

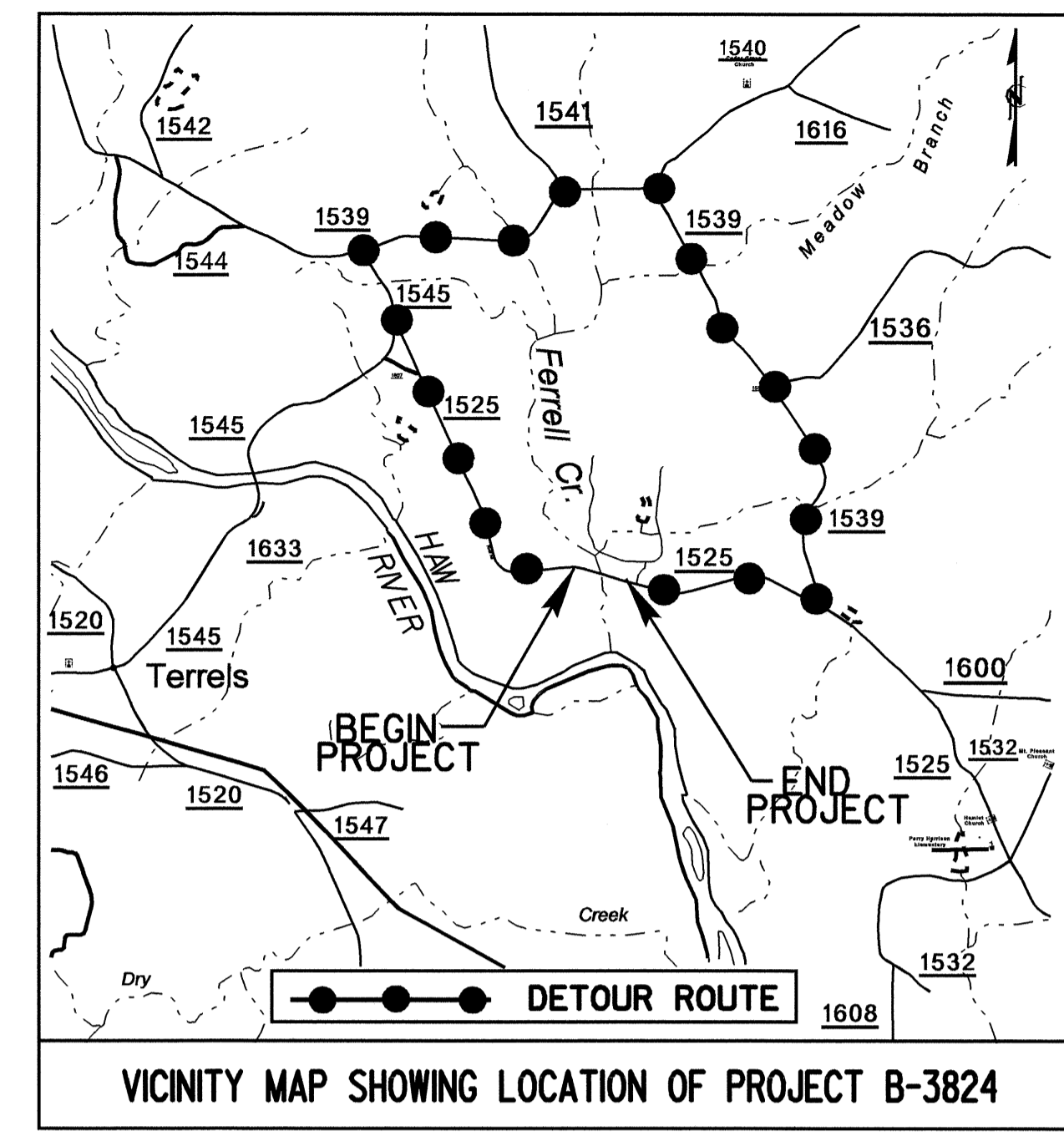
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3824		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33276.1.1	BRZ-1525(4)	P.E.	
33276.2.1	BRZ-1525(4)	ROW & UTIL	
33276.3.1	BRZ-1525(6)	CONSTR	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CHATHAM COUNTY

LOCATION: BRIDGE 88 OVER FERRELL'S CREEK ON SR 1525

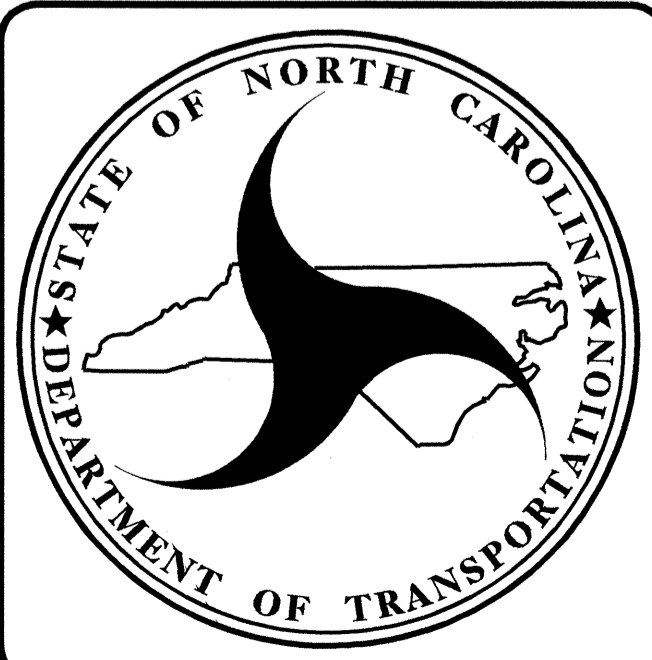
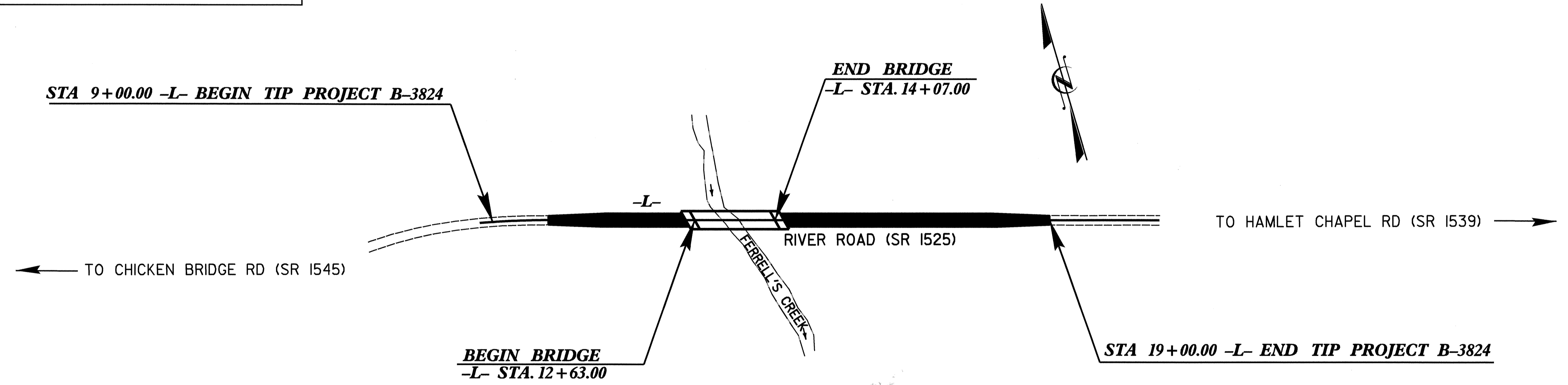
TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURE



TIP PROJECT: B-3824

CONTRACT: C201787

STRUCTURE



DESIGN DATA

ADT 2007 =	2616
ADT 2027 =	4376
DHV =	10 %
D =	65 %
T =	3 % *
* *V =	60 MPH
* TTST 1 %	DUAL 2 %
FUNC CLASS =	RURAL MINOR COLLECTOR

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-3824 =	0.162 MILES
LENGTH OF STRUCTURE TIP PROJECT B-3824 =	0.027 MILES
TOTAL LENGTH OF TIP PROJECT B-3824 =	0.189 MILES

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., NC, 27610

2006 STANDARD SPECIFICATIONS

LETTING DATE:
JANUARY 15, 2008

JOHN FRYE, PE
PROJECT ENGINEER

W. A. DAVIS, PE
PROJECT DESIGN ENGINEER

STRUCTURE DESIGN UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR

DATE

09/05/08 09:00:00 AM

12+50

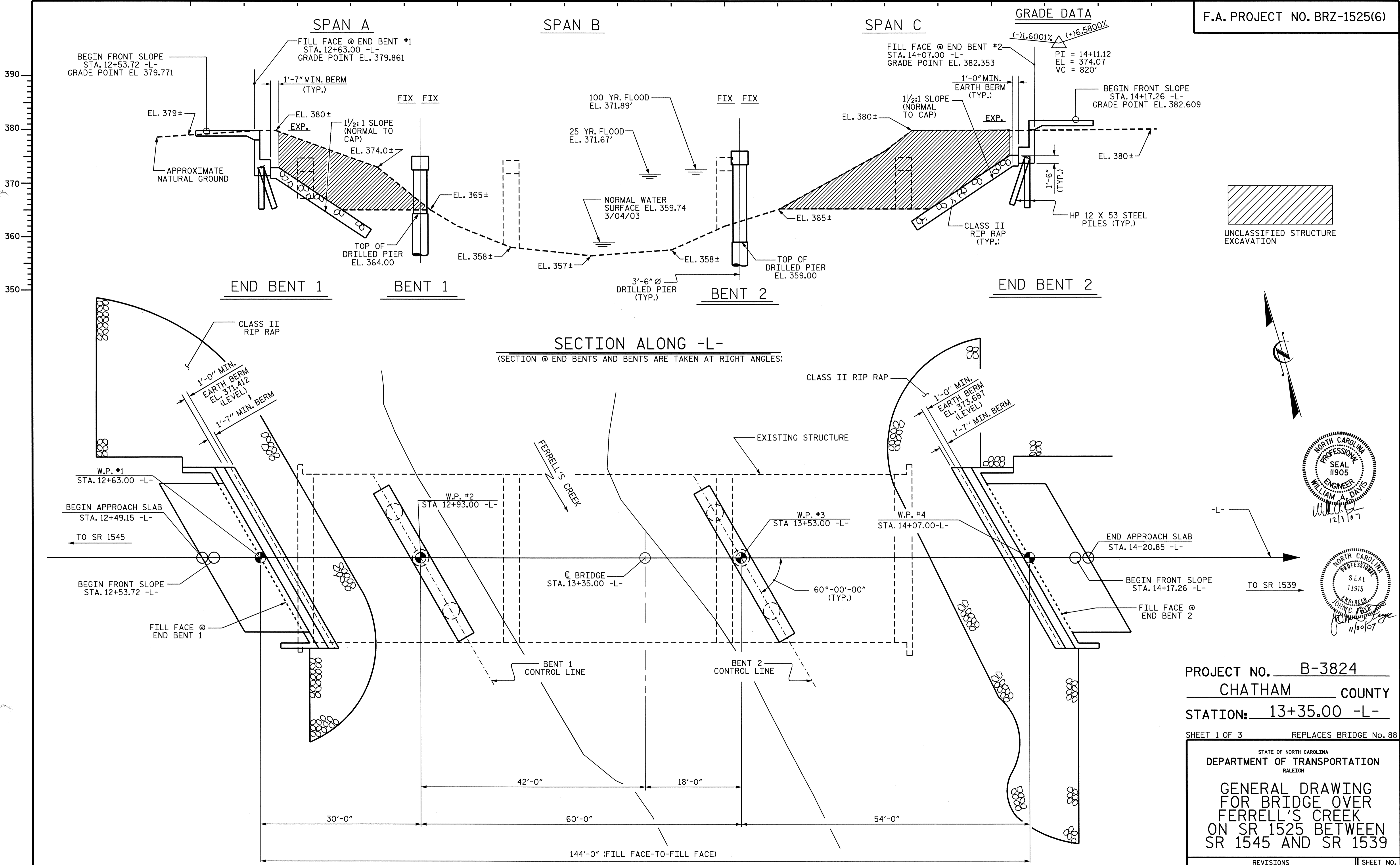
13+00

50

14+00

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qtnguyen

F.A. PROJECT NO. BRZ-1525(6)



GRADE DATA

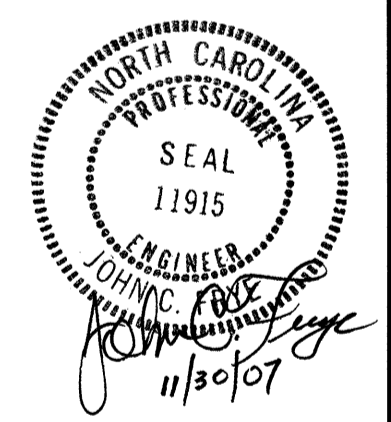
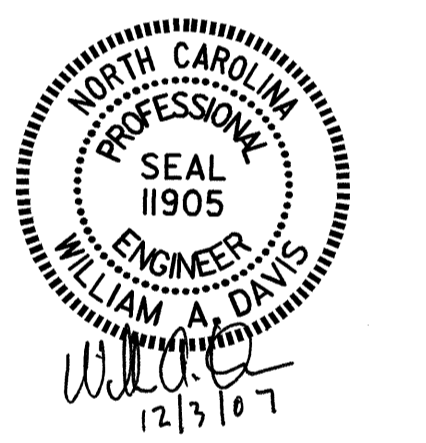
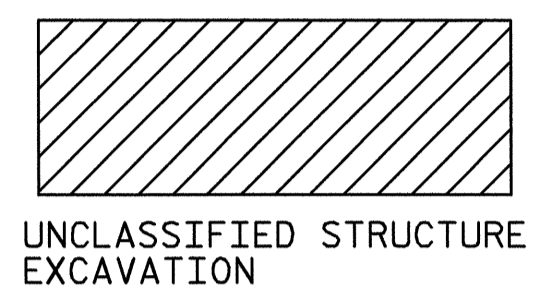
(-)-1.6001% (+)-6.5800%

PI = 14+11.12
EL = 374.07
VC = 820'

SECTION ALONG -L-
(SECTION @ END BENTS AND BENTS ARE TAKEN AT RIGHT ANGLES)

PLAN

(PILES NOT SHOWN IN PLAN VIEW FOR CLARITY)



PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-
 SHEET 1 OF 3 REPLACES BRIDGE No. 88

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER
 FERRELL'S CREEK
 ON SR 1525 BETWEEN
 SR 1545 AND SR 1539

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : T.L. CLELLAND/QTN DATE : 10/03/07
 CHECKED BY : W.A. DAVIS DATE : 10/03/07

NOTES

DRIVE PILES AT END BENT NO.1 AND 2 TO A REQUIRED BEARING CAPACITY OF 120 TONS PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO.

THE ALLOWABLE BEARING CAPACITY FOR PILES AT END BENTS NO.1 AND 2 IS 60 TONS PER PILE.

DRILLED PIERS AT BENT NO.1 ARE DESIGNED FOR BOTH SKIN FRICTION AND END BEARING. CHECK FIELD CONDITIONS FOR THE REQUIRED END BEARING CAPACITY OF 10 TSF.

DRILLED PIERS AT BENT NO.2 ARE DESIGNED FOR BOTH SKIN FRICTION AND END BEARING. CHECK FIELD CONDITIONS FOR THE REQUIRED END BEARING CAPACITY OF 10 TSF.

DRILLED PIERS AT BENT NO.1 ARE DESIGNED FOR AN APPLIED LOAD OF 237.5 TONS EACH AT THE TOP OF THE COLUMN.

DRILLED PIERS AT BENT NO.2 ARE DESIGNED FOR AN APPLIED LOAD OF 237.5 TONS EACH AT THE TOP OF THE COLUMN.

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

PERMANENT STEEL CASING IS NOT REQUIRED FOR DRILLED PIERS AT BENT NO.2.

DRILLED PIERS AT BENT NO.1 SHALL EXTEND TO AN ELEVATION NO HIGHER THEN 326 FT. AND SATISFY THE REQUIRED END BEARING CAPACITY.

DRILLED PIERS AT BENT NO.2 SHALL EXTEND TO AN ELEVATION NO HIGHER THEN 327 FT. AND SATISFY THE REQUIRED END BEARING CAPACITY.

THE SCOUR CRITICAL ELEVATIONS FOR BENT NO.1 IS ELEVATION 348 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

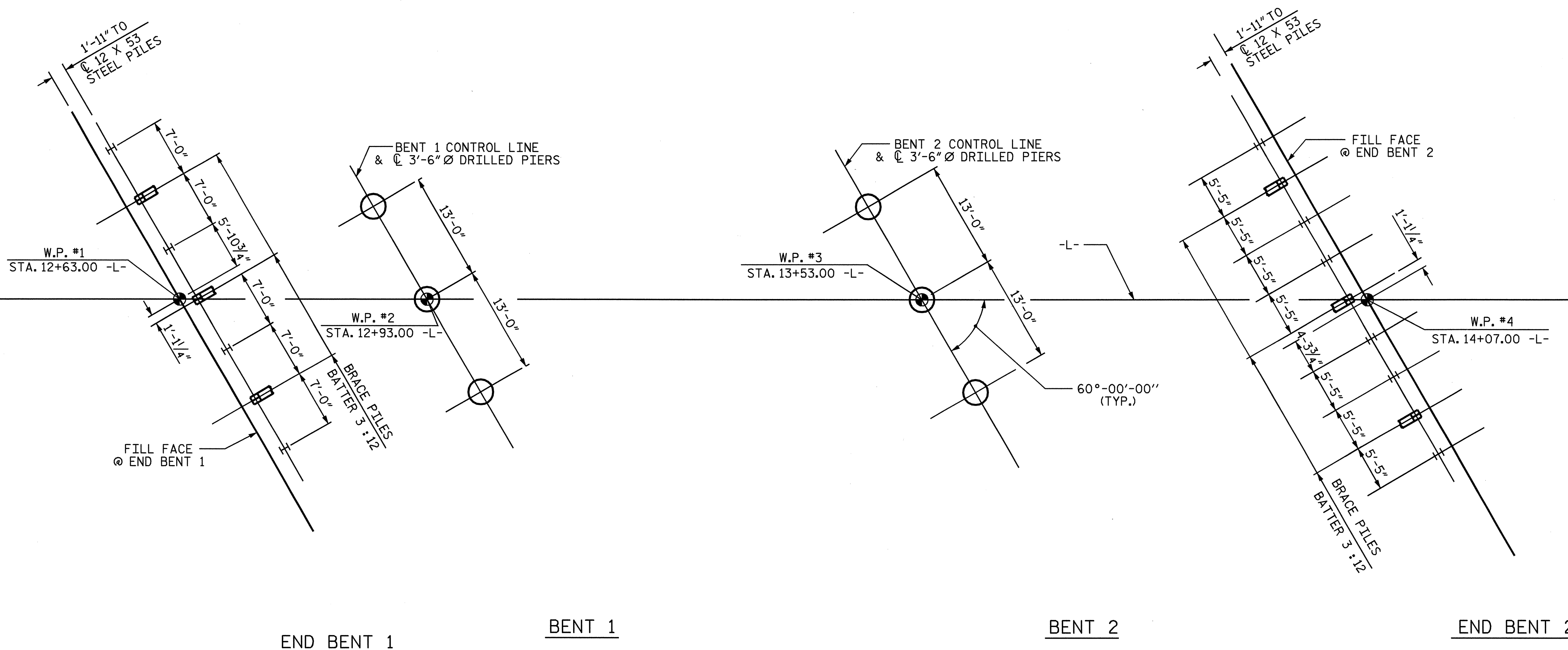
THE SCOUR CRITICAL ELEVATIONS FOR BENT NO.2 IS ELEVATION 348 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

FOR DRILLED PIERS, SEE DRILLED PIERS SPECIAL PROVISION.

SPT TESTING IS REQUIRED TO DETERMINE THE END BEARING CAPACITY OF THE DRILLED PIERS AT BENTS NO.1 AND 2. SEE DRILLED PIERS SPECIAL PROVISION.

SID INSPECTIONS ARE REQUIRED TO INSPECT THE BOTTOM CLEANLINESS OF THE DRILLED PIERS AT BENTS NO.1 AND 2. SEE DRILLED PIERS SPECIAL PROVISION.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR THE DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. SEE CROSSHOLE SONIC LOGGING SPECIAL PROVISION.

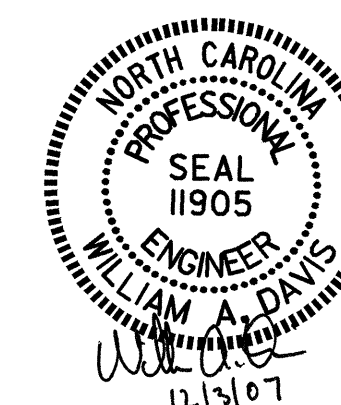


FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE)
 (DIMENSIONS LOCATING DRILLED PIERS ARE SHOWN TO THE DRILLED PIER CENTERLINE)

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 2 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER
 FERRELL'S CREEK
 ON SR 1525 BETWEEN
 SR 1545 AND SR 1539

DRAWN BY : J.L. CLELLAND/QTN DATE : 10/03/07
 CHECKED BY : W.A. DAVIS DATE : 10/03/07

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 atnauven

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTALS
2			4			37

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	3'-6" Ø DRILLED PIER IN SOIL	3'-6" Ø DRILLED PIER NOT IN SOIL	SID INSPECTION	SPT TESTING	CROSSHOLE SONIC LOGGING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	45" PRESTRESSED CONCRETE GIRDERS	HP 12 X 53 STEEL PILES	TWO BAR METAL RAIL	1'-0" X 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	EVAZOTE JT. SEALS	
	LUMP SUM	LIN. FT.	LIN. FT.	EA.	EA.	EA.	CY	SQ. FT.	SQ. FT.	CY	LUMP SUM	LBS.	LBS.	LIN. FT.	NO.	FT.	LIN. FT.	LIN. FT.	TONS	SQ. YD.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE								4897	4846					552.67			266.65	283.00				
END BENT #1							1378			28.1		4103			7	280			348	387		
BENT #1		105.0	9.0	3	3	1				23.2		13051	2914									
BENT #2		87.0	9.0	3	3	1				28.2		12855	2934									
END BENT #2							2065			29.0		4187			9	315			303	337		
TOTAL	LUMP SUM	192.0	18.0	6	6	2	3443	4897	4846	108.5	LUMP SUM	34196	5848	552.67	16	595	266.65	283.00	651	724	LUMP SUM	LUMP SUM

NOTES

ASSUMED LIVE LOAD = HS20 OR ALTERNATE LOADING, EXCEPT THAT THE GIRDERS HAVE BEEN DESIGNED FOR HS25.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

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 FT. BELOW THE GROUND LINE.

PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

THE EXISTING STRUCTURE CONSISTING OF 3 SPANS OF 40'-3", 40'-0" AND 35'-3" WITH A TIMBER DECK ON I-BEAMS AND A 20'-0" CLEAR ROADWAY WIDTH WITH A TIMBER DECK ON TIMBER CAP ON TIMBER PILES LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 35 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE MEASURED AND PAID FOR AT THE CONTRACT UNIT PRICE PER CUBIC YARD FOR UNCLASSIFIED STRUCTURE EXCAVATION.

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

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, 'EVALUATING SCOUR AT BRIDGES', MAY, 2001.

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

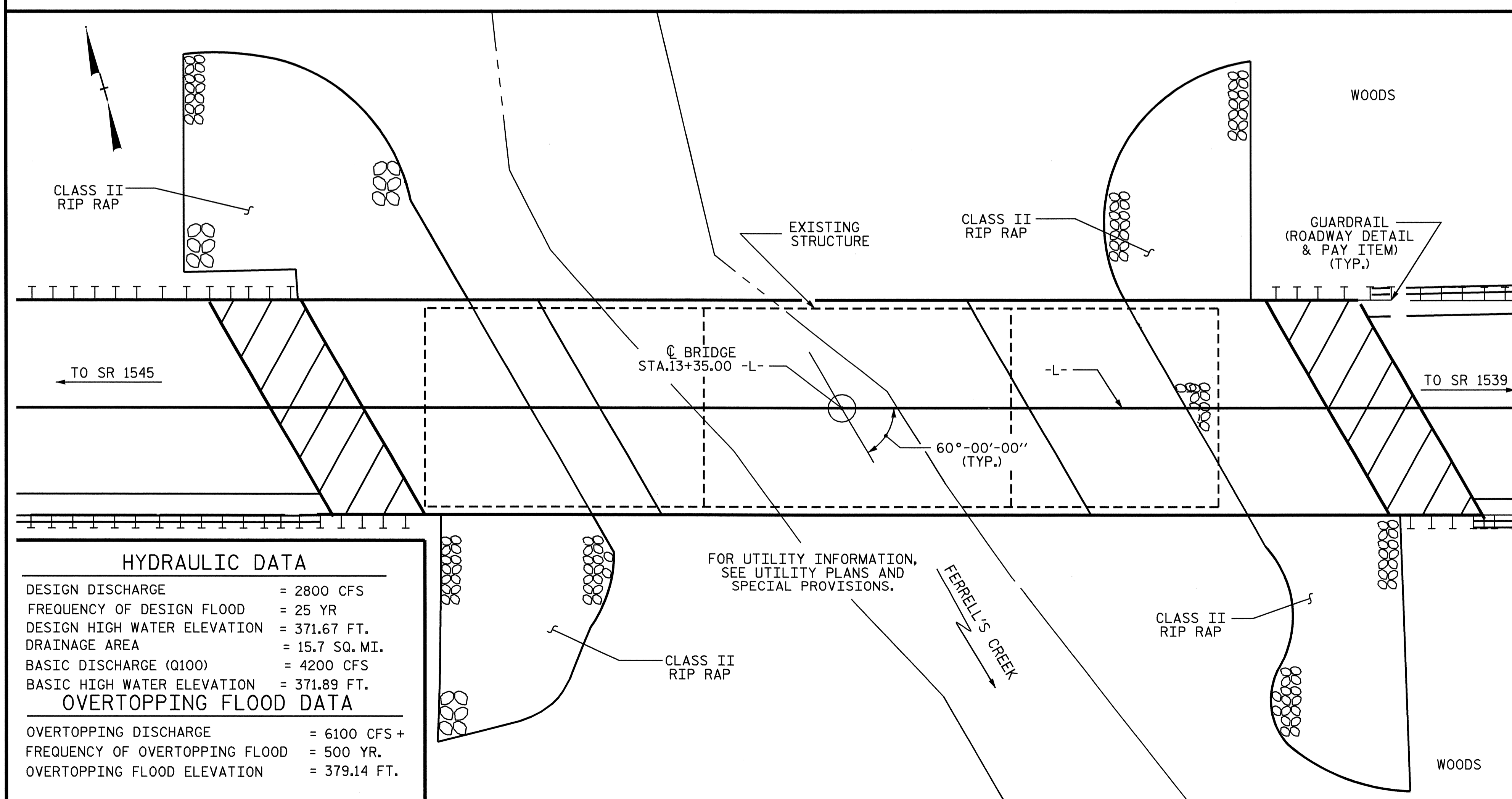
THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE 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.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR 'REMOVAL OF EXISTING STRUCTURE AT STATION 13+35.00 -L-.'

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURE, SEE SPECIAL PROVISIONS.

BENCHMARK #1, R.R. SPIKE IN BASE OF POWERPOLE 33.61 FT. RT. -L- STA. 11+81.44 : EL. 368.78



HYDRAULIC DATA

DESIGN DISCHARGE	= 2800 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YR
DESIGN HIGH WATER ELEVATION	= 371.67 FT.
DRAINAGE AREA	= 15.7 SQ. MI.
BASIC DISCHARGE (Q100)	= 4200 CFS
BASIC HIGH WATER ELEVATION	= 371.89 FT.
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 6100 CFS +
FREQUENCY OF OVERTOPPING FLOOD	= 500 YR.
OVERTOPPING FLOOD ELEVATION	= 379.14 FT.

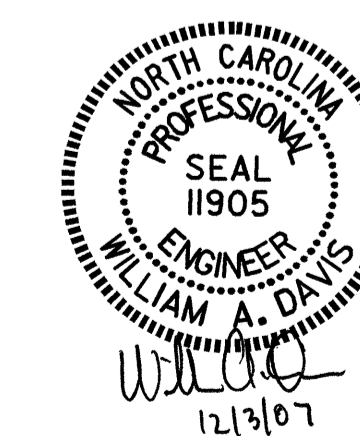
LOCATION SKETCH

DRAWN BY : T.L. CLELLAND/QTN DATE : 10/03/07
 CHECKED BY : W.A. DAVIS DATE : 10/03/07

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 qtnguyen

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**GENERAL DRAWING
 FOR BRIDGE OVER
 FERRELL'S CREEK
 ON SR 1525 BETWEEN
 SR 1545 AND SR 1539**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			37

NOTES

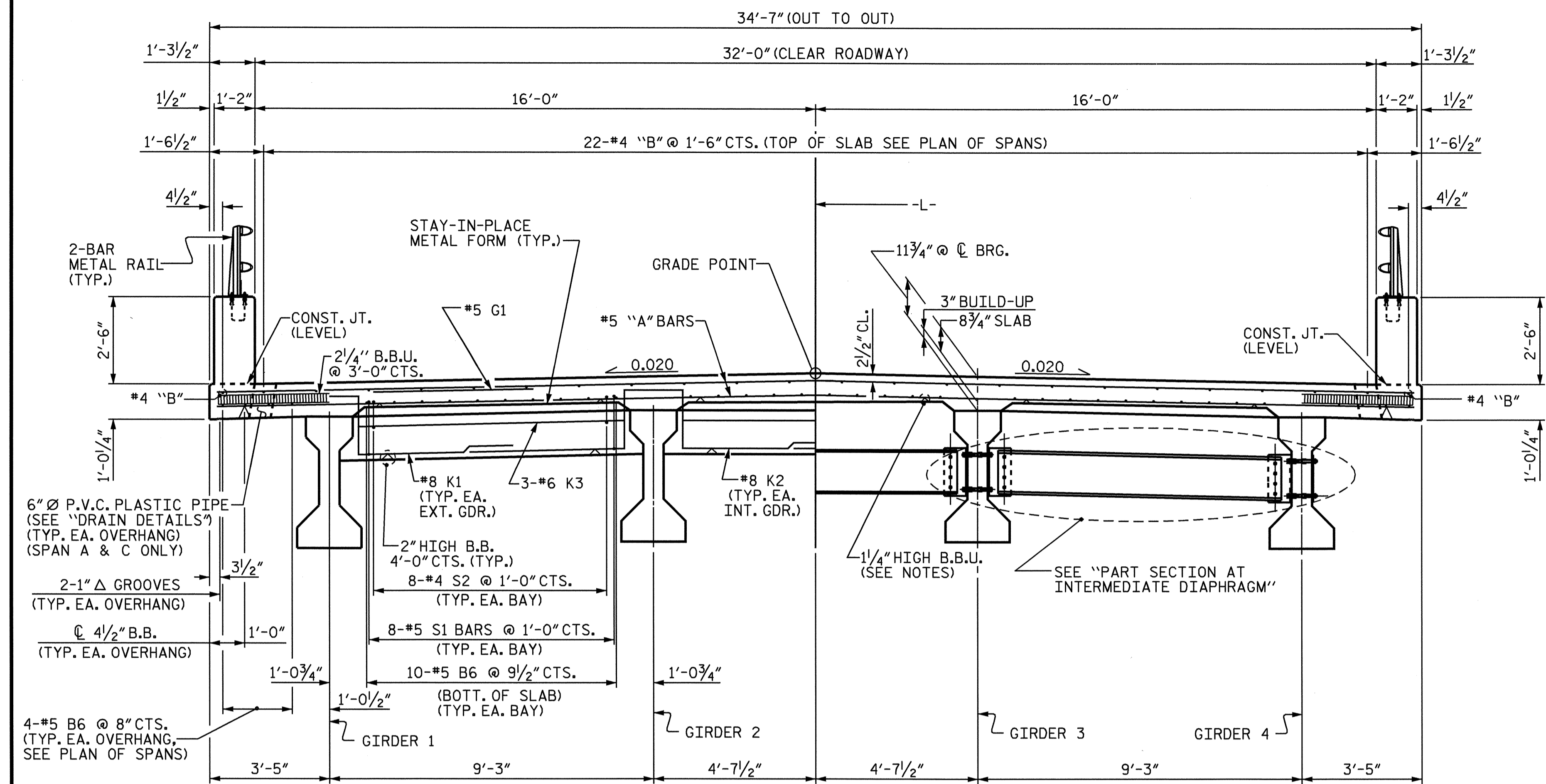
PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2"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

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

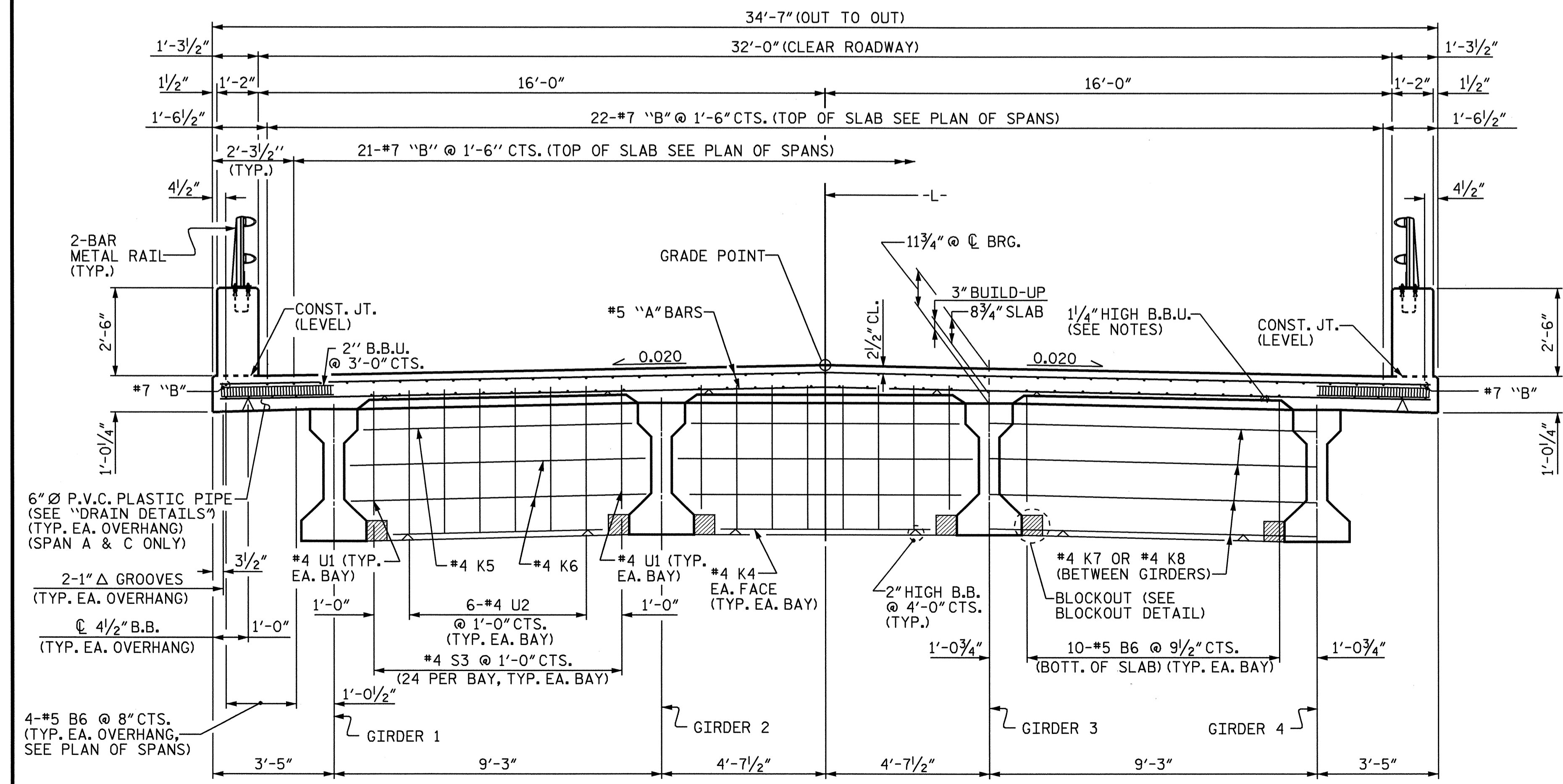
PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

REINFORCING STEEL MAY BE SHIFTED TO CLEAR DECK DRAINS.

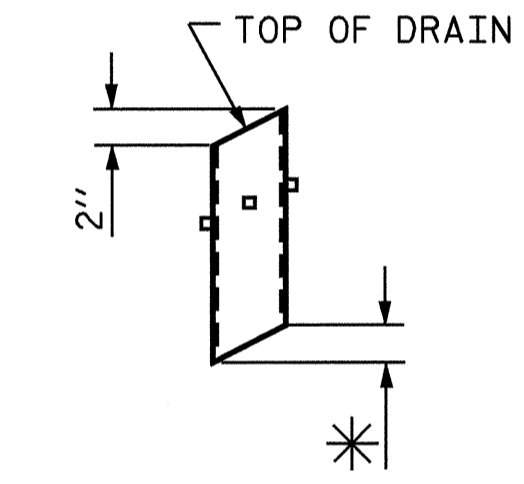
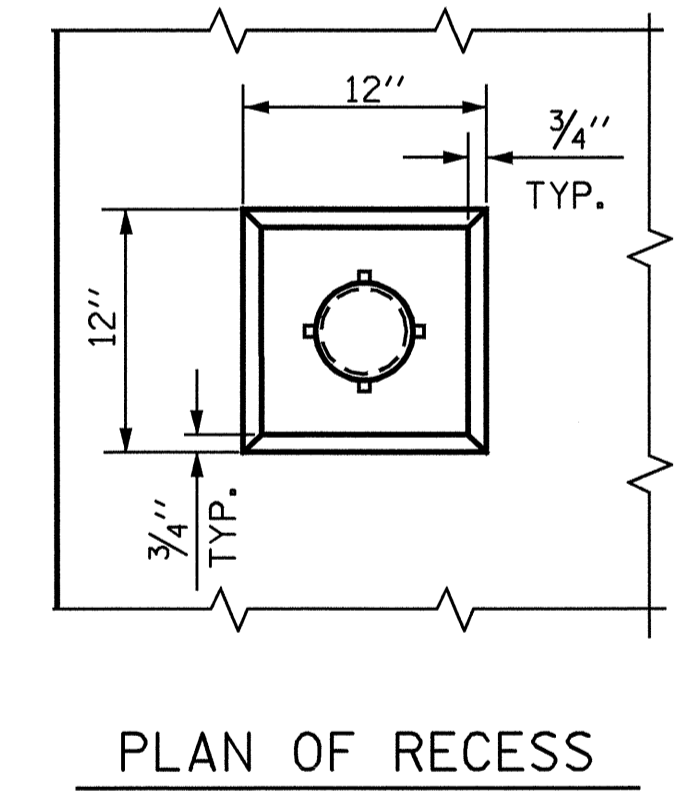
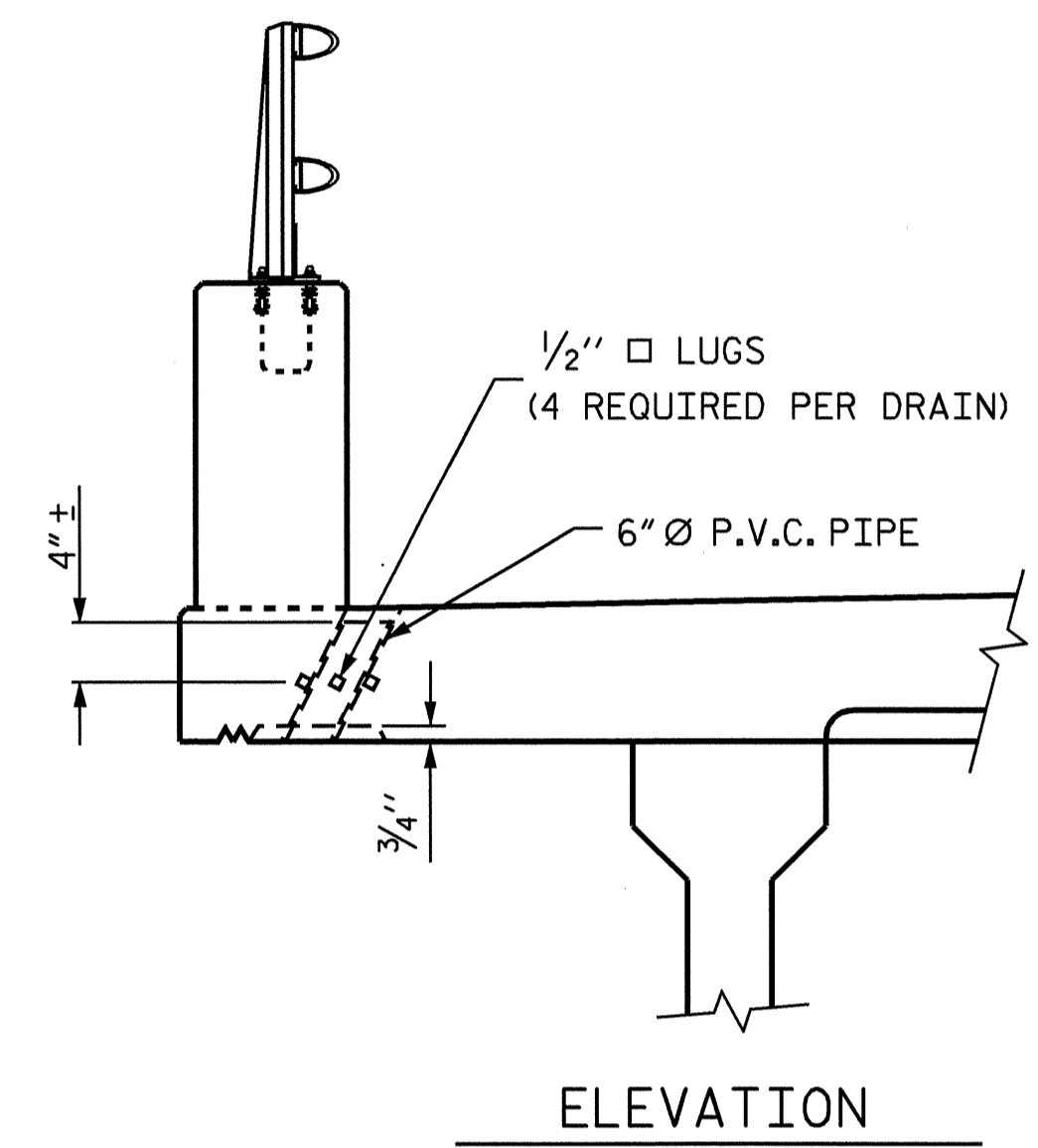


HALF TYPICAL SECTION
SHOWING END BENT DIAPHRAGMS

HALF TYPICAL SECTION
SHOWING INTERMEDIATE DIAPHRAGMS



TYPICAL SECTION
SHOWING BENT DIAPHRAGMS



* TO BE SET TO MATCH SLOPE OF BOTTOM OF OVERHANG (24 DRAINS REQUIRED)

PIPE DETAIL

TOP OF FLOOR DRAINS TO BE SET 3/8" BELOW SURFACE OF SLAB.

4 - 1/2" LUGS TO BE GLUED TO THE P.V.C. PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.

THE 6" Ø PVC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

DRAIN DETAILS
(SPAN A & C)

PROJECT NO. B-3824
CHATHAM COUNTY
STATION: 13+35.00 -L-
SHEET 1 OF 2

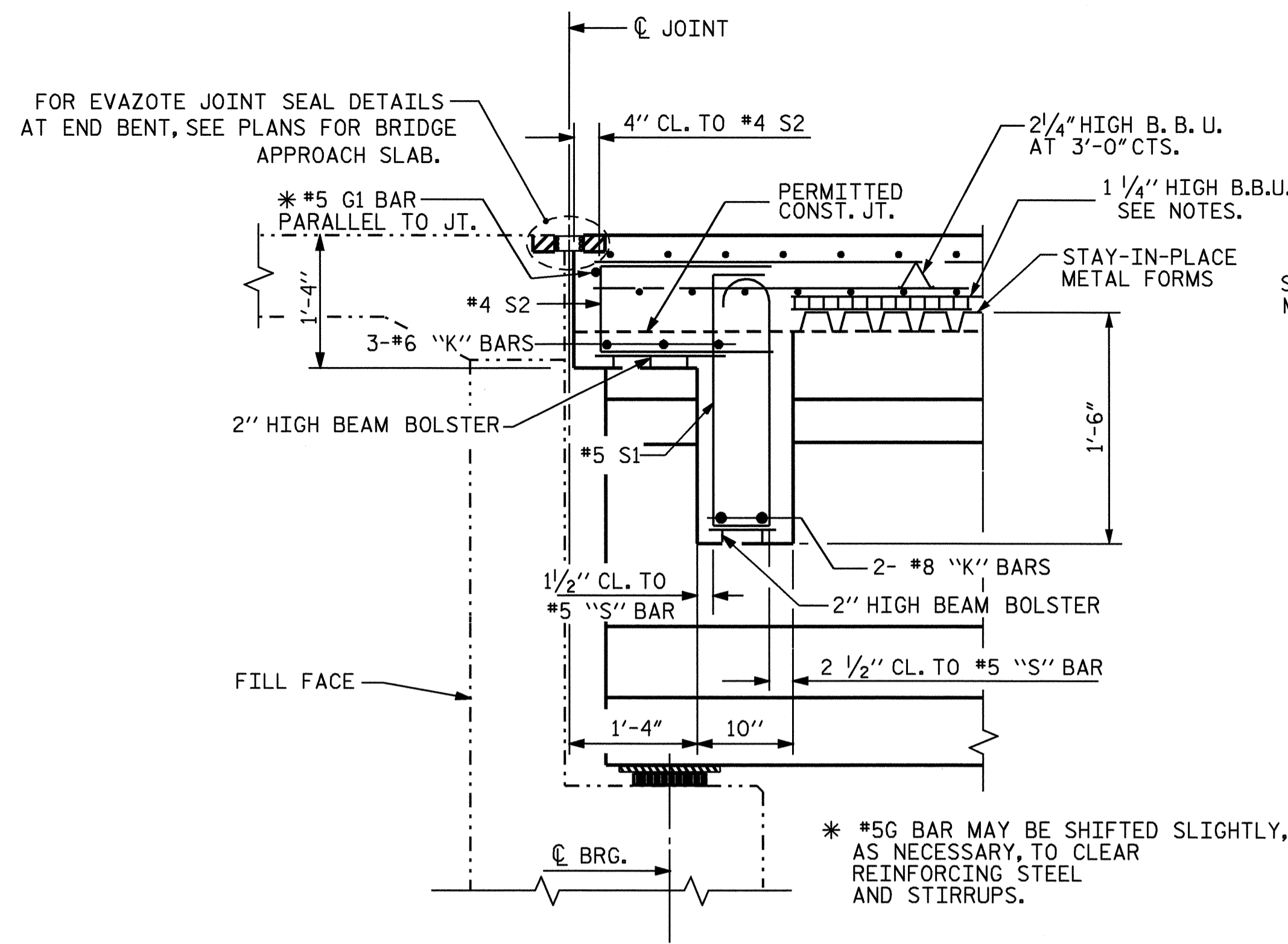


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

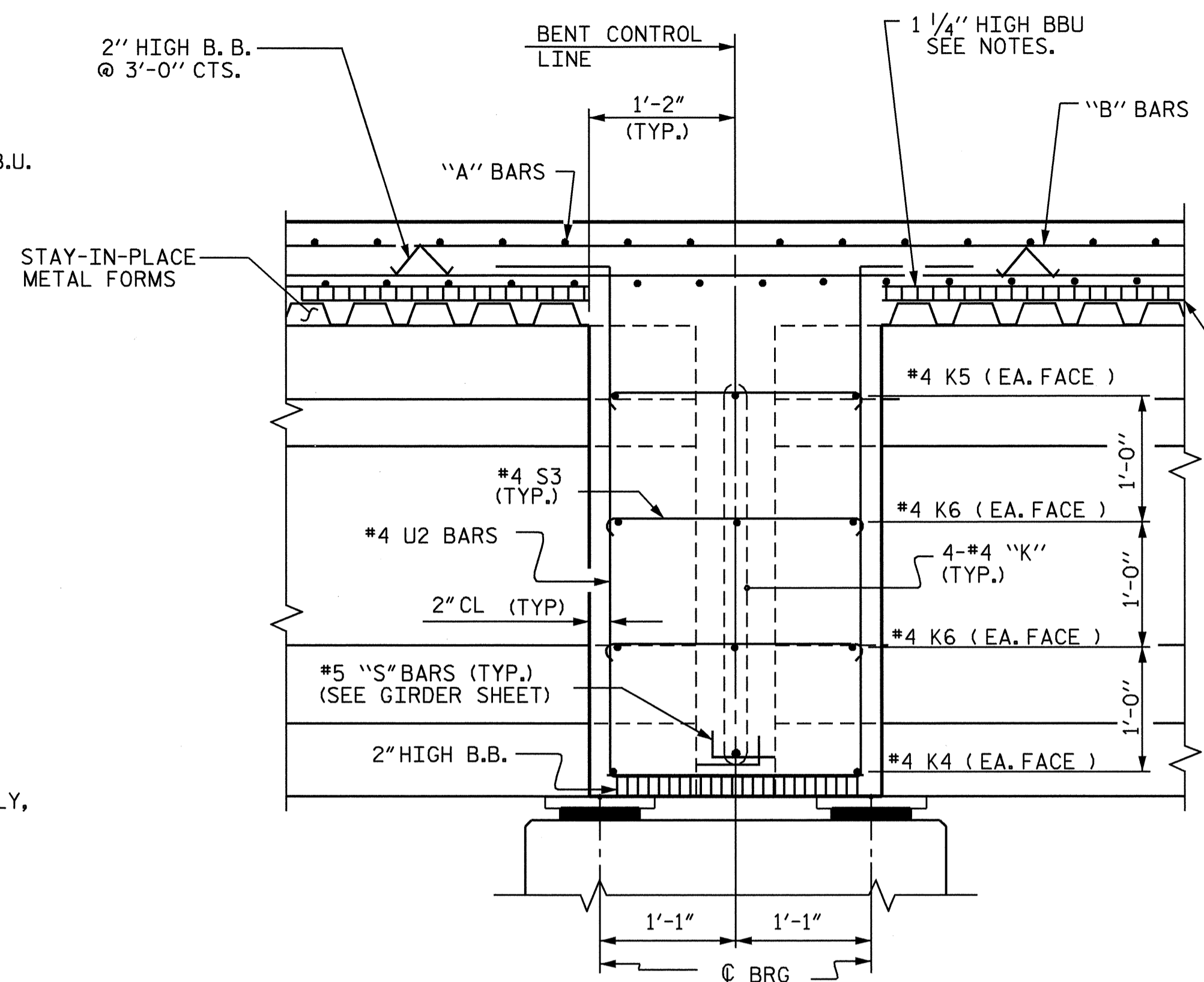
SUPERSTRUCTURE
TYPICAL SECTION

DRAWN BY : J.D. HAWK/QTN DATE : 10/07
CHECKED BY : W. PARKER/PKN DATE : 10/07

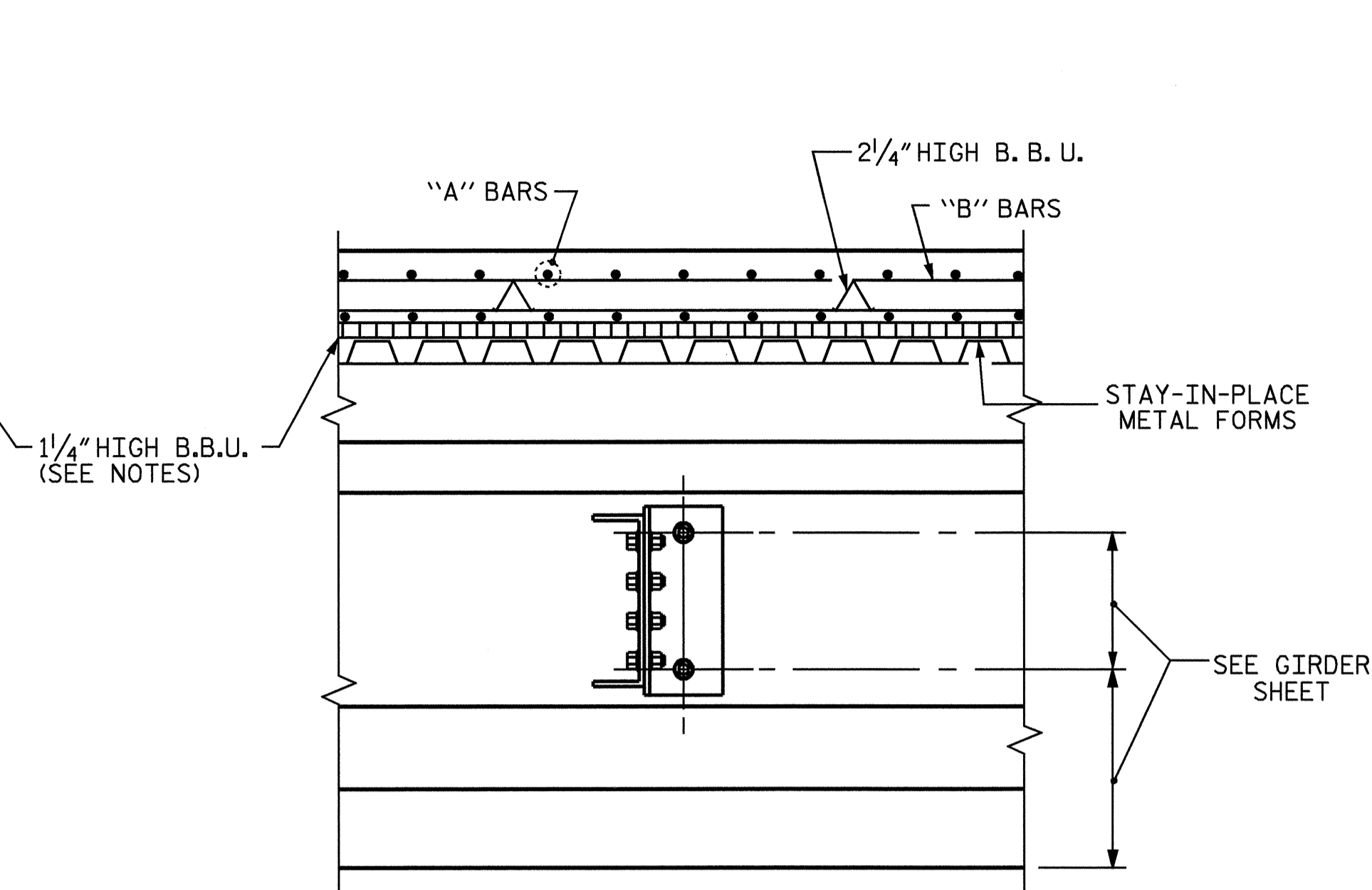
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4	
1			3			TOTAL SHEETS	
2			4			37	



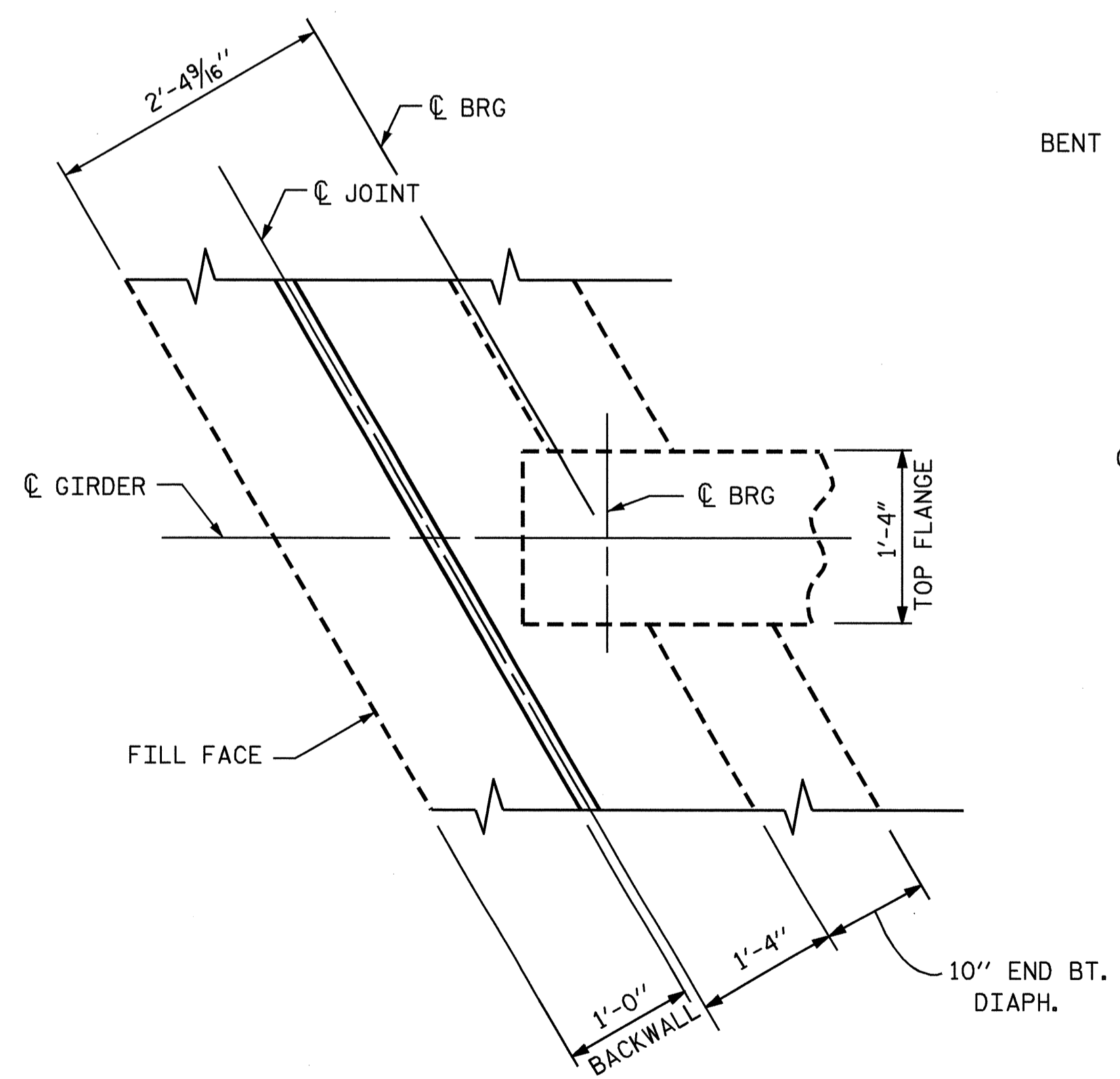
SECTION THRU
END BENT DIAPHRAGMS



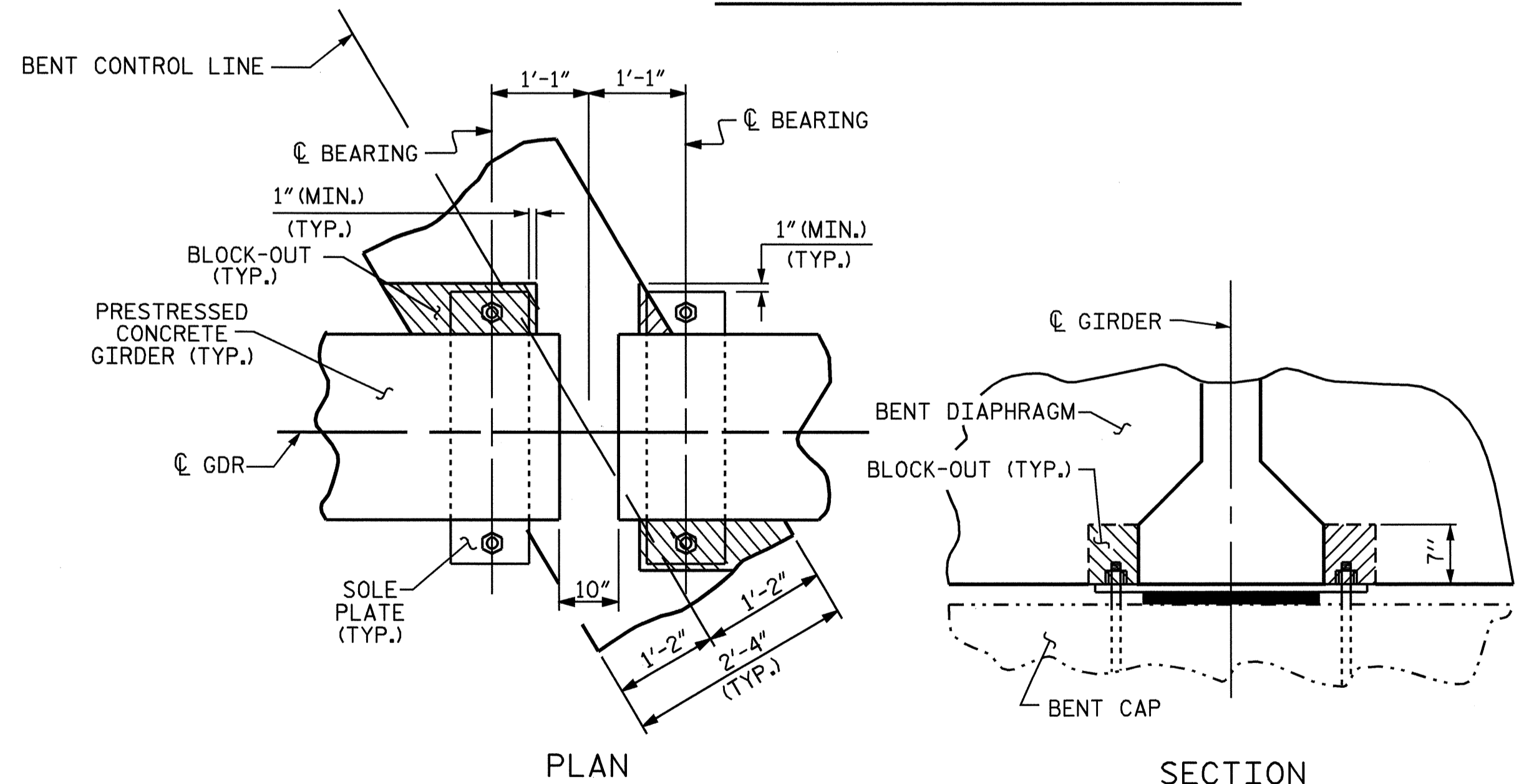
SECTION THRU
BENT DIAPHRAGMS



SECTION THRU
INTERMEDIATE DIAPHRAGMS
SEE INTERMEDIATE STEEL DIAPHRAGM DETAILS



END BENT DIAPHRAGM
VIEW OF END BENT DIAPHRAGM



PLAN SECTION
BENT DIAPHRAGM BLOCKOUT DETAIL
(TYP. AT BENTS)

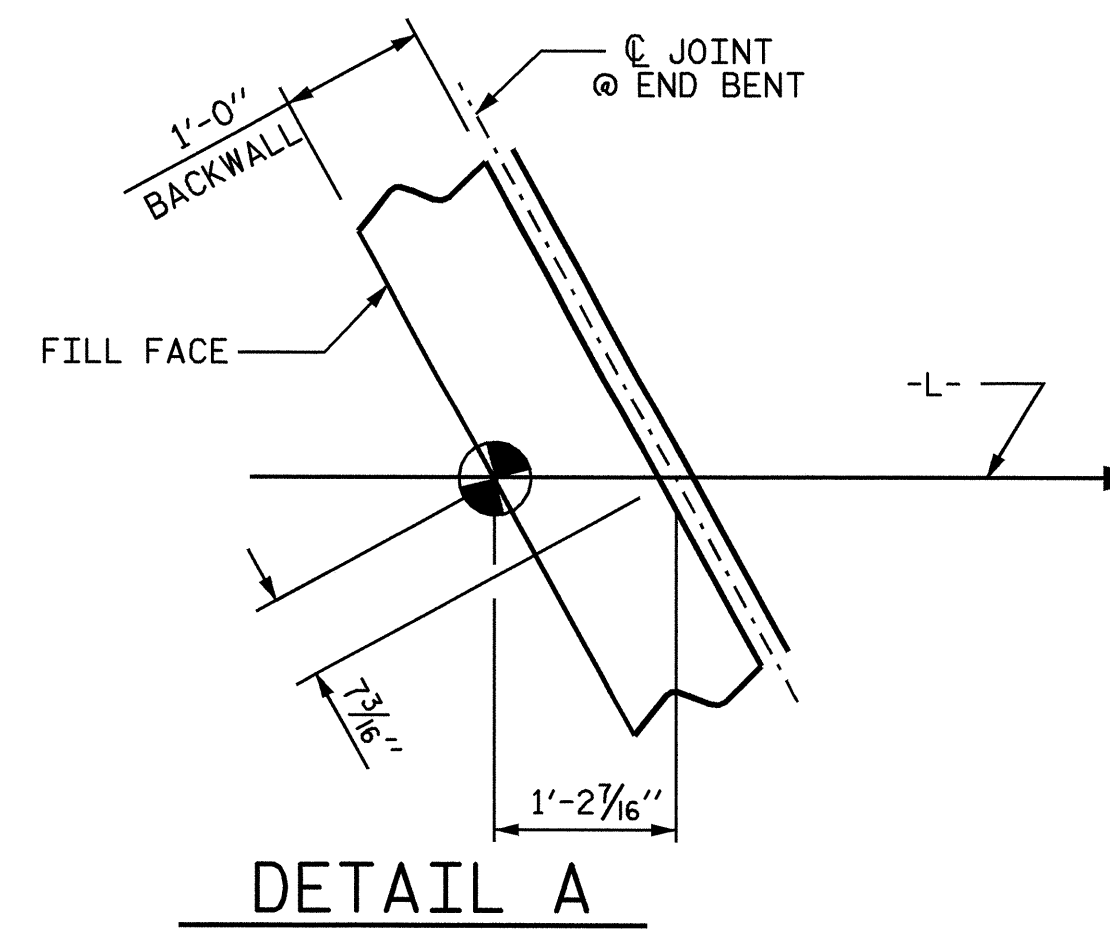
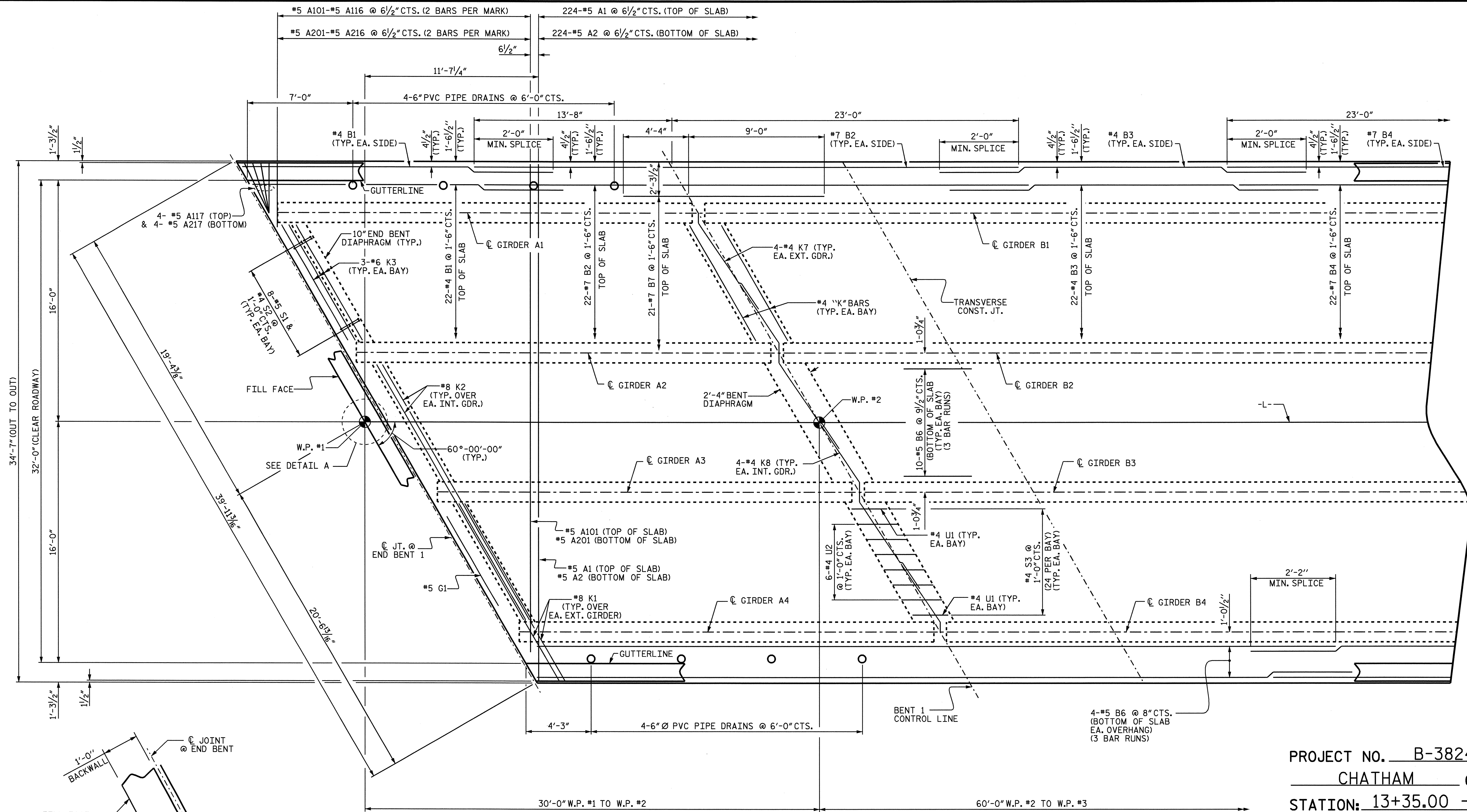


PROJECT NO. B-3824
CHATHAM COUNTY
STATION: 13+35.00 -L-
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION
DETAILS

DRAWN BY: J.D. HAWK/QTN DATE: 10/07
CHECKED BY: W.PARKER/PKN DATE: 10/07

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			37



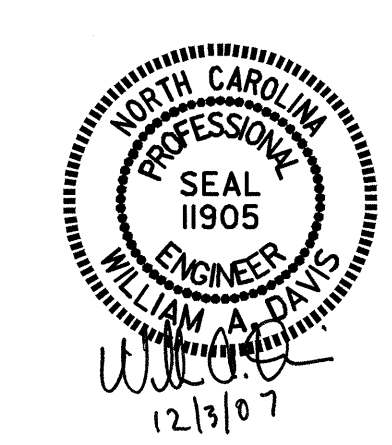
NOTE:
 FOR CONCRETE PARAPET REINFORCING STEEL AND DETAILS, SEE CONCRETE PARAPET SHEETS.
 FOR TRANSVERSE CONSTRUCTION JOINT, SEE SUPERSTRUCTURE BILL OF MATERIAL.

