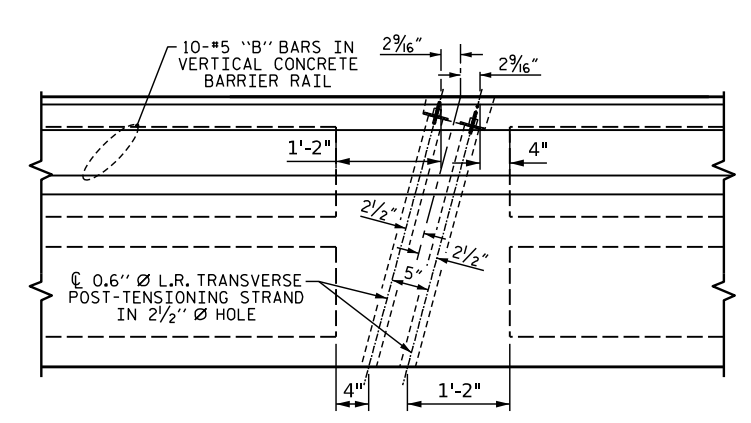
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			019
2			4			



**PLAN OF UNIT**  
(STAGE I)



**DETAIL "A"**  
(SIMILAR EACH END OF UNIT)  
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

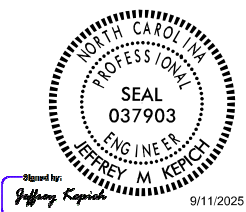


**DETAIL "B"**  
#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
STATION: **15+92.50 -L-**  
SHEET 3 OF 6

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**PLAN OF 55' UNIT**  
**24'-10" CLEAR ROADWAY**  
**105° SKEW**



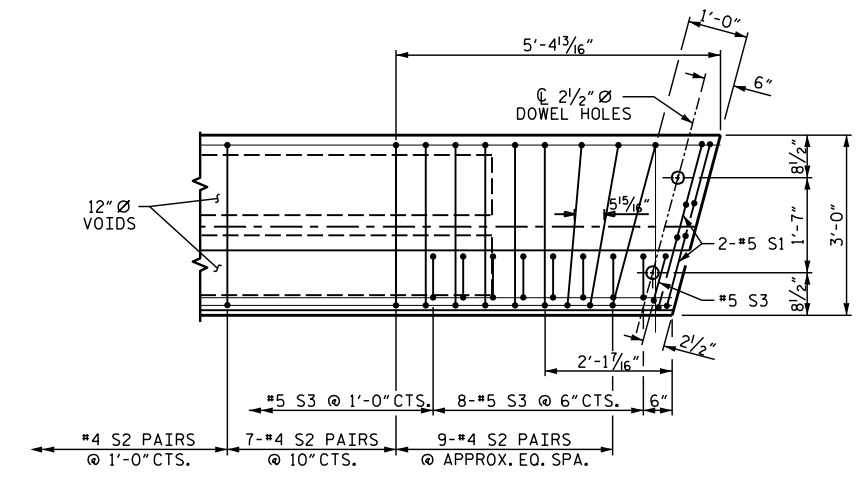
ASSEMBLED BY: J.M. KEPICH	DATE: 02/2025
CHECKED BY: L. SAMPLES	DATE: 07/2025
DRAWN BY: DGE 5/09	REV. 12/5/11 MAA/AAC
CHECKED BY: BCH 6/09	REV. 8/14 MAA/TMG

ms consultants, inc.  
5444 Wade Park Blvd.  
Suite 160  
Raleigh, NC 27607  
NC License Number: C-3239

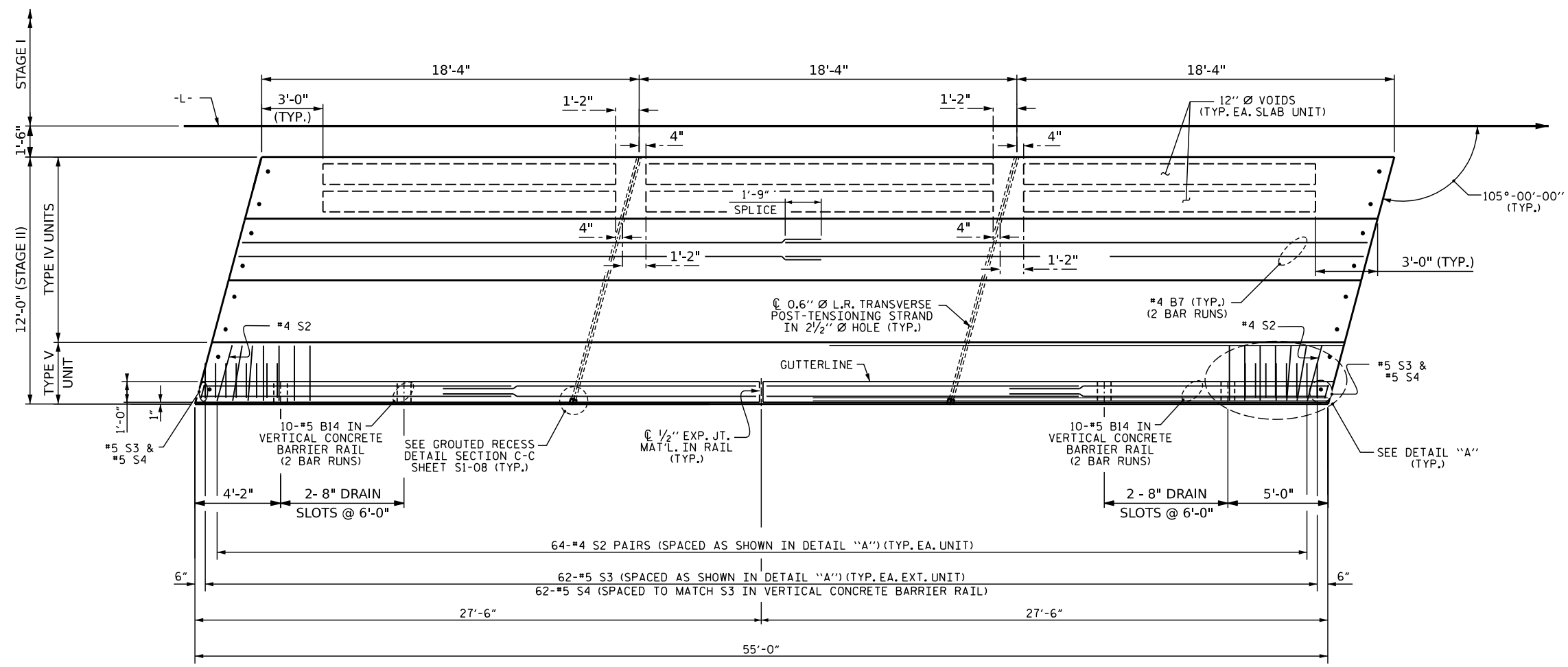
DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

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

TOTAL SHEETS: 019



**DETAIL "A"**  
 (SIMILAR EACH END OF UNIT)  
 NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

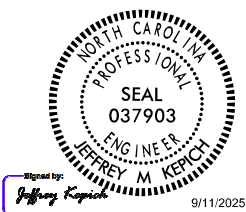


**PLAN OF UNIT**  
 (STAGE II)

PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
 STATION: **15+92.50 -L-**  
 SHEET 4 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**PLAN OF 55' UNIT**  
**24'-10" CLEAR ROADWAY**  
**105° SKEW**



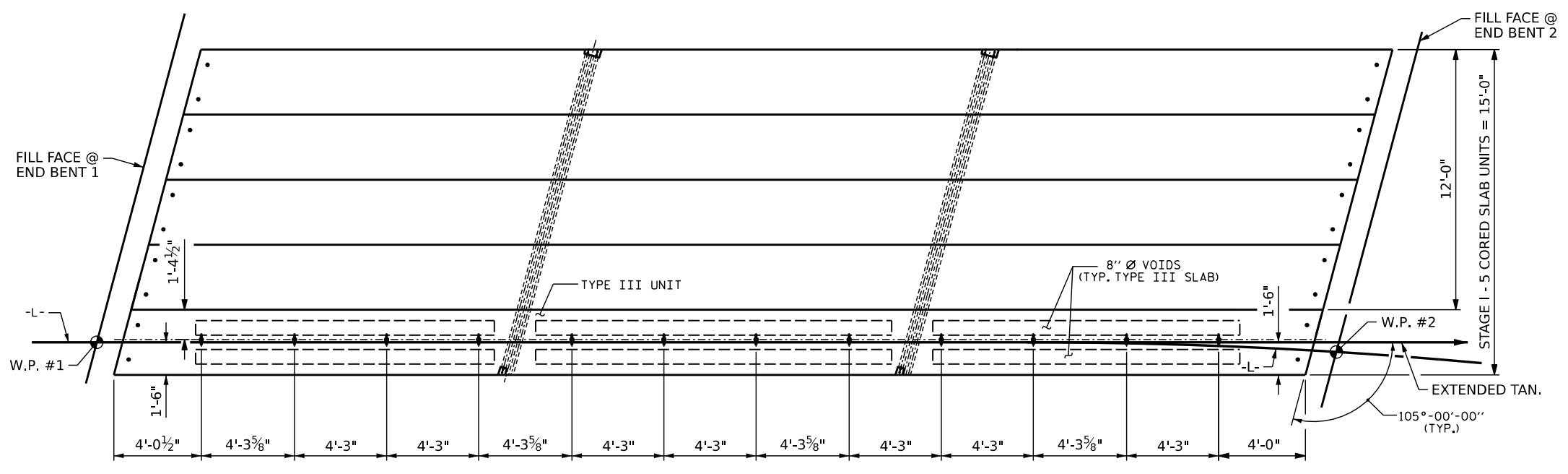
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TOTAL SHEETS: 019

