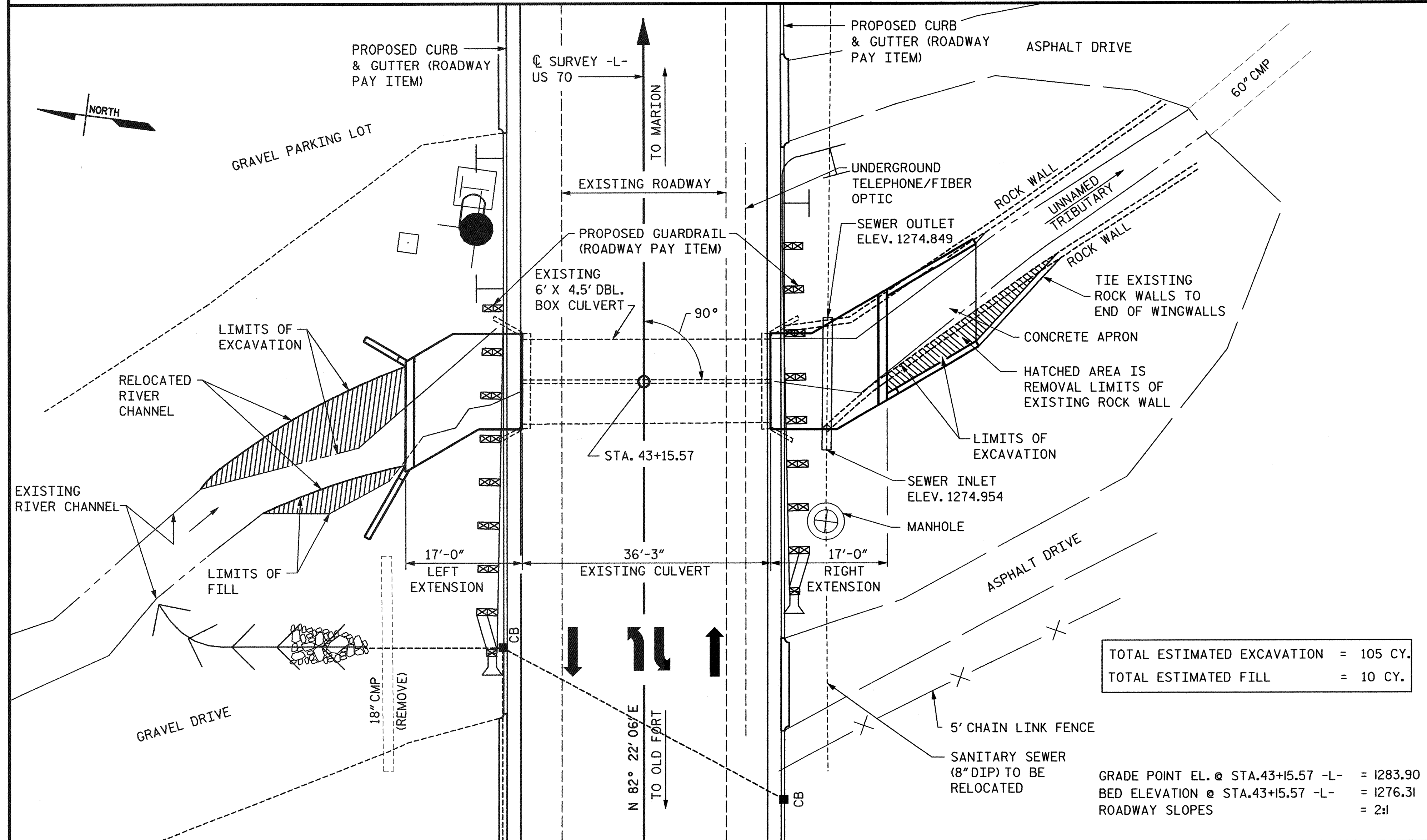


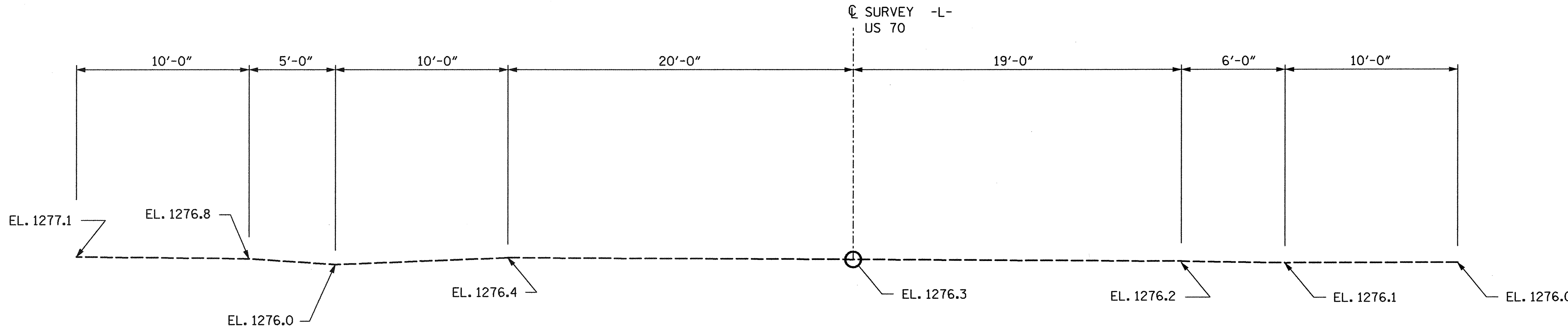
B.M.: MA13038R, BL-9, 18.6' LEFT OF STA. 44+98.9, EL. 1280.859



TOTAL ESTIMATED EXCAVATION = 105 CY.
TOTAL ESTIMATED FILL = 10 CY.

GRADE POINT EL. @ STA. 43+15.57 -L- = 1283.90
BED ELEVATION @ STA. 43+15.57 -L- = 1276.31
ROADWAY SLOPES = 2:1

LOCATION SKETCH



PROFILE ALONG CULVERT

NOTES

ASSUMED LIVE LOAD ----- HS20-44 OR ALTERNATE LOADING.
DESIGN FILL 3.44'
FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
3" 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 4" 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.

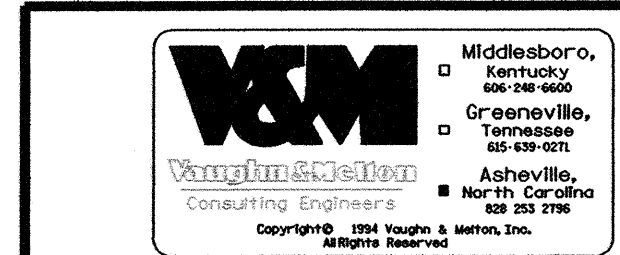
AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES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

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.
IN ADDITION TO THE REQUIREMENTS OF SECTION 414 OF THE STANDARD SPECIFICATIONS, THE COST OF ALL EXCAVATION AND FILL REQUIRED FOR RIVER CHANNEL RELOCATION AND FOR ROCK WALL EXCAVATION AND BACKFILL WILL BE INCLUDED IN THE LUMP SUM ITEM OF "CULVERT EXCAVATION, STATION 43+15.57"

NOTES CONTINUED ON NEXT SHEET

TOTAL STRUCTURE QUANTITIES		
CLASS A CONCRETE		
RIGHT EXTENSION	36.9	C.Y.
LEFT EXTENSION	26.8	C.Y.
GRAVITY RETAINING WALL	8.1	C.Y.
TOTAL	71.8	C.Y.
REINFORCING STEEL		
RIGHT EXTENSION	5967	LBS.
LEFT EXTENSION	4944	LBS.
TOTAL	10911	LBS.
CULVERT EXCAVATION, STATION 43+15.57 - LUMP SUM		

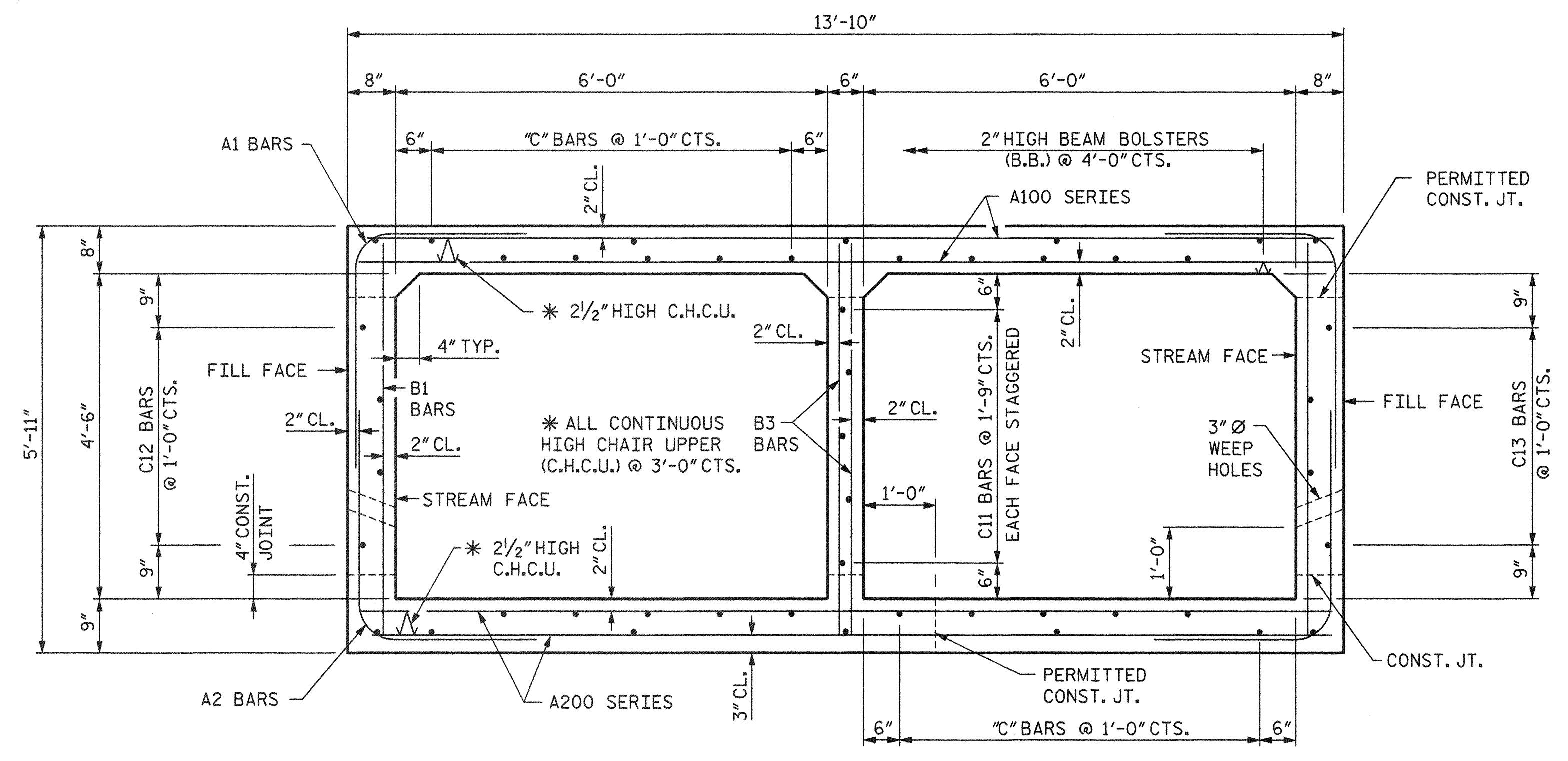
PROJECT NO. WBS 37840
McDOWELL COUNTY
STATION: 43+15.57 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
DOUBLE BARREL
6 FT. X 4.5 FT.
CONCRETE BOX CULVERT
RT. & LT. EXTENSIONS
DECEMBER 60° SKEW 2006

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

DRAWN BY: SF DATE: DEC. 2006
CHECKED BY: HLW DATE: DEC. 2006



**RIGHT ANGLE SECTION OF BARREL
(EITHER EXTENSION)**

THERE ARE 47 "C" BARS IN SECTION OF BARREL

NOTES CONTINUED FROM PREVIOUS SHEET

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 800,000 LBS. OF REINFORCING STEEL, ONE 2'-6" SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 800,000 LBS OF REINFORCING STEEL, TWO 2'-6" SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.

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

A 3'-0" STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

DOWELS SHALL BE USED TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT AS SHOWN. FOR NOTE REGARDING SETTING DOWELS, SEE SHEET SN.

IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING WINGS AS TEMPORARY SHORING FOR THE CONSTRUCTION OF THE CULVERT EXTENSION. IN THIS CASE, THE FOOTINGS OF THE EXTENSION SHALL BE POURED AT LEAST 72 HOURS PRIOR TO CUTTING THE WINGS. THE WINGS MAY BE CUT EARLIER PROVIDED THE FOOTING CONCRETE HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.

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.

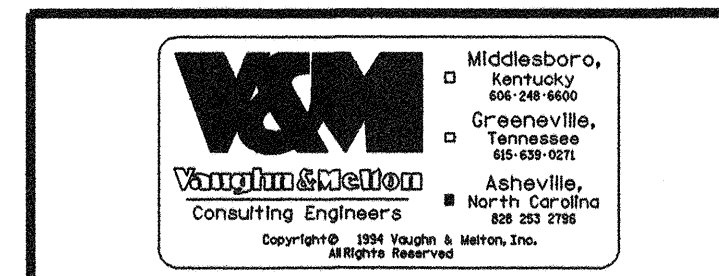
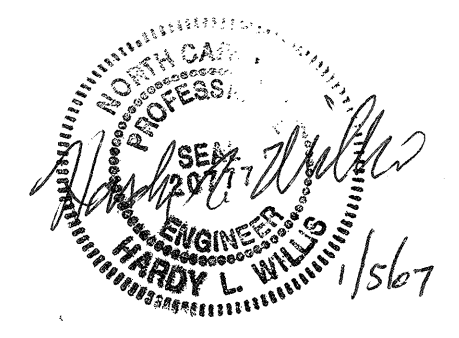
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

~~FOR CULVERT EXCAVATION, SEE SPECIAL PROVISIONS.~~

PROJECT NO. WBS 37840
McDOWELL COUNTY
 STATION: 43+15.57 -L-

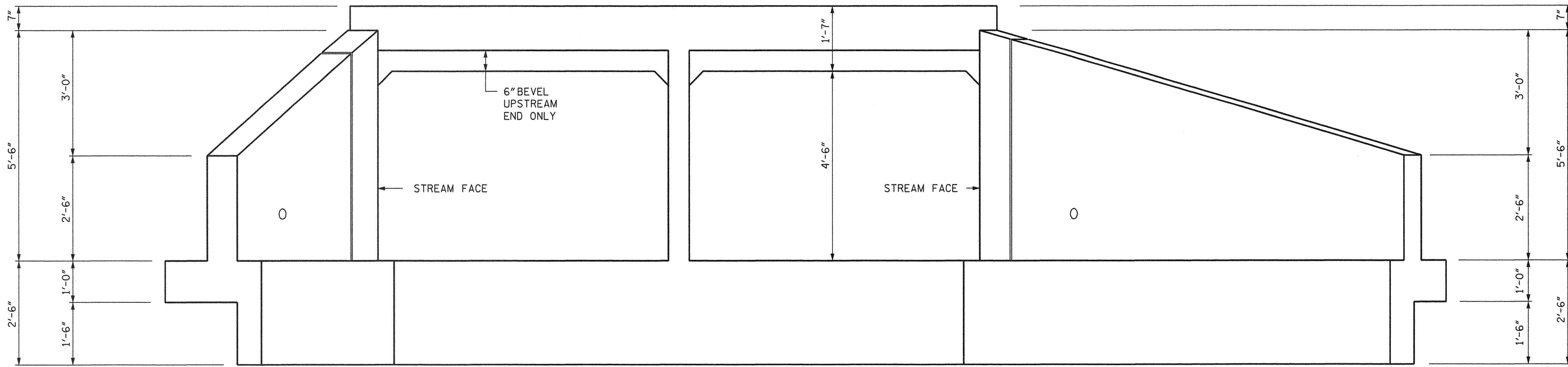


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**DOUBLE BARREL
 6 FT. X 4.5 FT.
 CONCRETE BOX CULVERT
 60° SKEW**

DECEMBER 2006

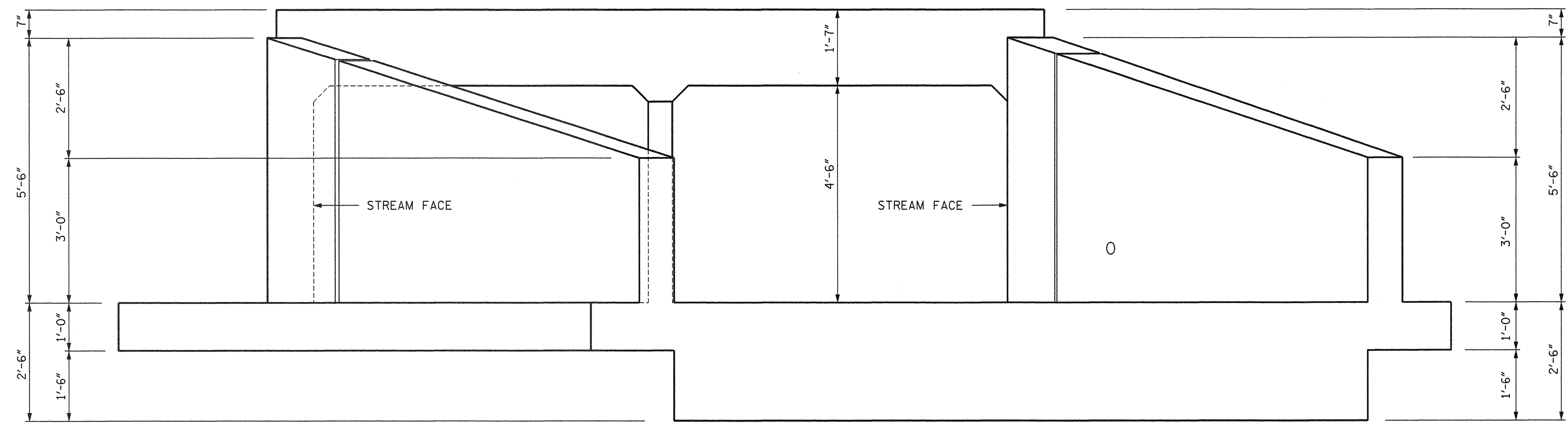
DRAWN BY: SF		DATE: DEC. 2006		NO.		BY:		DATE:		REVISIONS		SHEET NO.	
CHECKED BY: HLW		DATE: DEC. 2006		1		3						S-2	TOTAL SHEETS 13
				2		4							



