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TIP PROJECT: B-5405

CONTRACT: C204067

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

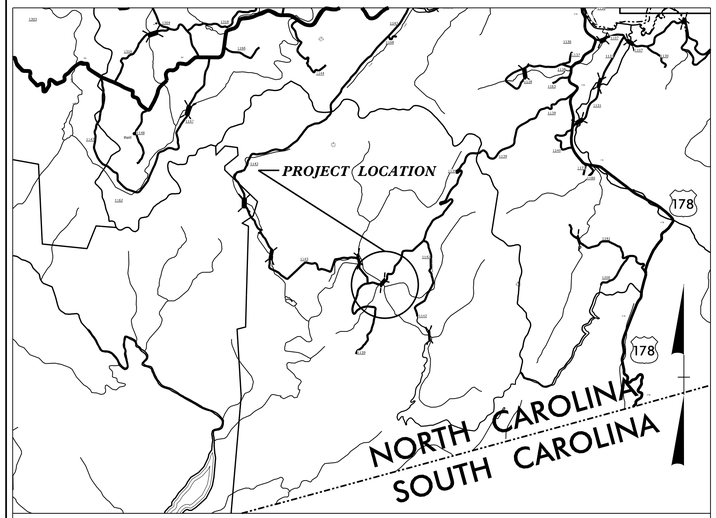
TRANSYLVANIA COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5405	1	

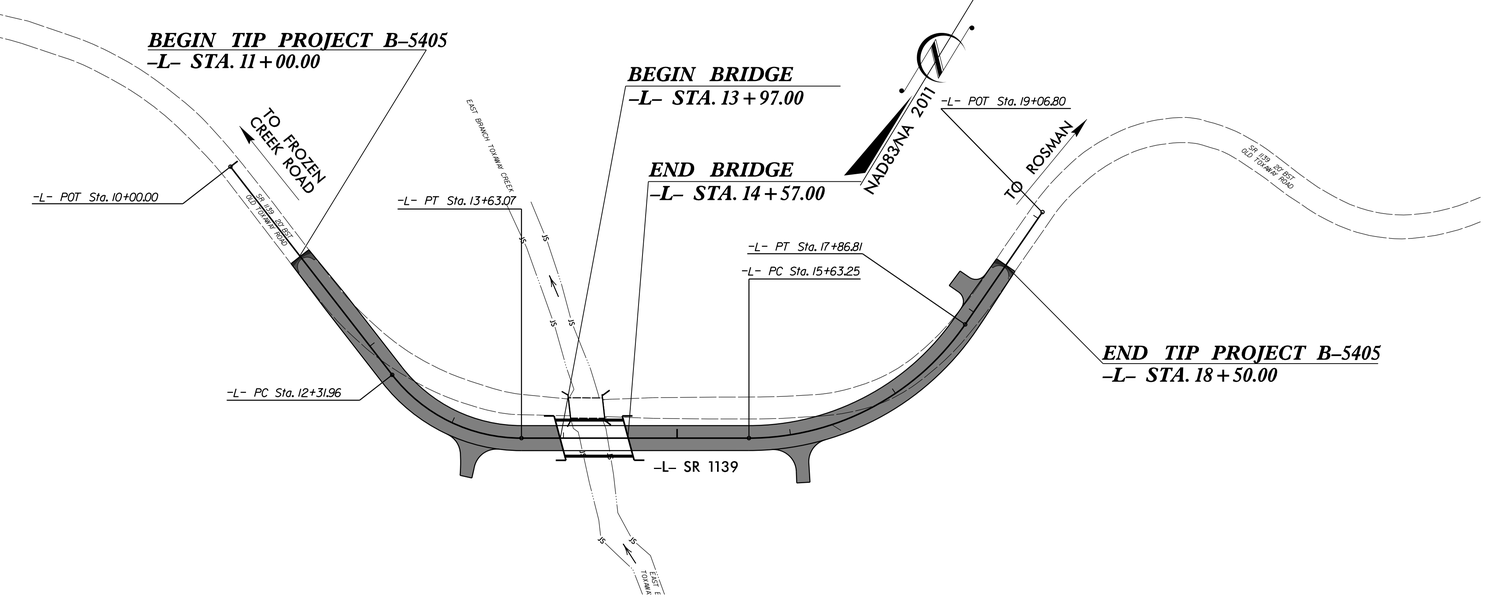
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46120.1.1	BRZ-1139(6)	PE
46120.2.1	BRZ-1139(6)	UTIL. & R/W
46120.3.1	BRZ-1139(6)	CONST.

LOCATION: REPLACE BRIDGE NO. 139 OVER EAST BRANCH TOXAWAY CREEK ON SR 1139 (OLD TOXAWAY ROAD)

TYPE OF WORK: GRADING, PAVING, AND STRUCTURE



VICINITY MAP



STRUCTURE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2018 = 223
ADT 2035 = 314
K = 10 %
D = 55 %
T = 22 % *
V = 40 MPH
* TTST = 2% + DUALS = 20%
FUNC CLASS =
RURAL LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT B-5405 = 0.130

LENGTH STRUCTURE T.I.P. PROJECT B-5405 = 0.012

TOTAL LENGTH OF T.I.P. PROJECT B-5405 = 0.142

PLANS PREPARED BY:
ms consultants, inc.
920 Main Campus Drive
Suite 430
Raleigh, NC 27606
NC License Number : C-3239

PLANS PREPARED FOR:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr.
Raleigh, NC 27610

2018 STANDARD SPECIFICATIONS

LETTING DATE:
FEBRUARY 20, 2018

F.A. PROJECT NO. BRZ-1139(6)

13+50 14+00 14+50 15+00

SPAN A

-5.1042% 0.6973%

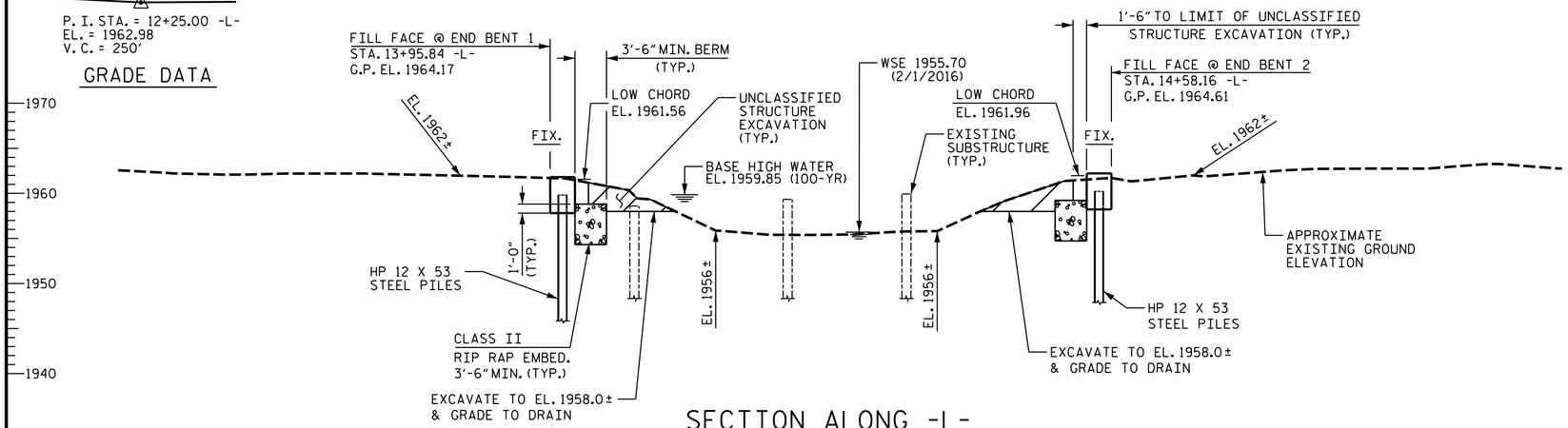
P. I. STA. = 12+25.00 -L-
EL. = 1962.98
V. C. = 250'

GRADE DATA

0.6973% 9.4988%

P. I. STA. = 15+85.00 -L-
EL. = 1965.49
V. C. = 222'

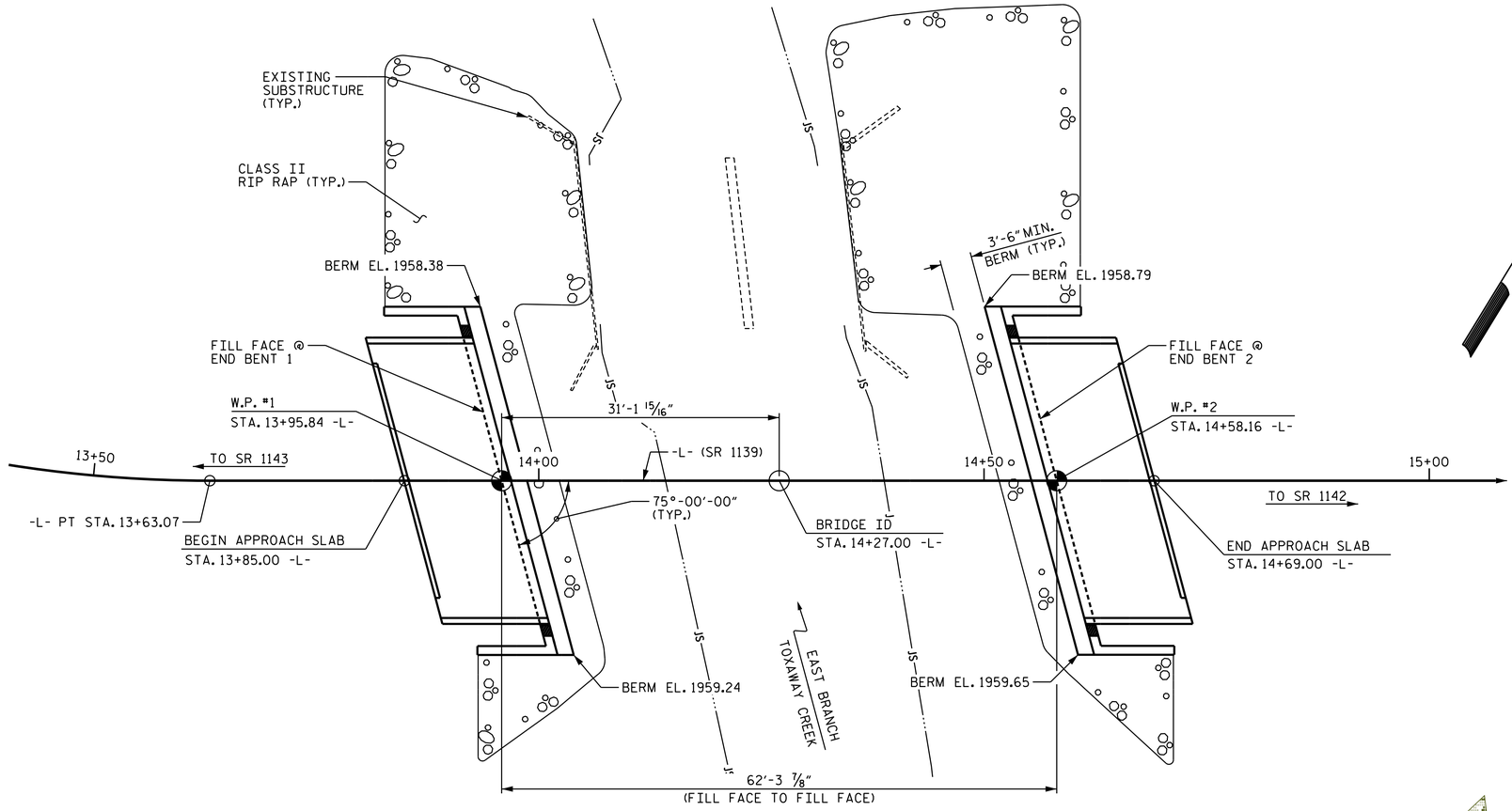
GRADE DATA



SECTION ALONG -L-

(SECTION TAKEN AT RIGHT ANGLES TO END BENTS)

END BENT 1 END BENT 2



PLAN ALONG -L-

(PILES NOT SHOWN FOR CLARITY)

HORIZONTAL CURVE DATA

P.I. STA. = 13+02.45 -L-
Δ = 52°-10'-00.0"(LT)
D = 39°-47'-19.4"
L = 131.11'
T = 70.49'
R = 144.00'

P.I. STA. = 16+84.66 -L-
Δ = 55°-27'-00.0"(LT)
D = 24°-48'-12.1"
L = 223.56'
T = 121.41'
R = 231.00'

PROJECT NO. B-5405

TRANSYLVANIA COUNTY

STATION: 14+27.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 139

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER EAST BRANCH TOXAWAY CREEK ON SR 1139 (OLD TOXAWAY ROAD) BETWEEN SR 1143 & SR 1142

DocuSigned by: Lisa M. Samples 10/25/2017

NORTH CAROLINA PROFESSIONAL SEAL 037031 ENGINEER LISA M SAMPLES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-01
1			3			TOTAL SHEETS
2			4			22

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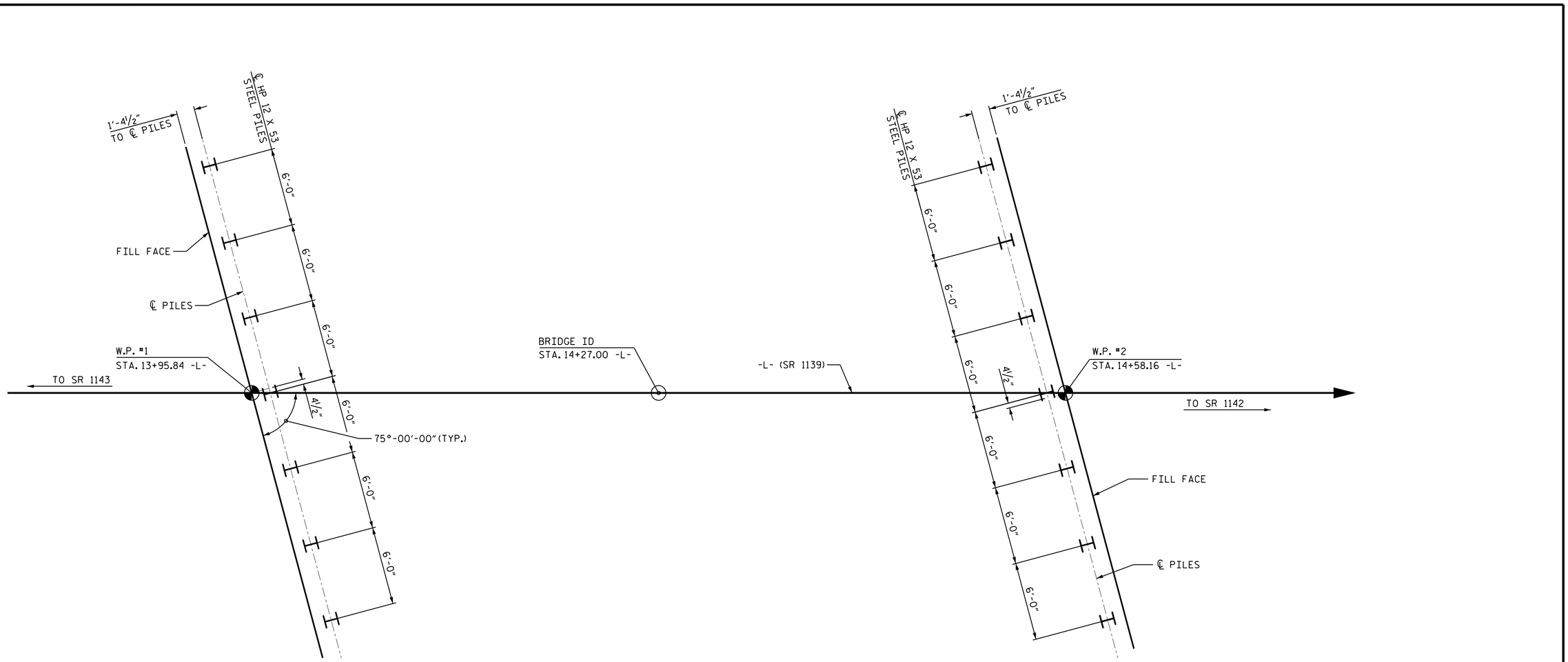
DRAWN BY : J.M. KEPICH DATE : 04/17
CHECKED BY : L.M. SAMPLES DATE : 07/17
DESIGN ENGINEER OF RECORD : L.M. SAMPLES DATE : 08/17

ms consultants, inc.
920 Main Campus Drive
Suite 430
Raleigh, NC 27606
NC License Number : C-3239

24-OCT-2017 15:36
N:\GO\0817-04 NCDOT B-5405 BRIDGE 139 OVER TOXAWAY CREEK\Structures\FinalPlans\B5405_SMU_GD_870139.dgn
jkepich



END BENT 1 END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE TO CENTERLINE

NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 80 TONS PER PILE.
DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 133 TONS PER PILE.
DRILLED-IN PILES ARE REQUIRED FOR END BENT NO. 1. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 1947.5 FT. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 80 TONS PER PILES.
DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 133 TONS PER PILE.
DRILLED-IN PILES ARE REQUIRED FOR END BENT NO. 2. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 1948.0 FT. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
CONCRETE IS REQUIRED TO FILL HOLES FOR PILE EXCAVATION AT END BENT NOS. 1 AND 2.