ASSEMBLED BY: J.M. KEPICH	DATE: 02/2025
CHECKED BY: L. SAMPLES	DATE: 07/2025
DRAWN BY: DGE 5/09	REV. 12/5/11 MAA/AAC
CHECKED BY: BCH 6/09	REV. 8/14 MAA/TMC

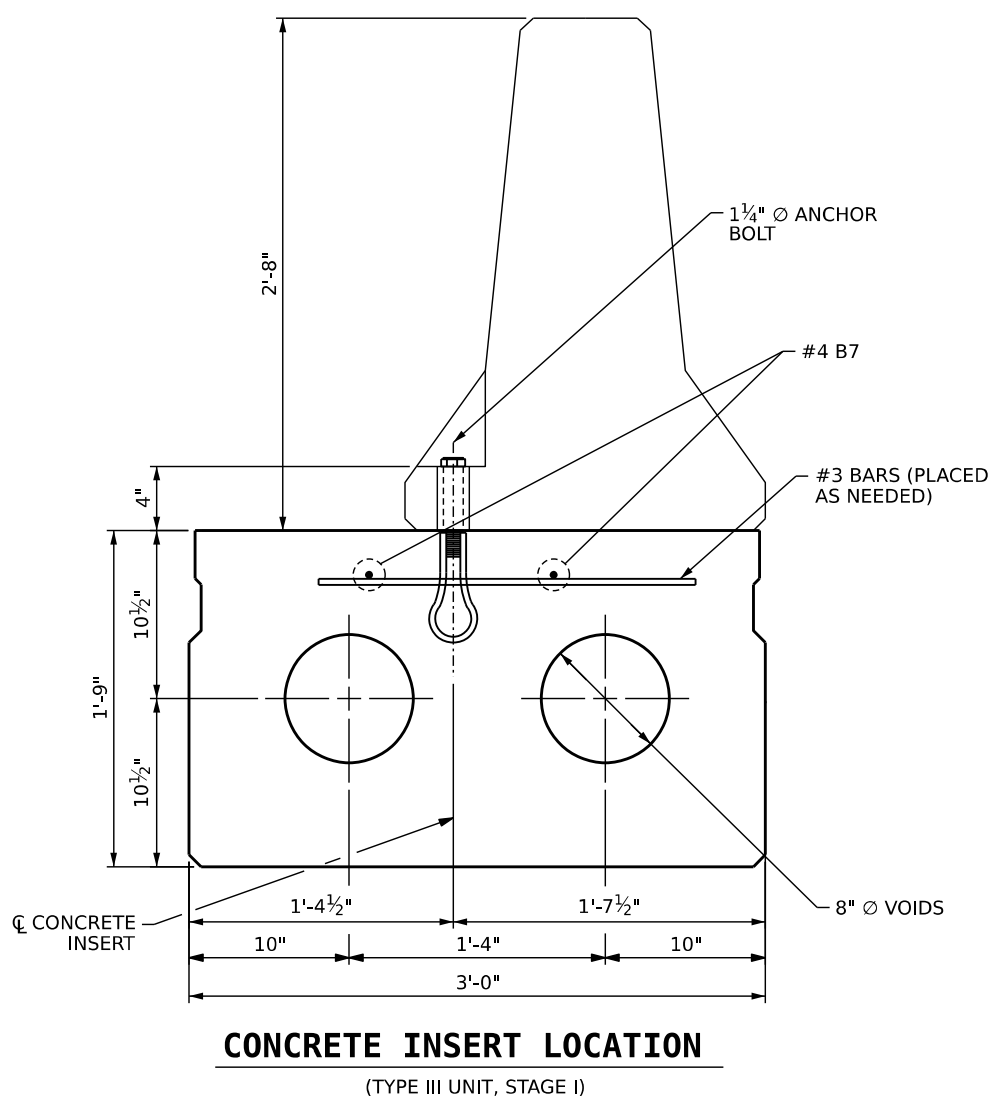




**CONCRETE INSERT SPACING FOR ANCHORED PORTABLE BARRIER - STAGE I**

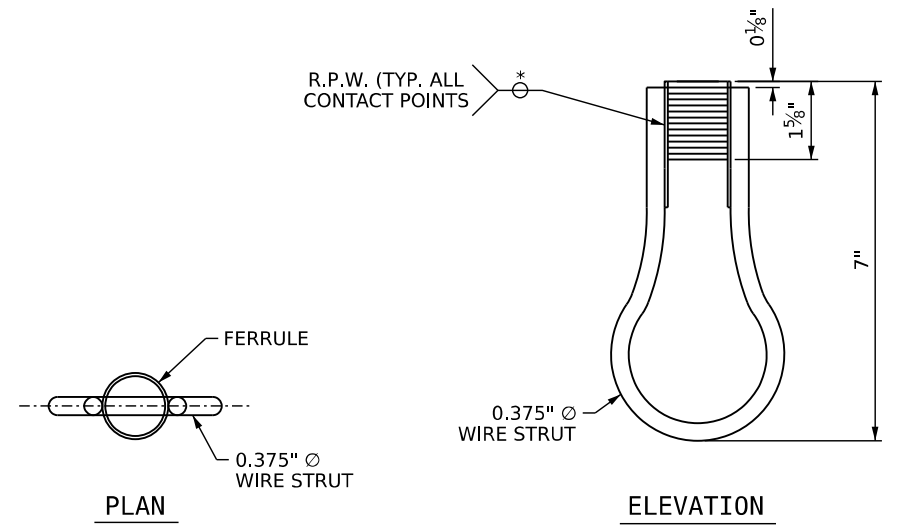
**NOTES**

- THE STRUCTURAL CONCRETE INSERT 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 1 5/8".
  - B. 1 1/4" Ø X 12" 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 1 1/4" Ø X 12" 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.)
  - C. 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 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- THE COST OF THE STRUCTURAL INSERT ASSEMBLY, COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR 3'-0" X 1'-9" CONCRETE CORED SLABS.
- TO FACILITATE PLACEMENT OF STRUCTURAL CONCRETE INSERT ASSEMBLIES, #3 BARS MAY BE TIED TO THE #4 B7 BARS IN THE CORED SLAB UNITS. THE COST OF THE #3 BARS SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR 3'-0" X 1'-9" CONCRETE CORED SLABS.
- STIRRUPS IN THE CORED SLAB UNITS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR STRUCTURAL CONCRETE INSERT ASSEMBLIES.
- FERRULES TO BE PLUGGED DURING CASTING OF THE CORED SLAB UNITS AS RECOMMENDED BY THE MANUFACTURER.
- ANCHORED PORTABLE CONCRETE BARRIER SHALL BE AS SPECIFIED IN ROADWAY STANDARD NO. 1170.01, SEE TRAFFIC CONTROL PLANS.
- AFTER REMOVAL OF ANCHORED PORTABLE CONCRETE BARRIER, THE STRUCTURAL CONCRETE INSERTS SHALL BE FILLED WITH GROUT.



**CONCRETE INSERT LOCATION**

(TYPE III UNIT, STAGE I)

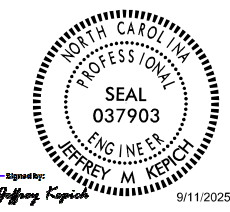


**STRUCTURAL CONCRETE INSERT**

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

PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
 STATION: **15+92.50 -L-**  
 SHEET 5 OF 6

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**ANCHORAGE LAYOUT**  
 FOR ANCHORED PORTABLE  
 CONCRETE BARRIER

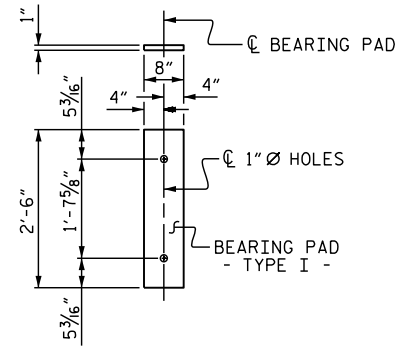


DRAWN BY : J.M. KEPICH DATE : 02/2025  
 CHECKED BY : L. SAMPLES DATE : 07/2025  
 DESIGN ENGINEER OF RECORD : J.M. KEPICH DATE : 07/2025



Signed By: Jeffrey Kerch 9/11/2025  
 DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-11
1			3			TOTAL SHEETS
2			4			019



FIXED END  
(TYPE I - 18 REQ'D)