W1

END ELEVATION - ALONG FACE OF
CULVERT OPENING (LEFT EXTENSION)

W2



W4

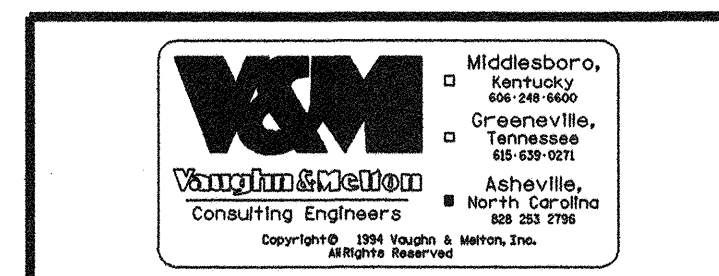
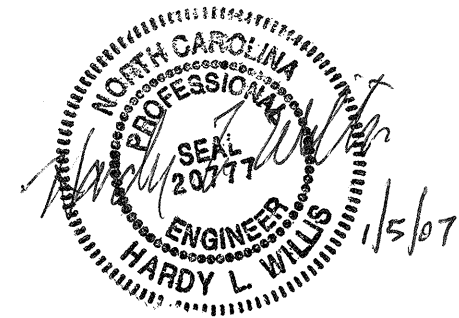
END ELEVATION - ALONG FACE OF
CULVERT OPENING (RIGHT EXTENSION)

W3

PROJECT NO. WBS 37840
McDOWELL COUNTY
 STATION: 43+15.57 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE BARREL
 6 FT. X 4.5 FT.
 CONCRETE BOX CULVERT
 60° SKEW

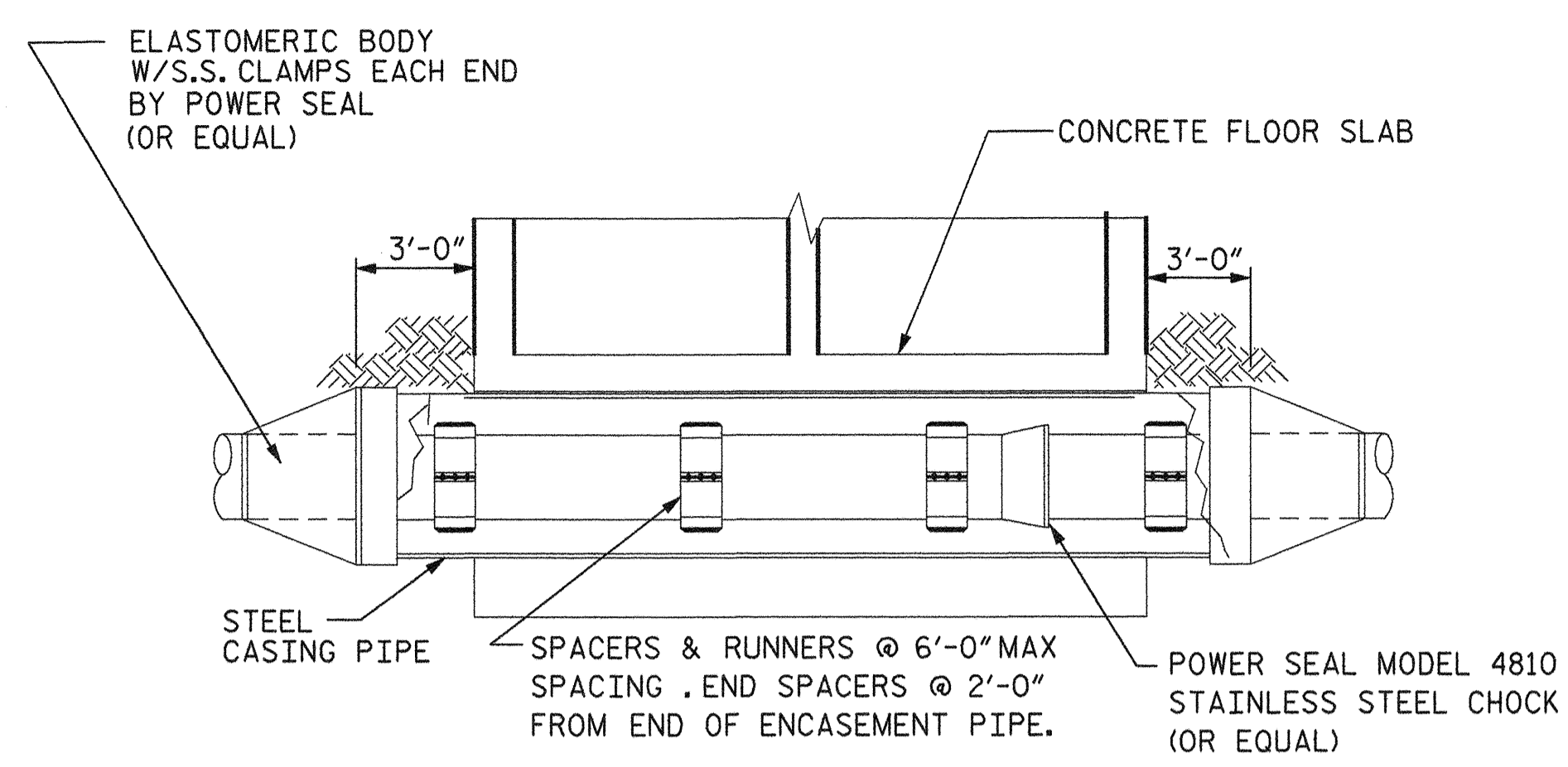
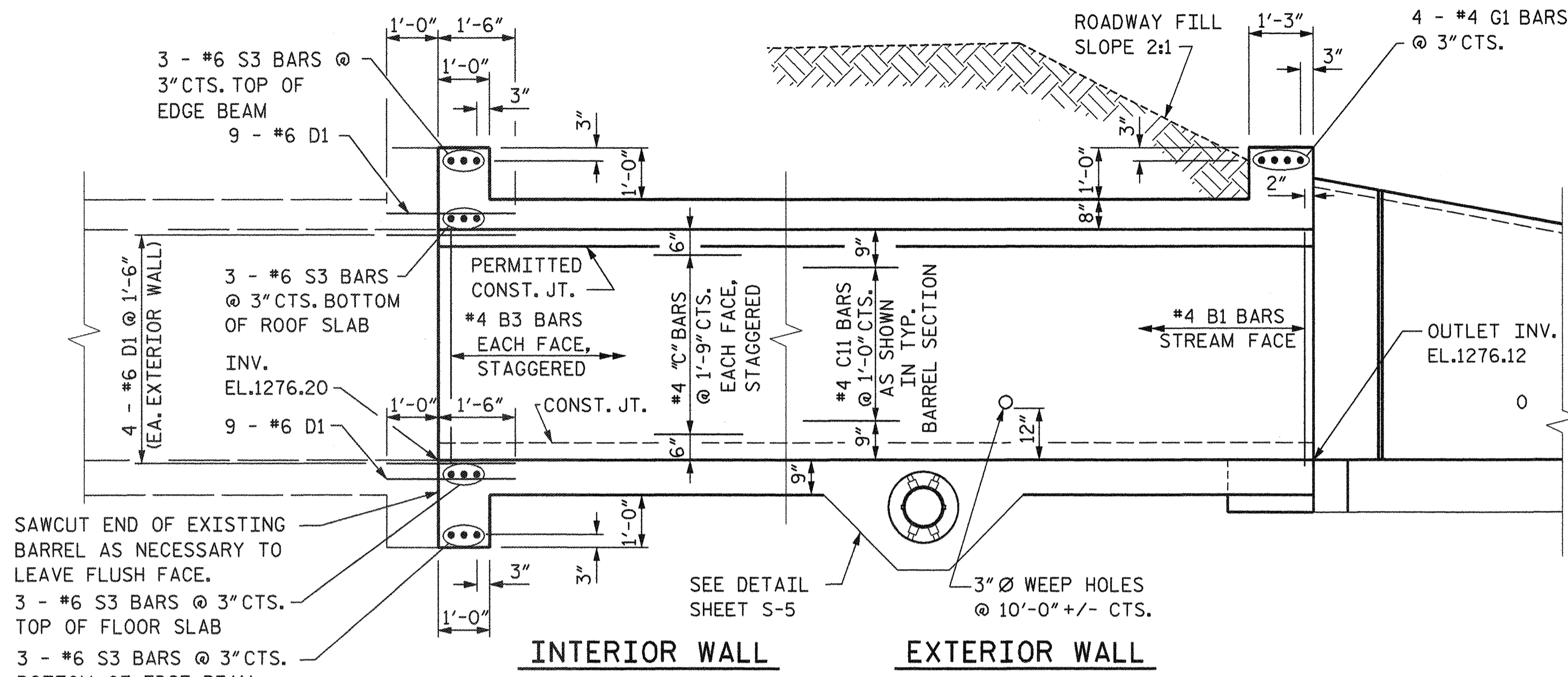
DECEMBER 2006



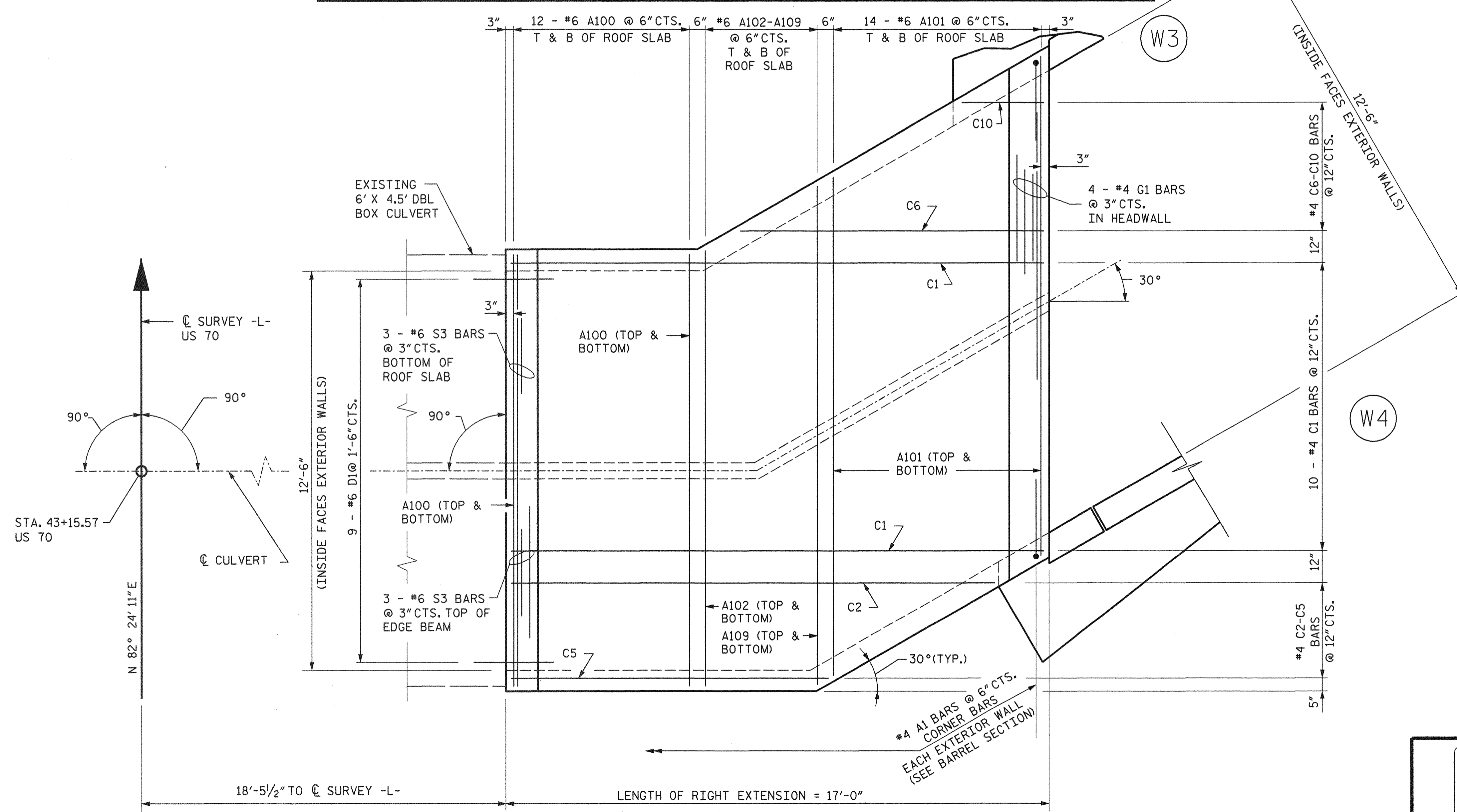
DRAWN BY: SF DATE: DEC. 2006
 CHECKED BY: HLW DATE: DEC. 2006

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

TOTAL SHEETS 13

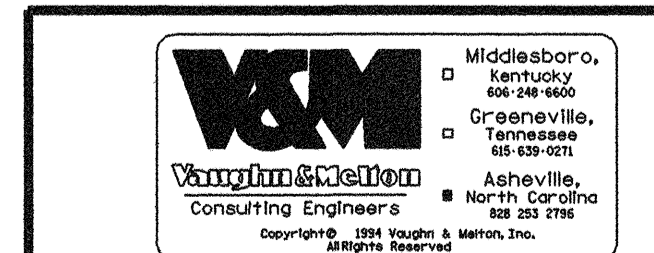
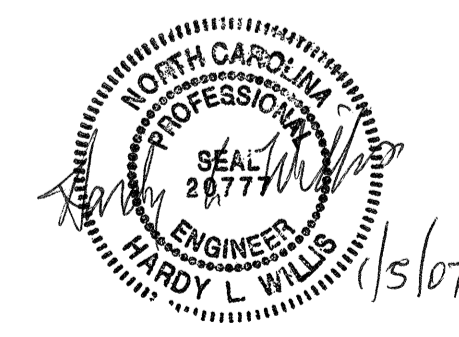


CULVERT SECTION NORMAL TO ROADWAY (RIGHT EXTENSION)



ROOF SLAB (RIGHT EXTENSION)

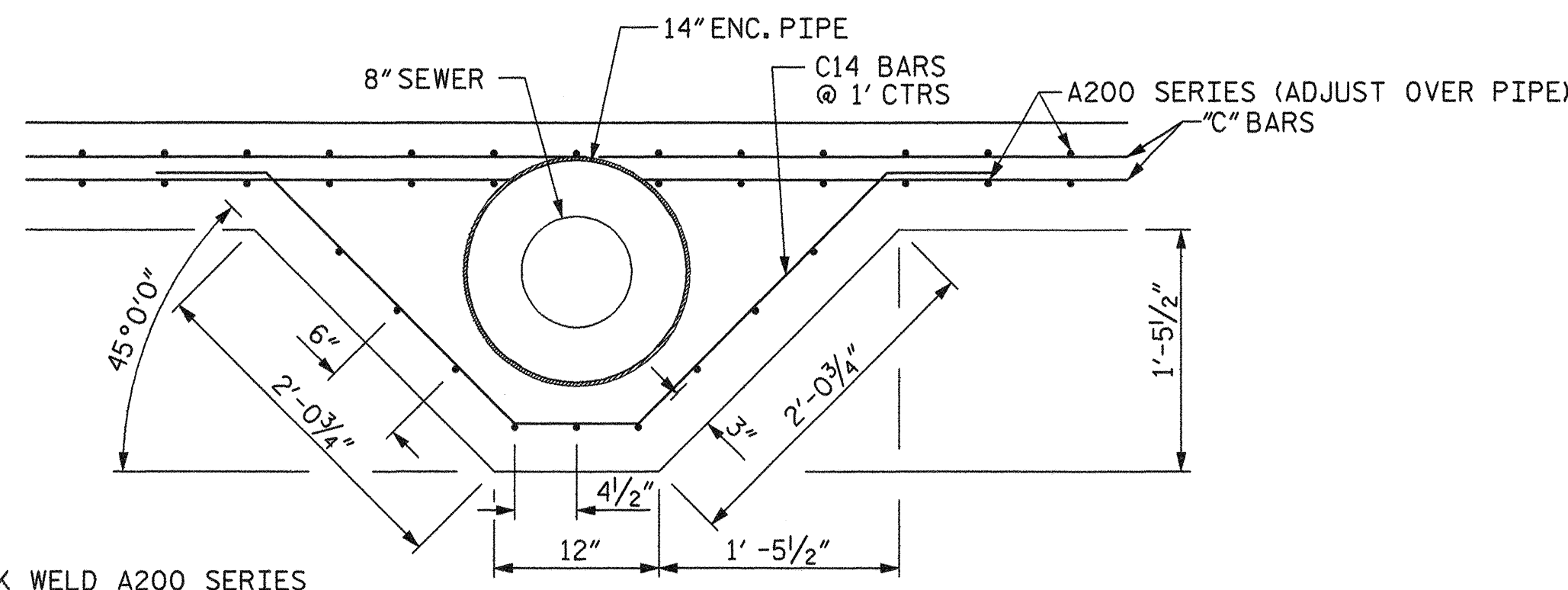
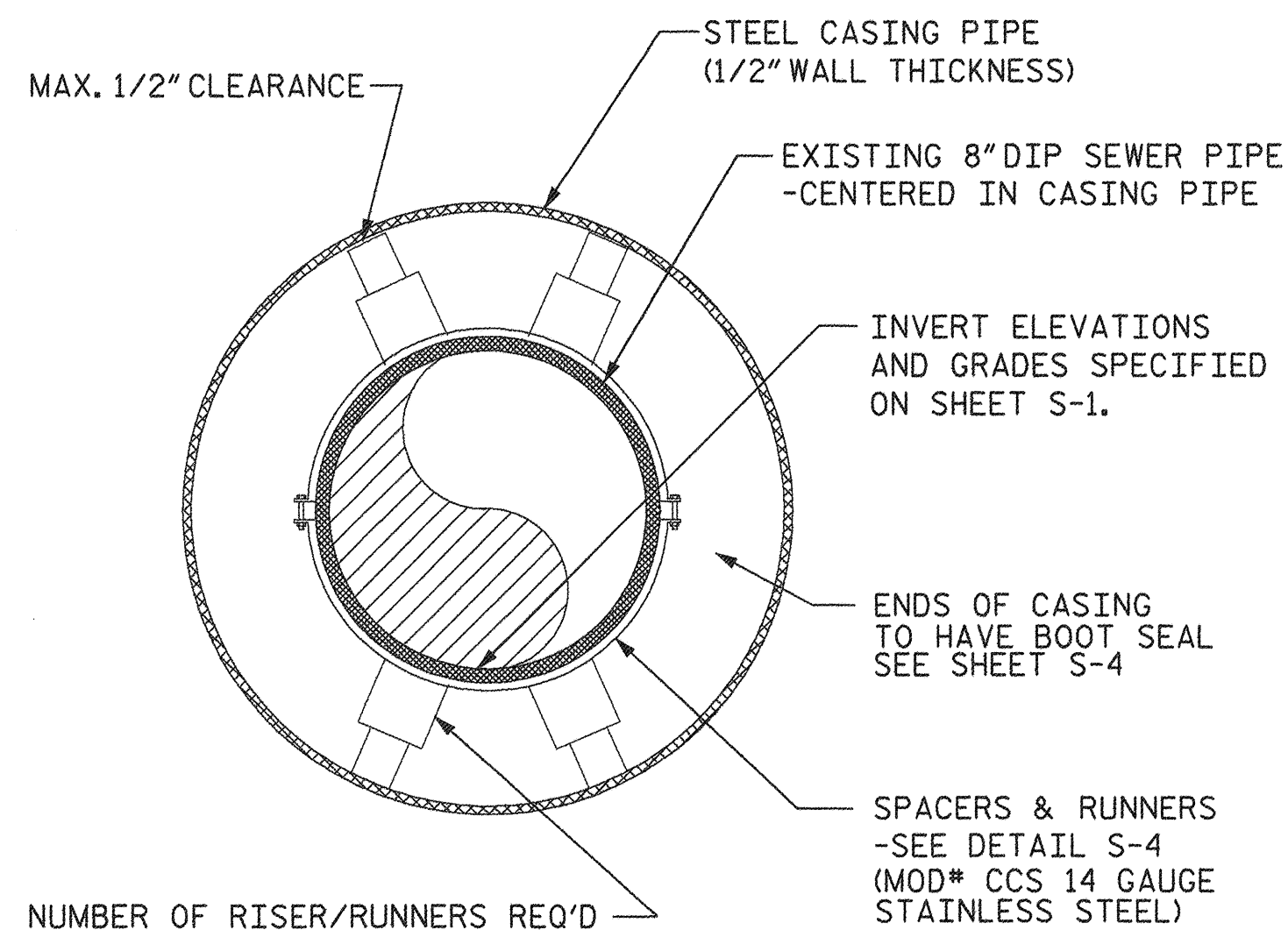
PROJECT NO. WBS 37840
McDOWELL COUNTY
 STATION: 43+15.57 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**DOUBLE 6 FT. X 4.5 FT.
 CONCRETE BOX CULVERT
 60° SKEW
 RIGHT EXTENSION**
 DECEMBER 2006