PROJECT NO. B-5405
TRANSYLVANIA COUNTY
STATION: 14+27.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER EAST BRANCH TOXAWAY CREEK ON SR 1139 (OLD TOXAWAY ROAD) BETWEEN SR 1143 & SR 1142

DocuSigned by: Lisa M. Samples 12/8/2017

NORTH CAROLINA PROFESSIONAL SEAL 037031 ENGINEER LISA M SAMPLES

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-02
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : J.M. KEPICH DATE : 05/17
CHECKED BY : L.M. SAMPLES DATE : 07/17
DESIGN ENGINEER OF RECORD : L.M. SAMPLES DATE : 08/17

05-DEC-2017 15:40
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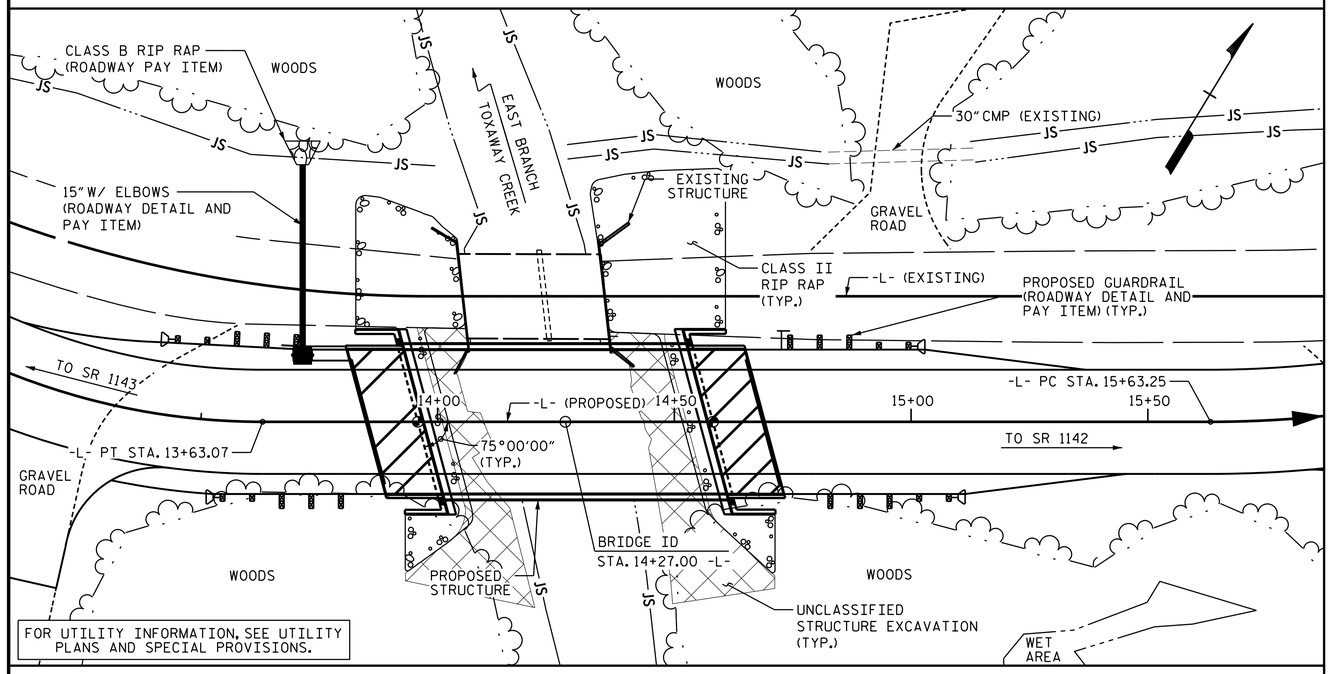
jkepich

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP12X53 STEEL PILES	HP12X53 STEEL PILES		ANODIZED TWO BAR METAL RAIL	1'-2" X 2'-9½" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLABS		ASBESTOS ASSESSMENT
	LUMP SUM	LIN. FT.	LIN. FT.	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	EACH	NO.	LIN. FT.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.	LUMP SUM
SUPERSTRUCTURE											105	120				11	660	
END BENT NO. 1		27	43		22.5		2756	7	7	105			56	82				
END BENT NO. 2		25	45		22.5		2756	7	7	105			80	119				
TOTAL	LUMP SUM	52	88	LUMP SUM	45	LUMP SUM	5512	14	14	210	105	120	136	201	LUMP SUM	11	660	LUMP SUM

BM. #2 - RAILROAD SPIKE SET IN BASE OF 24" WHITE PINE TREE, 64.74' LT. OF -L- STA. 14+87.82 EL. 1961.40



LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE	= 850 C.F.S.
FREQUENCY OF DESIGN DISCHARGE	= 25 YRS.
DESIGN HIGH WATER ELEVATION	= 1959.0
DRAINAGE AREA	= 2.9 SQ. MI.
BASE DISCHARGE (Q100)	= 1,200 C.F.S.
BASE HIGH WATER ELEVATION	= 1959.85

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 2,537 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 500(+) YRS.
OVERTOPPING FLOOD ELEVATION	= 1964.3 ✳

✳ SAG STA. 13+20 -L-
OT STA. 13+27 -L- DUE TO SUPER TRANSITION

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

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 14+27.00 -L-."

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 20 FT LEFT AND 40 FT RIGHT OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, PRESTRESSED CONCRETE END BENT CAPS MAY BE SUBSTITUTED IN PLACE OF THE CAST-IN-PLACE CAPS. THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER TO RECEIVE REVISED PLANS AND DETAILS FROM THE STRUCTURES MANAGEMENT UNIT. THE REDESIGN AND ANY ADDITIONAL MATERIALS NEEDED WILL BE AT NO ADDITIONAL COST TO THE CONTRACTOR.

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING STRUCTURE CONSISTING OF A TWO SPAN CONTINUOUS (1 @ 16'-10", 1 @ 13'-10"), TIMBER DECK ON STEEL I-BEAMS, 19'-0" WIDE ON END & CRUTCH BENTS OF TIMBER POSTS AND SILLS AND LOCATED ADJACENT FROM PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

PROJECT NO. B-5405
TRANSYLVANIA COUNTY
STATION: 14+27.00 -L-

SHEET 3 OF 3

DocuSigned by: Lisa M. Samples 5663D099A9B449C...
10/26/2017

NORTH CAROLINA PROFESSIONAL SEAL 037031 ENGINEER LISA M SAMPLES

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920 Main Campus Drive
Suite 430
Raleigh, NC 27606
NC License Number : C-3239

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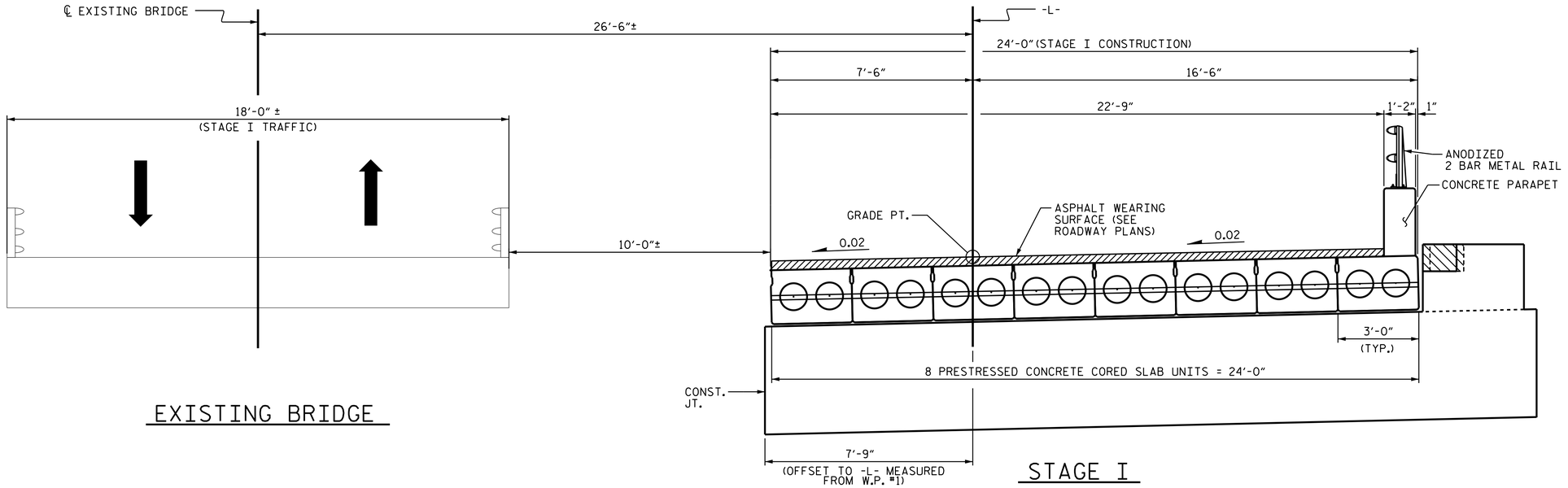
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER EAST BRANCH TOXAWAY CREEK ON SR 1139 (OLD TOXAWAY ROAD) BETWEEN SR 1143 & SR 1142

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-03
1			3			TOTAL SHEETS
2			4			22

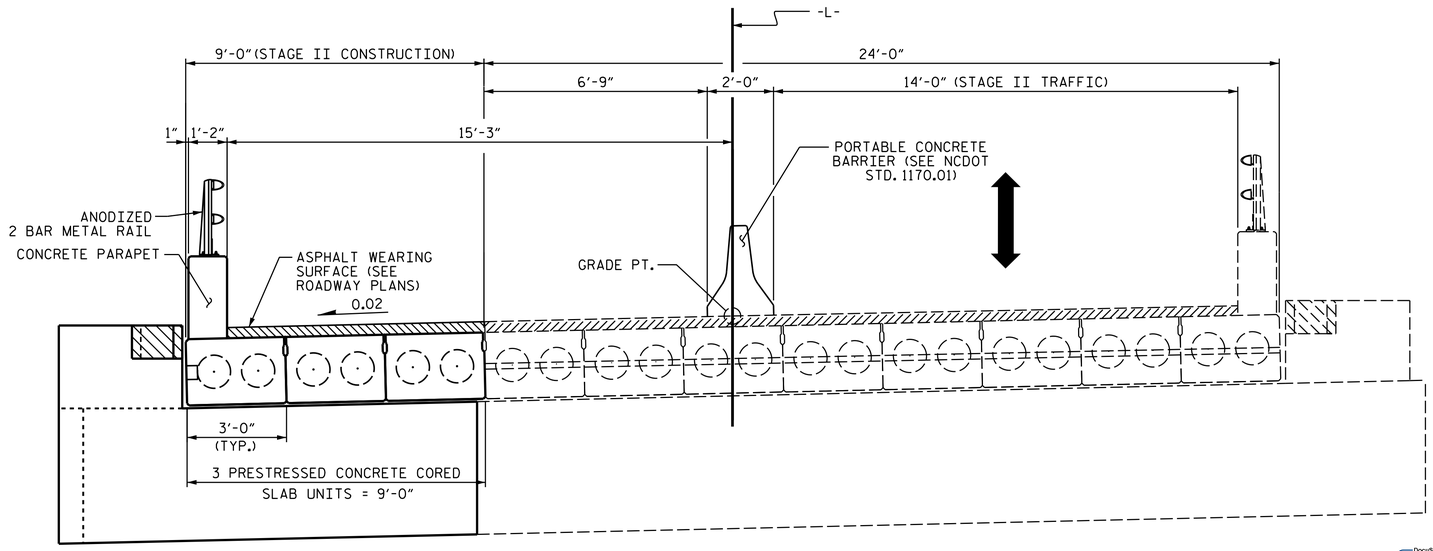
DRAWN BY : J.M. KEPICH DATE : 04/17
CHECKED BY : L.M. SAMPLES DATE : 07/17
DESIGN ENGINEER OF RECORD : L.M. SAMPLES DATE : 08/17

26-OCT-2017 10:43
N:\60\08317-04 NCDOT B-5405 BRIDGE 139 OVER TOXAWAY CREEK\Structures\06.Deliverables\B5405 BR139 Final Tracings Submittal\CADD dgns\Structures\B5405_SNU_BM_8170139.dgn
jkeplon



EXISTING BRIDGE

STAGE I



STAGE II

STAGING SEQUENCE

PROJECT NO. B-5405

TRANSYLVANIA COUNTY

STATION: 14+27.00 -L-

DocuSigned by:
Lisa M. Samples
5663D099A9B449C...
10/25/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONSTRUCTION STAGING

NORTH CAROLINA PROFESSIONAL SEAL 037031 ENGINEER LISA M SAMPLES

ms consultants, inc.
920 Main Campus Drive
Suite 430
Raleigh, NC 27606
NC License Number : C-3239

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-04
1			3			TOTAL SHEETS
2			4			22

DRAWN BY : J.M. KEPICH DATE : 04/17
CHECKED BY : L.M. SAMPLES DATE : 07/17
DESIGN ENGINEER OF RECORD : L.M. SAMPLES DATE : 08/17

24-OCT-2017 15:36
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jkeplch

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)	1.128	--	1.75	0.27	1.35	60′	EL	29.482	0.608	**1.13**	60′	EL	**2.948**	0.80	0.27	1.39	60′	EL	29.482	
		HL-93(Opr)	N/A	--	1.463	--	1.35	0.27	1.76	60′	EL	29.482	0.608	1.46	60′	EL	2.948	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	(2)	1.381	49.722	1.75	0.27	1.72	60′	EL	29.482	0.608	**1.38**	60′	EL	**2.948**	0.80	0.27	1.76	60′	EL	29.482	
		HS-20(Opr)	36.000	--	1.79	64.455	1.35	0.27	2.22	60′	EL	29.482	0.608	1.79	60′	EL	2.948	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.791	51.185	1.4	0.27	4.62	60′	EL	29.482	0.608	4.02	60′	EL	2.948	0.80	0.27	3.79	60′	EL	29.482	
		SNGARBS2	20.000	--	2.888	57.751	1.4	0.27	3.53	60′	EL	29.482	0.608	2.89	60′	EL	2.948	0.80	0.27	2.90	60′	EL	29.482	
		SNAGRIS2	22.000	--	2.691	59.194	1.4	0.27	3.39	60′	EL	29.482	0.608	2.69	60′	EL	2.948	0.80	0.27	2.78	60′	EL	29.482	
		SNCOTTS3	27.250	--	1.889	51.473	1.4	0.27	2.3	60′	EL	29.482	0.608	2.01	60′	EL	2.948	0.80	0.27	1.89	60′	EL	29.482	
		SNAGGRS4	34.925	--	1.608	56.157	1.4	0.27	1.96	60′	EL	29.482	0.608	1.69	60′	EL	2.948	0.80	0.27	1.61	60′	EL	29.482	
		SNS5A	35.550	--	1.57	55.826	1.4	0.27	1.91	60′	EL	29.482	0.608	1.72	60′	EL	2.948	0.80	0.27	1.57	60′	EL	29.482	
		SNS6A	39.950	--	1.453	58.064	1.4	0.27	1.77	60′	EL	29.482	0.608	1.58	60′	EL	2.948	0.80	0.27	1.45	60′	EL	29.482	
		SNS7B	42.000	--	1.385	58.152	1.4	0.27	1.69	60′	EL	29.482	0.608	1.56	60′	EL	2.948	0.80	0.27	1.38	60′	EL	29.482	
	TTST	TNAGRIT3	33.000	--	1.776	58.612	1.4	0.27	2.16	60′	EL	29.482	0.608	1.87	60′	EL	2.948	0.80	0.27	1.78	60′	EL	29.482	
		TNT4A	33.075	--	1.787	59.12	1.4	0.27	2.18	60′	EL	29.482	0.608	1.81	60′	EL	2.948	0.80	0.27	1.79	60′	EL	29.482	
		TNT6A	41.600	--	1.474	61.31	1.4	0.27	1.79	60′	EL	29.482	0.608	1.68	60′	EL	2.948	0.80	0.27	1.47	60′	EL	29.482	
		TNT7A	42.000	--	1.488	62.489	1.4	0.27	1.81	60′	EL	29.482	0.608	1.62	60′	EL	2.948	0.80	0.27	1.49	60′	EL	29.482	
		TNT7B	42.000	--	1.515	63.636	1.4	0.27	1.89	60′	EL	29.482	0.608	1.52	60′	EL	2.948	0.80	0.27	1.55	60′	EL	29.482	
		TNAGRIT4	43.000	--	1.464	62.958	1.4	0.27	1.79	60′	EL	29.482	0.608	1.46	60′	EL	2.948	0.80	0.27	1.47	60′	EL	29.482	
		TNAGT5A	45.000	--	1.378	62.016	1.4	0.27	1.68	60′	EL	29.482	0.608	1.47	60′	EL	2.948	0.80	0.27	1.38	60′	EL	29.482	
		TNAGT5B	45.000	(3)	1.356	61.038	1.4	0.27	1.65	60′	EL	29.482	0.608	1.39	60′	EL	2.948	0.80	0.27	**1.36**	60′	EL	**29.482**	

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.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

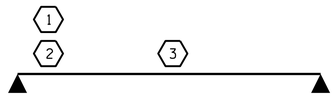
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY
FOR SPAN 'A'

PROJECT NO. B-5405
TRANSYLVANIA **COUNTY**
STATION: 14+27.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR 60′ CORED SLAB UNIT 75° SKEW
(NON-INTERSTATE TRAFFIC)

DocuSigned by: Lisa M. Samples 5663D099A9B449C...
10/25/2017

NORTH CAROLINA PROFESSIONAL SEAL 037031 ENGINEER LISA M SAMPLES

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920 Main Campus Drive
Suite 430
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NC License Number : C-3239

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2			4			22

ASSEMBLED BY : J.M. KEPICH DATE : 04/17
CHECKED BY : L.M. SAMPLES DATE : 07/17
DRAWN BY : CVC 6/10
CHECKED BY : DNS 6/10

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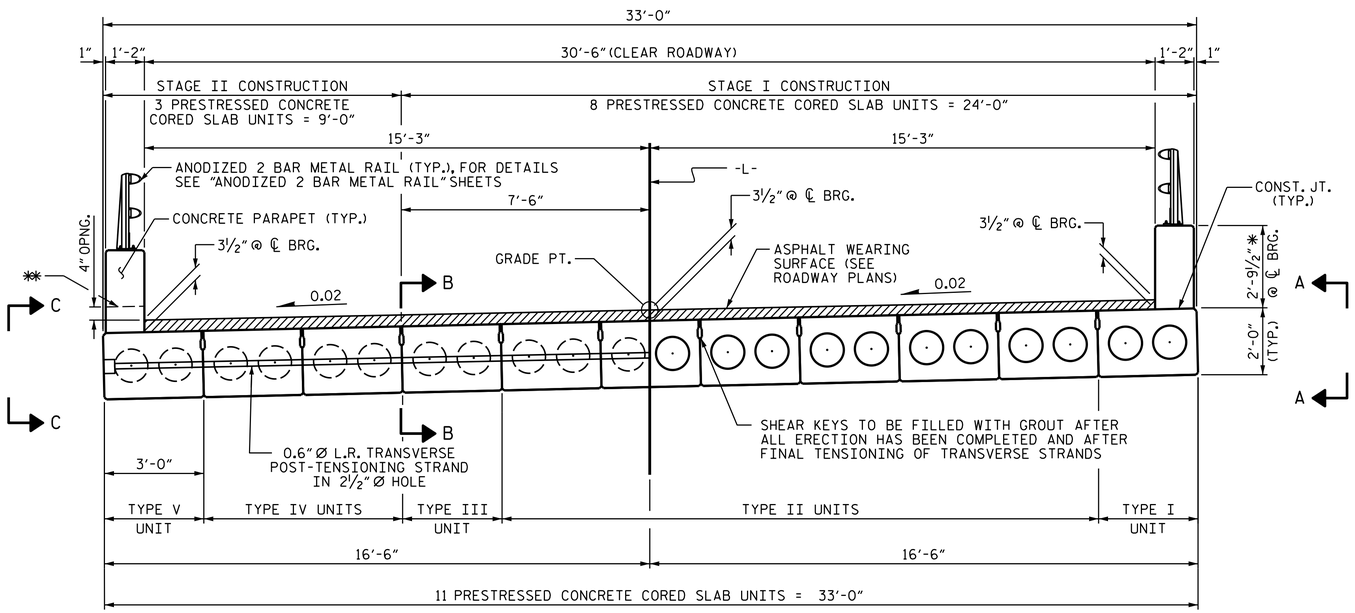
jkeplch

