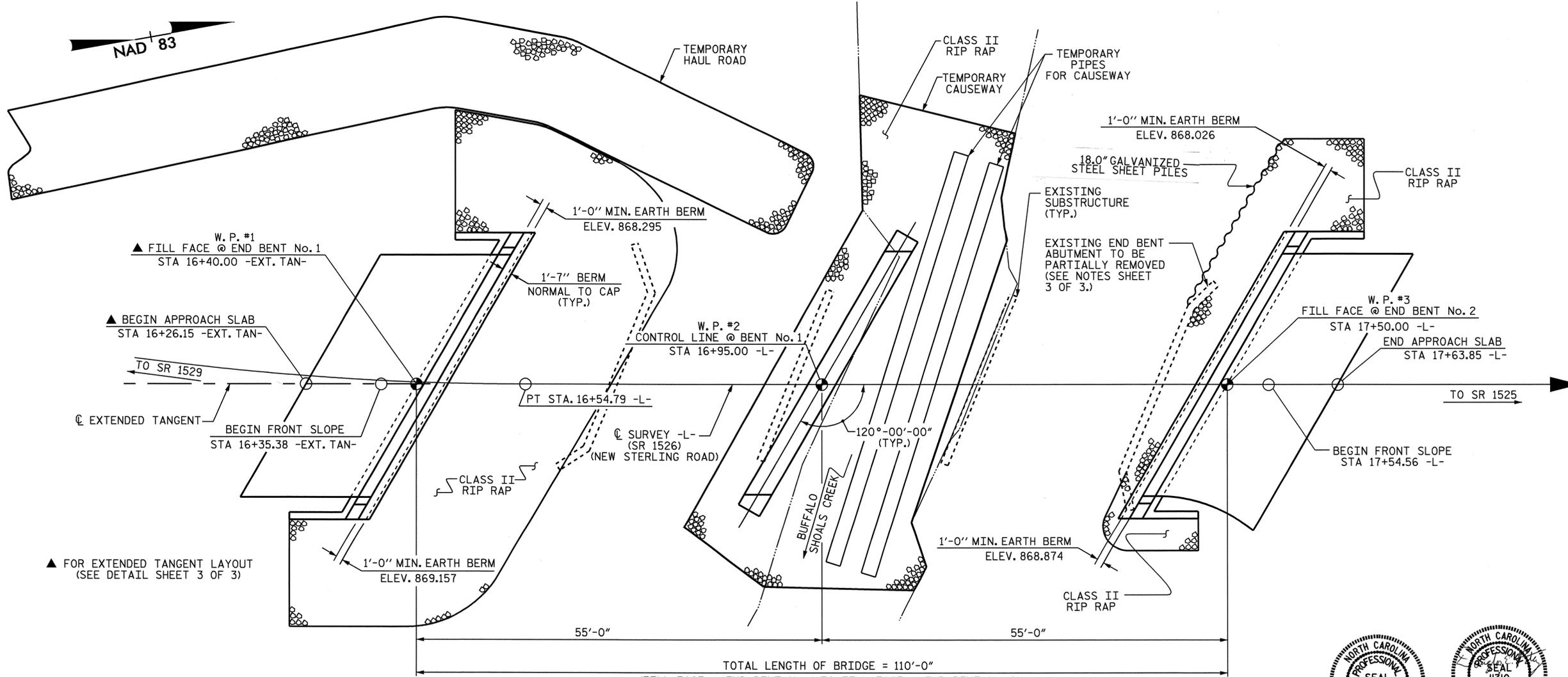


**HORIZONTAL CURVE DATA**

PI STA. = 15+12.85 -L-  
 Δ = 42°-45'-59.6" (LT)  
 D = 14°-19'-26.2"  
 L = 298.57'  
 T = 156.62'  
 R = 400.00'



PROJECT NO. B-4552  
 IREDELL COUNTY  
 STATION: 16+95.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE No. 100

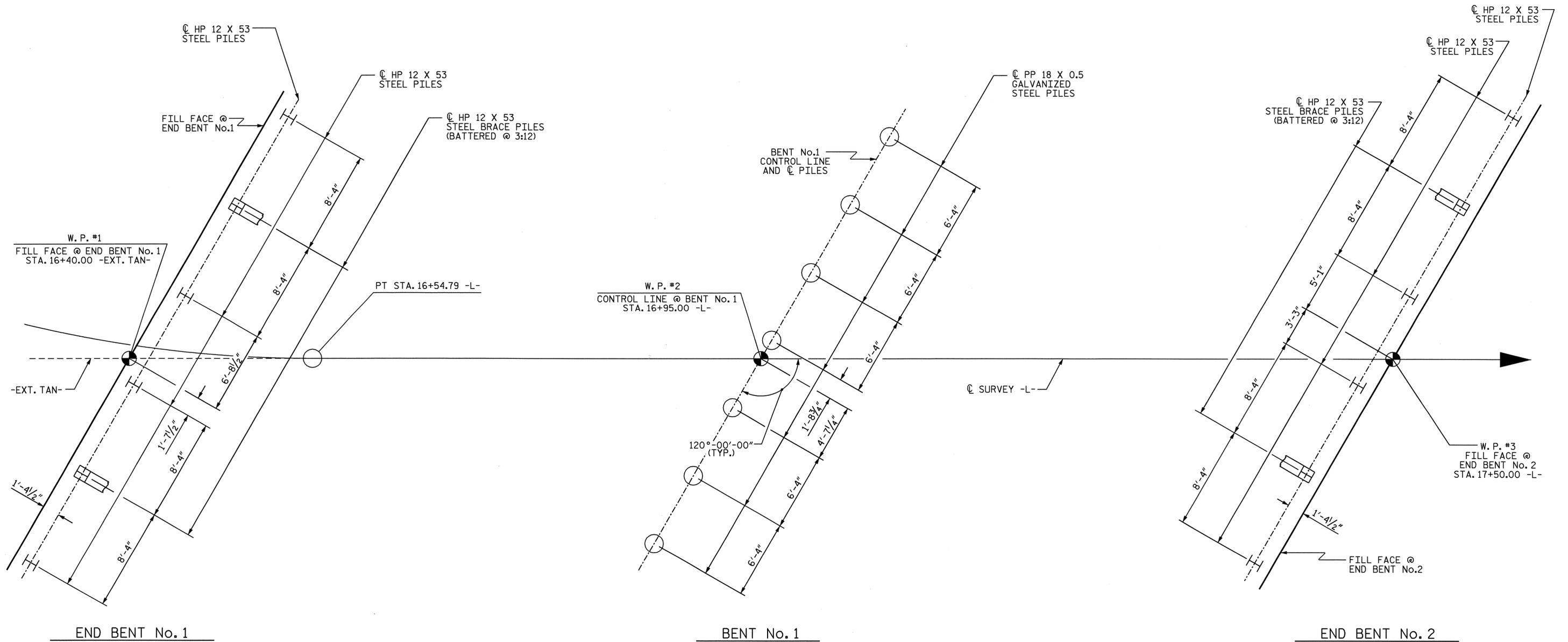
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 BRIDGE ON  
 SR 1526 (NEW STERLING ROAD)  
 OVER BUFFALO SHOALS CREEK  
 BETWEEN SR 1529 AND SR 1525

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

DRAWN BY: A. V. ROYAL DATE: 03-08  
 CHECKED BY: D. E. PETREY DATE: 04-08

15-MAY-2008 09:01  
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 jbankovich





FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE AT BOTTOM OF CAP

PROJECT NO. B-4552  
IREDELL COUNTY  
 STATION: 16+95.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

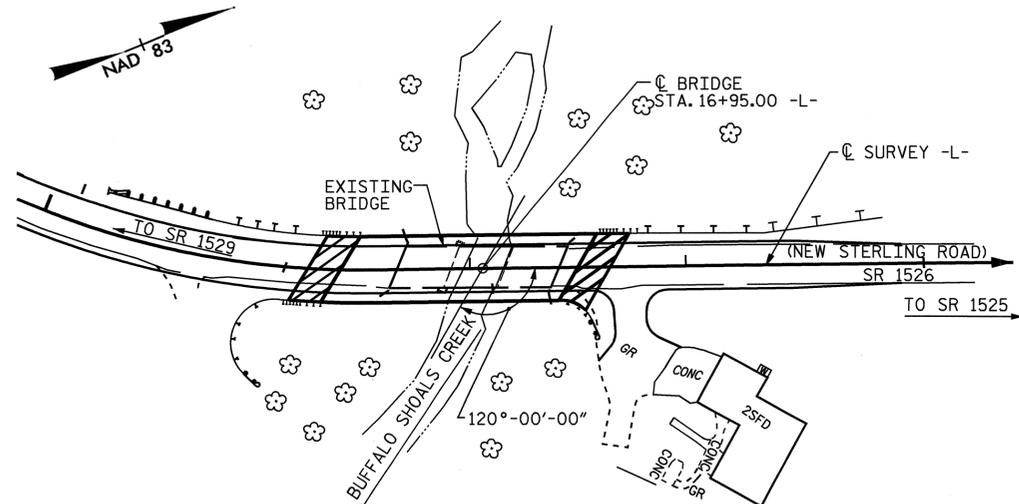
GENERAL DRAWING

BRIDGE ON  
 SR 1526 (NEW STERLING ROAD)  
 OVER BUFFALO SHOALS CREEK  
 BETWEEN SR 1529 AND SR 1525



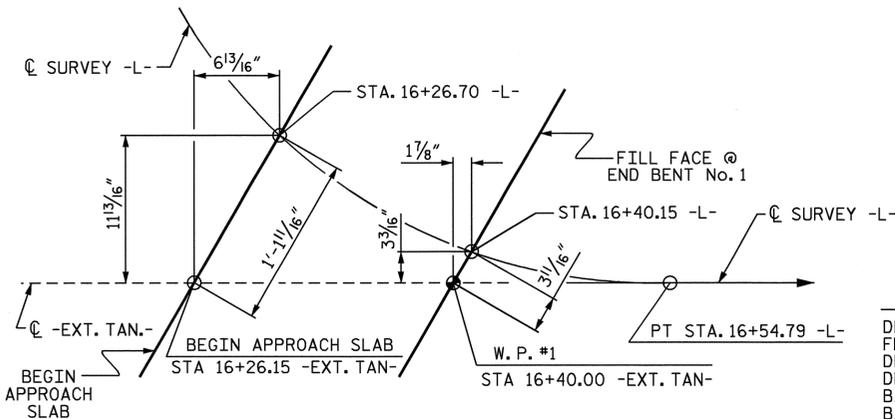
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 CHECKED BY : D. E. PETREY DATE : 04-08

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



LOCATION SKETCH

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS & SPECIAL PROVISIONS



EXTENDED TANGENT LAYOUT

NOTE: THE EFFECTS OF THE HORIZONTAL CURVE SHALL BE NEGLECTED IN THE CONSTRUCTION OF THIS BRIDGE. THE BRIDGE IS TO BE BUILT ALONG THE TANGENT AND EXTENDED TANGENT BETWEEN WORK POINTS.

THE APPROACH SLAB AT END BENT No. 1 SHALL BE CONSTRUCTED AS A TRANSITION BETWEEN THE TANGENT BRIDGE AND CURVED ROADWAY ALIGNMENT.

HYDRAULIC DATA

DESIGN DISCHARGE	1500 CFS
FREQUENCY OF DESIGN FLOOD	25 YEARS
DESIGN HIGH WATER ELEVATION	862.6
DRAINAGE AREA	5.9 SQ. MI.
BASIC DISCHARGE (Q100)	2300 CFS
BASIC HIGH WATER ELEVATION	864.4
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	10000 CFS.
FREQUENCY OF OVERTOPPING FLOOD	500 YRS. +
OVERTOPPING FLOOD ELEVATION	873.2 *
* OVERTOPPING OCCURS AT SAG LT. STA. 17+66.5 -L-	

NOTES:

ASSUMED LIVE LOAD = HS20 OR ALTERNATE LOADING, EXCEPT THAT THE CORED SLABS HAVE BEEN DESIGNED FOR HS 25.

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.

THE EXISTING STRUCTURE CONSISTING OF 1 @ 25'-6", 1 @ 25'-0", 1 @ 25'-6" SPANS WITH TIMBER DECK AND ASPHALT WEARING SURFACE ON STEEL I BEAMS, AND A CLEAR ROADWAY WIDTH OF 19.2' ON YOUNT MASONRY END BENT ABUTMENTS, AND TIMBER CAP AND PILE INTERIOR BENTS, AND LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT.

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 SHALL BE EXCAVATED FOR A DISTANCE OF 26 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE 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.

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

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 16+95.00 -L-."

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 16+95.00 -L-.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

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

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.

DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 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 BENT NO. 1 AND END BENT NO. 2 IS 60 TONS PER PILE.

DRIVE PILES AT BENT NO. 1 TO A REQUIRED BEARING CAPACITY OF 180 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 BENT NO. 1 IS 90 TONS PER PILE.

PIPE PILE PLATES ARE REQUIRED FOR THE PIPE PILES AT BENT NO. 1. USE PIPE PILE PLATES WITH A DIAMETER EQUAL TO THE PIPE PILE DIAMETER. SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILE EXCAVATION IS REQUIRED TO INSTALL PIPE PILES AT BENT NO. 1. EXCAVATE HOLES TO ELEVATION 840 FT. (LT.) AND 841 FT. (RT.). SEE PILE EXCAVATION SPECIAL PROVISION.

LOCATE EACH PIPE PILE AT BENT NO. 1 BY SURVEY.

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

THE SCOUR CRITICAL ELEVATIONS FOR BENT NO. 1 ARE 846 FT. (LT.) AND 847.5 FT. (RT.). SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

THE SCOUR CRITICAL ELEVATION FOR END BENT NO. 2 IS ELEVATION 852 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

EXISTING END BENT ABUTMENT AT THE SOUTH END OF THE BRIDGE SHALL BE REMOVED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

EXISTING END BENT ABUTMENT AT THE NORTH END OF THE BRIDGE SHALL BE PARTIALLY REMOVED AS DIRECTED BY THE ENGINEER. THE EXISTING ABUTMENT WALL AND WINGS SHALL BE REMOVED TO AN ELEVATION NO HIGHER THAN ELEVATION 868.5 ±. REMOVE THE DOWNSTREAM WING OF THE EXISTING ABUTMENT AS NECESSARY TO AVOID INTERFERENCE WITH NEW END BENT NO. 2 CAP, WINGS AND PILES.

DRIVE 18.0" GALVANIZED STEEL SHEET PILES ON THE UPSTREAM SIDE OF THE EXISTING NORTH END BENT ABUTMENT IN A STRAIGHT LINE APPROXIMATELY PARALLEL TO THE FILL FACE OF PROPOSED END BENT NO. 2 FOR A DISTANCE THIRTY (30) FEET ± AS DIRECTED BY THE ENGINEER. DRIVE STEEL SHEET PILES PRIOR TO SETTING SPAN B CORED SLAB UNITS.

TOP OF STEEL SHEET PILES SHALL BE ELEVATION 869.0 ± OR APPROXIMATELY ONE FOOT ABOVE TOP OF NATURAL GROUND AS DIRECTED BY THE ENGINEER.

INSTALL SHEET PILES TO A TIP ELEVATION NO HIGHER THAN 852 FT.

STEEL SHEET PILES SHALL BE HOT ROLLED.

FOR 18.0" GALVANIZED STEEL SHEET PILES, SEE STEEL SHEET PILES SPECIAL PROVISION.

FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	CONSTRUCTION MAINTENANCE, AND REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	HP 12 X 53 STEEL PILES	PP 18 X 0.50 GALVANIZED STEEL PILES	PIPE PILE PLATES	18.0" GALVANIZED STEEL SHEET PILES	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLABS			
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	EACH	SQ. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE													214.5					22	1179.75	
END BENT NO. 1					LUMP SUM	14.5		2245	6	165						250	278			
BENT NO. 1			5	53		15.0		2611		200	7									
END BENT NO. 2					LUMP SUM	14.5		2245	6	120			510		60	67				
TOTAL	LUMP SUM	LUMP SUM	5	53	LUMP SUM	44.0	LUMP SUM	7101	12	285	7	200	7	510	214.5	310	345	LUMP SUM	22	1179.75

PROJECT NO. B-4552  
IREDELL COUNTY  
 STATION: 16+95.00 -L-

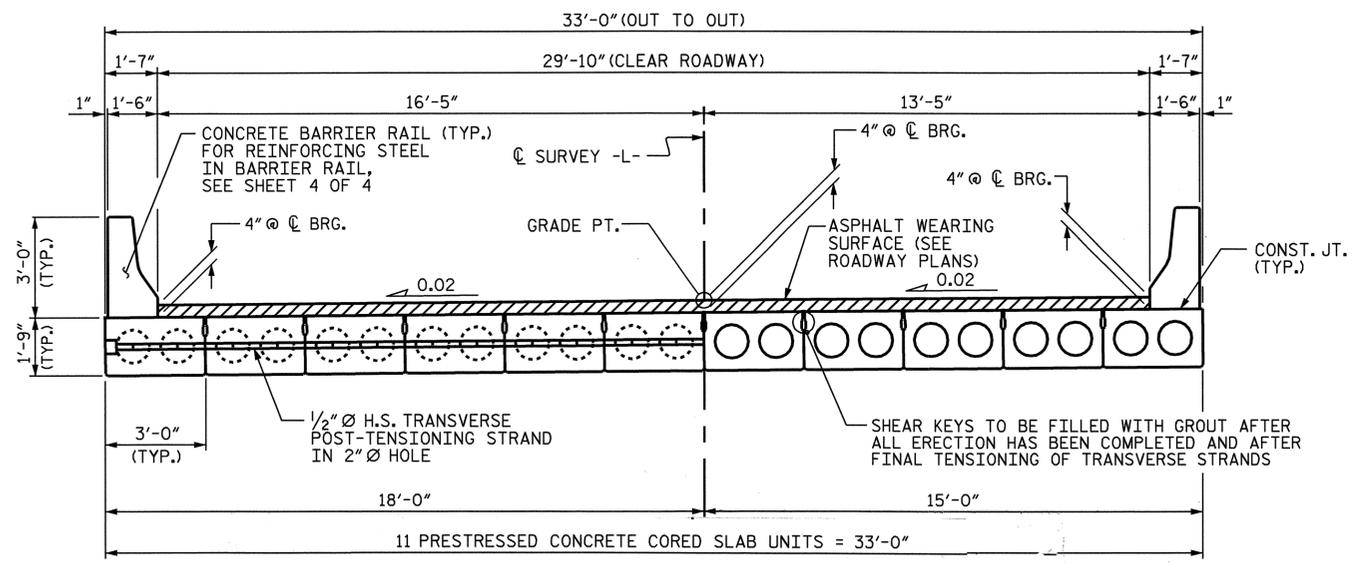
SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 BRIDGE ON  
 SR 1526 (NEW STERLING ROAD)  
 OVER BUFFALO SHOALS CREEK  
 BETWEEN SR 1529 AND SR 1525



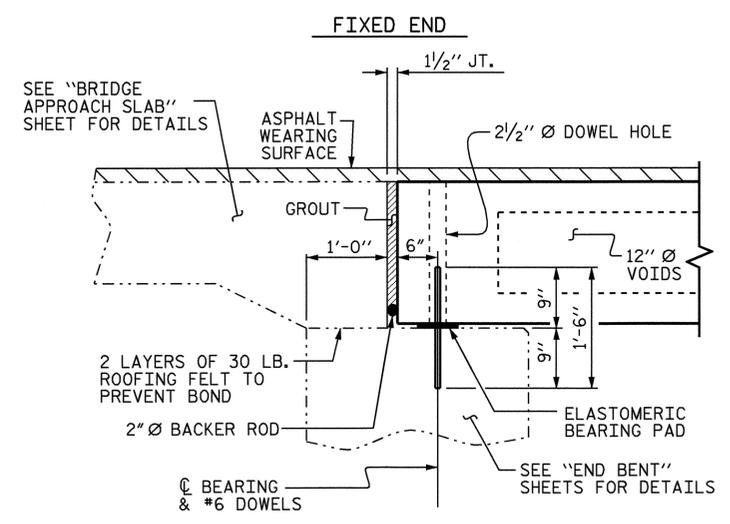
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NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-3
2			4			TOTAL SHEETS 21

