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**TIP PROJECT: R-5311A**

**CONTRACT: C203941**

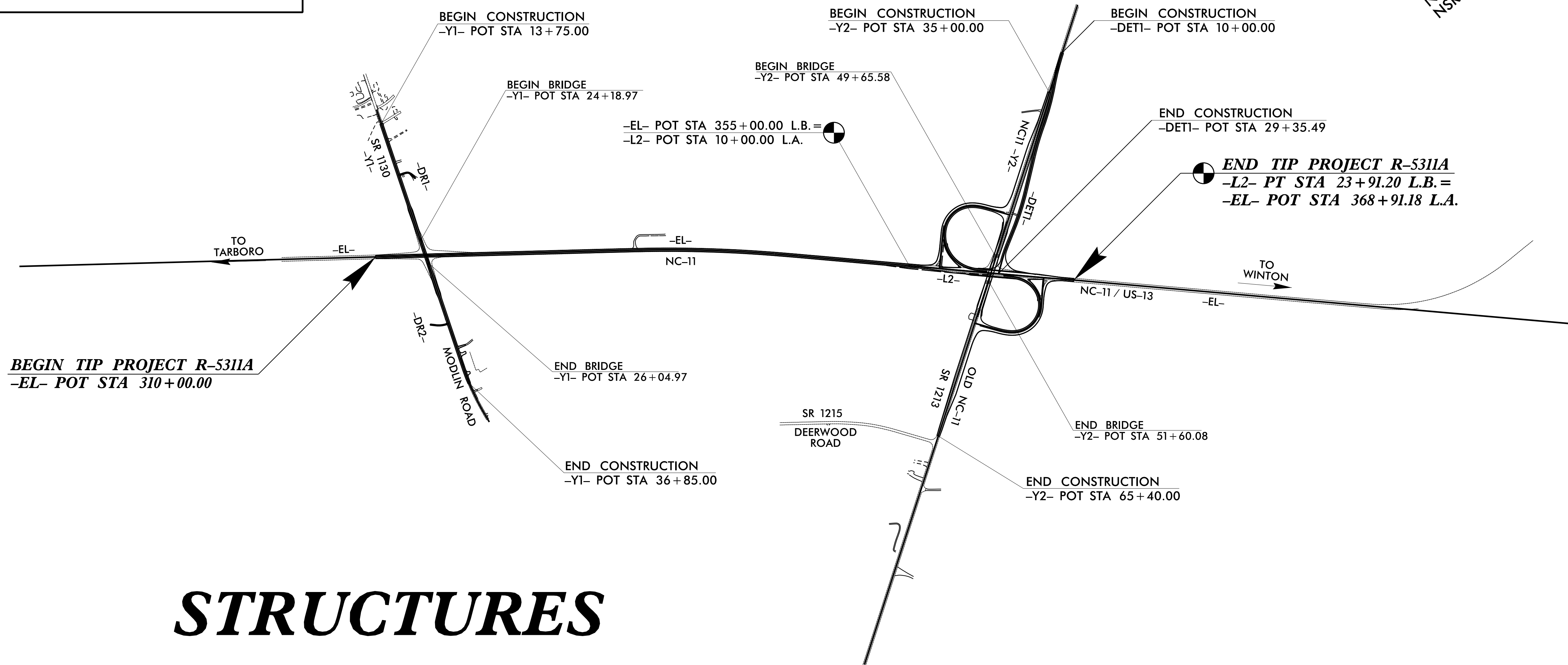
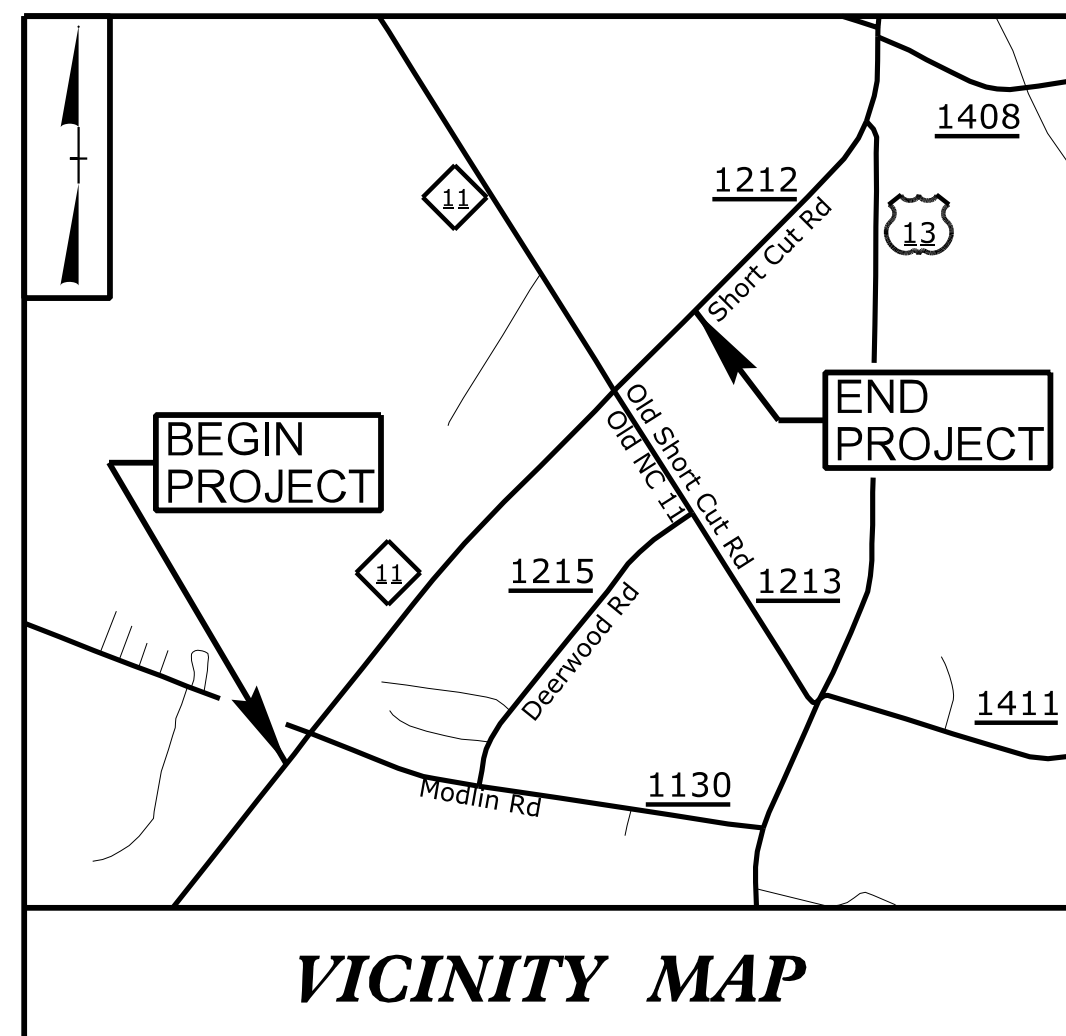
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**HERTFORD COUNTY**

**LOCATION: WEST OF MODLIN ROAD TO EAST OF NC 11/SR 1213 (OLD NC 11 ROAD). CONSTRUCT GRADE SEPARATION AT SR 1130 (MODLIN ROAD) AND INTERCHANGE AT OLD NC 11/SR 1213 (OLD NC 11 ROAD).**

**TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURES**

| STATE           | STATE PROJECT REFERENCE NO. | SHEET NO.   | TOTAL SHEETS |
|-----------------|-----------------------------|-------------|--------------|
| N.C.            | R-5311A                     |             |              |
| STATE PROJ. NO. | F.A. PROJ. NO.              | DESCRIPTION |              |
| 45449.1.2       | NHF-0013(37)                | P.E.        |              |
| 45449.3.3       | NHF-0013(37)                | CONST.      |              |



**STRUCTURES**

DIVISION OF HIGHWAYS

STATE OF NORTH CAROLINA

**DESIGN DATA**

|                                     |        |
|-------------------------------------|--------|
| ADT 2017 =                          | 7,500  |
| ADT 2036 =                          | 10,830 |
| K =                                 | 10 %   |
| D =                                 | 55 %   |
| T =                                 | 26 % * |
| V =                                 | 60 MPH |
| * TTST = 22% DUAL 4%                |        |
| FUNC CLASS = ARTERIAL REGIONAL TIER |        |

**PROJECT LENGTH**

|                                      |             |
|--------------------------------------|-------------|
| LENGTH ROADWAY TIP PROJECT R-5311A = | 1.116 MILES |
| TOTAL LENGTH TIP PROJECT R-5311A =   | 1.116 MILES |

Prepared in the Office of:

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN  
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

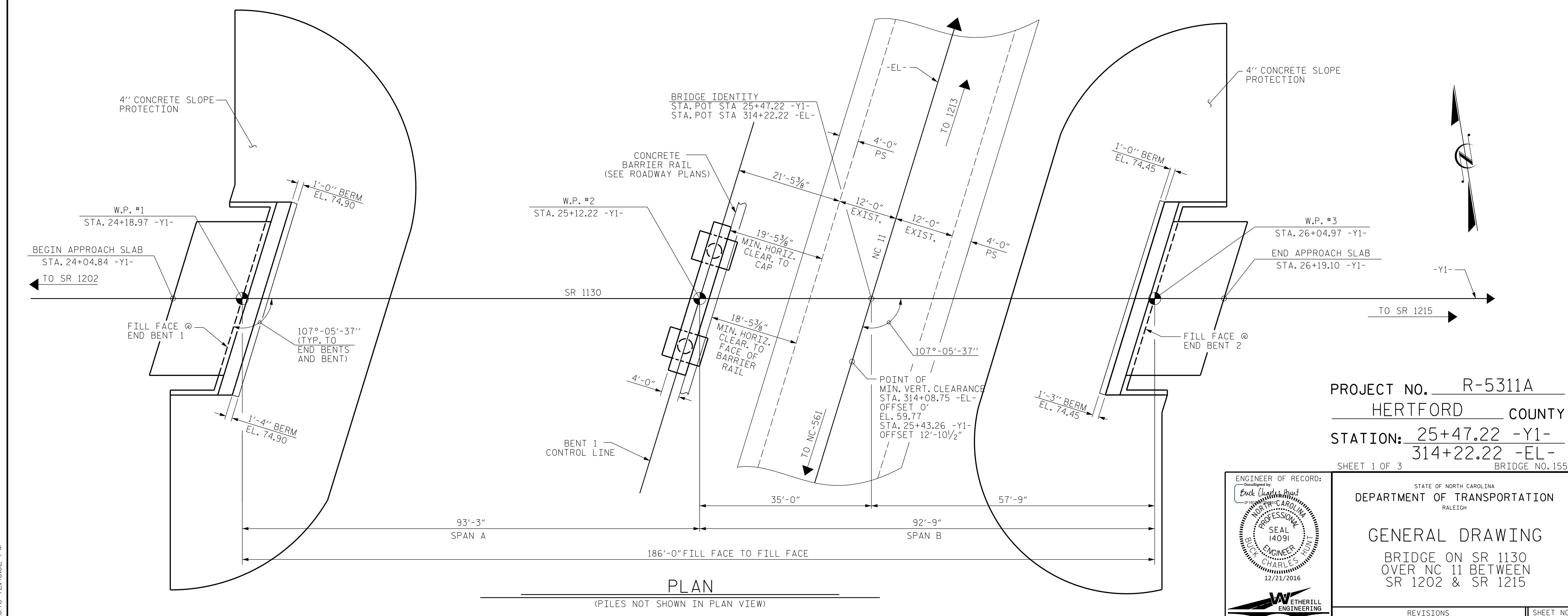
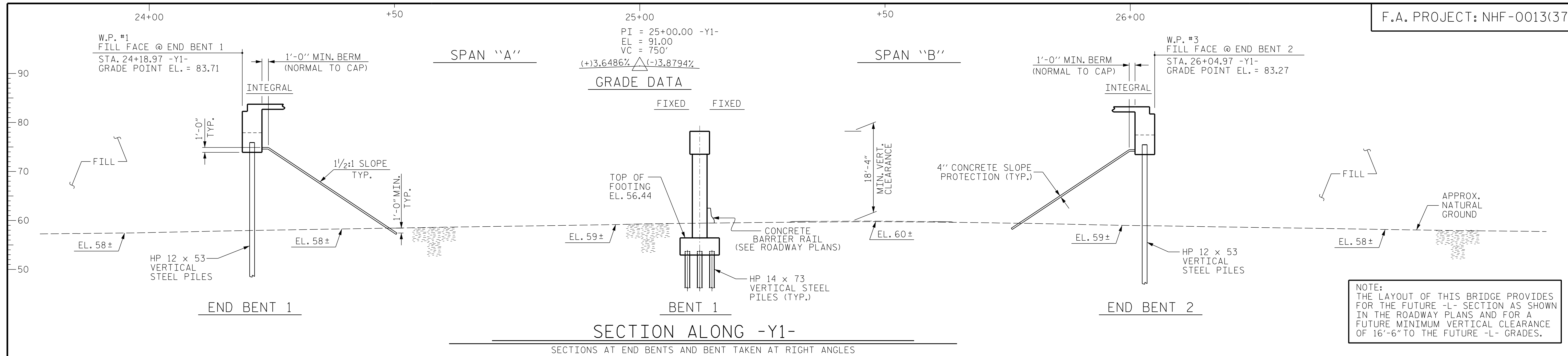
2012 STANDARD SPECIFICATIONS

LETTING DATE:  
JUNE 20, 2017

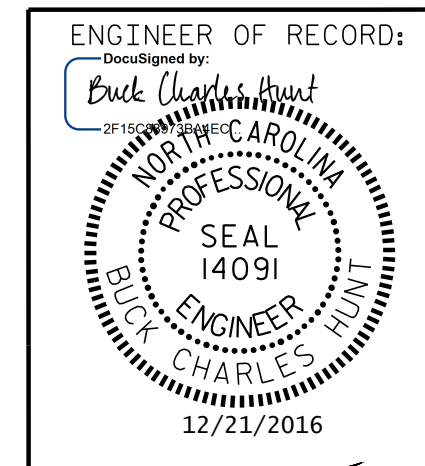
EDWARD G. WETHERHILL, P.E.  
PROJECT ENGINEER

B.C. HUNT, P.E.  
PROJECT DESIGN ENGINEER

12/20/2016 10:53:11 AM Structures\Str - Y1 - N00NN R-5311A STR-181.dgn  
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PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 25+47.22 -Y1-  
314+22.22 -EL-  
SHEET 1 OF 3 BRIDGE NO. 155



ETHERILL ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**GENERAL DRAWING**  
BRIDGE ON SR 1130  
OVER NC 11 BETWEEN  
SR 1202 & SR 1215

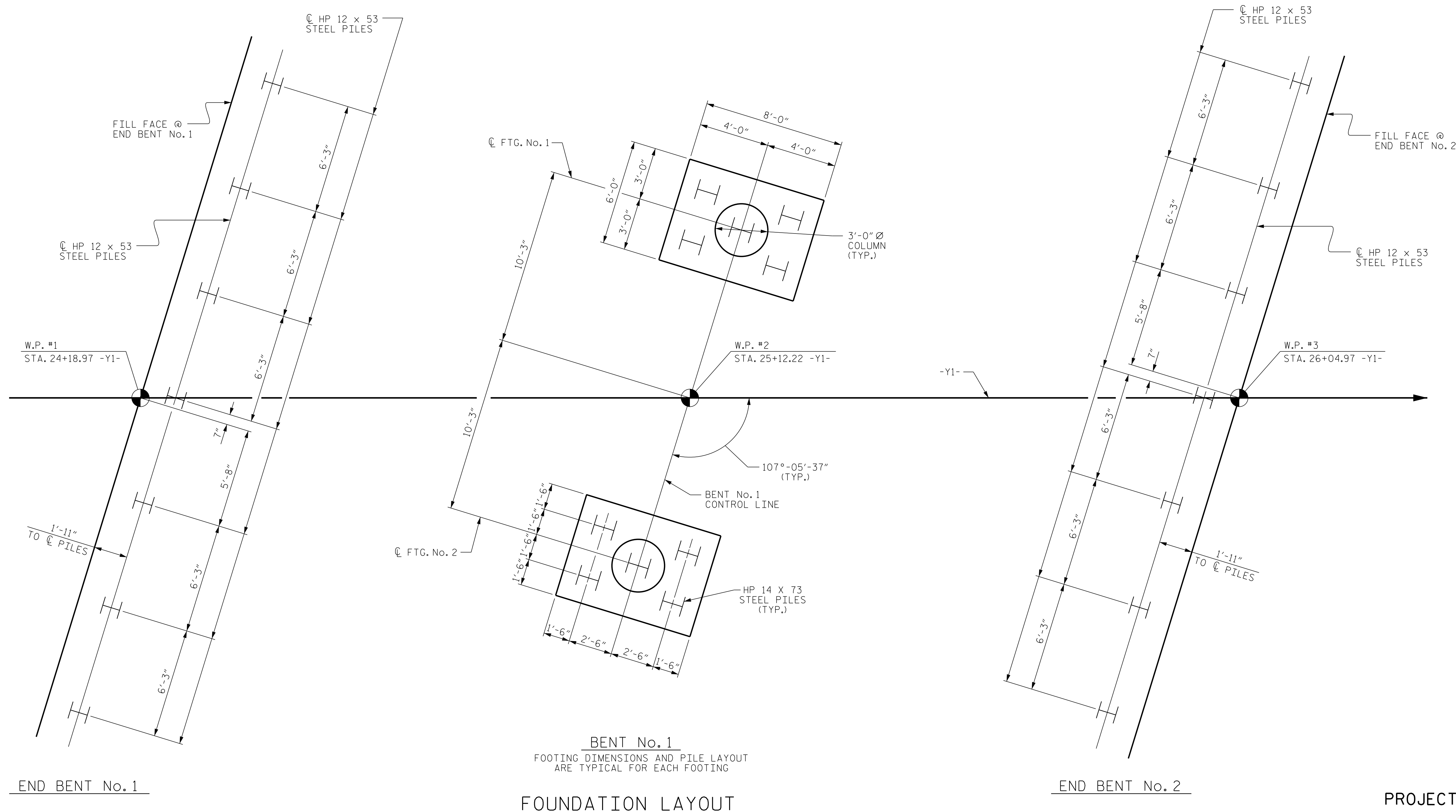
| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | SHEET NO.    |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 61           |

DRAWN BY: J. PENDERGRAFT DATE: 2-16  
CHECKED BY: B.C. HUNT DATE: 2-16

DOCUMENT NOT CONSIDERED FINAL  
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**BENT No. 1**  
FOOTING DIMENSIONS AND PILE LAYOUT  
ARE TYPICAL FOR EACH FOOTING

**FOUNDATION LAYOUT**

**FOUNDATION NOTES**

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE. PILES AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 145 TONS PER PILE.

DRIVE PILES AT END BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 135 TONS PER PILE. DRIVE PILES AT END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 295 TONS PER PILE. THE REQUIRED DRIVING RESISTANCE AT END BENT NO.2 INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAW. DRIVE PILES AT BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE.

TESTING THE FIRST PRODUCTION PILE WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING, OR REDRIVING IS REQUIRED AT END BENT NO.1 OR END BENT NO.2 AND BENT NO.1. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

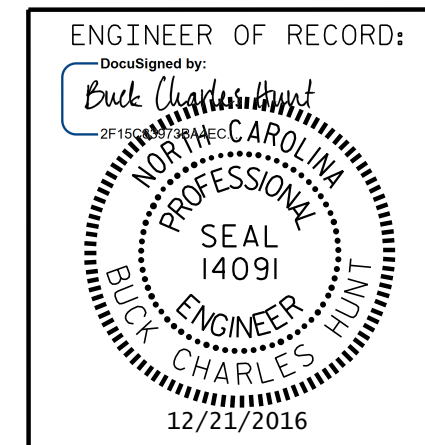
OBSERVE A 1 MONTH WAITING PERIOD AT END BENT NO.1 AND 3 MONTH WAITING PERIOD AT END BENT NO.2 AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FEET OF FINISHED GRADE BEFORE BEGINNING CONSTRUCTION AT END BENT NO.1 AND END BENT NO.2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

SEE ROADWAY PLANS AND SPECIAL PROVISIONS FOR THE SETTLEMENT GAUGES REQUIRED AT END BENT NO.1 AND END BENT NO.2.

BENT NO.1 BOTTOM OF FOOTING ELEVATION MAY BE BELOW GROUNDWATER TABLE AND DEWATERING MAY BE REQUIRED.

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 25+47.22 -Y1-

SHEET 2 OF 3



1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

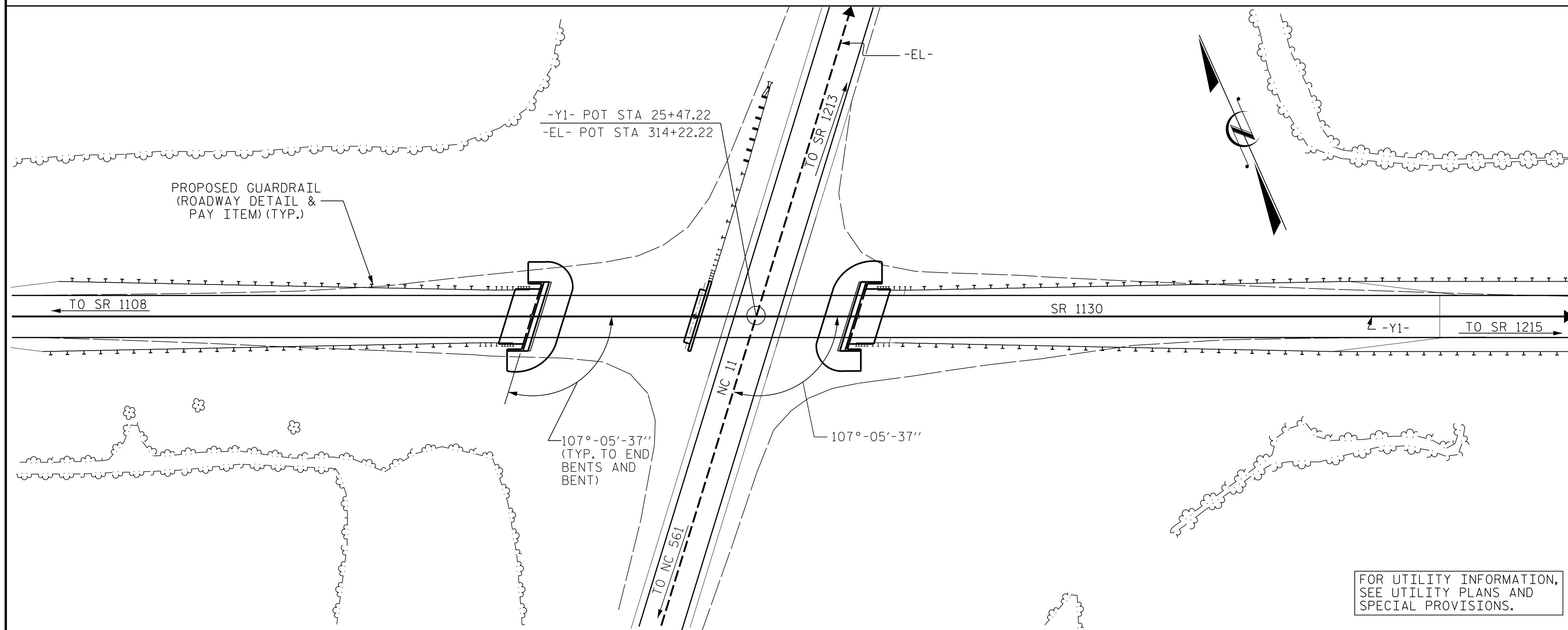
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|---|-----|-------|-----|-----|-------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH              |     |       |     |     |       |
| GENERAL DRAWING<br>BRIDGE ON SR 1130<br>OVER NC 11 BETWEEN<br>SR 1202 & SR 1215 |     |       |     |     |       |
| REVISIONS   |     |       |     |     |       |
| NO.   | BY: | DATE: | NO. | BY: | DATE: |
| 1   |     |       | 3   |     |       |
| 2   |     |       | 4   |     |       |
| SHEET NO.   |     |       |     |     | S01-2 |
| TOTAL SHEETS  |     |       |     |     | 61    |

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DRAWN BY : D. HODGE DATE : 3/16  
CHECKED BY : B.C. HUNT DATE : 10/16

BENCH MARK #2 STA. 95+76.00 -L-, 145' LT., N941556 E2588303, EL. 55.41



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

**NOTES:**

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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.

THE ELEVATION AND CLEARANCE SHOWN ON THE PLANS AT THE POINT OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

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

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

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

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

FOR PLACING LOAD ON STRUCTURAL MEMBER, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

**TOTAL BILL OF MATERIAL**

|                | FOUNDATION EXCAVATION FOR BENT | PDA TESTING | REINFORCED CONCRETE DECK SLAB | GROOVING BRIDGE FLOORS | CLASS A CONCRETE | BRIDGE APPROACH SLABS | REINFORCING STEEL | SPIRAL COLUMN REINFORCING STEEL | 54" PRESTRESSED CONCRETE GIRDERS | PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES | PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES | HP 12 x 53 STEEL PILES | HP 14 x 73 STEEL PILES | PILE REDRIVES | CONCRETE BARRIER RAIL | 4" SLOPE PROTECTION | ELASTOMERIC BEARINGS |
|----------------|--------------------------------|-------------|-------------------------------|------------------------|------------------|-----------------------|-------------------|---------------------------------|----------------------------------|---|---|------------------------|------------------------|---------------|-----------------------|---------------------|----------------------|
|                | LUMP SUM                       | EA.         | SQ. FT.                       | SQ. FT.                | CU. YDS.         | LUMP SUM              | LBS.              | LBS.                            | No., LIN. FT.                    | EA.   | EA.   | No., LIN. FT.          | No., LIN. FT.          | EA.           | LIN. FT.              | SQ. YDS.            | LUMP SUM             |
| SUPERSTRUCTURE |                                |             | 6,185                         | 5,758                  |                  | LUMP SUM              |                   |                                 | 8 730.33                         |   |   |                        |                        |               | 368.51                |                     | LUMP SUM             |
| END BENT 1     |                                |             |                               |                        | 32.8             |                       | 3,713             |                                 |                                  | 7   |   | 7 609                  |                        | 4             |                       | 475                 |                      |
| BENT 1         | LUMP SUM                       |             |                               |                        | 42.8             |                       | 6,323             | 799                             |                                  |   | 10  |                        | 10 708                 | 5             |                       |                     |                      |
| END BENT 2     |                                |             |                               |                        | 32.9             |                       | 3,713             |                                 |                                  | 7   |   | 7 609                  |                        | 4             |                       | 420                 |                      |
| TOTAL          | LUMP SUM                       | 2           | 6,185                         | 5,758                  | 108.5            | LUMP SUM              | 13,749            | 799                             | 8 730.33                         | 14  | 10  | 14 1,218               | 10 708                 | 13            | 368.51                | 895                 | LUMP SUM             |

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-

SHEET 3 OF 3

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DRAWN BY: J. PENDERGRAFT DATE: 2-16  
 CHECKED BY: B.C. HUNT DATE: 10/16

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ENGINEER OF RECORD:  
*Bud Charles*  
 015150359  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 14091  
 BUD CHARLES  
 4/5/2017  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 BRIDGE ON SR 1130  
 OVER NC 11 BETWEEN  
 SR 1202 & SR 1215

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |              |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 61           |