DRAWN BY: SF DATE: DEC. 2006
 CHECKED BY: HLW DATE: DEC. 2006

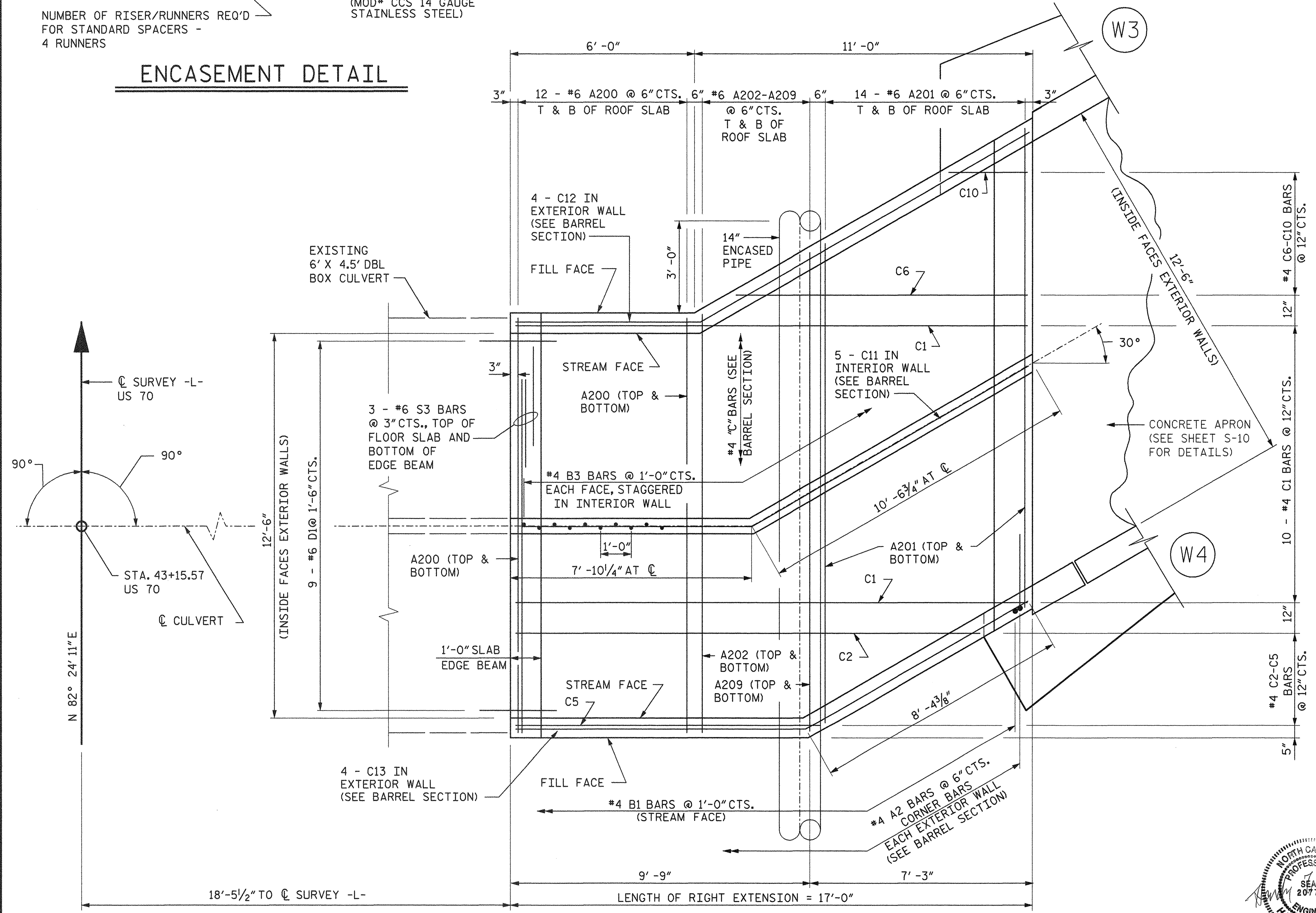
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			13



NOTE:
 1. CUT & TACK WELD A200 SERIES BARS TO ENCASEMENT PIPE.
 2. ADJUST OR CUT VERTICAL BARS IN WALL TO AVOID CASING PIPE

PIPE DETAIL

ENCASEMENT DETAIL



PLAN OF FLOOR SLAB (RIGHT EXTENSION)

RIGHT EXTENSION BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	76	4	①	5'-5"	275
A2	76	4	①	5'-4"	271
A100	24	6	STR	13'-6"	487
A101	28	6	STR	15'-7"	655
A102	2	6	STR	13'-7"	41
A103	2	6	STR	13'-10"	42
A104	2	6	STR	14'-2"	43
A105	2	6	STR	14'-5"	43
A106	2	6	STR	14'-9"	44
A107	2	6	STR	15'-0"	45
A108	2	6	STR	15'-4"	46
A109	2	6	STR	15'-7"	47
A200	24	6	STR	13'-6"	487
A201	28	6	STR	15'-7"	655
A202	2	6	STR	13'-7"	41
A203	2	6	STR	13'-10"	42
A204	2	6	STR	14'-2"	43
A205	2	6	STR	14'-5"	43
A206	2	6	STR	14'-9"	44
A207	2	6	STR	15'-0"	45
A208	2	6	STR	15'-4"	46
A209	2	6	STR	15'-7"	47
A400	30	4	STR	12'-6"	251
A401	12	4	STR	9'-9"	78
B1	38	4	STR	5'-6"	140
B3	38	4	STR	5'-6"	140
C1	10	4	STR	16'-8"	111
C2	1	4	STR	15'-1"	10
C3	1	4	STR	13'-4"	9
C4	1	4	STR	11'-7"	8
C5	1	4	STR	9'-10"	7
C6	1	4	STR	9'-5"	6
C7	1	4	STR	7'-8"	5
C8	1	4	STR	5'-11"	4
C9	1	4	STR	4'-3"	3
C10	1	4	STR	2'-6"	2
C11	5	4	②	17'-11"	60
C12	4	4	②	18'-1"	48
C13	4	4	②	17'-7"	47
C14	16	4	③	7'-11"	85
D1	26	6	STR	2'-6"	98
D2	15	6	STR	3'-0"	68
G1	4	4	STR	15'-6"	41
H1	15	4	STR	14'-8"	147
K1	8	4	④	3'-4"	18
S2	5	6	STR	14'-1"	106
S3	12	6	STR	15'-6"	279

RIGHT EXTENSION QUANTITIES

CLASS A CONCRETE

BARREL @ 1.04 CY/FT 19.2 C.Y.

WINGS, APRON, ETC. 16.5 C.Y.

SEWER ENCASEMENT 1.2 C.Y.

TOTAL 36.9 C.Y.

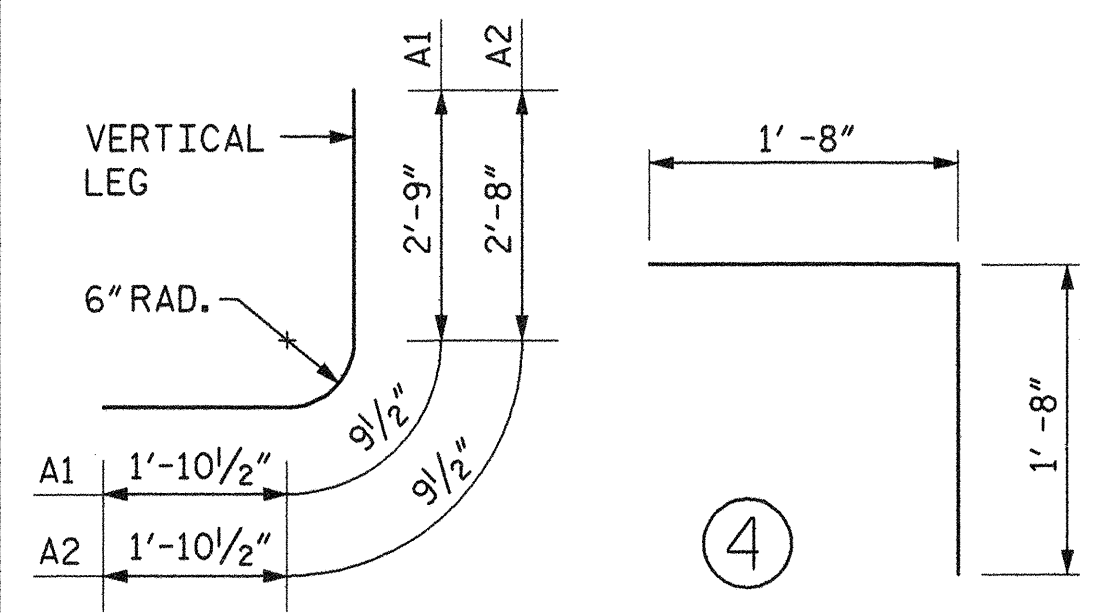
REINFORCING STEEL

BARREL 5303 LBS.

WINGS, APRON, ETC. 664 LBS.

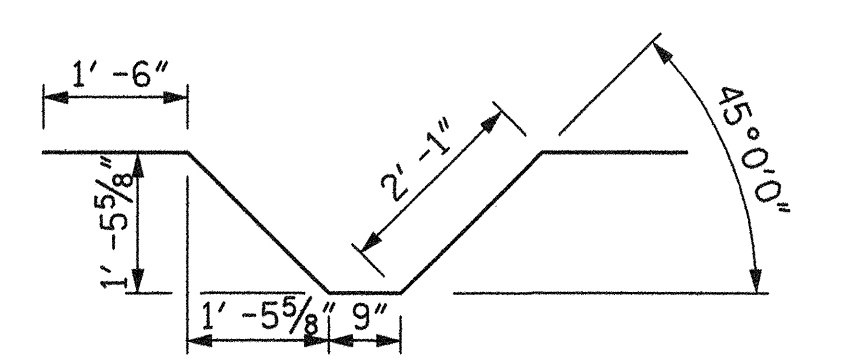
TOTAL 5967 LBS.

BAR TYPE



②

BAR	LENGTH		
	A	B	C
C11	7'-8"	10'-3"	5'-1 1/2"
C12	5'-10"	12'-3"	6'-1 1/2"
C13	9'-5"	8'-2"	4'-1"



