

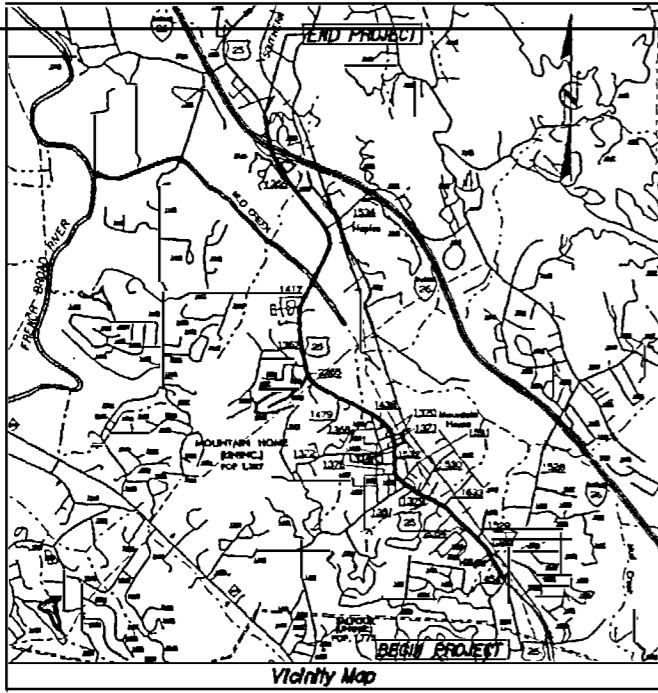
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**HENDERSON COUNTY**

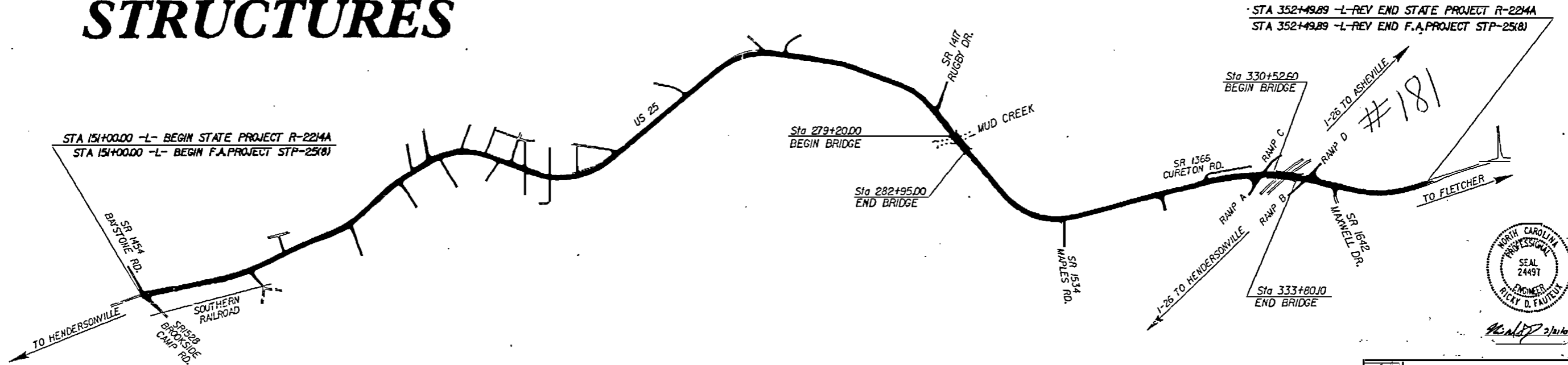
LOCATION: US 25 FROM SR 1528 (BROOKSIDE CAMP ROAD) NORTH  
OF HENDERSONVILLE TO SR 1345, NORTH OF I-26

TYPE OF WORK: GRADING, DRAINAGE, PAVING, RESURFACING, SIGNALS AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2214A		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
8.1951101	STP-25(3)	P.E.	
8.1951102	STP-25(8)	R/W	
8.1951105	STP-25(8)	CONST.	



**STRUCTURES**



**RUMMEL, KLEPPER & KAHL, LLP**  
consulting engineers  
5800 FARMINGTON PLACE - SUITE 105  
RALEIGH, NORTH CAROLINA 27609-3960

R-2214A

PROJECT: 8.1951105

Part I

	<p><b>DESIGN DATA</b></p> <p>ADT 2001 = 14200-18700 ADT 2026 = 25700-33200</p> <p>DHV = 10 % D = 55 % T = 8 % * * (TTST 3% DUAL 5%) V = 50 MPH</p>	<p><b>PROJECT LENGTH</b></p> <p>LENGTH ROADWAY F.A. PROJECT STP-25(8) = 3.668 MI</p> <p>LENGTH STRUCTURES F.A. PROJECT STP-25(8) = 0.133 MI</p> <p>TOTAL LENGTH STATE PROJECT 8.1951105 = 3.801 MI</p>	<p>Prepared for: <b>DIVISION OF HIGHWAYS</b></p> <p>2002 STANDARD SPECIFICATIONS</p> <p>LETTING DATE: AUGUST 19, 2003</p>	<p><b>STRUCTURE DESIGN UNIT</b> 1800 MERCEDES BRIDGE DR. RALEIGH, NC 27618</p> <p>7/23/02</p>	<p><b>DIVISION OF HIGHWAYS</b> STATE OF NORTH CAROLINA</p> <p><i>D.M. Barlow</i> STATE DESIGN ENGINEER</p> <p>DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION</p> <p>APPROVED DIVISION ADMINISTRATOR</p>
					DATE

01-JUL-2002 14:23

PVI = 330+70.00 -L1 REV-  
EL = 2134.37  
VC = 965.00'

GRADE DATA

+5.248% Δ -2.404%  
APPROXIMATE  
EXISTING GROUND LINE

2130  
2120  
2110  
2100  
2090

FILL FACE @ END BENT 1  
STA. 330+52.60 -L1REV-  
GRADE POINT EL 2124.880  
EL 21196 ±  
1'-5" (MIN)  
HP 12x53 STEEL PILES

EXP. 1'-0" BERM  
(NORMAL TO CAP)  
4" CONC. SLOPE PROTECTION  
2:1 SLOPE  
(NORMAL TO CAP)  
FILL  
EL 2096.2 ±  
PAVED DITCH  
(ROADWAY PAY ITEM)

SPAN A  
FIX  
DRILLED PIER  
TOP OF DRILLED PIER  
EL 2092.500

SPAN B  
2:1 SLOPE  
(NORMAL TO CAP)  
4" CONC. SLOPE PROTECTION  
FILL  
EL 2193.1 ±  
PAVED DITCH  
(ROADWAY PAY ITEM)

EXP. 1'-0" BERM  
(NORMAL TO CAP)  
1'-6" (MIN)  
HP 12x53 STEEL PILES

FILL FACE @ END BENT 2  
STA. 333+80.10 -L1REV-  
GRADE POINT EL 2125.737  
EL 21239 ±

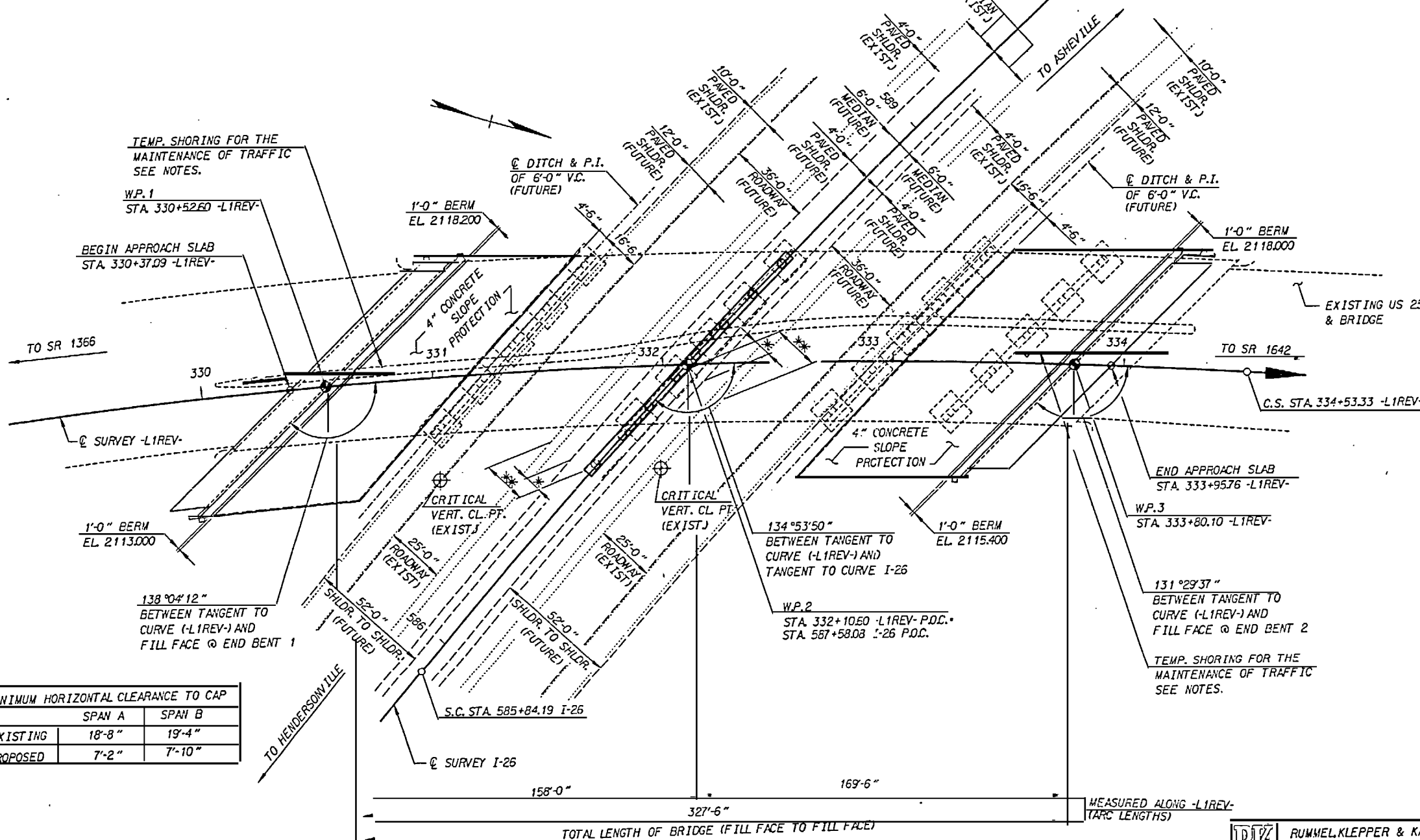
END BENT 1

BENT 1

END BENT 2

SECTION ALONG @ SURVEY -L1REV-

BENT AND END BENTS ON SECTION AT RIGHT ANGLES TO @ BENT AND END BENTS.



-L1REV- HORIZONTAL CURVE DATA

PI = 328+59.47  
Δ = 24° 13' 02.3" (RT)  
D = 02' 00" 29.0"  
L = 1,206.00'  
T = 612.14'  
R = 2953.29'  
SC = 322+47.33  
CS = 334+53.33  
e = 0.035 FT/FT

I-26 HORIZONTAL CURVE DATA

PIs Sta 585+09.20 PI Sta 595+93.84  
θ s = 1° 58' 07.5" Δ = 34° 16' 39.4" (RT)  
Ls = 225.00' D = 1° 45' 00.0"  
LT = 150.01' L = 1958.72'  
ST = 75.01' R = 3274.04'

MINIMUM HORIZONTAL CLEARANCE TO CAP		
	SPAN A	SPAN B
EXISTING	18'-8"	19'-4"
PROPOSED	7'-2"	7'-10"

TOTAL LENGTH OF BRIDGE (FILL FACE TO FILL FACE)

PLAN

NOTE: PILES ARE NOT SHOWN IN PLAN VIEW FOR CLARITY

PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+10.60 -L1REV- P.O.C.  
587+58.08 I-26 P.O.C.  
SHEET 1 OF 5 REPLACES BRIDGE NO. 121

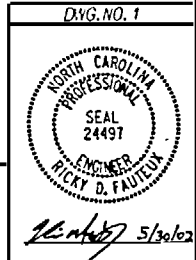
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

GENERAL DRAWING FOR BRIDGE  
ON US 25 OVER I-26  
BETWEEN SR 1366 AND SR 1642

MAY 2002

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

SHEET NO  
5-58  
TOTAL SHEETS  
107

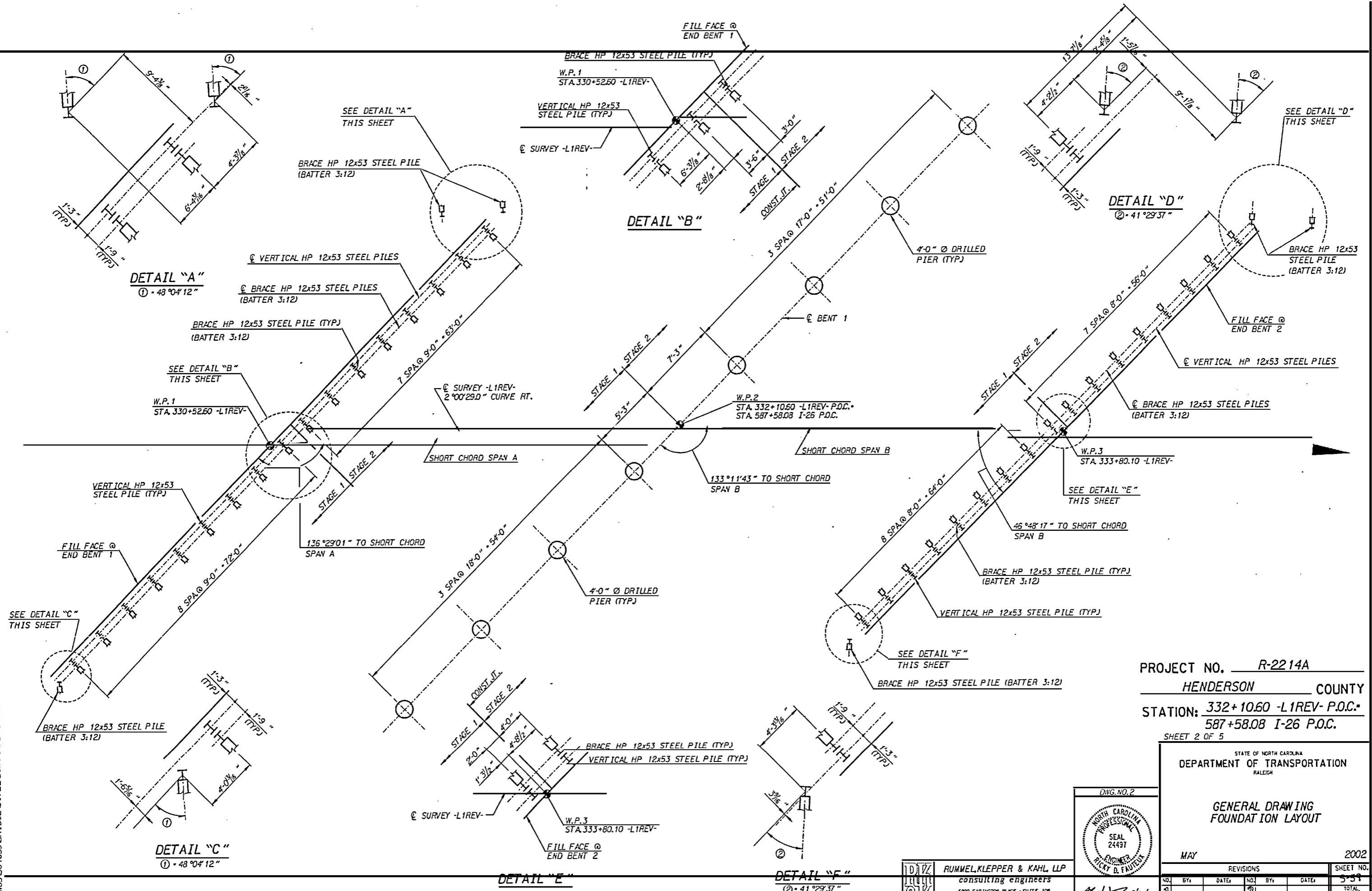


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CHECKED BY: R.D. FAUTEUX DATE: 04/02

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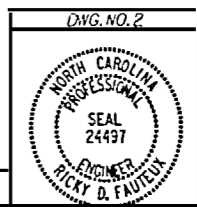
PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.-  
587+58.08 I-26 P.O.C.

SHEET 2 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING  
 FOUNDATION LAYOUT**

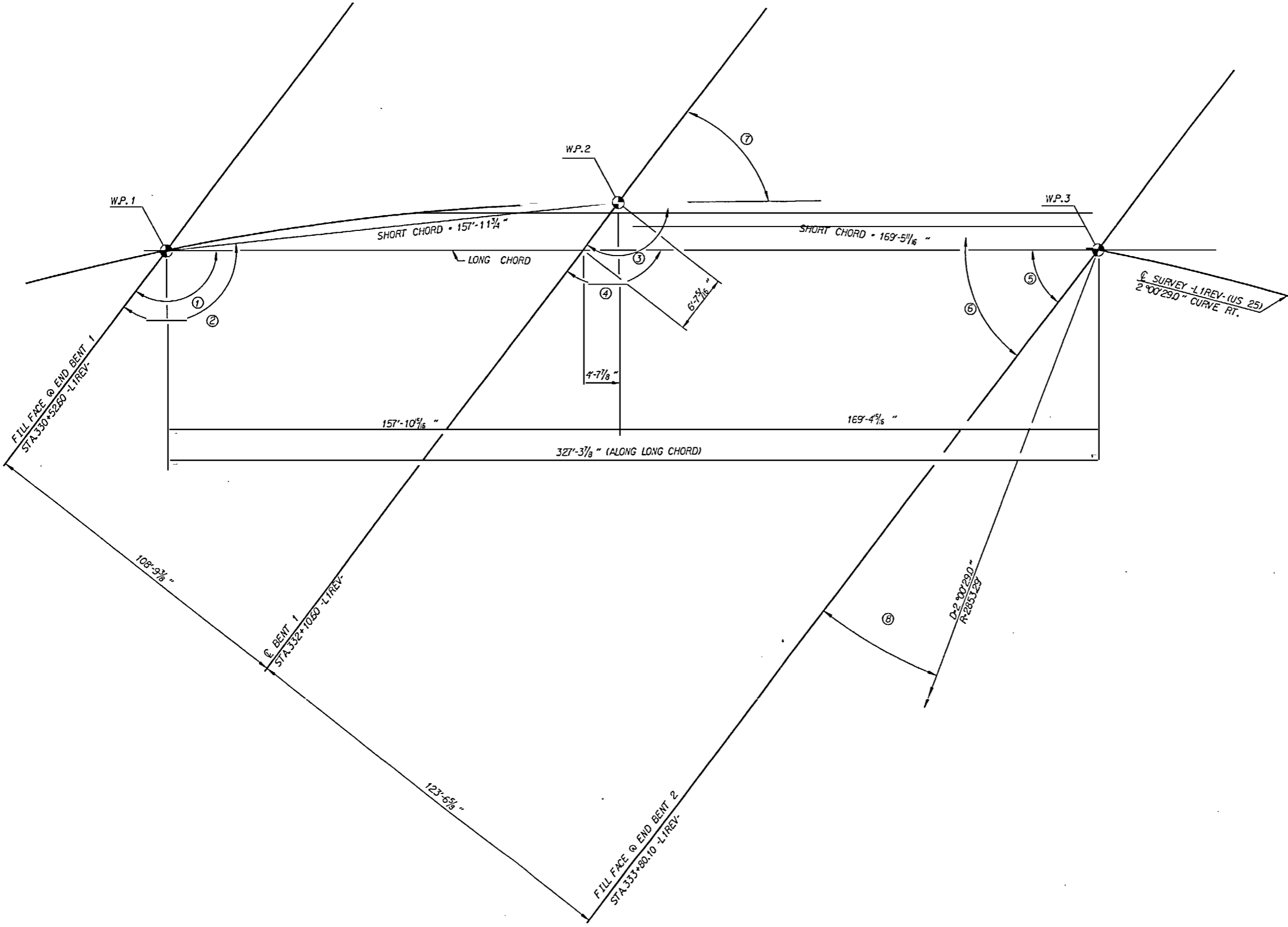
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REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			5/59
2			4			107

DRAWN BY: B. PARRISH DATE: 04/02  
 CHECKED BY: R. D. FAUTEUX DATE: 04/02



**-L1REV- HORIZONTAL CURVE DATA**

P1 = 328+59.47  
 Δ = 24°13'02" (RT)  
 D = 02°00'29"  
 L = 1,206.00'  
 T = 612.14'  
 R = 2,853.29'  
 PC = 322+47.33  
 CS = 334+53.33  
 e = 0.035 FT/FT

**ANGLES**

- ① 134°46'54"
- ② 136°29'01"
- ③ 133°11'43"
- ④ 134°46'54"
- ⑤ 45°13'06"
- ⑥ 46°48'17"
- ⑦ 45°06'10" (TANGENT TO CURVE)
- ⑧ 41°29'37"

PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.-  
587+58.08 I-26 P.O.C.

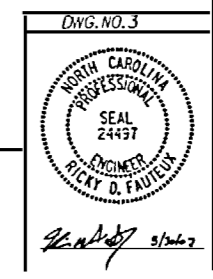
SHEET 3 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**GENERAL DRAWING  
LONG CHORD LAYOUT**

MAY 2002

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			5-60
2			4			107



**R&K**  
**RUMMEL, KLEPPER & KAHL**  
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**LONG CHORD LAYOUT**  
BENT AND END BENTS ARE PARALLEL

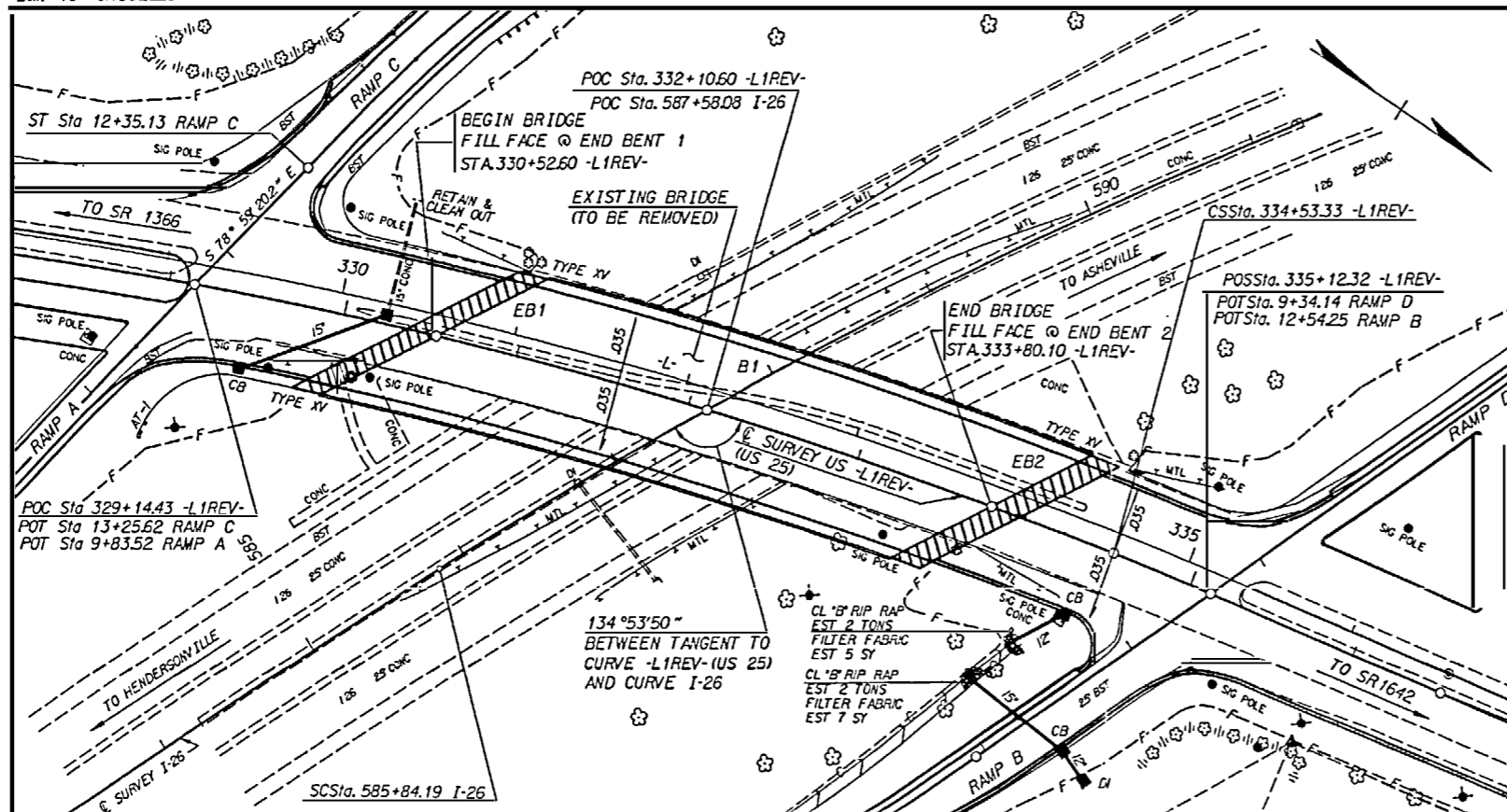
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 CHECKED BY : R. D. FAUTEUX DATE : 04 /02

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# TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	4'-0" Ø DRILLED PIER NOT IN SOIL	4'-0" Ø DRILLED PIER IN SOIL	SPT TESTING	CROSSHOLE SONIC LOGGING	CSL TUBES	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS "A" CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	STRUCTURAL STEEL	HP 12x53 STEEL PILES	3 BAR METAL RAIL	4" SLOPE PROTECTION	POT BEARINGS	EVAZOTE JOINT SEALS	
	LUMP SUM	LF.	LF.	EACH	EACH	LF.	SO. FT.	SO. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	APPROX. LBS.	NO.	LF.	SO. YDS.	LUMP SUM	LUMP SUM	
SUPERSTRUCTURE	LUMP SUM						30,382	24,840					1,264,300			631,667			
END BENT 1									124.4	LUMP SUM	20,302			37	1,480		785		
BENT 1		32	228	8	1	1,120			1707		64,579	13,921							
END BENT 2									107.9	LUMP SUM	18,480			37	1,665		890		
<b>TOTAL</b>	<b>LUMP SUM</b>	<b>32</b>	<b>228</b>	<b>8</b>	<b>1</b>	<b>1,120</b>	<b>30,382</b>	<b>24,840</b>	<b>403.0</b>	<b>LUMP SUM</b>	<b>103,351</b>	<b>13,921</b>	<b>1,264,300</b>	<b>74</b>	<b>3,145</b>	<b>631,667</b>	<b>1,675</b>	<b>LUMP SUM</b>	<b>LUMP SUM</b>

B.M. #16 - CHISELED X ON CONCRETE SLAB 120' RT. - L- STA. 305+60, ELEV. 2063.40



## LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

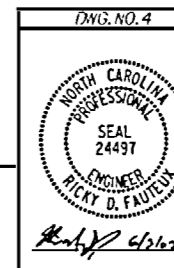
PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.  
587+58.08 I-26 P.O.C.  
 SHEET 4 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING FOR BRIDGE  
 ON US 25 OVER I-26  
 BETWEEN SR 1366 AND SR 1642

MAY 2002

NO.		BY:		DATE:		NO.		BY:		DATE:		SHEET NO.
1						3						5-01
2						4						TOTAL SHEETS 107



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DRAWN BY: F.D. WEEDEN DATE: 04 / 02  
 CHECKED BY: R.D. FAUTEUX DATE: 04 / 02

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**GENERAL NOTES**

ASSUMED LIVE LOAD - HS20 OR ALTERNATE LOADING.

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

THIS BRIDGE HAS BEEN DESIGNED BY STRENGTH THE DESIGN METHOD AS SPECIFIED IN AASHTO STANDARD SPECIFICATIONS.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR SEISMIC DESIGN OF HIGHWAY BRIDGES FOR SEISMIC PERFORMANCE CATEGORY B.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE CONSISTING OF 5 SPANS OF 1 AT 79'-8", 1 AT 81'-4", 1 AT 81'-8", 1 AT 52'-2", AND 1 AT 53'-0" (TOTAL LENGTH OF 347'-10"), COMPOSED OF CONCRETE SLABS ON CONCRETE PIERS AND ABUTMENTS, LOCATED 11'-6" WEST FROM THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS, UNLESS OTHERWISE NOTED ON THE PLANS.

STEEL SHEET PILING FOR SHORING SHALL BE HOT ROLLED

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.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE ANCHORED PORTABLE CONCRETE BARRIER.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

ALL PAVEMENT MARKING WILL BE IN ACCORDANCE WITH THE PAVEMENT MARKING PLANS AND SHALL PROVIDE FOR BICYCLES.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE LOCATED 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.

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 CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNANCE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

WHEN DRIVING PILES, THE MAXIMUM BLOW COUNT SHALL NOT BE EXCEEDED.

SLURRY CONSTRUCTION SHALL NOT BE USED ON THIS PROJECT.

FOR DRILLED PIERS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMS OVER OR ADJACENT TO TRAFFIC, SEE SPECIAL PROVISIONS.

THE DRILLED PIERS AT BENT NO. 1 HAVE BEEN DESIGNED FOR BOTH SKIN FRICTION AND TIP BEARING. THE REQUIRED TIP BEARING CAPACITY IS 15 TSF.

THE REQUIRED TIP BEARING CAPACITY AT BENT NO. 1 SHALL BE VERIFIED.

DRILLED PIERS FOR BENT NO. 1 HAVE BEEN DESIGNED FOR AN APPLIED LOAD OF 405 TONS EACH AT THE TOP OF THE COLUMN.

PERMANENT STEEL CASING IS NOT REQUIRED FOR DRILLED PIERS AT BENT NO. 1.

DRILLED PIERS AT BENT NO. 1 SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 2060 FEET AND SATISFY THE REQUIRED TIP BEARING CAPACITY.

SPT TESTING IS REQUIRED TO DETERMINE THE TIP BEARING CAPACITY OF THE DRILLED PIERS AT BENT NO. 1 SEE DRILLED PIERS SPECIAL PROVISIONS.

SID INSPECTIONS ARE NOT REQUIRED TO DETERMINE THE BOTTOM CLEANLINESS OF THE DRILLED PIERS AT BENT NO. 1.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR THE DRILLED PIERS AT BENT NO. 1. SEE SPECIAL PROVISIONS FOR CROSSHOLE SONIC LOGGING.

PILES FOR END BENTS NOS. 1 AND 2 SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 60 TONS EACH.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FOOT BELOW THE GROUND LINE.

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PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.-  
587+58.08 I-26 P.O.C.

SHEET 5 OF 5

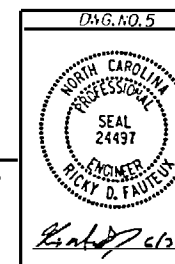
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 NOTES

MAY

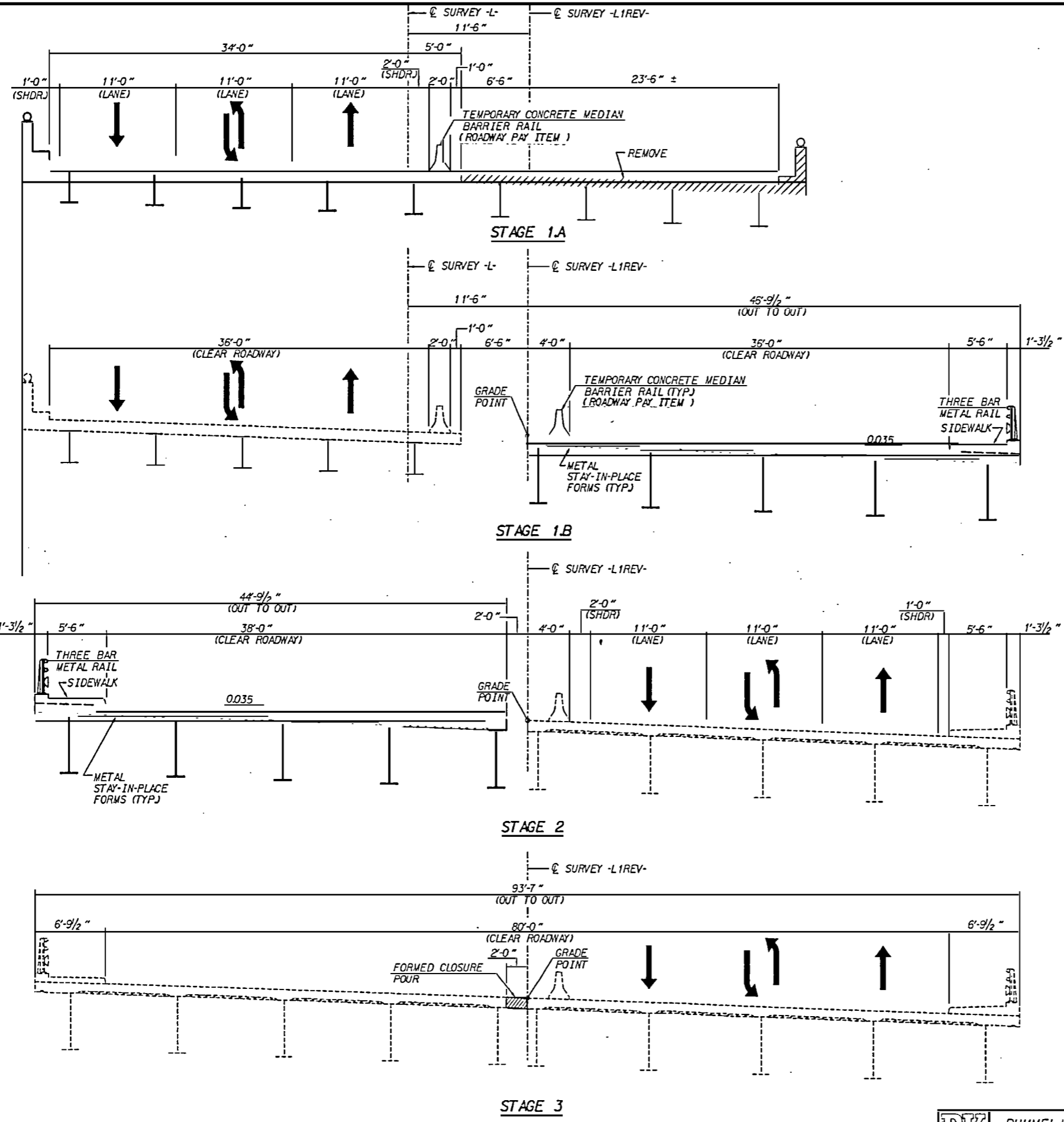
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1	2	1	2	1	2	
1				3		5-62
2				4		TOTAL SHEETS 107



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DRAWN BY : F.D. WEEDEN DATE : 04 / 02  
 CHECKED BY : R.D. FAUTEUX DATE : 04 / 02



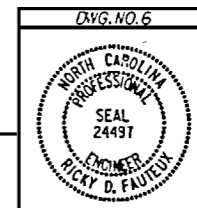
**SEQUENCE OF CONSTRUCTION**

1. REMOVE PORTION OF EXISTING BRIDGE.
2. CONSTRUCT STAGE 1 - COMPLETE WITH SIDEWALK AND 3 BAR METAL RAIL AND TEMPORARY ANCHORED PORTABLE CONCRETE BARRIER.
3. SHIFT TRAFFIC TO COMPLETED STAGE 1.
4. REMOVE REMAINING PORTION OF EXISTING BRIDGE.
5. CONSTRUCT STAGE 2 COMPLETE WITH SIDEWALK AND 3 BAR METAL RAIL.
6. CONSTRUCT STAGE 3 (SLAB CLOSURE POUR), REMOVE TEMPORARY ANCHORED PORTABLE CONCRETE BARRIER.

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PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.

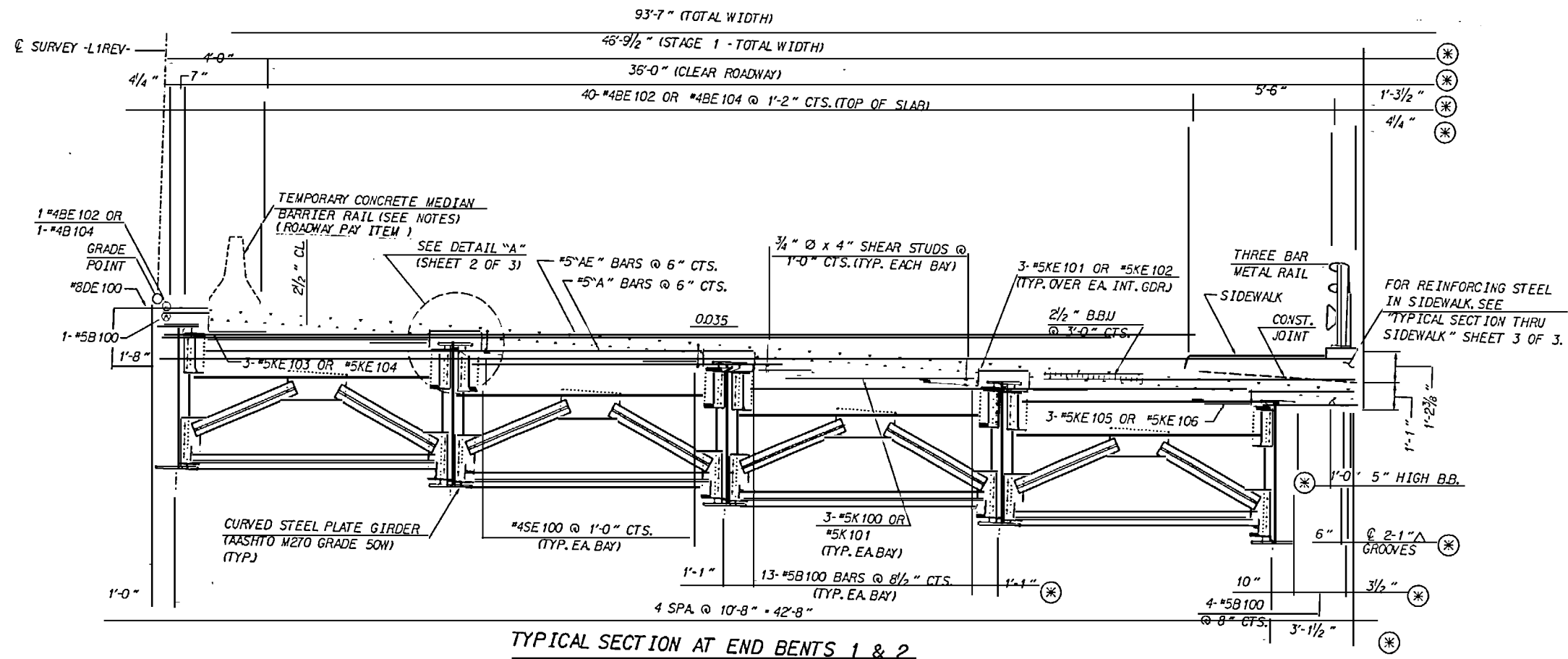
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**CONSTRUCTION SEQUENCE**



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 RALEIGH, NORTH CAROLINA 27609-3950

NO.		BY:		DATE:		REVISIONS		SHEET NO.	
1						3		5-63	
2						4		TOTAL SHEETS	107

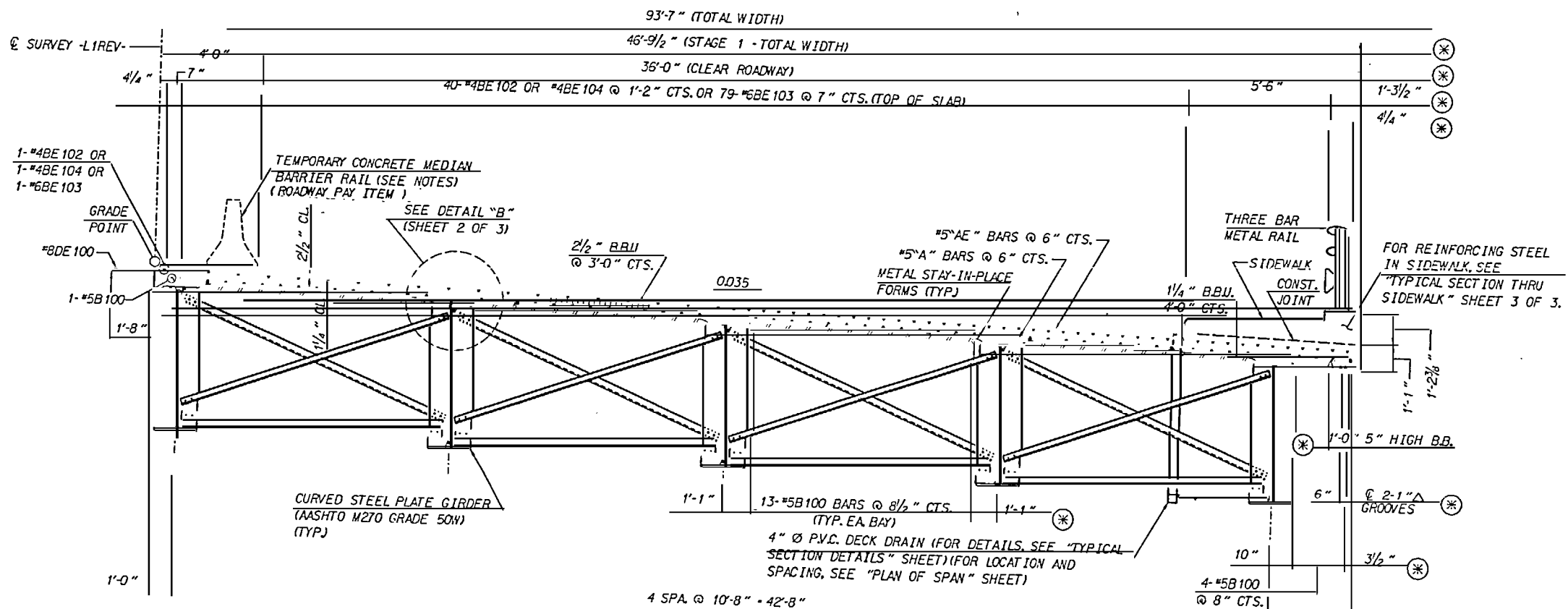
DRAWN BY: F.D. WEEDEN DATE: 04/02  
 CHECKED BY: [Signature] DATE: 04/02



TYPICAL SECTION AT END BENTS 1 & 2

STAGE 1

(\*) DENOTES RADIAL DIMENSION



TYPICAL HALF SECTION AT INTERMEDIATE DIAPHRAGM

TYPICAL HALF SECTION AT BENT 1

STAGE 1

(\*) DENOTES RADIAL DIMENSION

NOTES:

CONCRETE SIDEWALK IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSION STRENGTH OF 3000 PSI.

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND GIRDER STIFFENER OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSION STRENGTH OF 3000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSE WORK OR FORMS ARE PLACED ON THE UNIT.

#5GE BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.

PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER (BBU) @ 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (CHCM) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAILS SHEETS.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE TEMPORARY ANCHORED PORTABLE CONCRETE BARRIER (STAGE 1).

#8DE 100 AND #8DE 200 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP SLAB REINFORCING STEEL.

THE CONTRACTOR SHALL ADJUST THE GIRDER BUILDUPS AS NECESSARY TO INCORPORATE A MAXIMUM PERMISSIBLE VARIATION IN POT BEARING DEPTH OF 1/2"; SEE SPECIAL PROVISION FOR POT BEARINGS.

PROJECT NO. R-2214A  
 HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.

SHEET 1 OF 3

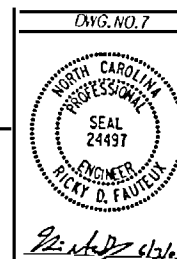
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 TYPICAL SECTION  
 STAGE 1

MAY 2002

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

TOTAL SHEETS 107



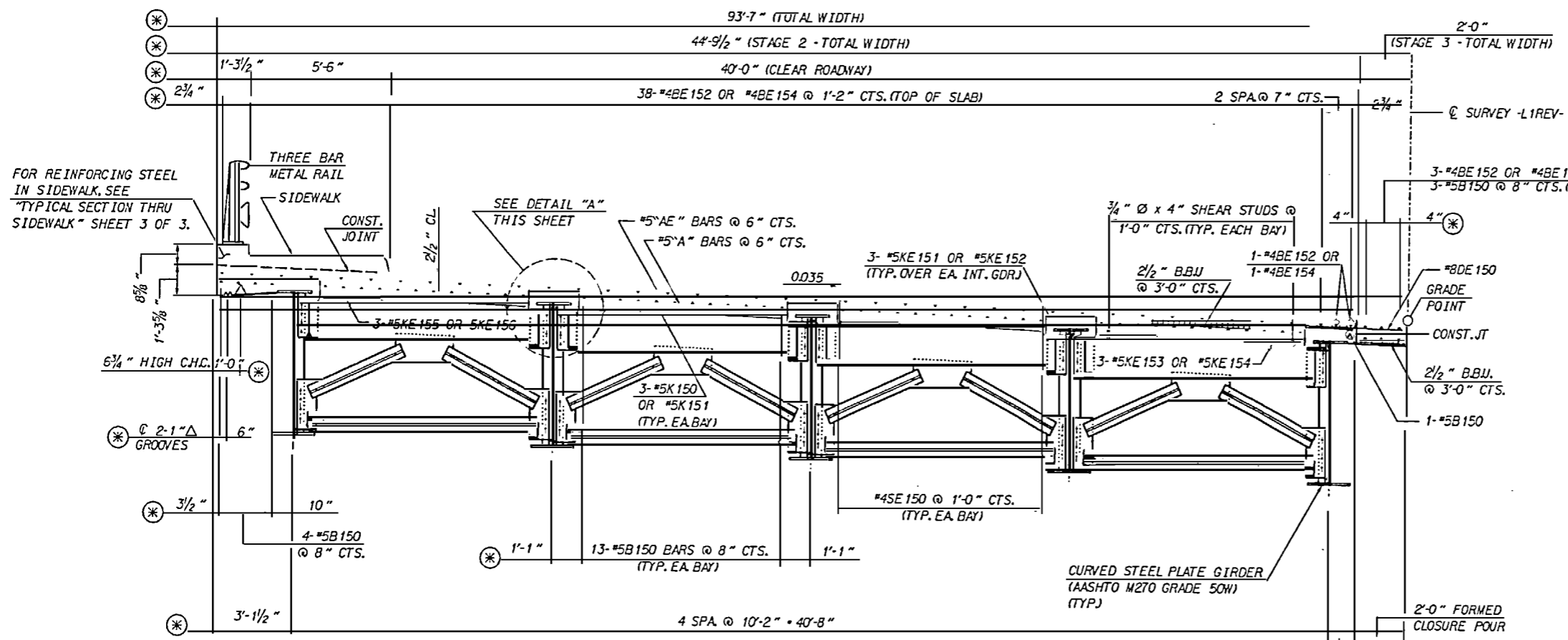
RUMMEL, KLEPPER & KAHL, LLP  
 consulting engineers  
 5800 FARINGDON PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27609-3960

G:\COMNOS\30 1059\BRIDGE\ITE2\06\NF\NALTYPSEC.DGN

DRAWN BY: B. PARRISH DATE: 04/02  
 CHECKED BY: R. D. FAUTEUX DATE: 04/02

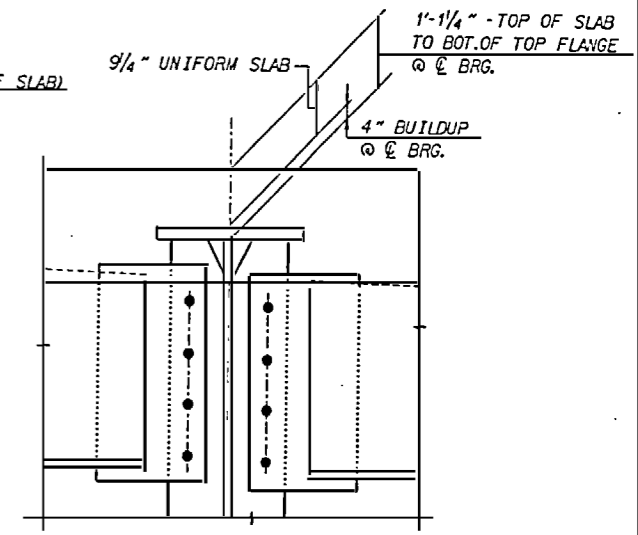


**NOTES:**  
FOR NOTES, SEE SHEET 1 OF 3.

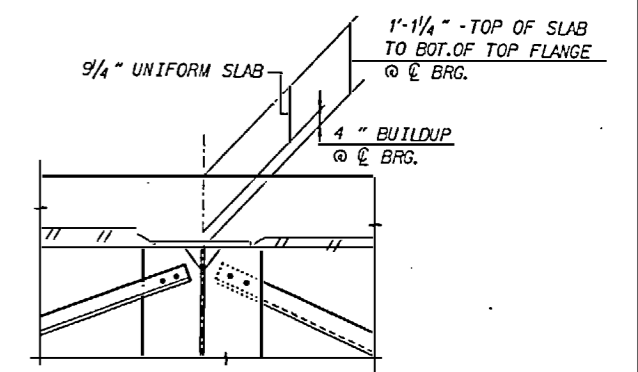


**TYPICAL SECTION AT END BENTS 1 & 2**  
**STAGES 2 & 3**

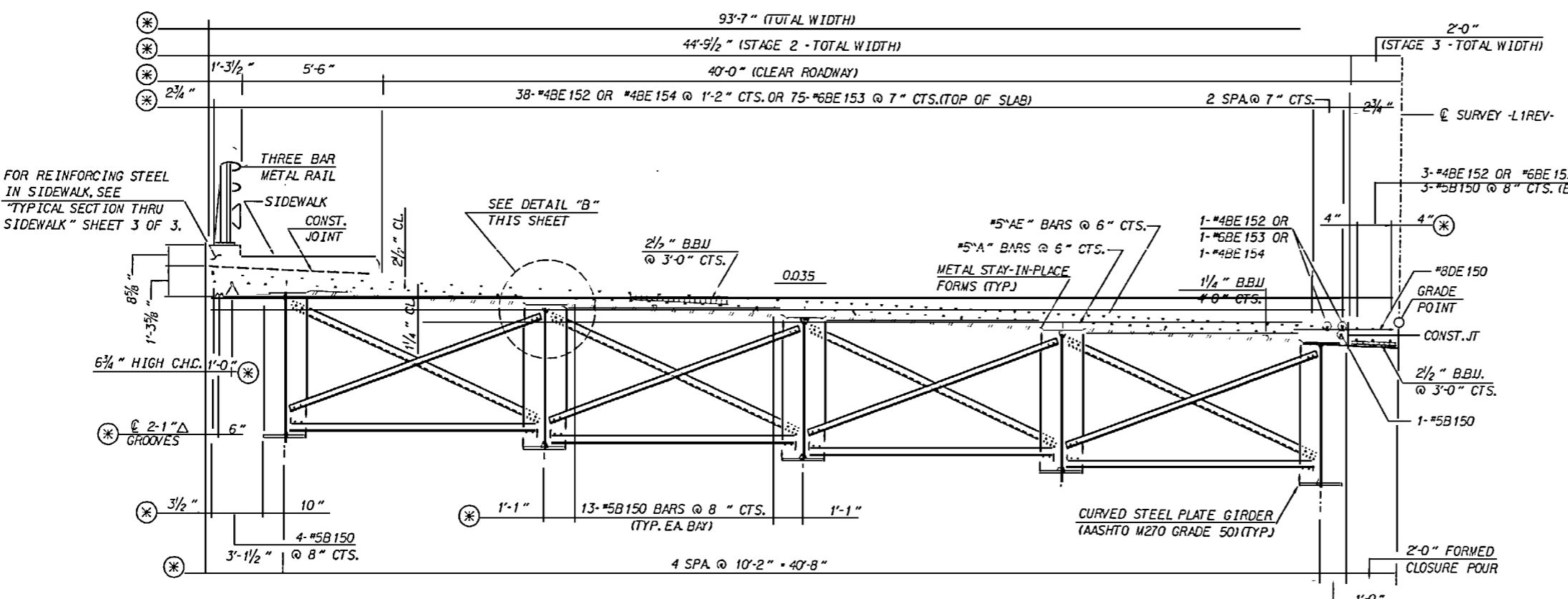
(\*) DENOTES RADIAL DIMENSION



**DETAIL "A"**



**DETAIL "B"**



**TYPICAL HALF SECTION AT INTERMEDIATE DIAPHRAGM**

**TYPICAL HALF SECTION AT BENT 1**

**STAGES 2 & 3**

(\*) DENOTES RADIAL DIMENSION

PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+1060 -L1REV-P.O.C.

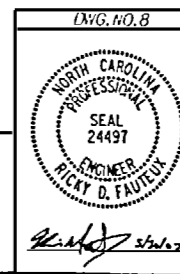
SHEET 2 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SUPERSTRUCTURE**  
**TYPICAL SECTION**  
**STAGES 2 & 3**

MAY

2002

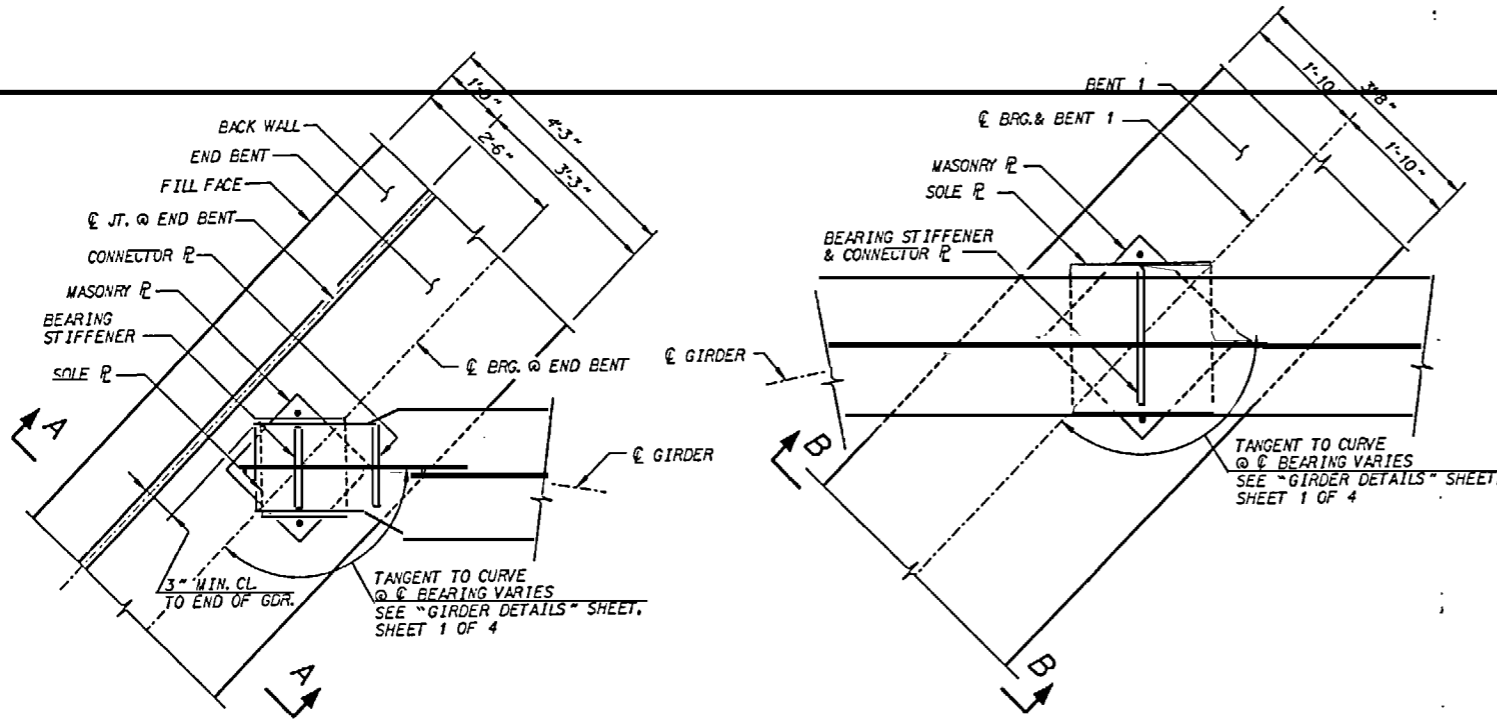


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RALEIGH, NORTH CAROLINA 27609-3560

REVISIONS						SHEET NO. 5-65
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 107
2			4			

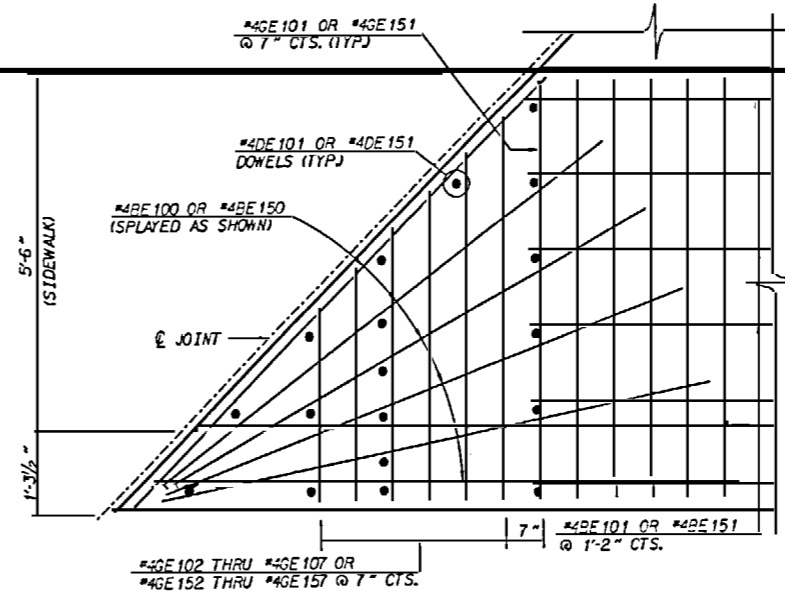
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DRAWN BY: B. PARRISH DATE: 04/02  
CHECKED BY: R. D. FAUTEUX DATE: 04/02

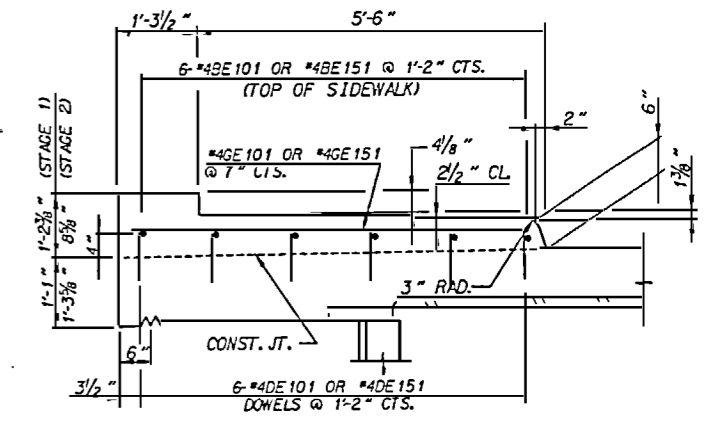


**PLAN DETAIL OF END BENT JOINT**  
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

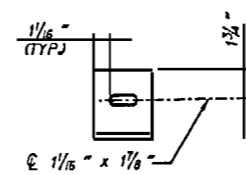
**PLAN DETAIL OF BENT 1**



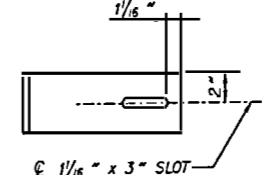
**PLAN OF SIDEWALK AT SLAB CORNERS**  
(STAGE 1 SHOWN STAGE 2 SIMILAR)



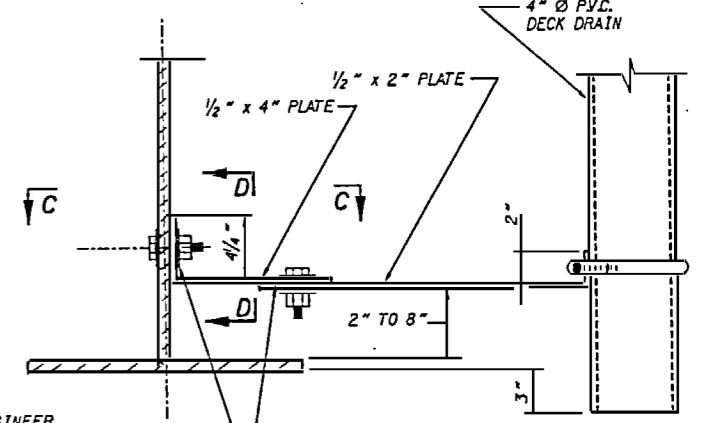
**TYPICAL SECTION THRU SIDEWALK**  
DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.