DRAWN BY: A. V. ROYAL DATE: 03-08  
 CHECKED BY: D. E. PETREY DATE: 04-08

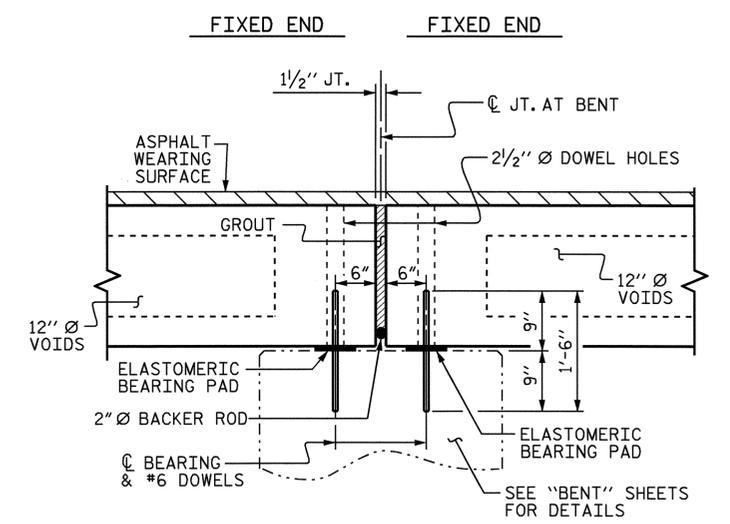


HALF SECTION AT INTERMEDIATE DIAPHRAGMS      HALF SECTION AT 12" Ø VOIDS

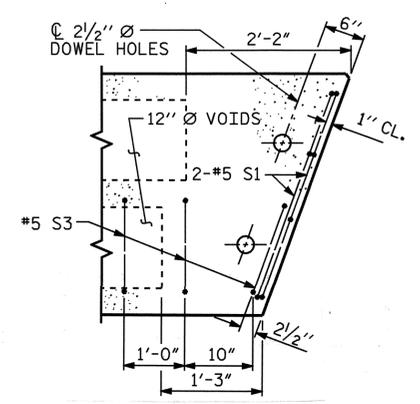
TYPICAL SECTION



SECTION AT END BENT

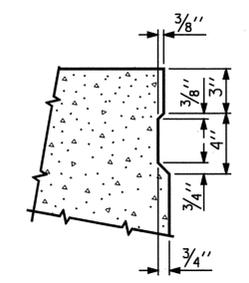


SECTION AT BENT



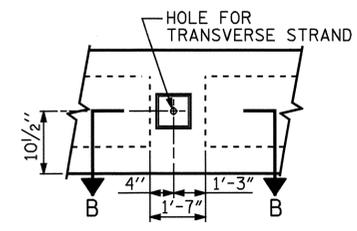
PART PLAN-EXTERIOR SECTION

NOTE: EXTERIOR SECTION SHOWN-INTERIOR SECTION SIMILAR EXCEPT OMIT S3 BARS

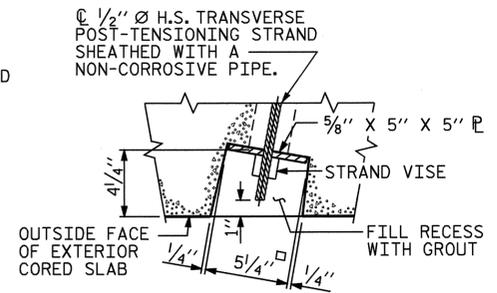


SHEAR KEY DETAIL

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

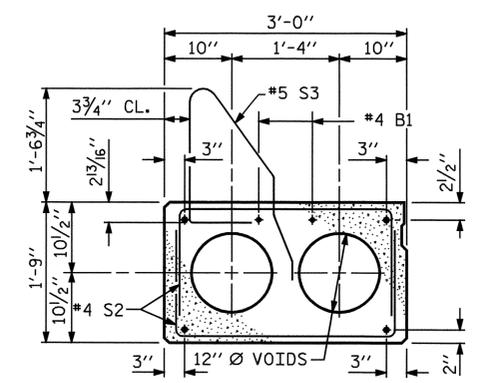


ELEVATION VIEW

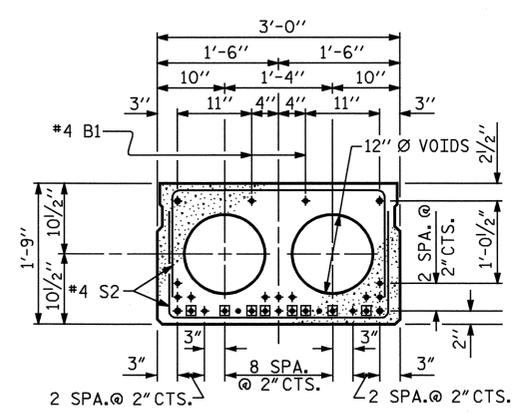


SECTION B-B

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

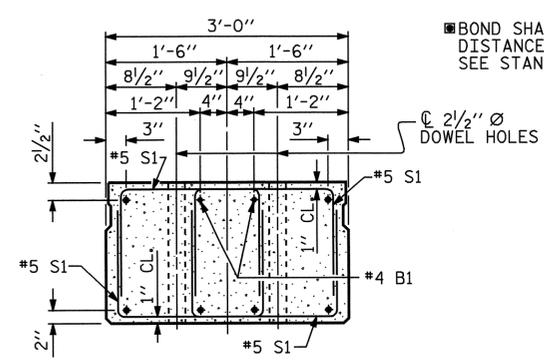


EXTERIOR SLAB SECTION  
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



INTERIOR SLAB SECTION

1/2" Ø LOW RELAXATION STRAND LAYOUT  
(26 STRANDS)



END ELEVATION

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

■ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 5'-8" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

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IREDELL COUNTY  
STATION: 16+95.00 -L-

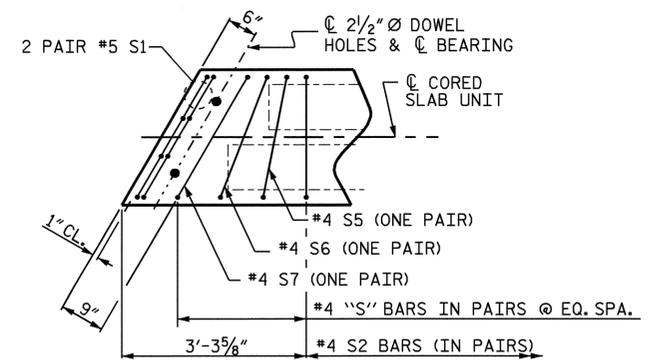
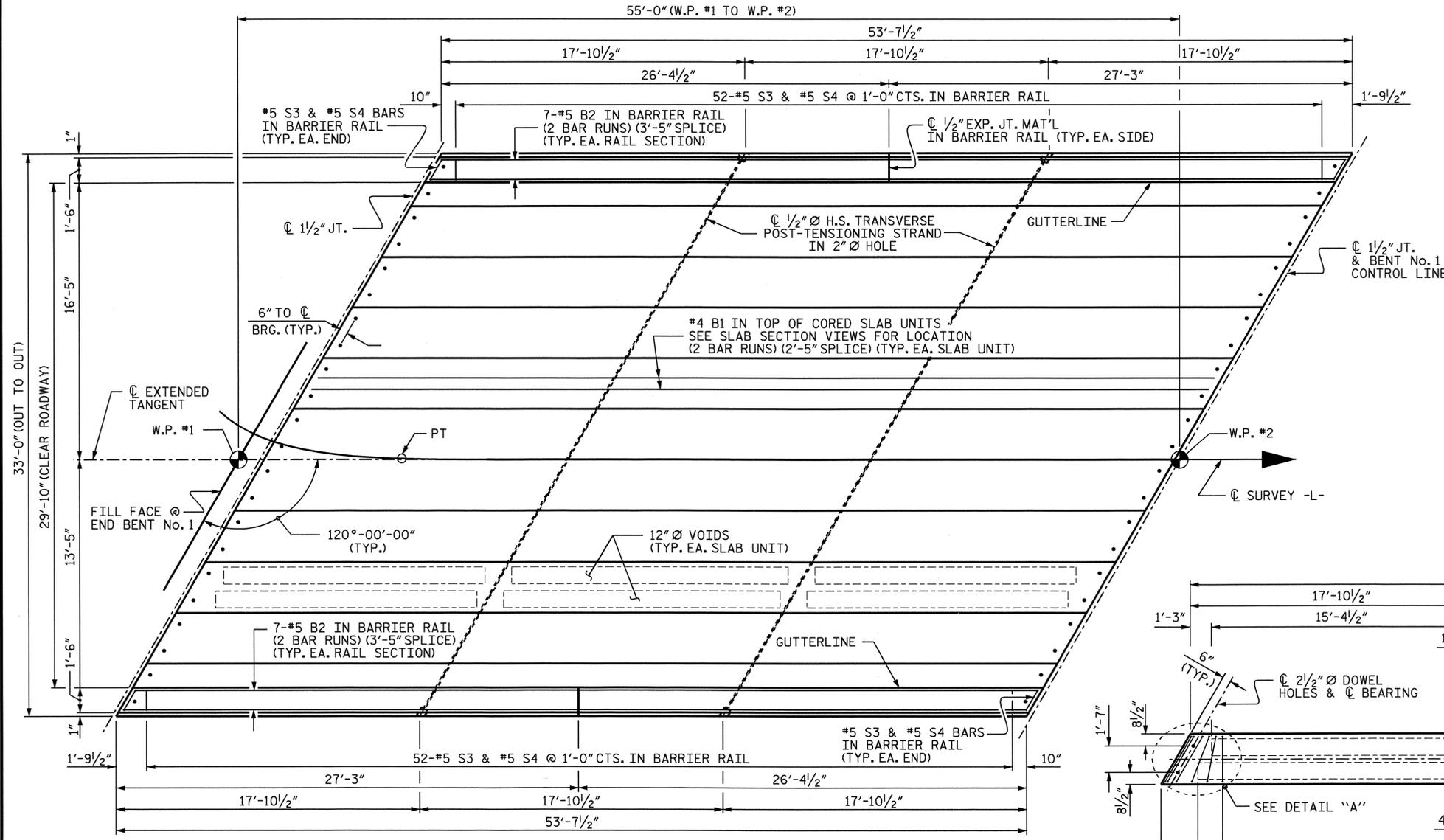
SHEET 1 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 1'-9"  
PRESTRESSED CONCRETE  
CORED SLAB UNIT

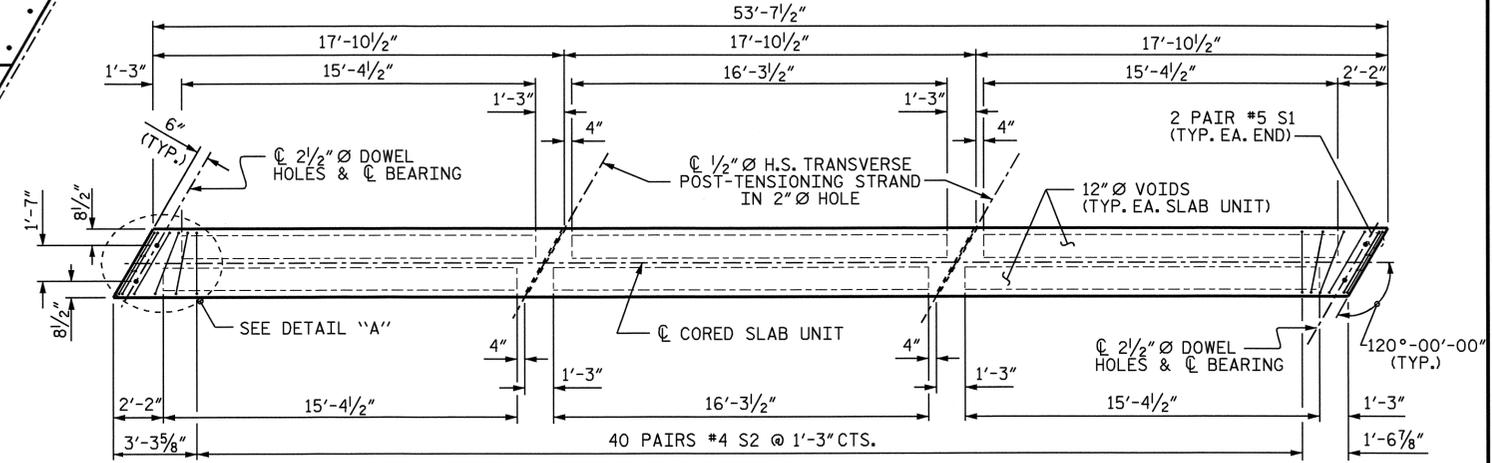


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2			4			

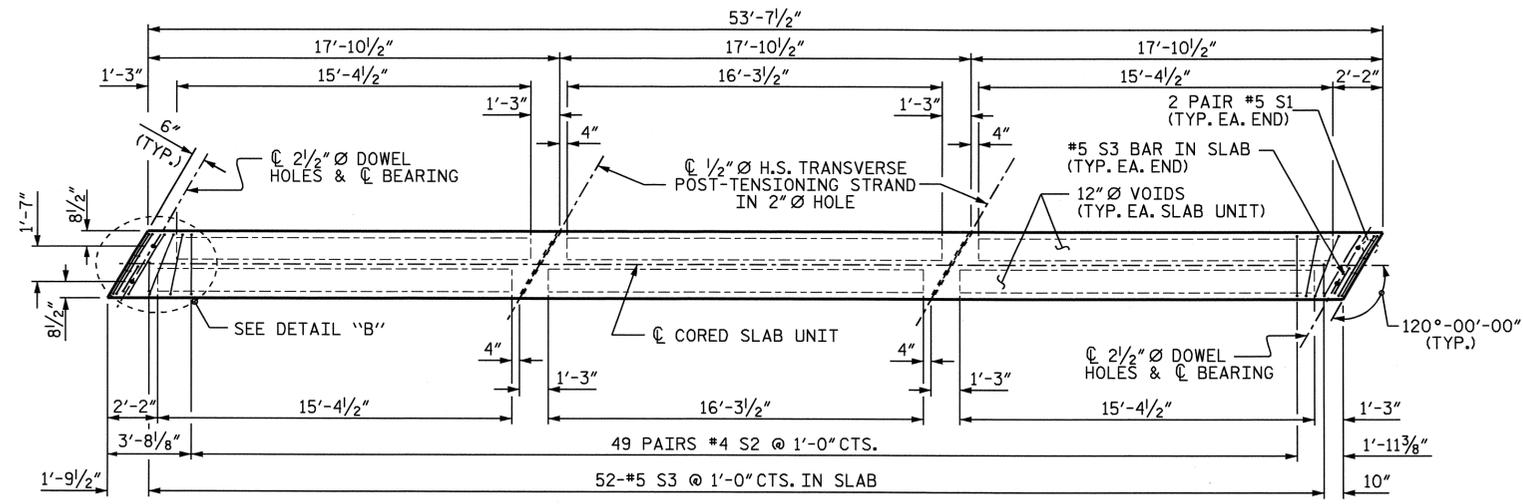
ASSEMBLED BY: <u>M.L. BROWN</u>	DATE: <u>7/07</u>
CHECKED BY: <u>S.B. WILLIAMS</u>	DATE: <u>8/07</u>
DRAWN BY: <u>WJH 4/89</u>	REV. 10/17/00 RWW/LES
CHECKED BY: <u>FCJ 5/89</u>	REV. 7/10/01RR RWW/LES
	REV. 5/1/06 TLA/GM



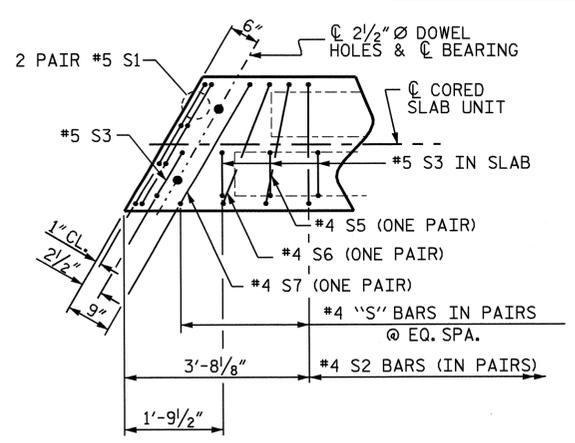
DETAIL "A"  
(EA. END SIMILAR)



PLAN OF INTERIOR CORED SLAB UNIT



PLAN OF EXTERIOR CORED SLAB UNIT



DETAIL "B"  
(EA. END SIMILAR)

PROJECT NO. B-4552  
IREDELL COUNTY  
STATION: 16+95.00 -L-

SHEET 2 OF 4

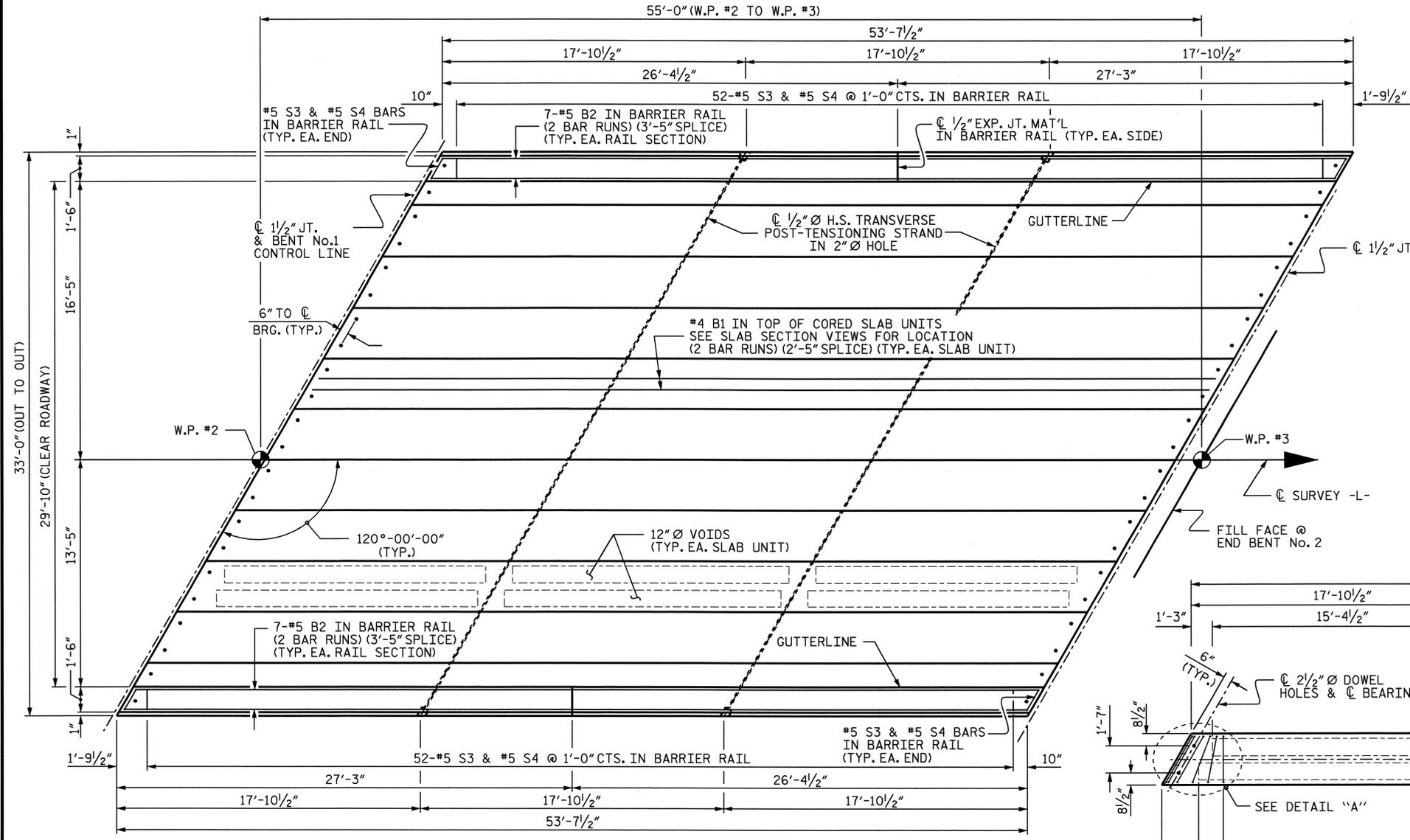
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
PLAN OF SPAN "A"