SHEET NO. S01-3



## LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

| LEVEL                    | VEHICLE                              | WEIGHT (W)<br>(TONS) | CONTROLLING<br>LOAD RATING<br># | MINIMUM<br>RATING FACTORS<br>(RF) | TONS = W x RF | STRENGTH I LIMIT STATE                  |                              |               |       |                 |   |                              |               |       |                 | SERVICE III LIMIT STATE                   |   |                              |               |       | COMMENT NUMBER |                 |   |  |
|--------------------------|--------------------------------------|----------------------|---------------------------------|-----------------------------------|---------------|---|------------------------------|---------------|-------|-----------------|---|------------------------------|---------------|-------|-----------------|---|---|------------------------------|---------------|-------|----------------|-----------------|---|--|
|                          |                                      |                      |                                 |                                   |               | MOMENT                                  |                              |               |       |                 | SHEAR                                     |                              |               |       |                 | MOMENT                                    |   |                              |               |       |                |                 |   |  |
|                          |                                      |                      |                                 |                                   |               | LIVE-LOAD<br>FACTORS (γ <sub>L1</sub> ) | DISTRIBUTION<br>FACTORS (DF) | RATING FACTOR | SPAN  | GIRDER LOCATION | DISTANCE FROM<br>LEFT END OF<br>SPAN (FT) | DISTRIBUTION<br>FACTORS (DF) | RATING FACTOR | SPAN  | GIRDER LOCATION | DISTANCE FROM<br>LEFT END OF<br>SPAN (FT) | LIVE-LOAD<br>FACTORS (γ <sub>L1</sub> ) | DISTRIBUTION<br>FACTORS (DF) | RATING FACTOR | SPAN  |                | GIRDER LOCATION | DISTANCE FROM<br>LEFT END OF<br>SPAN (FT) |  |
| DESIGN<br>LOAD<br>RATING | HL-93 (INVENTORY)                    | N/A                  | ①                               | 1.14                              | ---           | 1.75                                    | 0.800                        | 1.430         | A     | E               | 45.060                                    | 0.840                        | 1.260         | A     | E               | 63.370                                    | 0.80                                    | 0.800                        | 1.140         | A     | E              | 45.060          |   |  |
|                          | HL-93 (OPERATING)                    | N/A                  |                                 | 1.73                              | ---           | 1.35                                    | 0.800                        | 1.850         | A     | E               | 45.060                                    | 0.910                        | 1.730         | A     | I               | 72.530                                    | N/A                                     | --                           | --            | --    | --             | --              |   |  |
|                          | HS-20 (INVENTORY)                    | 36.000               | ②                               | 1.55                              | 55.800        | 1.75                                    | 0.800                        | 1.950         | A     | E               | 45.060                                    | 0.910                        | 1.710         | A     | I               | 72.530                                    | 0.80                                    | 0.800                        | 1.550         | A     | E              | 45.060          |   |  |
|                          | HS-20 (OPERATING)                    | 36.000               |                                 | 2.26                              | 81.360        | 1.35                                    | 0.800                        | 2.530         | A     | E               | 45.060                                    | 0.910                        | 2.260         | A     | I               | 72.530                                    | N/A                                     | --                           | --            | --    | --             | --              |   |  |
| LEGAL<br>LOAD<br>RATING  | SINGLE VEHICLE<br>(SV)               | SNSH                 | 13.500                          |                                   | 3.63          | 49.005                                  | 1.40                         | 0.800         | 5.710 | A               | E   | 45.060                       | 0.910         | 5.460 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 3.630 | A              | E               | 45.060                                    |  |
|                          |                                      | SNGRBS2              | 20.000                          |                                   | 2.65          | 53.000                                  | 1.40                         | 0.800         | 4.170 | A               | E   | 45.060                       | 0.910         | 3.810 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 2.650 | A              | E               | 45.060                                    |  |
|                          |                                      | SNAGRIS2             | 22.000                          |                                   | 2.48          | 54.560                                  | 1.40                         | 0.800         | 3.910 | A               | E   | 45.060                       | 0.910         | 3.520 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 2.480 | A              | E               | 45.060                                    |  |
|                          |                                      | SNCOTTS3             | 27.250                          |                                   | 1.80          | 49.050                                  | 1.40                         | 0.800         | 2.840 | A               | E   | 45.060                       | 0.910         | 2.640 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 1.800 | A              | E               | 45.060                                    |  |
|                          |                                      | SNAGGRS4             | 34.925                          |                                   | 1.48          | 51.689                                  | 1.40                         | 0.800         | 2.340 | A               | E   | 45.060                       | 0.910         | 2.150 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 1.480 | A              | E               | 45.060                                    |  |
|                          |                                      | SNS5A                | 35.550                          |                                   | 1.45          | 51.548                                  | 1.40                         | 0.800         | 2.290 | A               | E   | 45.060                       | 0.910         | 2.170 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 1.450 | A              | E               | 45.060                                    |  |
|                          |                                      | SNS6A                | 39.950                          |                                   | 1.32          | 52.734                                  | 1.40                         | 0.800         | 2.090 | A               | E   | 45.060                       | 0.910         | 1.960 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 1.320 | A              | E               | 45.060                                    |  |
|                          |                                      | SNS7B                | 42.000                          |                                   | 1.26          | 52.920                                  | 1.40                         | 0.800         | 1.990 | A               | E   | 45.060                       | 0.910         | 1.920 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 1.260 | A              | E               | 45.060                                    |  |
|                          | TRUCK TRACTOR SEMI-TRAILER<br>(TTST) | TNAGRIT3             | 33.000                          |                                   | 1.61          | 53.130                                  | 1.40                         | 0.800         | 2.540 | A               | E   | 45.060                       | 0.910         | 2.370 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 1.610 | A              | E               | 45.060                                    |  |
|                          |                                      | TNT4A                | 33.075                          |                                   | 1.62          | 53.582                                  | 1.40                         | 0.800         | 2.550 | A               | E   | 45.060                       | 0.910         | 2.310 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 1.620 | A              | E               | 45.060                                    |  |
|                          |                                      | TNT6A                | 41.600                          |                                   | 1.31          | 54.496                                  | 1.40                         | 0.800         | 2.070 | A               | E   | 45.060                       | 0.910         | 2.040 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 1.310 | A              | E               | 45.060                                    |  |
|                          |                                      | TNT7A                | 42.000                          |                                   | 1.32          | 55.440                                  | 1.40                         | 0.800         | 2.070 | A               | E   | 45.060                       | 0.910         | 2.000 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 1.320 | A              | E               | 45.060                                    |  |
|                          |                                      | TNT7B                | 42.000                          |                                   | 1.35          | 56.700                                  | 1.40                         | 0.800         | 2.130 | A               | E   | 45.060                       | 0.910         | 1.870 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 1.350 | A              | E               | 45.060                                    |  |
|                          |                                      | TNAGRIT4             | 43.000                          |                                   | 1.29          | 55.470                                  | 1.40                         | 0.800         | 2.040 | A               | E   | 45.060                       | 0.910         | 1.810 | A               | I   | 72.530                                  | 0.80                         | 0.800         | 1.290 | A              | E               | 45.060                                    |  |
| TNAGT5A                  | 45.000                               |                      | 1.22                            | 54.900                            | 1.40          | 0.800                                   | 1.930                        | A             | E     | 45.060          | 0.910                                     | 1.790                        | A             | I     | 72.530          | 0.80                                      | 0.800                                   | 1.220                        | A             | E     | 45.060         |                 |   |  |
| TNAGT5B                  | 45.000                               | ③                    | 1.21                            | 54.450                            | 1.40          | 0.800                                   | 1.910                        | A             | E     | 45.060          | 0.910                                     | 1.720                        | A             | I     | 72.530          | 0.80                                      | 0.800                                   | 1.210                        | A             | E     | 45.060         |                 |   |  |

LOAD FACTORS:

|                                     |             |                 |                 |
|-------------------------------------|-------------|-----------------|-----------------|
| DESIGN<br>LOAD<br>RATING<br>FACTORS | LIMIT STATE | γ <sub>DC</sub> | γ <sub>DW</sub> |
|                                     | STRENGTH I  | 1.25            | 1.50            |
|                                     | SERVICE III | 1.00            | 1.00            |

**NOTES:**

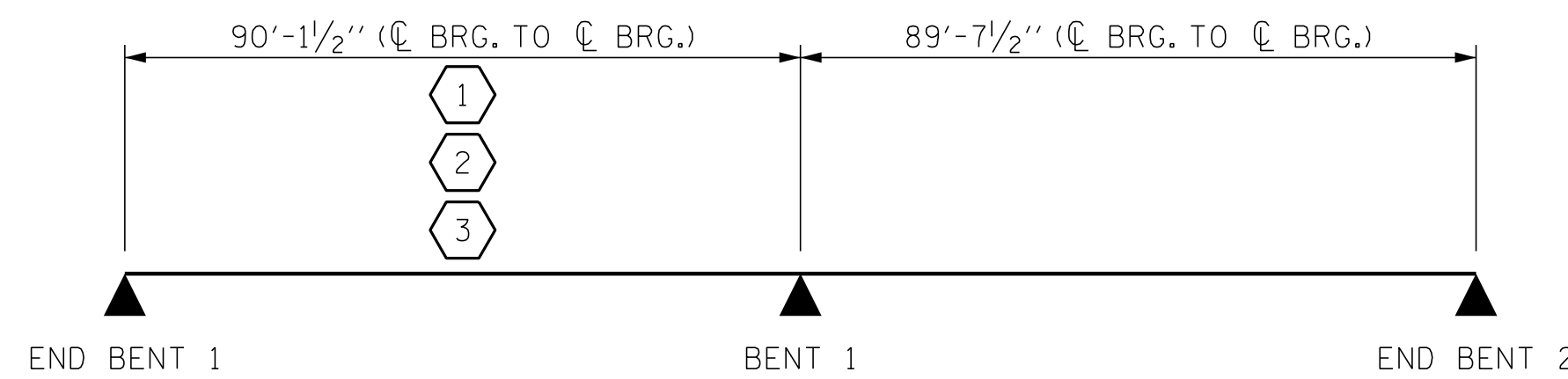
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

**COMMENTS:**

- 1.
- 2.
- 3.
- 4.

|  |
|--|
| # CONTROLLING LOAD RATING                  |
| ① DESIGN LOAD RATING (HL-93)               |
| ② DESIGN LOAD RATING (HS-20)               |
| ③ LEGAL LOAD RATING **                     |
| ** SEE CHART FOR VEHICLE TYPE              |
| GIRDER LOCATION                            |
| I - INTERIOR GIRDER<br>E - EXTERIOR GIRDER |



LRFR SUMMARY

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-

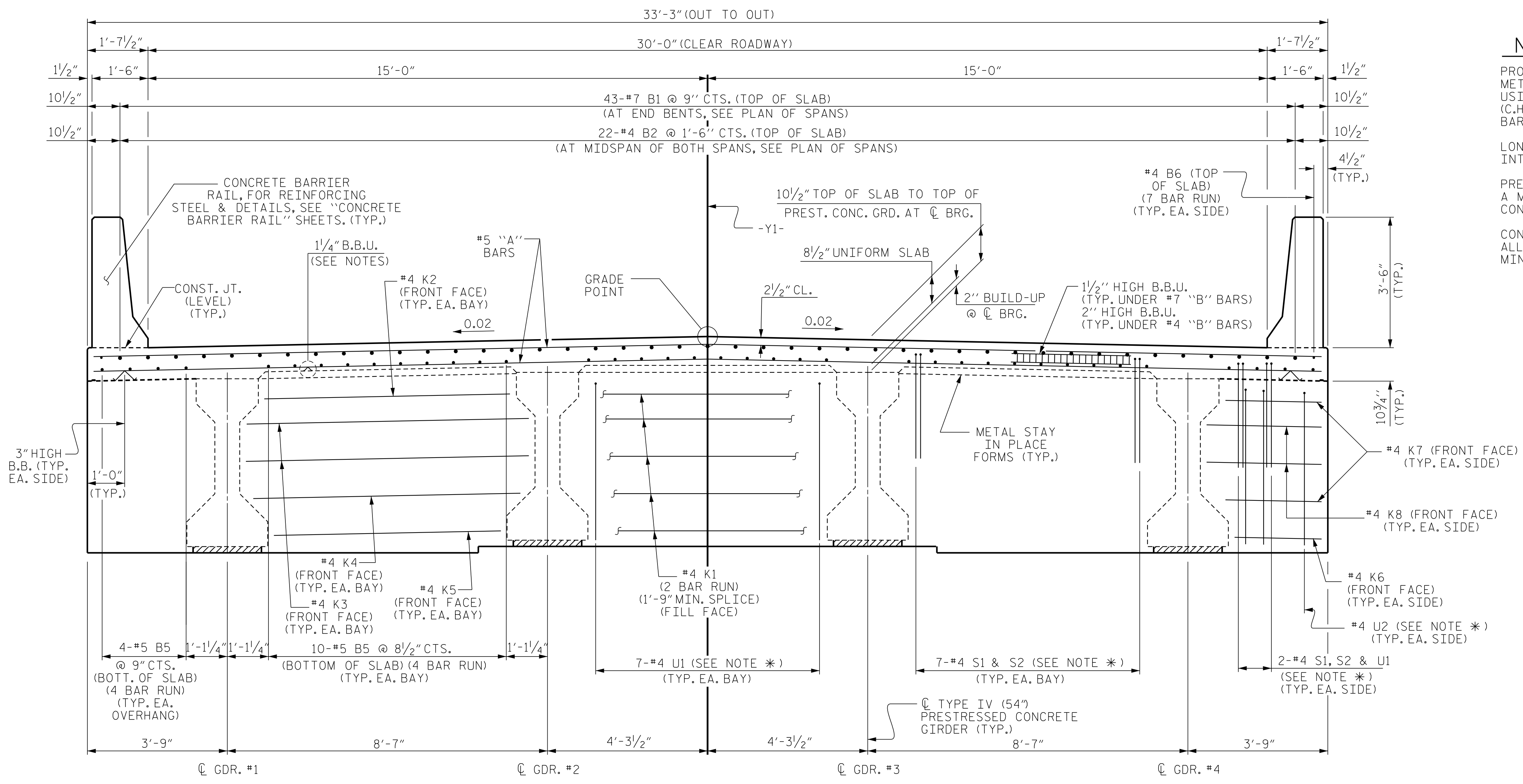
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|                             |                       |
|-----------------------------|-----------------------|
| ASSEMBLED BY : G.M. GILLAND | DATE : 2-29-16        |
| CHECKED BY: B.C. HUNT       | DATE : 2-29-16        |
| DRAWN BY : MAA 1/08         | REV. 11/2/08RR MAA/GM |
| CHECKED BY : GM/DI 2/08     | REV. 10/1/11 MAA/GM   |

ENGINEER OF RECORD:  
 Documented by:  
  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

|   |     |       |     |     |                    |
|---|-----|-------|-----|-----|--------------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH                          |     |       |     |     |                    |
| STANDARD<br>LRFR SUMMARY FOR<br>PRESTRESSED<br>CONCRETE GIRDERS<br>(NON-INTERSTATE TRAFFIC) |     |       |     |     |                    |
| REVISIONS   |     |       |     |     |                    |
| NO.   | BY: | DATE: | NO. | BY: | DATE:              |
| 1   |     |       | 3   |     |                    |
| 2   |     |       | 4   |     |                    |
|   |     |       |     |     | SHEET NO.<br>S01-4 |
|   |     |       |     |     | TOTAL SHEETS<br>61 |

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**NOTES:**

PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

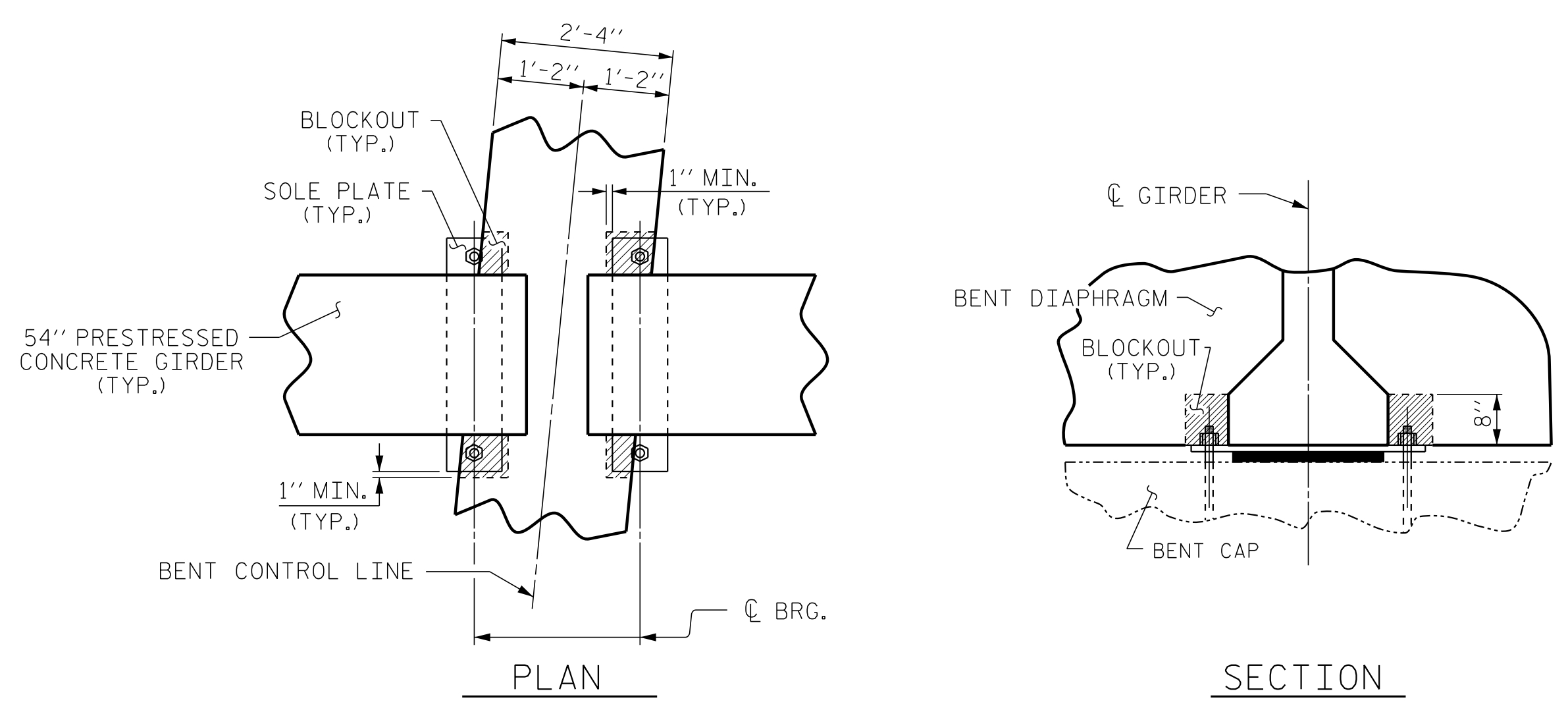
PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

CONCRETE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

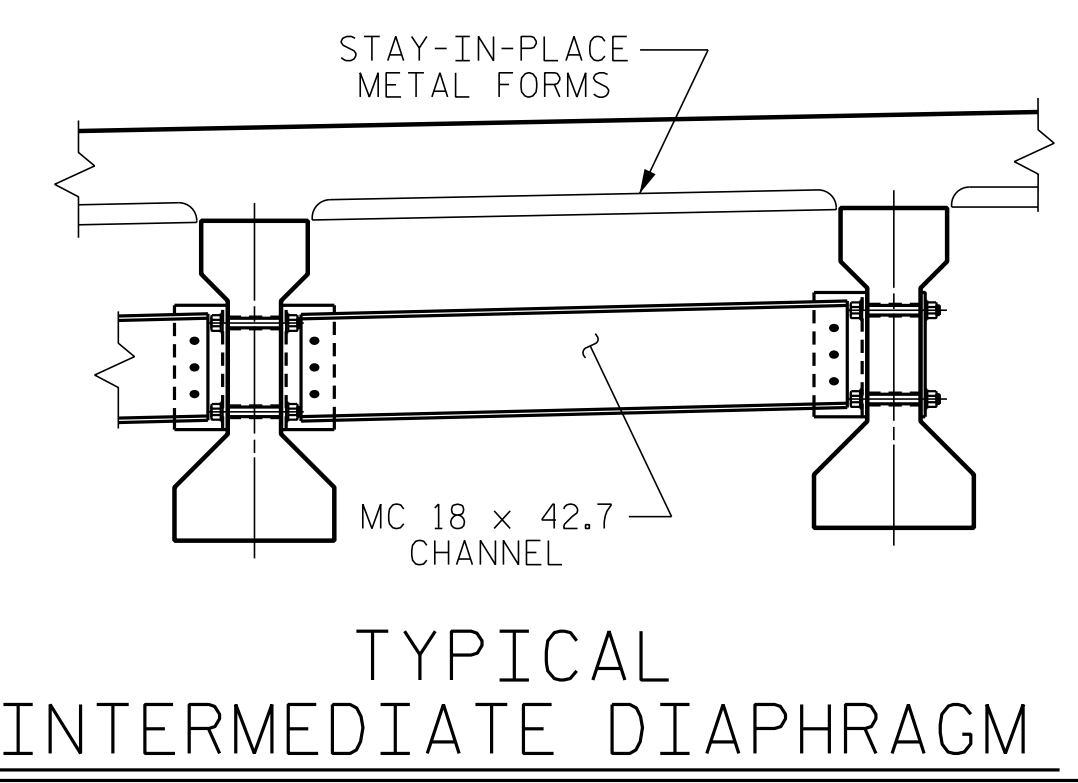
**TYPICAL SECTION**

(END BENT No. 1 DIAPHRAGM SHOWN, END BENT No. 2 SIMILAR)

NOTE \*  
THESE BARS ARE TO MATCH #4 'V' BARS IN END BENT

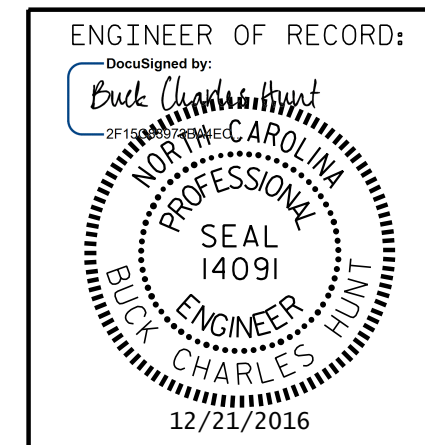


**BENT DIAPHRAGM BLOCK-OUT DETAIL**



SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET FOR DETAILS

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-  
 SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 TYPICAL SECTION**

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

TOTAL SHEETS: 61

DRAWN BY: D. HODGE DATE: 2/16  
 CHECKED BY: G.M. GILLAND DATE: 3/16

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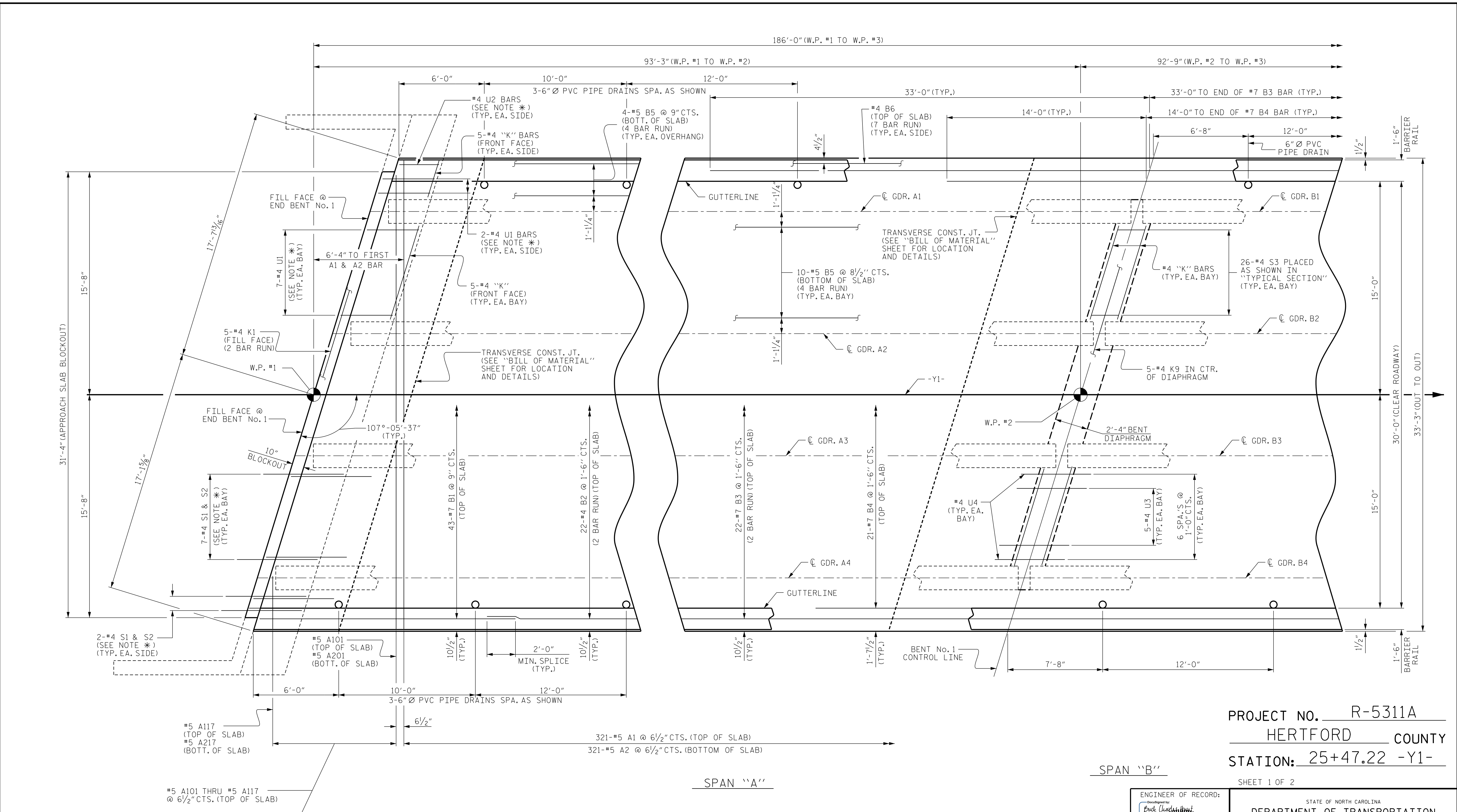
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**PARTIAL PLAN OF SPAN**

**NOTES :**

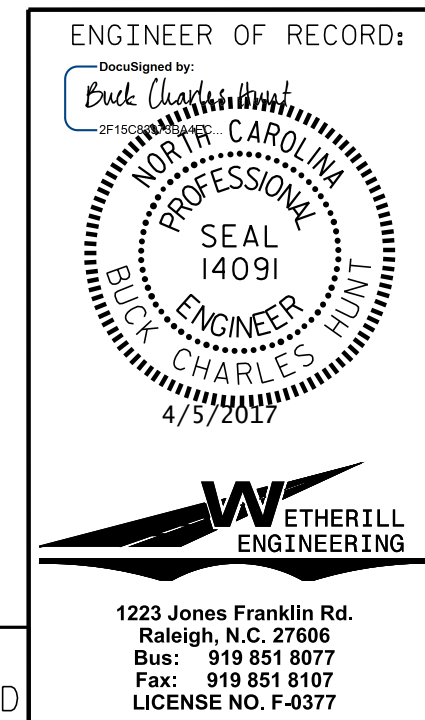
FOR CONCRETE BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEETS.

\* THESE BARS ARE TO MATCH SPACING OF THE #4 "V" BARS IN END BENT.

FOR LOCATIONS OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEET.

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-  
 SHEET 1 OF 2

DRAWN BY : D. HODGE DATE : 2/16  
 CHECKED BY : G.M. GILLAND DATE : 3/16

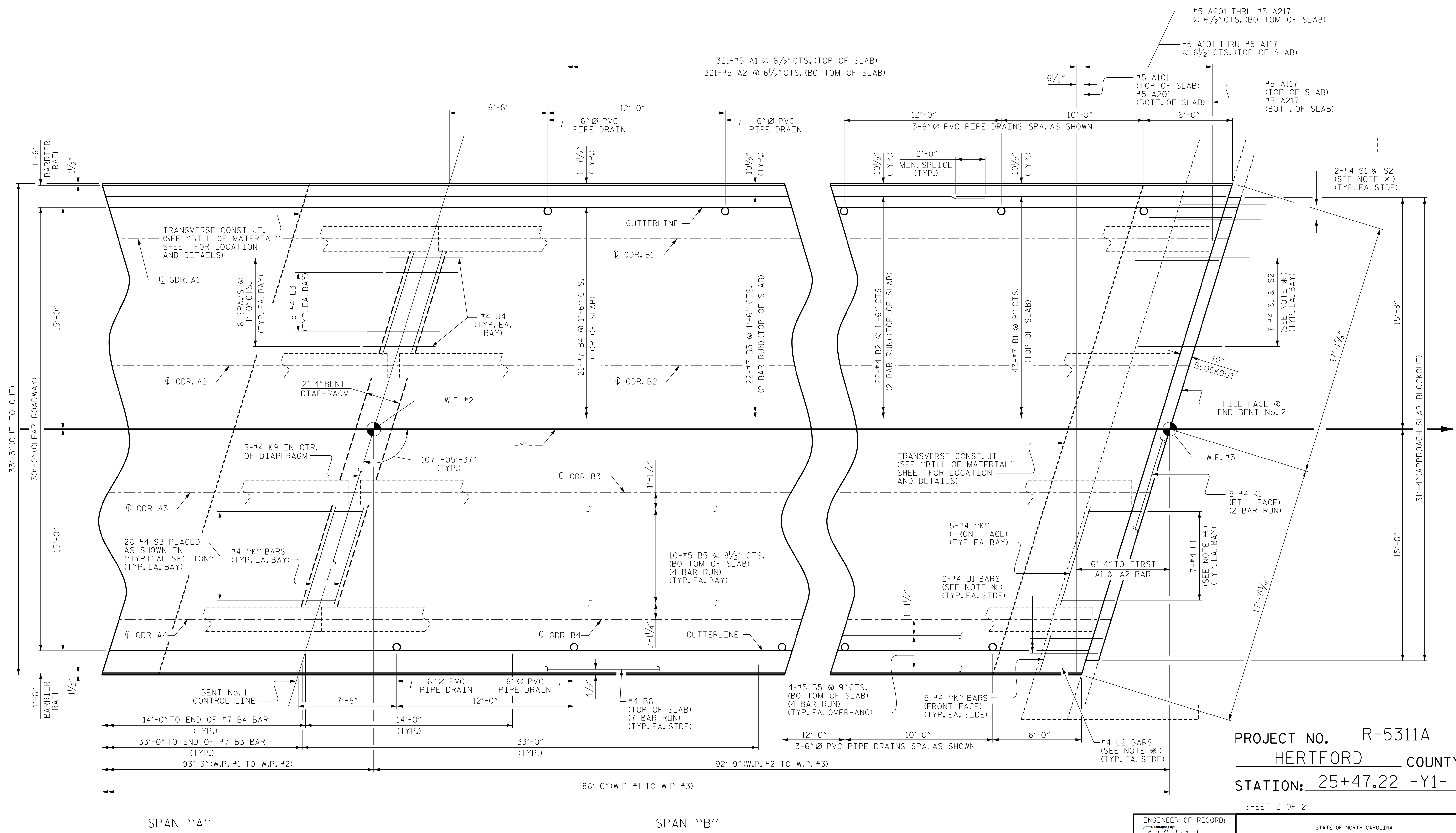


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| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                    |
| SUPERSTRUCTURE<br>PLAN OF SPAN                                     |     |       |     |     |                    |
| REVISIONS  |     |       |     |     |                    |
| NO.  | BY: | DATE: | NO. | BY: | DATE:              |
| 1  |     |       | 3   |     |                    |
| 2  |     |       | 4   |     |                    |
| SHEET NO.<br>S01-7   |     |       |     |     | TOTAL SHEETS<br>61 |

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SPAN "A"

SPAN "B"

**PARTIAL PLAN OF SPAN**

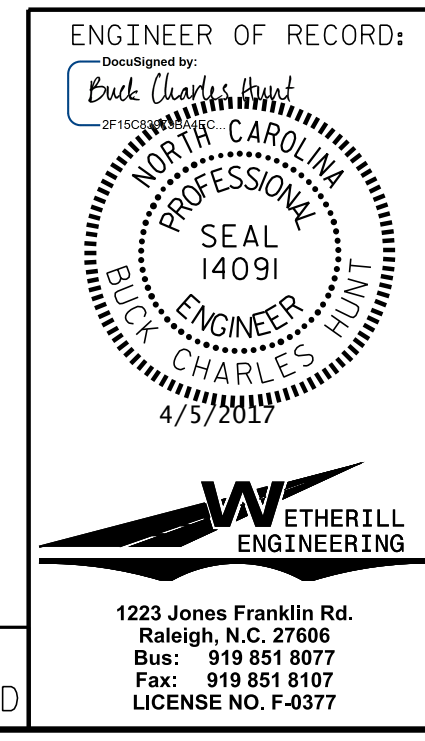
**NOTES :**  
 FOR CONCRETE BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEETS.  
 \* THESE BARS ARE TO MATCH SPACING OF THE #4 "V" BARS IN END BENT.  
 FOR LOCATIONS OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEET.