**SECTION D-D**



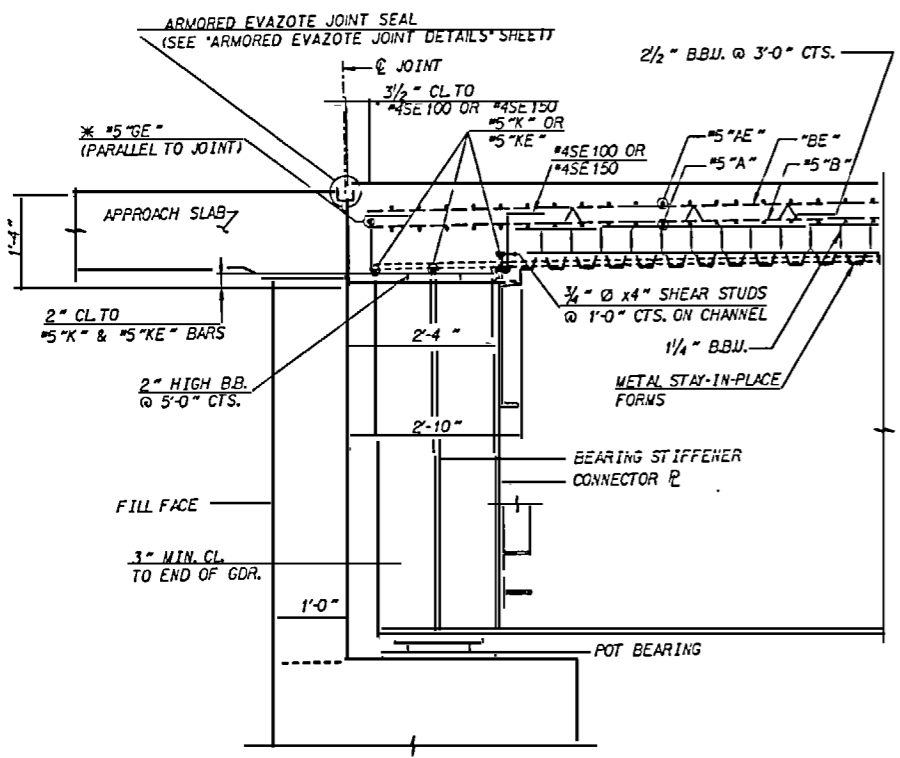
**SECTION C-C**



**DRAIN CONNECTOR DETAIL**  
(27 REQ'D)

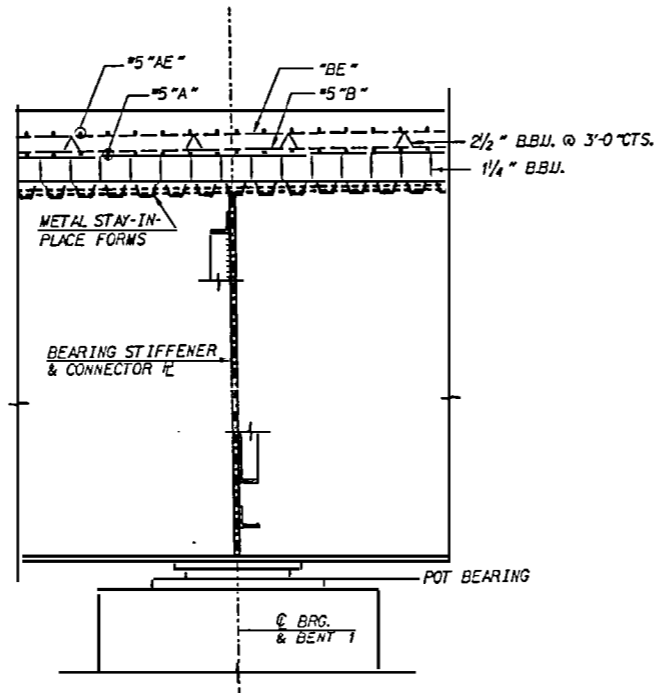
**DECK DRAIN NOTES**

COUPLING IN DRAIN PIPE WILL BE PERMITTED AS APPROVED BY THE ENGINEER.  
TOP OF FLOOR DRAIN TO BE SET 3/8" BELOW SURFACE OF SLAB.  
(1) 1/2" SQUARE LUGS TO BE GLUED TO THE PVC PLASTIC PIPE AT EQUAL SPACES AROUND THE DECK DRAIN APPROXIMATELY 4" FROM THE TOP OF PIPE.  
BOLT SIZE TO BE SAME AS DIAPHRAGMS AND CROSS FRAME CONNECTIONS. STAINLESS STEEL WORM DRIVE HOSE CLAMP SHALL BE COMMERCIAL QUALITY.  
PVC DECK DRAINS SHALL BE PAINTED WITH TWO COATS OF BROWN PRIMER MEETING THE REQUIREMENTS OF ARTICLE 1020-12 OF THE STANDARD SPECIFICATIONS. EACH COAT SHALL BE 2 DRY MILS THICK. DECK DRAINS SHALL BE ROUGHENED PRIOR TO PAINTING. NO SEPARATE PAYMENT SHALL BE MADE FOR PAINTING PVC DECK DRAINS AS THIS IS CONSIDERED INCIDENTAL TO PAY ITEM FOR REINFORCED CONCRETE DECK SLAB.



**SECTION A-A**

(DIMENSIONS SHOWN ABOVE ARE NORMAL TO THE END BENT)  
\* #5 "GE" BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.

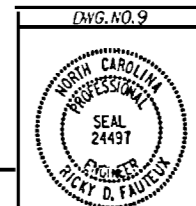


**SECTION B-B**

PROJECT NO. **R-2214A**  
**HENDERSON** COUNTY  
STATION: **332+10.60 -L1REV- P.O.C.**

SHEET 3 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUPERSTRUCTURE TYPICAL SECTION DETAILS	
MAY 2002		REVISIONS	
NO.	BY	DATE	BY
1		3	
2		4	
SHEET NO <b>5-66</b>		TOTAL SHEETS <b>107</b>	

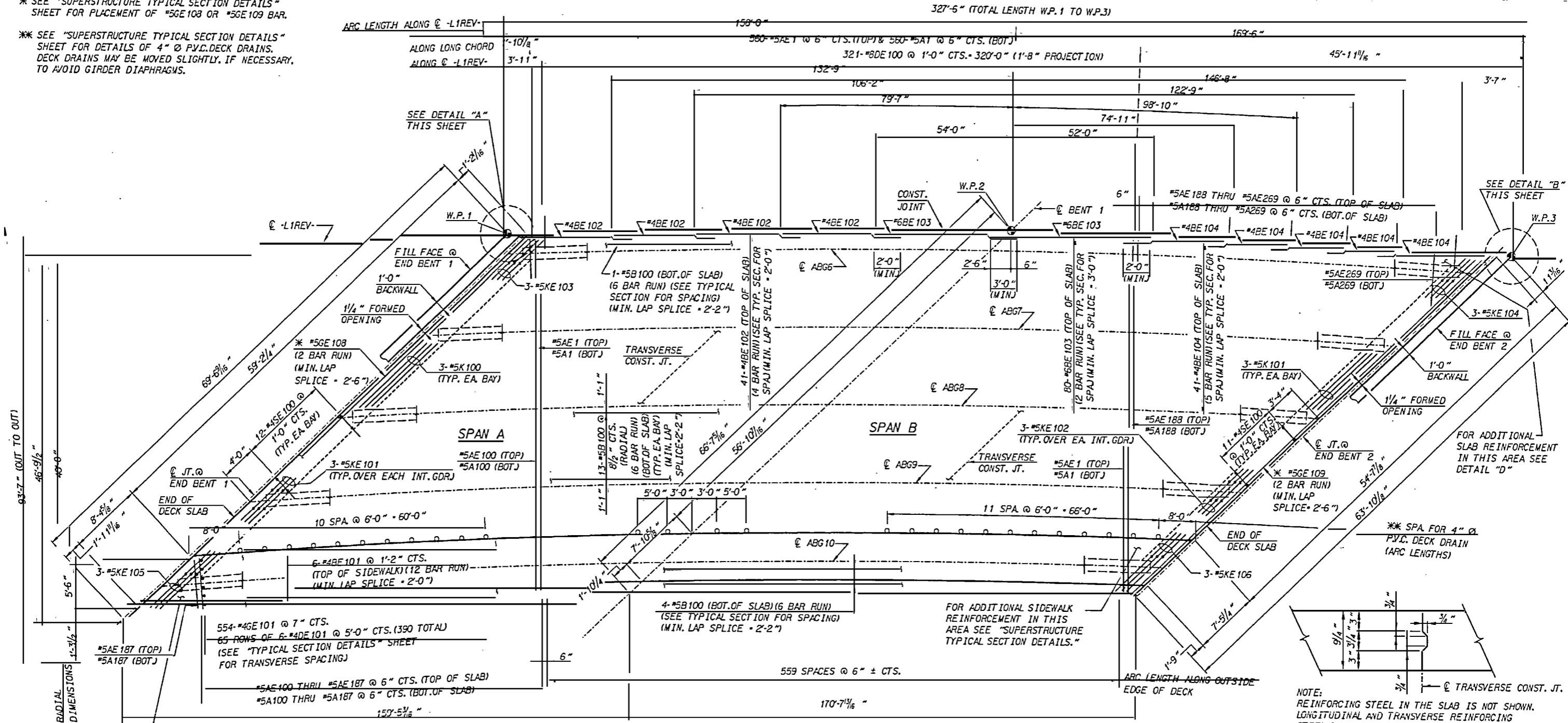


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RALEIGH, NORTH CAROLINA 27609-3960

DRAWN BY: **F.D. WEEDEN** DATE: **04/02**  
CHECKED BY: **R.D. FAUTEUX** DATE: **04/02**

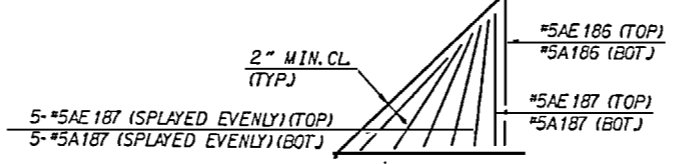
\* SEE "SUPERSTRUCTURE TYPICAL SECTION DETAILS" SHEET FOR PLACEMENT OF #5GE108 OR #5GE109 BAR.

\*\* SEE "SUPERSTRUCTURE TYPICAL SECTION DETAILS" SHEET FOR DETAILS OF 4" Ø P.V.C. DECK DRAINS. DECK DRAINS MAY BE MOVED SLIGHTLY, IF NECESSARY, TO AVOID GIRDER DIAPHRAGMS.

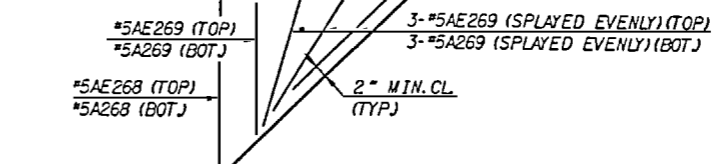


PLAN OF SPANS A & B - STAGE 1

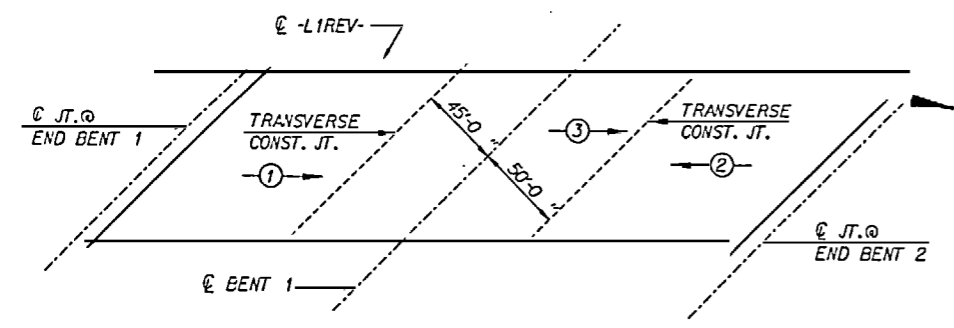
FOR ADDITIONAL SLAB REINFORCEMENT IN THIS AREA SEE DETAIL "C".  
FOR ADDITIONAL SIDEWALK REINFORCEMENT IN THIS AREA SEE "SUPERSTRUCTURE TYPICAL SECTION DETAILS" SHEET.



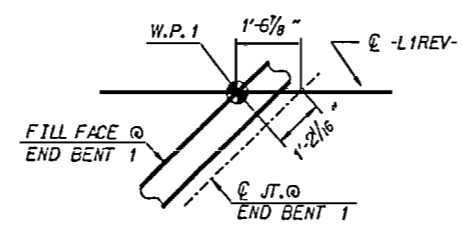
ACUTE CORNER SLAB REINFORCEMENT AT EB1  
DETAIL "C"



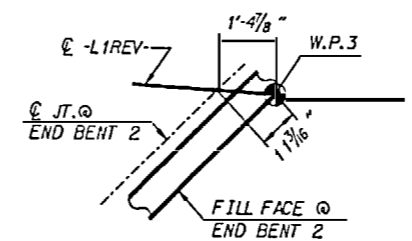
ACUTE CORNER SLAB REINFORCEMENT AT EB2  
DETAIL "D"



SLAB POURING SEQUENCE



DETAIL "A"



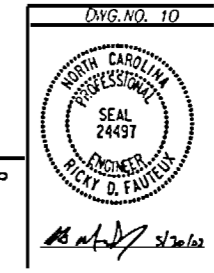
DETAIL "B"

NOTE:  
REINFORCING STEEL IN THE SLAB IS NOT SHOWN.  
LONGITUDINAL AND TRANSVERSE REINFORCING  
STEEL SHALL BE CONTINUOUS THRU JOINT.  
TRANSVERSE CONST. JOINT IN DECK SLAB

PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+10.60 -L1REV- P.O.C

SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
<b>SUPERSTRUCTURE PLAN OF SPAN STAGE 1</b>					
MAY 2002					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					SHEET NO. 5-67 TOTAL SHEETS 107



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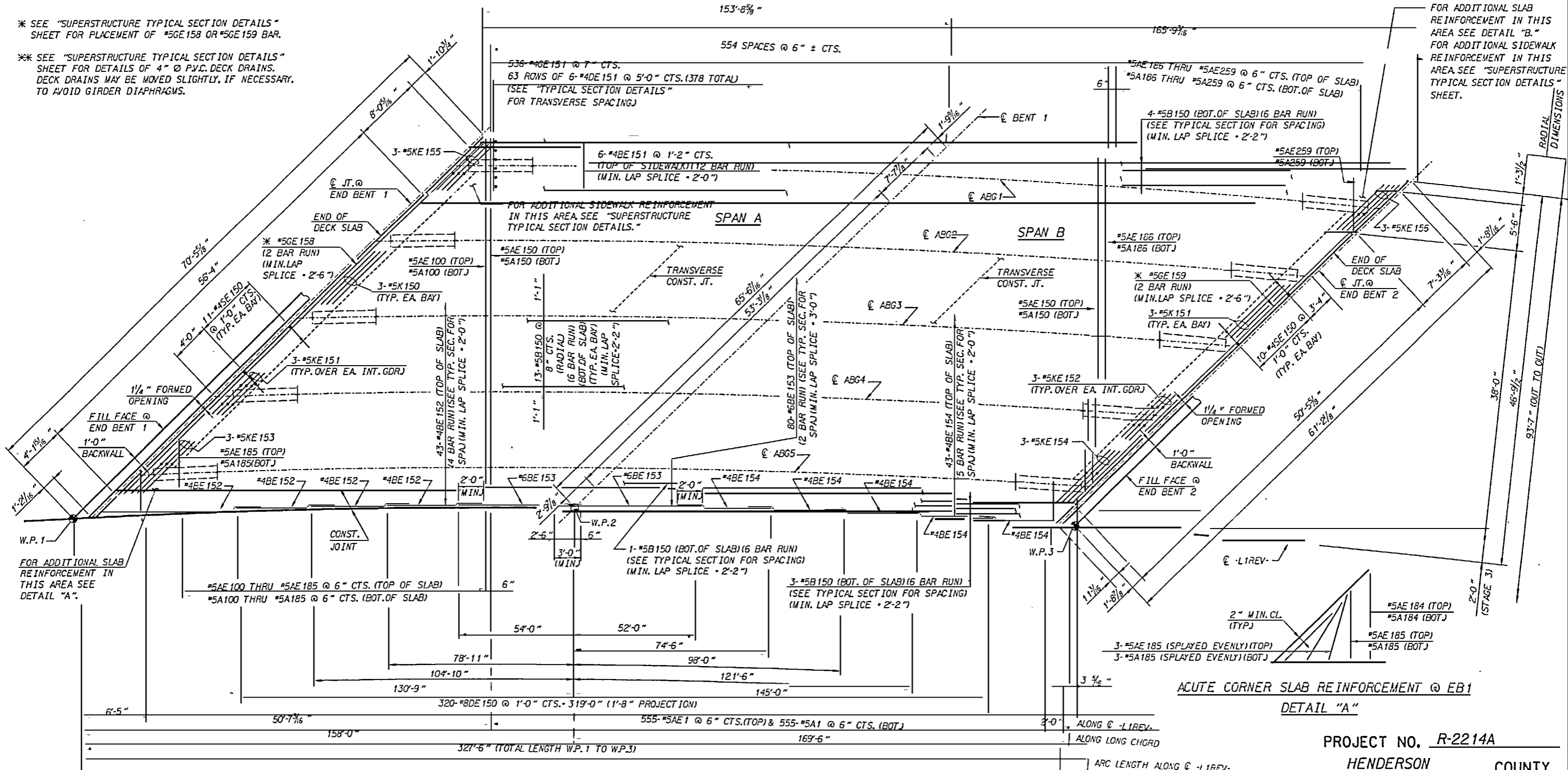
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DRAWN BY: F.D. WEEDEN DATE: 04/02  
CHECKED BY: R.D. FAUTEUX DATE: 04/02

\* SEE "SUPERSTRUCTURE TYPICAL SECTION DETAILS" SHEET FOR PLACEMENT OF #5GE158 OR #5GE159 BAR.

\*\* SEE "SUPERSTRUCTURE TYPICAL SECTION DETAILS" SHEET FOR DETAILS OF 4" Ø P.V.C. DECK DRAINS. DECK DRAINS MAY BE MOVED SLIGHTLY, IF NECESSARY, TO AVOID GIRDER DIAPHRAGMS.

FOR ADDITIONAL SLAB REINFORCEMENT IN THIS AREA SEE DETAIL "B." FOR ADDITIONAL SIDEWALK REINFORCEMENT IN THIS AREA SEE "SUPERSTRUCTURE TYPICAL SECTION DETAILS" SHEET.

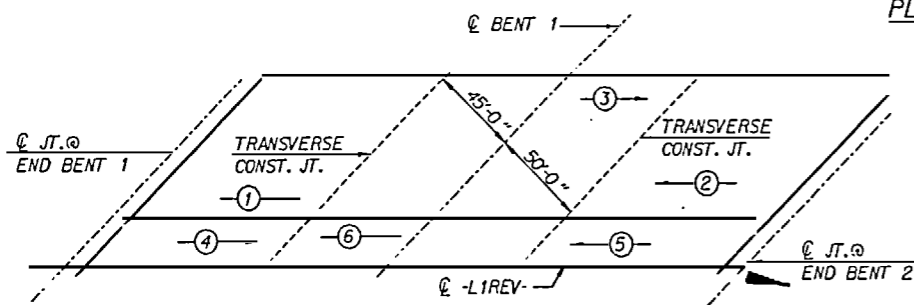


FOR ADDITIONAL SLAB REINFORCEMENT IN THIS AREA SEE DETAIL "A".

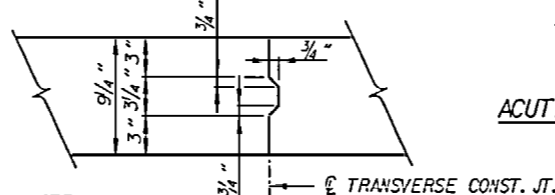
ACUTE CORNER SLAB REINFORCEMENT @ EB1  
DETAIL "A"

PLAN OF SPANS A & B - STAGES 2 & 3

ACUTE CORNER SLAB REINFORCEMENT @ EB2  
DETAIL "B"



SLAB POURING SEQUENCE



NOTE:  
REINFORCING STEEL IN THE SLAB IS NOT SHOWN.  
LONGITUDINAL AND TRANSVERSE REINFORCING  
STEEL SHALL BE CONTINUOUS THRU JOINT.  
TRANSVERSE CONST. JOINT IN DECK SLAB

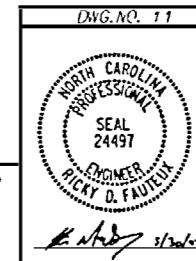
PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+10.60 -L1REV- P.O.C

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
PLAN OF SPAN  
STAGES 2 & 3

DRAWN BY: F.D. WEEDEN DATE: 04/02  
CHECKED BY: R.O. FAUTEUX DATE: 04/02

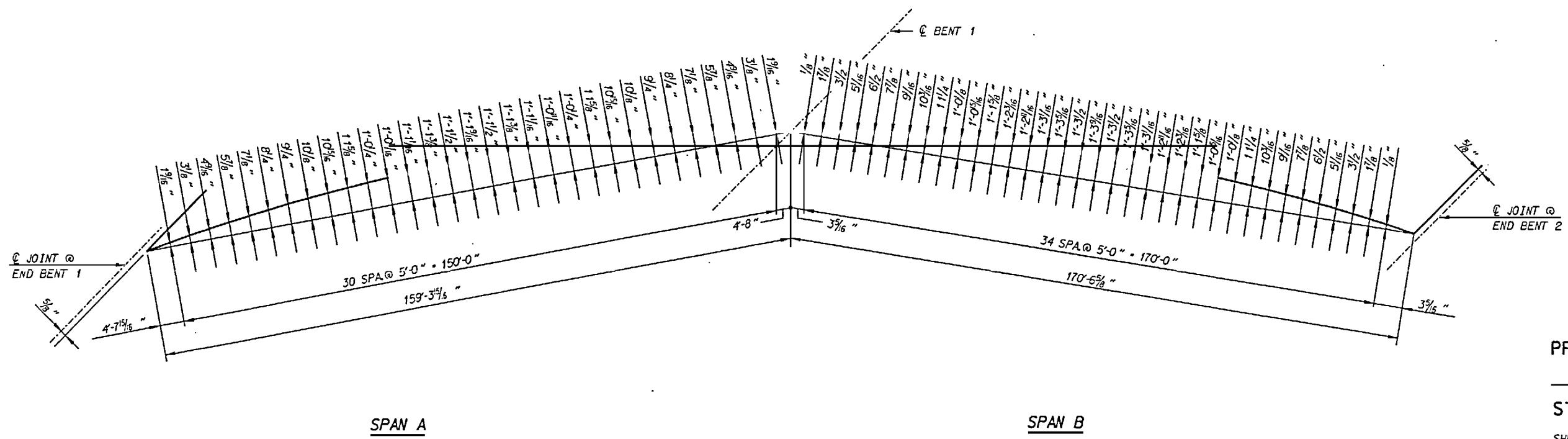
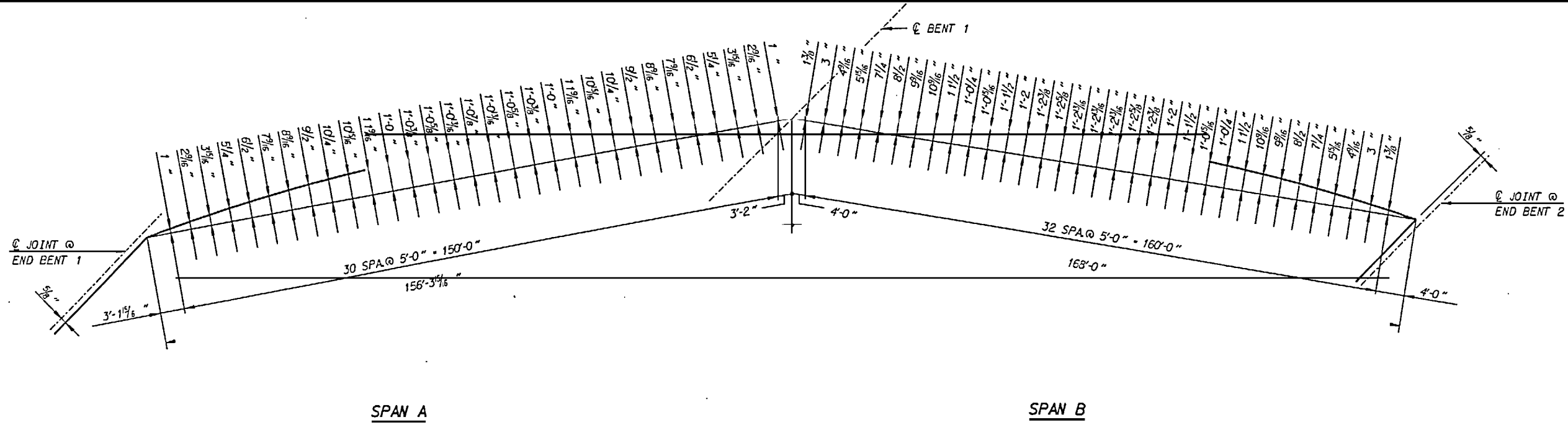
RUMMELKLEPPER & KAHL LLP  
consulting engineers  
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RALEIGH, NORTH CAROLINA 27609-3960



MAY 2002

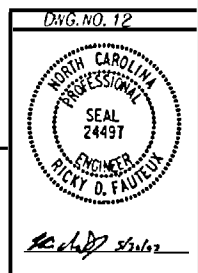
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. 568  
TOTAL SHEETS 107



PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.D.C.  
 SHEET 1 OF 2

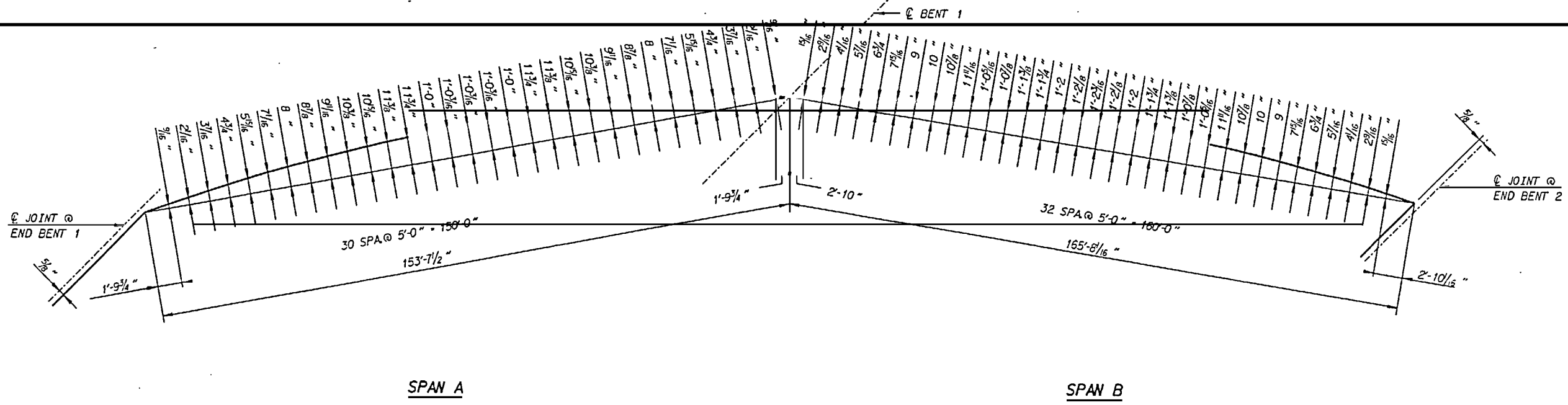
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
<b>SUPERSTRUCTURE CURVE OFFSETS STAGE 1</b>					
MAY 2002					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					SHEET NO. 5-69 TOTAL SHEETS 107



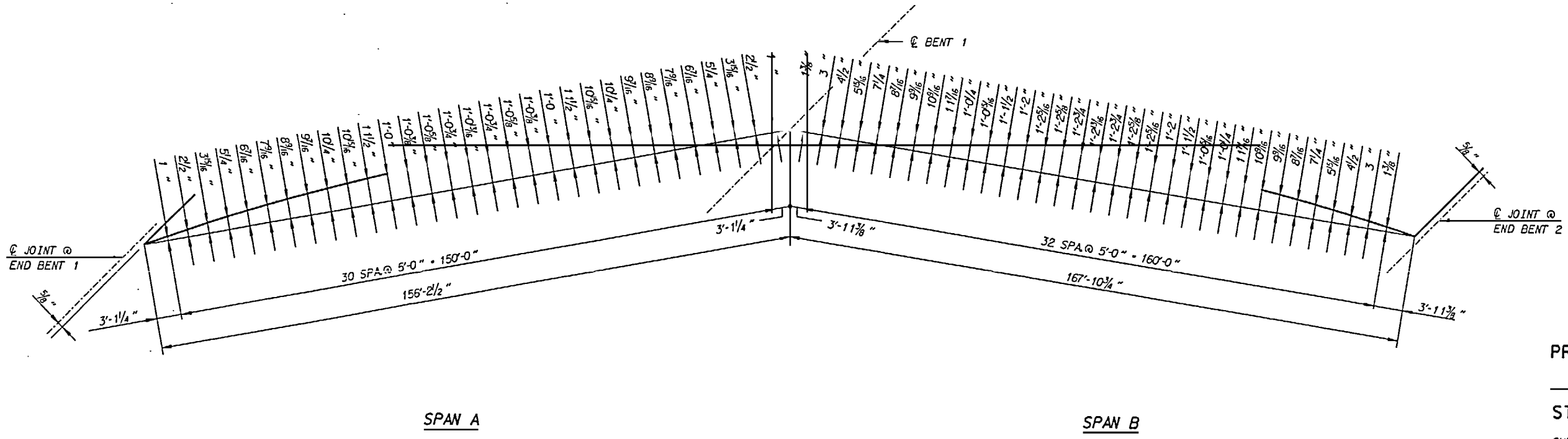
**RUMMEL, KLEPPER & KAHL**  
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 RALEIGH, NORTH CAROLINA 27609-3560

DRAWN BY : F. WEEDEN DATE : 04/02  
 CHECKED BY : R. D. FAUTEUX DATE : 04/02

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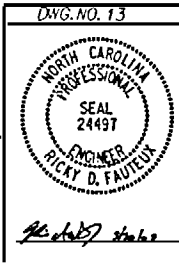
LEFT EDGE - 46'-9 1/2" LEFT OF C SURVEY -L1REV-



RIGHT EDGE - 2'-0" LEFT OF C SURVEY -L1REV-

PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C.  
 SHEET 2 OF 2

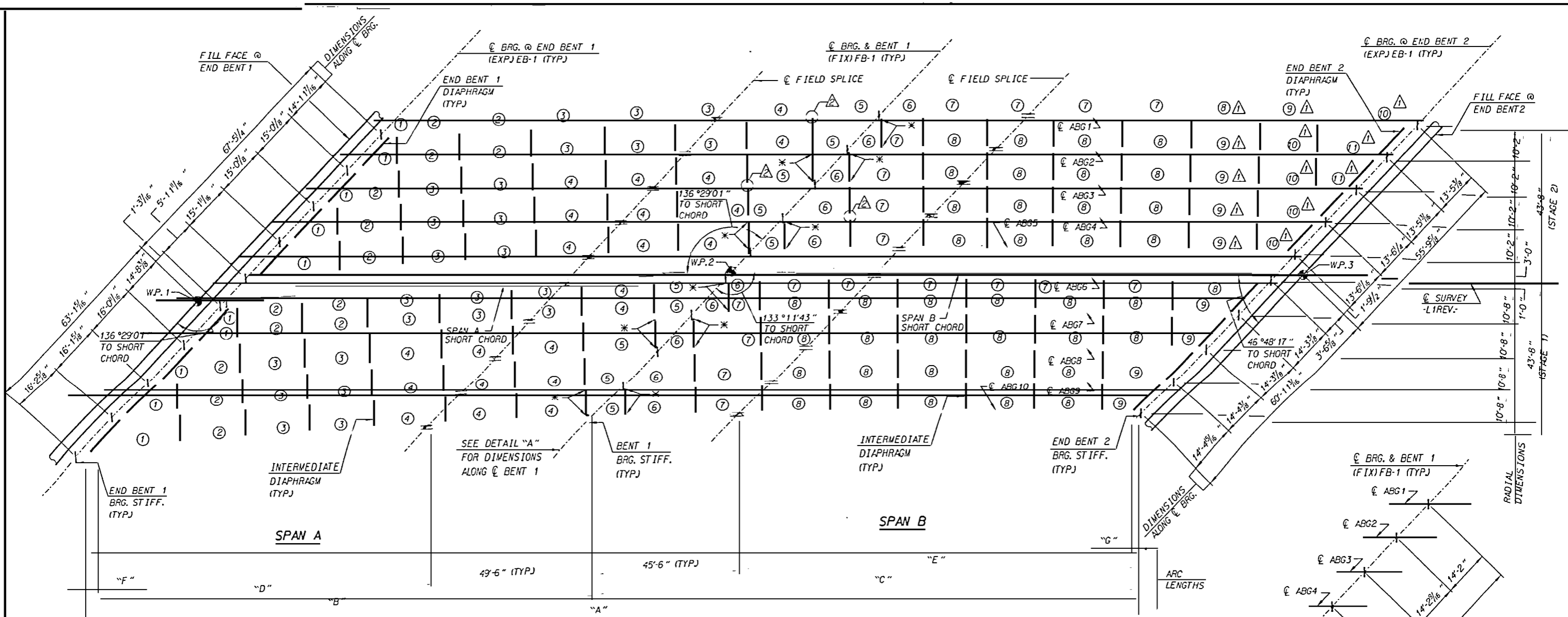
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
<b>SUPERSTRUCTURE CURVE OFFSETS STAGE 2</b>					
MAY					2002
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					SHEET NO. <b>5-70</b> TOTAL SHEETS <b>107</b>



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DRAWN BY: F. WEEDEN DATE: 04/02  
 CHECKED BY: R. D. FAUTEUX DATE: 04/02



**CONTINUOUS CURVED GIRDER FRAMING PLAN**

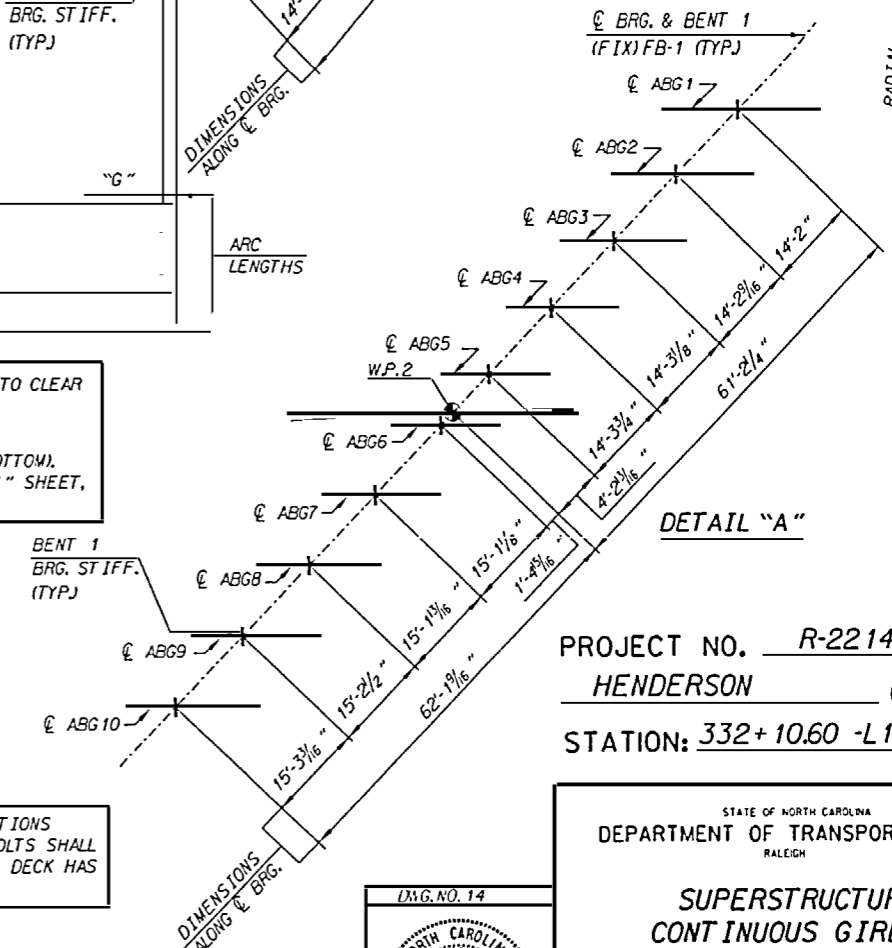
NOTE: INTERMEDIATE DIAPHRAGMS SHALL BE PLACED RADIALLY BETWEEN GIRDERS

GIRDER NO.	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
ABG1	4'-3 1/8"	20'-0"	22'-0"	20'-3 1/2"	19'-10 1/16"	11'-2 5/8"	21'-0"	22'-0"	20'-0"	25'-7 1/16"	
ABG2	15'-2 1/16"	19'-1 1/16"	21'-1 1/16"	20'-2 3/8"	9'-1 1/16"	9'-10 3/8"	11'-1 1/16"	20'-1 1/16"	21'-1 1/16"	19'-1 1/16"	16'-9 3/8"
ABG3	6'-2 3/8"	20'-0"	19'-10 3/8"	21'-10 3/8"	20'-1 3/8"	9'-11"	20'-1 1/8"	20'-10 1/4"	21'-10 3/8"	19'-10 3/8"	7'-10 3/8"
ABG4	17'-3 3/8"	19'-1 1/8"	19'-9 1/2"	21'-9 1/4"	10'-1 1/8"	19'-10 3/8"	20'-10 1/4"	20'-9 3/8"	21'-9 1/4"	18'-8 1/2"	
ABG5	28'-4 1/8"	19'-10 3/8"	19'-8 3/4"	21'-8 3/4"	10'-0 1/8"	19'-9 3/8"	20'-9 3/8"	20'-8 1/8"	21'-8 3/4"	9'-8 3/8"	
ABG6	3'-5 1/8"	20'-0"	22'-0"	22'-0 1/8"	21'-6 1/8"	10'-4 3/8"	21'-0"	28'-7 3/4"			
ABG7	15'-4"	19'-1 1/8"	21'-11"	21'-11 1/8"	10'-9 3/8"	10'-7 1/8"	10'-4 3/8"	20'-1 1/16"	19'-0 3/8"		
ABG8	7'-2 3/8"	20'-0"	19'-10 3/8"	21'-10"	21'-10 3/8"	10'-8 3/8"	20'-1 1/16"	20'-10 1/8"	9'-5 3/8"		
ABG9	19'-3 1/2"	19'-1 1/8"	19'-9 3/8"	21'-9 1/8"	10'-1 1/8"	21'-6 3/8"	20'-10 1/8"	20'-9 3/8"	20'-6 3/8"		
ABG10	31'-4 3/8"	19'-10 3/8"	19'-8 1/8"	21'-8 1/8"	10'-10 3/8"	21'-5 3/8"	20'-9 3/8"	20'-8 1/4"	10'-9 1/8"		

GIRDER NO.	GIRDER RADIUS	"A"	"B"	"C"	"D"	"E"	"F"	"G"
ABG1	2896.9557'	315'-9 3/8"	151'-9 3/8"	164'-0"	102'-3 3/8"	118'-6"	1'-3 3/8"	1'-2 1/16"
ABG2	2886.7890'	316'-9 3/4"	152'-3 3/8"	164'-5 1/8"	102'-9 3/8"	118'-1 1/8"	1'-3 3/8"	1'-2 1/16"
ABG3	2876.6223'	317'-10 5/8"	152'-10 3/8"	164'-1 1/8"	103'-4 3/8"	119'-5 3/8"	1'-3 3/8"	1'-2 1/8"
ABG4	2866.4557'	318'-1 1/16"	153'-5 1/8"	165'-5 1/8"	103'-1 1/16"	119'-1 1/8"	1'-3 3/8"	1'-2 1/8"
ABG5	2856.2890'	320'-1 1/16"	154'-1"	166'-0 1/8"	104'-7"	120'-6 1/8"	1'-3 3/8"	1'-2 3/8"
ABG6	2852.2890'	320'-6 1/8"	154'-3 3/8"	166'-2 3/8"	104'-9 3/8"	120'-8 1/8"	1'-3 3/8"	1'-2 3/8"
ABG7	2841.6223'	321'-8 1/8"	154'-1 1/8"	166'-9 1/4"	105'-5 3/8"	121'-3 3/4"	1'-3 3/8"	1'-2 1/4"
ABG8	2830.9557'	322'-1 1/16"	155'-7 3/8"	167'-4 1/8"	106'-1 1/8"	121'-10 1/16"	1'-4"	1'-2 1/8"
ABG9	2820.2890'	324'-2 1/8"	156'-3 3/4"	167'-1 1/16"	106'-9 3/4"	122'-5 1/16"	1'-4 3/8"	1'-2 1/8"
ABG10	2809.6223'	325'-6 3/8"	157'-0 1/8"	168'-6 3/8"	107'-6 3/8"	123'-0 3/8"	1'-4 3/8"	1'-2 3/8"

\* NOTE: DIAPHRAGM/CONNECTOR PLATE CONNECTIONS SHALL BE MADE USING OVERSIZED HOLES. BOLTS SHALL REMAIN LOOSE UNTIL AFTER THE CONCRETE DECK HAS BEEN POURED.

▲ DIMENSIONS REVISED TO CLEAR FLANGE TRANSITION  
 ▲ BOLTED CONN. PLATE REQUIRED (TOP AND BOTTOM). SEE "GIRDER DETAILS" SHEET, SHEET 3 OF 4



PROJECT NO. R-2214A  
 HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C.

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

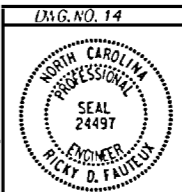
**SUPERSTRUCTURE CONTINUOUS GIRDER FRAMING PLAN SPANS A & B**

MARCH 2004

NO.	BY	DATE	NO.	BY	DATE
1	RDF	03/25/04	3		
2	RDF	03/25/04	4		

SHEET NO. S-71  
 TOTAL SHEETS

**RUMMEL, KLEPPER & KAHL**  
 consulting engineers  
 5800 FARRINGTON POLE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27609-3960



DRAWN BY: F.O. NEEDEN DATE: 04/02  
 CHECKED BY: R.D. FAUTEUX DATE: 04/02

"N" ROWS OF STUDS (SPACED AS SHOWN) - "P" STUDS

TOP FLANGE TENSION ZONE (SEE NOTES ① AND ②)

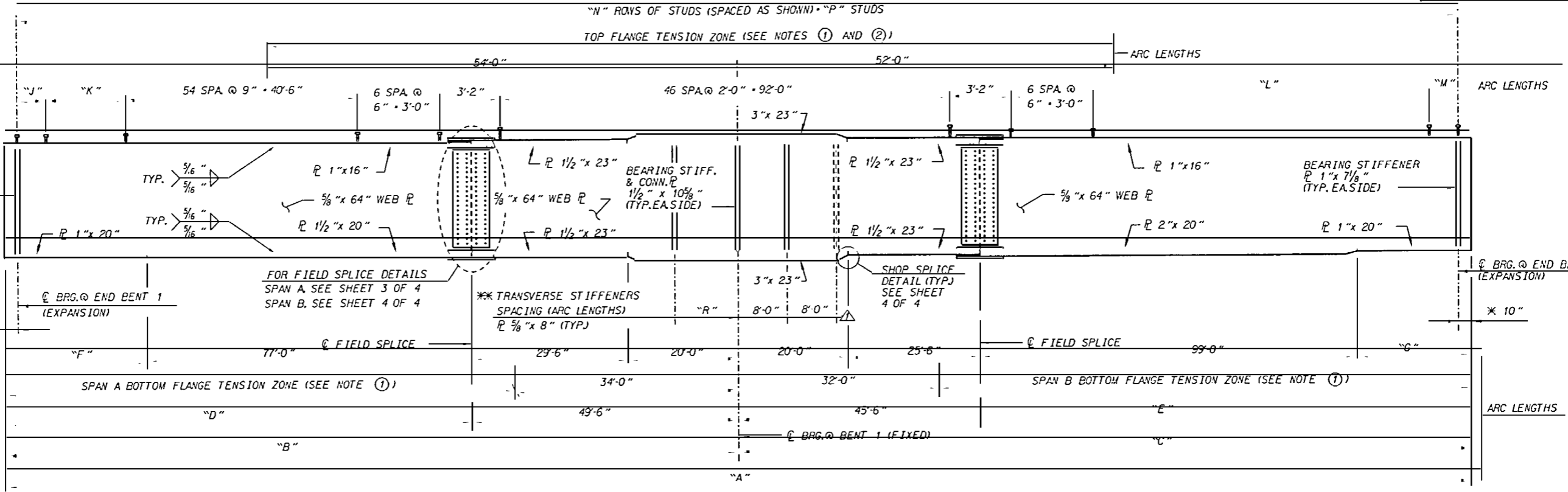
3/4" x 6/8" SHEAR STUD CONN. SPACING 3 STUDS PER ROW (TYP)

BEARING STIFFENER R 1" x 7/8" (TYP. EA. SIDE)

SEE DETAIL "A" SHEET 3 OF 4 (TYP. EA. END)

FILL FACE @ END BENT 1

BEARING STIFF. R 1" x 7/8"



FOR FIELD SPLICE DETAILS SPAN A SEE SHEET 3 OF 4 SPAN B SEE SHEET 4 OF 4

\*\* TRANSVERSE STIFFENERS SPACING (ARC LENGTHS) R 5/8" x 8" (TYP)

SHOP SPLICE DETAIL (TYP) SEE SHEET 4 OF 4

SPAN A BOTTOM FLANGE TENSION ZONE (SEE NOTE ①)

SPAN B BOTTOM FLANGE TENSION ZONE (SEE NOTE ①)

**BOTTOM FLANGE DETAIL**

(INTERIOR GIRDER SHOWN, EXTERIOR GIRDER SIMILAR, EXCEPT AS NOTED)

\*\* PLACE ALL TRANSVERSE STIFFENERS ON THE INSIDE FACE OF WEB ON EXTERIOR GIRDERS, INCLUDING GIRDER ABG6.

**GIRDER DIMENSION SCHEDULE**

**GIRDER ANGLE SCHEDULE**

**SHEAR STUD DIMENSION SCHEDULE**

GIRDER NO.	GIRDER DIMENSION SCHEDULE									GIRDER ANGLE SCHEDULE			SHEAR STUD DIMENSION SCHEDULE							
	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"I"	END BENT 1	BENT 1	END BENT 2	"J"	"K"	"L"	"M"	"N"	"P"	"R"	
ABG1	317'-5 1/8"	152'-7 1/8"	164'-10"	103'-1 1/8"	119'-4"	26'-1 1/8"	20'-4"	1'-3 1/8"	1'-2 1/8"	137°02'41"	134°02'35"	130°47'58"	1'-1 1/8"	56 SPA @ 1'-0"	113 SPA @ 1'-0"	10"	286	858	11'-0"	
ABG2	318'-5 1/8"	153'-1 1/8"	165'-3 1/8"	103'-7 1/8"	119'-9 1/8"	26'-7 1/8"	20'-9 1/8"	1'-3 1/8"	1'-2 1/8"	137°15'42"	134°14'19"	130°58'26"	7/8"	57 SPA @ 1'-0"	113 SPA @ 1'-0"	2 SPA @ 7 1/8"	288	864	11'-0"	
ABG3	319'-6 1/8"	153'-8 1/8"	165'-9 1/8"	104'-2 1/8"	120'-3 1/8"	27'-2 1/8"	21'-3 1/8"	1'-3 1/8"	1'-2 1/8"	137°28'53"	134°26'10"	131°09'00"	2 SPA @ 7 1/8"	57 SPA @ 1'-0"	114 SPA @ 1'-0"	9/8"	289	867	11'-0"	
ABG4	320'-7 1/8"	154'-3 1/8"	166'-3 1/8"	104'-9 1/8"	120'-9 1/8"	27'-9 1/8"	21'-9 1/8"	1'-3 1/8"	1'-2 1/8"	137°42'13"	134°38'08"	131°19'40"	9 1/8"	58 SPA @ 1'-0"	114 SPA @ 1'-0"	2 SPA @ 7 1/8"	290	870	11'-0"	
ABG5	321'-9 1/8"	154'-11"	166'-10 1/8"	105'-5"	121'-4 1/8"	28'-5"	22'-4 1/8"	1'-3 1/8"	1'-2 1/8"	137°55'41"	134°50'14"	131°30'26"	2 SPA @ 8 1/2"	58 SPA @ 1'-0"	115 SPA @ 1'-0"	10 1/16"	291	873	11'-0"	
ABG6	322'-2 1/8"	155'-1 1/8"	167'-0 1/8"	105'-7 1/8"	121'-6 3/8"	28'-7 1/8"	22'-6 3/8"	1'-3 1/8"	1'-2 1/8"	138°01'02"	134°55'02"	131°34'42"	7/8"	59 SPA @ 1'-0"	115 SPA @ 1'-0"	1'-0 1/16"	291	873	10'-0"	
ABG7	323'-4 1/8"	155'-9 1/8"	167'-7 1/8"	106'-3 1/8"	122'-1 1/8"	29'-3 1/8"	23'-1 1/8"	1'-3 1/8"	1'-2 1/8"	138°15'24"	135°07'56"	131°46'10"	2 SPA @ 7 1/8"	59 SPA @ 1'-0"	116 SPA @ 1'-0"	7/4"	293	879	10'-0"	
ABG8	324'-7 1/8"	156'-5 1/8"	168'-2 1/8"	107'-1 1/8"	122'-8 1/8"	29'-1 1/8"	23'-8 1/8"	1'-4"	1'-2 1/8"	138°29'57"	135°20'58"	131°57'45"	1 1/16"	60 SPA @ 1'-0"	116 SPA @ 1'-0"	2 SPA @ 7"	294	882	10'-0"	
ABG9	325'-10 1/8"	157'-1 1/8"	168'-9 1/8"	107'-7 1/8"	123'-3 1/8"	30'-7 1/8"	24'-3 1/8"	1'-4 1/8"	1'-2 1/8"	138°44'41"	135°34'09"	132°09'28"	7 3/4"	61 SPA @ 1'-0"	117 SPA @ 1'-0"	9/16"	295	885	10'-0"	
ABG10	327'-2 1/8"	157'-10 1/8"	169'-4 1/8"	108'-4 1/8"	123'-10 1/8"	31'-4 1/8"	24'-10 1/8"	1'-4 1/8"	1'-2 1/8"	138°59'36"	135°47'29"	132°21'18"	2 SPA @ 8 1/8"	61 SPA @ 1'-0"	117 SPA @ 1'-0"	2 SPA @ 8 1/8"	297	891	10'-0"	

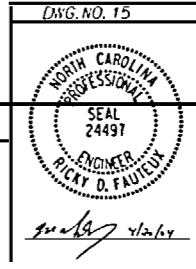
PROJECT NO. R-2214A  
 HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C.  
 SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE GIRDER DETAILS**

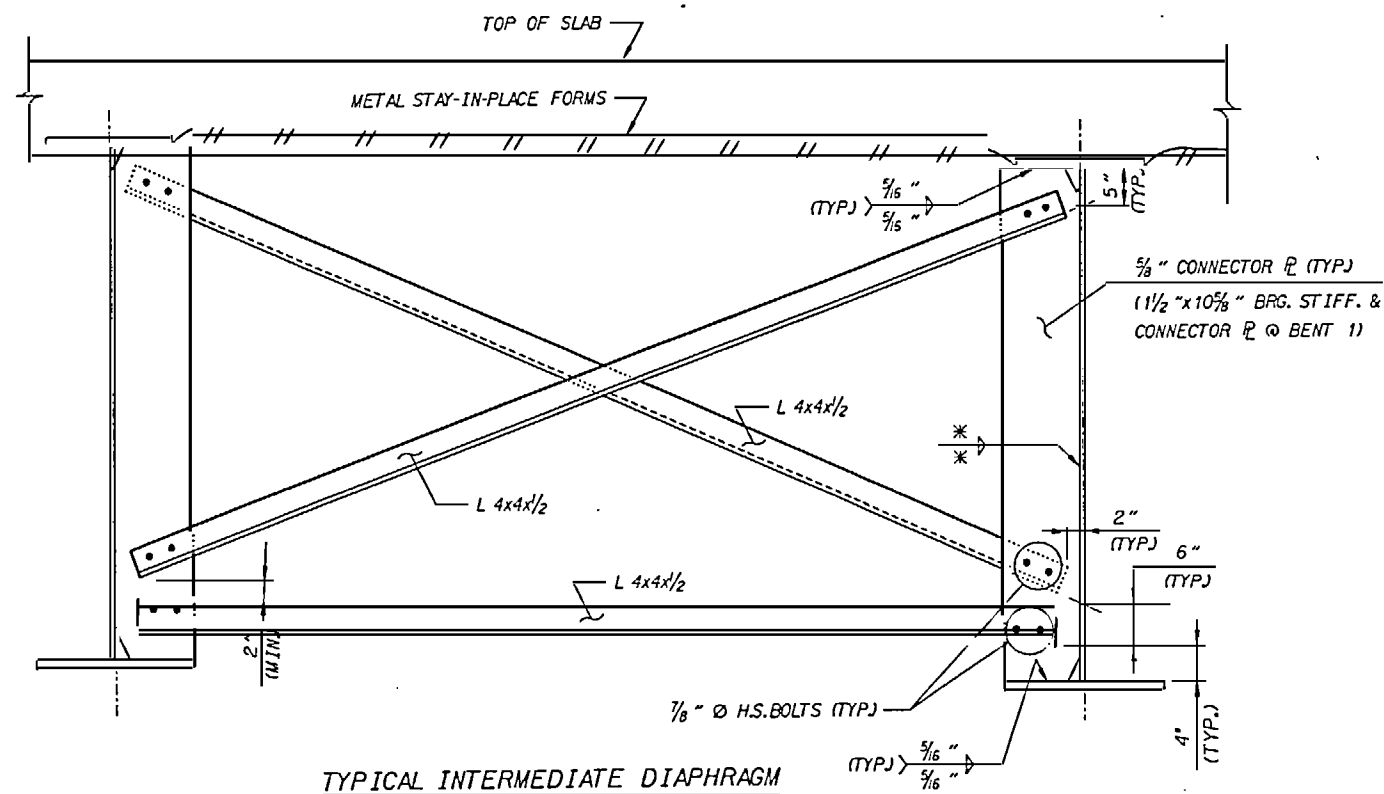
MARCH		2004	
REVISIONS		SHEET NO. S-72	
NO.	BY	DATE	TOTAL SHEETS
1	RDF	03/23/04	107
2			

▲ REVISED DIMENSION TO CLEAR DIAPHRAGM LOCATIONS AND FLANGE TRANSITION.

