

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

**The documents contained herein were originally issued
and sealed by the individuals whose names and license
numbers appear on each page, on the dates appearing
with their signature on that page.**

**This file or an individual page
shall not be considered a certified document.**

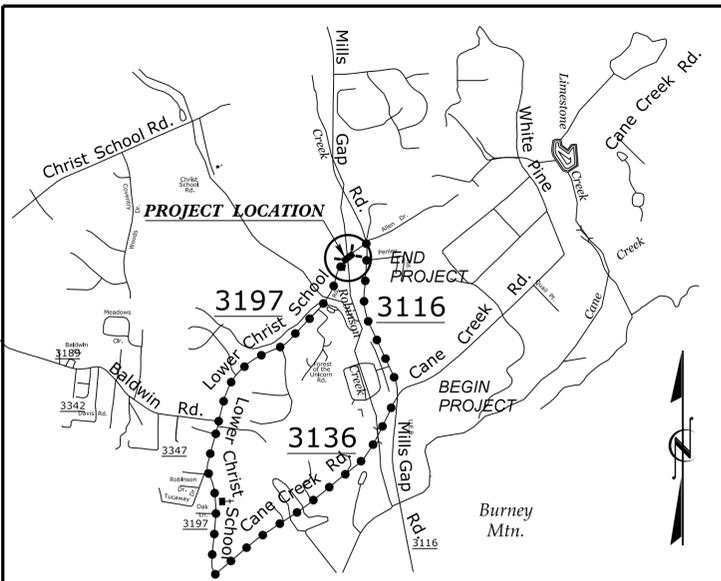
TIP PROJECT: B-5244

CONTRACT: C203669

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

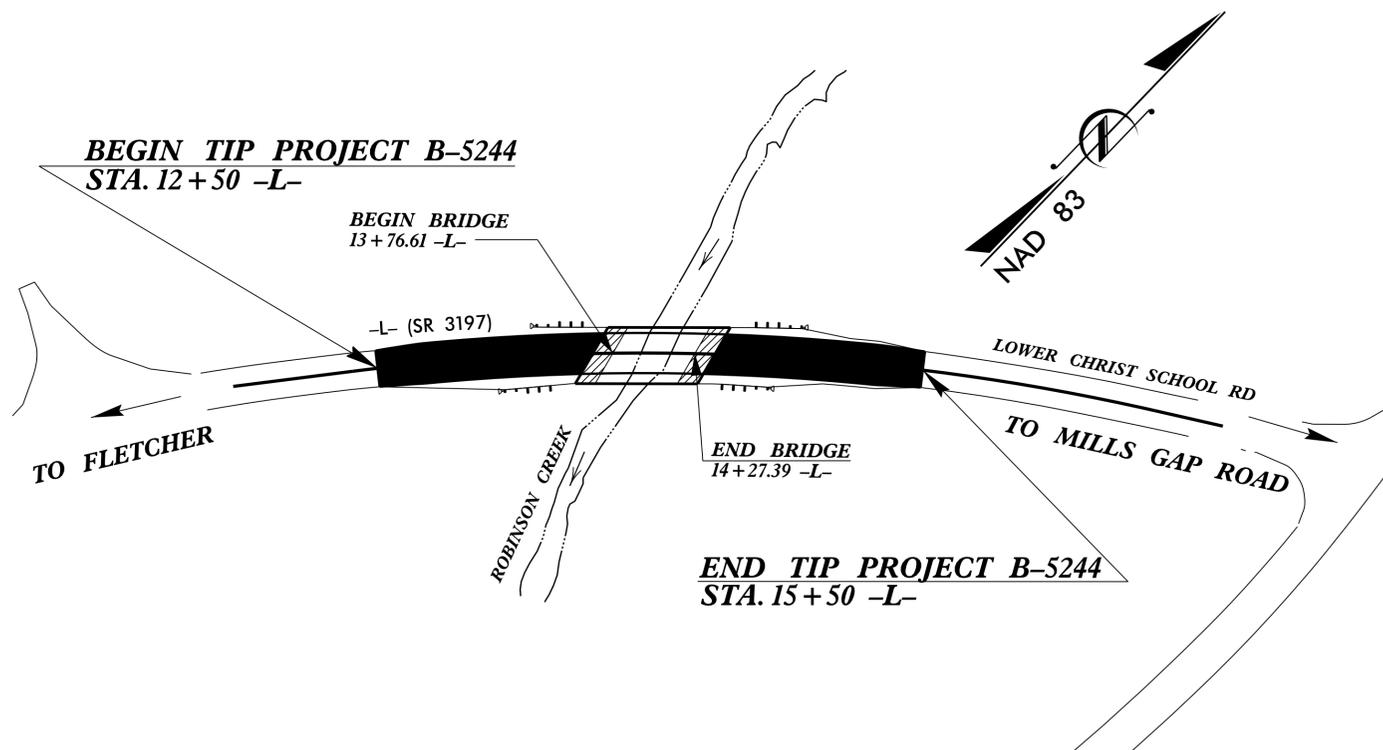
BUNCOMBE COUNTY

LOCATION: BRIDGE No. 363 OVER ROBINSON CREEK ON SR 3197
TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURE



VICINITY MAP

●●●●● OFFSITE DETOUR



STRUCTURE



DESIGN DATA

ADT 2011 = 2200
ADT 2035 = 4000
K = 9 %
D = 70 %
T = 3 % *
V = 40 MPH
* (TTST 1 %, DUAL 2 %)
FUNC. CLASS. =
LOCAL SUB-REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5244 = 0.047 MILES
LENGTH STRUCTURE TIP PROJECT B-5244 = 0.010 MILES

TOTAL LENGTH TIP PROJECT B-5244 = 0.057 MILES

Prepared In the Office of:
DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

2012 STANDARD SPECIFICATIONS

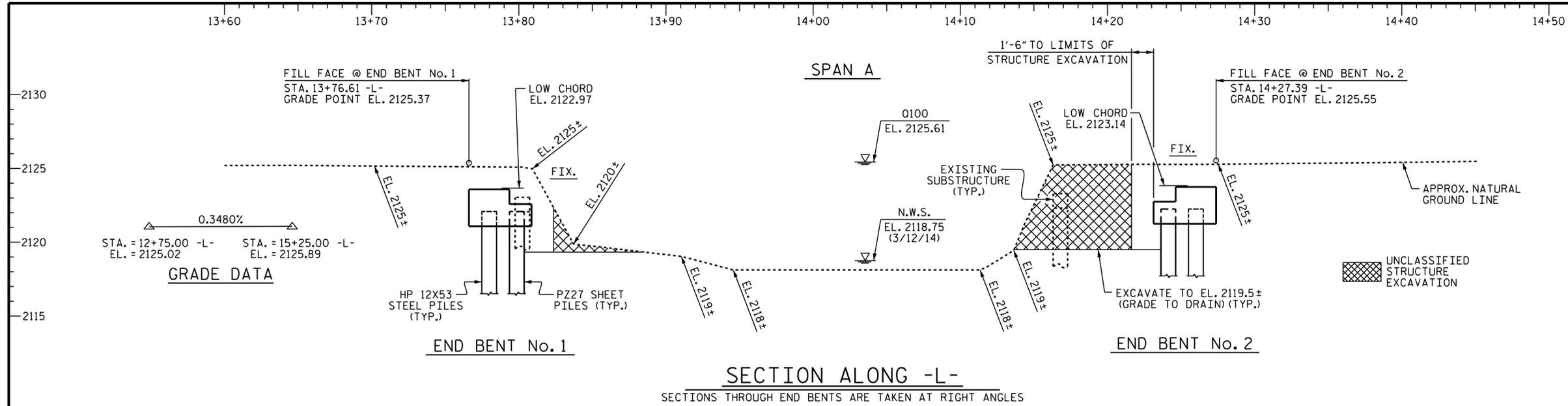
LETTING DATE : FEBRUARY 16, 2016

D. R. CALHOUN, PE
PROJECT ENGINEER

MARC CHEEK, PE
PROJECT DESIGN ENGINEER

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5244		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
42846.1.1	BRZ-3197 (1)	P.E.	
42846.2.3	BRZ-3197 (1)	RW & UTL	
42846.3.2	BRZ-3197 (1)	CONSTR.	





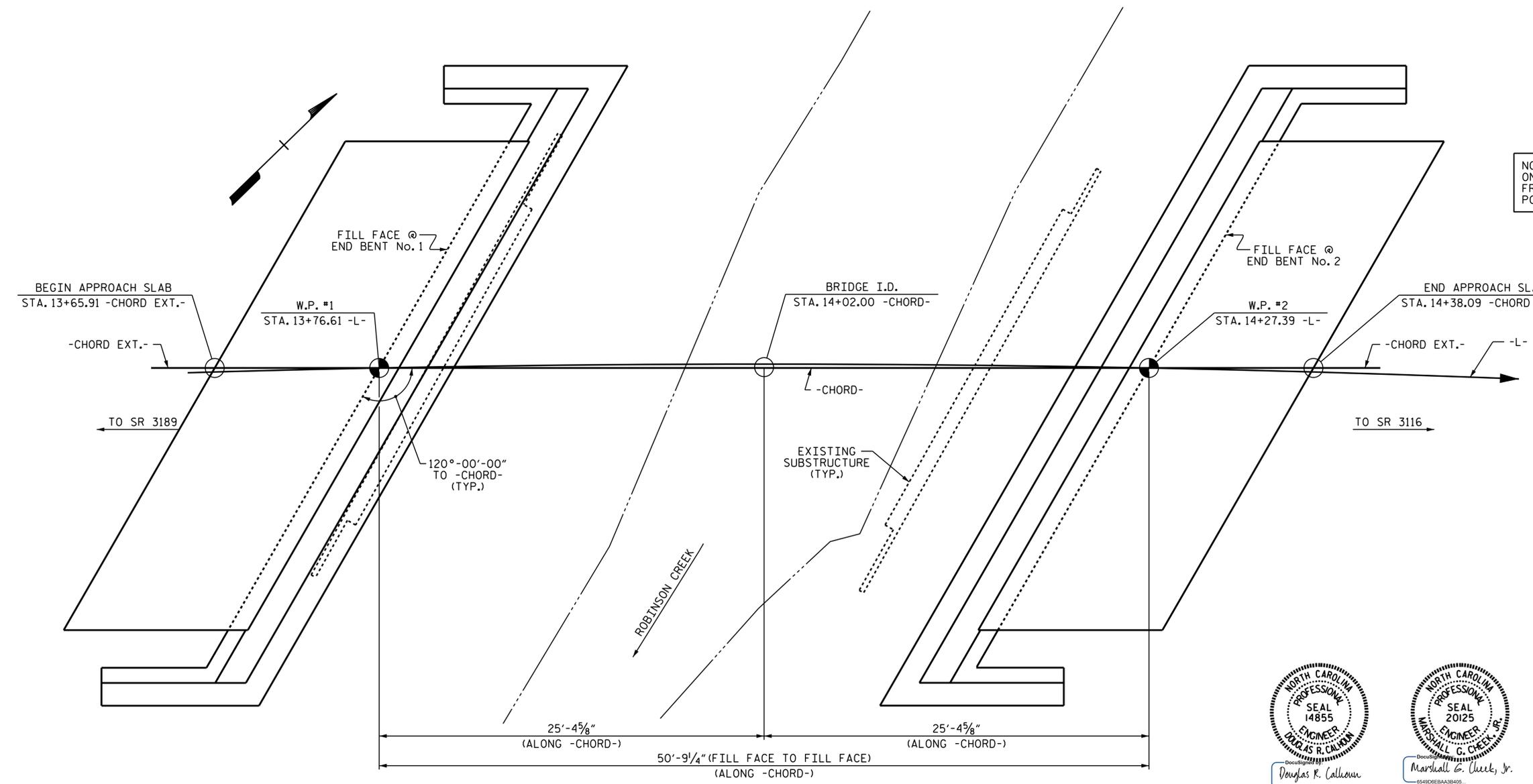
SECTION ALONG -L-
SECTIONS THROUGH END BENTS ARE TAKEN AT RIGHT ANGLES

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

HORIZONTAL CURVE DATA

P.I. STA. = 14+60.08 -L-
 $\Delta = 20^{\circ}-00'-00''$ (RT.)
 D = 4°-30'-54.1"
 L = 442.96'
 T = 223.76'
 R = 1269.00'

NOTE TO THE CONTRACTOR: ALL STATIONING ON THE BRIDGE OCCURS ALONG THE CHORD FROM W.P. #1 TO W.P. #2, WHILE THE GRADE POINT FOLLOWS THE -L-.



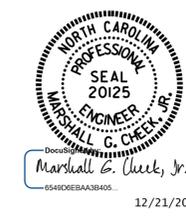
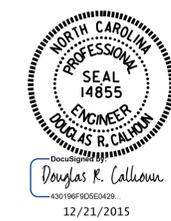
PLAN

PILES & SHEET PILES NOT SHOWN FOR CLARITY

PROJECT NO. B-5244
BUNCOMBE COUNTY
 STATION: 14+02.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE No. 363

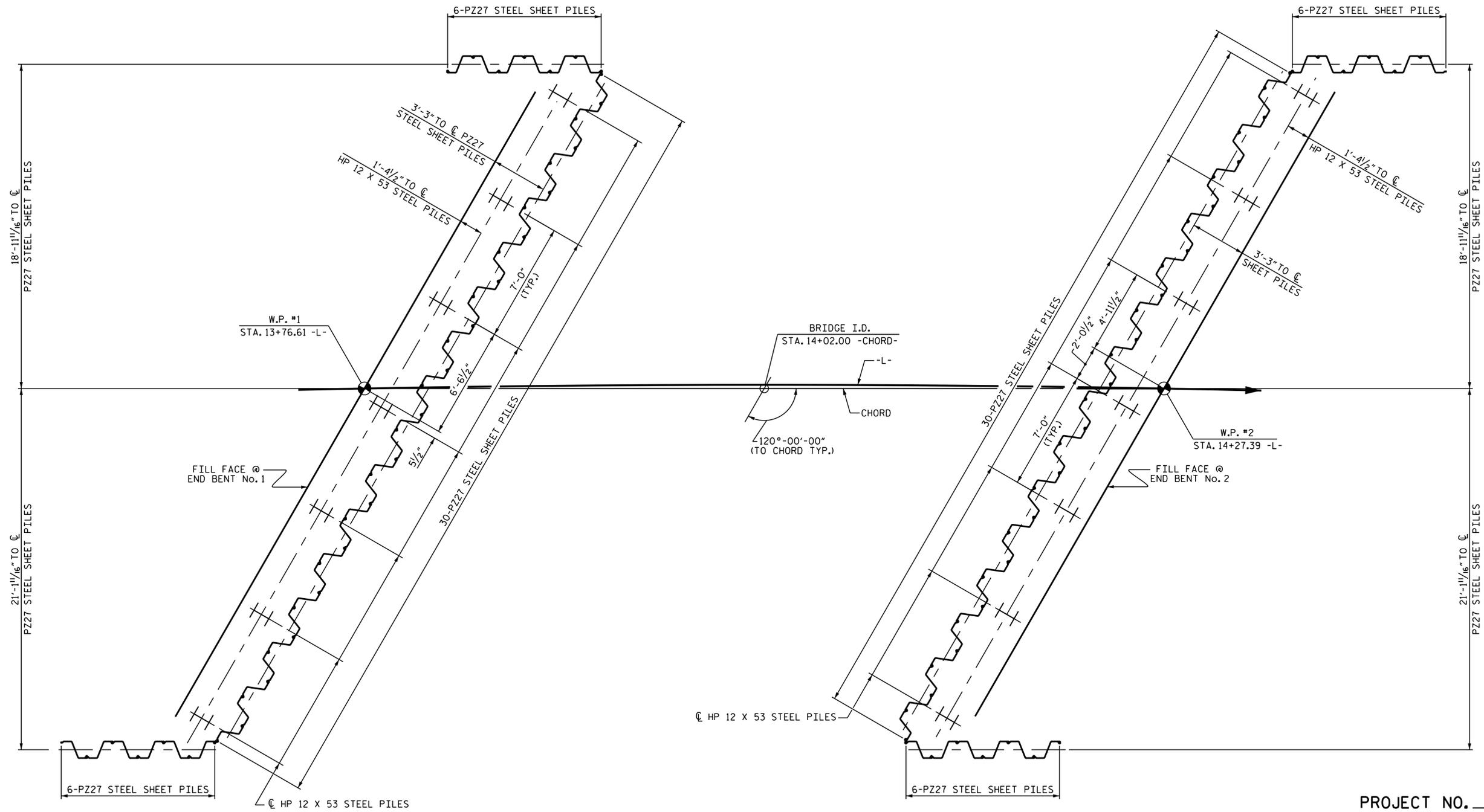
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON SR 3197
 OVER ROBINSON CREEK
 BETWEEN
 SR 3189 AND SR 3116



DRAWN BY : B.N. GRADY
 CHECKED BY : D. HODGE
 DATE : 10/15
 DATE : 10/15

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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



END BENT No. 1

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE TO THE PILE CENTERLINES.

