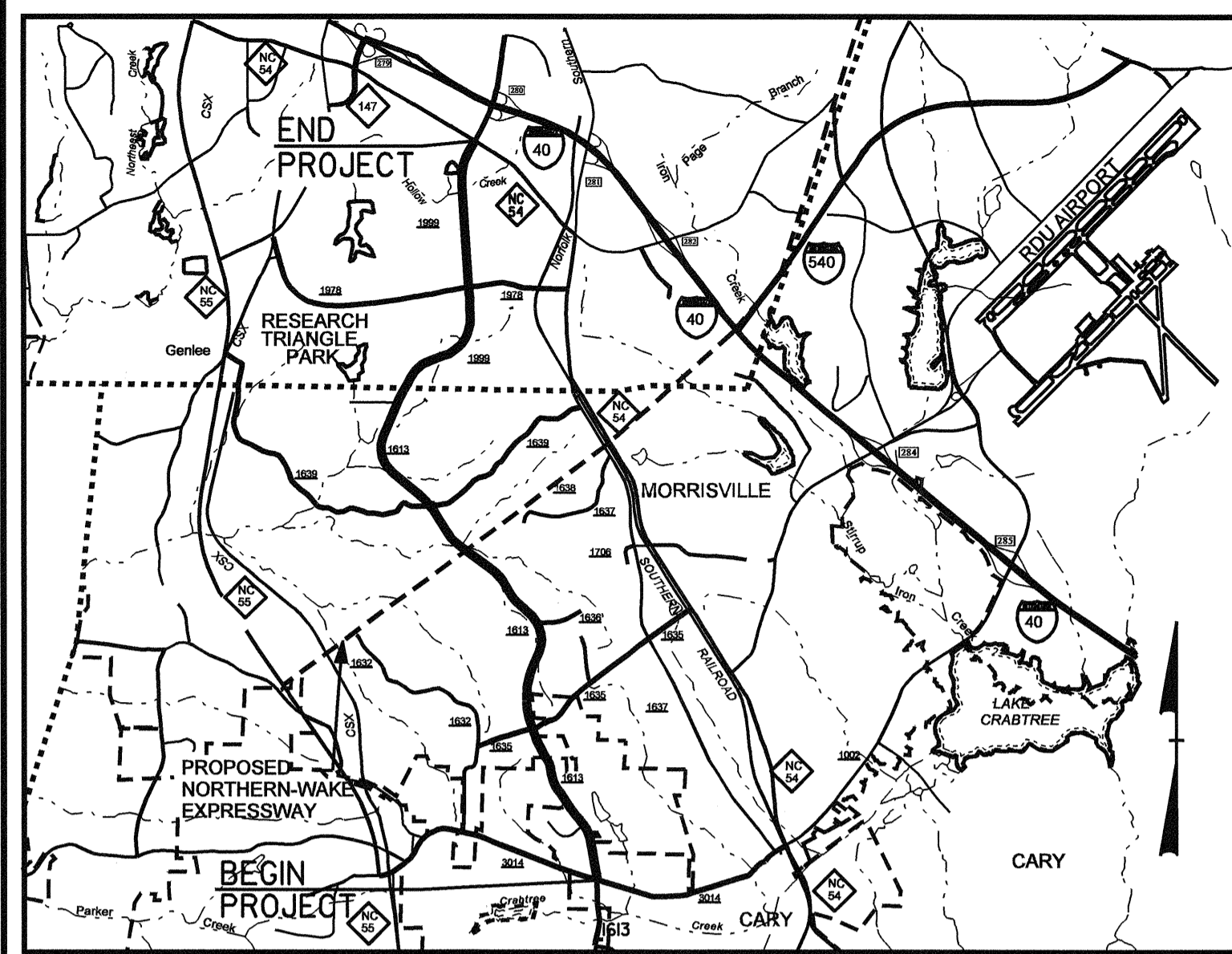


CONTRACT: C200840 **TIP PROJECT: U-4026**

STRUCTURES

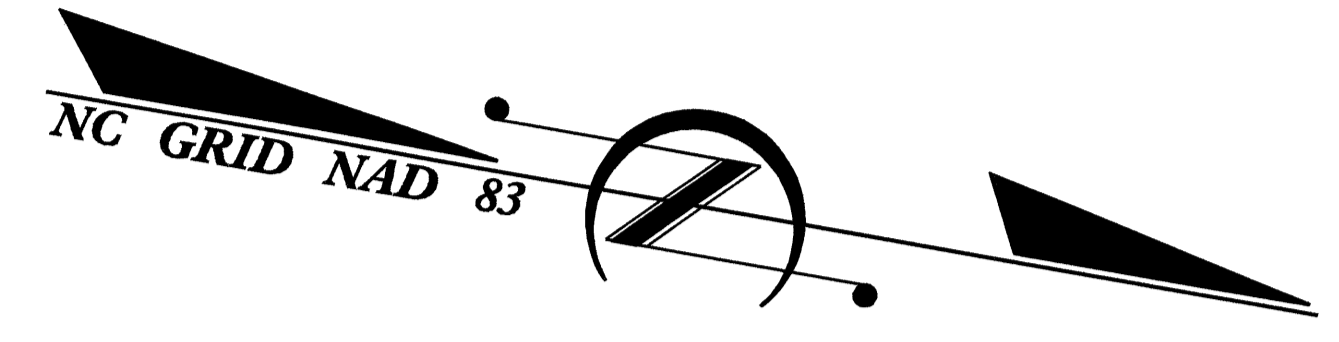


VICINITY MAP

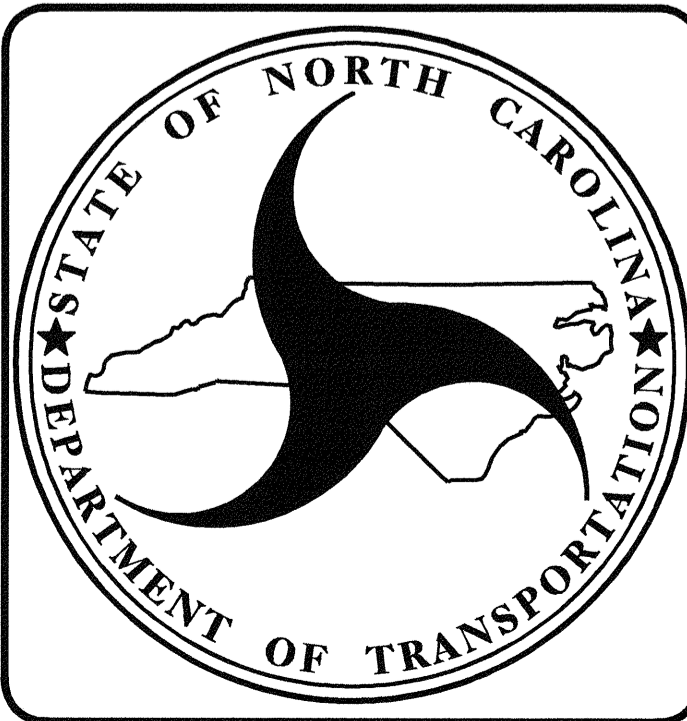
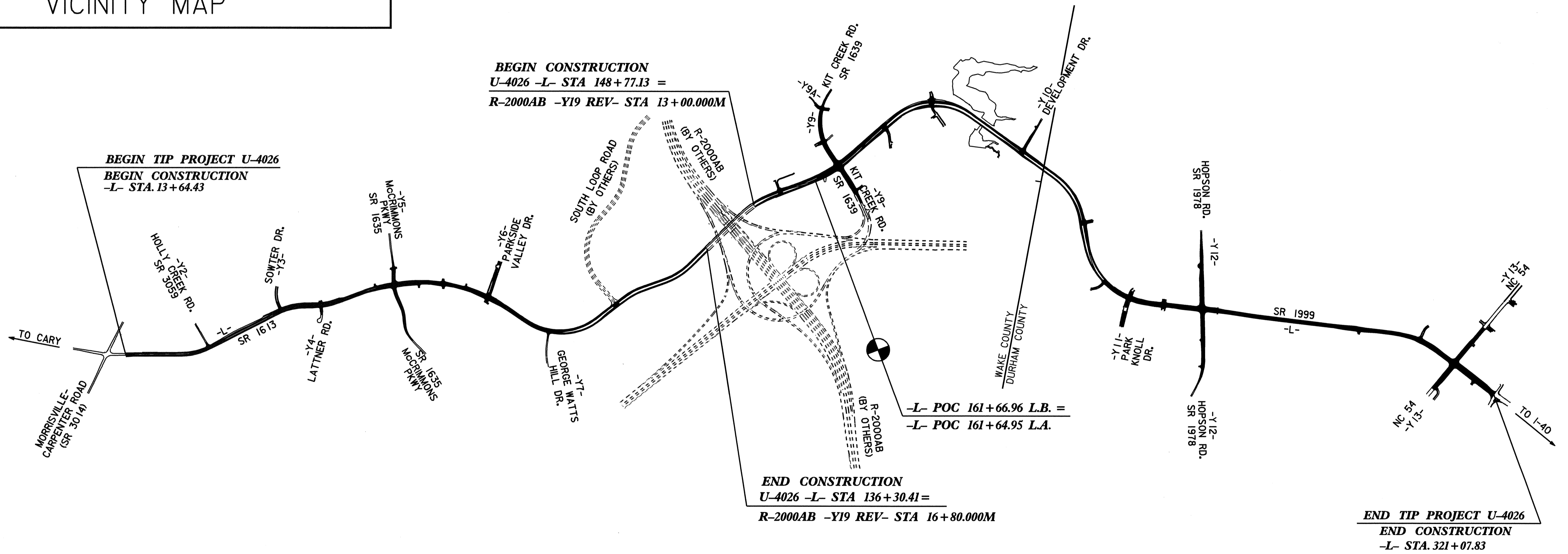
STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

WAKE-DURHAM COUNTIES

LOCATION: DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF MORRISVILLE-CARPENTER ROAD (SR 3014) TO NC 54
TYPE OF WORK: GRADING, DRAINAGE, PAVING, CULVERTS, RETAINING WALL AND SIGNALS.



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4026		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
35018.1.1		P.E.	
35018.2.1		RW	
35018.3.1		CONST.	



DESIGN DATA

ADT (2004)=	24155
ADT (2024)=	45055
DHV =	12 %
D =	65 %
T =	4 % *
V =	55 MPH (SHLD)
	= 50 MPH (C&G)
* TTST	1 % DUAL 3 %

PROJECT LENGTH

TOTAL LENGTH TIP PROJECT U-4026	=	5.587 MI.
---------------------------------	---	-----------

Prepared In the Office of:
DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS LETTING DATE: DECEMBER 19, 2006	JOHN C. FRYE, PE PROJECT ENGINEER BRIAN C. HANKS, PE PROJECT DESIGN ENGINEER
--	---

STRUCTURE DESIGN UNIT
 1000 BIRCH RIDGE DR.
 RALEIGH, NC 27610

Gregory R. PerfeTTi
10-24-06

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

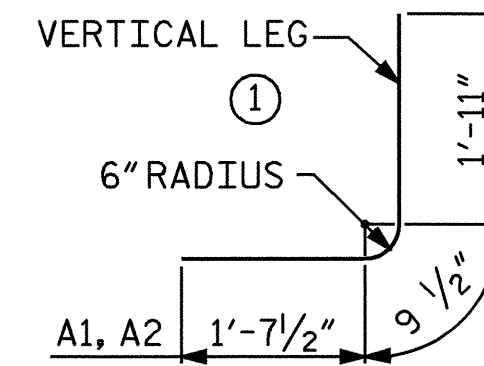
P.E.
STATE DESIGN ENGINEER
DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
APPROVED DIVISION ADMINISTRATOR
DATE

BM#11 : "X" CUT IN SE CORNER OF CONCRETE RETAINING WALL 325.31' LT. OF STA. 188+61.78 -L- ELEV. = 300.29

BILL OF MATERIAL

BAR	NO	SIZE	TYPE	LENGTH	WEIGHT
A1	212	4	1	4'-4"	614
A2	212	4	1	4'-4"	614
A100	91	4	STR	15'-7"	947
A200	85	4	STR	15'-7"	885
A300	106	5	STR	15'-7"	1723
A400	106	5	STR	15'-7"	1723
B1	106	4	STR	7'-3"	513
B2	212	4	STR	5'-4"	755
B3	106	4	STR	7'-3"	513
C1	148	4	STR	27'-5"	2711
D1	28	6	STR	2'-6"	105
G1	4	5	STR	15'-8"	65

REINFORCING STEEL LBS. 11,168



BAR TYPE

BAR DIMENSIONS ARE OUT TO OUT

SPLICE LENGTHS CHART

BAR	SIZE	SPLICE LENGTH
A200	4	1'-9"
A400	5	1'-9"
B1	4	1'-9"
B3	4	1'-9"
C1	4	1'-11"

--- NOTES ---

ASSUMED LIVE LOAD -----HS20-44 OR ALTERNATE LOADING.

DESIGN FILL ----- 15.00'

FOR OTHER DESIGN DATA AND GENERAL NOTES SEE SHEET SN.

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 WALLS AND BOTH FACES OF INTERIOR WALL 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.

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

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

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

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

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

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

ROADWAY DATA

GRADE POINT ELEV. @ STA 199+96.10 -L- = 287.830
 BED ELEV. @ STATION 199+96.10 -L- = 267.140
 ROADWAY SLOPES = 2:1

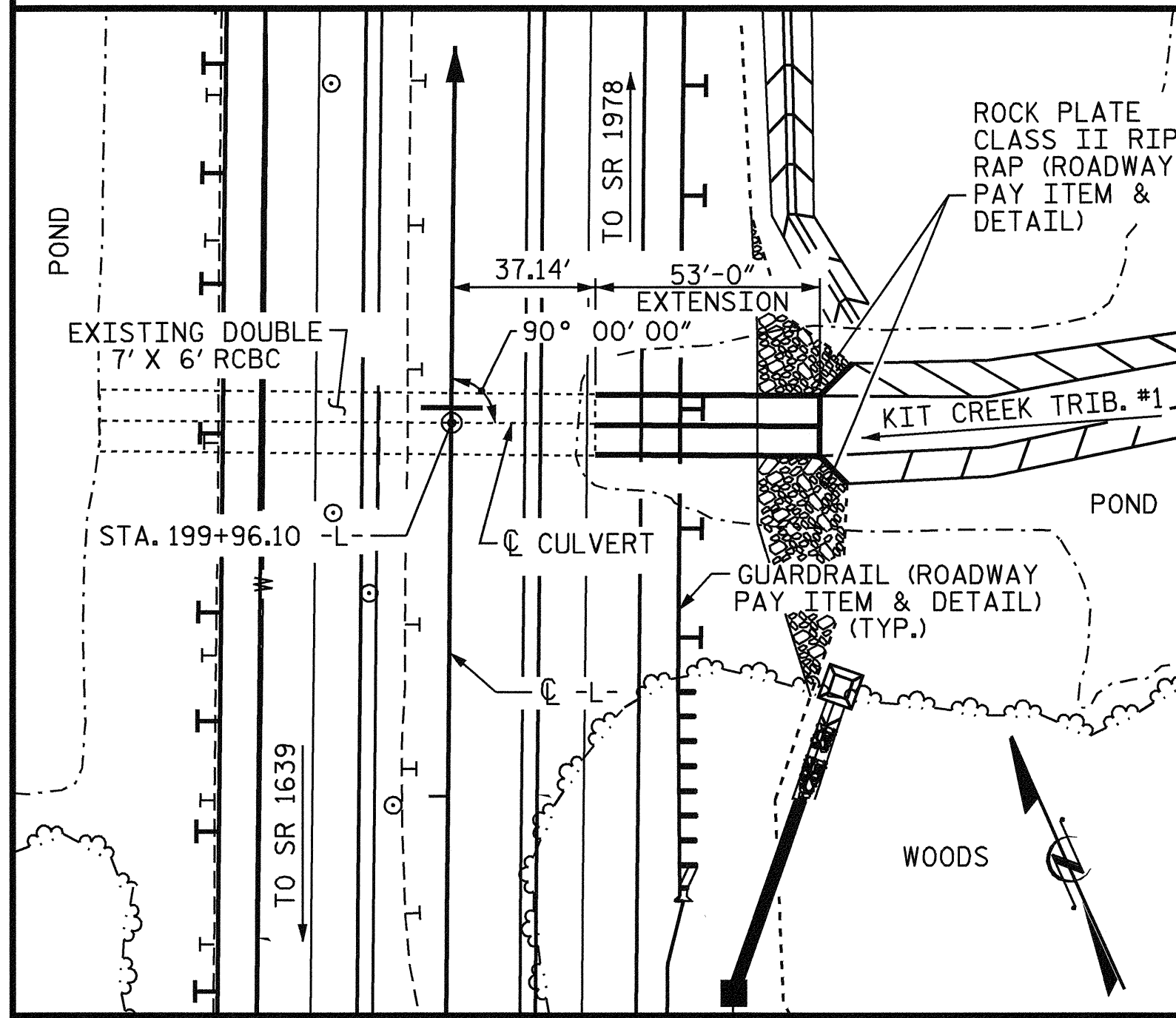
HYDRAULIC DATA

DESIGN DISCHARGE = 900 CFS
 FREQUENCY OF DESIGN FLOOD = 50 YEARS
 DESIGN HIGH WATER ELEVATION = 280.100
 DRAINAGE AREA = 629 ACRES
 BASIC DISCHARGE (Q100) = 1100 CFS
 BASIC HIGH WATER ELEVATION = 280.900

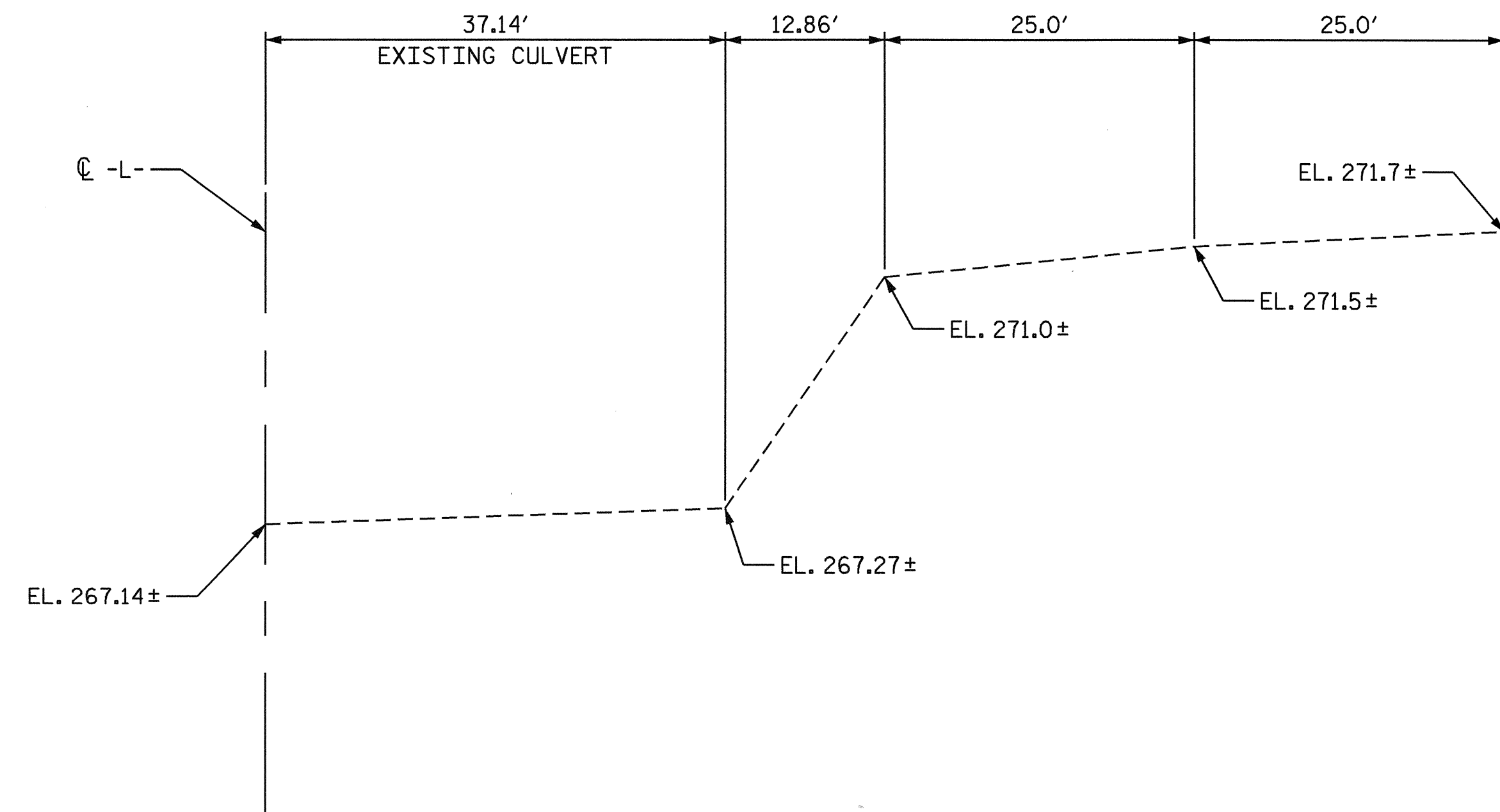
OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = +1400 CFS
 FREQUENCY OF OVERTOPPING FLOOD = +500 YEARS
 OVERTOPPING FLOOD ELEVATION = 284.100

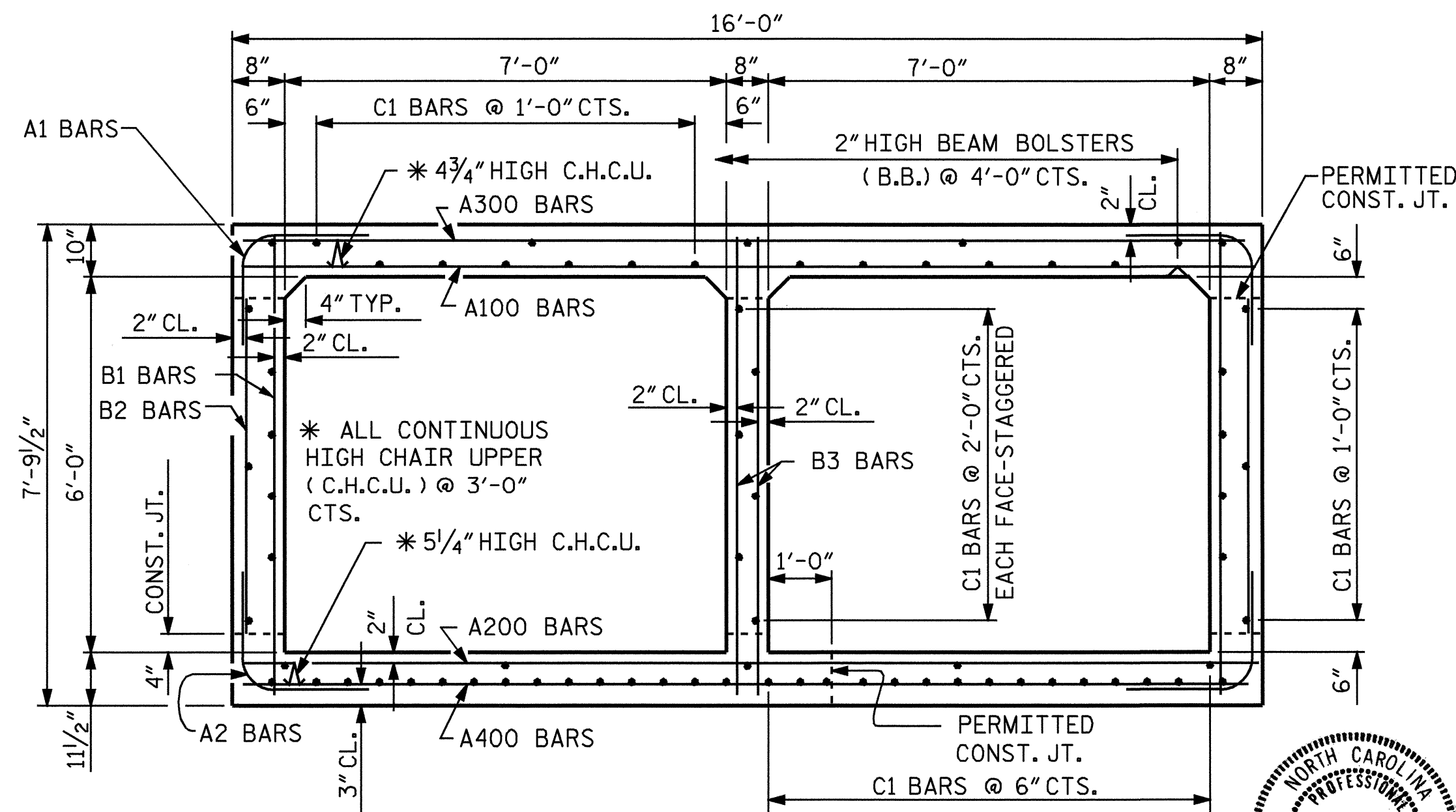
FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.



LOCATION SKETCH



PROFILE ALONG CULVERT



RIGHT ANGLE SECTION OF BARREL

THERE ARE 74 "C" BARS IN SECTION OF BARREL.

TOTAL STRUCTURE QUANTITIES

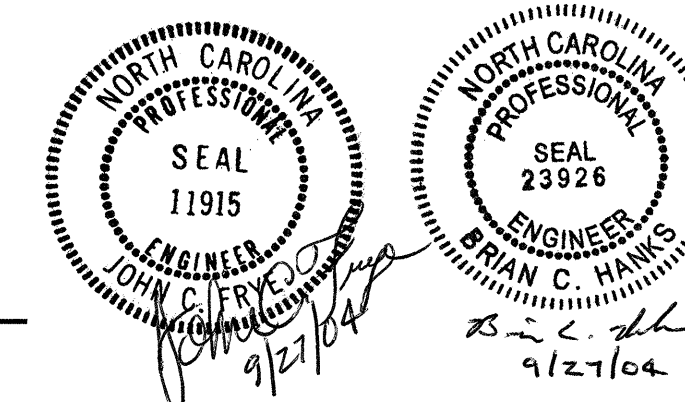
CLASS A CONCRETE		
BARREL @ 1.514 CY/FT	80.3	C.Y.
WINGS, ETC.	8.4	C.Y.
TOTAL	88.7	C.Y.
REINFORCING STEEL		
BARREL	11,168	LBS.
WINGS, ETC.	396	LBS.
TOTAL	11,564	LBS.
CULVERT EXCAVATION		LUMP SUM
FOUNDATION CONDITIONING MAT'L	60	TONS

PROJECT NO. U-4026
 WAKE - DURHAM COUNTY
 STATION: 199+96.10 -L-

SHEET 1 OF 3

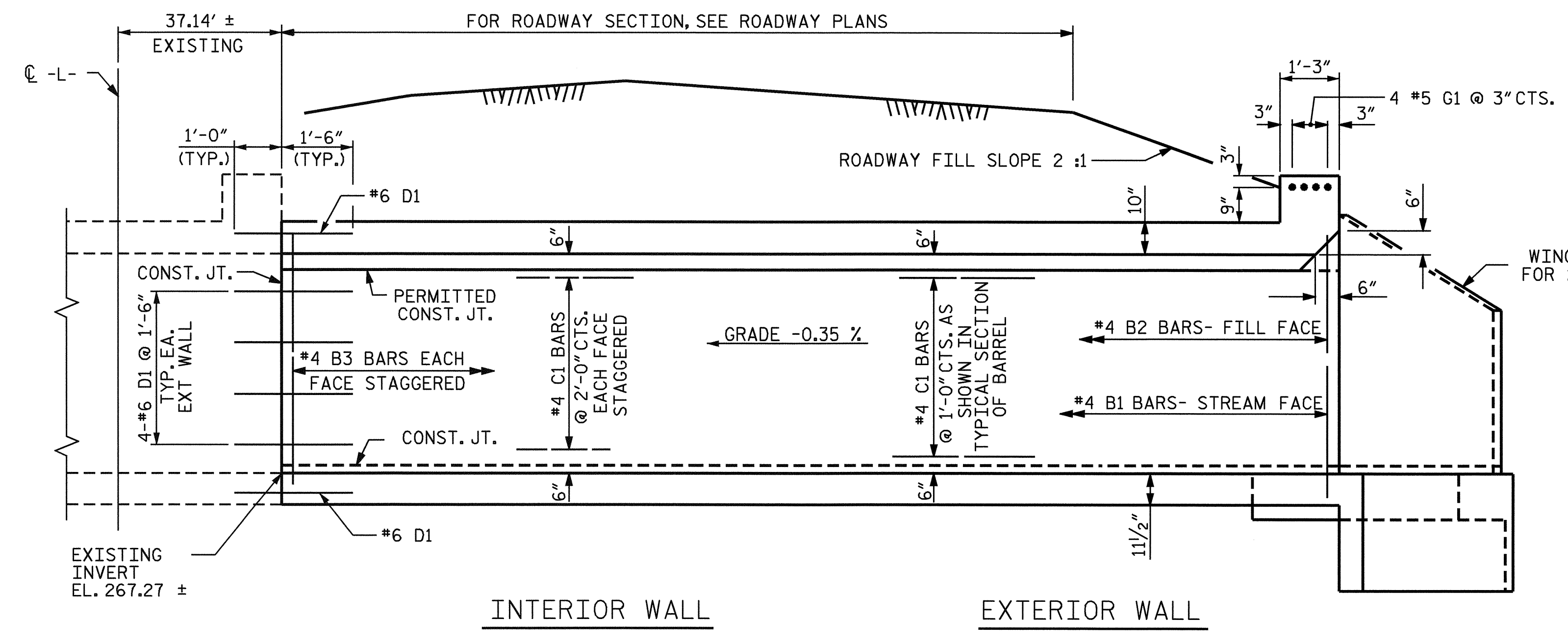
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 7 FT. X 6 FT.
 CONCRETE BOX CULVERT
 EXTENSION
 90° SKEW