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-

SHEET 2 OF 2

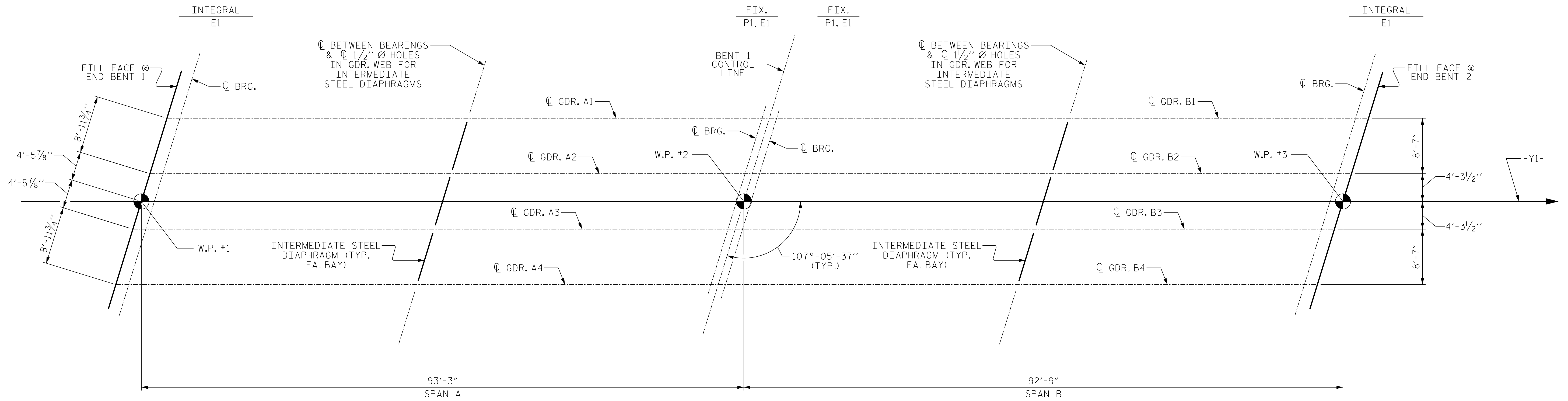
DRAWN BY: D. HODGE DATE: 2/16  
 CHECKED BY: G.M. GILLAND DATE: 2/16

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|   |     |  |                 |     |       |
|---|-----|--|-----------------|-----|-------|
| ENGINEER OF RECORD:<br>Charles H. Etherill<br>NORTH CAROLINA PROFESSIONAL ENGINEER<br>SEAL 14091<br>CHARLES H. ETHERILL<br>4/3/2017 |     | STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |                 |     |       |
| SUPERSTRUCTURE<br>PLAN OF SPAN  |     |  |                 |     |       |
| REVISIONS   |     |  |                 |     |       |
| NO.   | BY: | DATE:  | NO.             | BY: | DATE: |
| 1   |     |  | 3               |     |       |
| 2   |     |  | 4               |     |       |
| SHEET NO. S01-8   |     |  | TOTAL SHEETS 61 |     |       |





GIRDER LAYOUT

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-

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DRAWN BY : G.M. GILLAND DATE : 4/16  
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ENGINEER OF RECORD:  
 DocuSigned by:  
*Bob Hetherill*  
 2016  
 NORTH CAROLINA  
 PROFESSIONAL  
 SEAL  
 14091  
 BUCK, CHARLES  
 ENGINEER  
 12/21/2016

**W**ETHERILL  
 ENGINEERING

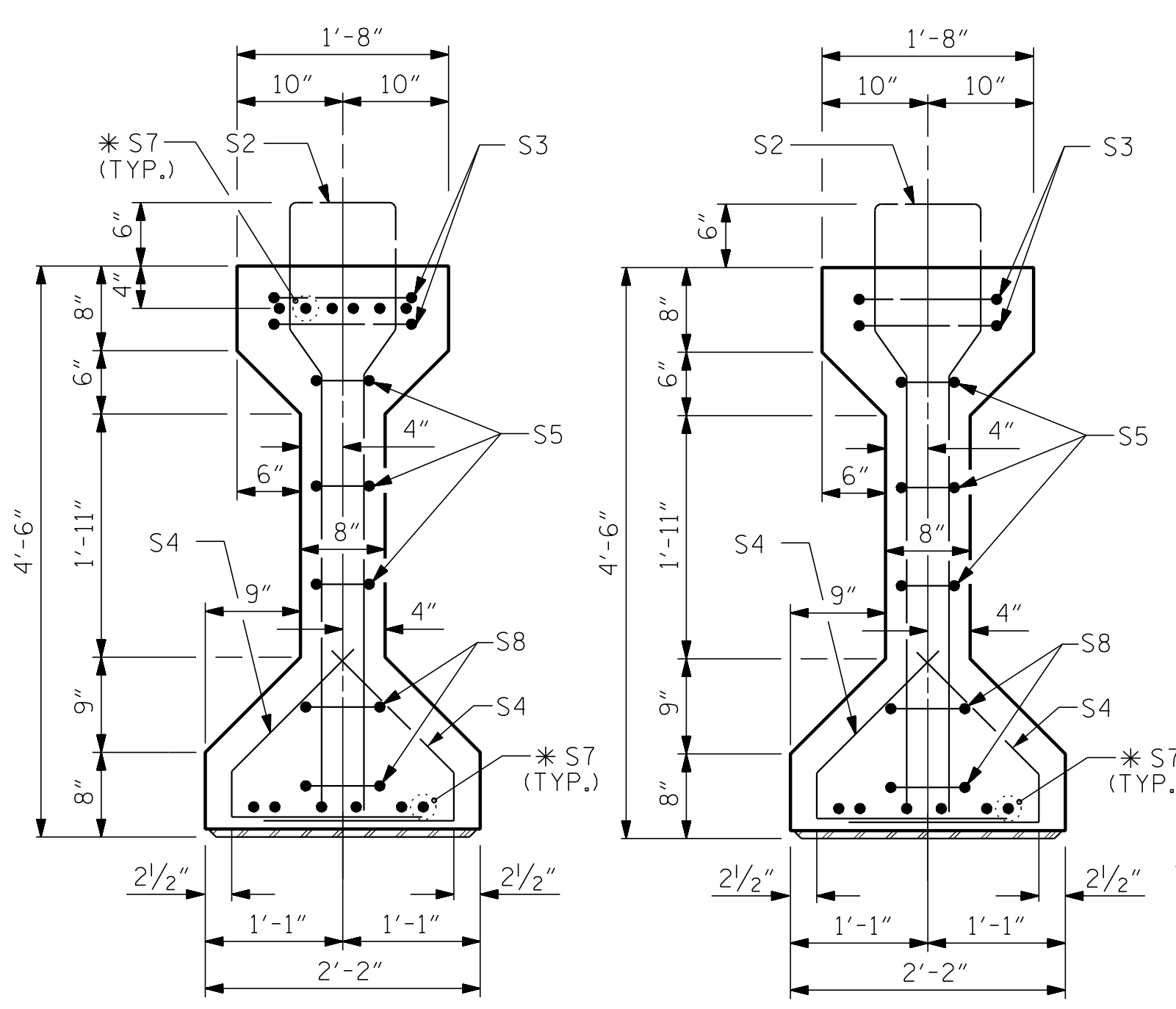
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SUPERSTRUCTURE  
 GIRDER LAYOUT

| REVISIONS |     |       |     |     |       | SHEET NO.    |
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| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 61           |

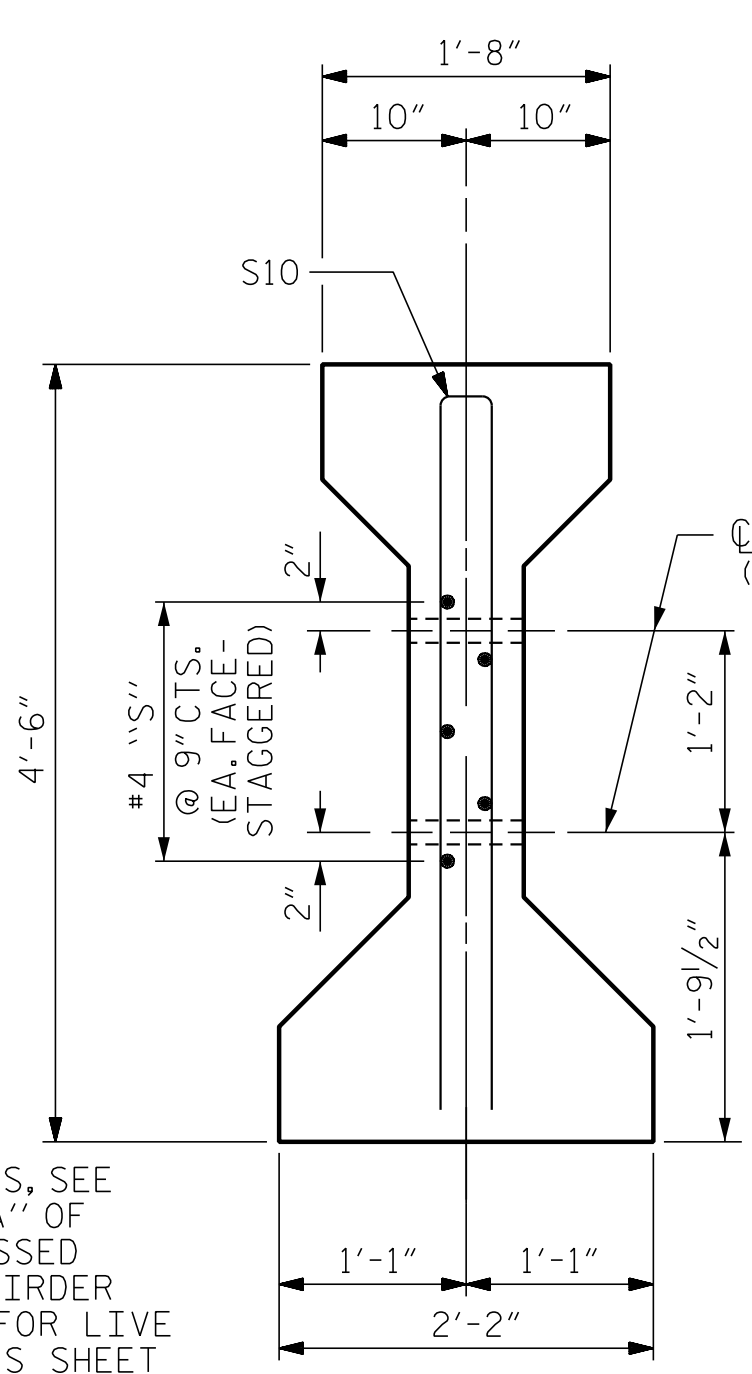
S01-9



SECTION A-A

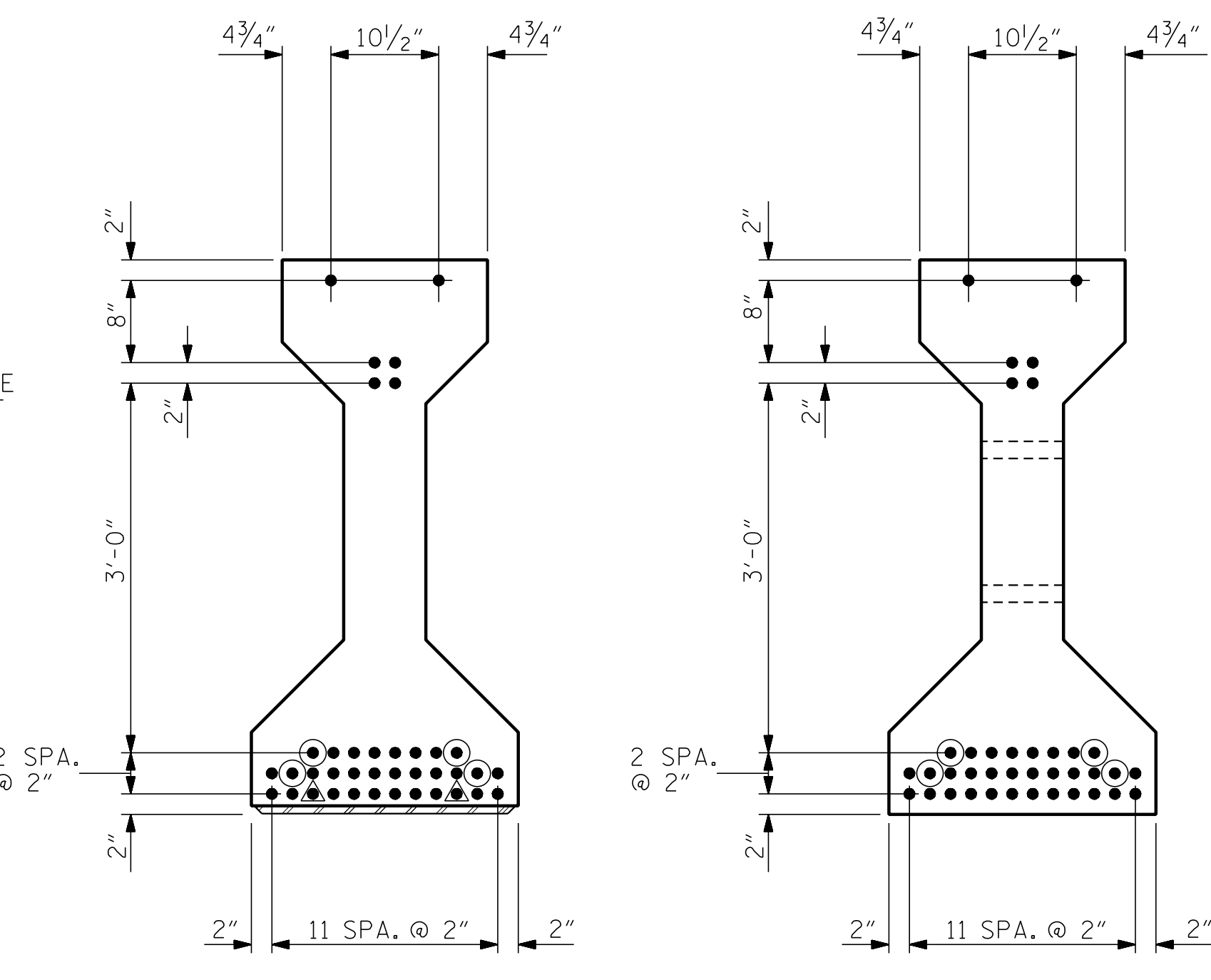
SECTION B-B

\* FOR S7 BARS, SEE  
DETAIL "A" OF  
PRESTRESSED  
CONCRETE GIRDER  
CONTINUOUS FOR LIVE  
LOAD DETAILS SHEET



SECTION C-C  
(S1 BARS NOT SHOWN)

1/2" Ø FORMED HOLE  
(SEE GIRDER LAYOUT  
FOR LOCATION)



AT END OF GIRDER

AT C OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

NOTE: OPTIONAL STRANDS ARE PROVIDED  
TO ALLOW -Y1- GIRDERS TO BE  
CAST WITH -Y2- GIRDERS.

DEBONDING LEGEND

- ▲ DEBOND STRANDS 10'-0"
- FULLY DEBONDED STRAND (OPTIONAL)

0.6" Ø L. R. GRADE 270 STRANDS

| AREA<br>(SQUARE INCHES) | ULTIMATE<br>STRENGTH<br>(LBS. PER STRAND) | APPLIED<br>PRESTRESS<br>(LBS. PER STRAND) |
|-------------------------|---|---|
| 0.217                   | 58,600                                    | 43,950                                    |

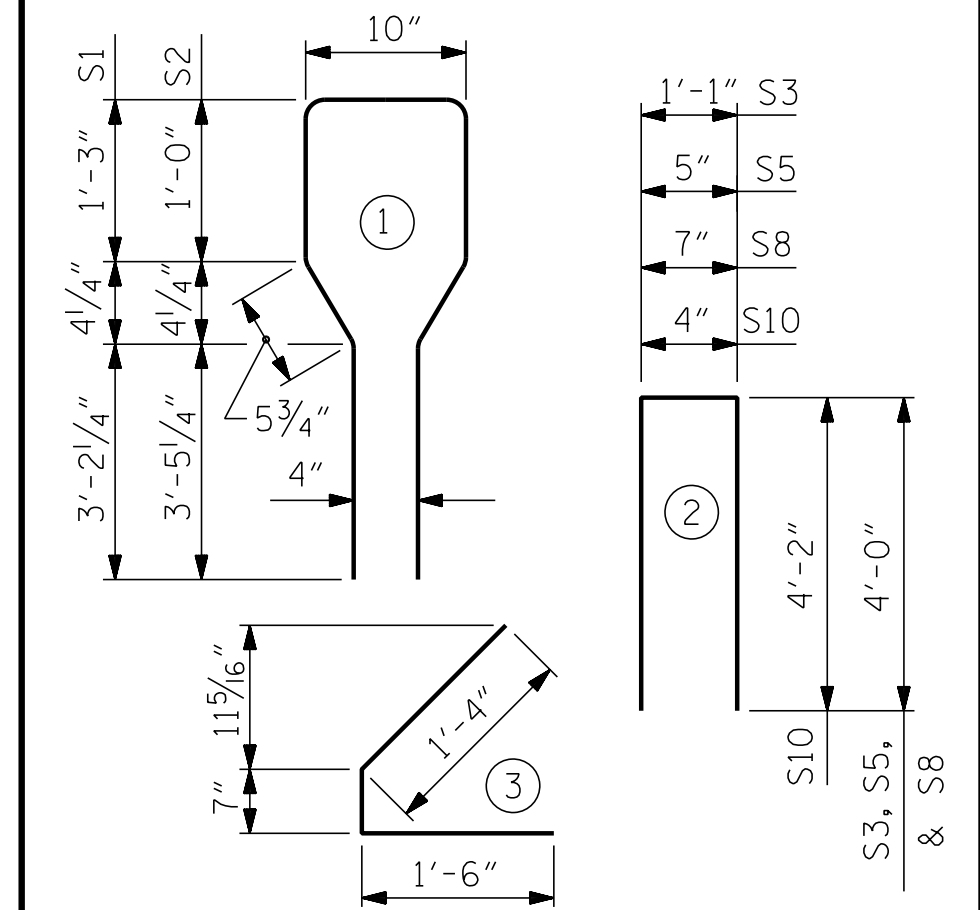
REINFORCING STEEL FOR ONE GIRDER

| BAR  | NUMBER | SIZE | TYPE | LENGTH | WEIGHT |
|------|--------|------|------|--------|--------|
| S1   | 66     | #4   | 1    | 10'-8" | 470    |
| S2   | 16     | #6   | 1    | 10'-8" | 256    |
| S3   | 4      | #4   | 2    | 9'-1"  | 24     |
| S4   | 68     | #4   | 3    | 3'-5"  | 155    |
| S5   | 6      | #4   | 2    | 8'-5"  | 34     |
| * S7 | 18     | #5   | STR  | 3'-8"  | 69     |
| S8   | 4      | #4   | 2    | 8'-7"  | 23     |
| S9   | 2      | #3   | STR  | 1'-10" | 1      |
| S10  | 2      | #5   | 2    | 8'-8"  | 18     |
| S11  | 5      | #4   | STR  | 7'-0"  | 23     |
| S13  | 1      | #3   | STR  | 1'-4"  | 1      |

\* NOTE: S7 BARS SHALL BE BENT BEFORE  
SHIPMENT. HEAT BENDING SHALL  
NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT

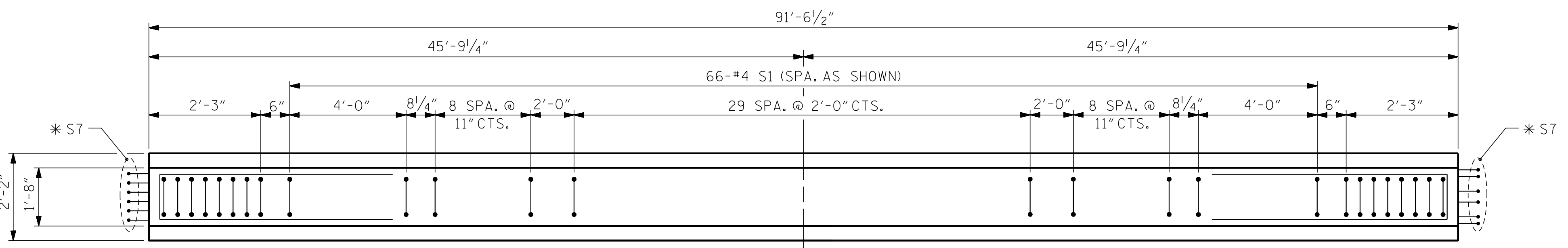


QUANTITIES FOR ONE GIRDER

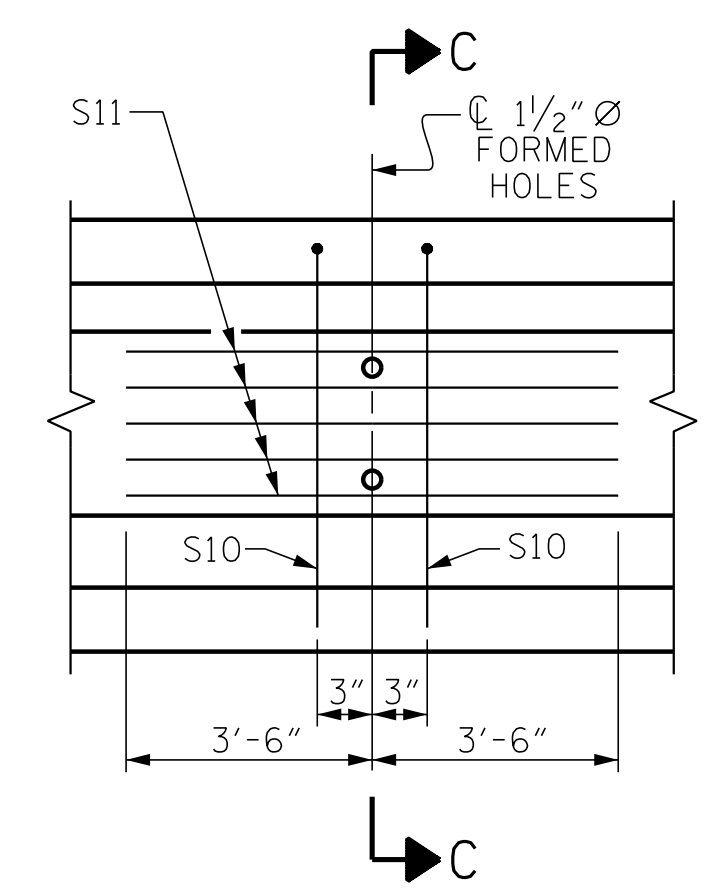
| REINFORCING<br>STEEL | 7500 PSI<br>CONCRETE | 0.6" Ø L. R.<br>STRANDS |
|----------------------|----------------------|-------------------------|
| LB.                  | C.Y.                 | No.                     |
| 1074                 | 18.6                 | 34                      |

GIRDERS REQUIRED

| NUMBER | LENGTH     | TOTAL LENGTH |
|--------|------------|--------------|
| 4      | 91'-6 1/2" | 366'-2"      |

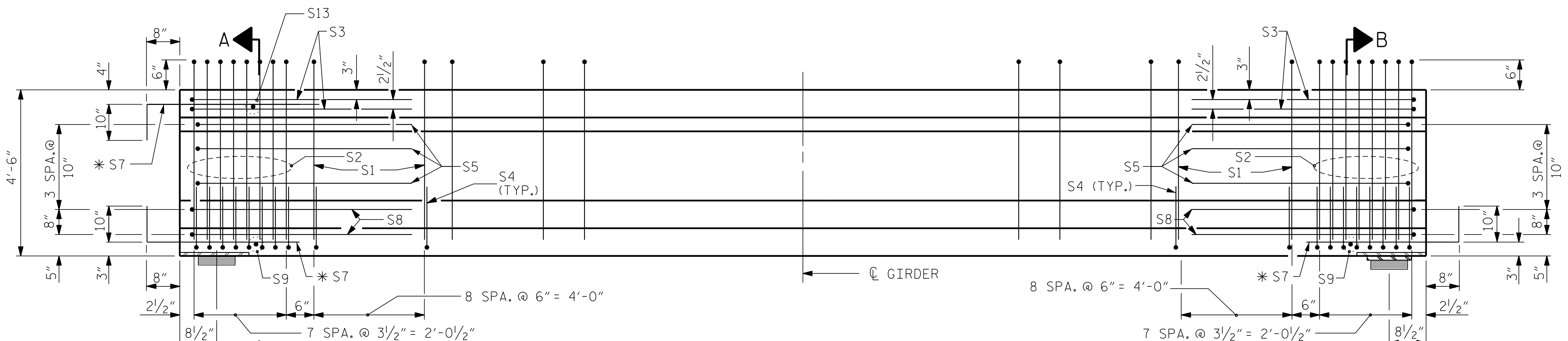


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM  
REINFORCING STEEL FOR GIRDER Nos. 1-4



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

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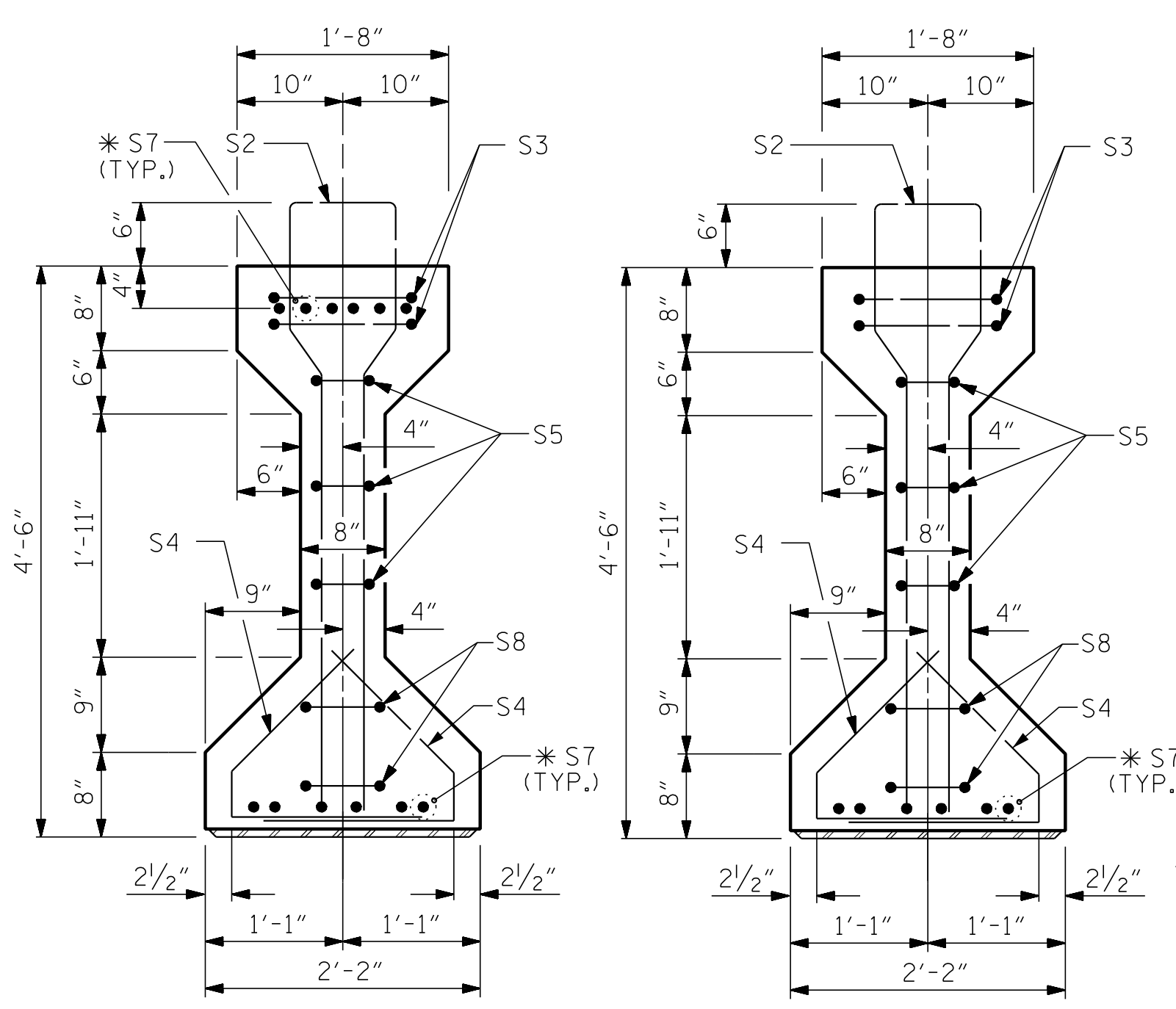
PROJECT NO. R-5311A  
 HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-  
 SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

