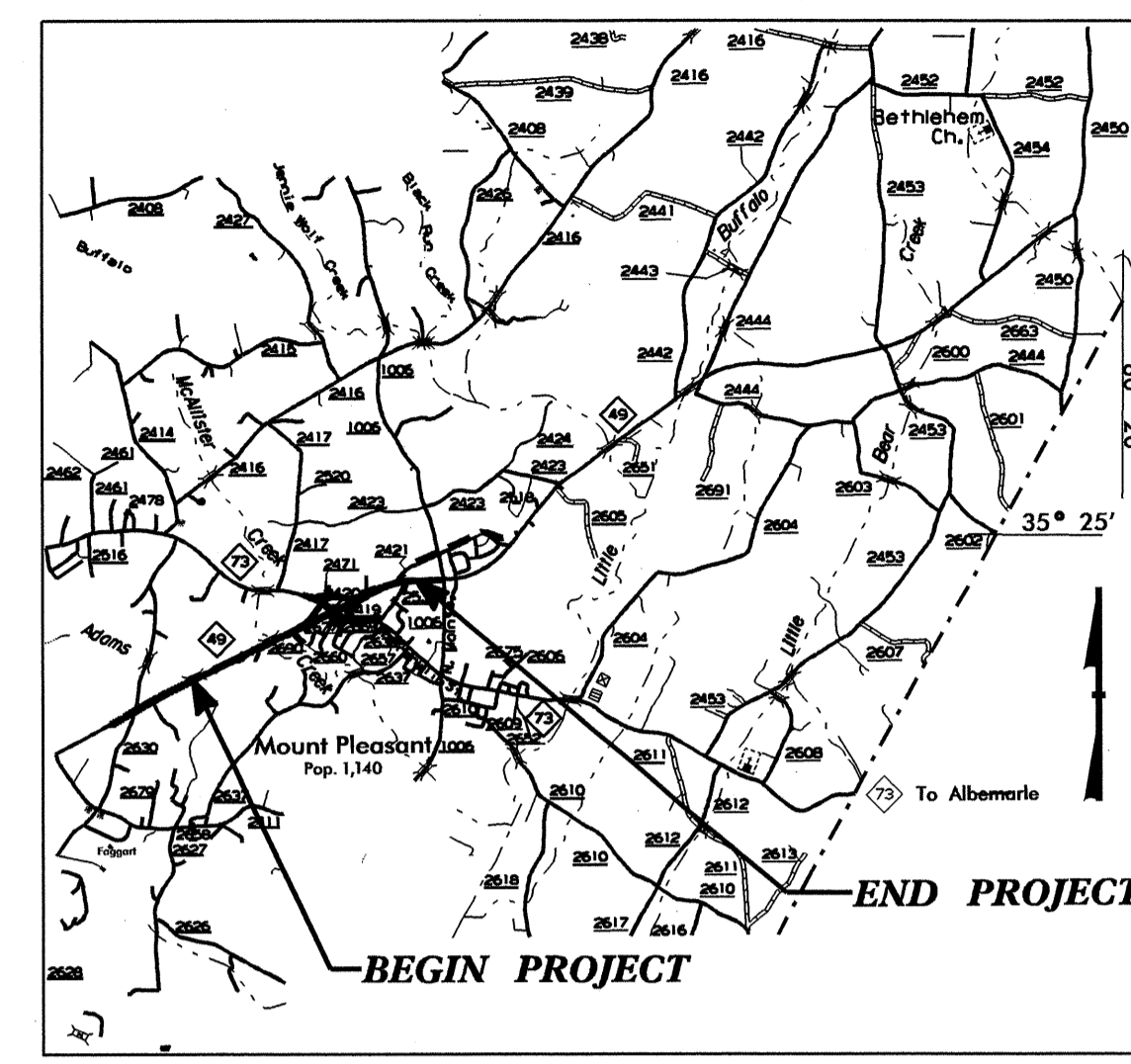


TIP: R-2533CC

CONTRACT: C202596

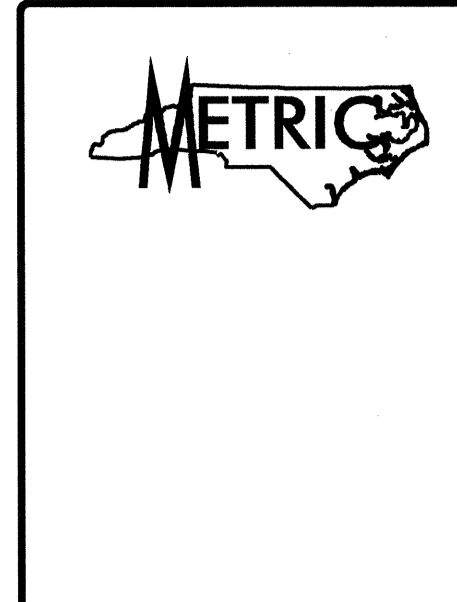


VICINITY MAP OF PROJECT R-2533CC

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
CABARRUS COUNTY

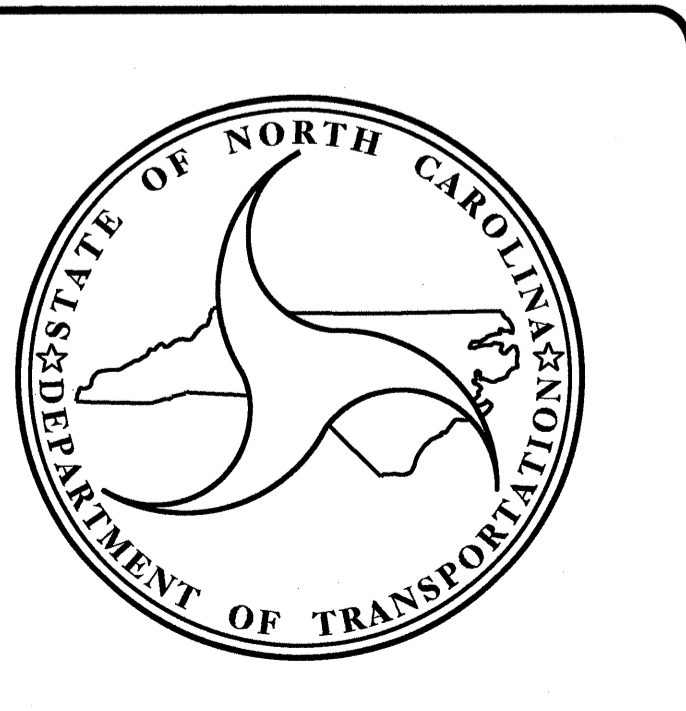
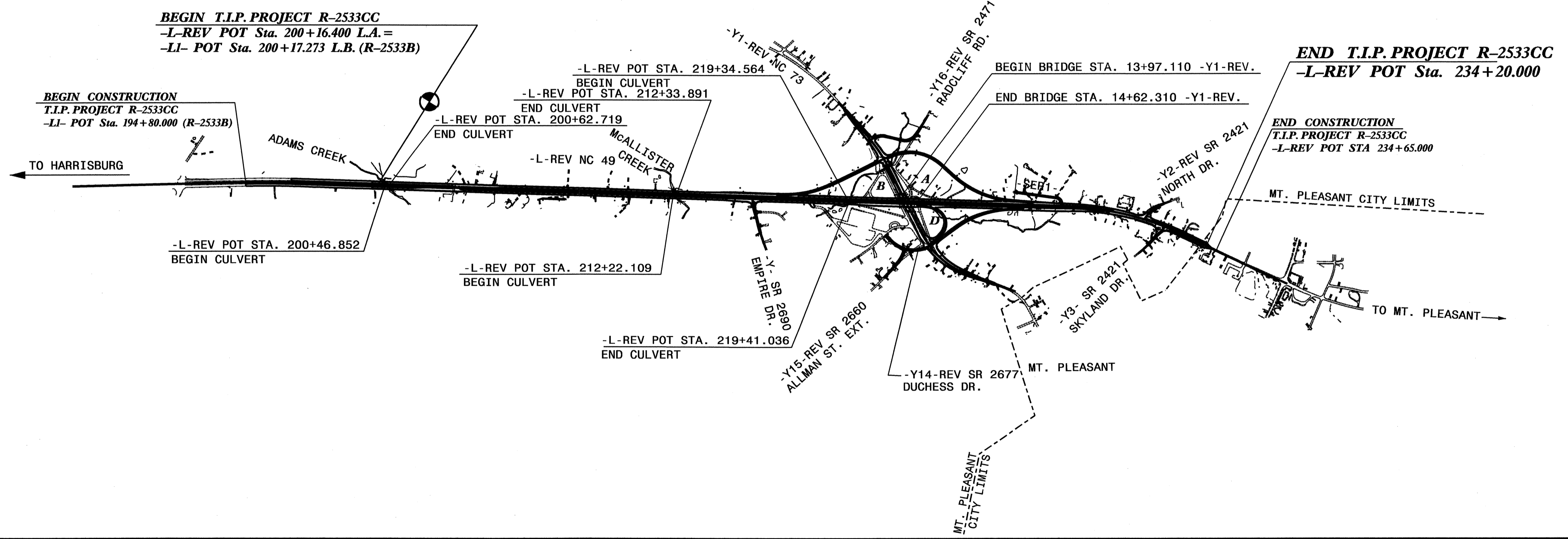
LOCATION: NC 49 FROM EAST OF SR 2630 (CLINE ROAD) TO EAST OF NC 73

TYPE OF WORK: GRADING, PAVING, STRUCTURES, CULVERTS, DRAINAGE, SIGNALS, AND SIGNING



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2533CC		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34448.1.1	NHF-28-1(5)	PE	
34448.2.1	NHF-28-1(5)	RW, UTIL	
34448.3.9	NHS-0049(26)	CONST	

STRUCTURES



DESIGN DATA

ADT 2011	= 10,685
ADT 2031	= 13,531
DHV	= 11 %
D	= 60 %
T	= 13 %
(TTST 7% + DUALS 6%)	
-L-REV NBL V	= 100 km/h
-L-REV SBL V	= 90 km/h
RRR - DESIGN GUIDELINES	
FUNCT. CLASS. - ARTERIAL	

PROJECT LENGTH

LENGTH ROADWAY PROJECT R-2533CC	= 3.370 Km
LENGTH STRUCTURES PROJECT R-2533CC	= 0.034 Km
TOTAL LENGTH STATE PROJECT R-2533CC	= 3.404 Km

Prepared in the Office of:
DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

LETTING DATE:
JUNE 21, 2011

J. M. BAILEY, P.E.
PROJECT ENGINEERS

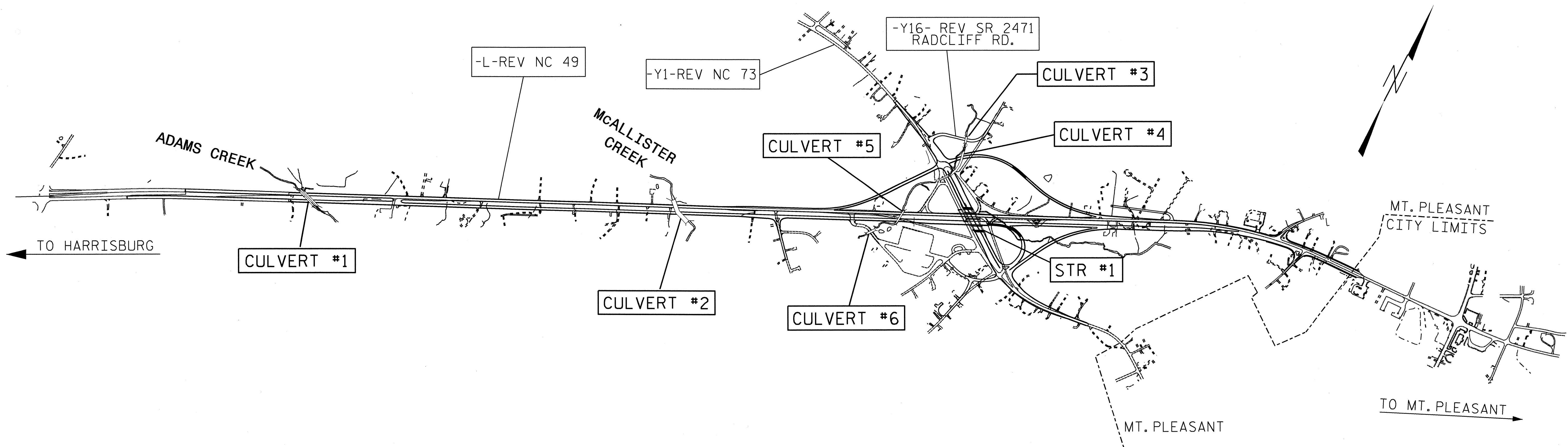
B. D. KLAPPENBACH, P.E.
PROJECT DESIGN ENGINEERS

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

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED _____ DATE _____
DIVISION ADMINISTRATOR



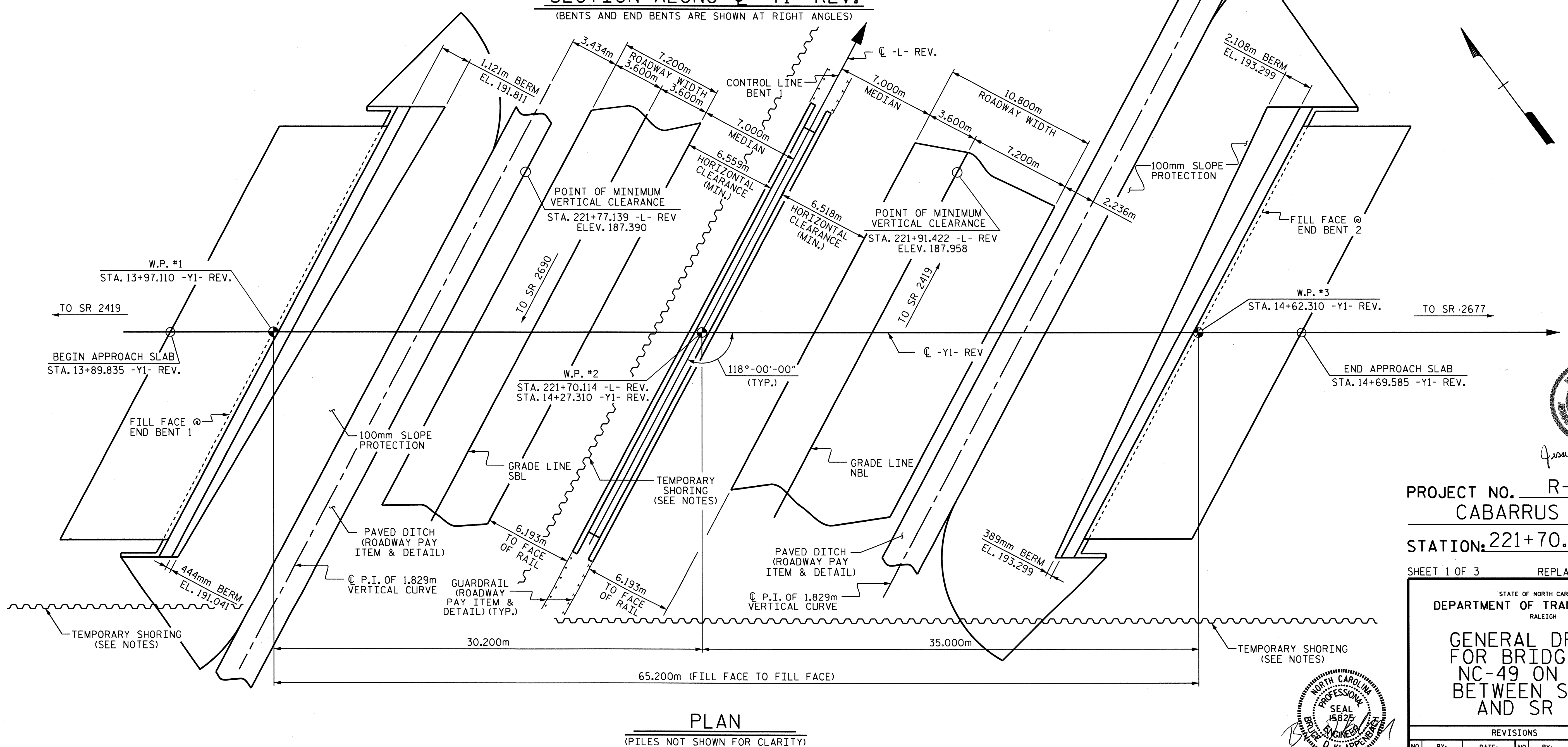
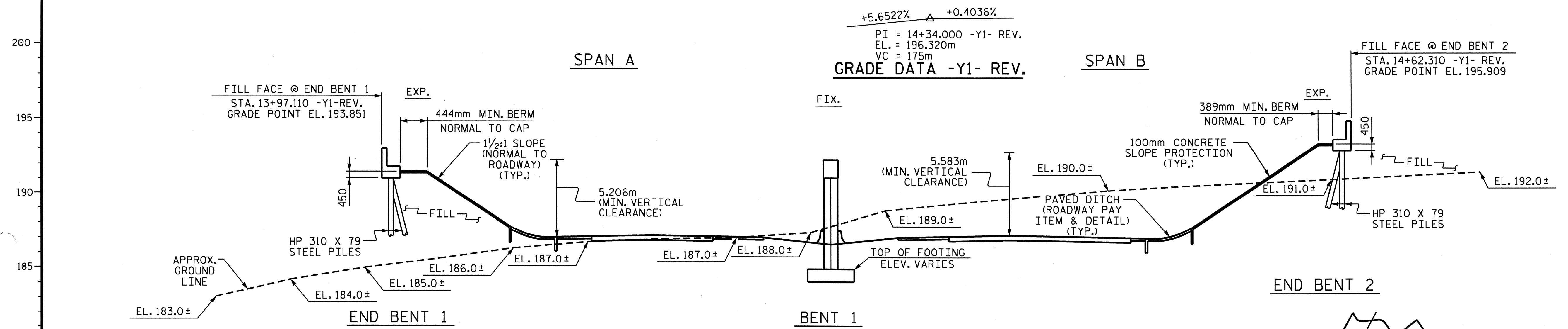
INDEX			
NO.	STATION	DESCRIPTION	SHEET NUMBERS
STR #1	STA. 221+70.114 -L-REV	BRIDGE ON NC 73 OVER NC 49	S-1 THRU S-41
CULVERT #1	STA. 200+54.650 -L-REV	TRIPLE 3.700m X 3.700m RCBC	C-1 THRU C-10
CULVERT #2	STA. 212+28.000 -L-REV	SINGLE 11.000m X 2.700m PRECAST REINFORCED CONCRETE THREE SIDE CULVERT	C-11 THRU C-13
CULVERT #3	STA. 12+11.600 -Y16-REV	DOUBLE 2.700m X 2.700m RCBC	C-14 THRU C-17
CULVERT #4	STA. 12+68.320 -Y1-REV	DOUBLE 2.700m X 2.700m RCBC	C-18 THRU C-28
CULVERT #5	STA. 219+37.800 -L-REV	DOUBLE 2.700m X 2.700m RCBC	C-29 THRU C-37
CULVERT #6	STA. 218+46.294 -L-REV (OFFSET 50.221m RIGHT)	DOUBLE 2.700m X 2.700m RCBC	C-38 THRU C-42

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: _____

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

DRAWN BY : M. G. SHAIKH DATE : 01-12-11
 CHECKED BY : B. D. KLAPPENBACH DATE : 01-12-11

25-FEB-2011 15:07
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 bklappenbach



PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 221+70.114-L-REV
 SHEET 1 OF 3 REPLACES BRIDGE NO. 127

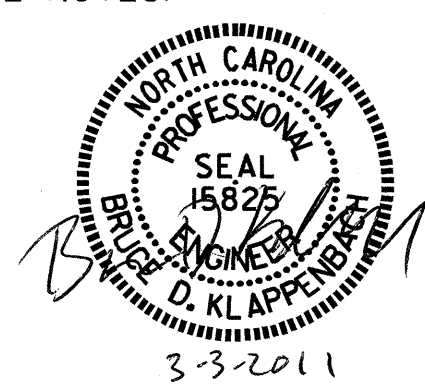
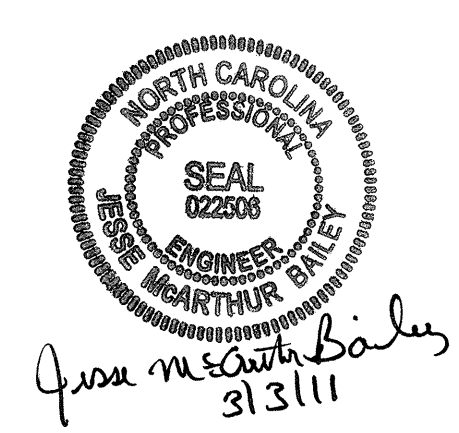
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

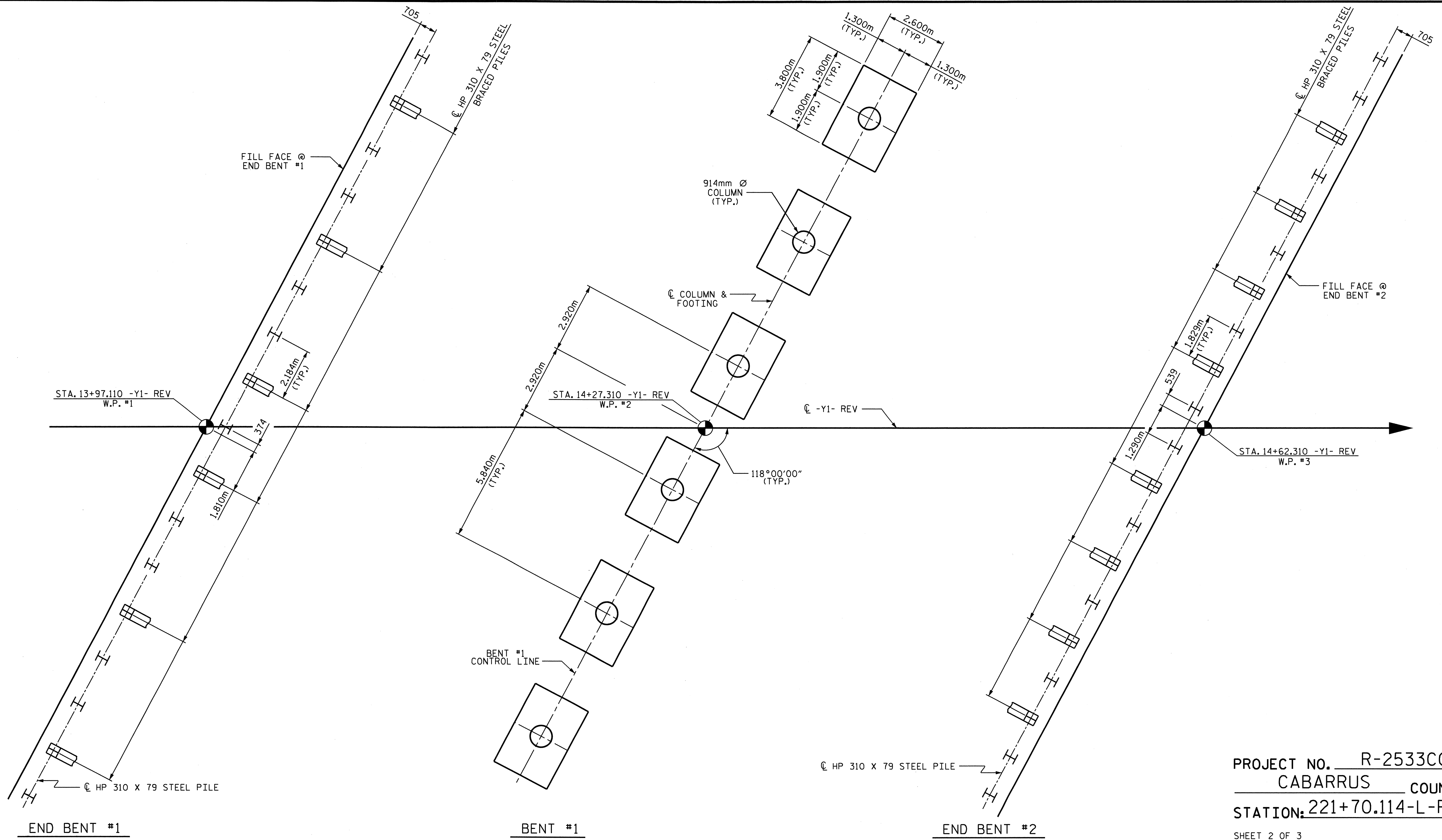
**GENERAL DRAWING
 FOR BRIDGE OVER
 NC-49 ON NC 73
 BETWEEN SR 2419
 AND SR 2677**

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1	
1			3			TOTAL SHEETS 41	
2			4				

DRAWN BY: C.R. YARBROUGH DATE: 08/09
 CHECKED BY: B.D. KLAPPENBACH DATE: 01/11

24-FEB-2011 5:16
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 cyarbrough





FOUNDATION LAYOUT PLAN

DRIVE PILES AT END BENT NO.1 TO A REQUIRED BEARING CAPACITY OF 1060 KN PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO.

DRIVE PILES AT END BENT NO.2 TO A REQUIRED BEARING CAPACITY OF 1060 KN 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 530 KN PER PILE.

CARRY IN SPREAD FOOTINGS AT BENT NO.1 AT LEAST 0.305m (12 IN.) INTO ROCK WITH MINIMUM THICKNESS AS SHOWN ON THE PLANS.

FOR BLASTING ADJACENT TO HIGHWAY STRUCTURES, SEE ROCK BLASTING PROVISION, IF APPLICABLE, OR ARTICLE 410-11 OF THE STANDARD SPECIFICATIONS.

THE REQUIRED BEARING CAPACITY FOR SPREAD FOOTINGS AT BENT NO.1 IS 1149 KPA (12 TSF). CHECK FIELD CONDITIONS FOR THE REQUIRED BEARING CAPACITY JUST BEFORE PLACING CONCRETE.

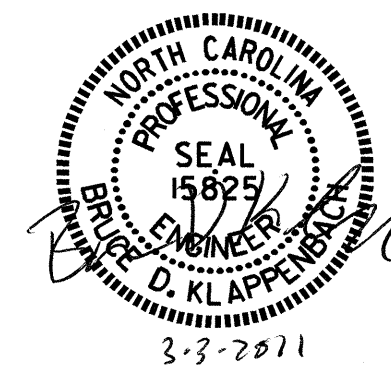
THE ALLOWABLE BEARING CAPACITY FOR SPREAD FOOTINGS AT BENT NO.1 IS 383 KPA (4 TSF). FOR PILES, SEE SPECIAL PROVISIONS.

BRACE PILES AT END BENTS ARE BATTERED AT 250:1000.

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 221+70.114-L-REV

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**GENERAL DRAWING
 FOR BRIDGE OVER
 NC-49 ON NC 73
 BETWEEN SR 2419
 AND SR 2677**

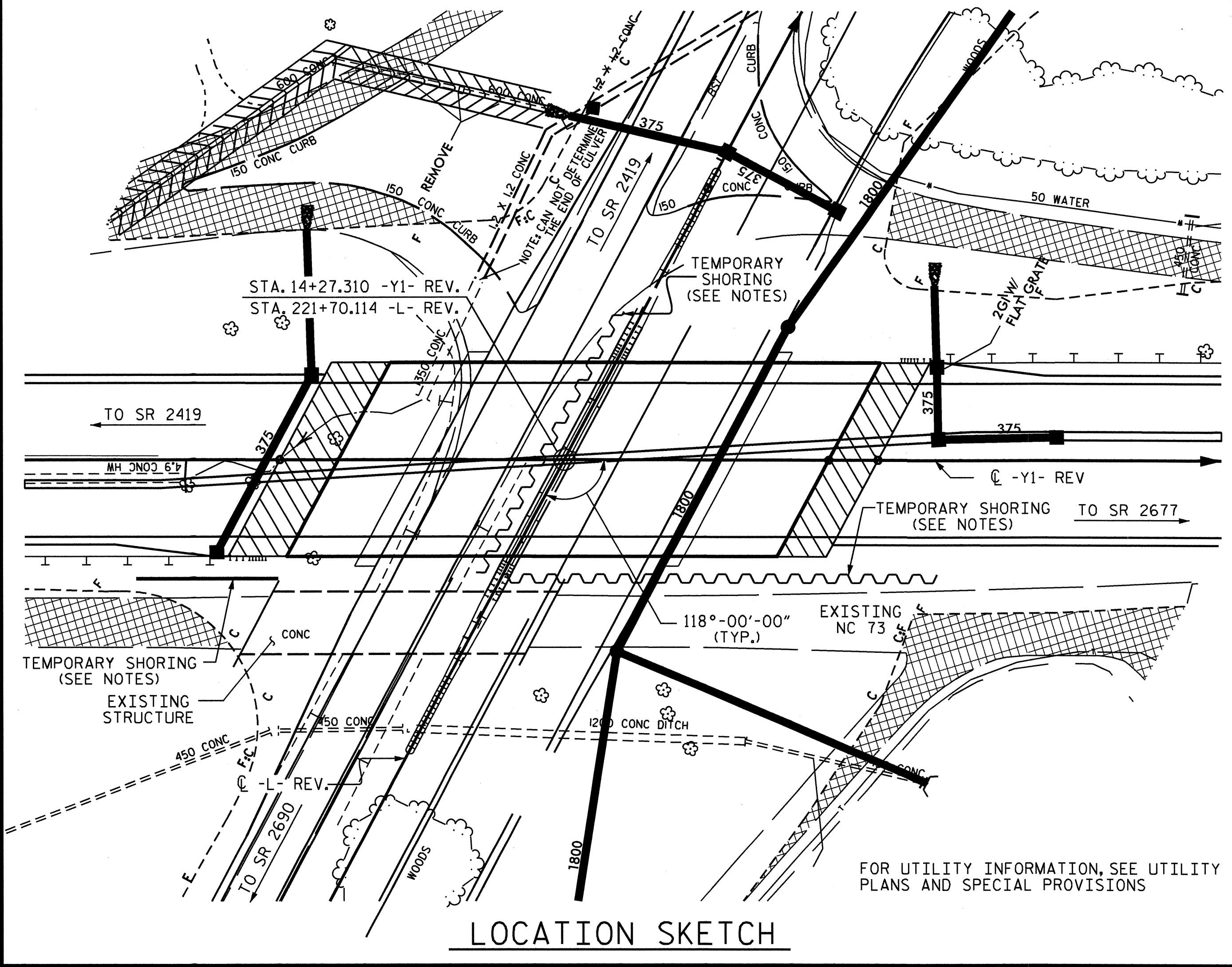


DRAWN BY: W.B. HILL DATE: 01/10
 CHECKED BY: C.R. YARBROUGH DATE: 02/10

24-FEB-2011 15:06
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REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2	
1			3			TOTAL SHEETS	41
2			4				

B.M. #2 SOUTHEAST CORNER OF HEADWALL OF NC 73 BRIDGE, STA. 15+48.000 -L-
ELEV. 192.476 RT. 19.0m



NOTES

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
ALL ELEVATIONS ARE IN METERS.
ASSUMED LIVE LOAD = MS 18 OR ALTERNATE LOADING.
FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SNSM.
FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 345W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 360,000 kg OF REINFORCING STEEL, ONE 760mm SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 360,000 kg OF REINFORCING STEEL, TWO 760mm SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE PLUS A MINIMUM LAP SPICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

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

FOR BLASTING ADJACENT TO HIGHWAY STRUCTURES, SEE ROCK BLASTING SPECIAL PROVISION, IF APPLICABLE, OR ARTICLE 410-11 OF THE STANDARD SPECIFICATIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

FOR SHIPPING OF STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE CONSISTING OF 3 SPANS (1 @ 46'-3", 1 @ 46'-7", 1 @ 46'-3"), WITH A 2.5" ASPHALT WEARING SURFACE ON A 6.5" REINFORCED CONCRETE DECK ON 4 LINES OF REINFORCED CONCRETE GIRDERS AND A CLEAR ROADWAY WIDTH OF 26.0' ON REINFORCED CONCRETE CAPS ON TIMBER PILES AT THE END BENTS AND REINFORCED CONCRETE CAP AND COLUMNS AT THE INTERIOR BENTS, AND LOCATED 27 METERS EAST OF THE PROPOSED BRIDGE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING THE CONSTRUCTION OF THE PROPOSED STRUCTURE, A LOAD LIMIT MAY BE POSTED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

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.

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

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

WORK SHALL NOT BE STARTED ON THIS BRIDGE (OR SPECIFIC PARTS OF BRIDGE) UNTIL ROADWAY SECTION HAS BEEN EXCAVATED.

FOR METRIC STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	FOUNDATION EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	STRUCTURAL STEEL	HP 310 X 79 STEEL PILES	CONCRETE BARRIER RAIL	100mm SLOPE PROTECTION	POT BEARINGS	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS	
	LUMP SUM	LUMP SUM	SO. METERS	SO. METERS	CU. METERS	LUMP SUM	kg	kg	APPROX. kg	NO.	METERS	METERS	SO. METERS	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			1920.9	2021.0		LUMP SUM			292900		141.650			LUMP SUM	LUMP SUM	LUMP SUM
END BENT 1					58.7		4994			17	170.0	460				
BENT 1		LUMP SUM			140.4		11834	1218								
END BENT 2					63.2		5705			20	200.0	595				
TOTAL	LUMP SUM	LUMP SUM	1920.9	2021.0	262.3	LUMP SUM	22533	1218	292900	37	370.0	1055	LUMP SUM	LUMP SUM	LUMP SUM	

PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 221+70.114-L-REV

SHEET 3 OF 3

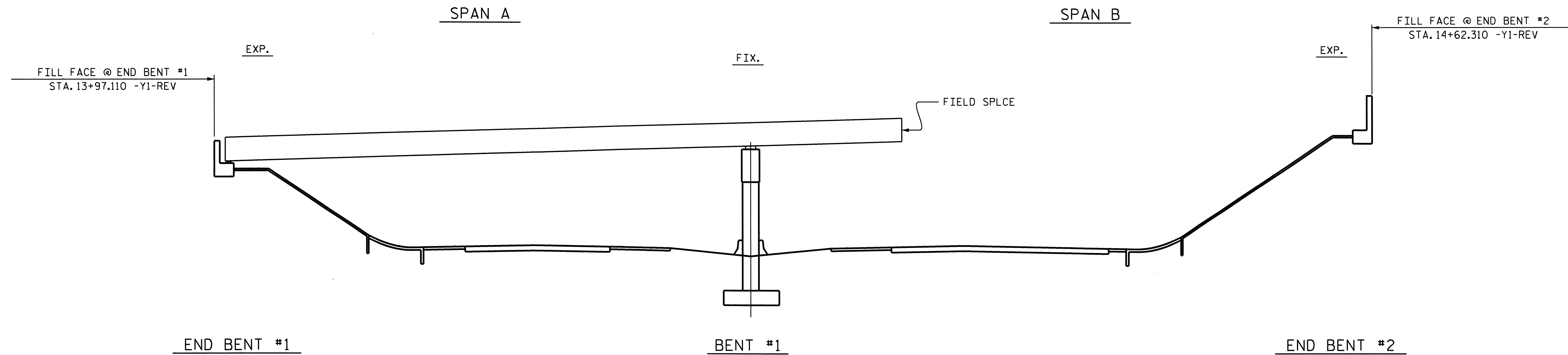


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
NC-49 ON NC 73
BETWEEN SR 2419
AND SR 2677

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			41

DRAWN BY: C.R. YARBROUGH DATE: 08/09
CHECKED BY: B.D. KLAPPENBACH DATE: 01/11



GIRDER ERECTION

(SECTION AT BENT & END BENTS ARE AT RIGHT ANGLES)

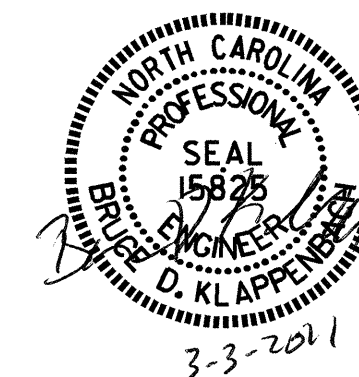
ERECTION NOTES

ERECT MINIMUM OF TWO GIRDERS WITH ALL DIAPHRAGMS/CROSSFRAMES BETWEEN THE GIRDERS IN PLACE AND THE BOLTS TIGHTENED PRIOR TO RELEASING THE GIRDERS.
 ERECT EACH SUBSEQUENT GIRDER WITH DIAPHRAGMS/CROSSFRAMES CONNECTING TO THE ADJACENT PREVIOUSLY ERECTED GIRDER AND TIGHTEN ALL BOLTS BEFORE RELEASING THE GIRDER.
 THE STRUCTURAL STEEL SHALL BE SUPPORTED DURING ERECTION IN ITS CAMBERED POSITION.
 DURING THE GIRDER ERECTION PROCEDURE, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY LATERAL BRACING AND OTHER MEANS OF SUPPORT, AS REQUIRED, TO ENSURE STABILITY OF THE GIRDERS, AND TO ENSURE PLUMBNESS OF THE GIRDERS IN THE FINAL CONDITION.
 THE CONTRACTOR MAY SUBMIT AN ALTERNATE ERECTION METHOD TO THE ENGINEER FOR REVIEW AND APPROVAL.

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 221+70.114-L-REV

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GIRDER ERECTION DETAILS



DRAWN BY : S.H. SOCKWELL DATE : 02/03/11
 CHECKED BY : B.D. KLAPPENBACH DATE : 02/11/11

24-FEB-2011 11:38
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 bklappenbach

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			41

NOTES

PROVIDE 32mm HIGH BEAM BOLSTERS UPPER AT 1.200m 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.) @ 1.200m CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 65mm ABOVE THE TOP OF THE REMOVABLE FORM.

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

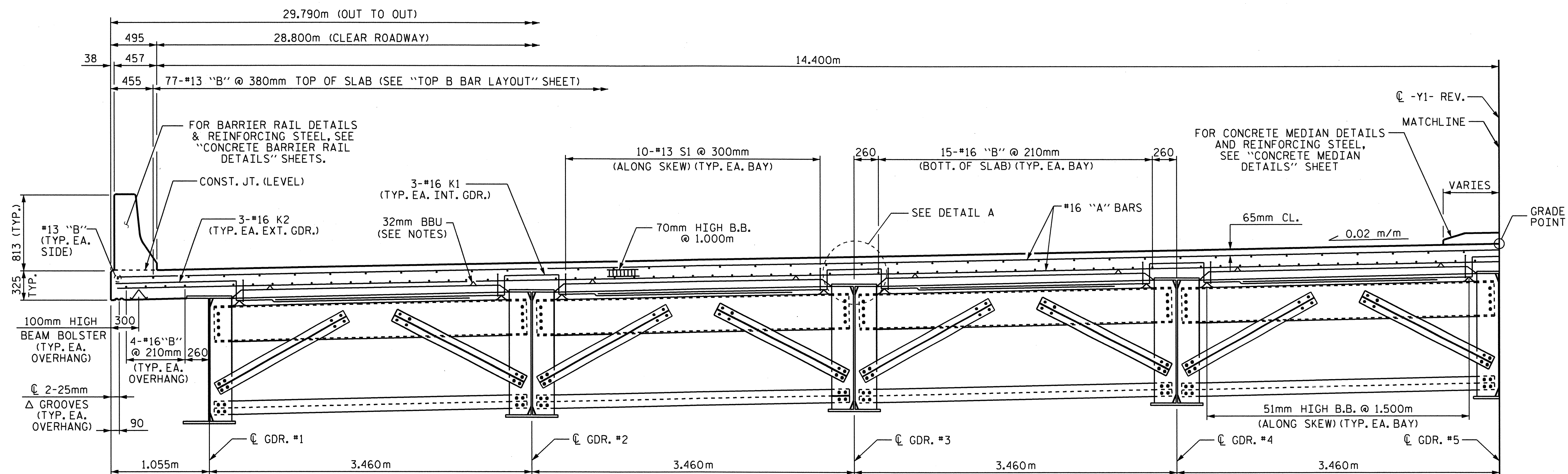
PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 20.7 MPa BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

BARRIER RAIL 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 20.7 MPa.

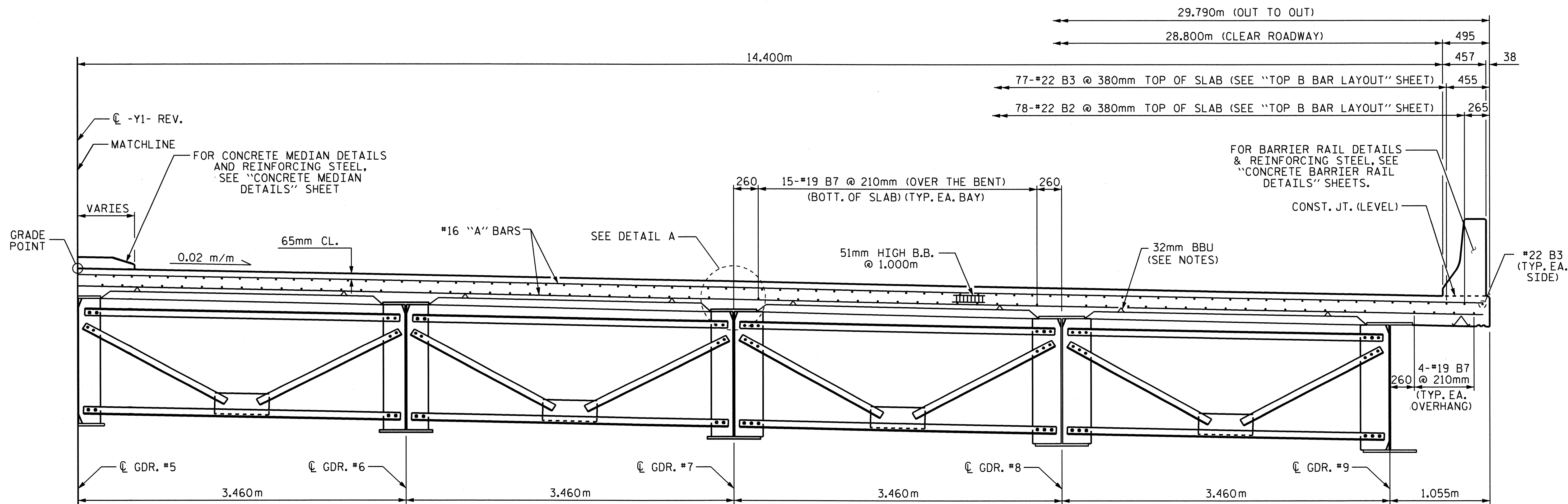
STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

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

THE CONTRACTOR SHALL ADJUST THE GIRDER BUILDUPS AS NECESSARY TO INCORPORATE A MAXIMUM PERMISSIBLE VARIATION IN POT BEARING DEPTH OF 13mm. SEE SPECIAL PROVISION FOR POT BEARINGS.

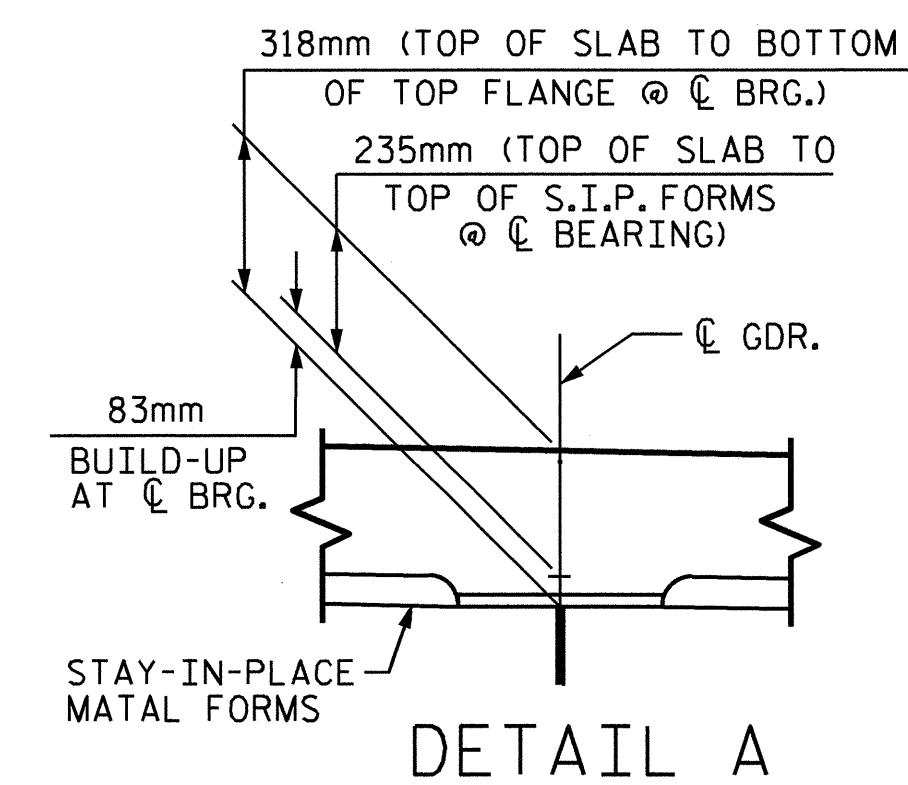


TYPICAL SECTION AT END BENT DIAPHRAGM



TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM

TYPICAL SECTION AT BENT DIAPHRAGM



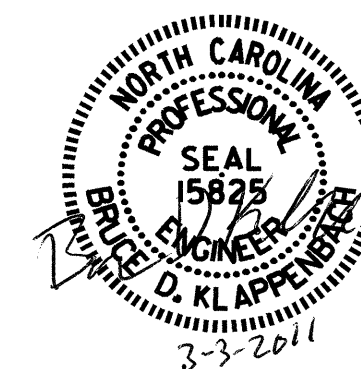
DETAIL A

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 221+70.114 -L-REV

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 TYPICAL SECTION

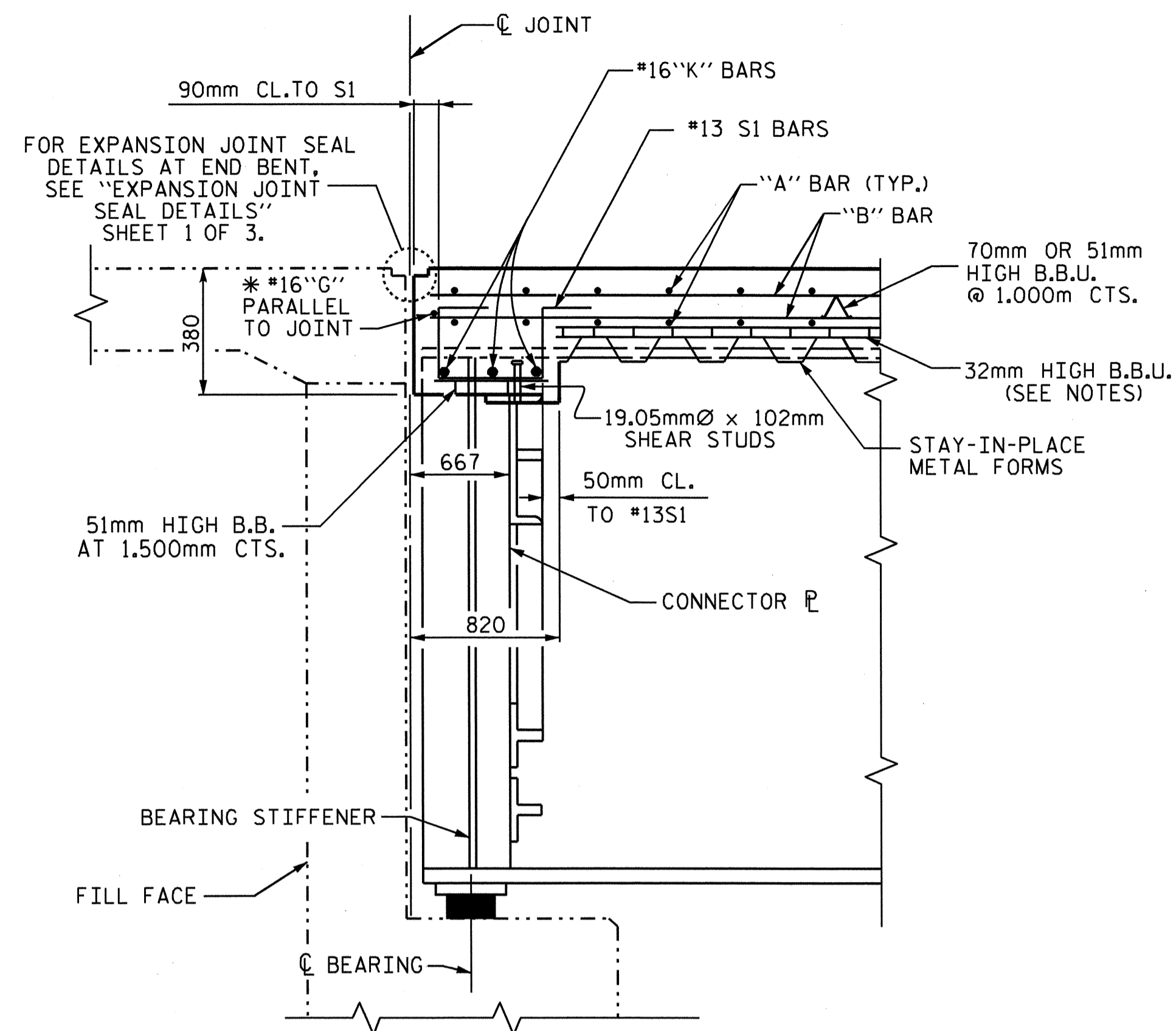


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 CHECKED BY: H. T. BARBOUR DATE: 06-22-09

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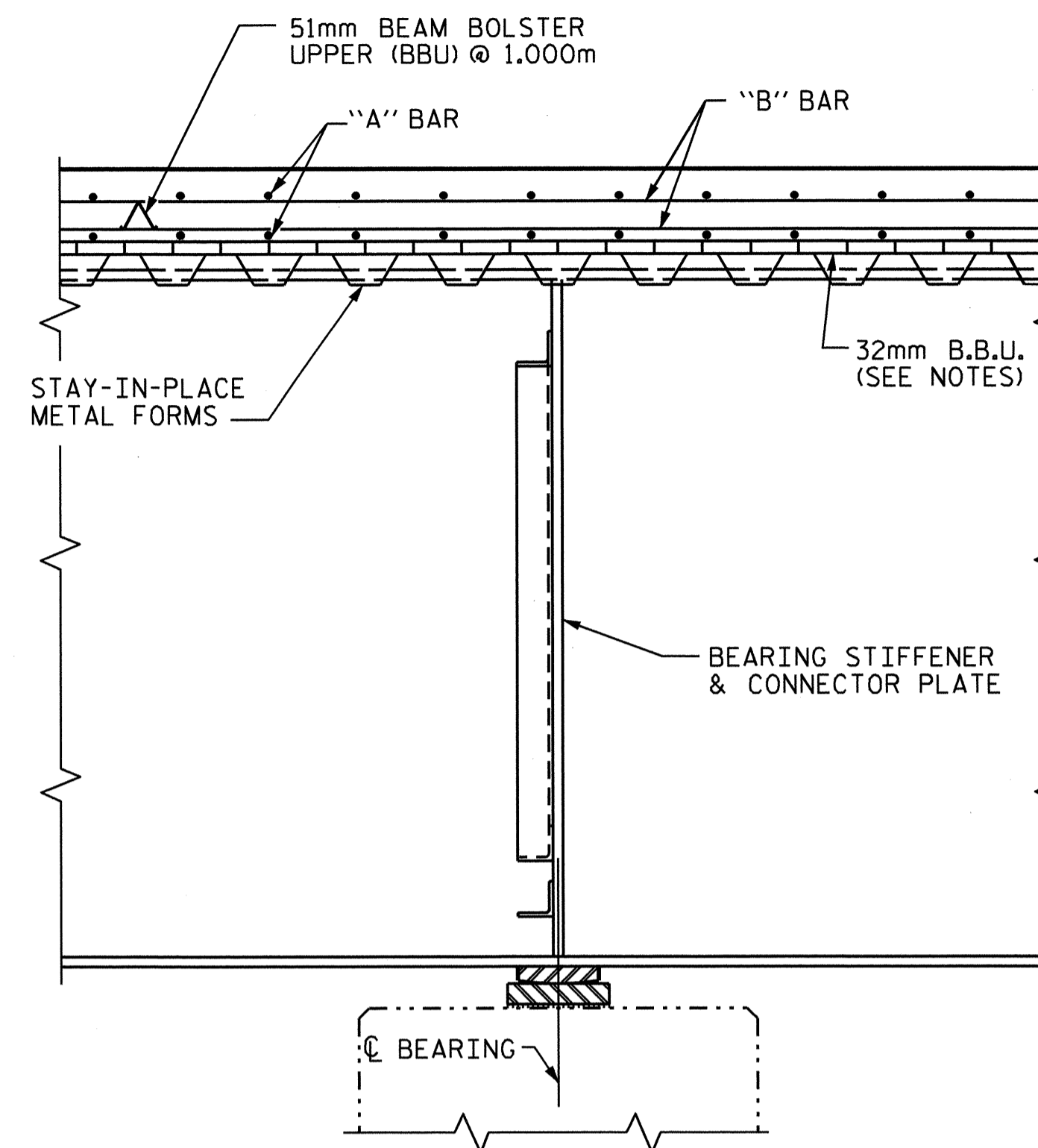
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NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 41
2			4			

STR #1

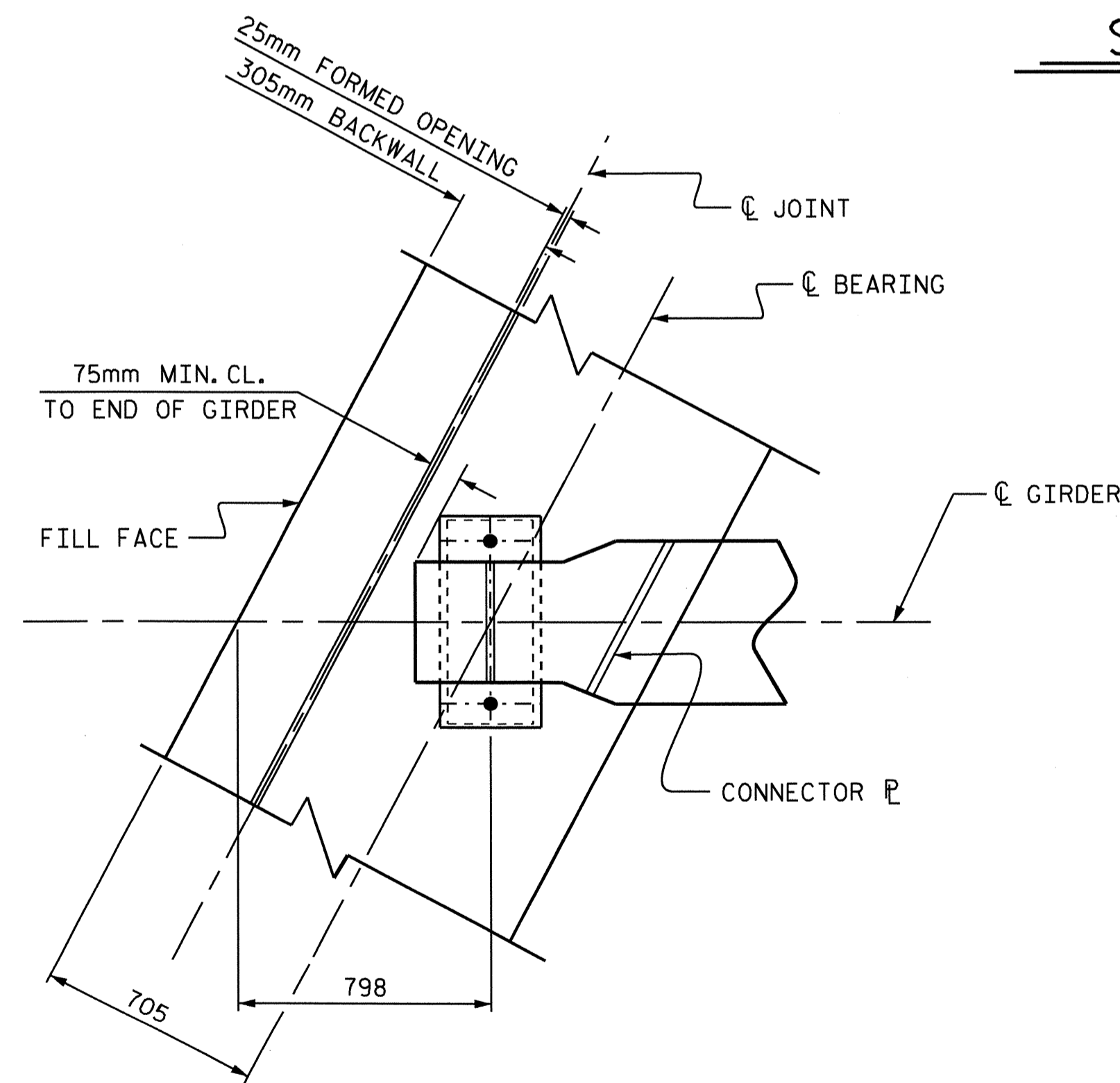


SECTION AT END BENT

* #16 "G" BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR DIAPHRAGM AND REINFORCING STEEL.



SECTION AT BENT CROSSFRAME



PLAN AT END BENT #1

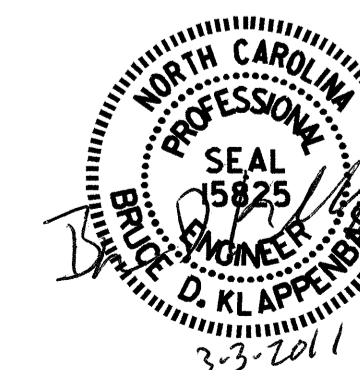
(SHOWING BOTTOM FLANGE)
(END BENT #2 SIMILAR)

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 221+70.114 -L-REV

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 TYPICAL SECTION**



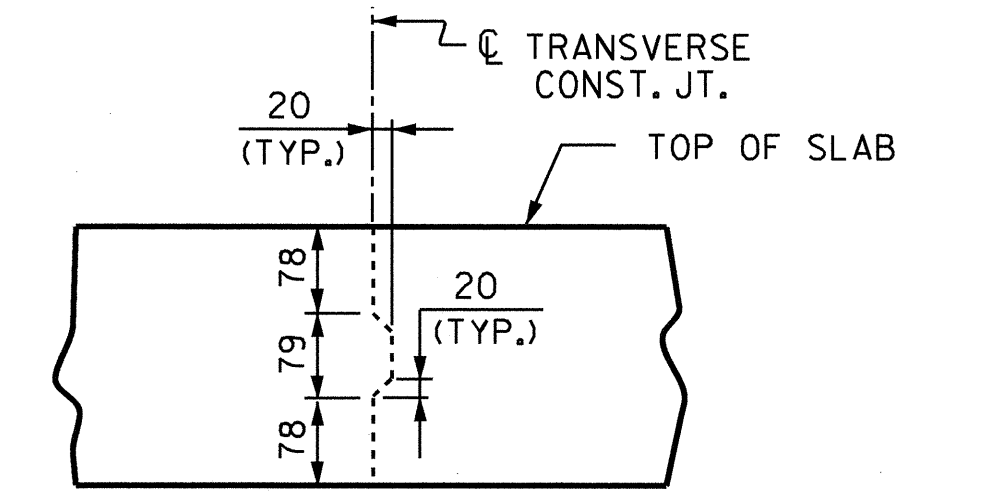
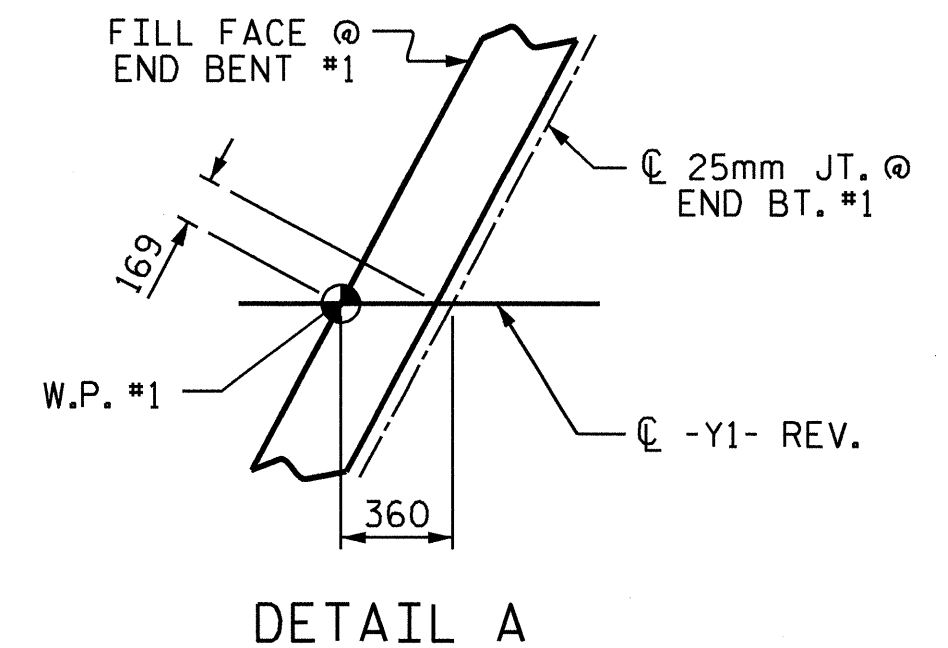
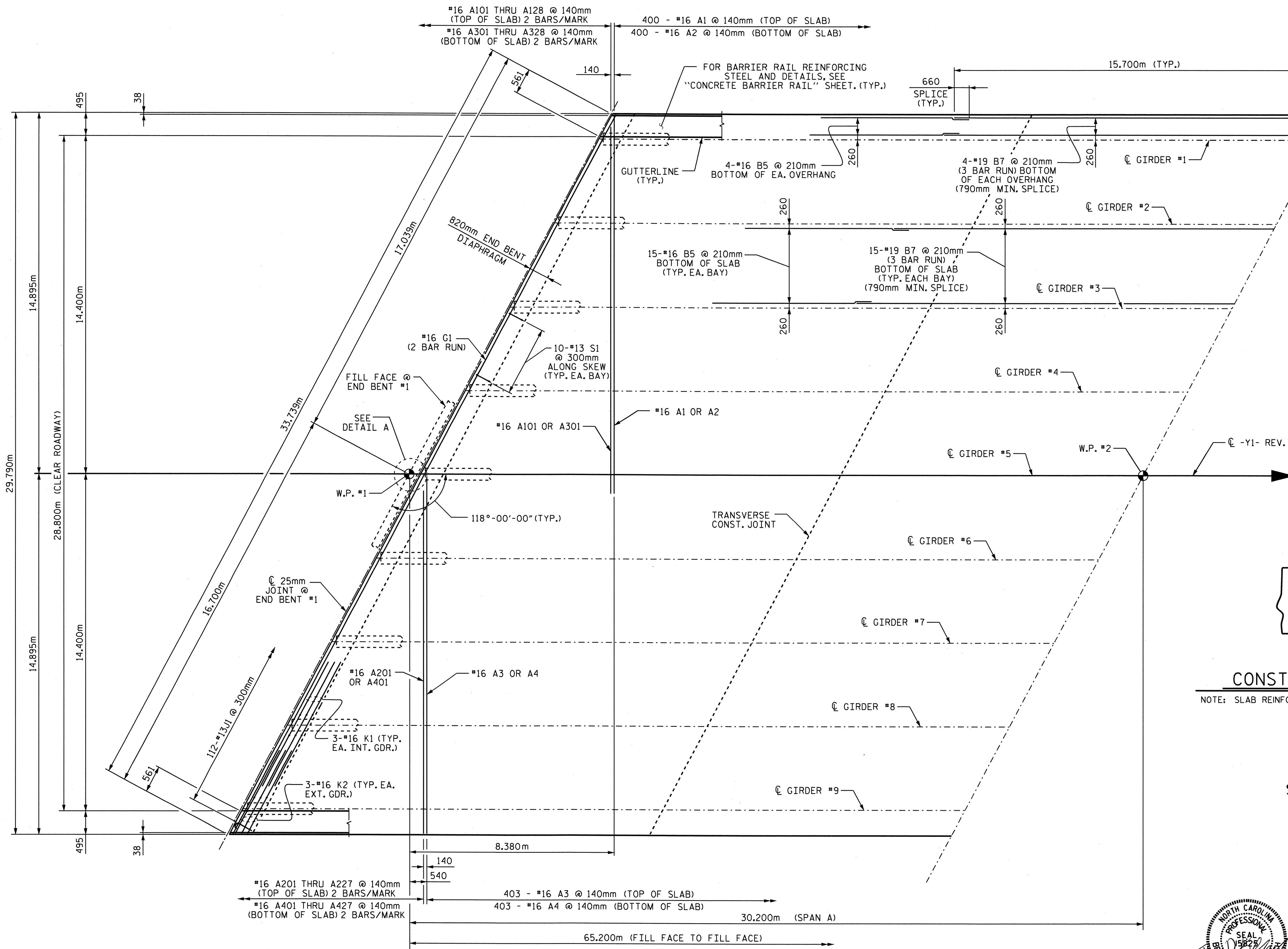
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 mshaikh

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			41

STR #1

NOTE
FOR CONCRETE MEDIAN, SEE CONCRETE
MEDIAN DETAILS SHEET.



TRANSVERSE CONSTRUCTION JOINT DETAIL

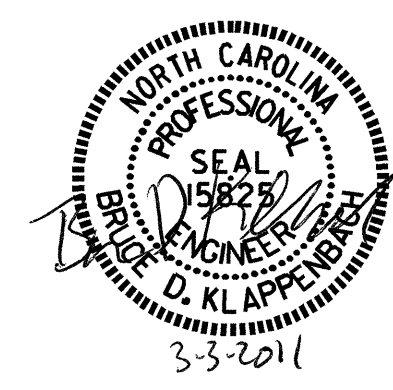
NOTE: SLAB REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT

PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 221+70.114 -L-REV

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE PLAN OF SPAN A



REVISIONS						SHEET NO. S-7
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 41
2			4			

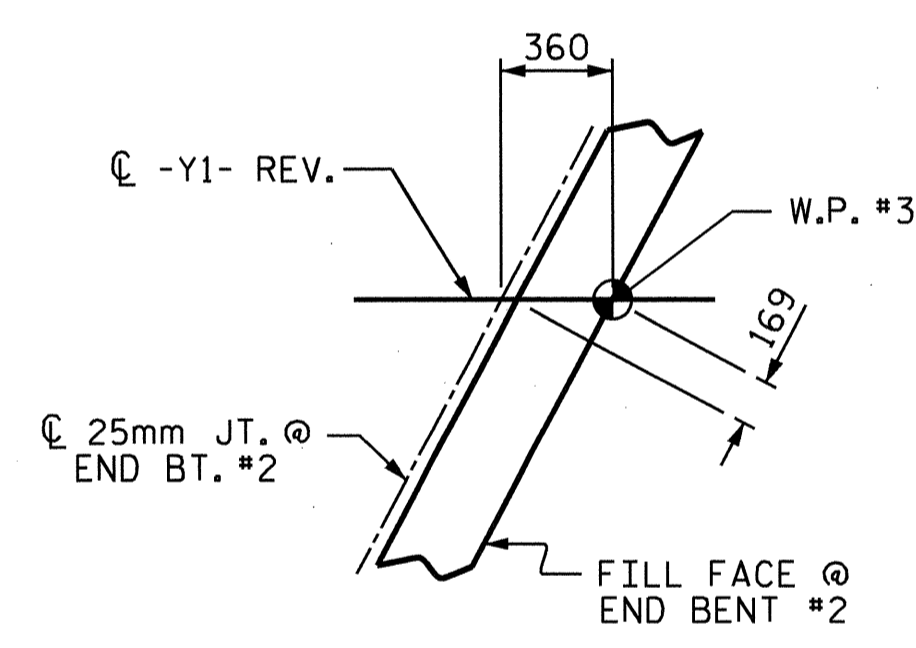
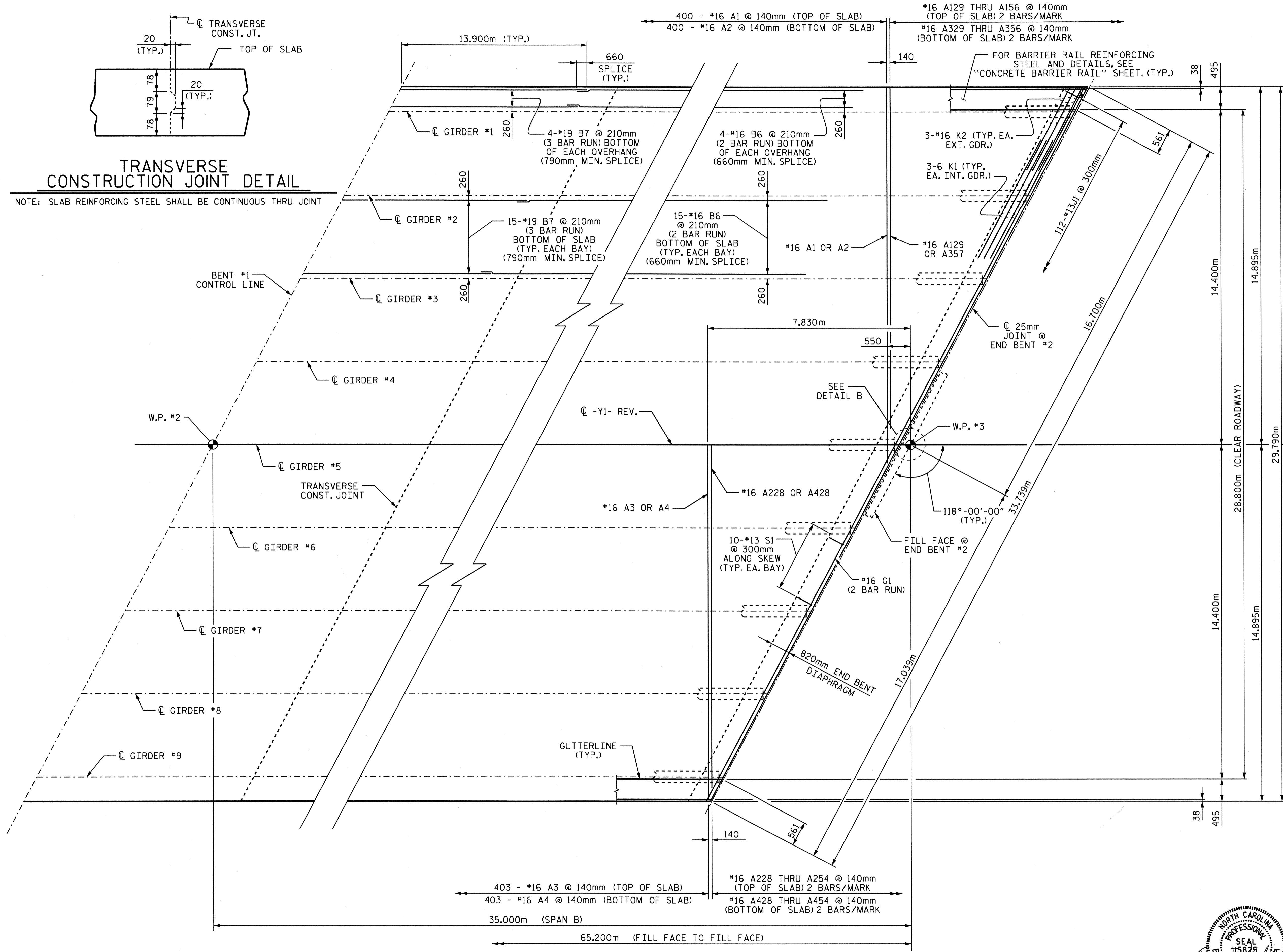
STR #1

DRAWN BY: M. G. SHAIKH DATE: 12-03-08
CHECKED BY: H. T. BARBOUR DATE: 06-22-09

28-FEB-2011 4:04
J:\Structures\Str1\mshalkh\Microstation\R-2533CC.sd.TS.dgn
mshalkh

PLAN OF SPAN A
FOR TOP "B" BAR SEE SUPERSTRUCTURE TOP "B" BAR STEEL LAYOUT SHEET.

NOTE
FOR CONCRETE MEDIAN, SEE CONCRETE MEDIAN DETAILS SHEET.

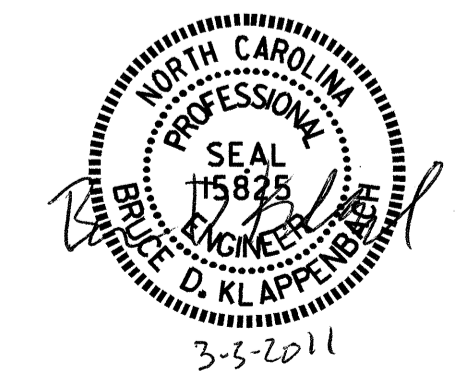


PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 221+70.114 -L-REV

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

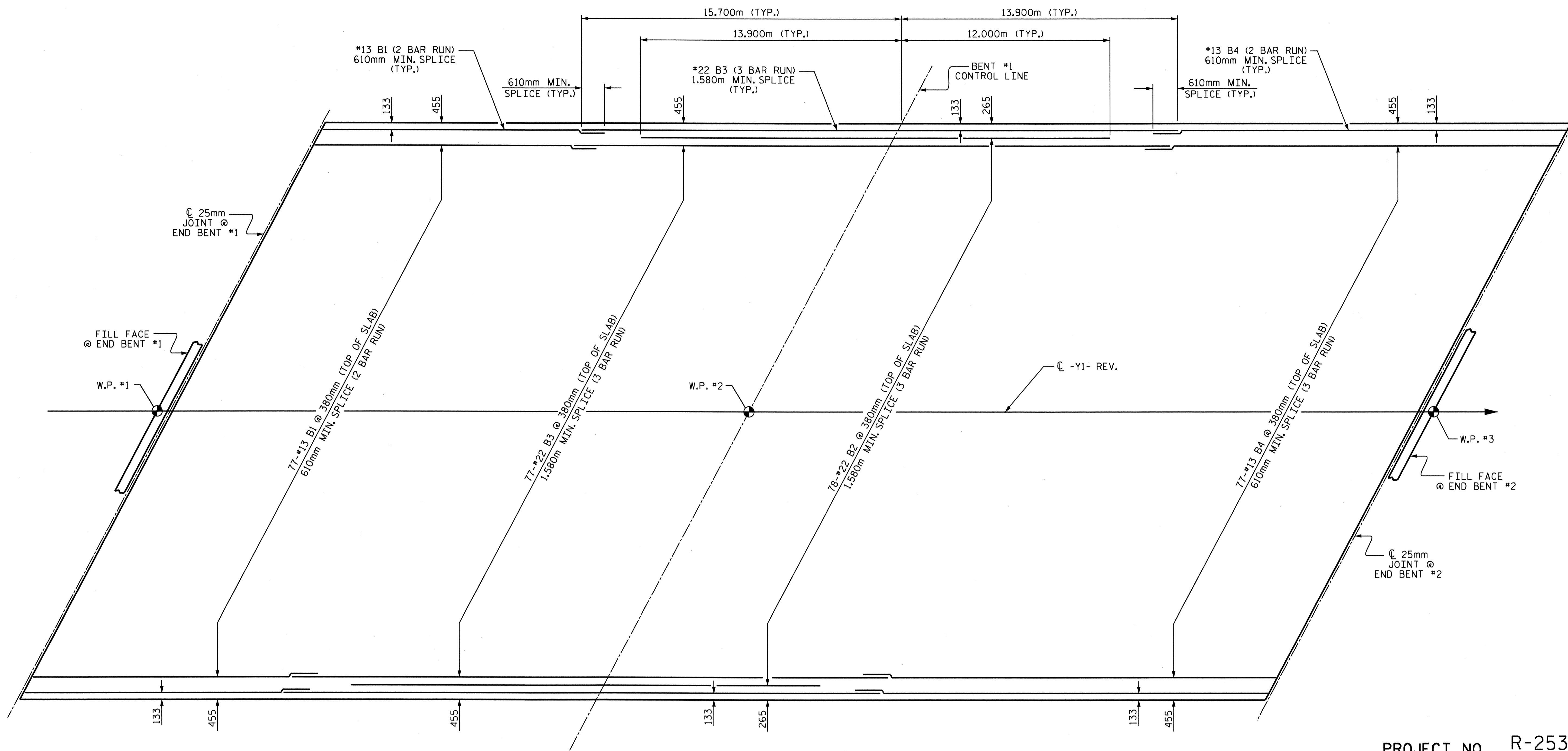
**SUPERSTRUCTURE
 PLAN OF SPAN B**



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8	
1			3			TOTAL SHEETS	41
2			4				

DRAWN BY : M. G. SHAIKH DATE : 12-03-08
 CHECKED BY : H. T. BARBOUR DATE : 06-22-09

STR #1

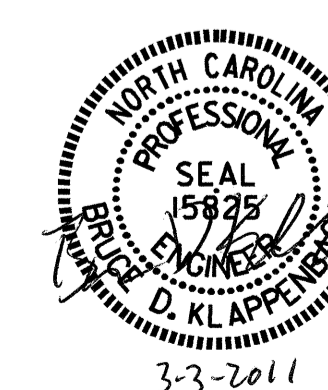


PLAN

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 221+70.114 -L-REV

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 TOP STEEL
 "B" BAR LAYOUT

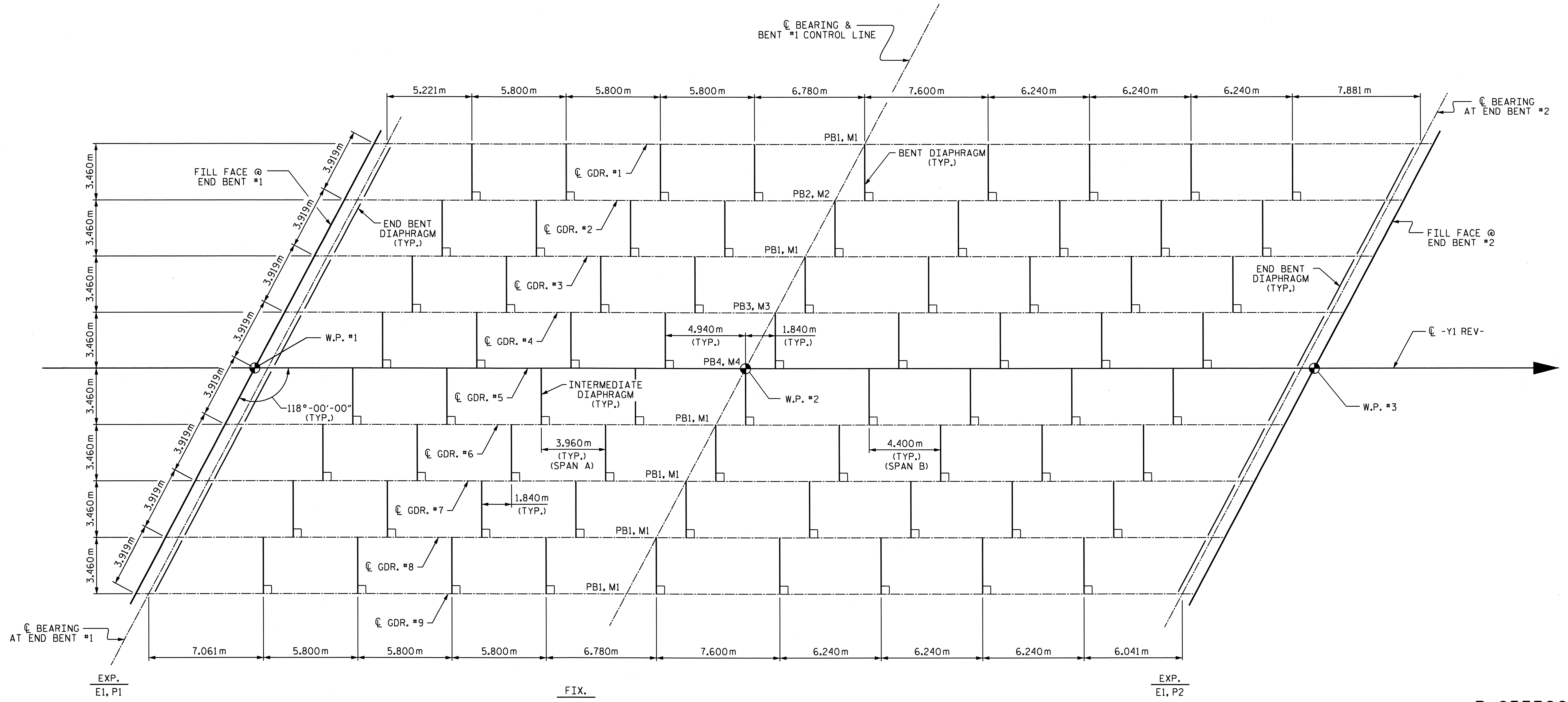


DRAWN BY : M. G. SHAIKH DATE : 12-03-08
 CHECKED BY : H. T. BARBOUR DATE : 06-22-09

28-FEB-2011 14:03
 J:\Structures\Str\mshaiikh\Microstation\R-2533CC.sd.TS.dgn
 mshaiikh

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9	
1			3			TOTAL SHEETS	
2			4			41	

STR #1



SPAN A

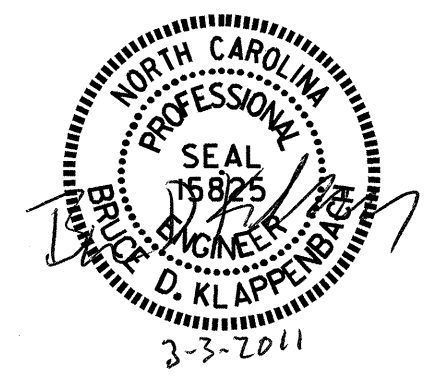
SPAN B

FRAMING PLAN

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 221+70.114 -L-REV

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 FRAMING PLAN**

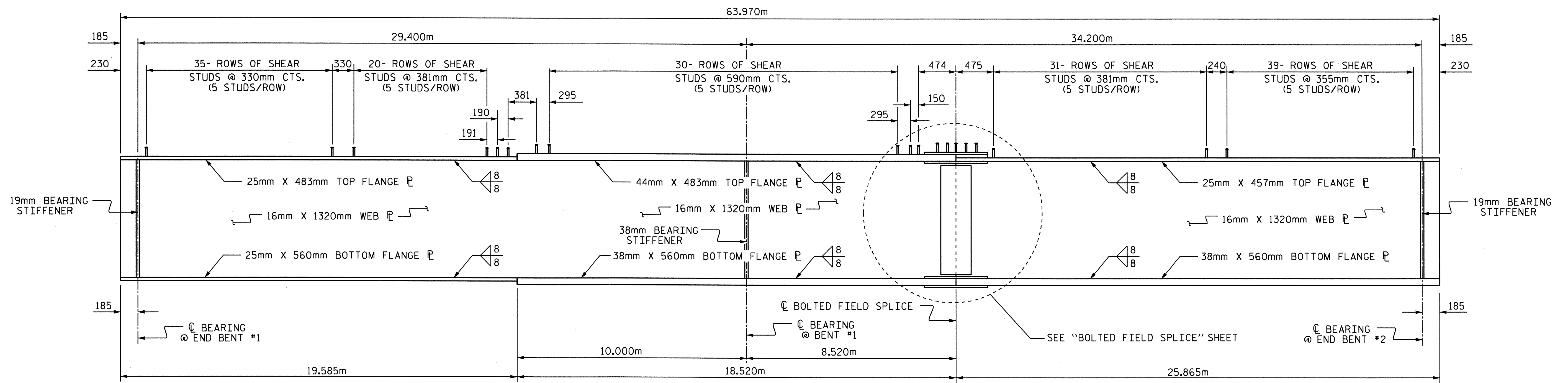


DRAWN BY: M. G. SHAIKH DATE: 12-12-08
 CHECKED BY: H. T. BARBOUR DATE: 06-22-09

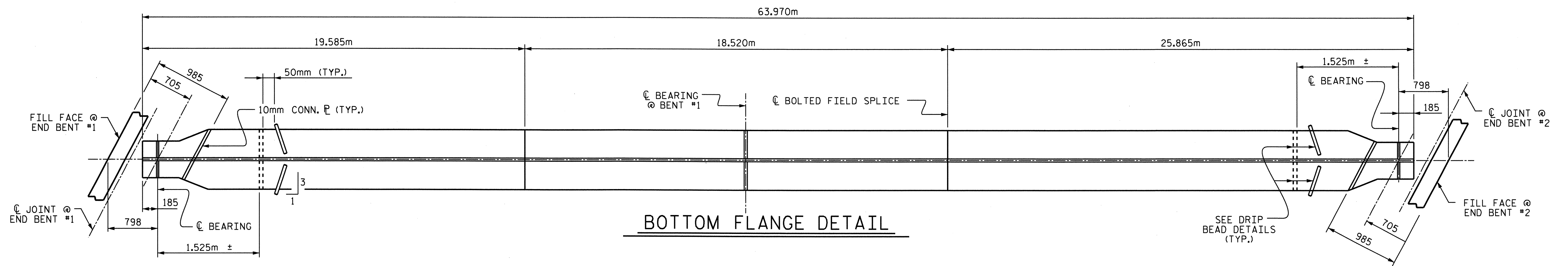
28-FEB-2011 14:03
 J:\Structures\Str1\mshalkh\Microstation\R-2533CC.sd.TS.dgn
 mshalkh

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10	
1			3			TOTAL SHEETS	
2			4			41	

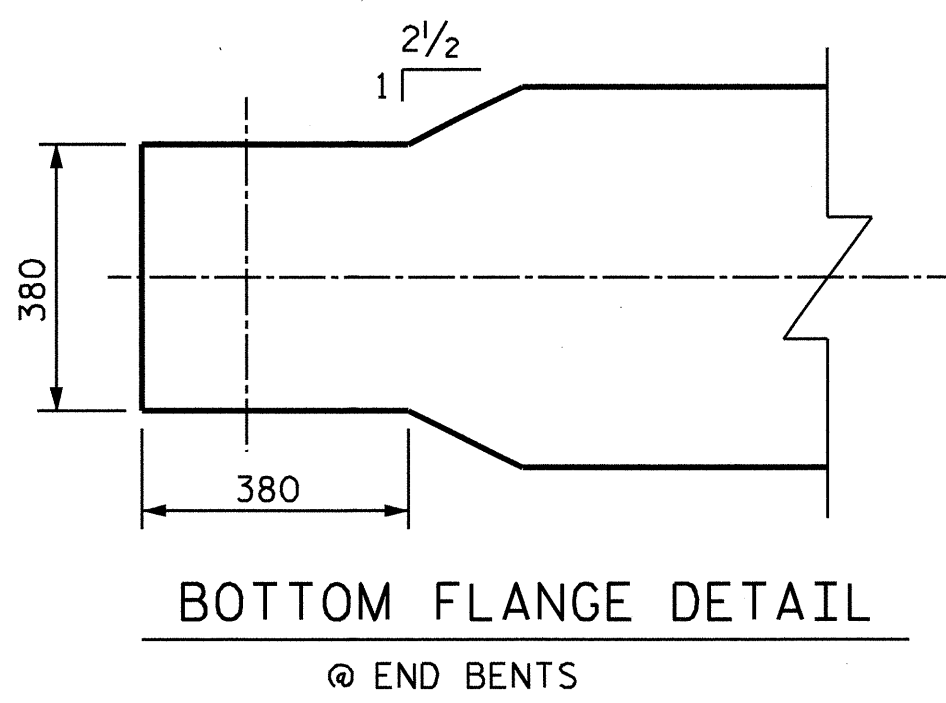
STR #1



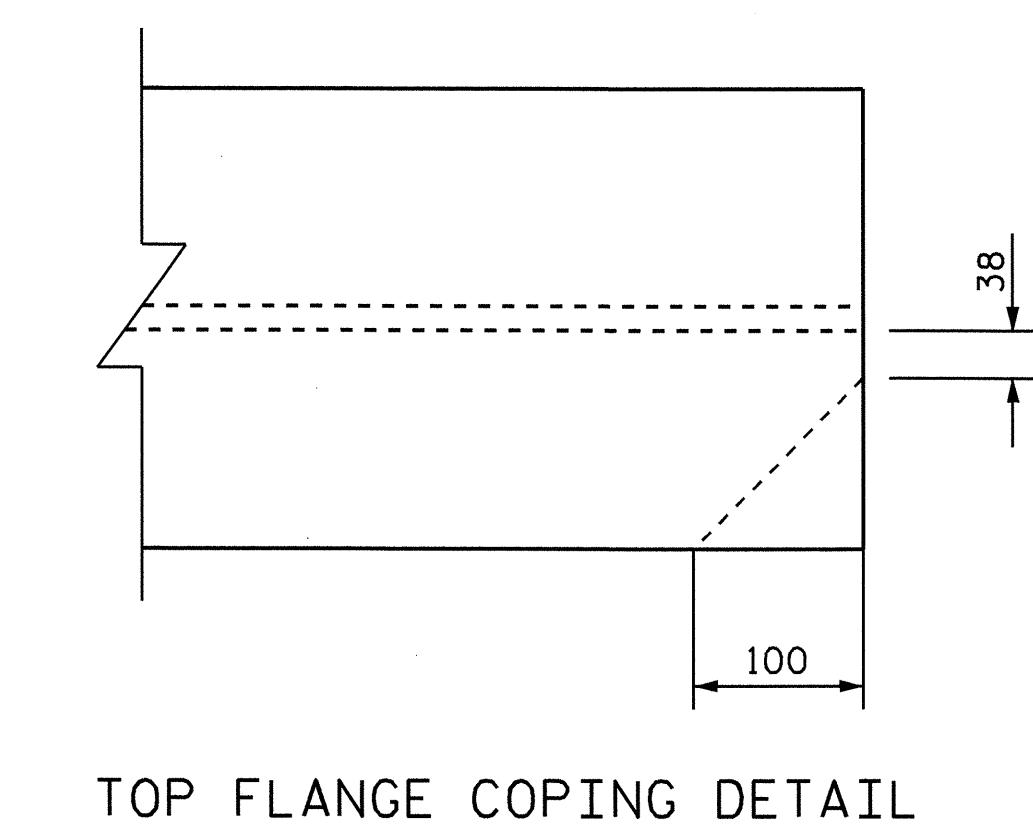
GIRDER ELEVATION



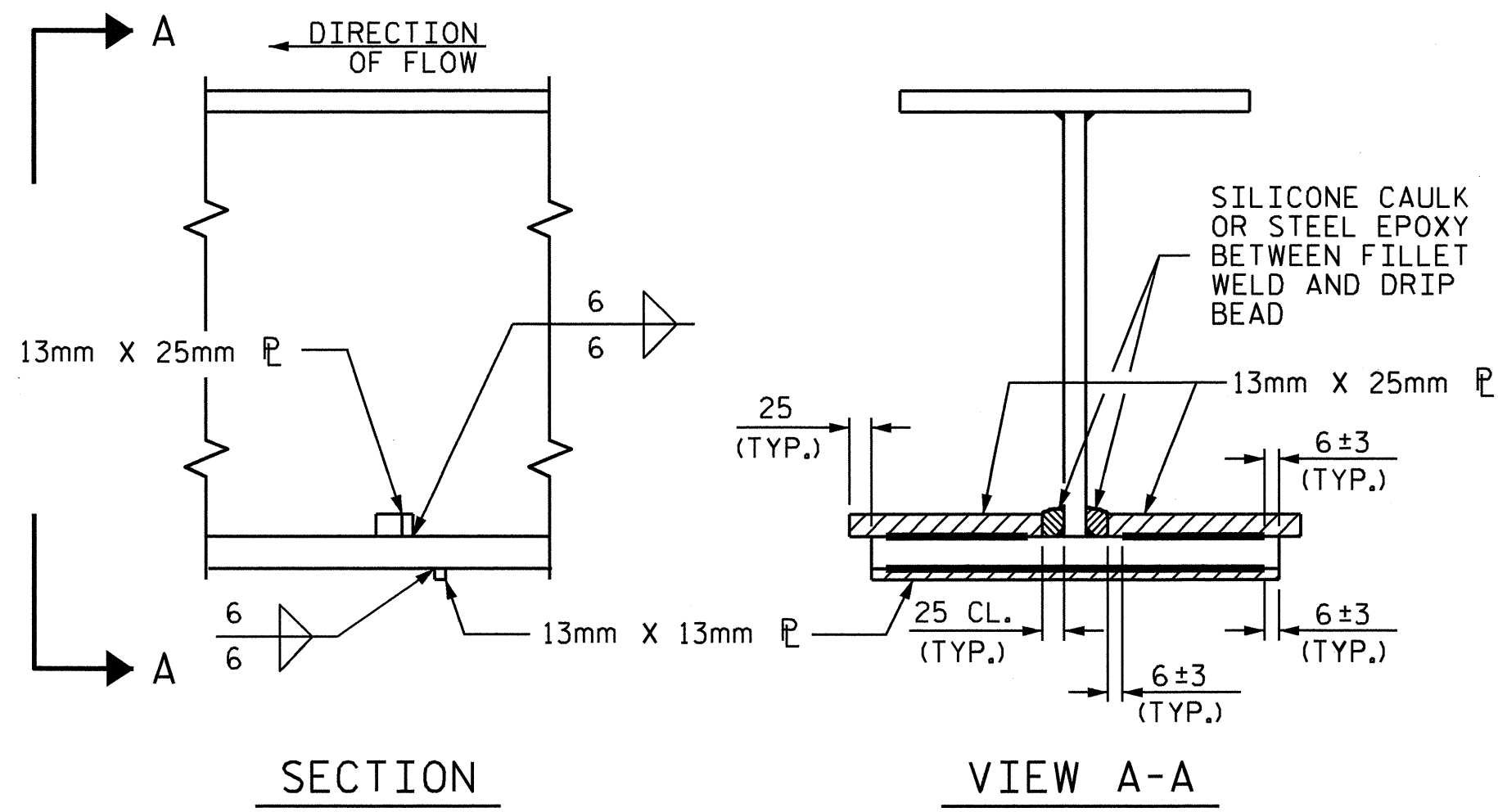
BOTTOM FLANGE DETAIL



BOTTOM FLANGE DETAIL @ END BENTS



TOP FLANGE COPING DETAIL



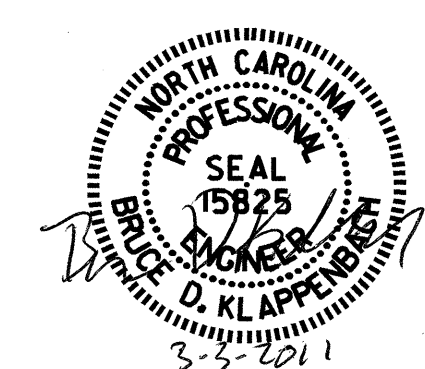
DRIP BEAD DETAILS

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 221+70.114 -L-REV

SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 STRUCTURAL STEEL
 DETAILS**

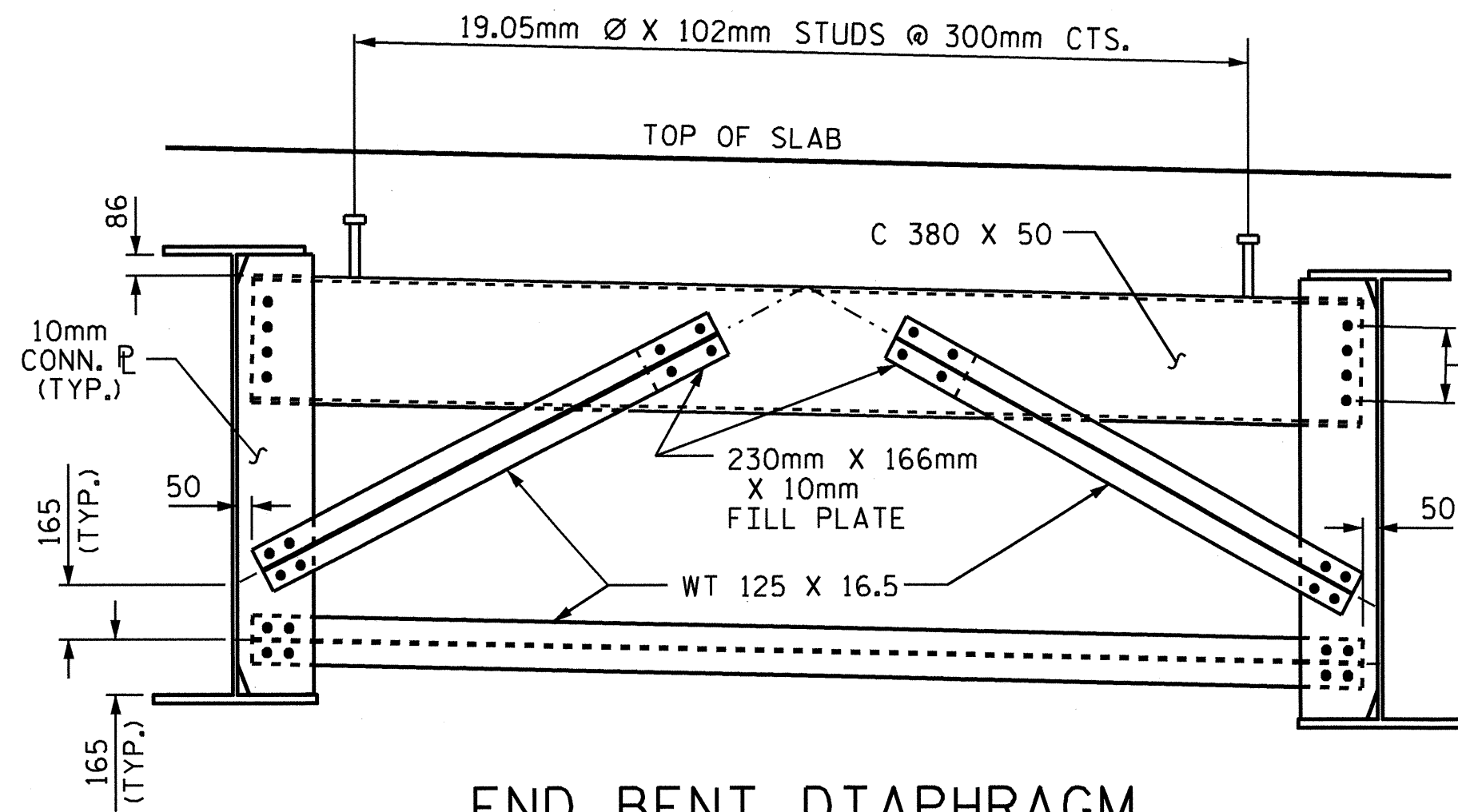


REVISIONS						SHEET NO. S-11
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 41
2			4			

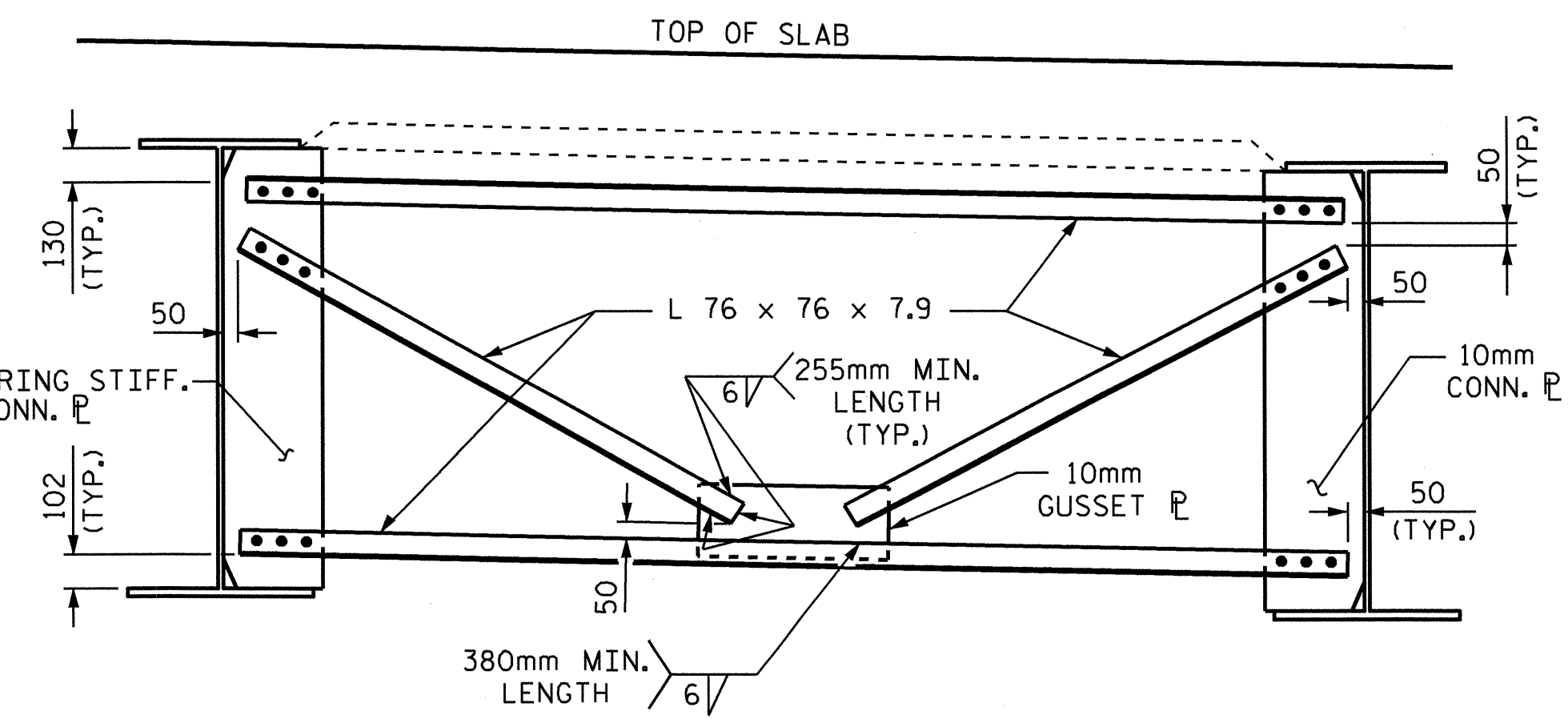
DRAWN BY: M. G. SHAIKH DATE: 12-15-08
 CHECKED BY: H. T. BARBOUR DATE: 06-22-09

01-MAR-2011 11:18
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 mshalkh

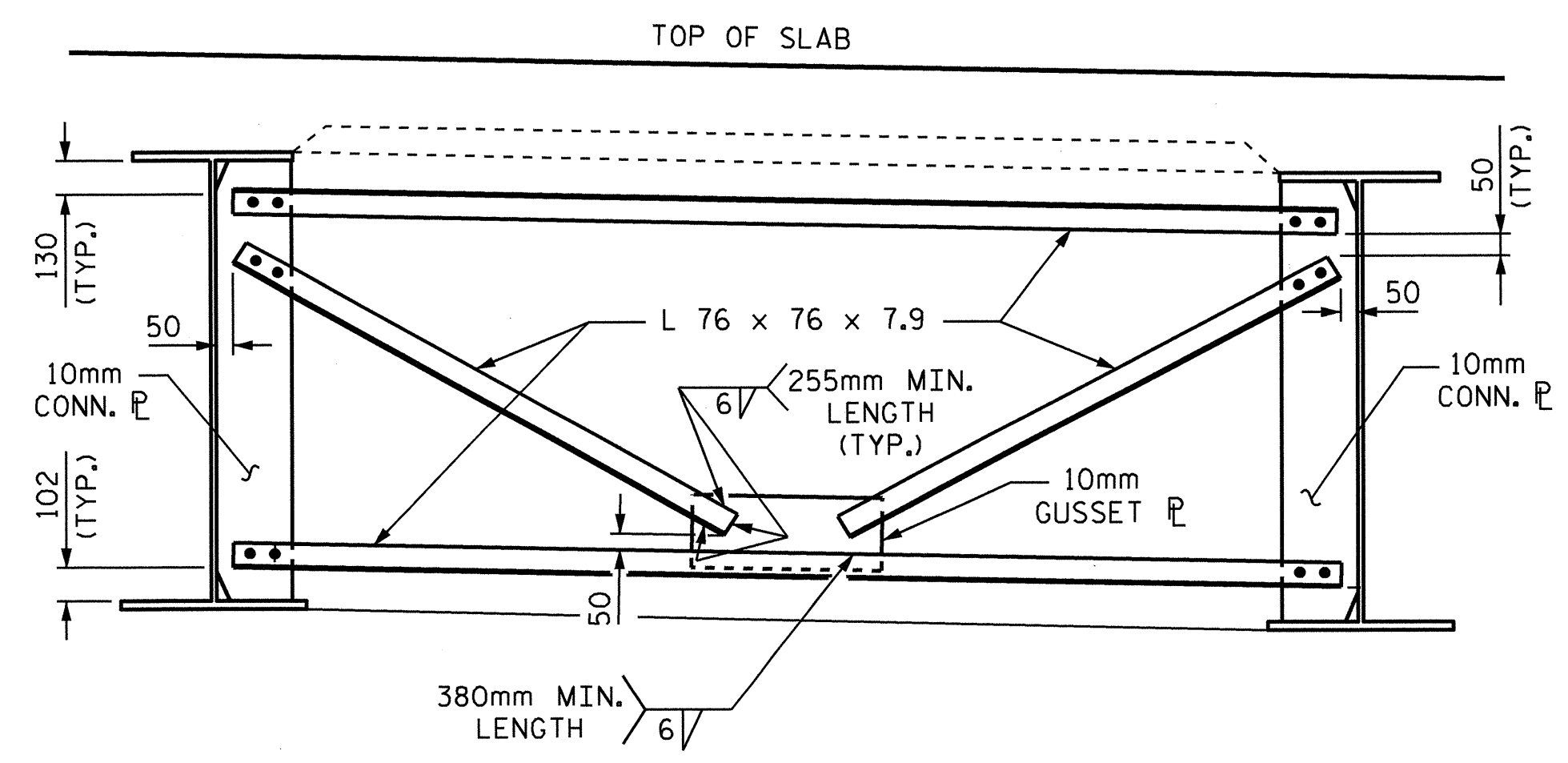
STR. #1



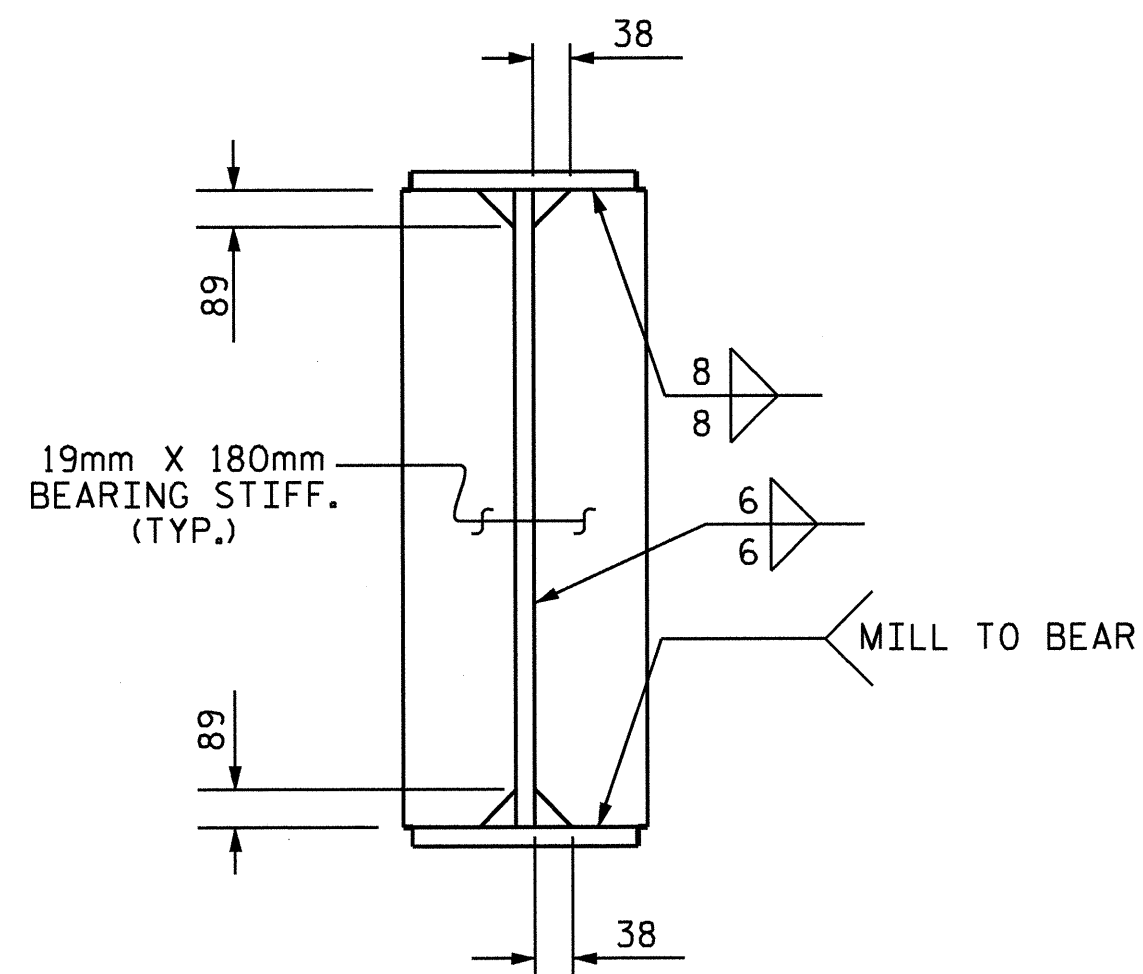
END BENT DIAPHRAGM



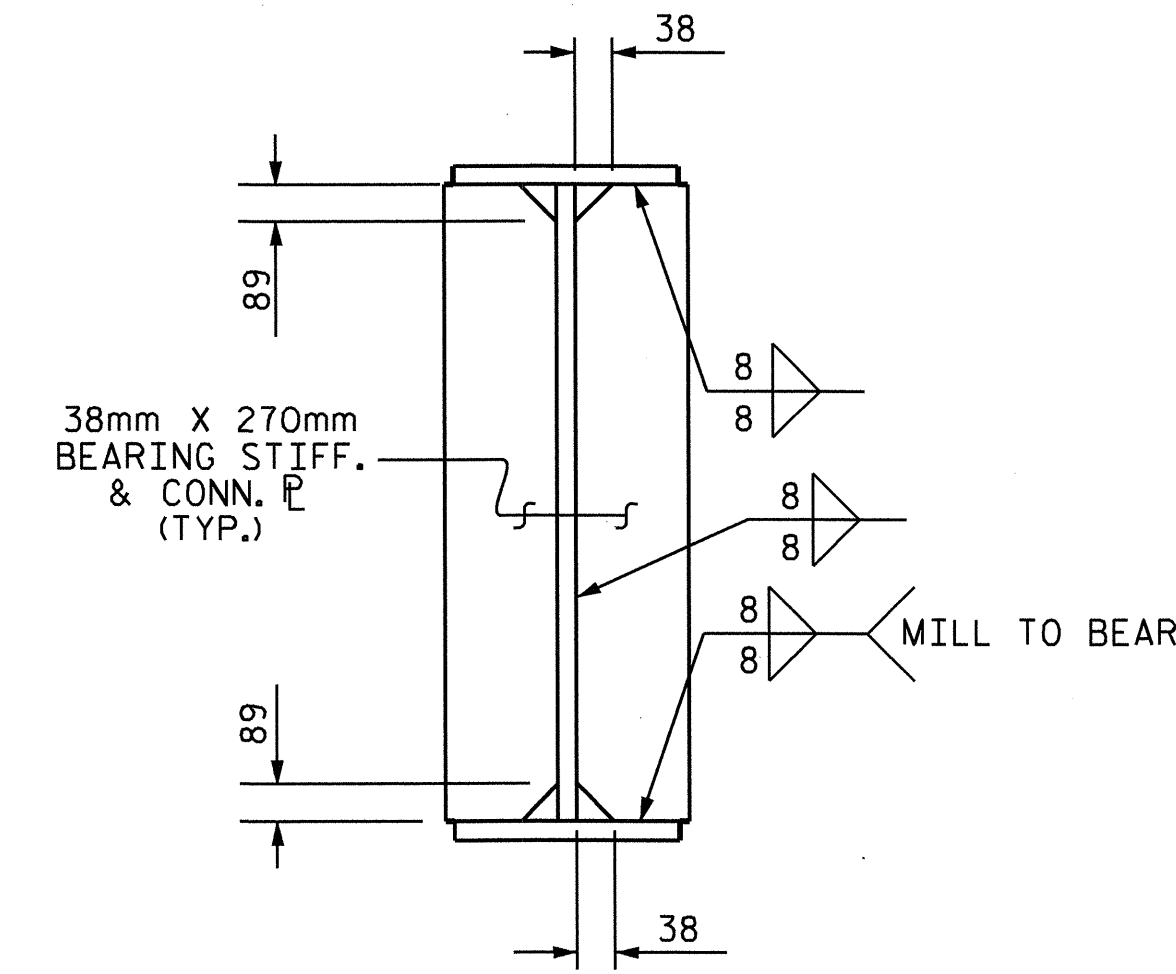
BENT DIAPHRAGM



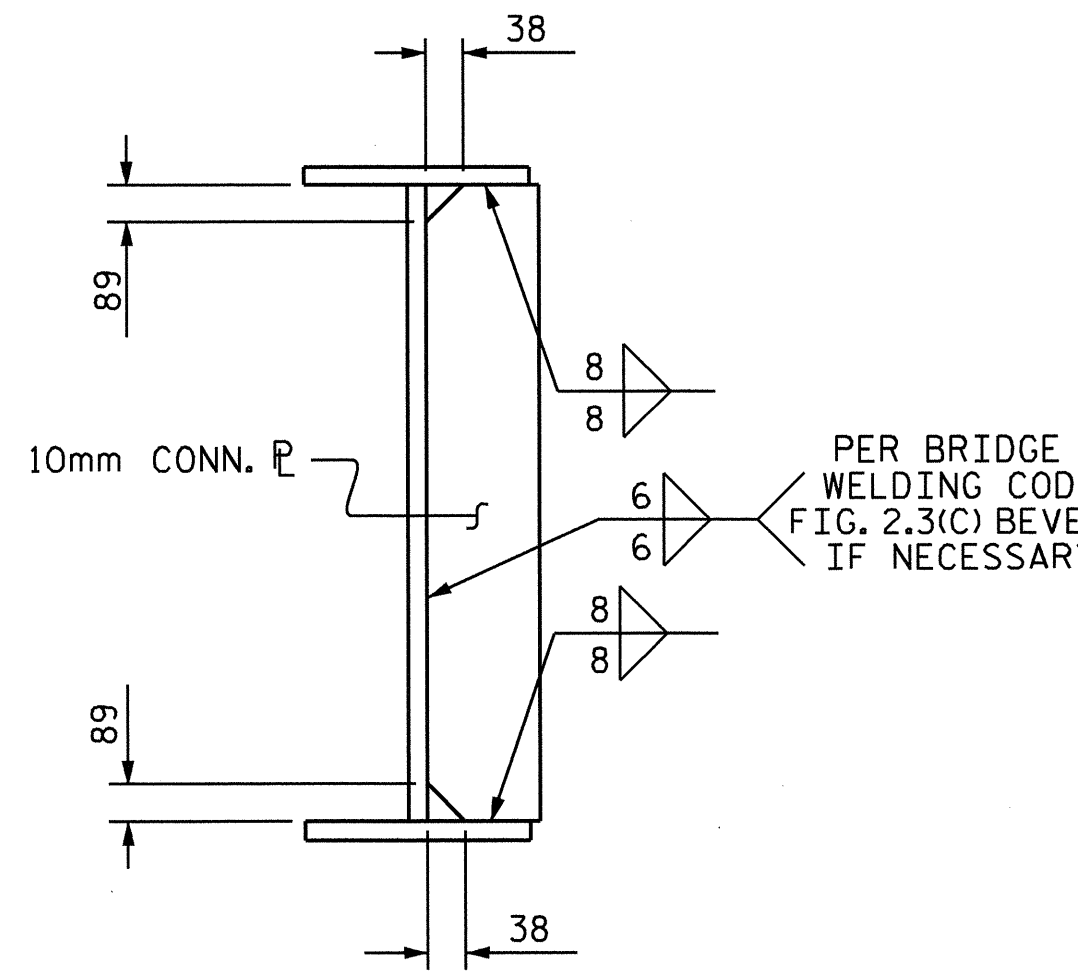
INTERMEDIATE DIAPHRAGM



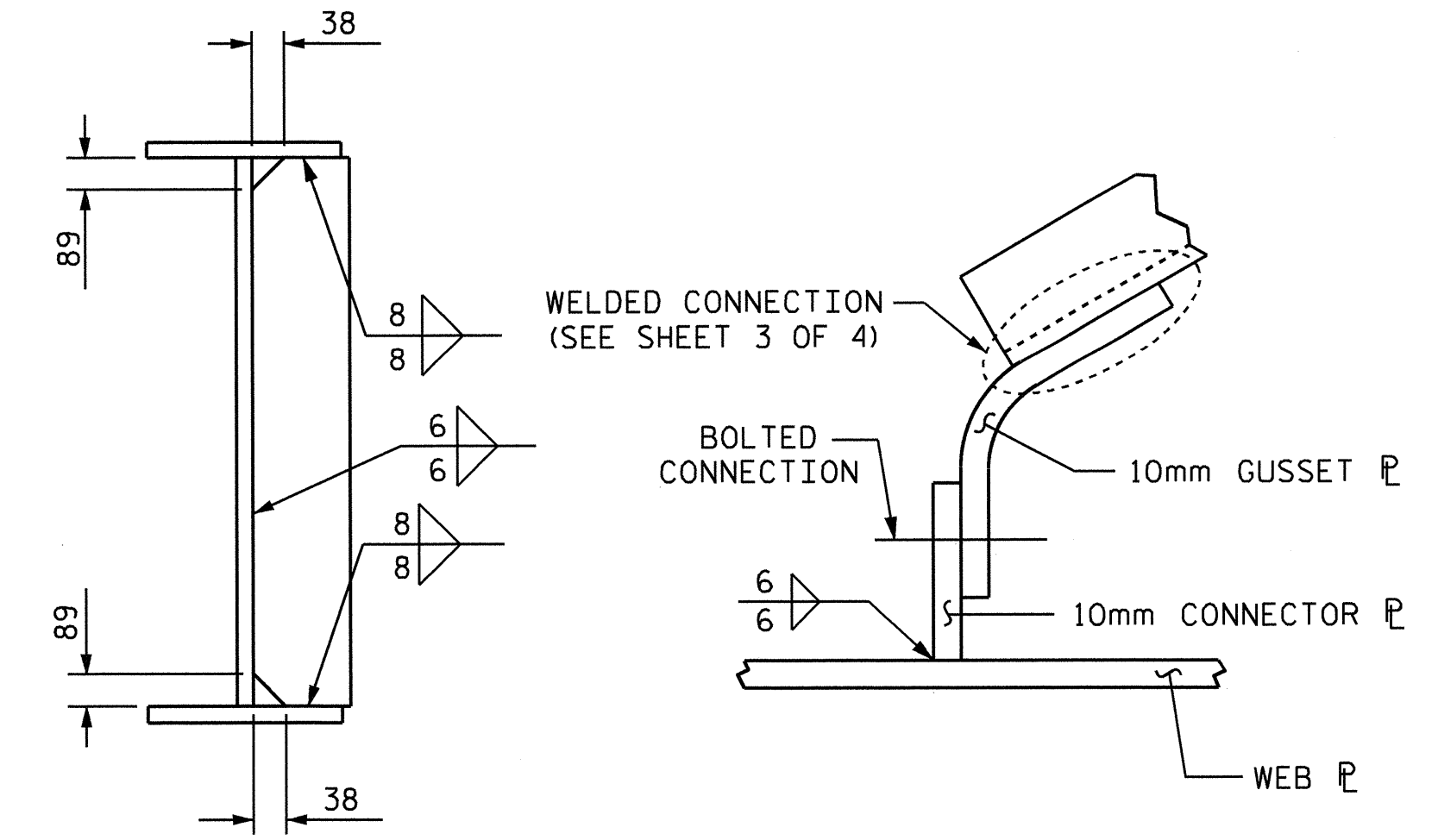
BEARING STIFFENER AT END BENT



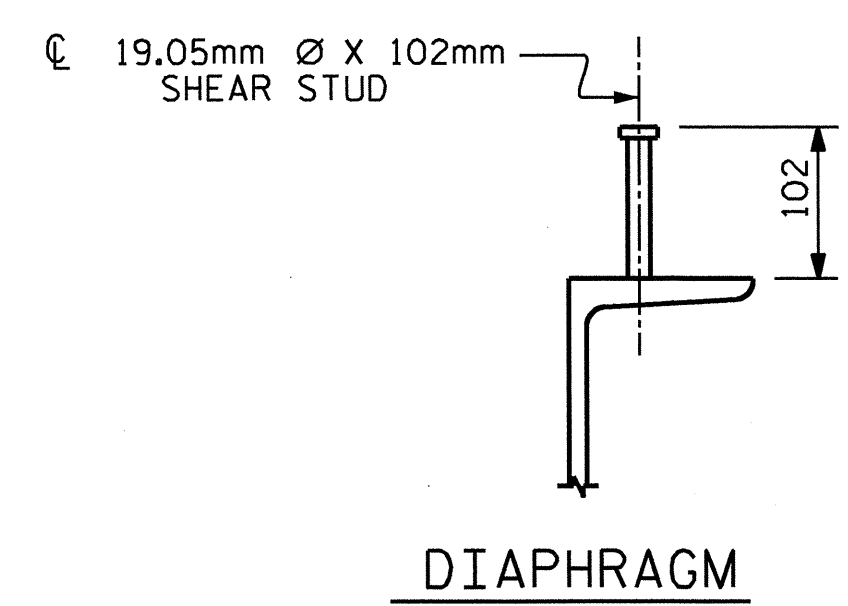
BEARING STIFFENER/CONNECTOR PLATE AT BENT DIAPHRAGMS



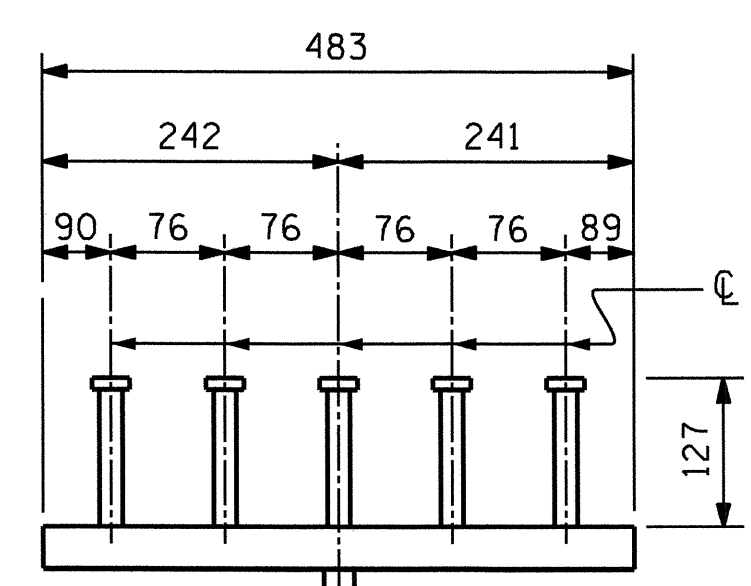
CONNECTOR PLATE



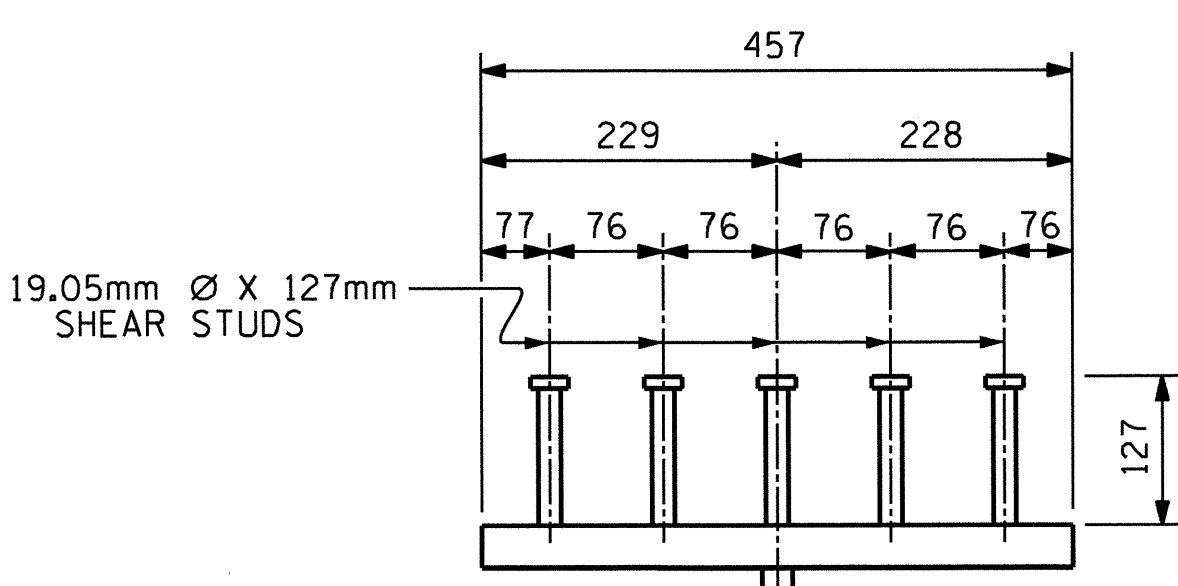
CONNECTOR PLATE AT END BENT DIAPHRAGMS



DIAPHRAGM



GIRDER



GIRDER

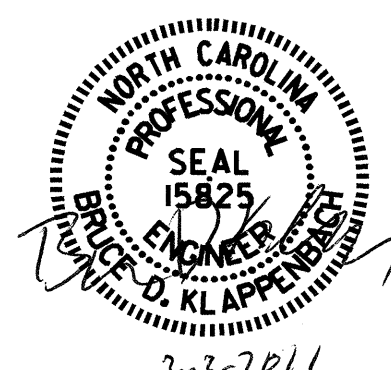
SHEAR STUD DETAILS

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 221+70.114 -L-REV

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 STRUCTURAL STEEL
 DETAILS

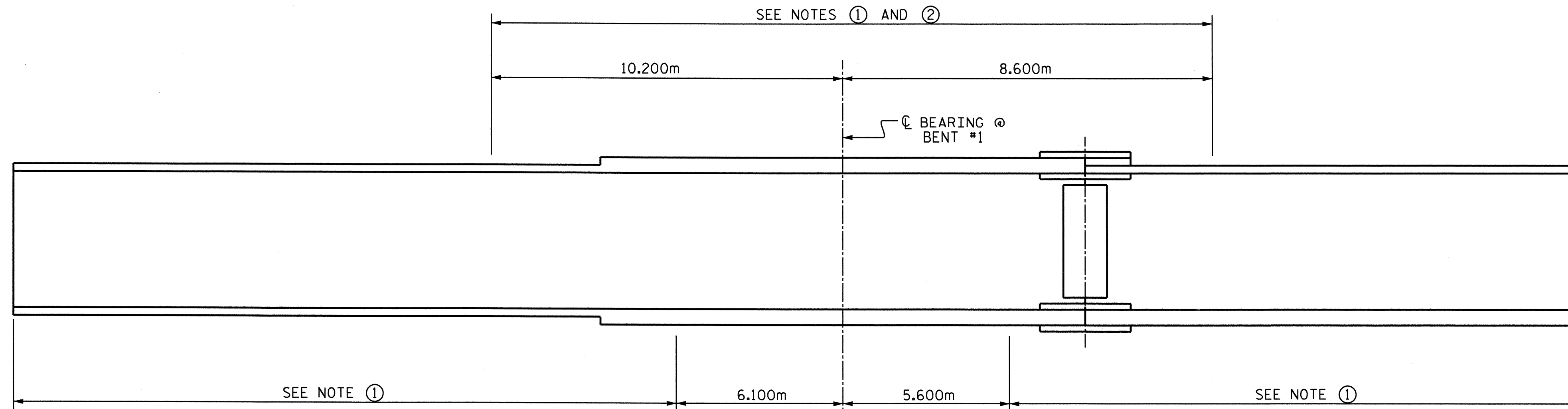


REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12	
1			3			TOTAL SHEETS 41	
2			4				

DRAWN BY: M. G. SHAIKH DATE: 12-15-08
 CHECKED BY: H. T. BARBOUR DATE: 06-22-09

01-MAR-2011 11:18
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 mshalkh

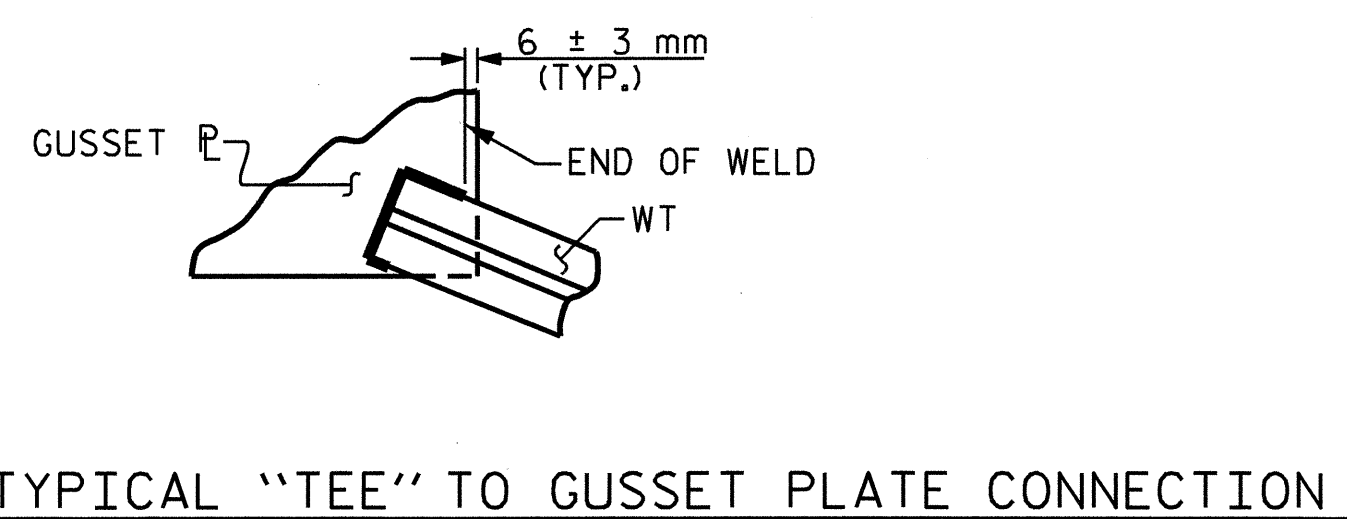
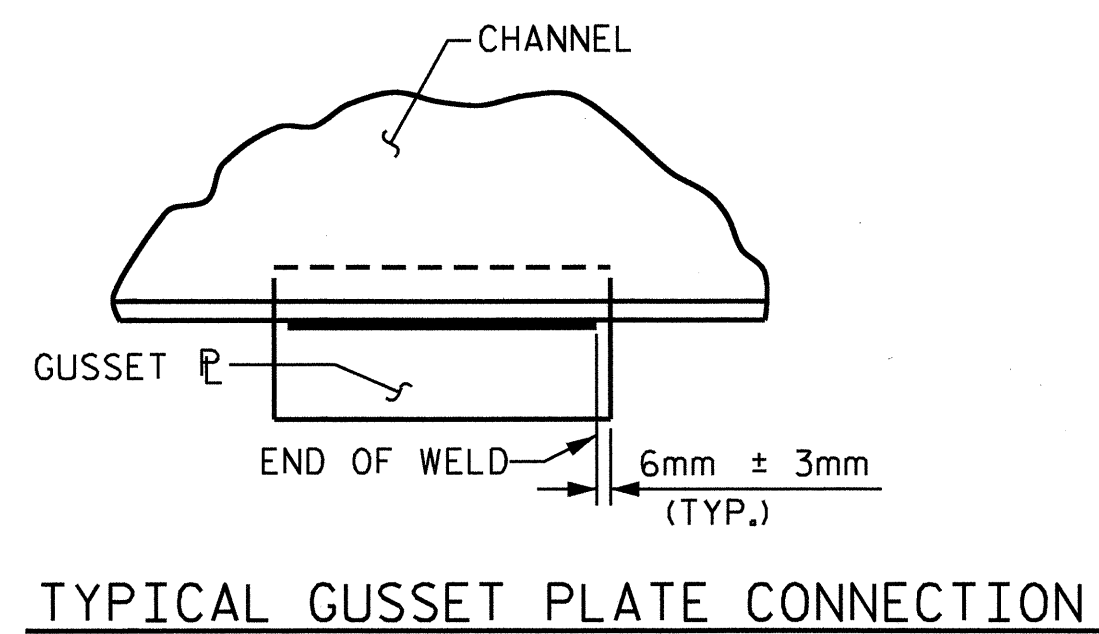
STR. #1



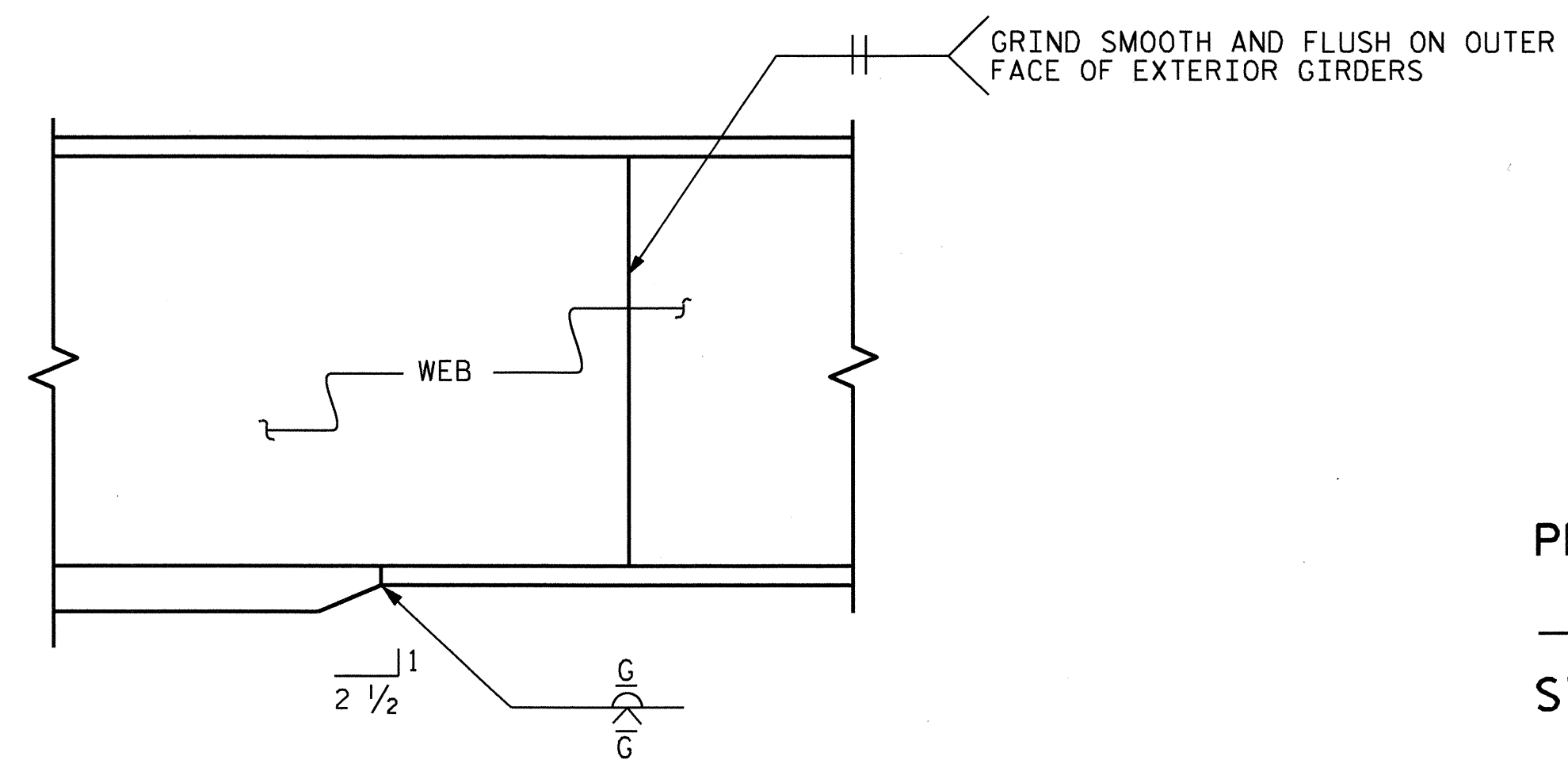
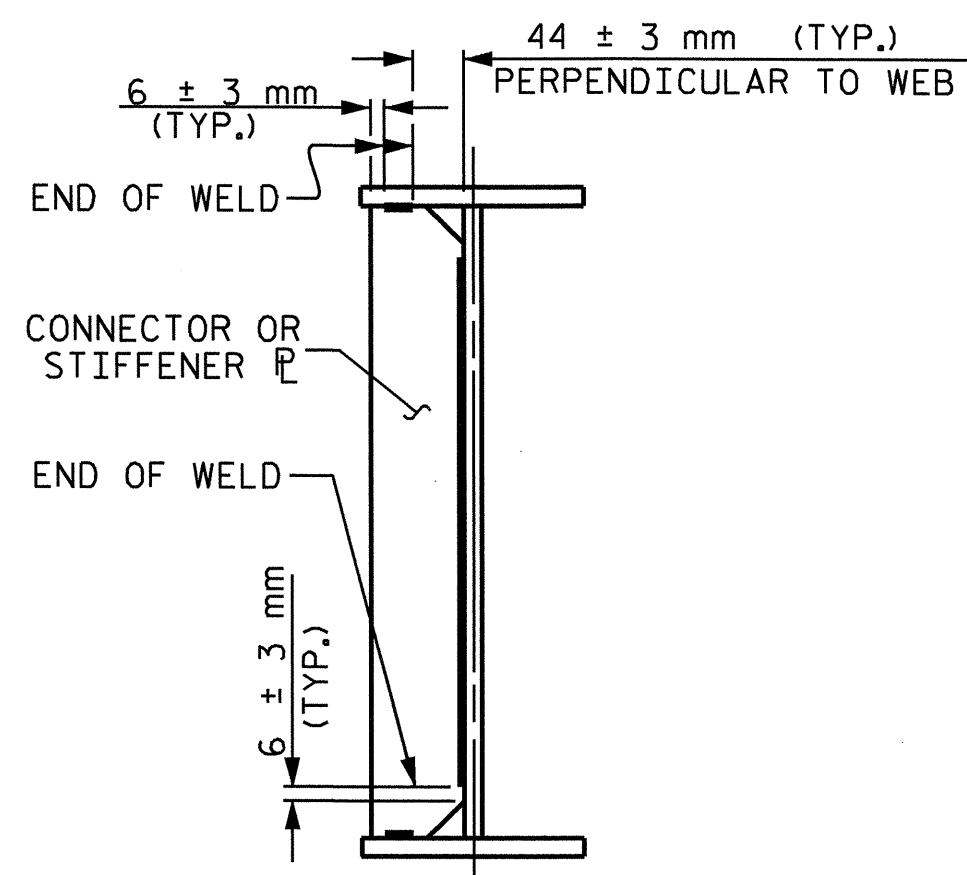
NOTE ① : CHARPY V-NOTCH TESTS ARE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATE WHICH FALLS WITHIN THESE LIMITS, ALL WEB PLATES, AND ALL SPLICE PLATES. IF A PERMITTED SHOP FLANGE SPLICE IS NOT USED, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE FLANGE PLATE. FOR CHARPY V-NOTCH TESTS, SEE ARTICLE 1072-9 OF THE STANDARD SPECIFICATIONS.