DIMENSIONS ARE OUT TO OUT

PROJECT NO. WBS 37840

McDOWELL COUNTY

STATION: 43+15.57 -L-

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

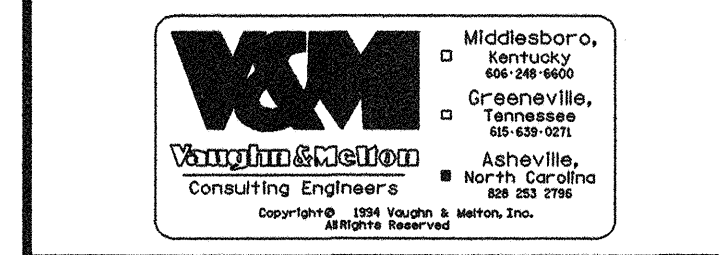
RALEIGH

DOUBLE 6 FT. X 4.5 FT. CONCRETE BOX CULVERT

60° SKEW

RIGHT EXTENSION

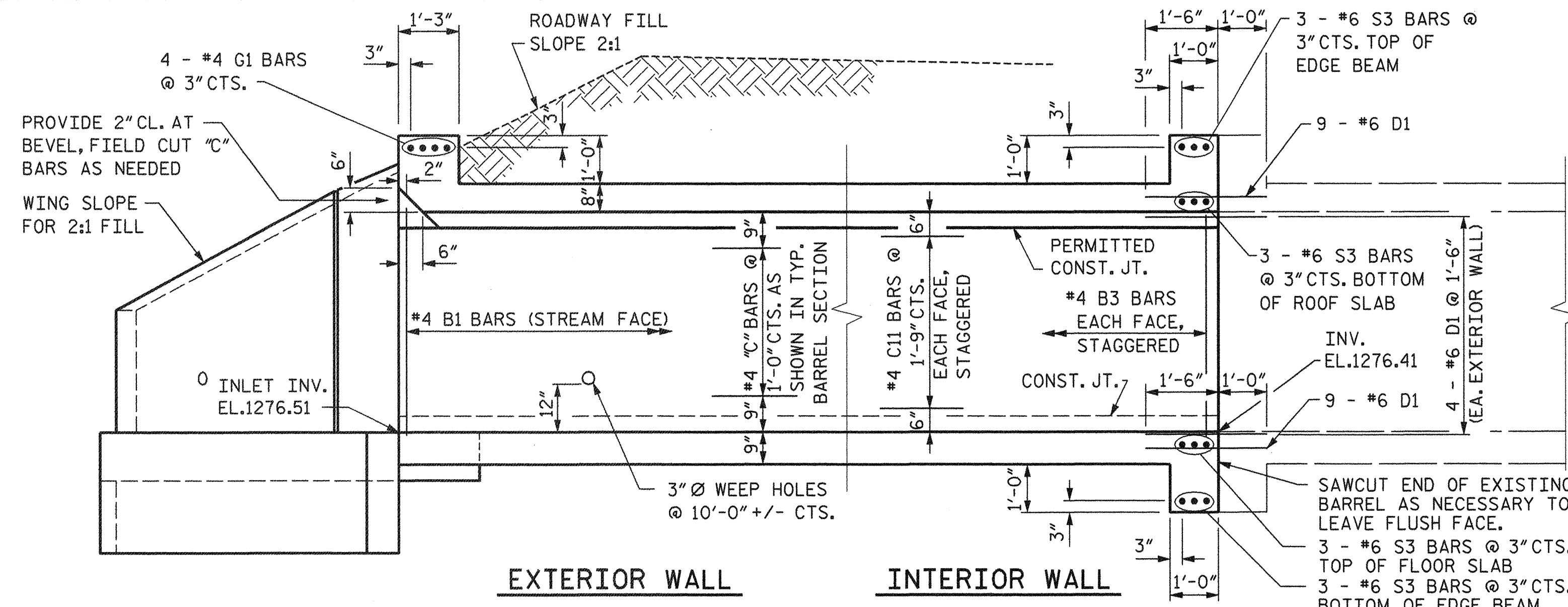
DECEMBER 2006



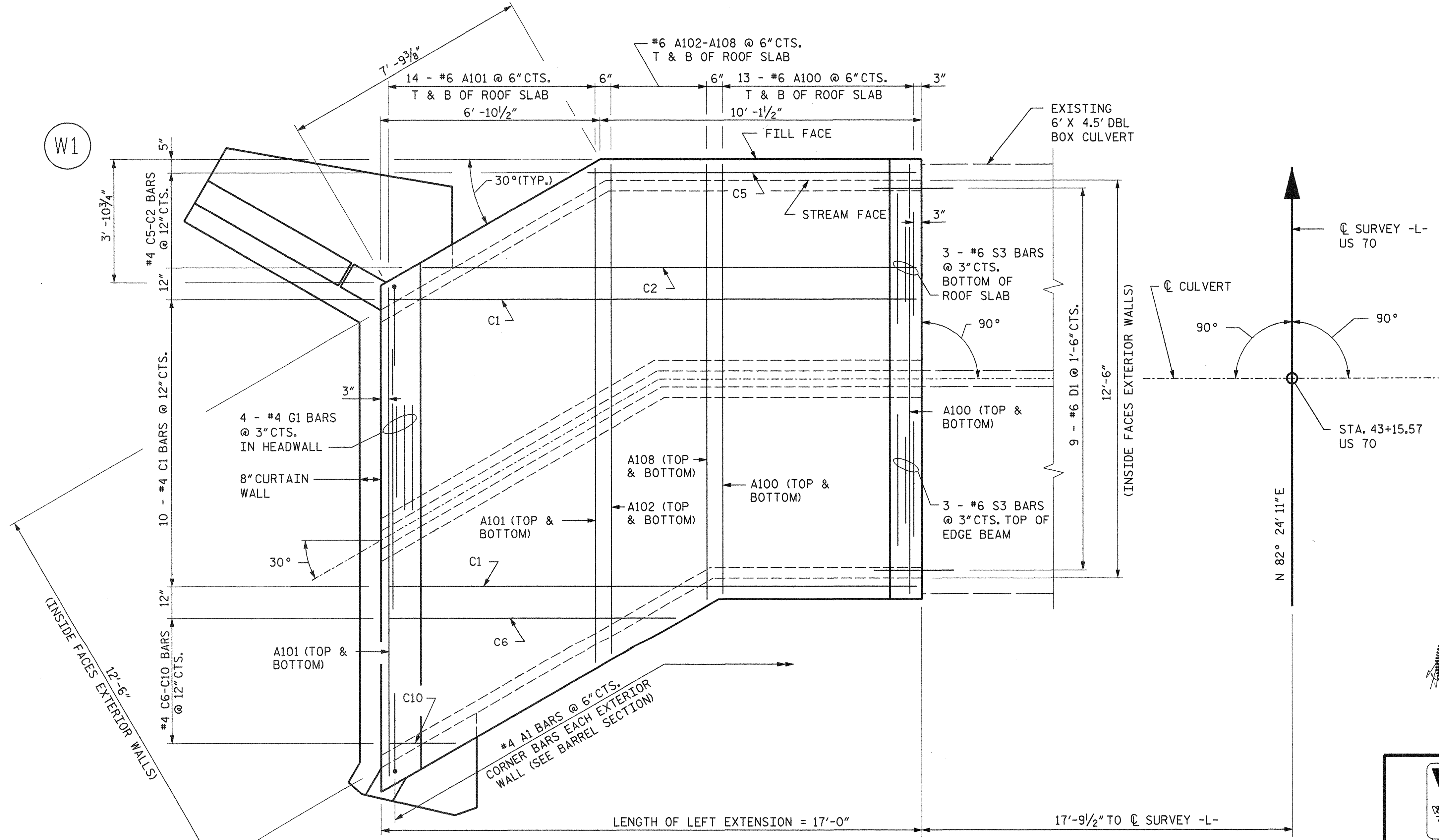
DRAWN BY: SF DATE: DEC. 2006

CHECKED BY: HLW DATE: DEC. 2006

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

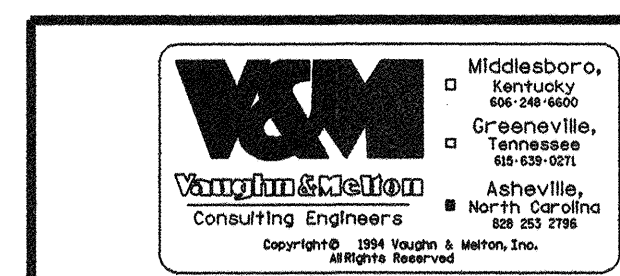
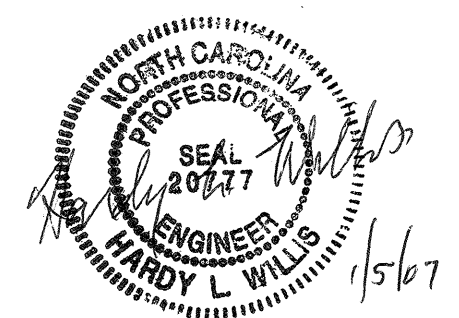


CULVERT SECTION NORMAL TO ROADWAY (LEFT EXTENSION)



ROOF SLAB (LEFT EXTENSION)

PROJECT NO. WBS 37840
McDOWELL COUNTY
 STATION: 43+15.57 -L-

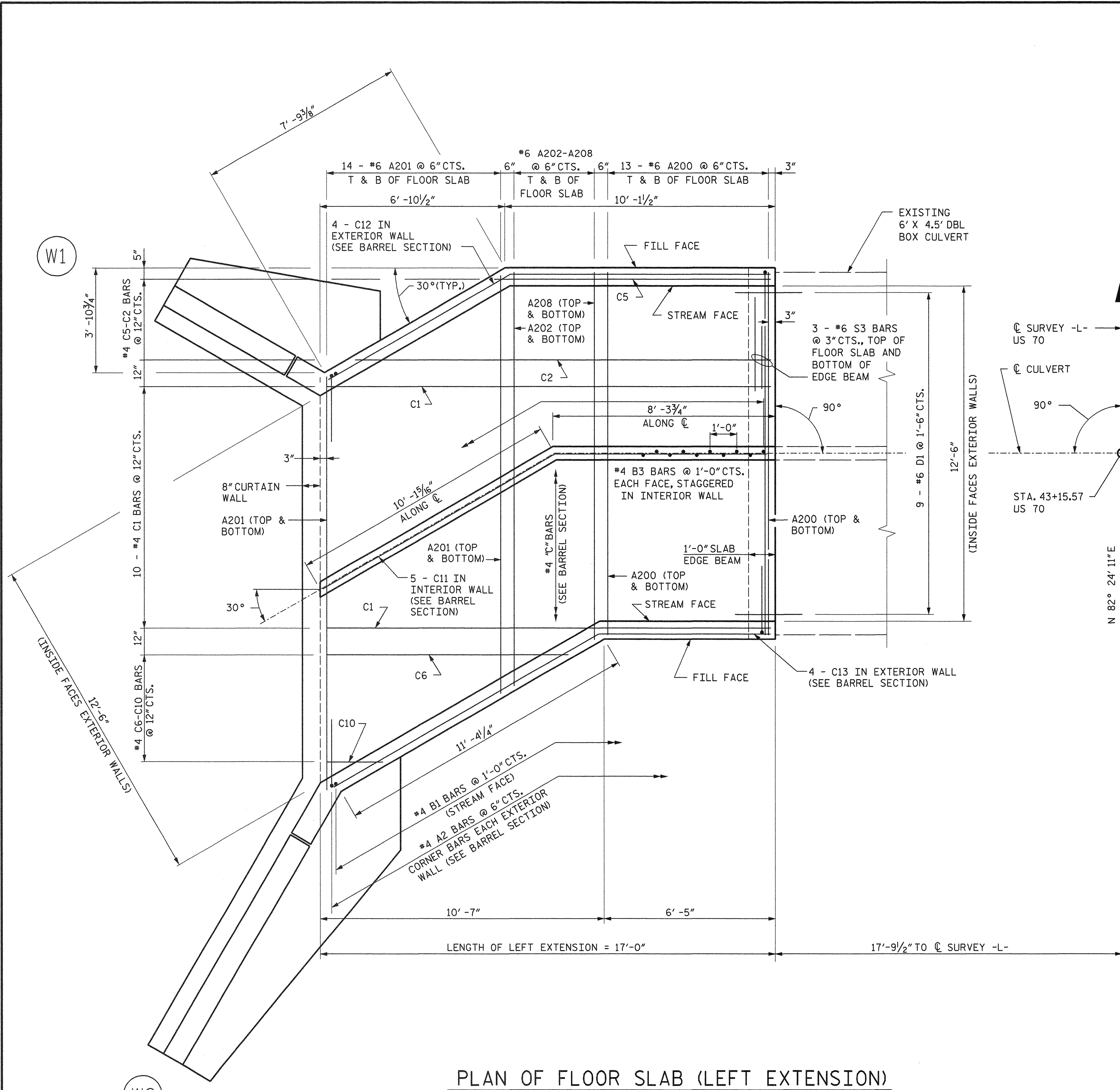


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE 6 FT. X 4.5 FT.
 CONCRETE BOX CULVERT
 60° SKEW
 LEFT EXTENSION

DECEMBER 2006

DRAWN BY: SF DATE: DEC. 2006
 CHECKED BY: HLW DATE: DEC. 2006

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			13



PLAN OF FLOOR SLAB (LEFT EXTENSION)

LEFT EXTENSION BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	76	4	①	5'-5"	275
A2	76	4	①	5'-4"	271
A100	26	6	STR	13'-6"	527
A101	28	6	STR	15'-7"	655
A102	2	6	STR	15'-5"	46
A103	2	6	STR	15'-1"	45
A104	2	6	STR	14'-10"	45
A105	2	6	STR	14'-6"	44
A106	2	6	STR	14'-3"	43
A107	2	6	STR	13'-11"	42
A108	2	6	STR	13'-8"	41
A200	26	6	STR	13'-6"	527
A201	28	6	STR	15'-7"	655
A202	2	6	STR	15'-5"	46
A203	2	6	STR	15'-1"	45
A204	2	6	STR	14'-10"	45
A205	2	6	STR	14'-6"	44
A206	2	6	STR	14'-3"	43
A207	2	6	STR	13'-11"	42
A208	2	6	STR	13'-8"	41
B1	38	4	STR	5'-6"	140
B3	38	4	STR	5'-6"	140
C1	10	4	STR	16'-8"	111
C2	1	4	STR	15'-6"	10
C3	1	4	STR	13'-9"	9
C4	1	4	STR	12'-0"	8
C5	1	4	STR	10'-3"	7
C6	1	4	STR	9'-0"	6
C7	1	4	STR	7'-3"	5
C8	1	4	STR	5'-6"	4
C9	1	4	STR	3'-9"	3
C10	1	4	STR	2'-1"	1
C11	5	4	②	18'-0"	60
C12	4	4	②	17'-10"	48
C13	4	4	②	18'-1"	48
D1	26	6	STR	2'-6"	98
G1	4	4	STR	15'-6"	41
S3	12	6	STR	15'-6"	279

LEFT EXTENSION QUANTITIES

CLASS A CONCRETE

BARREL @ 1.04 CY/FT 19.2 C.Y.

WINGS ETC. 7.6 C.Y.

TOTAL 26.8 C.Y.

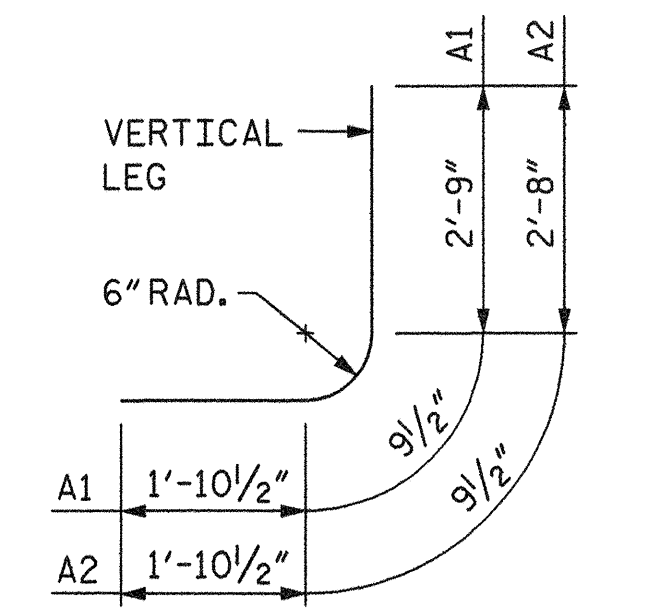
REINFORCING STEEL

BARREL 4540 LBS.

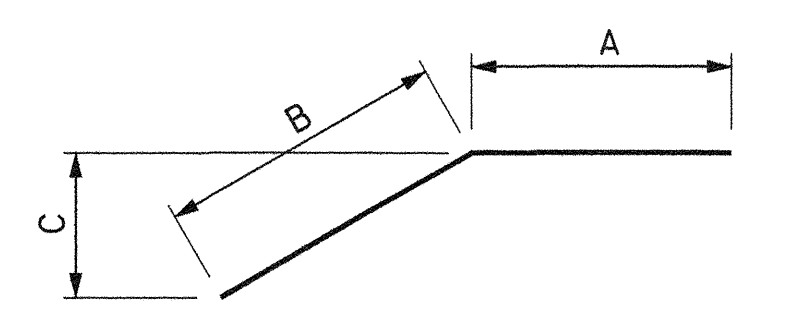
WINGS ETC. 404 LBS.

TOTAL 4944 LBS.

BAR TYPE



①



BAR	LENGTH		
	A	B	C
C11	8'-1"	9'-11"	4'-11 1/2"
C12	9'-9"	8'-1"	4'-0 1/2"
C13	6'-4"	11'-9"	5'-10 1/2"

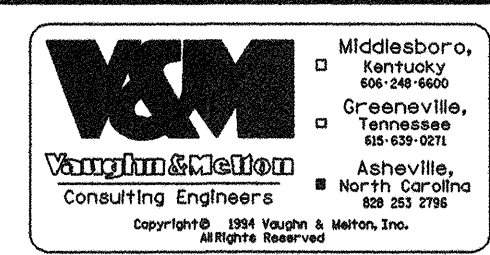
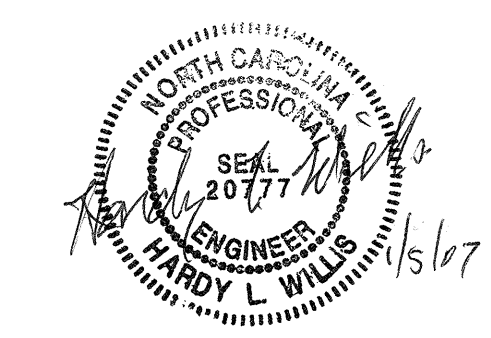
②