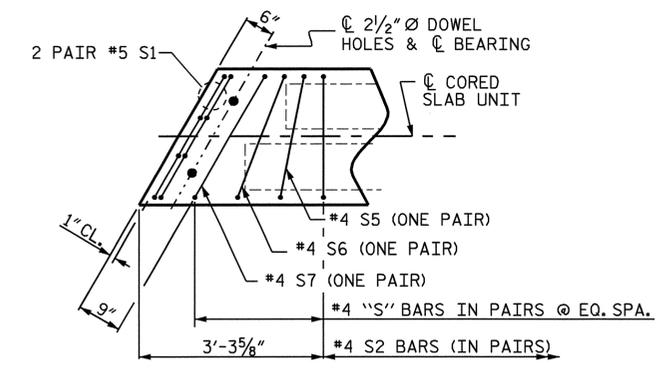
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NO.	BY:	DATE:	NO.	BY:	DATE:	
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2			4			

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CHECKED BY: S.B. WILLIAMS DATE: 8/07

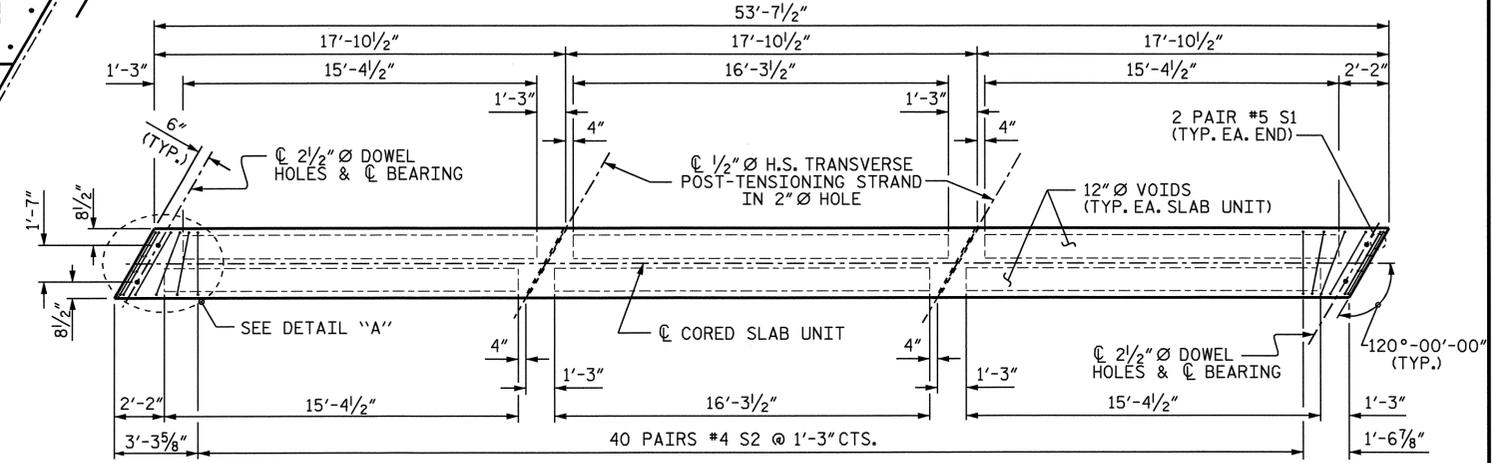




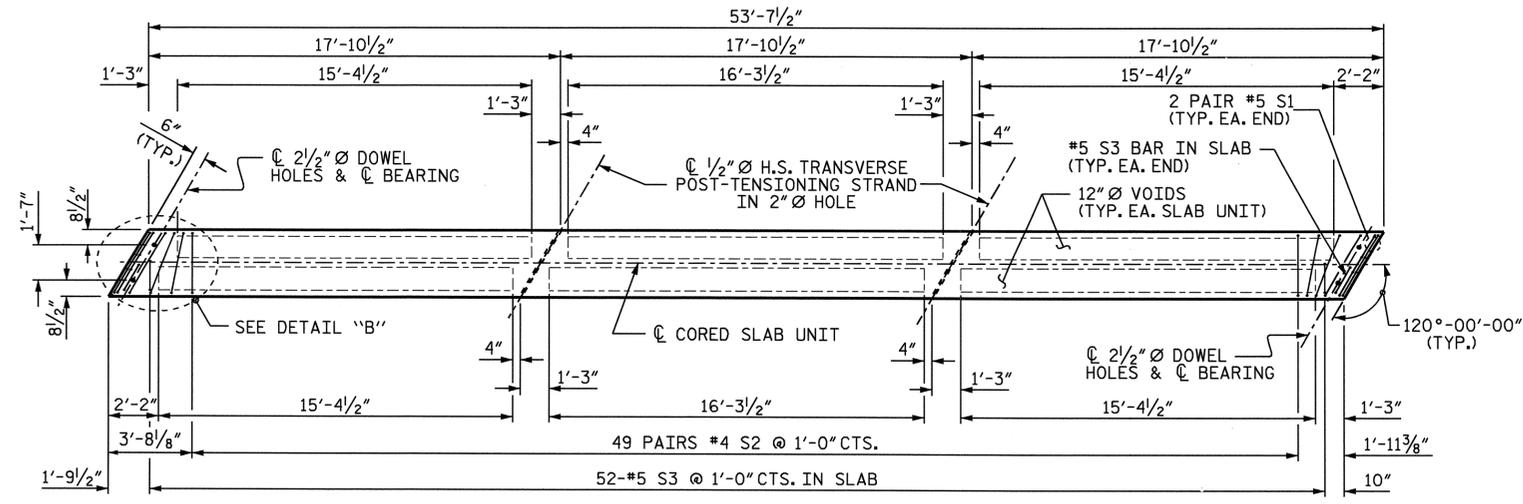
SPAN "B"



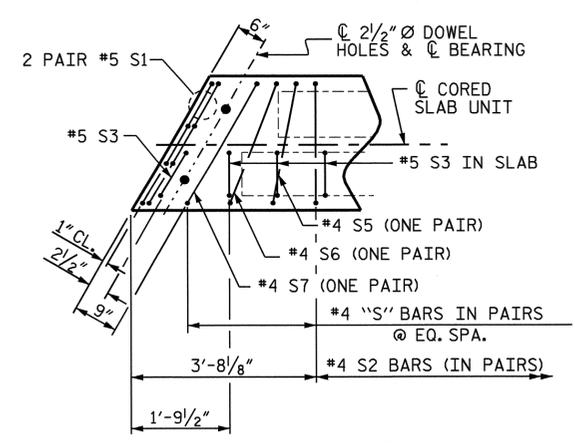
DETAIL "A"  
(EA. END SIMILAR)



PLAN OF INTERIOR CORED SLAB UNIT



PLAN OF EXTERIOR CORED SLAB UNIT



DETAIL "B"  
(EA. END SIMILAR)

PROJECT NO. B-4552  
IREDELL COUNTY  
STATION: 16+95.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
PLAN OF SPAN "B"



DRAWN BY: M.L. BROWN DATE: 7/07  
CHECKED BY: S.B. WILLIAMS DATE: 8/07

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			21

# NOTES

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

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

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

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

THE 2" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, A POSITIVE HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. THIS SYSTEM SHALL BE DESIGNED TO BE LEFT IN PLACE UNTIL THE CONCRETE HAS REACHED RELEASE STRENGTH. AT LEAST THREE WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4400 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

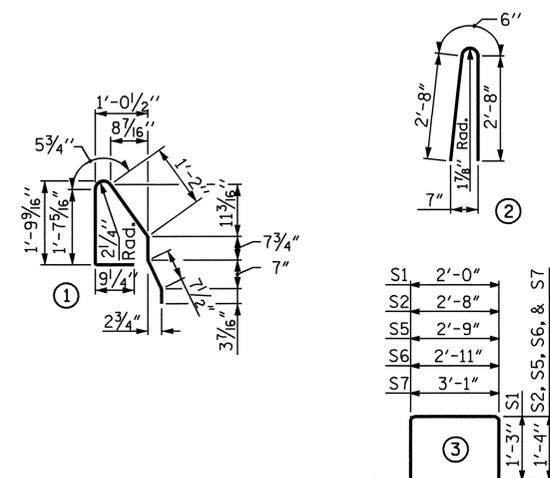
PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

VERTICAL GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A VERTICAL CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

## BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

## BILL OF MATERIAL FOR ONE CORED SLAB SECTION

SPAN "A" OR "B"				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B1	4	#4	STR	27'-11"	75	27'-11"	75
S1	8	#5	3	4'-6"	38	4'-6"	38
S2	98	#4	3	5'-4"	349		
S2	80	#4	3			5'-4"	285
*S3	54	#5	1	5'-7"	314		
S5	4	#4	3	5'-5"	14	5'-5"	14
S6	4	#4	3	5'-7"	15	5'-7"	15
S7	4	#4	3	5'-9"	15	5'-9"	15
REINFORCING STEEL				506 LBS.		442 LBS.	
*EPOXY COATED REINFORCING STEEL				314 LBS.			
5,800 P.S.I. CONCRETE				7.7 CU. YDS.		7.7 CU. YDS.	
1/2" Ø L.R. STRANDS				No.	26		26

### BILL OF MATERIAL FOR CONCRETE BARRIER RAIL

BAR	BARS PER SPAN		TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	SPAN "A"	SPAN "B"					
*B2	56	56	112	#5	STR	15'-2"	1772
*S4	108	108	216	#5	2	5'-10"	1314
*EPOXY COATED REINFORCING STEEL						3086 LBS.	
CLASS AA CONCRETE						25.6 CU.YDS.	
TOTAL LIN.FT. OF CONCRETE BARRIER RAIL						214.50	

### DEAD LOAD DEFLECTION AND CAMBER

SPAN "A" & "B"	3'-0" x 1'-9"
CAMBER (SLAB ALONE IN PLACE)	1/2" Ø L.R. STRAND 2 13/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD **	7/16" ↓
FINAL CAMBER	2 3/8" ↑

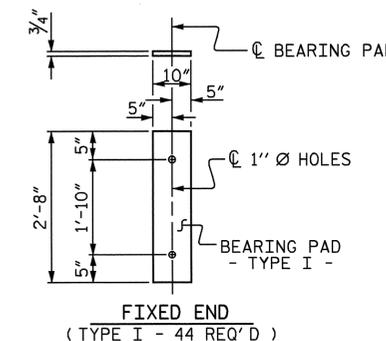
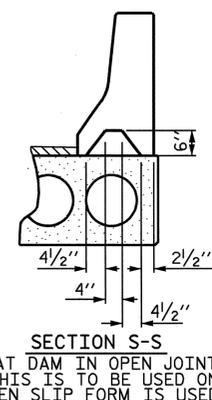
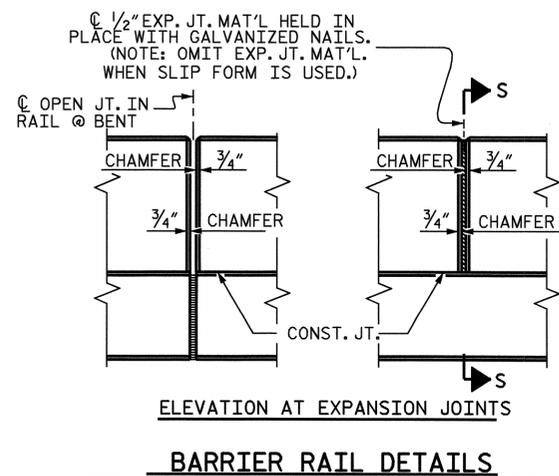
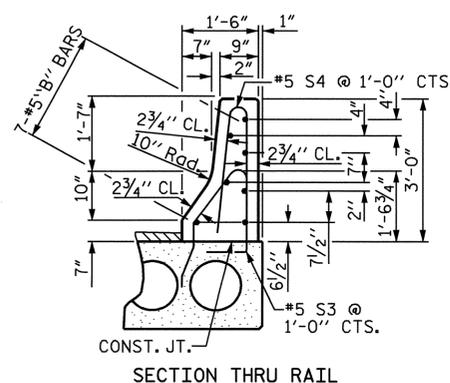
\*\* INCLUDES FUTURE WEARING SURFACE

### CORED SLABS REQUIRED

		NUMBER	LENGTH	TOTAL LENGTH
SPAN "A"	EXTERIOR C.S.	2	53'-7 1/2"	107'-3"
	INTERIOR C.S.	9	53'-7 1/2"	482'-7 1/2"
SPAN "B"	EXTERIOR C.S.	2	53'-7 1/2"	107'-3"
	INTERIOR C.S.	9	53'-7 1/2"	482'-7 1/2"
TOTAL		22		1179.75

### GRADE 270 STRANDS

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



## ELASTOMERIC BEARING DETAILS

PROJECT NO. B-4552  
IREDELL COUNTY  
 STATION: 16+95.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 3'-0" X 1'-9"  
 PRESTRESSED CONCRETE  
 CORED SLAB UNIT



ASSEMBLED BY : M.L. BROWN	DATE : 7/07
CHECKED BY : S.B. WILLIAMS	DATE : 8/07
DRAWN BY : WJH 4/89	REV. 7/10/01 RWW/LES
CHECKED BY : FCJ 5/89	REV. 5/7/03RRR RWW/JTE
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			21

NOTES

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

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 M11.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

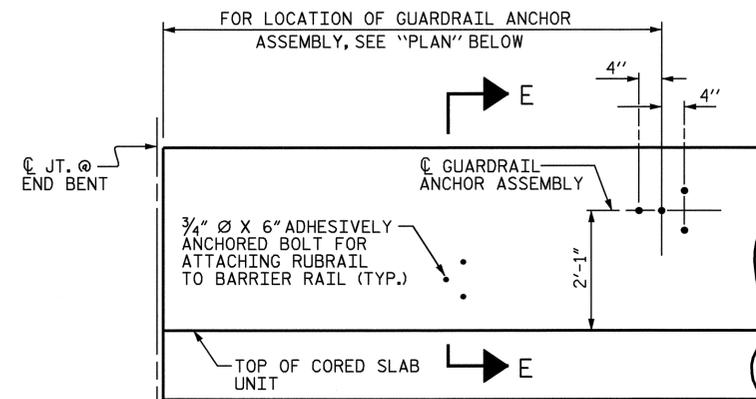
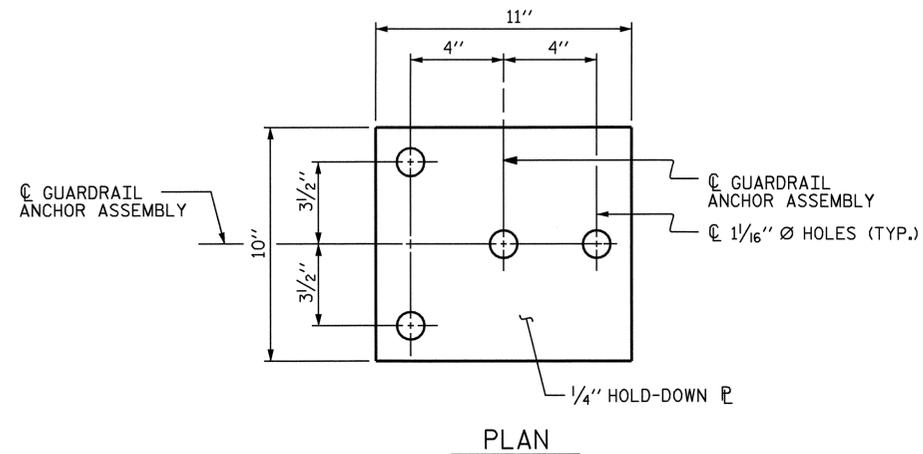
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

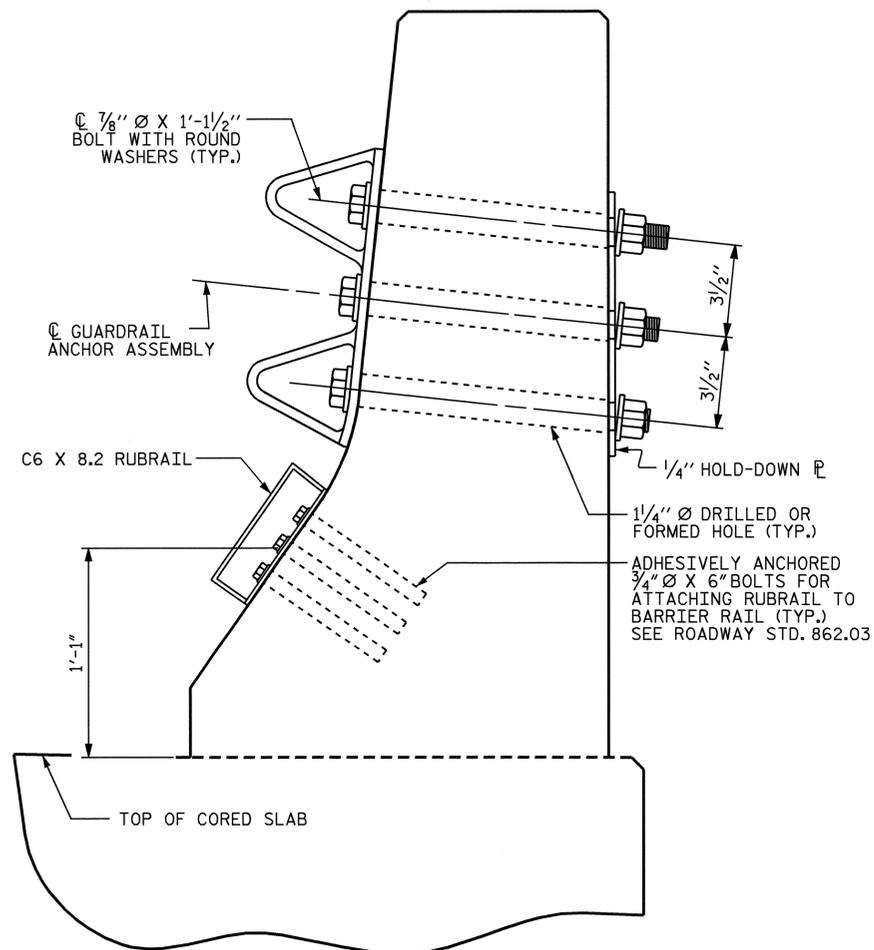
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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.

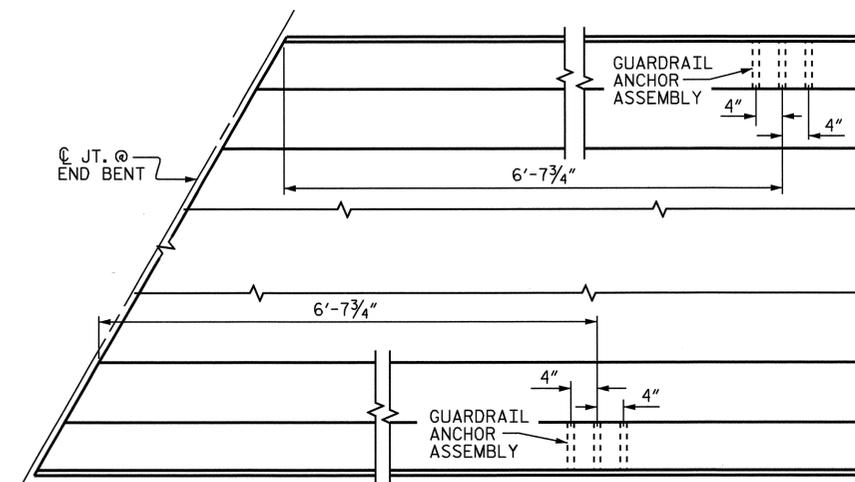
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03

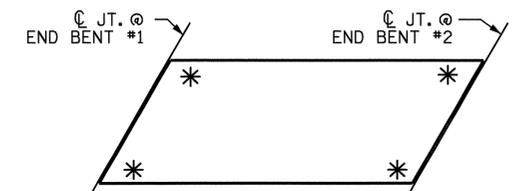


GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.