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

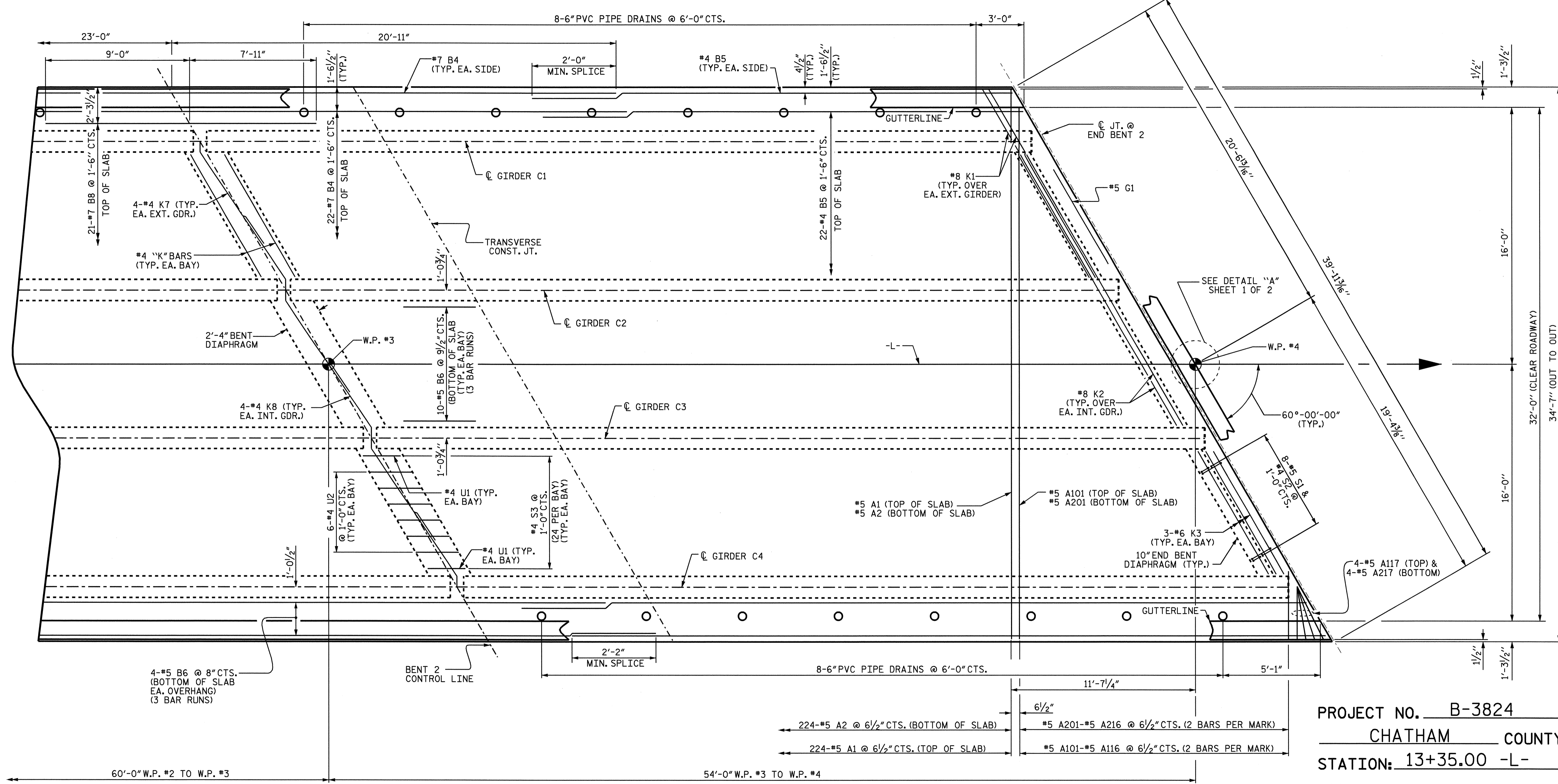
SUPERSTRUCTURE
 PLAN OF SPANS



DRAWN BY: J.D. HAWK/QTN DATE: 10-07
 CHECKED BY: W.PARKER/PKN DATE: 10-07

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

TOTAL SHEETS: 37



SPAN B

SPAN C

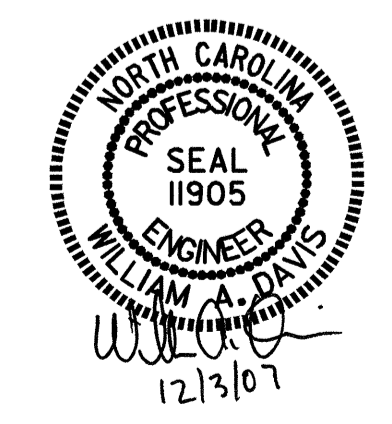
PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 PLAN OF SPANS

NOTE:
 FOR CONCRETE PARAPET REINFORCING STEEL
 AND DETAILS, SEE CONCRETE PARAPET SHEETS.
 FOR TRANSVERSE CONSTRUCTION JOINT, SEE
 SUPERSTRUCTURE BILL OF MATERIAL.

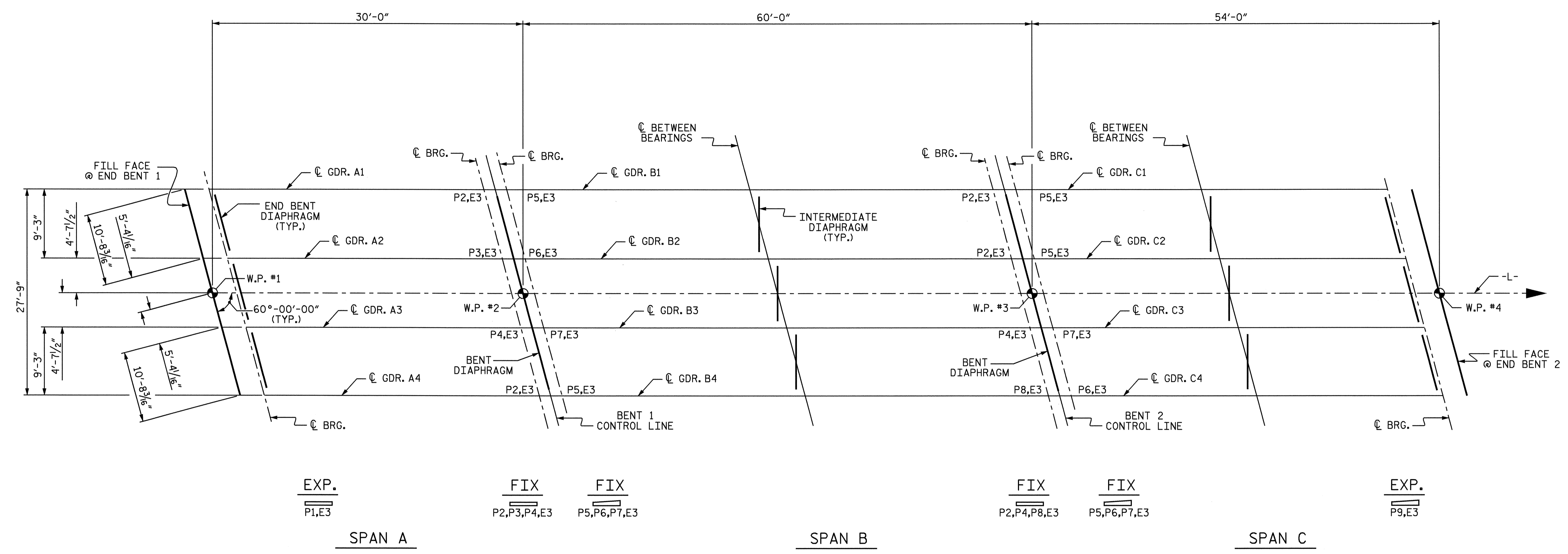


DRAWN BY: J.D. HAWK/QTN DATE: 10-07
 CHECKED BY: W.PARKER/PKN DATE: 10-07

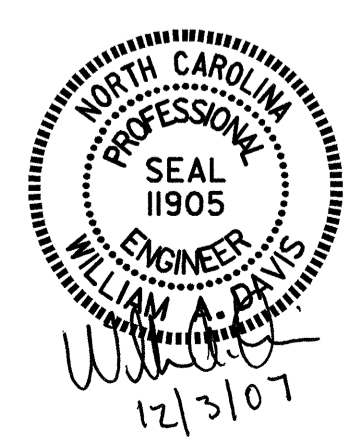
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

TOTAL SHEETS	37
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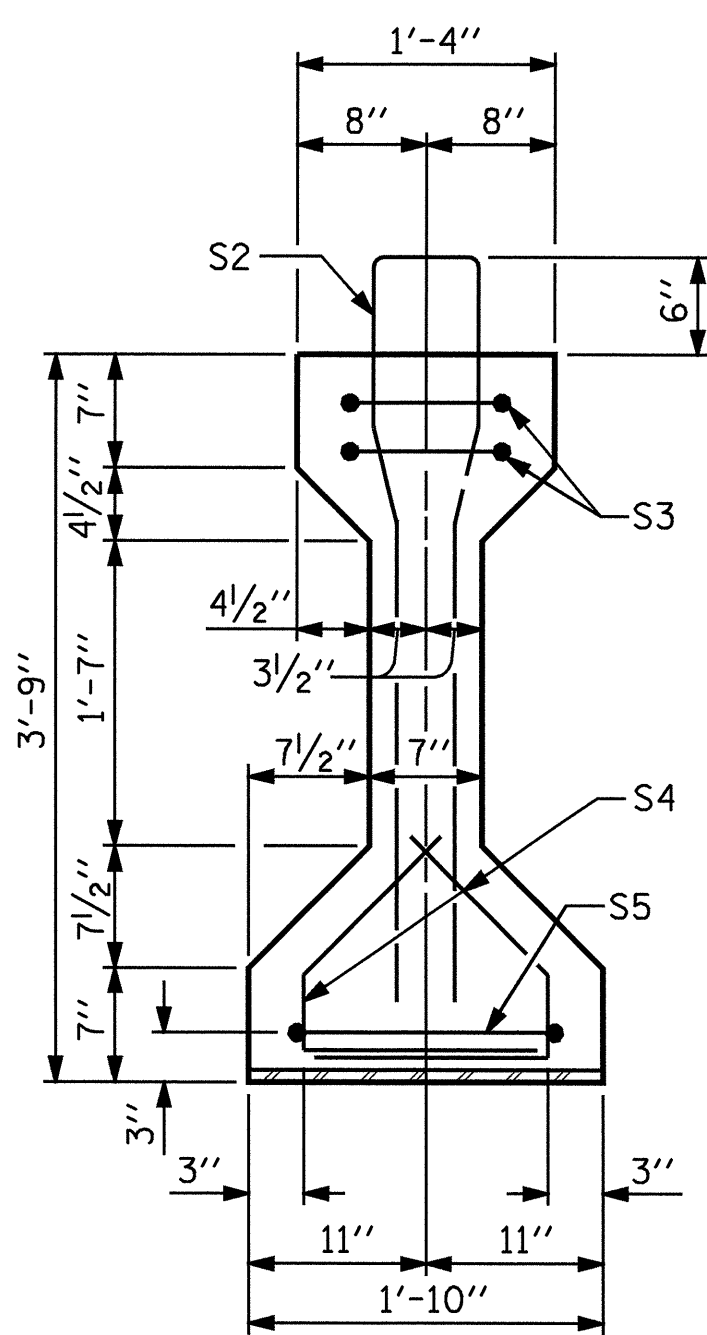


DRAWN BY : J.D. HAWK/QTN DATE : 10/07
 CHECKED BY : W. PARKER/PKN DATE : 10/07

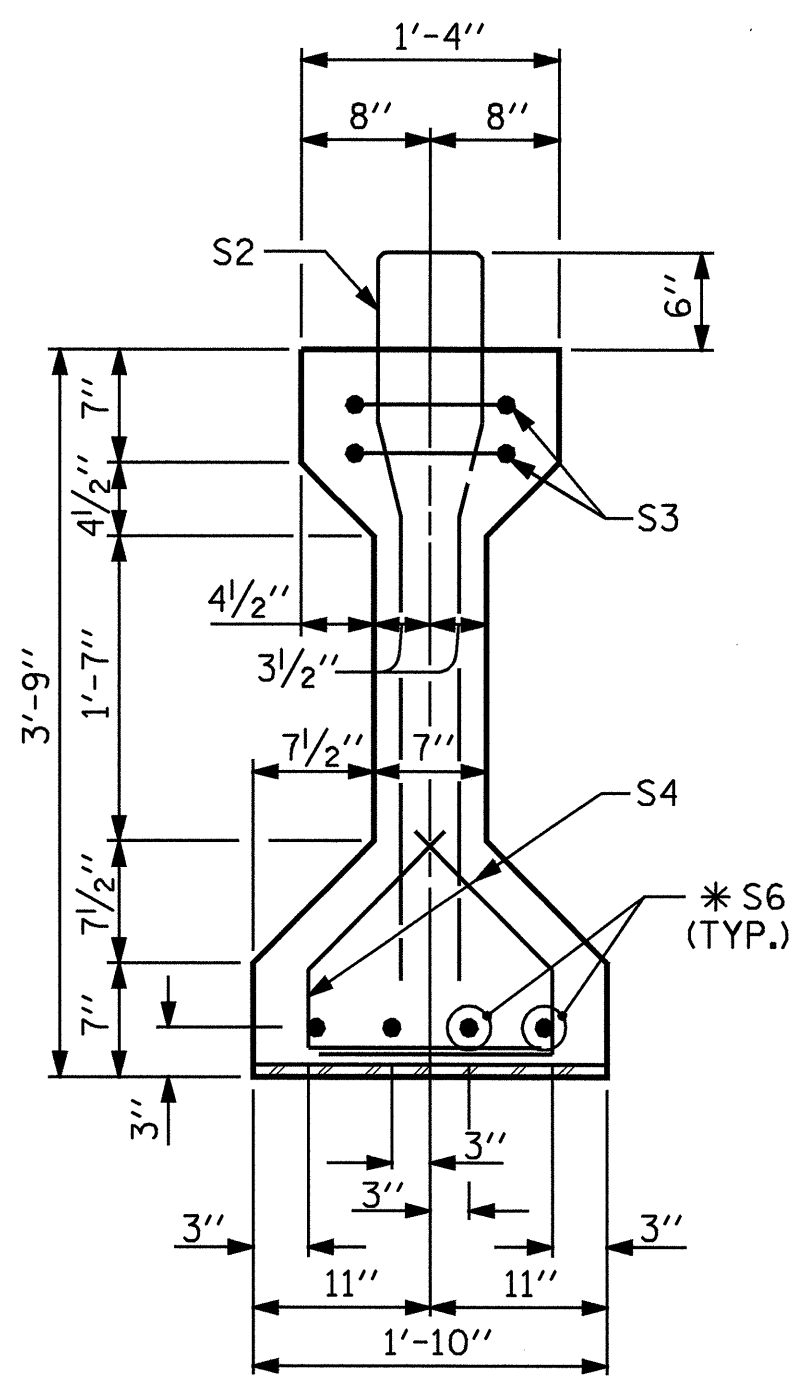


PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

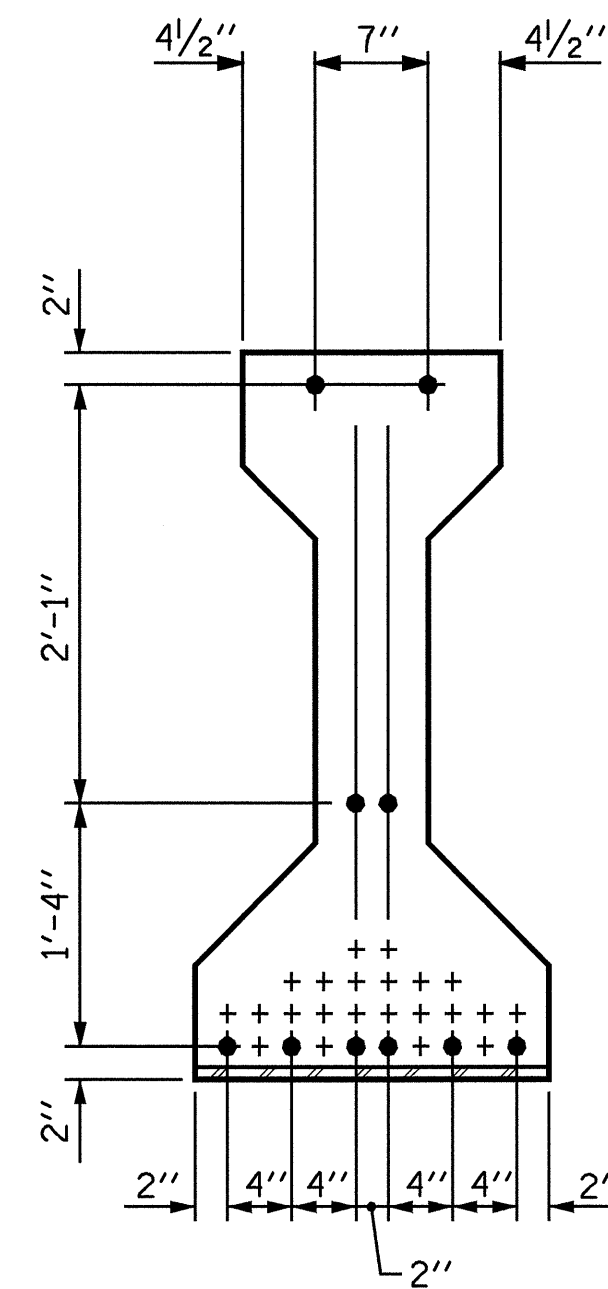
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-8
SUPERSTRUCTURE GIRDER LAYOUT						
REVISIONS						TOTAL SHEETS 37
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



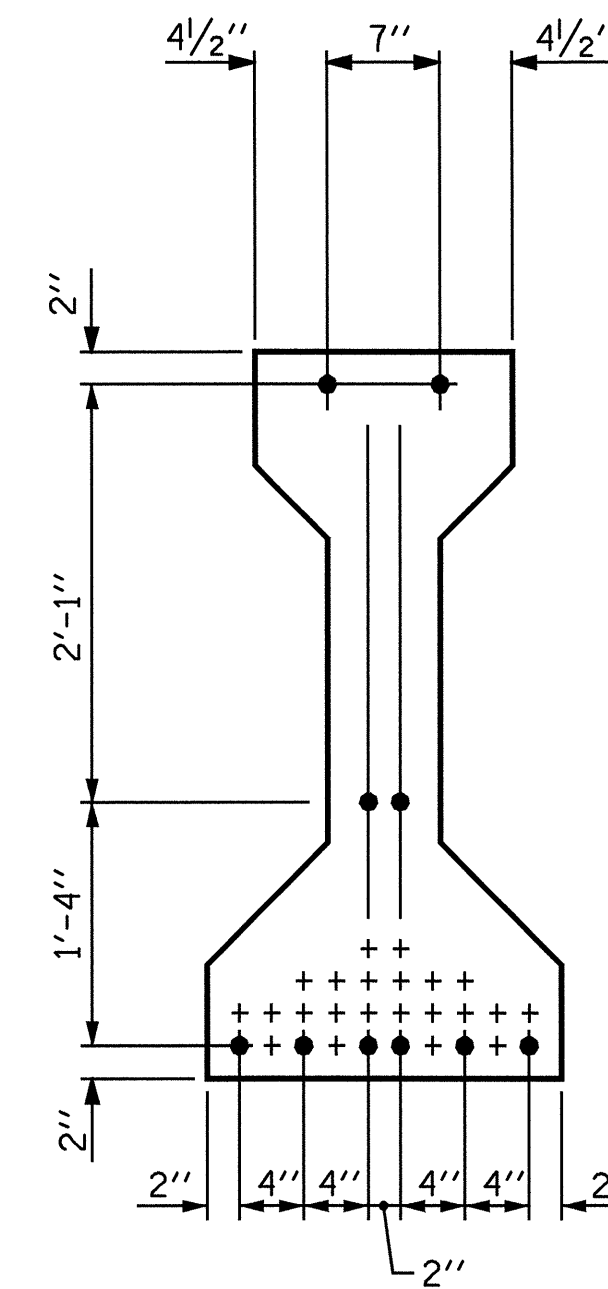
SECTION A-A



SECTION B-B



AT END OF GIRDER



AT C OF GIRDER

1/2" Ø LOW RELAXATION STRAND LAYOUT

1/2" Ø L. R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.153	41,300	30,980

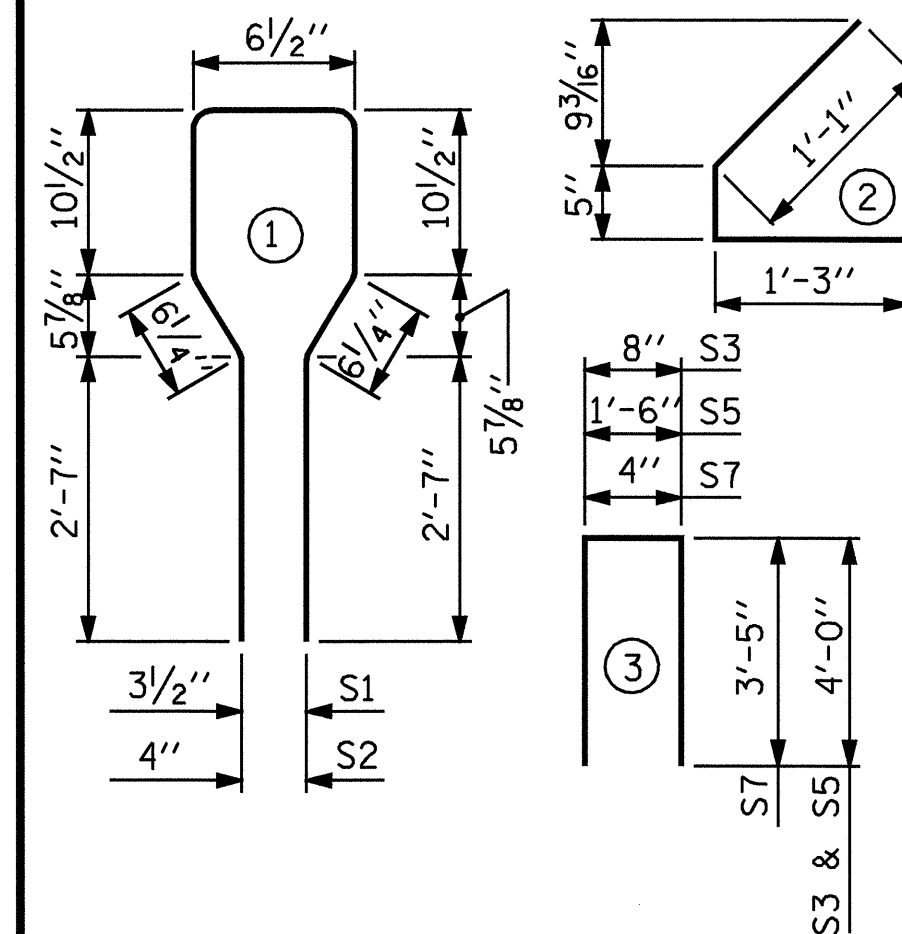
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	26	#4	1	8'-6"	148
S2	12	#6	1	8'-6"	153
S3	4	#4	3	8'-8"	23
S4	56	#4	2	2'-9"	103
S5	1	#4	3	9'-6"	6
* S6	4	#5	STR	3'-8"	15

* NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT

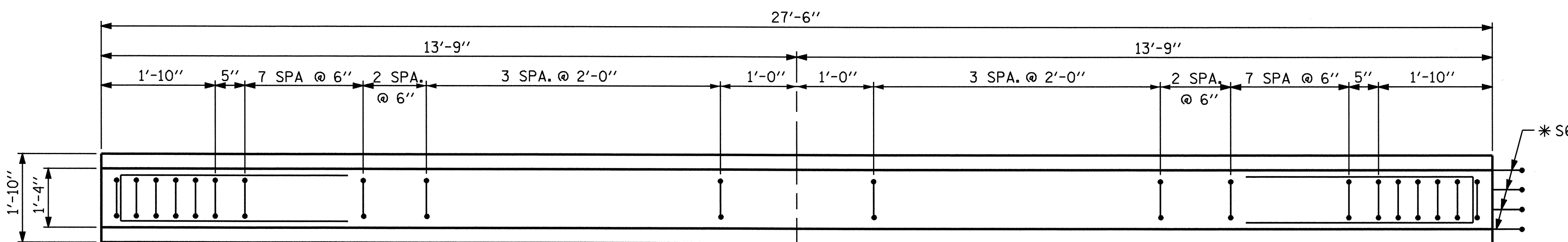


QUANTITIES FOR ONE GIRDER

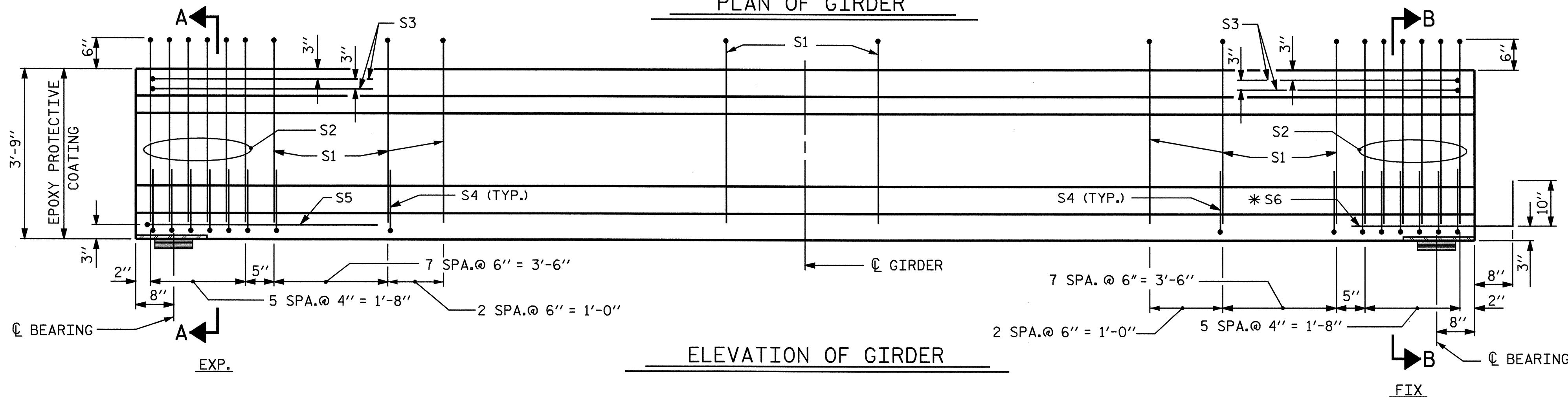
REINFORCING STEEL	5000 PSI CONCRETE	1/2" Ø L.R. STRANDS
LB.	C.Y.	No.
448	4.0	10

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4	27'-6"	110.00'



PLAN OF GIRDER



ELEVATION OF GIRDER

PROJECT NO. B-3824
 CHATHAM COUNTY
 STATION: 13+35.00 -L-

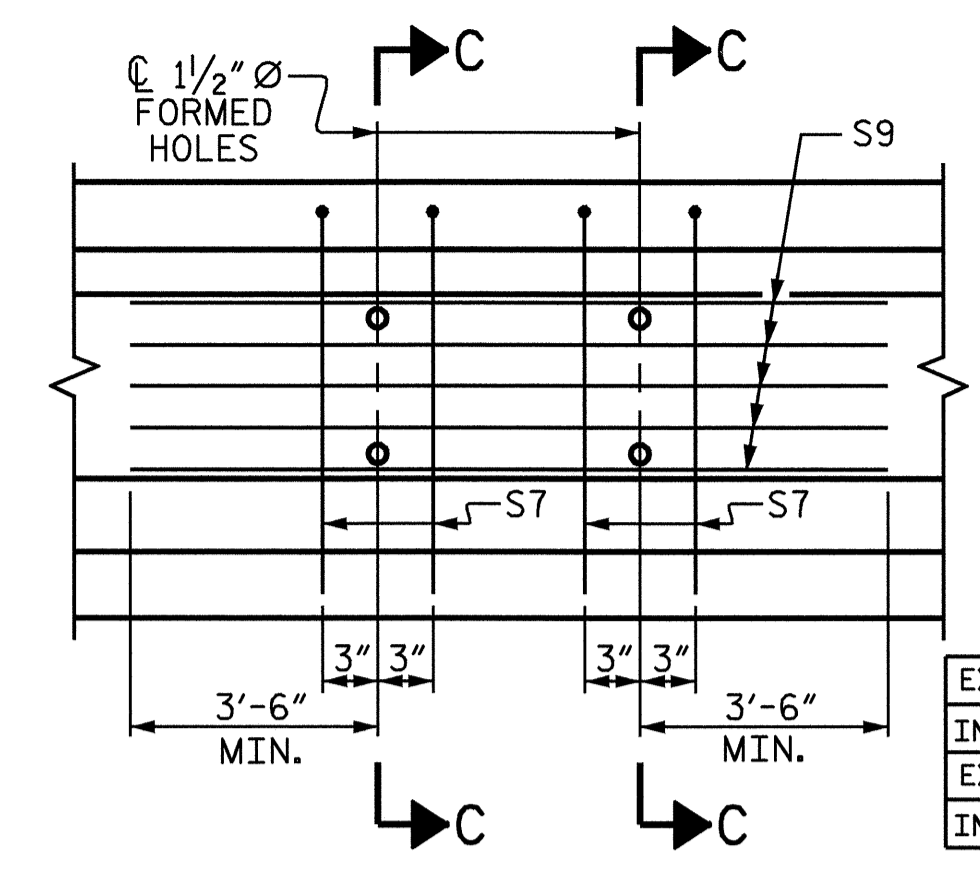
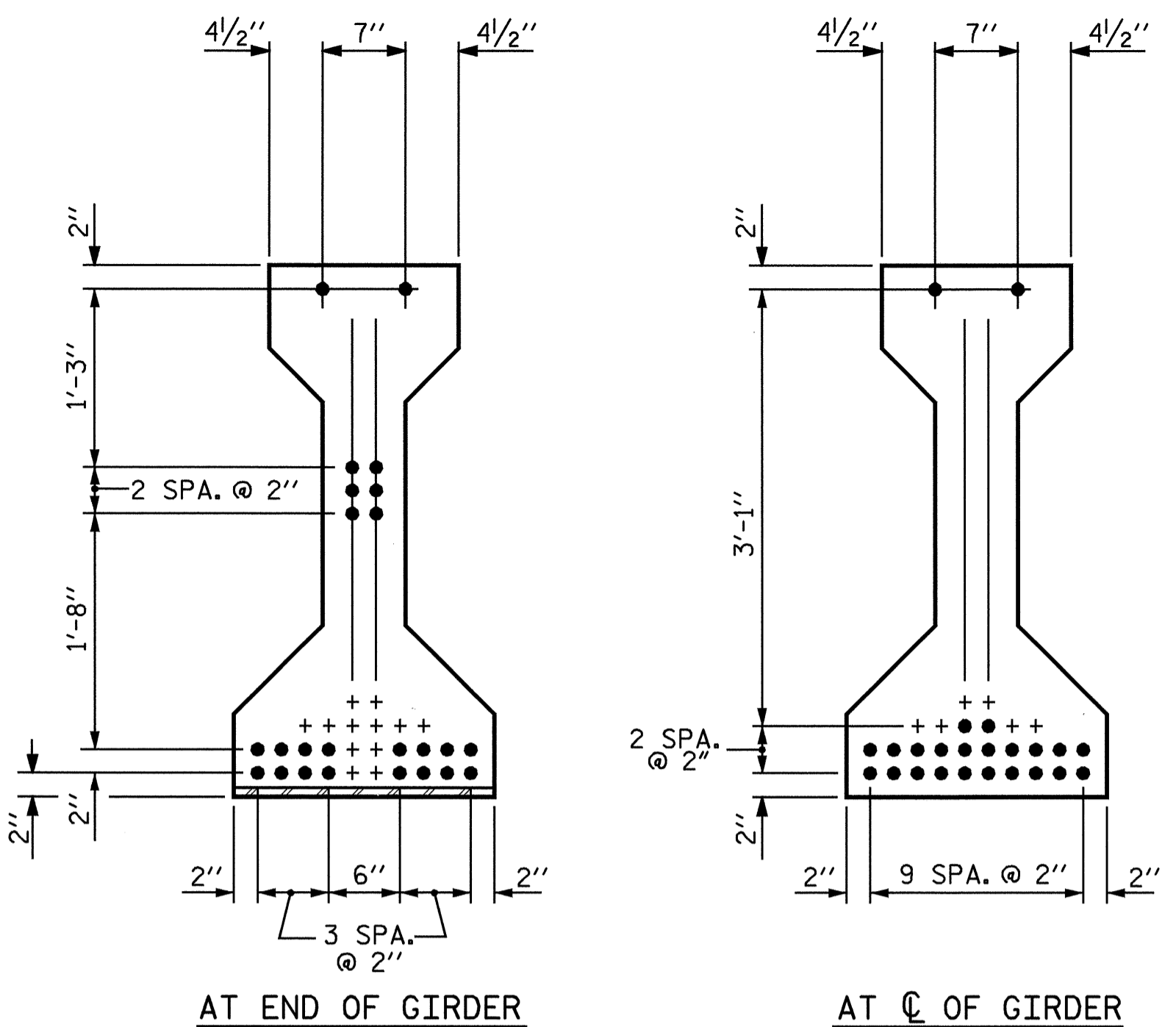
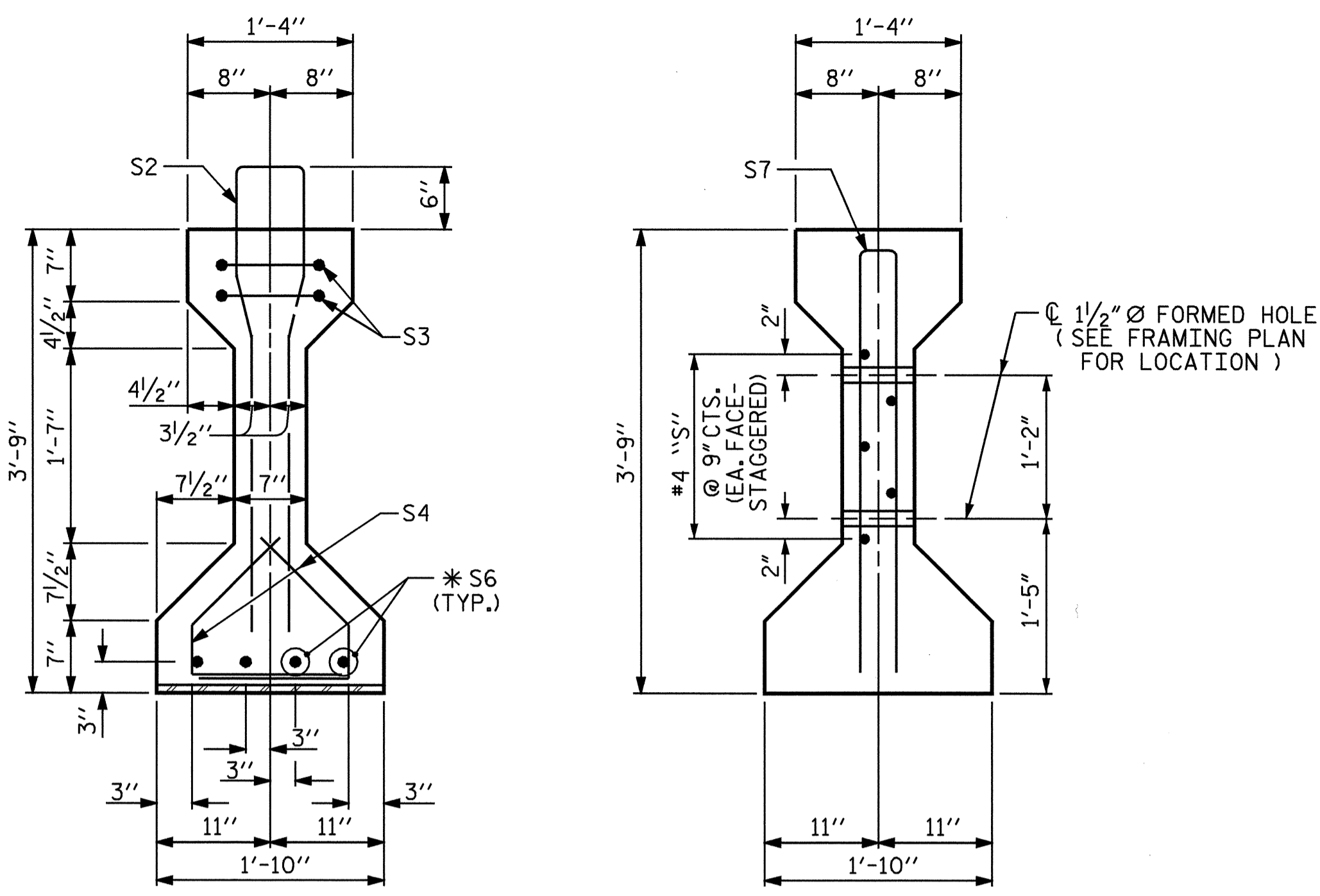
SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 AASHTO TYPE III
 PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 SPAN A

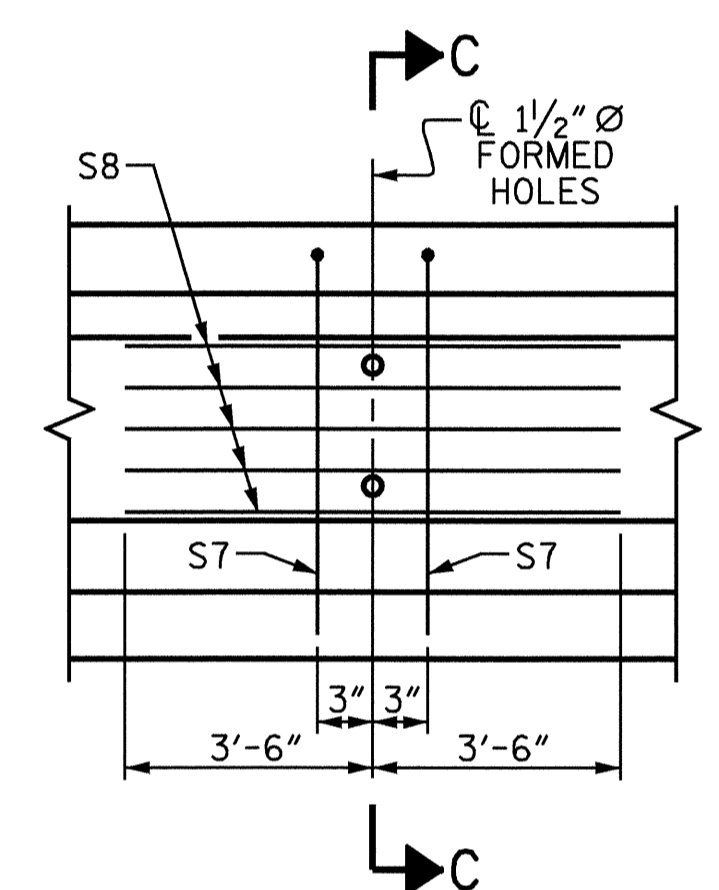


ASSEMBLED BY: QT NGUYEN	DATE: 10-07
CHECKED BY: W. PARKER/PKN	DATE: 10-07
DRAWN BY: ELR 8/91	REV. 7/17/98 RWW/LES
CHECKED BY: GRP 8/91	REV. 10/17/00R RWW/LES
	REV. 5/1/06 TLA/GM

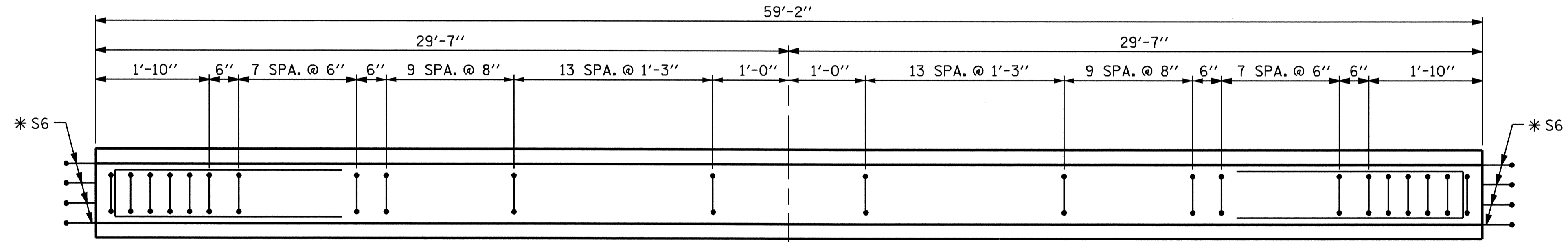
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		



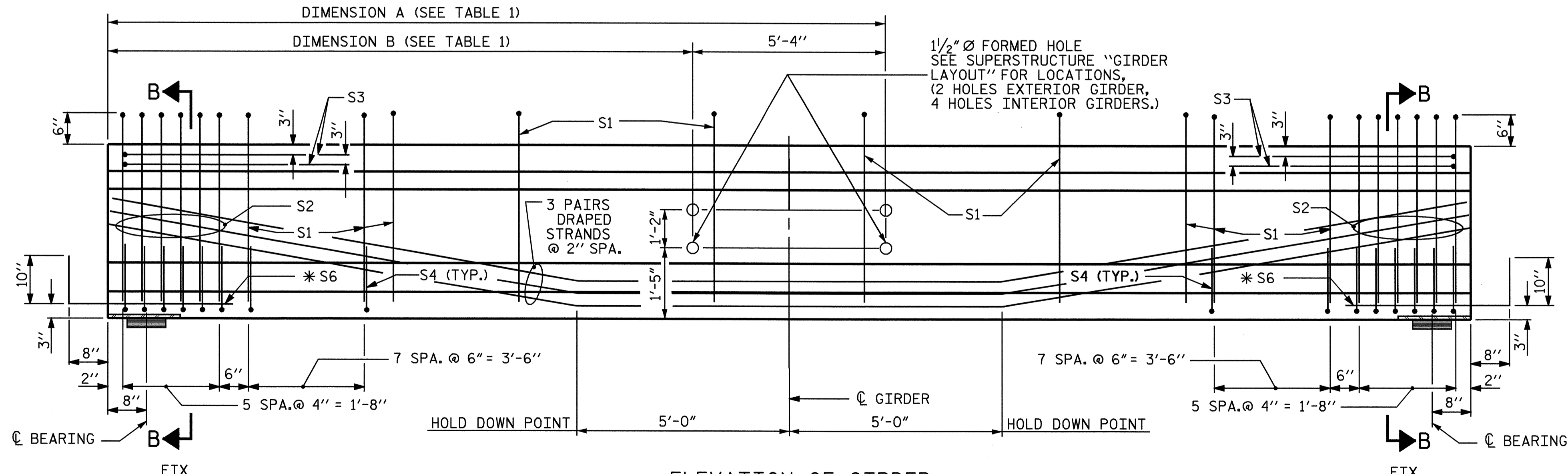
PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER 2 AND 3



PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER 1 AND 4



PLAN OF GIRDER



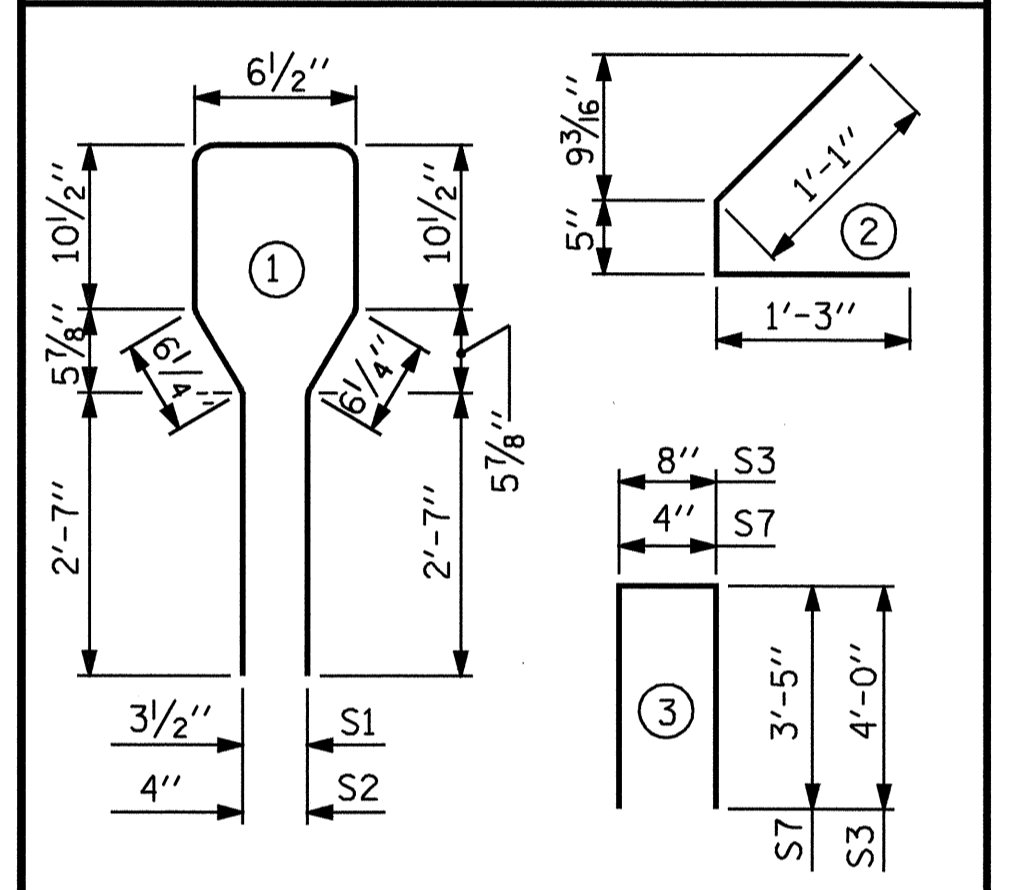
ELEVATION OF GIRDER
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

1/2" Ø L. R. GRADE 270 STRANDS		
AREA (SQ. INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.153	41,300	30,980

REINFORCING STEEL FOR ONE GIRDER						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	62	#4	1	8'-6"	352	
S2	12	#6	1	8'-6"	153	
S3	4	#4	3	8'-8"	23	
S4	56	#4	2	2'-9"	103	
*S6	8	#5	STR	3'-8"	31	
EXTERIOR GDR.	S7	4	#5	3	7'-2"	30
INTERIOR GDR.	S7	4	#5	3	7'-2"	30
EXTERIOR GDR.	S8	5	#4	STR	7'-0"	23
INTERIOR GDR.	S9	5	#4	STR	12'-5"	41

* NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES
ALL BAR DIMENSIONS ARE OUT-TO-OUT



	REINFORCING STEEL		8000 PSI CONCRETE		1/2" Ø L.R. STRANDS	
	LB.	C.Y.	C.Y.	No.	No.	No.
EXTERIOR GIRDER	715	8.5			24	
INTERIOR GIRDER	733	8.5			24	

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	59'-2"	236.67'

TABLE 1		
GIRDERS	DIMENSION A	DIMENSION B
GIRDER B1	32'-3"	
GIRDER B2	32'-3"	26'-11"
GIRDER B3	32'-3"	26'-11"
GIRDER B4	26'-11"	

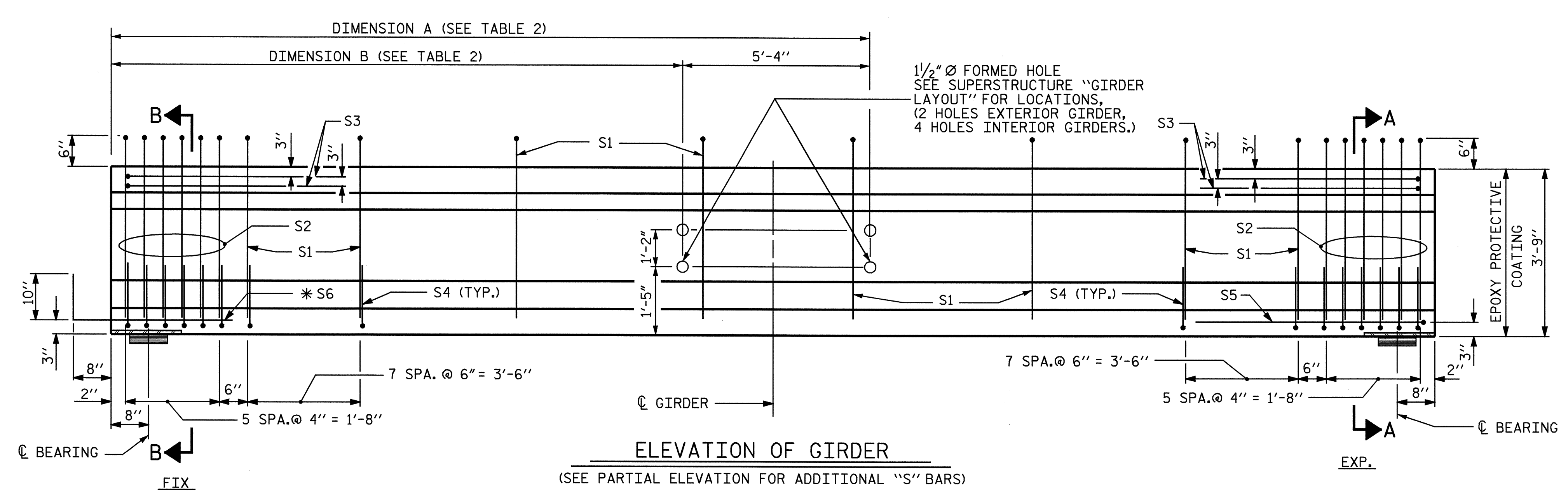
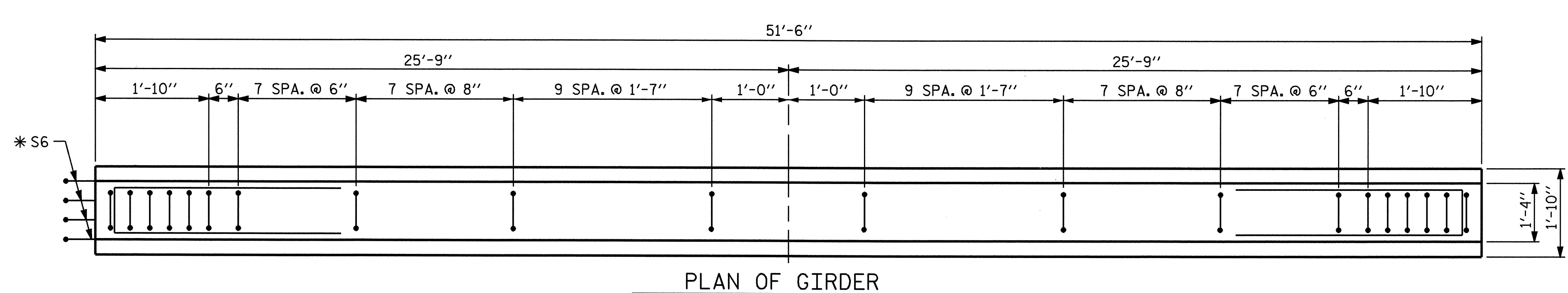
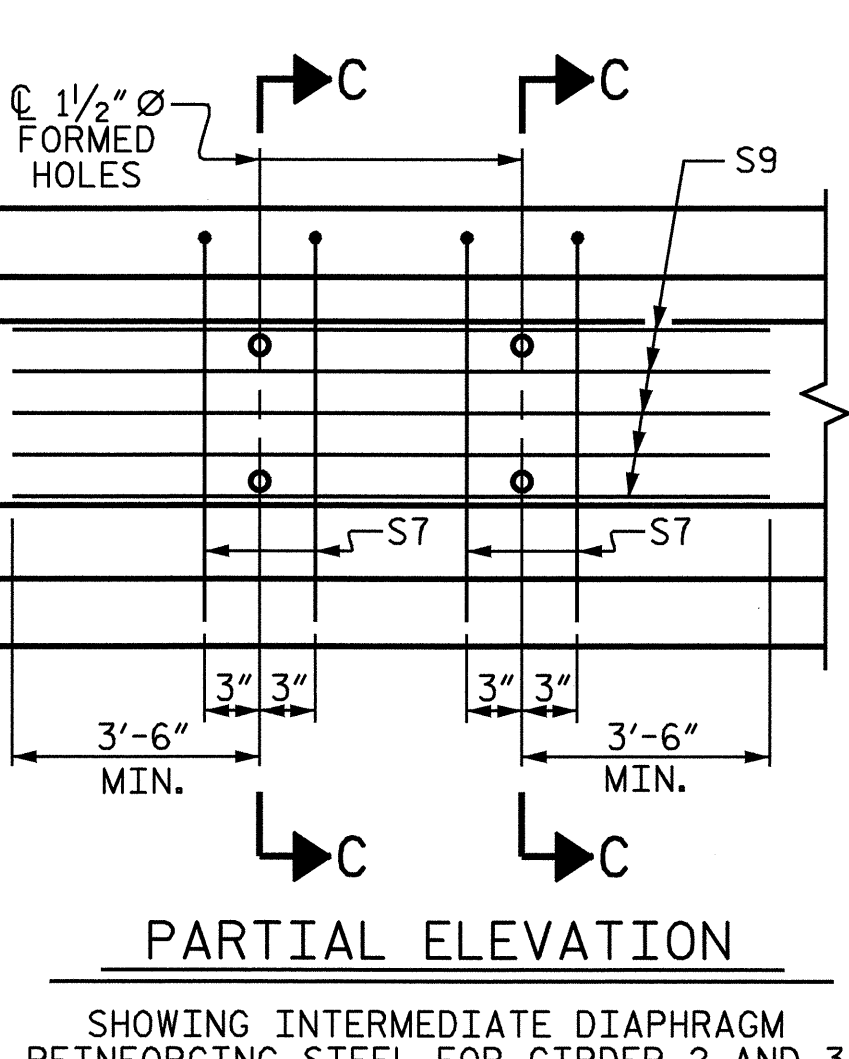
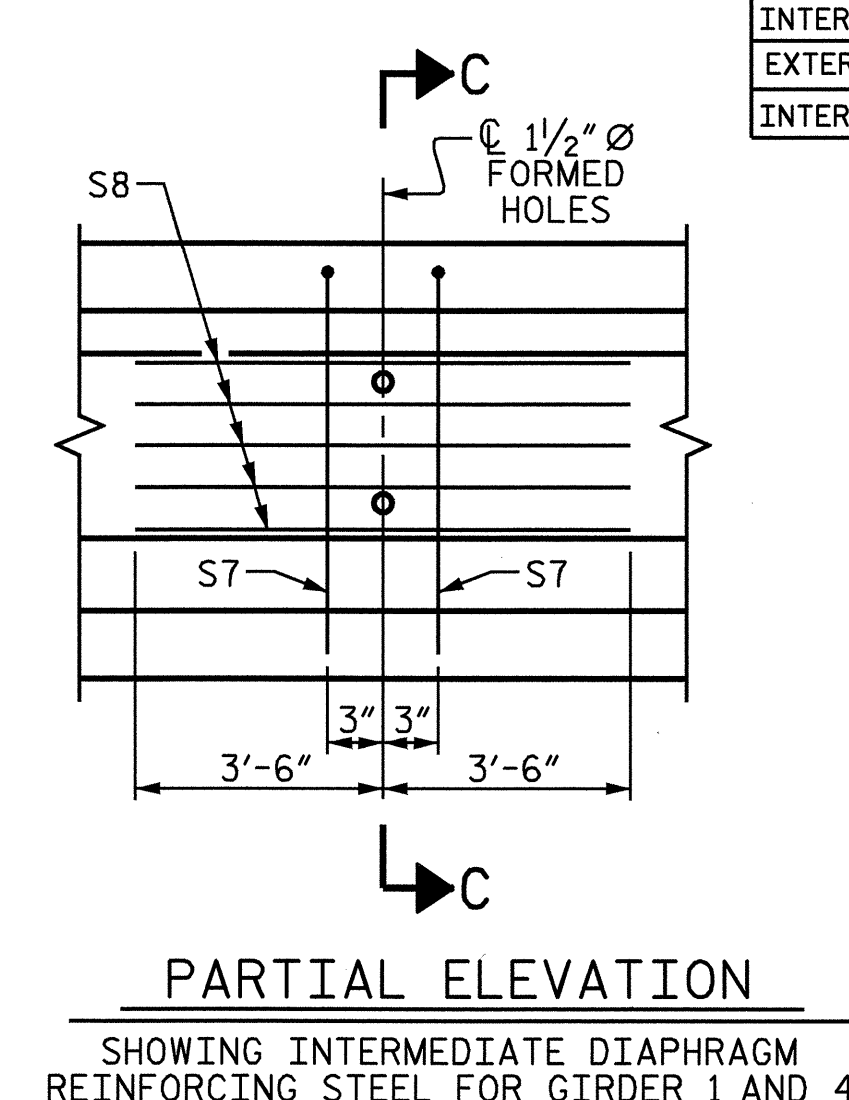
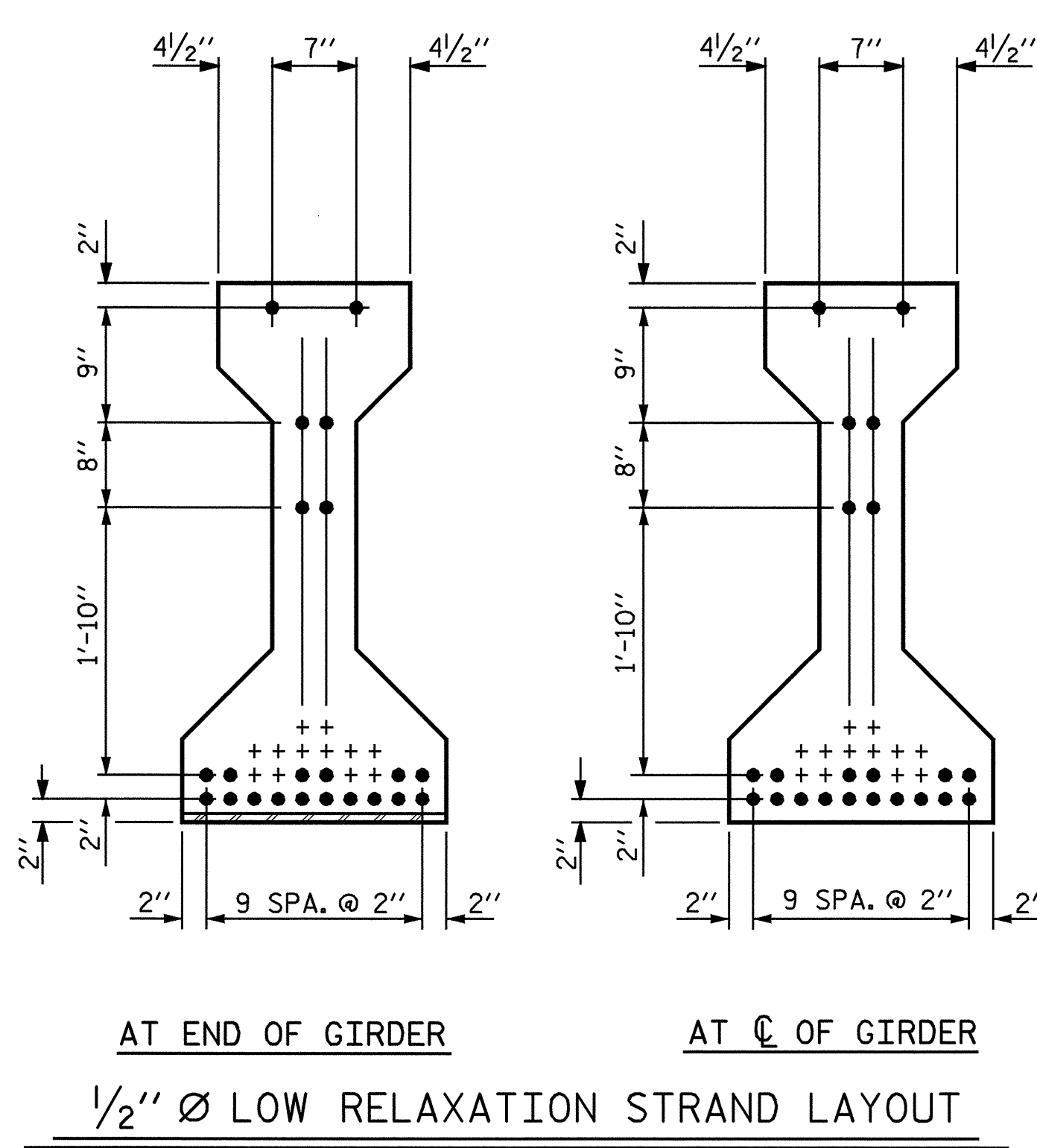
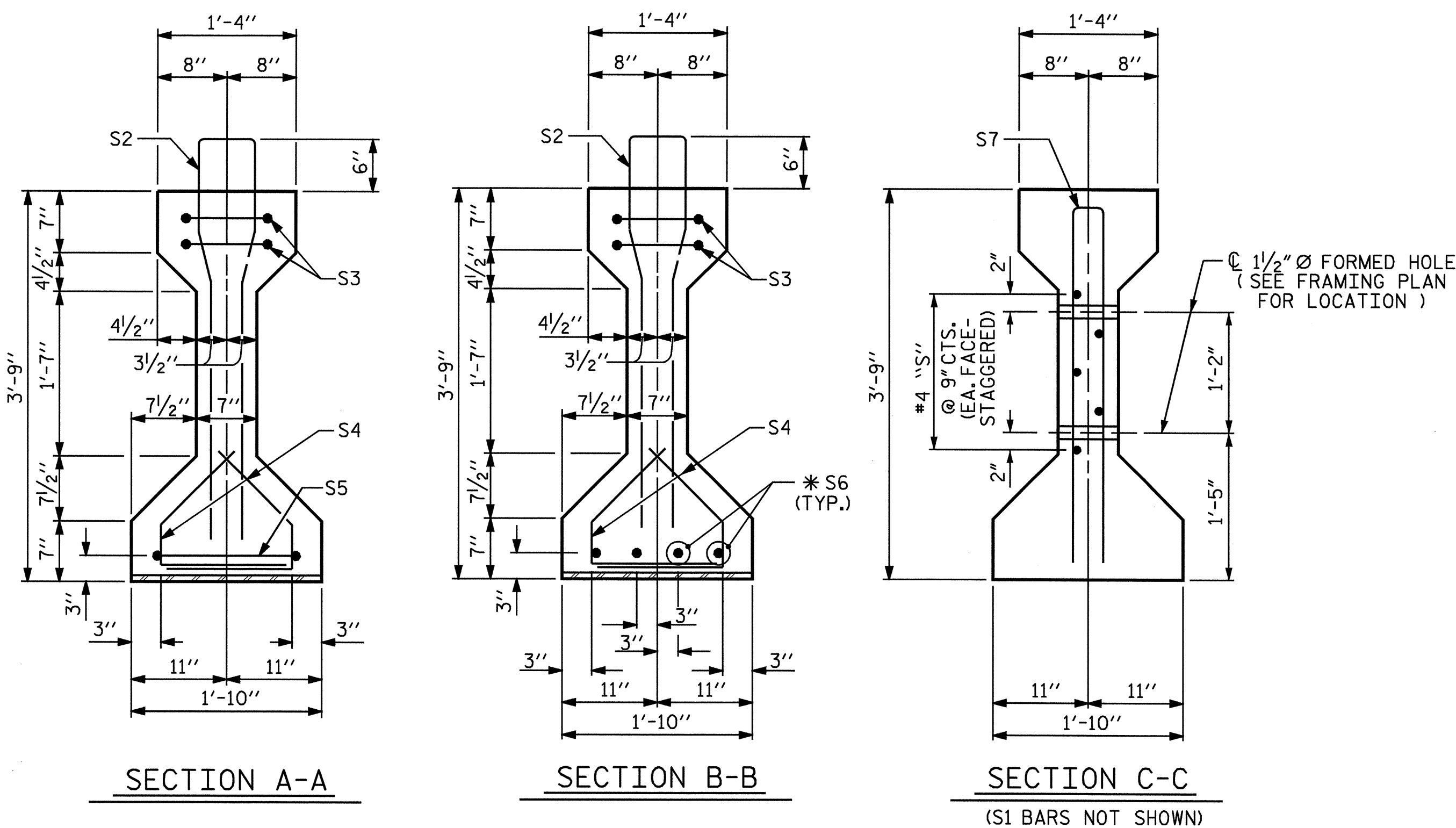
PROJECT NO. B-3824
CHATHAM COUNTY
STATION: 13+35.00 -L-

SHEET 2 OF 4



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD AASHTO TYPE III PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN B					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-10
					TOTAL SHEETS 37

ASSEMBLED BY : QT NGUYEN	DATE : 10-07
CHECKED BY : W.PARKER/PKN	DATE : 10-07
DRAWN BY : ELR 8/91	REV. 7/17/98 RWW/LES
CHECKED BY : GRP 8/91	REV. 10/17/00R RWW/LES
	REV. 5/1/06 TLA/GM

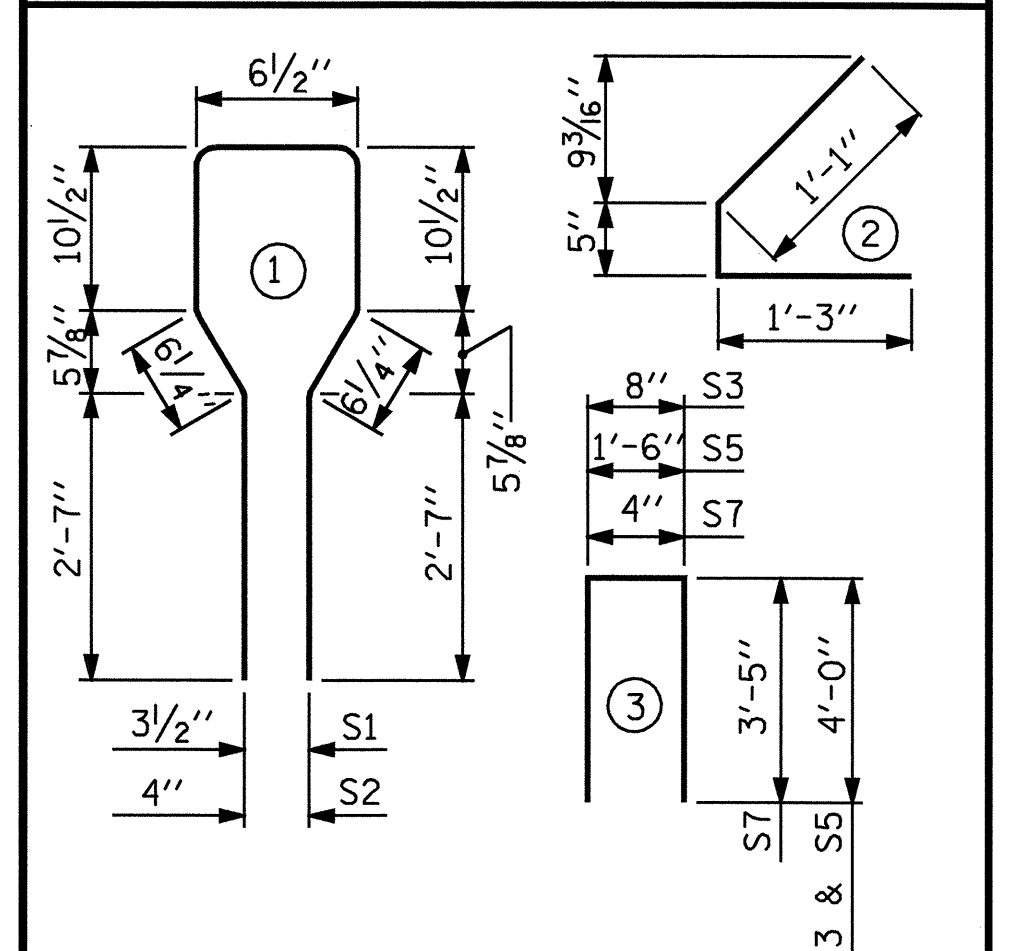


1/2" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.153	41,300	30,980

REINFORCING STEEL FOR ONE GIRDER						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	48	#4	1	8'-6"	273	
S2	12	#6	1	8'-6"	153	
S3	4	#4	3	8'-8"	23	
S4	56	#4	2	2'-9"	103	
S5	1	#4	3	9'-6"	6	
*S6	4	#5	STR	3'-8"	15	
EXTERIOR GDR.	S7	4	#5	3	7'-2"	30
INTERIOR GDR.	S7	4	#5	3	7'-2"	30
EXTERIOR GDR.	S8	5	#4	STR	7'-0"	23
INTERIOR GDR.	S9	5	#4	STR	12'-5"	41

* NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES
ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL LB.	8000 PSI CONCRETE C.Y.	1/2" Ø L.R. STRANDS No.
EXTERIOR GIRDER	626	7.4	22
INTERIOR GIRDER	644	7.4	22

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	51'-6"	206.00'

PROJECT NO. B-3824
CHATHAM COUNTY
STATION: 13+35.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
AASHTO TYPE III
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN C

TABLE 2		
GIRDERS	DIMENSION A	DIMENSION B
GIRDER C1	28'-5"	23'-1"
GIRDER C2	28'-5"	23'-1"
GIRDER C3	28'-5"	23'-1"
GIRDER C4	23'-1"	



ASSEMBLED BY: QT NGUYEN DATE: 10-07
CHECKED BY: W.PARKER/PKN DATE: 10-07
DRAWN BY: ELR 8/91 REV. 7/17/98 RWW/LES
CHECKED BY: GRP 8/91 REV. 10/17/00 RWW/LES
REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO. S-11
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 37
2			4			

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. BEVEL EDGES OF PLATE "B-1" TO GIVE CLOSE FIT BUT NOT TIGHT FIT TO STEEL CASTING FORM.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS. PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

FOR CRACK REPAIR OF PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.

WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
1/2" Ø LOW RELAXATION	SPAN A																					
	GIRDERS 1 & 4											GIRDERS 2 & 3										
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.003	0.005	0.007	0.008	0.008	0.008	0.007	0.005	0.003	0.000	0.000	0.003	0.005	0.007	0.008	0.008	0.008	0.007	0.005	0.003	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.000	0.000	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.000
FINAL CAMBER ↑	0"	0"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	0"	0"	0"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	0"

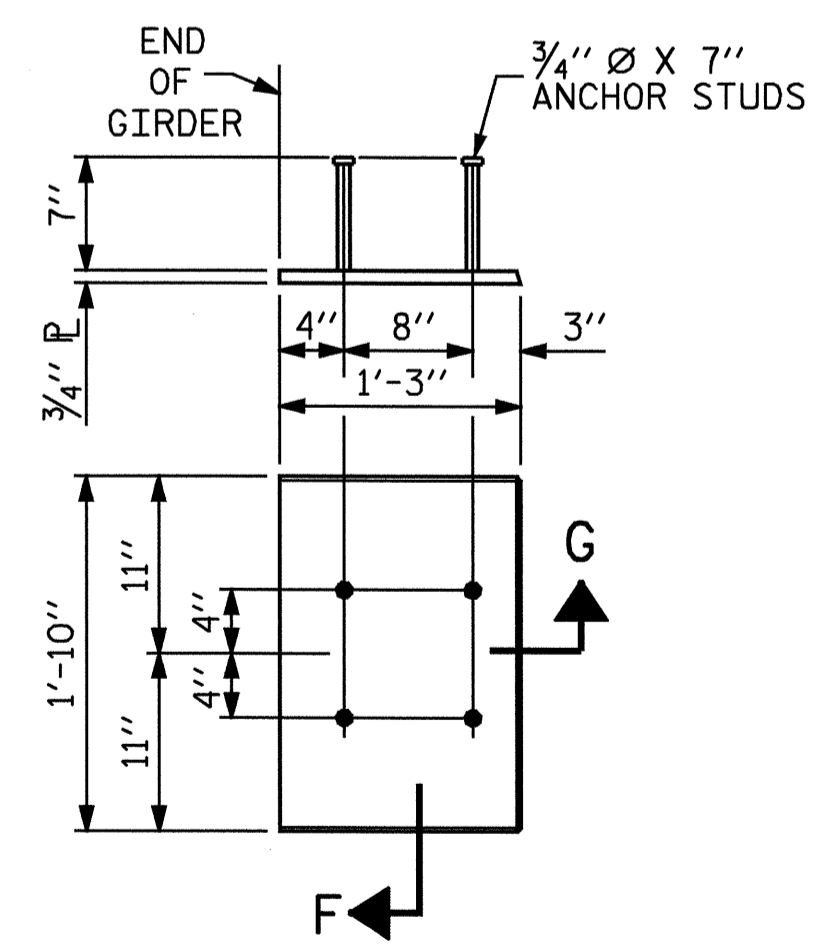
* INCLUDES FUTURE WEARING SURFACE
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
1/2" Ø LOW RELAXATION	SPAN B																					
	GIRDERS 1 & 4											GIRDERS 2 & 3										
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.048	0.092	0.126	0.147	0.154	0.147	0.126	0.092	0.048	0.000	0.000	0.048	0.092	0.126	0.147	0.154	0.147	0.126	0.092	0.048	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.013	0.025	0.035	0.041	0.043	0.041	0.035	0.025	0.013	0.000	0.000	0.015	0.028	0.038	0.045	0.047	0.045	0.038	0.028	0.015	0.000
FINAL CAMBER ↑	0"	7/16"	13/16"	1/16"	1/4"	13/8"	1/4"	1/16"	13/16"	7/16"	0"	0"	7/16"	3/4"	1/16"	1/4"	15/16"	1/4"	1/16"	3/4"	7/16"	0"

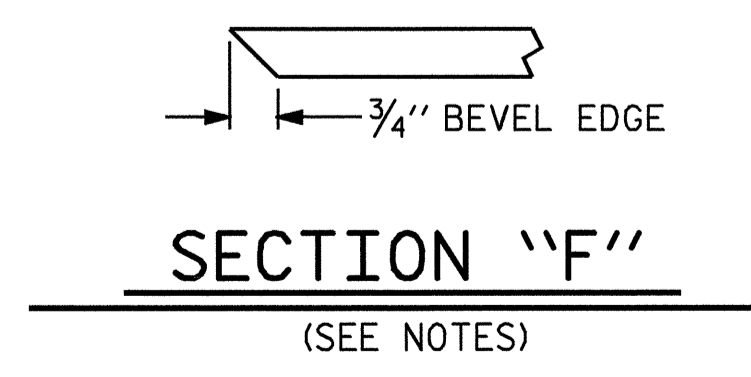
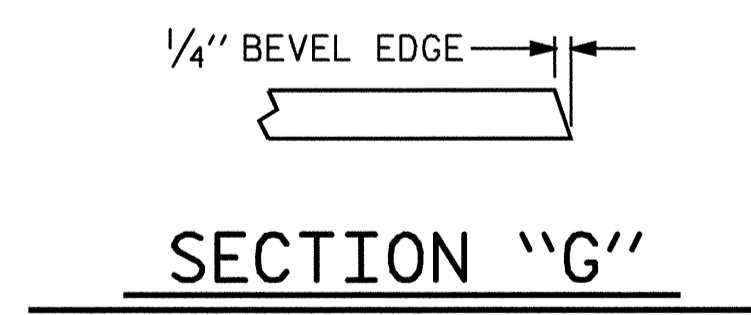
* INCLUDES FUTURE WEARING SURFACE
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
1/2" Ø LOW RELAXATION	SPAN C																					
	GIRDERS 1 & 4											GIRDERS 2 & 3										
	TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.023	0.044	0.060	0.070	0.074	0.070	0.060	0.044	0.023	0.000	0.000	0.023	0.044	0.060	0.070	0.074	0.070	0.060	0.044	0.023	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.008	0.014	0.020	0.023	0.024	0.023	0.020	0.014	0.008	0.000	0.000	0.008	0.016	0.022	0.026	0.027	0.026	0.022	0.016	0.008	0.000
FINAL CAMBER ↑	0"	3/16"	3/8"	1/2"	9/16"	5/8"	9/16"	1/2"	3/8"	3/16"	0"	0"	3/16"	5/16"	7/16"	9/16"	9/16"	9/16"	7/16"	5/16"	3/16"	0"

* INCLUDES FUTURE WEARING SURFACE
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).



EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE III GIRDER
(2 REQ'D PER GIRDER)



PROJECT NO. B-3824
CHATHAM COUNTY
STATION: 13+35.00 -L-

SHEET 4 OF 4



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS 37
2			4			

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL, CONNECTOR PLATES AND PLATE WASHERS SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE AASHTO M164 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

TENSION ON THE AASHTO M164 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE CHANNELS, ANGLES, WASHERS, PLATE WASHERS, AND DIRECT TENSION INDICATORS SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISIONS AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, AND WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

USE A MINIMUM 7/16" THICK PLATE WASHER WITH STANDARD HOLES UNDER EACH BOLT HEAD AND NUT. THE PLATE WASHERS SHALL HAVE SUFFICIENT SIZE TO COVER THE HOLES AFTER INSTALLATION. DIRECT TENSION INDICATORS ARE TO BE USED IN CONJUNCTION WITH THE PLATE WASHERS.

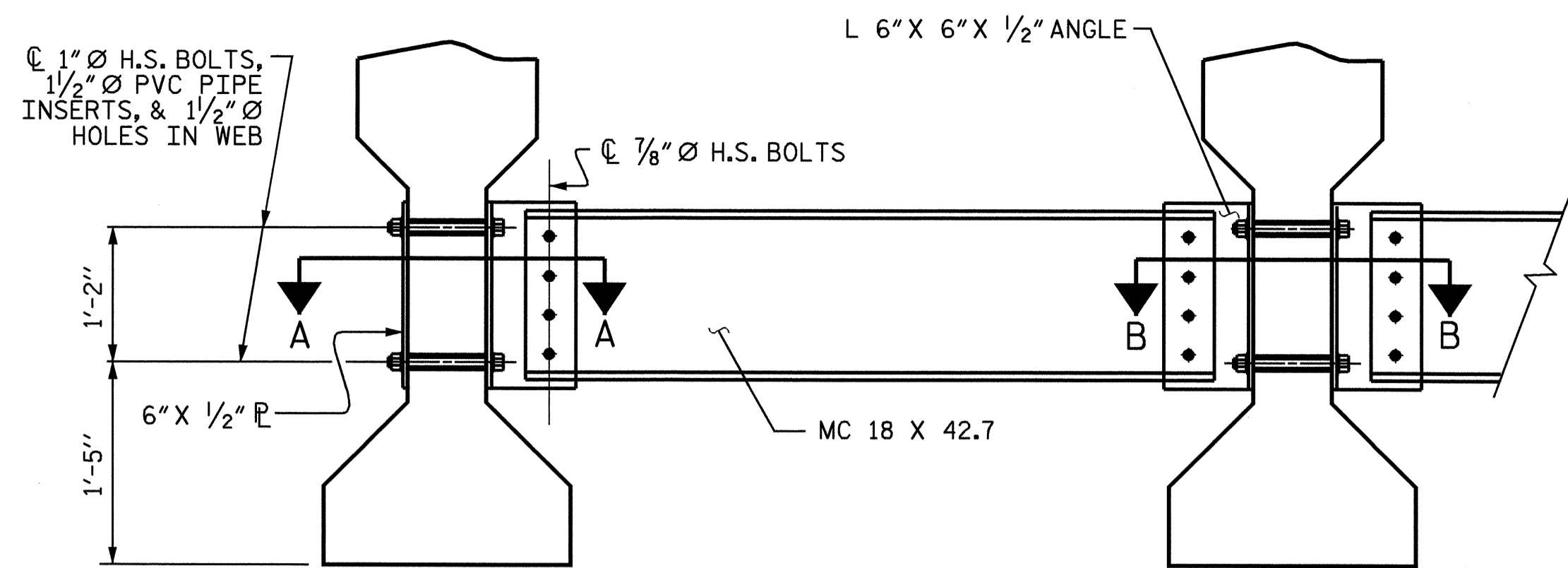
PROVIDE SUFFICIENT LENGTH OF ALL BOLTS TO ACCOMMODATE WASHERS, DIRECT TENSION INDICATORS, THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

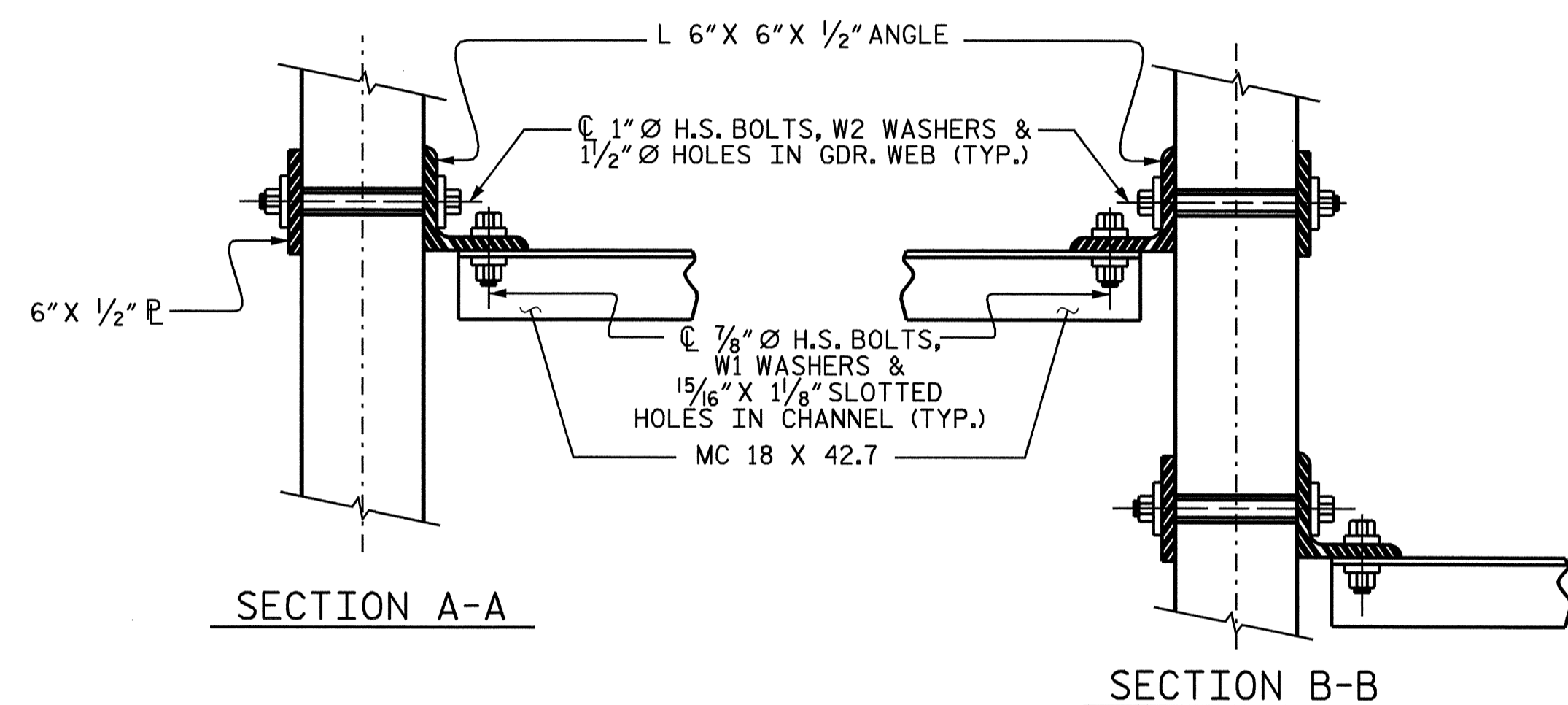
CONTRACTOR SHALL SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, TEMPORARY STRUTS SHALL BE PLACED BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED. ALL AASHTO M164 H.S. BOLTS SHALL BE FULLY TIGHTENED AFTER THE STRUTS HAVE BEEN REMOVED.

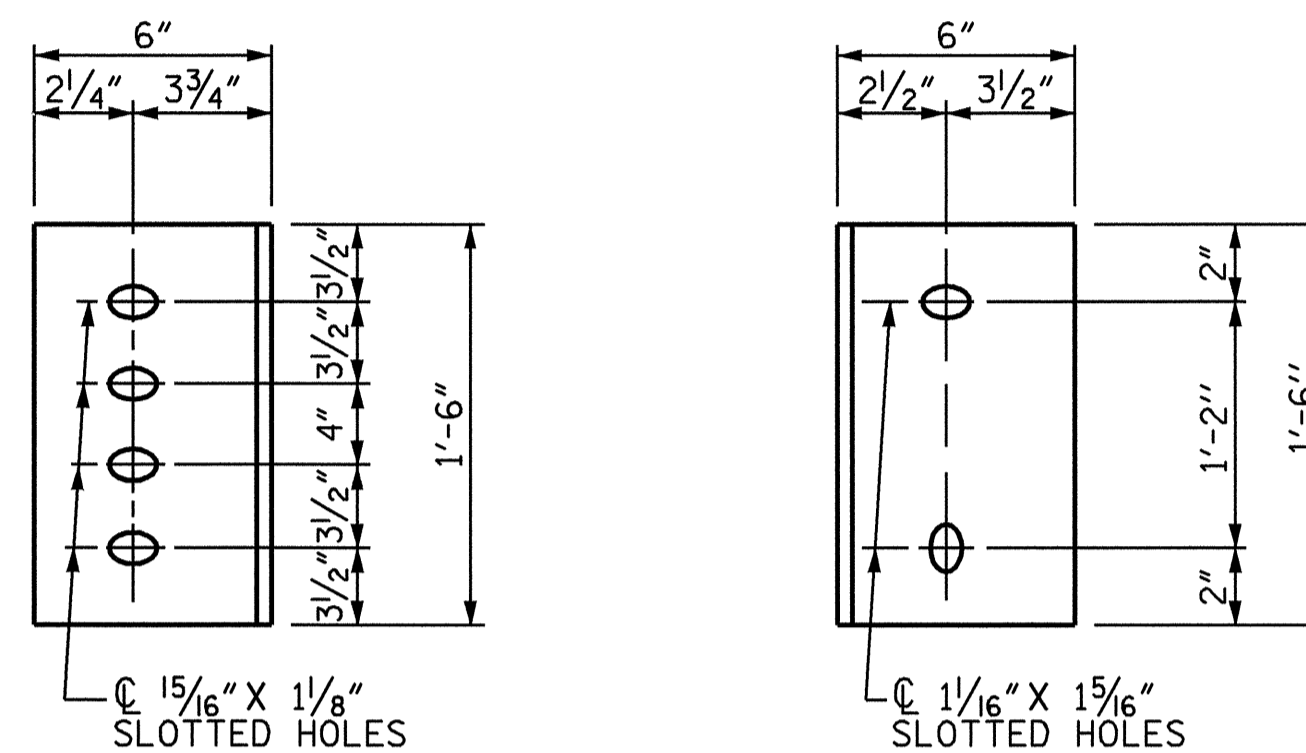
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



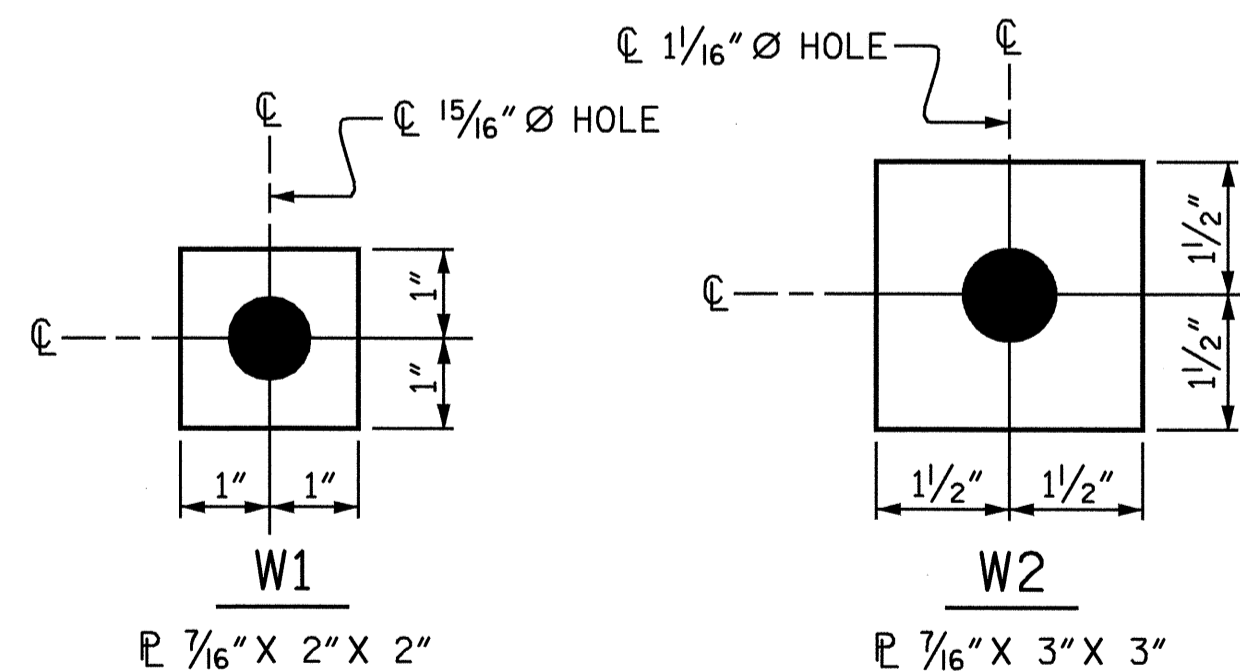
EXTERIOR GIRDER
INTERIOR GIRDER
PART SECTION AT INTERMEDIATE DIAPHRAGM



SECTION A-A
SECTION B-B
CONNECTION DETAILS



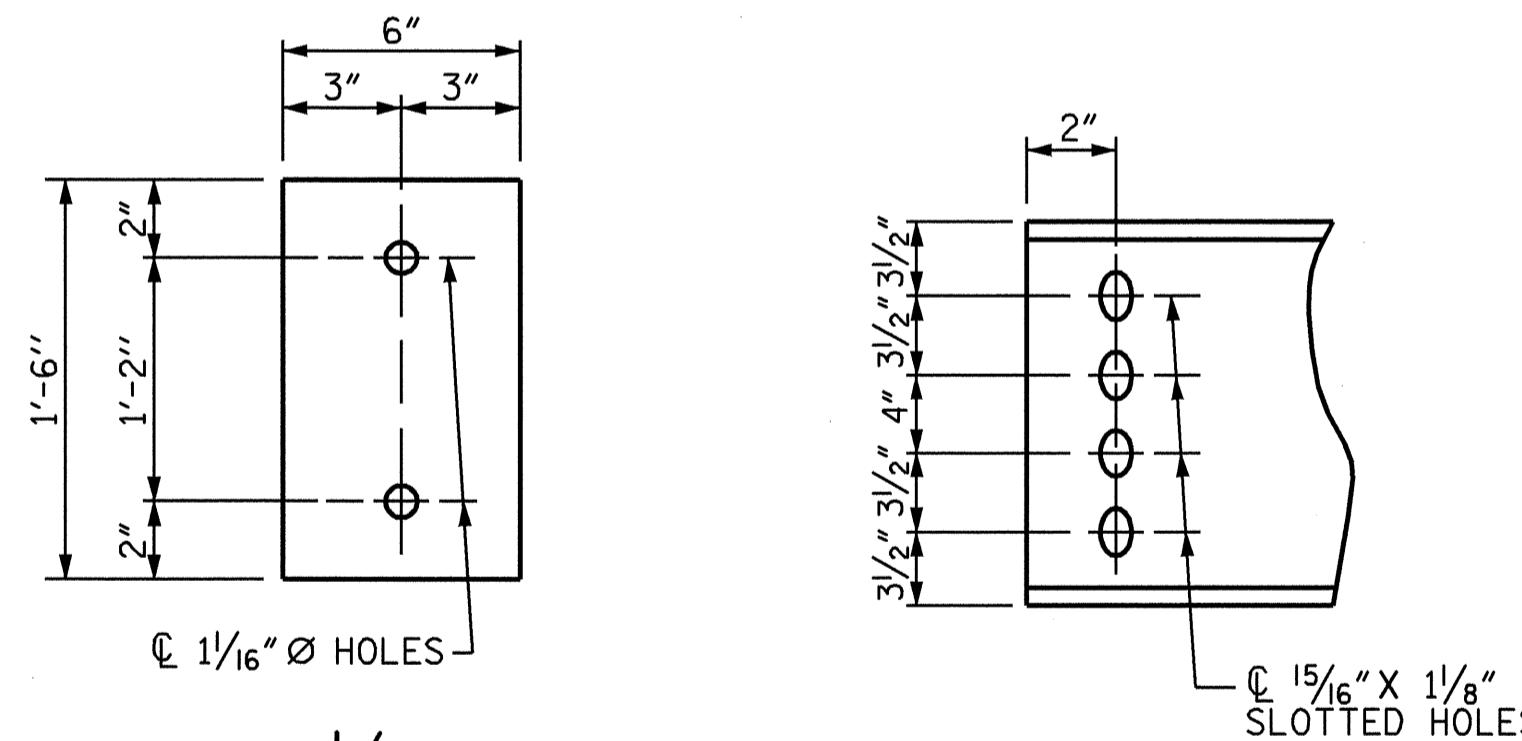
DIAPHRAGM FACE
WEB FACE
L 6" X 6" X 1/2" ANGLE DETAILS



USE WITH 7/8" HVY. HEX NUTS & DIRECT TENSION INDICATOR WASHERS AT DIAPHRAGM CHANNEL TO CONNECTOR PLATE CONNECTIONS

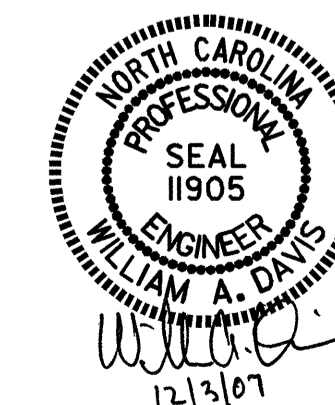
USE WITH 1" HVY. HEX NUTS & DIRECT TENSION INDICATOR WASHERS AT CONNECTOR PLATE TO GIRDER CONNECTIONS

WASHER DETAILS



6" X 1/2" PLATE DETAILS
CHANNEL END DETAILS

PROJECT NO. B-3824
CHATHAM COUNTY
STATION: 13+35.00 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
INTERMEDIATE
STEEL DIAPHRAGMS
FOR TYPE III
PRESTRESSED CONCRETE
GIRDERS

ASSEMBLED BY :	QT NGUYEN	DATE :	10-07
CHECKED BY :	PK NEWTON	DATE :	10-07
DRAWN BY :	TLA 6/05	ADDED :	10/21/05
CHECKED BY :	VC 6/05	REV. :	5/1/06R KMM/GM

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

TOTAL SHEETS: 37

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

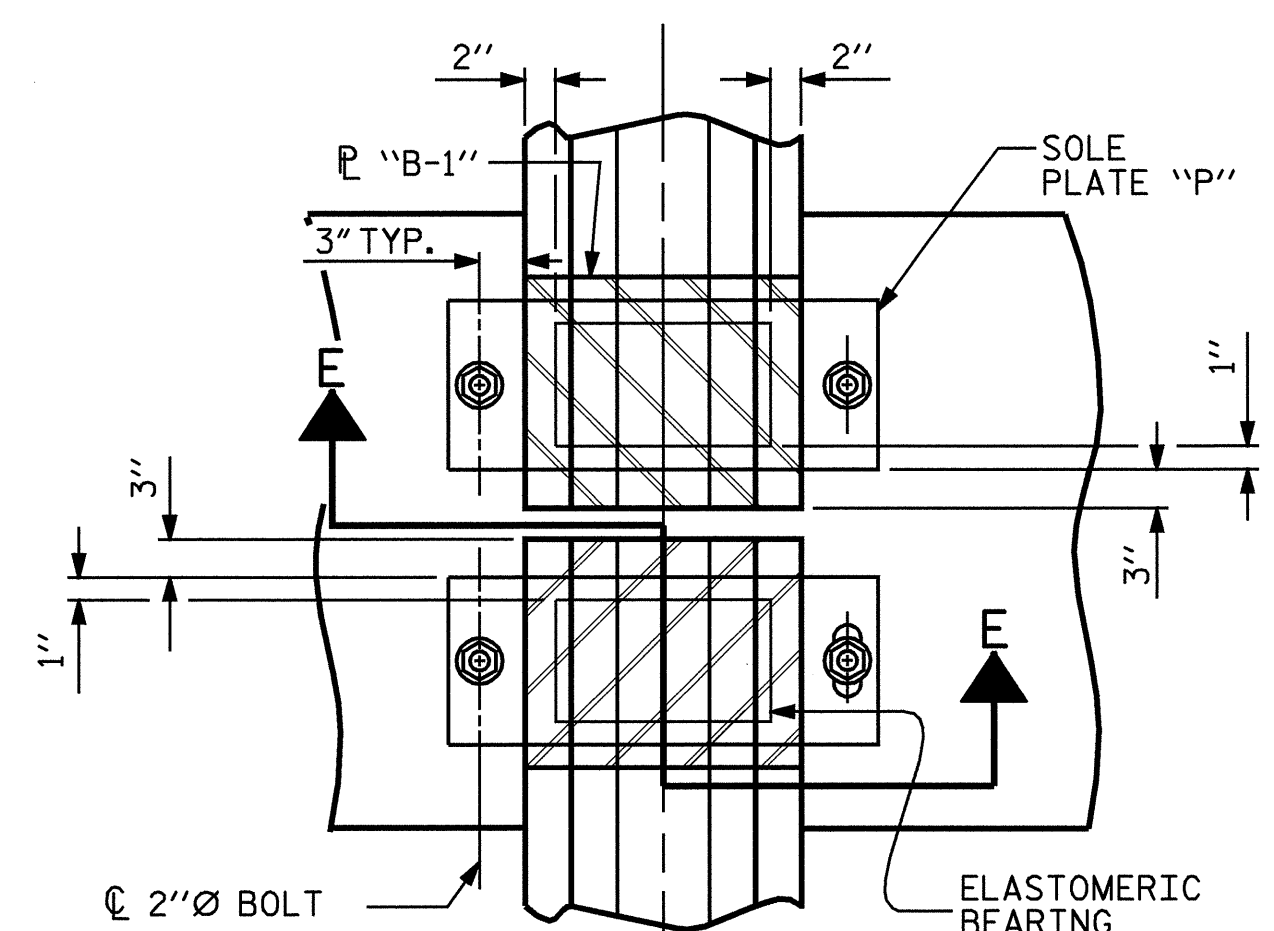
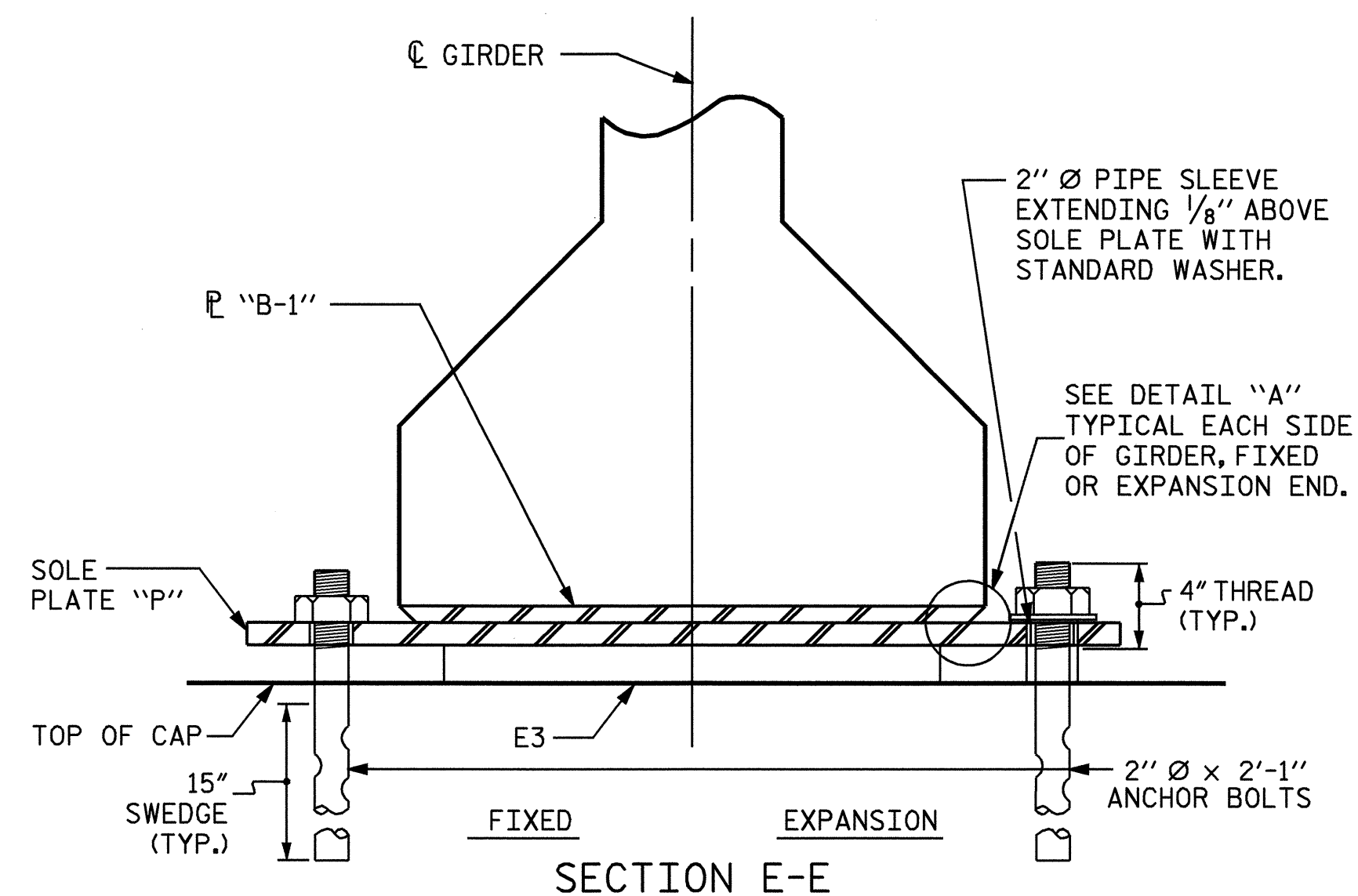
PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

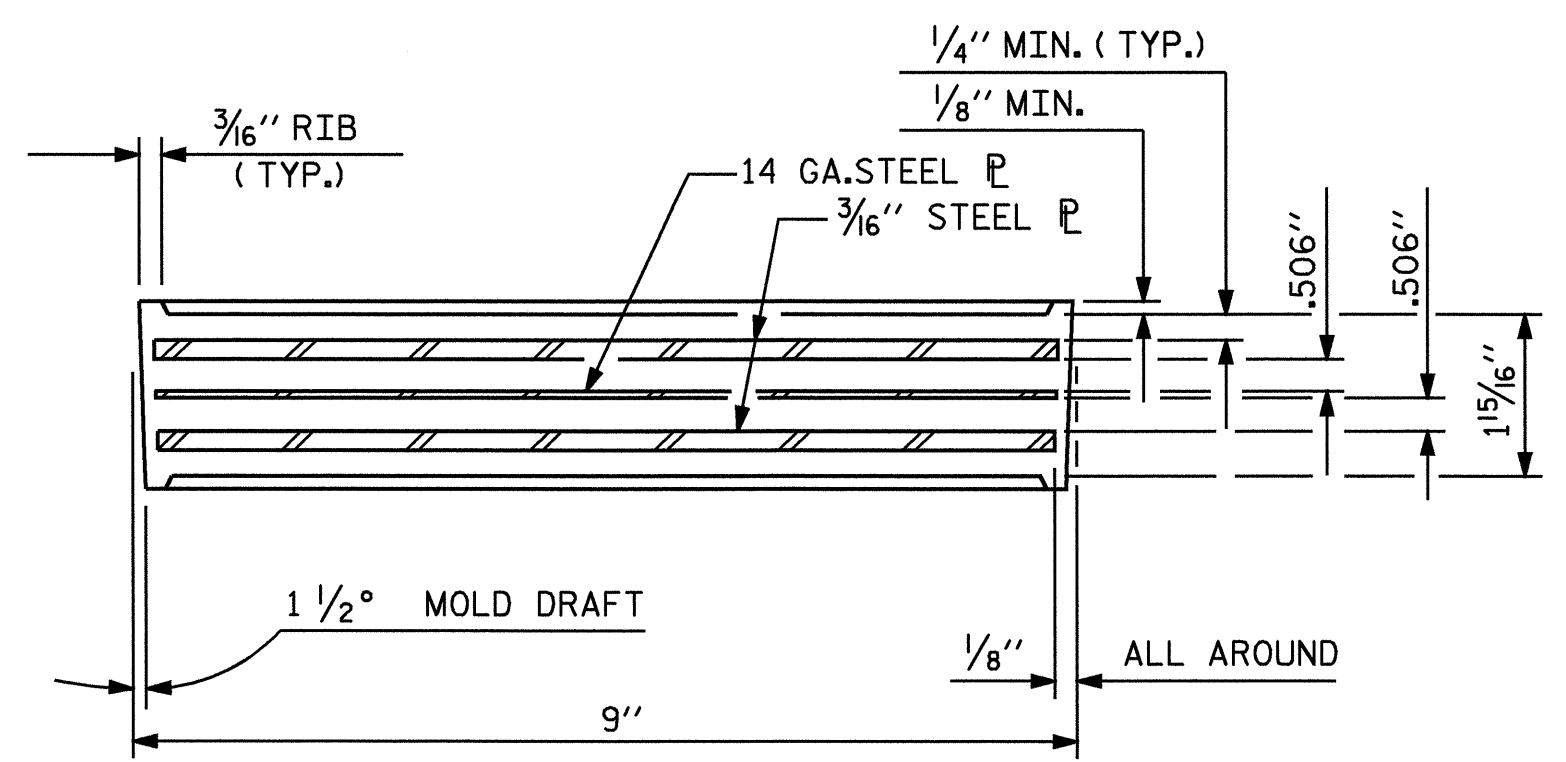
SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

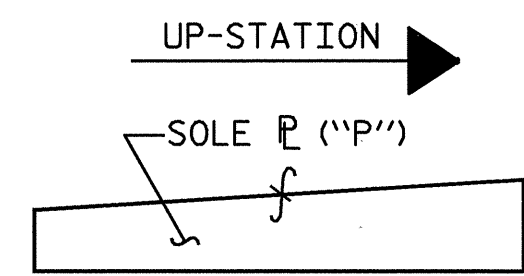
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.



TYPICAL HALF-PLAN (SHOWING CONTINUOUS BENT) TYPICAL HALF-PLAN (SHOWING SIMPLE SPAN BENT)

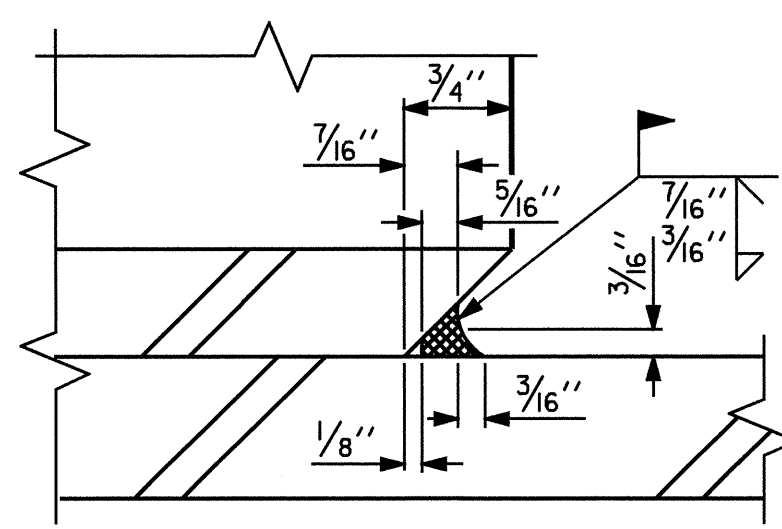


TYPICAL SECTION OF ELASTOMERIC BEARINGS



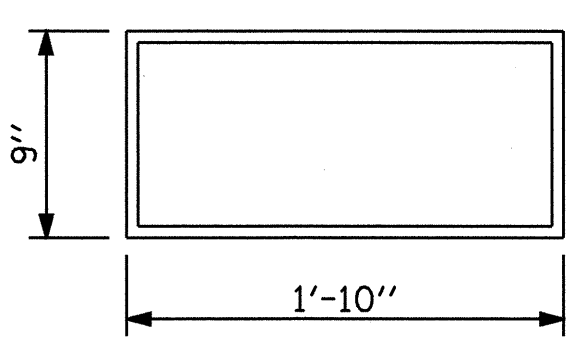
SOLE PLATE PLACEMENT DETAIL

(P5, P6, P7, & P9)



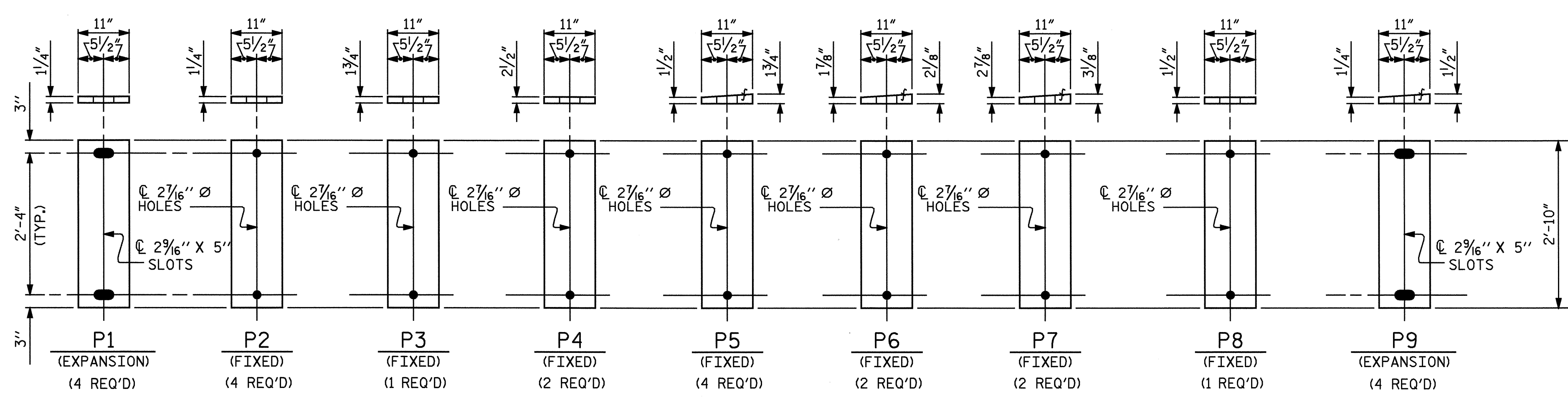
DETAIL "A"

— LOAD RATINGS —	
	MAX.D.L.+L.L.
45" PCG -TYPE IV	137 K



E3 (24 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING

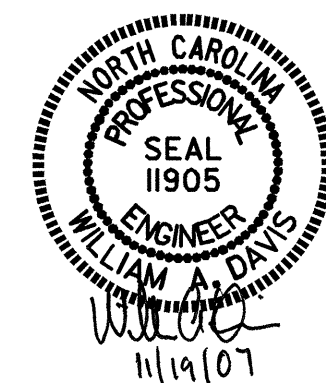
TYPE IV



SOLE PLATE DETAILS ("P")

PROJECT NO. B-3824
CHATHAM COUNTY
STATION: 13+35.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
**ELASTOMERIC BEARING
DETAILS**
PRESTRESSED CONCRETE GIRDER
SUPERSTRUCTURE



ASSEMBLED BY : J.G.KHARVA/QTN DATE : 10-07
CHECKED BY : W.PARKER/PKN DATE : 10-07
DRAWN BY : WJH 8/89 REV. 10/17/00 RWW/LES
CHECKED BY : CRK 8/89 REV. 7/10/01 RWW/LES
REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			37

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 B-221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

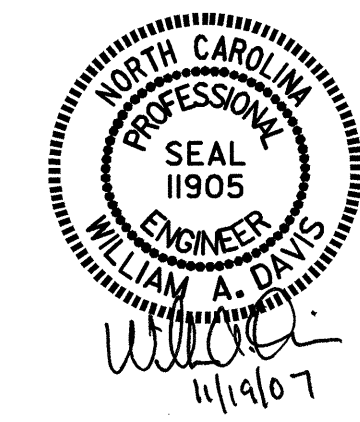
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8FT. TO 10FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 266.65 LIN. FT.

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

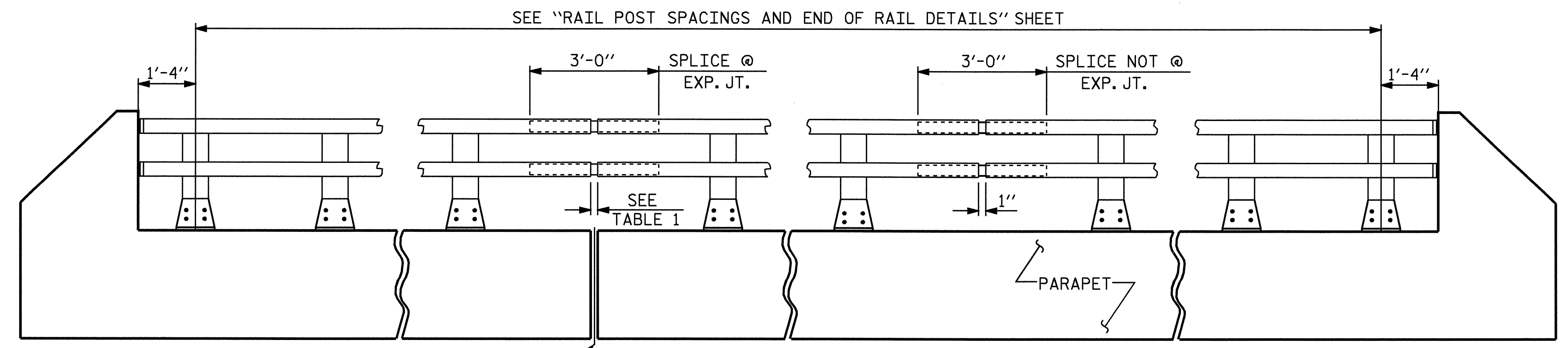
SHEET 1 OF 2



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

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

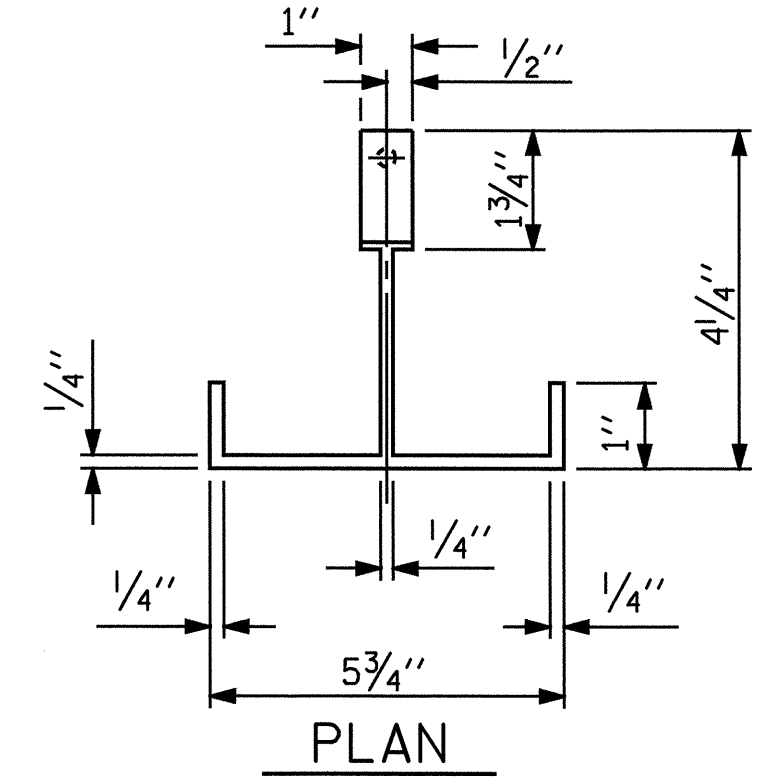
TOTAL SHEETS: 37



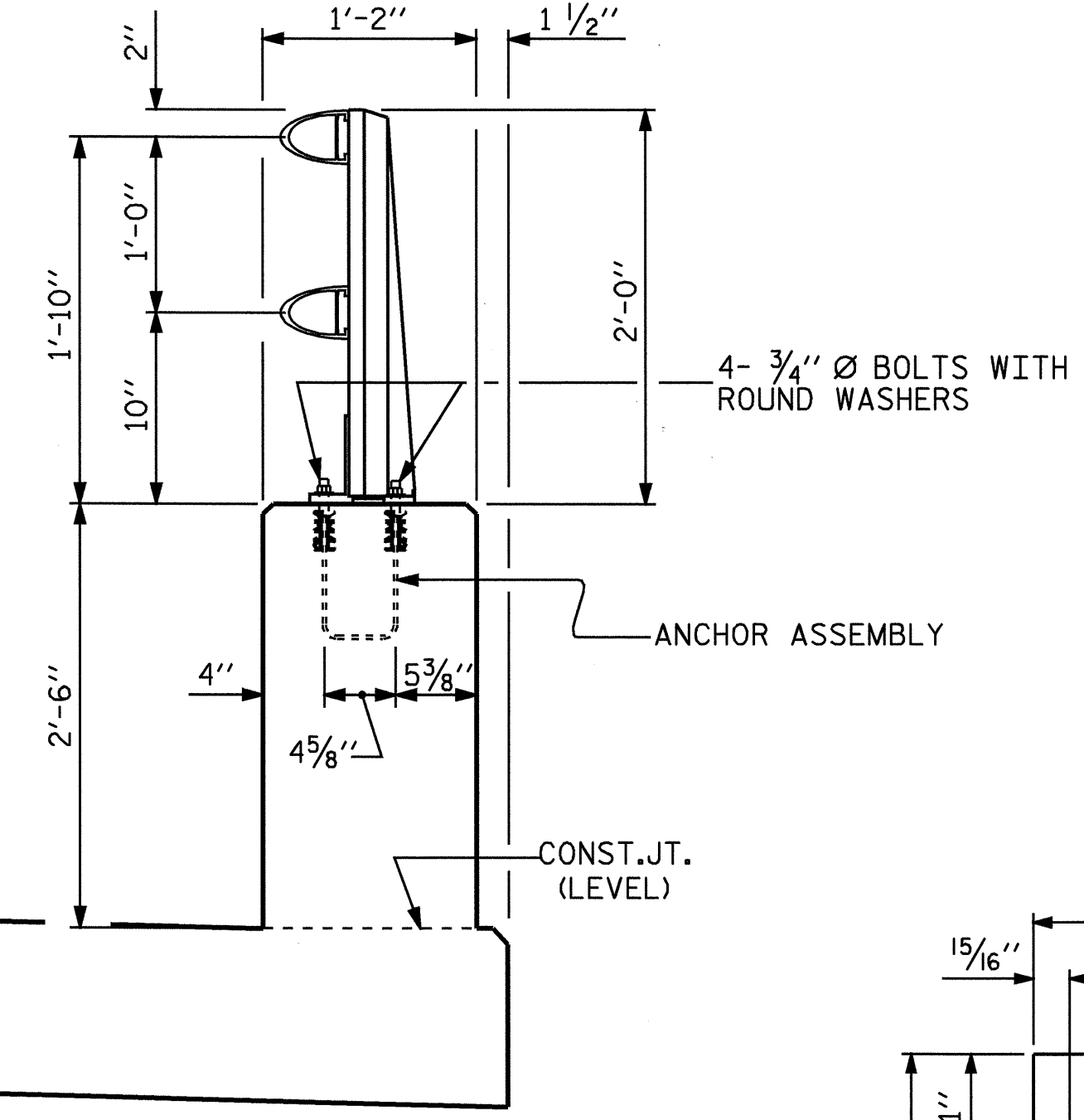
ELEVATION

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

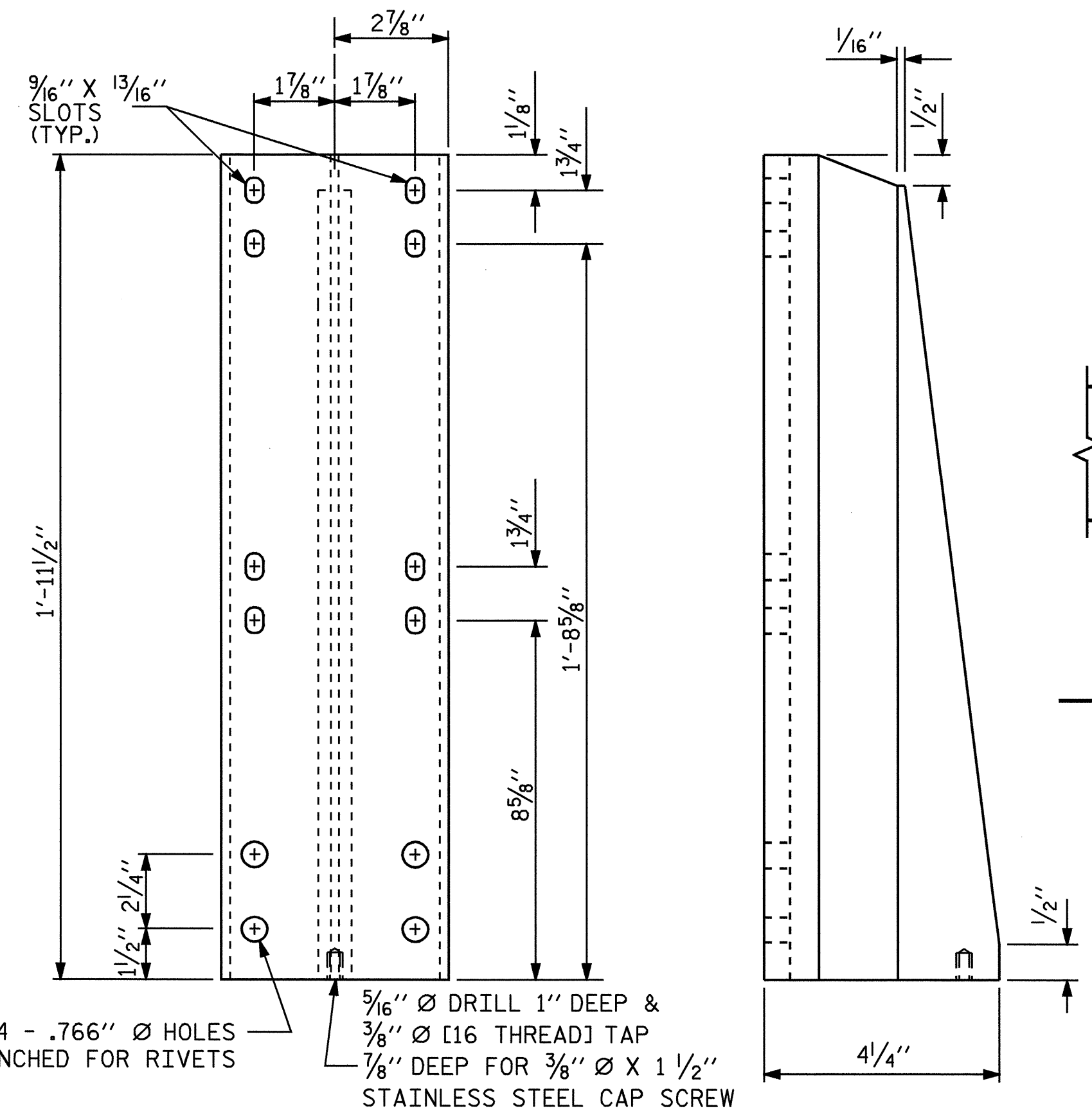
EXP. JT. @	RAIL OPENING
BENT No. 1	1"
BENT No. 2	1"



PLAN



SECTION THRU PARAPET AND RAIL

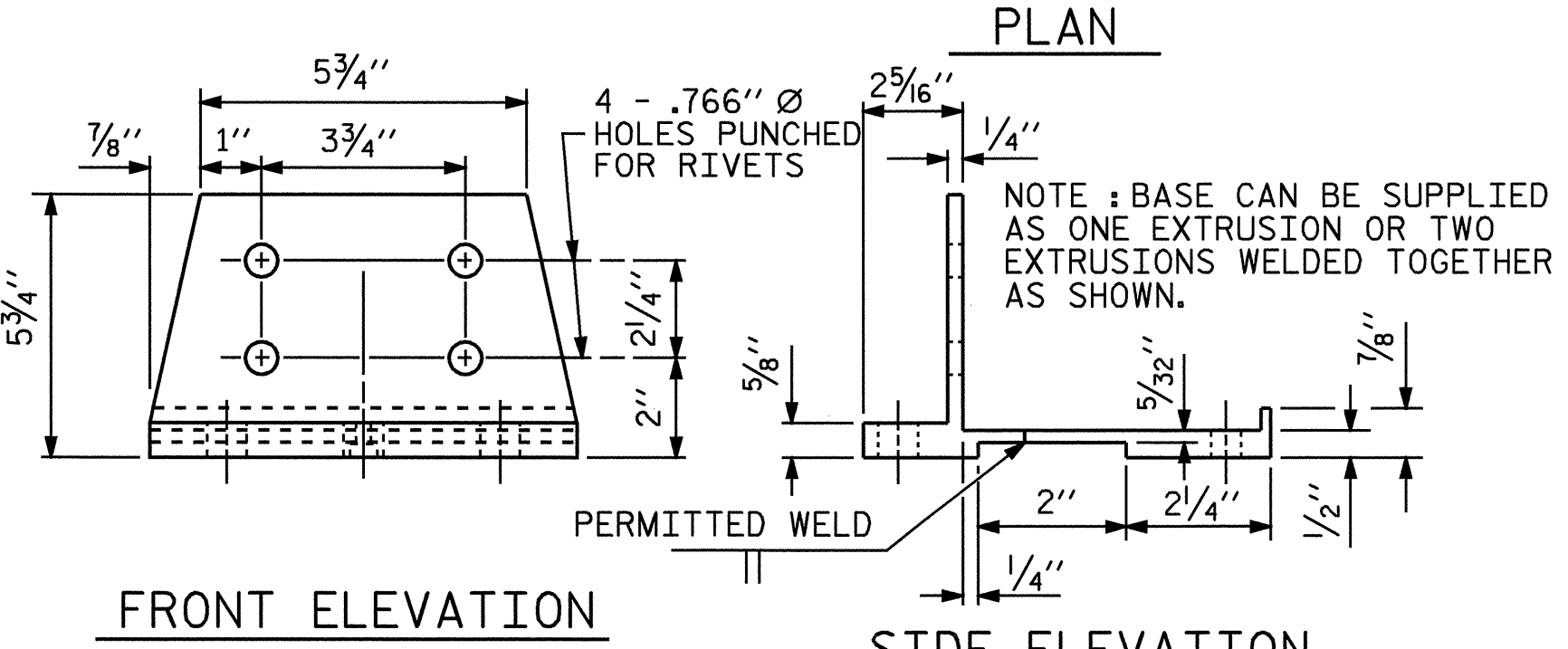


FRONT ELEVATION

SIDE ELEVATION

DETAILS OF POST

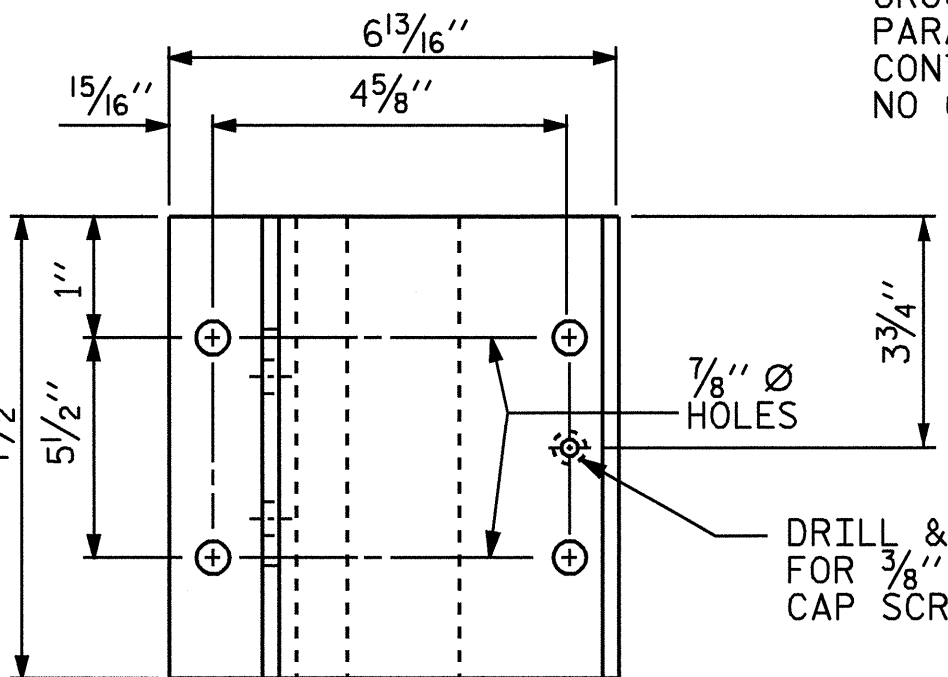
ASSEMBLED BY: J.D. HAWK/QTN DATE: 10-07
 CHECKED BY: W.PARKER/PKN DATE: 10-07
 DRAWN BY: EEM 6/94
 CHECKED BY: RGW 6/94
 REV. 10/17/00 LES/RDR
 REV. 5/1/03R RWW/JTE
 REV. 5/1/06 TLA/GM