AASHTO TYPE IV  
 PRESTRESSED CONCRETE GIRDER  
 CONTINUOUS FOR LIVE LOAD  
 SPAN A

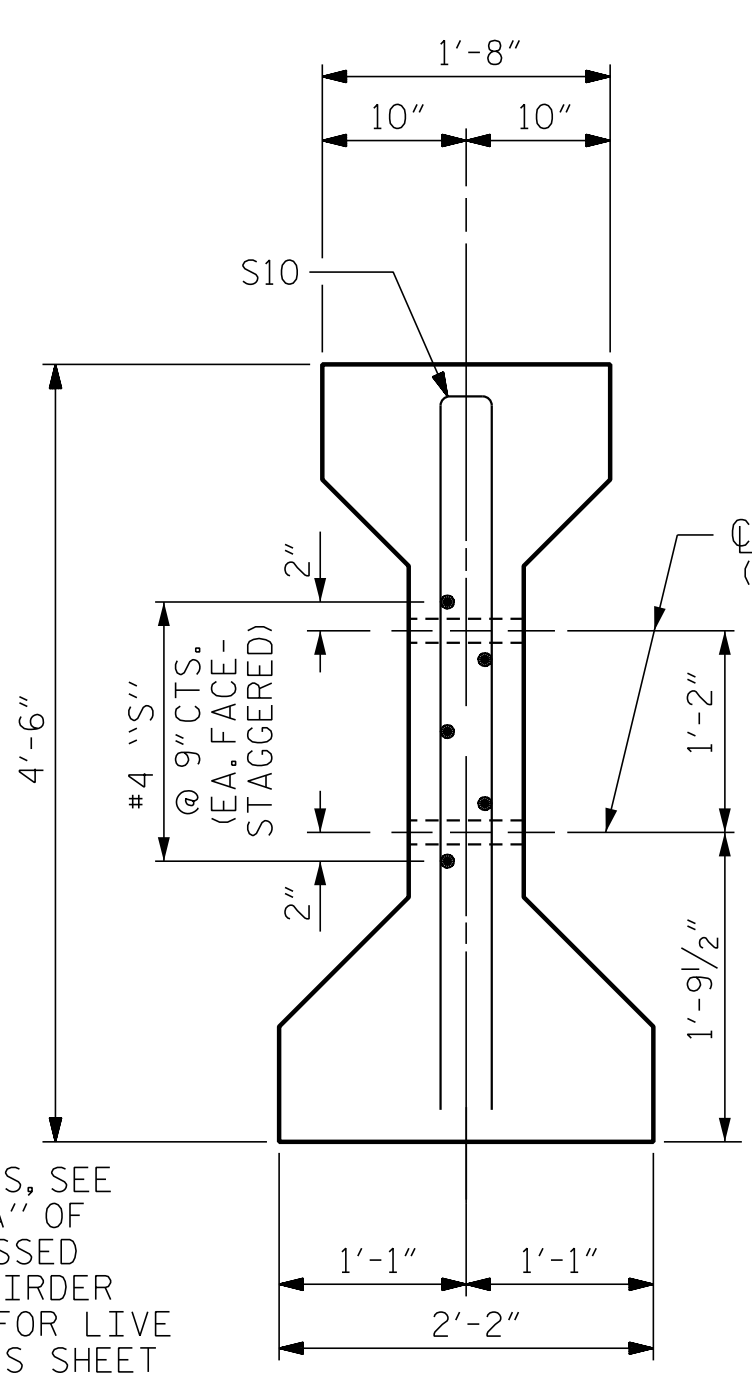
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|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | SHEET NO.    |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 61           |



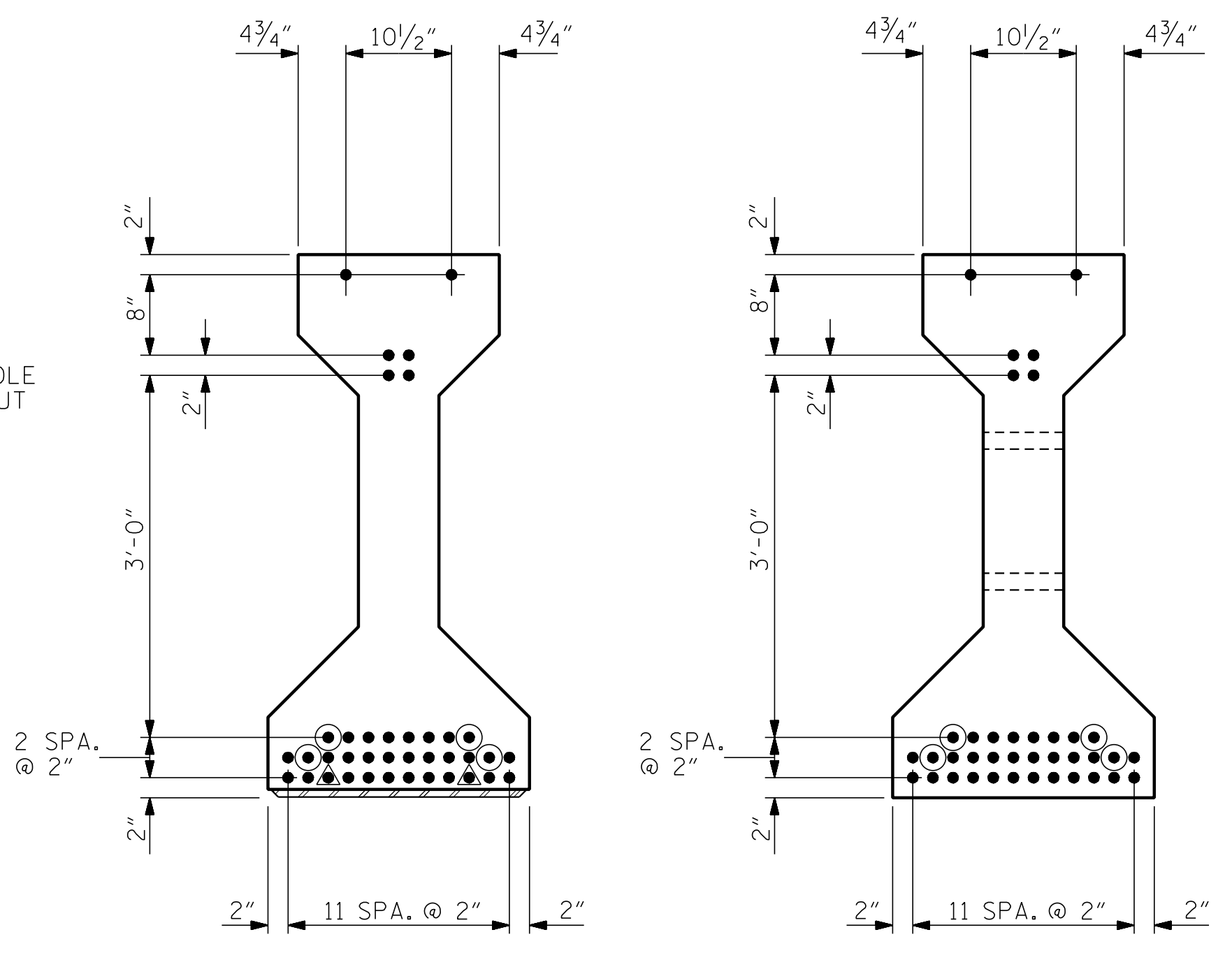


SECTION A-A SECTION B-B

\* FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET



SECTION C-C (S1 BARS NOT SHOWN)



AT END OF GIRDER AT C OF GIRDER  
0.6" Ø LOW RELAXATION STRAND LAYOUT

NOTE: OPTIONAL STRANDS ARE PROVIDED TO ALLOW -Y1- GIRDERS TO BE CAST WITH -Y2- GIRDERS.

DEBONDING LEGEND

- ▲ DEBOND STRANDS 10'-0"
- FULLY DEBONDED STRAND (OPTIONAL)

| 0.6" Ø L. R. GRADE 270 STRANDS |                                     |                                     |
|--------------------------------|-------------------------------------|-------------------------------------|
| AREA (SQUARE INCHES)           | ULTIMATE STRENGTH (LBS. PER STRAND) | APPLIED PRESTRESS (LBS. PER STRAND) |
| 0.217                          | 58,600                              | 43,950                              |

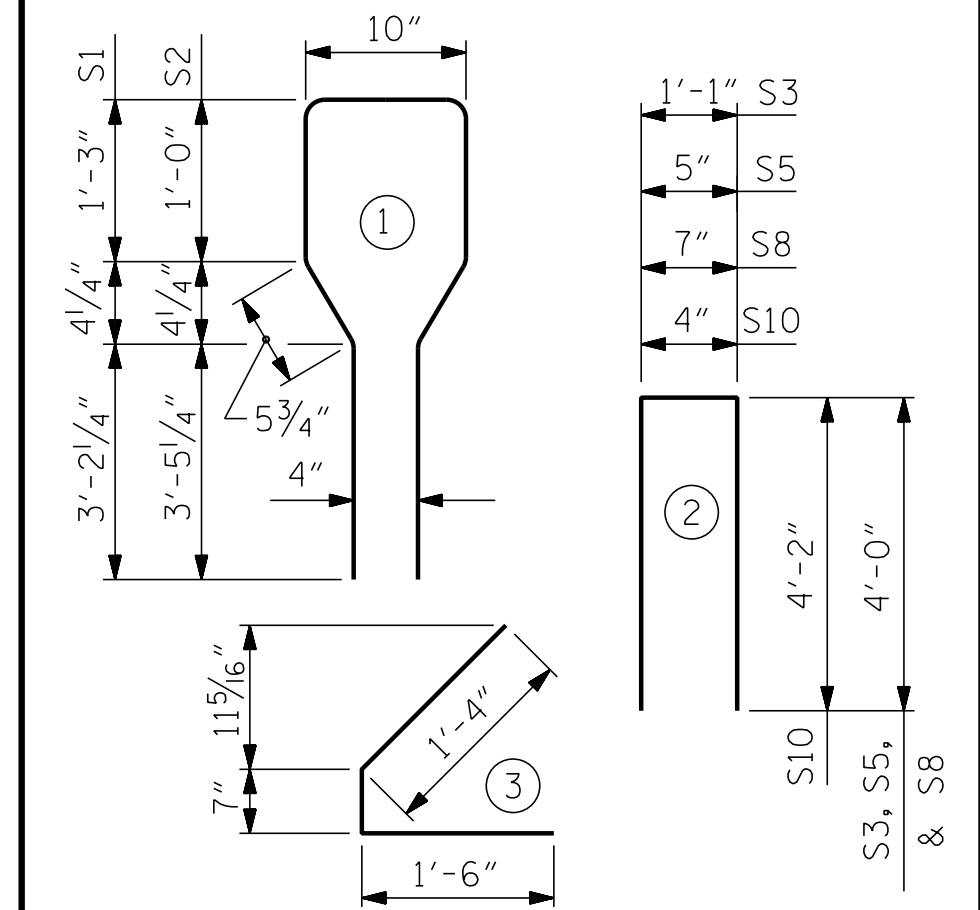
REINFORCING STEEL FOR ONE GIRDER

| BAR  | NUMBER | SIZE | TYPE | LENGTH | WEIGHT |
|------|--------|------|------|--------|--------|
| S1   | 66     | #4   | 1    | 10'-8" | 470    |
| S2   | 16     | #6   | 1    | 10'-8" | 256    |
| S3   | 4      | #4   | 2    | 9'-1"  | 24     |
| S4   | 68     | #4   | 3    | 3'-5"  | 155    |
| S5   | 6      | #4   | 2    | 8'-5"  | 34     |
| * S7 | 18     | #5   | STR  | 3'-8"  | 69     |
| S8   | 4      | #4   | 2    | 8'-7"  | 23     |
| S9   | 2      | #3   | STR  | 1'-10" | 1      |
| S10  | 2      | #5   | 2    | 8'-8"  | 18     |
| S11  | 5      | #4   | STR  | 7'-0"  | 23     |
| S13  | 1      | #3   | STR  | 1'-4"  | 1      |

\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT

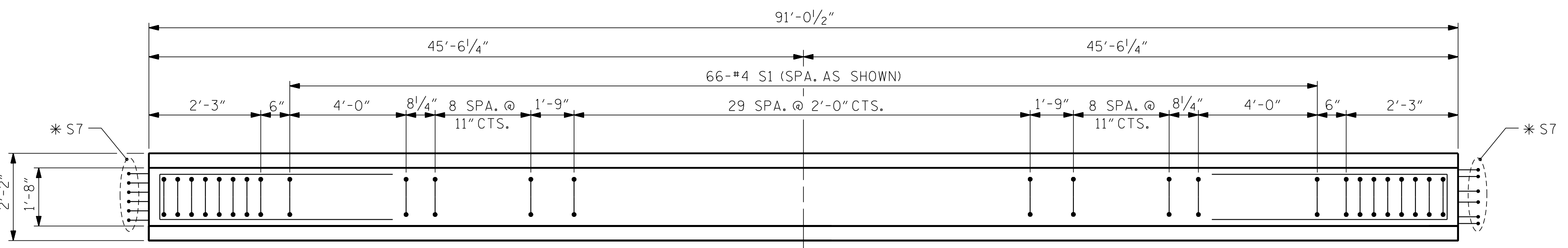


QUANTITIES FOR ONE GIRDER

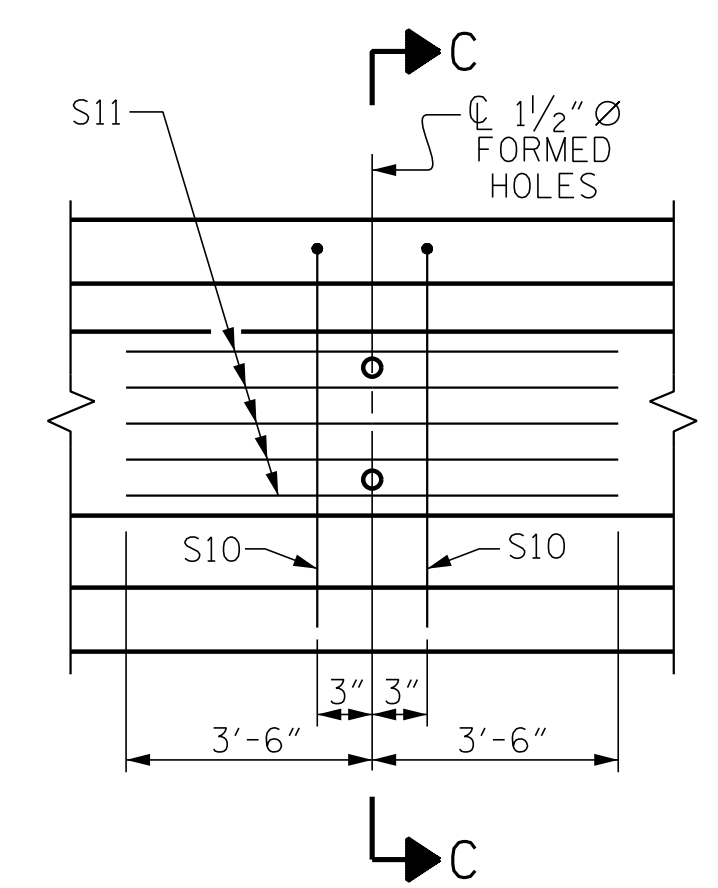
| REINFORCING STEEL | 7500 PSI CONCRETE | 0.6" Ø L. R. STRANDS |
|-------------------|-------------------|----------------------|
| LB.               | C.Y.              | No.                  |
| 1074              | 18.5              | 34                   |

GIRDERS REQUIRED

| NUMBER | LENGTH     | TOTAL LENGTH |
|--------|------------|--------------|
| 4      | 91'-0 1/2" | 364'-2"      |

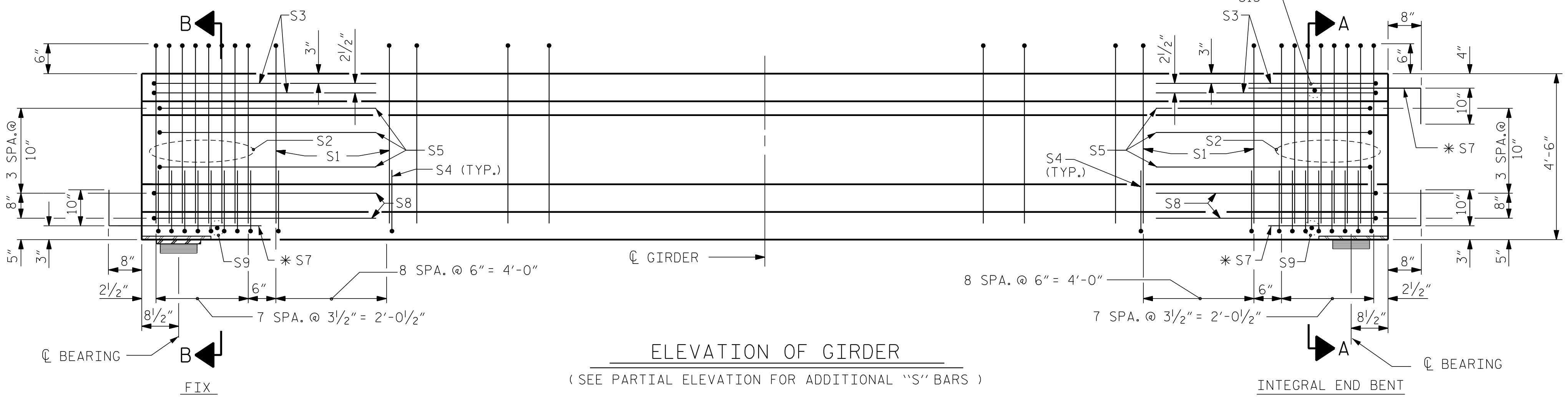


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos.1-4



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

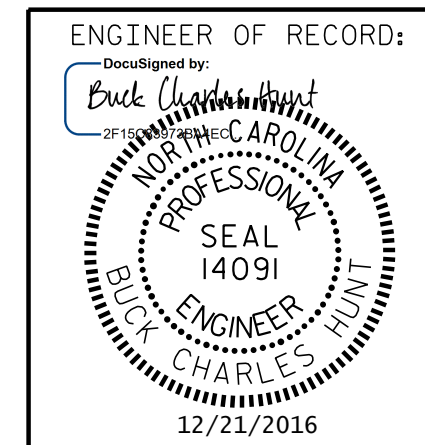
INTEGRAL END BENT

PROJECT NO. R-5311A

HERTFORD COUNTY

STATION: 25+47.22 -Y1-

SHEET 2 OF 4



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RALEIGH

AASHTO TYPE IV  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
SPAN B

| REVISIONS |     |       |     |     |       | SHEET NO.    |  |
|-----------|-----|-------|-----|-----|-------|--------------|--|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S01-11       |  |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |  |
| 2         |     |       | 4   |     |       | 61           |  |

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CHECKED BY: G.M. GILLAND DATE: 3/16

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NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

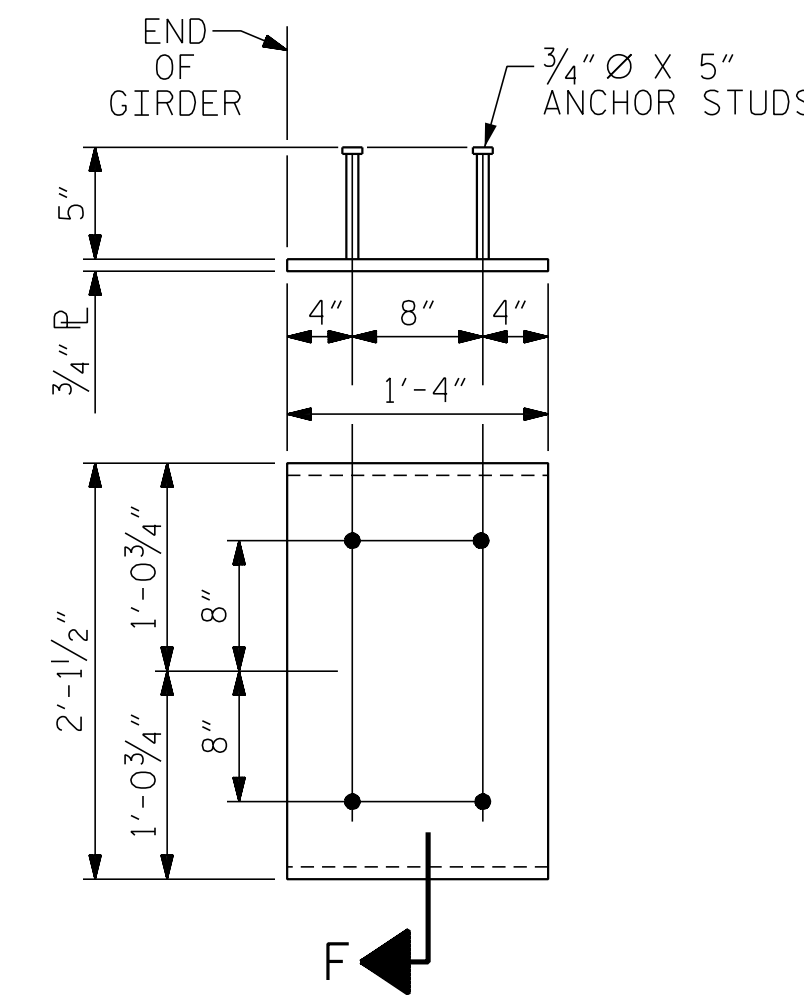
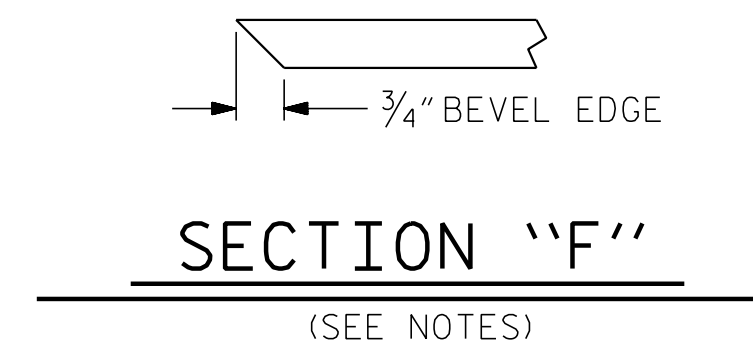
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

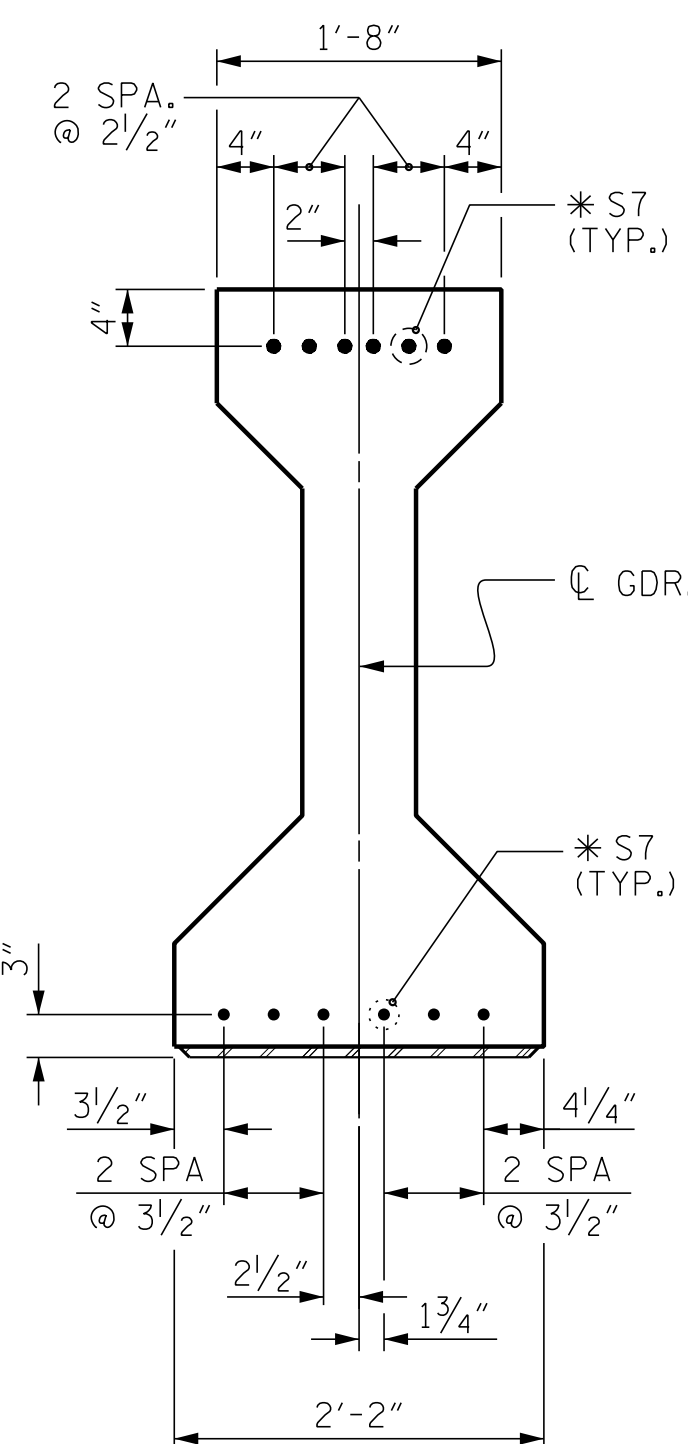
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

FOR EMBEDDED CLIPS FOR PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.



EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)

— DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPANS A & B —

| 0.6" Ø LOW RELAXATION                 | GIRDERS 1 THRU 4 |       |       |       |       |       |       |       |       |       |    |
|---------------------------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|
|                                       | TENTH POINTS     | 0     | .1    | .2    | .3    | .4    | .5    | .6    | .7    | .8    | .9 |
| CAMBER ( GIRDER ALONE IN PLACE )      | 0                | 0.043 | 0.082 | 0.112 | 0.131 | 0.138 | 0.131 | 0.112 | 0.082 | 0.043 | 0  |
| * DEFLECTION DUE TO SUPERIMPOSED D.L. | 0                | 0.033 | 0.066 | 0.091 | 0.108 | 0.113 | 0.108 | 0.091 | 0.066 | 0.033 | 0  |
| FINAL CAMBER                          | 0                | 1/8"  | 3/16" | 1/4"  | 5/16" | 5/16" | 5/16" | 1/4"  | 3/16" | 1/8"  | 0  |

\* INCLUDES FUTURE WEARING SURFACE  
ALL VALUES ARE SHOWN IN FEET ( DECIMAL FORM ), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES ( FRACTION FORM ).