NOTES

- FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT No. 1 & No. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 65 TONS PER PILE.
- DRIVE PILES AT END BENT No. 1 & No. 2 TO A REQUIRED DRIVING RESISTANCE OF 108 TONS PER PILE.
- FOR SHEET PILES, SEE SPECIAL PROVISIONS.
- SHEET PILES FOR THE VERTICAL WALLS SHOULD BE DRIVEN TO EL. 2104 AT END BENT No. 1 & No. 2.

END BENT No. 2

PROJECT NO. B-5244
BUNCOMBE COUNTY
 STATION: 14+02.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON SR 3197
 OVER ROBINSON CREEK
 BETWEEN
 SR 3189 AND SR 3116

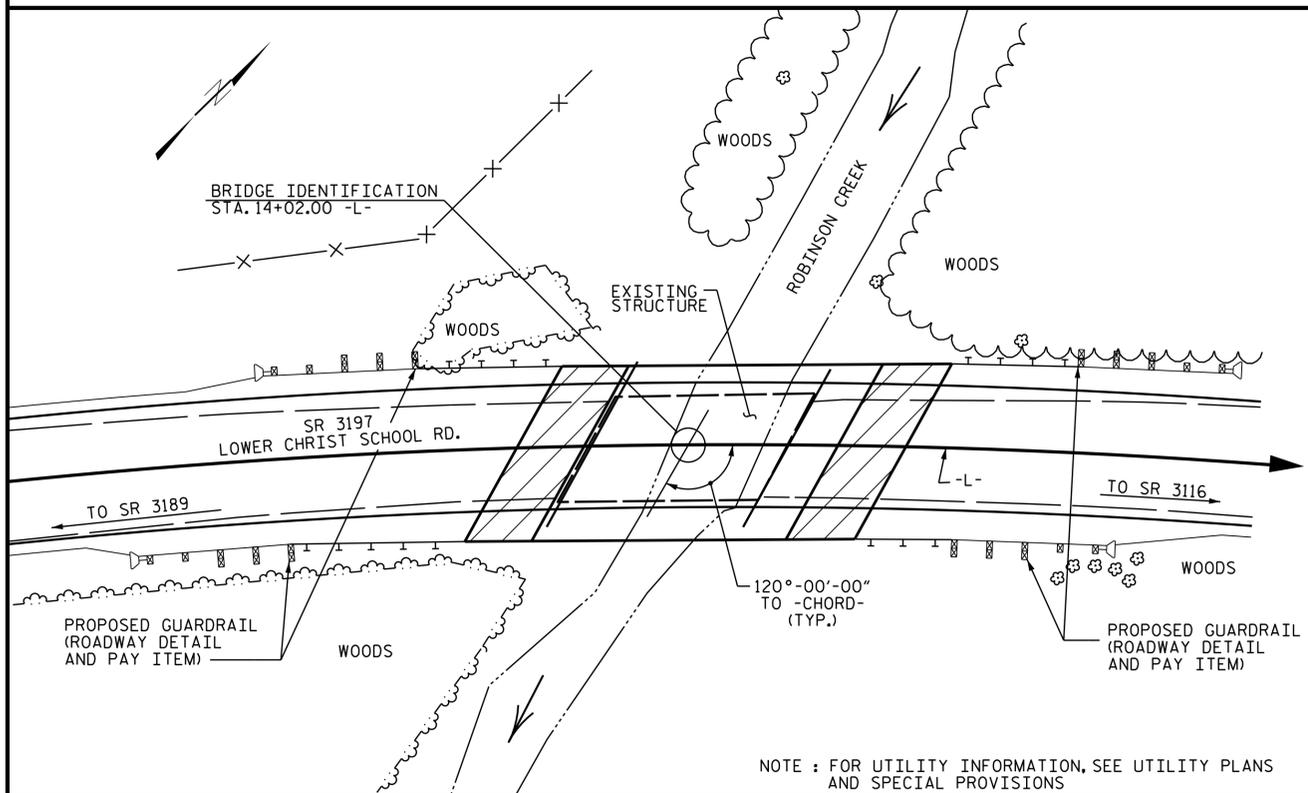


12/22/2015

DRAWN BY : H. T. BARBOUR DATE : 7-20-15
 CHECKED BY : D. HODGE DATE : 11/15

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

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



LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE.....1250 C.F.S.
 FREQUENCY OF DESIGN FLOOD.....25 YEARS
 DESIGN HIGH WATER ELEVATION.....2124.40
 DRAINAGE AREA.....4.8 SQ. MI.
 BASE DISCHARGE(Q100).....1830 C.F.S.
 BASE HIGH WATER ELEVATION.....2125.61

OVERTOPPING DATA

OVERTOPPING DISCHARGE.....1299 C.F.S.
 FREQUENCY OF OVERTOPPING FLOOD.....< 50 YRS.
 OVERTOPPING FLOOD ELEVATION.....2124.90

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	HP 12 X 53 STEEL PILES		TWO BAR METAL RAIL	1'-2" x 2'-8 3/4" CONCRETE PARAPET	ELASTOMERIC BEARINGS	3'-0" X 1'-6" PRESTRESSED CONCRETE CORED SLABS	18" GALVANIZED STEEL SHEET PILES	ASBESTOS ASSESSMENT	
	LUMP SUM	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	NO.	LIN.FT.	LIN.FT.	LIN.FT.	LUMP SUM	NO.	LIN.FT.	SO. FT.	LUMP SUM
SUPERSTRUCTURE				LUMP SUM				80.00	96.33	LUMP SUM	11	529.83		
END BENT NO. 1		LUMP SUM	21.2		2928	7	300					1140		
END BENT NO. 2		LUMP SUM	21.2		2928	7	335					1153		
TOTAL	LUMP SUM	LUMP SUM	42.4	LUMP SUM	5856	14	635	80.00	96.33	LUMP SUM	11	529.83	2293	LUMP SUM

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.

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 SPICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPICE 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".

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 23 FT EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING 35'-8" SINGLE SPAN STRUCTURE WITH A CLEAR ROADWAY WIDTH OF 19'-2" AND A 3/2" ASPHALT WEARING SURFACE ON A TIMBER FLOOR ON STEEL I-BEAMS, WITH A SUBSTRUCTURE CONSISTING OF TIMBER CAPS ON TIMBER POSTS AND SILLS AT THE END BENTS AND LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED. SEE SPECIAL PROVISIONS FOR "REMOVAL OF EXISTING STRUCTURE".

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

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

FOR 18" GALVANIZED STEEL SHEET PILES, SEE SPECIAL PROVISIONS.

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

PROJECT NO. B-5244
BUNCOMBE COUNTY
 STATION: 14+02.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE ON SR 3197
 OVER ROBINSON CREEK
 BETWEEN
 SR 3189 AND SR 3116



1/4/2016

DRAWN BY : B.N. GRADY DATE : 10/15
 CHECKED BY : D. HODGE DATE : 10/15

29-DEC-2015 10:05
 R:\Structures\Final Plans\B5244_SD.GD.dgn
 bngrady

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

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

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

LOAD FACTORS:

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

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			
						LIVELOAD FACTORS	MOMENT					SHEAR					LIVELOAD FACTORS	MOMENT						
							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)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	1.10	--	1.75	0.248	1.11	A	EL	23,509	0.667	1.10	A	EL	4,702	0.80	0.248	1.12	A	EL	23,509		
	HL-93(0pr)	N/A	--	1.43	--	1.35	0.248	1.44	A	EL	23,509	0.667	1.43	A	EL	4,702	N/A	--	--	--	--	--		
	HS-20(Inv)	36,000	2	1.31	47,255	1.75	0.248	1.37	A	EL	23,509	0.667	1.31	A	EL	4,702	0.80	0.248	1.38	A	EL	23,509		
	HS-20(0pr)	36,000	--	1.70	61,257	1.35	0.248	1.78	A	EL	23,509	0.667	1.70	A	EL	4,702	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13,500	--	2.77	37,325	1.4	0.248	3.44	A	EL	23,509	0.667	3.63	A	EL	4,702	0.80	0.248	2.76	A	EL	23,509	
		SNGARBS2	20,000	--	2.20	44,023	1.4	0.248	2.74	A	EL	23,509	0.667	2.67	A	EL	4,702	0.80	0.248	2.20	A	EL	23,509	
		SNAGRIS2	22,000	--	2.15	47,202	1.4	0.248	2.67	A	EL	18,807	0.667	2.51	A	EL	4,702	0.80	0.248	2.15	A	EL	23,509	
		SNCOTTS3	27,250	--	1.38	37,595	1.4	0.248	1.72	A	EL	23,509	0.667	1.82	A	EL	4,702	0.80	0.248	1.38	A	EL	23,509	
		SNAGGRS4	34,925	--	1.21	42,119	1.4	0.248	1.50	A	EL	23,509	0.667	1.57	A	EL	4,702	0.80	0.248	1.21	A	EL	23,509	
		SNS5A	35,550	--	1.18	41,792	1.4	0.248	1.46	A	EL	23,509	0.667	1.62	A	EL	4,702	0.80	0.248	1.18	A	EL	23,509	
		SNS6A	39,950	--	1.10	44,031	1.4	0.248	1.37	A	EL	23,509	0.667	1.51	A	EL	4,702	0.80	0.248	1.10	A	EL	23,509	
	SNS7B	42,000	--	1.05	44,121	1.4	0.248	1.31	A	EL	23,509	0.667	1.52	A	EL	4,702	0.80	0.248	1.05	A	EL	23,509		
	TTST	TNAGRIT3	33,000	--	1.35	44,589	1.4	0.248	1.68	A	EL	23,509	0.667	1.77	A	EL	4,702	0.80	0.248	1.35	A	EL	23,509	
		TNT4A	33,075	--	1.36	45,109	1.4	0.248	1.70	A	EL	23,509	0.667	1.70	A	EL	4,702	0.80	0.248	1.36	A	EL	23,509	
		TNT6A	41,600	--	1.14	47,386	1.4	0.248	1.42	A	EL	23,509	0.667	1.65	A	EL	4,702	0.80	0.248	1.14	A	EL	23,509	
		TNT7A	42,000	--	1.16	48,636	1.4	0.248	1.44	A	EL	23,509	0.667	1.53	A	EL	4,702	0.80	0.248	1.16	A	EL	23,509	
		TNT7B	42,000	--	1.21	50,680	1.4	0.248	1.50	A	EL	23,509	0.667	1.45	A	EL	4,702	0.80	0.248	1.21	A	EL	23,509	
		TNAGRIT4	43,000	--	1.15	49,304	1.4	0.248	1.43	A	EL	23,509	0.667	1.40	A	EL	4,702	0.80	0.248	1.15	A	EL	23,509	
TNAGT5A		45,000	--	1.07	48,132	1.4	0.248	1.33	A	EL	23,509	0.667	1.43	A	EL	4,702	0.80	0.248	1.07	A	EL	23,509		
TNAGT5B	45,000	3	1.05	47,099	1.4	0.248	1.30	A	EL	23,509	0.667	1.33	A	EL	4,702	0.80	0.248	1.05	A	EL	23,509			

NOTES:

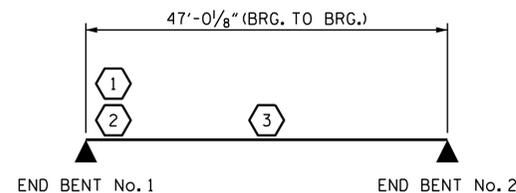
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

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

PROJECT NO. B-5244
BUNCOMBE COUNTY
 STATION: 14+02.00 -L-

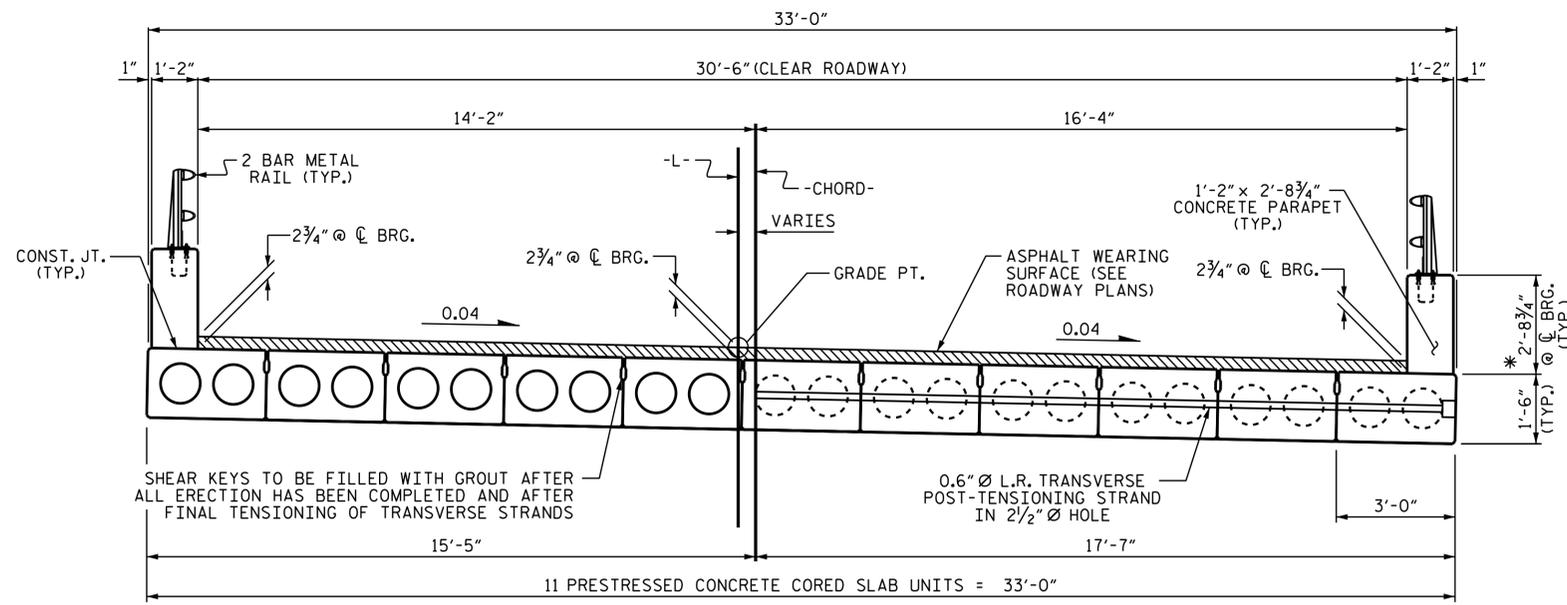


12/21/2015

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (NON-INTERSTATE TRAFFIC)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-4					TOTAL SHEETS 18