\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-4552  
IREDELL COUNTY  
 STATION: 16+95.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 GUARDRAIL ANCHORAGE  
 FOR BARRIER RAIL

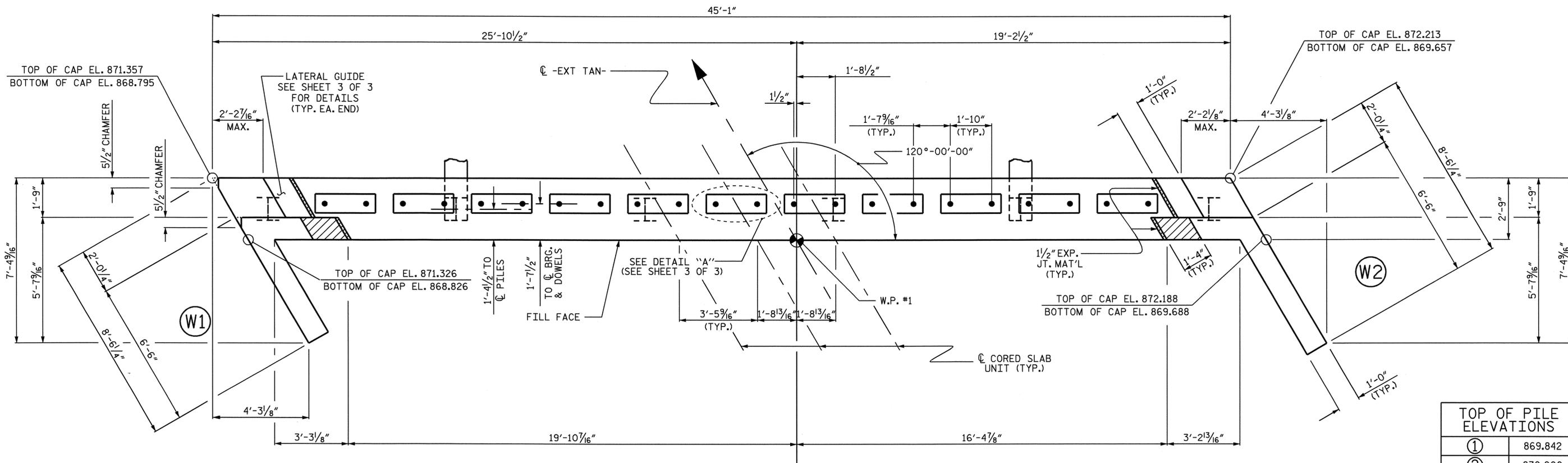


ASSEMBLED BY : M.L. BROWN	DATE : 7/07
CHECKED BY : S.B. WILLIAMS	DATE : 8/07
DRAWN BY : TLA 5/06	ADDED 5/1/06R KMM/GM
CHECKED BY : GM 5/06	

15-MAY-2008 07:38  
 r:\structures\superstructure\_drawings\mbrown\b-4552.sd\_bm.dgn  
 jbankovich

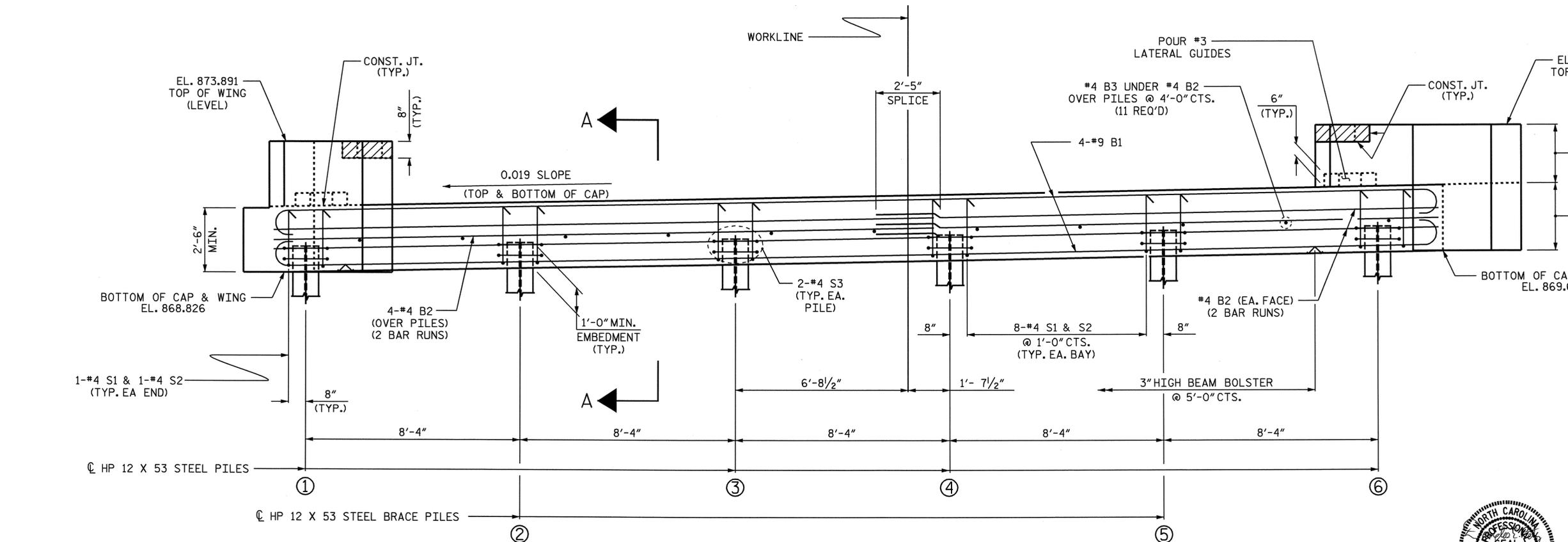
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			21

(SHT 2) STD. NO. GRA2



PLAN

TOP OF PILE ELEVATIONS	
①	869.842
②	870.000
③	870.159
④	870.317
⑤	870.475
⑥	870.634



ELEVATION

FOR SECTION A-A, SEE SHEET 3 OF 3

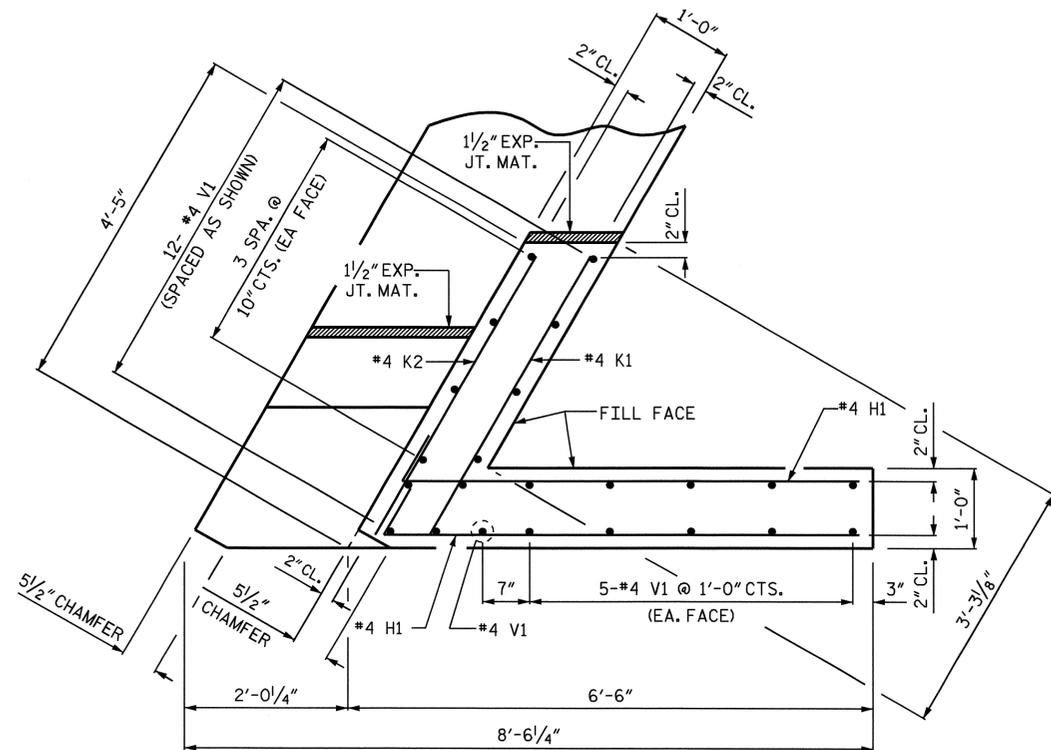
PROJECT NO. B-4552  
IREDELL COUNTY  
 STATION: 16+95.00 -L-

SHEET 1 OF 3

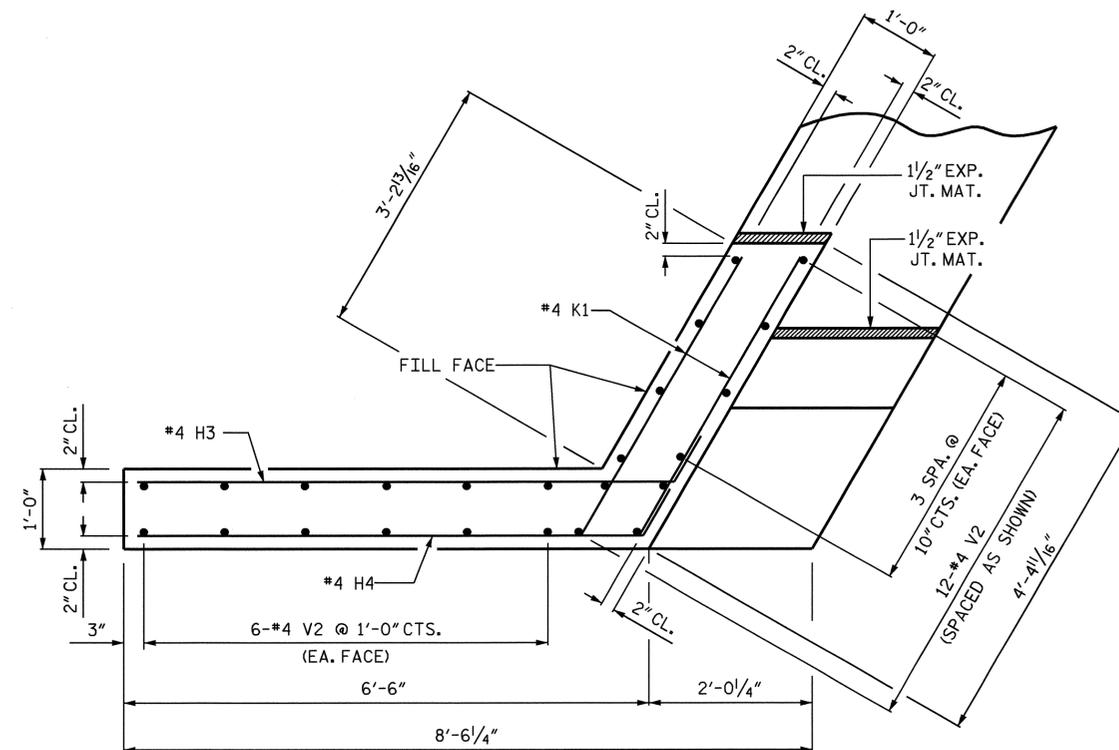
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT No. 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		



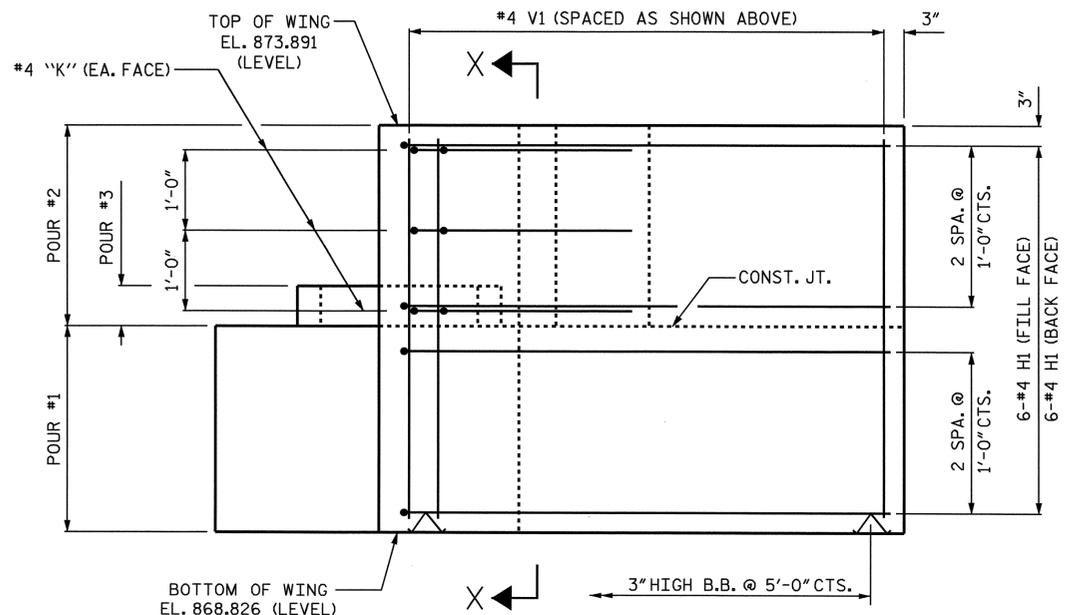
DRAWN BY : T. BANKOVICH DATE : 8/07  
 CHECKED BY : S. B. WILLIAMS DATE : 9/07



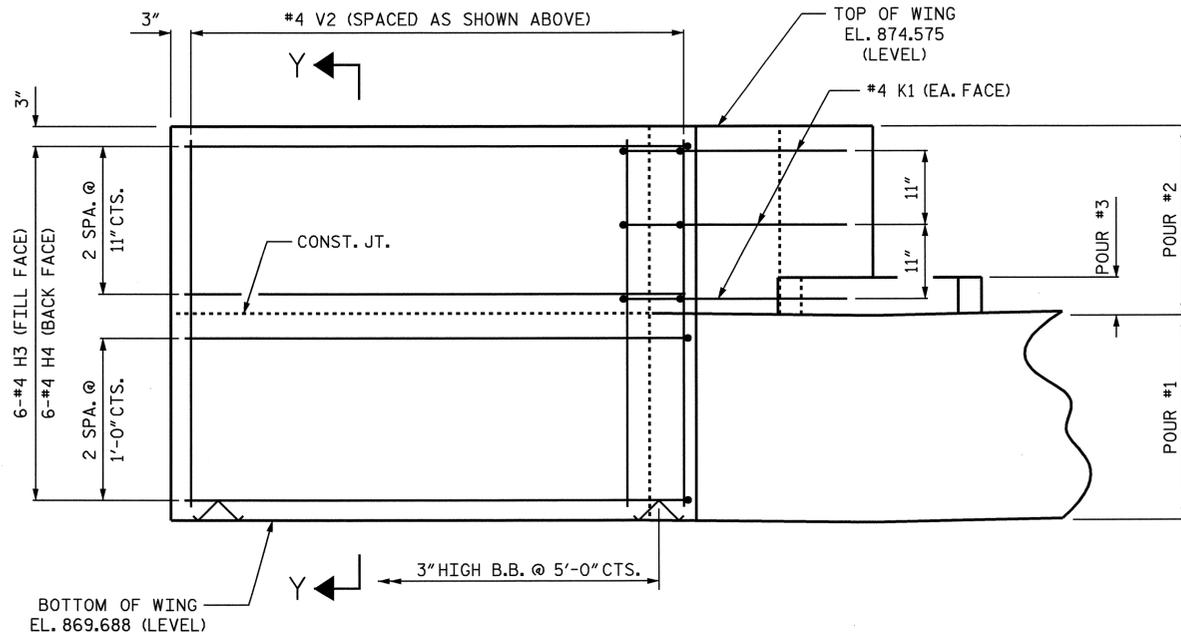
PLAN OF WING (W1)



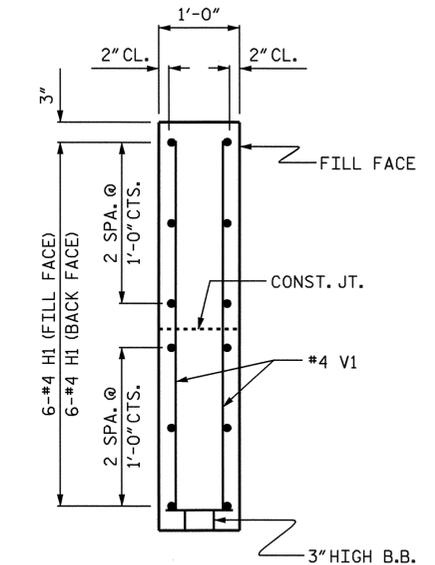
PLAN OF WING (W2)



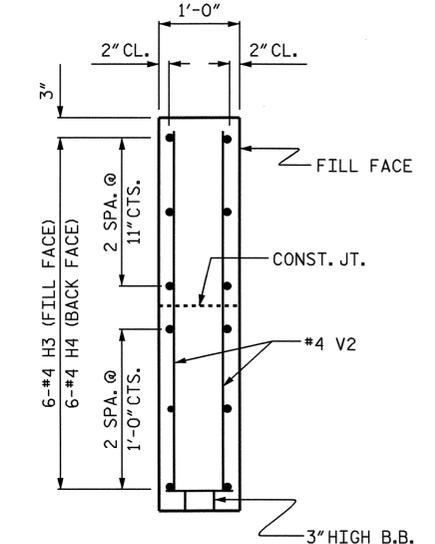
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION X-X



SECTION Y-Y

PROJECT NO. B-4552  
 IREDELL COUNTY  
 STATION: 16+95.00 -L-

SHEET 2 OF 3

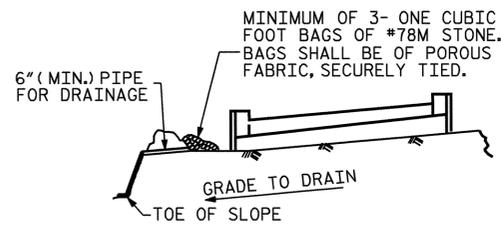
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			21

DRAWN BY : T. BANKOVICH DATE : 8/07  
 CHECKED BY : S. B. WILLIAMS DATE : 9/07



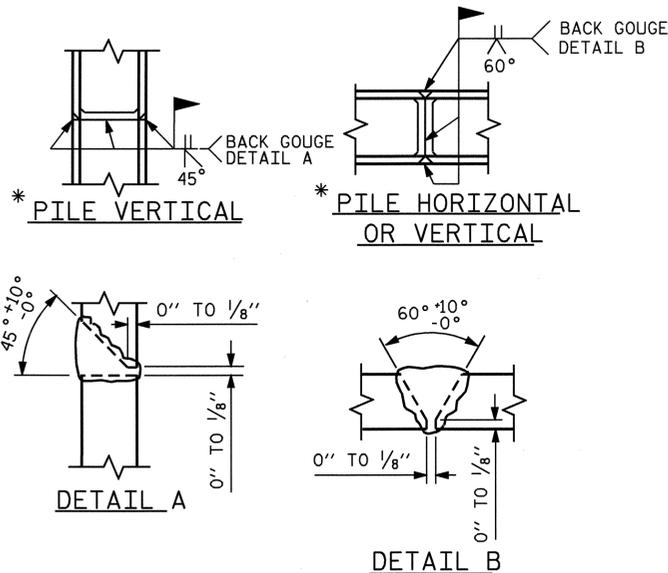


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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 No. 1

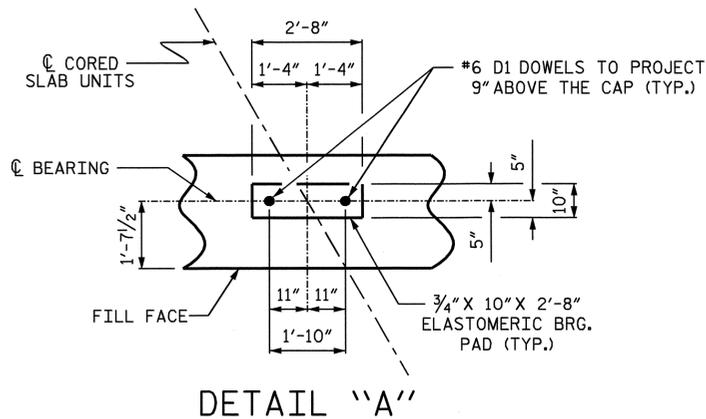


\* POSITION OF PILE DURING WELDING.