STD. NO. 24LRFR1_75&105S_60L

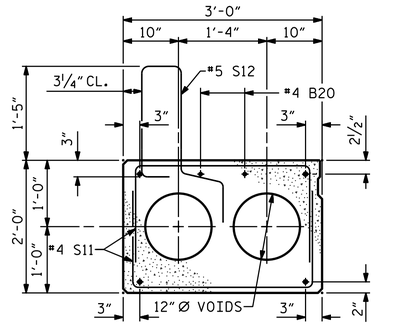


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

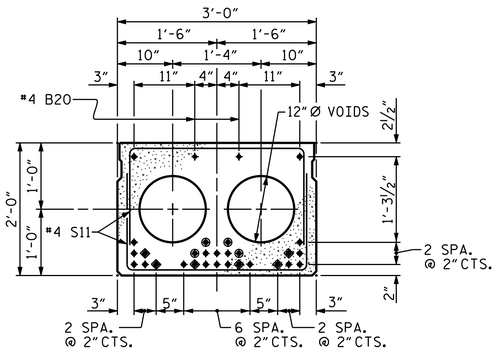
TYPICAL SECTION

FINAL BRIDGE (STAGE 1 AND 2 COMPLETED)
(FOR VIEWS A-A, B-B, AND C-C, SEE SHEET 2 OF 6)



EXTERIOR SLAB SECTION

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



INTERIOR SLAB SECTION

TYPE II, TYPE III, & TYPE IV (24 STRANDS REQUIRED)

◈ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12′-0″ FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

◉ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

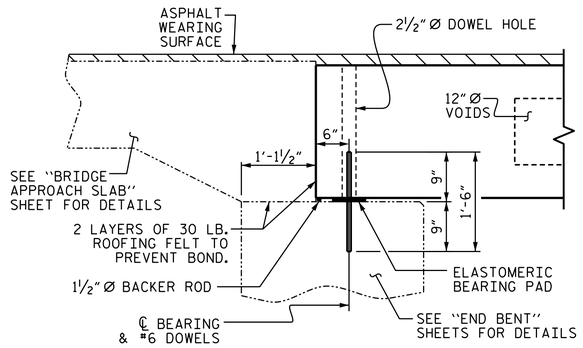
DEBONDING LEGEND

0.6″ Ø LOW RELAXATION STRAND LAYOUT

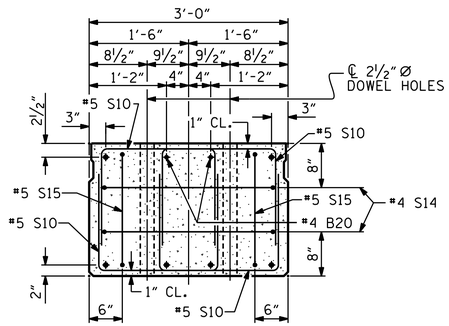
✳ -THE MAXIMUM CONCRETE PARAPET HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE CONCRETE PARAPET AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE CONCRETE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.

✳✳ -8″ WIDE DRAIN BLOCKOUT (HEIGHT VARIES). FOR LAYOUT SEE STAGE II "PLAN OF UNIT" ON SHEET 4 OF 6.

FIXED END

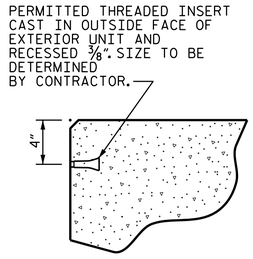


SECTION AT END BENT

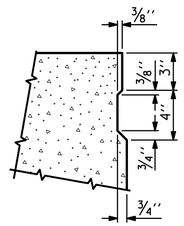


END ELEVATION

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.



THREADED INSERT DETAIL



SHEAR KEY DETAIL

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

DESIGN ENGINEER OF RECORD : L.M. SAMPLES	DATE : 08/17
ASSEMBLED BY : J.M. KEPICH	DATE : 04/17
CHECKED BY : L.M. SAMPLES	DATE : 07/17
DRAWN BY : MAA 6/10	REV. 9/14 MAA/TWG
CHECKED BY : MKT 7/10	

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DocuSigned by:
Lisa M. Samples
5663C095A0B449C...
12/8/2017

NORTH CAROLINA PROFESSIONAL SEAL 037031 ENGINEER LISA M SAMPLES

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PROJECT NO. B-5405
TRANSYLVANIA COUNTY
STATION: 14+27.00 -L-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3′-0″ X 2′-0″ PRESTRESSED CONCRETE CORED SLAB UNIT

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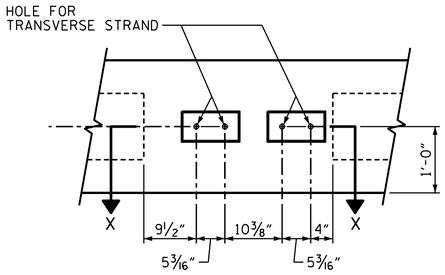
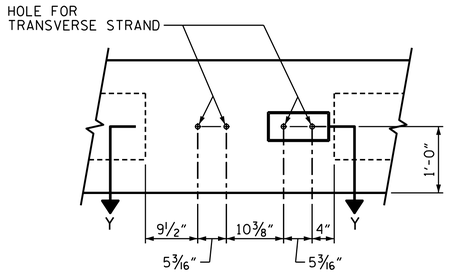
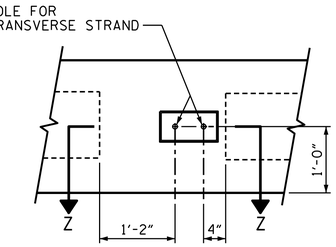


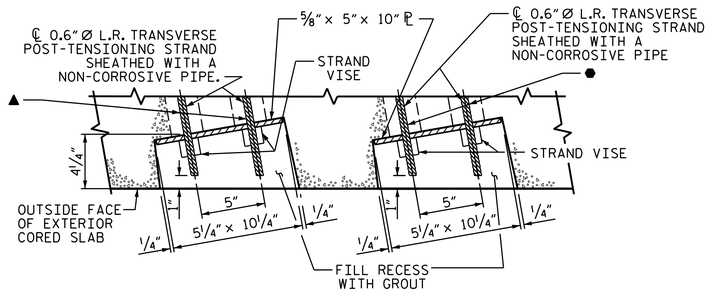
VIEW A-A
(SEE SHEET 1 OF 6)



VIEW B-B
(SEE SHEET 1 OF 6)

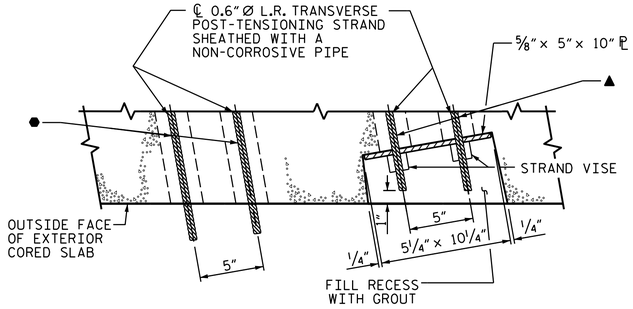


VIEW C-C
(SEE SHEET 1 OF 6)



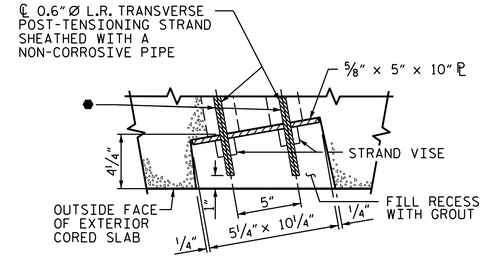
SECTION X-X
(TYPE I UNIT)

UPSTATION



SECTION Y-Y
(TYPE III UNIT)

UPSTATION



SECTION Z-Z
(TYPE V UNIT)

UPSTATION

GROUTED RECESS AT END OF POST-TENSIONED STRAND

▲ STRAND GROUP #1 TO PASS THROUGH 8 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE I CONSTRUCTION)

● STRAND GROUP #2 TO PASS THROUGH ALL 11 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE II CONSTRUCTION)

PROJECT NO. B-5405

TRANSYLVANIA COUNTY

STATION: 14+27.00 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0'' X 2'-0'' PRESTRESSED CONCRETE CORED SLAB UNIT

DocuSigned by:
Lisa M. Samples
10/25/2017

NORTH CAROLINA PROFESSIONAL SEAL 037031 ENGINEER LISA M SAMPLES

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DRAWN BY : J.M. KEPICH DATE : 04/17
CHECKED BY : L.M. SAMPLES DATE : 07/17
DESIGN ENGINEER OF RECORD : L.M. SAMPLES DATE : 08/17

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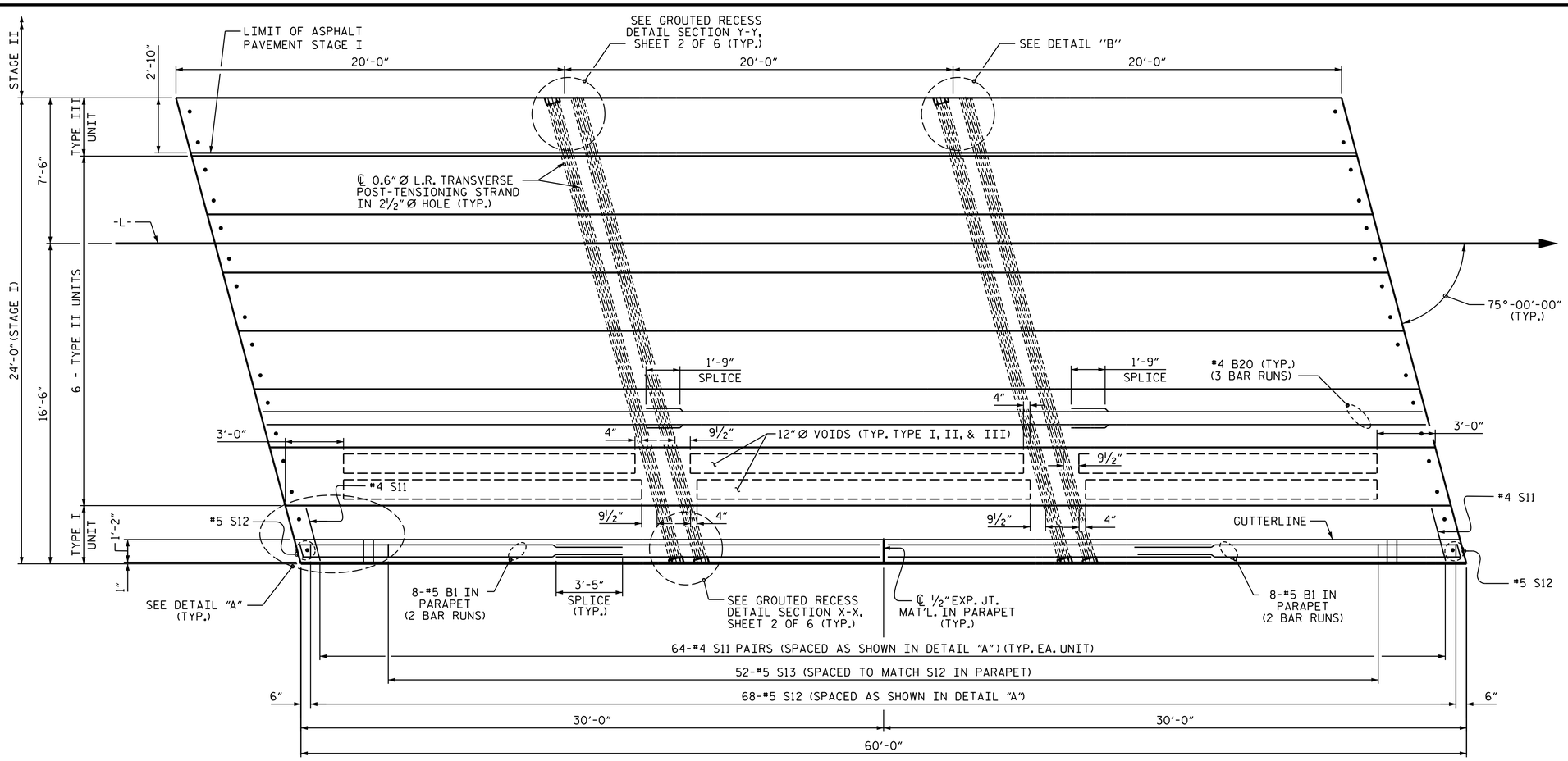
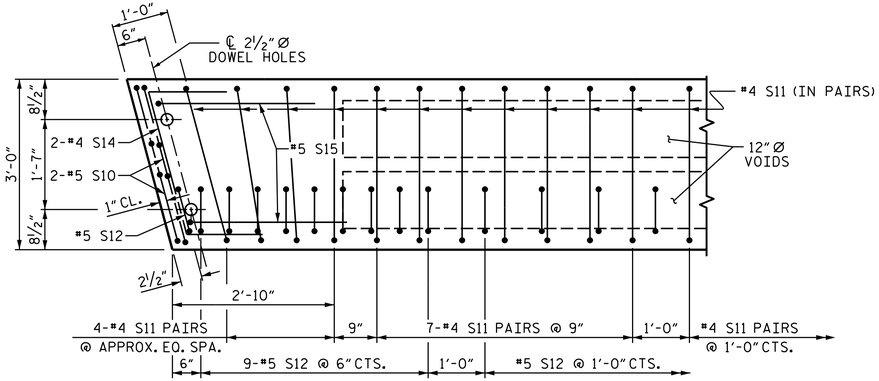
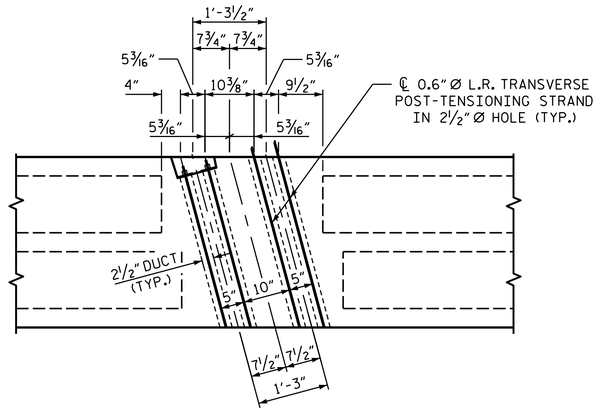
jkepich



PLAN OF UNIT
(STAGE I)



DETAIL "A"
(SIMILAR EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"
#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2½"Ø TRANSVERSE POST-TENSIONING STRAND HOLES

DESIGN ENGINEER OF RECORD : L.M. SAMPLES DATE : 08/17				
ASSEMBLED BY : J.M. KEPICH	DATE : 04/17			
CHECKED BY : L.M. SAMPLES	DATE : 07/17			
DRAWN BY : MAA	6/10	REV. 12/5/11	MAA/AAC	
CHECKED BY : MKT	7/10	REV. 8/14	MAA/TMG	

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DocuSigned by: Lisa M. Samples 10/25/2017

NORTH CAROLINA PROFESSIONAL SEAL 037031 ENGINEER LISA M SAMPLES

PROJECT NO. B-5405
TRANSYLVANIA COUNTY
STATION: 14+27.00 -L-
SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 60' UNIT STAGE I 75° SKEW

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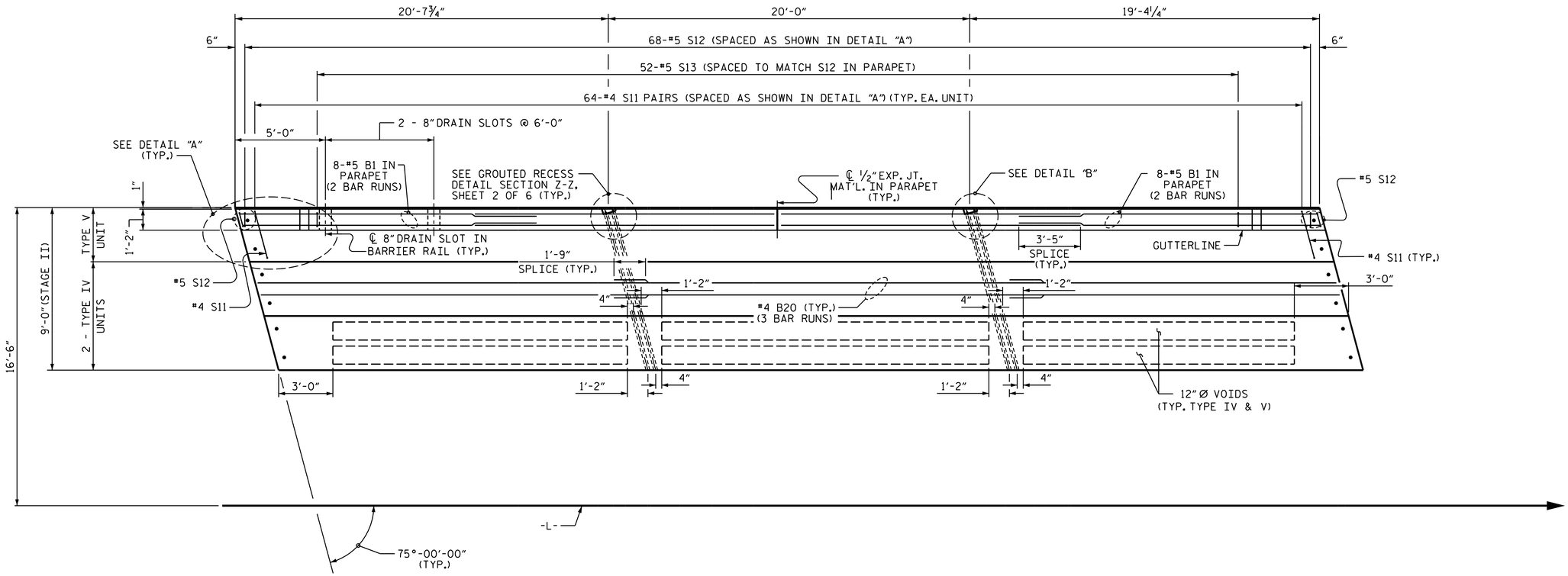
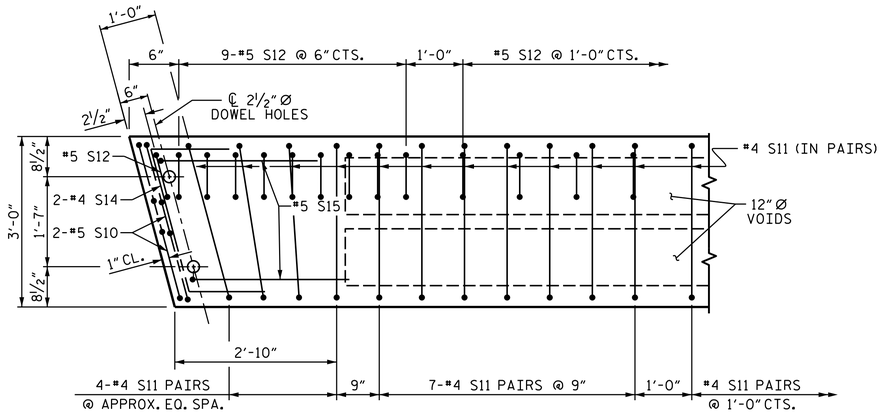
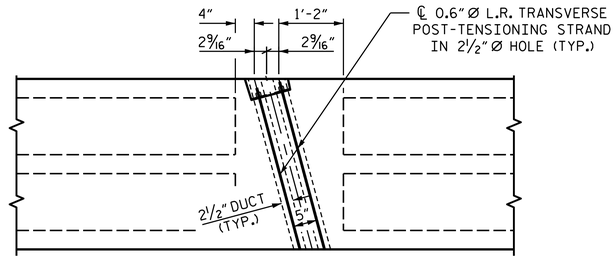
JKepich