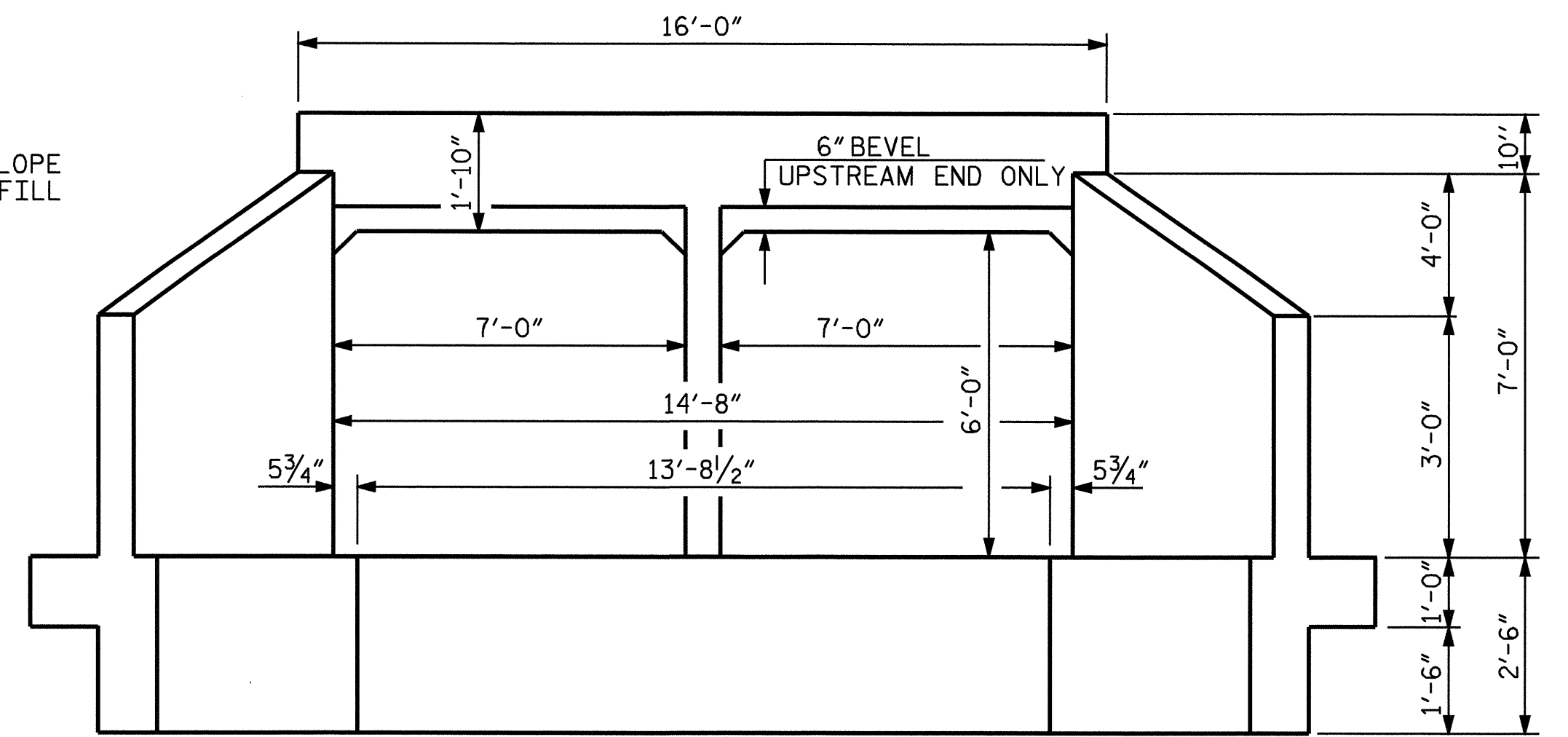


ASSEMBLED BY: Neil M. Ruffin DATE: 1/13/04
 CHECKED BY: J.L. WALTON DATE: 4/22/04

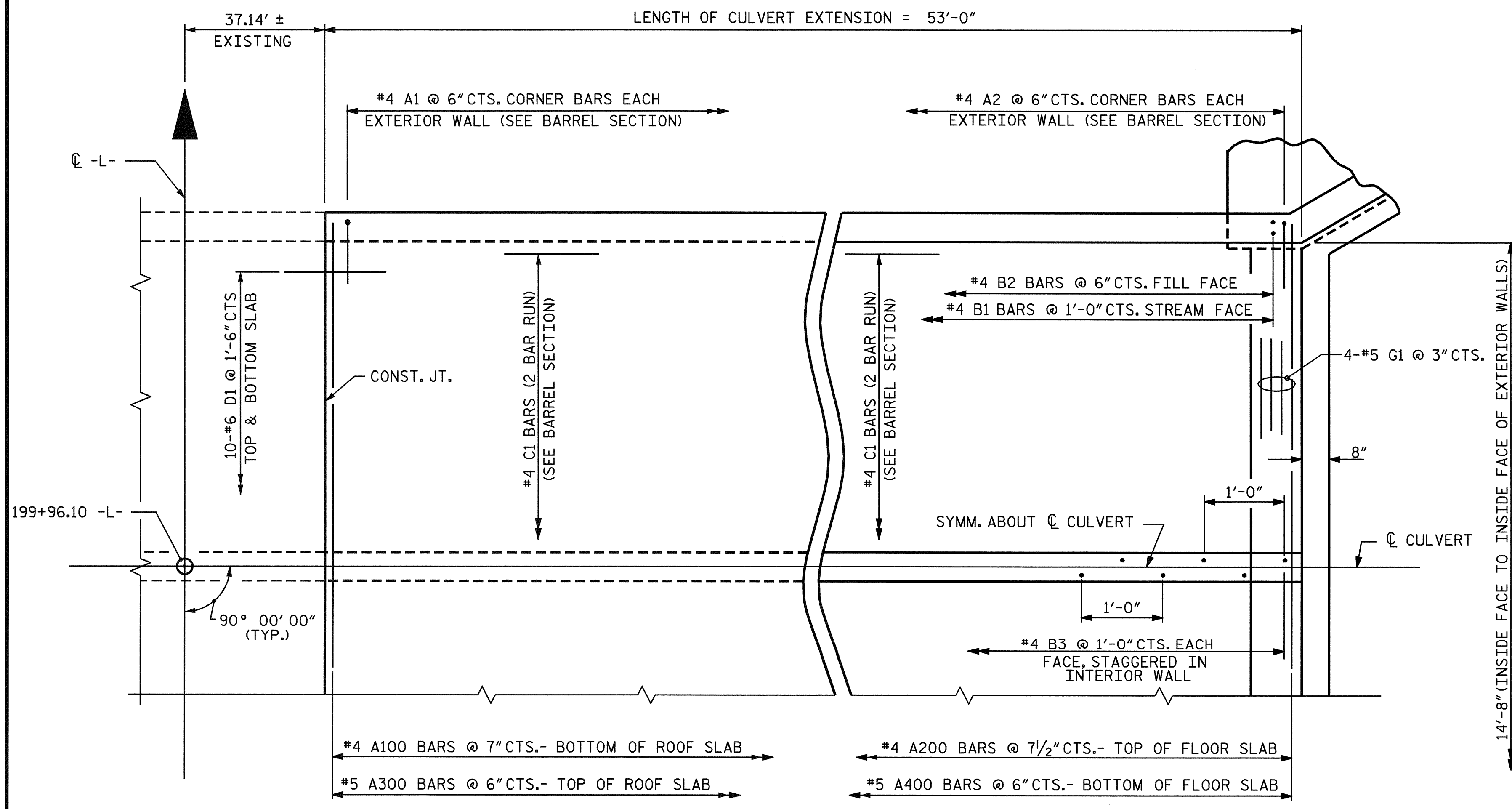
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-1
1			3			TOTAL SHEETS 15
2			4			



CULVERT SECTION NORMAL TO ROADWAY



END ELEVATION

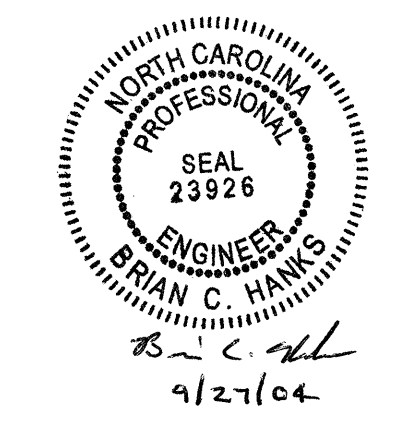


PART PLAN-ROOF SLAB

PART PLAN-FLOOR SLAB

PROJECT NO. U-4026
 WAKE - DURHAM COUNTY
 STATION: 199+96.10 -L-

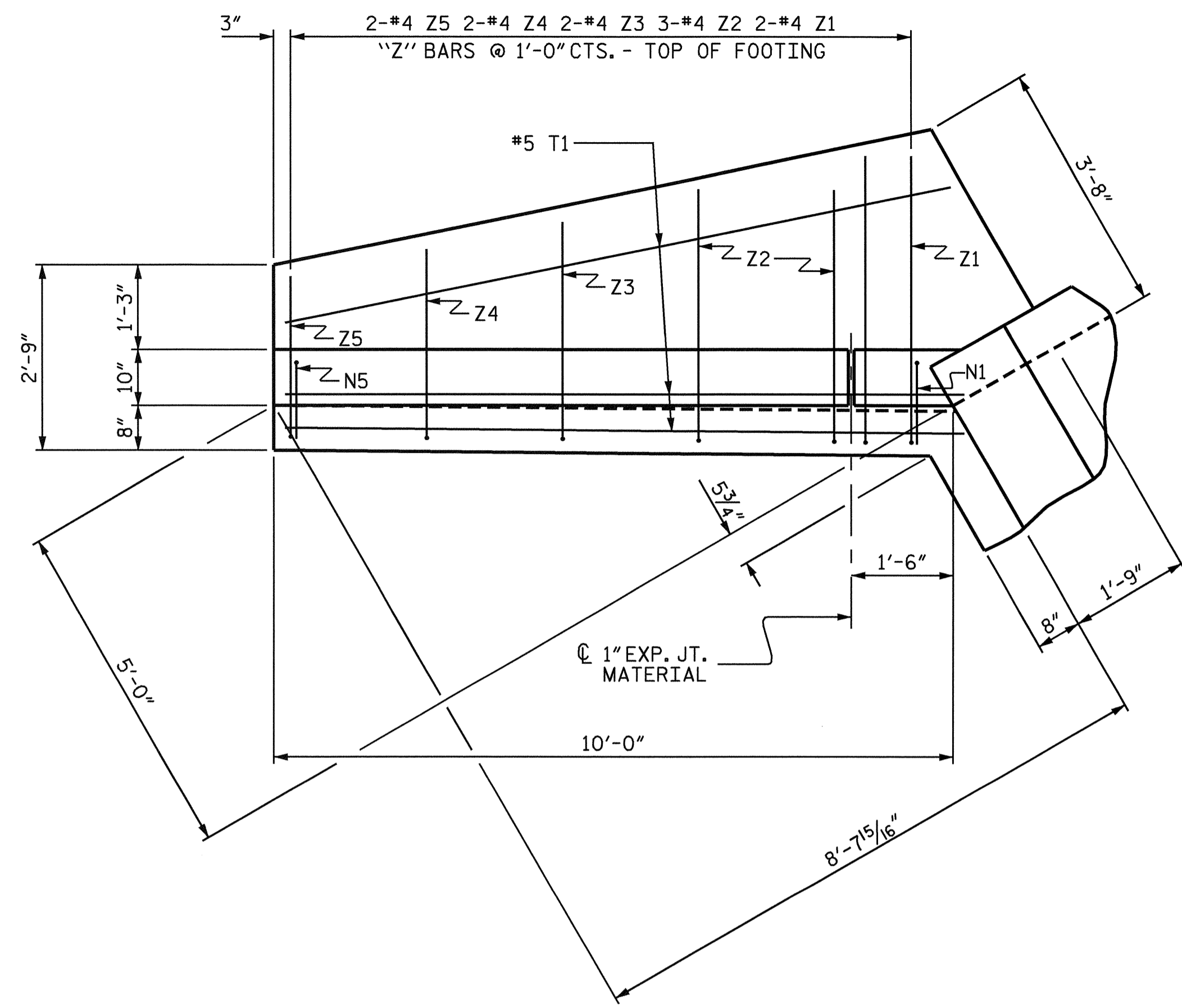
SHEET 2 OF 3



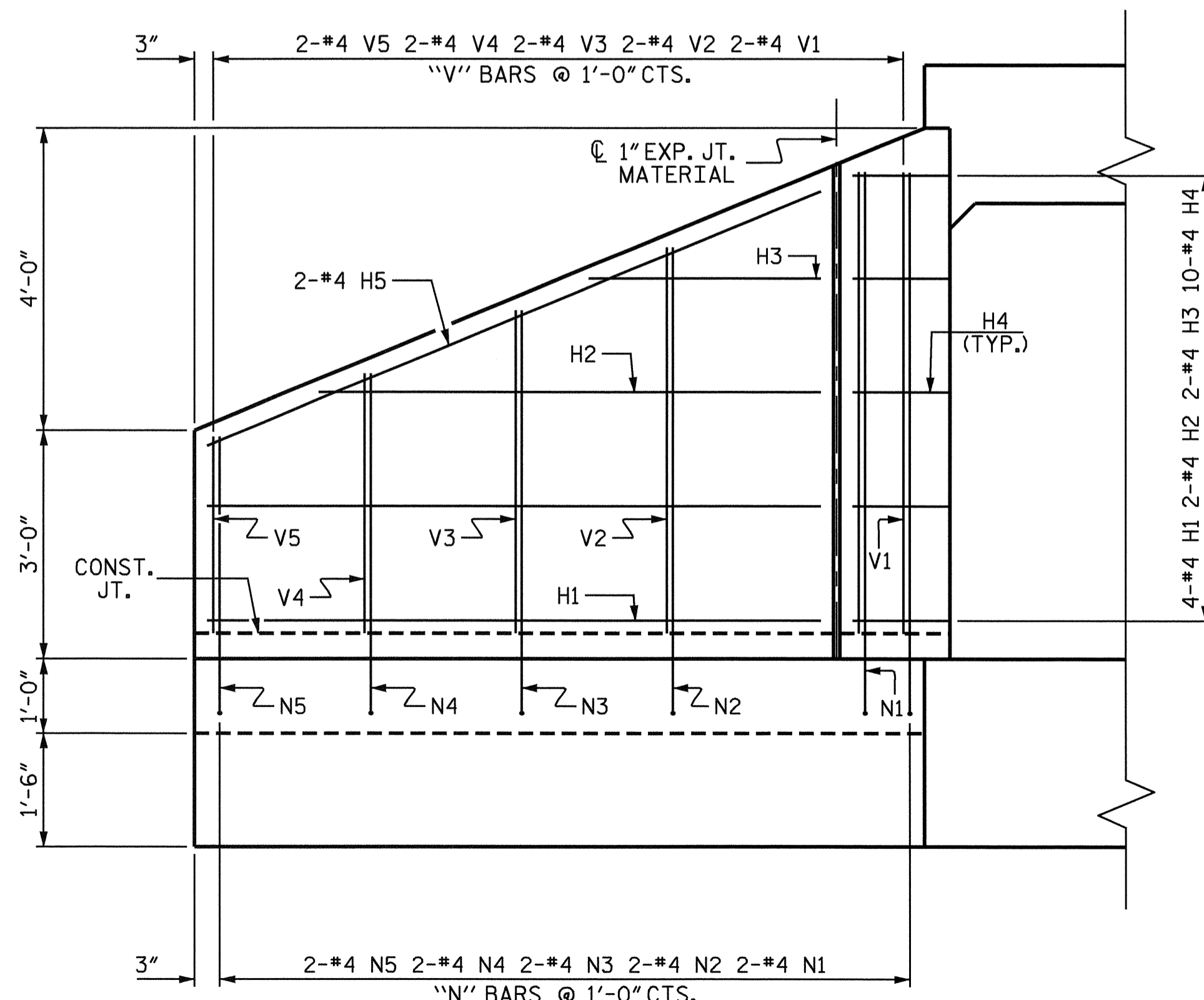
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**DOUBLE 7 FT. X 6 FT.
 CONCRETE BOX CULVERT
 EXTENSION
 90° SKEW**

ASSEMBLED BY: Ned M. Raffin DATE: 1/3/04
 CHECKED BY: J.L. WALTON DATE: 4/22/04

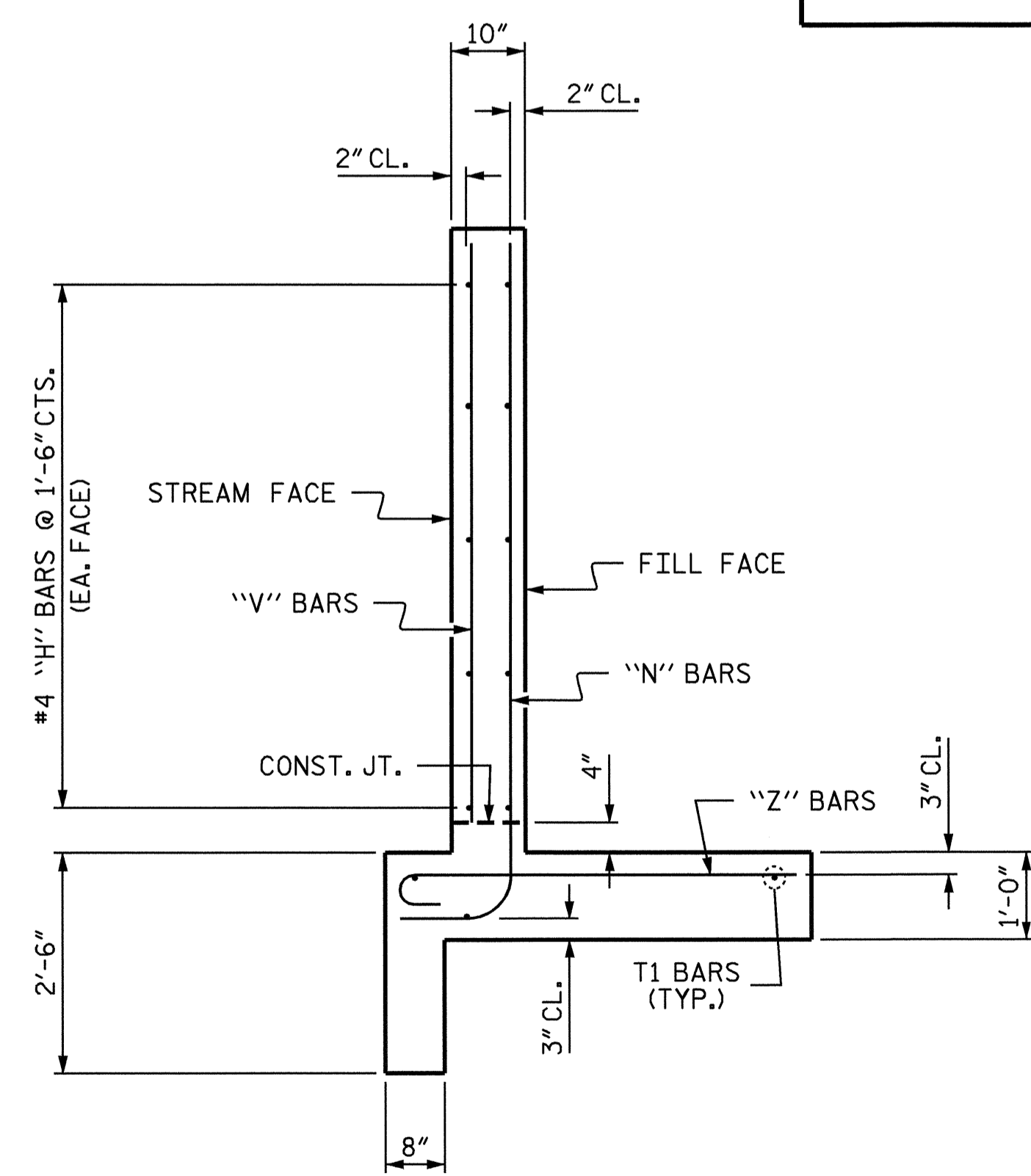
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2	
1			3			TOTAL SHEETS	
2			4			15	



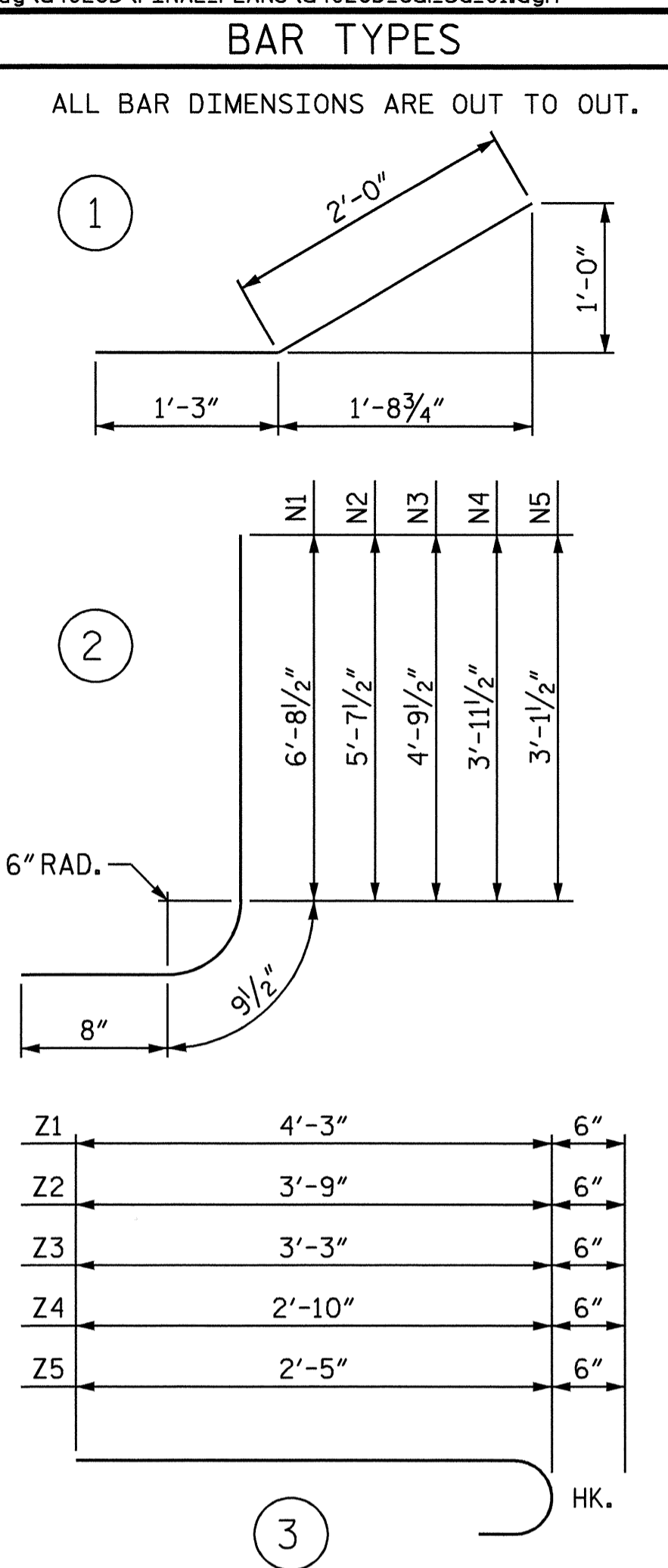
PLAN



ELEVATION



TYPICAL WING SECTION



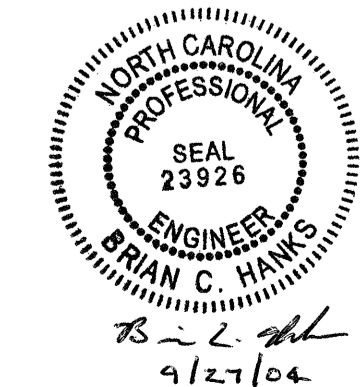
BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	8	#4	STR	8'-1"	43
H2	4	#4	STR	6'-8"	18
H3	4	#4	STR	3'-1"	8
H4	20	#4	1	3'-3"	43
H5	4	#4	STR	8'-9"	23
N1	4	#4	2	8'-2"	22
N2	4	#4	2	7'-1"	19
N3	4	#4	2	6'-3"	17
N4	4	#4	2	5'-5"	14
N5	4	#4	2	4'-7"	12
T1	6	#5	STR	10'-0"	63
V1	4	#4	STR	6'-1"	16
V2	4	#4	STR	5'-1"	14
V3	4	#4	STR	4'-3"	11
V4	4	#4	STR	3'-5"	9
V5	4	#4	STR	2'-7"	7
Z1	4	#4	3	4'-9"	13
Z2	6	#4	3	4'-3"	17
Z3	4	#4	3	3'-9"	10
Z4	4	#4	3	3'-4"	9
Z5	4	#4	3	2'-11"	8

REINFORCING STEEL FOR 2 WINGS	396 LBS
CLASS A CONCRETE	
2 WINGS	6.9 CY
1 HEADWALL	0.7 CY
END CURTAIN WALL	0.8 CY
TOTAL	8.4 CY

ASSEMBLED BY : Neil M. Kaffen DATE : 1/12/04
 CHECKED BY : J.L. WALTON DATE : 4/22/04
 DRAWN BY : CCJ 10/99
 CHECKED BY : RWW 03/00

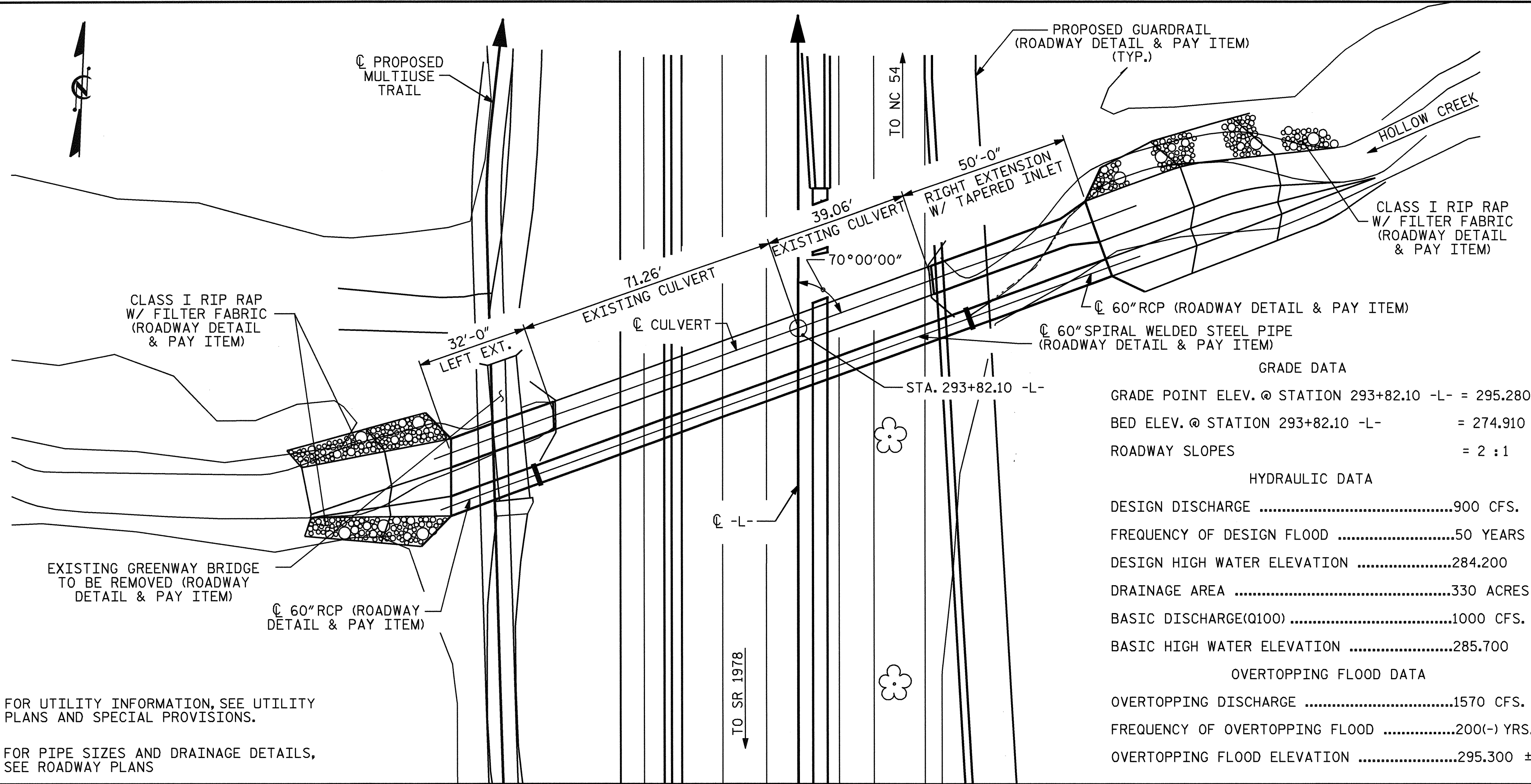
PROJECT NO. U-4026
 WAKE - DURHAM COUNTY
 STATION: 199+96.10 -L-

SHEET 3 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 6'-0" SLOPE = 2:1
 90° SKEW



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

BM #16 : RR SPIKE IN BASE OF 18" PINE 96.36' LT. STA. 289+75.52 -L-, ELEVATION = 287.21



NOTES

ASSUMED LIVE LOAD -----HS20-44 OR ALTERNATE LOADING.

DESIGN FILL -----14.66'

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

3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

STAGE 1

1. WING FOOTINGS AND HEADWALL FOOTINGS INCLUDING 4" OF ALL VERTICAL WALLS.
2. HEADWALLS TO THE STAGE 1 CONSTRUCTION JOINT AND WINGS FULL HEIGHT.

STAGE 2

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE CULVERT WALLS, HEADWALLS, AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB.

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. 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.

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

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

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

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

FOR FALSEWORK AND FORM WORK, SEE SPECIAL PROVISIONS.

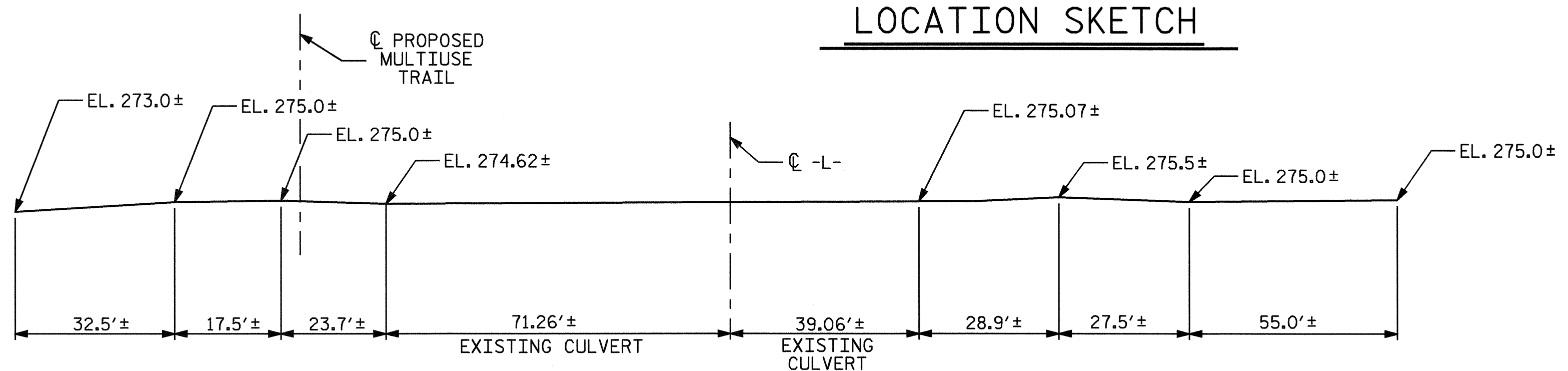
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

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

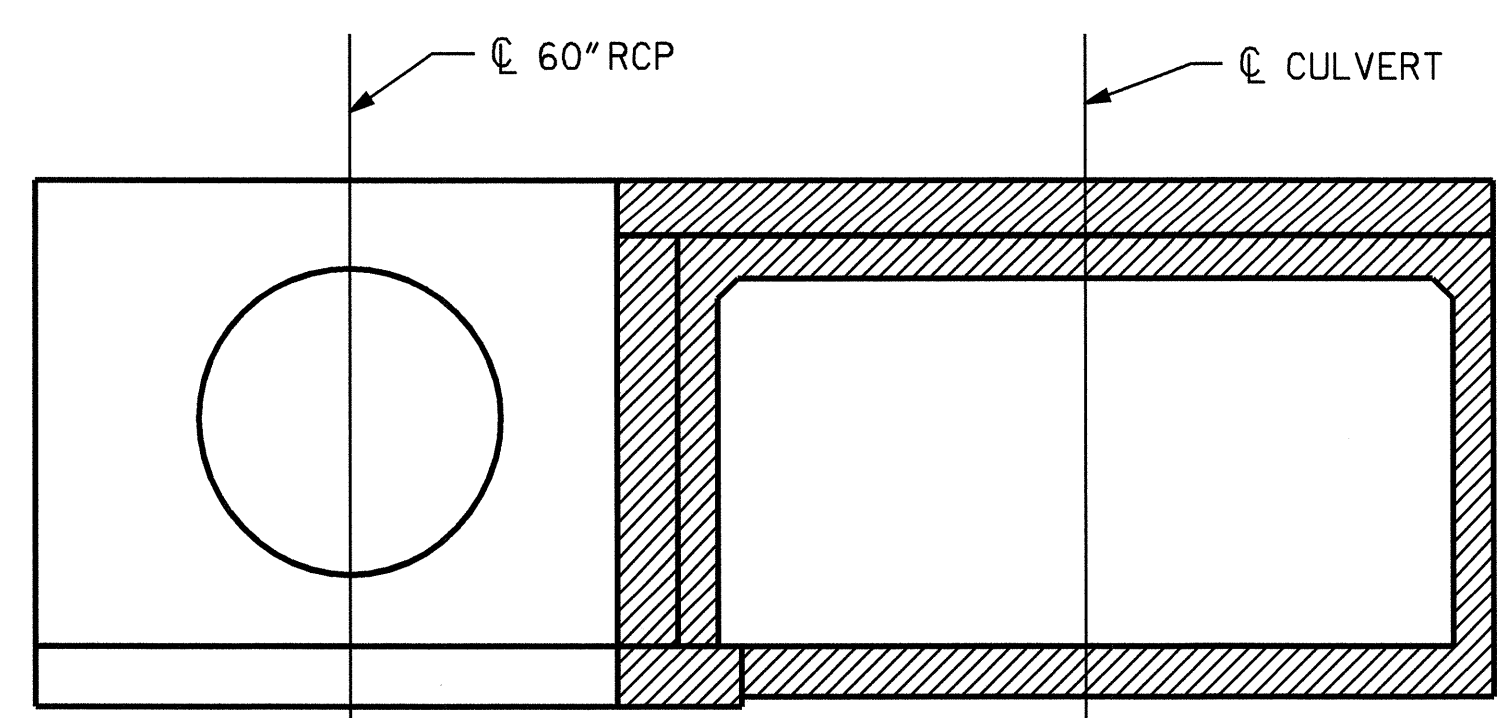
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