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 25+47.22 -Y1-

SHEET 3 OF 4

|                           |                     |
|---------------------------|---------------------|
| ASSEMBLED BY : D. HODGE   | DATE : 3/16         |
| CHECKED BY : G.M. GILLAND | DATE : 3/16         |
| DRAWN BY : ELR 11/91      | REV. 10/1/11 MAA/GM |
| CHECKED BY : GRP 11/91    | REV. 1/15 MAA/TMG   |
|                           | REV. 2/15 MAA/TMG   |

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:  
DocuSigned by:  
*Eric Charles*  
STATE OF NORTH CAROLINA  
PROFESSIONAL ENGINEER  
SEAL 14091  
ERIC CHARLES  
12/27/2016

ETHERILL ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

|  |     |       |     |     |                 |
|--|-----|-------|-----|-----|-----------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH             |     |       |     |     |                 |
| STANDARD<br>PRESTRESSED CONCRETE GIRDER<br>CONTINUOUS FOR LIVE LOAD<br>DETAILS |     |       |     |     |                 |
| REVISIONS  |     |       |     |     |                 |
| NO.  | BY: | DATE: | NO. | BY: | DATE:           |
| 1  |     |       | 3   |     |                 |
| 2  |     |       | 4   |     |                 |
| SHEET NO. S01-12   |     |       |     |     | TOTAL SHEETS 61 |

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STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

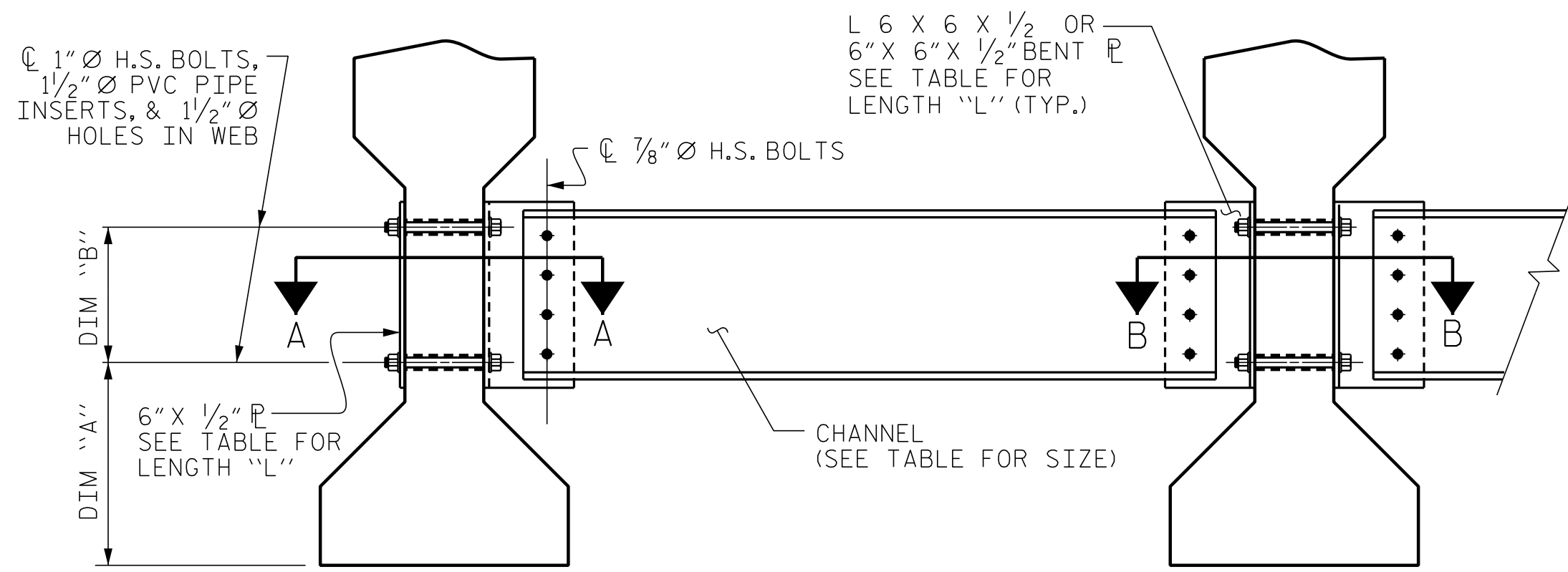
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

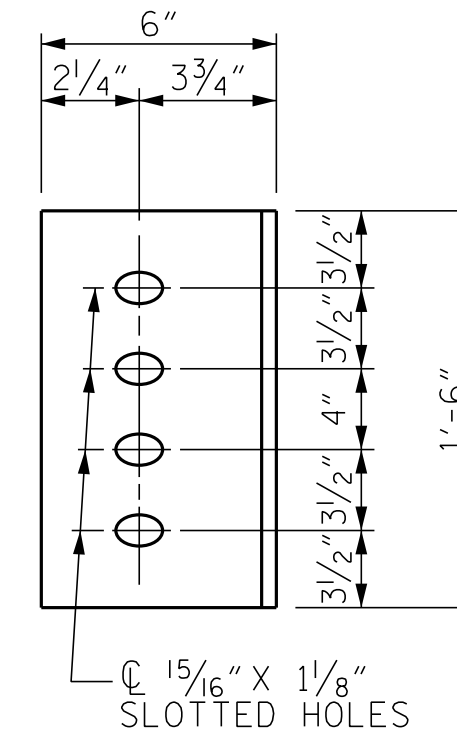
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

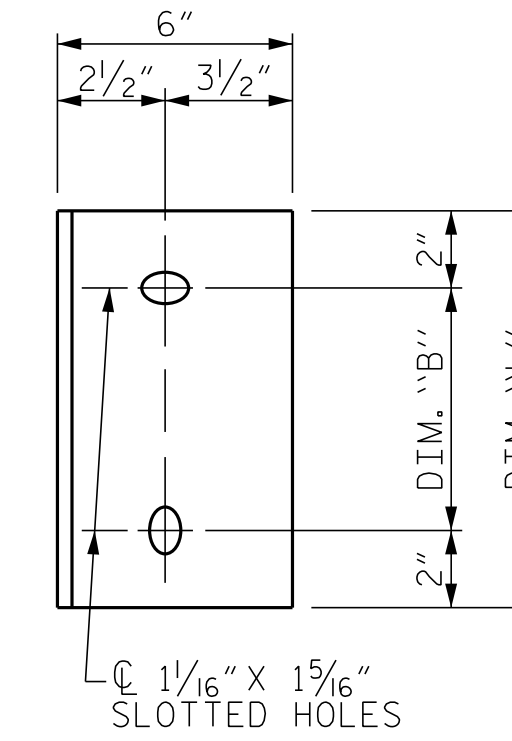
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



EXTERIOR GIRDER  
INTERIOR GIRDER  
PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE



WEB FACE

CONNECTOR PLATE DETAILS

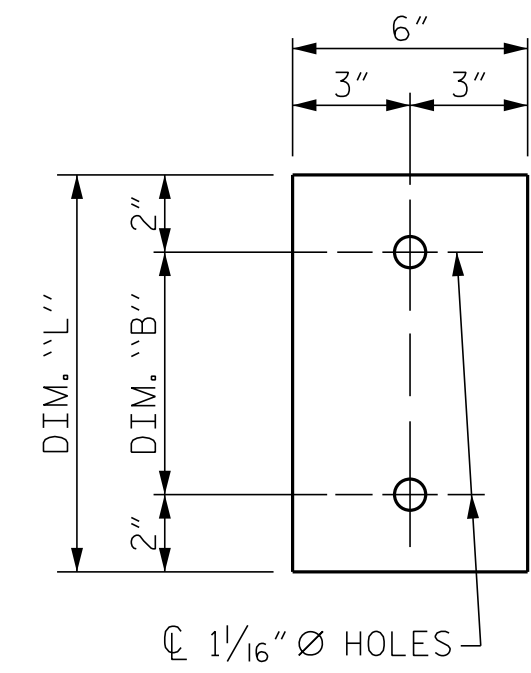
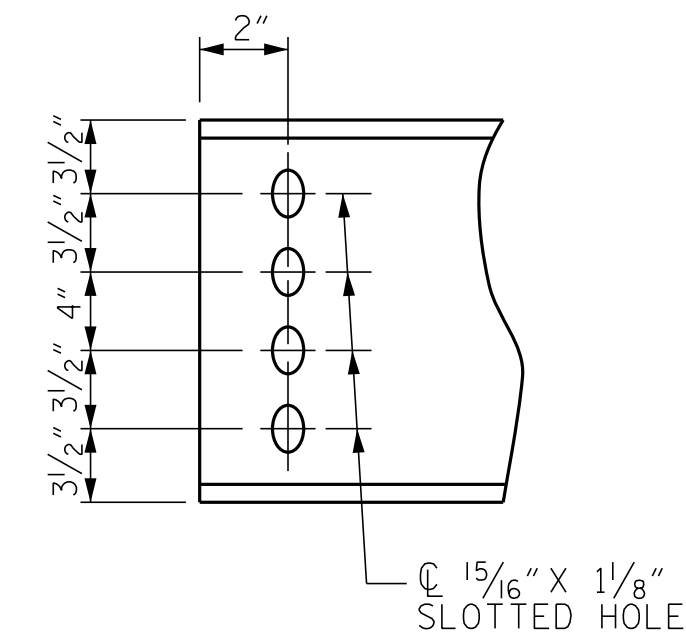


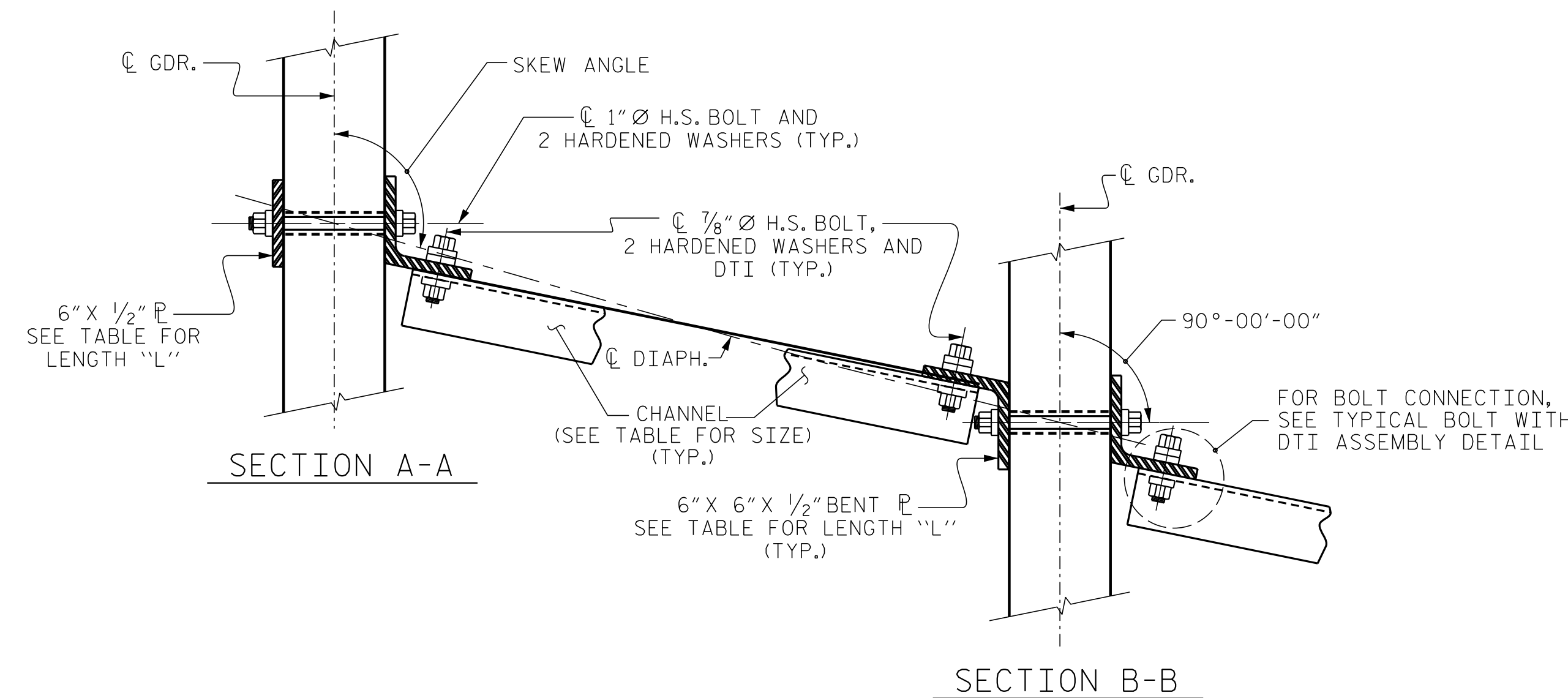
PLATE DETAILS



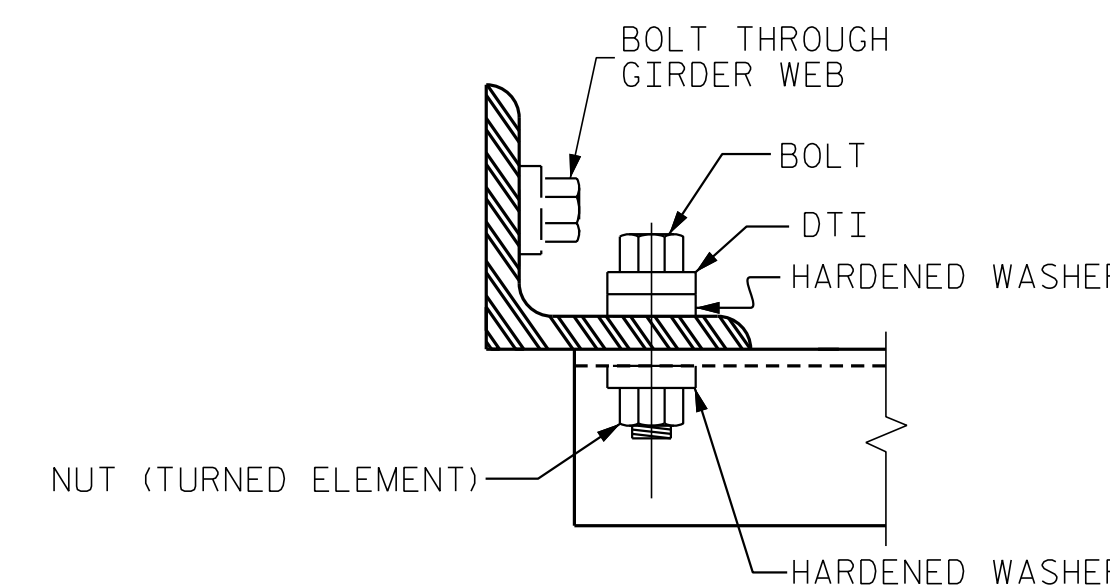
CHANNEL END

TABLE

| GIRDER TYPE | CHANNEL SIZE | DIM "A"   | DIM "B" | DIM "L" |
|-------------|--------------|-----------|---------|---------|
| IV          | MC 18 x 42.7 | 1'-9 1/2" | 1'-2"   | 1'-6"   |



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 25+47.22 -Y1-

SHEET 4 OF 4

ENGINEER OF RECORD:  
DocuSigned by:  
Buck Charles  
12/21/2016  
SEAL 14091  
BUCK CHARLES  
12/21/2016  
ETHERILL ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
INTERMEDIATE  
STEEL DIAPHRAGMS  
FOR TYPE IV  
PRESTRESSED CONCRETE  
GIRDERS

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | SHEET NO.    |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 61           |

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UNLESS ALL SIGNATURES COMPLETED

|                           |                       |
|---------------------------|-----------------------|
| ASSEMBLED BY : D. HODGE   | DATE : 3/16           |
| CHECKED BY : G.M. GILLAND | DATE : 3/16           |
| DRAWN BY : TLA 6/05       | ADDED 10/21/05        |
| CHECKED BY : VC 6/05      | REV. 5/1/06RRR KMM/GM |
|                           | REV. 10/1/11 MAA/GM   |

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT THEN BE BURRED WITH A SHARP POINTED TOOL.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

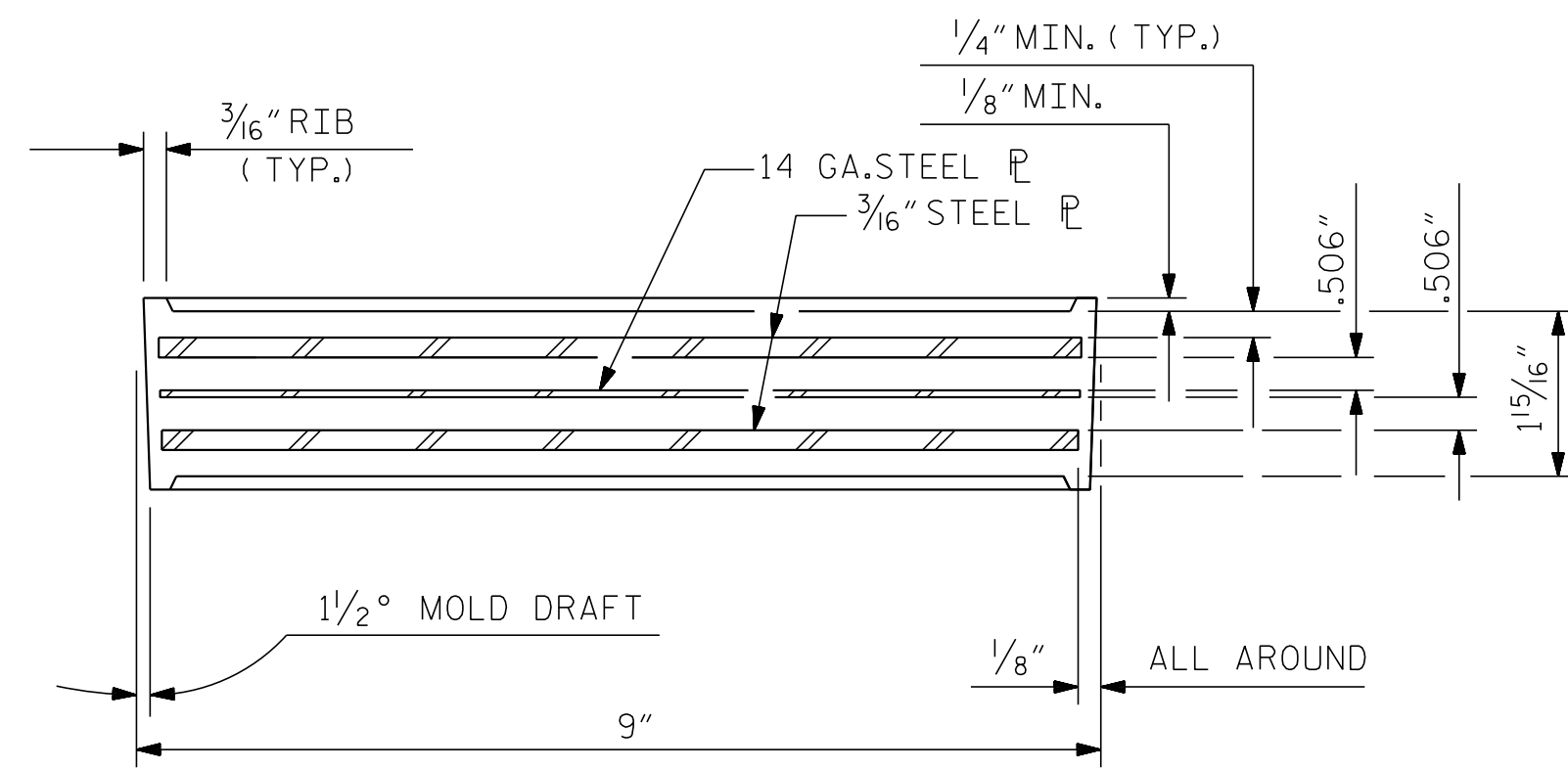
SOLE PLATE P1, BOLTS, NUTS AND WASHERS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

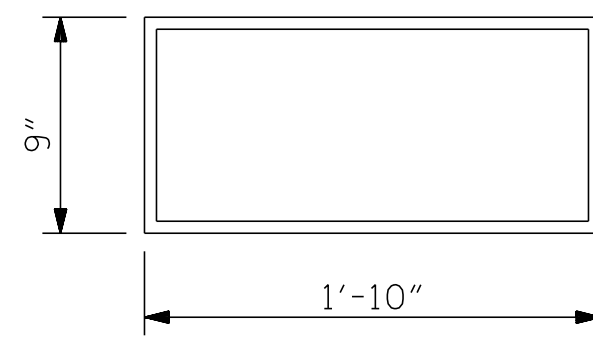
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

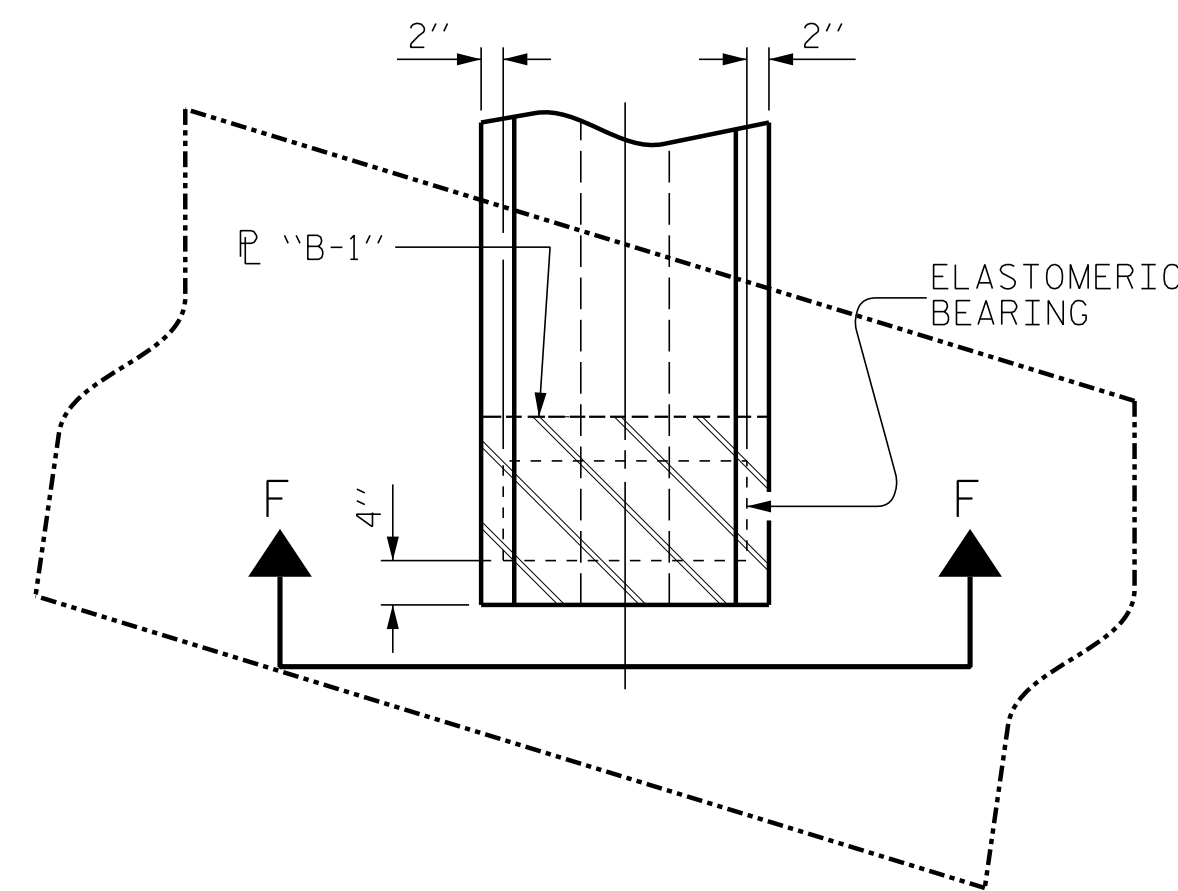


TYPICAL SECTION OF ELASTOMERIC BEARINGS



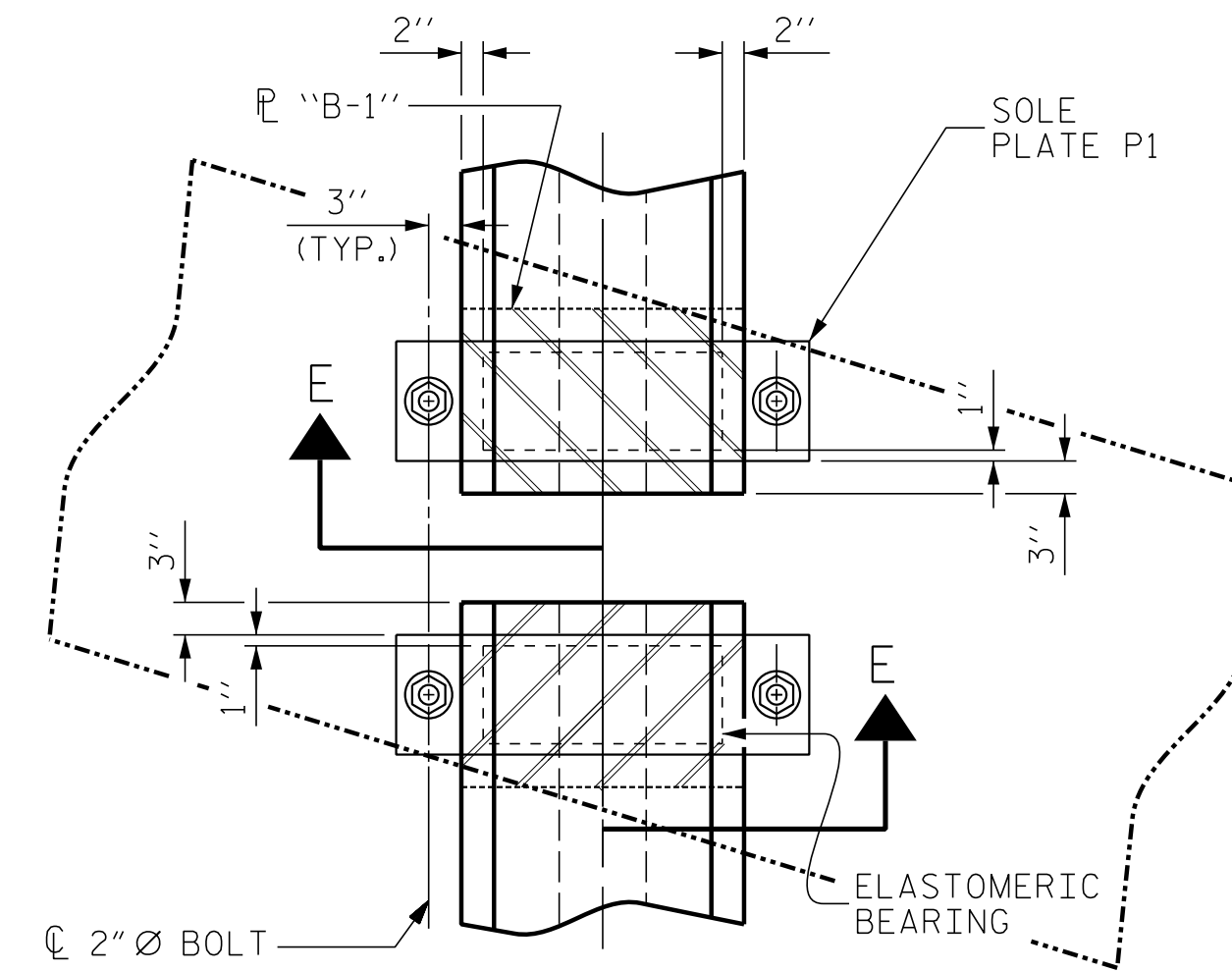
E1 ( 16 REQ'D )  
PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



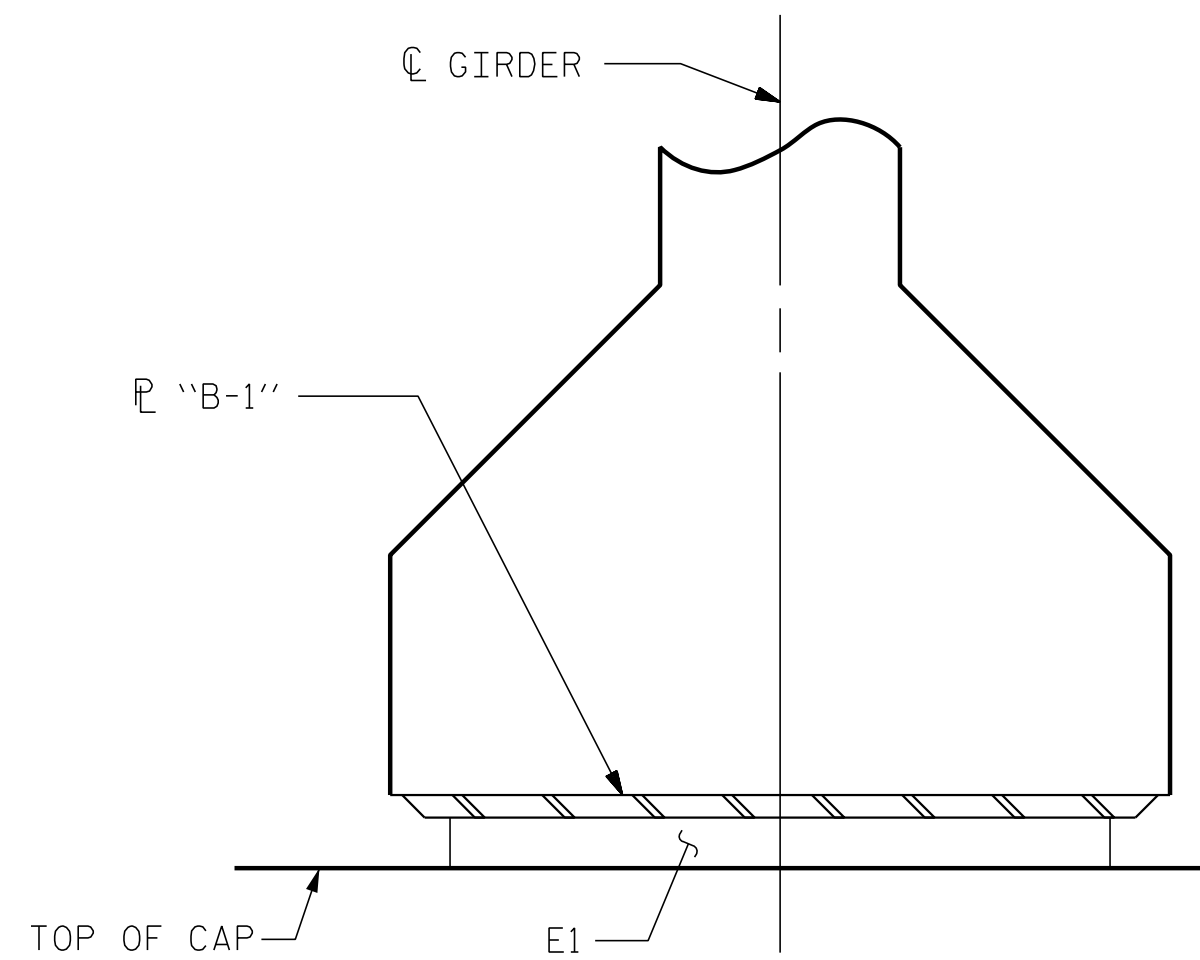
TYPICAL PLAN @ END BENT

(SHOWING INTEGRAL END BENT)