DIMENSIONS ARE OUT TO OUT

PROJECT NO. WBS 37840

McDOWELL COUNTY

STATION: 43+15.57 -L-



DRAWN BY: SF DATE: DEC. 2006

CHECKED BY: HLW DATE: DEC. 2006

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

DOUBLE 6 FT. X 4.5 FT. CONCRETE BOX CULVERT

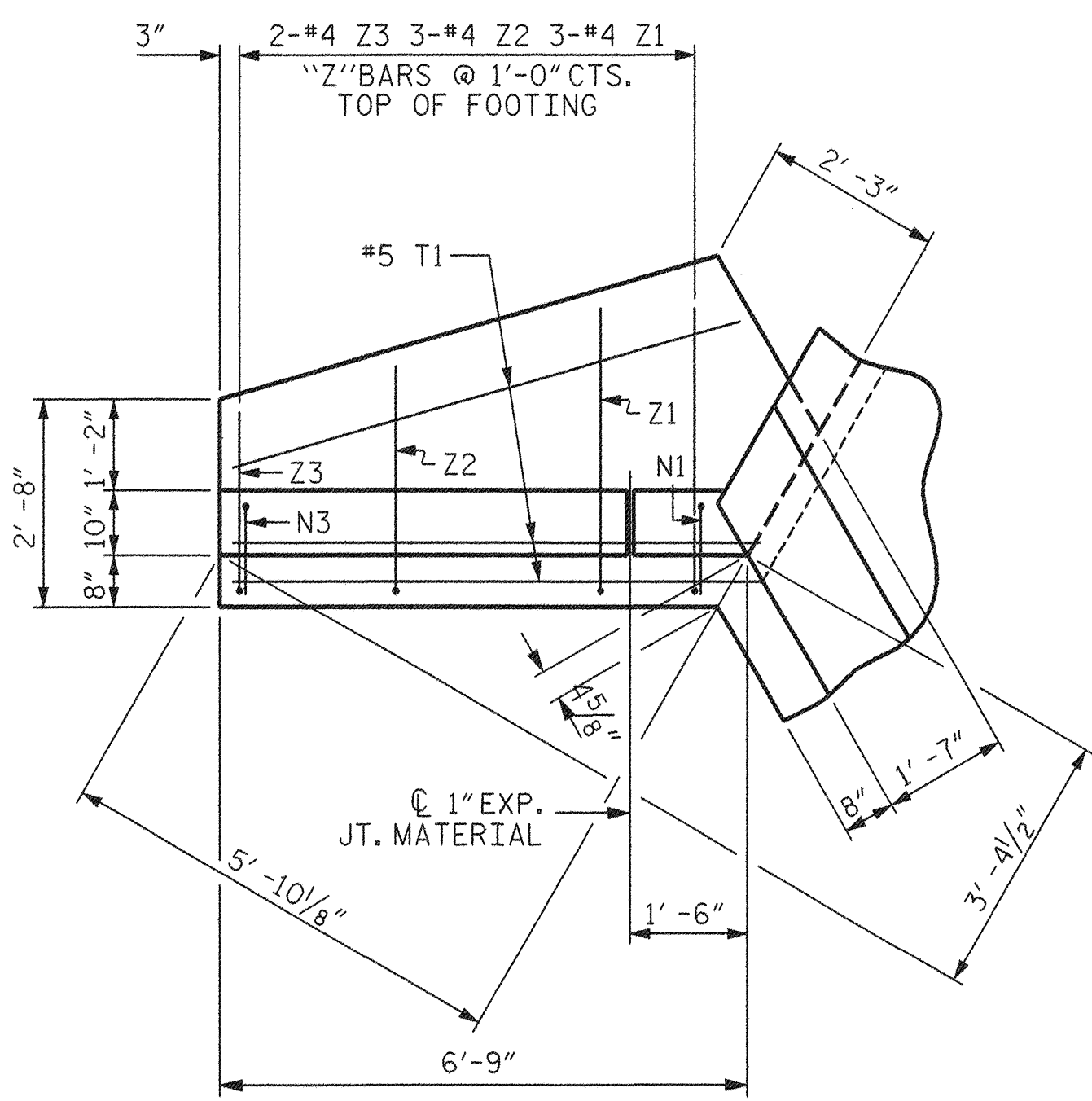
60° SKEW

LEFT EXTENSION

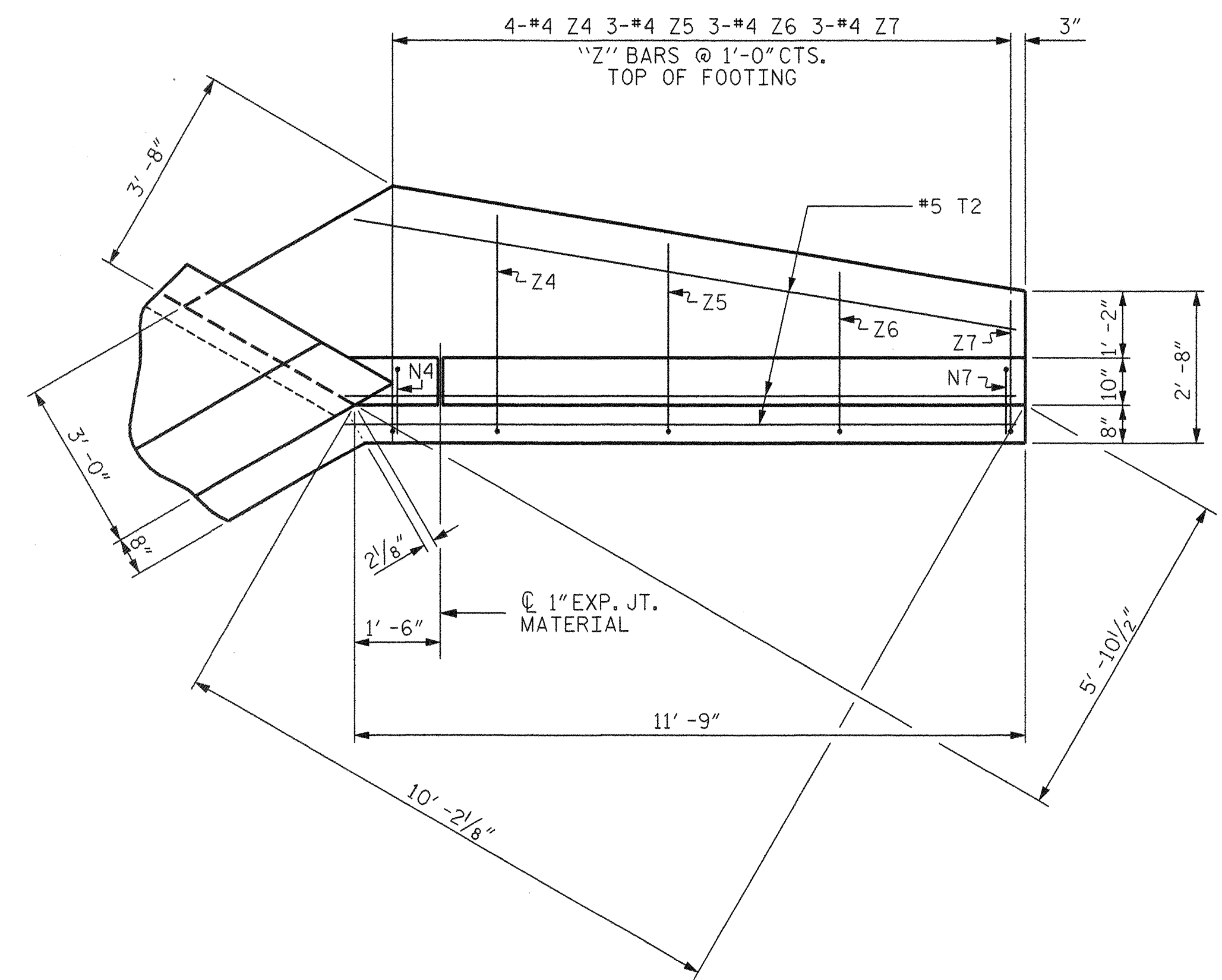
DECEMBER 2006

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

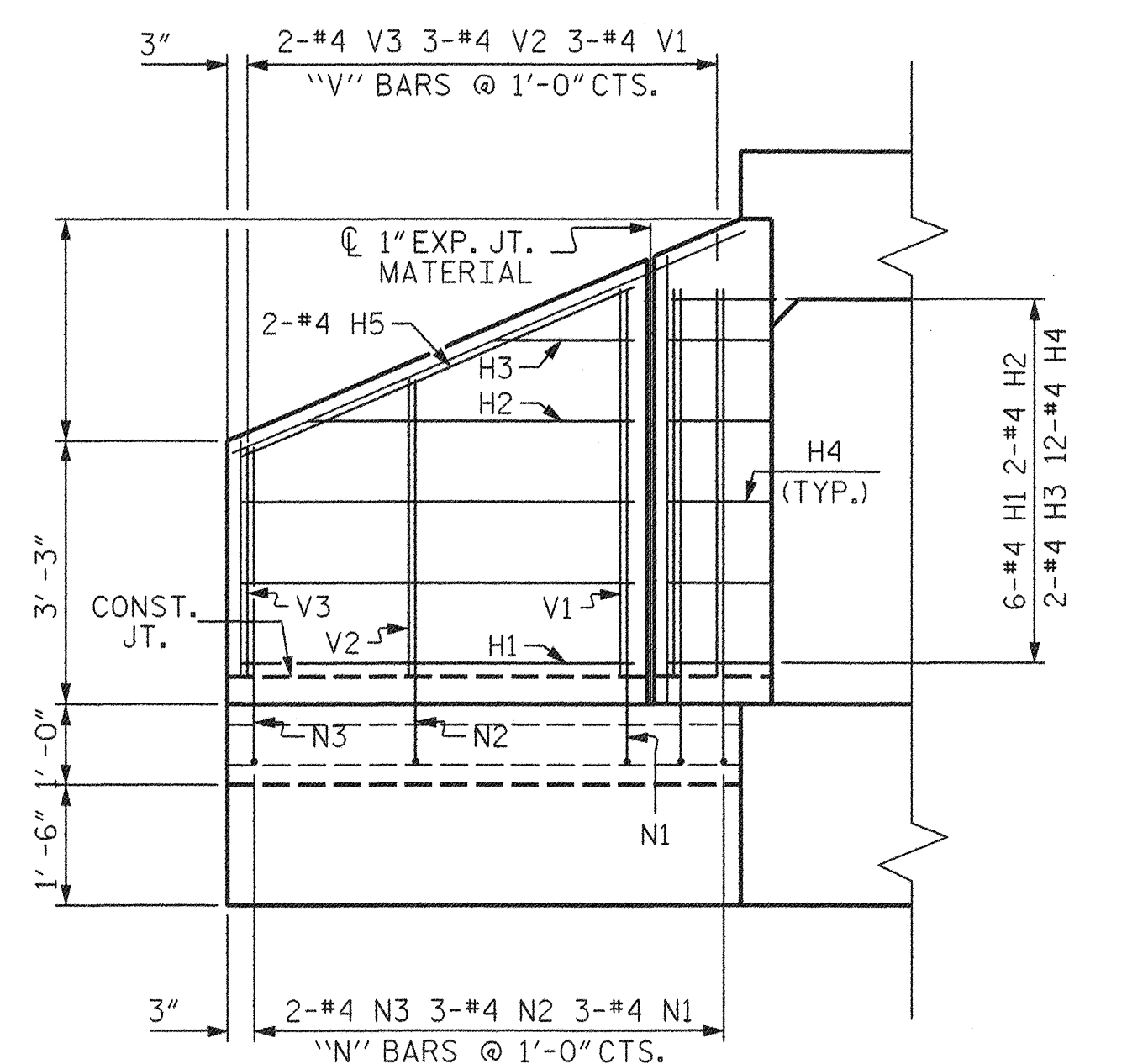
TOTAL SHEETS 13



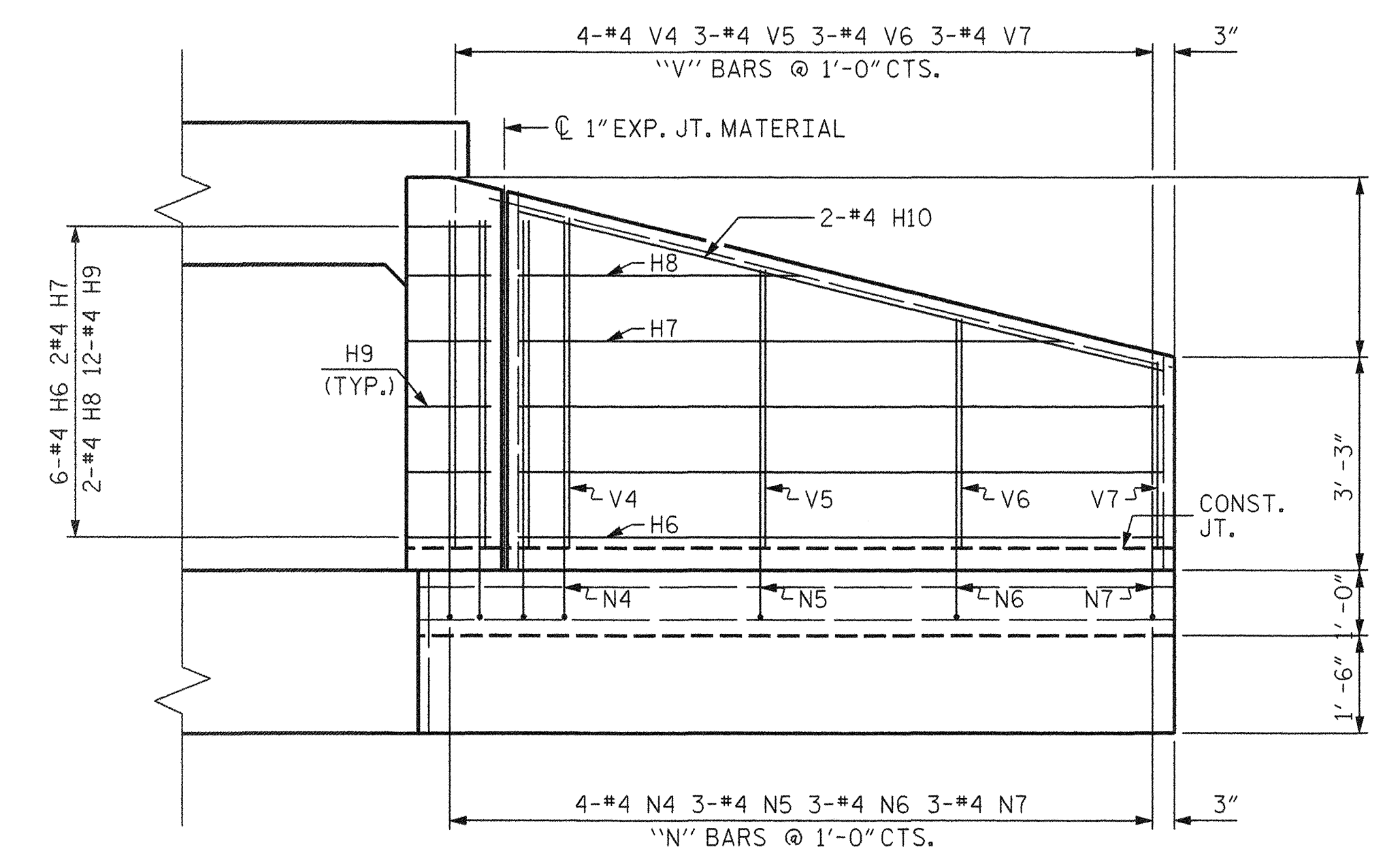
PLAN W1



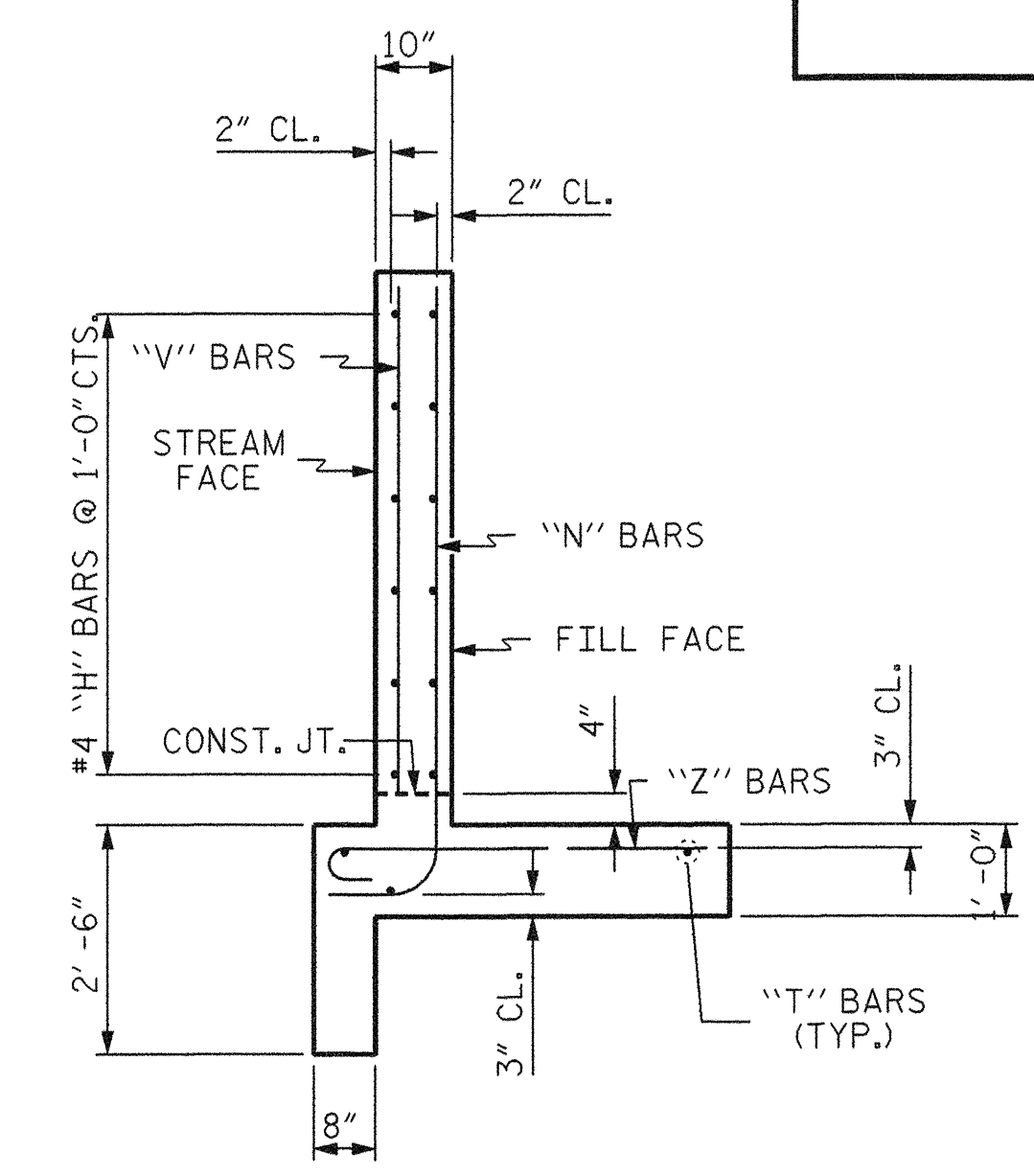
PLAN W2



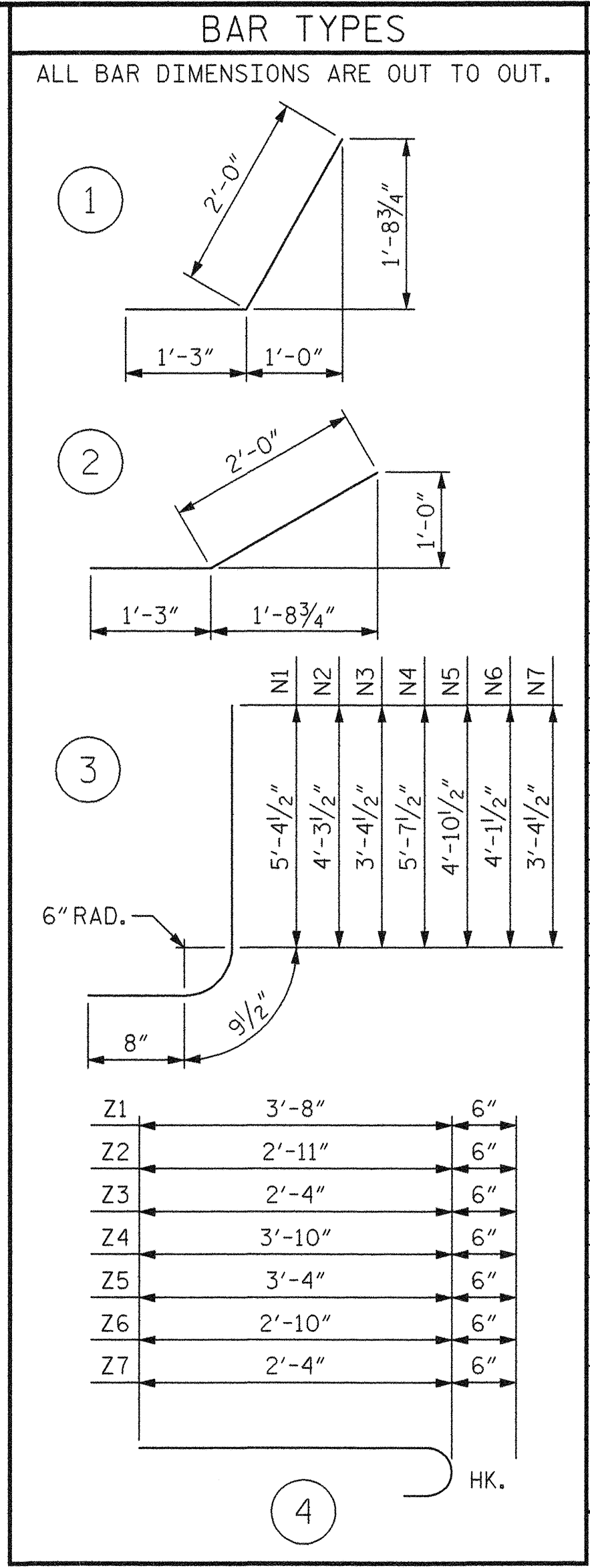
ELEVATION W1



ELEVATION W2



TYPICAL WING SECTION



BAR TYPES					BILL OF MATERIAL				
ALL BAR DIMENSIONS ARE OUT TO OUT.					BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	4'-10"	20				
H2	2	#4	STR	4'-0"	6				
H3	2	#4	STR	1'-9"	3				
H4	12	#4	1	3'-3"	26				
H5	2	#4	STR	5'-3"	7				
H6	6	#4	STR	9'-10"	40				
H7	2	#4	STR	8'-4"	11				
H8	2	#4	STR	4'-3"	6				
H9	12	#4	2	3'-3"	26				
H10	2	#4	STR	10'-2"	14				
N1	3	#4	3	6'-10"	14				
N2	3	#4	3	5'-9"	12				
N3	2	#4	3	4'-10"	7				
N4	4	#4	3	7'-1"	19				
N5	3	#4	3	6'-4"	13				
N6	3	#4	3	5'-7"	11				
N7	3	#4	3	4'-10"	10				
T1	3	#5	STR	6'-9"	21				
T2	3	#5	STR	11'-9"	37				
V1	3	#4	STR	4'-9"	10				
V2	3	#4	STR	3'-8"	8				
V3	2	#4	STR	2'-10"	4				
V4	4	#4	STR	5'-0"	14				
V5	3	#4	STR	4'-3"	9				
V6	3	#4	STR	3'-6"	7				
V7	3	#4	STR	2'-10"	6				
Z1	3	#4	4	4'-2"	9				
Z2	3	#4	4	3'-4"	7				
Z3	2	#4	4	2'-10"	4				
Z4	4	#4	4	4'-4"	12				
Z5	3	#4	4	4'-0"	8				
Z6	3	#4	4	3'-4"	7				
Z7	3	#4	4	2'-10"	6				
REINFORCING STEEL FOR 2 WINGS					404 LBS				
CLASS A CONCRETE									
WINGS W1 & W2					6.1 CY				
1 HEADWALL					0.9 CY				
1 END CURTAIN WALL					0.6 CY				
TOTAL					7.6 CY				

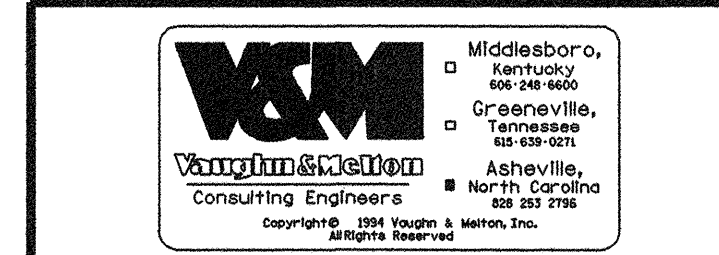
NOTE:
THESE WING DETAILS APPLY TO BOTH WINGS ON LEFT EXTENSION (W1 & W2).