PLAN OF UNIT
(STAGE II)



DETAIL "A"
(SIMILAR EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"
#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2½" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

DESIGN ENGINEER OF RECORD : L.M. SAMPLES DATE : 08/17					
ASSEMBLED BY : J.M. KEPICH DATE : 04/17	CHECKED BY : L.M. SAMPLES DATE : 07/17				
DRAWN BY : MAA 6/10	CHECKED BY : MKT 7/10	REV. 12/5/11 MAA/AAC	REV. 8/14 MAA/TMG		

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jkepich

PROJECT NO. B-5405
TRANSYLVANIA COUNTY
STATION: 14+27.00 -L-
SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 60' UNIT
STAGE II
75° SKEW

DocuSigned by: Lisa M. Samples 5663C095A0B440C...
10/25/2017

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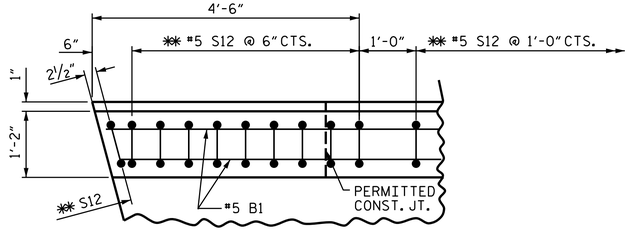
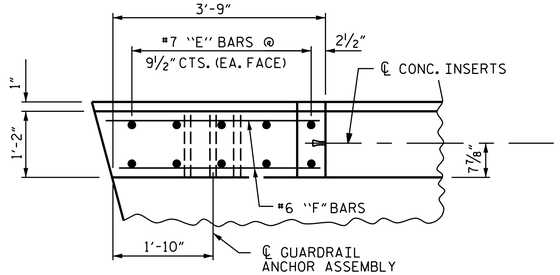


PLAN OF PARAPET

(AT END BENT 1, END BENT 2 SIMILAR)



PLAN OF END POST

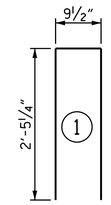
NOTES:

ALL REINFORCEMENT IN PARAPETS AND END POSTS SHALL BE EPOXY COATED.

PAYMENT FOR THE END POSTS SHALL BE INCLUDED IN THE PAY ITEM FOR THE CONCRETE PARAPET.

✱✱ #5 S12 BARS INCLUDED IN BILL OF MATERIAL FOR CORED SLAB UNIT.

BAR TYPE



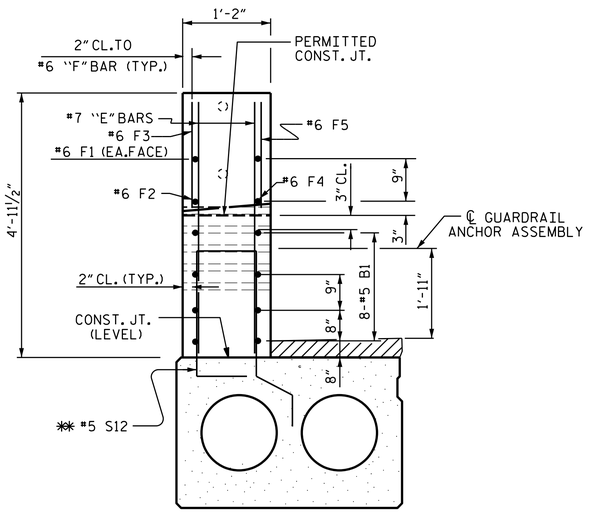
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

PARAPET AND END POSTS

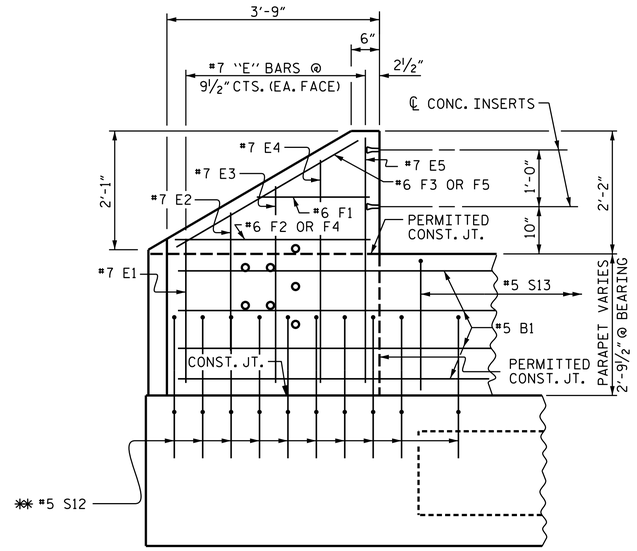
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ B1	64	#5	STR	16'-8"	1113
✱ E1	8	#7	STR	2'-6"	40
✱ E2	8	#7	STR	3'-0"	50
✱ E3	8	#7	STR	3'-6"	58
✱ E4	8	#7	STR	4'-0"	66
✱ E5	8	#7	STR	4'-4"	70
✱ F1	8	#6	STR	1'-11"	23
✱ F2	4	#6	STR	3'-3"	20
✱ F3	4	#6	STR	3'-8"	22
✱ F4	4	#6	STR	3'-0"	18
✱ F5	4	#6	STR	3'-5"	21
✱ S13	104	#5	1	5'-9"	624

✱ EPOXY COATED REINFORCING STEEL	2125 LBS.
CLASS AA CONCRETE (PARAPET & END POSTS)	15.33 CU. YDS.
1'-2" X 2'-9½" CONCRETE PARAPET	120.00 LIN. FT.

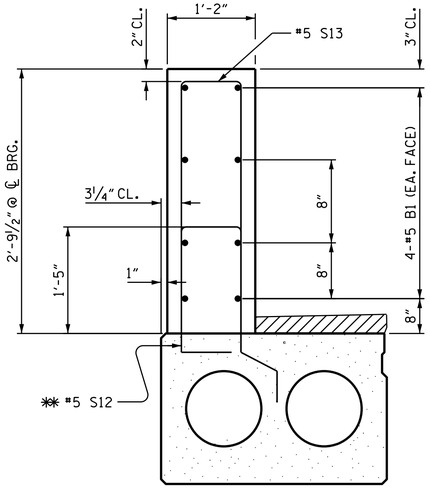


END VIEW

(DRAIN BLOCKOUT NOT SHOWN)



ELEVATION



SECTION THRU PARAPET

PARAPET AND END POST FOR TWO BAR RAIL

PROJECT NO. B-5405

TRANSYLVANIA COUNTY

STATION: 14+27.00 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE CONCRETE PARAPET & END POSTS DETAILS

DocuSigned by: Lisa M. Samples 12/8/2017

NORTH CAROLINA PROFESSIONAL SEAL 037031 ENGINEER LISA M SAMPLES

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DRAWN BY :	J.M. KEPICH	DATE : 04/17
CHECKED BY :	L.M. SAMPLES	DATE : 07/17
DESIGN ENGINEER OF RECORD :	L.M. SAMPLES	DATE : 08/17

05-DEC-2017 15:38
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jkepich

BILL OF MATERIAL FOR ONE 60' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B20	6	#4	STR	21'-2"	85	21'-2"	85
S10	8	#5	3	4'-10"	40	4'-10"	40
S11	128	#4	3	5'-10"	499	5'-10"	499
✳S12	70	#5	1	5'-9"	420		
S14	4	#4	4	5'-8"	15	5'-8"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL LBS.					669		669
✳EPOXY COATED REINFORCING STEEL LBS.					420		
6000 P.S.I. CONCRETE CU. YDS.					10.3		10.3
0.6" Ø L.R. STRANDS No.					24		24

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
60' UNITS	2 1/8"	2'-8 1/8"

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 2'-0"
60' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1 7/8" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/2" ↓
FINAL CAMBER	1 3/8" ↑

** INCLUDES FUTURE WEARING SURFACE

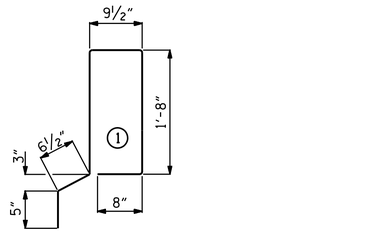
CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
60' UNIT			
EXTERIOR C.S.	2	60'-0"	120'-0"
INTERIOR C.S.	9	60'-0"	540'-0"
TOTAL	11		660'-0"

CONCRETE RELEASE STRENGTH

UNIT	PSI
60' UNITS	4800

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

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

NOTES

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

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

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

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

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

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

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

ALL REINFORCING STEEL IN CONCRETE 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.

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

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

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

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

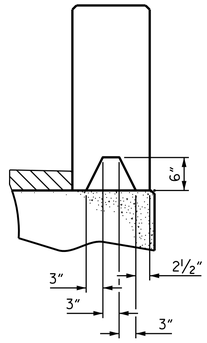
THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

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

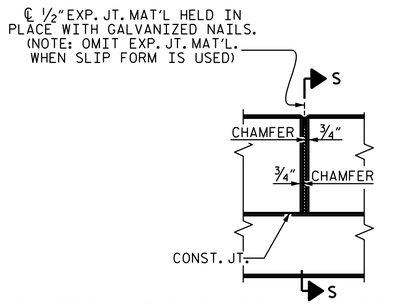
THE DRAIN OPENING AT THE GUTTERLINE SHALL BE 4" X 8". THE HEIGHT OF THE BLOCKOUT IN THE CONCRETE PARAPET SHALL EXTEND FROM THE TOP OF THE CORED SLAB UNIT TO THE TOP OF THE DRAIN OPENING.

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

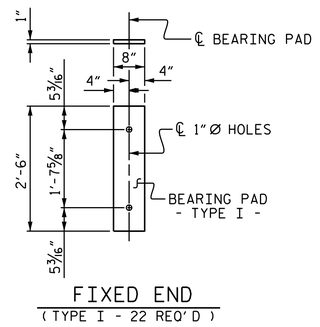
SECTION THRU PARAPET



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



ELEVATION AT EXPANSION JOINTS



FIXED END
(TYPE I - 22 REQ'D)

PARAPET DETAILS

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

PROJECT NO. B-5405
TRANSYLVANIA COUNTY
STATION: 14+27.00 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3'-0" X 2'-0"
PRESTRESSED CONCRETE
CORED SLAB UNIT

DocuSigned by: Lisa M. Samples 5663D09A4B449C... 10/25/2017

NORTH CAROLINA PROFESSIONAL SEAL 037031 ENGINEER LISA M SAMPLES

ms consultants, inc.
920 Main Campus Drive
Suite 430
Raleigh, NC 27606
NC License Number : C-3239

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			22

STD. NO. 24PCS3_33_75&105S

ASSEMBLED BY : J.M. KEPICH	DATE : 04/17		
CHECKED BY : L.M. SAMPLES	DATE : 07/17		
DRAWN BY : MAA	6/10	REV. 11/14	MAA/TMG
CHECKED BY : MKT	7/10		

24-OCT-2017 15:36
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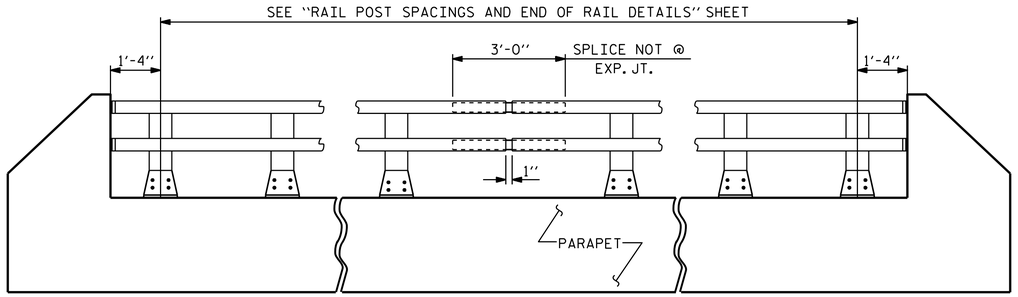
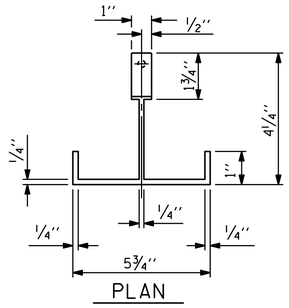
JKepich

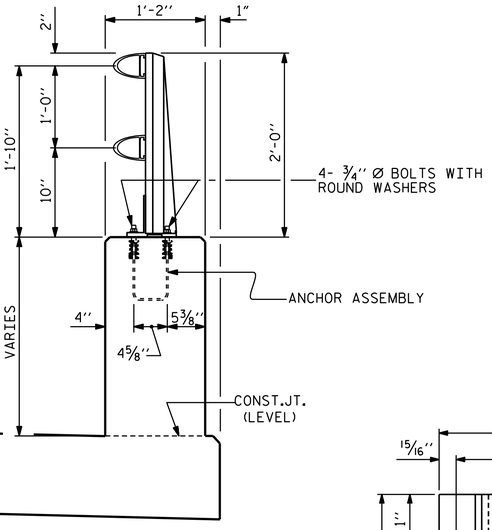


ELEVATION

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



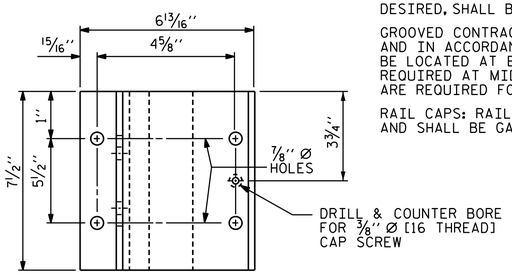
PLAN



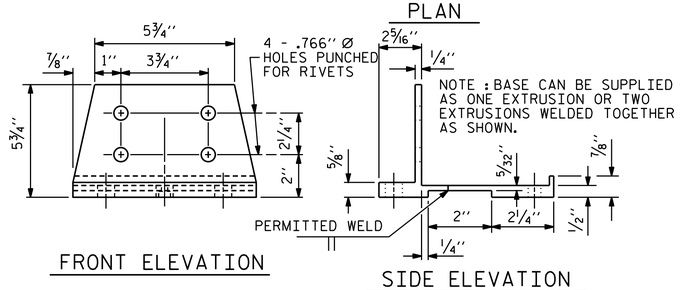
FRONT ELEVATION SIDE ELEVATION

DETAILS OF POST

SECTION THRU PARAPET AND RAIL



PLAN



FRONT ELEVATION SIDE ELEVATION

POST BASE DETAILS

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 LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER ''2 BAR METAL RAIL ALTERNATE''. ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

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

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

ANODIZING

ALUMINUM FOR POSTS, BASES, RAILS, EXPANSION BARS, CLAMP BARS, RIVETS, AND SHIMS SHALL BE ANODIZED DARK BROWN. FOR ANODIZED 2 BAR METAIL RAIL, SEE SPECIAL PROVISIONS.

ANY DAMAGE TO THE ANODIZED SURFACE OF THE RAIL OR COMPONENTS DURING THE CONSTRUCTION SHALL BE REPAIRED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AT THE DIRECTION OF THE ENGINEER AND AT THE CONTRACTOR'S EXPENSE.

AFTER A SHADE OF BROWN HAS BEEN SELECTED FOR THE RAILING, THE CONTRACTOR SHALL SUBMIT A SAMPLE OF COMPATIBLE EXTERIOR ACRYLIC HOUSE PAINT TO THE ENGINEER. THIS PAINT SHALL MATCH THE ANODIZED RAIL COLOR AS CLOSELY AS POSSIBLE. AFTER ERECTION OF THE ANODIZED ALUMINUM RAILING, ALL EXPOSED ANCHOR BOLTS, NUTS, WASHERS, MACHINE SCREWS, CAP SCREWS, BOLTS, ATTACHMENT BRACKETS, HOLD DOWN PLATES, RAIL CAPS AND BUILT UP ANGLES SHALL BE COATED WITH TWO COATS OF THIS PAINT.

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.

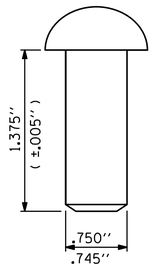
ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

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.

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.

PAY LENGTH = 105.00 LIN. FT.



RIVET DETAIL

DocuSigned by: Lisa M. Samples 10/25/2017

PROJECT NO. B-5405

TRANSYLVANIA COUNTY

STATION: 14+27.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ANODIZED 2 BAR METAL RAIL

ASSEMBLED BY : J.M. KEPICH	DATE : 04/17
CHECKED BY : L.M. SAMPLES	DATE : 07/17

DRAWN BY : EEM	6/94	REV. 5/1/06	TLA/GM
CHECKED BY : RGW	6/94	REV. 10/1/11	MAA/GM
		REV. 6/13	MAA/GM

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920 Main Campus Drive
Suite 430
Raleigh, NC 27606
NC License Number : C-3239

NORTH CAROLINA PROFESSIONAL SEAL 037031 ENGINEER LISA M SAMPLES

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STD. NO. BMR3

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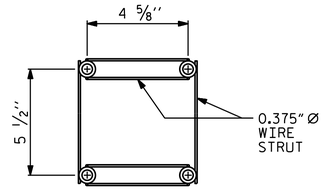
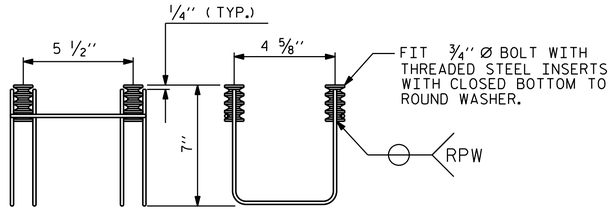
JKepich



PLAN



SIDE VIEW ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(22 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 1/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

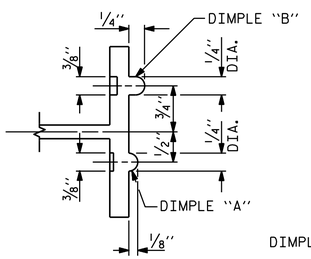
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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.