**ELASTOMERIC BEARING DETAILS**

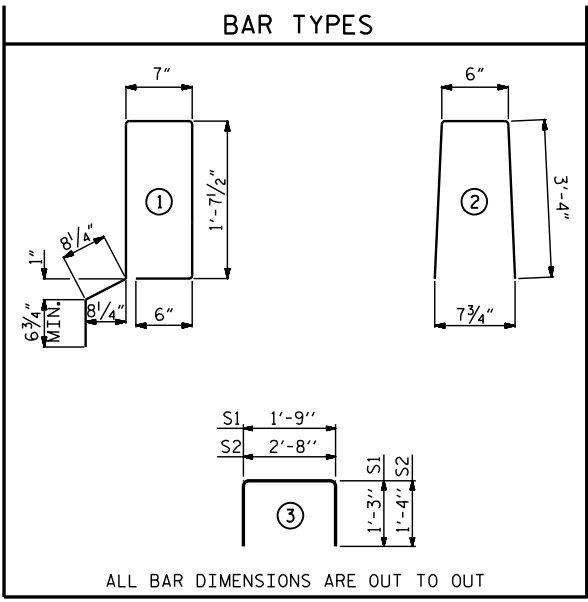
ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS	RAIL HEIGHT
	@ MID-SPAN	@ MID-SPAN
50' & 55' UNITS	1 7/8"	3'-7 5/8"

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
55' UNIT						
*B14	80	80	#5	STR	15'-5"	1286
*S4	128	128	#5	2	7'-2"	957
* EPOXY COATED REINFORCING STEEL						LBS. 2243
CLASS AA CONCRETE						CU.YDS. 14.1
TOTAL VERTICAL CONCRETE BARRIER RAIL						LN.FT. 110.25

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 1'-9"
55' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1 1/2" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	3/8" ↓
FINAL CAMBER	1 1/8" ↑

\*\* INCLUDES FUTURE WEARING SURFACE

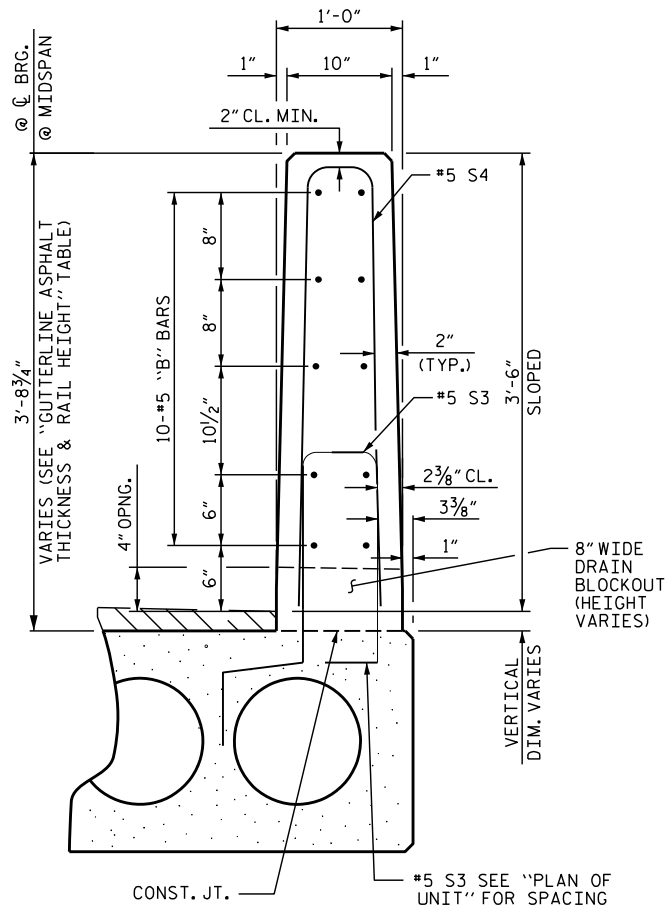


ALL BAR DIMENSIONS ARE OUT TO OUT

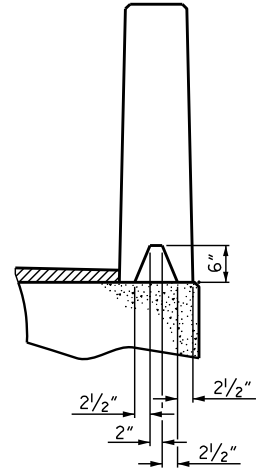
CORED SLABS REQUIRED			
55' UNIT	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	2	55'-0"	110'-0"
INTERIOR C.S.	7	55'-0"	385'-0"
TOTAL	9		495'-0"

BILL OF MATERIAL FOR ONE 55' CORED SLAB UNIT							
		EXTERIOR UNIT			INTERIOR UNIT		
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B7	4	#4	STR	28'-3"	75	28'-3"	75
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	128	#4	3	5'-4"	456	5'-4"	456
*S3	64	#5	1	5'-7"	373		
REINFORCING STEEL					LBS. 566	566	
* EPOXY COATED REINFORCING STEEL					LBS. 373	373	
6500 P.S.I. CONCRETE					CU.YDS. 7.9	7.9	
0.6" Ø L.R. STRANDS					No. 19	19	

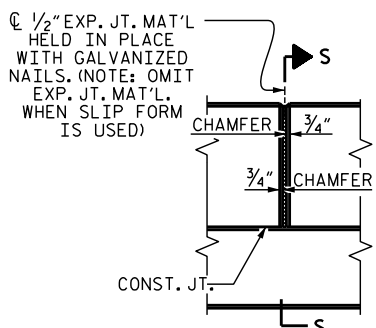
GRADE 270 STRANDS	
	0.6" Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950



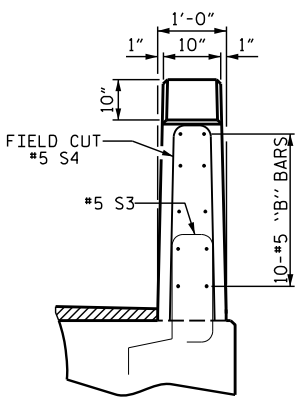
VERTICAL CONCRETE BARRIER RAIL SECTION



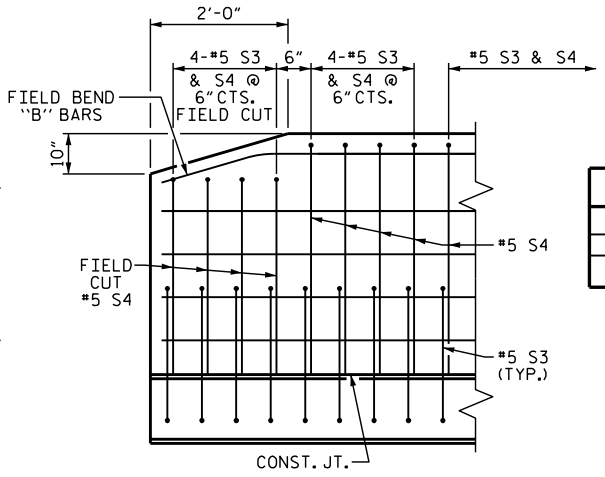
SECTION S-S  
AT DAM IN OPEN JOINT  
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS



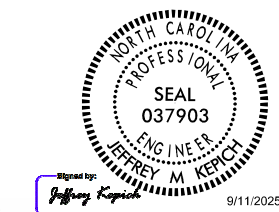
END VIEW



SIDE VIEW

**END OF RAIL DETAILS**

CONCRETE RELEASE STRENGTH	
UNIT	PSI
55' UNITS	4900



**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 SIDEWAYS. 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.

ALL REINFORCING STEEL IN THE VERTICAL CONCRETE BARRIER RAIL 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 BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL 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.

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.

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.

THE DRAIN OPENING AT THE GUTTERLINE SHALL BE 4" X 8". THE HEIGHT OF THE BLOCKOUT IN THE VERTICAL CONCRETE BARRIER RAIL SHALL EXTEND FROM THE TOP OF THE CORED SLAB UNIT TO THE TOP OF THE DRAIN OPENING.

APPLY EPOXY PROTECTIVE COATING TO EXTERIOR FACE OF THE EXTERIOR CORED SLAB UNITS THAT REQUIRE DRAINS IN THE BARRIER RAIL.

PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
 STATION: **15+92.50 -L-**

SHEET 6 OF 6

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

ASSEMBLED BY: J.M. KEPICH	DATE: 02/2025
CHECKED BY: L. SAMPLES	DATE: 07/2025
DRAWN BY: DGE 5/09	REV. 5/18 MAA/THC
CHECKED BY: BCH 6/09	

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



**NOTES**

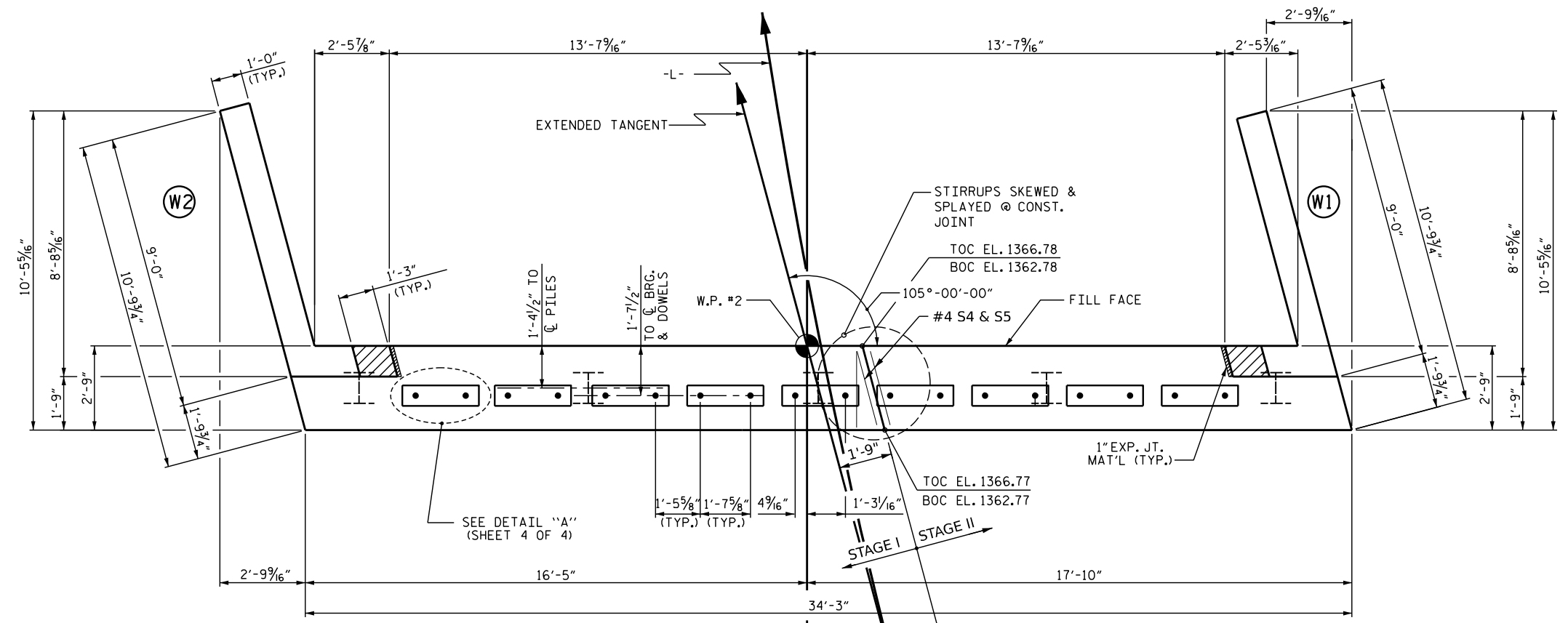
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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 4.

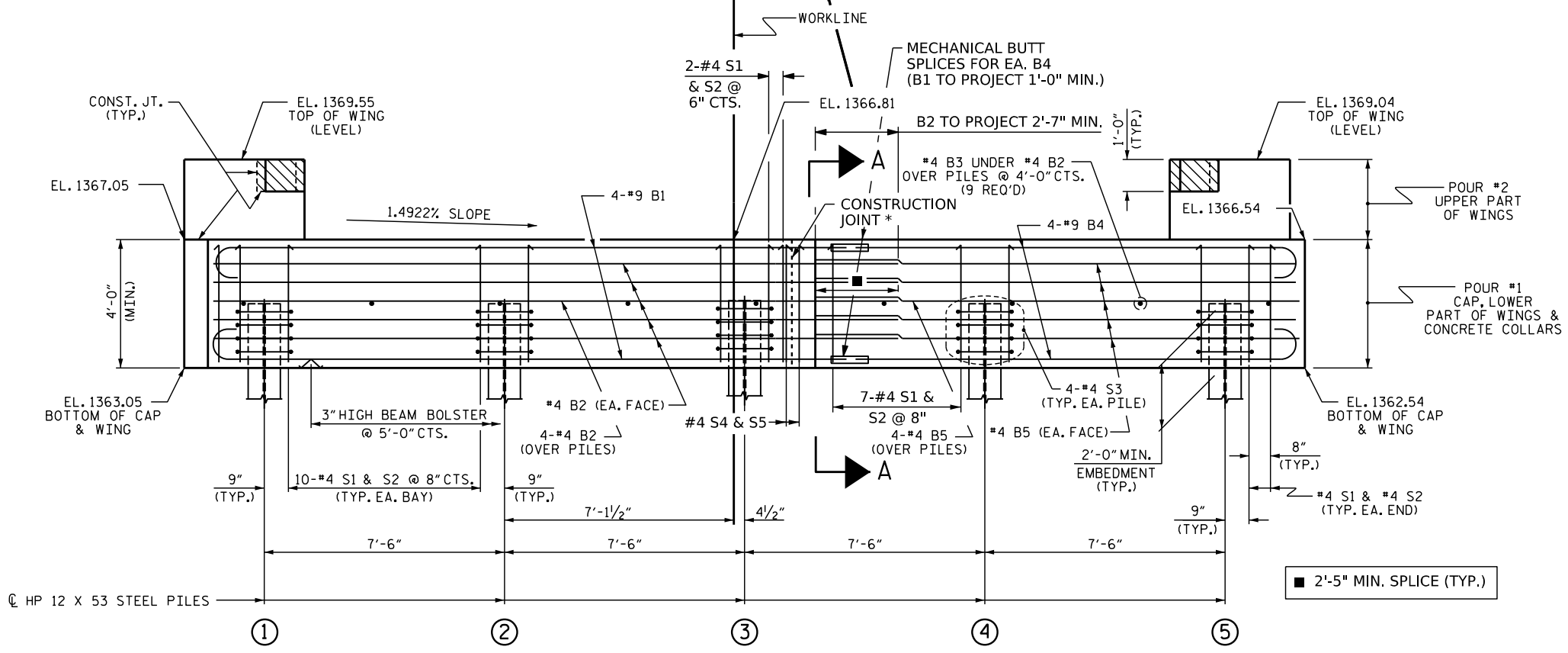
FOR WING DETAILS, SEE SHEET 3 OF 4.

\*FOR CONSTRUCTION JOINT DETAIL SEE SHEET 4 OF 4.



**PLAN**

TOP OF PILE ELEVATIONS	
①	1365.03
②	1364.91
③	1364.80
④	1364.69
⑤	1364.58



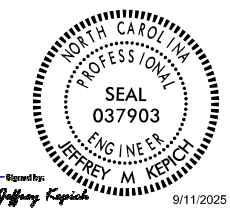
**ELEVATION**

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

PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
 STATION: **15+92.50 -L-**  
 SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE**  
**END BENT No. 2**



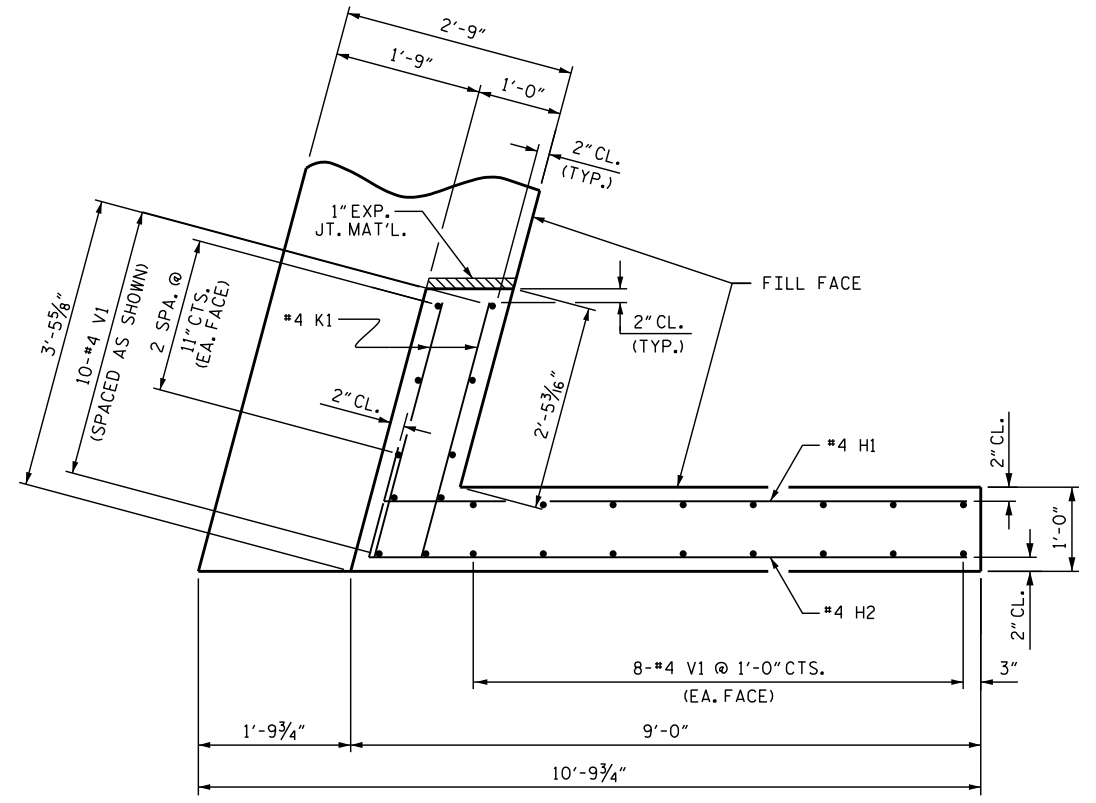
ASSEMBLED BY: J.M. KEPICH	DATE: 02/2025
CHECKED BY: L. SAMPLES	DATE: 07/2025
DRAWN BY: WJH 12/11	REV. 4/15 MAA/TMG
CHECKED BY: AAC 12/11	