NOTE ② : NO WELDING OF FORM OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTED IN THIS REGION.

CHARPY V-NOTCH TEST FOR GIRDERS



WELD TERMINATION DETAILS



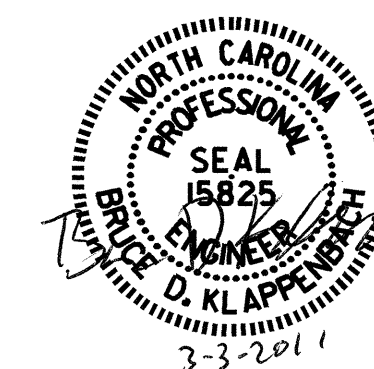
TYPICAL FLANGE AND WEB BUTT JOINTS

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 221+70.114 -L-REV

SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 STRUCTURAL STEEL
 DETAILS



DRAWN BY : M. G. SHAIKH DATE : 12-16-08
 CHECKED BY : H. T. BARBOUR DATE : 06-22-09

28-FEB-2011 14:03
 J:\Structures\Str\mshaiKh\Microstation\R-2533CC.sd.TS.dgn
 mshaiKh

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13	
1			3			TOTAL SHEETS	
2			4			41	

STR. #1

NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 345W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE 22.23mm DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

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

SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 18 METERS AND WEB PIECE LENGTHS TO 14 METERS. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 4.5 METERS OF MAXIMUM DEAD LOAD DEFLECTION (NOR WITHIN 4.5 METERS OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS). KEEP 600mm MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 150mm MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

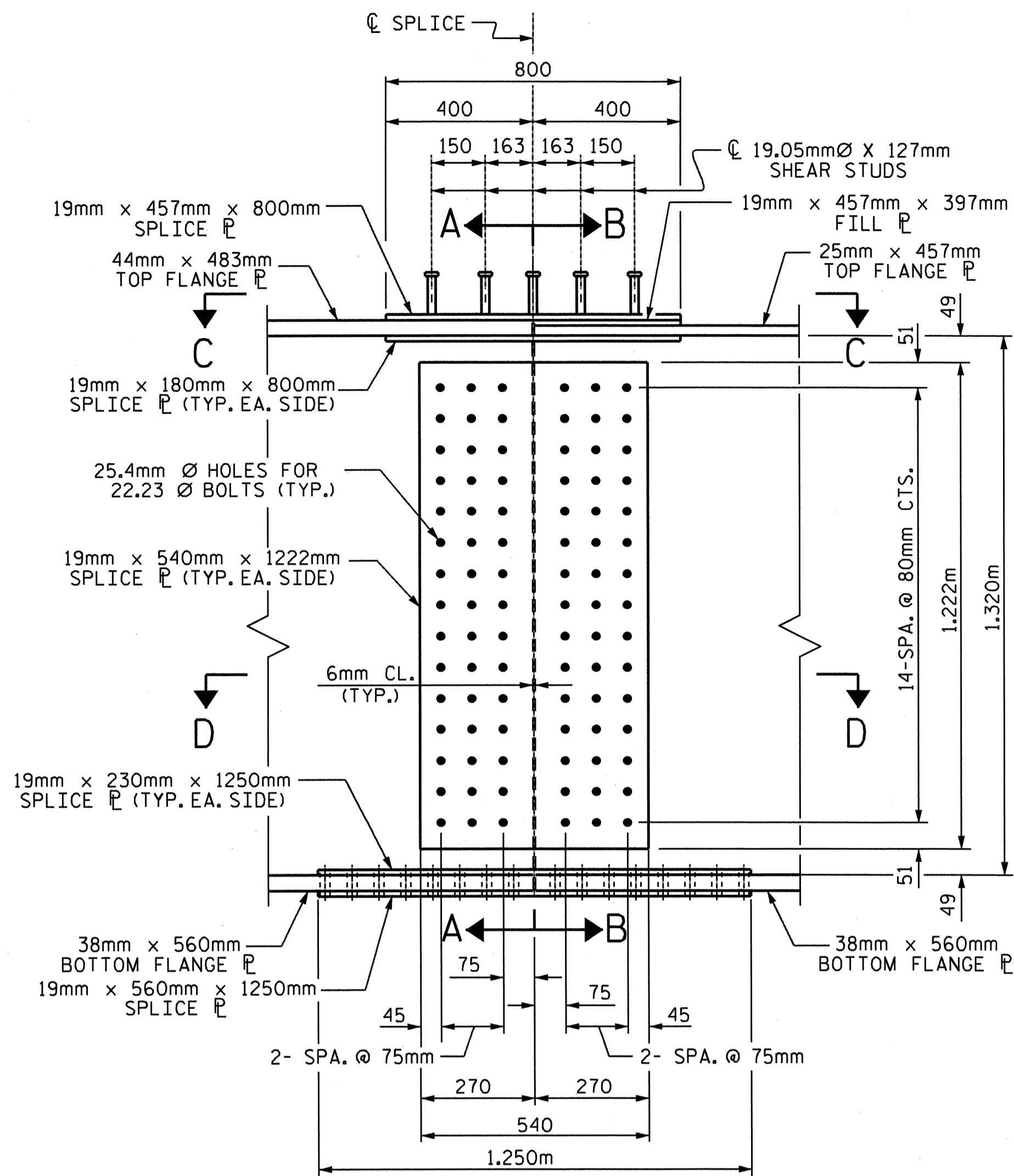
STUDS ON GIRDERS MAY BE SHIFTED UP TO 25mm IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

ENDS OF GIRDERS SHALL BE PLUMB.

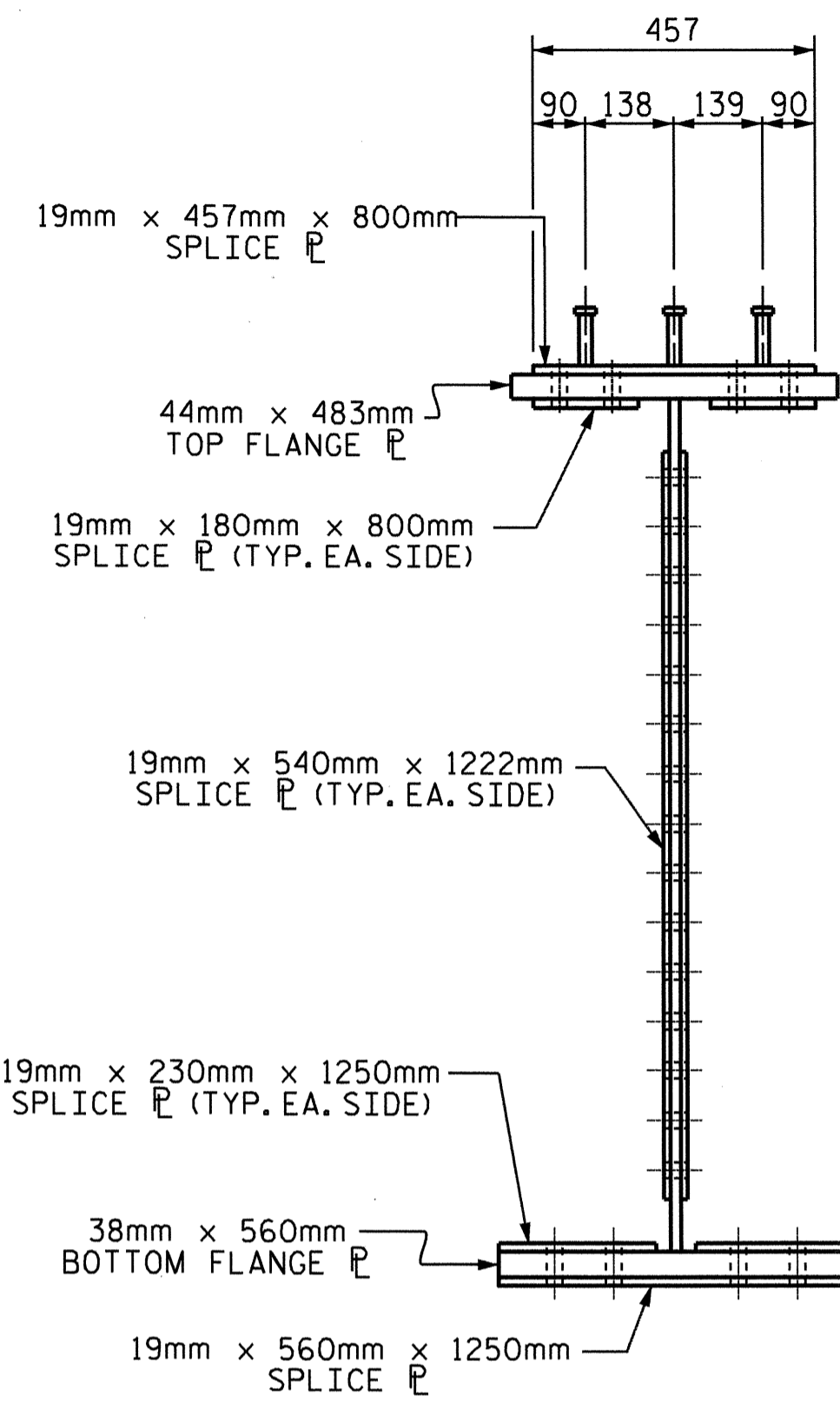
TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS. FOR DIRECT TENSION INDICATORS, SEE SPECIAL PROVISIONS.

FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

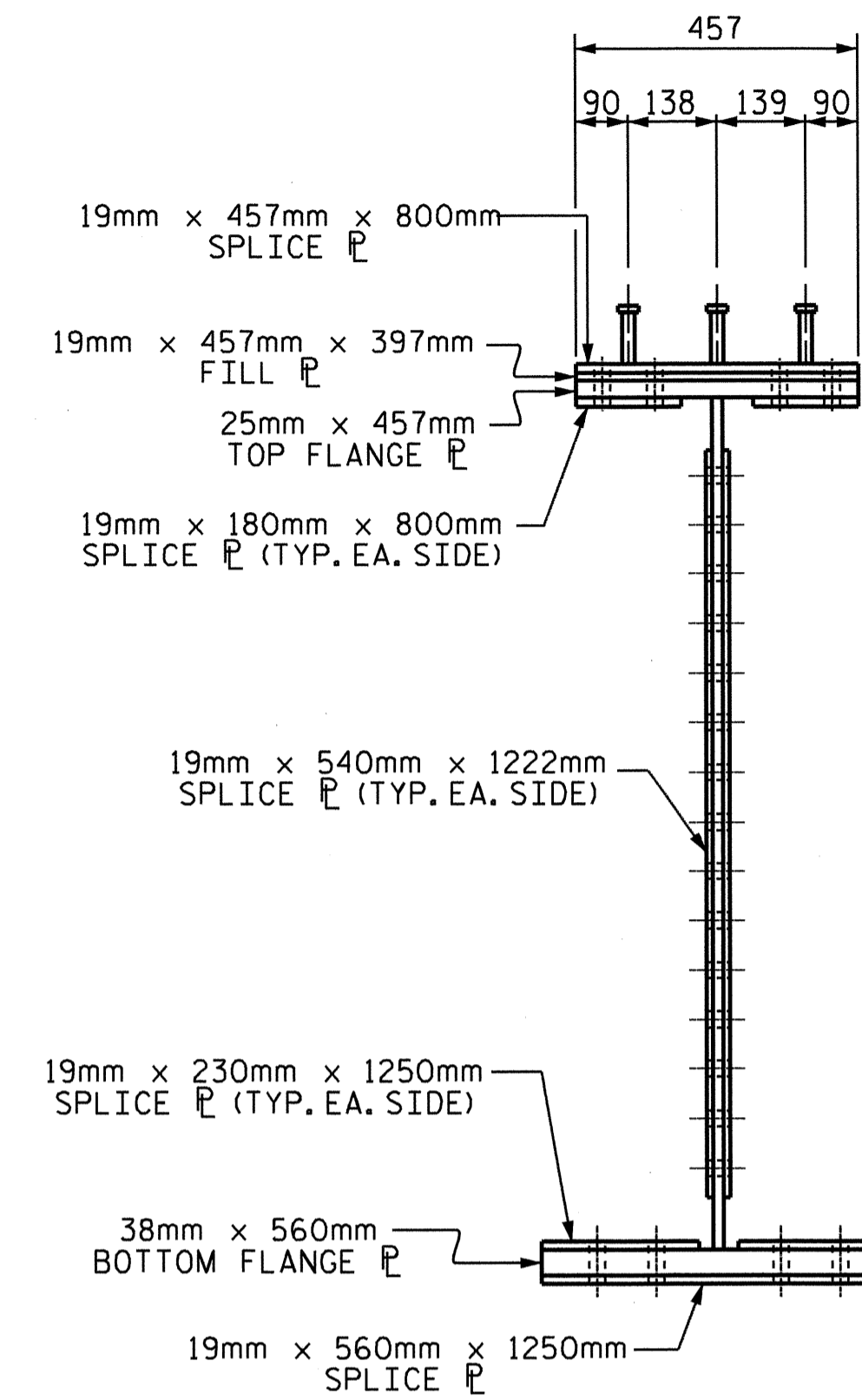
BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE TO AVOID INTERFERENCE WITH THE ANCHOR BOLT.



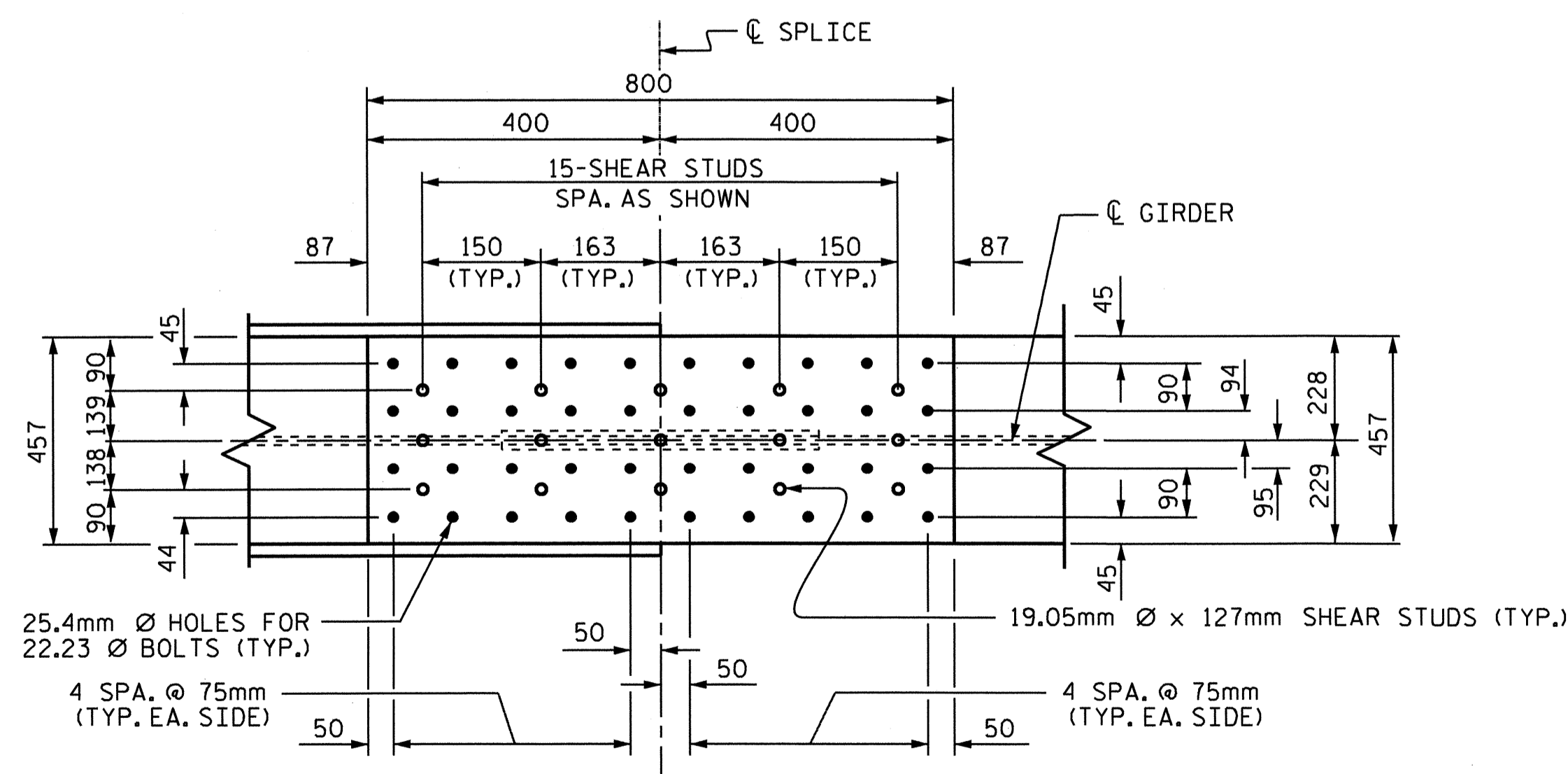
ELEVATION



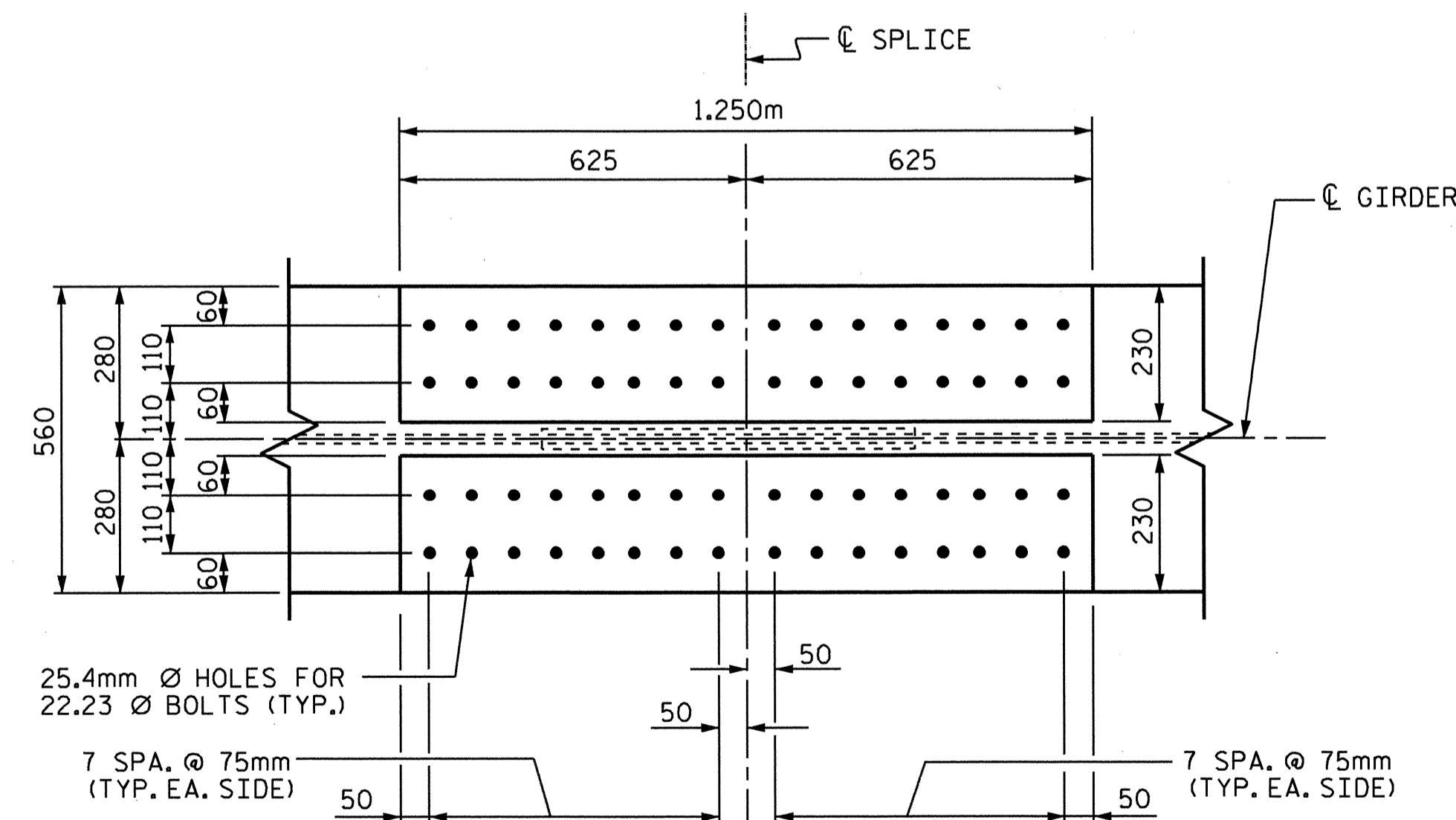
SECTION A-A



SECTION B-B



VIEW C-C

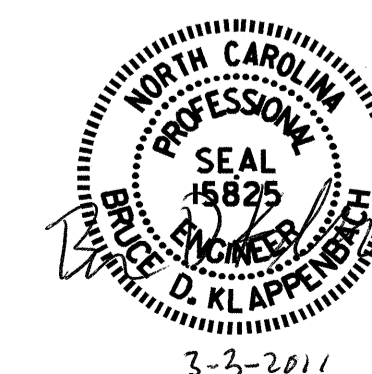


VIEW D-D

BOLTED FIELD SPLICE

DRAWN BY : M. G. SHAIKH DATE : 12-11-08
 CHECKED BY : H. T. BARBOUR DATE : 06-22-09

28-FEB-2011 14:02
 J:\Structures\Str\mshaiKh\Microstation\R-2533CC.sd.TS.dgn
 mshaiKh



PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 221+70.114 -L-REV

SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STRUCTURAL STEEL
 BOLTED FIELD SPLICE

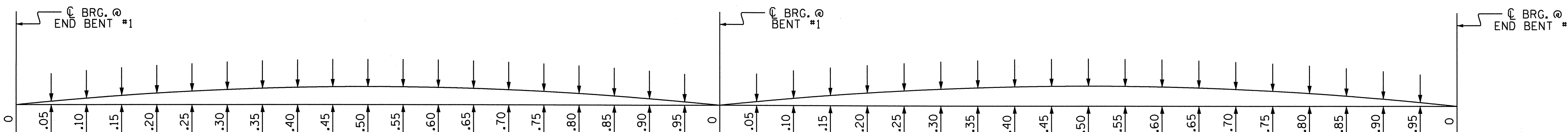
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14	
1			3			TOTAL SHEETS	
2			4			41	

STR. #1

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
TWENTIETH POINTS	SPAN "A"																				
	GIRDER 1																				
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.001	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.004	0.007	0.010	0.013	0.015	0.016	0.017	0.017	0.017	0.016	0.014	0.012	0.009	0.007	0.004	0.002	0.001	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.000	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.005	0.009	0.013	0.017	0.020	0.021	0.022	0.022	0.022	0.021	0.019	0.015	0.012	0.009	0.006	0.002	0.001	0.000	0.000	0.000
VERTICAL CURVE ORDINATE ↓	0.000	0.006	0.012	0.017	0.021	0.024	0.027	0.030	0.031	0.032	0.032	0.032	0.031	0.030	0.027	0.024	0.021	0.017	0.012	0.006	0.000
ORDINATE DUE TO SUPERELEVATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	11	21	30	38	44	48	52	53	54	53	51	46	42	36	30	23	18	12	6	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
TWENTIETH POINTS	SPAN "B"																				
	GIRDER 1																				
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.010	0.011	0.011	0.011	0.010	0.010	0.009	0.007	0.006	0.004	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.003	0.007	0.012	0.017	0.022	0.029	0.034	0.038	0.041	0.043	0.045	0.045	0.043	0.041	0.036	0.031	0.025	0.018	0.009	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.000	0.001	0.001	0.002	0.002	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.004	0.010	0.016	0.023	0.030	0.039	0.045	0.051	0.055	0.058	0.060	0.060	0.057	0.055	0.048	0.041	0.033	0.024	0.012	0.000
VERTICAL CURVE ORDINATE ↓	0.000	0.008	0.016	0.022	0.028	0.033	0.037	0.040	0.042	0.043	0.044	0.043	0.042	0.040	0.037	0.033	0.028	0.022	0.016	0.008	0.000
ORDINATE DUE TO SUPERELEVATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	12	26	38	51	63	76	85	93	98	102	103	102	97	92	81	69	55	40	20	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN METERS, EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN MILLIMETERS.



SPAN "A"

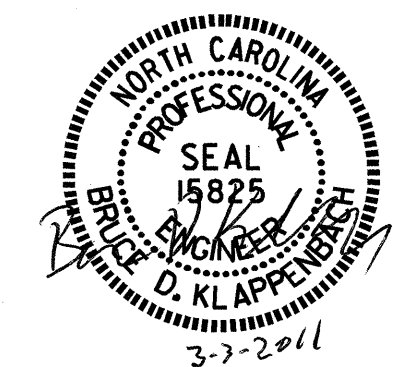
SPAN "B"

SCHEMATIC CAMBER ORDINATES
SLOPE FOR THE ZERO CAMBER BASE LINE VARIES.

DRAWN BY : M. G. SHAIKH DATE : 01-06-11
CHECKED BY : H. T. BARBOUR DATE : 01-10-11

PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 221+70.114 -L-REV

SHEET 1 OF 4



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
**SUPERSTRUCTURE
DEAD LOAD
DEFLECTIONS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			41

STR #1

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
TWENTIETH POINTS	SPAN "A"																				
	GIRDER 2																				
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.001	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.005	0.009	0.012	0.015	0.018	0.019	0.020	0.020	0.020	0.018	0.016	0.014	0.011	0.008	0.005	0.003	0.001	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.006	0.011	0.015	0.019	0.022	0.023	0.024	0.024	0.024	0.022	0.020	0.017	0.014	0.010	0.007	0.003	0.001	0.000	0.000	0.000
VERTICAL CURVE ORDINATE ↓	0.000	0.006	0.012	0.017	0.021	0.024	0.027	0.030	0.031	0.032	0.032	0.032	0.031	0.030	0.027	0.024	0.021	0.017	0.012	0.006	0.000
ORDINATE DUE TO SUPERELEVATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	12	23	32	40	46	50	54	55	56	54	52	48	44	37	31	24	18	12	6	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
TWENTIETH POINTS	SPAN "B"																				
	GIRDER 2																				
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.010	0.011	0.011	0.011	0.010	0.010	0.009	0.007	0.006	0.004	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.003	0.008	0.013	0.019	0.026	0.032	0.038	0.043	0.048	0.051	0.052	0.052	0.050	0.047	0.042	0.035	0.028	0.020	0.010	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.004	0.010	0.017	0.024	0.033	0.041	0.048	0.054	0.060	0.064	0.066	0.066	0.062	0.059	0.053	0.044	0.035	0.025	0.013	0.000
VERTICAL CURVE ORDINATE ↓	0.000	0.008	0.016	0.022	0.028	0.033	0.037	0.040	0.042	0.043	0.044	0.043	0.042	0.040	0.037	0.033	0.028	0.022	0.016	0.008	0.000
ORDINATE DUE TO SUPERELEVATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	12	26	39	52	66	78	88	96	103	108	109	108	102	96	86	72	57	41	21	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
TWENTIETH POINTS	SPAN "A"																				
	GIRDER 3																				
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.001	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.005	0.009	0.012	0.016	0.018	0.020	0.020	0.021	0.021	0.019	0.019	0.014	0.011	0.008	0.005	0.003	0.001	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.006	0.010	0.014	0.020	0.022	0.024	0.025	0.025	0.024	0.023	0.021	0.017	0.014	0.009	0.006	0.003	0.001	0.000	0.000	0.000
VERTICAL CURVE ORDINATE ↓	0.000	0.006	0.012	0.017	0.021	0.024	0.027	0.030	0.031	0.032	0.032	0.032	0.031	0.030	0.027	0.024	0.021	0.017	0.012	0.006	0.000
ORDINATE DUE TO SUPERELEVATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	12	22	31	41	46	51	55	56	56	55	53	48	44	36	30	24	18	12	6	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
TWENTIETH POINTS	SPAN "B"																				
	GIRDER 3																				
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.010	0.011	0.011	0.011	0.010	0.010	0.009	0.007	0.006	0.004	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.003	0.008	0.014	0.020	0.026	0.033	0.039	0.044	0.049	0.052	0.053	0.053	0.051	0.048	0.043	0.036	0.029	0.020	0.010	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.004	0.010	0.018	0.025	0.033	0.041	0.048	0.054	0.061	0.065	0.066	0.066	0.063	0.060	0.053	0.044	0.036	0.025	0.012	0.000
VERTICAL CURVE ORDINATE ↓	0.000	0.008	0.016	0.022	0.028	0.033	0.037	0.040	0.042	0.043	0.044	0.043	0.042	0.040	0.037	0.033	0.028	0.022	0.016	0.008	0.000
ORDINATE DUE TO SUPERELEVATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	12	26	40	53	66	78	88	96	104	109	109	108	103	97	86	72	58	41	20	0

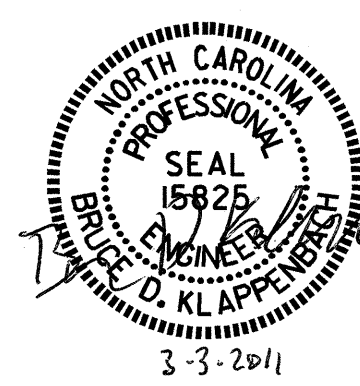
* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN METERS, EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN MILLIMETERS.

PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 221+70.114 -L-REV

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUPERSTRUCTURE
DEAD LOAD
DEFLECTIONS**



DRAWN BY : M. G. SHAIKH DATE : 01-06-11
CHECKED BY : H. T. BARBOUR DATE : 01-10-11

REVISIONS						SHEET NO. S-16
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 41
2			4			

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																				
TWENTIETH POINTS	SPAN "A"																			
	GIRDER 4, 5, 6 & 7																			
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.001	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.005	0.009	0.012	0.016	0.018	0.020	0.021	0.021	0.020	0.019	0.017	0.014	0.011	0.008	0.005	0.003	0.001	0.000	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.006	0.010	0.014	0.020	0.022	0.024	0.025	0.025	0.024	0.023	0.021	0.017	0.013	0.009	0.006	0.003	0.001	0.000	0.000
VERTICAL CURVE ORDINATE ↓	0.000	0.006	0.012	0.017	0.021	0.024	0.027	0.030	0.031	0.032	0.032	0.032	0.031	0.030	0.027	0.024	0.021	0.017	0.012	0.006
ORDINATE DUE TO SUPERELEVATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	12	22	31	40	46	51	55	56	56	55	53	48	43	36	30	24	18	12	6

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																				
TWENTIETH POINTS	SPAN "B"																			
	GIRDER 4, 5 & 6																			
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.010	0.011	0.011	0.011	0.010	0.010	0.009	0.007	0.006	0.004	0.002
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.003	0.008	0.013	0.019	0.026	0.033	0.039	0.044	0.048	0.051	0.053	0.053	0.051	0.047	0.042	0.036	0.028	0.020	0.010
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.004	0.010	0.016	0.024	0.033	0.041	0.048	0.054	0.059	0.063	0.065	0.065	0.062	0.058	0.052	0.044	0.035	0.025	0.012
VERTICAL CURVE ORDINATE ↓	0.000	0.008	0.016	0.022	0.028	0.033	0.037	0.040	0.042	0.043	0.044	0.043	0.042	0.040	0.037	0.033	0.028	0.022	0.016	0.008
ORDINATE DUE TO SUPERELEVATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	12	26	38	52	66	78	88	96	102	107	108	107	102	95	85	72	57	41	20

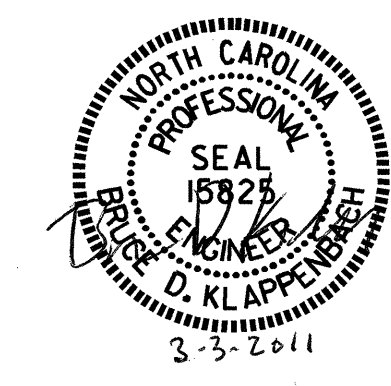
DEAD LOAD DEFLECTION TABLE FOR GIRDERS																				
TWENTIETH POINTS	SPAN "B"																			
	GIRDER 7																			
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.010	0.011	0.011	0.011	0.010	0.010	0.009	0.007	0.006	0.004	0.002
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.003	0.008	0.014	0.020	0.026	0.033	0.039	0.044	0.049	0.052	0.053	0.053	0.051	0.048	0.043	0.036	0.029	0.020	0.010
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.004	0.010	0.018	0.025	0.033	0.041	0.048	0.054	0.061	0.065	0.066	0.066	0.063	0.060	0.053	0.044	0.036	0.025	0.012
VERTICAL CURVE ORDINATE ↓	0.000	0.008	0.016	0.022	0.028	0.033	0.037	0.040	0.042	0.043	0.044	0.043	0.042	0.040	0.037	0.033	0.028	0.022	0.016	0.008
ORDINATE DUE TO SUPERELEVATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	12	26	40	53	66	78	88	96	104	109	109	108	103	97	86	72	58	41	20

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN METERS, EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN MILLIMETERS.

PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 221+70.114 -L-REV

SHEET 3 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE DEAD LOAD DEFLECTIONS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-17
					TOTAL SHEETS 41



DRAWN BY: M. G. SHAIKH DATE: 01-06-11
CHECKED BY: H. T. BARBOUR DATE: 01-10-11

STR #1

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
TWENTIETH POINTS	SPAN "A"																				
	GIRDER 8																				
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.001	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.005	0.009	0.012	0.015	0.018	0.020	0.021	0.021	0.020	0.019	0.017	0.014	0.011	0.008	0.006	0.003	0.001	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.006	0.011	0.015	0.019	0.022	0.024	0.025	0.025	0.024	0.023	0.021	0.017	0.014	0.010	0.007	0.003	0.001	0.000	0.000	0.000
VERTICAL CURVE ORDINATE ↓	0.000	0.006	0.012	0.017	0.021	0.024	0.027	0.030	0.031	0.032	0.032	0.032	0.031	0.030	0.027	0.024	0.021	0.017	0.012	0.006	0.000
ORDINATE DUE TO SUPERELEVATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	12	23	32	40	46	51	55	56	56	55	53	48	44	37	31	24	18	12	6	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
TWENTIETH POINTS	SPAN "B"																				
	GIRDER 8																				
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.010	0.011	0.011	0.011	0.010	0.010	0.009	0.007	0.006	0.004	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.003	0.008	0.013	0.019	0.025	0.032	0.038	0.043	0.047	0.050	0.052	0.052	0.050	0.046	0.042	0.035	0.028	0.019	0.010	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.004	0.010	0.017	0.024	0.032	0.041	0.048	0.054	0.059	0.064	0.066	0.066	0.062	0.058	0.053	0.044	0.035	0.024	0.013	0.000
VERTICAL CURVE ORDINATE ↓	0.000	0.008	0.016	0.022	0.028	0.033	0.037	0.040	0.042	0.043	0.044	0.043	0.042	0.040	0.037	0.033	0.028	0.022	0.016	0.008	0.000
ORDINATE DUE TO SUPERELEVATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	12	26	39	52	65	78	88	96	102	108	109	108	102	95	86	72	57	40	21	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
TWENTIETH POINTS	SPAN "A"																				
	GIRDER 9																				
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.004	0.008	0.011	0.013	0.015	0.017	0.017	0.018	0.017	0.016	0.015	0.012	0.010	0.007	0.005	0.003	0.001	0.000	0.000	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.000	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.005	0.011	0.014	0.017	0.020	0.022	0.022	0.023	0.022	0.021	0.020	0.016	0.013	0.009	0.007	0.004	0.001	0.000	0.000	0.000
VERTICAL CURVE ORDINATE ↓	0.000	0.006	0.012	0.017	0.021	0.024	0.027	0.030	0.031	0.032	0.032	0.032	0.031	0.030	0.027	0.024	0.021	0.017	0.012	0.006	0.000
ORDINATE DUE TO SUPERELEVATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	11	23	31	38	44	49	52	54	54	53	52	47	43	36	31	25	18	12	6	0

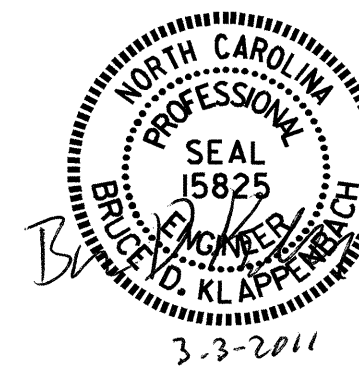
DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
TWENTIETH POINTS	SPAN "B"																				
	GIRDER 9																				
	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.002	0.003	0.004	0.005	0.007	0.008	0.009	0.010	0.010	0.011	0.011	0.010	0.010	0.009	0.007	0.006	0.004	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.002	0.007	0.012	0.016	0.022	0.028	0.033	0.038	0.041	0.043	0.044	0.044	0.043	0.040	0.036	0.031	0.024	0.017	0.009	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.000	0.001	0.001	0.002	0.002	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.002	0.001	0.001	0.001	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.003	0.010	0.016	0.022	0.029	0.038	0.044	0.050	0.055	0.057	0.059	0.059	0.057	0.054	0.048	0.041	0.032	0.022	0.012	0.000
VERTICAL CURVE ORDINATE ↓	0.000	0.008	0.016	0.022	0.028	0.033	0.037	0.040	0.042	0.043	0.044	0.043	0.042	0.040	0.037	0.033	0.028	0.022	0.016	0.008	0.000
ORDINATE DUE TO SUPERELEVATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	11	26	38	50	62	75	84	92	98	101	102	101	97	91	81	69	54	38	20	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN METERS, EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN MILLIMETERS.

DRAWN BY : M. G. SHAIKH DATE : 01-06-11
CHECKED BY : H. T. BARBOUR DATE : 01-10-11

PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 221+70.114 -L-REV

SHEET 4 OF 4



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
DEAD LOAD
DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			41

STR #1

NOTES

THE 51mm Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.

FOR AASHTO M270 GRADE 345W STRUCTURAL STEEL, SOLE PLATE SHALL BE AASHTO M270 GRADE 345W AND SHALL NOT BE GALVANIZED, ANCHOR BOLTS AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291M-12 OR AASHTO M292M-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293M. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

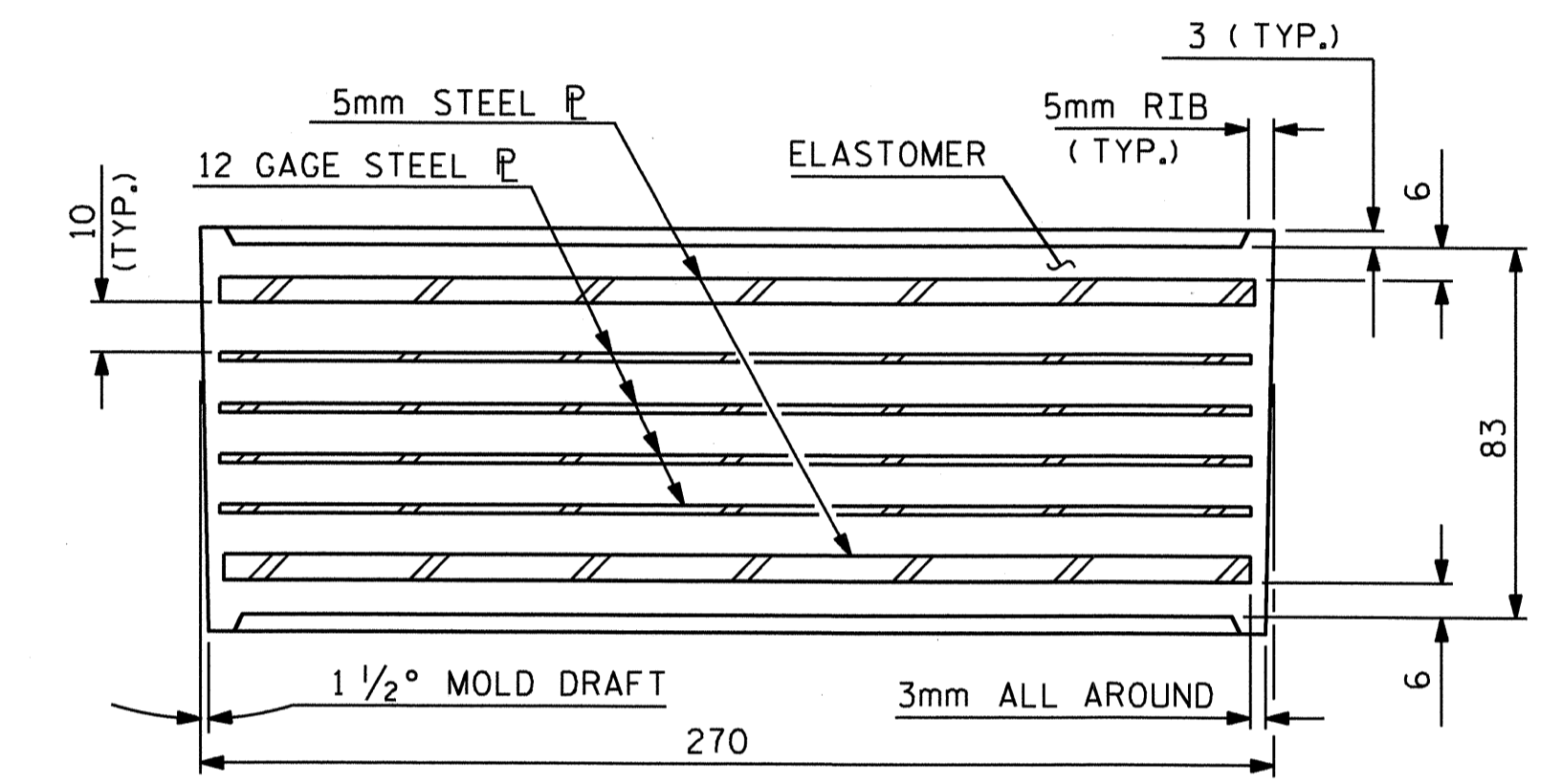
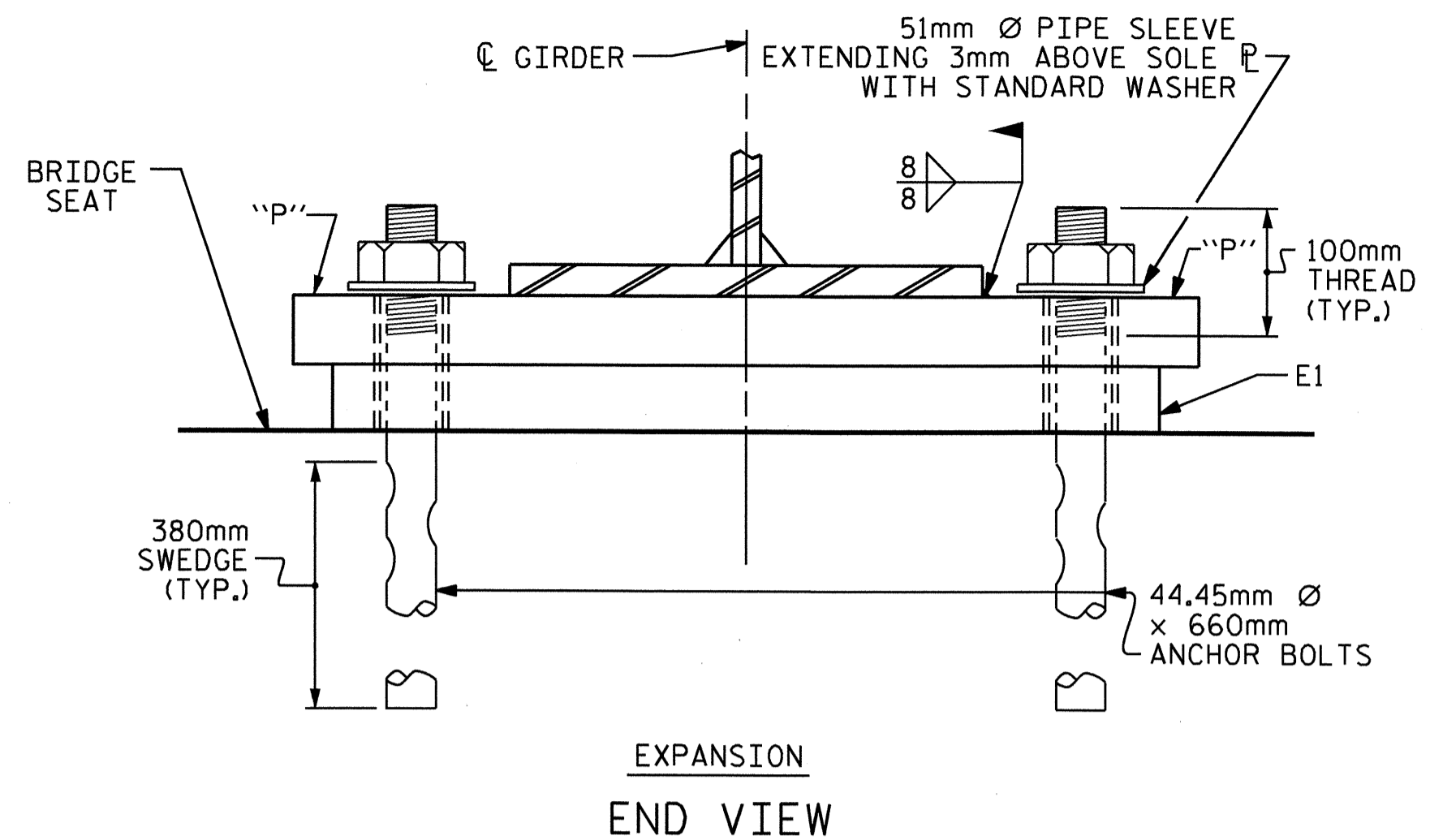
WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 149°C. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

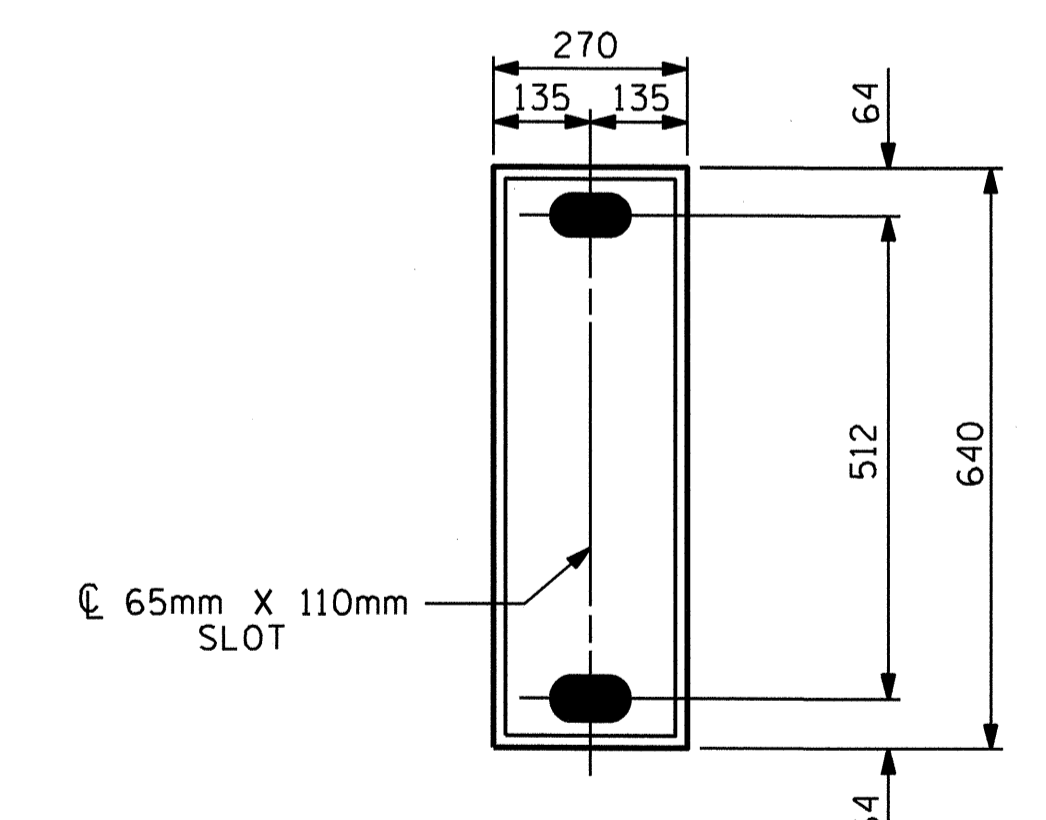
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FOLLOWING PROCEDURE, WHICH MAY BE REQUIRED BY THE ENGINEER, TO RESET ELASTOMERIC BEARINGS DUE TO GIRDER TRANSLATION AND END ROTATION:

1. ONCE THE DECK HAS CURED, THE GIRDERS SHALL BE JACKED AND THE ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 16°C.

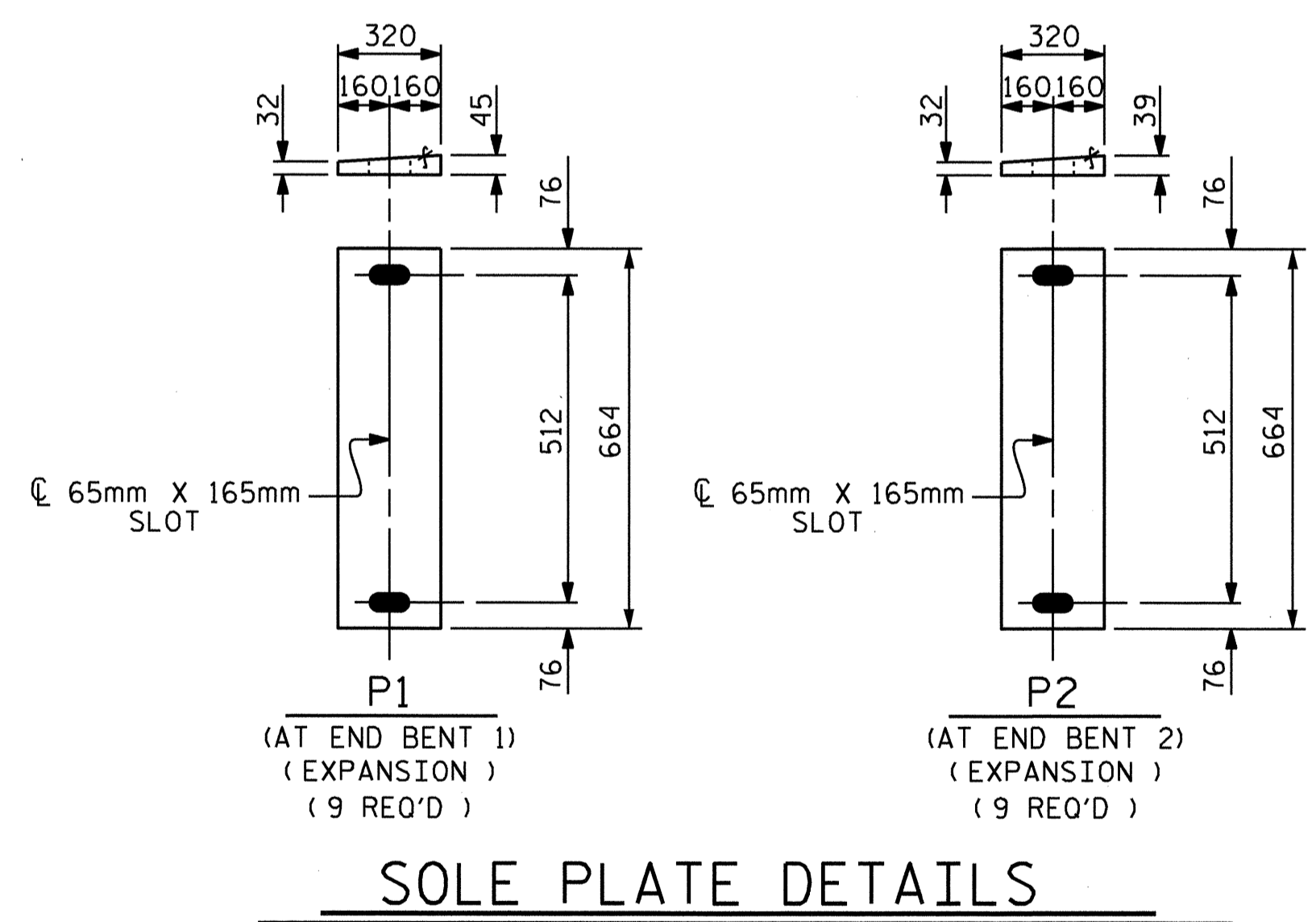
THE CONTRACTOR MAY PROPOSE ALTERNATE METHODS, PROVIDED DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.



TYPICAL SECTION OF ELASTOMERIC BEARINGS



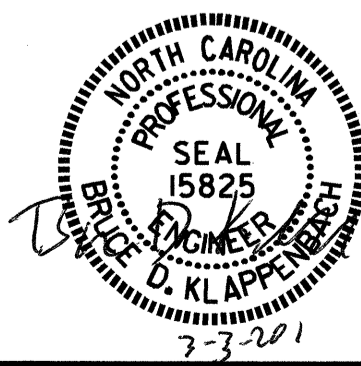
E1 (18 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING
TYPE IV



SOLE PLATE DETAILS

-LOAD RATINGS-	
	MAX.D.L.+ L.L.
TYPE IV	809 kN

PROJECT NO. R-2533CA
CABARRUS COUNTY
 STATION: 221+70.114 -L-REV



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
ELASTOMERIC BEARING DETAILS (STEEL SUPERSTRUCTURE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

ASSEMBLED BY : M. G. SHAIKH	DATE : 12-18-08
CHECKED BY : H. T. BARBOUR	DATE : 06-22-09
DRAWN BY : JMB 11/87	REV. 8/16/99 MAB/LES
CHECKED BY : ARB 11/87	REV. 10/17/00 RWW/LES
	REV. 5/1/06 TLA/OM

NOTES

FOR POT BEARINGS, SEE SPECIAL PROVISIONS.

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

WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 121°C TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR ELASTOMER.

SOLE PLATES SHOULD BE WELDED TO BEAM FLANGES BEFORE FALSEWORK IS PLACED.

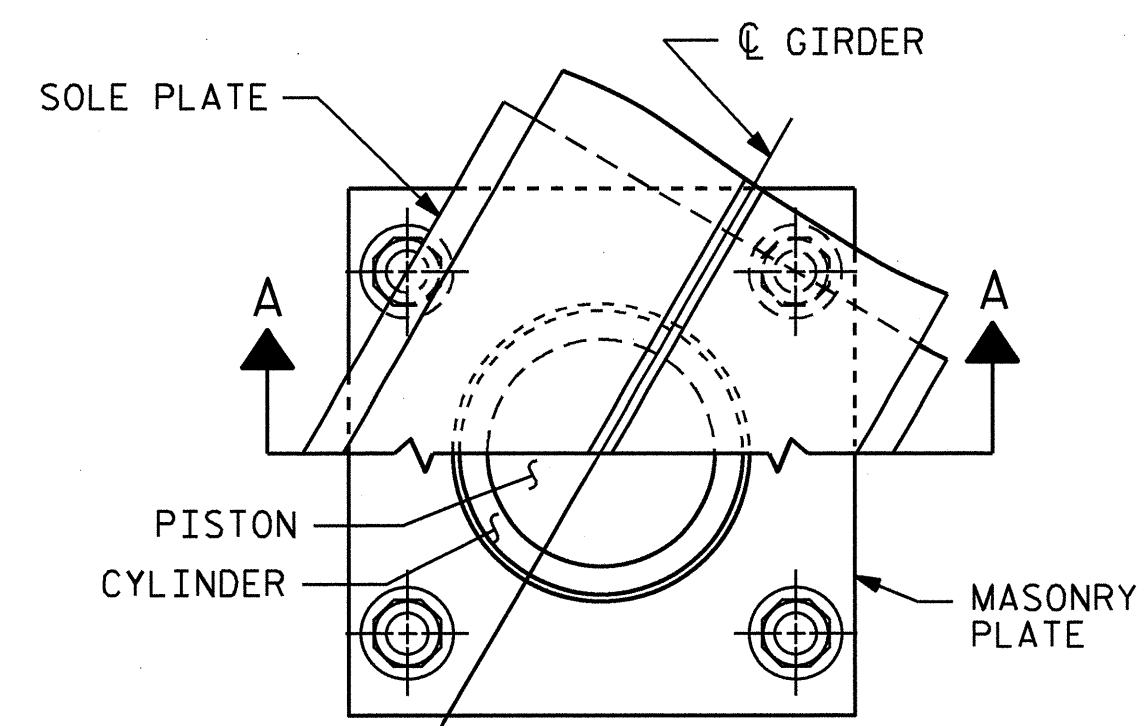
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

THE CONTRACTOR MAY SUBSTITUTE DISC BEARINGS FOR THE POT BEARINGS SHOWN. FOR OPTIONAL DISC BEARINGS, SEE SPECIAL PROVISIONS.

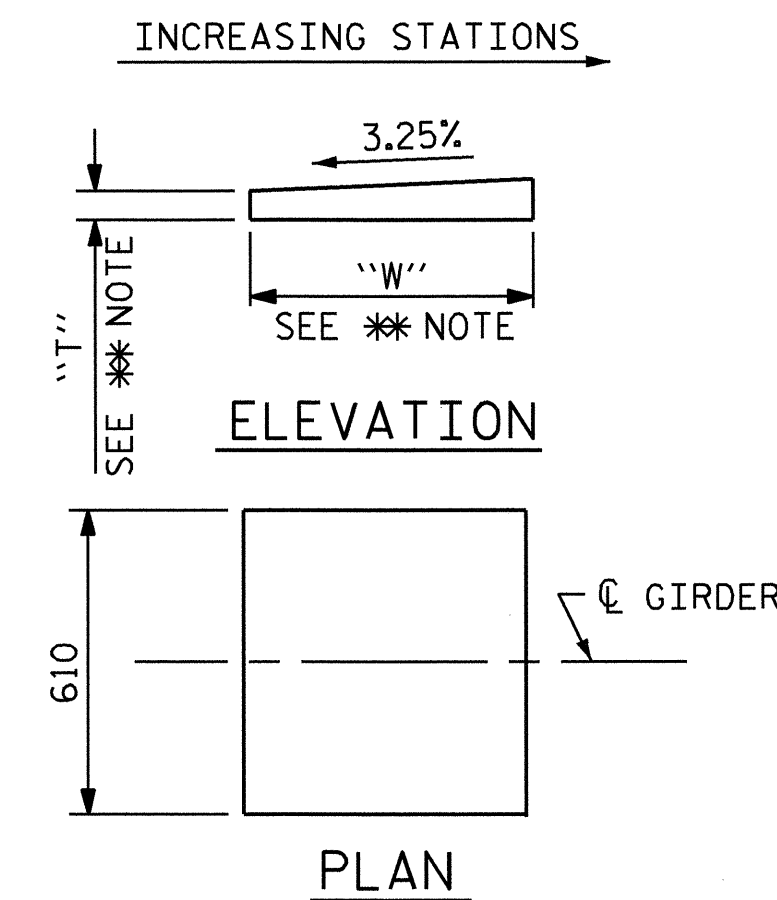
THE CONTRACTOR SHALL ADJUST THE GIRDER BUILDUPS AS NECESSARY TO INCORPORATE A MAXIMUM PERMISSIBLE VARIATION IN POT BEARING DEPTH OF 13mm, SEE SPECIAL PROVISION FOR POT BEARINGS.

AT THE CONTRACTOR'S OPTION, FILL PLATES (WHERE USED) MAY BE COMBINED WITH MASONRY PLATES.



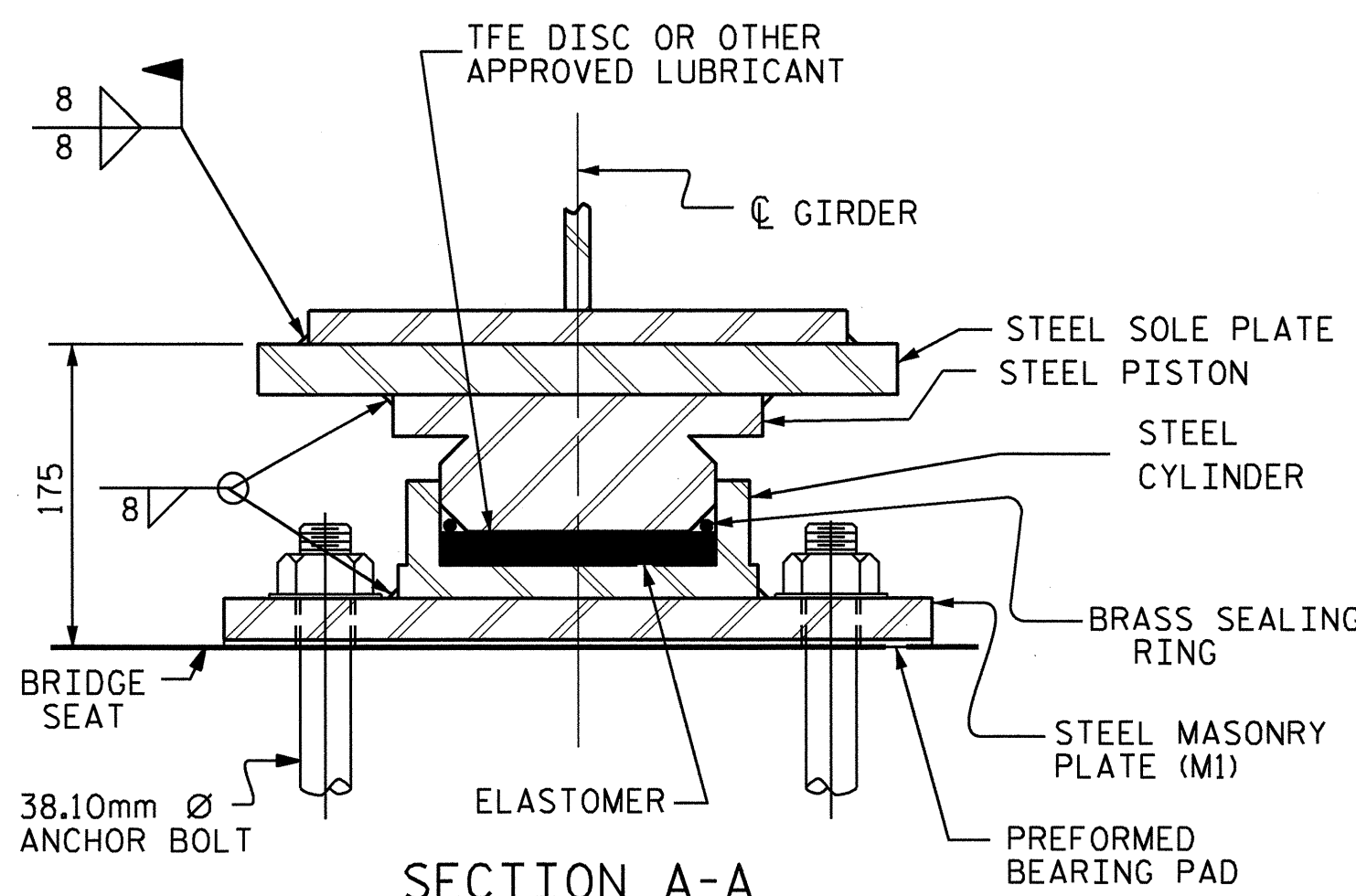
CUT-AWAY PLAN

BEARING	LOCATION	VERTICAL LOAD (kN)			LATERAL LOAD (kN)	TOTAL MOVEMENT (mm)
		DEAD	LIVE	TOTAL		
PB1-PB4 (FIXED)	BENT #1	1324.77	558.72	1883.49	264.95	0

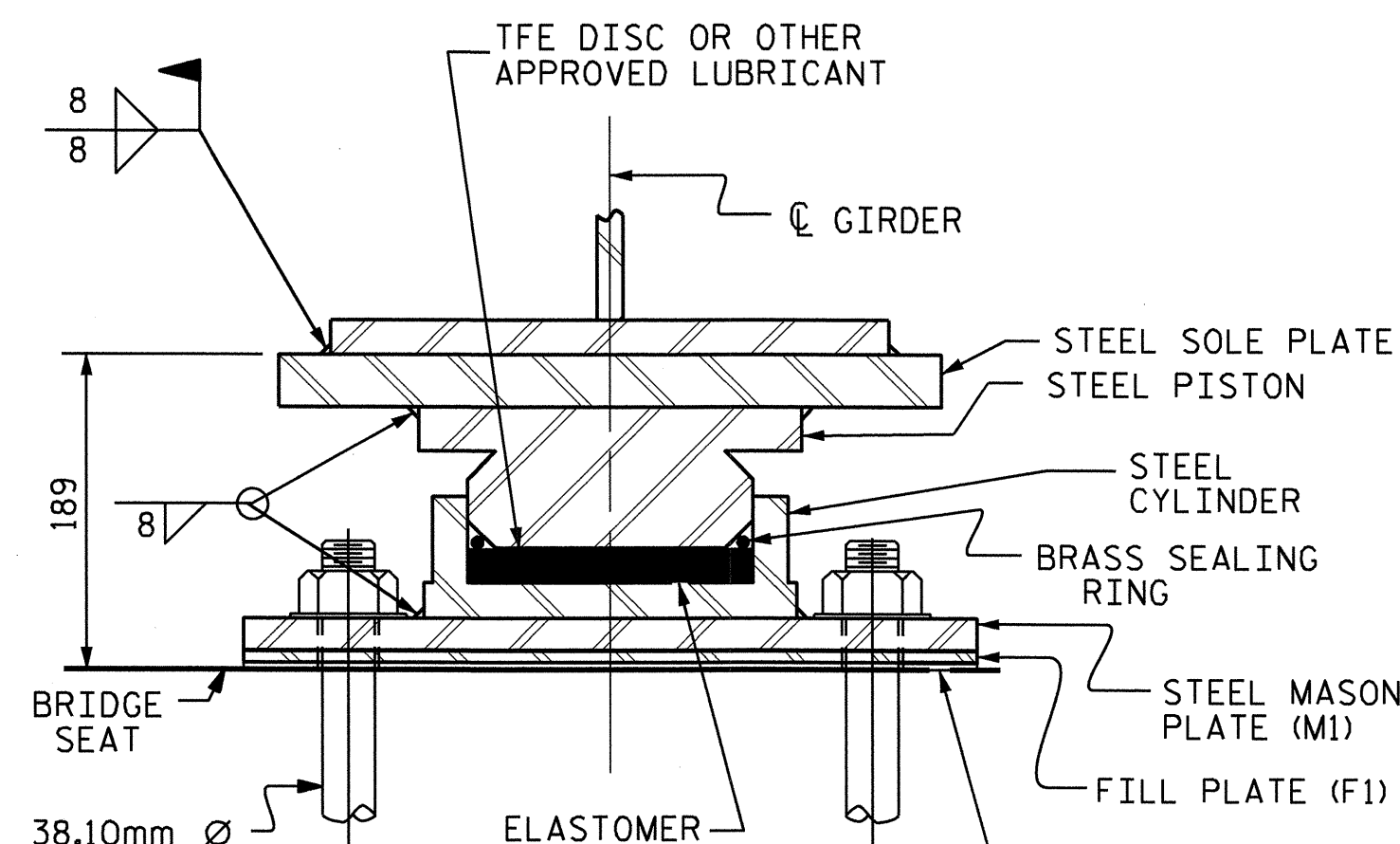


** NOTE: DIMENSIONS "W" AND "T" ARE TO BE DETERMINED BY THE MANUFACTURER.

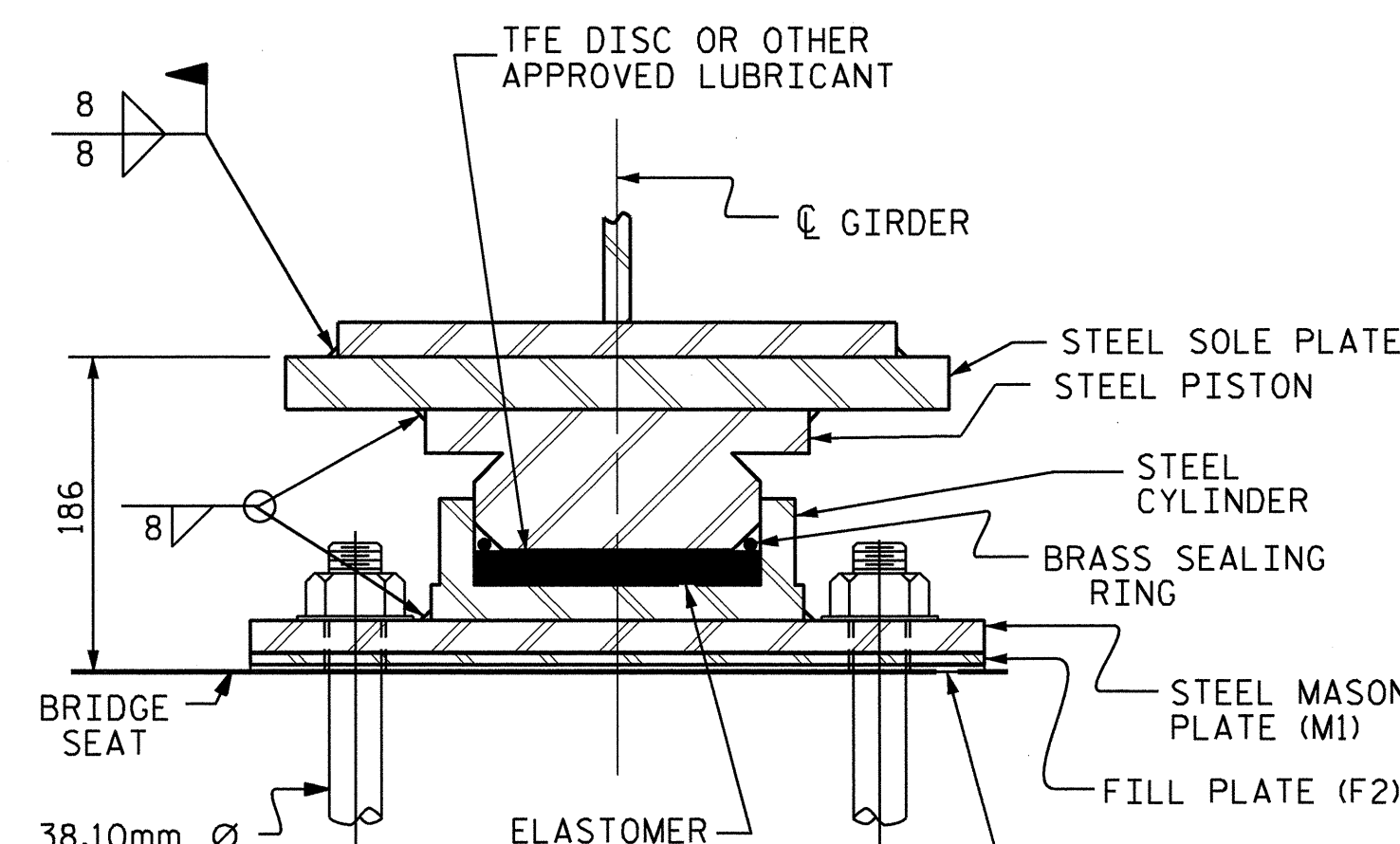
SOLE PLATE DETAILS



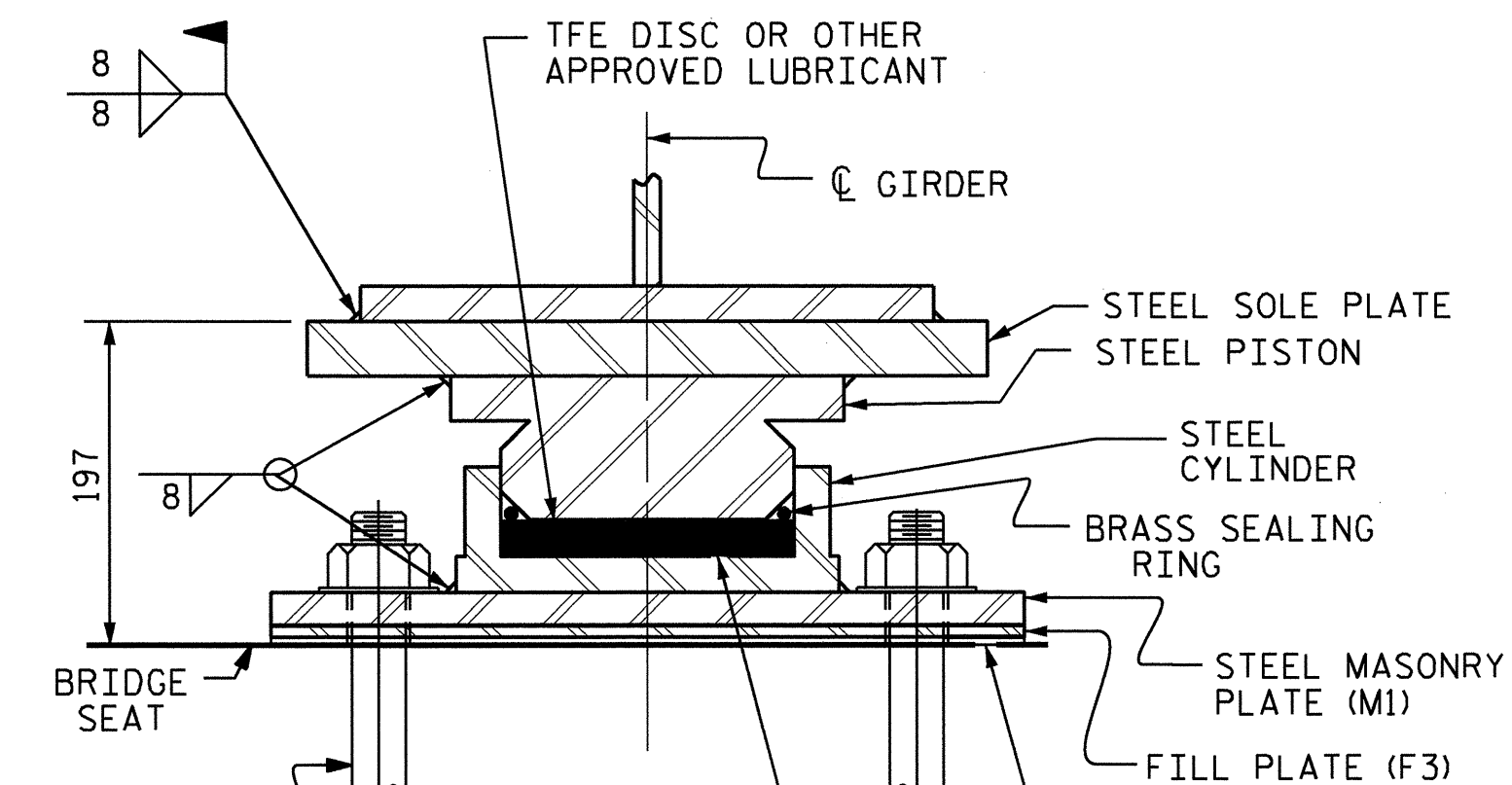
SECTION A-A
PB1, FIXED
(6 REQ'D.)



SECTION A-A
PB2, FIXED
(1 REQ'D.)

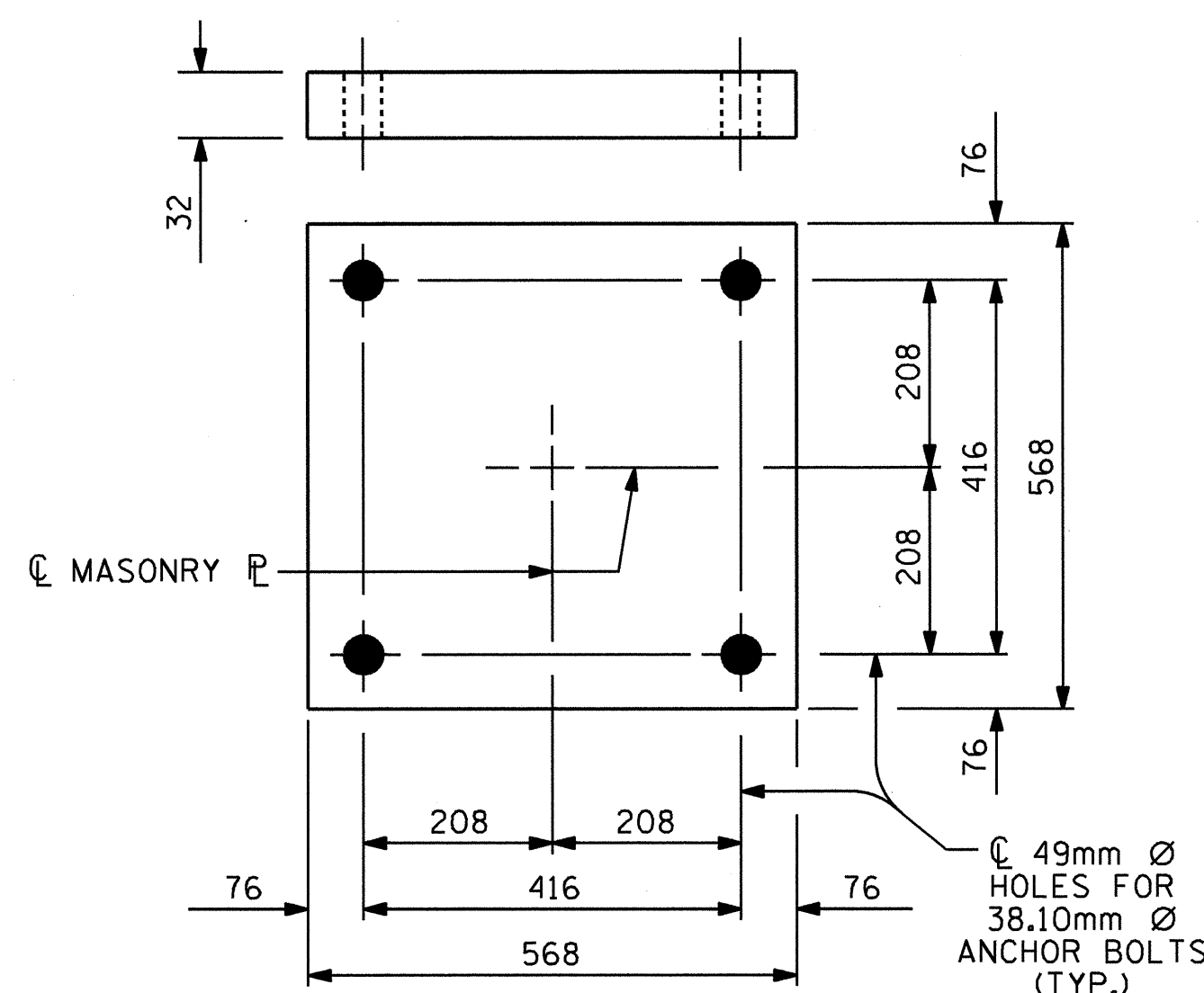


SECTION A-A
PB3, FIXED
(1 REQ'D.)

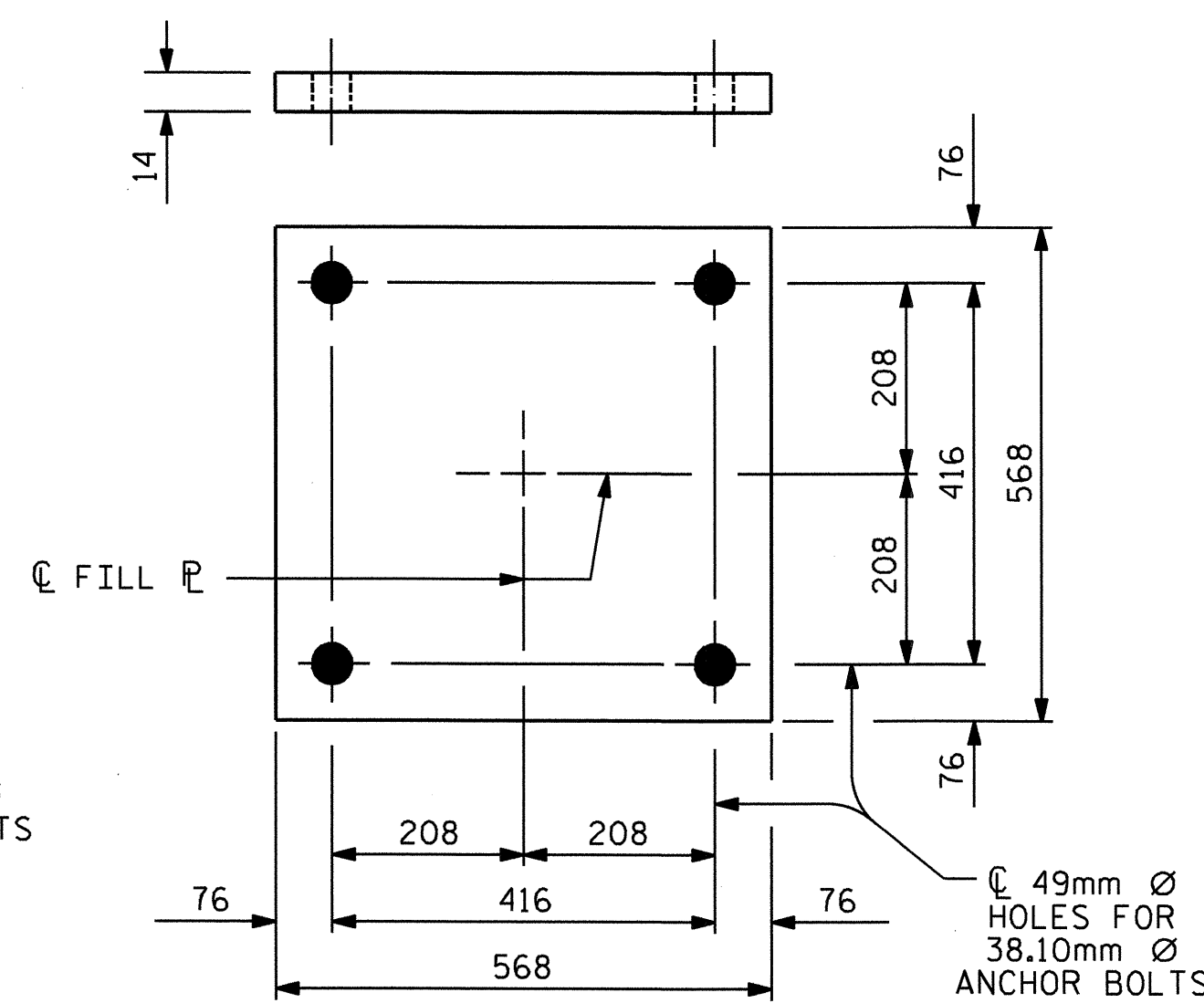


SECTION A-A
PB4, FIXED
(1 REQ'D.)

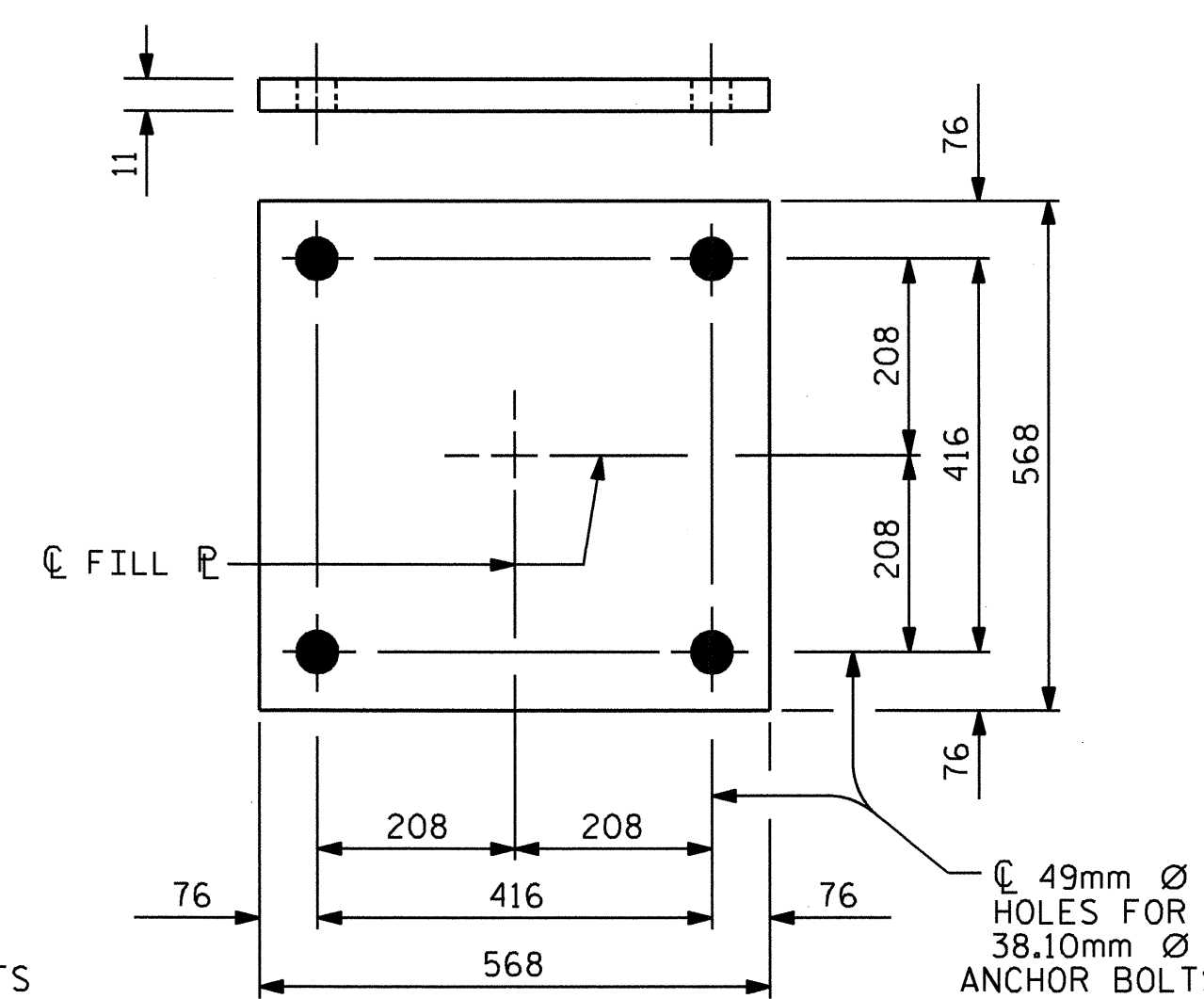
POT BEARING DETAILS



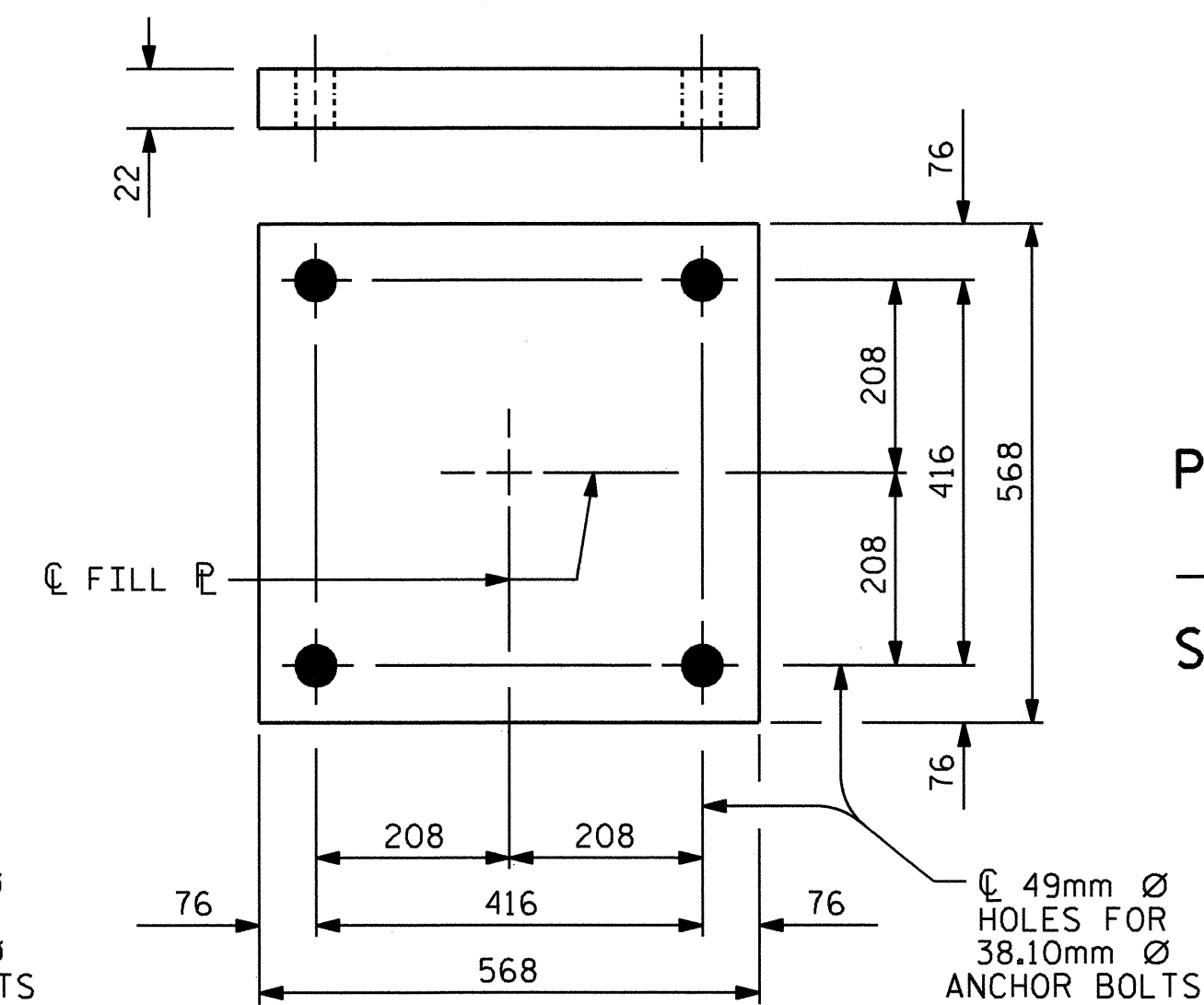
PLAN
M1 (9 REQ'D.)
MASONRY PLATE DETAILS



PLAN
F1 (1 REQ'D.)



PLAN
F2 (1 REQ'D.)



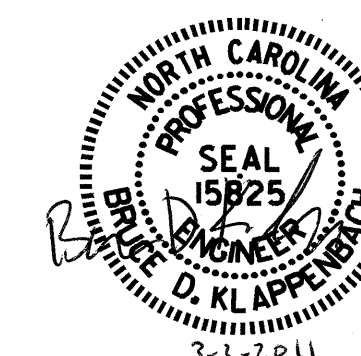
PLAN
F3 (1 REQ'D.)

FILL PLATES

PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 221+70.114 -L-REV

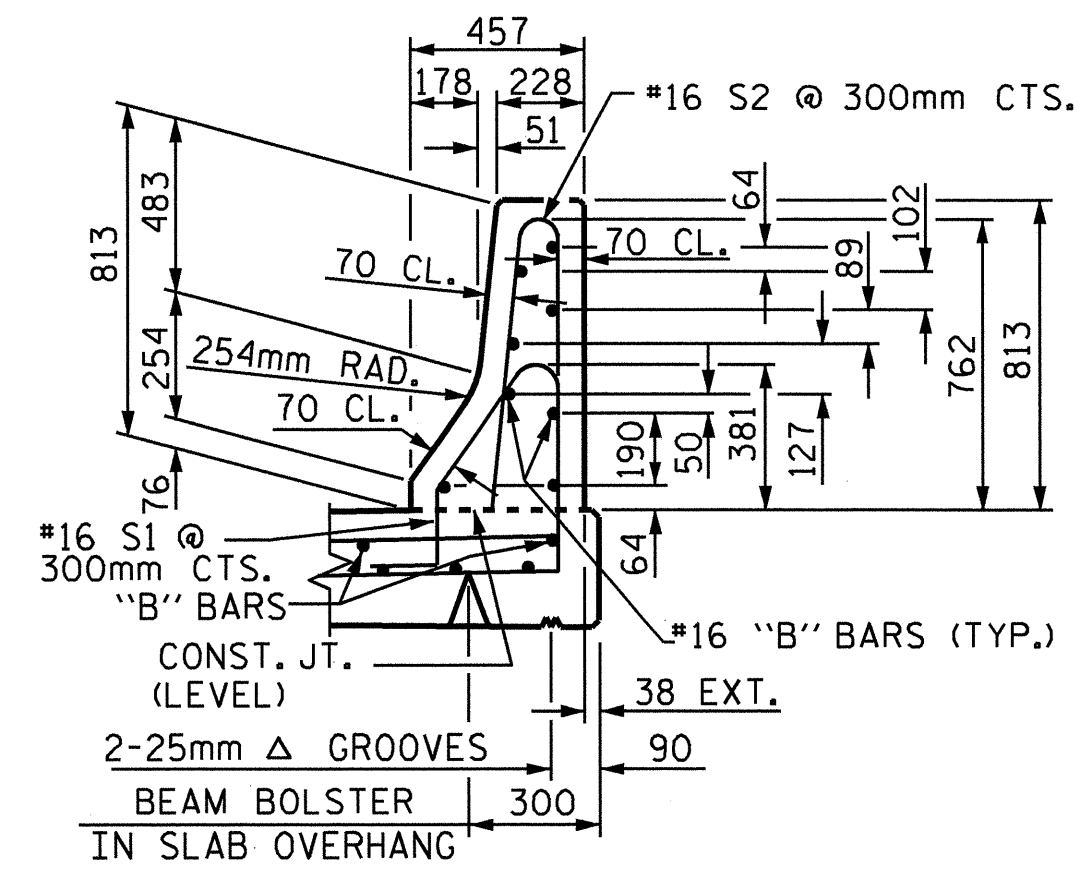
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

POT BEARING
DETAILS

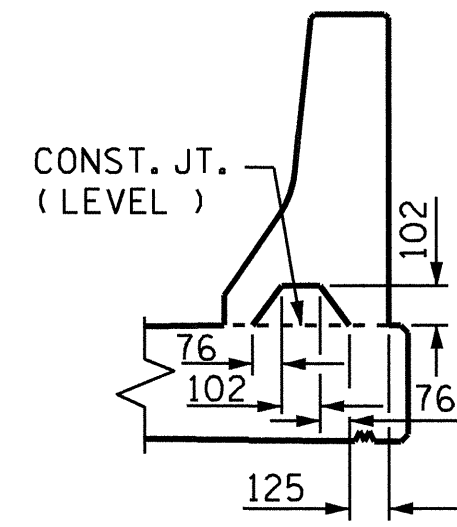


REVISIONS						SHEET NO. S-20
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 41
2			4			

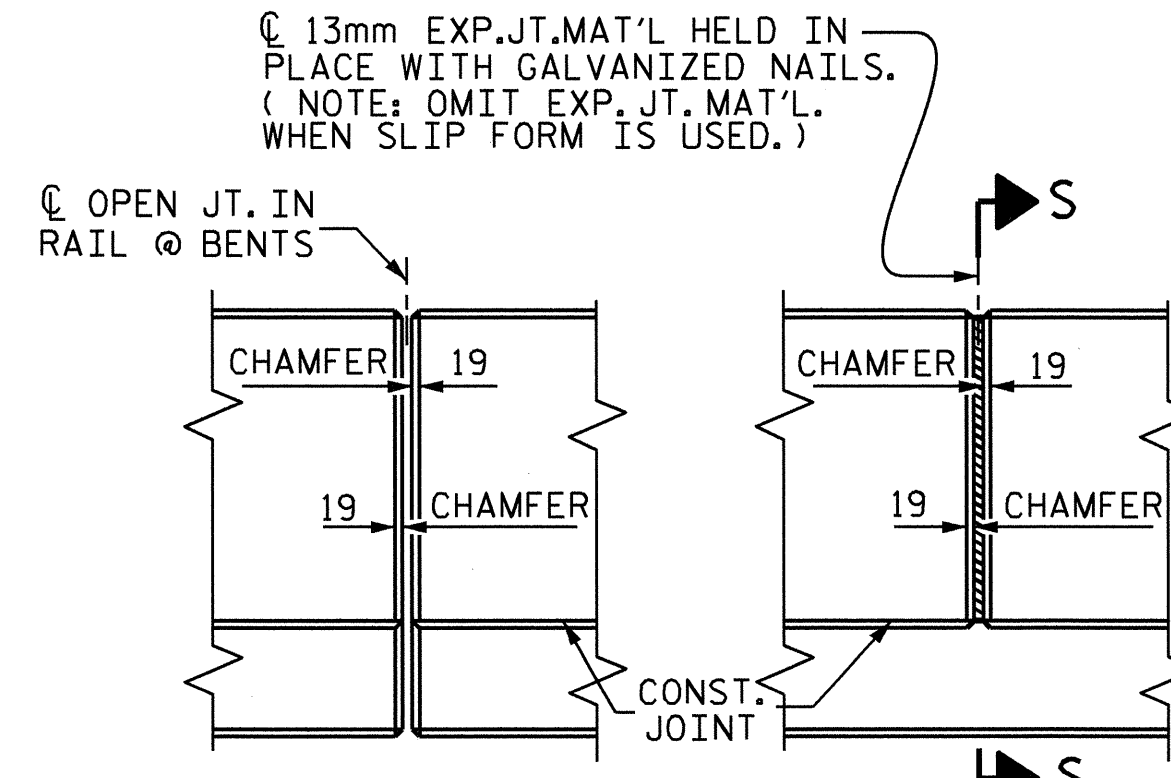
ASSEMBLED BY: M. G. SHAIKH DATE: 12-18-08
CHECKED BY: H. T. BARBOUR DATE: 06-22-09
DRAWN BY: RWW 8/99 REV. 10/17/00 RWW/LES
CHECKED BY: LES 8/99 REV. 7/10/01 LES/RWW
REV. 5/7/03 RWW/JTE



SECTION THRU RAIL



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



ELEVATION AT EXPANSION JOINTS
BARRIER RAIL DETAILS

NOTES

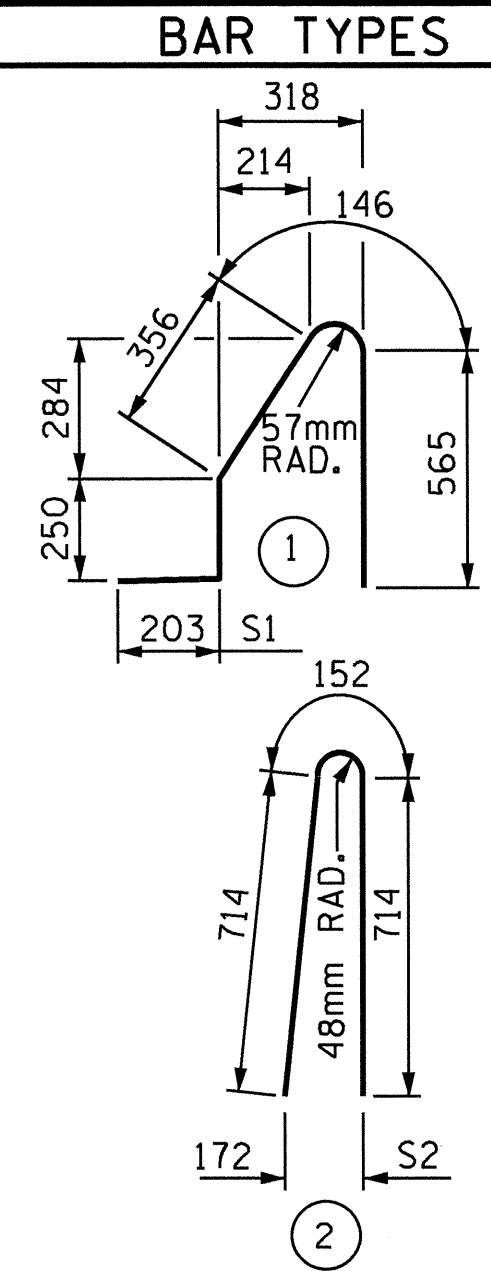
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 20.7 MPa.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

VERTICAL GROOVED CONTRACTION JOINTS, 12mm 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. THE 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 6.1m IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 3.5m IN LENGTH.

THE #16 S1 & S2 BARS MAY BE SHIFTED SLIGHTLY IN THE AREA OF THE GUARDRAIL ANCHOR ASSEMBLY TO CLEAR ASSEMBLY BOLTS.

S1 BARS ON THE APPROACH SLAB ARE INCLUDED IN THE APPROACH SLAB BILL OF MATERIAL.



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

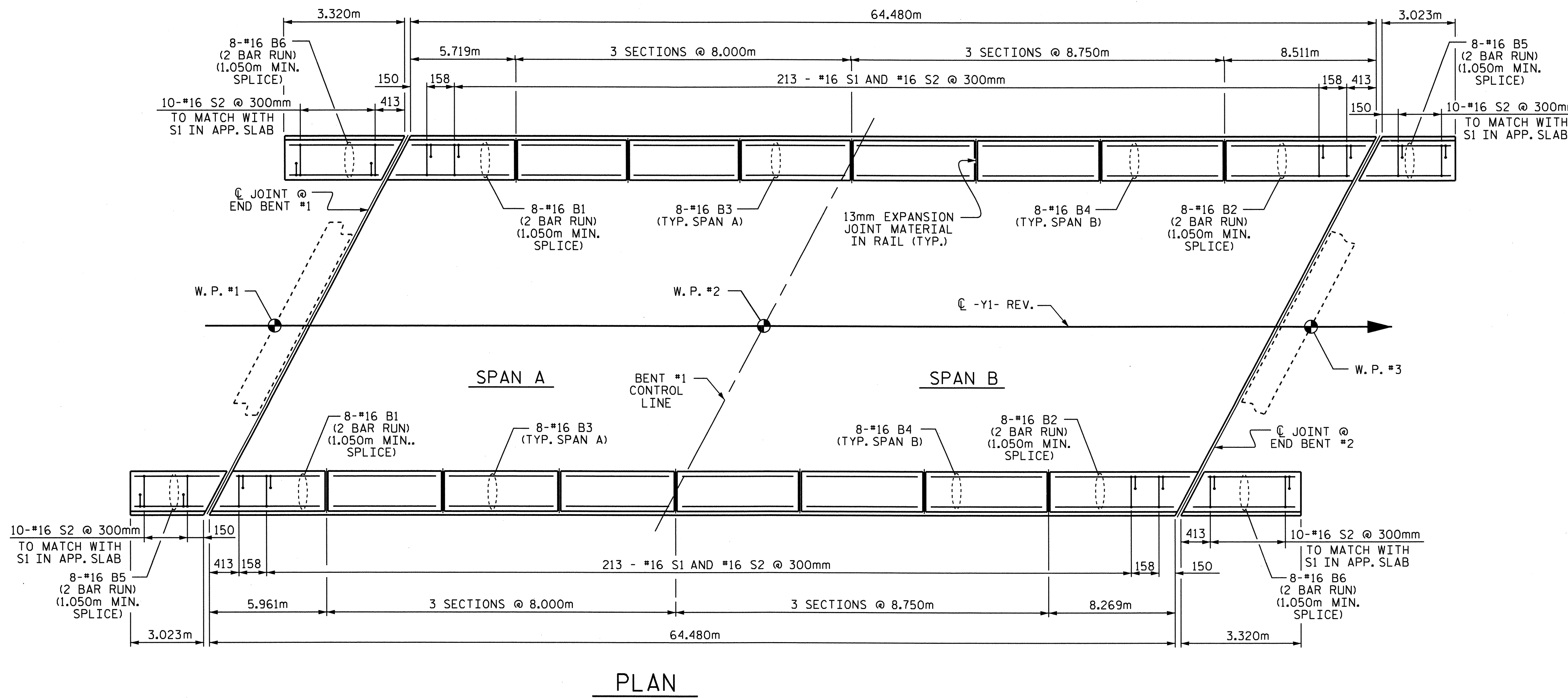
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	32	#16	STR	3440	171
* B2	32	#16	STR	4720	234
* B3	48	#16	STR	7880	587
* B4	48	#16	STR	8640	644
* B5	32	#16	STR	2100	52
* B6	32	#16	STR	2080	52
* S1	426	#16	1	1520	1005
* S2	466	#16	2	1580	1143

* EPOXY COATED REINFORCING STEEL 3888 kg

CLASS AA CONCRETE 35.6 CU. METER

CONCRETE BARRIER RAIL 141.65 METERS

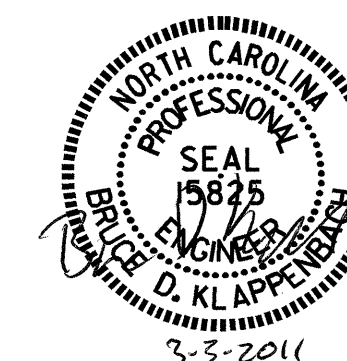


PLAN

PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 221+70.114 -L-REV

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE BARRIER RAIL



ASSEMBLED BY : M. G. SHAIKH DATE : 12-19-08
CHECKED BY : H. T. BARBOUR DATE : 06-22-09
DRAWN BY : ARB 5/87 REV. 10/17/00 RWW/LES
CHECKED BY : SJD 9/87 REV. 5/7/03R RWW/JTE
REV. 5/1/06 TLA/GM

01-MAR-2011 11:17
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REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21	
1			3			TOTAL SHEETS 41	
2			4				

STR #1 STD. No. CBRISM

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 6mm HOLD DOWN PLATE AND 4 - 22.23mm 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 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 22.23mm 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.)

