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12+00 12+50 13+00 13+50 14+00 14+50

VERTICAL GRADE DATA -L-
(-)8.1463%
(-)3.000%
PI = 11+91.00
EL = 2,344.57
VC = 80'

SPAN A

VERTICAL GRADE DATA -L-
(-)3.000%
(-)9.0337%
PI = 13+54.00
EL = 2,339.68'
VC = 40'

2,360
2,350
2,340
2,330
2,320
2,310

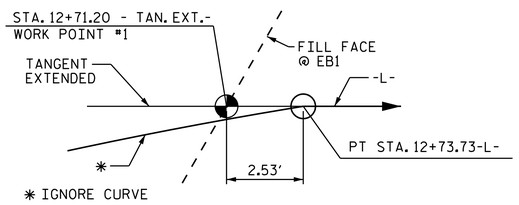
APPROXIMATE GROUND LINE
EL. 2,343±
EL. 2,342±
UNCLASSIFIED STRUCTURE EXCAVATION
STA. 12+71.20 - TAN. EXT.-
FILL FACE @ END BENT 1
G.P. EL. 2,342.16
FIX.
EL. 2,341±
APPROX. W.S. ELEV.= 2,335.0
DATE: 3/7/18
EL. 2,339.7
(Q25)
EL. 2,341.5
(Q100)
EL. 2,340±
EL. 2,339±
1'-6" TO LIMITS OF UNCLASSIFIED STRUCTURE EXCAVATION (TYP.)
STA. 13+28.80 -L-
FILL FACE @ END BENT 2
G.P. EL. 2,340.44
FIX.
1
1.5 (TYP.)
EL. 2,333±
CLASS II RIP RAP (TYP.)
EXCAVATE TO EL. 2,336.0 (GRADE TO DRAIN)
HP12x53 STEEL PILES (TYP.)
PZ27 SHEET PILES (TYP.)
EXCAVATE TO EL. 2,337.0 (GRADE TO DRAIN)
EL. 2,338±
EL. 2,336±

END BENT 1 END BENT 2

SECTION ALONG -L-

SECTIONS THROUGH END BENTS ARE TAKEN AT RIGHT ANGLES

LOW CHORD ELEVATIONS	
EB1: 2,339.49	EB2: 2,337.79



WORKPOINT #1 DETAIL

THE CONTRACTOR SHALL USE THE TANGENT EXTENDED FOR THE LAYOUT OF THE FOLLOWING:
1. LAYOUT OF END BENT 1
2. LAYOUT OF APPROACH SLAB AT END BENT 1
3. COMPUTATIONS OF BRIDGE OR APPROACH SLAB ELEVATIONS

IN ADDITION, THE CONTRACTOR SHALL ASSUME THAT ALL STATIONING OCCURS ALONG THE TANGENT EXTENDED.

HYDRAULIC DATA:

DESIGN DISCHARGE	750 CFS
FREQUENCY OF DESIGN DISCHARGE	25 YRS.
DESIGN HIGH WATER ELEVATION	2339.7
DRAINAGE AREA	2.38 SQ. MI.
BASE DISCHARGE (Q100)	1100 CFS
BASE HIGH WATER ELEVATION	2341.5

OVERTOPPING FLOOD DATA:

OVERTOPPING DISCHARGE	820 CFS
FREQUENCY OF OVERTOPPING FLOOD	25 YR+
OVERTOPPING FLOOD ELEVATION	* 2341.0

* OVERTOPPING ELEVATION REPRESENTS LOWEST HIGH POINT ON DECK/ROADWAY, WHICH OCCURS @ -L- STA 13+30 RT

NC GRID NAD 83/NA 2011

CLASS II RIP RAP (TYP.)
TELLICO CREEK
EXISTING STRUCTURE
PT 12+73.73 -L-
STA. 12+71.20 - TAN. EXT.-
WORK POINT 1
FILL FACE @ END BENT 1
STA. 13+00.00 -L-
BRIDGE I.D. STA.
STA. 13+28.80 -L-
WORK POINT 2
FILL FACE @ END BENT 2
TEMPORARY SHORING (ROADWAY PAY ITEM & DETAIL) (TYP.)
STA. 12+60.50 -TAN. EXT.-
BEGIN APPROACH SLAB
STA. 13+39.50 -L-
END APPROACH SLAB
-TAN. EXT.-
(SEE WORKPOINT #1 DETAIL)
PC 13+39.55 -L-
120°00'00" (TYP.)
TO SR 1408
TO SR 1366
-L-
28'-9⅝" 28'-9⅝"
57'-7¼" = LENGTH OF BRIDGE
FILL FACE TO FILL FACE

-L- CURVE DATA
PI Sta 12+32.69
Δ = 30° 06' 03.4"(RT)
D = 35° 48' 35.5"
L = 84.06'
T = 43.02'
R = 160.00'

-L- CURVE DATA
PI Sta 13+93.04
Δ = 20° 13' 01.8"(LT)
D = 19° 05' 54.9"
L = 105.86'
T = 53.48'
R = 300.00'

NOTE TO CONTRACTOR: W.P. #1 AND APPROACH SLAB STATIONING @ END BENT 1 OCCURS ON THE TANGENT EXTENDED FROM THE PT AT STATION 12+73.73-L-.

PLAN

PILES & SHEET PILES NOT SHOWN IN PLAN VIEW FOR CLARITY

PROJECT NO. 17BP.14.R.207
MACON COUNTY
STATION: 13+00.00-L-
SHEET 1 OF 4 REPLACES BRIDGE NO. 550181

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CREEK, JR.
7/30/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

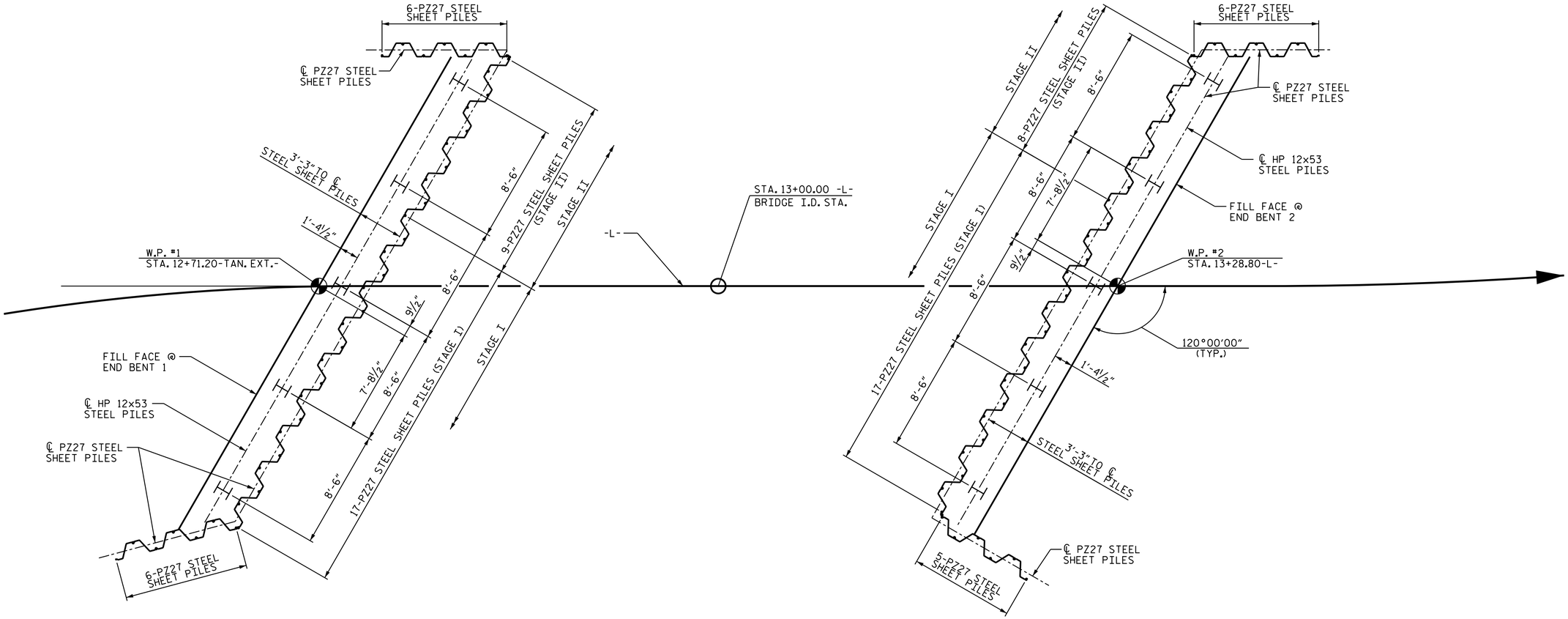
IGS ENGINEERS
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER TELLICO CREEK ON SR 1369 BETWEEN SR 1408 AND SR 1366

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	CCC	DATE : 12/18
CHECKED BY :	MGC	DATE : 12/18
DESIGN ENGINEER OF RECORD :	MGC	DATE : 12/18



END BENT 1

END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES.
ORIENT PILES AS SHOWN.

FOUNDATION RECOMMENDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT No. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.

DRIVE PILES AT END BENT No. 1 TO A REQUIRED DRIVING RESISTANCE OF 142 TONS PER PILE.

PILES AT END BENT No. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.

DRIVE PILES AT END BENT No. 2 TO A REQUIRED DRIVING RESISTANCE OF 142 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT No. 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PZ27 SHEET PILES ARE TO BE DRIVEN IN FRONT (STREAM SIDE) OF HP 12x53 STEEL PILES AT EACH END BENT AS SHOWN.

STEEL SHEET PILES SHOULD BE DRIVEN TO REFUSAL AND AT MINIMUM ELEVATION OF 2,324.1 FT. (LT) AND 2,326.2 (RT) AT END BENT No. 1 AND AT 2,315.4 FT. (LT) AND 2,327.7 FT. (RT) AT END BENT No. 2.

IF REFUSAL IS ENCOUNTERED ABOVE THE MINIMUM ELEVATIONS SPECIFIED, THE ENGINEER SHALL CONTACT THE GEOTECHNICAL OPERATIONS PERSON TO REVIEW AND MAKE RECOMMENDATIONS.

ALL PILES ARE TO BE INSTALLED PLUMB WITH THE STRONG AXIS ORIENTED PARALLEL TO THE BRIDGE DECK ALIGNMENT.

THE SCOUR CRITICAL ELEVATION FOR THE SHEET PILES AT END BENT No. 1 & 2 IS 2,330.2 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

DRAWN BY :	CCC	DATE :	12/18
CHECKED BY :	MGC	DATE :	12/18
DESIGN ENGINEER OF RECORD :	MGC	DATE :	12/18

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR.
DocuSigned by: [illegible] Sr.
7/30/2019

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TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PROJECT NO. 17BP.14.R.207
MACON COUNTY
STATION: 13+00.00-L-

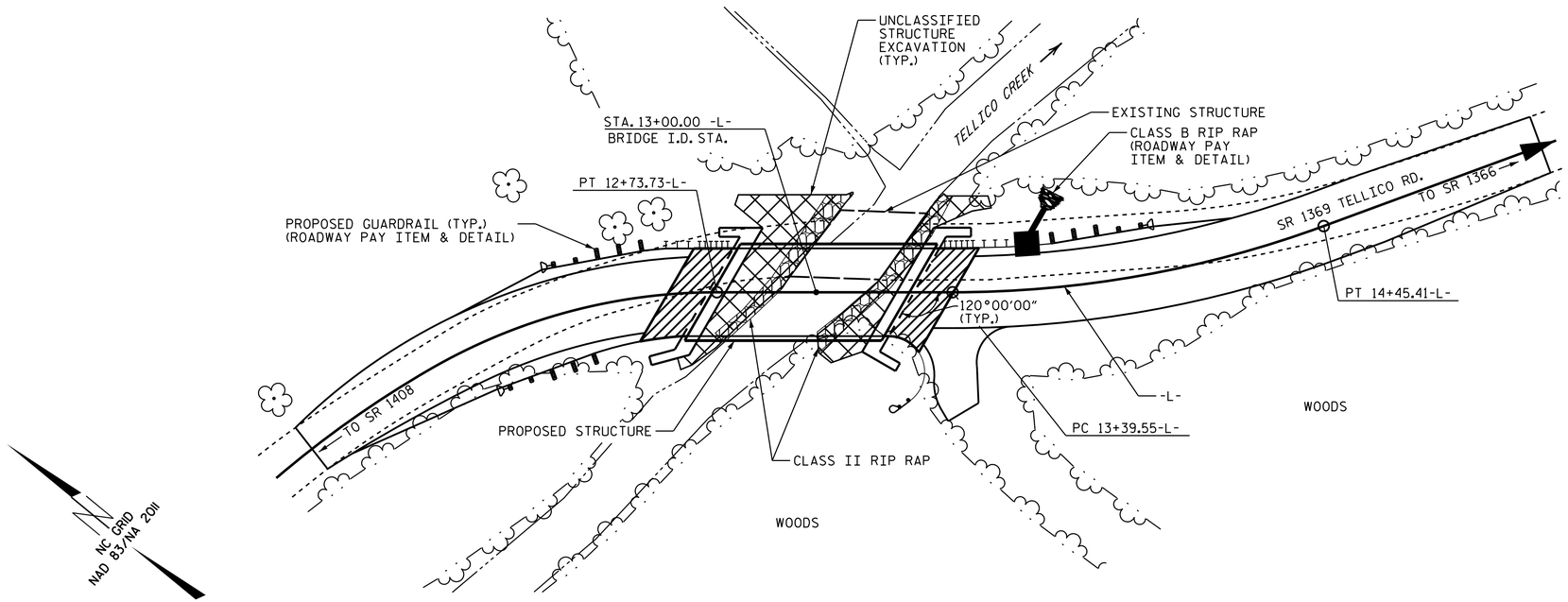
SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER TELLICO CREEK ON SR 1369 BETWEEN SR 1408 AND SR 1366

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			38

BM#1: 10" SPIKE IN BASE OF 28" POPLAR TREE, -L- STA. 12+29.00, 21' RT, ELEV. 2342.97'



FOR UTILITY INFORMATION SEE UTILITY PLANS AND SPECIAL PROVISIONS

LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN (S-38).

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING SINGLE SPAN (1 SPAN @ 25'-6") WITH A CLEAR ROADWAY WIDTH OF 19.15 FT. AND AN 2½" ASPHALT WEARING SURFACE, CONSISTING OF A TIMBER FLOOR ON STEEL I-BEAMS AND A SUBSTRUCTURE CONSISTING OF TIMBER CAPS/TIMBER POST AND SILL ABUTMENTS AND LOCATED AT THE SITE OF THE PROPOSED BRIDGE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE INTEGRITY OF THE BRIDGE DETERIORATE, THIS LOAD LIMIT MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA (SEE LOCATION SKETCH) SHALL BE EXCAVATED FOR A DISTANCE OF 30 FT. (LT.) AND 25 FT. (RT.) OF -L- AT END BENT #1 AND 30 FT. (LT.) AND 25 FT. (RT.) OF -L- AT END BENT #2 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. 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.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITIES ON ROADWAY PLANS.

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

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

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 13+00.00-L-."

TEMPORARY SHORING WILL BE REQUIRED IN THE AREAS INDICATED IN THE PLAN VIEW. FOR LIMITS OF TEMPORARY SHORING, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING, SEE ROADWAY PLANS.

FOR STEEL SHEET PILES, SEE SPECIAL PROVISIONS.

DRAWN BY :	CCC	DATE :	12/18
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 3 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CREEK, JR.

7/30/2019

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TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
TELLICO CREEK
ON SR 1369 BETWEEN
SR 1408 AND SR 1366

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			38

TOTAL BILL OF MATERIAL

ITEM	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS "A" CONCRETE (BRIDGE)	BRIDGE APPROACH SLABS	REINFORCING STEEL (BRIDGE)	PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES	HP12x53 STEEL PILES		STEEL PILE POINTS	TWO BAR METAL RAIL	1'-2" x 2'-8¾" CONCRETE PARAPET	RIP RAP, CLASS II (2'-0" THICK)	ELASTOMERIC BEARINGS	3'-0" x 1'-9" PRESTRESSED CONCRETE CORED SLABS		STEEL SHEET PILES
	LUMP SUM	LUMP SUM	LUMP SUM	C.Y.	LUMP SUM	LBS.	EA.	NO.	LIN. FT.	EA.	LIN. FT.	LIN. FT.	TONS	LUMP SUM	NO.	LIN. FT.	SQ. FT.
SUPERSTRUCTURE											93.66	110.00			9	495.00	
END BENT 1				18.3		2,588	5	5	75				40				770
END BENT 2				18.3		2,624	5	5	105	5			40				800
TOTALS	LUMP SUM	LUMP SUM	LUMP SUM (150 C.Y.)	36.6	LUMP SUM	5,212	10	10	180	5	93.66	110.00	80	LUMP SUM	9	495.00	1,570

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 4 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
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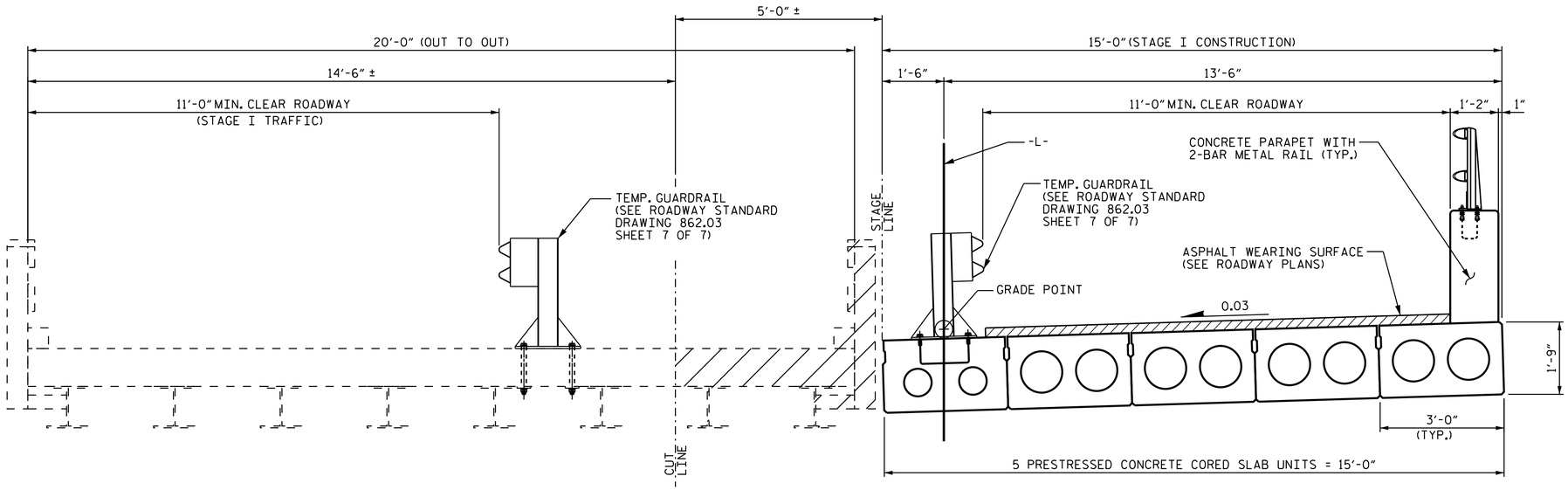
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER TELLICO CREEK ON SR 1369 BETWEEN SR 1408 AND SR 1366

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE : 3/19
CHECKED BY :	MGC	DATE : 5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE : 5/19

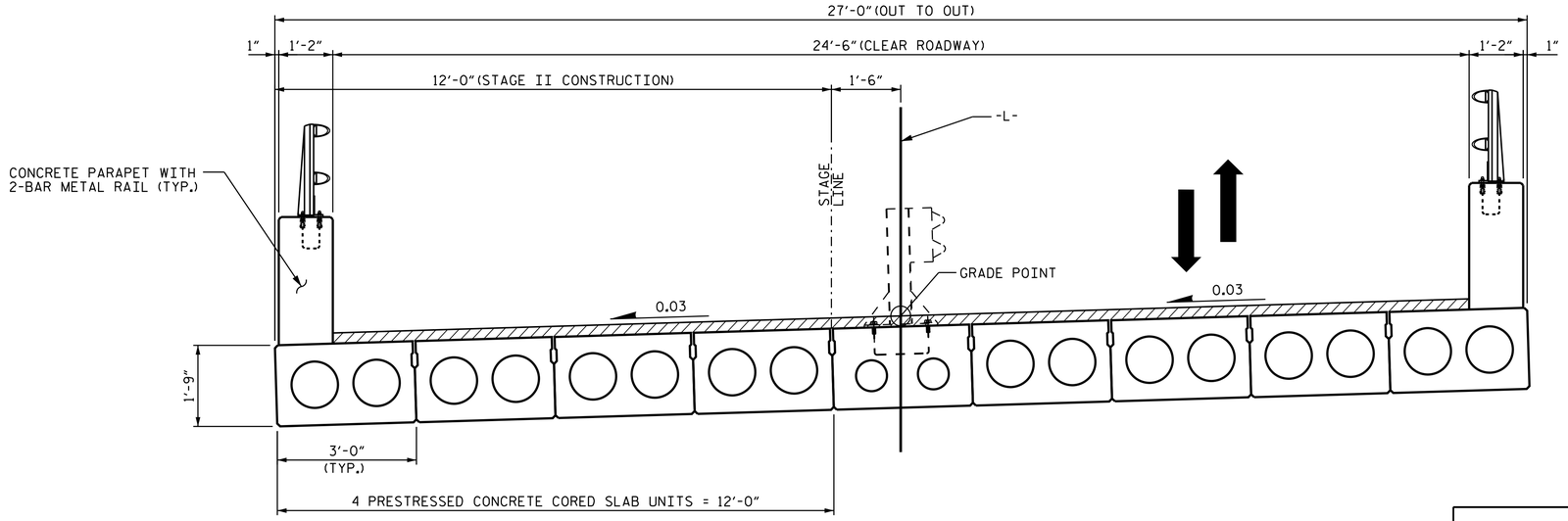


STAGE I

= TWO WAY TRAFFIC

FOR TRAFFIC PHASING, SEE TRAFFIC CONTROL PLANS.

FOR TEMPORARY GUARDRAIL DETAILS AND PAY ITEM, SEE ROADWAY PLANS.



STAGE II

STAGING SEQUENCE

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONSTRUCTION STAGING

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE : 3/19
CHECKED BY :	MGC	DATE : 5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE : 5/19

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	1.163	--	1.75	0.249	1.36	55′	EL	26.923	0.659	1.21	55′	EL	10.769	0.80	0.249	**1.16**	55′	EL	**26.923**	
		HL-93(Opr)	N/A	--	1.564	--	1.35	0.249	1.76	55′	EL	26.923	0.659	1.56	55′	EL	10.769	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	2	1.424	51.265	1.75	0.249	1.7	55′	EL	26.923	0.659	**1.42**	55′	EL	**10.769**	0.80	0.249	1.46	55′	EL	26.923	
		HS-20(Opr)	36.000	--	1.846	66.455	1.35	0.249	2.2	55′	EL	26.923	0.659	1.85	55′	EL	10.769	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.057	41.264	1.4	0.249	4.46	55′	EL	26.923	0.659	3.96	55′	EL	10.769	0.80	0.249	3.06	55′	EL	26.923	
		SNGARBS2	20.000	--	2.374	47.473	1.4	0.249	3.46	55′	EL	26.923	0.659	2.9	55′	EL	10.769	0.80	0.249	2.37	55′	EL	26.923	
		SNAGRIS2	22.000	--	2.291	50.392	1.4	0.249	3.34	55′	EL	26.923	0.659	2.72	55′	EL	10.769	0.80	0.249	2.29	55′	EL	26.923	
		SNCOTTS3	27.250	--	1.524	41.521	1.4	0.249	2.22	55′	EL	26.923	0.659	1.98	55′	EL	10.769	0.80	0.249	1.52	55′	EL	26.923	
		SNAGGRS4	34.925	--	1.31	45.74	1.4	0.249	1.91	55′	EL	26.923	0.659	1.71	55′	EL	10.769	0.80	0.249	1.31	55′	EL	26.923	
		SNS5A	35.550	--	1.278	45.439	1.4	0.249	1.86	55′	EL	26.923	0.659	1.76	55′	EL	10.769	0.80	0.249	1.28	55′	EL	26.923	
		SNS6A	39.950	--	1.189	47.481	1.4	0.249	1.73	55′	EL	26.923	0.659	1.63	55′	EL	10.769	0.80	0.249	1.19	55′	EL	26.923	
		SNS7B	42.000	--	1.132	47.562	1.4	0.249	1.65	55′	EL	26.923	0.659	1.64	55′	EL	10.769	0.80	0.249	1.13	55′	EL	26.923	
	TTST	TNAGRIT3	33.000	--	1.454	47.984	1.4	0.249	2.12	55′	EL	26.923	0.659	1.92	55′	EL	10.769	0.80	0.249	1.45	55′	EL	26.923	
		TNT4A	33.075	--	1.465	48.451	1.4	0.249	2.14	55′	EL	26.923	0.659	1.85	55′	EL	10.769	0.80	0.249	1.46	55′	EL	26.923	
		TNT6A	41.600	--	1.213	50.478	1.4	0.249	1.77	55′	EL	26.923	0.659	1.81	55′	EL	10.769	0.80	0.249	1.21	55′	EL	26.923	
		TNT7A	42.000	--	1.228	51.576	1.4	0.249	1.79	55′	EL	26.923	0.659	1.67	55′	EL	10.769	0.80	0.249	1.23	55′	EL	26.923	
		TNT7B	42.000	--	1.282	53.827	1.4	0.249	1.87	55′	EL	26.923	0.659	1.58	55′	EL	10.769	0.80	0.249	1.28	55′	EL	26.923	
		TNAGRIT4	43.000	--	1.213	52.158	1.4	0.249	1.77	55′	EL	26.923	0.659	1.52	55′	EL	10.769	0.80	0.249	1.21	55′	EL	26.923	
		TNAGT5A	45.000	--	1.136	51.134	1.4	0.249	1.66	55′	EL	26.923	0.659	1.55	55′	EL	10.769	0.80	0.249	1.14	55′	EL	26.923	
		TNAGT5B	45.000	3	1.116	50.224	1.4	0.249	1.63	55′	EL	26.923	0.659	1.44	55′	EL	10.769	0.80	0.249	**1.12**	55′	EL	**26.923**	

LOAD FACTORS:

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

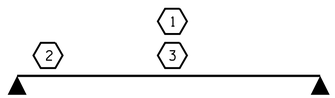
NOTES:

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.