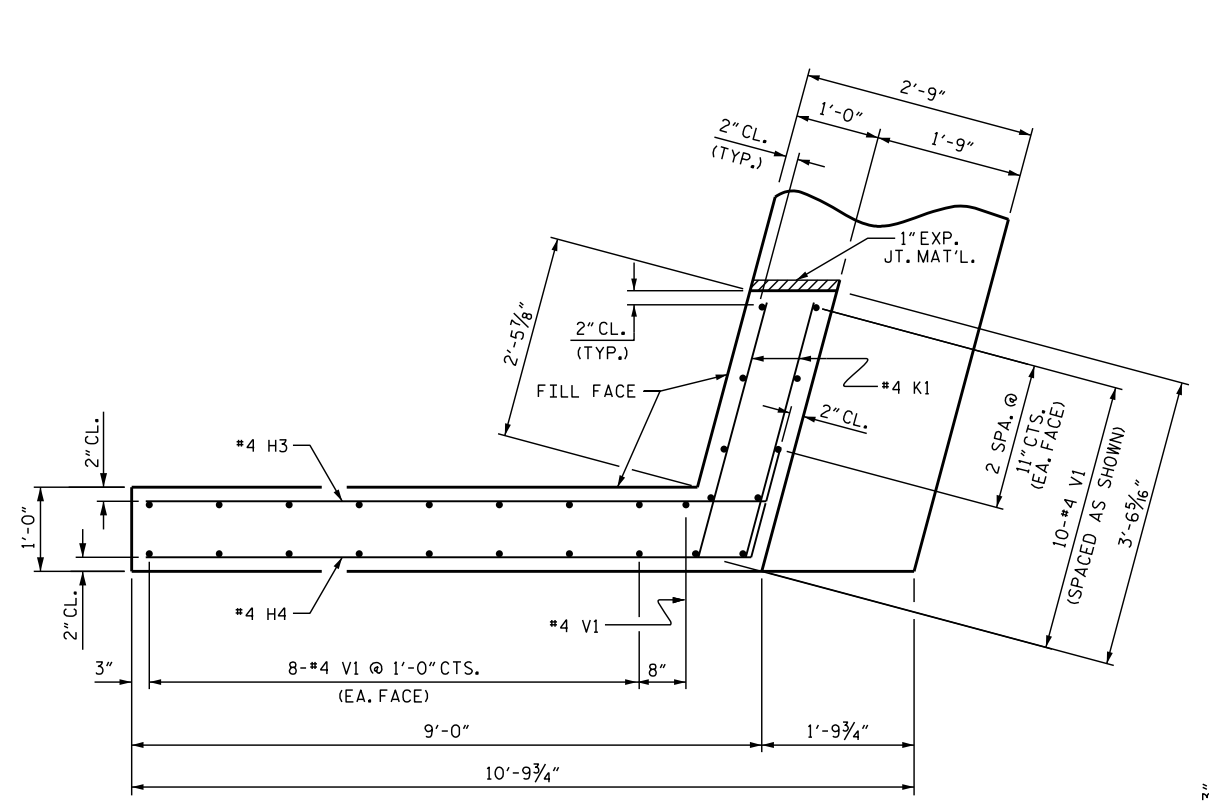
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

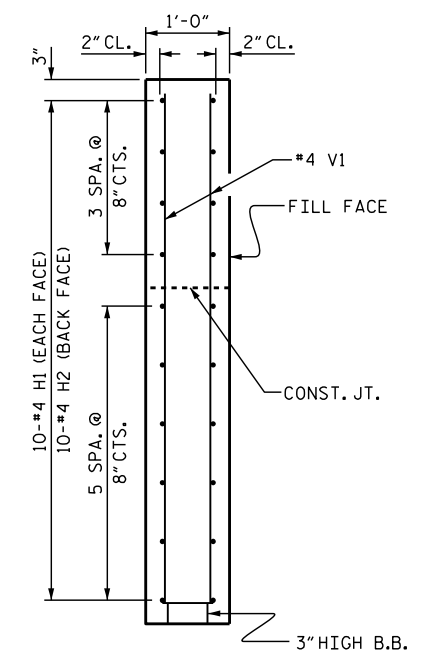
TOTAL SHEETS: 019



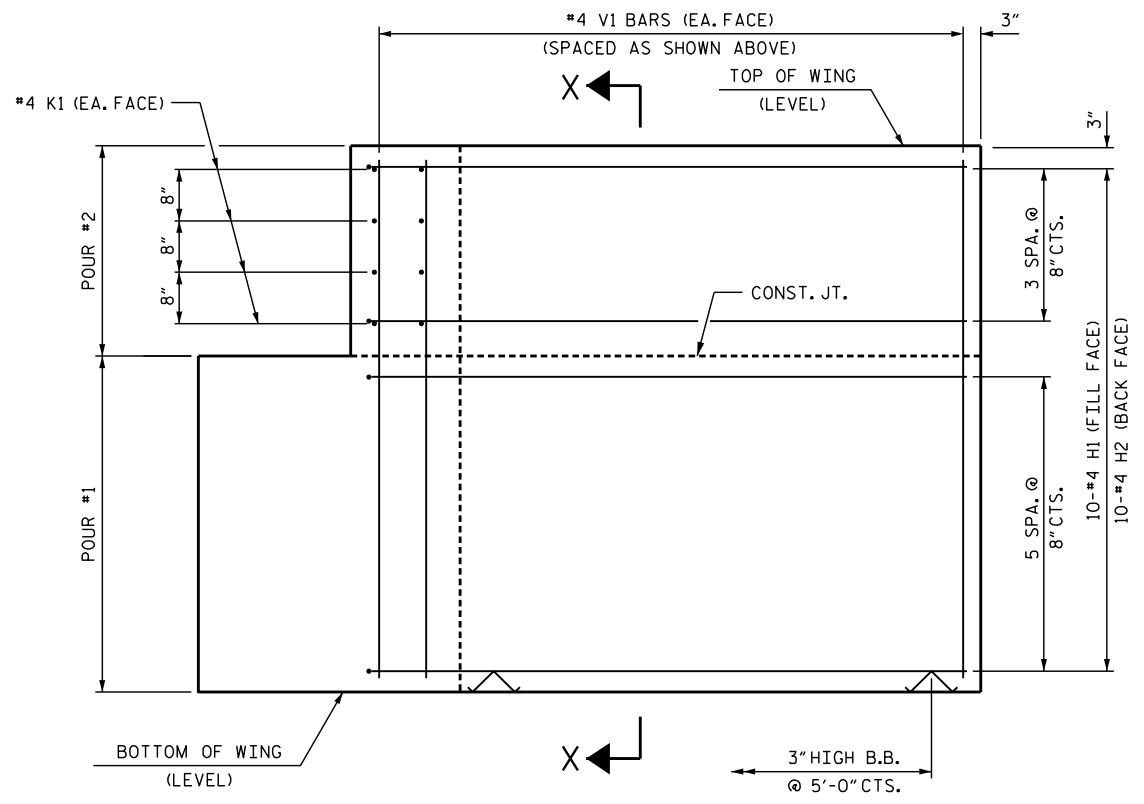
PLAN OF WING (W1)



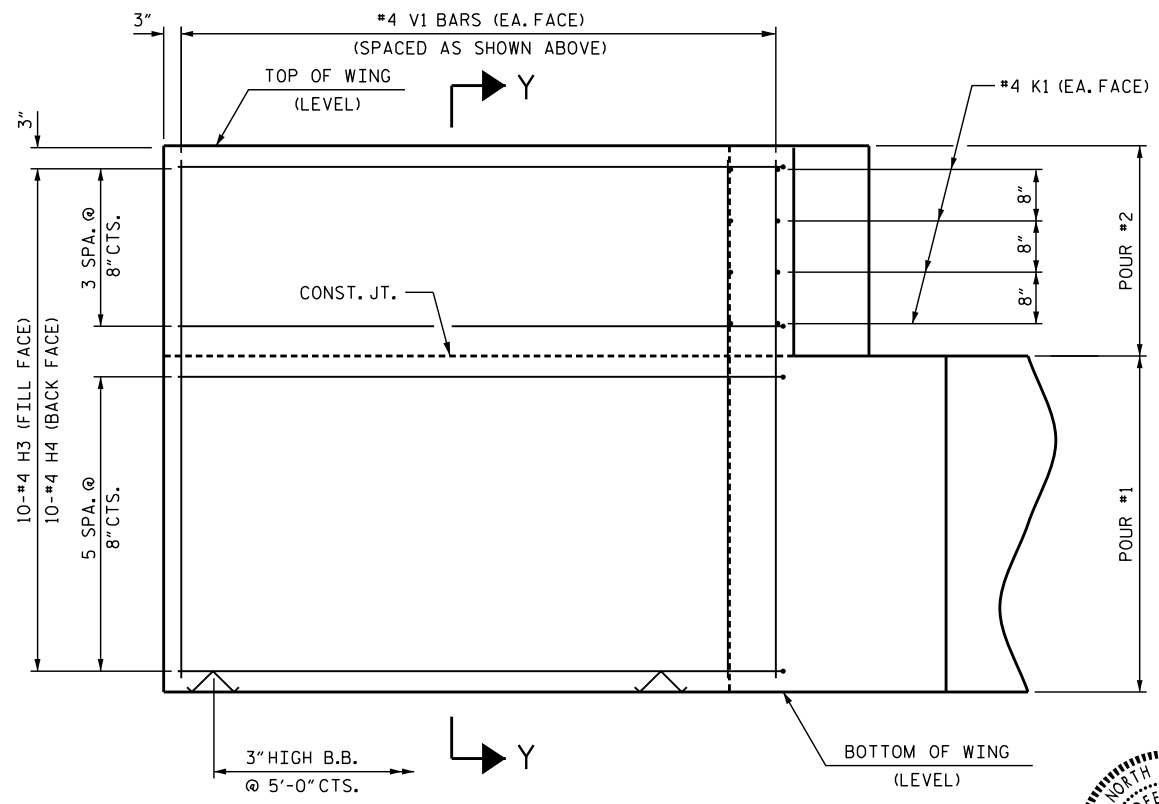
PLAN OF WING (W2)