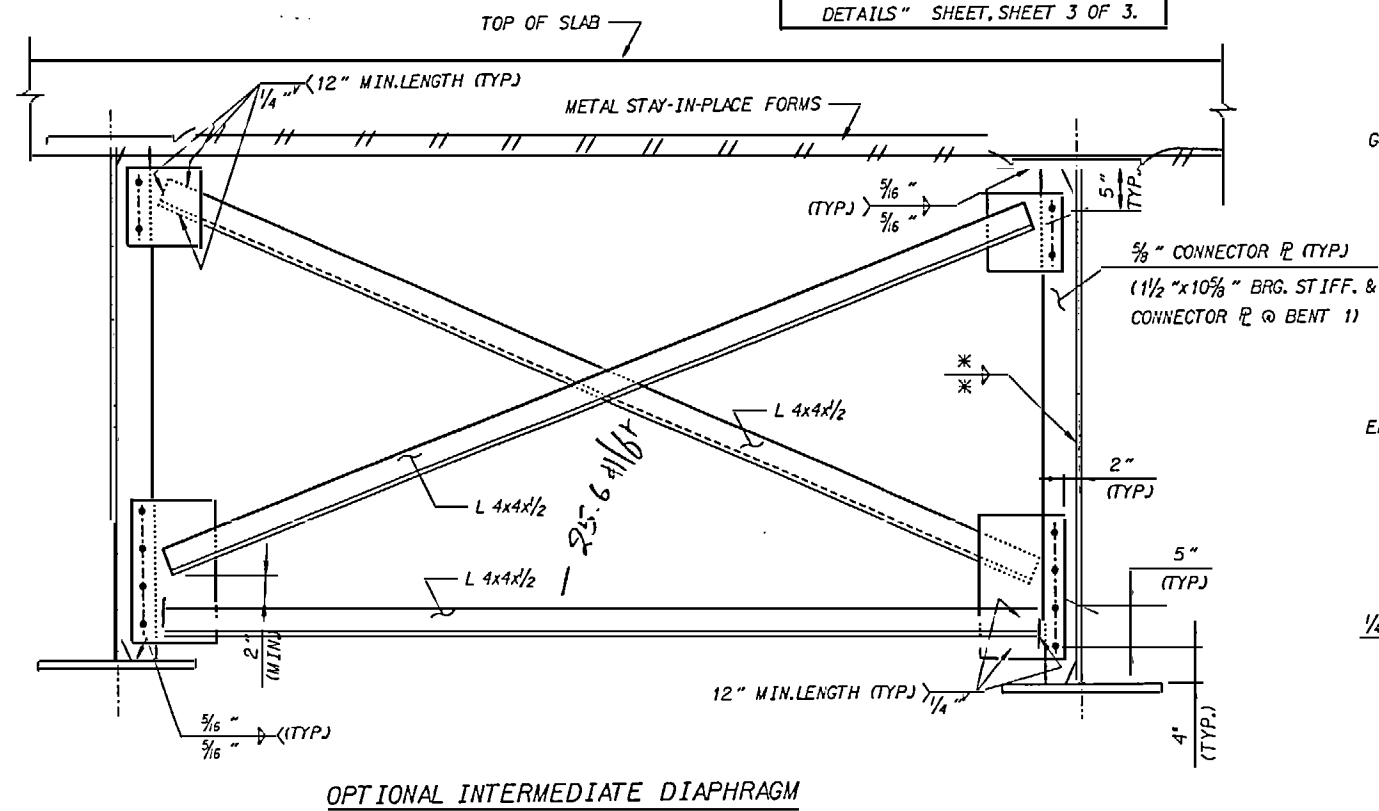


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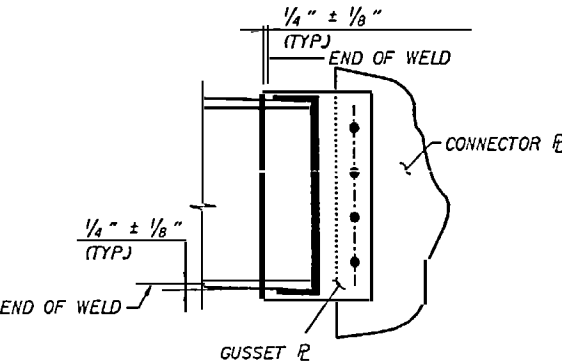
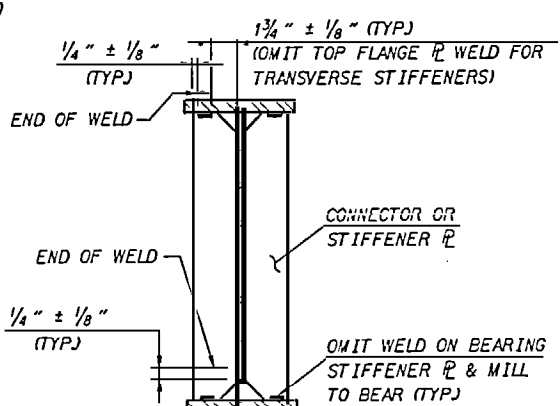
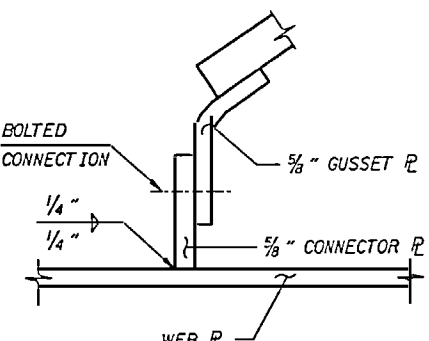
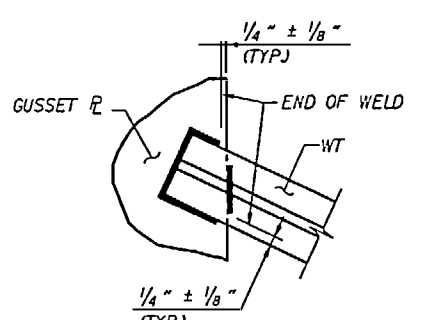
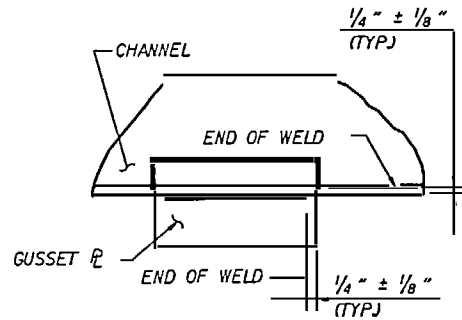
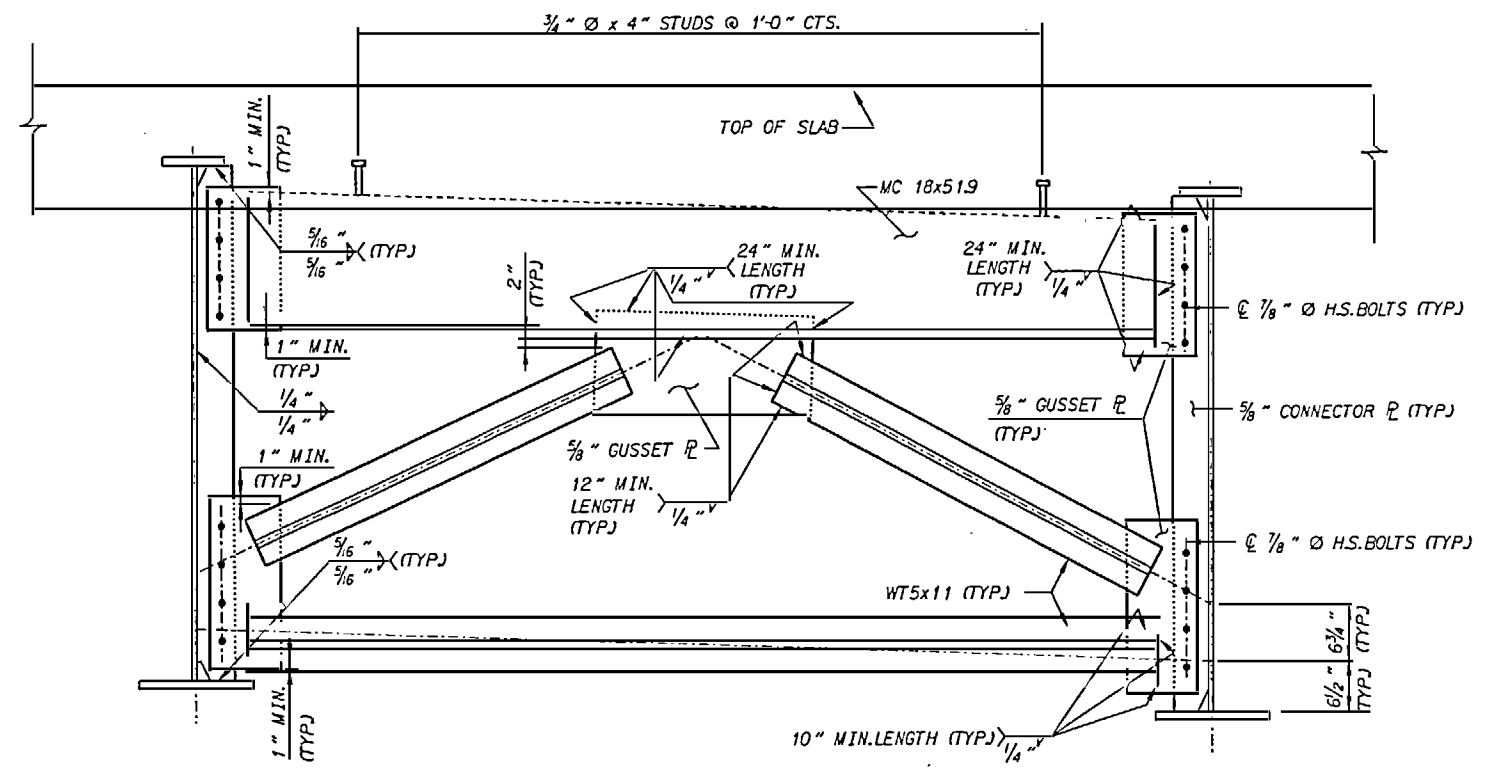




\* FOR WELD SIZE, SEE CONNECTOR PLATE DETAILS ON "GIRDER DETAILS" SHEET, SHEET 3 OF 3.



NOTE: AT THE CONTRACTOR'S OPTION, THE OPTIONAL DIAPHRAGM WITH THE WELDED GUSSET PLATES MAY BE USED IN LIEU OF THE DIAPHRAGM WITH BOLTED ANGLES AT NO ADDITIONAL COST TO THE DEPARTMENT.



**CONNECTOR OR STIFFENER PLATE CONNECTIONS**

**TYPICAL CHANNEL TO GUSSET PLATE CONNECTION**

**WELD TERMINATION DETAILS**



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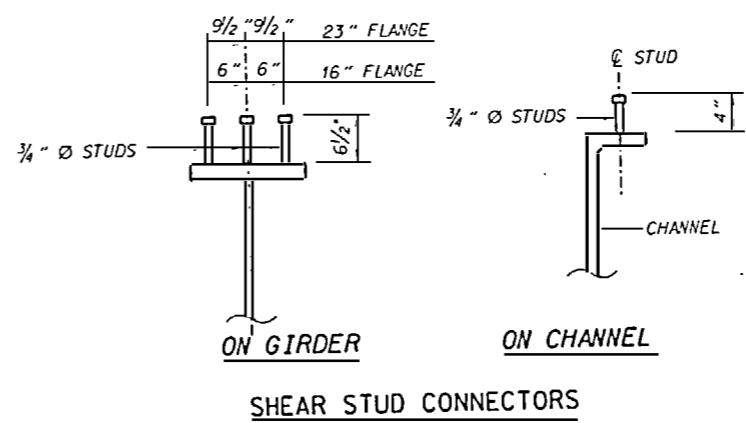
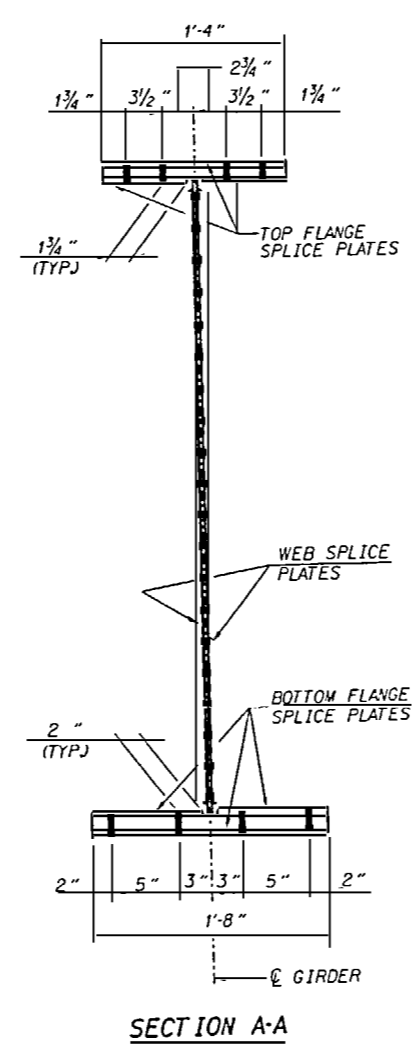
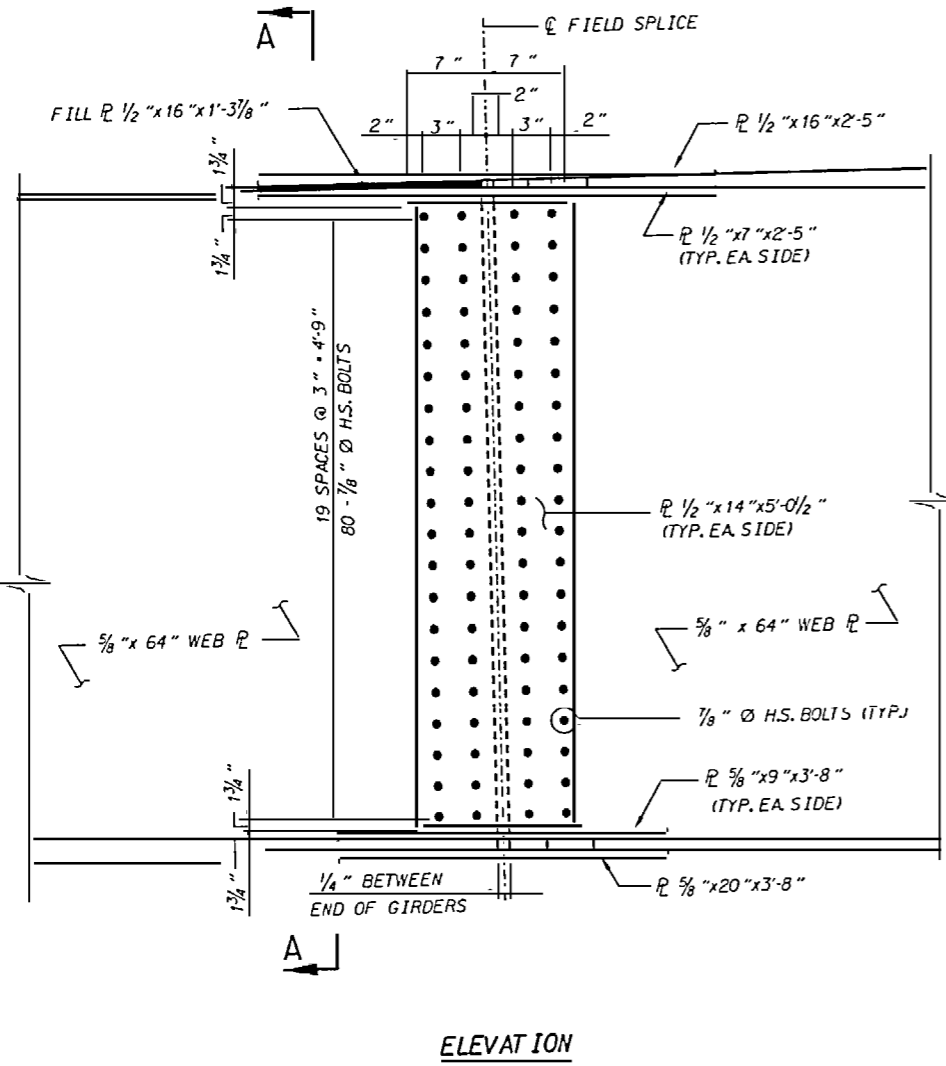
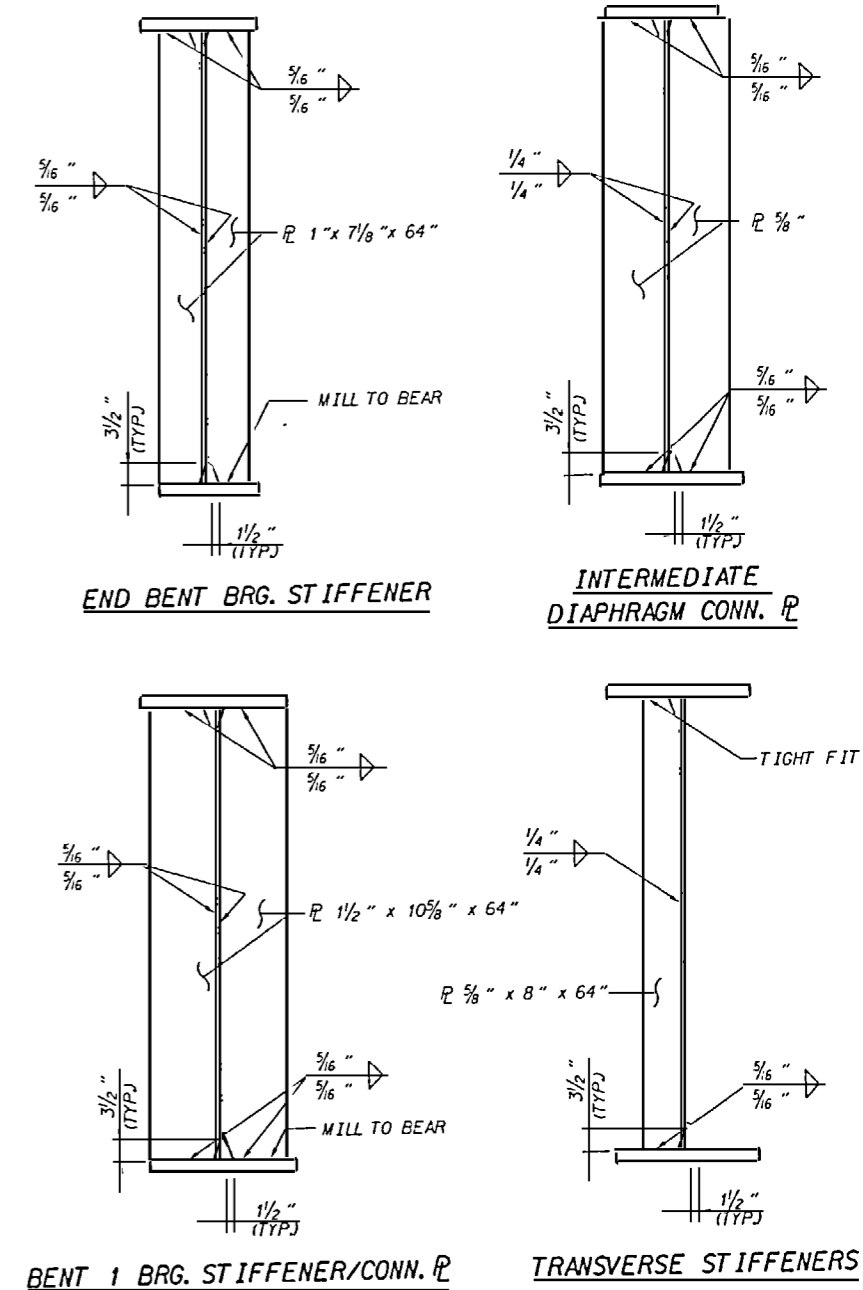
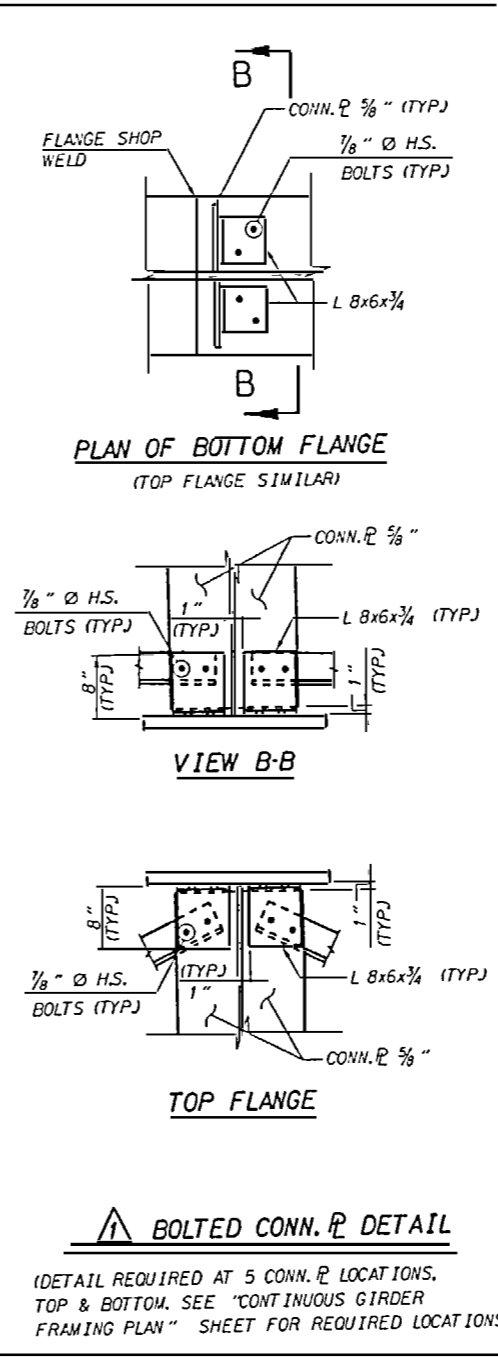
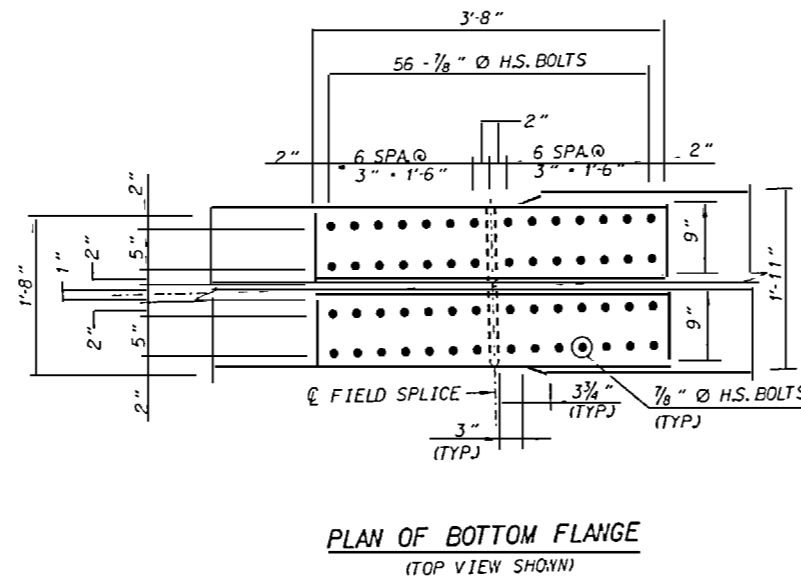
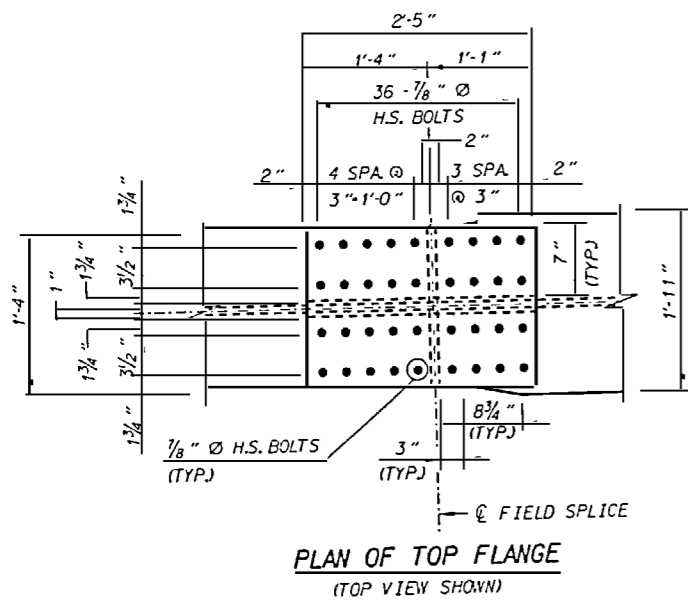


PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+10.60 - L1REV-P.O.C.  
SHEET 2 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
<b>SUPERSTRUCTURE GIRDER DETAILS</b>					
MAY 2002					SHEET NO. 5-73
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
TOTAL SHEETS					107

DRAWN BY: B. PARRISH DATE: 04/02  
CHECKED BY: R.D. FAUTEUX DATE: 04/02

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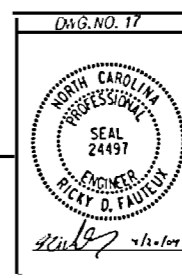


**SPAN A - FIELD SPLICE DETAIL**

PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+10.60 -L1REV-P.O.C.  
SHEET 3 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
<b>SUPERSTRUCTURE GIRDER DETAILS</b>					
MARCH 2004					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1	RDF	03/24/04	3		
2			4		
					SHEET NO. S-74
					TOTAL SHEETS 107

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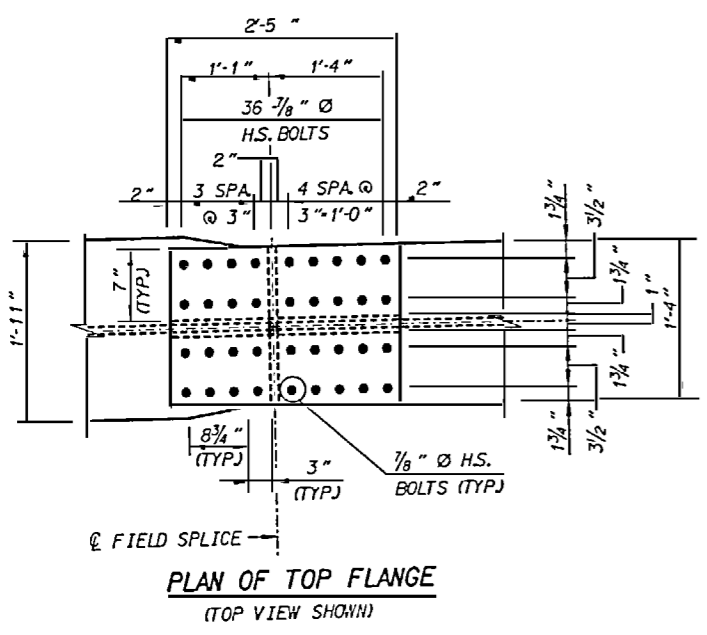
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CHECKED BY: R.D. FAUTEUX DATE: 04/02

R-2214A

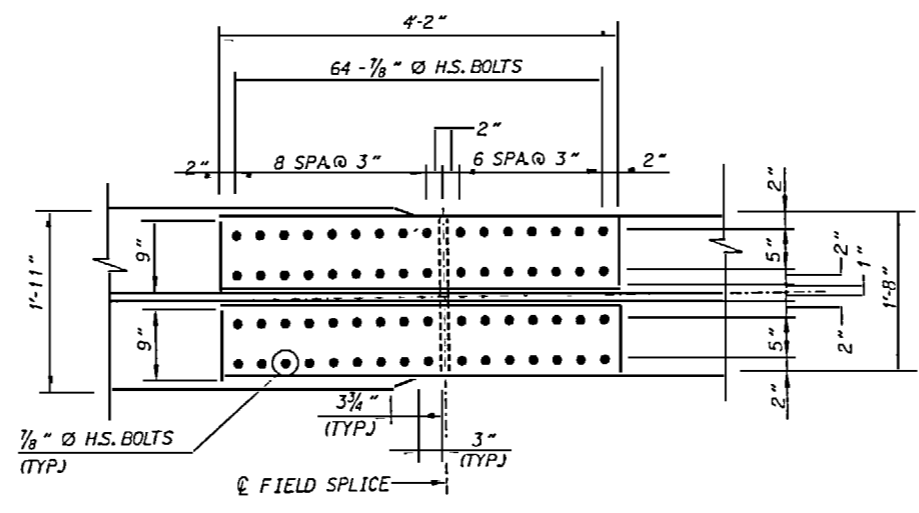
Part II

2.195110.5

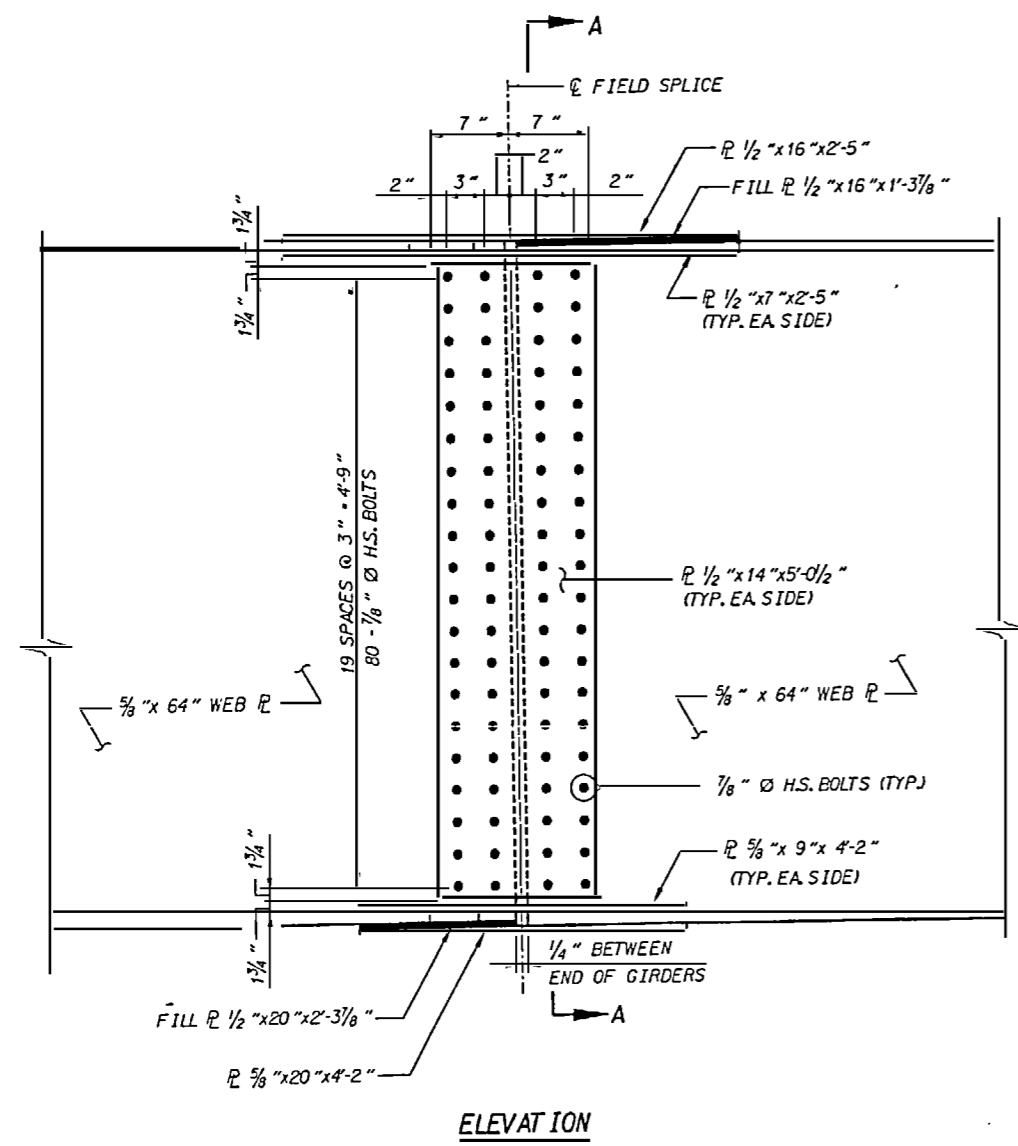
SCALE: AS SHOWN UNLESS OTHERWISE NOTED



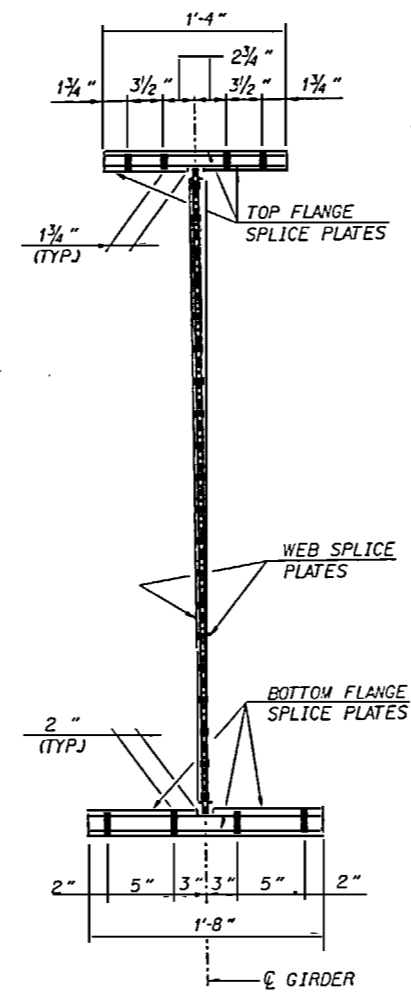
PLAN OF TOP FLANGE (TOP VIEW SHOWN)



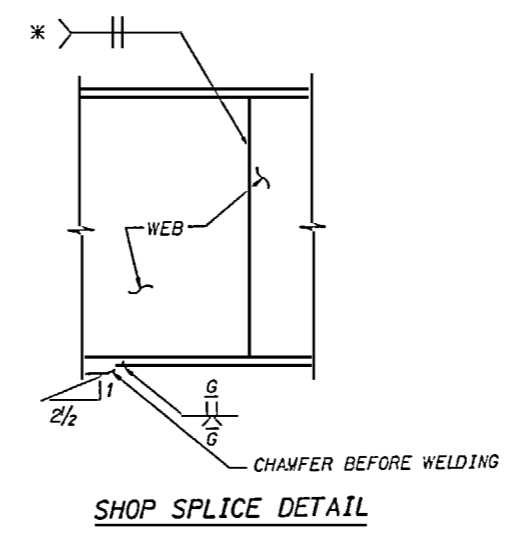
PLAN OF BOTTOM FLANGE (TOP VIEW SHOWN)



ELEVATION

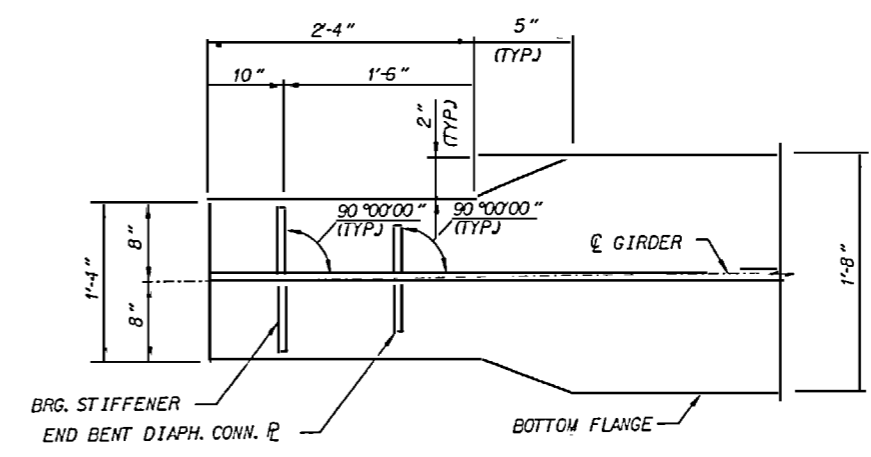


SECTION A-A



SHOP SPLICE DETAIL

\* GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR GIRDERS.



DETAIL "A"

NOTES:

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL UNLESS OTHERWISE NOTED.

CAMBERED GIRDER LENGTHS SHALL BE ADJUSTED AND BEARINGS ARE TO BE PLACED ON THE CAMBERED GIRDER SO AS TO BE ALIGNED WITH THE ANCHORS AFTER THE DEAD LOAD DEFLECTION HAS OCCURRED. SHOP PLANS SHALL BE PREPARED ACCORDINGLY.

STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

ALL FIELD CONNECTIONS ARE TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 60 FEET AND WEB PIECE LENGTHS TO 45 FEET. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION (NOR WITHIN 15 FEET OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS). KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE AND TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-10 OF THE STANDARD SPECIFICATIONS.

BEARING STIFFENERS AND ENDS OF THE CONTINUOUS PLATE GIRDERS SHALL BE IN A PLUMB POSITION AFTER THE TOTAL DEAD LOAD DEFLECTION HAS OCCURRED.

BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

CURVATURE OF STEEL GIRDERS MAY BE ACCOMPLISHED BY CUTTING PLATES OR BY HEAT TREATING TO THE RADIUS. HEAT CURVING OF GIRDERS IS ALLOWED. FOR HEAT CURVING OF GIRDERS, SEE SPECIAL PROVISIONS.

- ① CHARPY V-NOTCH TESTS ARE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATES WHICH FALL WITHIN THESE LIMITS. ALSO, CHARPY V-NOTCH TEST WILL BE REQUIRED FOR ALL WEB PLATES, WEB SPLICE PLATES, FLANGE SPLICE PLATES AND ALL END BENT, INTERMEDIATE AND BENT DIAPHRAGM MEMBERS. FOR CHARPY V-NOTCH TESTS, SEE SPECIAL PROVISIONS.
- ② NO WELDING OF FORMS OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTED IN THIS REGION

THE CONTRACTOR SHALL MAINTAIN STABILITY OF THE CURVED GIRDERS UNTIL ALL FIELD SPLICES AND CROSSFRAME CONNECTIONS HAVE BEEN COMPLETED. STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

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SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

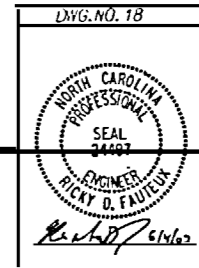
SUPERSTRUCTURE GIRDER DETAILS

MAY 2002

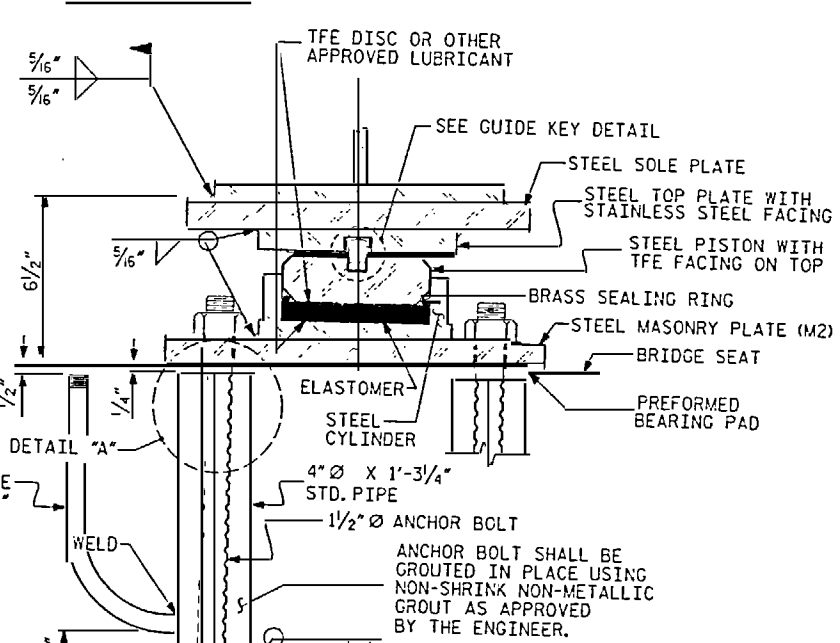
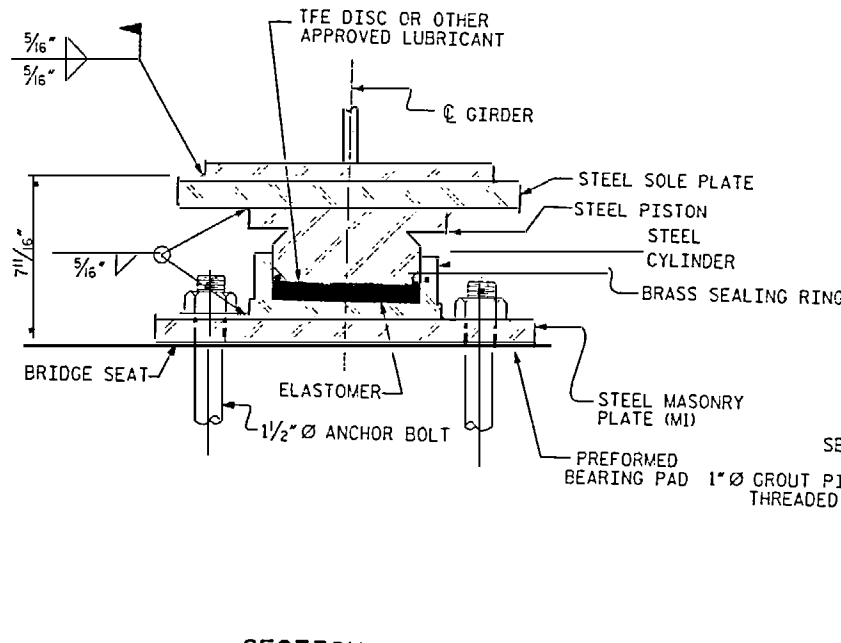
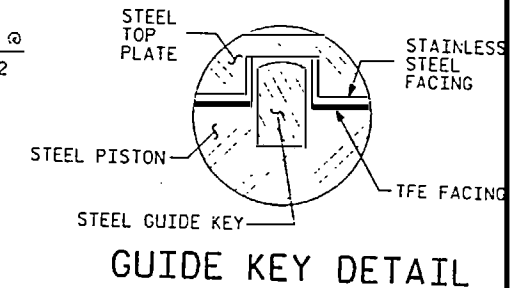
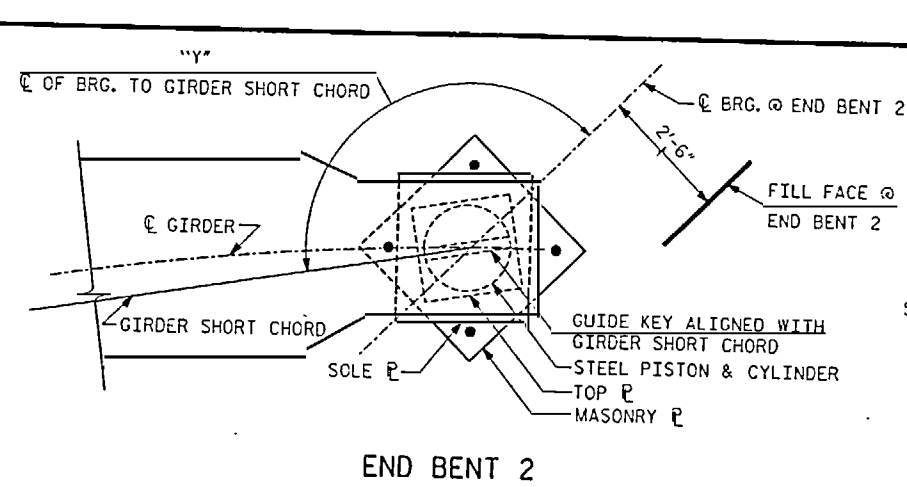
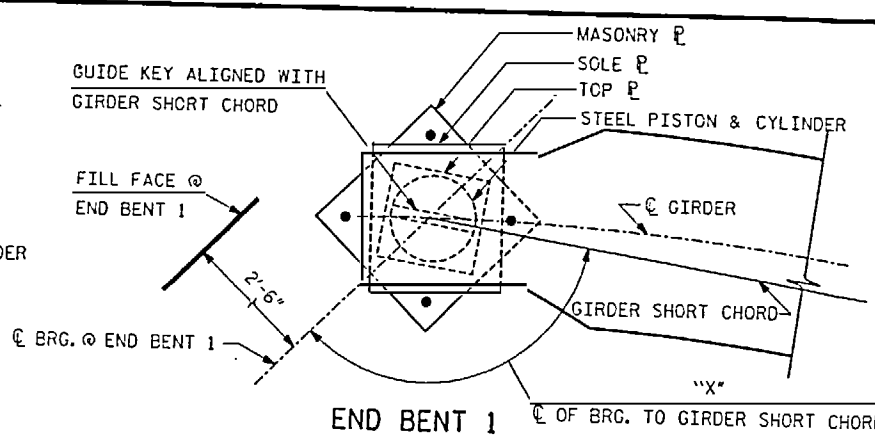
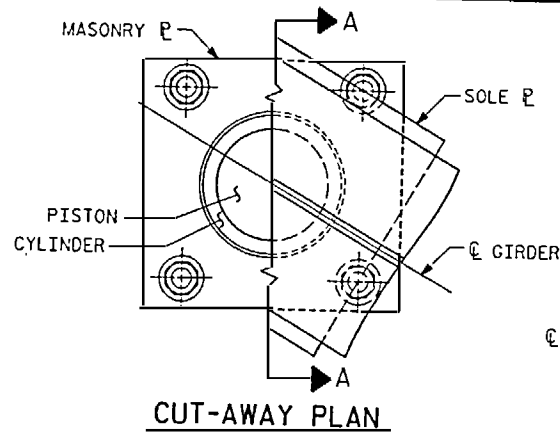
DRAWN BY: F.D. WEEDEN DATE: 04/02  
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NO.		BY		DATE		SHEET NO.
1	2	3	4	5	6	
1				3		5-15
2				4		107



GIRDER NO.	END BENT 1 "X"	END BENT 2 "Y"
ABG1	135°32'38"	132°25'16"
ABG2	135°45'00"	132°36'22"
ABG3	135°57'31"	132°47'35"
ABG4	136°10'10"	132°58'54"
ABG5	136°22'58"	133°10'20"
ABG6	136°28'02"	133°14'52"
ABG7	136°41'40"	133°27'03"
ABG8	136°55'28"	133°39'22"
ABG9	137°09'25"	133°51'49"
ABG10	137°23'23"	134°04'24"

**NOTES**

FOR POT BEARINGS, SEE SPECIAL PROVISIONS.

AT ALL POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS SHALL BE TIGHTENED FINGER TIGHT AND GIVEN AN ADDITIONAL 1/4 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR ELASTOMER.

AFTER BEARING ASSEMBLY IS IN PLACE AND ANCHOR BOLTS HAVE BEEN FINALLY POSITIONED, THEY SHALL BE GROUTED IN PLACE AS SHOWN.

THE CLOSURE PLATE, GROUT PIPE AND STANDARD PIPE FOR THIS ASSEMBLY NEED NOT BE GALVANIZED.

SOLE PLATES SHOULD BE WELDED TO BEAM FLANGES AND ANCHOR BOLTS SHOULD BE GROUTED BEFORE FALSEWORK IS PLACED.

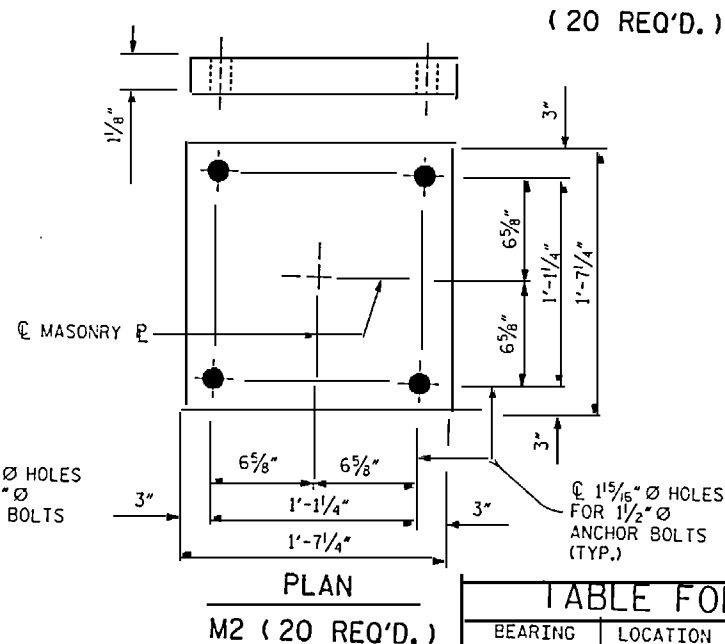
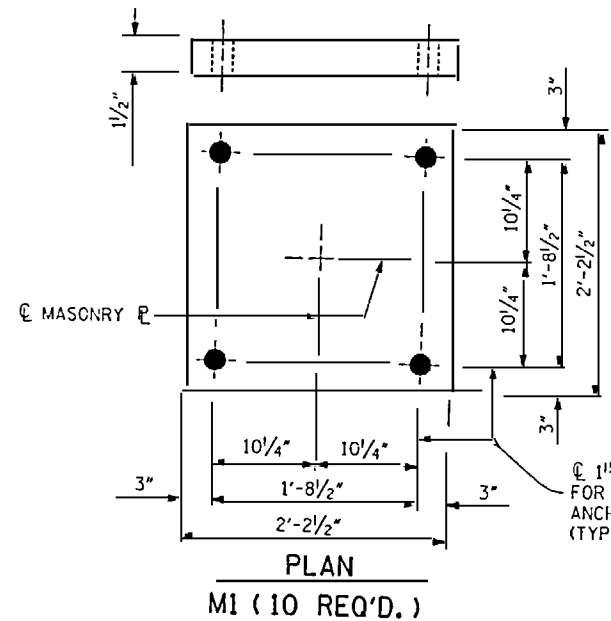
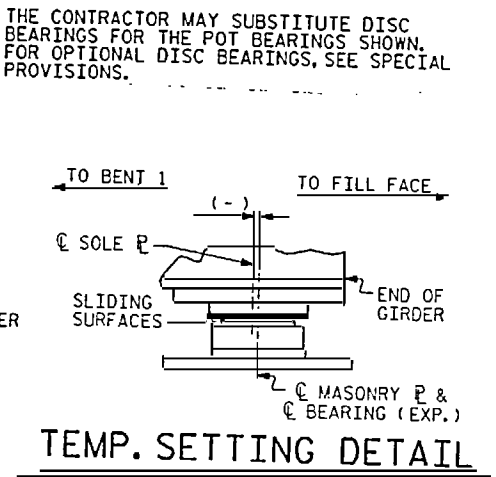
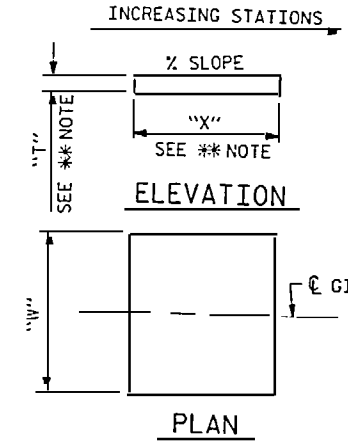
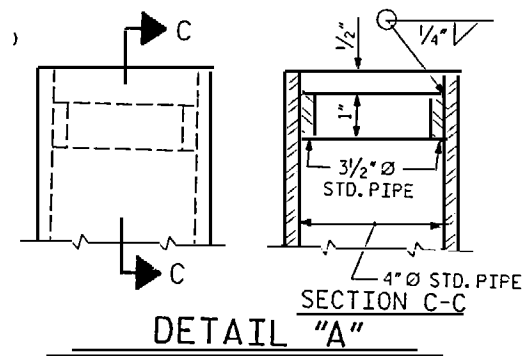
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

**SECTION A-A**  
**FIXED BEARING @ BENT 1 (FB-1)**  
**(10 REQ'D.)**

**EXPANSION BEARING @**  
**END BENTS 1 & 2 (EB-1)**  
**(20 REQ'D.)**

**POT BEARING DETAILS**



**MASONRY PLATE DETAILS**

TEMPERATURE AT TIME OF SETTING	30° F	60° F	90° F	*
END BENT 1	-1/16"	0	1/16"	3/8"
END BENT 2	-1/2"	0	1/2"	3/16"

\* CORRECTION FOR END ROTATION DUE TO WEIGHT OF SLAB AND COMPOSITE DEAD LOAD.

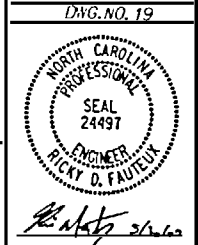
**SOLE PLATE DETAILS**

LOCATION	"W"	% SLOPE
END BENT 1	1'-6"	0
BENT 1	2'-1"	0
END BENT 2	1'-6"	0

BEARING	LOCATION	VERTICAL LOAD (KIPS)			LATERAL LOAD (KIPS)	TOTAL MOVEMENT (INCHES)
		DEAD	LIVE	TOTAL		
EB-1	END BENT 1	119.9	74.4	194.3	87.5	1 1/16"
FB-1	BENT 1	476.4	170.7	647.1	104.5	0
EB-1	END BENT 2	138.5	78.6	217.1	87.5	1 1/16"

DRAWN BY: F.D. WEEDEN DATE: 04/02  
CHECKED BY: R.O. FAUTEUX DATE: 04/02

**RUMMEL, KLEPPER & KAHL, LLP**  
consulting engineers  
5800 FARLINGTON PLACE - SUITE 105  
RALEIGH, NORTH CAROLINA 27609-3560



PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+10.60 -L1REV-P.O.C.