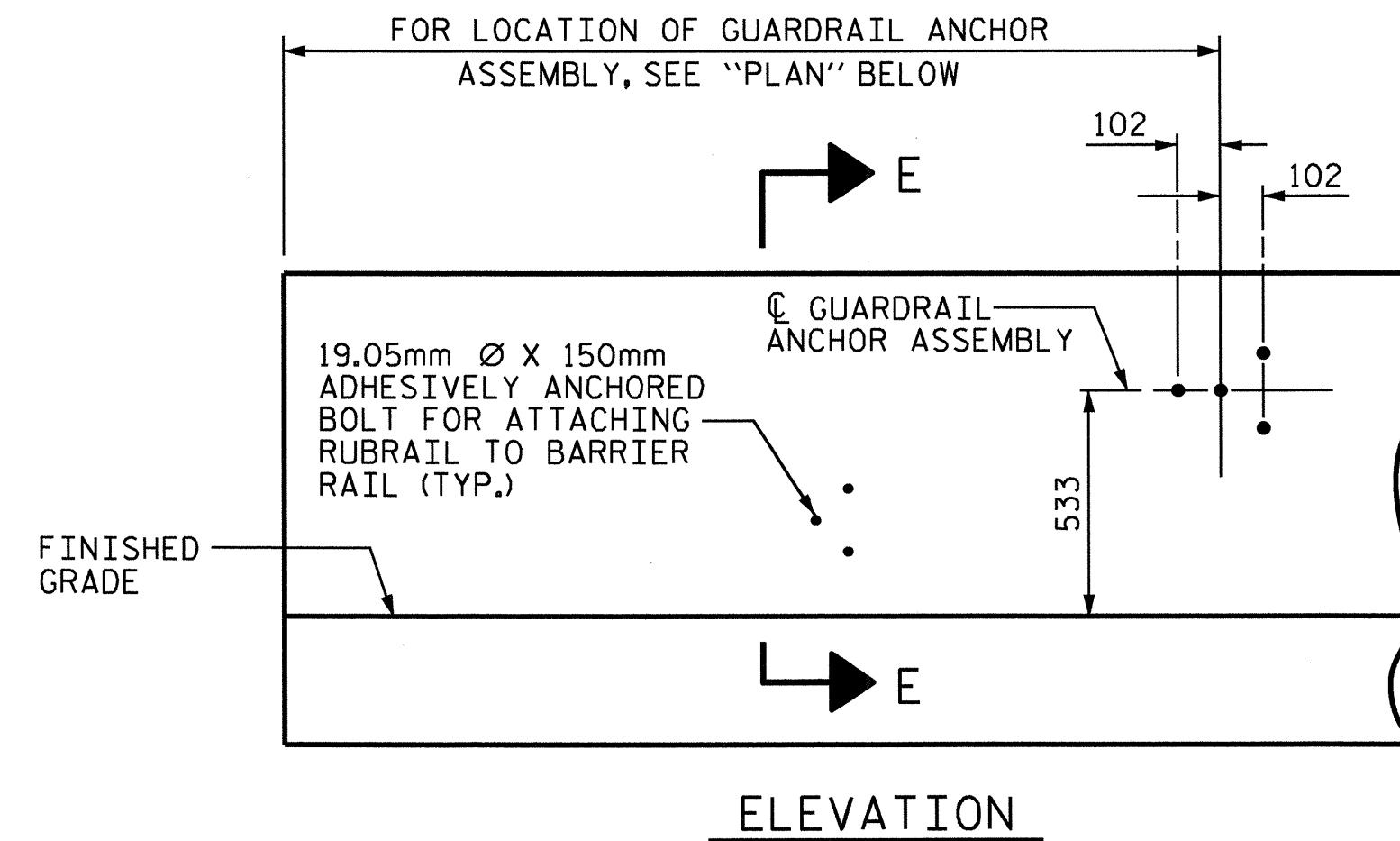
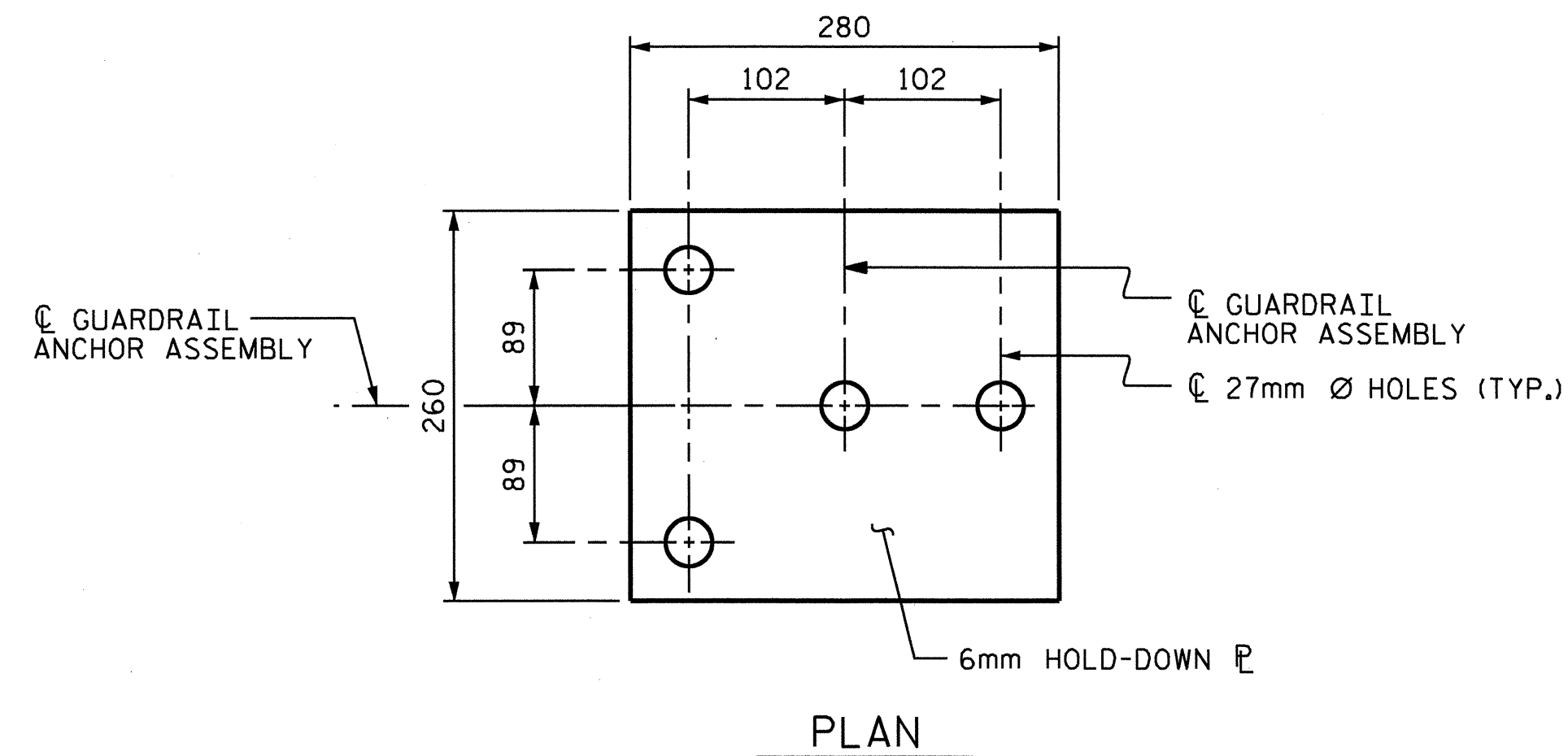
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

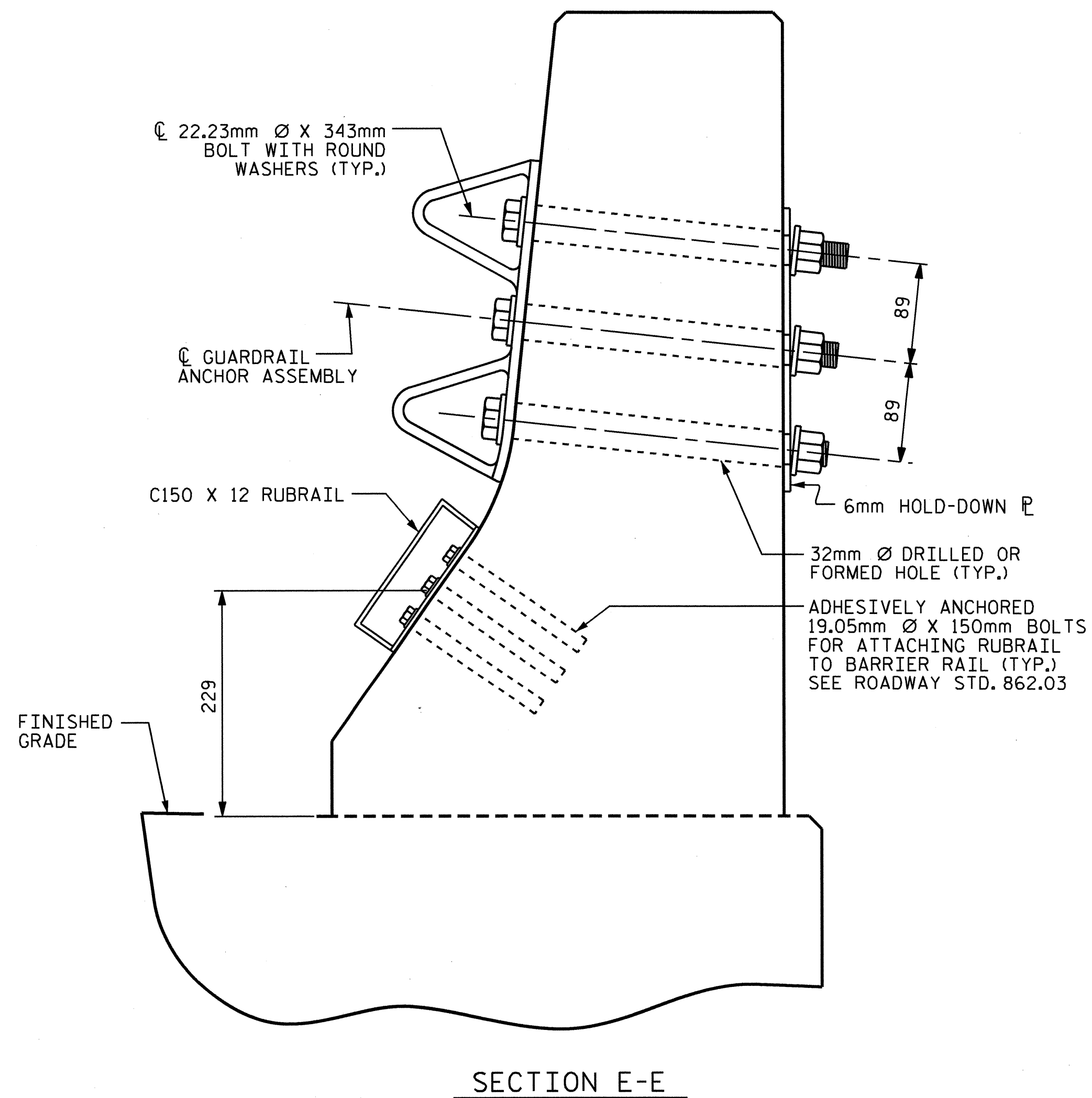
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

THE 32mm 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.

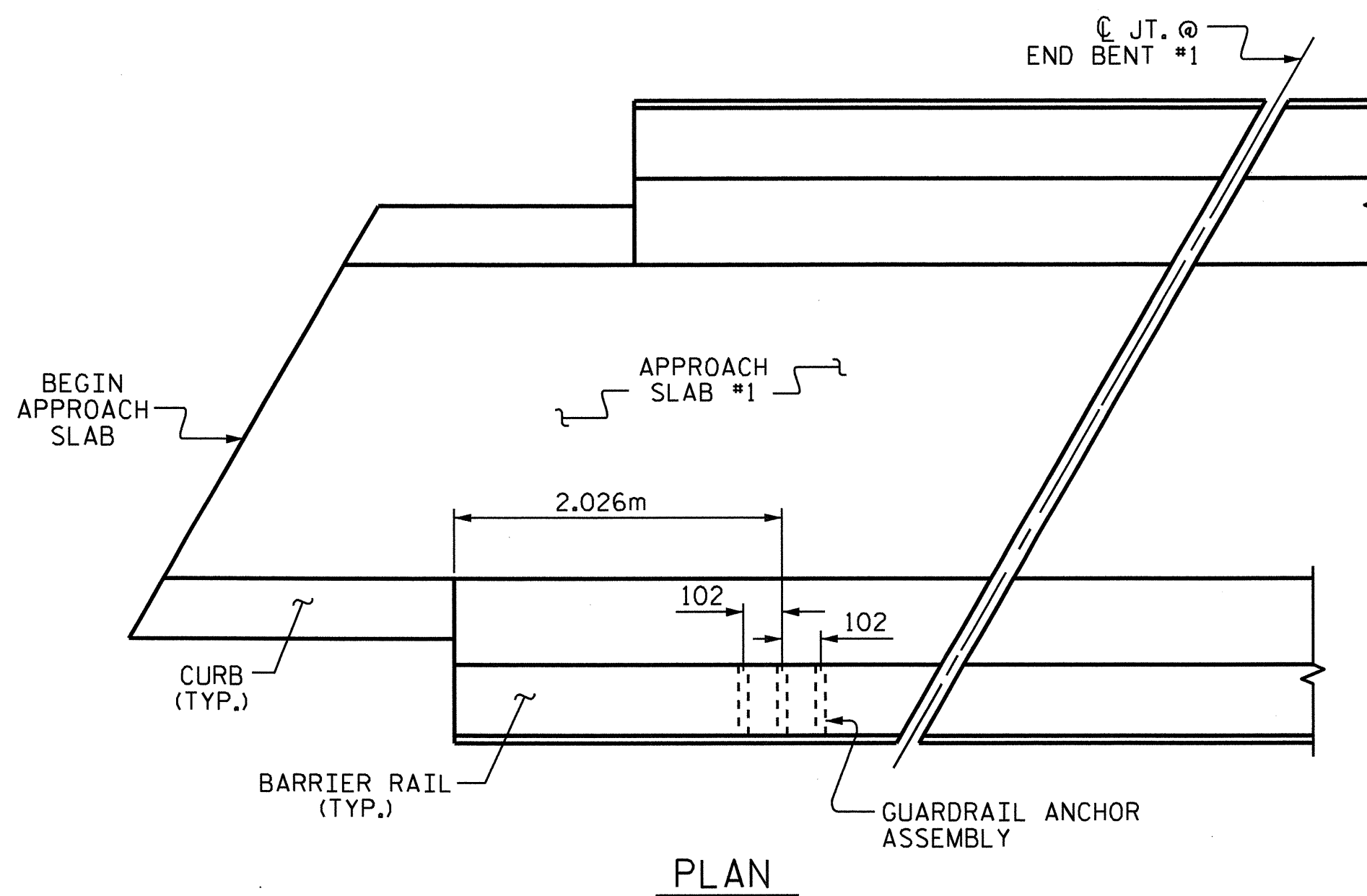
THE C150 X 12 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 19.05mm Ø X 150mm BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 19.05mm Ø BOLTS IS 53.4kN. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03

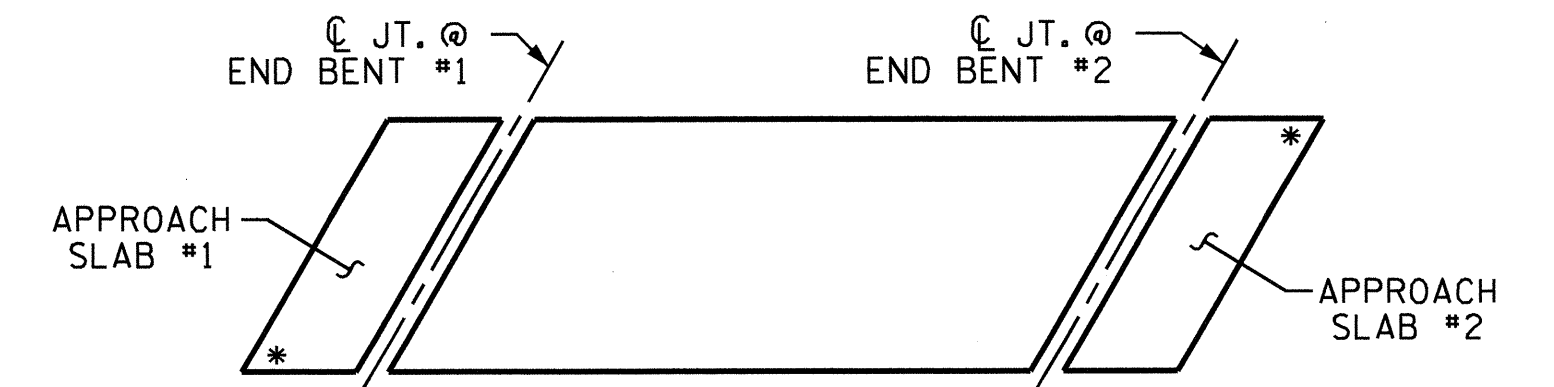


GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF ANCHORS FOR GUARDRAIL

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

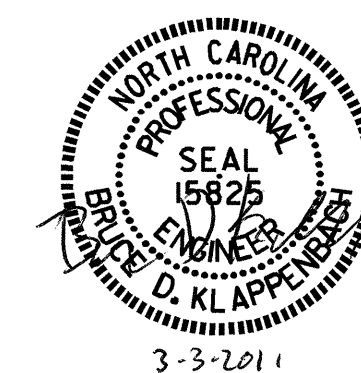


SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-2533CA
CABARRUS COUNTY
 STATION: 221+70.114 -L-REV

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



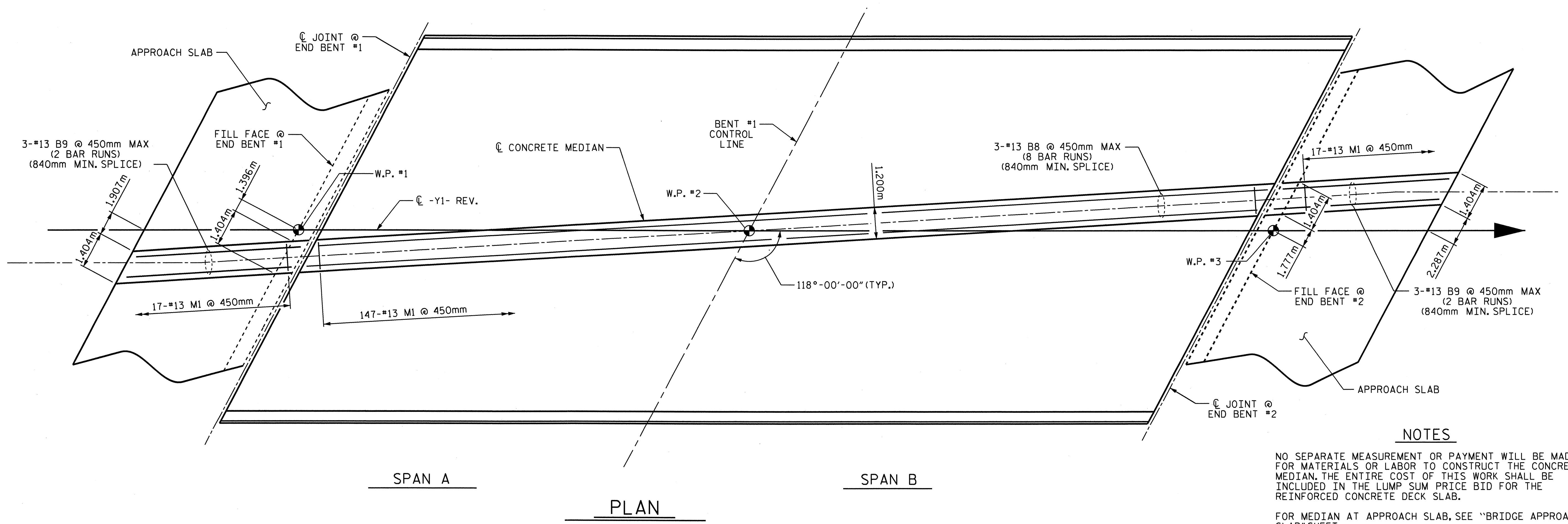
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22	
1			3			TOTAL SHEETS 41	
2			4				

DRAWN BY: M. G. SHAIKH DATE: 12-19-08
 CHECKED BY: H. T. BARBOUR DATE: 06-22-09

28-FEB-2011 4:00
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 mshaikh

STR. #1

STD. NO. GRA2SM



NOTES

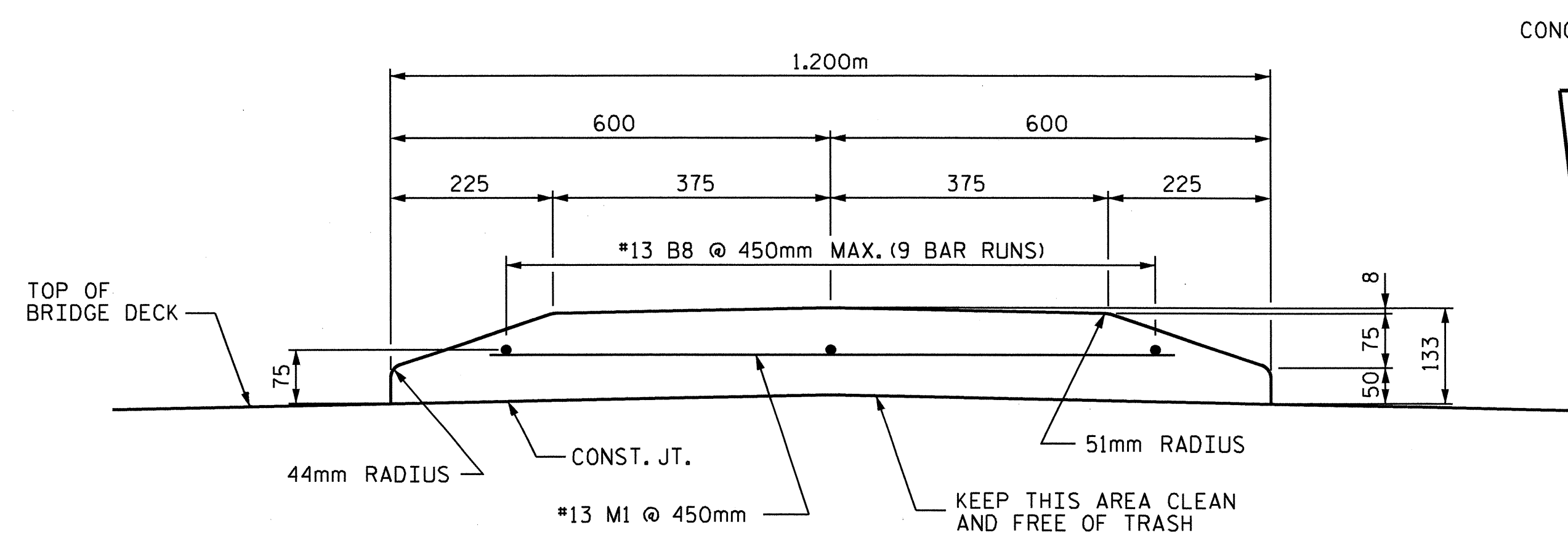
NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR MATERIALS OR LABOR TO CONSTRUCT THE CONCRETE MEDIAN. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR THE REINFORCED CONCRETE DECK SLAB.

FOR MEDIAN AT APPROACH SLAB, SEE "BRIDGE APPROACH SLAB" SHEET.

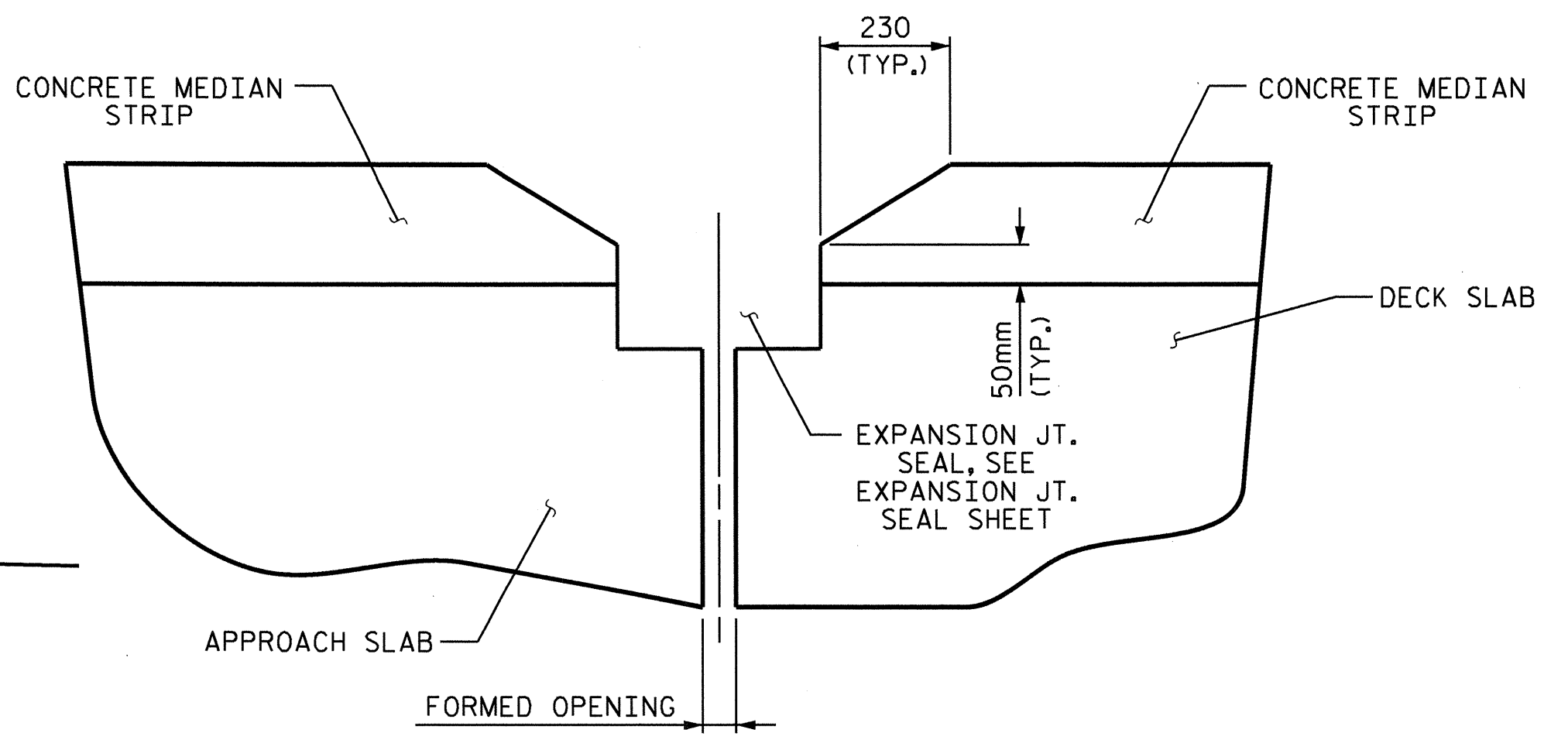
FOR LOCATION OF CONCRETE MEDIAN, SEE ROADWAY PLANS.

ALL REINFORCING STEEL IN CONCRETE MEDIANS SHALL BE EPOXY COATED.

BILL OF MATERIAL					
CONCRETE MEDIAN					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B8	24	13	STR	8860	211
* B9	12	13	STR	4360	52
* M1	181	13	STR	740	133
* EPOXY COATED REINFORCING STEEL					396 kg
CLASS AA CONCRETE					12.5 m ³



SECTION THRU CONCRETE MEDIAN

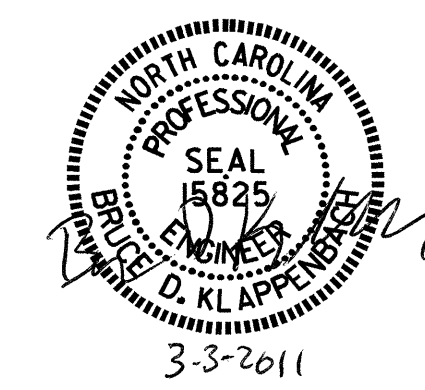


SECTION @ JOINT

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 221+70.114 L-REV

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 CONCRETE MEDIAN
 DETAILS**

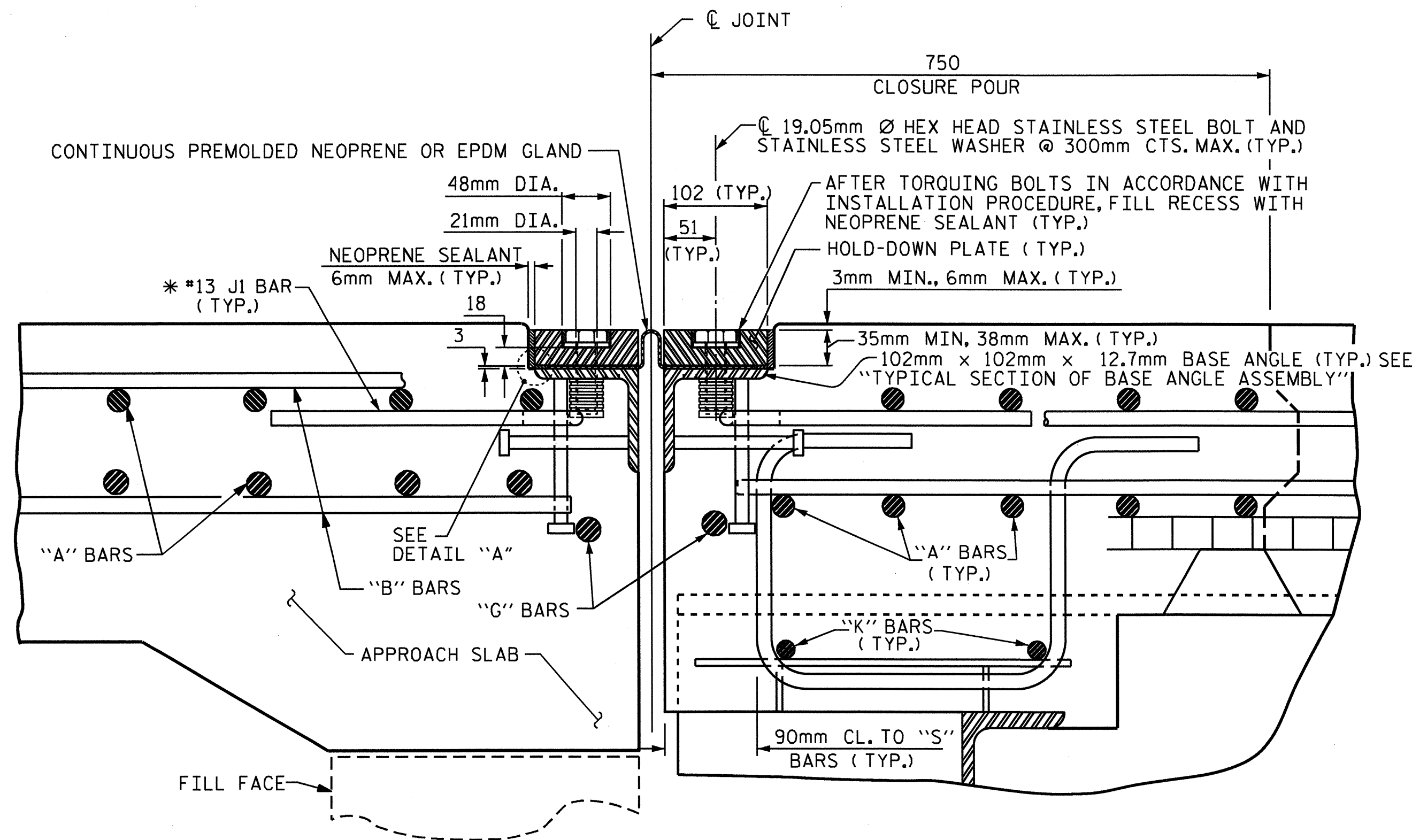


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : M. G. SHAIKH DATE : 01-07-09
 CHECKED BY : H. T. BARBOUR DATE : 06-22-09

INSTALLATION PROCEDURE

GENERAL NOTES



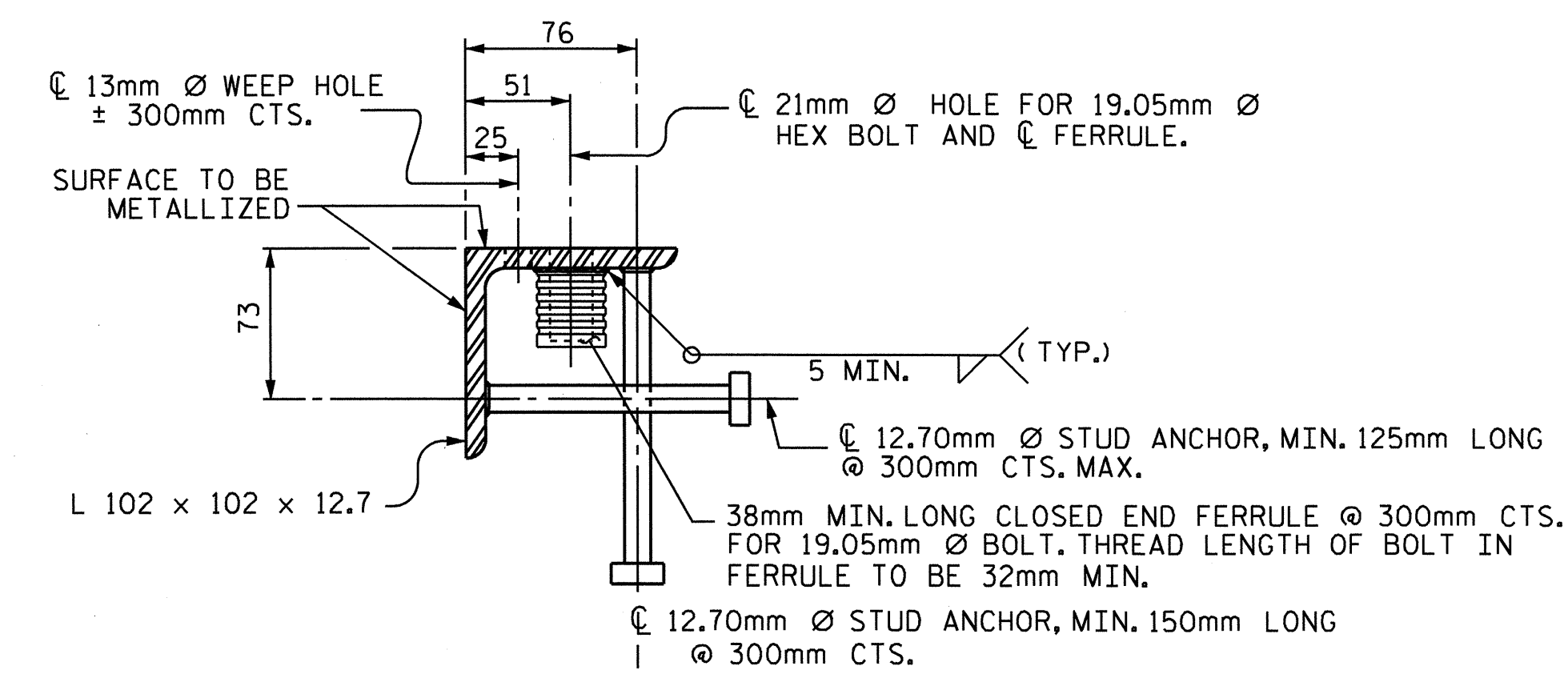
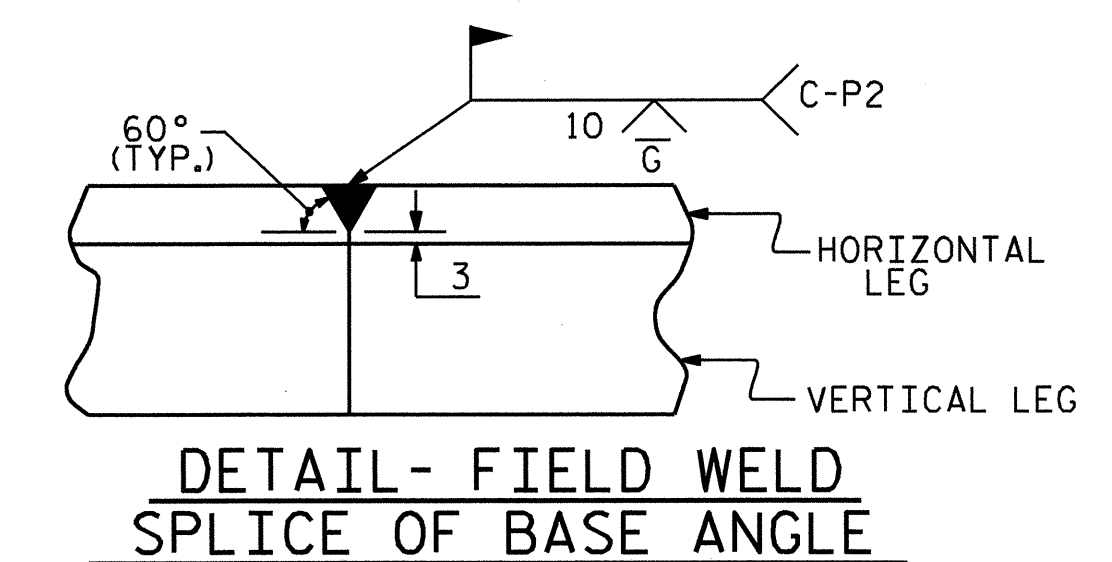
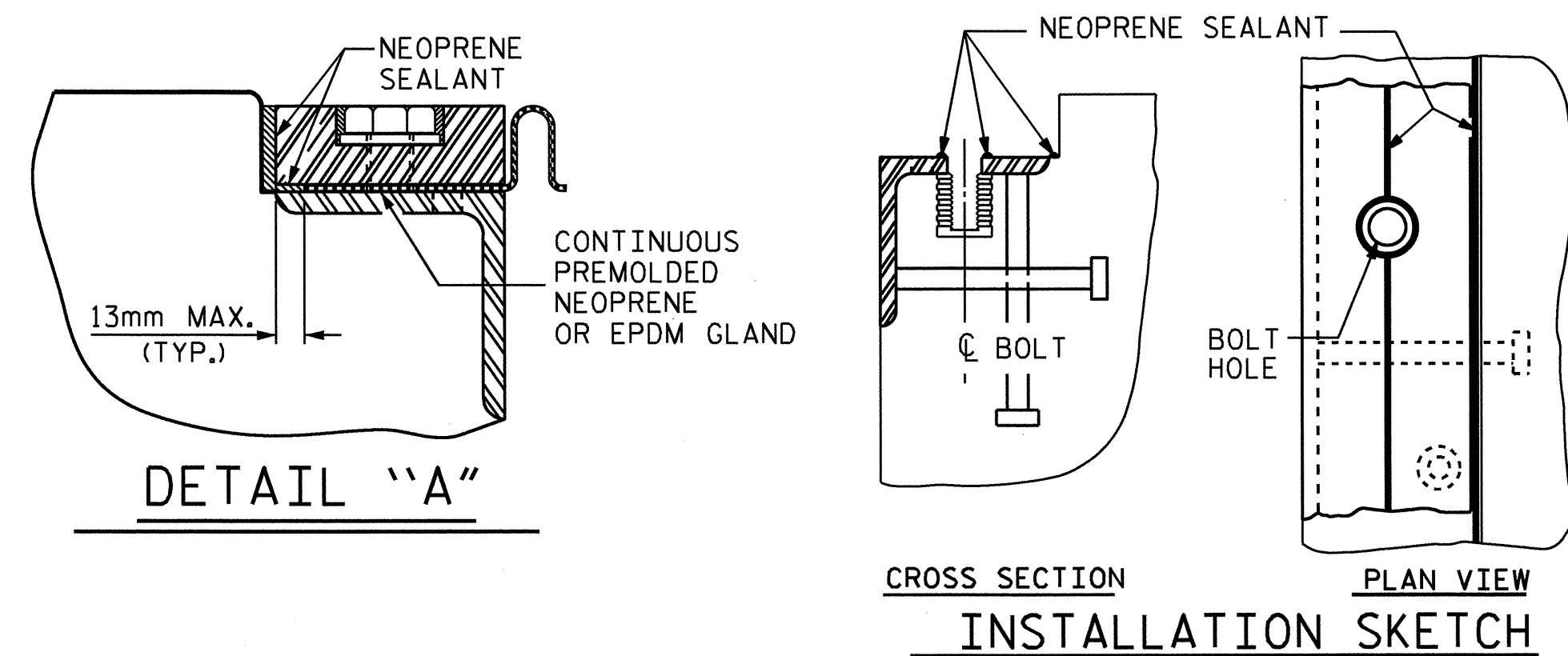
EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- STEEL SUPERSTRUCTURE

* THE QUANTITY OF #13 JI BARS ON THE BILL OF MATERIAL IS BASED ON 300mm CENTERS. JI BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHOR BOLTS EXCEEDS THE NUMBER OF JI BARS SPECIFIED, ADDITIONAL JI BARS WILL NOT BE REQUIRED.

- A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 105mm TO 108mm WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 19.05mm Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 25mm Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 102mm X 102mm X 12.7mm BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
- AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE COATED WITH A MINIMUM THICKNESS OF 0.100mm (DRY) OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 22mm IN DIAMETER WITH A HAND PUNCH.
- IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
- AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 119.3 N-m WITH A TORQUE WRENCH. THE TORQUE WRENCH SHALL BE CALIBRATED IN ACCORDANCE WITH SECTION 440-10 (D) OF THE STANDARD SPECIFICATIONS. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 119.3 N-m. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 108.5 N-m AFTER SEVEN (7) DAYS.
- AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES AND THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, COMPLETELY FILL THESE RECESSES WITH NEOPRENE SEALANT.

- FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
- ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 250 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL. WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 13.3 kN MIN.
- A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
- CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
- SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
- UPON COMPLETION OF SHOP FABRICATION, THE HOLD DOWN PLATE AND BASE ANGLE ASSEMBLY AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED. SEE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
- BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE GROUND SMOOTH AND COATED WITH A MINIMUM THICKNESS OF 0.100mm (DRY) OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 6.1m LENGTHS UNLESS APPROVED BY THE ENGINEER.
- NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
- THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 19.05mm DIA. BOLT IS 44.5 kN. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

MOVEMENT AND SETTING AT JOINT					
END BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG C RDWY)	PERPENDICULAR JOINT OPENING AT 7° C	PERPENDICULAR JOINT OPENING AT 16° C	PERPENDICULAR JOINT OPENING AT 32° C
1	118°-00'-00"	24.8	52	48	42
2	118°-00'-00"	24.8	52	48	42

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 221+70.114 -L-REV

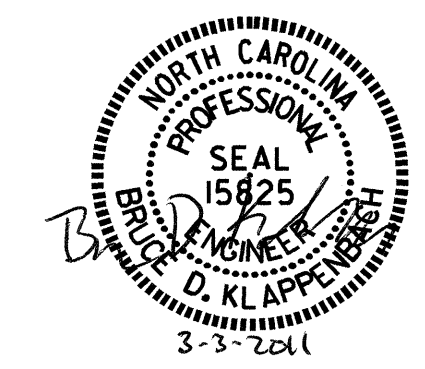
SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

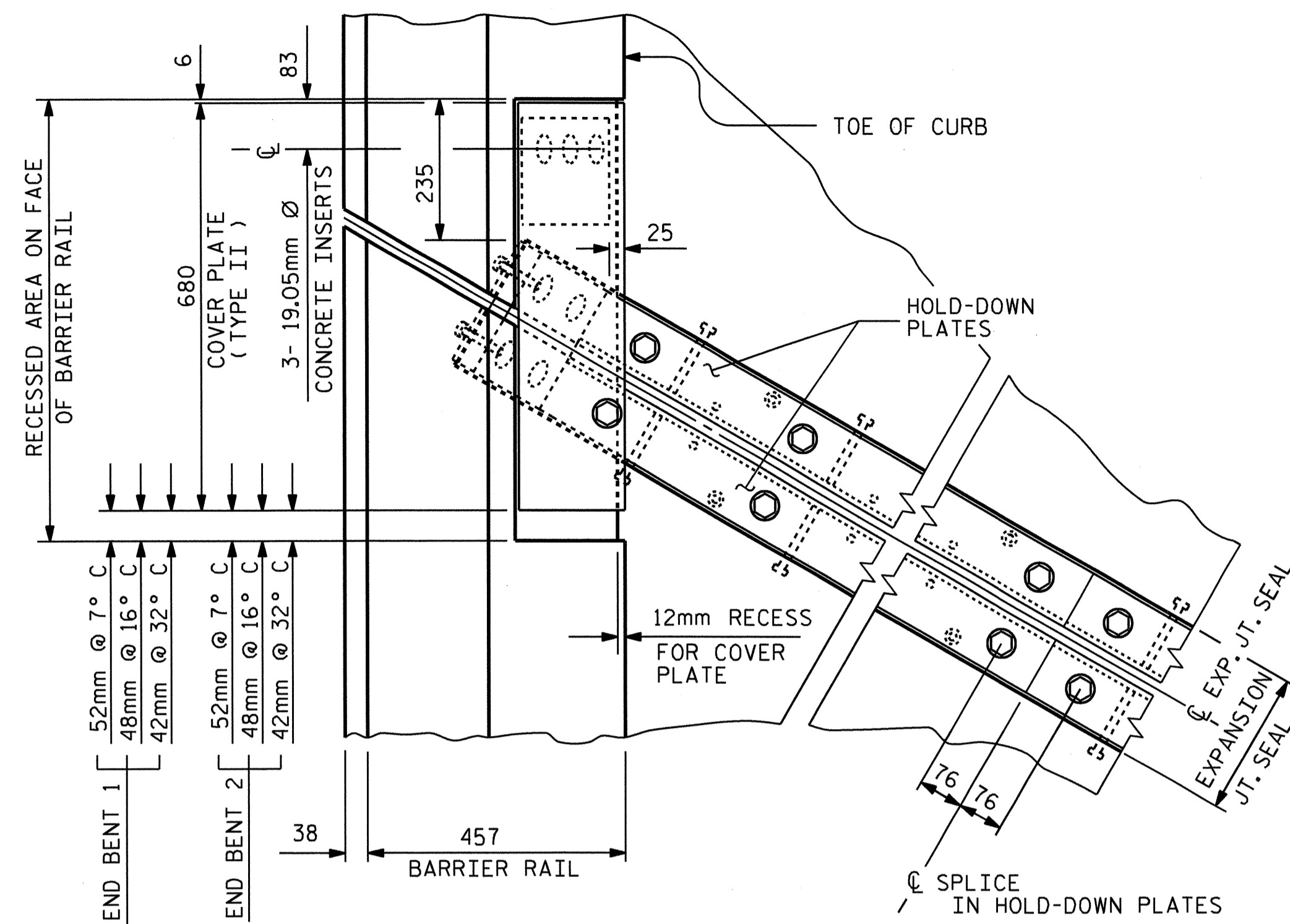
EXPANSION JOINT SEAL DETAILS

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

SHEET NO. S-24
 TOTAL SHEETS 41

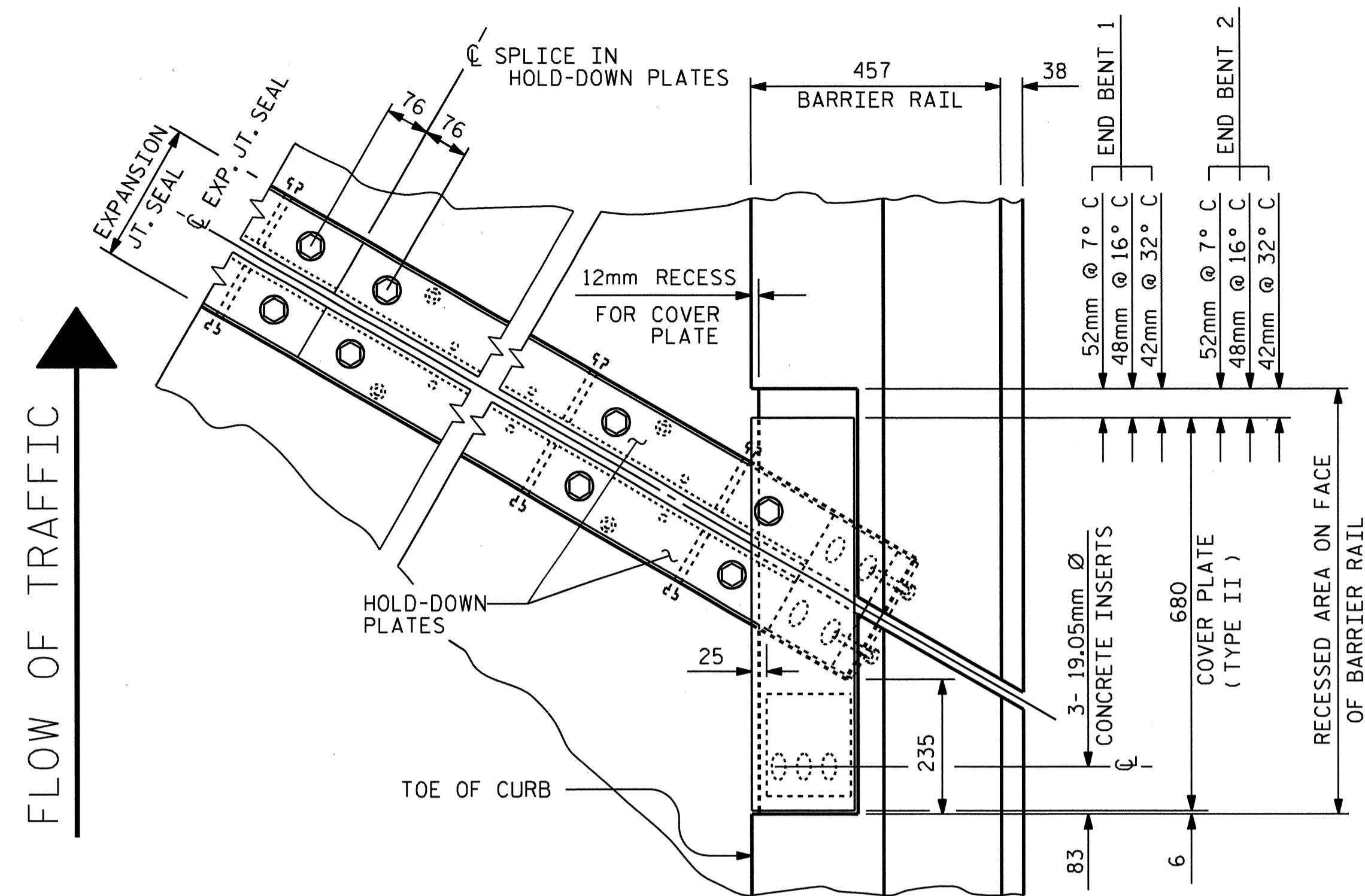


ASSEMBLED BY : M. G. SHAIKH DATE : 01-10-11
 CHECKED BY : H. T. BARBOUR DATE : 01-12-11
 DRAWN BY : REK 9/87 REV. 10/17/00 RWW/LES
 CHECKED BY : CRK 10/87 REV. 5/7/03R RWW/JTE
 REV. 5/1/06 TLA/GM

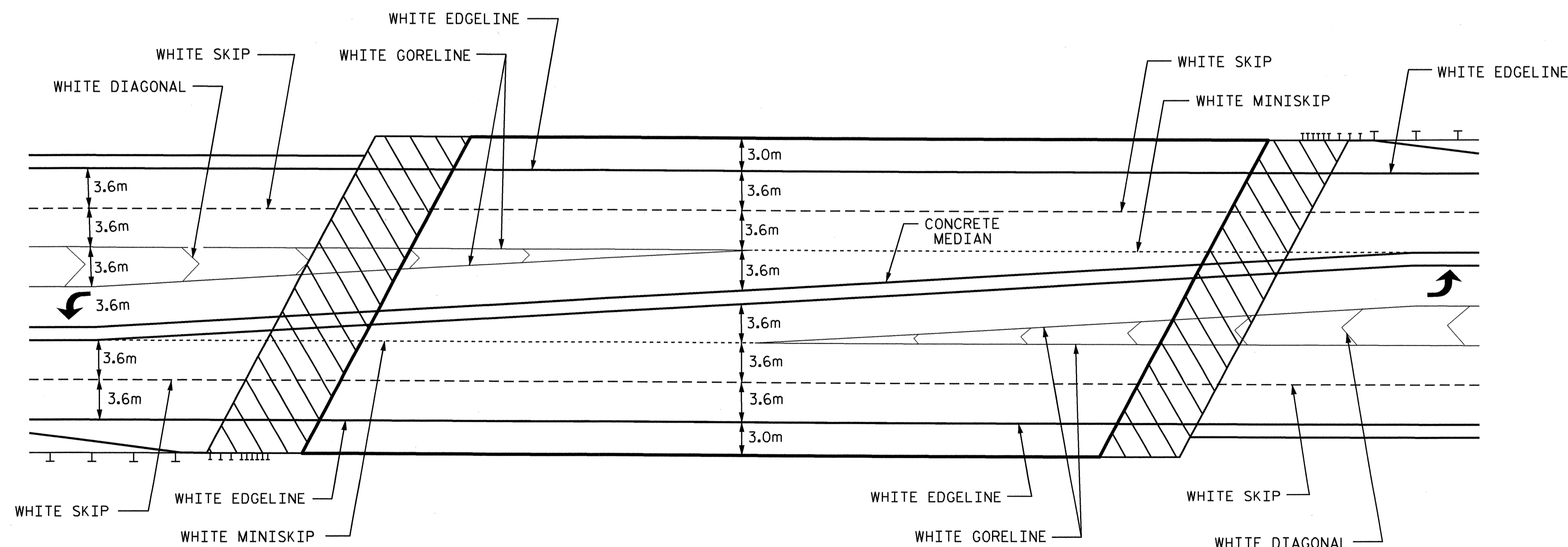


PLAN OF EXPANSION JOINT SEAL - LEFT SIDE

FLOW OF TRAFFIC ↓



PLAN OF EXPANSION JOINT SEAL - RIGHT SIDE



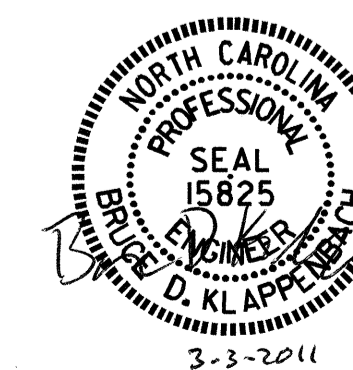
PAVEMENT MARKING ALIGNMENT

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 221+70.114 L-REV-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

EXPANSION JOINT
 SEAL DETAILS
 FOR BARRIER RAIL



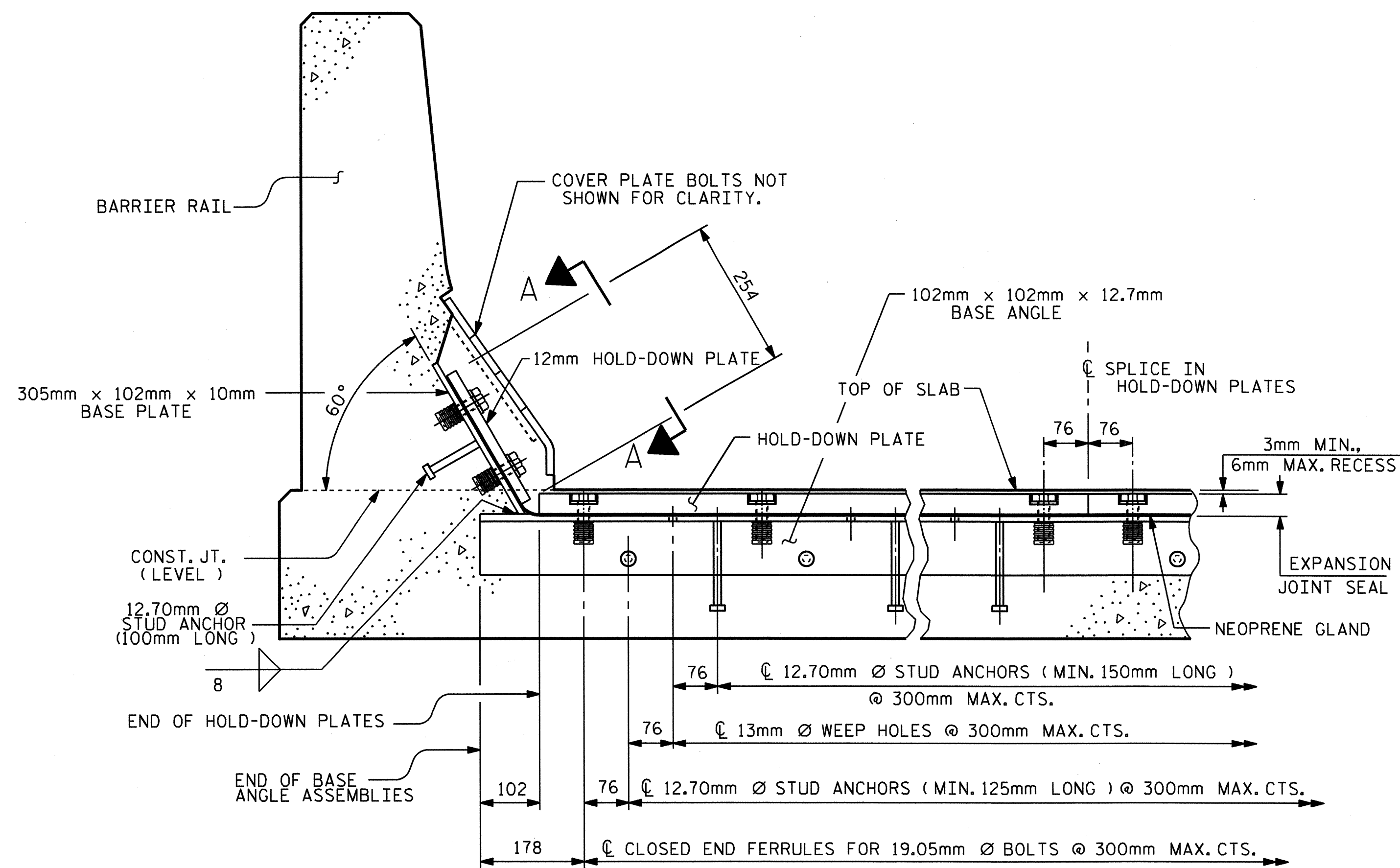
ASSEMBLED BY : M. G. SHAIKH DATE : 01-11-11
 CHECKED BY : H. T. BARBOUR DATE : 01-12-11
 DRAWN BY : REK 9/87
 CHECKED BY : CRK 10/87
 REV. 7/17/98 RWW/LES
 REV. 10/17/00 RWW/LES
 REV. 5/1/06 TLA/GM

28-FEB-2011 15:29
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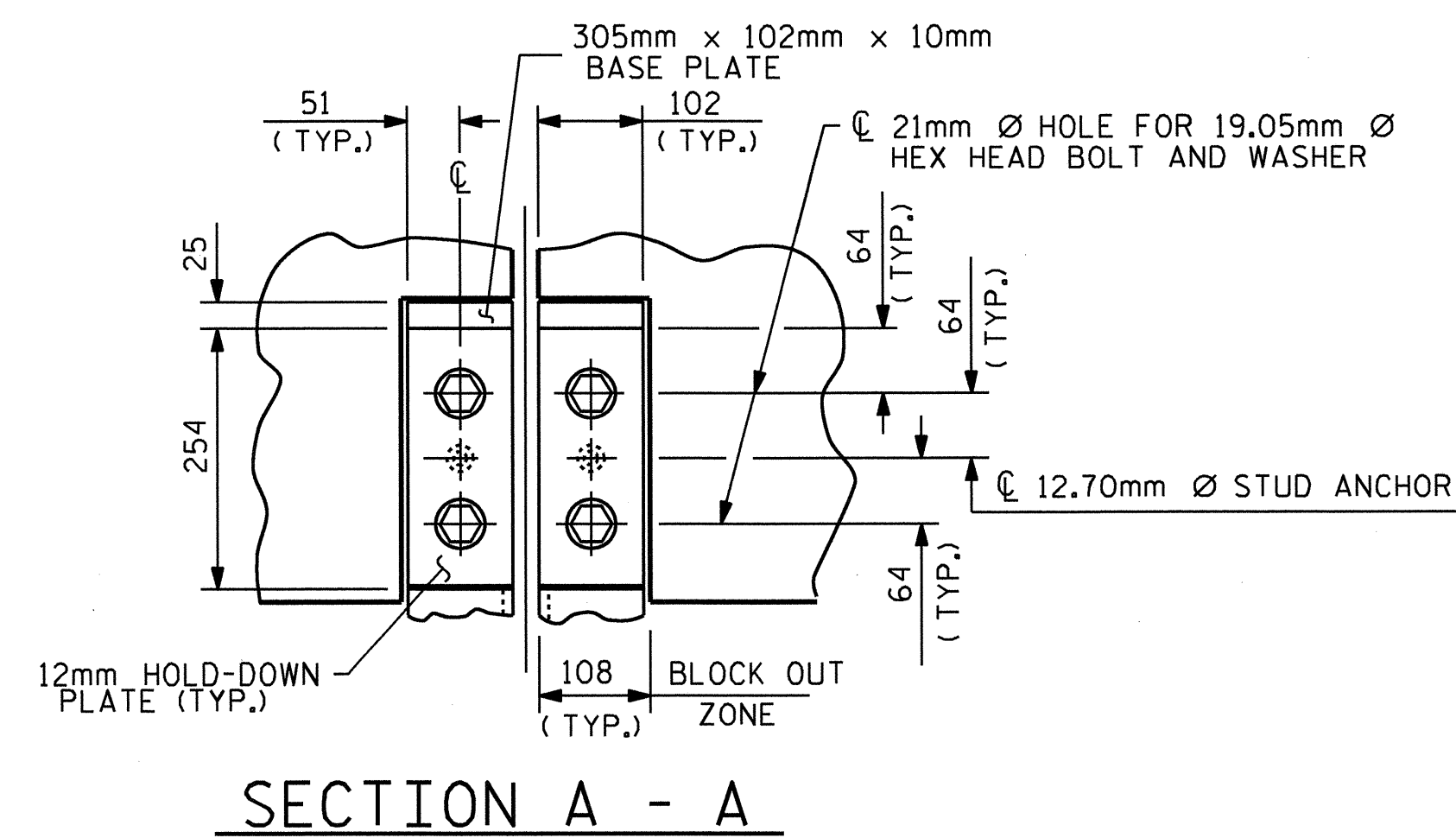
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BY:	DATE:	NO.	BY:	DATE:		S-25
		3				TOTAL SHEETS
		4				41

STR #1

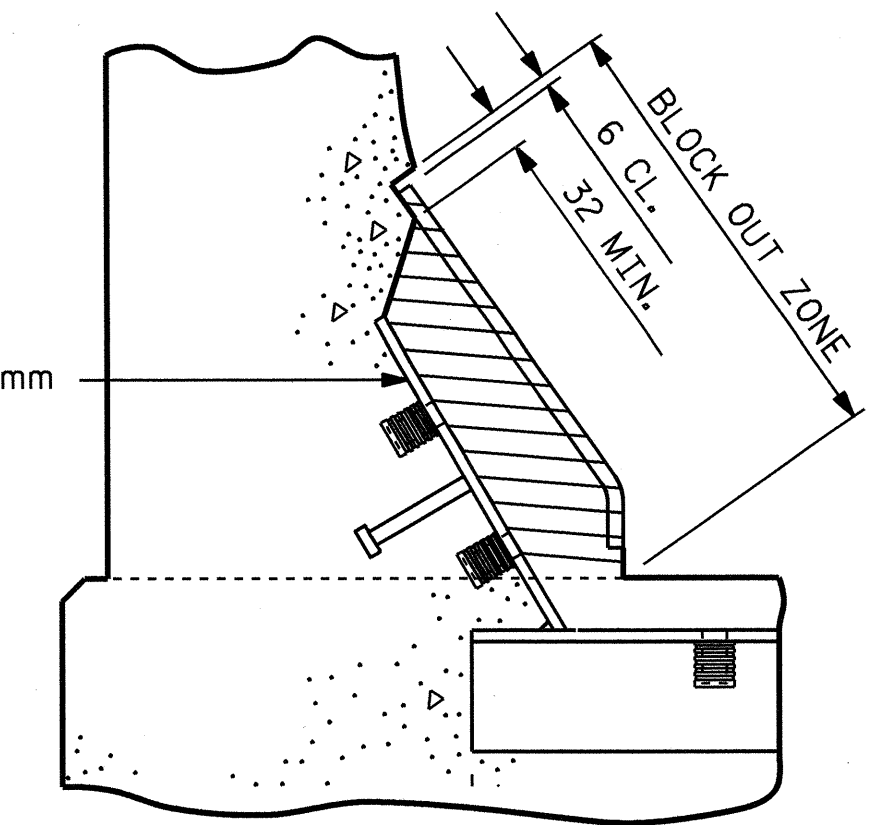
STD. NO. EJS2SM



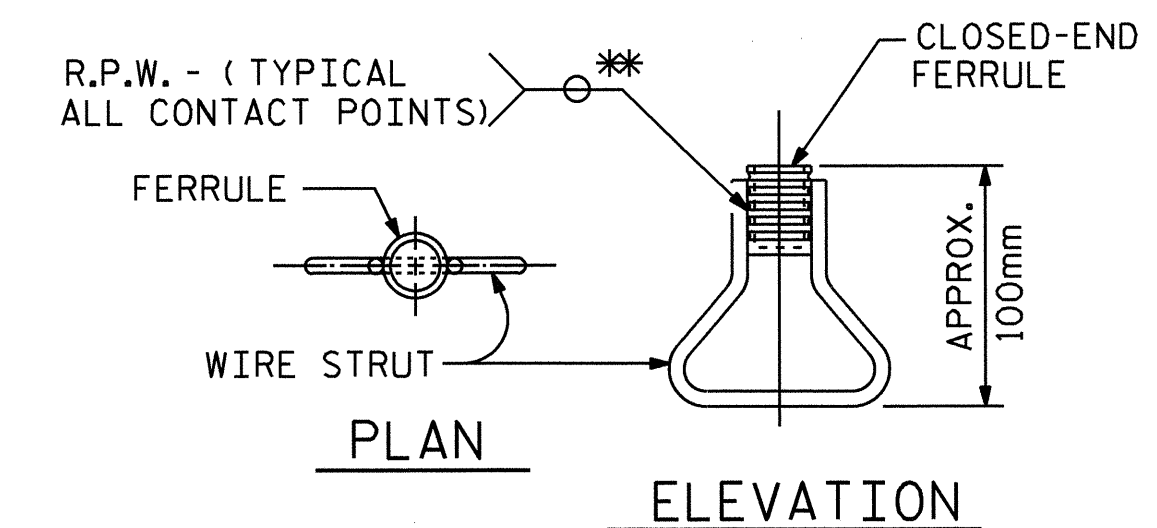
SECTION THRU RAIL NORMAL TO JOINT



SECTION A - A

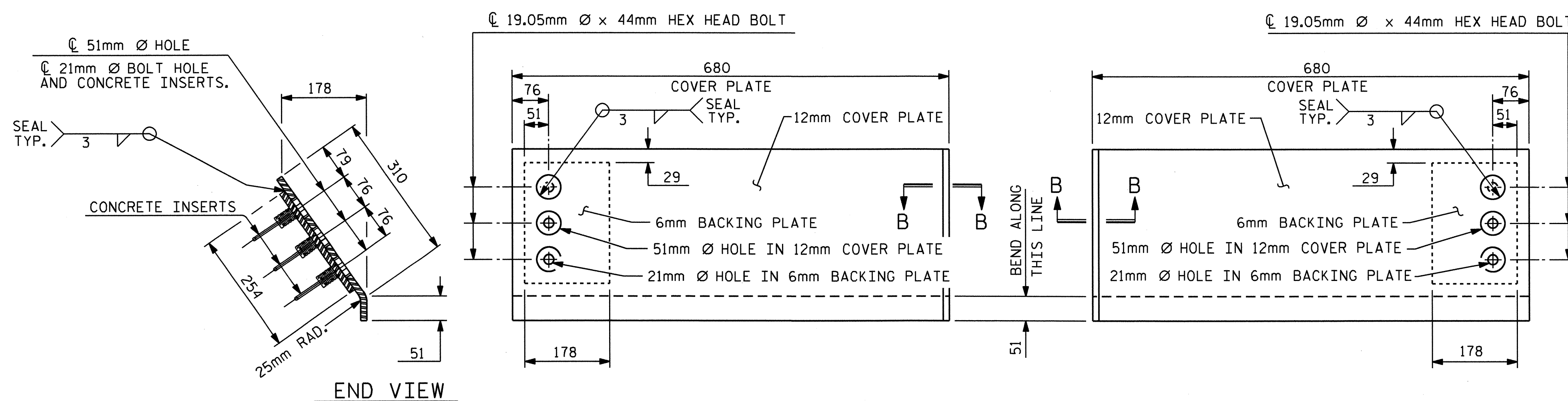


BLOCK OUT DETAIL
SEE "SECTION A - A" FOR OTHER DETAILS.



CONCRETE INSERT

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

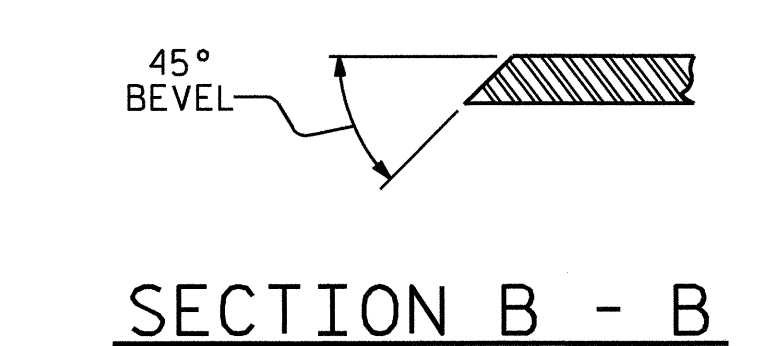


END VIEW

TYPE II - ELEVATION VIEW

TYPE II - ELEVATION VIEW

COVER PLATE DETAILS



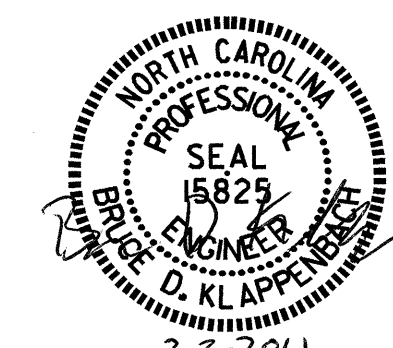
SECTION B - B

PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 221+70.114 L-REV-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

EXPANSION JOINT
SEAL DETAILS
FOR BARRIER RAIL



ASSEMBLED BY :	M. G. SHAIKH	DATE :	01-11-11
CHECKED BY :	H. T. BARBOUR	DATE :	01-12-11
DRAWN BY :	REK 9/87	REV. 7/17/98	RWW/LES
CHECKED BY :	CRK 10/87	REV. 10/17/00	RWW/LES
		REV. 5/1/06	TLA/GM

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REVISIONS						SHEET NO. S-26
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 41
2			4			

STR #1

STD. NO. EJS2SM

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT												
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A2	400	#16	STR	15620	9697	*A143	2	#16	STR	7940	25	*A232	2	#16	STR	12300	38	A323	2	#16	STR	3620	11	A411	2	#16	STR	9240	29	*B2	234	#22	STR	9700	6905												
*A3	403	#16	STR	14860	9294	*A144	2	#16	STR	7400	23	*A233	2	#16	STR	11780	37	A324	2	#16	STR	3100	10	A412	2	#16	STR	8720	27	*B3	237	#22	STR	10920	7873												
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NOTES

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

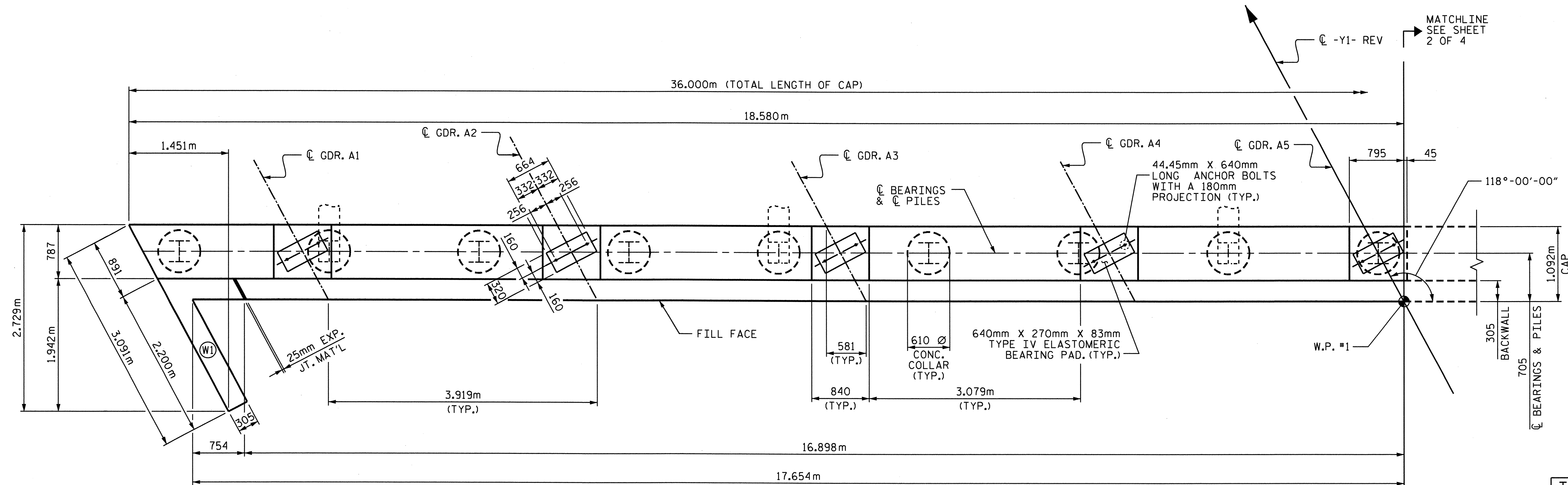
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 102mm DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS. SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

*FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A, SHEET 4 OF 4.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

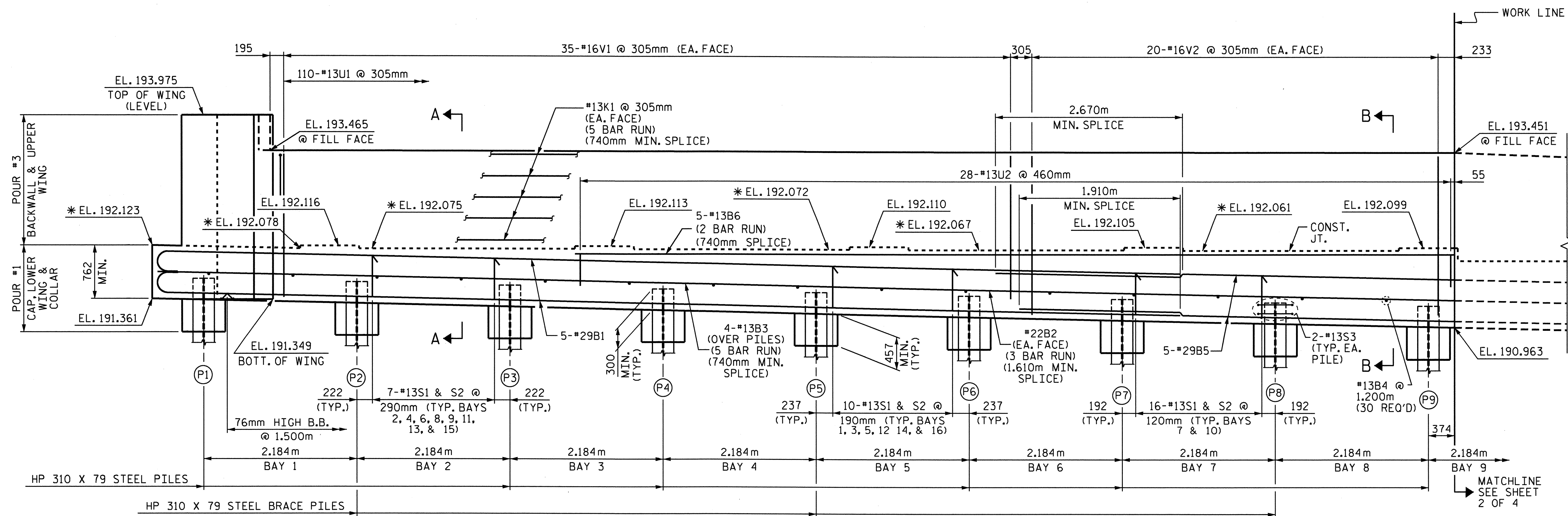
THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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 %.



PLAN

TOP OF PILE ELEVATIONS			
PILE	ELEV.	PILE	ELEV.
P1	191.649	P6	191.415
P2	191.602	P7	191.369
P3	191.556	P8	191.322
P4	191.509	P9	191.275
P5	191.462		



ELEVATION



PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 221+70.114-L-REV

SHEET 1 OF 4

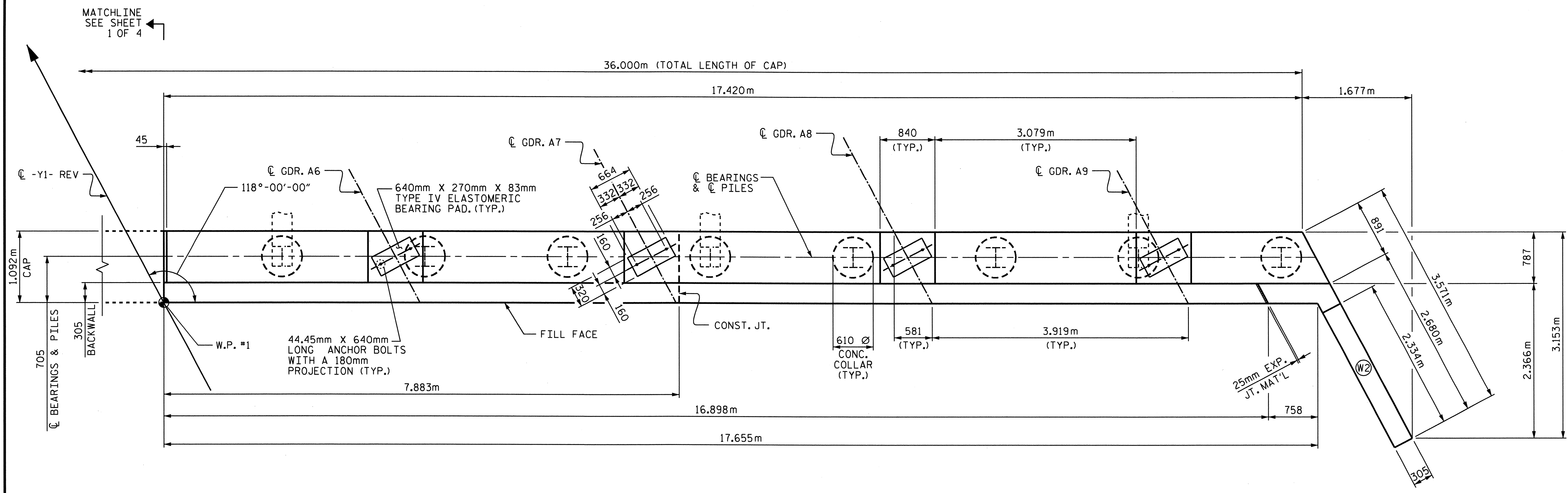
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT #1**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			41

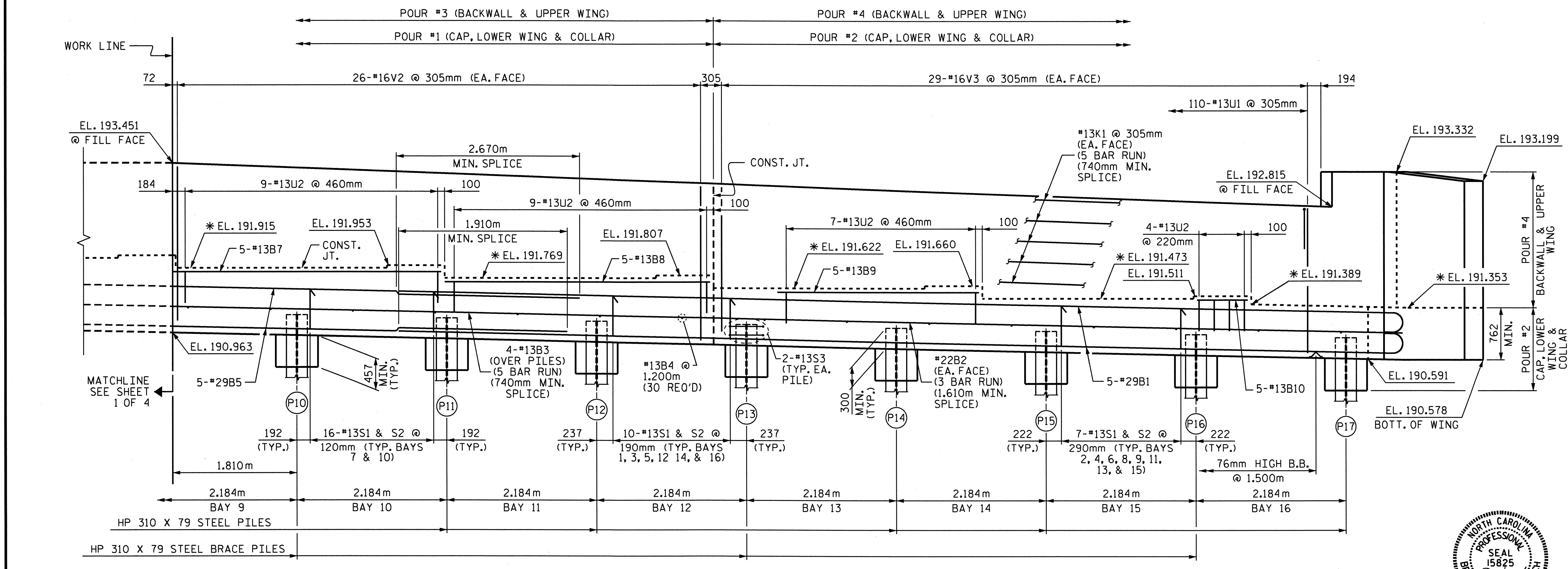
DRAWN BY : C.R. YARBROUGH DATE : 03/09
 CHECKED BY : M.G. SHAIKH DATE : 08/09

24-FEB-2011 5:28
 R:\Structures\Str\cyarrough\R-2533CC.sd.E*.dgn
 cyarrough



PLAN

TOP OF PILE ELEVATIONS			
PILE	ELEV.	PILE	ELEV.
P10	191.228	P14	191.041
P11	191.182	P15	190.995
P12	191.135	P16	190.948
P13	191.088	P17	190.901



ELEVATION

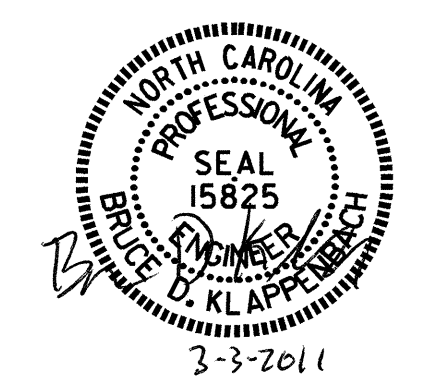
PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 221+70.114-L-REV

SHEET 2 OF 4

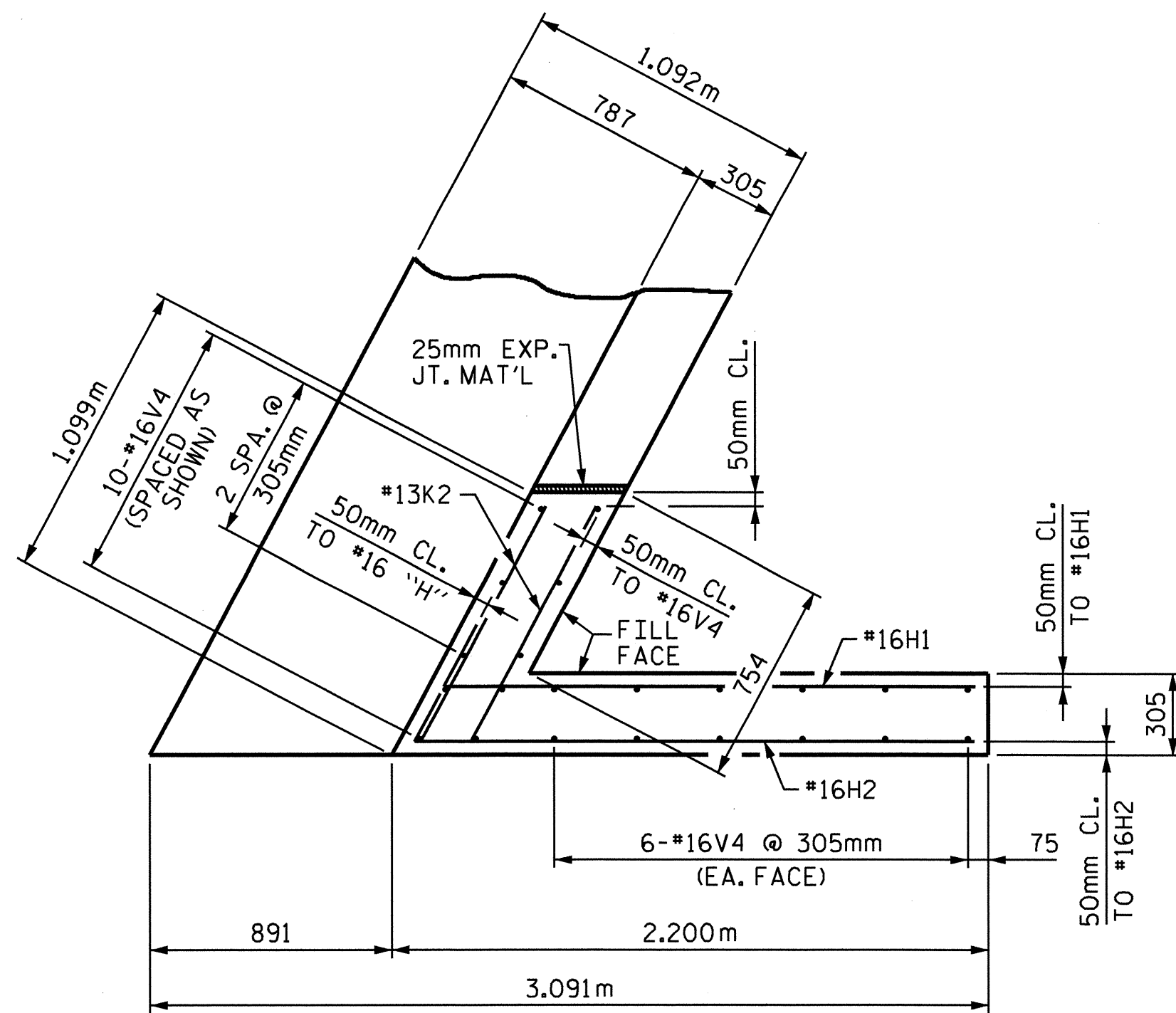
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT #1**

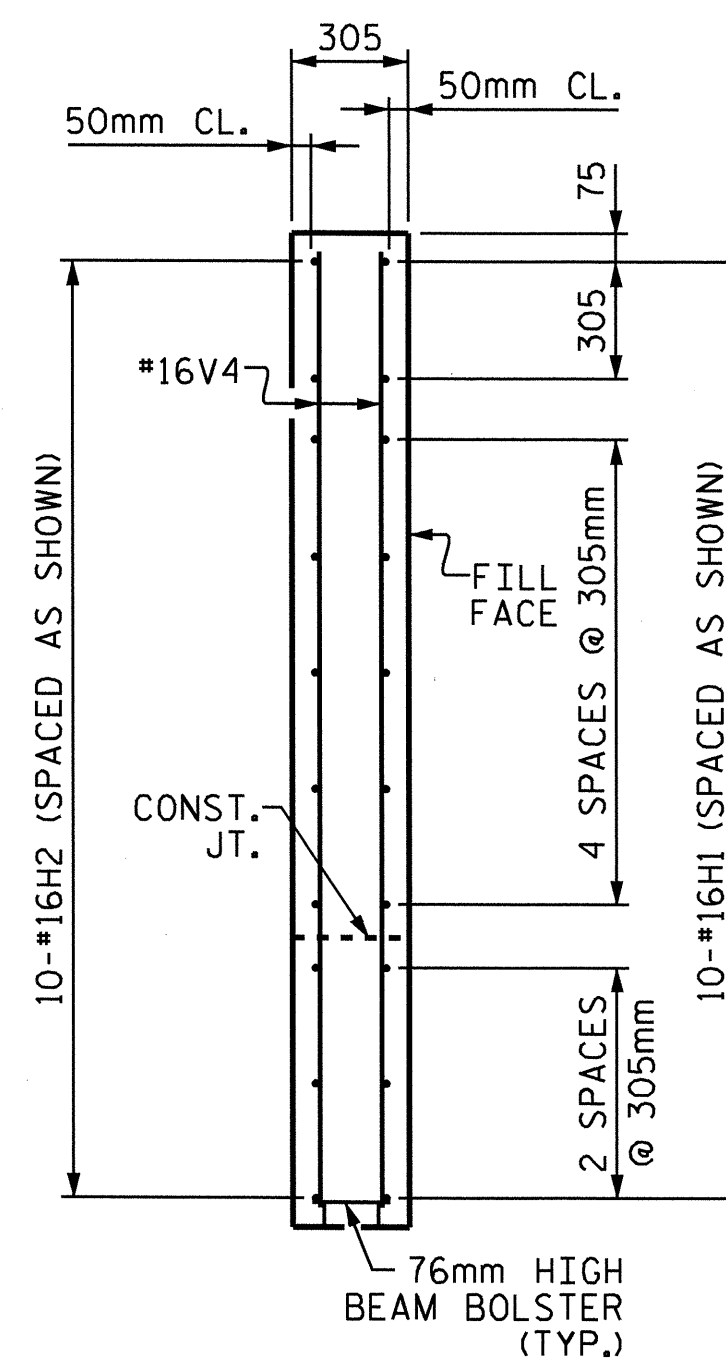
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29	
1			3			TOTAL	5
2			4			SHEETS	41



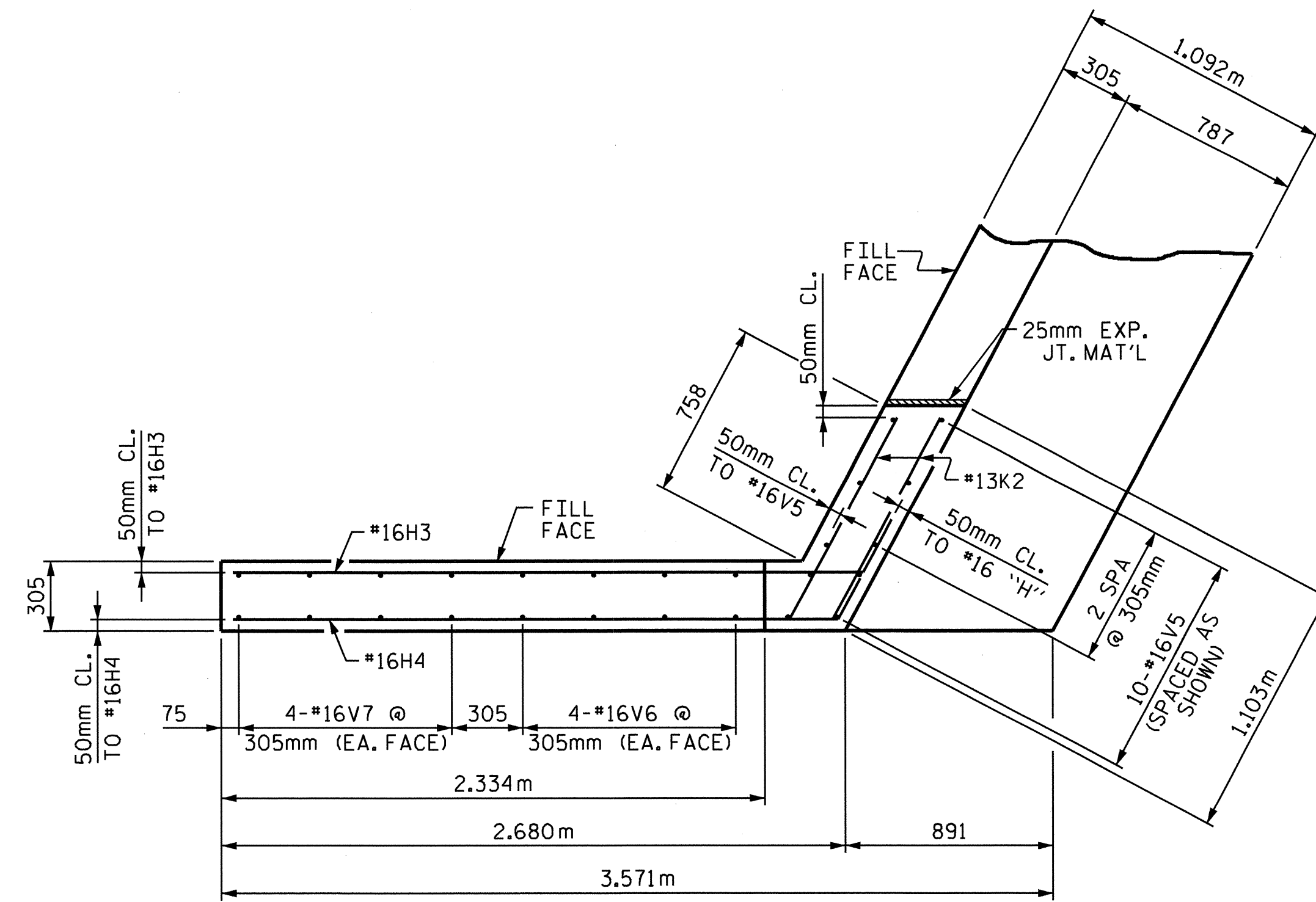
DRAWN BY: C.R. YARBROUGH DATE: 03/09
 CHECKED BY: M.G. SHAIKH DATE: 08/09



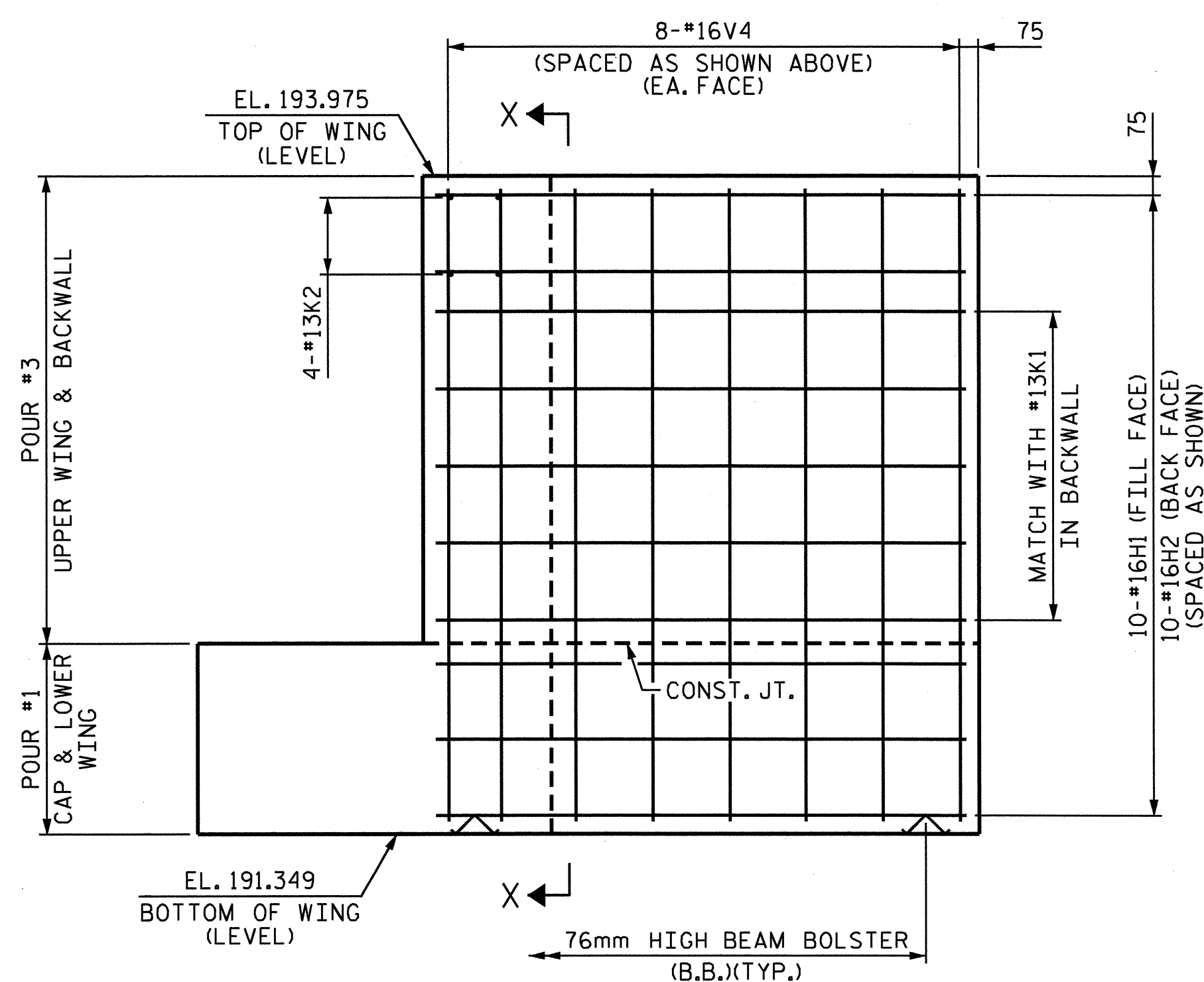
PLAN OF LEFT WING (W1)



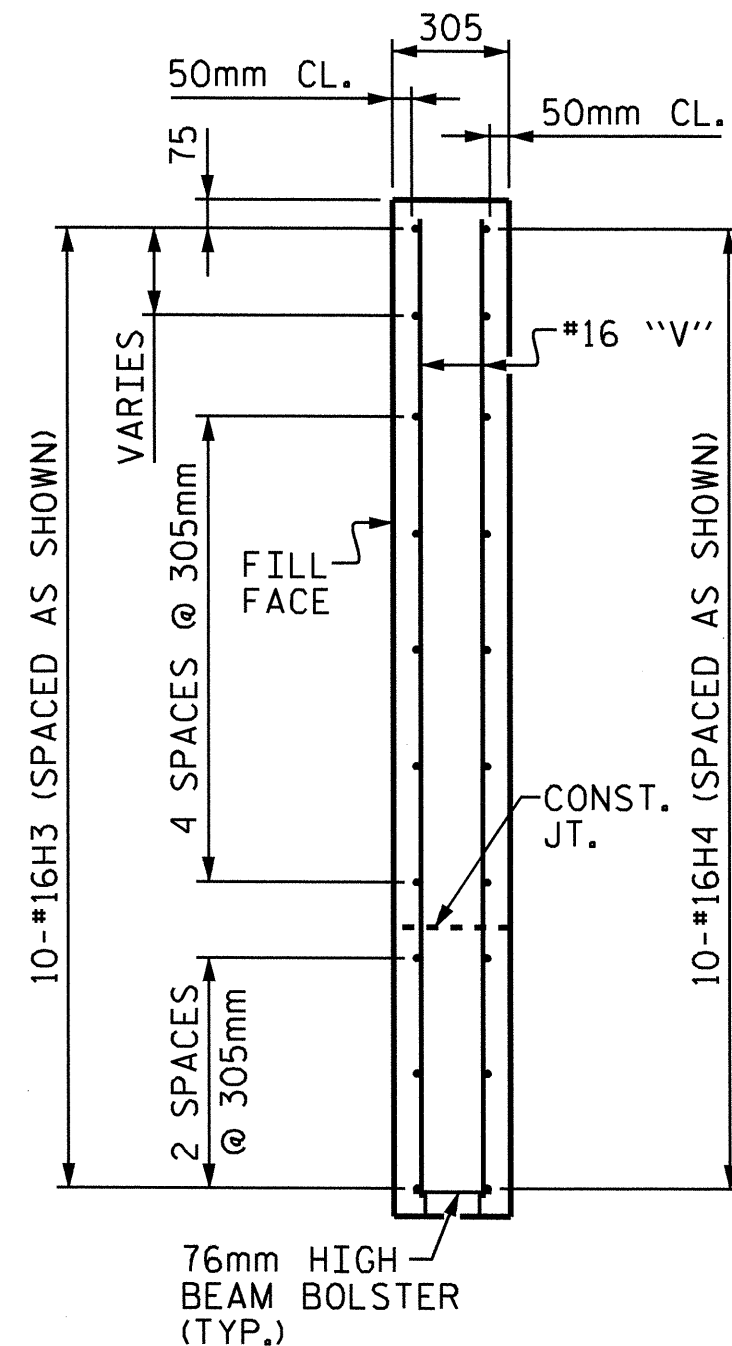
SECTION X-X



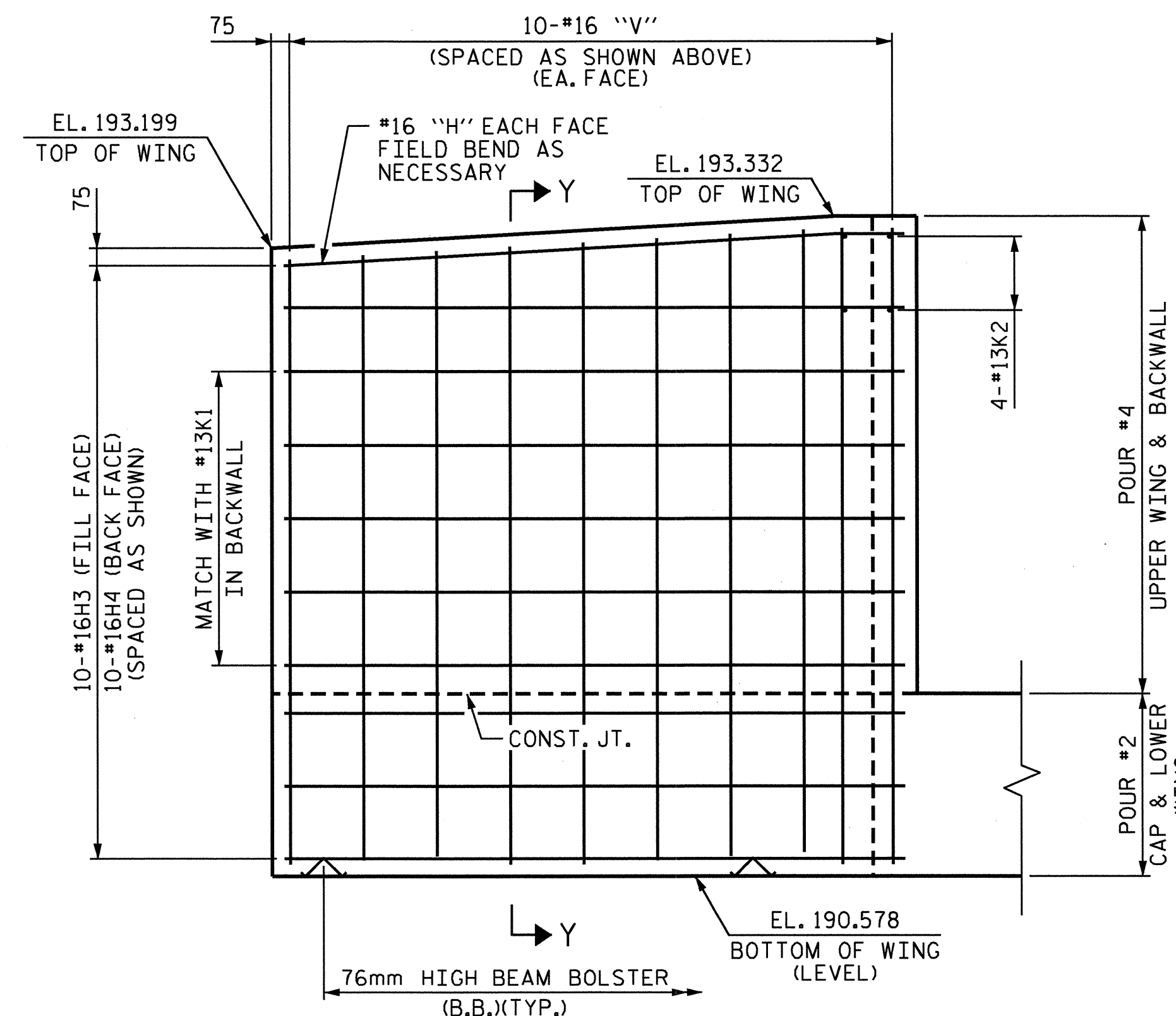
PLAN OF RIGHT WING (W2)



ELEVATION OF LEFT WING (W1)



SECTION Y-Y



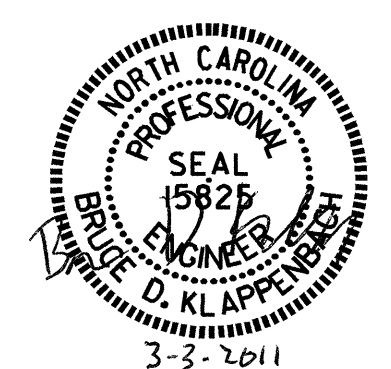
ELEVATION OF RIGHT WING (W2)

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 221+70.114-L-REV

SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

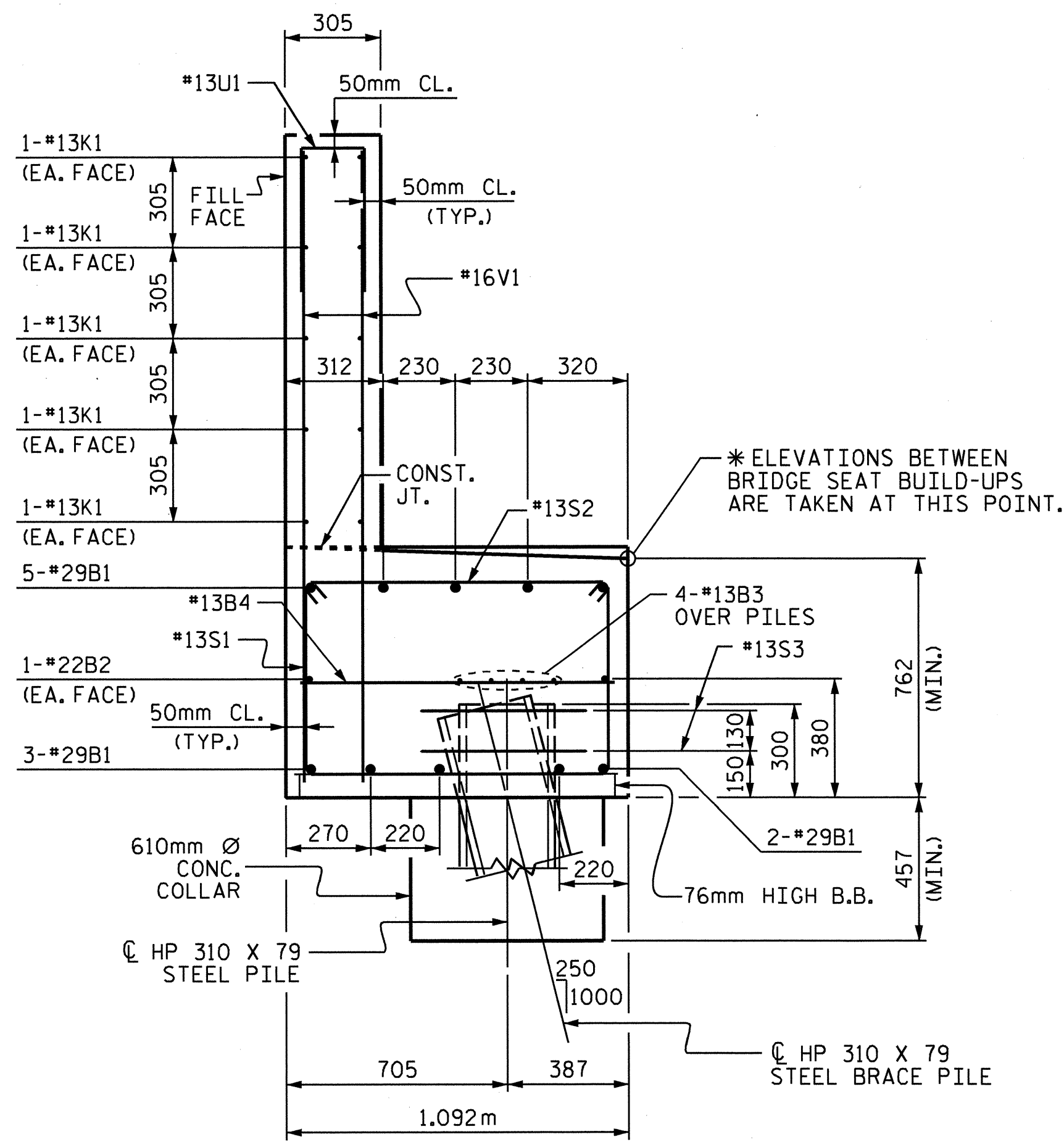
SUBSTRUCTURE
 END BENT #1



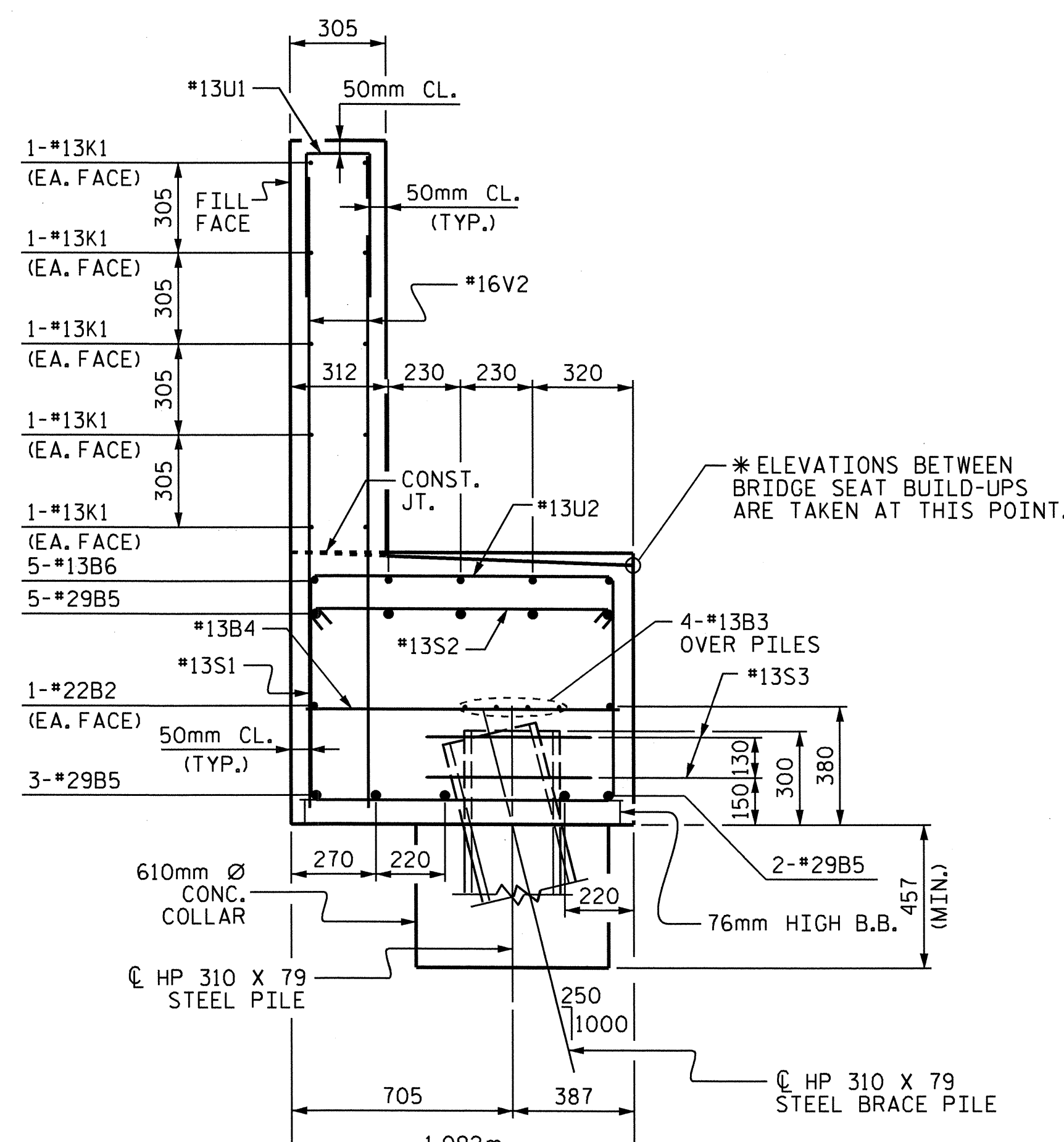
DRAWN BY: C.R. YARBROUGH DATE: 04/09
 CHECKED BY: M.G. SHAIKH DATE: 08/09

24-FEB-2011 15:27
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 cyarbrough

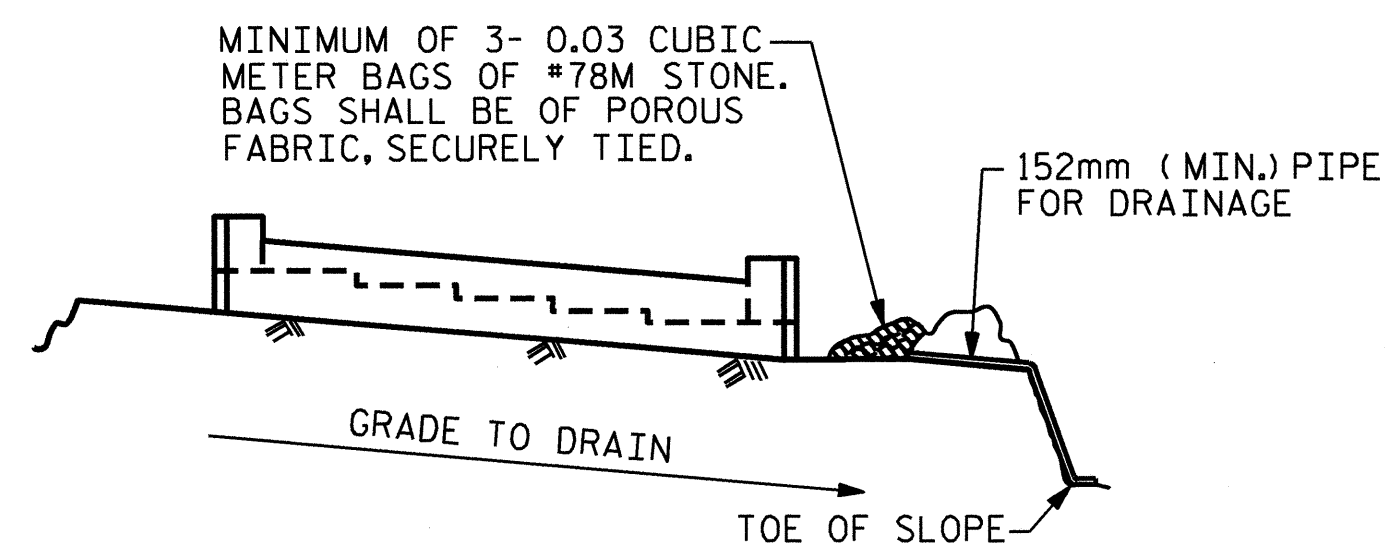
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30	
1			3			TOTAL SHEETS	41
2			4				



SECTION A-A



SECTION B-B

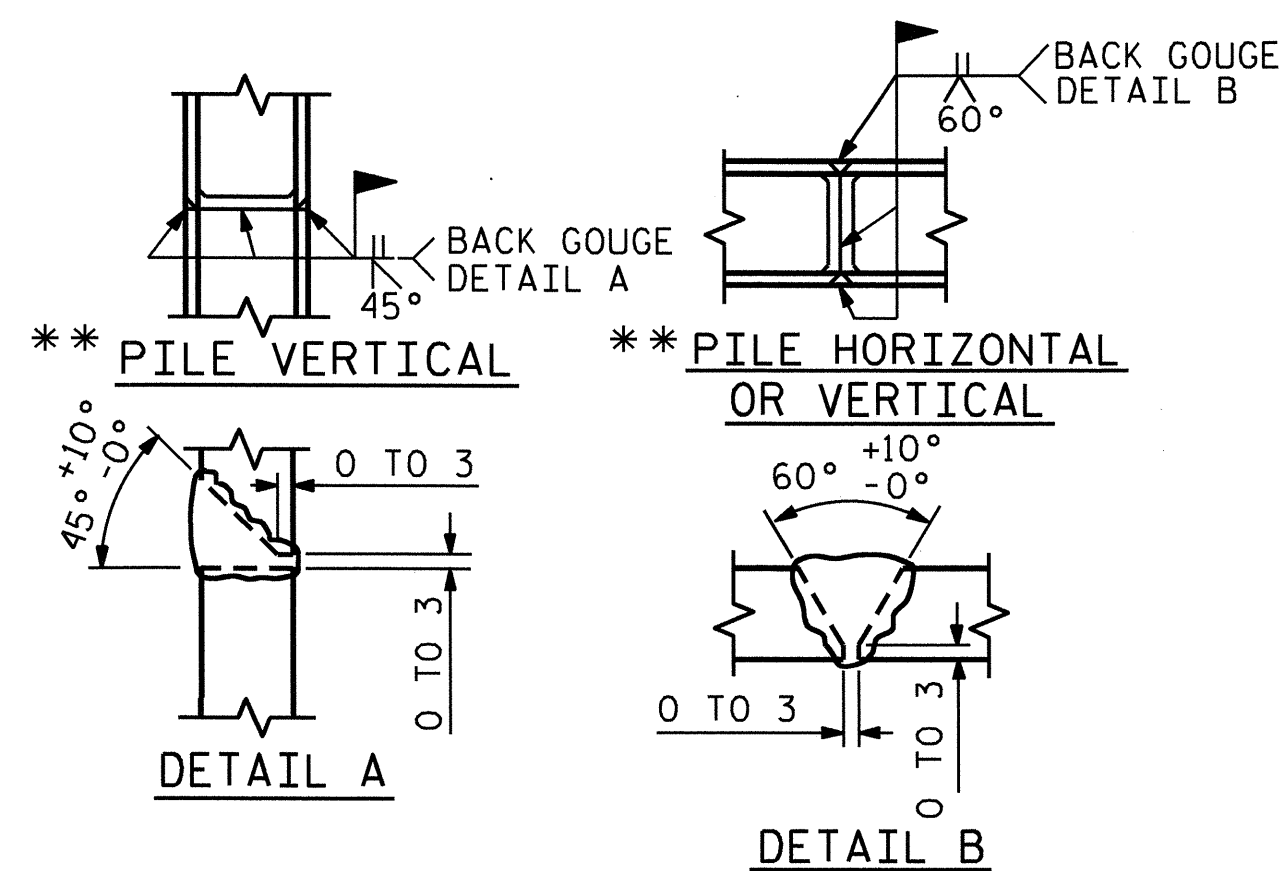


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

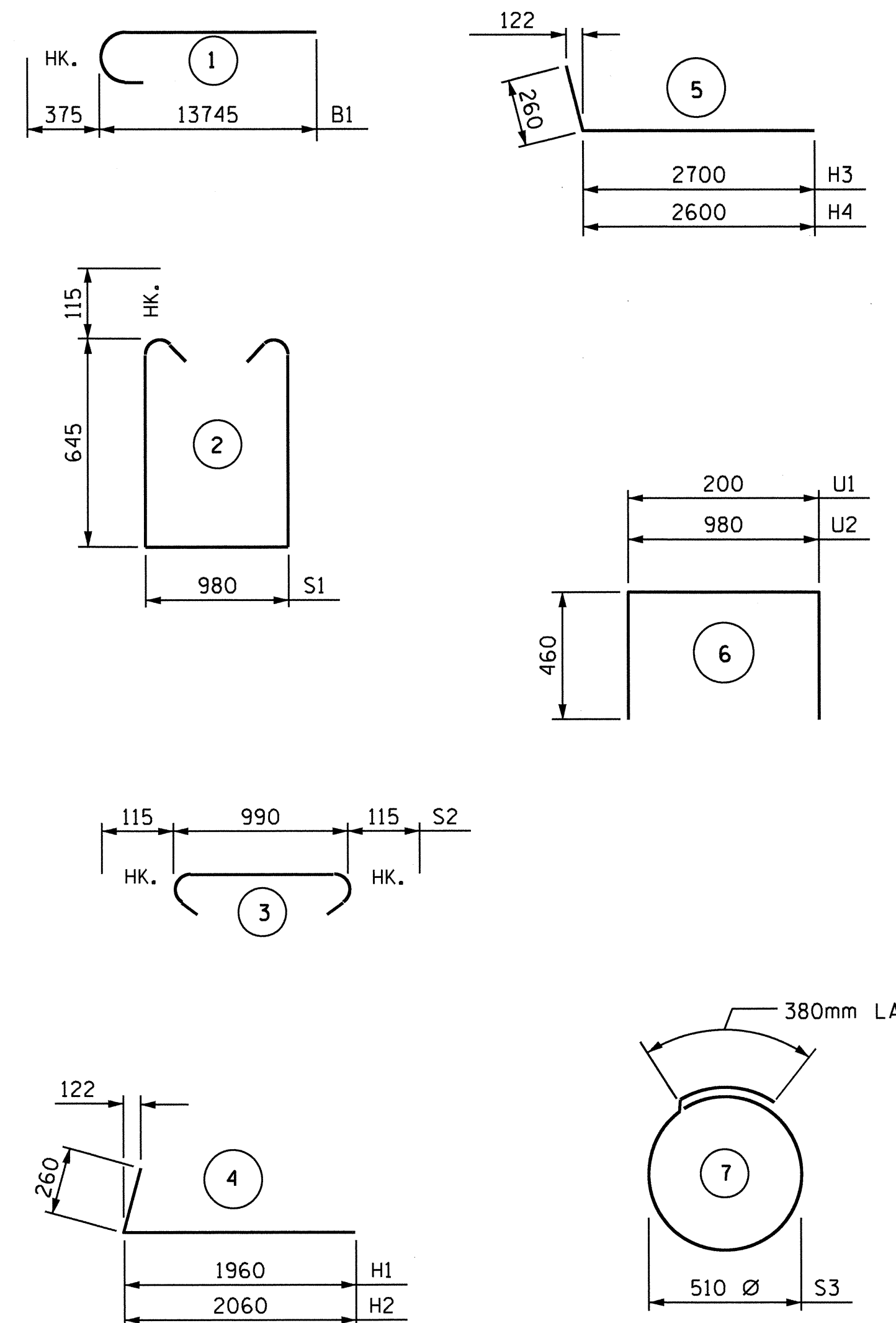
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT NO. 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	20	#29	1	14120	1429
B2	6	#22	STR	13040	238
B3	20	#13	STR	7780	155
B4	30	#13	STR	980	29
B5	10	#29	STR	13740	695
B6	10	#13	STR	6640	66
B7	5	#13	STR	3920	19
B8	5	#13	STR	3860	19
B9	5	#13	STR	2940	15
B10	5	#13	STR	740	4
H1	10	#16	4	2220	34
H2	10	#16	4	2320	36
H3	10	#16	5	2960	46
H4	10	#16	5	2860	44
K1	50	#13	STR	7780	387
K2	8	#13	STR	980	8
S1	148	#13	2	2500	368
S2	148	#13	3	1220	179
S3	34	#13	7	1980	67
V1	70	#16	STR	2040	222
V2	92	#16	STR	2260	323
V3	58	#16	STR	2120	191
V4	22	#16	STR	2520	86
V5	10	#16	STR	2640	41
V6	8	#16	STR	2580	32
V7	8	#16	STR	2520	31
U1	110	#13	6	1120	122
U2	57	#13	6	1900	108

REINFORCING STEEL = 4994 KG

CLASS A CONCRETE BREAKDOWN

POUR #1 CAP, LOWER WING & COLLAR	29.1 CU. M.
POUR #2 CAP, LOWER WING & COLLAR	11.2 CU. M.
POUR #3 BACKWALL & UPPER WING	13.5 CU. M.
POUR #4 BACKWALL & UPPER WING	4.9 CU. M.
TOTAL CLASS A CONCRETE	58.7 CU. M.