PROJECT NO. WBS 37840
McDOWELL COUNTY
 STATION: 43+15.57 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**WINGS W1 AND W2
 DETAILS**

DECEMBER 2006

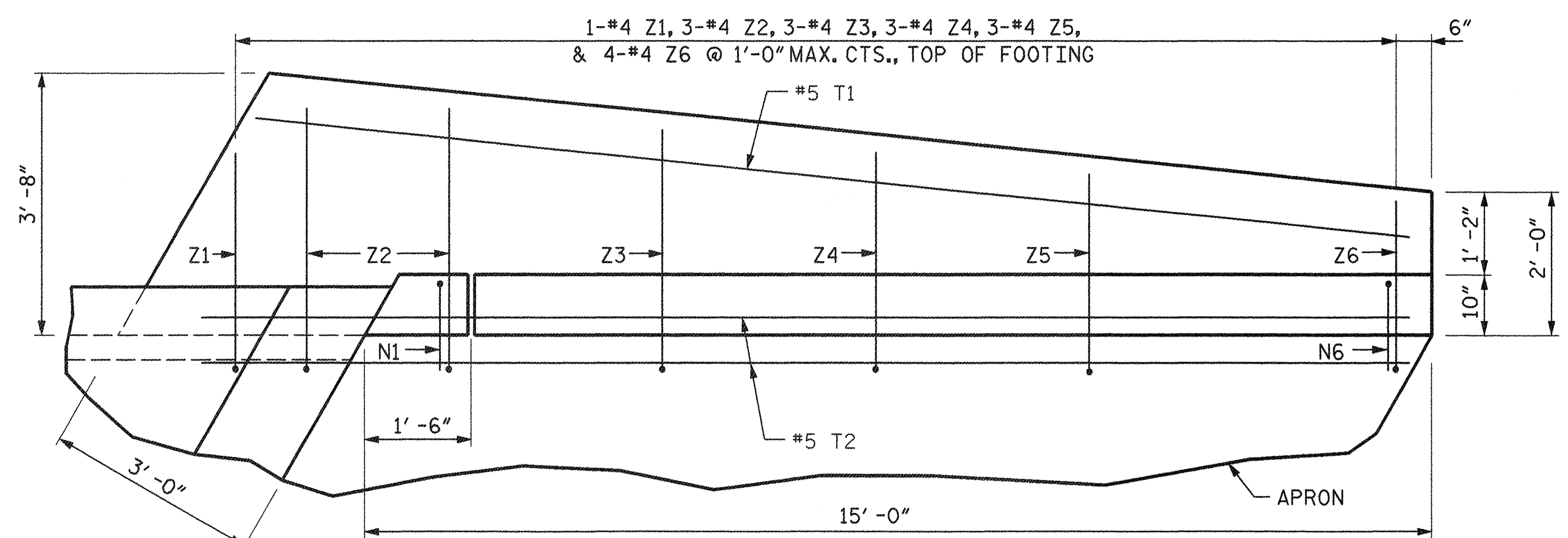


DRAWN BY: SF DATE: DEC. 2006
 CHECKED BY: HLW DATE: DEC. 2006

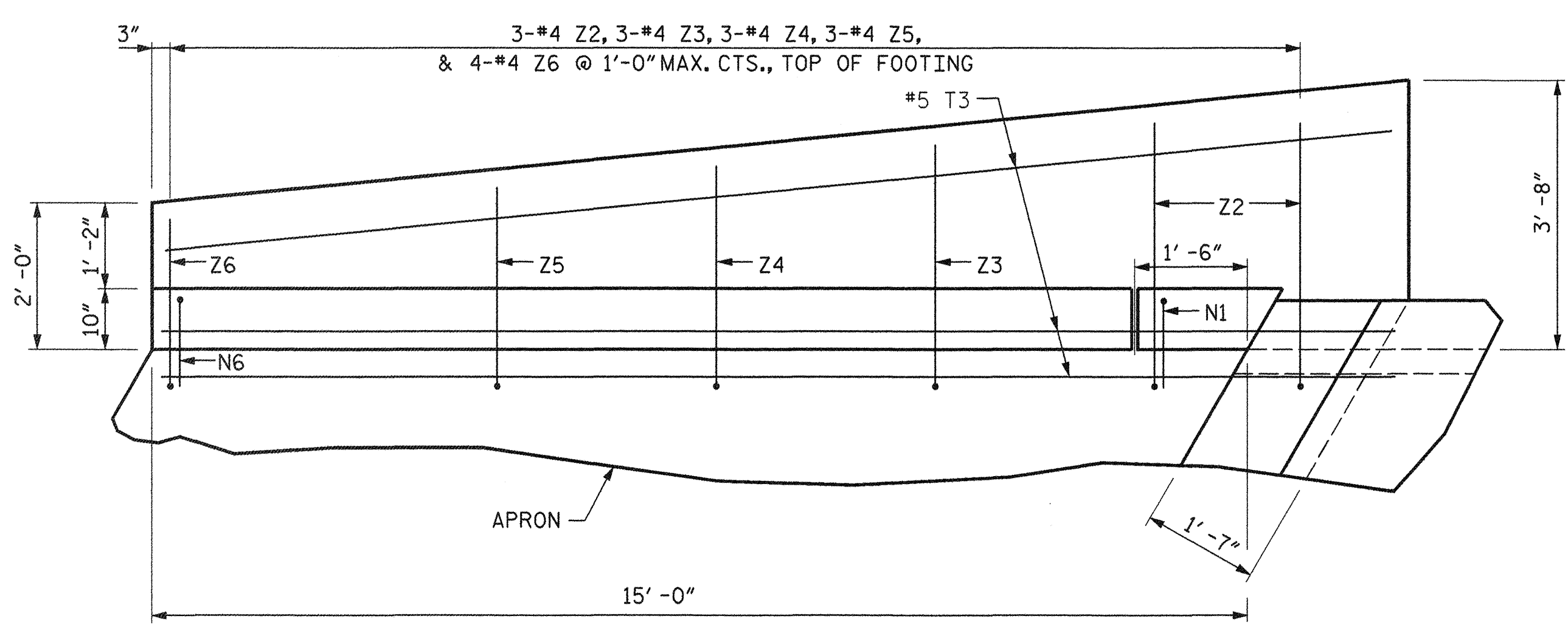
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

S-8
TOTAL SHEETS 13

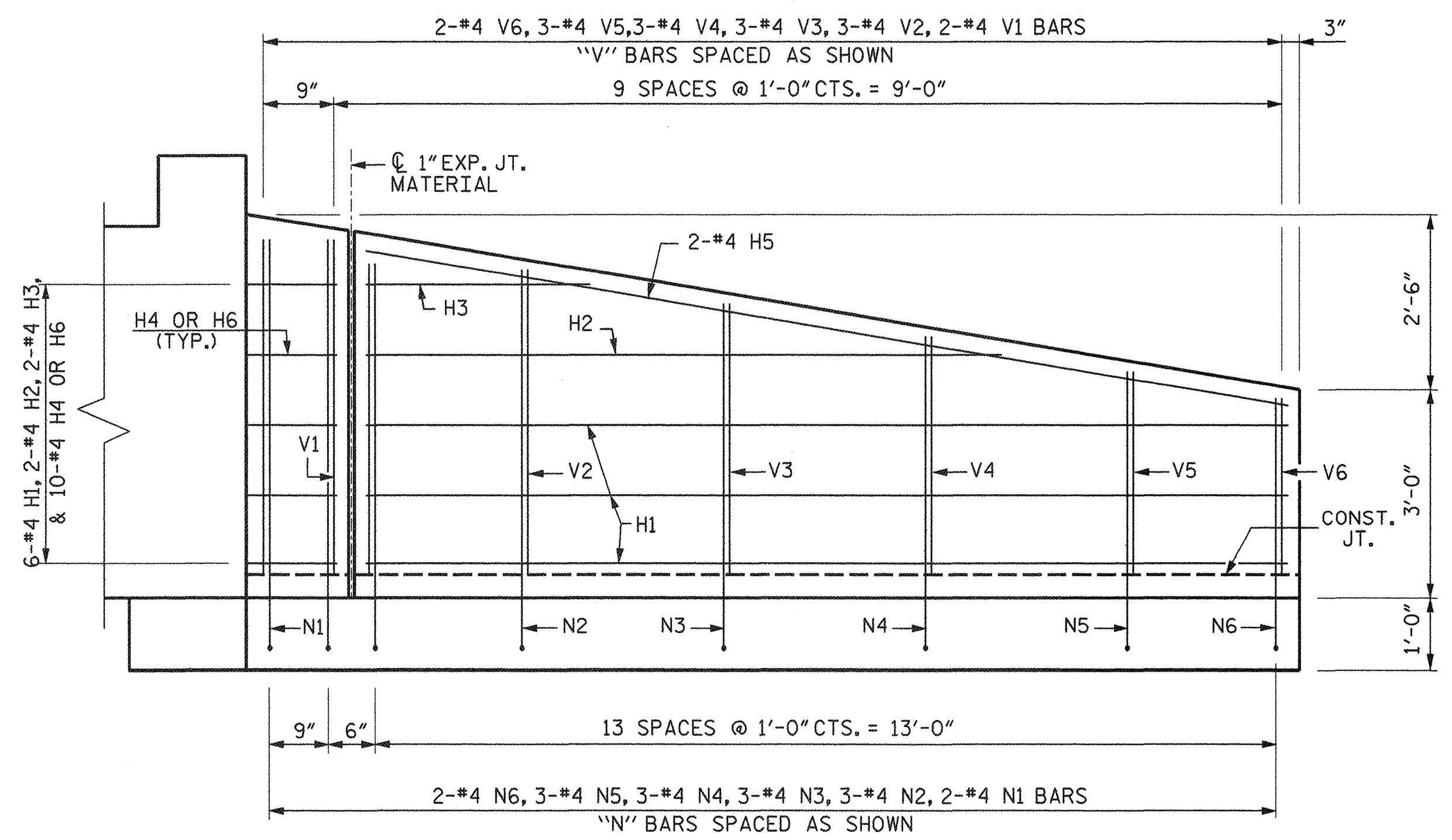
ASSEMBLED BY: SF DATE: 12/06
 CHECKED BY: HLW DATE: 12/06
 DRAWN BY: CCJ 11/99
 CHECKED BY: RWW 03/00



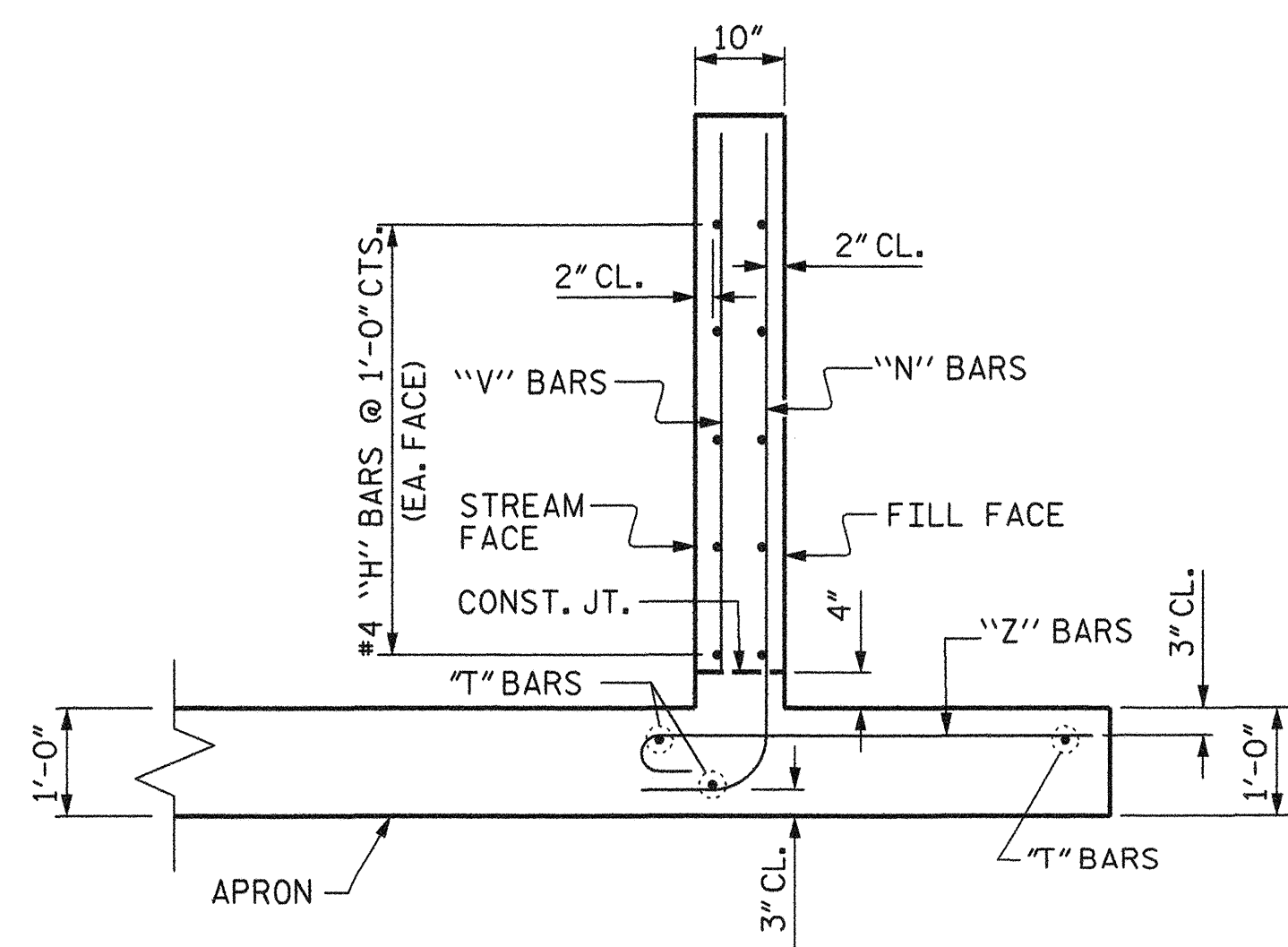
PLAN - W3 WING



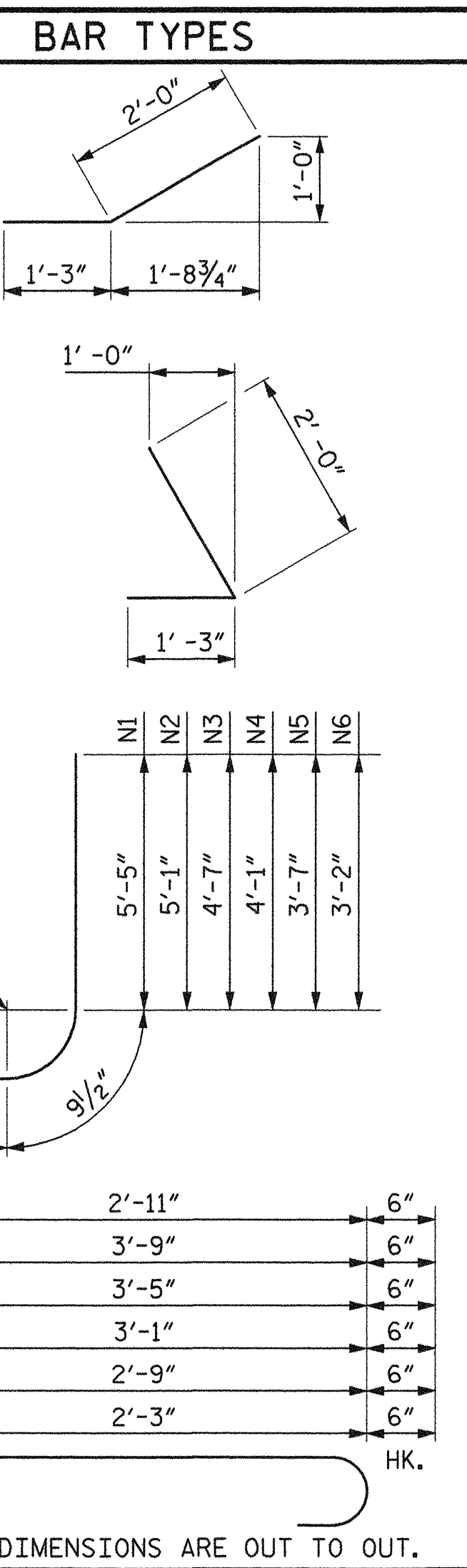
PLAN - W4 WING



ELEVATION - W3 & W4



TYPICAL WING SECTION

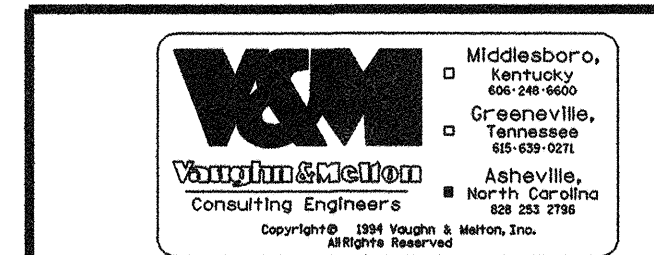
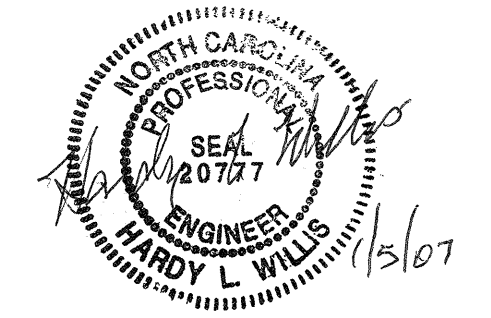


BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR	13'-2"	106
H2	4	#4	STR	9'-6"	25
H3	4	#4	STR	3'-6"	9
H4	20	#4	①	3'-3"	43
H5	4	#4	STR	13'-3"	35
H6	20	#4	②	3'-3"	43
N1	4	#4	③	7'-4"	20
N2	6	#4	③	7'-0"	28
N3	6	#4	③	6'-6"	26
N4	6	#4	③	6'-0"	24
N5	6	#4	③	5'-6"	22
N6	4	#4	③	5'-1"	14
T1	1	#5	STR	16'-5"	17
T2	2	#5	STR	17'-1"	36
T3	3	#5	STR	16'-10"	53
V1	4	#4	STR	5'-1"	14
V2	6	#4	STR	4'-9"	19
V3	6	#4	STR	4'-3"	17
V4	6	#4	STR	3'-9"	15
V5	6	#4	STR	3'-3"	13
V6	4	#4	STR	2'-10"	8
Z1	1	#4	④	3'-5"	2
Z2	6	#4	④	4'-3"	17
Z3	6	#4	④	3'-11"	16
Z4	6	#4	④	3'-7"	14
Z5	6	#4	④	3'-3"	13
Z6	8	#4	④	2'-9"	15

REINFORCING STEEL FOR WINGS W3 & W4		664 LBS
CLASS A CONCRETE WINGS W3 & W4		7.5 CY
1 HEADWALL		0.9 CY
1 APRON		7.5 CY
1 END CURTAIN WALL		0.6 CY
TOTAL		16.5 CY

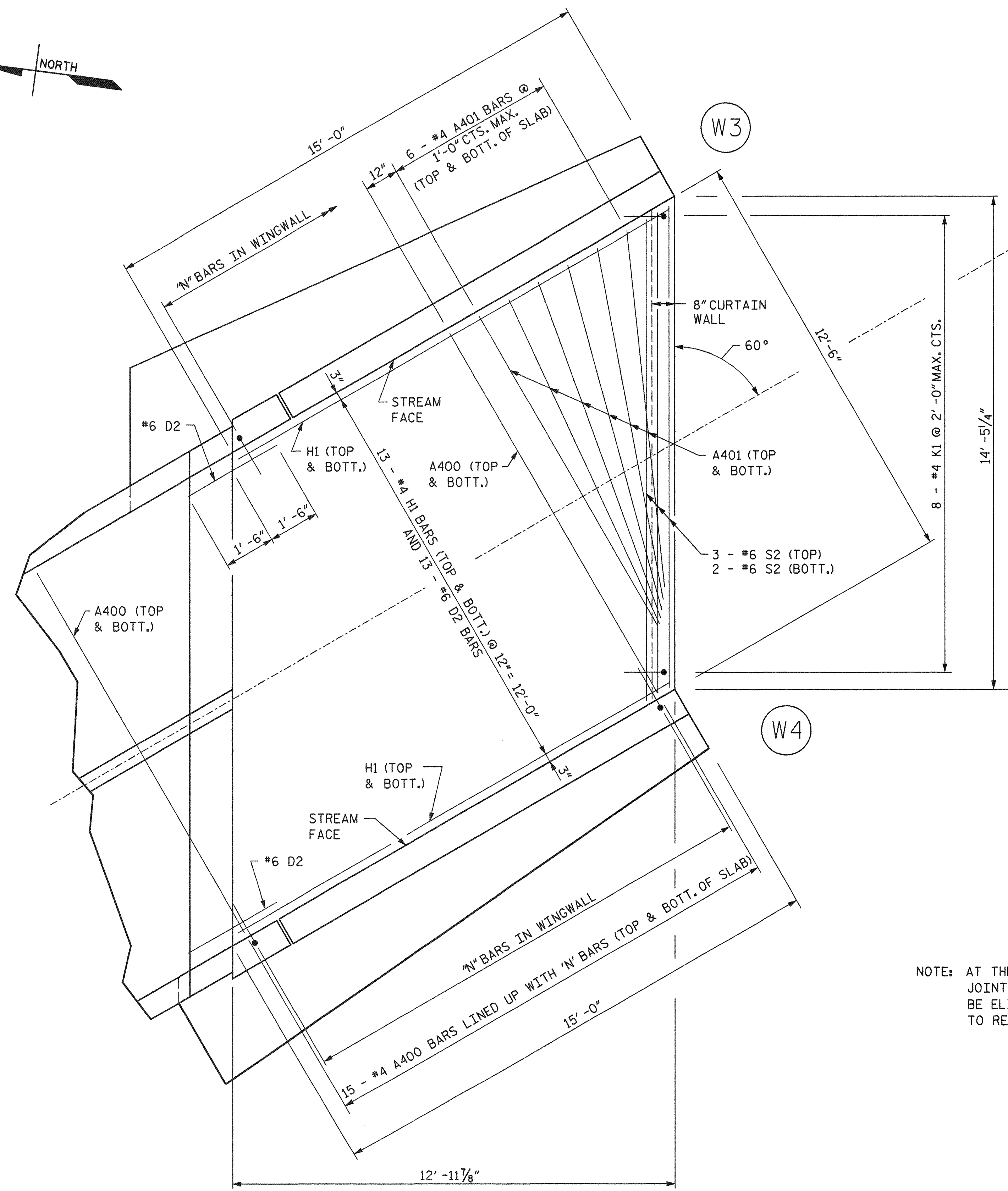
NOTE:
THESE WING DETAILS APPLY TO WINGS ON RIGHT EXTENSION (W3 & W4).

PROJECT NO. WBS 37840
McDOWELL COUNTY
STATION: 43+15.57 -L-



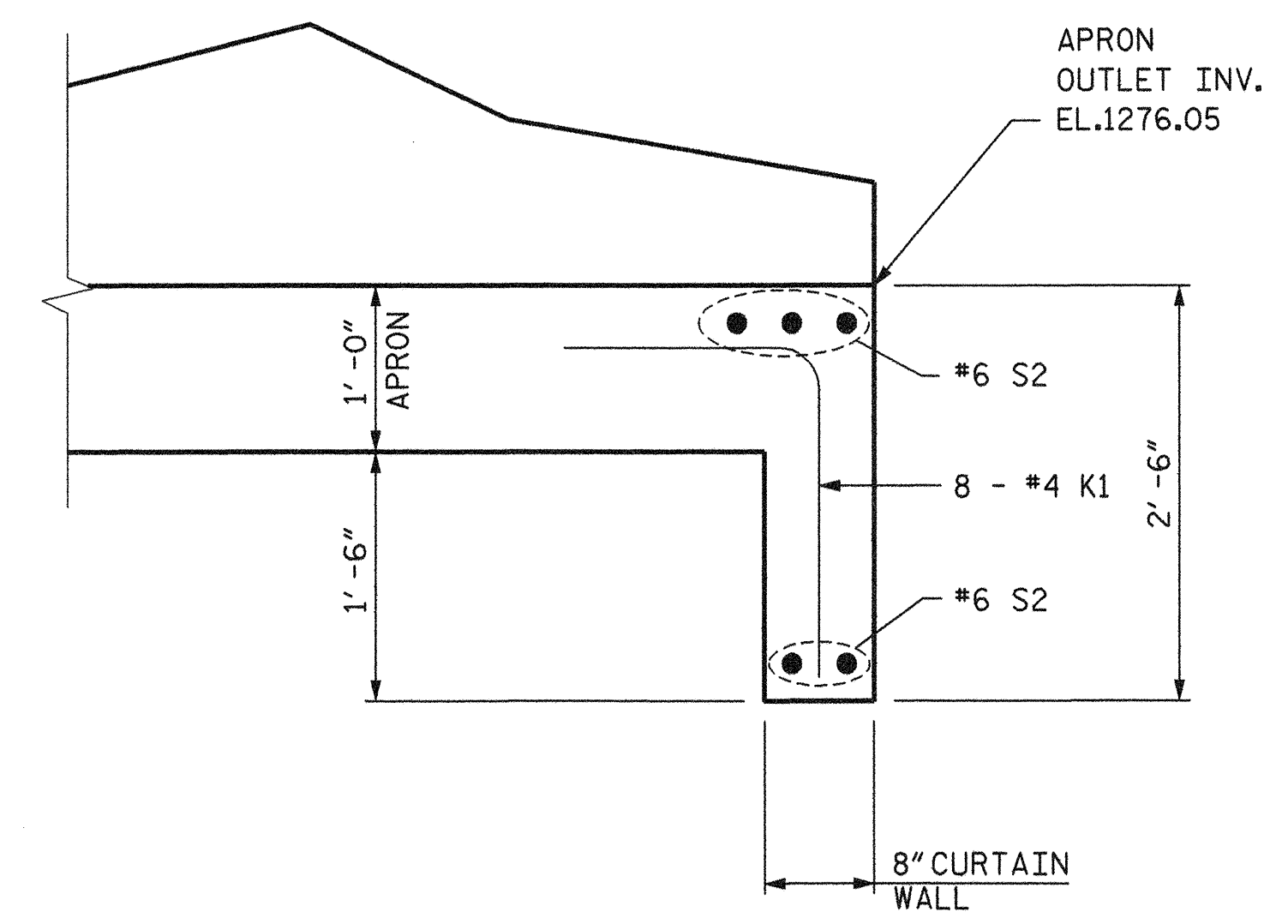
DRAWN BY: SF DATE: DEC. 2006
CHECKED BY: HLW DATE: DEC. 2006

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		WINGS W3 AND W4 DETAILS	
DECEMBER 2006		SHEET NO. S-9	
REVISIONS			
NO.	BY:	DATE:	DATE:
1			
2			
TOTAL SHEETS 13			

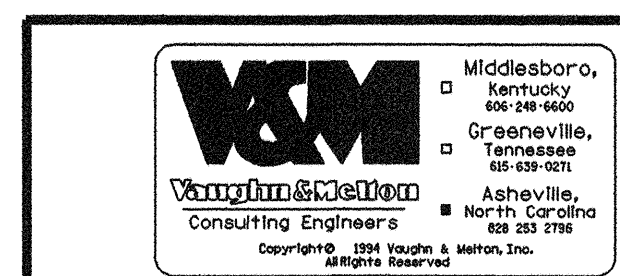


PLAN OF APRON SLAB (RIGHT EXTENSION)

NOTE: AT THE CONTRACTOR'S OPTION THE VERTICAL CONSTRUCTION JOINT BETWEEN THE OUTLET WINGS AND THE BARREL MAY BE ELIMINATED AND THE 'C' BARS IN THE BARREL MAY BE EXTENDED TO REPLACE THE 'D' AND 'H' BARS IN THE WINGS AND SLAB.



APRON SECTION



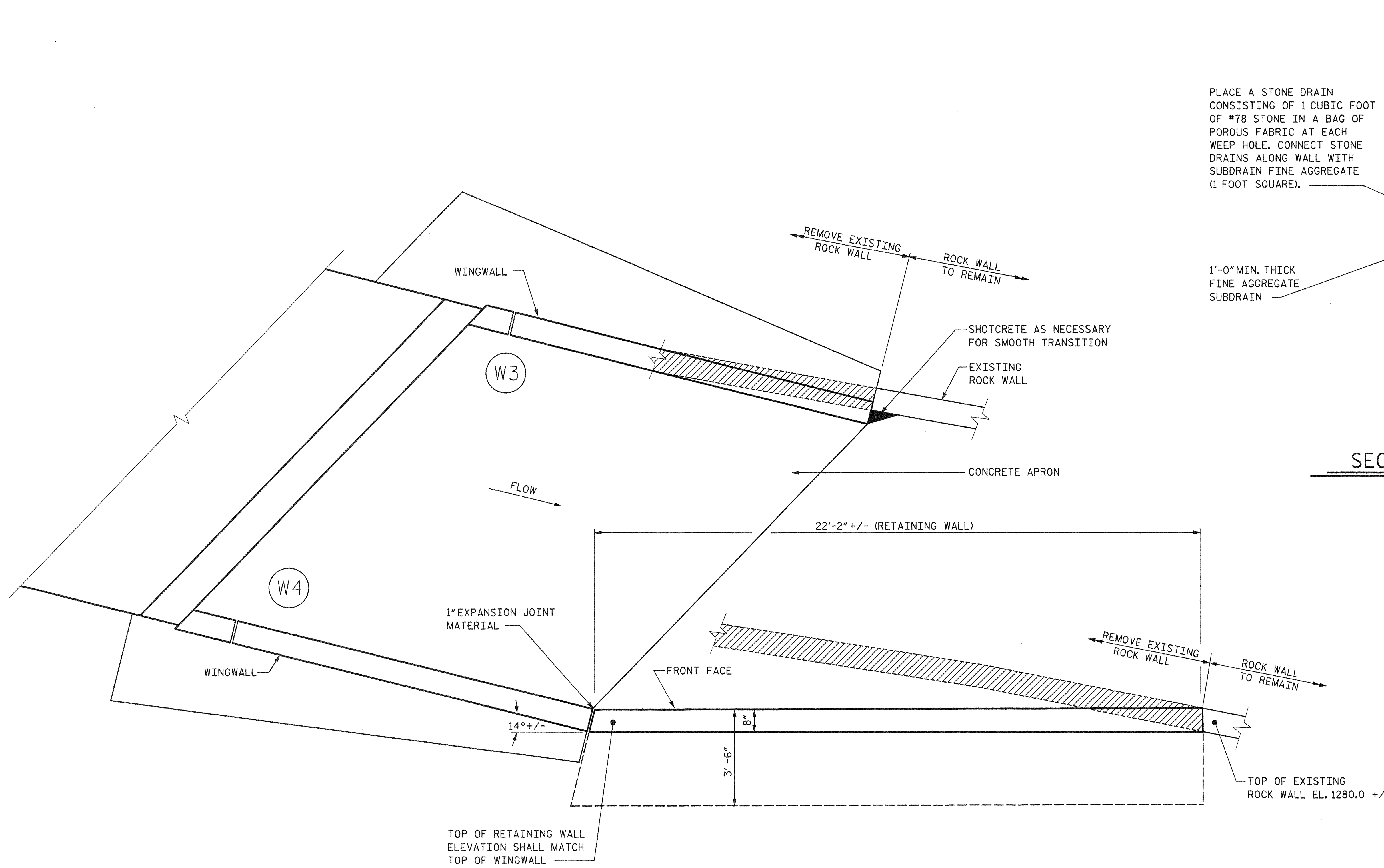
DRAWN BY: SF DATE: DEC. 2006
 CHECKED BY: HLW DATE: DEC. 2006

PROJECT NO. WBS 37840
McDOWELL COUNTY
 STATION: 43+15.57 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**DOUBLE 6 FT. X 4.5 FT.
 CONCRETE BOX CULVERT
 60° SKEW
 RIGHT EXTENSION**