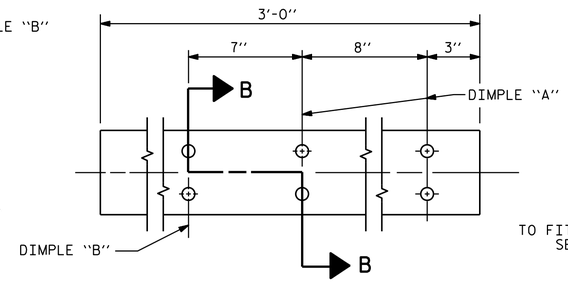
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

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.

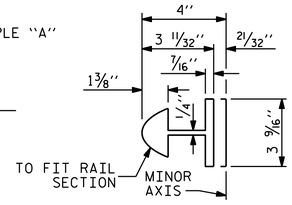
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY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



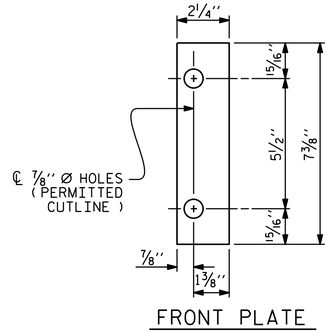
SECTION B - B



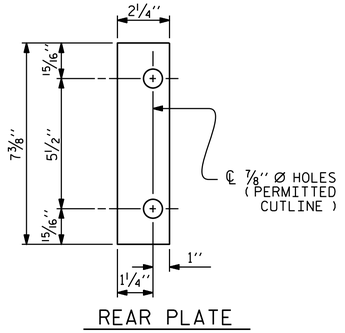
EXPANSION BAR DETAILS



BAR SECTION



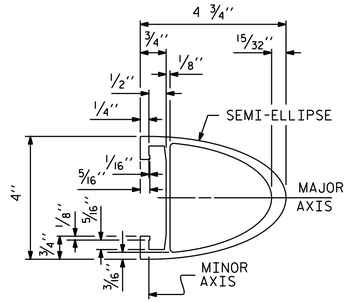
FRONT PLATE



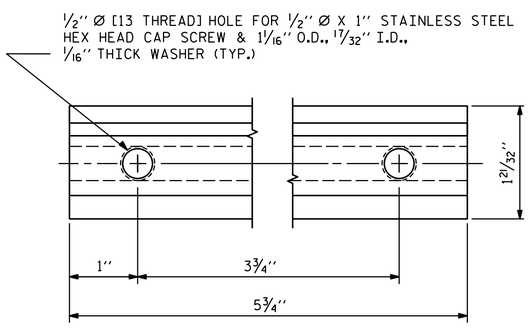
REAR PLATE

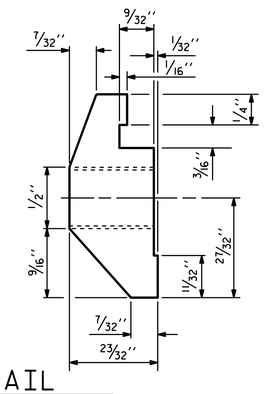
SHIM DETAILS

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



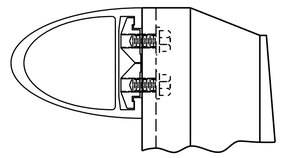
RAIL SECTION



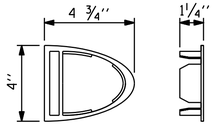


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. B-5405
TRANSYLVANIA COUNTY
STATION: 14+27.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

ANODIZED
2 BAR METAL RAIL

DocuSigned by: 10/25/2017

NORTH CAROLINA PROFESSIONAL SEAL 037031 ENGINEER LISA M SAMPLES

ms consultants, inc.
920 Main Campus Drive
Suite 430
Raleigh, NC 27606
NC License Number : C-3239

ASSEMBLED BY : J.M. KEPICH	DATE : 04/17
CHECKED BY : L.M. SAMPLES	DATE : 07/17
DRAWN BY : EEM 6/94	REV. 8/16/99 MAB/LES
CHECKED BY : RGW 6/94	REV. 5/1/06R KMM/GM
	REV. 10/1/11 MAA/GM

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2			4			22

STD. NO. BMR4

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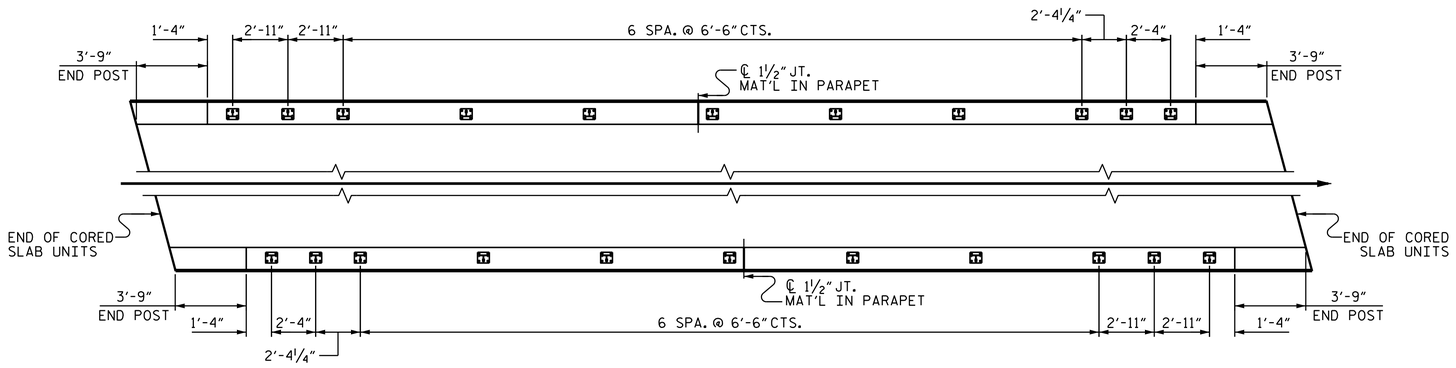
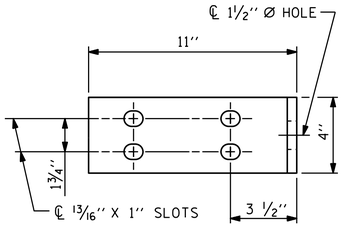
JKepich

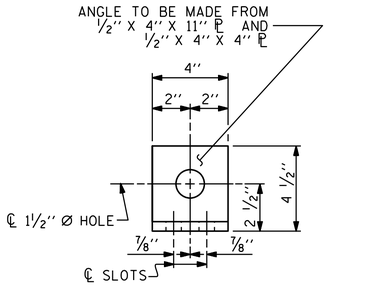


PLAN OF RAIL POST SPACINGS

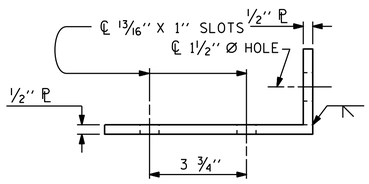
TOTAL NUMBER OF POSTS = 22



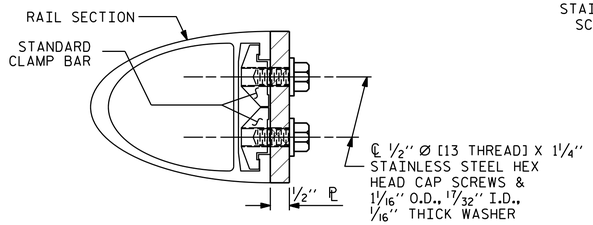
ELEVATION



END VIEW (FIX AND EXP.)

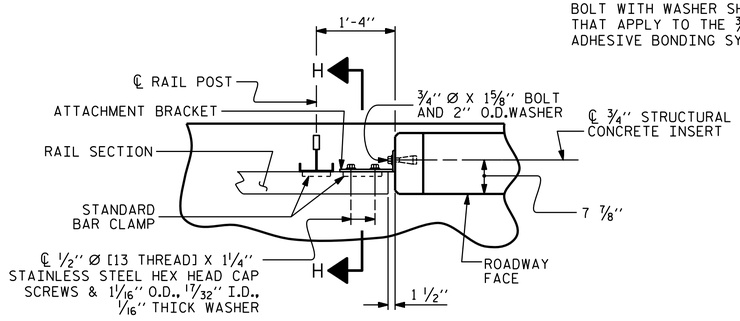


TOP VIEW



SECTION H-H (FIX)

FIXED



PLAN - RAIL AND END POST

DETAILS FOR ATTACHING METAL RAIL TO 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 1½''.

B. 1 - ¾'' Ø X 1⅝'' 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 ¾'' Ø X 1⅝'' 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. ½'' PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾'' STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾''Ø X 1⅝'' BOLT WITH 2'' O.D. WASHER IN PLACE. THE ¾''Ø X 1⅝'' 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).

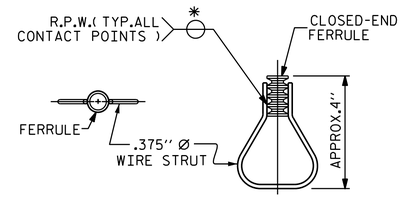
E. ½'' Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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 ¾'' STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾'' STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½'' 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 ¾'' Ø X 1⅝'' BOLT WITH WASHER SHALL BE REPLACED WITH A ¾''Ø X 6½'' BOLT AND 2'' O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾'' Ø X 1⅝'' BOLT SHALL APPLY TO THE ¾''Ø X 6 ½'' 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. B-5405

TRANSYLVANIA COUNTY

STATION: 14+27.00 -L-

SHEET 3 OF 3

DocuSigned by: 10/25/2017

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

RAIL POST SPACINGS AND END OF RAIL DETAILS
FOR ONE OR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			22

ASSEMBLED BY : J.M. KEPICH DATE : 04/17
CHECKED BY : L.M. SAMPLES DATE : 07/17

DRAWN BY : FCJ 1/88
CHECKED BY : CRK 3/89

REV. 5/7/03 RWW/JTE
REV. 5/1/06 TLA/GM
REV. 10/1/11 MAA/GM

STD. NO. BMR2

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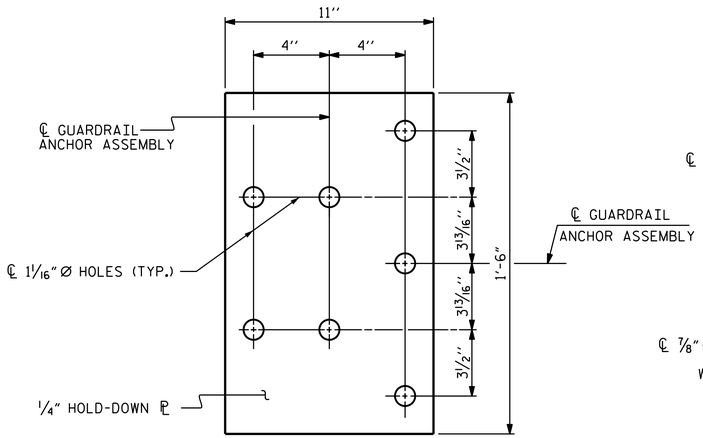
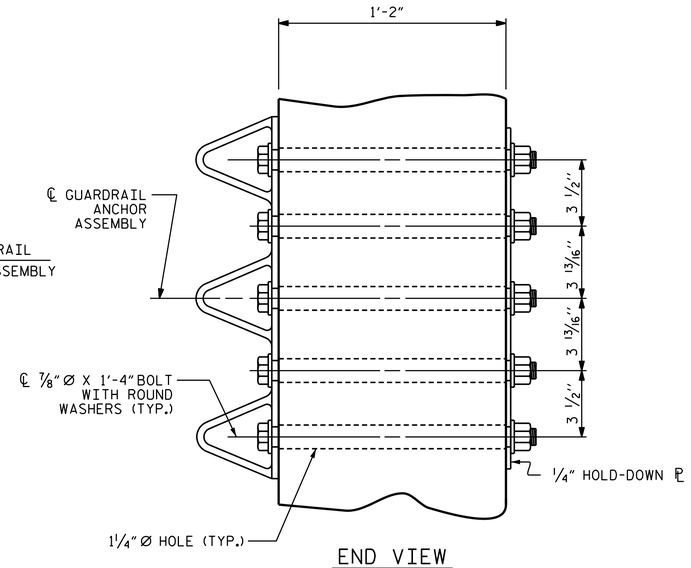
JKepich



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.

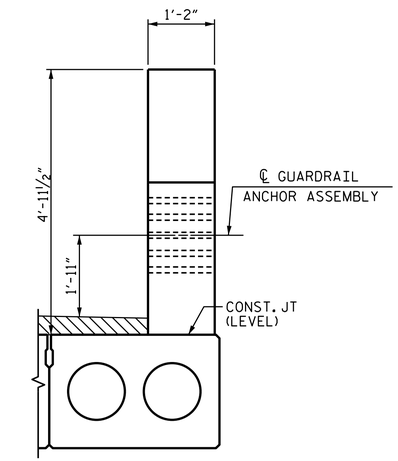
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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.

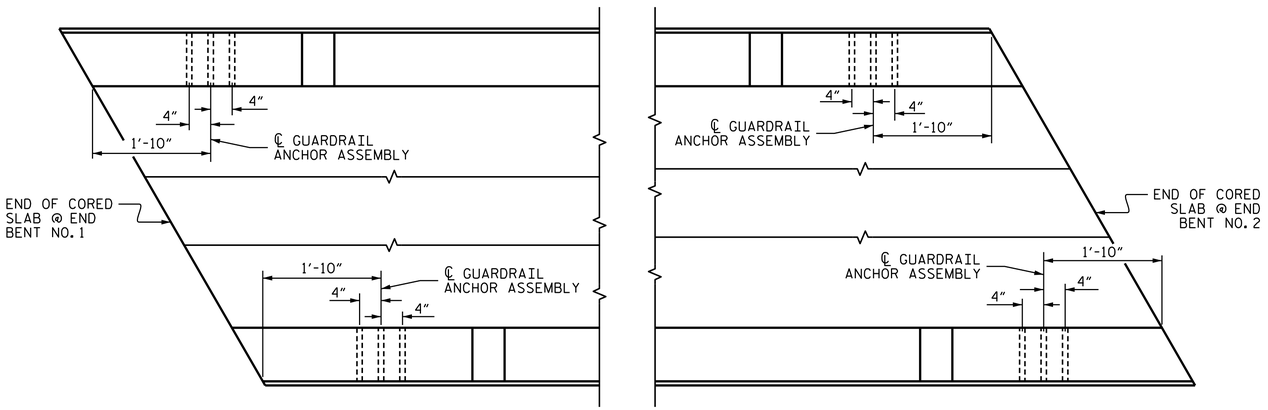
ALL METAL SURFACES, INCLUDING PLATES, BOLTS, NUTS, AND WASHERS SHALL BE PAINTED DARK BROWN.

SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



END VIEW
(TWO BAR METAL RAIL)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. B-5405
TRANSYLVANIA COUNTY
STATION: 14+27.00 -L-

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

DocuSigned by: Lisa M. Samples 5663D99A9B449C...
12/8/2017

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ASSEMBLED BY :	J.M. KEPICH
DATE :	04/17
CHECKED BY :	L.M. SAMPLES
DATE :	07/17
DRAWN BY : MAA	5/10
CHECKED BY : GM	5/10
REV. 6/13	MAA/GM
REV. 1/15	MAA/TMG
REV. 12/17	MAA/THC

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2			4			22

STD. NO. GRA3

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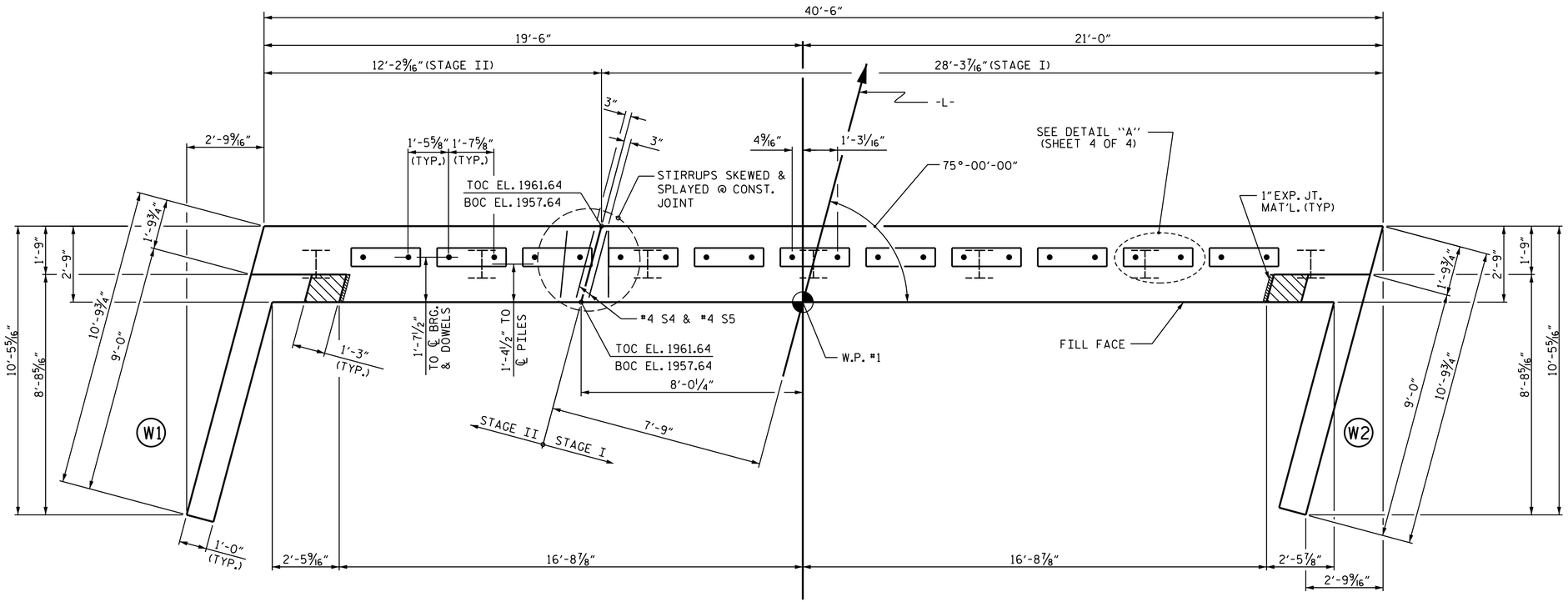
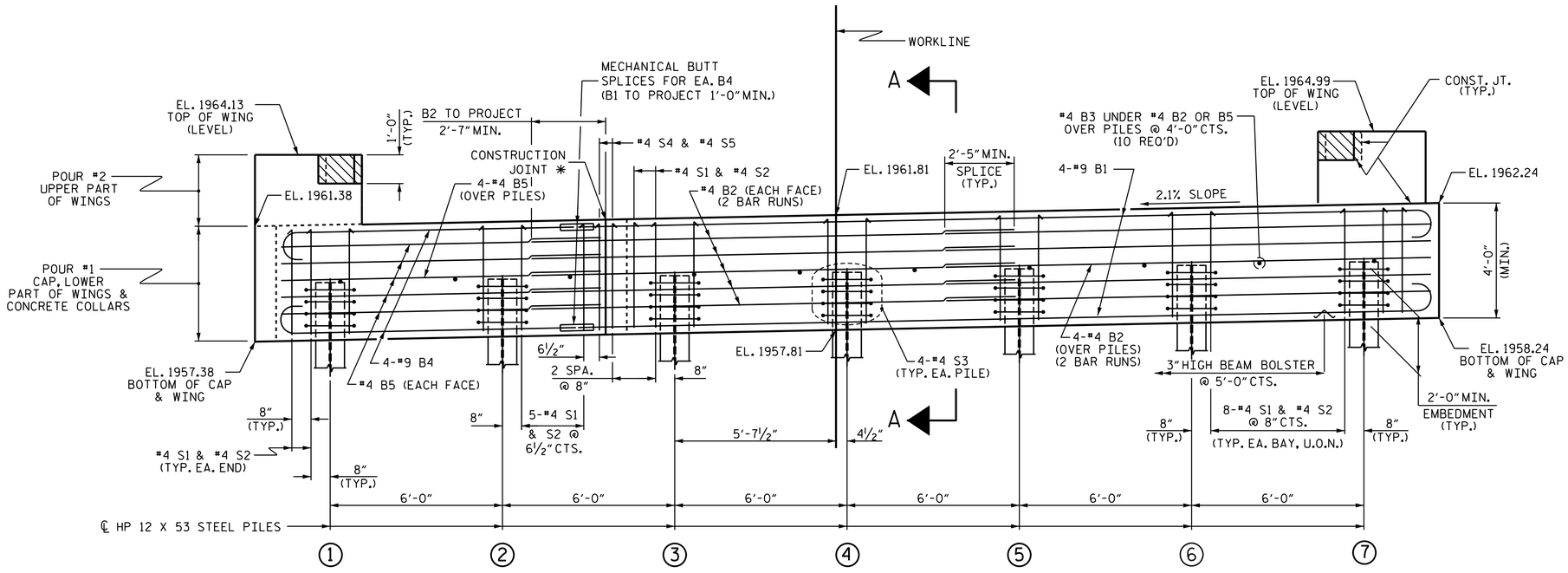
jkepich



PLAN



ELEVATION

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

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 CONCRETE PARAPET IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

* FOR CONSTRUCTION JOINT DETAIL SEE SHEET 4 OF 4.