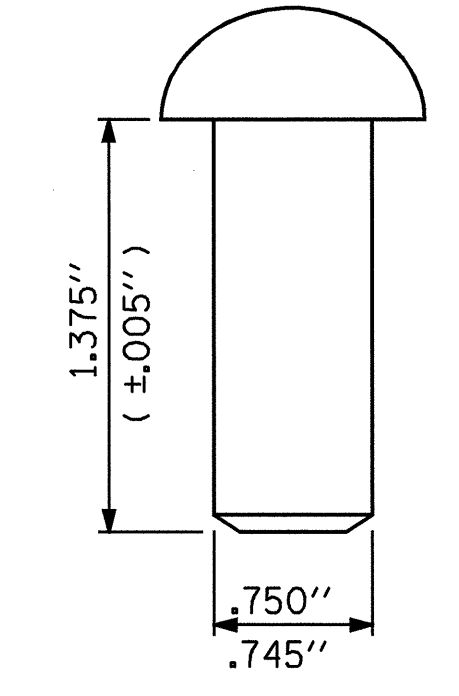
FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



PLAN



RIVET DETAIL

NOTES

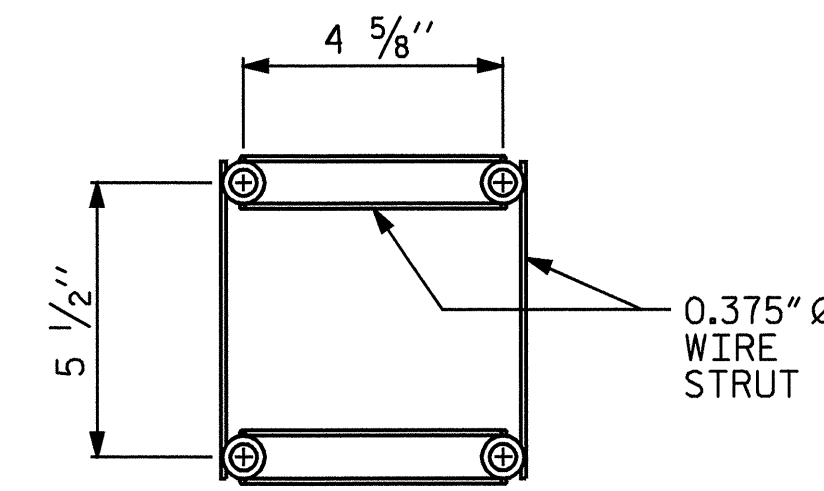
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

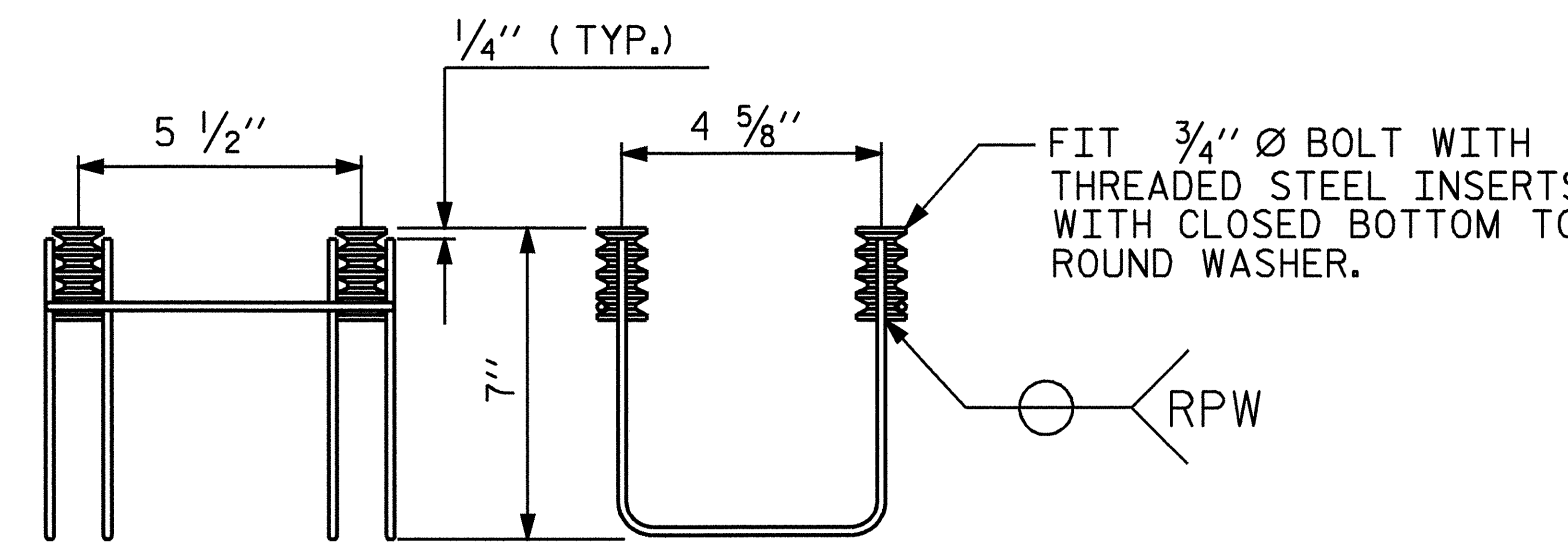
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

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



PLAN



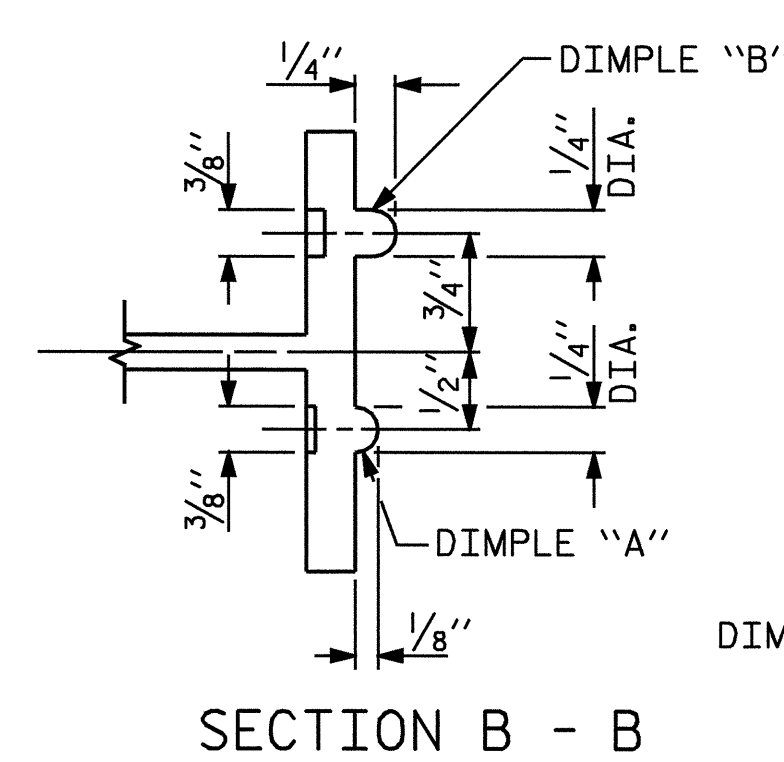
SIDE VIEW

ELEVATION

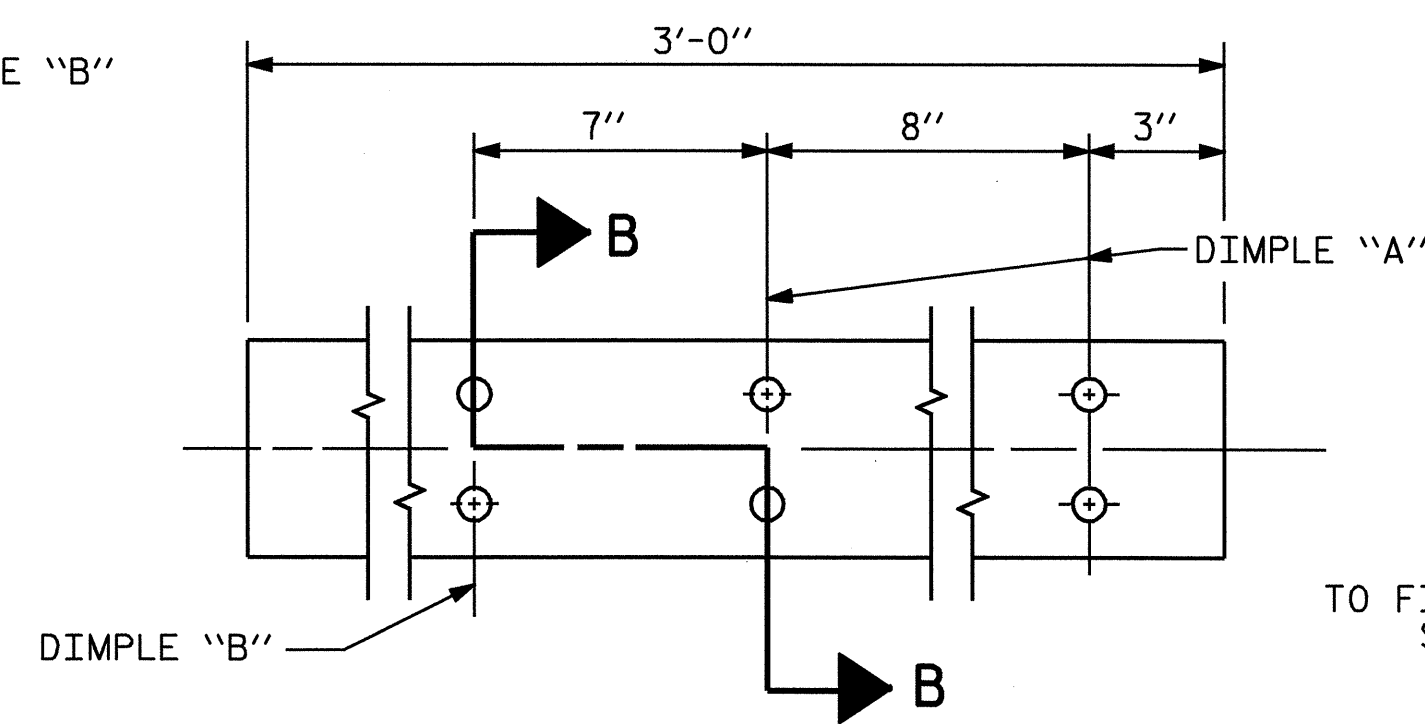
MINIMUM LENGTH OF THREADS IN INSERT (FERRULE) : 1 3/4"

4-BOLT METAL RAIL ANCHOR ASSEMBLY

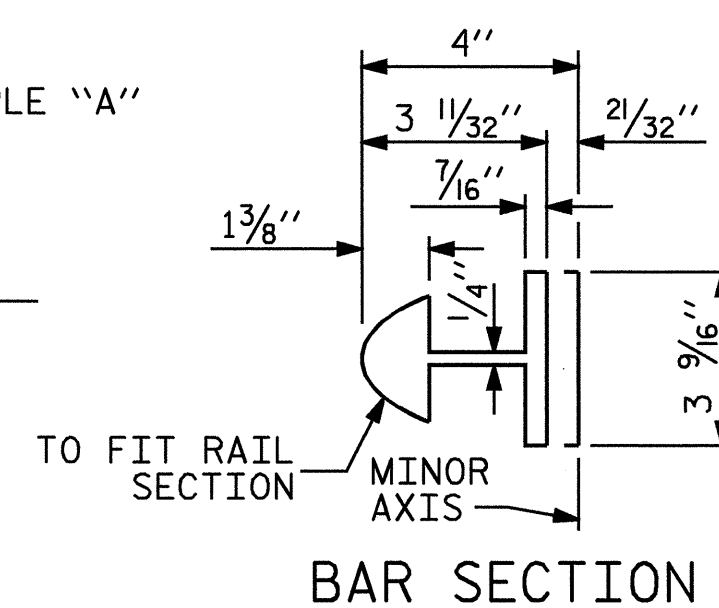
(46 ASSEMBLIES REQUIRED)



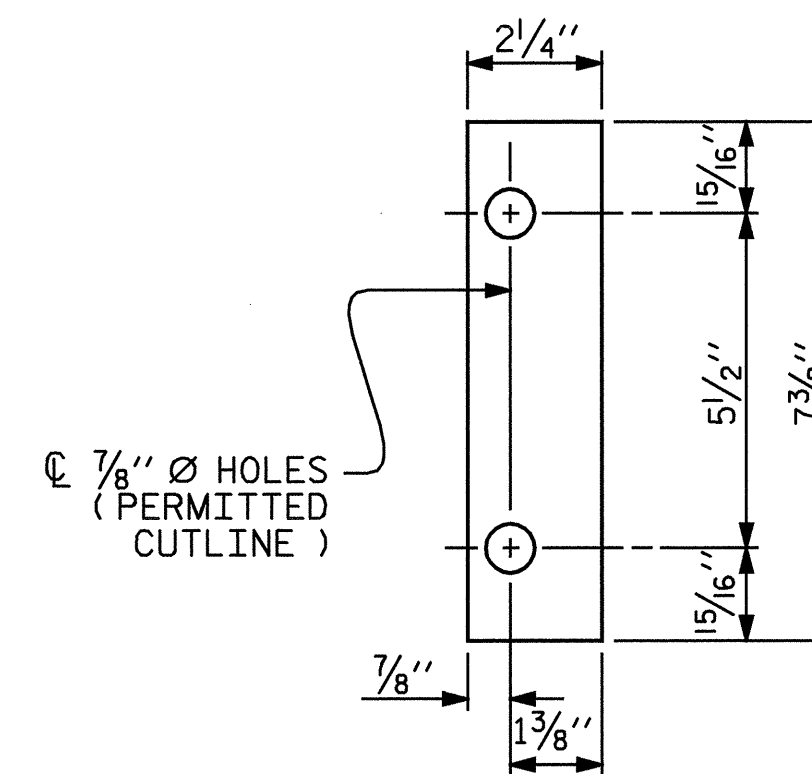
SECTION B - B



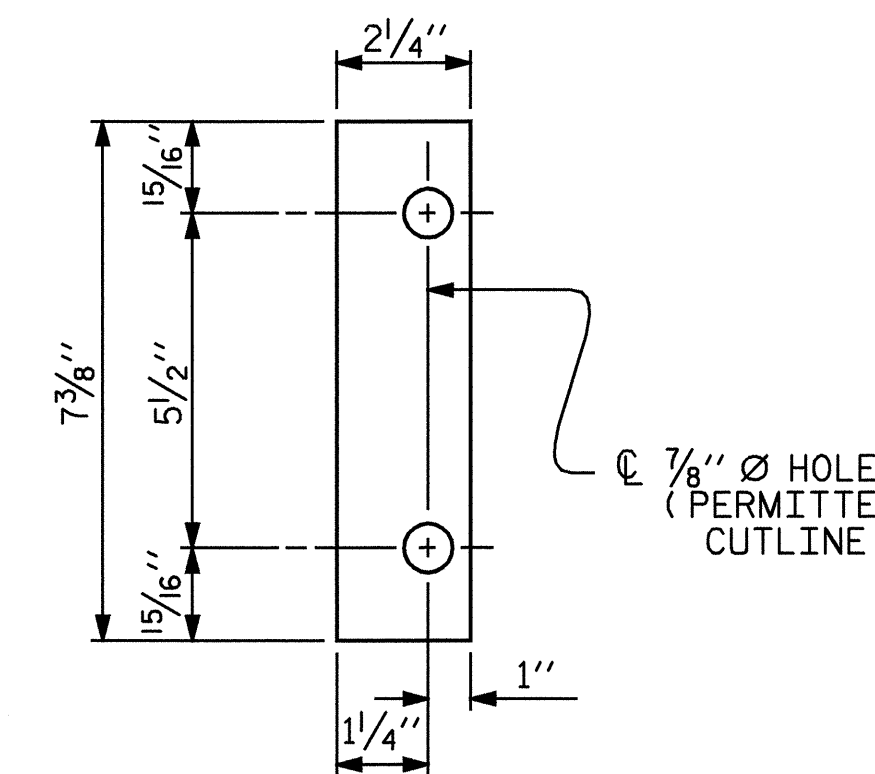
EXPANSION BAR DETAILS



BAR SECTION



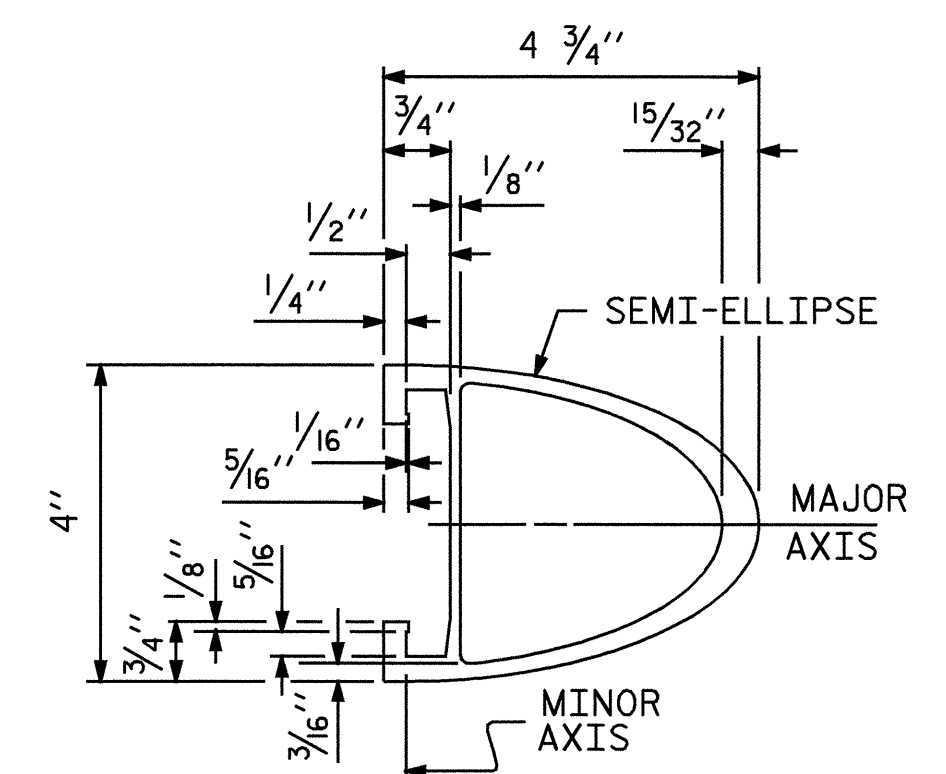
FRONT PLATE



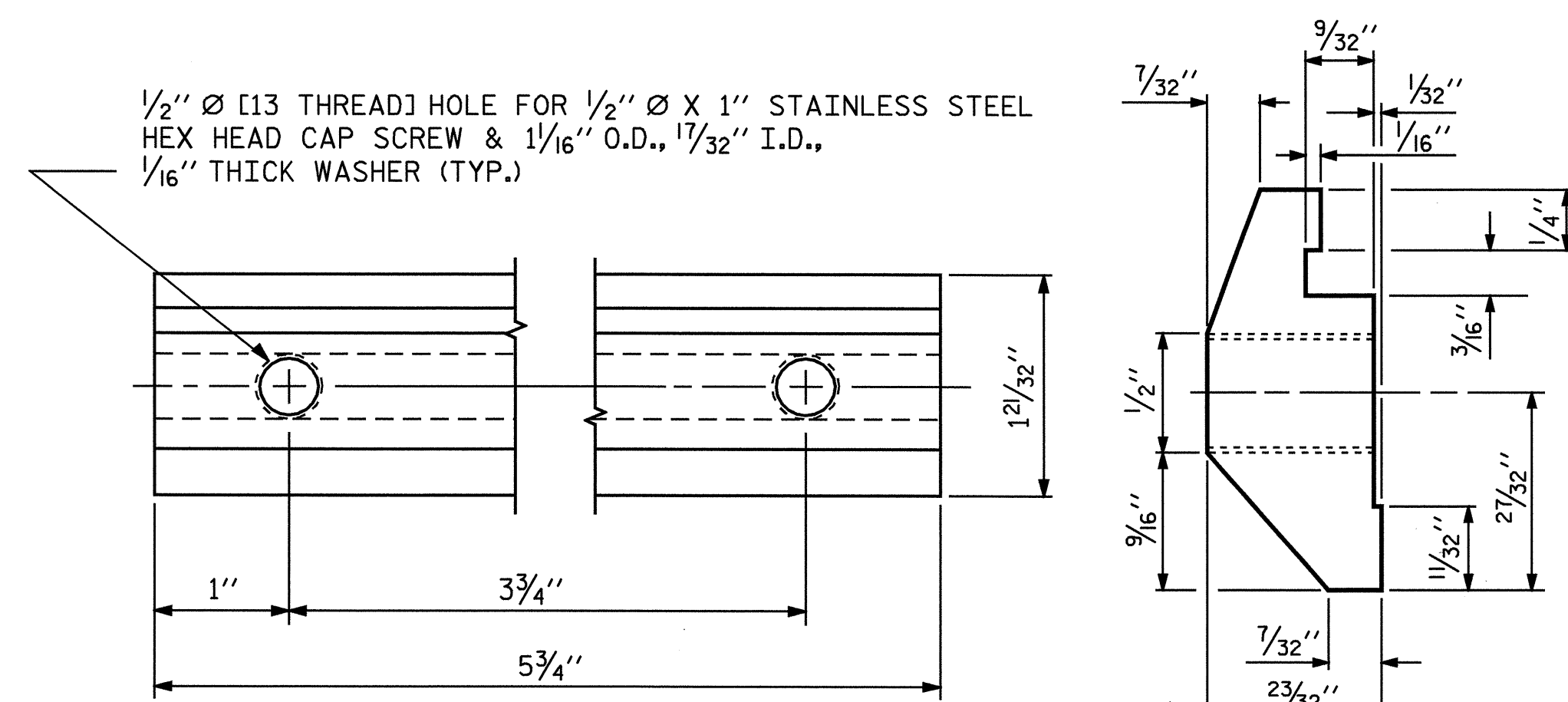
REAR PLATE

SHIM DETAILS

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

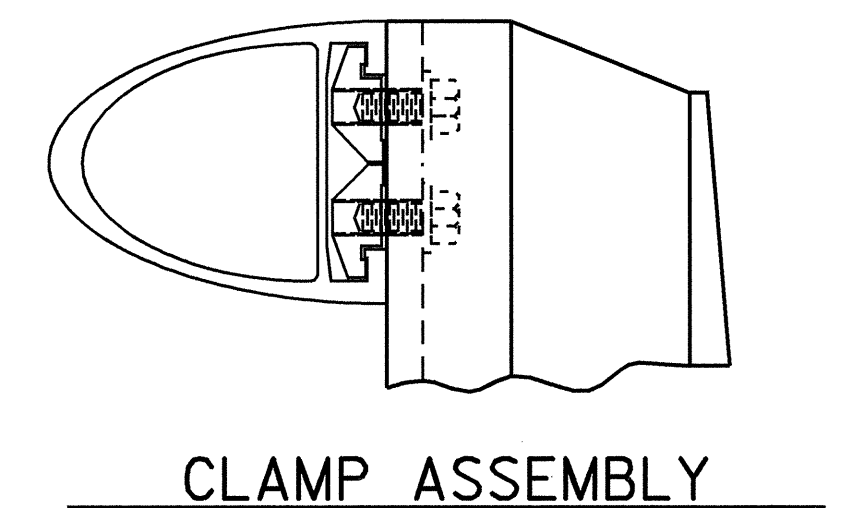


RAIL SECTION

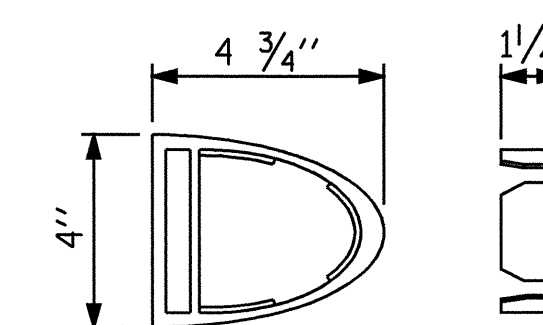


CLAMP BAR DETAIL

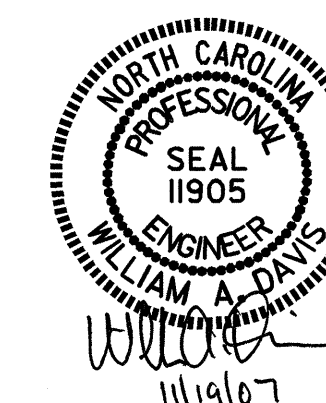
(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP



PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

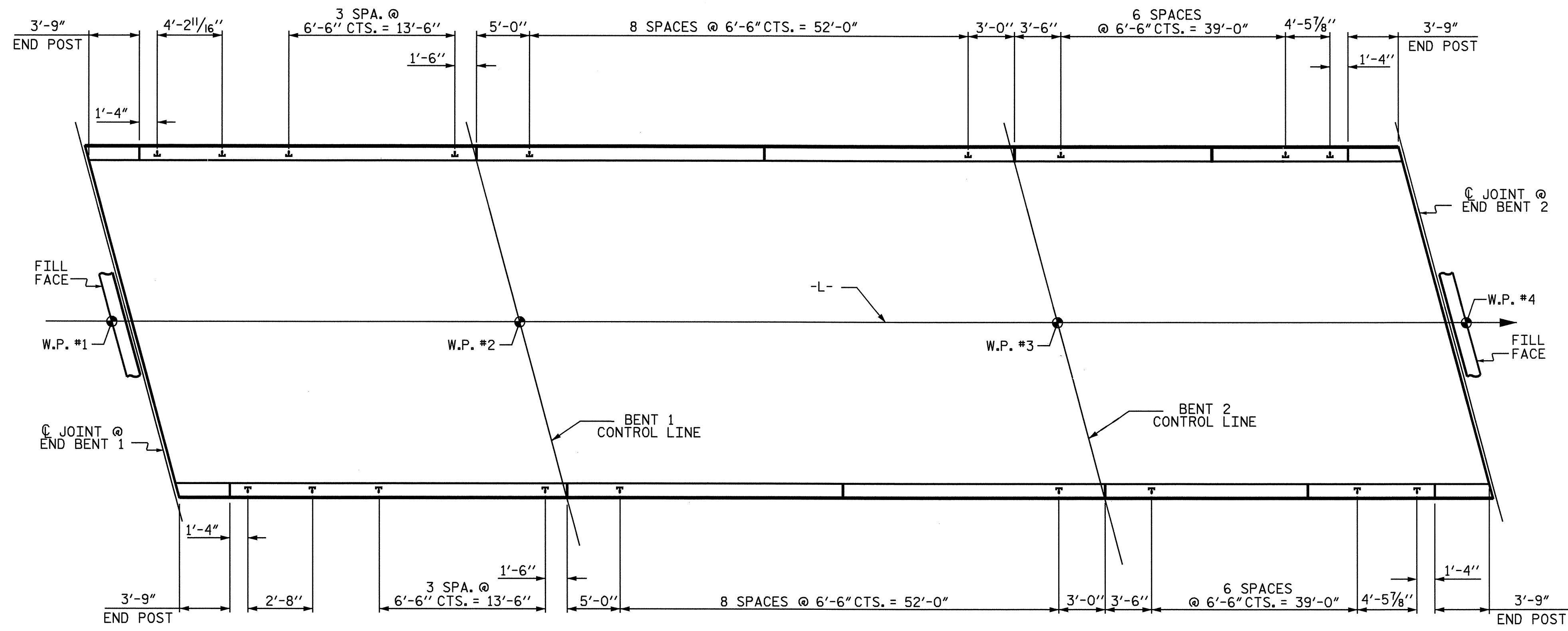
SHEET 2 OF 2

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

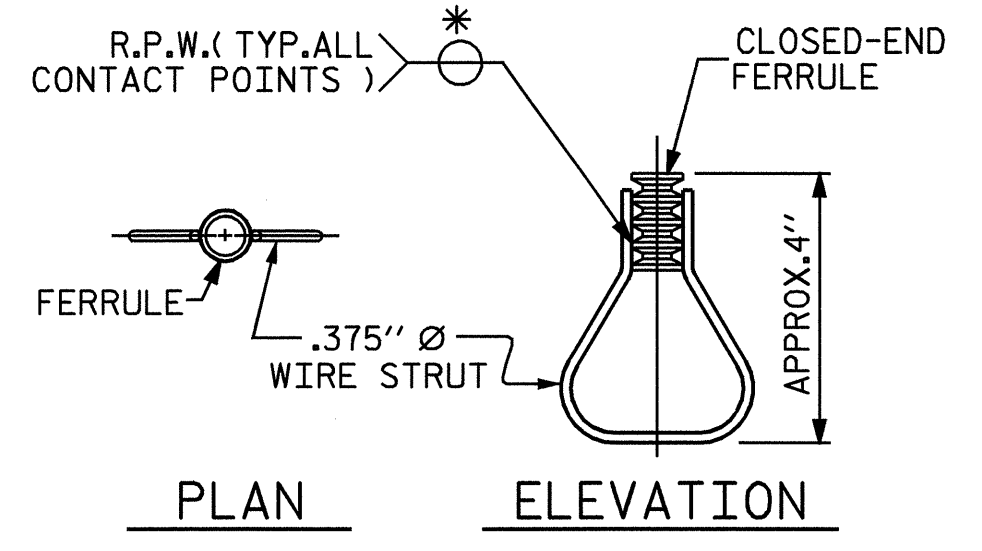
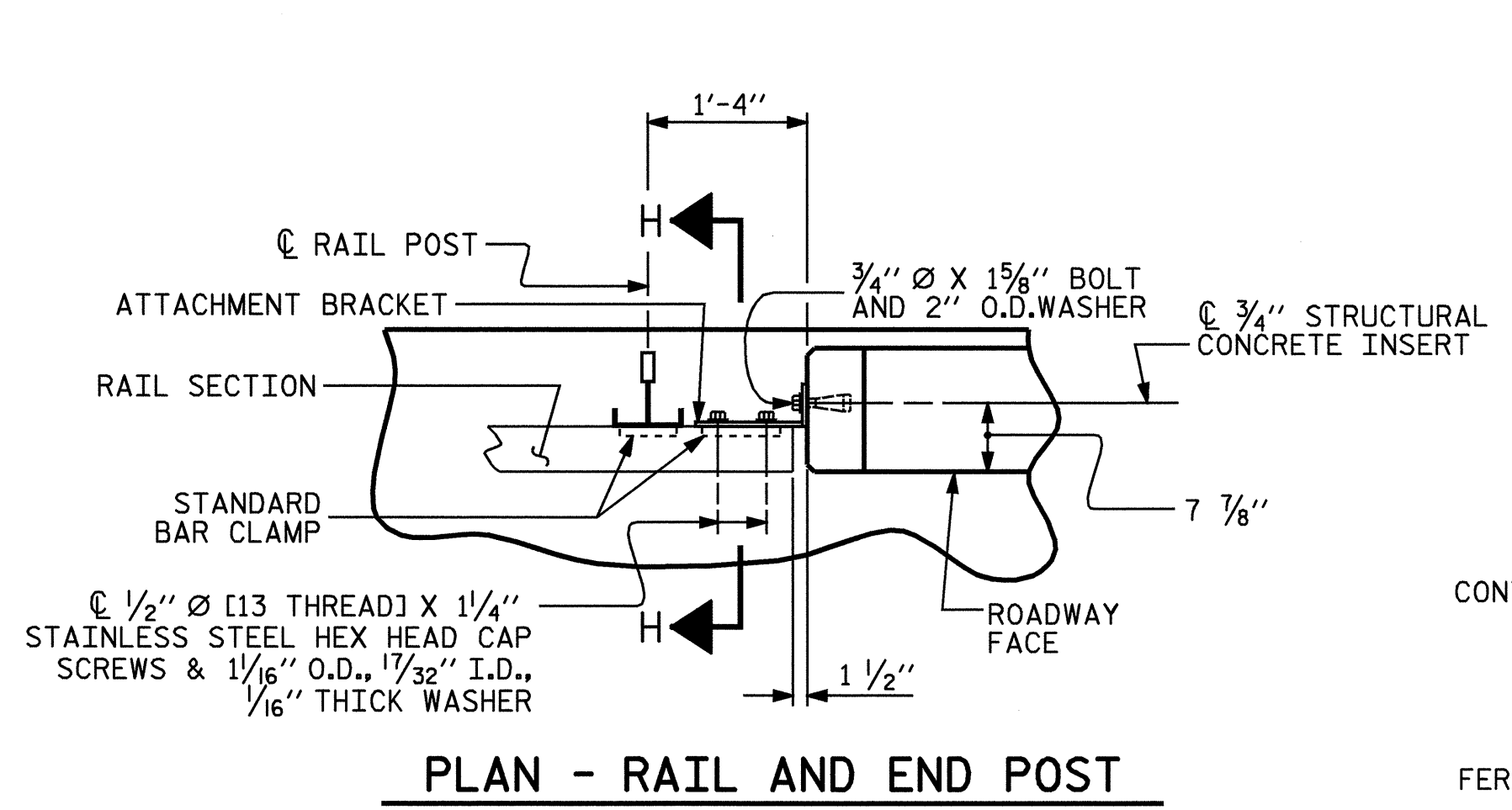
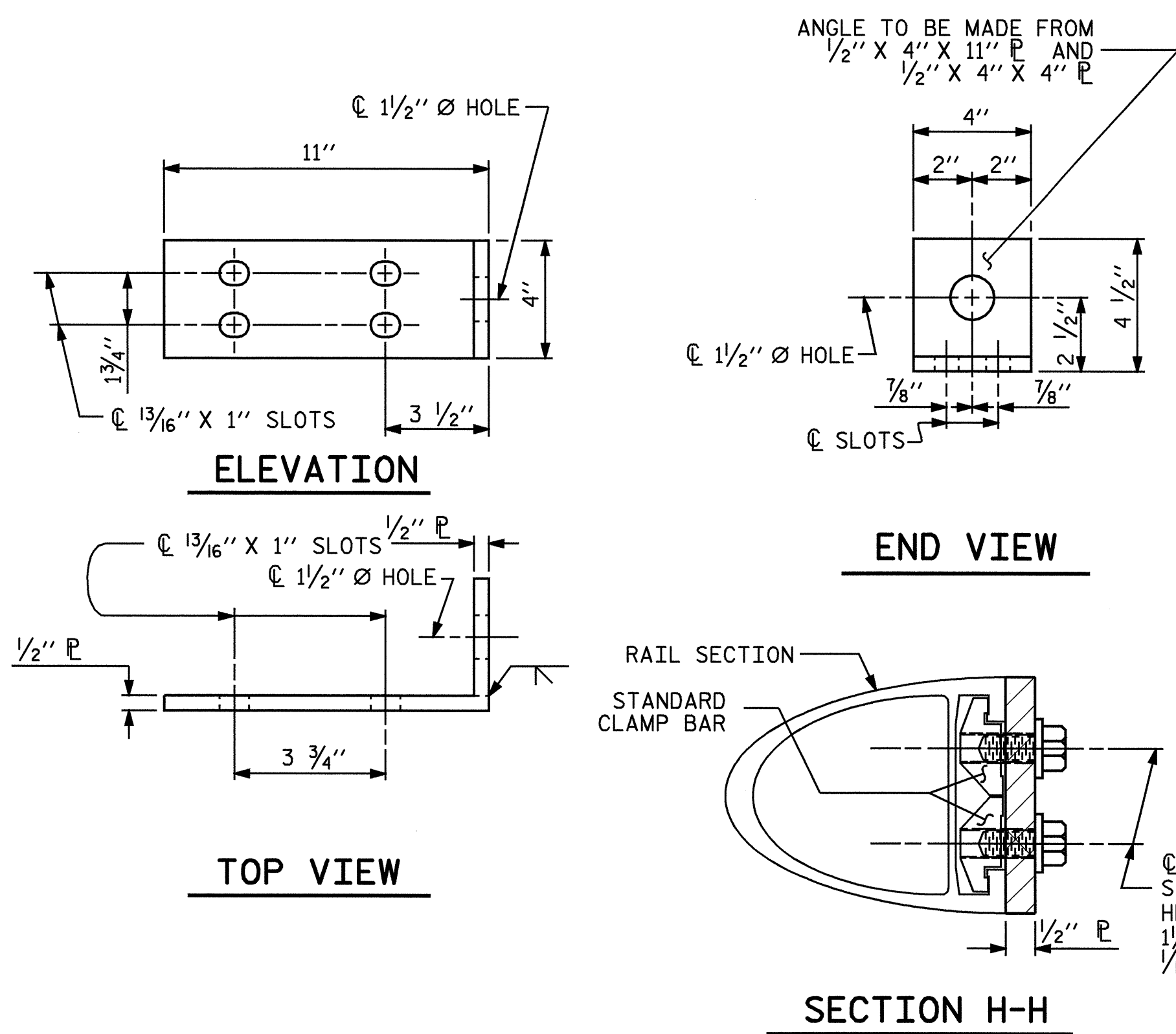
ASSEMBLED BY : J.D.HAWK/QTN	DATE : 10-07
CHECKED BY : W.PARKER/PKN	DATE : 10-07
DRAWN BY : EEM 6/94	REV. 2/6/97 EEM/RGW
CHECKED BY : RGW 6/94	REV. 8/16/99 MAB/LES
	REV. 5/1/06R KMM/GM

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

TOTAL SHEETS: 37



PLAN OF RAIL POST SPACINGS



STRUCTURAL CONCRETE INSERT

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

NOTES

STRUCTURAL CONCRETE INSERT

- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
 - B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER, BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
 - C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
 - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.
 - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
 - D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
 - E. 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.
- THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.
- THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.
- THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.
- THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

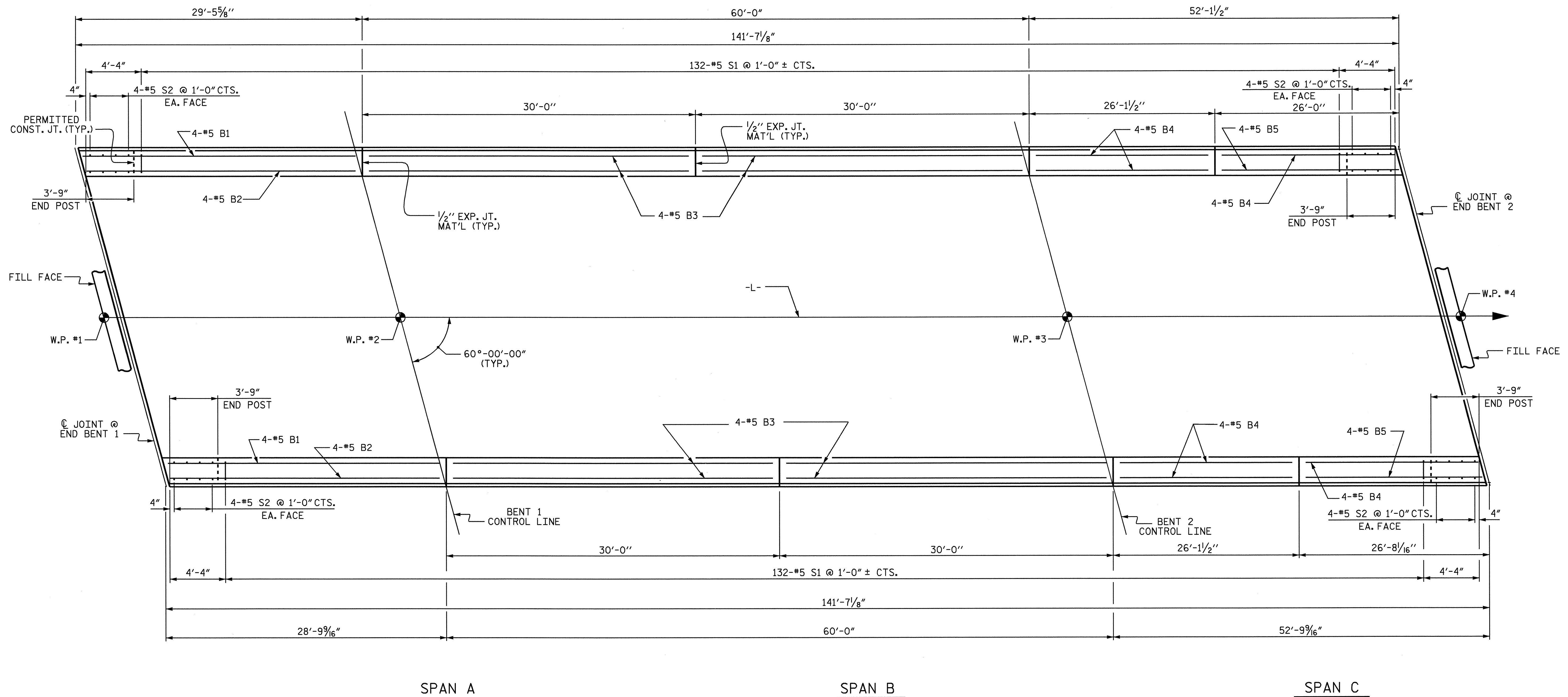
PROJECT NO. B-3824
 CHATHAM COUNTY
 STATION: 13+35.00 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 RAIL POST SPACINGS
 AND
 END OF RAIL DETAILS
 FOR TWO BAR METAL RAILS



REVISIONS						SHEET NO. S-17
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 37
2			4			

ASSEMBLED BY : J.D. HAWK/QTN	DATE : 10-07
CHECKED BY : W.PARKER/PKN	DATE : 10-07
DRAWN BY : FCJ 1/88	REV. 10/17/00 LES/RDR
CHECKED BY : CRK 3/89	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM



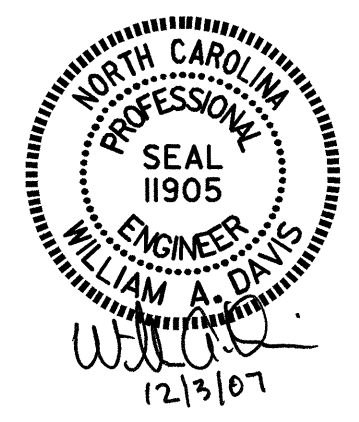
PLAN OF PARAPET

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-
 SHEET 1 OF 2

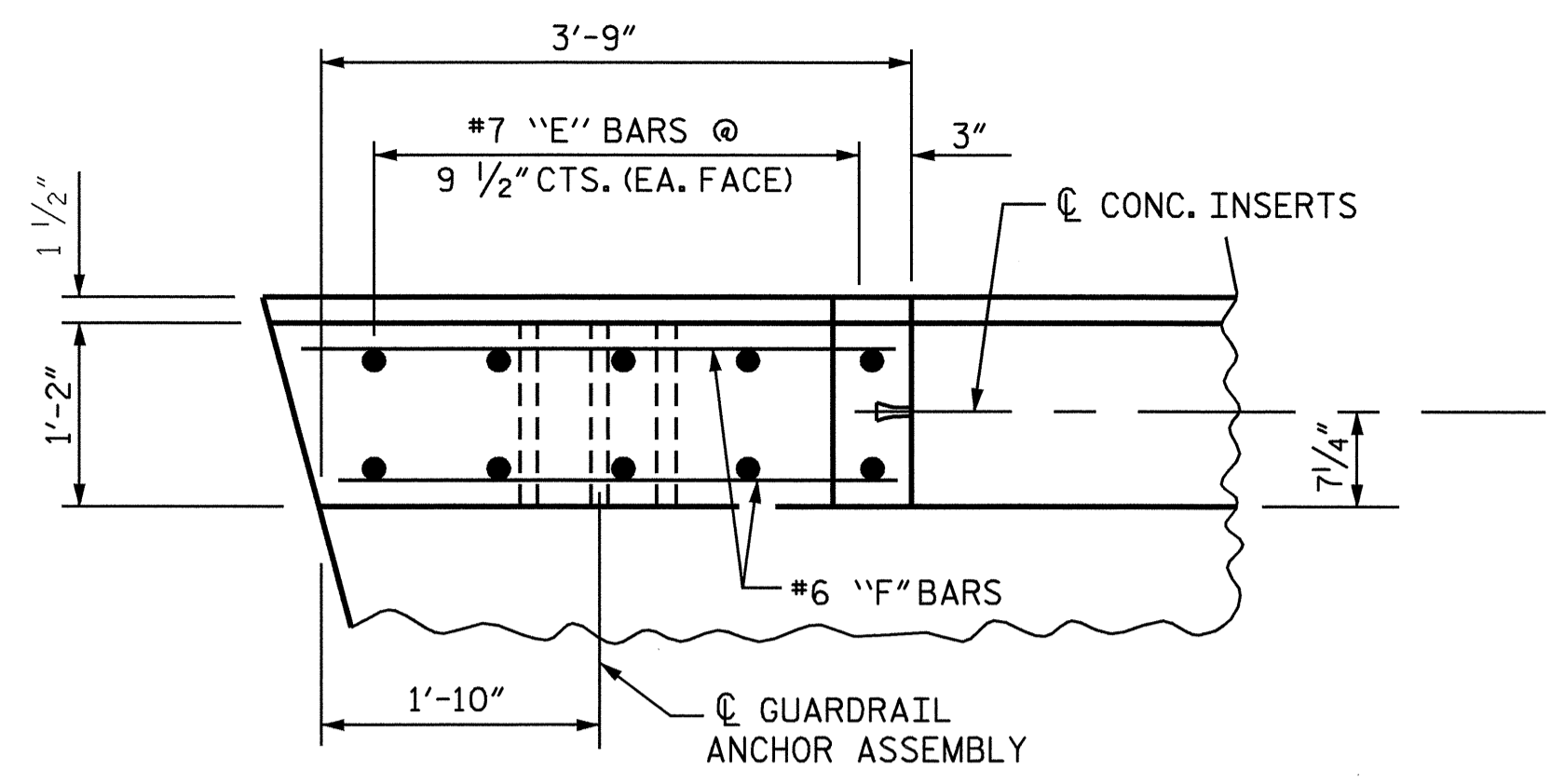
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

CONCRETE PARAPET

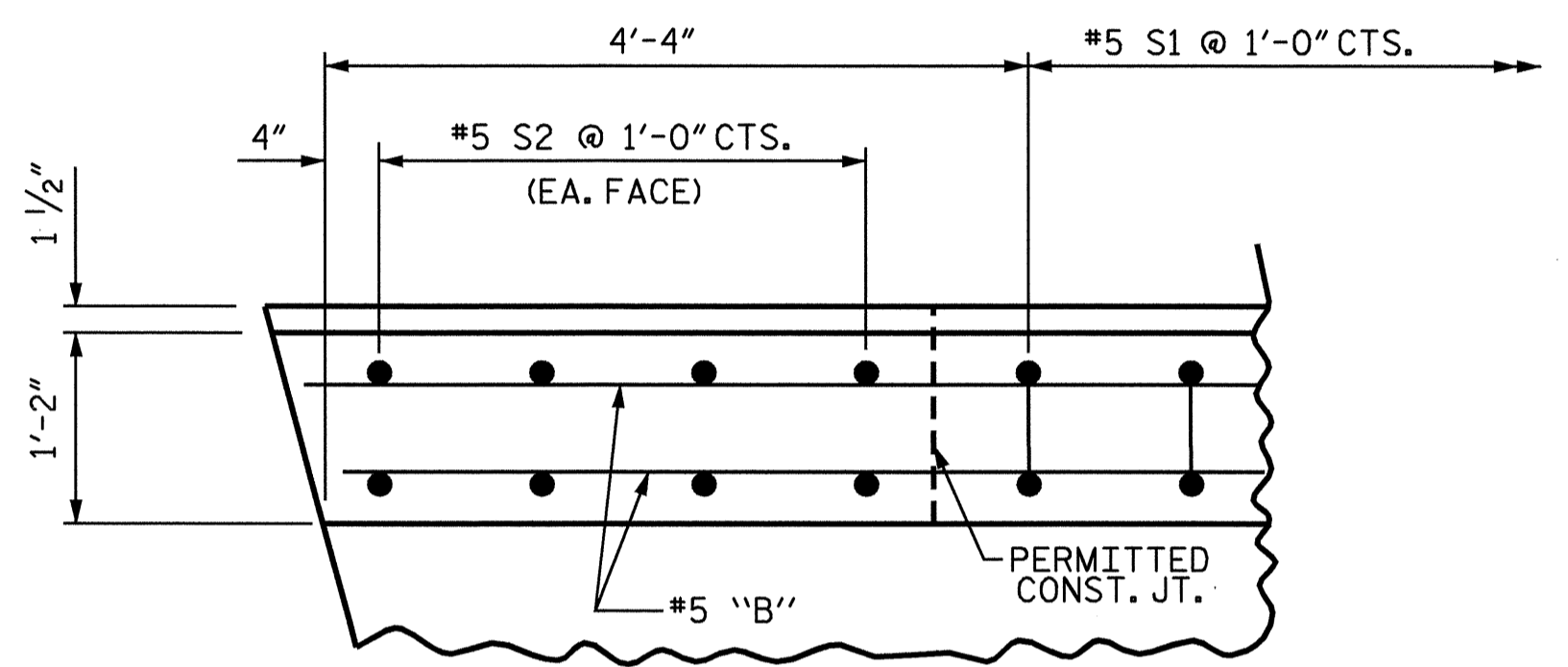
DRAWN BY: J.D. HAWK/QTN DATE: 10-07
 CHECKED BY: W.PARKER/PKN DATE: 10-07



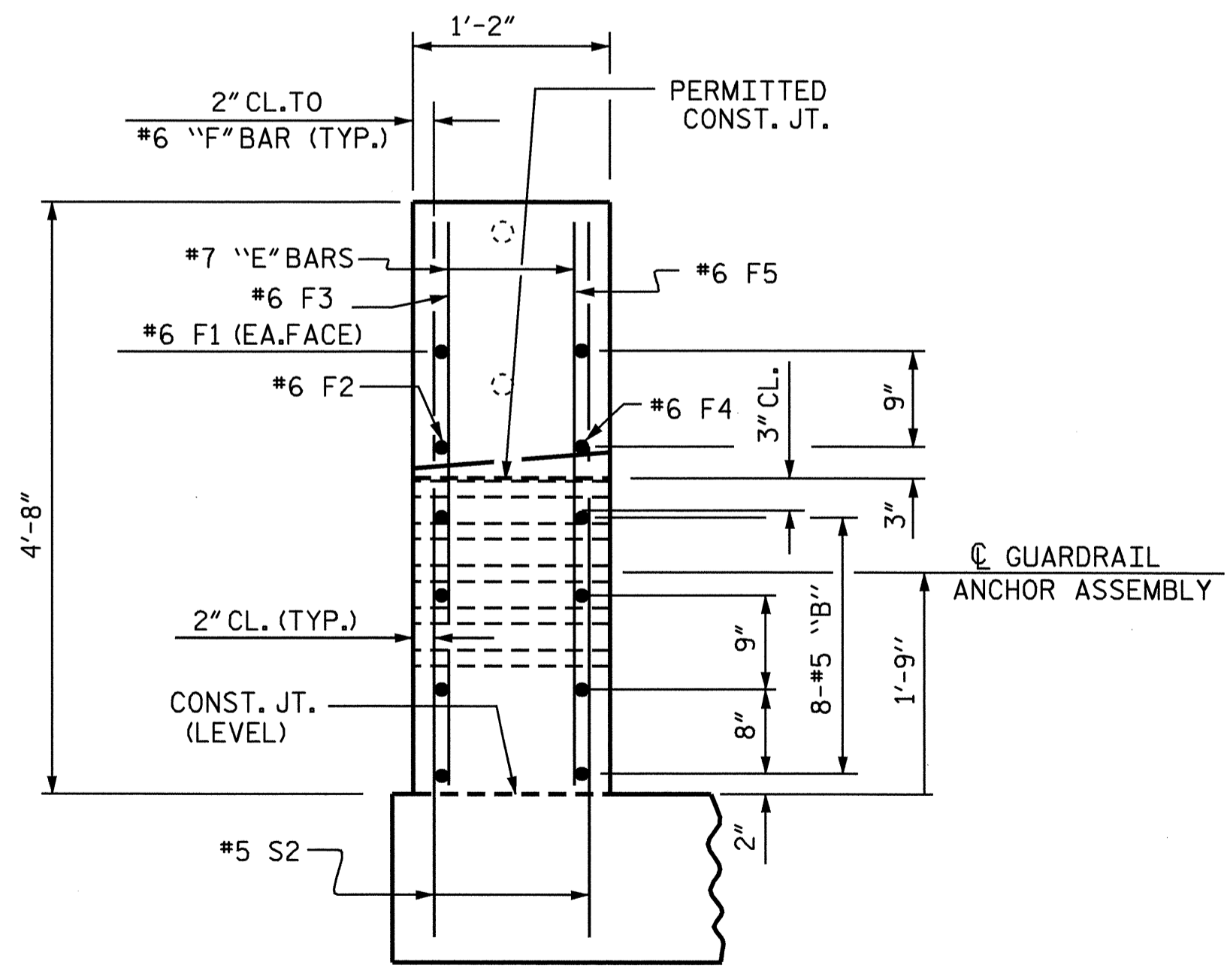
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18	
1			3			TOTAL	37
2			4			SHEETS	



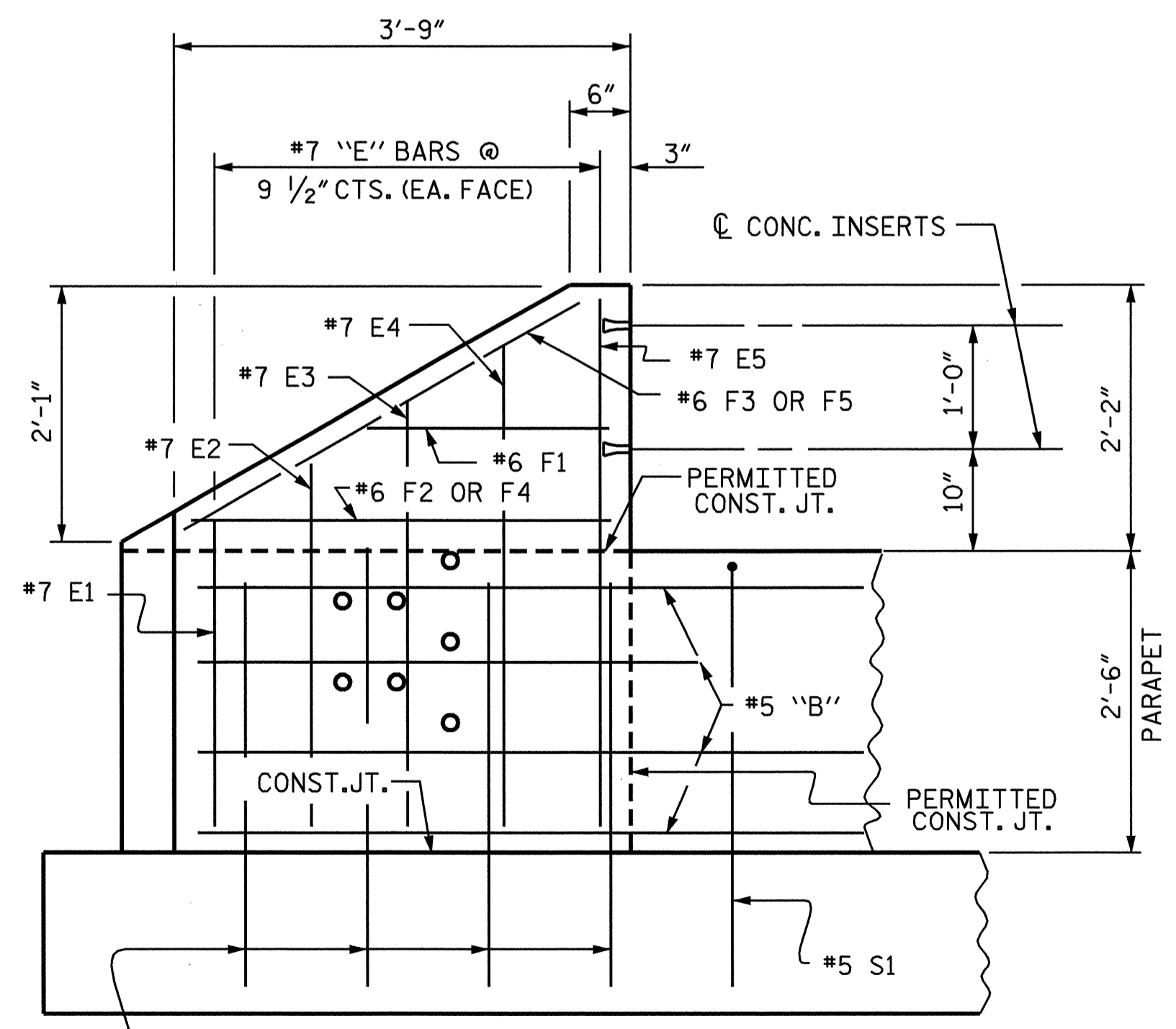
PLAN OF END POST



PLAN OF PARAPET



END VIEW



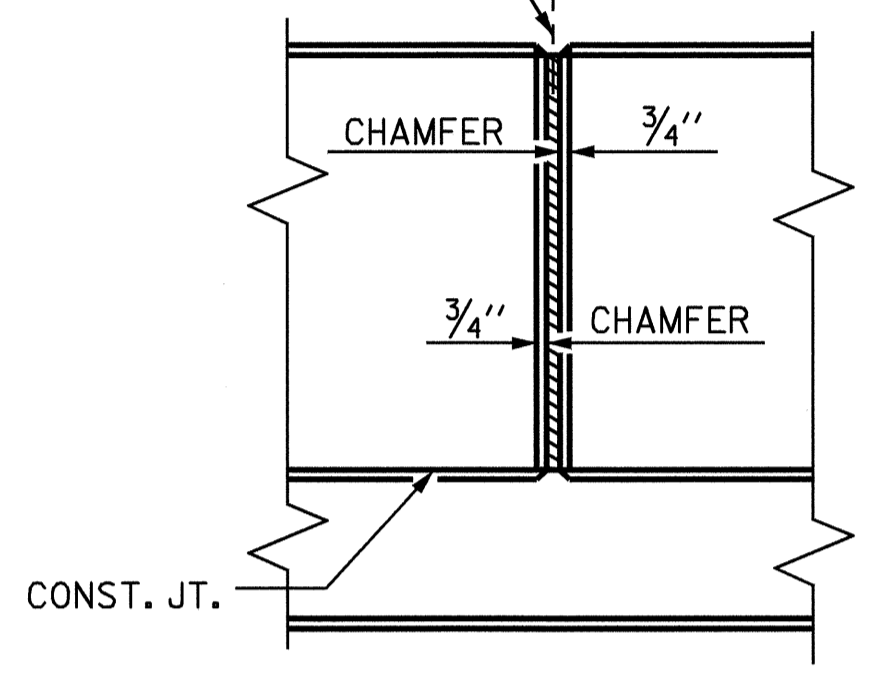
ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL

NOTES

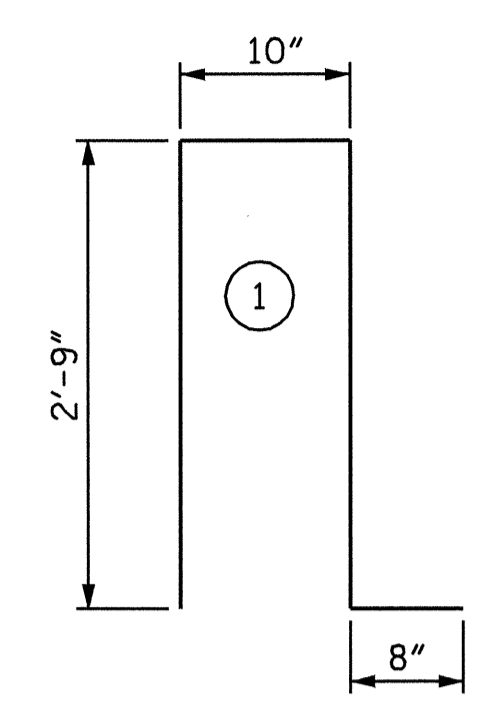
FOR DETAILS OF CONCRETE INSERT AND GUARDRAIL ANCHOR ASSEMBLY, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.
ALL REINFORCING STEEL IN THE CONCRETE PARAPET SHALL BE EPOXY COATED.
THE #5 S2 BARS SHALL BE INSTALLED USING AN ADHESIVE ANCHORING SYSTEM AFTER SAWING THE JOINT. FOR ADHESIVELY ANCHORED BOLTS OR DOWELS, SEE SPECIAL PROVISIONS. THE YIELD LOAD OF THE #5 S2 BARS IS 18.6 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

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

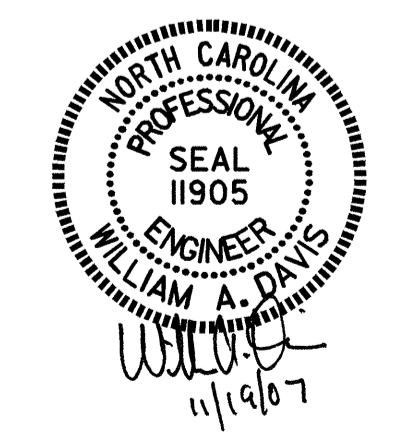


**ELEVATION AT EXPANSION JOINTS
PARAPET DETAILS**

BAR TYPE		BILL OF MATERIAL FOR CONCRETE PARAPETS AND END POSTS				
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* B1	8	#5	STR	29'-0"	242	
* B2	8	#5	STR	28'-4"	236	
* B3	32	#5	STR	29'-7"	987	
* B4	24	#5	STR	25'-7"	640	
* B5	8	#5	STR	26'-3"	219	
* E1	8	#7	STR	2'-6"	41	
* E2	8	#7	STR	3'-0"	49	
* E3	8	#7	STR	3'-6"	57	
* E4	8	#7	STR	4'-0"	65	
* E5	8	#7	STR	4'-4"	71	
* F1	8	#6	STR	1'-8"	20	
* F2	4	#6	STR	3'-5"	21	
* F3	4	#6	STR	3'-10"	23	
* F4	4	#6	STR	3'-1"	19	
* F5	4	#6	STR	3'-6"	21	
* S1	264	#5	1	7'-0"	1927	
* S2	32	#5	STR	3'-0"	100	
* EPOXY COATED REINF. STEEL =					4738 LBS	
CLASS AA CONCRETE				31.2	C.Y.	
CONCRETE PARAPET				283.00	FT.	
* THESE BARS ARE EPOXY COATED						



ALL BAR DIMENSIONS ARE OUT TO OUT.