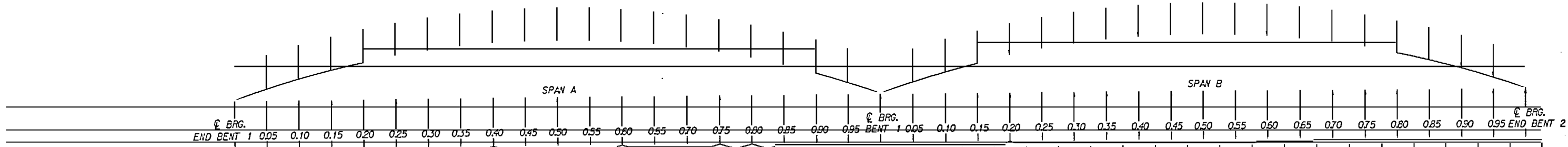
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SUPERSTRUCTURE POT BEARINGS**

MAY 2002

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

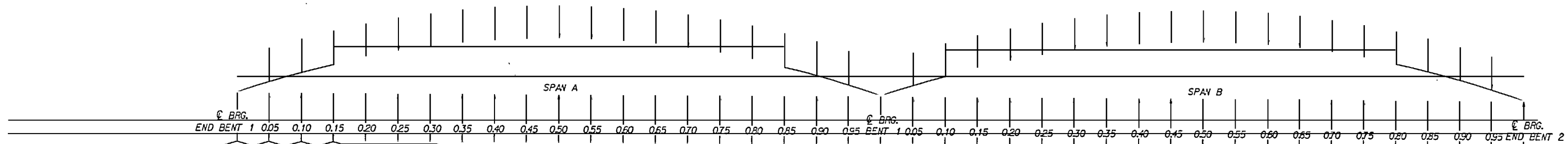
TOTAL SHEETS: 107



	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00
GIRDER 6	0.013	0.026	0.037	0.046	0.053	0.058	0.060	0.060	0.058	0.053	0.047	0.039	0.030	0.022	0.014	0.007	0.002	-0.001	-0.002		0.005	0.012	0.021	0.033	0.046	0.060	0.074	0.086	0.096	0.104	0.109	0.110	0.107	0.101	0.091	0.078	0.062	0.043	0.022	
DEFLECTION DUE TO WEIGHT OF STEEL	0.037	0.073	0.104	0.129	0.149	0.163	0.170	0.170	0.164	0.152	0.136	0.115	0.092	0.068	0.046	0.026	0.011	0.002	-0.002		0.010	0.026	0.048	0.076	0.109	0.143	0.177	0.208	0.234	0.254	0.266	0.269	0.264	0.249	0.225	0.193	0.153	0.107	0.055	
DEFLECTION DUE TO WEIGHT OF SLAB *	0.004	0.008	0.011	0.014	0.016	0.018	0.019	0.019	0.018	0.016	0.014	0.012	0.009	0.006	0.004	0.002	0.001	0.000		0.001	0.003	0.006	0.009	0.012	0.016	0.019	0.022	0.025	0.026	0.027	0.027	0.026	0.025	0.022	0.019	0.015	0.010	0.005		
DEFLECTION DUE TO WEIGHT OF RAIL	0.055	0.106	0.152	0.190	0.219	0.239	0.249	0.249	0.240	0.223	0.198	0.168	0.134	0.099	0.066	0.037	0.015	0.002	-0.004		0.015	0.041	0.075	0.118	0.168	0.219	0.270	0.316	0.355	0.384	0.401	0.406	0.397	0.374	0.338	0.290	0.230	0.160	0.083	
TOTAL DEAD LOAD DEFLECTION	0.045	0.085	0.121	0.151	0.177	0.198	0.215	0.227	0.234	0.236	0.234	0.227	0.215	0.198	0.177	0.151	0.120	0.085	0.045		0.052	0.099	0.140	0.175	0.206	0.230	0.249	0.263	0.271	0.274	0.271	0.263	0.249	0.230	0.206	0.175	0.140	0.089	0.052	
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RESULTING FROM HEAT CURVING	0"	1/16"	2/16"	3/16"	4/16"	4 1/4"	5/16"	5/16"	5 1/8"	5 1/2"	5 1/2"	4 1/4"	4 1/8"	3 1/8"	2 3/8"	2 1/4"	1 3/8"	1 1/8"	1/2"	0"	1/8"	1 1/8"	2 1/8"	3 1/2"	4 1/2"	5 3/8"	6 1/4"	6 1/2"	7 1/2"	7 1/4"	8 1/16"	8"	7 1/4"	7 1/4"	6 1/2"	5 1/8"	4 1/8"	3 1/8"	1 3/8"	0"
REQUIRED CAMBER	0"	1 1/16"	2 1/16"	3 1/16"	4 1/16"	4 1/4"	5 1/16"	5 1/8"	5 1/2"	5 1/2"	4 1/4"	4 1/8"	3 1/8"	2 3/8"	2 1/4"	1 3/8"	1 1/8"	1/2"	0"	1/8"	1 1/8"	2 1/8"	3 1/2"	4 1/2"	5 3/8"	6 1/4"	6 1/2"	7 1/2"	7 1/4"	8 1/16"	8"	7 1/4"	7 1/4"	6 1/2"	5 1/8"	4 1/8"	3 1/8"	1 3/8"	0"	

	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00					
GIRDERS 7, 8, 9	0.014	0.027	0.039	0.048	0.056	0.060	0.063	0.063	0.060	0.055	0.049	0.041	0.032	0.023	0.015	0.007	0.002	-0.001	-0.002		0.005	0.012	0.022	0.034	0.047	0.062	0.075	0.088	0.099	0.107	0.111	0.112	0.110	0.104	0.094	0.080	0.064	0.044	0.023						
DEFLECTION DUE TO WEIGHT OF STEEL	0.053	0.103	0.147	0.184	0.212	0.232	0.242	0.242	0.234	0.217	0.193	0.164	0.131	0.098	0.066	0.038	0.017	0.004	-0.002		0.013	0.036	0.067	0.107	0.152	0.200	0.248	0.291	0.328	0.356	0.373	0.378	0.370	0.349	0.316	0.271	0.215	0.150	0.077						
DEFLECTION DUE TO WEIGHT OF SLAB *	0.011	0.021	0.030	0.038	0.044	0.048	0.051	0.052	0.051	0.048	0.044	0.039	0.032	0.025	0.018	0.011	0.006	0.002	0.000		0.003	0.008	0.015	0.024	0.033	0.043	0.052	0.060	0.067	0.071	0.074	0.072	0.067	0.060	0.052	0.041	0.029	0.015							
DEFLECTION DUE TO WEIGHT OF RAIL	0.078	0.151	0.216	0.270	0.312	0.340	0.355	0.357	0.345	0.320	0.285	0.243	0.195	0.146	0.099	0.057	0.024	0.005	-0.004		0.021	0.056	0.103	0.164	0.233	0.305	0.375	0.439	0.493	0.533	0.558	0.564	0.551	0.520	0.470	0.402	0.319	0.223	0.115						
TOTAL DEAD LOAD DEFLECTION	0.046	0.088	0.124	0.156	0.183	0.205	0.222	0.234	0.241	0.244	0.241	0.234	0.222	0.205	0.183	0.156	0.124	0.088	0.045		0.054	0.101	0.144	0.180	0.211	0.237	0.257	0.271	0.279	0.282	0.279	0.282	0.279	0.271	0.257	0.237	0.211	0.180	0.144	0.102	0.054				
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
CAMBER DUE TO DISSIPATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
RESULTING FROM HEAT CURVING	0"	1/2"	2/8"	4/16"	5/16"	5 1/8"	6 1/16"	6 3/16"	7 1/16"	7"	6 3/4"	6 1/2"	5 3/4"	5"	4 1/2"	3 3/8"	2 3/8"	1 3/4"	1 1/8"	1/2"	0"	1/8"	1 1/8"	2 1/8"	3 1/2"	4 1/2"	5 3/8"	6 1/4"	6 1/2"	7 1/8"	7 1/4"	8 1/16"	8 1/4"	9 1/4"	9 1/2"	10 1/16"	10"	9 1/8"	9 1/16"	8 1/8"	7"	5 1/8"	3 3/8"	2"	0"
REQUIRED CAMBER	0"	1 1/2"	2 1/8"	4 1/16"	5 1/16"	5 1/8"	6 1/16"	6 3/16"	7 1/16"	7"	6 3/4"	6 1/2"	5 3/4"	5"	4 1/2"	3 3/8"	2 3/8"	1 3/4"	1 1/8"	1/2"	0"	1/8"	1 1/8"	2 1/8"	3 1/2"	4 1/2"	5 3/8"	6 1/4"	6 1/2"	7 1/8"	7 1/4"	8 1/16"	8 1/4"	9 1/4"	9 1/2"	10 1/16"	10"	9 1/8"	9 1/16"	8 1/8"	7"	5 1/8"	3 3/8"	2"	0"

	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00		
GIRDER 10	0.015	0.028	0.040	0.050	0.058	0.063	0.065	0.065	0.062	0.058	0.051	0.042	0.033	0.024	0.015	0.008	0.002	-0.001	-0.002		0.005	0.012	0.022	0.034	0.048	0.063	0.077	0.090	0.101	0.109	0.114	0.115	0.113	0.106	0.096	0.082	0.065	0.046	0.024			
DEFLECTION DUE TO WEIGHT OF STEEL	0.044	0.085	0.122	0.152	0.176	0.192	0.200	0.201	0.194	0.180	0.160	0.136	0.109	0.082	0.055	0.032	0.014	0.003	-0.002		0.011	0.029	0.054	0.087	0.124	0.163	0.202	0.237	0.267	0.290	0.303	0.308	0.301	0.285	0.258	0.221	0.176	0.123	0.063			
DEFLECTION DUE TO WEIGHT OF SLAB *	0.012	0.023	0.032	0.041	0.047	0.052	0.055	0.055	0.055	0.052	0.047	0.041	0.034	0.027	0.019	0.012	0.006	0.002	0.000		0.003	0.008	0.016	0.025	0.035	0.046	0.055	0.064	0.071	0.076	0.079	0.077	0.072	0.065	0.055	0.044	0.031	0.016				
DEFLECTION DUE TO WEIGHT OF RAIL	0.070	0.136	0.195	0.243	0.281	0.306	0.320	0.321	0.311	0.289	0.258	0.228	0.177	0.132	0.090	0.052	0.023	0.005	-0.003		0.018	0.050	0.092	0.145	0.207	0.271	0.334	0.391	0.439	0.475	0.496	0.502	0.491	0.463	0.418	0.358	0.285	0.199	0.102			
TOTAL DEAD LOAD DEFLECTION	0.048	0.091	0.128	0.161	0.189	0.212	0.229	0.242	0.249	0.252	0.249	0.242	0.229	0.212	0.189	0.161	0.129	0.091	0.048		0.055	0.105	0.148	0.186	0.218	0.244	0.264	0.279	0.287	0.290	0.287	0.279	0.264	0.244	0.218	0.186	0.148	0.104	0.055			
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
CAMBER DUE TO DISSIPATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RESULTING FROM HEAT CURVING	0"	1 1/16"	2 1/4"	3 1/8"	4 1/8"	5 1/8"	6 1/16"	6 3/16"	6 3/4"	6 1/2"	6 1/5"	5 1/16"	4 1/8"	4 1/8"	3 3/8"	2 3/8"	1 3/4"	1 1/8"	3/8"	0"	1/8"	1 1/8"	2 1/8"	3 1/2"	4"	5 1/8"	6 1/16"	7 1/16"	8 1/16"	8 1/16"	9 1/8"	9 1/8"	9 1/8"	9 1/16"	8 1/2"	7 1/8"	6 1/2"	5 1/8"	3 3/8"	1 1/4"	0"	
REQUIRED CAMBER	0"	1 1/16"	2 1/4"	3 1/8"	4 1/8"	5 1/8"	6 1/16"	6 3/16"	6 3/4"	6 1/2"	6 1/5"	5 1/16"	4 1/8"	4 1/8"	3 3/8"	2 3/8"	1 3/4"	1 1/8"	3/8"	0"	1/8"	1 1/8"	2 1/8"	3 1/2"	4"	5 1/8"	6 1/16"	7 1/16"	8 1/16"	8 1/16"												



GIRDER 1		0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	
DEFLECTION DUE TO WEIGHT OF STEEL		0.013	0.024	0.035	0.043	0.050	0.054	0.056	0.056	0.053	0.049	0.043	0.036	0.028	0.020	0.013	0.006	0.002	-0.001	-0.002	0.005	0.011	0.020	0.032	0.044	0.057	0.070	0.082	0.092	0.099	0.103	0.104	0.102	0.095	0.087	0.074	0.059	0.041	0.021	
DEFLECTION DUE TO WEIGHT OF SLAB *		0.037	0.073	0.104	0.129	0.150	0.163	0.170	0.171	0.164	0.152	0.135	0.114	0.091	0.058	0.045	0.026	0.011	0.002	-0.002	0.010	0.027	0.050	0.079	0.113	0.148	0.183	0.214	0.241	0.261	0.273	0.277	0.271	0.256	0.231	0.198	0.157	0.109	0.056	
DEFLECTION DUE TO WEIGHT OF RAIL		0.010	0.019	0.028	0.035	0.040	0.044	0.047	0.047	0.047	0.044	0.040	0.035	0.029	0.022	0.016	0.010	0.005	0.002	0.000	0.003	0.008	0.014	0.023	0.032	0.041	0.050	0.058	0.064	0.068	0.071	0.071	0.069	0.065	0.058	0.049	0.039	0.027	0.014	
TOTAL DEAD LOAD DEFLECTION		0.060	0.116	0.165	0.207	0.239	0.261	0.273	0.274	0.264	0.245	0.218	0.185	0.148	0.110	0.073	0.041	0.017	0.002	-0.004	0.017	0.046	0.085	0.134	0.189	0.247	0.303	0.354	0.397	0.429	0.448	0.452	0.442	0.416	0.376	0.321	0.254	0.177	0.091	
VERTICAL CURVE ORDINATE		0.042	0.080	0.113	0.142	0.168	0.188	0.202	0.213	0.219	0.221	0.219	0.213	0.202	0.186	0.166	0.142	0.113	0.080	0.042	0.049	0.093	0.132	0.166	0.194	0.217	0.235	0.248	0.256	0.259	0.256	0.248	0.235	0.217	0.194	0.165	0.132	0.093	0.049	
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER		0"	1/4"	2/8"	3/8"	4/8"	5/8"	5/16"	5/16"	5/16"	5/16"	5/8"	4/4"	4/16"	3/16"	2/8"	2/16"	1/16"	1"	1/16"	1/16"	1/16"	2/8"	3/16"	4/8"	5/16"	6/16"	7/16"	7/16"	8/16"	8/16"	7/8"	6/16"	5/16"	4/8"	3/4"	1/16"	0"		

GIRDERS 2,3,4		0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	
DEFLECTION DUE TO WEIGHT OF STEEL		0.013	0.025	0.036	0.044	0.051	0.056	0.058	0.058	0.055	0.051	0.045	0.037	0.029	0.021	0.013	0.007	0.002	-0.001	-0.002	0.005	0.012	0.021	0.032	0.045	0.059	0.072	0.084	0.094	0.101	0.106	0.107	0.104	0.098	0.089	0.076	0.060	0.042	0.022	
DEFLECTION DUE TO WEIGHT OF SLAB *		0.047	0.090	0.129	0.161	0.185	0.203	0.212	0.212	0.205	0.190	0.169	0.143	0.114	0.085	0.057	0.032	0.014	0.003	-0.003	0.012	0.033	0.061	0.097	0.138	0.182	0.225	0.264	0.297	0.321	0.337	0.341	0.334	0.315	0.284	0.244	0.193	0.135	0.069	
DEFLECTION DUE TO WEIGHT OF RAIL		0.010	0.019	0.028	0.035	0.040	0.044	0.047	0.047	0.047	0.044	0.040	0.035	0.029	0.022	0.016	0.010	0.005	0.002	0.000	0.003	0.008	0.014	0.023	0.032	0.041	0.050	0.058	0.064	0.068	0.071	0.071	0.069	0.065	0.058	0.049	0.039	0.027	0.014	
TOTAL DEAD LOAD DEFLECTION		0.069	0.135	0.192	0.240	0.278	0.303	0.317	0.318	0.307	0.285	0.254	0.215	0.173	0.128	0.085	0.049	0.020	0.003	-0.004	0.020	0.052	0.096	0.152	0.215	0.281	0.346	0.404	0.453	0.490	0.512	0.517	0.506	0.476	0.430	0.368	0.292	0.204	0.105	
VERTICAL CURVE ORDINATE		0.043	0.082	0.116	0.146	0.171	0.191	0.207	0.219	0.226	0.228	0.225	0.219	0.207	0.191	0.171	0.145	0.116	0.082	0.043	0.050	0.096	0.135	0.170	0.199	0.223	0.242	0.255	0.263	0.265	0.263	0.255	0.242	0.223	0.199	0.170	0.135	0.096	0.050	
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER		0"	1/8"	2/8"	3/16"	4/8"	5/8"	5/16"	6/16"	6/16"	6/16"	5/4"	5/16"	4/16"	3/16"	2/16"	1/16"	1"	1/16"	0"	1/16"	1/4"	2/4"	3/8"	5"	6/16"	7/16"	7/16"	8/16"	9/16"	9/16"	9/4"	8/16"	8/16"	7/16"	6/16"	5/8"	3/16"	1/8"	0"

GIRDER 5		0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95			
DEFLECTION DUE TO WEIGHT OF STEEL		0.013	0.026	0.037	0.046	0.053	0.058	0.060	0.060	0.058	0.053	0.047	0.039	0.030	0.022	0.014	0.007	0.002	-0.001	-0.002	0.005	0.012	0.021	0.033	0.046	0.060	0.074	0.086	0.096	0.104	0.109	0.110	0.107	0.101	0.091	0.078	0.062	0.043	0.022			
DEFLECTION DUE TO WEIGHT OF SLAB *		0.037	0.073	0.104	0.129	0.149	0.163	0.170	0.170	0.164	0.152	0.136	0.115	0.092	0.058	0.046	0.026	0.011	0.002	-0.002	0.010	0.026	0.048	0.076	0.109	0.143	0.177	0.208	0.234	0.254	0.266	0.269	0.264	0.249	0.225	0.193	0.153	0.107	0.055			
DEFLECTION DUE TO WEIGHT OF RAIL		0.004	0.008	0.011	0.014	0.016	0.018	0.019	0.019	0.018	0.016	0.014	0.012	0.009	0.005	0.004	0.002	0.001	0.000	0.000	0.001	0.003	0.005	0.009	0.012	0.016	0.019	0.022	0.025	0.026	0.027	0.027	0.026	0.025	0.022	0.019	0.015	0.010	0.005			
TOTAL DEAD LOAD DEFLECTION		0.055	0.105	0.152	0.190	0.219	0.239	0.249	0.249	0.240	0.223	0.193	0.168	0.134	0.099	0.066	0.037	0.015	0.002	-0.004	0.015	0.041	0.075	0.118	0.168	0.219	0.270	0.316	0.355	0.384	0.401	0.406	0.397	0.374	0.338	0.290	0.230	0.160	0.093			
VERTICAL CURVE ORDINATE		0.045	0.085	0.121	0.151	0.177	0.198	0.215	0.227	0.234	0.236	0.234	0.227	0.215	0.198	0.177	0.151	0.120	0.085	0.045	0.052	0.099	0.140	0.175	0.206	0.230	0.249	0.263	0.271	0.274	0.271	0.263	0.249	0.230	0.206	0.175	0.140	0.099	0.052			
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
REQUIRED CAMBER		0"	1/16"	2/16"	3/4"	4/16"	4/4"	5/4"	5/16"	5/16"	5/16"	5/2"	5/16"	4/4"	4/16"	3/16"	2/16"	2/4"	1/8"	1/16"	1/2"	0"	1/16"	1/16"	2/16"	3/2"	4/2"	5/8"	6/4"	6/16"	7/2"	7/8"	8/15"	8"	7/4"	7/4"	6/2"	5/16"	4/16"	3/8"	1/8"	0"

**SCHEMATIC CAMBER ORDINATES**

DEFLECTIONS ARE IN FEET (DECIMAL FORM) AT TWENTIETH POINTS BETWEEN BEARINGS. REQUIRED CAMBER VALUES ARE IN INCHES (FRACTIONAL FORM)

\* INCLUDES SLAB, BUILDUPS AND STAY-IN-PLACE FORMS

SLOPE FOR THE ZERO CAMBER BASE LINE VARIES

PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C

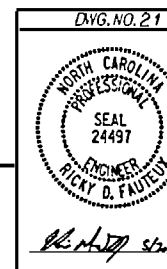
SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE**  
**GIRDER CAMBER DETAILS**  
**STAGE 2**

MAY

2002



**RUMMELKLEPPER & KAHL, LLP**  
 consulting engineers  
 5800 FARRINGTON PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27609-3900

DRAWN BY: F.D. WEEDEN DATE: 04/02  
 CHECKED BY: R.D. FAUTEUX DATE: 04/02

SHEET NO. **5-18**  
 TOTAL SHEETS **107**

REVISIONS			
NO.	BY	DATE	DESCRIPTION
1			3
2			4

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.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 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. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS FOR RAIL ATTACHMENT 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.

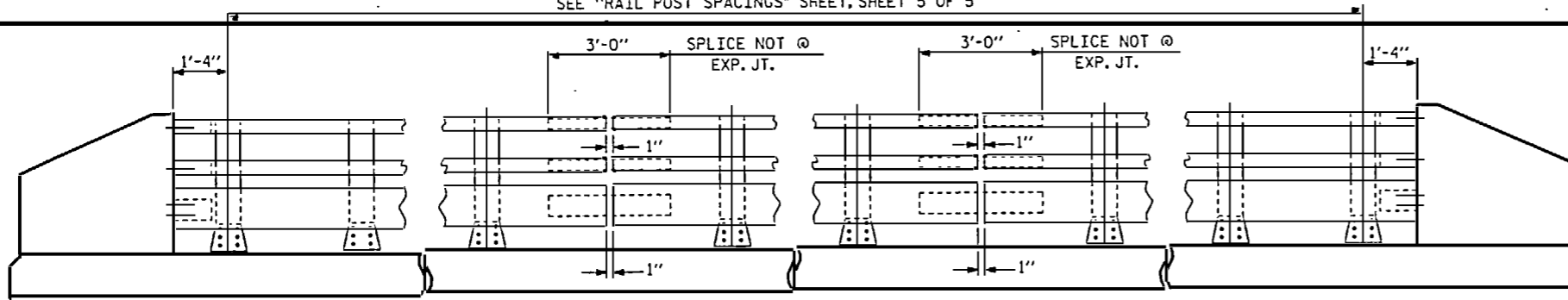
TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAIN VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

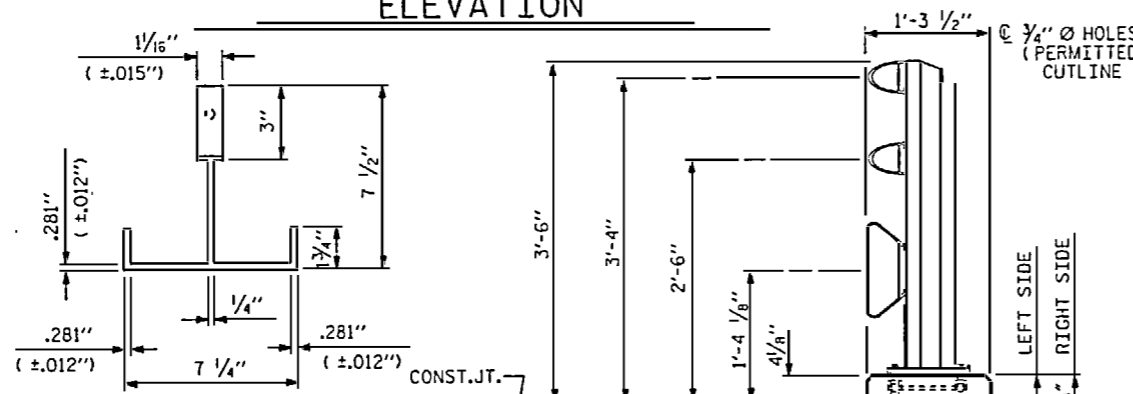
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

PAY LENGTH = 631'-8" LIN. FT.



ELEVATION

NOTE:  
FOR ATTACHMENT OF METAL RAIL TO END  
POST, SEE SHEET 3 OF 5.

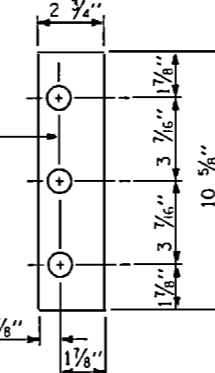


PLAN

SECTION THRU RAIL

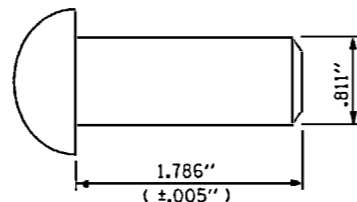
FOR ANCHOR ASSEMBLY, SEE SHEET 2 OF 5.

REAR PLATE

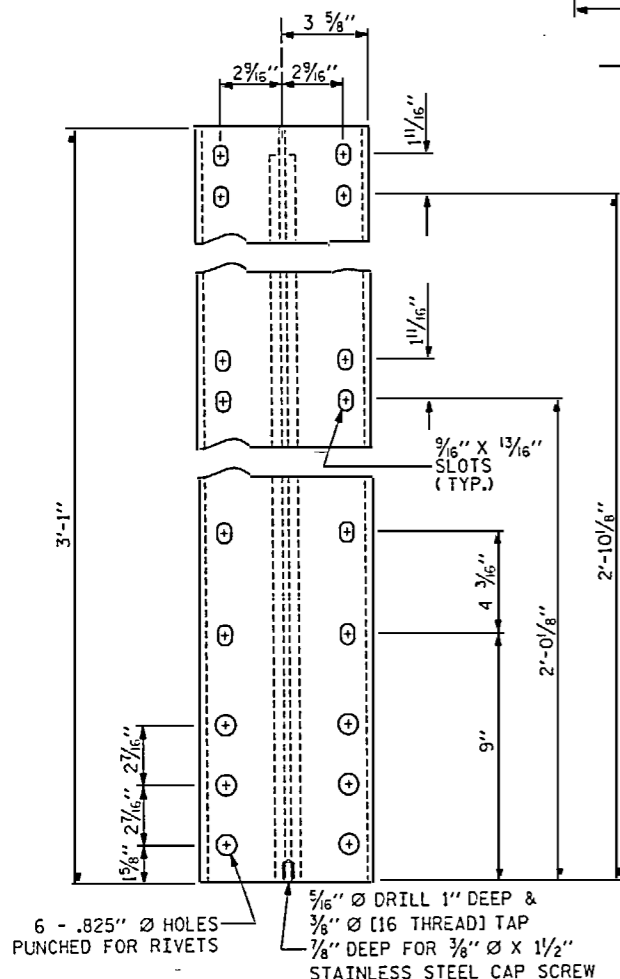


FRONT PLATE  
SHIM DETAILS

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



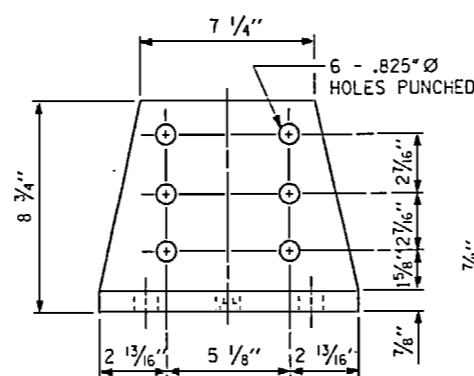
RIVET DETAIL



FRONT ELEVATION

SIDE ELEVATION

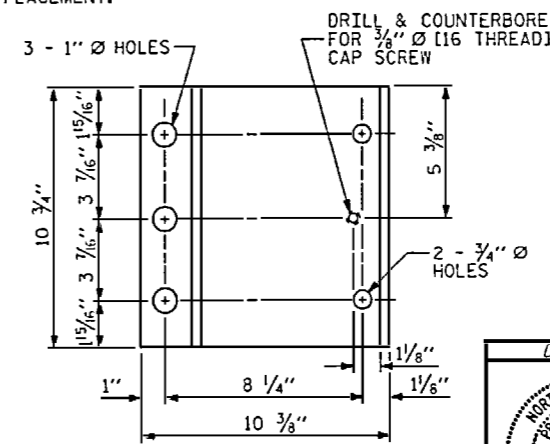
DETAILS OF POST



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



PLAN

PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+10.60 -L1REV-P.O.C.

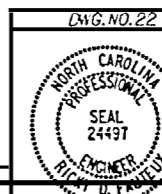
SHEET 1 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
3 BAR METAL RAIL

MAY 2002

REVISIONS		SHEET NO.	
NO.	BY	DATE	NO.
1			5-19
2			TOTAL SHEETS 107



RUMMELKLEPPER & KAY, LLP  
consulting engineers  
5800 FARINGHAM PLACE - SUITE 105  
RALEIGH, NORTH CAROLINA 27609-3560

ASSEMBLED BY: F.D. WEEDEN DATE: 04/02  
CHECKED BY: R.D. FAUTEUX DATE: 04/02  
DRAWN BY: JMB 1/88 REV. 2/6/97 EEM/RGW  
CHECKED BY: GGH 1/88 REV. 8/16/99 RHW/LES  
REV. 10/17/00R RHW/LES

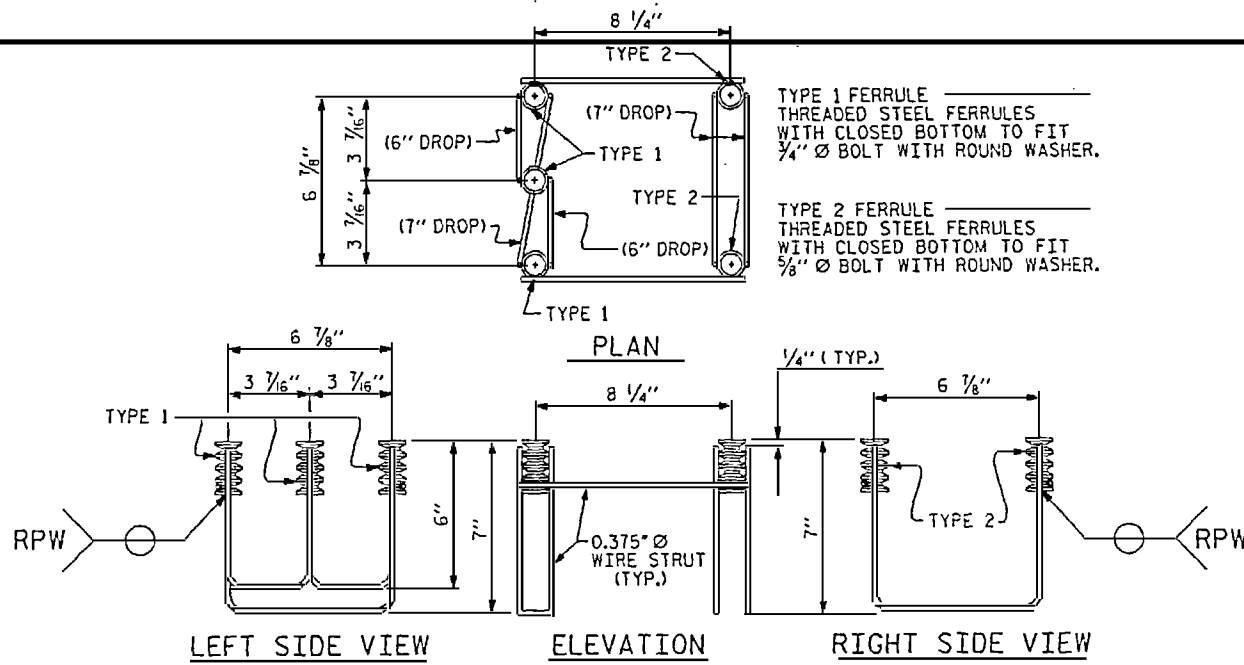
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NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

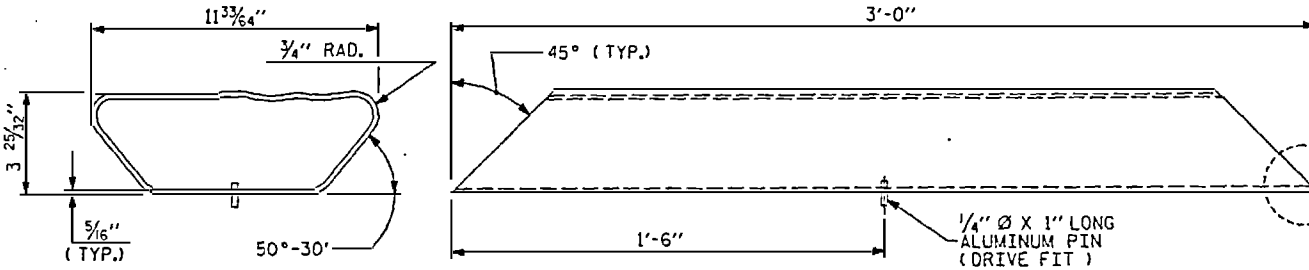
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES AND 1 1/4" FOR 5/8" FERRULES.
- B. 3 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS 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. 2 - 5/8" Ø X 2 1/4" 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 5/8" Ø X 2 1/4" 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.
- D. 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.
- E. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- F. 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.
- G. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.



LEFT SIDE VIEW ELEVATION RIGHT SIDE VIEW

5-BOLT METAL RAIL ANCHOR ASSEMBLY

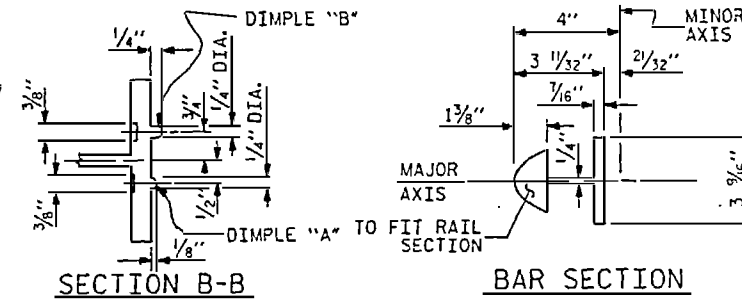
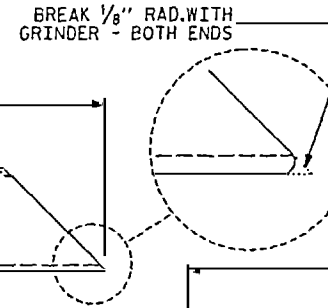
(108 ASSEMBLIES REQUIRED)



END VIEW

PLAN VIEW

BOTTOM RAIL EXPANSION BAR

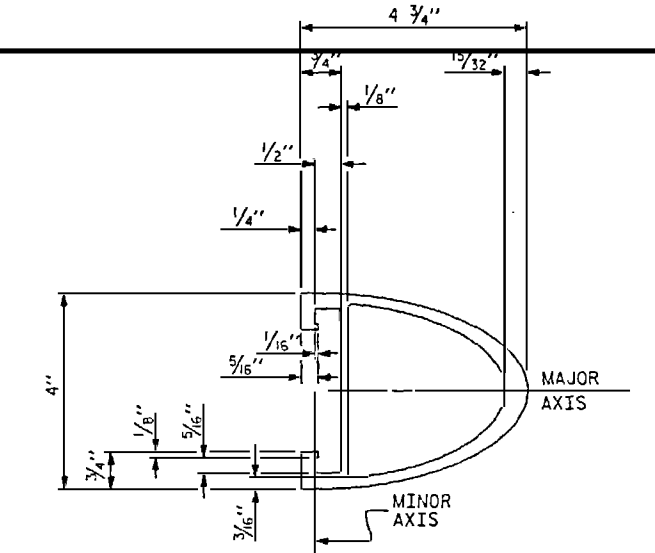


SECTION B-B

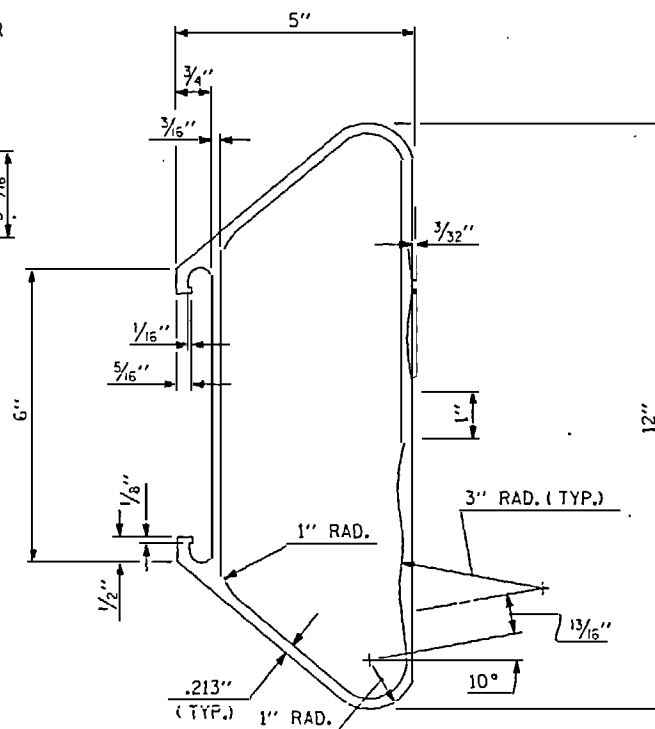
BAR SECTION

BACK ELEVATION

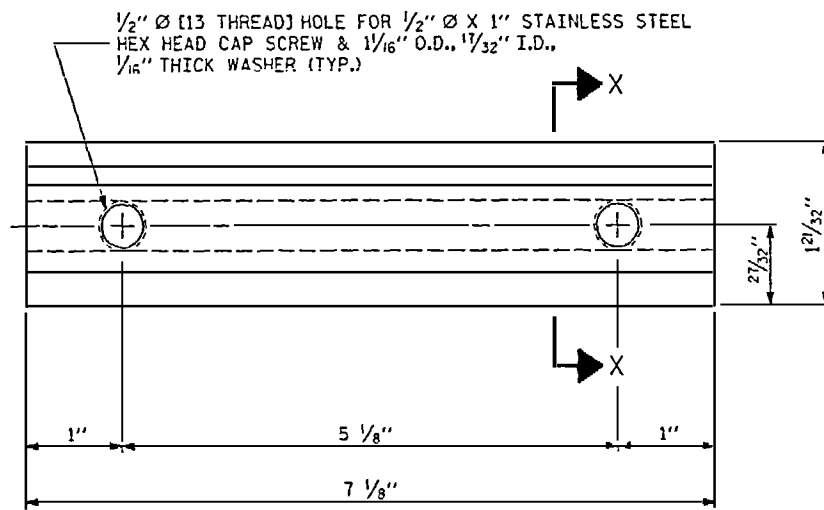
TOP & MIDDLE RAIL EXPANSION BAR



TOP & MIDDLE RAIL SECTION



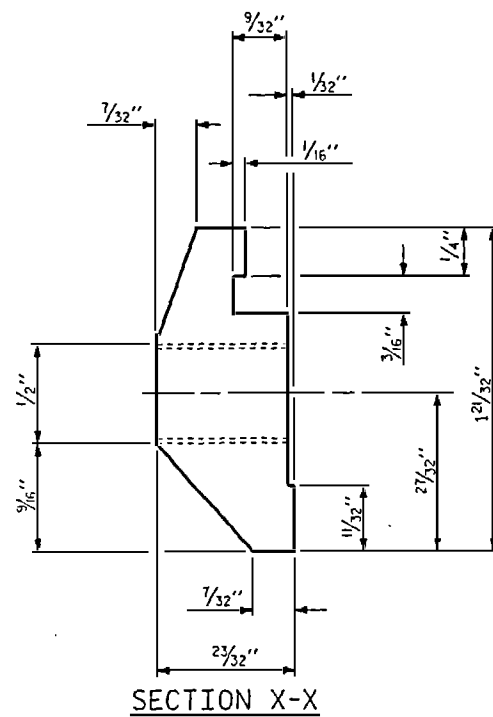
BOTTOM RAIL SECTION



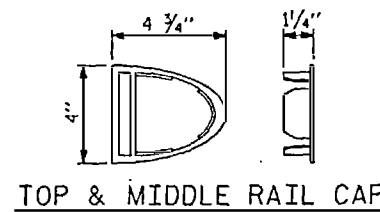
ELEVATION

CLAMP BAR DETAIL

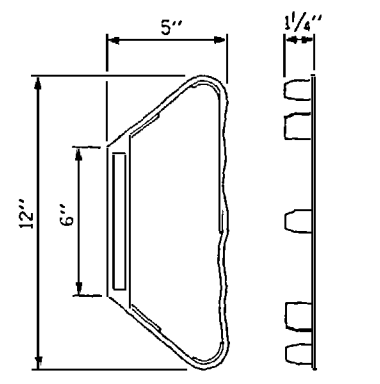
(6 REQUIRED PER POST)



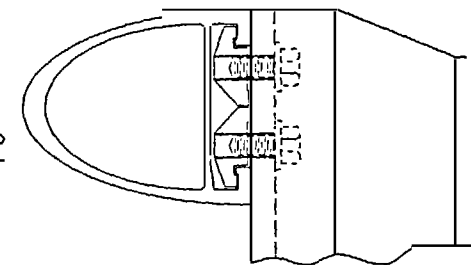
SECTION X-X



TOP & MIDDLE RAIL CAP



BOTTOM RAIL CAP



CLAMP ASSEMBLY

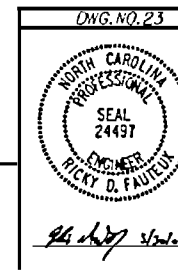
TOP RAIL SHOWN (MIDDLE & BOTTOM RAIL ARE SIMILAR)

G:\COMMONS\301059\BRIDGE\SITE\2\06\NAD\DOTS\STD\BMRS67.SXD

ASSEMBLED BY : F.D. WEEDEN	DATE : 04/02
CHECKED BY : R.D. FAUTEUX	DATE : 04/02
DRAWN BY : JMB 1/88	REV. 8/16/93 MAB/LES
CHECKED BY : GGH 1/88	REV. 10/11/03 LES/RDS
	REV. 7/10/01R RHW/LES



RUMMEL, KLEPPER & KAHL, LLP  
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5800 FARMINGTON PLACE - SUITE 105  
RALEIGH, NORTH CAROLINA 27609-3960



PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+1060 -L1REV-P.O.C.

SHEET 2 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
**STANDARD**  
**3 BAR METAL RAIL**

MAY		2002	
REVISIONS			
NO.	BY	DATE	NO.
1			3
2			4
TOTAL SHEETS			107



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 1/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 1/8" 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. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.
- D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

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 3 BAR METAL RAIL.

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

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

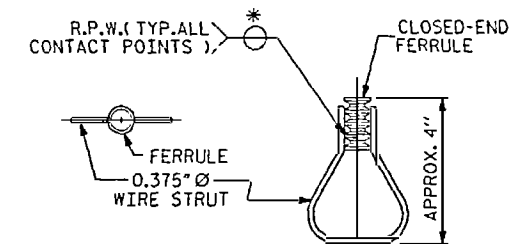
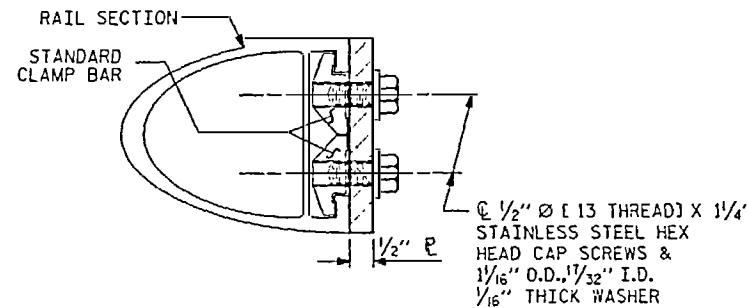
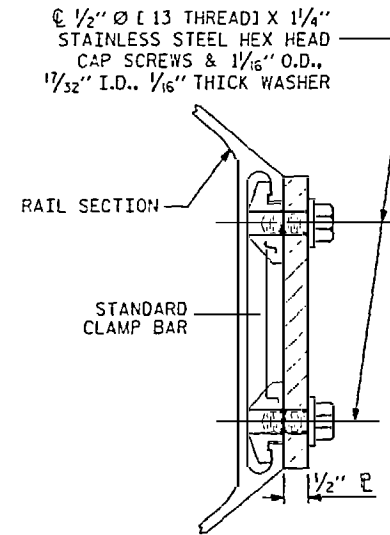
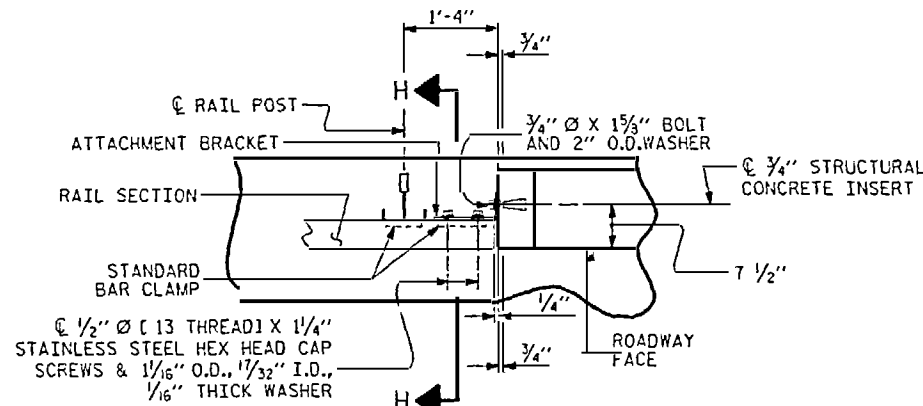
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 1/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT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

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 1/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 1/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- 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.

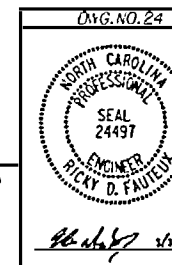


\* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+1060 -L IREV- P.O.C.

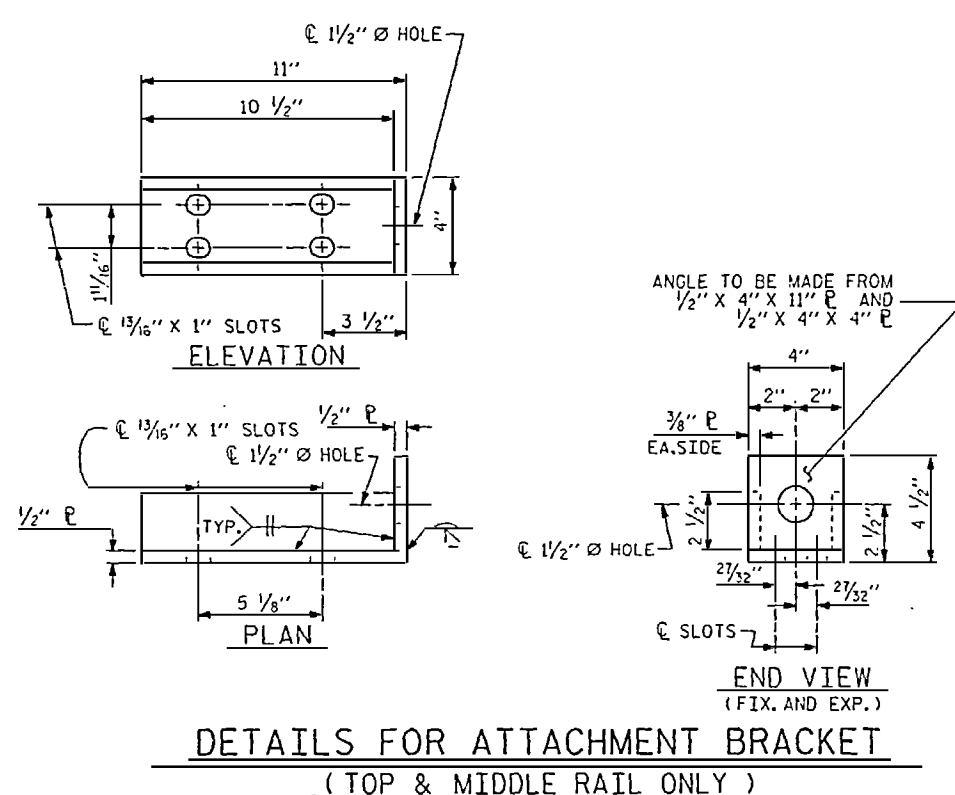
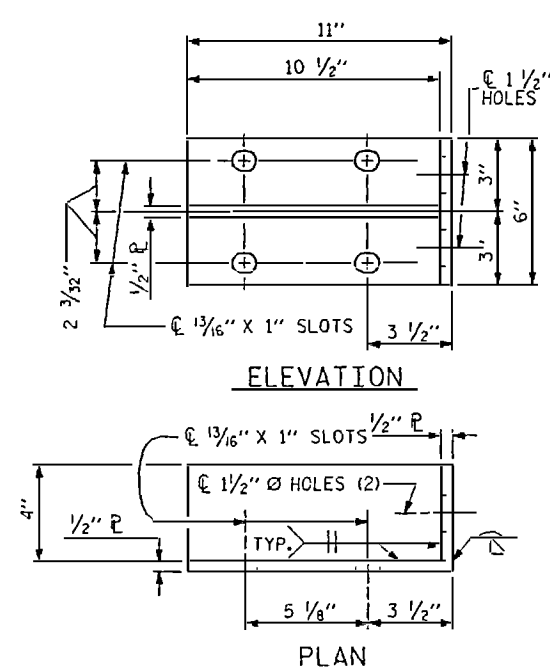
SHEET 3 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
**STANDARD**  
**3 BAR METAL RAIL**



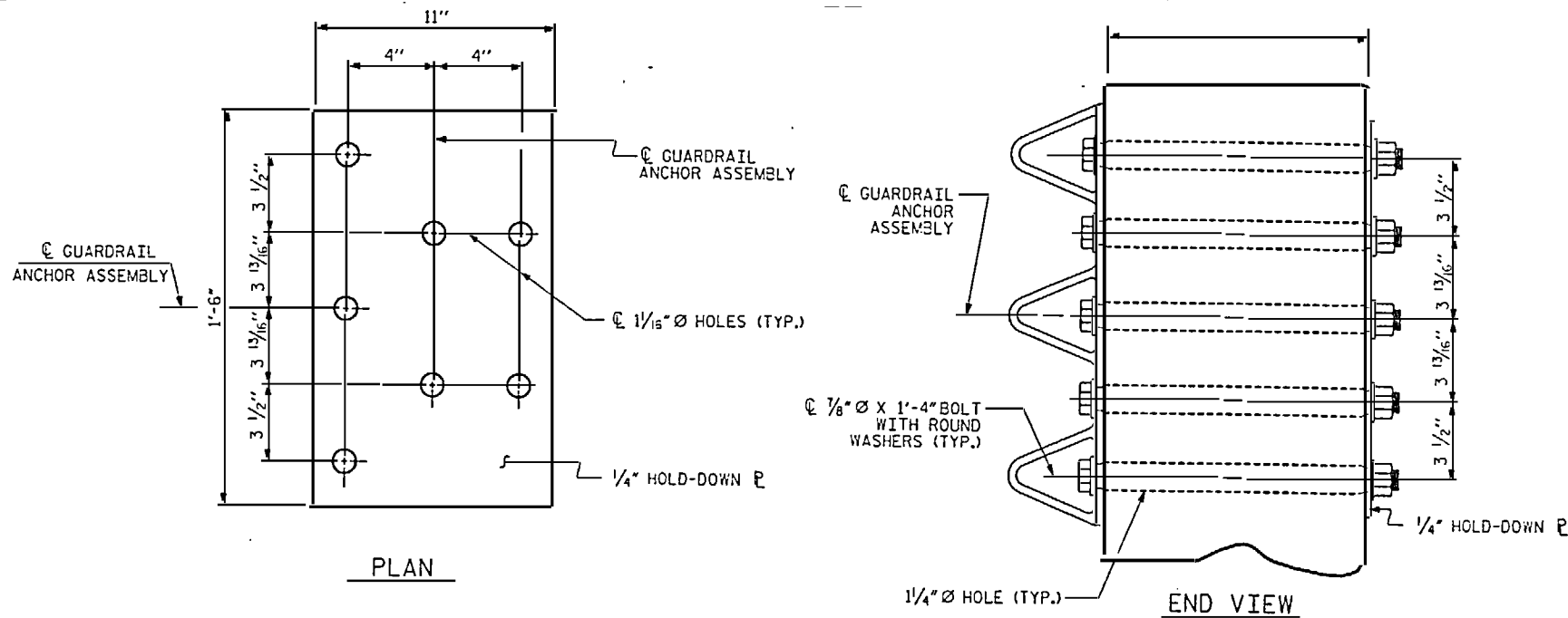
MAY		2002	
NO.		SHEET NO.	
1	BY: [Signature]	3	5-81
2	DATE: [Signature]	4	TOTAL SHEETS 107

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consulting engineers  
5800 FAIRHORN PLACE - SUITE 105  
RALEIGH, NORTH CAROLINA 27609-3560

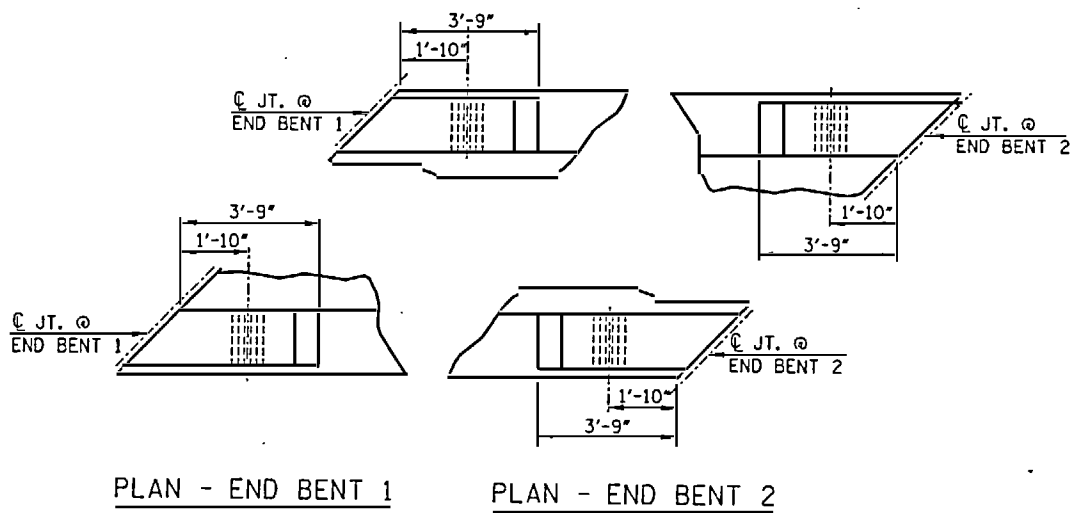


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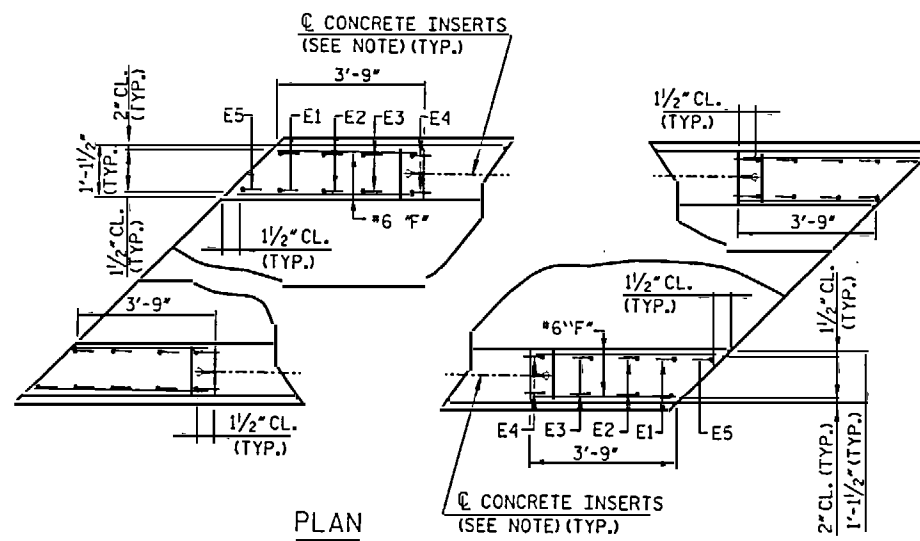
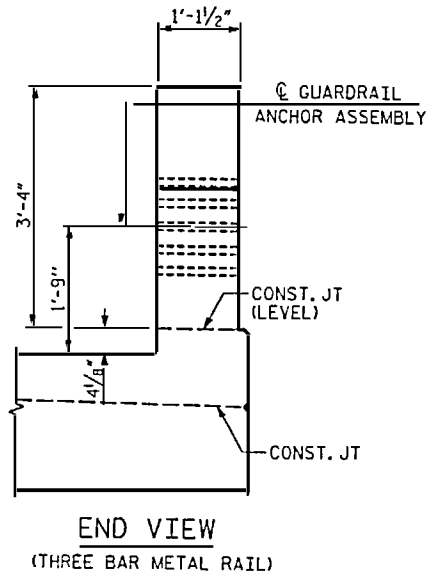
ASSEMBLED BY : F.D. WEEDEN DATE : 04/02  
CHECKED BY : R.D. FAUTEUX DATE : 04/02  
DRAWN BY : JMB 1/88 REV. 2/6/97 EEM/RGW  
CHECKED BY : GGH 1/88 REV. 10/17/00 RWW/LES  
REV. 7/10/01R RWW/LES



**GUARDRAIL ANCHOR ASSEMBLY DETAILS**



**LOCATION OF GUARDRAIL ANCHOR AT END POST**



NOTE: FOR DETAILS OF CONCRETE INSERTS, SEE "3 BAR METAL RAIL" SHEET, SHEET 3 OF 5.

**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.

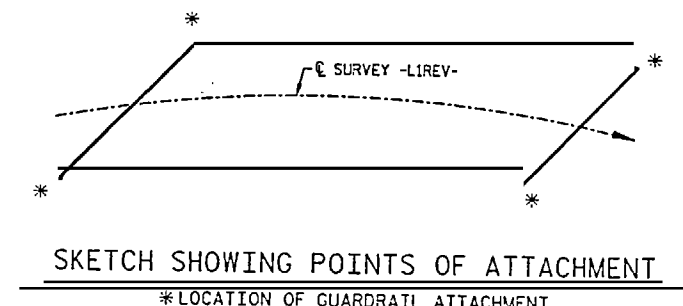
AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

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 1/4" 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.

BILL FOR ONE END POST (4 REQ)					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
E1	2 #7	1	3'-5"	14	
E2	2 #7	1	4'-0"	16	
E3	2 #7	1	4'-7"	19	
E4	2 #7	1	5'-1"	21	
E5	1 #7	1	3'-0"	6	
F1	1 #6	STR	3'-8"	6	
F2	1 #6	STR	3'-1"	5	
F3	2 #6	STR	3'-5"	10	
F4	1 #6	STR	4'-8"	7	
F5	1 #6	STR	3'-11"	6	
F6	2 #6	STR	4'-3"	13	
TOTAL EPOXY RE INF. STEEL				123 LB.	
CLASS AA CONCRETE				0.5 CU.YDS.	



PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.

SHEET 4 OF 5

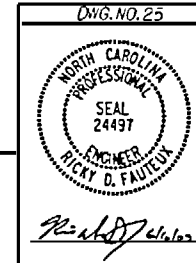
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR METAL RAILS

MAY 2002

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

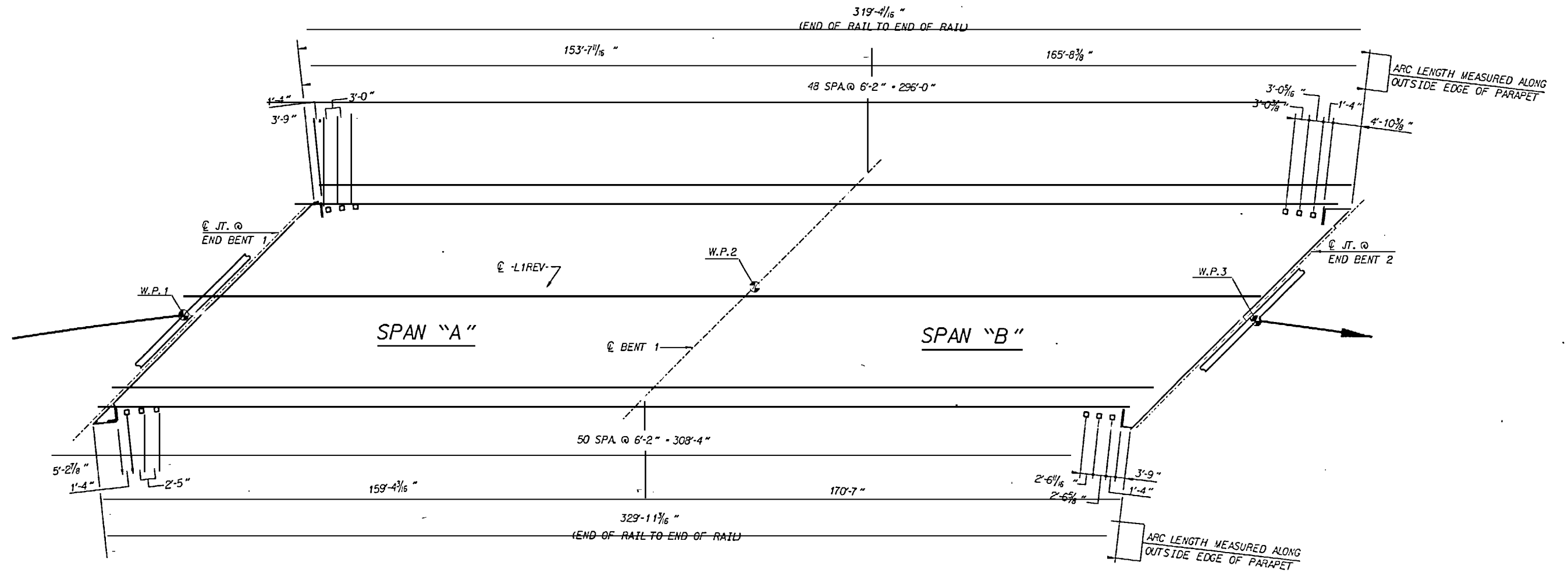
TOTAL SHEETS 107



**RUMMELKLEPPER & KAHL, LLP**  
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 5800 FARINGHAM PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27629-1960

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ASSEMBLED BY: F.D. WEEDEN DATE: 04/02  
 CHECKED BY: R.D. FAUTEUX DATE: 04/02  
 DRAWN BY: EEM 6/94 REV. 8/16/99 RHW/LES  
 CHECKED BY: RCW 6/94 REV. 10/17/00R RHW/LES



PLAN OF RAIL POST SPACINGS

PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C.

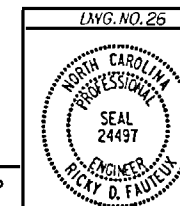
SHEET 5 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEGH

**SUPERSTRUCTURE**  
**RAIL POST SPACINGS**  
**FOR THREE BAR METAL RAIL**

MAY

2002



**RUMMEL, KLEPPER & KAHL, LLP**  
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DRAWN BY : F.D. WEEDEN DATE : 04/02  
 CHECKED BY : R.D. FAUTEUX DATE : 04/02

REVISIONS						SHEET NO. 5-83
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 107
2			4			

NOTES

ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169 GRADES 1010 THRU 1020 OR APPROVED EQUAL.

STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON THE PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.

UPON COMPLETION OF SHOP FABRICATION, THE ENTIRE ANCHOR ASSEMBLY SHALL BE METALLIZED TO A MINIMUM THICKNESS OF 6 MILS. THE 1/2" Ø STUD ANCHORS AND ANCHOR TABS NEED NOT BE METALLIZED. SEE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).

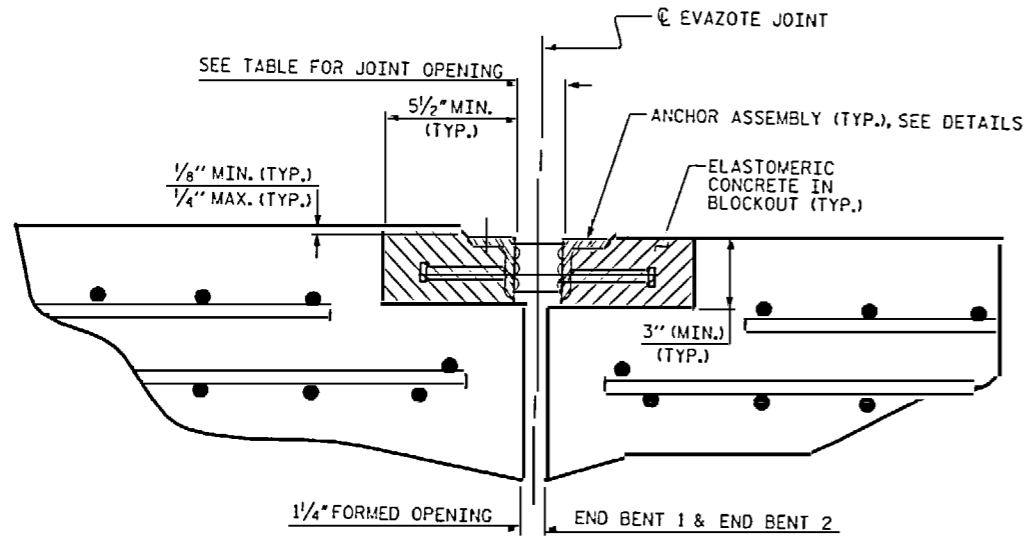
ANCHOR ASSEMBLY SHALL BE MADE CONTINUOUS THE LENGTH OF THE JOINT FROM GUTTER TO GUTTER. FOR FIELD SPLICES AT ALL CROWN BREAK POINTS, THE ENDS OF THE STEEL ANGLES SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE. FINISHED FIELD WELDS SHALL BE GRIND SMOOTH AND COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR ASSEMBLY SEGMENTS SHALL NOT BE LESS THAN 12 FEET NOR MORE THAN 20 FEET IN LENGTH. SHORTER SEGMENTS MAY BE USED AT THE EDGE OF ROADWAY OR AT POINTS OF STAGED CONSTRUCTION.

THE ANCHOR ASSEMBLY SHALL BE SECURED AND LEVELLED AS SHOWN IN THE "ARMORED JOINT ANCHOR ASSEMBLY DETAILS". NO SUBMITTALS ARE REQUIRED FOR 3/8" Ø EXPANSION ANCHORS, NUTS OR WASHERS. THE CONTRACTOR MAY SUBMIT FOR APPROVAL AN ALTERNATE METHOD OF ALIGNING AND LEVELLING THE ANGLES. THE ALTERNATE METHOD SHALL NOT INCLUDE ANY WELDING TO THE OUTSIDE FACE OF THE ANGLES.

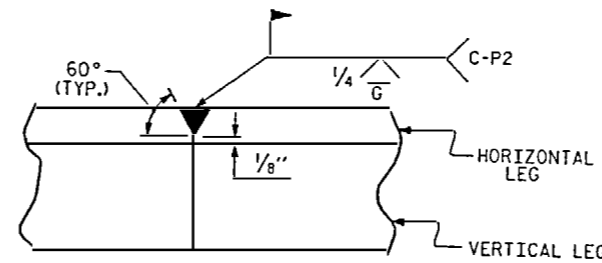
AFTER THE ELASTOMERIC CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE ANY EXCESS CONCRETE THAT COMES THROUGH THE WEEP HOLES AND THOROUGHLY CLEAN THE ANGLES. ANY DAMAGED STEEL SHALL BE COATED WITH A MINIMUM OF 4 MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

SEE SPECIAL PROVISIONS FOR EVAZOTE JOINT SEALS.  
SEE SPECIAL PROVISIONS FOR ELASTOMERIC CONCRETE.

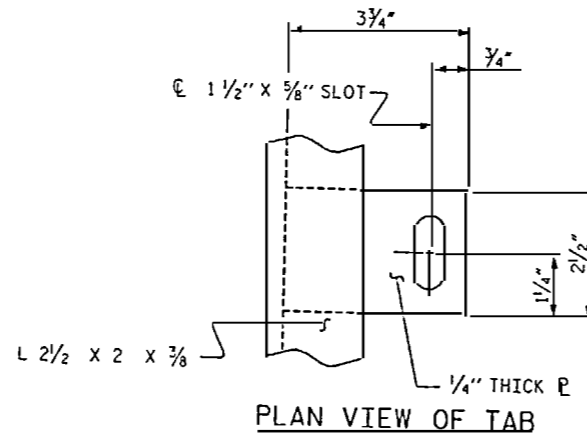


ARMORED JOINT DETAILS

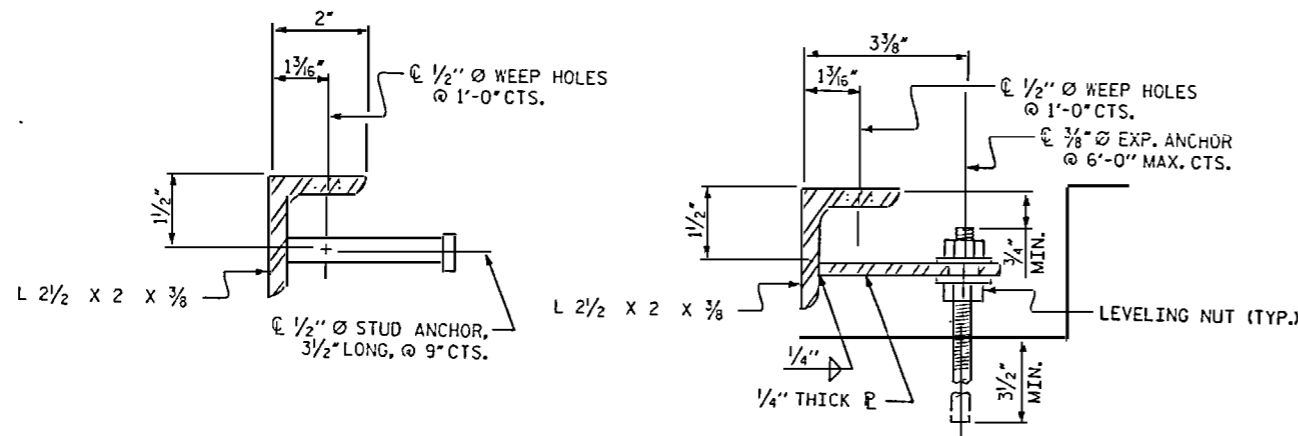
SECTION NORMAL TO JOINT AT END BENT



DETAIL- FIELD WELD SPLICE OF ANGLE



PLAN VIEW OF TAB



SECTION VIEW OF STUD

SECTION VIEW OF TAB

ARMORED JOINT ANCHOR ASSEMBLY DETAILS

MOVEMENT AND SETTING AT EVAZOTE JOINT						
BENT NO.	SKIEW ANGLE	NOMINAL UNCOMPRESSED SEAL WIDTH	TOTAL MOVEMENT (ALONG C. RDWY)	PERPENDICULAR JOINT OPENING AT 30° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
END BENT 1	136°04'12"	3/8"	1 1/16"	2 1/16"	2"	1 1/16"
END BENT 2	131°29'37"	3/8"	1 5/16"	2 3/8"	2"	1 5/16"

TOTAL MOVEMENT IS CALCULATED ALONG THE CENTERLINE OF ROADWAY. JOINT OPENINGS ARE MEASURED PERPENDICULAR TO THE JOINT.

BILL OF MATERIAL						
BENT NO.	STAGE 1		STAGES 2 & 3		TOTAL	
	ELASTOMERIC CONCRETE * (CU. FT.)	LENGTH OF ANGLE	ELASTOMERIC CONCRETE * (CU. FT.)	LENGTH OF ANGLE	ELASTOMERIC CONCRETE * (CU. FT.)	LENGTH OF ANGLE
END BENT 1	16.21	120'-8 7/8"	15.88	118'-7 3/4"	32.09	239'-4 3/8"
END BENT 2	14.42	107'-5 7/8"	14.24	106'-3 3/4"	28.66	213'-8 3/4"

\* BASED ON THE MINIMUM BLOCKOUT SHOWN.

PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+10.60 -L1REV-P.O.C.

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

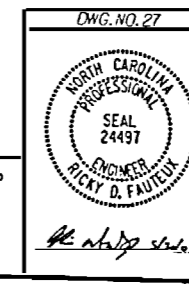
STANDARD ARMORED EVAZOTE JOINT DETAILS

MAY 2002

REVISIONS

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

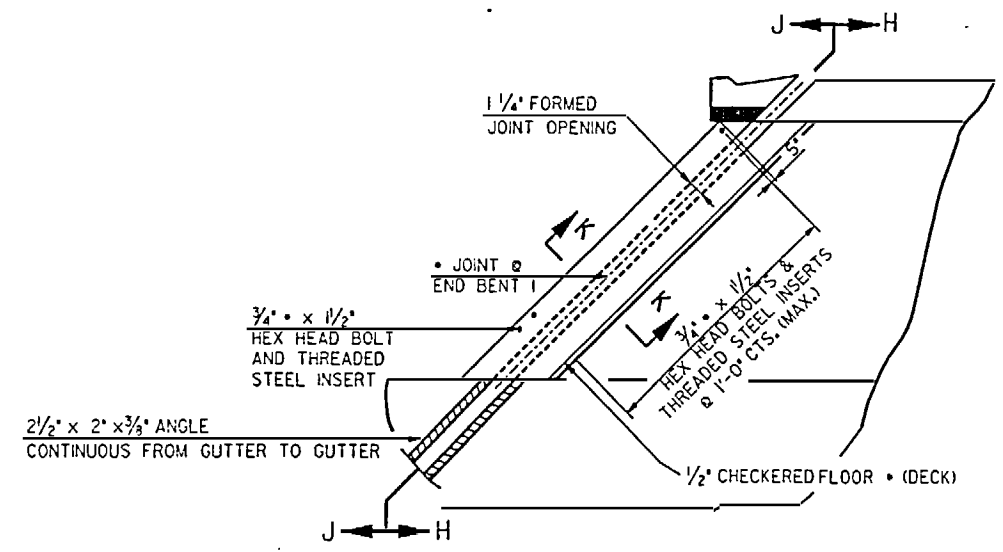
SHEET NO. S-64  
TOTAL SHEETS 107



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ASSEMBLED BY : F.D. WEEDEN DATE : 04/02  
CHECKED BY : R.D. FAUTEUX DATE : 04/02  
DRAWN BY : EEM 1/96 REV. 8/16/99 RWW/LES  
CHECKED BY : RCW 1/96 REV. 10/17/00 RWW/LES  
REV. 7/10/01 LES/RDR

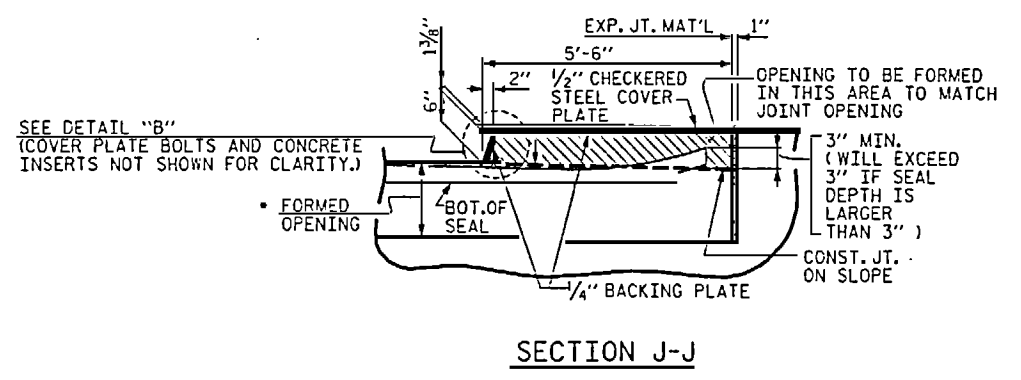
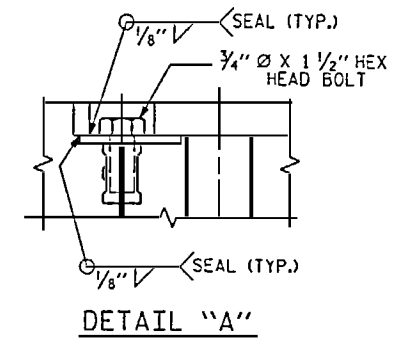
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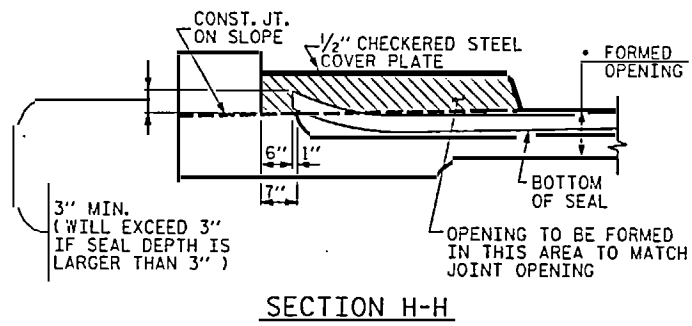
**JOINT SEAL @ END BENT 1**

END BENT 1 SHOWN, END BENT 2 SIMILAR.

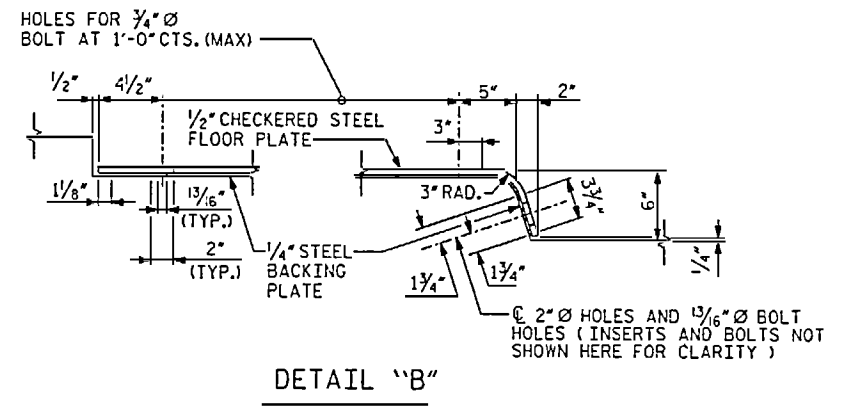
FOR JOINT OPENING DIMENSIONS AND DETAILS, SEE SHEET 1 OF 2.



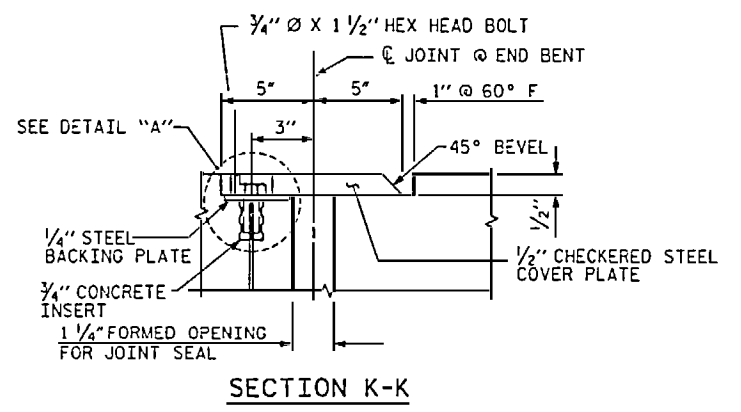
SECTION J-J



SECTION H-H



DETAIL "B"

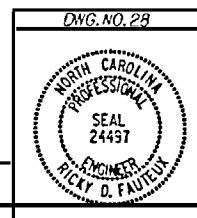


SECTION K-K

**JOINT SEAL DETAILS @ END BENT**  
(FOR SIDEWALK)

PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.  
 SHEET 2 OF 2

STATE OF NORTH CAROLINA		DEPARTMENT OF TRANSPORTATION		RALEIGH	
<b>ARMORED EVAZOTE JOINT DETAILS</b>					
MAY 2002					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					SHEET NO. 5-85
					TOTAL SHEETS 107



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ASSEMBLED BY : F.D. NEEDEN DATE : 04/02  
 CHECKED BY : R.D. FAUTEUX DATE : 04/02

**REINFORCING BAR SCHEDULE**

**STAGE 1 - EPOXY COATED**

**STAGE 1 - NON-EPOXY COATED**

STAGE 1 - EPOXY COATED											STAGE 1 - NON-EPOXY COATED																								
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT						
AE1	560	5	STR	45-5"	27.111	AE166	1	5	STR	14-3"	15	AE233	1	5	STR	21-8"	23	A1	560	5	STR	45-5"	27.111	A166	1	5	STR	15-0"	16	A233	1	5	STR	22-4"	23
AE100	1	5	STR	45-6"	47	AE167	1	5	STR	13-9"	14	AE234	1	5	STR	21-2"	22	A100	1	5	STR	46-2"	48	A167	1	5	STR	14-6"	15	A234	1	5	STR	21-10"	23
AE101	1	5	STR	44-11"	47	AE168	1	5	STR	13-5"	14	AE235	1	5	STR	20-8"	22	A101	1	5	STR	45-8"	48	A168	1	5	STR	14-1"	15	A235	1	5	STR	21-4"	22
AE102	1	5	STR	44-6"	46	AE169	1	5	STR	12-11"	13	AE236	1	5	STR	20-1"	21	A102	1	5	STR	45-2"	47	A169	1	5	STR	13-7"	14	A236	1	5	STR	20-9"	22
AE103	1	5	STR	44-0"	46	AE170	1	5	STR	12-5"	13	AE237	1	5	STR	19-7"	20	A103	1	5	STR	44-9"	47	A170	1	5	STR	13-1"	14	A237	1	5	STR	20-3"	21
AE104	1	5	STR	43-6"	45	AE171	1	5	STR	11-11"	12	AE238	1	5	STR	19-1"	20	A104	1	5	STR	44-3"	46	A171	1	5	STR	12-8"	13	A238	1	5	STR	19-9"	21
AE105	1	5	STR	43-0"	45	AE172	1	5	STR	11-6"	12	AE239	1	5	STR	18-5"	19	A105	1	5	STR	43-9"	46	A172	1	5	STR	12-2"	13	A239	1	5	STR	19-2"	20
AE106	1	5	STR	42-6"	44	AE173	1	5	STR	10-11"	11	AE240	1	5	STR	17-11"	19	A106	1	5	STR	43-3"	45	A173	1	5	STR	11-8"	12	A240	1	5	STR	18-8"	19
AE107	1	5	STR	42-2"	44	AE174	1	5	STR	10-6"	11	AE241	1	5	STR	17-5"	18	A107	1	5	STR	42-10"	45	A174	1	5	STR	11-3"	12	A241	1	5	STR	18-2"	19
AE108	1	5	STR	41-8"	43	AE175	1	5	STR	10-0"	10	AE242	1	5	STR	16-11"	18	A108	1	5	STR	42-4"	44	A175	1	5	STR	10-9"	11	A242	1	5	STR	17-7"	18
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AE110	1	5	STR	40-9"	42	AE177	1	5	STR	9-2"	10	AE244	1	5	STR	15-11"	17	A110	1	5	STR	41-5"	43	A177	1	5	STR	9-10"	10	A244	1	5	STR	16-7"	17
AE111	1	5	STR	40-3"	42	AE178	1	5	STR	8-8"	9	AE245	1	5	STR	15-3"	16	A111	1	5	STR	40-11"	43	A178	1	5	STR	9-4"	10	A245	1	5	STR	16-0"	17
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AE113	1	5	STR	39-3"	41	AE180	1	5	STR	7-9"	8	AE247	1	5	STR	14-3"	15	A113	1	5	STR	40-0"	42	A180	1	5	STR	8-5"	9	A247	1	5	STR	15-0"	16
AE114	1	5	STR	38-9"	40	AE181	1	5	STR	7-4"	8	AE248	1	5	STR	13-9"	14	A114	1	5	STR	39-6"	41	A181	1	5	STR	8-0"	8	A248	1	5	STR	14-5"	15
AE115	1	5	STR	38-3"	40	AE182	1	5	STR	6-10"	7	AE249	1	5	STR	13-3"	14	A115	1	5	STR	39-0"	41	A182	1	5	STR	7-6"	8	A249	1	5	STR	13-11"	15
AE116	1	5	STR	37-11"	40	AE183	1	5	STR	6-4"	7	AE250	1	5	STR	12-8"	13	A116	1	5	STR	38-7"	40	A183	1	5	STR	7-0"	7	A250	1	5	STR	13-4"	14
AE117	1	5	STR	37-5"	39	AE184	1	5	STR	5-11"	6	AE251	1	5	STR	12-2"	13	A117	1	5	STR	38-1"	40	A184	1	5	STR	6-7"	7	A251	1	5	STR	12-10"	13
AE118	1	5	STR	36-11"	38	AE185	1	5	STR	5-5"	6	AE252	1	5	STR	11-8"	12	A118	1	5	STR	37-7"	39	A185	1	5	STR	6-1"	6	A252	1	5	STR	12-4"	13
AE119	1	5	STR	35-6"	38	AE186	1	5	STR	4-11"	5	AE253	1	5	STR	11-0"	12	A119	1	5	STR	37-2"	39	A186	1	5	STR	5-8"	6	A253	1	5	STR	11-9"	12
AE120	1	5	STR	35-11"	38	AE187	6	5	STR	4-5"	28	AE254	1	5	STR	10-5"	11	A120	1	5	STR	36-8"	38	A187	6	5	STR	5-2"	32	A254	1	5	STR	11-3"	12
AE121	1	5	STR	35-6"	37	AE188	1	5	STR	4-5"	47	AE255	1	5	STR	10-0"	10	A121	1	5	STR	36-2"	38	A188	1	5	STR	4-5"	48	A255	1	5	STR	10-9"	11
AE122	1	5	STR	35-0"	37	AE189	1	5	STR	4-9"	47	AE256	1	5	STR	9-6"	10	A122	1	5	STR	35-9"	37	A189	1	5	STR	4-6"	47	A256	1	5	STR	10-2"	11
AE123	1	5	STR	34-6"	36	AE190	1	5	STR	4-3"	46	AE257	1	5	STR	8-11"	9	A123	1	5	STR	35-3"	37	A190	1	5	STR	4-0"	47	A257	1	5	STR	9-8"	10
AE124	1	5	STR	34-0"	36	AE191	1	5	STR	4-3"	46	AE258	1	5	STR	8-6"	9	A124	1	5	STR	34-9"	36	A191	1	5	STR	4-4"	46	A258	1	5	STR	9-2"	10
AE125	1	5	STR	33-6"	35	AE192	1	5	STR	4-3"	45	AE259	1	5	STR	7-11"	8	A125	1	5	STR	34-3"	36	A192	1	5	STR	4-0"	45	A259	1	5	STR	8-7"	9
AE126	1	5	STR	33-2"	35	AE193	1	5	STR	4-2"	45	AE260	1	5	STR	7-5"	8	A126	1	5	STR	33-10"	35	A193	1	5	STR	4-5"	45	A260	1	5	STR	8-1"	8
AE127	1	5	STR	32-8"	34	AE194	1	5	STR	4-2"	44	AE261	1	5	STR	6-10"	7	A127	1	5	STR	33-4"	35	A194	1	5	STR	4-2"	45	A261	1	5	STR	7-6"	8
AE128	1	5	STR	32-2"	34	AE195	1	5	STR	4-1"	44	AE262	1	5	STR	6-4"	7	A128	1	5	STR	32-10"	34	A195	1	5	STR	4-2"	44	A262	1	5	STR	7-0"	7
AE129	1	5	STR	31-8"	33	AE196	1	5	STR	4-1"	43	AE263	1	5	STR	5-10"	6	A129	1	5	STR	32-5"	34	A196	1	5	STR	4-1"	44	A263	1	5	STR	6-6"	7
AE130	1	5	STR	31-2"	33	AE197	1	5	STR	4-0"	42	AE264	1	5	STR	5-3"	5	A130	1	5	STR	31-11"	33	A197	1	5	STR	4-1"	43	A264	1	5	STR	5-11"	6
AE131	1	5	STR	30-8"	32	AE198	1	5	STR	4-2"	42	AE265	1	5	STR	4-9"	5	A131	1	5	STR	31-5"	33	A198	1	5	STR	4-0"	43	A265	1	5	STR	5-5"	6
AE132	1	5	STR	30-4"	32	AE199	1	5	STR	3-9"	41	AE266	1	5	STR	4-3"	4	A132	1	5	STR	31-0"	32	A199	1	5	STR	4-0"	42	A266	1	5	STR	4-11"	5
AE133	1	5	STR	29-10"	31	AE200	1	5	STR	3-9"	41	AE267	1	5	STR	3-8"	4	A133	1	5	STR	30-6"	32	A200	1	5	STR	3-9"	41	A267	1	5	STR	4-4"	5
AE134	1	5	STR	29-4"	31	AE201	1	5	STR	3-6"	40	AE268	1	5	STR	3-2"	3	A134	1	5	STR	30-0"	31	A201	1	5	STR	3-9"	41	A268	1	5	STR	3-10"	4
AE135	1	5	STR	28-11"	30	AE202	1	5	STR	3-8"	40	AE269	4	5	STR	2-7"	11	A135	1	5	STR	29-7"	31	A202	1	5	STR	3-8"	40	A269	4	5	STR	3-3"	14
AE136	1	5	STR	28-5"	30	AE203	1	5	STR	3-7"	39						A136	1	5	STR	29-1"	30	A203	1	5	STR	3-8"	40							
AE137	1	5	STR	27-11"	29	AE204	1	5	STR	3-6"	39	BE100	12	4	STR	8-9"	70	A137	1	5	STR	28-8"	30	A204	1	5	STR	3-8"	39	B100	342	5	STR	56-9"	20243
AE138	1	5	STR	27-5"	29	AE205	1	5	STR	3-6"	38	BE101	72	4	STR	29-4"	1,411	A138	1	5	STR	28-2"	29	A205	1	5	STR	3-7"	39						
AE139	1	5	STR	26-11"	28	AE206	1	5	STR	3-5"	37	BE102	164	4	STR	28-7"	3,131	A139	1	5	STR	27-8"	29	A206	1	5	STR	3-6"	38	K100	12	5	STR	13-6"	169
AE140	1	5	STR	25-7"	28	AE207	1	5	STR	3-5"	37	BE103	160	6	STR	5-4"	13,097	A140	1	5	STR	27-3"	28	A207	1	5	STR	3-5"	38						
AE141	1	5	STR	25-1"	27	AE208	1	5	STR	3-4"	36	BE104	205	4	STR	25-11"	3,549	A141	1	5	STR	26-9"	28	A208	1	5	STR	3-5"	37	K101	12	5	STR	12-0"	150
AE142	1	5	STR	25-7"	27	AE209	1	5	STR	3-4"	36						A142	1	5	STR	26-3"	27	A209	1	5	STR	3-5"	37							
AE143	1	5	STR	25-2"	26	AE210	1	5	STR	3-3"	35	GE100	321	8	STR	3-8"	3,143	A143	1	5	STR	25-10"	27	A210	1	5	STR	3-4"	36						
AE144	1	5	STR	24-8"	26	AE211	1	5	STR	3-3"	35	GE101	414	4	STR	0-9"	207	A144	1	5	STR	25-4"	26	A211	1	5	STR	3-4"	35						
AE145	1	5	STR	24-2"	25	AE212	1	5	STR	3-2"	34						A145	1	5	STR	24-10"	26	A212	1	5	STR	3-5"	35							

RE INFORCING BAR SCHEDULE

STAGES 2 & 3 - EPOXY COATED

STAGES 2 & 3 - NON-EPOXY COATED

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT						
AE 1	555	5	STR	44-5"	257.11	AE 164	1	5	STR	12-6"	13	AE 229	1	5	STR	20-5"	21	A 1	555	5	STR	44-5"	257.11	A 164	1	5	STR	13-3"	14	A 229	1	5	STR	24-1"	22
AE 100	1	5	STR	43-3"	45	AE 165	1	5	STR	12-0"	13	AE 230	1	5	STR	19-10"	21	A 100	1	5	STR	44-0"	46	A 165	1	5	STR	12-9"	13	A 230	1	5	STR	20-6"	21
AE 101	1	5	STR	42-11"	45	AE 166	1	5	STR	11-6"	12	AE 231	1	5	STR	19-4"	20	A 101	1	5	STR	43-7"	45	A 166	1	5	STR	12-3"	13	A 231	1	5	STR	20-0"	21
AE 102	1	5	STR	42-5"	44	AE 167	1	5	STR	11-2"	12	AE 232	1	5	STR	18-8"	20	A 102	1	5	STR	43-1"	45	A 167	1	5	STR	11-10"	12	A 232	1	5	STR	19-5"	20
AE 103	1	5	STR	41-11"	44	AE 168	1	5	STR	10-8"	11	AE 233	1	5	STR	18-2"	19	A 103	1	5	STR	42-7"	44	A 168	1	5	STR	11-4"	12	A 233	1	5	STR	18-11"	20
AE 104	1	5	STR	41-5"	43	AE 169	1	5	STR	10-2"	11	AE 234	1	5	STR	17-8"	18	A 104	1	5	STR	42-1"	44	A 169	1	5	STR	10-10"	11	A 234	1	5	STR	18-5"	19
AE 105	1	5	STR	40-11"	43	AE 170	1	5	STR	9-8"	10	AE 235	1	5	STR	17-2"	18	A 105	1	5	STR	41-7"	43	A 170	1	5	STR	10-4"	11	A 235	1	5	STR	17-10"	19
AE 106	1	5	STR	40-6"	42	AE 171	1	5	STR	9-3"	10	AE 236	1	5	STR	16-8"	17	A 106	1	5	STR	41-2"	43	A 171	1	5	STR	9-11"	10	A 236	1	5	STR	17-4"	18
AE 107	1	5	STR	39-11"	42	AE 172	1	5	STR	8-9"	9	AE 237	1	5	STR	16-1"	17	A 107	1	5	STR	40-8"	42	A 172	1	5	STR	9-5"	10	A 237	1	5	STR	16-9"	17
AE 108	1	5	STR	39-6"	41	AE 173	1	5	STR	8-3"	9	AE 238	1	5	STR	15-6"	16	A 108	1	5	STR	40-2"	42	A 173	1	5	STR	8-11"	9	A 238	1	5	STR	16-3"	17
AE 109	1	5	STR	38-11"	41	AE 174	1	5	STR	7-10"	8	AE 239	1	5	STR	14-11"	16	A 109	1	5	STR	39-8"	41	A 174	1	5	STR	8-6"	9	A 239	1	5	STR	15-8"	16
AE 110	1	5	STR	38-6"	40	AE 175	1	5	STR	7-4"	8	AE 240	1	5	STR	14-6"	15	A 110	1	5	STR	39-2"	41	A 175	1	5	STR	8-0"	8	A 240	1	5	STR	15-2"	16
AE 111	1	5	STR	38-0"	40	AE 176	1	5	STR	6-10"	7	AE 241	1	5	STR	13-11"	14	A 111	1	5	STR	38-9"	40	A 176	1	5	STR	7-6"	8	A 241	1	5	STR	14-7"	15
AE 112	1	5	STR	37-6"	39	AE 177	1	5	STR	6-4"	7	AE 242	1	5	STR	13-5"	14	A 112	1	5	STR	38-3"	40	A 177	1	5	STR	7-0"	7	A 242	1	5	STR	14-1"	15
AE 113	1	5	STR	37-0"	39	AE 178	1	5	STR	5-11"	6	AE 243	1	5	STR	12-11"	13	A 113	1	5	STR	37-9"	39	A 178	1	5	STR	6-7"	7	A 243	1	5	STR	13-7"	14
AE 114	1	5	STR	36-6"	38	AE 179	1	5	STR	5-5"	6	AE 244	1	5	STR	12-3"	13	A 114	1	5	STR	37-3"	39	A 179	1	5	STR	6-1"	6	A 244	1	5	STR	13-0"	14
AE 115	1	5	STR	36-0"	38	AE 180	1	5	STR	4-11"	5	AE 245	1	5	STR	11-9"	12	A 115	1	5	STR	36-9"	38	A 180	1	5	STR	5-7"	6	A 245	1	5	STR	12-6"	13
AE 116	1	5	STR	35-8"	37	AE 181	1	5	STR	4-5"	5	AE 246	1	5	STR	11-3"	12	A 116	1	5	STR	36-4"	38	A 181	1	5	STR	5-1"	5	A 246	1	5	STR	11-11"	12
AE 117	1	5	STR	35-2"	37	AE 182	1	5	STR	3-11"	4	AE 247	1	5	STR	10-9"	11	A 117	1	5	STR	35-10"	37	A 182	1	5	STR	4-8"	5	A 247	1	5	STR	11-5"	12
AE 118	1	5	STR	34-8"	36	AE 183	1	5	STR	3-6"	4	AE 248	1	5	STR	10-2"	11	A 118	1	5	STR	35-4"	37	A 183	1	5	STR	4-2"	4	A 248	1	5	STR	10-10"	11
AE 119	1	5	STR	34-2"	36	AE 184	1	5	STR	2-11"	3	AE 249	1	5	STR	9-8"	10	A 119	1	5	STR	34-10"	36	A 184	1	5	STR	3-8"	4	A 249	1	5	STR	10-4"	11
AE 120	1	5	STR	33-8"	35	AE 185	4	5	STR	2-7"	11	AE 250	1	5	STR	9-0"	9	A 120	1	5	STR	34-4"	36	A 185	4	5	STR	3-3"	4	A 250	1	5	STR	9-9"	10
AE 121	1	5	STR	33-3"	35	AE 186	1	5	STR	43-3"	45	AE 251	1	5	STR	8-6"	9	A 121	1	5	STR	33-11"	35	A 186	1	5	STR	4-0"	4	A 251	1	5	STR	9-3"	10
AE 122	1	5	STR	32-9"	34	AE 187	1	5	STR	42-9"	45	AE 252	1	5	STR	8-0"	8	A 122	1	5	STR	33-5"	35	A 187	1	5	STR	43-6"	45	A 252	1	5	STR	8-9"	9
AE 123	1	5	STR	32-3"	34	AE 188	1	5	STR	42-3"	44	AE 253	1	5	STR	7-6"	8	A 123	1	5	STR	32-11"	34	A 188	1	5	STR	43-0"	45	A 253	1	5	STR	8-2"	9
AE 124	1	5	STR	31-8"	33	AE 189	1	5	STR	41-9"	44	AE 254	1	5	STR	6-11"	7	A 124	1	5	STR	32-5"	34	A 189	1	5	STR	42-5"	44	A 254	1	5	STR	7-8"	8
AE 125	1	5	STR	31-4"	33	AE 190	1	5	STR	41-3"	43	AE 255	1	5	STR	6-5"	7	A 125	1	5	STR	32-0"	33	A 190	1	5	STR	41-11"	44	A 255	1	5	STR	7-1"	7
AE 126	1	5	STR	30-10"	32	AE 191	1	5	STR	40-8"	42	AE 256	1	5	STR	5-11"	6	A 126	1	5	STR	31-6"	33	A 191	1	5	STR	41-4"	43	A 256	1	5	STR	6-7"	7
AE 127	1	5	STR	30-4"	32	AE 192	1	5	STR	40-2"	42	AE 257	1	5	STR	5-4"	6	A 127	1	5	STR	31-0"	32	A 192	1	5	STR	40-10"	43	A 257	1	5	STR	6-0"	6
AE 128	1	5	STR	29-10"	31	AE 193	1	5	STR	39-8"	41	AE 258	1	5	STR	4-10"	5	A 128	1	5	STR	30-6"	32	A 193	1	5	STR	40-4"	42	A 258	1	5	STR	5-6"	6
AE 129	1	5	STR	29-4"	31	AE 194	1	5	STR	39-0"	41	AE 259	6	5	STR	4-3"	25	A 129	1	5	STR	30-0"	31	A 194	1	5	STR	39-9"	41	A 259	6	5	STR	4-11"	31
AE 130	1	5	STR	28-11"	30	AE 195	1	5	STR	38-6"	40							A 130	1	5	STR	29-7"	31	A 195	1	5	STR	39-3"	41						
AE 131	1	5	STR	28-5"	30	AE 196	1	5	STR	37-11"	40	BE 150	12	4	STR	8-9"	70	A 131	1	5	STR	29-1"	30	A 196	1	5	STR	38-8"	40	B 150	360	5	STR	55-11"	20,996
AE 132	1	5	STR	27-11"	29	AE 197	1	5	STR	37-6"	39	BE 151	72	4	STR	20-6"	1,374	A 132	1	5	STR	28-7"	30	A 197	1	5	STR	38-2"	40						
AE 133	1	5	STR	27-5"	29	AE 198	1	5	STR	36-11"	39	BE 152	172	4	STR	27-11"	3,208	A 133	1	5	STR	28-1"	29	A 198	1	5	STR	37-8"	39	K 150	12	5	STR	12-9"	160
AE 134	1	5	STR	26-11"	28	AE 199	1	5	STR	36-5"	38	BE 153	160	6	STR	54-6"	13,007	A 134	1	5	STR	27-8"	29	A 199	1	5	STR	37-1"	39	K 151	12	5	STR	11-5"	143
AE 135	1	5	STR	26-5"	28	AE 200	1	5	STR	35-11"	37	BE 154	215	4	STR	25-6"	3,662	A 135	1	5	STR	27-2"	28	A 200	1	5	STR	36-7"	38						
AE 136	1	5	STR	25-11"	27	AE 201	1	5	STR	35-3"	37							A 136	1	5	STR	26-8"	28	A 201	1	5	STR	36-0"	38						
AE 137	1	5	STR	25-5"	27	AE 202	1	5	STR	34-9"	36	DE 150	320	8	STR	3-8"	3,133	A 137	1	5	STR	26-2"	27	A 202	1	5	STR	35-6"	37						
AE 138	1	5	STR	24-11"	26	AE 203	1	5	STR	34-3"	36	DE 151	402	4	STR	0-9"	201	A 138	1	5	STR	25-8"	27	A 203	1	5	STR	35-0"	37						
AE 139	1	5	STR	24-7"	26	AE 204	1	5	STR	33-9"	35							A 139	1	5	STR	25-3"	26	A 204	1	5	STR	34-5"	36						
AE 140	1	5	STR	24-1"	25	AE 205	1	5	STR	33-3"	35	GE 151	536	4	STR	0-3"	2,238	A 140	1	5	STR	24-9"	26	A 205	1	5	STR	33-11"	35						
AE 141	1	5	STR	23-7"	25	AE 206	1	5	STR	32-8"	34	GE 152	2	4	STR	5-7"	8	A 141	1	5	STR	24-3"	25	A 206	1	5	STR	33-4"	35						
AE 142	1	5	STR	23-1"	24	AE 207	1	5	STR	32-2"	34	GE 153	2	4	STR	4-11"	7	A 142	1	5	STR	23-9"	25	A 207	1	5	STR	32-10"	34						
AE 143	1	5	STR	22-8"	24	AE 208	1	5	STR	31-8"	33	GE 154	2	4	STR	4-3"	6	A 143	1	5	STR	23-4"	24	A 208	1	5	STR	32-4"	34						
AE 144	1	5	STR	22-2"	23	AE 209	1	5	STR	31-1"	32	GE 155	2	4	STR	3-7"	5	A 144	1	5	STR	22-10"	24	A 209	1	5	STR	31-9"	33						
AE 145	1	5	STR	21-8"	23	AE 210	1	5																											

**SUPERSTRUCTURE BILL OF MATERIAL**

**CLASS AA CONCRETE POUR QUANTITY SUMMARY**

LOCATION	STAGE 1				STAGE 2 & 3						TOTAL	
	POUR 1	POUR 2	POUR 3	TOTAL	POUR 1	POUR 2	POUR 3	POUR 4	POUR 5	POUR 6		TOTAL
SPANS A & B	160.7	170.8	228.1	559.6	147.0	156.2	208.5	5.3	5.6	7.7	530.3	1089.9
END POSTS				1.0							1.0	2.0
<b>TOTAL</b>				<b>560.6</b>							<b>531.3</b>	<b>1091.9</b>

NOTE: SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET FOR CONCRETE QUANTITIES OF END OF RAIL POST FOR THREE BAR METAL RAIL.

**EPOXY COATED REINFORCING STEEL**

LOCATION	EPOXY COATED REINFORCING STEEL			UNCOATED REINFORCING STEEL		
	STAGE 1	STAGE 2 & 3	TOTAL	STAGE 1	STAGE 2 & 3	TOTAL
SPANS A & B	59,144	57,329	116,473	52,175	51,047	103,222
END POSTS	246	246	492	0	0	0
<b>TOTAL</b>			<b>116,965</b>			<b>103,222</b>

NOTE: SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET FOR STEEL REINFORCEMENT QUANTITIES OF END OF RAIL POST FOR THREE BAR METAL RAIL.

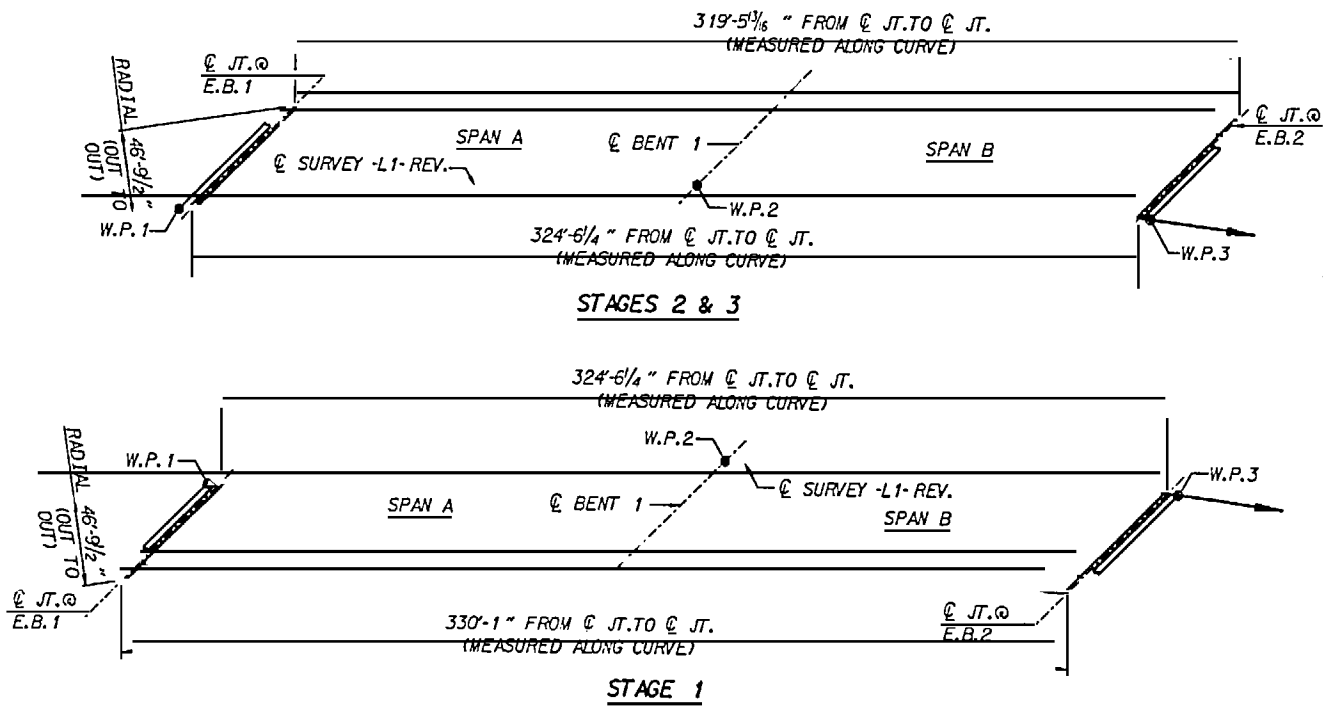
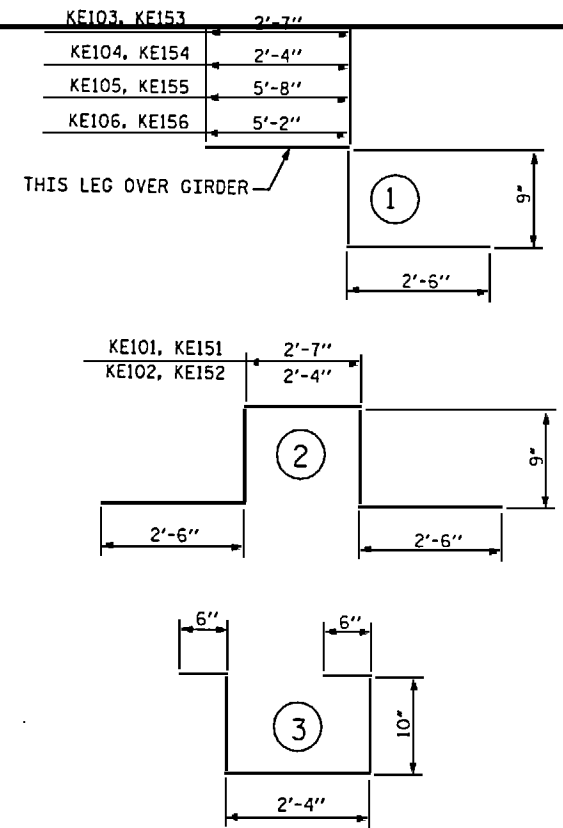
**GROOVING BRIDGE FLOORS**

LOCATION	STAGE 1	STAGES 2 & 3	TOTAL
	(SQ.FT.)	(SQ.FT.)	(SQ.FT.)
APP.SLAB 1	0	0	0
SPANS A & B	12,420	12,420	24,840
APP.SLAB 2	0	0	0
<b>TOTAL</b>	<b>12,420</b>	<b>12,420</b>	<b>24,840</b>

**REINFORCED CONCRETE DECK SLAB**

LOCATION	STAGE 1	STAGES 2 & 3	TOTAL
	(SQ.FT.)	(SQ.FT.)	(SQ.FT.)
SPANS A & B	15.315	15.067	30.382

**BAR TYPES**



**LAYOUT FOR COMPUTING AREA OF REINFORCING CONCRETE DECK SLAB**

**SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS**

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.

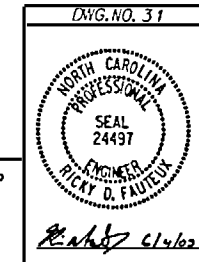
SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**STANDARD  
 SUPERSTRUCTURE  
 BILL OF MATERIAL  
 SUMMARY**

MAY 2002

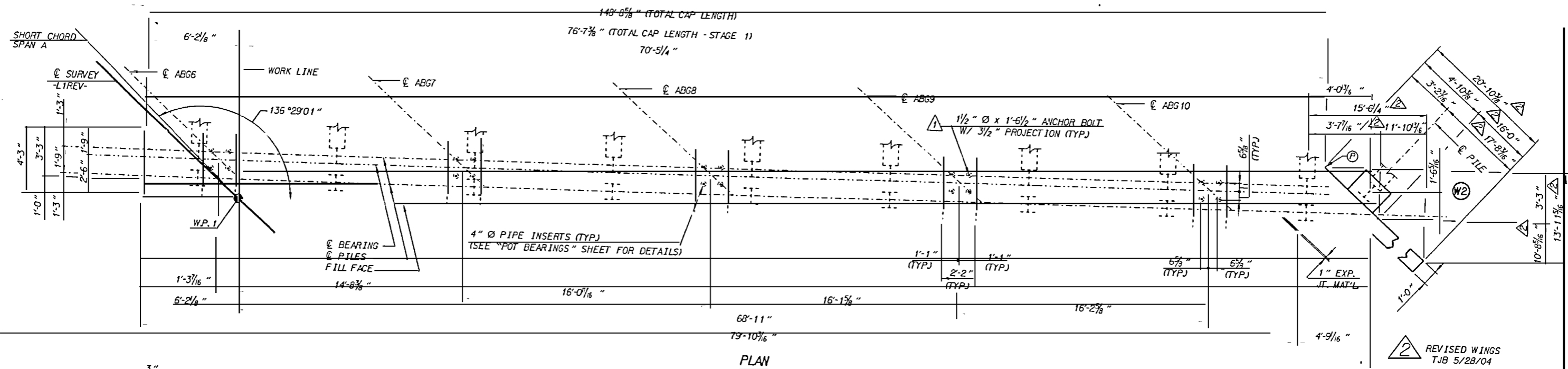
REVISIONS						SHEET NO. 5-88
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 107
2			4			



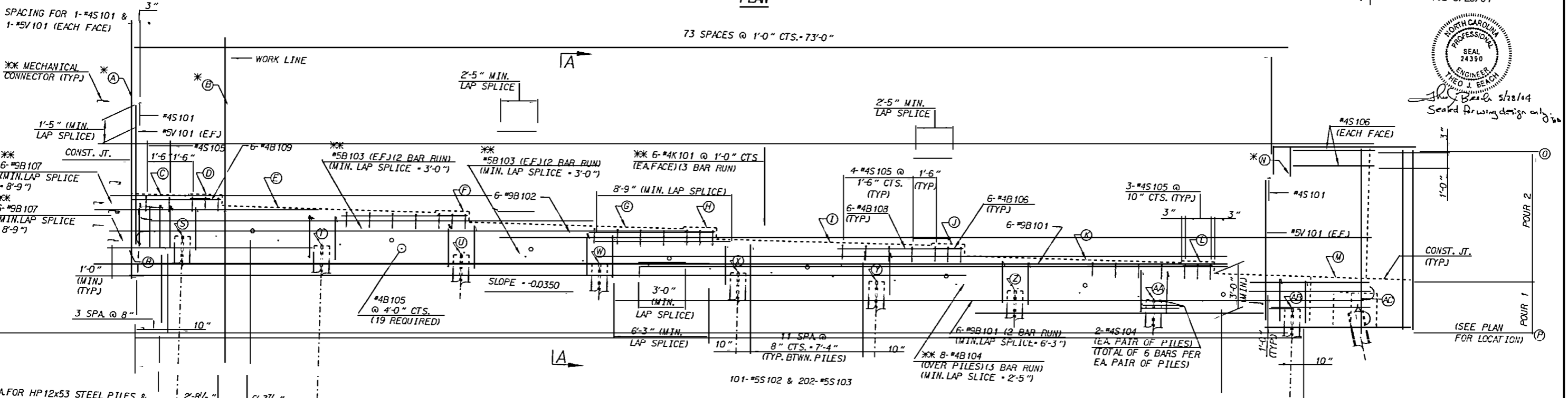
**RUMMEL, KLEPPER & KAHL, LLP**  
 consulting engineers  
 5800 PARTINGDON PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27609-3360

ASSEMBLED BY: B. PARRISH DATE: 04/02  
 CHECKED BY: R. D. FAUTEUX DATE: 04/02  
 DRAWN BY: JMS 5/87 REV. 6/1/94 EEM/GRP  
 CHECKED BY: SJD 9/87 REV. 8/16/99 RWW/LES





PLAN



ELEVATION

2 REVISED WINGS  
TJB 5/28/04



Sealed Drawing design only

PROJECT NO. R-2214A  
 HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C.

SHEET 1 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT 1  
 STAGE 1

DEC. 2003

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1	R. D. F.	12/01/03	3		
2	TJB	5/28/04	4		

SHEET NO. S-89  
 TOTAL SHEETS 107

**NOTES:**  
 FOR PILE SPLICE DETAILS AND TEMPORARY DRAINAGE, SEE "SUBSTRUCTURE END BENT 2 DETAILS" SHEET, SHEET 3 OF 5.  
 FOR PIPE DRAIN DETAILS, SEE "SUBSTRUCTURE END BENT 1 DETAILS" SHEET, SHEET 3 OF 5.  
 FOR NOTES AND SECTION A-A, SEE "SUBSTRUCTURE END BENT 1 DETAILS" SHEET, SHEET 3 OF 5.