TOP OF PILE ELEVATIONS

1	1959.43
2	1959.55
3	1959.68
4	1959.81
5	1959.94
6	1960.06
7	1960.19

PROJECT NO. B-5405

TRANSYLVANIA COUNTY

STATION: 14+27.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

DocuSigned by: Lisa M. Samples 5663D09A9B449C...
10/25/2017

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2			4			22

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ASSEMBLED BY : J.M. KEPICH DATE : 05/17	
CHECKED BY : L.M. SAMPLES DATE : 07/17	
DRAWN BY : WJH 12/11	REV. 4/15 MAA/TMG
CHECKED BY : AAC 12/11	

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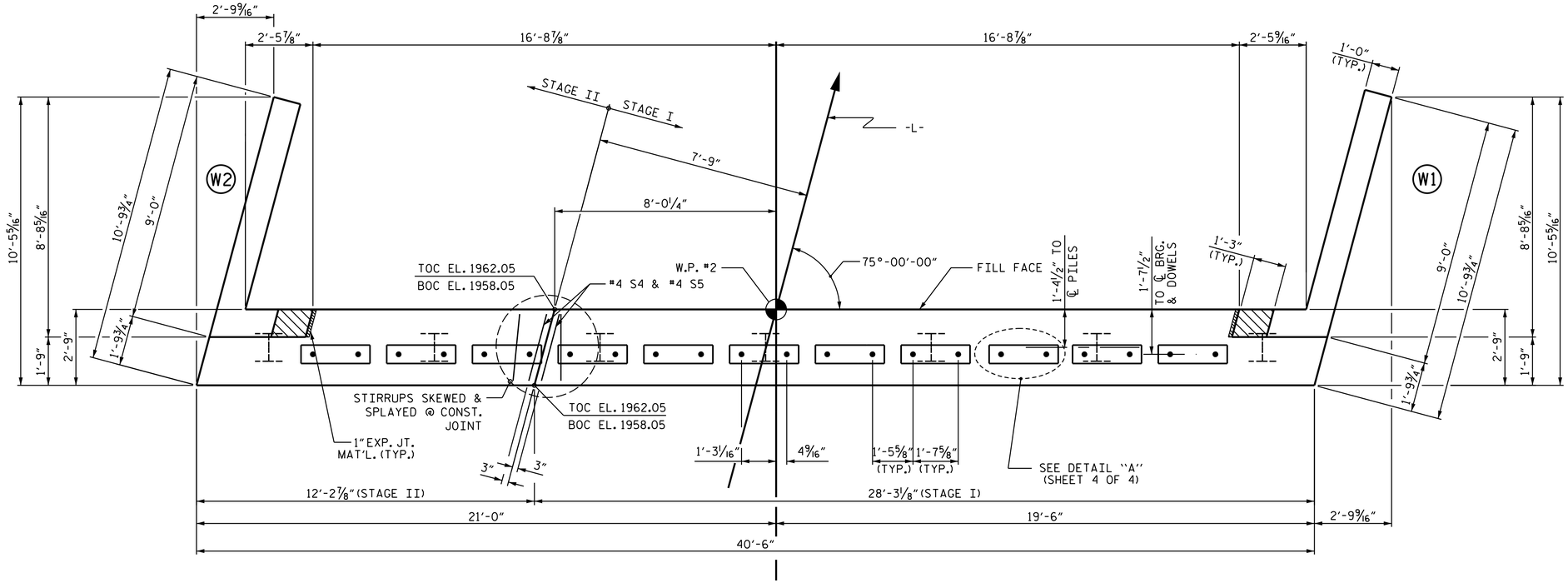

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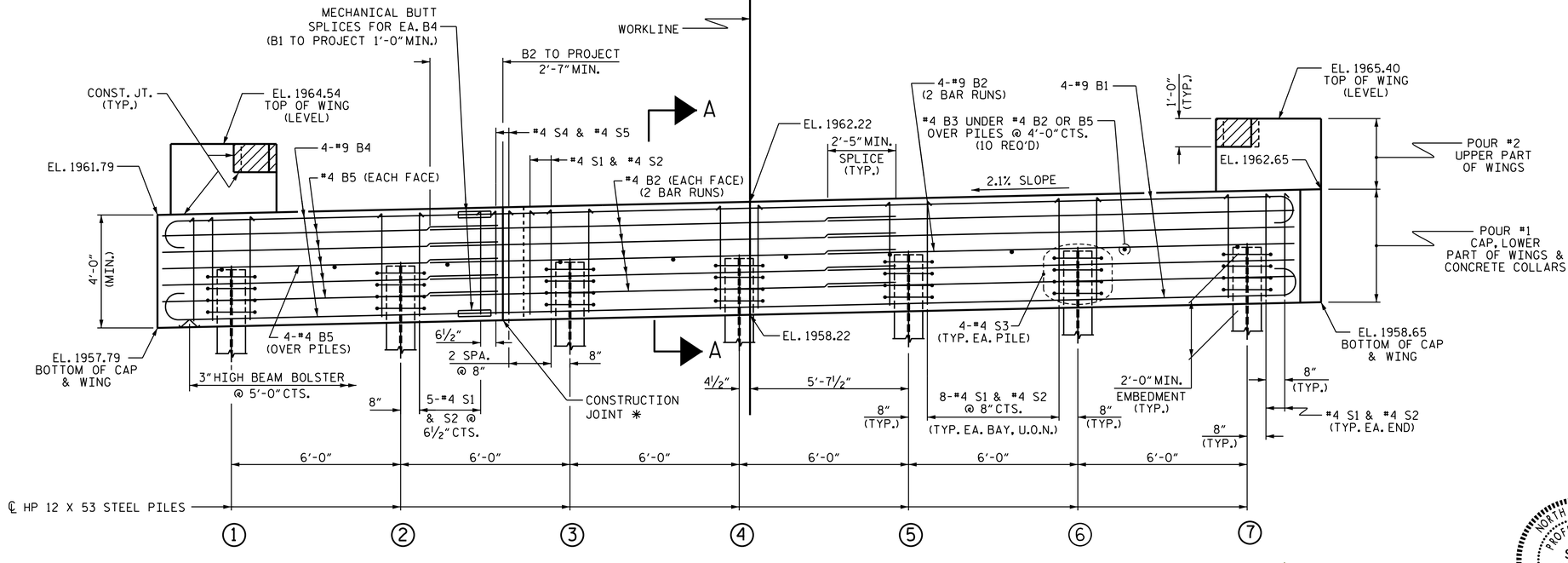

ELEVATION

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

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 CONCRETE PARAPET IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

* FOR CONSTRUCTION JOINT DETAIL SEE SHEET 4 OF 4.

TOP OF PILE ELEVATIONS	
1	1959.84
2	1959.97
3	1960.09
4	1960.22
5	1960.35
6	1960.47
7	1960.60

PROJECT NO. B-5405
TRANSYLVANIA COUNTY
STATION: 14+27.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

DocuSigned by: Lisa M. Samples 10/25/2017

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DESIGN ENGINEER OF RECORD : L.M. SAMPLES	DATE : 08/17	
ASSEMBLED BY : J.M. KEPICH	DATE : 05/17	
CHECKED BY : L.M. SAMPLES	DATE : 07/17	
DRAWN BY : WJH 12/11	REV. 4/15	MAA/TMG
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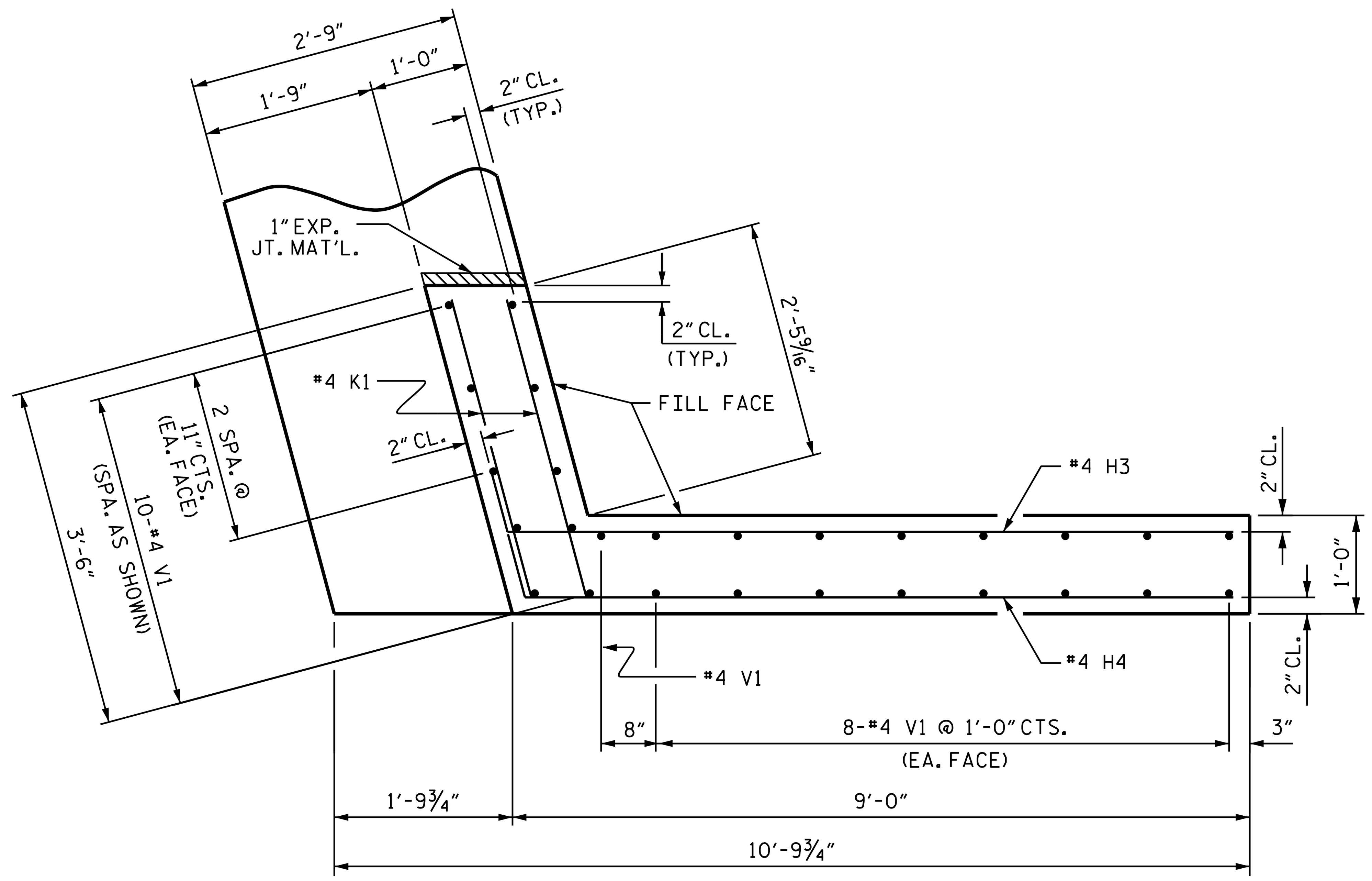
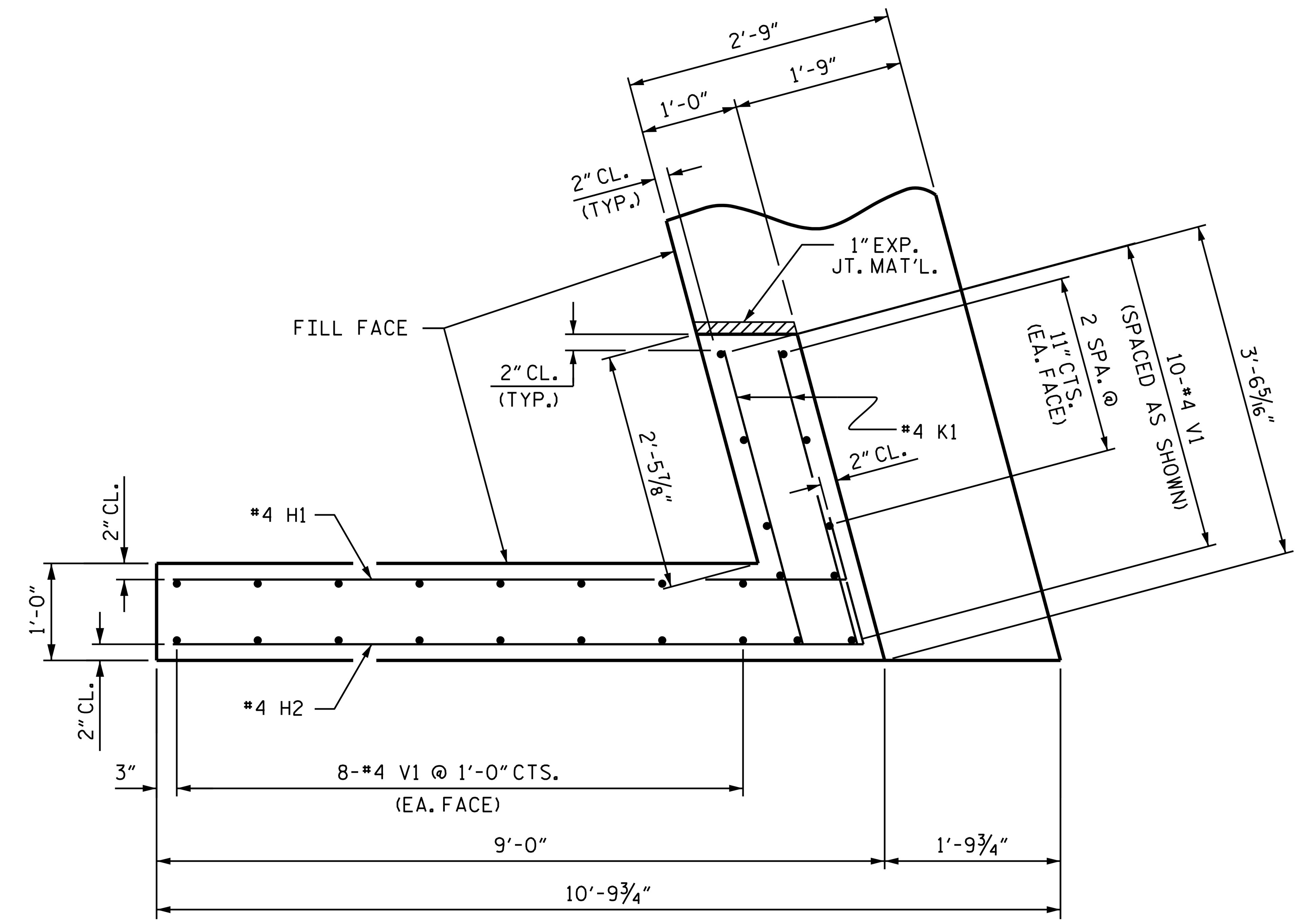
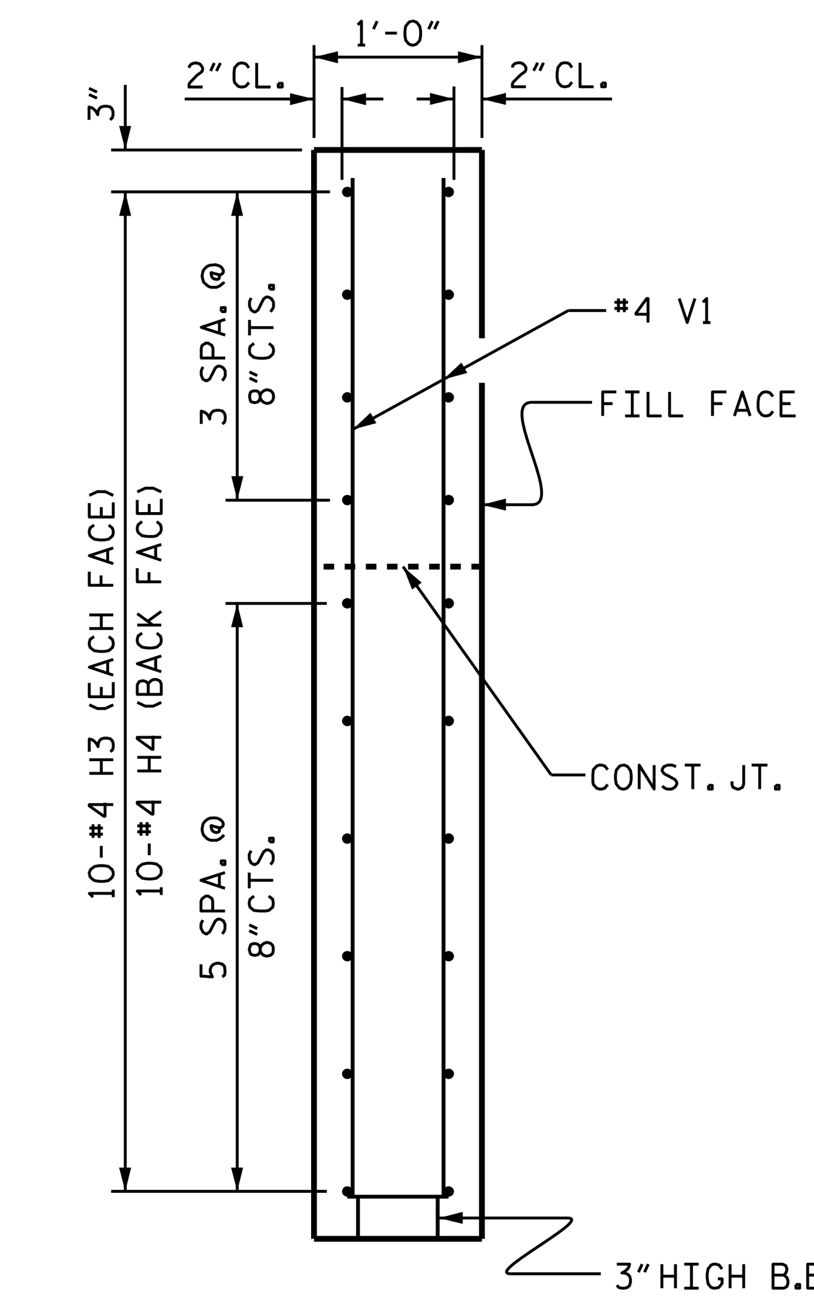