PROJECT NO. B-3824
CHATHAM COUNTY
STATION: 13+35.00 -L-
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
**CONCRETE PARAPET
AND PARAPET
END POST DETAIL**
(FOR TWO BAR METAL RAIL)

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19	
1			3			TOTAL SHEETS	37
2			4				

NOTES

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

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

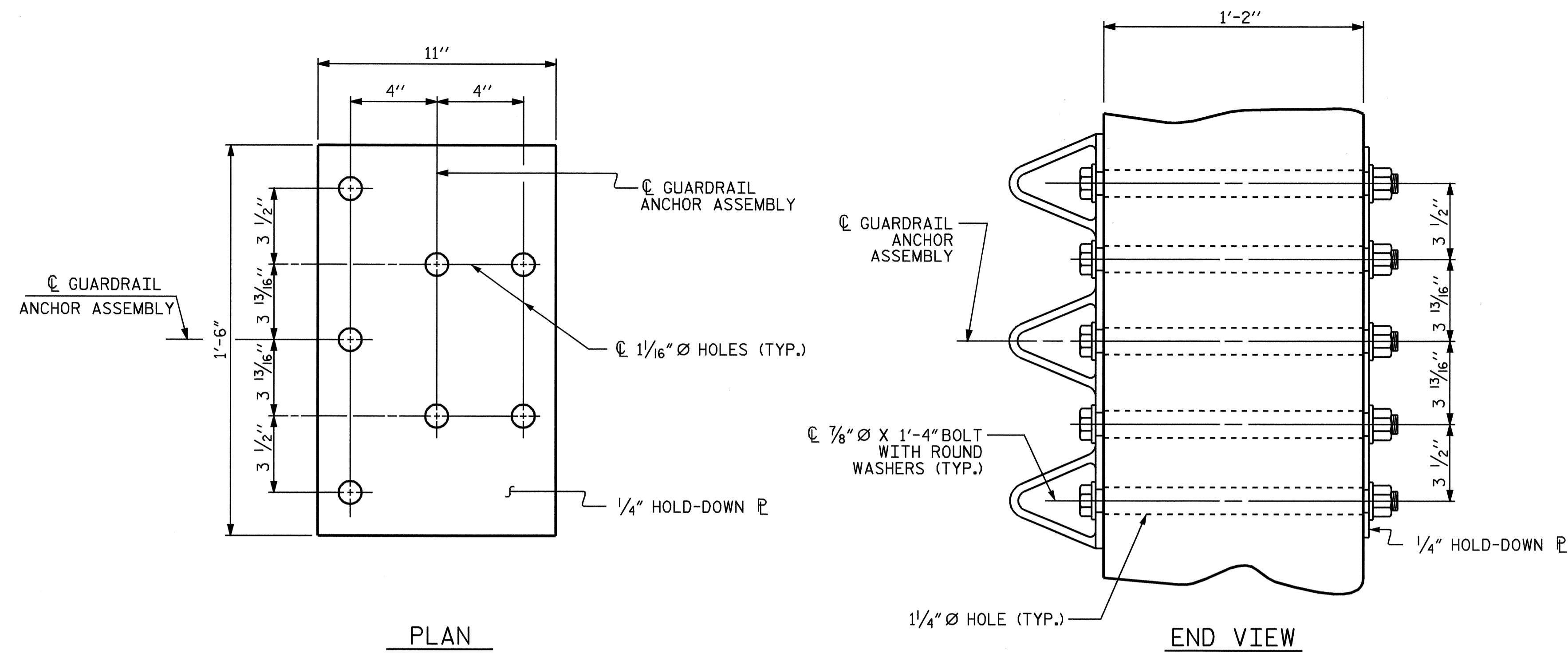
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

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

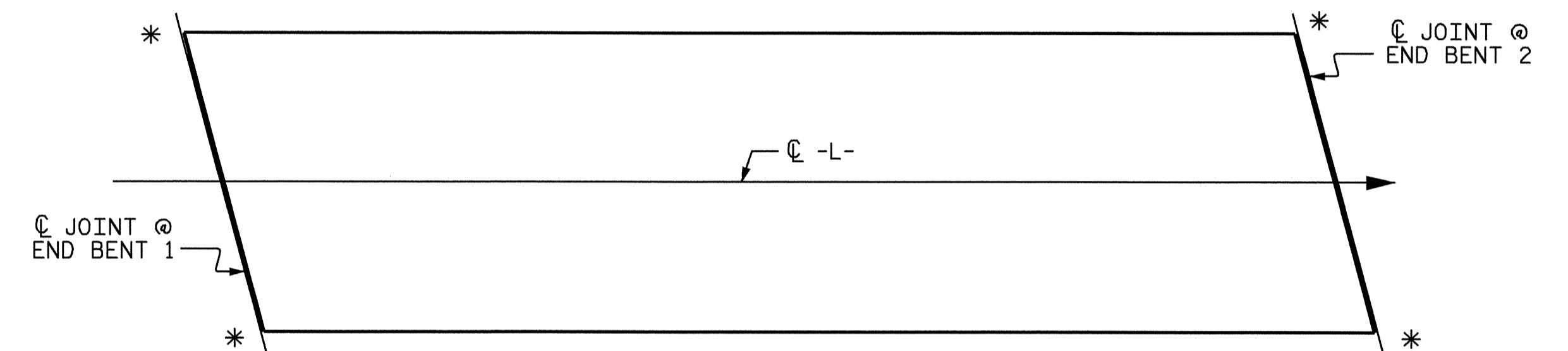
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

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

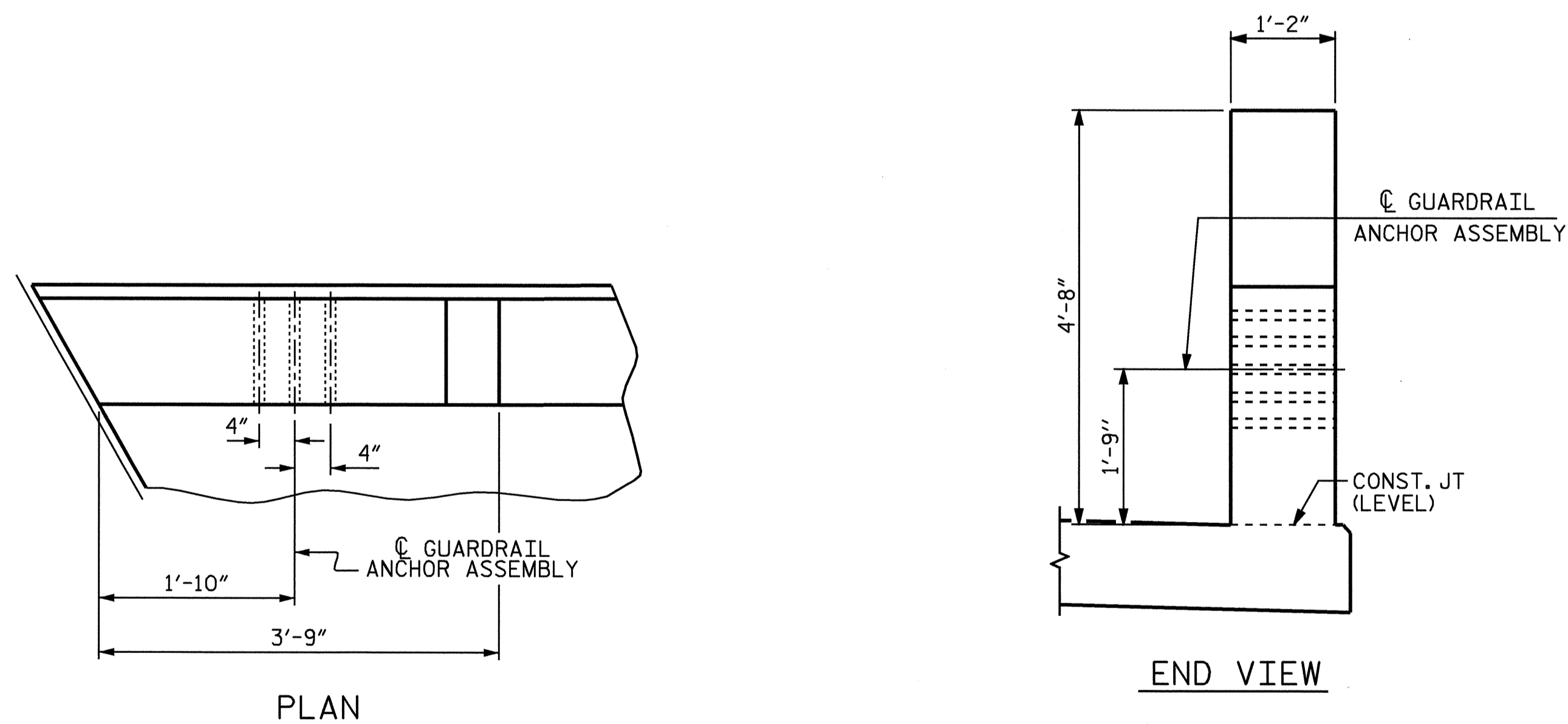


GUARDRAIL ANCHOR ASSEMBLY DETAILS



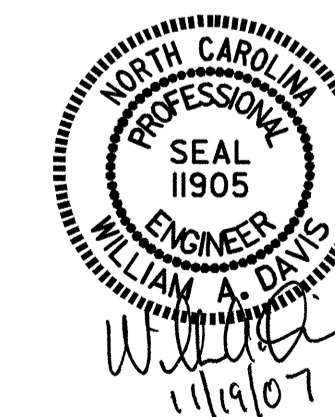
SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



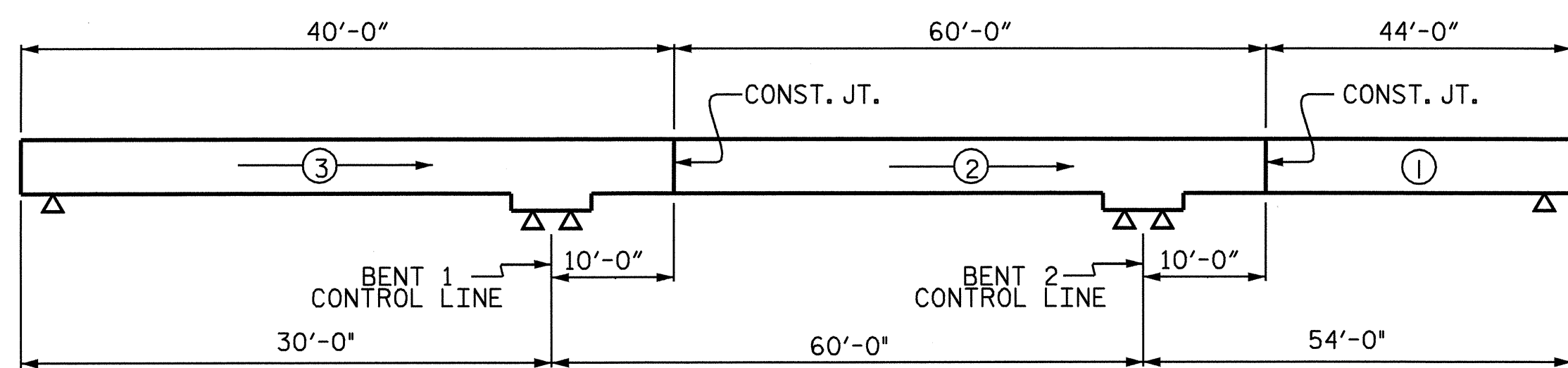
LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-



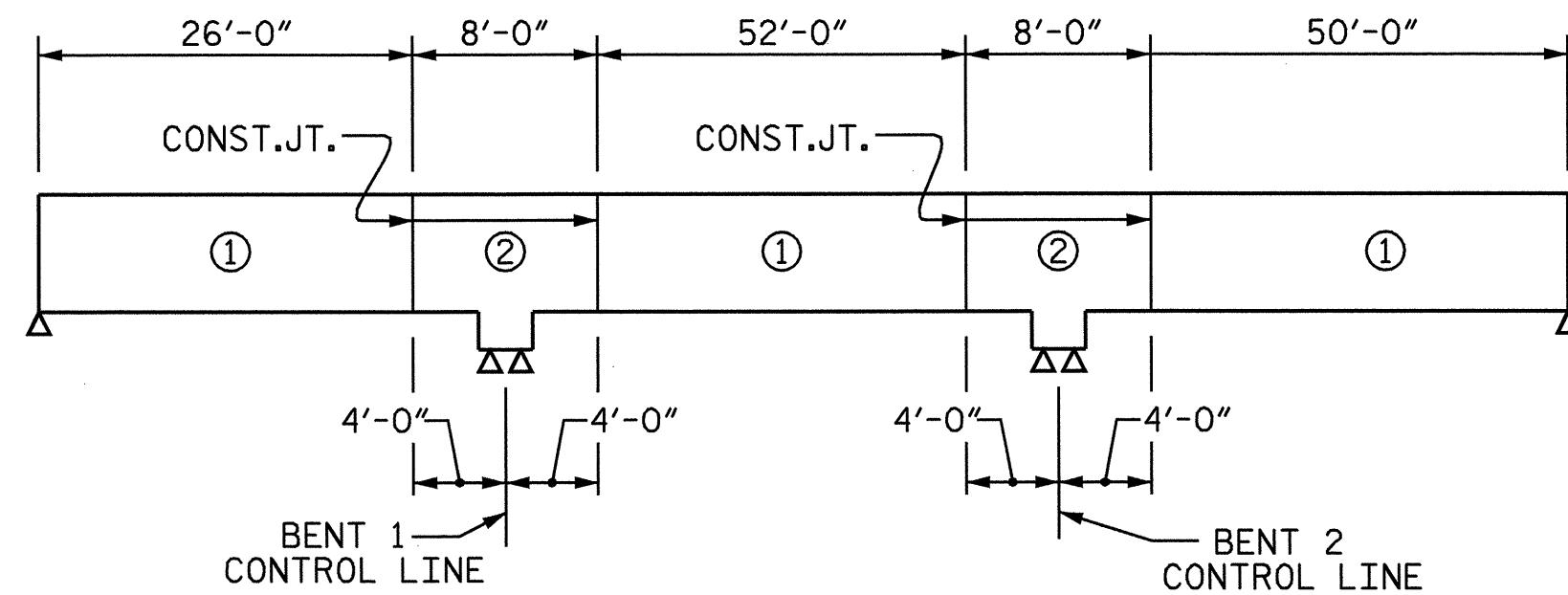
STATE OF NORTH CAROLINA						SHEET NO. S-20
DEPARTMENT OF TRANSPORTATION						
RALEIGH						TOTAL SHEETS 37
STANDARD						
GUARDRAIL ANCHORAGE						
DETAILS						
FOR METAL RAILS						
REVISIONS						SHEET NO. S-20
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

ASSEMBLED BY : J.D. HAWK/QTN	DATE : 10-07
CHECKED BY : W.PARKER/PKN	DATE : 10-07
DRAWN BY : EEM 6/94	REV. 10/17/00 RWW/LES
CHECKED BY : RGW 6/94	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

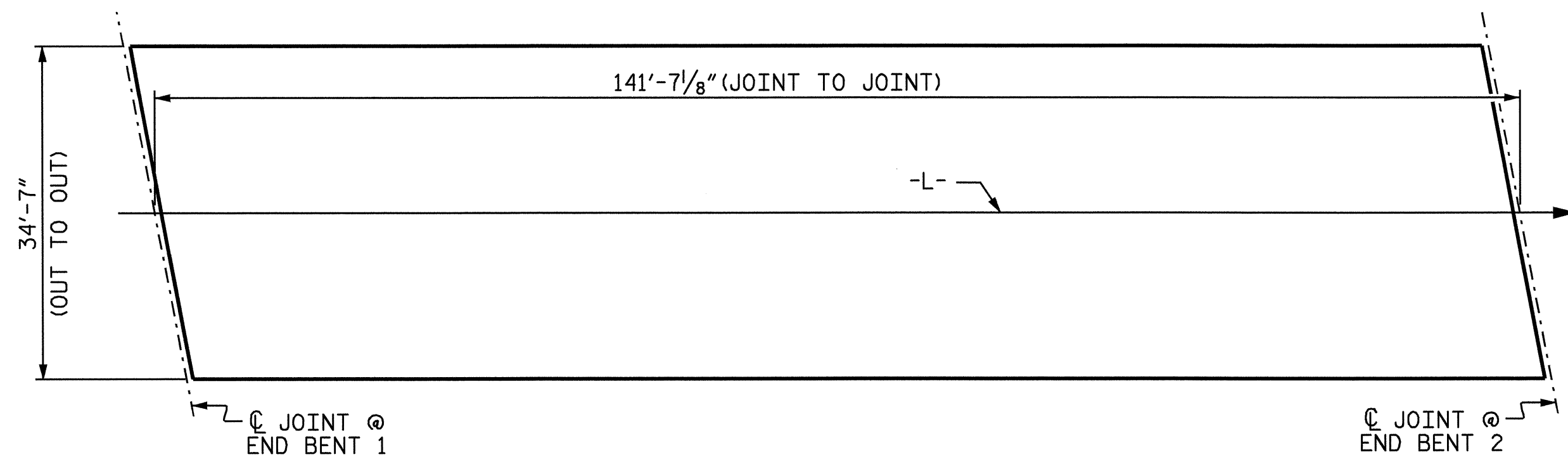


3 SPANS

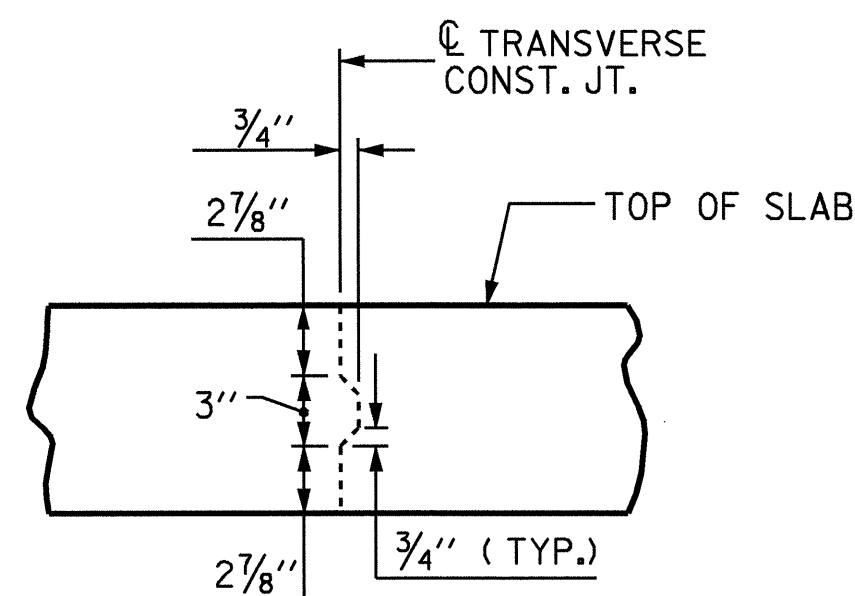
POURING SEQUENCE-PRESTRESSED CONCRETE SUPERSTRUCTURE
(CONTINUOUS FOR LIVE LOAD)



OPTIONAL POURING SEQUENCE-PRESTRESSED CONCRETE SUPERSTRUCTURE
(CONTINUOUS FOR LIVE LOAD)



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 4897)



TRANSVERSE CONSTRUCTION JOINT DETAIL

NOTE: REINFORCING STEEL IN SLAB NOT SHOWN.
LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT

ASSEMBLED BY :	J.D. HAWK/QTN	DATE :	10-07
CHECKED BY :	W.PARKER/PKN	DATE :	10-07
DRAWN BY :	JMB 5/87	REV. 6/1/94	EEM/GRP
CHECKED BY :	SJD 9/87	REV. 8/16/99	RWW/LES
		REV. 5/1/06	TLA/GM

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	224	#5	STR	34'-3"	8002	*B1	24	#4	STR	16'-11"	271
A2	224	#5	STR	34'-3"	8002	*B2	24	#7	STR	36'-8"	1799
						*B3	24	#4	STR	18'-0"	289
*A101	4	#5	STR	32'-8"	136	*B4	24	#7	STR	43'-11"	2154
*A102	4	#5	STR	30'-9"	128	*B5	24	#4	STR	31'-8"	508
*A103	4	#5	STR	28'-11"	121	B6	114	#5	STR	48'-6"	5767
*A104	4	#5	STR	27'-0"	113	*B7	21	#7	STR	13'-4"	572
*A105	4	#5	STR	25'-2"	105	*B8	21	#7	STR	16'-11"	726
*A106	4	#5	STR	23'-3"	97						
*A107	4	#5	STR	21'-5"	89	*G1	2	#5	STR	39'-6"	82
*A108	4	#5	STR	19'-6"	81						
*A109	4	#5	STR	17'-7"	73	*K1	8	#8	1	14'-3"	304
*A110	4	#5	STR	15'-9"	66	*K2	8	#8	2	21'-1"	450
*A111	4	#5	STR	13'-10"	58	*K3	18	#6	STR	8'-9"	237
*A112	4	#5	STR	12'-0"	50	K4	12	#4	STR	7'-5"	59
*A113	4	#5	STR	10'-1"	42	K5	12	#4	STR	8'-9"	70
*A114	4	#5	STR	8'-3"	34	K6	24	#4	STR	9'-6"	152
*A115	4	#5	STR	6'-4"	26	K7	16	#4	6	6'-4"	68
*A116	4	#5	STR	4'-6"	19	K8	16	#4	7	12'-8"	135
*A117	8	#5	STR	2'-7"	22						
						*S1	48	#5	3	4'-11"	246
A201	4	#5	STR	32'-8"	136	*S2	48	#4	4	4'-2"	134
A202	4	#5	STR	30'-9"	128	S3	144	#4	5	2'-9"	265
A203	4	#5	STR	28'-11"	121						
A204	4	#5	STR	27'-0"	113	*U1	12	#4	2	12'-6"	100
A205	4	#5	STR	25'-2"	105	*U2	36	#4	2	13'-8"	329
A206	4	#5	STR	23'-3"	97						
A207	4	#5	STR	21'-5"	89						
A208	4	#5	STR	19'-6"	81						
A209	4	#5	STR	17'-7"	73						
A210	4	#5	STR	15'-9"	66						
A211	4	#5	STR	13'-10"	58						
A212	4	#5	STR	12'-0"	50						
A213	4	#5	STR	10'-1"	42						
A214	4	#5	STR	8'-3"	34						
A215	4	#5	STR	6'-4"	26						
A216	4	#5	STR	4'-6"	19						
A217	8	#5	STR	2'-7"	22						
						REINFORCING STEEL = 15778 LBS					
						*EPOXY COATED REINF. STEEL = 17463 LBS					

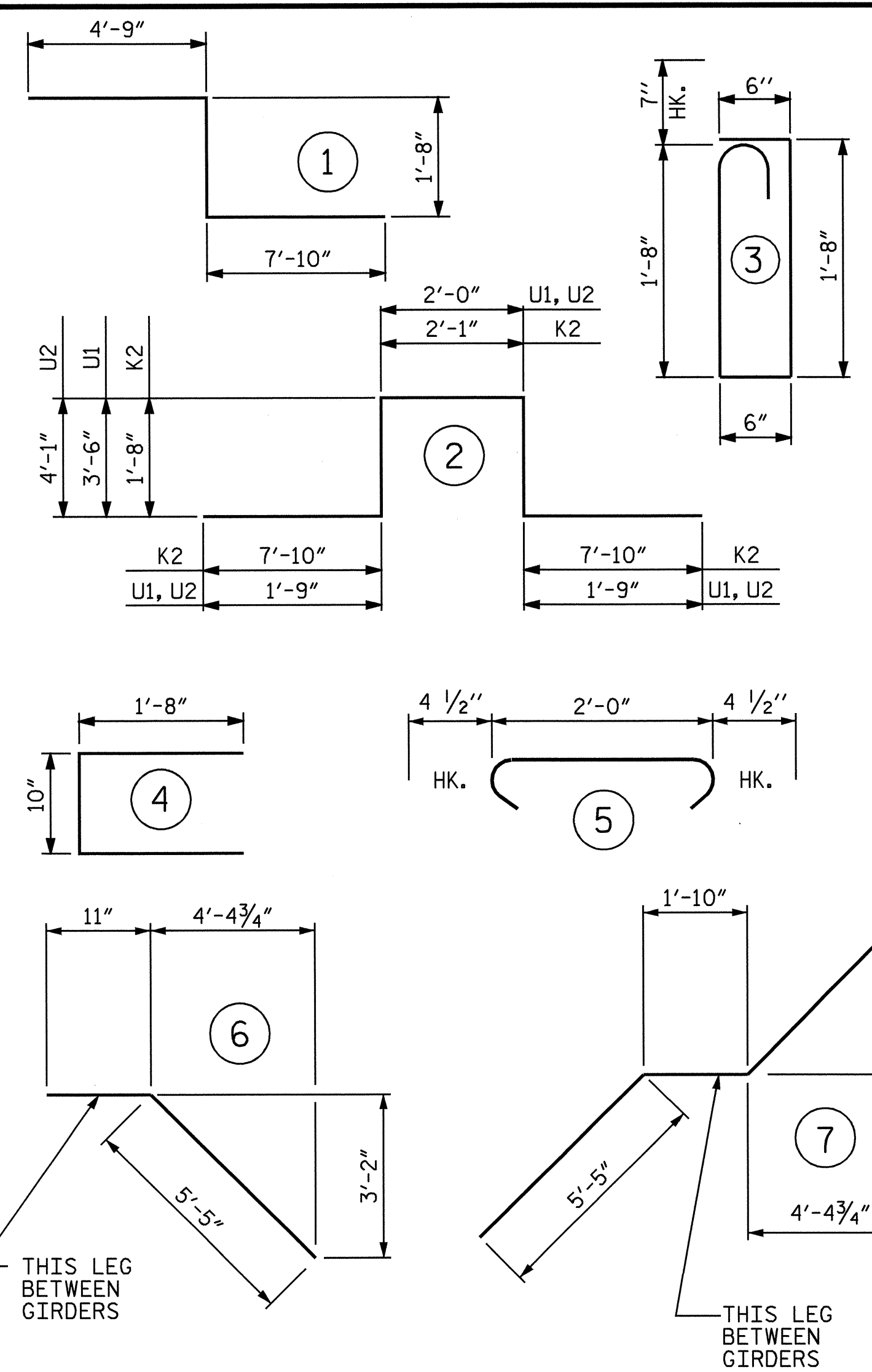
SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

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"			

GROOVING BRIDGE FLOORS

APPROACH SLABS	784	SQ.FT.
BRIDGE DECK	4062	SQ.FT.
TOTAL	4846	SQ.FT.

BAR TYPES



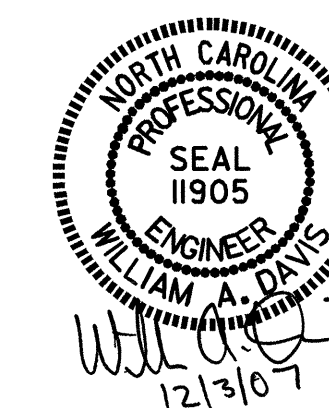
ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE				REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)				(LBS.)	(LBS.)
	POUR #1	POUR #2	POUR #3	TOTALS**		
SPANS A, B, & C	48.7	69.3	52.0	170.0	15778	17463

** QUANTITIES FOR PARAPET ARE NOT INCLUDED

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00-L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 SUPERSTRUCTURE
 BILL OF MATERIAL

REVISIONS						SHEET NO. S-21
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 37
2			4			

STD. NO. BOM2

NOTES

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

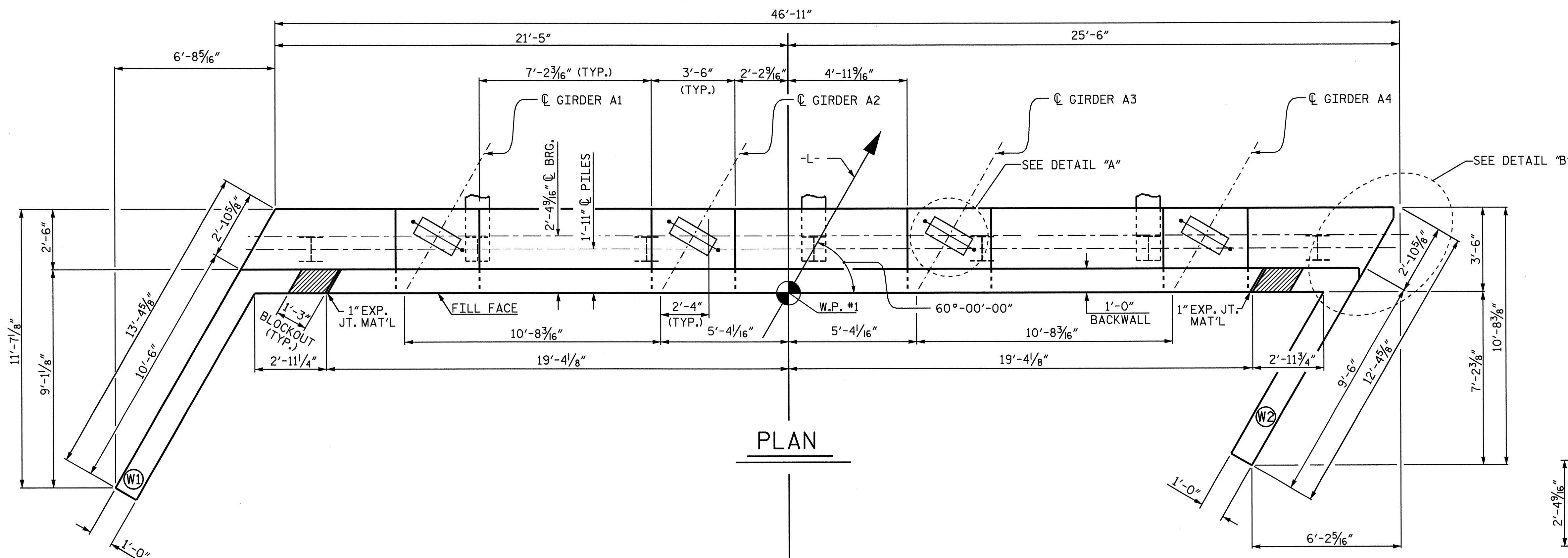
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

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

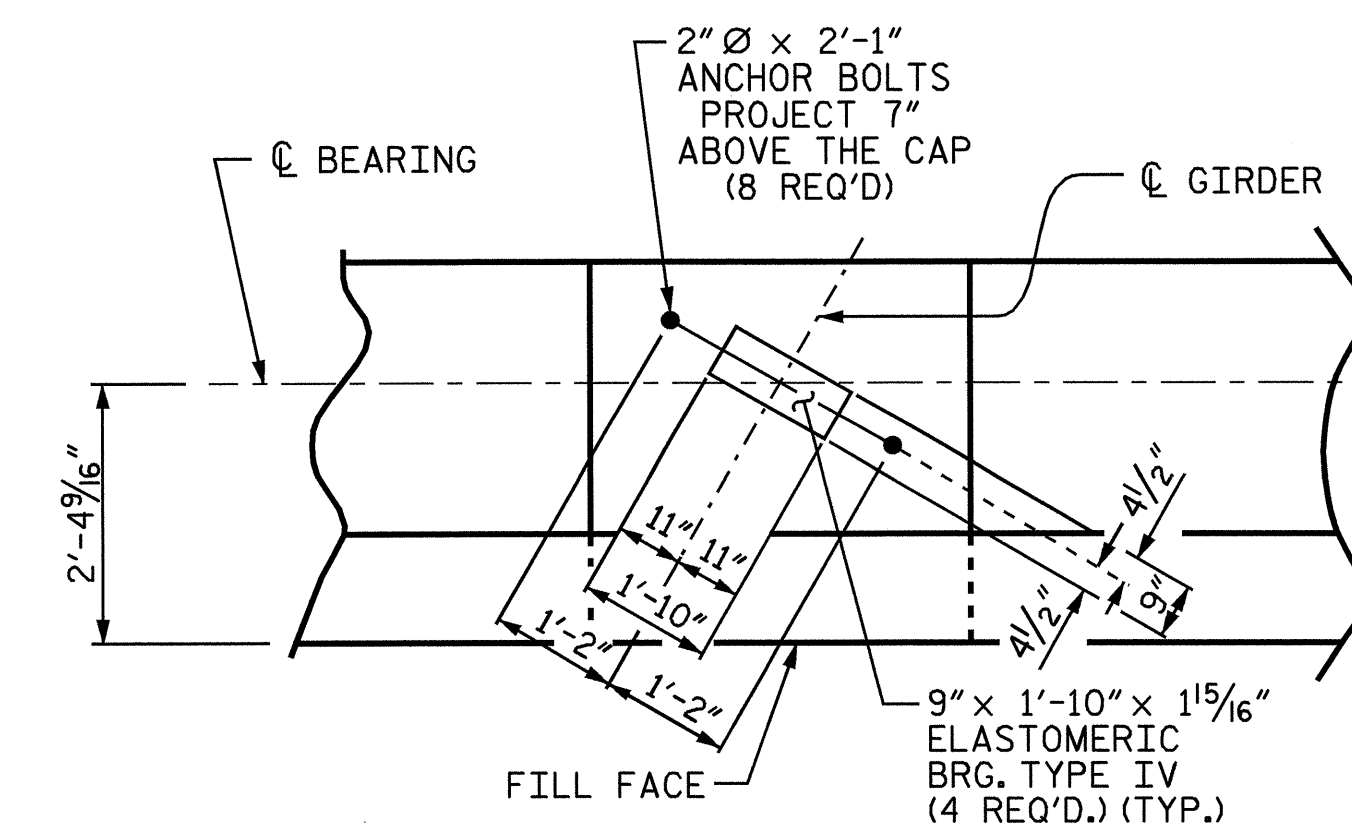
THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

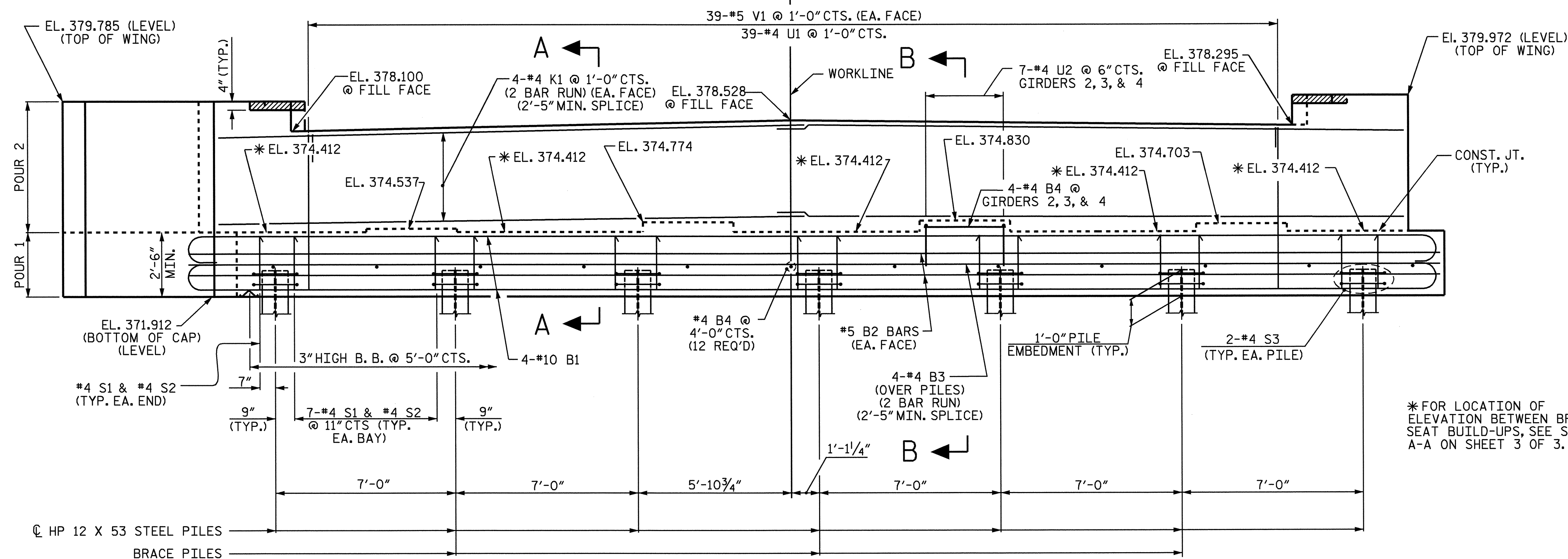
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE PARAPET AND END POST ARE CAST IF SLIP FORMING IS USED.



PLAN

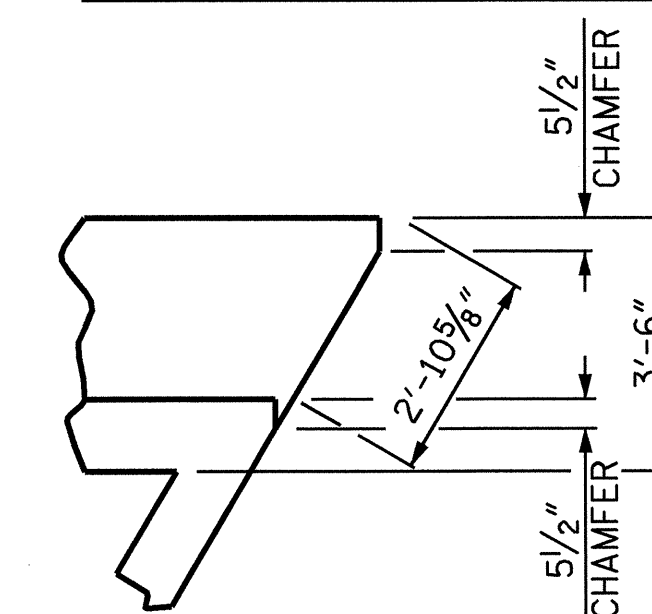


DETAIL "A"



ELEVATION

RIGHT WING NOT SHOWN FOR CLARITY



DETAIL "B"

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 1 OF 3

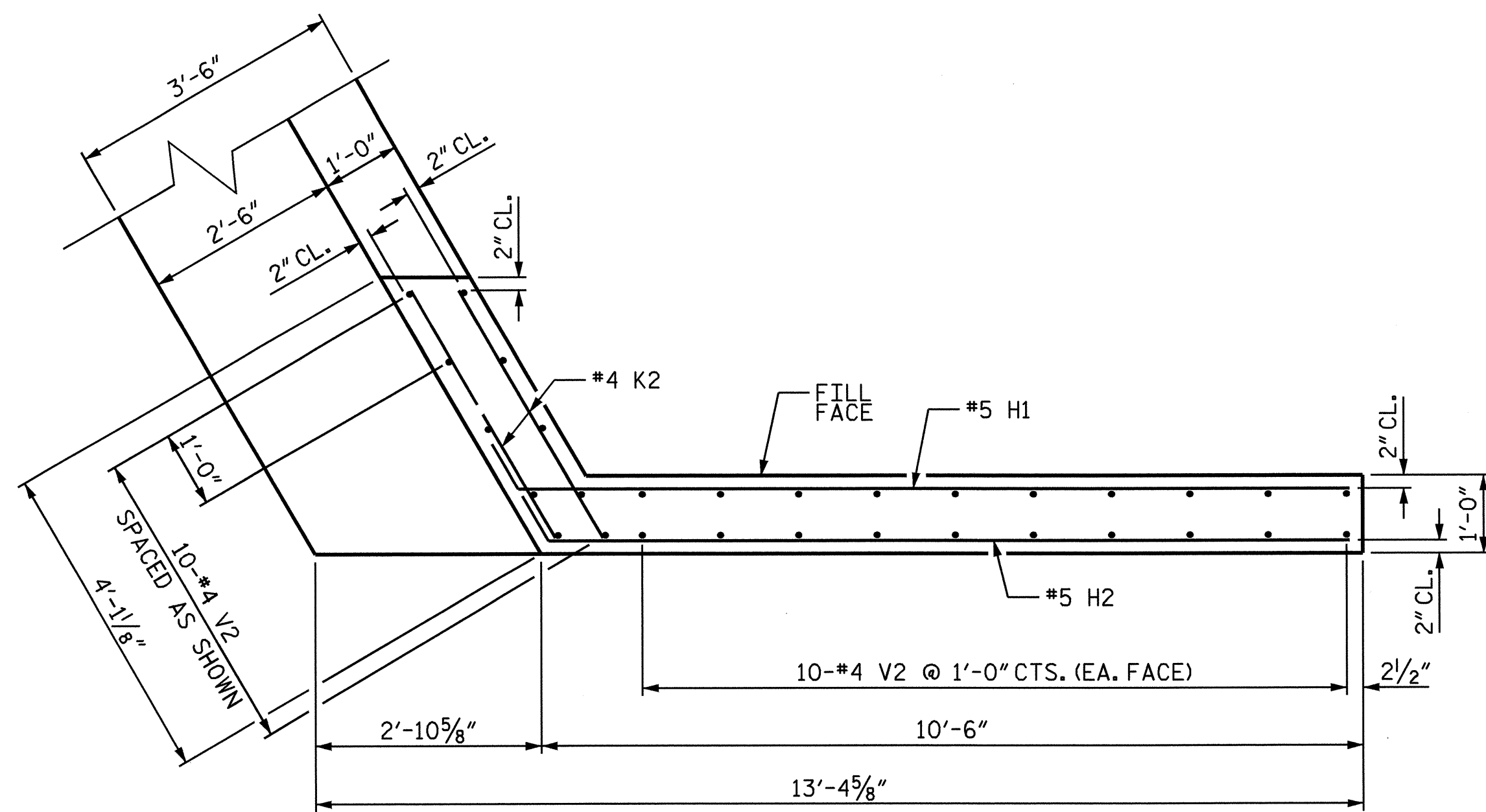
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 1**

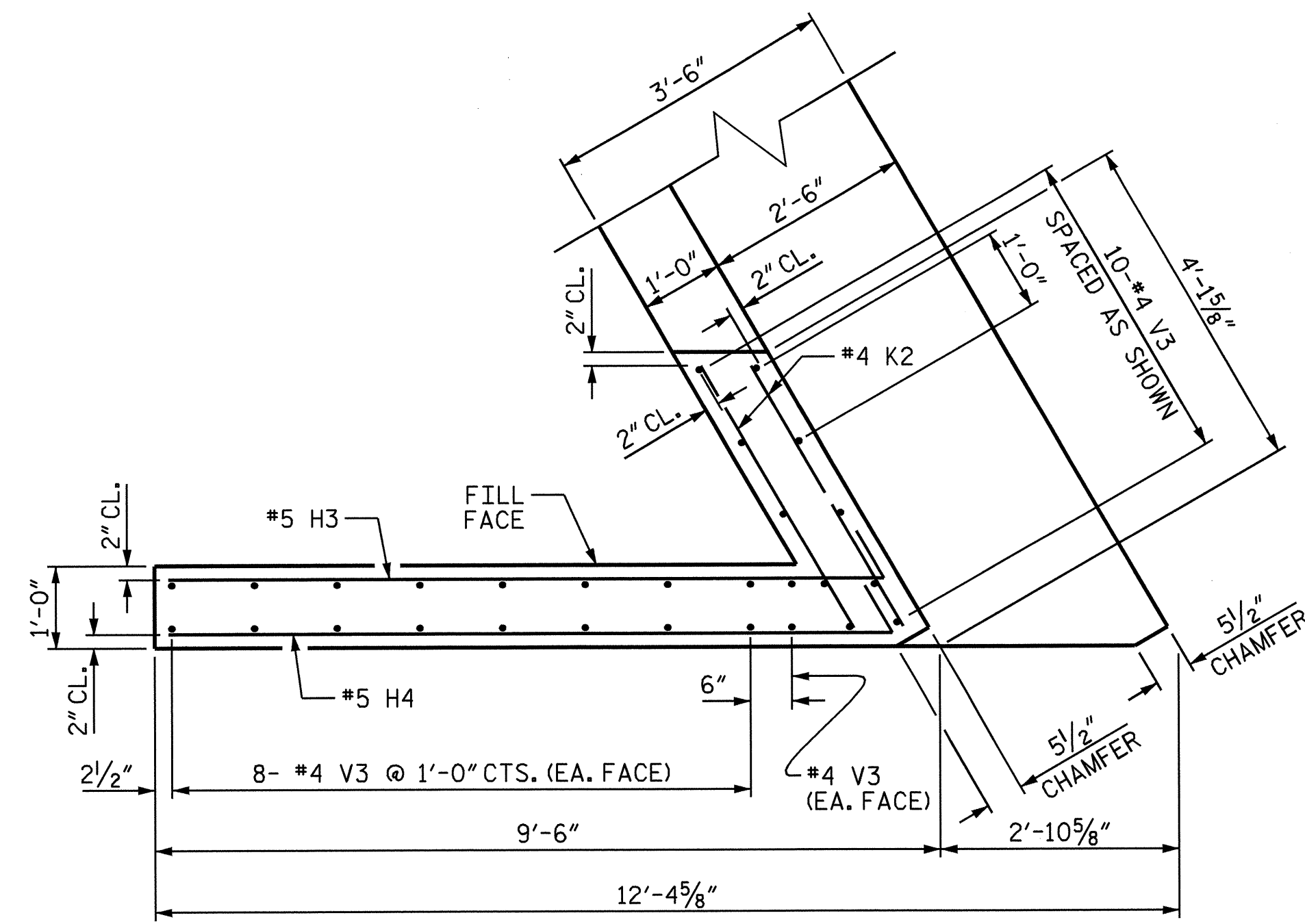


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			37

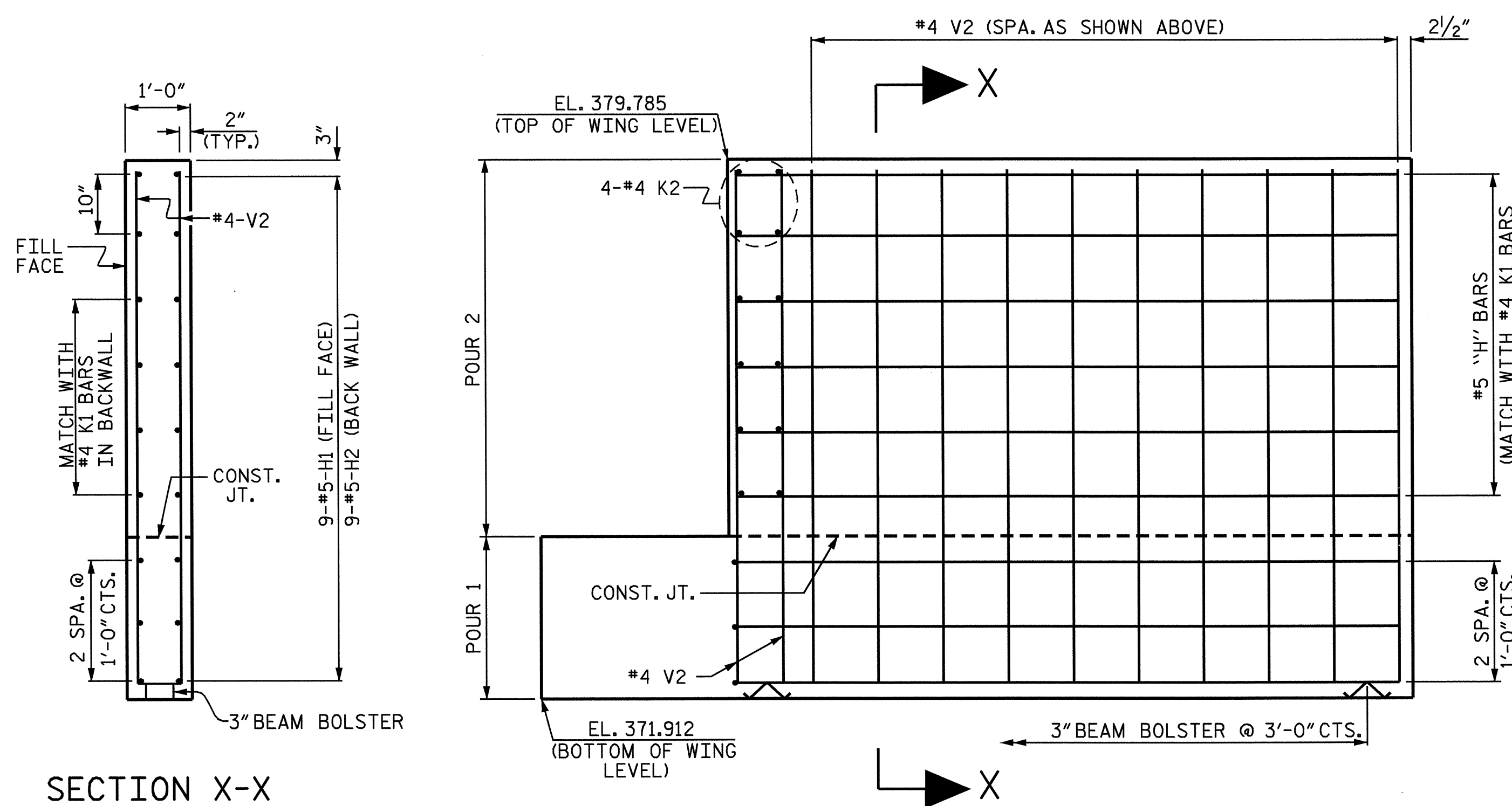
DRAWN BY: G.O. COOPER/JLW DATE: 11/2/07
 CHECKED BY: Q.T. NGUYEN/PKN DATE: 11/2/07



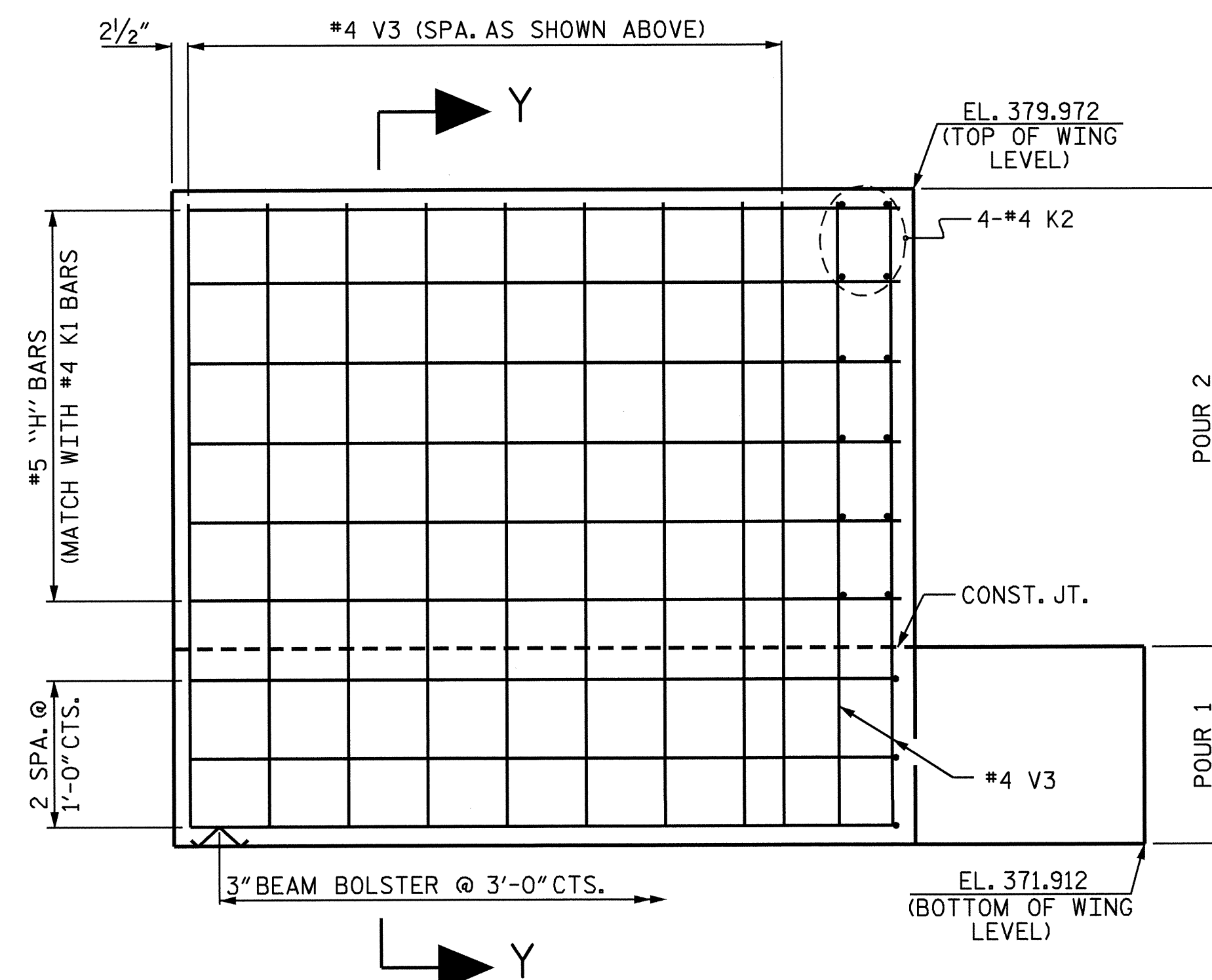
PLAN OF WING W1



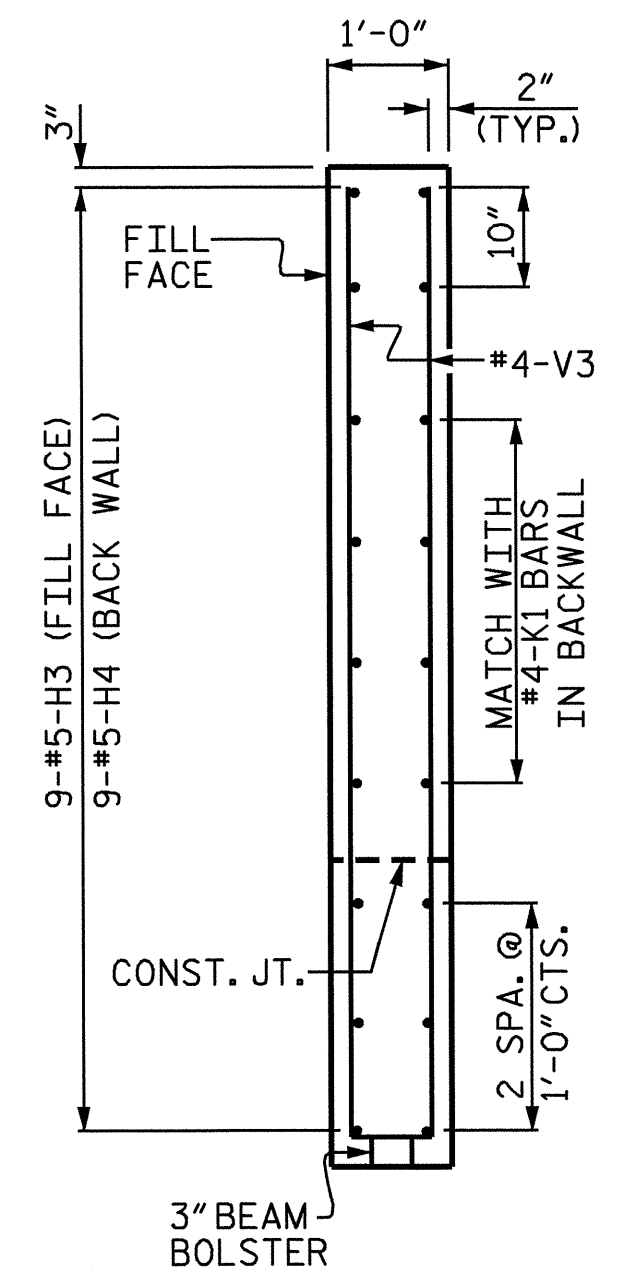
PLAN OF WING W2



ELEVATION OF WING W1



ELEVATION OF WING W2



SECTION Y-Y

SECTION X-X

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

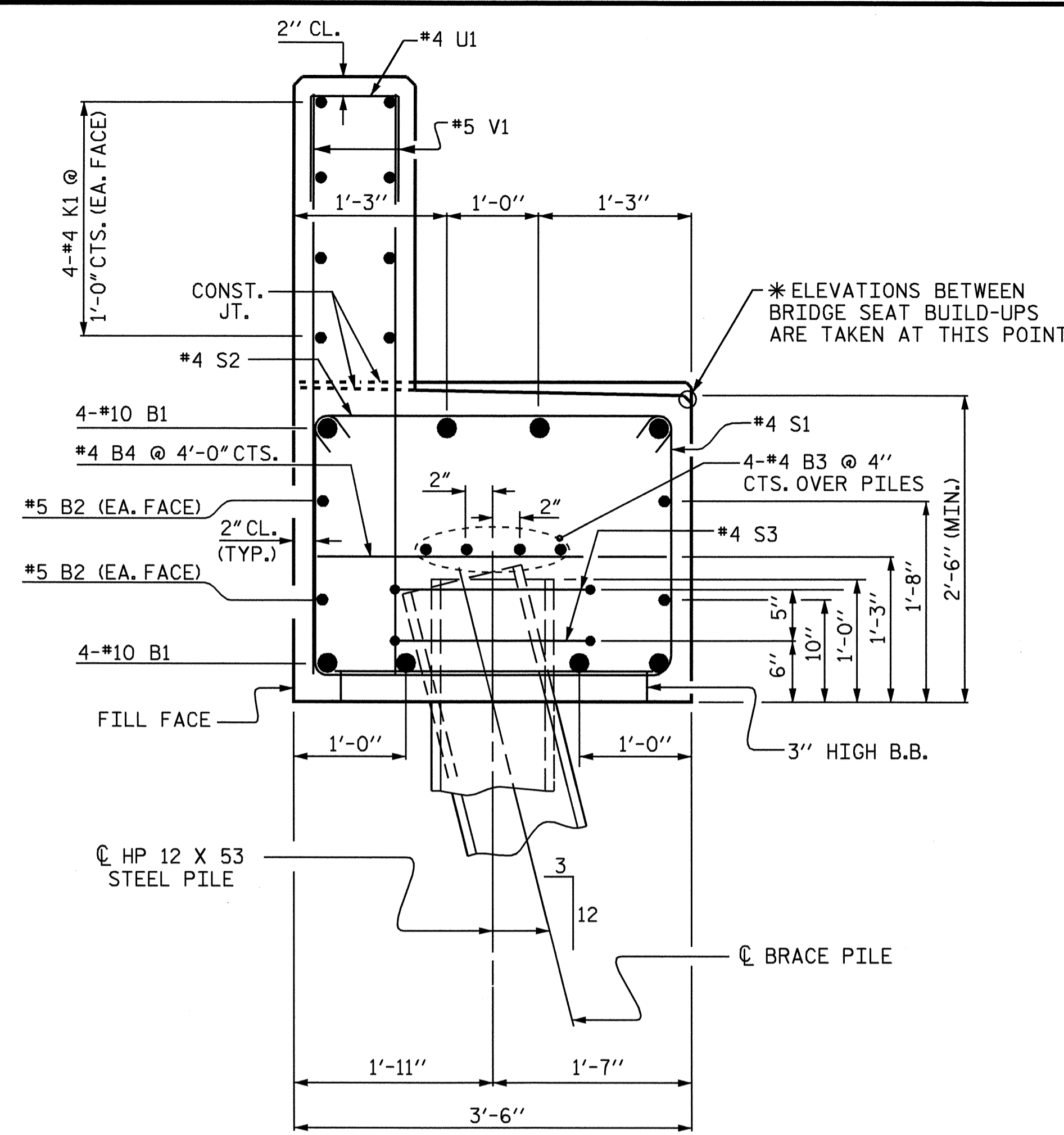
SUBSTRUCTURE
 END BENT 1

REVISIONS						SHEET NO. S-23
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 34
2			4			

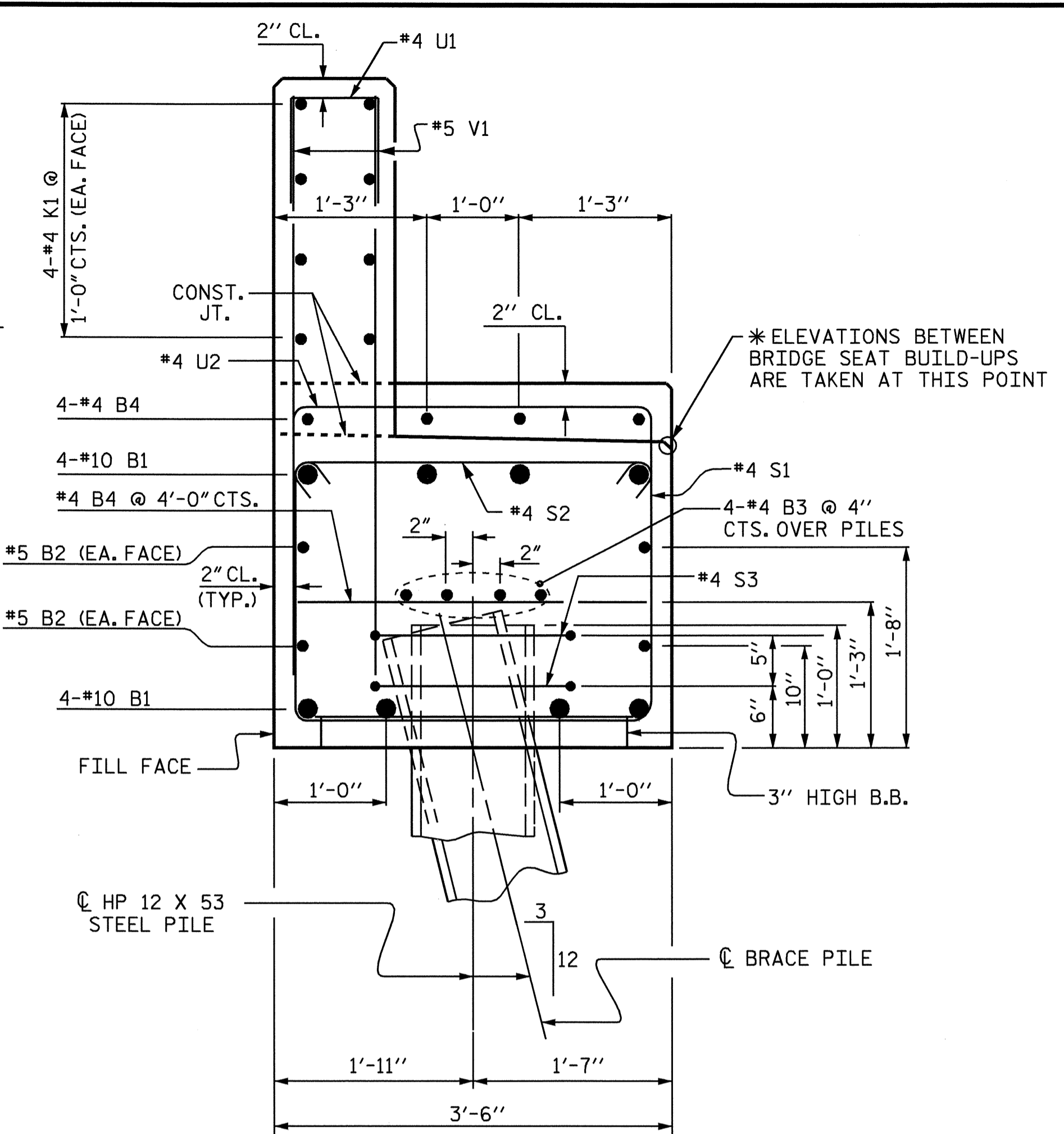


DRAWN BY: G.O. COOPER/JLW DATE: 11/2/07
 CHECKED BY: Q.T. NGUYEN/PKN DATE: 11/2/07

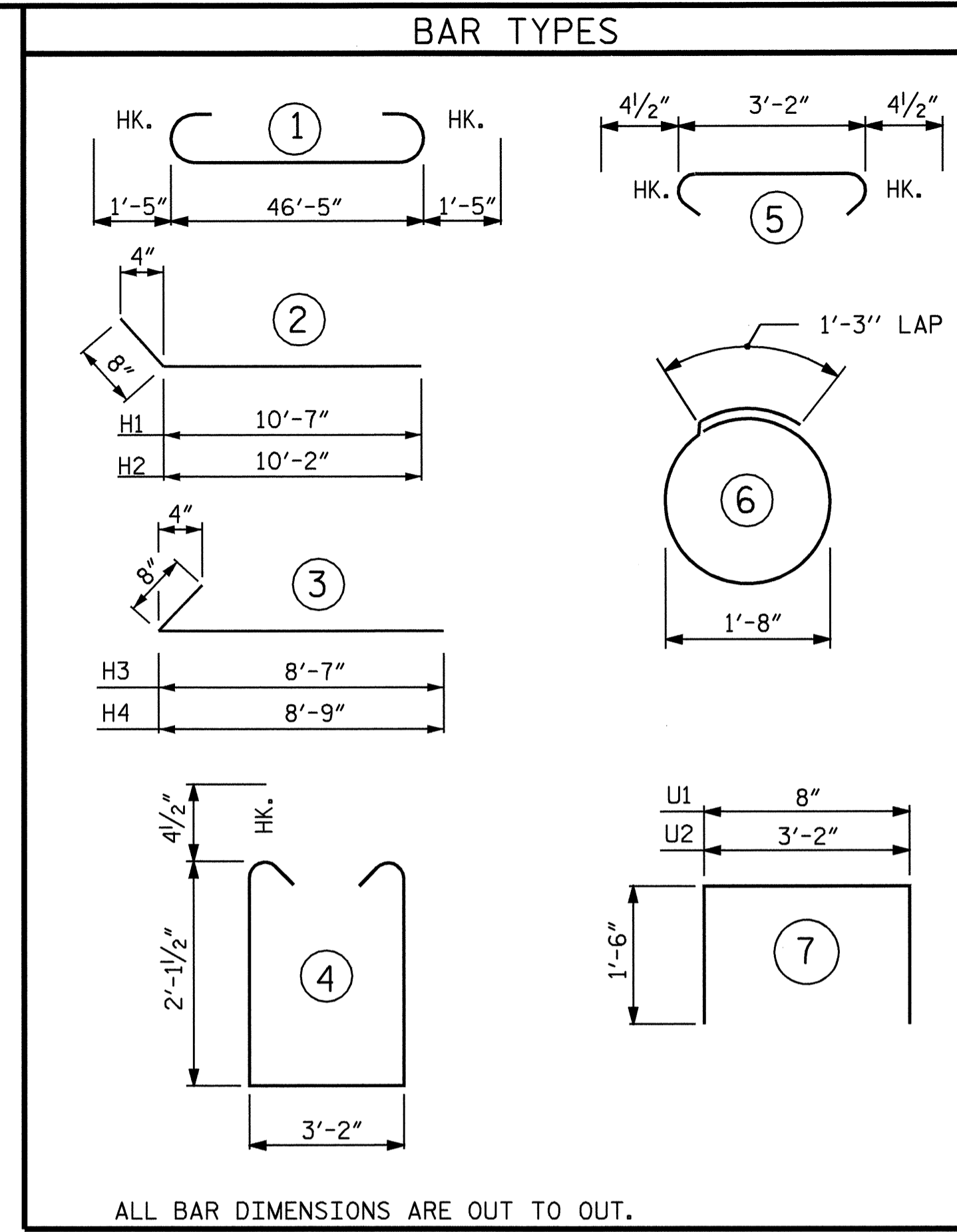
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SECTION A-A

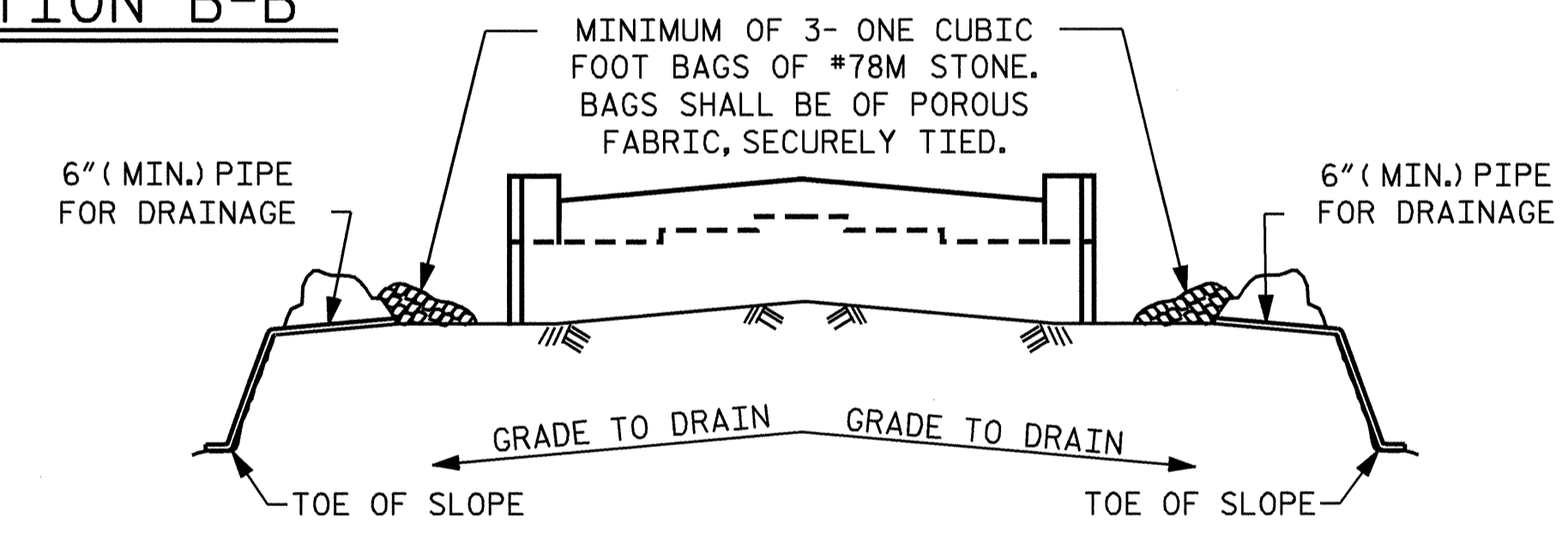


SECTION B-B



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10		49'-3"	1695
B2	4	#5	STR	46'-5"	194
B3	8	#4	STR	24'-6"	131
B4	24	#4	STR	3'-2"	51
H1	9	#5	2	11'-3"	106
H2	9	#5	2	10'-10"	102
H3	9	#5	3	9'-3"	87
H4	9	#5	3	9'-5"	88
K1	16	#4	STR	24'-6"	262
K2	8	#4	STR	3'-8"	20
S1	44	#4	4	8'-2"	240
S2	44	#4	5	3'-11"	115
S3	14	#4	6	6'-6"	61
U1	39	#4	7	3'-8"	96
U2	21	#4	7	6'-2"	87
V1	78	#5	STR	5'-10"	475
V2	30	#4	STR	7'-6"	150
V3	28	#4	STR	7'-8"	143
REINFORCING STEEL					LBS. 4103
CLASS A CONC. BREAKDOWN					
POUR 1 (CAP & LOWER WINGS) C.Y.					17.4
POUR 2 (UPPER WINGS & BACKWALL) C.Y.					10.7
TOTAL C.Y.					28.1
HP 12X53 STEEL PILES					
NUMBER = 7					LIN. FT. = 280

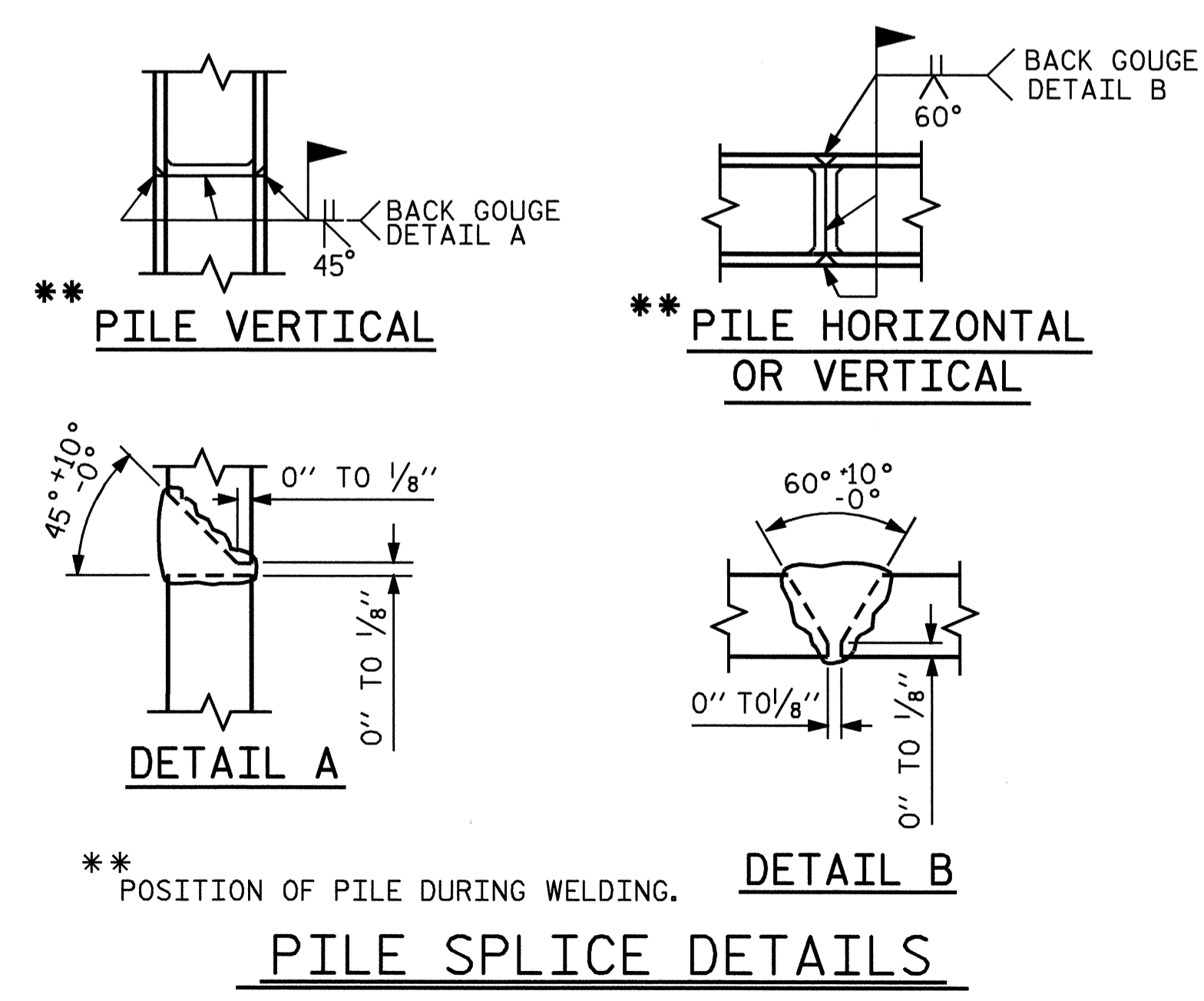


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

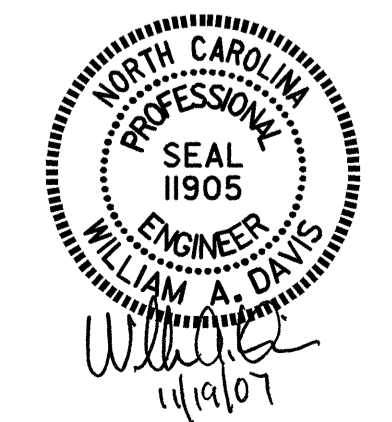


PILE SPLICE DETAILS

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-
 SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 1**



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24	
1			3			TOTAL SHEETS	
2			4			37	

NOTES

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

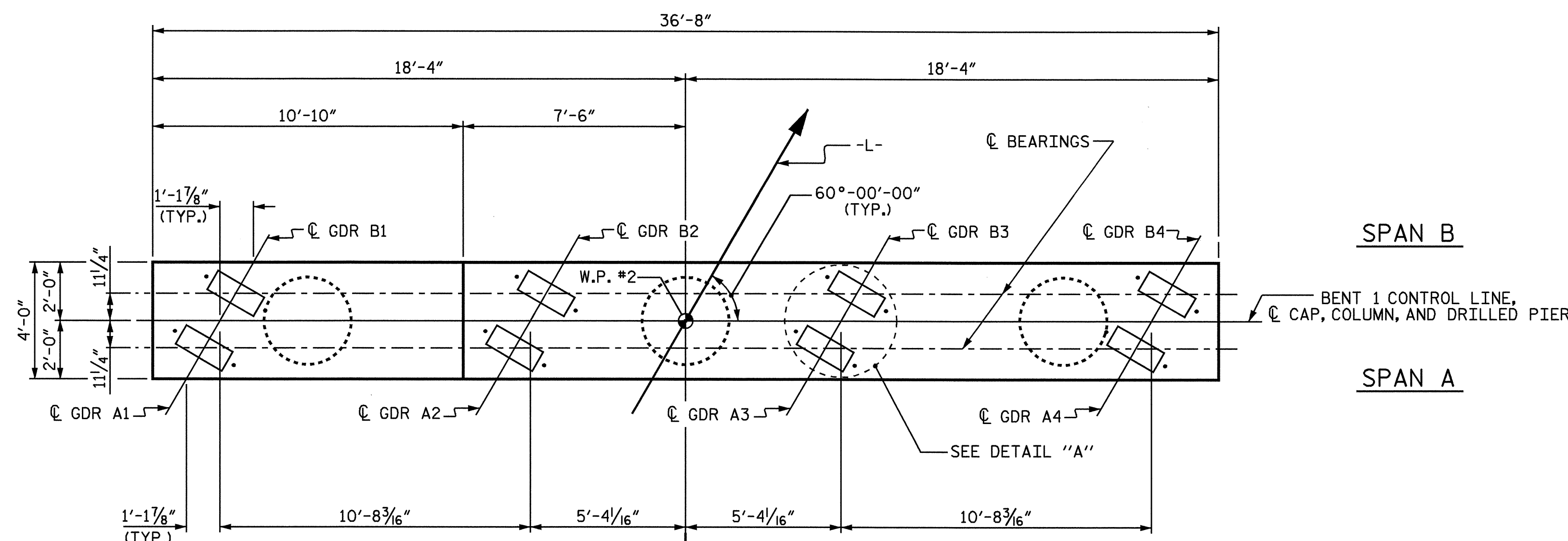
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIERS WILL NOT BE PERMITTED.