COMMENTS:

1.
2.
3.
4.



LRFR SUMMARY

FOR SPAN 'A'

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR.

7/30/2019

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TGS ENGINEERS
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SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

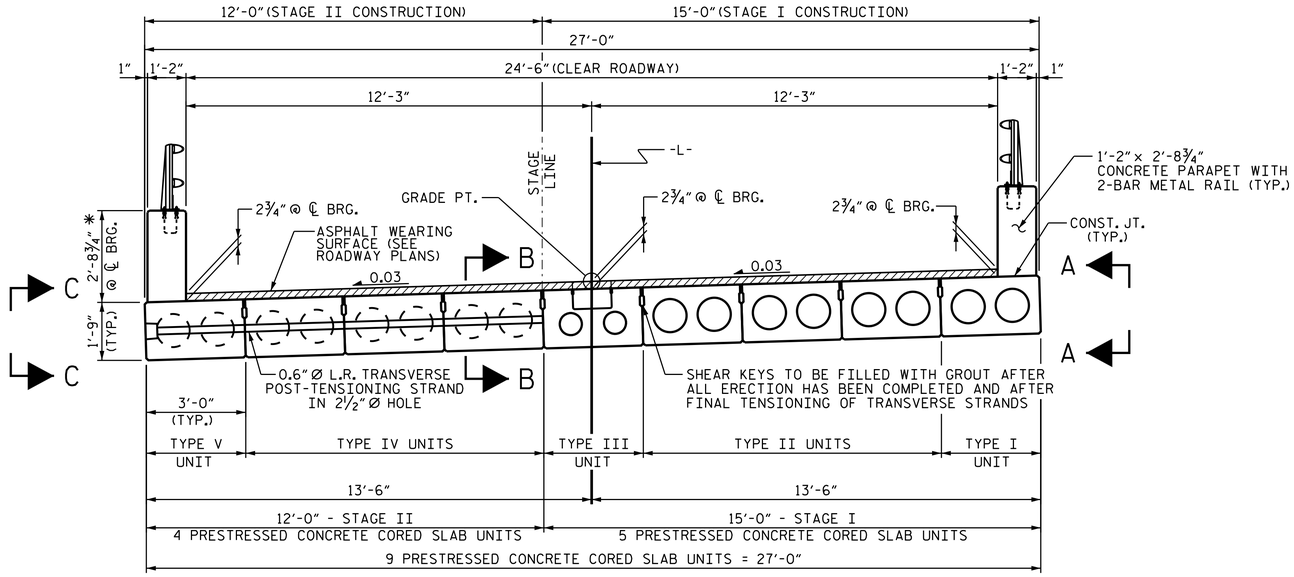
STANDARD

LRFR SUMMARY FOR 55′ CORED SLAB UNIT 120° SKEW (NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			38

ASSEMBLED BY :	JLA	DATE :	3/19
CHECKED BY :	MGC	DATE :	5/19
DRAWN BY :	CVC		6/10
CHECKED BY :	DNS		6/10

STD. NO. 21LRFR1_60&120S_55L

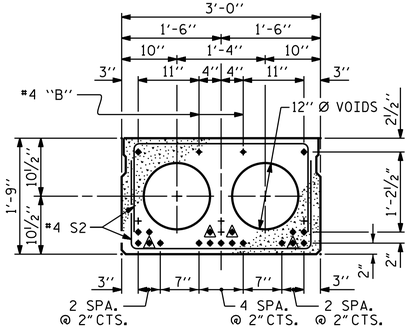


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

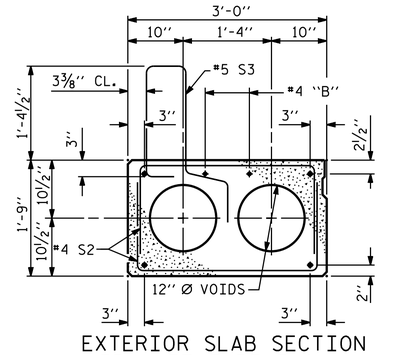
TYPICAL SECTION

* - THE MAXIMUM PARAPET HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE PARAPET AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR PARAPET HEIGHT DETAILS SEE THE "PARAPET SECTION FOR TWO BAR METAL RAIL" DETAIL.



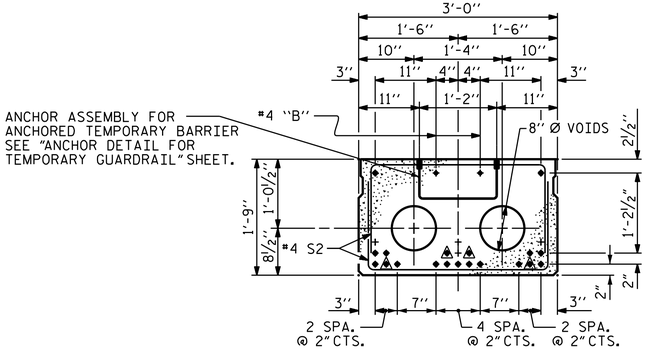
INTERIOR SLAB SECTION (55' UNIT)(TYPE II & IV)

(19 STRANDS REQUIRED)



EXTERIOR SLAB SECTION (55' UNIT)(TYPE I & V)

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION - TYPE II & IV)



INTERIOR SLAB SECTION (55' UNIT)(TYPE III)

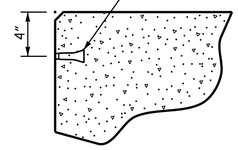
(19 STRANDS REQUIRED)

0.6" Ø LOW RELAXATION STRAND LAYOUT

▲ 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.

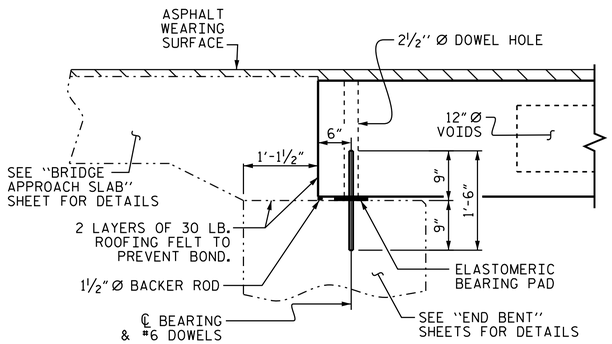
DEBONDING LEGEND

PERMITTED THREADED INSERT CAST IN OUTSIDE FACE OF EXTERIOR UNIT AND RECESSED ⅜". SIZE TO BE DETERMINED BY CONTRACTOR.

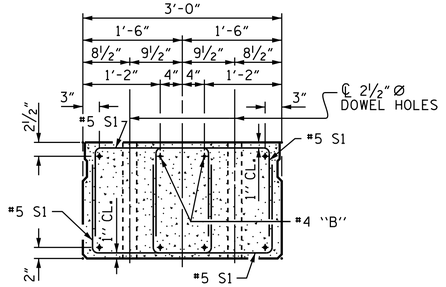


THREADED INSERT DETAIL

FIXED END

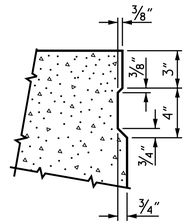


SECTION AT END BENT



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.

PROJECT NO. 17BP.14.R.207
MACON COUNTY
STATION: 13+00.00-L-

SHEET 1 OF 8

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
7/30/2019

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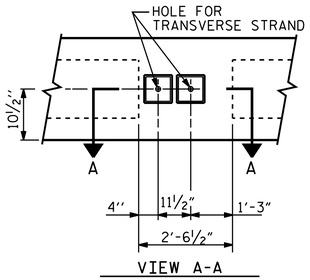
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

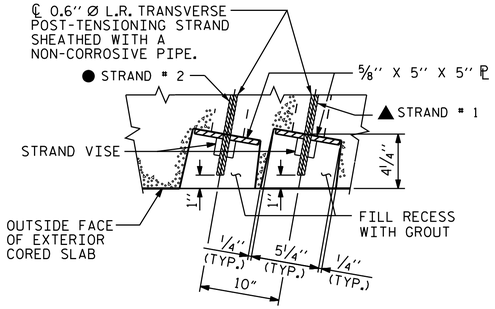
SUPERSTRUCTURE
3'-0" X 1'-9"
PRESTRESSED CONCRETE CORED SLAB UNIT
120° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE : 4/19
CHECKED BY :	MGC	DATE : 5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE : 5/19



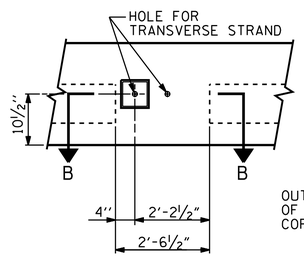
VIEW A-A



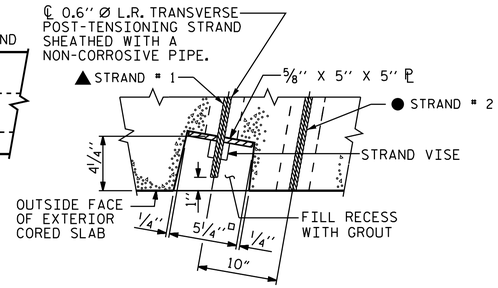
SECTION A-A

DETAIL A
GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS

(TYPE I UNIT)



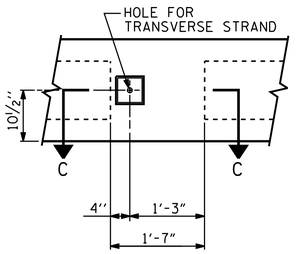
VIEW B-B



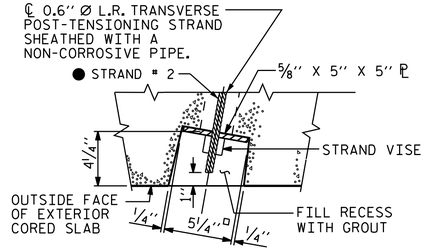
SECTION B-B

DETAIL B
GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS

(TYPE III UNIT)



VIEW C-C



SECTION C-C

DETAIL C
GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS

(TYPE V UNIT)

▲ STRAND # 1 GOES THRU 5 CORED SLAB UNITS
(TO BE TENSIONED DURING STAGE I CONSTRUCTION)

● STRAND # 2 GOES THRU ALL 9 CORED SLAB UNITS
(TO BE TENSIONED DURING STAGE II CONSTRUCTION)

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 2 OF 8

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
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7/30/2019

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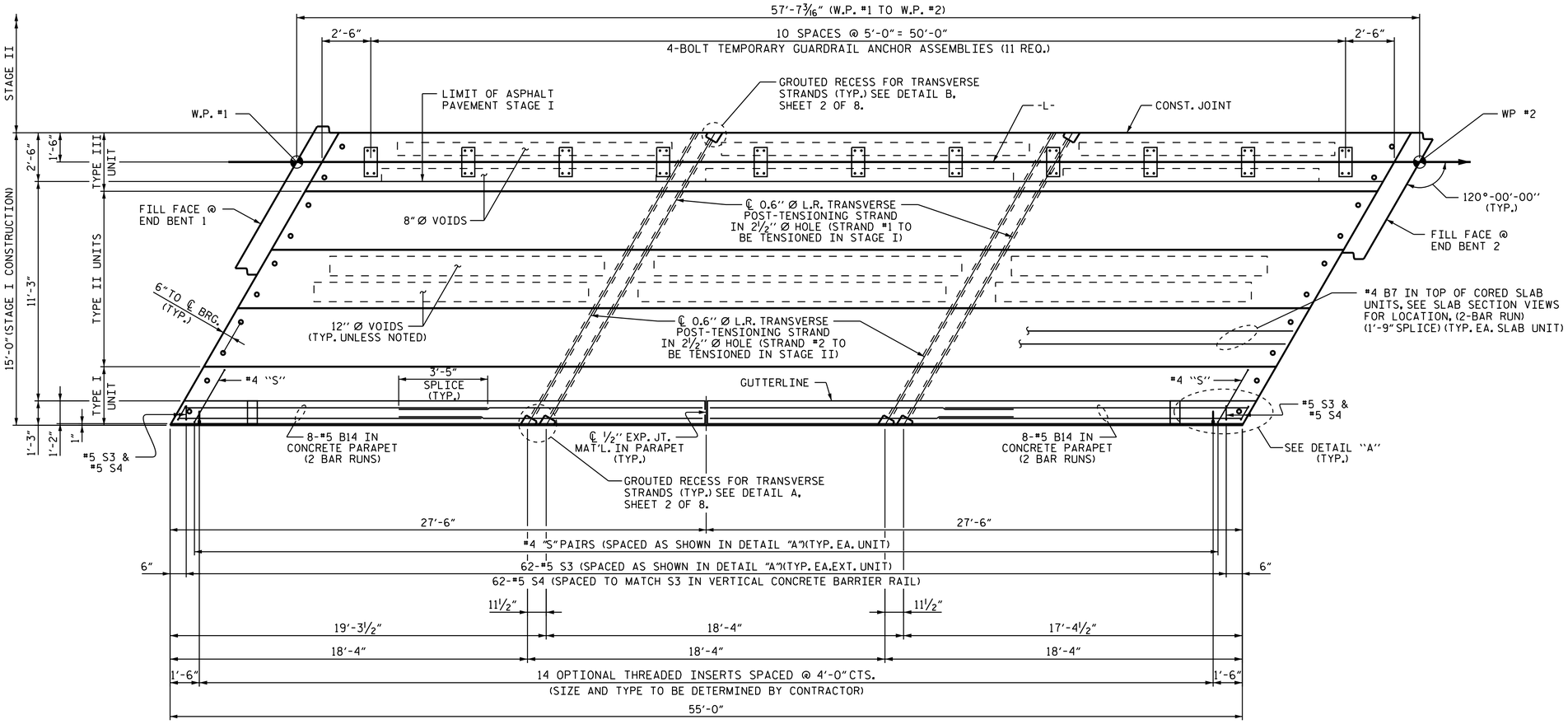
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

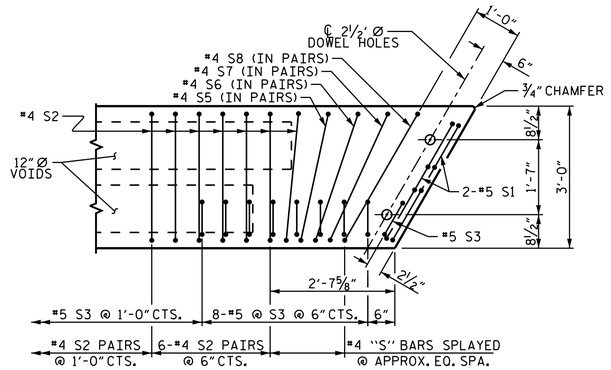
PRESTRESSED CORED SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	4/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19



PLAN OF SPAN A - STAGE I



DETAIL "A"

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

PROJECT NO. 17BP.14.R.207
MACON COUNTY
STATION: 13+00.00-L-
SHEET 3 OF 8

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
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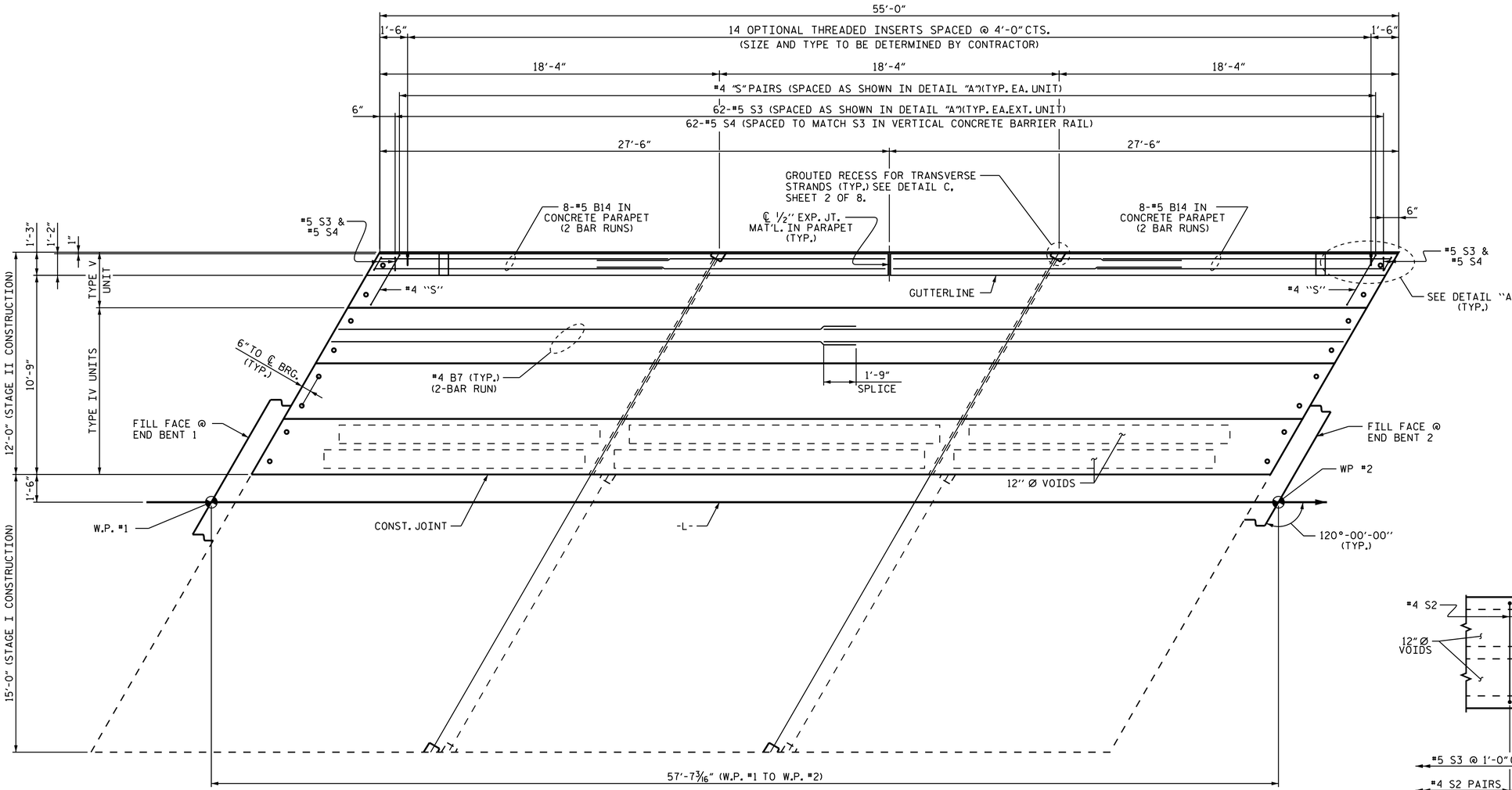
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

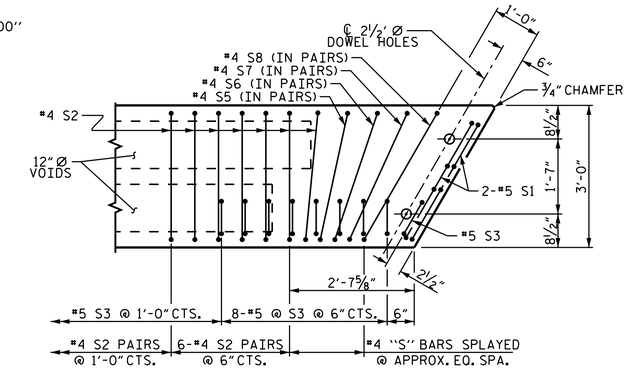
PLAN OF SPAN A
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	4/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19



PLAN OF SPAN A - STAGE II



DETAIL "A"

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

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 4 OF 8

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
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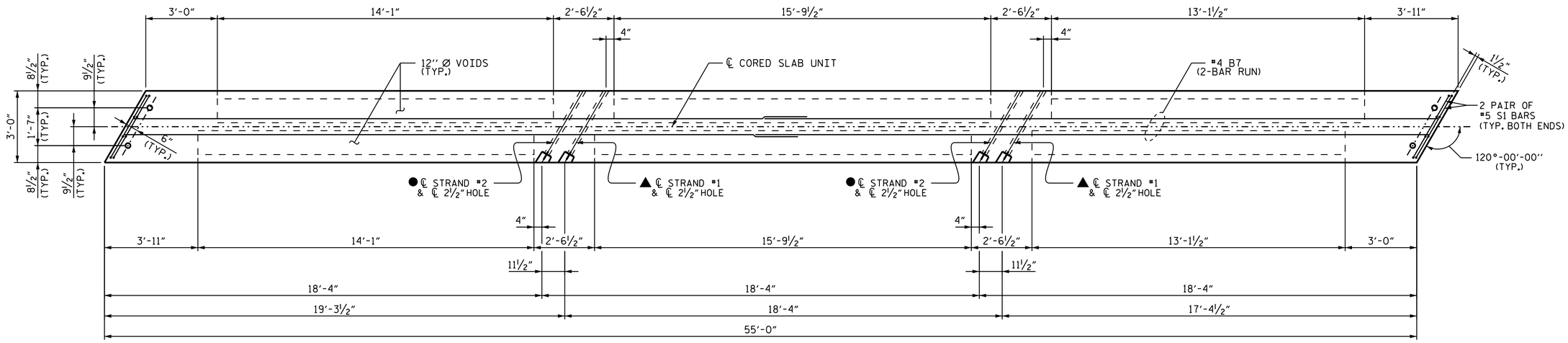
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A
STAGE II

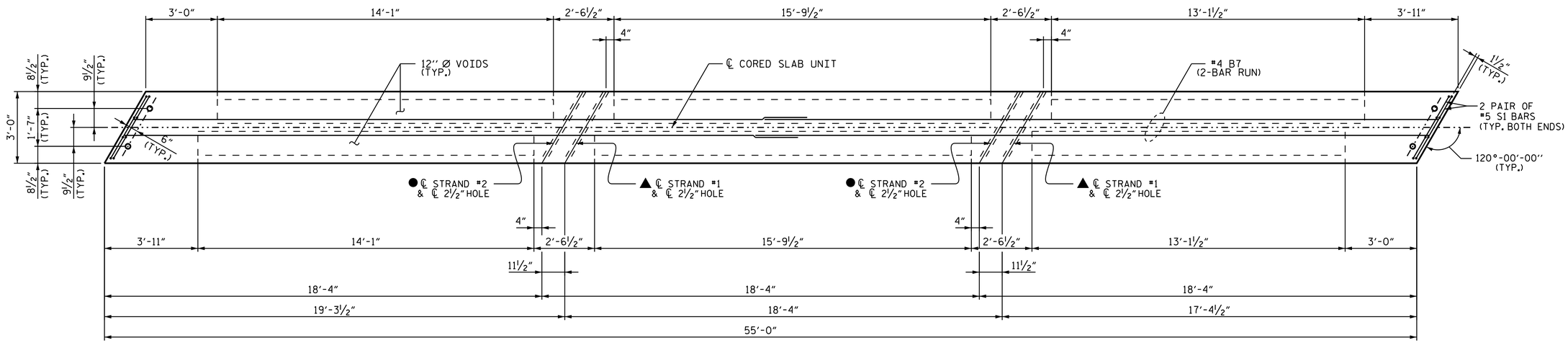
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	4/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19