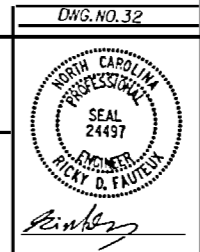
ELEVATION TABLE

*A	2123.928	J	2116.094	T	2114.738
*B	2123.713	K	2115.363	U	2114.423
C	2117.699	L	2115.488	W	2114.108
D	2117.224	M	2114.719	X	2113.793
E	2117.136	*N	2121.197	Y	2113.478
F	2117.261	O	2123.176	Z	2113.163
G	2116.559	P	2111.500	AA	2112.848
H	2116.584	R	2114.179	AB	2112.533
I	2115.969	S	2115.053	AC	2112.447

\* AT FILL FACE

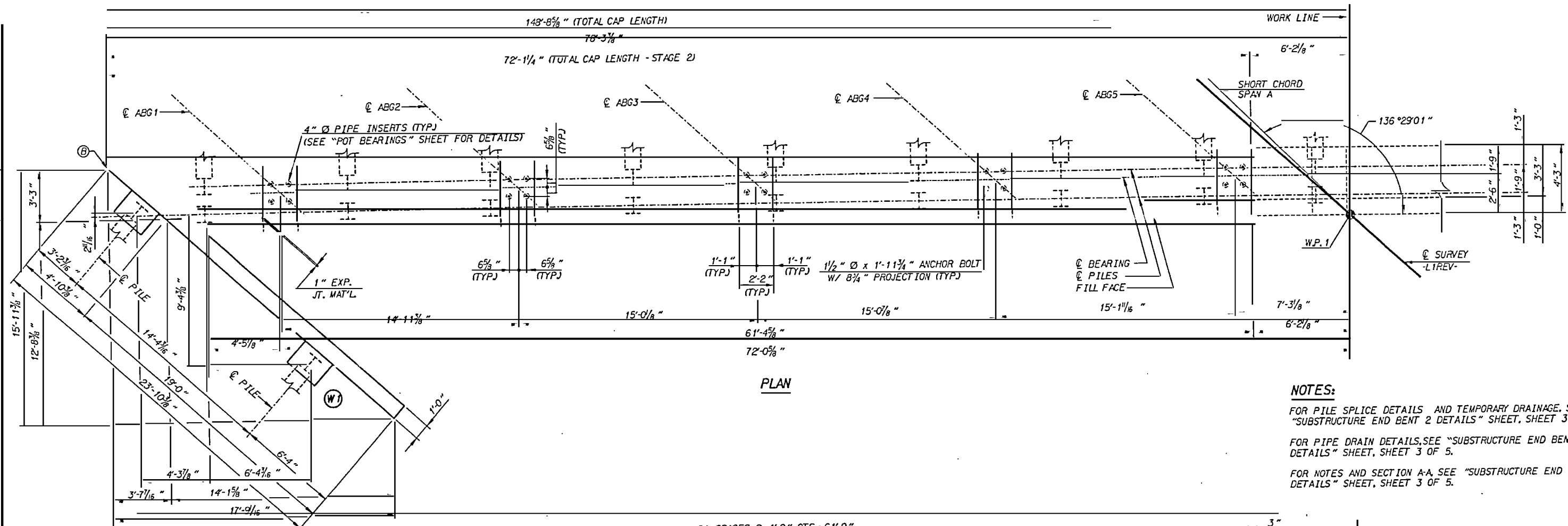
\*\* REINFORCING BARS WILL REQUIRE MECHANICAL CONNECTOR FOR STAGE 2 CONSTRUCTION. THE LOCATION OF THE COUPLERS SHALL BE STAGGERED ON ALTERNATING BARS BY ONE (1) FT. AND THE REINFORCING STEEL SHALL BE CUT ACCORDINGLY.

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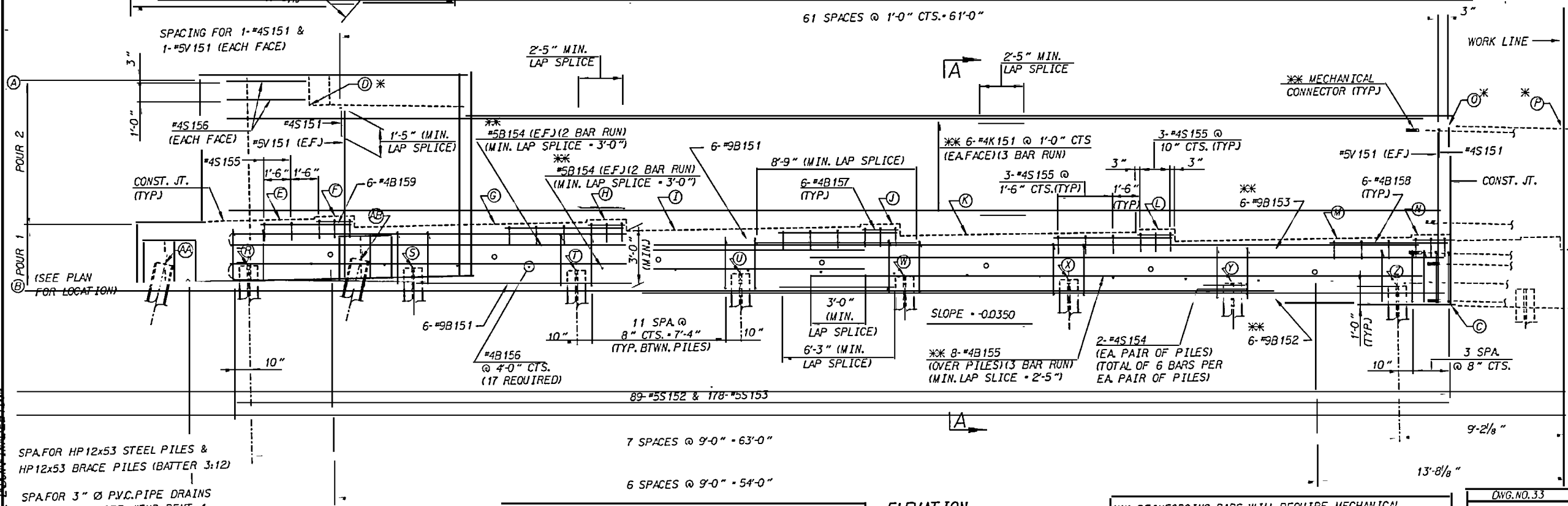
G:\COMNOS\301059\BRIDGE\SITE 2\06\FINAL\EB1.DWG

DRAWN BY: F. D. WEEDEN DATE: 04/02  
 CHECKED BY: R. D. FAULSTICH DATE: 12/03



PLAN

**NOTES:**  
 FOR PILE SPLICE DETAILS AND TEMPORARY DRAINAGE, SEE "SUBSTRUCTURE END BENT 2 DETAILS" SHEET, SHEET 3 OF 5.  
 FOR PIPE DRAIN DETAILS, SEE "SUBSTRUCTURE END BENT 1 DETAILS" SHEET, SHEET 3 OF 5.  
 FOR NOTES AND SECTION A-A, SEE "SUBSTRUCTURE END BENT 1 DETAILS" SHEET, SHEET 3 OF 5.



ELEVATION

ELEVATION TABLE			
A	2127.569	J	2119.058
B	2116700	K	2118.425
C	2114.179	L	2118.550
D	2125.984	M	2117.906
E	2119.914	N	2118.031
F	2120.039	O	2123.928
G	2119.429	P	2123.713
H	2119.554	R	2117.489
I	2118.933	S	2117.174
T			2116.859
U			2116.544
V			2116.229
W			2115.914
X			2115.599
Y			2115.284
Z			2115.517
AA			2117.482

\*\* REINFORCING BARS WILL REQUIRE MECHANICAL CONNECTOR FOR STAGE 2 CONSTRUCTION. THE LOCATION OF THE COUPLERS SHALL BE STAGGERED ON ALTERNATING BARS BY ONE (1) FT. AND THE REINFORCING STEEL SHALL BE CUT ACCORDINGLY.

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PROJECT NO. R-2214A  
 HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C.

SHEET 2 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 END BENT 1  
 STAGE 2**

MAY 2002

REVISIONS			
NO.	BY	DATE	DESCRIPTION
1			
2			
3			
4			

SHEET NO. 5-90  
 TOTAL SHEETS 107

DRAWN BY: F.D. WEEDEN DATE: 04/02  
 CHECKED BY: R.D. FAITHEUX DATE: 04/02

\* AT FILL FACE

**NOTES:**

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

PIPE DRAINS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND ANCHOR BOLTS.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

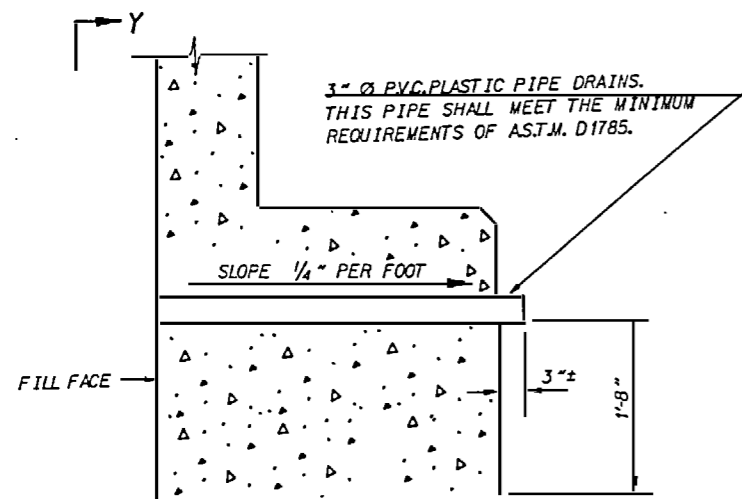
FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

FOR TEMPORARY DRAINAGE AT END BENTS AND PILE SPlice DETAILS, SEE "END BENT 2 DETAILS" SHEET.

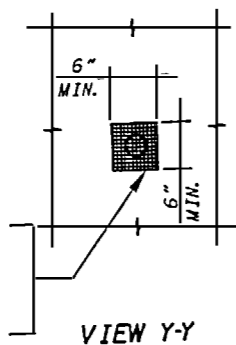
THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 1/4" PER FOOT.

FOR MECHANICAL BUTT SPlicing OF REINFORCING STEEL SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



**SECTION THRU CAP**

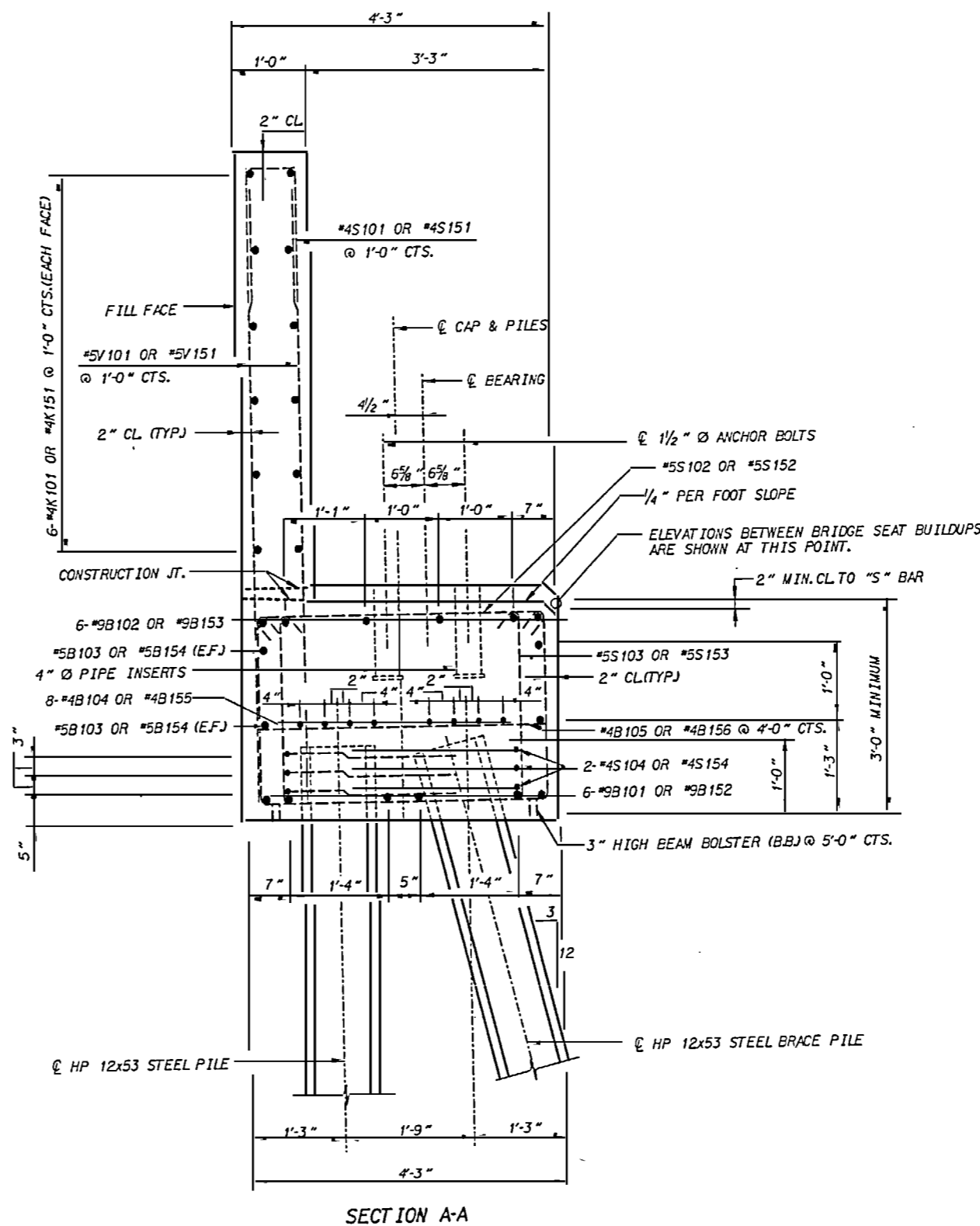


6" SQUARE ALUMINUM OR GALVANIZED STEEL WIRE 4 MESH HARDWARE CLOTH OF COMMERCIAL QUALITY. ANCHOR FIRMLY TO FILL FACE.

**PIPE DRAIN DETAILS**

**NOTES:**

NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING & INSTALLING THE PVC PLASTIC PIPE DRAINS, HARDWARE CLOTH & FASTENERS. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE FOR THE SEVERAL PAY ITEMS.



**SECTION A-A**

PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C.

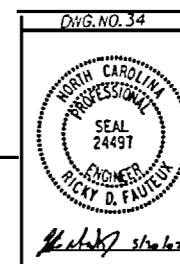
SHEET 3 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 END BENT 1  
 DETAILS**

MAY 2002

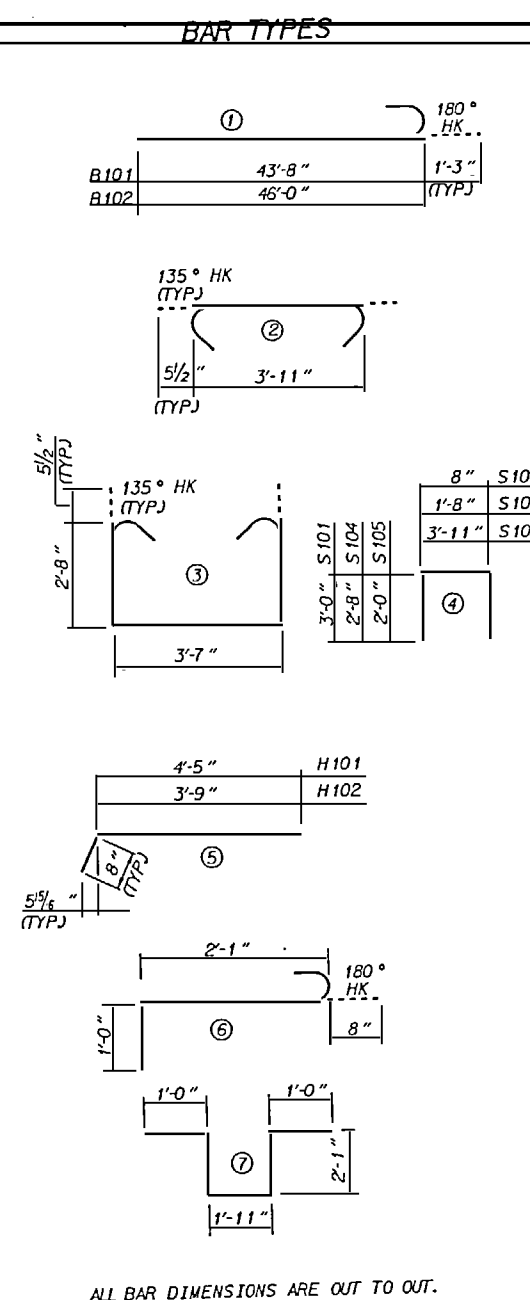
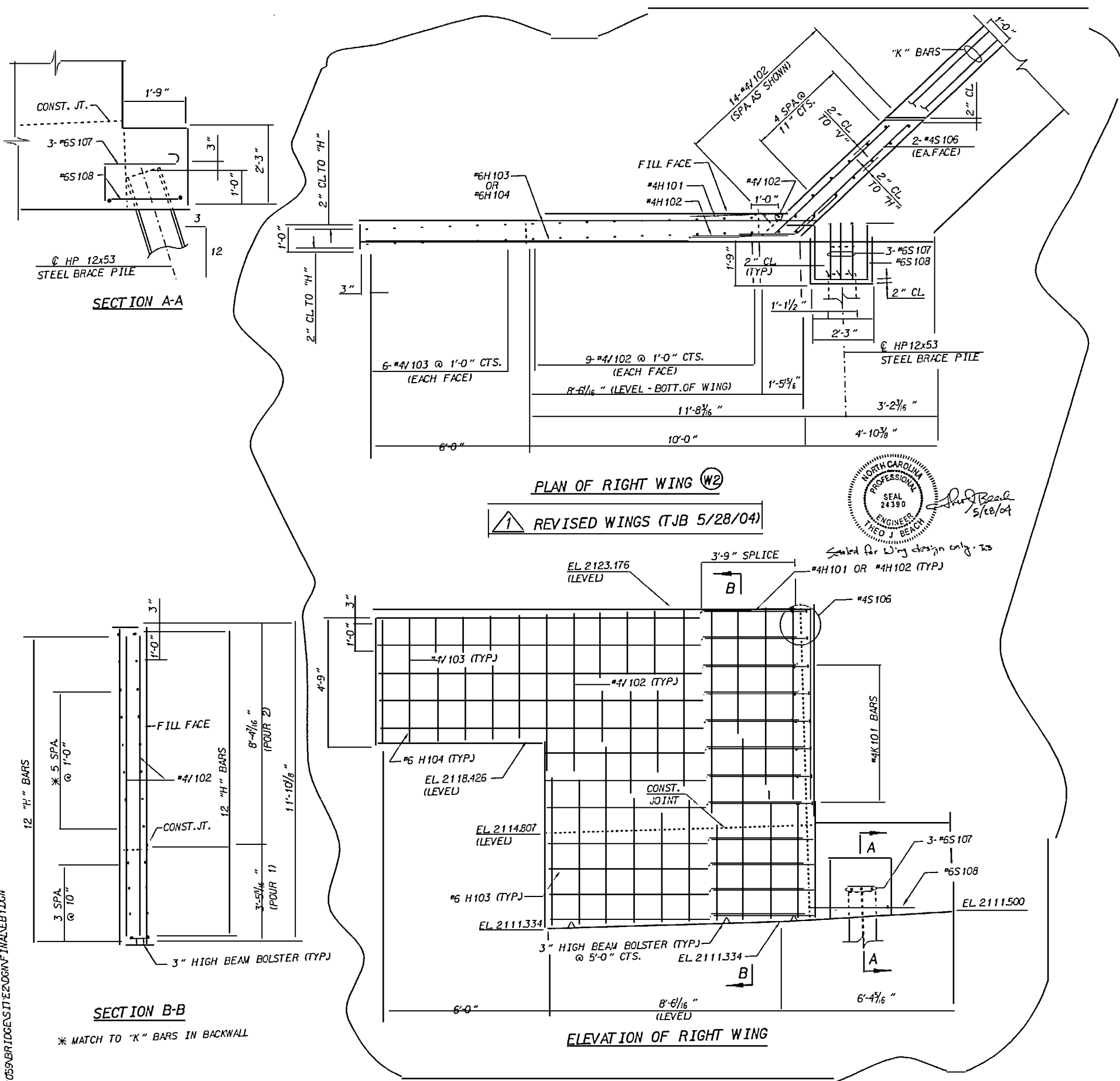
REVISIONS						TOTAL SHEETS
NO.	BY	DATE	NO.	BY	DATE	107
1			3			
2			4			



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DRAWN BY: F.D. WEEDEN DATE: 04/02  
 CHECKED BY: R.D. FAUTEUX DATE: 04/02



**BILL OF MATERIAL**

**END BENT 1 (STAGE 1)**

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
B101	#8		44'-11"	2749
B102	#8		47'-3"	964
B103	#5	STR.	43'-1"	359
B104	#4	STR.	29'-4"	470
B105	#4	STR.	8'-11"	50
B106	#4	STR.	1'-10"	37
B107	#9	STR.	11'-0"	449
B108	#4	STR.	8'-0"	128
B109	#4	STR.	5'-6"	22
H101	#4		5'-1"	41
H102	#4		4'-5"	35
K101	#4	STR.	29'-4"	705
S101	#4		6'-8"	330
S102	#5		4'-10"	509
S103	#5		9'-10"	2072
S104	#4		7'-0"	253
S105	#4		7'-11"	175
S106	#4	STR.	5'-8"	15
S107	#5		3'-9"	17
S108	#6		8'-1"	12
V101	#5	STR.	7'-10"	1209
V102	#4	STR.	11'-4"	250
H103	#6	STR.	9'-9"	205
H104	#6	STR.	15'-9"	237
V103	#4	STR.	4'-5"	35
<b>REINFORCING STEEL</b>				<b>11,328 LBS.</b>
<b>CLASS "A" CONCRETE</b>				
POUR 1 (CAP & LOWER WINGS)				43.0 CY.
POUR 2 (BACKWALL & UPPER WINGS)				23.2 CY.
<b>TOTAL</b>				<b>66.2 CY.</b>
<b>HP 12x53 STEEL PILES</b>				
NO.				19
LF.				760

PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C.

SHEET 4 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

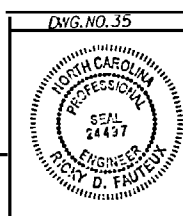
**SUBSTRUCTURE**  
**END BENT 1 WING**  
**DETAILS & B.O.M.**  
**STAGE 1**

MAY

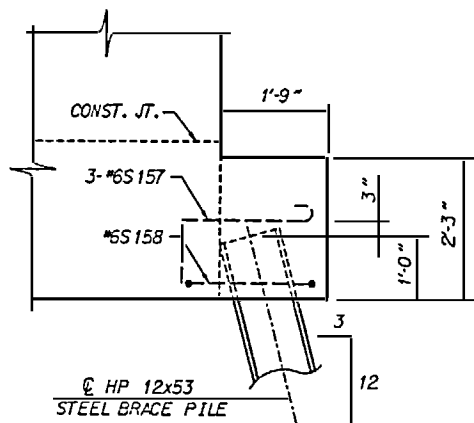
NO.	BY	DATE	NO.	BY	DATE
1	TJB	5/28/04	3		
2			4		

SHEET NO. 5-9  
 TOTAL SHEETS 10

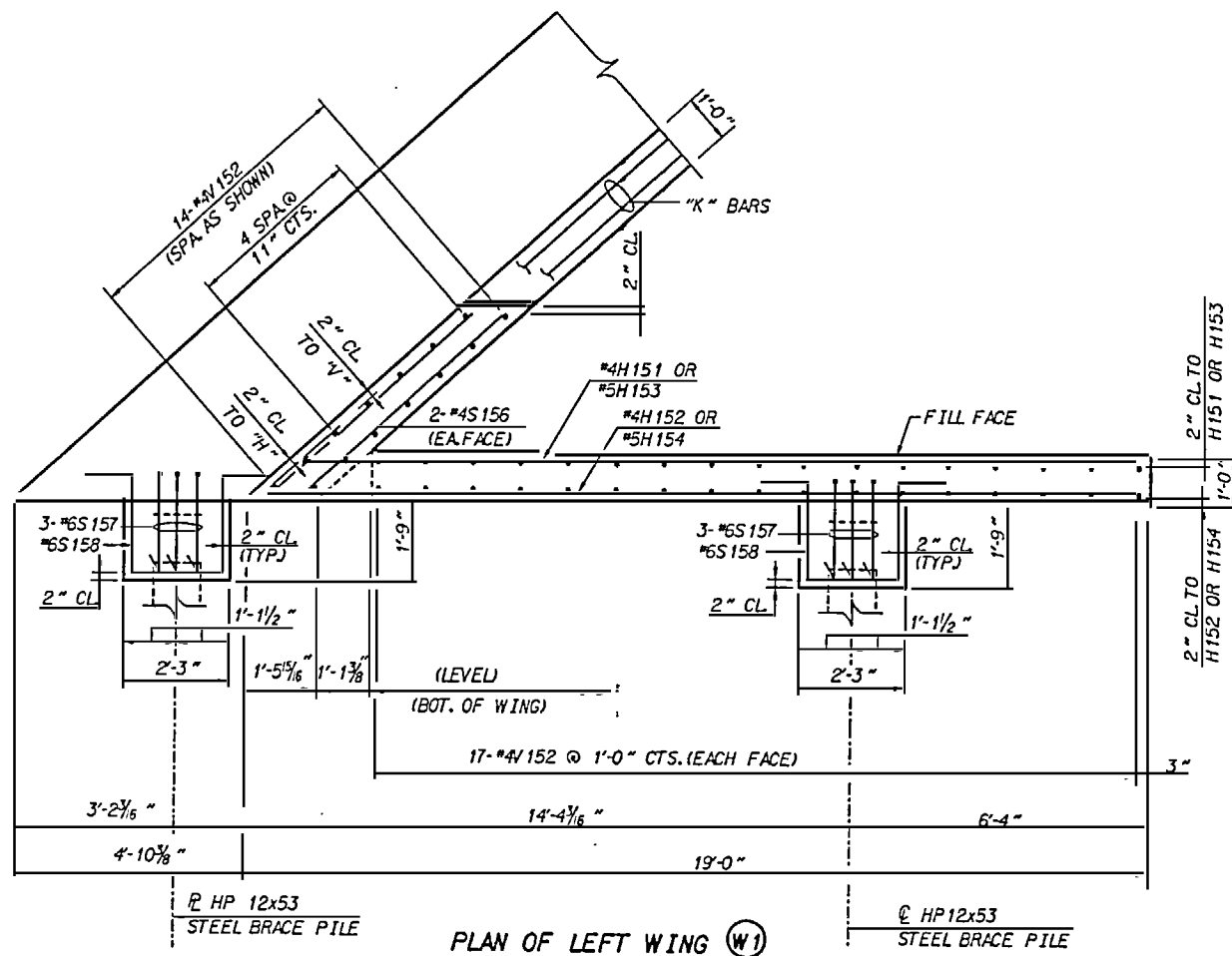
**RUMMEL, KLEPPER & KAHL, LLP**  
 consulting engineers  
 5500 FARINGTON PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27609-3360



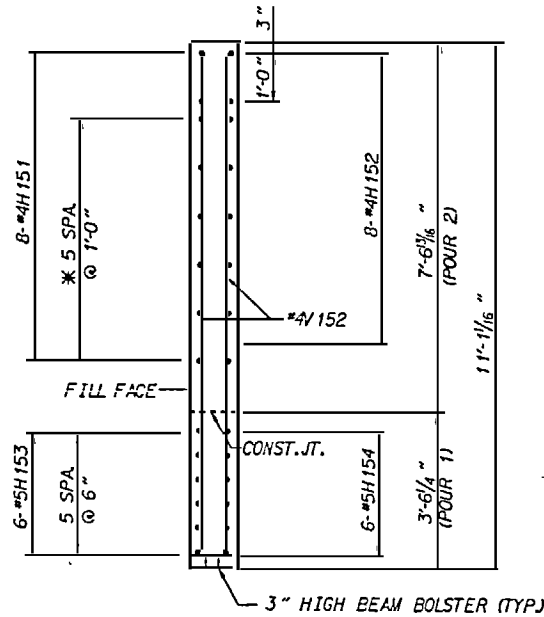
DRAWN BY: F.D. WEEDEN DATE: 04/02  
 CHECKED BY: R.D. FAULTIER DATE: 04/02



SECTION A-A

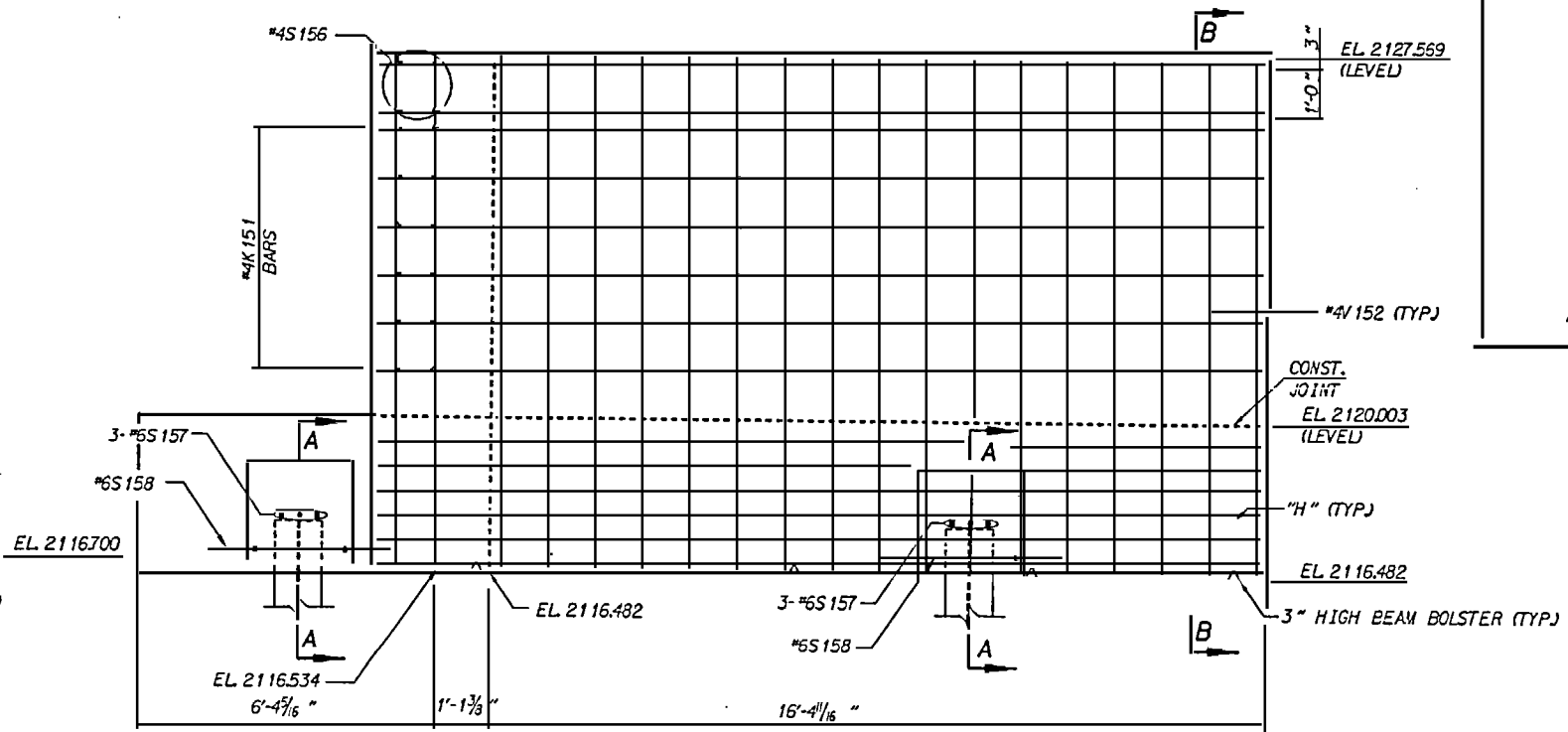


PLAN OF LEFT WING (W1)



SECTION B-B

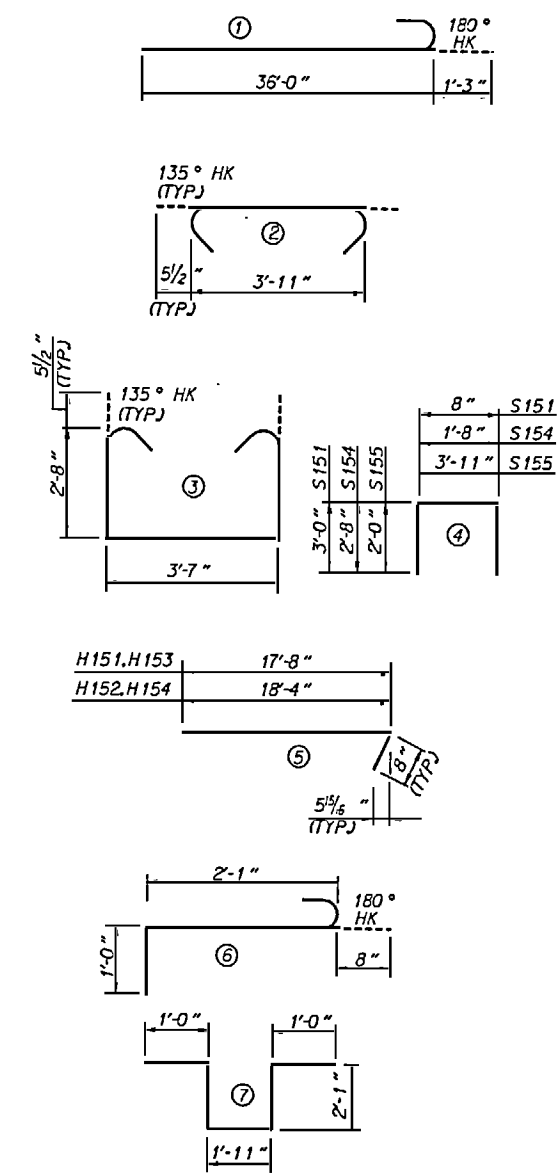
\* MATCH TO "K" BARS IN BACKWALL



ELEVATION OF LEFT WING

TOTAL QUANTITIES - END BENT 1				
	REINFORCING STEEL	CLASS "A" CONCRETE	HP 12 x 53 STEEL PILES	
			NO.	LN.FT.
STAGE 1	10760 LBS.	62.4 CY.	19	760
STAGE 2	9542 LBS.	62.0 CY.	18	720
TOTAL	20302 LBS.	124.4 CY.	37	1480

BAR TYPES



BILL OF MATERIAL

END BENT 1 (STAGE 2)						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
B151	12	#9	1	37'-3"	1520	
B152	6	#9	STR.	41'-2"	840	
B153	6	#9	STR.	43'-8"	891	
B154	8	#5	STR.	37'-0"	309	
B155	24	#4	STR.	25'-3"	405	
B156	17	#4	STR.	3'-11"	44	
B157	30	#4	STR.	1'-10"	37	
B158	24	#4	STR.	7'-0"	192	
B159	6	#4	STR.	4'-0"	6	
H151	8	#4	5	18'-4"	98	
H152	8	#4	5	19'-0"	102	
H153	6	#5	5	18'-4"	115	
H154	6	#5	5	19'-0"	119	
K151	36	#4	STR.	24'-1"	519	
S151	62	#4	4	6'-8"	216	
S152	89	#5	2	4'-10"	49	
S153	178	#5	3	9'-10"	1626	
S154	48	#4	4	7'-0"	24	
S155	29	#4	4	7'-11"	153	
S156	4	#4	STR.	5'-4"	14	
S157	6	#5	6	3'-9"	34	
S158	2	#5	7	8'-1"	24	
V151	124	#5	STR.	7'-10"	1073	
V152	48	#4	STR.	10'-8"	342	
REINFORCING STEEL						9542 LBS.
CLASS "A" CONCRETE						
POUR 1 (CAP & LOWER WINGS)						41.5 CY.
POUR 2 (BACKWALL & UPPER WINGS)						20.5 CY.
TOTAL						62.0 CY.
HP 12x53 STEEL PILES						
NO.						18
LF.						720

ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. R-2214A  
 HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C.

SHEET 5 OF 5

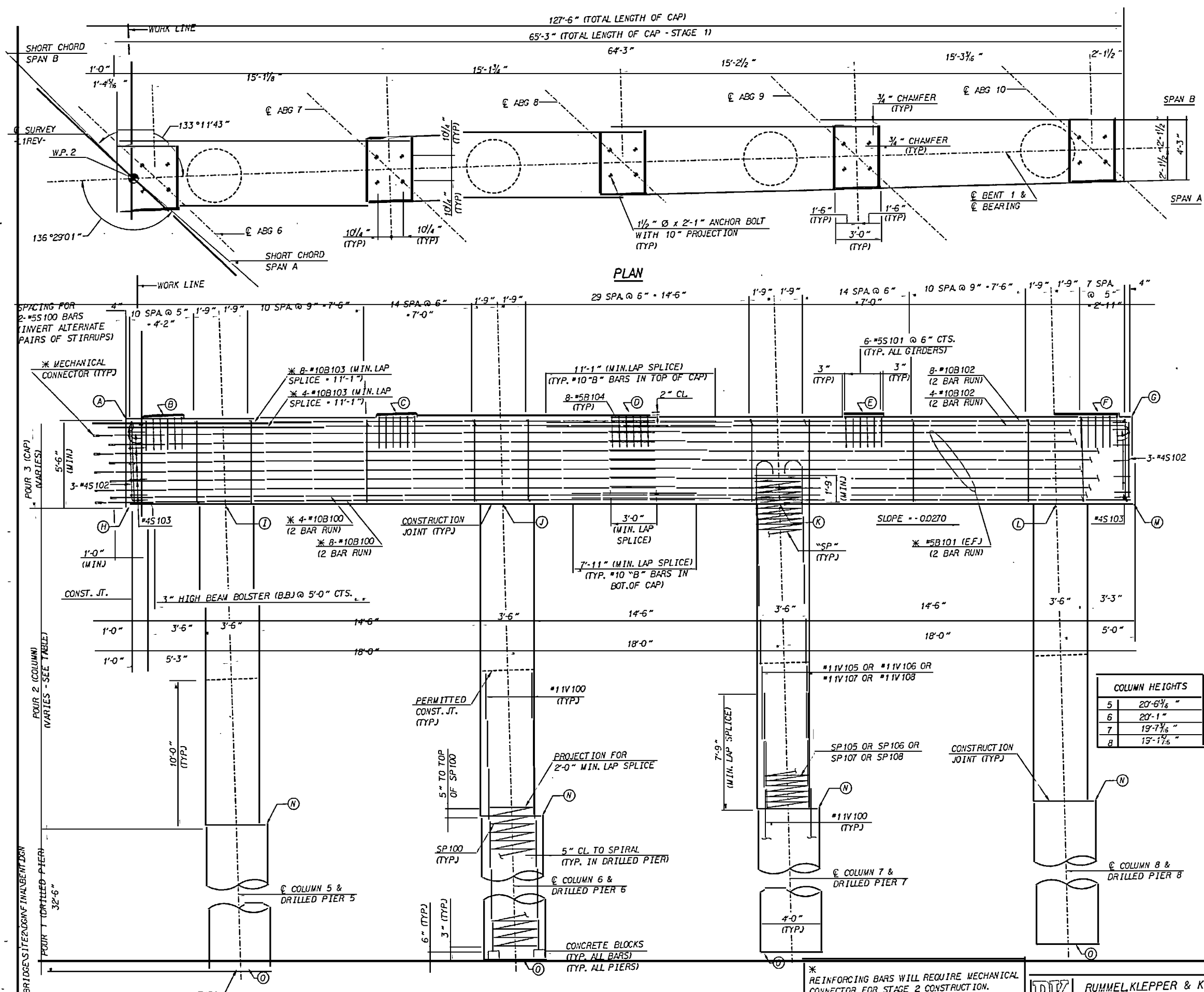
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 1 WING  
 DETAILS & B.O.M.  
 STAGE 2



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REVISIONS					SHEET NO.	
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			5-93
2			4			107

DRAWN BY: F. D. WEFDEN DATE: 04/02  
 CHECKED BY: R. D. FAUTEUX DATE: 04/02



**NOTES:**  
FOR NOTES, SEE SHEET 3 OF 4.

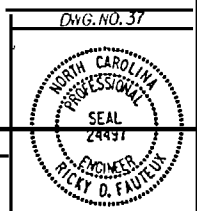
COLUMN HEIGHTS	
5	20'-6 1/8"
6	20'-1"
7	19'-7 1/8"
8	15'-1 1/8"

ELEVATION TABLE	
A	21187.39
B	21189.99
C	21185.78
D	2118.156
E	21177.25
F	2117.283
G	2116.977
H	2113.239
I	2113.070
J	2112.584
K	2112.098
L	2111.612
M	2111.477
N	2092.500
O	2060.000

PROJECT NO. R-2214A  
 HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.

SHEET 1 OF 4  
 STATE OF NORTH CAROLINA  
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**SUBSTRUCTURE**  
**BENT 1**  
**STAGE 1**



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MAY		REVISIONS		2002	
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

DRAWN BY: F.D. WEEDEN DATE: 04/02  
 CHECKED BY: R.D. FAUTEUX DATE: 04/02

DATA SHOWN TYPICAL FOR EACH DRILLED PIER AND COLUMN.

\* REINFORCING BARS WILL REQUIRE MECHANICAL CONNECTOR FOR STAGE 2 CONSTRUCTION. THE LOCATION OF THE COUPLERS SHALL BE STAGGERED ON ALTERNATING BARS BY ONE (1) FT. AND THE REINFORCING STEEL SHALL BE CUT ACCORDINGLY.

**BILL OF MATERIAL**

**STAGE I - BAR TYPES -**

180°HK (TYP)	①		
1'-5"	38'-0"	B102	
1'-7"	23'-2"	V105	
(TYP)	22'-8"	V106	
	22'-2"	V107	
	21'-8"	V108	

**BENT 1 - STAGE 1**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B100	24	#10	STR.	37'-7"	3,881
B101	28	#5	STR.	35'-1"	1,025
B102	24	#10	1	39'-5"	4,071
B103	12	#10	STR.	13'-3"	684
B104	40	#5	STR.	2'-8"	111

S100	198	#5	2	13'-10"	2,857
S101	30	#5	3	7'-11"	248
S102	8	#4	3	6'-6"	35
S103	10	#4	3	5'-3"	35

V100	55	#11	STR.	42'-9"	12,719
V105	14	#11	1	24'-9"	1,841
V106	14	#11	1	24'-3"	1,804
V107	14	#11	1	23'-9"	1,767
V108	14	#11	1	23'-3"	1,729

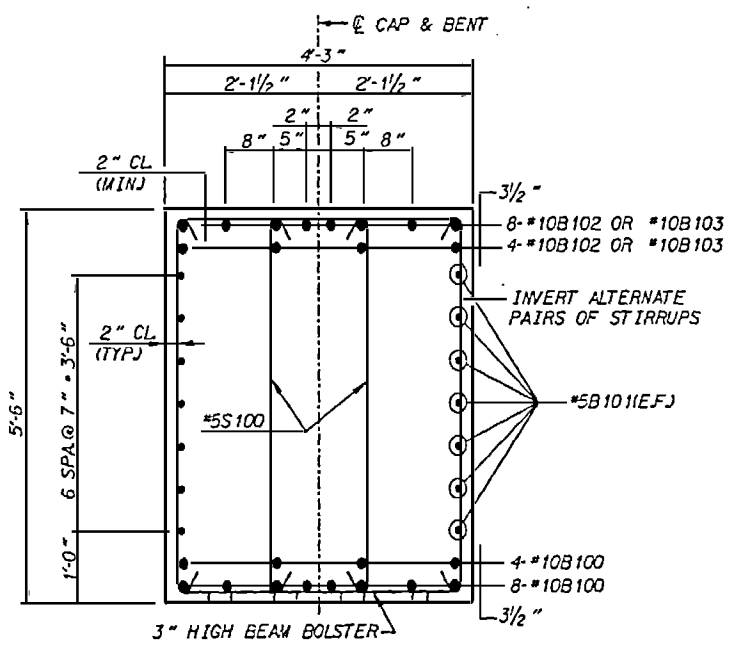
SP100	4	**	4	773'-0"	3,225
SP105	1	**	5	890'-6"	929
SP106	1	**	5	871'-0"	908
SP107	1	**	5	851'-6"	889
SP108	1	**	5	831'-9"	858

SPIRAL COLUMN					
REINFORCING STEEL					6,818
REINFORCING STEEL					32,807

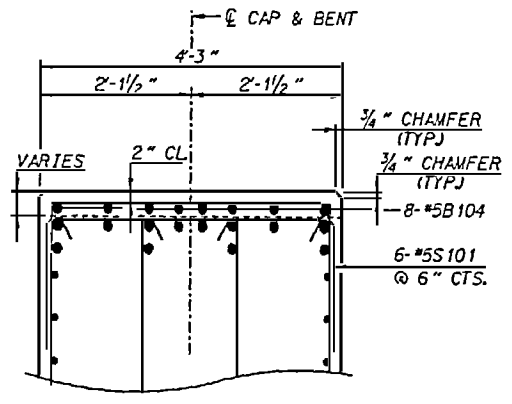
DRILLED PIER CONCRETE					
POUR 1 (DRILLED PIERS)					60.5 CY.

CLASS A CONCRETE					
POUR 2 (COLUMNS)					28.3 CY.
POUR 3 (CAP)					57.1 CY.
<b>TOTAL</b>					<b>85.4 CY.</b>

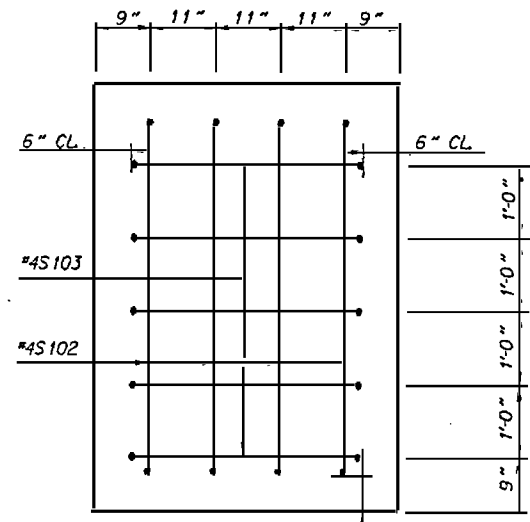
\*\* ALL "SP" SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.



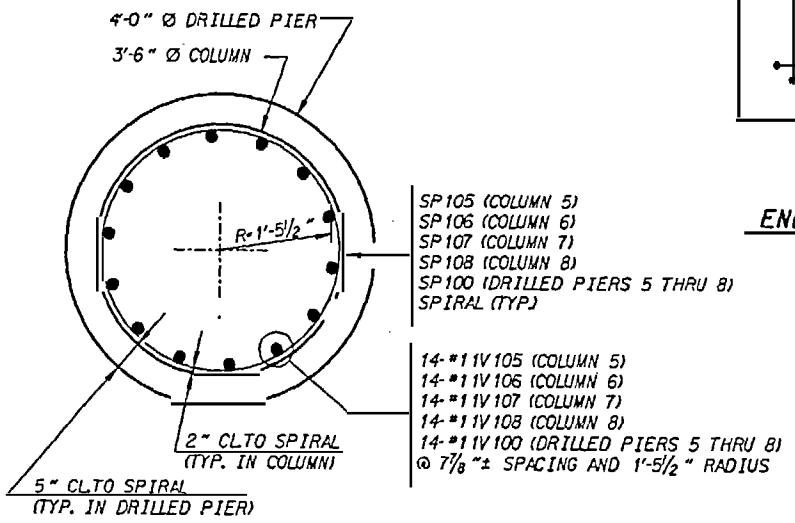
**SECTION THRU CAP**



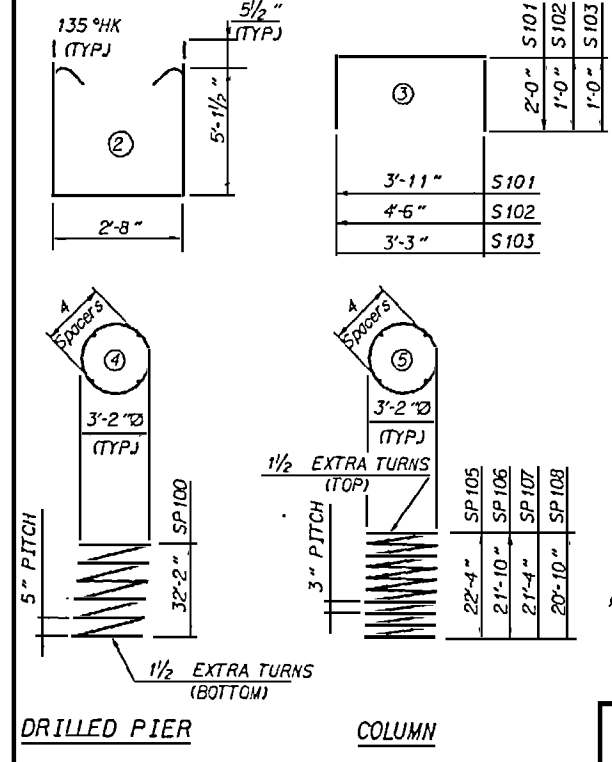
**SECTION THRU BEARING**



**END OF CAP DETAIL**

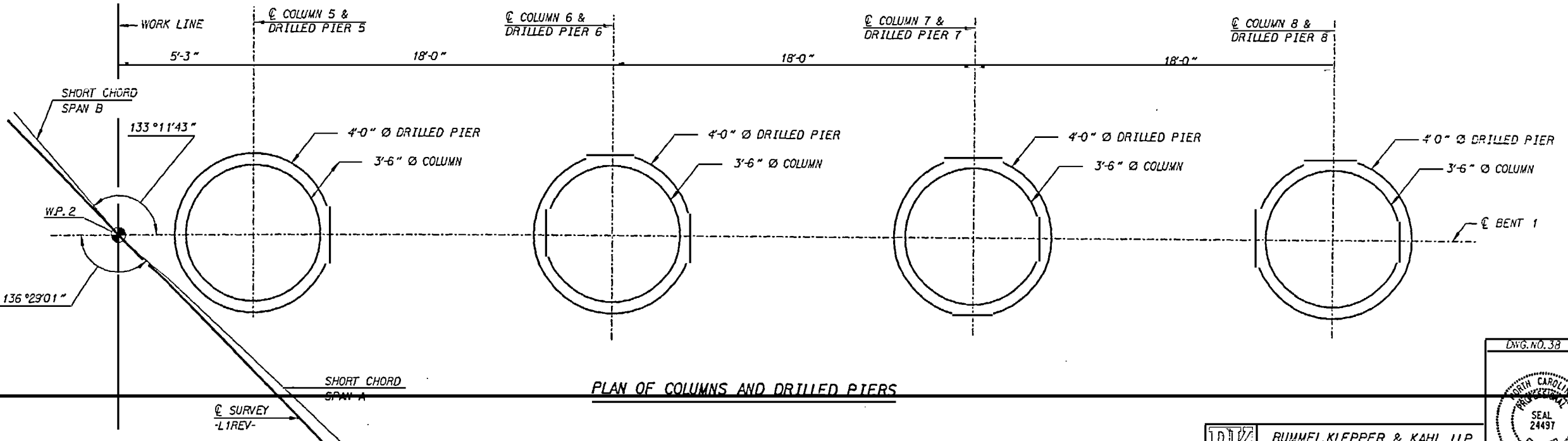


**PLAN OF COLUMN AND DRILLED PIER**



**DRILLED PIER COLUMN**

ALL DIMENSIONS ARE OUT TO OUT.



**PLAN OF COLUMNS AND DRILLED PIERS**

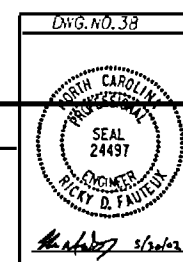
PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 BENT 1  
 DETAILS & D.O.M.  
 STAGE 1**

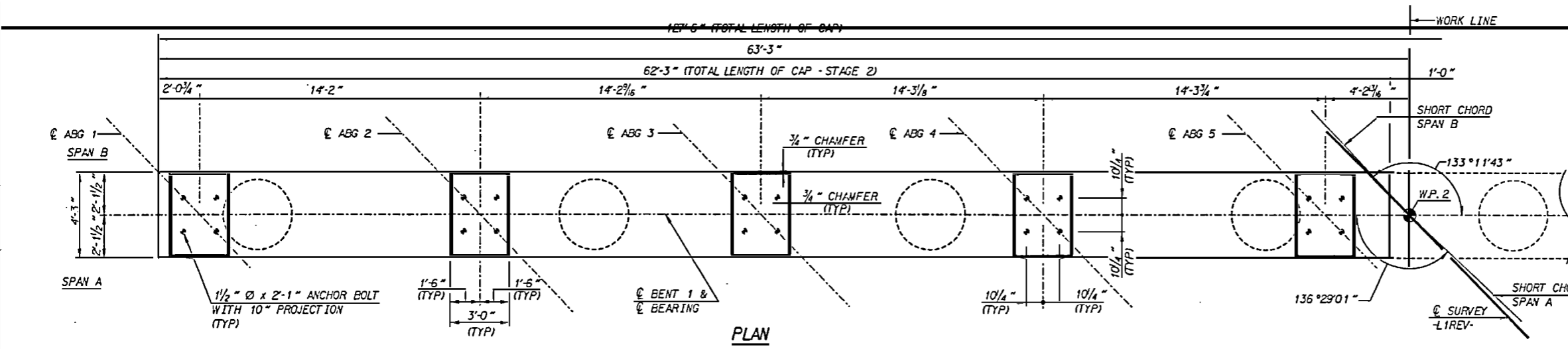
MAY 2002



**RUMMELKLEPPER & KAHL, LLP**  
 consulting engineers  
 5800 FARINGDON PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27609-3960

DRAWN BY: F.O. WEEDEN DATE: 04/02  
 CHECKED BY: R.D. FAUTEUX DATE: 04/02

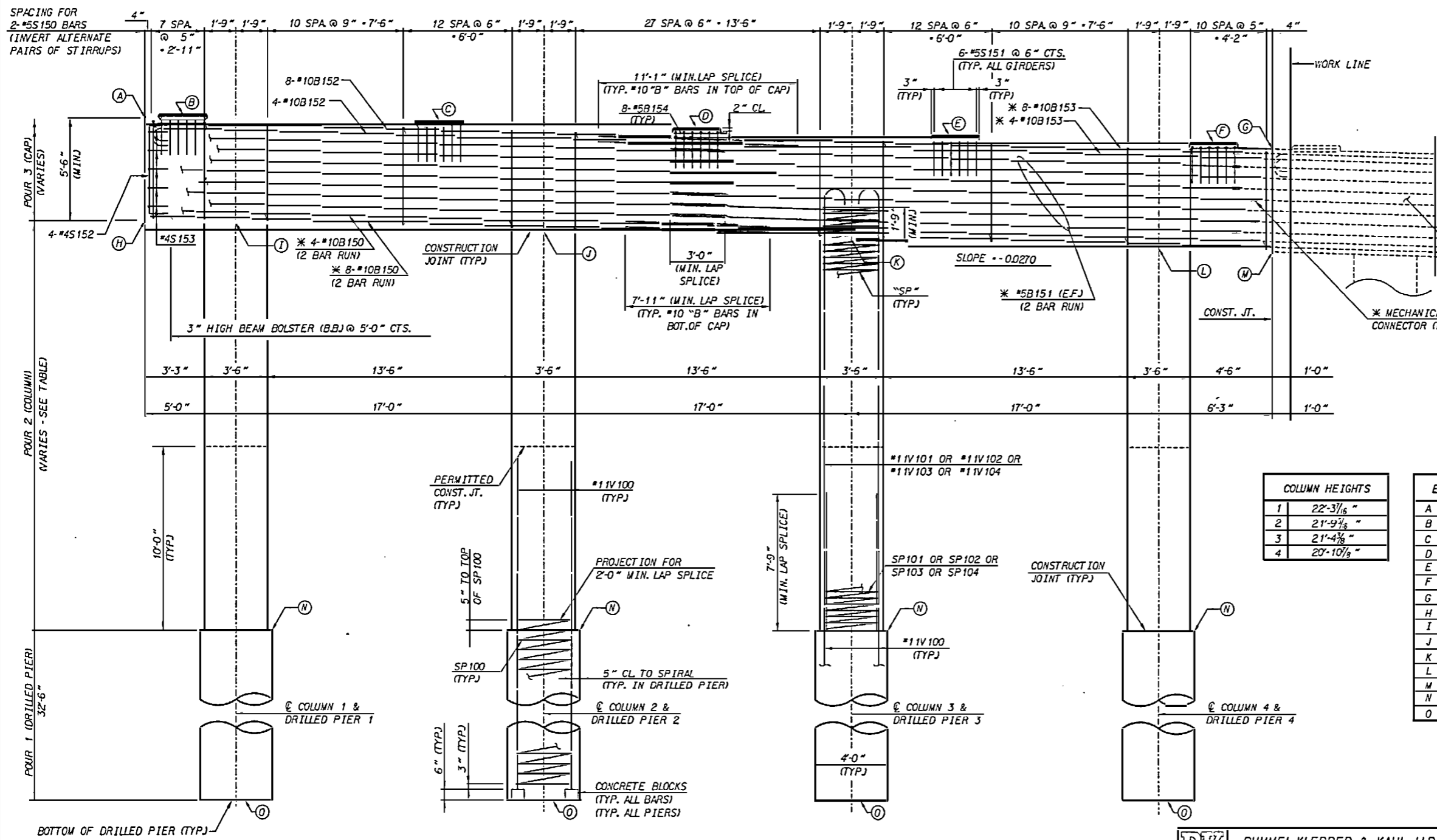
REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	DATE	S-95
1			3		TOTAL SHEETS 107
2			4		



PLAN

NOTES:

- FOR END ELEVATION, SEE SHEET 1 OF 4.
- STIRRUPS IN CAP MAY SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.
- HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- FOR DRILLED PIERS, SEE SPECIAL PROVISIONS.
- THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET EXTRA LENGTH.
- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".
- THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FOOT BELOW THE GROUND LINE.
- FOR MECHANICAL BUTT SPlicing OF REINFORCING STEEL, SEE SPECIAL PROVISIONS.