LOCATION SKETCH



PROFILE ALONG CL CULVERT



CONSTRUCTION SEQUENCE

TOTAL STRUCTURE QUANTITIES	
CLASS A CONCRETE	
LEFT EXTENSION	42.4 C.Y.
RIGHT EXTENSION	58.4 C.Y.
TOTAL	100.8 C.Y.
REINFORCING STEEL	
LEFT EXTENSION	5244 LBS.
RIGHT EXTENSION	8393 LBS.
TOTAL	13637 LBS.
CULVERT EXCAVATION LUMP SUM	
FOUNDATION CONDITIONING MAT'L	
LEFT EXTENSION	25 TONS
RIGHT EXTENSION	35 TONS
TOTAL	60 TONS

PROJECT NO. U-4026

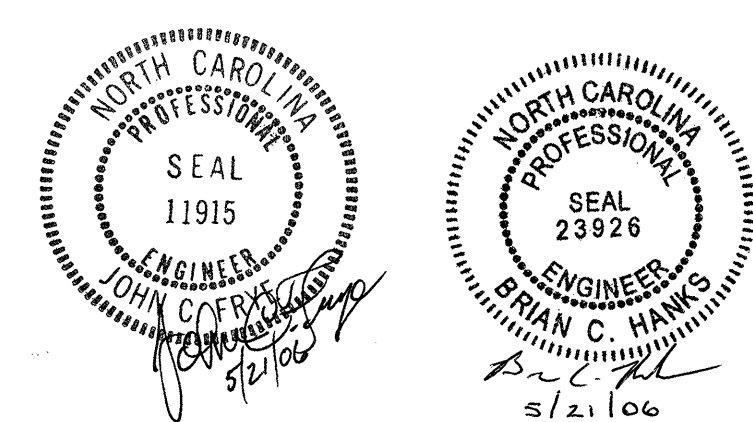
WAKE - DURHAM COUNTY

STATION: 293+82.10 -L-

SHEET 1 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

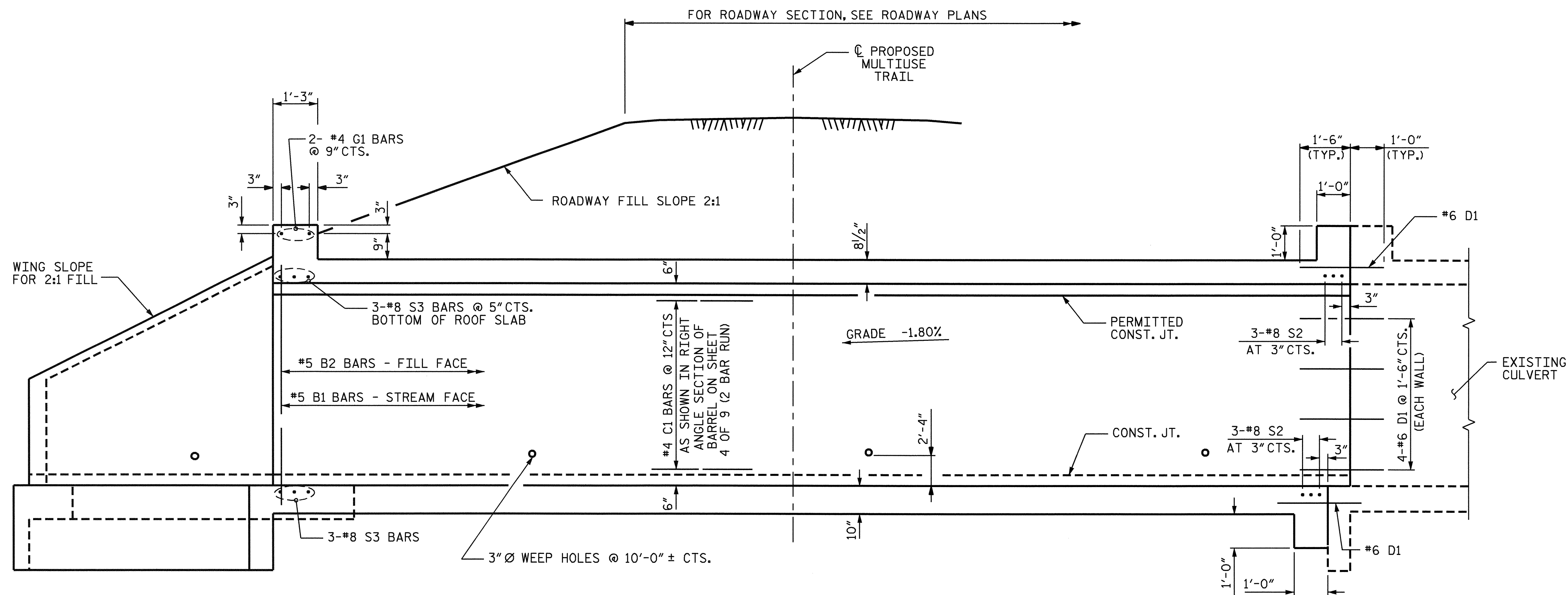
SINGLE 8 FT. X 6 FT. CONCRETE BOX CULVERT EXTENSIONS WITH TAPERED INLET 70° SKEW



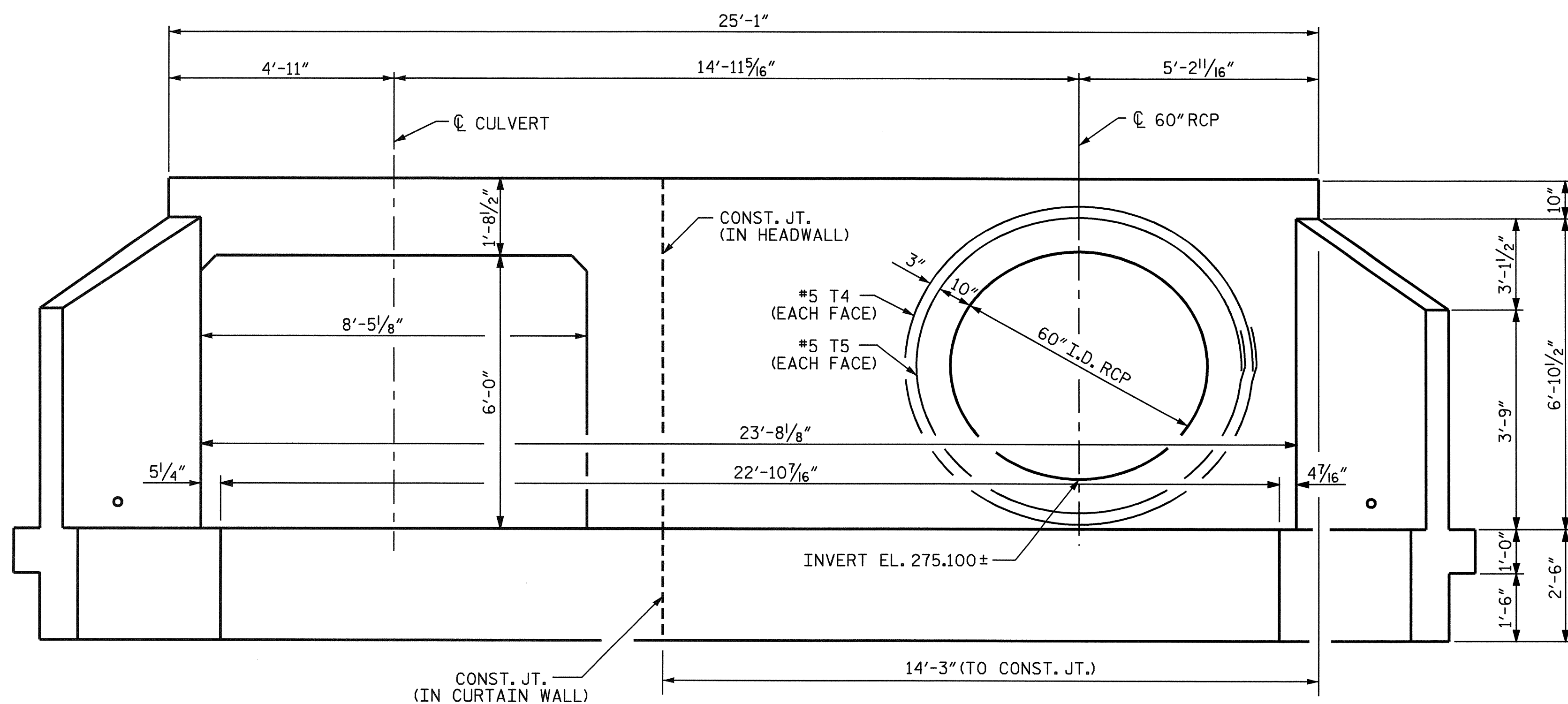
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-4	
1			3			TOTAL SHEETS	
2			4			15	

DRAWN BY : Nail M. Kuffin DATE : 3/31/04

CHECKED BY : W.F. PARKER DATE : 8/3/04



CULVERT SECTION NORMAL TO ROADWAY



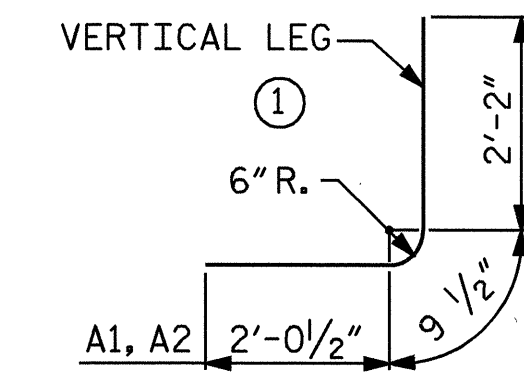
OUTLET END ELEVATION NORMAL TO SKEW

BILL OF MATERIAL LEFT CULVERT EXTENSION

BAR NO	SIZE	TYPE	LENGTH	WEIGHT	
A1	82	5	1	5'-0"	428
A2	82	5	1	5'-0"	428
A100	58	5	STR	8'-11"	539
A101	4	5	STR	6'-0"	25
A102	4	5	STR	3'-0"	13
A200	63	5	STR	8'-11"	586
A201	4	5	STR	6'-5"	27
A202	4	5	STR	3'-8"	15
B1	78	5	STR	7'-0"	569
B2	82	5	STR	5'-4"	456
C1	68	4	STR	16'-11"	768
D1	22	6	STR	2'-6"	83
G1	4	4	STR	13'-10"	37
S2	6	8	STR	9'-6"	152
S3	6	8	STR	10'-7"	170

REINFORCING STEEL lbs. 4,296

BAR TYPE



DIMENSIONS ARE OUT TO OUT

SPLICE LENGTH CHART

BAR	SIZE	LENGTH
B1	5	2'-2"
C1	4	1'-11"
G1	4	1'-11"

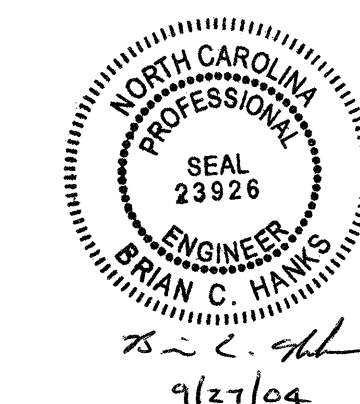
TOTAL STRUCTURE QUANTITIES LEFT CULVERT EXTENSION

CLASS A CONCRETE	
BARREL	26.7 C.Y.
WINGS, ETC.	15.7 C.Y.
TOTAL	42.4 C.Y.
REINFORCING STEEL	
BARREL	4296 LBS.
WINGS, ETC.	948 LBS.
TOTAL	5244 LBS.
CULVERT EXCAVATION	LUMP SUM
FOUNDATION CONDITIONING MAT'L	25 TONS

PROJECT NO. U-4026
 WAKE - DURHAM COUNTY
 STATION: 293+82.10 -L-

SHEET 2 OF 9

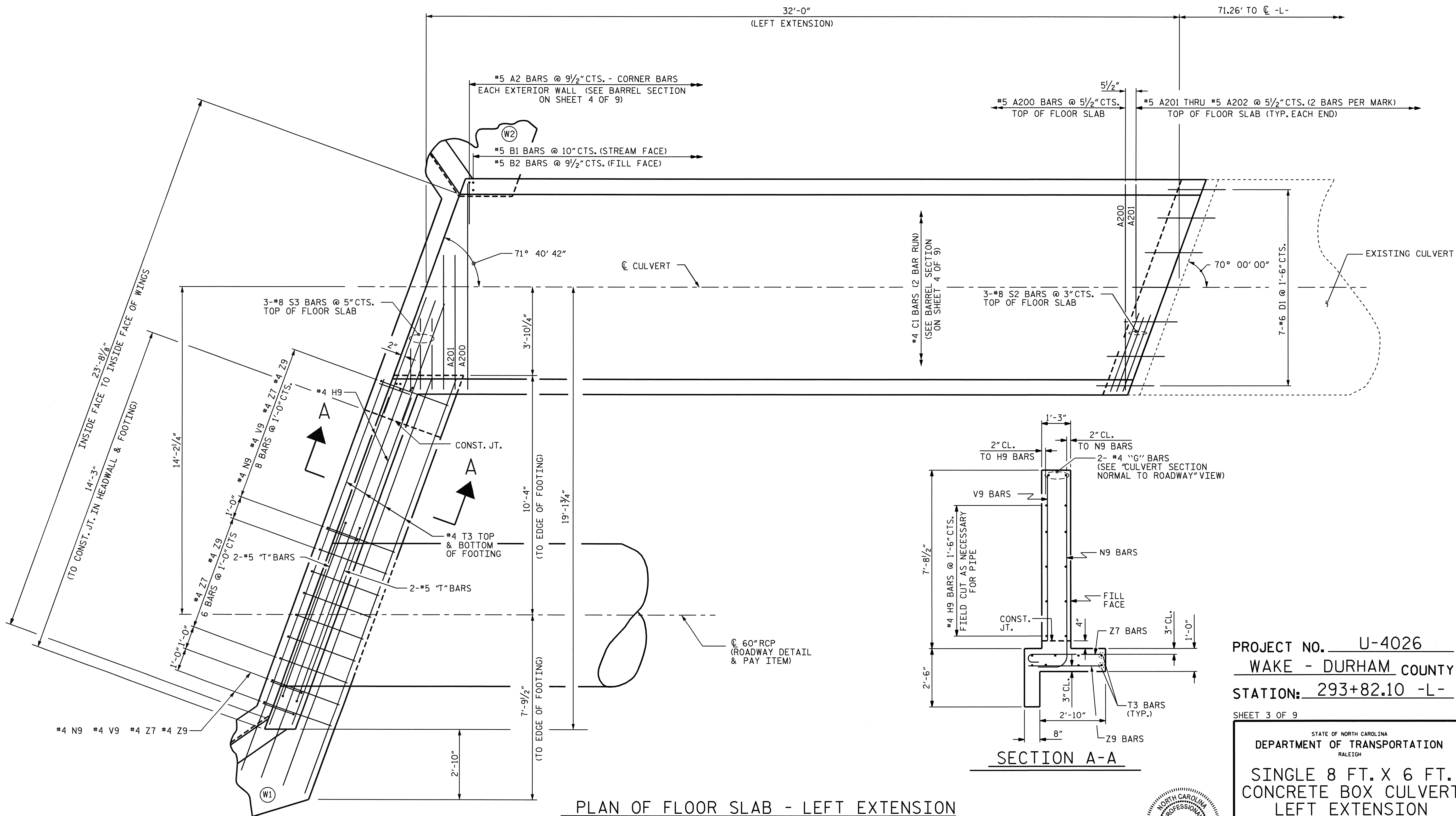
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 8 FT. X 6 FT.
 CONCRETE BOX CULVERT
 LEFT EXTENSION
 70° SKEW



DRAWN BY: Neil M. Ruffin DATE: 3/3/04
 CHECKED BY: W. F. PARKER DATE: 8/4/04

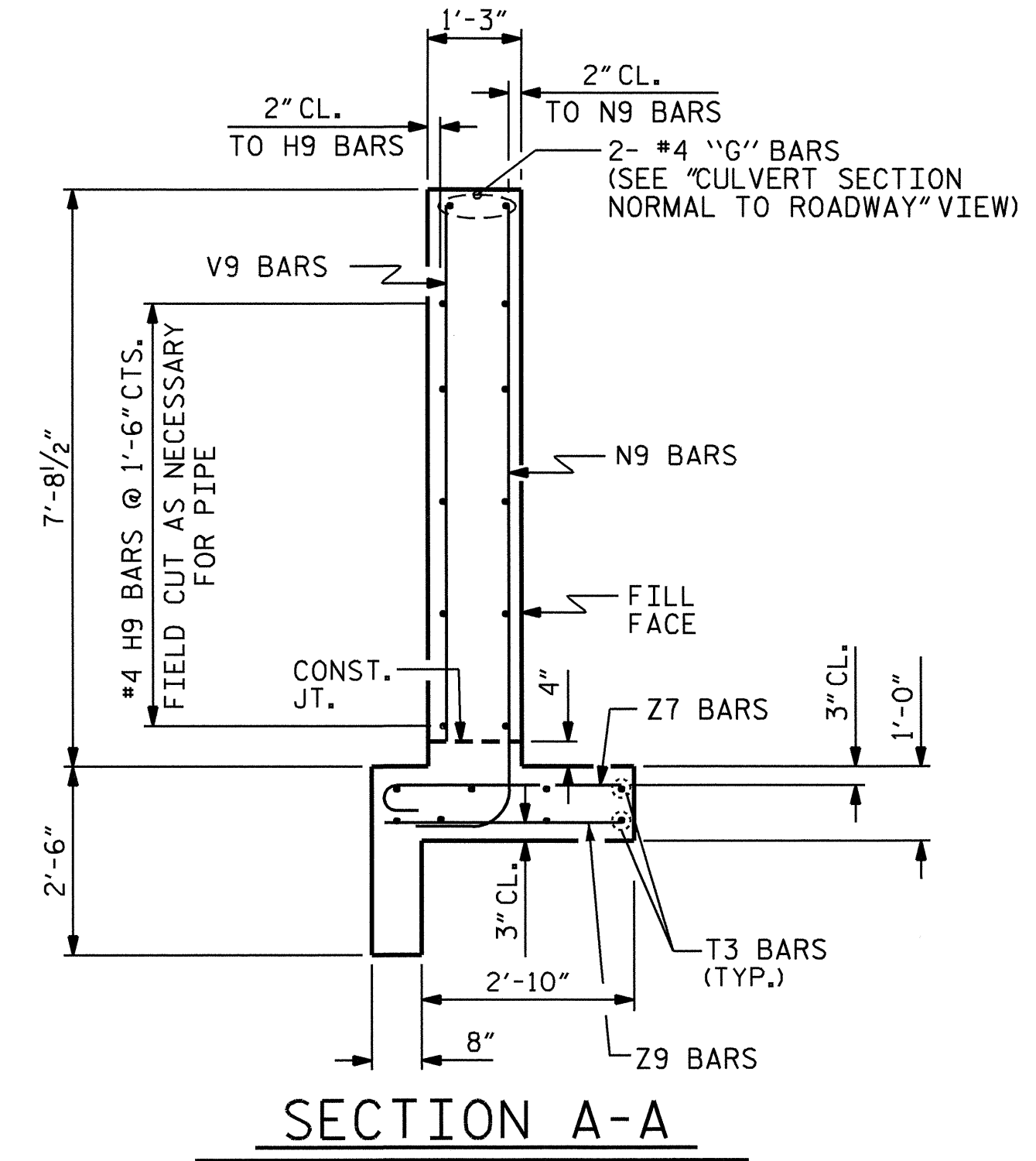
23-SEP-2004 12:23
 W:\squadg\4026b\FINAL_PLANS\4026b_oul_sd_02.dgn

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



PLAN OF FLOOR SLAB - LEFT EXTENSION

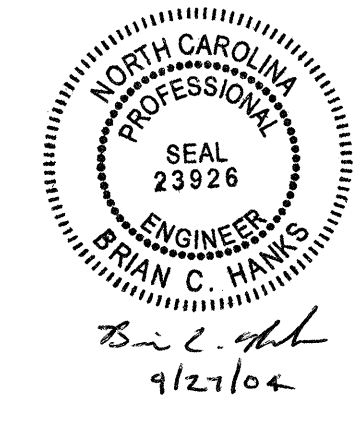
CONCRETE AND REINFORCING STEEL QUANTITIES FOR THE FOOTING AND HEADWALL AROUND THE 60° RCP ARE INCLUDED WITH THE WING QUANTITIES ON SHEET 5 OF 9.



SECTION A-A

PROJECT NO. U-4026
 WAKE - DURHAM COUNTY
 STATION: 293+82.10 -L-

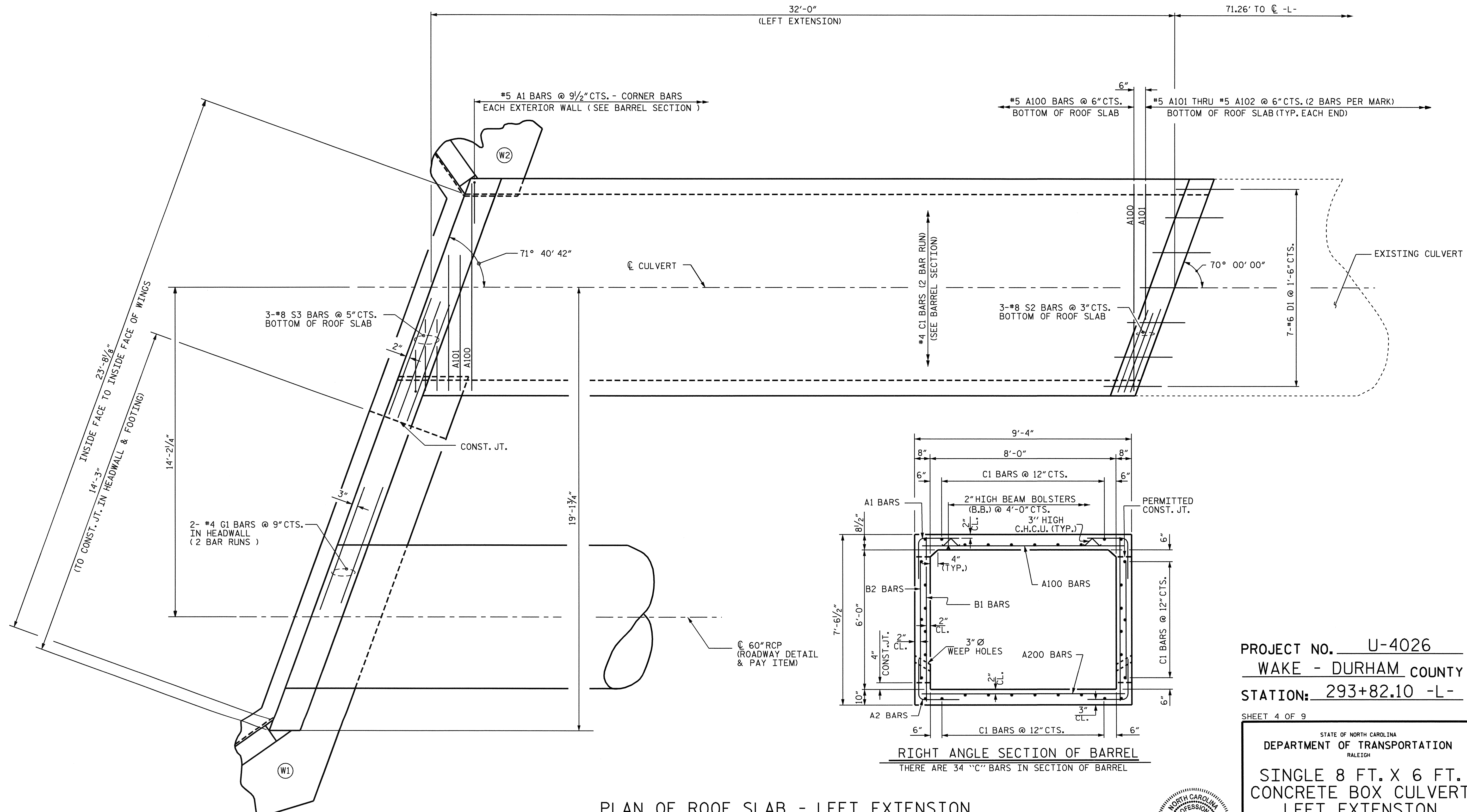
SHEET 3 OF 9
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 8 FT. X 6 FT.
 CONCRETE BOX CULVERT
 LEFT EXTENSION
 70° SKEW



DRAWN BY: Neil M. Kuffen DATE: 3/31/04
 CHECKED BY: W. F. PARKER DATE: 8/4/04

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

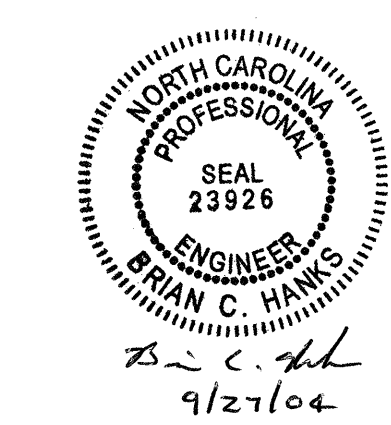
TOTAL SHEETS: 15



PLAN OF ROOF SLAB - LEFT EXTENSION

PROJECT NO. U-4026
 WAKE - DURHAM COUNTY
 STATION: 293+82.10 -L-
 SHEET 4 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 8 FT. X 6 FT.
 CONCRETE BOX CULVERT
 LEFT EXTENSION
 70° SKEW

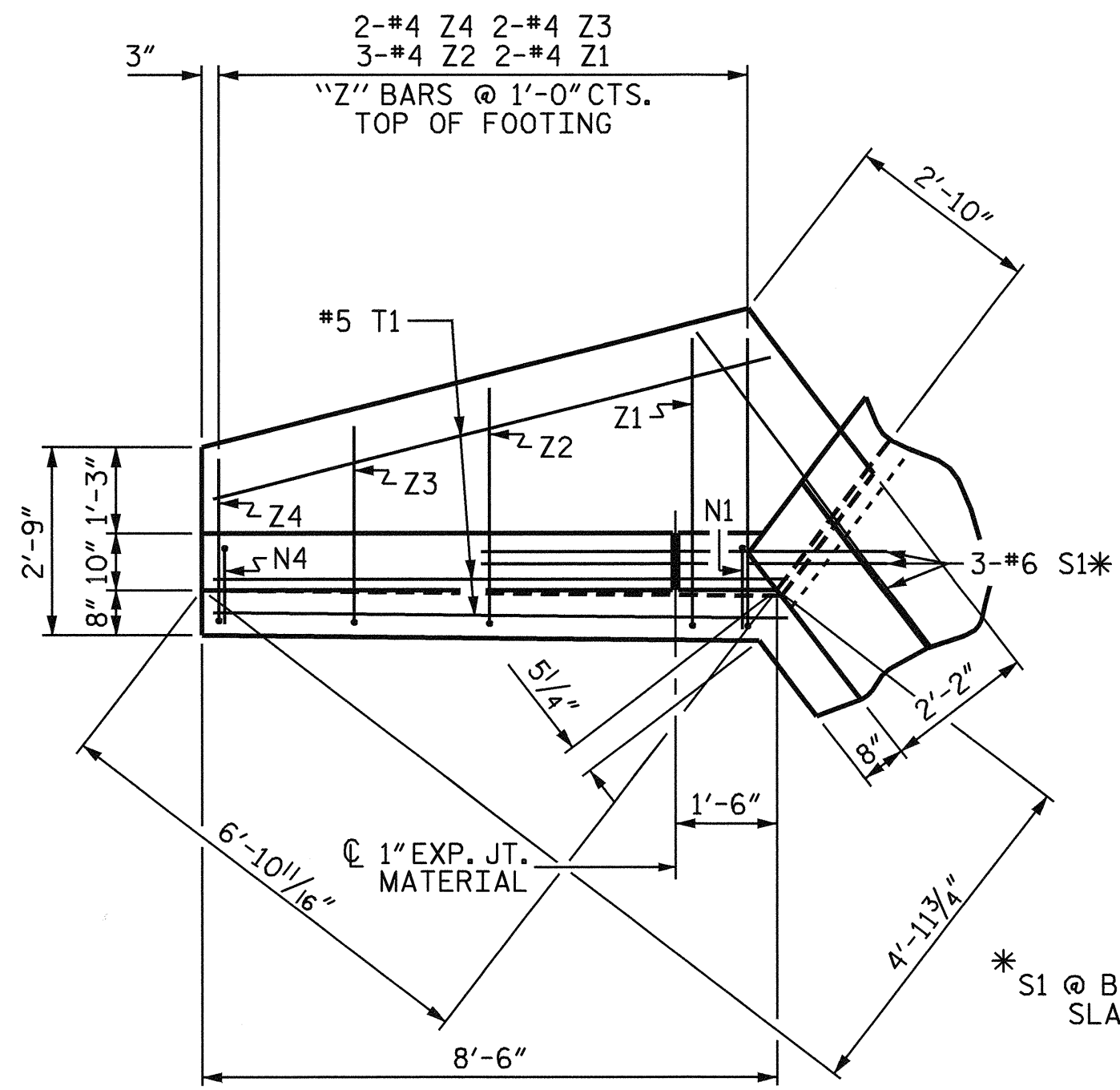


DRAWN BY: Neil M. Ruffin DATE: 3/31/04
 CHECKED BY: W. F. PARKER DATE: 8/4/04

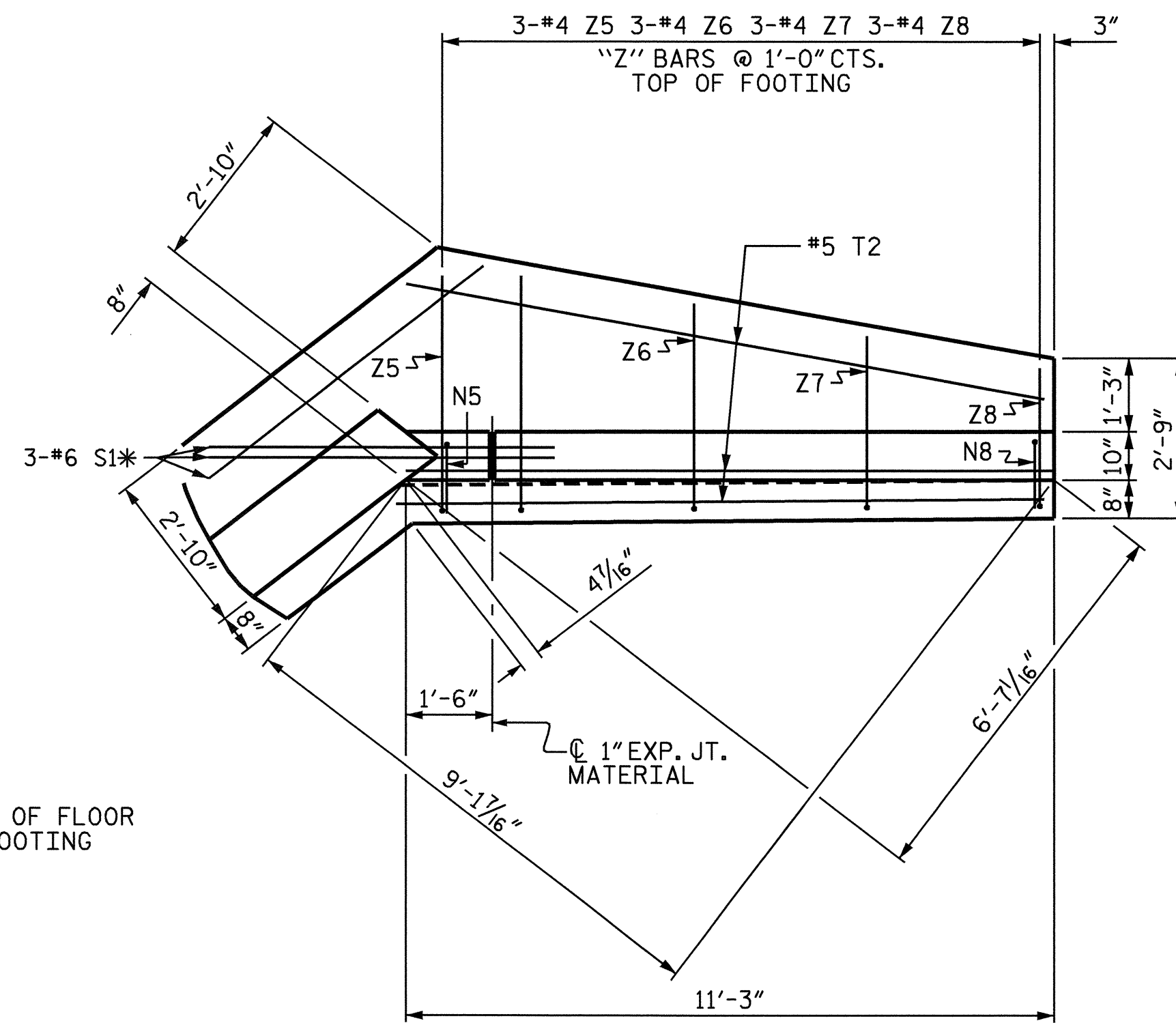
23-SEP-2004 12:23
 W:\squadg\4026b\FINAL_PLANS\4026b_cul.ed.02.dgn