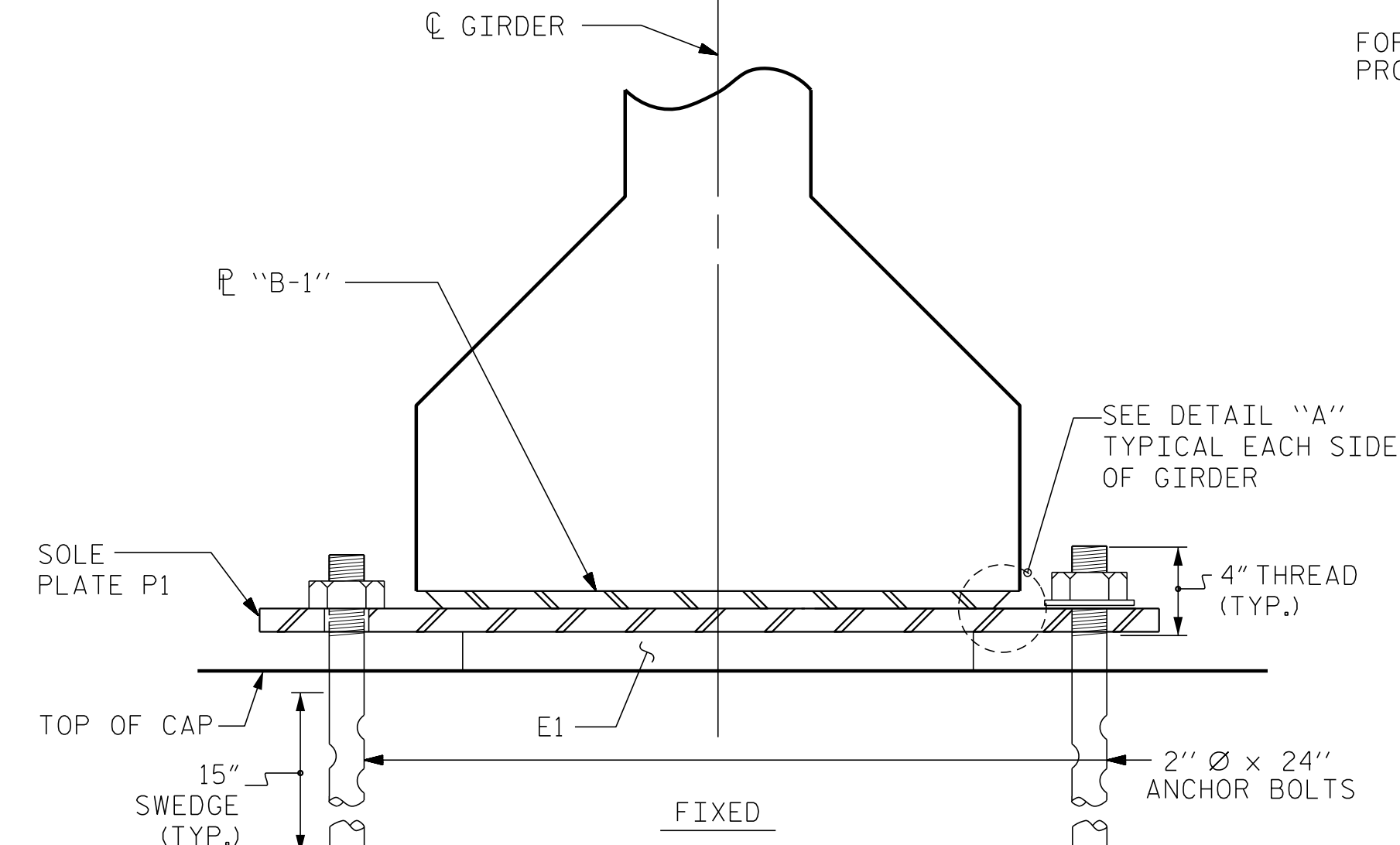


TYPICAL PLAN @ BENT

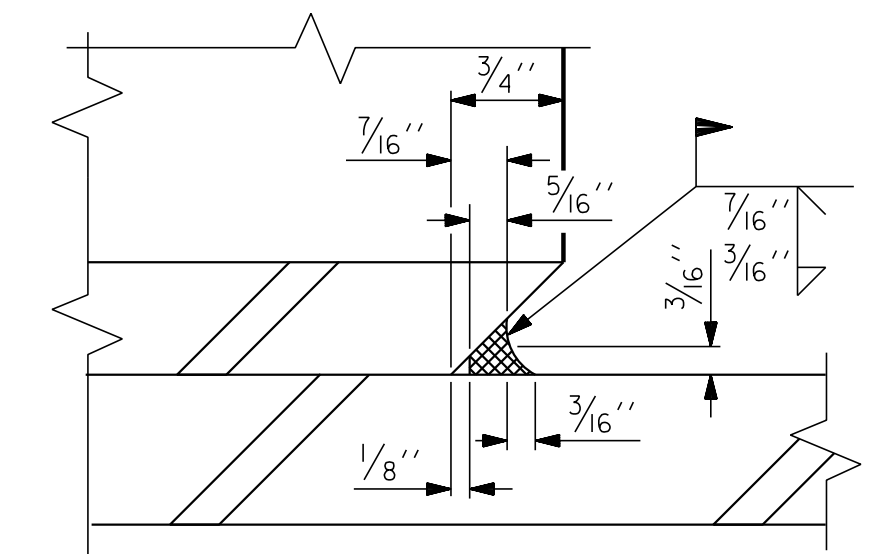
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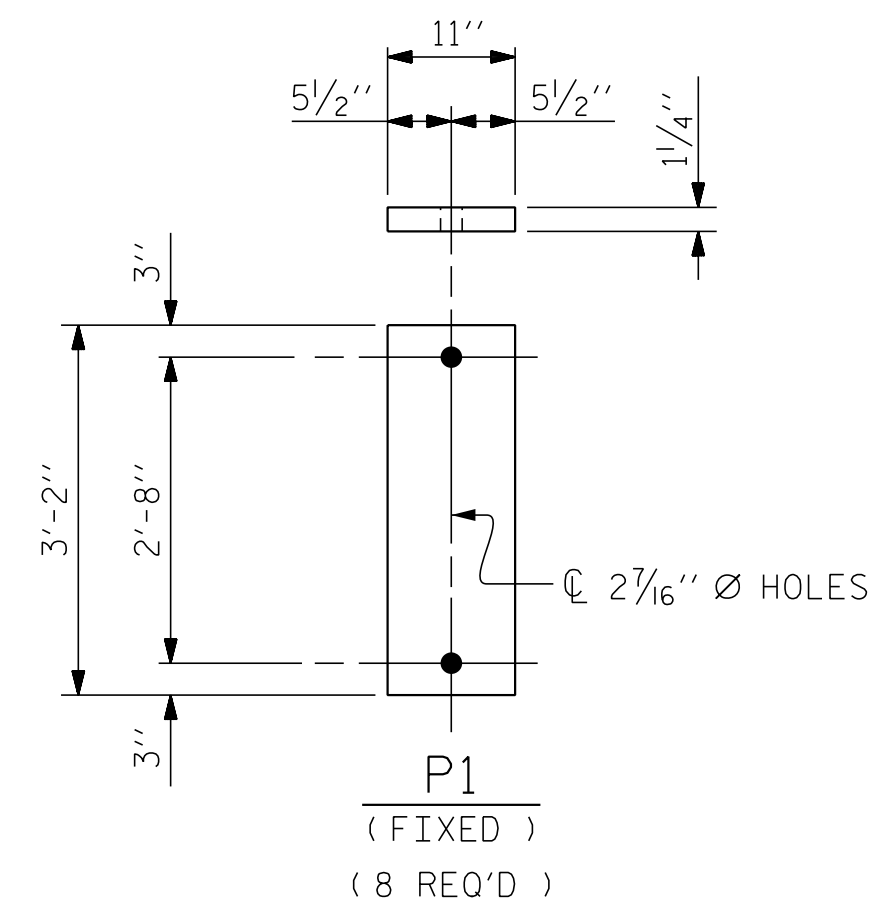
FIXED  
SECTION F-F



FIXED  
SECTION E-E



DETAIL "A"



SOLE PLATE ( P1 ) DETAIL

|                                 |       |
|---------------------------------|-------|
| MAXIMUM ALLOWABLE SERVICE LOADS |       |
| D.L.+L.L. (NO IMPACT)           |       |
| TYPE V                          | 225 k |

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 25+47.22 -Y1-

ENGINEER OF RECORD:  
  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
ELASTOMERIC  
BEARING DETAILS

REVISIONS

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

SHEET NO.

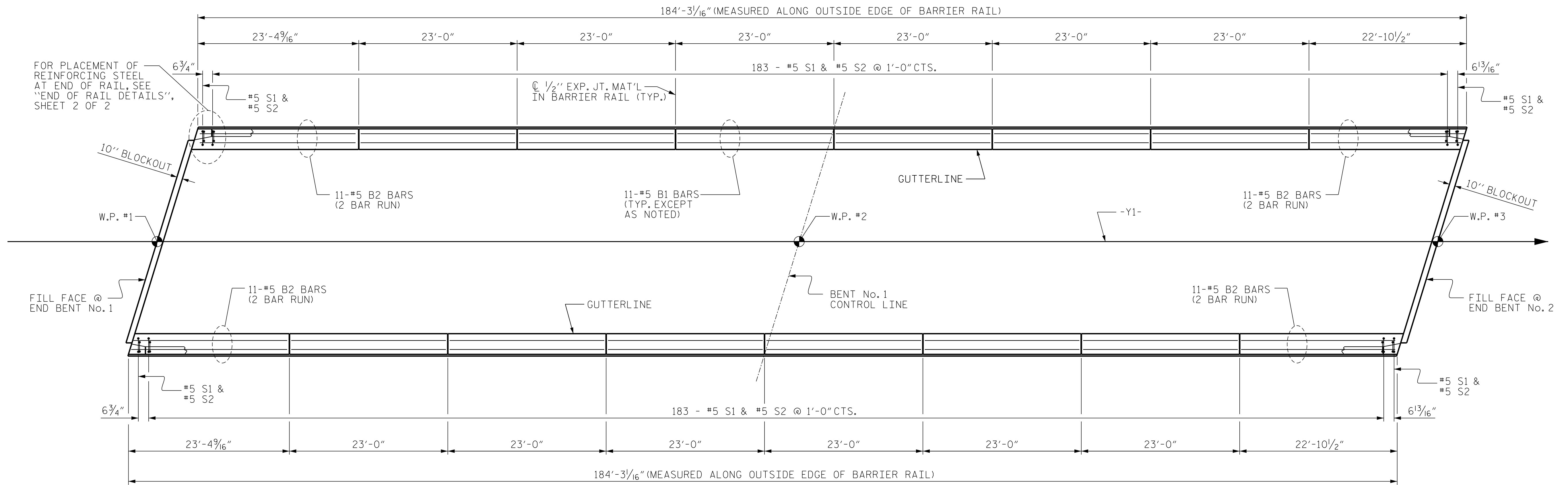
S01-14  
TOTAL SHEETS 61

DRAWN BY : G.M. GILLAND DATE : 4-16  
CHECKED BY : B.C. HUNT DATE : 10/16

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PLAN OF CONCRETE BARRIER RAIL

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-

SHEET 1 OF 2

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DRAWN BY : J. PENDERGRAFT/DAH DATE : 3-16  
 CHECKED BY : B.C. HUNT DATE : 4-16

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ENGINEER OF RECORD:  
 DocuSigned by:  
 Buck Charles  
 STATE OF NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 SEAL 14091  
 BUCK CHARLES  
 12/21/2016

**ETHERILL ENGINEERING**  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 CONCRETE  
 BARRIER RAIL

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS |
| 1         |     |       | 3   |     |       | 61           |
| 2         |     |       | 4   |     |       |              |

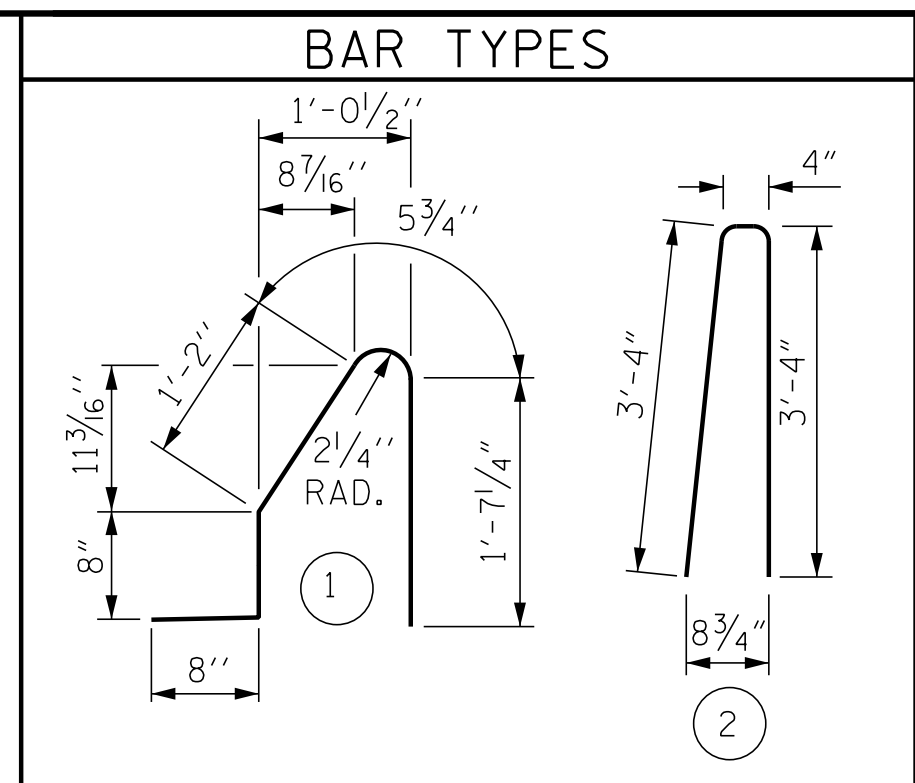
S01-15

NOTES

BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

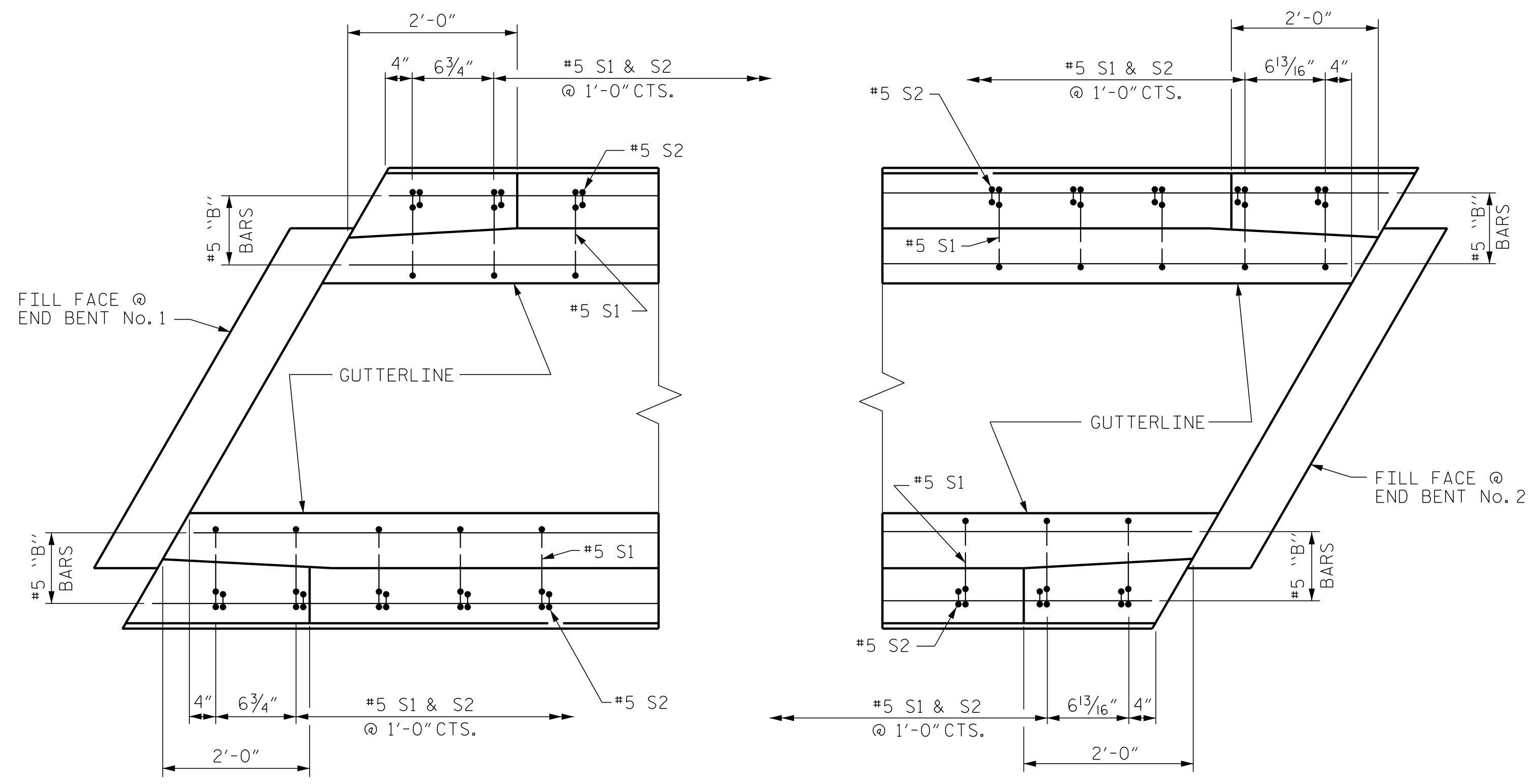


ALL BAR DIMENSIONS ARE OUT TO OUT

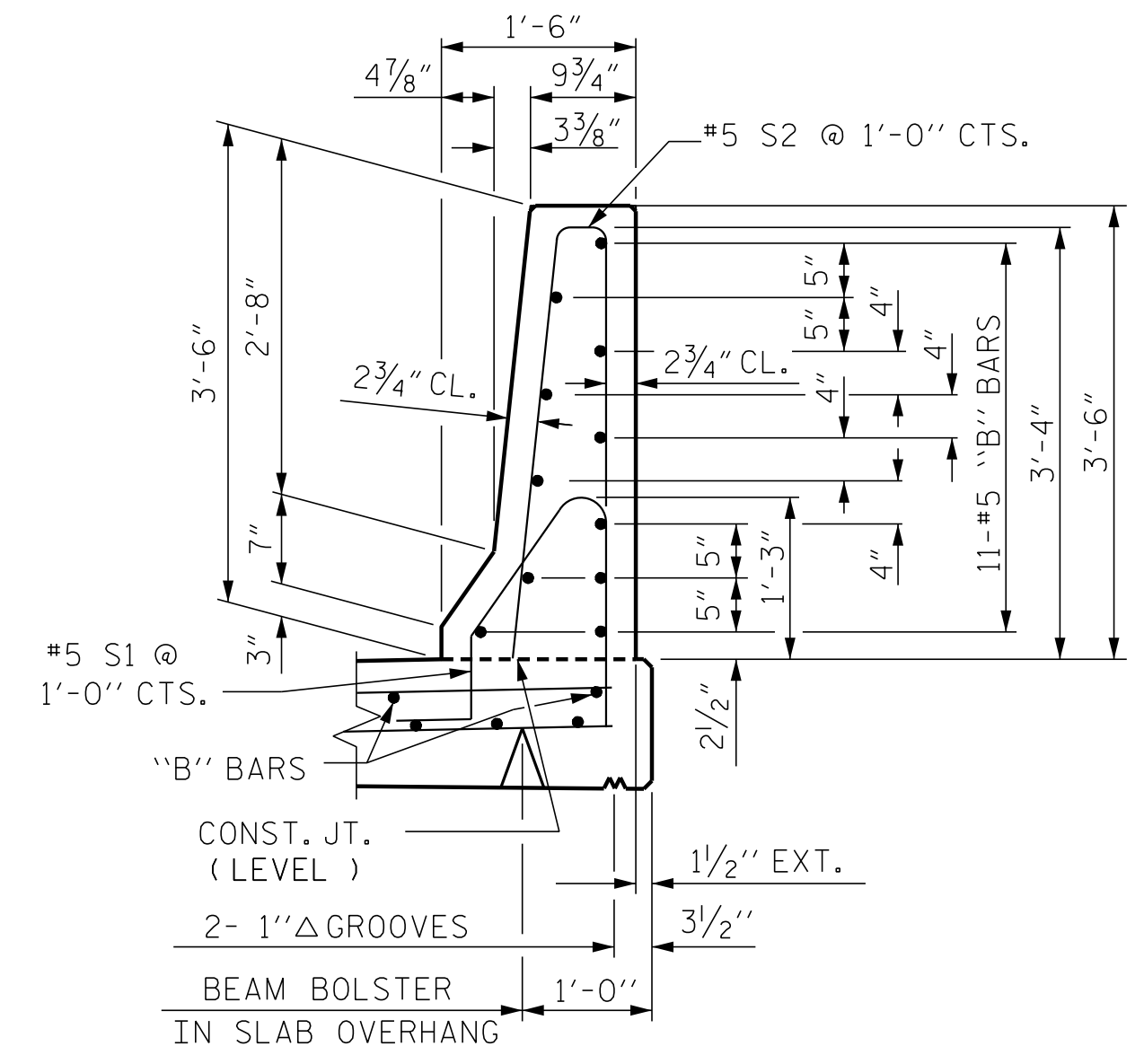
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

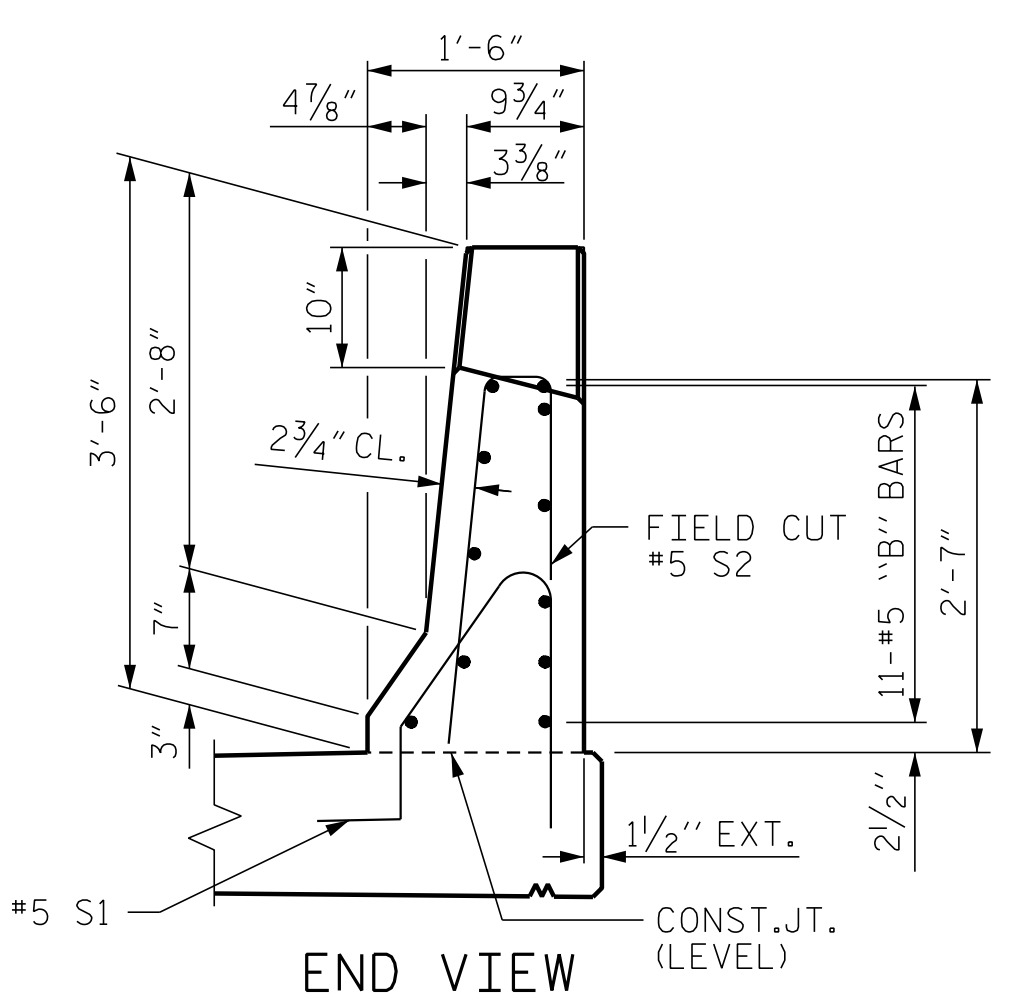
| BAR NO.                          | SIZE | TYPE   | LENGTH | WEIGHT          |
|----------------------------------|------|--------|--------|-----------------|
| * B1                             | 132  | #5 STR | 22'-7" | 3109            |
| * B2                             | 88   | #5 STR | 13'-5" | 1231            |
| * S1                             | 370  | #5 1   | 4'-7"  | 1769            |
| * S2                             | 370  | #5 2   | 7'-0"  | 2701            |
| * EPOXY COATED REINFORCING STEEL |      |        |        | 8,810 LBS.      |
| CLASS AA CONCRETE                |      |        |        | 50.1 CU. YDS.   |
| CONCRETE BARRIER RAIL            |      |        |        | 368.51 LIN. FT. |



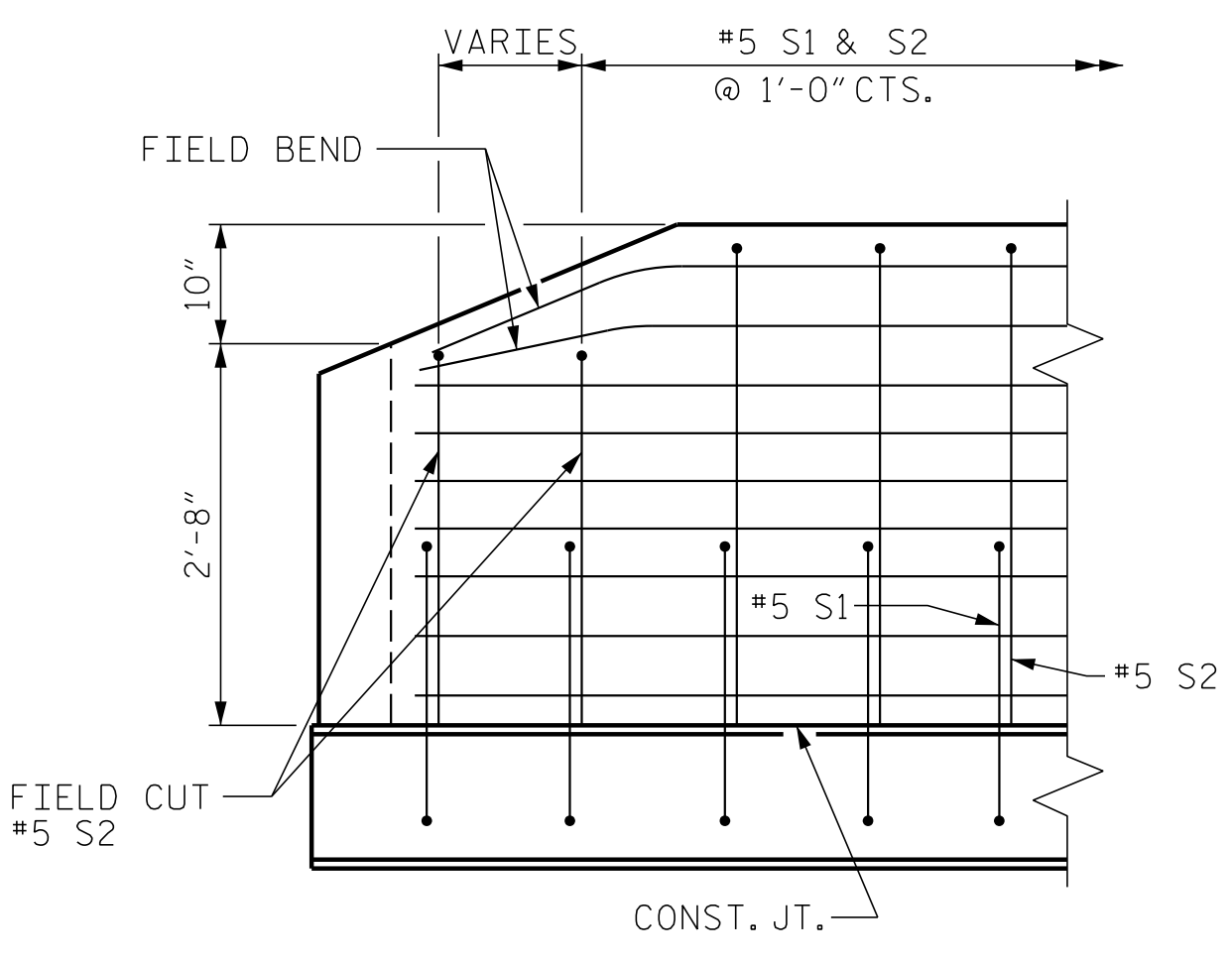
PLAN



SECTION THRU RAIL



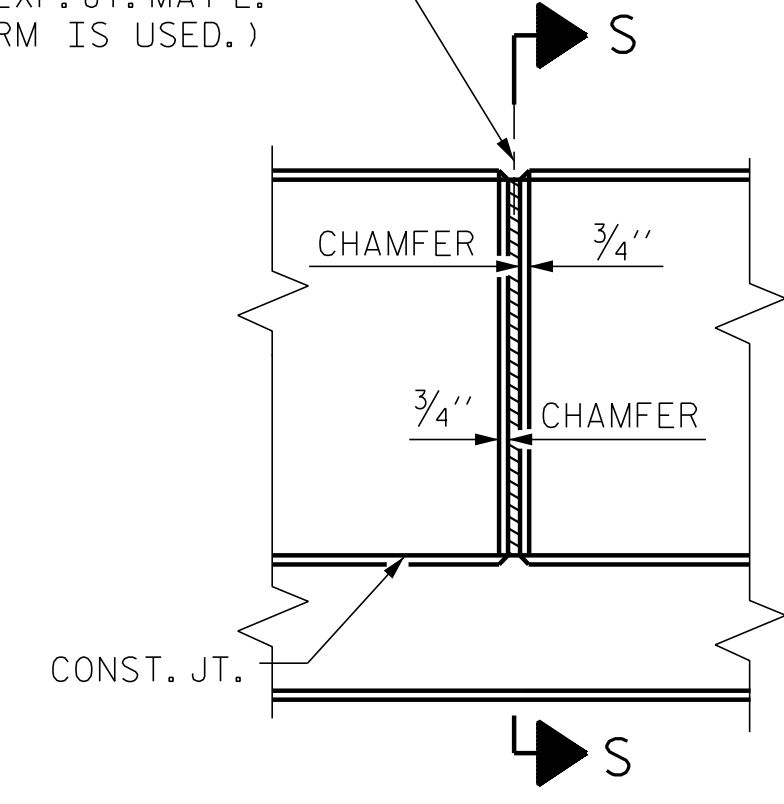
END VIEW



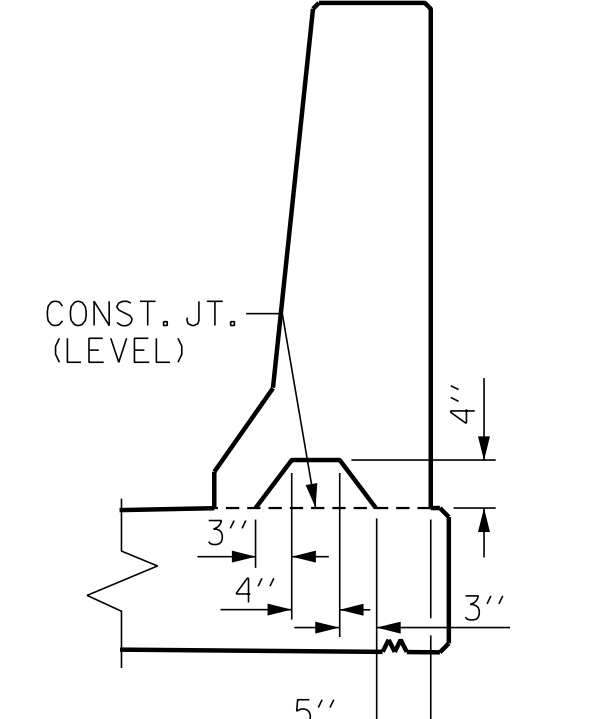
SIDE VIEW

END OF RAIL DETAILS

1/2" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS.  
(NOTE: OMIT EXP. JT. MAT'L WHEN SLIP FORM IS USED.)