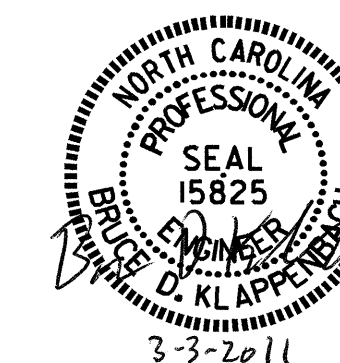
HP 310 X 79 STEEL PILES NO. 17 170 METERS

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 221+70.114-L-REV

SHEET 4 OF 4

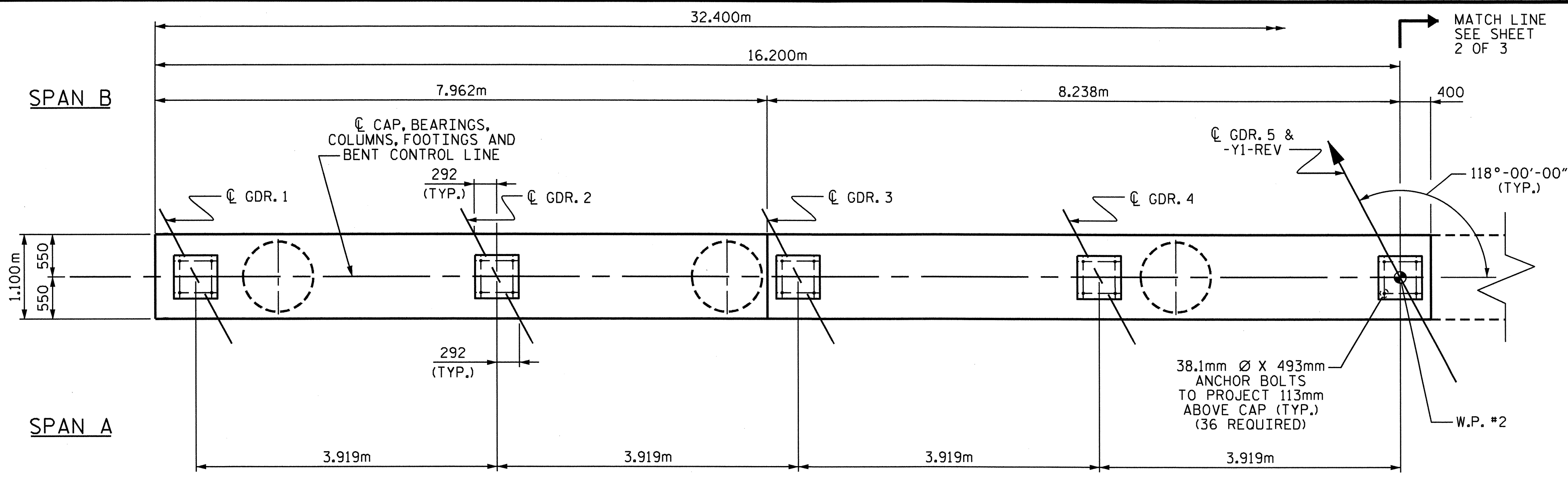
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT #1**

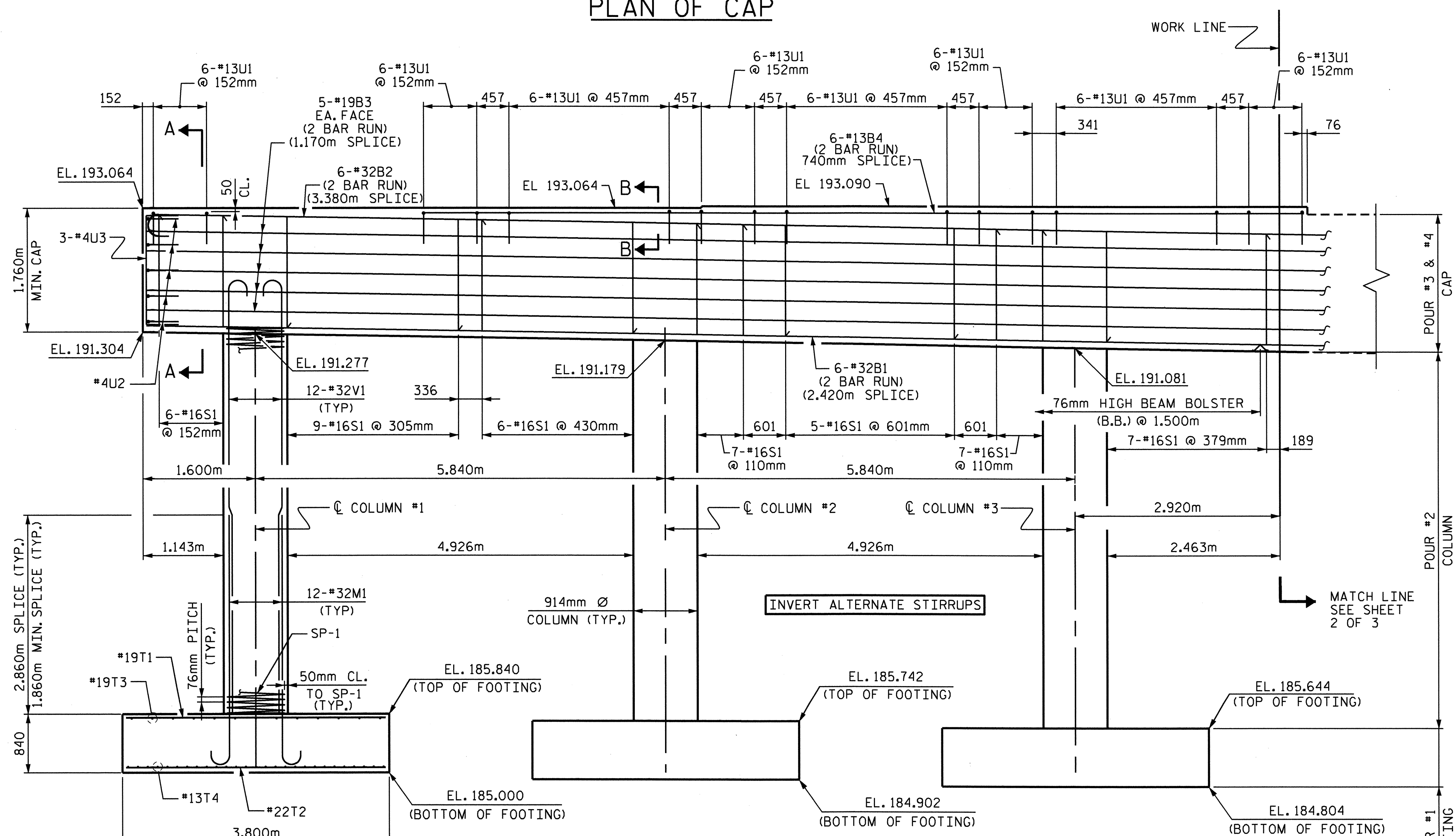


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS 41
2			4			

DRAWN BY: C.R. YARBROUGH DATE: 04/09
 CHECKED BY: M.G. SHAIKH DATE: 08/09

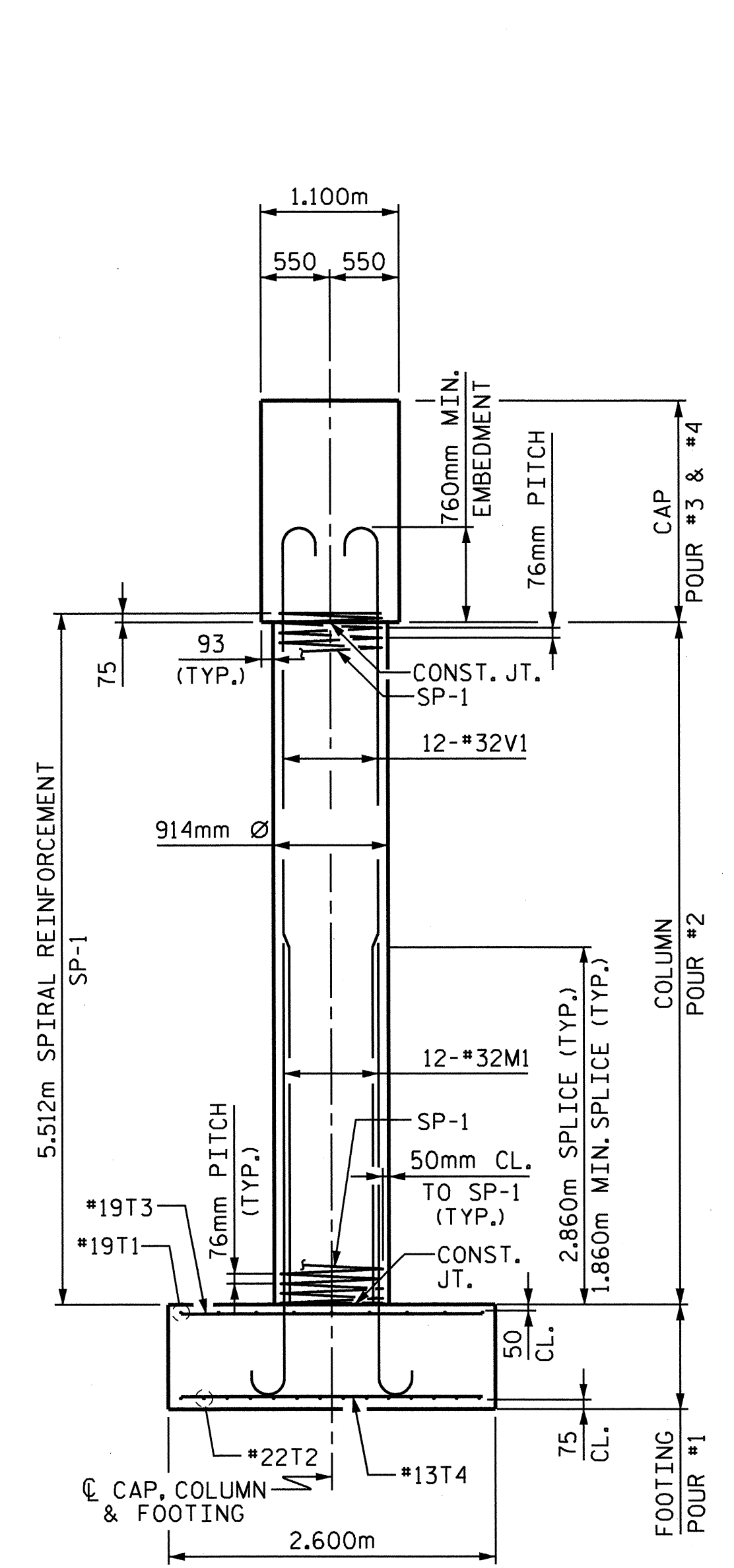


PLAN OF CAP



ELEVATION

COLUMN #1, #2 AND #3 AND FOOTINGS IDENTICAL



LEFT END ELEVATION

NOTES

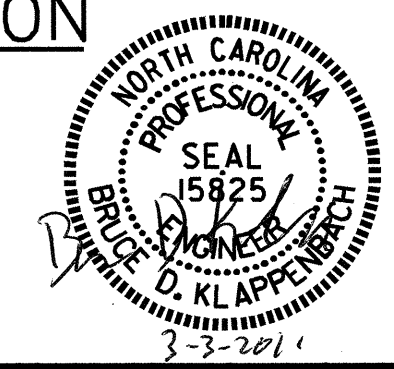
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
 THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE COLUMNS IS DETAILED WITH 1 METER OF EXTRA LENGTH.

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 221+70.114-L-REV.

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT #1

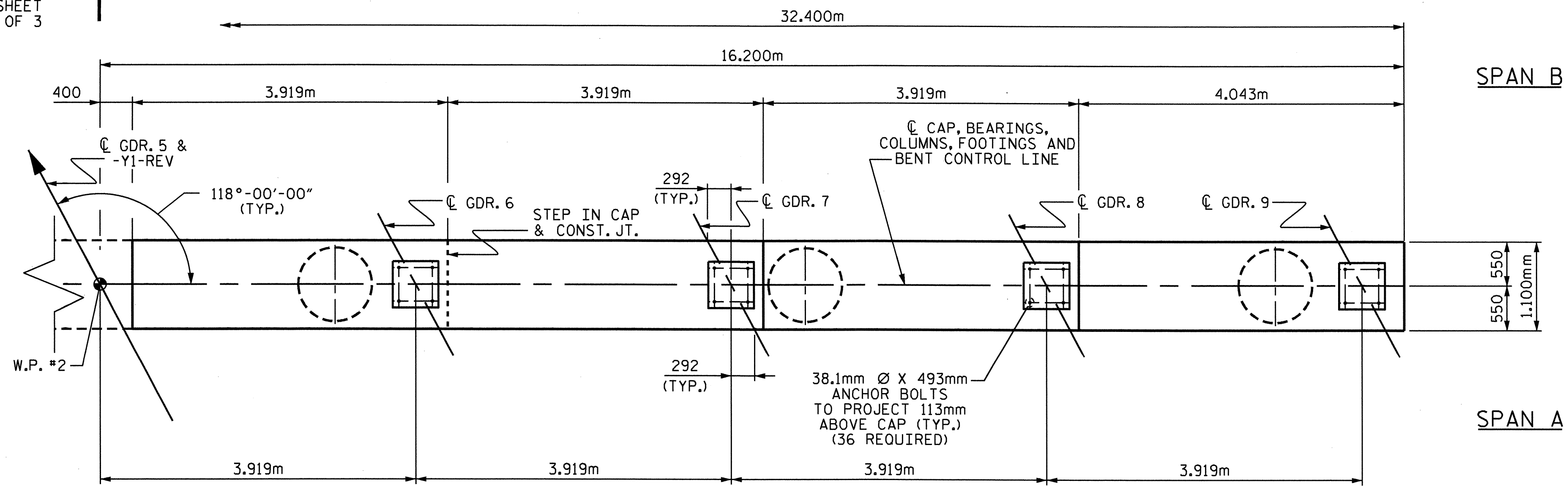


DRAWN BY: H. TOM BARBOUR DATE: 2-19-09
 CHECKED BY: C. R. YARBROUGH DATE: 12-10

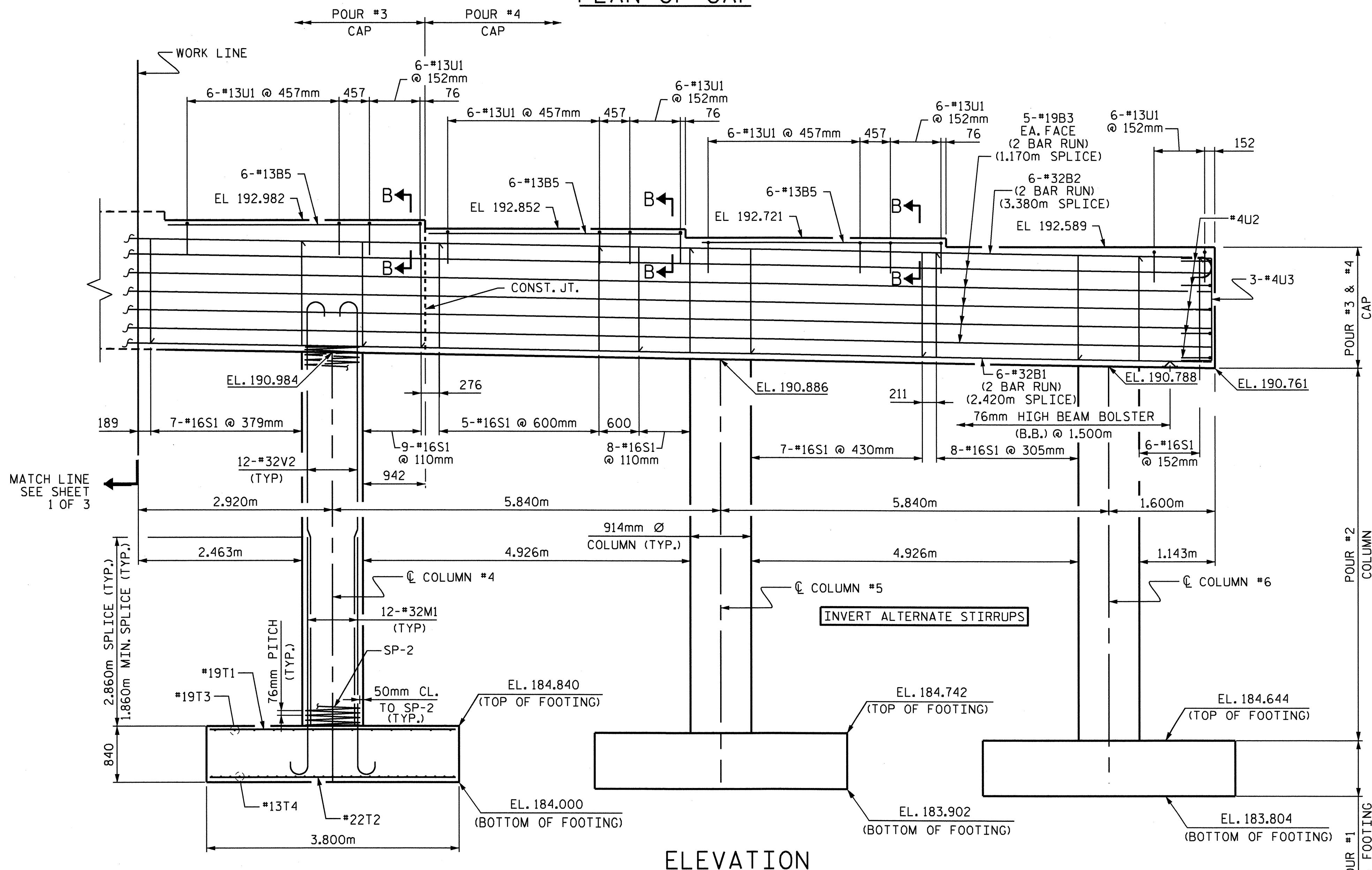
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 cyarbrough

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32	
1			3			TOTAL SHEETS	
2			4			41	

MATCH LINE
SEE SHEET
1 OF 3

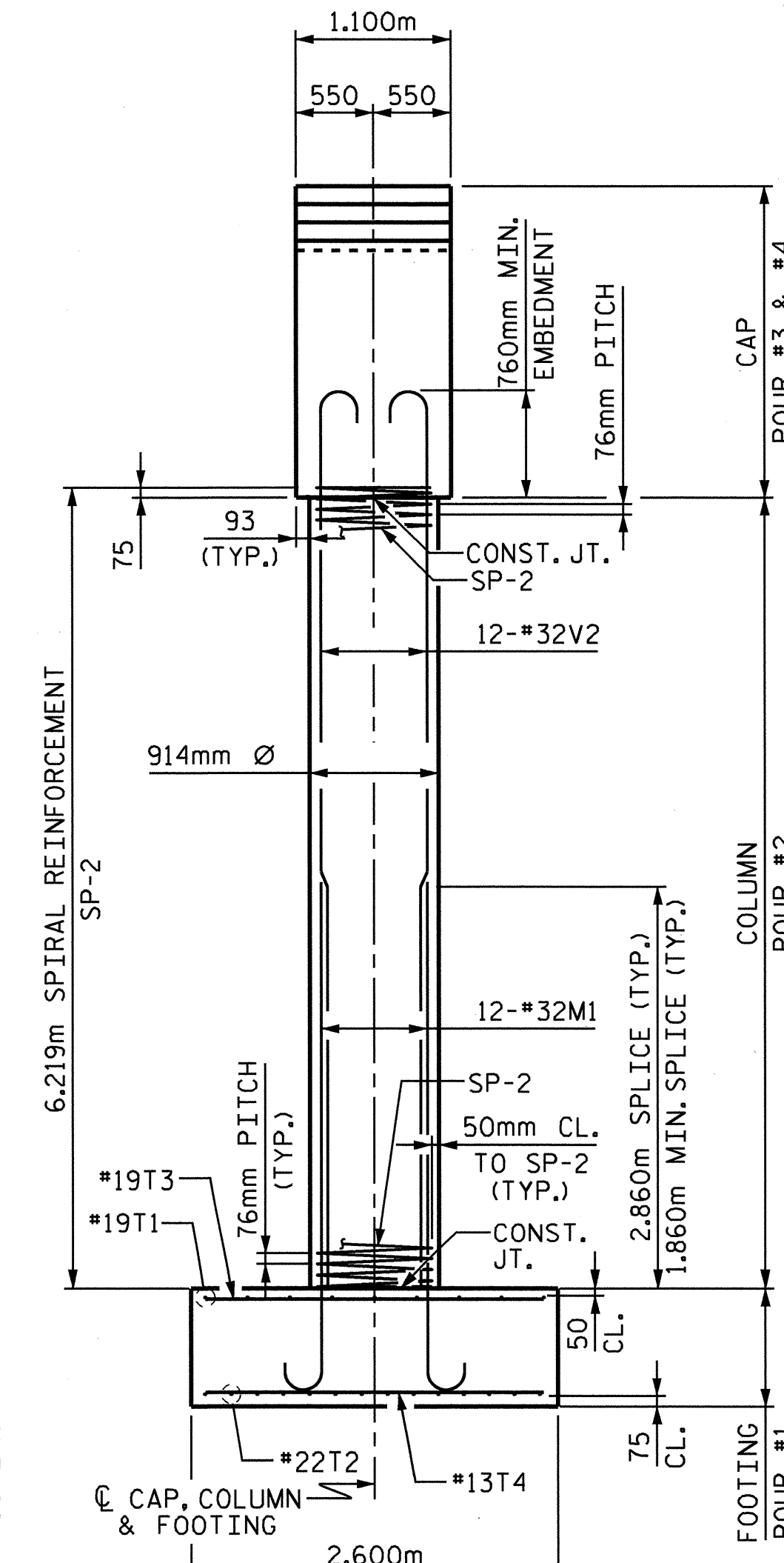


PLAN OF CAP

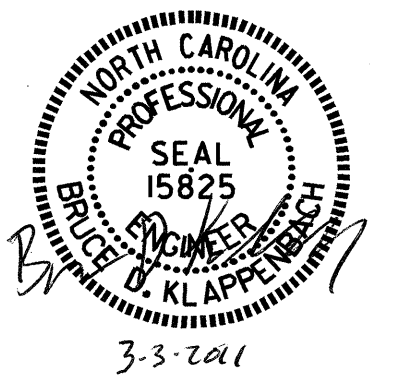


ELEVATION

COLUMN #4, #5 AND #6 AND FOOTINGS IDENTICAL



RIGHT END ELEVATION



PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 221+70.114-L-REV.

SHEET 2 OF 3

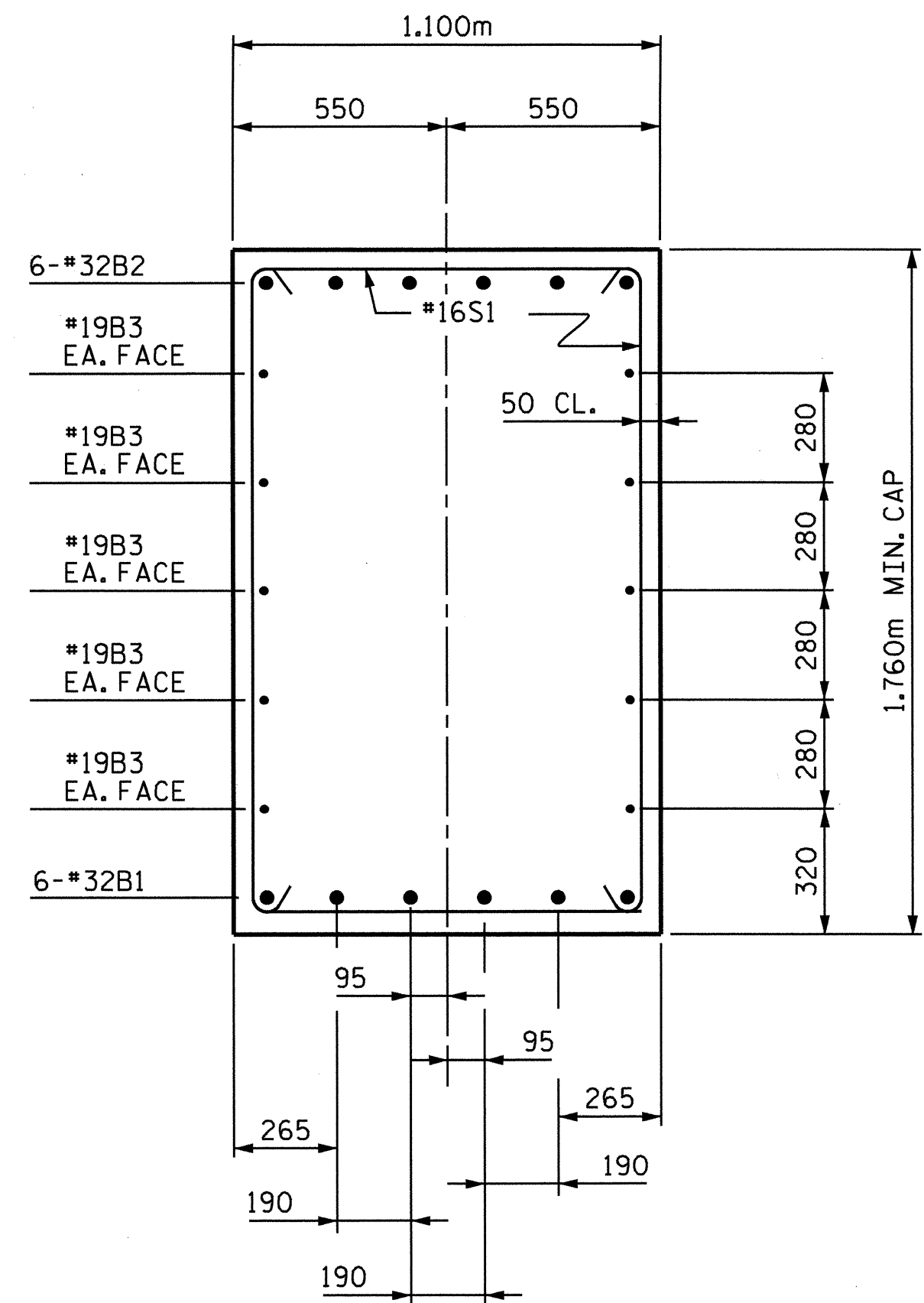
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT #1

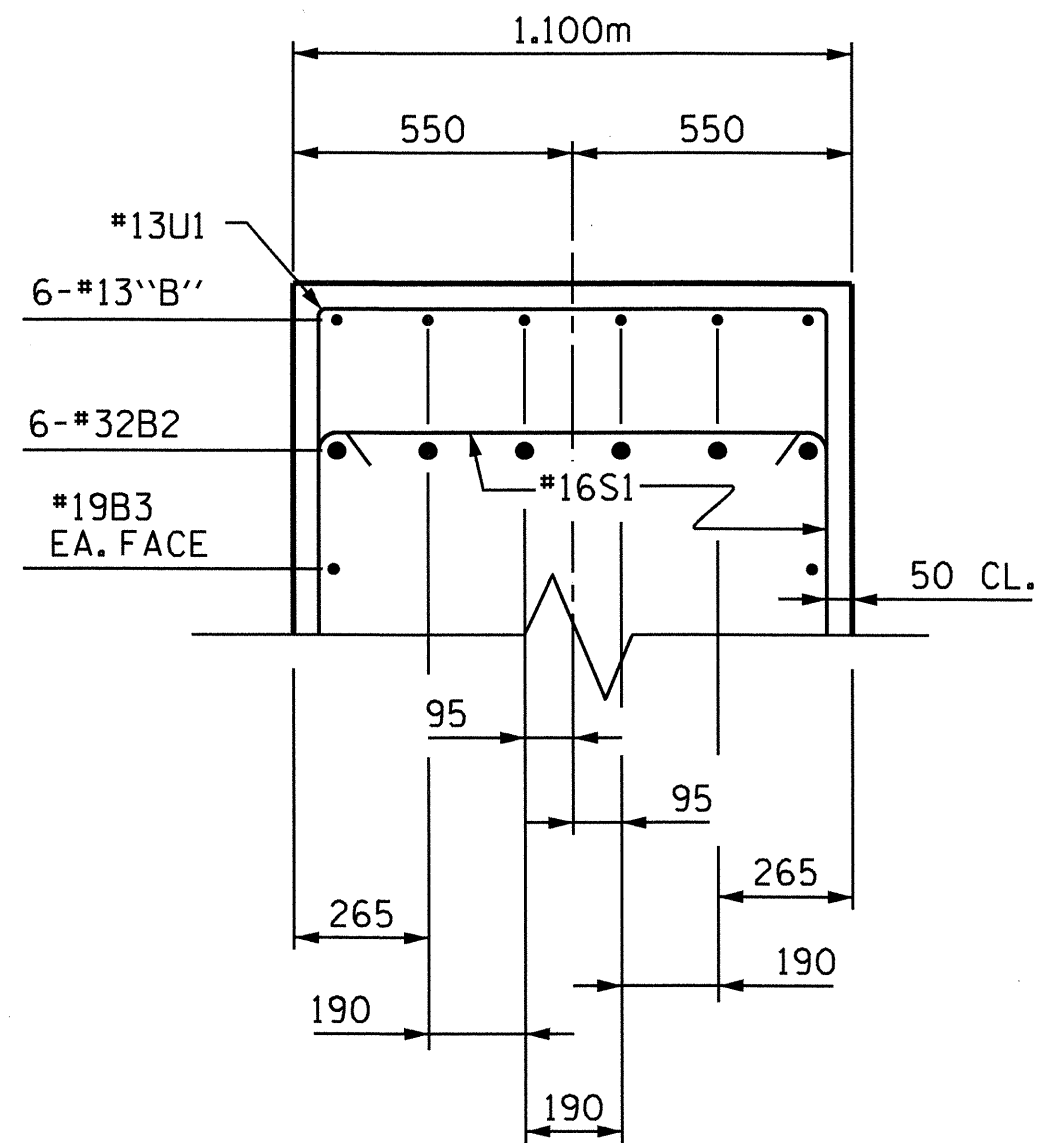
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33	
1			3			TOTAL SHEETS	41
2			4				

DRAWN BY: H. TOM BARBOUR DATE: 2-20-09
CHECKED BY: C. R. YARBROUGH DATE: 12-10

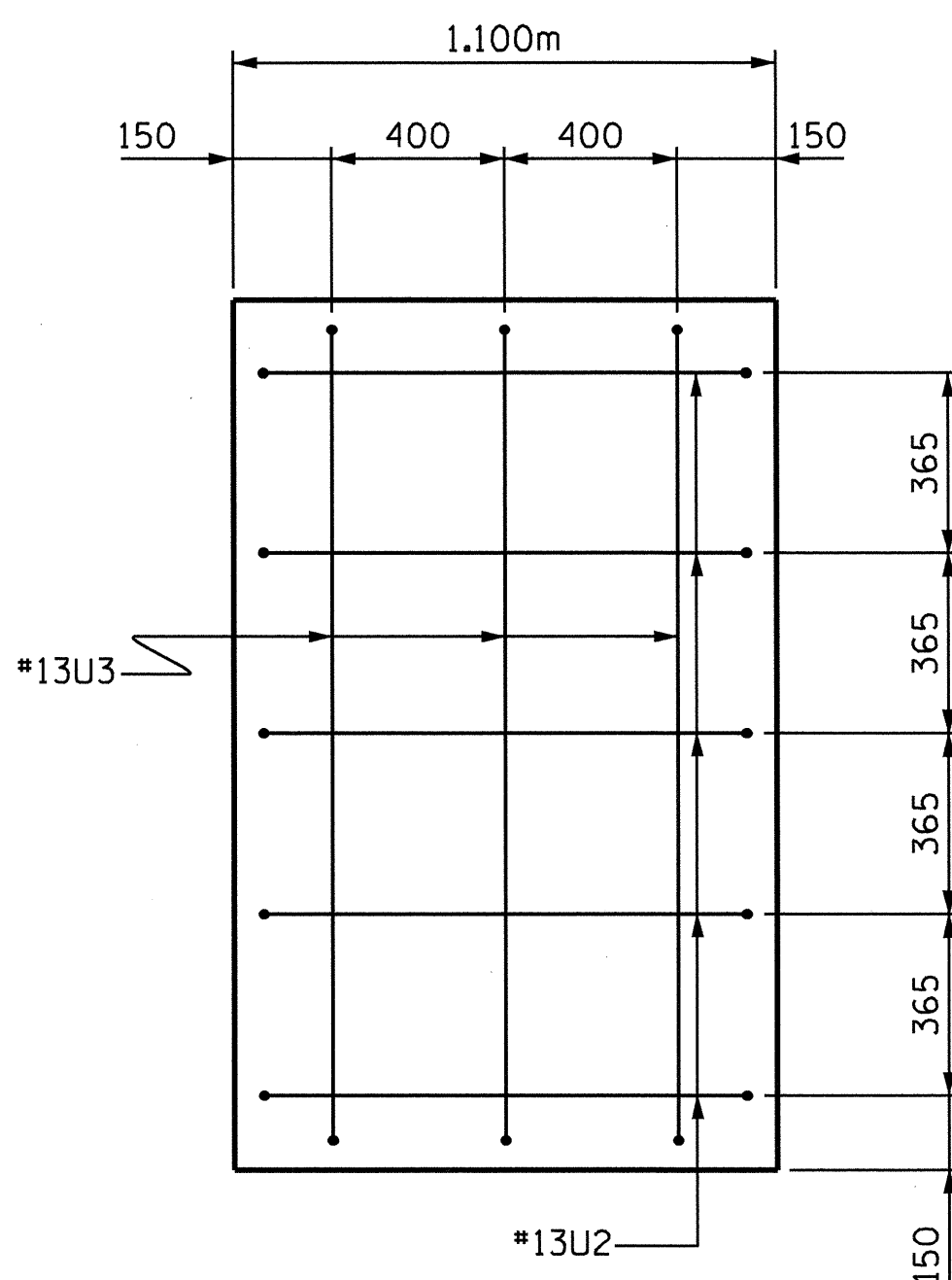
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cyarbrough



SECTION A-A

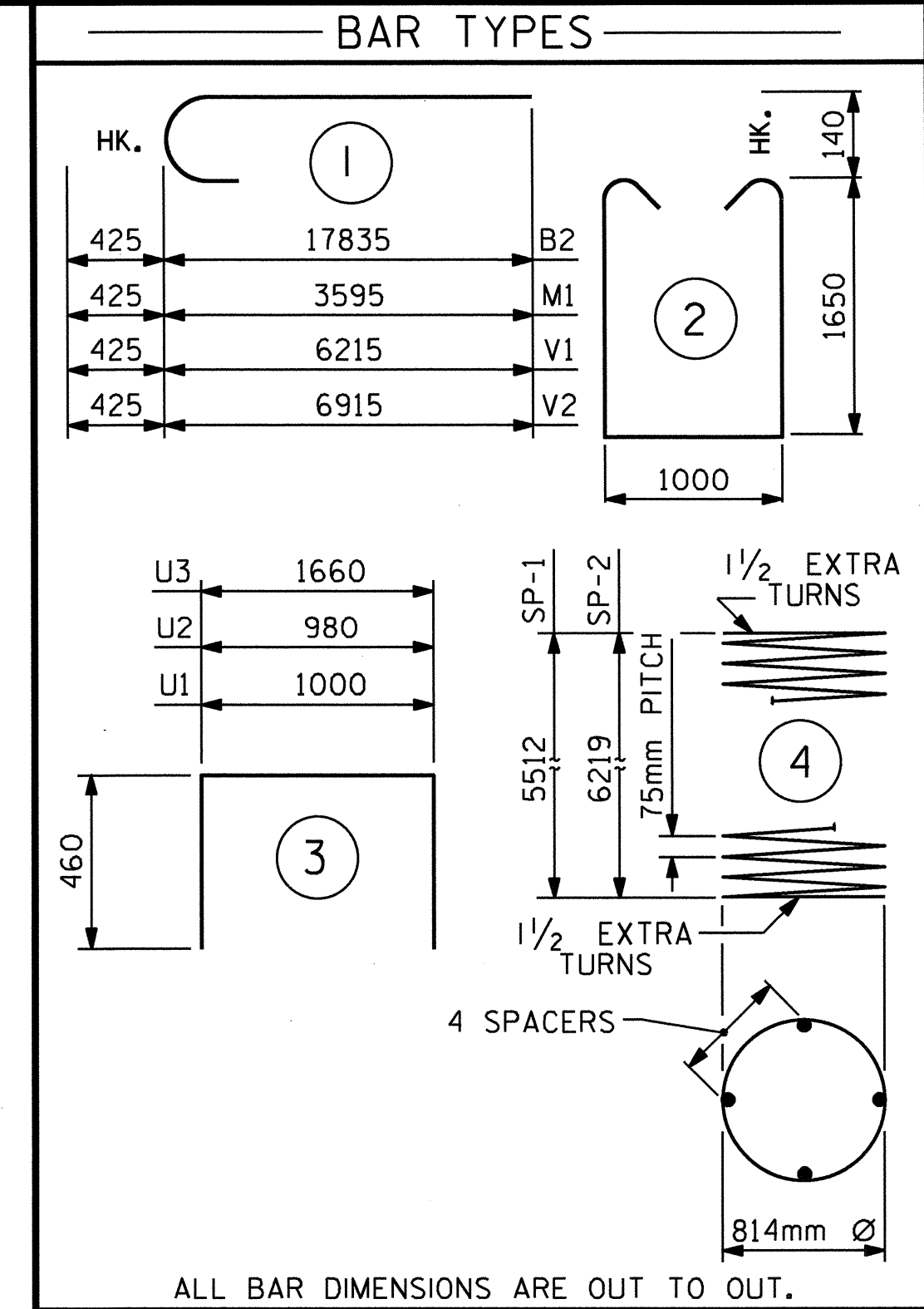


SECTION B-B



END VIEW

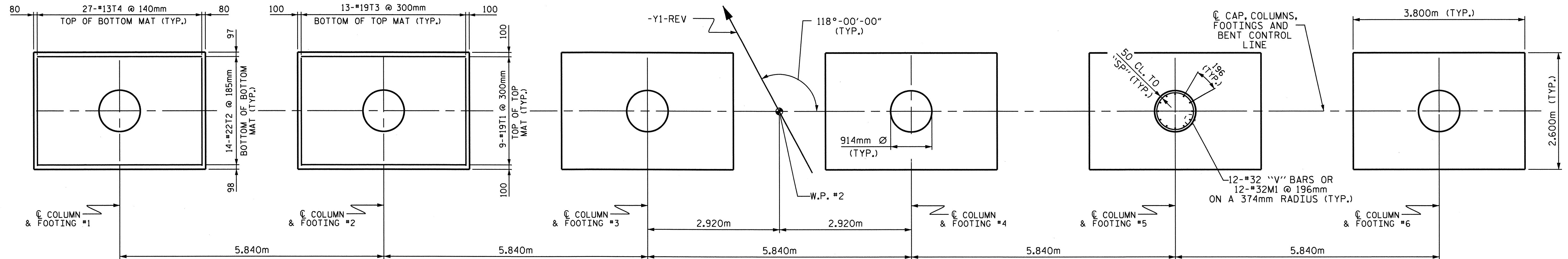
(TYP. EACH END)
50mm MIN. CONCRETE COVER FROM
END OF CAP REQUIRED FOR ALL #13U2 AND
AND #13U3 BARS. #13 U2 AND #13U3 MAY BE
SHIFTED UP TO 50mm TO CLEAR "B" BARS.



BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#32	STR	17360	1334
B2	12	#32	1	18260	1403
B3	20	#19	STR	16740	748
B4	12	#13	STR	6660	79
B5	18	#13	STR	3820	68
M1	72	#32	1	4020	1854
S1	97	#16	2	4580	689
T1	54	#19	STR	3700	447
T2	84	#22	STR	3700	945
T3	78	#19	STR	2500	436
T4	162	#13	STR	2500	403
U1	90	#13	3	1920	172
U2	10	#13	3	1860	18
U3	6	#13	3	2580	15
V1	36	#32	1	6640	1531
V2	36	#32	1	7340	1692
REINFORCING STEEL				=	11834 LBS
SP-1				3	* 4 192280
SP-2				3	* 4 216160
SP-1				3	* 4 192280
SP-2				3	* 4 216160
SPIRAL REINFORCING STEEL				=	1218
CLASS A CONCRETE					
POUR #1 FOOTINGS				CU. M.	49.8
POUR #2 COLUMNS				CU. M.	22.8
POUR #3 CAP				CU. M.	43.5
POUR #4 CAP				CU. M.	24.3
TOTAL				CU. M.	140.4
FOUNDATION EXCAVATION					LUMP SUM

ALL BAR DIMENSIONS ARE OUT TO OUT.

* THE SP-1 & SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #13 PLAIN OR DEFORMED BAR.



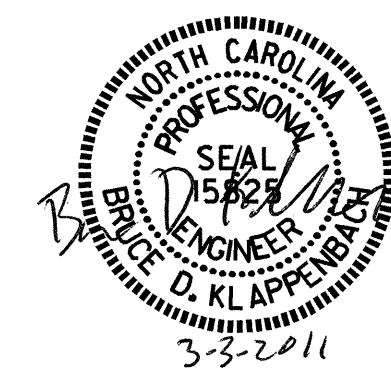
PLAN OF COULMNS AND FOOTINGS

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 221+70.114-L-REV.

SHEET 3 OF 3

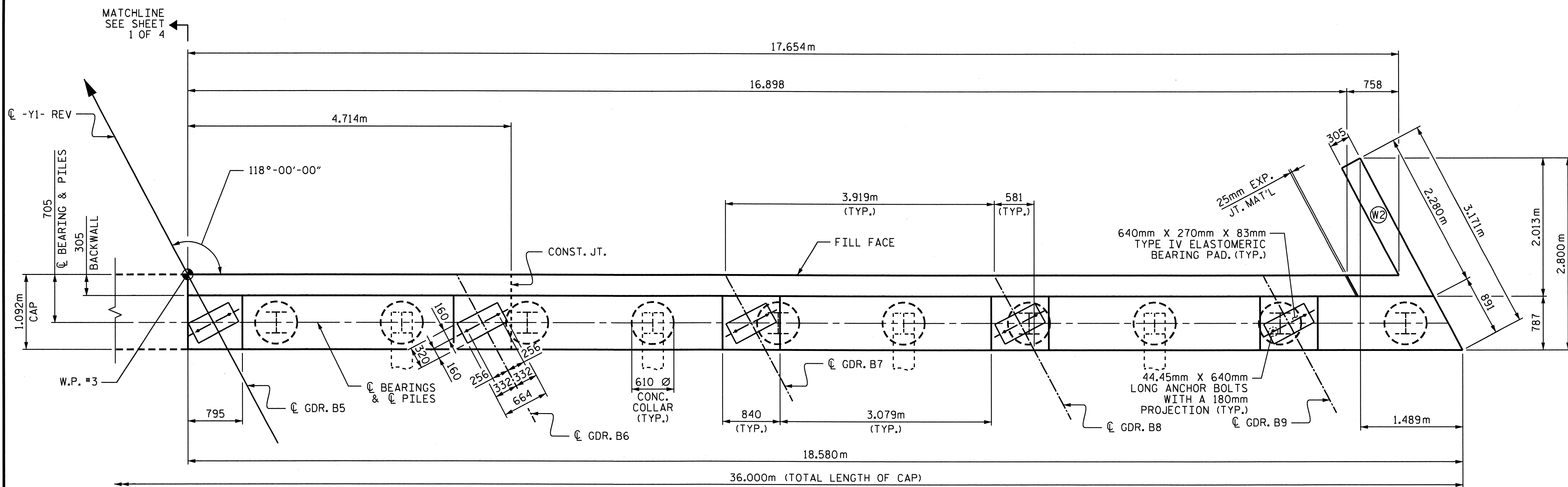
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT #1

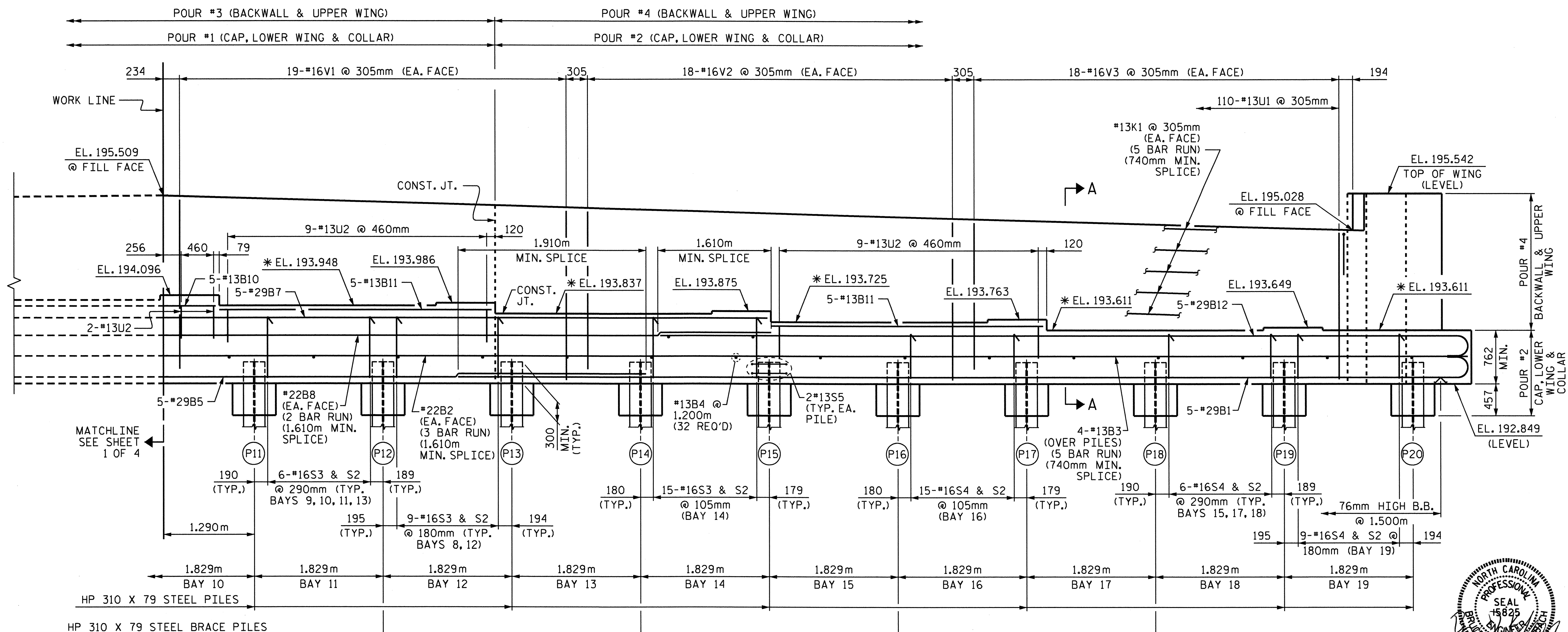


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			41

DRAWN BY: H. TOM BARBOUR DATE: 2-25-09
 CHECKED BY: C. R. YARBROUGH DATE: 12-10



PLAN



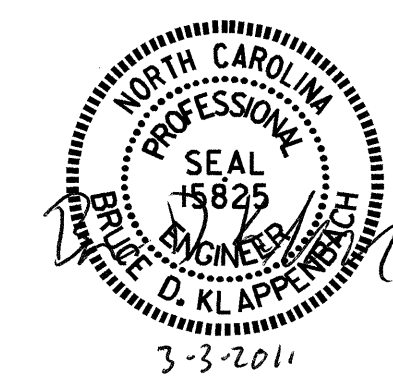
ELEVATION

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 221+70.114-L-REV

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

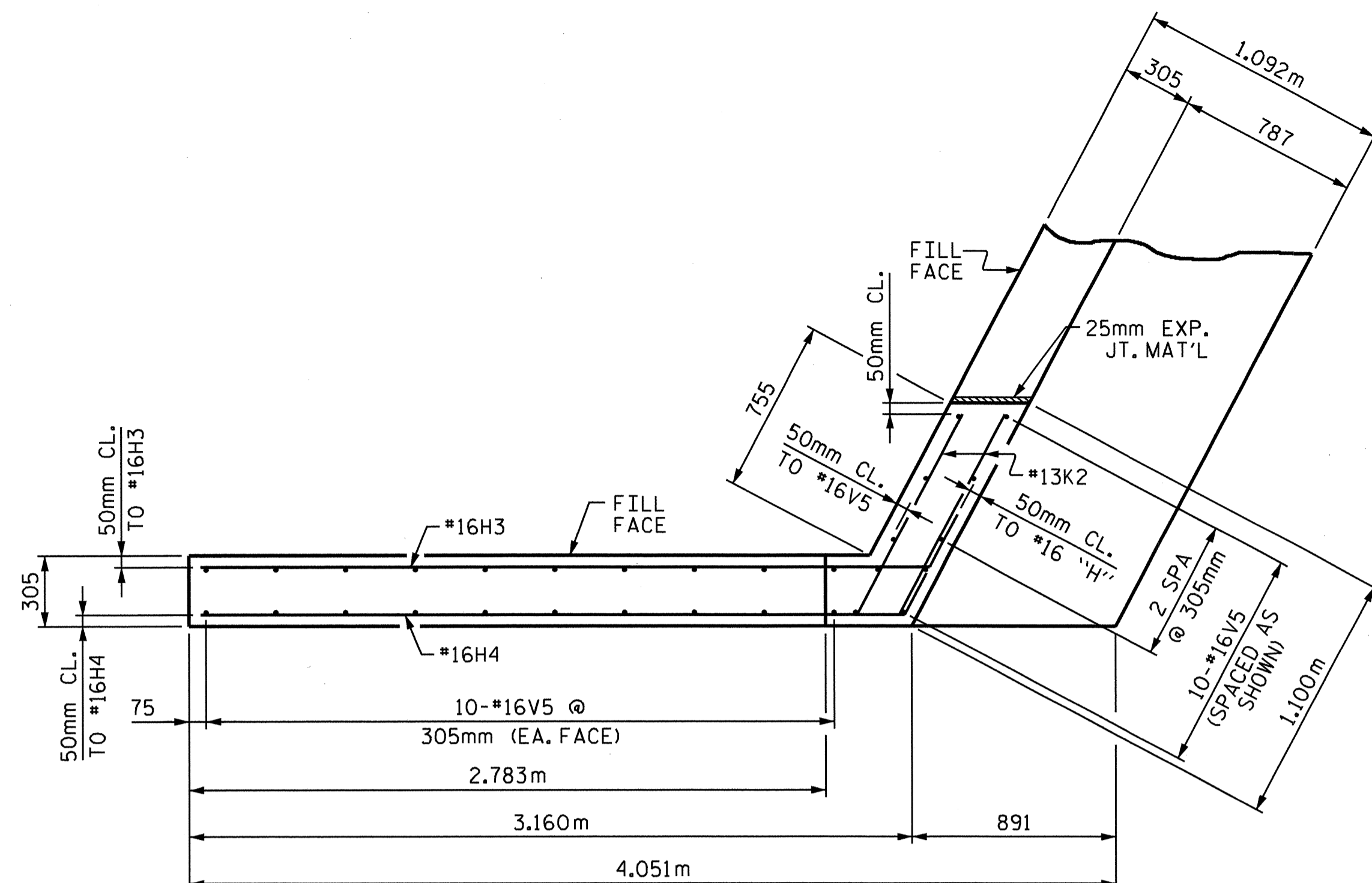
**SUBSTRUCTURE
 END BENT #2**



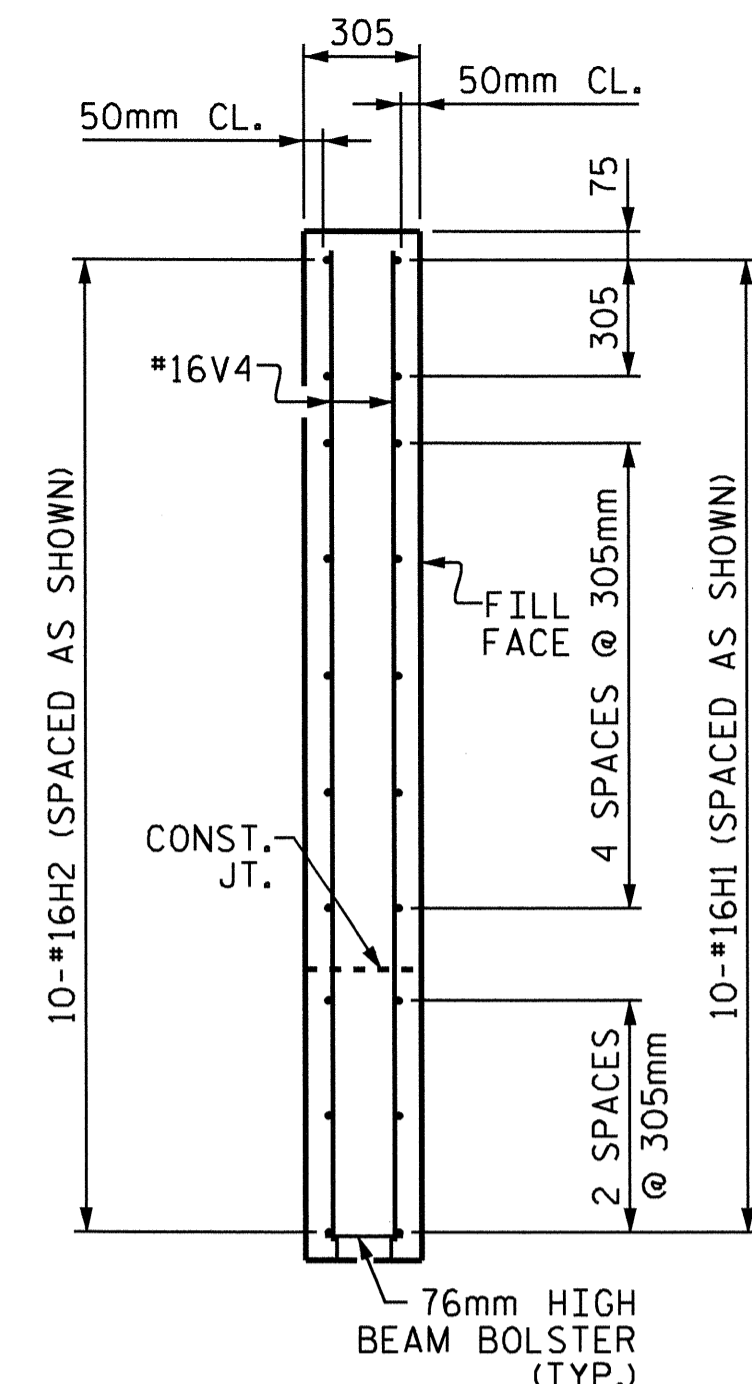
DRAWN BY: C.R. YARBROUGH DATE: 03/09
 CHECKED BY: M.G. SHAIKH DATE: 08/09

24-FEB-2011 15:27
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 cyarborough

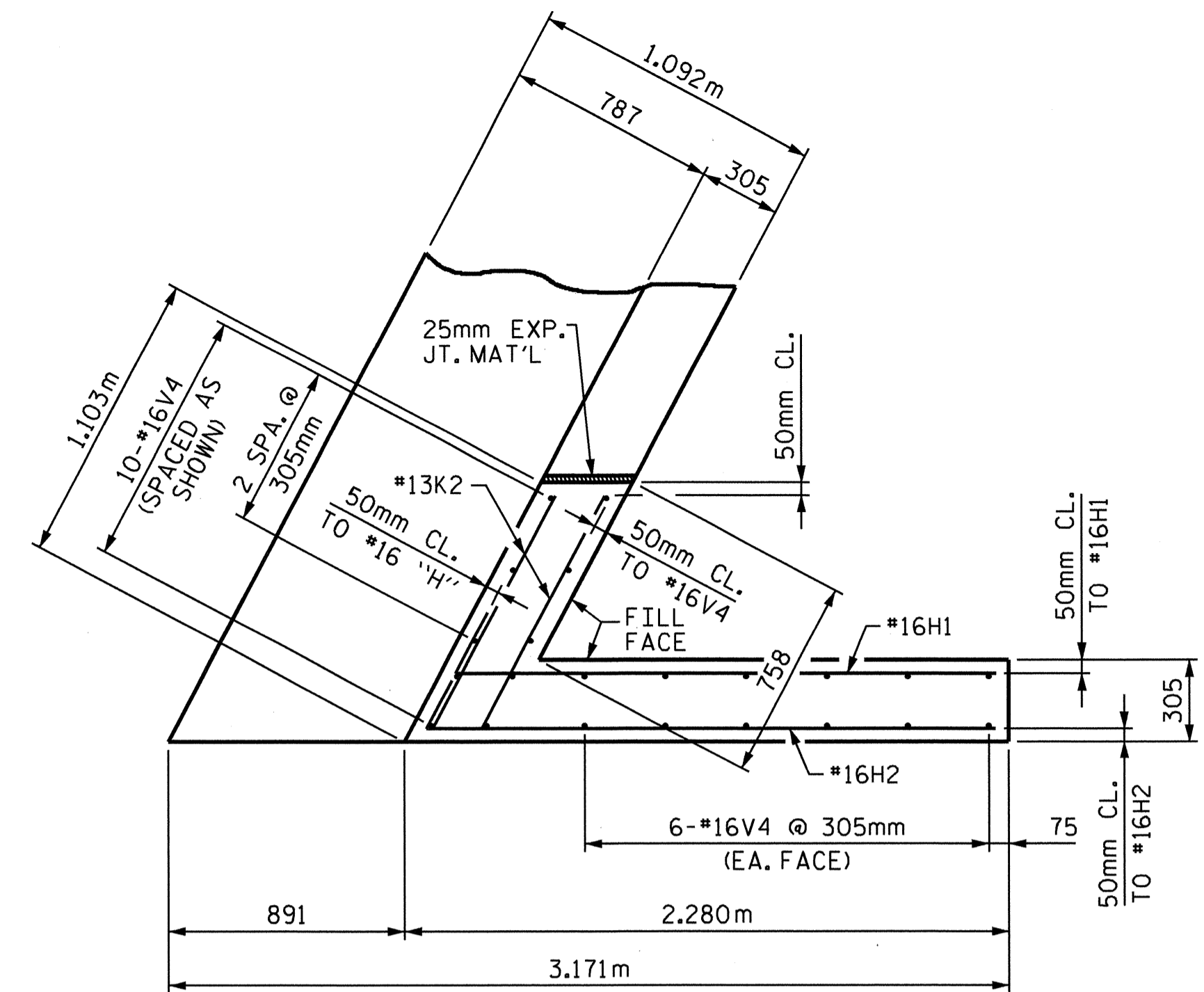
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-36	
1			3			TOTAL SHEETS	41
2			4				



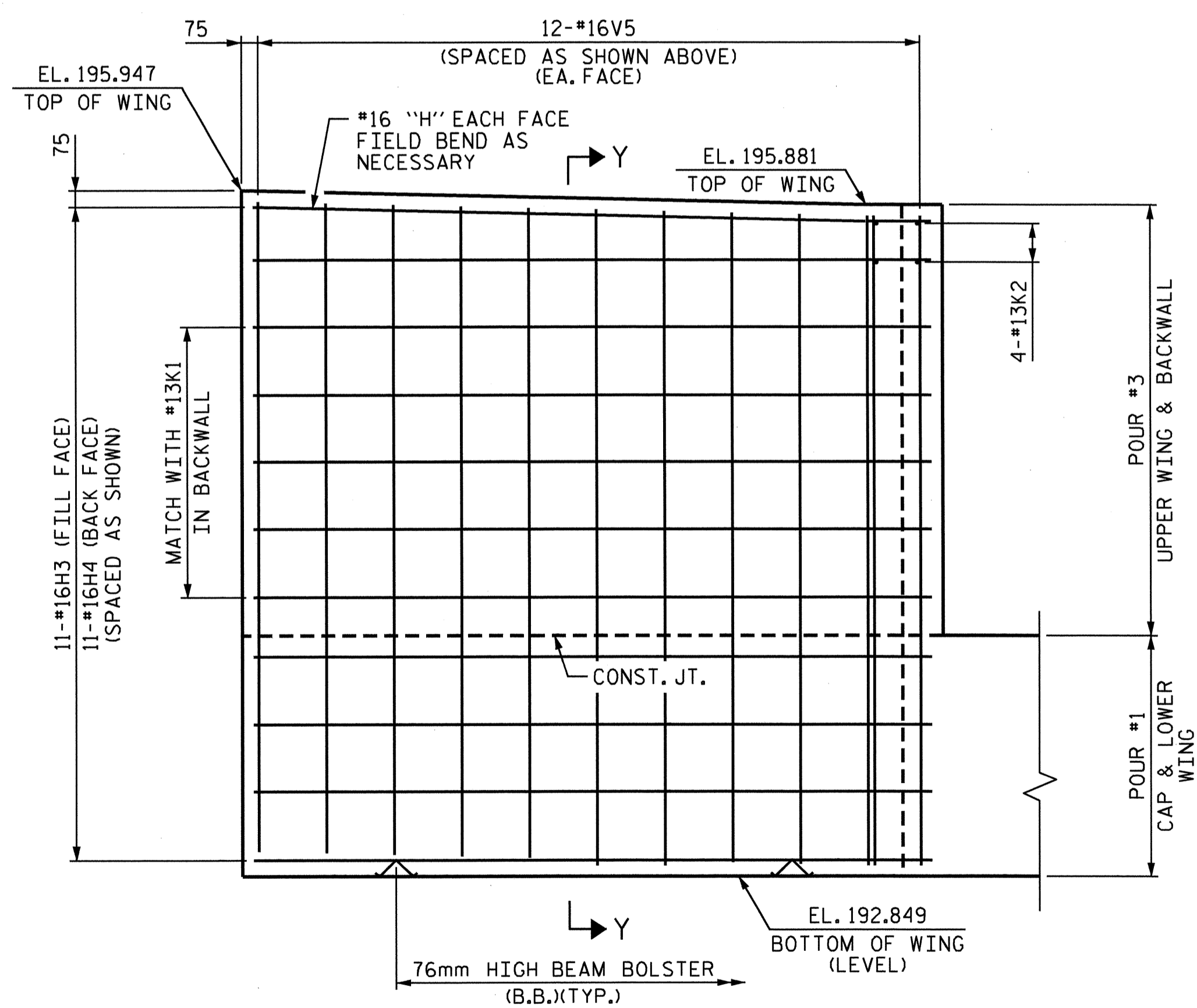
PLAN OF LEFT WING (W1)



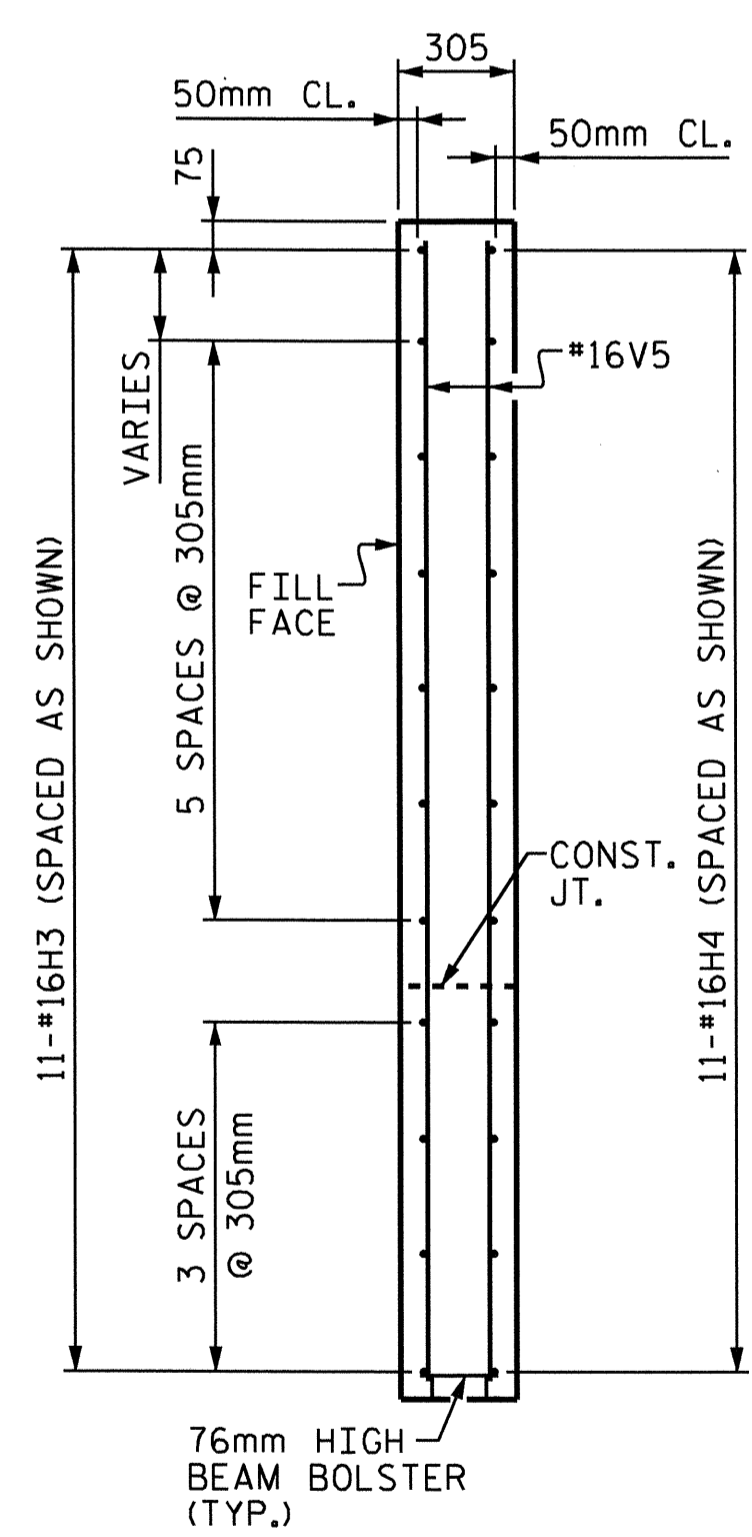
SECTION X-X



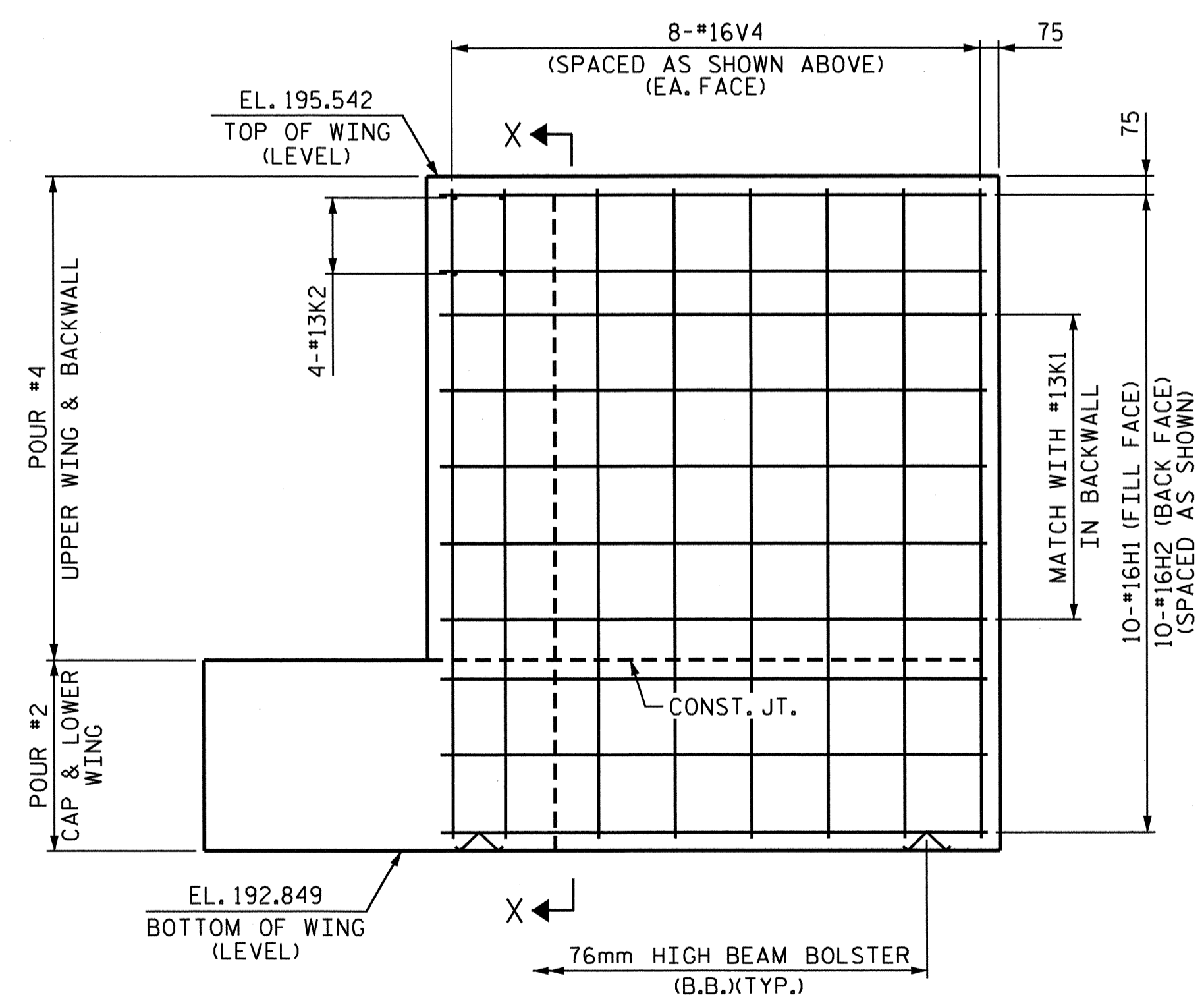
PLAN OF RIGHT WING (W2)



ELEVATION OF LEFT WING (W1)



SECTION Y-Y

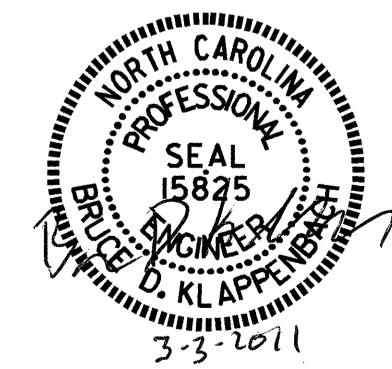


ELEVATION OF RIGHT WING (W2)

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 221+70.114-L-REV

SHEET 3 OF 4
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

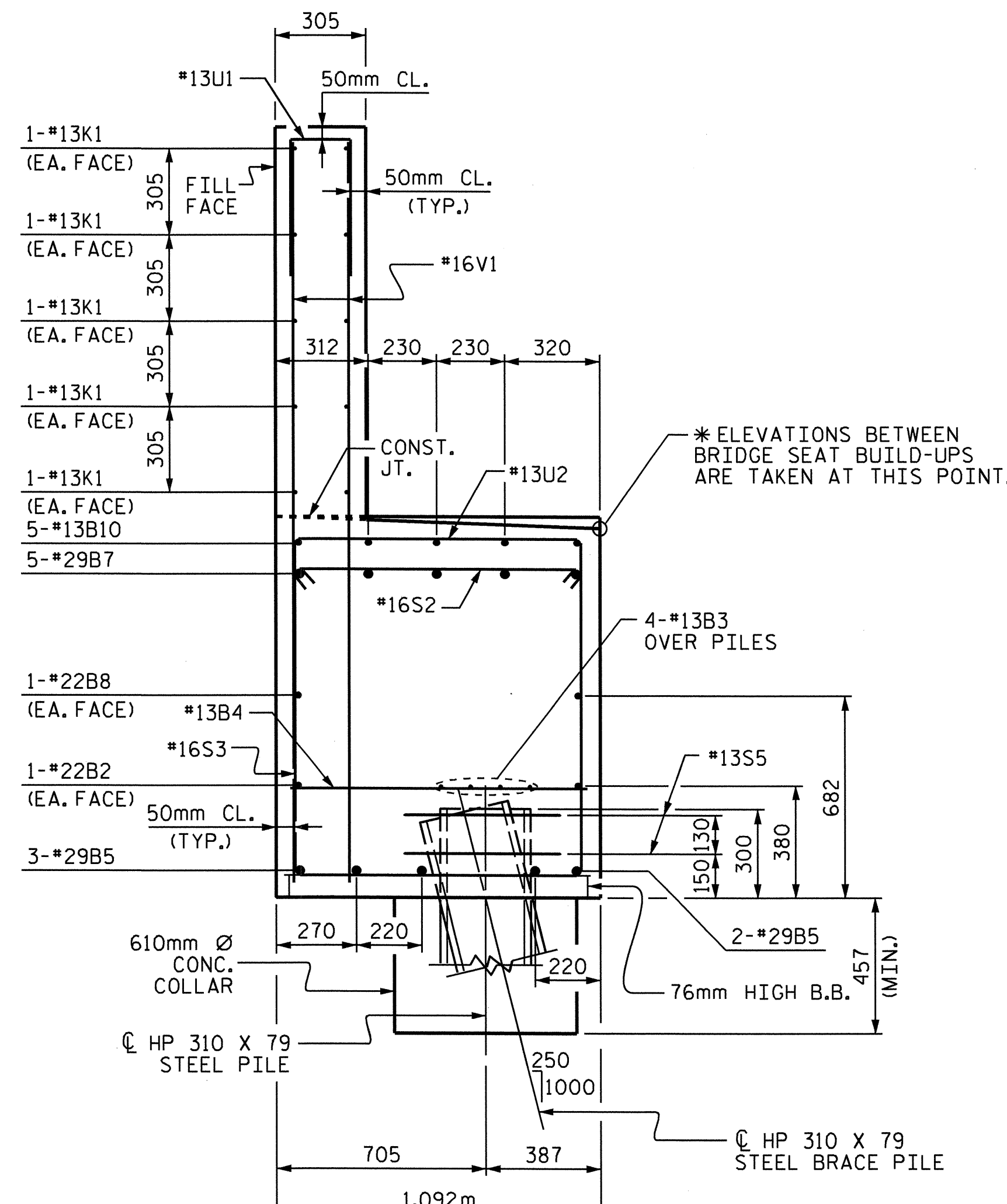
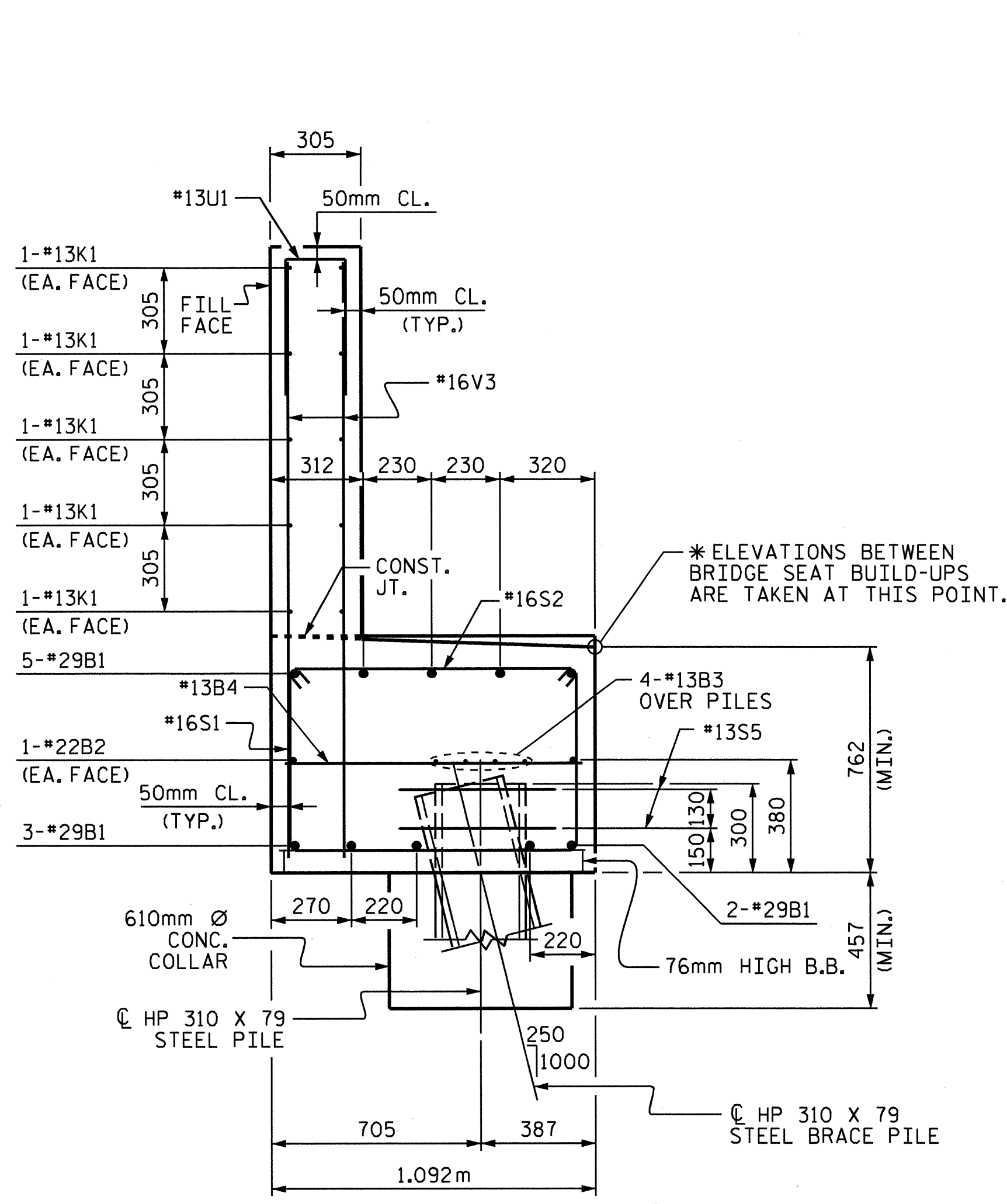
SUBSTRUCTURE
 END BENT #2



DRAWN BY: C.R. YARBROUGH DATE: 04/09
 CHECKED BY: M.G. SHAIKH DATE: 08/09

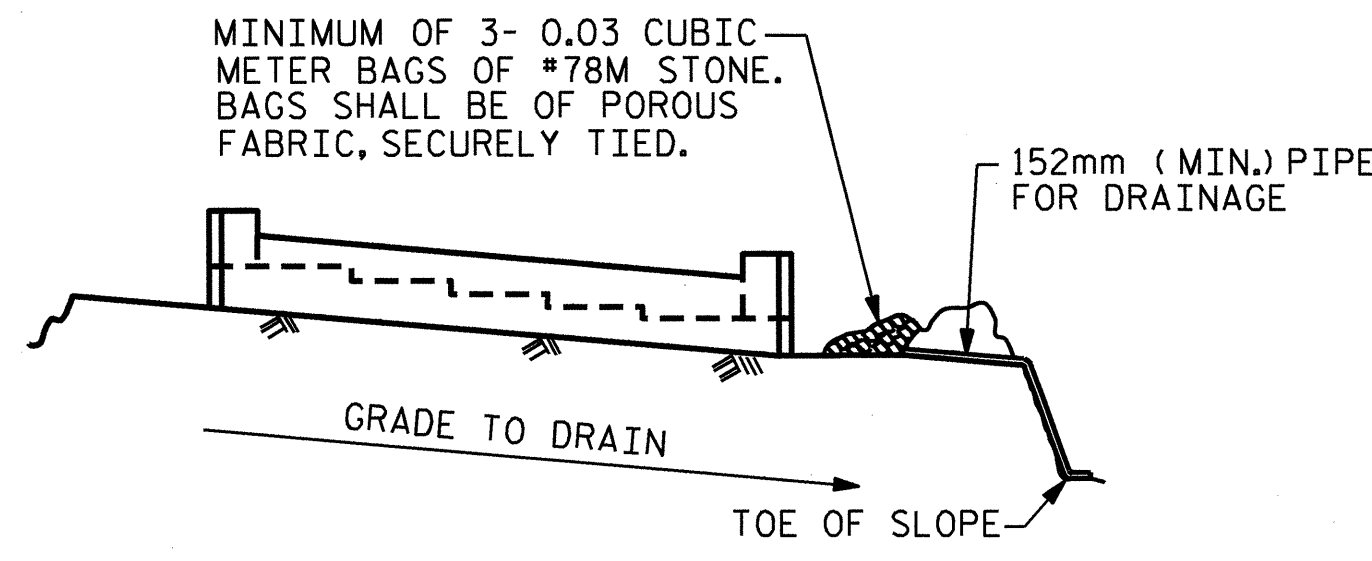
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 cyarbrough

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37	
1			3			TOTAL SHEETS	
2			4			41	



SECTION A-A

SECTION B-B



MINIMUM OF 3- 0.03 CUBIC METER BAGS OF #78M STONE. BAGS SHALL BE OF POROUS FABRIC, SECURELY TIED.

152mm (MIN.) PIPE FOR DRAINAGE

GRADE TO DRAIN

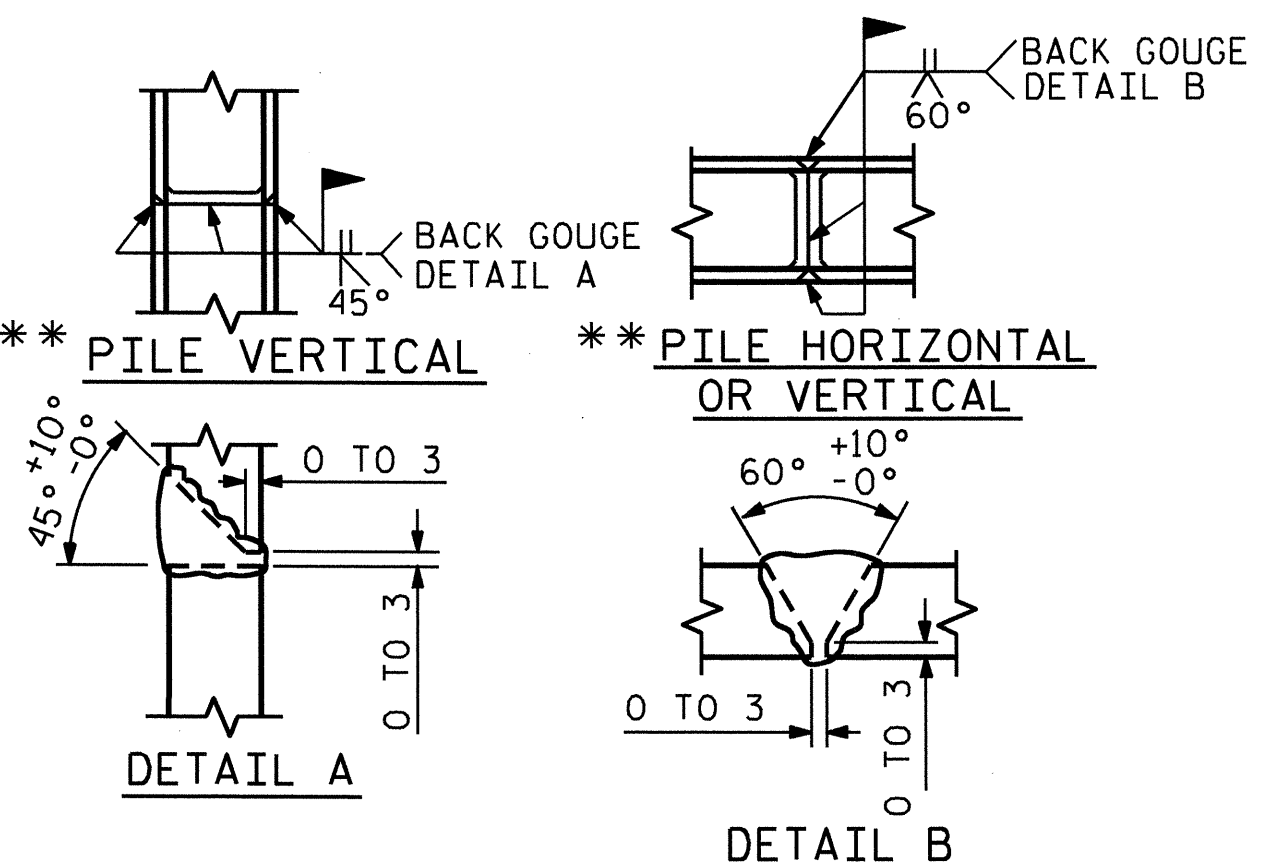
TOE OF SLOPE

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 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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT NO. 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#29	1	14120	714
B2	6	#22	STR	13040	238
B3	20	#13	STR	7780	155
B4	32	#13	STR	980	31
B5	5	#29	STR	13740	348
B6	5	#29	1	14300	362
B7	5	#29	STR	15220	385
B8	4	#22	STR	13820	168
B9	10	#13	STR	740	7
B10	5	#13	STR	4660	23
B11	10	#13	STR	3860	38
B12	5	#29	1	11880	301
H1	10	#16	4	2300	36
H2	10	#16	4	2400	37
H3	11	#16	5	3440	59
H4	11	#16	5	3340	57
K1	50	#13	STR	7780	387
K2	8	#13	STR	980	8
S1	63	#16	2	3200	313
S2	162	#16	3	1260	317
S3	57	#16	2	3020	267
S4	42	#16	2	2560	167
S5	40	#13	7	1980	79
V1	148	#16	STR	2400	551
V2	36	#16	STR	2240	125
V3	36	#16	STR	2080	116
V4	22	#16	STR	2580	88
V5	30	#16	STR	2920	136
U1	110	#13	6	1120	122
U2	37	#13	6	1900	70
REINFORCING STEEL				=	5705 KG
CLASS A CONCRETE BREAKDOWN					
POUR #1					
CAP, LOWER WING & COLLAR					27.7 CU. M.
POUR #2					
CAP, LOWER WING & COLLAR					17.4 CU. M.
POUR #3					
BACKWALL & UPPER WING					11.1 CU. M.
POUR #4					
BACKWALL & UPPER WING					7.0 CU. M.
TOTAL CLASS A CONCRETE					63.2 CU. M.
HP 310 X 79 STEEL PILES					
NO. 20					200 METERS

PROJECT NO. R-2533CC

CABARRUS COUNTY

STATION: 221+70.114-L-REV

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

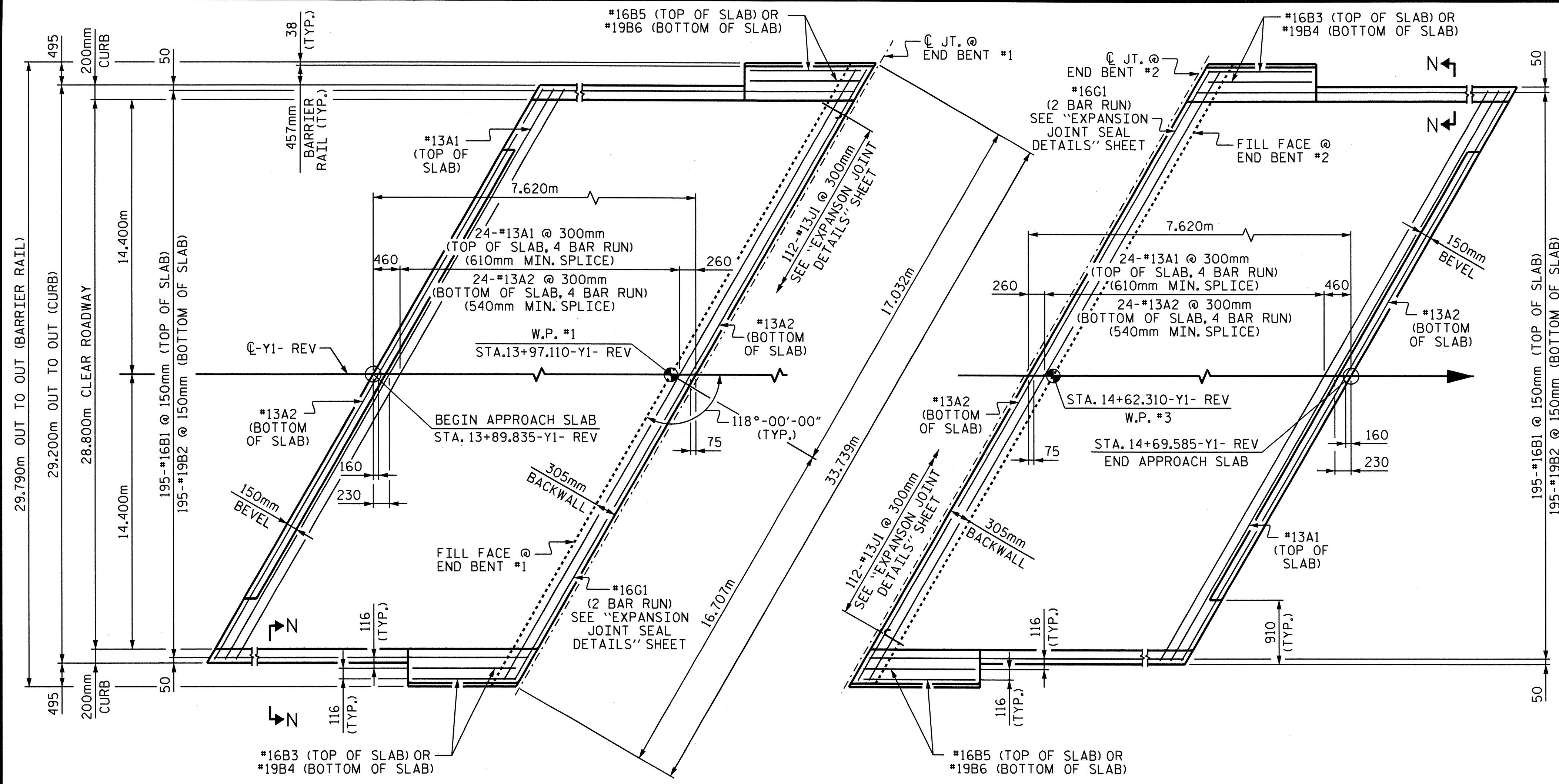
**SUBSTRUCTURE
END BENT #2**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			41

3-3-2011

DRAWN BY: C.R. YARBROUGH DATE: 04/09

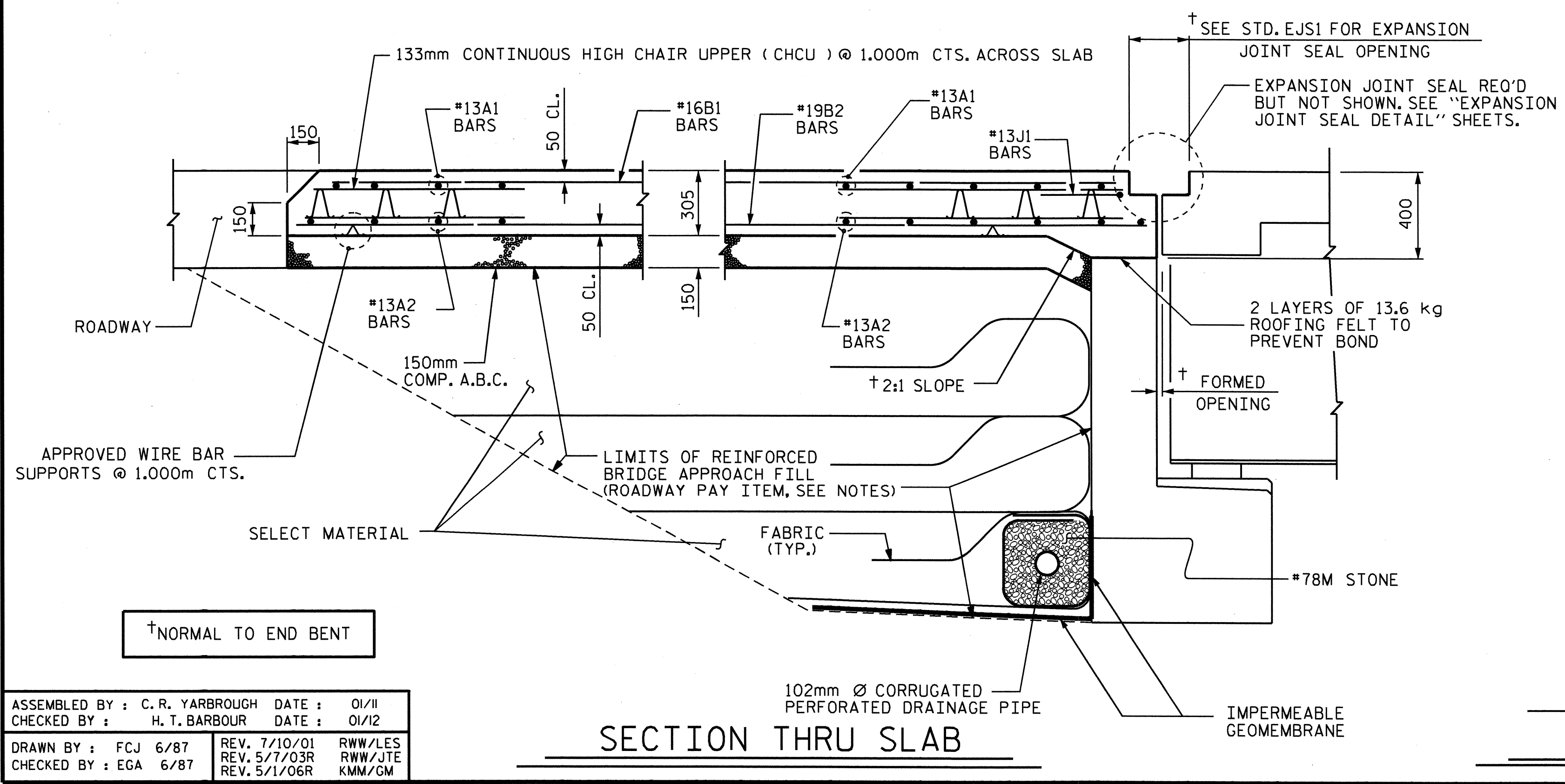
CHECKED BY: M.G. SHAIKH DATE: 08/09



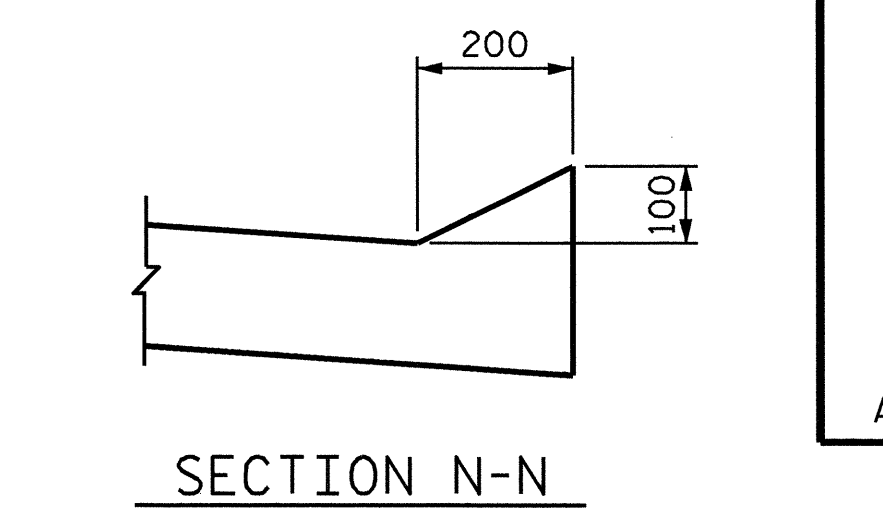
PLAN @ END BENT #1

PLAN @ END BENT #2

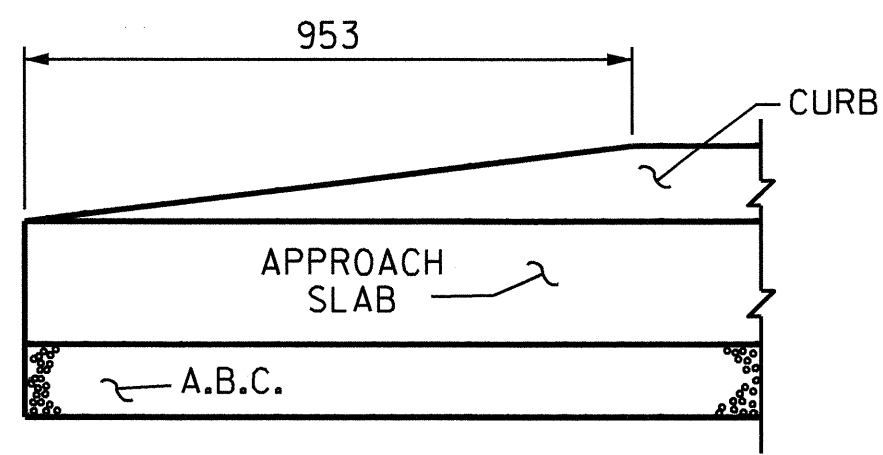
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



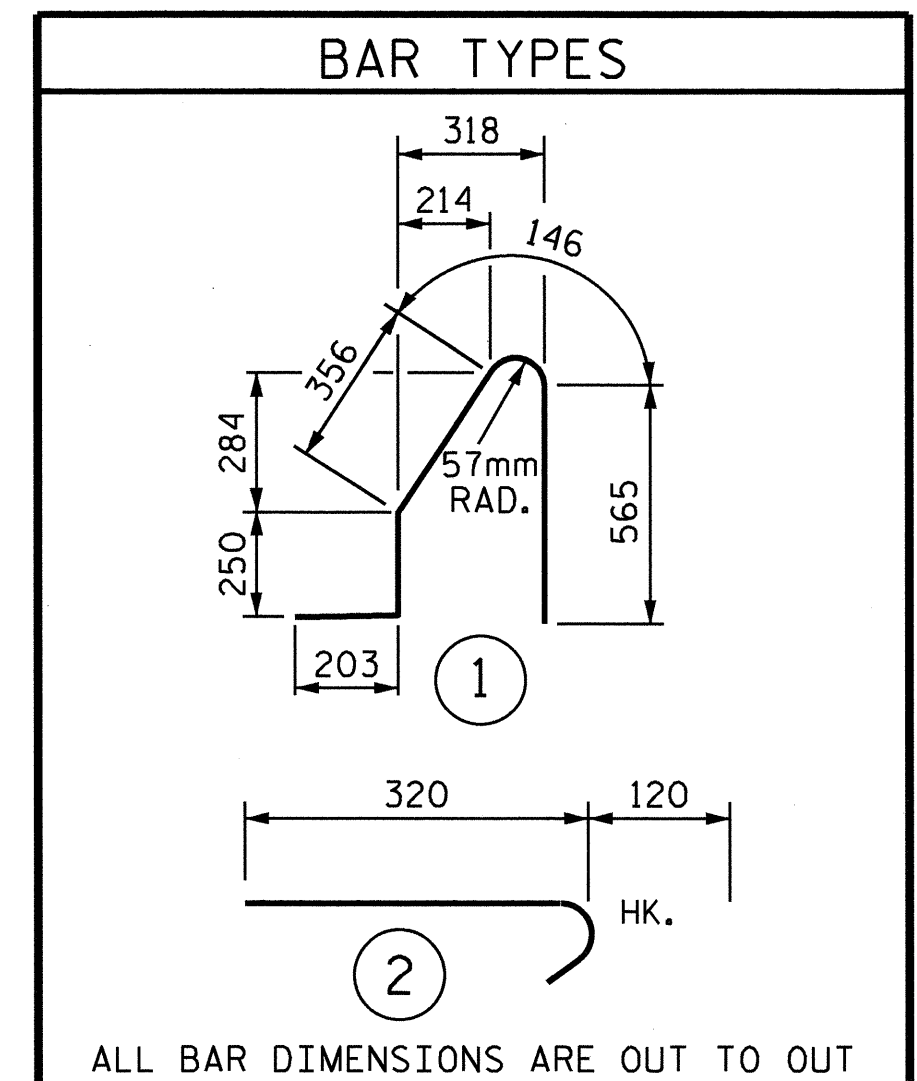
SECTION THRU SLAB



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER CURB DETAILS



ALL BAR DIMENSIONS ARE OUT TO OUT

NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 102mm 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 150mm COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 300mm OUTSIDE OF EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 100mm TYPE B-25.0B ASPHALT CONCRETE COURSE IN LIEU OF 150mm 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 125mm CLASS "A" CONCRETE BASE IN LIEU OF 150mm 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 13.6 kg 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 EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

THE LENGTH OF BARRIER RAIL ON THE APPROACH SLAB IS INCLUDED IN THE LINEAR METERS QUANTITY FOR THE CONCRETE BARRIER RAIL PAY ITEM. THE COST OF THE REINFORCING STEEL AND CLASS AA CONCRETE IN THE BARRIER RAIL ON THE APPROACH SLAB SHALL NOT BE INCLUDED IN THE LUMP SUM CONTRACT PRICE BID FOR BRIDGE APPROACH SLABS.

BILL OF MATERIAL

APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	100	#13	STR	8880	883
A2	104	#13	STR	8820	912
* B1	195	#16	STR	7260	2197
B2	195	#19	STR	7520	3277
* B3	2	#16	STR	2820	9
B4	2	#19	STR	2940	13
* B5	2	#16	STR	2960	9
B6	2	#19	STR	3080	14
* G1	2	#16	2	17220	54
* J1	112	#13	2	440	49
* S1	20	#16	1	1520	47
REINFORCING STEEL				kg.	4216
* EPOXY COATED REINFORCING STEEL				kg.	3248
CLASS AA CONCRETE				C.M.	69.5
APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	100	#13	STR	8880	883
A2	104	#13	STR	8820	912
* B1	195	#16	STR	7260	2197
B2	195	#19	STR	7520	3277
* B3	2	#16	STR	2820	9
B4	2	#19	STR	2940	13
* B5	2	#16	STR	2960	9
B6	2	#19	STR	3080	14
* G1	2	#16	2	17220	54
* J1	112	#13	2	440	49
* S1	20	#16	1	1520	47
REINFORCING STEEL				kg.	4216
* EPOXY COATED REINFORCING STEEL				kg.	3248
CLASS AA CONCRETE				C.M.	69.5

PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 221+70.114-L-REV.

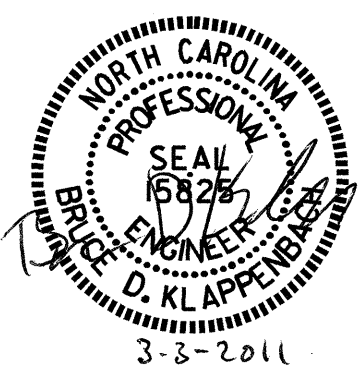
SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

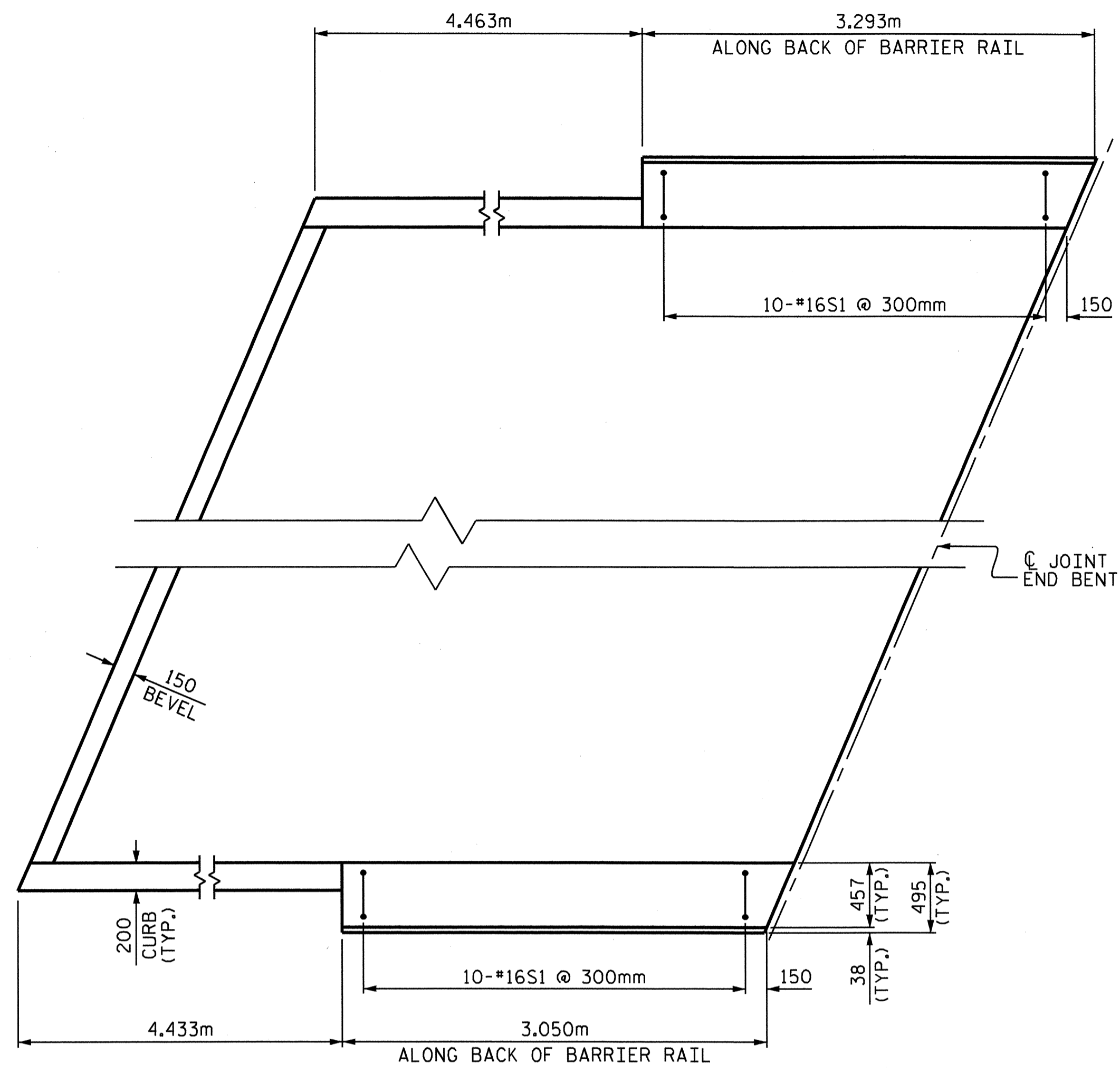
STANDARD
BRIDGE APPROACH SLAB
FOR FLEXIBLE PAVEMENT

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

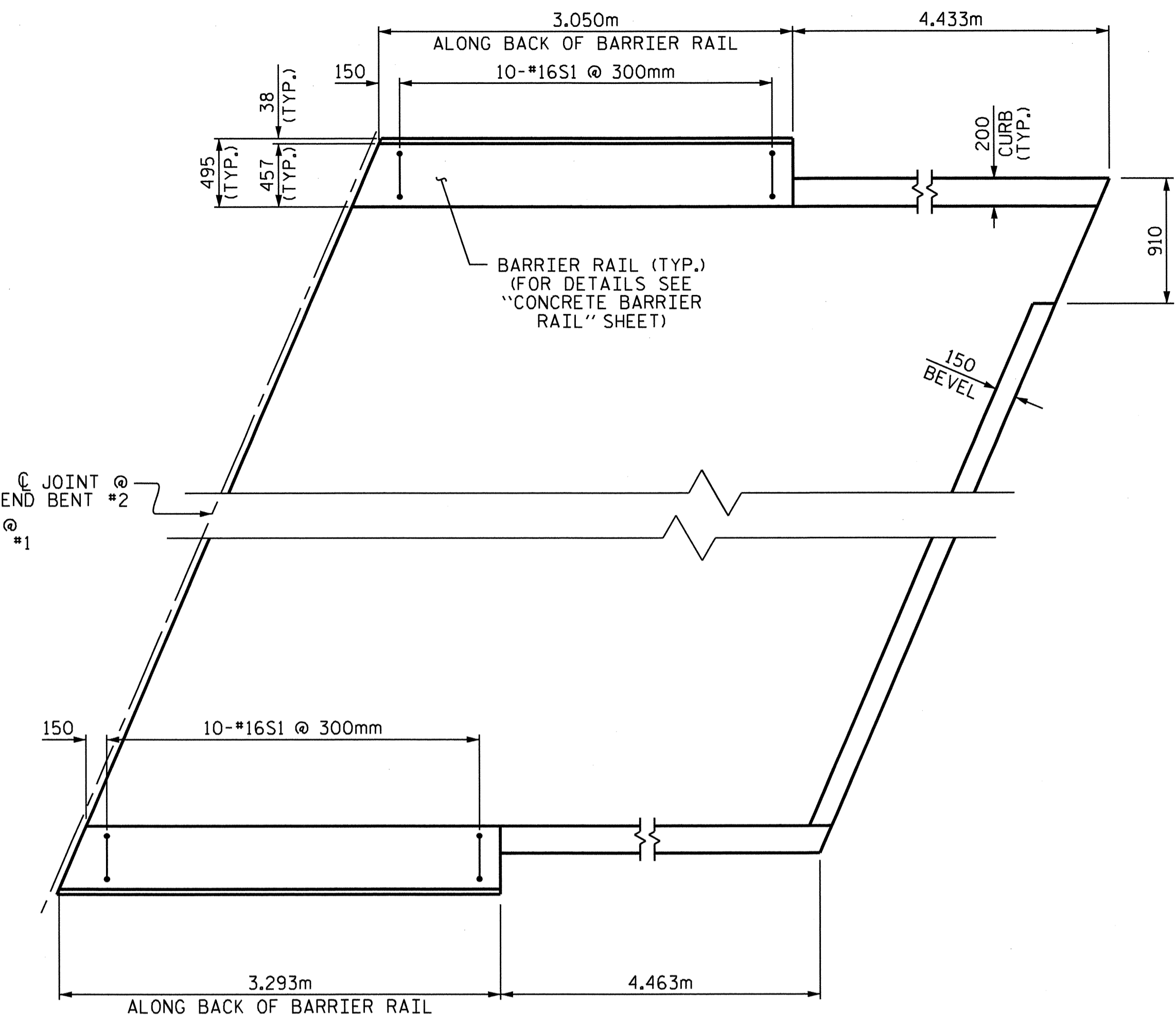
SHEET NO. S-40
TOTAL SHEETS 41



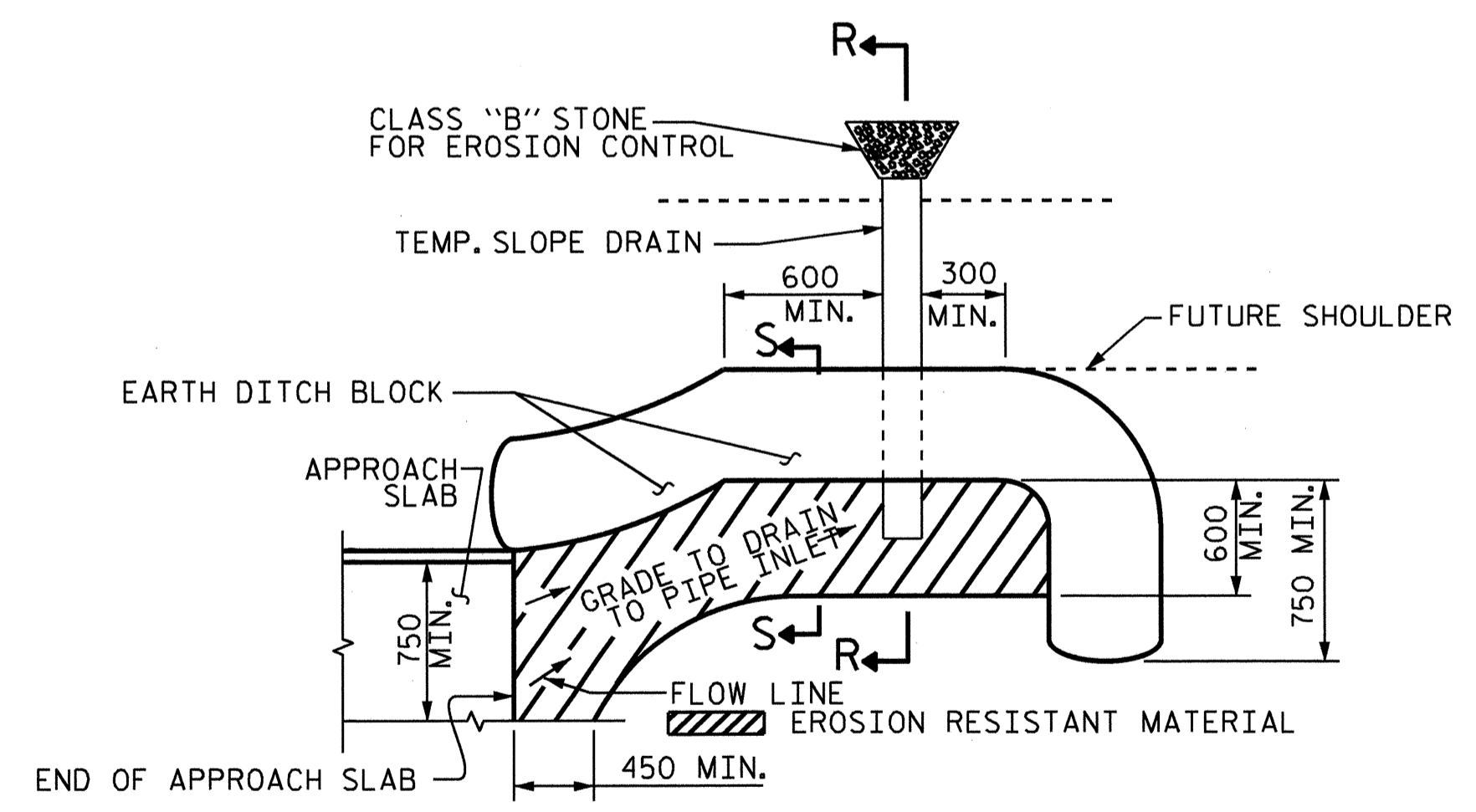
ASSEMBLED BY :	C. R. YARBROUGH	DATE :	01/11
CHECKED BY :	H. T. BARBOUR	DATE :	01/12
DRAWN BY :	FCJ 6/87	REV. 7/10/01	RWW/LES
CHECKED BY :	EGA 6/87	REV. 5/7/03R	RWW/JTE
		REV. 5/1/06R	KMM/GM



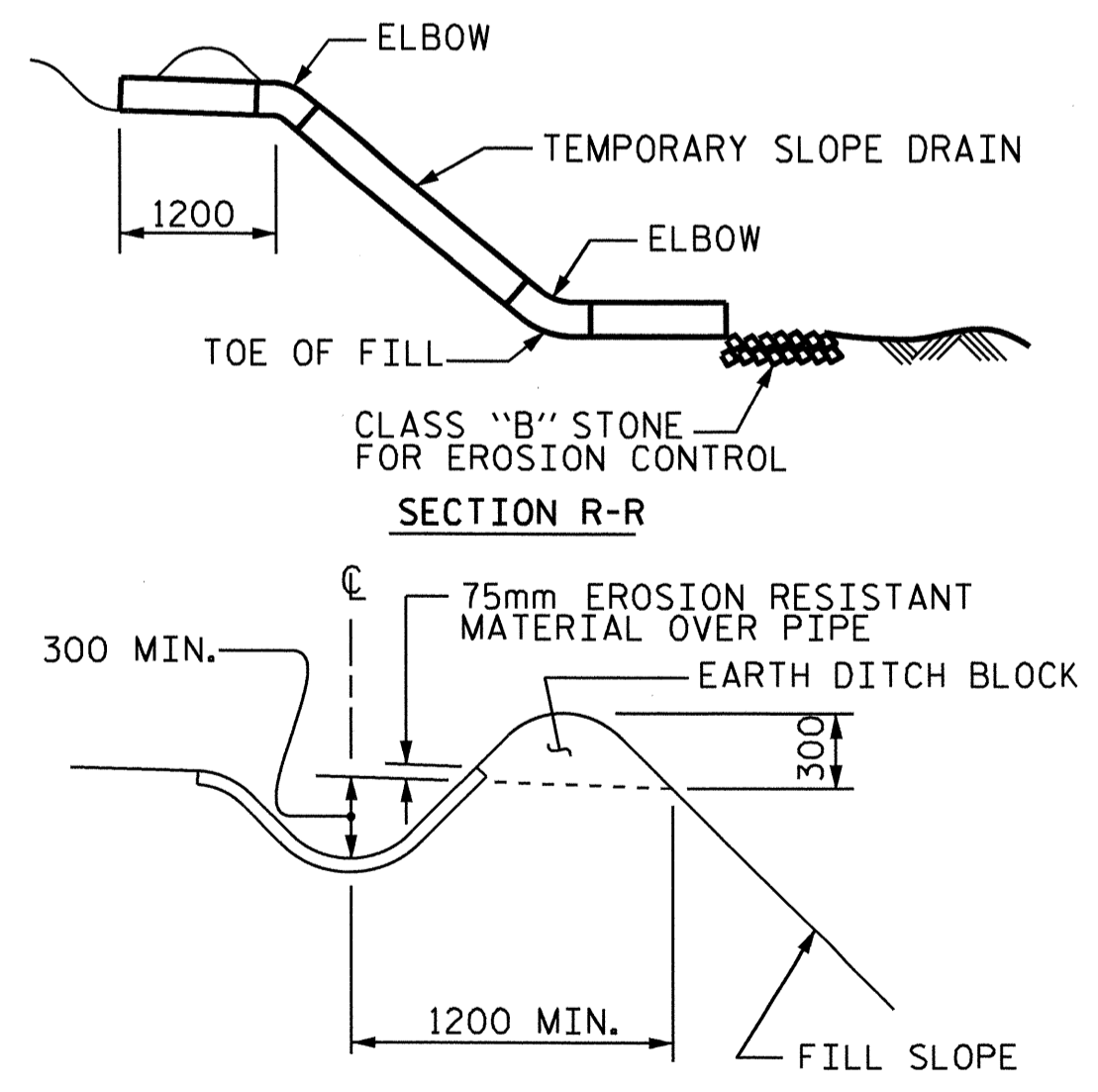
PLAN @ END BENT #1



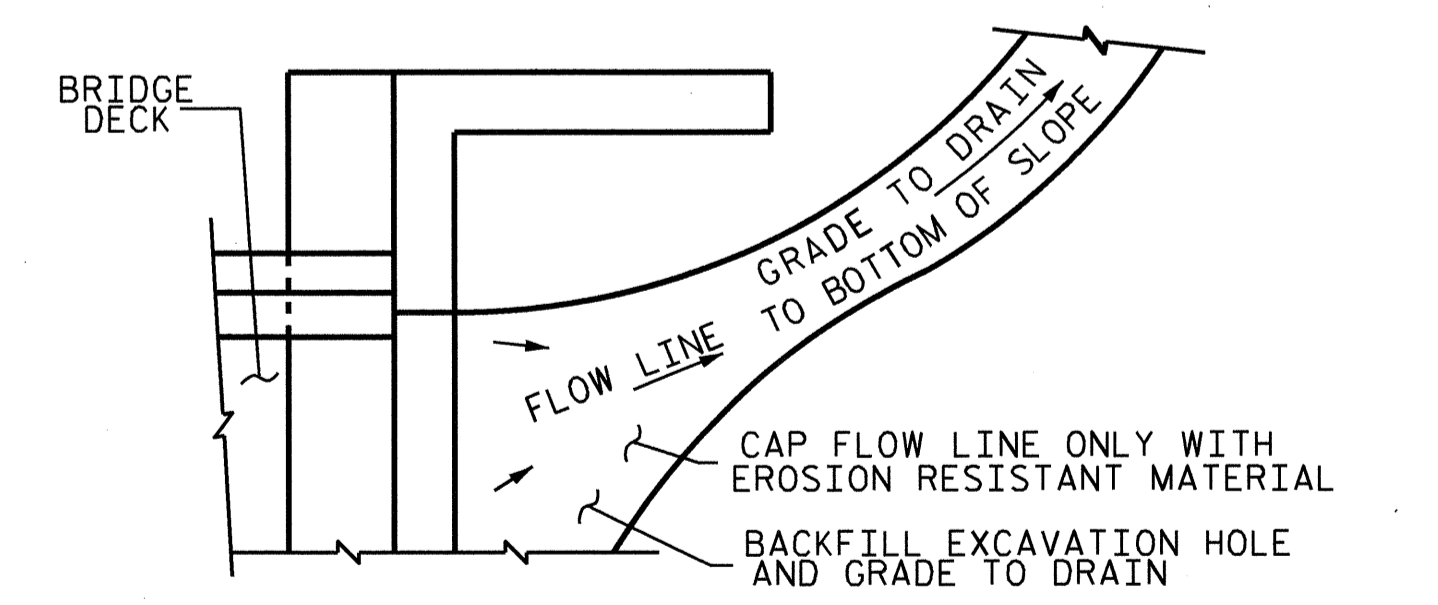
PLAN @ END BENT #2



PLAN VIEW



SECTION S-S



TEMPORARY DRAINAGE DETAIL

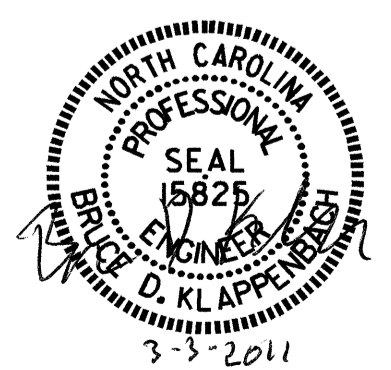
NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 50mm 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, 305mm IN DIAMETER.

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.

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 221+70.114-L-REV.