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

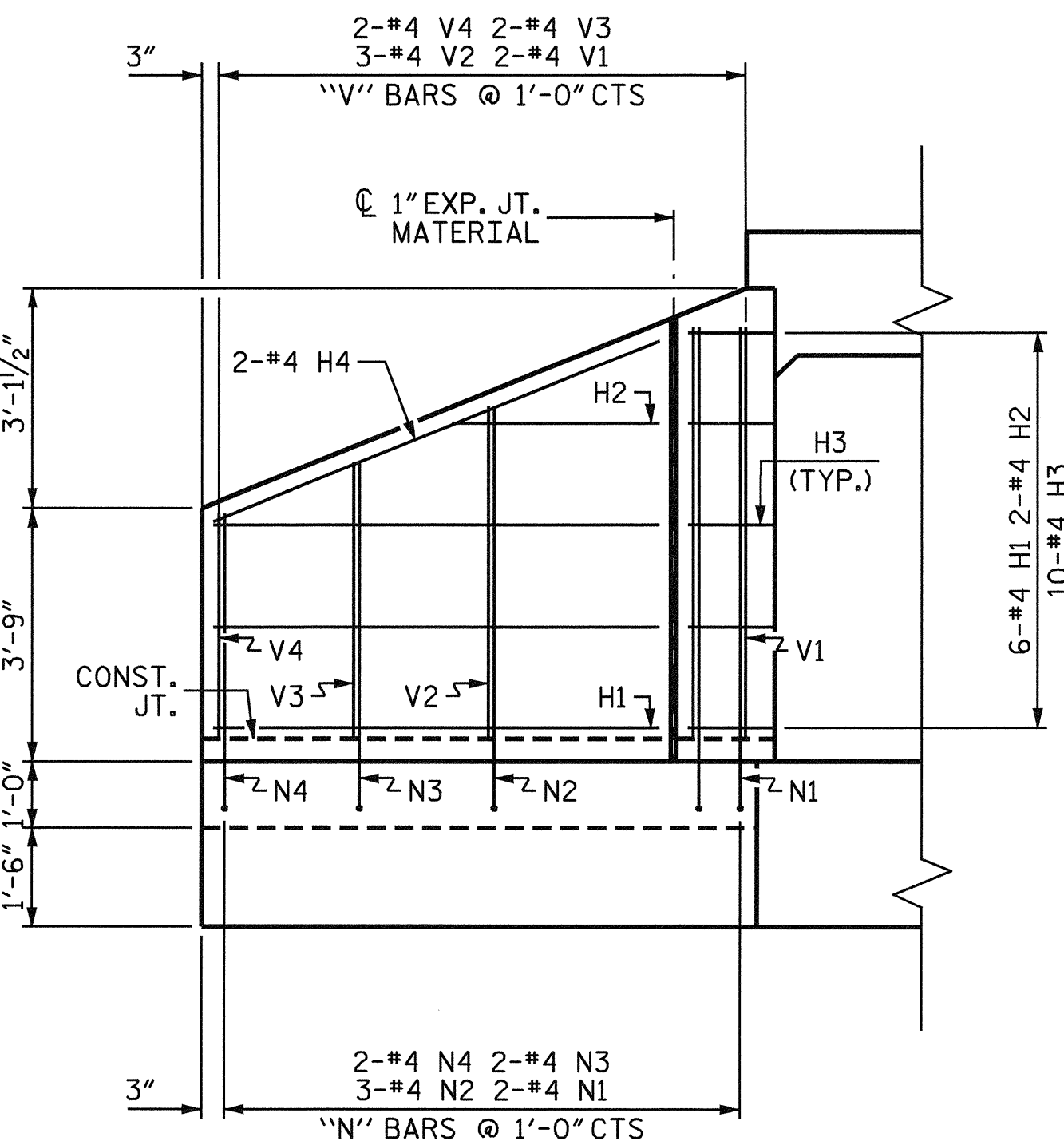
C-7
 TOTAL SHEETS
 15



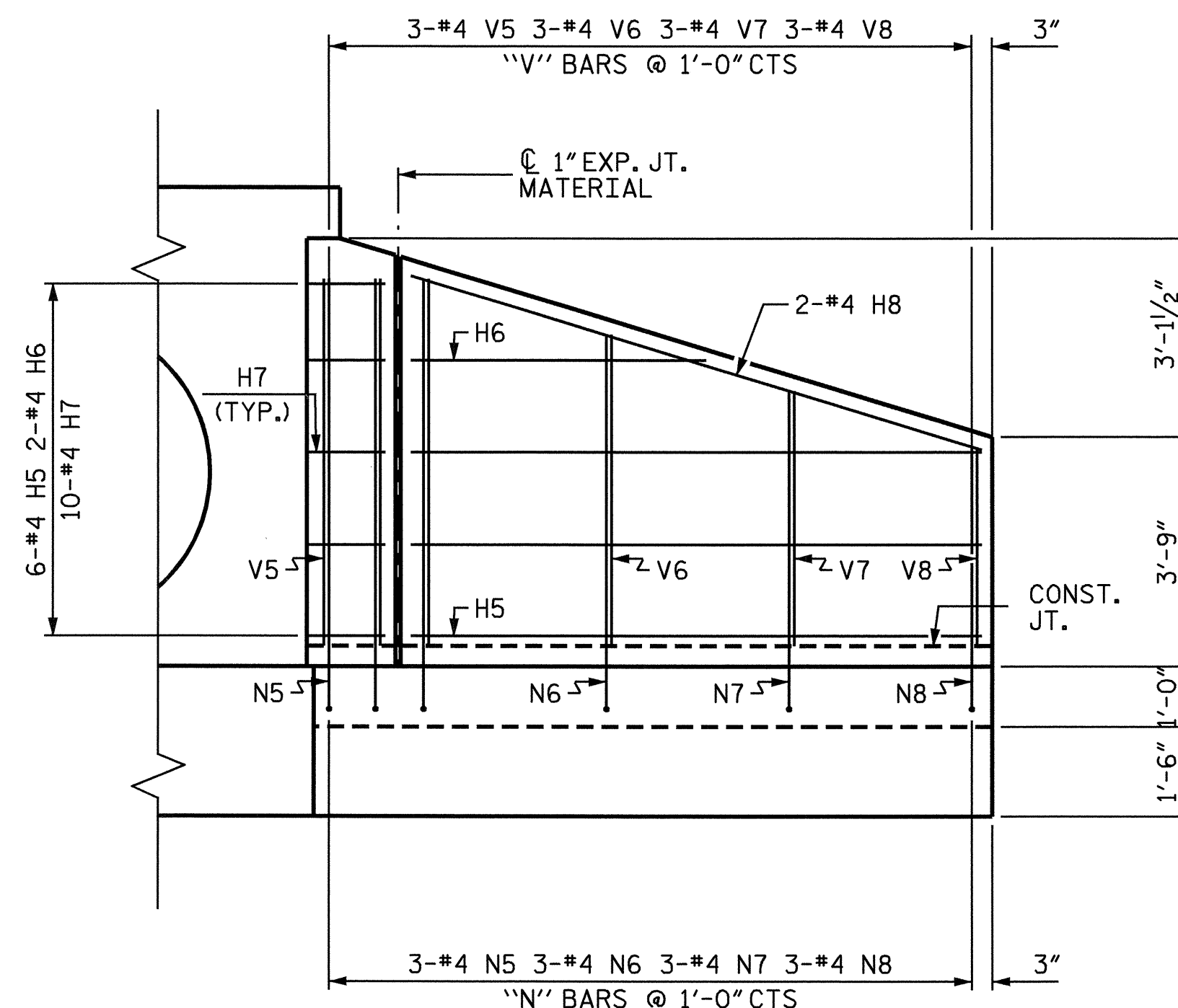
PLAN W2



PLAN W1



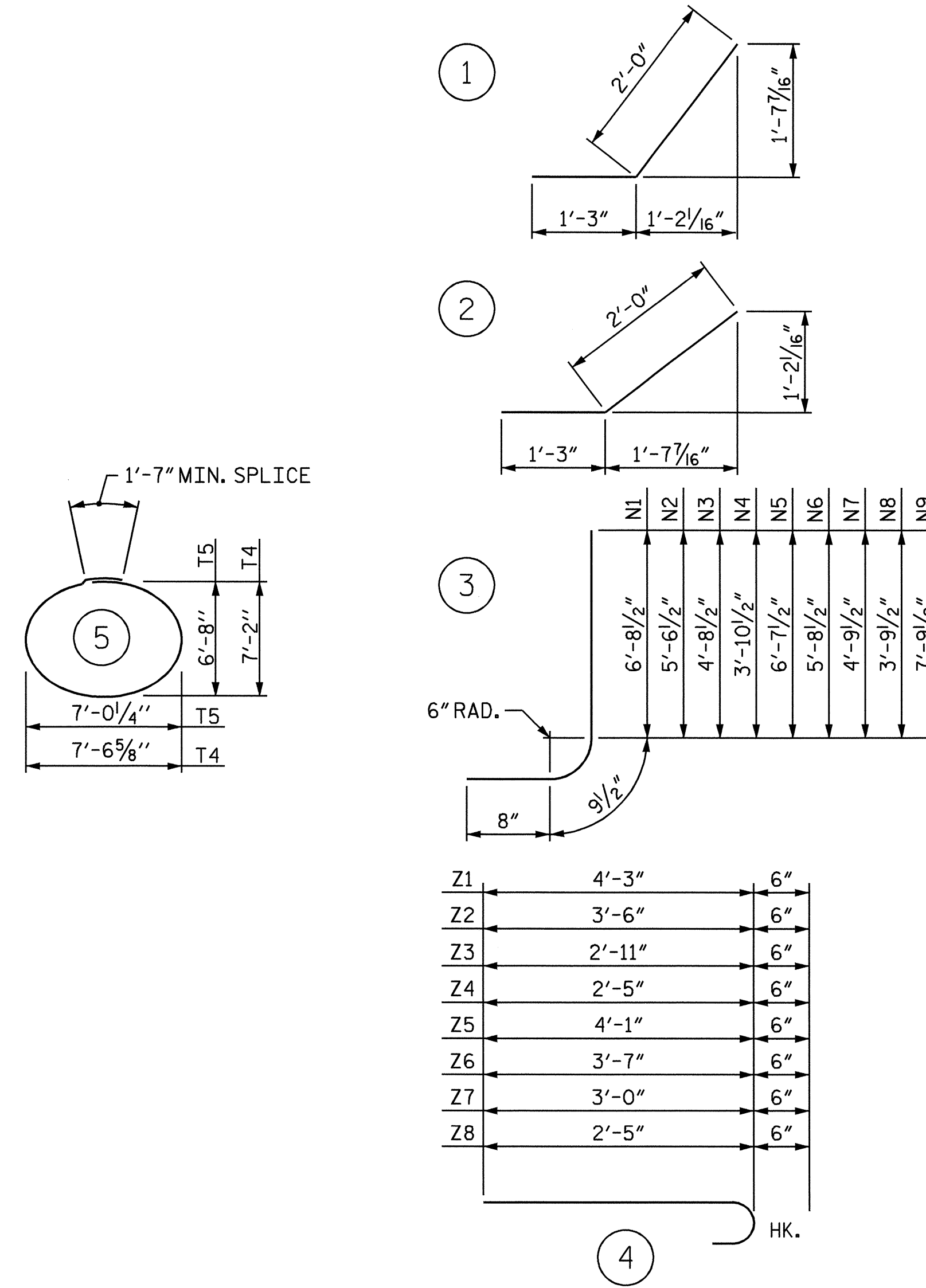
ELEVATION W2



ELEVATION W1

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



Z1	4'-3"	6"
Z2	3'-6"	6"
Z3	2'-11"	6"
Z4	2'-5"	6"
Z5	4'-1"	6"
Z6	3'-7"	6"
Z7	3'-0"	6"
Z8	2'-5"	6"

BILL OF MATERIAL FOR LEFT EXTENSION WINGS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	4	STR	6'-7"	26
H2	2	4	STR	3'-1"	4
H3	10	4	1	3'-3"	22
H4	2	4	STR	7'-1"	9
H5	6	4	STR	9'-4"	37
H6	2	4	STR	4'-10"	6
H7	10	4	2	3'-3"	22
H8	2	4	STR	9'-9"	13
H9	10	4	STR	14'-10"	99
N1	2	4	3	8'-2"	11
N2	3	4	3	7'-1"	14
N3	2	4	3	6'-2"	8
N4	2	4	3	5'-4"	7
N5	3	4	3	8'-1"	16
N6	3	4	3	7'-2"	14
N7	3	4	3	6'-3"	13
N8	3	4	3	5'-3"	11
N9	10	4	3	9'-3"	62
S1	6	6	STR	6'-0"	54
T1	3	5	STR	8'-6"	27
T2	3	5	STR	11'-3"	35
T3	8	4	STR	18'-9"	100
T4	2	5	5	25'-3"	53
T5	2	5	5	23'-7"	49
V1	2	4	STR	6'-1"	8
V2	3	4	STR	4'-11"	10
V3	2	4	STR	4'-1"	5
V4	2	4	STR	3'-4"	4
V5	3	4	STR	6'-0"	12
V6	3	4	STR	5'-1"	10
V7	3	4	STR	4'-2"	8
V8	3	4	STR	3'-3"	7
V9	10	4	STR	7'-2"	48
Z1	2	4	4	4'-9"	6
Z2	3	4	4	4'-0"	8
Z3	2	4	4	3'-5"	5
Z4	2	4	4	2'-11"	4
Z5	3	4	4	4'-7"	9
Z6	3	4	4	4'-1"	8
Z7	19	4	4	3'-6"	44
Z8	3	4	4	2'-11"	6
Z9	16	4	STR	3'-2"	34

REINFORCING STEEL lbs. 948
FOR 2 WINGS

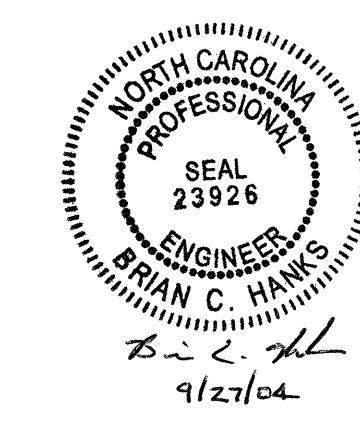
CLASS A CONCRETE		
2 WINGS	7.1	CY
*1 HEADWALL	6.5	CY
1 END CURTAIN WALL	1.4	CY
2 EDGE BEAMS	0.7	CY
TOTAL	15.7	CY

PROJECT NO. U-4026
WAKE - DURHAM COUNTY
 STATION: 293+82.10 -L-

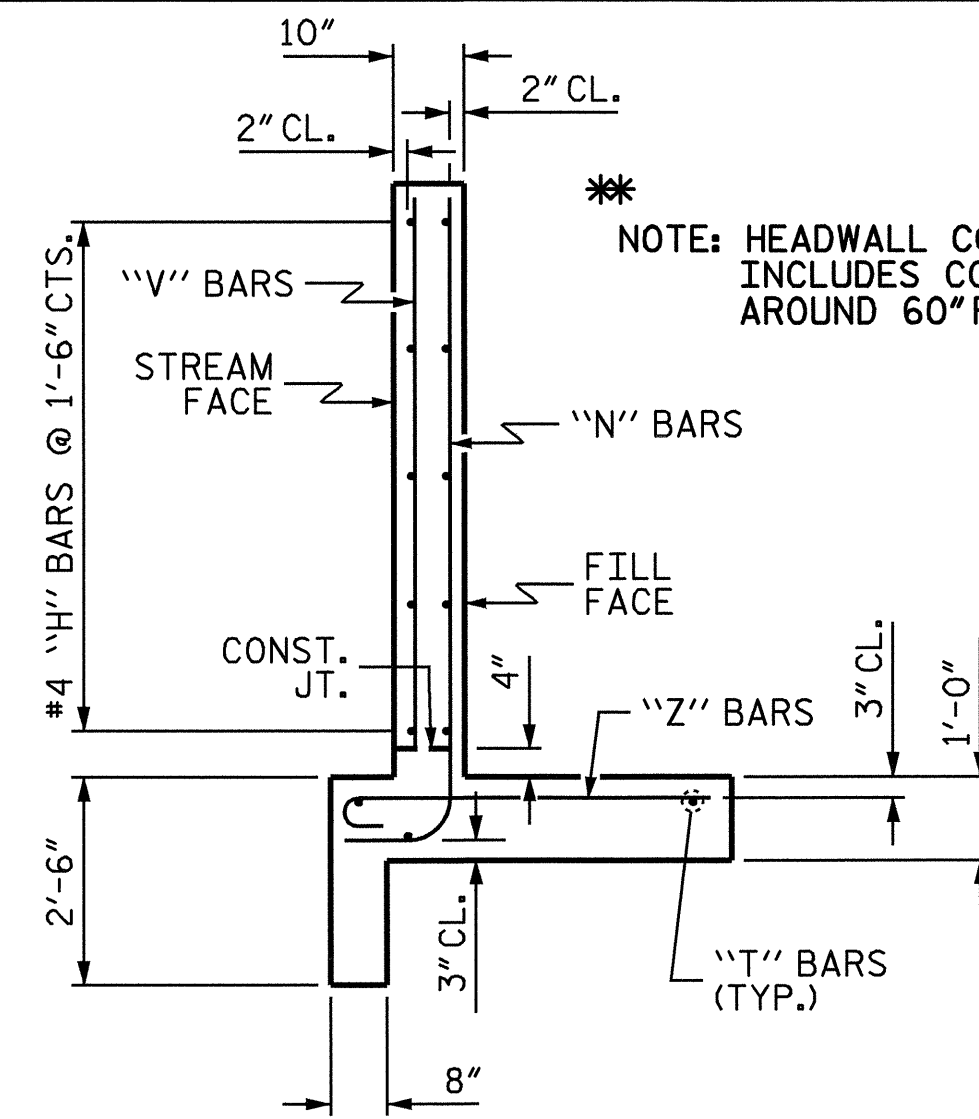
SHEET 5 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

CULVERT WINGS FOR CONCRETE BOX CULVERT LEFT EXTENSION
 H = 6'-0" SLOPE = 2:1
 70° SKEW



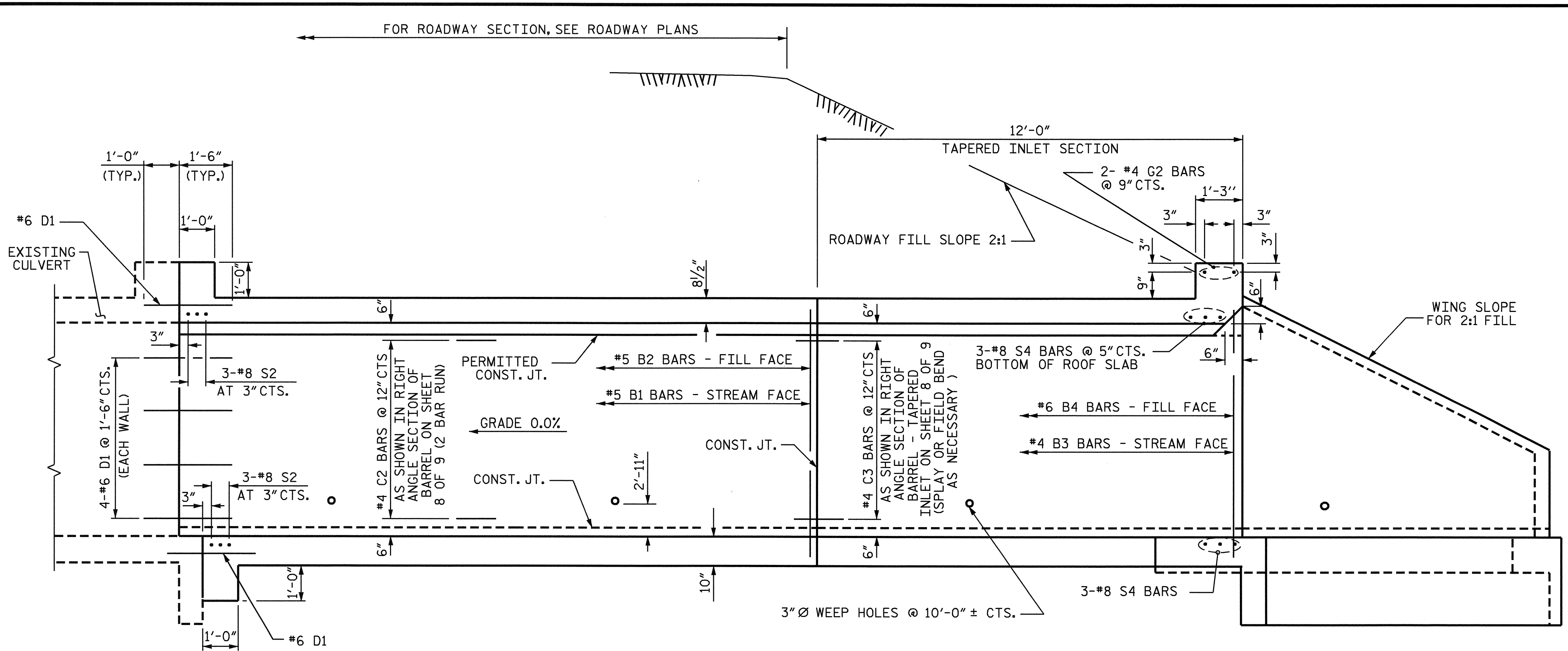
TYPICAL WING SECTION



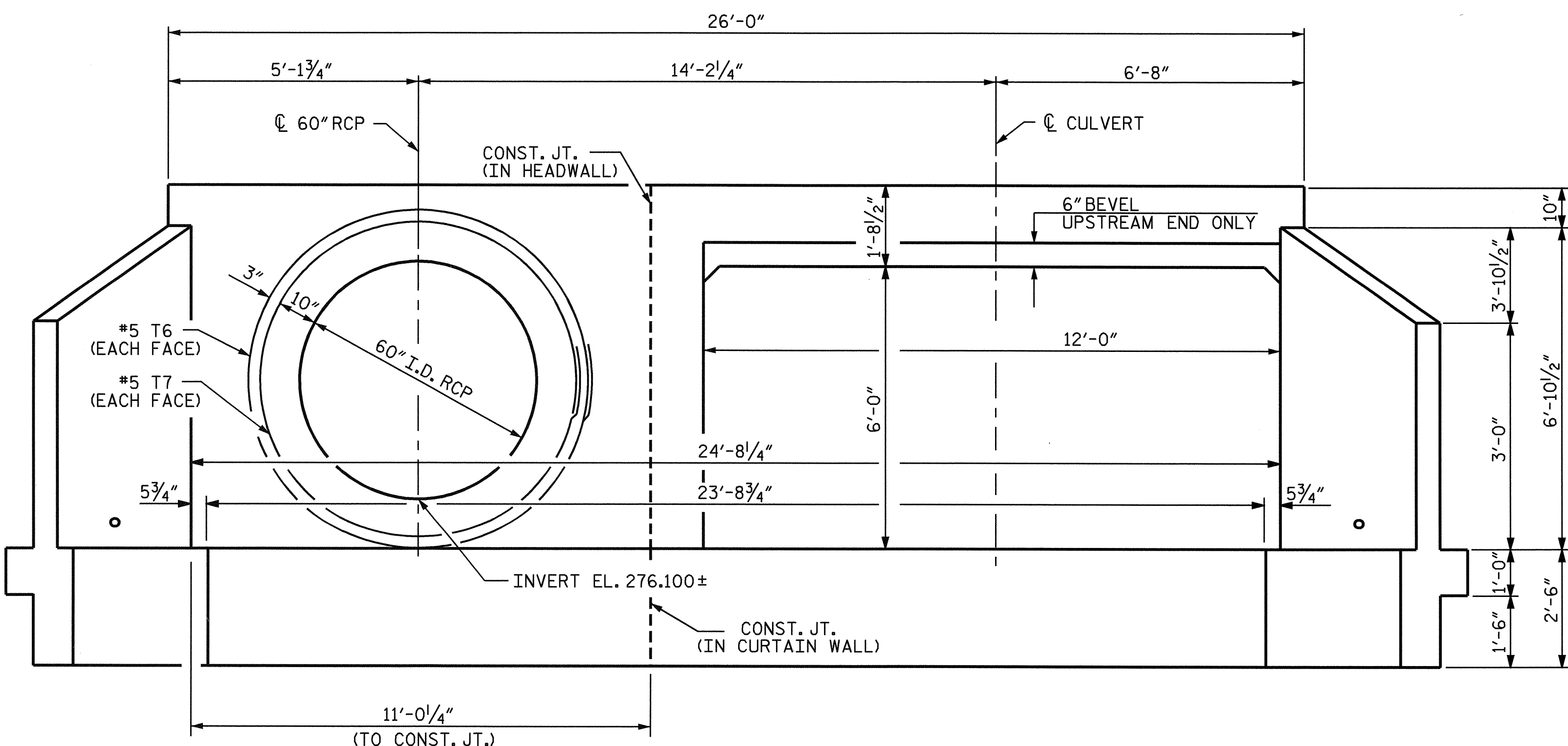
NOTE: HEADWALL CONCRETE QUANTITY INCLUDES CONCRETE FROM WALL AROUND 60" RCP

ASSEMBLED BY: Neil M. Ruffin DATE: 3/31/04
 CHECKED BY: W. F. PARKER DATE: 8/4/04

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-8
1			3			TOTAL SHEETS
2			4			15



CULVERT SECTION NORMAL TO ROADWAY



INLET END ELEVATION NORMAL TO SKEW

BILL OF MATERIAL
RIGHT CULVERT EXTENSION

BAR	NO	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO	SIZE	TYPE	LENGTH	WEIGHT
A3	102	5	1	4'-6"	479	A200	79	5	STR	8'-11"	735
A4	102	5	1	4'-6"	479	A201	2	5	STR	6'-5"	13
A5	40	6	1	5'-8"	340	A202	2	5	STR	3'-8"	8
A6	40	6	1	5'-8"	340	A203	1	7	STR	8'-11"	18
						A204	1	7	STR	9'-1"	19
A100	73	5	STR	8'-11"	679	A205	1	7	STR	9'-4"	19
A101	2	5	STR	6'-0"	13	A206	1	7	STR	9'-6"	19
A102	2	5	STR	3'-0"	6	A207	1	7	STR	9'-8"	20
A103	1	7	STR	8'-11"	18	A208	1	7	STR	9'-11"	20
A104	1	7	STR	9'-1"	19	A209	1	7	STR	10'-1"	21
A105	1	7	STR	9'-4"	19	A210	1	7	STR	10'-3"	21
A106	1	7	STR	9'-6"	19	A211	1	7	STR	10'-6"	21
A107	1	7	STR	9'-8"	20	A212	1	7	STR	10'-8"	22
A108	1	7	STR	9'-11"	20	A213	1	7	STR	10'-10"	22
A109	1	7	STR	10'-1"	21	A214	1	7	STR	11'-1"	23
A110	1	7	STR	10'-3"	21	A215	1	7	STR	11'-3"	23
A111	1	7	STR	10'-6"	21	A216	1	7	STR	11'-5"	23
A112	1	7	STR	10'-8"	22	A217	1	7	STR	11'-8"	24
A113	1	7	STR	10'-10"	22	A218	1	7	STR	11'-10"	24
A114	1	7	STR	11'-1"	23	A219	1	7	STR	12'-0"	25
A115	1	7	STR	11'-3"	23	A220	1	7	STR	12'-3"	25
A116	1	7	STR	11'-5"	23	A221	1	7	STR	12'-5"	25
A117	1	7	STR	11'-8"	24	A222	1	7	STR	12'-7"	26
A118	1	7	STR	11'-10"	24	A223	1	7	STR	12'-10"	26
A119	1	7	STR	12'-0"	25						
A120	1	7	STR	12'-3"	25	B1	92	5	STR	7'-0"	672
A121	1	7	STR	12'-5"	25	B2	95	5	STR	5'-4"	528
A122	1	7	STR	12'-7"	26	B3	42	4	STR	7'-0"	196
A123	1	7	STR	12'-10"	26	B4	40	6	STR	5'-4"	320

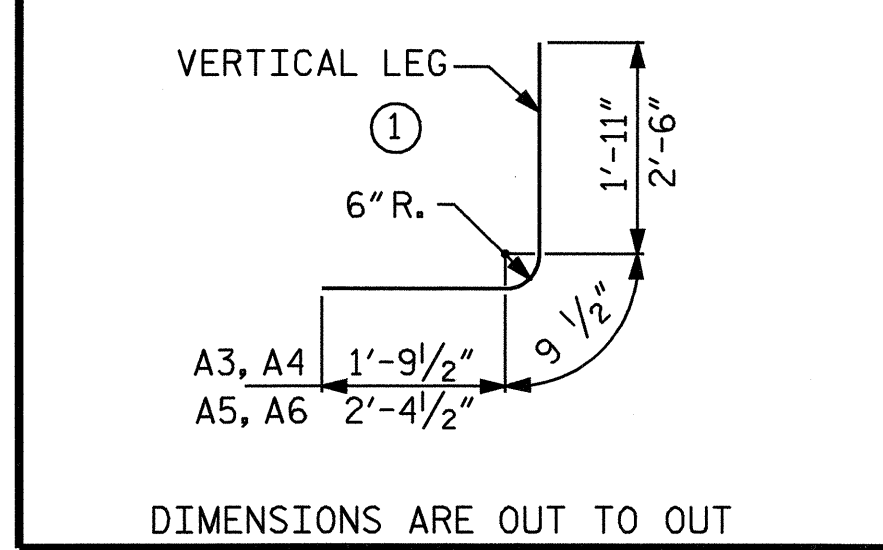
SPLICE LENGTH CHART

BAR	SIZE	LENGTH
B1	5	2'-2"
B3	5	2'-2"
C2	4	1'-11"
C3	4	1'-11"
G2	4	1'-11"

C2	68	4	STR	20'-9"	943
C3	42	4	STR	13'-10"	388
D1	22	6	STR	2'-6"	83
G2	4	4	STR	13'-7"	36
S2	6	8	STR	9'-5"	151
S4	6	8	STR	13'-11"	223

REINFORCING STEEL lbs. 7564

BAR TYPE

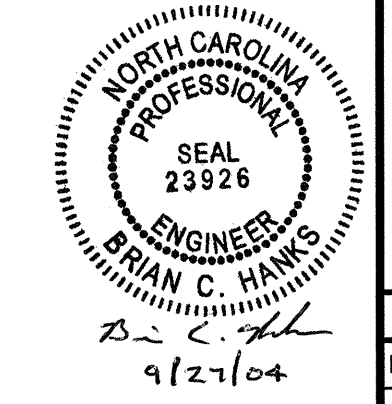


DIMENSIONS ARE OUT TO OUT

TOTAL STRUCTURE QUANTITIES RIGHT CULVERT EXTENSION	
CLASS A CONCRETE	
BARREL	43.1 C.Y.
WINGS, ETC.	15.3 C.Y.
TOTAL	58.4 C.Y.
REINFORCING STEEL	
BARREL	7564 LBS.
WINGS, ETC.	829 LBS.
TOTAL	8393 LBS.
CULVERT EXCAVATION	LUMP SUM
FOUNDATION CONDITIONING MAT'L	35 TONS