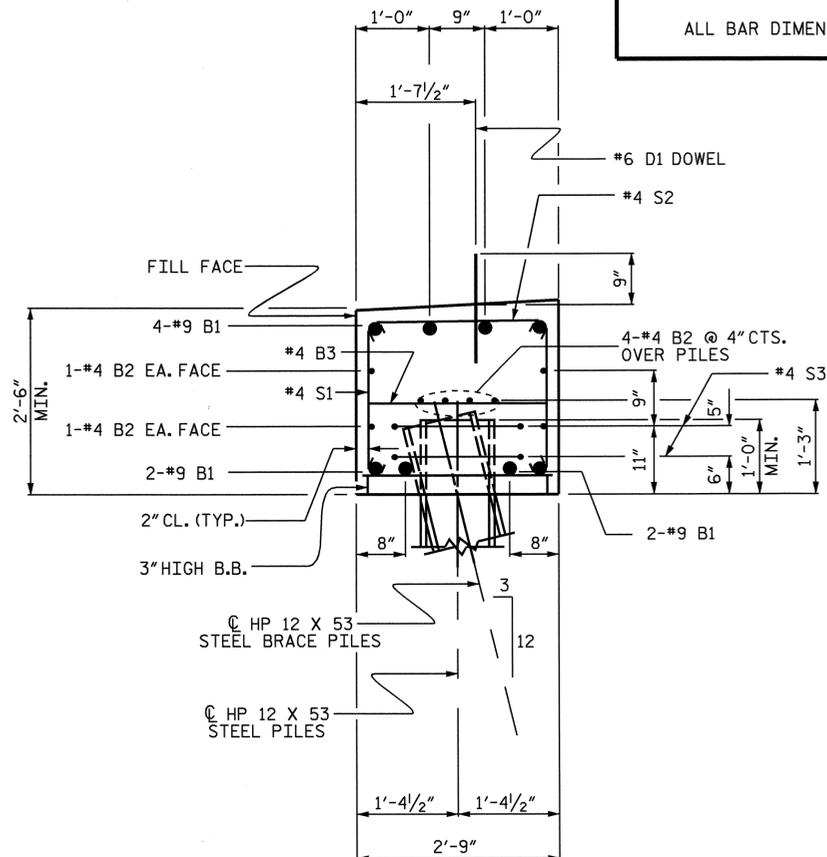
### PILE SPLICE DETAILS

BAR TYPES						BILL OF MATERIAL					
						END BENT No. 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT						
B1	8	#9		47'-1"	1281						
B2	16	#4	STR	23'-7"	252						
B3	11	#4	STR	2'-5"	18						
D1	22	#6	STR	1'-6"	50						
H1	12	#4	4	6'-4"	51						
H3	6	#4	3	7'-3"	29						
H4	6	#4	3	6'-10"	27						
K1	9	#4	STR	4'-0"	24						
K2	3	#4	STR	3'-9"	8						
S1	42	#4	5	7'-5"	208						
S2	42	#4	2	3'-2"	89						
S3	12	#4	6	6'-6"	52						
S4	4	#4	7	4'-7"	12						
V1	23	#4	STR	4'-8"	72						
V2	24	#4	STR	4'-6"	72						
REINFORCING STEEL					2245 LBS.						
CLASS A CONCRETE											
POUR #1 (CAP & LOWER WINGS)						12.6 C.Y.					
POUR #2 (UPPER WINGS)						1.8 C.Y.					
POUR #3 (LATERAL GUIDE)						0.1 C.Y.					
TOTAL =						14.5 C.Y.					
HP 12 X 53 STEEL PILES											
NO. = 6						165 LIN. FT.					

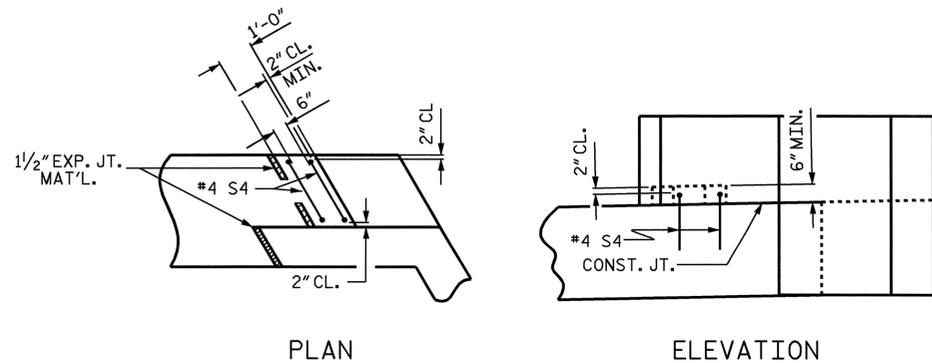
ALL BAR DIMENSIONS ARE OUT TO OUT.



DETAIL "A"



SECTION A-A



### LATERAL GUIDE DETAILS

(RIGHT LATERAL GUIDE SHOWN, LEFT GUIDE SIMILAR)

### NOTES

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

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 LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

THE TOP SURFACE OF THE END BENT CAP IS SLOPED LONGITUDINALLY AND TRANSVERSELY.

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

PROJECT NO. B-4552  
IREDELL COUNTY  
 STATION: 16+95.00 -L-

SHEET 3 OF 3

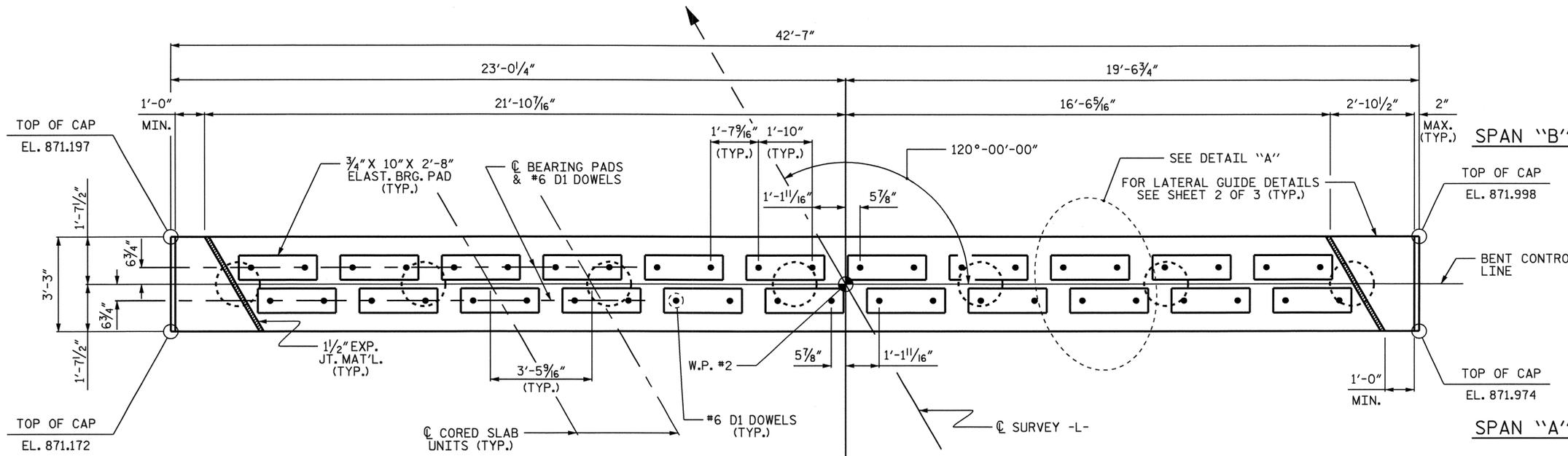
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1



DRAWN BY: T. BANKOVICH DATE: 9/07  
 CHECKED BY: S. B. WILLIAMS DATE: 9/07

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			21



PLAN

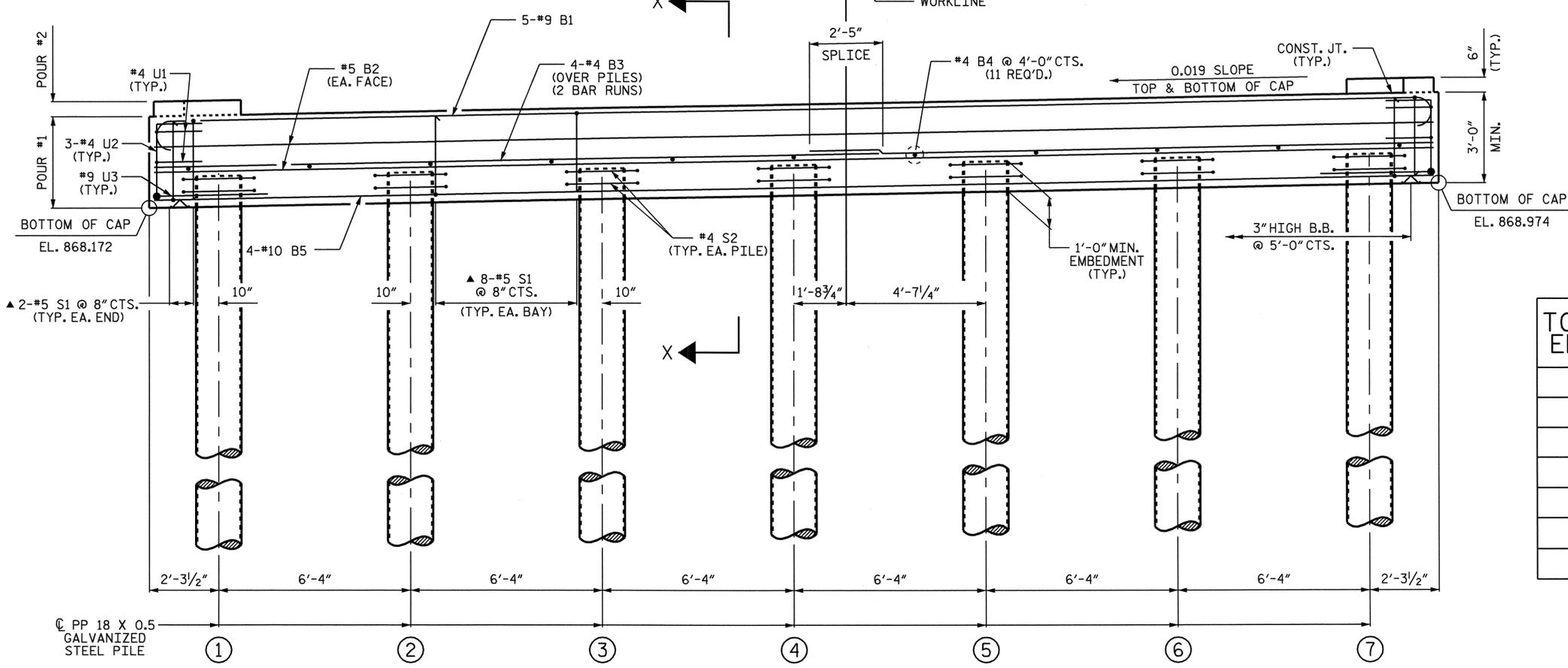
**NOTES**

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

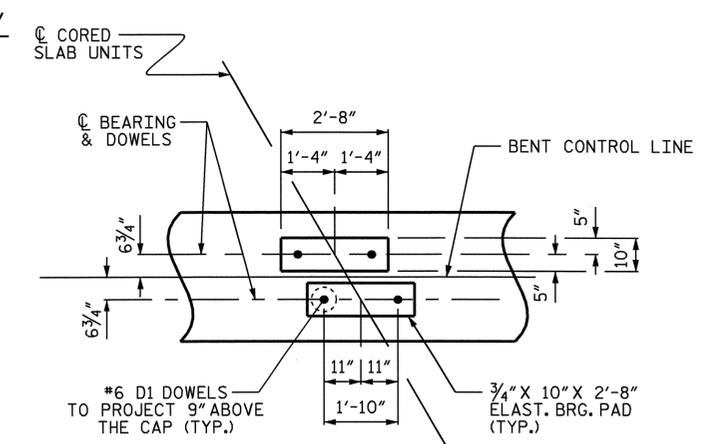
THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL THE CORED SLAB UNITS ARE IN PLACE.

▲ INVERT ALTERNATE STIRRUPS AS SHOWN.

THE TOP SURFACE OF THE BENT CAP IS SLOPED LONGITUDINALLY AND TRANSVERSELY.



ELEVATION



DETAIL "A"

TOP OF PILE ELEVATIONS	
①	869.229
②	869.348
③	869.467
④	869.587
⑤	869.706
⑥	869.825
⑦	869.944

PROJECT NO. B-4552

IREDELL COUNTY

STATION: 16+95.00 -L-

SHEET 1 OF 3

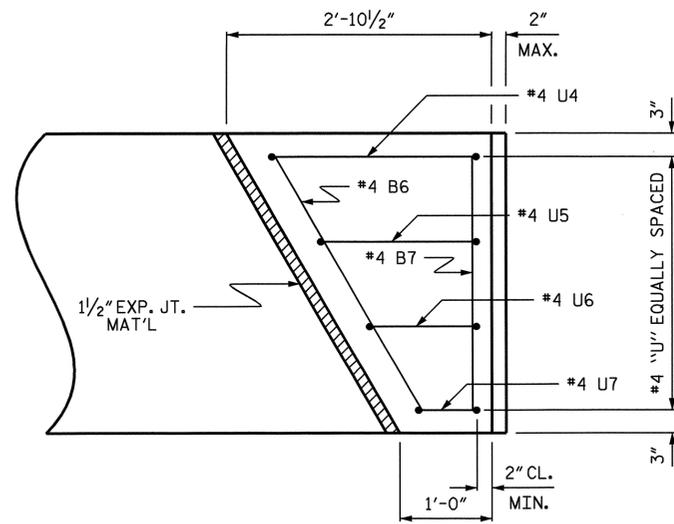
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
BENT No. 1

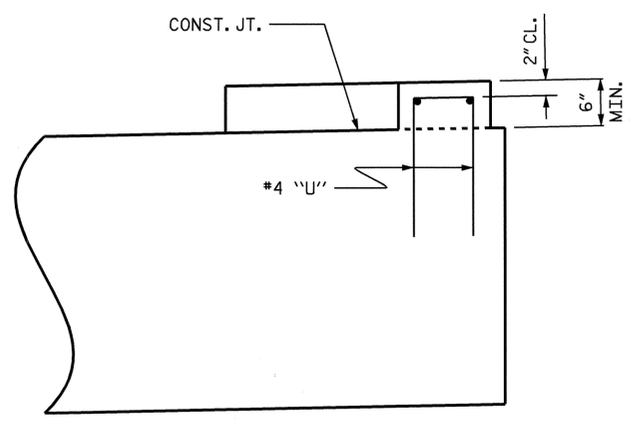


DRAWN BY: T. BANKOVICH DATE: 10/07  
CHECKED BY: M. L. BROWN DATE: 12/07

REVISIONS						SHEET NO. S-12 TOTAL SHEETS 21
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



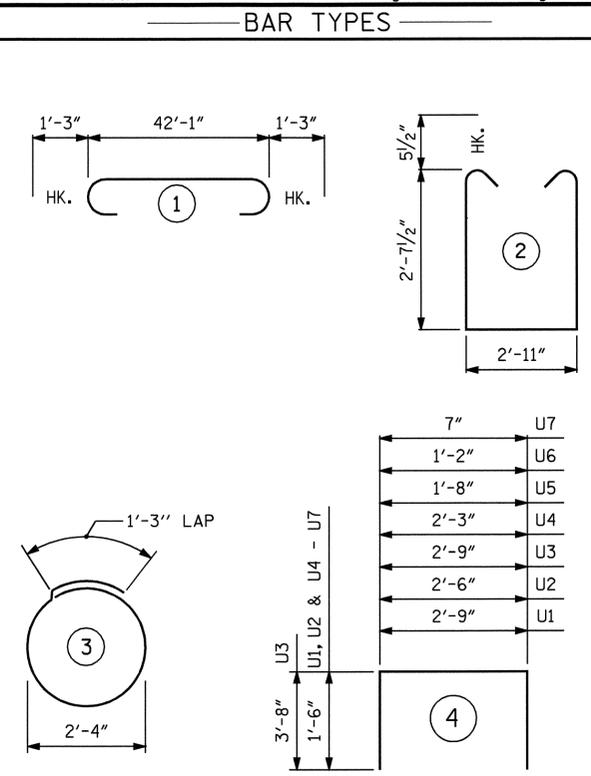
PLAN



ELEVATION

LATERAL GUIDE DETAIL

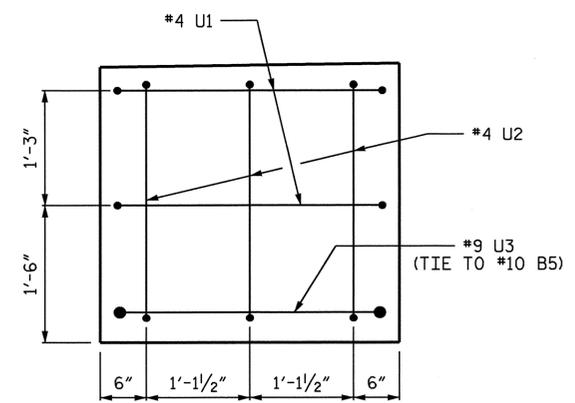
RIGHT LATERAL GUIDE SHOWN, LEFT LATERAL GUIDE SIMILAR



ALL BAR DIMENSIONS ARE OUT TO OUT.

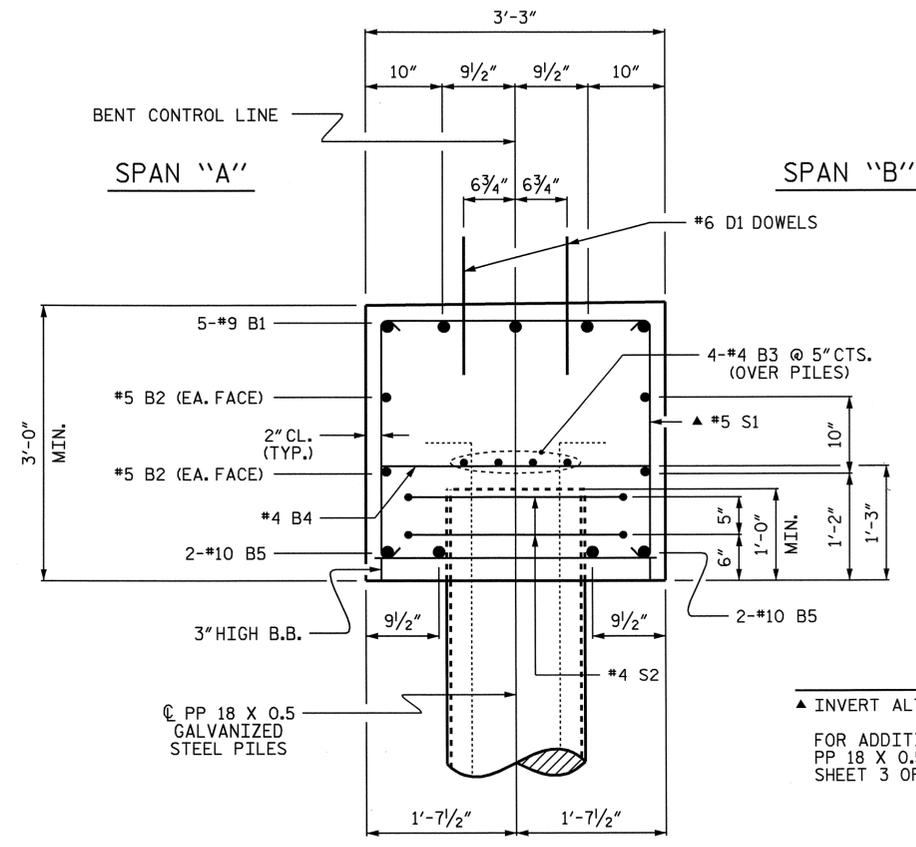
BILL OF MATERIAL					
BENT No. 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#9	1	44'-7"	758
B2	4	#5	STR	42'-3"	176
B3	8	#4	STR	22'-4"	119
B4	11	#4	STR	2'-11"	21
B5	4	#10	STR	42'-3"	727
B6	2	#4	STR	3'-4"	4
B7	2	#4	STR	2'-11"	4
D1	44	#6	STR	1'-6"	99
S1	52	#5	2	9'-1"	493
S2	14	#4	3	8'-7"	80
U1	4	#4	4	5'-9"	15
U2	6	#4	4	5'-6"	22
U3	2	#9	4	10'-1"	69
U4	2	#4	4	5'-3"	7
U5	2	#4	4	4'-8"	6
U6	2	#4	4	4'-2"	6
U7	2	#4	4	3'-7"	5
TOTAL REINFORCING STEEL					2611 LBS
CLASS A CONCRETE BREAKDOWN					
POUR #1 (CAP)					14.9 C.Y.
POUR #2 (LATERAL GUIDE)					0.1 C.Y.
TOTAL CLASS A CONCRETE					15.0 C.Y.
PP 18 X 0.5 GALVANIZED STEEL PILE					
No. = 7					LIN. FT. = 200
PIPE PILE PLATES No. = 7					
PILE EXCAVATION IN SOIL					5 LIN. FT.
PILE EXCAVATION NOT IN SOIL					53 LIN. FT.