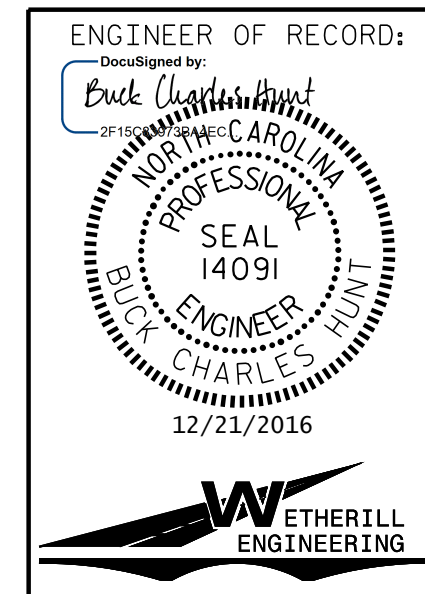
ELEVATION AT EXPANSION JOINTS  
BARRIER RAIL DETAILS



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

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 25+47.22 -Y1-

SHEET 2 OF 2



ETHERILL ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
CONCRETE BARRIER RAIL

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

TOTAL SHEETS: 61

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DRAWN BY: J. PENDERGRAFT/DAH DATE: 3-16  
CHECKED BY: B.C. HUNT DATE: 4-16

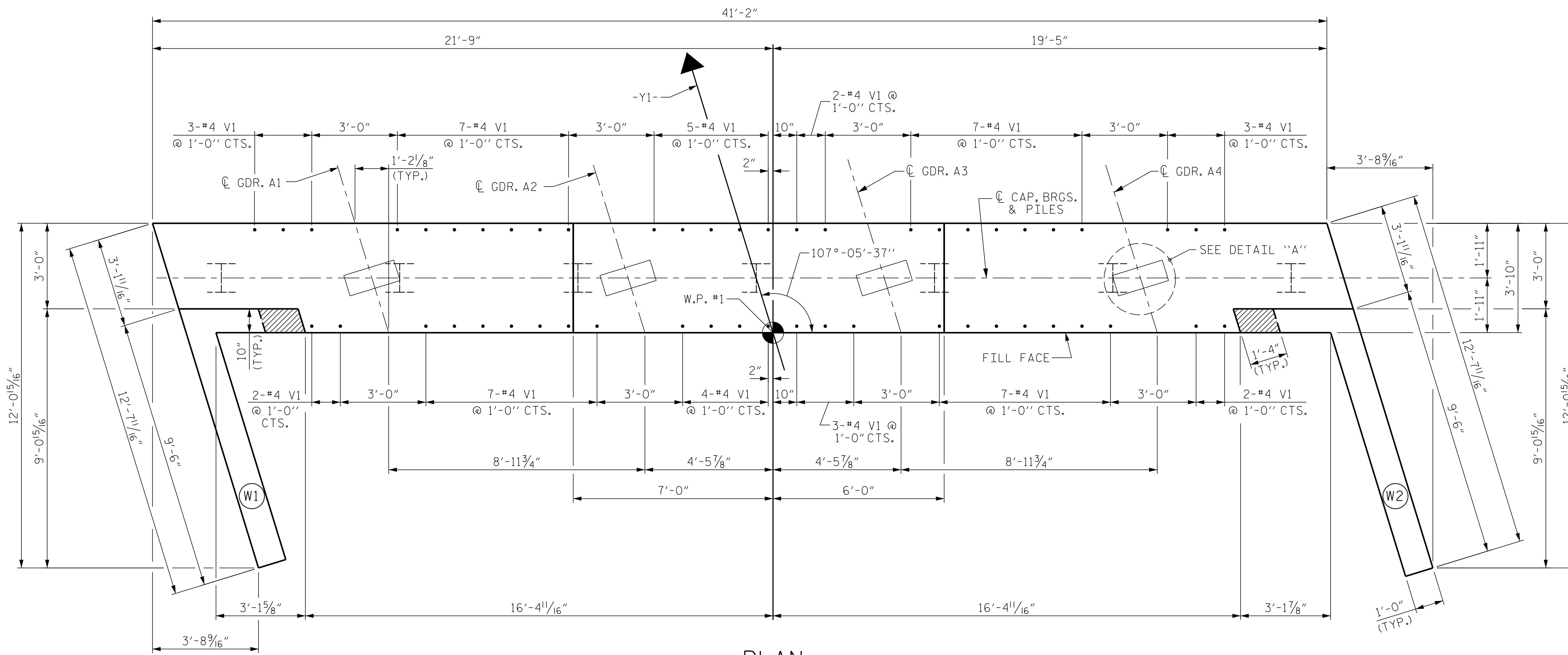
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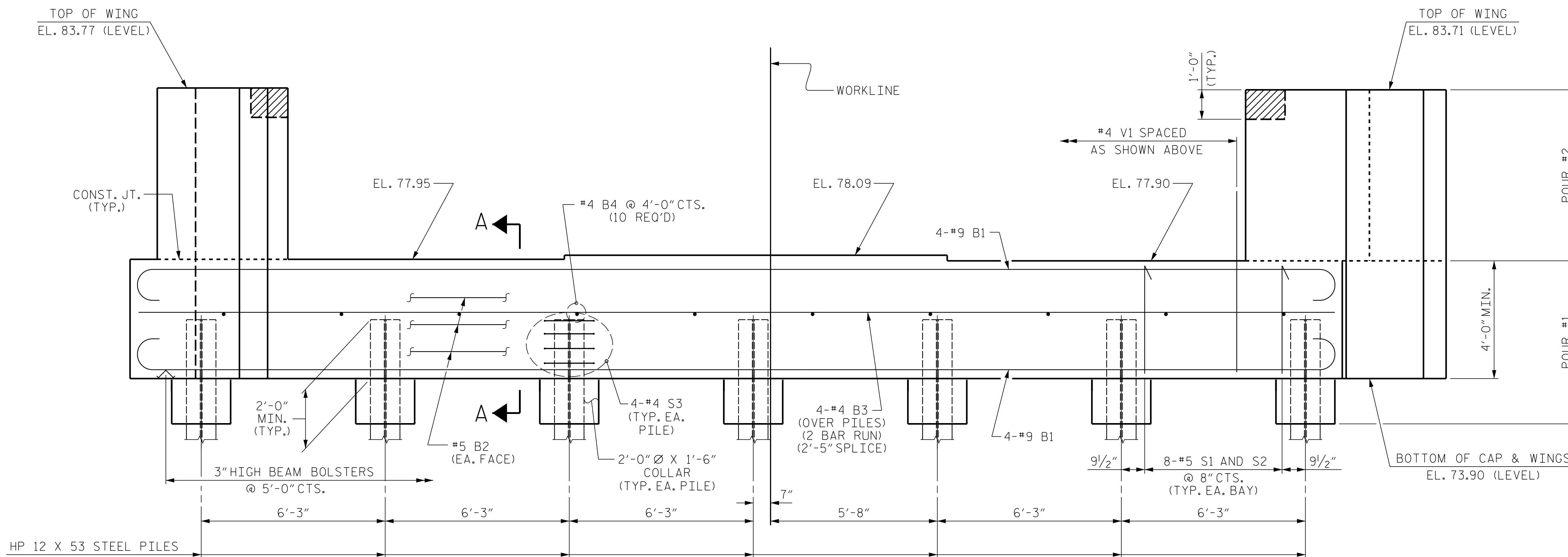








PLAN



ELEVATION

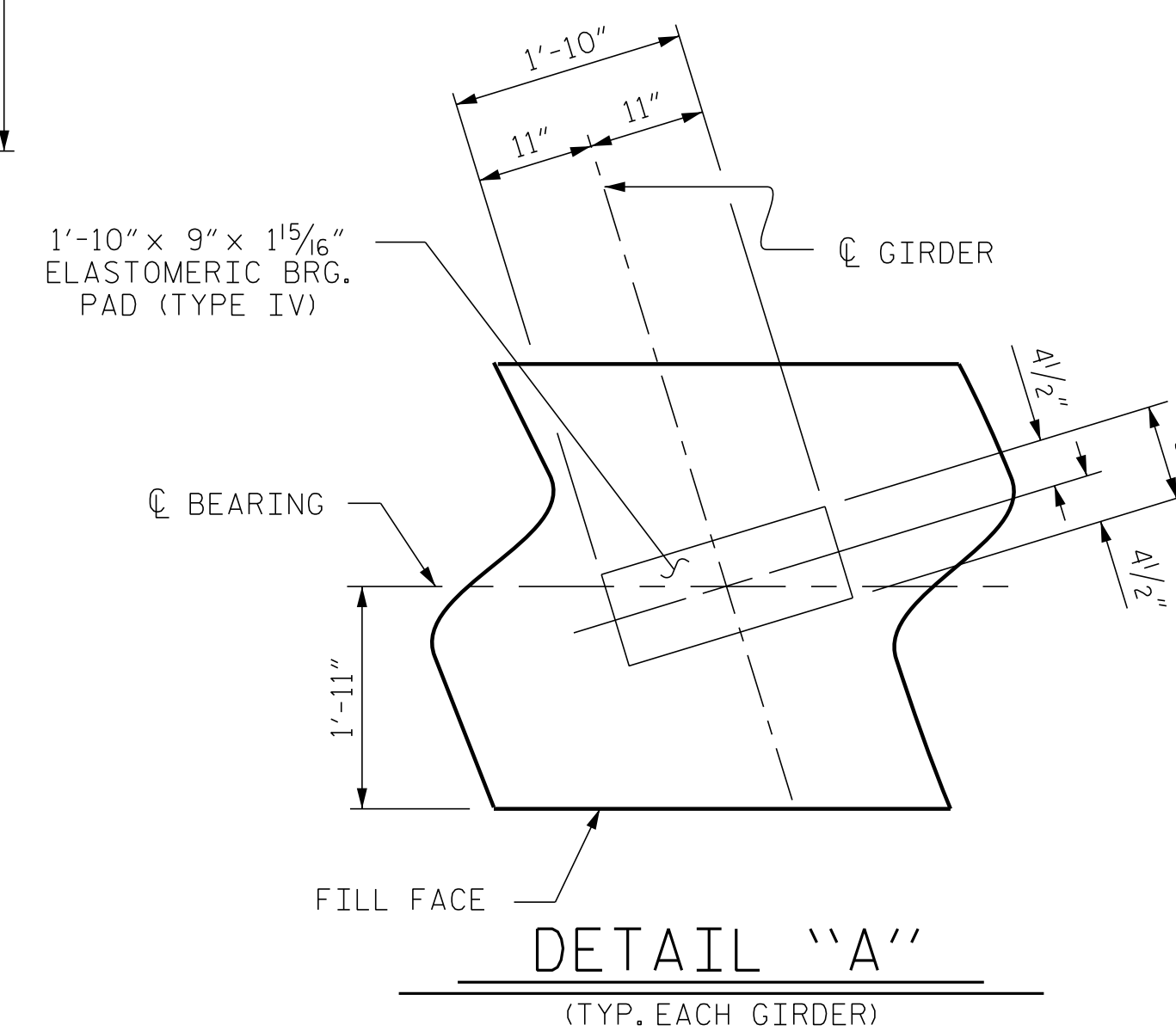
FOR SECTION A-A, SEE SHEET 3 OF 3.

NOTES

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

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA AND THE AREA OUTSIDE THE EDGE OF SUPERSTRUCTURE, SHALL BE RAKED TO A DEPTH OF 1/4".



DETAIL "A"  
(TYP. EACH GIRDER)

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 25+47.22 -Y1-

SHEET 1 OF 3

ENGINEER OF RECORD:  
 Drawn by: *Eric Clifton*  
 25 NORTH CAROLINA  
 PROFESSIONAL  
 SEAL  
 14091  
 BUCK CHARLES HUI  
 12/21/2016

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1

REVISIONS

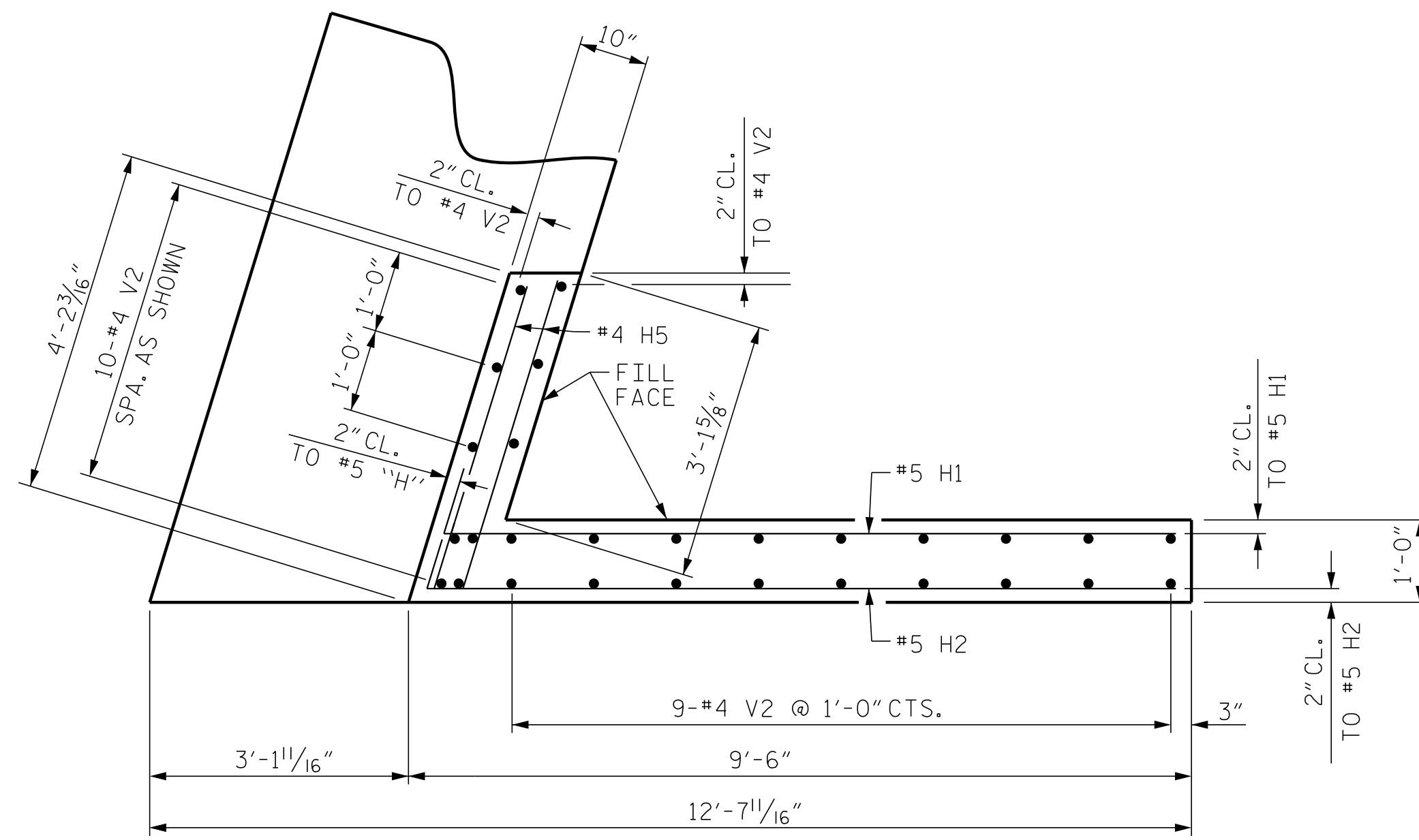
| NO. | BY: | DATE: | NO. | BY: | DATE: |
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| 2   |     |       | 4   |     |       |

SHEET NO.  
 S01-19  
 TOTAL SHEETS  
 61

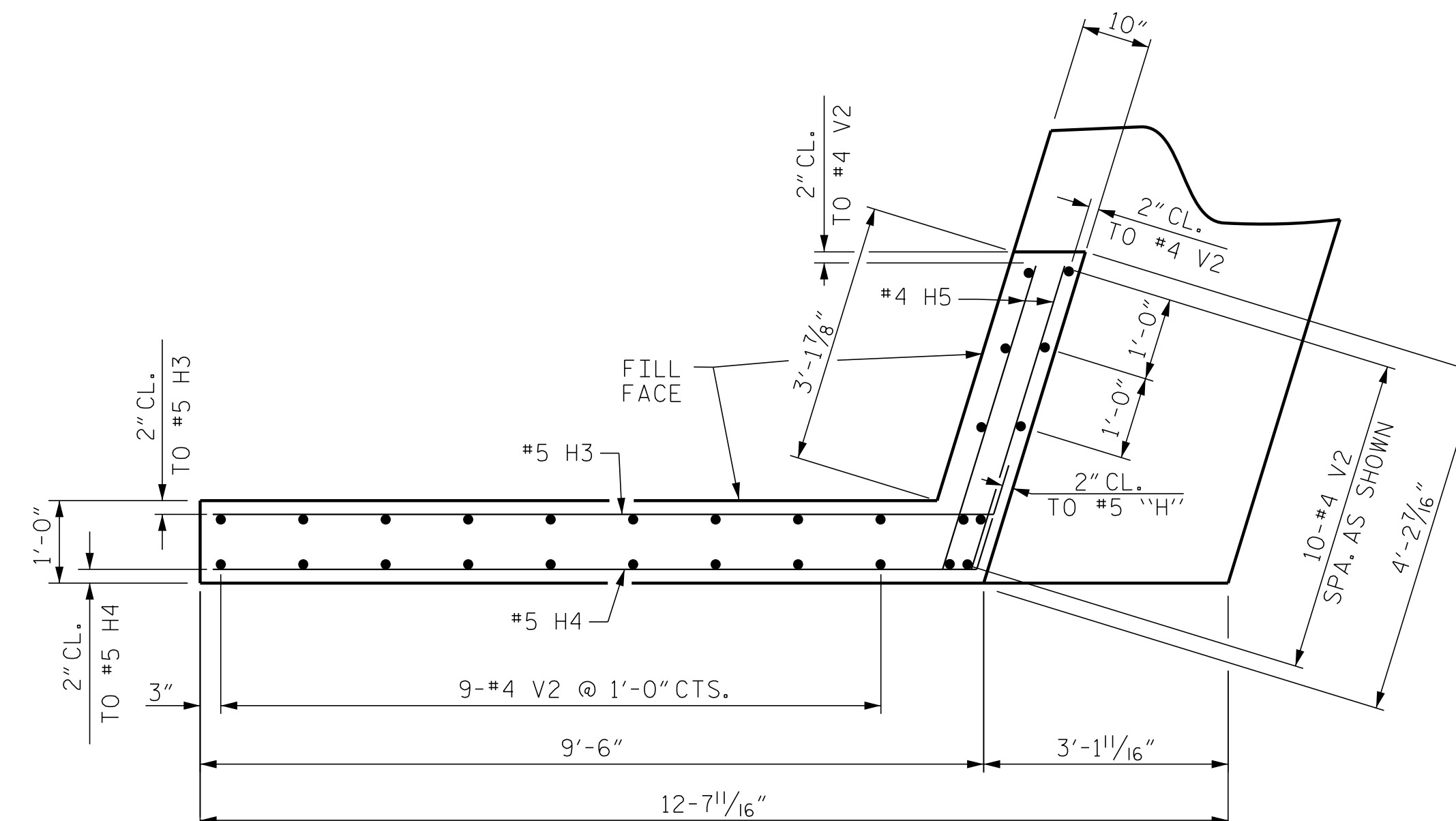
DRAWN BY: J. PENDERGRAFT DATE: 3-16  
 CHECKED BY: G.M. GILLAND/DAH DATE: 3-16

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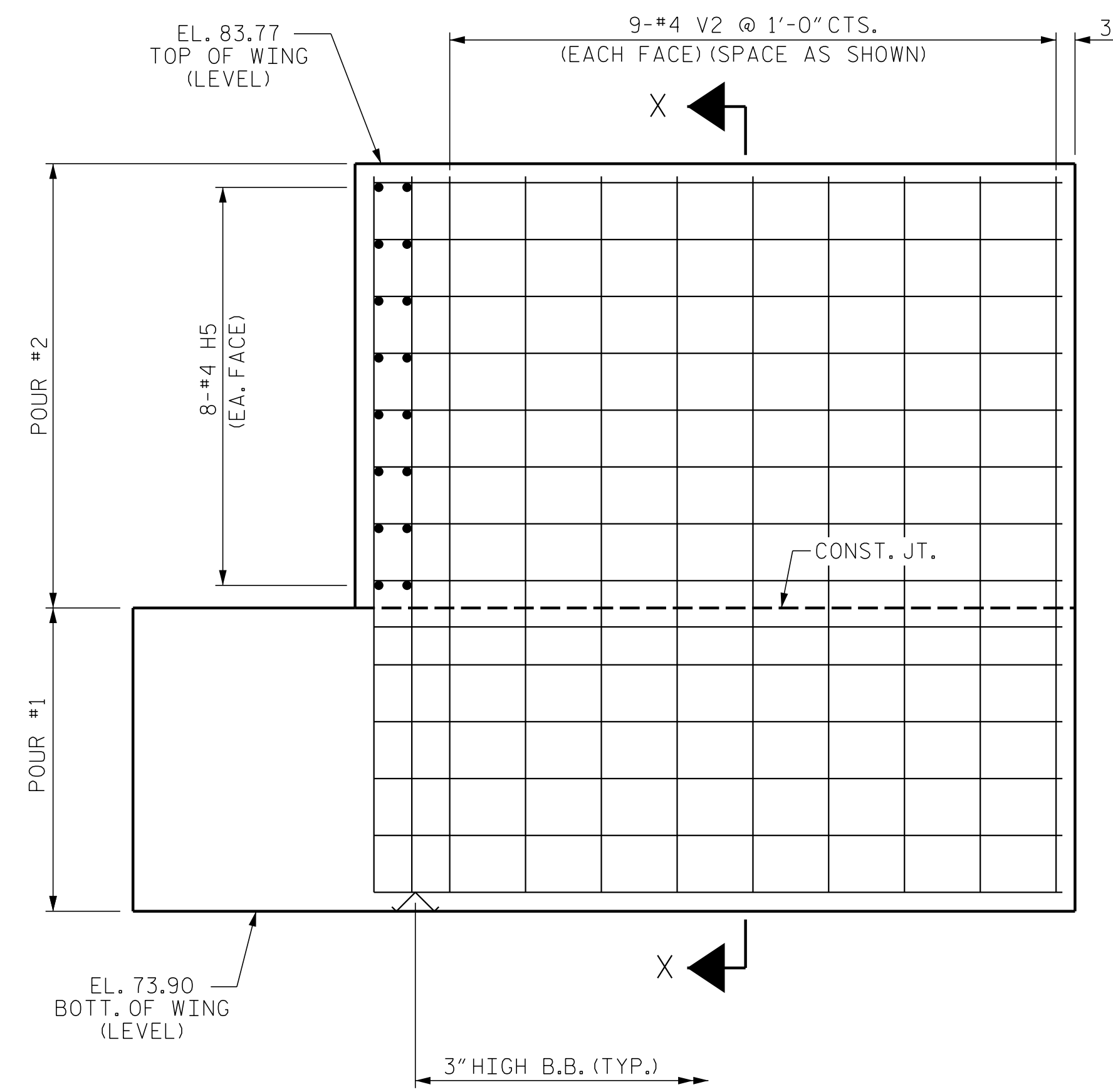
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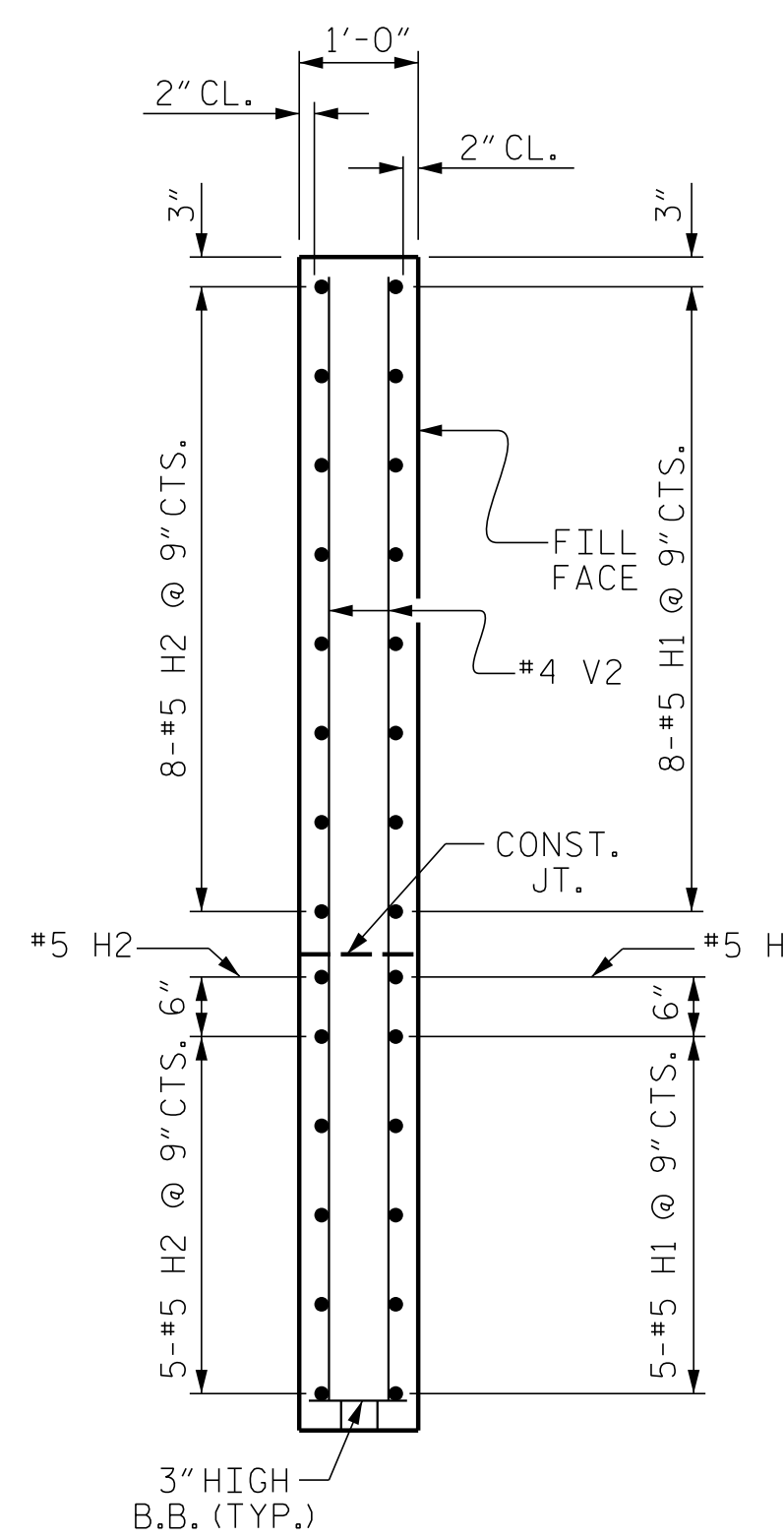
PLAN OF WING - W1