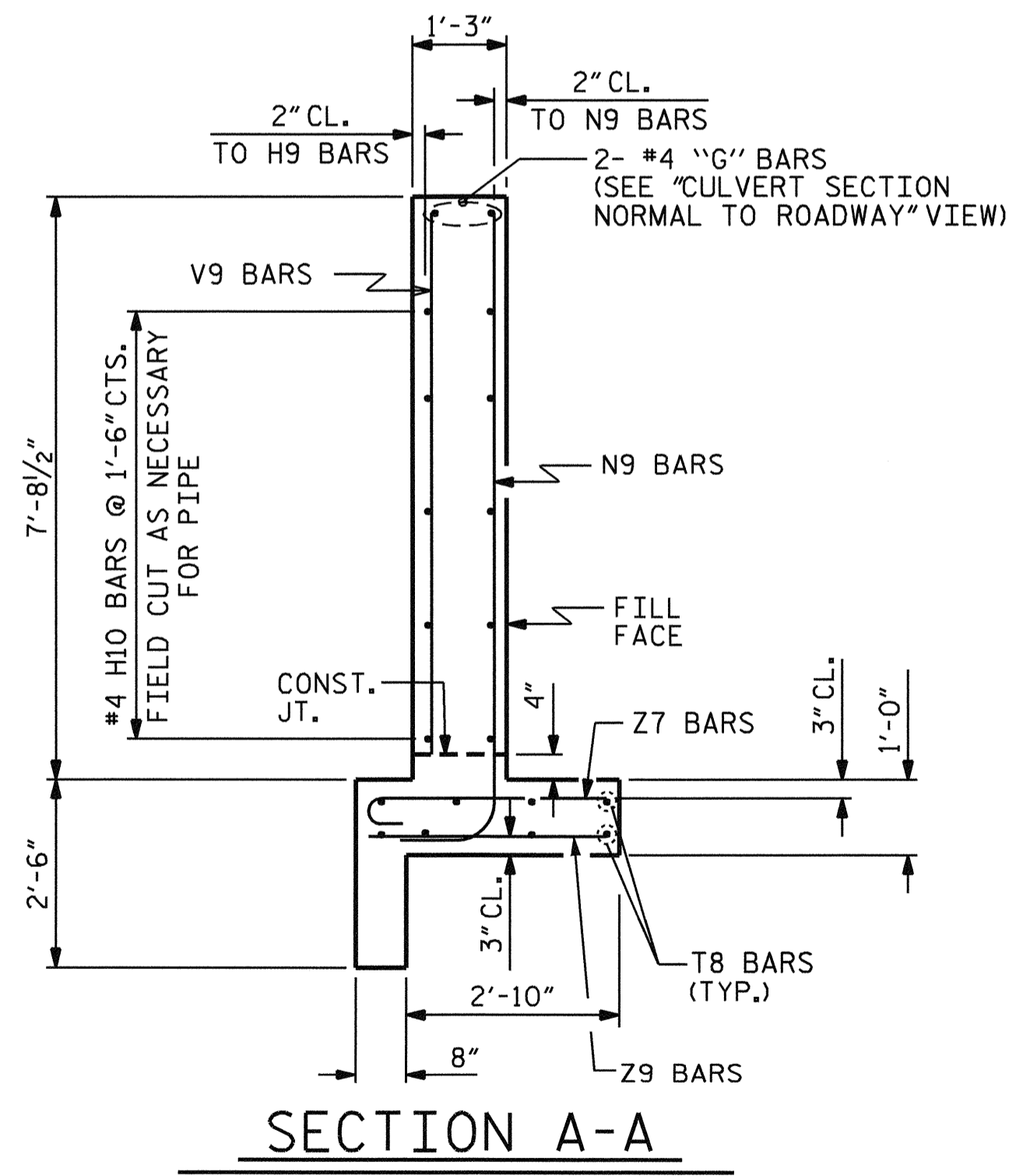
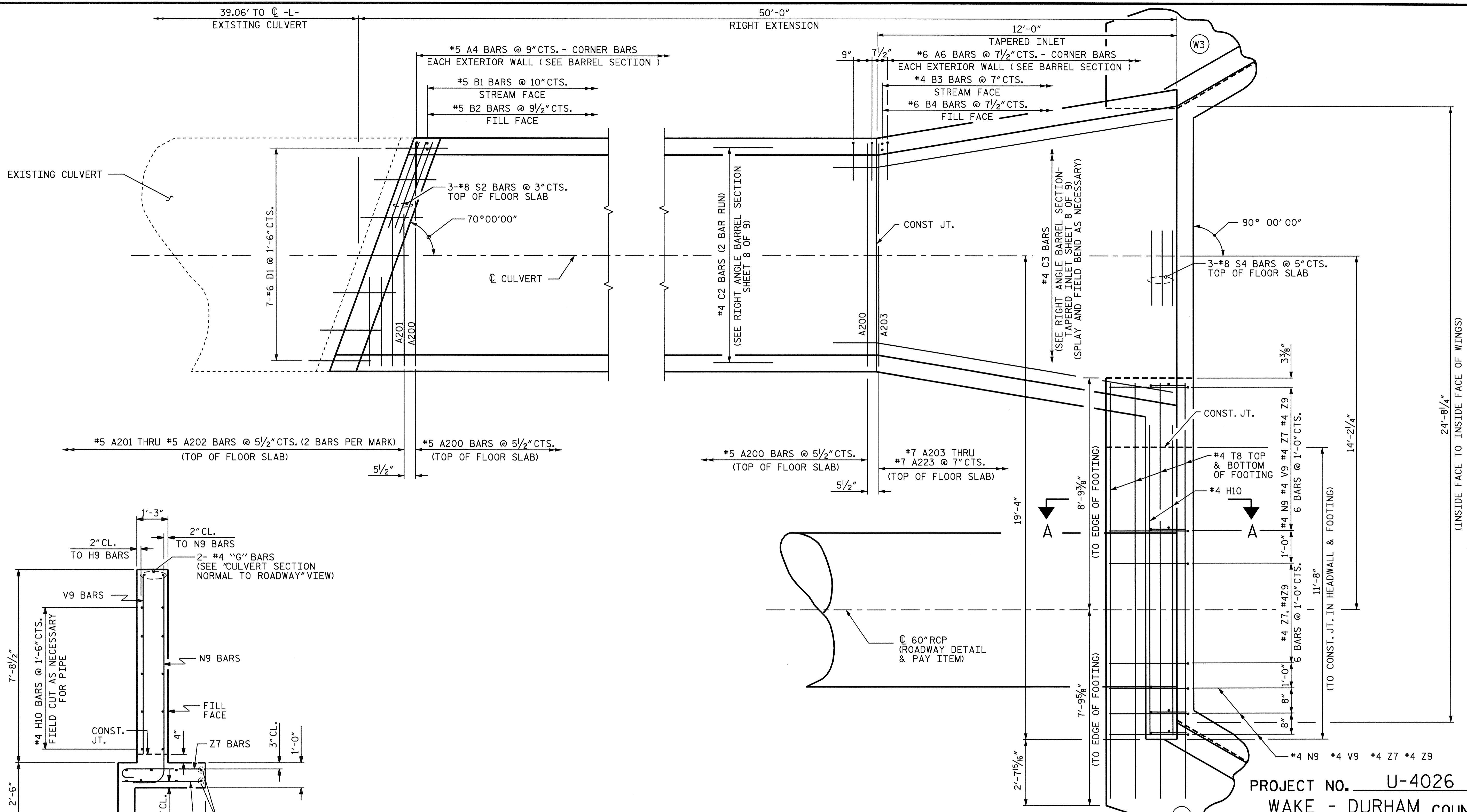
PROJECT NO. U-4026
WAKE - DURHAM COUNTY
STATION: 293+82.10 -L-

SHEET 6 OF 9
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SINGLE 8 FT. X 6 FT.
CONCRETE BOX CULVERT
RIGHT EXTENSION
WITH TAPERED INLET
70° SKEW



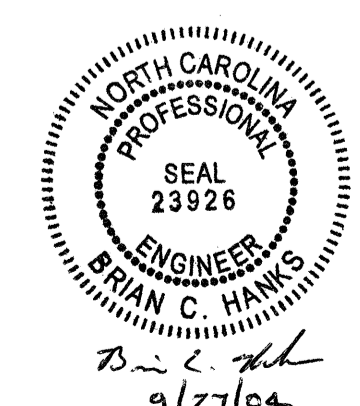
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

DRAWN BY: Neal M. Kiffin DATE: 3/31/04
CHECKED BY: W. F. PARKER DATE: 8/4/04



PLAN OF FLOOR SLAB - RIGHT EXTENSION
 CONCRETE AND REINFORCING STEEL QUANTITIES FOR THE FOOTING AND HEADWALL AROUND THE 60" RCP ARE INCLUDED WITH THE WING QUANTITIES ON SHEET 9 OF 9.

PROJECT NO. U-4026
 WAKE - DURHAM COUNTY
 STATION: 293+82.10 -L-
 SHEET 7 OF 9

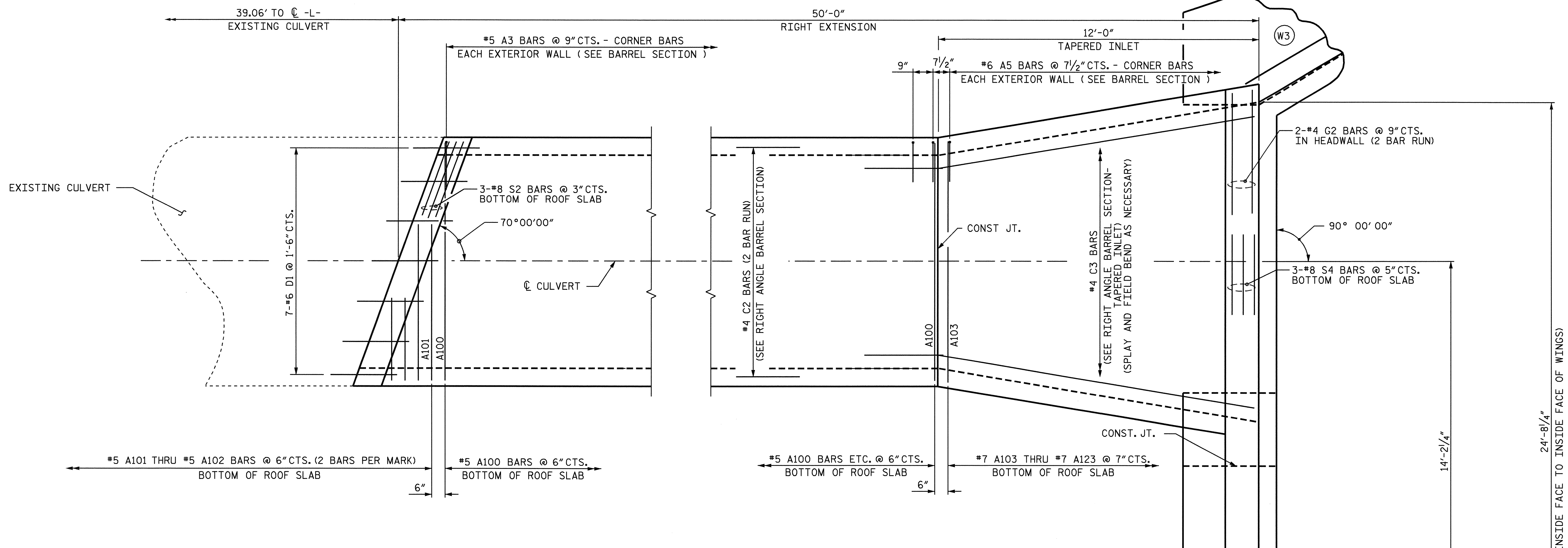


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 8 FT. X 6 FT.
 CONCRETE BOX CULVERT
 RIGHT EXTENSION
 WITH TAPERED INLET
 70° SKEW

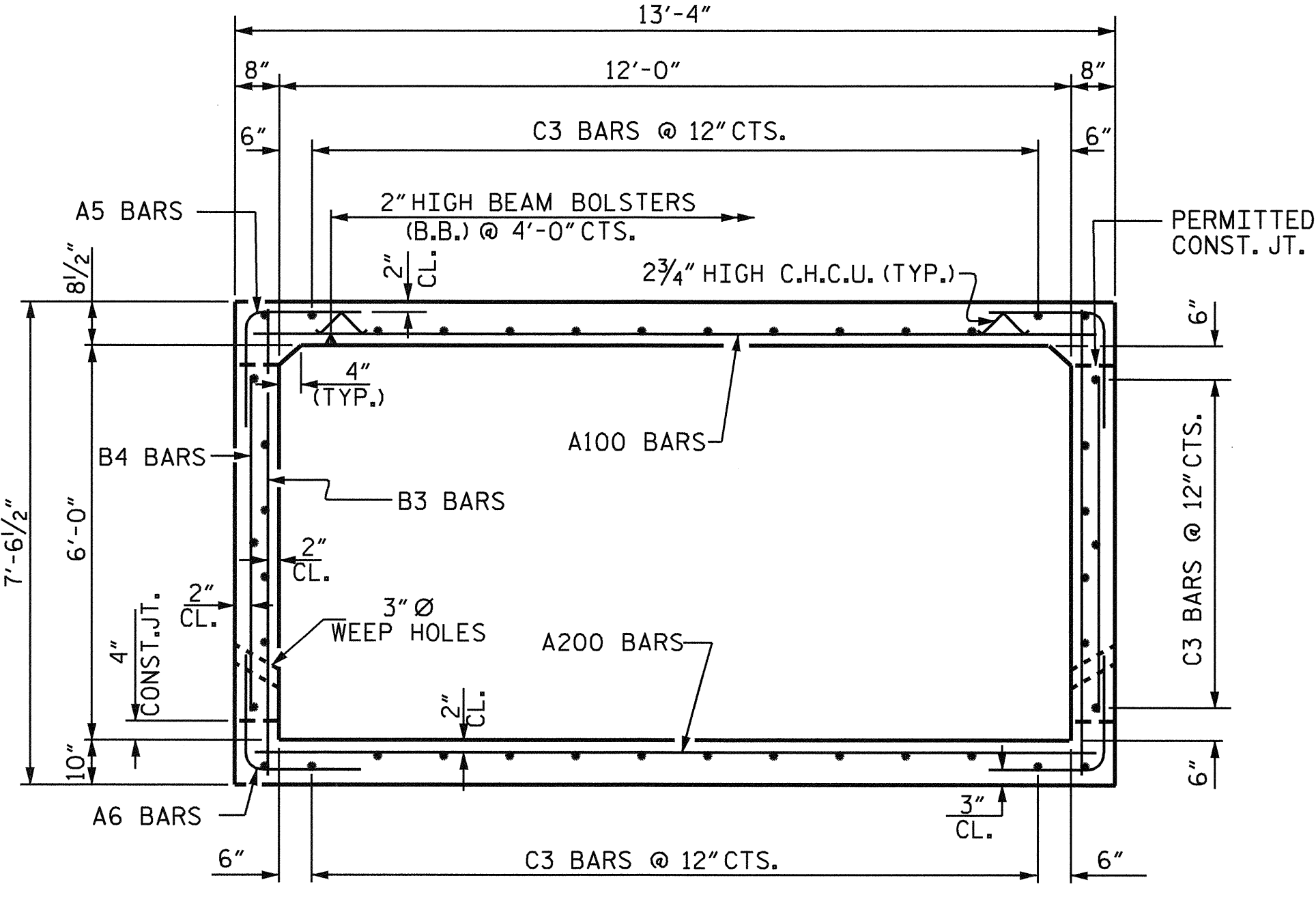
REVISIONS				SHEET NO.	
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

DRAWN BY: Neil M. Ruffin DATE: 3/31/04
 CHECKED BY: W. F. PARKER DATE: 8/4/04

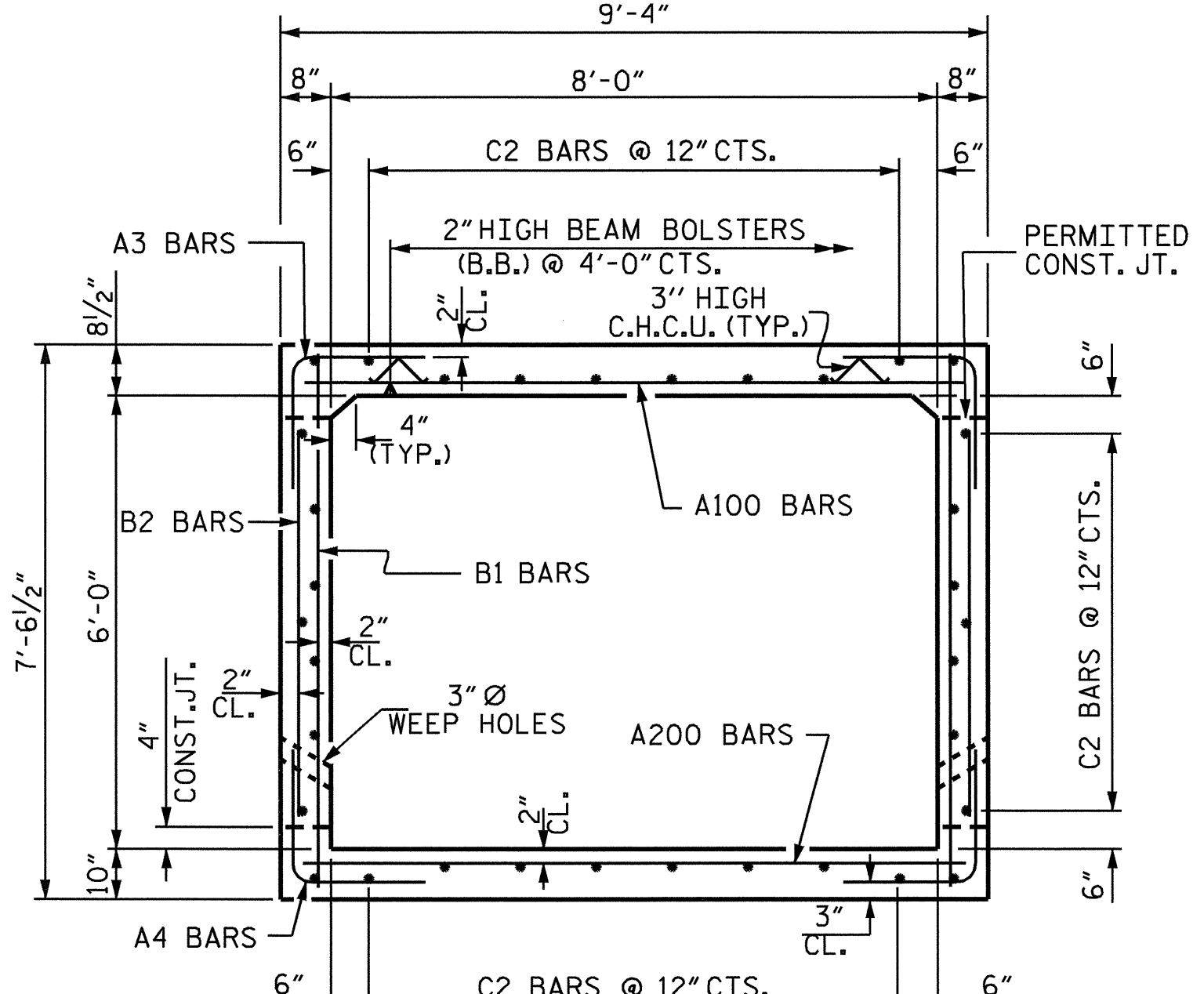
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PLAN OF ROOF SLAB - RIGHT EXTENSION



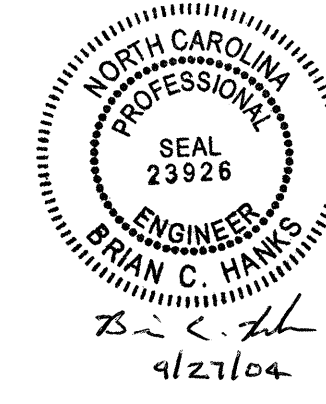
RIGHT ANGLE SECTION OF BARREL - TAPERED INLET
THERE ARE 42 "C" BARS IN SECTION OF BARREL



RIGHT ANGLE SECTION OF BARREL
THERE ARE 34 "C" BARS IN SECTION OF BARREL

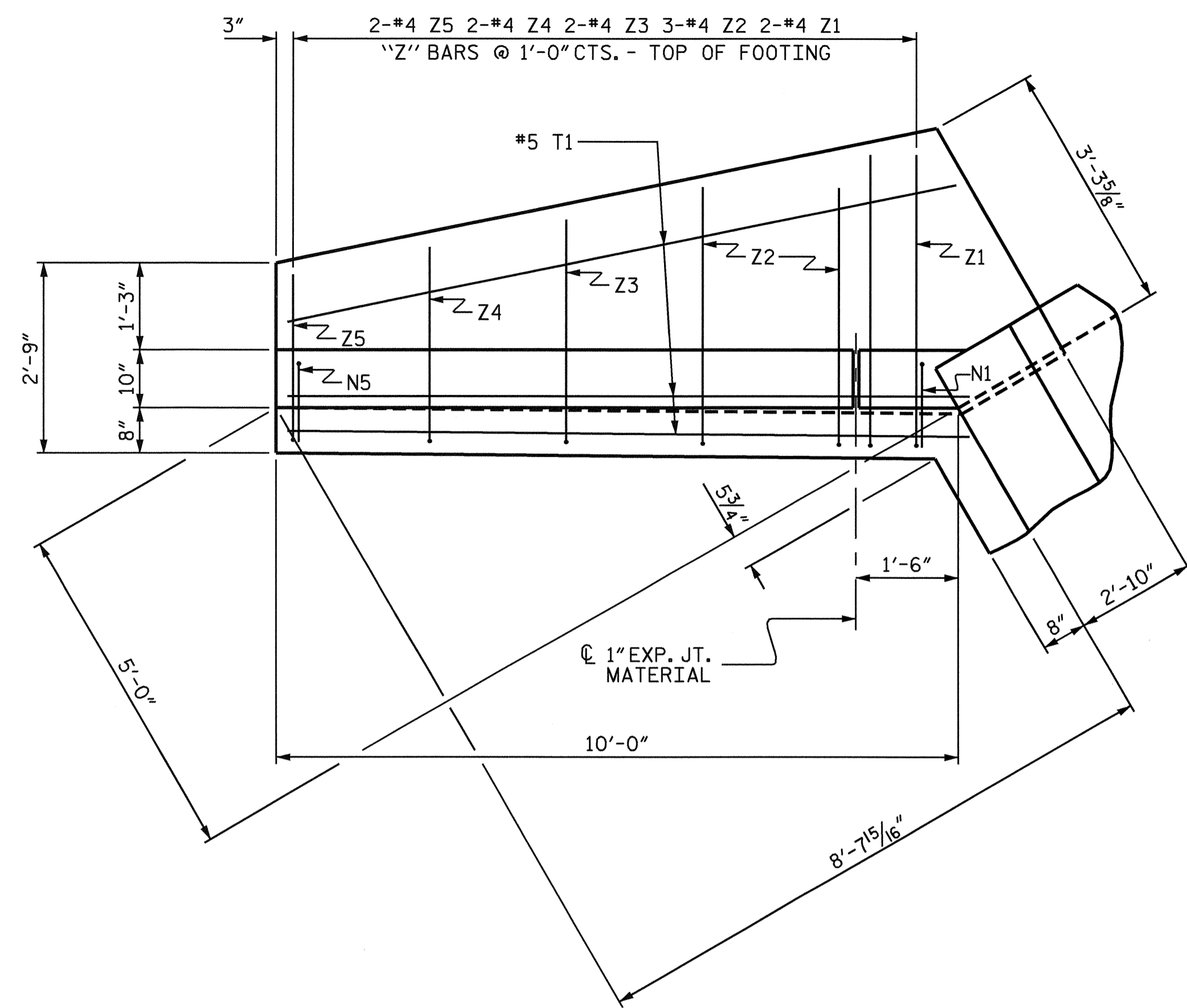
PROJECT NO. U-4026
 WAKE - DURHAM COUNTY
 STATION: 293+82.10 -L-
 SHEET 8 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 8 FT. X 6 FT.
 CONCRETE BOX CULVERT
 RIGHT EXTENSION
 WITH TAPERED INLET
 70° SKEW

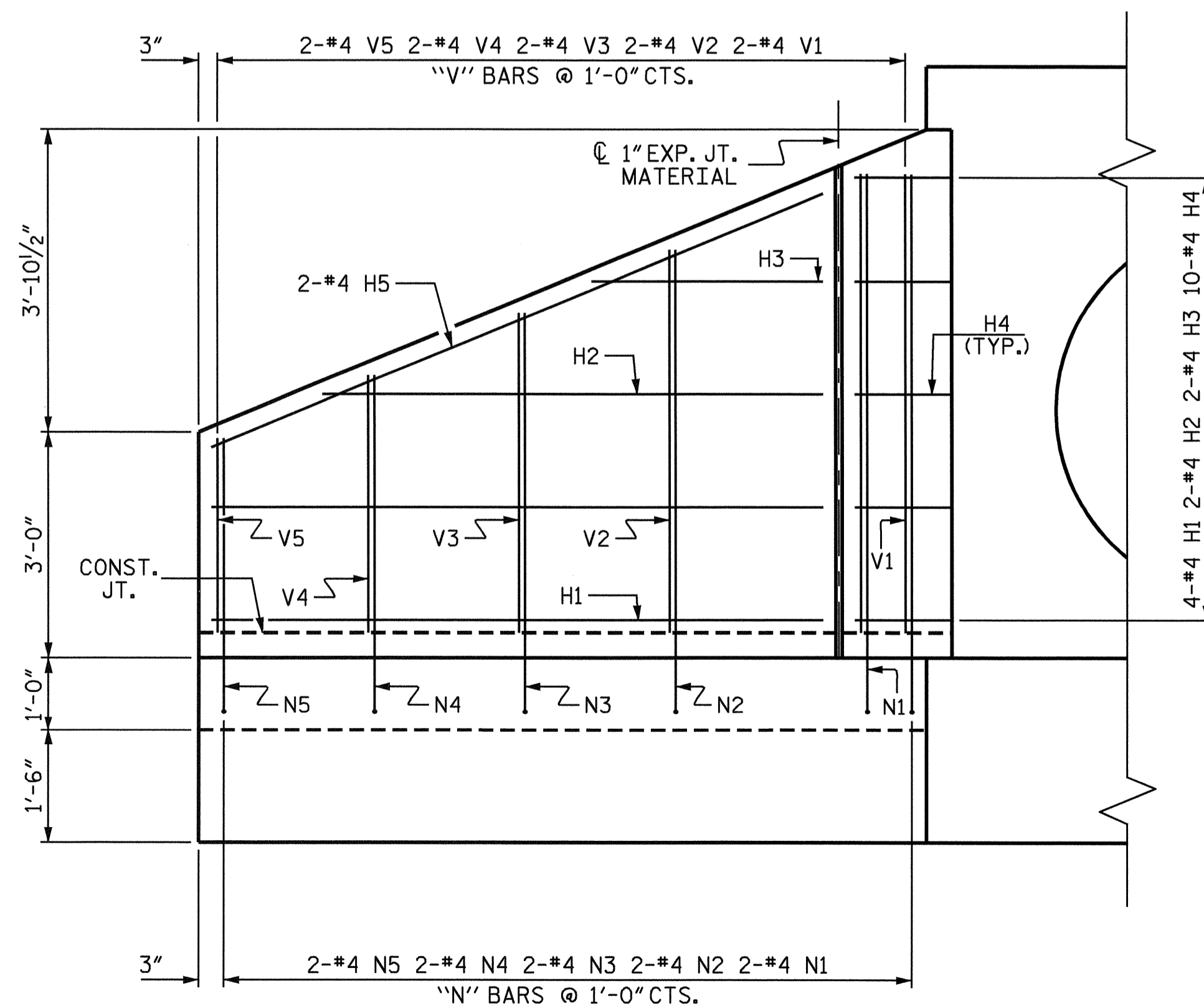


REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-11	
1			3			TOTAL SHEETS	
2			4			15	

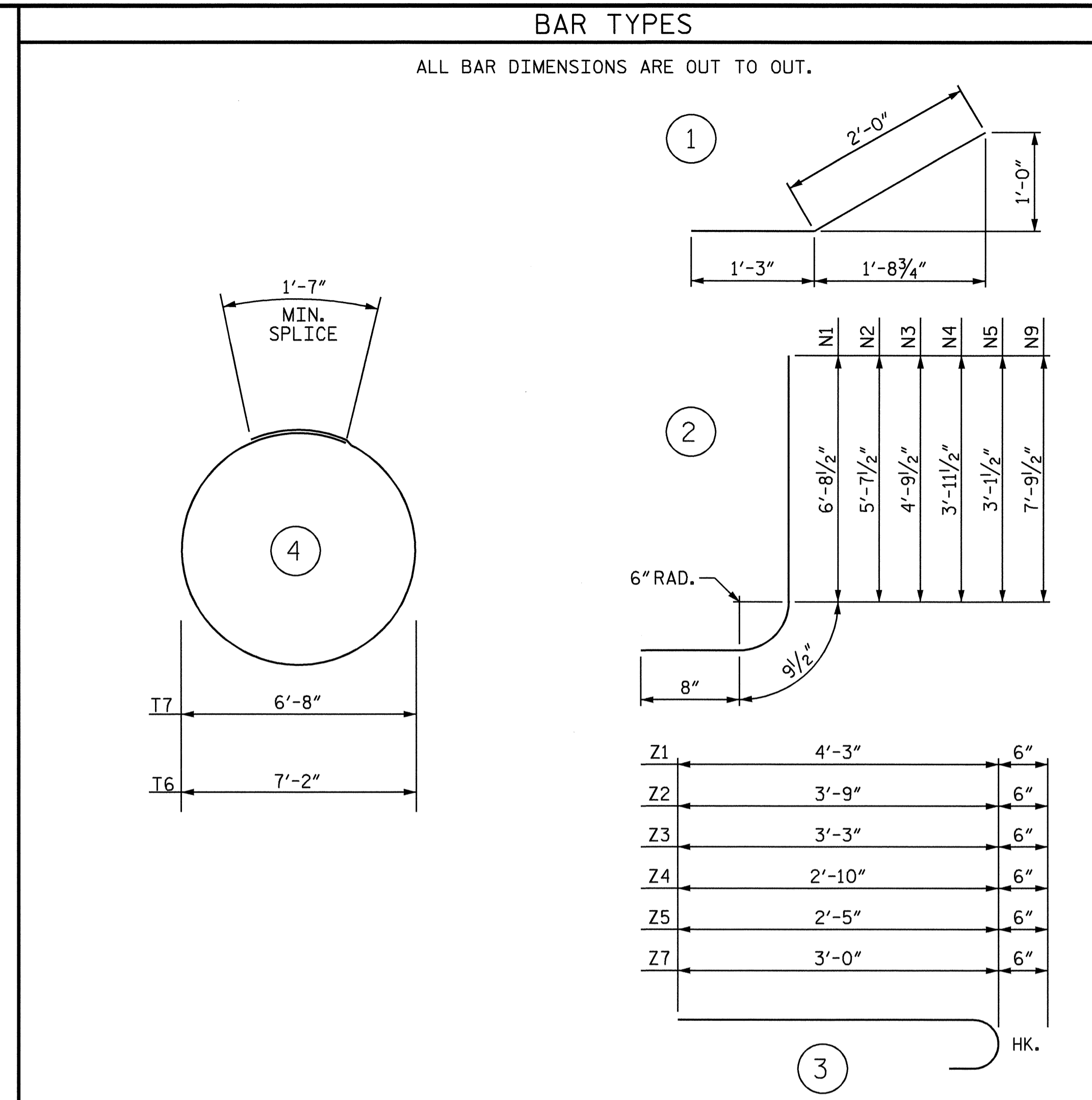
DRAWN BY : Neil M. Ruffin DATE : 3/31/04
 CHECKED BY : W. F. PARKER DATE : 8/4/04