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 LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1'-0" BELOW THE GROUND LINE.

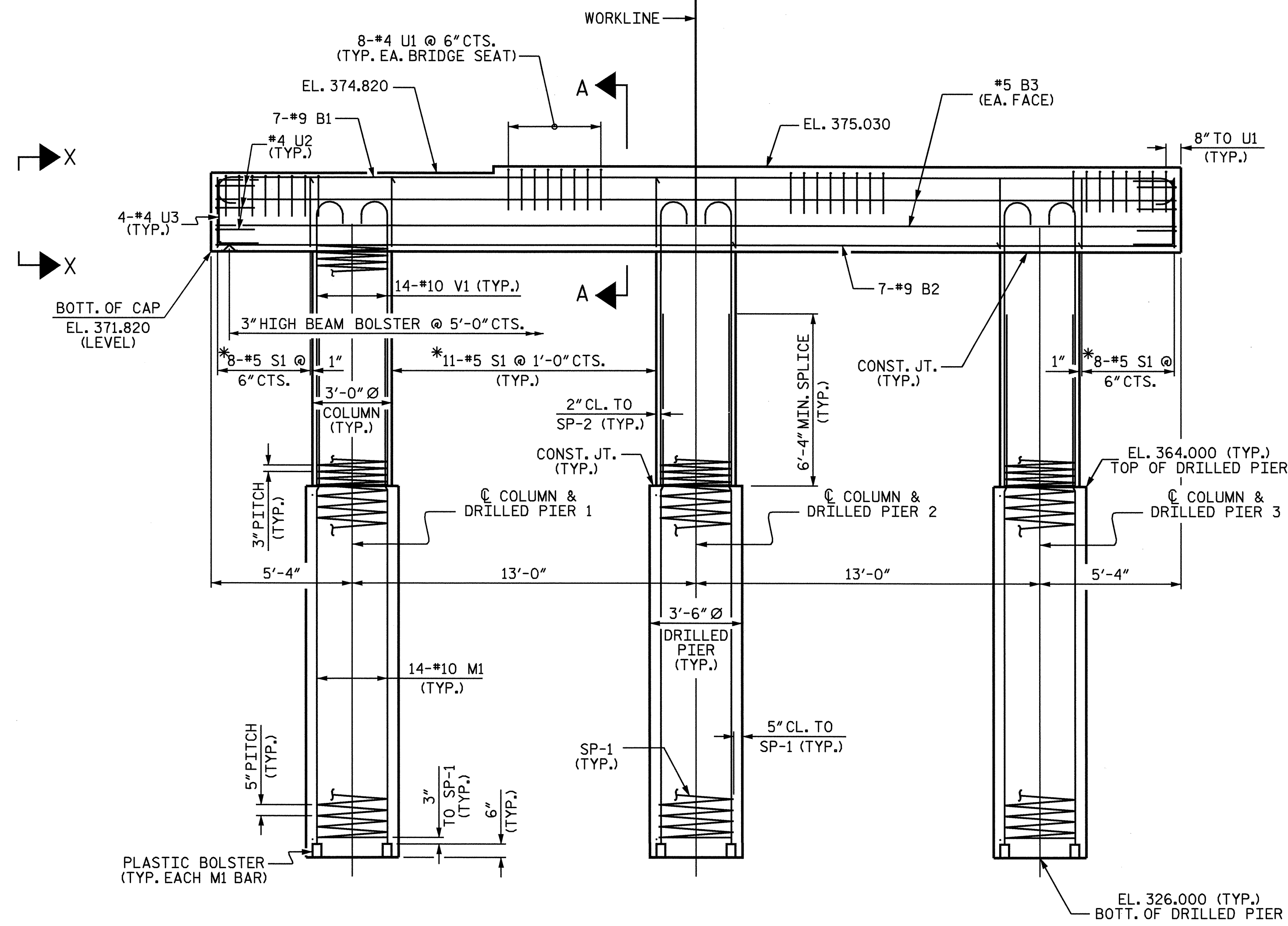


SPAN B

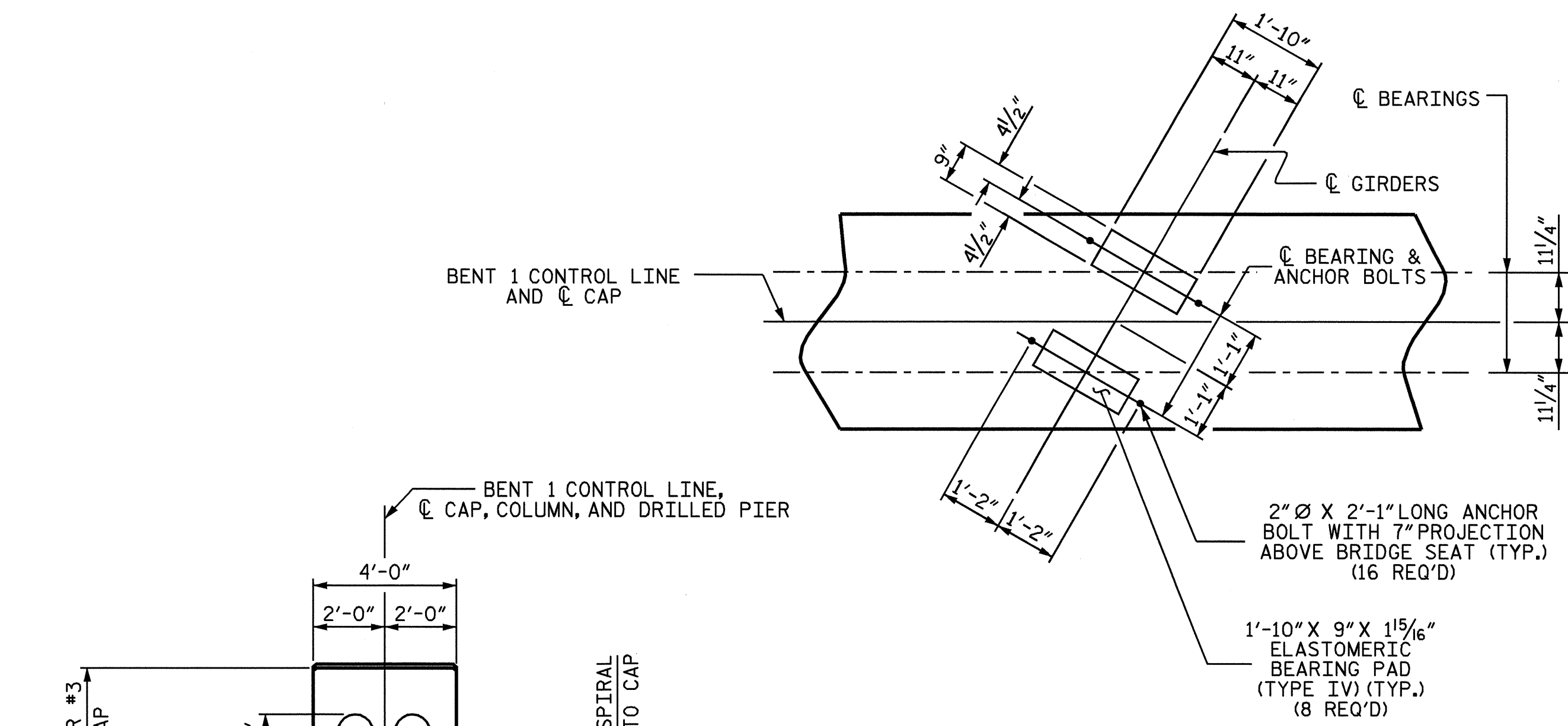
SPAN A

PLAN

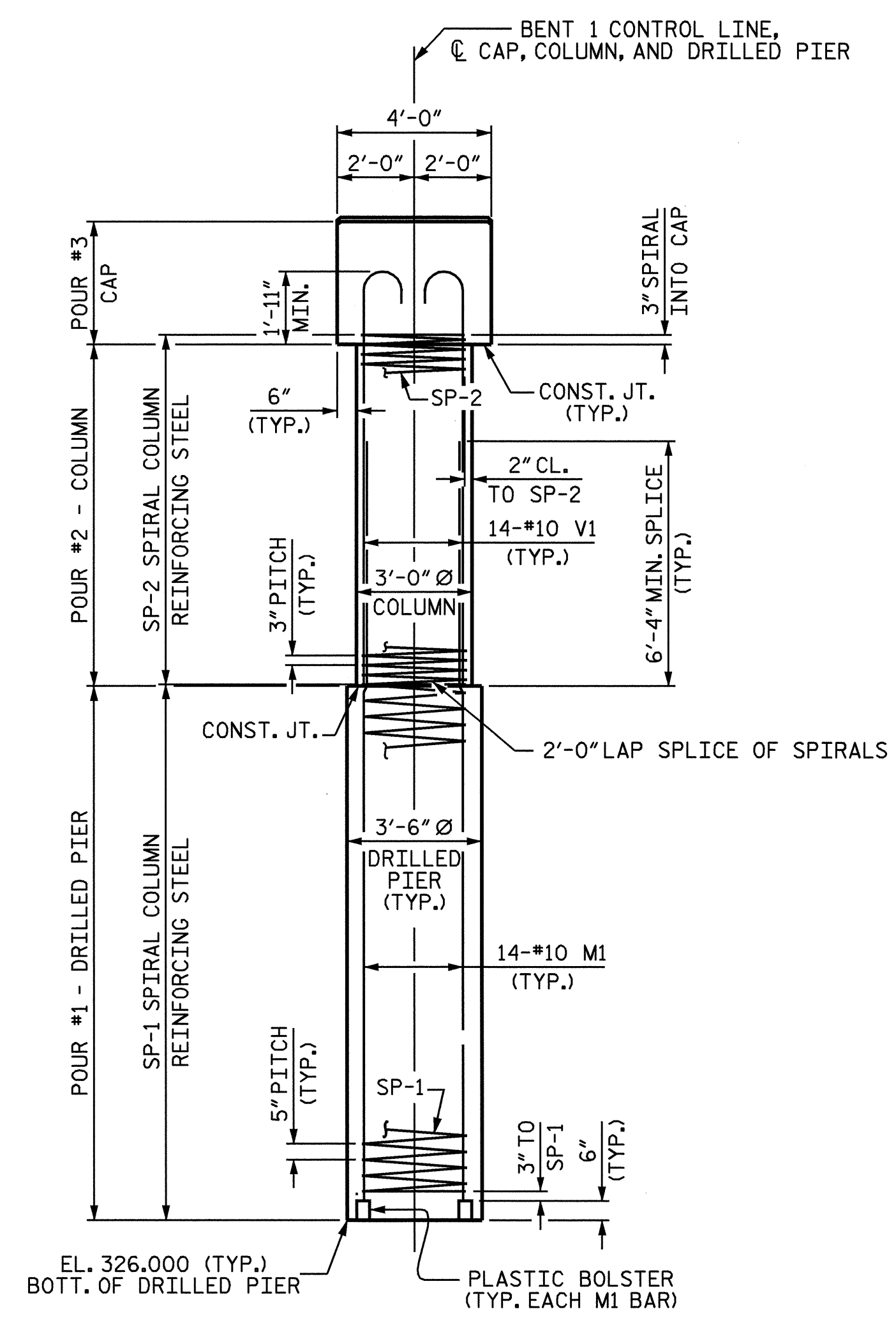
* INVERT ALTERNATE STIRRUPS



ELEVATION



DETAIL "A"
(TYP. EA. GDR.)



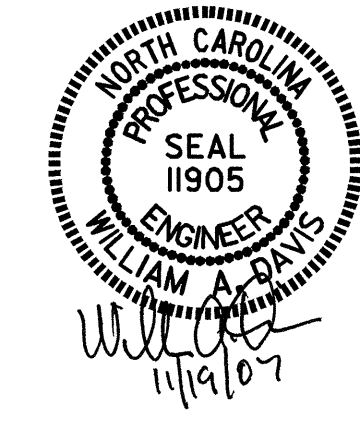
END ELEVATION

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 1 OF 2

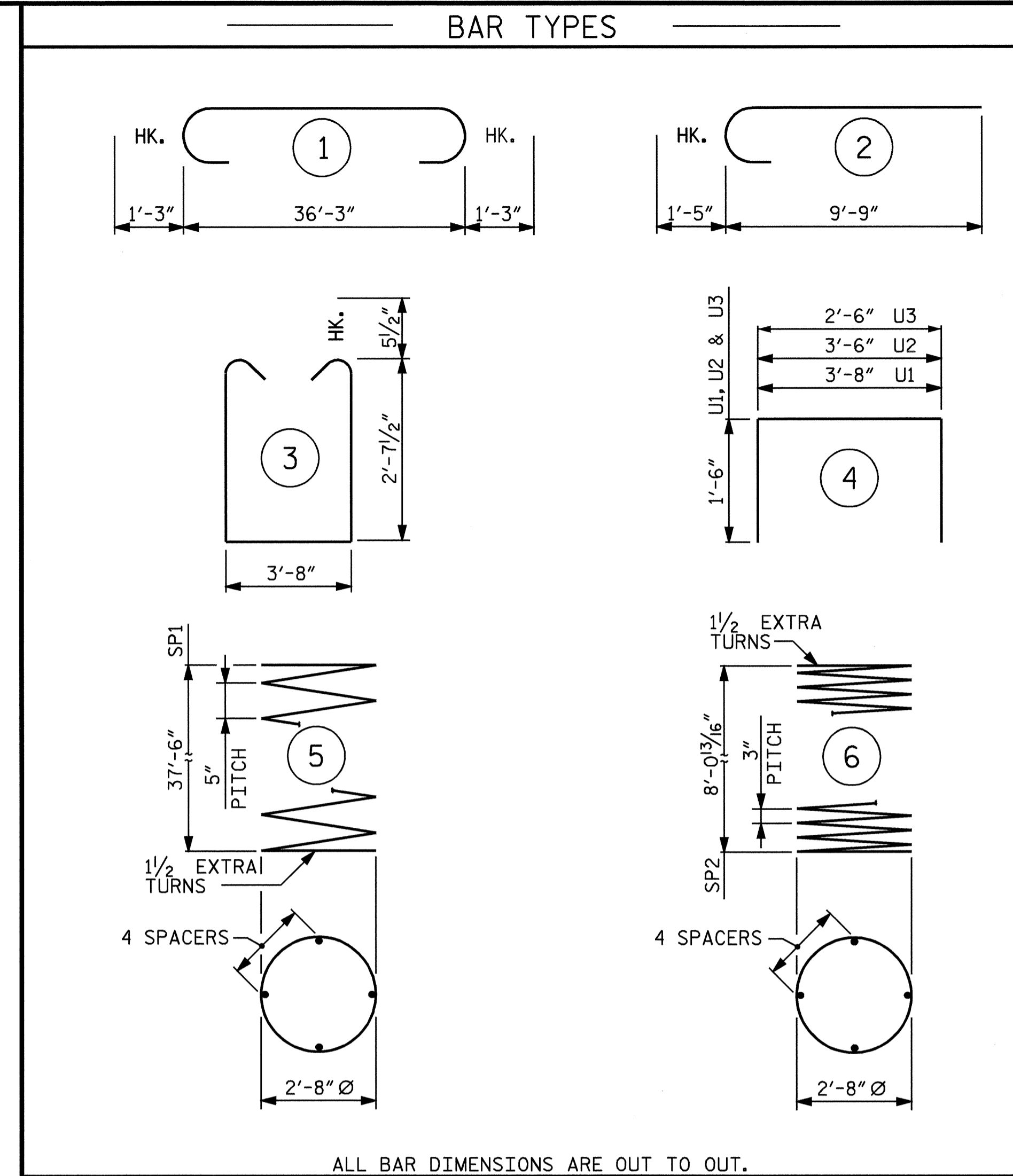
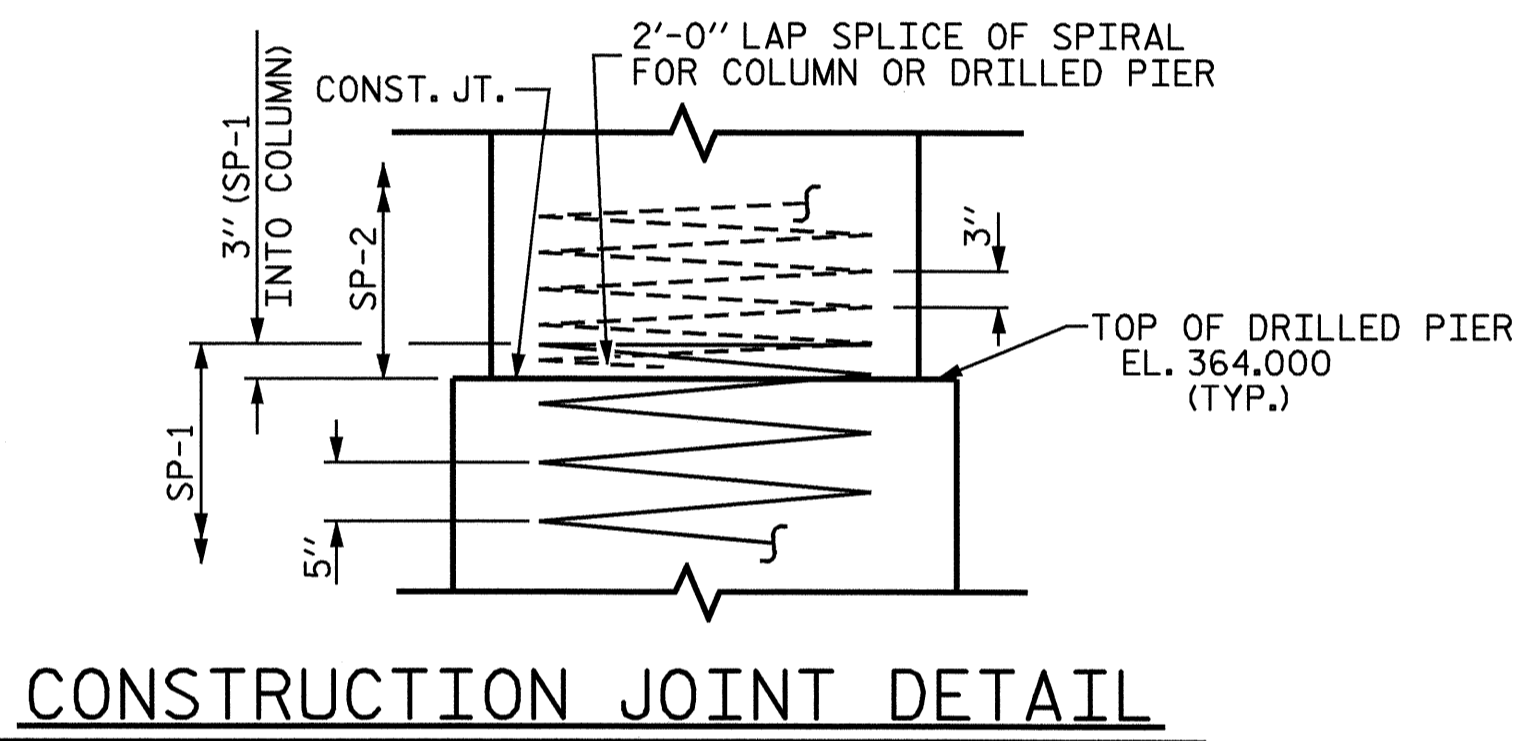
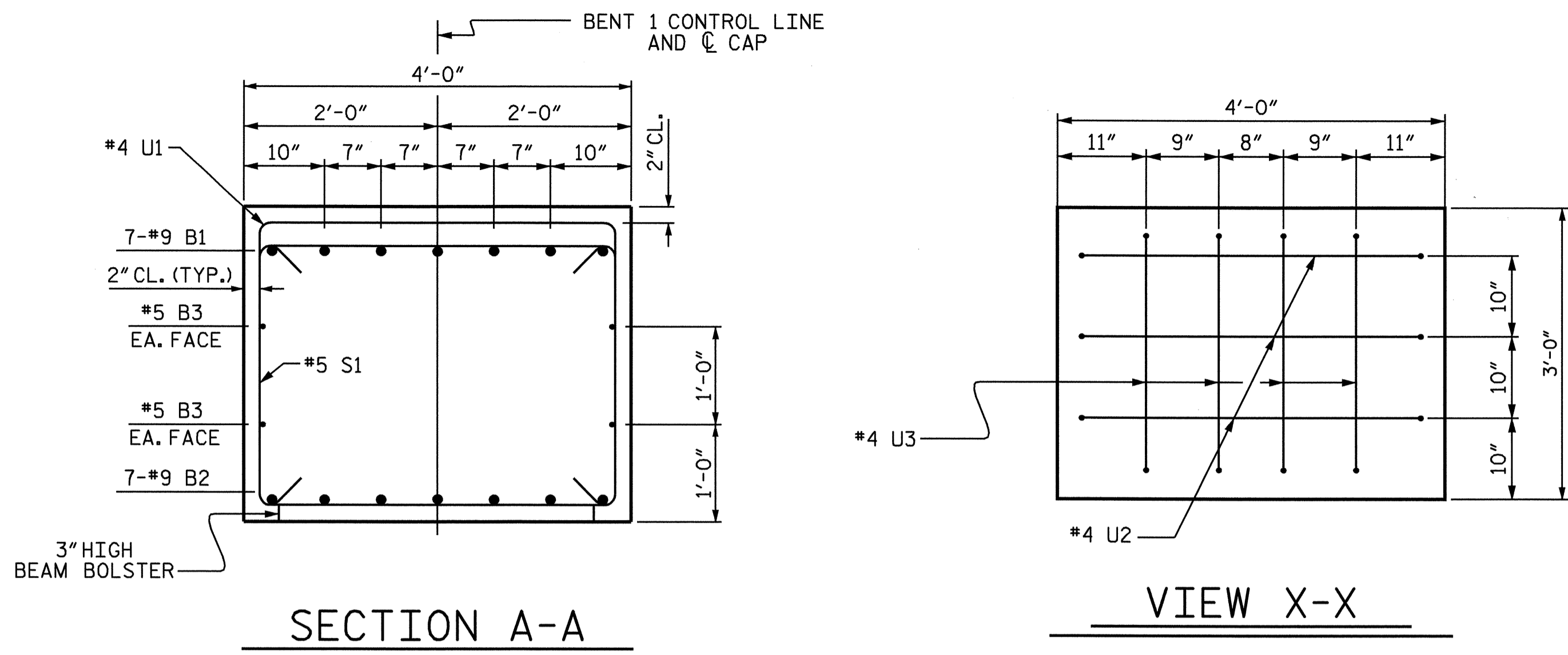
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 BENT 1**

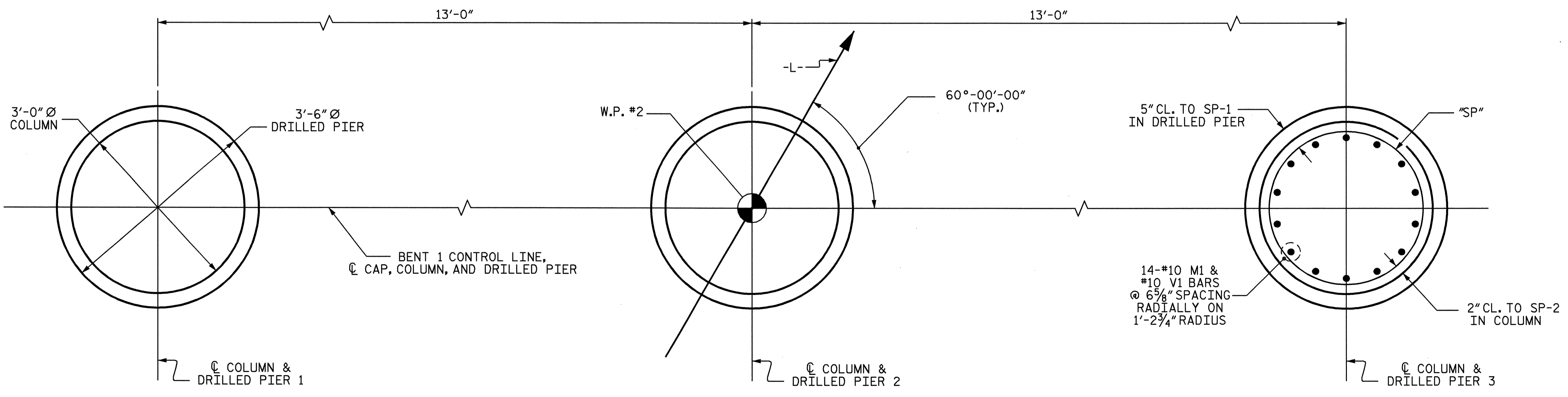


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : A. SORSENGINH/JLW DATE : 11/8/07
 CHECKED BY : Q.T. NGUYEN/PKN DATE : 11/8/07



BILL OF MATERIAL					
BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#9	1	38'-9"	922
B2	7	#9	STR	36'-3"	863
B3	4	#5	STR	36'-3"	151
M1	42	#10	STR	47'-1"	8509
S1	38	#5	3	9'-10"	390
U1	32	#4	4	6'-8"	143
U2	6	#4	4	6'-6"	26
U3	8	#4	4	5'-6"	29
V1	42	#10	2	11'-2"	2018
REINFORCING STEEL (LBS.)					13051
SP-1	3	*	5	752'-7"	2355
SP-2	3	**	6	278'-9"	559
SPIRAL REINFORCING STEEL (LBS.)					2914
CLASS A CONCRETE BREAKDOWN					
POUR #2 (COLUMNS)					6.1 C.Y.
POUR #3 (CAP)					17.1 C.Y.
TOTAL					23.2 C.Y.
DRILLED PIERS					
DRILLED PIER CONCRETE (CU. YARDS)					
POUR #1 (DRILLED PIERS)					40.6 C.Y.
3'-6" Ø DRILLED PIERS IN SOIL					105.0 FT.
3'-6" Ø DRILLED PIERS NOT IN SOIL					9.0 FT.
CROSSHOLE SONIC LOGGING					1 EACH
SPT TESTING					3 EACH
SID INSPECTION					3 EACH
CSL TUBES					486.0 FT.

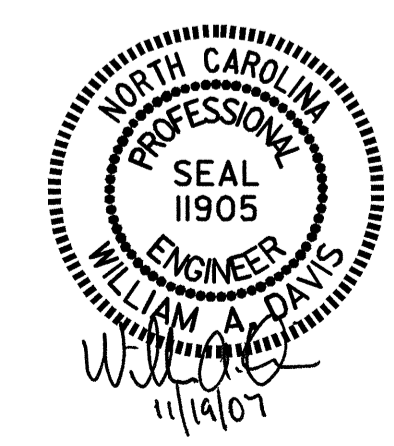


PLAN OF COLUMNS AND DRILLED PIERS
DIMENSIONS AND REINFORCING ARE TYPICAL FOR EACH COLUMN & DRILLED PIER

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. B-3824
CHATHAM COUNTY
STATION: 13+35.00 -L-
SHEET 2 OF 2



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 1					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 37

DRAWN BY: A. SORSENGINH/JLW DATE: 11/8/07
CHECKED BY: Q.T. NGUYEN/PKN DATE: 11/8/07

NOTES

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

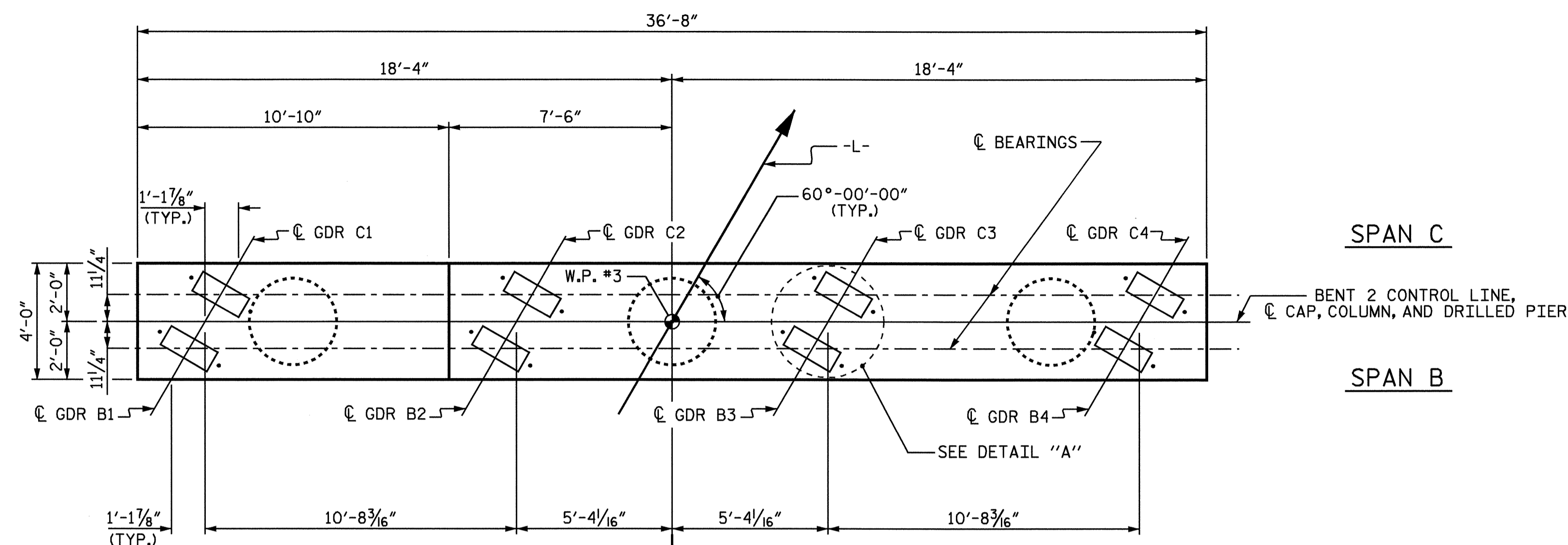
HOOKS ON 1/2" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

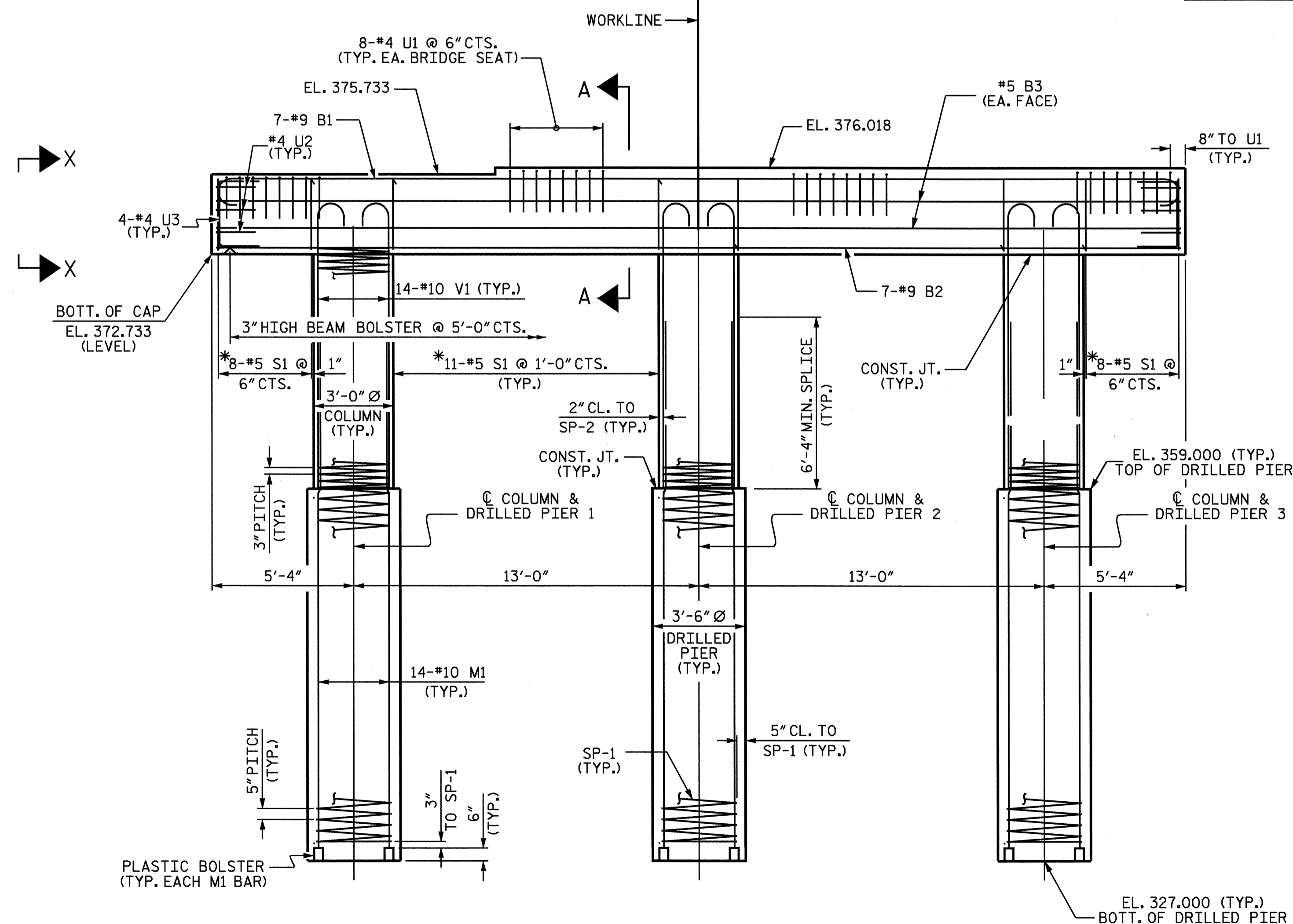
SPLICING OF THE LONGITUDINAL BARS IN THE DRILLED PIERS WILL NOT BE PERMITTED.

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 LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1'-0" BELOW THE GROUND LINE.

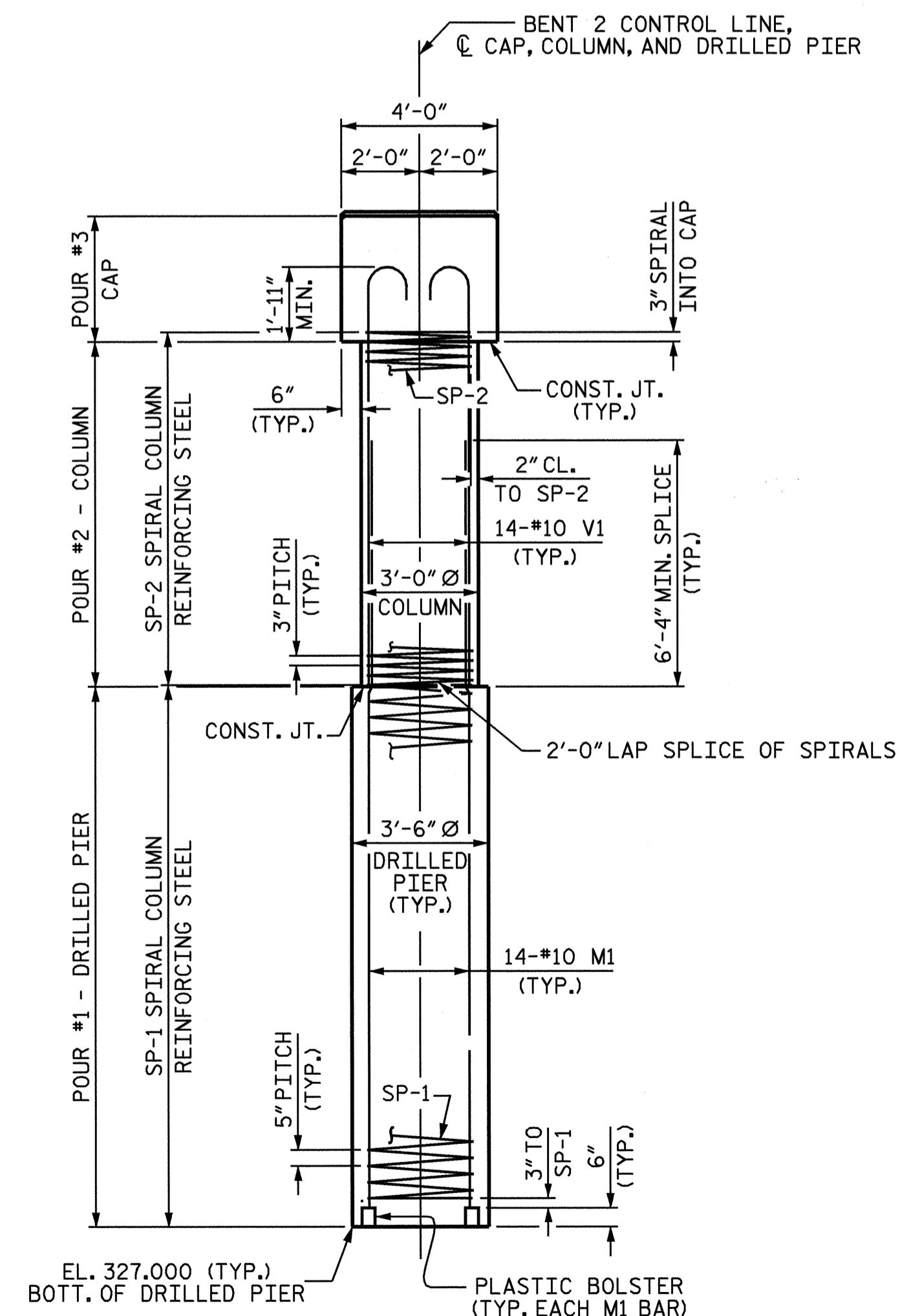


PLAN

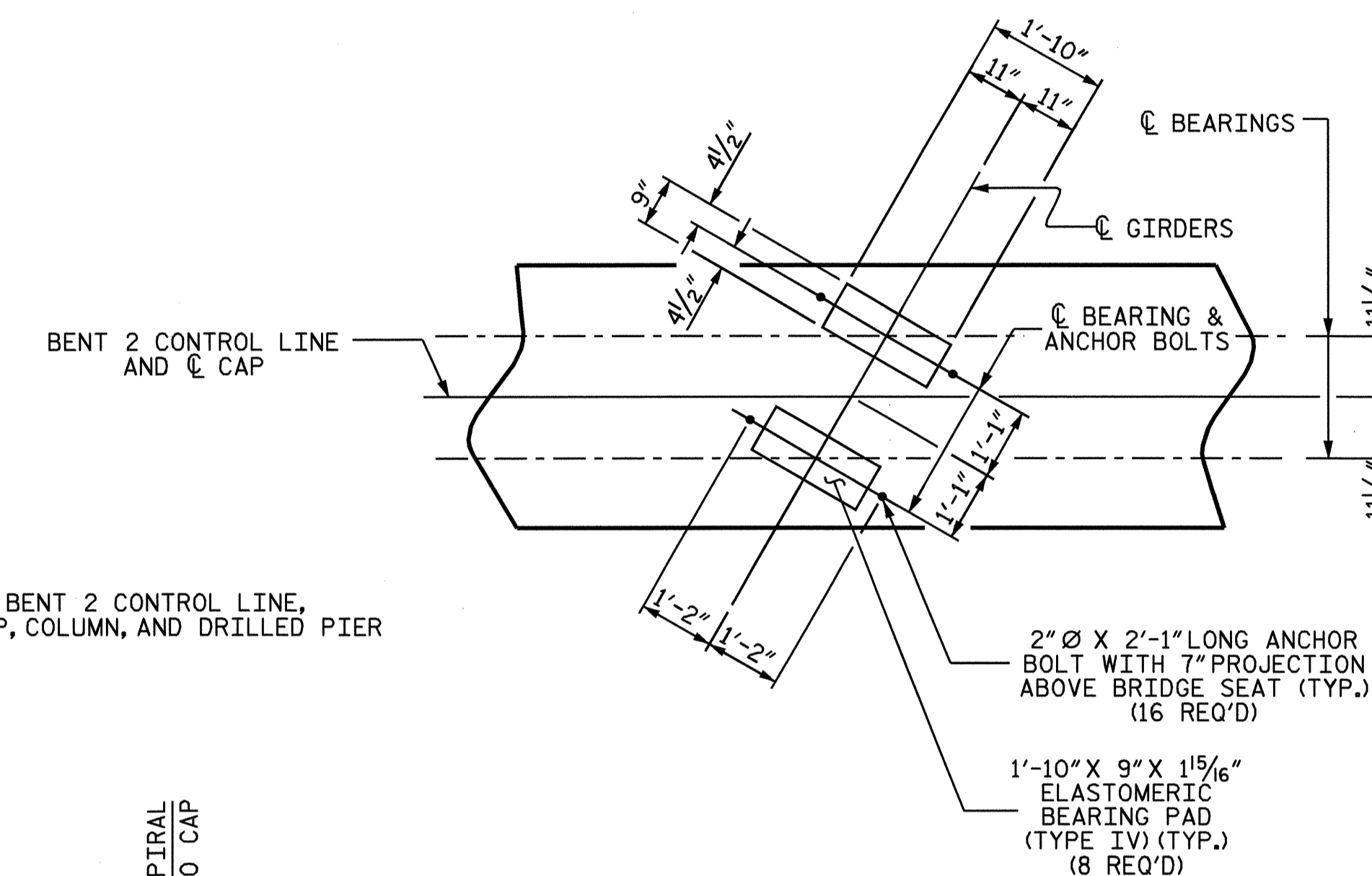
* INVERT ALTERNATE STIRRUPS



ELEVATION



END ELEVATION



DETAIL "A"
(TYP. EA. GDR.)

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 1 OF 2

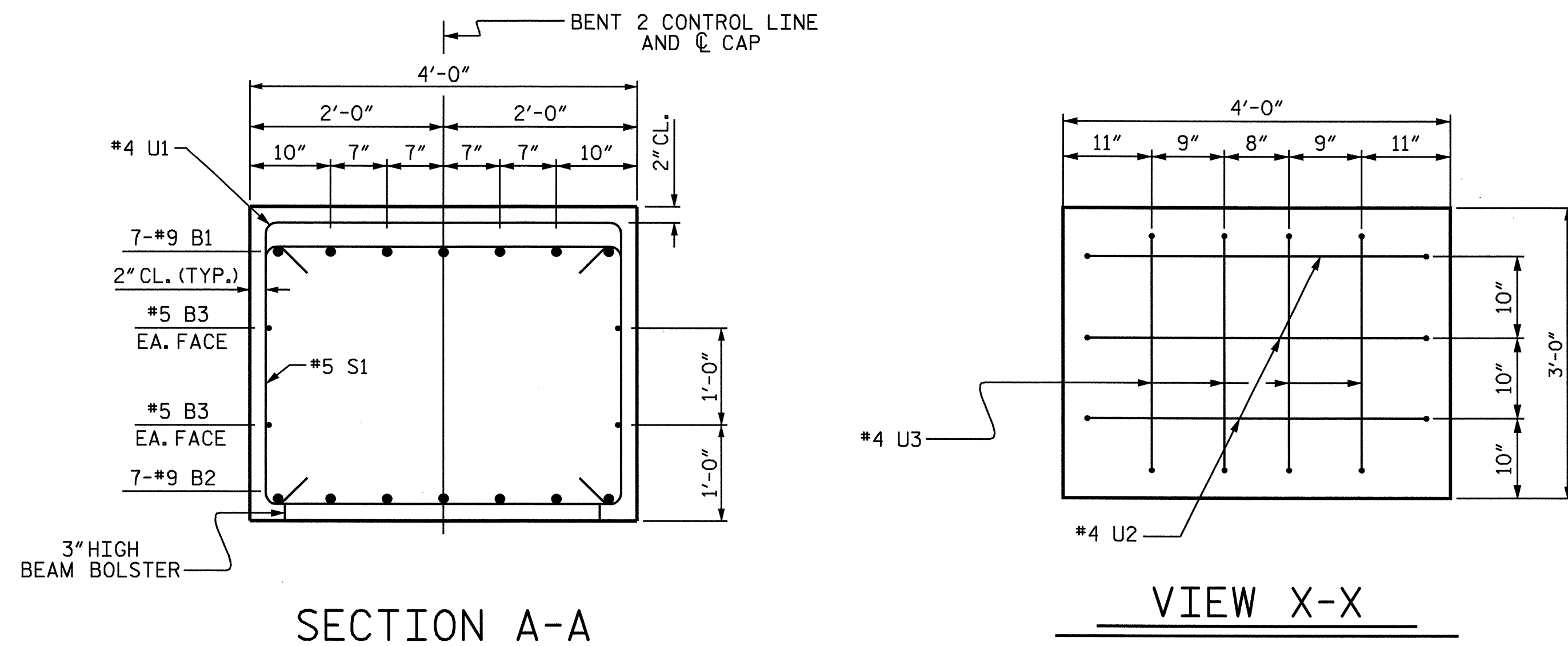
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 BENT 2**



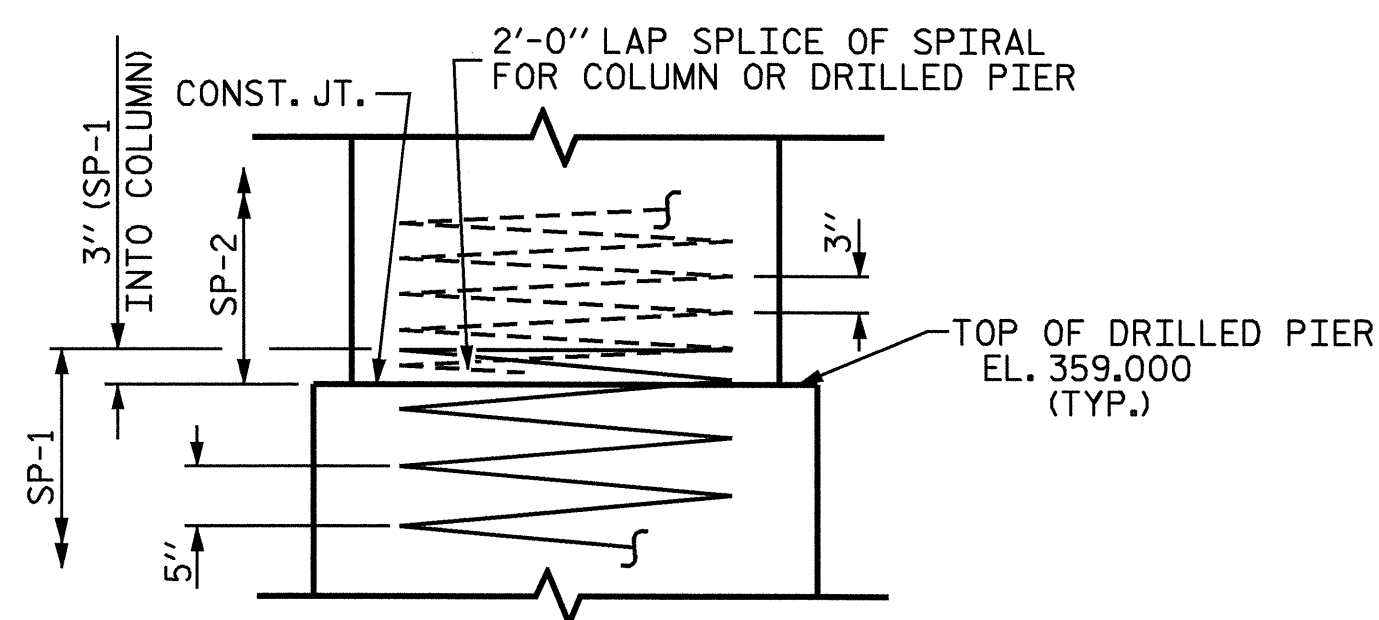
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			37

DRAWN BY : A. SORSENGINH/JLW DATE : 11/8/07
 CHECKED BY : Q.T. NGUYEN/PKN DATE : 11/8/07



SECTION A-A

VIEW X-X



CONSTRUCTION JOINT DETAIL

BILL OF MATERIAL					
BENT 2					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	7	#9	1	38'-9"	922
B2	7	#9	STR	36'-3"	863
B3	4	#5	STR	36'-3"	151
M1	42	#10	STR	41'-1"	7244
S1	38	#5	3	9'-10"	390
U1	32	#4	4	6'-8"	143
U2	6	#4	4	6'-6"	26
U3	8	#4	4	5'-6"	29
V1	42	#10	2	17'-1"	3087
REINFORCING STEEL (LBS.)					12855
SP-1	3	*	5	634'-2"	1984
SP-2	3	**	6	473'-11"	950
SPIRAL REINFORCING STEEL (LBS.)					2934
CLASS A CONCRETE BREAKDOWN					
POUR #2 (COLUMNS)					10.8 C.Y.
POUR #3 (CAP)					17.4 C.Y.
TOTAL					28.2 C.Y.
DRILLED PIERS					
DRILLED PIER CONCRETE (CU. YARDS)					
POUR #1 (DRILLED PIERS)					34.2 C.Y.
3'-6" Ø DRILLED PIERS IN SOIL					87.0 FT.
3'-6" Ø DRILLED PIERS NOT IN SOIL					9.0 FT.
CROSSHOLE SONIC LOGGING					1 EACH
SPT TESTING					3 EACH
SID INSPECTION					3 EACH
CSL TUBES					414.0 FT.

1

2

3

4

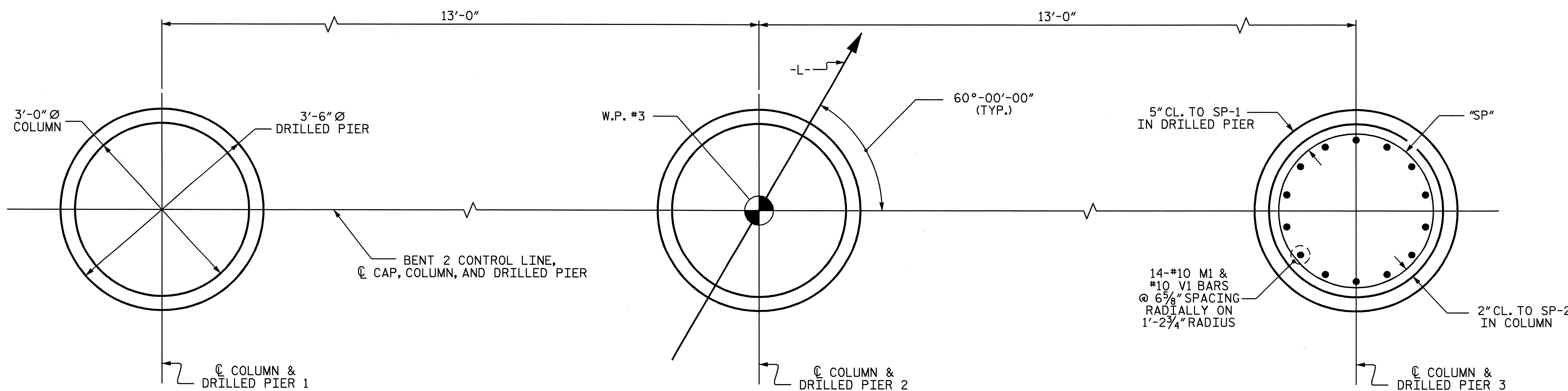
5

6

4 SPACERS

4 SPACERS

ALL BAR DIMENSIONS ARE OUT TO OUT.

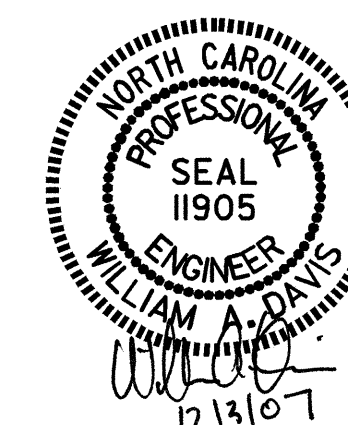


PLAN OF COLUMNS AND DRILLED PIERS

DIMENSIONS AND REINFORCING ARE TYPICAL FOR EACH COLUMN & DRILLED PIER

- * THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.
- ** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. B-3824
 CHATHAM COUNTY
 STATION: 13+35.00 -L-
 SHEET 2 OF 2



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 2					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 37

DRAWN BY: A. SORSENGINH/JLW DATE: 11/8/07
 CHECKED BY: Q.T. NGUYEN/PKN DATE: 11/8/07

NOTES

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

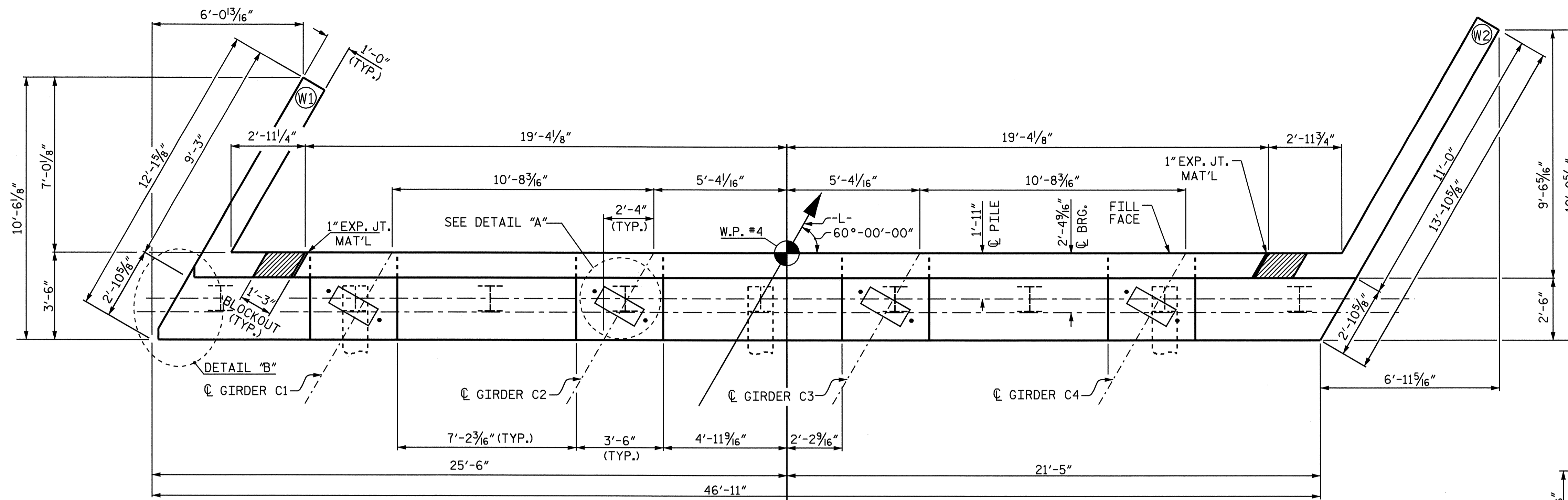
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

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

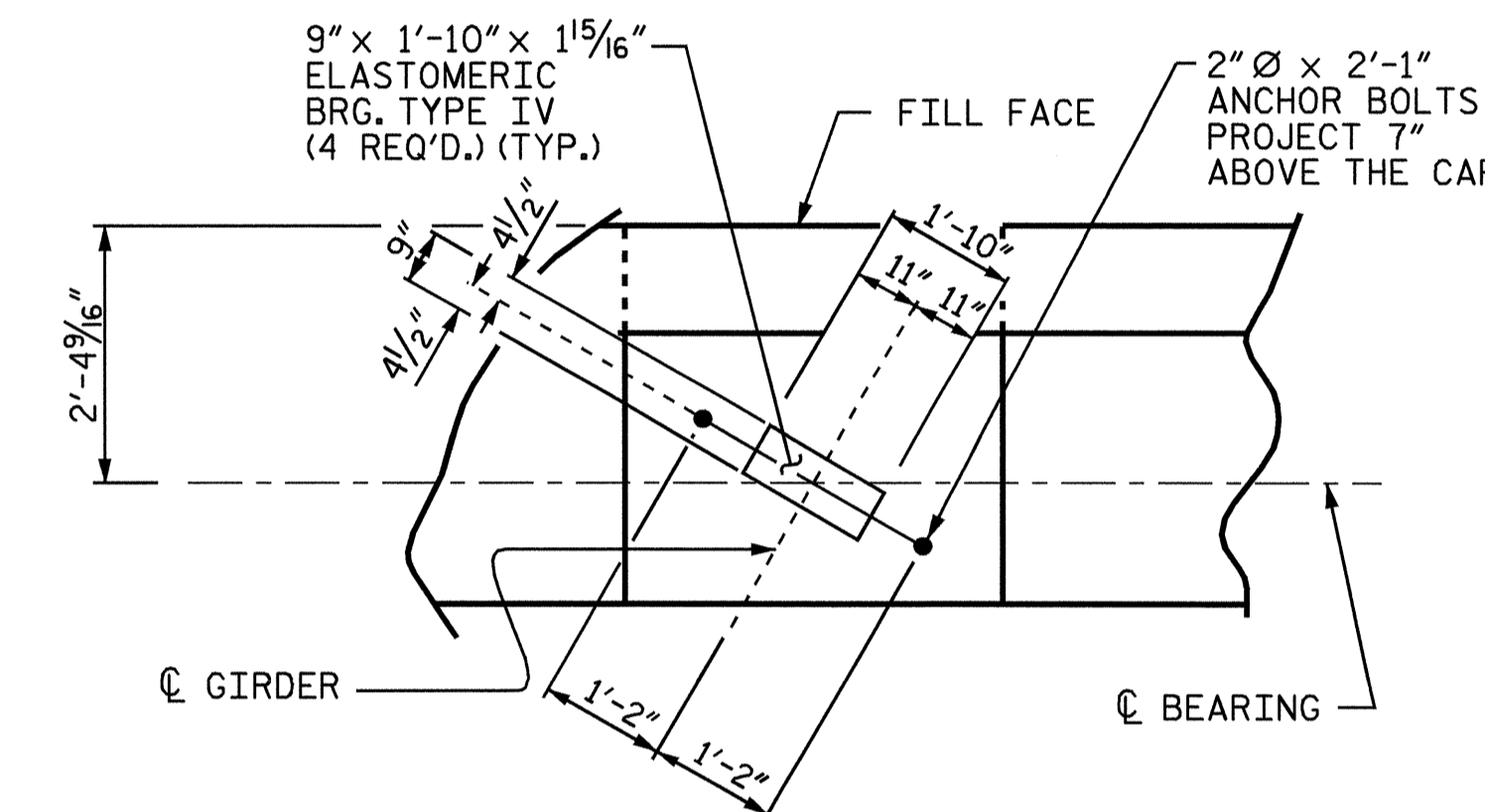
THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

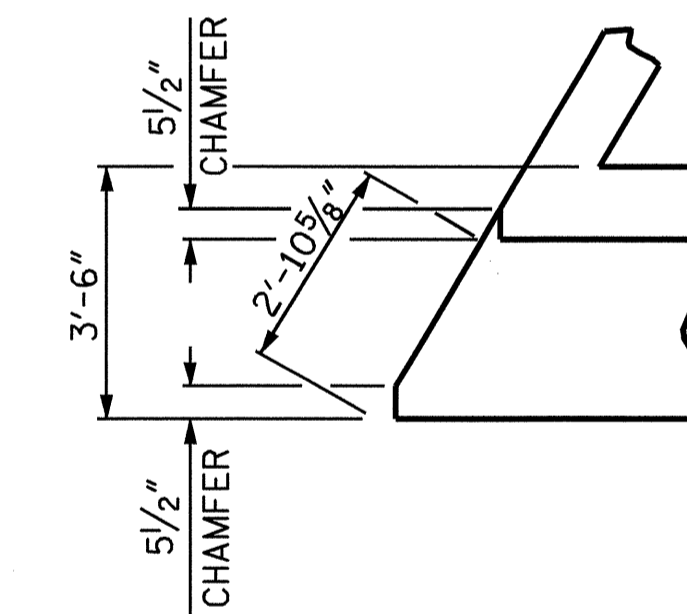
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE PARAPET AND END POST ARE CAST IF SLIP FORMING IS USED.