DECEMBER 2006

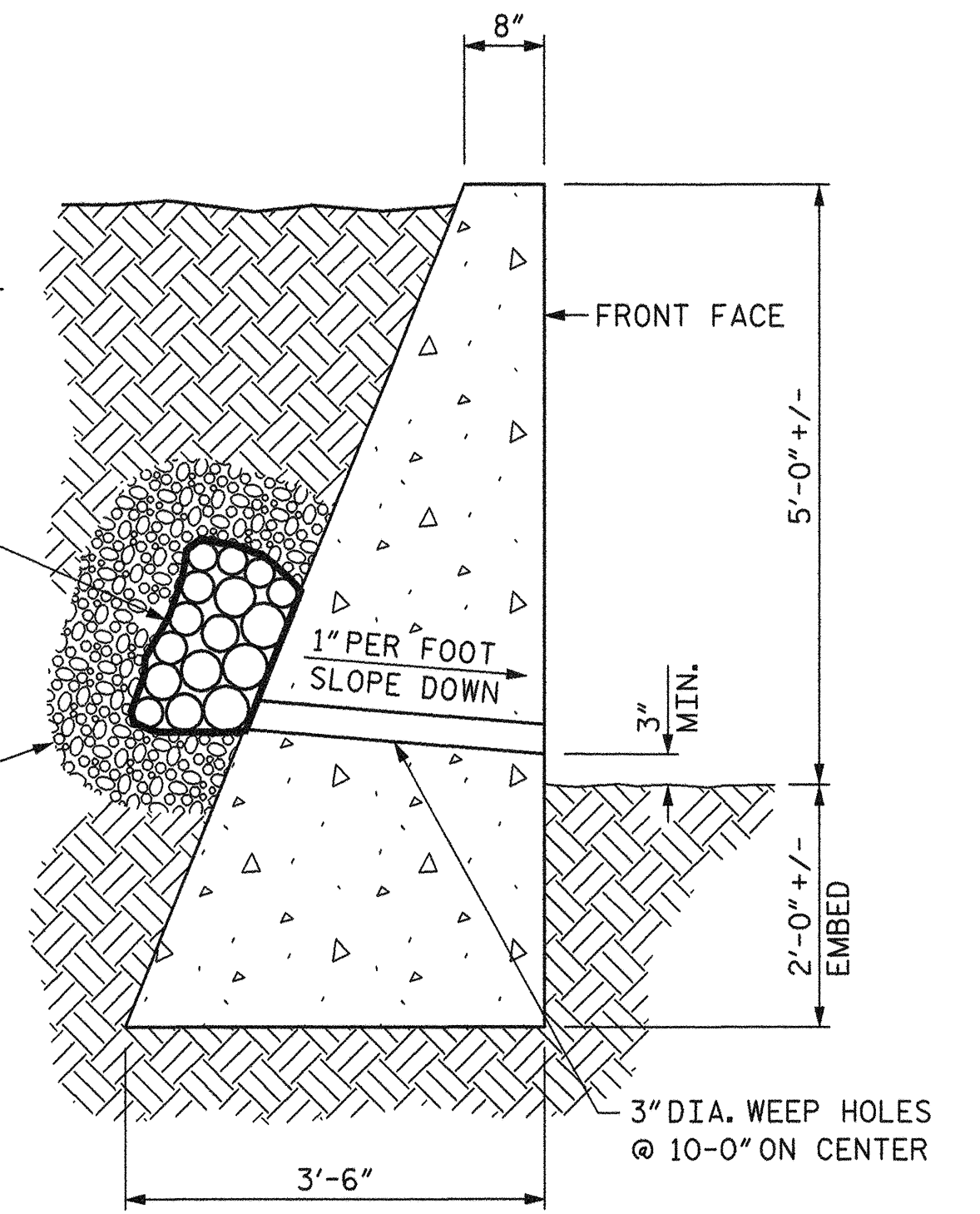
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10	TOTAL SHEETS
1			3				13
2			4				



PLAN - RETAINING WALL

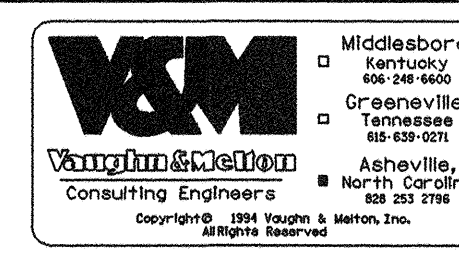
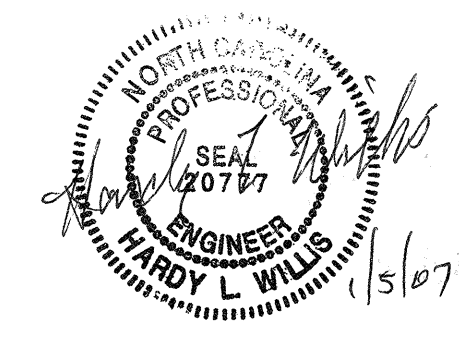
PLACE A STONE DRAIN CONSISTING OF 1 CUBIC FOOT OF #78 STONE IN A BAG OF POROUS FABRIC AT EACH WEEP HOLE. CONNECT STONE DRAINS ALONG WALL WITH SUBDRAIN FINE AGGREGATE (1 FOOT SQUARE).

1'-0" MIN. THICK FINE AGGREGATE SUBDRAIN



SECTION - RETAINING WALL

PROJECT NO. WBS 37840
McDOWELL COUNTY
 STATION: 43+15.57 -L-

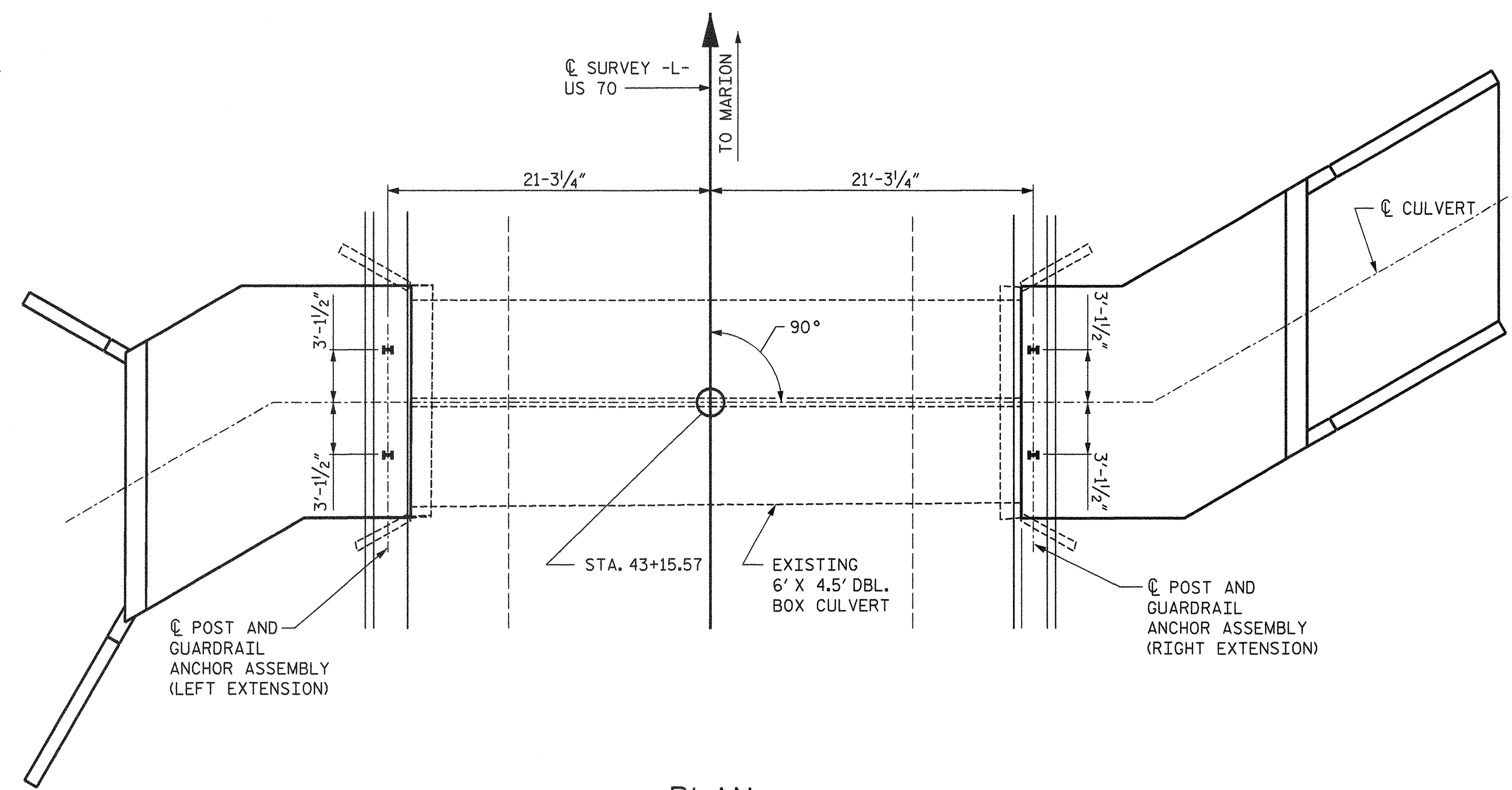


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**DOUBLE 6 FT. X 4.5 FT.
 CONCRETE BOX CULVERT
 60° SKEW
 RIGHT EXTENSION**

DECEMBER 2006

DRAWN BY: SF DATE: DEC. 2006
 CHECKED BY: HLW DATE: DEC. 2006

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



PLAN

SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING.

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 2 1/2".
 - B. 4 - 1" Ø X 2 1/4" BOLTS WITH WASHERS, BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1" Ø X 2 1/4" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
 - C. WIRE STRUTS SHOWN IN THE "GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS" DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 3/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO ENSURE 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.

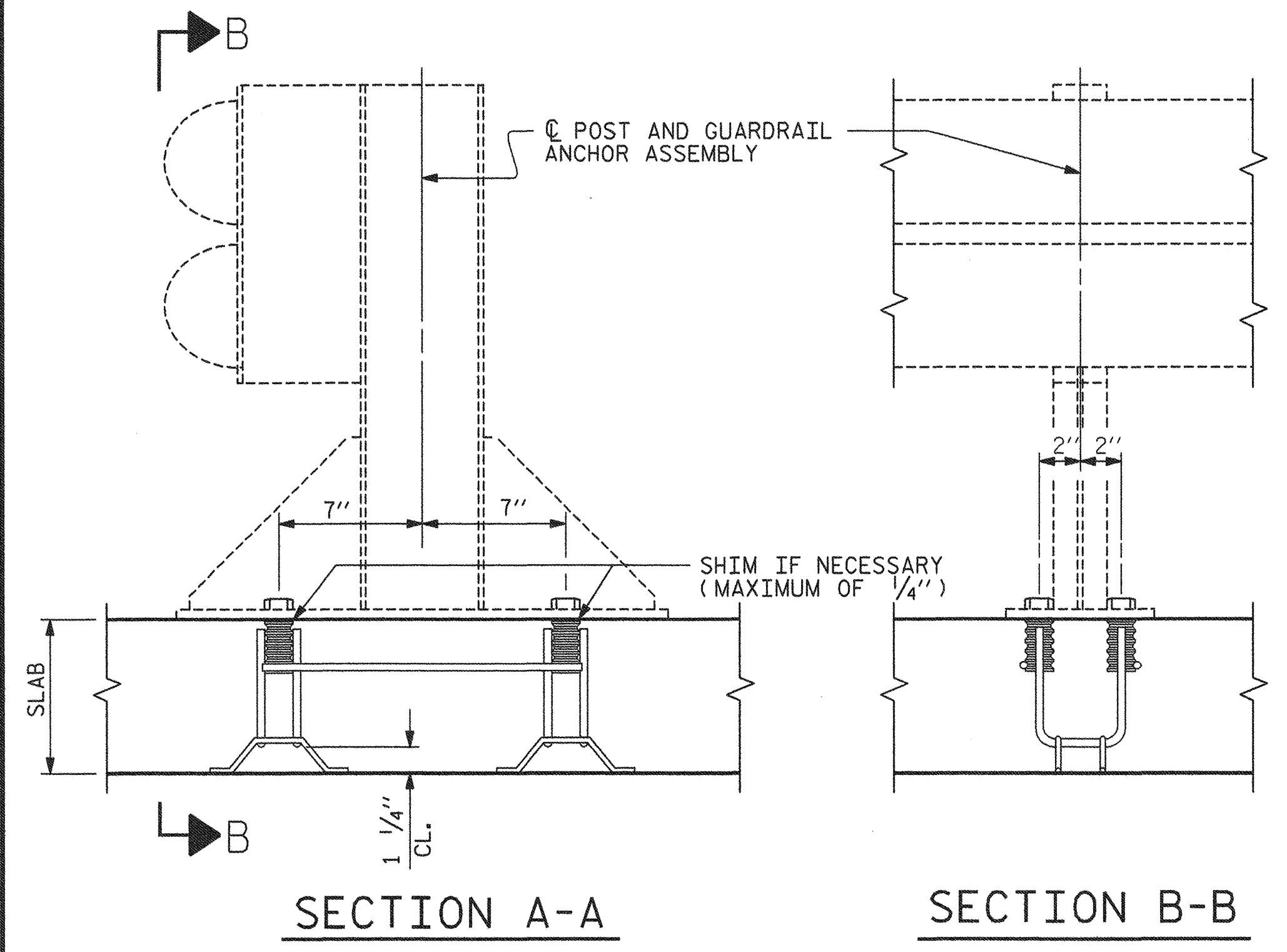
FERRULES SHALL BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

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.

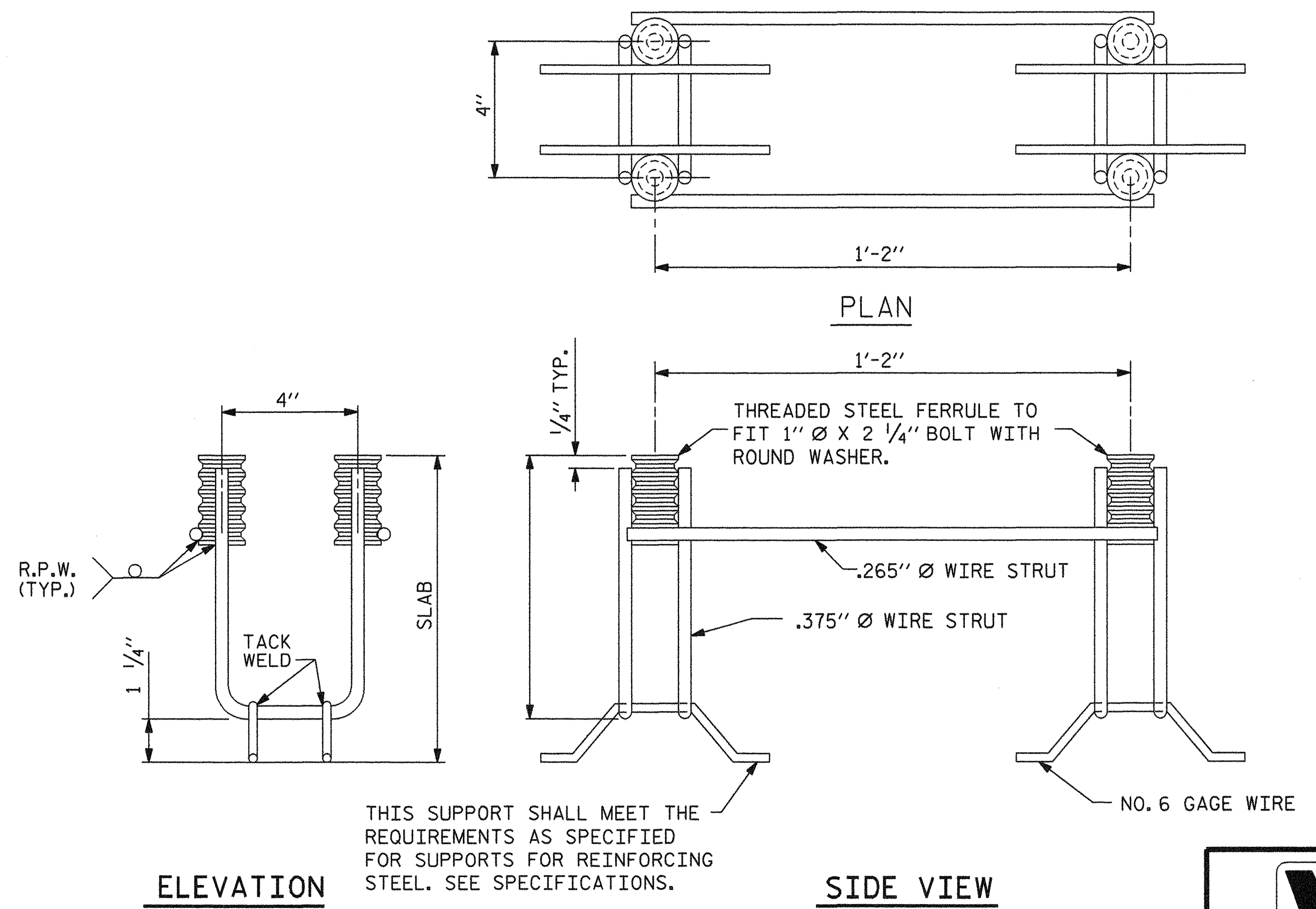
SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. THE YIELD LOAD OF THE 1" Ø BOLT SHALL BE 21.8 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS REQUIRED. ~~SEE SPECIAL PROVISIONS FOR "ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS".~~



SECTION A-A

SECTION B-B



ELEVATION

SIDE VIEW

THIS SUPPORT SHALL MEET THE REQUIREMENTS AS SPECIFIED FOR SUPPORTS FOR REINFORCING STEEL. SEE SPECIFICATIONS.

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

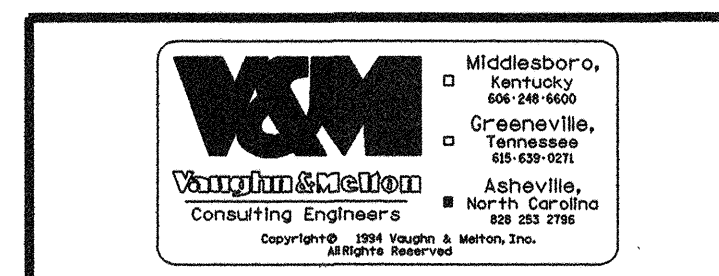


PROJECT NO. WBS 37840
McDOWELL COUNTY
 STATION: 43+15.57 -L-

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

DECEMBER 2006

ASSEMBLED BY : SF	DATE : JULY 2004
CHECKED BY : HLW	DATE : JULY 2004
DRAWN BY : FCJ	REV. 8/16/99 RAL/LES
CHECKED BY : ARB	6/88 REV. 7/10/01 LES/RDR
	REV. 5/7/03 RWW/JTE



DRAWN BY: SF DATE: DEC. 2006
 CHECKED BY: HLW DATE: DEC. 2006

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

TOTAL SHEETS 13

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

DOWELS:

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

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

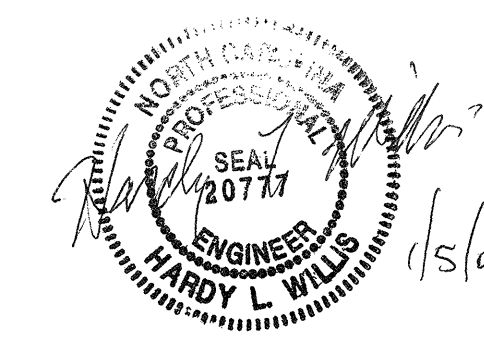
HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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



ENGLISH

JANUARY, 1990

STD. NO. SN