PLAN - SPAN A - TYPE I UNIT - STAGE I

NOTE: SEE PLAN OF SPAN A STAGE I FOR SPACING OF THE "S" BARS AND THREADED INSERTS



PLAN - SPAN A - TYPE II UNIT - STAGE I

NOTE: SEE PLAN OF SPAN A STAGE I FOR SPACING OF THE "S" BARS

NOTES

▲ STRAND # 1 GOES THRU 5 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE I CONSTRUCTION)

● STRAND # 2 GOES THRU ALL 9 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE II CONSTRUCTION)

FOR GROUTED RECESS, SEE SHEET 2 OF 8

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 5 OF 8

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER

7/30/2019

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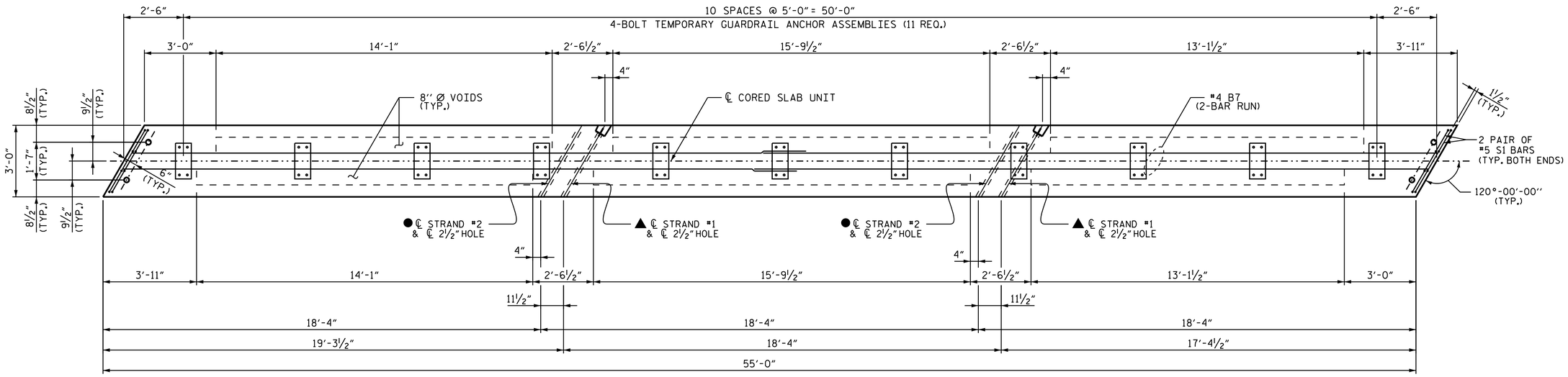
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT DETAILS STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	4/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19



PLAN - SPAN A - TYPE III UNIT - STAGE I

NOTE: SEE PLAN OF SPAN A STAGE I FOR SPACING OF THE "S" BARS

NOTES

▲ STRAND # 1 GOES THRU 5 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE I CONSTRUCTION)

● STRAND # 2 GOES THRU ALL 9 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE II CONSTRUCTION)

FOR GROUTED RECESS, SEE SHEET 2 OF 8

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
7/30/2019

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

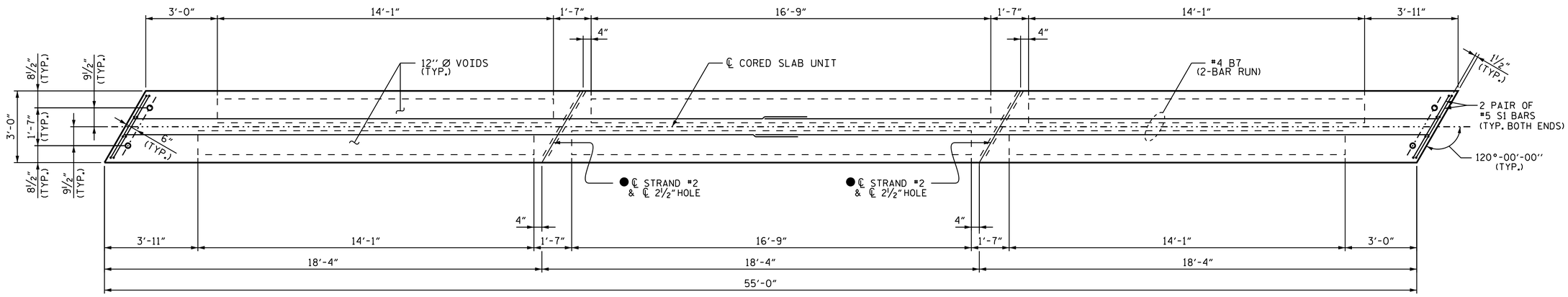
SUPERSTRUCTURE

3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT DETAILS STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			38

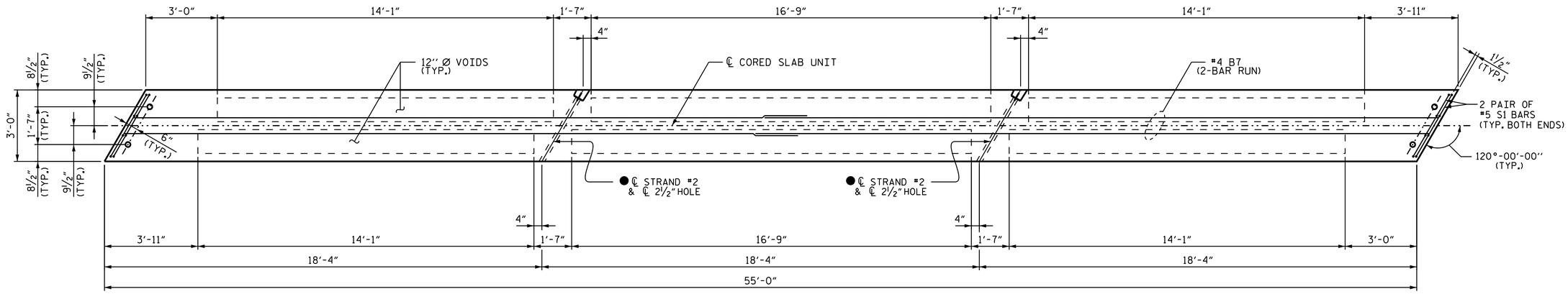
PROJECT NO. 17BP.14.R.207
MACON COUNTY
STATION: 13+00.00-L-
SHEET 6 OF 8

DRAWN BY :	JLA	DATE :	4/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19



PLAN - SPAN A - TYPE IV UNIT - STAGE II

NOTE: SEE PLAN OF SPAN A STAGE II FOR SPACING OF THE "S" BARS



PLAN - SPAN A - TYPE V UNIT - STAGE II

NOTE: SEE PLAN OF SPAN A STAGE II FOR SPACING OF THE "S" BARS AND THREADED INSERTS

NOTES

- STRAND * 2 GOES THRU ALL 9 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE II CONSTRUCTION)

  FOR GROUTED RECESS, SEE SHEET 2 OF 8

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 7 OF 8

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
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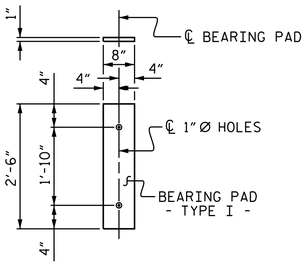
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT DETAILS STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	4/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19



FIXED END
(TYPE I - 18 REQ'D)

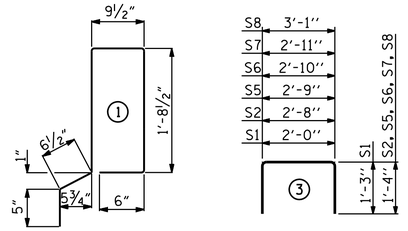
ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

CORED SLABS REQUIRED SPAN A				
		NUMBER	LENGTH	TOTAL LENGTH
STAGE I	TYPE I	1	55'-0"	55'-0"
	TYPE II	3	55'-0"	165'-0"
	TYPE III	1	55'-0"	55'-0"
	STAGE I TOTAL	5		275'-0"
STAGE II	TYPE IV	3	55'-0"	165'-0"
	TYPE V	1	55'-0"	55'-0"
	STAGE I TOTAL	4		220'-0"
	TOTAL	9		495'-0"

GUTTERLINE ASPHALT THICKNESS & PARAPET HEIGHT		
	ASPHALT OVERLAY THICKNESS	PARAPET HEIGHT
	@ MID-SPAN	@ MID-SPAN
55' UNITS	1⅝"	2'-7⅝"

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

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 2½"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 CONCRETE PARAPET 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, ½" 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 PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF CONCRETE PARAPET 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.

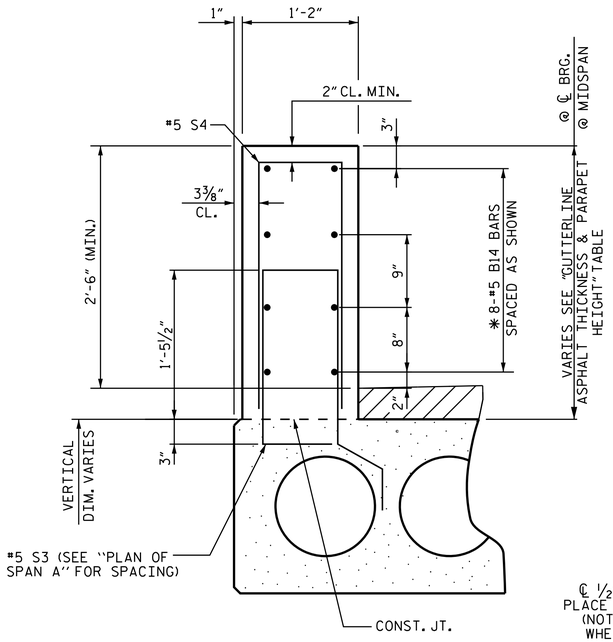
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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.

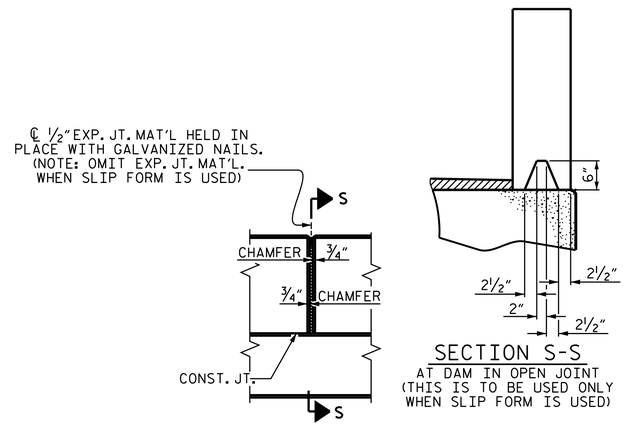


PARAPET SECTION FOR TWO BAR METAL RAIL

QUANTITIES FOR THE #5 S4 AND #5 B14 BARS ARE INCLUDED WITH THE END POST BILL OF MATERIAL.

BILL OF MATERIAL FOR ONE CORED SLAB UNIT

				TYPE I UNIT		TYPE II UNIT		TYPE III UNIT		TYPE IV UNIT		TYPE V UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT	LENGTH	WEIGHT
B7	4	#4	STR	28'-3"	75	28'-3"	75	28'-3"	75	28'-3"	75	28'-3"	75
S1	8	#5	3	4'-6"	38	4'-6"	38	4'-6"	38	4'-6"	38	4'-6"	38
S2	112	#4	3	5'-4"	399	5'-4"	399	5'-4"	399	5'-4"	399	5'-4"	399
∗ S3	64	#5	1	5'-8"	378							5'-8"	378
S5	4	#4	3	5'-5"	14	5'-5"	14	5'-5"	14	5'-5"	14	5'-5"	14
S6	4	#4	3	5'-6"	15	5'-6"	15	5'-6"	15	5'-6"	15	5'-6"	15
S7	4	#4	3	5'-7"	15	5'-7"	15	5'-7"	15	5'-7"	15	5'-7"	15
S8	4	#4	3	5'-9"	15	5'-9"	15	5'-9"	15	5'-9"	15	5'-9"	15
REINFORCING STEEL LBS.					571		571		571		571		571
∗EPOXY COATED REINFORCING STEEL LBS.					378								378
6500 P.S.I. CONCRETE CU. YDS.					8.2		8.2		9.6		8.1		8.1
0.6" Ø L.R. STRANDS No.				19		19		19		19		19	



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

ELEVATION AT EXPANSION JOINTS

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)	1½" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD∗∗	⅜" ↓
FINAL CAMBER	1⅛" ↑

∗∗ INCLUDES FUTURE WEARING SURFACE

CONCRETE RELEASE STRENGTH	
UNIT	PSI
55' UNITS	4900

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

PROJECT NO. 17BP.14.R.207
MACON COUNTY
STATION: 13+00.00-L-
SHEET 8 OF 8

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
7/30/2019

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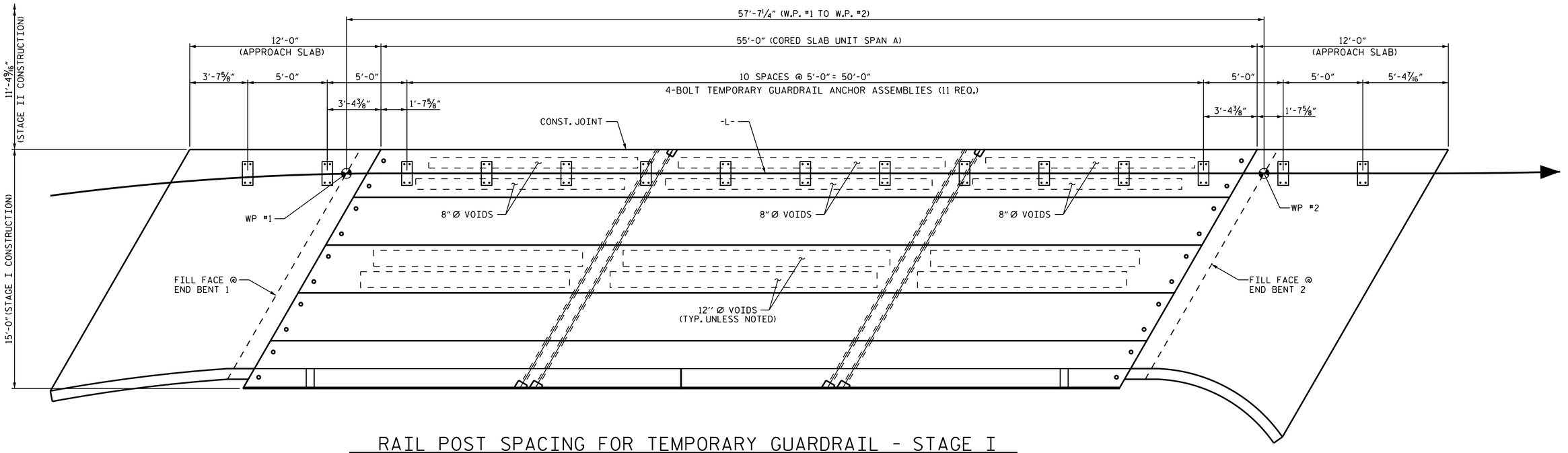
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

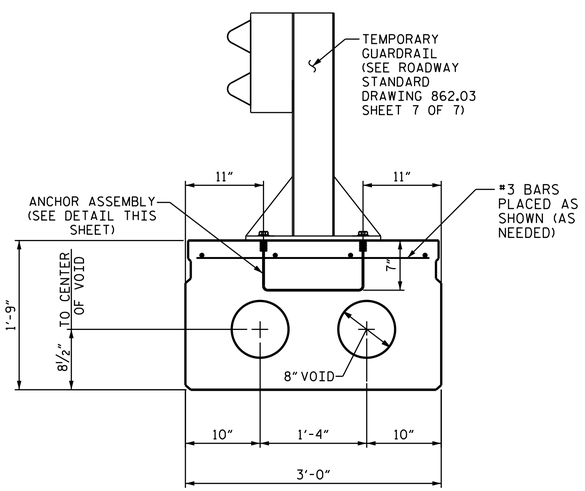
3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT 120° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	4/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19

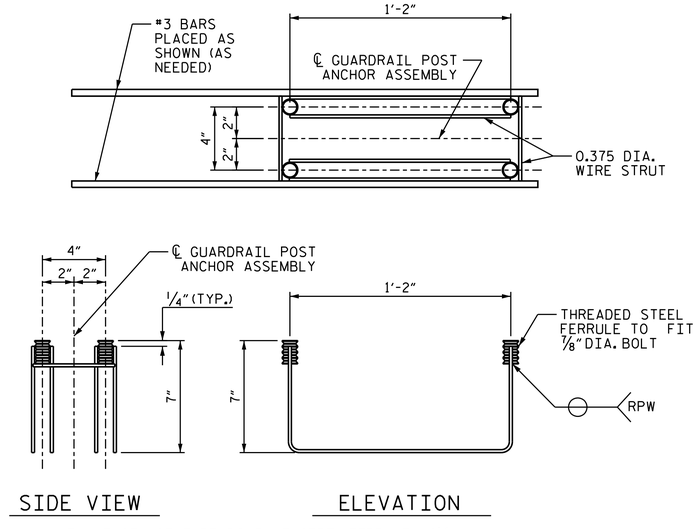


RAIL POST SPACING FOR TEMPORARY GUARDRAIL - STAGE I



SECTION OF ANCHOR ASSEMBLY LOCATION

(TYPE III UNIT)



MIN. LENGTH OF THREADS IN INSERT (FERRULE): 2½"

TEMPORARY GUARDRAIL ANCHOR ASSEMBLY

(11 ASSEMBLIES REQUIRED IN THE TYPE III CORED SLAB UNITS)
(4 ASSEMBLIES REQUIRED IN THE APPROACH SLABS)

NOTES FOR TEMPORARY GUARDRAIL ON PROPOSED BRIDGE

THE ANCHOR ASSEMBLY FOR TEMPORARY GUARDRAIL SHALL CONSIST OF THE FOLLOWING :

A) FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2½".

B) 2-⅞" DIA x 5" ANCHOR BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. ANCHOR BOLTS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATIVE FOR THE ⅞" DIA. x 5" GALVANIZED ANCHOR BOLTS. 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 ANCHOR ASSEMBLY DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI.

ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE ANCHOR ASSEMBLY COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR "3'-0" x 1'-9" PRESTRESSED CONCRETE CORED SLABS".

FERRULES TO BE PLUGGED DURING CASTING OF THE CORED SLAB UNITS AS RECOMMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

PAYMENT FOR ANCHORED TEMPORARY GUARDRAIL ARE INCLUDED IN TRAFFIC CONTROL.

PLUG FERRULES WITH GROUT UPON REMOVAL OF TEMPORARY GUARDRAIL BOLTS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
DocuSigned by: 45BCC2F3A4DC413...
7/30/2019

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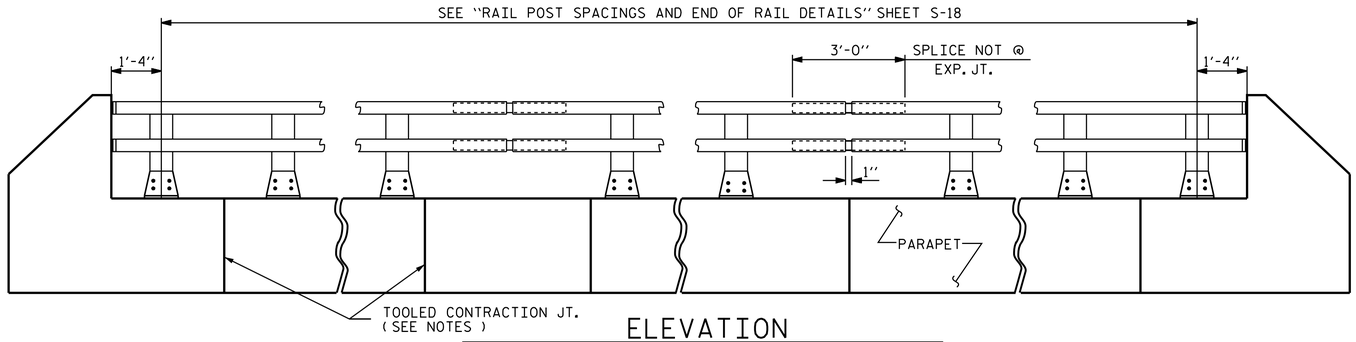
RALEIGH

ANCHORAGE DETAILS FOR TEMPORARY GUARDRAIL

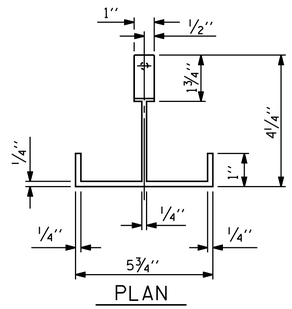
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	4/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19

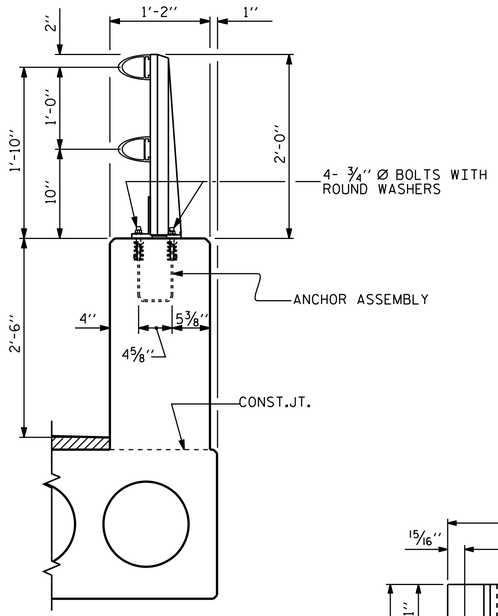


ELEVATION

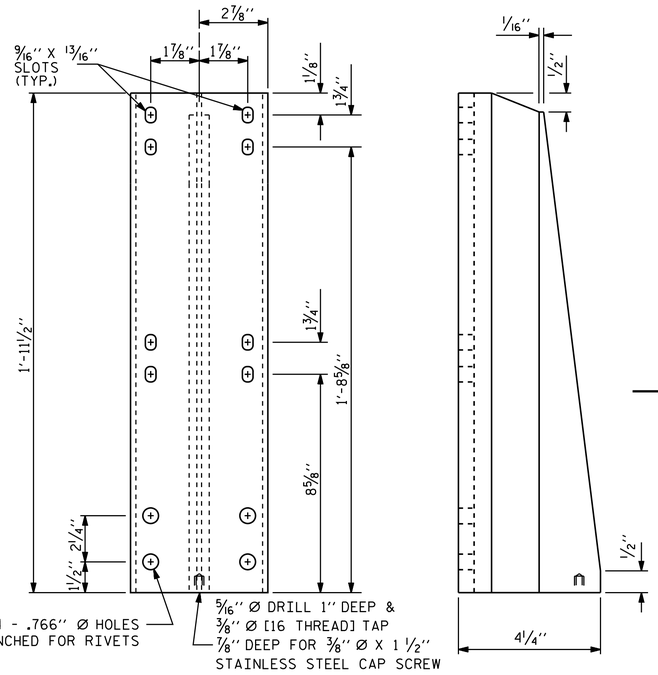
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE SHEET S-18



PLAN

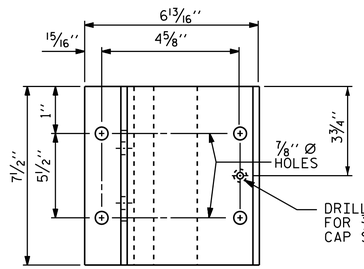


SECTION THRU PARAPET AND RAIL

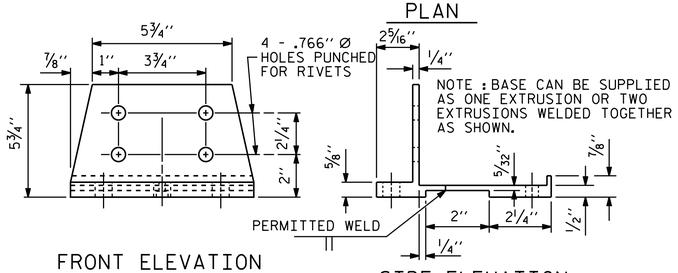


FRONT ELEVATION — SIDE ELEVATION

DETAILS OF POST

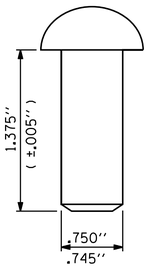


PLAN



FRONT ELEVATION — SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

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 LRFDBRIDGE 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 = 93.66 LIN. FT.