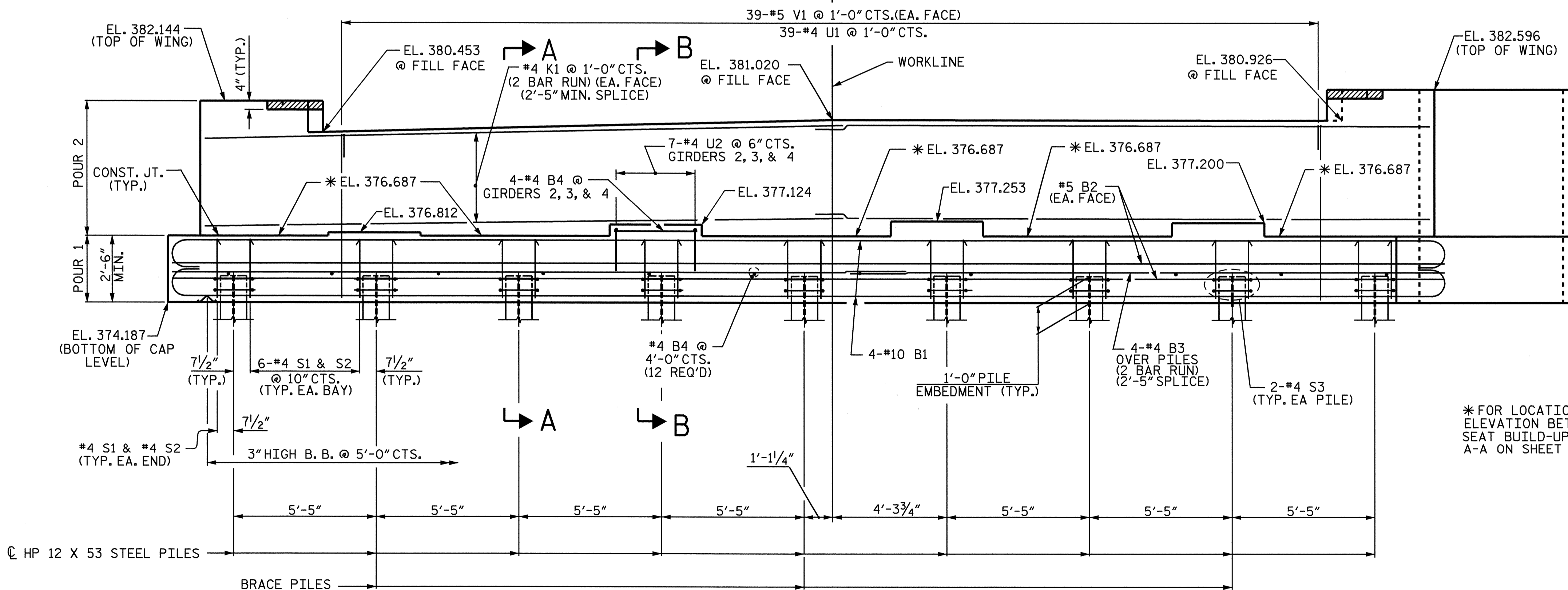
PLAN



DETAIL "A"



DETAIL "B"



ELEVATION

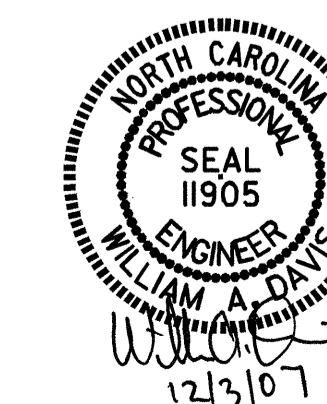
LEFT WING NOT SHOWN FOR CLARITY

* FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A ON SHEET 3 OF 3.

PROJECT NO. B-3824
 CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 1 OF 3

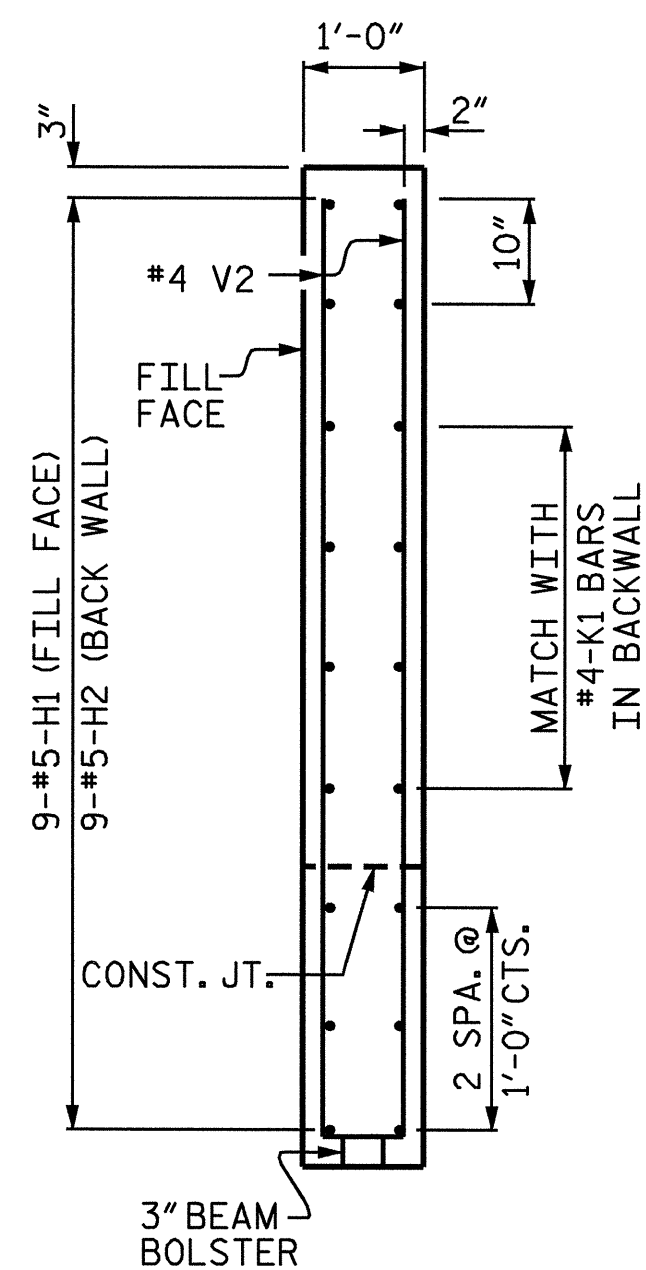
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT #2



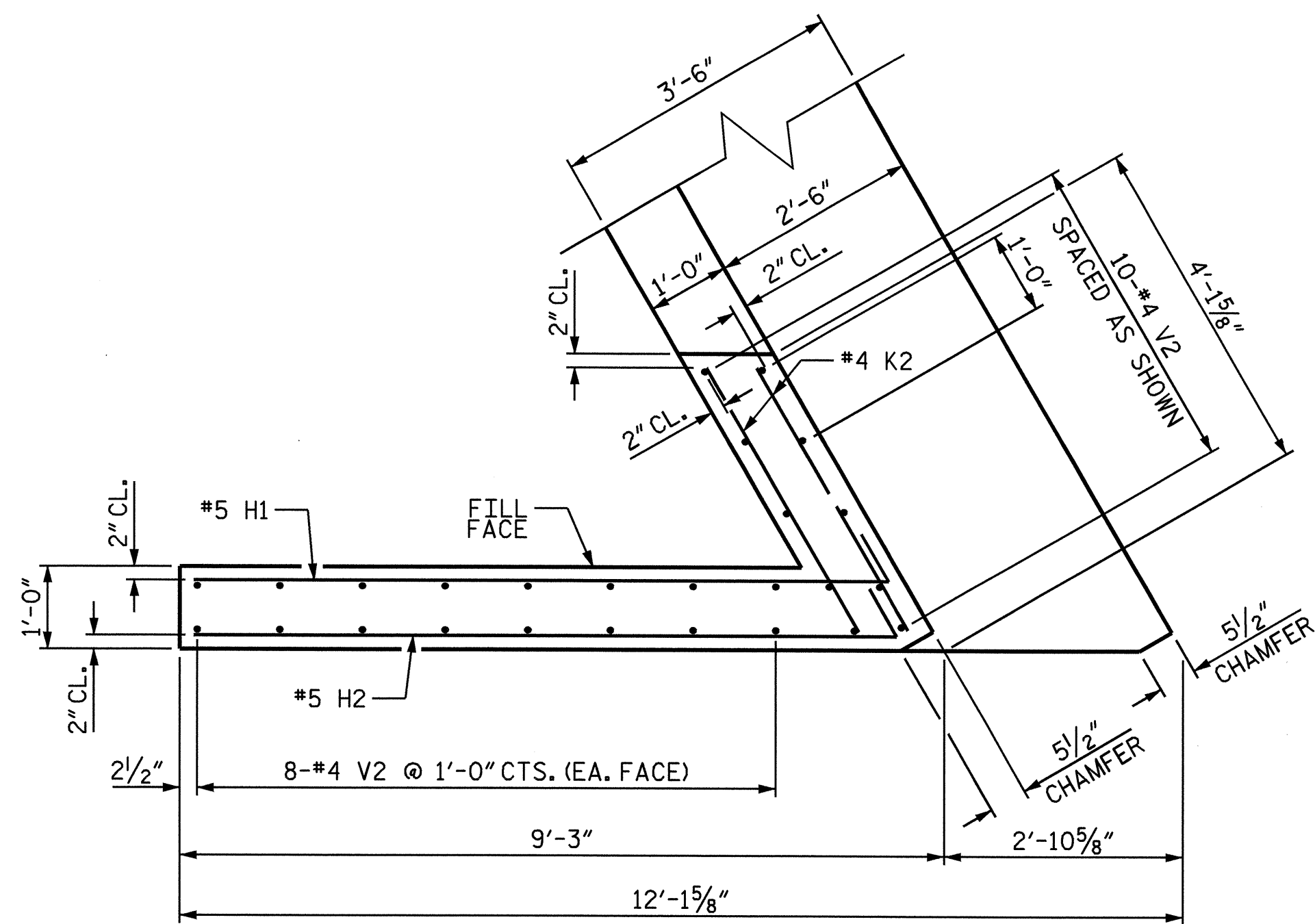
DRAWN BY: G.O. COOPER/JLW DATE: 11/2/07
 CHECKED BY: Q.T. NGUYEN/PKN DATE: 11/2/07

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 kpnwton

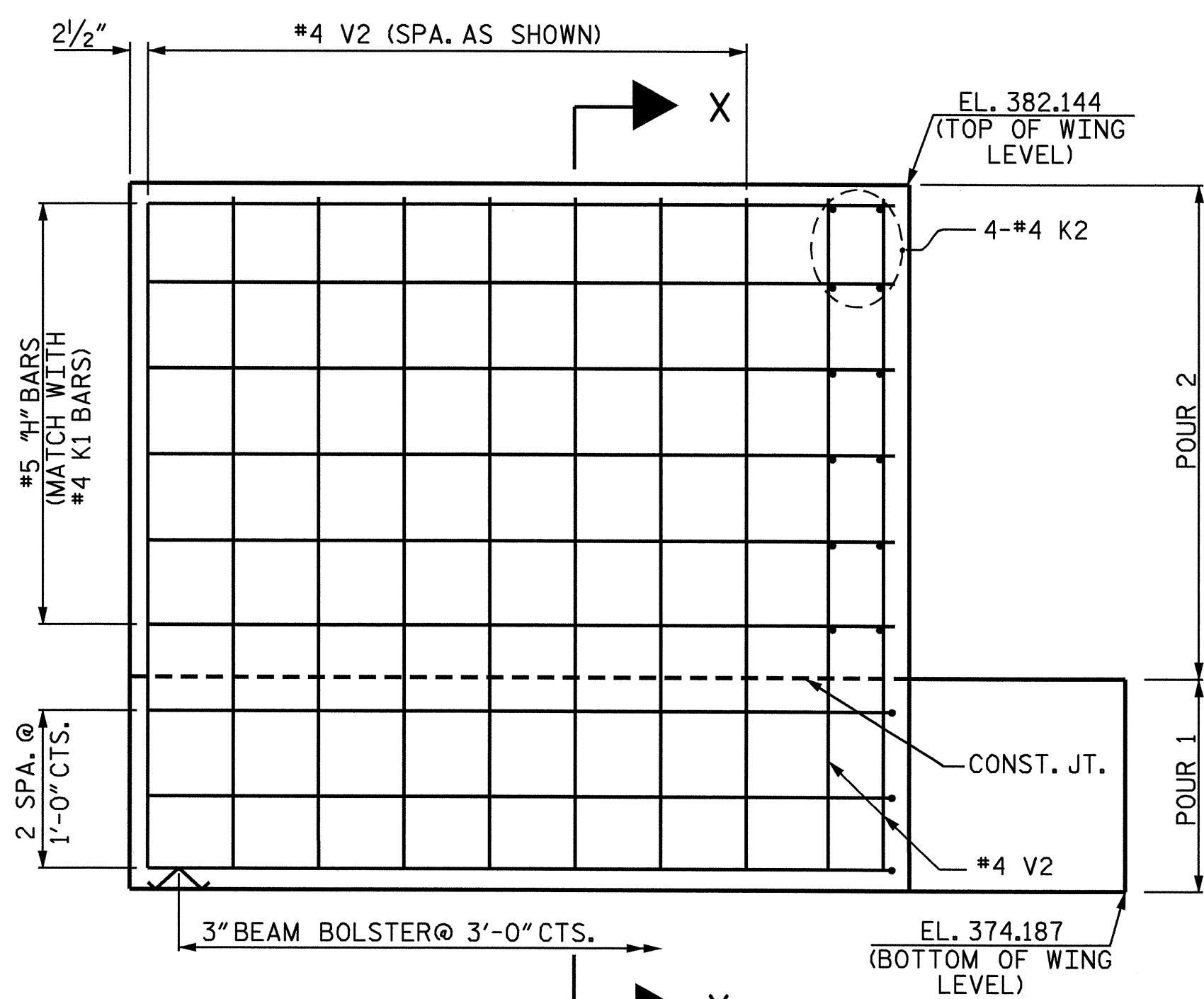
REVISIONS						SHEET NO. S-29
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 37
2			4			



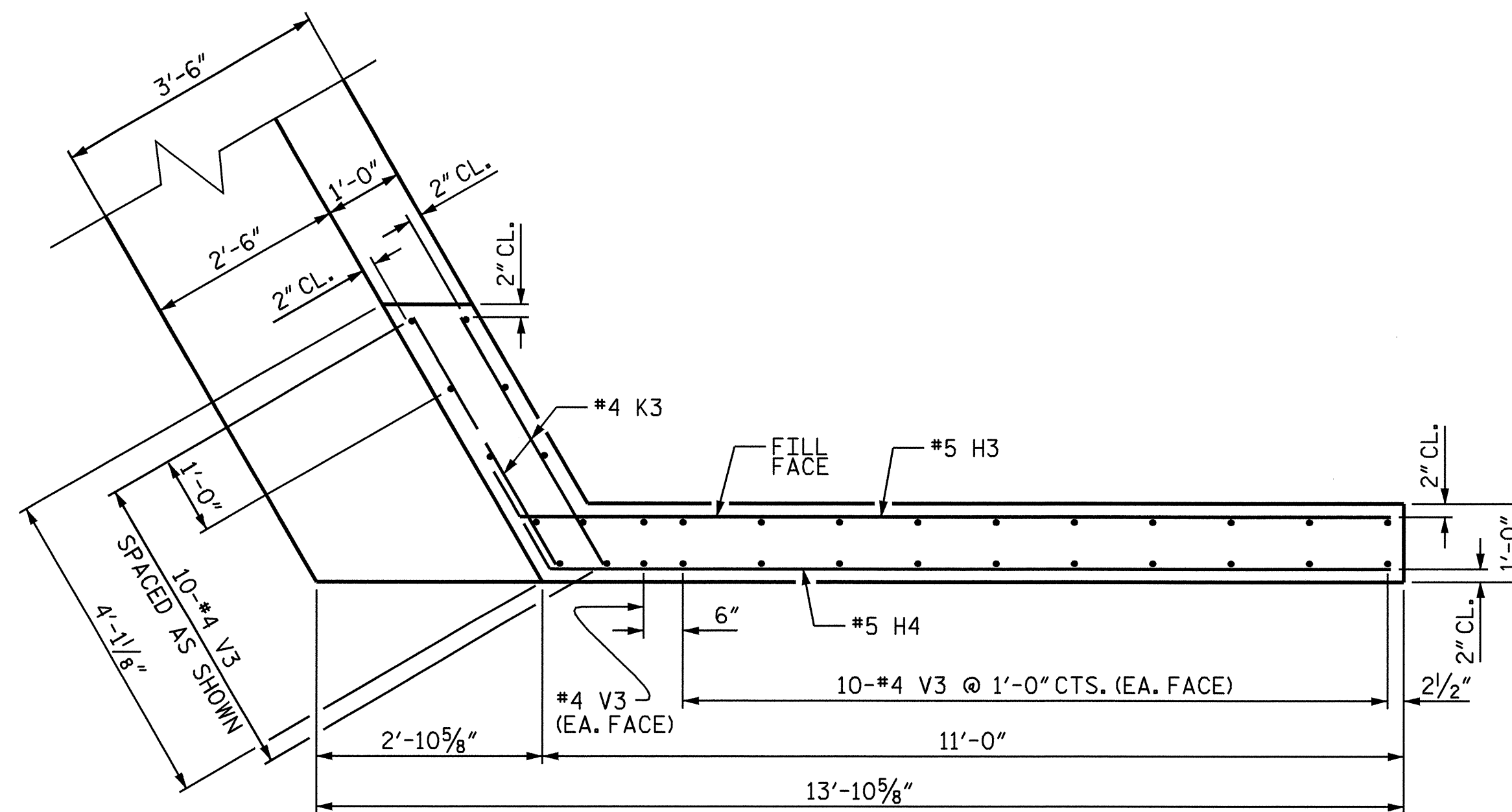
SECTION X-X



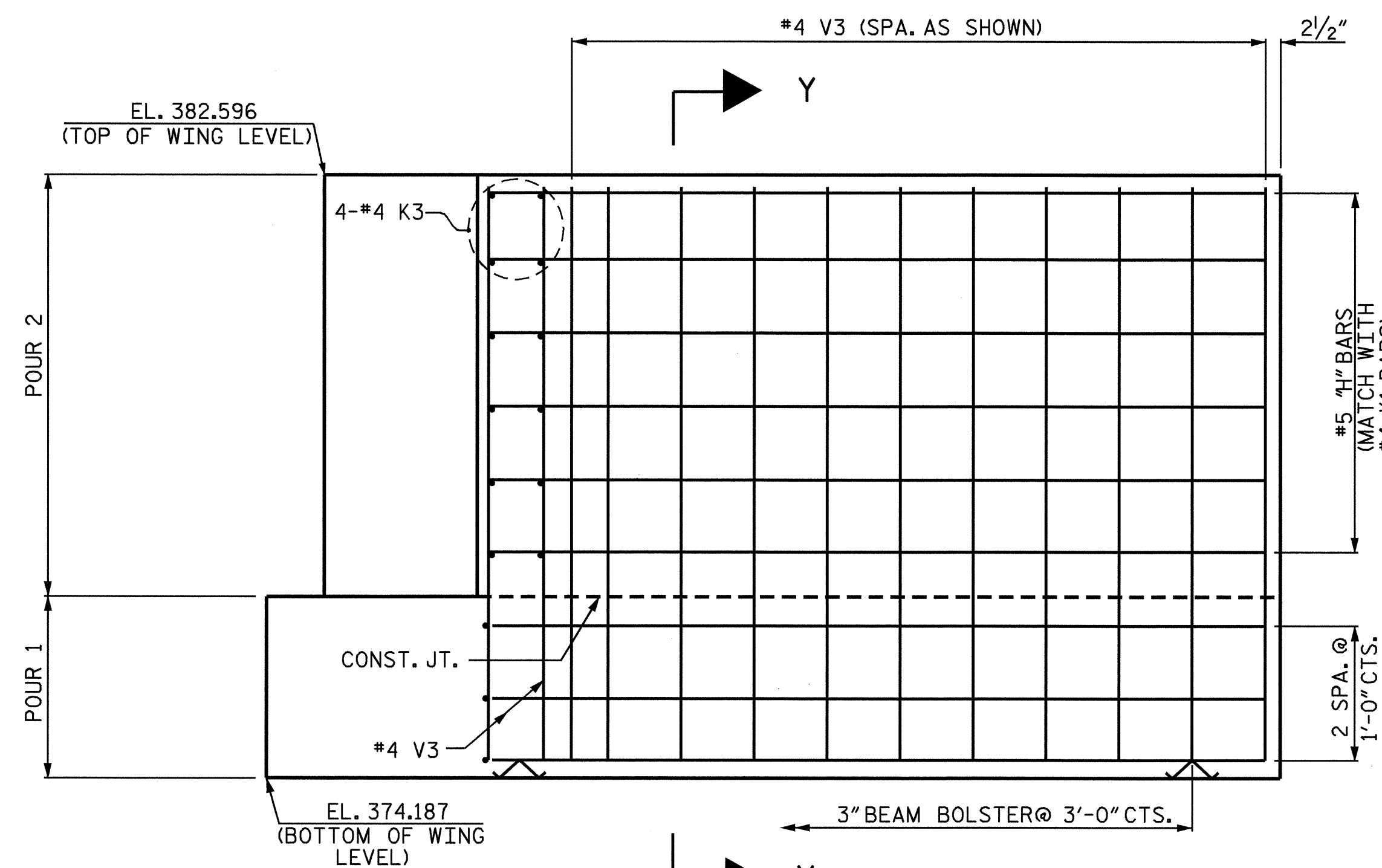
PLAN OF WING W1



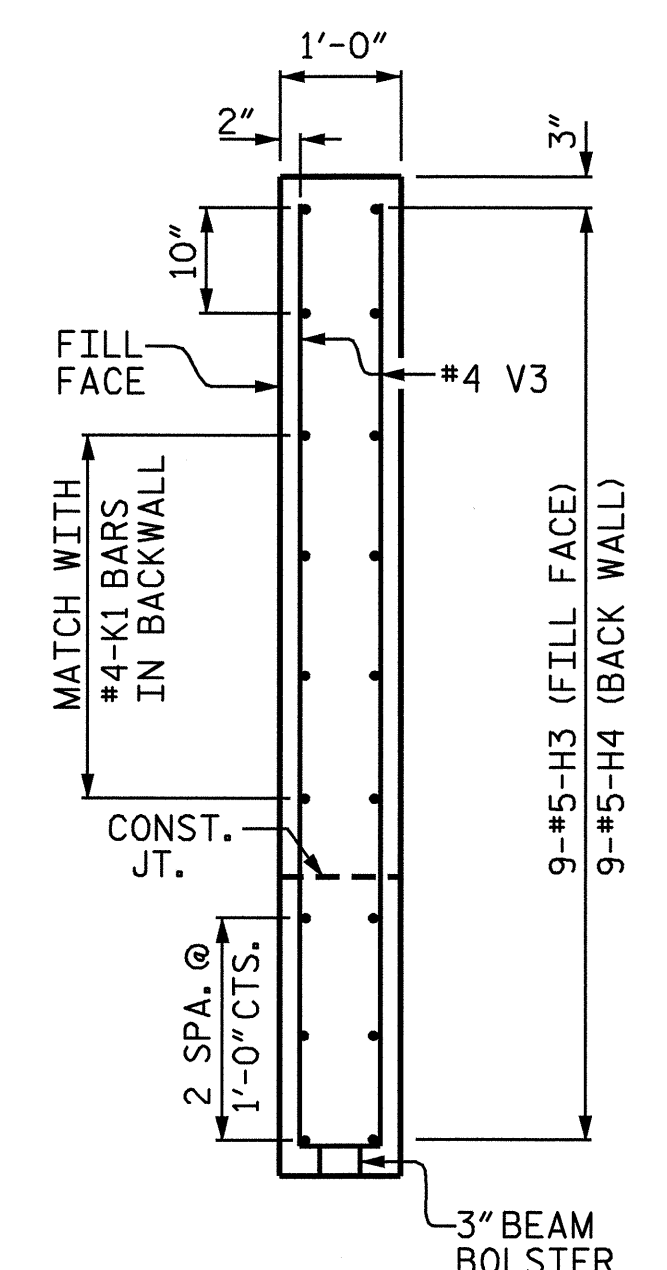
ELEVATION OF WING W1



PLAN OF WING W2



ELEVATION OF WING W2



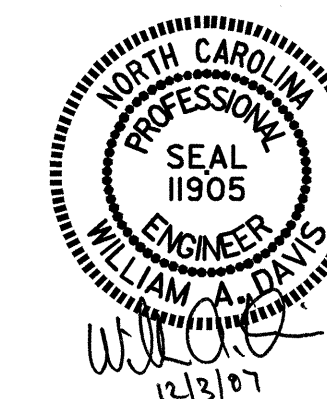
SECTION Y-Y

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

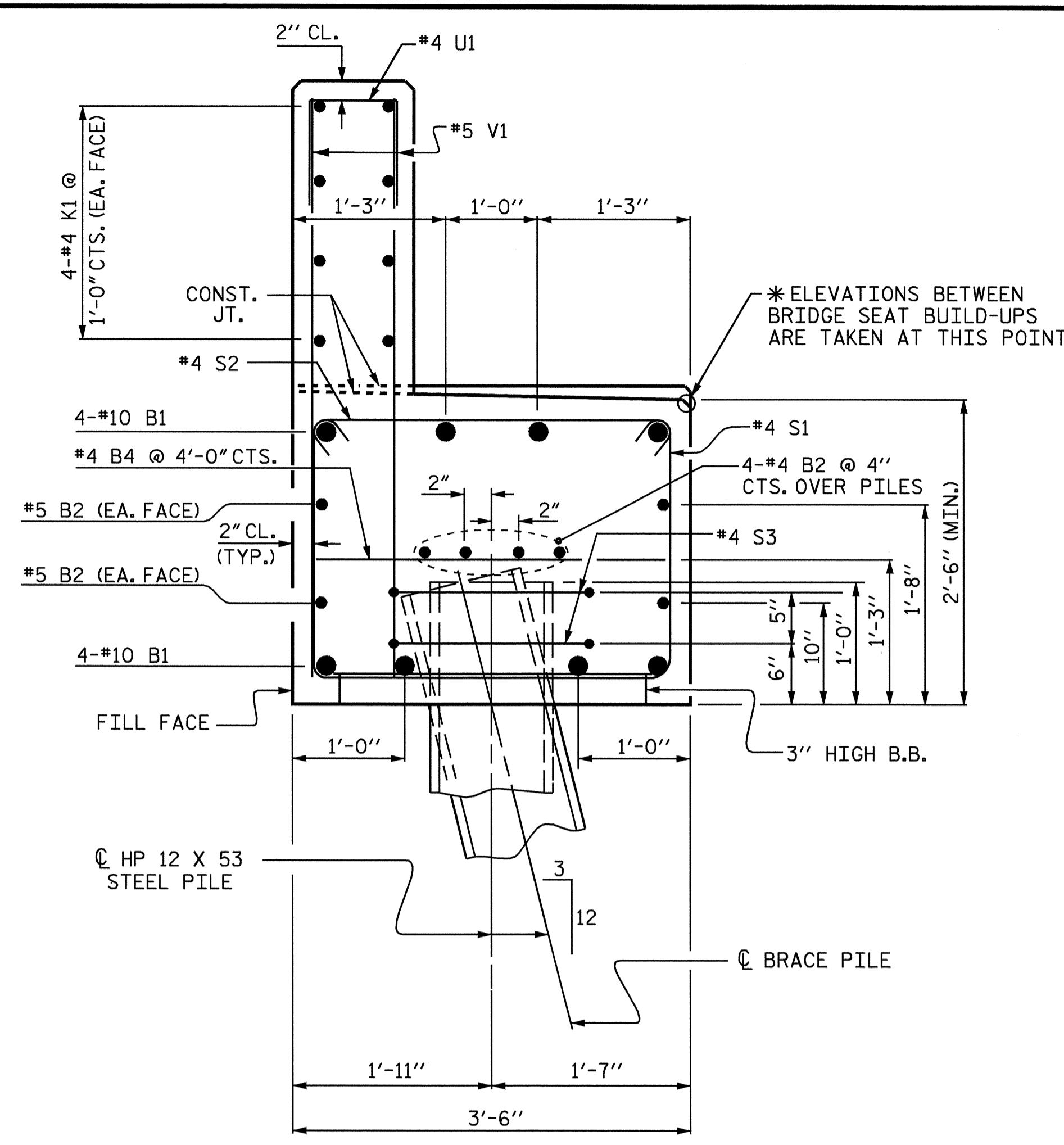
SUBSTRUCTURE
 END BENT 2



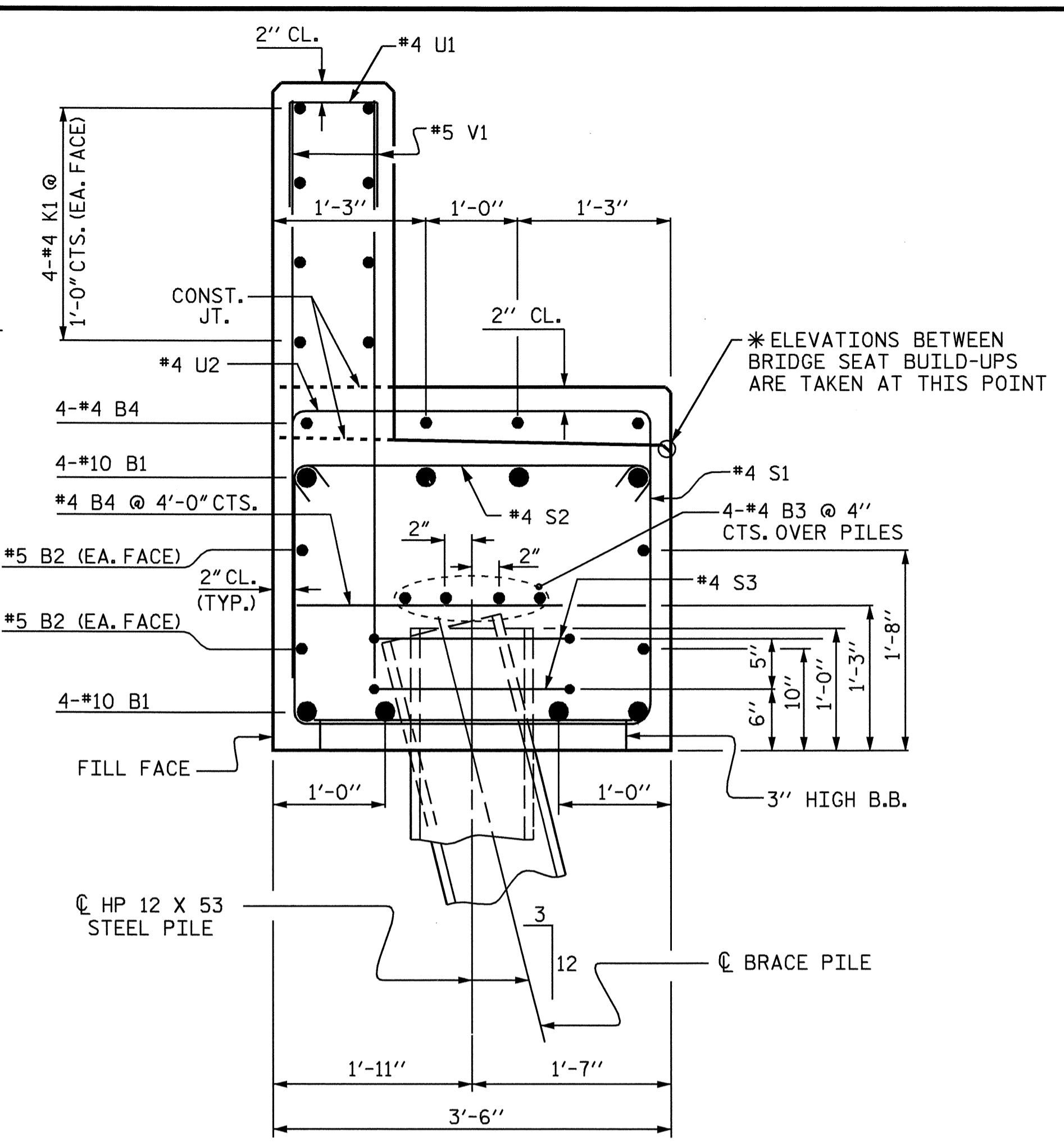
DRAWN BY : G.O. COOPER/JLW DATE : 11/2/07
 CHECKED BY : Q.T. NGUYEN/PKN DATE : 11/2/07

03-DEC-2007 11:56
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 kprenton

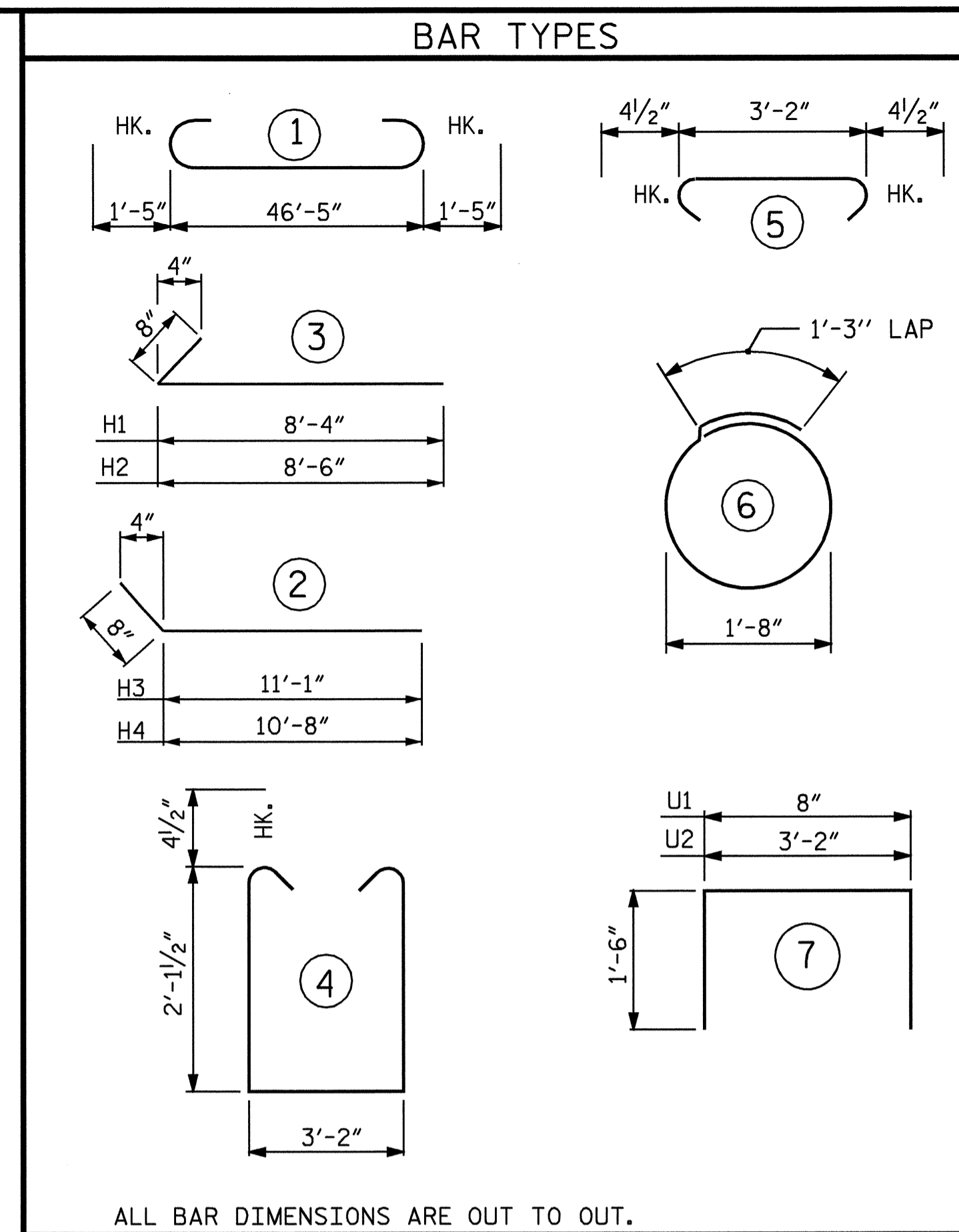
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			37



SECTION A-A

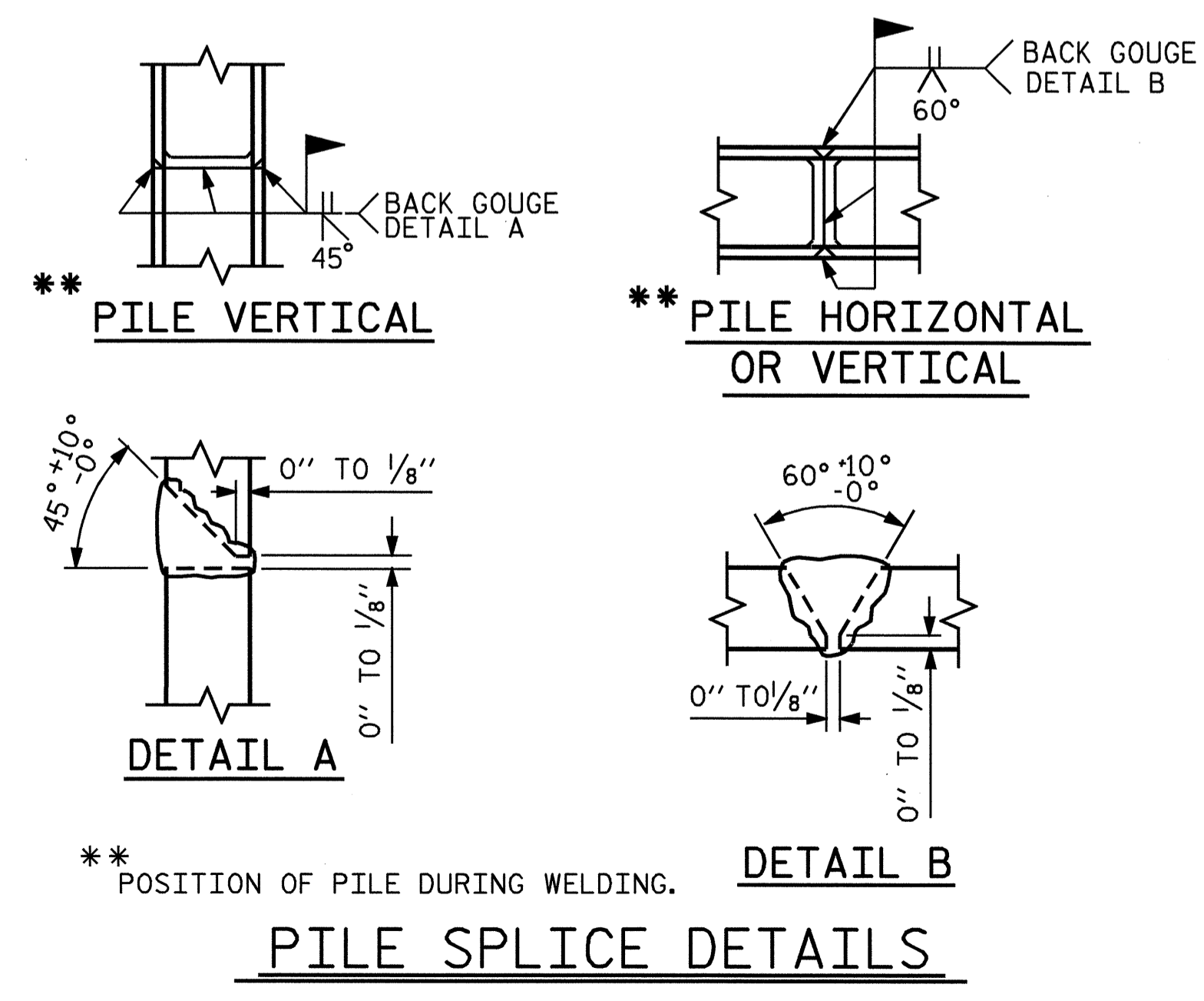


SECTION B-B

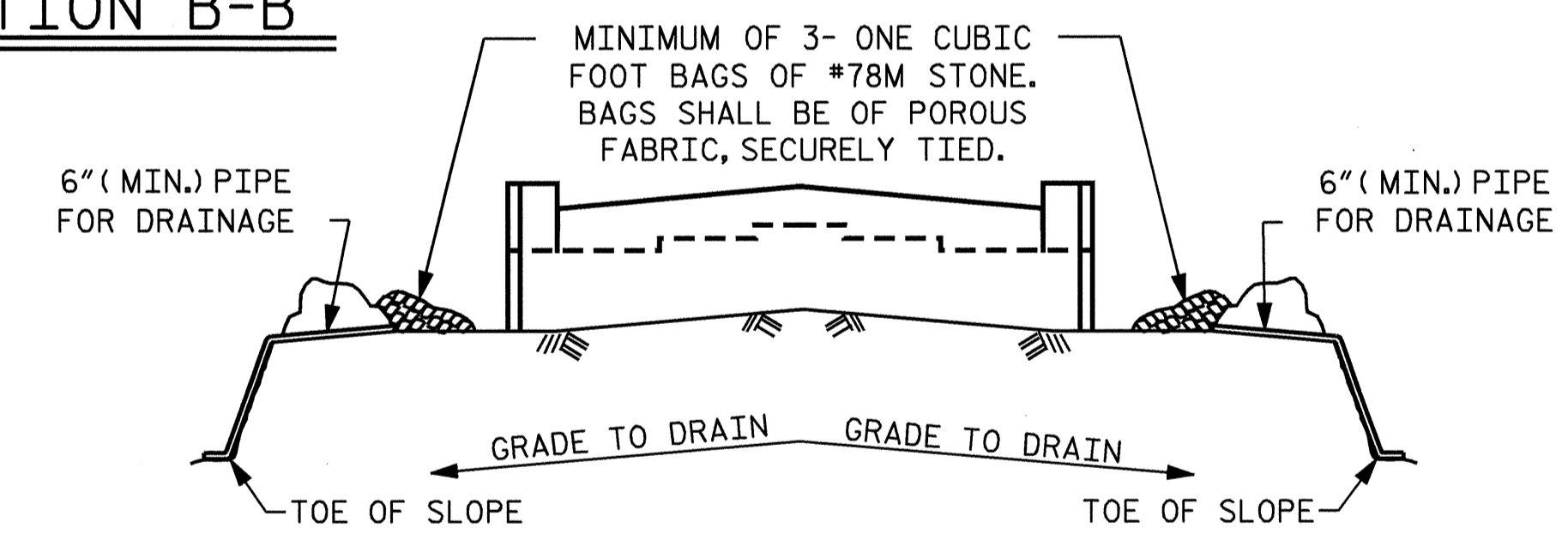


ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	49'-3"	1695
B2	4	#5	STR	46'-5"	194
B3	8	#4	STR	24'-6"	131
B4	24	#4	STR	3'-2"	51
H1	9	#5	2	9'-0"	84
H2	9	#5	2	9'-2"	86
H3	9	#5	3	11'-9"	110
H4	9	#5	3	11'-4"	106
K1	16	#4	STR	24'-6"	262
K2	4	#4	STR	3'-8"	10
K3	4	#4	STR	3'-7"	10
S1	50	#4	4	8'-2"	273
S2	50	#4	5	3'-11"	131
S3	18	#4	6	6'-6"	78
U1	39	#4	7	3'-8"	96
U2	21	#4	7	6'-2"	87
V1	78	#5	STR	5'-11"	481
V2	26	#4	STR	7'-7"	131
V3	32	#4	STR	8'-0"	171
REINFORCING STEEL					LBS. 4187
CLASS A CONC. BREAKDOWN					
POUR 1 (CAP & LOWER WINGS)				C.Y.	17.4
POUR 2 (UPPER WINGS & BACKWALL)				C.Y.	11.6
TOTAL				C.Y.	29.0
HP 12X53 STEEL PILES					
NUMBER = 9				LIN. FT. =	315



PILE SPLICE DETAILS



MINIMUM OF 3- ONE CUBIC FOOT BAGS OF #78M STONE. BAGS SHALL BE OF POROUS FABRIC, SECURELY TIED.

6" (MIN.) PIPE FOR DRAINAGE

6" (MIN.) PIPE FOR DRAINAGE

GRADE TO DRAIN

GRADE TO DRAIN

TOE OF SLOPE

TOE OF SLOPE

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 DETEIORATED AND LOST THEIR EFFECTIVENESS.

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

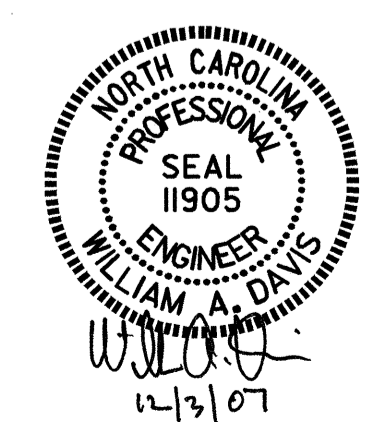
TEMPORARY DRAINAGE AT END BENT

PROJECT NO. B-3824
CHATHAM COUNTY
STATION: 13+35.00 -L-

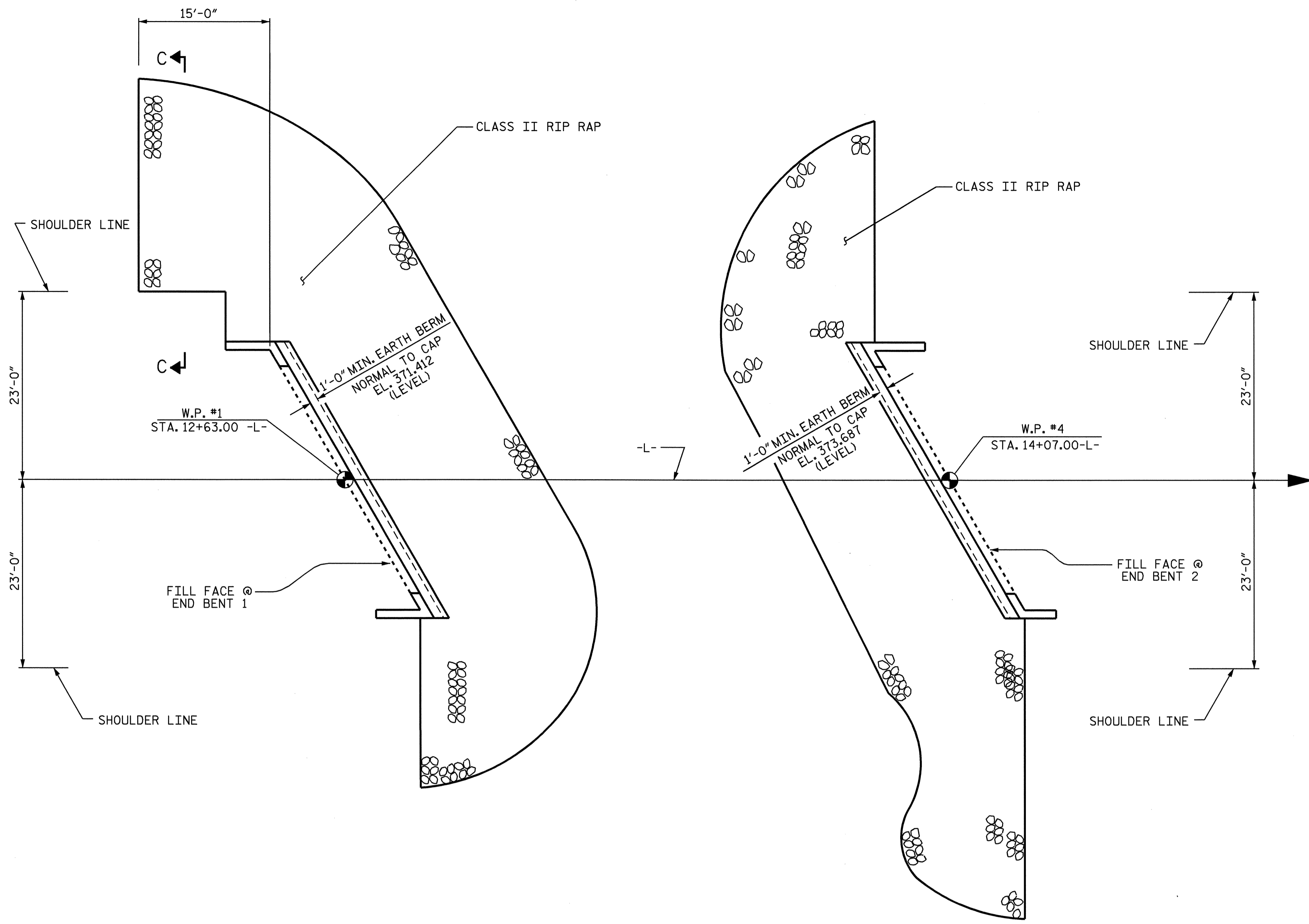
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

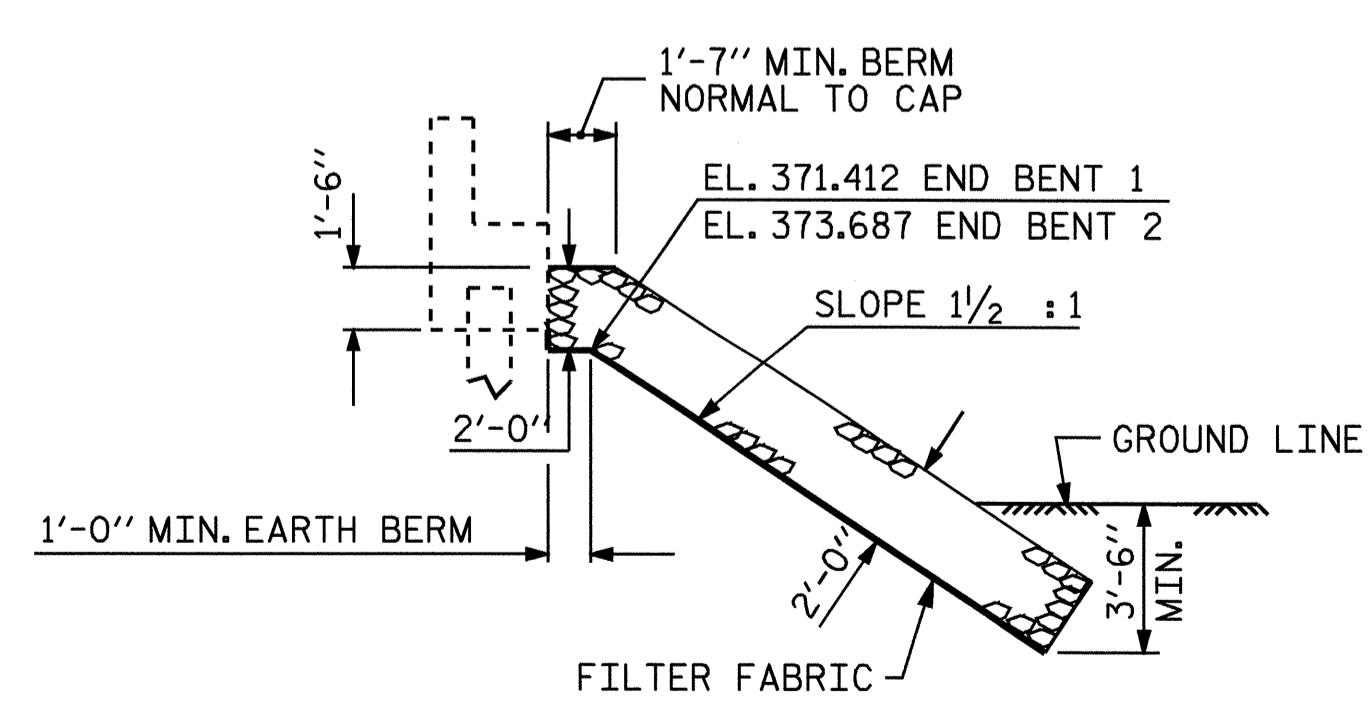
SUBSTRUCTURE
END BENT 2



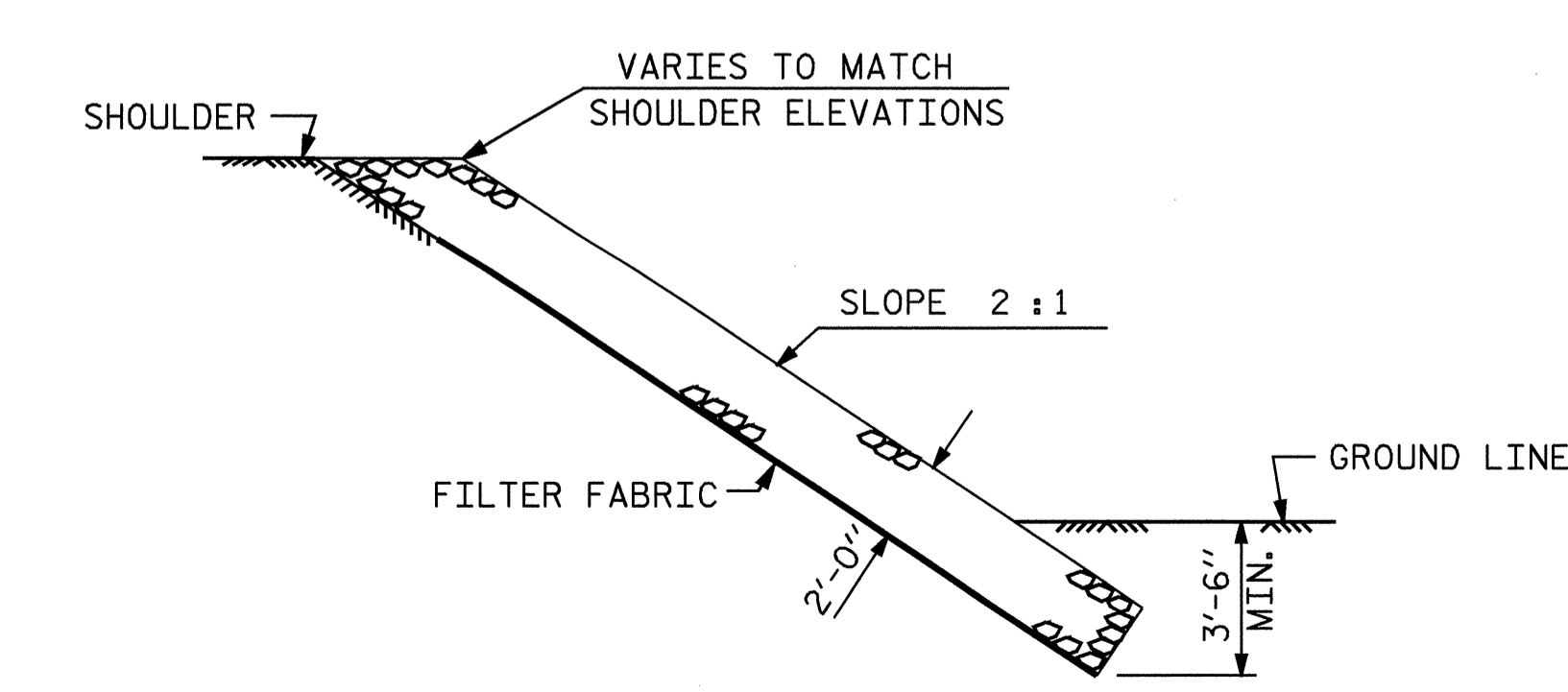
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS 37
2			4			



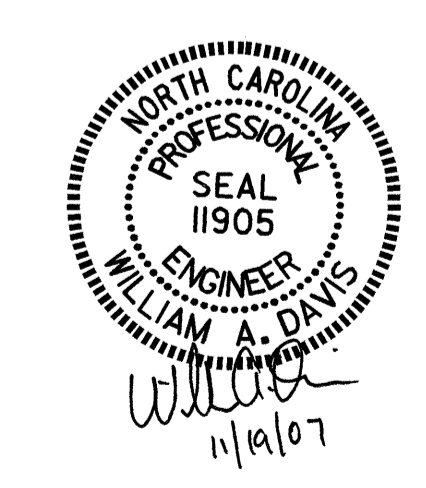
ESTIMATED QUANTITIES		
BRIDGE @ STA. 13+35.00 -L-	RIP RAP CLASS II	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	348	387
END BENT 2	303	337



SECTION
BERM RIP RAPPED



SECTION C-C



PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET OF
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 = RIP RAP DETAILS =

ASSEMBLED BY : J.L. WALTON DATE : 4/06
 CHECKED BY : T.L. CLELLAND DATE : 11/06
 DRAWN BY : REK 1/84 REV. 8/16/99 RWW/LES
 CHECKED BY : RDU 1/84 REV. 10/17/00 RWW/LES
 REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			37

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.

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. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 1'-0" OUTSIDE EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY 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. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE ROADWAY 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.

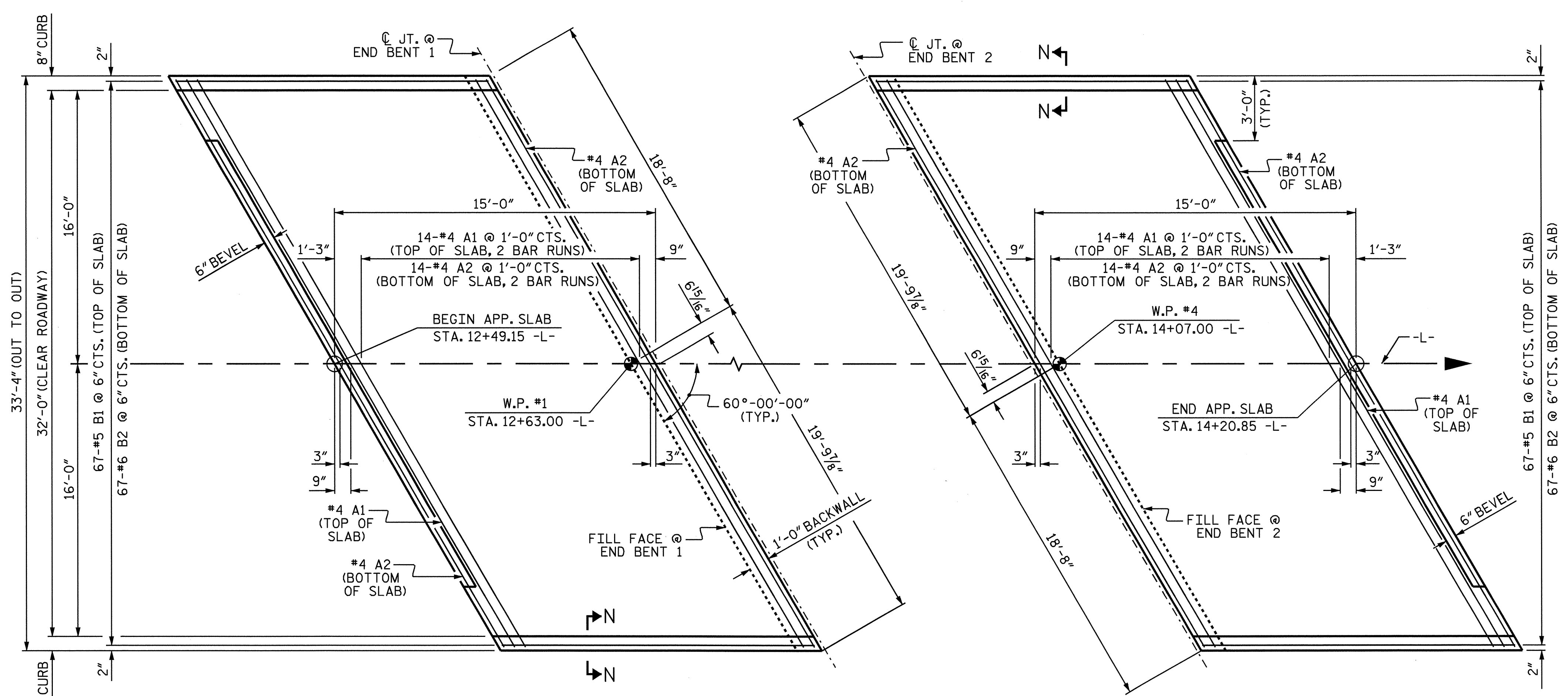
THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE PARAPET AND END POST.

WITH EVAZOTE JOINT SEAL

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

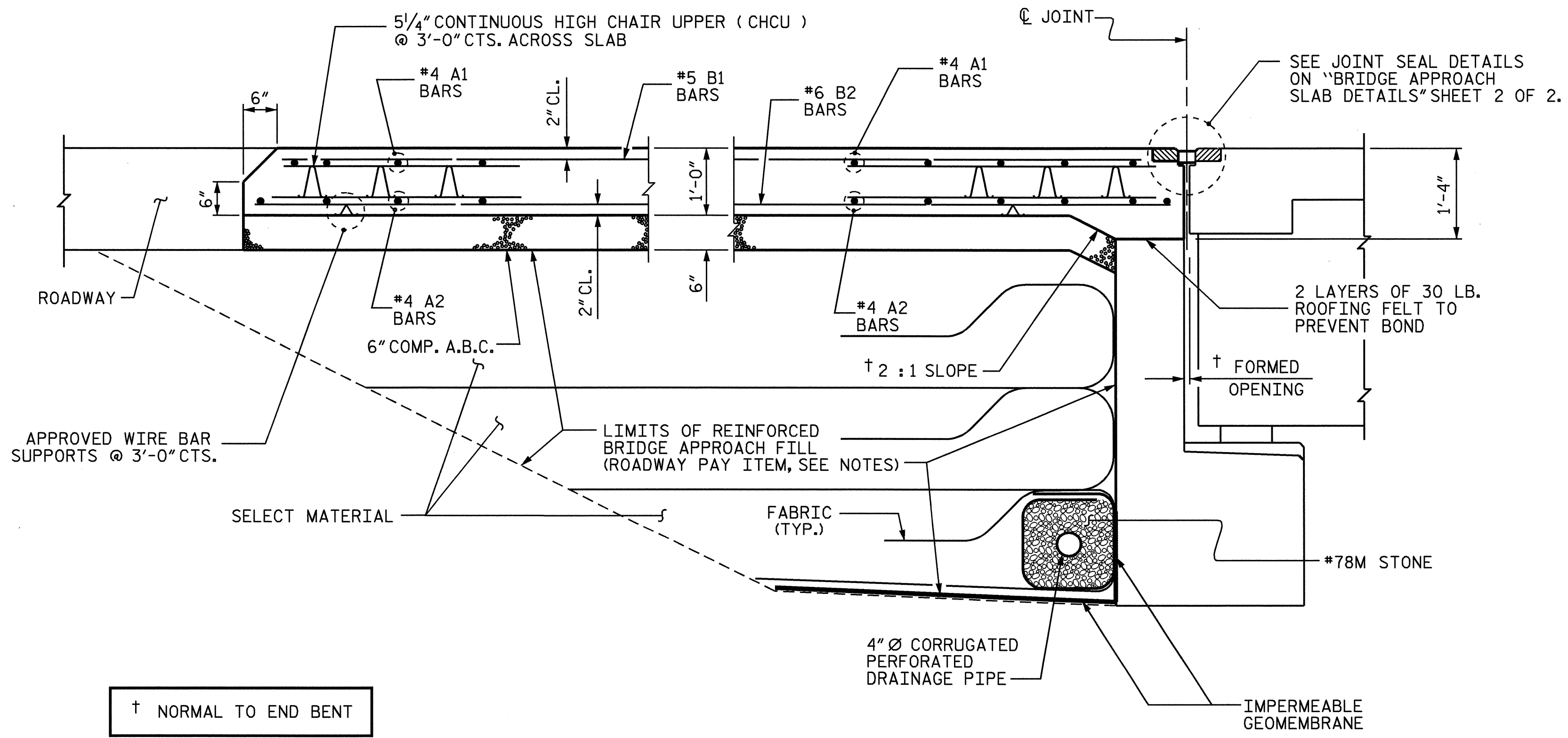
THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 2 1/2".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.