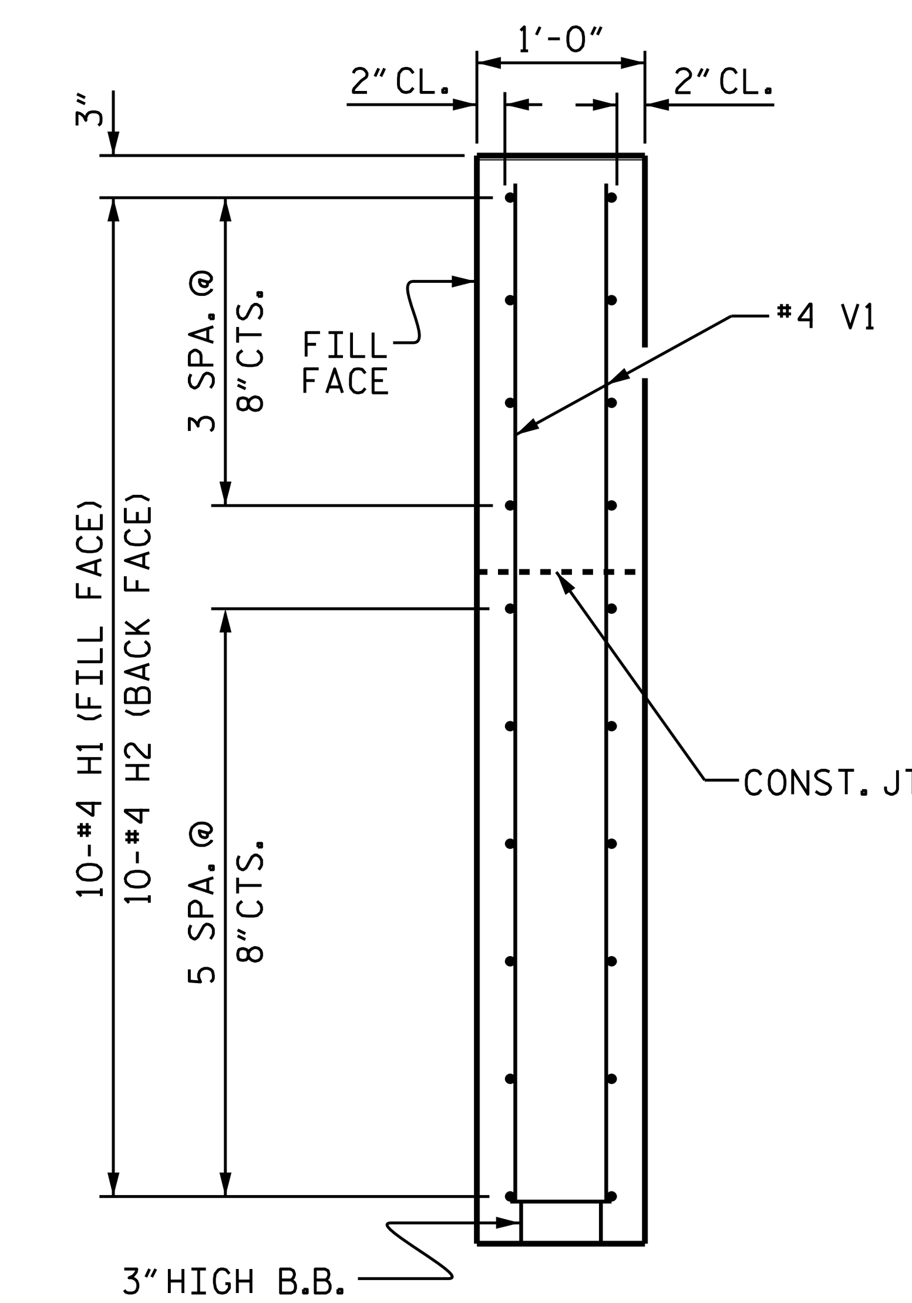
PLAN OF WING (W1)



PLAN OF WING (W2)



SECTION X-X



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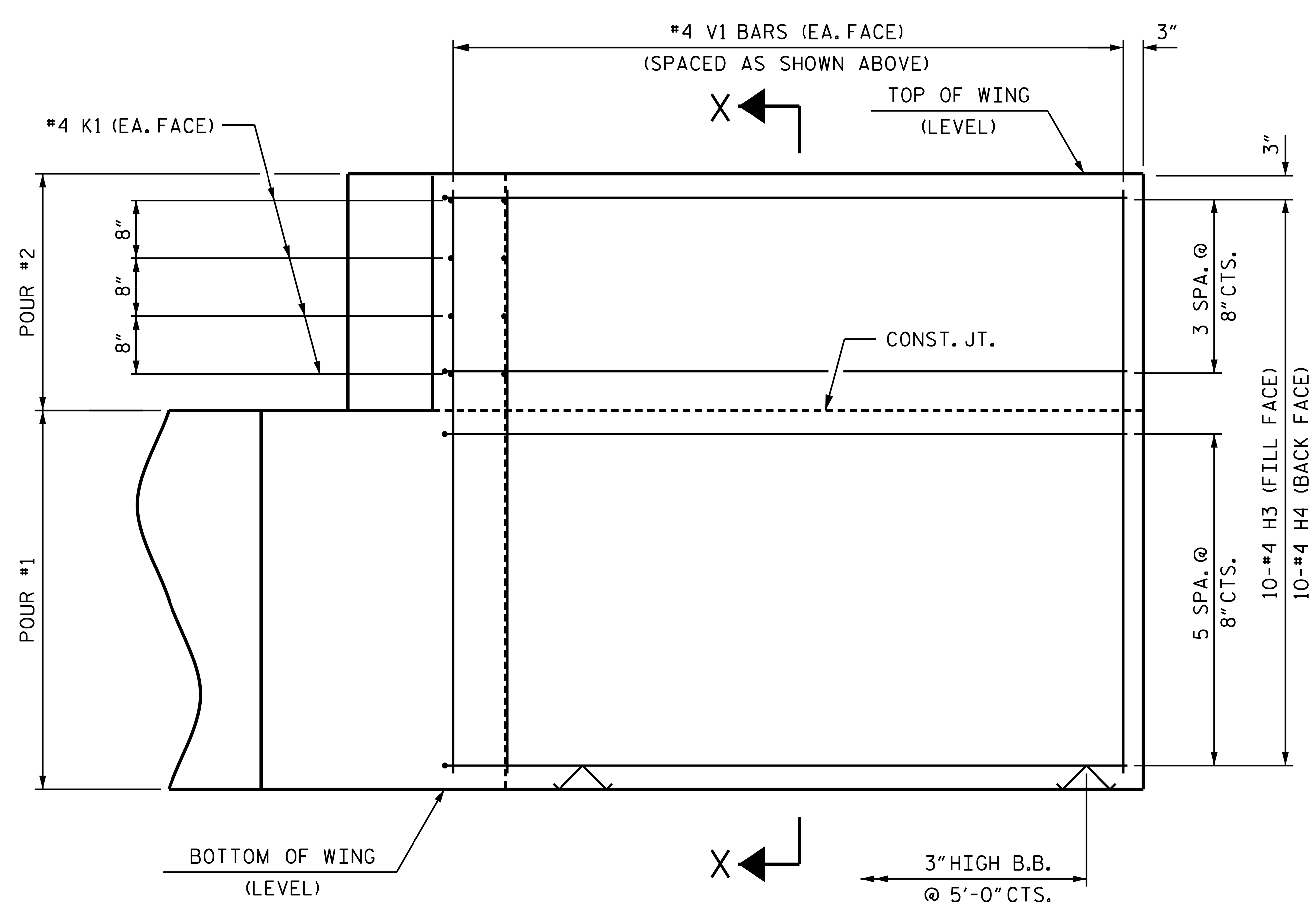
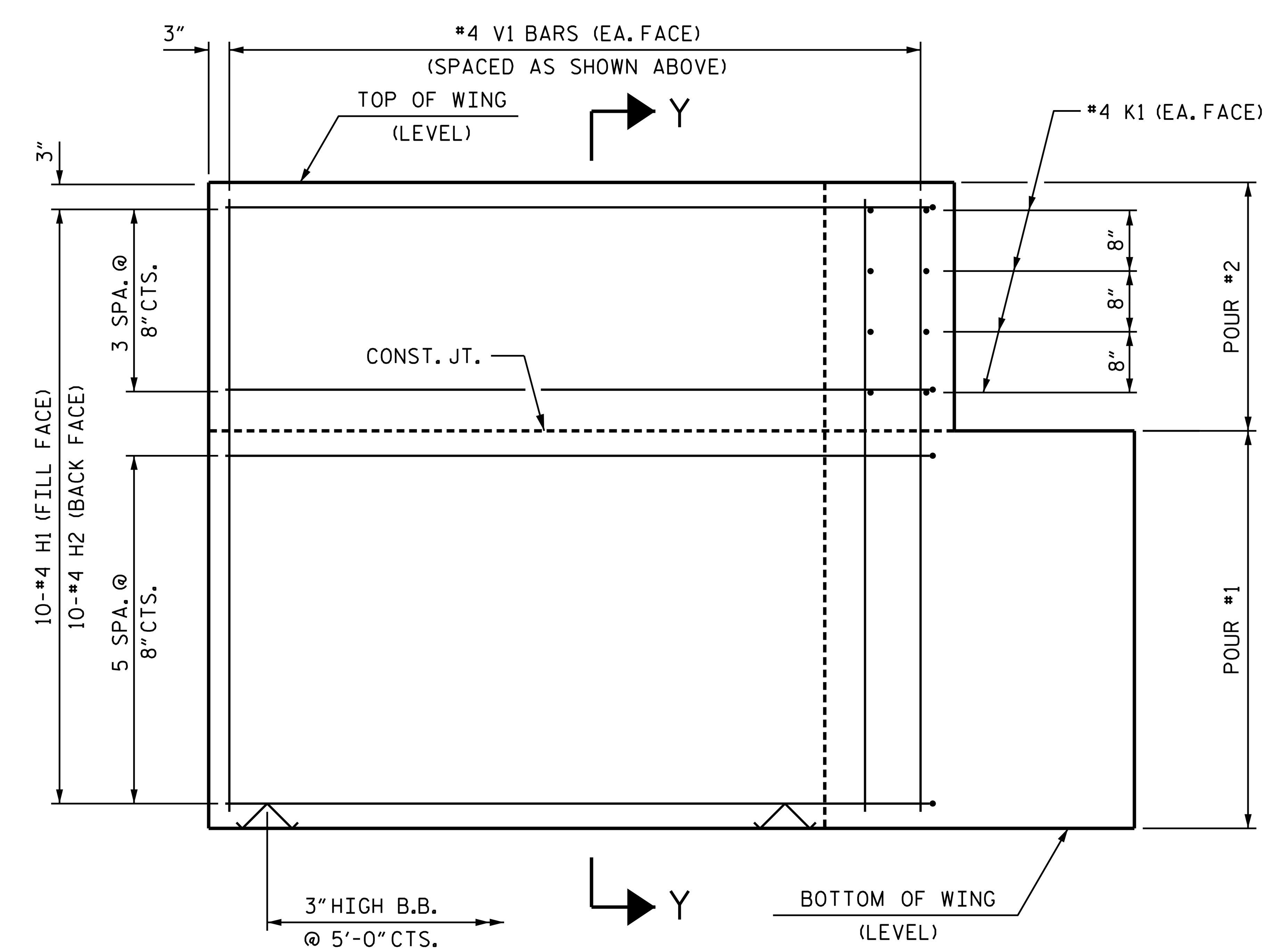


ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. B-5405
TRANSYLVANIA COUNTY
STATION: 14+27.00 -L-
SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT
WING DETAILS

DocuSigned by: 10/25/2017

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037031 LISA M SAMPLES

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1			3					TOTAL SHEETS 22
2			4					

ASSEMBLED BY : J.M. KEPICH	DATE : 05/17		
CHECKED BY : L.M. SAMPLES	DATE : 07/17		
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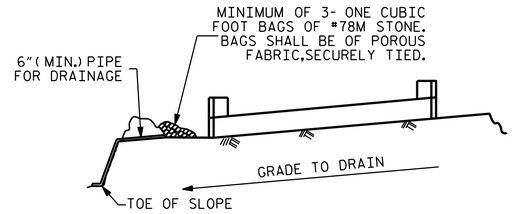
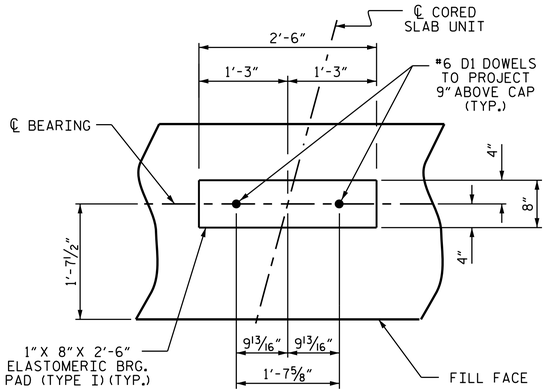


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

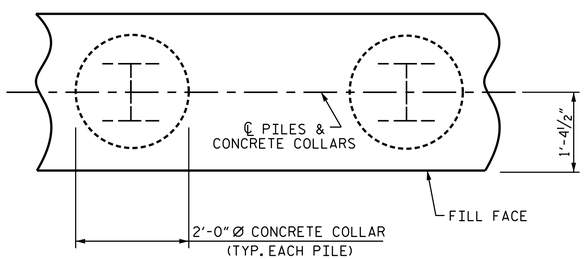
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

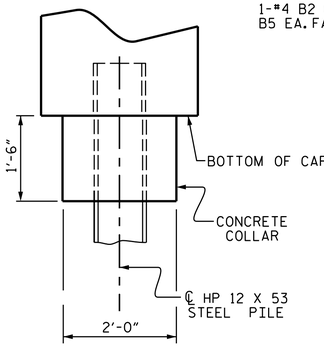


DETAIL "A"

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



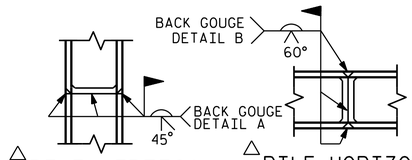
PLAN



ELEVATION

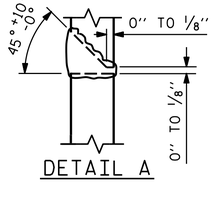
CORROSION PROTECTION FOR STEEL PILES DETAIL

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

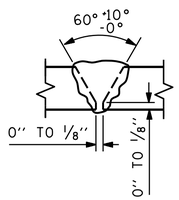


△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



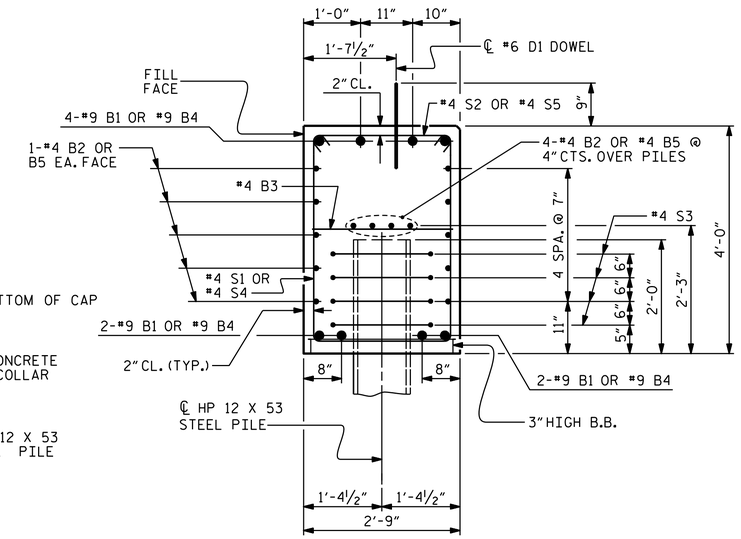
DETAIL A



DETAIL B

△ POSITION OF PILE DURING WELDING.

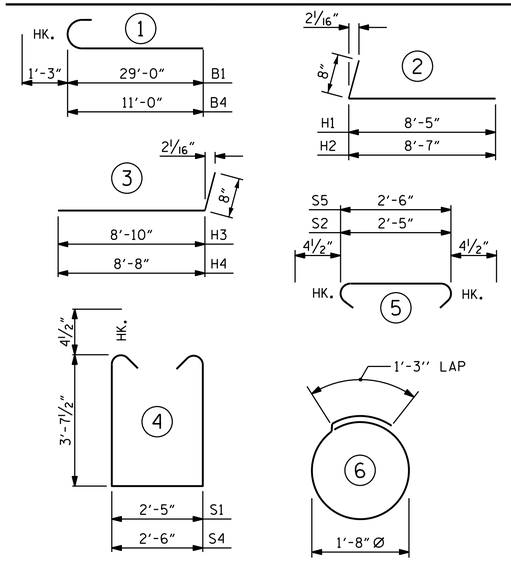
PILE SPLICE DETAILS



SECTION A-A

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 1	END BENT No. 2
HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES
NO: 7 LIN. FT.= 105	NO: 7 LIN. FT.= 105
PILE EXCAVATION IN SOIL LIN. FT.= 27	PILE EXCAVATION IN SOIL LIN. FT.= 25
PILE EXCAVATION NOT IN SOIL LIN. FT.= 43	PILE EXCAVATION NOT IN SOIL LIN. FT.= 45
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 7	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 7

BILL OF MATERIAL FOR ONE END BENT

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	8	#9	1	30'-3"	823
B2	28	#4	STR	16'-7"	310
B3	7	#4	STR	2'-5"	11
D1	16	#6	STR	1'-6"	36
H1	5	#4	2	9'-1"	30
H2	5	#4	2	9'-3"	31
H3	5	#4	3	9'-6"	32
H4	5	#4	3	9'-4"	31
K1	8	#4	STR	3'-1"	17
S1	36	#4	4	10'-5"	251
S2	36	#4	5	3'-2"	76
S3	20	#4	6	6'-6"	87
S4	1	#4	4	10'-6"	7
S5	1	#4	5	3'-3"	2
V1	27	#4	STR	6'-5"	116

REINFORCING STEEL (FOR STAGE I) 1860 LBS.

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B3	3	#4	STR	2'-5"	5
✳B4	8	#9	1	12'-3"	333
B5	14	#4	STR	11'-10"	111
D1	6	#6	STR	1'-6"	14
H1	5	#4	2	9'-1"	30
H2	5	#4	2	9'-3"	31
H3	5	#4	3	9'-6"	32
H4	5	#4	3	9'-4"	31
K1	8	#4	STR	3'-1"	17
S1	15	#4	4	10'-5"	104
S2	15	#4	5	3'-2"	32
S3	8	#4	6	6'-6"	35
S4	1	#4	4	10'-6"	7
S5	1	#4	5	3'-3"	2
V1	26	#4	STR	6'-5"	112

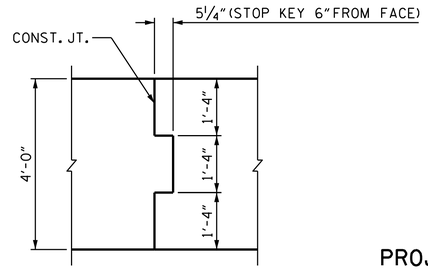
REINFORCING STEEL (FOR STAGE II) 896 LBS.

REINFORCING STEEL TOTAL FOR ONE END BENT 2756 LBS.

CLASS A CONCRETE BREAKDOWN (FOR STAGE I)		CLASS A CONCRETE BREAKDOWN (FOR STAGE II)	
POUR #1	CAP, LOWER PART OF WINGS & COLLARS 13.6 C.Y.	POUR #1	CAP, LOWER PART OF WINGS & COLLARS 6.5 C.Y.
POUR #2	UPPER PART OF WINGS 1.2 C.Y.	POUR #2	UPPER PART OF WINGS 1.2 C.Y.
TOTAL CLASS A CONCRETE	14.8 C.Y.	TOTAL CLASS A CONCRETE	7.7 C.Y.

TOTAL CLASS A CONCRETE 22.5 C.Y.

✳ MECHANICAL BUTT SPLICES ARE REQUIRED, ADJUST BAR LENGTHS AS NECESSARY FOR THE APPROVED SPLICE MECHANISM SELECTED.



CONST. JT. DETAIL

PROJECT NO. B-5405

TRANSYLVANIA COUNTY

STATION: 14+27.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2 DETAILS

DocuSigned by: Lisa M. Samples 5663D099A9B449C...
10/25/2017

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CHECKED BY : L.M. SAMPLES	DATE : 07/17	
DRAWN BY : WJH	12/11	
CHECKED BY : AAC	12/11	

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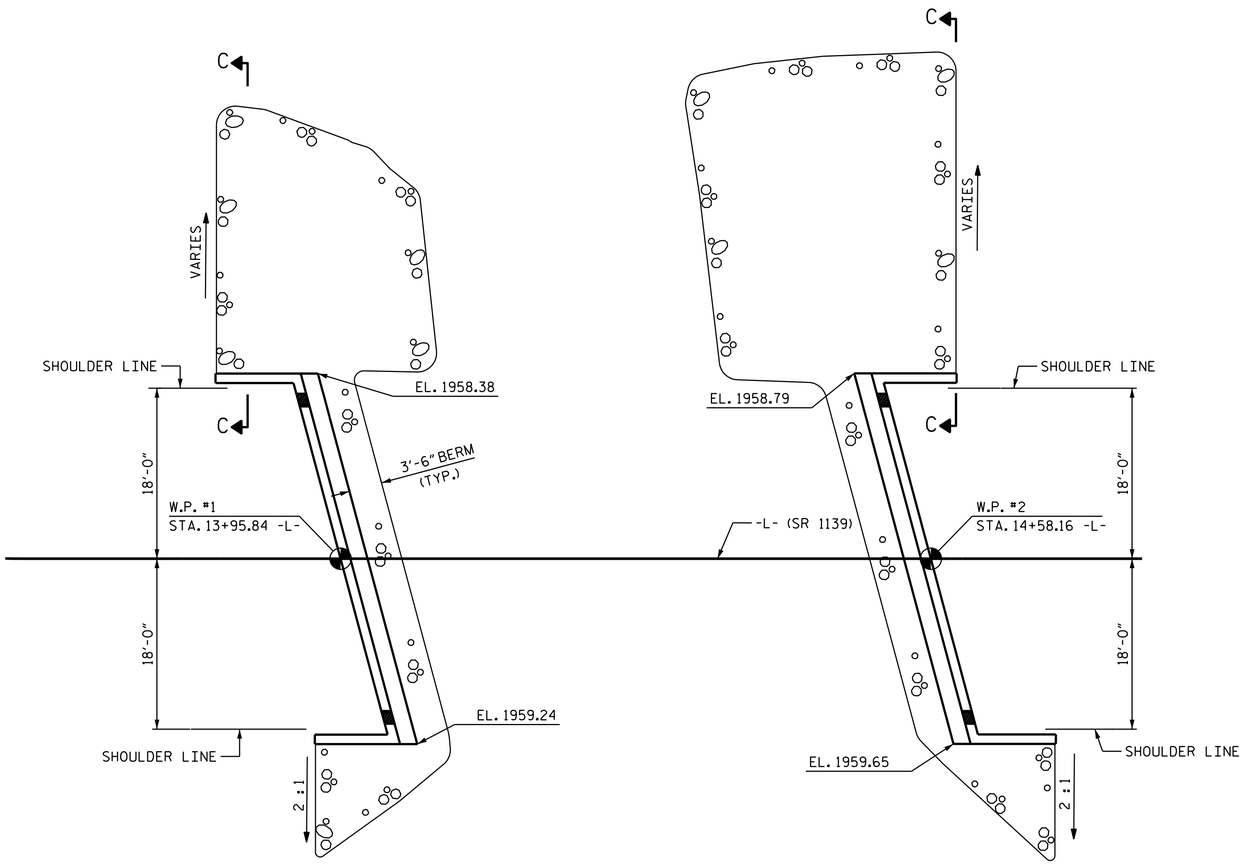
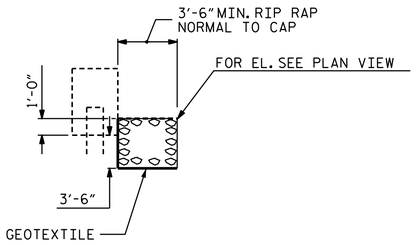
STD. NO. EB_33_75S4



AT END BENT 1

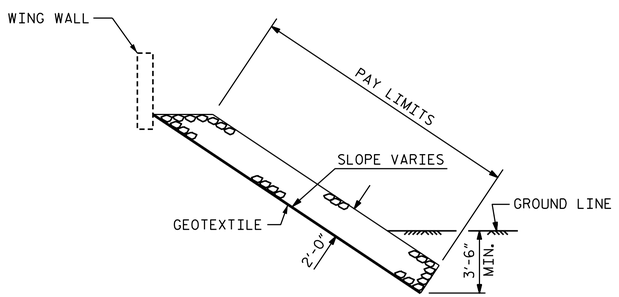
AT END BENT 2

PLAN



℄ SECTION

BERM RIP RAPPED



SECTION C-C

ESTIMATED QUANTITIES

BRIDGE @ STA. 14+27.00	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	56	82
END BENT 2	80	119

PROJECT NO. B-5405

TRANSYLVANIA COUNTY

STATION: 14+27.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

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2			4			22

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CHECKED BY : L.M. SAMPLES DATE : 07/17

DRAWN BY : REK 1/84
CHECKED BY : RDU 1/84

REV. 5/1/06R	TLA/GM
REV. 10/1/11	MAA/GM
REV. 12/21/11	MAA/GM

STD. NO. RR1

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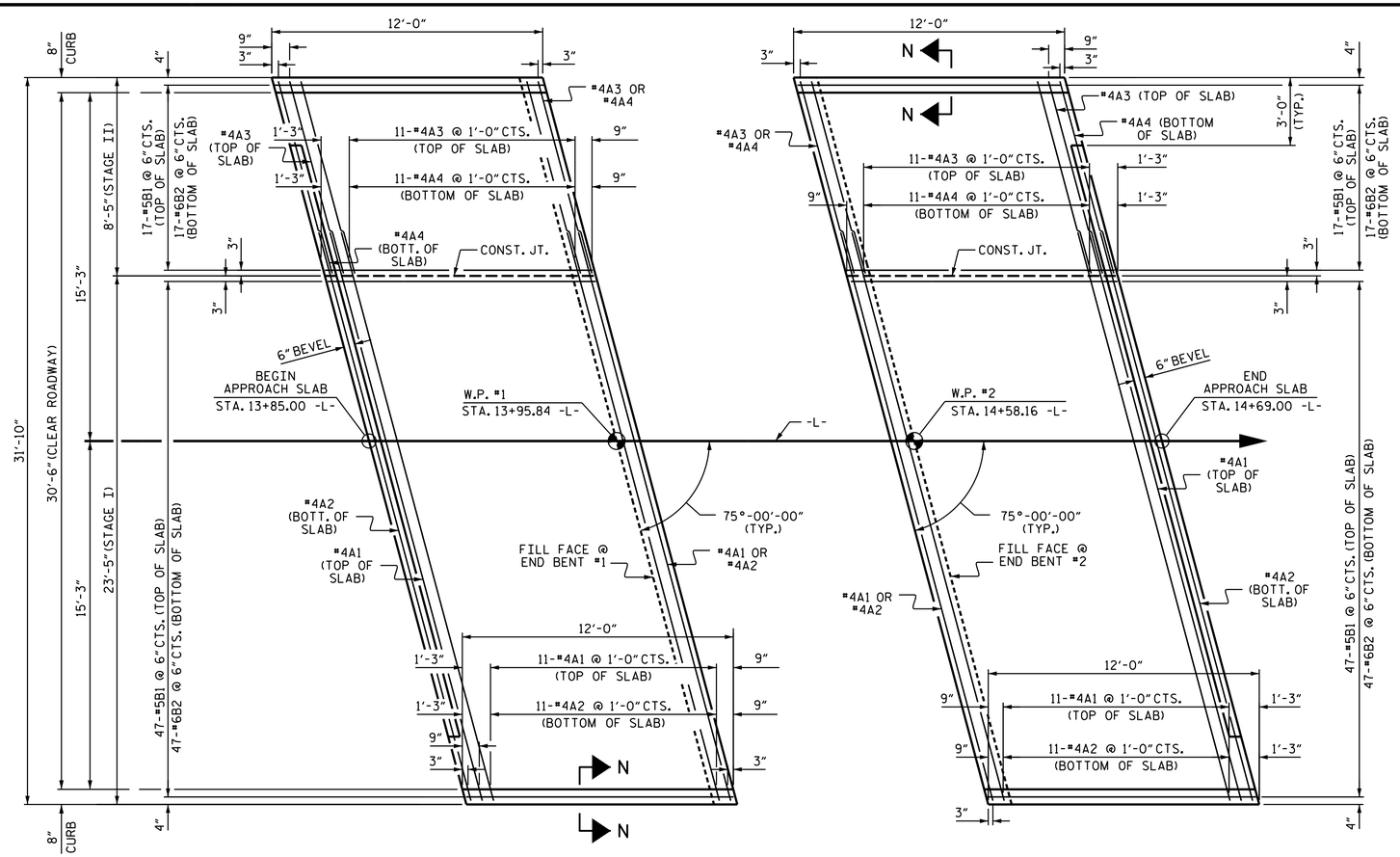
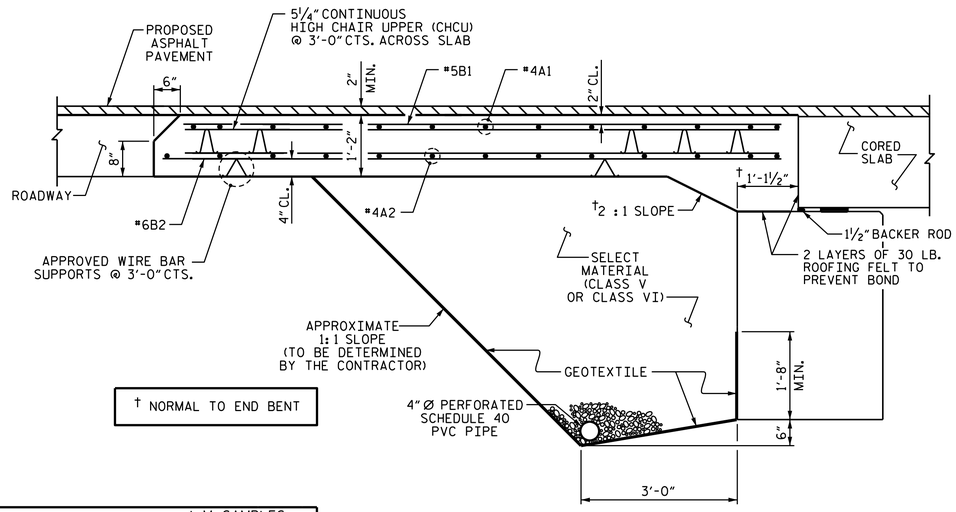


PLAN @ END BENT #1

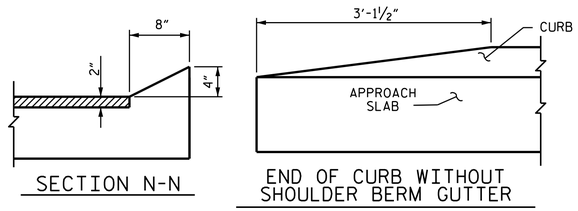
PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB

(TYPE II - MODIFIED APPROACH FILL)



CURB DETAILS

BILL OF MATERIAL

APPROACH SLAB AT EB #1 STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	13	#4	STR	26'-3"	228
A2	13	#4	STR	26'-0"	226
✱B1	47	#5	STR	11'-1"	543
B2	47	#6	STR	11'-7"	818
REINFORCING STEEL				LBS.	1044
✱EPOXY COATED REINFORCING STEEL				LBS.	771
CLASS AA CONCRETE				C. Y.	14.1

APPROACH SLAB AT EB #2 STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	13	#4	STR	26'-3"	228
A2	13	#4	STR	26'-0"	226
✱B1	47	#5	STR	11'-1"	543
B2	47	#6	STR	11'-7"	818
REINFORCING STEEL				LBS.	1044
✱EPOXY COATED REINFORCING STEEL				LBS.	771
CLASS AA CONCRETE				C. Y.	14.1

APPROACH SLAB AT EB #1 STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A3	13	#4	STR	8'-5"	73
A4	13	#4	STR	8'-5"	73
✱B1	17	#5	STR	11'-1"	197
B2	17	#6	STR	11'-7"	296
REINFORCING STEEL				LBS.	369
✱EPOXY COATED REINFORCING STEEL				LBS.	270
CLASS AA CONCRETE				C. Y.	5.3

APPROACH SLAB AT EB #2 STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A3	13	#4	STR	8'-5"	73
A4	13	#4	STR	8'-5"	73
✱B1	17	#5	STR	11'-1"	197
B2	17	#6	STR	11'-7"	296
REINFORCING STEEL				LBS.	369
✱EPOXY COATED REINFORCING STEEL				LBS.	270
CLASS AA CONCRETE				C. Y.	5.3

SPLICE LENGTHS

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

DESIGN ENGINEER OF RECORD : L.M. SAMPLES	DATE : 08/17
ASSEMBLED BY : J.M. KEPICH	DATE : 05/17
CHECKED BY : L.M. SAMPLES	DATE : 07/17
DRAWN BY : SHS/MAA 5-09	REV. 12-17 MAA/THC
CHECKED BY : BCH 5-09	

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PROJECT NO. B-5405

TRANSYLVANIA COUNTY

STATION: 14+27.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) 75° SKEW

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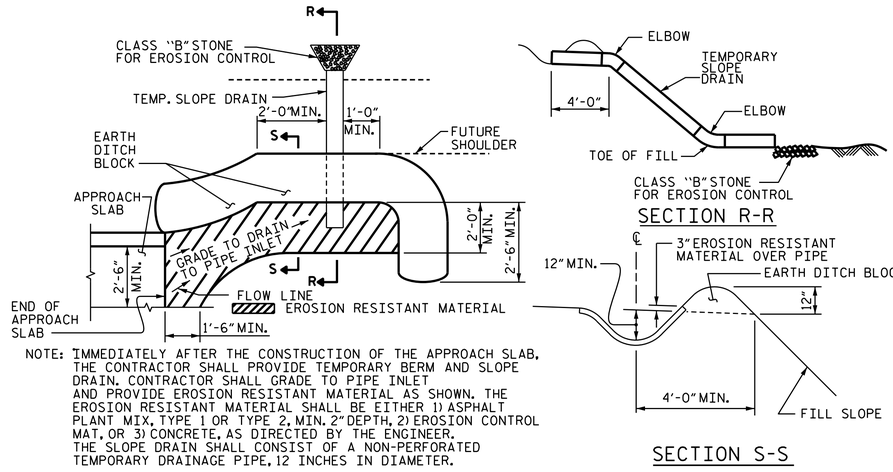


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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)

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.

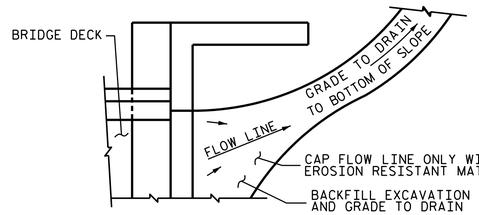
SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

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.

ANCHOR ASSEMBLIES FOR ANCHORED PORTABLE CONCRETE BARRIERS IN BRIDGE APPROACH SLABS WILL BE PAID FOR UNDER LUMP SUM PRICE FOR BRIDGE APPROACH SLABS.



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

PROJECT NO. B-5405

TRANSYLVANIA COUNTY

STATION: 14+27.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

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12/8/2017

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CHECKED BY : L.M. SAMPLES DATE : 07/17

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CHECKED BY : BCH 5-09

REV. 12-17 MAA/THC

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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 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 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.

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM (/) RGW REV. 5-7-03 RWW (/) JTE REV. 10-1-11 MAA (/) GM
REV. 8-16-99 RWW (/) LES REV. 5-1-06 TLA (/) GM

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