ELEVATION

DATA SHOWN TYPICAL FOR EACH DRILLED PIER AND COLUMN.

1	22'-3 1/8"
2	21'-4 1/2"
3	21'-4 3/8"
4	20'-10 1/8"

A	2120.420
B	2120.514
C	2120.258
D	2119.893
E	2119.521
F	2119.141
G	2118.739
H	2114.920
I	2114.785
J	2114.326
K	2113.857
L	2113.408
M	2113.239
N	2092.500
O	2060.000

\* REINFORCING BARS WILL REQUIRE MECHANICAL CONNECTOR FOR STAGE 2 CONSTRUCTION. THE LOCATION OF THE COUPLERS SHALL BE STAGGERED ON ALTERNATING BARS BY ONE (1) FT. AND THE REINFORCING STEEL SHALL BE CUT ACCORDINGLY.

PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C.

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT 1  
 STAGE 2

MAY 2002



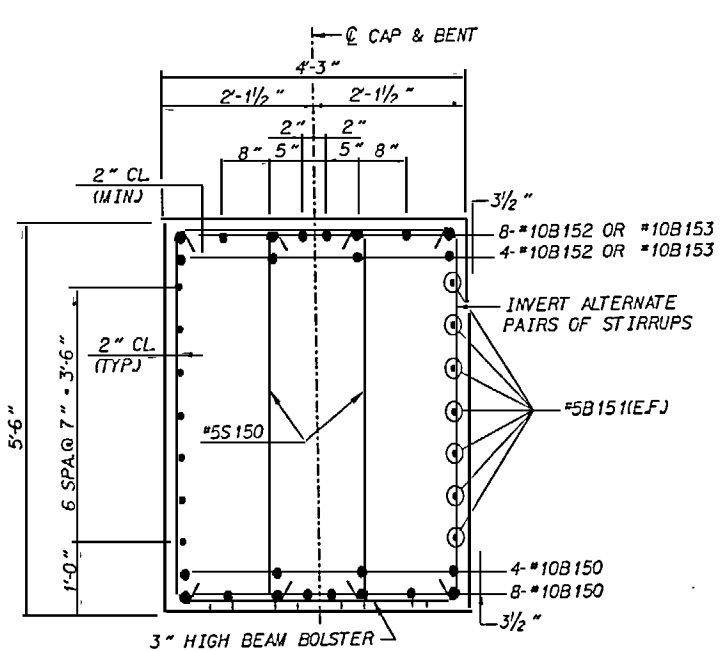
**RUMMEL, KLEPPER & KAHL, LLP**  
 consulting engineers  
 5800 FARINGDON PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27609-3960

DRAWN BY: F.O. WEEDEN DATE: 04/02  
 CHECKED BY: R.D. FAUTEUX DATE: 04/02

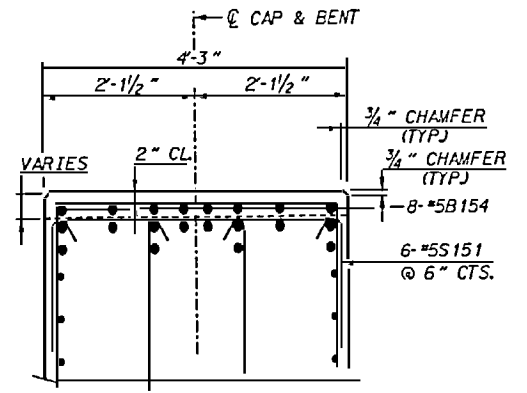
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NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

TOTAL SHEETS: 107

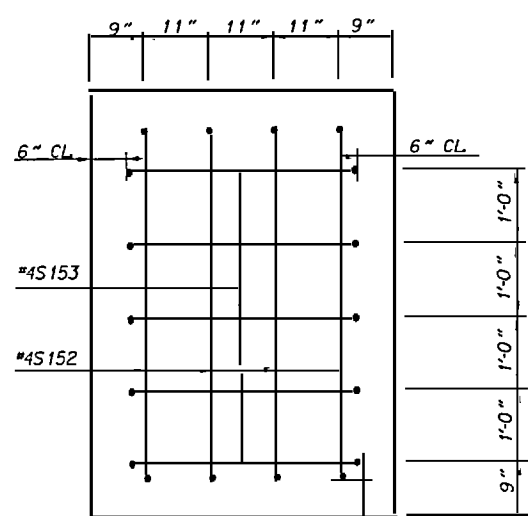




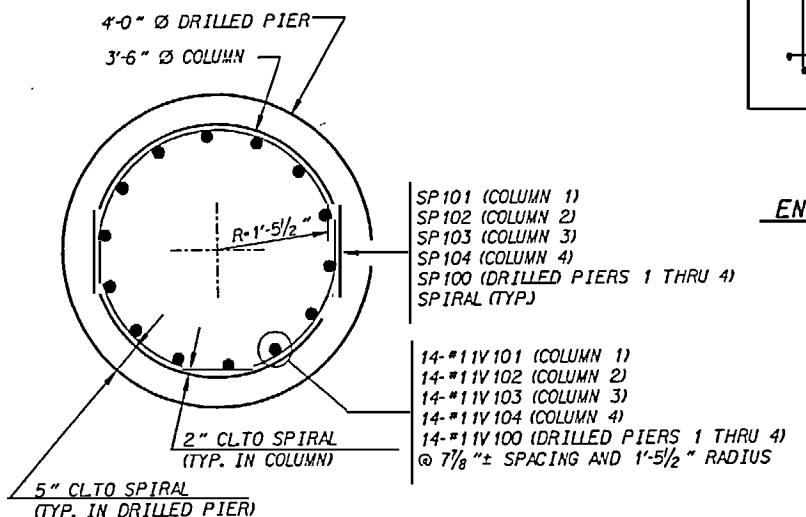
SECTION THRU CAP



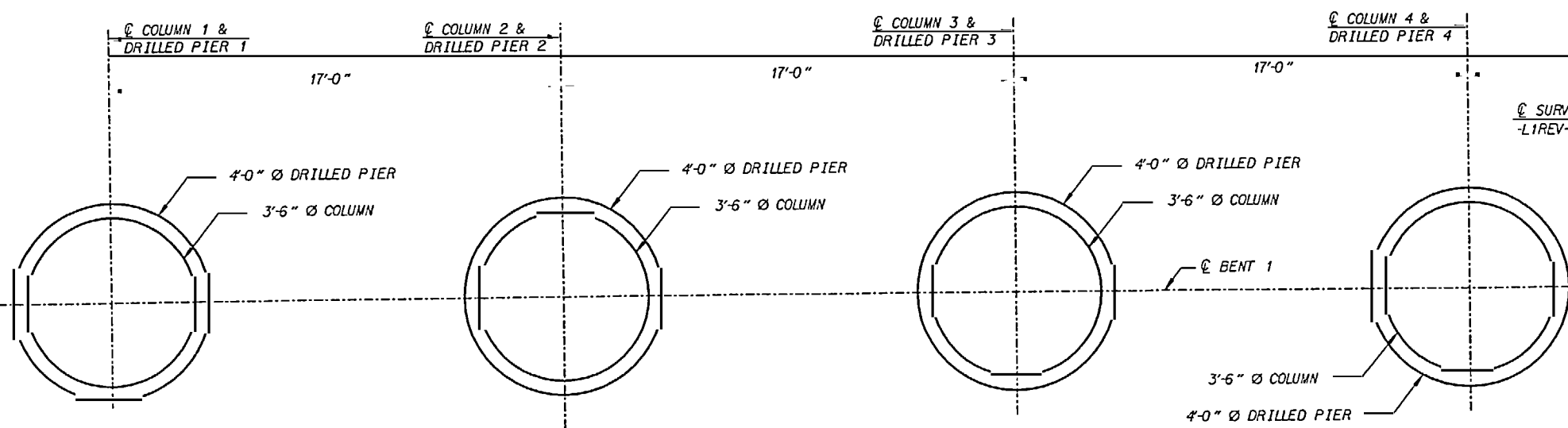
SECTION THRU BEARING



END OF CAP DETAIL



PLAN OF COLUMN AND DRILLED PIER



PLAN OF COLUMNS AND DRILLED PIERS

### BILL OF MATERIAL

STAGE 2 - BAR TYPES -						BENT 1 - STAGE 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
180°HK (TYP)	①					B150	24	#10	STR.	34'-7"	3,572
1'-5" (TYP)		35'-1"				B151	28	#5	STR.	32'-1"	937
1'-7" (TYP)		24'-10"				B152	12	#10	1	37'-6"	1,936
		24'-5"				B153	12	#10	STR.	36'-2"	1,858
		23'-11"				B154	40	#5	STR.	2'-8"	111
		23'-6"				S150	186	#5	2	13'-10"	2,584
						S151	30	#5	3	7'-11"	248
						S152	4	#4	3	6'-6"	17
						S153	5	#4	3	5'-3"	18
135°HK (TYP)	②					V100	56	#11	STR.	42'-9"	12719
						V101	14	#11	1	26'-5"	1,965
						V102	14	#11	1	26'-0"	1,934
						V103	14	#11	1	25'-6"	1,897
						V104	14	#11	1	25'-1"	1,866
						SP100	4	***	4	77'-0"	3,225
						SP101	1	***	5	95'-0"	1,000
						SP102	1	***	5	93'-6"	930
						SP103	1	***	5	91'-9"	959
						SP104	1	***	5	90'-3"	939
SPIRAL COLUMN REINFORCING STEEL						7,103					
REINFORCING STEEL						31,772					
DRILLED PIER CONCRETE POUR 1 (DRILLED PIERS)						60.5 CY.					
CLASS A CONCRETE POUR 2 (COLUMNS)						30.8 CY.					
POUR 3 (CAP)						54.5 CY.					
TOTAL						85.3 CY.					

TOTAL BILL OF MATERIAL			
	STAGE 1	STAGE 2	TOTAL
SPIRAL COLUMN REINFORCING STEEL	6,818 LBS.	7,103 LBS.	13,921 LBS.
REINFORCING STEEL	32,807 LBS.	31,772 LBS.	64,579 LBS.
DRILLED PIER CONCRETE	60.5 CY.	60.5 CY.	121.0 CY.
CLASS A CONCRETE	85.4 CY.	85.3 CY.	170.7 CY.
4'-0" DIA DRILLED PIERS IN SOIL	114 FT.	114 FT.	228 FT.
4'-0" DIA DRILLED PIERS NOT IN SOIL	16 FT.	16 FT.	32 FT.

### TOTAL BILL OF MATERIAL

	STAGE 1	STAGE 2	TOTAL
SPIRAL COLUMN REINFORCING STEEL	6,818 LBS.	7,103 LBS.	13,921 LBS.
REINFORCING STEEL	32,807 LBS.	31,772 LBS.	64,579 LBS.
DRILLED PIER CONCRETE	60.5 CY.	60.5 CY.	121.0 CY.
CLASS A CONCRETE	85.4 CY.	85.3 CY.	170.7 CY.
4'-0" DIA DRILLED PIERS IN SOIL	114 FT.	114 FT.	228 FT.
4'-0" DIA DRILLED PIERS NOT IN SOIL	16 FT.	16 FT.	32 FT.

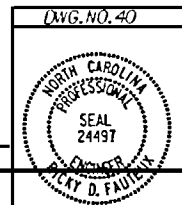
PROJECT NO. R-2214A  
 HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 BENT 1  
 DETAILS & B.O.M.  
 STAGE 2**

MAY 2002

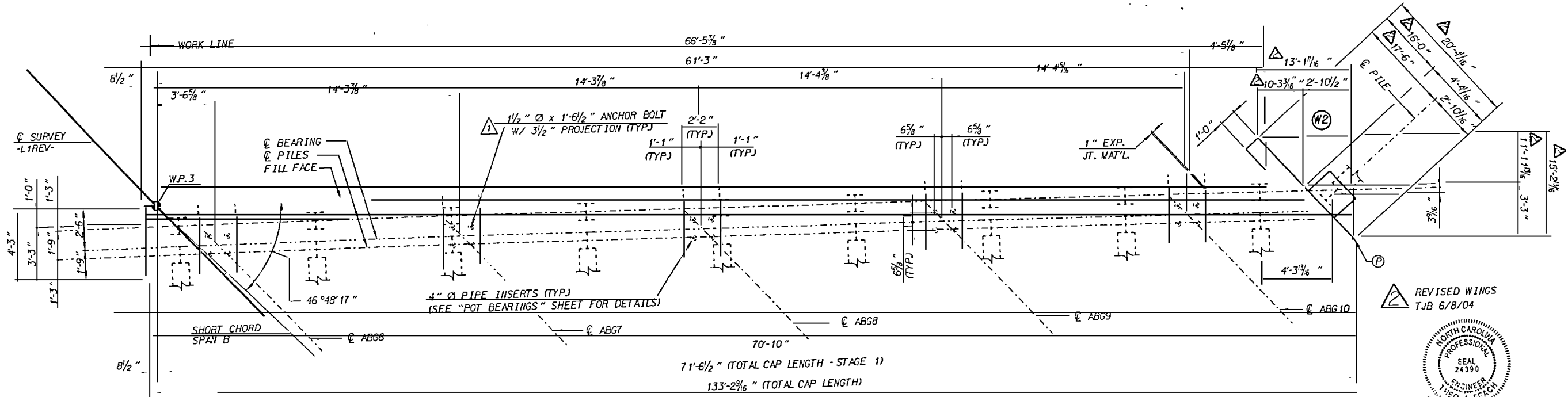


**RUMMEL, KLEPPER & KAHL, LLP**  
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 5800 FARINGDON PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27609-3360

DRAWN BY: F.D. WEEDEN DATE: 04/02  
 CHECKED BY: R. D. FAUTEUX DATE: 04/02

REVISIONS				SHEET NO.
NO.	BY	DATE	DATE	
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2				

TOTAL SHEETS: 107

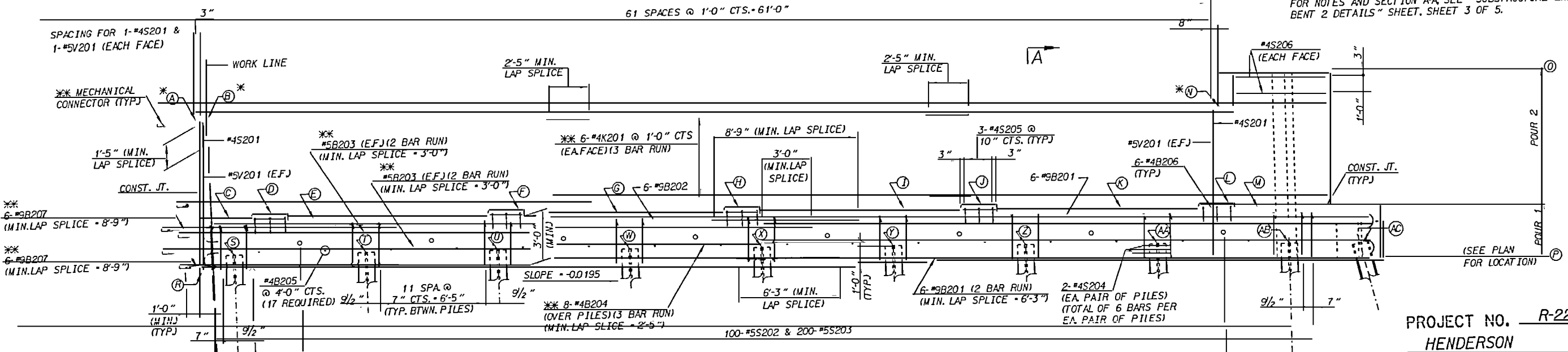


PLAN

REVISED WINGS  
TJB 6/8/04



**NOTES:**  
 Sealed for using design only for PILE SPLICE DETAILS AND TEMPORARY DRAINAGE. SEE "SUBSTRUCTURE END BENT 2 DETAILS" SHEET, SHEET 3 OF 5.  
 FOR PIPE DRAIN DETAILS, SEE "SUBSTRUCTURE END BENT 1 DETAILS" SHEET, SHEET 3 OF 5.  
 FOR NOTES AND SECTION A-A SEE "SUBSTRUCTURE END BENT 2 DETAILS" SHEET, SHEET 3 OF 5.



ELEVATION

PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C.

SHEET 1 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

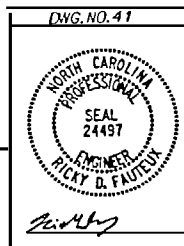
**SUBSTRUCTURE  
 END BENT 2  
 STAGE 1**

REVISIONS		DATE		BY	
1	R. D. F.	12/01/03	3		
2	TJB	6/8/04	4		

* A	2124584	J	2117819	T	2116101
* B	2124570	K	2117393	U	2115945
C	2118557	L	2117518	W	2115789
D	2118682	M	2117072	X	2115633
E	2118276	* N	2123335	Y	2115477
F	2118401	O	2125311	Z	2115321
G	2117988	P	2113900	AA	2115165
H	2118113	R	2115295	AB	2115009
I	2117694	S	2116257	AC	2114937

\* REINFORCING BARS WILL REQUIRE MECHANICAL CONNECTOR FOR STAGE 2 CONSTRUCTION. THE LOCATION OF THE COUPLERS SHALL BE STAGGERED ON ALTERNATING BARS BY ONE (1) FT. AND THE REINFORCING STEEL SHALL BE CUT ACCORDINGLY.

**RUMMEL, KLEPPER & KAHL, LLP**  
 consulting engineers  
 5800 FARINGHAM PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27609-3960



DRAWN BY: F. D. WEEDEN DATE: 04/02  
 CHECKED BY: R. D. FAUTEX DATE: 12/03

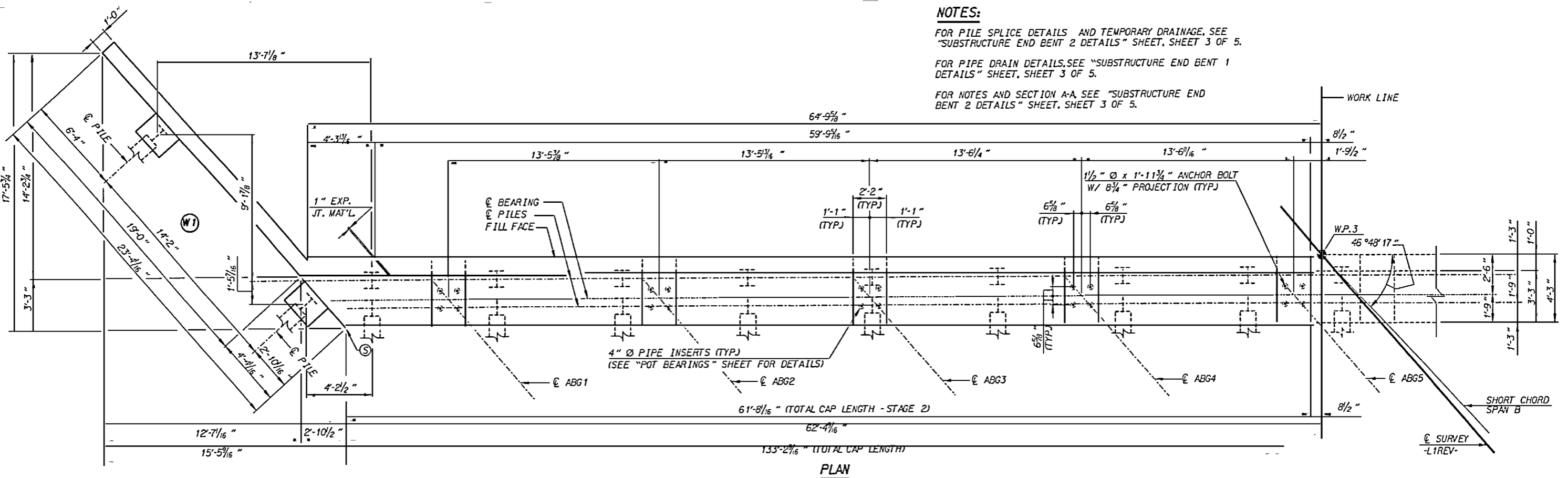
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**NOTES:**

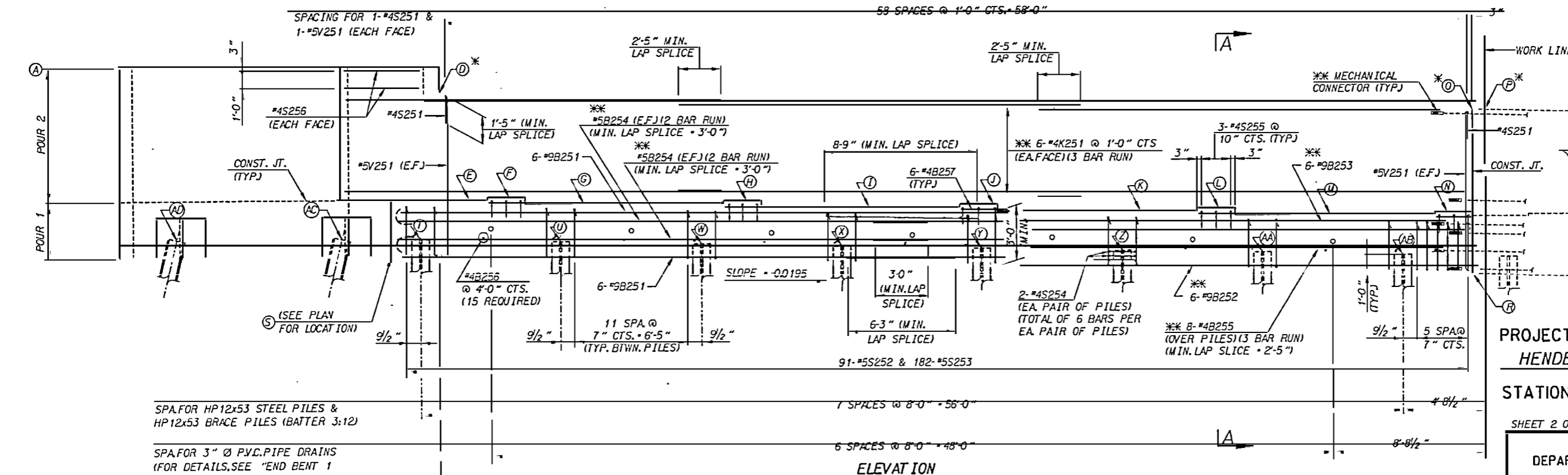
FOR PILE SPLICE DETAILS AND TEMPORARY DRAINAGE, SEE "SUBSTRUCTURE END BENT 2 DETAILS" SHEET, SHEET 3 OF 5.

FOR PIPE DRAIN DETAILS, SEE "SUBSTRUCTURE END BENT 1 DETAILS" SHEET, SHEET 3 OF 5.

FOR NOTES AND SECTION A-A SEE "SUBSTRUCTURE END BENT 2 DETAILS" SHEET, SHEET 3 OF 5.



**PLAN**

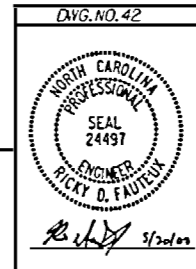


**ELEVATION**

ELEVATION TABLE			
A	2127.282	K	2118.922
B	2119.757	L	2119.047
C	2116.573	M	2118.661
D	2125.695	N	2118.766
E	2119.672	O	2124.584
F	2119.797	P	2124.570
G	2119.427	R	2115.296
H	2119.552	S	2116.500
I	2119.177	T	2117.466
J	2119.302	U	2117.310
W	2117.154	X	2116.998
Y	2116.842	Z	2116.686
AA	2116.530	AB	2116.374
AC	2117.537	AD	2117.573

REINFORCING BARS WILL REQUIRE MECHANICAL CONNECTOR FOR STAGE 2 CONSTRUCTION. THE LOCATION OF THE COUPLERS SHALL BE STAGGERED ON ALTERNATING BARS BY ONE (1) FT. AND THE REINFORCING STEEL SHALL BE CUT ACCORDINGLY.

**RUMMELKLEPPER & KAHL LLP**  
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5800 FARRINGTON PLACE - SUITE 105  
RALEIGH, NORTH CAROLINA 27609-3560



PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+10.60 -L1REV- P.O.

SHEET 2 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SUBSTRUCTURE  
END BENT 2  
STAGE 2**

REVISIONS			
NO.	BY	DATE	DESCRIPTION
1			
2			

2002  
SHEET NO. 5-99  
TOTAL SHEETS 101

DRAWN BY: F. D. WEEDEN DATE: 04/02  
CHECKED BY: R. D. FAUTEUX DATE: 04/02

**NOTES:**

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

PIPE DRAINS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND ANCHOR BOLTS.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

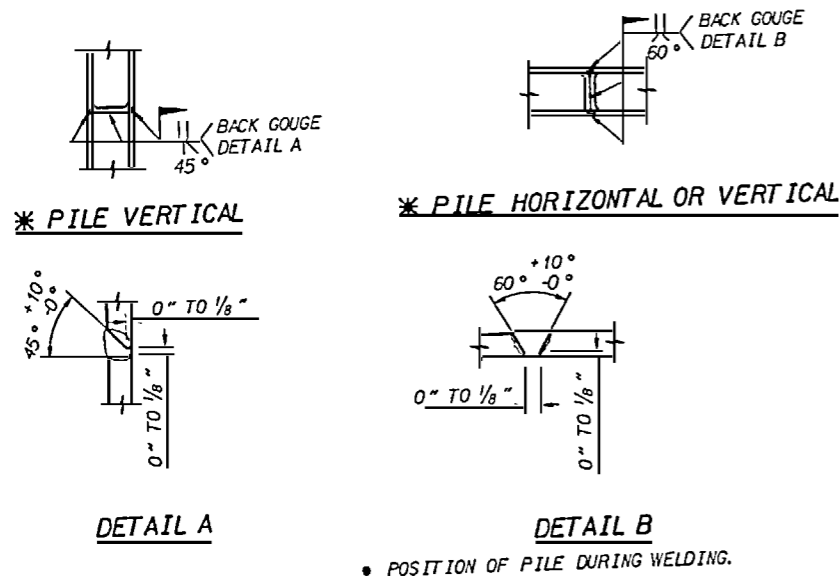
FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

FOR PIPE DRAIN DETAILS, SEE "END BENT 1 DETAILS" SHEET.

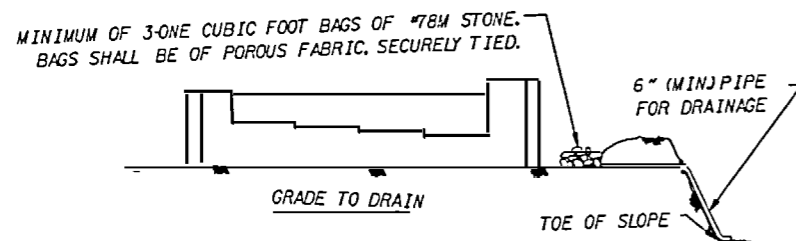
THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 1/4" PER FOOT.

FOR MECHANICAL BUTT SPlicing OF REINFORCING STEEL SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



**PILE SPLICE DETAILS**

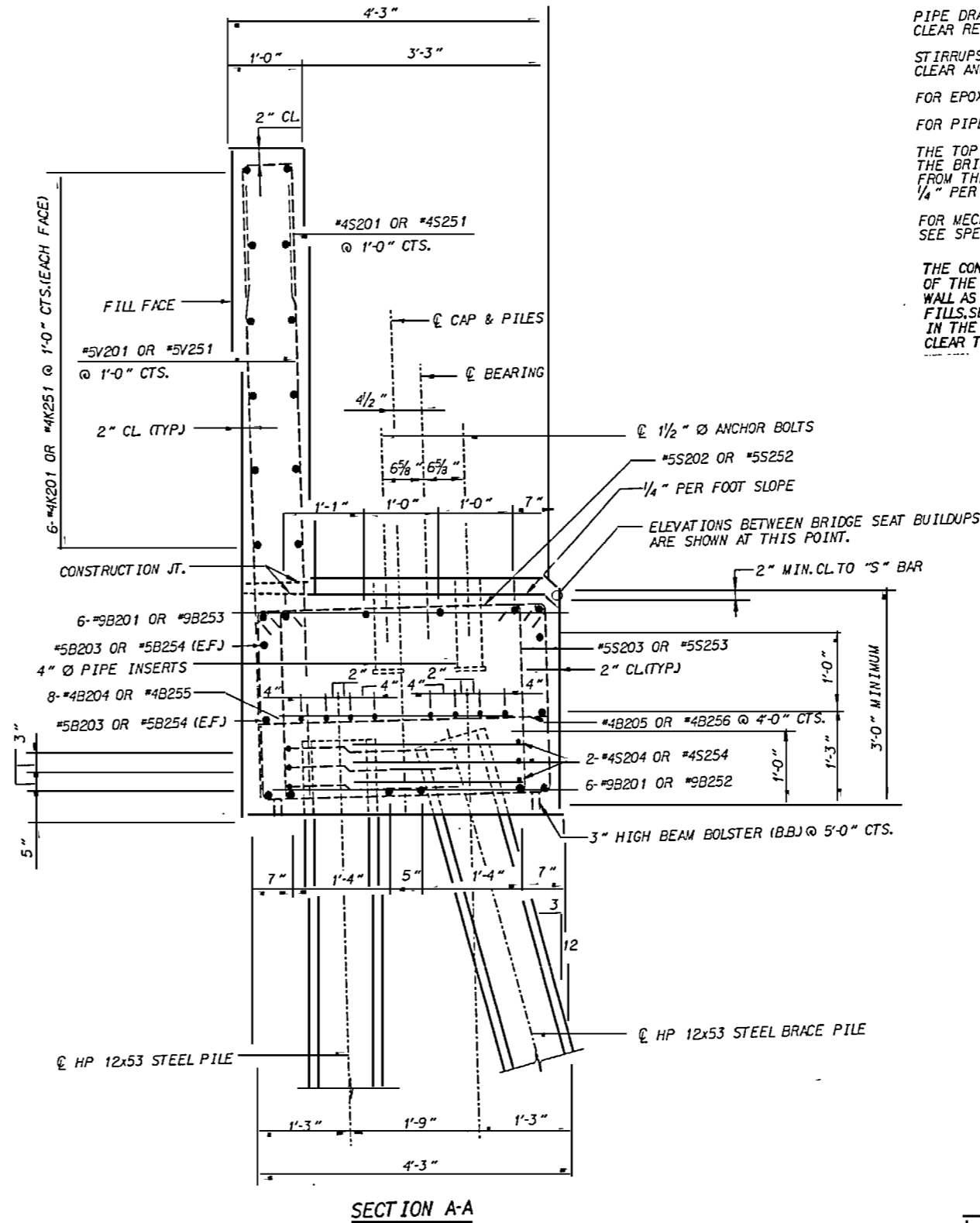


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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 FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**



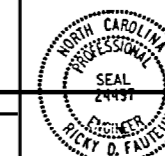
PROJECT NO. R-2214A  
HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C.

SHEET 3 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 END BENT 2  
 DETAILS**

CONV. NO. 43



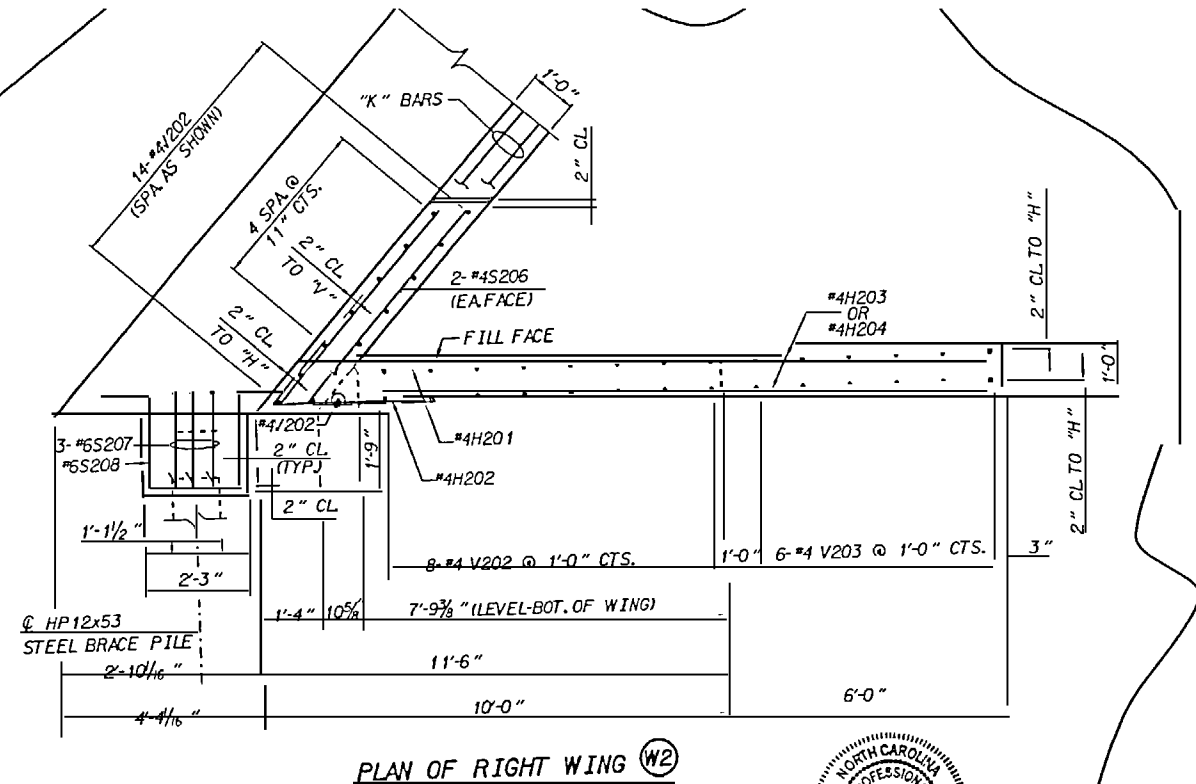
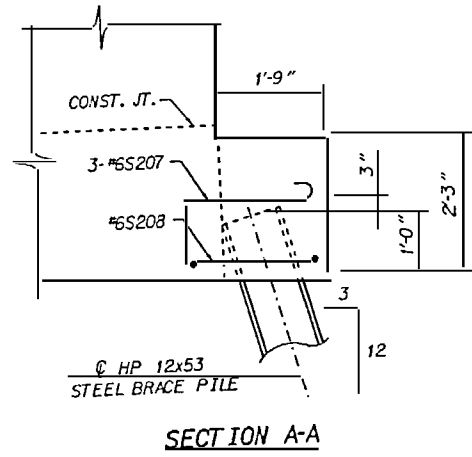
**RUMMELKLEPPER & KAHL, LLP**  
 consulting engineers  
 5800 FARINGDON PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27609-3950

MAY		REVISIONS		2002	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

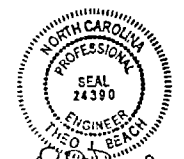
SHEET NO. **5-100**  
 TOTAL SHEETS **107**

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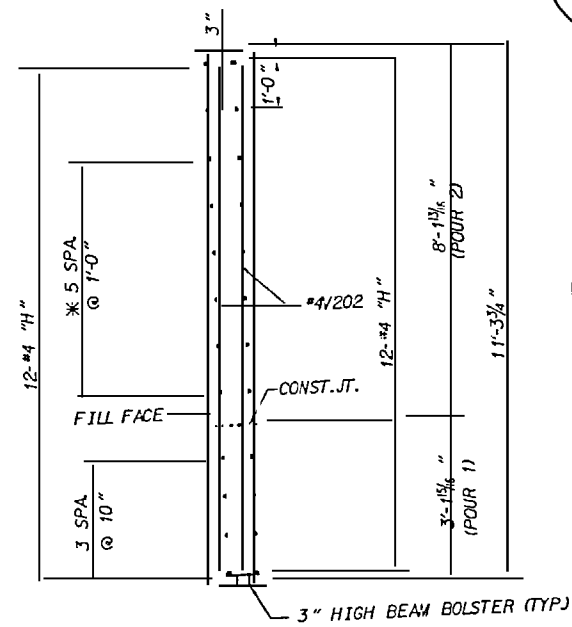
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 CHECKED BY: R. D. FAUTEUX DATE: 04/02



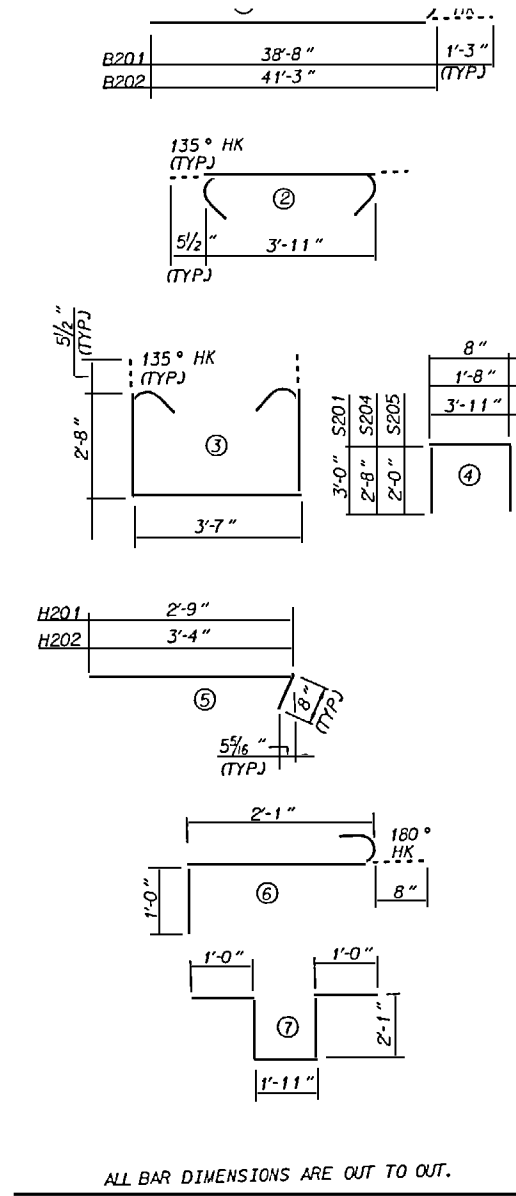
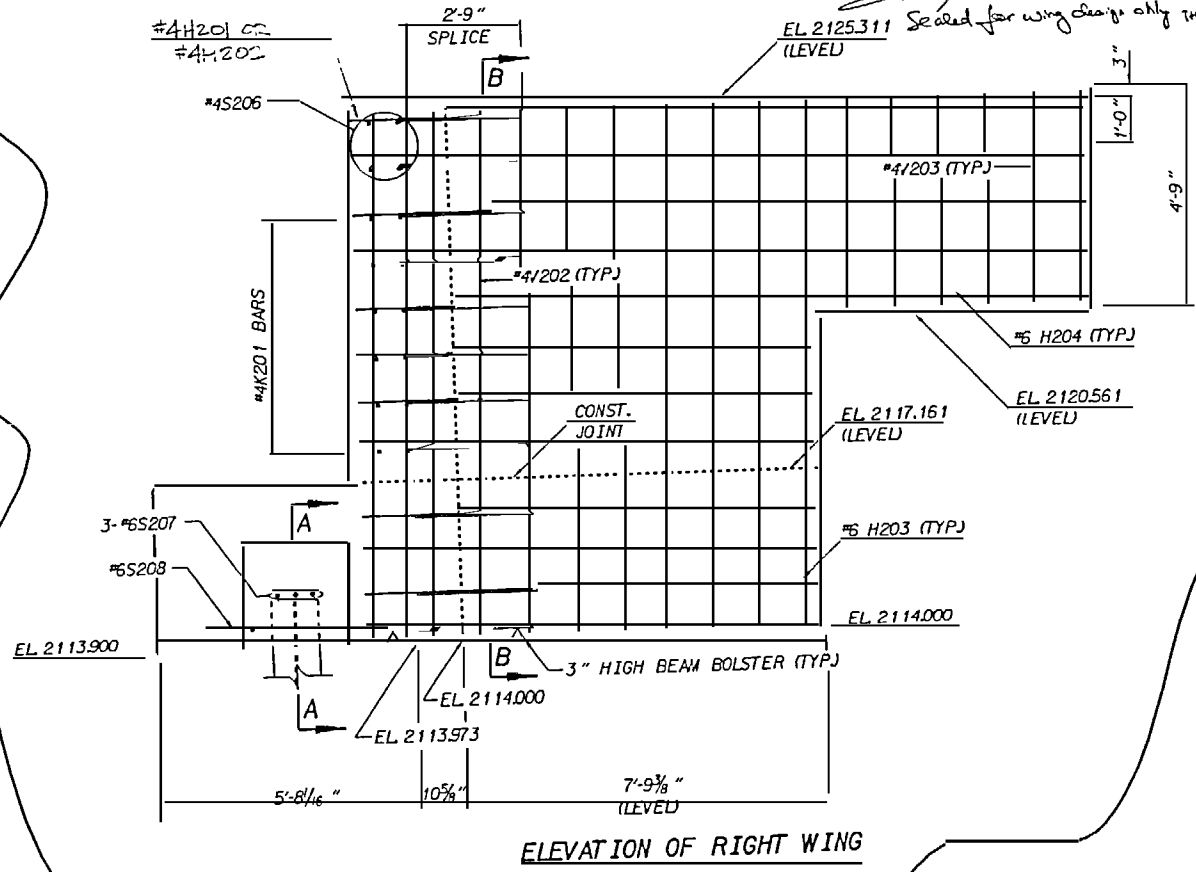
REVISI  
 1 REVISED WINGS (TJB 6/8/04)



Sealed for wing design only TJB  
 EL 2125.311 (LEVEL)



SECTION B-B  
 \* MATCH TO "K" BARS IN BACKWALL



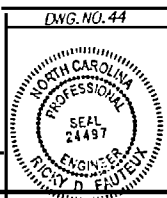
B201	6	#9	1	42'-6"	bb1
B203	8	#5	STR.	38'-2"	318
B204	24	#4	STR.	26'-1"	418
B205	17	#4	STR.	3'-11"	44
B206	30	#4	STR.	1'-10"	37
B207	12	#9	STR.	11'-0"	449
H201	12	#4	5	3'-5"	27
H202	12	#4	5	4'-0"	32
K201	36	#4	STR.	25'-1"	603
S201	62	#4	4	6'-8"	276
S202	100	#5	2	4'-10"	504
S203	200	#5	3	9'-10"	2051
S204	54	#4	4	7'-0"	253
S205	15	#4	4	7'-11"	79
S206	4	#4	STR.	5'-2"	14
S207	3	#5	6	3'-9"	17
S208	1	#5	7	8'-1"	12
V201	124	#5	STR.	7'-4"	948
V202	31	#4	STR.	10'-11"	226
H203	14	#6	STR.	8'-9"	184
H204	10	#6	STR.	14'-9"	222
V203	12	#4	STR.	4'-5"	35
REINFORCING STEEL					10,059 LBS.
CLASS "A" CONCRETE					
POUR 1 (CAP & LOWER WINGS)					37.2 CY.
POUR 2 (BACKWALL & UPPER WINGS)					18.5 CY.
TOTAL					55.7 CY.
HP12X53 STEEL PILES					
NO.					19
LF.					855

PROJECT NO. R-2214A  
 HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.C.

SHEET 4 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT 2 WING  
 DETAILS & B.O.M.  
 STAGE 1

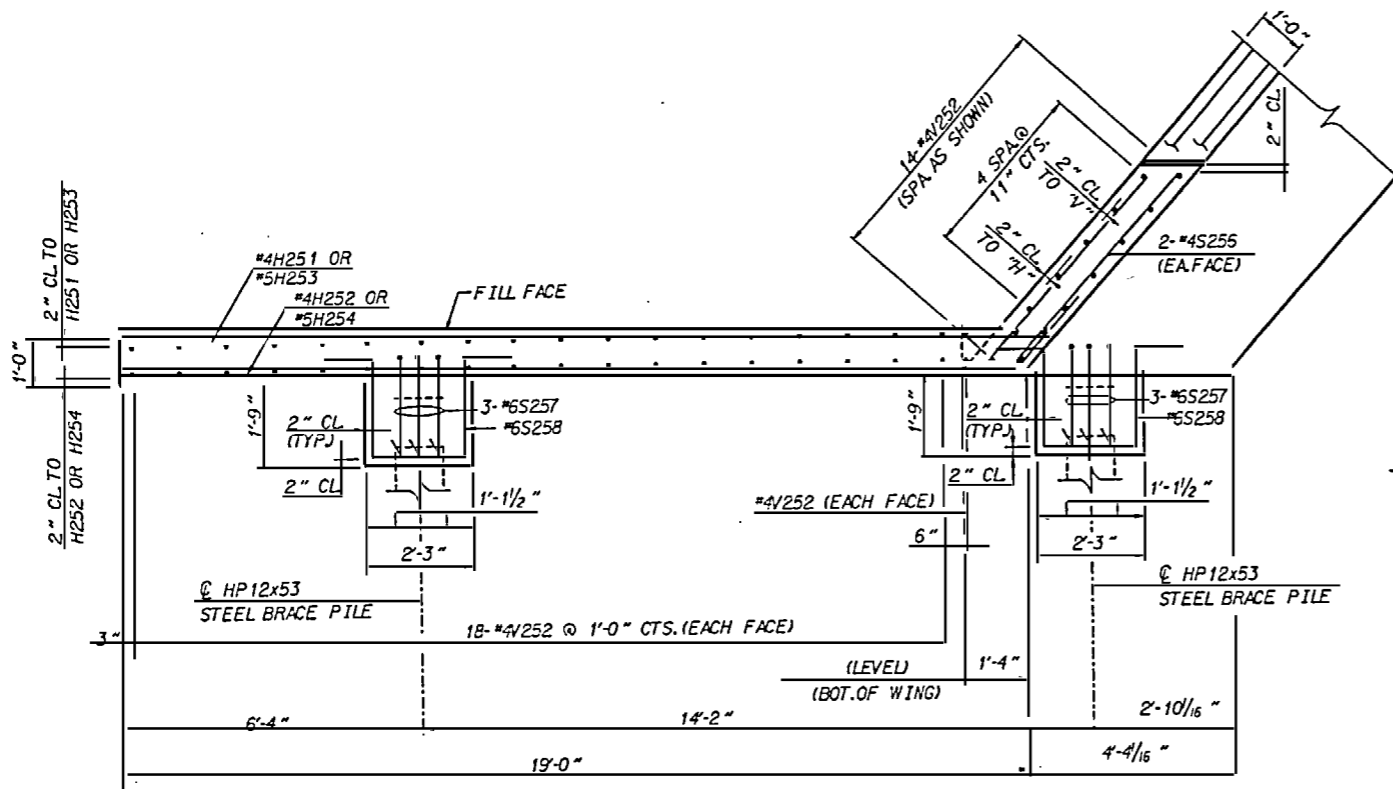
RUMMEL, KLEPPER & KAHL, LLP  
 consulting engineers  
 5800 FARINGTON PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27609-3960



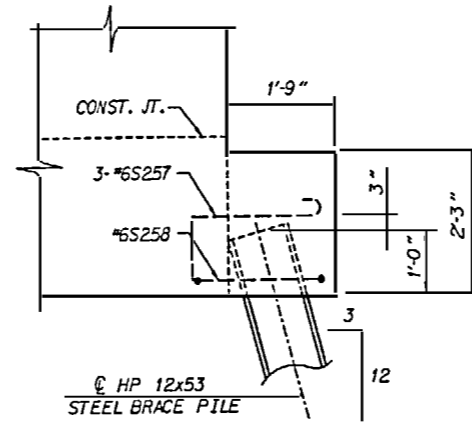
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2002  
 SHEET NO. 107

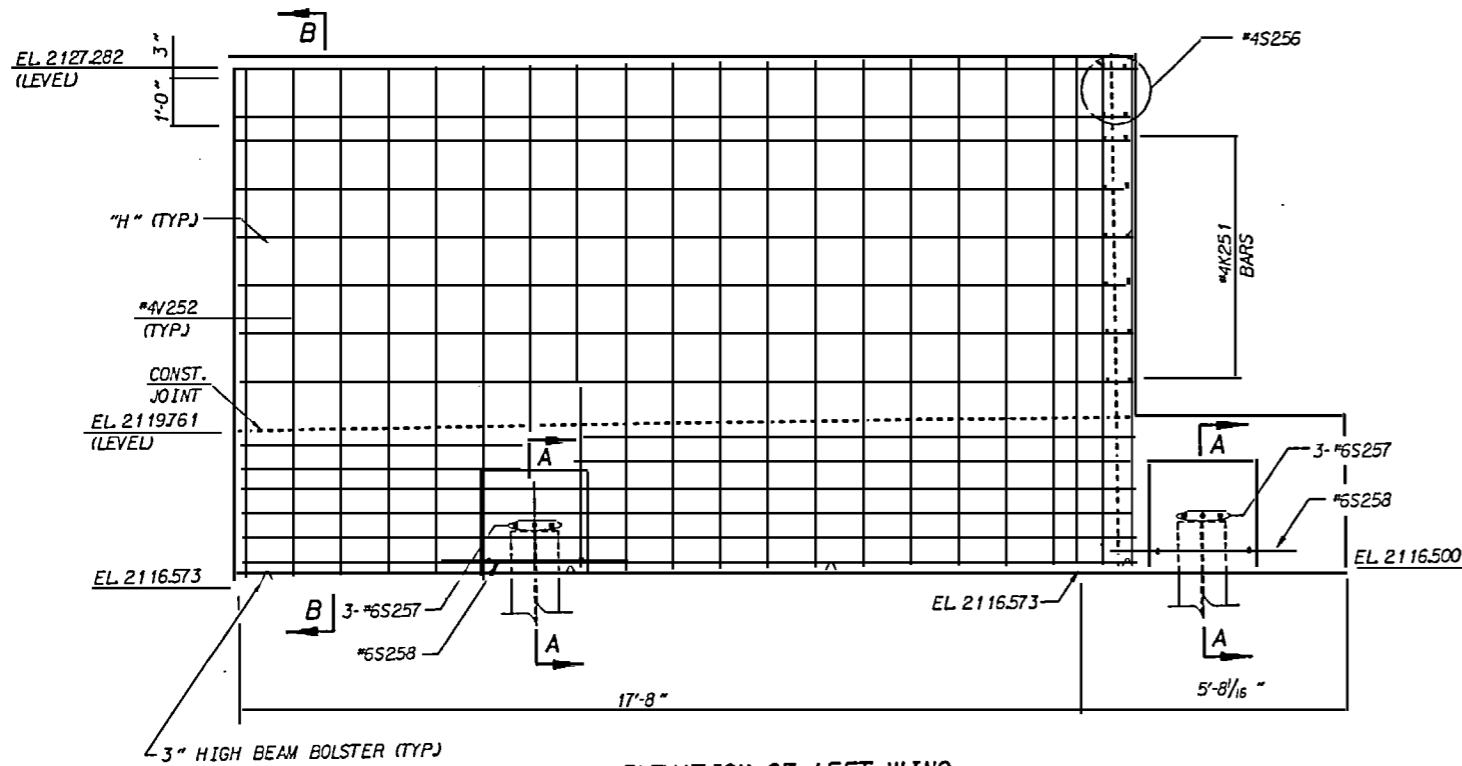
DRAWN BY: F D WEEDEN DATE: 04/02



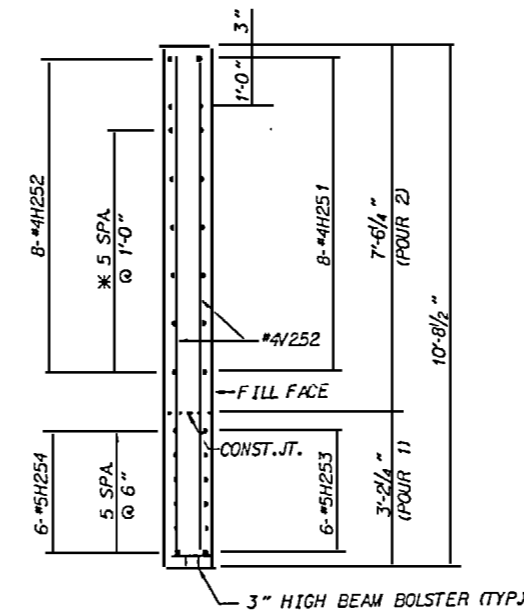
PLAN OF LEFT WING (W1)



SECTION A-A



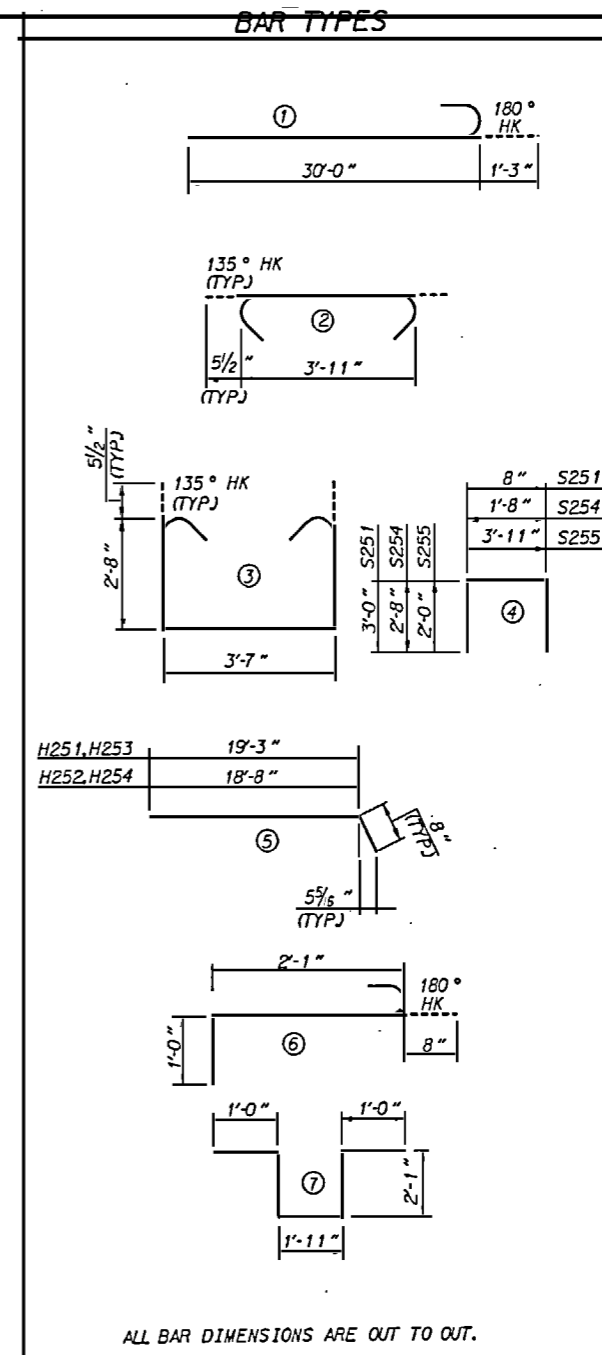
ELEVATION OF LEFT WING



SECTION B-B

\* MATCH TO "K" BARS IN BACKWALL

TOTAL QUANTITIES - END BENT 2				
	REINFORCING STEEL	CLASS "A" CONCRETE	HP 12 x 53 STEEL PILES	
			NO.	LIN. FT.
STAGE 1	9,531 LBS.	528 CY.	19	855
STAGE 2	8,949 LBS.	55.1 CY.	18	870
TOTAL	18,480 LBS.	1079 CY.	37	1,655



BILL OF MATERIAL

END BENT 2 (STAGE 2)						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
B251	12	#9	1	31'-3"	1,275	
B252	6	#9	STR.	40'-8"	830	
B253	6	#9	STR.	43'-2"	881	
B254	8	#5	STR.	33'-8"	281	
B255	24	#4	STR.	23'-1"	370	
B256	15	#4	STR.	3'-11"	39	
B257	30	#4	STR.	1'-10"	37	
H251	8	#4	5	19'-11"	106	
H252	8	#4	5	19'-4"	103	
H253	6	#5	5	19'-11"	125	
H254	6	#5	5	19'-4"	121	
K251	36	#4	STR.	23'-1"	555	
S251	59	#4	STR.	6'-8"	263	
S252	91	#5	2	4'-10"	459	
S253	182	#5	3	9'-10"	1,857	
S254	49	#4	4	7'-0"	224	
S255	15	#4	4	7'-11"	79	
S256	4	#4	STR.	5'-2"	14	
S257	6	#6	6	3'-9"	34	
S258	2	#6	7	8'-1"	24	
V251	118	#5	STR.	7'-4"	903	
V252	52	#4	STR.	10'-4"	359	
REINFORCING STEEL						8,949 LBS.
CLASS "A" CONCRETE						
POUR 1 (CAP & LOWER WINGS)						35.3 CY.
POUR 2 (BACKWALL & UPPER WINGS)						19.8 CY.
TOTAL						55.1 CY.
HP 12X53 STEEL PILES						
NO.						18
L.F.						870

PROJECT NO. R-2214A  
 HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV-P.O.