DRAWN BY : B.N. GRADY DATE : 11/15
 CHECKED BY : D. HODGE DATE : 11/15

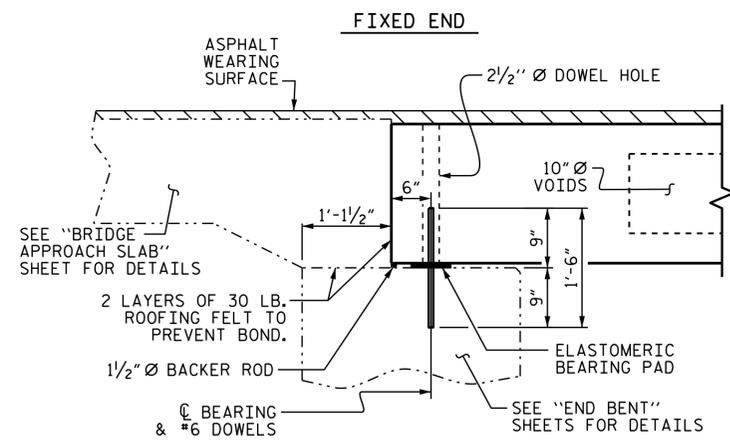
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



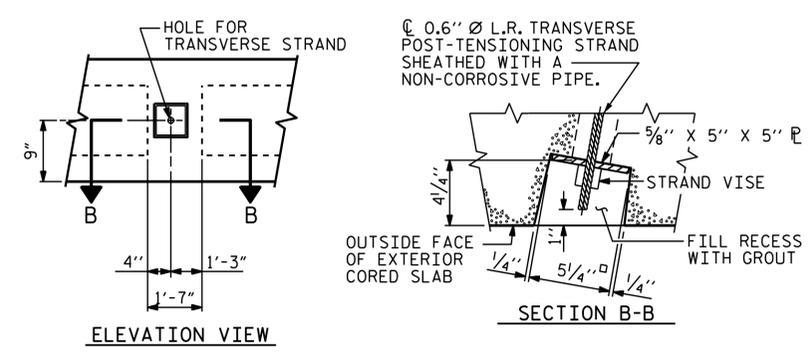
HALF SECTION THROUGH VOIDS HALF SECTION AT INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

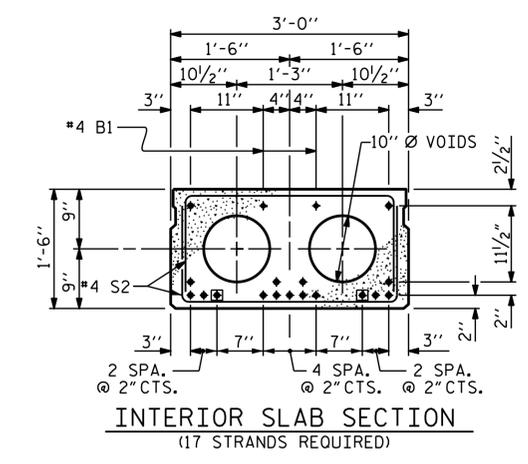
* - THE MAXIMUM PARAPET HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE PARAPET AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR PARAPET HEIGHT DETAILS AND ASPHALT THICKNESS SEE "SECTION THRU PARAPET" DETAIL, SHEET 3 OF 3.



SECTION AT END BENT

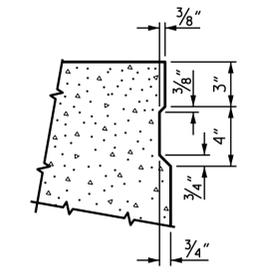


GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS

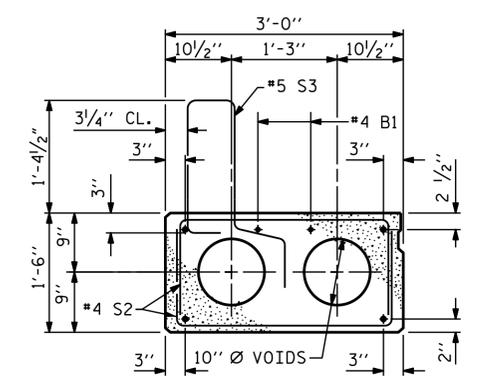


0.6" Ø LOW RELAXATION STRAND LAYOUT

● BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 4'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

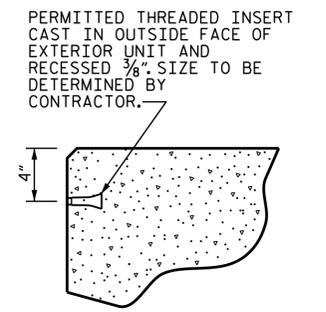


SHEAR KEY DETAIL
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.

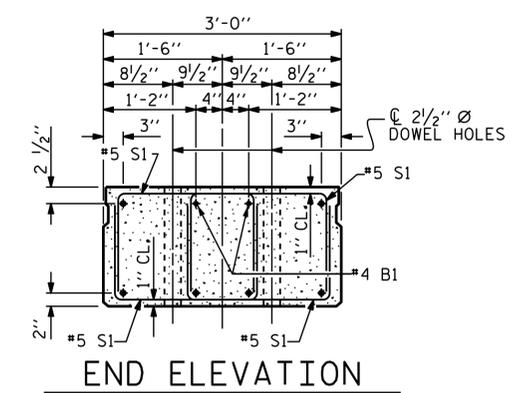


EXT. SLAB SECTION

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



THREADED INSERT DETAIL



END ELEVATION

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



PROJECT NO. B-5244
BUNCOMBE COUNTY
STATION: 14+02.00 -L-

SHEET 1 OF 3

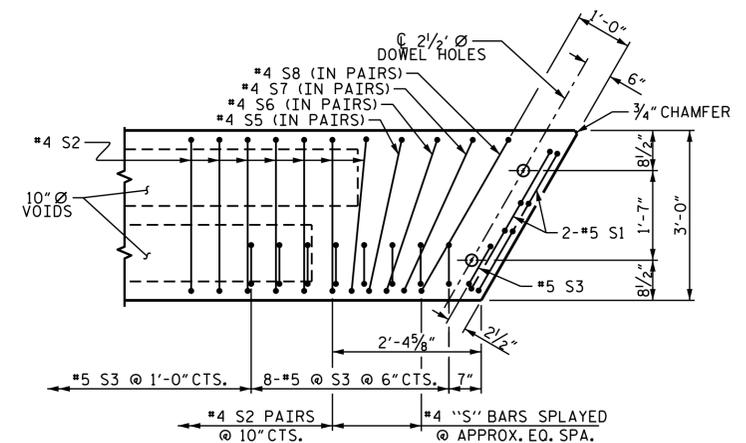
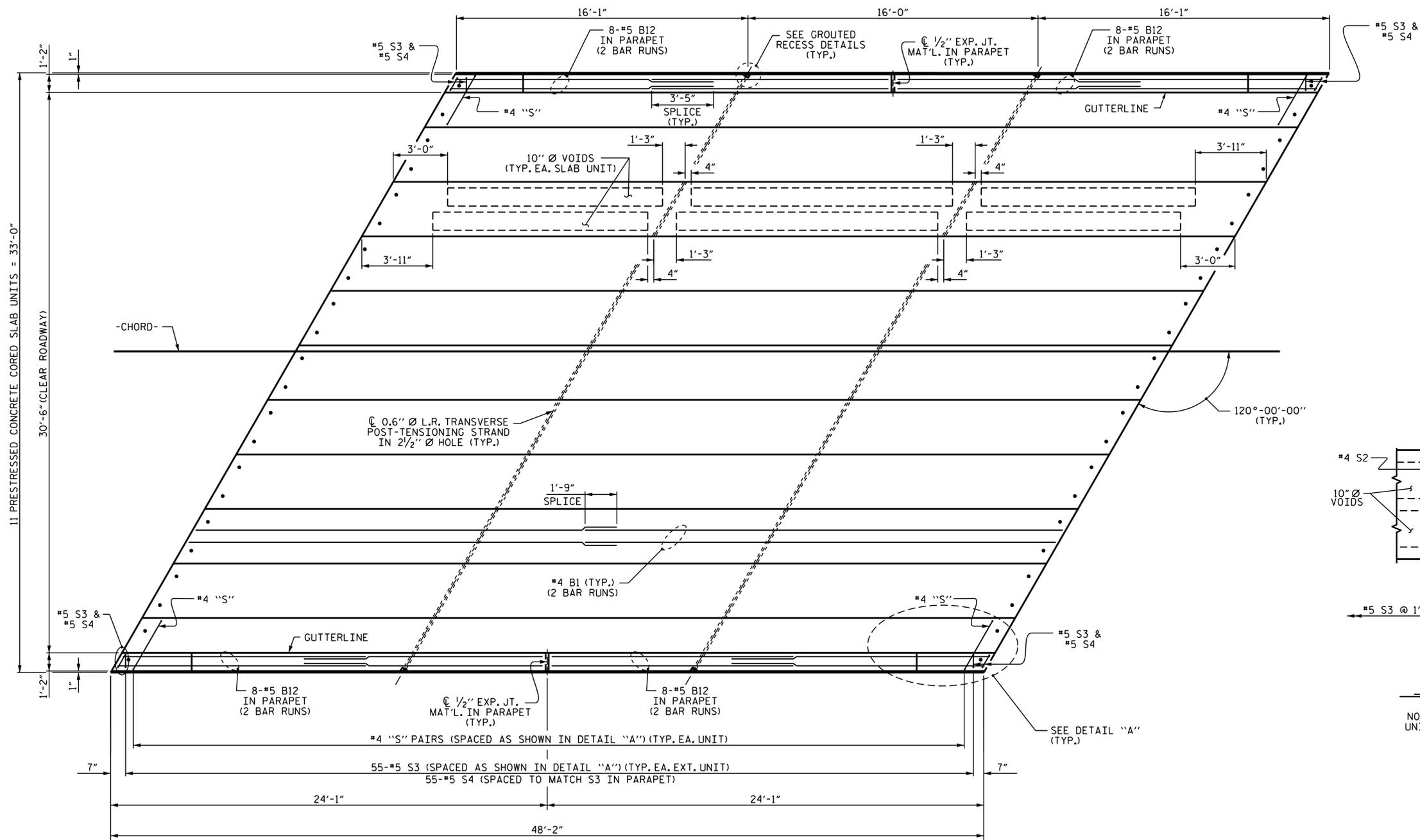
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 1'-6" PRESTRESSED CONCRETE CORED SLAB UNIT

DRAWN BY : B.N. GRADY	DATE : 10/15
CHECKED BY : D. HODGE	DATE : 11/15
DESIGN ENGINEER OF RECORD: B.N. GRADY	DATE : 11/15

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			18



DETAIL "A"

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

PLAN OF UNIT

PROJECT NO. B-5244
BUNCOMBE COUNTY
 STATION: 14+02.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

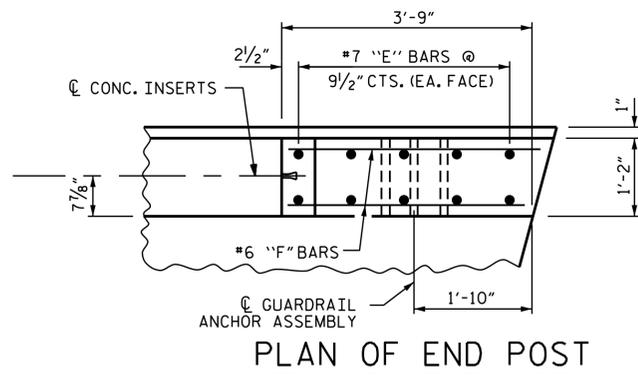
PLAN OF UNIT
 120° SKEW
 SPAN A



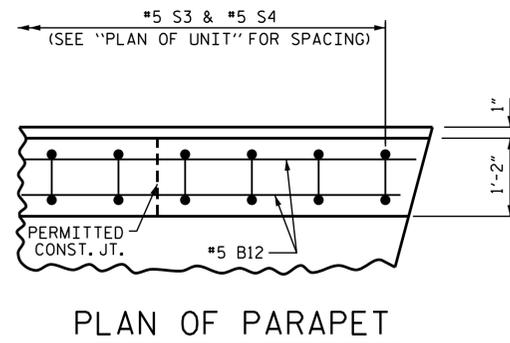
DRAWN BY : B.N. GRADY DATE : 10/15
 CHECKED BY : D. HODGE DATE : 11/15
 DESIGN ENGINEER OF RECORD: B.N. GRADY DATE : 11/15

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

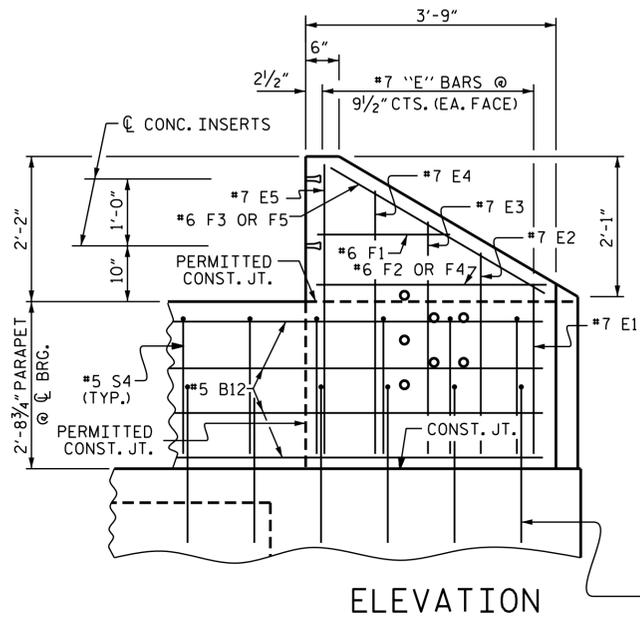
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			18



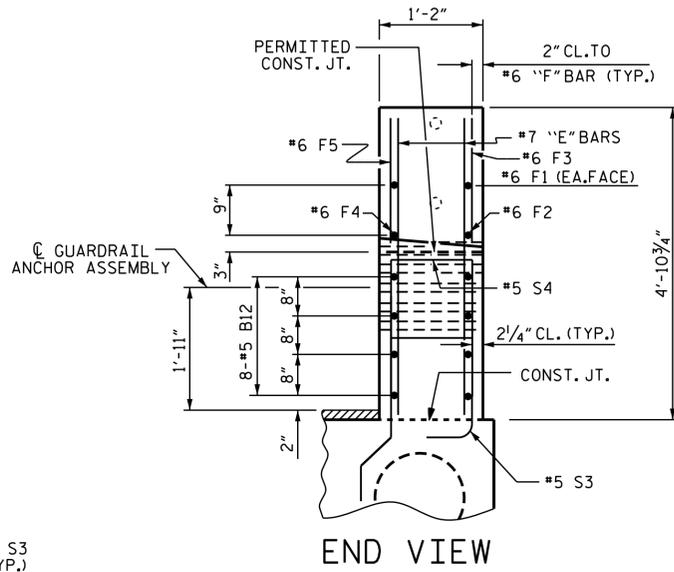
PLAN OF END POST



PLAN OF PARAPET

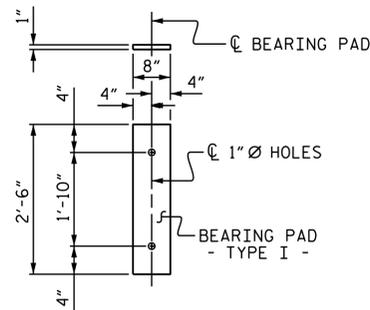


ELEVATION



END VIEW

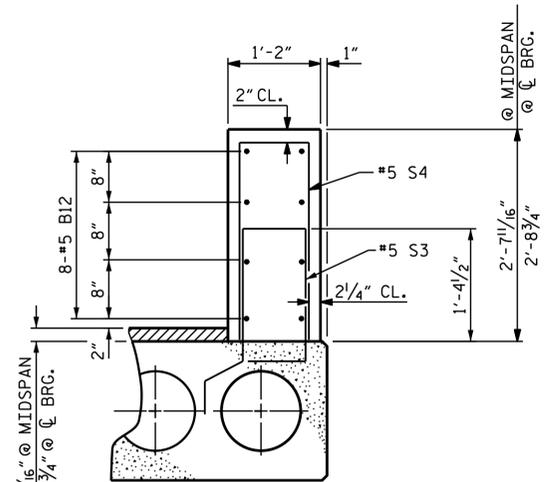
PARAPET AND END POST FOR TWO BAR RAIL



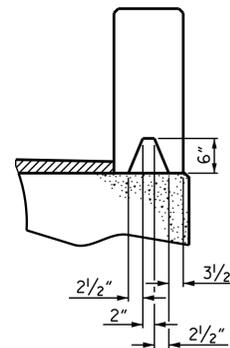
FIXED END (TYPE I - 22 REQ'D)