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 1 OF 2

ASSEMBLED BY : JLA	DATE : 4/19
CHECKED BY : MGC	DATE : 5/19
DRAWN BY : EEM 6/94	REV. 10/1/11 MAA/GM
CHECKED BY : RGW 6/94	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
DocuSigned by: 5BCC0F3A4DC413...
7/30/2019

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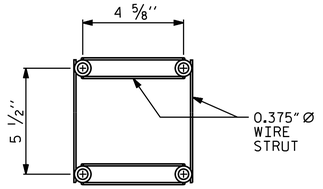
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

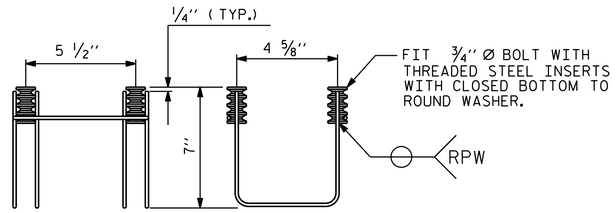
2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			38

STD. NO. BMR3



PLAN



SIDE VIEW ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(20 ASSEMBLIES REQUIRED)

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.

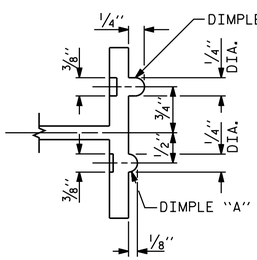
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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.

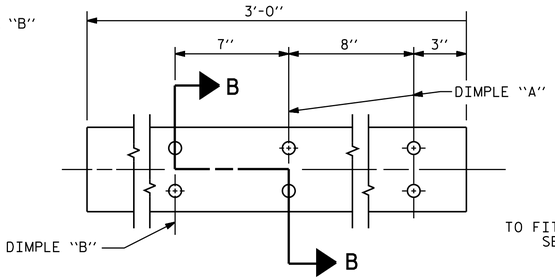
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

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.

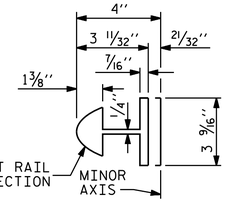
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY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



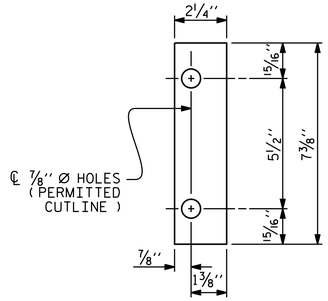
SECTION B - B



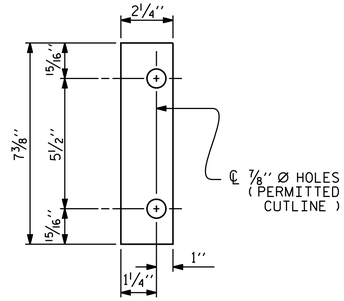
EXPANSION BAR DETAILS



BAR SECTION



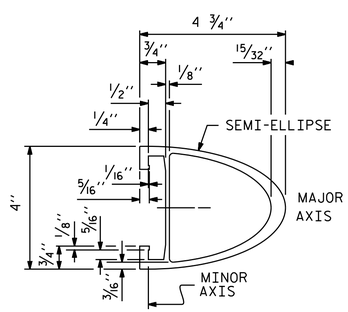
FRONT PLATE



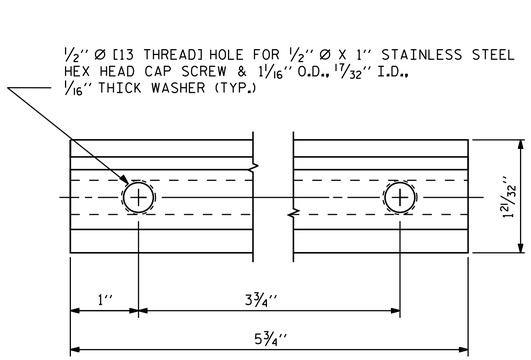
REAR PLATE

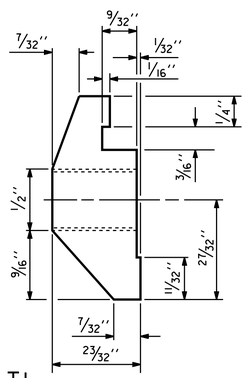
SHIM DETAILS

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



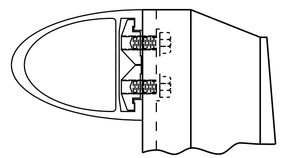
RAIL SECTION



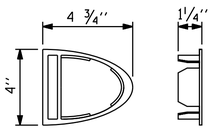


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 2 OF 2

ASSEMBLED BY : JLA	DATE : 4/19
CHECKED BY : MGC	DATE : 5/19
DRAWN BY : EEM 6/94	REV. 5/1/06R KMM/GM
CHECKED BY : RGW 6/94	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
DocuSigned by: 6BCC2F3AADC413...
7/30/2019

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TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

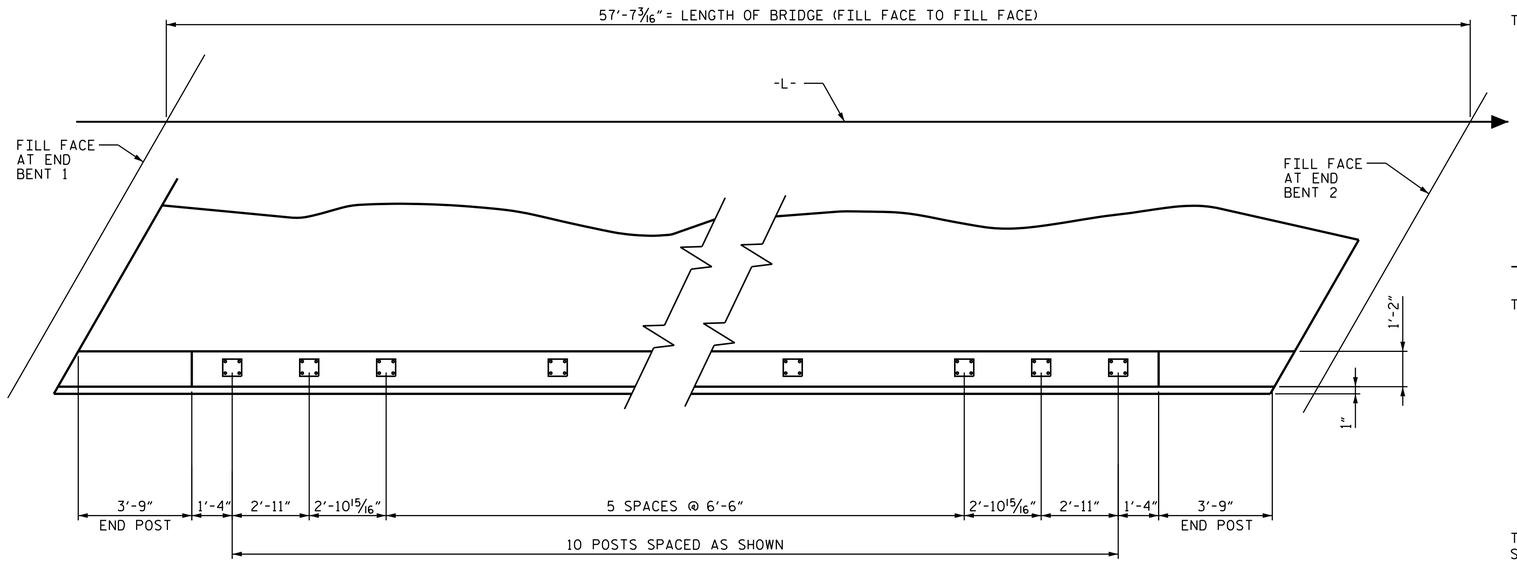
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

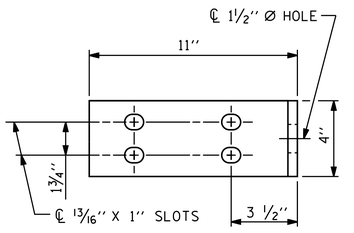
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			38

STD. NO. BMR4

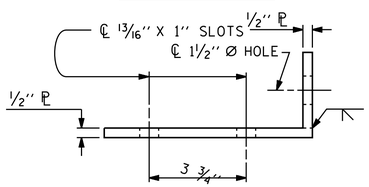


PLAN OF RAIL POST SPACINGS

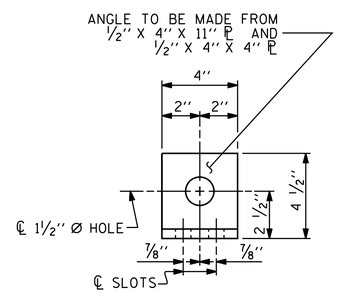
RIGHT SIDE SHOWN; LEFT SIDE SIMILAR.



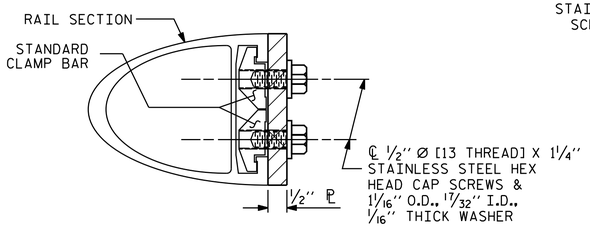
ELEVATION



TOP VIEW

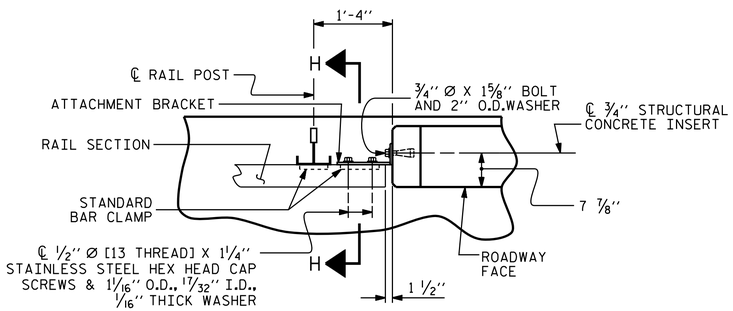


END VIEW (FIX AND EXP.)



SECTION H-H (FIX)

FIXED



PLAN - RAIL AND END POST

NOTES

STRUCTURAL CONCRETE INSERT

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 1/2".

B. 1 - 3/4" Ø X 1 5/8" 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 5/8" 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.)

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.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. 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 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4"Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.

C. 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.

D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

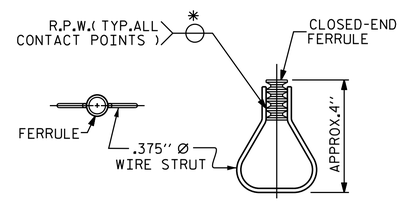
E. 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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 5/8" 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 5/8" BOLT SHALL APPLY TO THE 3/4"Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CREEK, JR. ENGINEER
DocuSigned by: 5BCC2F3A40C413...
7/30/2019

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SHELBY, NC 28150
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CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

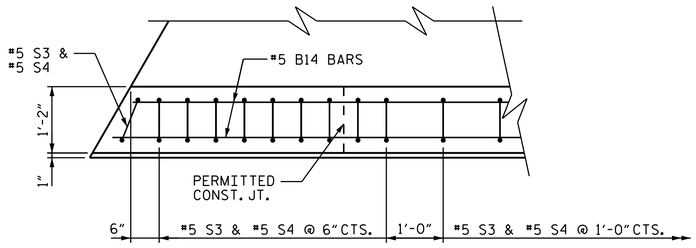
RAIL POST SPACINGS AND END OF RAIL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			38

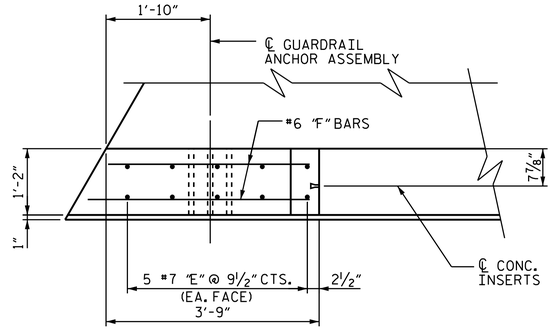
ASSEMBLED BY : NMW	DATE : 4/19	
CHECKED BY : MGC	DATE : 5/19	
DRAWN BY : FCJ 1/88	REV. 5/1/06	TLA/GM
CHECKED BY : CRK 3/89	REV. 10/1/11	MAA/GM
	REV. 12/17	MAA/THC

DETAILS FOR ATTACHING METAL RAIL TO END POST

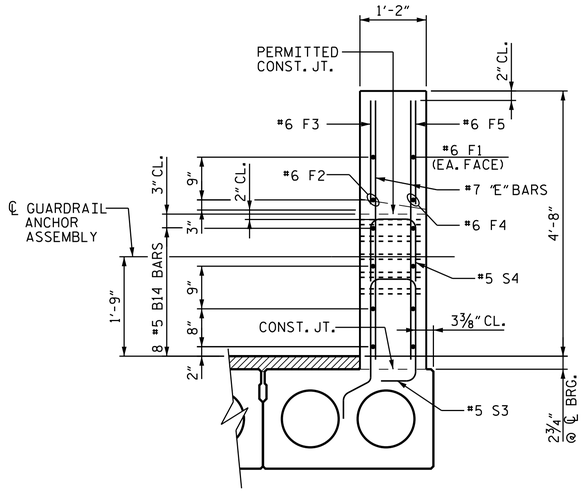
STD. NO. BMR2



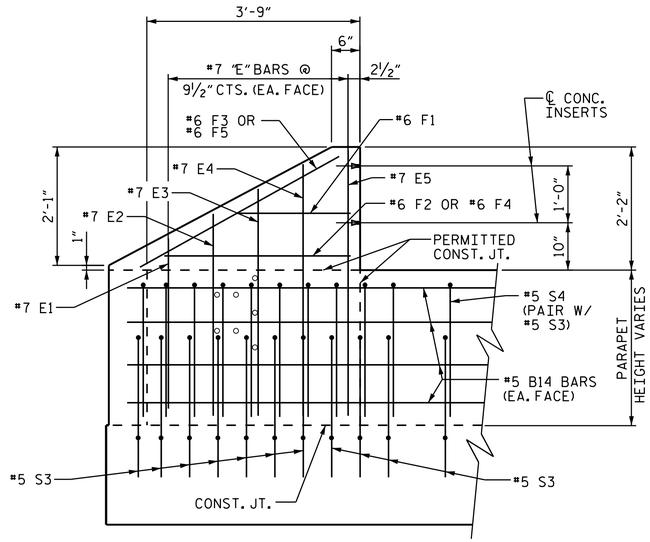
PLAN OF PARAPET



PLAN OF END POST



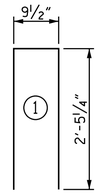
END VIEW



ELEVATION

1'-2" x 2'-8¾" CONCRETE PARAPET AND END POST

BAR TYPES



BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL FOR PARAPETS & FOUR END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B14	64	#5	STR.	15'-7"	1,040
✱E1	8	#7	STR.	2'-11"	48
✱E2	8	#7	STR.	3'-5"	56
✱E3	8	#7	STR.	3'-10"	63
✱E4	8	#7	STR.	4'-4"	71
✱E5	8	#7	STR.	4'-8"	76
✱F1	8	#6	STR.	1'-11"	23
✱F2	4	#6	STR.	3'-1"	19
✱F3	4	#6	STR.	3'-8"	22
✱F4	4	#6	STR.	3'-6"	21
✱F5	4	#6	STR.	4'-0"	24
✱S4	128	#5	1	5'-8"	757
✱EPOXY COATED REINFORCING STEEL					2,220 LBS.
CLASS "AA" CONCRETE					13.6 C.Y.
1'-2" x 2'-8¾" CONCRETE PARAPET					110.00 L.F.

NOTES:

QUANTITIES FOR THE #5 S3 BARS ARE INCLUDED WITH THE CORED SLAB BILL OF MATERIAL.

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CREEK, JR. ENGINEER
DocuSigned by: 5BCC2F3A40C413...
7/30/2019

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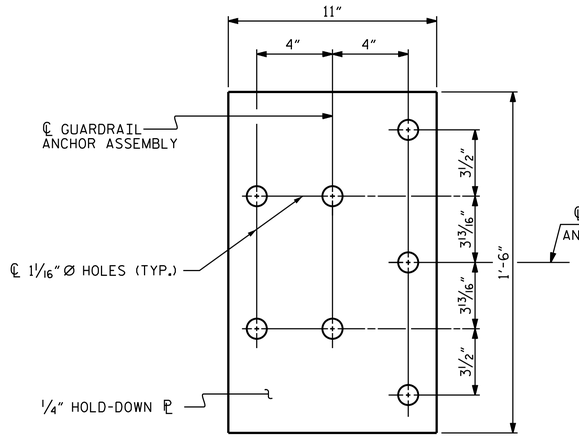
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

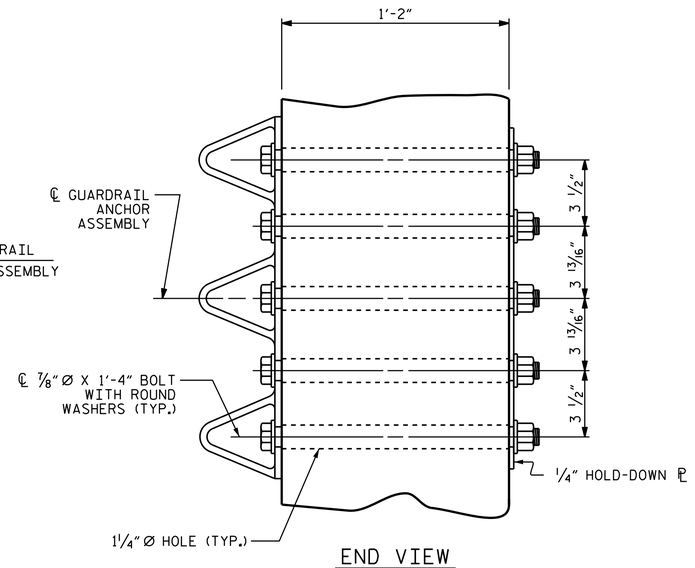
1'-2" x 2'-8¾" CONCRETE PARAPET AND END POST DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	4/19
CHECKED BY :	MGC	DATE :	5/19



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

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.

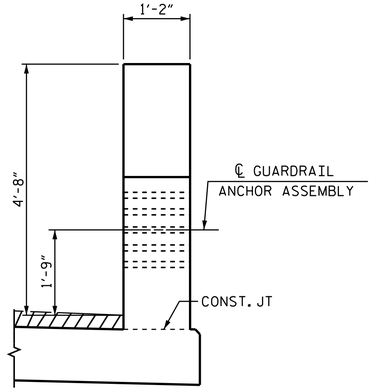
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

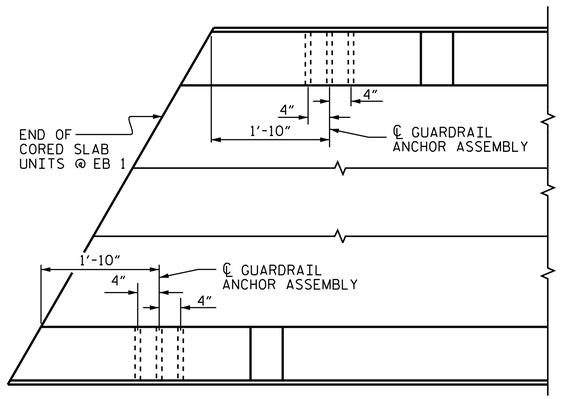
THE 1 1/4'' Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



END VIEW
(TWO BAR METAL RAIL)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
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DEPARTMENT OF TRANSPORTATION
RALEIGH

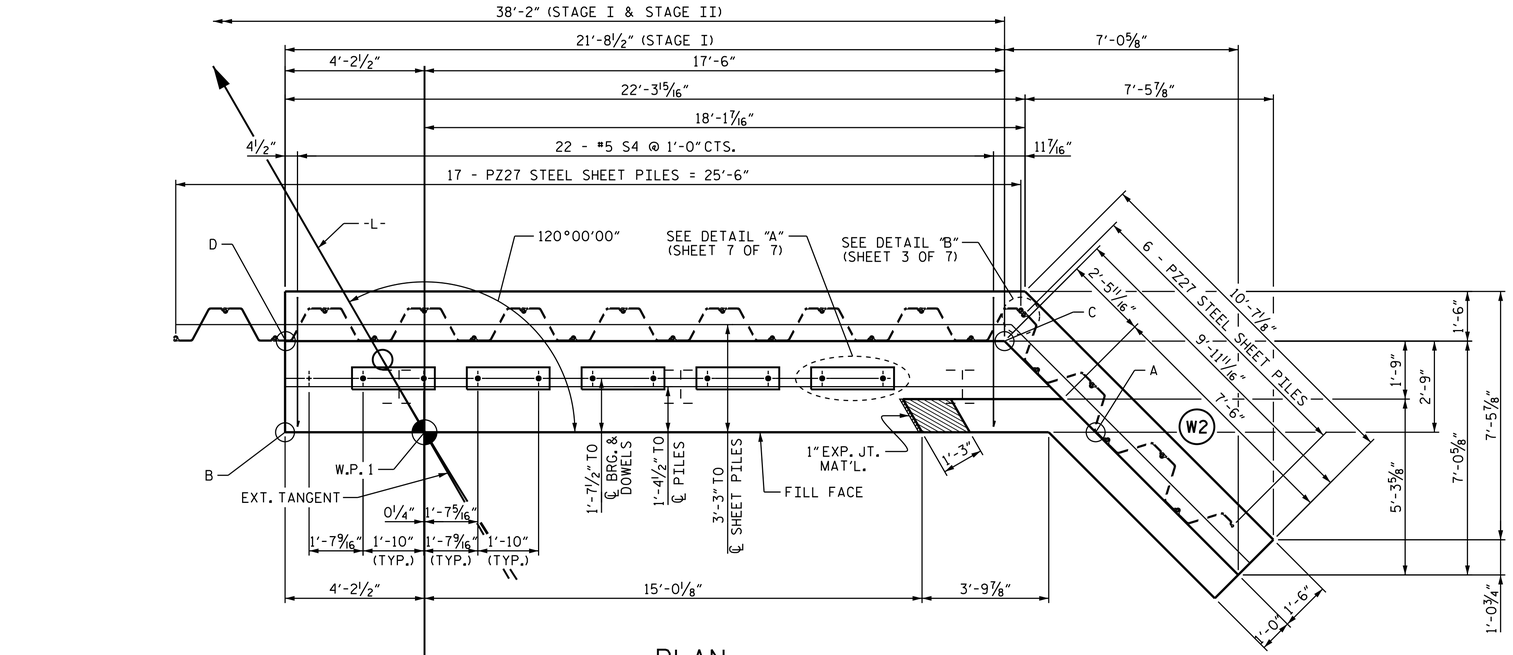
STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			38

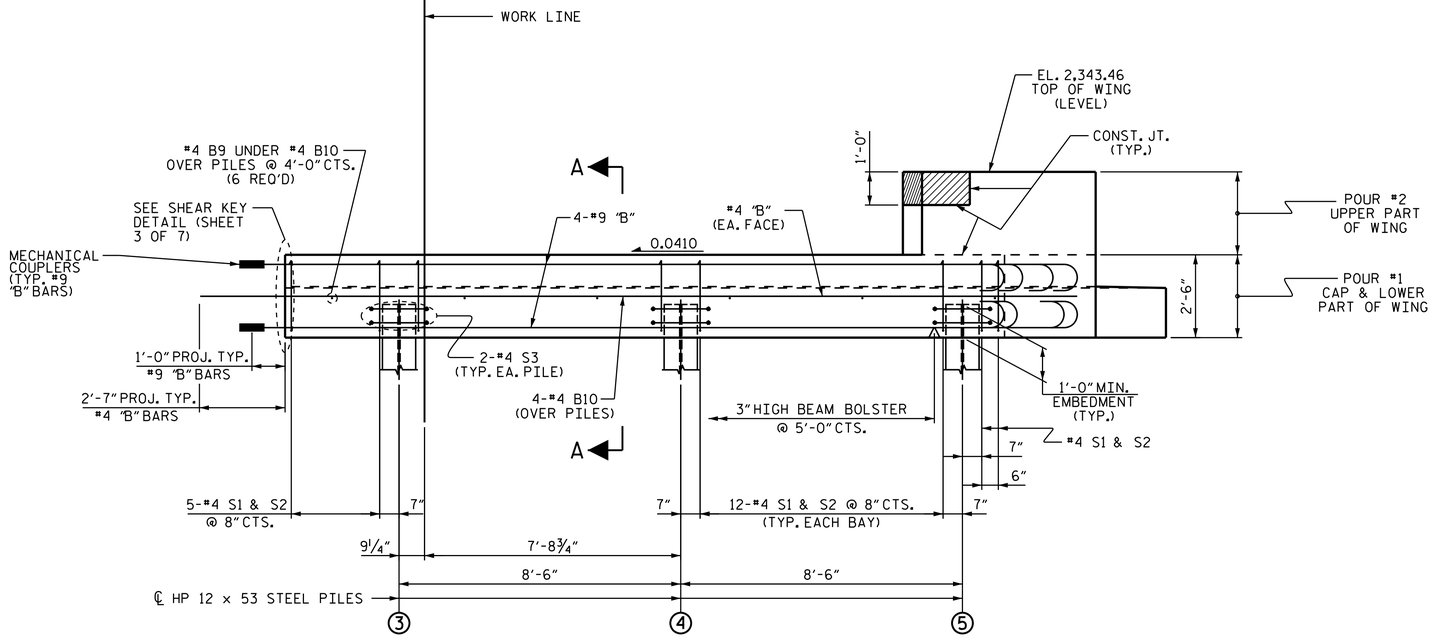
ASSEMBLED BY : JLA		DATE : 4/19	
CHECKED BY : MGC		DATE : 5/19	
DRAWN BY : MAA 5/10	REV. 1/15		MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17		MAA/THC
	REV. 5/18		MAA/THC

STD. NO. GRA3



PLAN

NOTE TO CONTRACTOR: W.P. #1 IS LOCATED ON THE TANGENT EXTENDED FROM THE PT AT STATION 12+73.73 -L-



ELEVATION

WING & SHEET PILES NOT SHOWN FOR CLARITY. FOR SECTION A-A, SEE SHEET 7 OF 7.