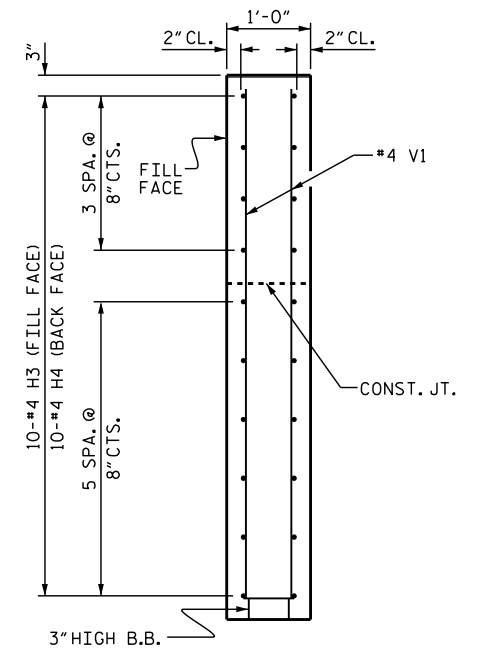
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

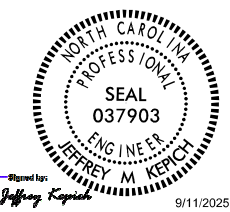


SECTION Y-Y

WING DETAILS

PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
 STATION: **15+92.50 -L-**  
 SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT  
 WING DETAILS



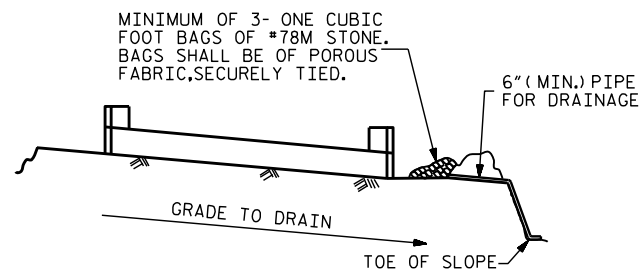
ASSEMBLED BY: J.M. KEPICH	DATE: 02/2025
CHECKED BY: L.SAMPLES	DATE: 07/2025
DRAWN BY: WJH 12/11	REV. 4/15 MAA/TMG
CHECKED BY: AAC 12/11	



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TOTAL SHEETS: 019

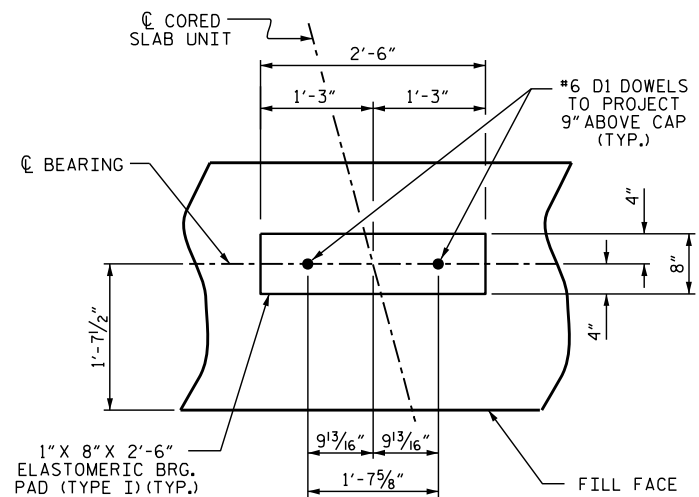


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

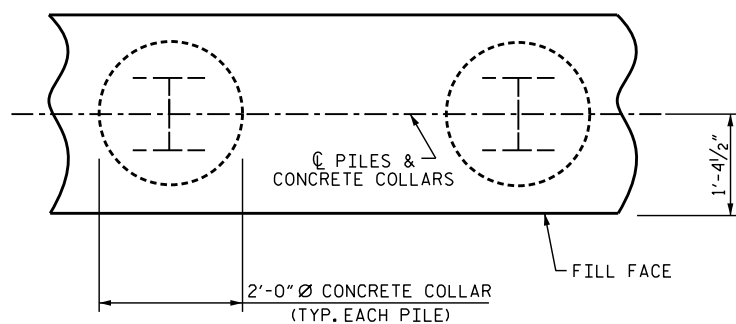
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT



#### DETAIL "A"

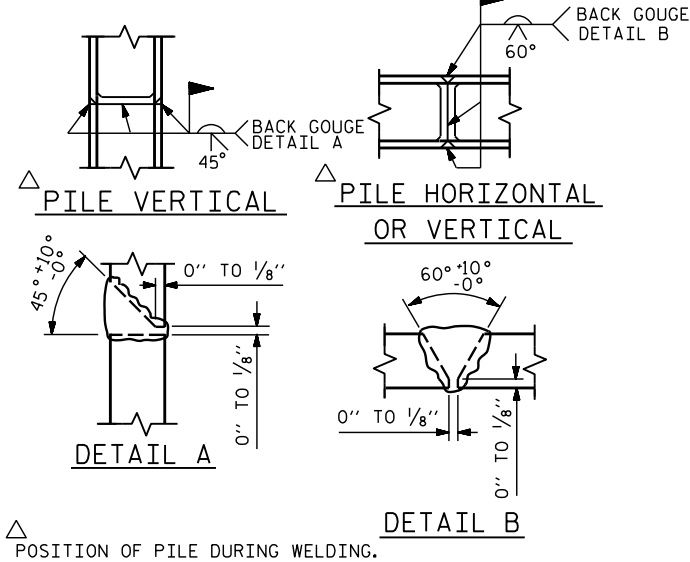
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



#### PLAN

### CORROSION PROTECTION FOR STEEL PILES DETAIL

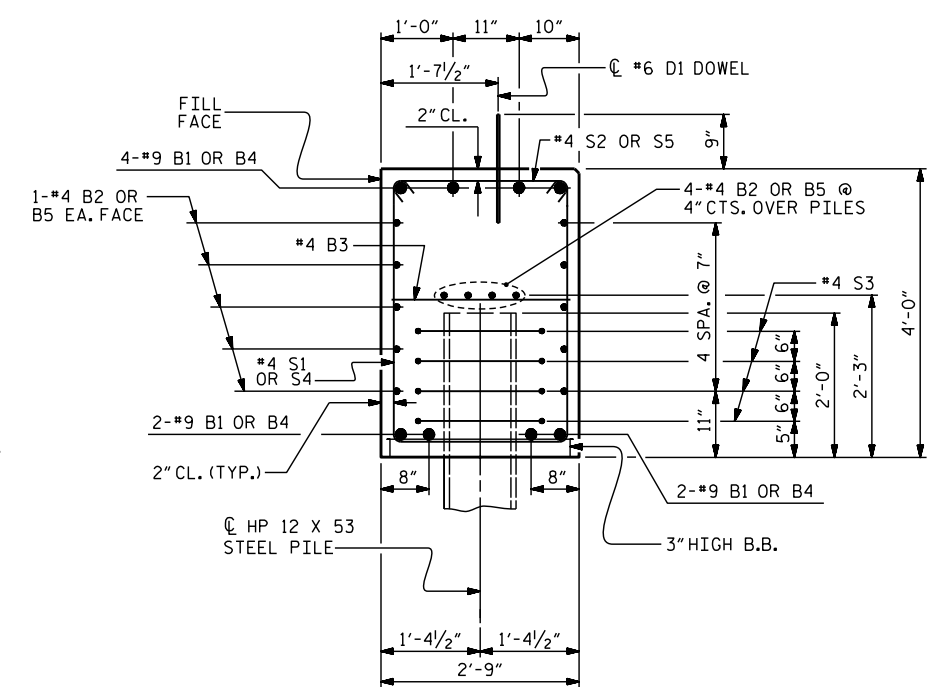
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