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

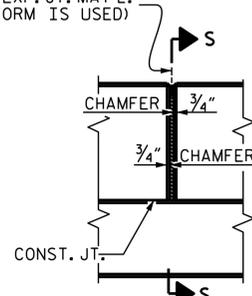


SECTION THRU PARAPET



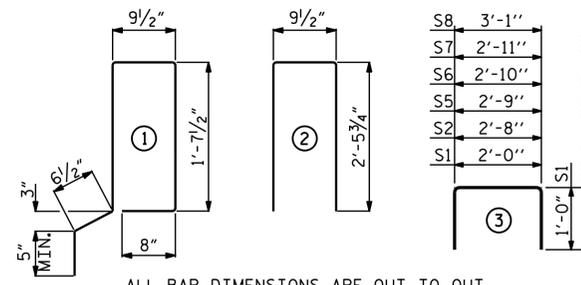
SECTION S-S AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

1/2" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS. (NOTE: OMIT EXP. JT. MAT'L WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE CORED SLAB UNIT

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
B1	4	#4	STR	24'-10"	66	24'-10"	66
S1	8	#5	3	4'-0"	33	4'-0"	33
S2	106	#4	3	4'-10"	342	4'-10"	342
* S3	57	#5	1	5'-8"	337		
S5	4	#4	3	4'-11"	13	4'-11"	13
S6	4	#4	3	5'-0"	13	5'-0"	13
S7	4	#4	3	5'-1"	14	5'-1"	14
S8	4	#4	3	5'-3"	14	5'-3"	14
REINFORCING STEEL				LBS.	495		495
* EPOXY COATED REINFORCING STEEL				LBS.	337		
6000 P.S.I. CONCRETE				CU. YDS.	6.4		6.4
0.6" Ø L.R. STRANDS				No.	17		17

BILL OF MATERIAL FOR TWO PARAPETS & FOUR END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B12	64	#5	STR	13'-10"	923
* E1	8	#7	STR	2'-8"	44
* E2	8	#7	STR	3'-2"	52
* E3	8	#7	STR	3'-8"	60
* E4	8	#7	STR	4'-2"	68
* E5	8	#7	STR	4'-6"	74
* F1	8	#6	STR	2'-2"	26
* F2	4	#6	STR	3'-7"	22
* F3	4	#6	STR	4'-8"	26
* F4	4	#6	STR	3'-5"	21
* F5	4	#6	STR	3'-10"	23
* S4	114	#5	2	5'-9"	684
* EPOXY COATED REINFORCING STEEL					2023 LBS.
CLASS AA CONCRETE					12.2 CU.YDS.
1'-2" X 2'-8 3/4" CONCRETE PARAPET					96.33 LIN. FT.

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	2	48'-2"	96'-4"
INTERIOR C.S.	9	48'-2"	433'-6"
TOTAL	11		529'-10"

DEAD LOAD DEFLECTION AND CAMBER

	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	3/8" ↓
FINAL CAMBER	1/16" ↑

** INCLUDES FUTURE WEARING SURFACE

NOTES

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

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

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

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

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

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

ALL REINFORCING STEEL IN THE 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, 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.

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 4800 PSI.

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.

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

PROJECT NO. B-5244
BUNCOMBE COUNTY
 STATION: 14+02.00 -L-

SHEET 3 OF 3

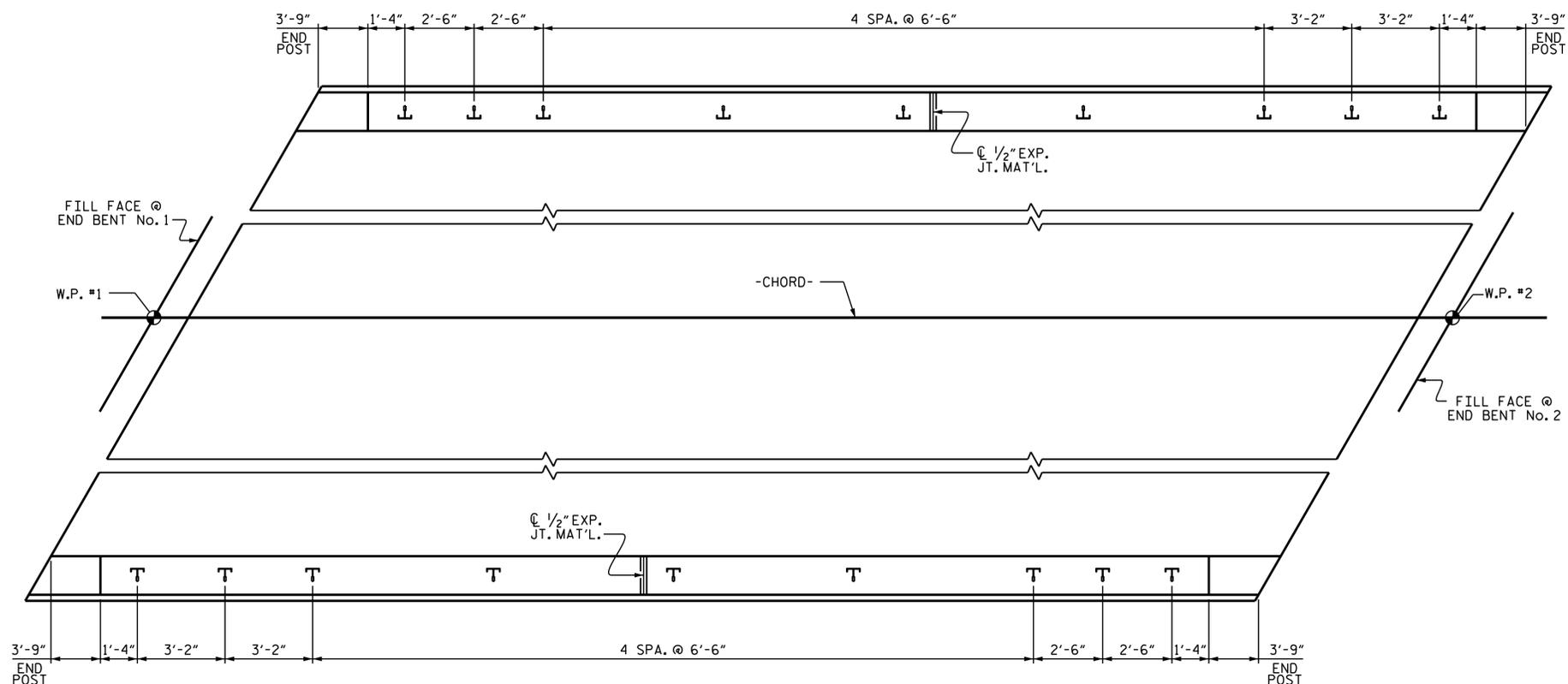


12/21/2015

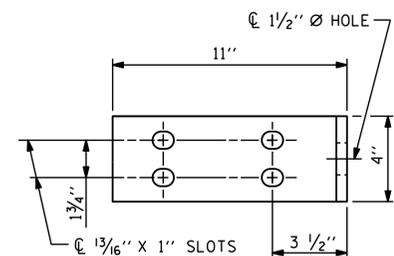
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS 18
2			4			

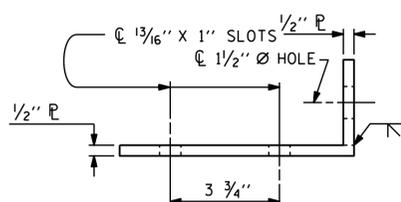
DRAWN BY : B.N. GRADY DATE : 11/14
 CHECKED BY : D. HODGE DATE : 11/15
 DESIGN ENGINEER OF RECORD: B.N. GRADY DATE : 11/15



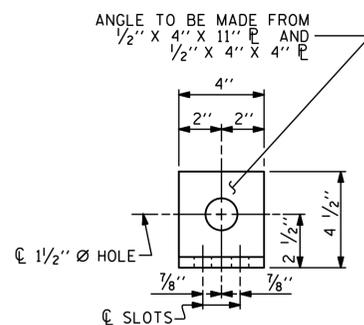
PLAN OF RAIL POST SPACINGS



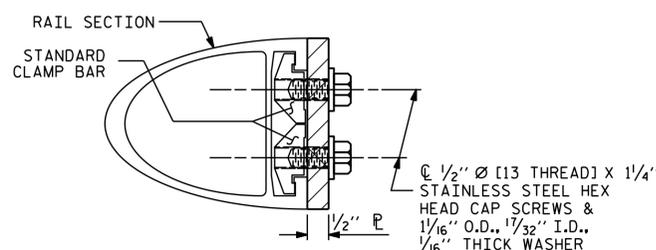
ELEVATION



TOP VIEW

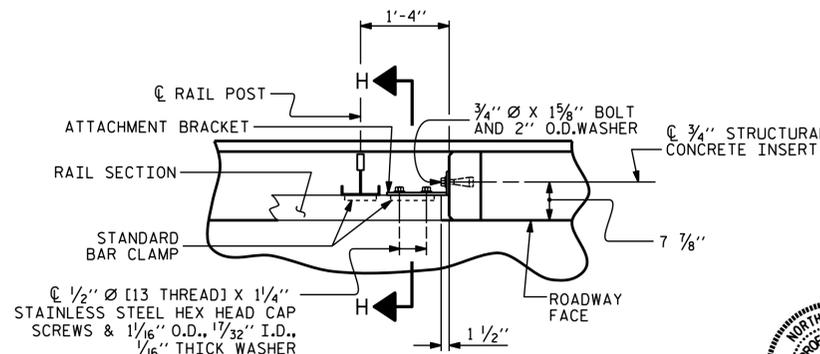


END VIEW (FIX AND EXP.)



SECTION H-H (FIX)

DETAILS FOR ATTACHING METAL RAIL TO END POST



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:

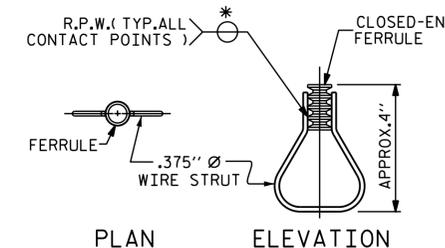
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
- B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE 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.



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. B-5244
BUNCOMBE COUNTY
STATION: 14+02.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

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

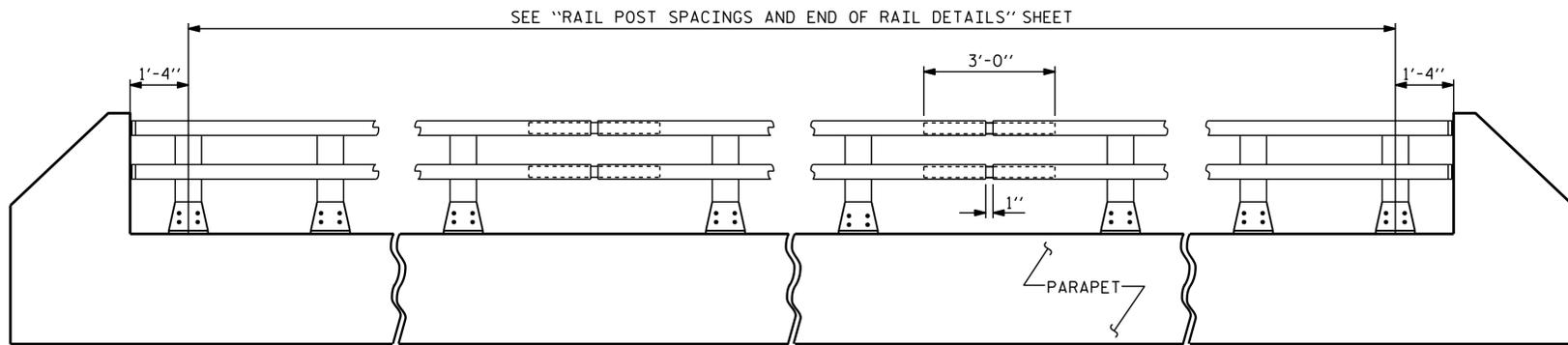


12/21/2015

ASSEMBLED BY : B.N. GRADY	DATE : 10/15
CHECKED BY : D. HODGE	DATE : 11/15
DRAWN BY : FCJ 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : CRK 3/89	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

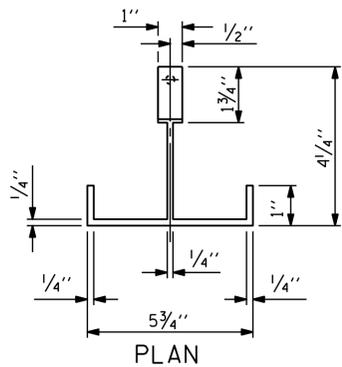
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8	
1			3			TOTAL SHEETS 18	
2			4				

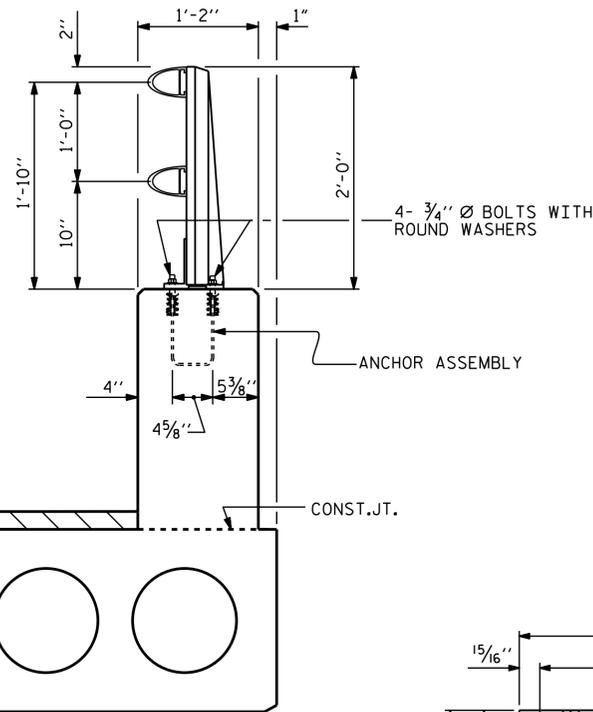


ELEVATION

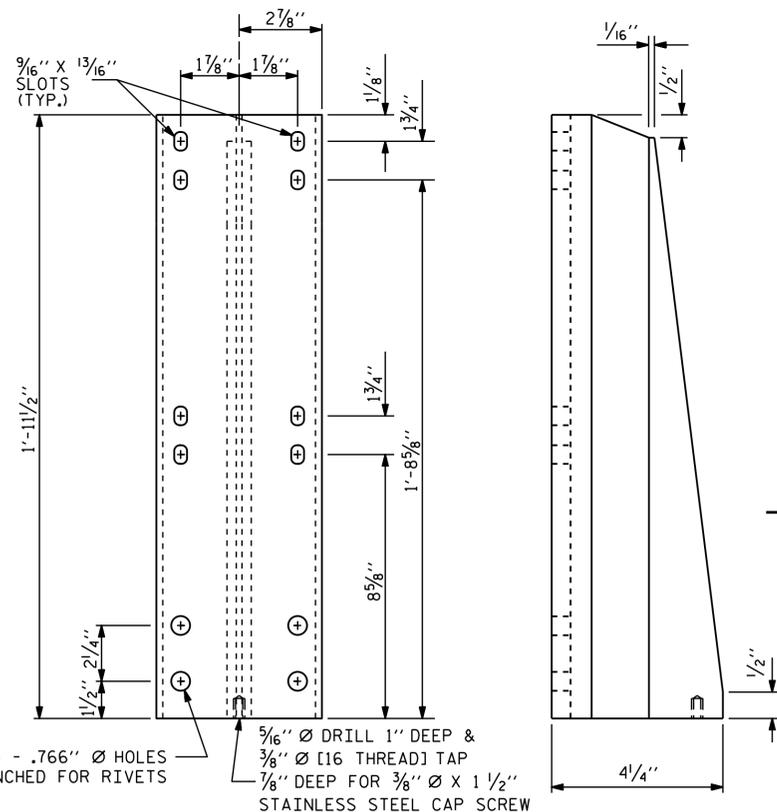
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE SHEET 1 OF 3.