SHEET 5 OF 5

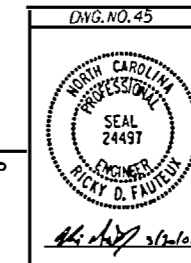
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 END BENT 2 WING  
 DETAILS & B.O.M.  
 STAGE 2**

MAY

2002

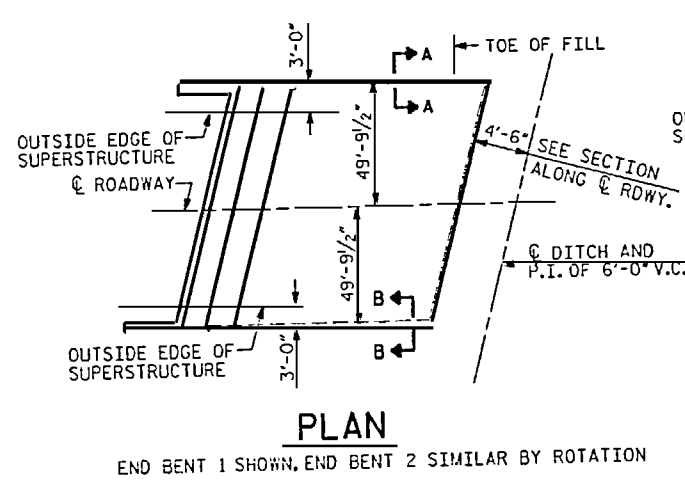
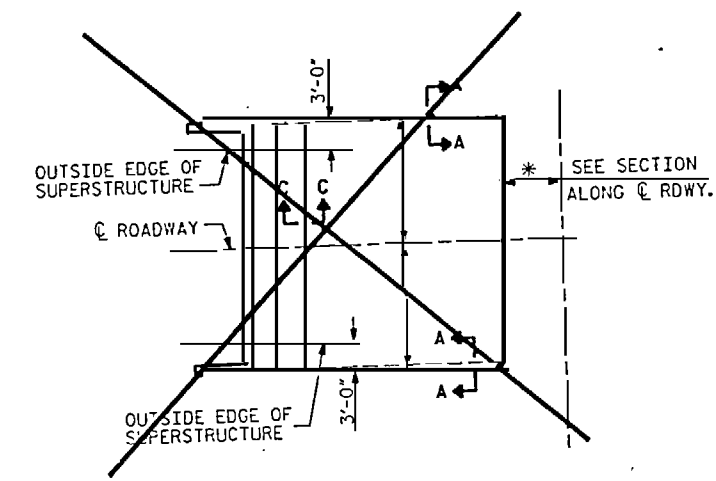
REVISIONS						SHEET NO S-102
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 107
2			4			



**Rummel, Klepper & Kahl, LLP**  
 consulting engineers  
 5300 FARINGTON PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27609-3560

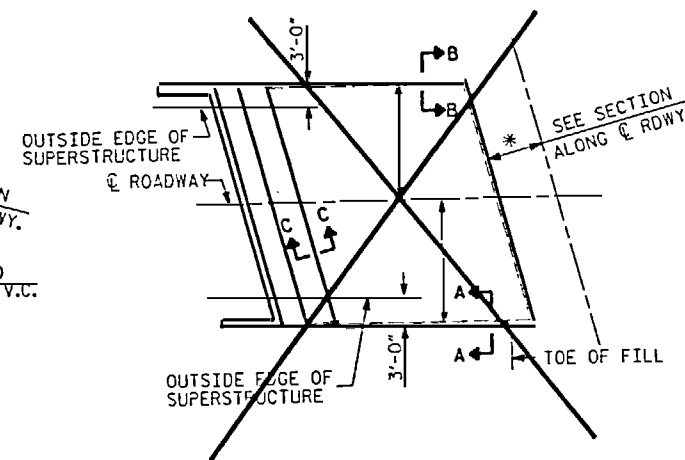
DRAWN BY: F. D. WEEDEN DATE: 04/02  
 CHECKED BY: R. D. FAUTEUX DATE: 04/02

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**PLAN**

END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION



**GENERAL NOTES**

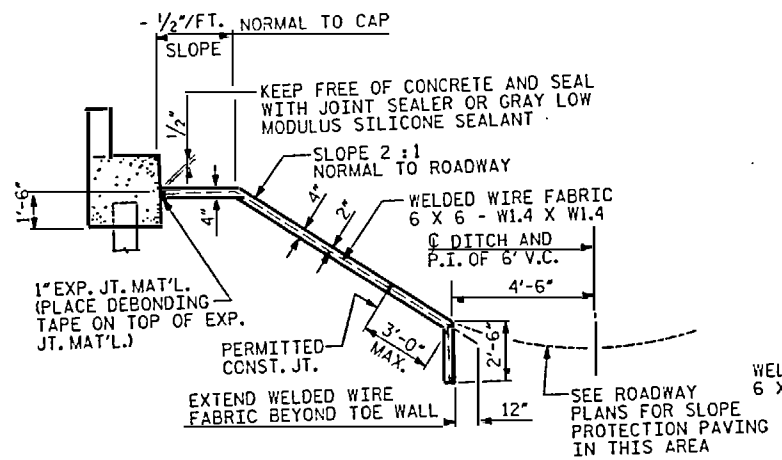
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. THE CONTRACTOR, AT HIS OPTION, MAY USE ALTERNATE "B" ONLY FOR HIGHWAY OVER HIGHWAY GRADE SEPARATIONS WITH 2:1 END BENT SLOPE IN RURAL, UNPOPULATED AREAS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. METHOD OF MEASUREMENT AND BASIS OF PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

**ALTERNATE "A"**

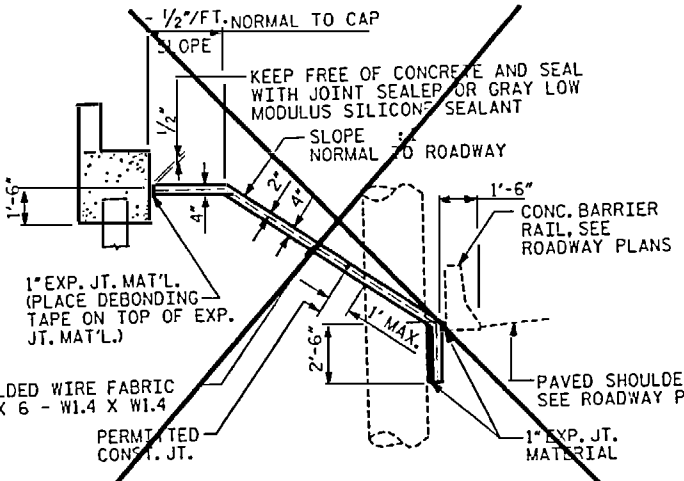
ALTERNATE "A" SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

**ALTERNATE "B"**

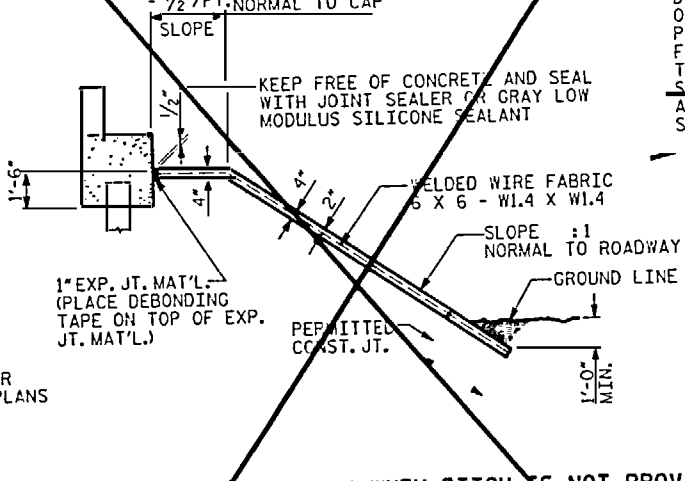
ALTERNATE "B" SHALL CONSIST OF A COMBINATION CONCRETE SLAB AND SLOPE PROTECTION. CONCRETE PORTIONS SHALL CONSIST OF PAVED STRIPS ALONG THE DITCH AS SHOWN IN THE DETAILS. FILTER FABRIC AND STONE SHALL BE PLACED OVER THE REMAINING AREA SHOWN ON THE PLANS TO BE COVERED WITH SLOPE PROTECTION. CONCRETE SHALL BE CLASS "B". THE COST OF THE CONCRETE, FILTER FABRIC, STONE AND WELDED WIRE FABRIC 6 X 6 - W1.4 X W1.4 SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION. THE STANDARD SPECIFICATIONS EXCEPT FOR SLOPE PROTECTION, SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT FOR SLOPE PROTECTION. SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO APPLICATION.



SECTION ALONG C ROADWAY WHEN FILL CATCHES IN DITCH



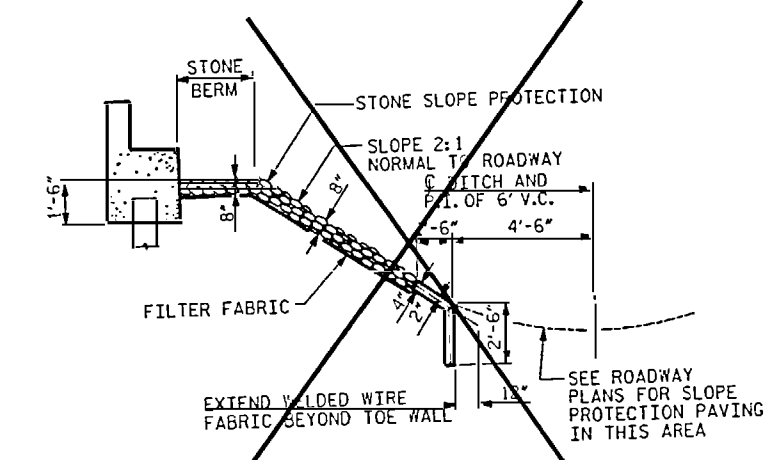
SECTION ALONG C ROADWAY WITH SHOULDER PIER



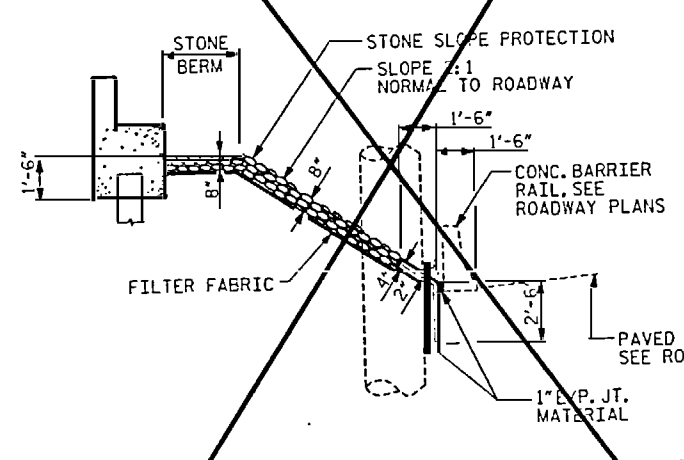
SECTION ALONG C ROADWAY WHEN DITCH IS NOT PROVIDED

BRIDGE @ STA. 332+10.60-L1REV-	4 INCH SLOPE PROTECTION	WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	785	1,550
END BENT 2	890	1,770

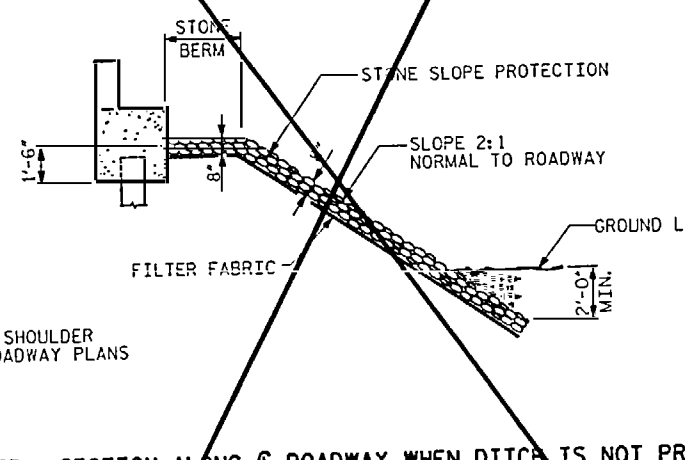
**DETAILS FOR ALTERNATE "A"**



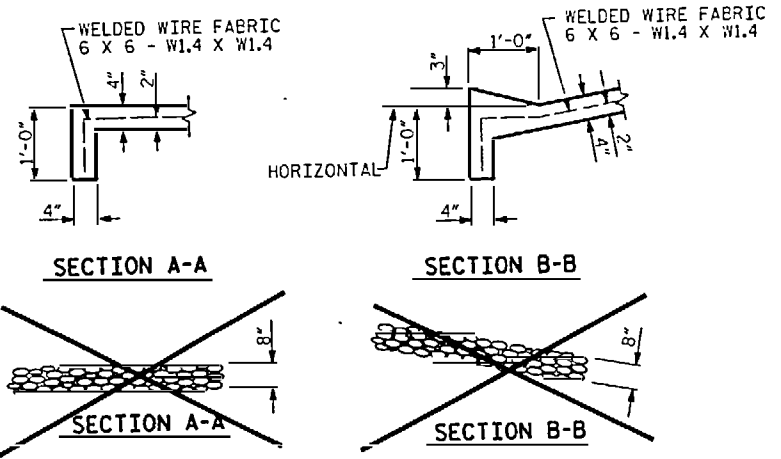
SECTION ALONG C ROADWAY WHEN FILL CATCHES IN DITCH



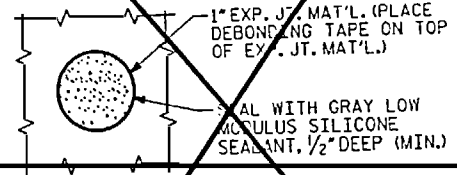
SECTION ALONG C ROADWAY WITH SHOULDER PIER



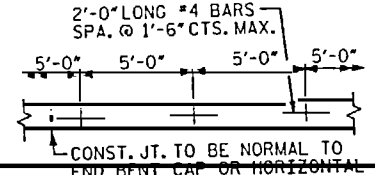
SECTION ALONG C ROADWAY WHEN DITCH IS NOT PROVIDED



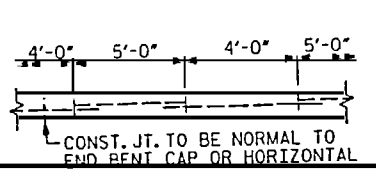
**DETAILS FOR ALTERNATE "B"**



PLAN WHERE CONCRETE SLOPE PROTECTION MUST BE PLACED AROUND BENT COLUMN



POURING DETAIL  
STRIP WIDTHS MAY VARY IN CURVED PORTION.

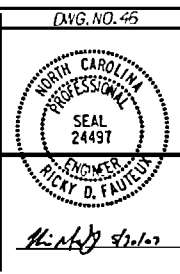


OPTIONAL POURING DETAIL  
POUR A 4'-0" STRIP FIRST, STRIP WIDTHS MAY VARY IN CURVED PORTION.

ASSEMBLED BY: F.D. WEEDEN DATE: 04/02  
 CHECKED BY: R.O. FAUTEUX DATE: 04/02  
 DRAWN BY: ELR 5/92  
 CHECKED BY: CRP 6/92

REV. 8/16/99 RH/RDR  
 REV. 10/17/00 LES/RDR  
 REV. 7/10/01 LES/RDR

RUMMEL, KLEPPER & KAHL, LLP  
 consulting engineers  
 5800 FARINGDON PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27609-3360

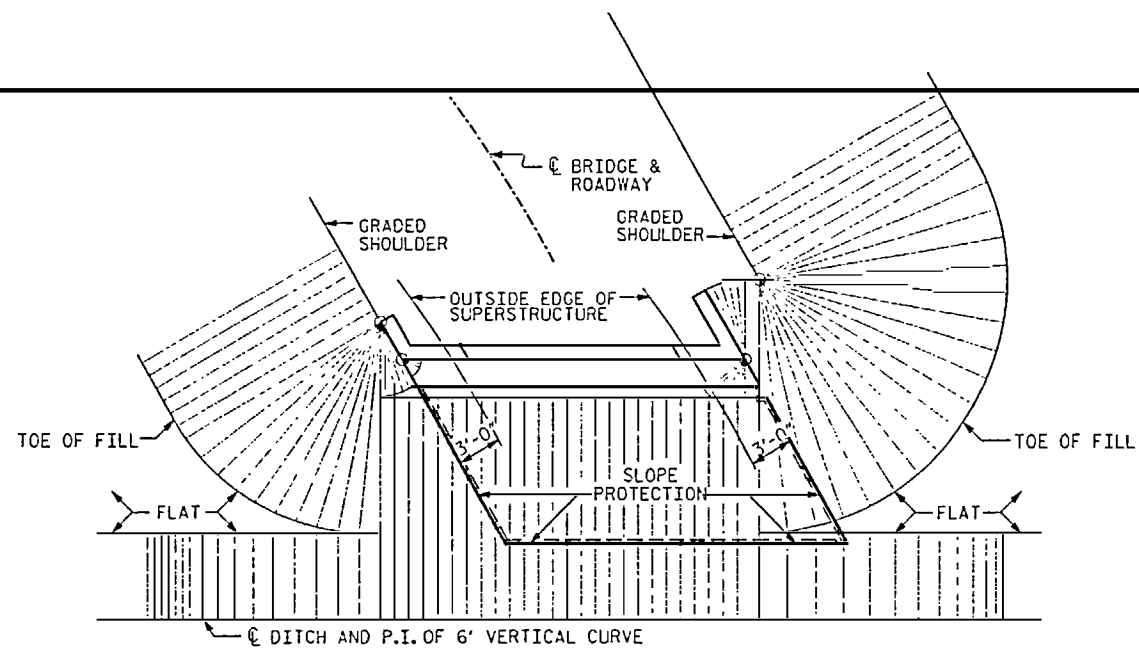


PROJECT NO. R-2214A  
 HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.

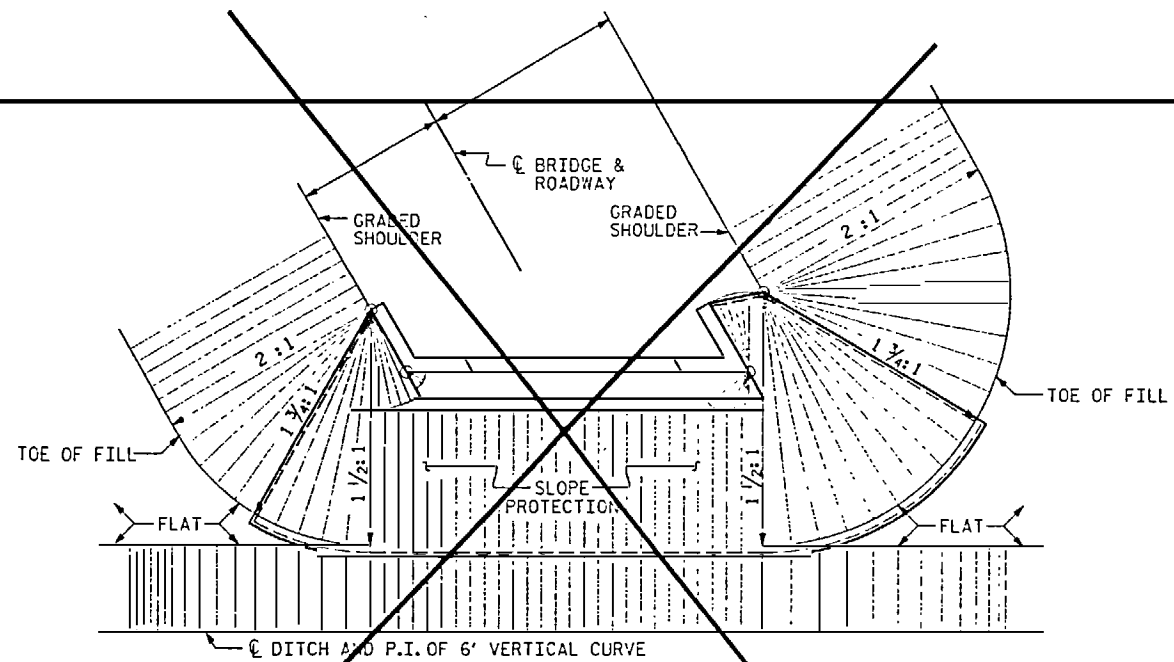
SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		STANDARD SLOPE PROTECTION DETAILS	
NO. BY DATE NO. BY DATE			
1		3	
2		4	

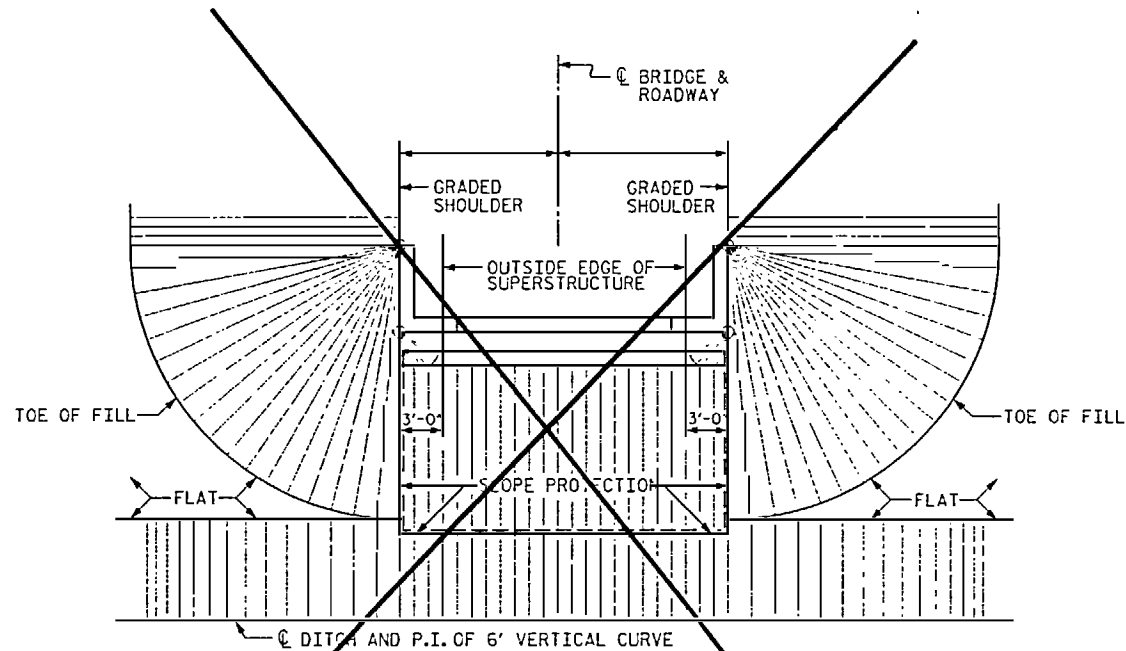
TOTAL SHEETS 107



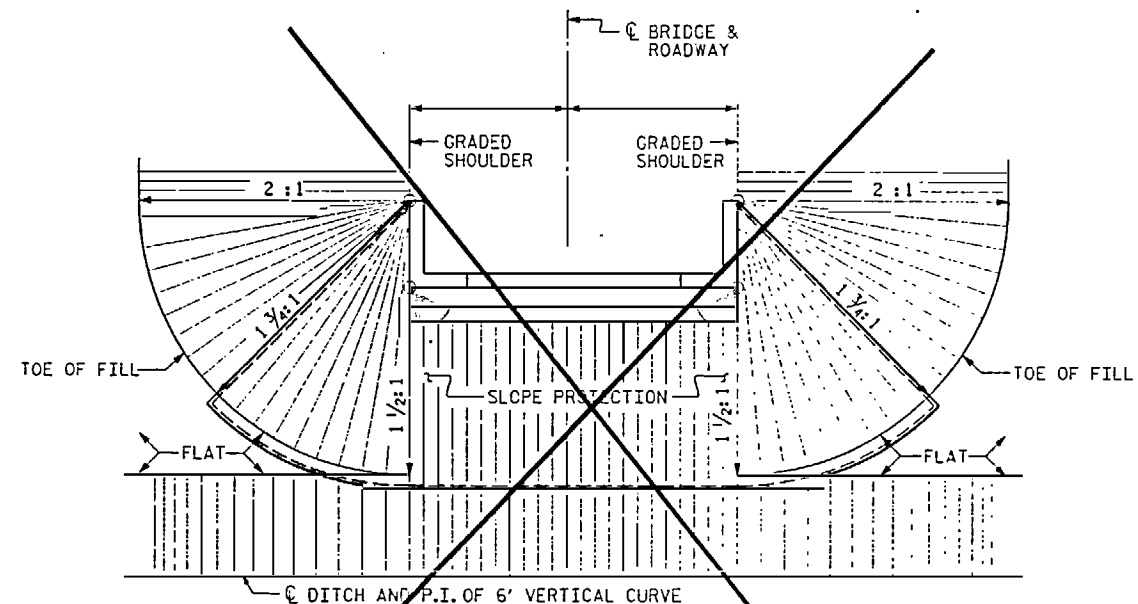
PLAN - END BENT WITH SWEEP BACK WINGS - SKEWED  
( 2:1 SLOPE )



PLAN - END BENT WITH SWEEP BACK WINGS - SKEWED  
( 1 1/2:1 SLOPE )



PLAN - END BENT WITH SWEEP BACK WINGS - 90°  
( 2:1 SLOPE )



PLAN - END BENT WITH SWEEP BACK WINGS - 90°  
( 1 1/2:1 SLOPE )

PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+10.60 -L1REV- P.O.C.

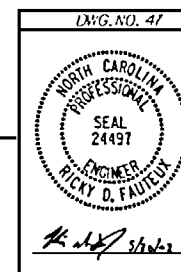
SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
SLOPE PROTECTION  
DETAILS

MAY

2002



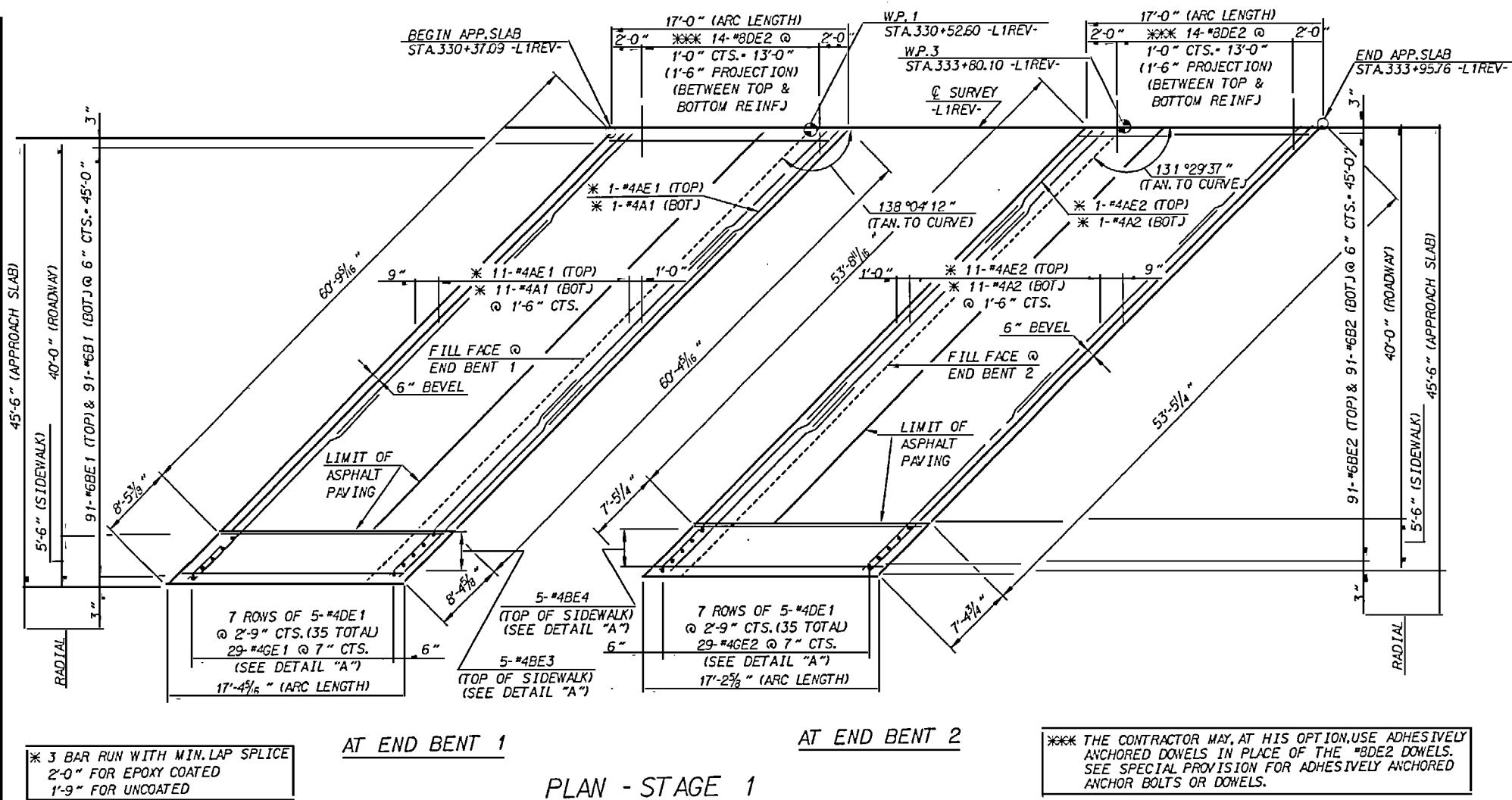
RUMEL, KLEPPER & KAHL, LLP  
consulting engineers  
5800 FARRINGTON PLACE - SUITE 105  
RALEIGH, NORTH CAROLINA 27609-3960

REVISIONS						SHEET NO. S-104
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 107
2			4			

ASSEMBLED BY : F.D. WEEDEN	DATE : 04/02
CHECKED BY : R.D. FAUTEUX	DATE : 04/02
DRAWN BY : WJH 10/88	REV. 8/28/92 ELR/GRP
CHECKED BY : FCJ 10/88	REV. 2/6/97 EEM/RGW
	REV. 7/17/98 REX/RWW

CALCULATIONS TO BE SUBMITTED TO THE STATE OF NORTH CAROLINA





AT END BENT 1

AT END BENT 2

PLAN - STAGE 1

\* 3 BAR RUN WITH MIN. LAP SPLICE  
2'-0" FOR EPOXY COATED  
1'-9" FOR UNCOATED

\*\*\* THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED DOWELS IN PLACE OF THE #4BE2 DOWELS. SEE SPECIAL PROVISION FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS.

NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

TEMPORARY DRAINAGE AND TEMPORARY BERM AND SLOPE DRAINS WILL BE PAID FOR UNDER THE LUMP SUM PRICE FOR BRIDGE APPROACH SLAB.

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.

THE 6" COMP. ABC. SHALL EXTEND 10'-0" BEYOND THE END OF THE APPROACH SLAB AND 1'-0" OUTSIDE OF EACH EDGE OF SLAB.

THE CONTRACTOR MAY USE 4" TYPE HB ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. ABC. IF THIS OPTION IS USED, THE BASE COURSE SHALL EXTEND 1'-0" BEYOND THE END OF THE APPROACH SLAB AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS 'A' CONCRETE BASE IN LIEU OF 6" COMP. ABC. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL EXTEND 1'-0" BEYOND THE END OF THE APPROACH SLAB AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

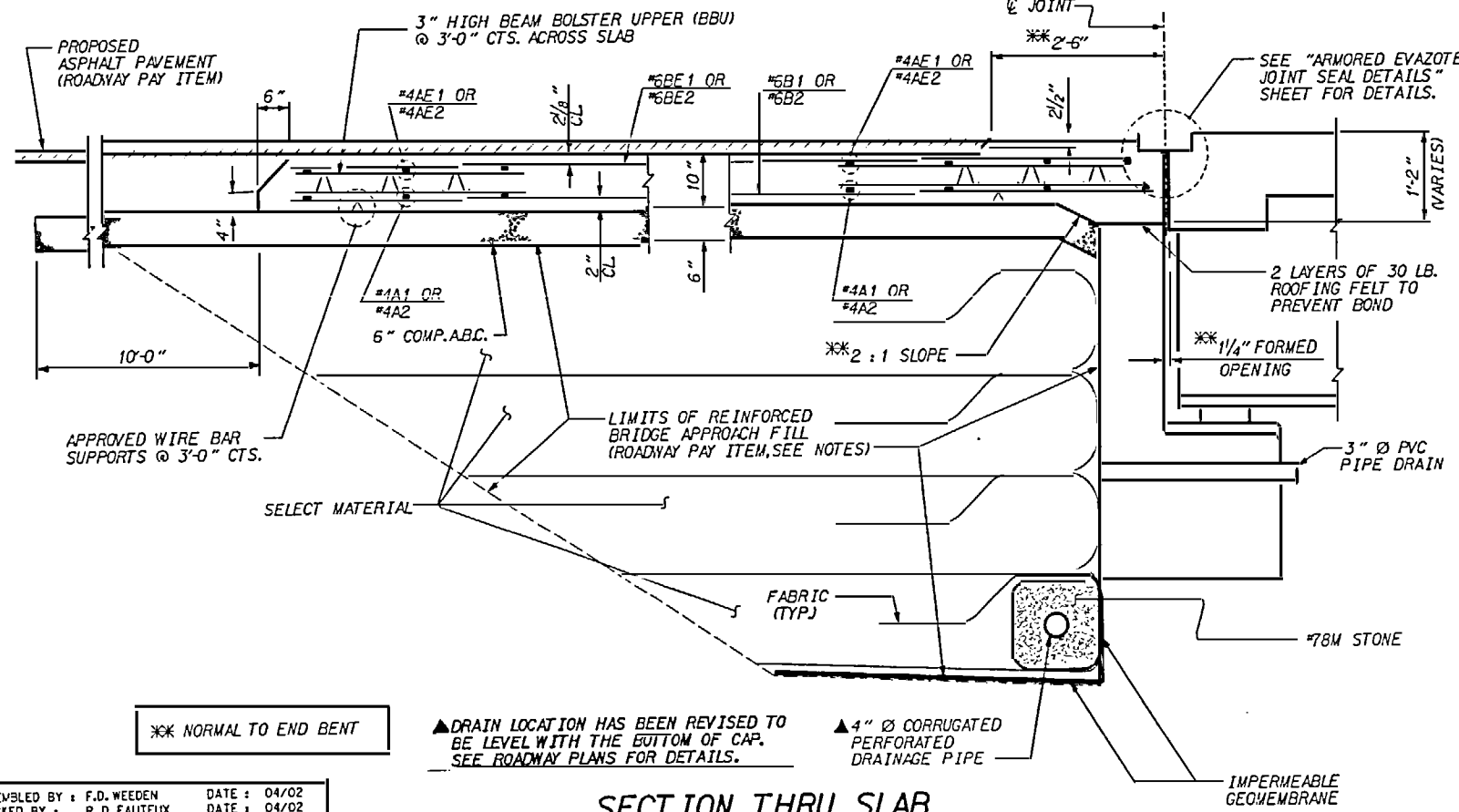
THE JOINT SHALL BE FORMED PRIOR TO THE CASTING OF THE PARAPET AND END POST.

APPROACH SLAB GROOVING IS NOT REQUIRED. TINE CONCRETE IN ACCORDANCE WITH ARTICLE 422-3 OF THE STANDARD SPECIFICATIONS EXCEPT ONLY TINE WITHIN THE LIMITS OF THE ASPHALT PAVEMENT.

WITH EVAZOTE JOINT SEAL

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 3/8".



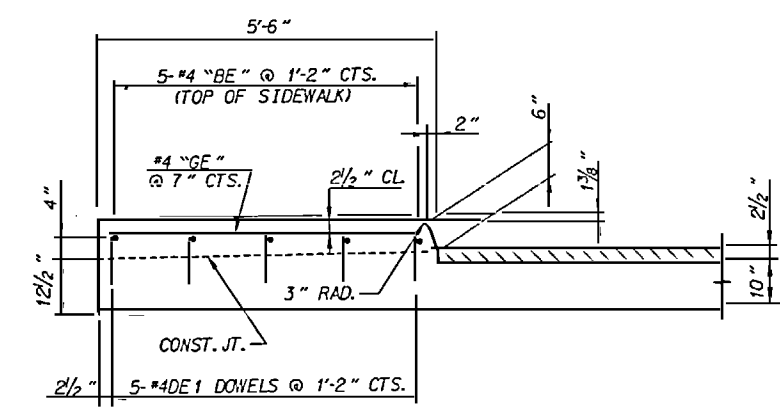
SECTION THRU SLAB

\*\*\* NORMAL TO END BENT

▲ DRAIN LOCATION HAS BEEN REVISED TO BE LEVEL WITH THE BOTTOM OF CAP. SEE ROADWAY PLANS FOR DETAILS.

▲ 4" Ø CORRUGATED PERFORATED DRAINAGE PIPE

\* #4DE1 DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER APPROACH SLAB HAS BEEN SCREEDED OFF.



DETAIL "A"

BILL OF MATERIAL (STAGE 1)

APPROACH SLAB AT END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
AE1	36	#4	STR.	24'-3"	583
BE1	91	#5	STR.	15'-4"	2096
BE3	5	#4	STR.	16'-8"	56
DE1	35	#4	STR.	0'-9"	18
DE2	14	#8	STR.	3'-0"	112
GE1	29	#4	STR.	7'-7"	147
A1	36	#4	STR.	24'-1"	579
B1	91	#5	STR.	16'-5"	2244

APPROACH SLAB AT END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
AE2	36	#4	STR.	21'-7"	519
BE2	91	#5	STR.	15'-5"	2107
BE4	5	#4	STR.	16'-6"	55
DE1	35	#4	STR.	0'-9"	18
DE2	14	#8	STR.	3'-0"	112
GE2	29	#4	STR.	6'-8"	129
A2	36	#4	STR.	21'-5"	515
B2	91	#5	STR.	16'-6"	2255

APPROACH SLAB AT END BENT 1	
EPOXY COATED REINF. STEEL	3,012 LB.
UNCOATED REINFORCING STEEL	2,823 LB.
CLASS AA CONCRETE	286 C.Y.

APPROACH SLAB AT END BENT 2	
EPOXY COATED REINF. STEEL	2,940 LB.
UNCOATED REINFORCING STEEL	2,770 LB.
CLASS AA CONCRETE	283 C.Y.

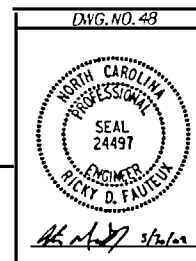
E = EPOXY COATED REINFORCING STEEL

PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+10.60 -L1REV- P.O.C.

SHEET 1 OF 3  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
STANDARD  
BRIDGE APPROACH SLAB  
FOR FLEXIBLE PAVEMENT  
WITH REINFORCED BRIDGE  
APPROACH FILL  
MAY STAGE 1 2002

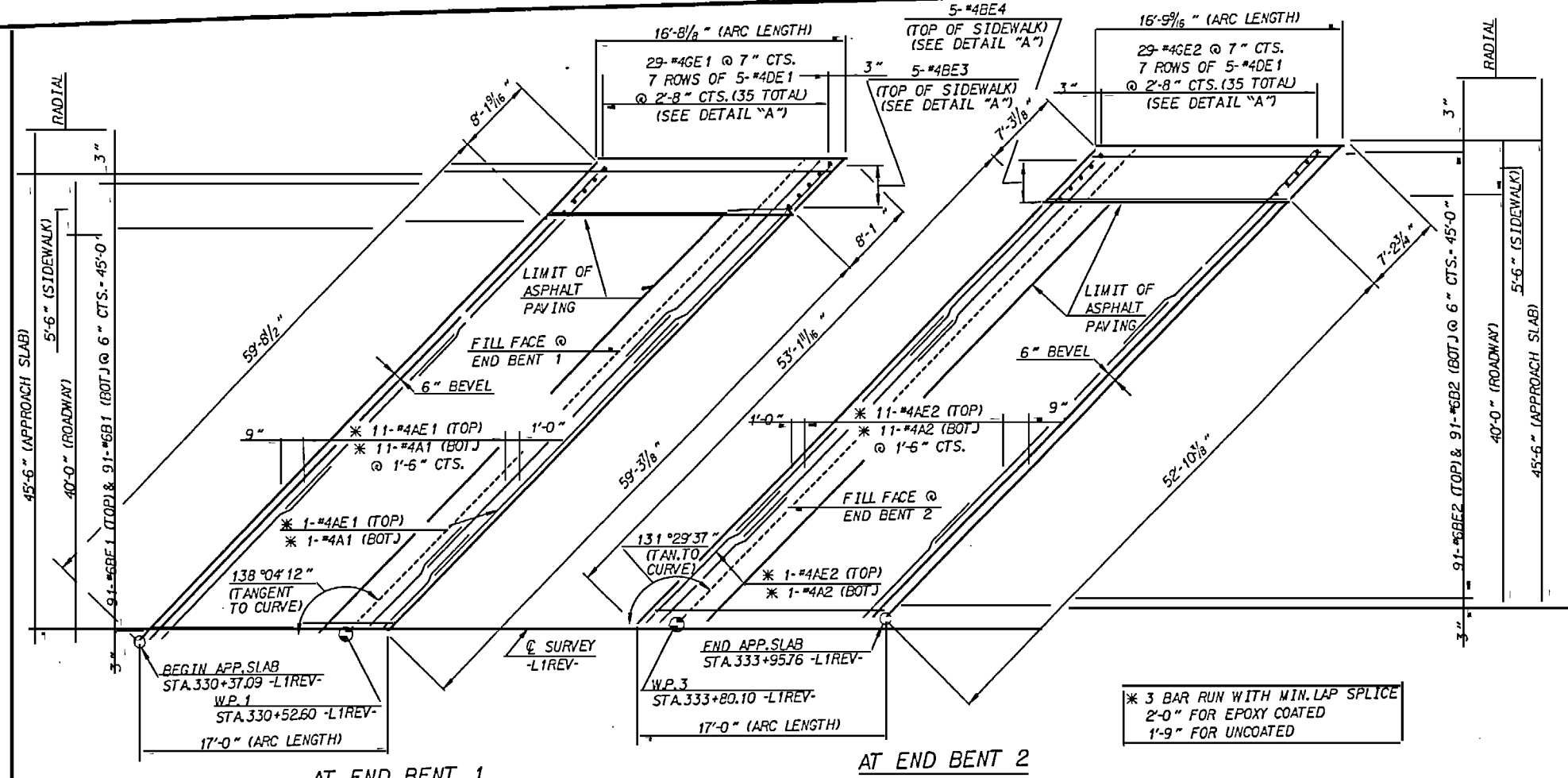
ASSEMBLED BY: F.D. WEEDEN DATE: 04/02  
CHECKED BY: R.D. FAUTEUX DATE: 04/02  
DRAWN BY: EEM 3/95 REV. 8/16/99 RWW/LES  
CHECKED BY: VAP 3/95 REV. 10/17/00 RWW/LES  
REV. 7/10/01R LES/RDR

RUMMELKLEPPER & KAHL, LLP  
consulting engineers  
5800 FARMINGTON PLACE - SUITE 105  
RALEIGH, NORTH CAROLINA 27609-3960



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

TOTAL SHEETS: 107



PLAN - STAGE 2

NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #7M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

TEMPORARY DRAINAGE AND TEMPORARY BERM AND SLOPE DRAINS WILL BE PAID FOR UNDER THE LUMP SUM PRICE FOR BRIDGE APPROACH SLAB.

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.

THE 6" COMP. ABC. SHALL EXTEND 10'-0" BEYOND THE END OF THE APPROACH SLAB AND 1'-0" OUTSIDE OF EACH EDGE OF SLAB.

THE CONTRACTOR MAY USE 4" TYPE HB ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. ABC. IF THIS OPTION IS USED, THE BASE COURSE SHALL EXTEND 1'-0" BEYOND THE END OF THE APPROACH SLAB AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS 'A' CONCRETE BASE IN LIEU OF 6" COMP. ABC. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL EXTEND 1'-0" BEYOND THE END OF THE APPROACH SLAB AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

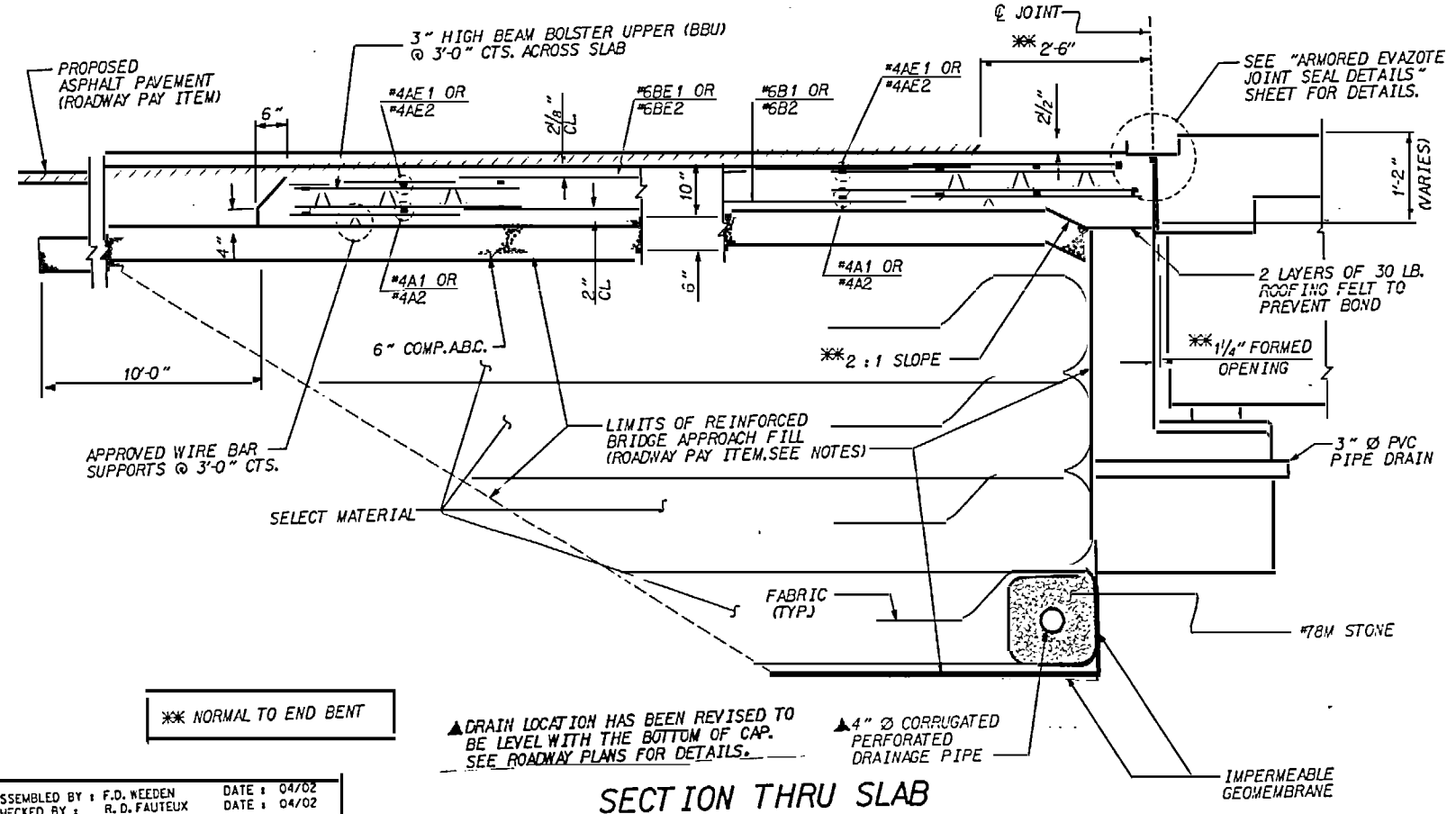
THE JOINT SHALL BE FORMED PRIOR TO THE CASTING OF THE PARAPET AND END POST.

APPROACH SLAB GROOVING IS NOT REQUIRED. TINE CONCRETE IN ACCORDANCE WITH ARTICLE 422-3 OF THE STANDARD SPECIFICATIONS EXCEPT ONLY TINE WITHIN THE LIMITS OF THE ASPHALT PAVEMENT.

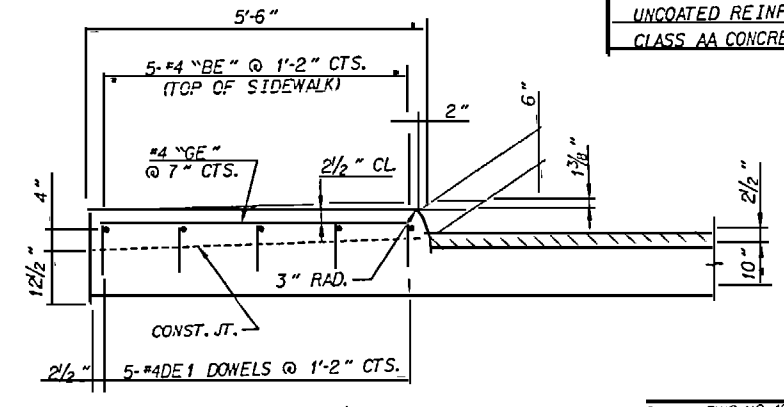
BILL OF MATERIAL (STAGE 2)

APPROACH SLAB AT END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
AE1	36	#4	STR.	23'-10"	573
BE1	91	#6	STR.	14'-11"	2039
BE3	5	#4	STR.	16'-1"	54
DE1	35	#4	STR.	0'-9"	18
GF1	29	#4	STR.	7'-3"	140
A1	35	#4	STR.	23'-8"	559
B1	91	#6	STR.	16'-1"	2198
APPROACH SLAB AT END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
AE2	36	#4	STR.	21'-4"	513
BE2	91	#6	STR.	15'-3"	2034
BE4	5	#4	STR.	16'-2"	54
DE1	35	#4	STR.	0'-9"	18
GE2	29	#4	STR.	6'-6"	126
A2	35	#4	STR.	21'-2"	509
B2	91	#6	STR.	16'-3"	2221
APPROACH SLAB AT END BENT 1					
EPOXY COATED REINF. STEEL				2,824 LB.	
UNCOATED REINFORCING STEEL				2,767 LB.	
CLASS AA CONCRETE				27.4 C.Y.	
APPROACH SLAB AT END BENT 2					
EPOXY COATED REINF. STEEL				2,795 LB.	
UNCOATED REINFORCING STEEL				2,730 LB.	
CLASS AA CONCRETE				27.3 C.Y.	
E - EPOXY COATED REINFORCING STEEL					

\* 3 BAR RUN WITH MIN. LAP SPLICE 2'-0" FOR EPOXY COATED 1'-9" FOR UNCOATED



SECTION THRU SLAB



DETAIL "A"

\*#4E1 DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER APPROACH SLAB HAS BEEN SCREEDED OFF.

TOTAL BILL OF MATERIAL			
ITEM	END BENT 1	END BENT 2	TOTAL
EPOXY COATED REINF. STEEL	5,836 LB.	5,735 LB.	11,571 LB.
UNCOATED REINFORCING STEEL	5,590 LB.	5,500 LB.	11,030 LB.
CLASS AA CONCRETE	56.0 C.Y.	55.6 C.Y.	111.6 C.Y.

PROJECT NO. R-2214A  
 HENDERSON COUNTY  
 STATION: 332+10.60 -L1REV- P.O.C.

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR FLEXIBLE PAVEMENT  
 WITH REINFORCED BRIDGE  
 APPROACH FILL

MAY STAGE 2 2002

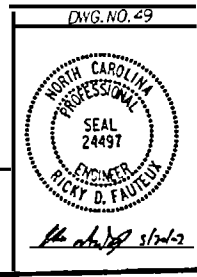
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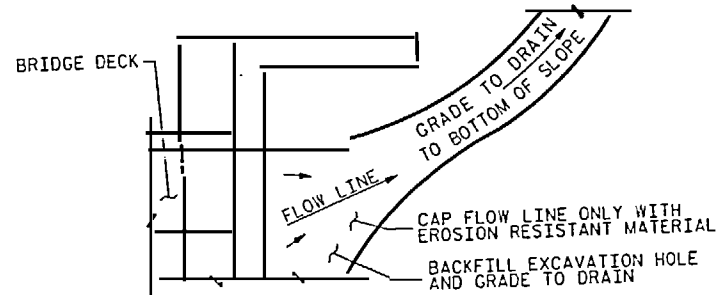
TOTAL SHEETS 107

RUMMEL, KLEPPER & KAHL, LLP  
 consulting engineers  
 5800 FAIRLAWN PLACE - SUITE 105  
 RALEIGH, NORTH CAROLINA 27619-3960



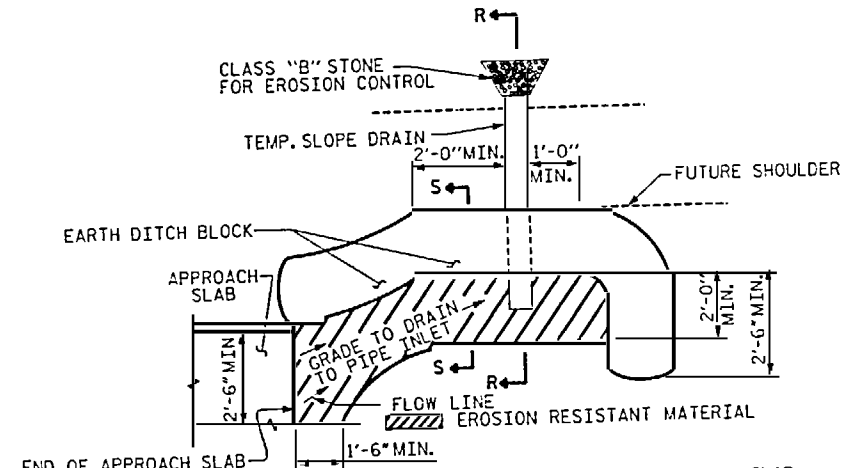
ASSEMBLED BY: F.D. WEEDEN DATE: 04/02  
 CHECKED BY: R.D. FAUTEUX DATE: 04/02

DRAWN BY: EEM 3/95 REV. 8/16/99 RWW/LES  
 CHECKED BY: VAP 3/95 REV. 10/17/00 RWW/LES  
 REV. 7/10/01R LES/RDR



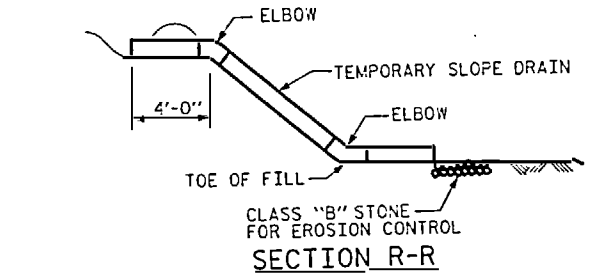
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

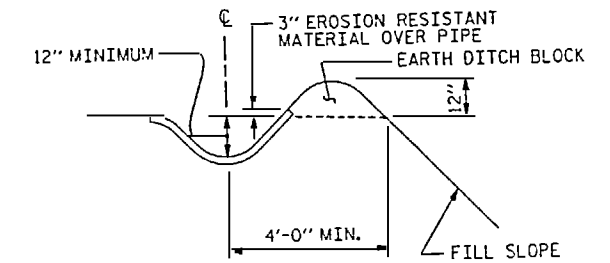


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW



SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

NOTE:  
ARC OFFSETS TO OUTSIDE EDGE OF SLABS  
ARE NEGLIGABLE, THEREFORE NOT SHOWN.

NOTE:  
FOR JOINT SEAL DETAILS AT THE END BENTS  
SEE "ARMORED EVAZOTE SEAL DETAILS",  
SHEET 2 OF 2.

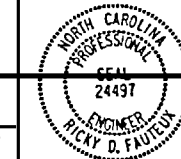
PROJECT NO. R-2214A  
HENDERSON COUNTY  
STATION: 332+10.60 -L1REV-P.O.C.

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD

**BRIDGE APPROACH  
SLAB DETAILS**

DWG. NO. 50



**RUMMEL, KLEPPER & KAHL LLP**  
consulting engineers  
5800 FARRINGTON PLACE - SUITE 105  
RALEIGH, NORTH CAROLINA 27609-3260

MAY 2002					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.  
**5-107**  
TOTAL SHEETS  
**107**

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ASSEMBLED BY :	F.D. WEEDEN	DATE :	04/02
CHECKED BY :	R. D. FAUTEUX	DATE :	04/02
DRAWN BY :	FCJ	11/88	REV. 7/17/98 RWW/LES
CHECKED BY :	ARB	11/88	REV. 8/16/99 MAB/LES
			REV. 10/17/00R RWW/LES