### PILE SPLICE DETAILS

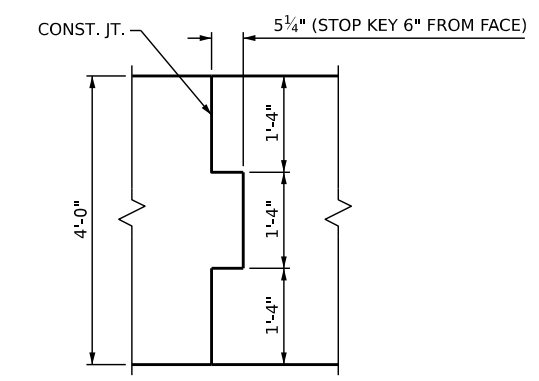
BAR TYPES	
<p>1</p>	<p>2</p>
<p>3</p>	<p>4</p>
<p>5</p>	<p>6</p>
ALL BAR DIMENSIONS ARE OUT TO OUT.	
END BENT No. 1	END BENT No. 2
HP 12 X 53 STEEL PILES NO: 5 LIN. FT. = 75	HP 12 X 53 STEEL PILES NO: 5 LIN. FT. = 75
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 5	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 5
STEEL PILE POINTS NO: 5	STEEL PILE POINTS NO: 5

BILL OF MATERIAL FOR ONE END BENT														
STAGE I						STAGE II								
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	20'-11"	569	B3	4	#4	STR	2'-5"	6			
B2	14	#4	STR	21'-3"	199	B4	8	#9	1	15'-4"	417			
B3	5	#4	STR	2'-5"	8	B5	14	#4	STR	15'-0"	140			
D1	10	#6	STR	1'-6"	23	D1	8	#6	STR	1'-6"	18			
H1	10	#4	2	9'-1"	61	H3	10	#4	3	9'-6"	63			
H2	10	#4	2	9'-3"	62	H4	10	#4	3	9'-4"	62			
K1	8	#4	STR	3'-1"	16	K1	8	#4	STR	3'-1"	16			
S1	24	#4	4	10'-5"	167	S1	19	#4	4	10'-5"	132			
S2	24	#4	5	3'-2"	51	S2	19	#4	5	3'-2"	40			
S3	12	#4	6	6'-6"	52	S3	8	#4	6	6'-6"	35			
S4	1	#4	4	10'-6"	7	S4	1	#4	4	10'-6"	7			
S5	1	#4	5	3'-3"	2	S5	1	#4	5	3'-3"	2			
V1	26	#4	STR	6'-2"	107	V1	27	#4	STR	6'-2"	111			
REINFORCING STEEL (FOR ONE END BENT)						REINFORCING STEEL (FOR ONE END BENT)								
						1324 LBS.								
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)						CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)								
POUR #1 CAP, LOWER PART OF WINGS & COLLARS						POUR #1 CAP, LOWER PART OF WINGS & COLLARS								
9.5 C.Y.						7.8 C.Y.								
POUR #2 UPPER PART OF WINGS						POUR #2 UPPER PART OF WINGS								
1.1 C.Y.						1.1 C.Y.								
TOTAL CLASS A CONCRETE						TOTAL CLASS A CONCRETE								
10.6 C.Y.						8.9 C.Y.								



#### SECTION A-A

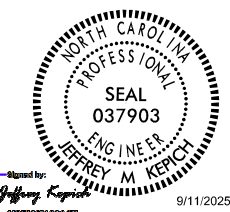
(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



#### CONST. JT. DETAIL

PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
 STATION: **15+92.50 -L-**  
 SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 1 & 2  
 DETAILS



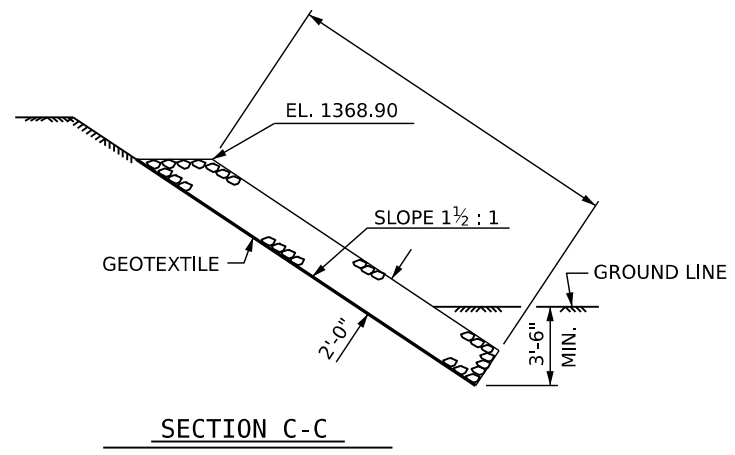
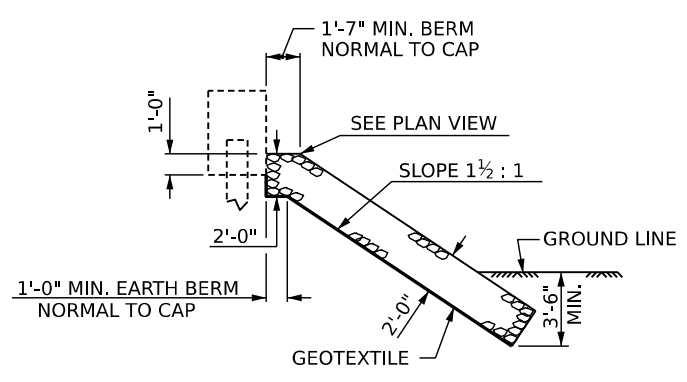
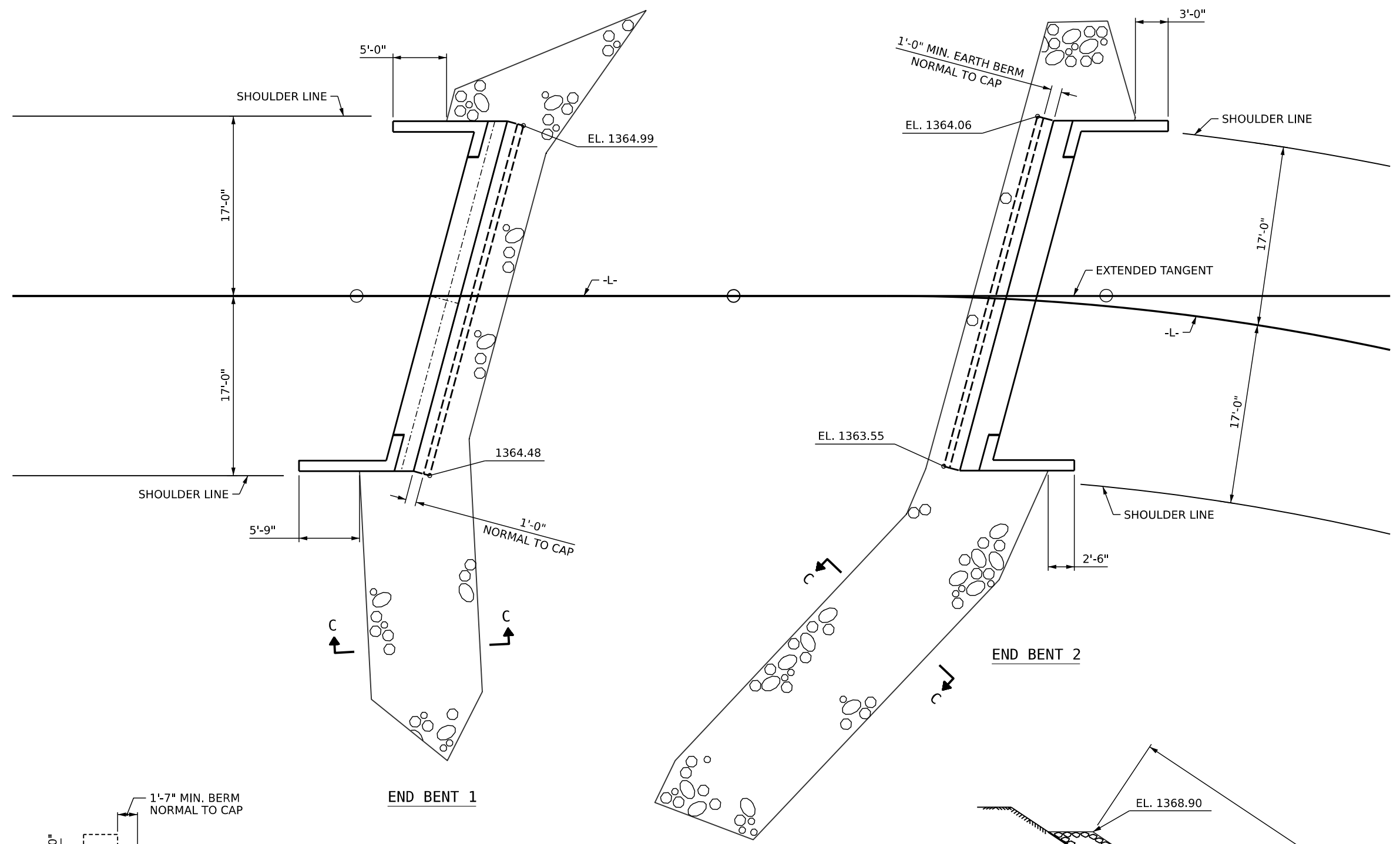
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TOTAL SHEETS 019

ASSEMBLED BY: J.M. KEPICH	DATE: 02/2025
CHECKED BY: L. SAMPLES	DATE: 07/2025
DRAWN BY: WJH 12/11	
CHECKED BY: AAC 12/11	REV. 4/17 MAA/THC