SHEET 2 OF 2

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



ASSEMBLED BY: C. R. YARBROUGH	DATE: 01/11
CHECKED BY: H. T. BARBOUR	DATE: 01/12
DRAWN BY: FCJ 11/88	REV. 10/17/00 RWW/JES
CHECKED BY: ARB 11/88	REV. 5/7/03 RWW/JTE
	REV. 5/10/06 MAA/KMM

TEMPORARY BERM AND SLOPE DRAIN DETAILS

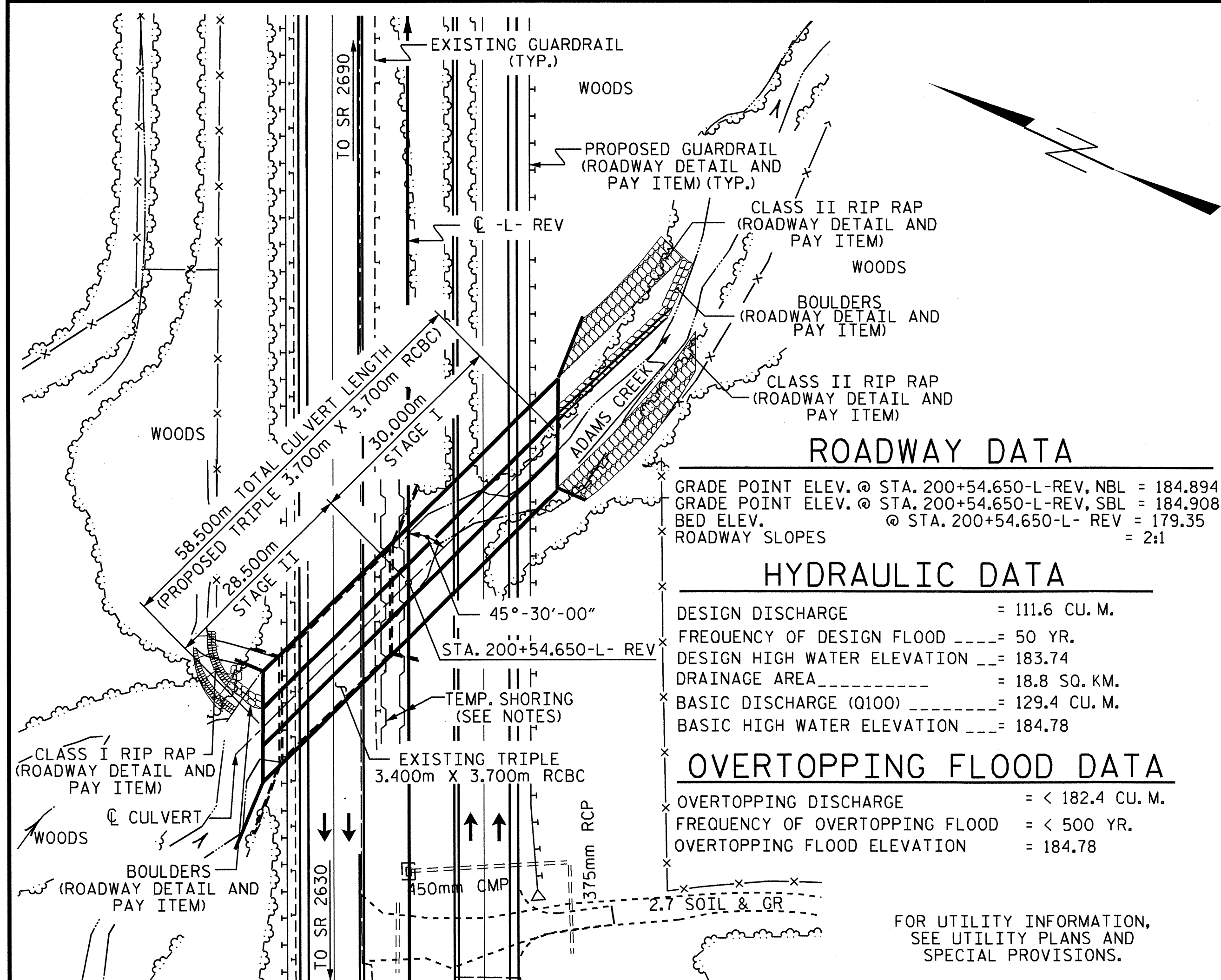
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41	
1			3			TOTAL SHEETS	41
2			4				

BENCH MARK #113 RAILROAD SPIKE IN BASE OF 375MM Ø TWIN SYCAMORE -L1- STA 199+91 (40 LT), EL 182.406

NOTES

F.A. PROJECT NO. NHS-0049(26)



ASSUMED LIVE LOAD -----MS18 OR ALTERNATE LOADING.
 DESIGN FILL-----MAX.2.07
 MIN. 0.73
 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
 ALL ELEVATIONS ARE IN METERS.
 FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
 76mm Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
 CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 21.0m. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

STEEL IN THE BOTTOM SLAB MAY BE SPICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION, HE MAY SPICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPICE LENGTH SHALL BE AS PROVIDED IN THE SPICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 360,000 kg OF REINFORCING STEEL, ONE 760mm SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 360,000kg OF REINFORCING STEEL, TWO 760mm SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

- STAGE I-
1. WING FOOTING AND FLOOR SLAB INCLUDING 100mm OF ALL VERTICAL WALLS OF BARREL 1.
 2. THE REMAINING PORTIONS OF THE WALLS OF BARREL 1 AND WING FULL HEIGHT.
 3. WING FOOTING AND FLOOR SLAB INCLUDING 100mm OF ALL VERTICAL WALLS OF BARRELS 2 AND 3.
 4. THE REMAINING PORTIONS OF THE WALLS OF BARRELS 2 AND 3 AND WING FULL HEIGHT FOLLOWED BY ROOF SLAB WITH HEADWALL AND EDGE BEAMS.

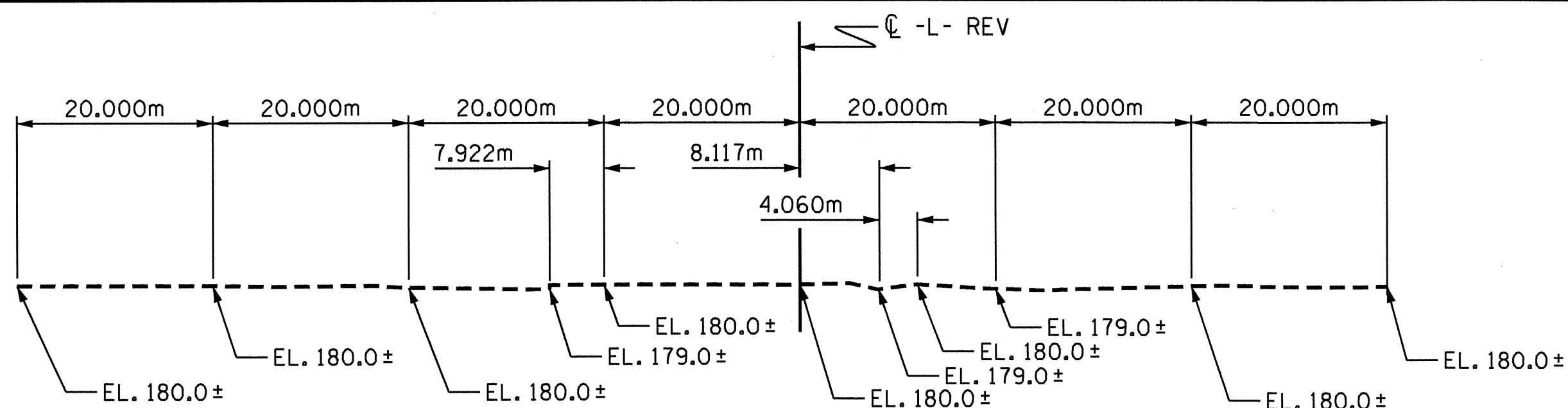
- STAGE II-
1. WING FOOTING AND FLOOR SLAB INCLUDING 100mm OF ALL VERTICAL WALLS OF BARREL 1.
 2. THE REMAINING PORTIONS OF THE WALLS OF BARREL 1 AND WING FULL HEIGHT.
 3. WING FOOTING AND FLOOR SLAB INCLUDING 100mm OF ALL VERTICAL WALLS OF BARRELS 2 AND 3.
 4. THE REMAINING PORTIONS OF THE WALLS OF BARRELS 2 AND 3 AND WING FULL HEIGHT FOLLOWED BY ROOF SLAB WITH HEADWALL AND EDGE BEAMS.
 5. SILL IN INLET END OF BARREL 1.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

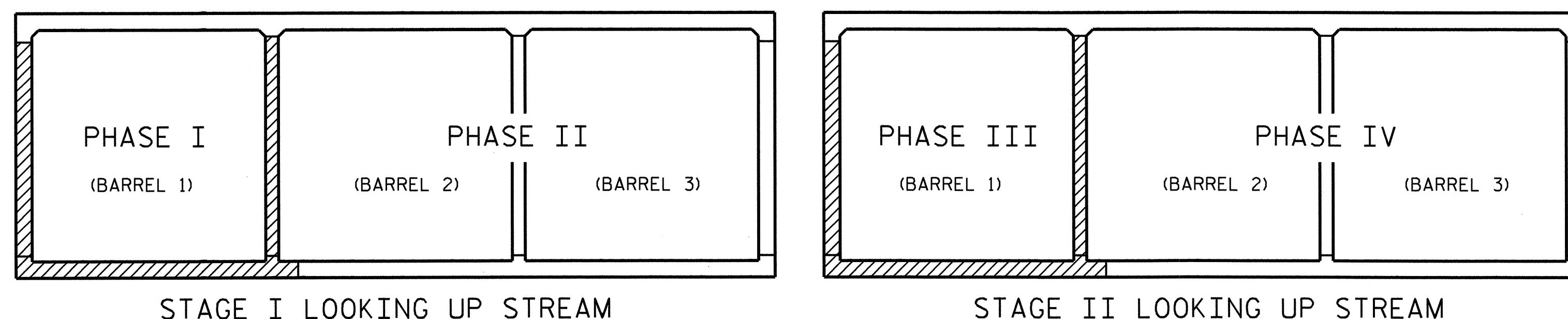
A 900mm STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

THE EXISTING TRIPLE BARREL 3.4m X 3.7m REINFORCED CONCRETE BOX CULVERT LOCATED AT THE SAME LOCATION AS THE PROPOSED CULVERT SHALL BE REMOVED.

LOCATION SKETCH



PROFILE ALONG C CULVERT



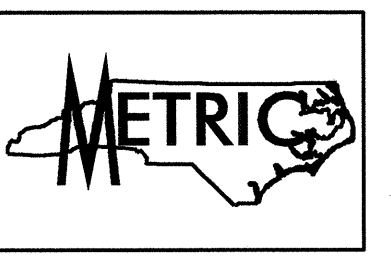
STAGE I LOOKING UP STREAM

STAGE II LOOKING UP STREAM

CONSTRUCTION STAGING

TOTAL STRUCTURE QUANTITIES

STAGE I CLASS A CONCRETE	
BARREL @ 11.89 m ³ /m	356.7 m ³
WINGS ETC.	34.7 m ³
SUBTOTAL	391.4 m ³
STAGE I REINFORCING STEEL	
BARREL	40780 kg
WINGS ETC.	1142 kg
SUBTOTAL	41922 kg
STAGE II CLASS A CONCRETE	
BARREL @ 11.89 m ³ /m	338.9 m ³
WINGS, SILL ETC.	35.2 m ³
SUBTOTAL	374.1 m ³
STAGE II REINFORCING STEEL	
BARREL	38778 kg
WINGS ETC.	1142 kg
SUBTOTAL	39920 kg
TOTAL CLASS A CONCRETE	765.5 m ³
TOTAL REINFORCING STEEL	81842 kg
CULVERT EXCAVATION ----- LUMP SUM	
FOUNDATION COND. MAT'L ----	METRIC TONS
STAGE I	242.0 METRIC TONS
STAGE II	230.0 METRIC TONS
TOTAL	472.0 METRIC TONS
REMOVAL OF EXISTING STRUCTURE LUMP SUM	



PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 200+54.650-L-REV

SHEET 1 OF 10 REPLACES CULVERT No. C97

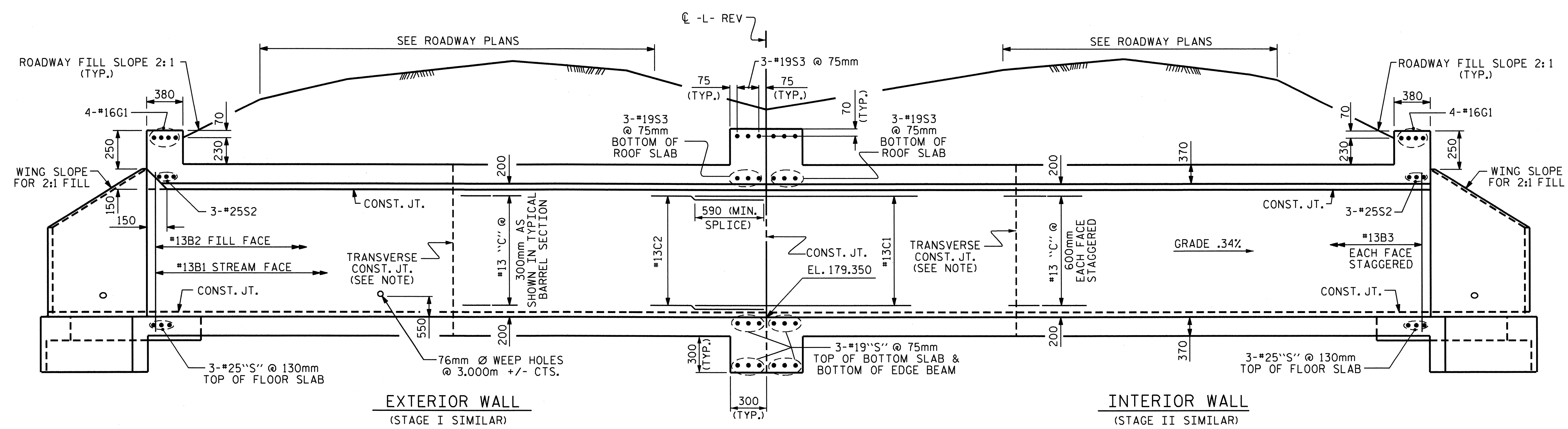
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

TRIPLE 3.700m X 3.700m
 CONCRETE BOX CULVERT
 45°-30'-00" SKEW



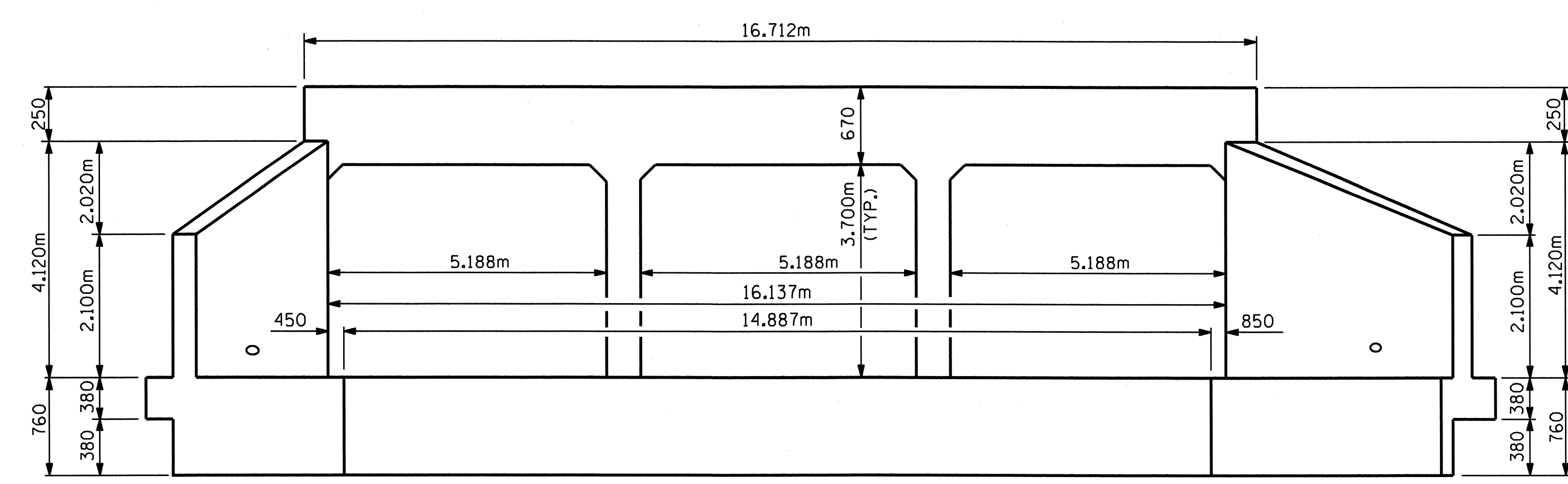
ASSEMBLED BY : H. T. BARBOUR DATE : 2-26-10
 CHECKED BY : C. R. YARBROUGH DATE : 1-3-1
 DRAWN BY : EEM 6/97
 CHECKED BY : ARB 7/97

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-1
1			3			TOTAL SHEETS 42
2			4			

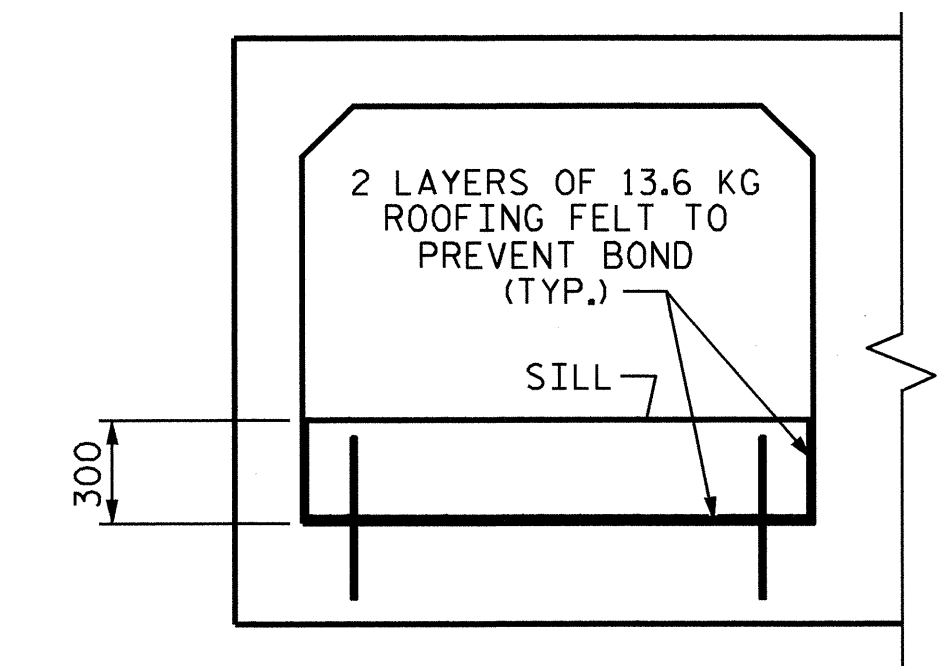


STAGE II CULVERT SECTION NORMAL TO ROADWAY

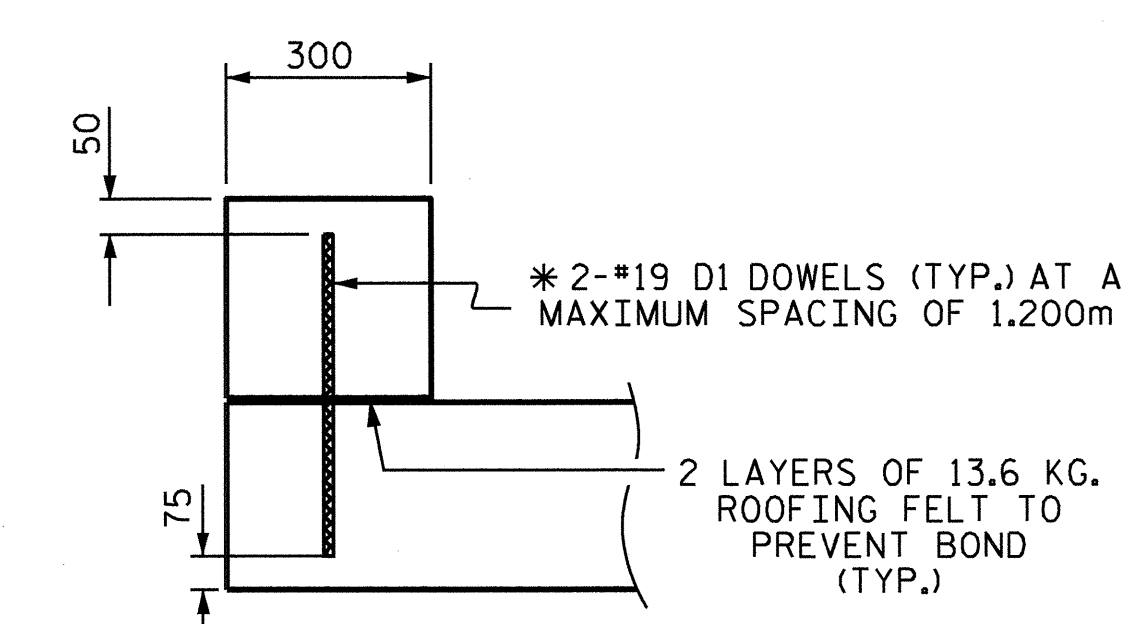
STAGE I CULVERT SECTION NORMAL TO ROADWAY



OUTLET END ELEVATION NORMAL TO SKEW



ELEVATION
(INLET END BARREL 1 STAGE II)



SECTION THROUGH SILL
 * DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 200+54.650-L-REV

SHEET 2 OF 10

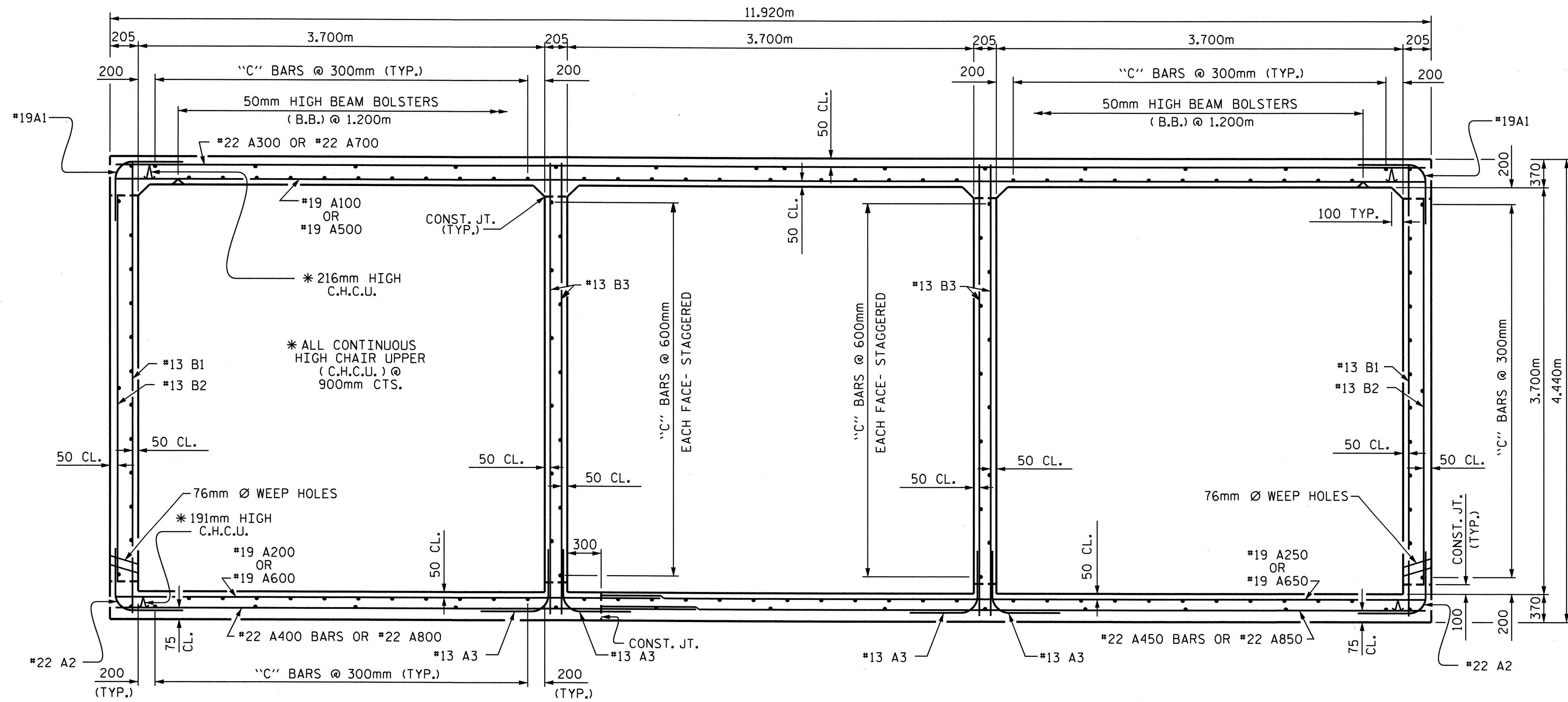
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

TRIPLE 3.700m X 3.700m
 CONCRETE BOX CULVERT
 45°-30'-00" SKEW



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2	
1			3			TOTAL SHEETS	42
2			4				

DRAWN BY: H. T. BARBOUR DATE: 2-26-10
 CHECKED BY: C. R. YARBROUGH DATE: 1-3-11



RIGHT ANGLE SECTION OF BARREL

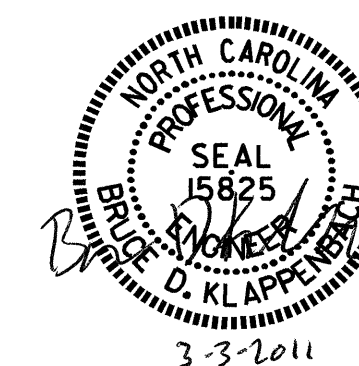
THERE ARE 148 "C" BARS IN SECTION OF BARREL.

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 200+54.650-L-REV

SHEET 3 OF 10

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

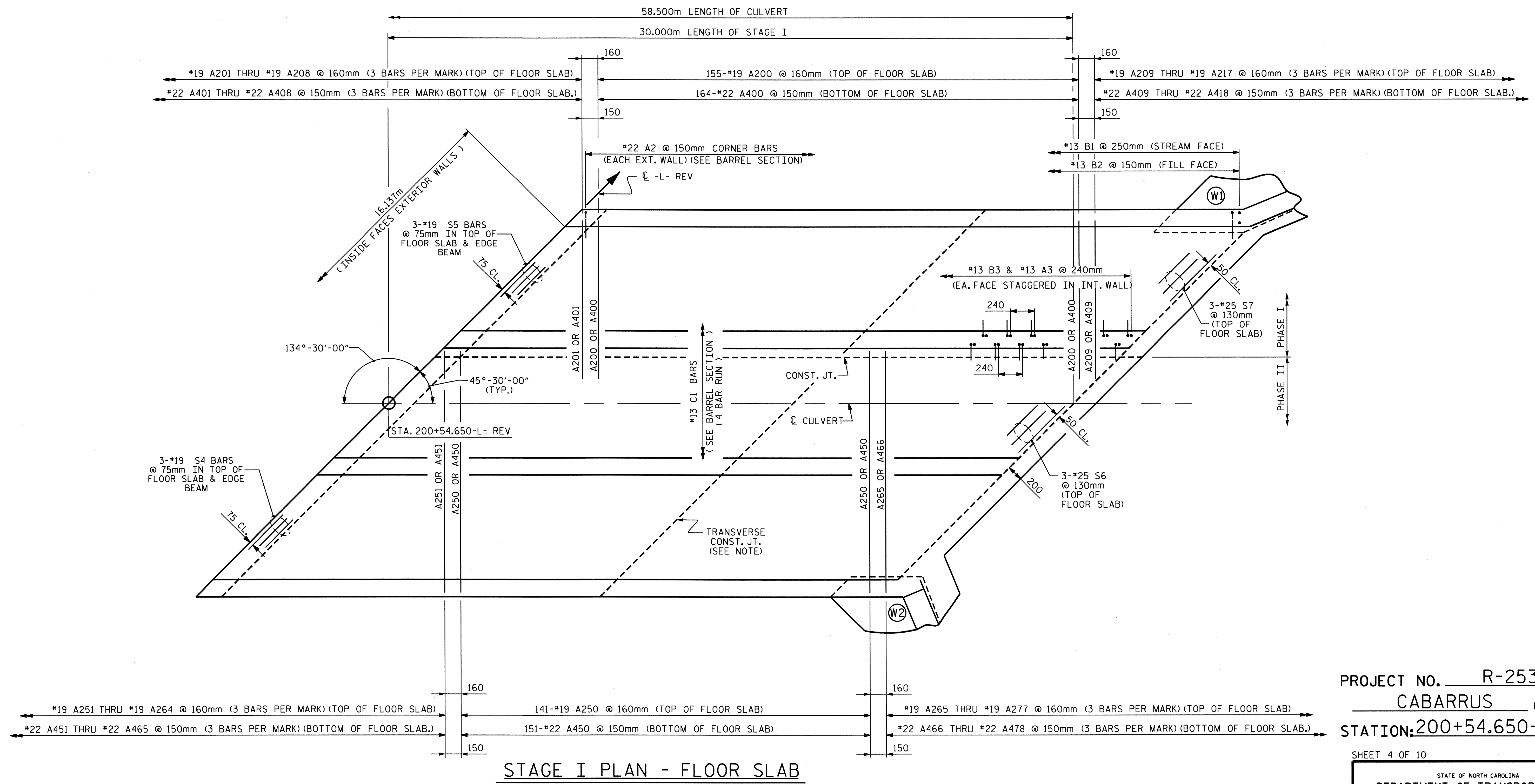
TRIPLE 3.700m X 3.700m
 CONCRETE BOX CULVERT
 45°-30'-00" SKEW



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-3	
1			3			TOTAL SHEETS 42	
2			4				

DRAWN BY: H. T. BARBOUR DATE: 2-26-10
 CHECKED BY: C. R. YARBROUGH DATE: 1-3-11

23-FEB-2011 16:27
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 hbarbour



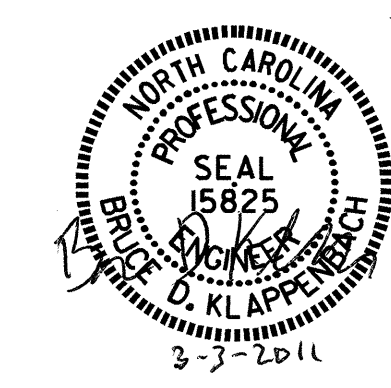
STAGE I PLAN - FLOOR SLAB

PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 200+54.650-L-REV

SHEET 4 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 3.700m X 3.700m
CONCRETE BOX CULVERT
45°-30'-00" SKEW

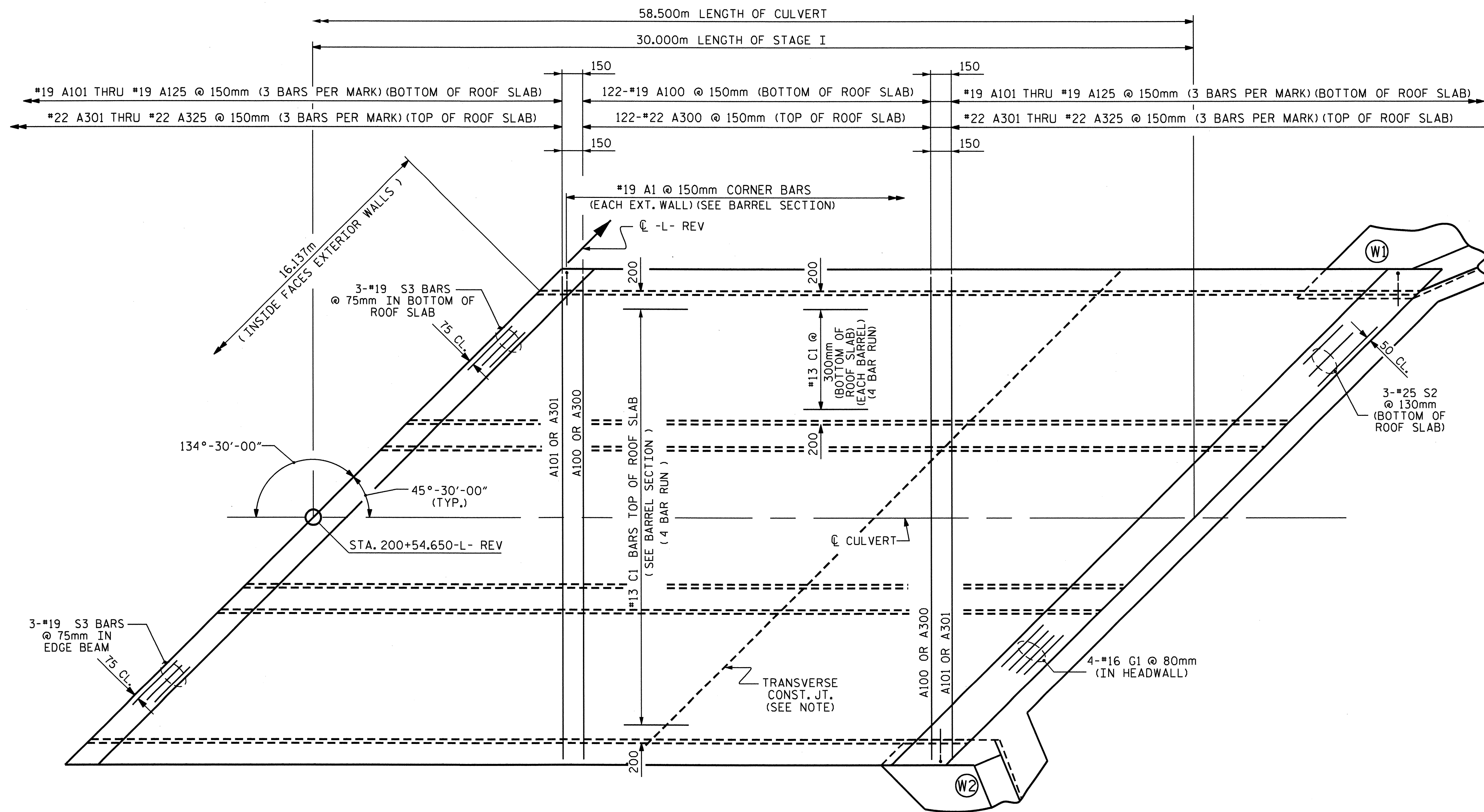


DRAWN BY: H. T. BARBOUR DATE: 2-26-10
CHECKED BY: C. R. YARBROUGH DATE: 1-3-11

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tbarbour

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-4
1			3			TOTAL SHEETS 42
2			4			

CULVERT 1



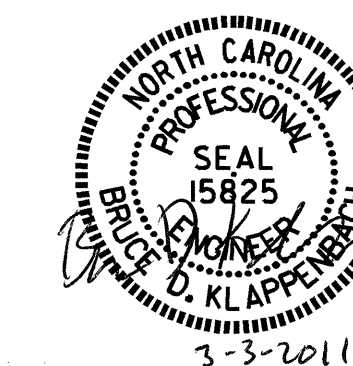
STAGE I PLAN - ROOF SLAB

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 200+54.650-L-REV

SHEET 5 OF 10

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

TRIPLE 3.700m X 3.700m
 CONCRETE BOX CULVERT
 45°-30'-00" SKEW



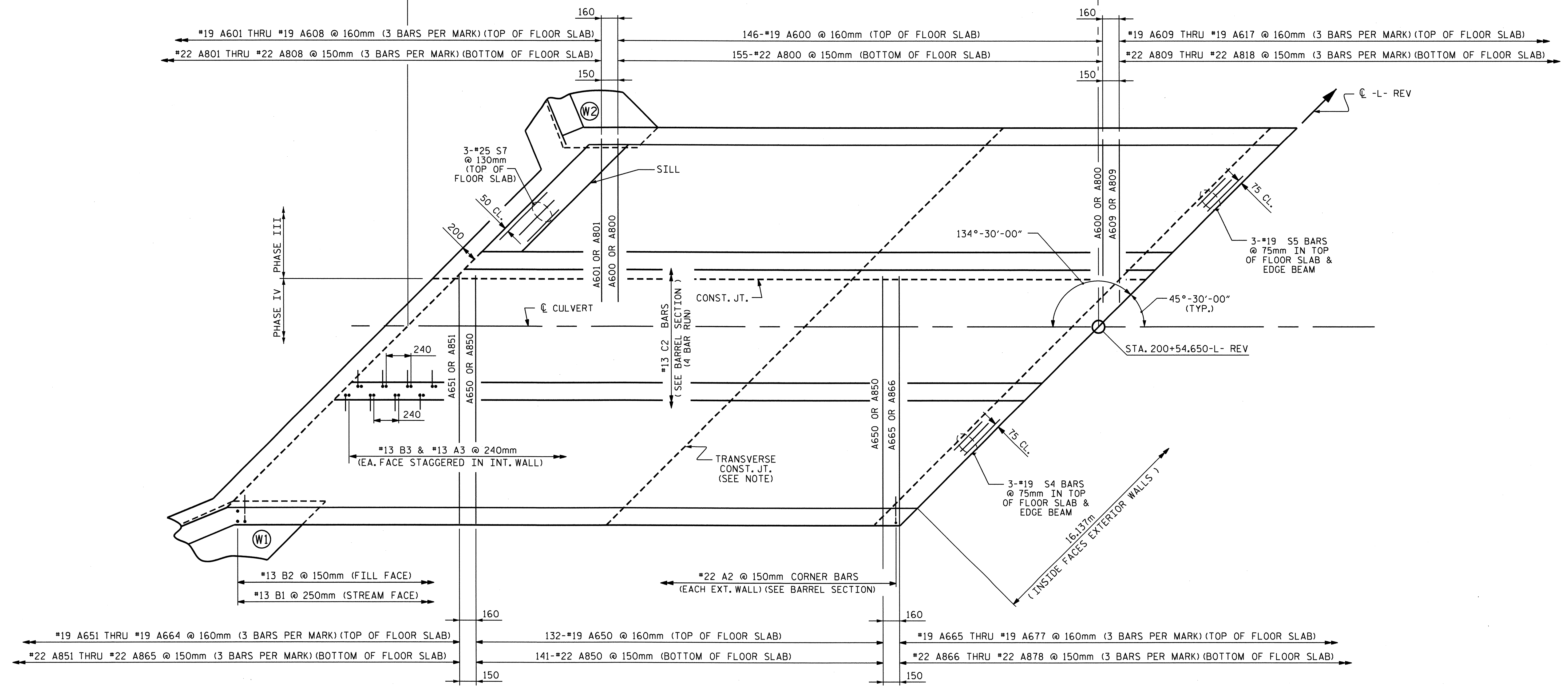
DRAWN BY : H. T. BARBOUR DATE : 2-26-10
 CHECKED BY : C. R. YARBROUGH DATE : 1-3-11

23-FEB-2011 16:27
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 hbarbour

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			42

CULVERT 1

58.500m LENGTH OF CULVERT
28.500m LENGTH OF STAGE II



STAGE II PLAN - FLOOR SLAB

PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 200+54.650-L-REV

SHEET 6 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 3.700m X 3.700m
CONCRETE BOX CULVERT
45°-30'-00" SKEW
STAGE II

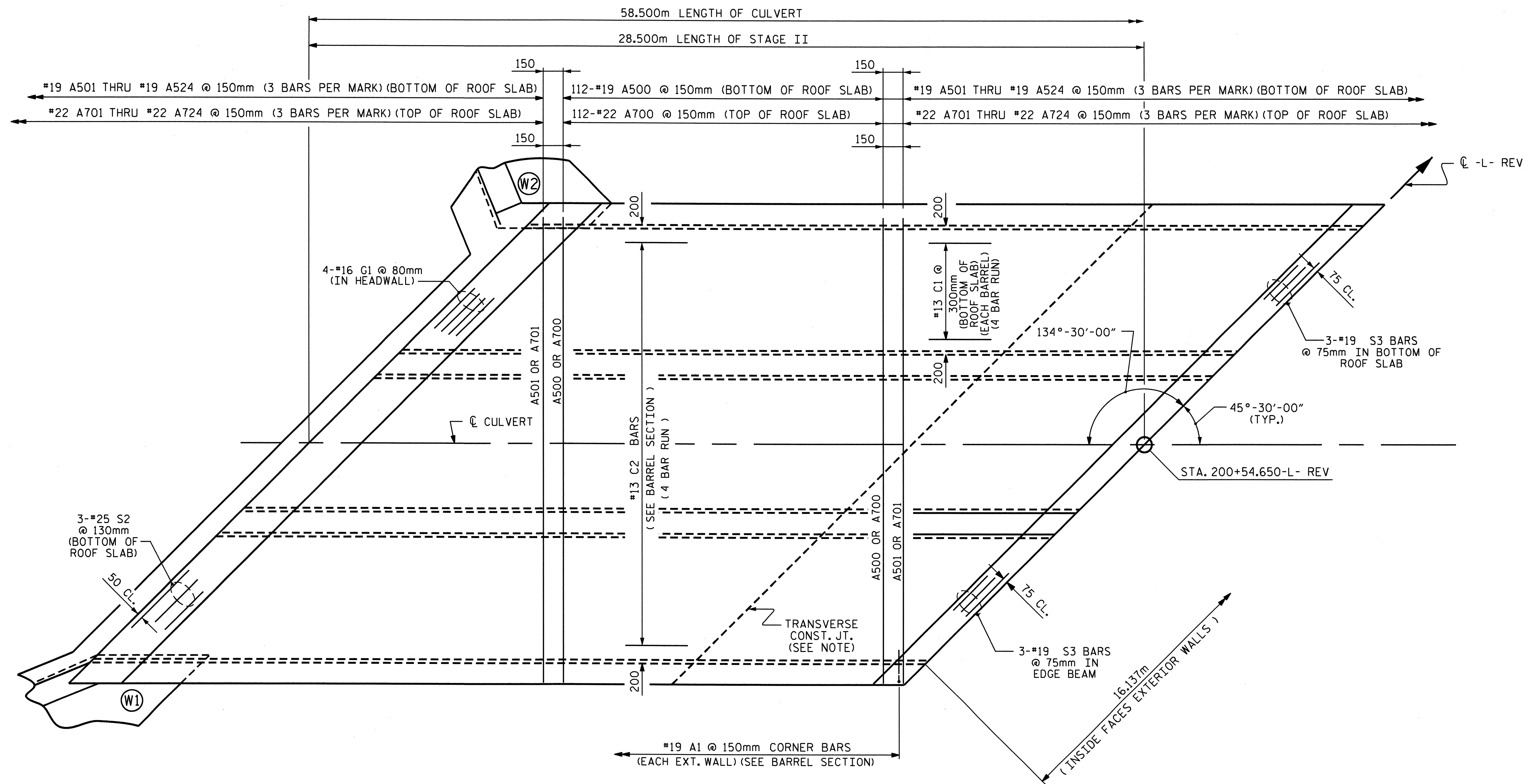


DRAWN BY: H. T. BARBOUR DATE: 2-26-10
CHECKED BY: C. R. YARBROUGH DATE: 1-3-11

23-FEB-2011 16:27
Z:\Structures\Culvert\Htbarbour\Microstation\r2533cc.sd.cu.dgn
tbarbour

REVISIONS						SHEET NO. C-6
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

CULVERT 1



STAGE II PLAN - ROOF SLAB

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 200+54.650-L-REV

SHEET 7 OF 10

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

TRIPLE 3.700m X 3.700m
 CONCRETE BOX CULVERT
 45°-30'-00" SKEW



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7
1			3			TOTAL SHEETS
2			4			42

DRAWN BY : H. T. BARBOUR DATE : 2-26-10
 CHECKED BY : C. R. YARBROUGH DATE : 1-3-11

23-FEB-2011 6:26
 Z:\Structures\Culvert\H\barbour\Microstation\R2533cc.sd.cu.dgn
 tbarbour

CULVERT 1

BILL OF MATERIAL

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	400	*19	1	2440	2181	A268	3	*19	STR	5540	37	A460	3	*22	STR	2860	26
A2	400	*22	1	2180	2653	A269	3	*19	STR	5040	34	A461	3	*22	STR	2400	22
A3	500	*13	1	1320	656	A270	3	*19	STR	4560	31	A462	3	*22	STR	1940	18
						A271	3	*19	STR	4060	27	A463	3	*22	STR	1480	14
A100	122	*19	STR	11820	3223	A272	3	*19	STR	3580	24	A464	3	*22	STR	1020	9
A101	6	*19	STR	11400	153	A273	3	*19	STR	3080	21	A465	3	*22	STR	560	5
A102	6	*19	STR	10940	147	A274	3	*19	STR	2600	17	A466	3	*22	STR	7000	64
A103	6	*19	STR	10480	141	A275	3	*19	STR	2120	14	A467	3	*22	STR	6540	60
A104	6	*19	STR	10020	134	A276	3	*19	STR	1620	11	A468	3	*22	STR	6080	55
A105	6	*19	STR	9580	128	A277	3	*19	STR	1140	8	A469	3	*22	STR	5620	51
A106	6	*19	STR	9120	122							A470	3	*22	STR	5160	47
A107	6	*19	STR	8660	116	A300	122	*22	STR	11820	4387	A471	3	*22	STR	4700	43
A108	6	*19	STR	8200	110	A301	6	*22	STR	11400	208	A472	3	*22	STR	4240	39
A109	6	*19	STR	7740	104	A302	6	*22	STR	10940	200	A473	3	*22	STR	3780	34
A110	6	*19	STR	7280	98	A303	6	*22	STR	10480	191	A474	3	*22	STR	3320	30
A111	6	*19	STR	6820	91	A304	6	*22	STR	10020	183	A475	3	*22	STR	2860	26
A112	6	*19	STR	6360	85	A305	6	*22	STR	9580	175	A476	3	*22	STR	2420	22
A113	6	*19	STR	5900	79	A306	6	*22	STR	9120	166	A477	3	*22	STR	1960	18
A114	6	*19	STR	5440	73	A307	6	*22	STR	8660	158	A478	3	*22	STR	1500	14
A115	6	*19	STR	5000	67	A308	6	*22	STR	8200	150						
A116	6	*19	STR	4540	61	A309	6	*22	STR	7740	141	B1	240	*13	STR	4260	1016
A117	6	*19	STR	4080	55	A310	6	*22	STR	7280	133	B2	400	*13	STR	3480	1384
A118	6	*19	STR	3620	49	A311	6	*22	STR	6820	124	B3	500	*13	STR	4260	2117
A119	6	*19	STR	3160	42	A312	6	*22	STR	6360	116						
A120	6	*19	STR	2700	36	A313	6	*22	STR	5900	108	C1	592	*13	STR	8100	4766
A121	6	*19	STR	2240	30	A314	6	*22	STR	5440	99						
A122	6	*19	STR	1780	24	A315	6	*22	STR	5000	91	G1	4	*16	STR	16560	103
A123	6	*19	STR	1320	18	A316	6	*22	STR	4540	83						
A124	6	*19	STR	860	12	A317	6	*22	STR	4080	74	S2	3	*25	STR	16560	197
A125	6	*19	STR	420	6	A318	6	*22	STR	3620	66	S3	6	*19	STR	16560	222
						A319	6	*22	STR	3160	58	S4	6	*19	STR	10380	139
A200	155	*19	STR	5100	1767	A320	6	*22	STR	2700	49	S5	6	*19	STR	7360	99
A201	3	*19	STR	4680	31	A321	6	*22	STR	2240	41	S6	3	*25	STR	10380	124
A202	3	*19	STR	4200	28	A322	6	*22	STR	1780	32	S7	3	*25	STR	8300	99
A203	3	*19	STR	3700	25	A323	6	*22	STR	1320	24						
A204	3	*19	STR	3220	22	A324	6	*22	STR	860	16						
A205	3	*19	STR	2740	18	A325	6	*22	STR	420	8						
A206	3	*19	STR	2240	15												
A207	3	*19	STR	1760	12	A400	164	*22	STR	5340	2664						
A208	3	*19	STR	1260	8	A401	3	*22	STR	4920	45						
A209	3	*19	STR	4740	32	A402	3	*22	STR	4460	41						
A210	3	*19	STR	4240	28	A403	3	*22	STR	4000	37						
A211	3	*19	STR	3760	25	A404	3	*22	STR	3540	32						
A212	3	*19	STR	3260	22	A405	3	*22	STR	3080	28						
A213	3	*19	STR	2780	19	A406	3	*22	STR	2620	24						
A214	3	*19	STR	2280	15	A407	3	*22	STR	2160	20						
A215	3	*19	STR	1800	12	A408	3	*22	STR	1700	16						
A216	3	*19	STR	1320	9	A409	3	*22	STR	5000	46						
A217	3	*19	STR	820	5	A410	3	*22	STR	4540	41						
						A411	3	*22	STR	4080	37						
A250	141	*19	STR	7420	2338	A412	3	*22	STR	3620	33						
A251	3	*19	STR	7000	47	A413	3	*22	STR	3160	29						
A252	3	*19	STR	6520	44	A414	3	*22	STR	2700	25						
A253	3	*19	STR	6040	40	A415	3	*22	STR	2240	20						
A254	3	*19	STR	5540	37	A416	3	*22	STR	1780	16						
A255	3	*19	STR	5060	34	A417	3	*22	STR	1320	12						
A256	3	*19	STR	4560	31	A418	3	*22	STR	860	8						
A257	3	*19	STR	4080	27												
A258	3	*19	STR	3600	24	A450	151	*22	STR	7400	3399						
A259	3	*19	STR	3100	21	A451	3	*22	STR	6980	64						
A260	3	*19	STR	2620	18	A452	3	*22	STR	6520	60						
A261	3	*19	STR	2120	14	A453	3	*22	STR	6060	55						
A262	3	*19	STR	1640	11	A454	3	*22	STR	5600	51						
A263	3	*19	STR	1140	8	A455	3	*22	STR	5140	47						
A264	3	*19	STR	660	4	A456	3	*22	STR	4680	43						
A265	3	*19	STR	7000	47	A457	3	*22	STR	4220	39						
A266	3	*19	STR	6500	44	A458	3	*22	STR	3760	34						
A267	3	*19	STR	6020	40	A459	3	*22	STR	3320	30						

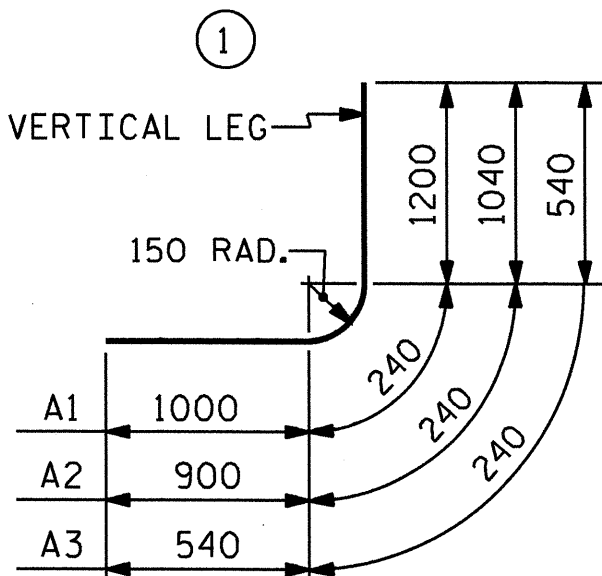
REINFORCING STEEL = 40780 KG

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
A200	19	690
A400	22	920
A600	19	690
A800	22	920
B1	13	540
B3	13	540
"C"	13	590
"S"	19	840
"S"	25	1500

BAR TYPE

DIMENSIONS ARE OUT TO OUT

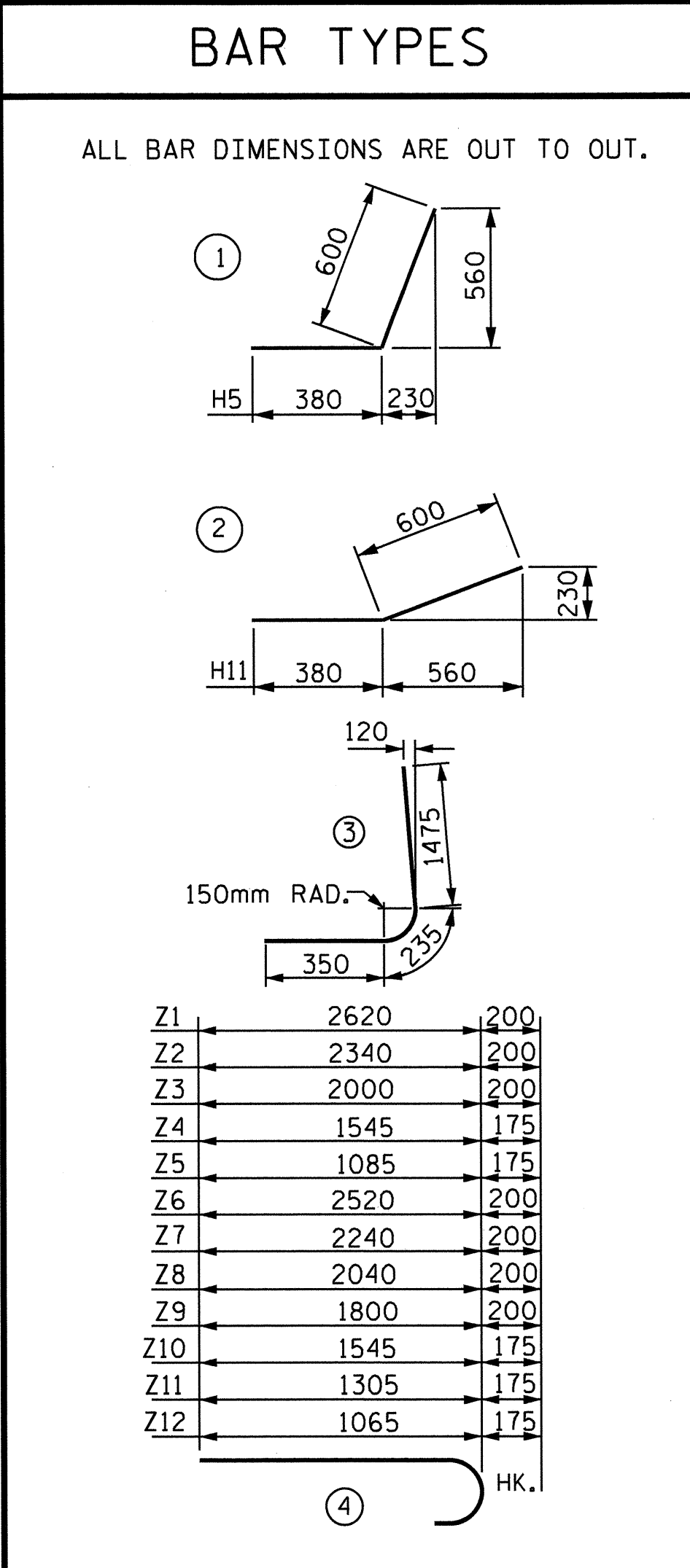


BILL OF MATERIAL

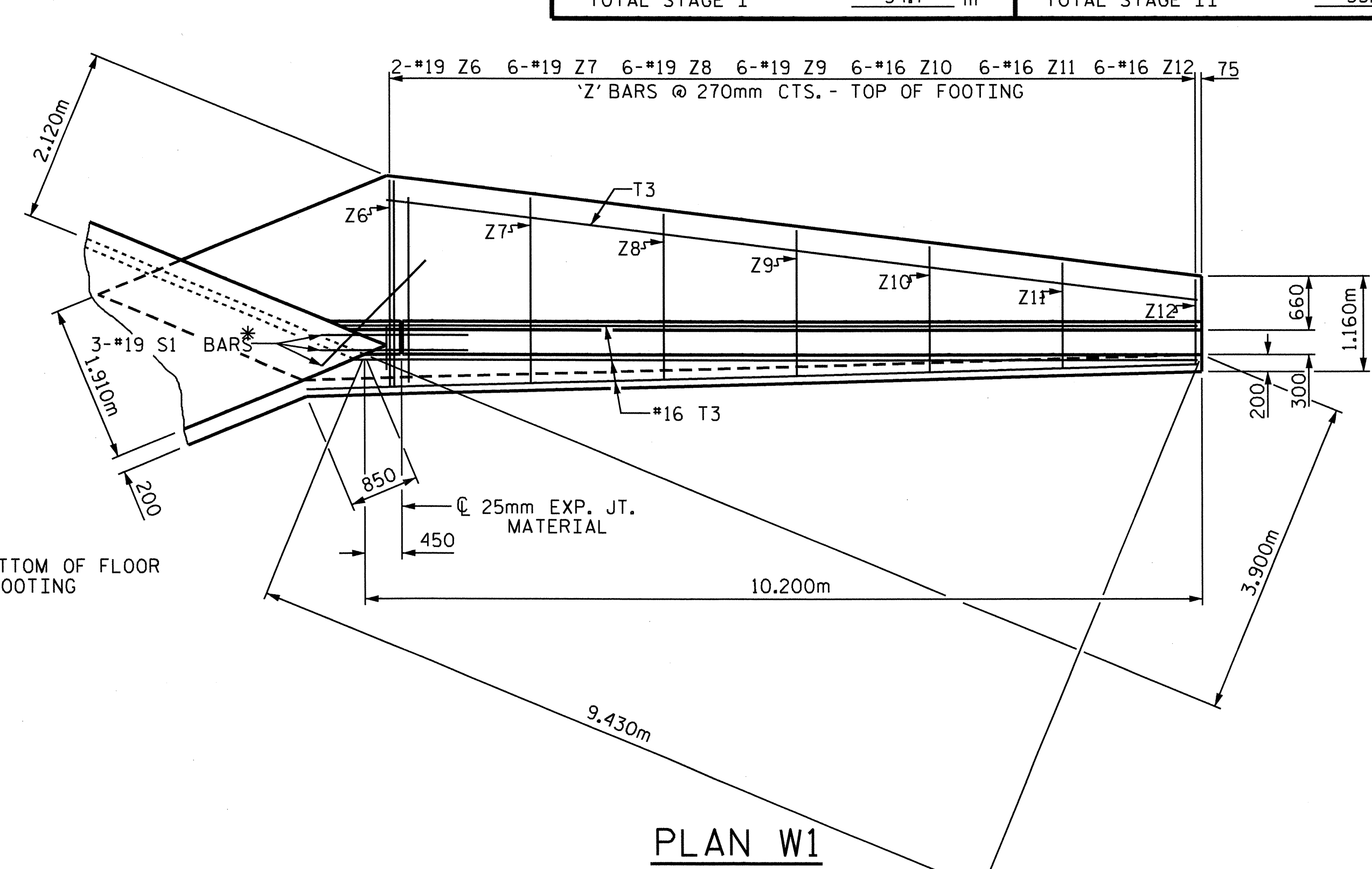
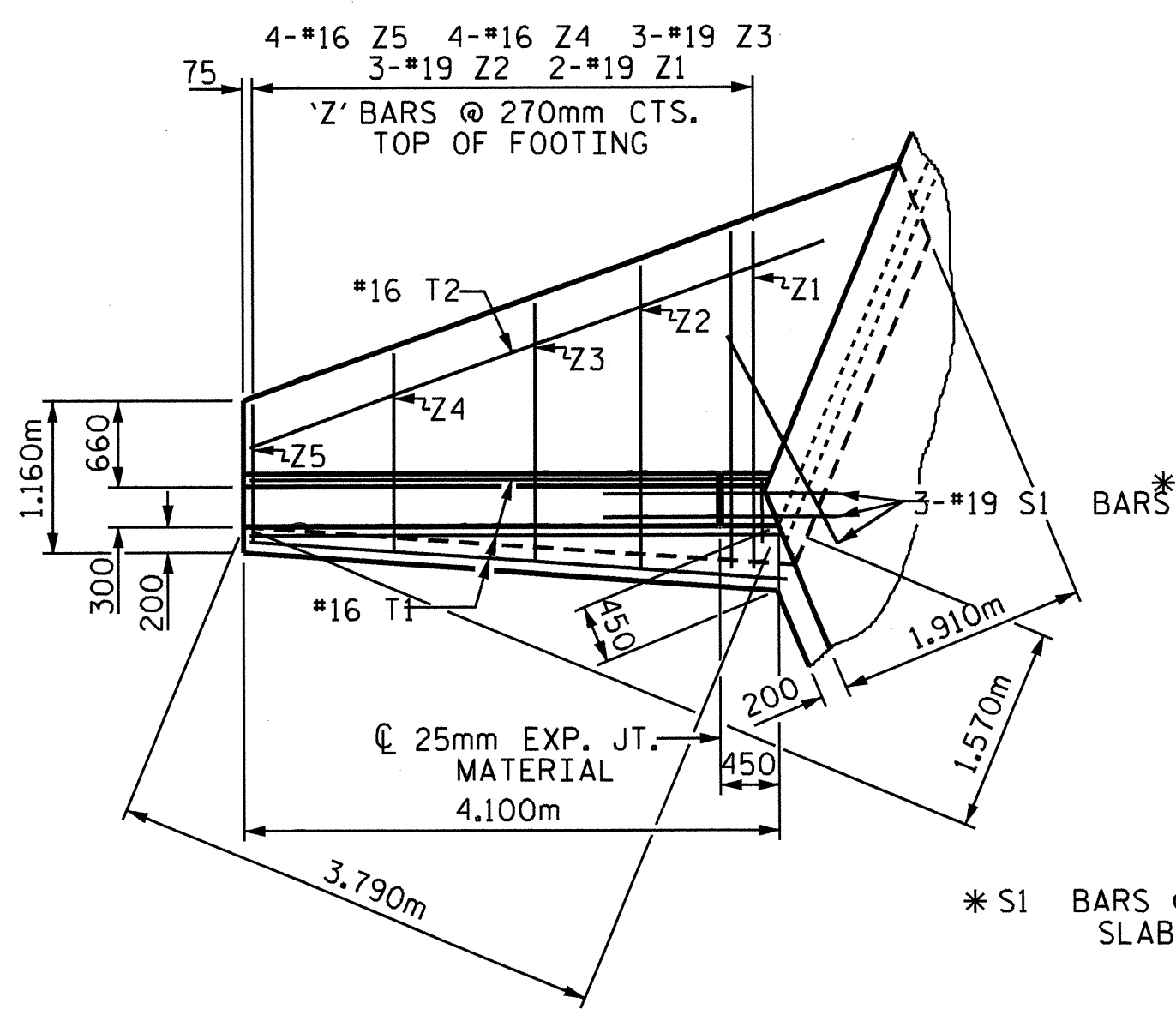
STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	380	*19	1	2440	2072	A669	3	*19	STR	5020	34	A862	3	*22	STR	1940	18
A2	380	*22	1	2180	2520	A670	3	*19	STR	4520	30	A863	3	*22	STR	1480	14
A3	476	*13	1	1320	625	A671	3	*19	STR	4040	27	A864	3	*22	STR	1020	9
						A672	3	*19	STR	3540	24	A865	3	*22	STR	560	5
A500	112	*19	STR	11820	2959	A673	3	*19	STR	3060	21	A866	3	*22	STR	7000	64
A501	6	*19	STR	11400	153	A674	3	*19	STR	2560	17	A867	3	*22	STR	6540	60
A502	6	*19	STR	10940	147	A675	3	*19	STR	2080	14	A868	3	*22	STR	6080	55
A503	6	*19	STR	10480	141	A676	3	*19	STR	1600	11	A869	3	*22	STR	5620	51
A504	6	*19	STR	10020	134	A677	3	*19	STR	1100	7	A870	3	*22	STR	5160	47
A505	6	*19	STR	9580	128							A871	3	*22	STR	4700	43
A506	6	*19	STR	9120	122	A700	112	*22	STR	11820	4027	A872	3	*22	STR	4240	39
A507	6	*19	STR	8660	116	A701	6	*22	STR	11400	208	A873	3	*22	STR	3780	34
A508	6	*19	STR	8200	110	A702	6	*22	STR	10940	200	A874	3	*22	STR	3320	30
A509	6	*19	STR	7740	104	A703	6	*22	STR	10480	191	A875	3	*22	STR	2860	26
A510	6	*19	STR	7280	98	A704	6	*22	STR	10020	183	A876	3	*22	STR	2420	22
A511	6	*19	STR	6820	91	A705	6	*22	STR	9580	175	A877	3	*22	STR	1960	18
A512	6	*19	STR	6360	85	A706	6	*22	STR	9120	166	A878	3	*22	STR	1500	14
A513	6	*19	STR	5900	79	A707	6	*22	STR	8660	158						
A514	6	*19	STR	5440	73	A708	6	*22	STR	8200	150	B1	226	*13	STR	4260	957
A515	6	*19	STR	5000	67	A709	6	*22	STR	7740	141	B2	378	*13	STR	3480	1308
A516	6	*19	STR	4540	61	A710	6	*22	STR	7280	133	B3	476	*13	STR	4260	2016
A517	6	*19	STR	4080	55	A711	6	*22	STR	6820	124						
A518	6																

WING QUANTITIES	
STAGE I	STAGE II
REINFORCING STEEL 1142 KG.	REINFORCING STEEL 1142 KG.
CLASS A CONCRETE	CLASS A CONCRETE
1 END CURTAIN WALL 2.3 m ³	1 END CURTAIN WALL 2.3 m ³
2 WINGS 27.5 m ³	2 WINGS 27.5 m ³
1 HEADWALL 1.9 m ³	1 HEADWALL 1.9 m ³
2 EDGE BEAMS 3.0 m ³	2 EDGE BEAMS 3.0 m ³
	1 SILL 0.5 m ³
TOTAL STAGE I 34.7 m ³	TOTAL STAGE II 35.2 m ³

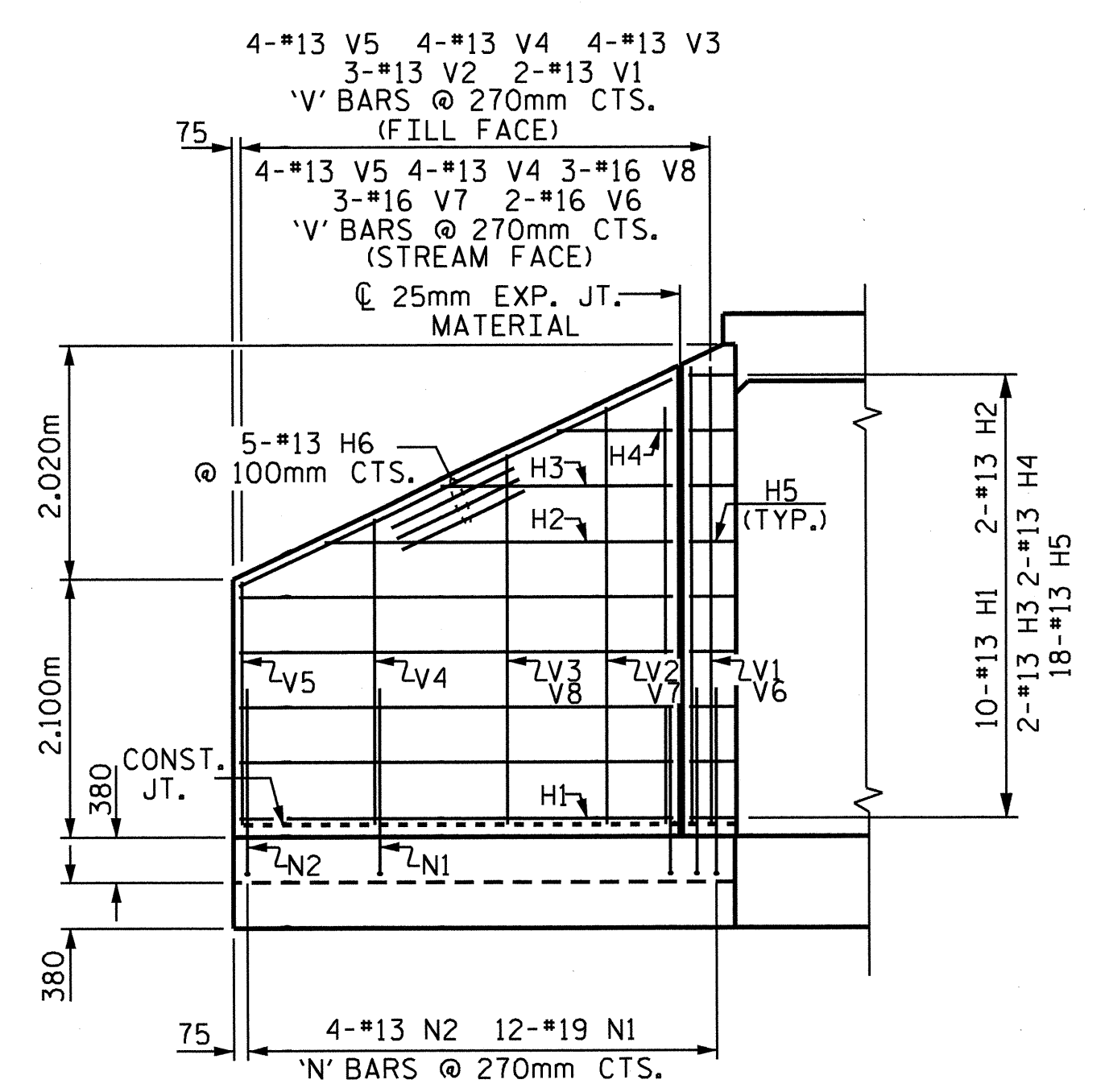


BILL OF MATERIAL					
STAGE I OR STAGE II					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
H1	10	13	STR	3540	35
H2	2	13	STR	2820	6
H3	2	13	STR	1880	4
H4	2	13	STR	920	2
H5	18	13	1	980	18
H6	5	13	STR	3900	19
H7	10	13	STR	9640	96
H8	2	13	STR	7980	16
H9	2	13	STR	5620	11
H10	2	13	STR	3240	6
H11	18	13	2	980	18
H12	5	13	STR	9800	49
N1	12	19	3	2060	55
N2	4	13	3	2060	8
N3	18	19	3	2060	83
N4	12	13	3	2060	25
S1	6	19	STR	1800	24
T1	3	16	STR	4100	19
T2	1	16	STR	4740	7
T3	4	16	STR	10200	63
V1	2	16	STR	3720	12
V2	3	16	STR	3380	16
V3	3	16	STR	3000	14
V4	8	13	STR	2500	20
V5	8	13	STR	1980	16
V6	2	13	STR	3720	7
V7	3	13	STR	3380	10
V8	3	13	STR	3000	9
V9	2	16	STR	3820	12
V10	5	16	STR	3660	28
V11	5	16	STR	3400	26
V12	5	16	STR	3140	24
V13	5	16	STR	2880	22
V14	12	13	STR	2580	31
V15	12	13	STR	2280	27
V16	12	13	STR	1960	23
V17	2	13	STR	3820	8
V18	5	13	STR	3660	18
V19	5	13	STR	3400	17
V20	5	13	STR	3140	16
V21	5	13	STR	2880	14
Z1	2	19	4	2820	13
Z2	3	19	4	2540	17
Z3	3	19	4	2200	15
Z4	4	16	4	1720	11
Z5	4	16	4	1260	8
Z6	2	19	4	2720	12
Z7	6	19	4	2480	33
Z8	6	19	4	2240	30
Z9	6	19	4	2000	27
Z10	6	16	4	1720	16
Z11	6	16	4	1480	14
Z12	6	16	4	1240	12

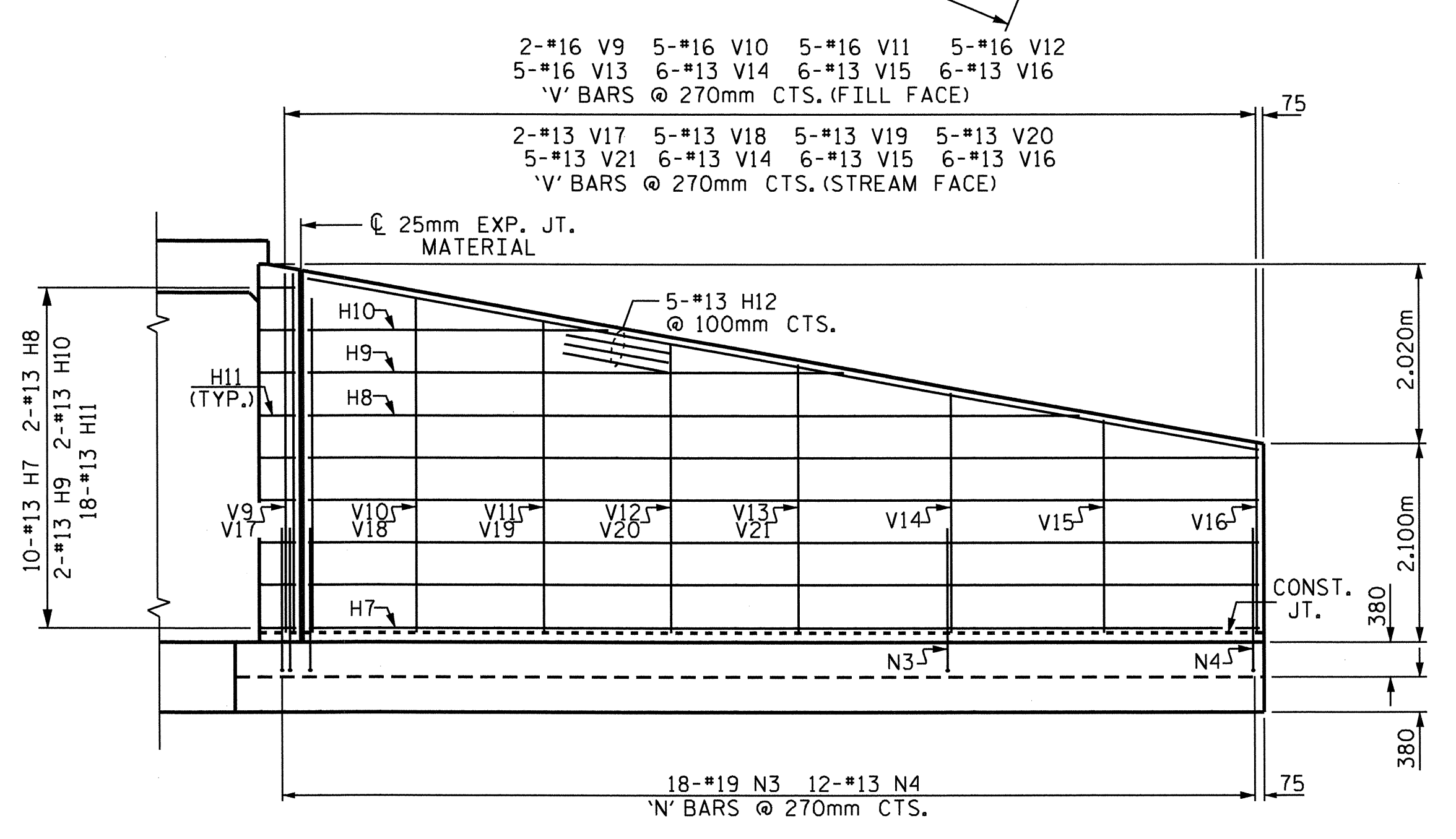


PLAN W2

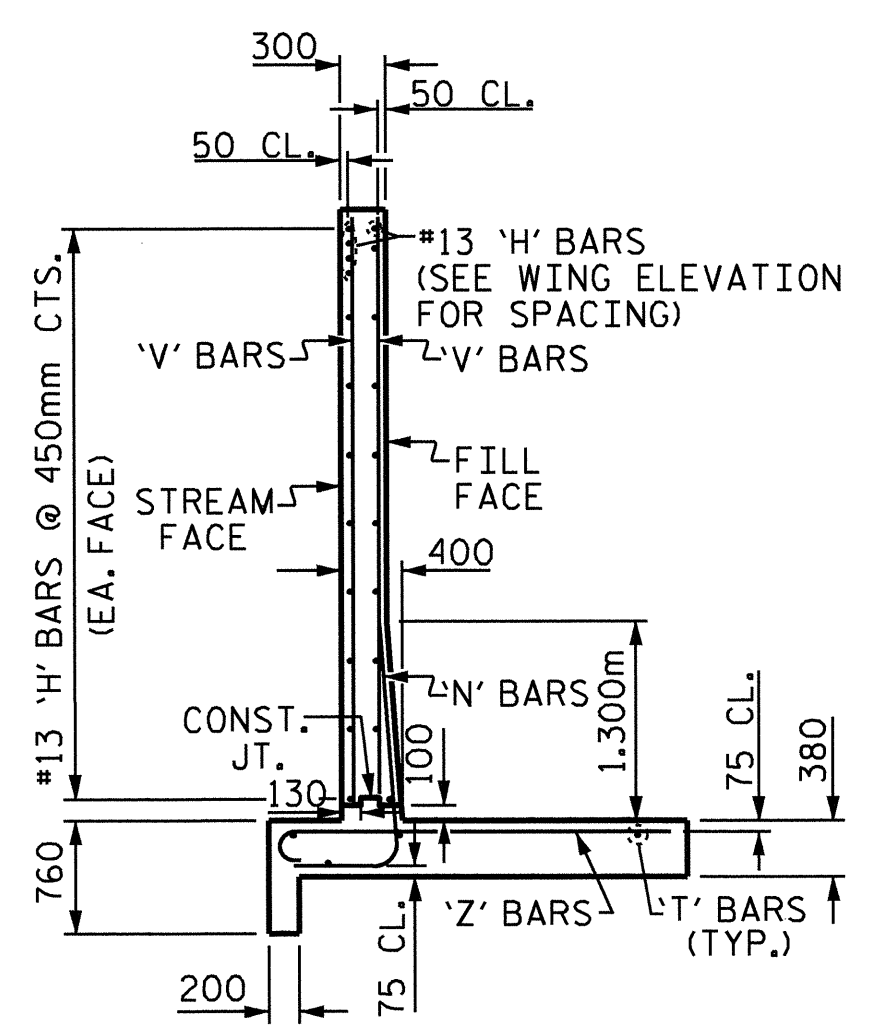
PLAN W1



ELEVATION W2



ELEVATION W1

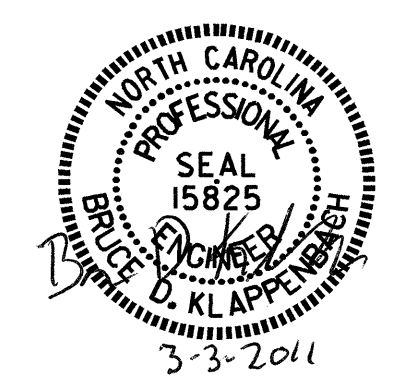


TYPICAL WING SECTION

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 200+54.650-L-REV

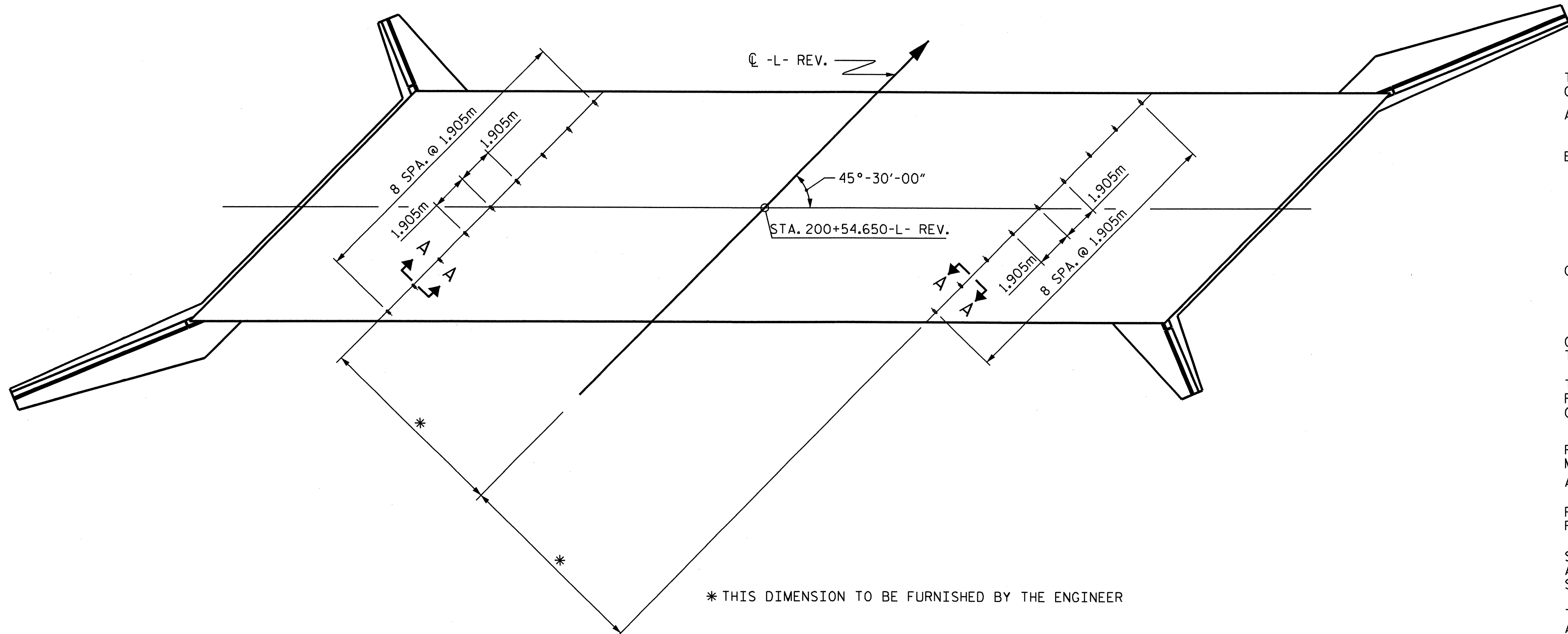
SHEET 9 OF 10

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H=3.700m SLOPE=2:1
 45° OR 135° SKEW



ASSEMBLED BY: H. T. BARBOUR DATE: 3-30-10
 CHECKED BY: C. R. YARBROUGH DATE: 1-3-11
 DRAWN BY: FPP 07/97
 CHECKED BY: VAP 07/97

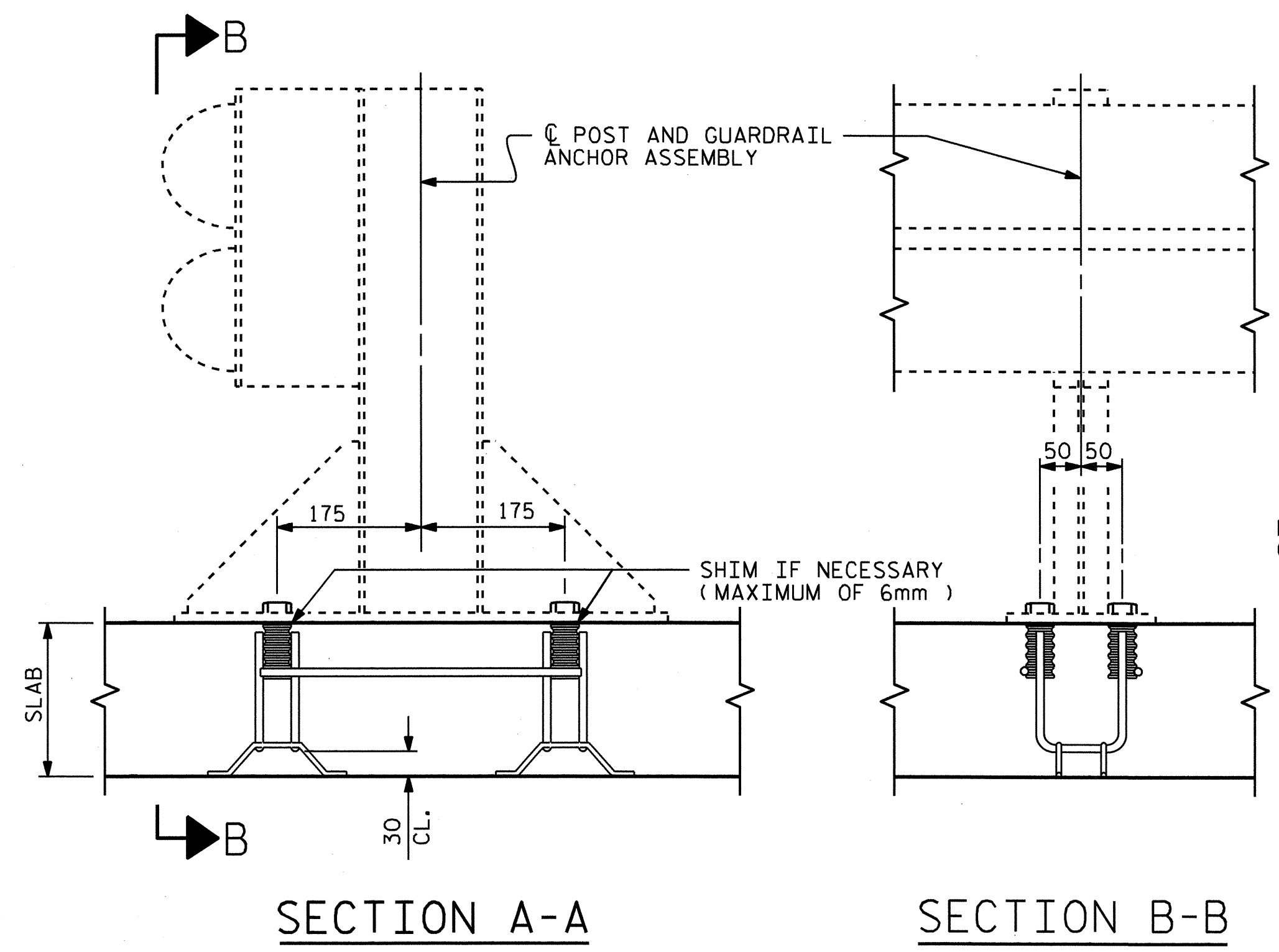
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		



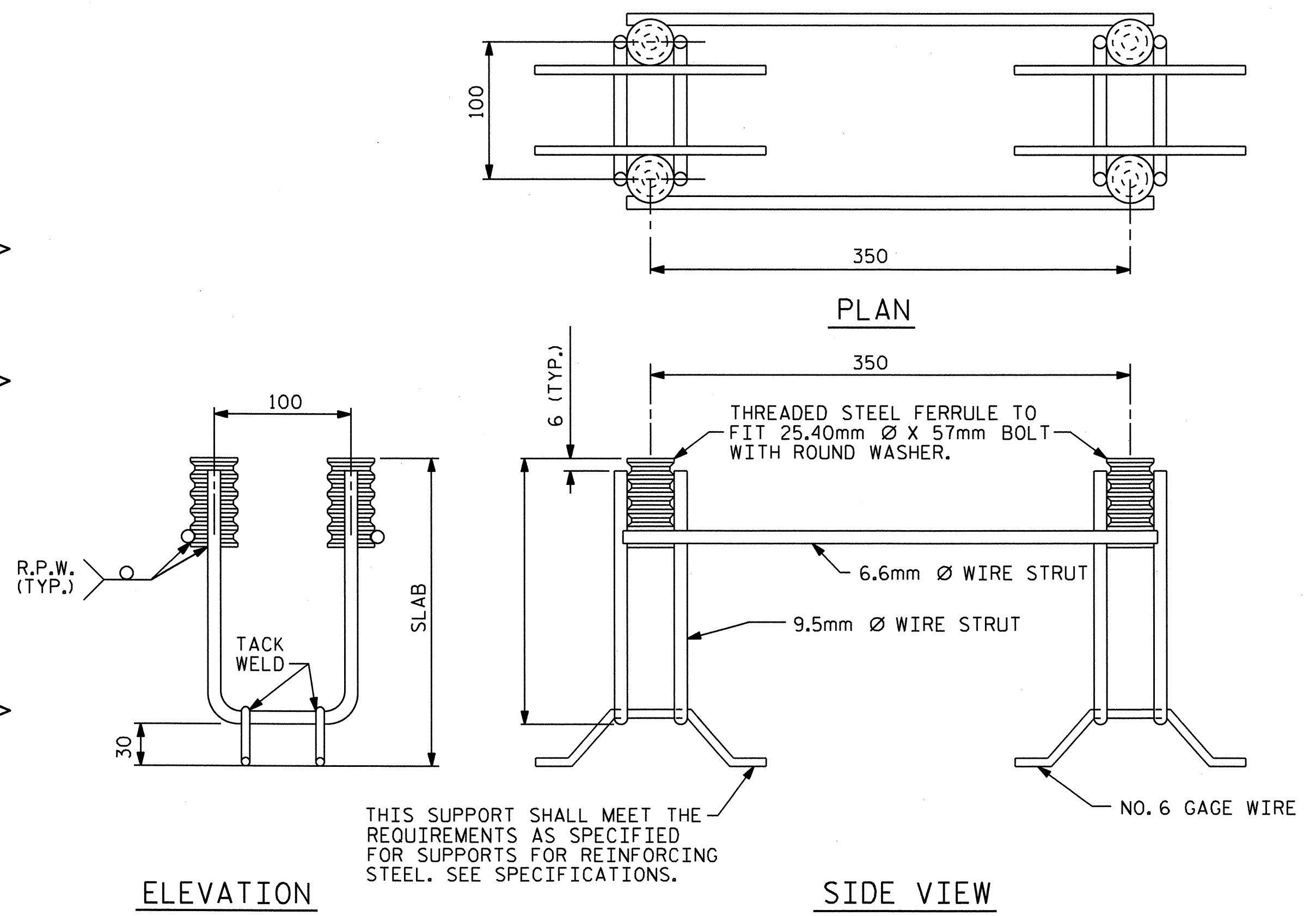
PLAN
SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING.
* THIS DIMENSION TO BE FURNISHED BY THE ENGINEER

NOTES

- THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS 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 64mm.
 - B. 4 - 25.40mm DIA. X 57mm 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 25.40mm DIA. X 57mm 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 STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 689 MPa. AS AN OPTION, A 11mm Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 620 MPa. IS ACCEPTABLE.
- GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.
- THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.
- FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.
AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.
- PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.
- SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.
- THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 25.40mm Ø BOLT IS 97.0 KN. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.



SECTION A-A **SECTION B-B**

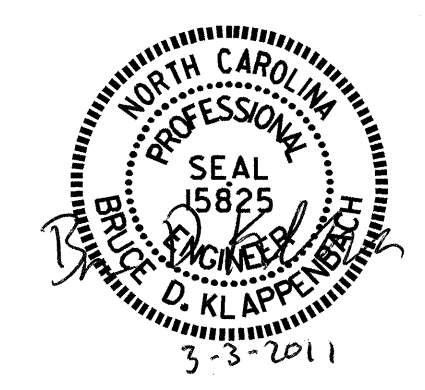


ELEVATION **SIDE VIEW**

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 200+54.650-L-REV
SHEET 10 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
ANCHORAGE DETAILS FOR
GUARDRAIL ANCHOR ASSEMBLY
FOR CULVERTS



ASSEMBLED BY : H. T. BARBOUR	DATE : 10-5-10
CHECKED BY : C. R. YARBROUGH	DATE : 1-3-11
DRAWN BY : FCJ 6/88	REV. 7/10/01 LES/RDR
CHECKED BY : ARB 6/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06R KMM/GM

REVISIONS						SHEET NO. C-10
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

BENCH MARK: #115 RAIL ROAD SPIKE SET IN BASE OF 375mm OAK TREE
 STA. 212+46.000 -L- 25.500m LT. ELEV. 181.692

F.A. PROJECT NO. NHS-0049(26)

NOTES

ASSUMED LIVE LOAD -----MS18 OR ALTERNATE LOADING.
 MAXIMUM DESIGN FILL ----- 4.250M.
 FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
 ALL ELEVATIONS ARE IN METERS.

THE SCOUR CRITICAL ELEVATION IS THE AS BUILT BOTTOM OF FOOTING ELEVATION. THE SCOUR CRITICAL ELEVATIONS ARE FOR USE BY MAINTENANCE FORCES TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

THE BOTTOM OF FOOTING ELEVATION MAY BE LOWERED IN ORDER TO SATISFY BEARING CAPACITY AND MINIMUM ROCK EMBEDMENT REQUIREMENTS.

FOR PRECAST REINFORCED CONCRETE THREE-SIDED CULVERT, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 360,000kg OF REINFORCING STEEL, ONE 760mm SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 360,000kg OF REINFORCING STEEL, TWO 760mm SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE 450mm Ø PIPE THROUGH THE WING OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR THE PIPE.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

THE PRECAST CULVERT SECTIONS AND WINGS SHALL BE DESIGNED TO HANDLE FULL DEPTH HYDROSTATIC PRESSURE IF WEEP HOLES ARE NOT UTILIZED. IF PROVIDED, WEEP HOLES SHALL BE LOCATED A MINIMUM HEIGHT OF 150mm ABOVE THE NORMAL FLOW LINE AND HAVE A MAXIMUM SPACING OF 3.000M.

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

A 900mm STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

FOR BLASTING ADJACENT TO HIGHWAY STRUCTURES, SEE STANDARD SPECIFICATIONS ARTICLE 410-11.

THE PRECAST CULVERT MAY BE LAID OUT WITH BEVELED PRECAST UNITS ALONG THE LENGTH OF THE ARC.

CONSTRUCTION SEQUENCE FOR CULVERT IN THE FOLLOWING ORDER:

- STAGE I
1. INSTALL STILLING BASIN (MIN. CAPACITY 45 CU. M.)
 2. INSTALL IMPERVIOUS DIKES AND DIVERT FLOW THROUGH THE TWO SOUTH EXISTING CULVERT BARRELS.
 3. REMOVE APPROXIMATELY 3.450m OF EXISTING CULVERT.
 4. CONSTRUCT BOTTOMLESS CULVERT AND OUTLET CHANNEL.
 5. REMOVE IMPERVIOUS DIKES AND STILLING BASIN.
 6. SHIFT TRAFFIC.

- STAGE II
1. REMOVE REMAINDER OF EXISTING CULVERT.
 2. CONSTRUCT IMPERVIOUS DIKES.
 3. CONSTRUCT REMAINDER OF BOTTOMLESS CULVERT. USE SILT BAGS AS NECESSARY.
 4. REMOVE IMPERVIOUS DIKES.

THE EXISTING TRIPLE BARREL 3.0m X 2.4m REINFORCED CONCRETE BOX CULVERT LOCATED AT THE SAME LOCATION AS THE PROPOSED CULVERT SHALL BE REMOVED. (APPROXIMATE LENGTH = 21.9m)

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

THE REQUIRED BEARING CAPACITY OF THE STRIP FOOTINGS IS 1437 KPA. THE REQUIRED BEARING CAPACITY SHALL BE VERIFIED.

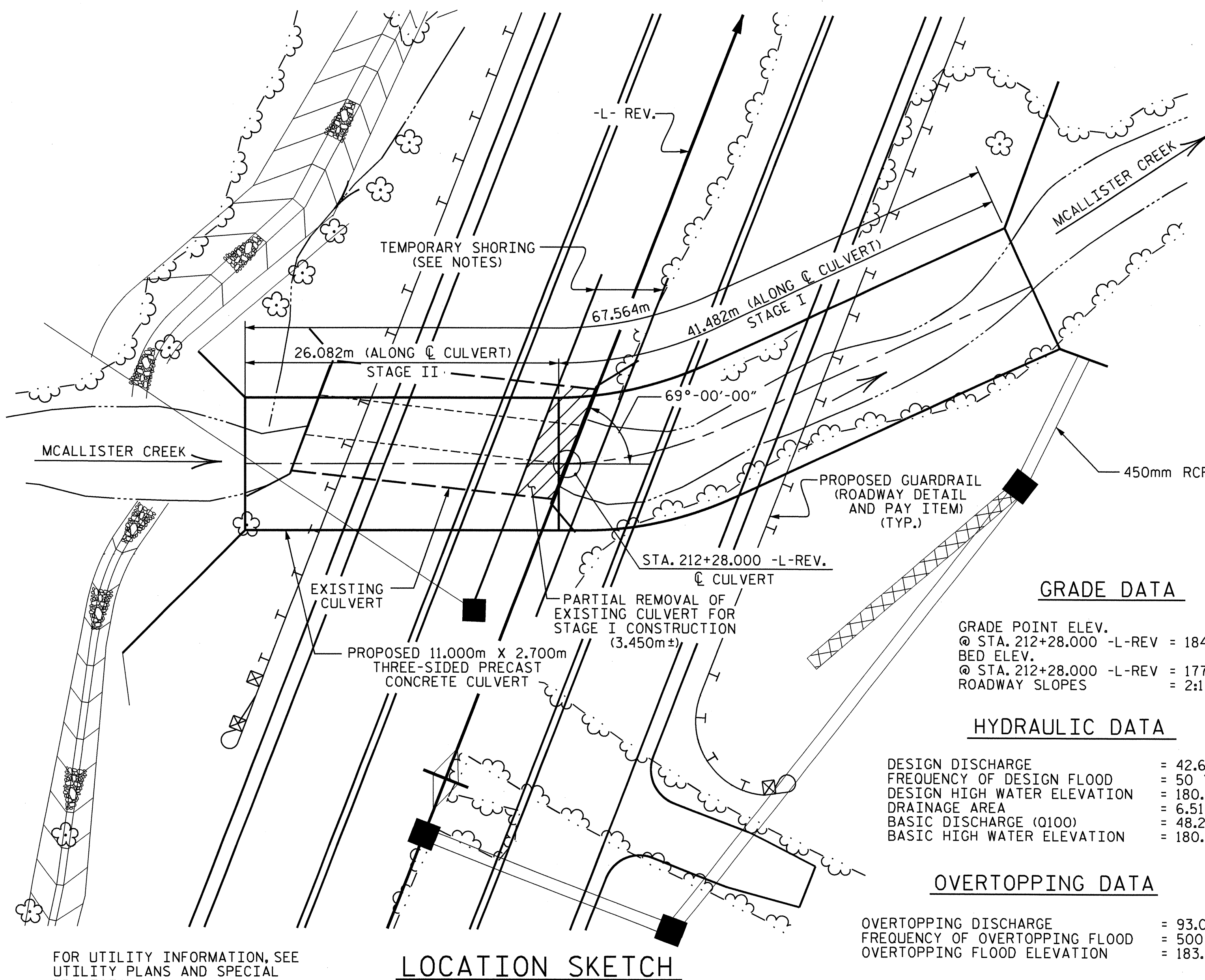
KEY FOOTINGS FOR THE THREE-SIDED CULVERT AT STATION 212+28.000± -L-REV. AT LEAST 305 MILLIMETERS INTO ROCK WITH A MINIMUM THICKNESS AS SHOWN ON THE PLANS.

FOR WING FOOTINGS, THE CONTRACTOR HAS THE OPTION TO KEY THE FOOTINGS 305 MILLIMETERS INTO ROCK. IF WING FOOTINGS ARE NOT KEYED INTO ROCK, RIP RAP SHALL BE REQUIRED. RIP RAP SHALL NOT BE PLACED ABOVE THE STREAM BED. SEE DETAILS ON SHEET 3 OF 3.

SCOUR PROTECTION SHALL BE REQUIRED. RIP RAP NOT TO BE PLACED ABOVE THE STREAMBED.

TO PROVIDE PROTECTION FROM POSSIBLE SCOUR, THE FOOTINGS SHALL NOT BE CONSTRUCTED AT AN ELEVATION HIGHER THAN SHOWN ON THE PLANS.

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



GRADE DATA

GRADE POINT ELEV.
 @ STA. 212+28.000 -L-REV = 184.198 (NBL)
 BED ELEV.
 @ STA. 212+28.000 -L-REV = 177.580 (SBL)
 ROADWAY SLOPES = 2:1

HYDRAULIC DATA

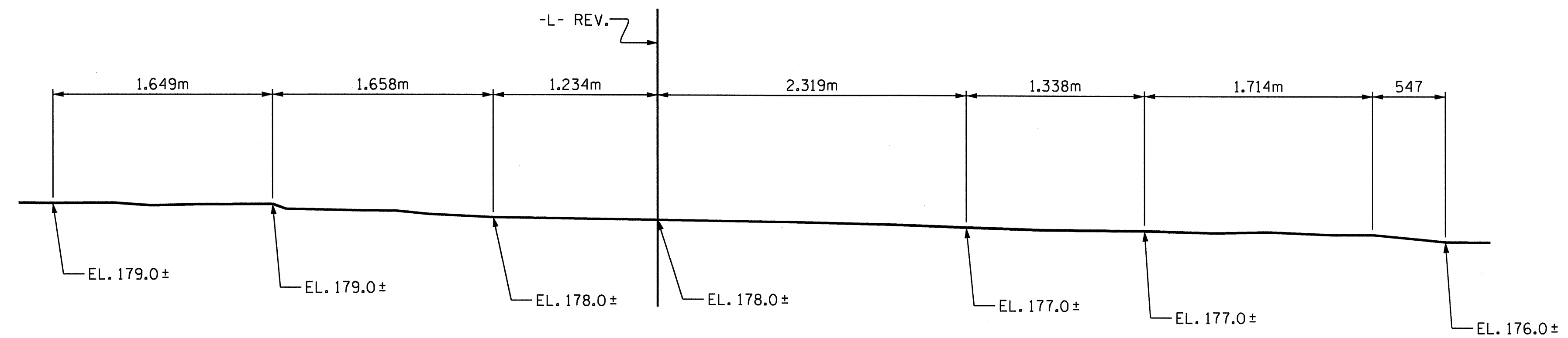
DESIGN DISCHARGE = 42.6 m³/s.
 FREQUENCY OF DESIGN FLOOD = 50 YR.
 DESIGN HIGH WATER ELEVATION = 180.110
 DRAINAGE AREA = 6.51 Sq.km.
 BASIC DISCHARGE (Q100) = 48.2 m³/s.
 BASIC HIGH WATER ELEVATION = 180.260

OVERTOPPING DATA

OVERTOPPING DISCHARGE = 93.0+ m³/s.
 FREQUENCY OF OVERTOPPING FLOOD = 500+ YRS.
 OVERTOPPING FLOOD ELEVATION = 183.300

LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.



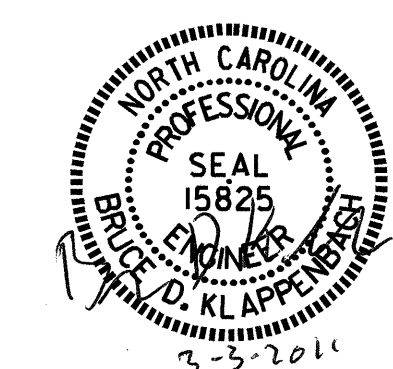
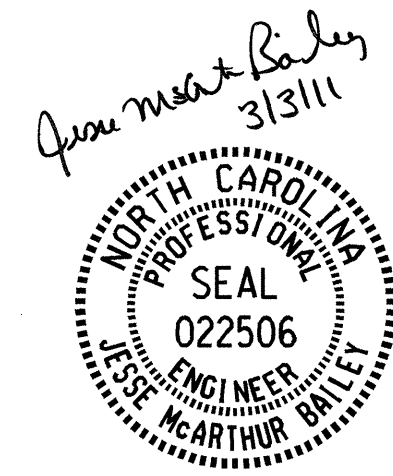
PROFILE ALONG CULVERT

TOTAL STRUCTURE QUANTITIES	
REMOVAL OF EXISTING STRUCTURE	----- LUMP SUM
PRECAST REINFORCED CONCRETE THREE-SIDED CULVERT @ STA. 212+28.000 -L-REV.	----- LUMP SUM
RIP RAP, CLASS II	----- 40.0 METRIC TONS
CLASS A CONCRETE	----- 98.5 CU. M.

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 212+28.000-L-REV

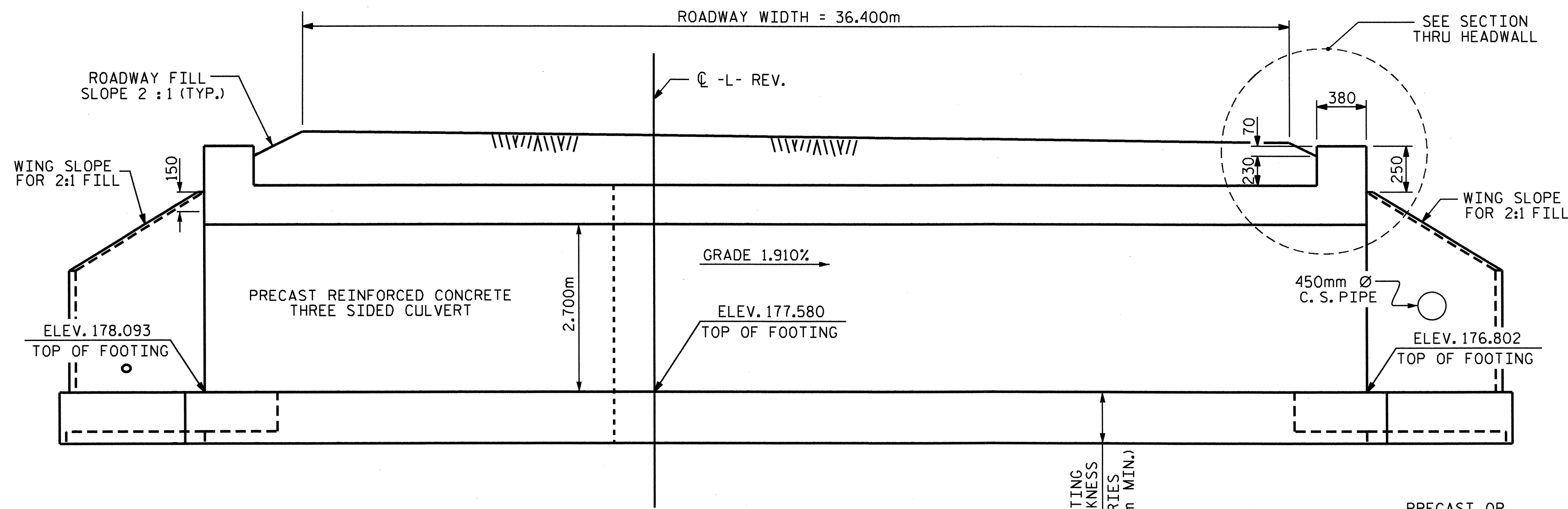
SHEET 1 OF 3 REPLACES CULVERT NO. C99

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
PRECAST REINFORCED CONCRETE THREE-SIDED CULVERT
 69° SKEW

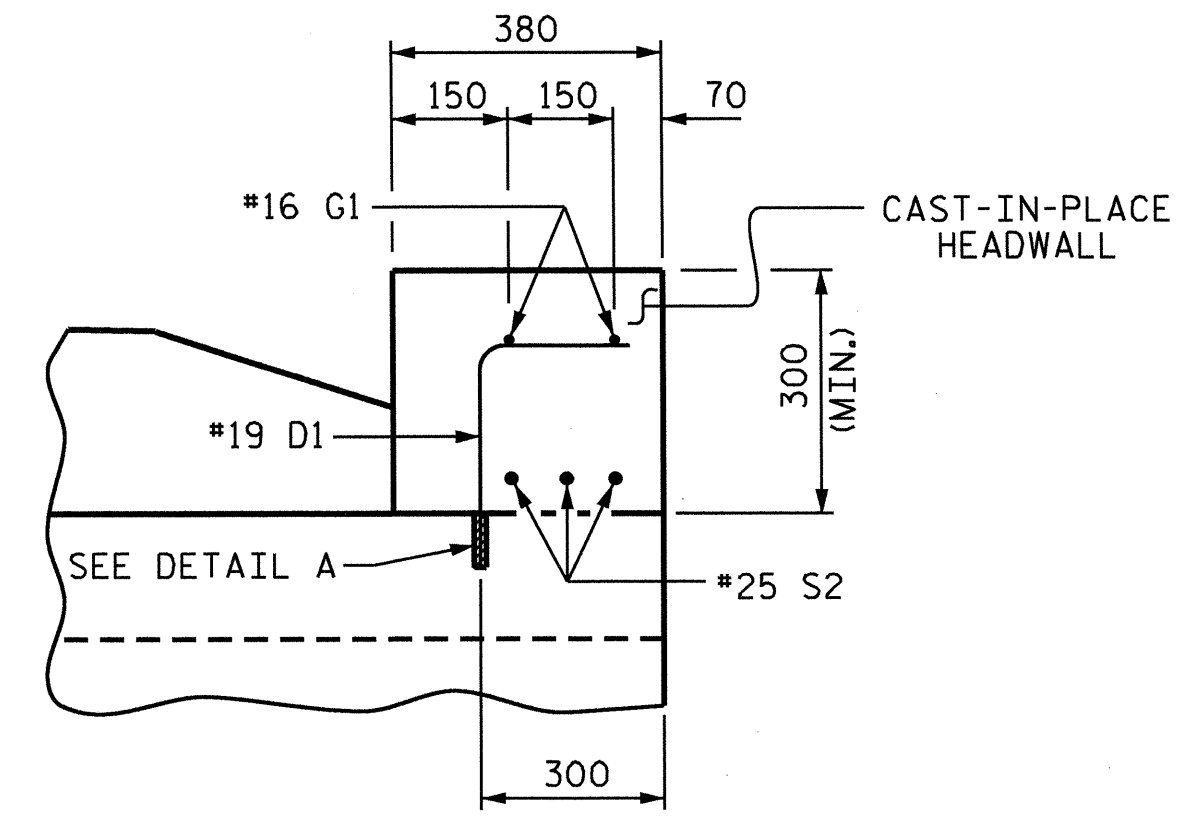


ASSEMBLED BY : M. G. SHAIKH DATE : 08-26-10
 CHECKED BY : B. KLAPPENBACH DATE : 12/10
 DRAWN BY : EEM 6/97
 CHECKED BY : ARB 7/97

REVISIONS						SHEET NO. C-11
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			



CULVERT SECTION NORMAL TO ROADWAY

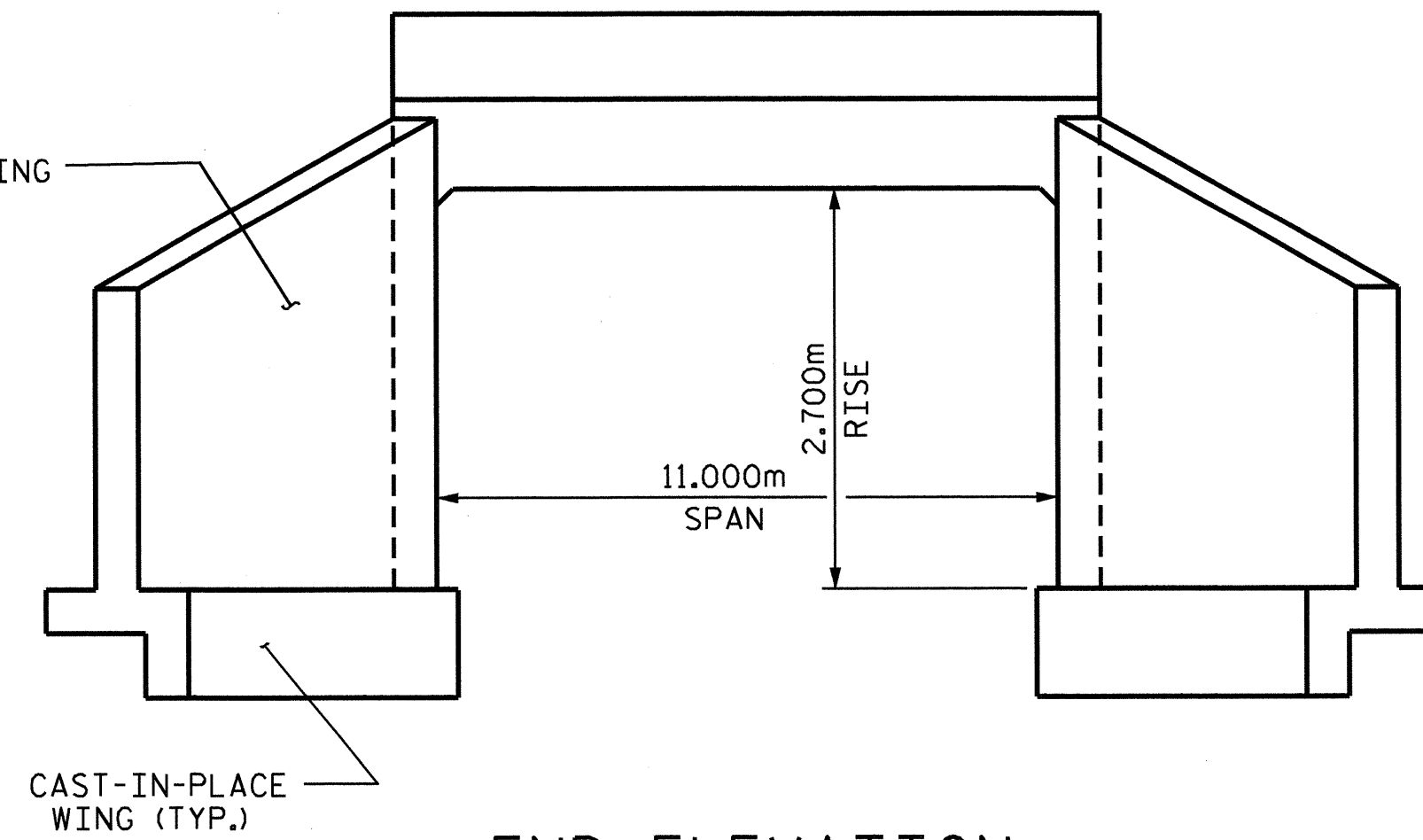


SECTION THRU HEADWALL

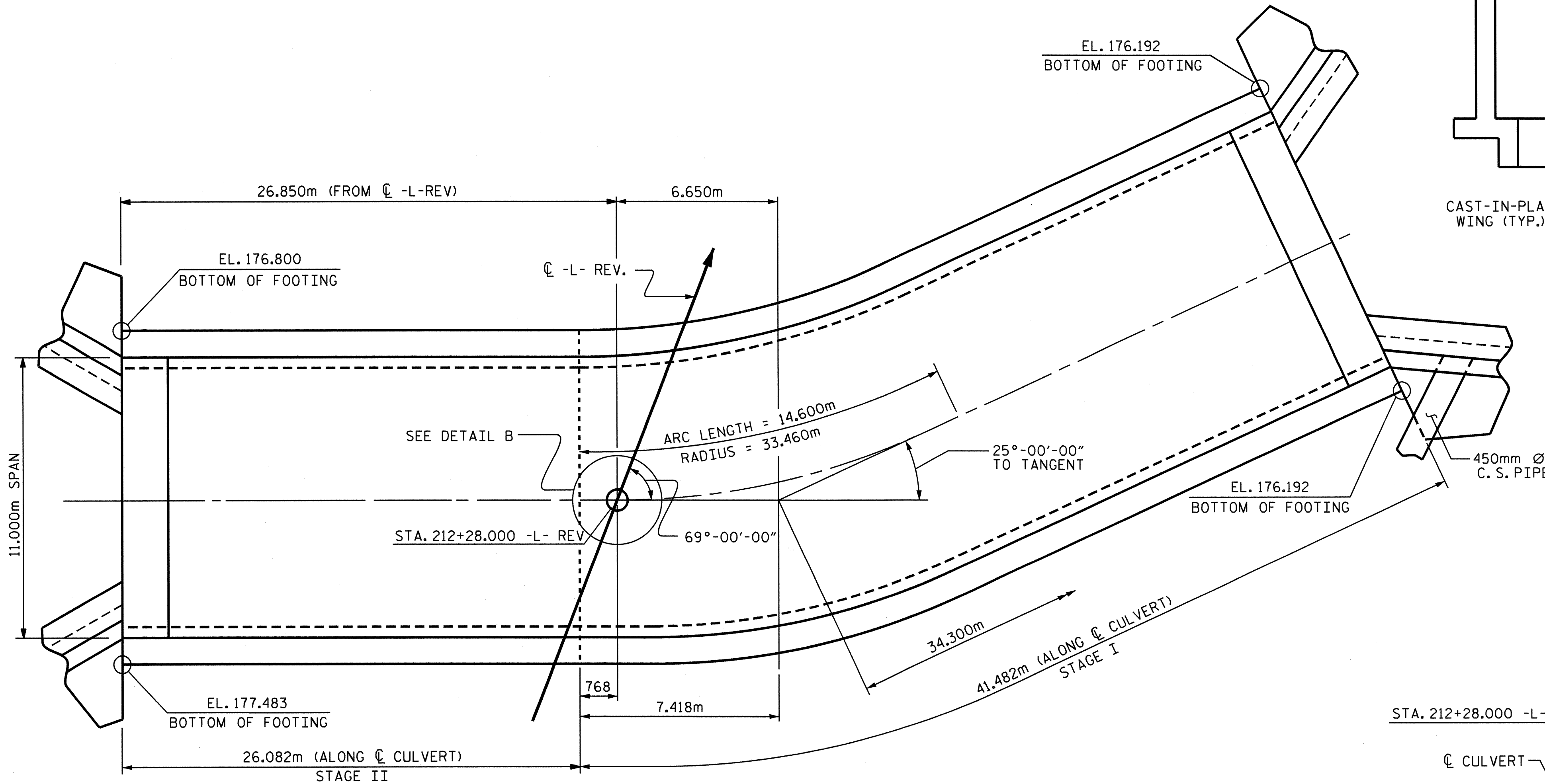
DETAIL A
 * APPROVED GALVANIZED CONCRETE INSERTS HAVING A MINIMUM WORKING LOAD TENSION CAPACITY OF 2.5 KIPS.
 DIA. =20mm, NO. REQUIRED 78

BAR SCHEDULE FOR ONE HEADWALL 2 REQUIRED					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
D1	39	19	1	1260	110
G1	2	16	STR	11500	71
S2	3	25	STR	11500	274
TOTAL				LBS.	559

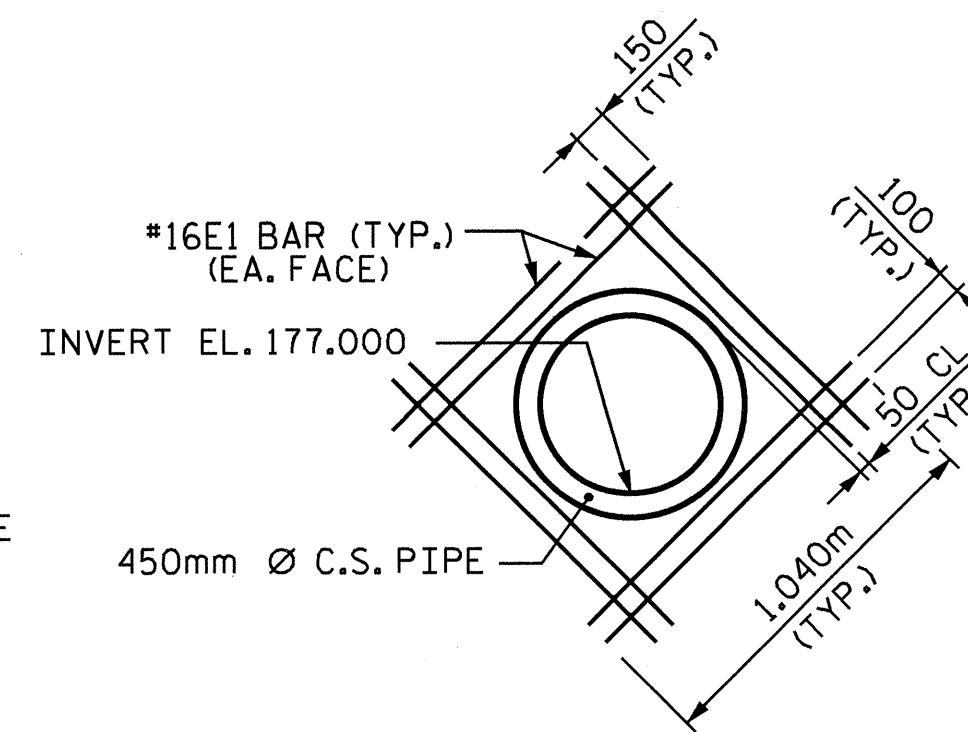
BAR TYPE	
1	280
	75
	D1
	60mm
	THREADED



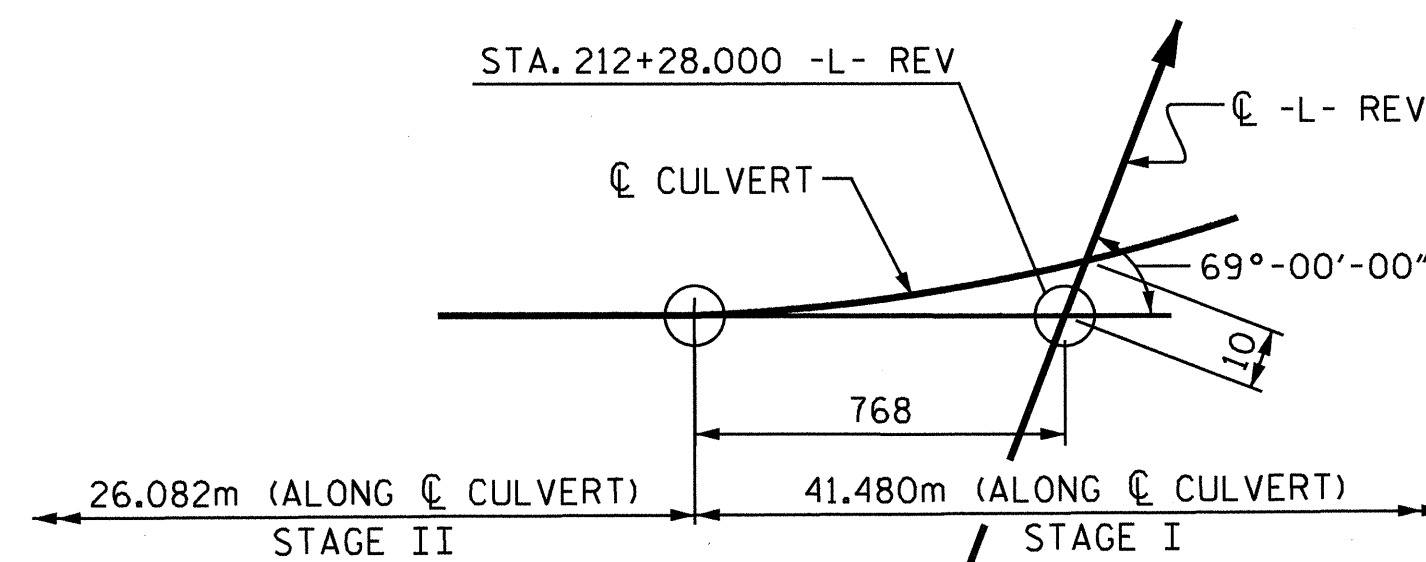
END ELEVATION



LENGTH FOR PRECAST THREE-SIDED CULVERT



DETAIL OF REINFORCING AROUND 450mm Ø PIPE
 (16-#16E1 REQUIRED, L=1.040m)



DETAIL B

NOTE : SEE SHEET 3 OF 3 FOR SECTION A-A

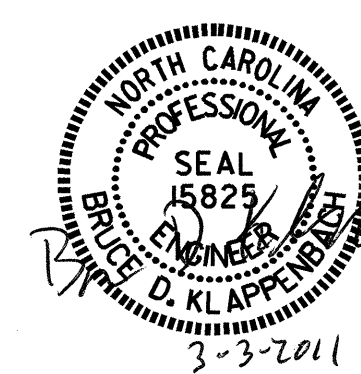
ASSEMBLED BY : M. G. SHAIKH DATE : 08-30-10
 CHECKED BY : B. KLAPPENBACH DATE : 12/10
 DRAWN BY : EEM 6/97
 CHECKED BY : ARB 7/97