THE CONCRETE DISPLACED BY THE PP 18 X 0.5 GALVANIZED STEEL PILES HAS BEEN DEDUCTED FROM POUR #1 CONCRETE QUANTITY.



END OF CAP VIEW

(RIGHT END SHOWN, LEFT END SIMILAR)



SECTION X-X

NOTES

- ▲ INVERT ALTERNATE STIRRUPS AS SHOWN.
- FOR ADDITIONAL REINFORCING STEEL IN PP 18 X 0.5 GALVANIZED STEEL PILES, SEE SHEET 3 OF 3

PROJECT NO. B-4552  
 IREDELL COUNTY  
 STATION: 16+95.00 -L-

SHEET 2 OF 3

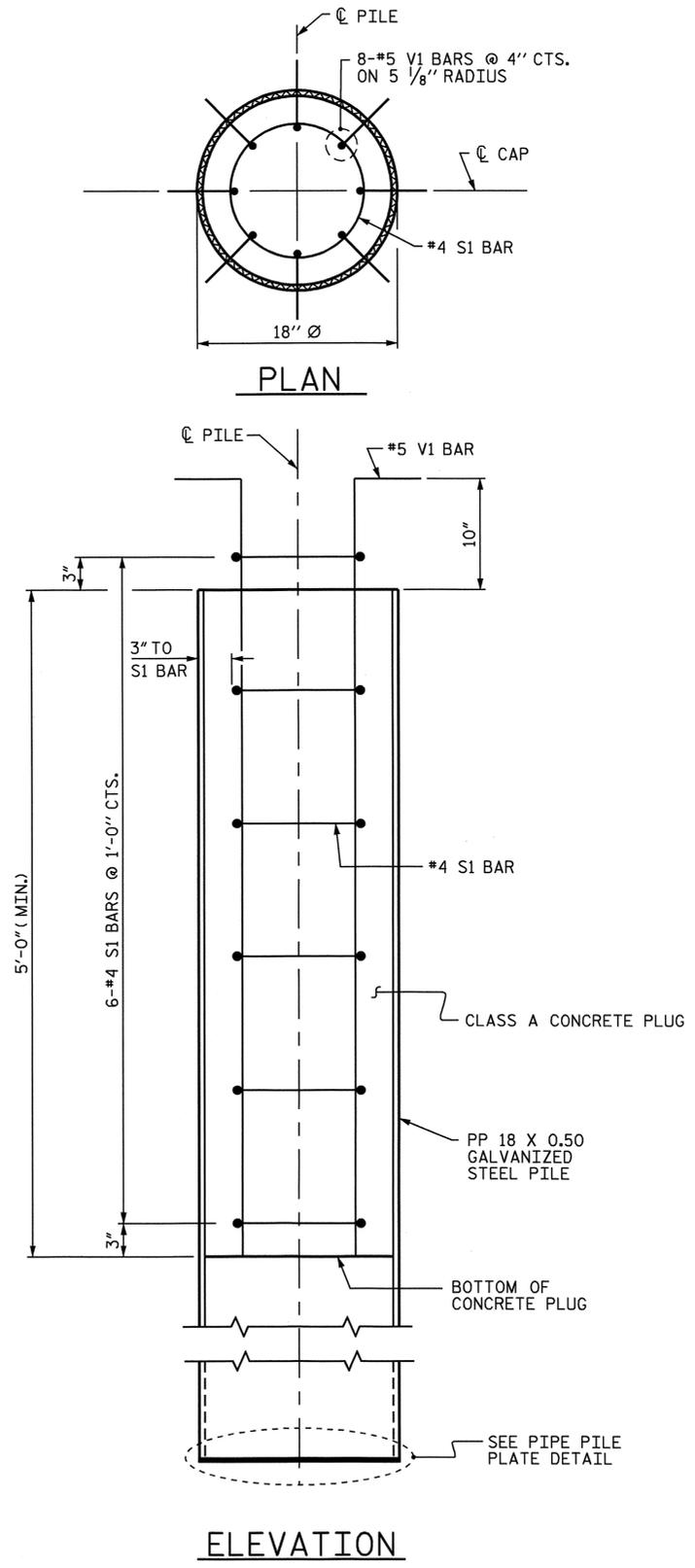
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 BENT No. 1

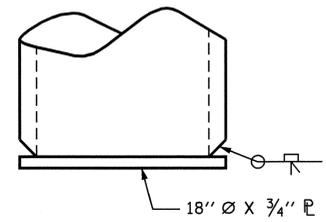


DRAWN BY: T. BANKOVICH DATE: 10/07  
 CHECKED BY: M. L. BROWN DATE: 12/07

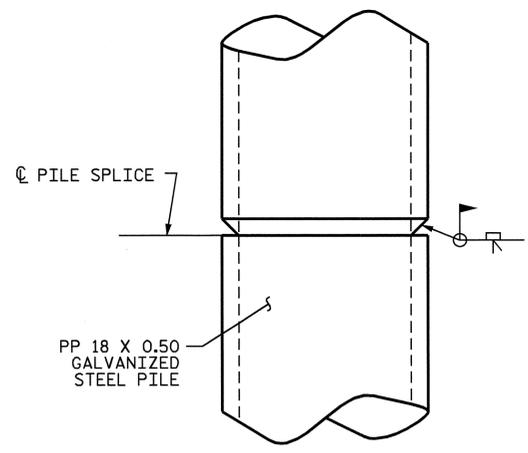
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS 21
2			4			



PP 18 X 0.50 GALVANIZED STEEL PILE



PIPE PILE PLATE DETAIL



PIPE PILE SPLICE DETAIL

NOTES

PIPE PILES SHALL BE IN ACCORDANCE WITH SECTION 1084 OF THE STANDARD SPECIFICATIONS.

GALVANIZE STEEL PIPE PILES IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS UNLESS METALLIZING IS REQUIRED. GALVANIZING OR METALLIZING PIPE PILE PLATES IS NOT REQUIRED.

PIPE PILE PLATES, IF REQUIRED, SHALL BE IN ACCORDANCE WITH SECTION 450 OF THE STANDARD SPECIFICATIONS.

REMOVE AND REPLACE OR REPAIR TO THE SATISFACTION OF THE ENGINEER PILES THAT ARE DAMAGED, DEFORMED OR COLLAPSED DURING INSTALLATION OR DRIVING.

PILE SPLICES SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND AWS D1.1.

FOR CLOSED END PIPE PILES, REMOVE ALL SOIL AND WATER FROM INSIDE THE PILES JUST PRIOR TO PLACING REINFORCING STEEL AND CONCRETE FOR THE CONCRETE PLUG.

FOR OPEN END PIPE PILES, REMOVE ENOUGH SOIL AND WATER FROM INSIDE THE PILES TO CONSTRUCT THE CONCRETE PLUG WITHOUT FOULING THE CONCRETE.

FORM THE CONCRETE PLUG SUCH THAT THE REINFORCING STEEL OR CONCRETE DOES NOT MOVE AND THE CLEARANCE FROM THE REINFORCING STEEL TO THE INSIDE OF THE PILE IS MAINTAINED AFTER CONCRETE PLACEMENT. DO NOT PLACE CONCRETE IN THE BENT CAP UNTIL THE CONCRETE PLUG HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.

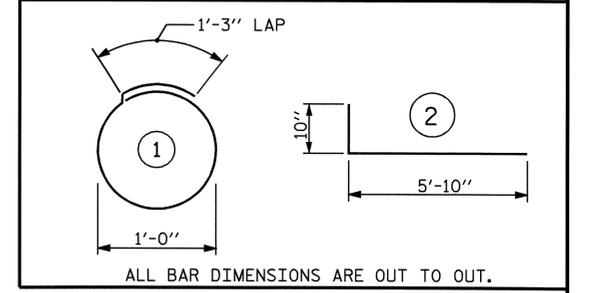
THE REINFORCING STEEL, CLASS A CONCRETE, AND GALVANIZING ARE CONSIDERED INCIDENTAL TO THE CONTRACT UNIT PRICE BID PER LINEAR FOOT FOR PP 18 X 0.50 GALVANIZED STEEL PILES.

BILL OF MATERIAL FOR ONE PP 18 X 0.50 GALVANIZED STEEL PILE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
S1	6	#4	1	4'-5"	18
V1	8	#5	2	6'-8"	56
REINFORCING STEEL =				74	lbs

CLASS A CONCRETE  
5'-0" MINIMUM PLUG 0.3 CY

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-4552  
IREDELL COUNTY  
STATION: 16+95.00 -L-

SHEET 3 OF 3

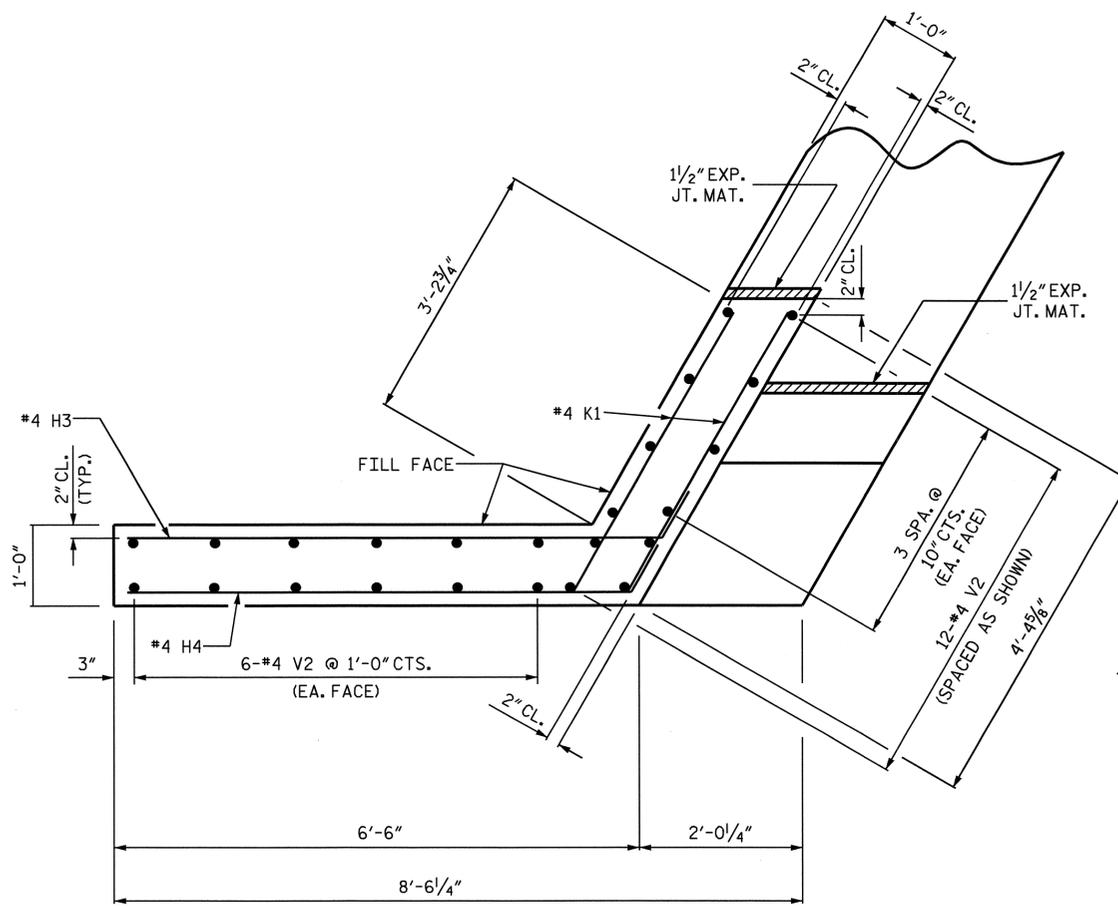
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
18" STEEL PIPE PILE



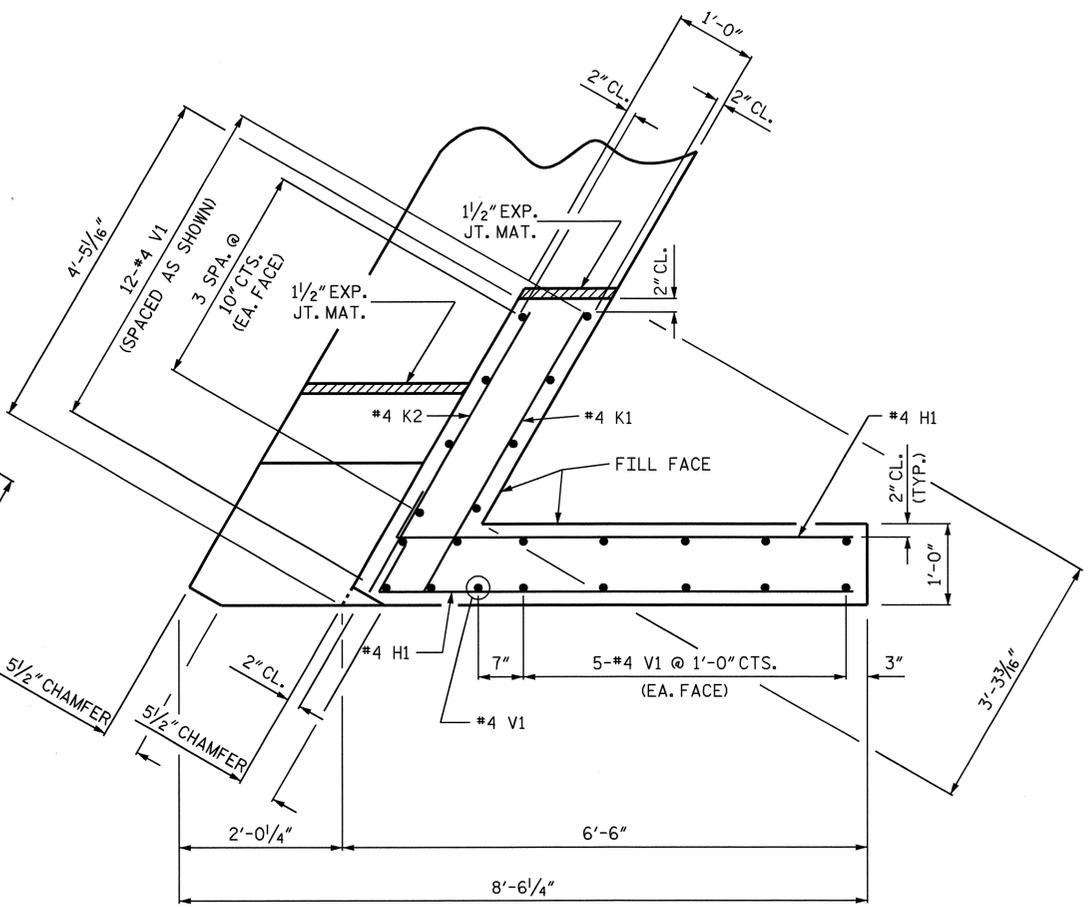
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			21

ASSEMBLED BY : T. BANKOVICH	DATE : 10/07
CHECKED BY : M. L. BROWN	DATE : 12/07
DRAWN BY : RWW 1/01	REV. 5/7/03 RWW/JTE
CHECKED BY : LES 1/01	REV. 10/1/05 LBG/TLA
	REV. 5/1/06R MAA/KMM

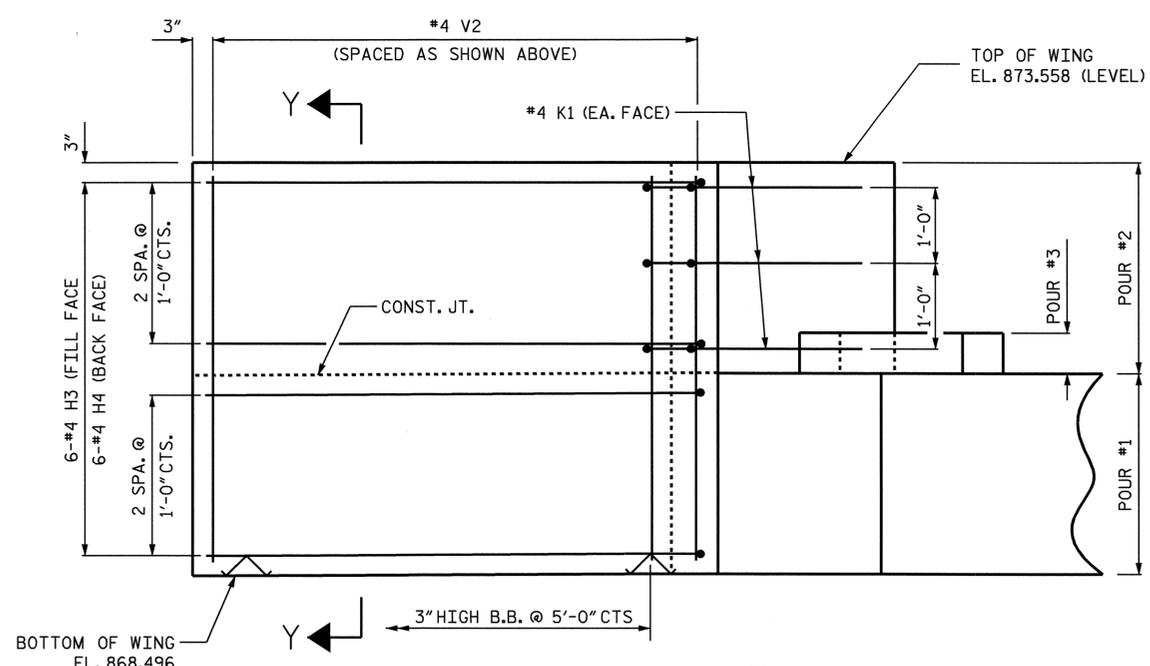




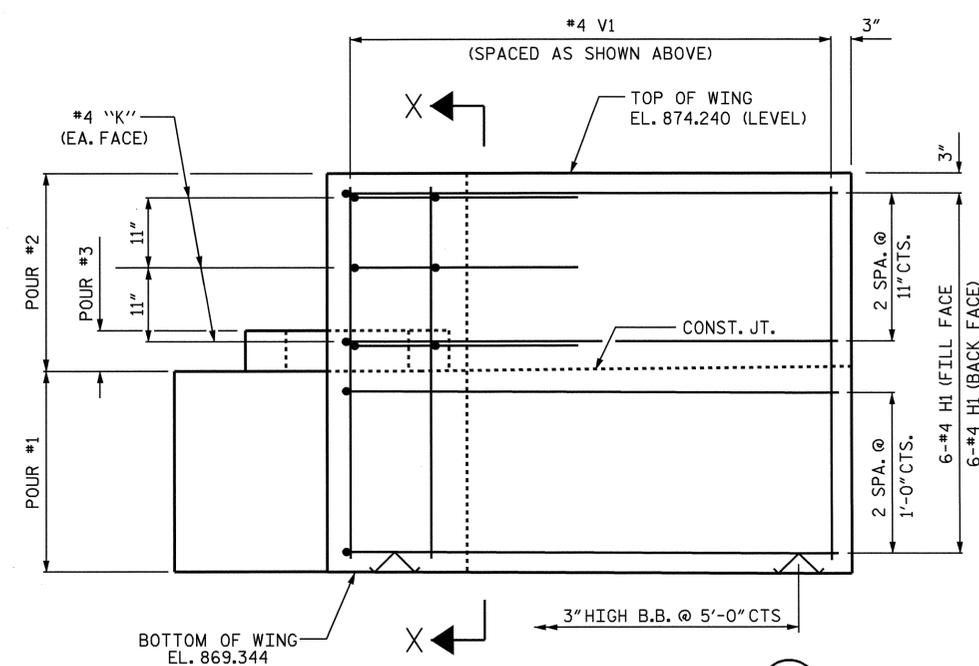
PLAN OF WING (W2)