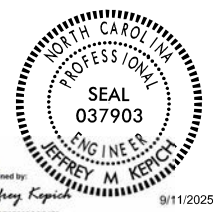


ESTIMATED QUANTITIES		
BRIDGE @ STA. 15+92.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	65.00	73.00
END BENT 2	83.00	93.00

PROJECT NO. BP13-R026  
MCDOWELL COUNTY  
 STATION: 15+92.50 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**RIP RAP DETAILS**



ASSEMBLED BY: J.M. KEPICH	DATE: 02/2025
CHECKED BY: L. SAMPLES	DATE: 07/2025
DRAWN BY: REK 1/84	REV. 10/1/11 MAA/GM
CHECKED BY: RDU 1/84	REV. 12/21/11 MAA/GM
	REV. 12/17 MAA/THC

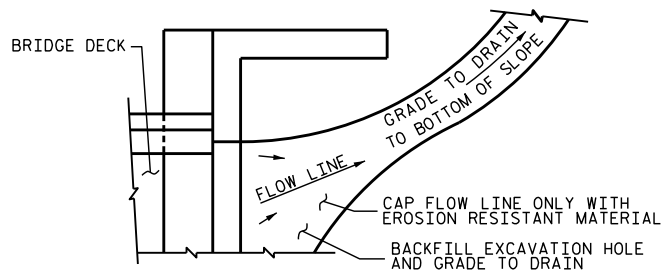


DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

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

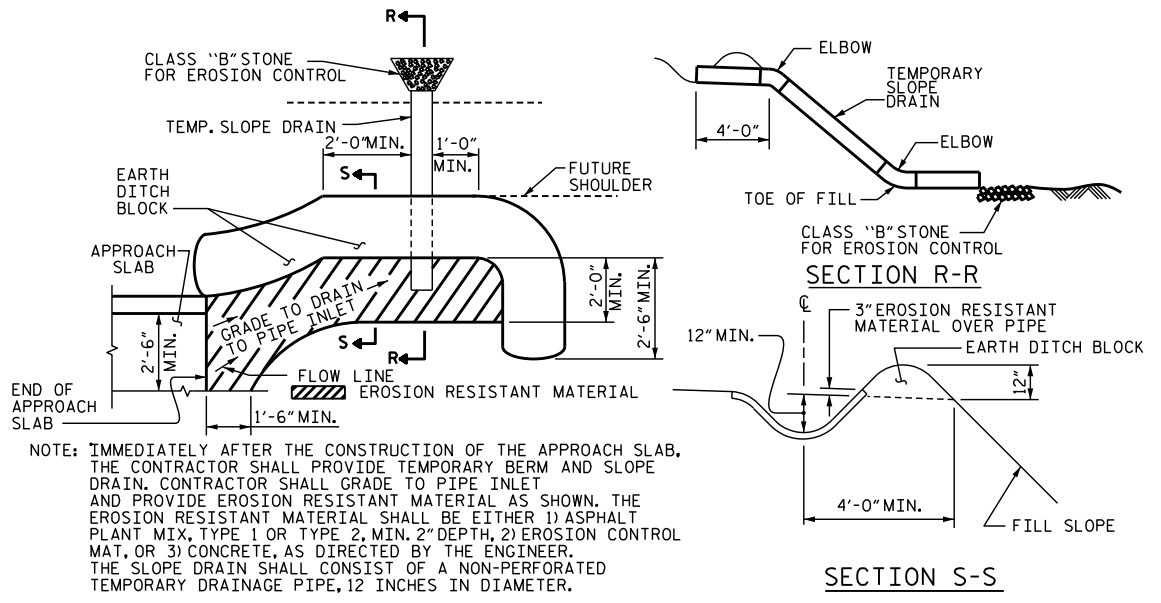
TOTAL SHEETS: 019





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.

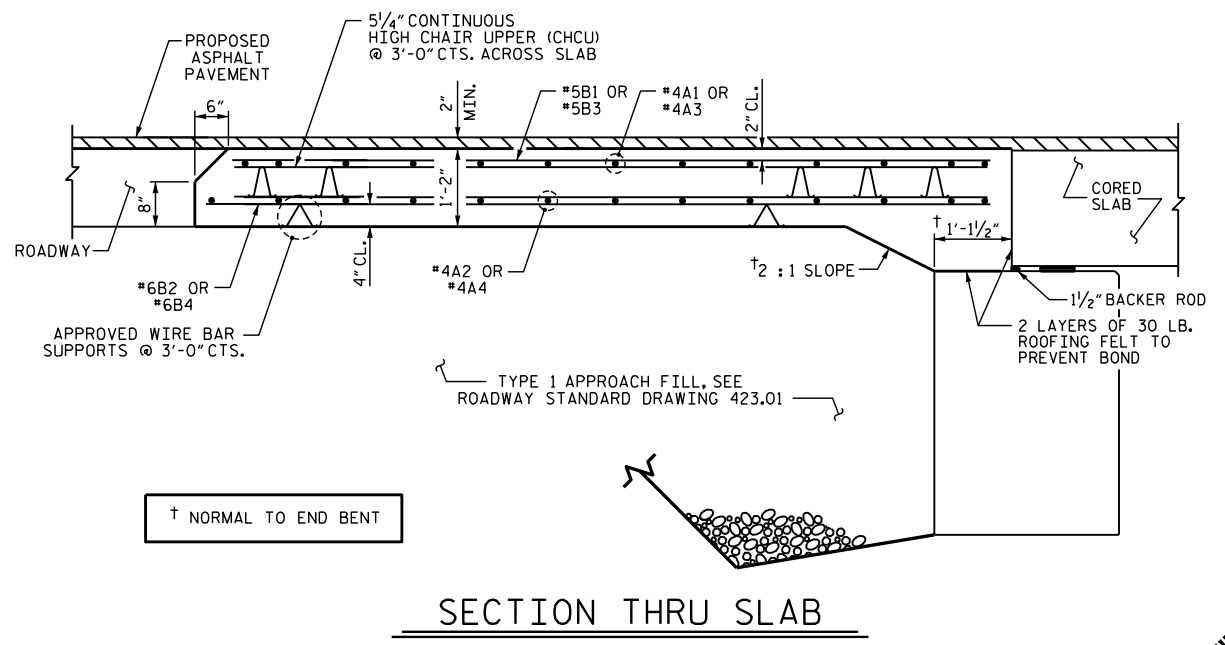
**TEMPORARY DRAINAGE DETAIL**



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



† NORMAL TO END BENT

**SECTION THRU SLAB**

**BILL OF MATERIAL**

APPROACH SLAB AT EB #1 (STAGE I)						APPROACH SLAB AT EB #2 (STAGE I)							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
*A1	13	#4	STR	17'-1"	149	*A1	13	#4	STR	17'-2"	149		
A2	13	#4	STR	16'-9"	145	A2	13	#4	STR	16'-10"	146		
*B1	30	#5	STR	11'-2"	350	*B1	30	#5	STR	10'-11"	342		
B2	30	#6	STR	11'-8"	526	B2	30	#6	STR	11'-5"	514		
REINFORCING STEEL					LBS.	671	REINFORCING STEEL					LBS.	660
* EPOXY COATED REINFORCING STEEL					LBS.	499	* EPOXY COATED REINFORCING STEEL					LBS.	491
CLASS AA CONCRETE					C. Y.	8.43	CLASS AA CONCRETE					C. Y.	8.62

APPROACH SLAB AT EB #1 (STAGE II)						APPROACH SLAB AT EB #2 (STAGE I)							
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
*A3	13	#4	STR	11'-7"	101	*A3	13	#4	STR	11'-6"	100		
A4	13	#4	STR	11'-7"	101	A4	13	#4	STR	11'-6"	100		
*B3	23	#5	STR	11'-2"	268	*B3	23	#5	STR	10'-11"	262		
B4	23	#6	STR	11'-8"	403	B4	23	#6	STR	11'-5"	394		
REINFORCING STEEL					LBS.	504	REINFORCING STEEL					LBS.	494
* EPOXY COATED REINFORCING STEEL					LBS.	369	* EPOXY COATED REINFORCING STEEL					LBS.	362
CLASS AA CONCRETE					C. Y.	6.57	CLASS AA CONCRETE					C. Y.	6.63

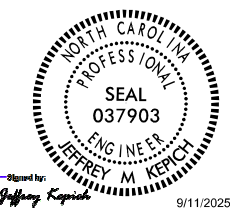
SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

PROJECT NO. **BP13-R026**  
**MCDOWELL** COUNTY  
 STATION: **15+92.50 -L-**

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB (SUB-REGIONAL TIER) 60° SKEW**



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

TOTAL SHEETS: 019

ASSEMBLED BY: J.M. KEPICH	DATE: 02/2025
CHECKED BY: L. SAMPLES	DATE: 07/2025
DRAWN BY: SHS/MAA 5-09	REV. 09-19 BNB/THC
CHECKED BY: BCH 5-09	REV. 01-25 HRS



# STANDARD NOTES

## DESIGN DATA:

SPECIFICATIONS .....	AASHTO (CURRENT)
LIVE LOAD .....	SEE PLANS
IMPACT ALLOWANCE .....	SEE AASHTO
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 AASHTO
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 2024 "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 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1 1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 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 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 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø 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 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 1/16" 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. FINIS 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.