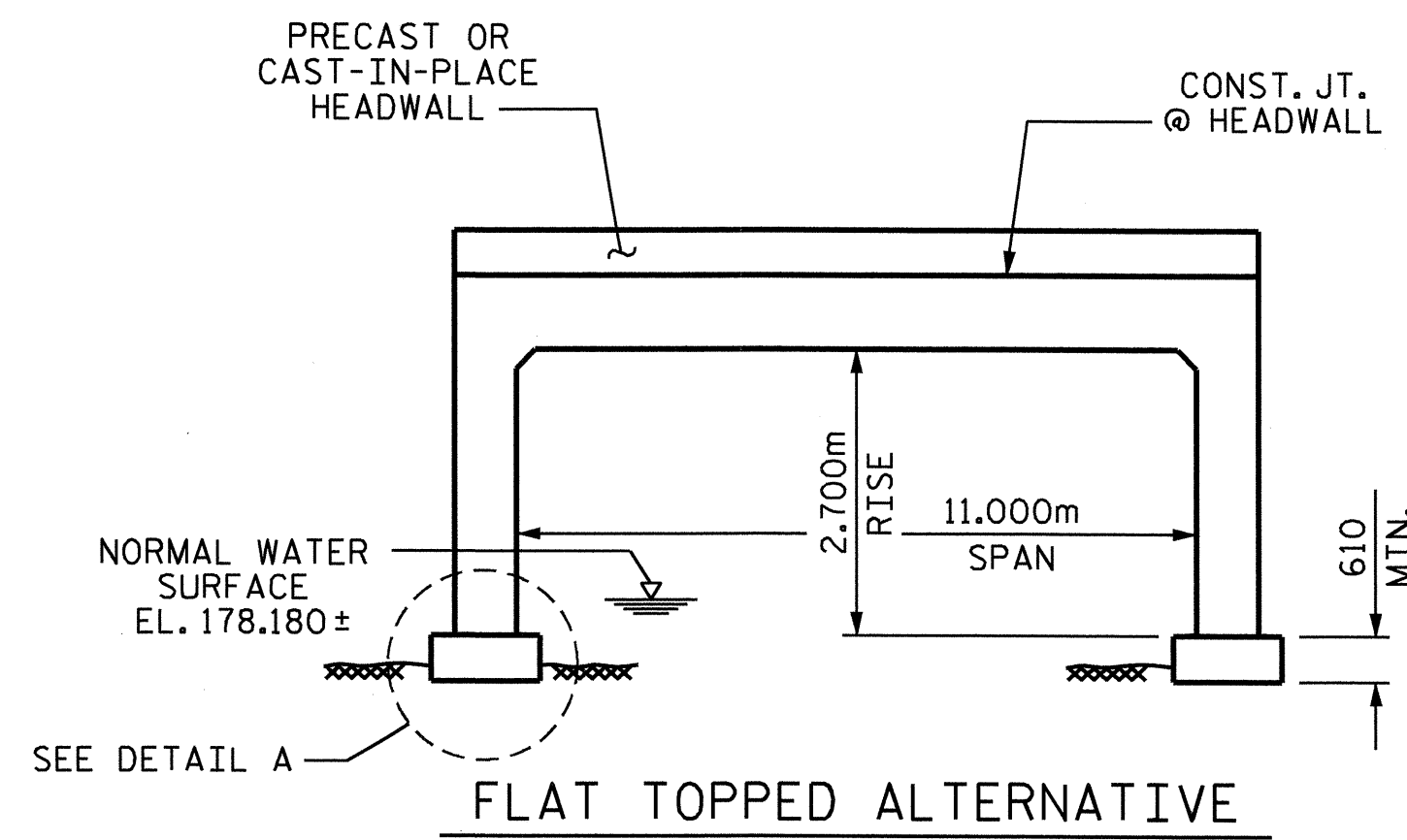
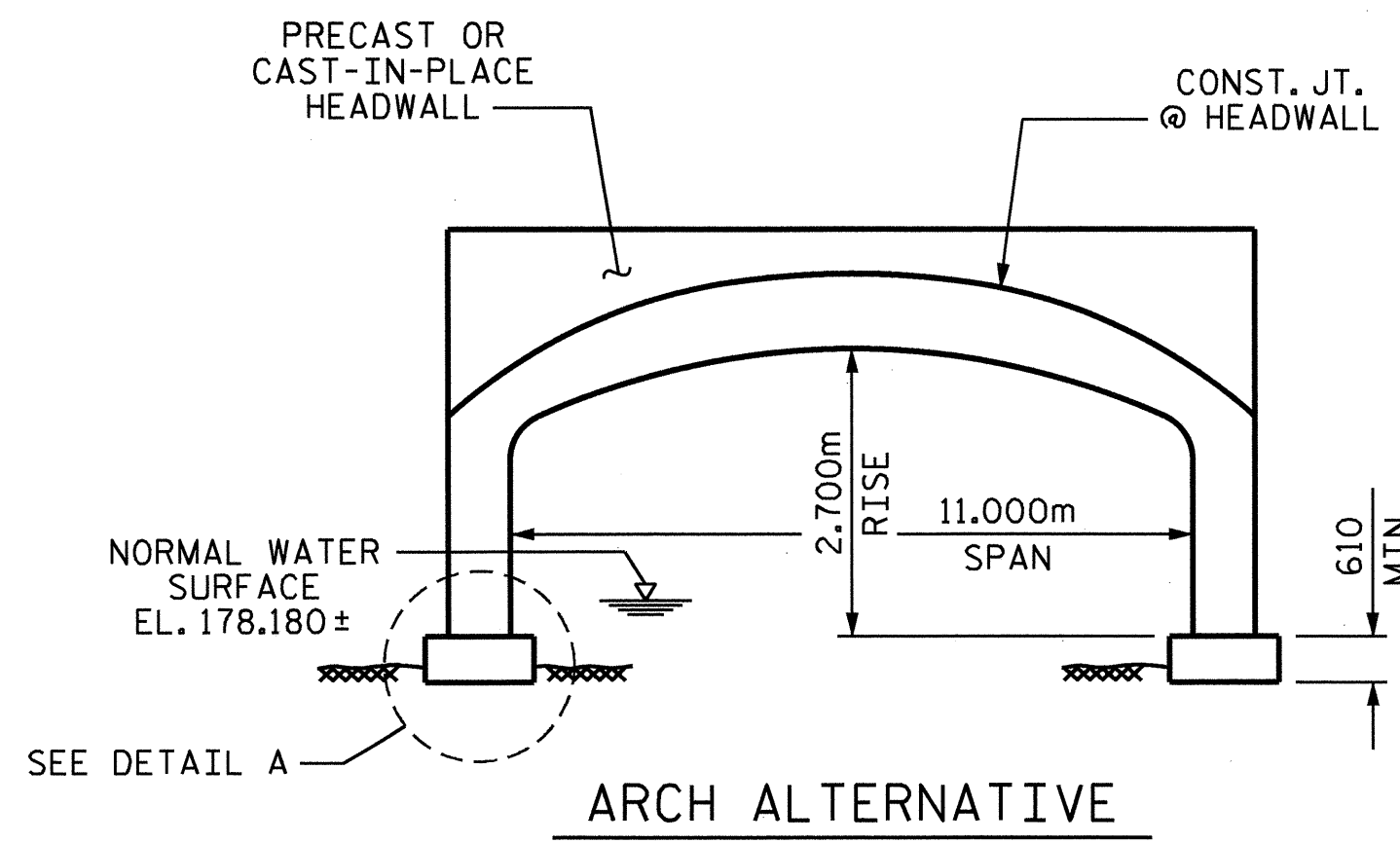
PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION 212+28.000-L-REV

SHEET 2 OF 3

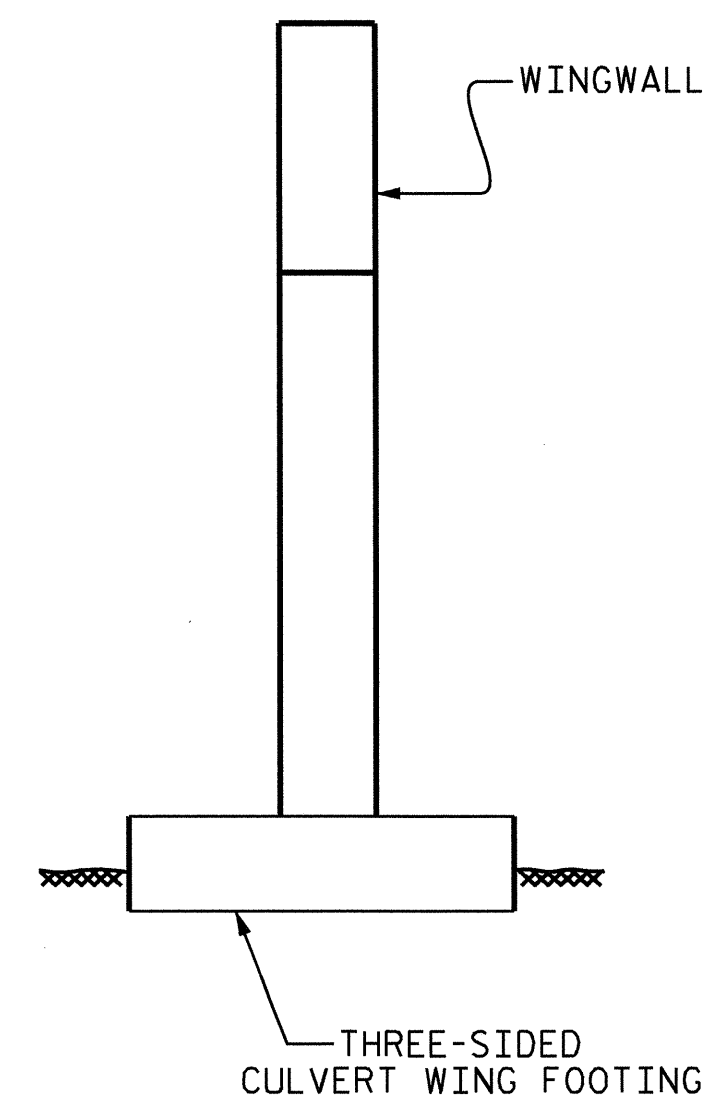
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
PRECAST REINFORCED CONCRETE THREE-SIDED CULVERT					
69° SKEW					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	
C-12	TOTAL SHEETS 42



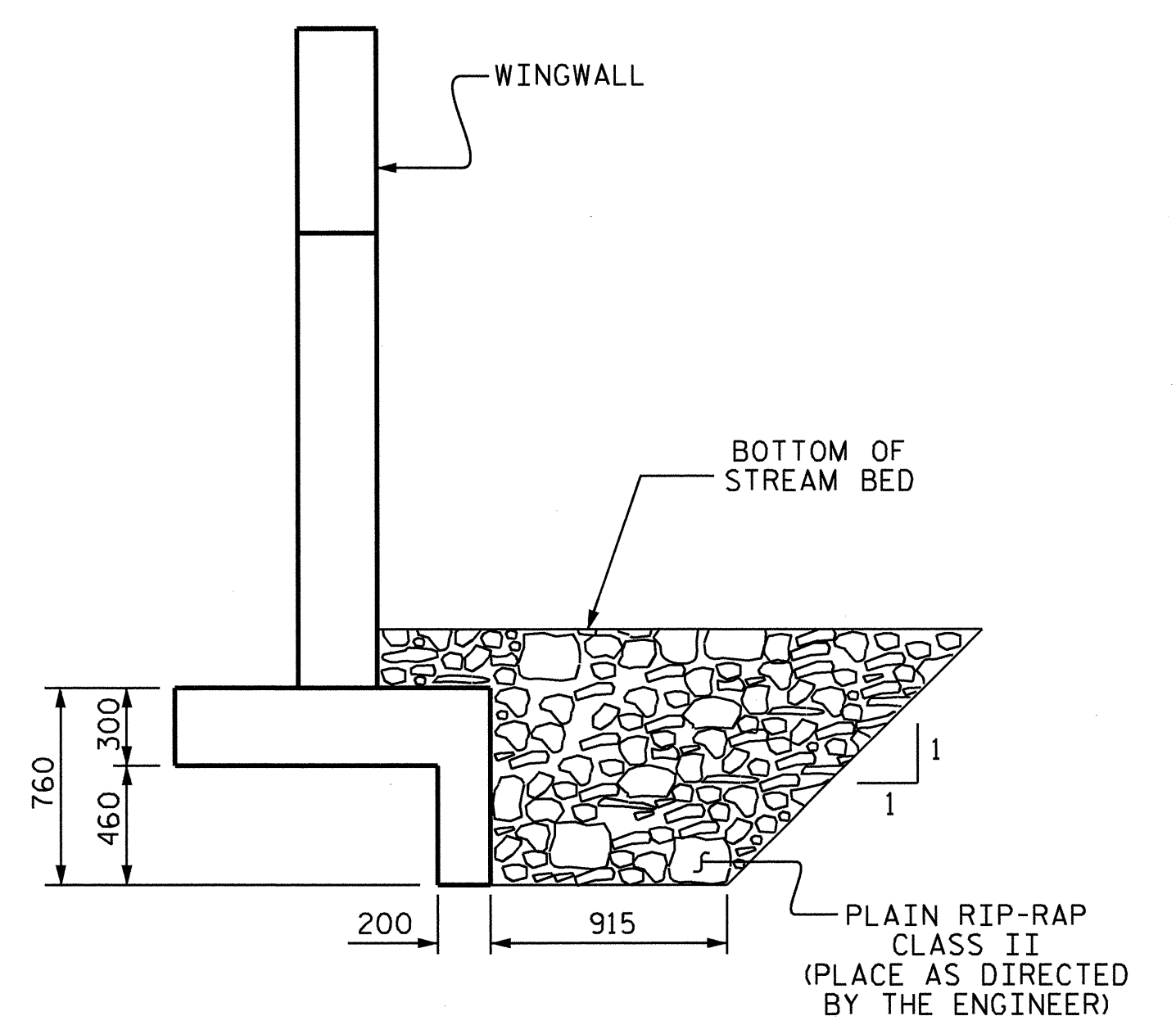


RIGHT ANGLE SECTION OF PRECAST CONCRETE THREE-SIDED CULVERT



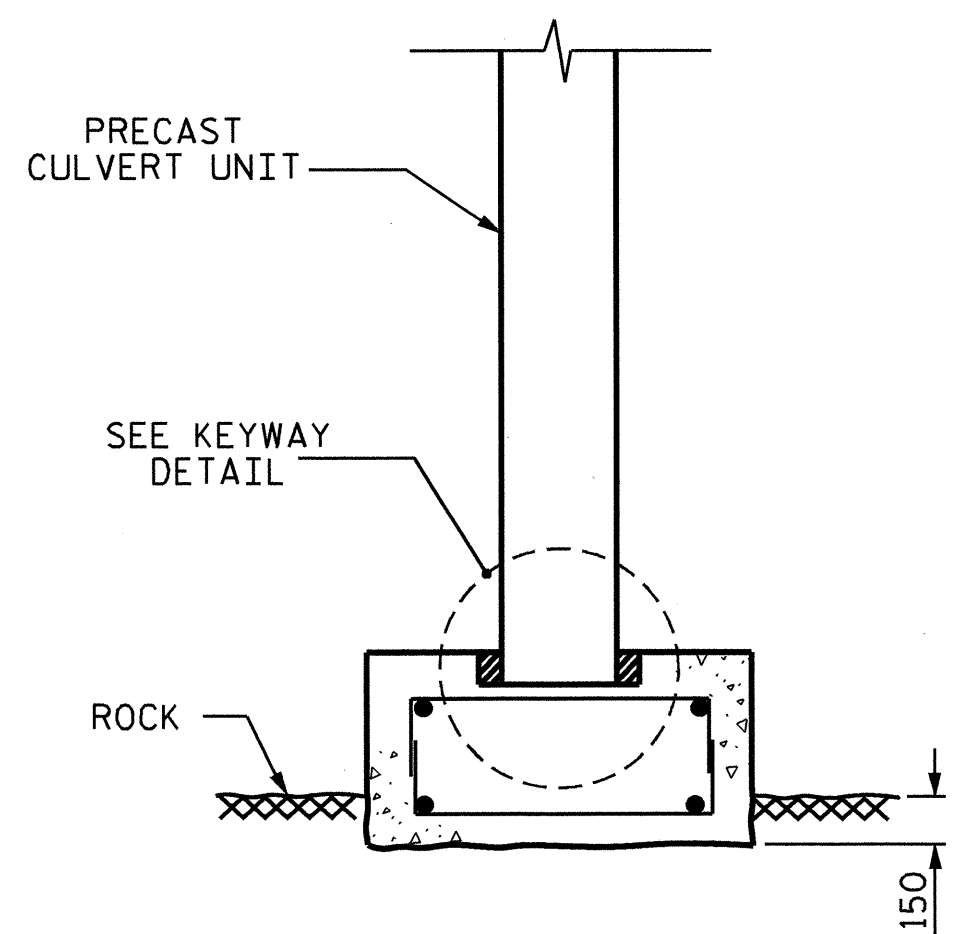
SECTION THRU WING WALL

CURTAIN WALL NOT REQUIRED WHEN FOOTINGS ARE KEYED INTO ROCK



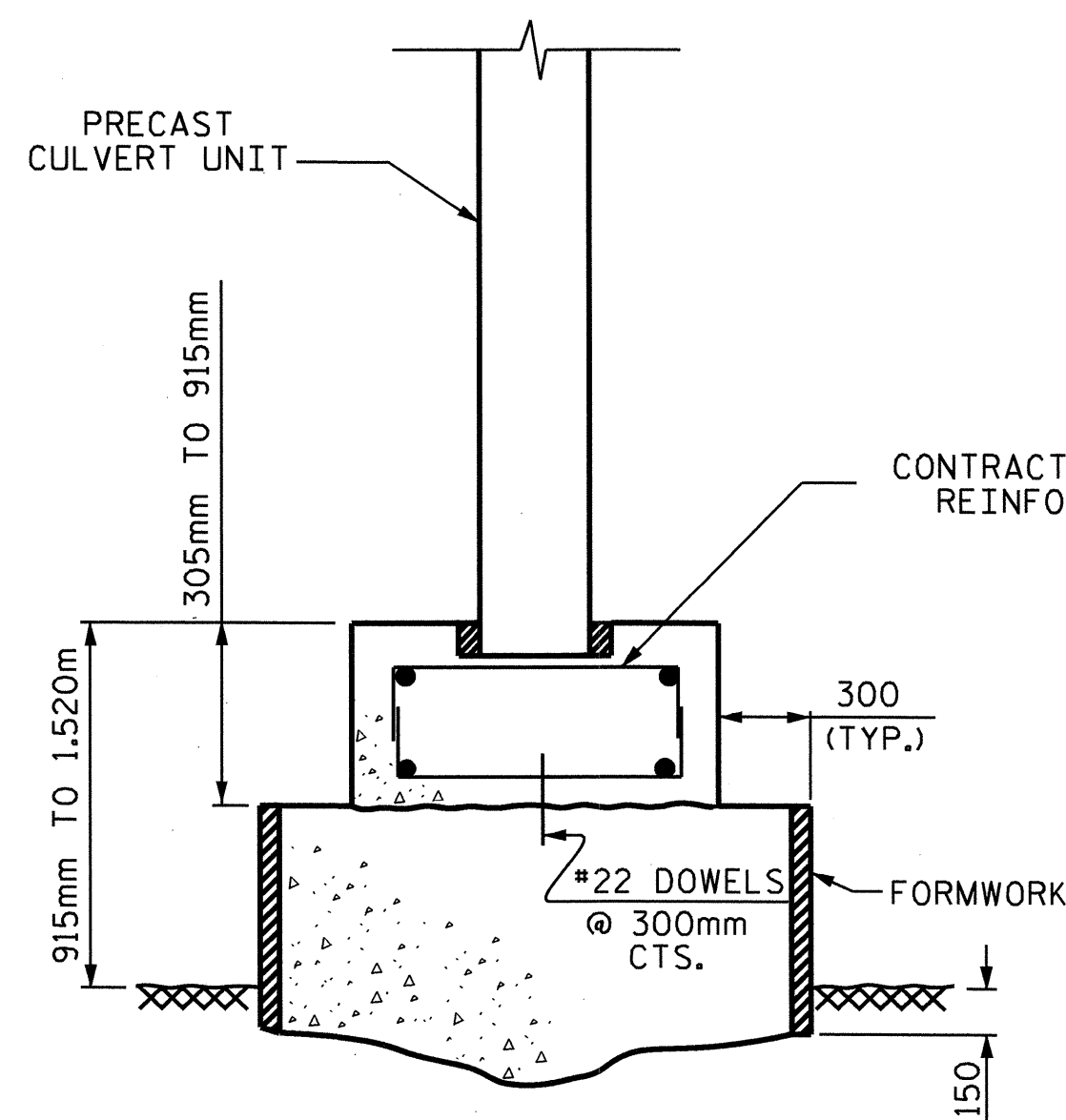
SECTION THRU WING WALL

WHEN FOOTINGS CANNOT BE KEYED INTO ROCK



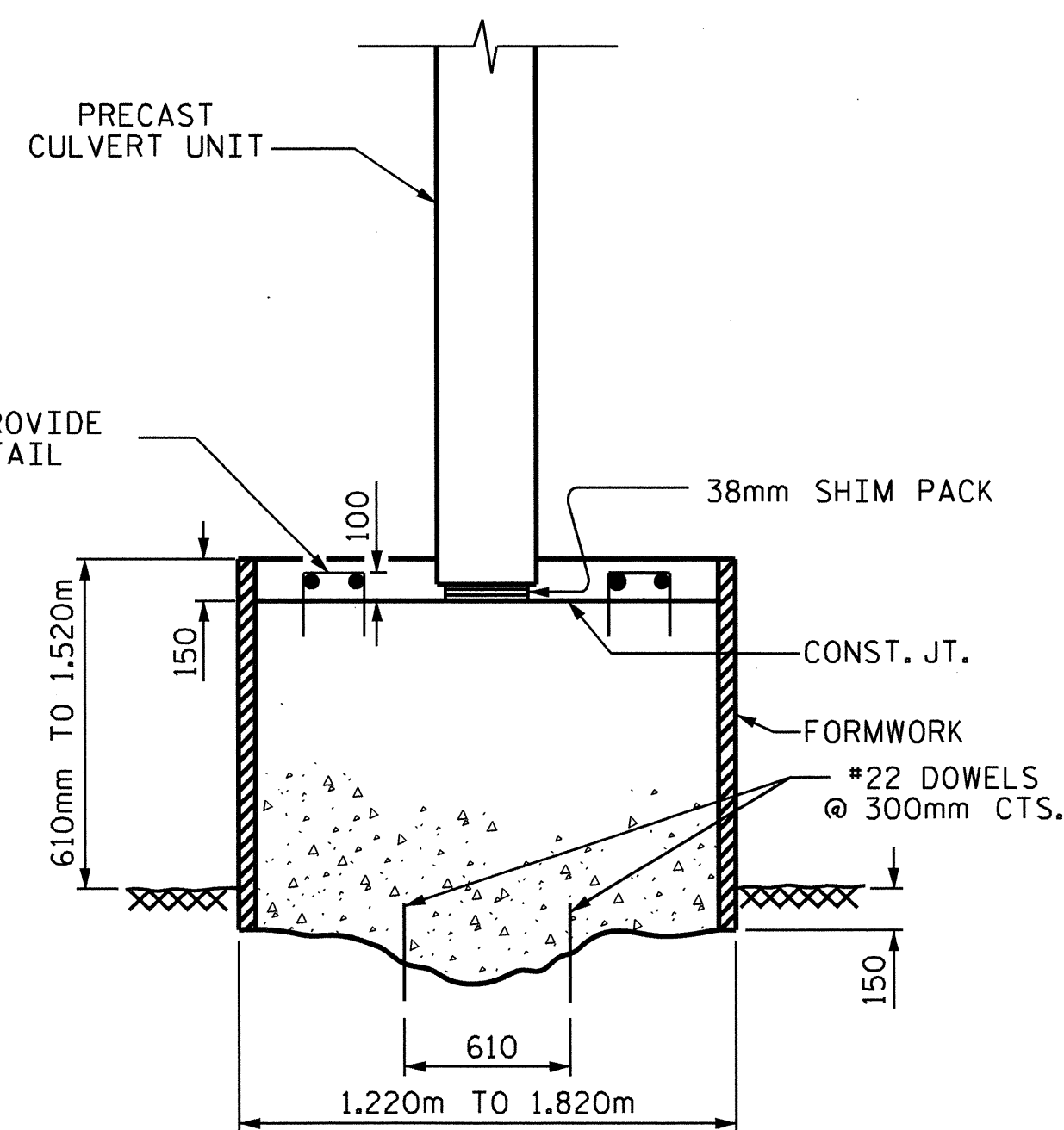
DETAIL A

FTG. KEYED INTO ROCK



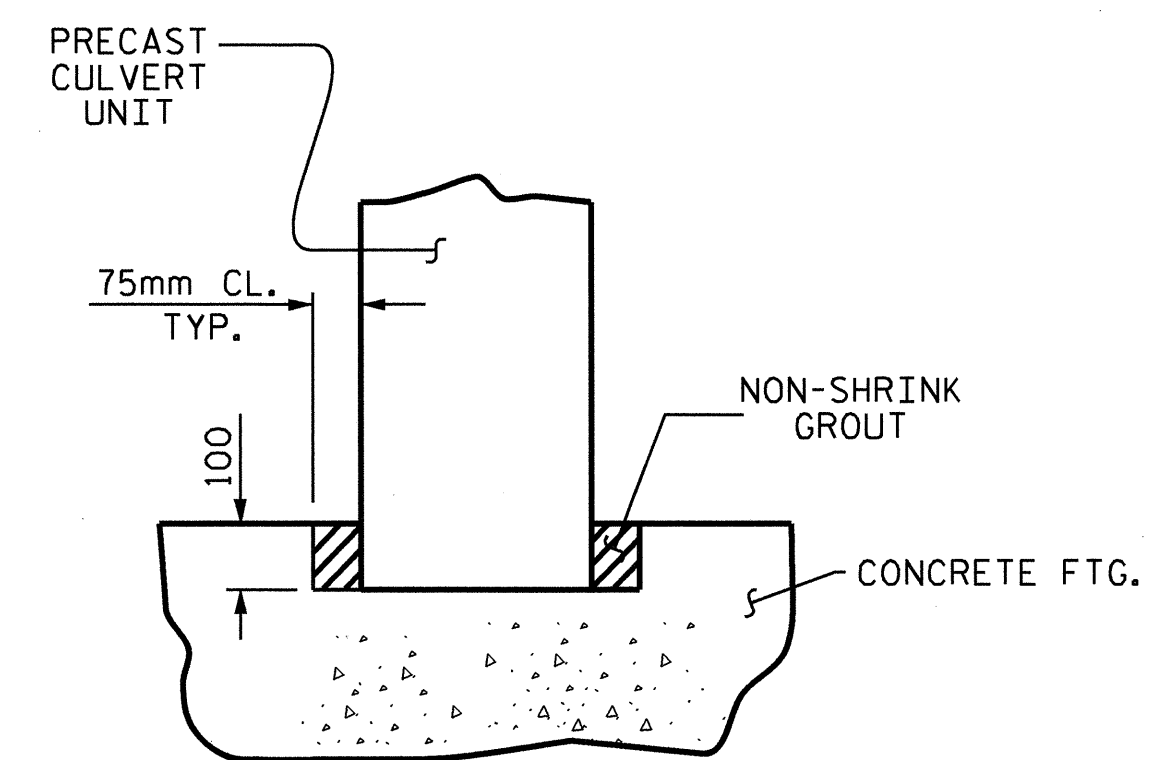
DETAIL A

OPTION 1
SUB-FTG TO BE USED WHEN FTG. CANNOT BE KEYED INTO ROCK



DETAIL A

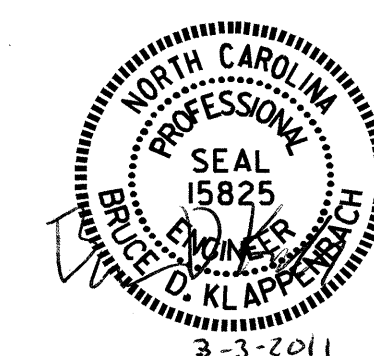
OPTION 2
MONOLITHIC SUB-FTG. AND FTG. TO BE USED WHEN FTG. CANNOT BE KEYED INTO ROCK



KEYWAY DETAIL

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 212+28.000-L-REV

SHEET 3 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 PRECAST REINFORCED CONCRETE THREE-SIDED CULVERT

69° SKEW

REVISIONS						SHEET NO. C-13
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

DRAWN BY: M. G. SHAIKH DATE: 08-31-10
 CHECKED BY: B. KLAPPENBACH DATE: 12/10

03-MAR-2011 09:25
 J:\Structures\Culvert2\mshaikh\Microstation\R-2533CC.SD.CU.dgn
 mshaikh

B.M. #115 : RAIL ROAD SPIKE IN BASE OF 373mm Ø OAK TREE, 25.500m LEFT OF STA. 212+46.000 -L- ELEV. 181.692m DATUM: NGVD 29

F.A. PROJECT NO. NHS-0049(26)

NOTES

ASSUMED LIVE LOAD ----- MS18 OR ALTERNATE LOADING.
 DESIGN FILL = 1.570m
 FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
 76mm Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
 CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 100mm OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION, EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS, EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 360,000kg OF REINFORCING STEEL, ONE 760mm SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 360,000kg OF REINFORCING STEEL, TWO 760mm SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

A 900mm STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

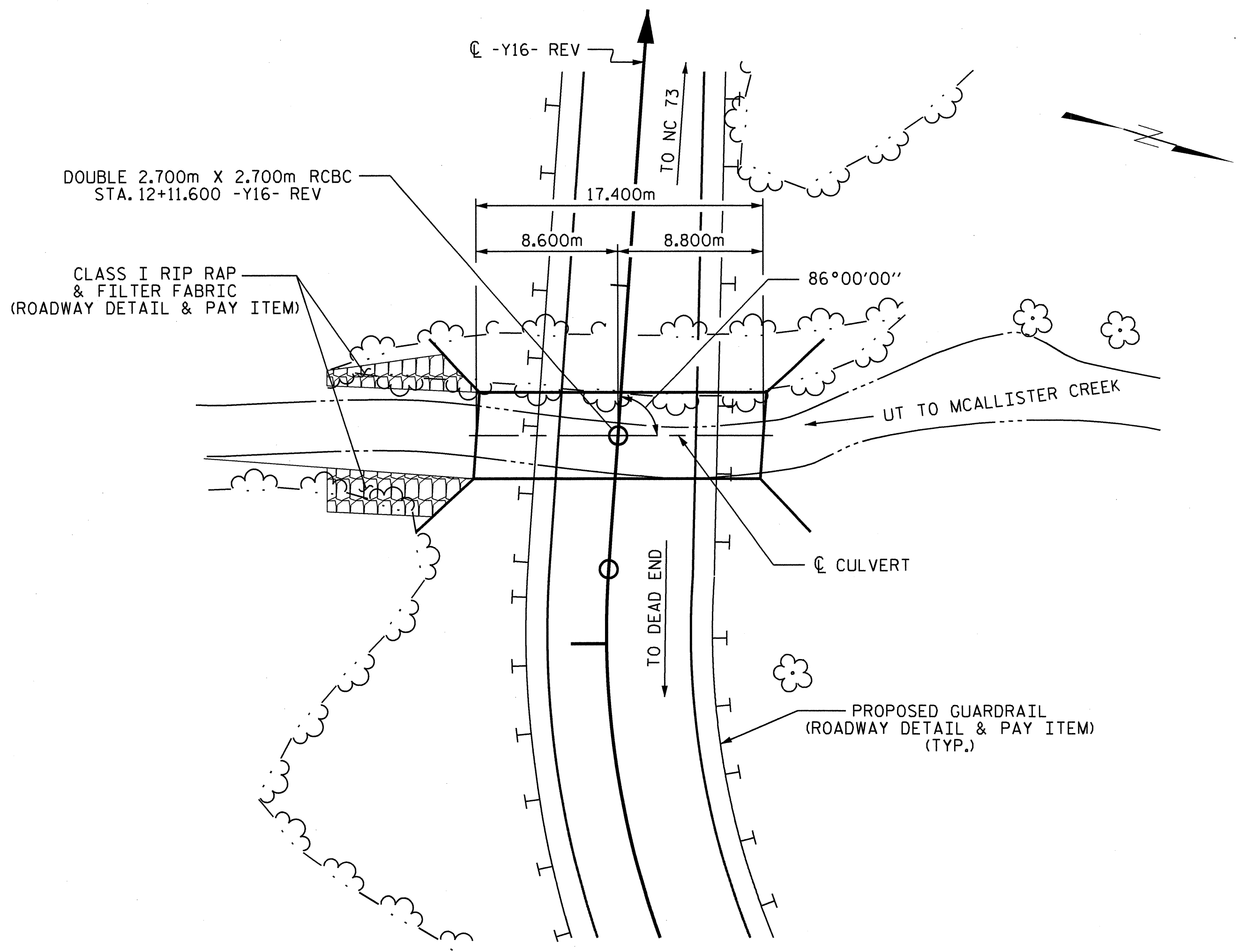
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

ROADWAY DATD

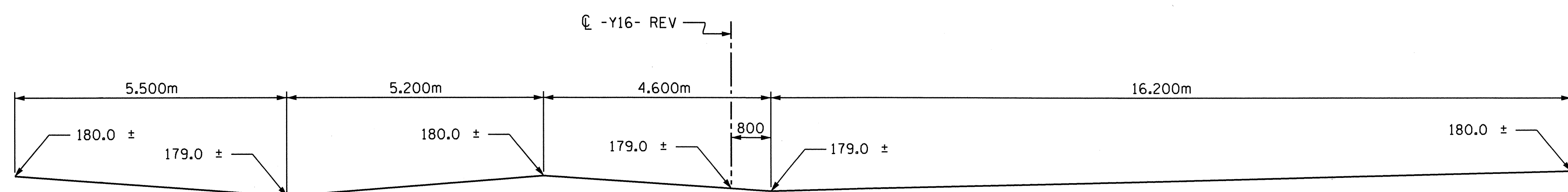
GRADE POINT ELEV. @ STA. 12+11.600 -Y16- REV ---- = 183.855m
 BED ELEV. @ STA. 12+11.600 -Y16- REV ----- = 179.750m
 ROADWAY SLOPES ----- = 2 : 1

HYDRAULIC DATA

DESIGN DISCHARGE ----- = 25.5m³/SEC.
 FREQUENCY OF DESIGN FLOOD ----- = 25 YEARS
 DESIGN HIGH WATER ELEVATION ----- = 182.510m
 DRAINAGE AREA ----- = 3.55 SQ. KM
 BASIC DISCHARGE (Q100) ----- = 33.6m³/SEC.
 BASIC HIGH WATER ELEVATION ----- = 183.400m

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE ----- = 33.6m³/SEC.
 FREQUENCY OF OVERTOPPING FLOOD ----- = 100 YEARS+
 OVERTOPPING FLOOD ELEVATION ----- = 184.020m

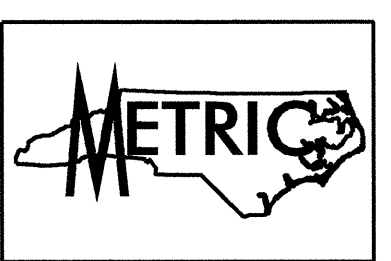
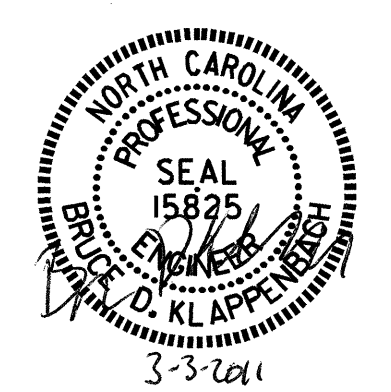
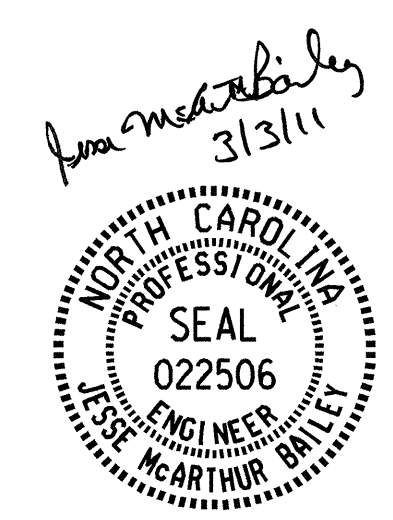


PROFILE ALONG CULVERT

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE			
BARREL @	4.99	m ³ /m	86.8 m ³
WINGS ETC.			22.7 m ³
TOTAL			109.5 m ³
REINFORCING STEEL			
BARREL			9847 kg
WINGS ETC.			879 kg
TOTAL			10,726 kg

CULVERT EXCAVATION ----- LUMP SUM
 FOUNDATION COND. MAT'L ---- 71 METRIC TONS



PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 12+11.600 -Y16- REV

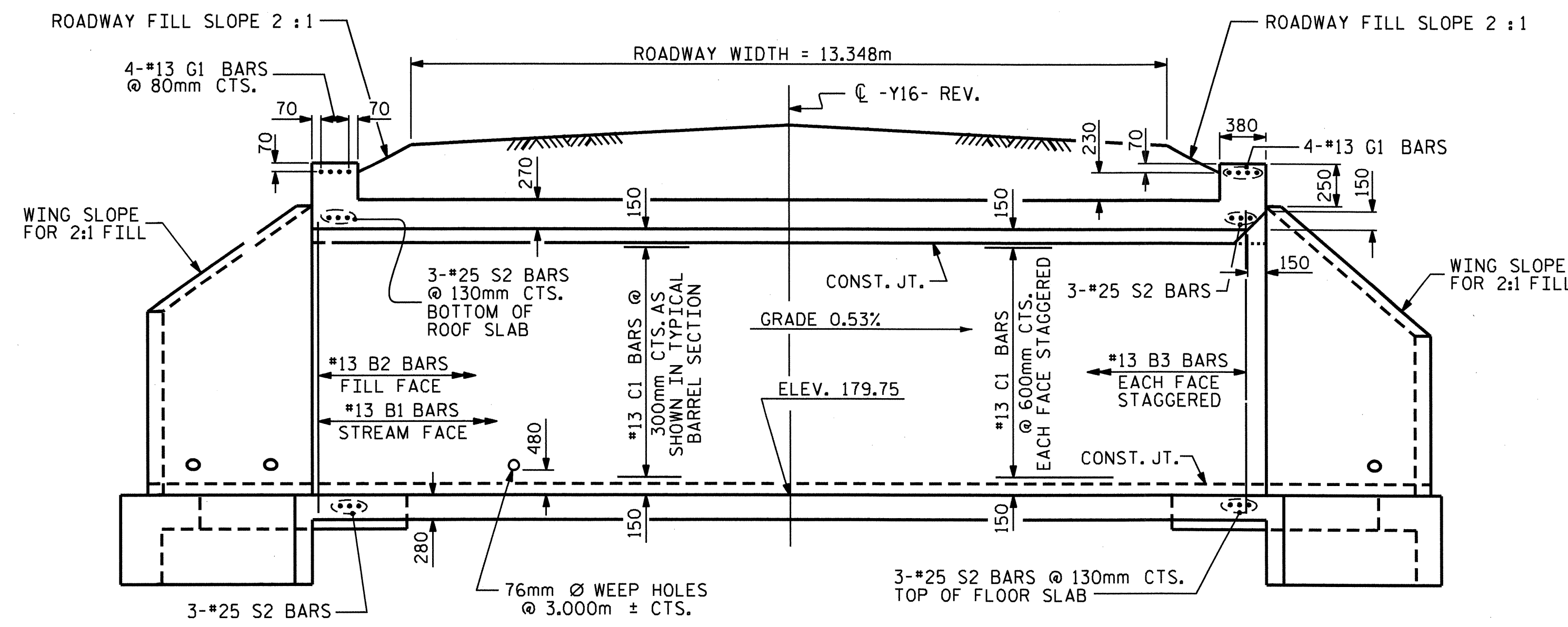
SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

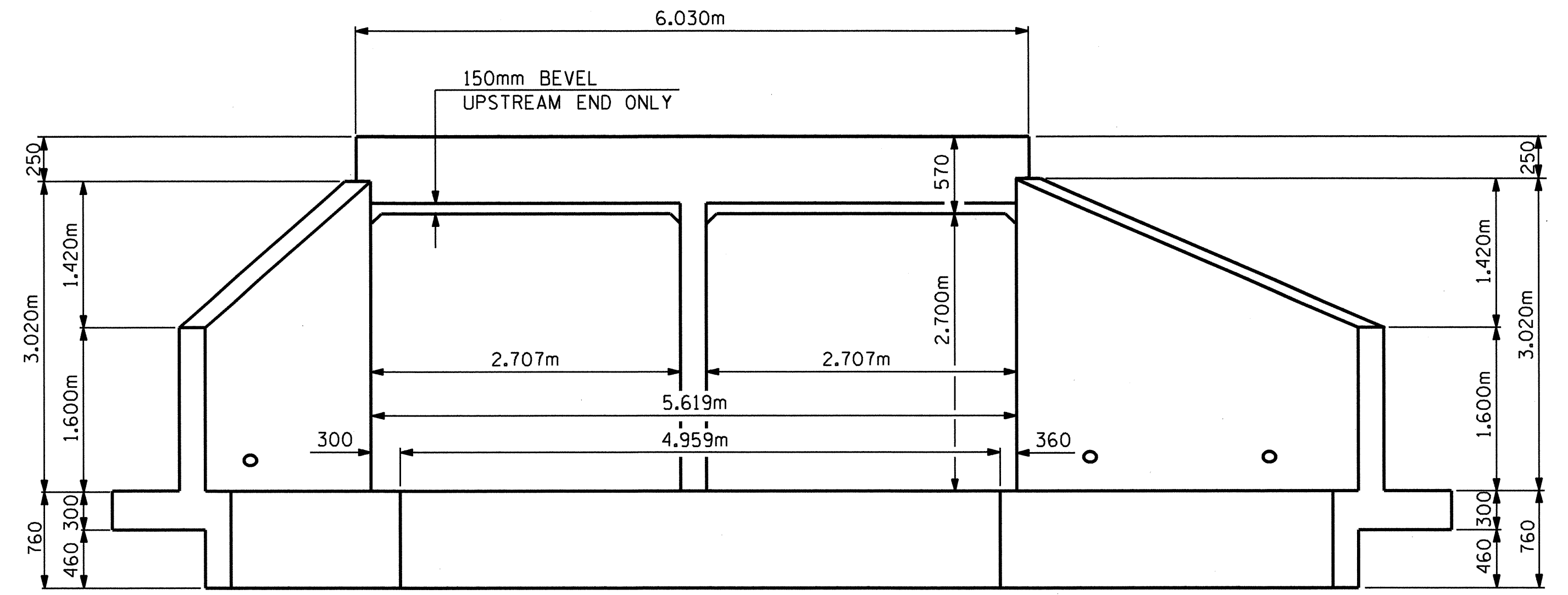
BARREL STANDARD
 DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT
 86° SKEW

REVISIONS						SHEET NO. C-14
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

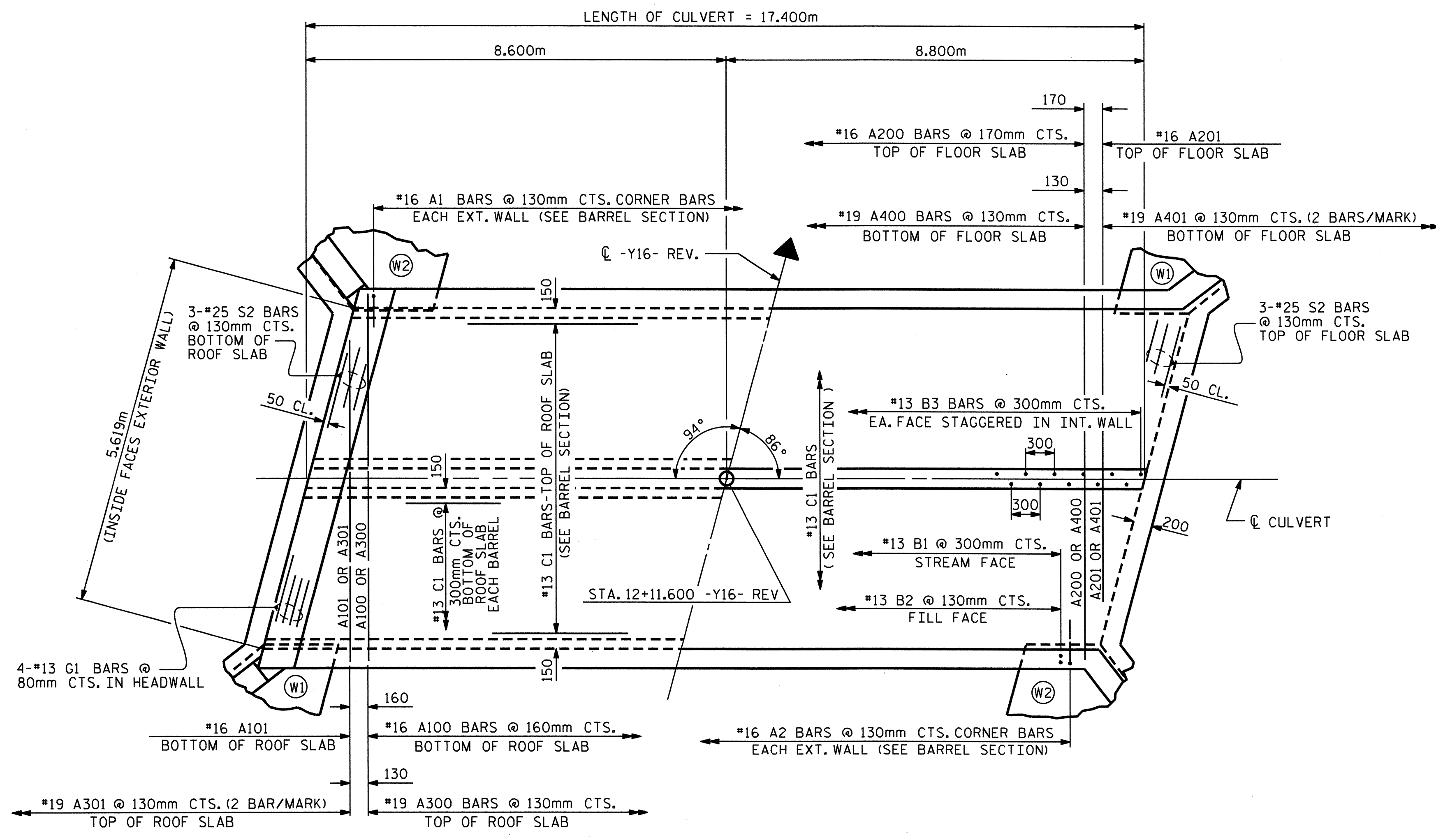
ASSEMBLED BY : D. A. GLADDEN DATE : 6-30-10
 CHECKED BY : M. G. SHAIKH DATE : 12-9-10
 DRAWN BY : EEM 6/97
 CHECKED BY : ARB 7/97



EXTERIOR WALL INTERIOR WALL
CULVERT SECTION NORMAL TO ROADWAY

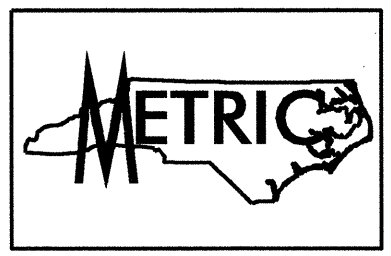


END ELEVATION - NORMAL TO SKEW



PART PLAN - ROOF SLAB

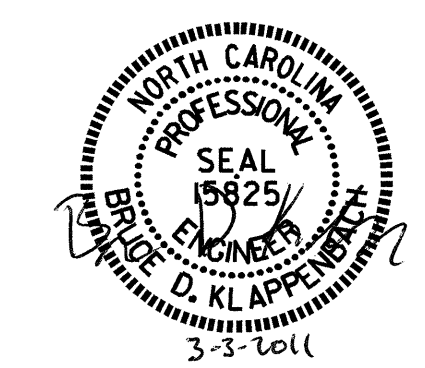
PART PLAN - FLOOR SLAB



PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 12+11.600 -Y16- REV

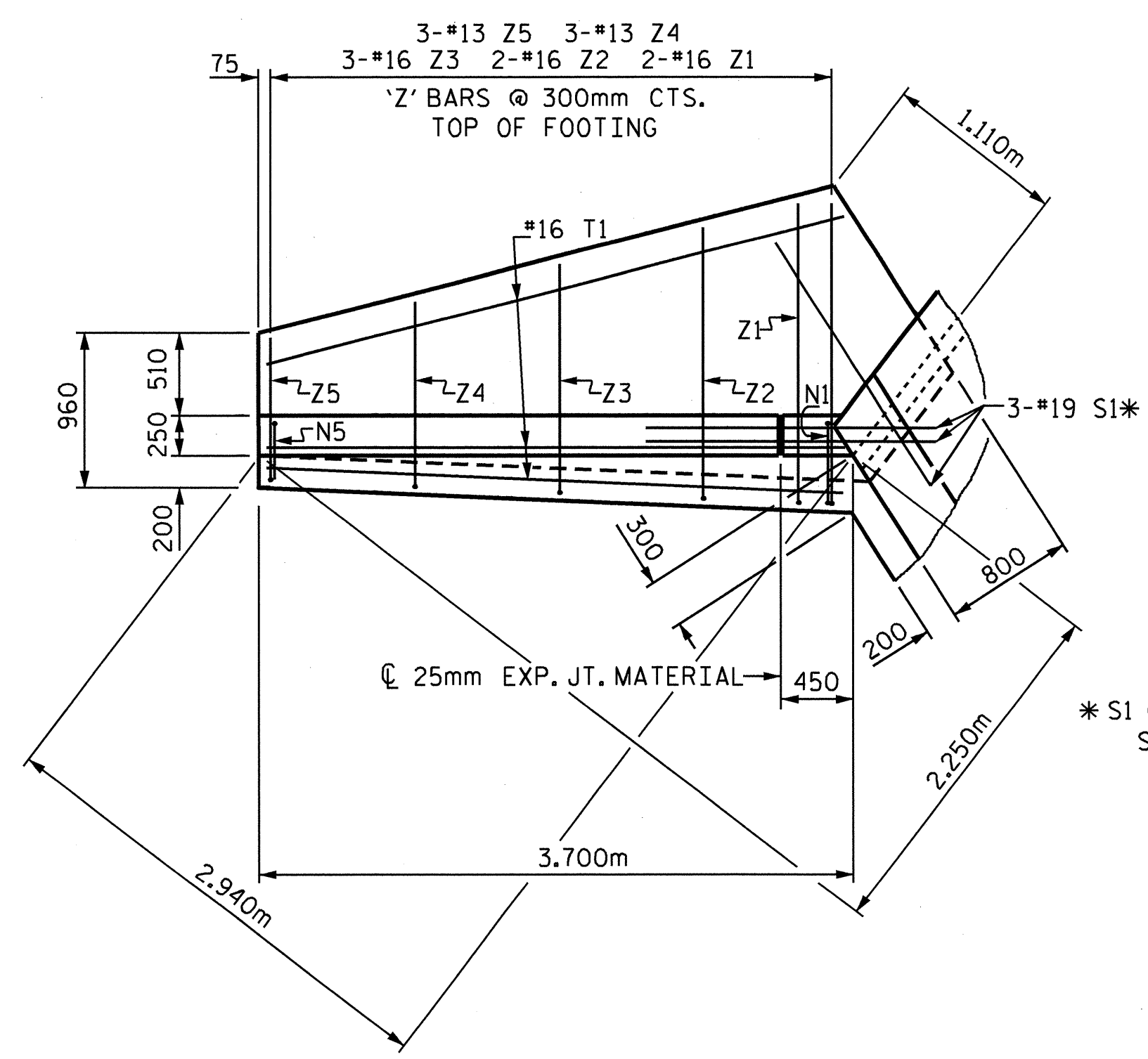
SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 BARREL STANDARD
 DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT
 86° SKEW

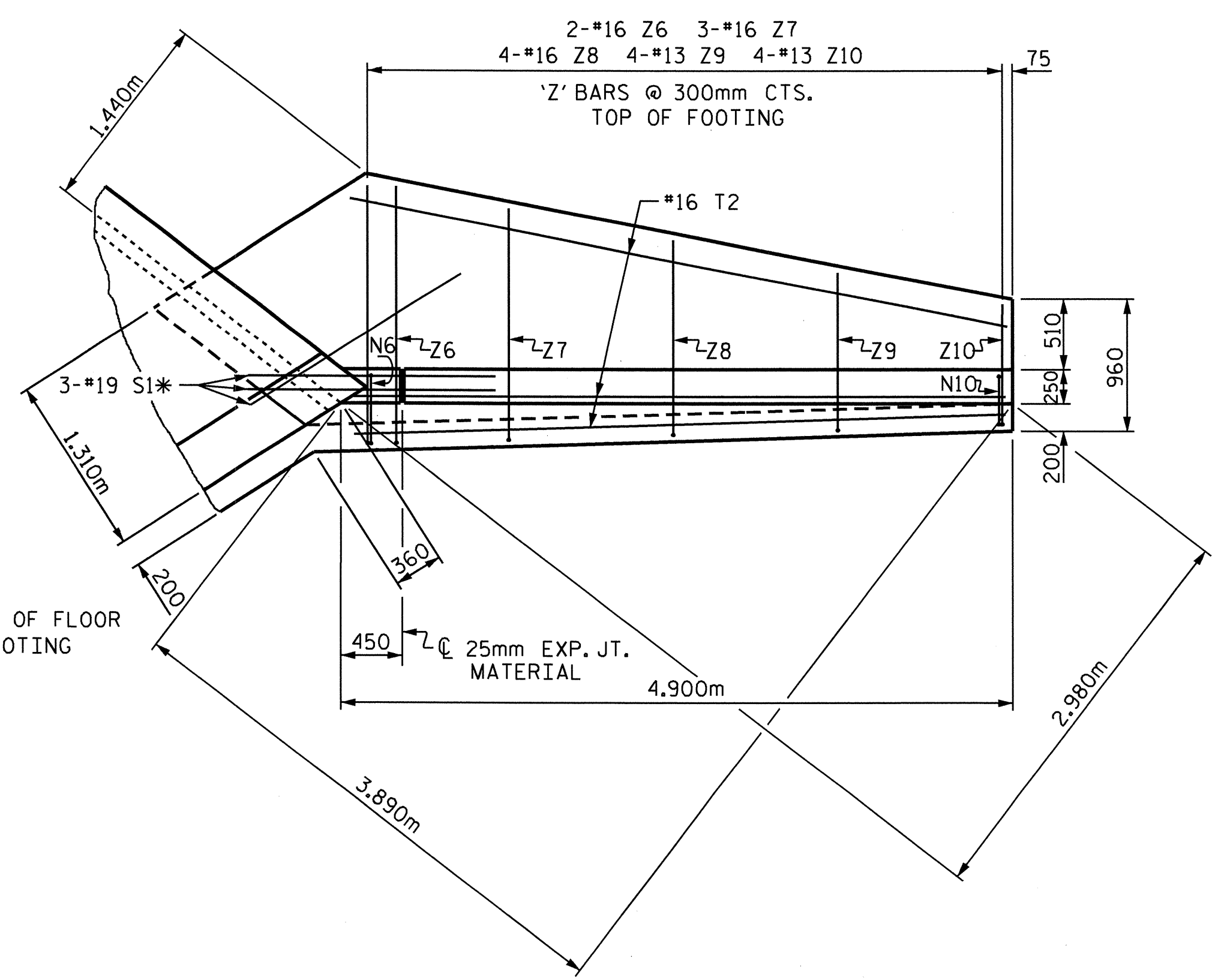


ASSEMBLED BY: D. A. GLADDEN DATE: 6-30-10
 CHECKED BY: M. G. SHAIKH DATE: 12-9-10
 DRAWN BY: EEM 6/97
 CHECKED BY: ARB 7/97

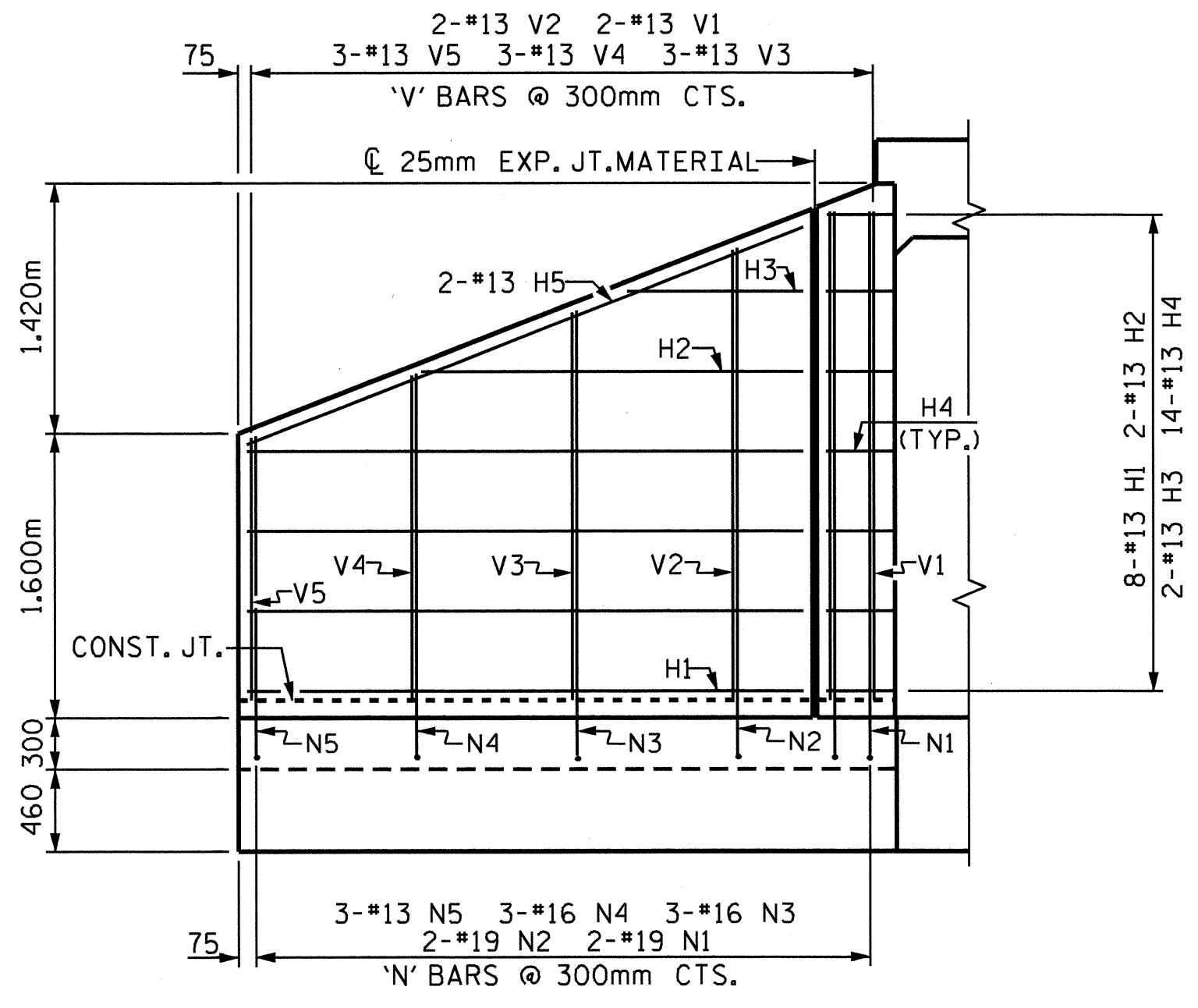
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NO.	BY:	DATE:	NO.	BY:	DATE:	C-15	
1			3			TOTAL SHEETS 42	
2			4				



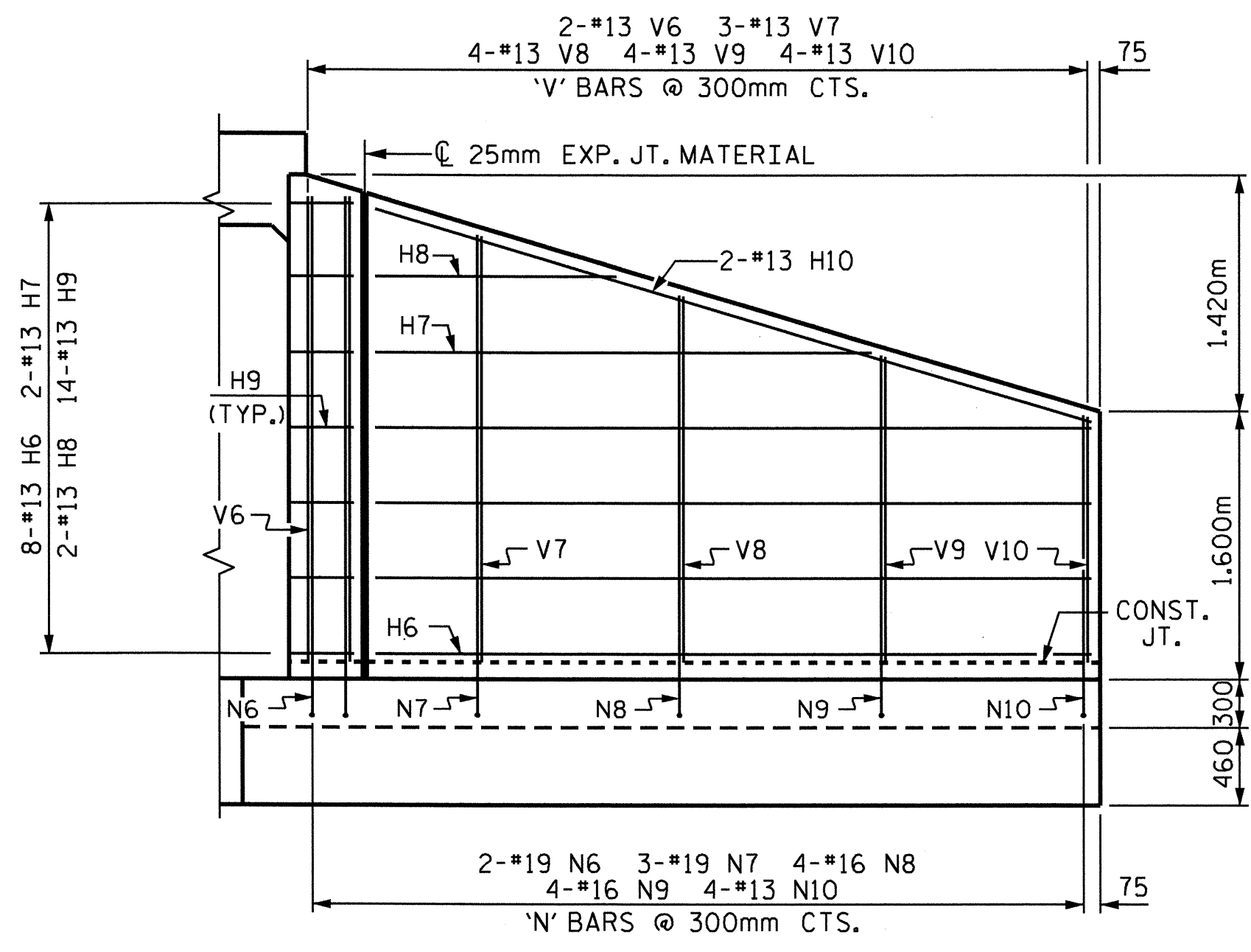
PLAN W2



PLAN W1

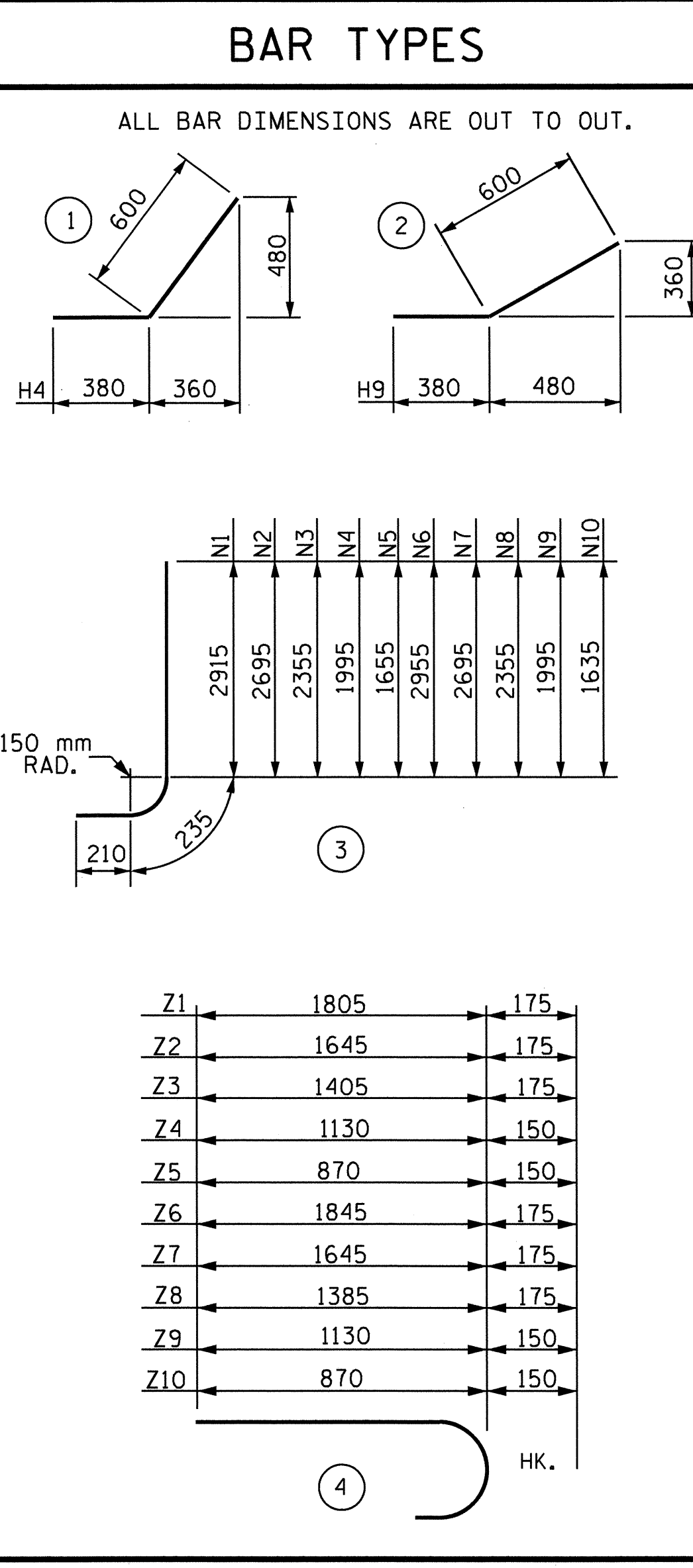


ELEVATION W2

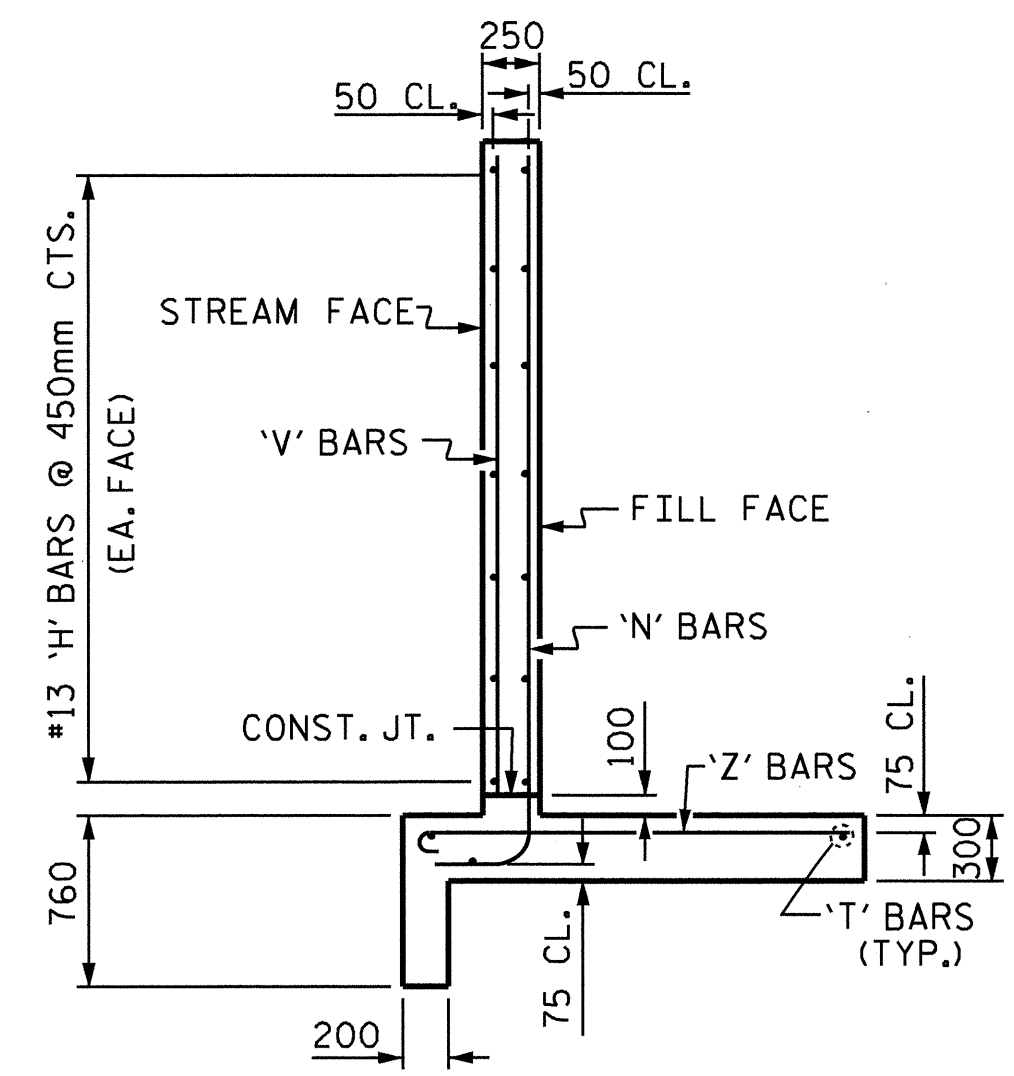


ELEVATION W1

FOR WING ORIENTATION, SEE BARREL STANDARD SHEET.



TYPICAL WING SECTION



BILL OF MATERIAL

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	13	STR	3140	50
H2	4	13	STR	2160	9
H3	4	13	STR	1000	4
H4	28	1	STR	980	27
H5	4	13	STR	3360	13
H6	16	13	STR	4340	69
H7	4	13	STR	3060	12
H8	4	13	STR	1540	6
H9	28	1	STR	980	27
H10	4	13	STR	4500	18
N1	4	19	STR	3360	30
N2	4	19	STR	3140	28
N3	6	19	STR	2800	26
N4	6	19	STR	2440	23
N5	6	19	STR	2100	13
N6	4	19	STR	3400	30
N7	6	19	STR	3140	42
N8	6	19	STR	2800	35
N9	6	19	STR	2440	30
N10	8	13	STR	2080	17
S1	12	19	STR	1800	48
T1	6	16	STR	3700	34
T2	6	16	STR	4900	46
V1	4	13	STR	2740	11
V2	4	13	STR	2520	10
V3	4	13	STR	2180	13
V4	6	13	STR	1820	11
V5	6	13	STR	1480	9
V6	4	13	STR	2780	11
V7	4	13	STR	2520	15
V8	8	13	STR	2180	17
V9	8	13	STR	1820	14
V10	8	13	STR	1460	12
Z1	4	16	4	1980	12
Z2	4	16	4	1820	11
Z3	6	16	4	1580	15
Z4	4	16	4	1280	8
Z5	4	16	4	1020	6
Z6	4	16	4	2020	13
Z7	4	16	4	1820	17
Z8	8	16	4	1560	19
Z9	8	16	4	1280	10
Z10	8	13	4	1020	8

REINFORCING STEEL FOR 4 WINGS 879 kg

CLASS A CONCRETE

4 WINGS 19.8 m³

2 HEADWALLS 1.4 m³

2 END CURTAIN WALLS 1.5 m³

TOTAL 22.7 m³

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 12+11.600 -Y16- REV

SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 2.700m SLOPE 2:1
 86° SKEW

REVISIONS					SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-17
1			3			TOTAL SHEETS
2			4			42



ASSEMBLED BY : D. A. GLADDEN DATE : 6-30-10
 CHECKED BY : M. G. SHAIKH DATE : 12-9-10
 DRAWN BY : KJA 6/97
 CHECKED BY : VAP 7/97

BENCH MARK #115: RR SPIKE IN BASE OF 375mm Ø OAK TREE 25.500m LT. OF STA. 212+46.000-L-

F.A. PROJECT NO. NHS-0049(26)

ROADWAY DATA

GRADE POINT ELEV. @ STA. 12+68.32-Y1-REV = 187.260
 GRADE POINT ELEV. @ STA. 6+11.80-RAMP A = 187.730
 BED ELEV. @ STA. 12+68.32-Y1-REV = 179.630
 ROADWAY SLOPES = 2:1

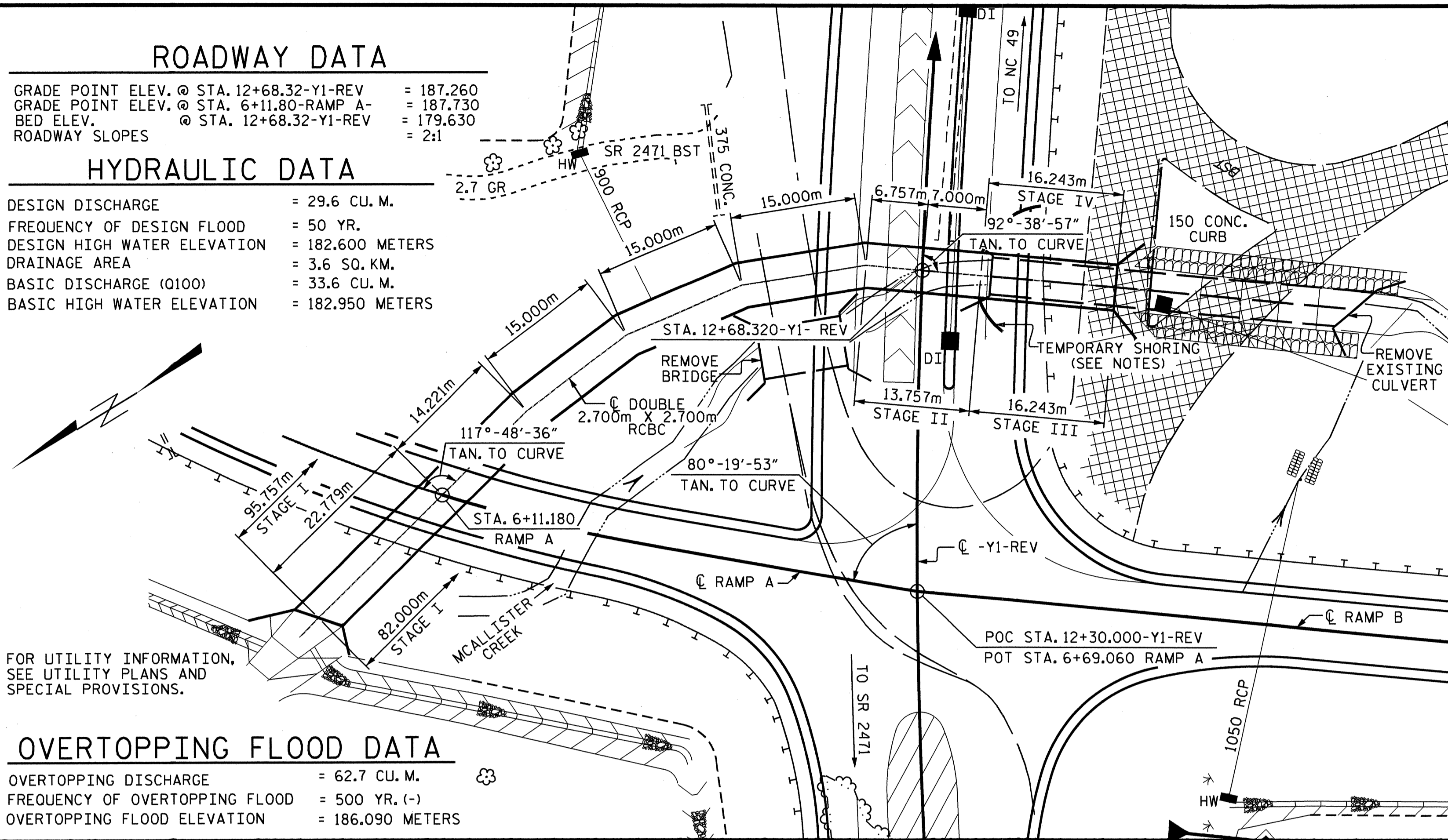
HYDRAULIC DATA

DESIGN DISCHARGE = 29.6 CU. M.
 FREQUENCY OF DESIGN FLOOD = 50 YR.
 DESIGN HIGH WATER ELEVATION = 182.600 METERS
 DRAINAGE AREA = 3.6 SQ. KM.
 BASIC DISCHARGE (Q100) = 33.6 CU. M.
 BASIC HIGH WATER ELEVATION = 182.950 METERS

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 62.7 CU. M.
 FREQUENCY OF OVERTOPPING FLOOD = 500 YR. (-)
 OVERTOPPING FLOOD ELEVATION = 186.090 METERS

LOCATION SKETCH



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

NOTES

ASSUMED LIVE LOAD -----MS18 OR ALTERNATE LOADING.
 DESIGN FILL-----5.49 MAX. FILL-----4.33 MIN. FILL
 FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
 76mm Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:

- STAGE I-
 1. WING FOOTINGS AND FLOOR SLAB INCLUDING 100mm OF ALL VERTICAL WALLS FOR 95.757m OF BARREL 1 AND 82.000m OF BARREL 2.
 2. THE REMAINING PORTIONS OF THE WALLS OF BARREL 1 AND BARREL 2 AND WING FULL HEIGHT.
- STAGE II-
 1. FLOOR SLAB INCLUDING 100mm OF THE EXTERIOR VERTICAL WALL FOR BARREL 2.
 2. THE REMAINING PORTION OF THE EXTERIOR VERTICAL WALL FOR BARREL 2.
 3. 95.757m OF ROOF SLAB FOR BARRELS 1 AND 2, INCLUDING HEADWALL.
- STAGE III-
 1. REMOVE EXISTING CULVERT.
 2. WING FOOTING AND FLOOR SLAB INCLUDING 100mm OF THE VERTICAL WALL OF BARREL 2.
 3. THE REMAINING PORTIONS OF THE WALLS OF BARREL 2 AND WING FULL HEIGHT.
- STAGE IV-
 1. WING FOOTING AND FLOOR SLAB INCLUDING 100mm OF THE EXTERIOR VERTICAL WALL OF BARREL 1.
 2. THE REMAINING PORTION OF THE EXTERIOR WALL OF BARREL 1 AND WING FULL HEIGHT.
 3. THE ROOF SLAB FOR BARRELS 1 AND 2 INCLUDING HEADWALL.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 21.000m. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.

THE 900mm DIA. PIPE THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR PIPE.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 360,000 kg OF REINFORCING STEEL, ONE 760mm SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 360,000 kg OF REINFORCING STEEL, TWO 760mm SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE CONSISTING OF 1 SPAN @ 7.010m (23'-0") WITH A REINFORCED SLAB CONCRETE SUPERSTRUCTURE AND 510mm (20'-0") REINFORCED CONCRETE FULL HEIGHT ABUTMENTS, LOCATED 14.400m LEFT OF STATION 12+60-Y1-REV, SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING DOUBLE BARREL 2.100m X 2.400m REINFORCED CONCRETE BOX CULVERT LOCATED AT THE SAME LOCATION AS THE PROPOSED CULVERT SHALL BE REMOVED (APPROXIMATE LENGTH=43.600m).

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

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR CURING OF CONCRETE, SEE SPECIAL PROVISIONS.

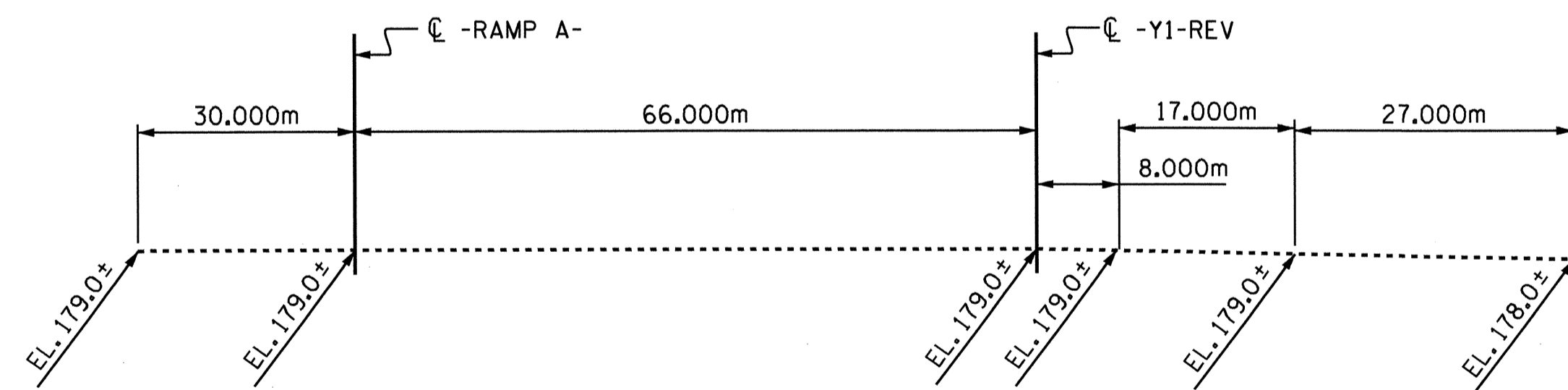
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

ALL ELEVATIONS ARE IN METERS.

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

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

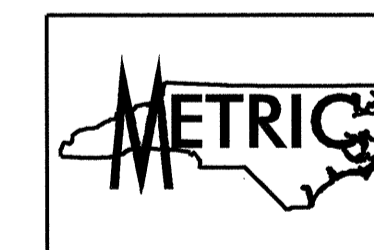


PROFILE ALONG CULVERT

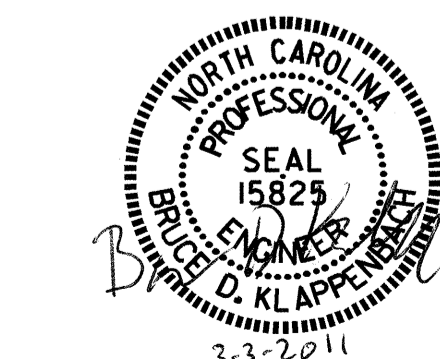
REMOVAL OF EXISTING STRUCTURES---LUMP SUM	
CULVERT EXCAVATION ----- LUMP SUM	
FOUNDATION COND. MAT'L ----	METRIC TONS
STAGE I	309
STAGE II	20
STAGE III	32
STAGE IV	24
TOTAL	385

TOTAL STRUCTURE QUANTITIES

STAGE I CLASS A CONCRETE	BARREL	372.8	m ³	STAGE I REINFORCING STEEL	BARREL	32522	kg
	WINGS ETC.	12.4	m ³		WINGS ETC.	471	kg
	SUBTOTAL	385.2	m³		SUBTOTAL	32993	kg
STAGE II CLASS A CONCRETE	BARREL	234.9	m ³	STAGE II REINFORCING STEEL	BARREL	24538	kg
	SUBTOTAL	234.9	m³		SUBTOTAL	24538	kg
STAGE III CLASS A CONCRETE	BARREL	40.7	m ³	STAGE III REINFORCING STEEL	BARREL	3643	kg
	SUBTOTAL	40.7	m³		SUBTOTAL	3643	kg
STAGE IV CLASS A CONCRETE	BARREL	62.8	m ³	STAGE IV REINFORCING STEEL	BARREL	5996	kg
	WINGS ETC.	11.0	m ³		WINGS ETC.	415	kg
	SUBTOTAL	73.8	m³		SUBTOTAL	6411	kg
TOTAL CLASS A CONCRETE		734.6	m³	TOTAL REINFORCING STEEL		67585	kg



James Bailey
3/31/11



PROJECT NO. R-2533C
CABARRUS COUNTY
 STATION: 12+68.320-Y1-REV

SHEET 1 OF 11 REPLACES BRIDGE #330

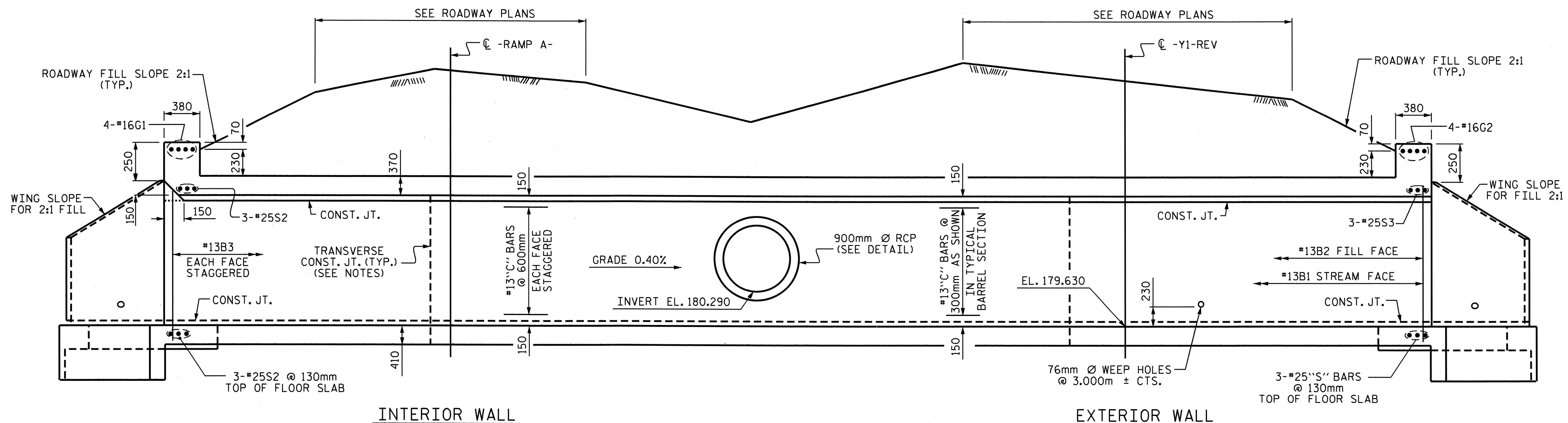
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**BARREL STANDARD
 DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT**

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

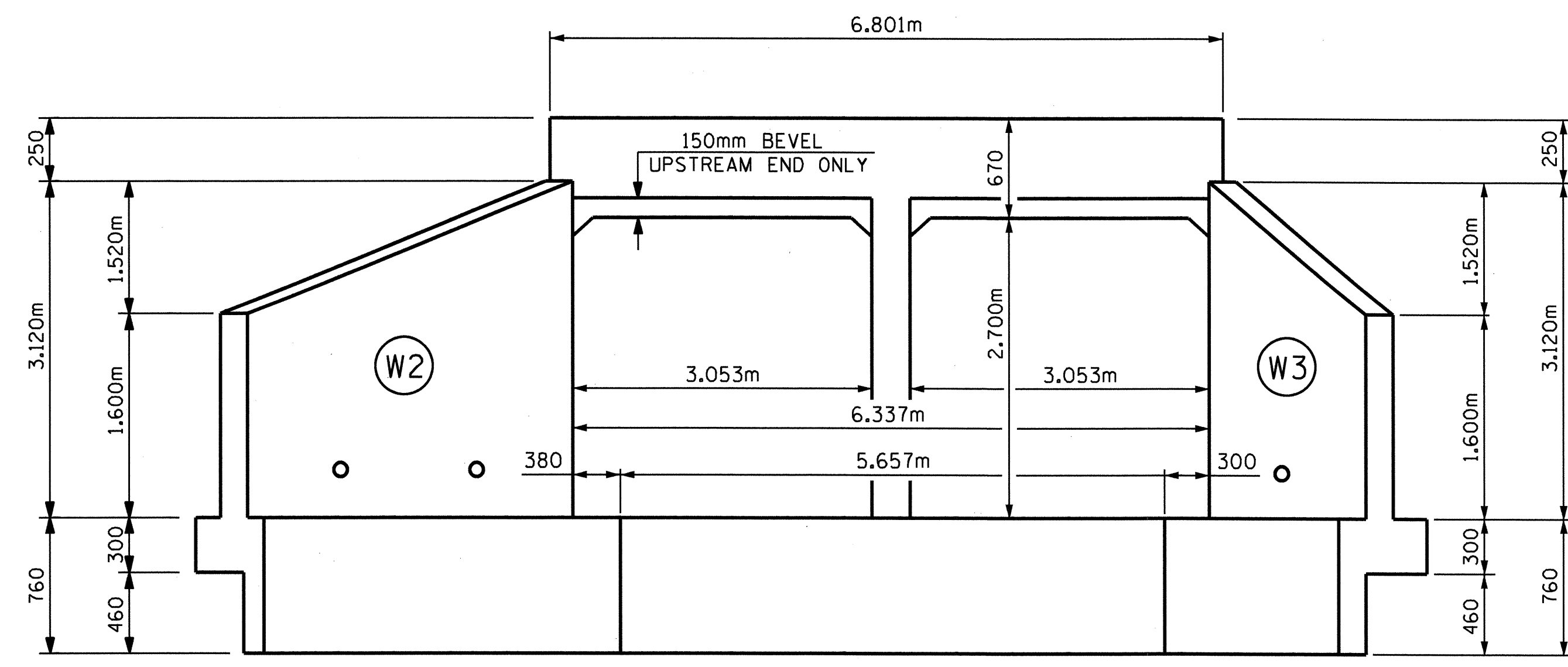
CULVERT 4

ASSEMBLED BY : S.H.SOCKWELL DATE : 1/6/11
 CHECKED BY : H.T. BARBOUR DATE : 1/10/11
 DRAWN BY : EEM 6/97
 CHECKED BY : ARB 7/97

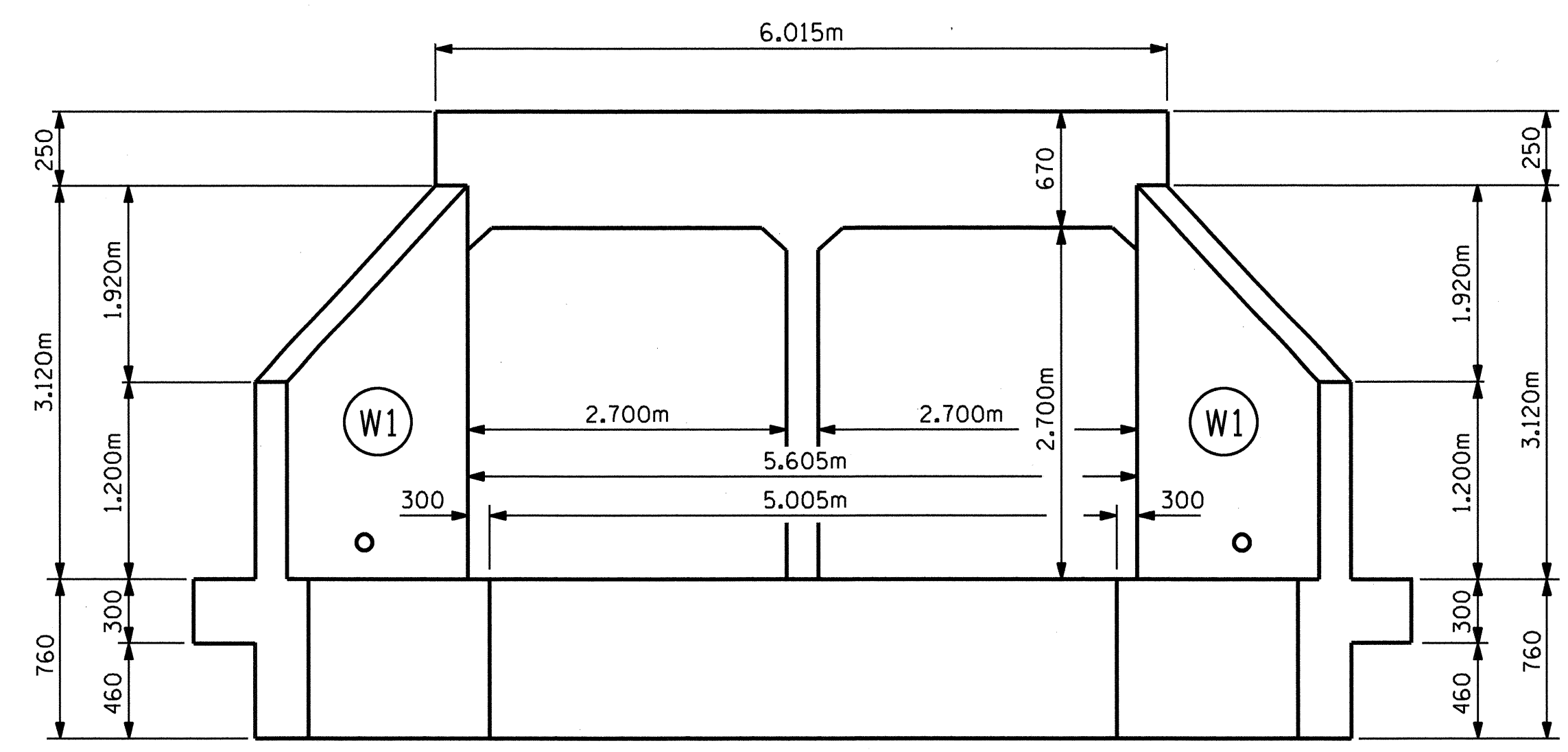


INTERIOR WALL EXTERIOR WALL

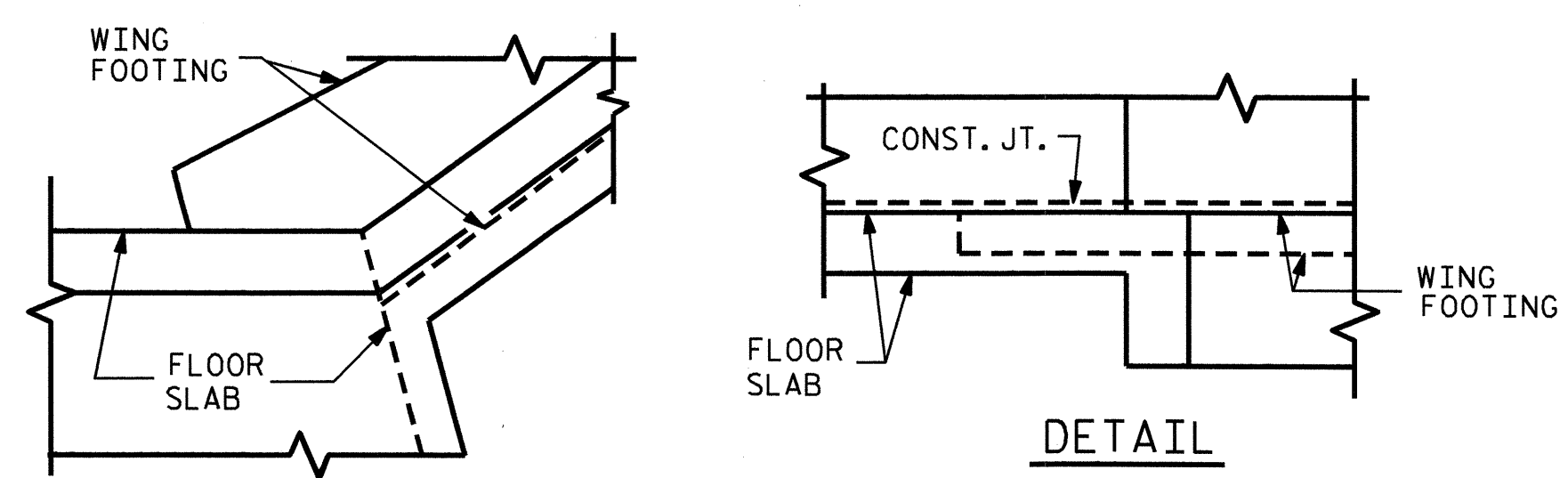
CULVERT SECTION NORMAL TO ROADWAY



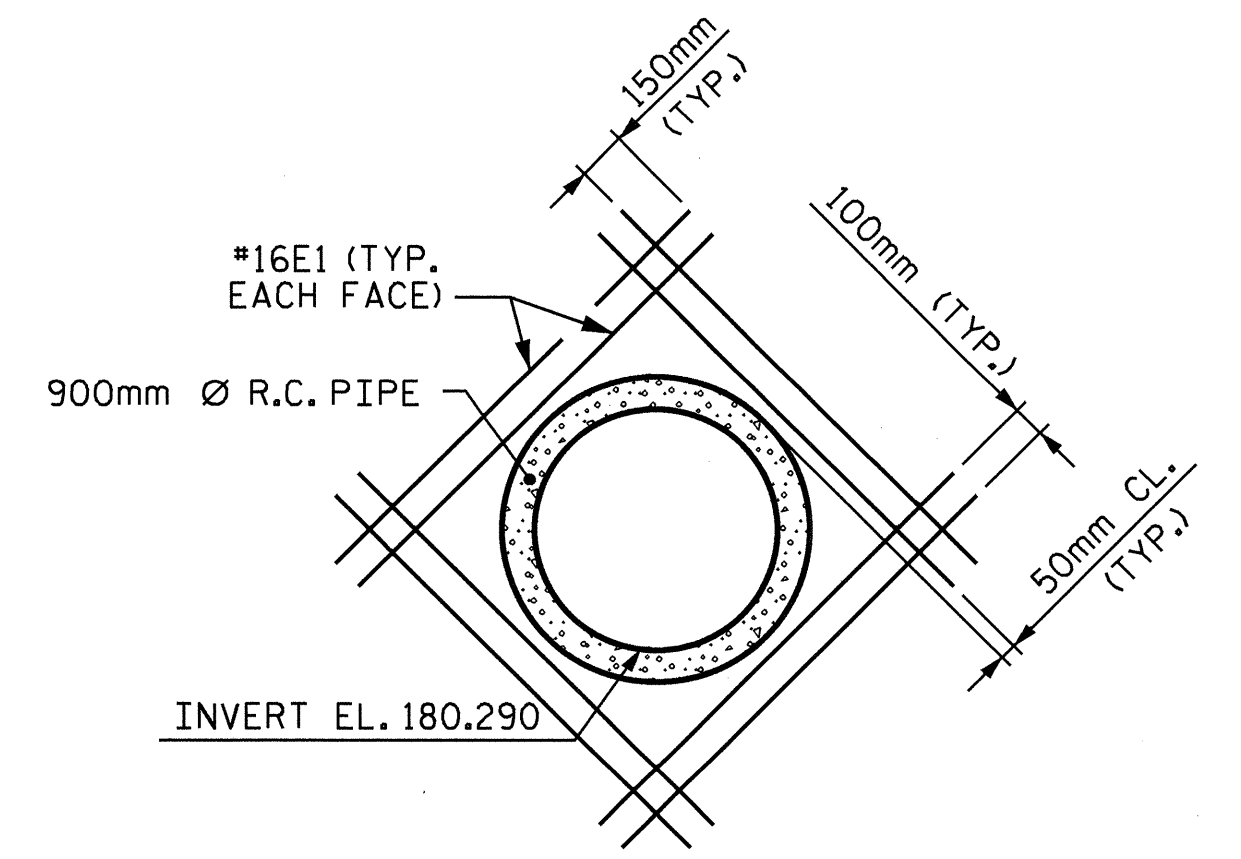
END ELEVATION NORMAL TO SKEW
 (LEFT SIDE) (117°-48'-36")



END ELEVATION NORMAL TO SKEW
 (RIGHT SIDE) (90°-00'-00")



CONNECTION OF WING FOOTING
 AND FLOOR SLAB WHEN SLAB
 IS THICKER THAN FOOTING

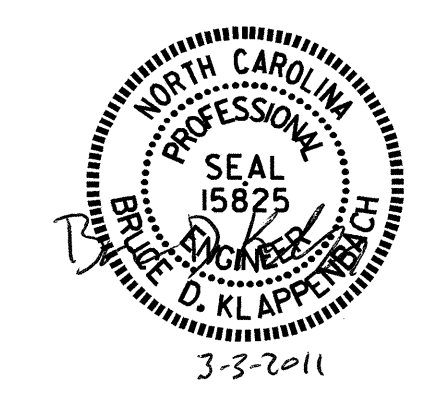


DETAIL OF REINFORCING
 AROUND 900mm Ø PIPE

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 12+68.320-Y1-REV

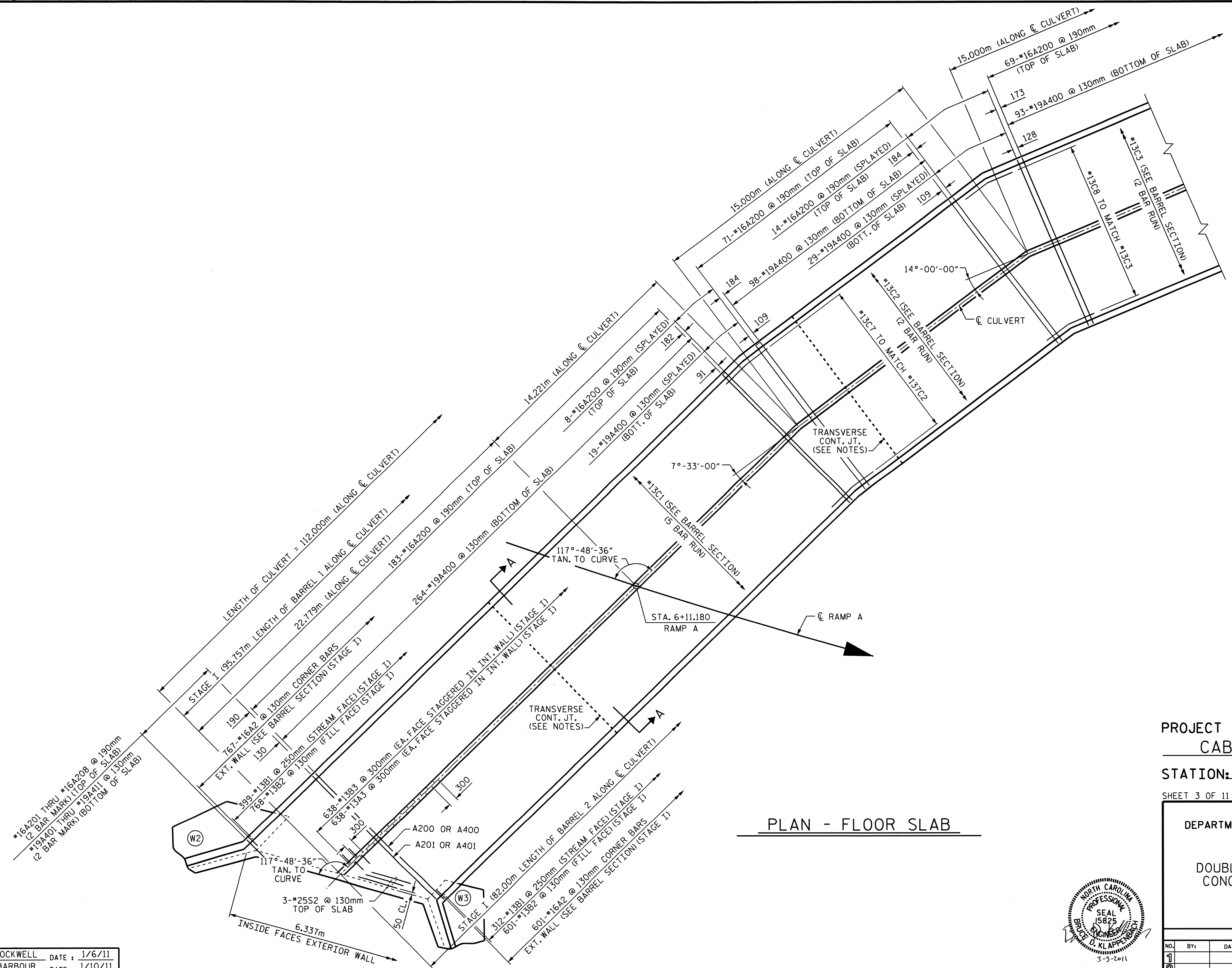
SHEET 2 OF 11

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 BARREL STANDARD
 DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT



ASSEMBLED BY : S.H. SOCKWELL	DATE : 1/6/11
CHECKED BY : H.T. BARBOUR	DATE : 1/10/11
DRAWN BY : EEM	6/97
CHECKED BY : ARB	7/97

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-19	
1			3			TOTAL SHEETS 42	
2			4				



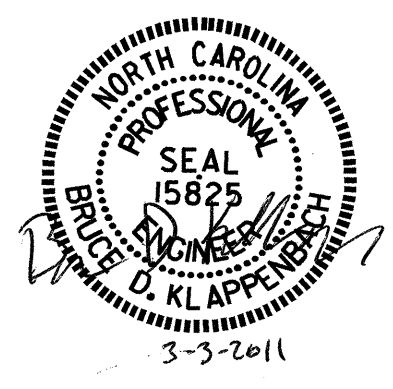
PLAN - FLOOR SLAB

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 12+68.320-Y1-REV

SHEET 3 OF 11

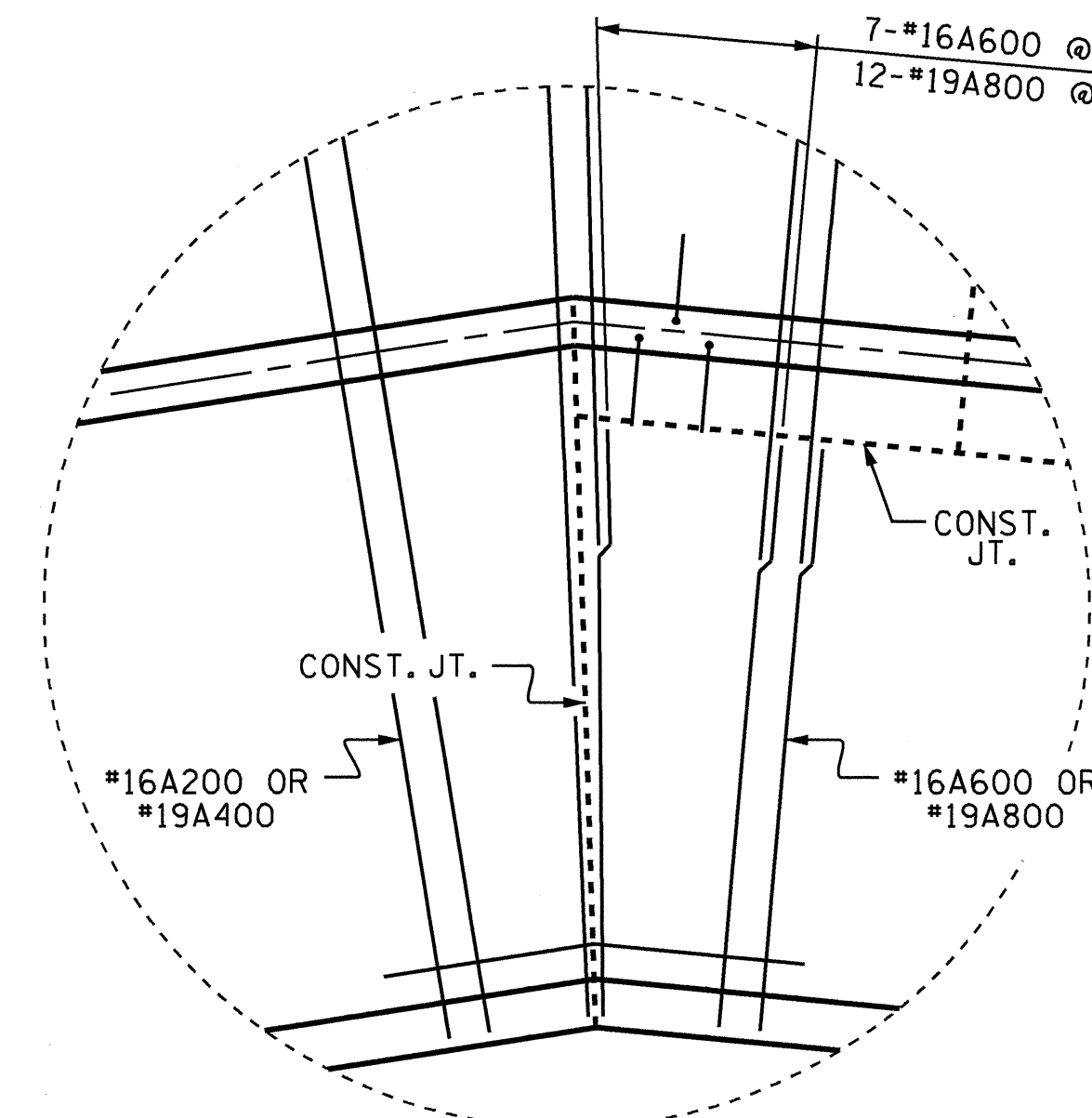
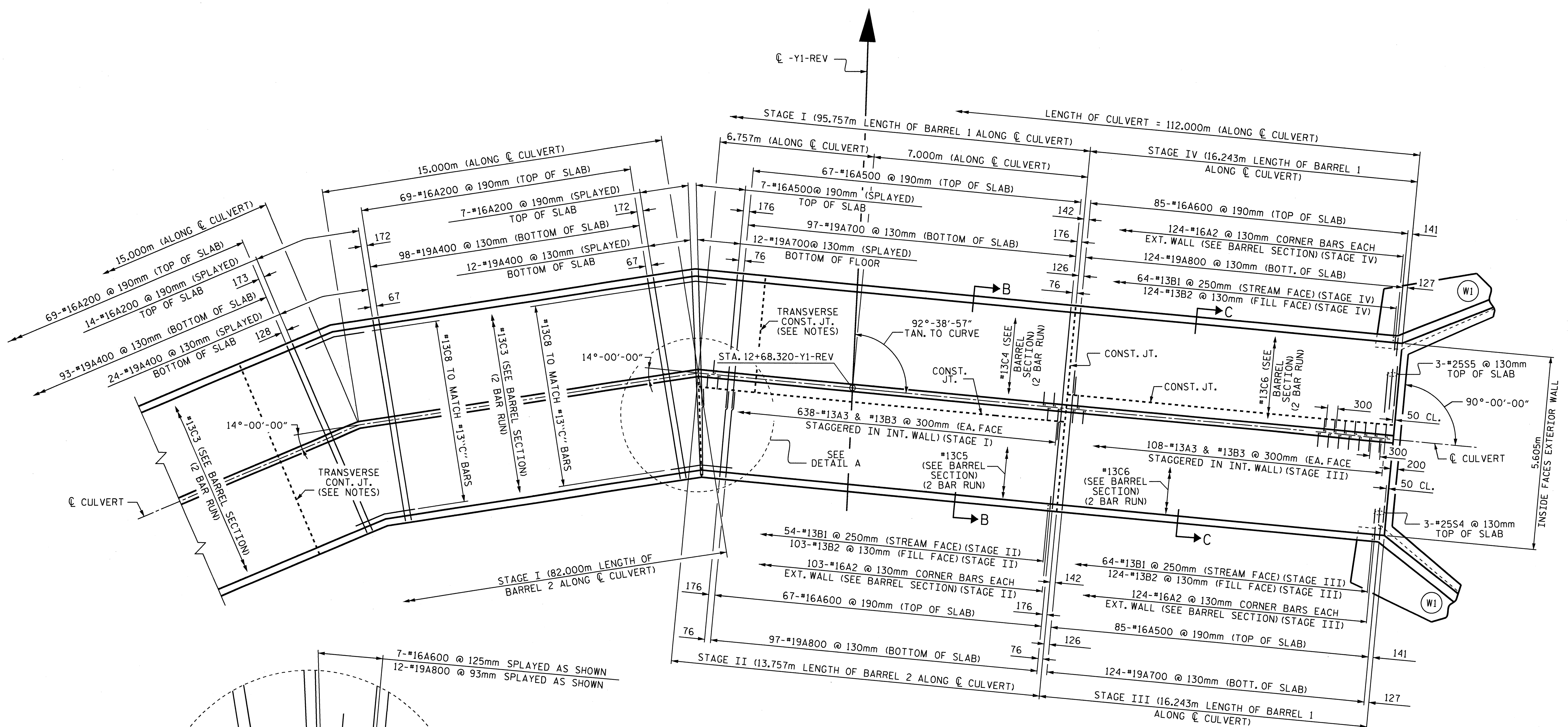
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT



REVISIONS						SHEET NO. C-20
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

DRAWN BY : S.H. SOCKWELL DATE : 1/6/11
 CHECKED BY : H.T. BARBOUR DATE : 1/10/11



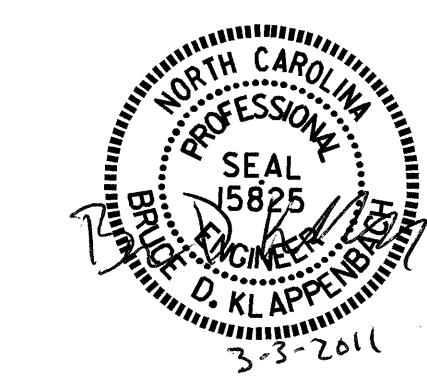
PLAN - FLOOR SLAB

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 12+68.320-Y1-REV

SHEET 4 OF 11

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT

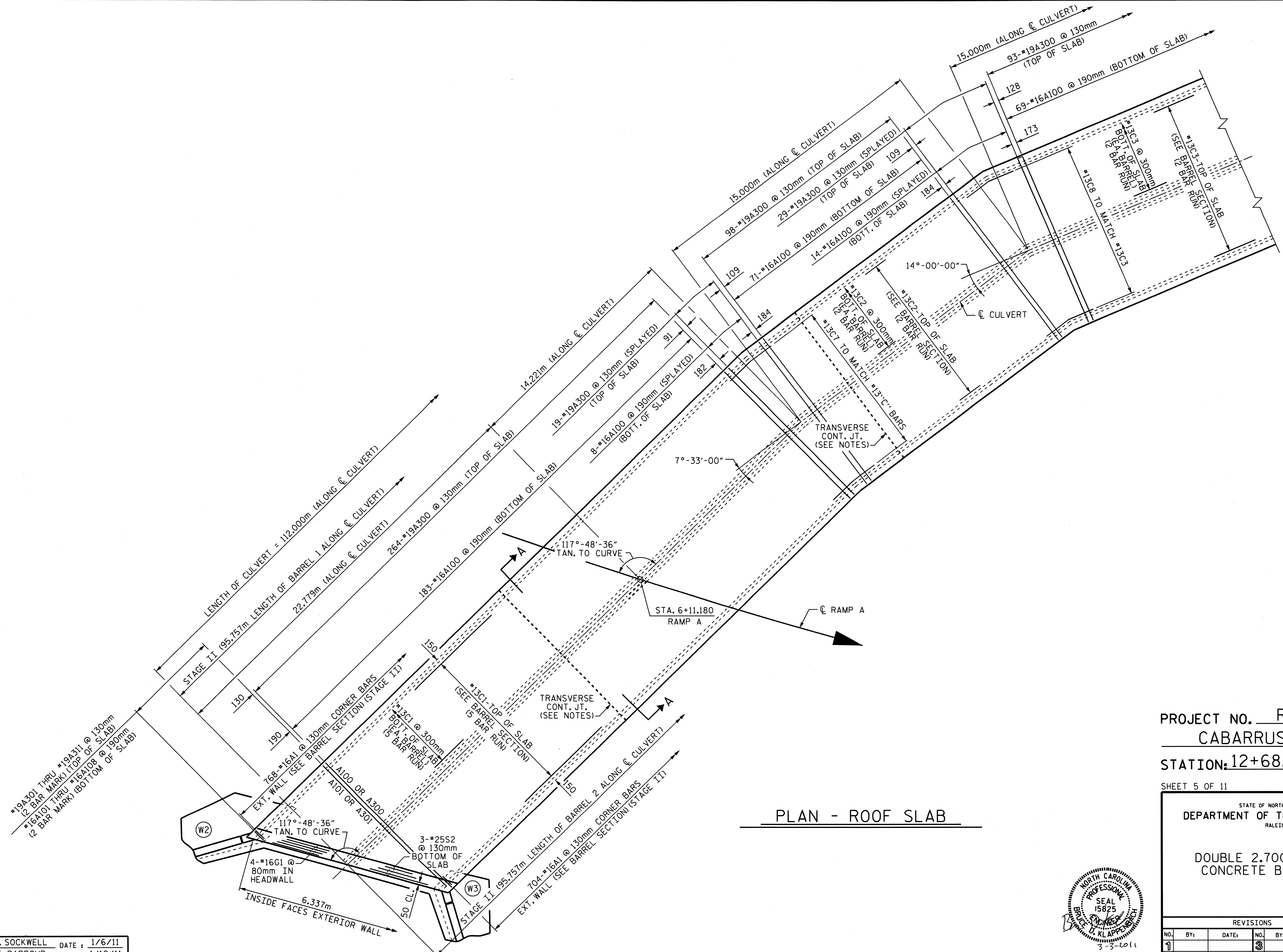


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 CHECKED BY: H.T. BARBOUR DATE: 1/10/11

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-21
1			3			TOTAL SHEETS 42
2			4			

CULVERT 4



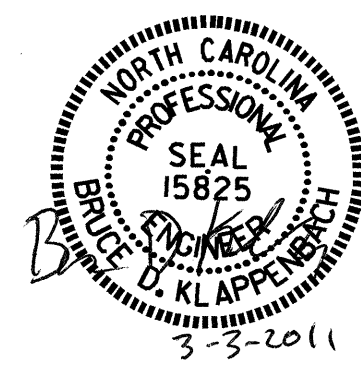
PLAN - ROOF SLAB

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 12+68.320-Y1-REV

SHEET 5 OF 11

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

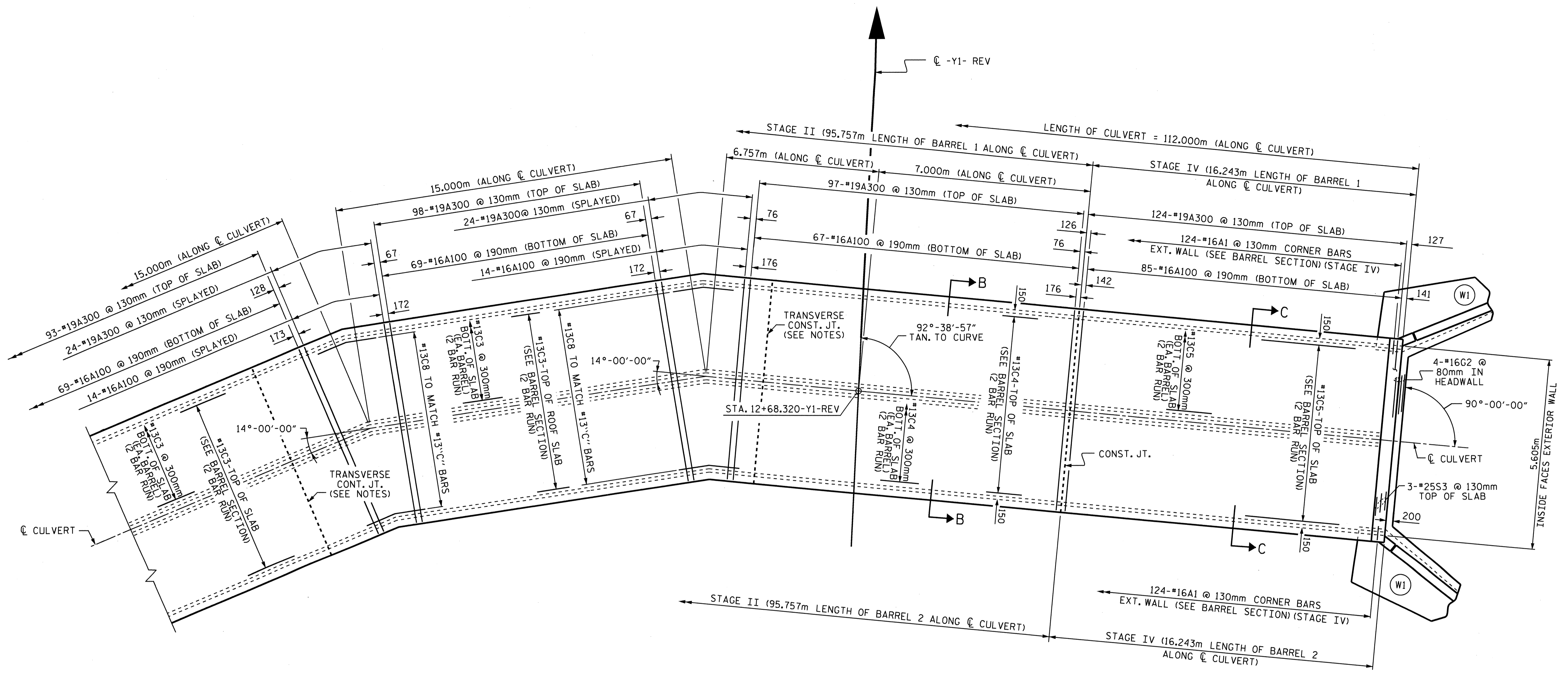
DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-22
1			3			TOTAL SHEETS
2			4			42

DRAWN BY : S.H. SOCKWELL DATE : 1/6/11
 CHECKED BY : H.T. BARBOUR DATE : 1/10/11

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PLAN - ROOF SLAB

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 12+68.320-Y1-REV

SHEET 6 OF 11

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT

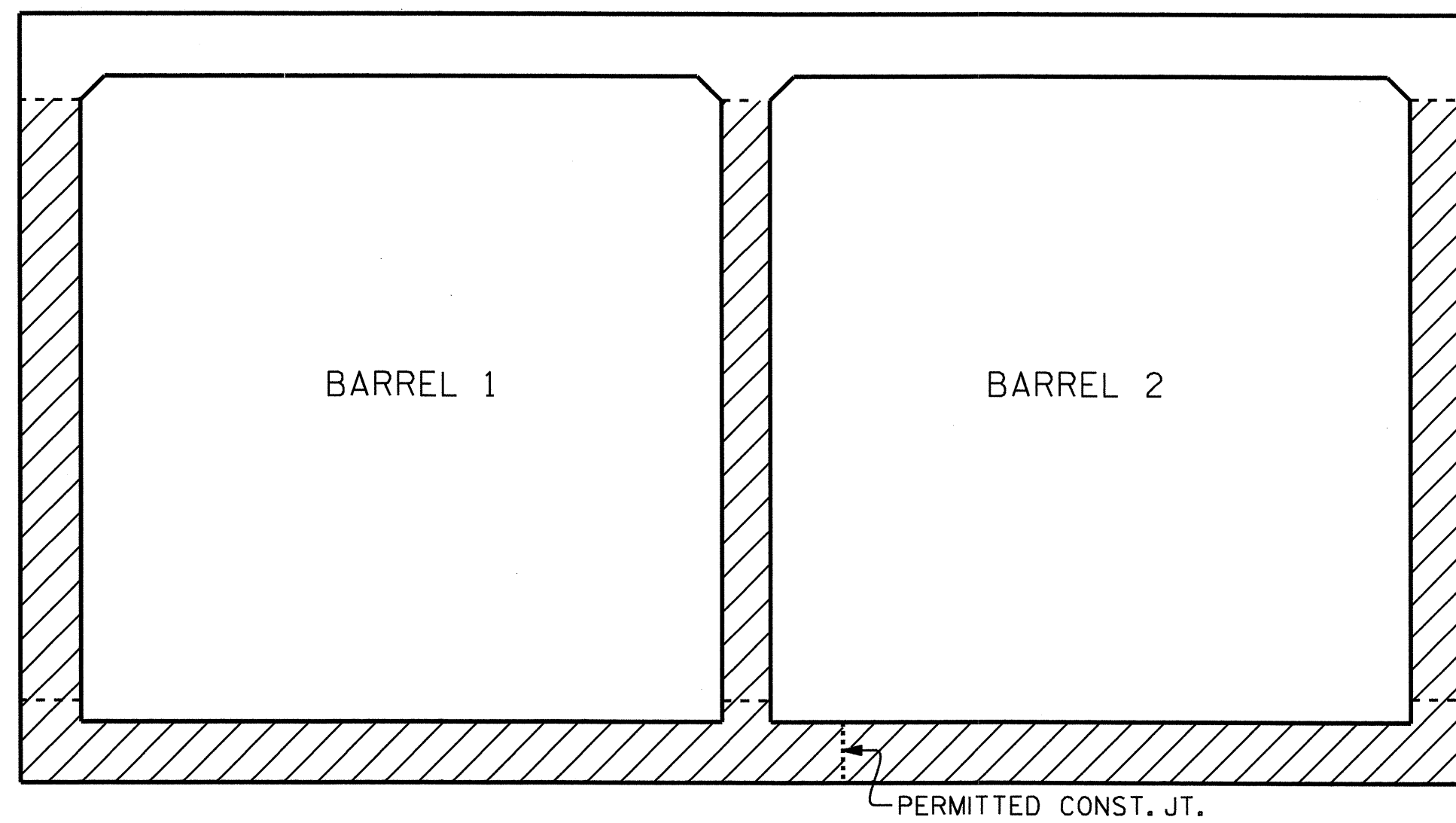


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1			3			TOTAL SHEETS 42
2			4			

CULVERT 4

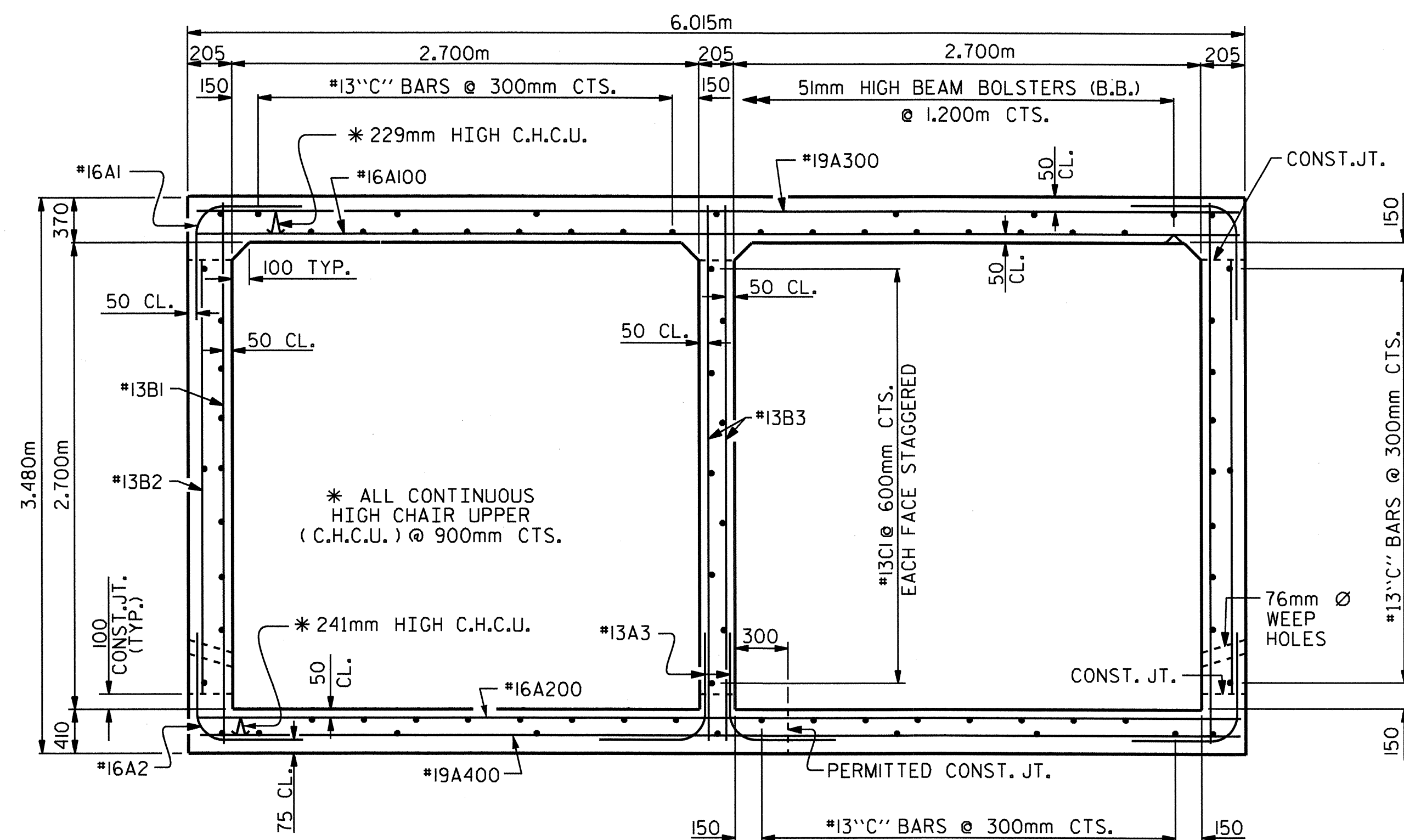
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 CHECKED BY : H.T. BARBOUR DATE : 1/10/11

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STAGING @ SECTION A-A

▨ FLOOR & WALLS □ ROOF



RIGHT ANGLE SECTION A-A OF BARREL

THERE ARE 79 "C" BARS IN SECTION OF BARREL.