PLAN



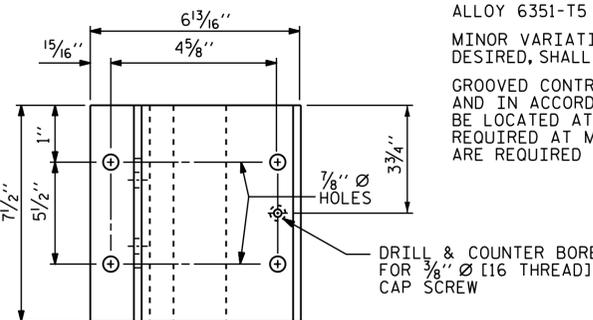
SECTION THRU PARAPET AND RAIL



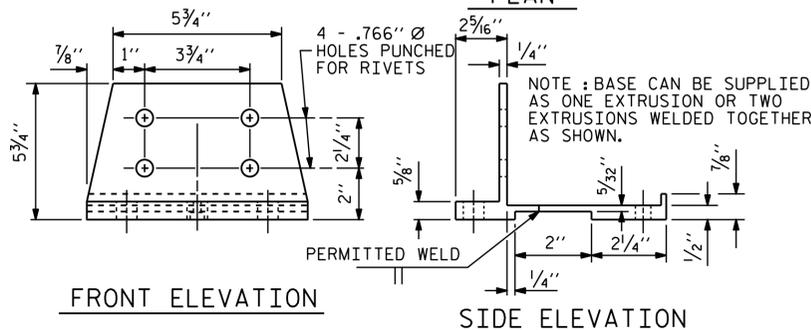
FRONT ELEVATION

SIDE ELEVATION

DETAILS OF POST



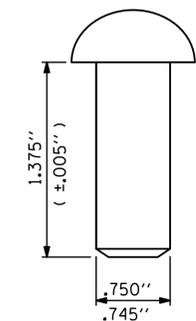
PLAN



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL



12/21/2015

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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.

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 = 80.00 LIN. FT.

PROJECT NO. B-5244
BUNCOMBE COUNTY
 STATION: 14+02.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 2 BAR METAL RAIL

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9	
1			3			TOTAL SHEETS 18	
2			4				

ASSEMBLED BY : B.N. GRADY	DATE : 10/15
CHECKED BY : D. HODGE	DATE : 11/15
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

NOTES

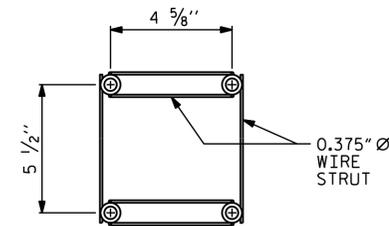
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

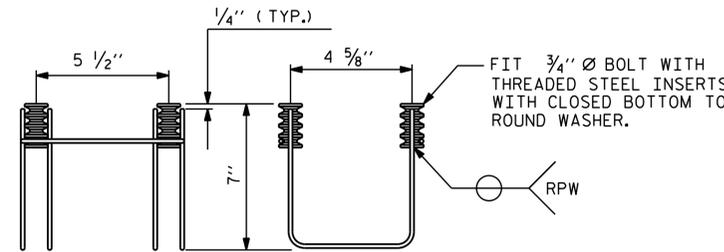
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT 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.



PLAN

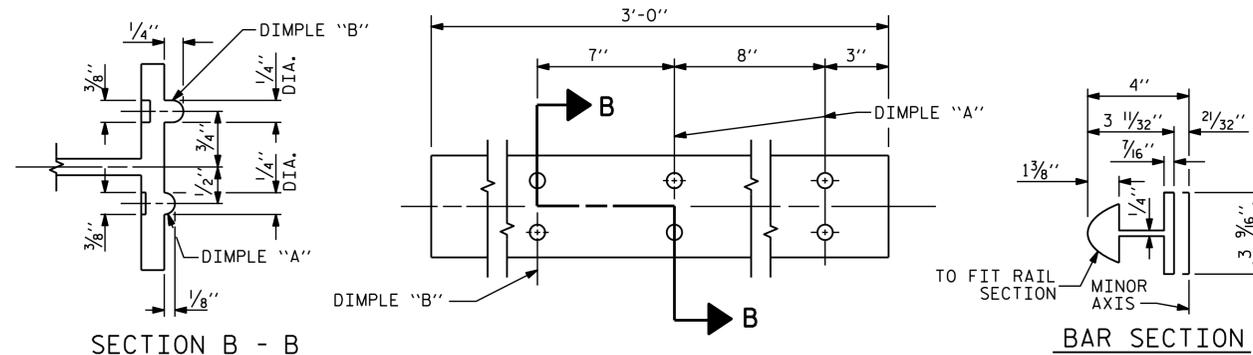


SIDE VIEW

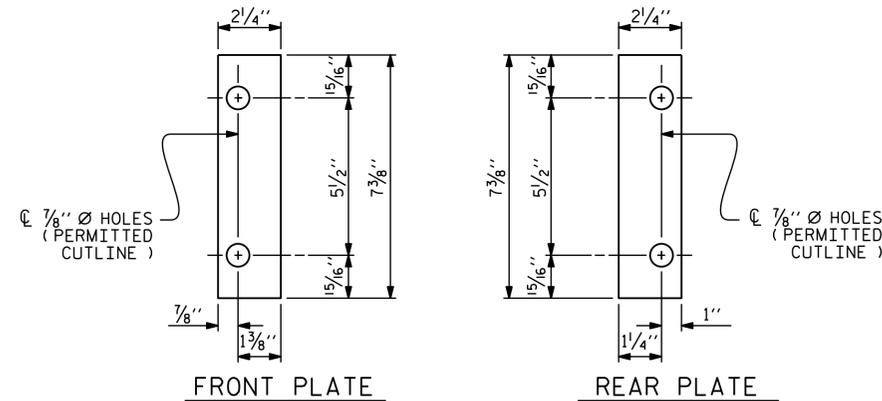
ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(18 ASSEMBLIES REQUIRED)



EXPANSION BAR DETAILS

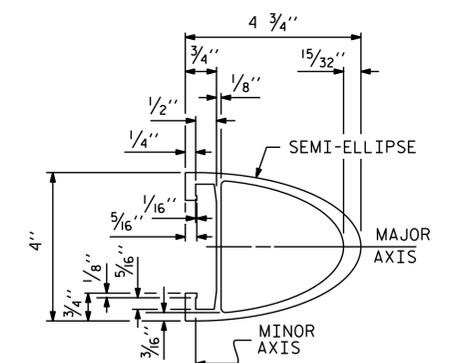


FRONT PLATE

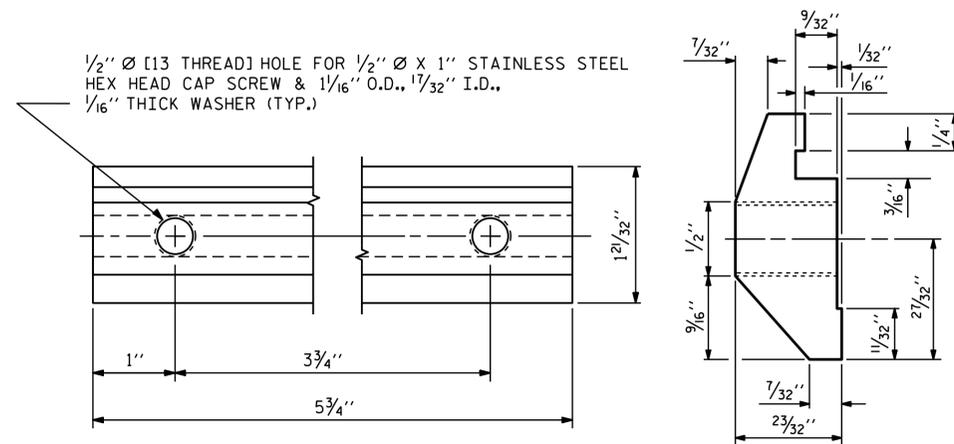
REAR PLATE

SHIM DETAILS

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

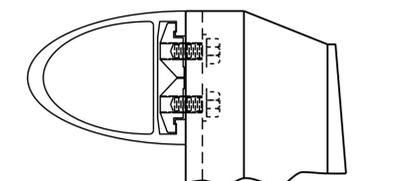


RAIL SECTION

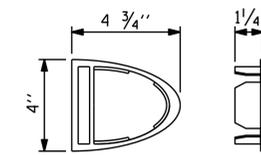


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. B-5244
BUNCOMBE COUNTY
 STATION: 14+02.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 2 BAR METAL RAIL



12/21/2015 Marshall G. Cheek, Jr.

ASSEMBLED BY : B.N. GRADY	DATE : 10/15
CHECKED BY : D. HODGE	DATE : 11/15
DRAWN BY : EEM 6/94	REV. 8/16/99 MAB/LES
CHECKED BY : RGW 6/94	REV. 5/1/06R KMM/GM
	REV. 10/11/11 MAA/GM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS 18
2			4			

NOTES

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

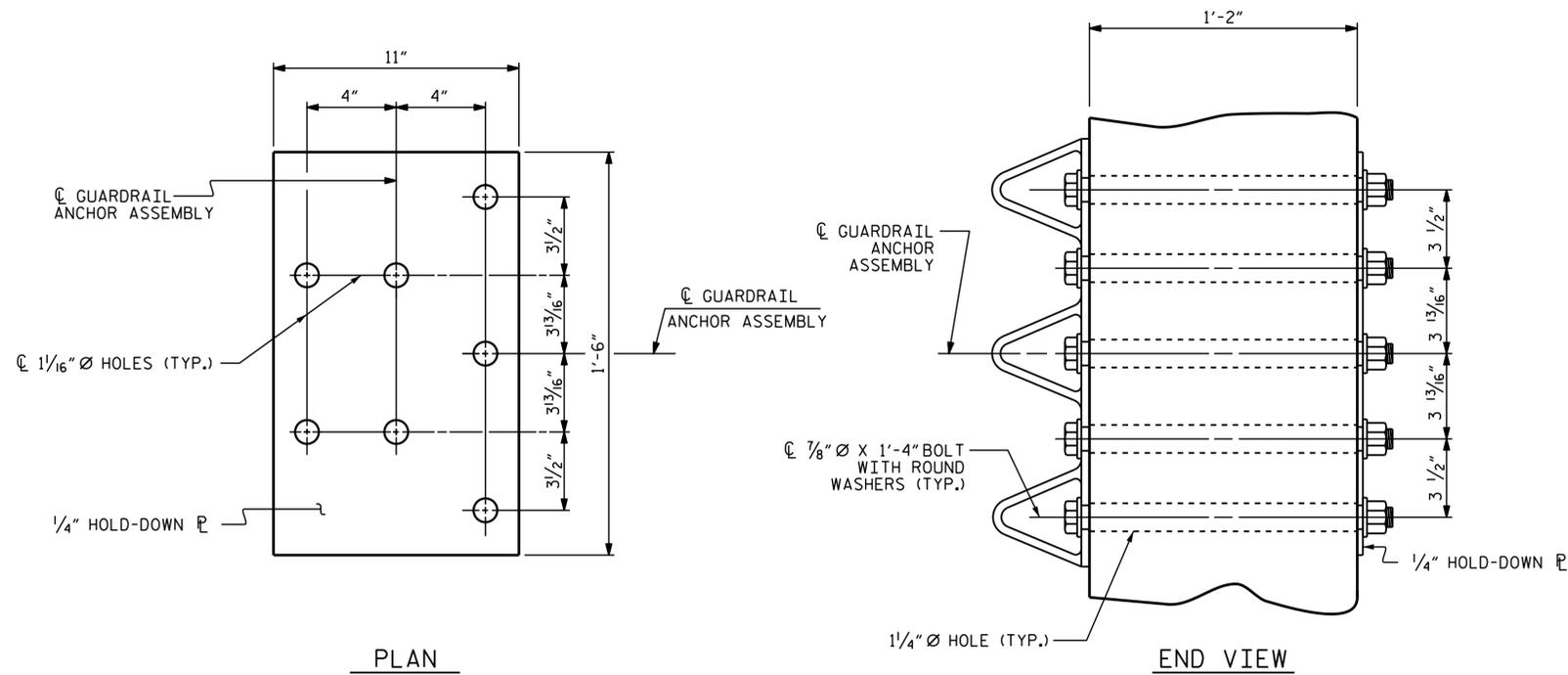
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

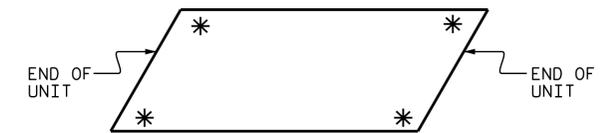
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



PLAN

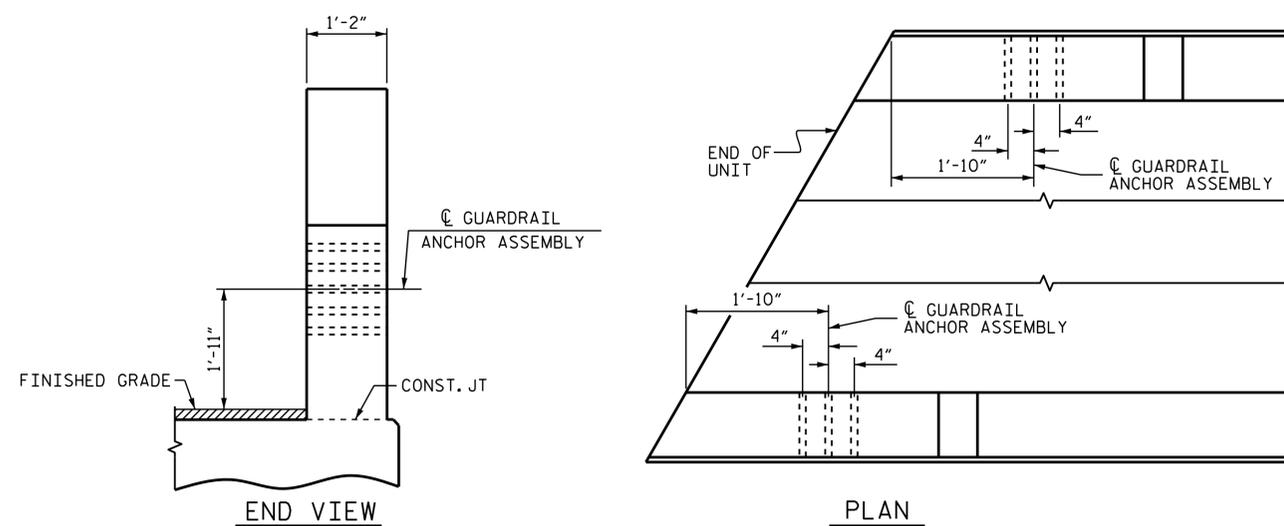
END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY



END VIEW

PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. B-5244
BUNCOMBE COUNTY
 STATION: 14+02.00 -L-



12/21/2015 654906EBA3B405

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

ASSEMBLED BY : B.N. GRADY	DATE : 10/15
CHECKED BY : D. HODGE	DATE : 11/15
DRAWN BY : MAA 5/10	REV. 12/5/11 MAA/GM
CHECKED BY : GM 5/10	REV. 6/13 MAA/GM
	REV. 1/15 MAA/TMG