PLAN W3



ELEVATION W3



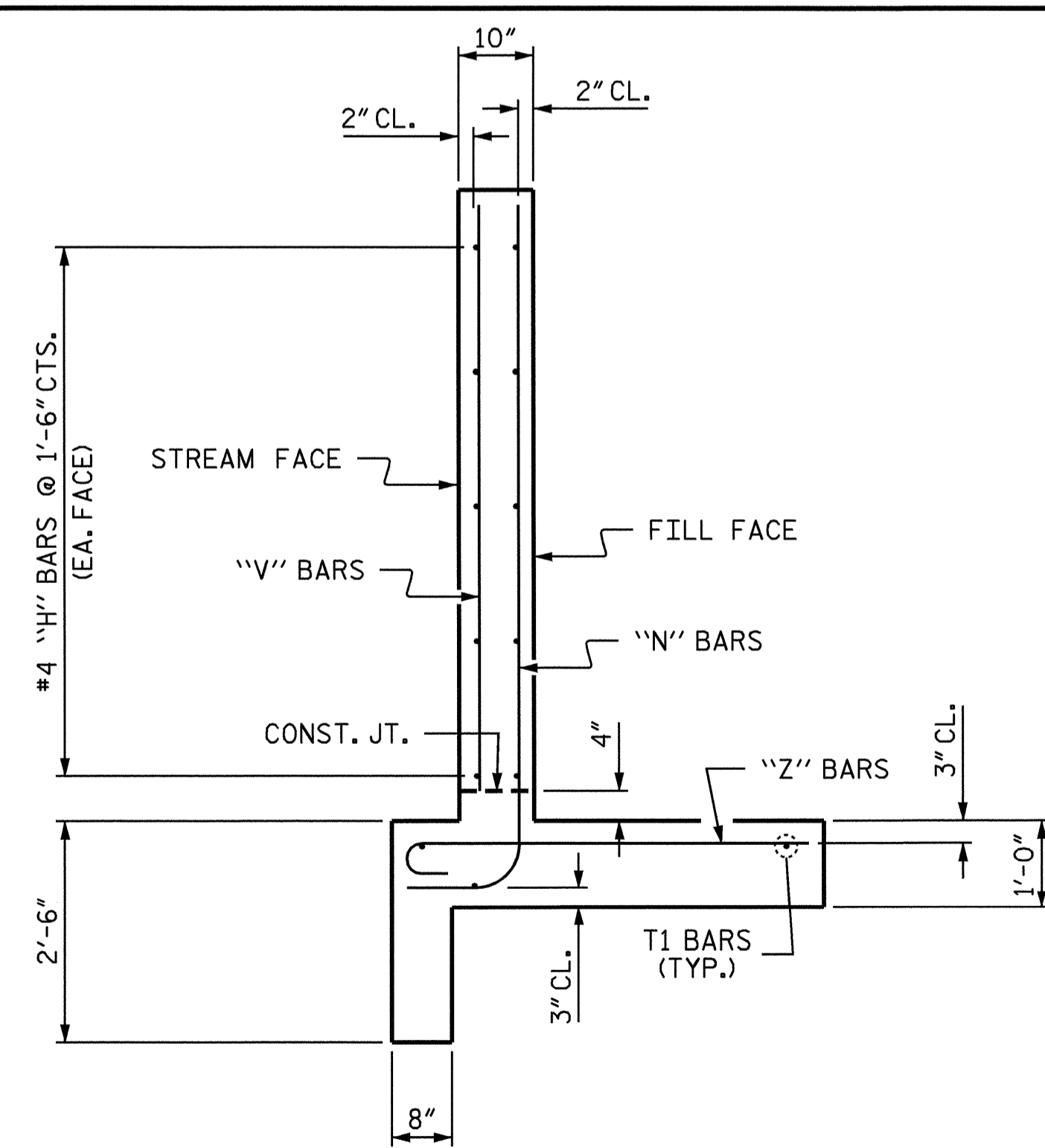
BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL FOR RIGHT EXTENSION WINGS

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	8	4 STR	8'-1"	43
H2	4	4 STR	6'-8"	18
H3	4	4 STR	3'-1"	8
H4	20	4 1	3'-3"	43
H5	4	4 STR	8'-9"	23
H10	10	4 STR	12'-4"	82
N1	4	4 2	8'-2"	22
N2	4	4 2	7'-1"	19
N3	4	4 2	6'-3"	17
N4	4	4 2	5'-5"	14
N5	4	4 2	4'-7"	12
N9	9	4 2	9'-3"	56
T1	6	5 STR	10'-0"	63
T6	2	5 4	24'-8"	51
T7	2	5 4	23'-1"	48
T8	8	4 STR	16'-0"	86
V1	4	4 STR	6'-1"	16
V2	4	4 STR	5'-1"	14
V3	4	4 STR	4'-3"	11
V4	4	4 STR	3'-5"	9
V5	4	4 STR	2'-7"	7
V9	9	4 STR	7'-2"	43
Z1	4	4 3	4'-9"	13
Z2	6	4 3	4'-3"	17
Z3	4	4 3	3'-9"	10
Z4	4	4 3	3'-4"	9
Z5	4	4 3	2'-11"	8
Z7	15	4 3	3'-6"	35
Z9	15	4 STR	3'-2"	32
REINFORCING STEEL FOR 2 WINGS				lbs. 829
CLASS A CONCRETE				
2 WINGS				7.2 CY
* 1 HEADWALL				5.9 CY
1 END CURTAIN WALL				1.5 CY
2 EDGE BEAMS				0.7 CY
TOTAL				15.3 CY

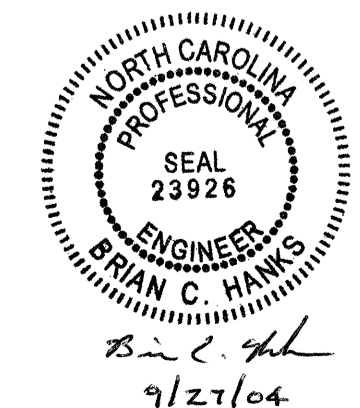
NOTE: HEADWALL CONCRETE QUANTITY INCLUDES CONCRETE FROM WALL AROUND 60" RCP



TYPICAL WING SECTION

PROJECT NO. U-4026
WAKE - DURHAM COUNTY
STATION: 293+82.10 -L-

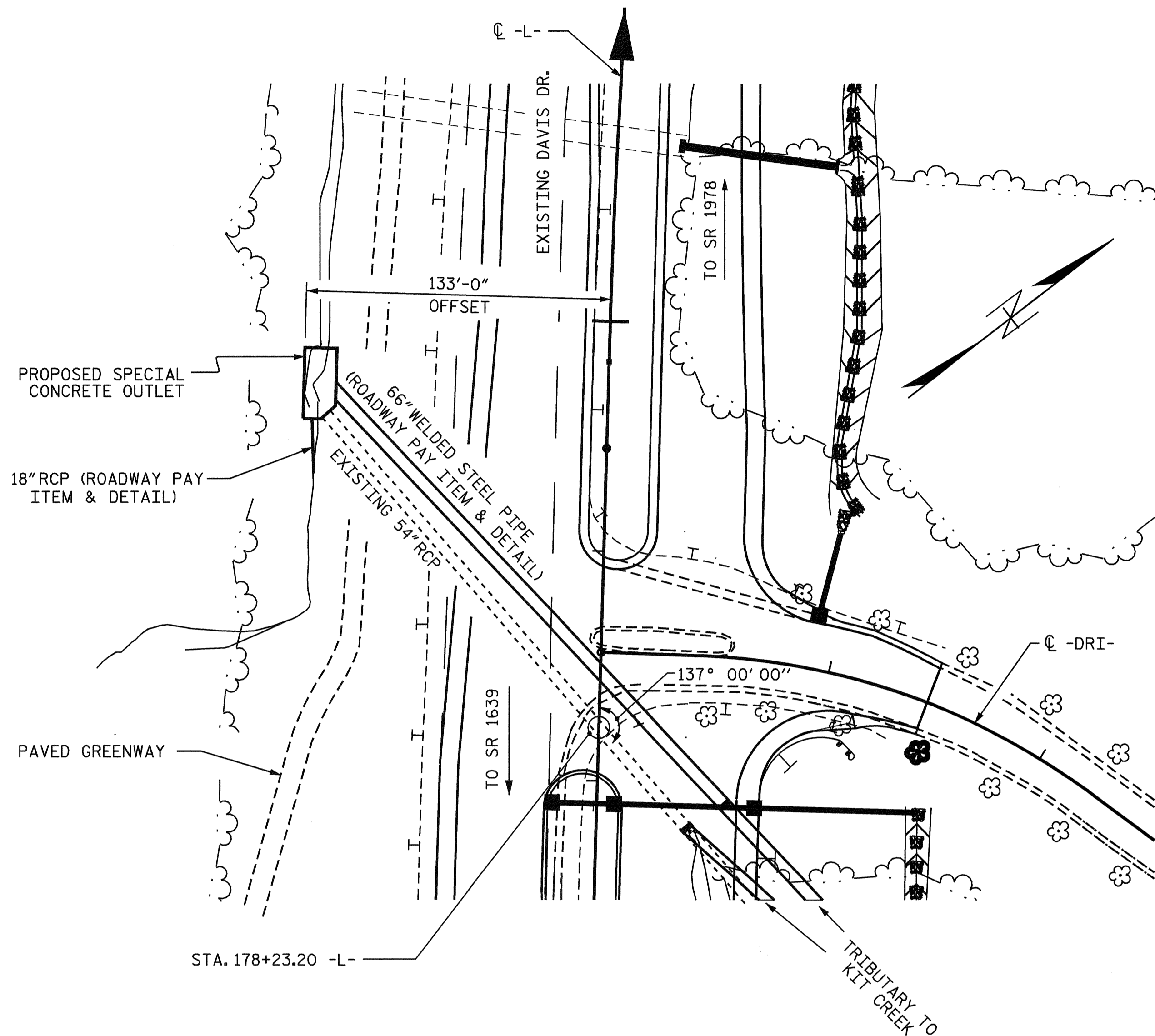
SHEET 9 OF 9
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
CULVERT WINGS FOR CONCRETE BOX CULVERT RIGHT EXTENSION
H = 6'-0" SLOPE = 2:1
90° SKEW



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-12	
1			3			TOTAL SHEETS	
2			4			15	

ASSEMBLED BY: Neil M. Ruffin DATE: 3/31/04
CHECKED BY: W. F. PARKER DATE: 8/4/04

BENCH MARK #11: "X" CUT IN SE CORNER OF CONCRETE RETAINING WALL 325.31' LT. OF STA. 188+61.78 -L-, ELEV.=300.29'



HYDRAULIC DATA

GRADE PT. EL. @ STA. 178+23.20 -L-	= 302.620
BED EL. @ STA. 178+23.20 -L-	= 276.506
ROADWAY SLOPES	= 2 : 1
DESIGN DISCHARGE	= 440 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEVATION	= 289.8±
DRAINAGE AREA	= 150 AC
BASIC DISCHARGE	= 500 C.F.S.
BASIC HIGH WATER ELEVATION	= 291.5±

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

FOR PIPE SIZES AND DRAINAGE DETAILS, SEE ROADWAY PLANS

LOCATION SKETCH

DRAWN BY : K K PUROHIT DATE : 7/01/04
 CHECKED BY : A B NAIK DATE : 7/07/04

30-SEP-2004 12:29
 W:\squadg\4026b\FINAL_PLANS\4026b_cul.ed_03.dgn
 bhanks

BILL OF MATERIAL

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
A100	30	#4	STR.	14'-11"	299	A1	96	#4	1	5'-7"	358
A101	1	#4	STR.	14'-5"	10	A2	154	#4	1	5'-7"	574
A102	1	#4	STR.	13'-5"	9						
A103	1	#4	STR.	12'-6"	8	B1	77	#4	STR.	7'-11"	407
A104	1	#4	STR.	11'-7"	8	B2	113	#4	STR.	6'-7"	497
A105	1	#4	STR.	10'-8"	7						
A106	1	#4	STR.	9'-9"	7	C1	8	#4	STR.	24'-7"	131
A107	1	#4	STR.	8'-10"	6	C2	8	#4	STR.	10'-11"	58
A108	1	#4	STR.	7'-11"	5	C3	8	#4	STR.	6'-11"	37
A109	1	#4	STR.	7'-0"	5	C4	80	#4	STR.	17'-0"	908

A200	40	#4	STR.	14'-11"	399	D1	2	#6	STR.	3'-10"	12
A201	1	#4	STR.	14'-10"	10	D2	2	#6	STR.	2'-10"	9
A202	1	#4	STR.	14'-2"	9	D3	8	#6	STR.	1'-10"	22
A203	1	#4	STR.	13'-5"	9	D4	2	#6	STR.	2'-6"	8
A204	1	#4	STR.	12'-9"	9	D5	2	#6	STR.	3'-6"	11
A205	1	#4	STR.	12'-0"	8	D6	2	#6	STR.	4'-6"	14
A206	1	#4	STR.	11'-5"	8	D7	12	#6	STR.	2'-3"	41
A207	1	#4	STR.	10'-8"	7						
A208	1	#4	STR.	10'-0"	7	H1	2	#4	STR.	13'-8"	18
A209	1	#4	STR.	9'-3"	6	H2	2	#4	2	15'-4"	20
A210	1	#4	STR.	8'-7"	6						
A211	1	#4	STR.	7'-11"	5	S1	2	#4	3	26'-5"	35
A212	1	#4	STR.	7'-3"	5	S2	2	#4	3	24'-10"	33

SPLICE LENGTH CHART

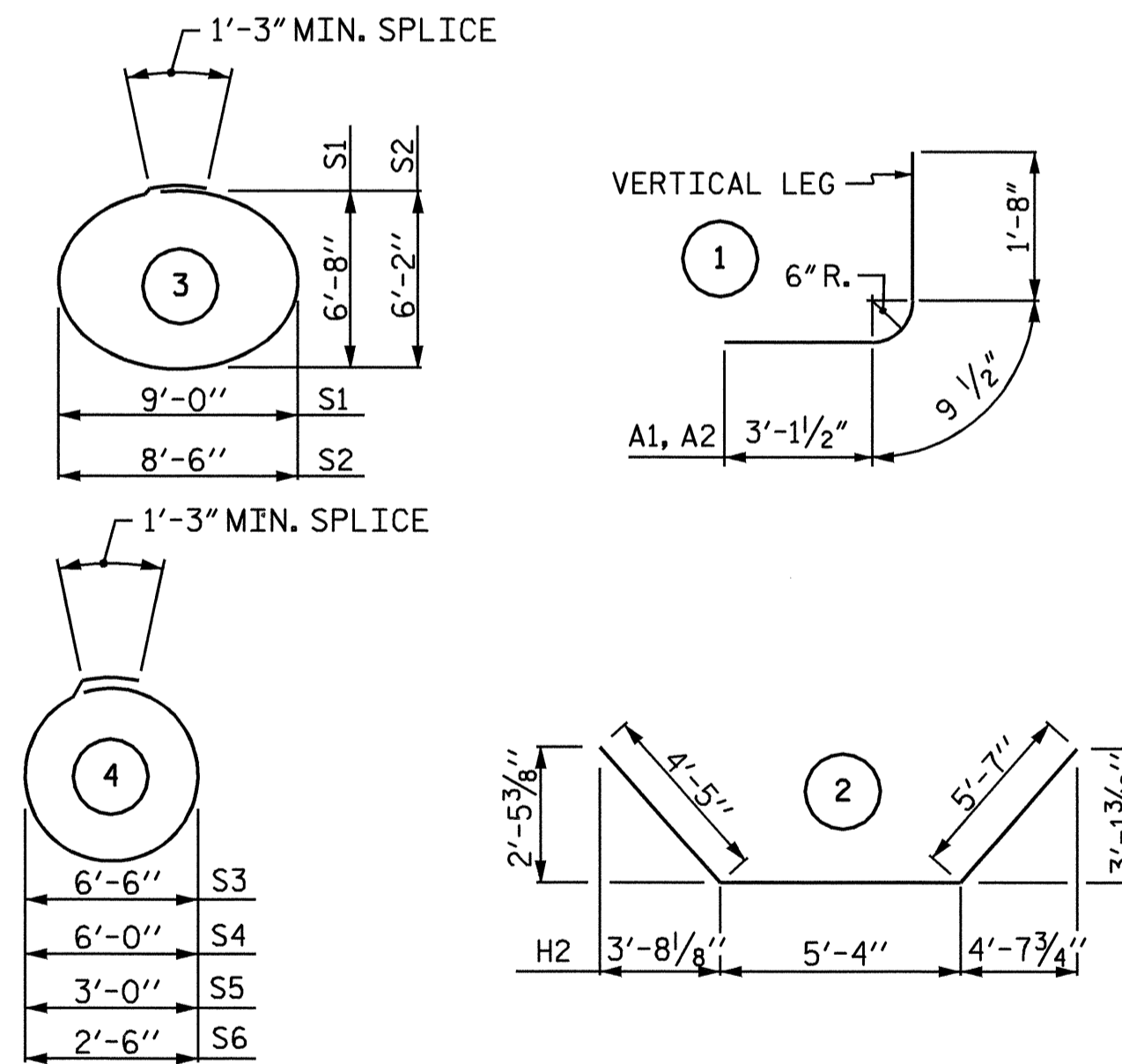
BAR	SIZE	LENGTH
B1	#4	1'-9"
C1	#4	1'-11"

S3	2	#4	4	22'-2"	30
S4	2	#4	4	20'-7"	27
S5	2	#4	4	11'-2"	15
S6	2	#4	4	9'-7"	13

REINFORCING STEEL = 4130 LBS

CLASS A CONCRETE = 34.8 C.Y.

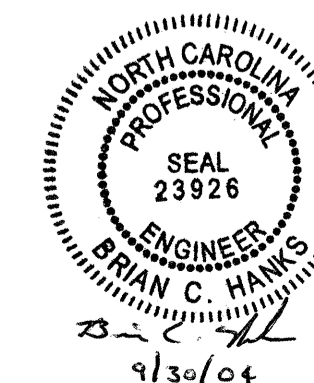
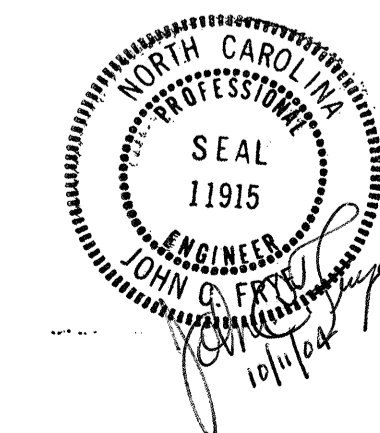
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE	34.8 C.Y.
REINFORCING STEEL	4130 LBS.
SPECIAL CONCRETE OUTLET EXCAVATION	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	35 TONS



NOTES

NO LIVE LOAD IS ASSUMED.

NO DESIGN FILL IS ASSUMED.

FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET SN.

3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH SPECIFICATIONS.

CONCRETE IN OUTLET STRUCTURE TO BE POURED IN THE FOLLOWING ORDER:

1. FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS, EXCEPT WEIR WALL.
2. THE REMAINING PORTIONS OF WALLS EXCEPT WEIR WALL FOLLOWED BY ROOF SLAB.
3. WEIR WALL.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE VERTICAL REINFORCING STEELS IN THE INTERIOR FACE OF 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 SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

DOWELS SHALL BE USED TO CONNECT THE WEIR WALL TO THE SIDE WALLS AND FLOOR AS SHOWN. FOR NOTE REGARDING SETTING OF DOWELS, SEE SHEET SN.

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 SPECIAL CONCRETE OUTLET EXCAVATION, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

PROJECT NO. U-4026
 WAKE - DURHAM COUNTY
 STATION: 178+23.20 -L-

SHEET 1 OF 3

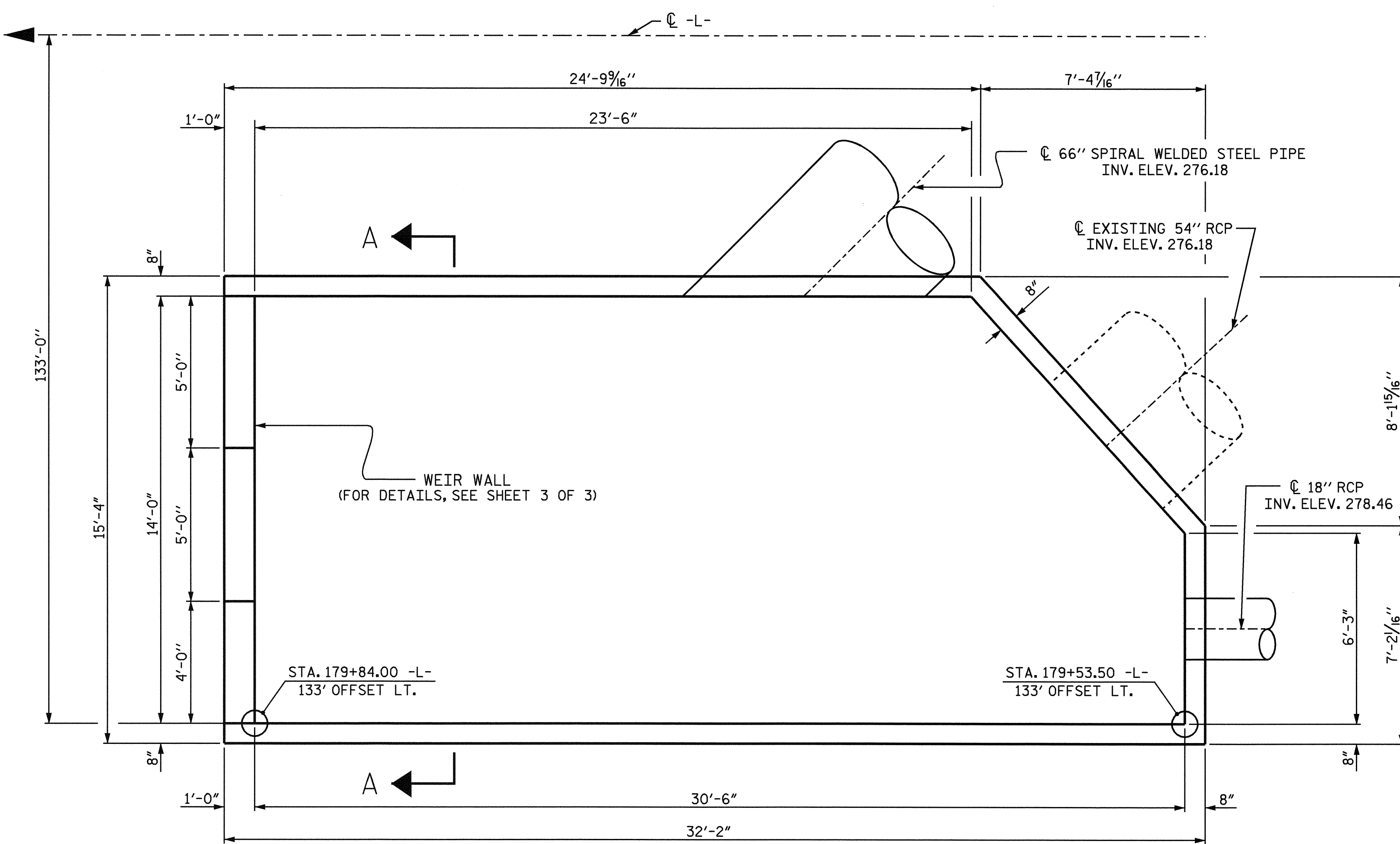
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SPECIAL CONCRETE
 OUTLET**

REVISIONS

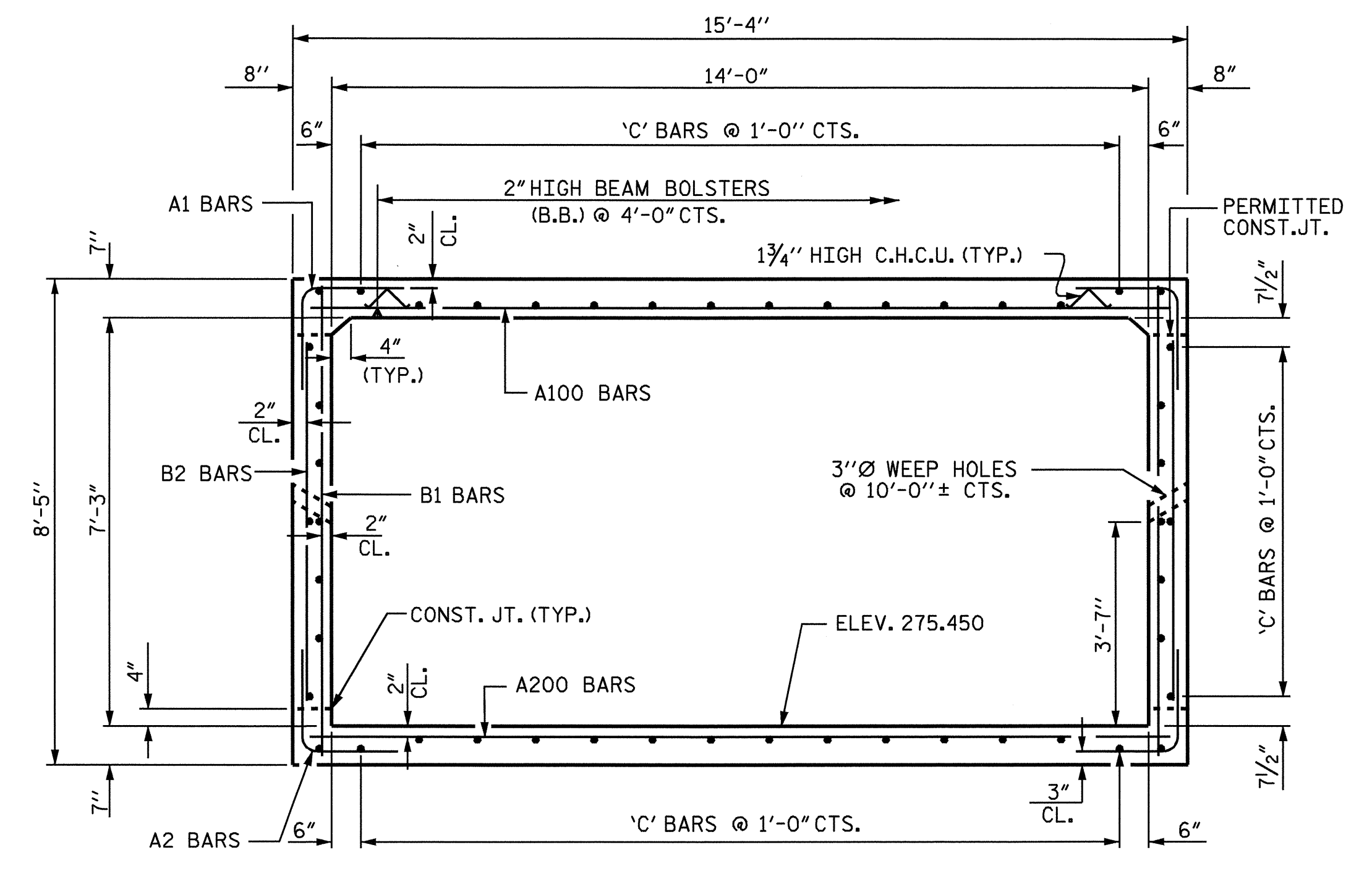
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.
 C-13
 TOTAL SHEETS
 15



PLAN

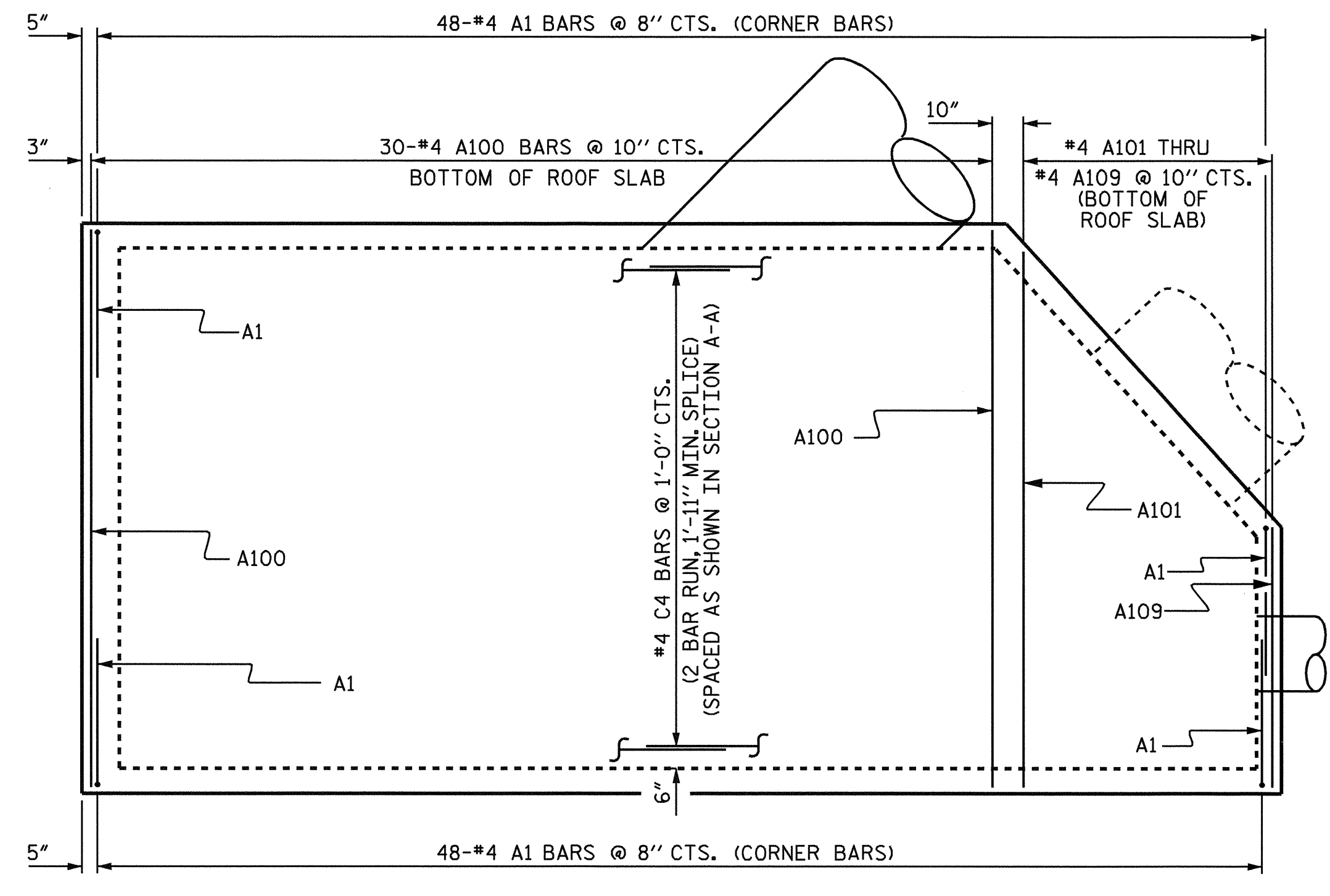
(SHOWING OUTLET LOCATION & DIMENSIONS)



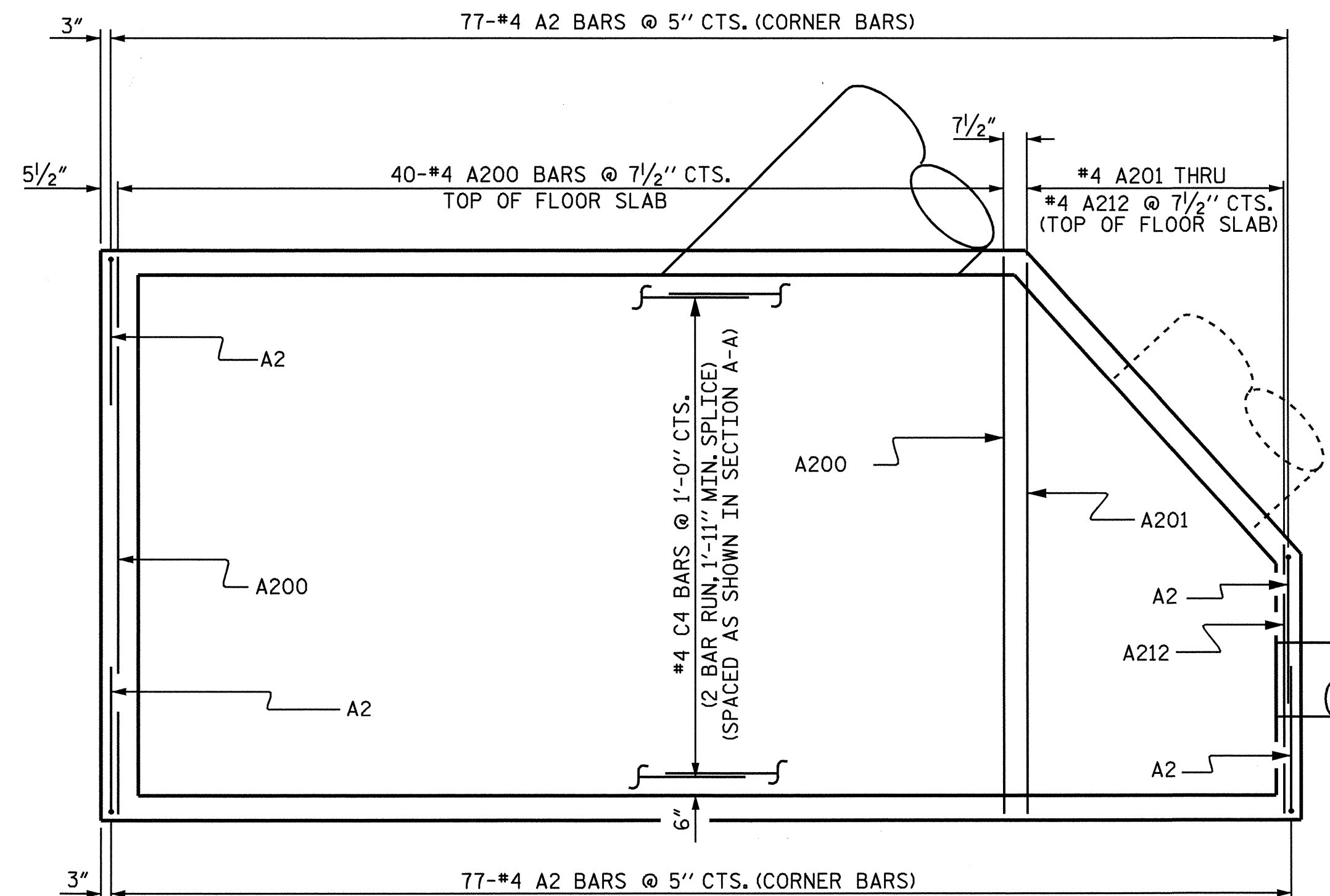
SECTION A-A

(THERE ARE 48 'C' BARS IN SECTION)

NOTE: FOR REINFORCING STEEL IN WALLS AND AROUND PIPES, SEE SHEET 3 OF 3.



PLAN OF ROOF SLAB



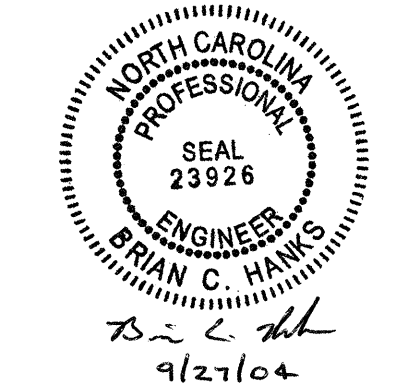
PLAN OF FLOOR SLAB

PROJECT NO. U-4026
 WAKE - DURHAM COUNTY
 STATION: 178+23.20 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

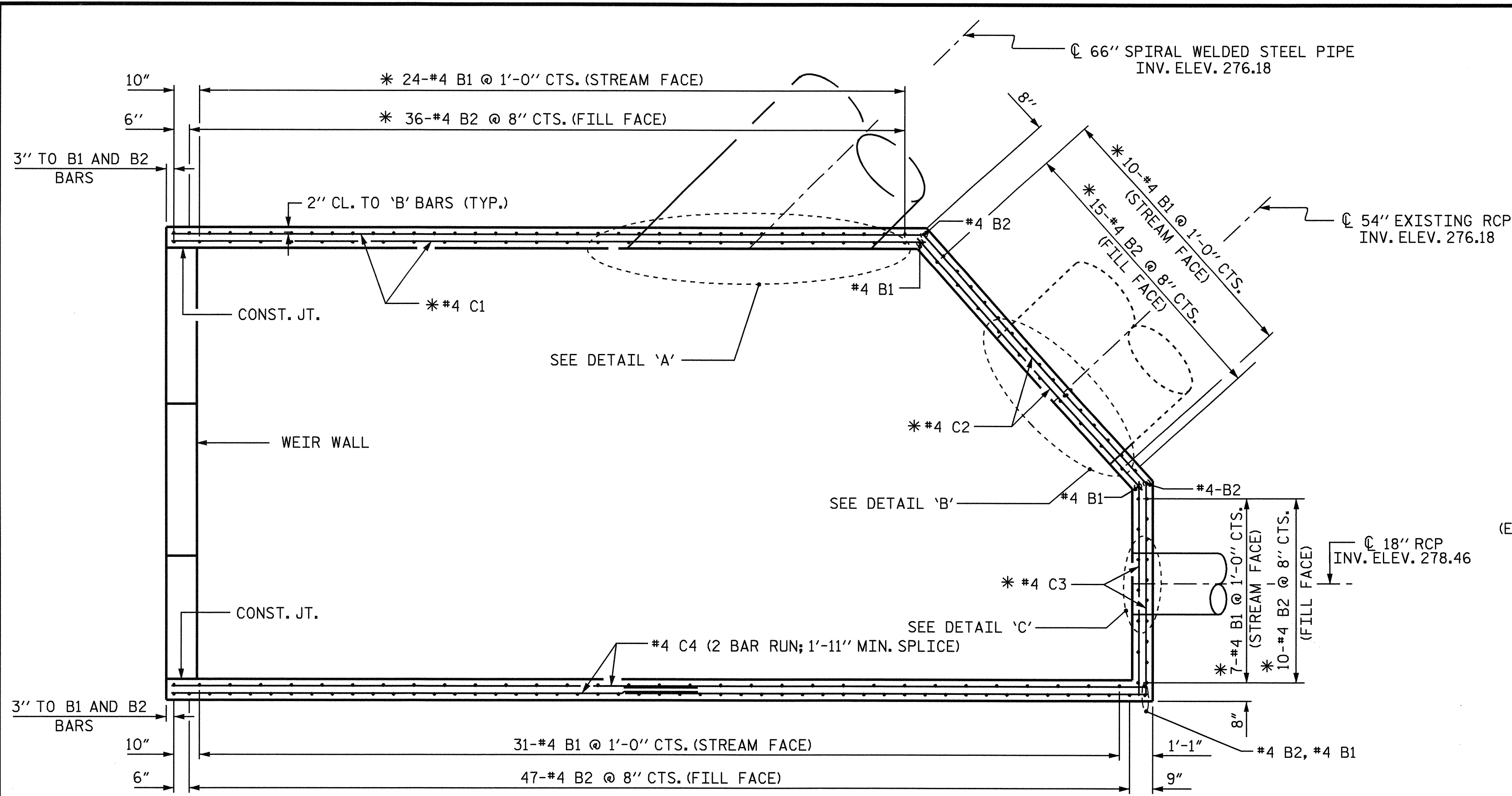
**SPECIAL CONCRETE
 OUTLET**



DRAWN BY: K K PUROHIT DATE: 5/27/04
 CHECKED BY: A B NAIK DATE: 7/07/04

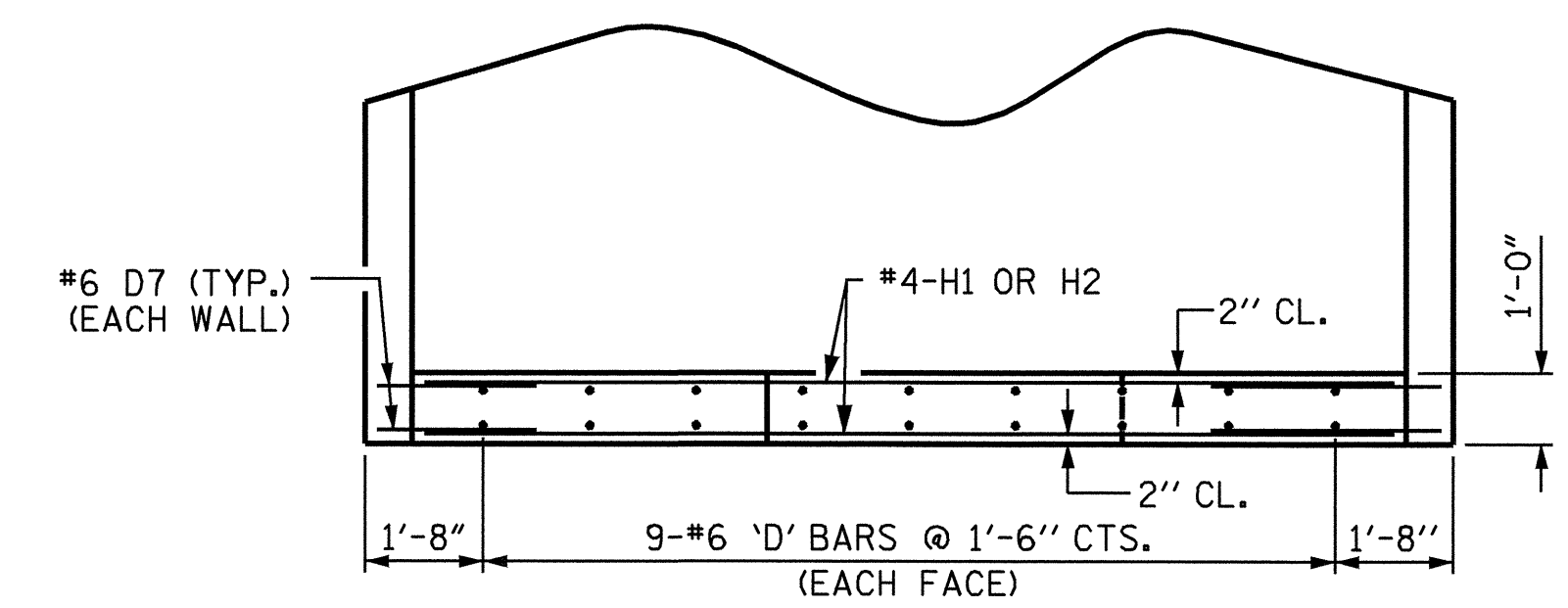
23-SEP-2004 12:23
 W:\sq\gdg\4026b\FINAL_PLANS\4026b_eul_sd_03.dgn
 wparker

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-14	
1			3			TOTAL	15
2			4			SHEETS	15

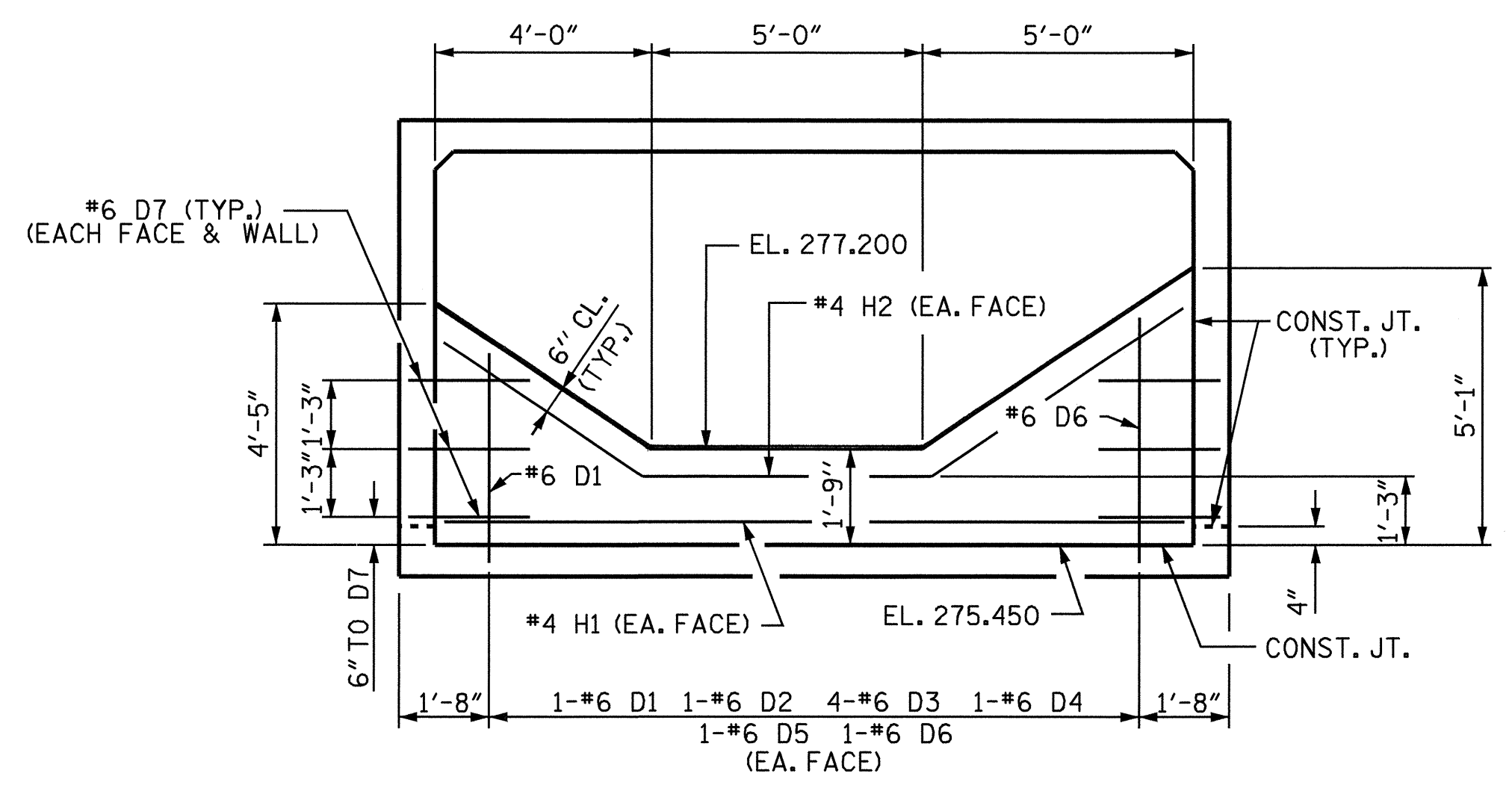


PLAN

(SHOWING REINFORCING STEEL IN WALLS)
 *FIELD CUT OR BEND AS NEEDED TO AVOID INTERFERENCE WITH PIPE

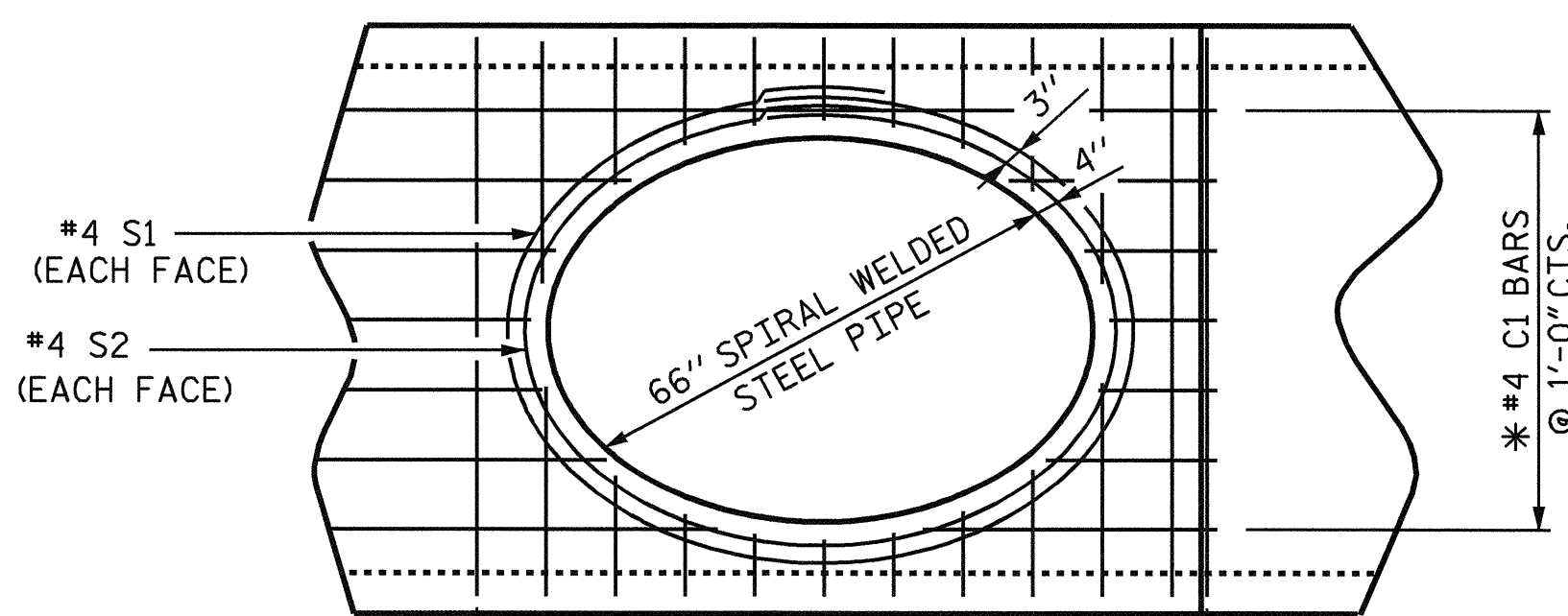


WEIR WALL PLAN VIEW



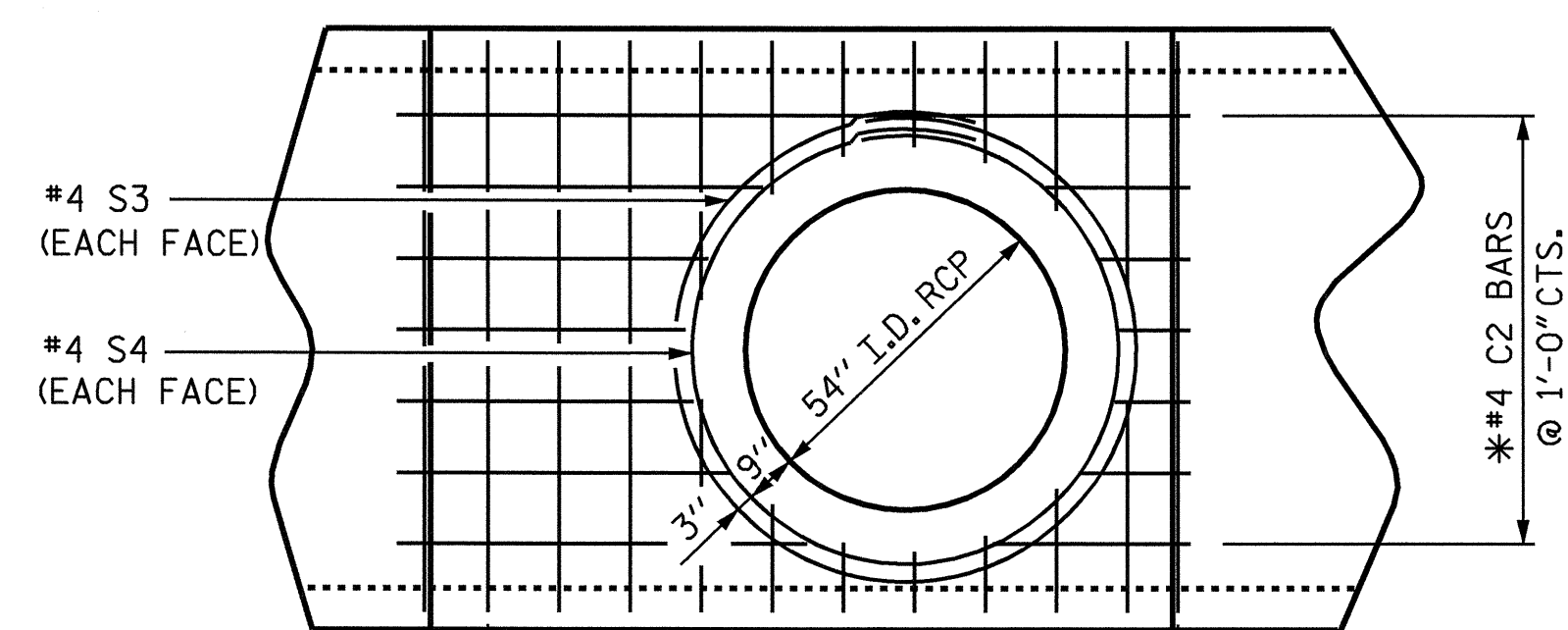
WEIR WALL ELEVATION

(LOOKING DOWNSTREAM)



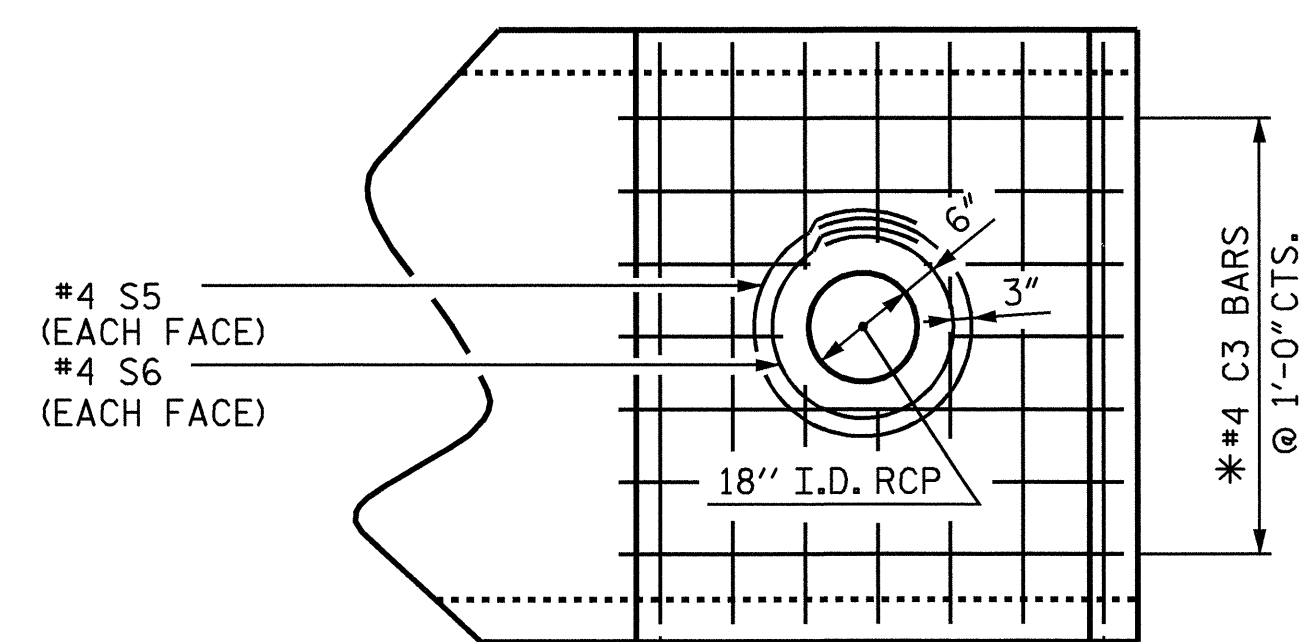
DETAIL A

(SHOWING 66" SPIRAL WELDED STEEL PIPE)
 *FIELD CUT OR BEND AS NEEDED TO AVOID INTERFERENCE WITH PIPE



DETAIL B

(SHOWING EXISTING 54" RCP)
 *FIELD CUT OR BEND AS NEEDED TO AVOID INTERFERENCE WITH PIPE



DETAIL C

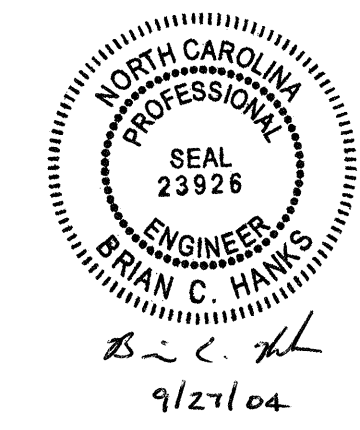
(SHOWING 18" RCP)
 *FIELD CUT OR BEND AS NEEDED TO AVOID INTERFERENCE WITH PIPE

PROJECT NO. U-4026
 WAKE - DURHAM COUNTY
 STATION: 178+23.20 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

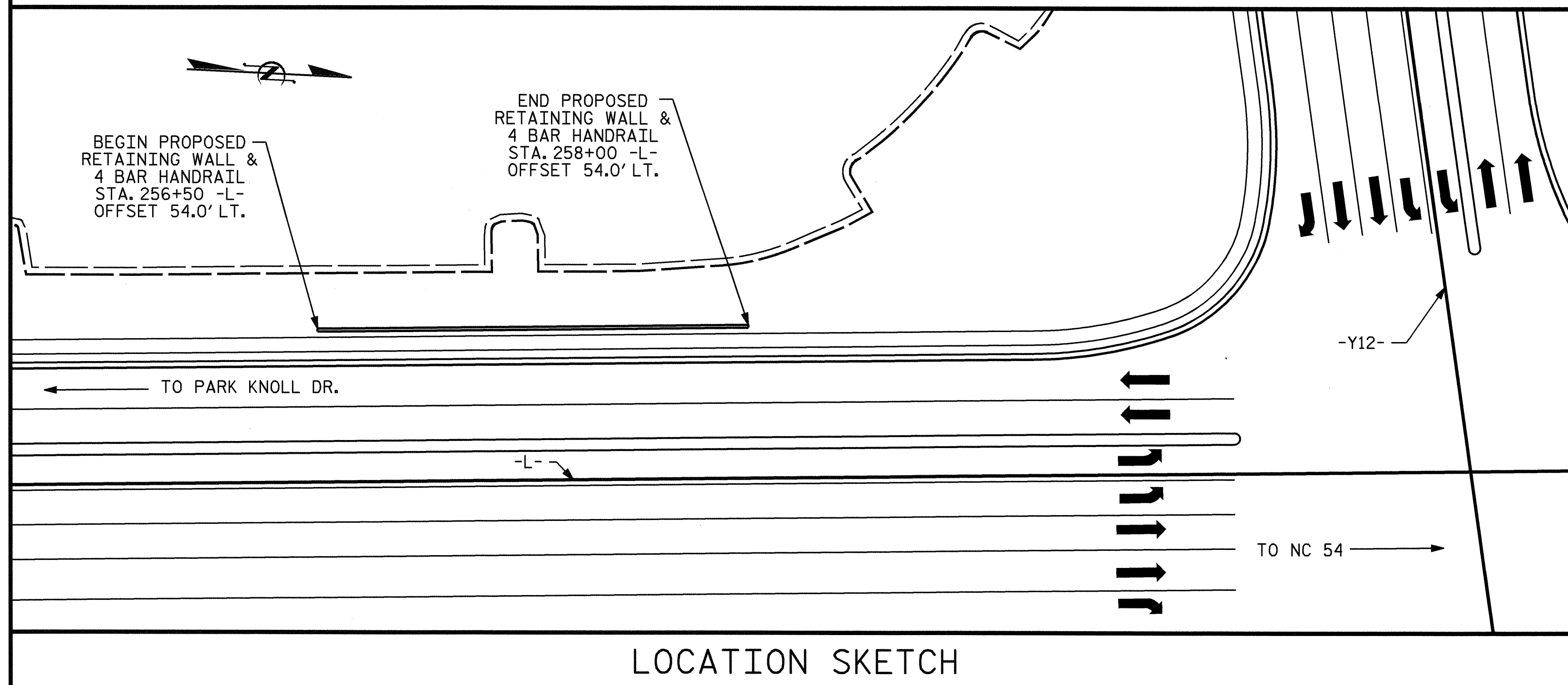
**SPECIAL CONCRETE
 OUTLET**



DRAWN BY : K K PUROHIT DATE : 5/24/04
 CHECKED BY : A B NAIK DATE : 7/07/04

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

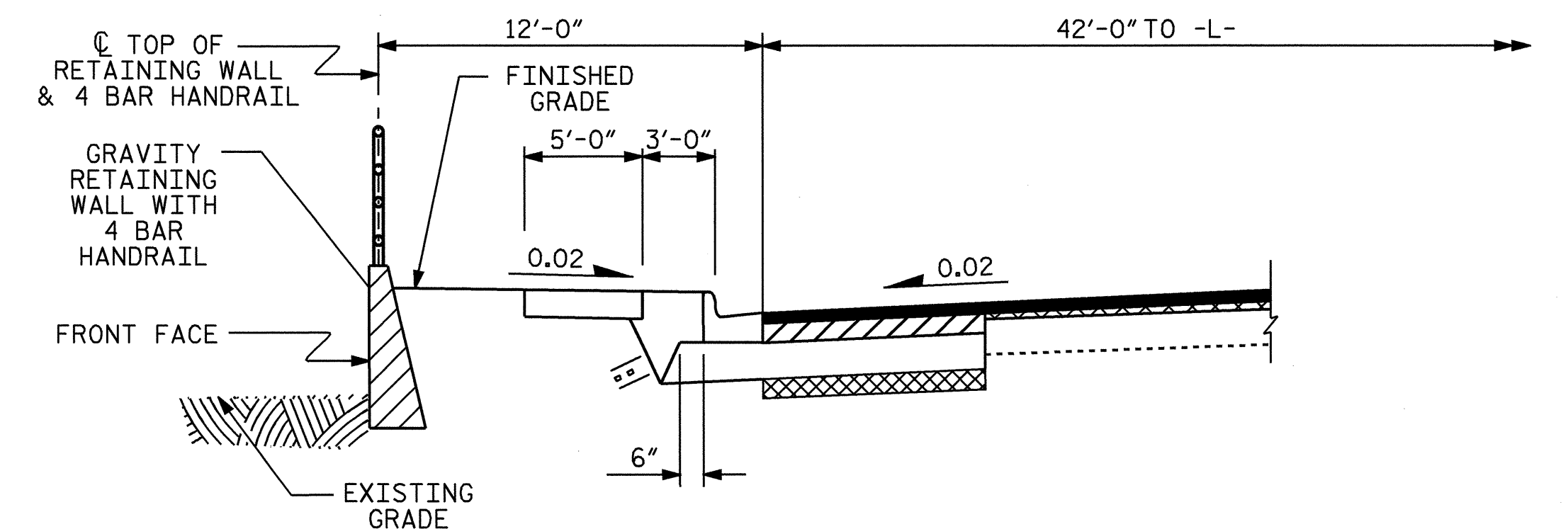
BM #16: RAIL ROAD SPIKE IN BASE OF 18" PINE AT STA. 289+75.52 -L- EL.96.36 LT.



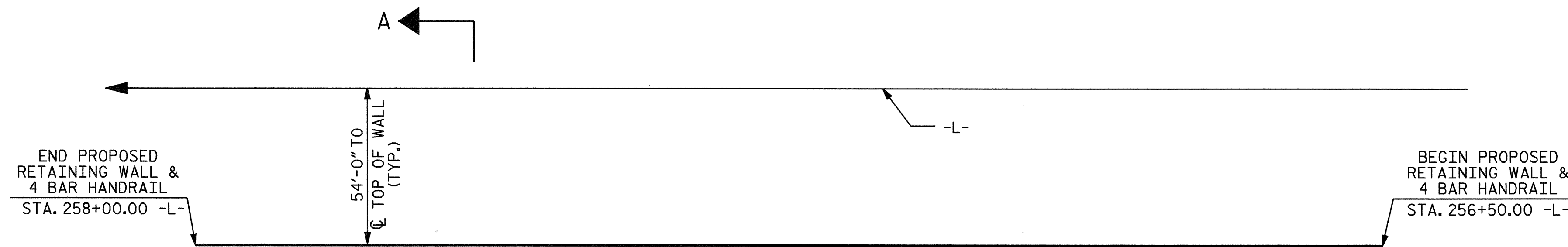
LOCATION SKETCH

-L- STA	OFFSET FROM CL (LEFT)	ELEV @ TOP OF WALL	* EXISTING GRADE ELEVATION	* EXPOSED WALL HEIGHT	** DESIGN WALL HEIGHT "H"
256+50.00	54.0	346.66	339.96	6.70	6.20
257+00.00	54.0	347.53	344.63	2.90	2.40
257+50.00	54.0	348.34	345.18	3.16	2.66
258+00.00	54.0	348.99	346.10	2.89	2.39

* ELEVATION @ EXISTING GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH
 ** FOR DESIGN WALL HEIGHT "H", SEE SHEET 2 OF 3

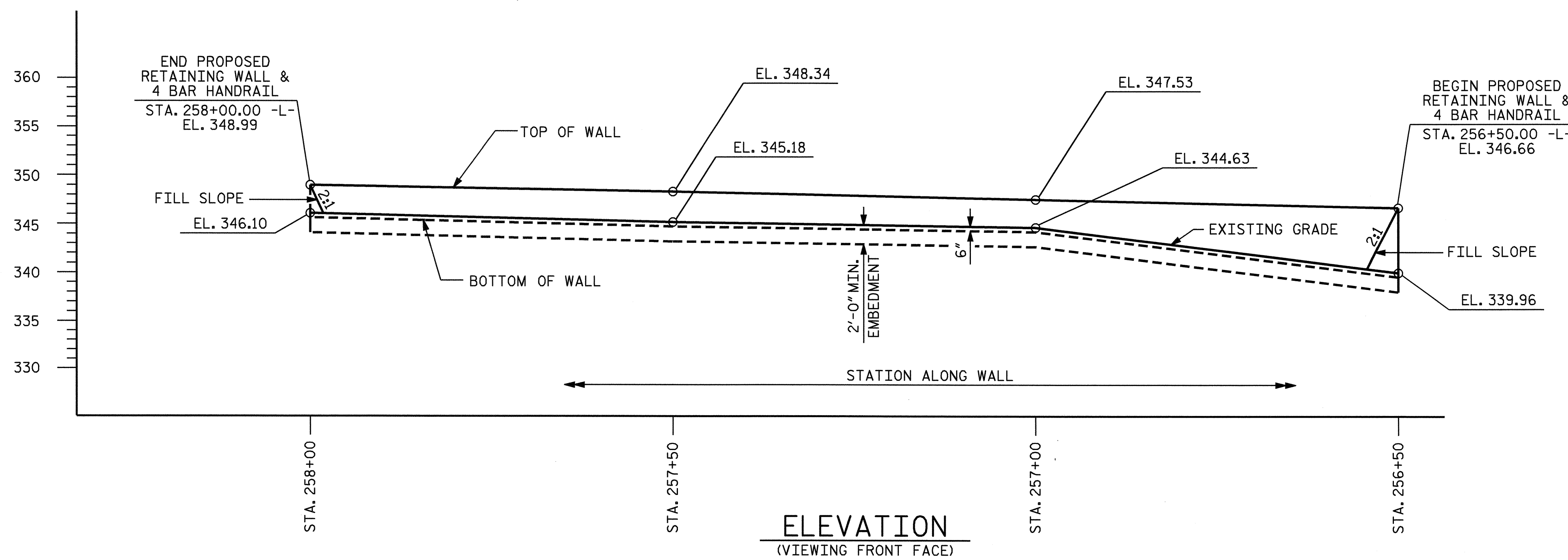


SECTION A-A



PLAN

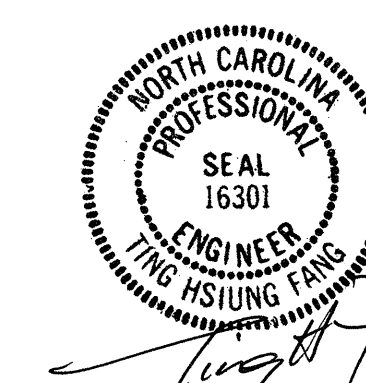
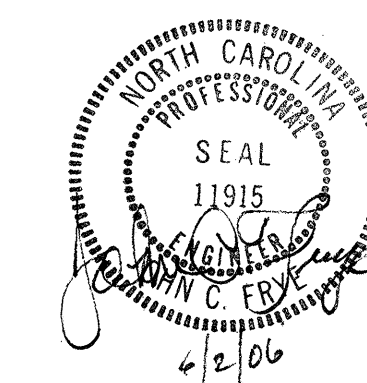
GRAVITY RETAINING WALLS	532	SQ. FT.
1 1/2" GALVANIZED STEEL PIPE RAIL	145	LIN. FT.



ELEVATION (VIEWING FRONT FACE)

PROJECT NO. U-4026
 WAKE-DURHAM COUNTY
 STATION: 256+50.00 -L-

SHEET 1 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GRAVITY RETAINING WALL

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

DRAWN BY: D. G. ELY DATE: 5/8/06
 CHECKED BY: T. H. FANG DATE: 5/19/06

NOTES

FOR GRAVITY RETAINING WALLS, SEE SECTION 453 OF THE STANDARD SPECIFICATIONS.

THE STANDARD GRAVITY RETAINING WALL IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
 TOTAL UNIT WEIGHT = 120 PCF
 COHESION = 0 PSF
 FRICTION ANGLE = 35 DEGREES (GROUNDWATER WITHIN 5'-0" OF BOTTOM OF FOOTING)
 FRICTION ANGLE = 30 DEGREES (GROUNDWATER MORE THAN 5'-0" BELOW BOTTOM OF FOOTING)

DO NOT USE A STANDARD GRAVITY RETAINING WALL IF THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF FOOTING.

DO NOT USE A STANDARD GRAVITY RETAINING WALL WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE WALL.

DO NOT PLACE CONCRETE UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND CHECKING FOUNDATION MATERIAL FOR IN-SITU ASSUMED SOIL PARAMETERS.

USE CLASS "A" CONCRETE AND PROVIDE CLASS I SURFACE FINISH FOR ALL EXPOSED SURFACES.

PROVIDE 3" DIAMETER WEEP HOLES ON 10'-0" CENTERS ALONG WALL. SLOPE WEEP HOLES ON A 1" PER FOOT SLOPE THROUGH THE WALL SO THAT WATER DRAINS OUT OF THE FRONT OF THE WALL.

CONSTRUCT A HORIZONTAL DRAIN IN SUBDRAIN FINE AGGREGATE AT LEAST 1'-0" TALL AND 1'-0" WIDE TO CONNECT ALL STONE DRAINS.

PROVIDE GROOVED CONTRACTION JOINTS EVERY 10'-0" AND EXPANSION JOINTS EVERY 30'-0" ALONG THE WALL.

DO NOT BACKFILL BEHIND WALL UNTIL CONCRETE DEVELOPS A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI. COMPACT BACKFILL IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. PLACE BACKFILL WITHIN 3'-0" OF THE BACK OF THE WALL WITH HAND OPERATED EQUIPMENT. DO NOT OPERATE HEAVY EARTH MOVING EQUIPMENT WITHIN 10'-0" OF THE BACK OF WALL.

WHEN A CONSTRUCTION JOINT IS LOCATED AT THE BASE OF THE WALL, IN SECTION, PROVIDE A MINIMUM OF 3-#4 DOWELS AT AN EQUAL SPACING. SPACE ALL DOWELS AT 1'-6" CENTERS ALONG THE LENGTH OF THE WALL.

SEE PREVIOUS SHEET FOR PLAN AND PROFILE VIEW (WALL ENVELOPE) AND PROPOSED ELEVATIONS FOR GRAVITY RETAINING WALL.

FOR WALL WITH FENCE, USE SLEEVES IN ACCORDANCE WITH SECTION 866 OF THE STANDARD SPECIFICATIONS FOR FENCE POSTS, OR SUBMIT FENCE POST ANCHOR PLATE DETAILS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

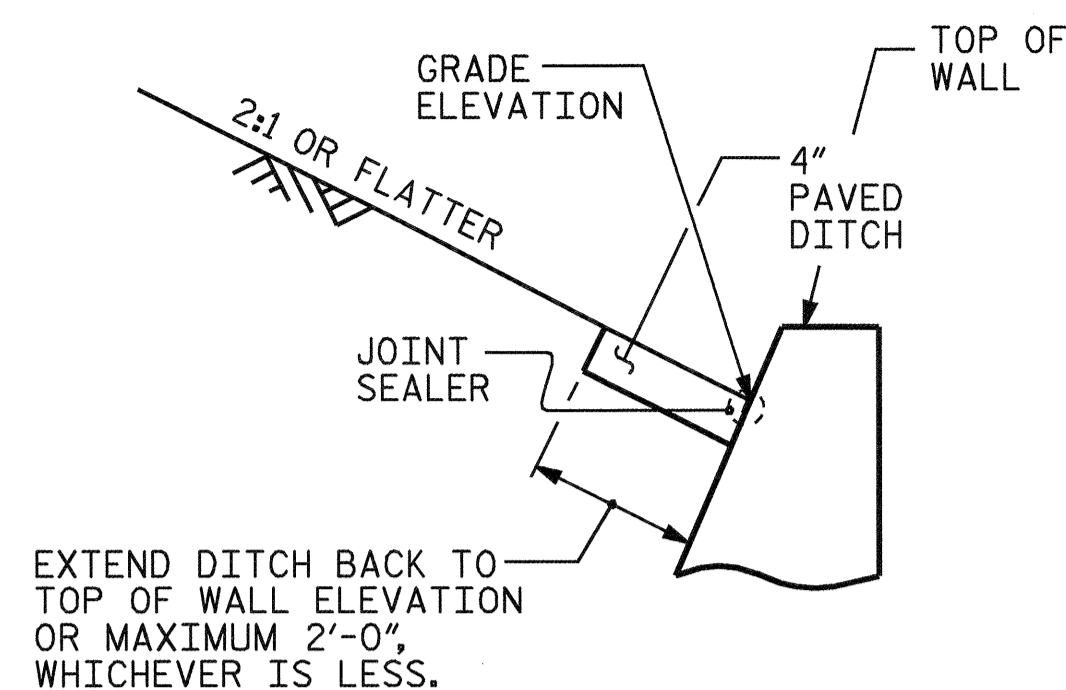
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

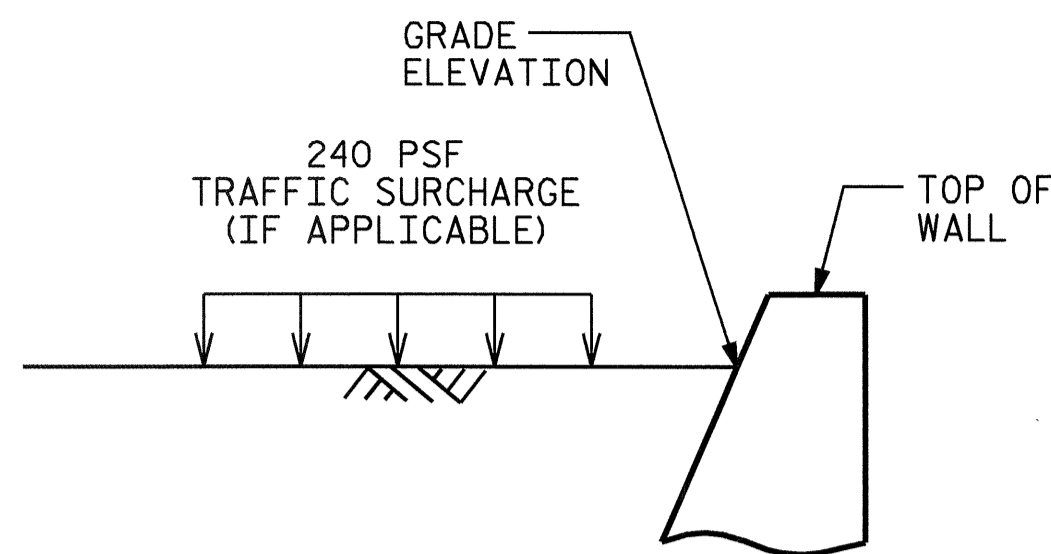
FOR GROUT FOR STRUCTURE, SEE SPECIAL PROVISIONS.

APPROXIMATE CLASS A CONCRETE QUANTITY FOR CONCRETE GRAVITY RETAINING WALL 53.0 C.Y.

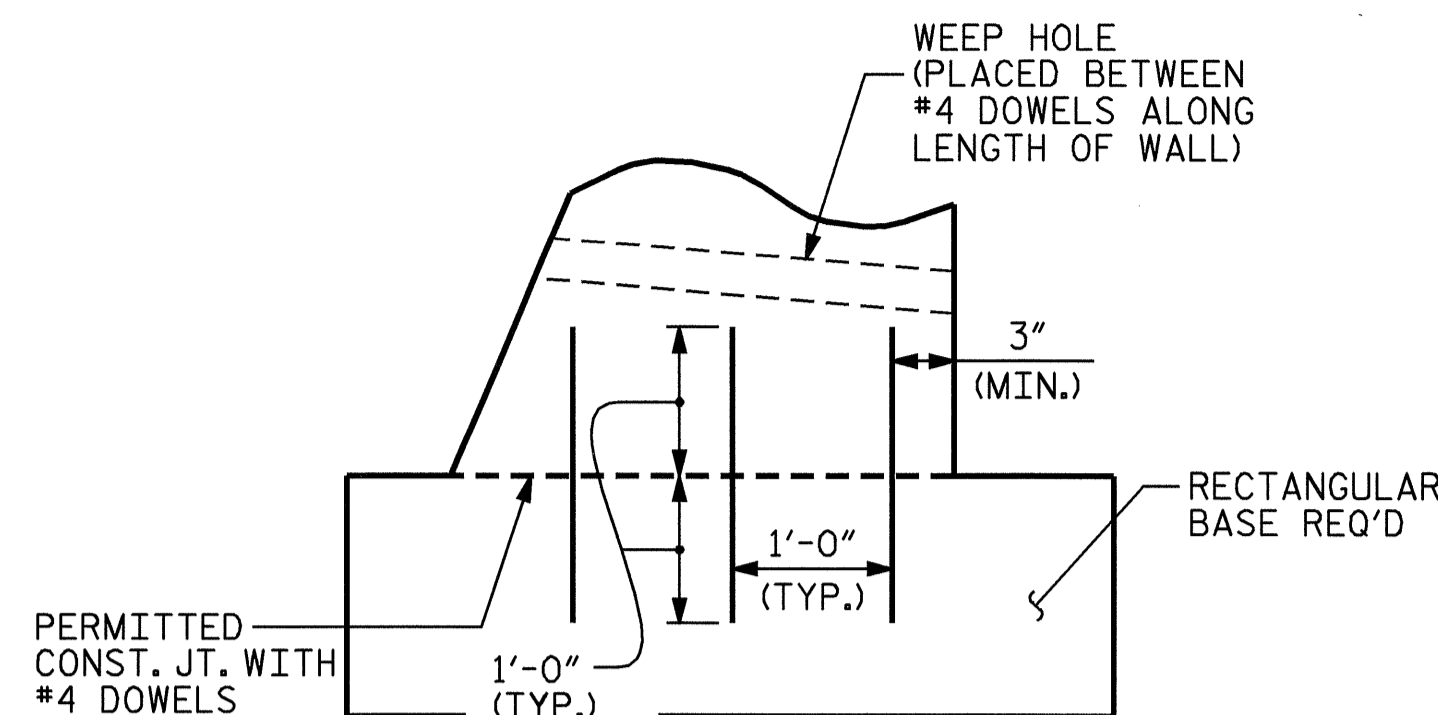
*BASED ON "NO SLOPE CONDITION WITHOUT TRAFFIC SURCHARGE"



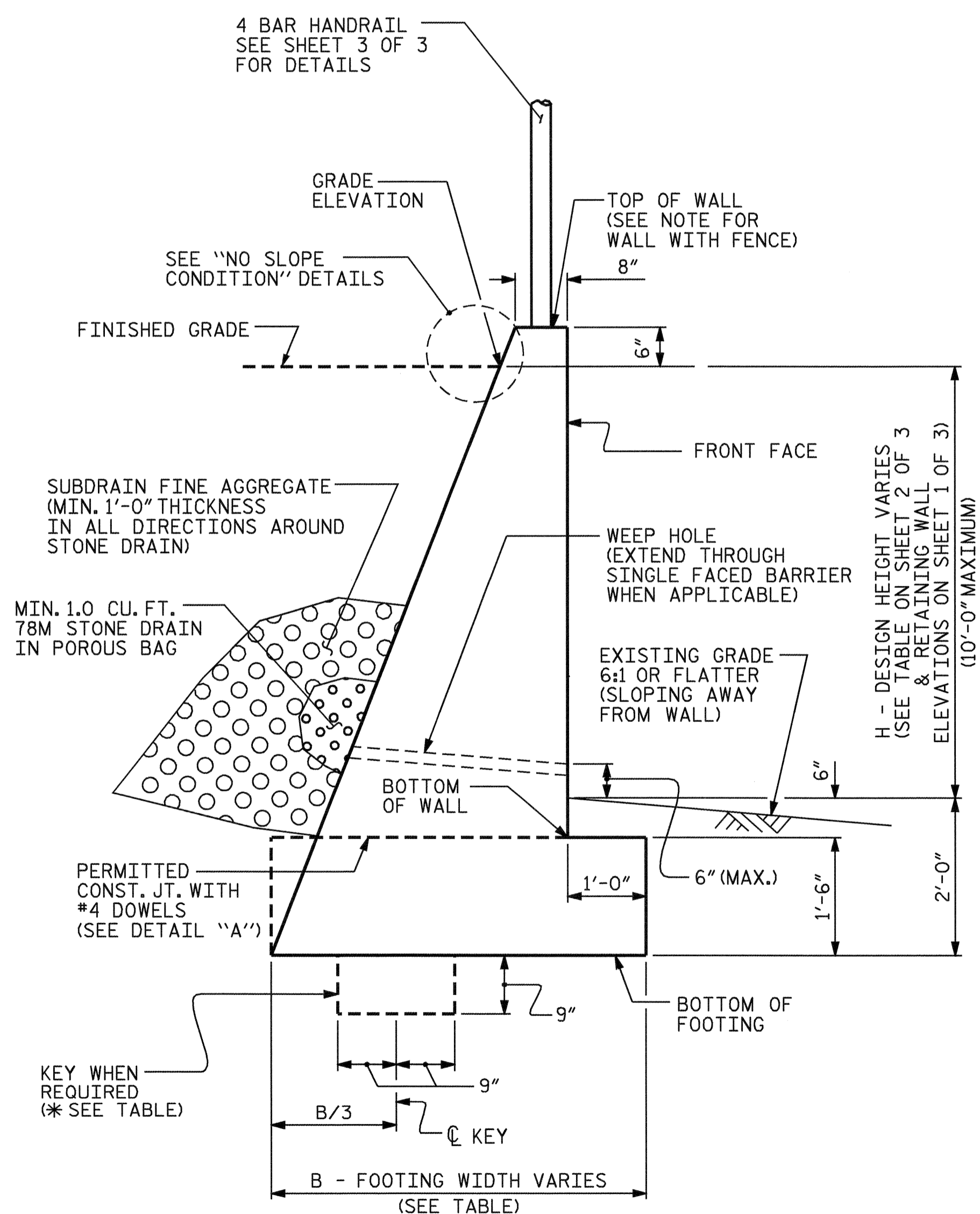
SLOPE CONDITION



NO SLOPE CONDITION



DETAIL "A"



TYPICAL SECTION

H + 2 (ft)	< 6	6 - 9	> 9 - 12
NO SLOPE CONDITION WITHOUT TRAFFIC SURCHARGE	.60	.60	.60
NO SLOPE CONDITION WITH TRAFFIC SURCHARGE	.80	.75 *	.70 *
SLOPE CONDITION	.66	.70 *	.75 *

B/(H + 2) RATIO

* KEY IS REQUIRED FOR SLOPE CONDITION OR NO SLOPE CONDITION WITH TRAFFIC SURCHARGE WHEN H + 2ft IS 6'-0" OR GREATER.

ASSEMBLED BY : D. G. ELY DATE : 5/9/06
 CHECKED BY : T. H. FANG DATE : 5/19/06
 DRAWN BY : KMM 12/05 ADDED 5/1/06
 CHECKED BY : GM 5/06

PROJECT NO. U-4026
WAKE-DURHAM COUNTY
 STATION: 256+00.00 -L-

SHEET 2 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**GRAVITY
 RETAINING
 WALL**

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

NOTES

THE 1/2" Ø STEEL PIPE SHALL MEET THE REQUIREMENTS OF ASTM A53 FOR STANDARD WEIGHT PIPE AND SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

POSTS AND VERTICAL ELEMENTS OF THE RAIL SHALL BE PLUMB.

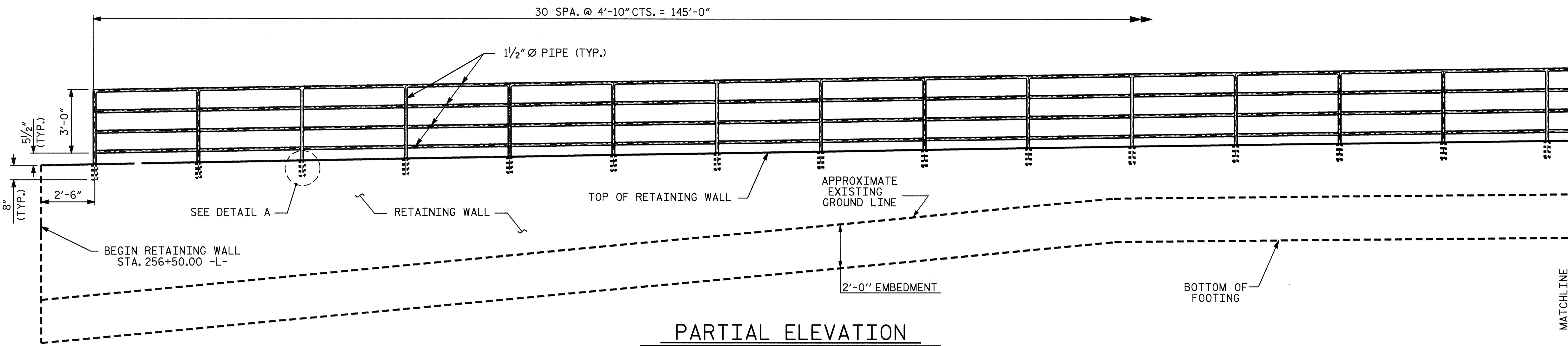
CONSTRUCT PROPOSED STEEL PIPE RAIL OF 1/2" DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53.

REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.

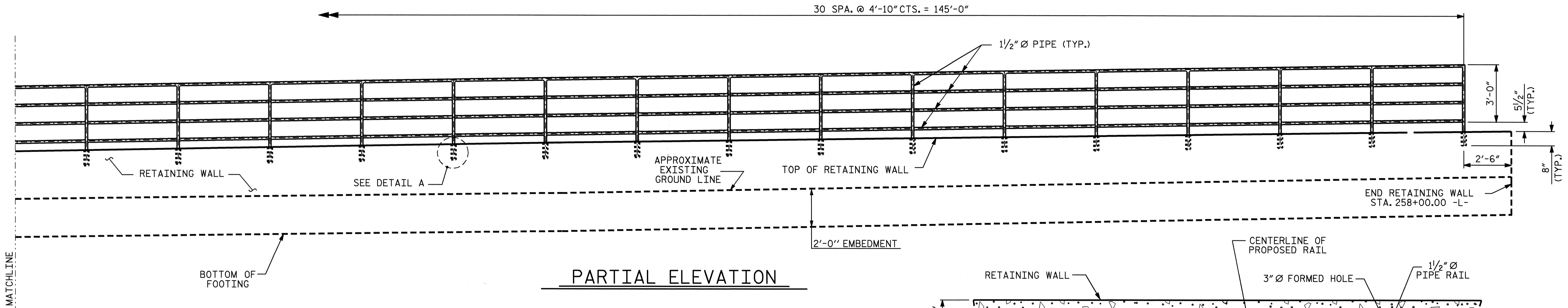
PAINT, IF REQUIRED BY THE ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE STANDARD SPECIFICATIONS.

WELD IN ACCORDANCE WITH ARTICLE 1072-20 OF THE STANDARD SPECIFICATIONS.

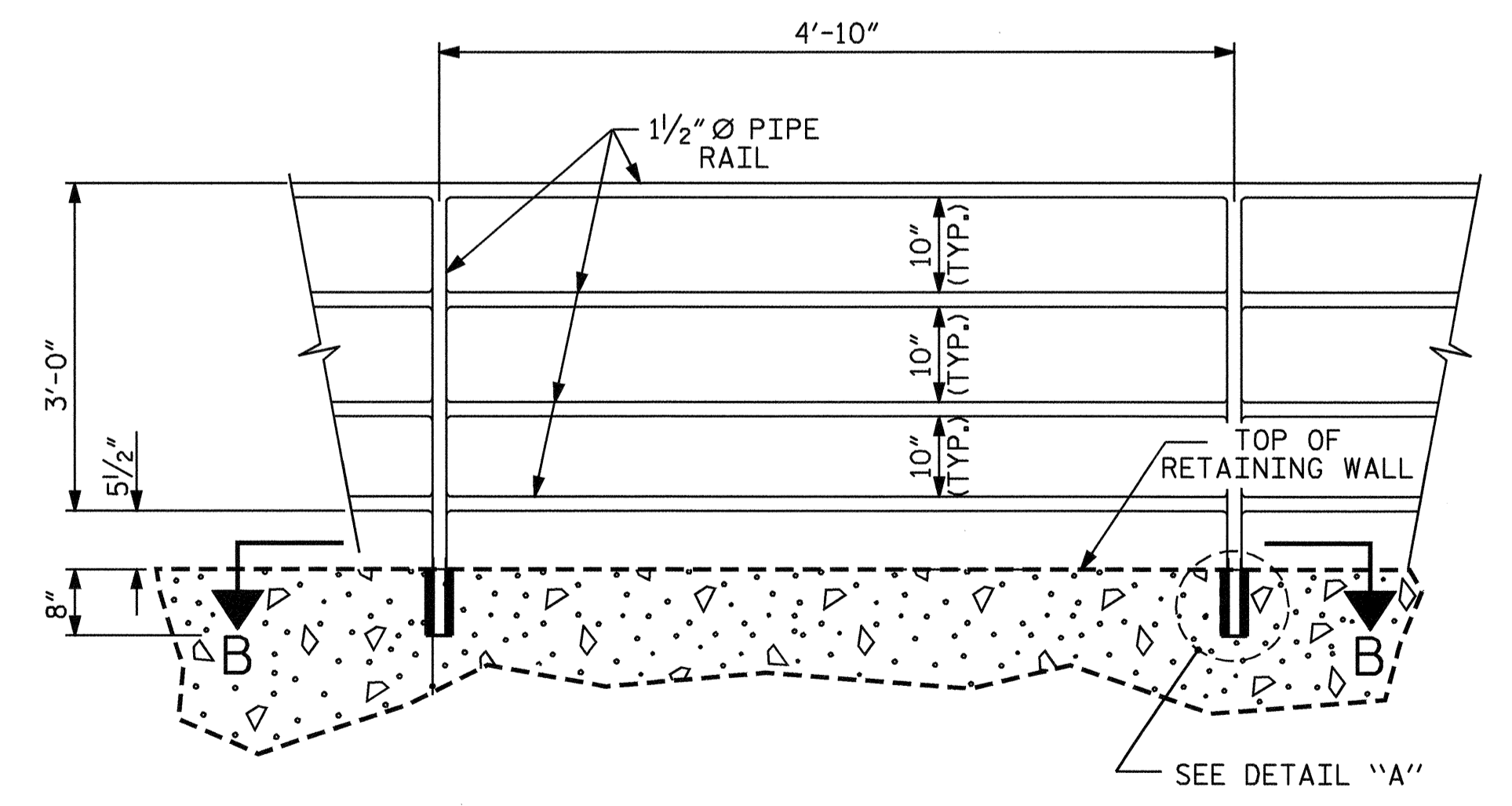
THE PIPE RAIL POSTS SHALL BE GROUTED IN PLACE USING NON-SHRINK, NON-METALLIC GROUT AS APPROVED BY THE ENGINEER.



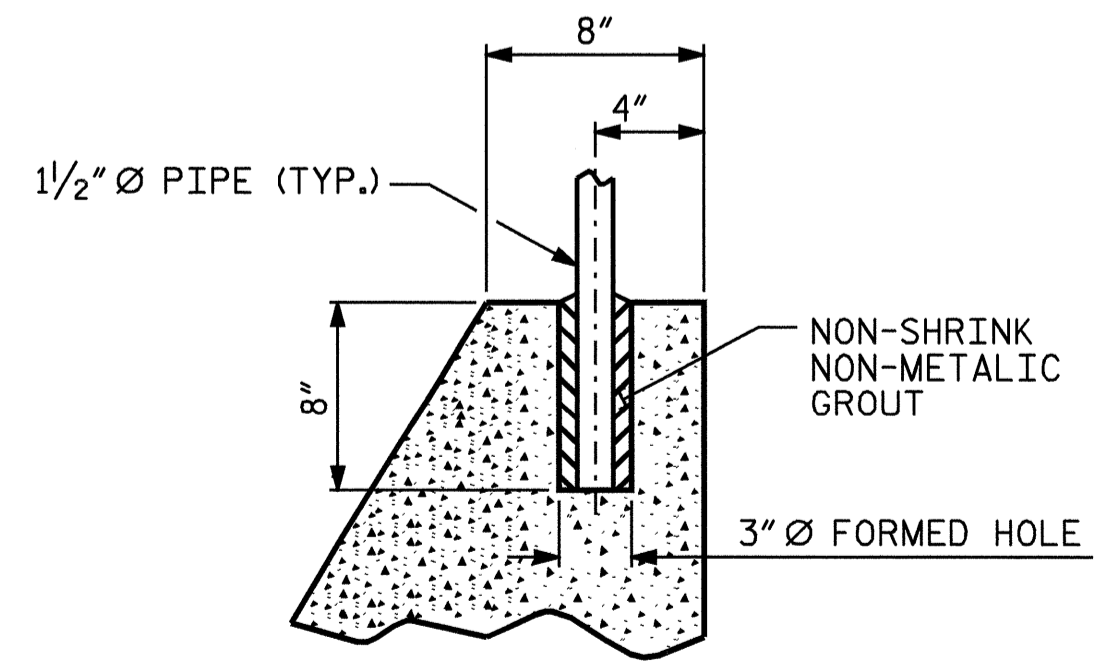
PARTIAL ELEVATION



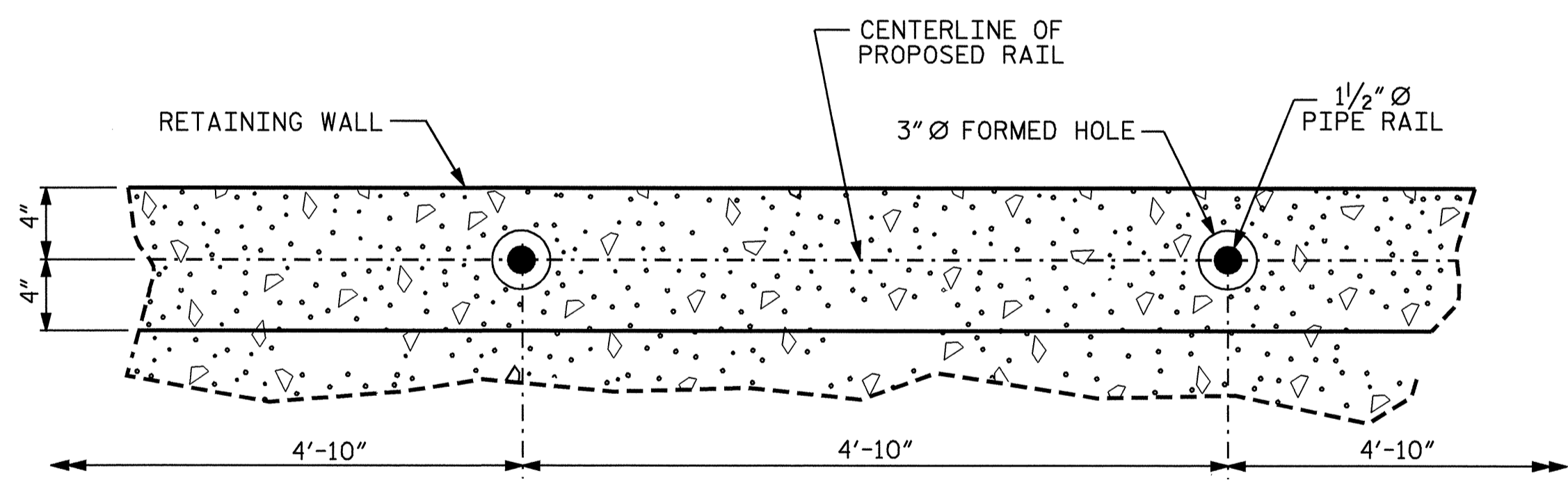
PARTIAL ELEVATION



ELEVATION OF PROPOSED PEDESTRAIN HANDRAIL
(TYP. EACH BAY)



DETAIL "A"
(TYP. EACH POST)



SECTION B-B

PROJECT NO. U-4026
WAKE-DURHAM COUNTY
 STATION: 256+50.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**GRAVITY
 RETAINING
 WALL**



DRAWN BY : D. G. ELY DATE : 5/10/06
 CHECKED BY : T. H. FANG DATE : 5/18/06

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

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

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

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB. METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINISHES AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

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

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