BILL OF MATERIAL

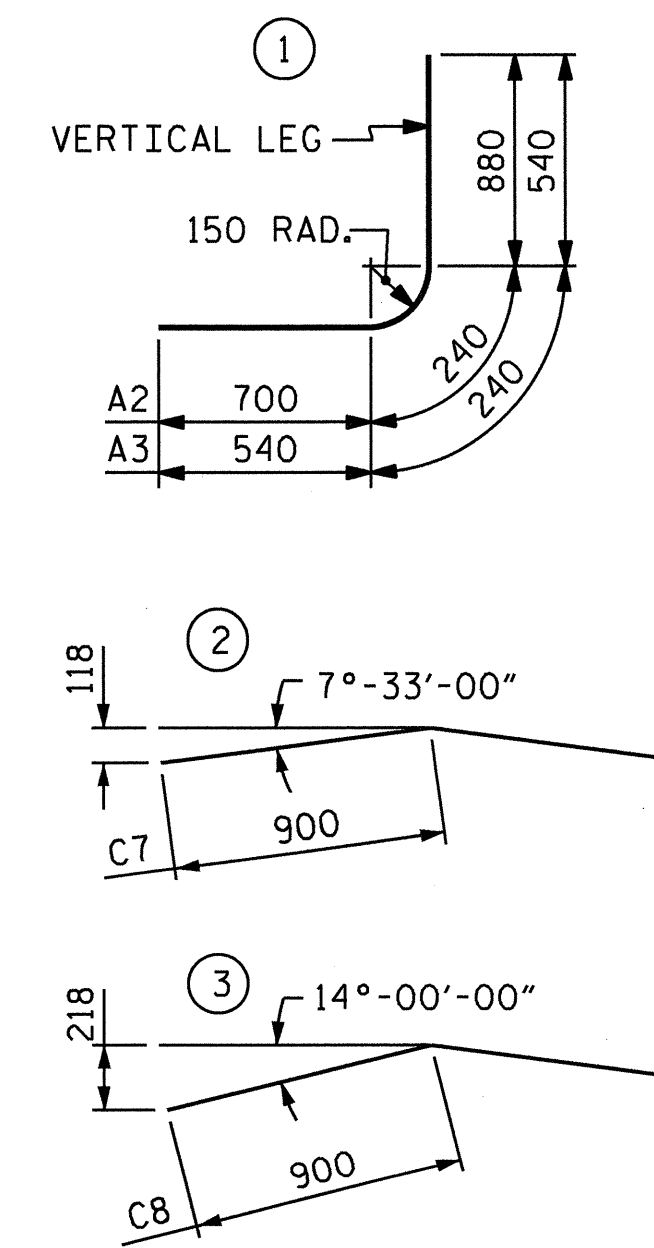
STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A2	1368	#16	1	1820	3864
A3	638	#13	1	1320	837
A200	435	#16	STR	5900	3983
A201	2	#16	STR	5480	17
A202	2	#16	STR	4760	15
A203	2	#16	STR	4040	13
A204	2	#16	STR	3320	10
A205	2	#16	STR	2600	8
A206	2	#16	STR	1880	6
A207	2	#16	STR	1160	4
A208	2	#16	STR	420	1
A400	637	#19	STR	5900	8400
A401	2	#19	STR	5540	25
A402	2	#19	STR	5040	23
A403	2	#19	STR	4540	20
A404	2	#19	STR	4060	18
A405	2	#19	STR	3560	16
A406	2	#19	STR	3060	14
A407	2	#19	STR	2580	12
A408	2	#19	STR	2080	9
A409	2	#19	STR	1580	7
A410	2	#19	STR	1100	5
A411	2	#19	STR	600	3
A500	74	#16	STR	3920	450
A700	109	#19	STR	4100	999
B1	711	#13	STR	3380	2389
B2	1369	#13	STR	2500	3402
B3	638	#13	STR	3380	2144
C1	270	#13	STR	8220	2206
C2	108	#13	STR	8060	865
C3	216	#13	STR	8140	1748
C4	66	#13	STR	7640	501
C7	54	#13	2	1800	97
C8	162	#13	3	1800	290
E1	16	#16	STR	1640	41
S2	3	#25	STR	6680	80
REINFORCING STEEL				=	32522 KG

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
"A"	16	540
"A"	19	690
"B"	13	540
"C"	13	590

BAR TYPE
DIMENSIONS ARE OUT TO OUT

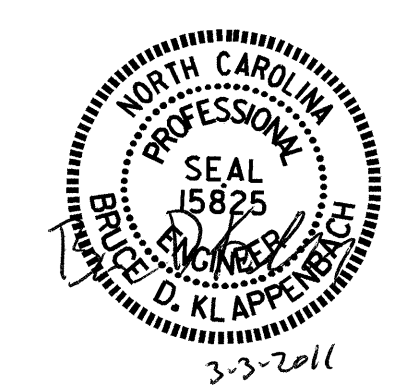


PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 12+68.320-Y1-REV

SHEET 7 OF 11

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BILL OF MATERIAL
STAGE I

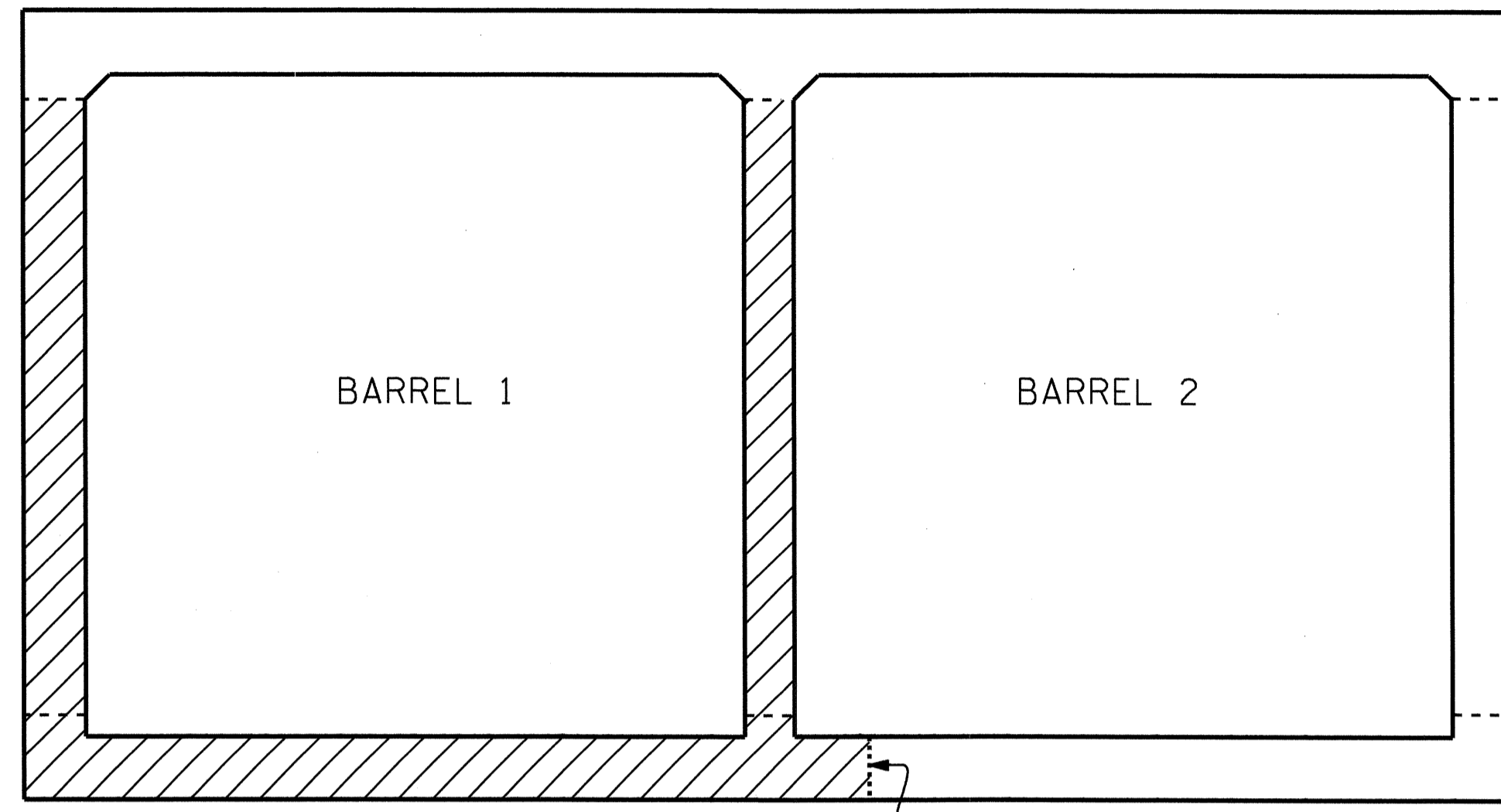


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-24
1			3			TOTAL SHEETS
2			4			42

DRAWN BY: S.H. SOCKWELL DATE: 1/6/11
CHECKED BY: H.T. BARBOUR DATE: 1/10/11

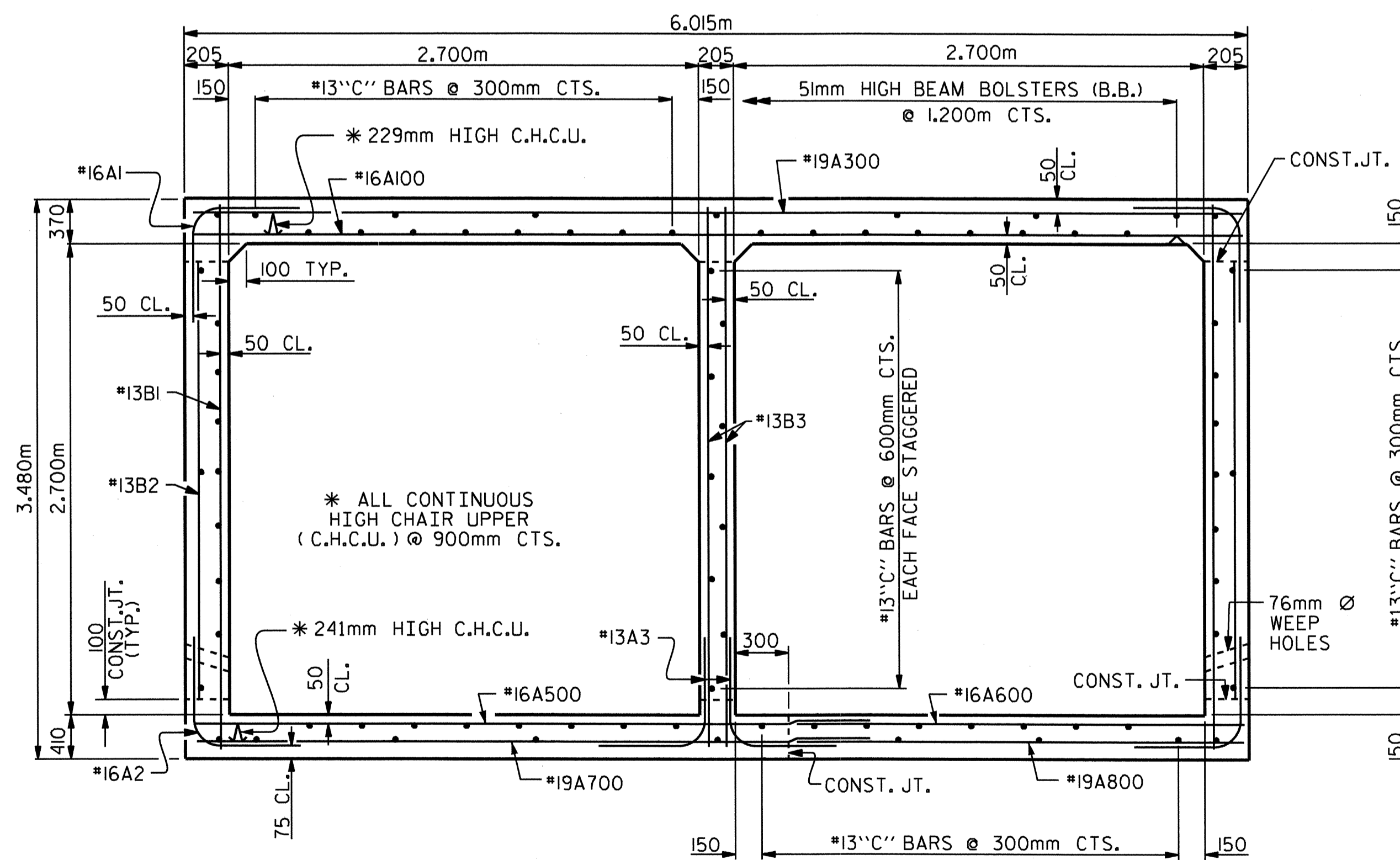
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ssockwell

CULVERT 4



STAGING @ SECTION B-B

▨ FLOOR & WALLS □ ROOF, FLOOR AND WALL



RIGHT ANGLE SECTION B-B OF BARREL

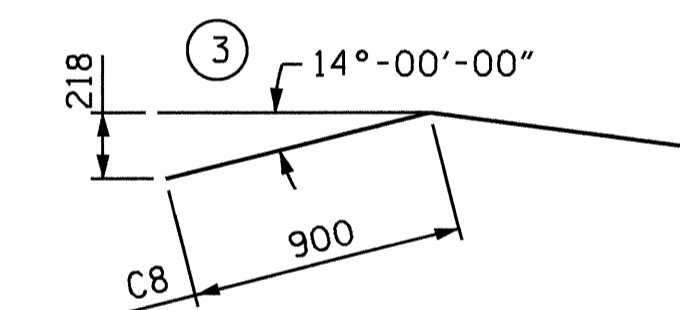
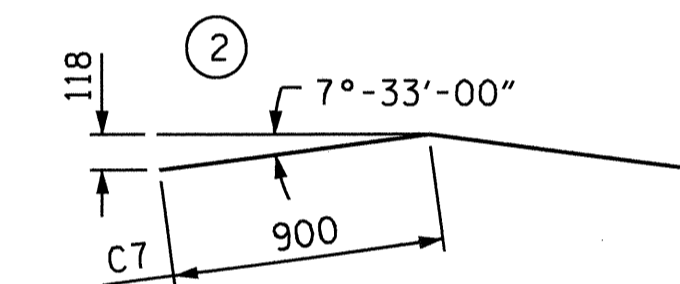
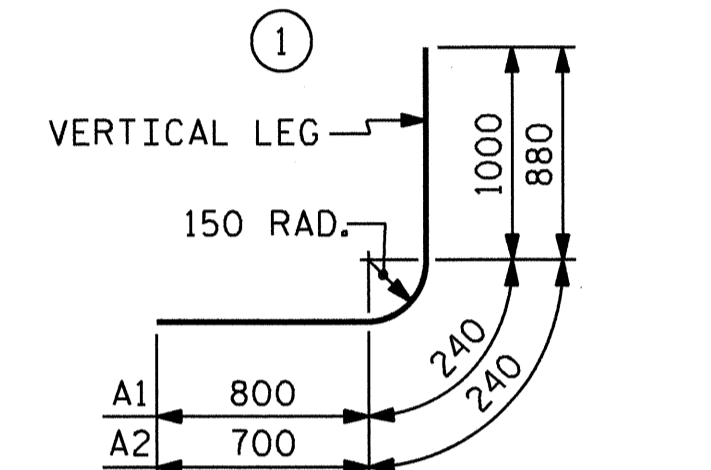
THERE ARE 79 "C" BARS IN SECTION OF BARREL.

BILL OF MATERIAL					
STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	1472	#16	1	2040	4660
A2	103	#16	1	1820	291
A100	509	#16	STR	5900	4661
A101	2	#16	STR	5480	17
A102	2	#16	STR	4760	15
A103	2	#16	STR	4040	13
A104	2	#16	STR	3320	10
A105	2	#16	STR	2600	8
A106	2	#16	STR	1880	6
A107	2	#16	STR	1160	4
A108	2	#16	STR	420	1
A300	746	#19	STR	5900	9837
A302	2	#19	STR	5540	25
A304	2	#19	STR	5040	23
A306	2	#19	STR	4540	20
A308	2	#19	STR	4060	18
A310	2	#19	STR	3560	16
A312	2	#19	STR	3060	14
A314	2	#19	STR	2580	12
A316	2	#19	STR	2080	9
A318	2	#19	STR	1580	7
A320	2	#19	STR	1100	5
A322	2	#19	STR	600	3
A600	74	#16	STR	292	292
A800	109	#19	STR	2500	609
B1	54	#13	STR	3380	181
B2	103	#13	STR	2500	255
C4	50	#13	STR	7640	600
C5	42	#13	STR	7460	2626
C7	25	#13	2	1800	45
C8	75	#13	3	1800	134
G1	4	#16	STR	6680	41
S2	3	#25	STR	6680	80
REINFORCING STEEL				= 24538 KG	

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
"A"	16	540
"A"	19	690
"B"	13	540
"C"	13	590

BAR TYPE
DIMENSIONS ARE OUT TO OUT

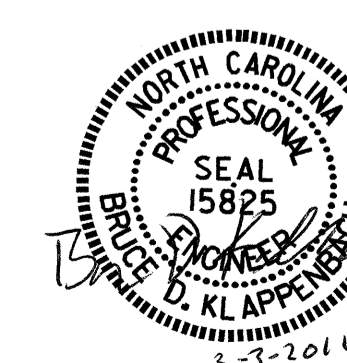


PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION 12+68.320-Y1-REV

SHEET 8 OF 11

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

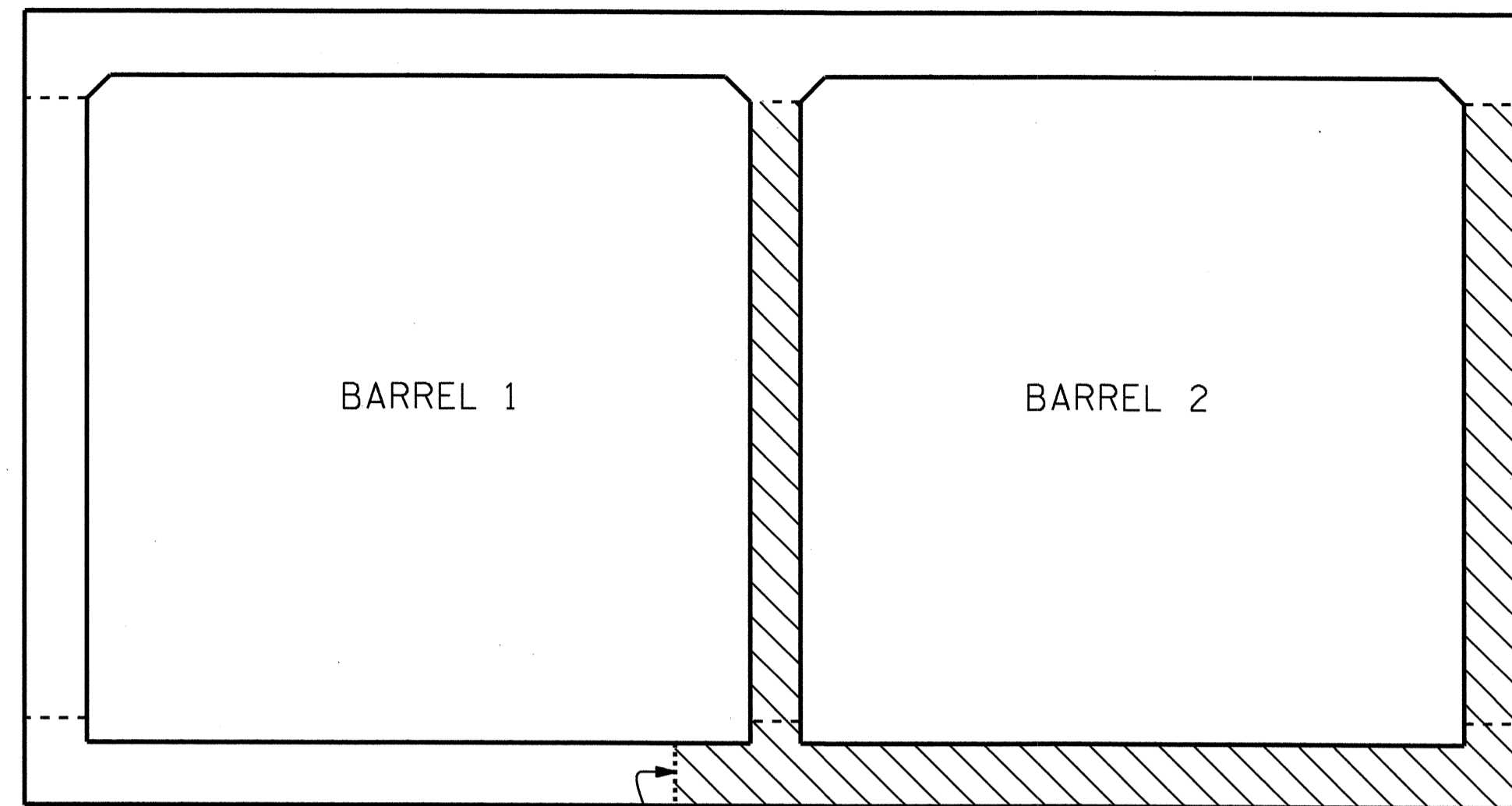
**BILL OF MATERIAL
 STAGE II**



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-25
1			3			TOTAL SHEETS
2			4			42

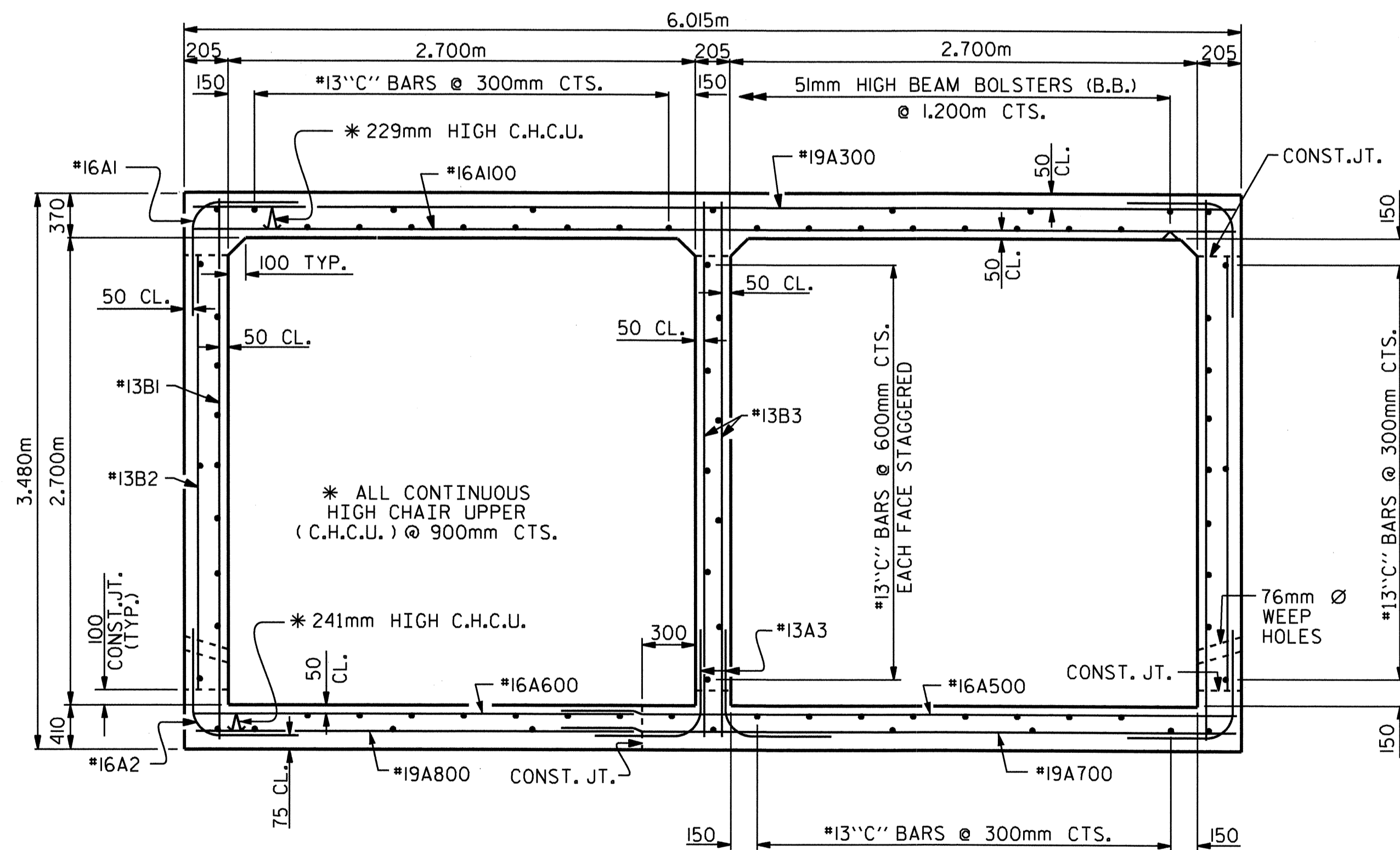
CULVERT 4

DRAWN BY: S.H. SOCKWELL DATE: 1/6/11
 CHECKED BY: H.T. BARBOUR DATE: 1/10/11



STAGING @ SECTION C-C

/// FLOOR & WALLS □ ROOF, FLOOR AND WALL



THERE ARE 79 'C' BARS IN SECTION OF BARREL.

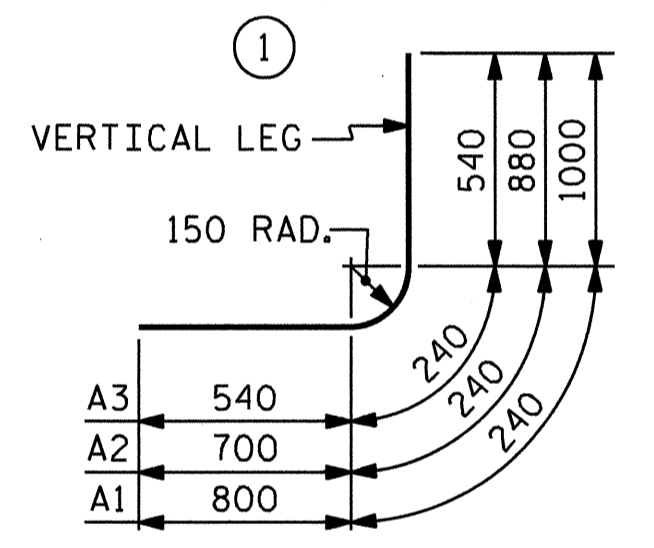
STAGE III						STAGE IV					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A2	124	#16	1	1820	350	A1	248	#16	1	2040	785
A3	108	#13	1	1320	142	A2	124	#16	1	1820	350
A500	85	#16	STR	3960	522	A100	85	#16	STR	5900	778
A700	124	#19	STR	4100	1136	A300	124	#19	STR	5900	1635
B1	64	#13	STR	3380	215	A600	85	#16	STR	2500	330
B2	124	#13	STR	2500	308	A800	124	#19	STR	2500	693
B3	108	#13	STR	3380	363	B1	64	#13	STR	3380	215
C6	66	#13	STR	8360	548	B2	124	#13	STR	2500	308
S4	3	#25	STR	4920	59	C6	92	#13	STR	8360	765
						G2	4	#16	STR	5900	37
						S3	3	#25	STR	5900	70
						S5	3	#25	STR	2540	30
REINFORCING STEEL = 3643 KG						REINFORCING STEEL = 5996 KG					

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
"A"	16	540
"A"	19	690
"B"	13	540
C6	13	590
"S"	25	1500

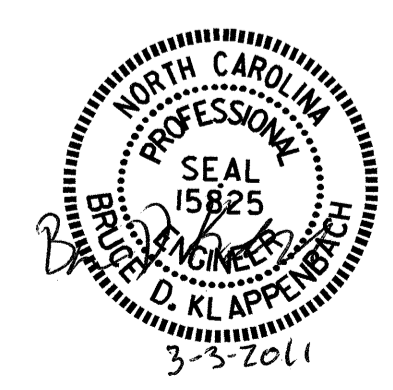
BAR TYPE

DIMENSIONS ARE OUT TO OUT



PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 12+68.320-Y1-REV

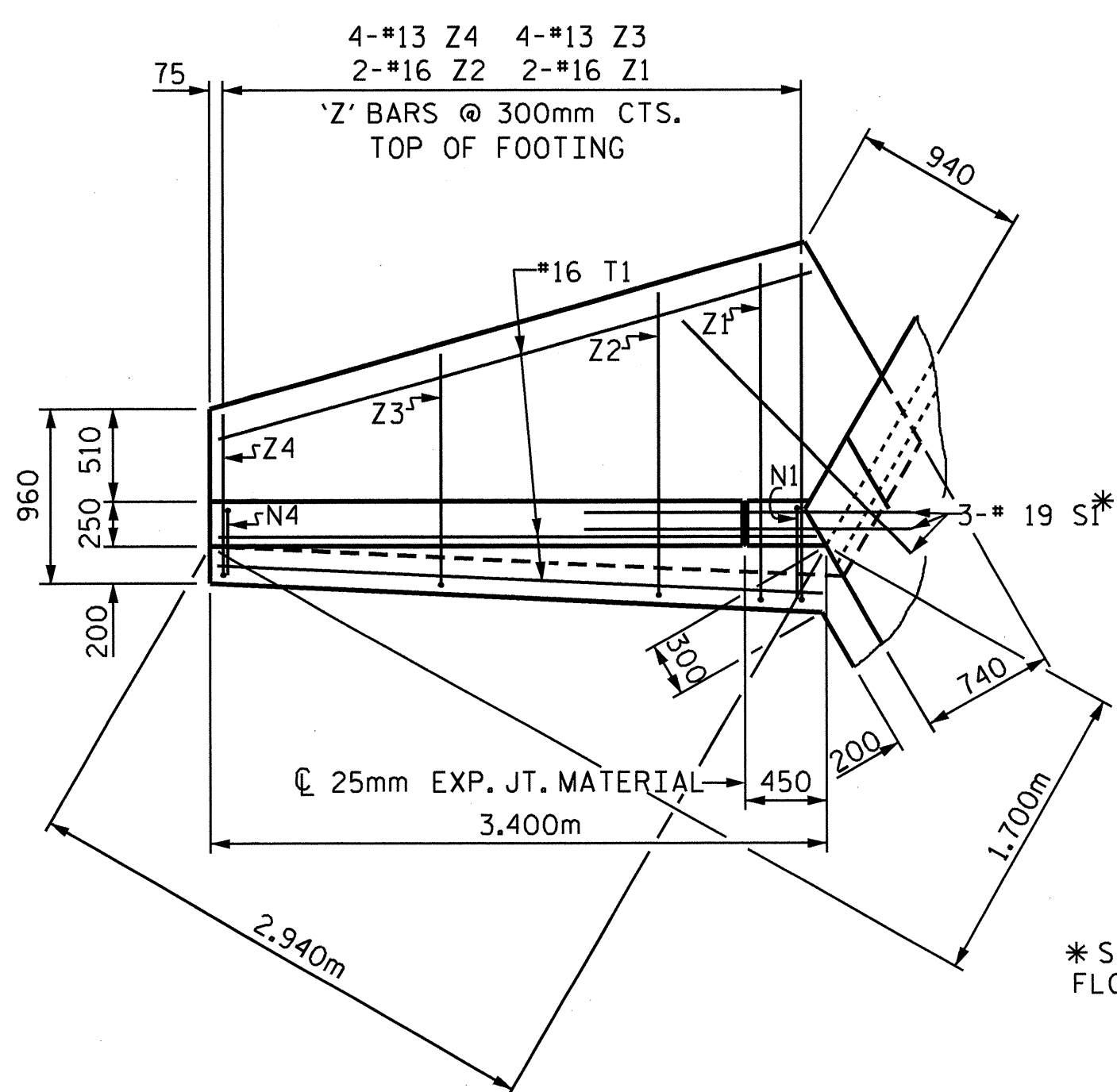
SHEET 9 OF 11



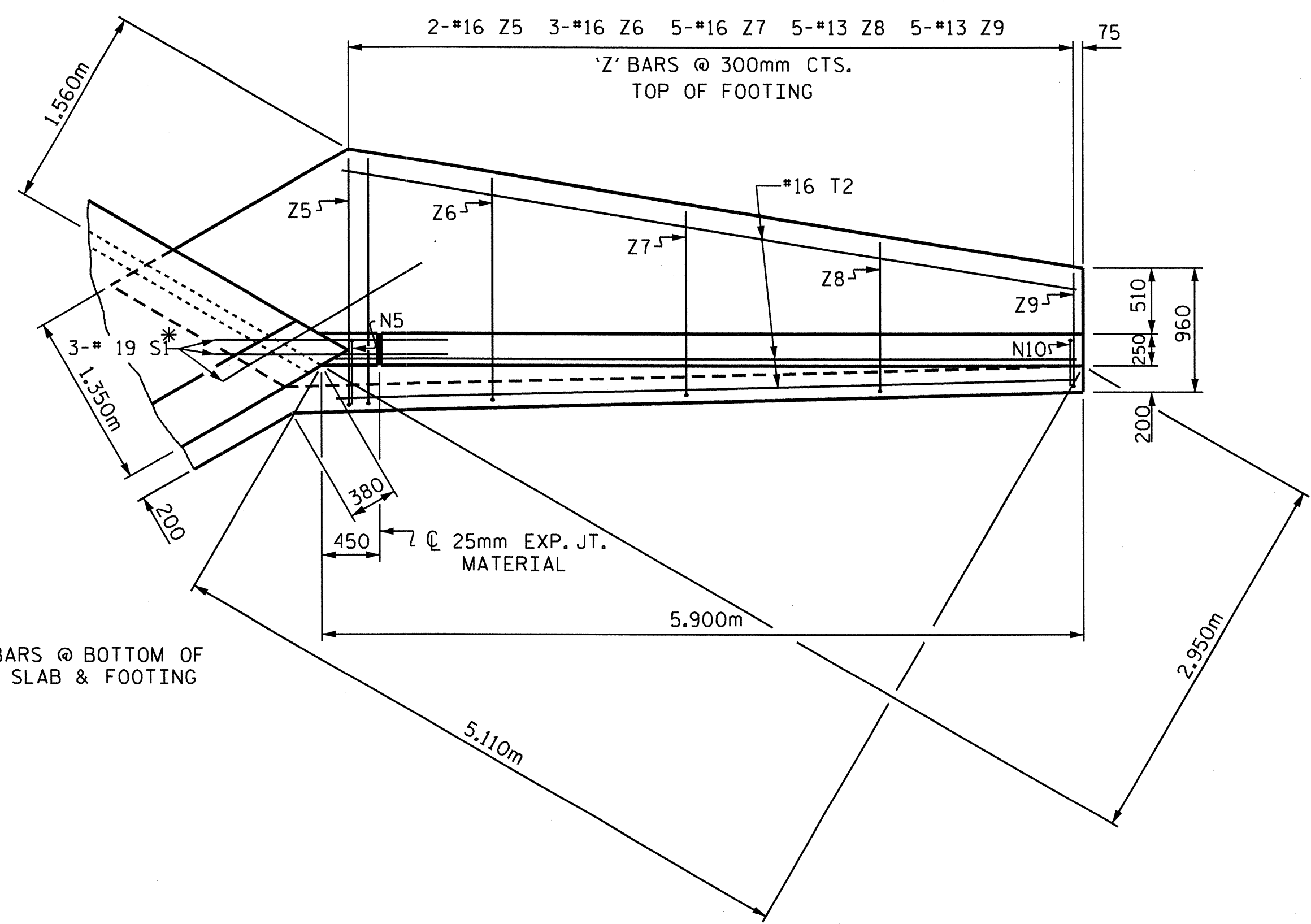
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						BILL OF MATERIAL STAGES III & IV	
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-26	
1			3			TOTAL SHEETS	42
2			4				

DRAWN BY: S.H. SOCKWELL DATE: 1/6/11
 CHECKED BY: H.T. BARBOUR DATE: 1/10/11

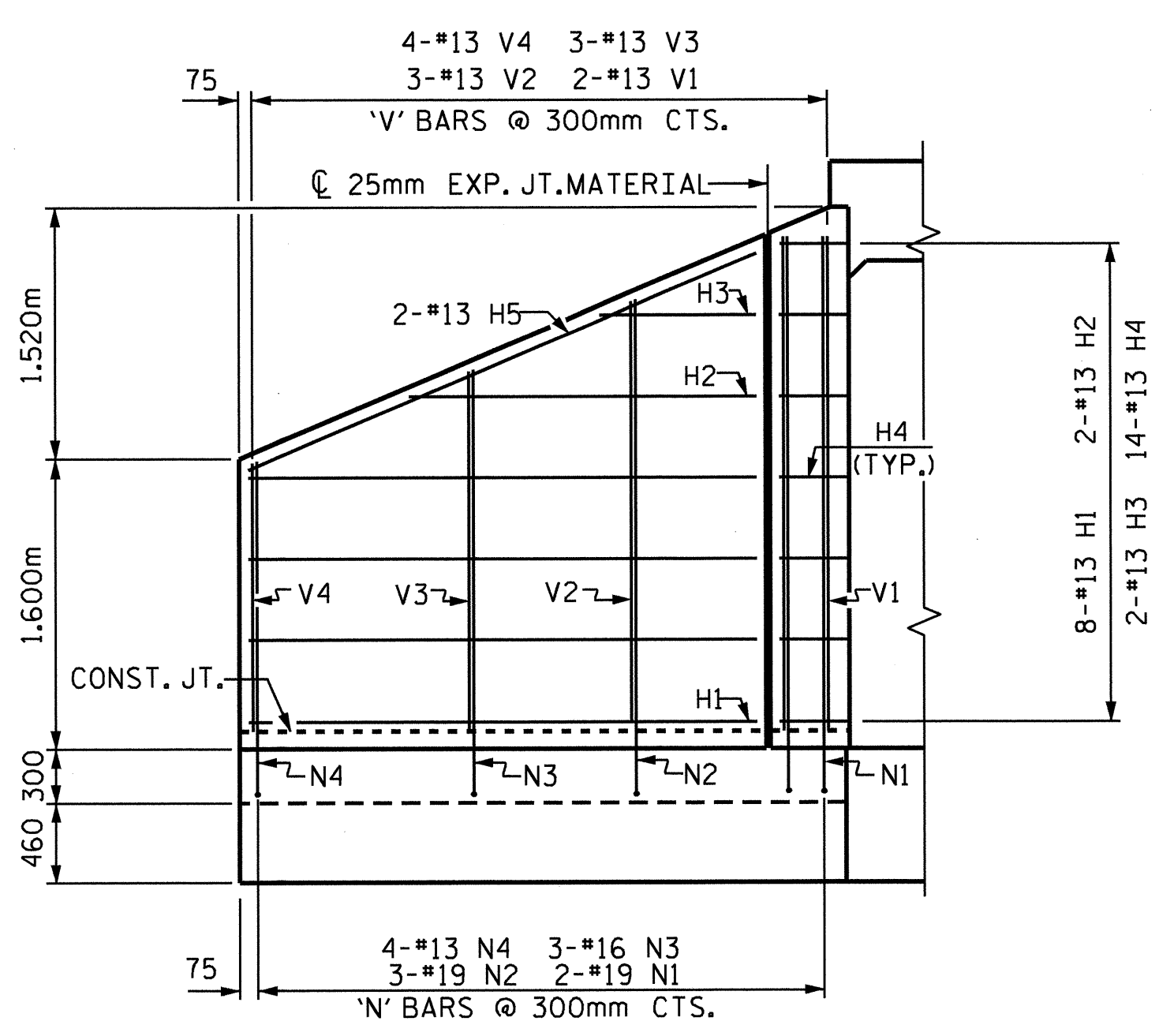
23-FEB-2011 15:15
 R:\Structures\Culvert4\sockwell\R-2533CC.SD.CU.dgn
 ssockwell



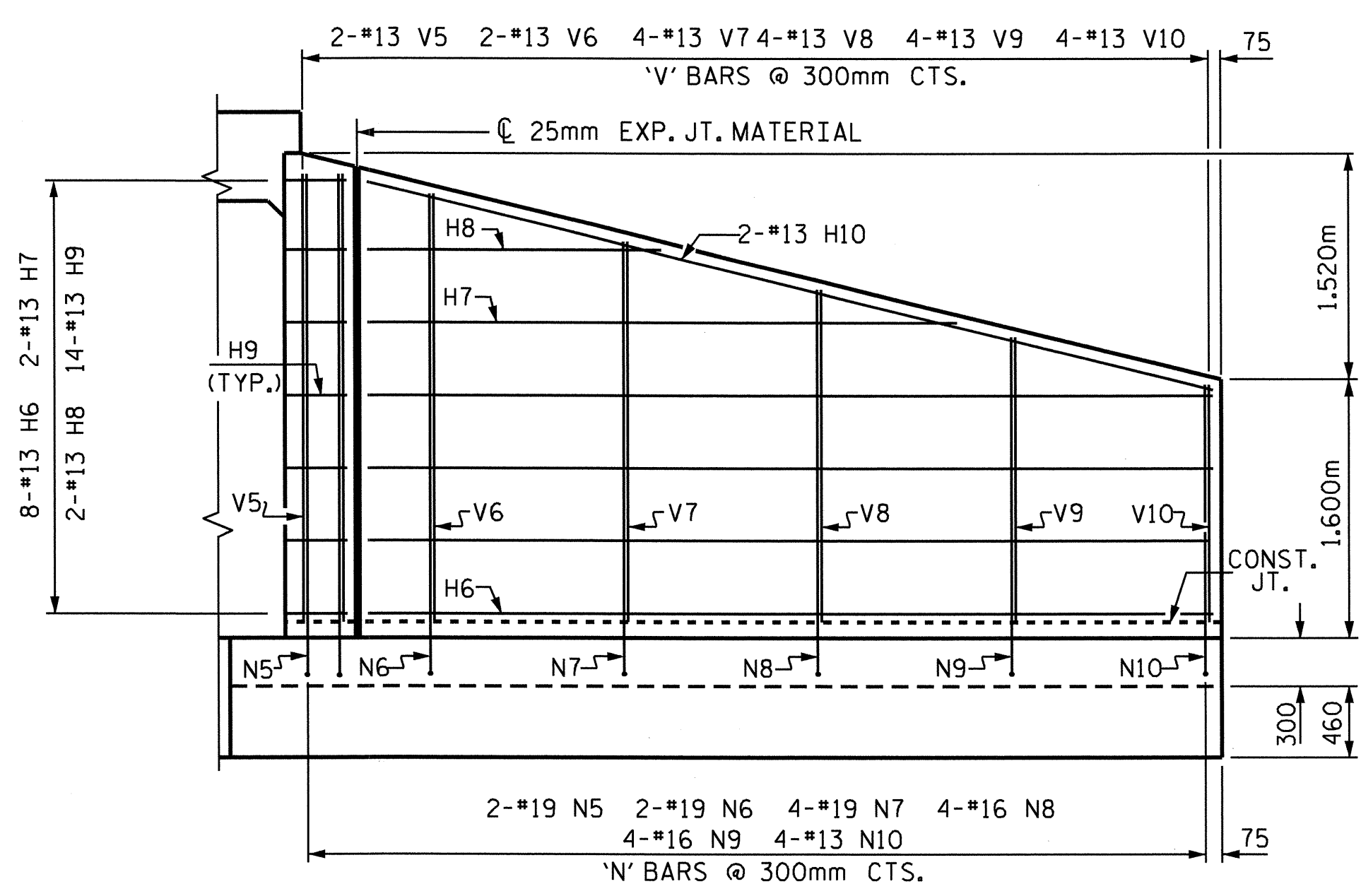
PLAN W3



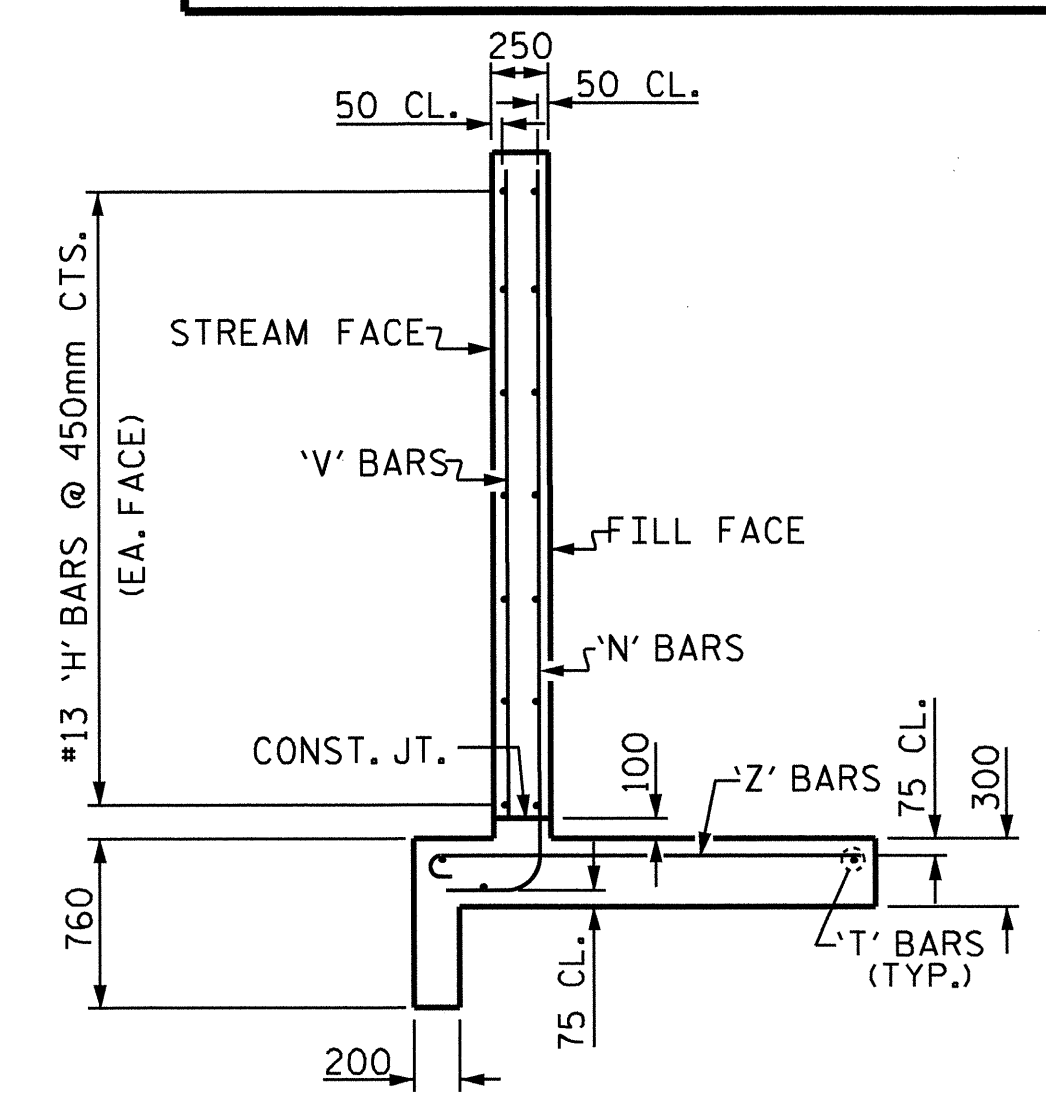
PLAN W2



ELEVATION W3

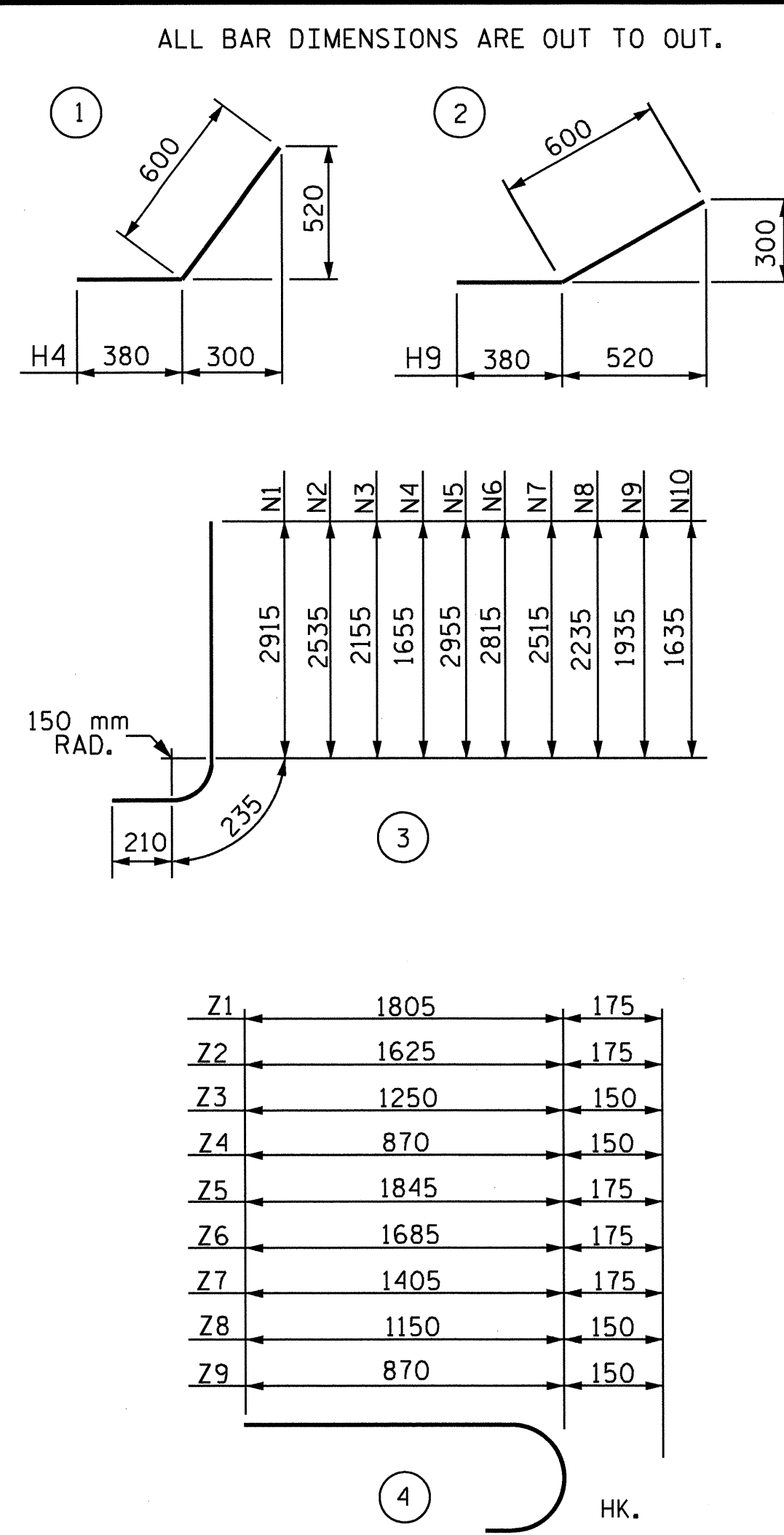


ELEVATION W2



TYPICAL WING SECTION

BAR TYPES



BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	8	13	STR	2840	23
H2	2	13	STR	1940	4
H3	2	13	STR	860	2
H4	14	13	1	980	14
H5	2	13	STR	3060	6
H6	8	13	STR	5340	42
H7	2	13	STR	3820	8
H8	2	13	STR	1980	4
H9	14	13	2	980	14
H10	2	13	STR	5480	11
N1	2	19	3	3360	15
N2	3	19	3	2980	20
N3	3	16	3	2600	12
N4	4	13	3	2100	8
N5	5	19	3	3400	15
N6	2	19	3	3260	15
N7	4	19	3	2960	26
N8	4	16	3	2680	17
N9	4	16	3	2380	15
N10	4	13	3	2080	8
S1	6	19	STR	1800	24
T1	3	16	STR	3400	16
T2	3	16	STR	5900	27
V1	2	13	STR	2740	5
V2	3	13	STR	2360	7
V3	3	13	STR	1980	6
V4	4	13	STR	1480	6
V5	2	13	STR	2780	6
V6	2	13	STR	2640	5
V7	4	13	STR	2340	9
V8	4	13	STR	2060	8
V9	4	13	STR	1760	7
V10	4	13	STR	1460	6
Z1	2	16	4	1980	6
Z2	2	16	4	1800	6
Z3	4	13	4	1400	6
Z4	4	13	4	1020	4
Z5	2	16	4	2020	6
Z6	3	16	4	1860	9
Z7	5	16	4	1580	12
Z8	5	13	4	1300	6
Z9	5	13	4	1020	5

REINFORCING STEEL FOR 2 WING WALLS 471 kg

CLASS A CONCRETE

2 WINGS 10.7 m³

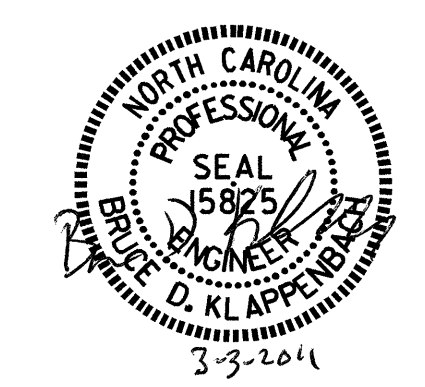
1 HEADWALL 0.8 m³

1 END CURTAIN WALL 0.9 m³

TOTAL 12.4 m³

ASSEMBLED BY : S.H. SOCKWELL DATE : 1/6/11
 CHECKED BY : H.T. BARBOUR DATE : 1/10/11
 DRAWN BY : KJA 6/97
 CHECKED BY : VAP 10/97

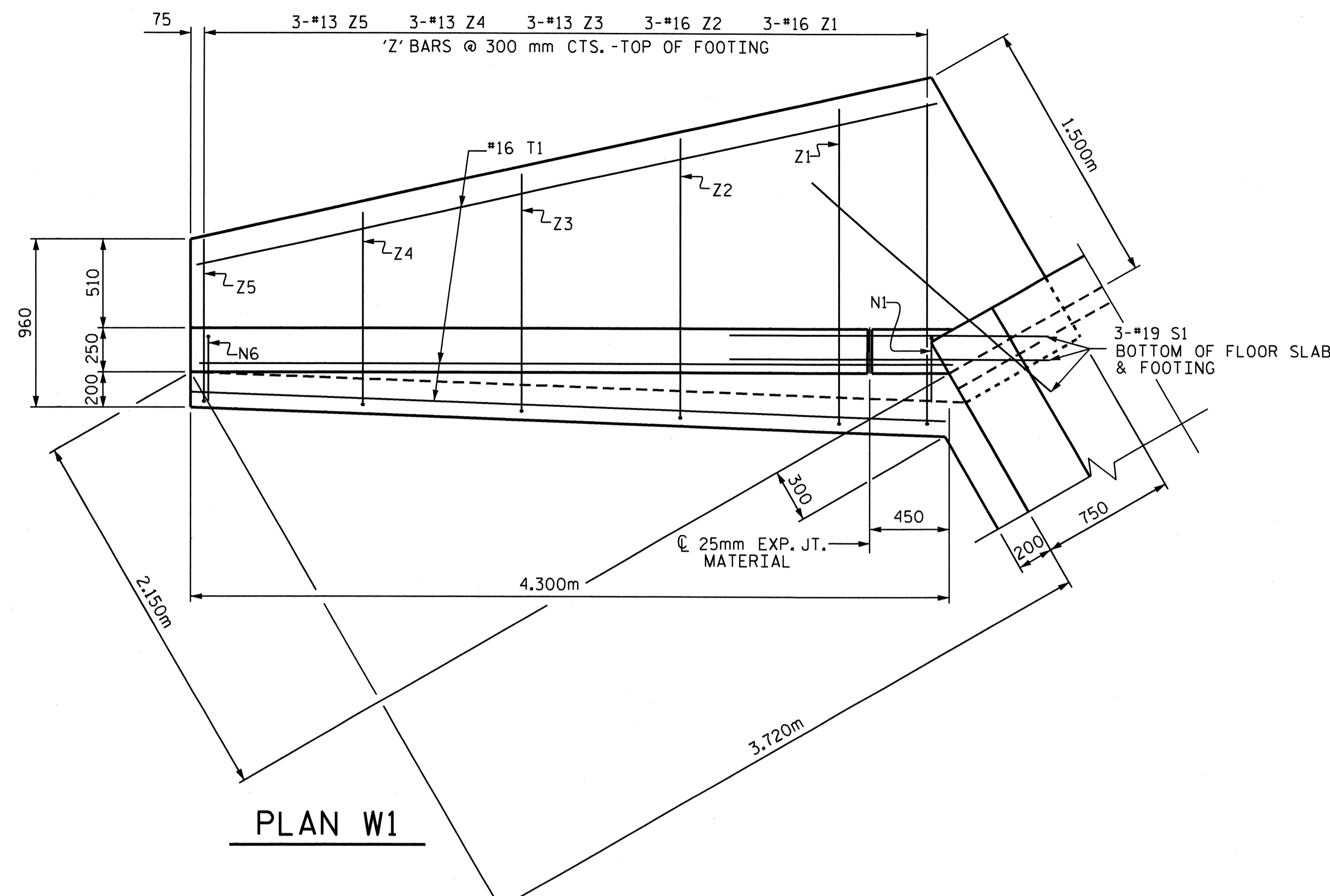
FOR WING ORIENTATION, SEE BARREL STANDARD SHEET.



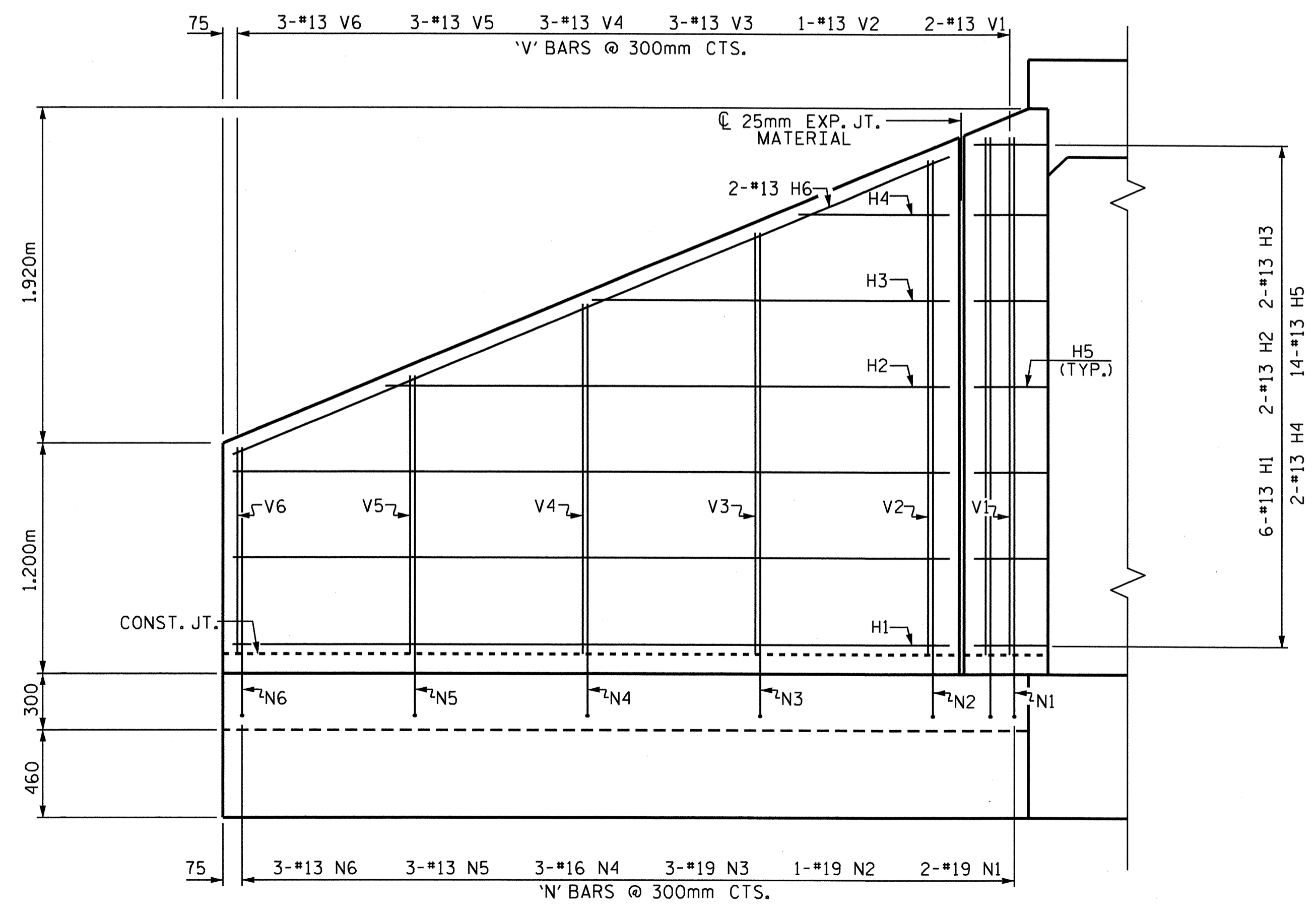
PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 12+68.320-Y1-REV

SHEET 10 OF 11
 DEPARTMENT OF NORTH CAROLINA
 RALEIGH
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 2.700m SLOPE 2:1
 120° SKEW

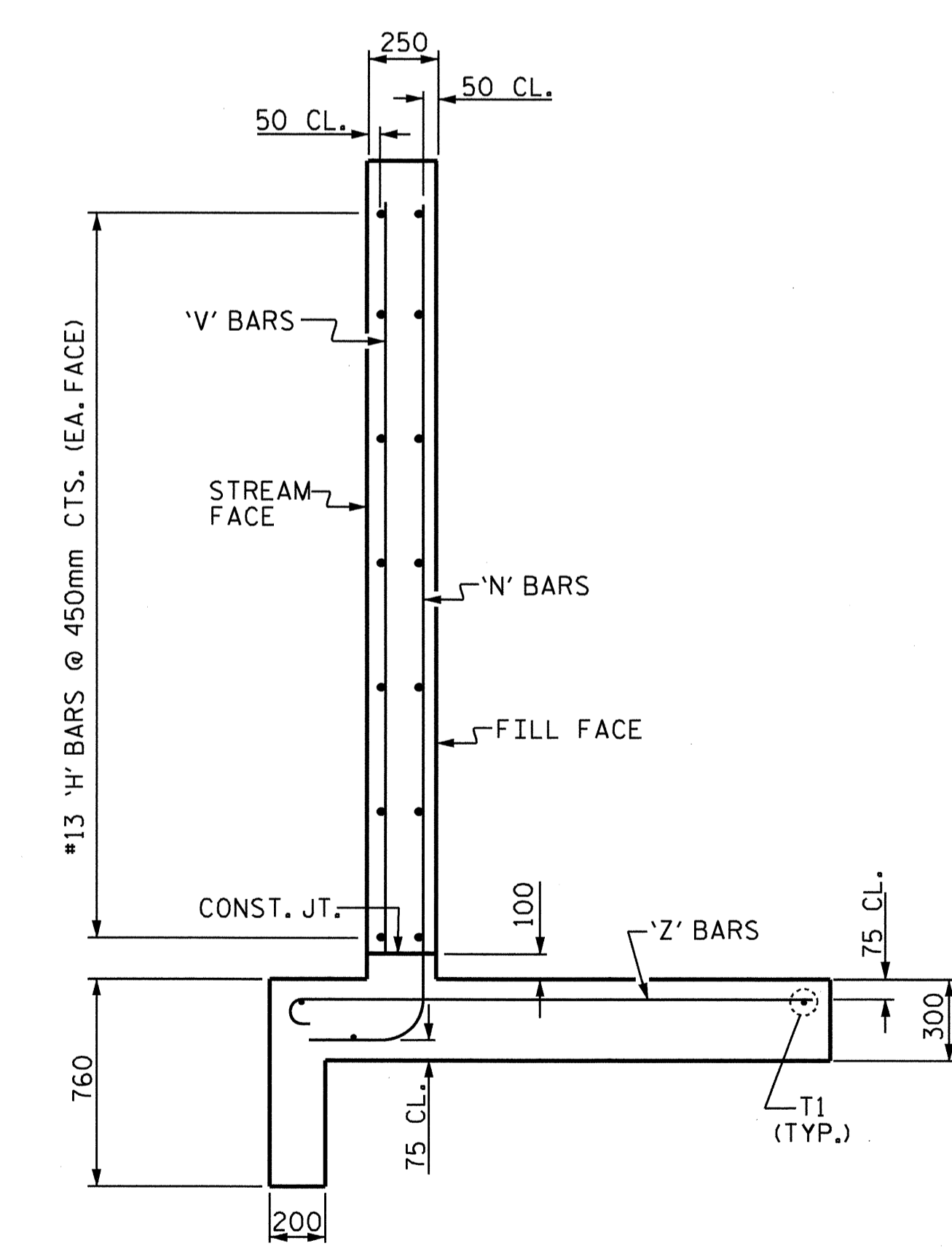
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-27	
1			3			TOTAL SHEETS	42
2			4				



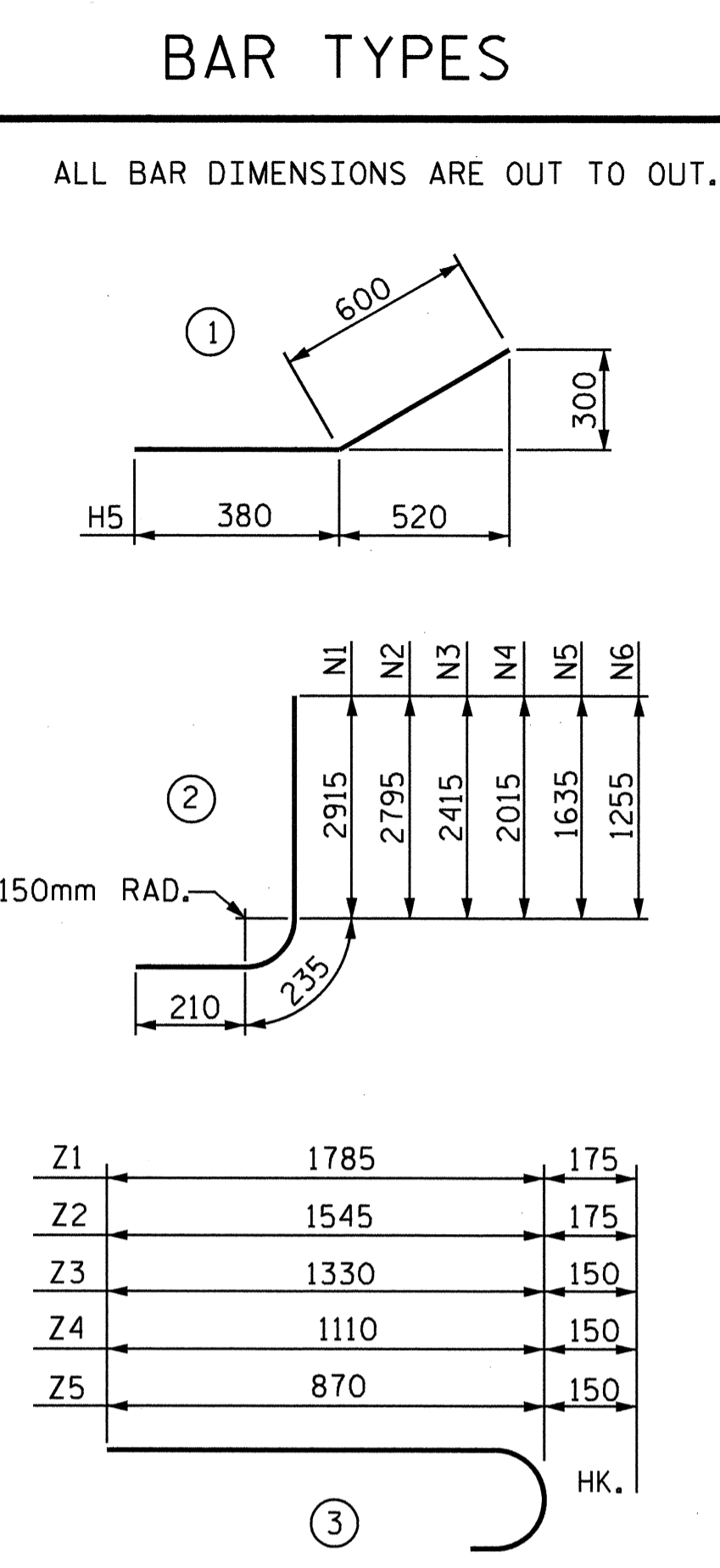
PLAN W1



ELEVATION W1



TYPICAL WING SECTION



BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
H1	12	13	STR	3740	45
H2	4	13	STR	2960	12
H3	4	13	STR	1900	8
H4	4	13	STR	860	3
H5	28	13	STR	980	27
H6	4	13	STR	4060	16
N1	4	19	2	3360	30
N2	2	19	2	3240	15
N3	6	19	2	2860	38
N4	6	16	2	2460	23
N5	6	13	2	2080	12
N6	6	13	2	1700	10
S1	6	19	STR	1800	24
T1	6	16	STR	4300	40
V1	4	13	STR	2740	11
V2	2	13	STR	2620	5
V3	6	13	STR	2240	13
V4	6	13	STR	1840	11
V5	6	13	STR	1460	9
V6	6	13	STR	1080	6
Z1	6	16	3	1960	18
Z2	6	16	3	1720	16
Z3	6	13	3	1480	9
Z4	6	13	3	1260	8
Z5	6	13	3	1020	6

REINFORCING STEEL
 FOR 2 WINGS 415 kg

CLASS A CONCRETE

2 WINGS 9.5 m³
 1 HEADWALL 0.7 m³
 1 END CURTAIN WALL 0.8 m³
 TOTAL 11.0 m³

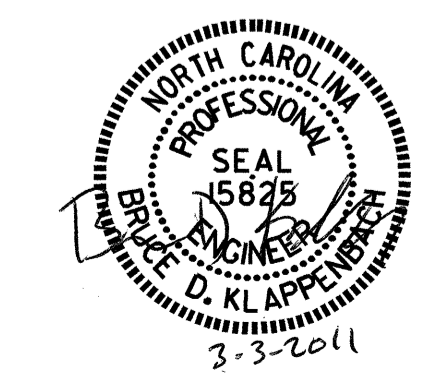
ASSEMBLED BY : S.H. SOCKWELL DATE : 1/6/11
 CHECKED BY : H.T. BARBOUR DATE : 1/10/11
 DRAWN BY : FPP 06/97
 CHECKED BY : VAP 08/97

PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 12+68.320-Y1-REV

SHEET 11 OF 11

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 2.700m SLOPE = 2:1
 90° SKEW

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-28	
1			3			TOTAL SHEETS	42
2			4				



BM #2 SOUTHEAST CORNER OF HEADWALL OF NC 73 BRIDGE STA. 221+54.00 -L- REV.
 9.000m RT. EL. 192.476

F.A. PROJECT NO. NHS-0049 (26)

NOTES

ASSUMED LIVE LOAD -----MS18 OR ALTERNATE LOADING.
 DESIGN FILL----- MAX. 3.60
 MIN. 1.79

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
 ALL ELEVATIONS ARE IN METERS.
 76mm Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
 FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 21.0m. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.

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

A 900mm STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

THE EXISTING DOUBLE BARREL 2.1m X 2.4m REINFORCED CONCRETE BOX CULVERT LOCATED AT THE SAME LOCATION AS THE PROPOSED CULVERT SHALL BE REMOVED (APPROXIMATE LENGTH = 38.0m).

THE 1800mm DIA. PIPE THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT OR CUT AS NECESSARY TO CLEAR THE PIPE.

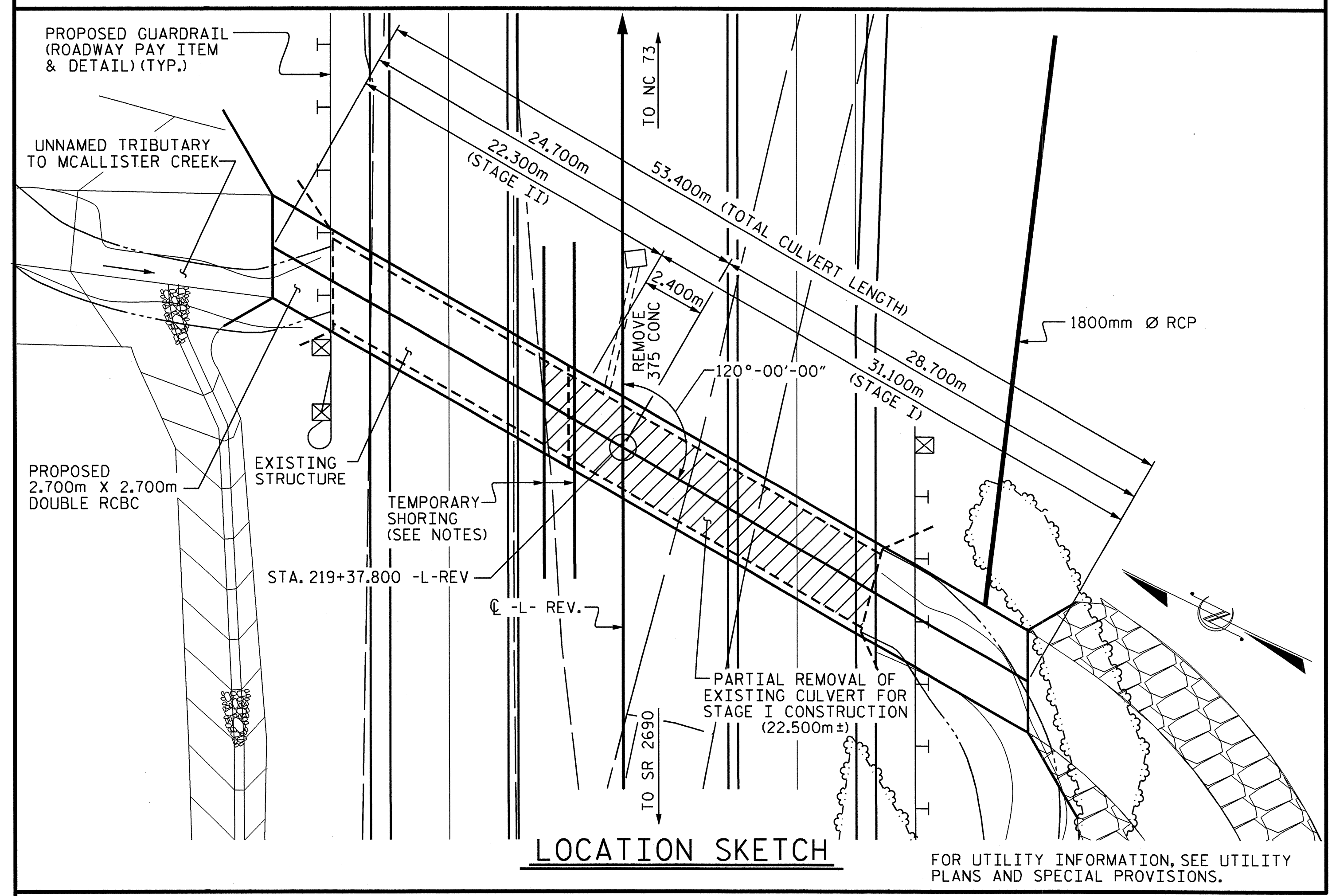
CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

STAGE I-
 1. REMOVE APPROXIMATELY 22.500m OF EXISTING CULVERT.
 2. WING FOOTING AND FLOOR SLAB INCLUDING 100mm OF ALL VERTICAL WALLS OF BARREL 1.
 3. THE REMAINING PORTIONS OF THE WALLS OF BARREL 1 AND WING FULL HEIGHT.
 4. WING FOOTING AND FLOOR SLAB INCLUDING 100mm OF ALL VERTICAL WALLS OF BARREL 2.
 5. THE REMAINING PORTIONS OF THE WALLS OF BARREL 2 AND WING FULL HEIGHT FOLLOWED BY ROOF SLAB WITH HEADWALL AND EDGE BEAMS.

STAGE II-
 1. REMOVE REMAINDER OF EXISTING CULVERT.
 2. WING FOOTING AND FLOOR SLAB INCLUDING 100mm OF ALL VERTICAL WALLS OF BARREL 1.
 3. THE REMAINING PORTIONS OF THE WALLS OF BARREL 1 AND WING FULL HEIGHT.
 4. WING FOOTING AND FLOOR SLAB INCLUDING 100mm OF ALL VERTICAL WALLS OF BARREL 2.
 5. THE REMAINING PORTIONS OF THE WALLS OF BARREL 2 AND WING FULL HEIGHT FOLLOWED BY ROOF SLAB WITH HEADWALL AND EDGE BEAMS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 360,000kg OF REINFORCING STEEL, ONE 760mm SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 360,000kg OF REINFORCING STEEL, TWO 760mm 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 DIAMETER. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.



ROADWAY DATA

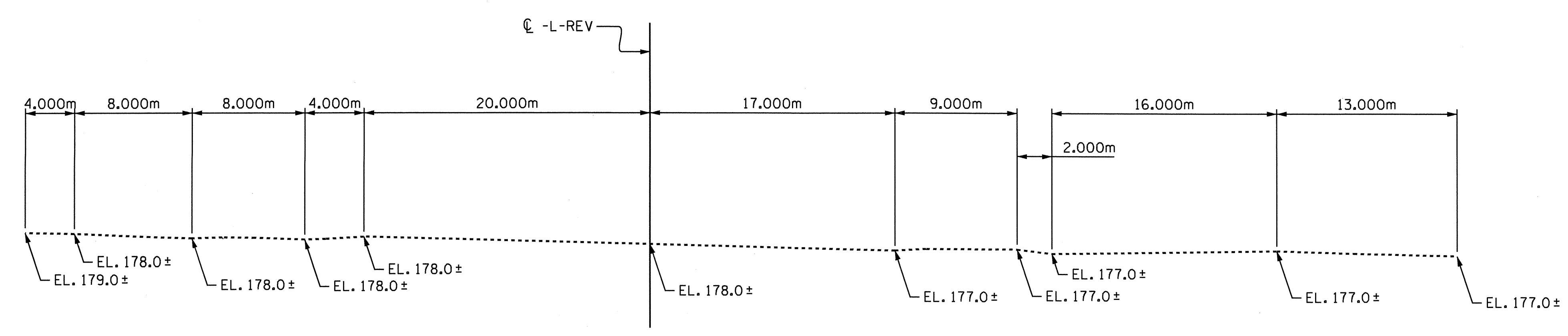
GRADE POINT ELEV. @ STA. 219+37.800-L-REV, NBL = 183.232
 GRADE POINT ELEV. @ STA. 219+37.800-L-REV, SBL = 182.679
 BED ELEV. @ STA. 219+37.800-L-REV = 177.29
 ROADWAY SLOPES = 2:1

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = < 66.2 CU. M.
 FREQUENCY OF OVERTOPPING FLOOD = < 500 YR.
 OVERTOPPING FLOOD ELEVATION = 182.49

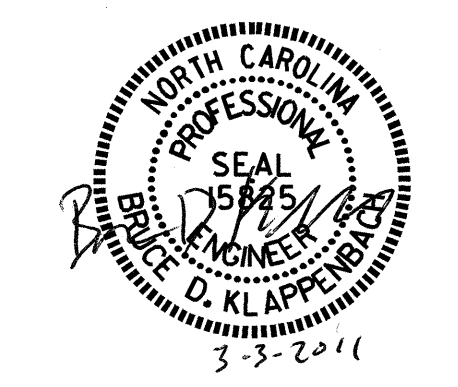
HYDRAULIC DATA

DESIGN DISCHARGE = 31.1 CU. M.
 FREQUENCY OF DESIGN FLOOD = 50 YR.
 DESIGN HIGH WATER ELEVATION = 180.31
 DRAINAGE AREA = 3.85 SQ. KM.
 BASIC DISCHARGE (Q100) = 35.3 CU. M.
 BASIC HIGH WATER ELEVATION = 180.52

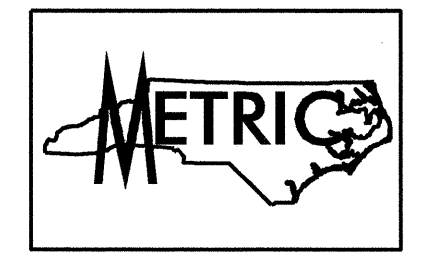


TOTAL STRUCTURE QUANTITIES

STAGE I CLASS A CONCRETE	
BARREL @ 5.69 m ³ /m	177.0 m ³
WINGS ETC.	13.7 m ³
SUBTOTAL	190.7 m ³
STAGE I REINFORCING STEEL	
BARREL	16620 kg
WINGS ETC.	471 kg
SUBTOTAL	17091 kg
STAGE II CLASS A CONCRETE	
BARREL @ 5.64 m ³ /m	125.8 m ³
WINGS ETC.	13.7 m ³
SUBTOTAL	139.5 m ³
STAGE II REINFORCING STEEL	
BARREL	11865 kg
WINGS ETC.	471 kg
SUBTOTAL	12336 kg
TOTAL CLASS A CONCRETE	330.2 m ³
TOTAL REINFORCING STEEL	29427 kg
CULVERT EXCAVATION	----- LUMP SUM
FOUNDATION COND. MAT'L	---- METRIC TONS
STAGE I	128 METRIC TONS
STAGE II	91 METRIC TONS
TOTAL	219 METRIC TONS
REMOVAL OF EXISTING STRUCTURE	-- LUMP SUM



Jose Matta Riley
 3/3/11



PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 219+37.800 -L- REV

SHEET 1 OF 9 CULVERT NO. 393

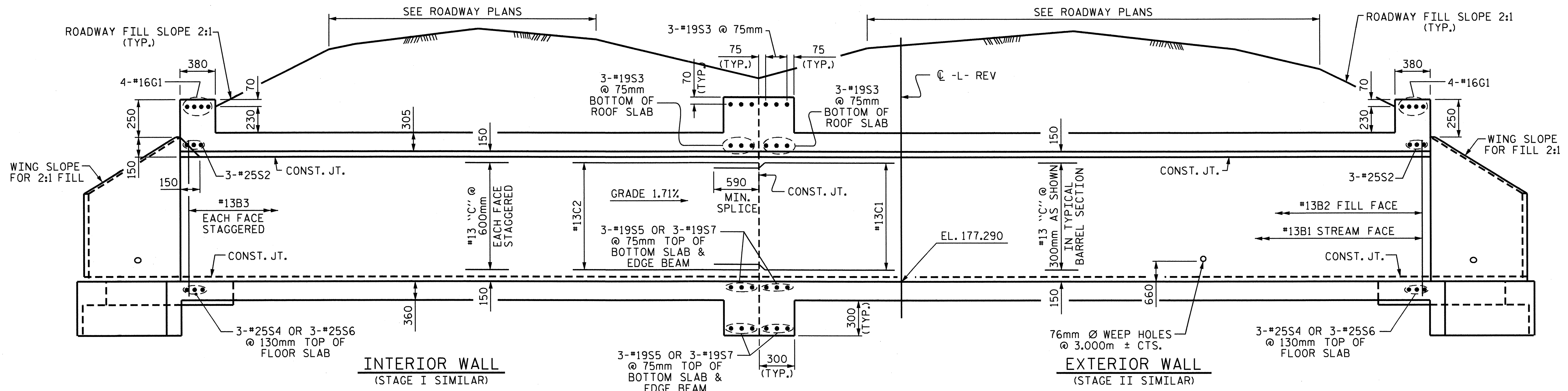
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

BARREL STANDARD
 DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT
 120°-00'-00" SKEW

REVISIONS						SHEET NO. C-29
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

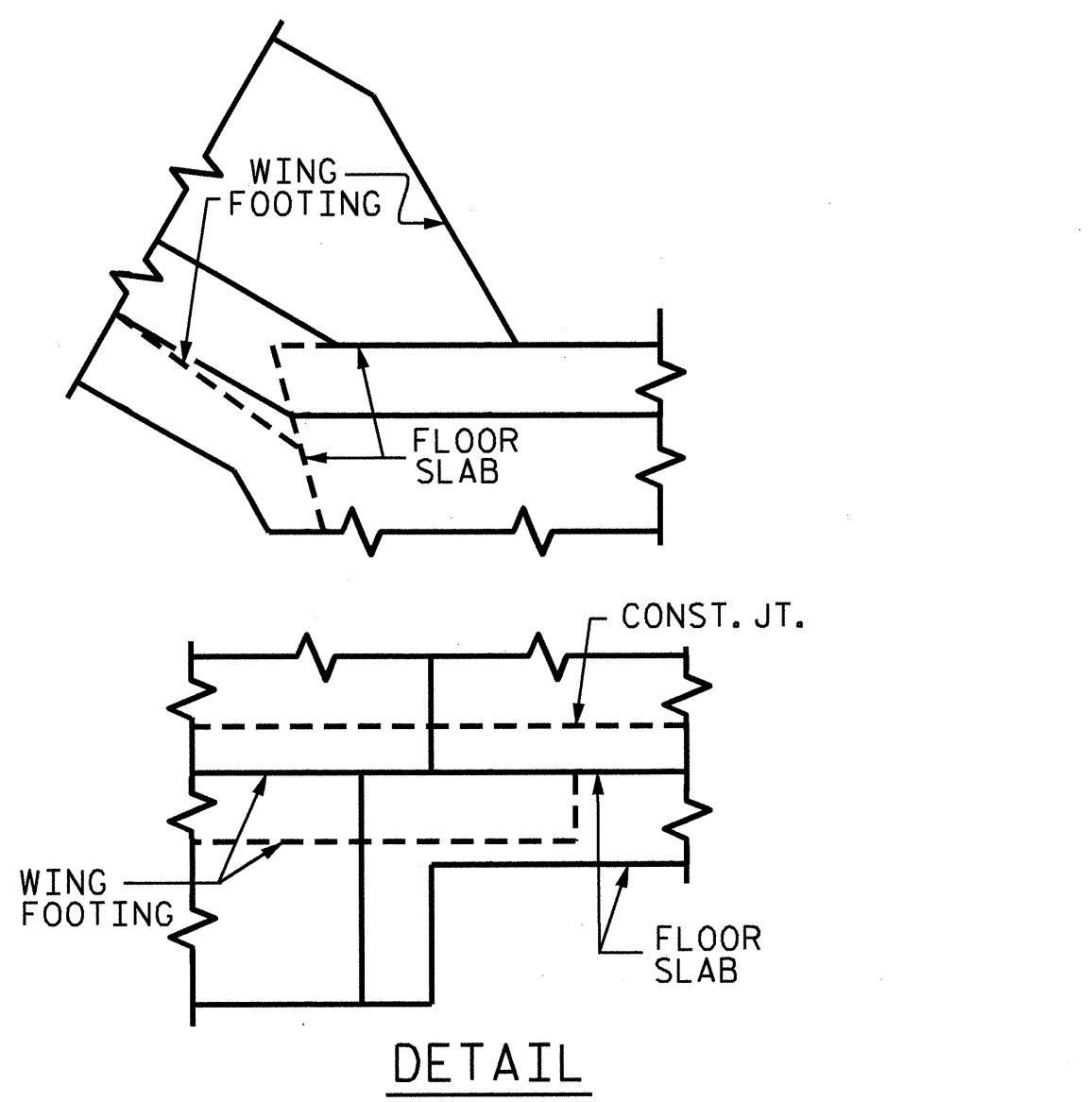
ASSEMBLED BY : C.R. YARBROUGH DATE : 08/10
 CHECKED BY : H.T. BARBOUR DATE : 01/11

DRAWN BY : EEM 6/97
 CHECKED BY : ARB 7/97

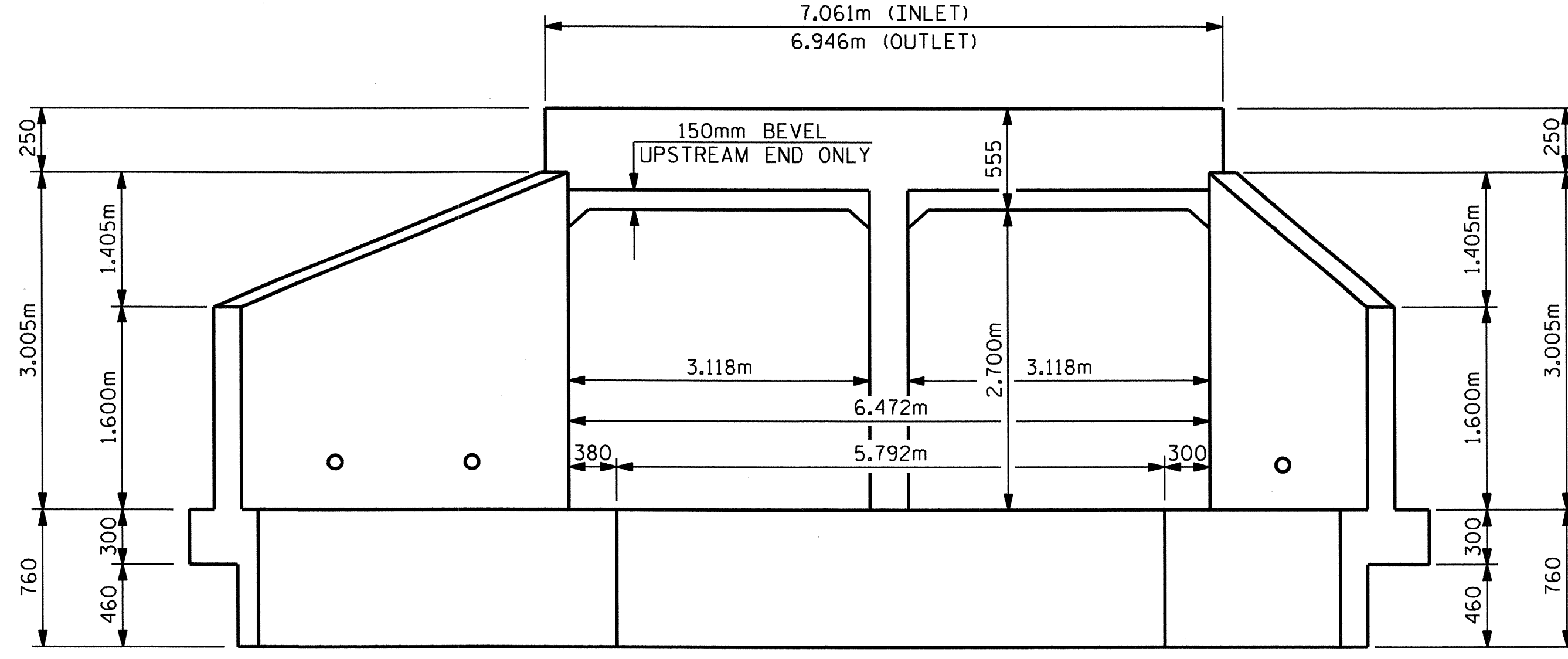


STAGE II CULVERT SECTION NORMAL TO ROADWAY

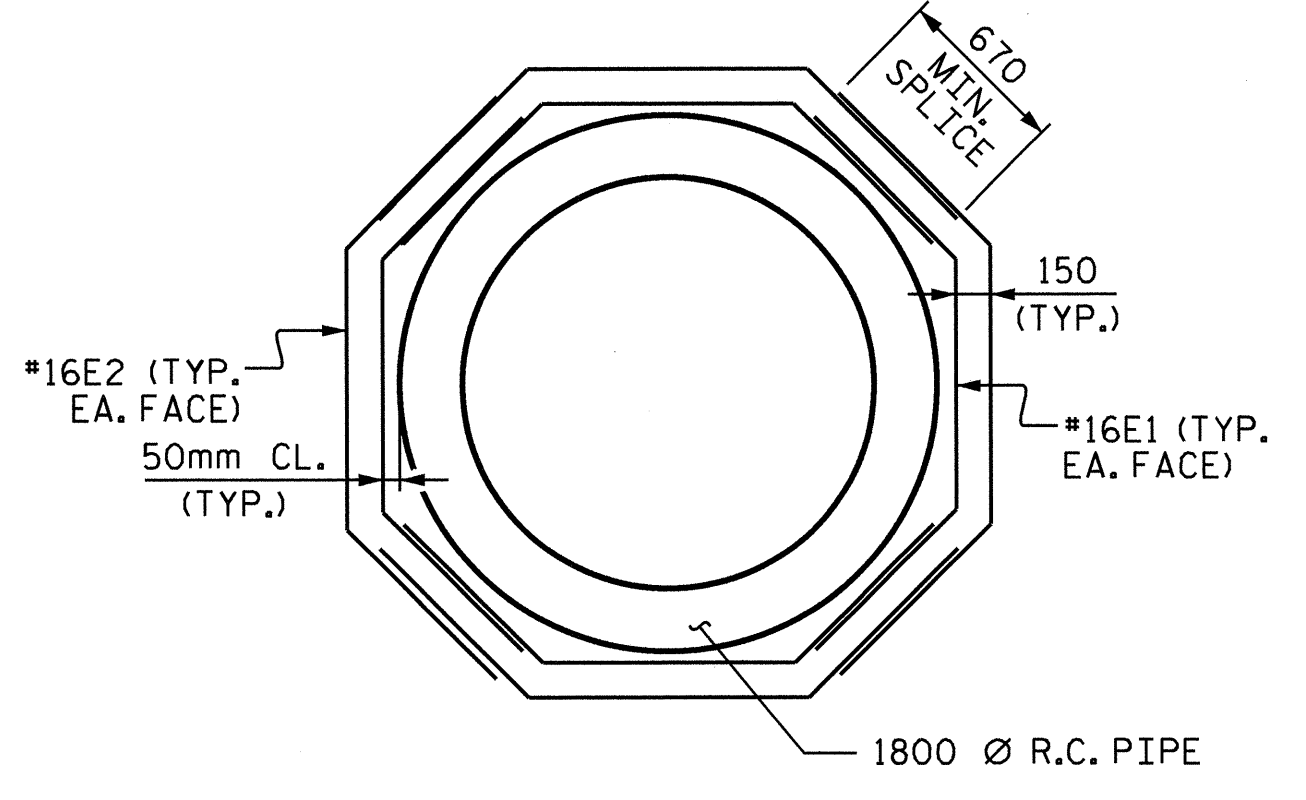
STAGE I CULVERT SECTION NORMAL TO ROADWAY



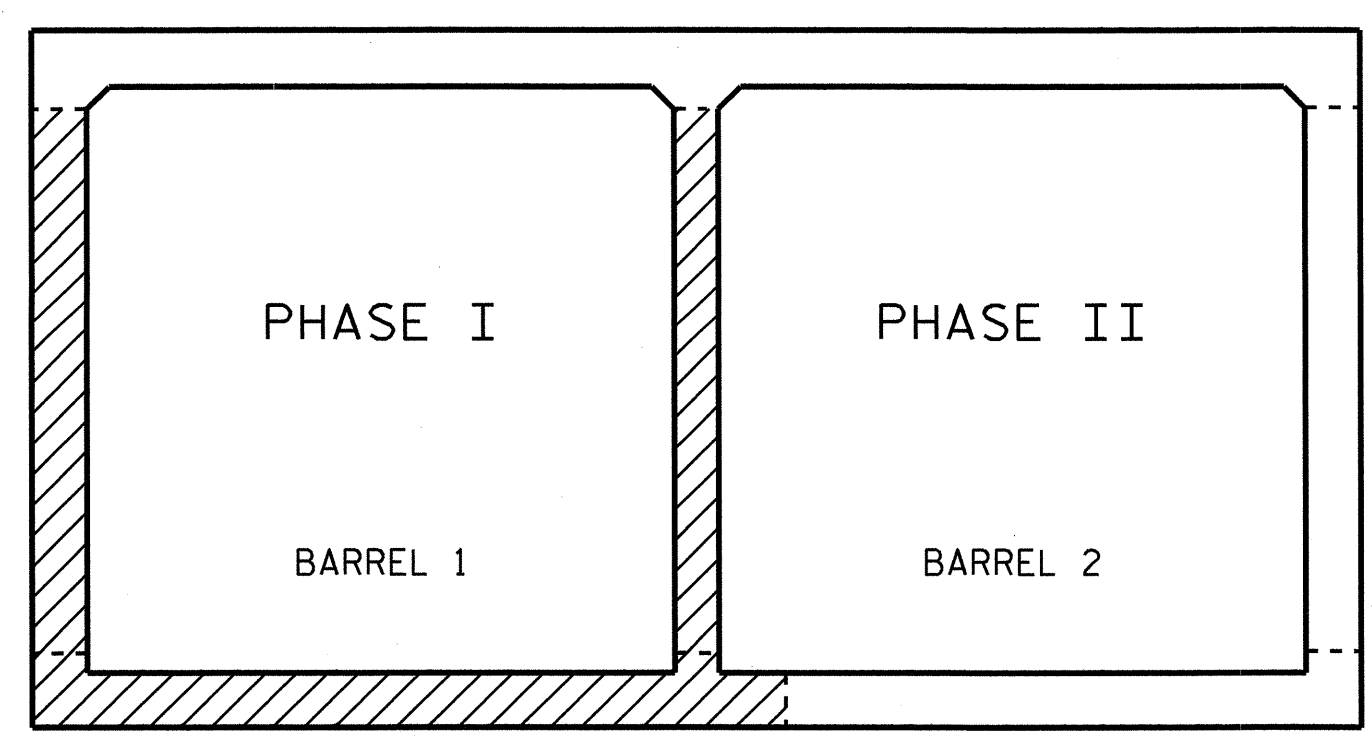
DETAIL CONNECTION OF WING FOOTING AND FLOOR SLAB WHEN SLAB IS THICKER THAN FOOTING



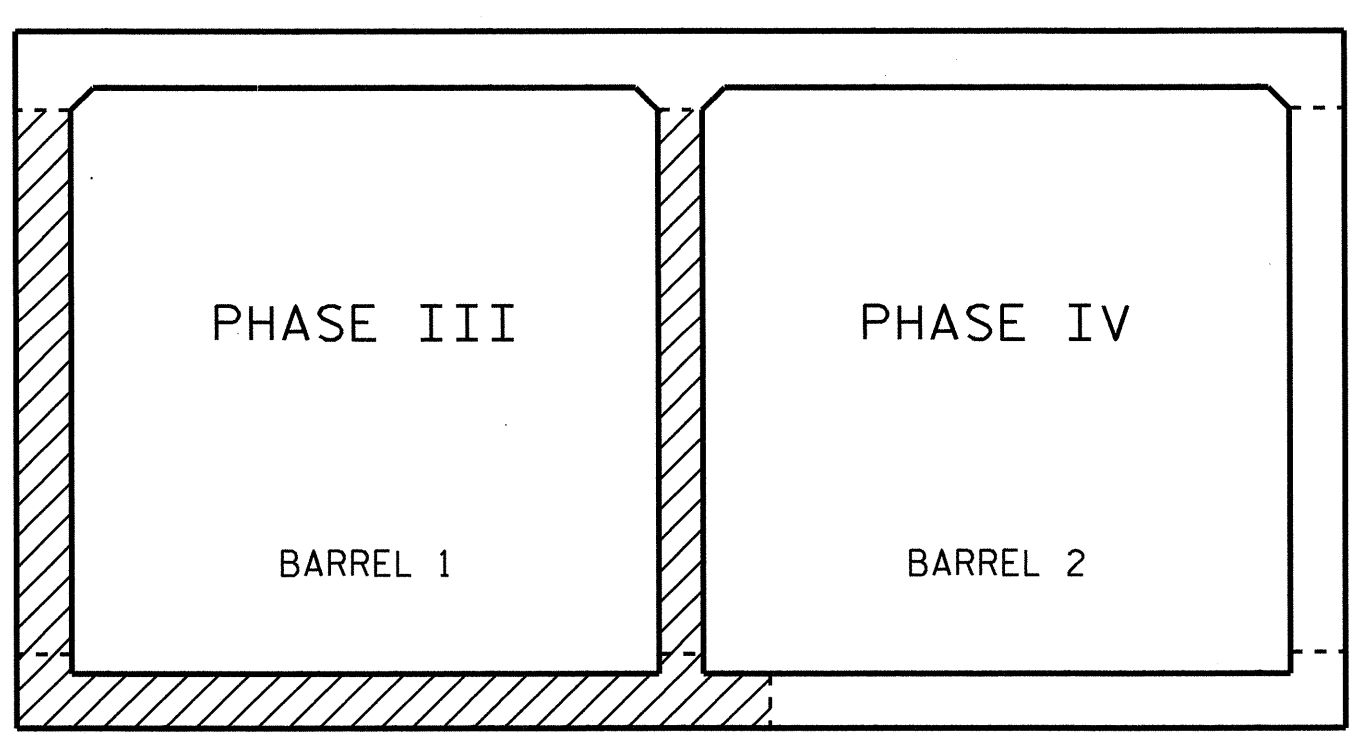
END ELEVATION NORMAL TO SKEW



DETAIL OF REINFORCING AROUND 1800 Ø PIPE



STAGE I LOOKING DOWN STREAM



STAGE II LOOKING DOWN STREAM

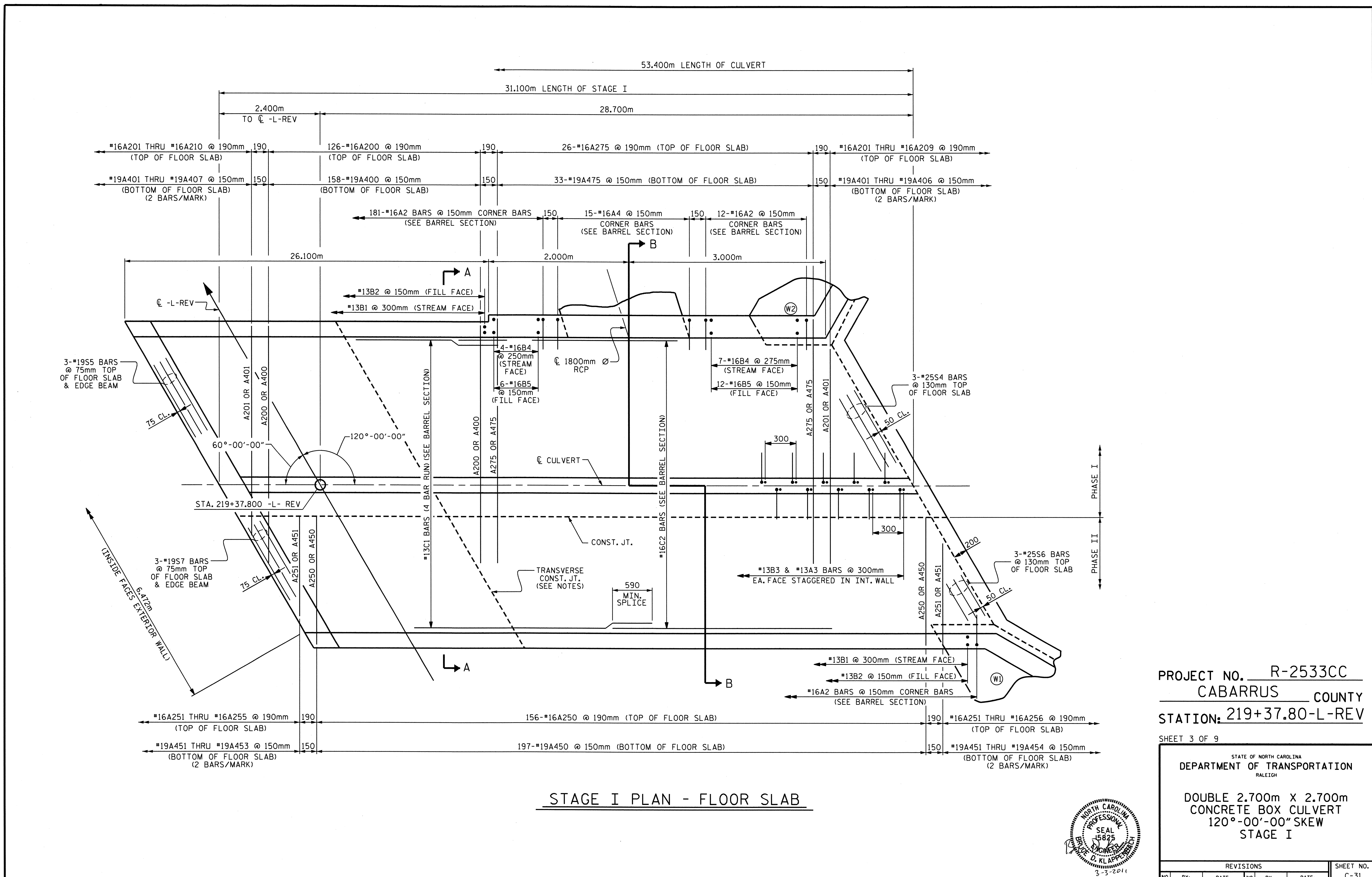
PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 219+37.800-L-REV

SHEET 2 OF 9
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT
 120°-00'-00" SKEW



REVISIONS						SHEET NO. C-30
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 42
2			4			

DRAWN BY: C.R. YARBROUGH DATE: 08/10
 CHECKED BY: H.T. BARBOUR DATE: 01/11



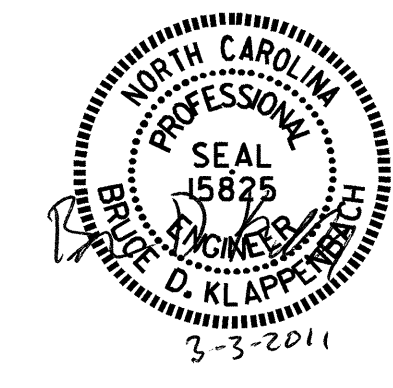
STAGE I PLAN - FLOOR SLAB

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 219+37.80-L-REV

SHEET 3 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT
 120°-00'-00" SKEW
 STAGE I

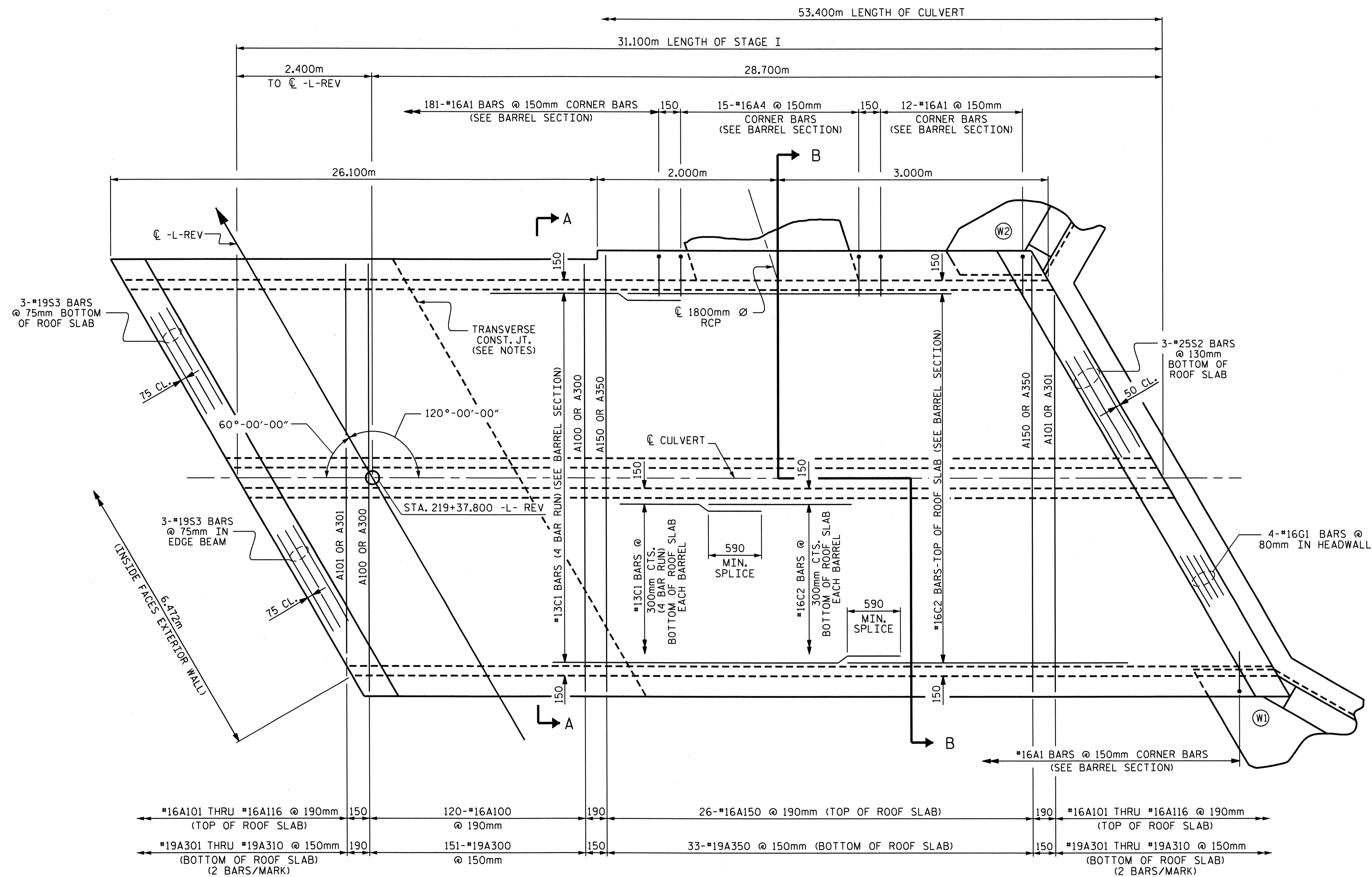


DRAWN BY: C.R. YARBROUGH DATE: 08/10
 CHECKED BY: H.T. BARBOUR DATE: 01/11

23-FEB-2011 16:36
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 cyarbraugh

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-31
1			3			TOTAL SHEETS
2			4			42

CULVERT #5



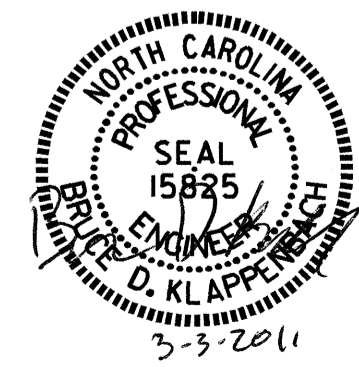
STAGE I PLAN - ROOF SLAB

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 219+37.80-L-REV

SHEET 4 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

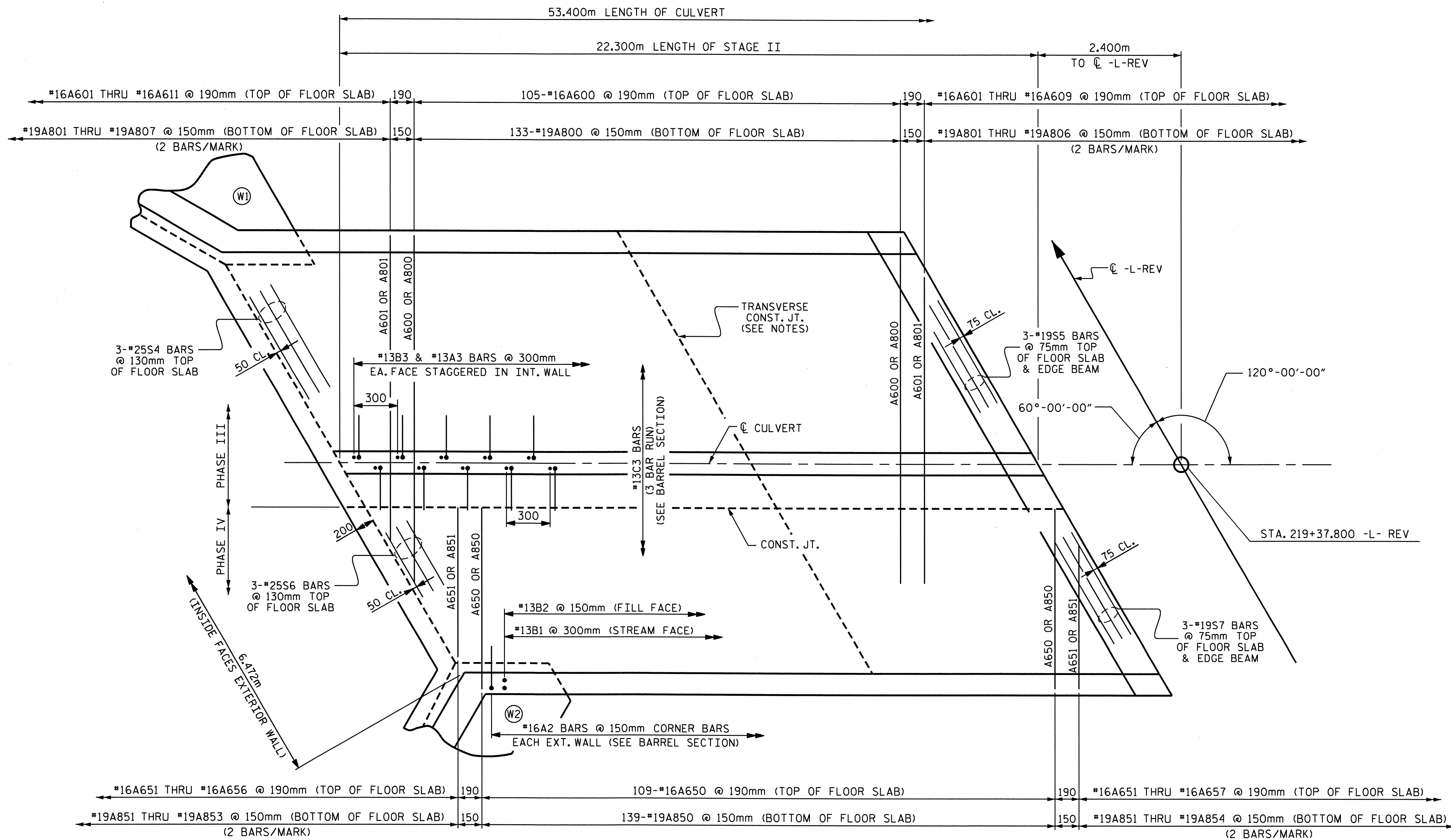
DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT
 120°-00'-00" SKEW
 STAGE I



DRAWN BY: C.R. YARBROUGH DATE: 08/10
 CHECKED BY: H.T. BARBOUR DATE: 01/11

23-FEB-2011 15:35
 R:\Structures\Culver+5\cyarbraugh\Micrstation\R-2533CC.SD.CU.*5.dgn
 cyarbraugh

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-32	
1			3			TOTAL	42
2			4			SHEETS	42



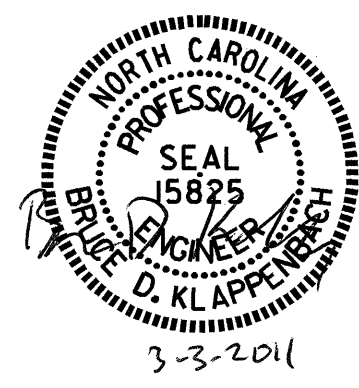
STAGE II PLAN - FLOOR SLAB

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 219+37.80-L-REV

SHEET 5 OF 9

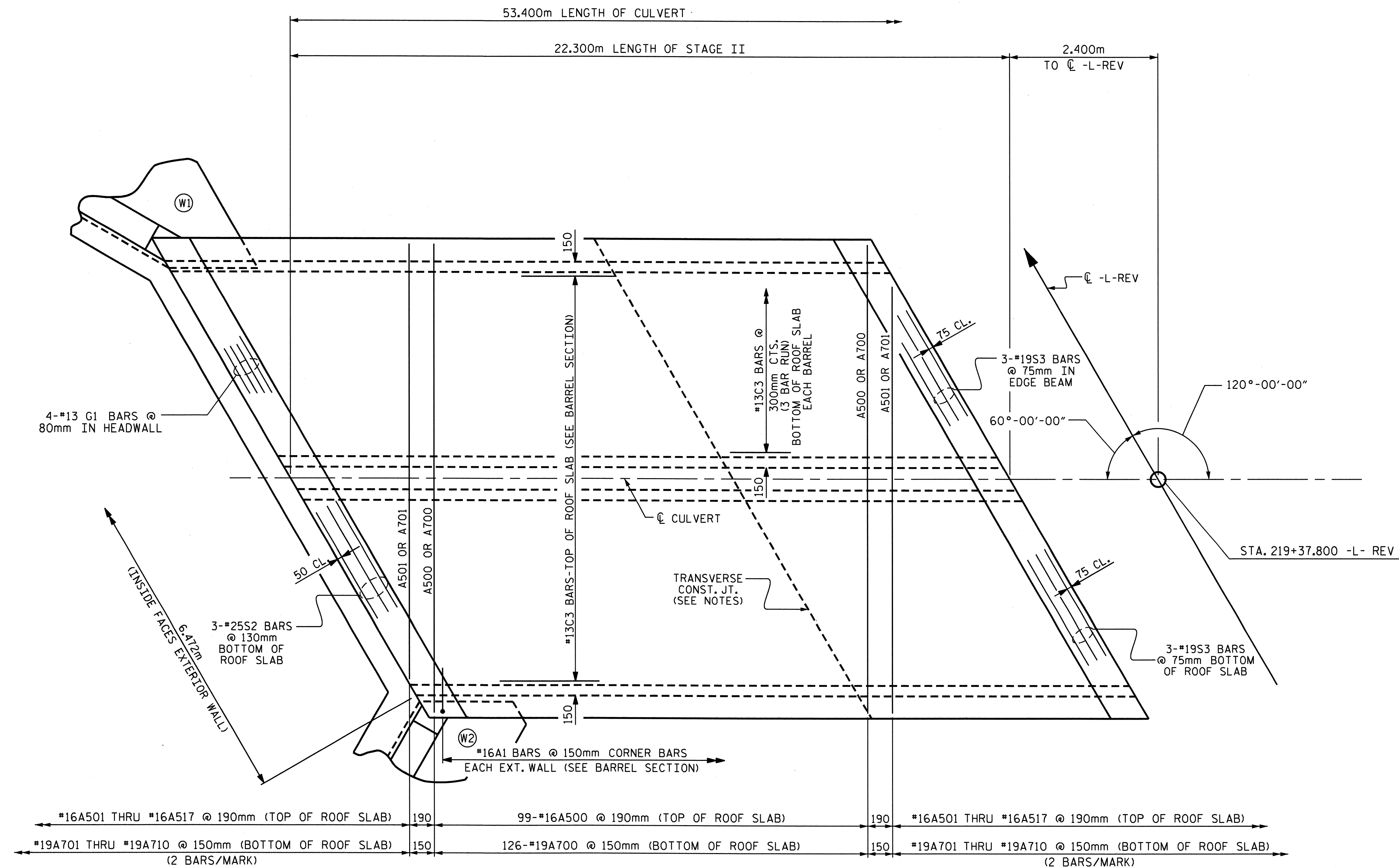
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT
 120°-00'-00" SKEW
 STAGE II



DRAWN BY: C.R. YARBROUGH DATE: 08/10
 CHECKED BY: H.T. BARBOUR DATE: 01/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-33
1			3			TOTAL SHEETS 42
2			4			42



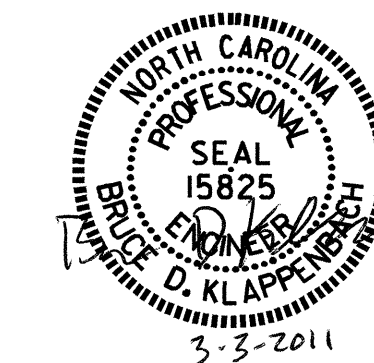
STAGE II PLAN - ROOF SLAB

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 219+37.80-L-REV

SHEET 6 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT
 120°-00'-00" SKEW
 STAGE II

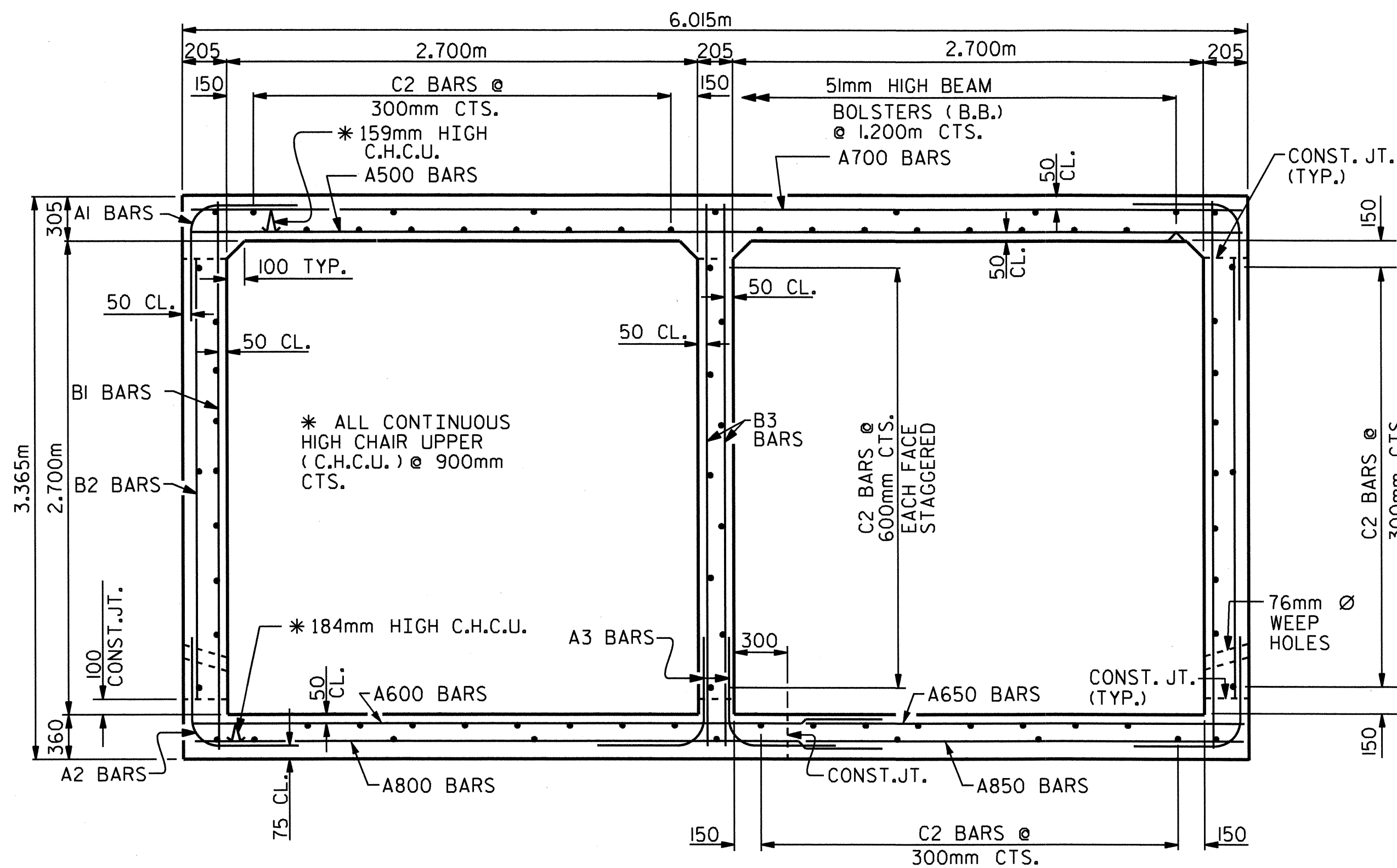


DRAWN BY: C.R. YARBROUGH DATE: 08/10
 CHECKED BY: H.T. BARBOUR DATE: 01/11

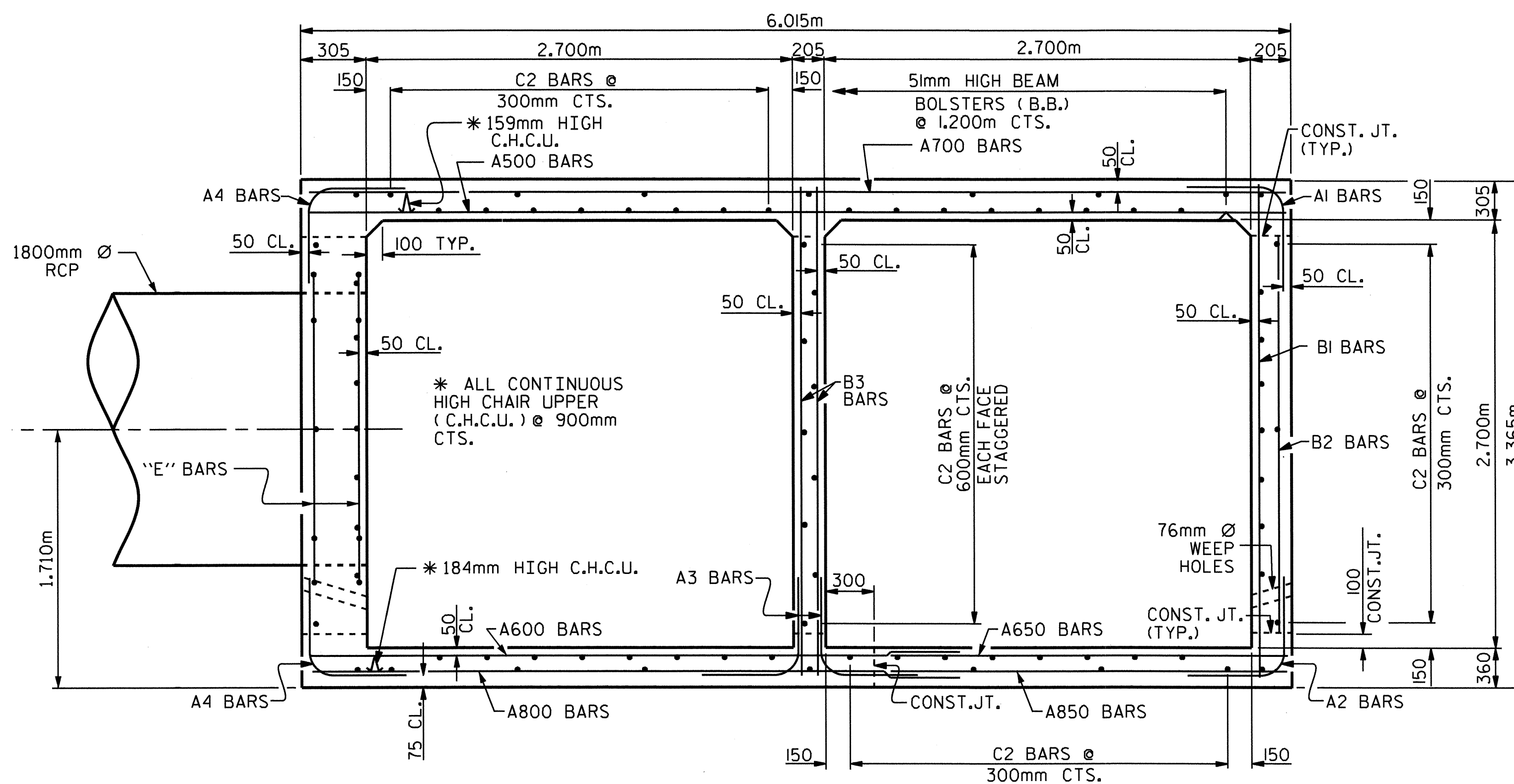
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 R:\Structures\Culvert+5\cyarrough\Microstation\R-2533CC_SD.CU.*5.dgn
 cyarrough

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-34
1			3			TOTAL SHEETS
2			4			42

CULVERT #5



SECTION A-A OF BARREL
THERE ARE 79 "C" BARS IN SECTION OF BARREL.