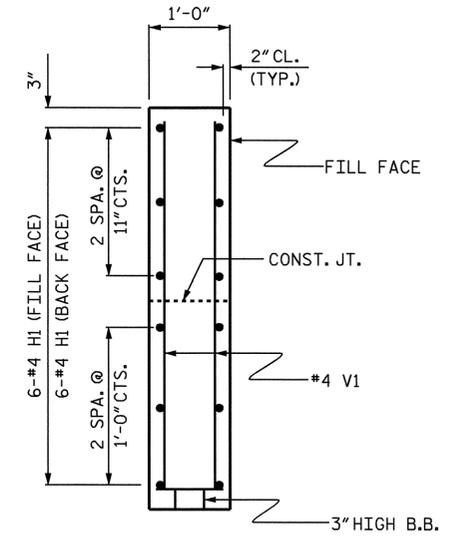
PLAN OF WING (W1)



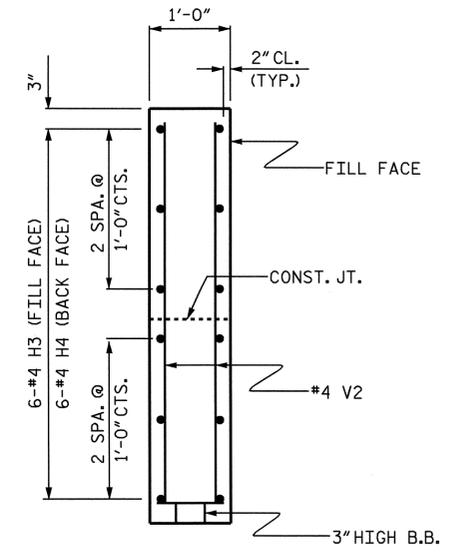
ELEVATION OF WING (W2)



ELEVATION OF WING (W1)



SECTION X-X



SECTION Y-Y

PROJECT NO. B-4552  
 IREDELL COUNTY  
 STATION: 16+95.00 -L-

SHEET 2 OF 3

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

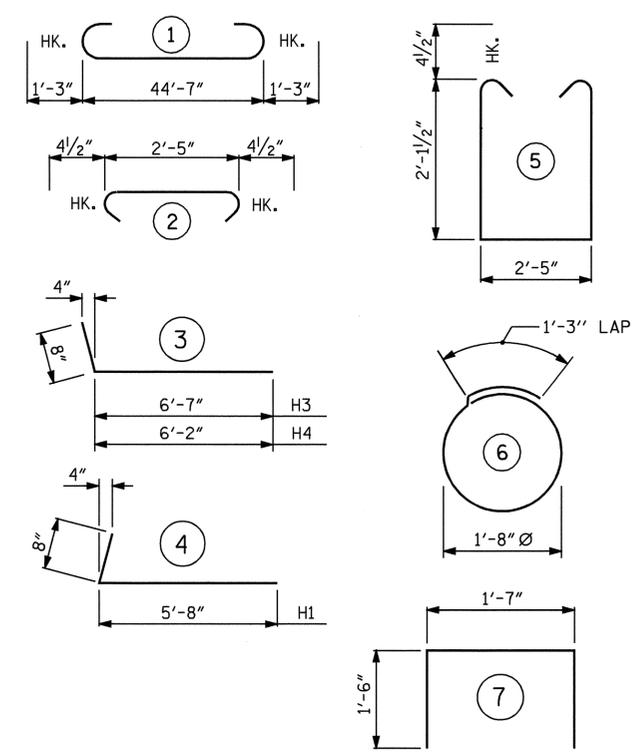


DRAWN BY: T. BANKOVICH DATE: 9/07  
 CHECKED BY: S. B. WILLIAMS DATE: 9/07

15-MAY-2008 08:39  
 r:\structures\substructure\_drawings\b4552.sd.e\*.2.dgn  
 tbankovich

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16	
1			3			TOTAL SHEETS 21	
2			4				

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT No. 2

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	#9	1	47'-1"	1281
B2	#4	STR	23'-7"	252
B3	#4	STR	2'-5"	18
D1	#6	STR	1'-6"	50
H1	#4	4	6'-4"	51
H3	#4	3	7'-3"	29
H4	#4	3	6'-10"	27
K1	#4	STR	4'-0"	24
K2	#4	STR	3'-9"	8
S1	#4	5	7'-5"	208
S2	#4	2	3'-2"	89
S3	#4	6	6'-6"	52
S4	#4	7	4'-7"	12
V1	#4	STR	4'-6"	69
V2	#4	STR	4'-8"	75

REINFORCING STEEL 2245 LBS.

CLASS A CONCRETE

POUR #1 (CAP & LOWER WINGS) 12.6 C.Y.

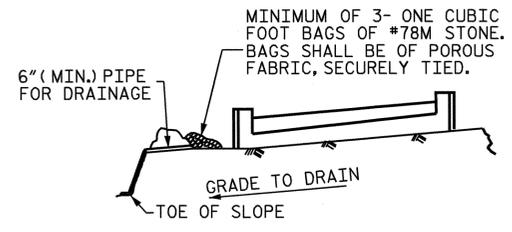
POUR #2 (UPPER WINGS) 1.8 C.Y.

POUR #3 (LATERAL GUIDES) 0.1 C.Y.

TOTAL = 14.5 C.Y.

HP 12 X 53 STEEL PILES

NO. = 6 120 LIN. FT.



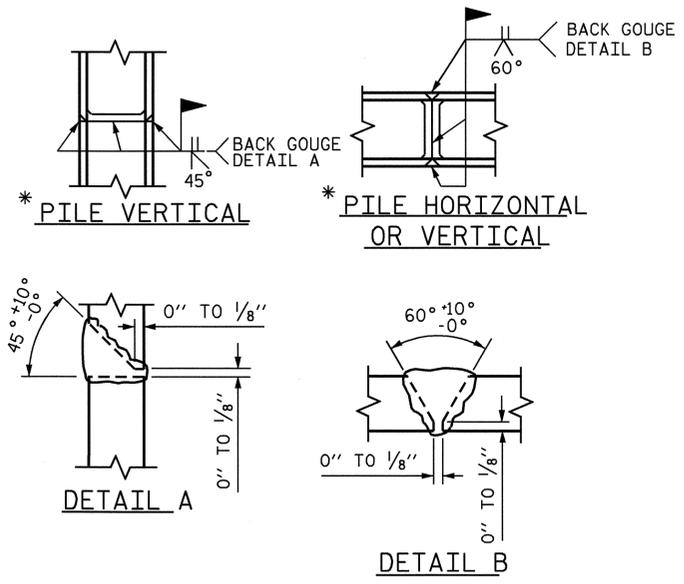
MINIMUM OF 3- ONE CUBIC FOOT BAGS OF #78M STONE. BAGS SHALL BE OF POROUS FABRIC, SECURELY TIED.

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.

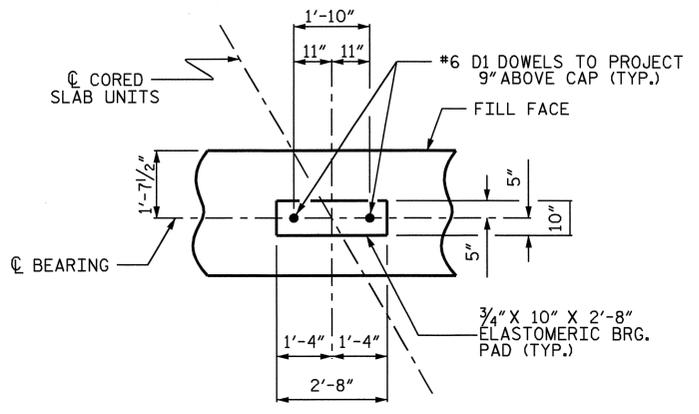
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT No. 2

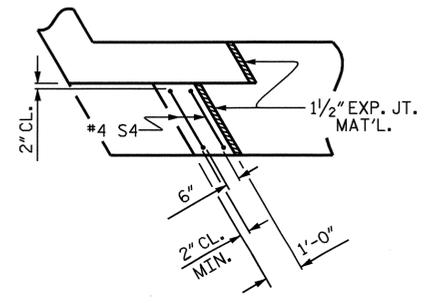


\* POSITION OF PILE DURING WELDING.

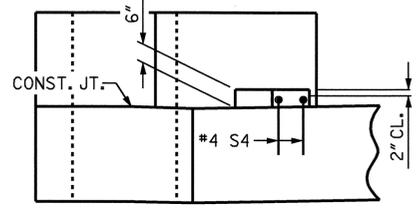
PILE SPLICE DETAILS



DETAIL "A"



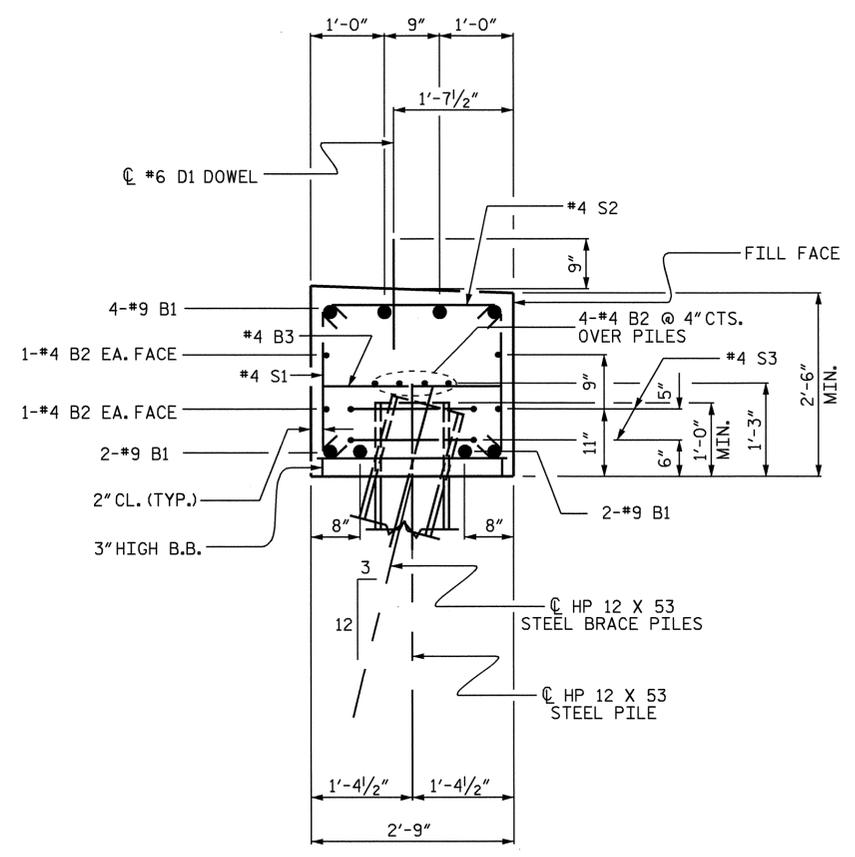
PLAN



ELEVATION

LATERAL GUIDE DETAILS

(LEFT LATERAL GUIDE SHOWN, RIGHT GUIDE SIMILAR)



SECTION A-A

NOTES

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

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

THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

THE TOP SURFACE OF THE END BENT CAP IS SLOPED LONGITUDINALLY AND TRANSVERSELY.

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

PROJECT NO. B-4552  
 IREDELL COUNTY  
 STATION: 16+95.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE

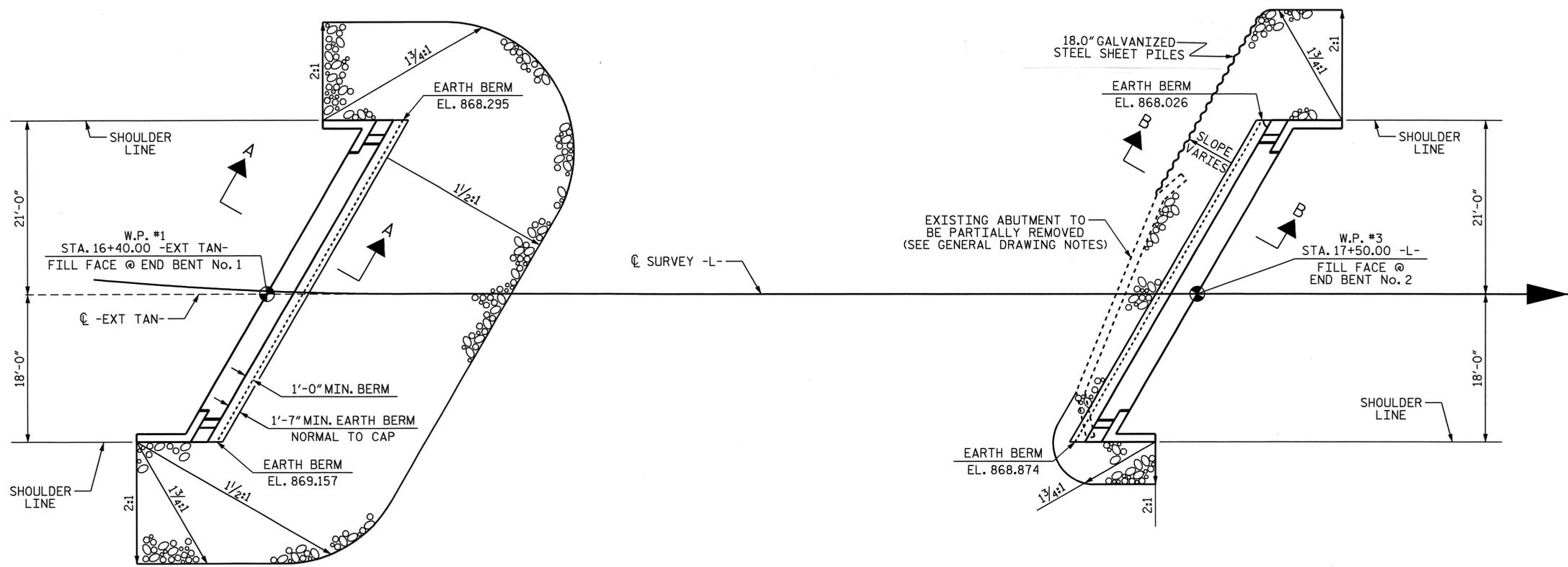
END BENT No. 2



DRAWN BY: T. BANKOVICH DATE: 9/07  
 CHECKED BY: S. B. WILLIAMS DATE: 9/07

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

TOTAL SHEETS 21

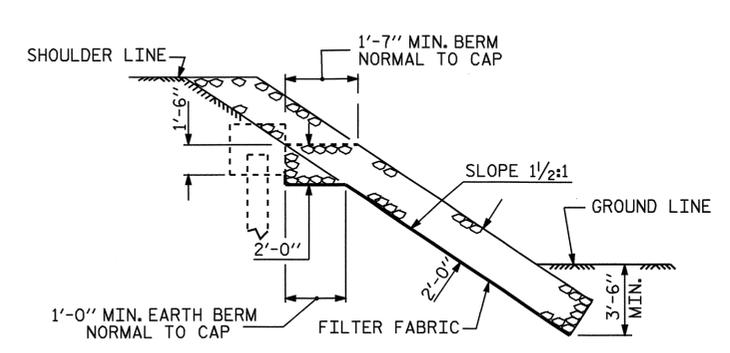


END BENT No. 1

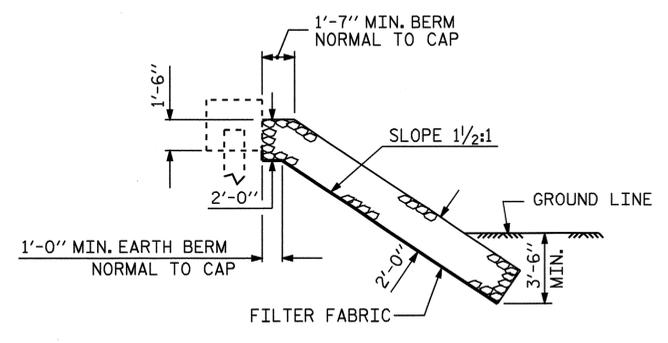
PLAN OF RIP RAP

END BENT No. 2

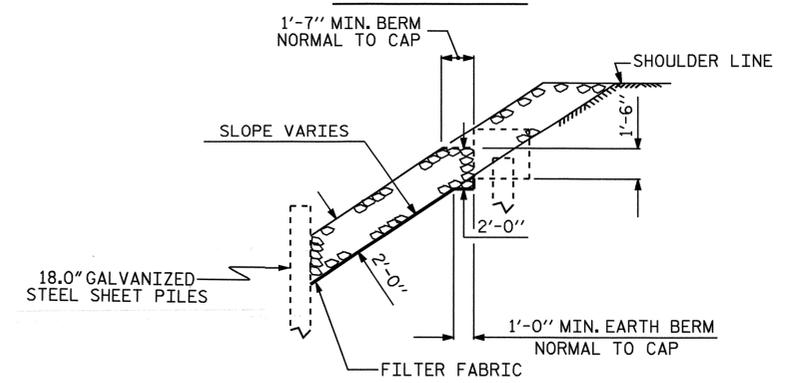
ESTIMATED QUANTITIES		
BRIDGE @ STA. 16+95.00 -L-	RIP RAP CLASS II	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	250	278
END BENT 2	60	67