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS 18
2			4			

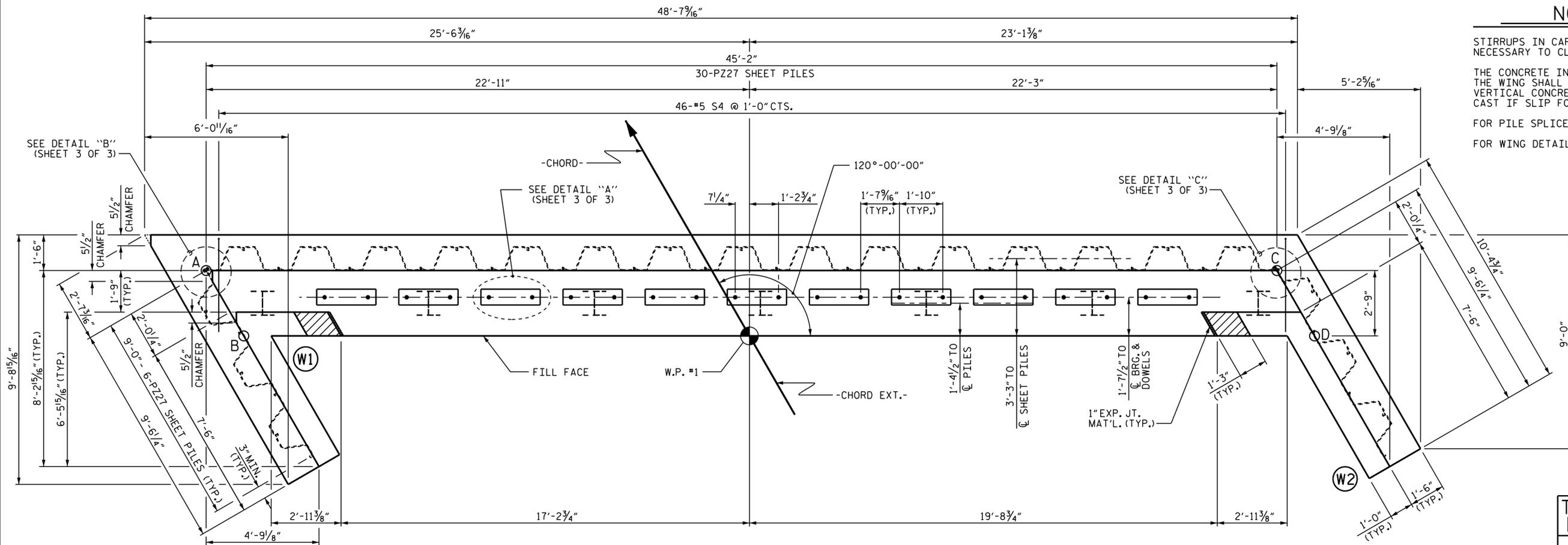
NOTES

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 VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

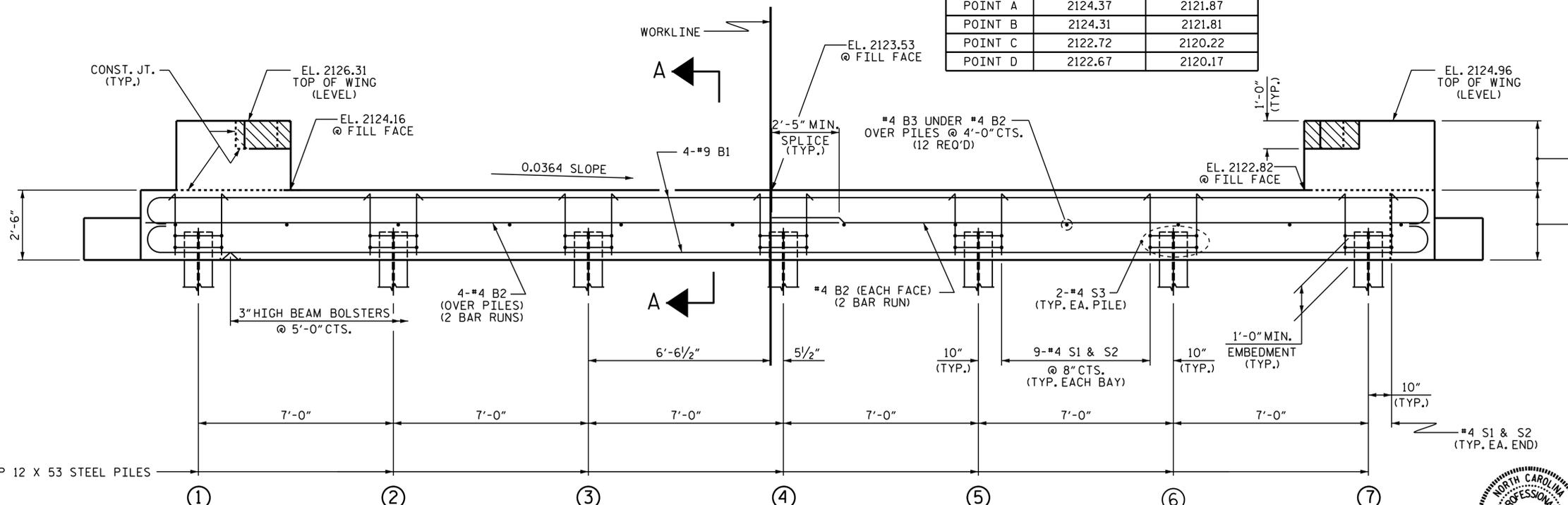
FOR WING DETAILS, SEE SHEET 2 OF 3.



PLAN

CAP ELEVATIONS		
	TOP OF CAP	BOTTOM OF CAP
POINT A	2124.37	2121.87
POINT B	2124.31	2121.81
POINT C	2122.72	2120.22
POINT D	2122.67	2120.17

TOP OF PILE ELEVATIONS	
①	2122.79
②	2122.54
③	2122.28
④	2122.03
⑤	2121.78
⑥	2121.52
⑦	2121.27



ELEVATION

WINGS AND SHEET PILES NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 3 OF 3.

CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.

PROJECT NO. B-5244
BUNCOMBE COUNTY
 STATION: 14+02.00 -L-
 SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT No. 1



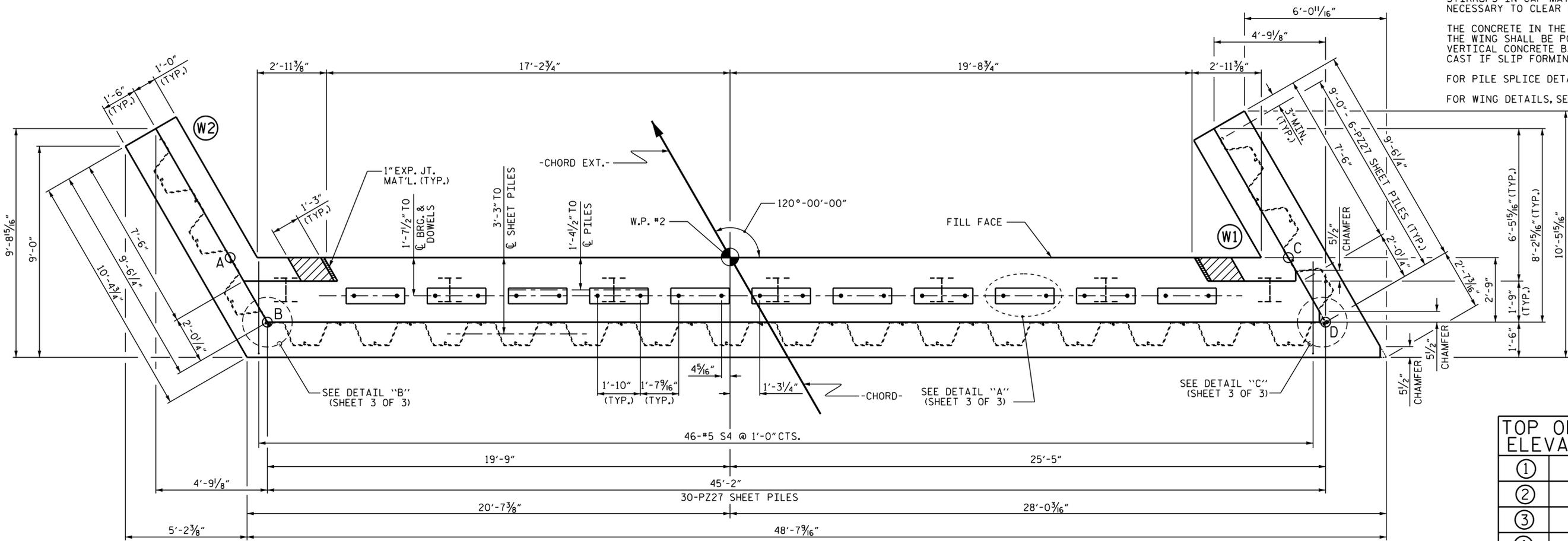
DRAWN BY: W.J. HARRIS DATE: 6/15
 CHECKED BY: B.N. GRADY DATE: 10/15
 DESIGN ENGINEER OF RECORD: W.J. HARRIS DATE: 12/15

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12	
1			3			TOTAL SHEETS 18	
2			4				

NOTES

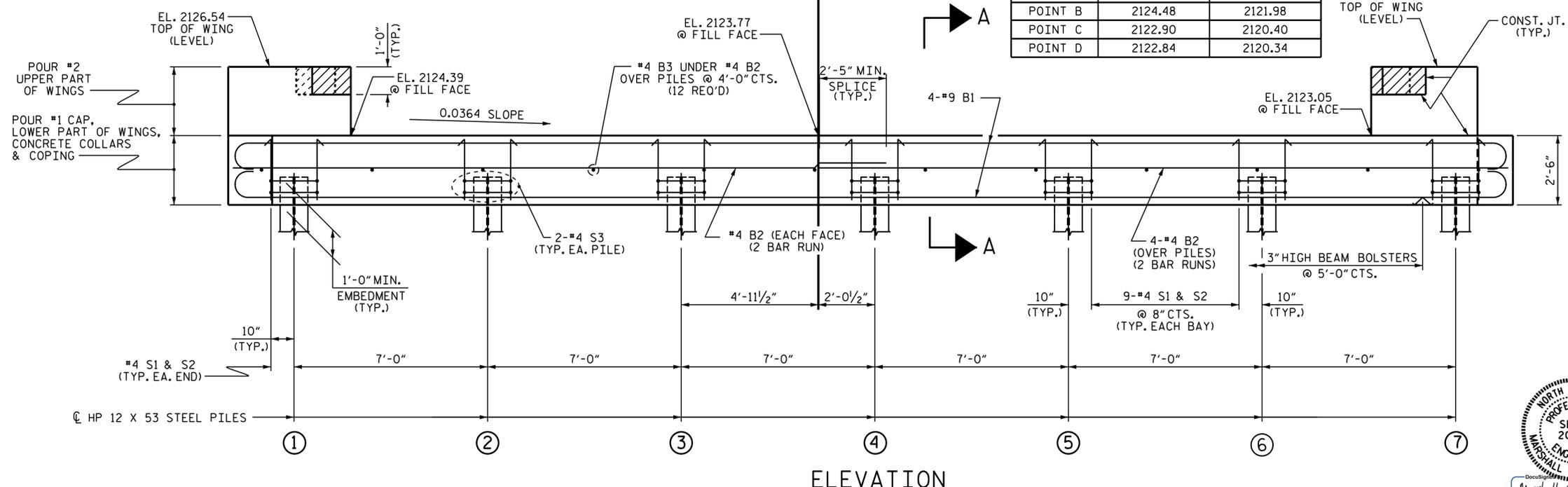
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.
 FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.
 FOR WING DETAILS, SEE SHEET 2 OF 3.



TOP OF PILE ELEVATIONS	
①	2122.97
②	2122.71
③	2122.46
④	2122.21
⑤	2121.95
⑥	2121.70
⑦	2121.44

PLAN

CAP ELEVATIONS		
	TOP OF CAP	BOTTOM OF CAP
POINT A	2124.54	2122.04
POINT B	2124.48	2121.98
POINT C	2122.90	2120.40
POINT D	2122.84	2120.34

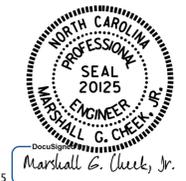


ELEVATION

PROJECT NO. B-5244
BUNCOMBE COUNTY
 STATION: 14+02.00 -L-
 SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT No. 2**



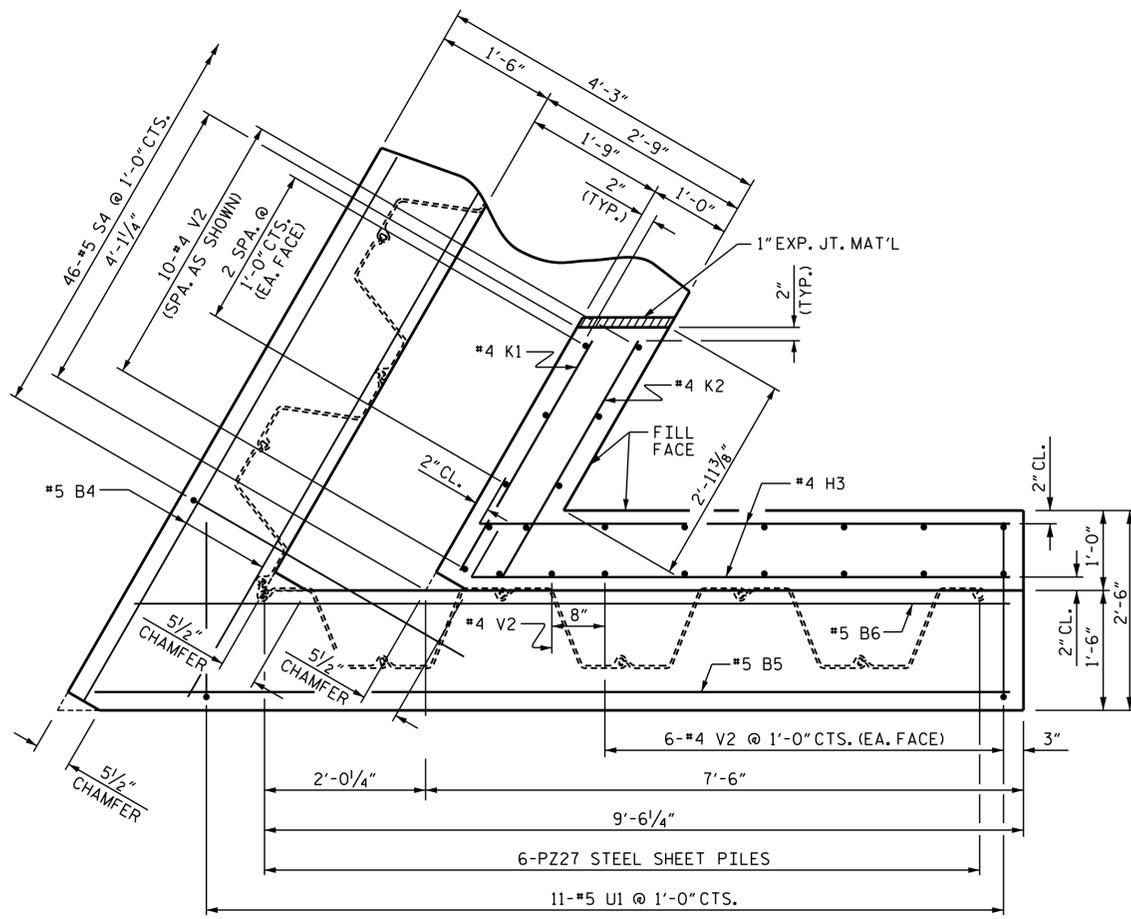
DRAWN BY: W.J. HARRIS DATE: 6/15
 CHECKED BY: B.N. GRADY DATE: 10/15
 DESIGN ENGINEER OF RECORD: W.J. HARRIS DATE: 12/15

WINGS AND SHEET PILES NOT SHOWN FOR CLARITY.
 FOR SECTION A-A, SEE SHEET 3 OF 3.
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.

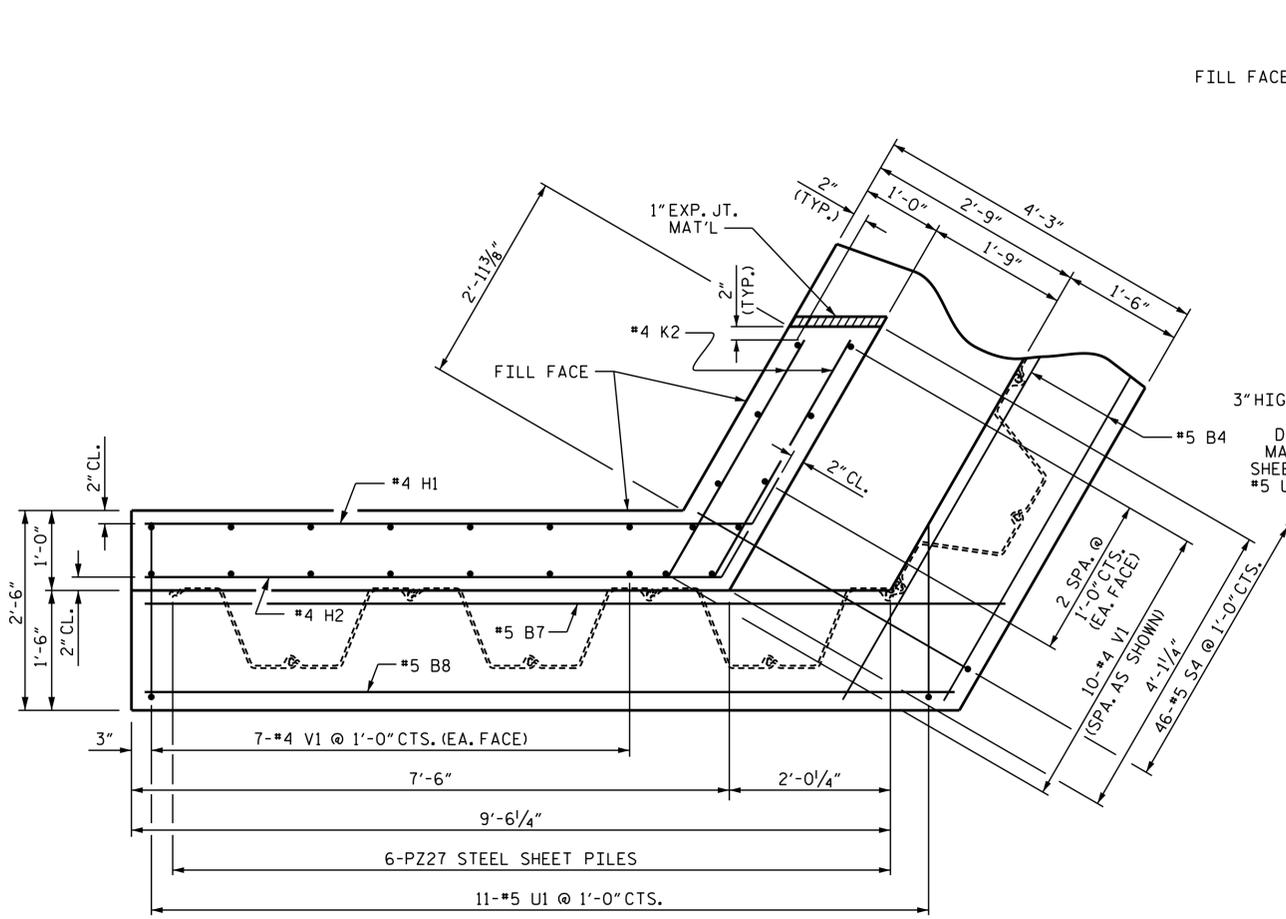
12/21/2015 6:40:06 AM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

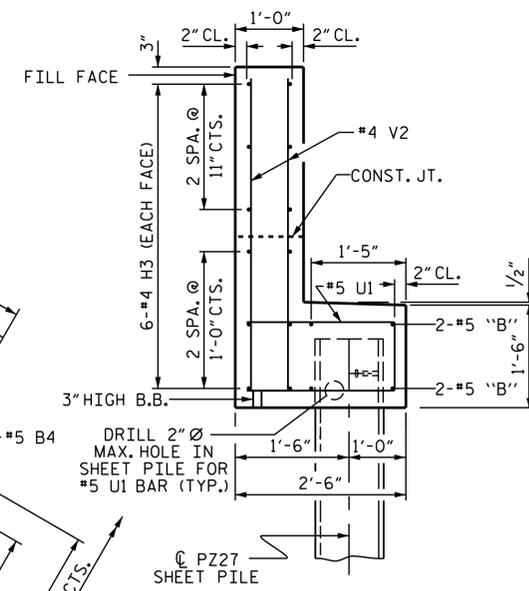
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15	
1			3			TOTAL SHEETS 18	
2			4				



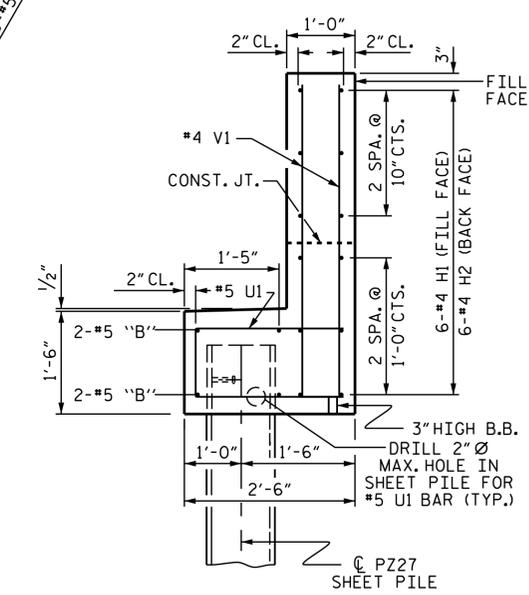
PLAN OF WING (W1)



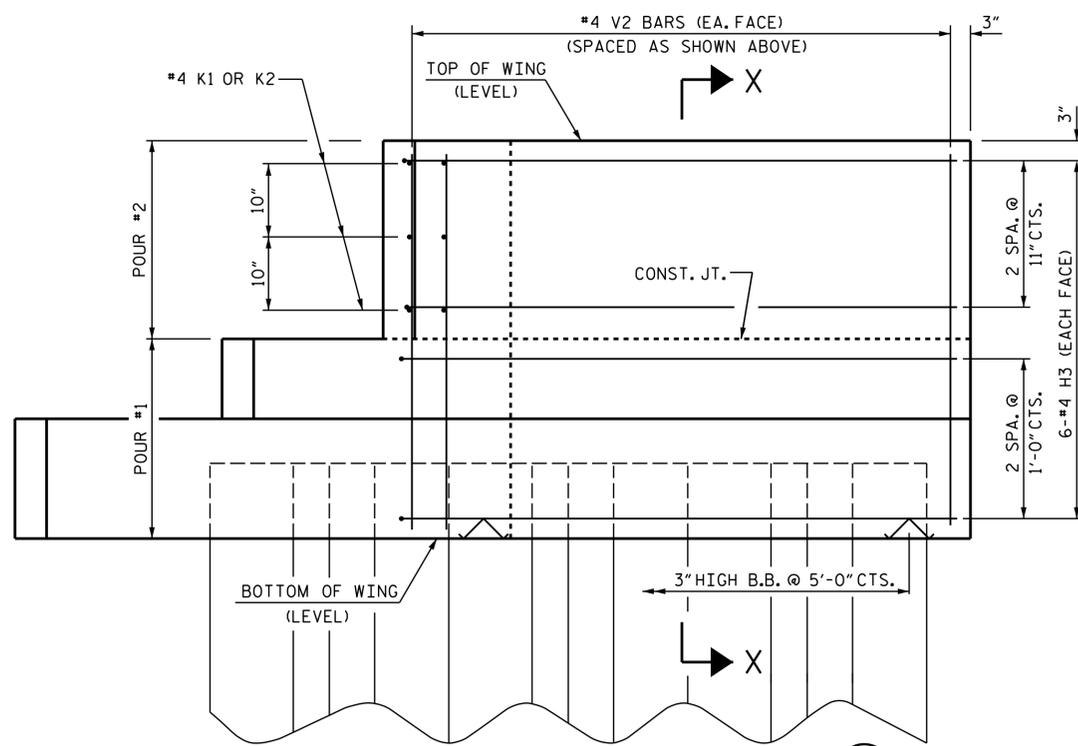
PLAN OF WING (W2)



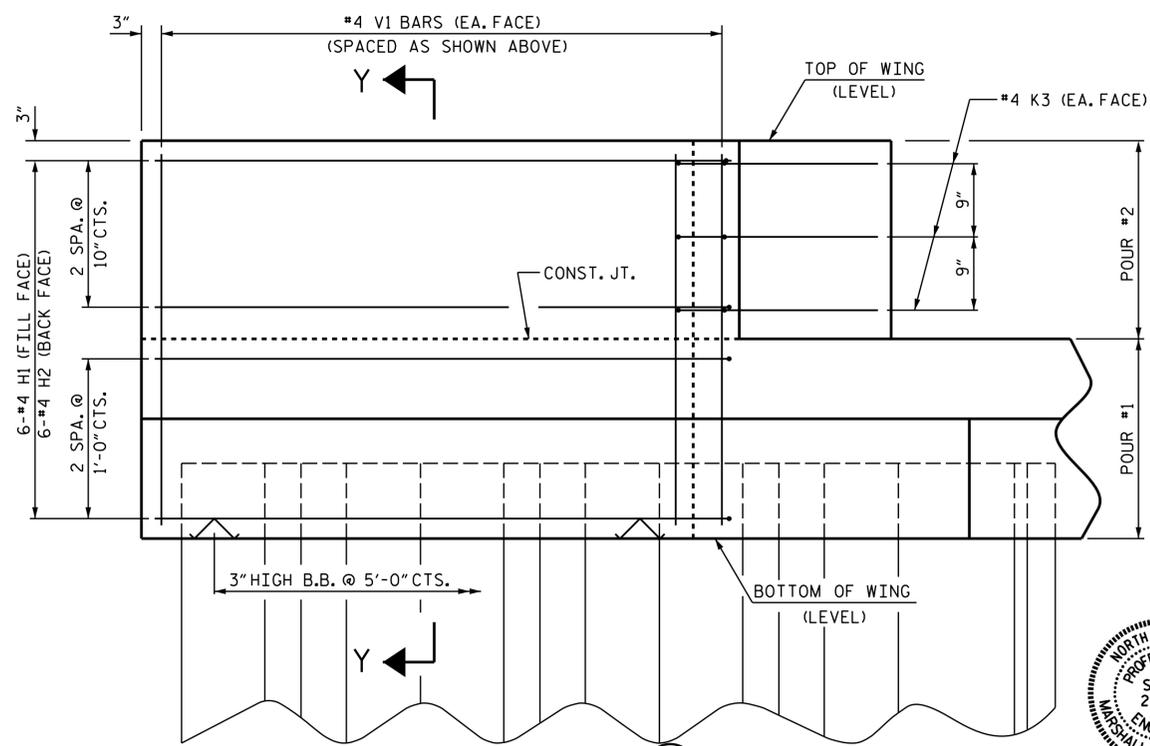
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

PROJECT NO. B-5244
 BUNCOMBE COUNTY
 STATION: 14+02.00 -L-
 SHEET 2 OF 3

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



12/21/2015
 Marshall G. Cheek, Jr.
 65490REBA3B3405

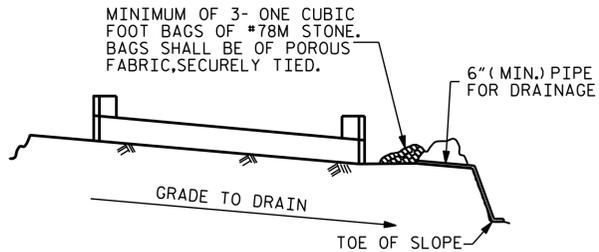
DRAWN BY: W.J. HARRIS DATE: 6/15
 CHECKED BY: B.N. GRADY DATE: 10/15
 DESIGN ENGINEER OF RECORD: W.J. HARRIS DATE: 12/15

WING DETAILS

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			18

*****SYSTEM*****
 *****DGN*****
 *****USER*****

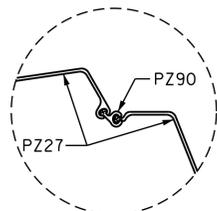


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

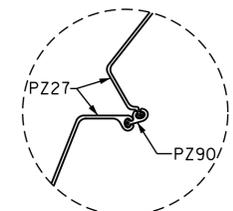
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

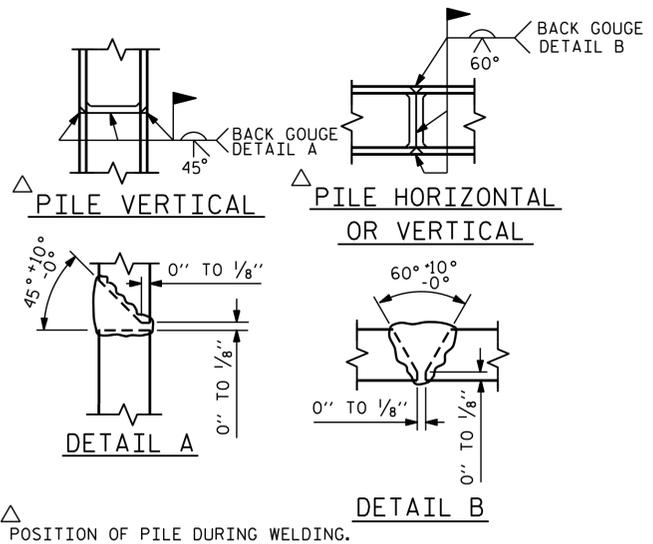
TEMPORARY DRAINAGE AT END BENT



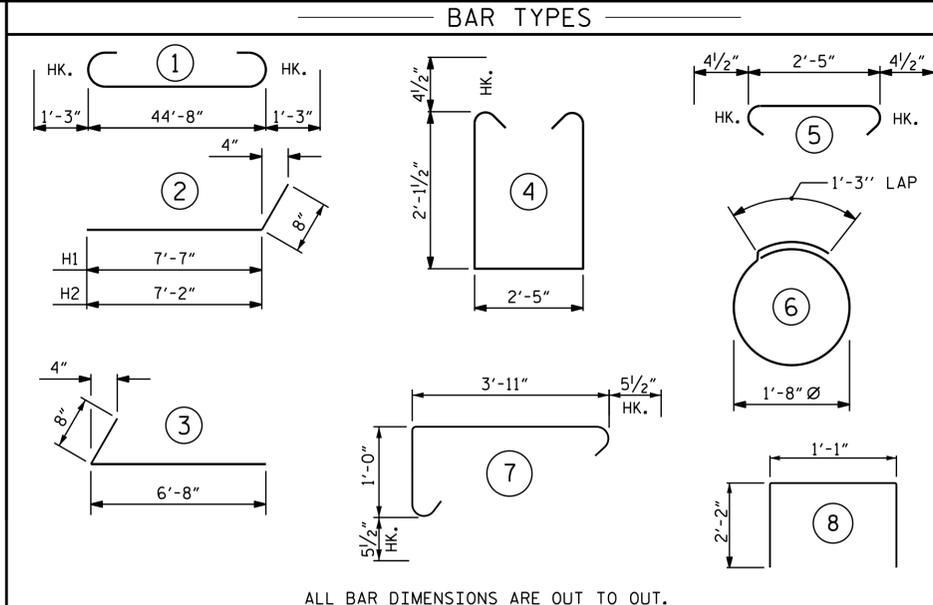
DETAIL "B"



DETAIL "C"



PILE SPLICE DETAILS

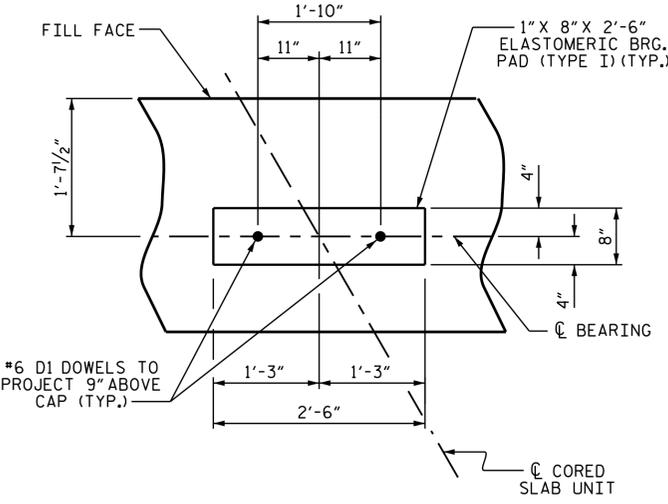


ALL BAR DIMENSIONS ARE OUT TO OUT.

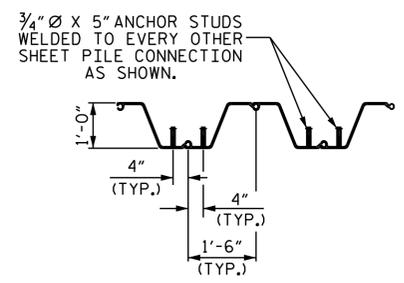
HP 12 X 53 STEEL PILES
NO: 7
LIN. FT. = 335 LIN. FT.

18" GALVANIZED STEEL SHEET PILES
NO. PZ27 = 42
NO. PZ90 = 2
TOTAL NO. = 44

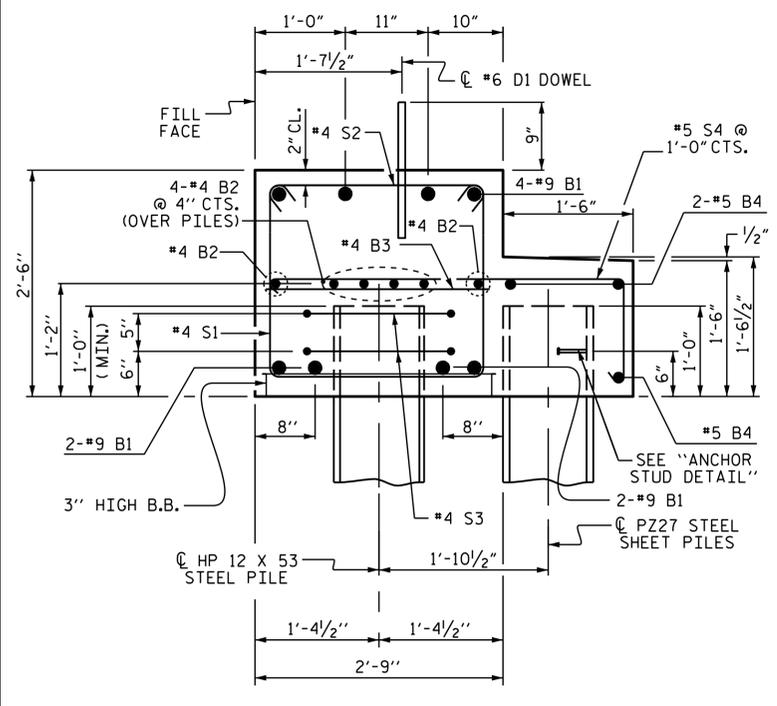
BILL OF MATERIAL					
END BENT No.2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	47'-2"	1283
B2	12	#4	STR	23'-7"	189
B3	12	#4	STR	2'-5"	19
B4	3	#5	STR	48'-2"	151
B5	2	#5	STR	11'-5"	24
B6	2	#5	STR	10'-11"	23
B7	2	#5	STR	10'-9"	22
B8	2	#5	STR	10'-2"	21
D1	22	#6	STR	1'-6"	50
H1	6	#4	2	8'-3"	33
H2	6	#4	2	7'-10"	31
H3	12	#4	3	7'-4"	59
K1	3	#4	STR	3'-5"	7
K2	9	#4	STR	3'-7"	22
S1	56	#4	4	7'-5"	277
S2	56	#4	5	3'-2"	118
S3	14	#4	6	6'-6"	61
S4	46	#5	7	5'-10"	280
U1	22	#5	8	5'-5"	124
V1	23	#4	STR	4'-1"	63
V2	24	#4	STR	4'-5"	71
REINFORCING STEEL				2928 LBS.	
CLASS A CONCRETE BREAKDOWN					
POUR #1 CAP, LOWER PART OF WINGS, COLLARS & COPING				19.6 CU. YDS.	
POUR #2 UPPER PART OF WINGS				1.6 CU. YDS.	
TOTAL CLASS A CONCRETE				21.2 CU. YDS.	



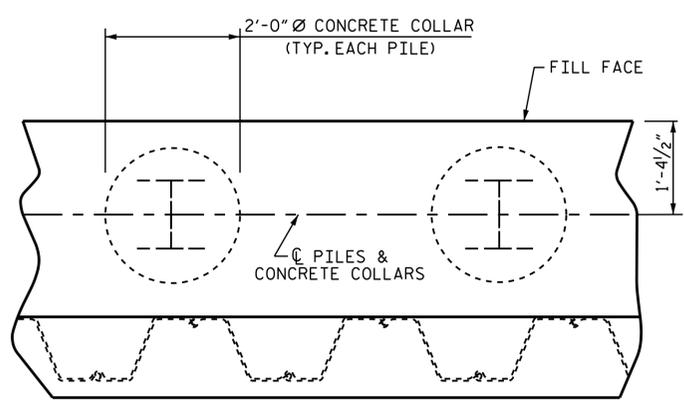
DETAIL "A"



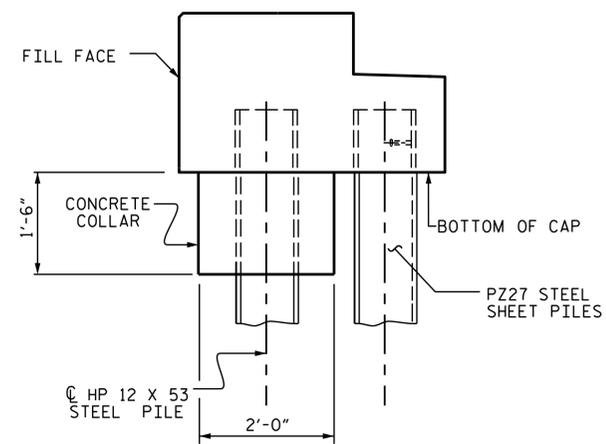
ANCHOR STUD DETAIL



SECTION A-A



PLAN

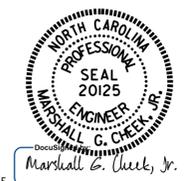


ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

DRAWN BY: W.J. HARRIS DATE: 6/15
 CHECKED BY: B.N. GRADY DATE: 10/15
 DESIGN ENGINEER OF RECORD: W.J. HARRIS DATE: 12/15

18-DEC-2015 13:26
 R:\Structures\Final Plans\B5244_SD.E*.dgn
 bngrady



12/21/2015

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-5244
 BUNCOMBE COUNTY
 STATION: 14+02.00 -L-

SHEET 3 OF 3

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

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

TOTAL SHEETS 18

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.

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

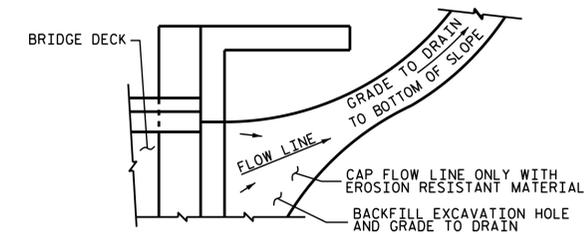
#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE 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.

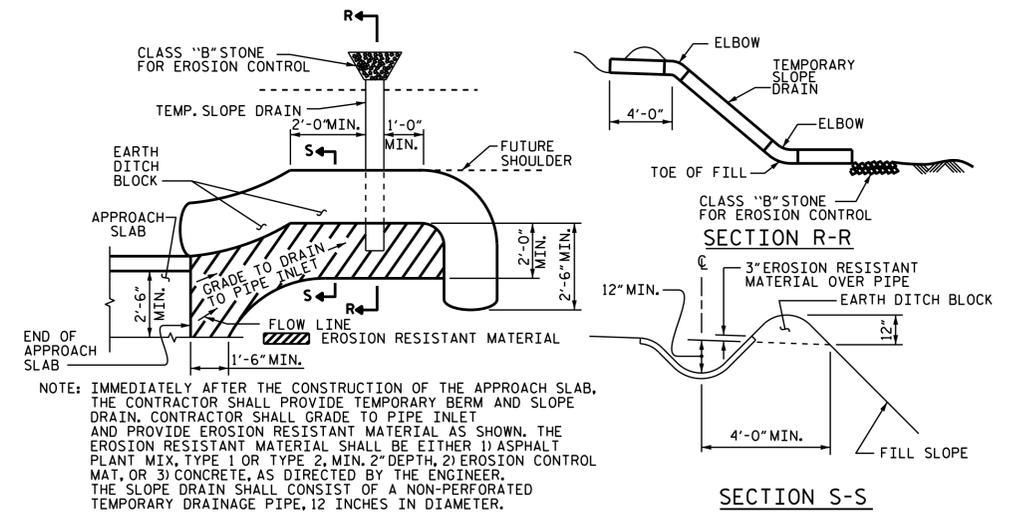
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

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.

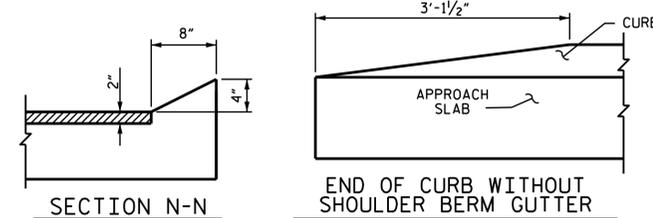
TEMPORARY DRAINAGE DETAIL



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.

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



CURB DETAILS

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



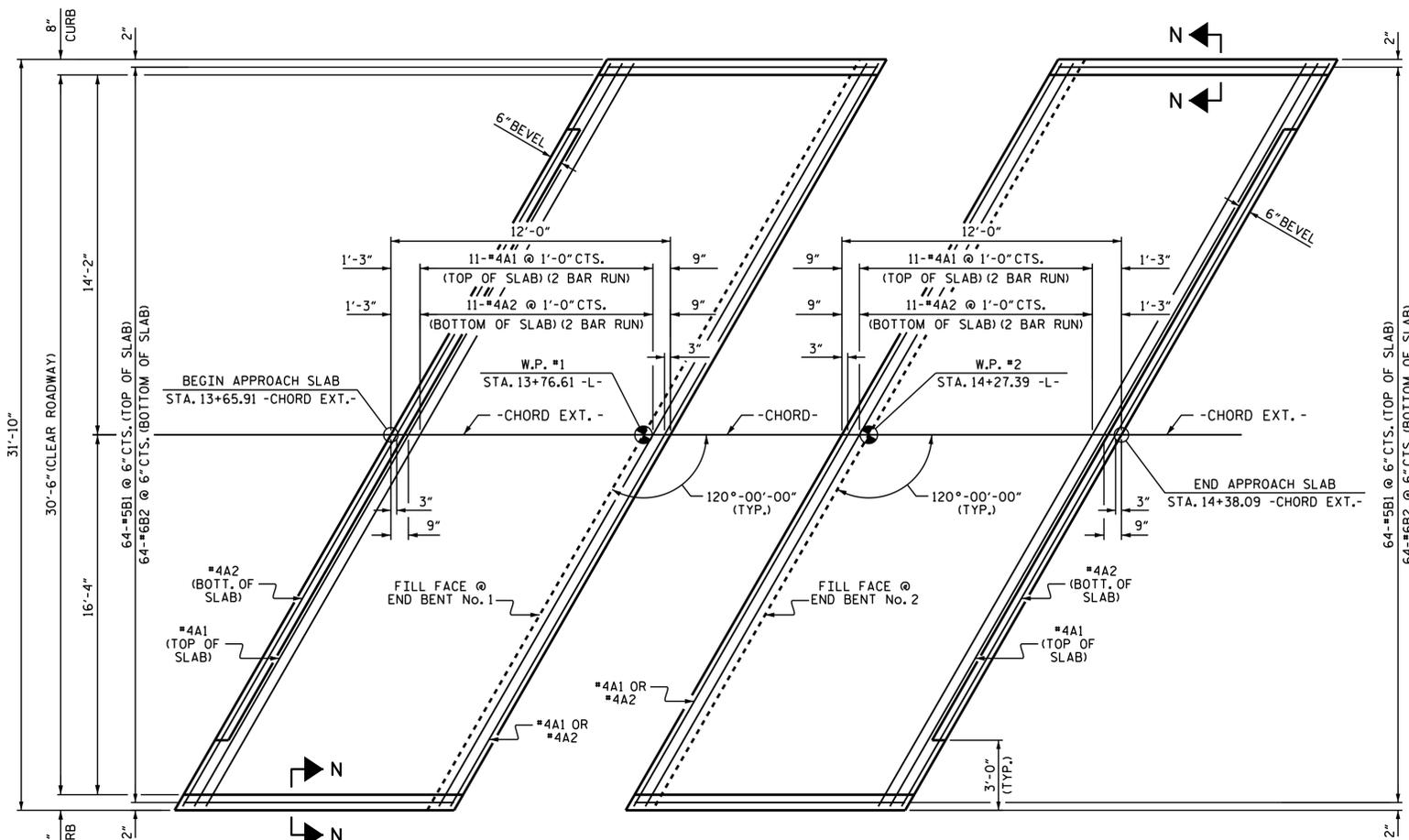
12/21/2015

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BILL OF MATERIAL

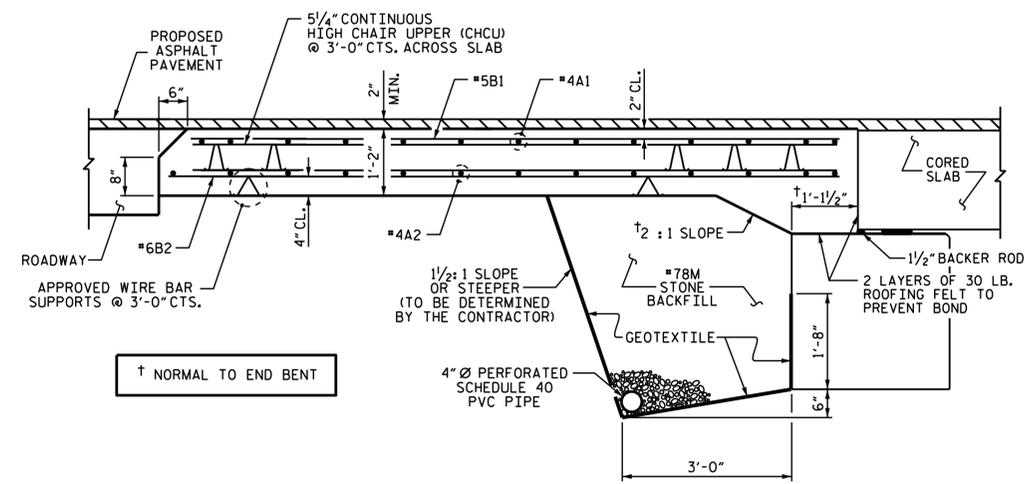
APPROACH SLAB AT EB No. 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	26	#4	STR	19'-3"	334
A2	26	#4	STR	19'-1"	331
*B1	64	#5	STR	11'-1"	740
B2	64	#6	STR	11'-7"	1113
REINFORCING STEEL					LBS. 1444
* EPOXY COATED REINFORCING STEEL					LBS. 1074
CLASS AA CONCRETE					C. Y. 17.4

APPROACH SLAB AT EB No. 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	26	#4	STR	19'-3"	334
A2	26	#4	STR	19'-1"	331
*B1	64	#5	STR	11'-1"	740
B2	64	#6	STR	11'-7"	1113
REINFORCING STEEL					LBS. 1444
* EPOXY COATED REINFORCING STEEL					LBS. 1074
CLASS AA CONCRETE					C. Y. 17.4



PLAN @ END BENT No. 1 **PLAN @ END BENT No. 2**

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB

DRAWN BY : B.N. GRADY DATE : 10/15
 CHECKED BY : D. HODGE DATE : 11/15

18-DEC-2015 13:26
 R:\Structures\Final Plans\B5244_SD_AS.dgn
 bngrady

PROJECT NO. B-5244
BUNCOMBE COUNTY
 STATION: 14+02.00 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 BRIDGE APPROACH SLAB
 FOR PRESTRESSED CONCRETE
 CORED SLAB UNIT
 (SUB-REGIONAL TIER)
 120° SKEW

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