SECTION B-B OF BARREL
THERE ARE 79 "C" BARS IN SECTION OF BARREL.

DRAWN BY: C.R. YARBROUGH DATE: 08/10
CHECKED BY: H.T. BARBOUR DATE: 01/11

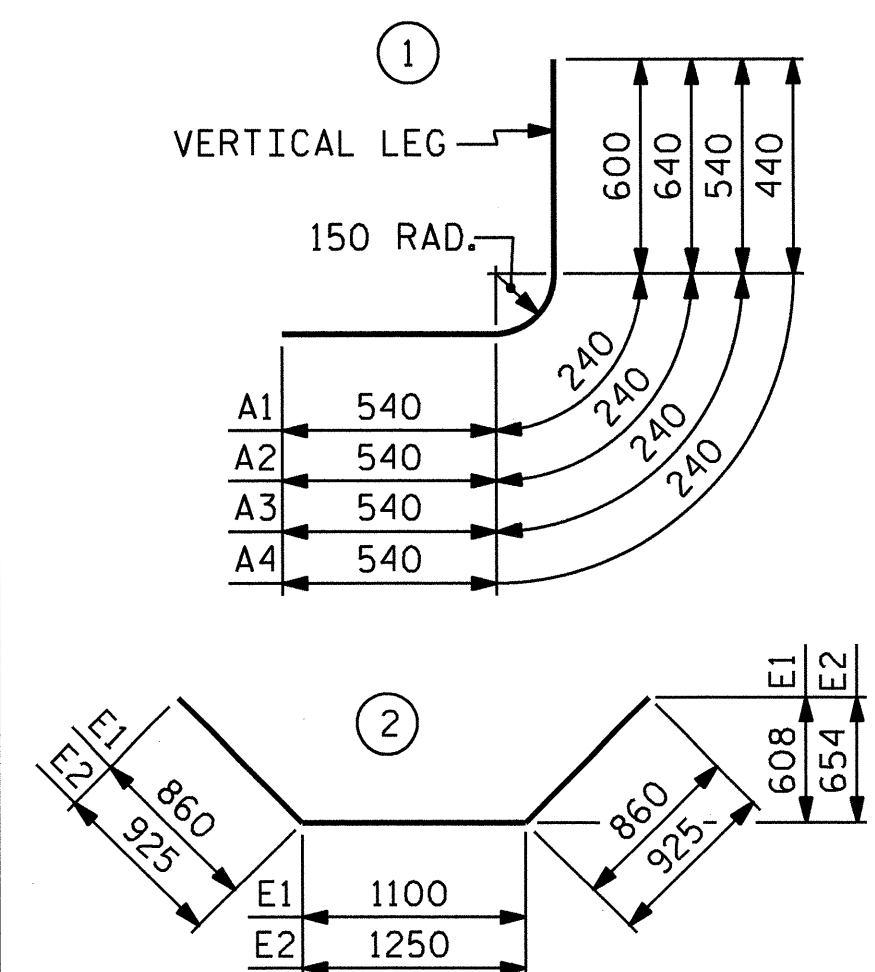
23-FEB-2011 15:34
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cyarborough

BILL OF MATERIAL

STAGE I

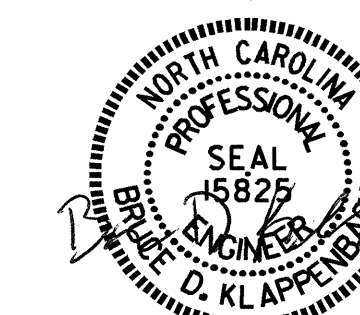
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	401	#16	1	1380	859	A300	151	#19	STR	5900	1991	S2	3	#25	STR	6800	81
A2	401	#16	1	1420	884	A301	4	#19	STR	5500	49	S3	6	#19	STR	6800	91
A3	208	#13	1	1320	273	A302	4	#19	STR	4980	45	S4	3	#25	STR	5680	68
A4	30	#16	1	1220	57	A303	4	#19	STR	4460	40	S5	6	#19	STR	4920	66
						A304	4	#19	STR	3940	35	S6	3	#25	STR	2900	35
A100	120	#16	STR	5900	1099	A305	4	#19	STR	3420	31	S7	6	#19	STR	2900	39
A101	2	#16	STR	5600	17	A306	4	#19	STR	2900	26	REINFORCING STEEL = 16620 KG					
A102	2	#16	STR	5260	16	A307	4	#19	STR	2380	21	SPLICE LENGTH CHART					
A103	2	#16	STR	4940	15	A308	4	#19	STR	1860	17	BAR	SIZE	SPLICE LENGTH			
A104	2	#16	STR	4600	14	A309	4	#19	STR	1340	12	A200	16	540			
A105	2	#16	STR	4280	13	A310	4	#19	STR	820	7	A400	19	690			
A106	2	#16	STR	3940	12							B1	13	540			
A107	2	#16	STR	3620	11	A350	33	#19	STR	6000	443	B3	13	540			
A108	2	#16	STR	3300	10							C1	13	590			
A109	2	#16	STR	2960	9	A400	158	#19	STR	4060	1434	"S"	19	840			
A110	2	#16	STR	2640	8	A401	4	#19	STR	3660	33	"S"	25	1500			
A111	2	#16	STR	2300	7	A402	4	#19	STR	3140	28						
A112	2	#16	STR	1980	6	A403	4	#19	STR	2620	23						
A113	2	#16	STR	1640	5	A404	4	#19	STR	2100	19						
A114	2	#16	STR	1320	4	A405	4	#19	STR	1580	14						
A115	2	#16	STR	980	3	A406	4	#19	STR	1060	9						
A116	2	#16	STR	660	2	A407	2	#19	STR	540	2						
A150	26	#16	STR	6000	242	A450	197	#19	STR	2540	1118						
A200	126	#16	STR	3900	763	A451	4	#19	STR	2120	19						
A201	2	#16	STR	3600	11	A452	4	#19	STR	1600	14						
A202	2	#16	STR	3280	10	A453	4	#19	STR	1080	10						
A203	2	#16	STR	2940	9	A454	2	#19	STR	560	3						
A204	2	#16	STR	2620	8	A475	33	#19	STR	4160	307						
A205	2	#16	STR	2280	7												
A206	2	#16	STR	1960	6	B1	191	#13	STR	3200	608						
A207	2	#16	STR	1620	5	B2	382	#13	STR	2480	942						
A208	2	#16	STR	1300	4	B3	208	#13	STR	3200	662						
A209	2	#16	STR	960	3	B4	11	#16	STR	3200	55						
A210	1	#16	STR	640	1	B5	18	#16	STR	2480	69						
A250	156	#16	STR	2540	615	C1	316	#13	STR	7140	2243						
A251	2	#16	STR	2260	7	C2	79	#16	STR	4900	601						
A252	2	#16	STR	1940	6												
A253	2	#16	STR	1620	5	E1	8	#16	2	2820	35						
A254	2	#16	STR	1280	4	E2	8	#16	2	3100	38						
A255	2	#16	STR	960	3												
A256	1	#16	STR	620	1	G1	4	#16	STR	6800	42						
A275	26	#16	STR	4000	161												

BAR TYPE
DIMENSIONS ARE OUT TO OUT



PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 219+37.80-L-REV

SHEET 7 OF 9

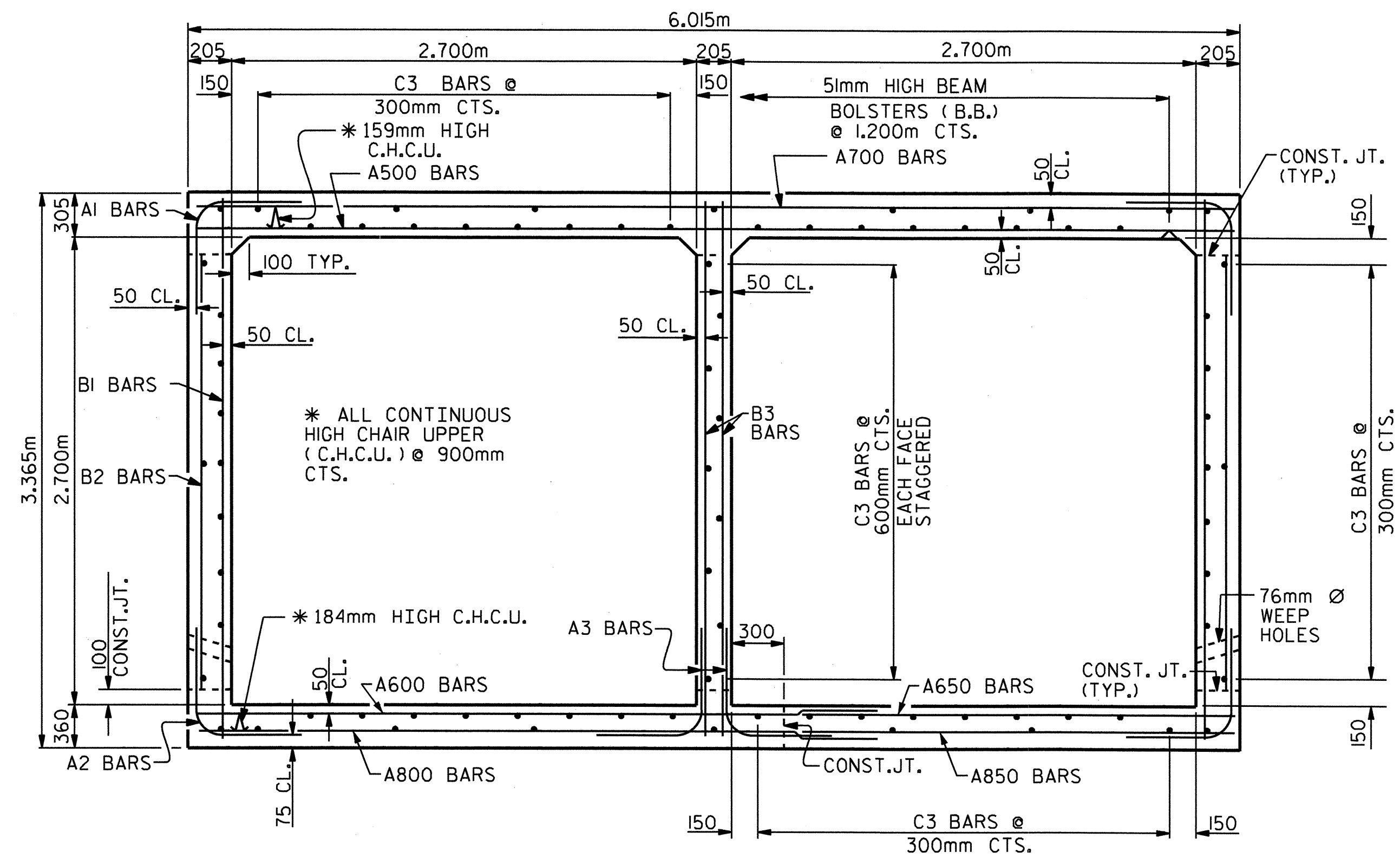


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BILL OF MATERIAL
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-35
1			3			TOTAL SHEETS
2			4			42

CULVERT #5



BILL OF MATERIAL

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	298	#16	1	1380	638	A650	109	#16	STR	2540	430	B1	150	#13	STR	3200	477
A2	298	#16	1	1420	657	A651	2	#16	STR	2380	7	B2	300	#13	STR	2480	740
A3	140	#16	1	1320	287	A652	2	#16	STR	2060	6	B3	150	#13	STR	3200	477
						A653	2	#16	STR	1720	5						
A500	99	#16	STR	5900	907	A654	2	#16	STR	1400	4	C3	237	#13	STR	7820	1842
A501	2	#16	STR	5700	18	A655	2	#16	STR	1060	3						
A502	2	#16	STR	5380	17	A656	2	#16	STR	740	2	G1	4	#16	STR	6800	42
A503	2	#16	STR	5060	16	A657	1	#16	STR	400	1						
A504	2	#16	STR	4720	15							S2	3	#25	STR	6800	81
A505	2	#16	STR	4400	14	A700	126	#19	STR	5900	1661	S3	6	#19	STR	6800	91
A506	2	#16	STR	4060	13	A701	4	#19	STR	5400	48	S4	3	#25	STR	5680	68
A507	2	#16	STR	3740	12	A702	4	#19	STR	4880	44	S5	6	#19	STR	4920	66
A508	2	#16	STR	3400	11	A703	4	#19	STR	4360	39	S6	3	#25	STR	2900	35
A509	2	#16	STR	3080	10	A704	4	#19	STR	3840	34	S7	6	#19	STR	2900	39
A510	2	#16	STR	2740	9	A705	4	#19	STR	3320	30						
A511	2	#16	STR	2420	8	A706	4	#19	STR	2800	25						
A512	2	#16	STR	2080	6	A707	4	#19	STR	2280	20						
A513	2	#16	STR	1760	5	A708	4	#19	STR	1760	16						
A514	2	#16	STR	1440	4	A709	4	#19	STR	1240	11						
A515	2	#16	STR	1100	3	A710	2	#19	STR	720	3						
A516	2	#16	STR	780	2												
A517	2	#16	STR	440	1	A800	133	#19	STR	4060	1207						
						A801	4	#19	STR	3560	32						
A600	105	#16	STR	3900	636	A802	4	#19	STR	3040	27						
A601	2	#16	STR	3720	12	A803	4	#19	STR	2520	23						
A602	2	#16	STR	3380	10	A804	4	#19	STR	2000	18						
A603	2	#16	STR	3060	9	A805	4	#19	STR	1480	13						
A604	2	#16	STR	2720	8	A806	4	#19	STR	960	9						
A605	2	#16	STR	2400	7	A807	2	#19	STR	440	2						
A606	2	#16	STR	2060	6												
A607	2	#16	STR	1740	5	A850	139	#19	STR	2540	789						
A608	2	#16	STR	1420	4	A851	4	#19	STR	2040	18						
A609	2	#16	STR	1080	3	A852	4	#19	STR	1520	14						
A610	1	#16	STR	760	1	A853	4	#19	STR	1000	9						
A611	1	#16	STR	420	1	A854	2	#19	STR	480	2						

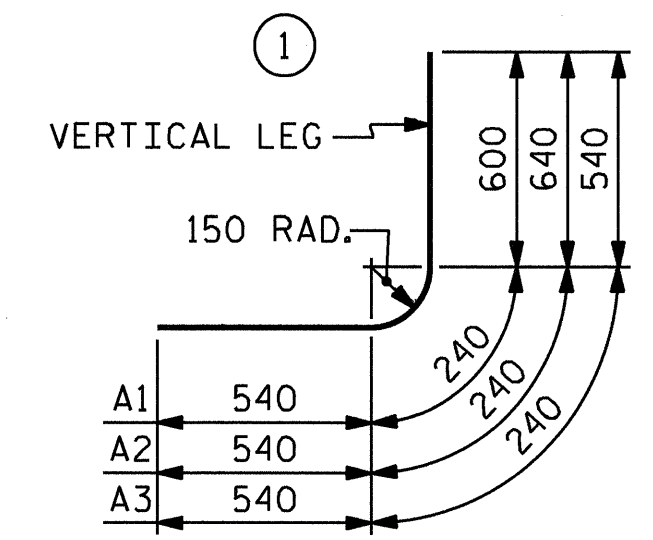
REINFORCING STEEL = 11865 KG

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
A600	16	540
A800	22	690
B1	13	540
B3	13	540
C2	13	590
"S"	19	840
"S"	25	1500

BAR TYPE

DIMENSIONS ARE OUT TO OUT

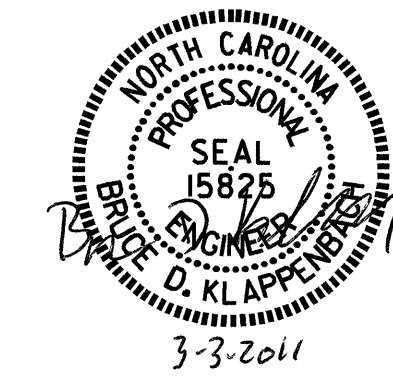


PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 219+37.80-L-REV

SHEET 8 OF 9

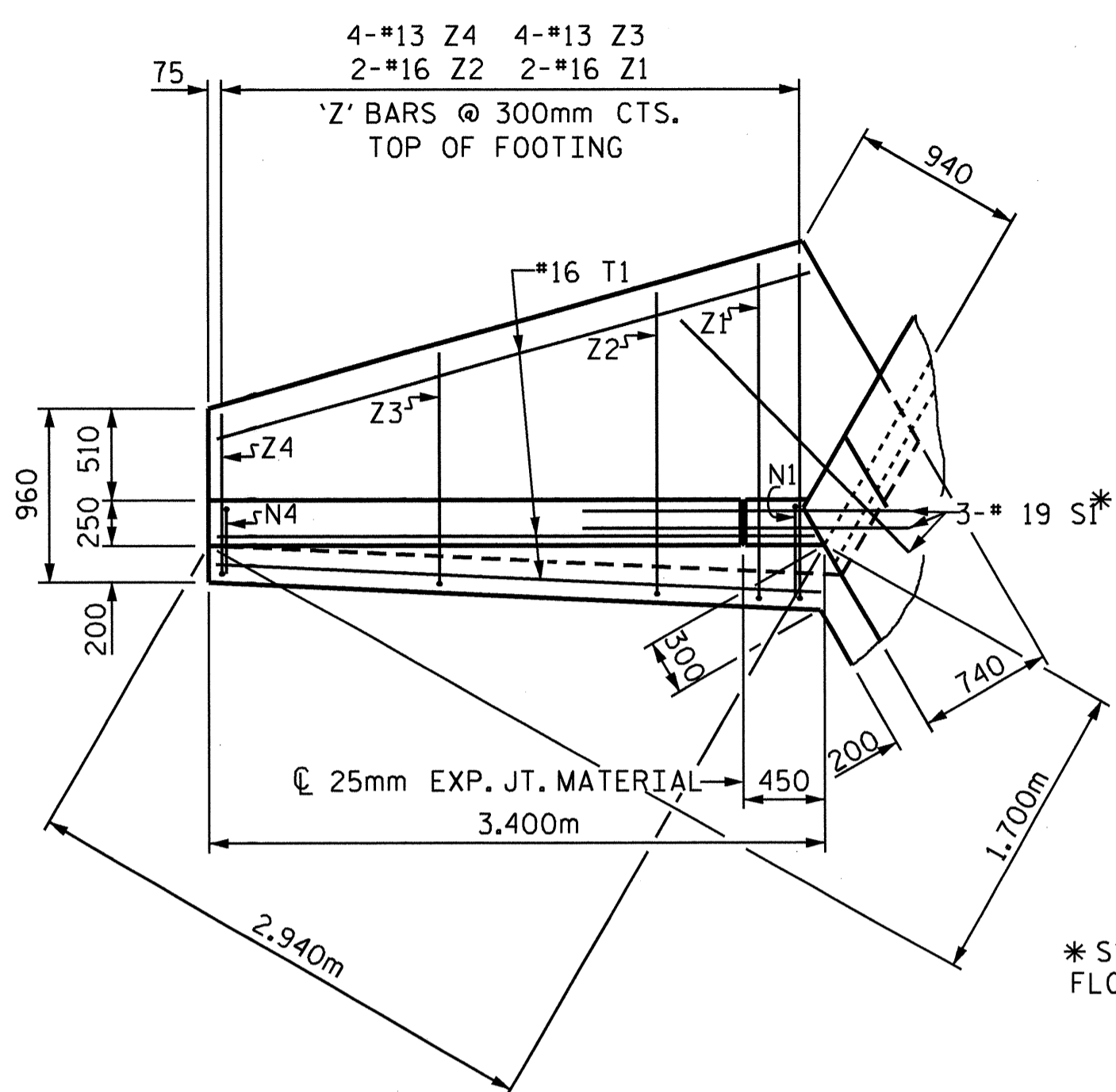
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BILL OF MATERIAL
STAGE II

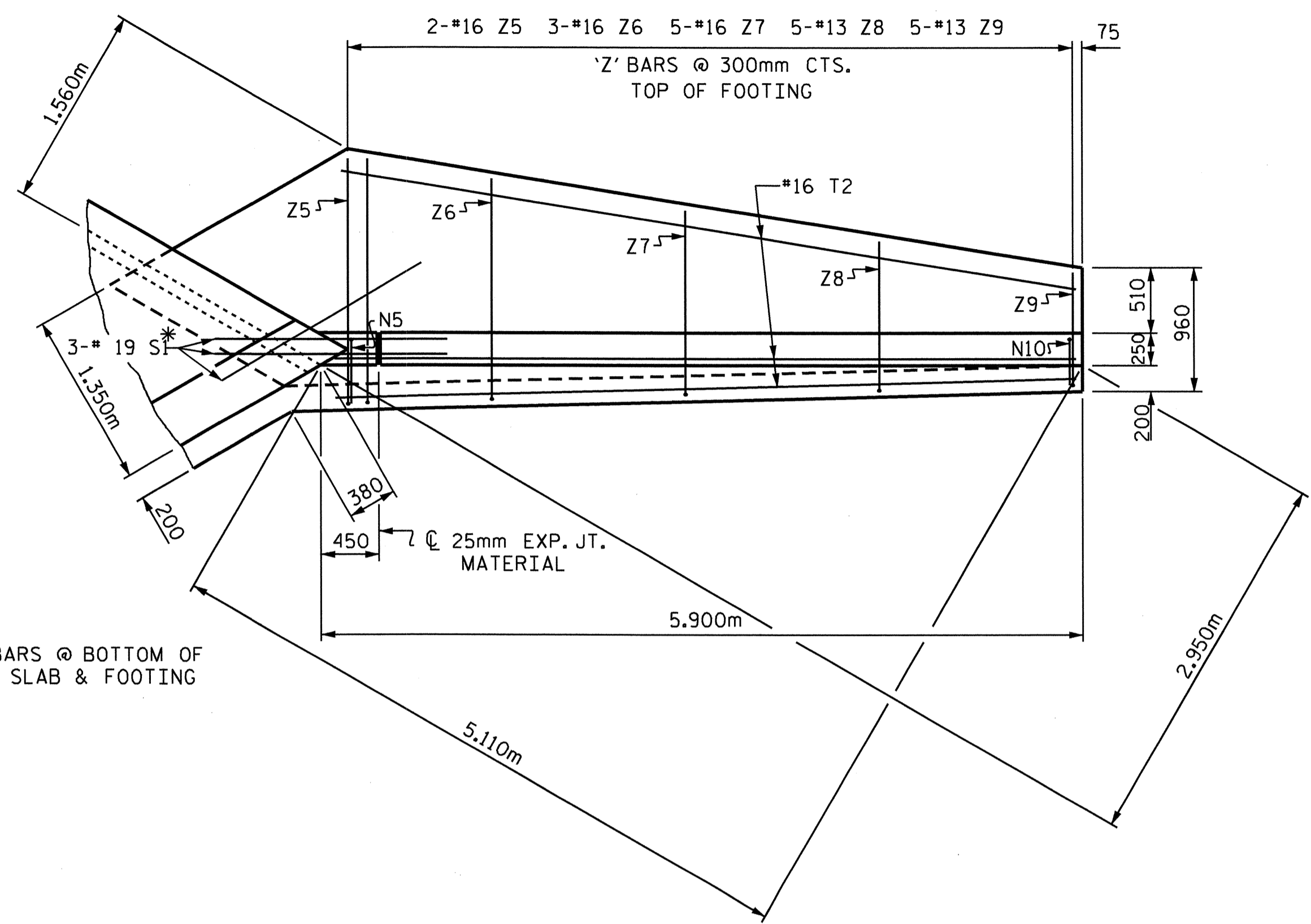


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-36
1			3			TOTAL SHEETS
2			4			42

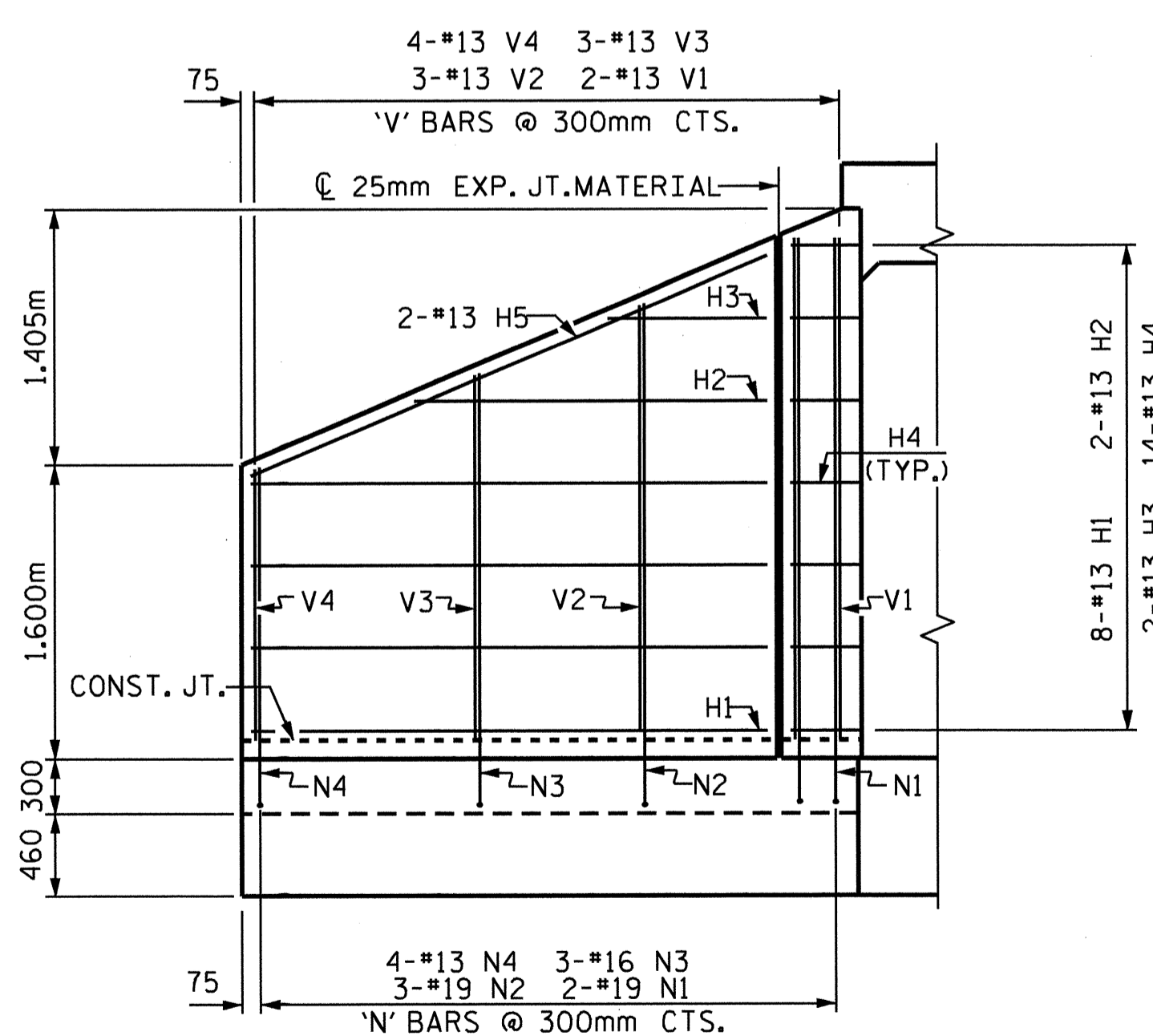
DRAWN BY: C.R. YARBROUGH DATE: 08/10
CHECKED BY: H.T. BARBOUR DATE: 01/11



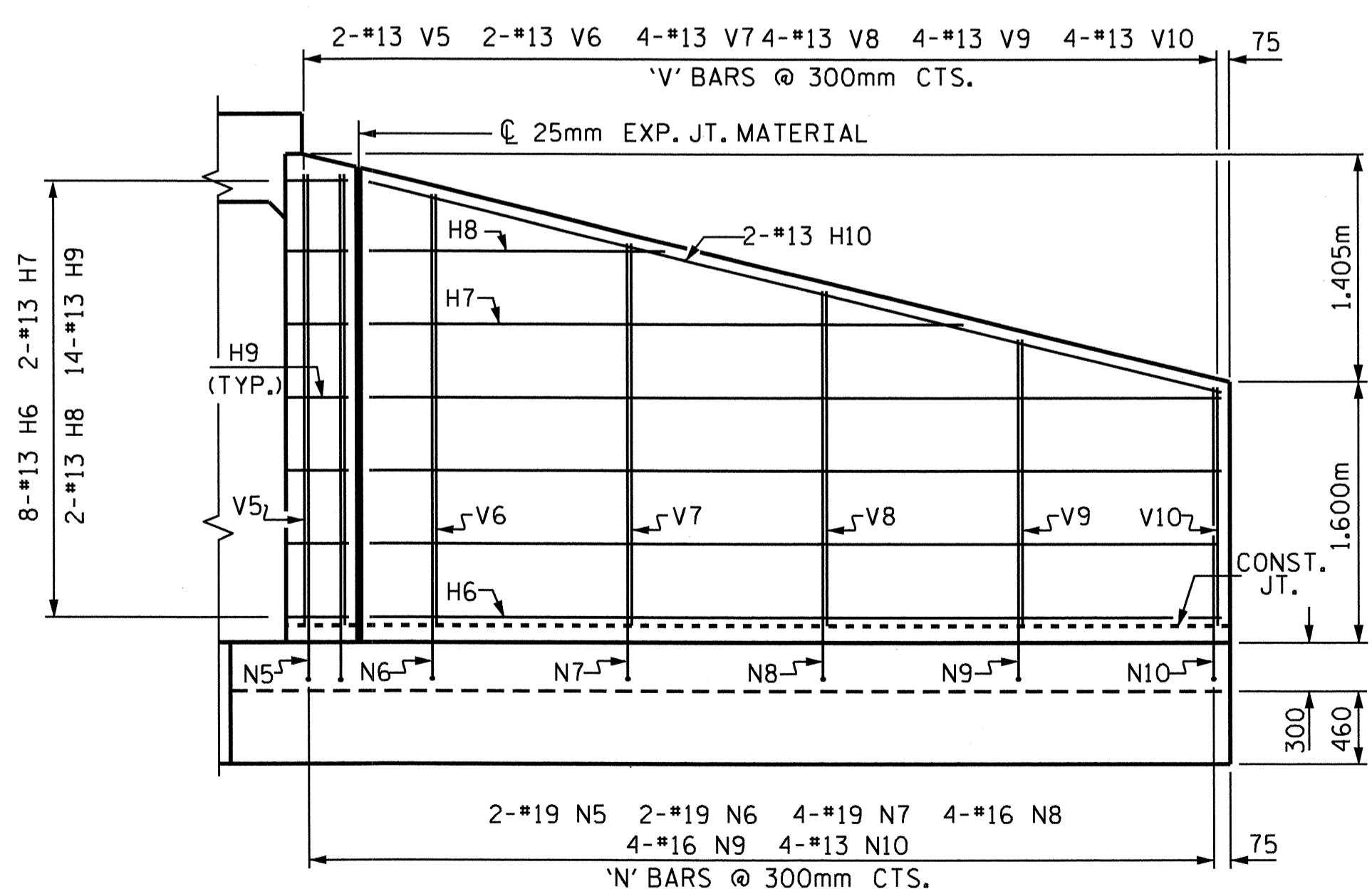
PLAN W2



PLAN W1



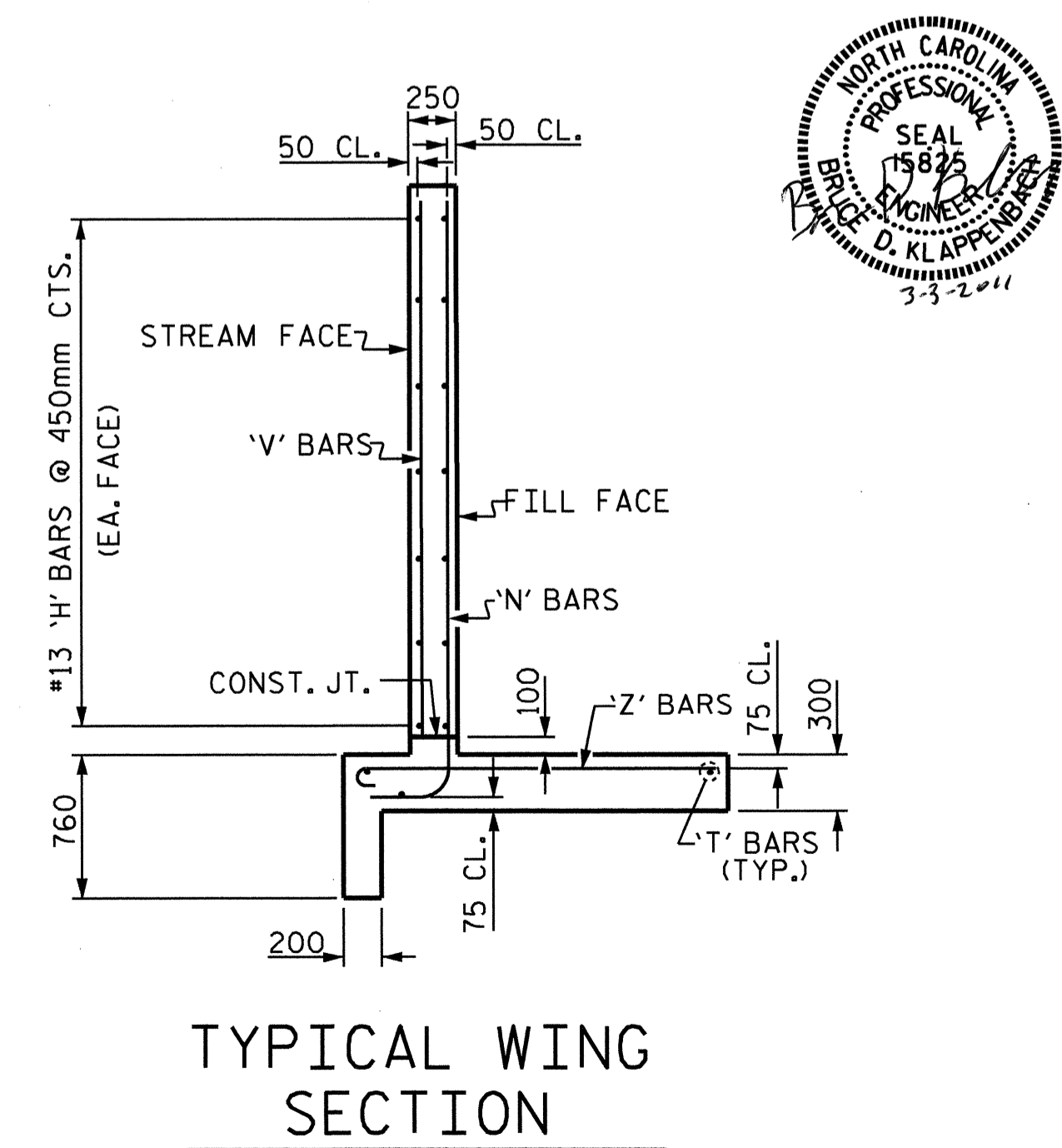
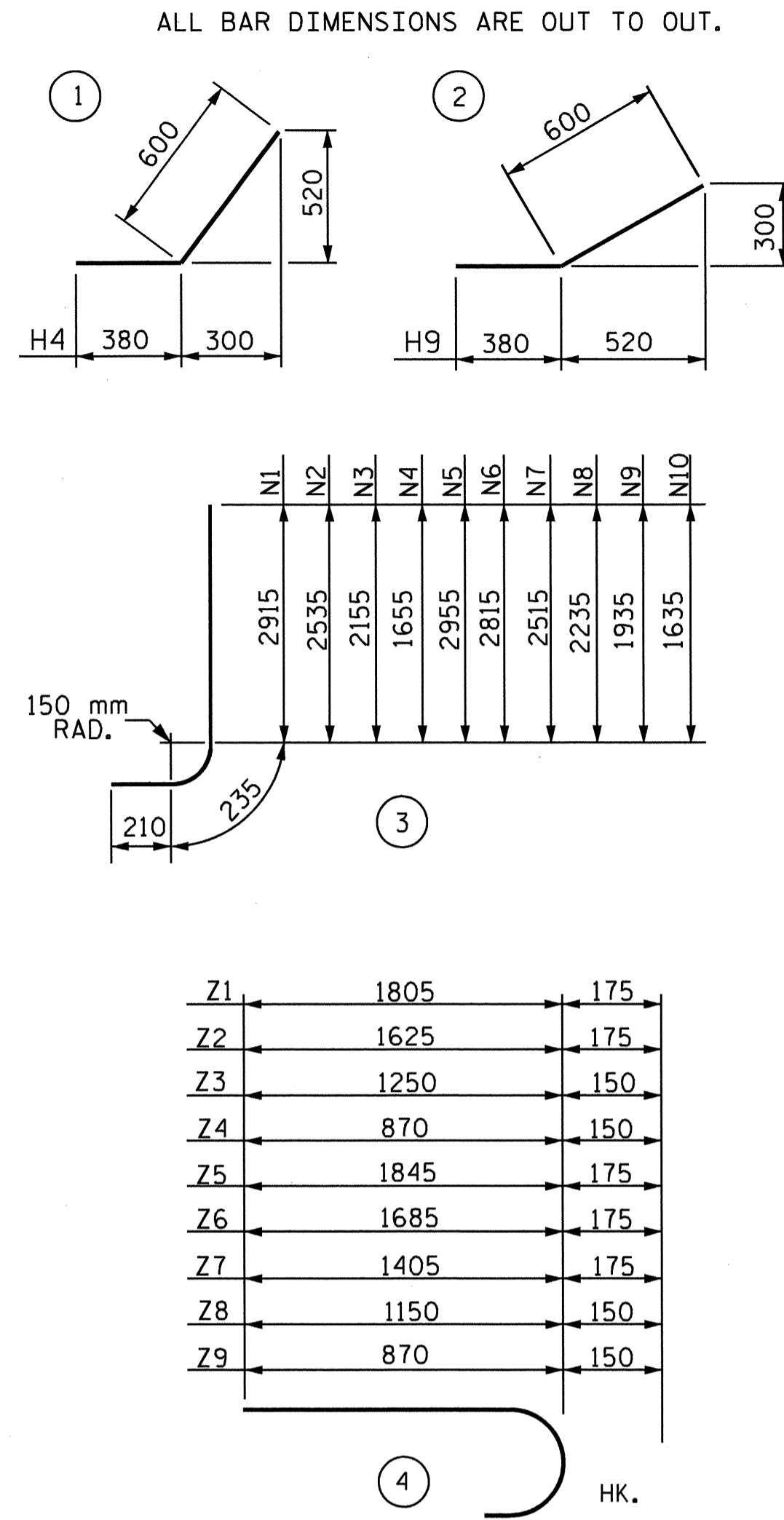
ELEVATION W2



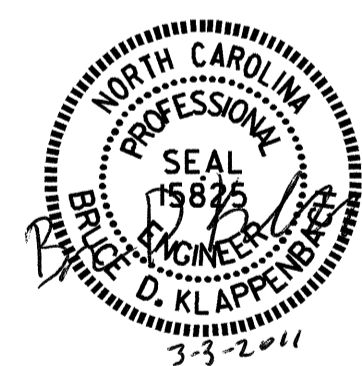
ELEVATION W1

FOR WING ORIENTATION, SEE BARREL STANDARD SHEET.

BAR TYPES		BILL OF MATERIAL			
STAGE I OR STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	8	13	STR	2840	23
H2	2	13	STR	1940	4
H3	2	13	STR	860	2
H4	14	13	1	980	14
H5	2	13	STR	3060	6
H6	8	13	STR	5340	42
H7	2	13	STR	3820	8
H8	2	13	STR	1980	4
H9	14	13	2	980	14
H10	2	13	STR	5480	11
N1	2	19	3	3360	15
N2	3	19	3	2980	20
N3	3	16	3	2600	12
N4	4	13	3	2100	8
N5	2	19	3	3400	15
N6	2	19	3	3260	15
N7	4	19	3	2960	26
N8	4	16	3	2680	17
N9	4	16	3	2380	15
N10	4	13	3	2080	8
S1	6	19	STR	1800	24
T1	3	16	STR	3400	16
T2	3	16	STR	5900	27
V1	2	13	STR	2740	5
V2	3	13	STR	2360	7
V3	3	13	STR	1980	6
V4	4	13	STR	1480	6
V5	2	13	STR	2780	6
V6	2	13	STR	2640	5
V7	4	13	STR	2340	9
V8	4	13	STR	2060	8
V9	4	13	STR	1760	7
V10	4	13	STR	1460	6
Z1	2	16	4	1980	6
Z2	2	16	4	1800	6
Z3	4	13	4	1400	6
Z4	4	13	4	1020	4
Z5	2	16	4	2020	6
Z6	3	16	4	1860	9
Z7	5	16	4	1580	12
Z8	5	13	4	1300	6
Z9	5	13	4	1020	5
REINFORCING STEEL FOR 2 WING WALLS				471kg	
CLASS A CONCRETE					
2 WINGS				10.7	m ³
1 HEADWALL				0.8	m ³
1 END CURTAIN WALL				0.9	m ³
2 EDGE BEAMS				1.3	m ³
TOTAL				13.7	m ³



TYPICAL WING SECTION



PROJECT NO. R-2533CC
CABARRUS COUNTY
STATION: 219+37.80-L-REV

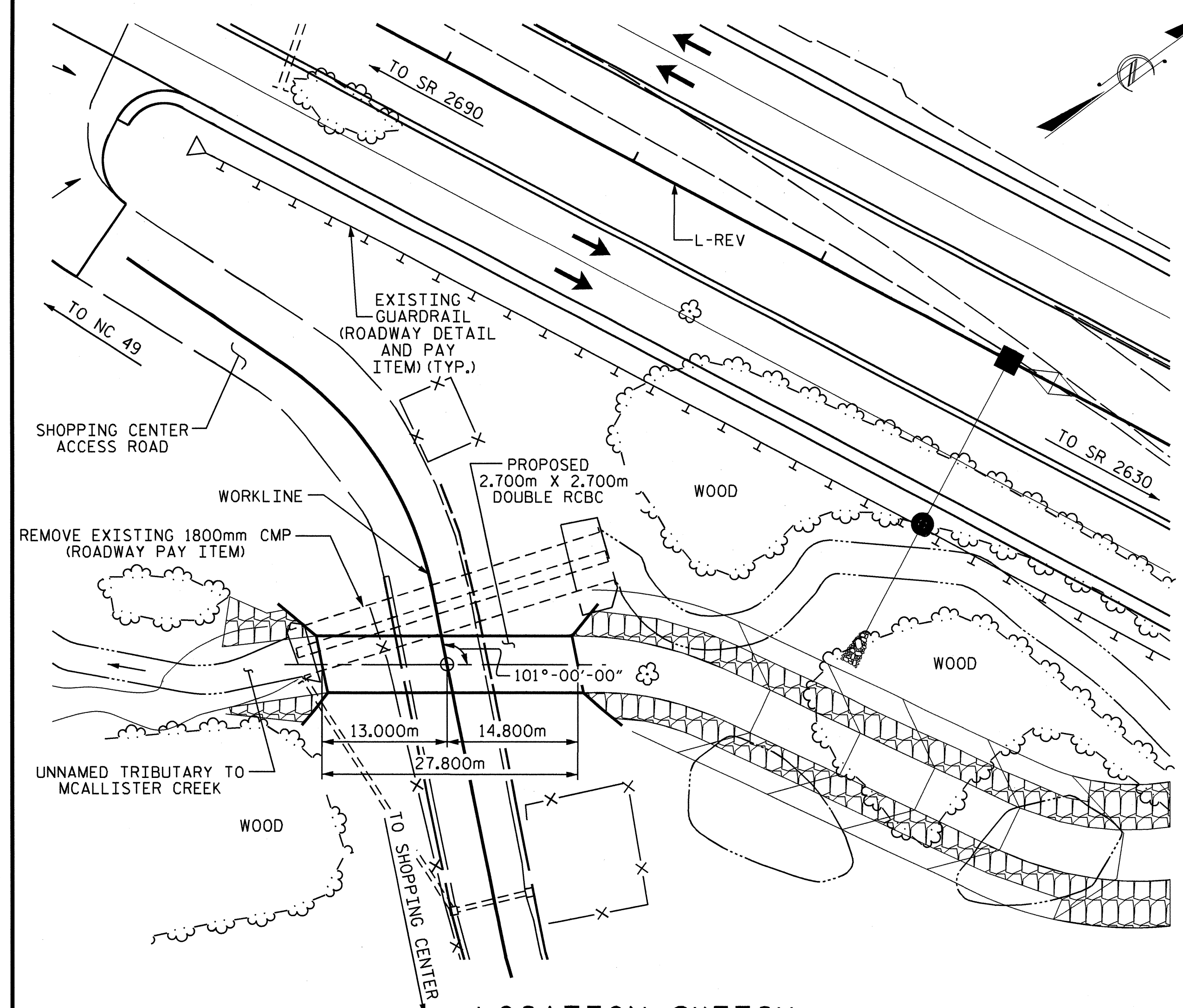
SHEET 9 OF 9
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD WINGS
FOR
CONCRETE BOX CULVERT
H = 2.700m SLOPE 2:1
60° OR 120° SKEW

ASSEMBLED BY: C.R. YARBROUGH DATE: 08/10
CHECKED BY: H.T. BARBOUR DATE: 01/11
DRAWN BY: KJA 6/97
CHECKED BY: VAP 10/97

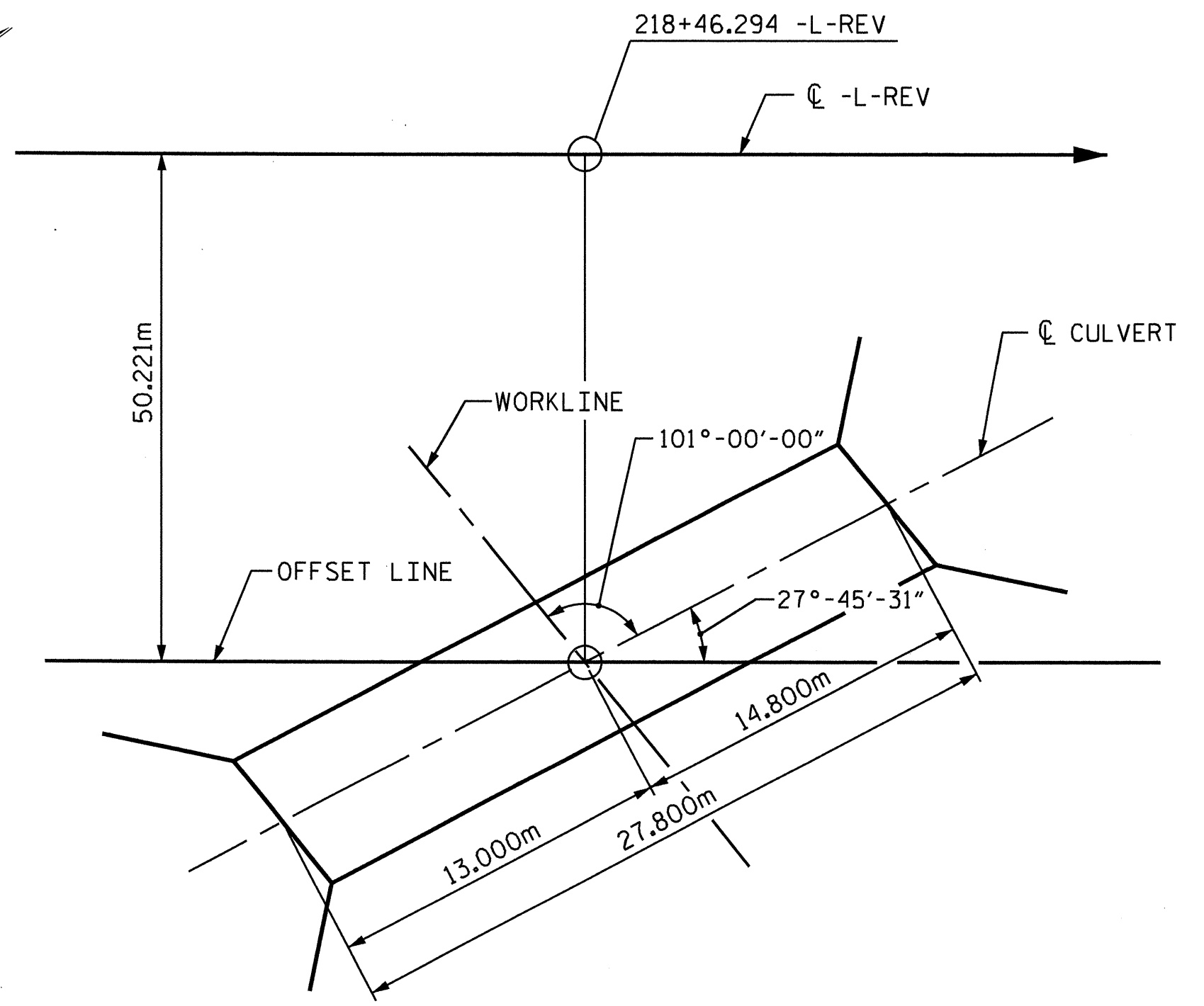
REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

BENCH MARK: #115 RAIL ROAD SPIKE SET IN BASE OF 375mm Ø OAK TREE STA. 212+46.000 -L- 25.500m LT. ELEV. 181.692

F.A. PROJECT NO. NHS-0049(26)



LOCATION SKETCH



LAYOUT SKETCH

GRADE DATA

GRADE POINT ELEV. @ STA. 218+46.294 -L-REV	= 182.200
BED ELEV. @ STA. 218+46.294 -L-REV	= 176.170
ROADWAY SLOPES	= 2:1

HYDRAULIC DATA

DESIGN DISCHARGE	= 33.0 m ³ /s.
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEVATION	= 179.210
DRAINAGE AREA	= 4.24 Sq.km.
BASIC DISCHARGE (Q100)	= 37.4 m ³ /s.
BASIC HIGH WATER ELEVATION	= 179.490

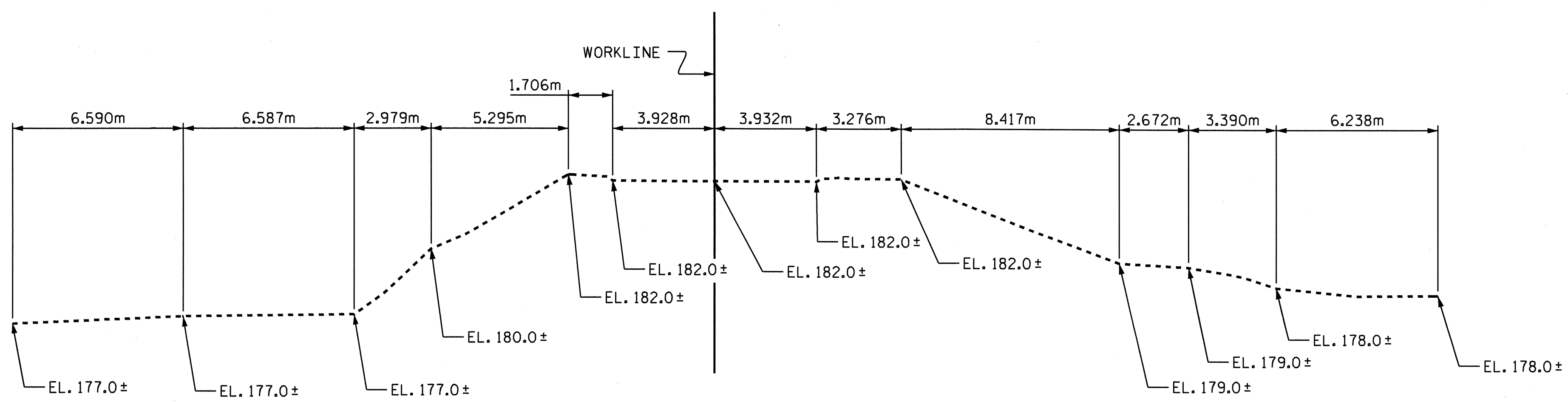
OVERTOPPING DATA

OVERTOPPING DISCHARGE	= 70.4+ m ³ /s.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 182.000

NOTES

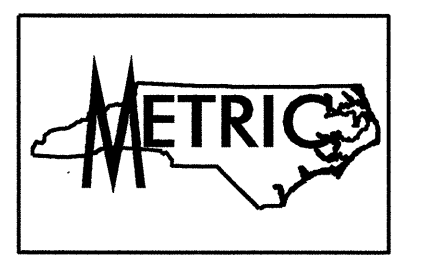
- ASSUMED LIVE LOAD -----MS18 OR ALTERNATE LOADING.
 DESIGN FILL = MAX. 3.760m
 MIN. 3.170m
- FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
 76mm Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
 CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:
 STAGE I
 1. WING FOOTINGS AND FLOOR SLAB AND INCLUDING 100mm OF VERTICAL WALLS AND CURTAIN WALLS TO CONSTRUCTION JOINTS.
 2. THE REMAINING PORTIONS OF WALLS AND WINGS FULL HEIGHT.
 STAGE II
 1. WING FOOTINGS AND FLOOR SLAB AND INCLUDING 100mm OF VERTICAL WALLS AND CURTAIN WALLS TO CONSTRUCTION JOINTS.
 2. THE REMAINING PORTIONS OF WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
- THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.
- DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
- AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.
- A 900mm STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 360,000kg OF REINFORCING STEEL, ONE 760mm SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 360,000kg OF REINFORCING STEEL, TWO 760mm SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 21.0m. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.



PROFILE ALONG CULVERT

TOTAL STRUCTURE QUANTITIES	
CLASS A CONCRETE	
BARREL @ 5.53 m ³ /m	153.7 m ³
WINGS ETC.	22.7 m ³
TOTAL	176.4 m ³
REINFORCING STEEL	
BARREL	14361 kg
WINGS ETC.	879 kg
TOTAL	15240 kg
CULVERT EXCAVATION -----	LUMP SUM
FOUNDATION COND. MAT'L ----	113 METRIC TONS

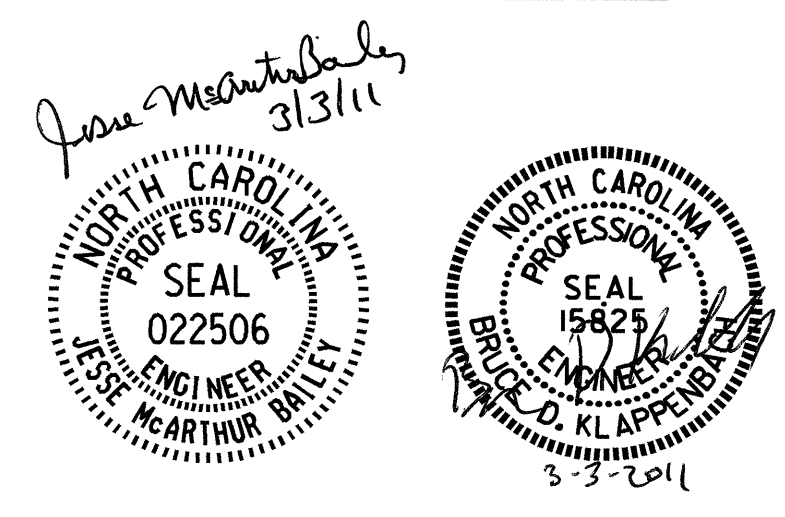


PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 218+46.294-L-REV

SHEET 1 OF 5

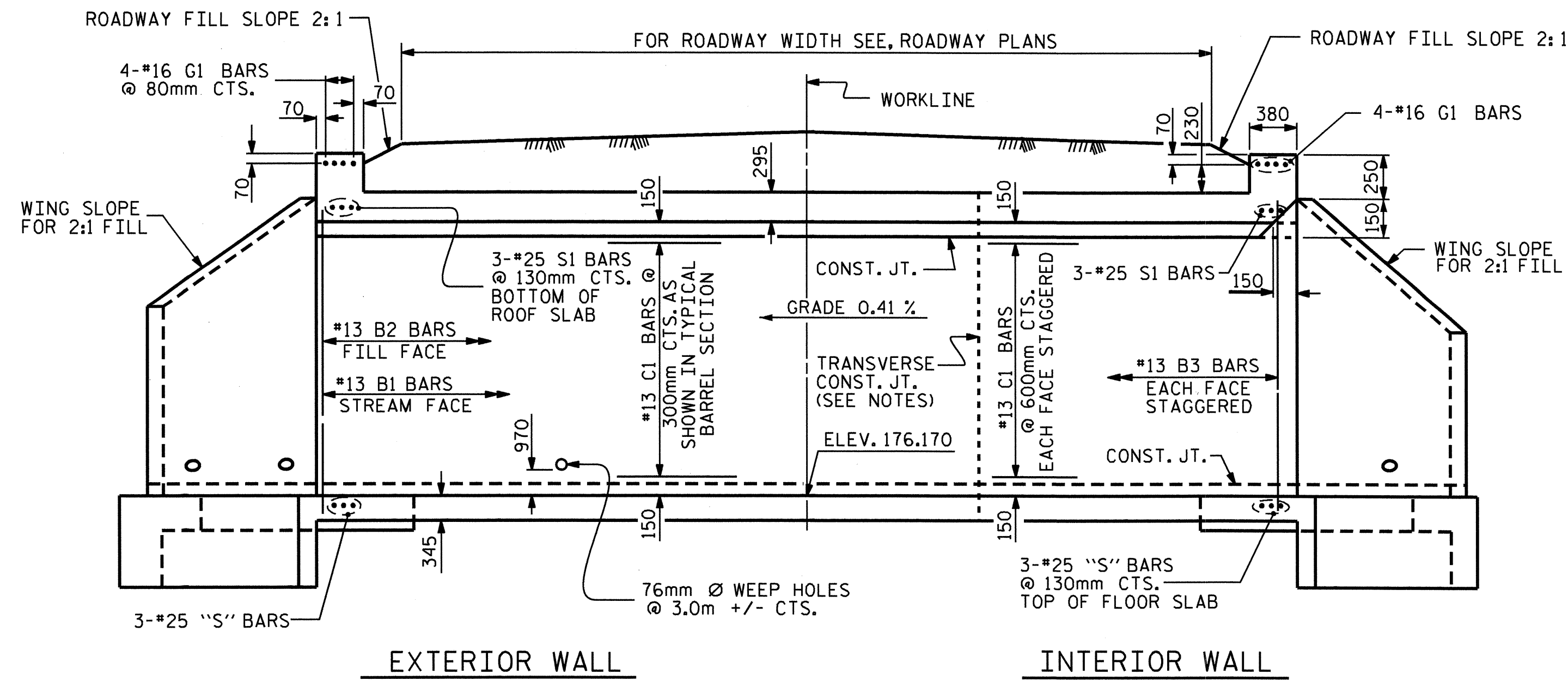
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

BARREL STANDARD
 DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT
 101°-00'-00" SKEW

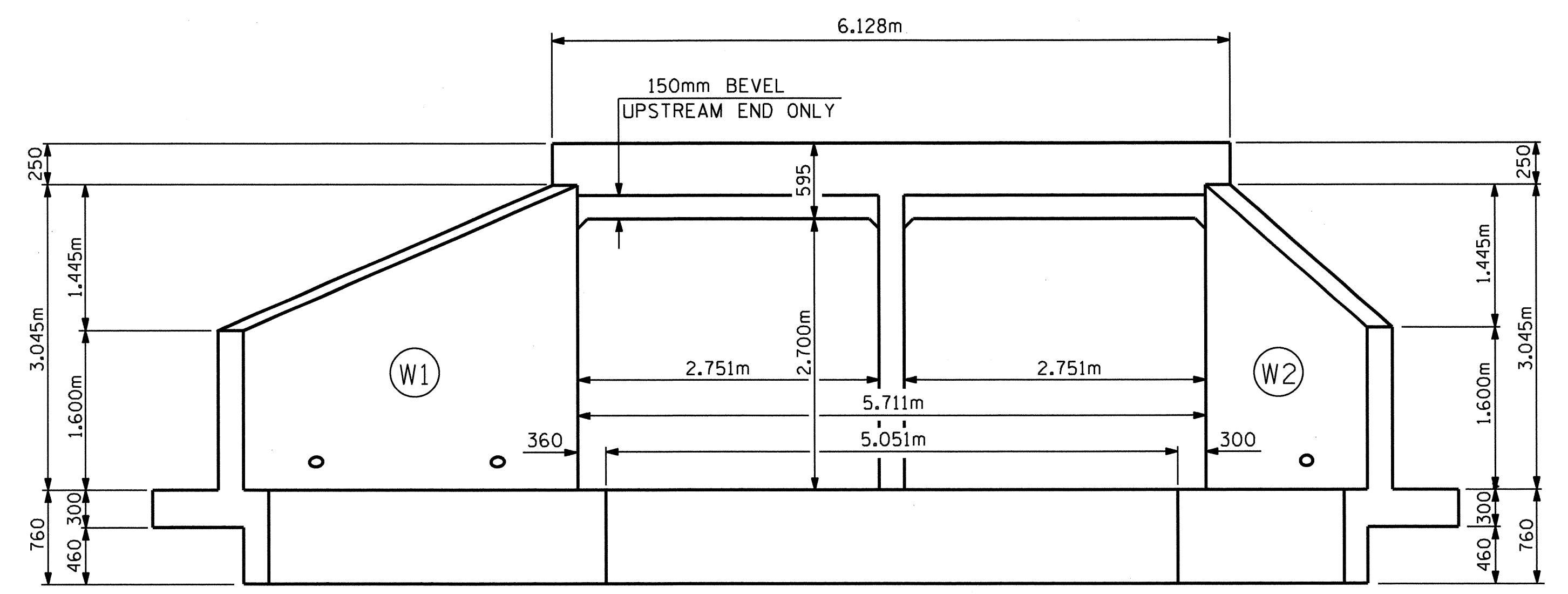


ASSEMBLED BY : M. G. SHAIKH	DATE : 08-24-10
CHECKED BY : H. T. BARBOUR	DATE : 12-09-10
DRAWN BY : EEM	6/97
CHECKED BY : ARB	7/97

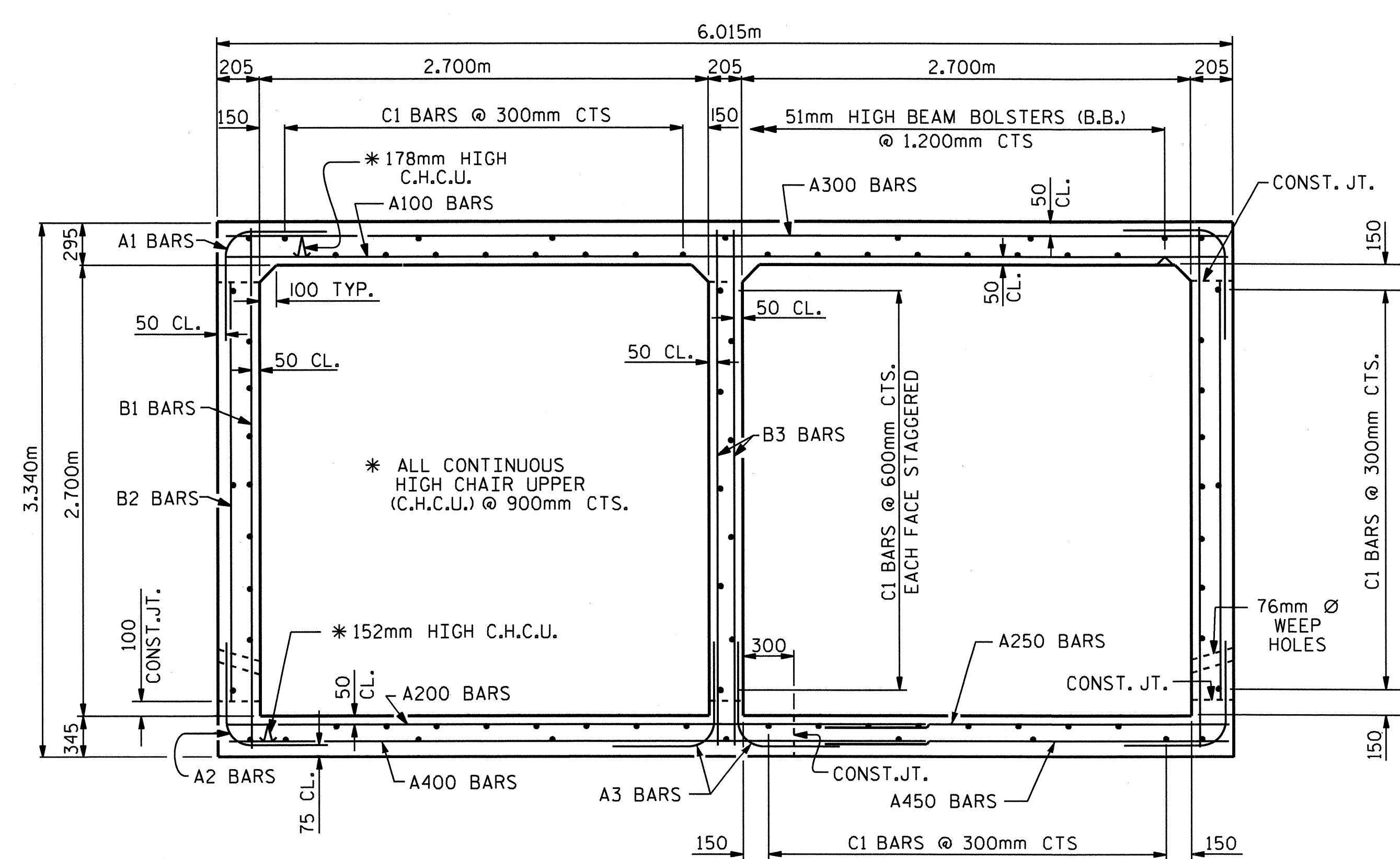
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-38
1			3			TOTAL SHEETS
2			4			42



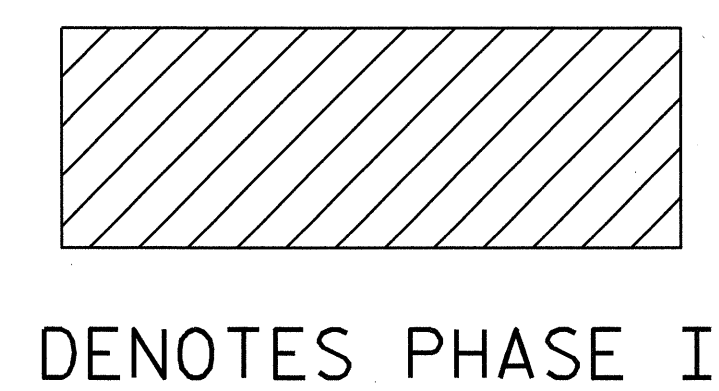
EXTERIOR WALL INTERIOR WALL
CULVERT SECTION NORMAL TO ROADWAY



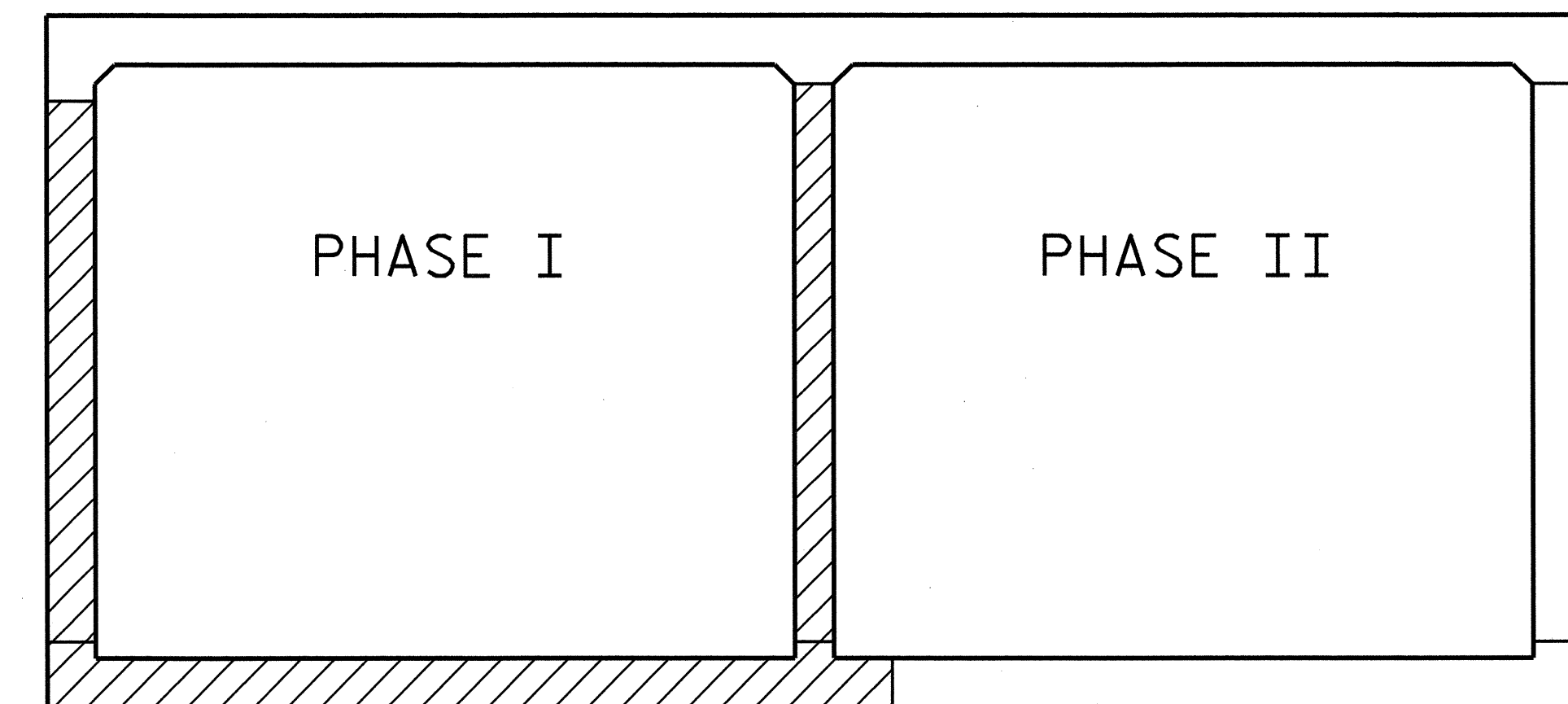
END ELEVATION - NORMAL TO SKEW



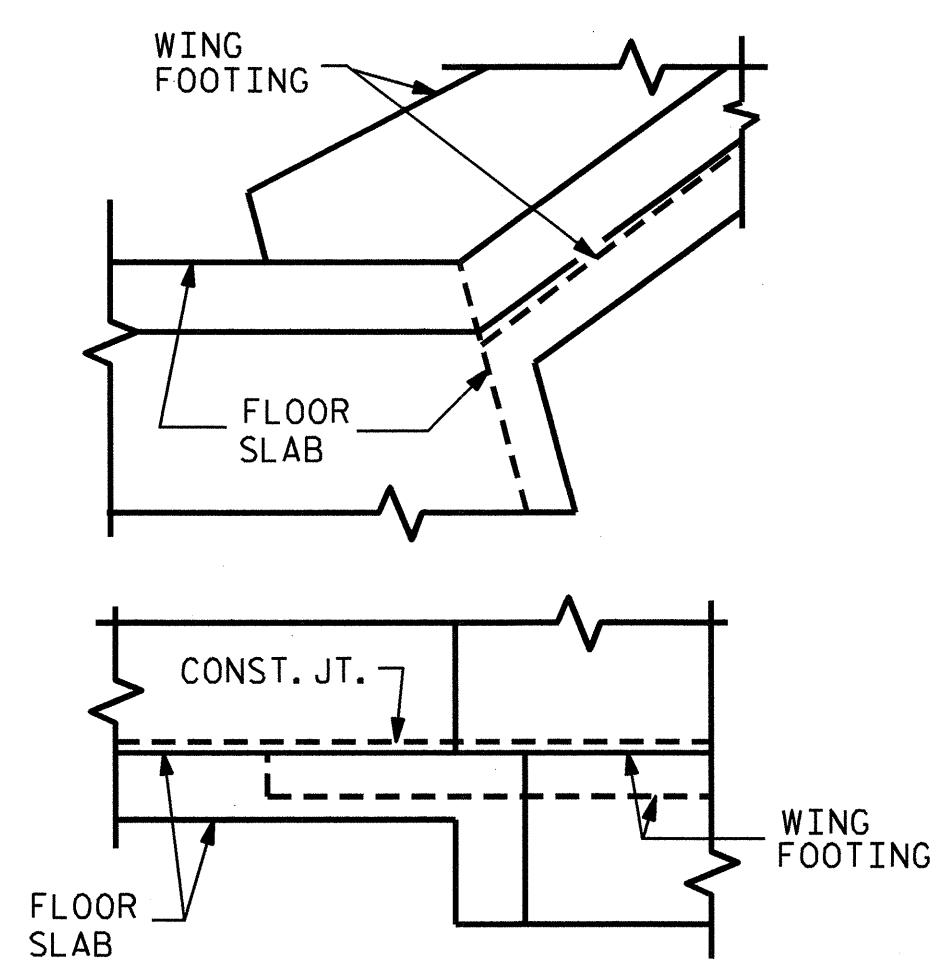
RIGHT ANGLE SECTION OF BARREL
 THERE ARE 79 "C" BARS IN SECTION OF BARREL.



DENOTES PHASE I



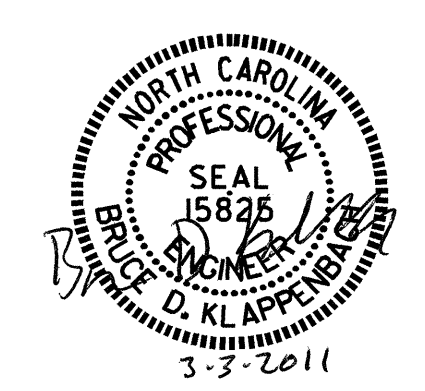
PHASE I & II LOOKING DOWN STREAM



DETAIL
CONNECTION OF WING FOOTING
AND FLOOR SLAB WHEN SLAB
IS THICKER THAN FOOTING

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 218+46.294-L-REV

SHEET 2 OF 5



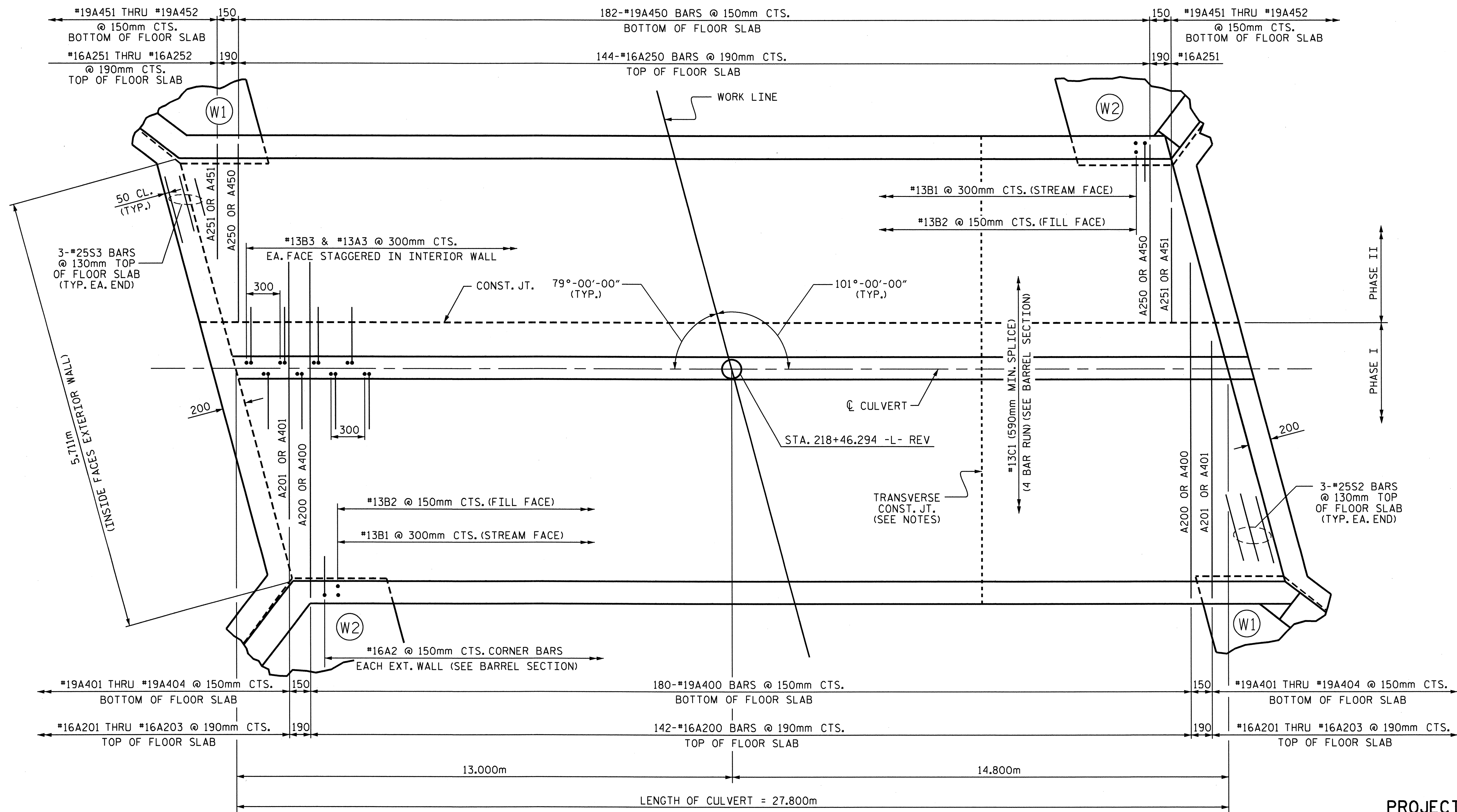
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 BARREL STANDARD
 DOUBLE 2.700m X 2.700m
 CONCRETE BOX CULVERT
 101°-00'-00" SKEW

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-39	
1			3			TOTAL	42
2			4			SHEETS	42

DRAWN BY: M. G. SHAIKH DATE: 08-24-10
 CHECKED BY: H. T. BARBOUR DATE: 12-09-10

24-FEB-2011 09:06
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 bklappenbach

CULVERT #6



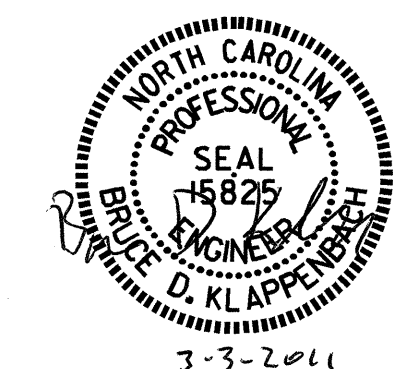
PLAN OF FLOOR SLAB

PROJECT NO. R-2533CC
CABARRUS COUNTY
 STATION: 218+46.294-L-REV

SHEET 3 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE
 2,700m X 2,700m
 CONCRETE BOX CULVERT
 101°-00'-00"

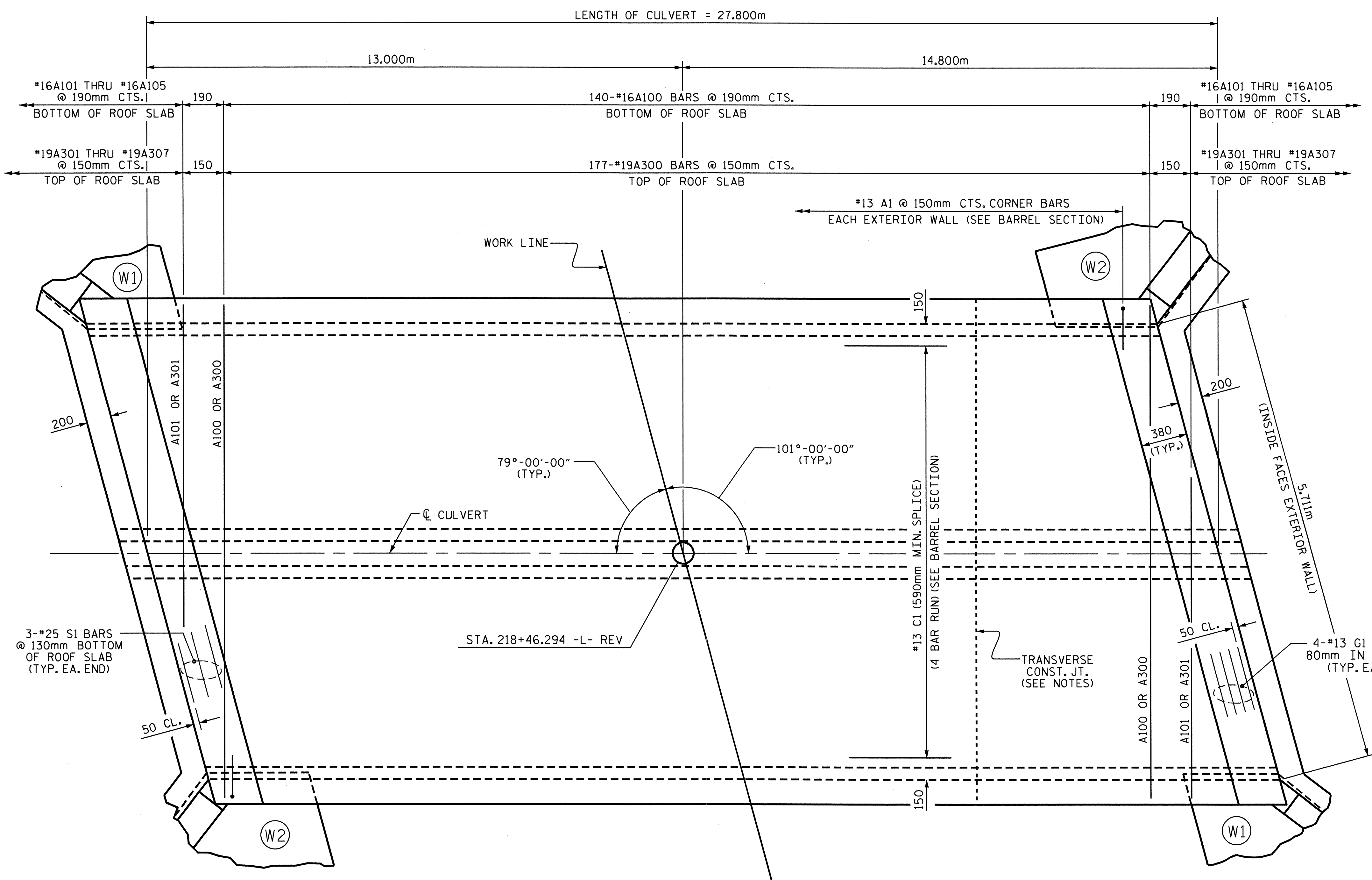


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DRAWN BY: M. G. SHAIKH/CRY DATE: 08-24-10
 CHECKED BY: H. T. BARBOUR DATE: 12-09-10

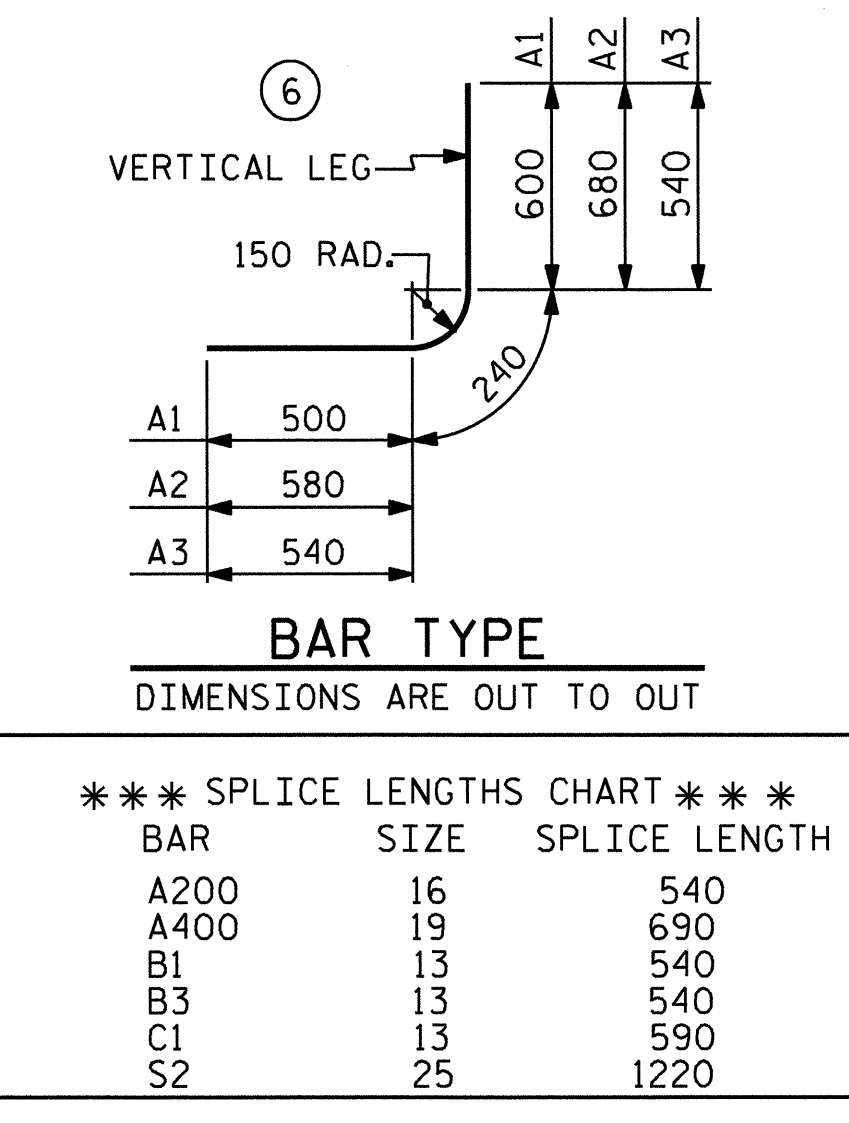
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 bklappenbach

CULVERT #6



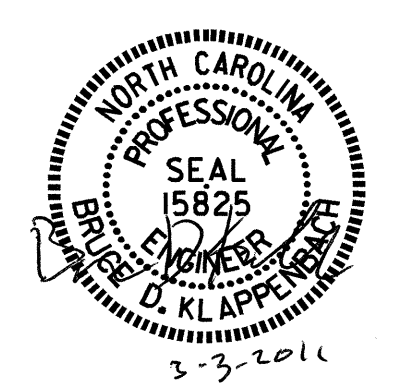
PLAN OF ROOF SLAB

BILL OF MATERIAL											
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	372	#13	6	1340	495	A400	180	#19	STR	4060	1633
A2	372	#13	6	1500	866	A401	2	#19	STR	3440	15
A3	186	#13	6	1320	244	A402	2	#19	STR	2660	12
						A403	2	#19	STR	1880	8
A100	140	#16	STR	5900	1282	A404	2	#19	STR	1120	5
A101	2	#16	STR	5280	16						
A102	2	#16	STR	4300	13						
A103	2	#16	STR	3340	10	A450	182	#19	STR	2560	1041
1104	2	#16	STR	2360	7	A451	2	#19	STR	1920	9
A105	2	#16	STR	1380	4	A452	2	#19	STR	1140	5
A200	142	#16	STR	3900	859						
A201	2	#16	STR	3300	10	B1	186	#13	STR	3180	588
A202	2	#16	STR	2320	7	B2	372	#13	STR	2480	917
A203	2	#16	STR	1340	4	B3	186	#13	STR	3180	588
A250	144	#16	STR	2560	572	C1	316	#13	STR	7380	2318
A251	2	#16	STR	1660	5						
A252	1	#16	STR	680	1	G1	8	#16	STR	6020	75
A300	177	#19	STR	5900	2334	S1	6	#25	STR	6020	144
A301	2	#19	STR	5520	25	S2	6	#25	STR	4680	112
A302	2	#19	STR	4740	21	S3	6	#25	STR	2600	62
A303	2	#19	STR	3980	18						
A304	2	#19	STR	3200	14						
A305	2	#19	STR	2440	11						
A306	2	#19	STR	1660	7						
A307	2	#19	STR	880	4						
REINFORCING STEEL = 14361 KG											



PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 218+46.294-L-REV

SHEET 4 OF 5
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE
 2.700m X 2.700m
 CONCRETE BOX CULVERT
 101°-00'-00" SKEW

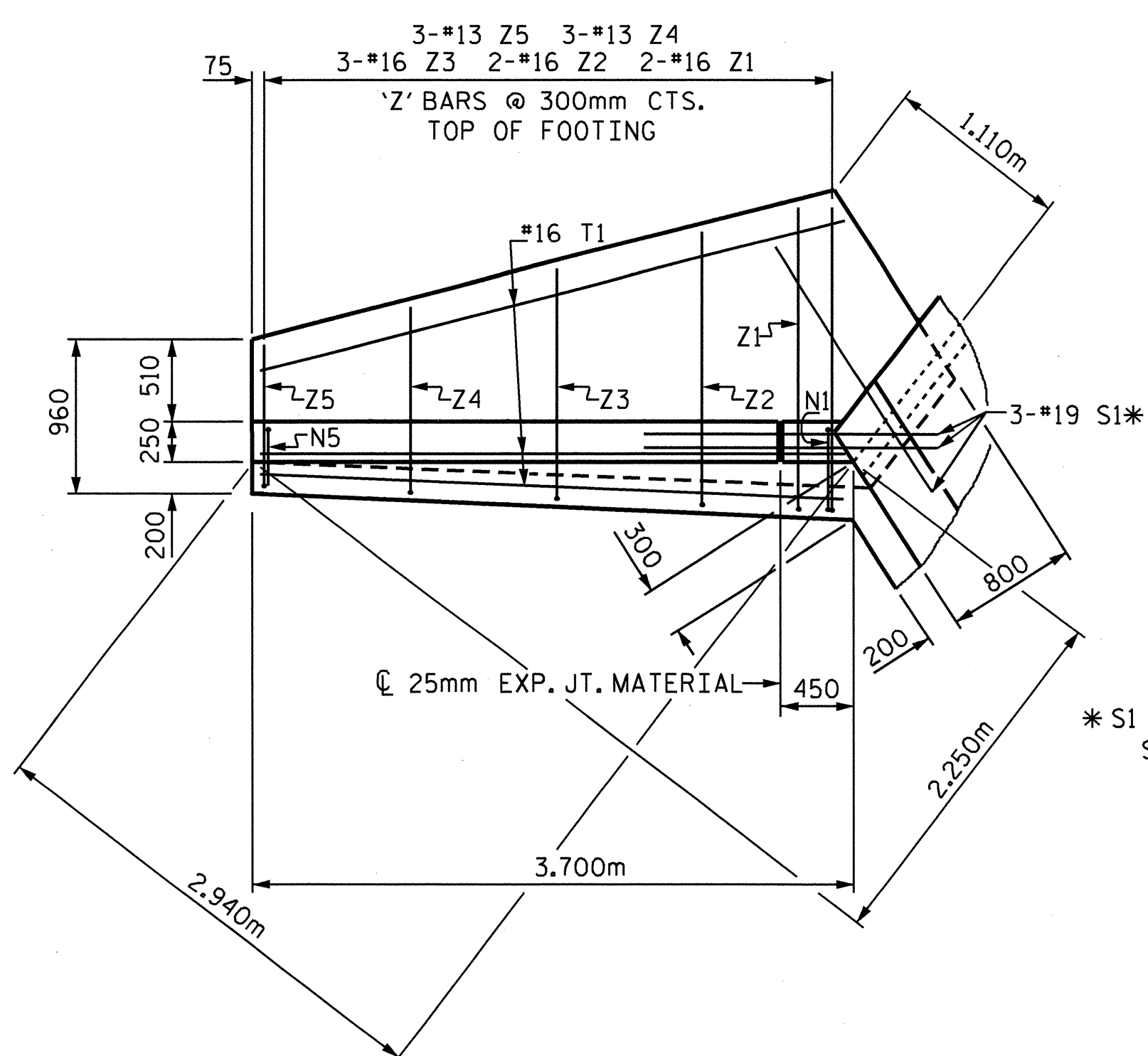


DRAWN BY: M. G. SHAIKH DATE: 08-24-10
 CHECKED BY: H. T. BARBOUR DATE: 12-09-10

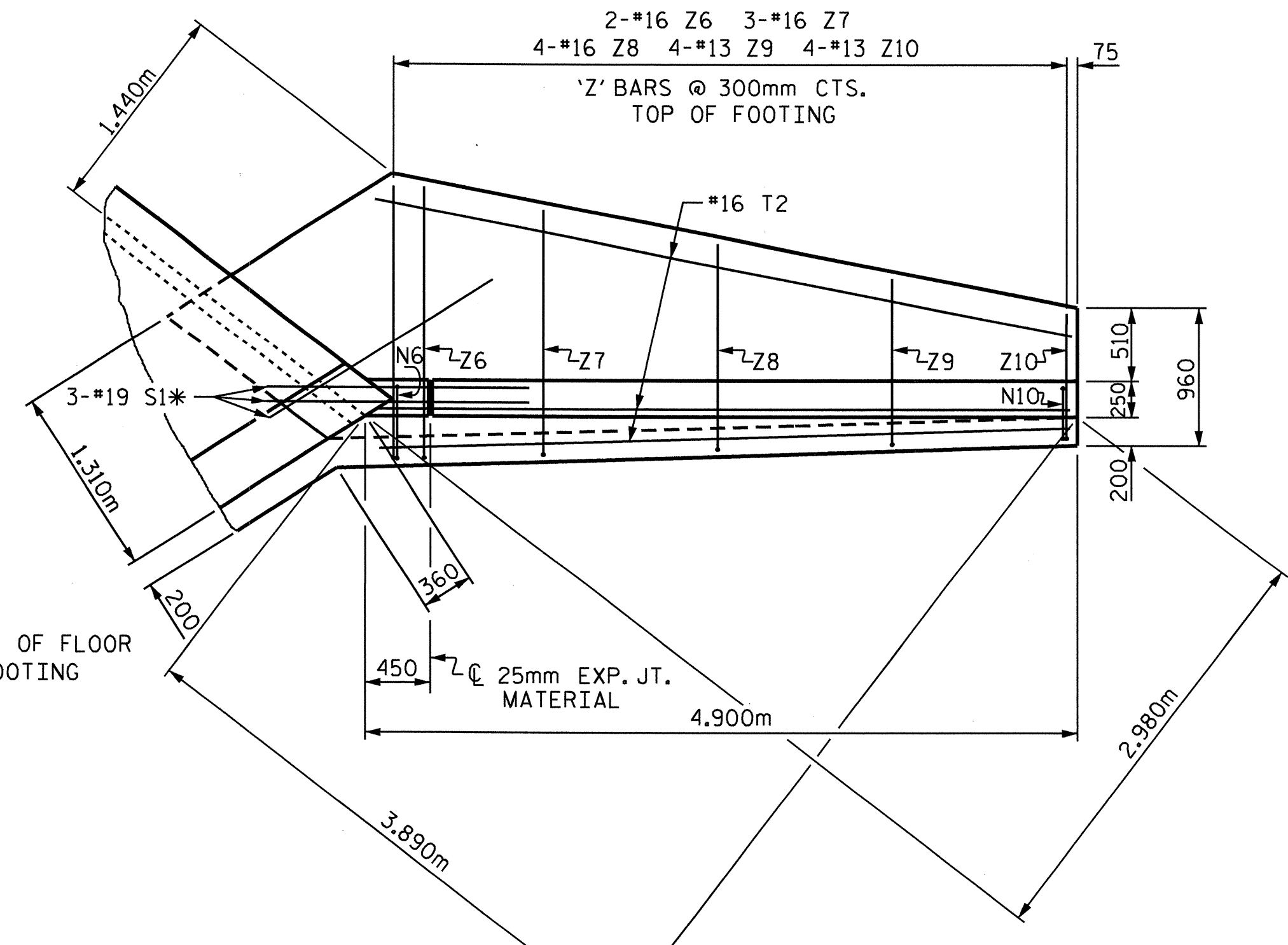
REVISIONS						SHEET NO.	
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1			3			TOTAL SHEETS 42	
2			4				

CULVERT #6

24-FEB-2010 09:06
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 bklappenbach

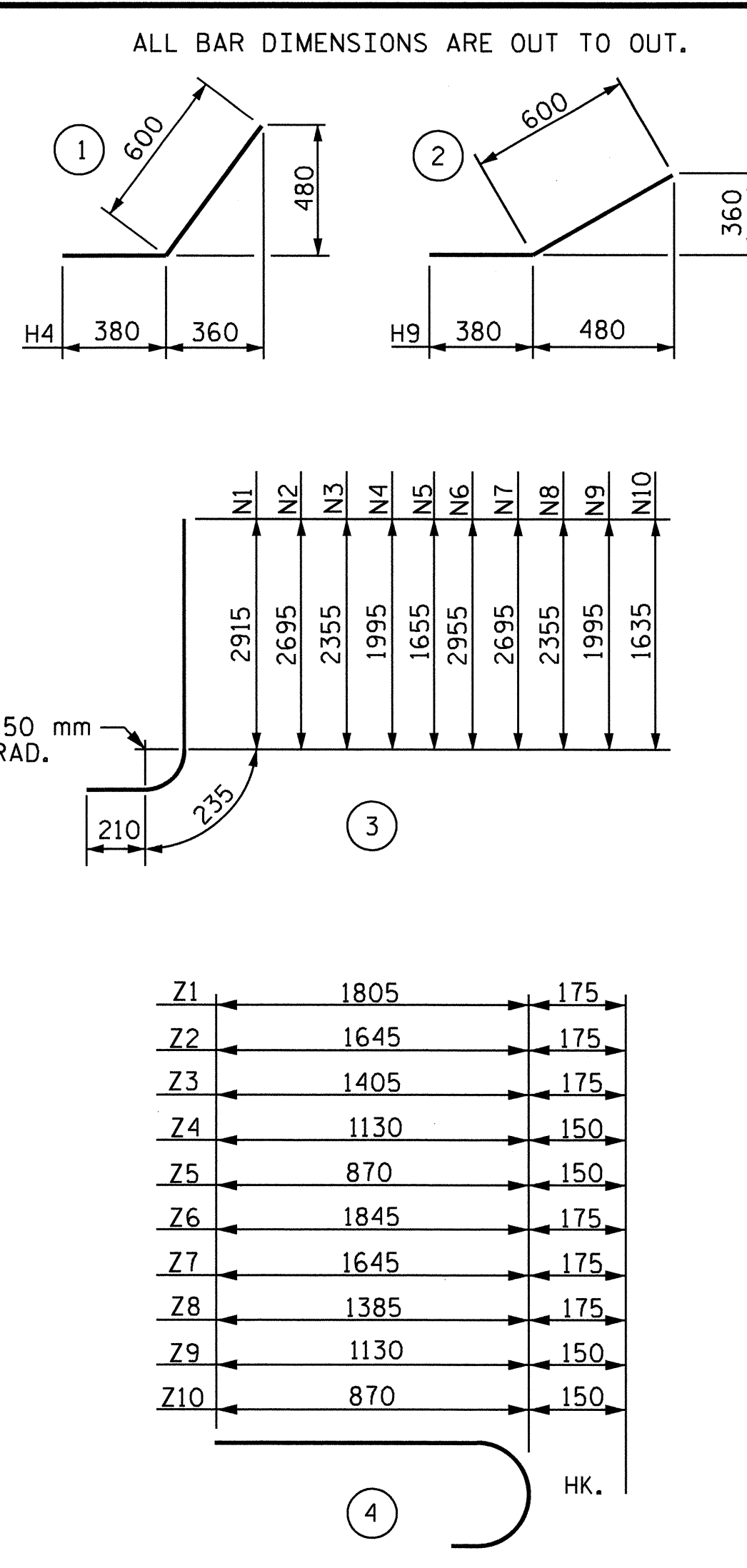


PLAN W2



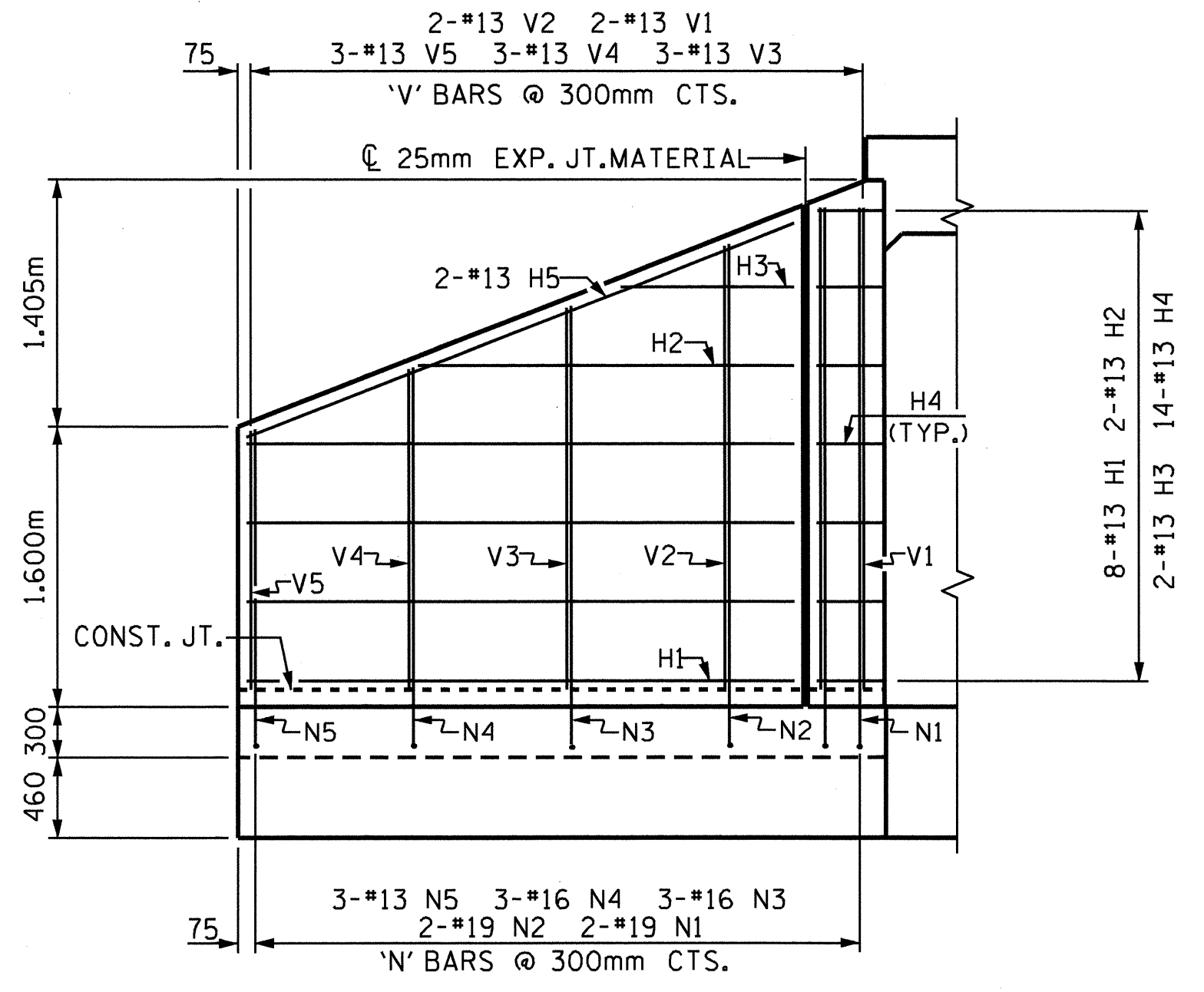
PLAN W1

BAR TYPES

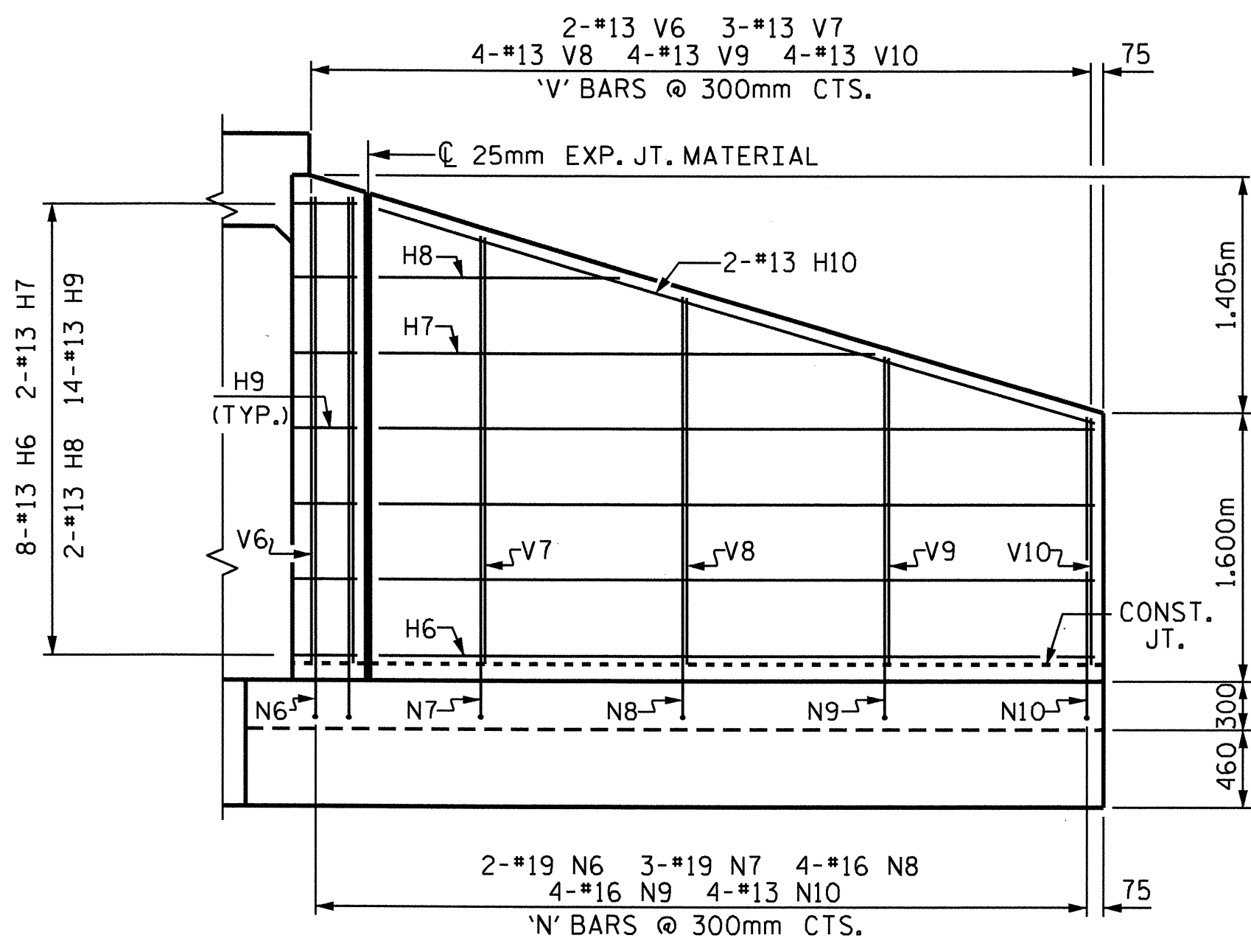


BILL OF MATERIAL

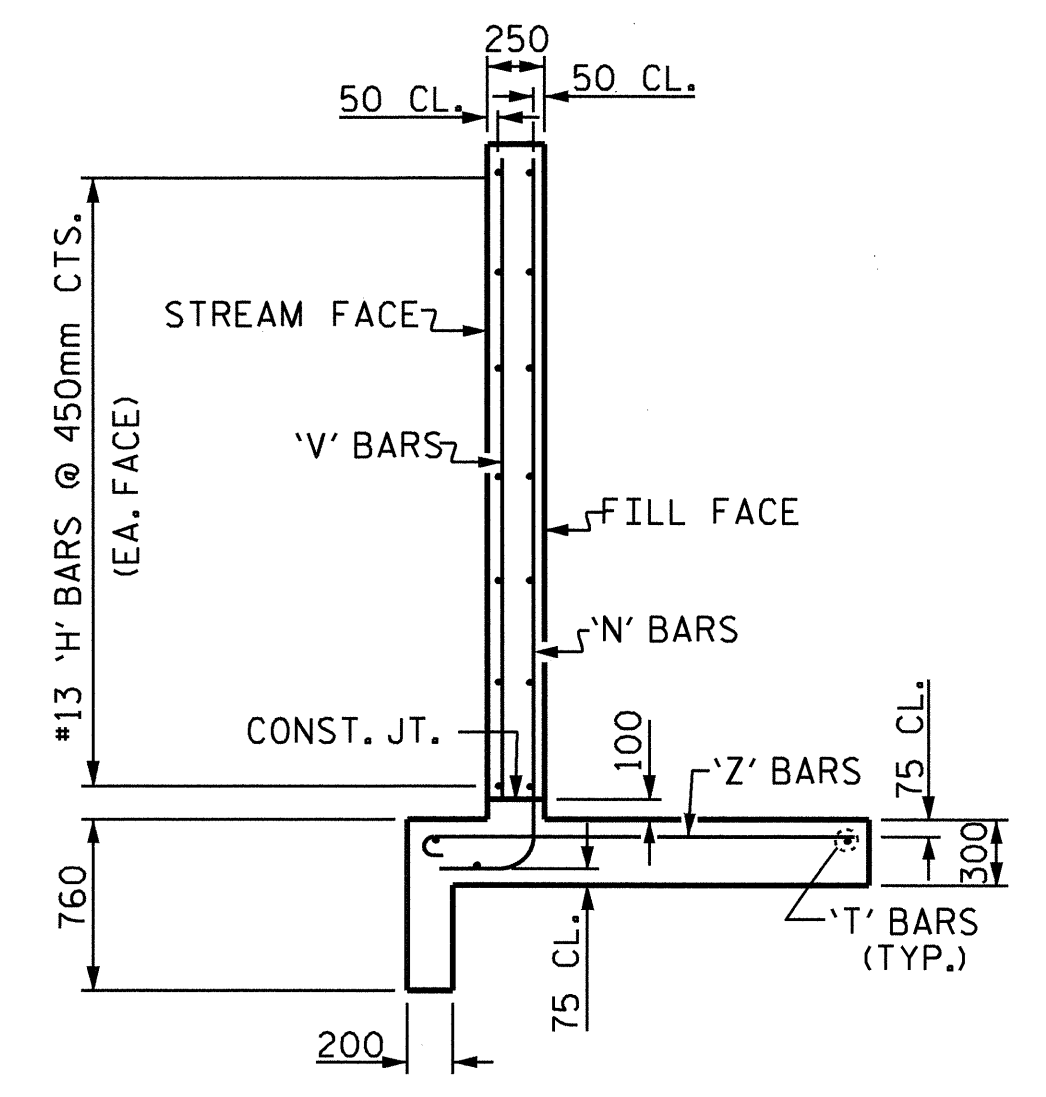
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	13	STR	3140	50
H2	4	13	STR	2160	9
H3	4	13	STR	1000	4
H4	28	13	STR	980	27
H5	4	13	STR	3360	13
H6	16	13	STR	4340	69
H7	4	13	STR	3060	12
H8	4	13	STR	1540	6
H9	28	13	STR	980	27
H10	4	13	STR	4500	18
N1	4	19	STR	3360	30
N2	4	19	STR	3140	28
N3	6	16	STR	2800	26
N4	6	16	STR	2440	23
N5	4	13	STR	2100	13
N6	4	13	STR	3400	30
N7	6	16	STR	3140	42
N8	8	16	STR	2800	35
N9	8	16	STR	2440	30
N10	8	13	STR	2080	17
S1	12	19	STR	1800	48
T1	6	16	STR	3700	34
T2	6	16	STR	4900	46
V1	4	13	STR	2740	11
V2	4	13	STR	2520	10
V3	6	13	STR	2180	13
V4	6	13	STR	1820	11
V5	6	13	STR	1480	9
V6	4	13	STR	2780	11
V7	6	13	STR	2520	15
V8	8	13	STR	2180	17
V9	8	13	STR	1820	14
V10	8	13	STR	1460	12
Z1	4	16	4	1980	12
Z2	4	16	4	1820	11
Z3	6	16	4	1580	15
Z4	13	13	4	1280	8
Z5	6	16	4	1020	6
Z6	4	16	4	2020	13
Z7	6	16	4	1820	17
Z8	8	16	4	1560	19
Z9	8	13	4	1280	10
Z10	8	13	4	1020	8
REINFORCING STEEL FOR 4 WINGS				879 kg	
CLASS A CONCRETE					
4 WINGS				19.8 m ³	
2 HEADWALLS				1.4 m ³	
2 END CURTAIN WALLS				1.5 m ³	
TOTAL				22.7 m ³	



ELEVATION W2 OR W3



ELEVATION W1 OR W4



TYPICAL WING SECTION



PROJECT NO. R-2533CC
 CABARRUS COUNTY
 STATION: 218+46.294-L-REV

SHEET 5 OF 5
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 2.700m SLOPE 2:1
 75° OR 105° SKEW

ASSEMBLED BY : M. G. SHAIKH DATE : 08-24-10
 CHECKED BY : H. T. BARBOUR DATE : 12-09-10
 DRAWN BY : KJA 6/97
 CHECKED BY : VAP 7/97

FOR WING ORIENTATION, SEE BARREL STANDARD SHEET.

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

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 250	--	140 MPa
- AASHTO M270 GRADE 345W	--	190 MPa
- AASHTO M270 GRADE 345	--	190 MPa
REINFORCING STEEL IN TENSION		
GRADE 420	--	165 MPa
CONCRETE IN COMPRESSION	-----	8.3 MPa
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR		
UNTREATED - EXTREME FIBER STRESS	-----	12 MPa
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	-----	2.6 MPa
EQUIVALENT FLUID PRESSURE OF EARTH	-----	480 kg/m ³
		(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 2006 "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 19mm WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 38mm RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 6mm 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 6mm 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 300mm INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE. ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER. DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS. WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 22.23mm Ø SHEAR STUDS FOR THE 19.05mm Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 22.23mm Ø STUDS FOR 4 - 19.05mm Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 22.23mm Ø STUDS ALONG THE BEAM AS SHOWN FOR 19.05mm Ø STUDS BASED ON THE RATIO OF 3 - 22.23mm Ø STUDS FOR 4 - 19.05mm Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 610mm. 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 8mm IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 50mm 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 1072-1.1. 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 2mm 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.

METRIC

JANUARY, 1990