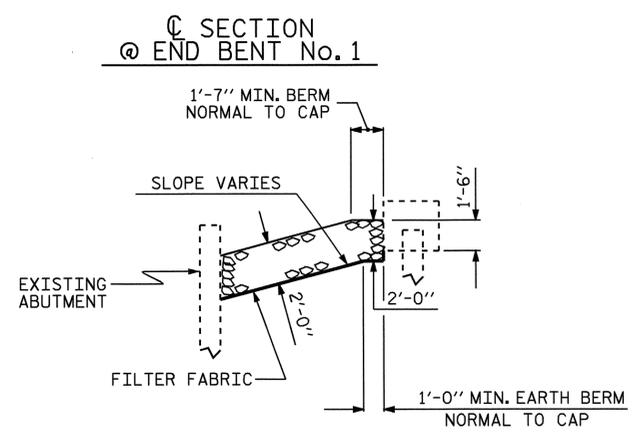
SECTION A-A



SECTION @ END BENT No. 1



SECTION B-B



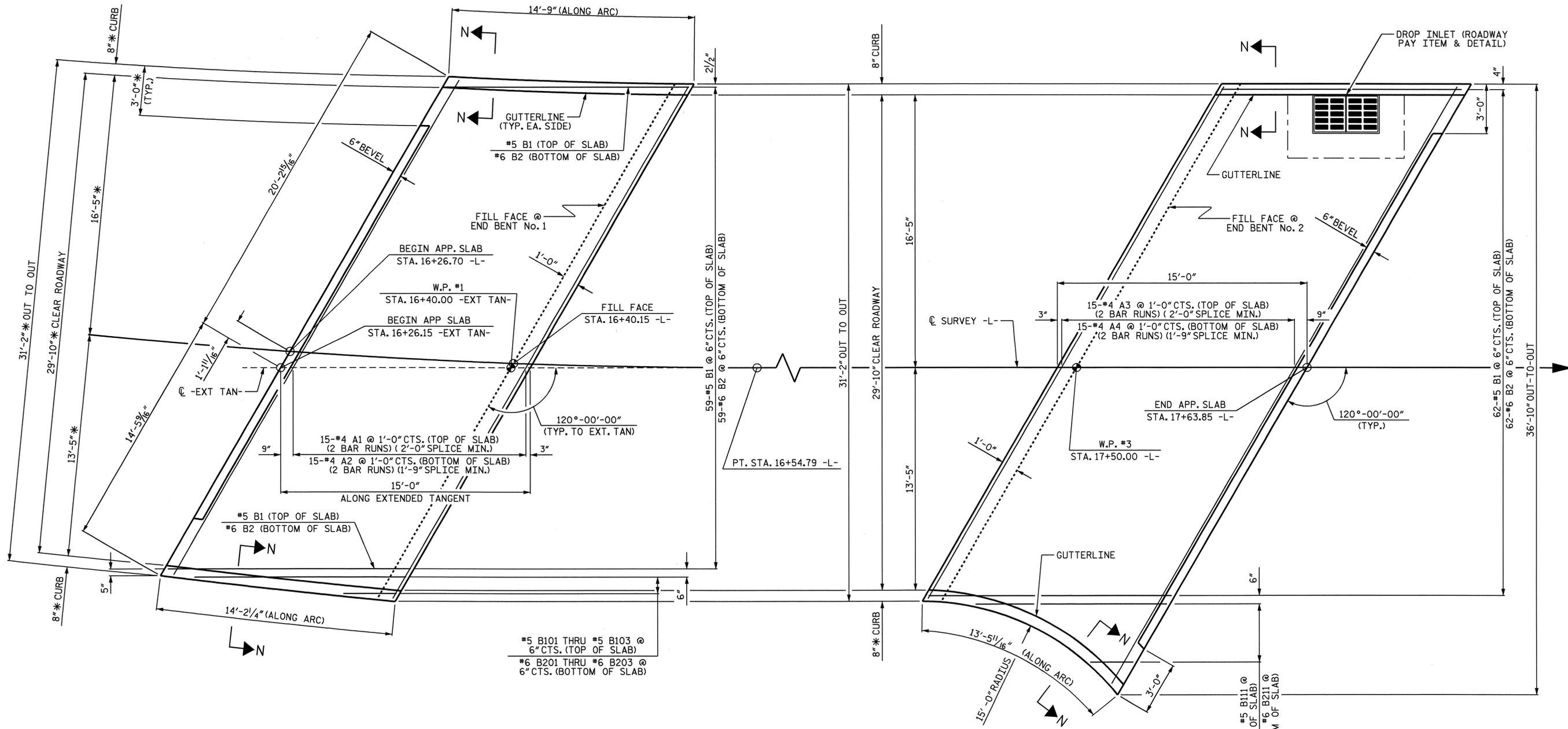
SECTION @ END BENT No. 2

PROJECT NO. B-4552  
IREDELL COUNTY  
 STATION: 16+95.00 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD = RIP RAP DETAILS =					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-18
					TOTAL SHEETS 21



ASSEMBLED BY : T. BANKOVICH DATE : 2-2008  
 CHECKED BY : D. PETREY DATE : 3-2008  
 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

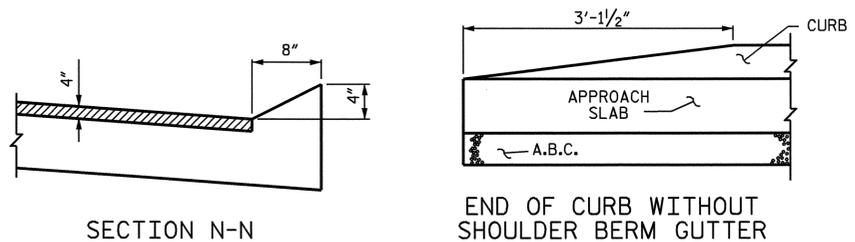


PLAN @ END BENT No. 1

"A" BARS SPACED ALONG EXTENDED TANGENT  
 "B" BARS SPACED PARALLEL TO EXTENDED TANGENT

PLAN OF APPROACH SLAB

PLAN @ END BENT No. 2



CURB DETAILS

**NOTES:**  
 \* MEASURED RADIALLY  
 FOR EXTENDED TANGENT LAYOUT SEE SHEET 3 OF 3 OF GENERAL DRAWING.  
 REINFORCING STEEL SHALL BE FIELD CUT IN ORDER TO MAINTAIN A 2 INCH MINIMUM CLEARANCE TO THE DROP INLET. SEE ROADWAY PLANS FOR DROP INLET REINFORCING STEEL AND DETAILS.

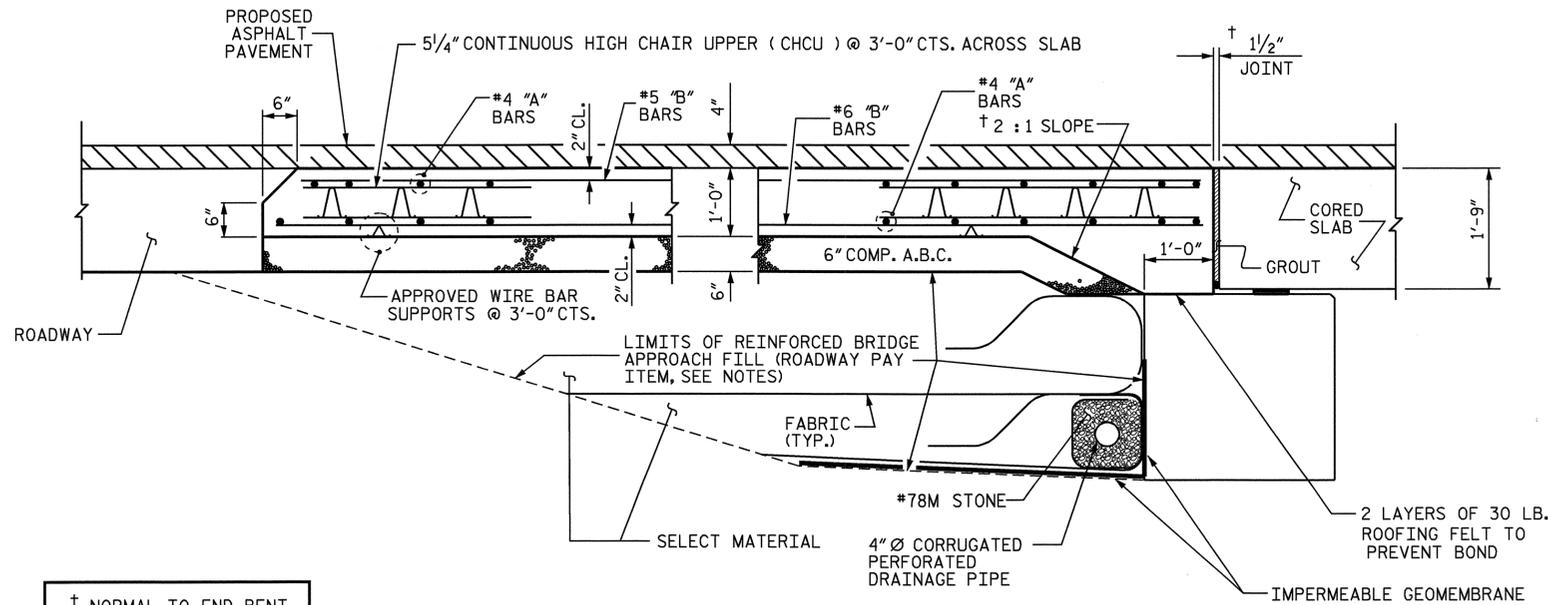


PROJECT NO. B-4552  
IREDELL COUNTY  
 STATION: 16+95.00 -L-

SHEET 1 OF 3

REVISIONS						SHEET NO. S-19
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 21
2			4			

DRAWN BY: T. BANKOVICH DATE: 3-2008  
 CHECKED BY: D. PETREY DATE: 3-2008



SECTION THRU SLAB

BILL OF MATERIAL						BILL OF MATERIAL						
APPROACH SLAB AT EB #1						APPROACH SLAB AT EB #2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	30	#4	STR	18'-10"	377	*A3	30	#4	STR	22'-1"	443	
A2	30	#4	STR	18'-9"	376	A4	30	#4	STR	22'-0"	441	
*B1	59	#5	STR	14'-2"	872	*B1	62	#5	STR	14'-2"	916	
*B101	1	#5	STR	12'-8"	13	*B104	1	#5	STR	10'-11"	11	
*B102	1	#5	STR	8'-2"	9	*B105	1	#5	STR	8'-10"	9	
*B103	1	#5	STR	3'-2"	3	*B106	1	#5	STR	7'-4"	8	
B2	59	#6	STR	14'-8"	1300	*B107	1	#5	STR	6'-0"	6	
B201	1	#6	STR	12'-8"	19	*B108	1	#5	STR	4'-10"	5	
B202	1	#6	STR	8'-2"	12	*B109	1	#5	STR	3'-10"	4	
B203	1	#6	STR	3'-2"	5	*B110	1	#5	STR	2'-11"	3	
						*B111	1	#5	STR	2'-7"	3	
REINFORCING STEEL					1712 LBS.	B2	62	#6	STR	14'-8"	1366	
*EPOXY COATED REINFORCING STEEL					1274 LBS.	B204	1	#6	STR	11'-6"	17	
CLASS AA CONCRETE					19.6 C. Y.	B205	1	#6	STR	9'-5"	14	
						B206	1	#6	STR	7'-10"	12	
						B207	1	#6	STR	6'-7"	10	
						B208	1	#6	STR	5'-5"	8	
						B209	1	#6	STR	4'-5"	7	
						B210	1	#6	STR	3'-5"	5	
						B211	1	#6	STR	2'-7"	4	
REINFORCING STEEL					1884 LBS.	*EPOXY COATED REINFORCING STEEL						1408 LBS.
CLASS AA CONCRETE					21.2 C. Y.	CLASS AA CONCRETE						21.2 C. Y.

NOTES

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 OF EACH EDGE OF THE APPROACH SLAB.

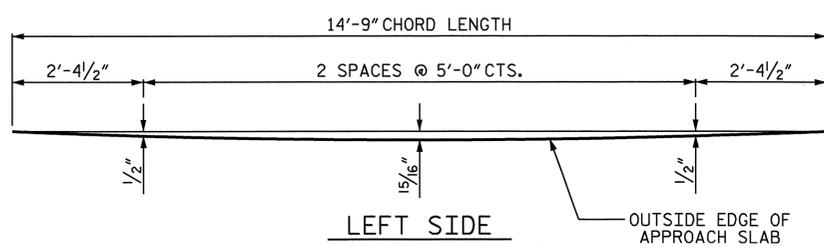
THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

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.

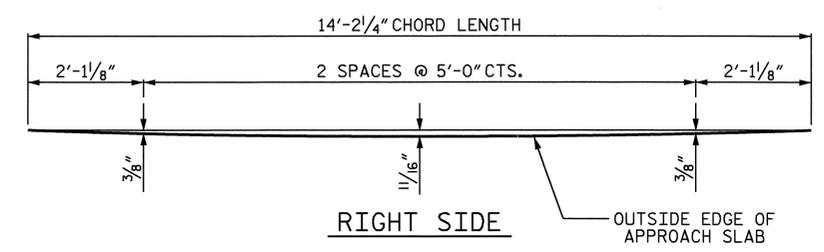
FOR JOINT DETAILS, SEE "PRESTRESSED CONCRETE CORED SLAB UNIT" SHEETS.

THE JOINT AT THE END BENT SHALL BE GROUTED AS SOON AS PRACTICAL AFTER THE CONSTRUCTION OF THE APPROACH SLABS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

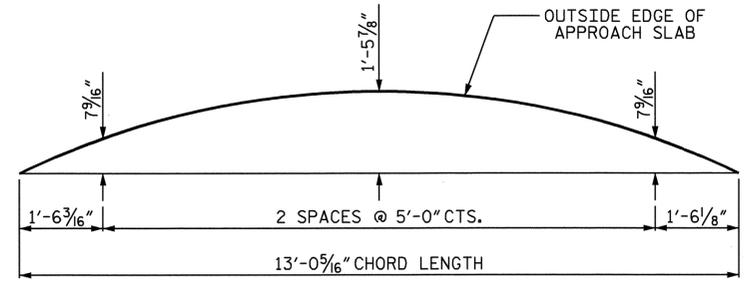


LEFT SIDE



RIGHT SIDE

ARC OFFSETS @ END BENT No. 1



RIGHT SIDE

ARC OFFSETS @ END BENT No. 2

PROJECT NO. B-4552  
IREDELL COUNTY  
 STATION: 16+95.00 -L-

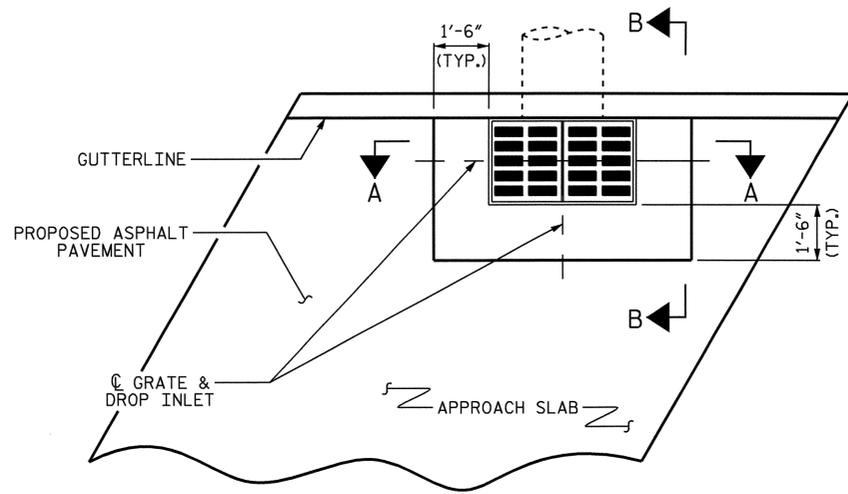
SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR PRESTRESSED CONCRETE  
 CORED SLAB

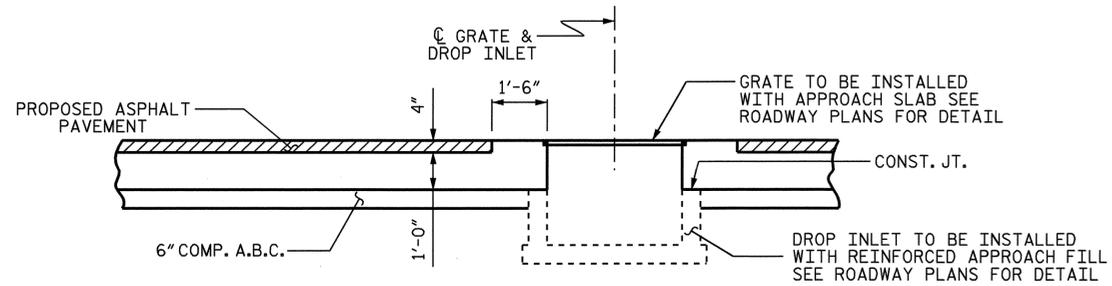


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			21

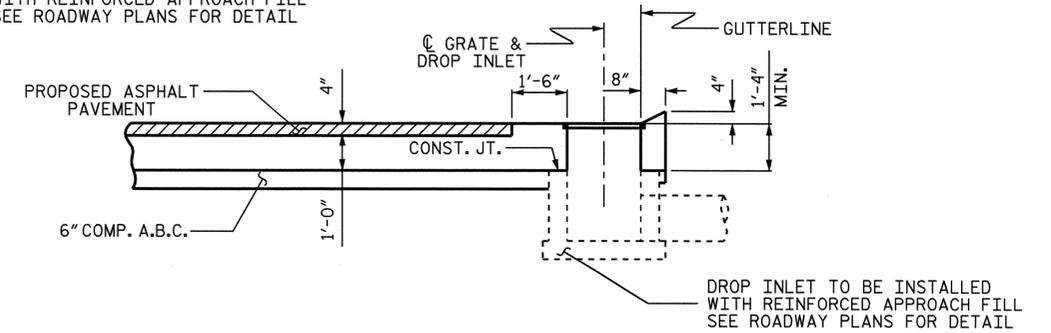
ASSEMBLED BY : T. BANKOVICH	DATE : 3-2008
CHECKED BY : D. PETREY	DATE : 3-2008
DRAWN BY : FCJ 6/87	REV. 7/10/01 LES/RDR
CHECKED BY : EGA 6/87	REV. 5/7/03R RWW/JTE
	REV. 5/1/06 TLA/GM



TYPICAL PART PLAN

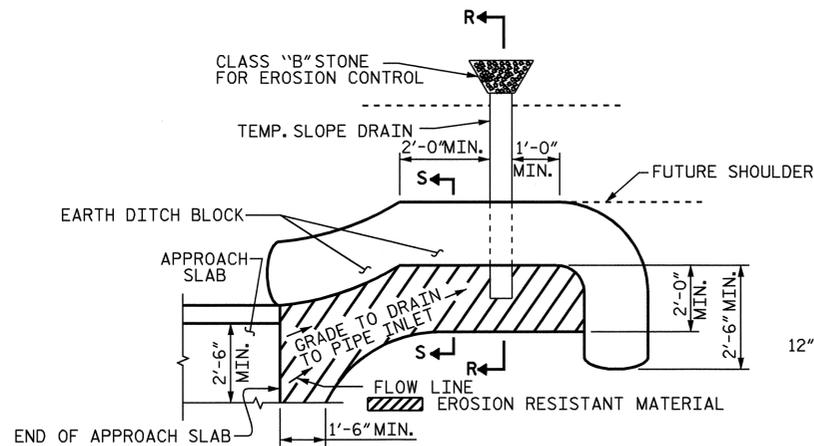


SECTION A-A



SECTION B-B

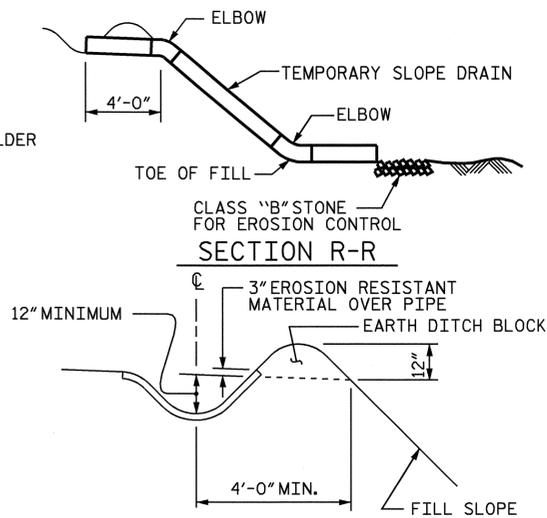
NOTE: DROP INLET AND GRATE ARE ROADWAY PAY ITEMS. SEE ROADWAY PLANS FOR DETAILS.



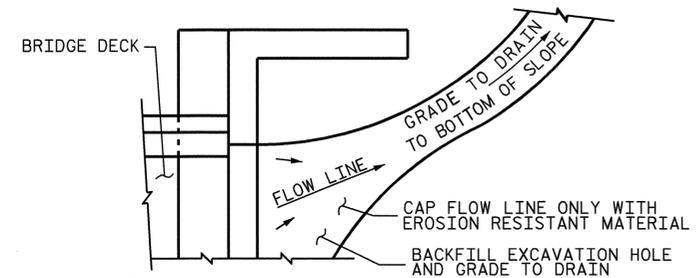
PLAN VIEW

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION S-S



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-4552  
IREDELL COUNTY  
 STATION: 16+95.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

DRAINAGE STRUCTURE  
 ON APPROACH SLAB  
 AND APPROACH SLAB  
 DETAILS



DRAWN BY : T. BANKOVICH DATE : 3-2008  
 CHECKED BY : D. PETREY DATE : 3-2008

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTALS
2			4			21

## 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.

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