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 7 OF 7.

FOR WING DETAILS, SEE STAGE I WING DETAILS SHEET 5 OF 7.

TOP OF PILE ELEVATIONS	
③	2,338.56
④	2,338.91
⑤	2,339.26

CAP ELEVATIONS		
POINTS	TOP OF CAP	BOTTOM OF CAP
A	2,340.96	2,338.46
B	2,339.96	2,337.46
C	2,340.79	2,338.29
D	2,339.90	2,337.40

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 1 OF 7

DRAWN BY :	JLA	DATE :	5/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19

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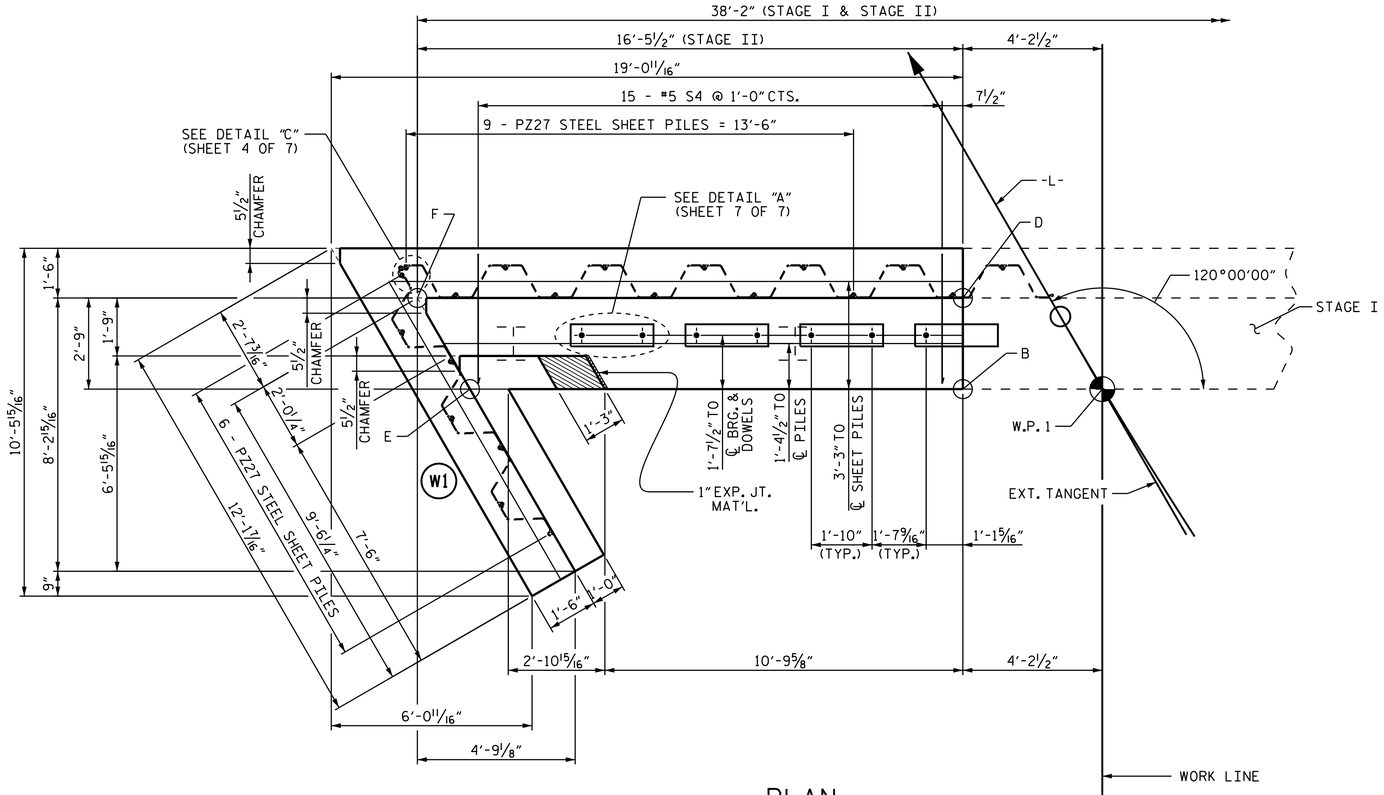
RALEIGH

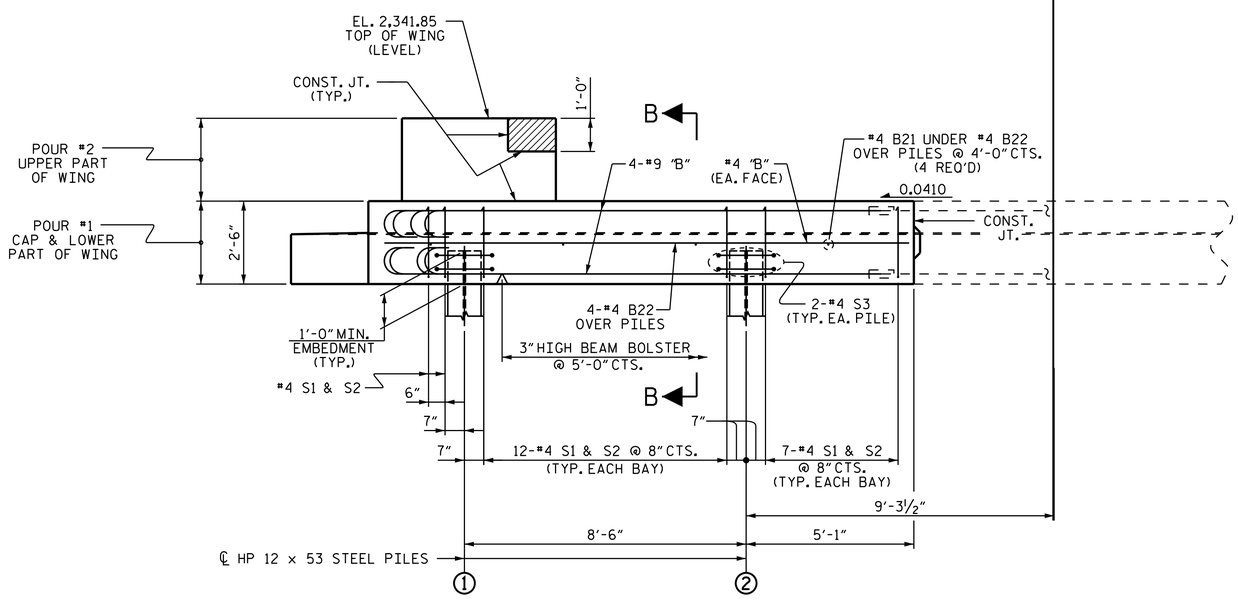
END BENT 1 STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			38



PLAN

NOTE TO CONTRACTOR: W.P. #1 IS LOCATED ON THE TANGENT EXTENDED FROM THE PT AT STATION 12+73.73 -L-



ELEVATION

WING & SHEET PILES NOT SHOWN FOR CLARITY.
FOR SECTION B-B, SEE SHEET 7 OF 7.

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 7 OF 7.

FOR WING DETAILS, SEE STAGE II WING DETAILS, SHEET 6 OF 7.

TOP OF PILE ELEVATIONS	
①	2,337.86
②	2,338.21

CAP ELEVATIONS		
POINTS	TOP OF CAP	BOTTOM OF CAP
B	2,339.96	2,337.46
D	2,339.90	2,337.40
E	2,339.35	2,336.85
F	2,339.22	2,336.72

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 2 OF 7

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
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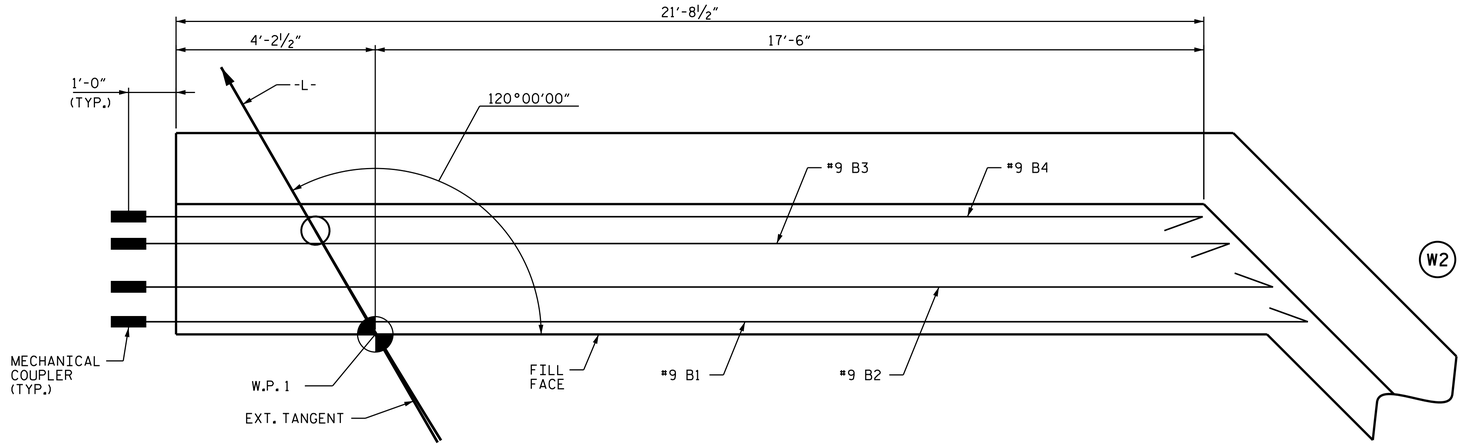
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

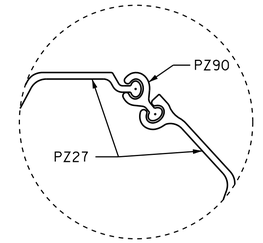
END BENT 1 STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			38

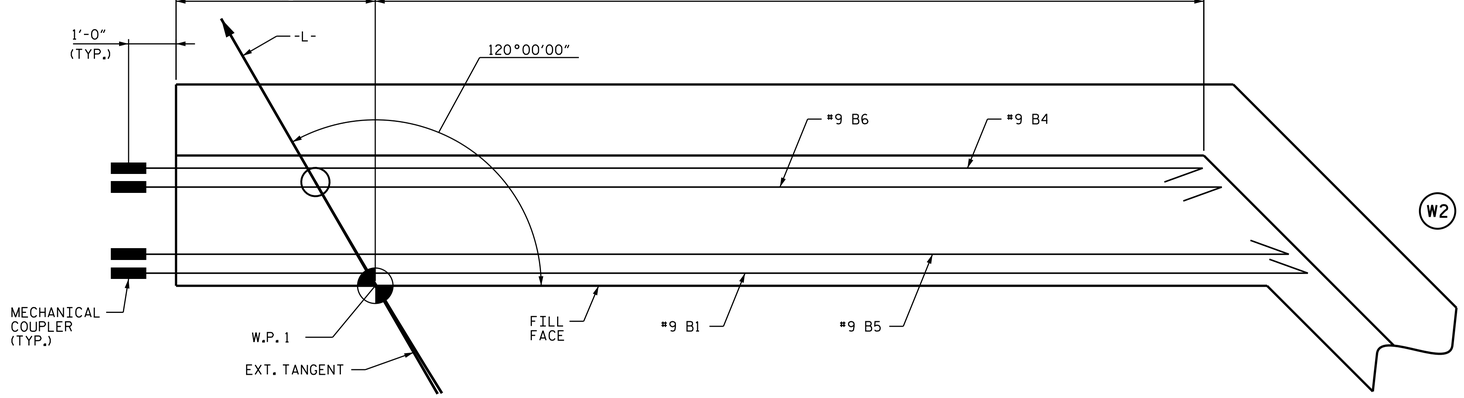
DRAWN BY :	JLA	DATE :	5/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19



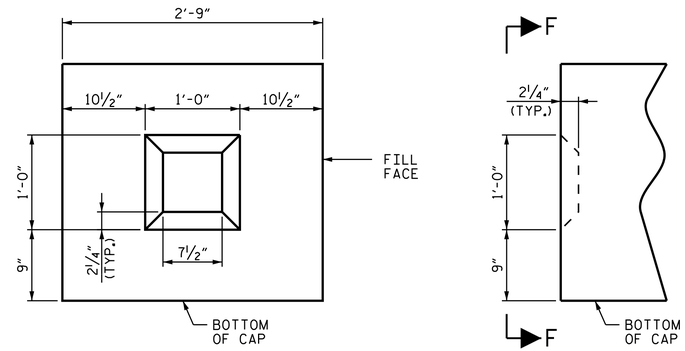
#9 "B" BARS - TOP OF CAP STAGE I



DETAIL "B"



#9 "B" BARS - BOTTOM OF CAP STAGE I



SECTION F-F

SHEAR KEY DETAIL

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 3 OF 7

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
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7/30/2019

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TGS ENGINEERS
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SHELBY, NC 28150
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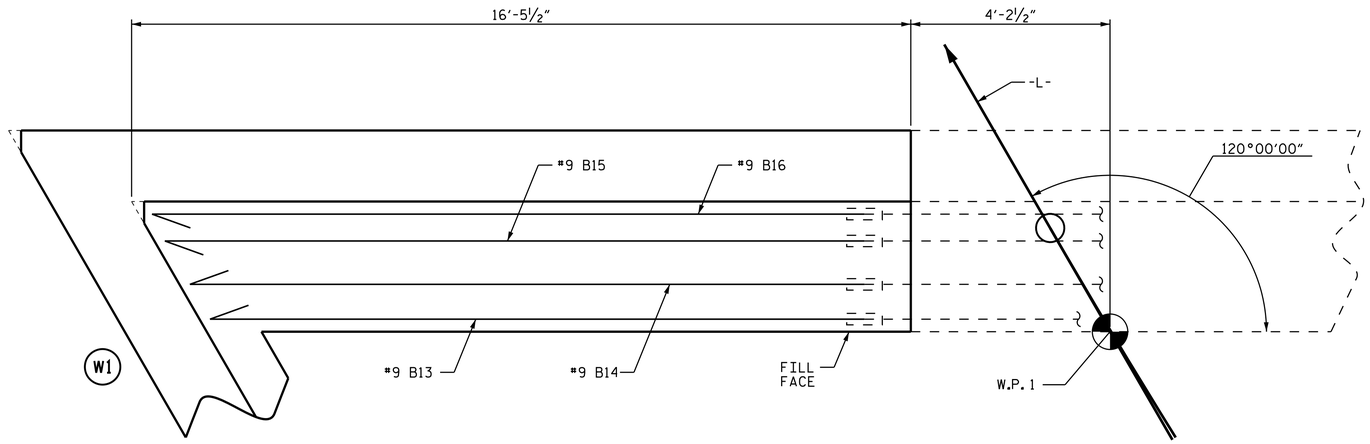
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

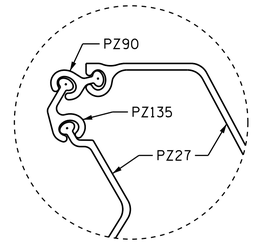
END BENT 1 STAGE I DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	5/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19



#9 "B" BARS - TOP OF CAP STAGE II



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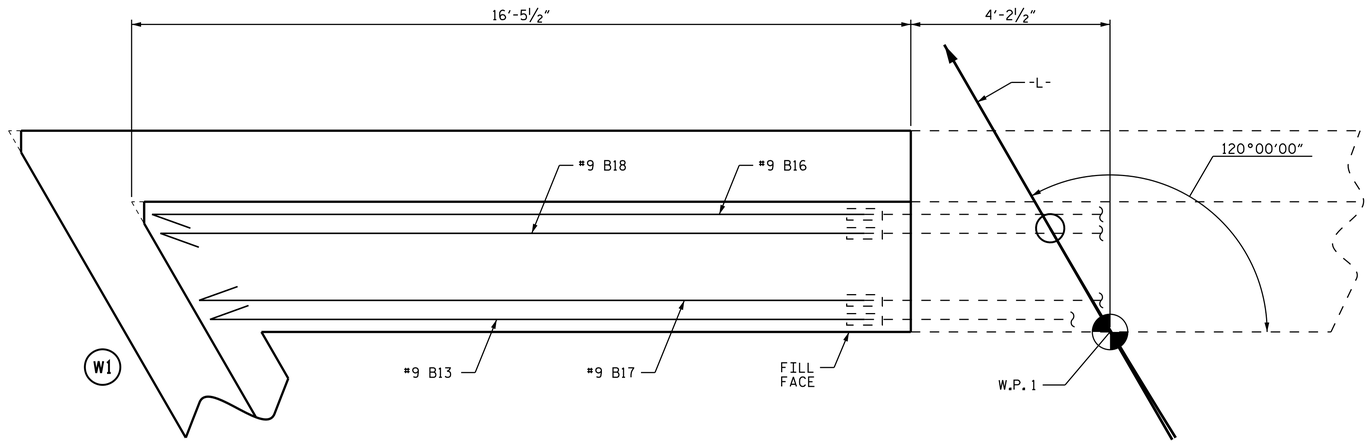

#9 "B" BARS - BOTTOM OF CAP STAGE II

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 4 OF 7

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
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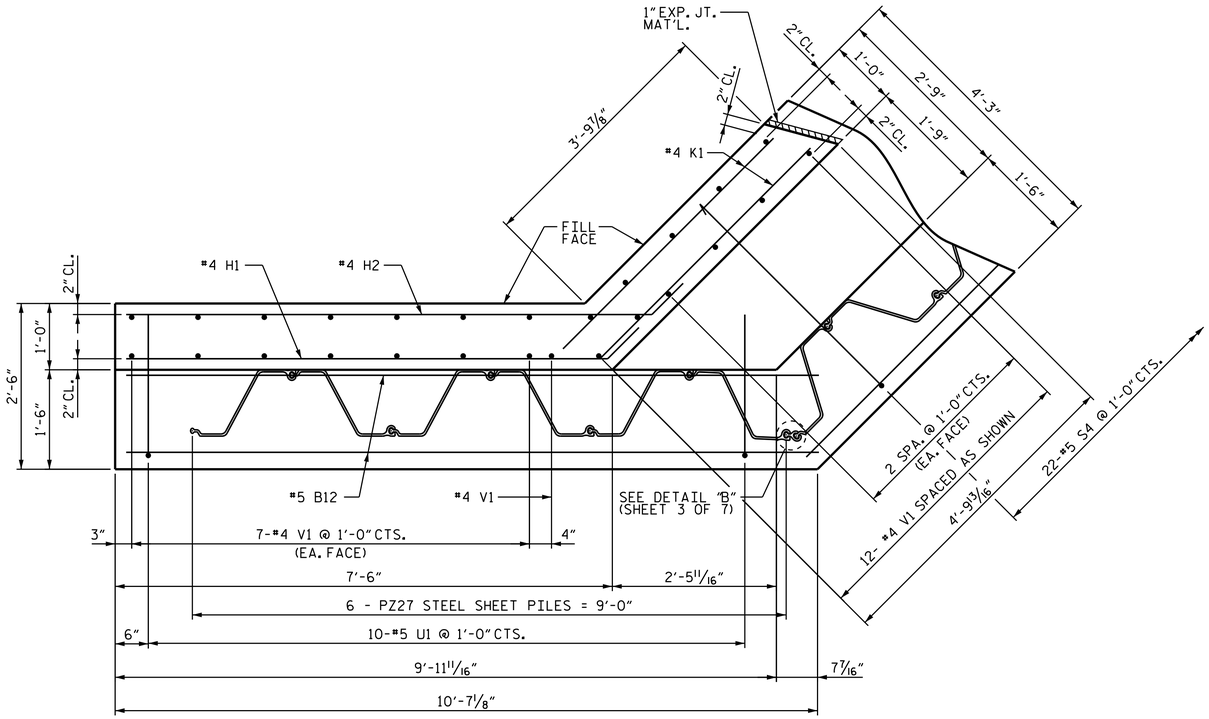
DEPARTMENT OF TRANSPORTATION
RALEIGH

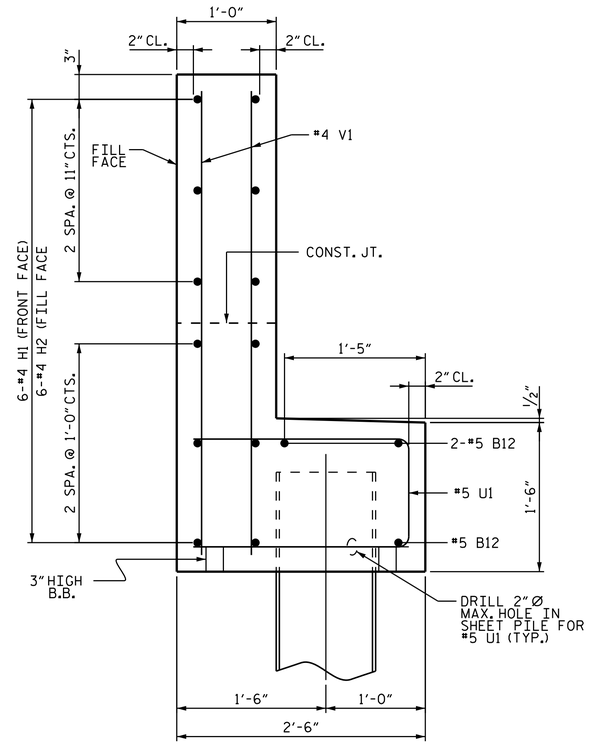
END BENT 1 STAGE II DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			38

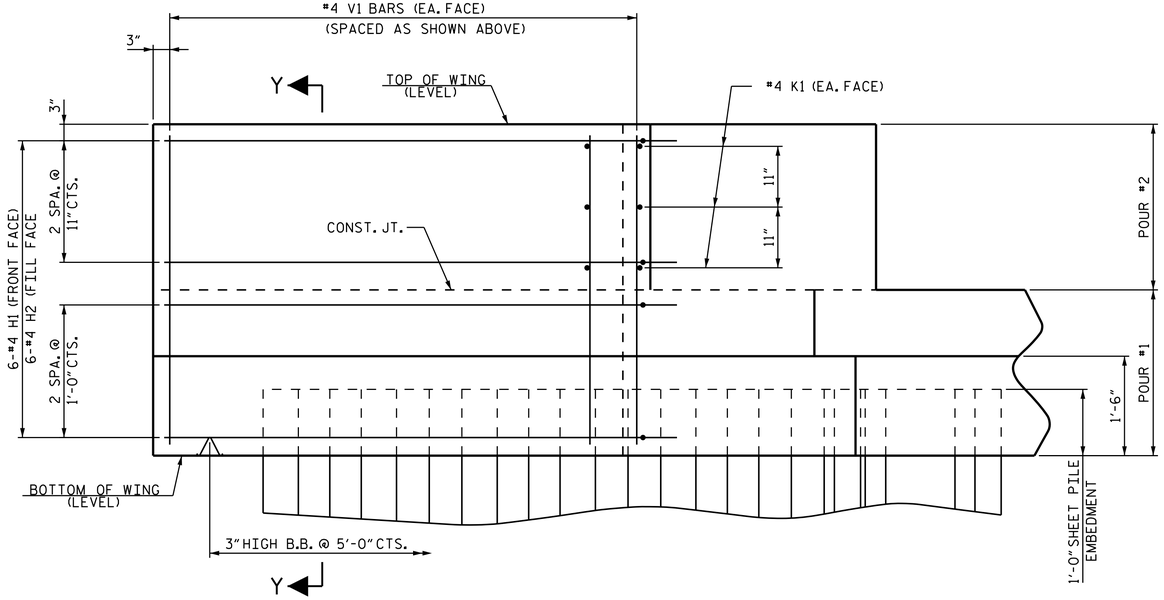
DRAWN BY :	JLA	DATE :	5/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19



PLAN OF WING (W2)



SECTION Y-Y



ELEVATION OF WING (W2)

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 5 OF 7

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER Sr.
7/30/2019

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DEPARTMENT OF TRANSPORTATION
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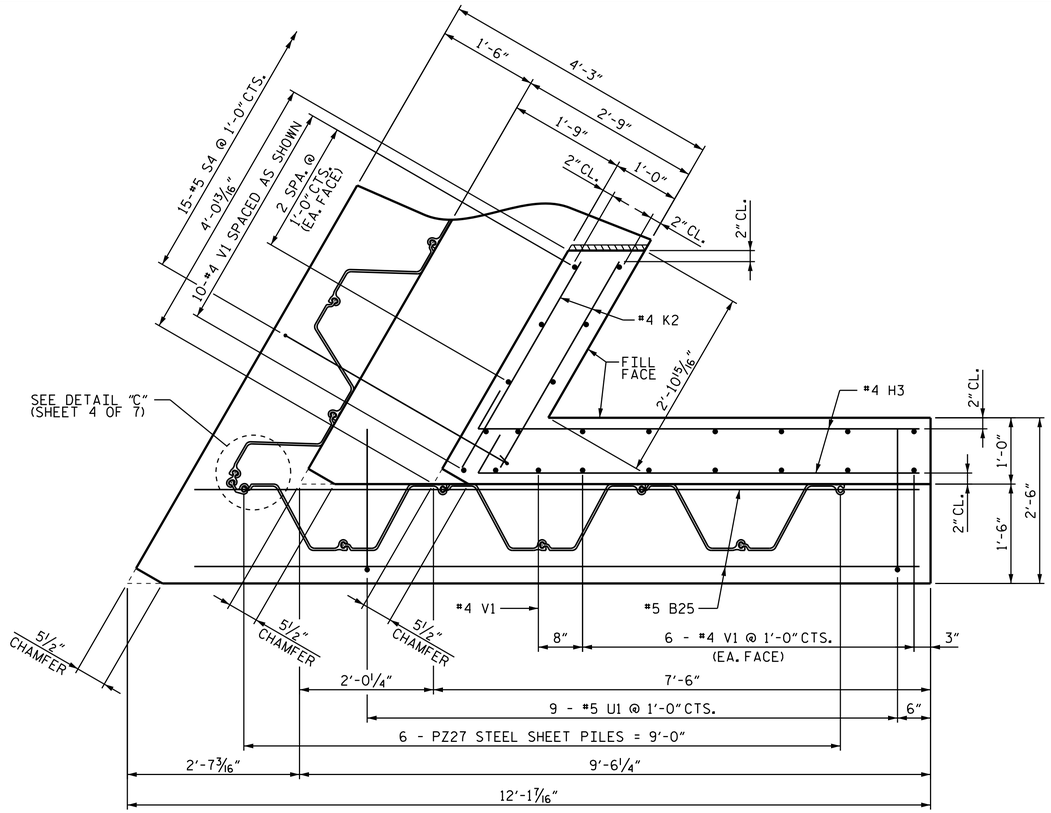
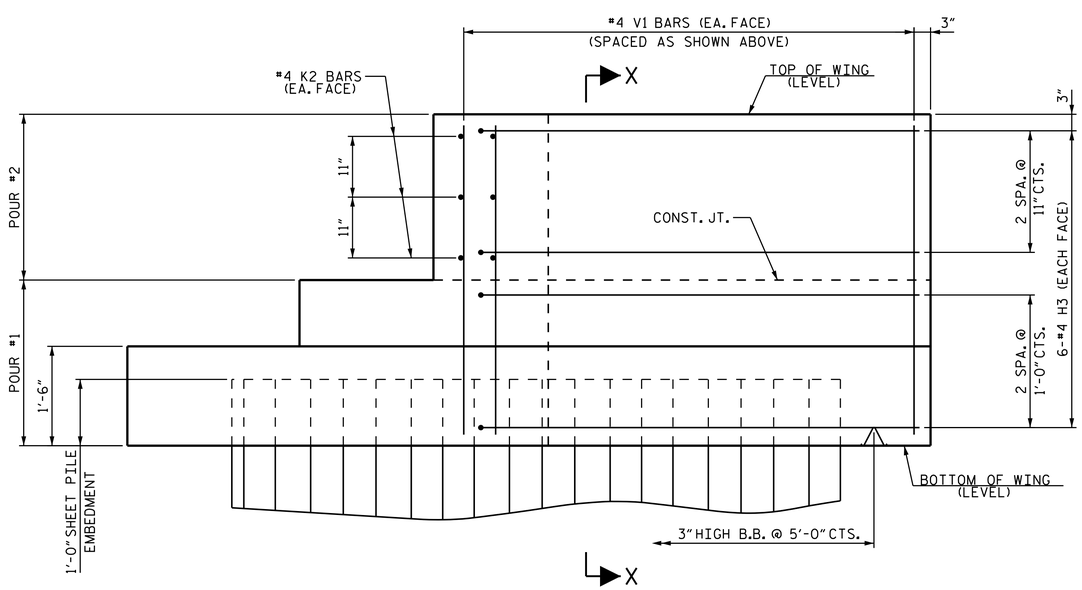
END BENT 1 STAGE I WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			38

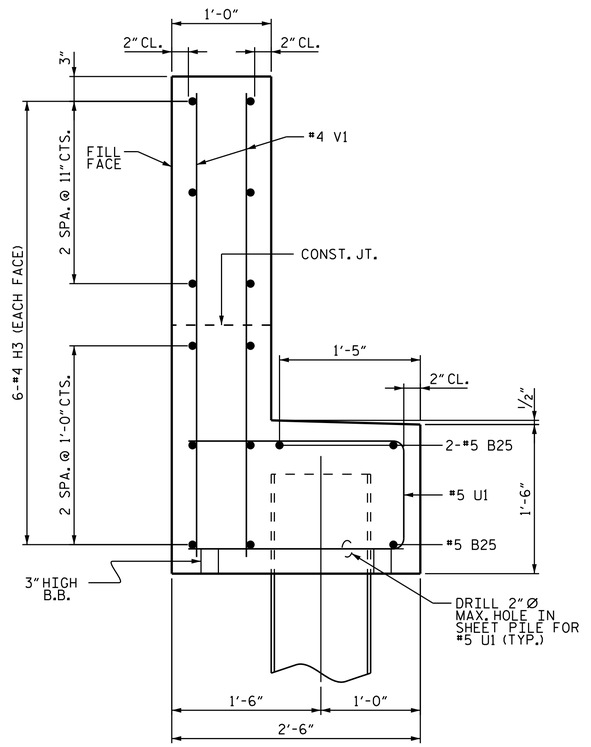
DRAWN BY :	JLA	DATE : 5/19
CHECKED BY :	MGC	DATE : 5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE : 5/19



PLAN OF WING (W1)



ELEVATION OF WING (W1)



SECTION X-X

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 6 OF 7

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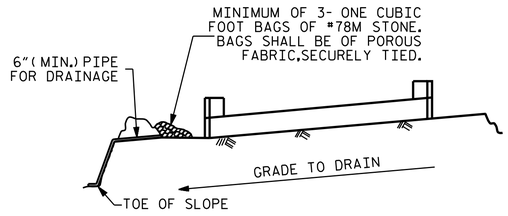
END BENT 1 STAGE II WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE : 5/19
CHECKED BY :	MGC	DATE : 5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE : 5/19

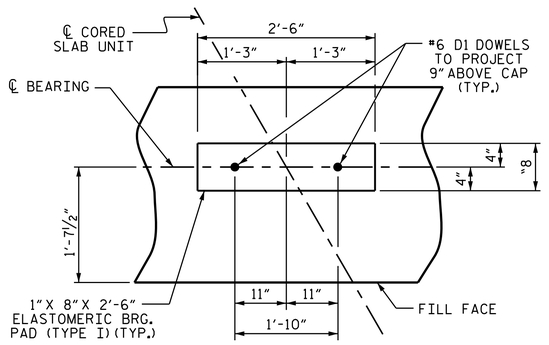


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

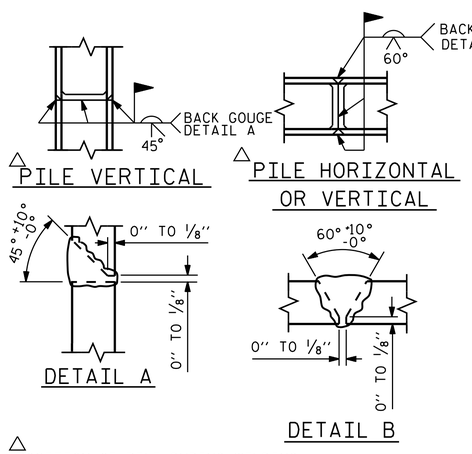
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

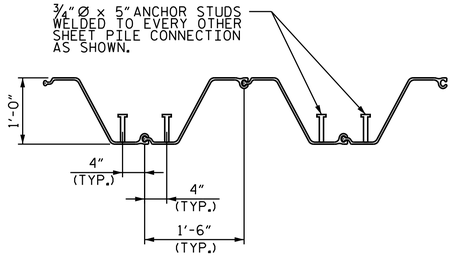


DETAIL "A"



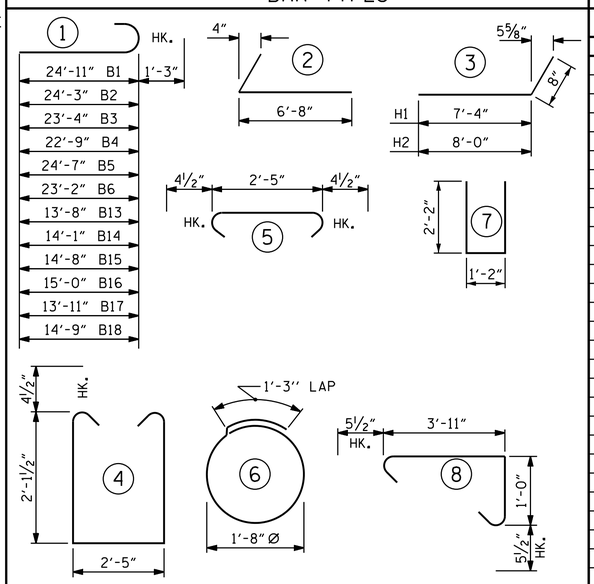
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



ANCHOR STUD DETAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

TOTAL QUANTITIES

REINFORCING STEEL	2,588 LBS.
CLASS A CONCRETE	18.3 C.Y.
HP 12x53 STEEL PILES	LIN. FT. 75
PILE DRIVING EQUIPMENT SET UP FOR HP 12x53 STEEL PILES	No: 5
STEEL SHEET PILES	770 SQ. FT.

BILL OF MATERIAL

END BENT 1 STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	2	#9	1	26'-2"	178
B2	1	#9	1	25'-6"	87
B3	1	#9	1	24'-7"	84
B4	2	#9	1	24'-0"	163
B5	1	#9	1	25'-10"	88
B6	1	#9	1	24'-5"	83
B7	1	#4	STR	26'-9"	18
B8	1	#4	STR	24'-3"	16
B9	6	#4	STR	2'-5"	10
B10	4	#4	STR	25'-11"	69
B11	3	#5	STR	25'-6"	80
B12	3	#5	STR	10'-5"	33
D1	11	#6	STR	1'-6"	25
H1	6	#4	3	8'-0"	32
H2	6	#4	3	8'-8"	35
K1	6	#4	STR	4'-6"	18
S1	31	#4	3	7'-5"	154
S2	31	#4	4	3'-2"	66
S3	6	#4	6	6'-6"	26
S4	22	#5	8	5'-10"	134
U1	10	#5	7	5'-6"	57
V1	27	#4	STR	4'-8"	84

REINFORCING STEEL 1,540 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1	CAP & LOWER PART OF WING	9.3 C.Y.
POUR #2	UPPER PART OF WING	1.1 C.Y.
TOTAL CLASS A CONCRETE		10.4 C.Y.

HP 12 X 53 STEEL PILES
NO: 3 LIN. FT.= 45

PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 3

STEEL SHEET PILES 450 SQ. FT.

END BENT 1 STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B13	2	#9	1	14'-11"	101
B14	1	#9	1	15'-4"	52
B15	1	#9	1	15'-11"	54
B16	2	#9	1	16'-3"	111
B17	1	#9	1	15'-2"	52
B18	1	#9	1	16'-0"	54
B19	1	#4	STR	14'-7"	10
B20	1	#4	STR	16'-0"	11
B21	4	#4	STR	2'-5"	6
B22	4	#4	STR	15'-0"	40
B23	1	#5	STR	17'-10"	19
B24	2	#5	STR	18'-5"	38
B25	3	#5	STR	10'-11"	34
D1	7	#6	STR	1'-6"	16
H3	12	#4	2	7'-0"	56
K2	6	#4	STR	3'-7"	14
S1	21	#4	3	7'-5"	104
S2	21	#4	4	3'-2"	44
S3	4	#4	6	6'-6"	17
S4	15	#5	8	5'-10"	91
U1	9	#5	7	5'-6"	52
V1	23	#4	STR	4'-8"	72

REINFORCING STEEL 1,048 LBS.

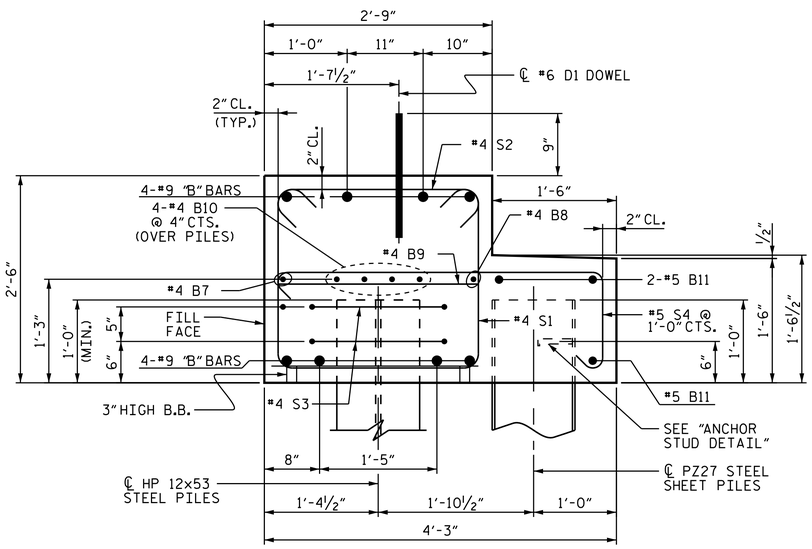
CLASS A CONCRETE BREAKDOWN

POUR #1	CAP & LOWER PART OF WING	7.0 C.Y.
POUR #2	UPPER PART OF WING	0.9 C.Y.
TOTAL CLASS A CONCRETE		7.9 C.Y.

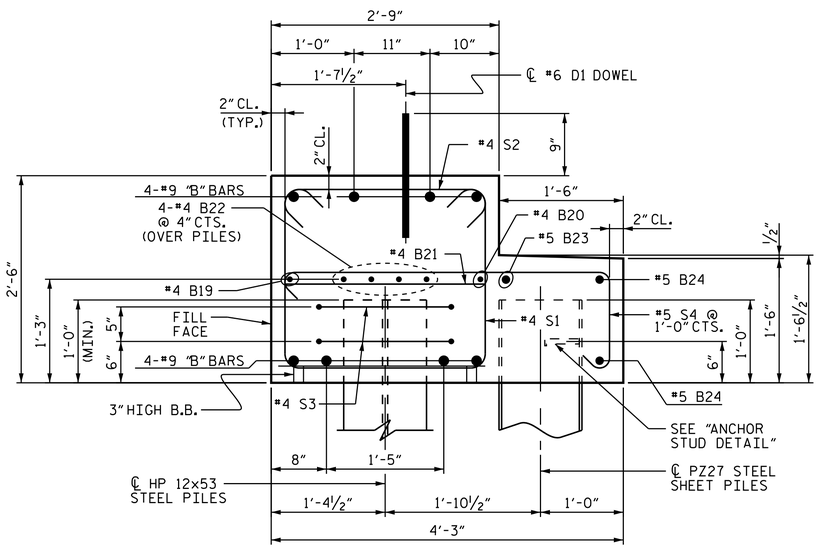
HP 12 X 53 STEEL PILES
NO: 2 LIN. FT.= 30

PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 2

STEEL SHEET PILES 320 SQ. FT.



SECTION A-A



SECTION B-B

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 7 OF 7

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
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7/30/2019

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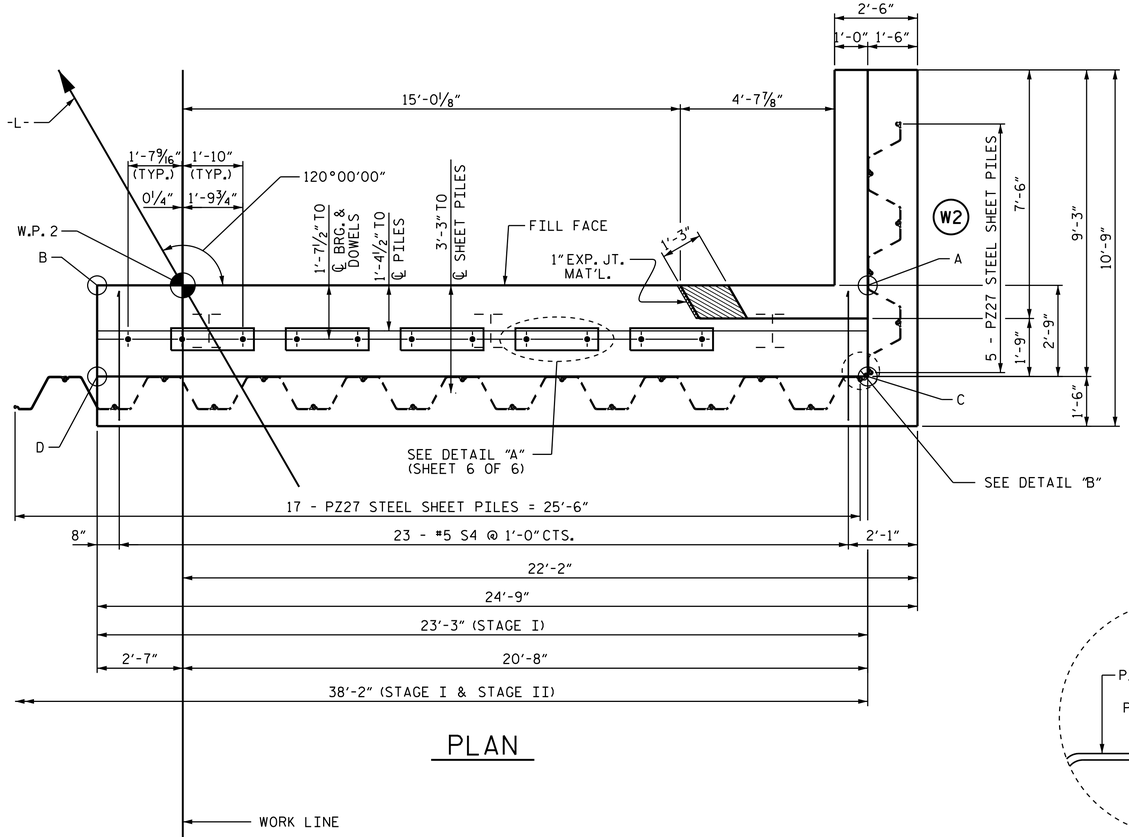
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

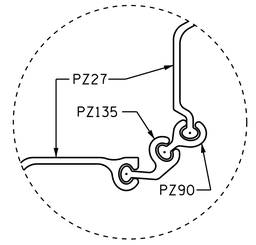
END BENT 1 STAGE I & II DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			38

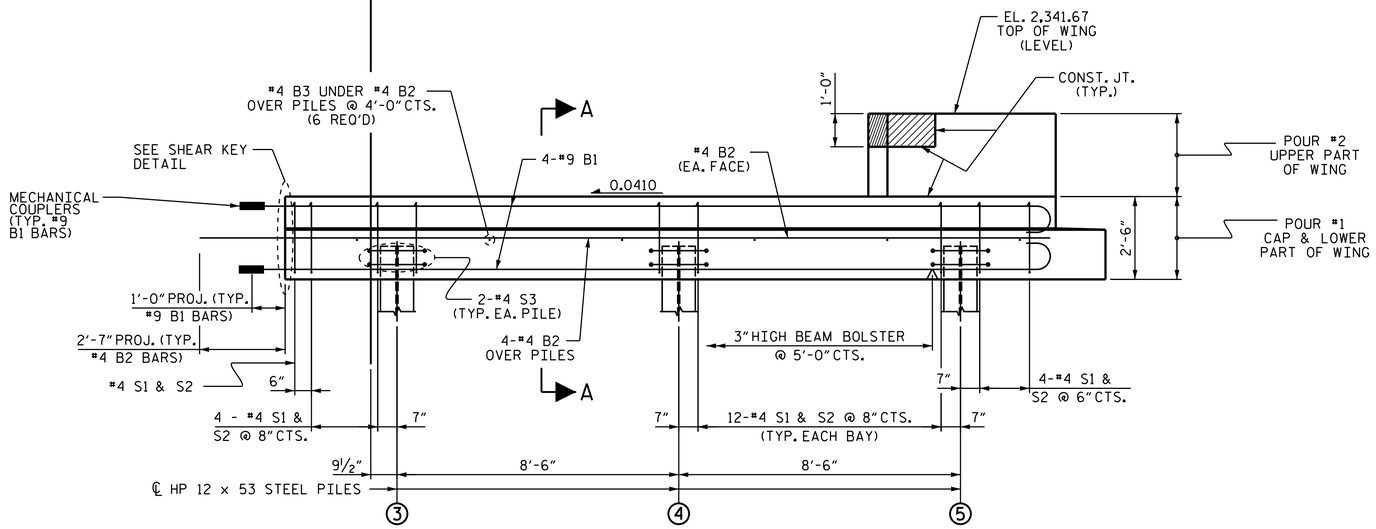
DRAWN BY :	JLA	DATE :	5/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19



PLAN



DETAIL "B"



ELEVATION

WING & SHEET PILES NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 6 OF 6.

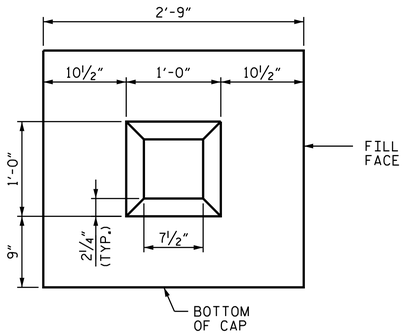
NOTES

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

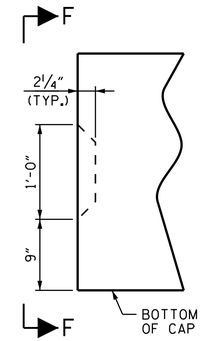
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 6 OF 6.

FOR WING DETAILS, SEE STAGE I WING DETAILS SHEET 4 OF 6.



SECTION F-F



SHEAR KEY DETAIL

TOP OF PILE ELEVATIONS	
③	2,336.94
④	2,337.29
⑤	2,337.64

CAP ELEVATIONS		
POINTS	TOP OF CAP	BOTTOM OF CAP
A	2,339.17	2,336.67
B	2,338.22	2,335.72
C	2,339.39	2,336.89
D	2,338.44	2,335.94

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 1 OF 6

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER
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DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT 2 STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	5/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD : MGC		DATE :	5/19

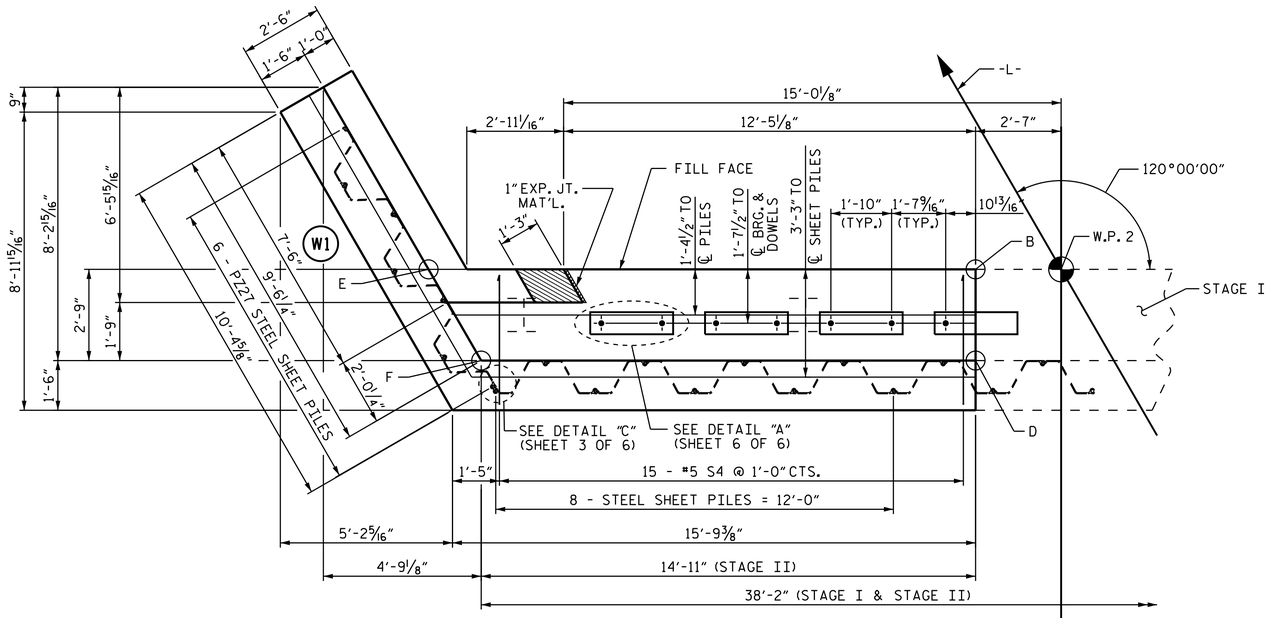
NOTES

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

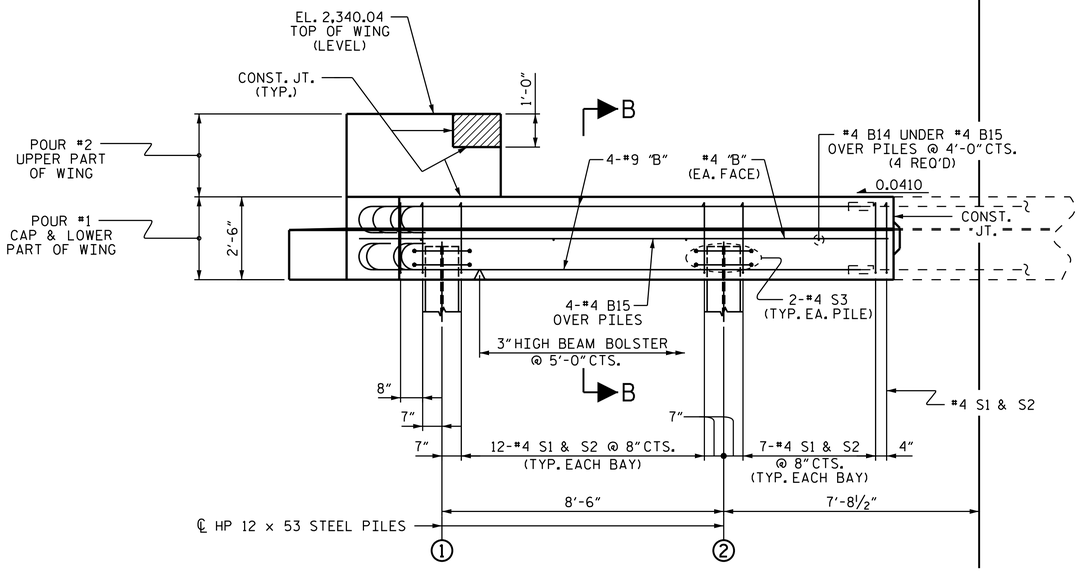
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 6 OF 6.

FOR WING DETAILS, SEE STAGE II WING DETAILS SHEET 5 OF 6.



PLAN



ELEVATION

WING & SHEET PILES NOT SHOWN FOR CLARITY.
FOR SECTION B-B, SEE SHEET 6 OF 6.

TOP OF PILE ELEVATIONS	
①	2,336.24
②	2,336.59

CAP ELEVATIONS		
POINTS	TOP OF CAP	BOTTOM OF CAP
B	2,338.22	2,335.67
D	2,338.39	2,335.89
E	2,337.54	2,335.04
F	2,337.72	2,335.22

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 2 OF 6

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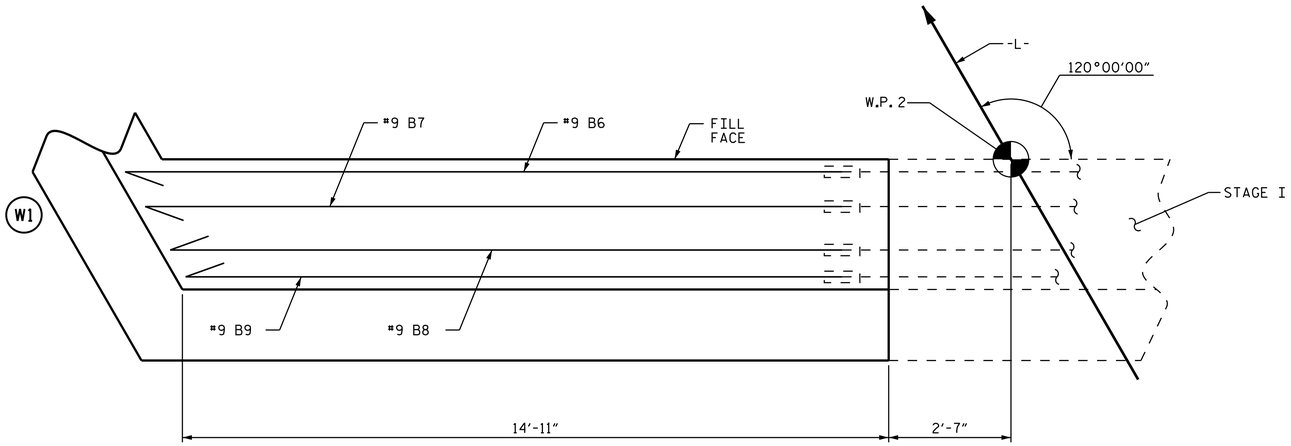
RALEIGH

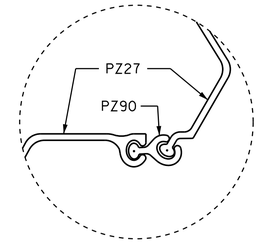
END BENT 2
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			38

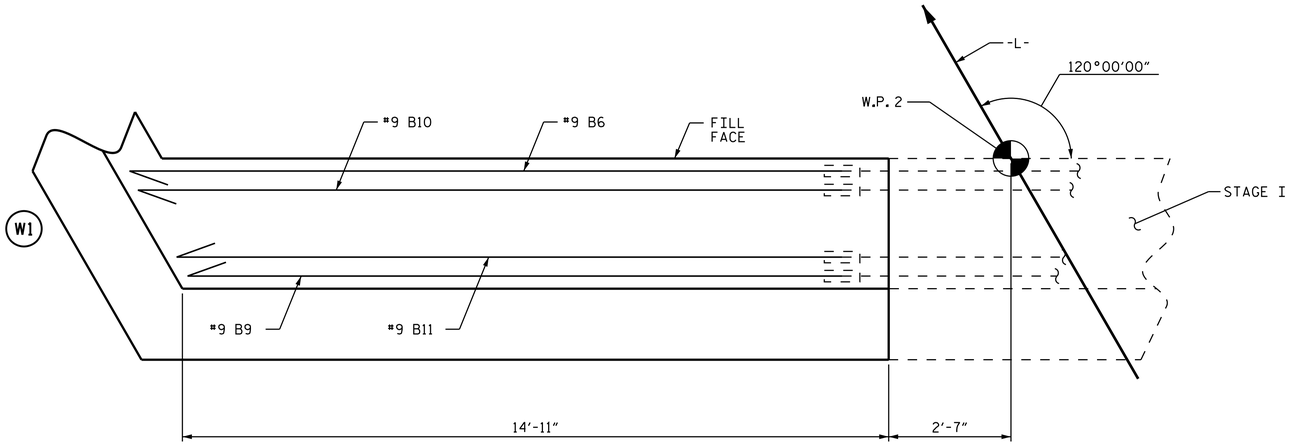
DRAWN BY :	JLA	DATE :	5/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19



#9 "B" BARS - TOP OF CAP STAGE II CONSTRUCTION



DETAIL "C"



#9 "B" BARS - BOTTOM OF CAP STAGE II CONSTRUCTION

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 3 OF 6

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
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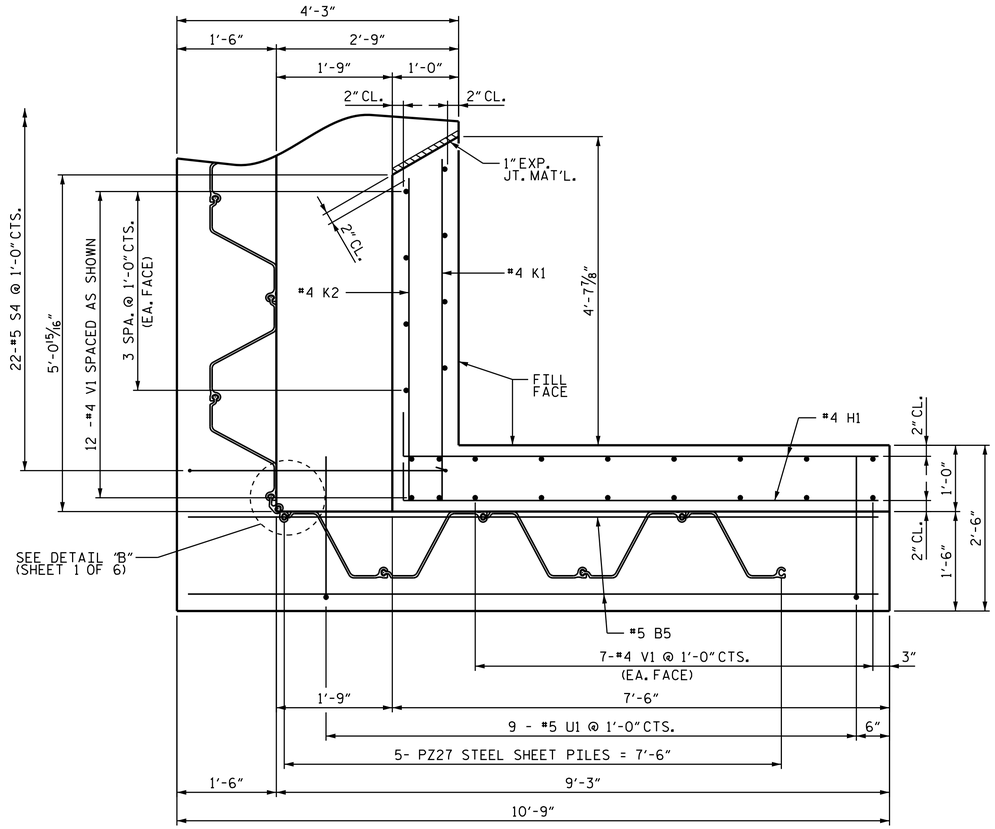
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

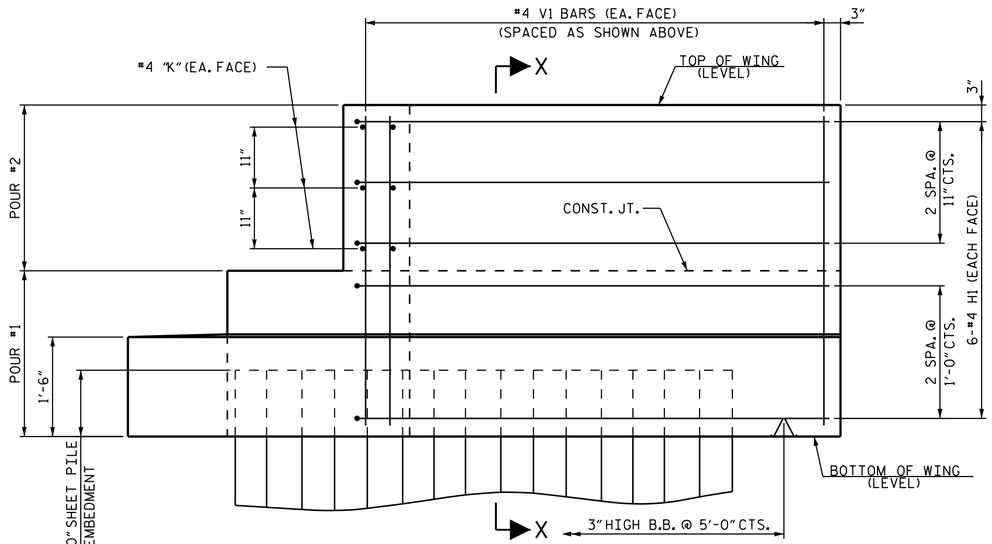
END BENT 2
STAGE II
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			38

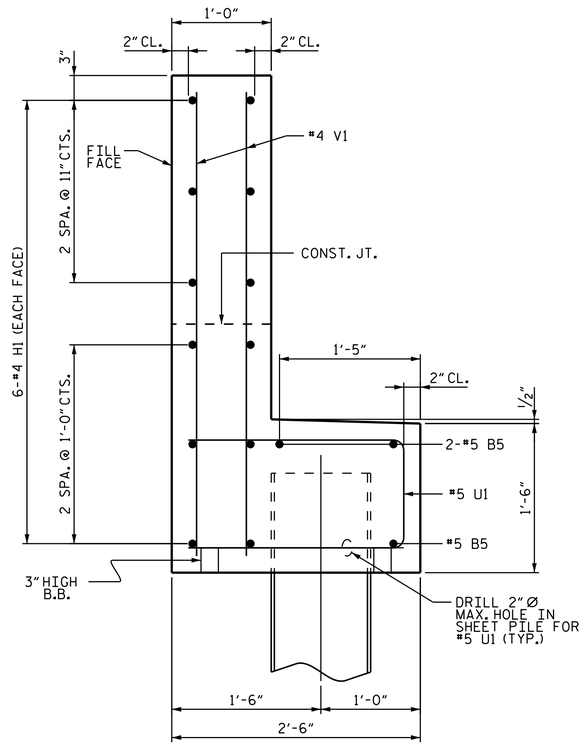
DRAWN BY :	JLA	DATE :	5/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19



PLAN OF WING (W2)



ELEVATION OF WING (W2)



SECTION X-X

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 4 OF 6

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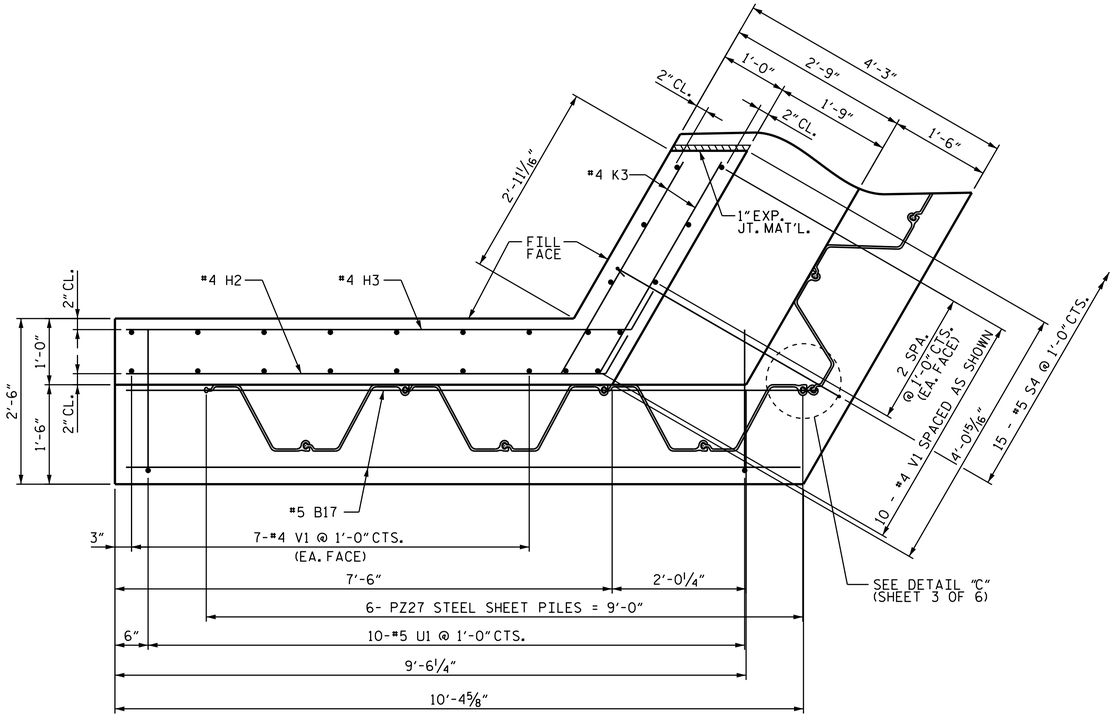
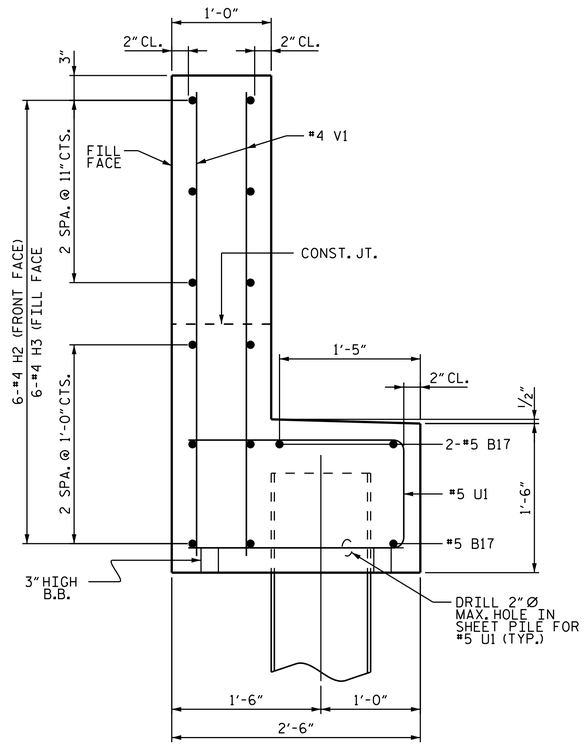
END BENT 2 STAGE I WING DETAILS

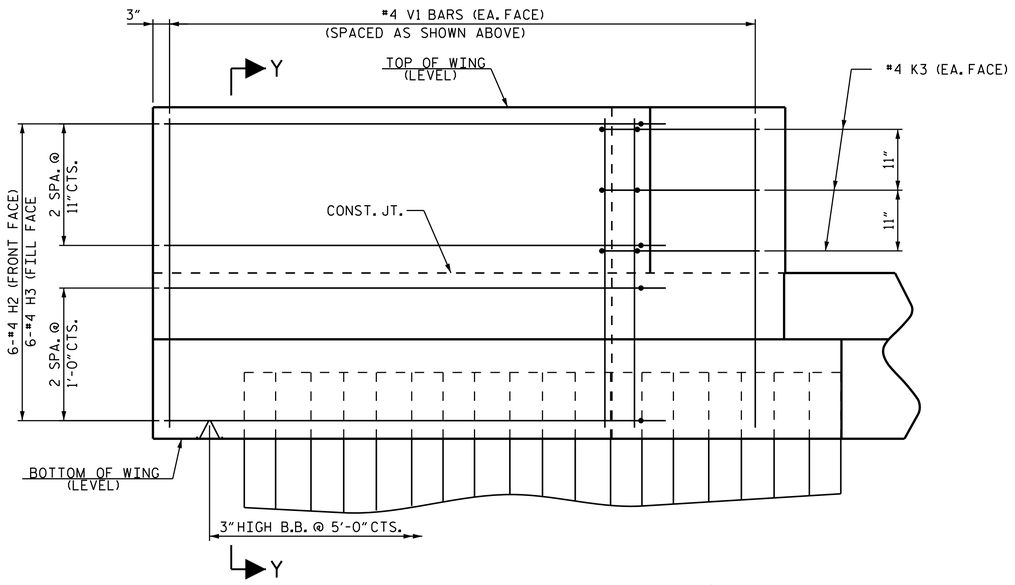
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			38



PLAN OF WING (W1)



SECTION Y-Y



ELEVATION OF WING (W1)

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 5 OF 6

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. Jr. — DocuSigned by: 19CC2F3A4DC413...

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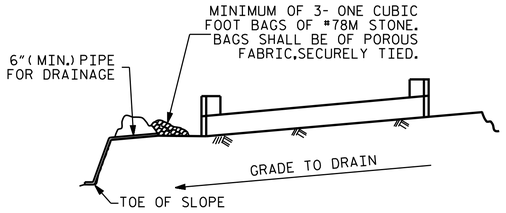
END BENT 2 STAGE II WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	5/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19

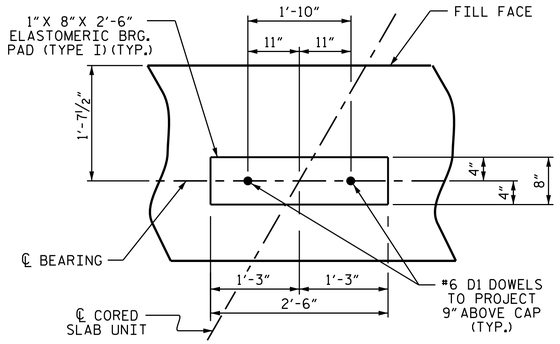


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

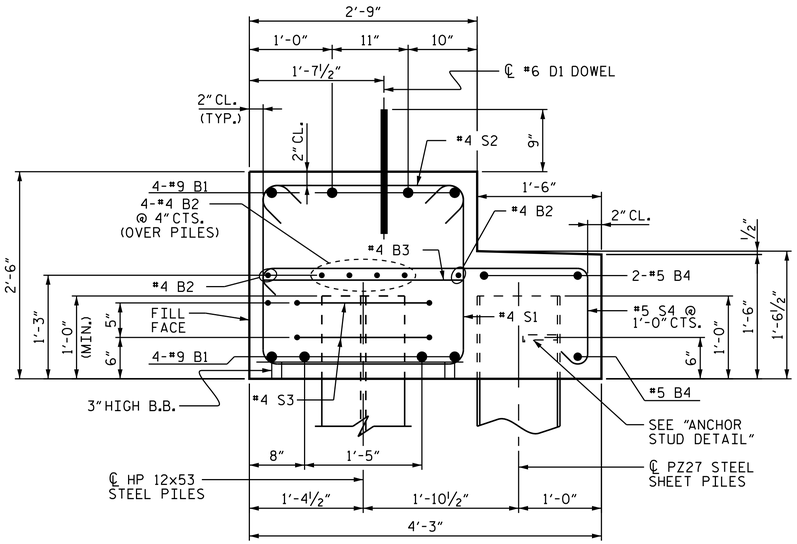
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

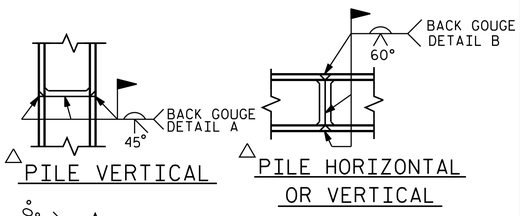
TEMPORARY DRAINAGE AT END BENT



DETAIL ''A''

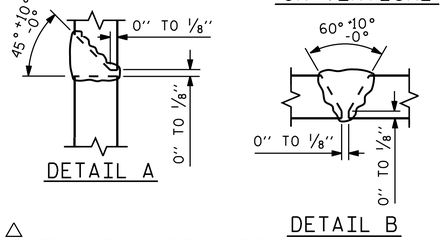


SECTION A-A



△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL

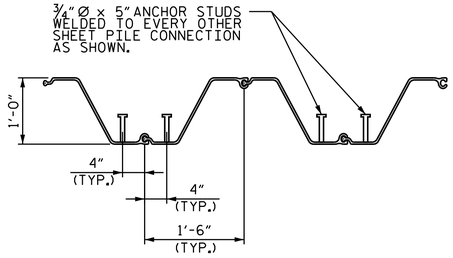


DETAIL A

DETAIL B

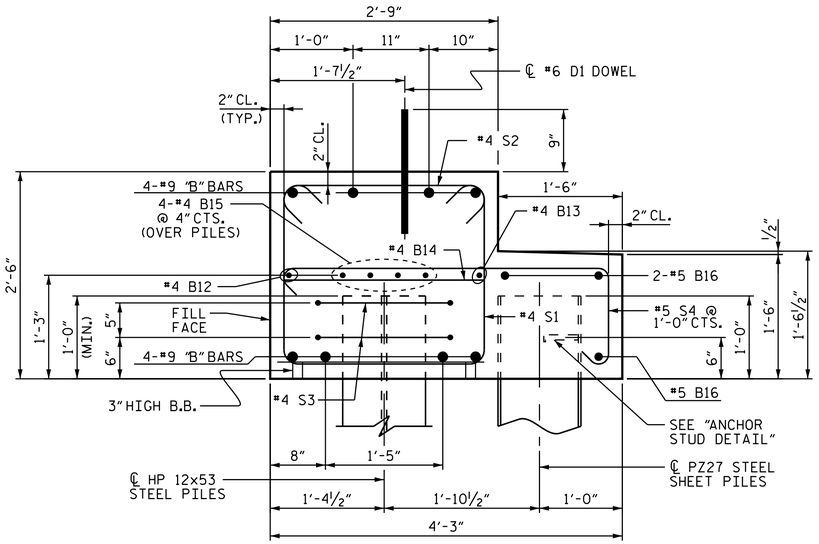
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

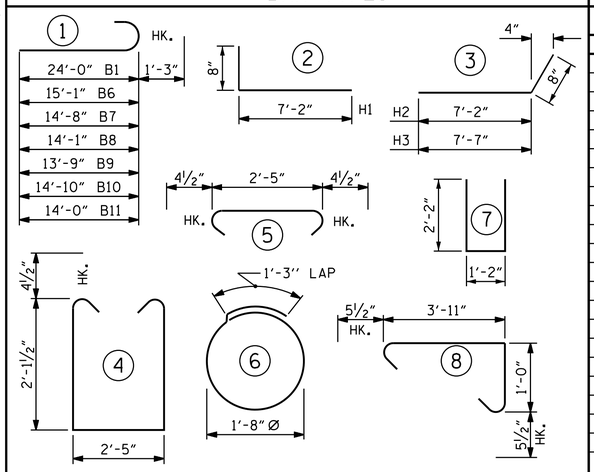


ANCHOR STUD DETAIL

SECTION B-B



BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

TOTAL QUANTITIES

REINFORCING STEEL	2,624 LBS.
CLASS A CONCRETE	18.3 C.Y.
HP 12x53 STEEL PILES	LIN. FT. 105
PILE DRIVING EQUIPMENT SET UP FOR HP 12x53 STEEL PILES	NO: 5
STEEL PILE POINTS	NO: 5
STEEL SHEET PILES	800 SQ. FT.