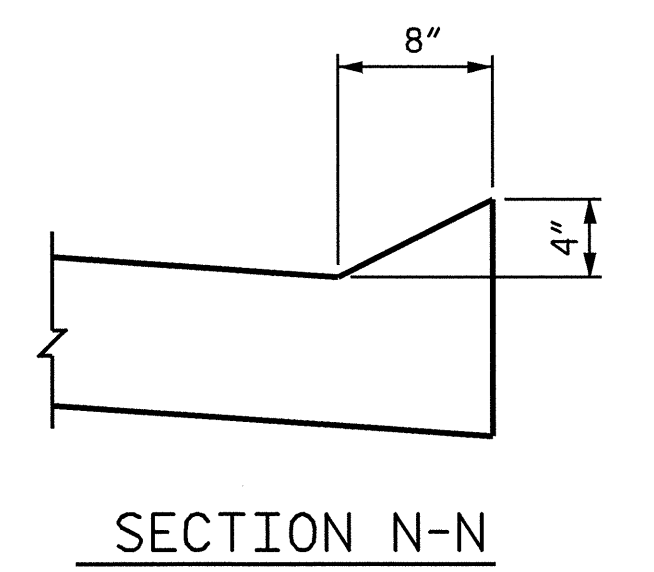
PLAN @ END BENT 1

PLAN @ END BENT 2



SECTION THRU SLAB

SHOWING SECTION WITHOUT CONCRETE WEARING SURFACE



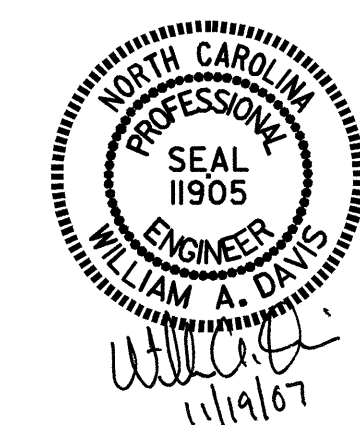
SECTION N-N

BILL OF MATERIAL					
FOR ONE APPROACH SLAB (2 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	30	#4	STR	20'-1"	402
A2	32	#4	STR	20'-0"	428
* B1	67	#5	STR	13'-10"	967
B2	67	#6	STR	14'-8"	1476
REINFORCING STEEL				LBS.	1904
* EPOXY COATED REINFORCING STEEL				LBS.	1369
CLASS AA CONCRETE				C. Y.	19.1

SPlice CHART	
#4 A1	2'-0"
#4 A2	1'-9"

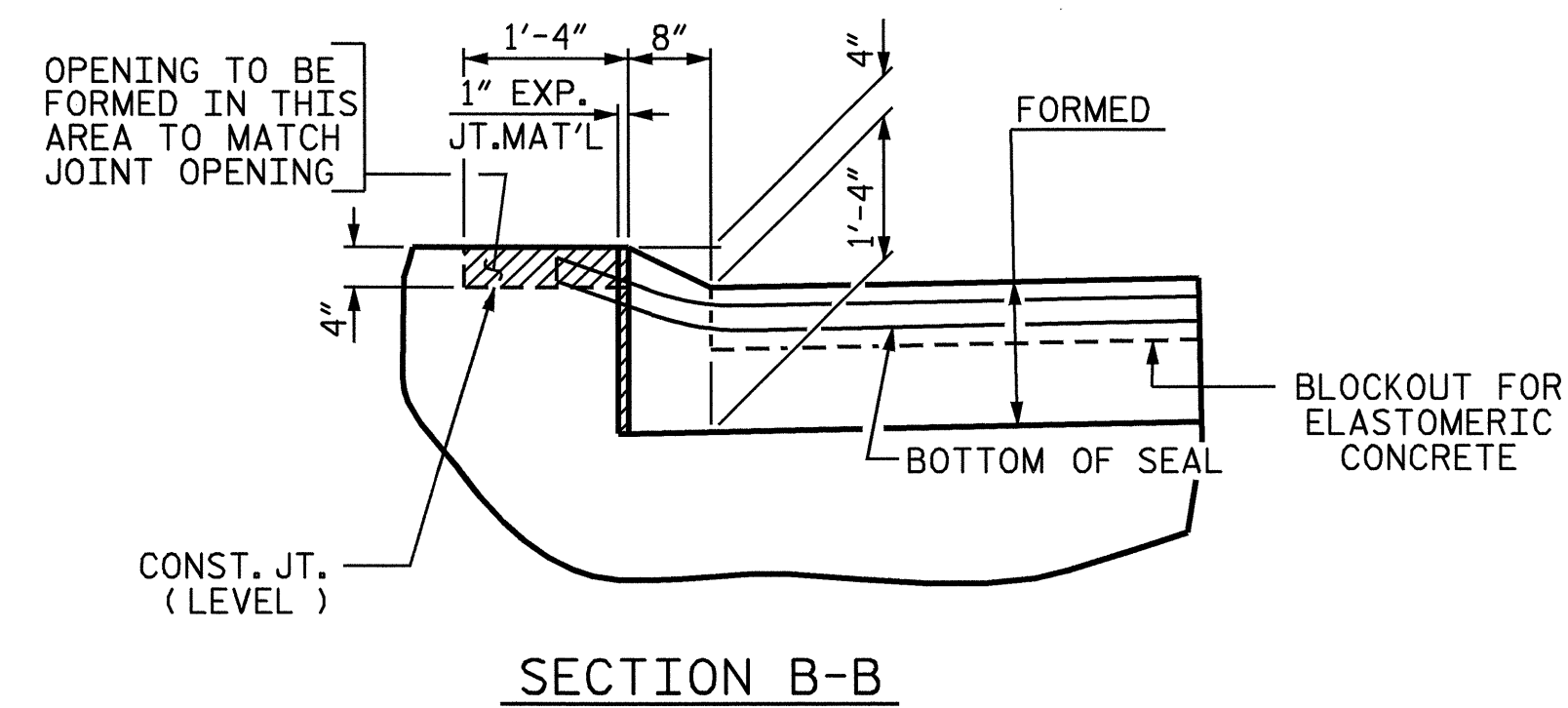
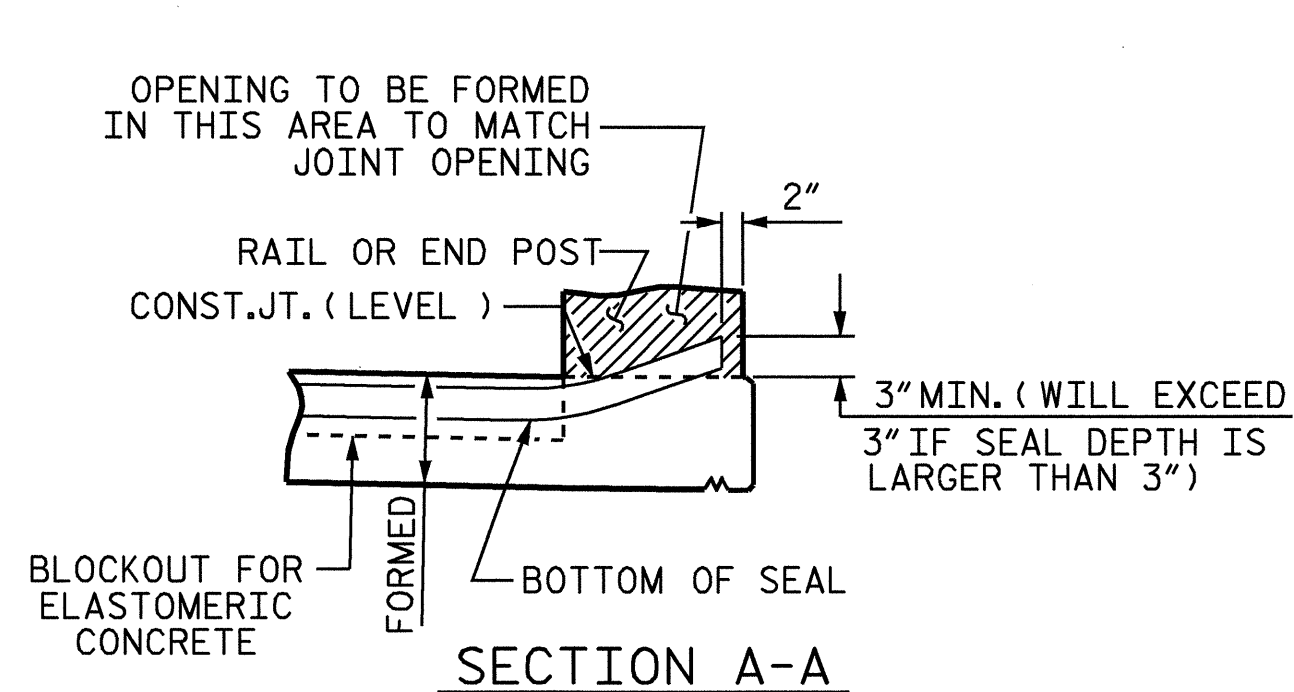
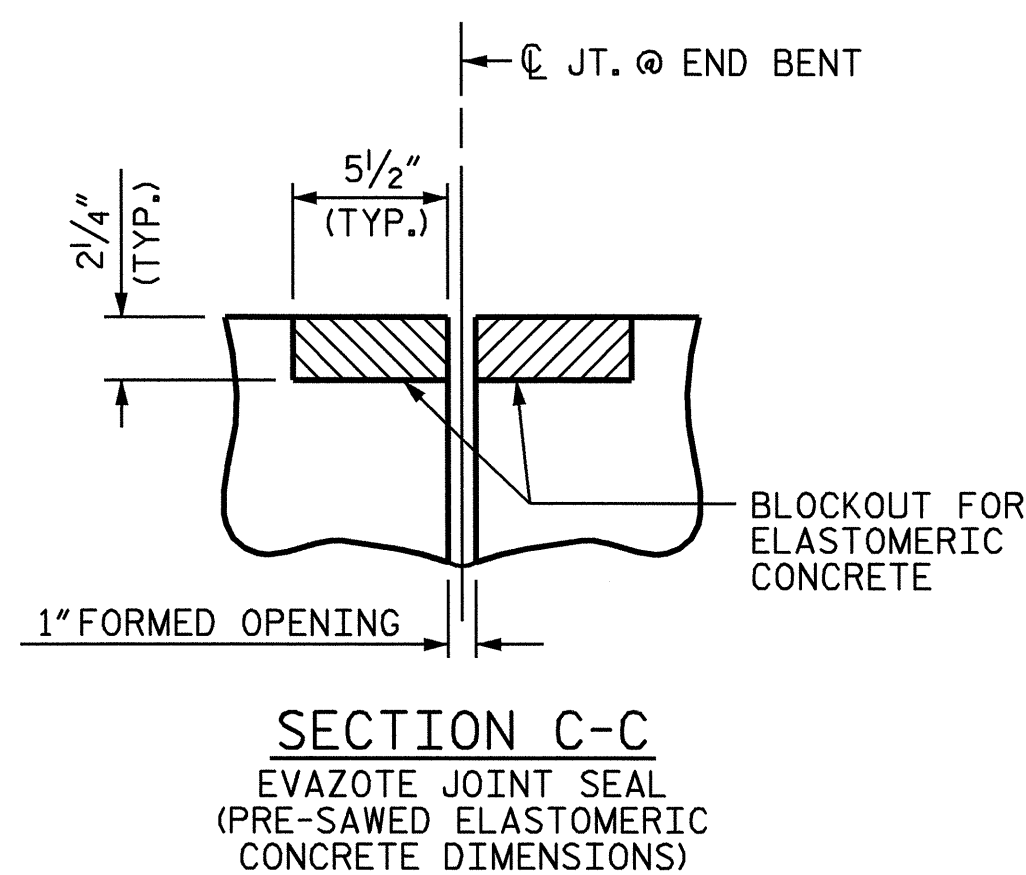
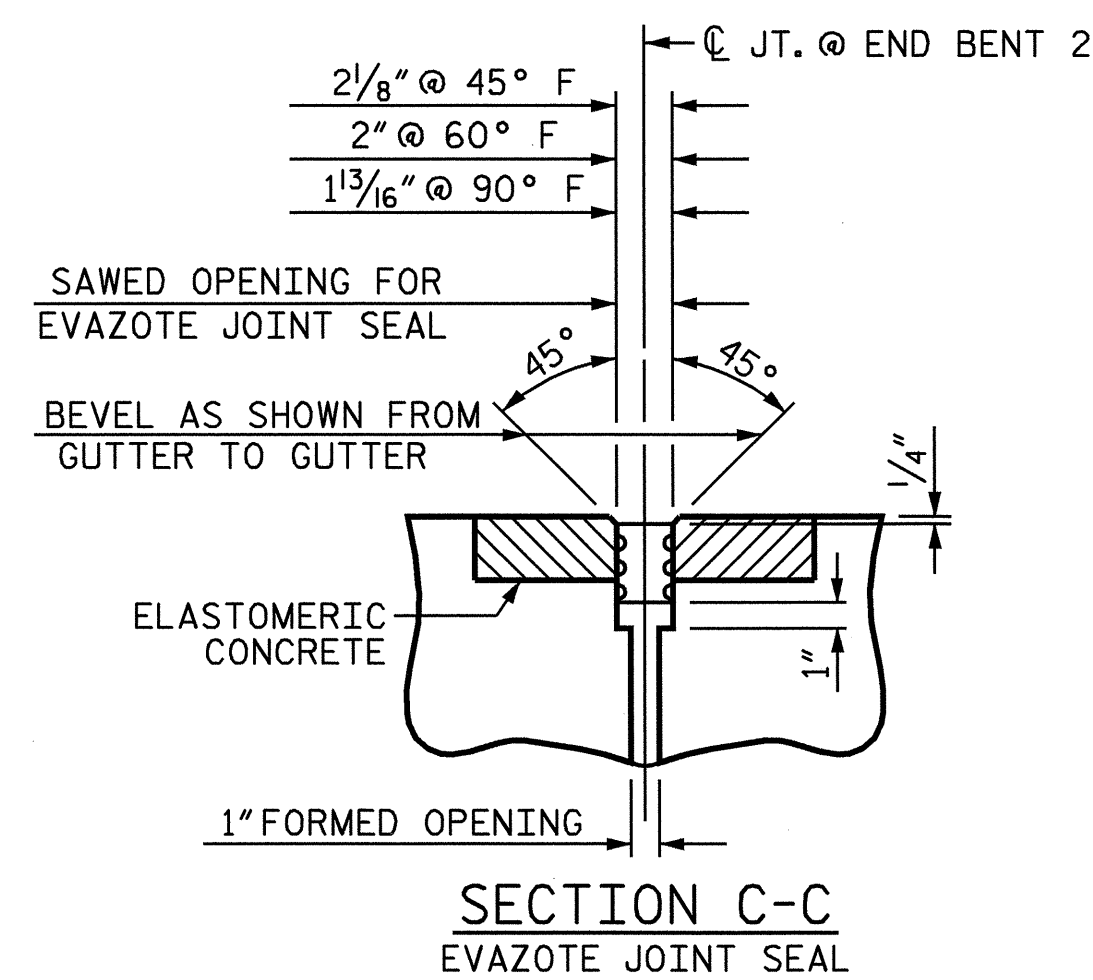
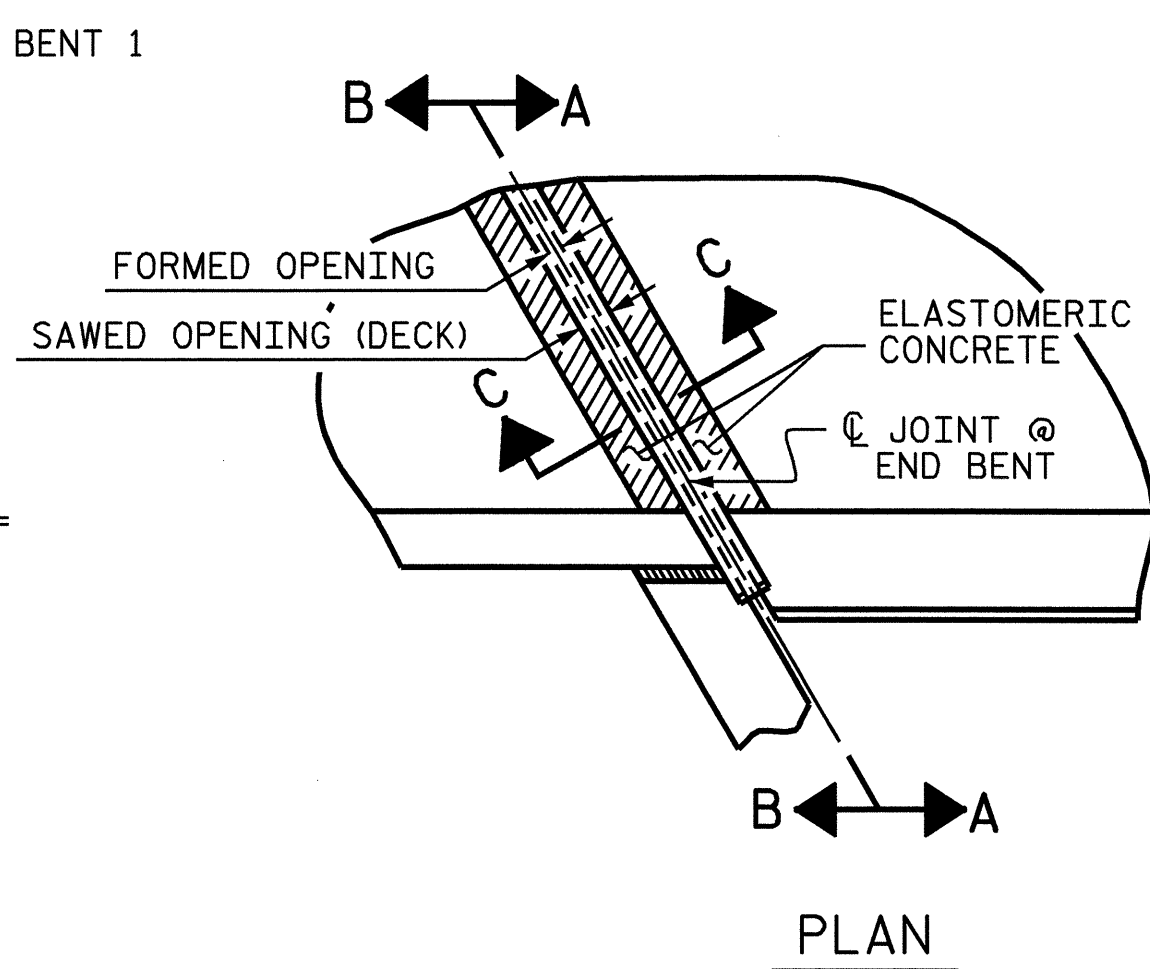
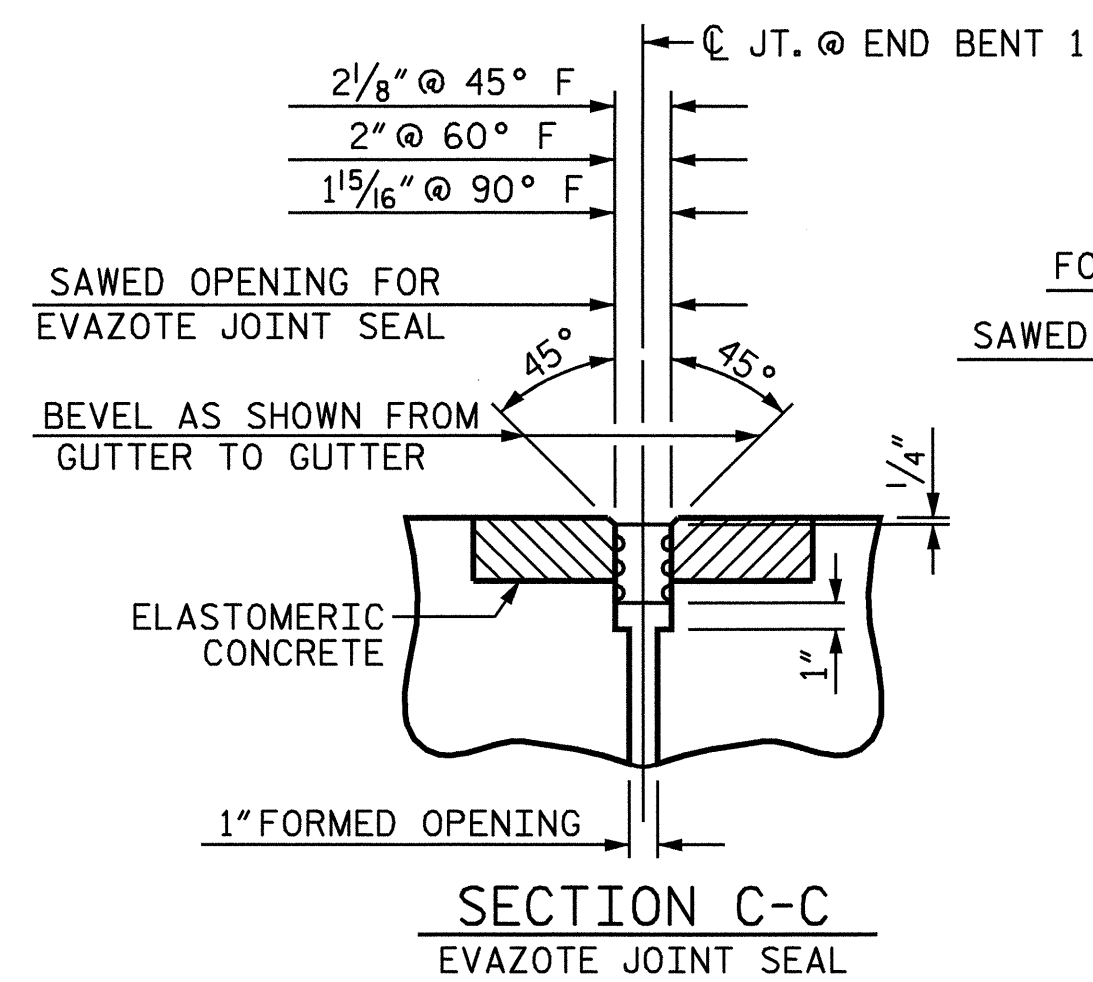
PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 1 OF 2

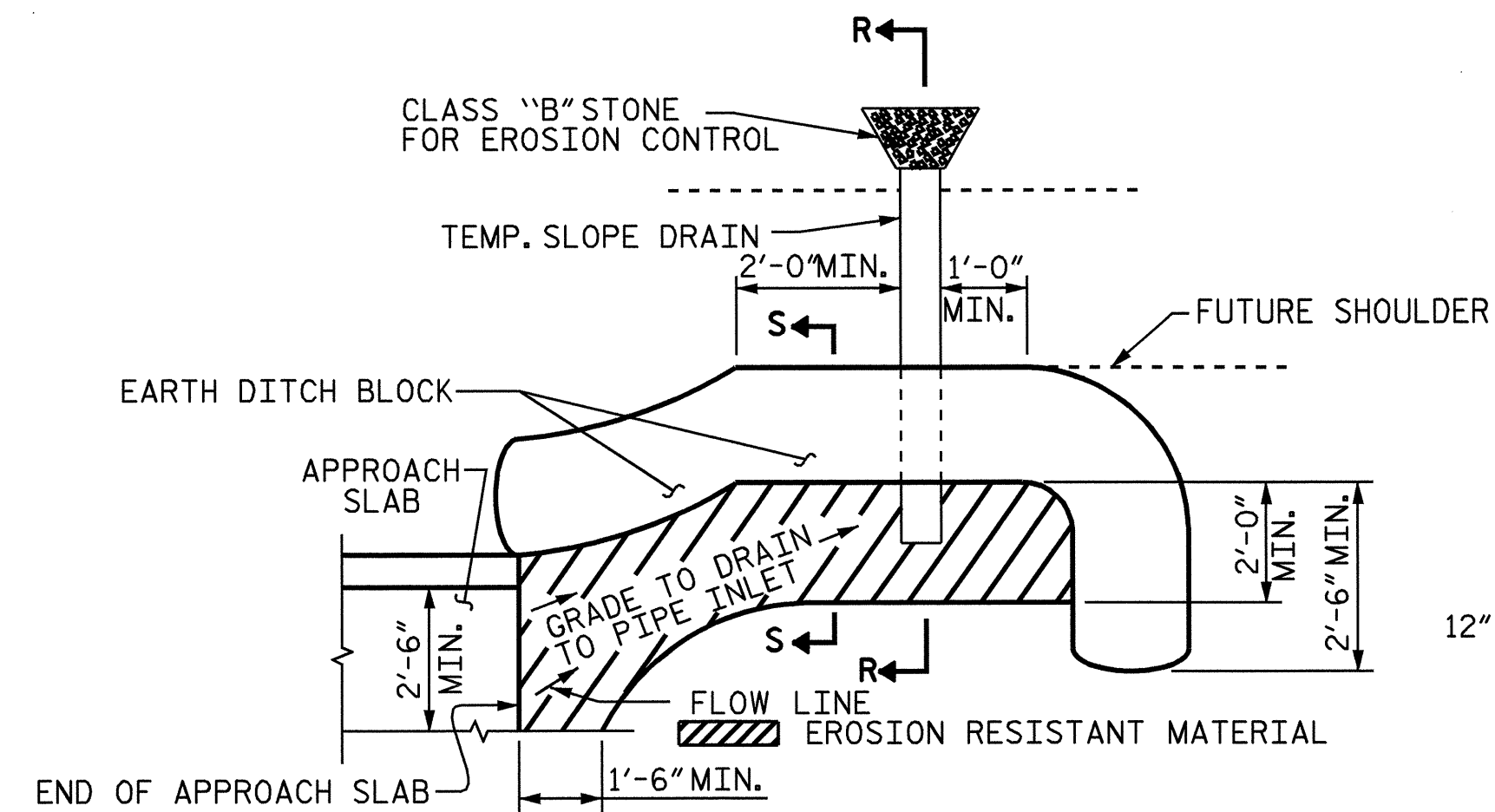


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

ASSEMBLED BY : J.L. WALTON	DATE : 4/06
CHECKED BY : T.L. CLELLAND	DATE : 11/06
DRAWN BY : EEM 3/95	REV. 7/10/01 LES/RDR
CHECKED BY : VAP 3/95	REV. 5/7/03R RWW/JTE
	REV. 5/1/06R KMM/GM



JOINT SEAL DETAILS @ END BENT

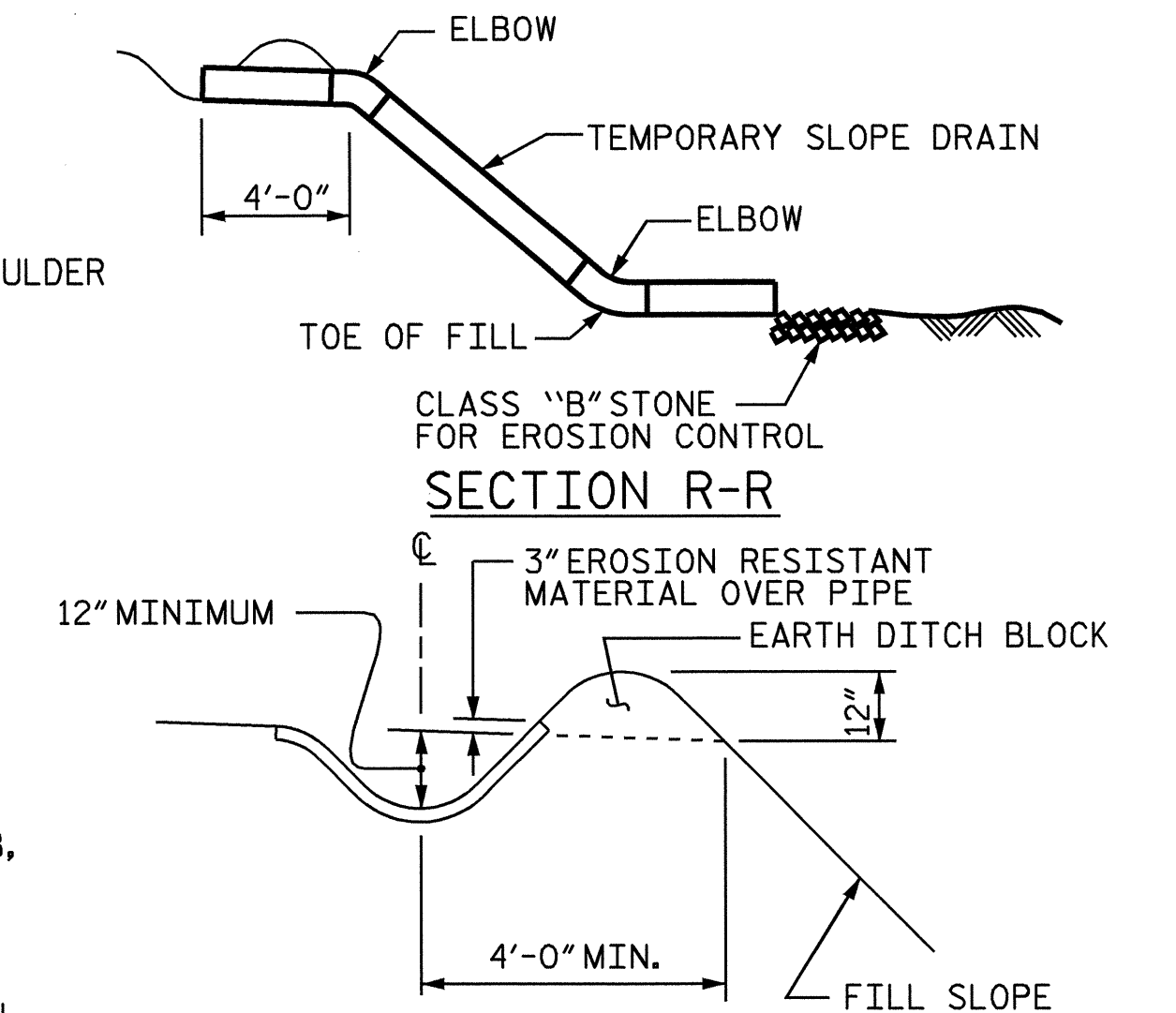


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

TEMPORARY BERM AND SLOPE DRAIN DETAILS

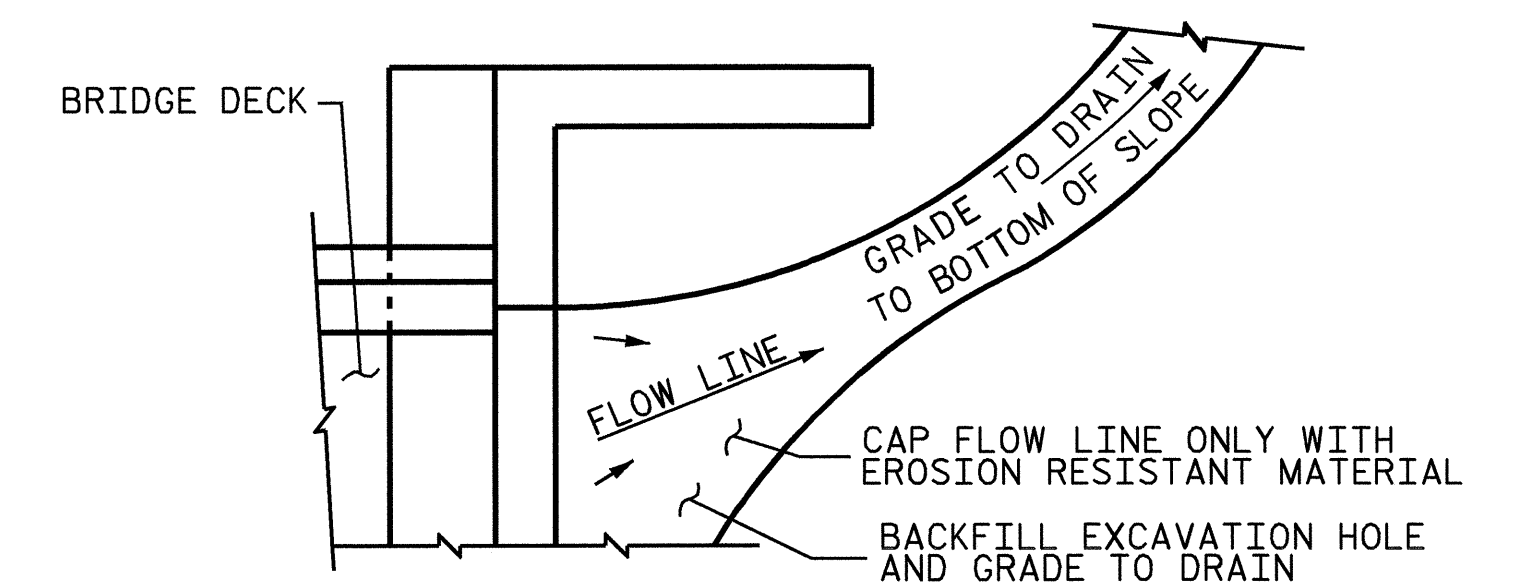
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION S-S

ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	6.4
2	6.4
TOTAL	12.8

* BASED ON THE MINIMUM BLOCKOUT SHOWN.



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

TEMPORARY DRAINAGE DETAIL

PROJECT NO. B-3824
 CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH
 SLAB DETAILS

ASSEMBLED BY : QT NGUYEN DATE : 10-07
 CHECKED BY : PK NEWTON DATE : 10-07
 DRAWN BY : FCJ 11/88 REV. 10/17/00 RWW/LES
 CHECKED BY : ARB 11/88 REV. 5/7/03 RWW/JTE
 REV. 5/1/06R MAA/KMM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS 37
2			4			

OVERHANG BRACKET CALCULATION INSTRUCTIONS

AASHTO SHAPES - TYPES III, IV, V, AND VI

- RECORD KNOWN INFORMATION ON "BRIDGE OVERHANG BRACKET SUMMARY" ON SHEET 2
- CALCULATE THE MAXIMUM SCREED LOAD PER BRACKET (SLPB) WITH AN ESTIMATED $R = 1.5$. $SLPB = R \times W$. ROUND VALUE UP TO NEAREST SLPB VALUE INDICATED ON APPROPRIATE TABLE 1-1, 1-2, 1-3, OR 1-4.
- WITH THE ESTIMATED SLPB, OVERHANG SLAB THICKNESS, "K" VALUE, AND 45° HANGER SAFE WORKING LOAD (SWL), ENTER THE APPROPRIATE TABLE 1-1, 1-2, 1-3, OR 1-4 (BASED ON OVERHANG DIMENSION) AND DETERMINE THE BRACKET SPACING, S.
- CALCULATE $S/D1$ AND $S/D2$, ROUNDING UP TO NEAREST VALUE IN TABLE 2. ENTER TABLE 2 AND DETERMINE R VALUE.
- CALCULATE REVISED SLPB. ROUND VALUE UP TO NEAREST SLPB VALUE INDICATED ON APPROPRIATE TABLE 1-1, 1-2, 1-3, OR 1-4.
- WITH THE REVISED SLPB, OVERHANG SLAB THICKNESS, "K" VALUE AND 45° HANGER SAFE WORKING LOAD (SWL), ENTER THE APPROPRIATE TABLE 1-1, 1-2, 1-3 OR 1-4 (BASED ON OVERHANG DIMENSION) AND DETERMINE REVISED BRACKET SPACING, S.
- CONTINUE ITERATIONS OF STEPS 4-6 UNTIL THE REVISED BRACKET SPACING, S, IS THE SAME AS THE PREVIOUS S VALUE.
- CHECK LUMBER JOIST SPACING: WITH BRACKET SPACING VALUE, S, ROUND THIS VALUE UP TO THE NEAREST VALUE OF ALLOWABLE SPAN LENGTH OF JOIST OF TABLE 3. USING THIS VALUE, ALONG WITH THE AVERAGE OVERHANG SLAB THICKNESS AND THE LUMBER JOIST SIZE, DETERMINE JOIST SPACING FROM TABLE 3. IF NECESSARY, ADJUST LUMBER JOIST SIZE AND/OR JOIST SPACING TO MEET ALLOWABLE SPAN LENGTH OF JOIST.
- CONVERSELY, IF THE DESIRED JOIST SPACING IS KNOWN, USE THIS ALONG WITH THE AVERAGE OVERHANG SLAB THICKNESS AND THE LUMBER JOIST SIZE TO DETERMINE IF ALLOWABLE SPAN LENGTH OF JOIST IS GREATER THAN THE BRACKET SPACING, S. IF NECESSARY, ADJUST LUMBER JOIST SIZE TO MEET REQUIREMENTS OF ALLOWABLE SPAN LENGTH OF JOIST AND JOIST SPACING.
- RECORD REMAINING INFORMATION ON "BRIDGE OVERHANG BRACKET SUMMARY" FORM.
- SUBMIT FORM AND CALCULATIONS FOR REVIEW AND APPROVAL.

TABLE 1-1 (FOR USE ON UP TO 2'-0" OVERHANG & 54" HORIZONTAL LEG LENGTH OF THE OVERHANG BRACKET)

AVG. SLAB THICKNESS (in)	BRACKET DIMENSION (in)	SCREED LOAD PER BRACKET									45° HANGER SWL (lbs)
		2500 lbs.	2250 lbs.	2000 lbs.	1750 lbs.	1500 lbs.	1250 lbs.	1000 lbs.	750 lbs.	0 lbs.	
10	30	3'-6"	4'-0"	4'-5"	2'-1"	2'-7"	3'-2"	3'-8"	4'-2"	5'-9"	4000
	40	3'-6"	4'-0"	4'-5"	2'-1"	2'-7"	3'-2"	3'-8"	4'-2"	5'-9"	6000
	50	3'-6"	4'-0"	4'-5"	2'-1"	2'-7"	3'-2"	3'-8"	4'-2"	5'-9"	6000
12	30	3'-2"	3'-7"	4'-1"	2'-4"	2'-10"	3'-4"	3'-9"	5'-2"	4000	
	40	3'-2"	3'-7"	4'-1"	2'-4"	2'-10"	3'-4"	3'-9"	5'-2"	6000	
	50	3'-2"	3'-7"	4'-1"	2'-4"	2'-10"	3'-4"	3'-9"	5'-2"	6000	
14	30	2'-10"	3'-4"	3'-9"	2'-2"	2'-7"	3'-0"	3'-5"	4'-9"	4000	
	40	2'-10"	3'-4"	3'-9"	2'-2"	2'-7"	3'-0"	3'-5"	4'-9"	6000	
	50	2'-10"	3'-4"	3'-9"	2'-2"	2'-7"	3'-0"	3'-5"	4'-9"	6000	
16	30	2'-8"	3'-0"	3'-5"	2'-0"	2'-4"	3'-0"	3'-5"	4'-9"	4000	
	40	2'-8"	3'-0"	3'-5"	2'-0"	2'-4"	3'-0"	3'-5"	4'-9"	6000	
	50	2'-8"	3'-0"	3'-5"	2'-0"	2'-4"	3'-0"	3'-5"	4'-9"	6000	

TABLE 1-2 (FOR USE ON OVER 2'-0" TO 2'-6" OVERHANG & 54" HORIZONTAL LEG LENGTH OF THE OVERHANG BRACKET)

AVG. SLAB THICKNESS (in)	BRACKET DIMENSION (in)	SCREED LOAD PER BRACKET									45° HANGER SWL (lbs)
		2500 lbs.	2250 lbs.	2000 lbs.	1750 lbs.	1500 lbs.	1250 lbs.	1000 lbs.	750 lbs.	0 lbs.	
10	30	3'-1"	3'-6"	4'-0"	2'-4"	2'-9"	3'-3"	3'-8"	5'-1"	4000	
	40	3'-1"	3'-6"	4'-0"	2'-4"	2'-9"	3'-3"	3'-8"	5'-1"	6000	
	50	3'-1"	3'-6"	4'-0"	2'-4"	2'-9"	3'-3"	3'-8"	5'-1"	6000	
12	30	2'-9"	3'-2"	3'-7"	2'-1"	2'-6"	2'-11"	3'-4"	4'-6"	4000	
	40	2'-9"	3'-2"	3'-7"	2'-1"	2'-6"	2'-11"	3'-4"	4'-6"	6000	
	50	2'-9"	3'-2"	3'-7"	2'-1"	2'-6"	2'-11"	3'-4"	4'-6"	6000	
14	30	2'-6"	2'-10"	3'-3"	2'-3"	2'-7"	3'-0"	4'-1"	4000		
	40	2'-6"	2'-10"	3'-3"	2'-3"	2'-7"	3'-0"	4'-1"	6000		
	50	2'-6"	2'-10"	3'-3"	2'-3"	2'-7"	3'-0"	4'-1"	6000		
16	30	2'-3"	2'-7"	2'-11"	2'-1"	2'-5"	2'-9"	3'-9"	4000		
	40	2'-3"	2'-7"	2'-11"	2'-1"	2'-5"	2'-9"	3'-9"	6000		
	50	2'-3"	2'-7"	2'-11"	2'-1"	2'-5"	2'-9"	3'-9"	6000		

TABLE 1-3 (FOR USE ON OVER 2'-6" TO 3'-0" OVERHANG & 54" HORIZONTAL LEG LENGTH OF THE OVERHANG BRACKET)

AVG. SLAB THICKNESS (in)	BRACKET DIMENSION (in)	SCREED LOAD PER BRACKET									45° HANGER SWL (lbs)
		2500 lbs.	2250 lbs.	2000 lbs.	1750 lbs.	1500 lbs.	1250 lbs.	1000 lbs.	750 lbs.	0 lbs.	
10	30				2'-1"	2'-6"	2'-11"	3'-4"	4'-6"	4000	
	40				2'-1"	2'-6"	2'-11"	3'-4"	4'-6"	6000	
	50	2'-9"	3'-2"	3'-7"	4'-0"	4'-5"	4'-10"	5'-3"	6'-7"	6000	
12	30				3'-11"	4'-3"	4'-8"	5'-0"	6'-1"	4000	
	40	2'-5"	2'-10"	3'-2"	3'-6"	3'-11"	4'-3"	4'-8"	5'-0"	6000	
	50	2'-5"	2'-10"	3'-2"	3'-6"	3'-11"	4'-3"	4'-8"	5'-0"	6000	
14	30				3'-2"	3'-6"	3'-10"	4'-2"	4'-6"	4000	
	40	2'-2"	2'-6"	2'-10"	3'-2"	3'-6"	3'-10"	4'-2"	4'-6"	6000	
	50	2'-2"	2'-6"	2'-10"	3'-2"	3'-6"	3'-10"	4'-2"	4'-6"	6000	
16	30				2'-11"	3'-2"	3'-6"	3'-10"	4'-1"	4000	
	40	2'-0"	2'-4"	2'-7"	2'-11"	3'-2"	3'-6"	3'-10"	4'-1"	6000	
	50	2'-0"	2'-4"	2'-7"	2'-11"	3'-2"	3'-6"	3'-10"	4'-1"	6000	

TABLE 1-4 (FOR USE ON OVER 3'-0" TO 3'-6" OVERHANG & 54" HORIZONTAL LEG LENGTH OF THE OVERHANG BRACKET)

AVG. SLAB THICKNESS (in)	BRACKET DIMENSION (in)	SCREED LOAD PER BRACKET									45° HANGER SWL (lbs)
		2500 lbs.	2250 lbs.	2000 lbs.	1750 lbs.	1500 lbs.	1250 lbs.	1000 lbs.	750 lbs.	0 lbs.	
10	30				2'-3"	2'-11"	3'-7"	4'-3"	5'-9"	4000	
	40				2'-3"	2'-11"	3'-7"	4'-3"	5'-9"	6000	
	50	2'-4"	2'-8"	3'-0"	3'-4"	3'-8"	4'-1"	4'-5"	4'-9"	6000	
12	30				2'-1"	2'-8"	3'-4"	3'-11"	5'-2"	4000	
	40				2'-2"	2'-6"	2'-9"	3'-5"	3'-5"	6000	
	50	2'-1"	2'-4"	2'-8"	3'-0"	3'-4"	3'-7"	3'-11"	4'-3"	6000	
14	30				2'-0"	2'-7"	3'-0"	3'-3"	3'-6"	4000	
	40				2'-0"	2'-7"	3'-0"	3'-3"	3'-6"	6000	
	50	2'-2"	2'-5"	2'-8"	3'-0"	3'-4"	3'-7"	3'-11"	4'-3"	6000	
16	30				2'-4"	2'-10"	3'-5"	4'-3"	4000		
	40				2'-4"	2'-10"	3'-5"	4'-3"	6000		
	50	2'-2"	2'-5"	2'-8"	3'-0"	3'-4"	3'-7"	3'-11"	4'-3"	6000	

DEFINITIONS

- SLPB = SCREED LOAD PER BRACKET (R x W)
- R = SCREED LOAD FACTOR, OBTAINED FROM TABLE 2
- W = WHEEL LOAD
- S = BRACKET SPACING
- T = AVERAGE SLAB THICKNESS
- SWL = SAFE WORKING LOAD
- K = DIMENSION DEFINED ON "BRIDGE OVERHANG BRACKET SUMMARY" ON SHEET 2
- L = OVERHANG MEASURED FROM EDGE OF TOP FLANGE TO EDGE OF SUPERSTRUCTURE

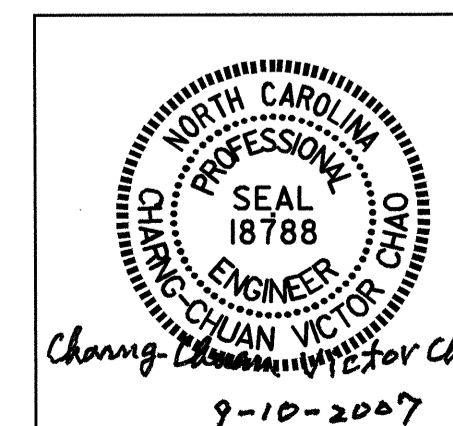
PROJECT NO. B-3824
 CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD OVERHANG FALSEWORK

AASHTO TYPES
 III, IV, V, AND VI



REVISIONS

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

SHEET NO. 5-35
 TOTAL SHEETS 37

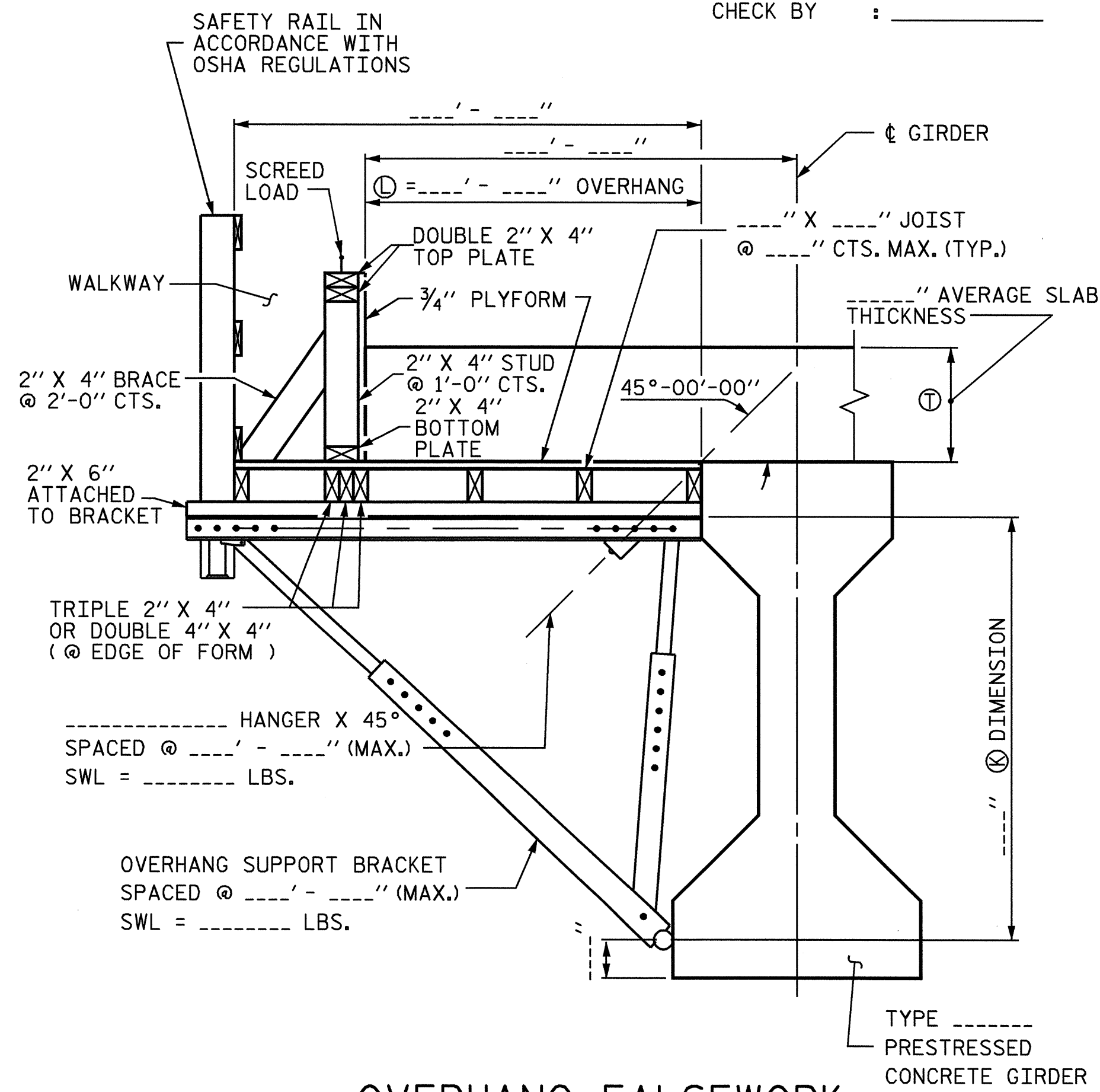
ASSEMBLED BY: DATE:
 CHECKED BY: DATE:
 DRAWN BY: R. WRIGHT 06/04 REV.
 CHECKED BY: C. V. CHAO 06/04

BRIDGE OVERHANG BRACKET SUMMARY

TOTAL SCREED WEIGHT = _____ LBS.
 NUMBER OF SCREED WHEELS = _____
 SCREED WHEEL LOAD (W) = _____ LBS.
 SCREED LOAD PER BRACKET = _____ LBS.

PROJECT No. : _____
 COUNTY : _____
 STATION : _____
 DESCRIPTION : _____

DATE : _____
 DESIGN BY : _____
 CHECK BY : _____



OVERHANG FALSEWORK

NOTES

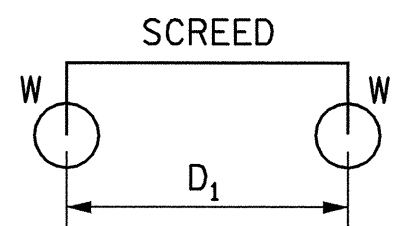
DESIGN INCLUDES CONSTRUCTION LIVE LOAD 20 PSF ON THE AREA SUPPORTED AND 75 PLF AT THE OUTSIDE DECK OF OVERHANGS.

REQUIRED MINIMUM DIAGONAL LEG CAPACITY: 3600 LB WORKING LOAD

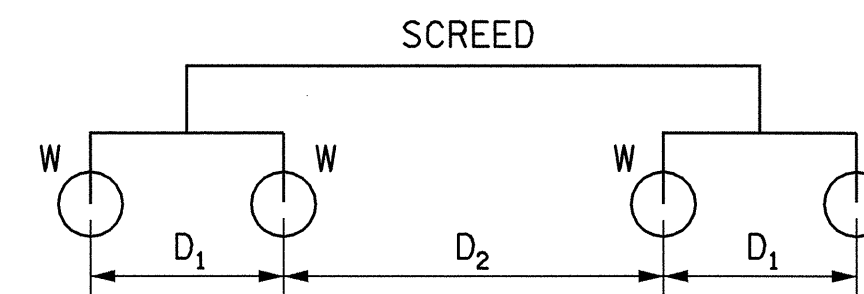
THE CONTRACTOR HAS THE OPTION OF SUBMITTING HIS OWN DESIGN FOR OVERHANG FALSEWORK IN ACCORDANCE WITH THE SPECIAL PROVISIONS.

SUBMITTALS UTILIZING THE INSTRUCTIONS AND PROCEDURES DESCRIBED ON SHEET 1 OF 3 SHALL BE IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF THE SPECIFICATIONS AND SPECIAL PROVISIONS, EXCEPT THAT CALCULATIONS FOR OVERHANG FALSEWORK NEED NOT BE SEALED BY A REGISTERED ENGINEER.

FOR OVERHANG FALSEWORK BRACING DESIGN, SEE SHEET 3 OF 3.



4-WHEEL MACHINE



8-WHEEL MACHINE

TABLE 2: SCREED LOAD FACTOR "R"

4 WHEEL MACHINE	
S/D1	R
<= 1.0	1.00
1.1	1.09
1.2	1.17
1.3	1.23
1.4	1.29
1.5	1.33
1.6	1.38
1.7	1.41
1.8	1.44
1.9	1.47
2.0	1.50
2.2	1.55
2.4	1.58
2.6	1.62
2.8	1.64
3.0	1.67
4.0	1.75

S/D1		THE SCREED LOAD FACTOR R (FOR 8 WHEEL MACHINE)																	
		S/D2																	
		<= 1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.2	2.4	2.6	2.8	3.0	3.5	4.0
<= 1.0	1.00	1.09	1.17	1.23	1.29	1.33	1.38	1.41	1.44	1.47	1.50	1.55	1.58	1.62	1.64	1.67	1.71	1.75	
1.1	1.09	1.18	1.26	1.32	1.38	1.42	1.47	1.50	1.54	1.56	1.59	1.64	1.67	1.71	1.73	1.76	1.81	1.84	
1.2	1.17	1.26	1.33	1.40	1.45	1.50	1.54	1.58	1.61	1.64	1.67	1.71	1.75	1.78	1.81	1.83	1.88	1.92	
1.3	1.23	1.32	1.40	1.46	1.52	1.56	1.61	1.64	1.68	1.70	1.73	1.78	1.81	1.85	1.87	1.90	1.95	1.98	
1.4	1.29	1.38	1.45	1.52	1.57	1.62	1.66	1.70	1.73	1.76	1.79	1.83	1.87	1.90	1.93	1.95	2.00	2.07	
1.5	1.33	1.42	1.50	1.56	1.62	1.67	1.71	1.75	1.78	1.81	1.83	1.88	1.92	1.95	1.98	2.00	2.10	2.17	
1.6	1.38	1.47	1.54	1.61	1.66	1.71	1.75	1.79	1.82	1.85	1.88	1.92	1.96	1.99	2.04	2.08	2.18	2.25	
1.7	1.41	1.50	1.58	1.64	1.70	1.75	1.79	1.82	1.86	1.89	1.91	1.96	2.00	2.05	2.11	2.16	2.25	2.32	
1.8	1.44	1.54	1.61	1.68	1.73	1.78	1.82	1.86	1.89	1.92	1.94	1.99	2.06	2.12	2.17	2.22	2.32	2.39	
1.9	1.47	1.56	1.64	1.70	1.76	1.81	1.85	1.89	1.92	1.95	1.97	2.04	2.11	2.18	2.23	2.28	2.38	2.45	
2.0	1.50	1.59	1.67	1.73	1.79	1.83	1.88	1.91	1.94	1.97	2.00	2.09	2.17	2.23	2.29	2.33	2.43	2.50	
2.2	1.55	1.64	1.71	1.78	1.83	1.88	1.92	1.96	1.99	2.04	2.09	2.18	2.26	2.32	2.38	2.42	2.52	2.59	
2.4	1.58	1.67	1.75	1.81	1.87	1.92	1.96	2.00	2.06	2.11	2.17	2.26	2.33	2.40	2.45	2.50	2.60	2.67	
2.6	1.62	1.71	1.78	1.85	1.90	1.95	1.99	2.05	2.12	2.18	2.23	2.32	2.40	2.46	2.52	2.56	2.66	2.73	
2.8	1.64	1.73	1.81	1.87	1.93	1.98	2.04	2.11	2.17	2.23	2.29	2.38	2.45	2.52	2.57	2.62	2.71	2.79	
3.0	1.67	1.76	1.83	1.90	1.95	2.00	2.08	2.16	2.22	2.28	2.33	2.42	2.50	2.56	2.62	2.67	2.76	2.83	
3.5	1.71	1.81	1.88	1.95	2.00	2.10	2.18	2.25	2.32	2.38	2.43	2.52	2.60	2.66	2.71	2.76	2.86	2.93	
4.0	1.75	1.84	1.92	1.98	2.07	2.17	2.25	2.32	2.39	2.45	2.50	2.59	2.67	2.73	2.79	2.83	2.93	3.00	

TABLE 3: ALLOWABLE SPAN LENGTH OF JOISTS AND JOIST SPACINGS

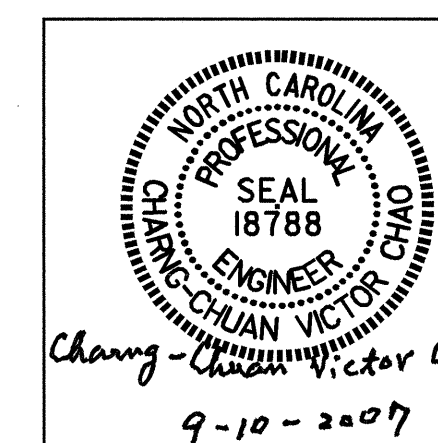
AVG. SLAB THICKNESS (IN)	LUMBER JOIST SIZE (IN X IN)	JOIST SPACINGS			
		15 IN	12 IN	10 IN	8 IN
		THE ALLOWABLE SPAN LENGTH OF JOISTS			
10	2 X 4	—	4' - 6"	4' - 9"	5' - 0"
	4 X 4	5' - 9"	6' - 3"	6' - 6"	6' - 7"
12	2 X 4	—	4' - 3"	4' - 9"	5' - 0"
	4 X 4	5' - 3"	6' - 0"	6' - 3"	6' - 5"
14	2 X 4	—	4' - 0"	4' - 6"	5' - 0"
	4 X 4	—	5' - 6"	6' - 0"	6' - 4"
16	2 X 4	—	4' - 0"	4' - 3"	4' - 9"
	4 X 4	—	5' - 3"	5' - 9"	6' - 3"

PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 2 OF 3

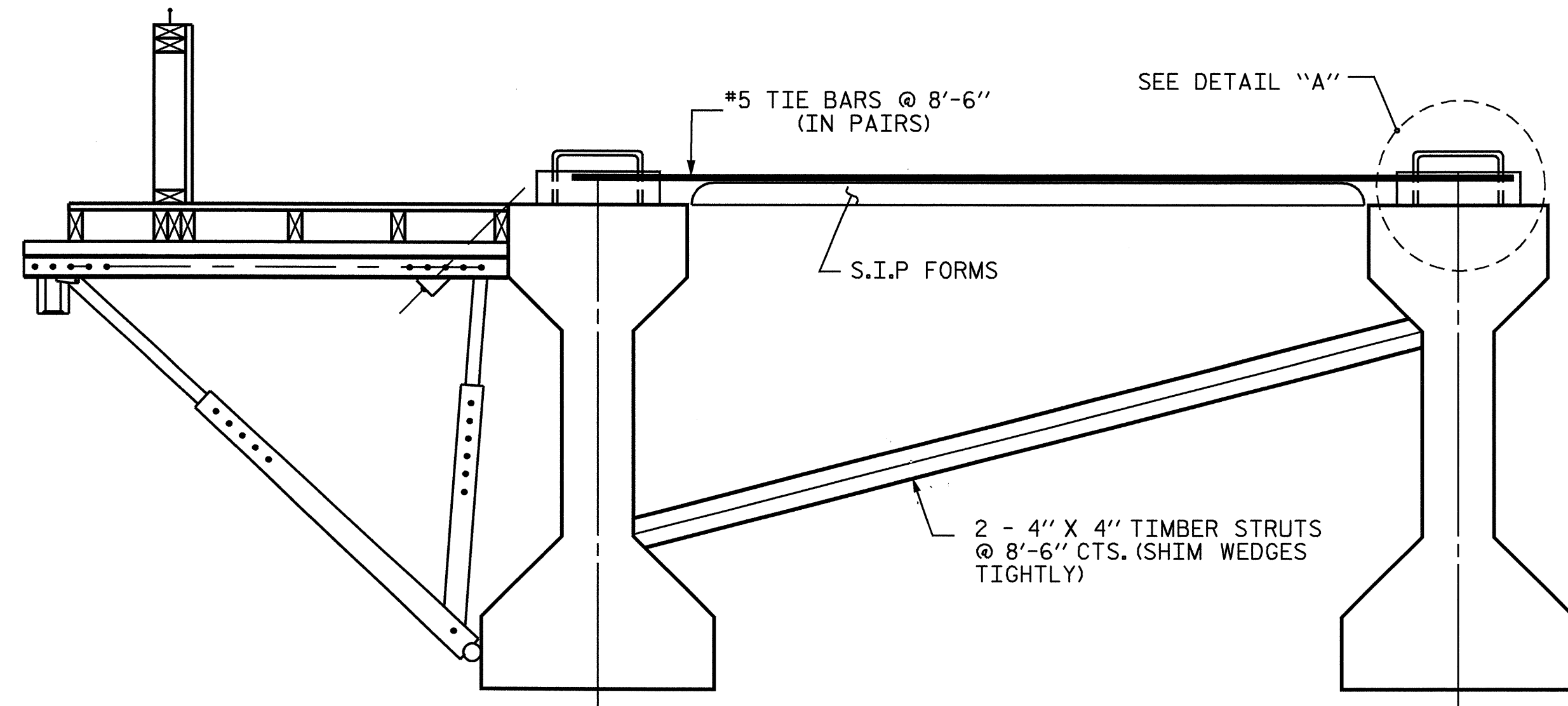
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD OVERHANG FALSEWORK
 AASHTO TYPES III, IV, V, AND VI



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-36
1			3			TOTAL SHEETS 37
2			4			

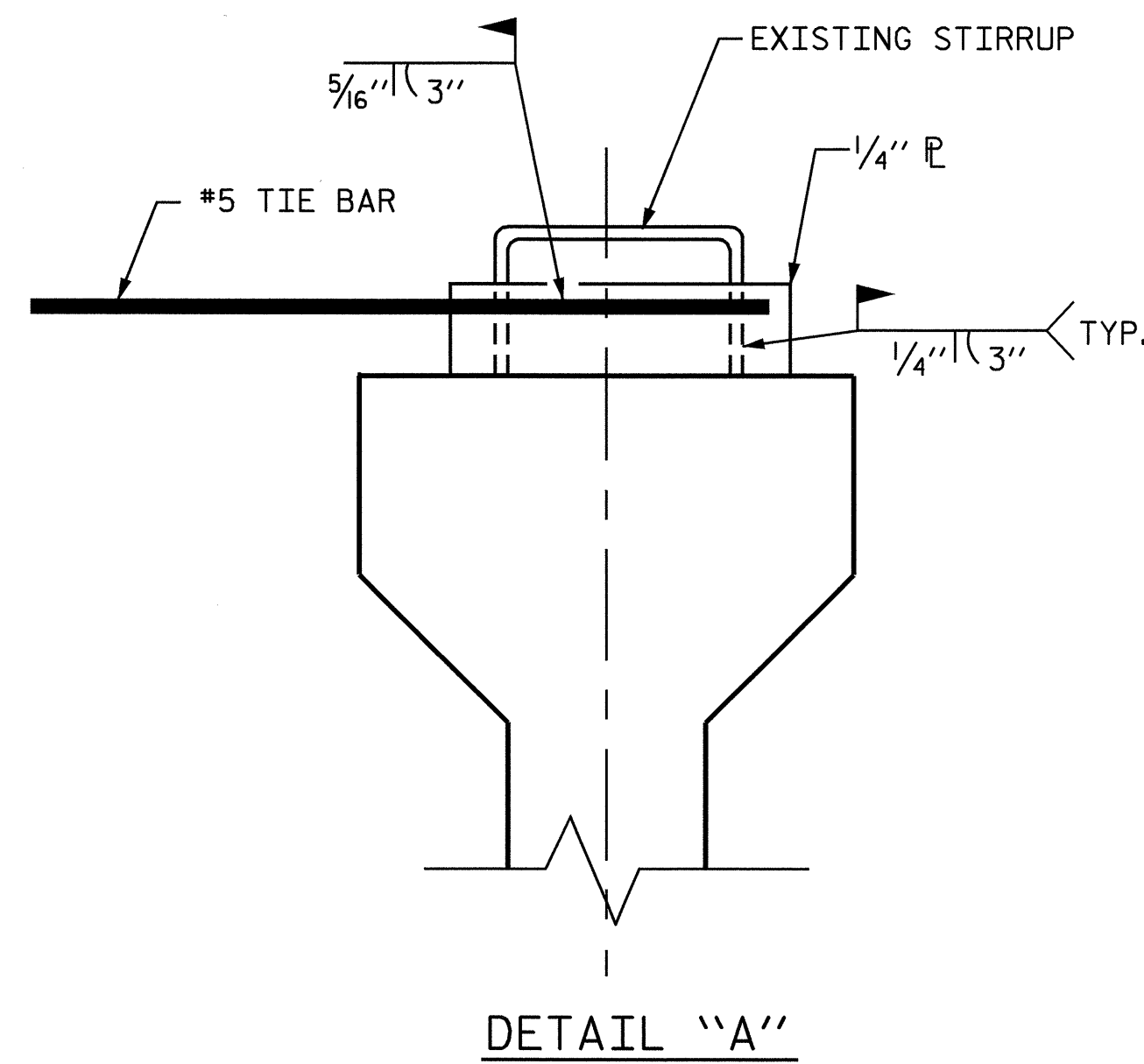
ASSEMBLED BY:	DATE:
CHECKED BY:	DATE:
DRAWN BY: R. WRIGHT 06/04	REV.
CHECKED BY: C. V. CHAO 06/04	



EXTERIOR GIRDER

INTERIOR GIRDER

DETAIL OF REQUIRED OVERHANG FALSEWORK BRACING SYSTEM



NOTES:

EACH #5 TIE BAR SHALL BE WELDED TO ONE STIRRUP LOOP AS SHOWN IN DETAIL "A". #5 TIE BARS SHALL BE WELDED TO TWO ADJACENT STIRRUPS OF THE EXTERIOR GIRDER AND THE ADJACENT INTERIOR GIRDER BETWEEN PERMANENT DIAPHRAGMS. WELD STEEL PLATES IN BETWEEN THE TIE BARS AND THE STIRRUP LOOP. WELDING TWO TIE BARS TO THE SAME STIRRUP LOOP SHALL NOT BE PERMITTED.

MAXIMUM SPACING BETWEEN THE BRACING (TIE BARS-TIMBER STRUT) IS 8'-6" CTS. #5 TIE BARS SHALL BE LOCATED OVER A TIMBER STRUT.

INSTALL TIE BARS AND TIMBER STRUTS PRIOR TO PLACEMENT OF CONCRETE OR SCREED WEIGHT ONTO THE OVERHANG FALSEWORK.

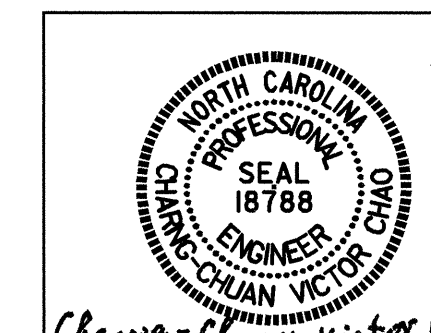
PROJECT NO. B-3824
CHATHAM COUNTY
 STATION: 13+35.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD OVERHANG FALSEWORK

AASHTO TYPES
 III, IV, V, AND VI



Chang-Chuan Victor Chao
 9-10-2007

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			37

DRAWN BY: R. WRIGHT 06/04 DATE : _____
 CHECKED BY: C. V. CHAO 06/04 DATE : _____

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	-----	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	-----	SEE PLANS
IMPACT ALLOWANCE	-----	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF		
STRUCTURAL STEEL - AASHTO M270 GRADE 36	-	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	-	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	-	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION		
GRADE 60	--	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	-----	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR		
UNTREATED - EXTREME FIBER STRESS	-----	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	-----	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	-----	30 LBS. PER CU. FT.
		(MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2002 STANDARD SPECIFICATIONS "FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP; AND CLASS S SHALL BE USED FOR UNDERWATER FOOTING SEALS.

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED WITH THE EXCEPTION OF #2 BARS WHICH MAY BE FABRICATED FROM COLD DRAWN STEEL WIRE. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

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

STRUCTURAL STEEL:

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

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

PLACEMENT OF BEAM OR GIRDER MEMBERS ON TRUCKS FOR HAULING SHALL BE DONE IN COMPLIANCE WITH LIMITS SHOWN ON SKETCHES PROVIDED TO THE MATERIALS AND TEST UNIT APPROVED BY THE STRUCTURE DESIGN UNIT DATED MAY 8, 1991. THESE SKETCHES PRIMARILY LIMIT THE UNSUPPORTED CANTILEVER LENGTH OF MEMBERS. WHEN THE CONTRACTOR WISHES TO PLACE MEMBERS ON TRUCKS NOT IN ACCORDANCE WITH THESE LIMITS, TO SHIP BY RAIL, TO ATTACH SHIPPING RESTRAINTS TO THE MEMBERS OR TO INVERT MEMBERS, HE SHALL SUBMIT A SKETCH FOR APPROVAL PRIOR TO SHIPPING. SEE ALSO ARTICLE 1072-11.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN