

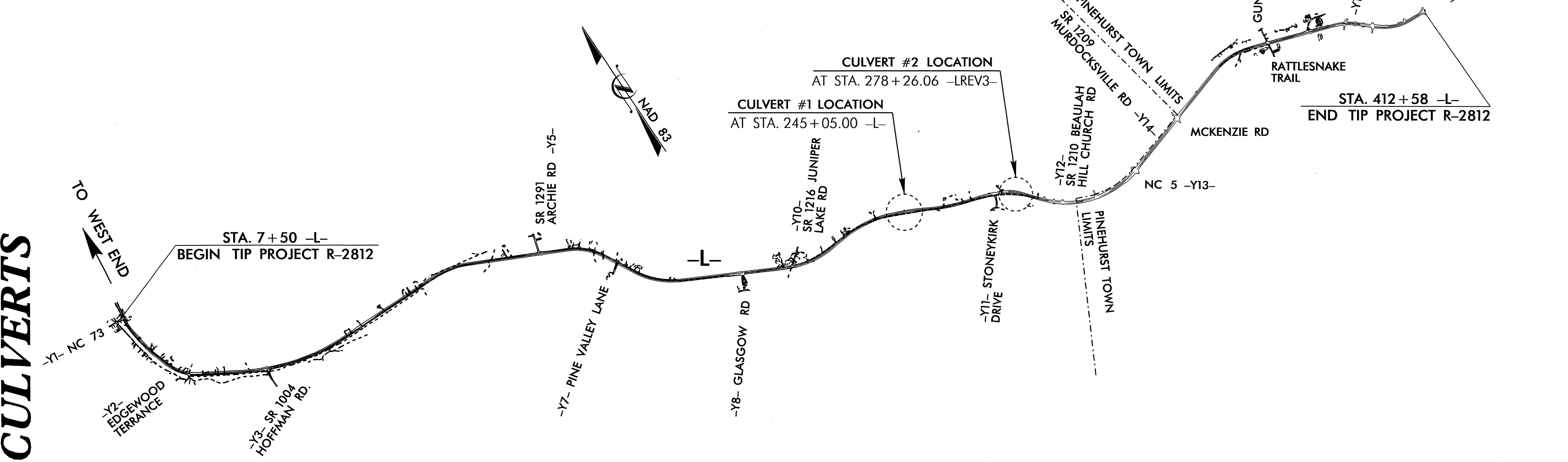
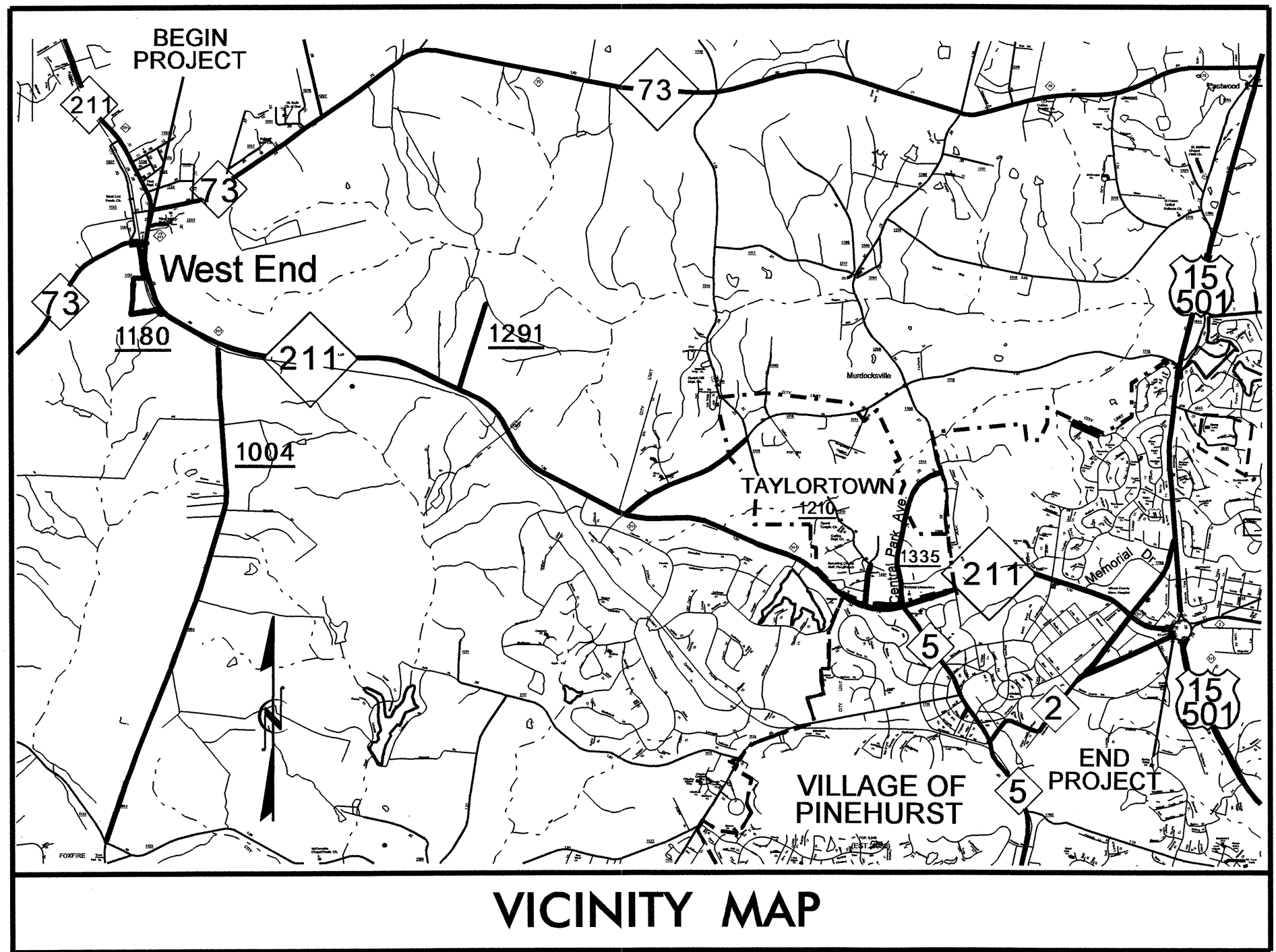
CONTRACT: C202663 TIP PROJECT: R-2812

| | | | |
|-----------------|-----------------------------|-------------|--------------|
| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
| N.C. | R-2812 | | |
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION | |
| 34504.1.1 | STP-0211 (5) | P.E. | |
| 34504.2.2 | STP-0211 (25) | R/W UTIL. | |
| 34504.3.2 | STP-0211 (26) | CONSTR. | |
| | | | |
| | | | |

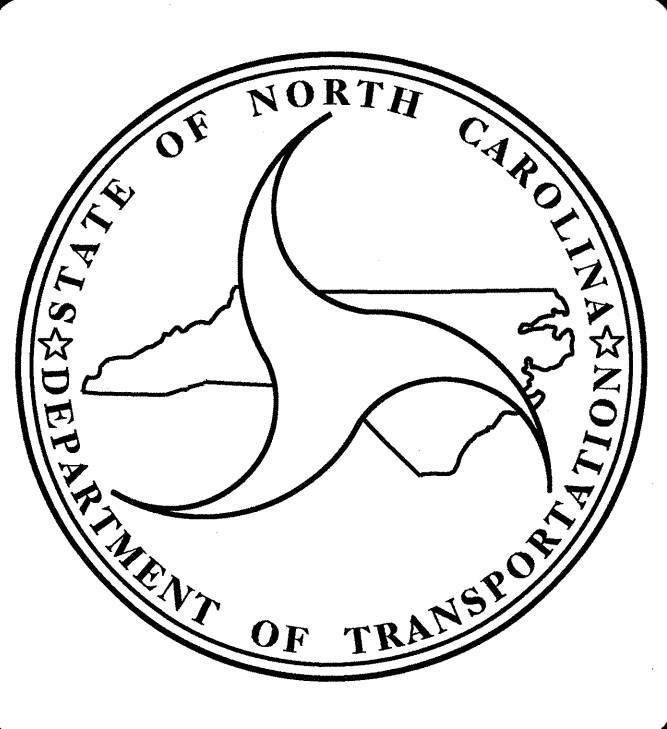
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
MOORE COUNTY

**LOCATION: NC 211 FROM NC 73 IN WEST END
TO THE TRAFFIC CIRCLE IN PINEHURST**

**TYPE OF WORK: GRADING, PAVING, DRAINAGE, CURB & GUTTER
SIGNALS, SIGNING, AND CULVERTS**



CULVERTS



DESIGN DATA

ADT 2004 = 15,300
ADT 2025 = 20,500
DHV = 9 %
D = 52 %
T = 5 % *
V = 50 MPH

* TTST 2% DUAL 3%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2812 = 7.610 MI
TOTAL LENGTH TIP PROJECT R-2812 = 7.610 MI

Prepared in the Office of:
DIVISION OF HIGHWAYS
2006 STANDARD SPECIFICATIONS

| | |
|---|---|
| <p>LETTING DATE :</p> <p>OCTOBER 18, 2011</p> | <p>J. C. FRYE, P.E. PROJECT ENGINEER</p> |
| | <p>T. H. FANG, P.E. PROJECT DESIGN ENGINEER</p> |

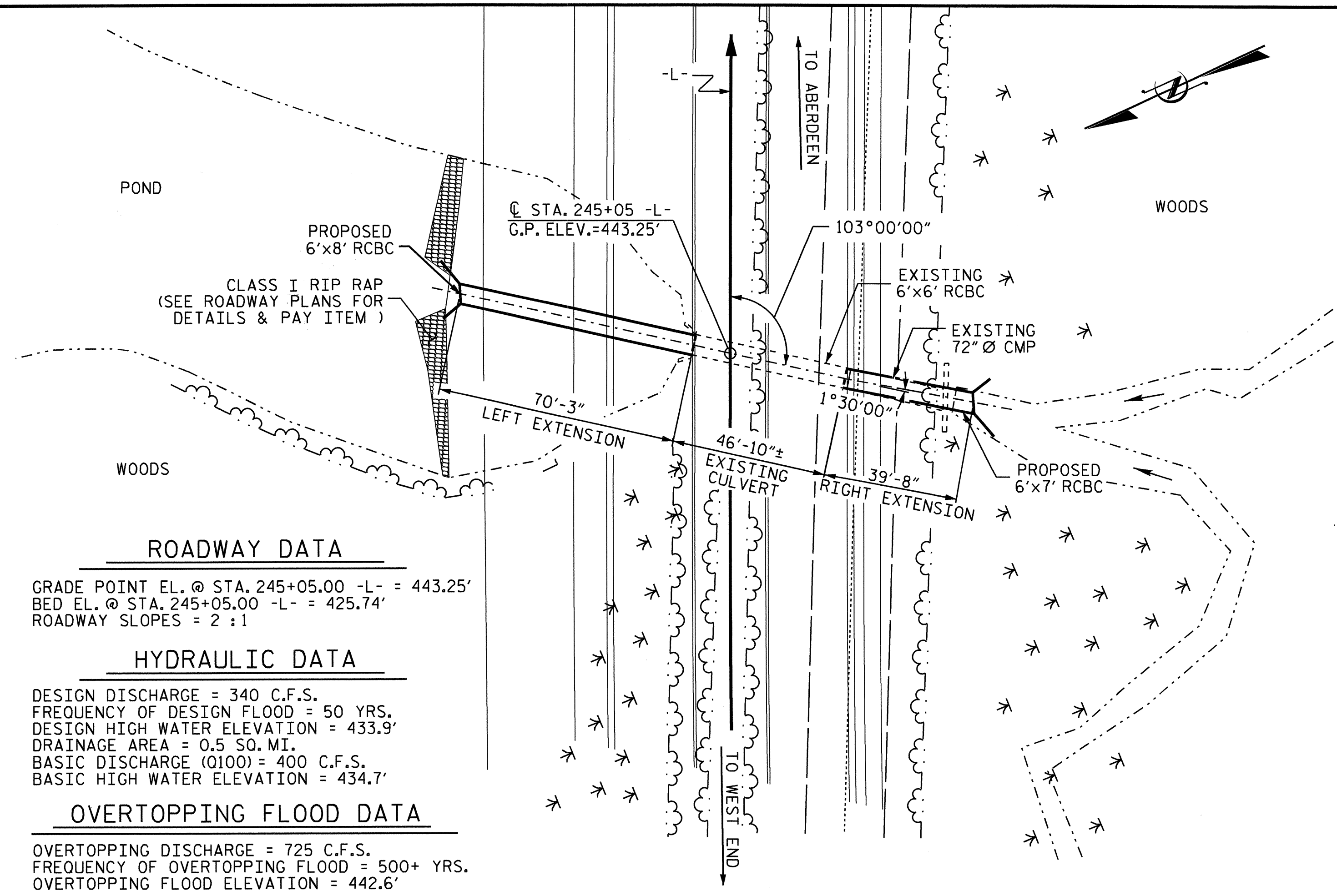
STRUCTURE DESIGN UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.

STATE DESIGN ENGINEER
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED _____ DATE _____
DIVISION ADMINISTRATOR



ROADWAY DATA

GRADE POINT EL. @ STA. 245+05.00 -L- = 443.25'
 BED EL. @ STA. 245+05.00 -L- = 425.74'
 ROADWAY SLOPES = 2 : 1

HYDRAULIC DATA

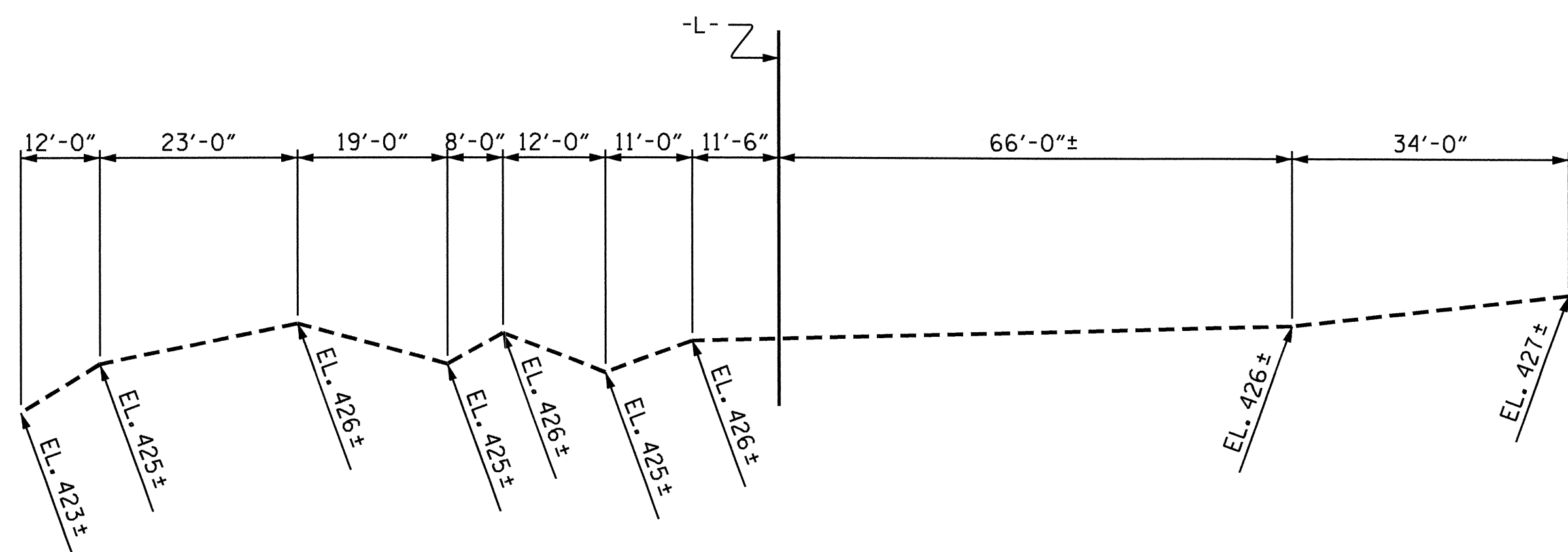
DESIGN DISCHARGE = 340 C.F.S.
 FREQUENCY OF DESIGN FLOOD = 50 YRS.
 DESIGN HIGH WATER ELEVATION = 433.9'
 DRAINAGE AREA = 0.5 SQ. MI.
 BASIC DISCHARGE (Q100) = 400 C.F.S.
 BASIC HIGH WATER ELEVATION = 434.7'

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 725 C.F.S.
 FREQUENCY OF OVERTOPPING FLOOD = 500+ YRS.
 OVERTOPPING FLOOD ELEVATION = 442.6'

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH



PROFILE ALONG CULVERT

NOTES

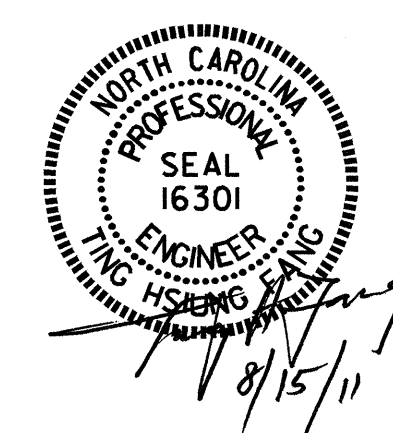
- ASSUMED LIVE LOAD -----HS20 OR ALTERNATE LOADING.
- DESIGN FILL----- 10.99 FT.
- FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
- 3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:
 1. WING FOOTINGS AND FLOOR 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.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR 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.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FEET. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROLS PLANS.
- 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.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
- DOWELS SHALL BE USED TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT AS SHOWN, FOR NOTE REGARDING SETTING OF 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 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.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.
- NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.
- FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

TOTAL STRUCTURE QUANTITIES

| CULVERT EXCAVATION | LUMP SUM | |
|------------------------|----------|--------|
| FOUNDATION COND. MAT'L | | |
| LEFT EXTENSION | TONS | 36.3 |
| RIGHT EXTENSION | TONS | 20.5 |
| TOTAL | TONS | 56.8 |
| CLASS A CONCRETE | | |
| LEFT EXTENSION | C.Y. | 65.3 |
| RIGHT EXTENSION | C.Y. | 39.3 |
| TOTAL | C.Y. | 104.6 |
| REINFORCING STEEL | | |
| LEFT EXTENSION | LBS. | 7,900 |
| RIGHT EXTENSION | LBS. | 4,354 |
| TOTAL | LBS. | 12,254 |

PROJECT NO. R-2812
MOORE COUNTY
 STATION: 245+05.00 -L-

SHEET 1 OF 7

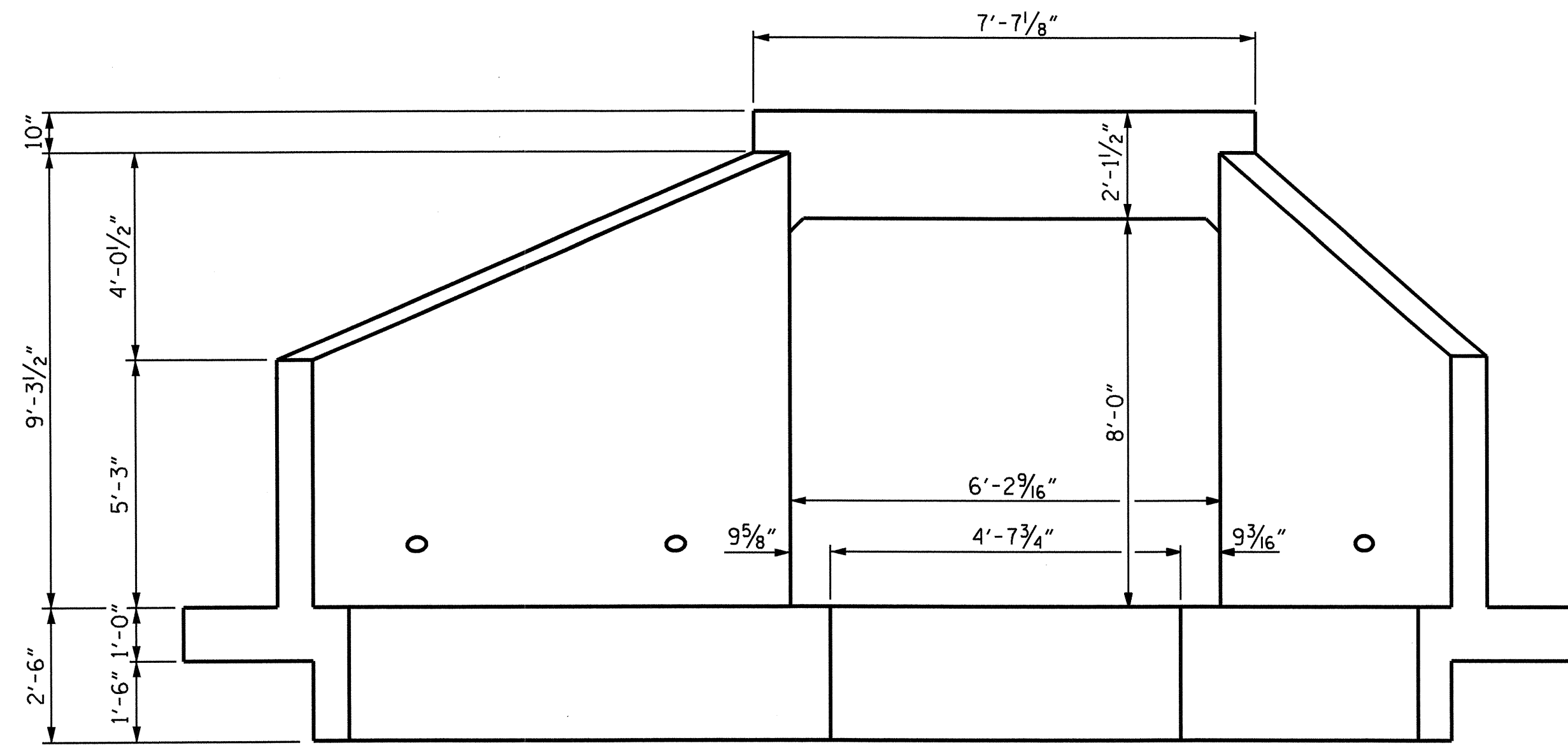


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**SINGLE BARREL
 CONCRETE BOX CULVERT
 103° SKEW**
 LEFT AND RIGHT EXTENSIONS

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

TOTAL SHEETS: 14

DRAWN BY : J.H.CARDEN DATE : 5/11
 CHECKED BY : W.F.PARKER DATE : 6/28/11

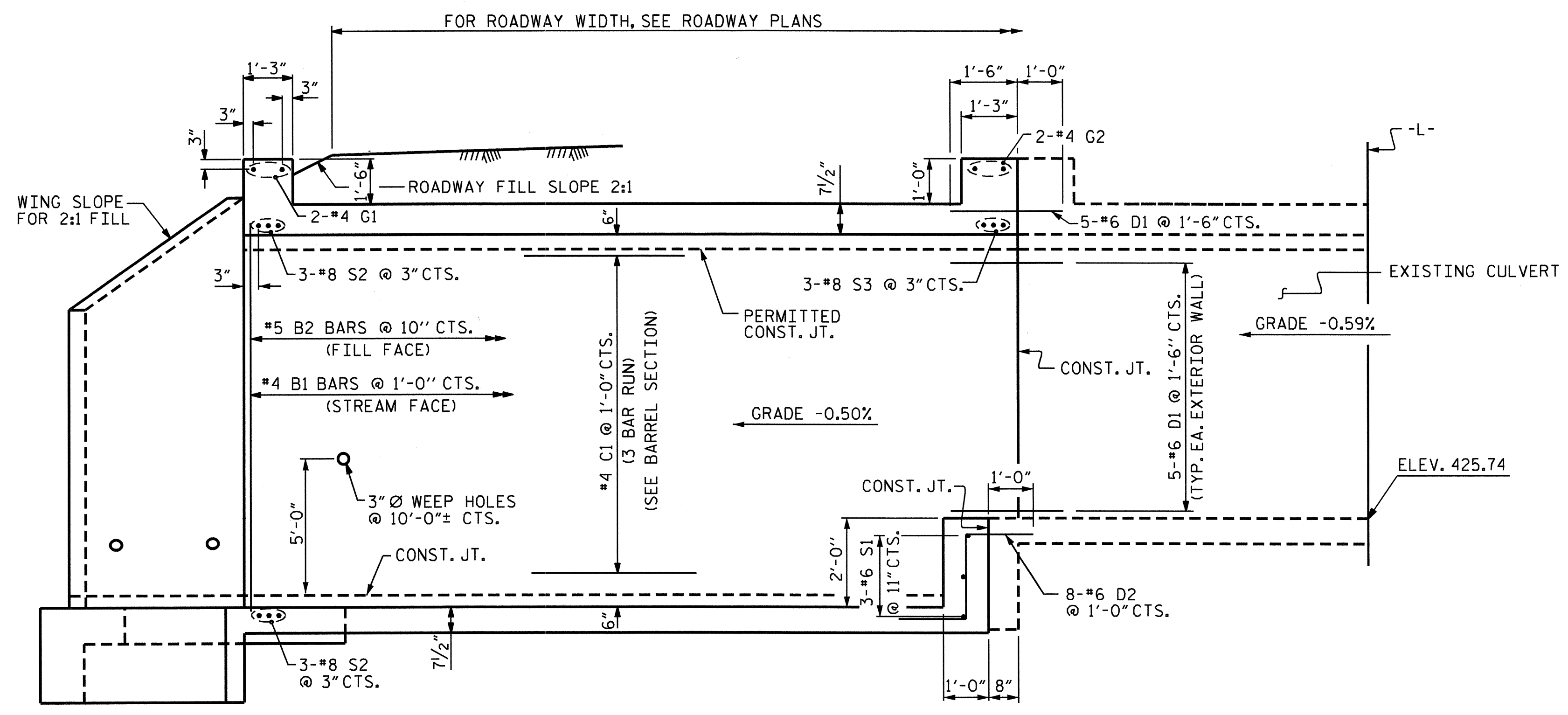


OUTLET END ELEVATION

NORMAL TO SKEW
(LEFT EXTENSION)

| BAR TYPES | | BILL OF MATERIAL | | | | | |
|-----------|---|-------------------|------|------|--------|--------|------------|
| | 1 | BAR NO. | SIZE | TYPE | LENGTH | WEIGHT | |
| | 2 | A1 | 169 | #5 | 1 | 4'-5" | 779 |
| | 1 | A2 | 168 | #5 | 1 | 4'-5" | 774 |
| | 2 | A100 | 128 | #4 | STR. | 7'-0" | 599 |
| | | A101 | 1 | #4 | STR. | 5'-8" | 4 |
| | | A102 | 1 | #4 | STR. | 3'-8" | 2 |
| | | A200 | 103 | #5 | STR. | 7'-0" | 752 |
| | | A201 | 1 | #5 | STR. | 5'-8" | 6 |
| | | A202 | 1 | #5 | STR. | 3'-8" | 4 |
| | | B1 | 141 | #4 | STR. | 8'-11" | 840 |
| | | B2 | 169 | #5 | STR. | 7'-4" | 1293 |
| | | C1 | 102 | #4 | STR. | 25'-1" | 1709 |
| | | D1 | 15 | #6 | STR. | 1'-6" | 34 |
| | | D2 | 8 | #6 | 2 | 5'-0" | 60 |
| | | G1 | 2 | #4 | STR. | 7'-3" | 10 |
| | | G2 | 2 | #4 | STR. | 7'-0" | 9 |
| | | S1 | 3 | #6 | STR. | 7'-0" | 32 |
| | | S2 | 6 | #8 | STR. | 7'-3" | 116 |
| | | S3 | 3 | #8 | STR. | 7'-0" | 56 |
| | | REINFORCING STEEL | | | | | 7,077 LBS. |

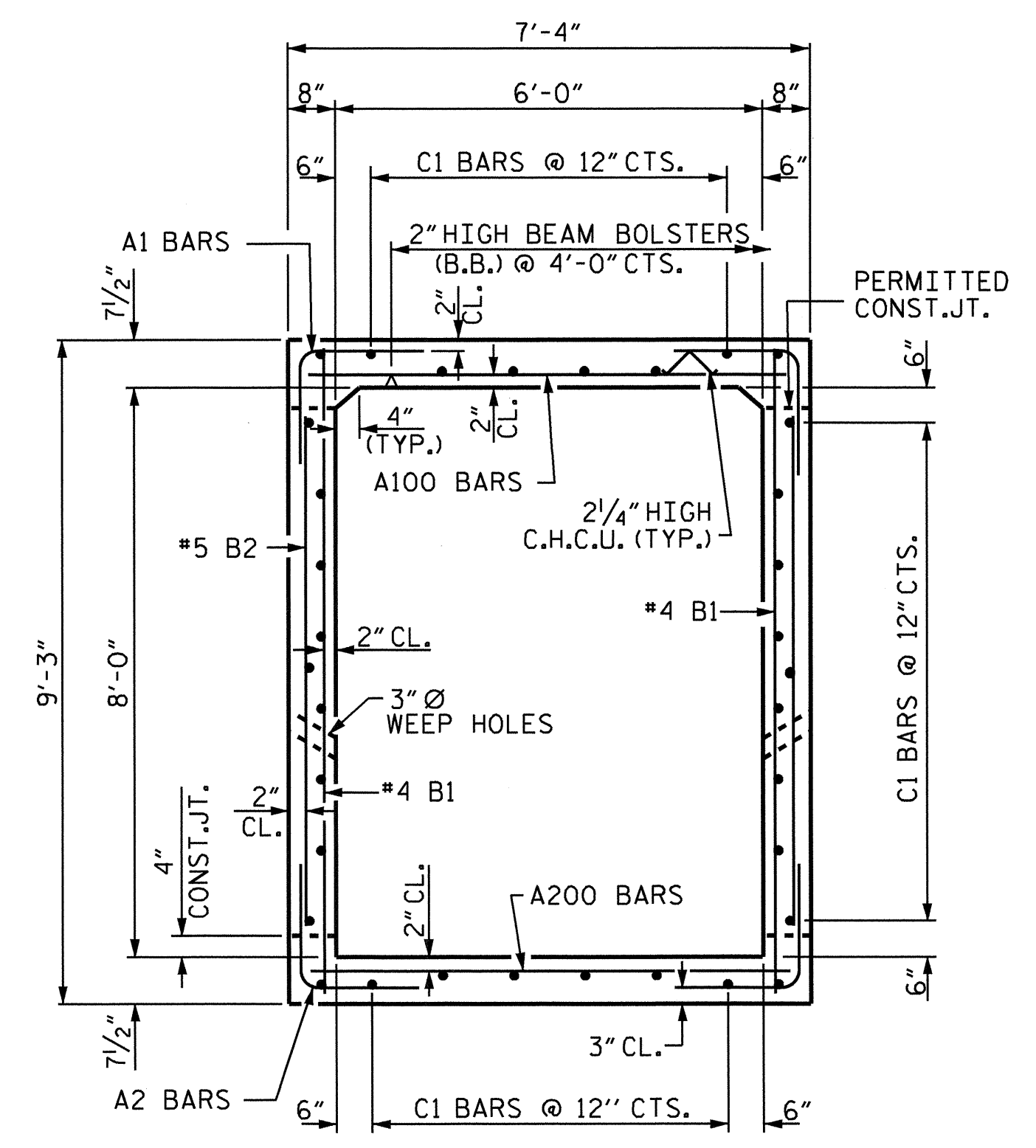
DIMENSIONS ARE OUT TO OUT



LEFT EXTENSION

CULVERT SECTION NORMAL TO ROADWAY

FIELD CUT B1 & B2 BARS ADJACENT TO THE CONSTRUCTION JOINT TO FIT THE HEIGHT OF EXISTING CULVERT.



RIGHT ANGLE SECTION OF BARREL

THERE ARE 34 C1 BARS IN SECTION OF BARREL

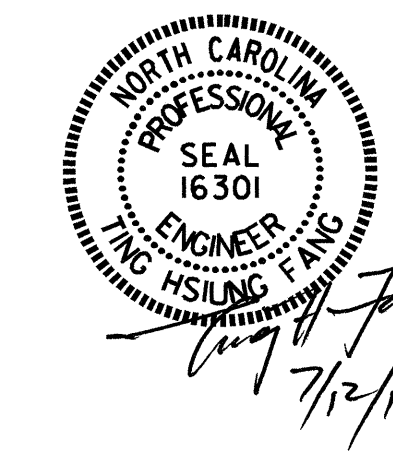
| LEFT EXTENSION STRUCTURE QUANTITIES | |
|-------------------------------------|------------|
| CLASS A CONCRETE | |
| BARREL @ 0.743 CY/FT | 51.8 C.Y. |
| WING ETC. | 13.5 C.Y. |
| TOTAL | 65.3 C.Y. |
| REINFORCING STEEL | |
| BARREL | 7,077 LBS. |
| WINGS ETC. | 823 LBS. |
| TOTAL | 7,900 LBS. |
| CULVERT EXCAVATION | LUMP SUM |
| FOUNDATION COND. MAT'L | 36.3 TONS |

| SPLICE LENGTH CHART | | |
|---------------------|------|--------|
| BAR | SIZE | SPLICE |
| C1 | #4 | 1'-11" |

PROJECT NO. R-2812
MOORE COUNTY
 STATION: 245+05.00 -L-

SHEET 2 OF 7

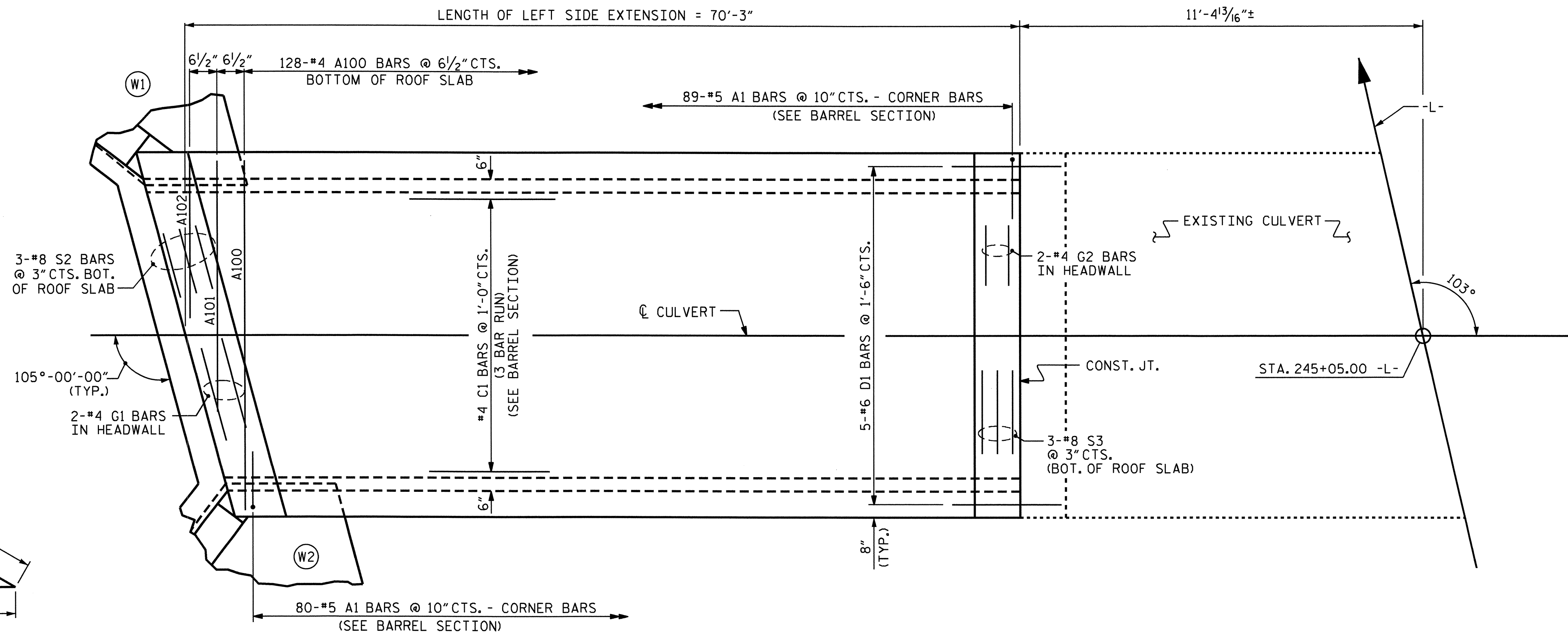
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 6 FT. X 8 FT.
 CONCRETE BOX CULVERT
 103° SKEW
 LEFT EXTENSION



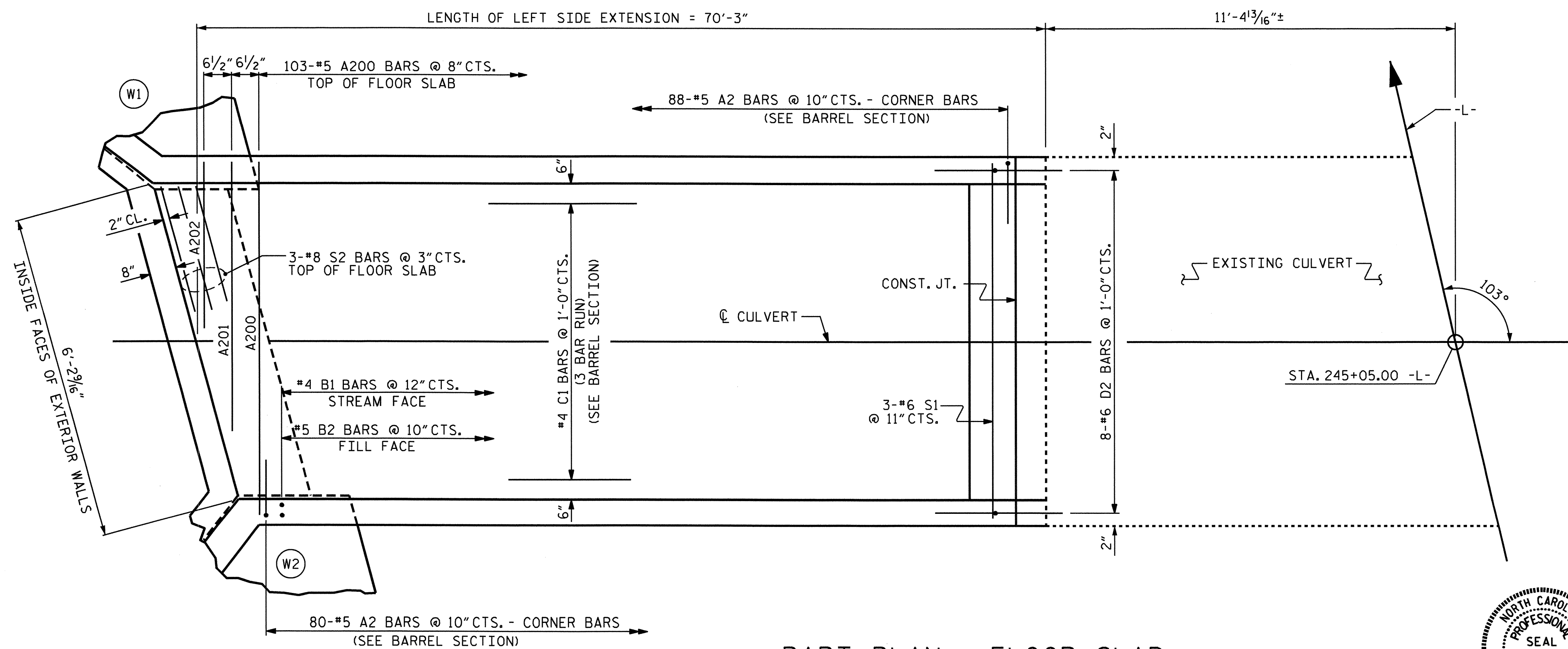
DRAWN BY: J.H.CARDEN DATE: 5/11
 CHECKED BY: W.F.PARKER DATE: 6/28/11

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

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PART PLAN - ROOF SLAB

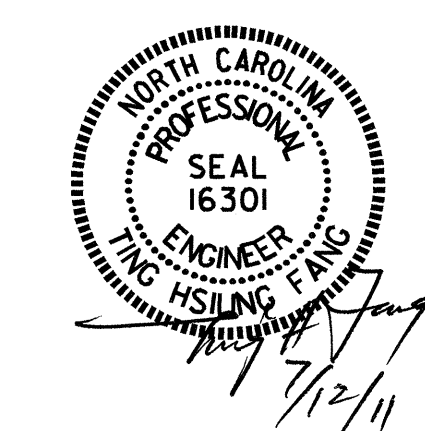


PART PLAN - FLOOR SLAB

PROJECT NO. R-2812
MOORE COUNTY
 STATION: 245+05.00 -L-

SHEET 3 OF 7

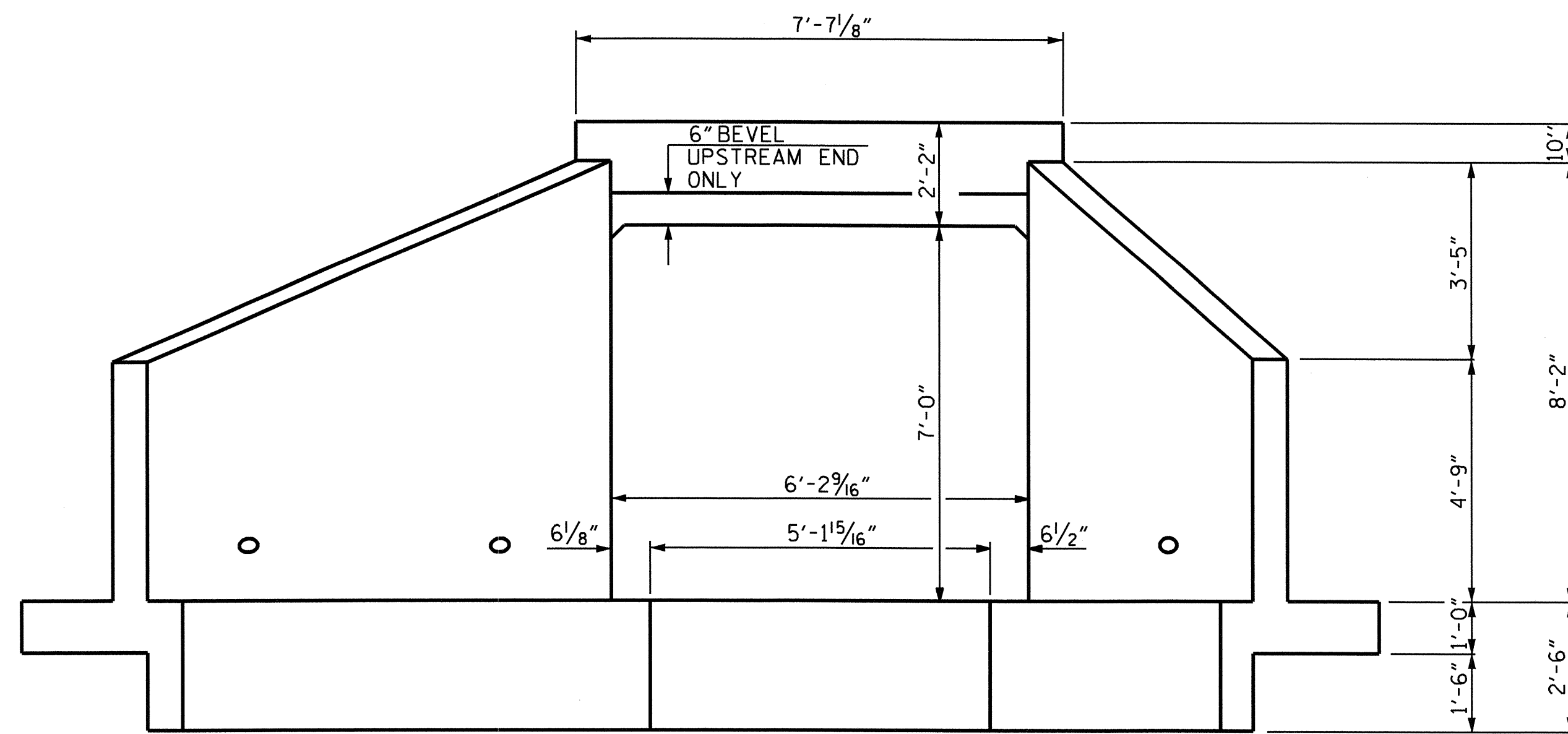
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 6 FT. X 8 FT.
 CONCRETE BOX CULVERT
 103° SKEW
 LEFT EXTENSION



DRAWN BY: J.H.CARDEN DATE: 5/11
 CHECKED BY: W.F.PARKER DATE: 6/28/11

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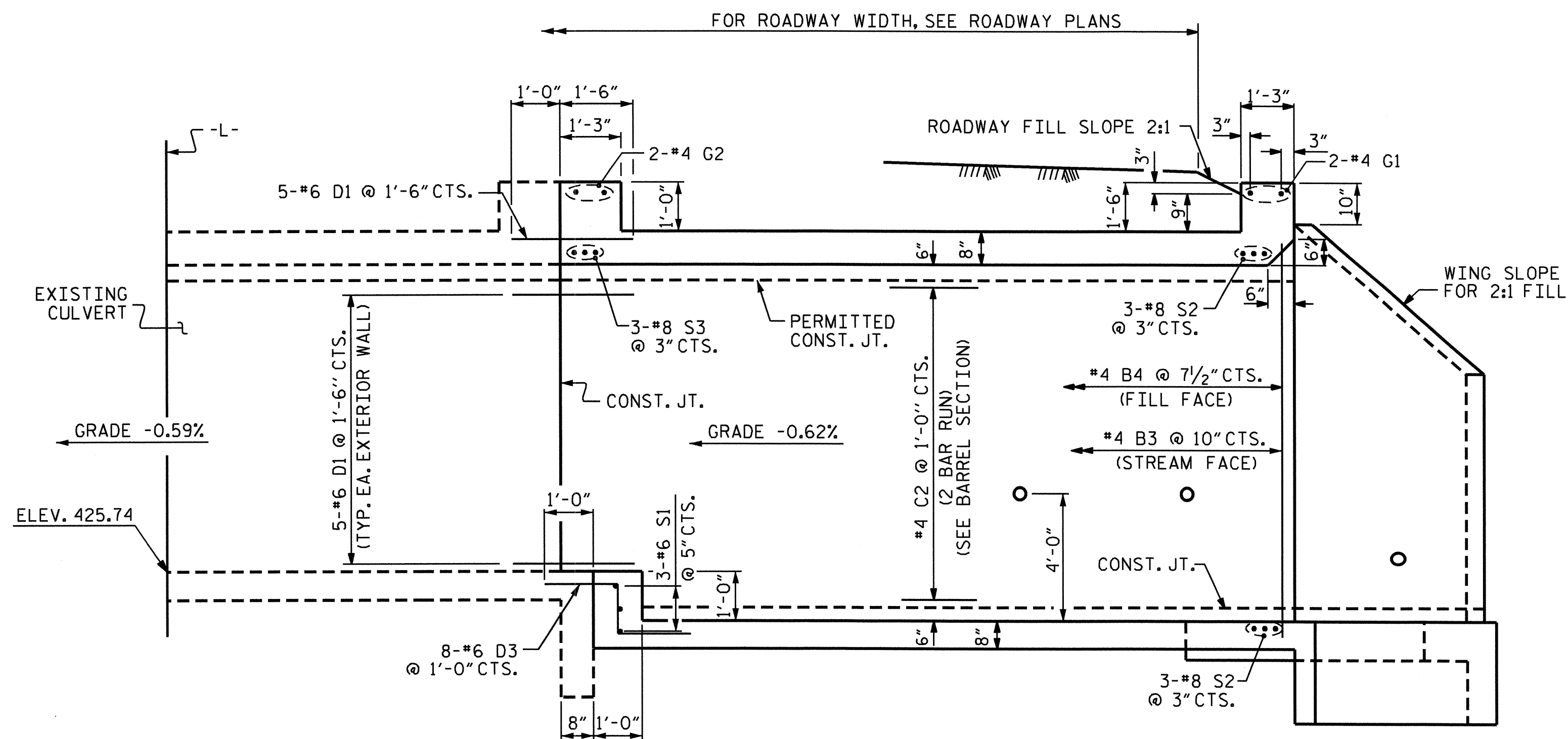
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|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | C-3 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 14 |



INLET END ELEVATION
NORMAL TO SKEW
(RIGHT EXTENSION)

| BAR TYPES | | BILL OF MATERIAL | | | | |
|-------------------|------|------------------|--------|--------|------|--|
| BAR NO. | SIZE | TYPE | LENGTH | WEIGHT | | |
| A3 | #4 | 1 | 4'-1" | 349 | | |
| A4 | #4 | 1 | 4'-0" | 337 | | |
| A100 | #4 | STR. | 7'-0" | 313 | | |
| A111 | #4 | STR. | 4'-5" | 3 | | |
| A112 | #4 | STR. | 2'-3" | 2 | | |
| A200 | #5 | STR. | 7'-0" | 394 | | |
| A211 | #5 | STR. | 5'-0" | 5 | | |
| A212 | #5 | STR. | 2'-4" | 2 | | |
| B3 | #4 | STR. | 8'-0" | 513 | | |
| B4 | #4 | STR. | 6'-4" | 542 | | |
| C2 | #4 | STR. | 21'-3" | 908 | | |
| D1 | #6 | STR. | 1'-6" | 34 | | |
| D3 | #6 | 2 | 4'-0" | 48 | | |
| G1 | #4 | STR. | 7'-3" | 10 | | |
| G2 | #4 | STR. | 7'-0" | 9 | | |
| S1 | #6 | STR. | 7'-0" | 32 | | |
| S2 | #8 | STR. | 7'-3" | 116 | | |
| S3 | #8 | STR. | 7'-0" | 56 | | |
| REINFORCING STEEL | | | | 3,673 | LBS. | |

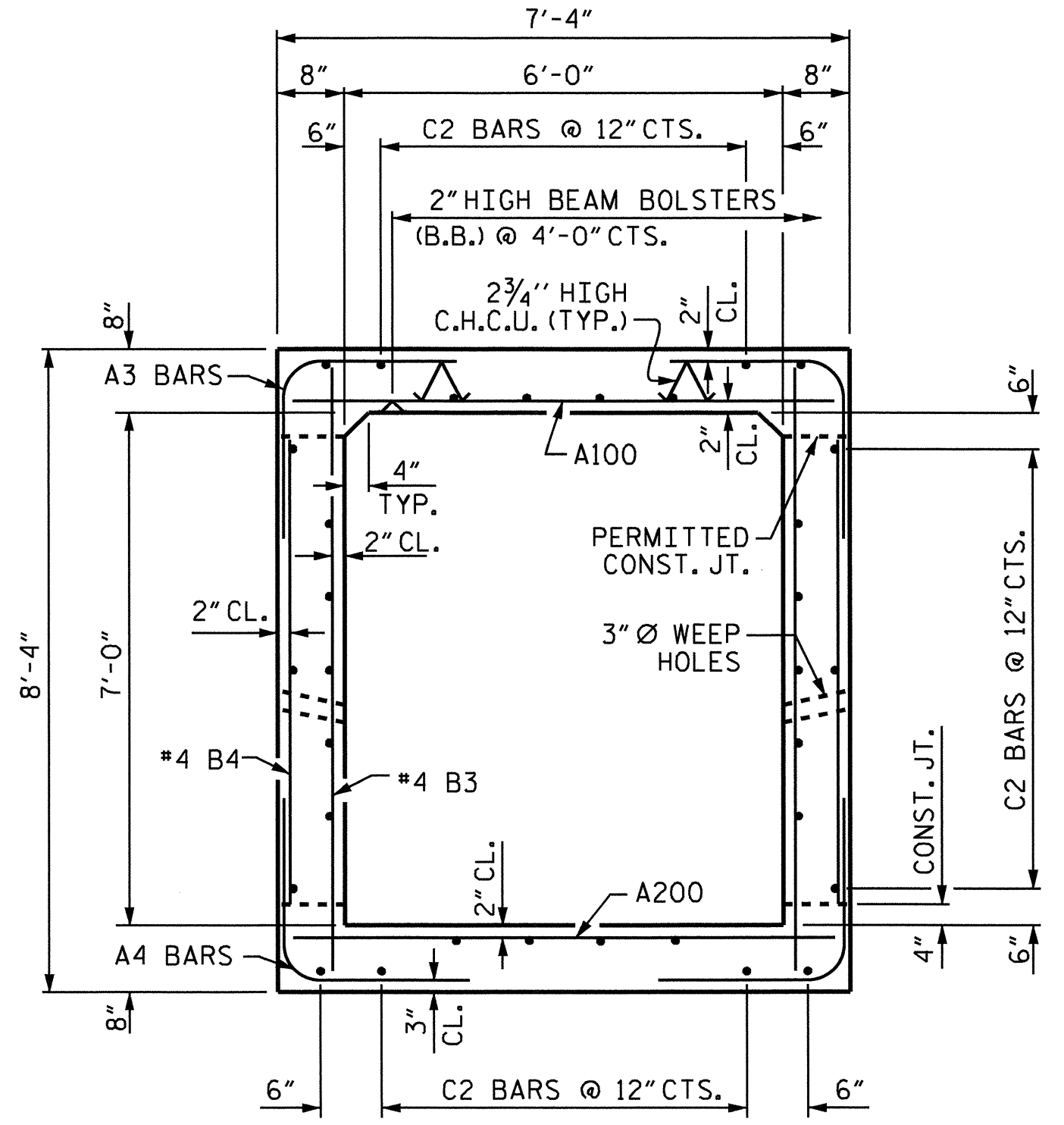
DIMENSIONS ARE OUT TO OUT



RIGHT EXTENSION

CULVERT SECTION NORMAL TO ROADWAY

FIELD CUT B3 & B4 BARS ADJACENT TO THE CONSTRUCTION JOINT TO FIT THE HEIGHT OF EXISTING CULVERT.



RIGHT ANGLE SECTION OF BARREL

THERE ARE 32 "C" BARS IN SECTION OF BARREL

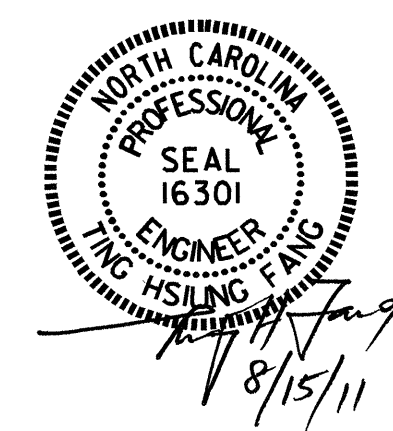
| RIGHT EXTENSION STRUCTURE QUANTITIES | |
|--------------------------------------|------------|
| CLASS A CONCRETE | |
| BARREL @ 0.716 CY/FT | 28.1 C.Y. |
| WING ETC. | 11.2 C.Y. |
| TOTAL | 39.3 C.Y. |
| REINFORCING STEEL | |
| BARREL | 3,673 LBS. |
| WINGS ETC. | 681 LBS. |
| TOTAL | 4,354 LBS. |
| CULVERT EXCAVATION | LUMP SUM |
| FOUNDATION COND. MAT'L | 20.5 TONS |

| SPLICE LENGTH CHART | | |
|---------------------|------|--------|
| BAR | SIZE | SPLICE |
| C2 | #4 | 1'-11" |

PROJECT NO. R-2812
MOORE COUNTY
STATION: 245+05.00 -L-

SHEET 4 OF 7

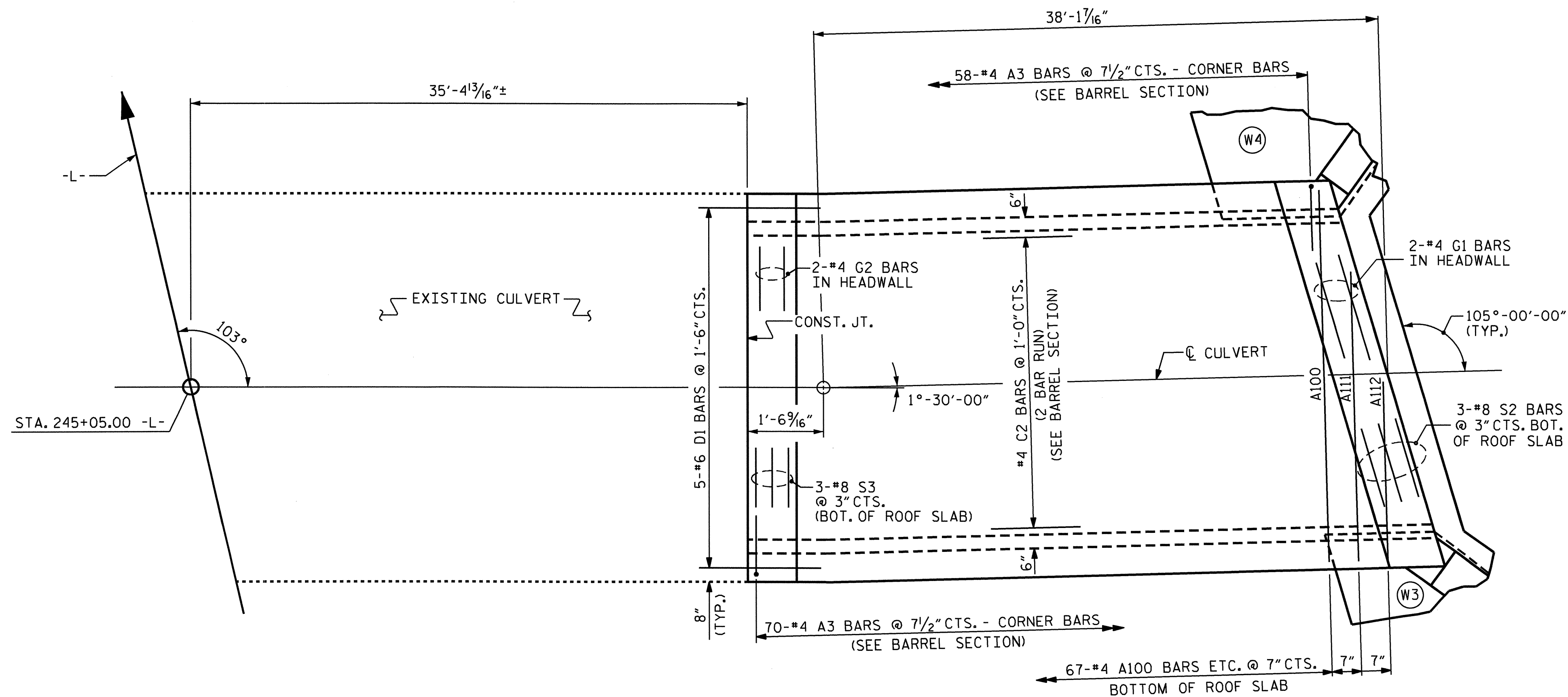
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SINGLE 6 FT. X 7 FT.
CONCRETE BOX CULVERT
103° SKEW
RIGHT EXTENSION



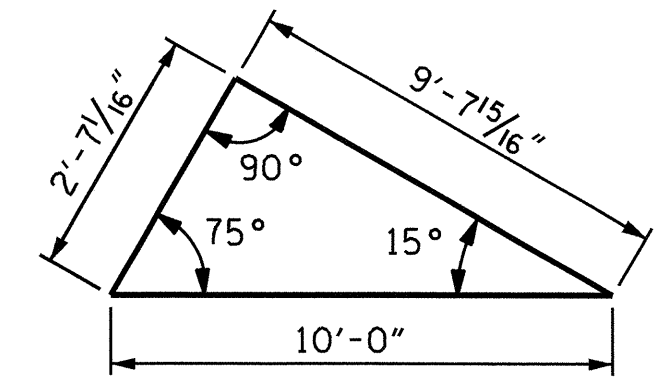
DRAWN BY: J.H.CARDEN DATE: 5/11
CHECKED BY: W.F.PARKER DATE: 6/28/11

| REVISIONS | | | | SHEET NO. | |
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| NO. | BY: | DATE: | NO. | BY: | DATE: |
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| 2 | | | 4 | | |

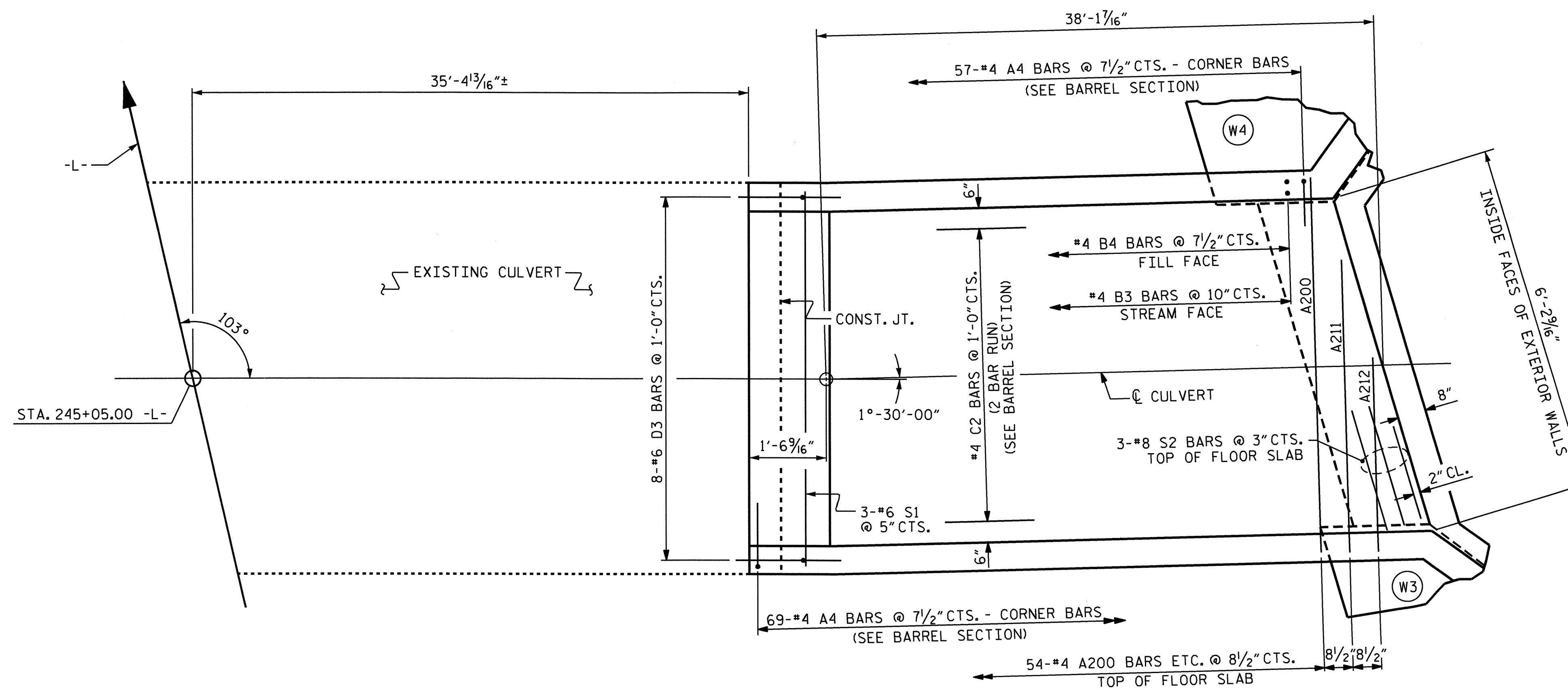
TOTAL SHEETS: 14



PART PLAN - ROOF SLAB



SKEW TRIANGLE

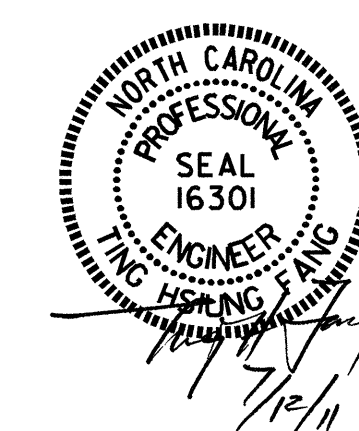


PART PLAN - FLOOR SLAB

PROJECT NO. R-2812
MOORE COUNTY
 STATION: 245+05.00 -L-

SHEET 5 OF 7

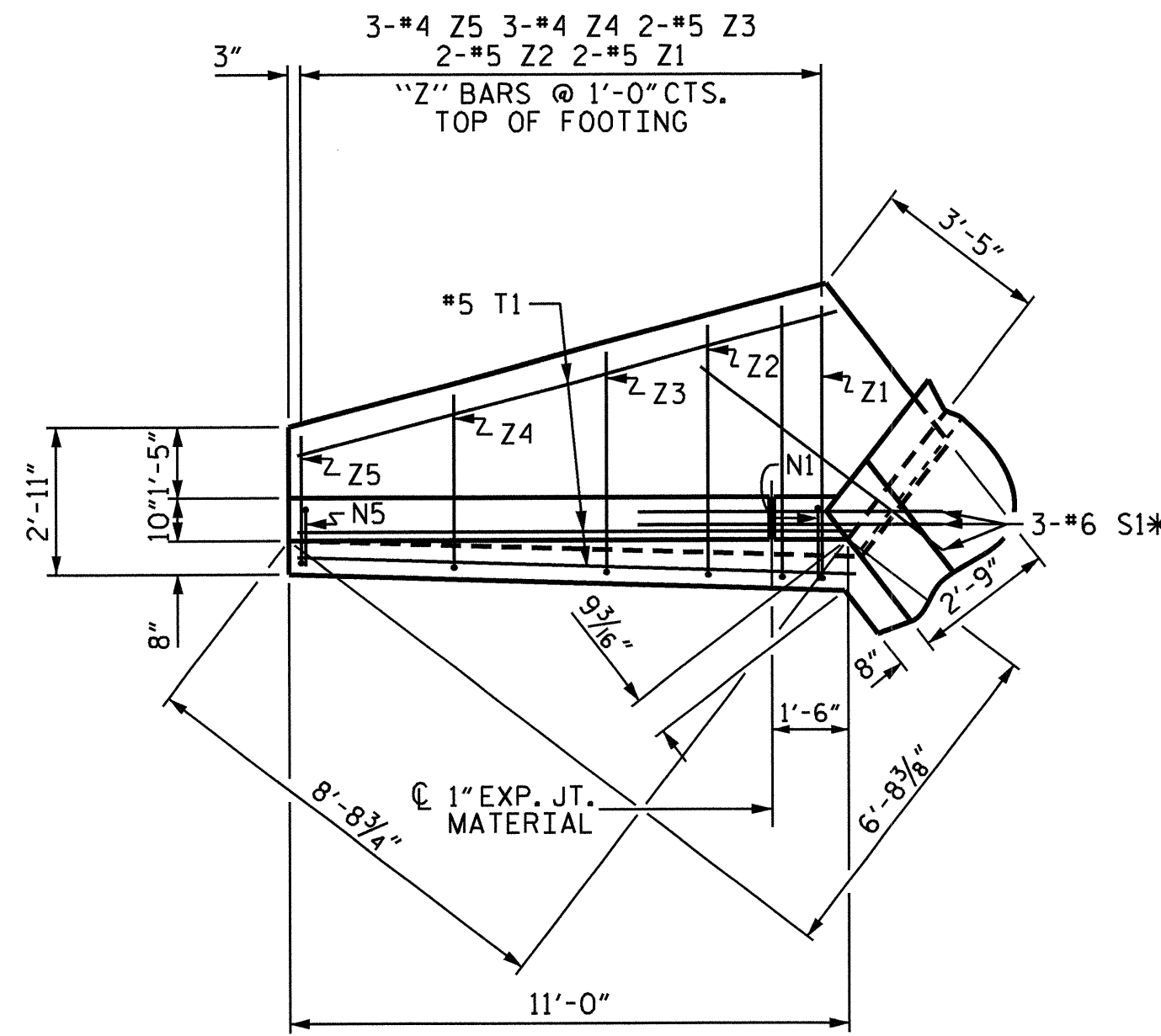
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 6 FT. X 7 FT.
 CONCRETE BOX CULVERT
 103° SKEW
 RIGHT EXTENSION



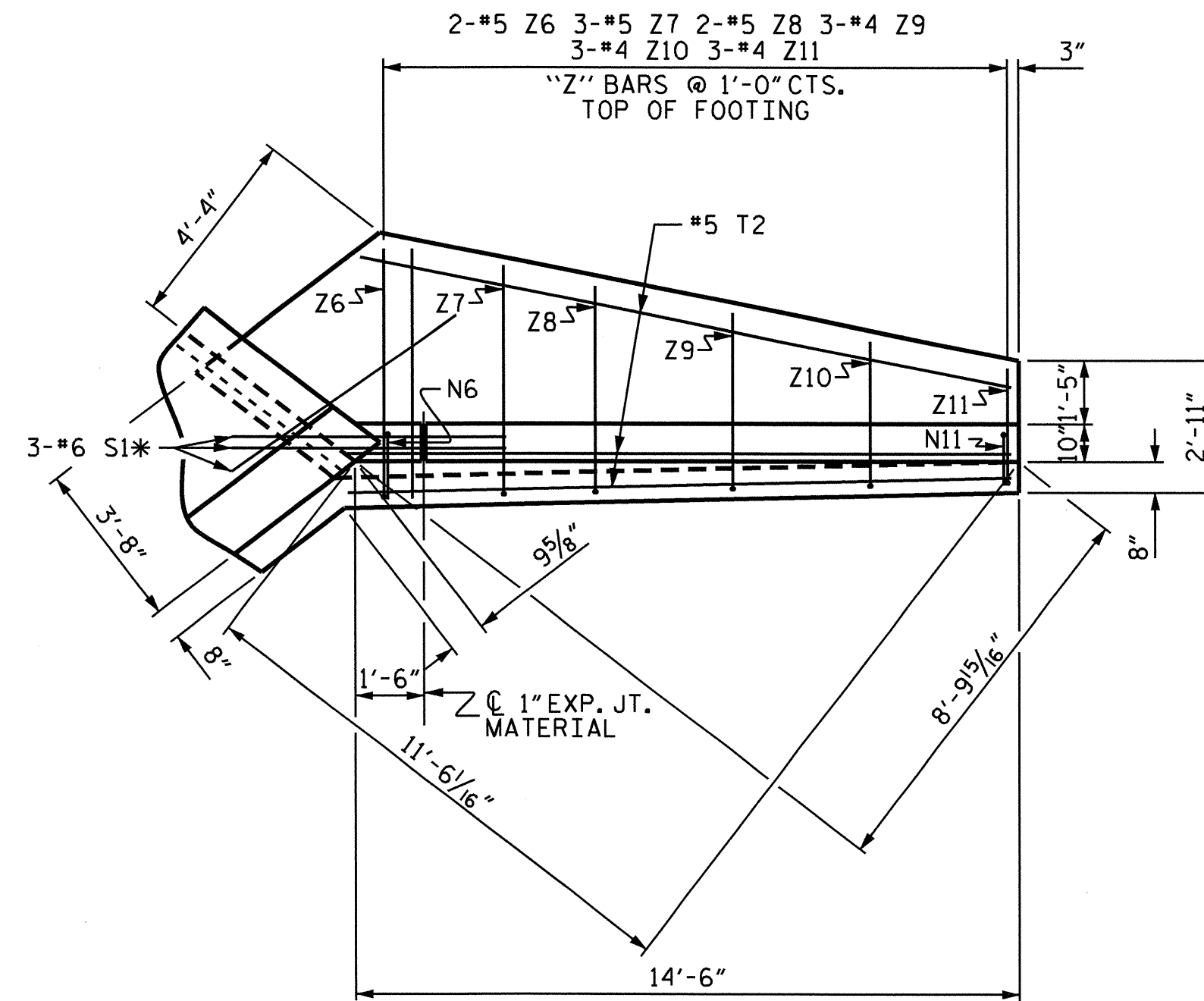
DRAWN BY: J.H. CARDEN DATE: 5/11
 CHECKED BY: W.F. PARKER DATE: 6/28/11

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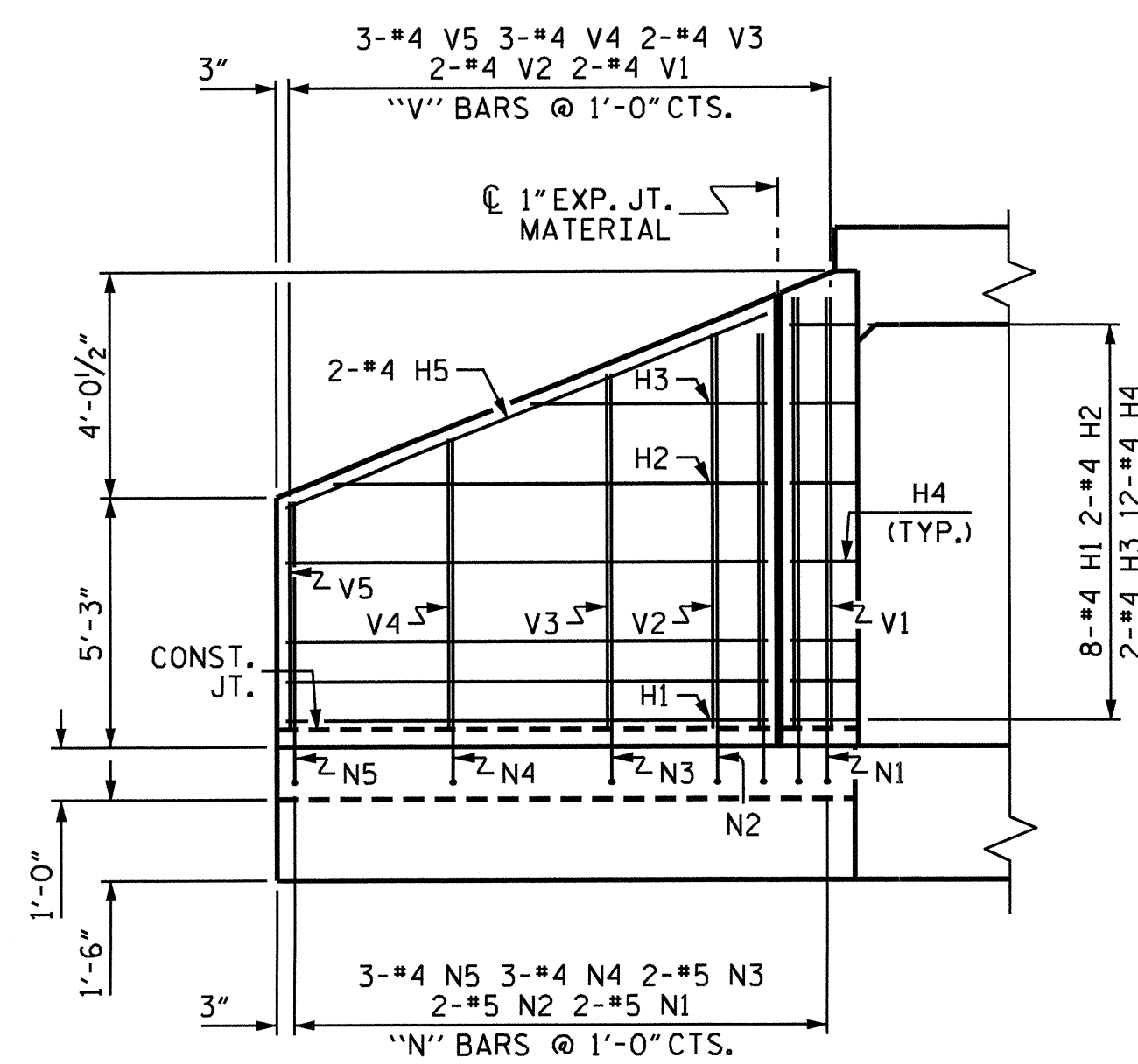
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| 2 | | | 4 | | |
| | | | | C-5 | |
| | | | | TOTAL SHEETS | |
| | | | | 14 | |



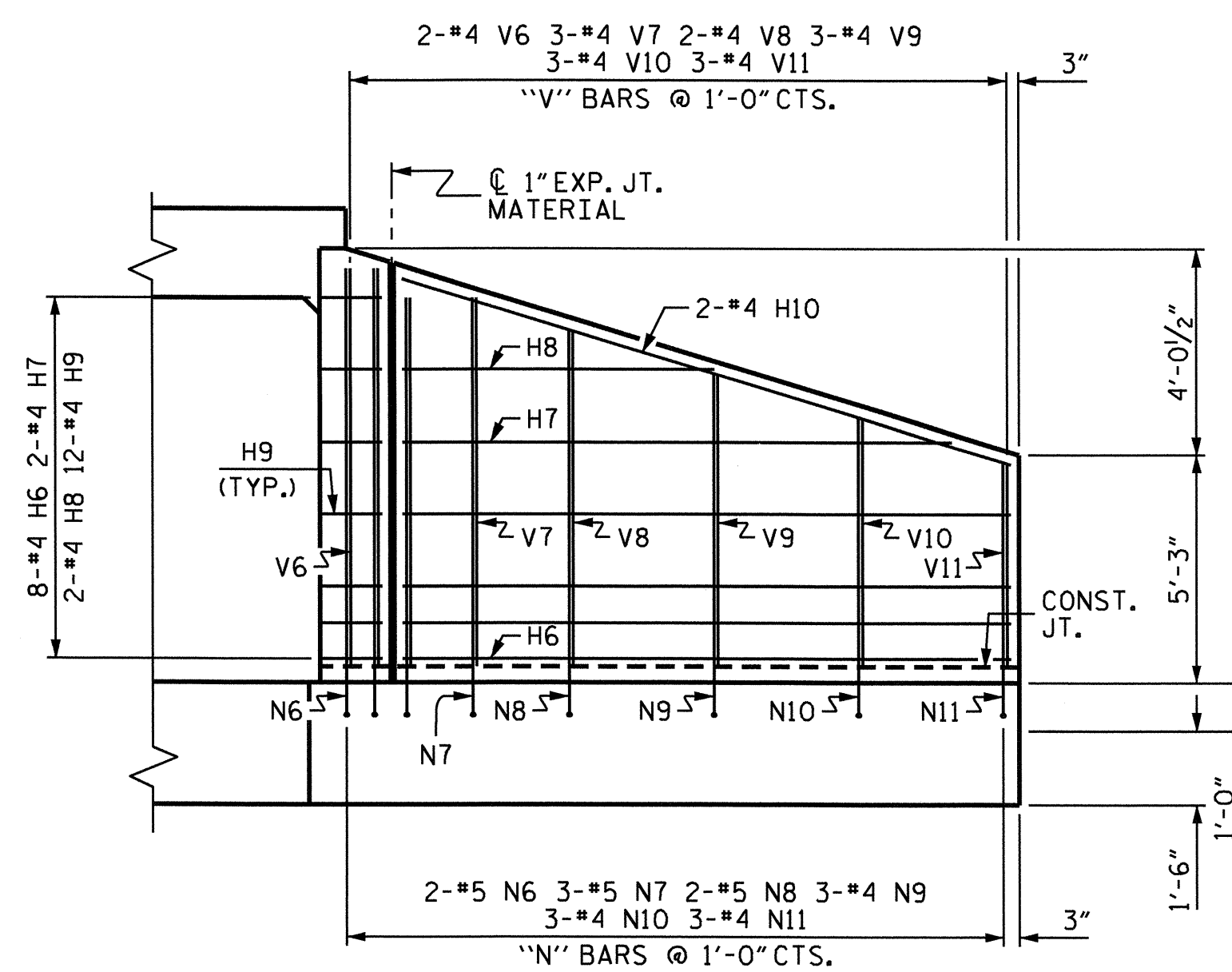
PLAN W2



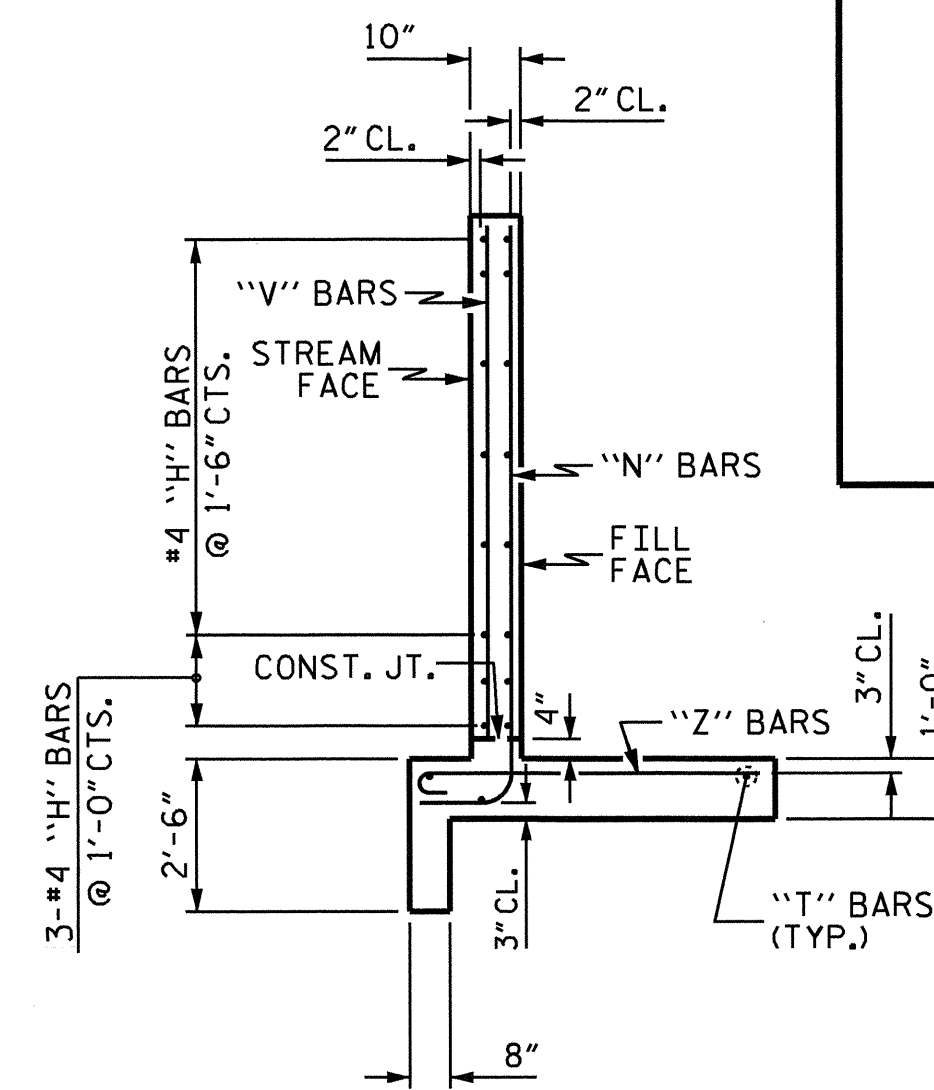
PLAN W1



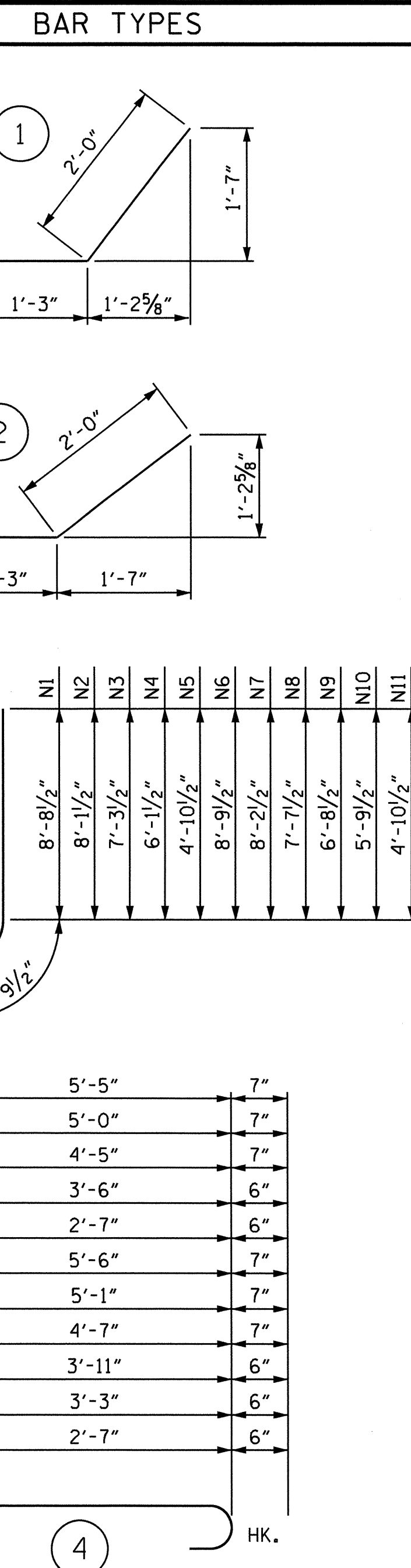
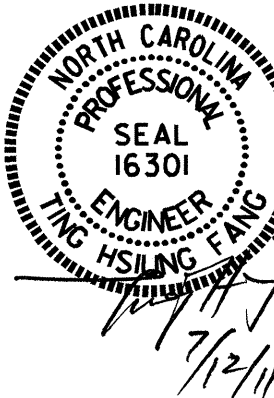
ELEVATION W2



ELEVATION W1



TYPICAL WING SECTION



| | | |
|-----|--------|----|
| Z1 | 5'-5" | 7" |
| Z2 | 5'-0" | 7" |
| Z3 | 4'-5" | 7" |
| Z4 | 3'-6" | 6" |
| Z5 | 2'-7" | 6" |
| Z6 | 5'-6" | 7" |
| Z7 | 5'-1" | 7" |
| Z8 | 4'-7" | 7" |
| Z9 | 3'-11" | 6" |
| Z10 | 3'-3" | 6" |
| Z11 | 2'-7" | 6" |

ALL BAR DIMENSIONS ARE OUT TO OUT.

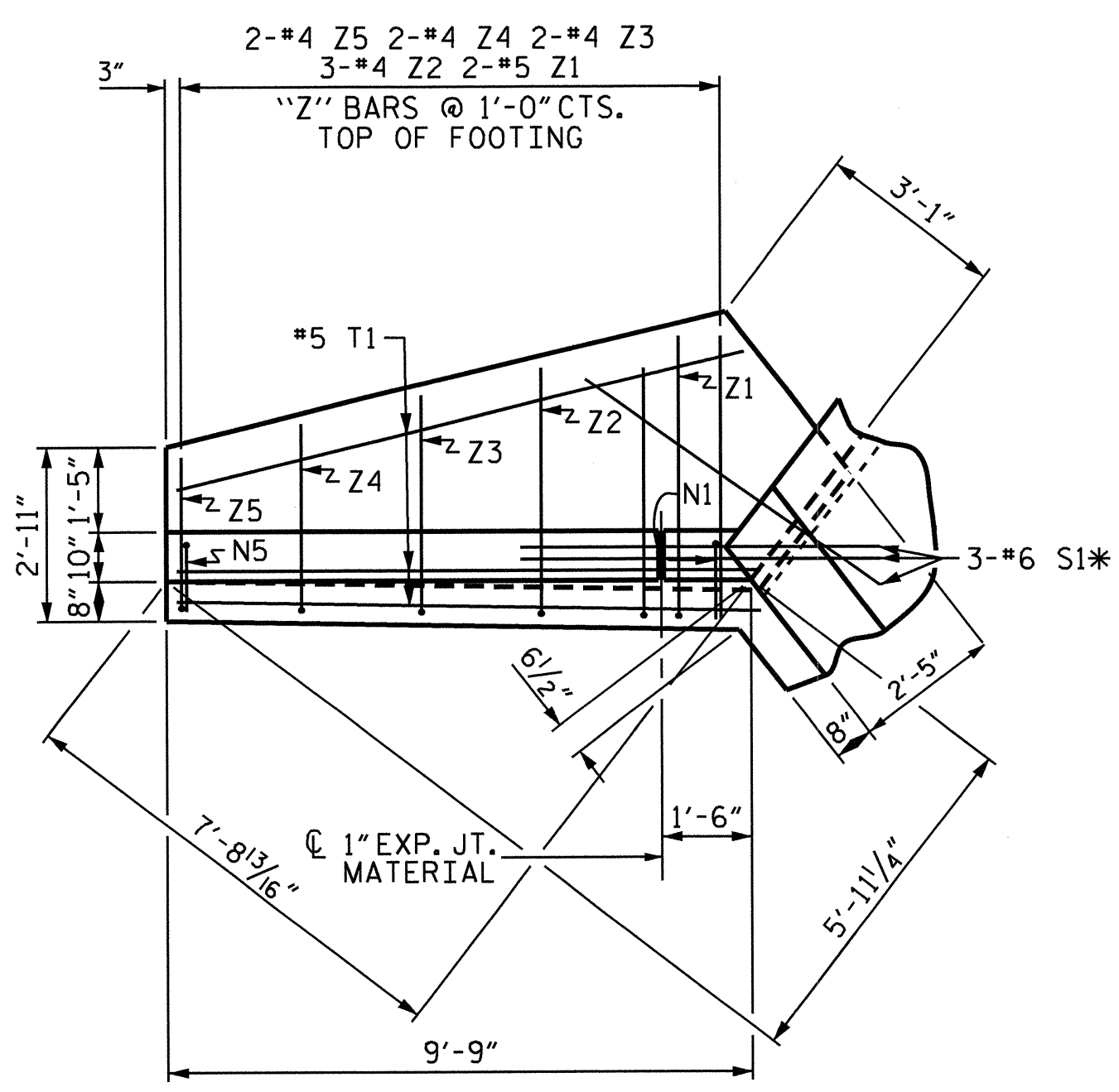
| BILL OF MATERIAL | | | | | |
|-------------------------------|-----|------|------|--------|--------|
| BAR NO. | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| H1 | 8 | #4 | STR | 9'-1" | 49 |
| H2 | 2 | #4 | STR | 8'-2" | 11 |
| H3 | 2 | #4 | STR | 4'-5" | 6 |
| H4 | 14 | #4 | 1 | 3'-3" | 30 |
| H5 | 2 | #4 | STR | 9'-10" | 13 |
| H6 | 8 | #4 | STR | 12'-7" | 67 |
| H7 | 2 | #4 | STR | 11'-4" | 15 |
| H8 | 2 | #4 | STR | 6'-5" | 9 |
| H9 | 14 | #4 | 2 | 3'-3" | 30 |
| H10 | 2 | #4 | STR | 13'-2" | 18 |
| N1 | 2 | #5 | 3 | 10'-2" | 21 |
| N2 | 2 | #5 | 3 | 9'-7" | 20 |
| N3 | 2 | #5 | 3 | 8'-9" | 18 |
| N4 | 3 | #4 | 3 | 7'-7" | 15 |
| N5 | 3 | #4 | 3 | 6'-4" | 13 |
| N6 | 2 | #5 | 3 | 10'-3" | 21 |
| N7 | 3 | #5 | 3 | 9'-8" | 30 |
| N8 | 2 | #5 | 3 | 9'-1" | 19 |
| N9 | 3 | #4 | 3 | 8'-2" | 16 |
| N10 | 3 | #4 | 3 | 7'-3" | 15 |
| N11 | 3 | #4 | 3 | 6'-4" | 13 |
| S1 | 6 | #6 | STR | 6'-0" | 54 |
| T1 | 3 | #5 | STR | 11'-0" | 34 |
| T2 | 3 | #5 | STR | 14'-6" | 45 |
| V1 | 2 | #4 | STR | 8'-8" | 12 |
| V2 | 2 | #4 | STR | 8'-0" | 11 |
| V3 | 2 | #4 | STR | 7'-3" | 10 |
| V4 | 3 | #4 | STR | 6'-0" | 12 |
| V5 | 3 | #4 | STR | 4'-10" | 10 |
| V6 | 2 | #4 | STR | 8'-9" | 12 |
| V7 | 3 | #4 | STR | 8'-2" | 16 |
| V8 | 2 | #4 | STR | 7'-6" | 10 |
| V9 | 3 | #4 | STR | 6'-7" | 13 |
| V10 | 3 | #4 | STR | 5'-8" | 11 |
| V11 | 3 | #4 | STR | 4'-9" | 10 |
| Z1 | 2 | #5 | 4 | 6'-0" | 13 |
| Z2 | 2 | #5 | 4 | 5'-7" | 12 |
| Z3 | 2 | #5 | 4 | 5'-0" | 10 |
| Z4 | 3 | #4 | 4 | 4'-0" | 8 |
| Z5 | 3 | #4 | 4 | 3'-1" | 6 |
| Z6 | 2 | #5 | 4 | 6'-1" | 13 |
| Z7 | 3 | #5 | 4 | 5'-8" | 18 |
| Z8 | 2 | #5 | 4 | 5'-2" | 11 |
| Z9 | 3 | #4 | 4 | 4'-5" | 9 |
| Z10 | 3 | #4 | 4 | 3'-9" | 8 |
| Z11 | 3 | #4 | 4 | 3'-1" | 6 |
| REINFORCING STEEL FOR 2 WINGS | | | | 823 | LBS |
| CLASS A CONCRETE | | | | | |
| 2 WINGS | | | | 12.1 | CY |
| 1 HEADWALL | | | | 0.4 | CY |
| 1 END CURTAIN WALL | | | | 0.3 | CY |
| 2 EDGE BEAMS | | | | 0.7 | CY |
| TOTAL | | | | 13.5 | CY |

PROJECT NO. R-2812
MOORE COUNTY
 STATION: 245+05.00 -L-

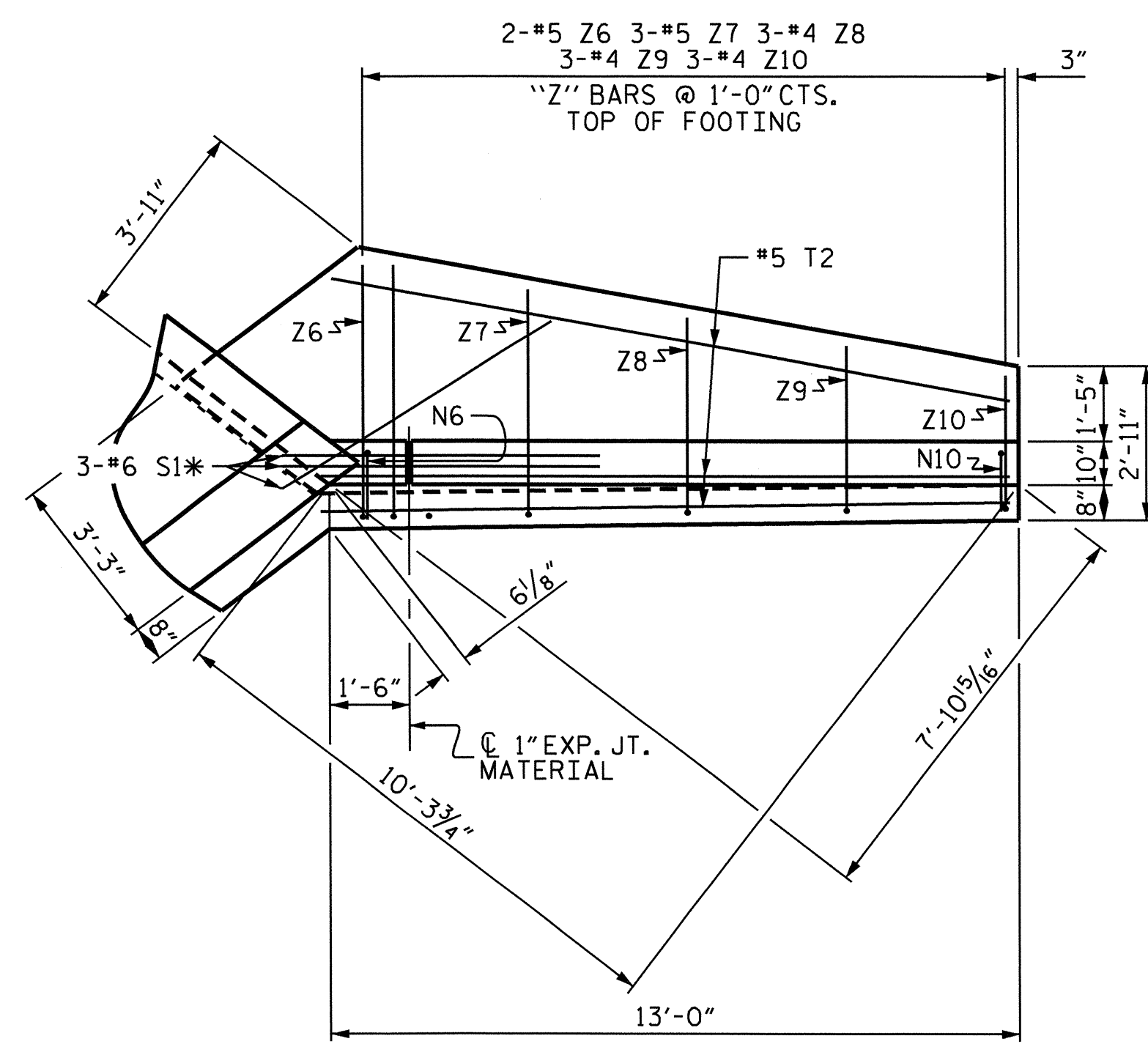
SHEET 6 OF 7
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS FOR
 CONCRETE BOX CULVERT
 H = 8'-0" SLOPE = 2:1
 75° OR 105° SKEW
 LEFT EXTENSION

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

ASSEMBLED BY : J.H.CARDEN DATE : 5/11
 CHECKED BY : W.F.PARKER DATE : 6/28/11
 DRAWN BY : CCJ 01/00
 CHECKED BY : RWW 03/00

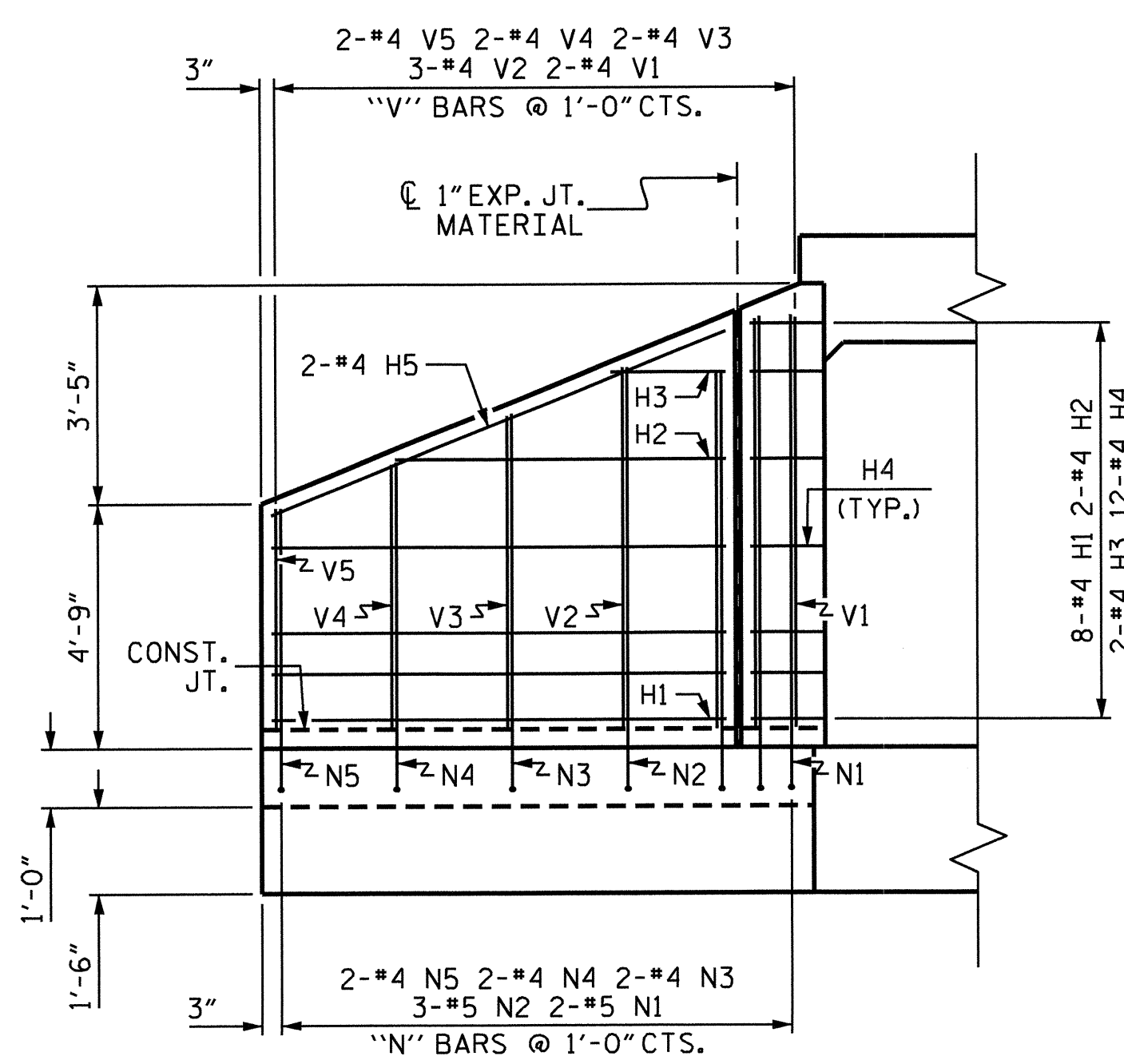


PLAN W4

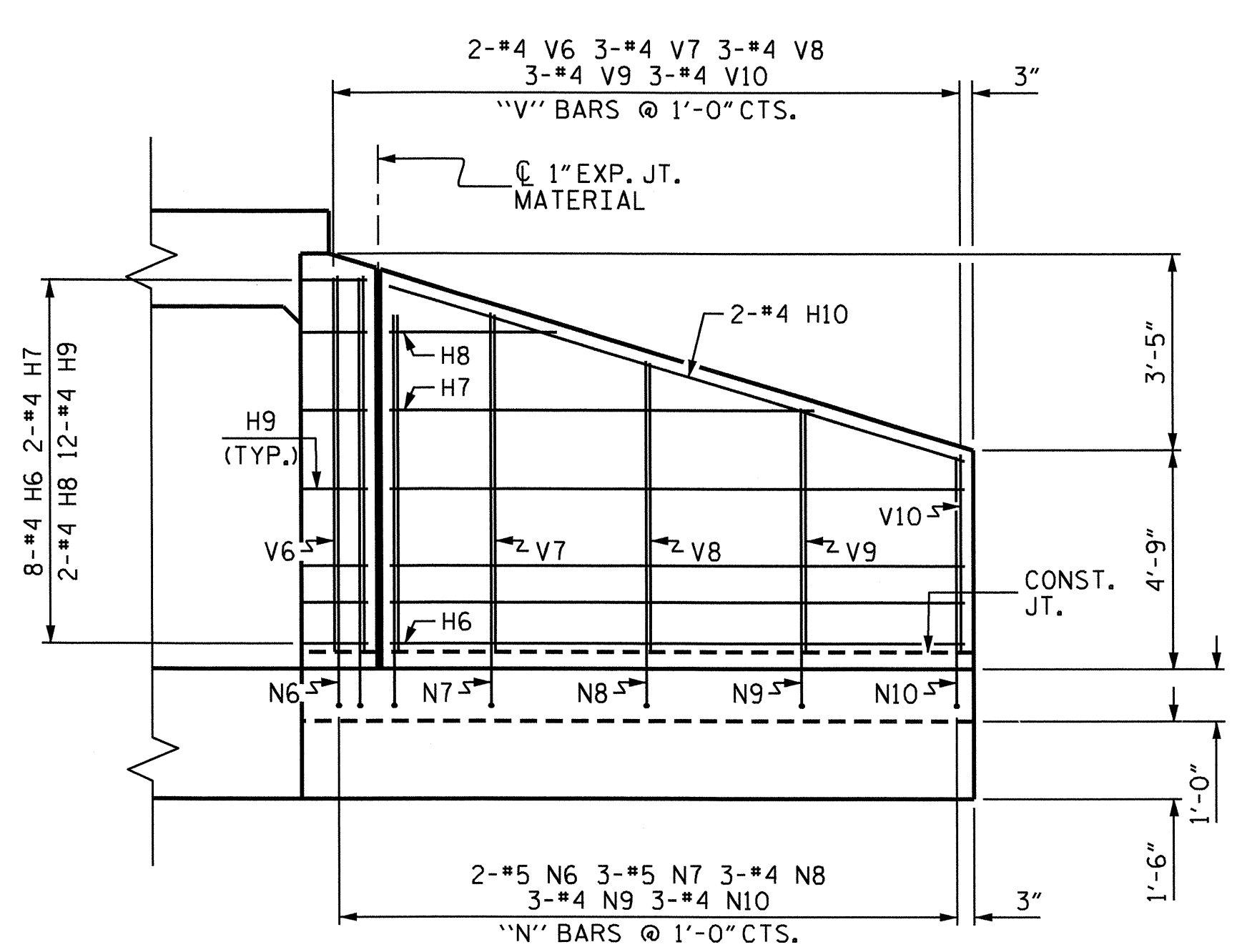


PLAN W3

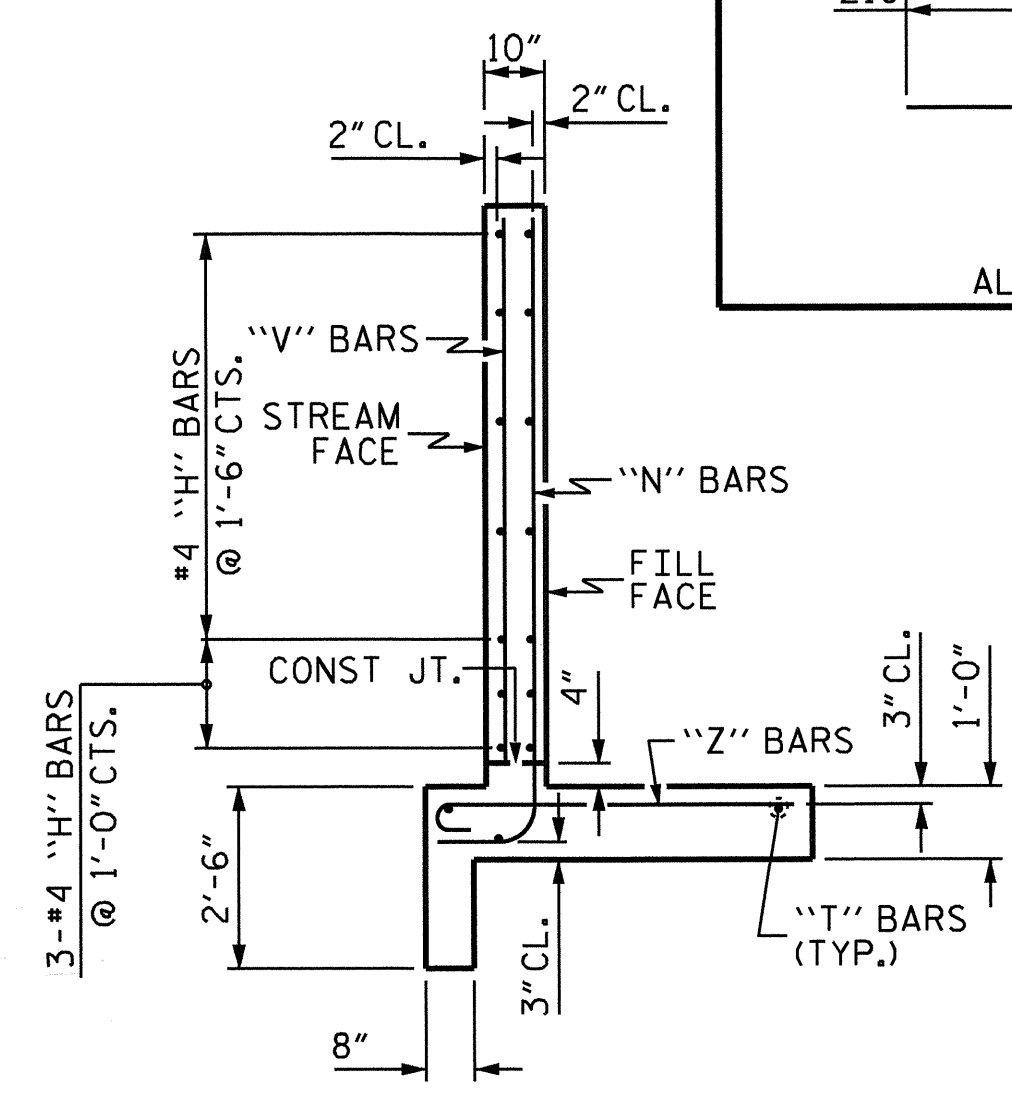
* S1 @ BOTTOM OF FLOOR SLAB & FOOTING



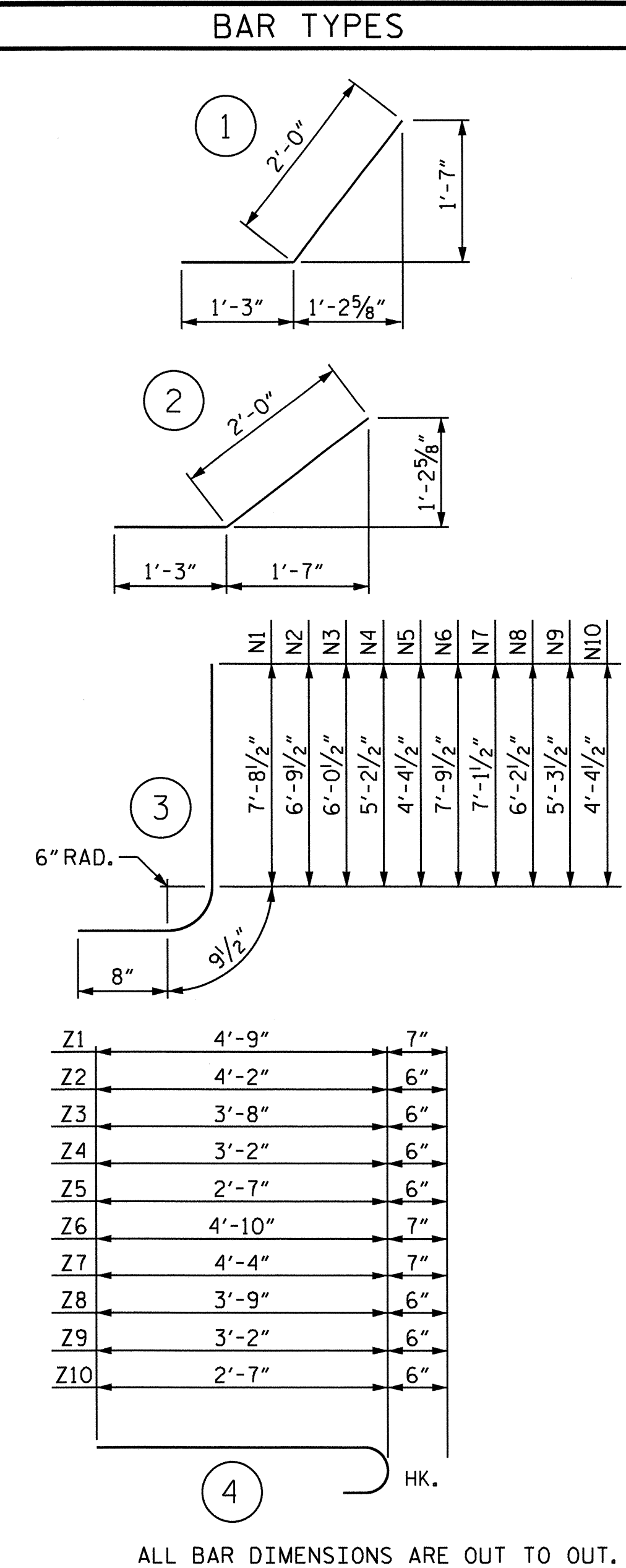
ELEVATION W4



ELEVATION W3



TYPICAL WING SECTION



| BILL OF MATERIAL | | | | |
|------------------|------|------|--------|--------|
| BAR NO. | SIZE | TYPE | LENGTH | WEIGHT |
| H1 | #4 | STR | 7'-10" | 42 |
| H2 | #4 | STR | 5'-8" | 8 |
| H3 | #4 | STR | 2'-0" | 3 |
| H4 | #4 | 1 | 3'-3" | 30 |
| H5 | #4 | STR | 8'-5" | 11 |
| H6 | #4 | STR | 11'-1" | 59 |
| H7 | #4 | STR | 8'-2" | 11 |
| H8 | #4 | STR | 3'-3" | 4 |
| H9 | #4 | 2 | 3'-3" | 30 |
| H10 | #4 | STR | 11'-7" | 15 |
| N1 | #5 | 3 | 9'-2" | 19 |
| N2 | #5 | 3 | 8'-3" | 26 |
| N3 | #4 | 3 | 7'-6" | 10 |
| N4 | #4 | 3 | 6'-8" | 9 |
| N5 | #4 | 3 | 5'-10" | 8 |
| N6 | #5 | 3 | 9'-3" | 19 |
| N7 | #5 | 3 | 8'-7" | 27 |
| N8 | #4 | 3 | 7'-8" | 15 |
| N9 | #4 | 3 | 6'-9" | 14 |
| N10 | #4 | 3 | 5'-10" | 12 |
| S1 | #6 | STR | 6'-0" | 54 |
| T1 | #5 | STR | 9'-9" | 31 |
| T2 | #5 | STR | 13'-0" | 41 |
| V1 | #4 | STR | 7'-7" | 10 |
| V2 | #4 | STR | 6'-9" | 14 |
| V3 | #4 | STR | 5'-11" | 8 |
| V4 | #4 | STR | 5'-1" | 7 |
| V5 | #4 | STR | 4'-4" | 6 |
| V6 | #4 | STR | 7'-9" | 10 |
| V7 | #4 | STR | 7'-0" | 14 |
| V8 | #4 | STR | 6'-1" | 12 |
| V9 | #4 | STR | 5'-2" | 10 |
| V10 | #4 | STR | 4'-4" | 9 |
| Z1 | #4 | 4 | 5'-4" | 11 |
| Z2 | #4 | 4 | 4'-8" | 9 |
| Z3 | #4 | 4 | 4'-2" | 6 |
| Z4 | #4 | 4 | 3'-8" | 5 |
| Z5 | #4 | 4 | 3'-1" | 4 |
| Z6 | #5 | 4 | 5'-5" | 11 |
| Z7 | #5 | 4 | 4'-11" | 15 |
| Z8 | #4 | 4 | 4'-3" | 9 |
| Z9 | #4 | 4 | 3'-8" | 7 |
| Z10 | #4 | 4 | 3'-1" | 6 |

REINFORCING STEEL 681 LBS
 FOR 2 WINGS

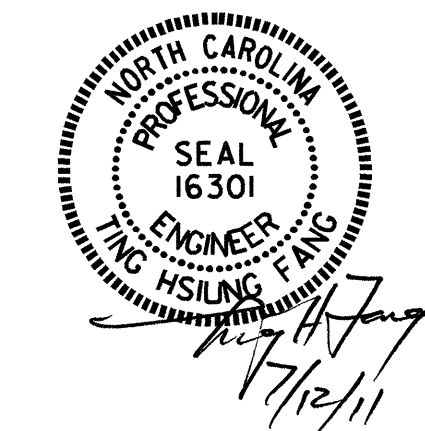
| | | |
|--------------------|-------------|-----------|
| CLASS A CONCRETE | | |
| 2 WINGS | 9.8 | CY |
| 1 HEADWALL | 0.6 | CY |
| 1 END CURTAIN WALL | 0.3 | CY |
| 2 EDGE BEAMS | 0.5 | CY |
| TOTAL | 11.2 | CY |

PROJECT NO. R-2812
MOORE COUNTY
 STATION: 245+05.00 -L-

SHEET 7 OF 7

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD WINGS FOR
 CONCRETE BOX CULVERT
 H = 7'-0" SLOPE = 2:1
 75° OR 105° SKEW
 RIGHT EXTENSION



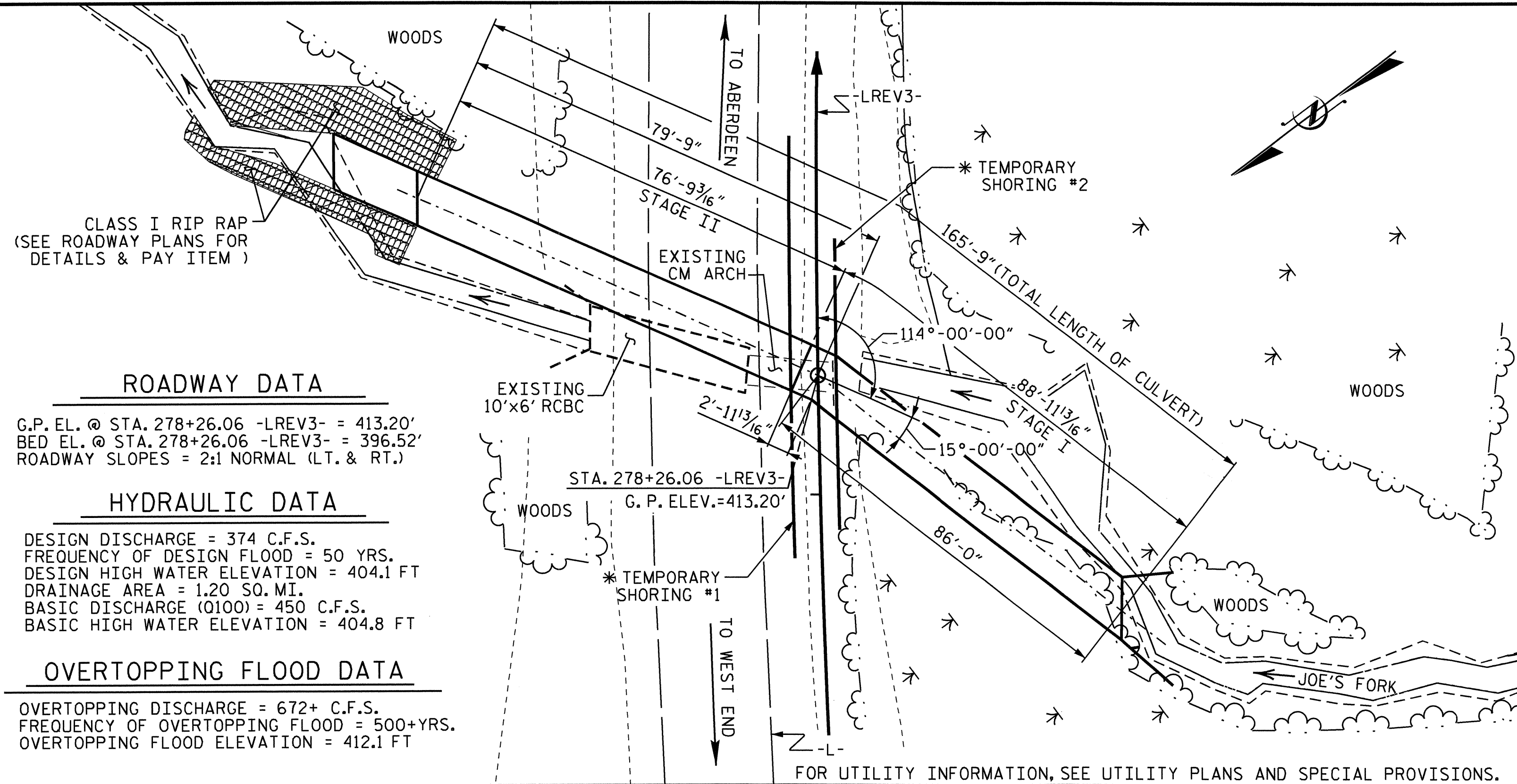
ASSEMBLED BY: J.H.CARDEN DATE: 5/11
 CHECKED BY: W.F.PARKER DATE: 6/28/11
 DRAWN BY: CCJ 12/99
 CHECKED BY: RWW 03/00

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

TOTAL SHEETS: 14

BM #20: RR SPIKE IN BASE OF POWER POLE, 91.00' RT OF STA. 290+65.00 -L-, EL. 444.38'

F. A. PROJECT NO. STP-0211 (26)

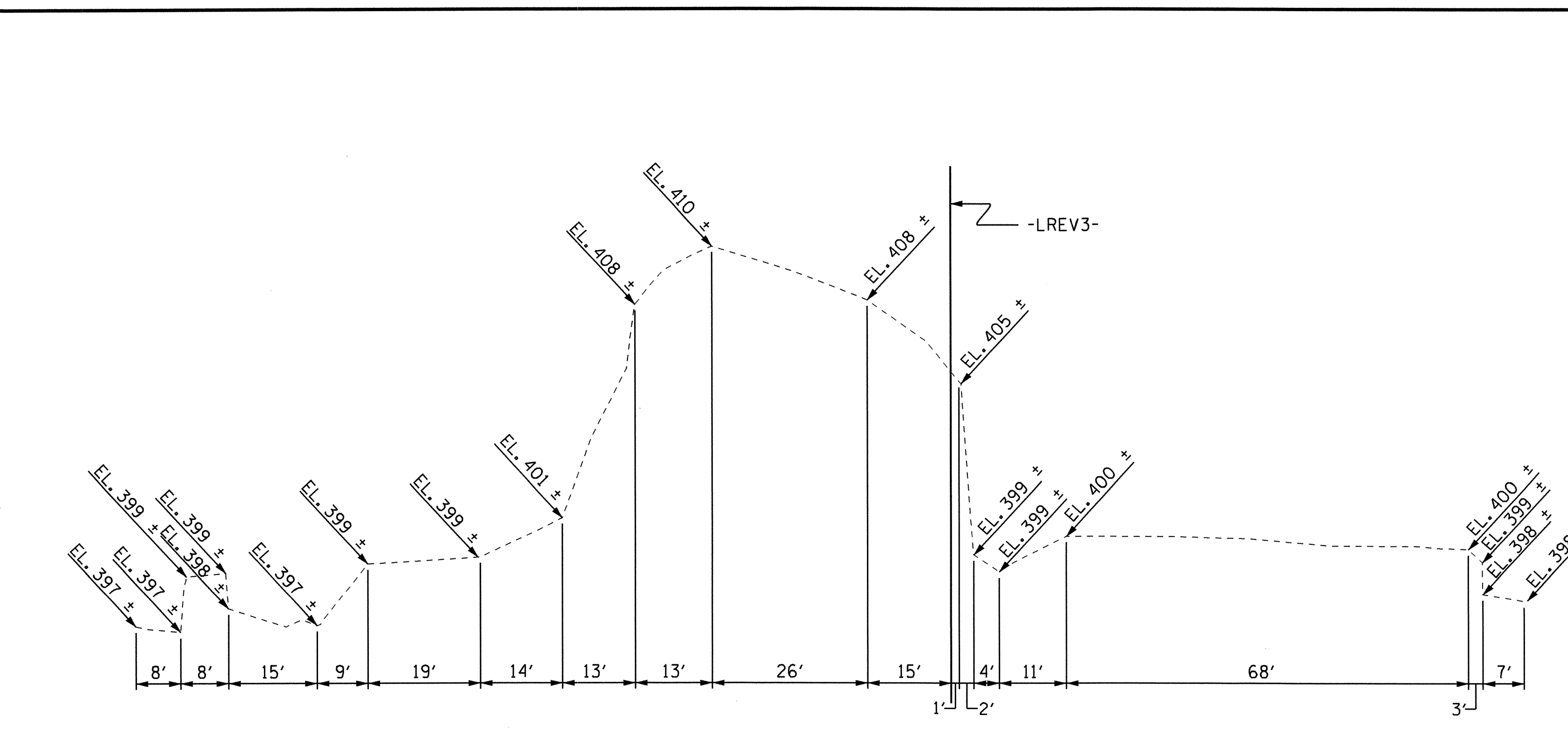


ROADWAY DATA
G.P. EL. @ STA. 278+26.06 -LREV3- = 413.20'
BED EL. @ STA. 278+26.06 -LREV3- = 396.52'
ROADWAY SLOPES = 2:1 NORMAL (LT. & RT.)

HYDRAULIC DATA
DESIGN DISCHARGE = 374 C.F.S.
FREQUENCY OF DESIGN FLOOD = 50 YRS.
DESIGN HIGH WATER ELEVATION = 404.1 FT
DRAINAGE AREA = 1.20 SQ. MI.
BASIC DISCHARGE (Q100) = 450 C.F.S.
BASIC HIGH WATER ELEVATION = 404.8 FT

OVERTOPPING FLOOD DATA
OVERTOPPING DISCHARGE = 672+ C.F.S.
FREQUENCY OF OVERTOPPING FLOOD = 500+YRS.
OVERTOPPING FLOOD ELEVATION = 412.1 FT

LOCATION SKETCH



PROFILE ALONG CULVERT

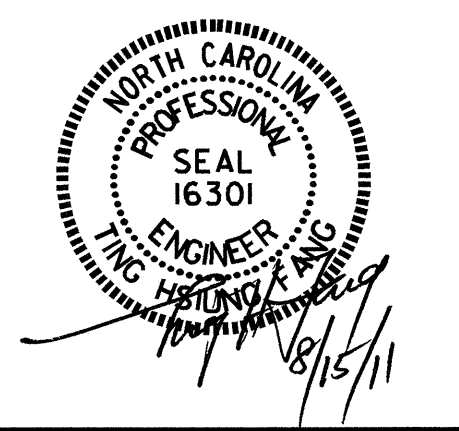
I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NOTES:
ASSUMED LIVE LOAD -----HS20-44 OR ALTERNATE LOADING.
DESIGN FILL----- 10.23 FT.
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, FOR EACH STAGE:
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.
TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FEET. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS, EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
AT THE CONTRACTOR'S OPTION, 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.
AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.
THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

* FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.
FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROLS PLANS.
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.
REMOVAL OF THE 10' X 6' RCBC SHALL BE INCIDENTAL TO CULVERT EXCAVATION.
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.
FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.
FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

| TOTAL STRUCTURE QUANTITIES | | |
|-----------------------------|--------|------|
| CLASS A CONCRETE | | |
| STAGE I | 113.3 | C.Y. |
| STAGE II | 96.3 | C.Y. |
| TOTAL | 209.6 | C.Y. |
| REINFORCING STEEL | | |
| STAGE I | 19,391 | LBS. |
| STAGE II | 17,526 | LBS. |
| TOTAL | 36,917 | LBS. |
| CULVERT EXCAVATION LUMP SUM | | |
| FOUNDATION COND. MAT'L | | |
| STAGE I | 78 | TONS |
| STAGE II | 81 | TONS |
| TOTAL | 159 | TONS |

PROJECT NO. R-2812
MOORE COUNTY
STATION: 278+26.06-LREV3-



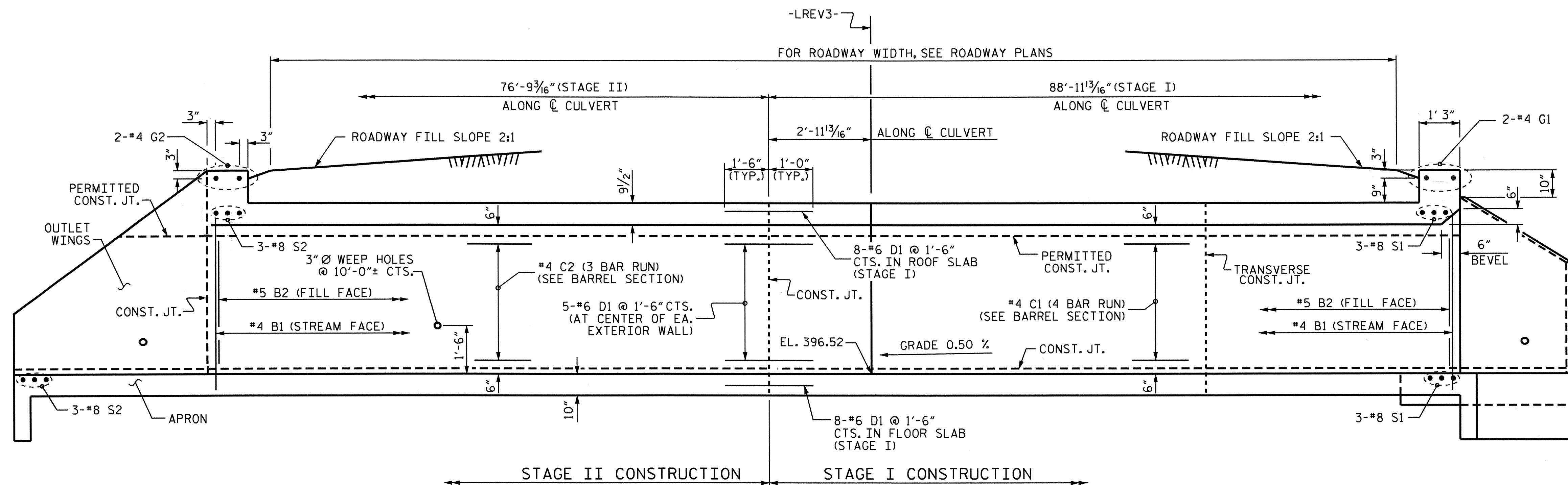
SHEET 1 OF 7

| STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH | | | | | |
|--|-----|-------|-----|-----|-------|
| SINGLE 11 FT. X 7 FT. CONCRETE BOX CULVERT 114° SKEW | | | | | |
| REVISIONS | | | | | |
| NO. | BY: | DATE: | NO. | BY: | DATE: |
| 1 | | | 3 | | |
| 2 | | | 4 | | |

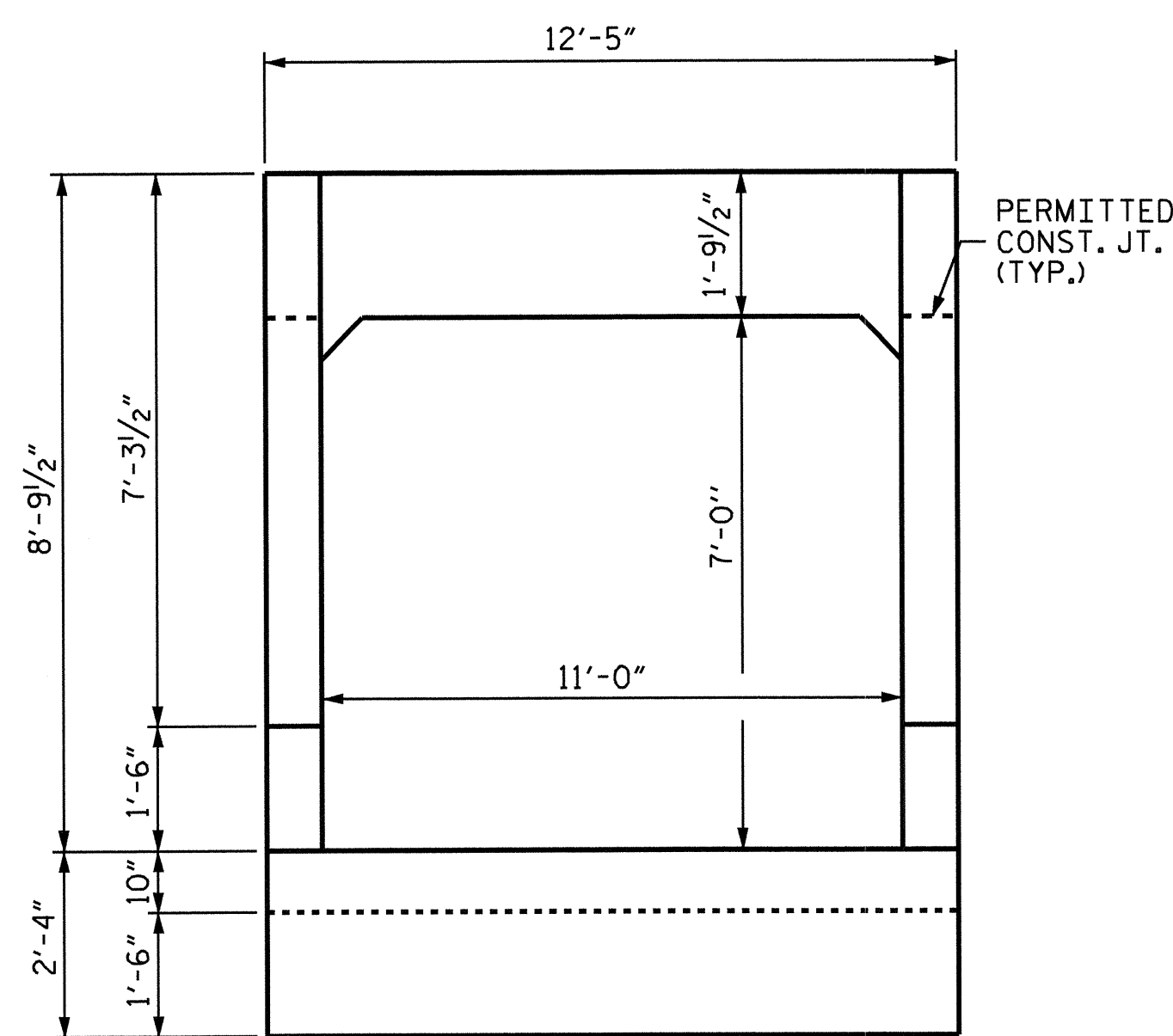
| | |
|--------------|-----|
| SHEET NO. | C-8 |
| TOTAL SHEETS | 14 |

ADDED NOV. 1, 1990

| | | |
|----------------------------|------------------|----------|
| ASSEMBLED BY: K.H. COMPTON | DATE: 3/11 | SPECIAL |
| CHECKED BY: J.H. CARDEN | DATE: 5/11 | |
| DRAWN BY: R.W. WRIGHT | DATE: JULY, 1990 | STANDARD |
| CHECKED BY: D.A. GLADDEN | DATE: JULY, 1990 | |

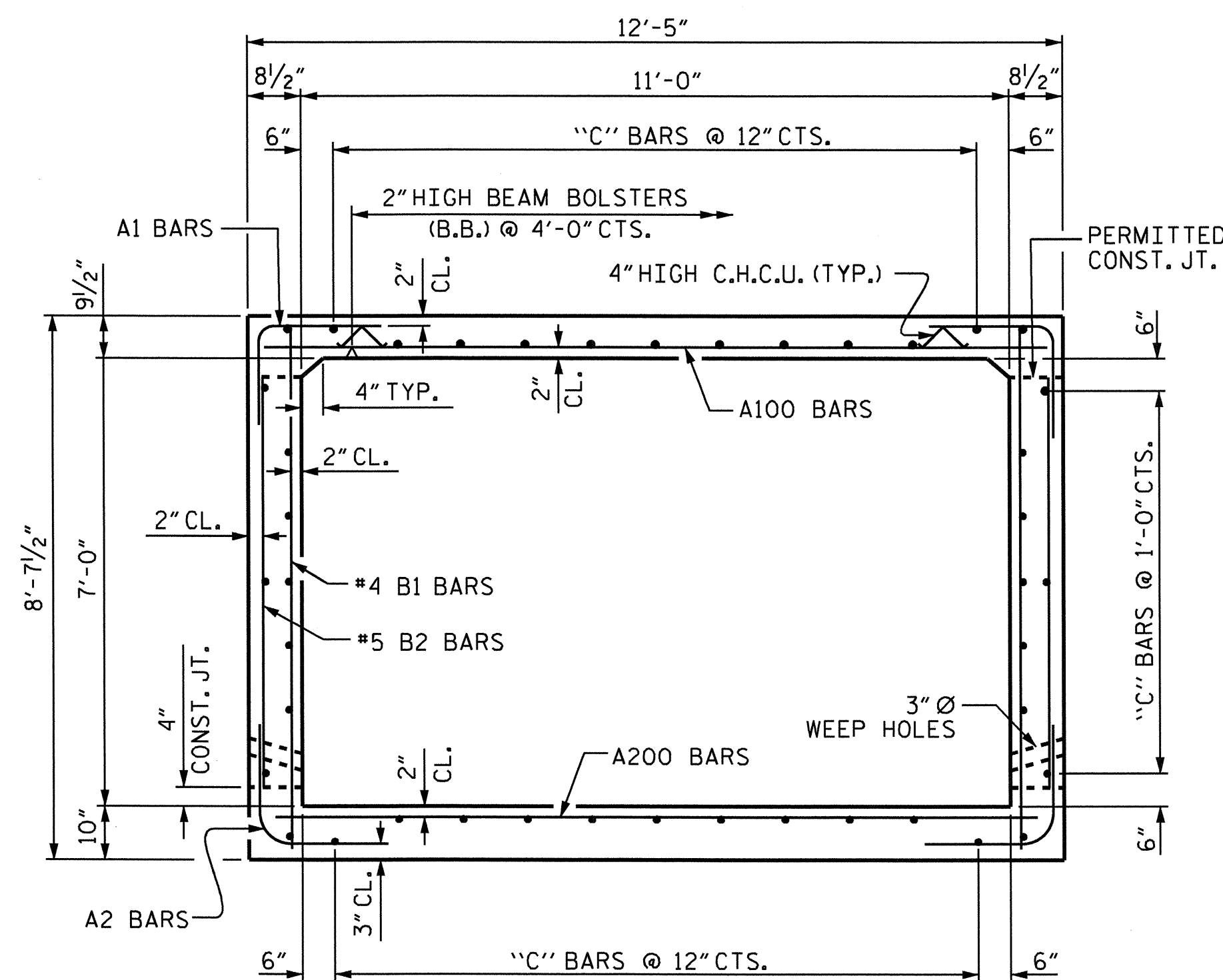


CULVERT SECTION ALONG \bar{C} CULVERT



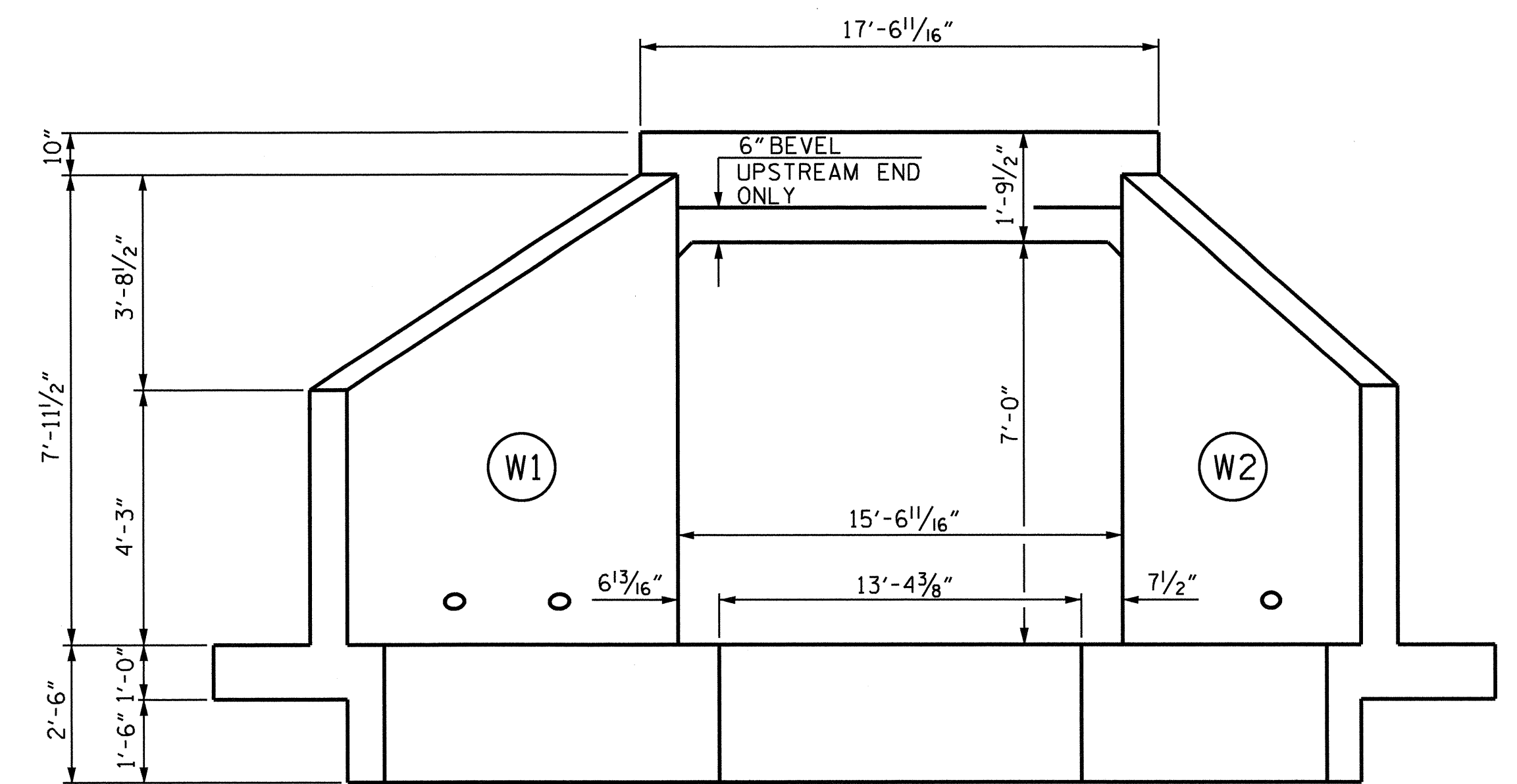
OUTLET END ELEVATION

NORMAL TO SKEW
(STAGE II)



RIGHT ANGLE SECTION OF BARREL

THERE ARE 42 "C" BARS IN SECTION OF BARREL.



INLET END ELEVATION

NORMAL TO SKEW
(STAGE I)

PROJECT NO. R-2812
MOORE COUNTY
 STATION: 278+26.06-LREV3-

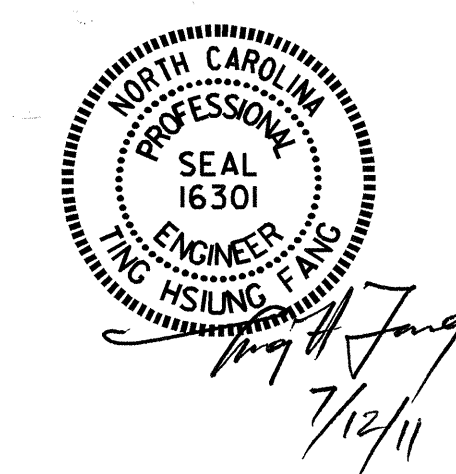
SHEET 2 OF 7

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

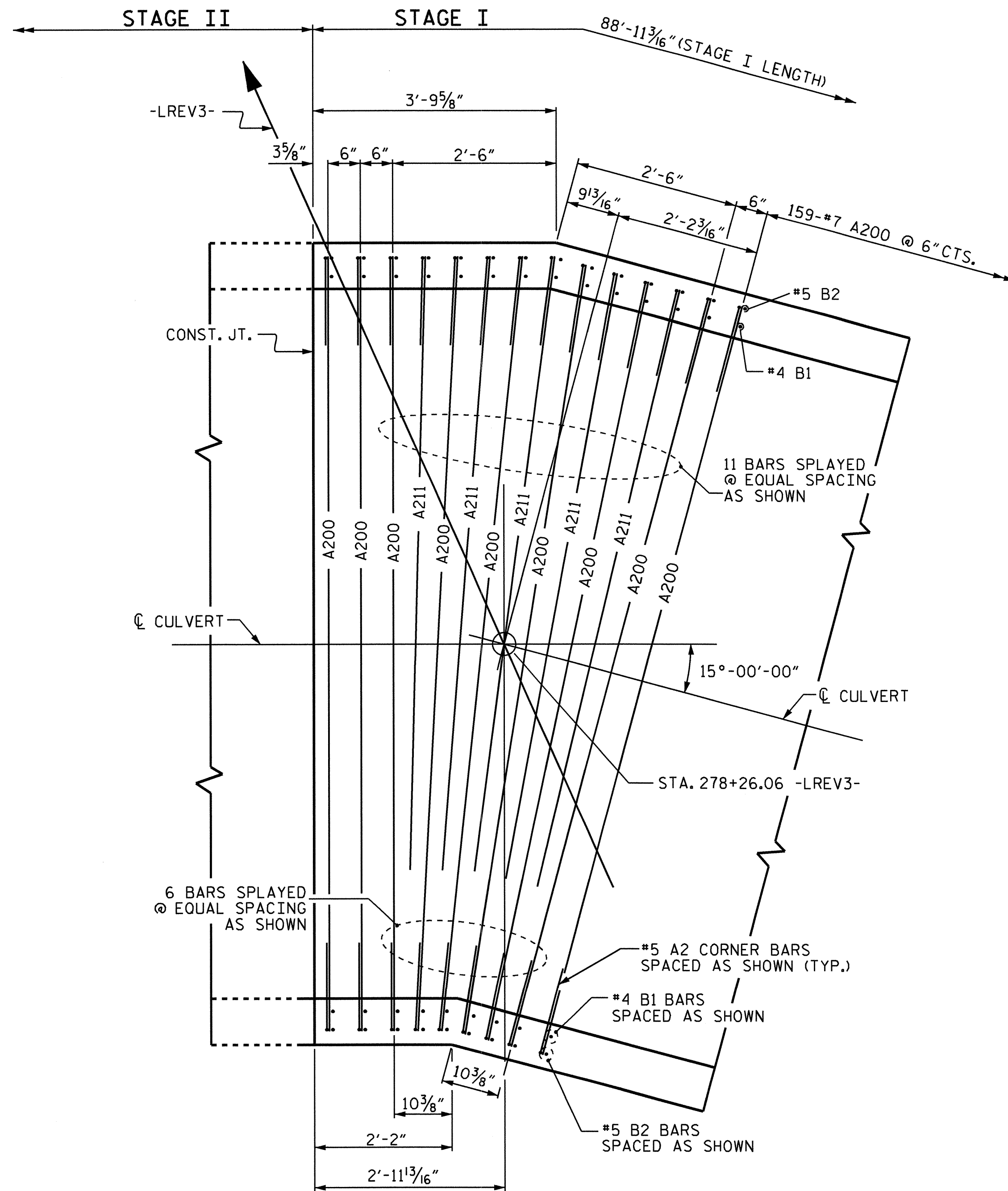
**SINGLE 11 FT. X 7 FT.
 CONCRETE BOX CULVERT
 114° SKEW**

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

TOTAL SHEETS: 14

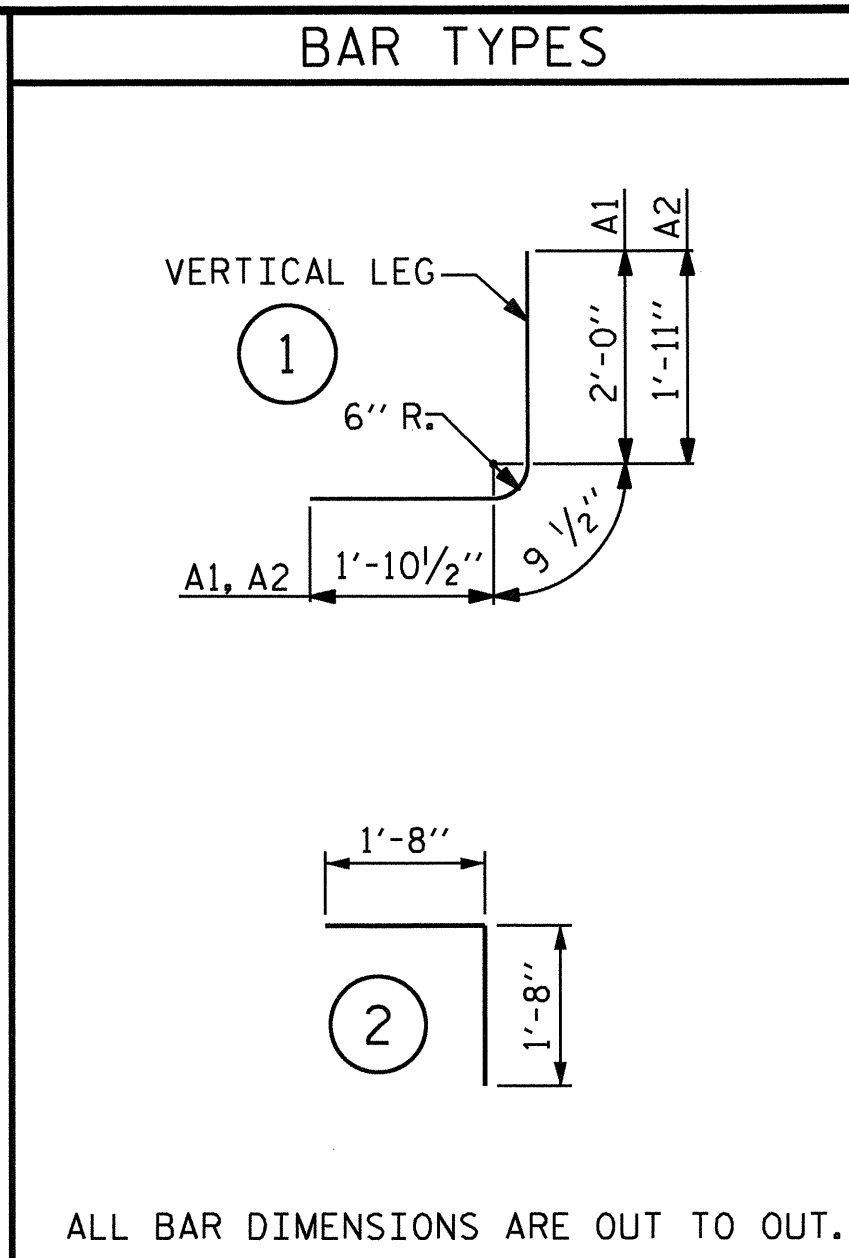


DRAWN BY: K.H. COMPTON DATE: 3/11
 CHECKED BY: J.H. CARDEN DATE: 5/11



DETAIL "X"

FLOOR SLAB SHOWN, ROOF SLAB SIMILAR.



| STAGE II | | | | | | STAGE I | | | | | |
|-------------------|------|------|--------|---------|------------|-------------------|------|--------|--------|--------|------------|
| BAR NO. | SIZE | TYPE | LENGTH | WEIGHT | BAR NO. | SIZE | TYPE | LENGTH | WEIGHT | | |
| A1 | 308 | #5 | 1 | 4'-8" | 1499 | A1 | 360 | #5 | 1 | 4'-8" | 1752 |
| A2 | 372 | #5 | 1 | 4'-7" | 1778 | A2 | 360 | #5 | 1 | 4'-7" | 1721 |
| A100 | 148 | #6 | STR | 12'-0" | 2668 | A100 | 167 | #6 | STR | 12'-0" | 3010 |
| A121 | 1 | #6 | STR | 9'-11" | 15 | A101 | 2 | #6 | STR | 11'-4" | 34 |
| A122 | 1 | #6 | STR | 8'-10" | 13 | A102 | 2 | #6 | STR | 10'-4" | 31 |
| A123 | 1 | #6 | STR | 7'-8" | 12 | A103 | 2 | #6 | STR | 9'-4" | 28 |
| A124 | 1 | #6 | STR | 6'-7" | 10 | A104 | 2 | #6 | STR | 8'-4" | 25 |
| A125 | 1 | #6 | STR | 5'-5" | 8 | A105 | 2 | #6 | STR | 7'-4" | 22 |
| A126 | 1 | #6 | STR | 4'-4" | 7 | A106 | 2 | #6 | STR | 6'-4" | 19 |
| A127 | 1 | #6 | STR | 3'-3" | 5 | A107 | 2 | #6 | STR | 5'-4" | 16 |
| A128 | 1 | #6 | STR | 2'-1" | 3 | A108 | 2 | #6 | STR | 4'-4" | 13 |
| | | | | | | A109 | 2 | #6 | STR | 3'-4" | 10 |
| A200 | 180 | #7 | STR | 12'-0" | 4415 | A110 | 2 | #6 | STR | 2'-4" | 7 |
| A221 | 1 | #7 | STR | 9'-11" | 20 | A111 | 5 | #6 | STR | 9'-6" | 71 |
| A222 | 1 | #7 | STR | 8'-10" | 18 | | | | | | |
| A223 | 1 | #7 | STR | 7'-8" | 16 | A200 | 167 | #7 | STR | 12'-0" | 4096 |
| A224 | 1 | #7 | STR | 6'-7" | 13 | A201 | 2 | #7 | STR | 11'-4" | 46 |
| A225 | 1 | #7 | STR | 5'-5" | 11 | A202 | 2 | #7 | STR | 10'-4" | 42 |
| A226 | 1 | #7 | STR | 4'-4" | 9 | A203 | 2 | #7 | STR | 9'-4" | 38 |
| A227 | 1 | #7 | STR | 3'-3" | 7 | A204 | 2 | #7 | STR | 8'-4" | 34 |
| A228 | 1 | #7 | STR | 2'-1" | 4 | A205 | 2 | #7 | STR | 7'-4" | 30 |
| | | | | | | A206 | 2 | #7 | STR | 6'-4" | 26 |
| B1 | 308 | #4 | STR | 8'-4" | 1715 | A207 | 2 | #7 | STR | 5'-4" | 22 |
| B2 | 307 | #5 | STR | 6'-4" | 2035 | A208 | 2 | #7 | STR | 4'-4" | 18 |
| | | | | | | A209 | 2 | #7 | STR | 3'-4" | 14 |
| C2 | 87 | #4 | STR | 27'-10" | 1618 | A210 | 2 | #7 | STR | 2'-4" | 10 |
| C3 | 52 | #4 | STR | 25'-5" | 883 | A211 | 5 | #7 | STR | 9'-6" | 97 |
| D1 | 12 | #6 | STR | 2'-6" | 45 | B1 | 359 | #4 | STR | 7'-10" | 1878 |
| | | | | | | B2 | 360 | #5 | STR | 6'-4" | 2378 |
| G2 | 2 | #4 | STR | 13'-3" | 18 | | | | | | |
| K1 | 6 | #4 | 2 | 3'-4" | 13 | C1 | 168 | #4 | STR | 24'-7" | 2759 |
| S2 | 8 | #8 | STR | 13'-3" | 283 | D1 | 26 | #6 | STR | 2'-6" | 98 |
| REINFORCING STEEL | | | | | 17,139 LBS | G1 | 2 | #4 | STR | 17'-1" | 23 |
| | | | | | | | | | | | |
| | | | | | | S1 | 6 | #8 | STR | 17'-1" | 274 |
| | | | | | | REINFORCING STEEL | | | | | 18,642 LBS |

SPLICE LENGTH CHART

| BAR | SIZE | SPLICE |
|------------|------|--------|
| C1, C2, C3 | #4 | 1'-11" |

STRUCTURE QUANTITIES

| STAGE II | | STAGE I | |
|--|--------------------|--|--------------------|
| CLASS A CONCRETE BARREL @ 1.123 CY/FT | 86.2 C.Y. | CLASS A CONCRETE BARREL @ 1.123 CY/FT | 99.9 C.Y. |
| OUTLET WINGS ETC. | 10.1 C.Y. | INLET WINGS ETC. | 13.4 C.Y. |
| TOTAL | 96.3 C.Y. | TOTAL | 113.3 C.Y. |
| REINFORCING STEEL BARREL | 17,139 LBS. | REINFORCING STEEL BARREL | 18,642 LBS. |
| OUTLET WINGS ETC. | 387 LBS. | INLET WINGS ETC. | 749 LBS. |
| TOTAL | 17,526 LBS. | TOTAL | 19,391 LBS. |
| CULVERT EXCAVATION | LUMP SUM | CULVERT EXCAVATION | LUMP SUM |
| FOUNDATION COND. MAT'L | 81 TONS | FOUNDATION COND. MAT'L | 78 TONS |

PROJECT NO. R-2812
MOORE COUNTY
 STATION: 278+26.06-LREV3-

SHEET 3 OF 7

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

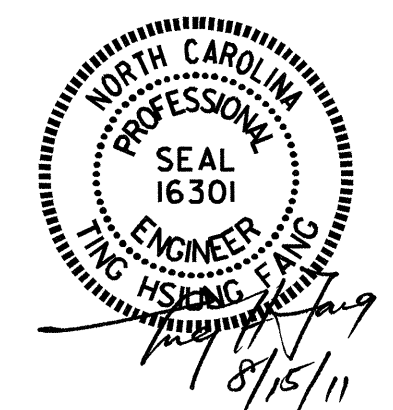
SINGLE 11 FT. X 7 FT.
 CONCRETE BOX CULVERT
 114° SKEW

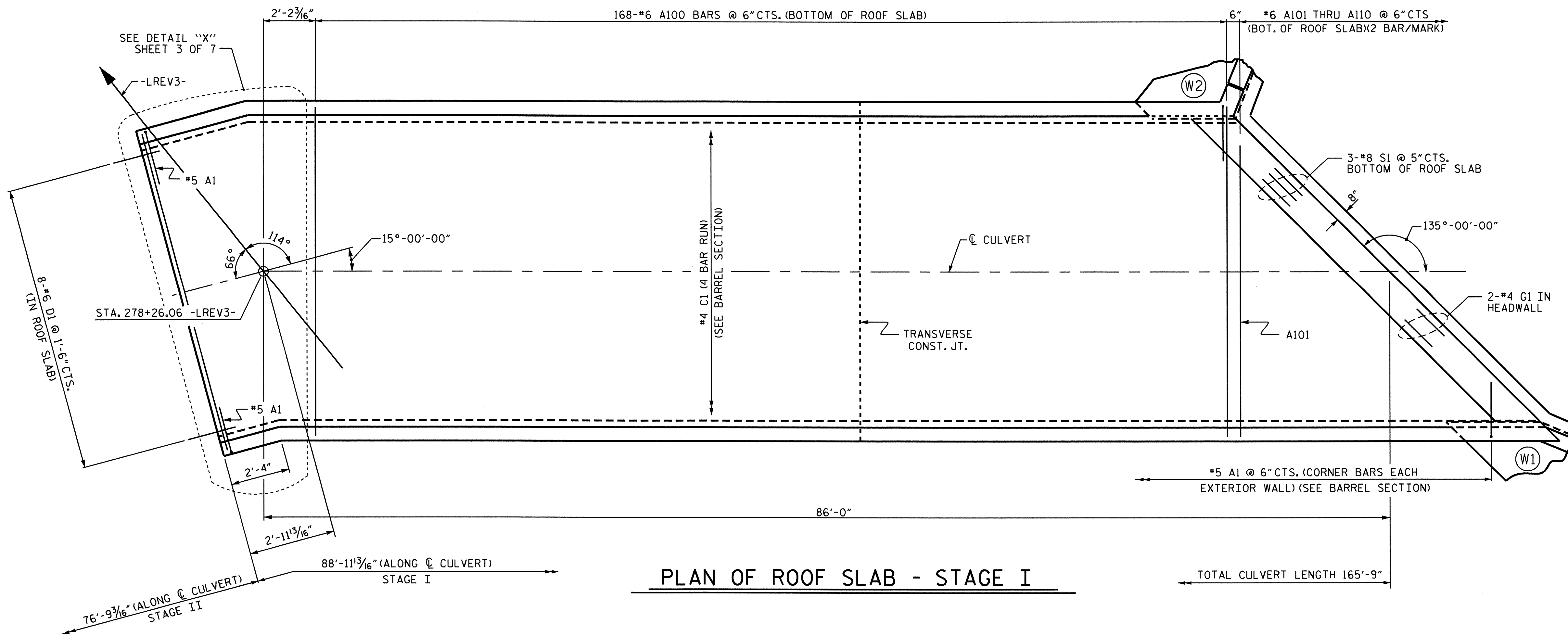
| REVISIONS | | | | SHEET NO. |
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| 2 | | | 4 | |

TOTAL SHEETS 14

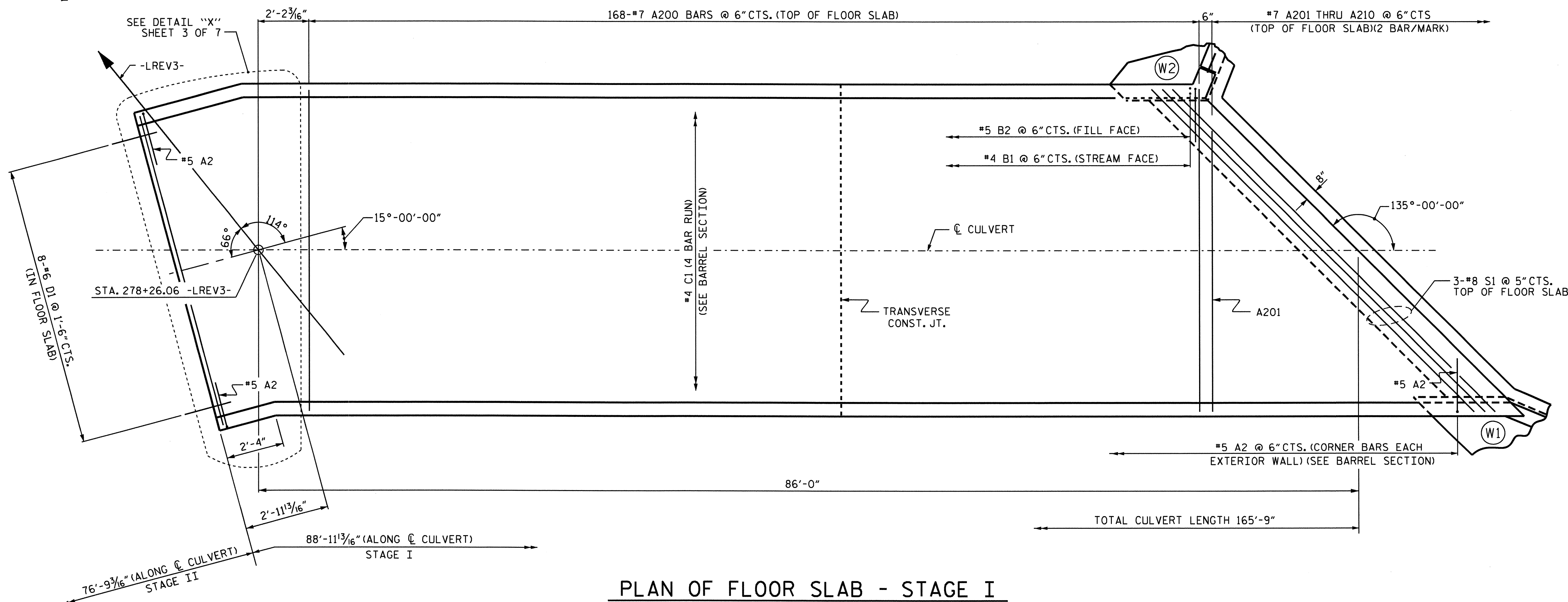
DRAWN BY: K.H. COMPTON DATE: 4/11
 CHECKED BY: J.H. GARDEN DATE: 5/11

15-AUG-2011 14:50
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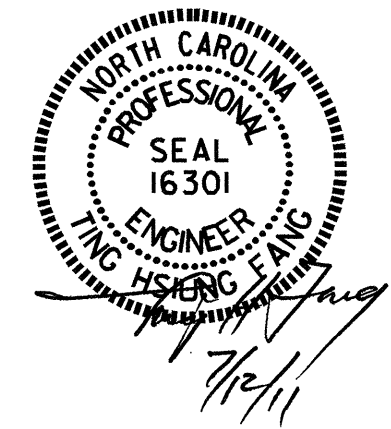
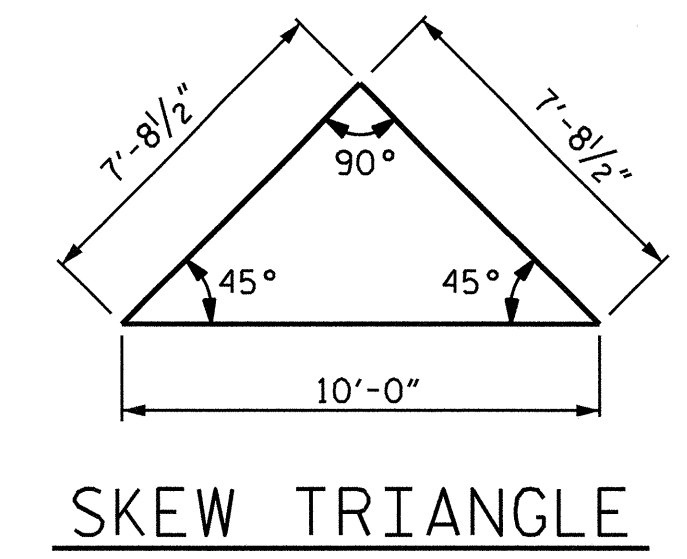




PLAN OF ROOF SLAB - STAGE I



PLAN OF FLOOR SLAB - STAGE I



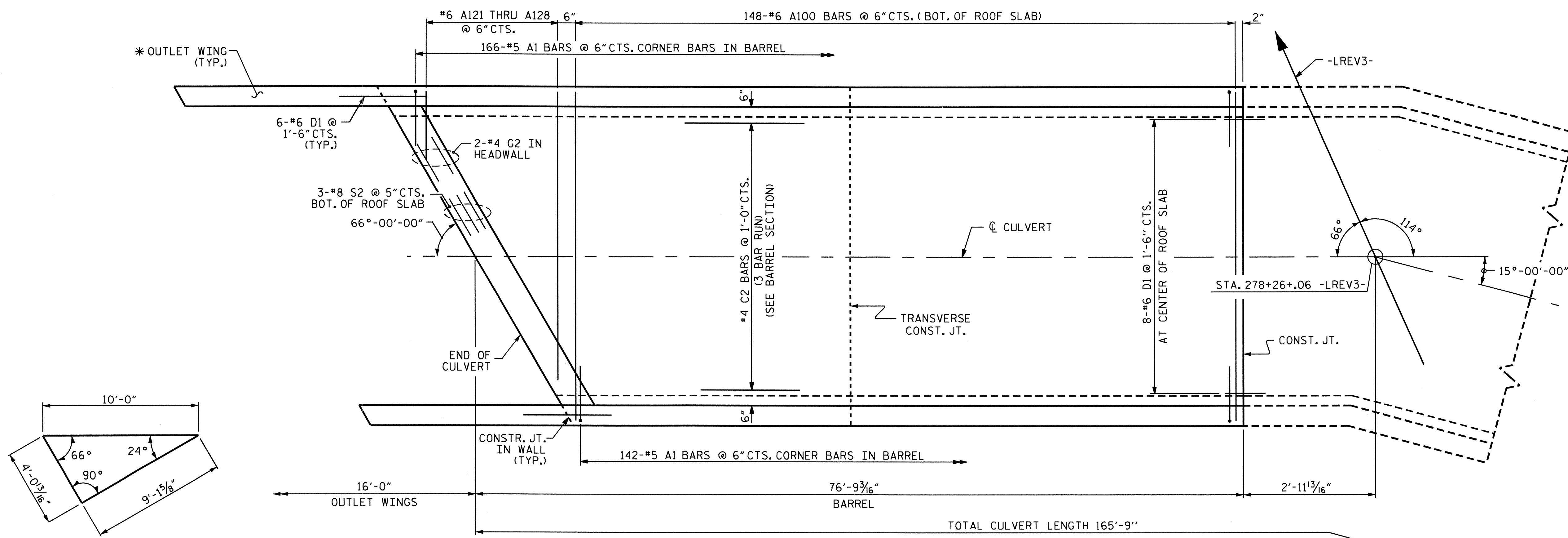
PROJECT NO. R-2812
 MOORE COUNTY
 STATION: 278+26.06-LREV3-

SHEET 4 OF 7
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 11 FT. X 7 FT.
 CONCRETE BOX CULVERT
 114° SKEW
 STAGE I

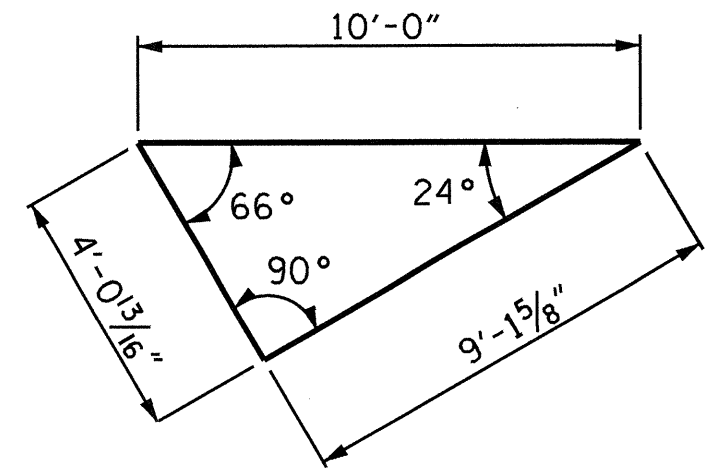
DRAWN BY: K.H. COMPTON DATE: 3/11
 CHECKED BY: J.H. CARDEN DATE: 5/11

12-JUL-2011 11:34
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 qtnghuyen

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|-----------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | C-11 |
| 1 | | | 3 | | | TOTAL SHEETS 14 |
| 2 | | | 4 | | | 14 |

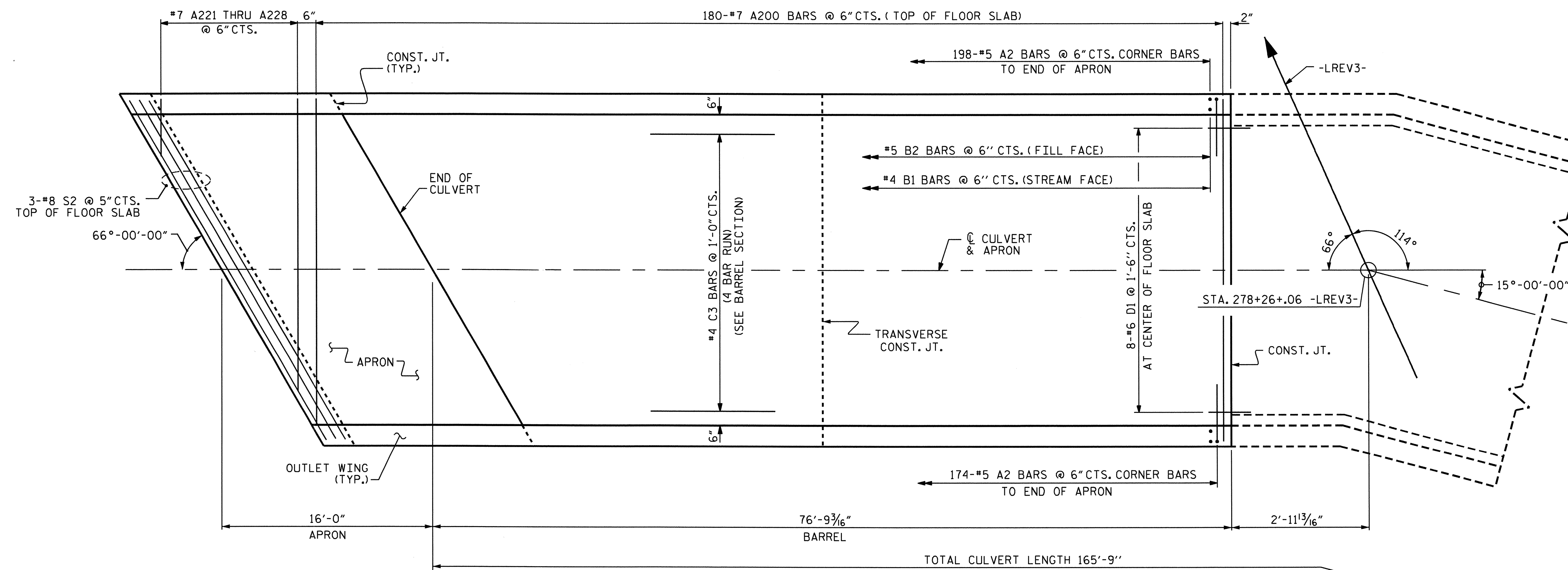


SKREW TRIANGLE



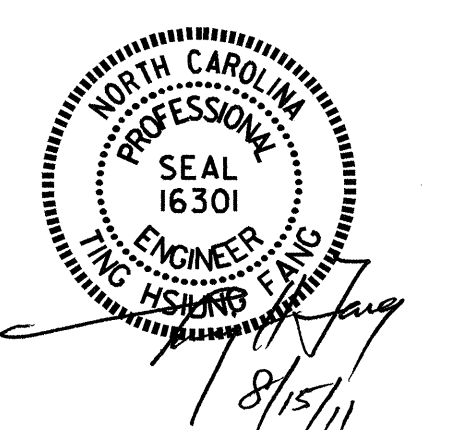
PLAN OF ROOF SLAB - STAGE II

* FOR REINFORCING STEEL IN OUTLET WINGS, SEE "OUTLET WINGS" SHEET.



PLAN OF FLOOR SLAB - STAGE II

FOR ADDITIONAL REINFORCING STEELS & DETAILS IN APRON, SEE SHEET 6 OF 7.



PROJECT NO. R-2812
MOORE COUNTY
 STATION: 278+26.06-LREV3-
 SHEET 5 OF 7

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 11 FT. X 7 FT.
 CONCRETE BOX CULVERT
 114° SKEW
 STAGE II

| REVISIONS | | | | | | SHEET NO. | |
|-----------|-----|-------|-----|-----|-------|-----------------|--|
| NO. | BY: | DATE: | NO. | BY: | DATE: | C-12 | |
| 1 | | | 3 | | | TOTAL SHEETS 14 | |
| 2 | | | 4 | | | | |

DRAWN BY: K.H. COMPTON DATE: 3/11
 CHECKED BY: J.H. CARDEN DATE: 5/11

15-AUG-2011 14:48
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 ttfang

BILL OF MATERIAL

2 WINGS

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|-----|-----|------|------|--------|--------|
| H1 | 17 | #4 | STR | 15'-7" | 177 |
| H2 | 2 | #4 | STR | 15'-5" | 21 |
| H3 | 2 | #4 | STR | 13'-3" | 18 |
| H4 | 2 | #4 | STR | 11'-1" | 15 |
| H5 | 2 | #4 | STR | 8'-10" | 12 |
| H6 | 2 | #4 | STR | 6'-8" | 9 |
| H7 | 2 | #4 | STR | 4'-6" | 6 |
| H8 | 2 | #4 | STR | 2'-3" | 3 |
| H9 | 2 | #4 | STR | 17'-3" | 23 |

| | | | | | |
|-----|---|----|-----|--------|----|
| V1 | 2 | #4 | STR | 8'-3" | 11 |
| V2 | 2 | #4 | STR | 7'-10" | 10 |
| V3 | 2 | #4 | STR | 7'-4" | 10 |
| V4 | 2 | #4 | STR | 6'-11" | 9 |
| V5 | 2 | #4 | STR | 6'-5" | 9 |
| V6 | 2 | #4 | STR | 6'-0" | 8 |
| V7 | 2 | #4 | STR | 5'-6" | 7 |
| V8 | 2 | #4 | STR | 5'-1" | 7 |
| V9 | 2 | #4 | STR | 4'-8" | 6 |
| V10 | 2 | #4 | STR | 4'-2" | 6 |
| V11 | 2 | #4 | STR | 3'-9" | 5 |
| V12 | 2 | #4 | STR | 3'-3" | 4 |
| V13 | 2 | #4 | STR | 2'-10" | 4 |
| V14 | 2 | #4 | STR | 2'-4" | 3 |
| V15 | 2 | #4 | STR | 1'-11" | 3 |
| V16 | 2 | #4 | STR | 1'-5" | 2 |

REINFORCING STEEL 387 LBS

| CLASS A CONCRETE | | |
|--------------------|--|----------------|
| 2 WINGS | | 4.3 CY |
| 1 HEADWALL | | 0.4 CY |
| 1 END CURTAIN WALL | | 0.5 CY |
| 1 APRON | | 4.9 CY |
| TOTAL | | 10.1 CY |

REINFORCING STEEL QUANTITIES FOR "A", "C", "D", "K" AND "S" BARS INCLUDED IN BARREL REINFORCING STEEL.

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.

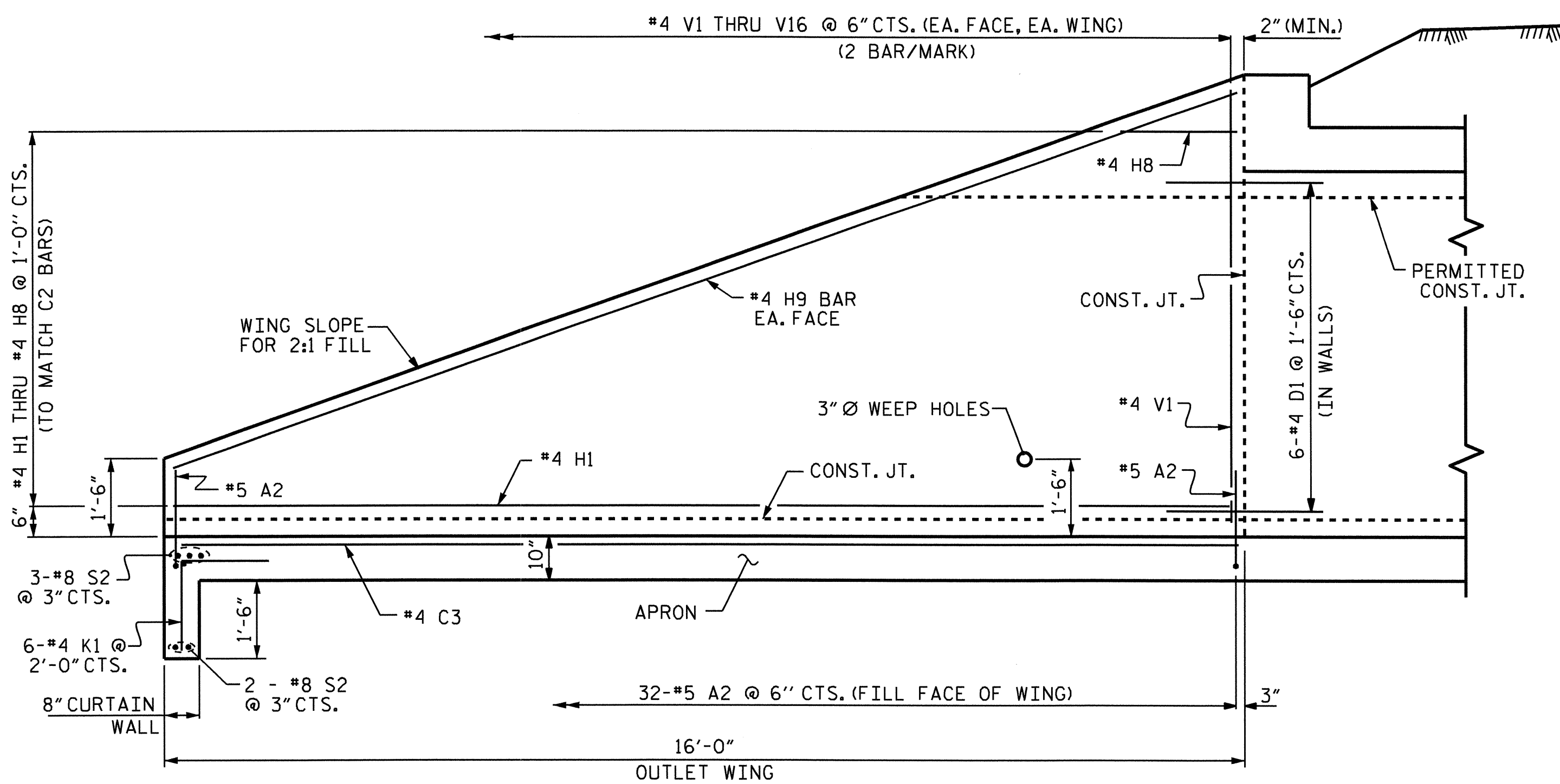
PROJECT NO. R-2812
MOORE COUNTY
STATION: 278+26.06-LREV3-

SHEET 6 OF 7

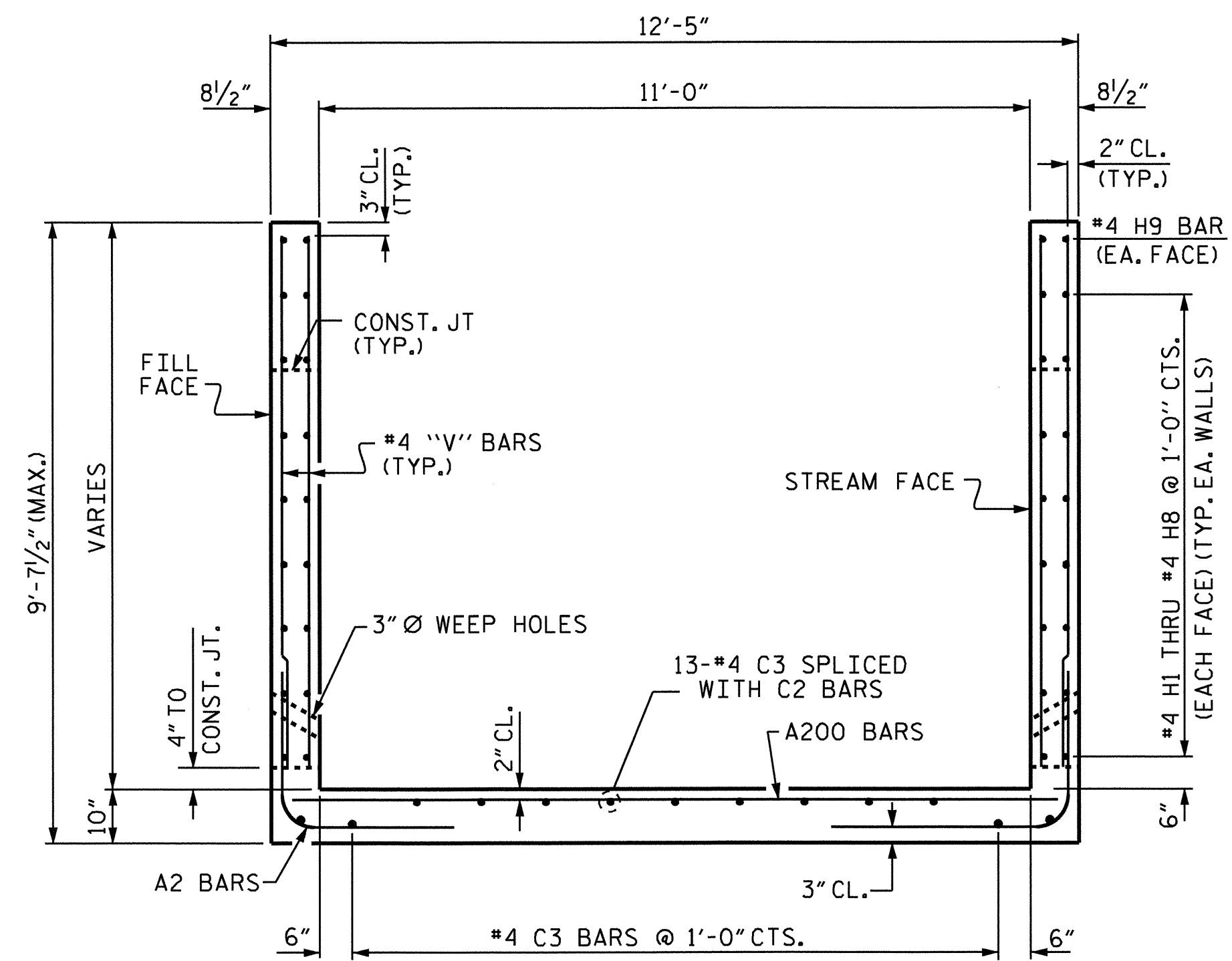
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
OUTLET WINGS
FOR
CONCRETE BOX CULVERT
114° SKEW
STAGE II

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

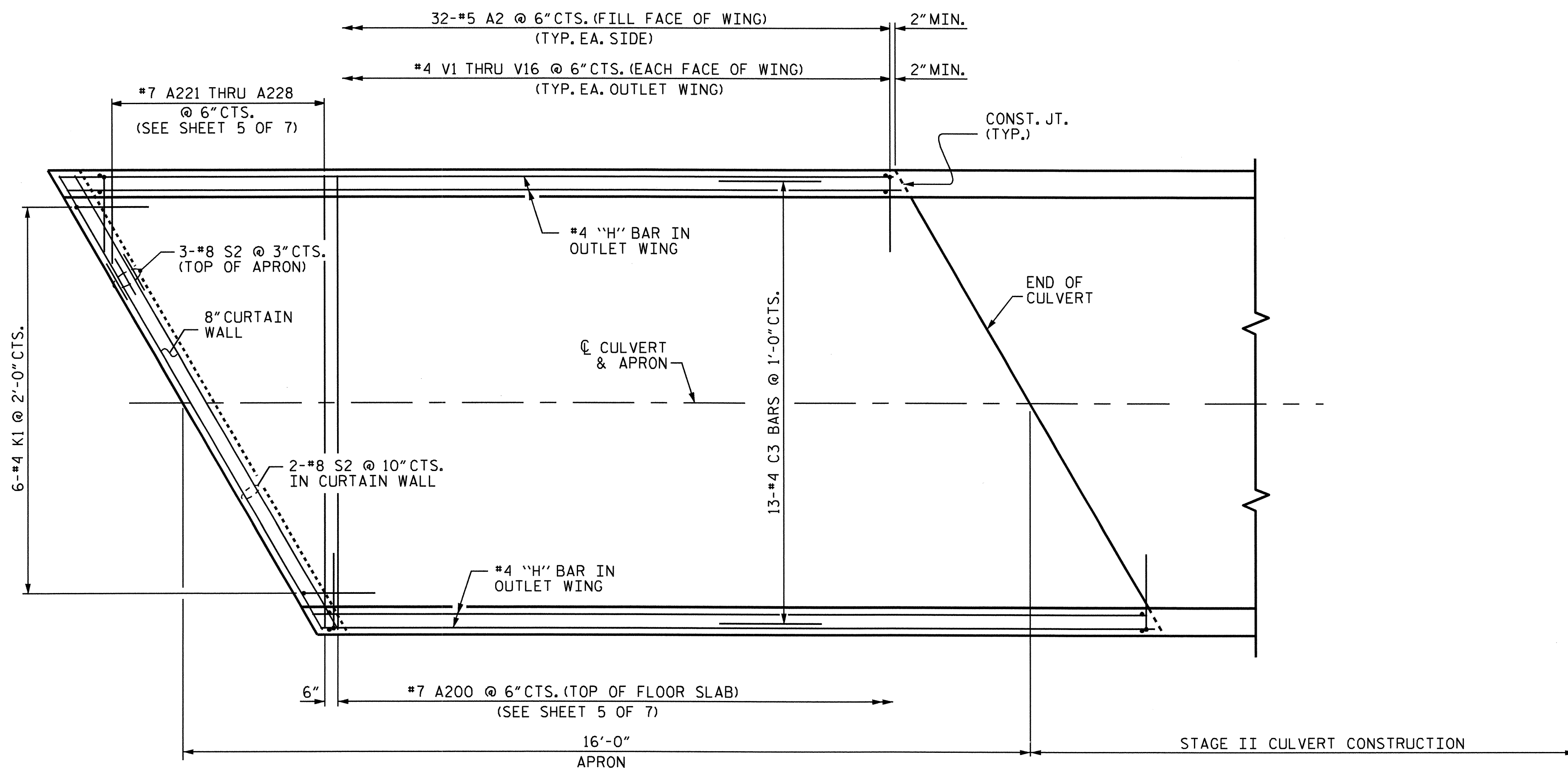
TOTAL SHEETS 14



ELEVATION

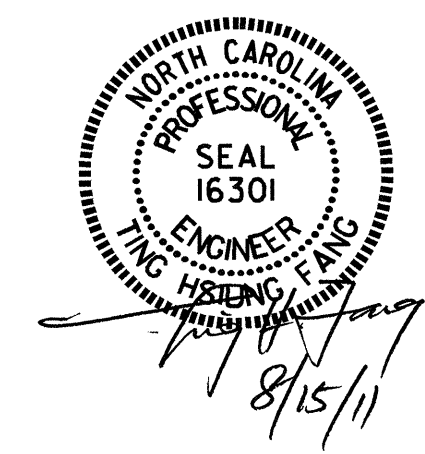


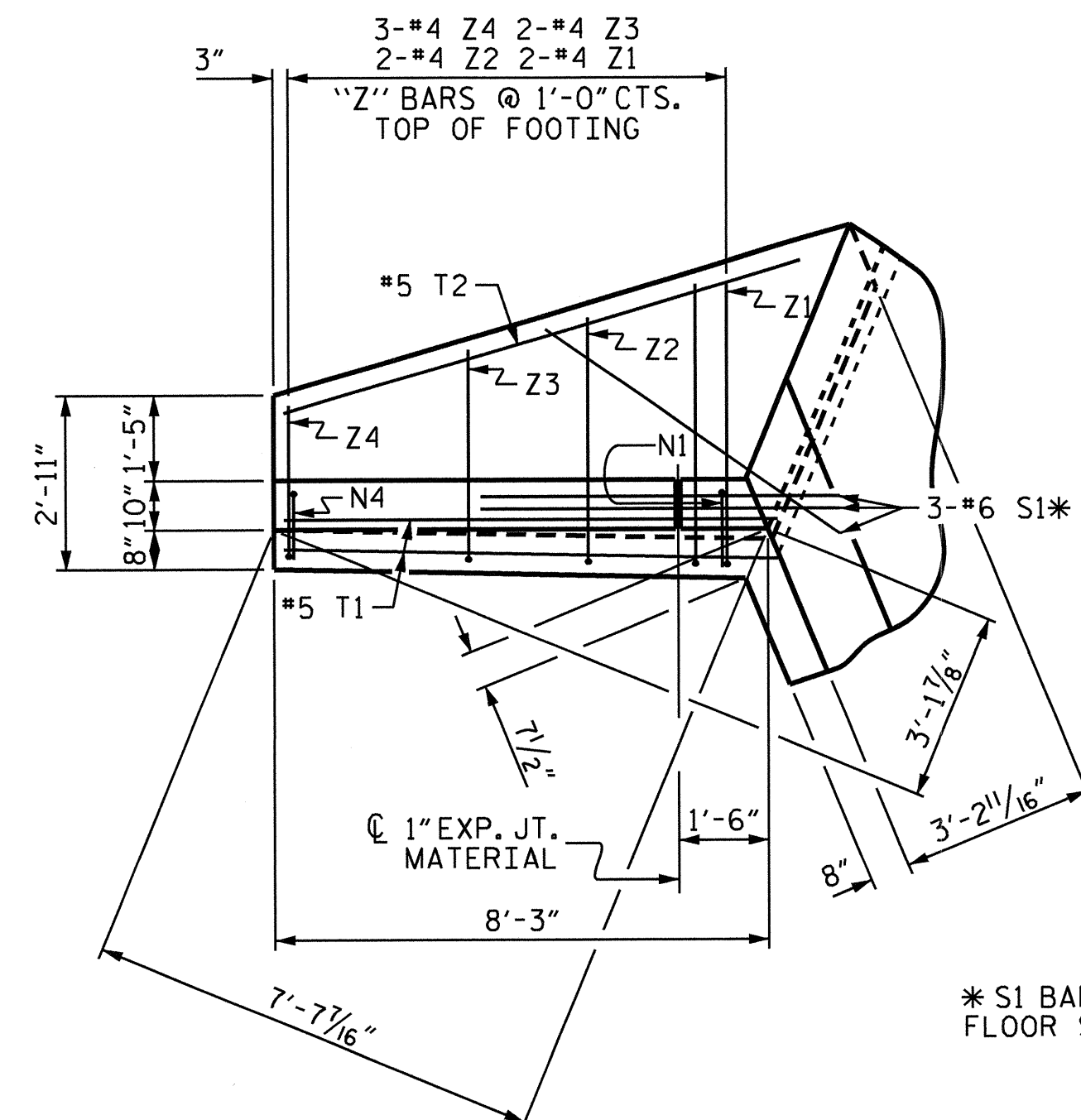
OUTLET WING SECTION



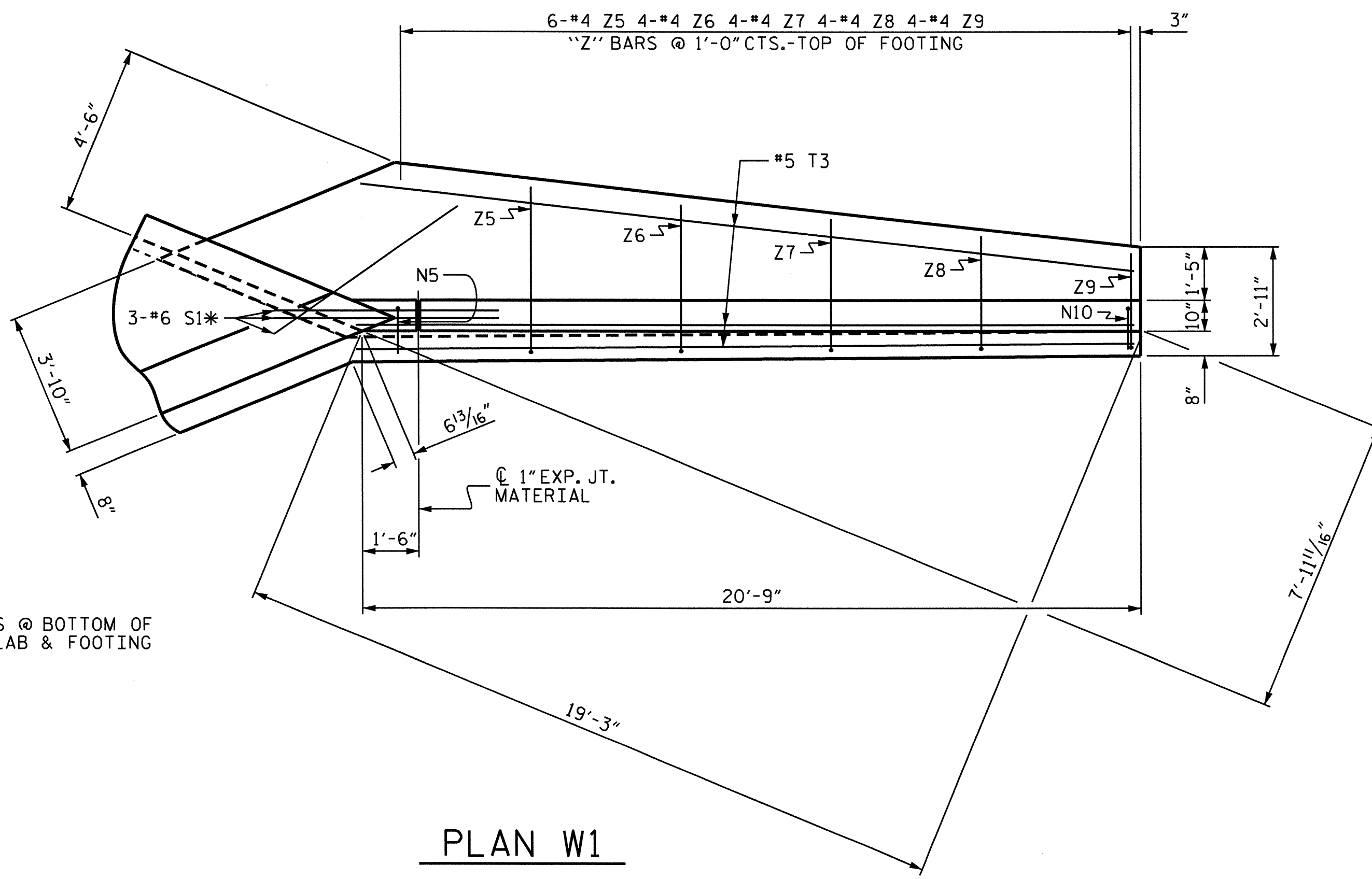
PLAN

DRAWN BY: K.H. COMPTON DATE: 4/11
CHECKED BY: J.H. CARDEN DATE: 5/11

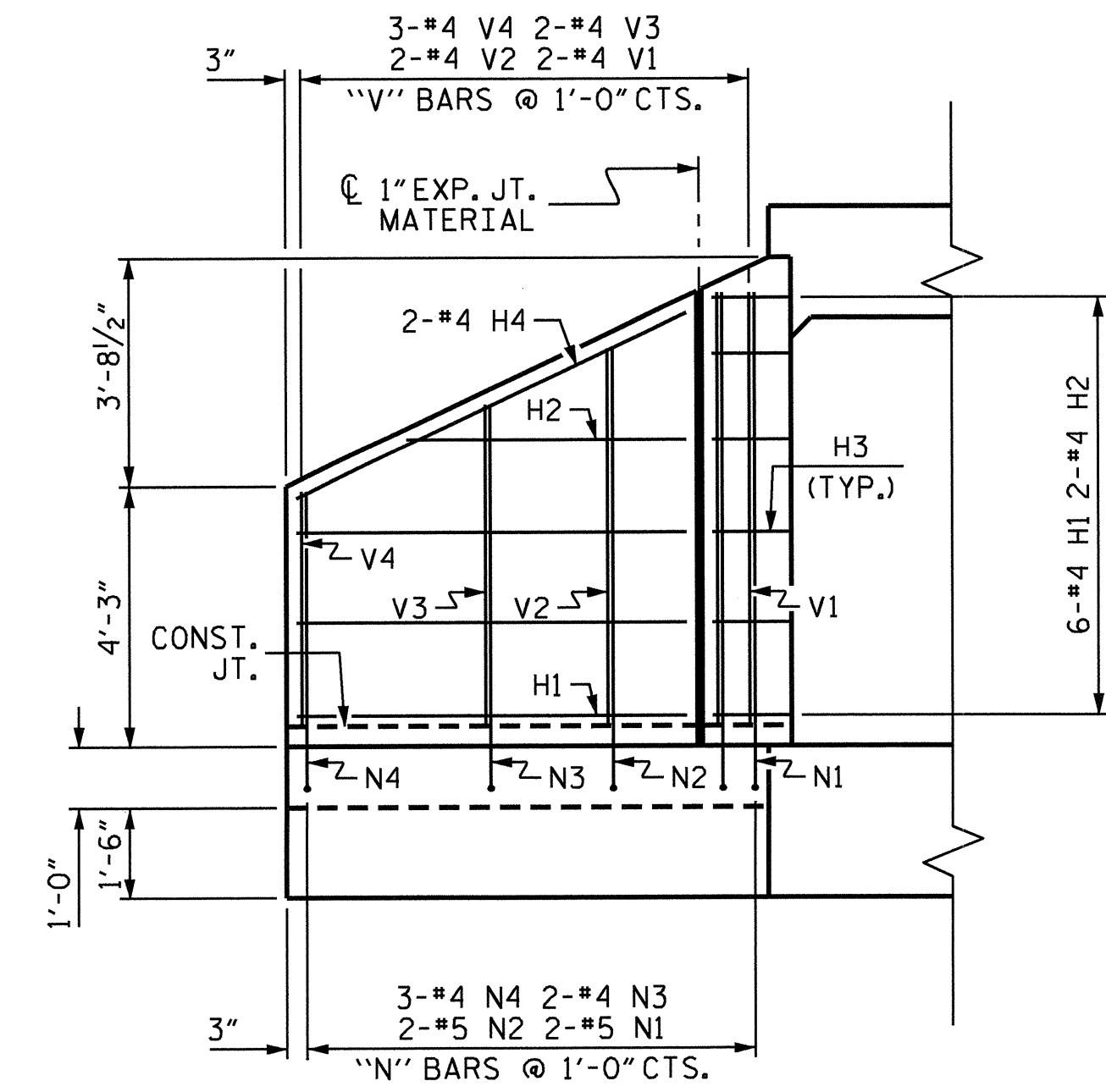




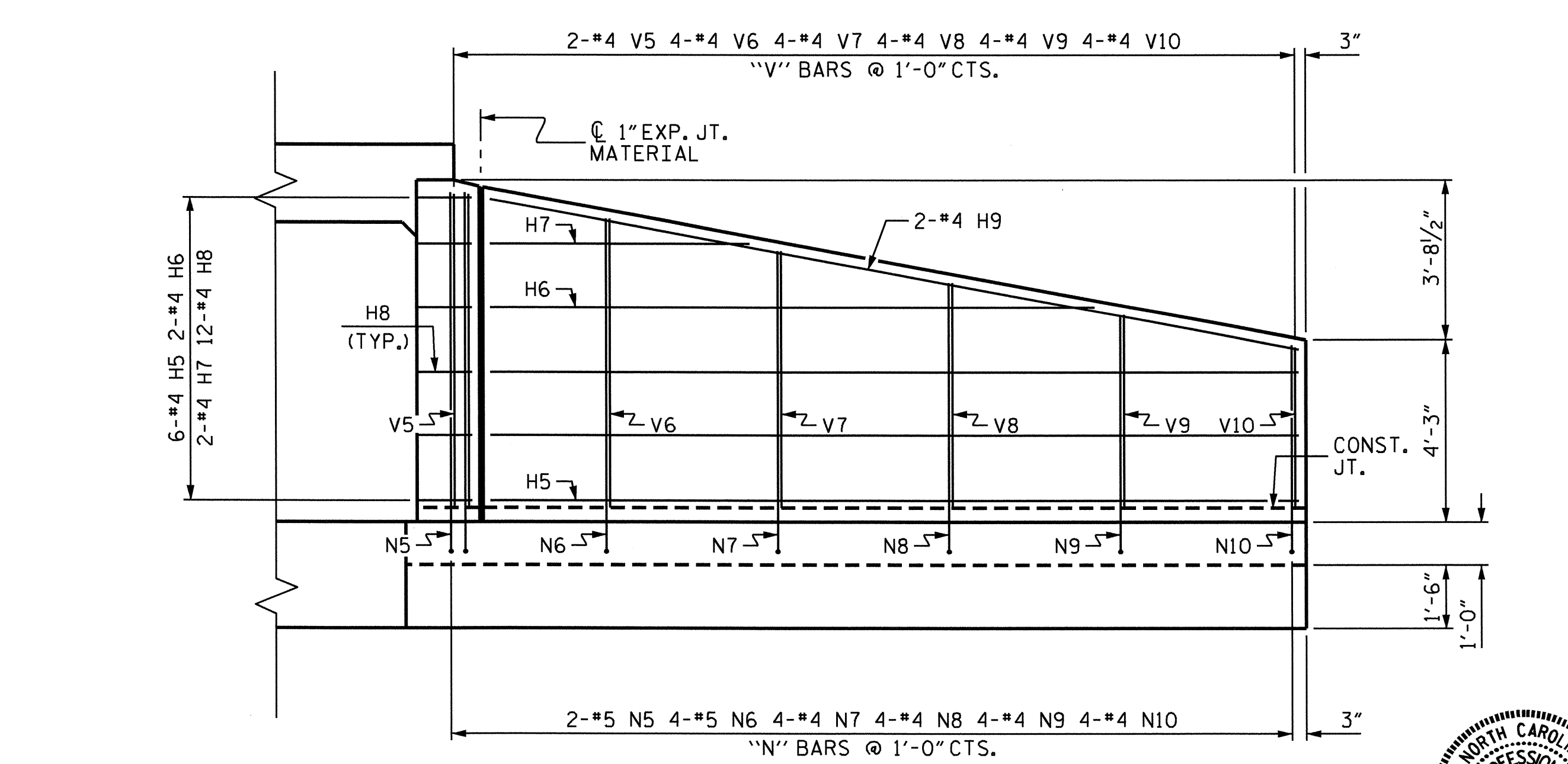
PLAN W2



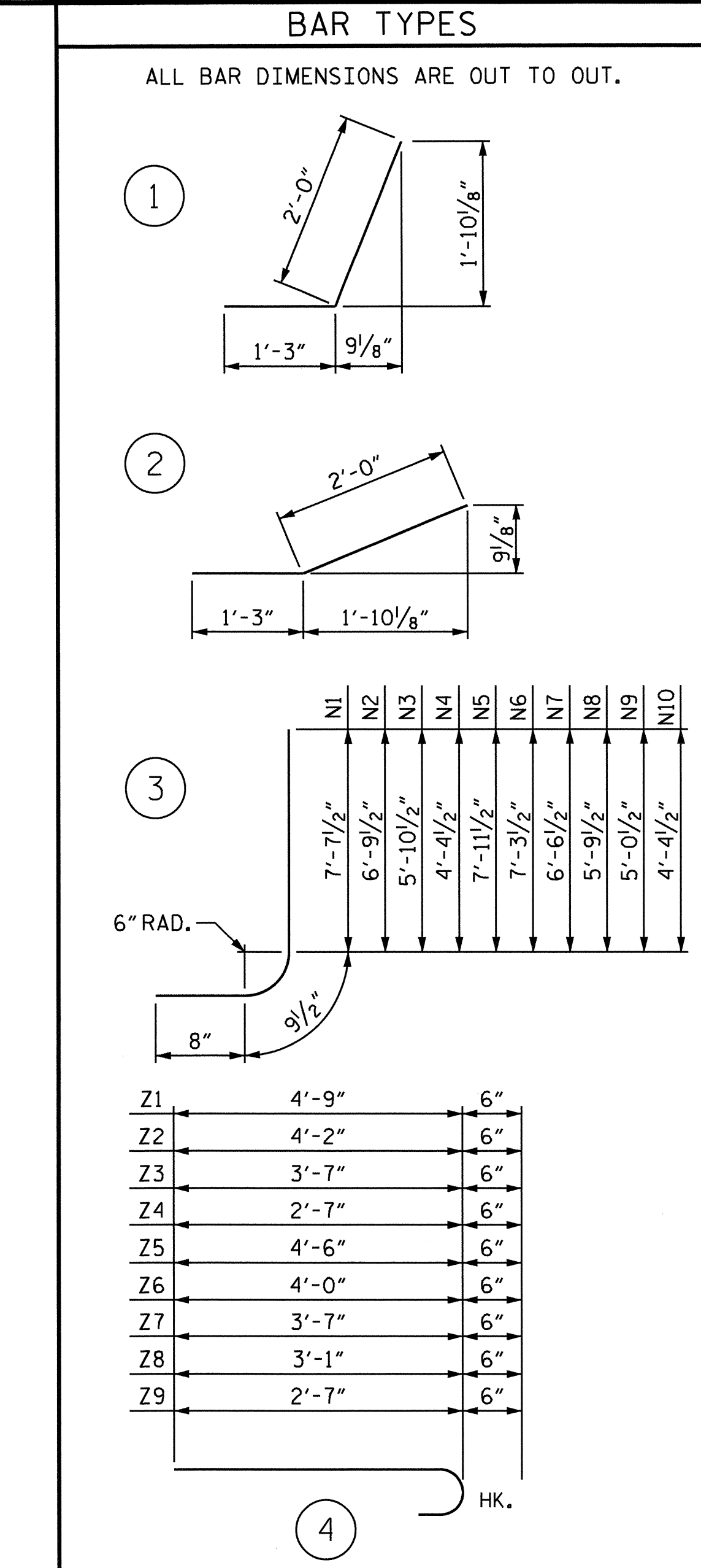
PLAN W1



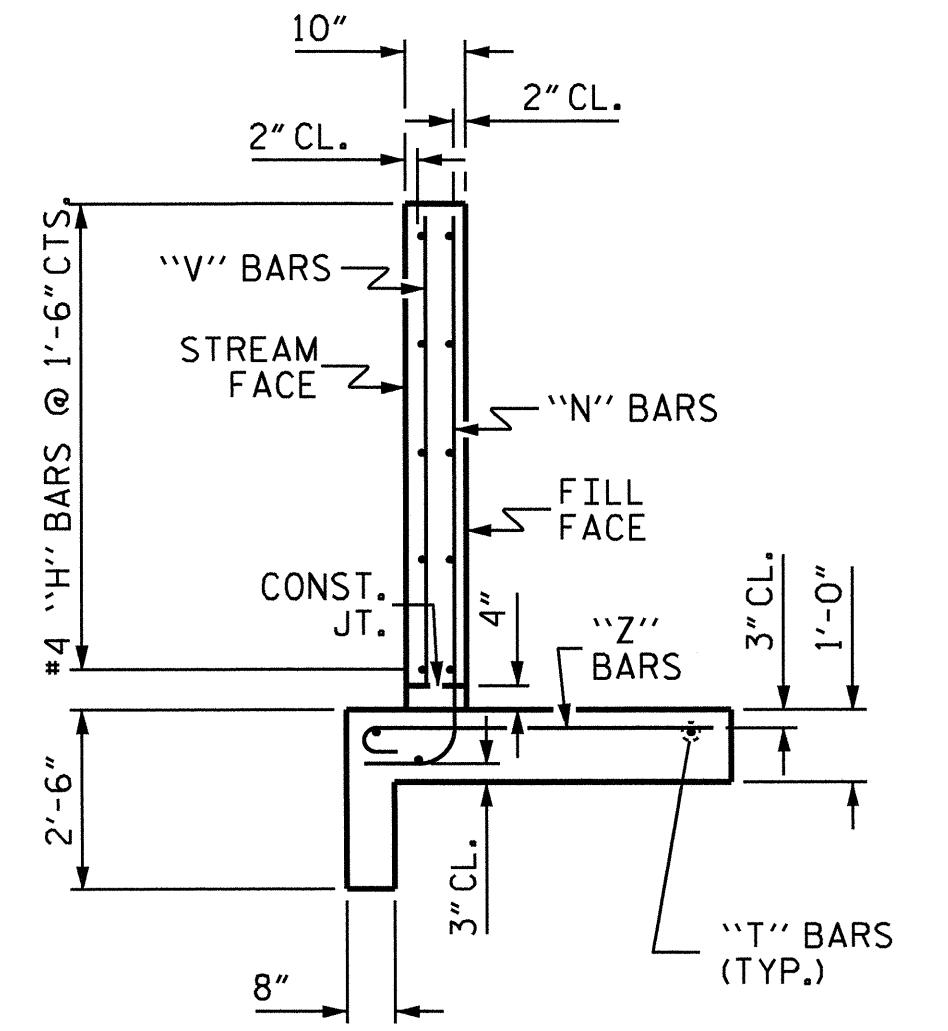
ELEVATION W2



ELEVATION W1

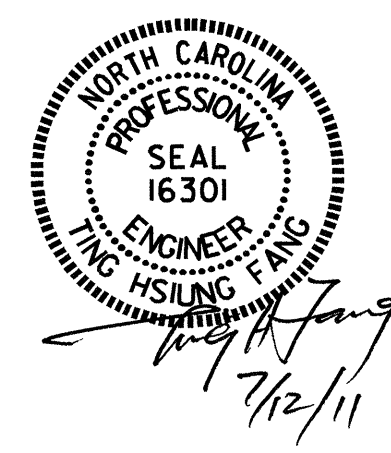


| BILL OF MATERIAL | | | | | |
|-------------------------------|-----|------|------|---------|---------|
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| H1 | 6 | #4 | STR | 6'-4" | 25 |
| H2 | 2 | #4 | STR | 4'-6" | 6 |
| H3 | 12 | #4 | 1 | 3'-3" | 26 |
| H4 | 2 | #4 | STR | 7'-0" | 9 |
| H5 | 6 | #4 | STR | 18'-10" | 75 |
| H6 | 2 | #4 | STR | 14'-1" | 19 |
| H7 | 2 | #4 | STR | 6'-0" | 8 |
| H8 | 12 | #4 | 2 | 3'-3" | 26 |
| H9 | 2 | #4 | STR | 19'-2" | 26 |
| N1 | 2 | #5 | 3 | 9'-1" | 19 |
| N2 | 2 | #5 | 3 | 8'-3" | 17 |
| N3 | 2 | #4 | 3 | 7'-4" | 10 |
| N4 | 3 | #4 | 3 | 5'-7" | 11 |
| N5 | 2 | #5 | 3 | 9'-5" | 20 |
| N6 | 4 | #5 | 3 | 8'-9" | 37 |
| N7 | 4 | #4 | 3 | 8'-0" | 21 |
| N8 | 4 | #4 | 3 | 7'-3" | 19 |
| N9 | 4 | #4 | 3 | 6'-6" | 17 |
| N10 | 4 | #4 | 3 | 5'-10" | 16 |
| S1 | 6 | #6 | STR | 6'-0" | 54 |
| T1 | 2 | #5 | STR | 8'-3" | 17 |
| T2 | 1 | #5 | STR | 9'-0" | 9 |
| T3 | 3 | #5 | STR | 20'-9" | 65 |
| V1 | 2 | #4 | STR | 7'-1" | 9 |
| V2 | 2 | #4 | STR | 6'-2" | 8 |
| V3 | 2 | #4 | STR | 5'-3" | 7 |
| V4 | 3 | #4 | STR | 3'-9" | 8 |
| V5 | 2 | #4 | STR | 7'-4" | 10 |
| V6 | 4 | #4 | STR | 6'-9" | 18 |
| V7 | 4 | #4 | STR | 6'-0" | 16 |
| V8 | 4 | #4 | STR | 5'-3" | 14 |
| V9 | 4 | #4 | STR | 4'-6" | 12 |
| V10 | 4 | #4 | STR | 3'-9" | 10 |
| Z1 | 2 | #4 | 4 | 5'-3" | 7 |
| Z2 | 2 | #4 | 4 | 4'-8" | 6 |
| Z3 | 2 | #4 | 4 | 4'-1" | 5 |
| Z4 | 3 | #4 | 4 | 3'-1" | 6 |
| Z5 | 6 | #4 | 4 | 5'-0" | 20 |
| Z6 | 4 | #4 | 4 | 4'-6" | 12 |
| Z7 | 4 | #4 | 4 | 4'-1" | 11 |
| Z8 | 4 | #4 | 4 | 3'-7" | 10 |
| Z9 | 4 | #4 | 4 | 3'-1" | 8 |
| REINFORCING STEEL FOR 2 WINGS | | | | | 749 LBS |
| CLASS A CONCRETE | | | | | |
| 2 WINGS | | | | | 11.8 CY |
| 1 HEADWALL | | | | | 0.8 CY |
| 1 END CURTAIN WALL | | | | | 0.8 CY |
| TOTAL | | | | | 13.4 CY |



TYPICAL WING SECTION

ASSEMBLED BY : K.H. COMPTON DATE : 4/11
 CHECKED BY : J.H. CARDEN DATE : 5/11
 DRAWN BY : CCJ 01/00
 CHECKED BY : RWW 03/00



PROJECT NO. R-2812
 MOORE COUNTY
 STATION: 278+26.06-LREV3-

SHEET 7 OF 7

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

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD WINGS FOR CONCRETE BOX CULVERT
 H = 7'-0" SLOPE = 2:1
 45° OR 135° SKEW

| | |
|-----------------|--|
| SHEET NO. C-14 | |
| TOTAL SHEETS 14 | |

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; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

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. 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. 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