BILL OF MATERIAL

END BENT 2 STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	25'-3"	687
B2	6	#4	STR	25'-10"	104
B3	6	#4	STR	2'-5"	10
B4	3	#5	STR	27'-9"	87
B5	3	#5	STR	10'-5"	33
D1	11	#6	STR	1'-6"	25
H1	12	#4	2	7'-10"	63
K1	3	#4	STR	5'-2"	10
K2	3	#4	STR	4'-8"	9
S1	33	#4	4	7'-5"	163
S2	33	#4	5	3'-2"	70
S3	6	#4	6	6'-6"	26
S4	23	#5	8	5'-10"	140
U1	9	#5	7	5'-6"	52
V1	26	#4	STR	4'-8"	81

REINFORCING STEEL 1,560 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1	CAP & LOWER PART OF WING	9.4 C.Y.
POUR #2	UPPER PART OF WING	1.1 C.Y.
TOTAL CLASS A CONCRETE		10.5 C.Y.

HP 12 X 53 STEEL PILES	NO: 3 LIN. FT.= 75
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	NO: 3
STEEL PILE POINTS	NO: 3
STEEL SHEET PILES	350 SQ. FT.

END BENT 2 STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B6	2	#9	1	16'-4"	111
B7	1	#9	1	15'-11"	54
B8	1	#9	1	15'-4"	52
B9	2	#9	1	15'-0"	102
B10	1	#9	1	16'-1"	55
B11	1	#9	1	15'-3"	52
B12	1	#4	STR	16'-0"	11
B13	1	#4	STR	14'-8"	10
B14	4	#4	STR	2'-5"	6
B15	4	#4	STR	15'-0"	40
B16	3	#5	STR	15'-6"	48
B17	3	#5	STR	10'-1"	32
D1	7	#6	STR	1'-6"	16
H2	6	#4	3	7'-10"	31
H3	6	#4	3	8'-3"	33
K3	6	#4	STR	3'-8"	15
S1	22	#4	3	7'-5"	109
S2	22	#4	4	3'-2"	47
S3	4	#4	6	6'-6"	17
S4	15	#5	8	5'-10"	91
U1	10	#5	5	5'-6"	57
V1	24	#4	STR	4'-8"	75

REINFORCING STEEL 1,064 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1	CAP & LOWER PART OF WING	6.8 C.Y.
POUR #2	UPPER PART OF WING	1.0 C.Y.
TOTAL CLASS A CONCRETE		7.8 C.Y.

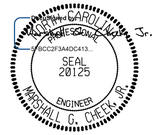
HP 12 X 53 STEEL PILES	NO: 2 LIN. FT.= 30
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	NO: 2
STEEL PILE POINTS	NO: 2
STEEL SHEET PILES	450 SQ. FT.

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 6 OF 6



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END BENT 2 STAGE I & II DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	5/19
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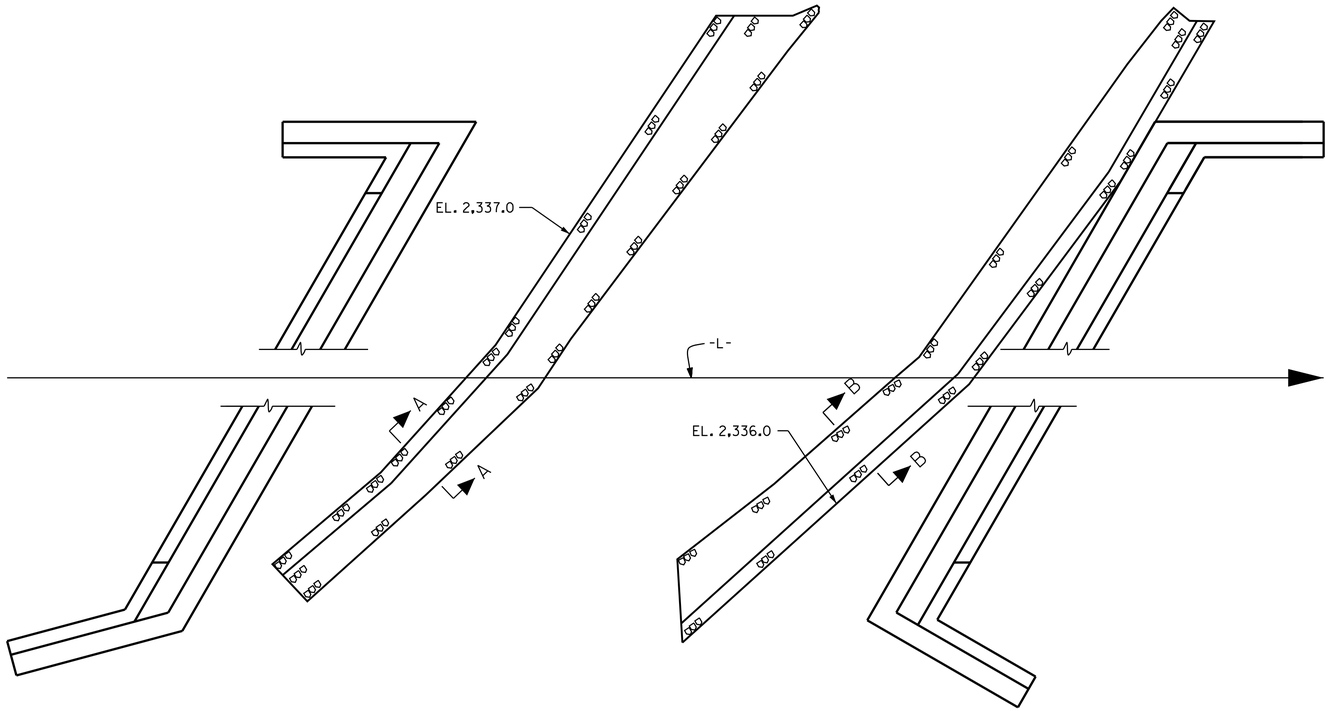
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19

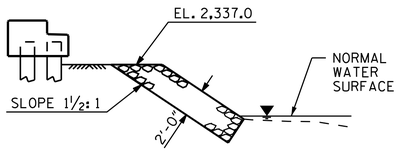


END BENT 1

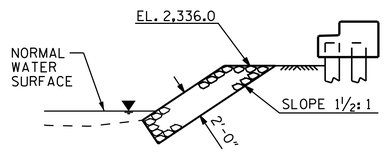
END BENT 2

PLAN

ESTIMATED QUANTITIES	
BRIDGE @ STA. 13+00.00-L-	RIP RAP CLASS II (2'-0" THICK)
	TONS
END BENT 1	40
END BENT 2	40



SECTION A-A



SECTION B-B

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR.

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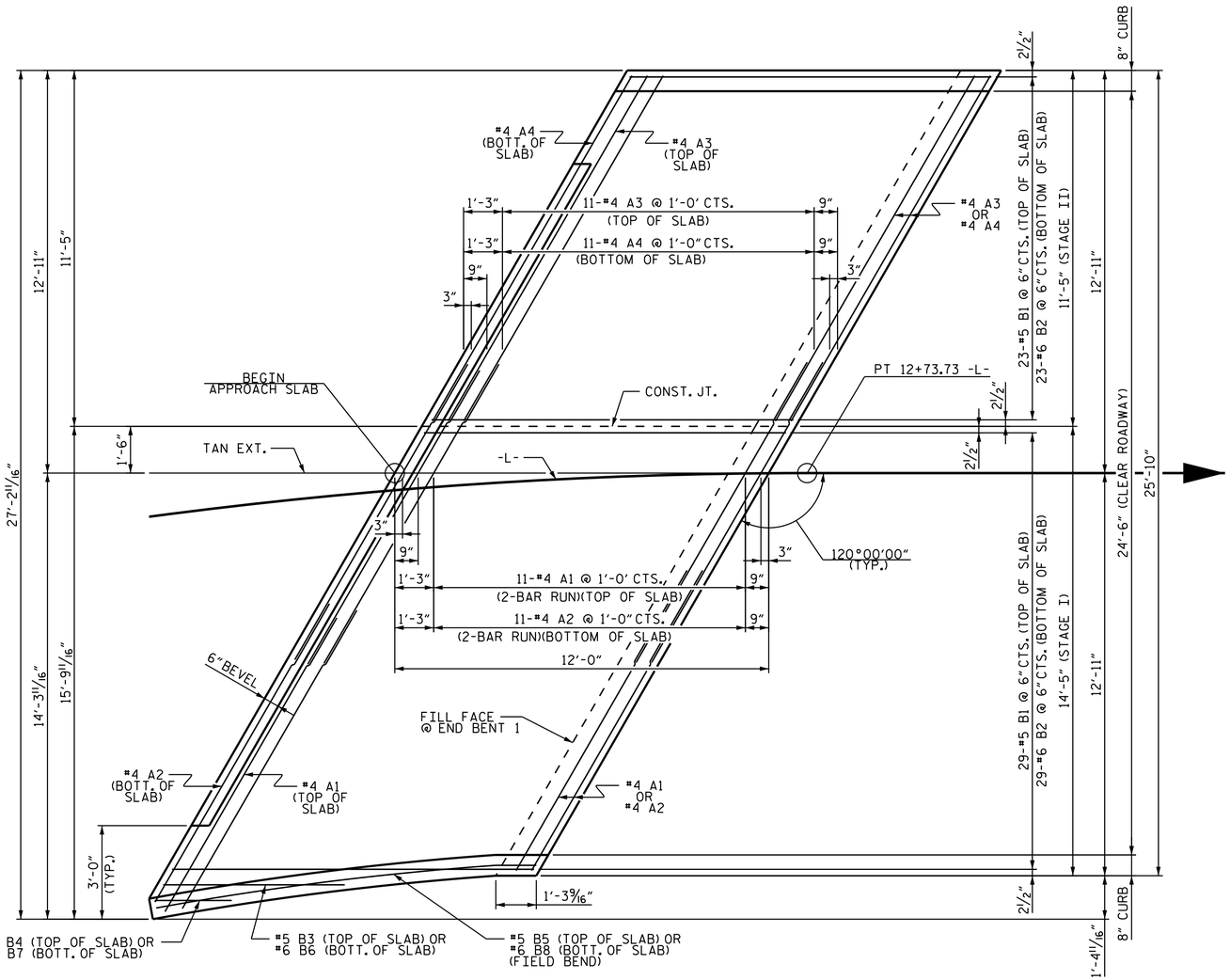
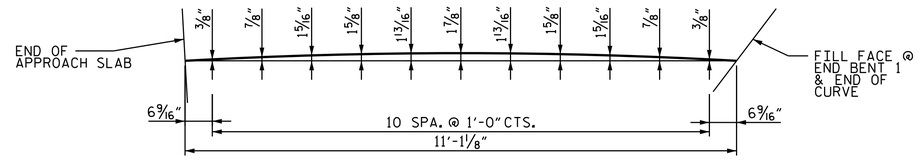
RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	5/19
CHECKED BY :	MGC	DATE :	5/19



PLAN @ END BENT #1



ARC OFFSETS - RIGHT SIDE

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 1 OF 3

DRAWN BY :	JLA
CHECKED BY :	MGC
DESIGN ENGINEER OF RECORD :	MGC
DATE :	5/19
DATE :	5/19
DATE :	5/19

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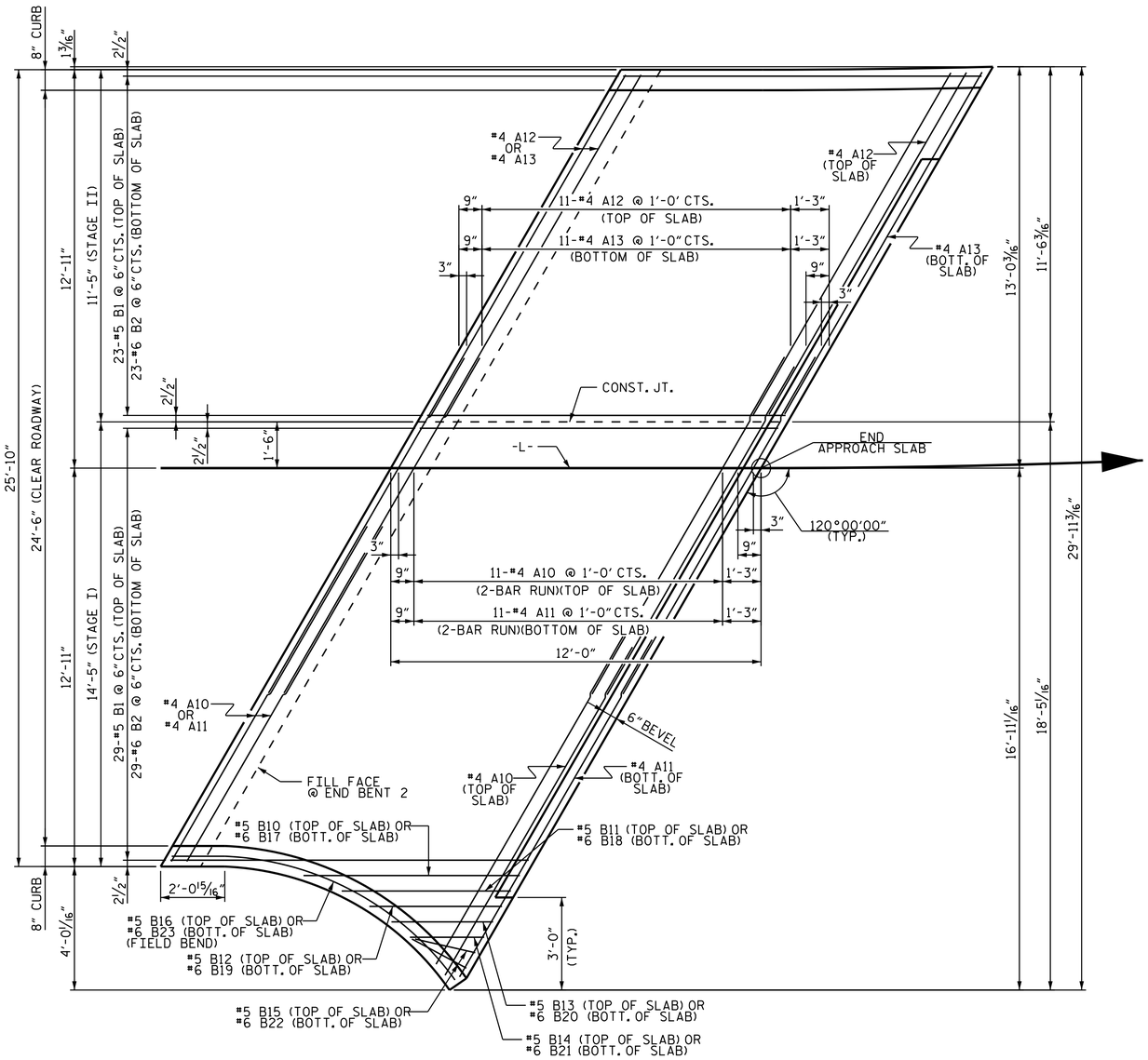
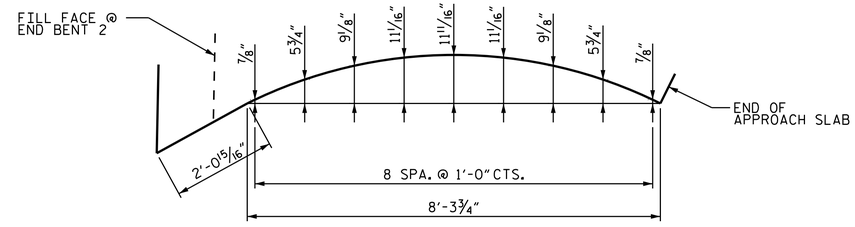
BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			38



PLAN @ END BENT #2



ARC OFFSETS - RIGHT SIDE

DRAWN BY :	JLA	DATE :	5/19
CHECKED BY :	MGC	DATE :	5/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	5/19

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 2 OF 3

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RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			38

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

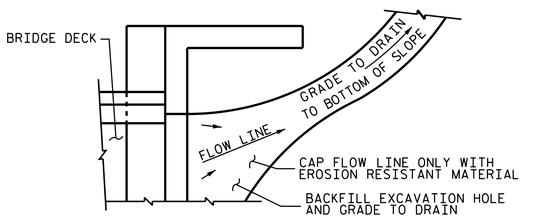
SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

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.

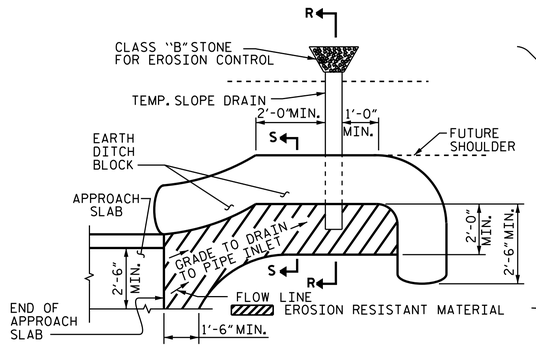
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



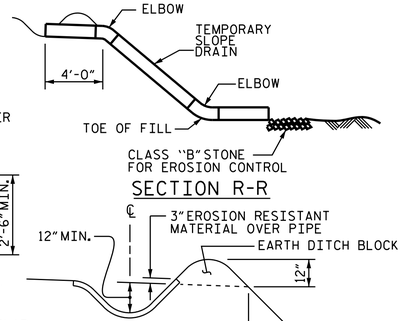
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

PLAN VIEW

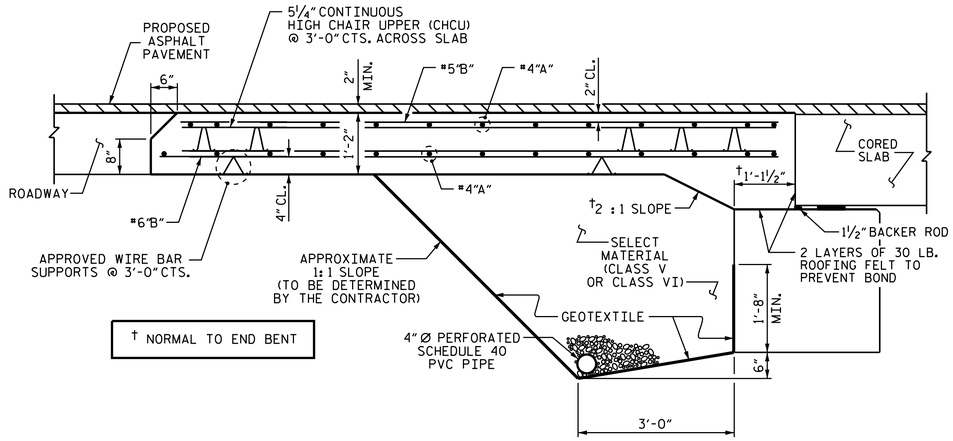


SECTION R-R

SECTION S-S

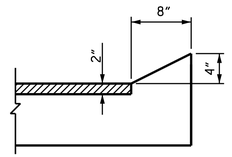
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION THRU SLAB

(TYPE II - MODIFIED APPROACH FILL)



SECTION N-N

CURB DETAILS

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

BILL OF MATERIAL

APPROACH SLAB AT EB #1 STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	26	#4	STR	10'-11"	190
A2	26	#4	STR	11'-1"	192
✱ B1	29	#5	STR	11'-1"	335
B2	29	#6	STR	11'-7"	505
✱ B3	1	#5	STR	5'-10"	6
✱ B4	1	#5	STR	2'-5"	3
✱ B5	1	#5	STR	12'-3"	13
B6	1	#6	STR	5'-10"	9
B7	1	#6	STR	2'-5"	4
B8	1	#6	STR	12'-3"	18
REINFORCING STEEL				LBS.	728
✱ EPOXY COATED REINFORCING STEEL				LBS.	547
CLASS AA CONCRETE				C. Y.	8.5

APPROACH SLAB AT EB #1 STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A3	13	#4	STR	12'-9"	111
A4	13	#4	STR	12'-9"	111
✱ B1	23	#5	STR	11'-1"	266
B2	23	#6	STR	11'-7"	400
REINFORCING STEEL				LBS.	511
✱ EPOXY COATED REINFORCING STEEL				LBS.	377
CLASS AA CONCRETE				C. Y.	6.9

APPROACH SLAB AT EB #2 STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A10	26	#4	STR	12'-3"	213
A11	26	#4	STR	12'-7"	219
✱ B1	29	#5	STR	11'-1"	335
B2	29	#6	STR	11'-7"	505
✱ B10	1	#5	STR	7'-0"	7
✱ B11	1	#5	STR	5'-5"	6
✱ B12	1	#5	STR	4'-3"	4
✱ B13	1	#5	STR	3'-3"	3
✱ B14	1	#5	STR	2'-4"	2
✱ B15	2	#5	STR	2'-0"	4
✱ B16	1	#5	STR	10'-5"	11
B17	1	#6	STR	7'-0"	11
B18	1	#6	STR	5'-5"	8
B19	1	#6	STR	4'-3"	6
B20	1	#6	STR	3'-3"	5
B21	1	#6	STR	2'-4"	4
B22	2	#6	STR	2'-0"	6
B23	1	#6	STR	10'-5"	16
REINFORCING STEEL				LBS.	780
✱ EPOXY COATED REINFORCING STEEL				LBS.	585
CLASS AA CONCRETE				C. Y.	8.9

APPROACH SLAB AT EB #2 STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A12	13	#4	STR	12'-9"	111
A13	13	#4	STR	12'-9"	111
✱ B1	23	#5	STR	11'-1"	266
B2	23	#6	STR	11'-7"	400
REINFORCING STEEL				LBS.	511
✱ EPOXY COATED REINFORCING STEEL				LBS.	377
CLASS AA CONCRETE				C. Y.	6.9

PROJECT NO. 17BP.14.R.207

MACON COUNTY

STATION: 13+00.00-L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL G. CHEEK, JR. ENGINEER

7/30/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

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-37
1			3			TOTAL SHEETS
2			4			38

DRAWN BY :	JLA	DATE :	5/19
CHECKED BY :	MGC	DATE :	5/19

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 ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" 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 ¼" 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 ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" 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 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. FINS 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.

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