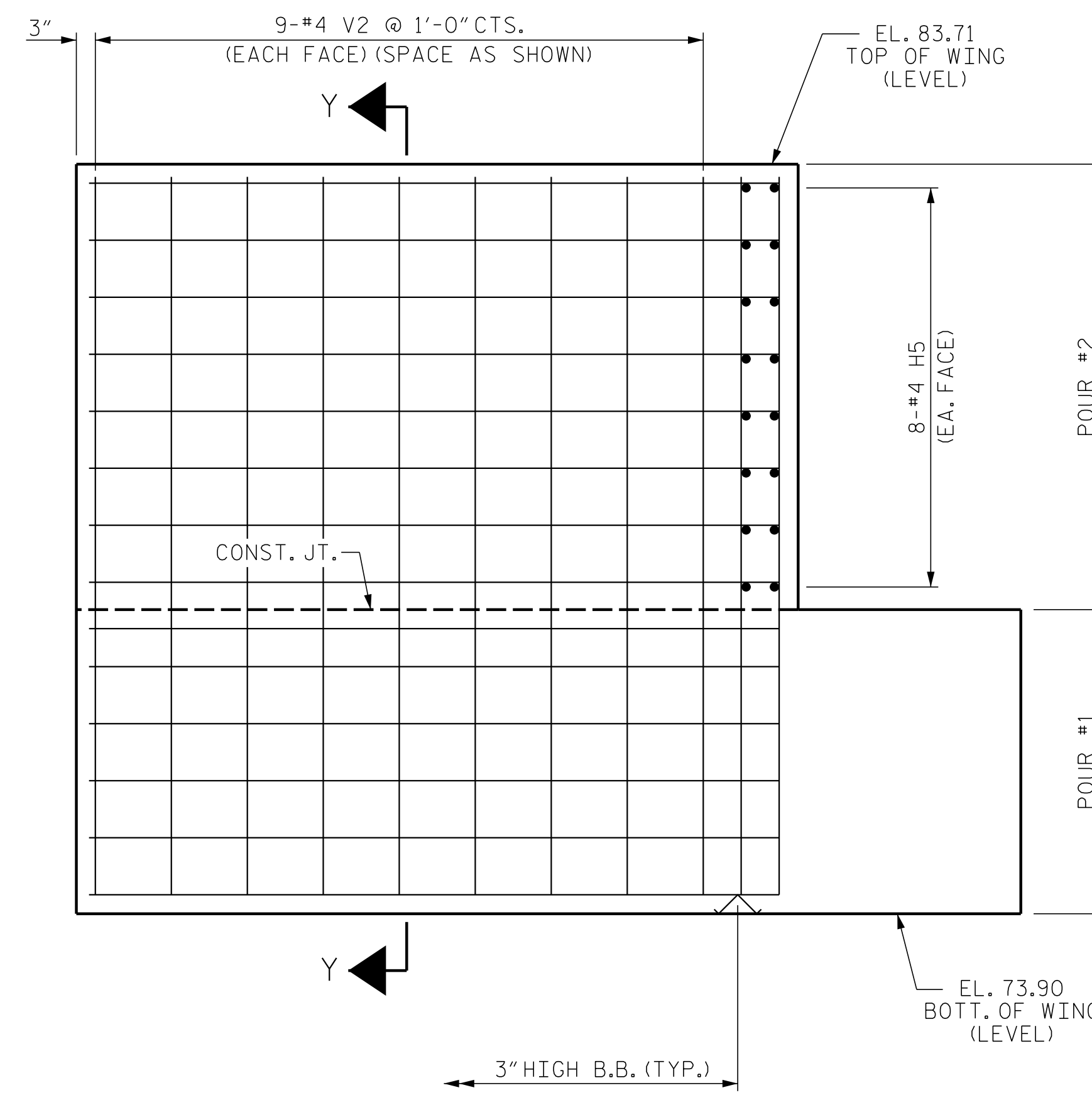
PLAN OF WING - W2



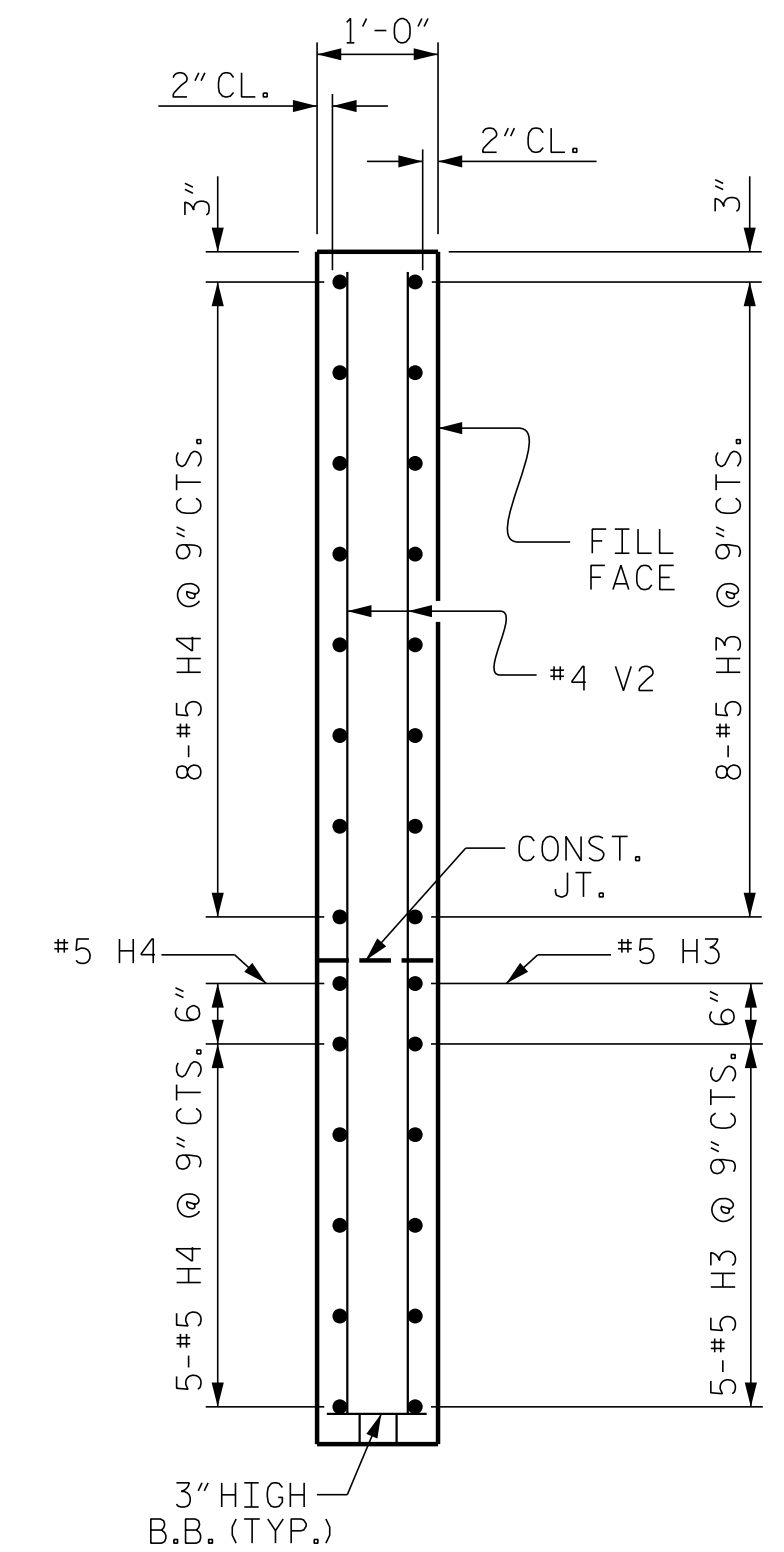
ELEVATION OF WING - W1



SECTION X-X



ELEVATION OF WING - W2



SECTION Y-Y

PROJECT NO. R-5311A  
 HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-

SHEET 2 OF 3

ENGINEER OF RECORD:  
 Buck Charles  
 27 NORTH CAROLINA  
 PROFESSIONAL  
 SEAL  
 14091  
 BUCK ENGINEER  
 CHARLES BUCK  
 12/21/2016

ETHERILL  
 ENGINEERING

1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1

REVISIONS

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

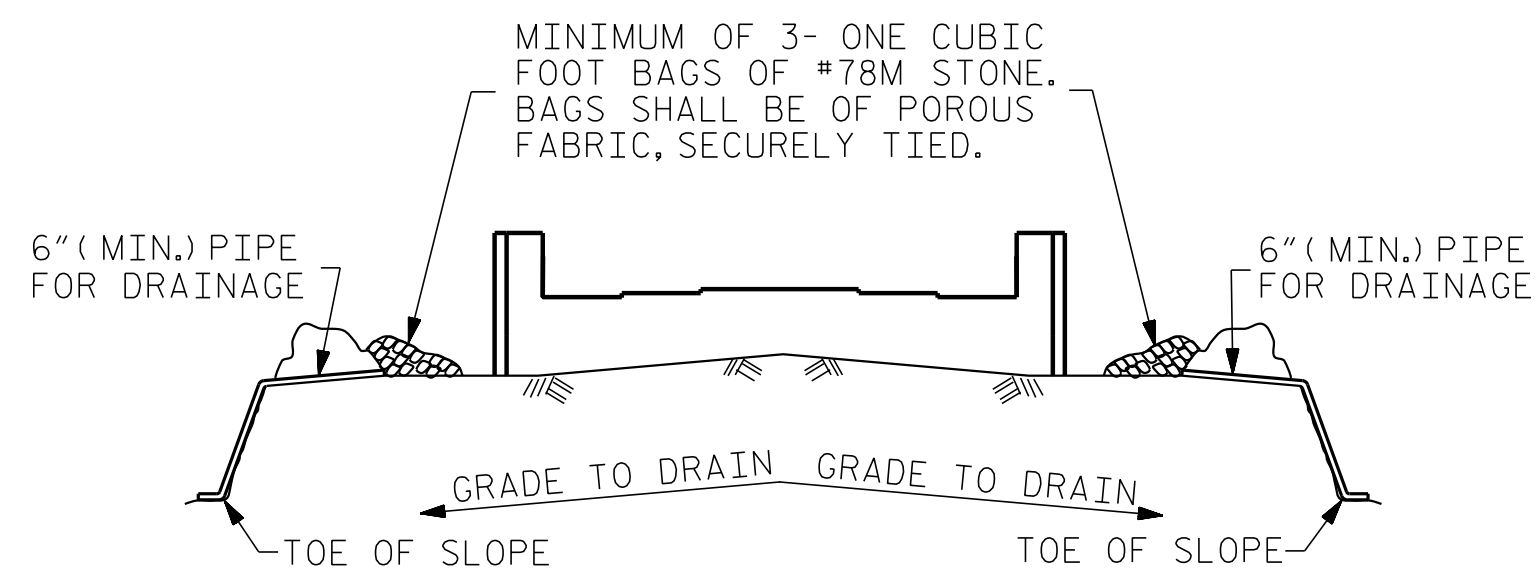
SHEET NO.  
 S01-20  
 TOTAL SHEETS  
 61

DRAWN BY: J. PENDERGRAFT DATE: 3-16  
 CHECKED BY: G.M. GILLAND/DAH DATE: 3-16

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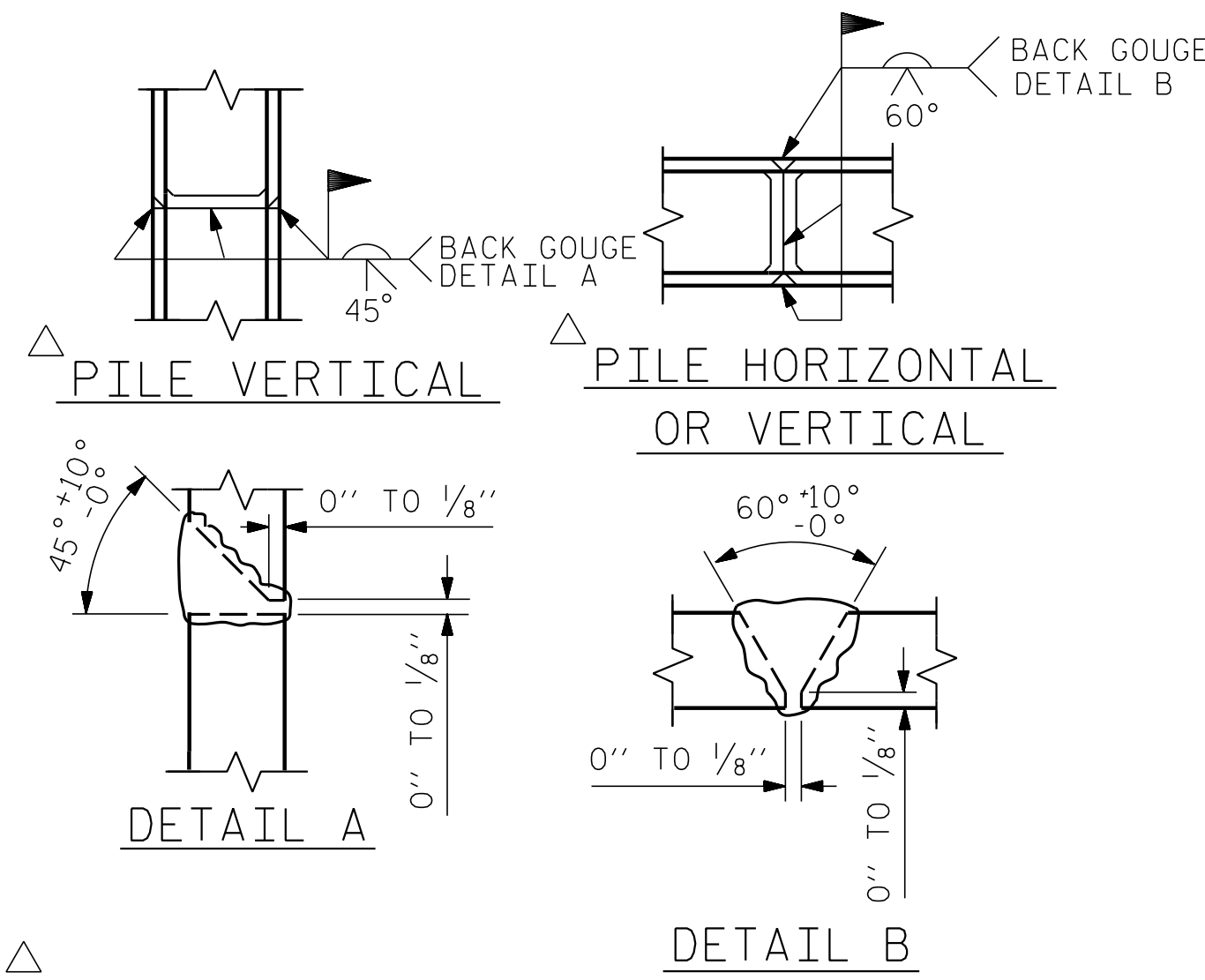


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

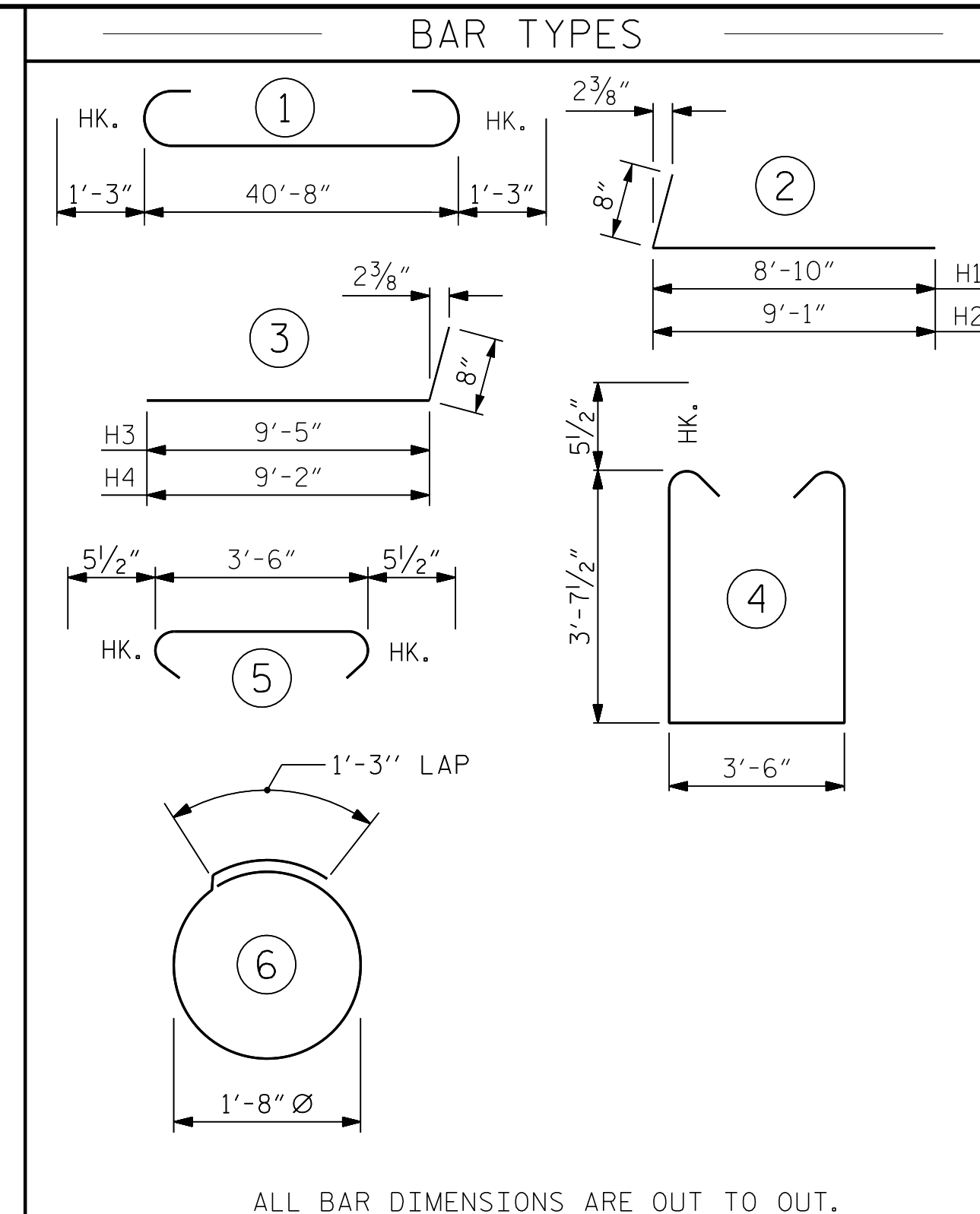
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

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

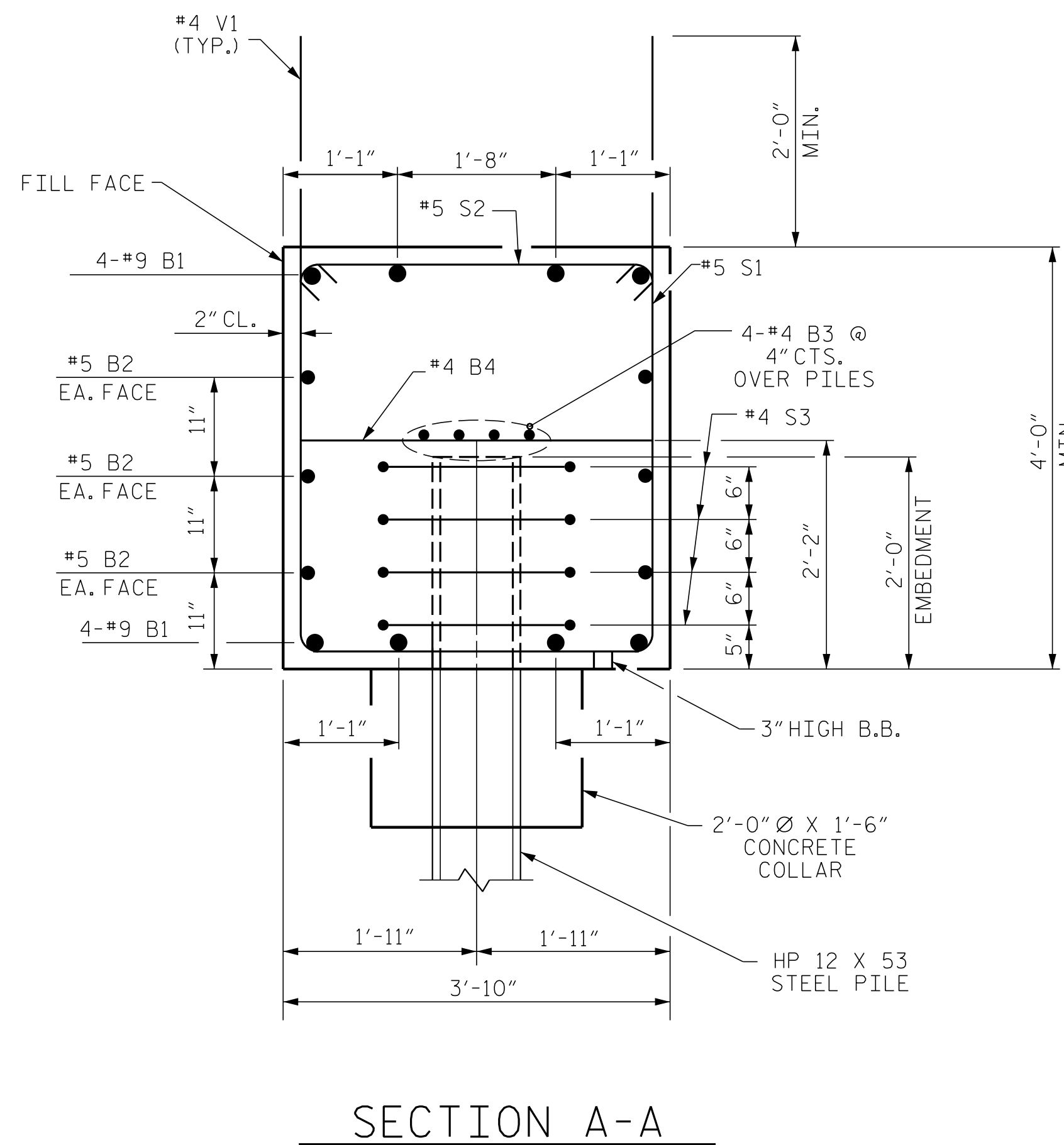
### TEMPORARY DRAINAGE AT END BENT



### PILE SPLICE DETAILS



| BILL OF MATERIAL   |  |      |      |         |               |
|--|--|------|------|---------|---------------|
| END BENT No. 1   |  |      |      |         |               |
| BAR NO.  | NO.                                      | SIZE | TYPE | LENGTH  | WEIGHT        |
| B1   | 8  | #9   | 1    | 43'-2"  | 1174          |
| B2   | 6  | #5   | STR  | 40'-10" | 256           |
| B3   | 8  | #4   | STR  | 21'-8"  | 116           |
| B4   | 10                                       | #4   | STR  | 3'-6"   | 23            |
| H1   | 14                                       | #5   | 2    | 9'-6"   | 139           |
| H2   | 14                                       | #5   | 2    | 9'-9"   | 142           |
| H3   | 14                                       | #5   | 3    | 10'-1"  | 147           |
| H4   | 14                                       | #5   | 3    | 9'-10"  | 144           |
| H5   | 32                                       | #4   | STR  | 3'-10"  | 82            |
| S1   | 48                                       | #5   | 4    | 11'-8"  | 584           |
| S2   | 48                                       | #5   | 5    | 4'-5"   | 221           |
| S3   | 28                                       | #4   | 6    | 6'-6"   | 122           |
| V1   | 52                                       | #4   | STR  | 6'-1"   | 211           |
| V2   | 56                                       | #4   | STR  | 9'-5"   | 352           |
| REINFORCING STEEL  |  |      |      |         | 3,713 LBS.    |
| CLASS A CONCRETE BREAKDOWN                               |  |      |      |         |               |
| POUR #1  | CAP, CONC, COLLARS & LOWER PART OF WINGS |      |      |         | 27.6 C.Y.     |
| POUR #2  | UPPER PART OF WINGS                      |      |      |         | 5.2 C.Y.      |
| TOTAL CLASS A CONCRETE                                   |  |      |      |         | 32.8 C.Y.     |
| HP 12 X 53 STEEL PILES                                   |  |      |      |         |               |
| NO: 7  |  |      |      |         | LIN. FT.= 609 |
| PILE REDRIVES  |  |      |      |         | 4 EA.         |
| PILE DRIVING EQUIPMENT SET UP FOR HP 12 X 53 STEEL PILES |  |      |      |         | 7 EA.         |



PROJECT NO. R-5311A  
 HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-  
 SHEET 3 OF 3

ENGINEER OF RECORD:  
 Eud...  
 NORTH CAROLINA PROFESSIONAL SEAL 14091  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

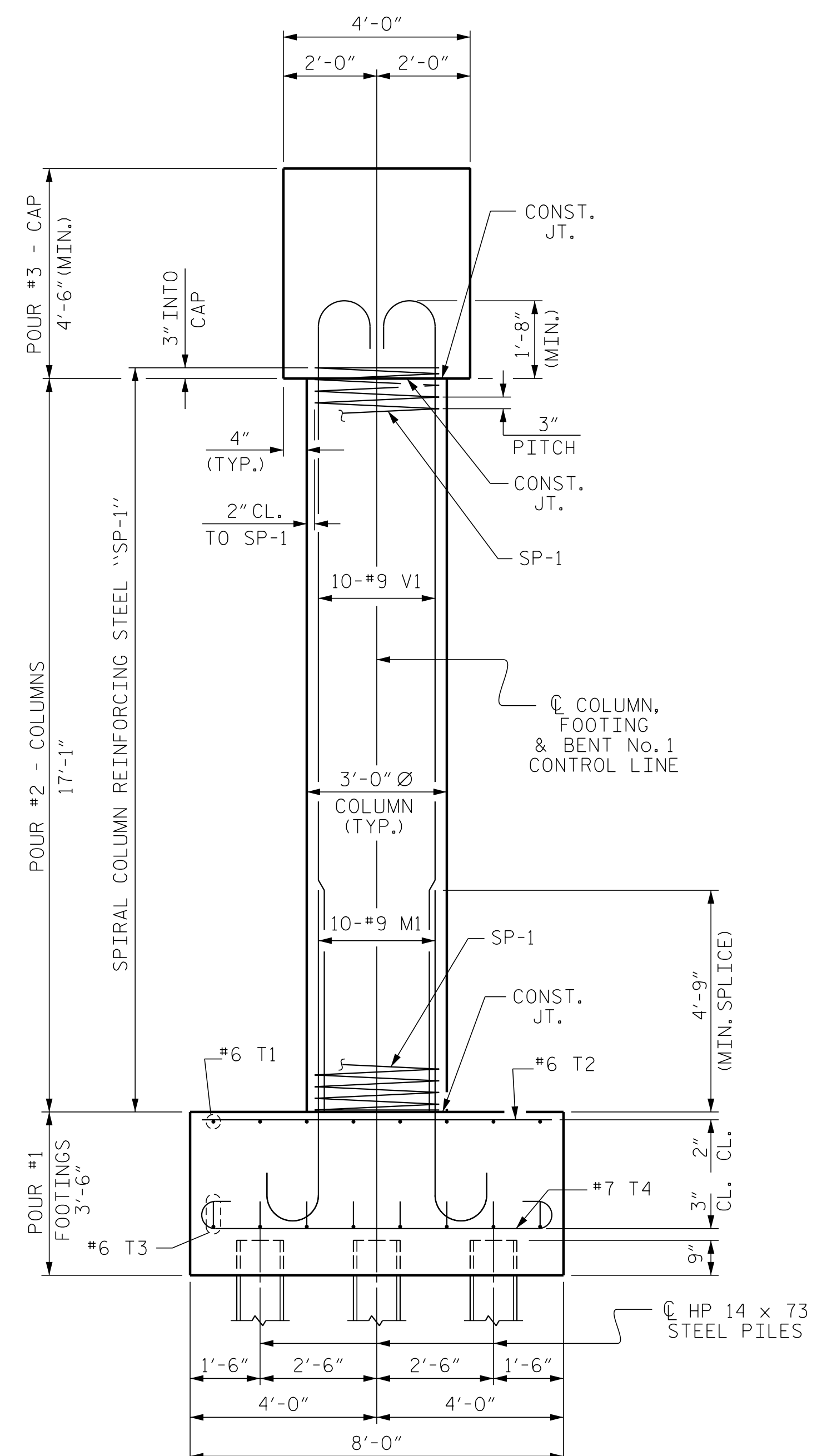
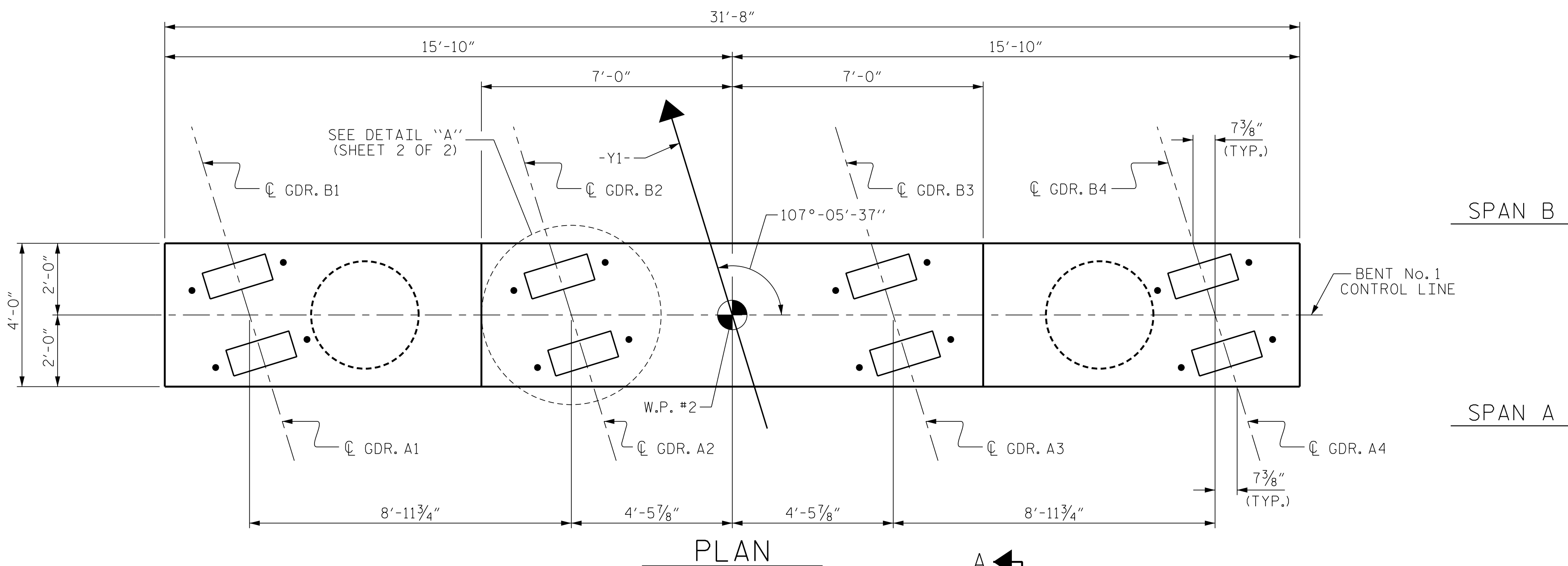
| REVISIONS |     |       |     |     |       |
|-----------|-----|-------|-----|-----|-------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |
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| 2         |     |       | 4   |     |       |

SHEET NO. S01-21  
 TOTAL SHEETS 61

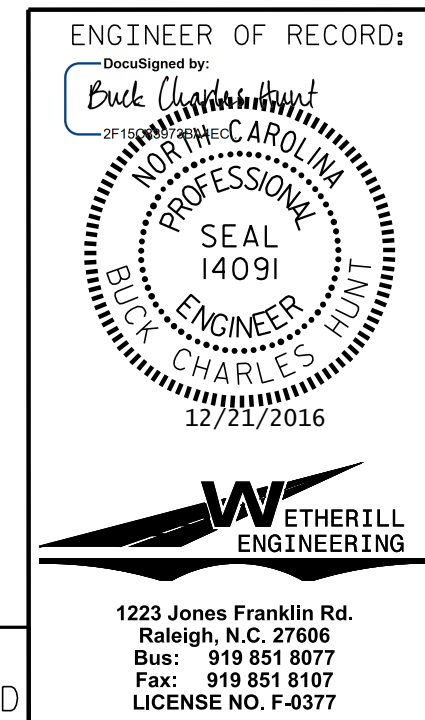
DRAWN BY: J. PENDERGRAFT DATE: 3-16  
 CHECKED BY: G.M. GILLAND/DAH DATE: 3-16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-  
 SHEET 1 OF 2



|  |     |                            |                    |
|--|-----|----------------------------|--------------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     | SUBSTRUCTURE<br>BENT No. 1 |                    |
| REVISIONS  |     |                            |                    |
| NO.  | BY: | DATE:                      | NO.                |
| 1  |     |                            | 3                  |
| 2  |     |                            | 4                  |
| SHEET NO.<br>S01-22  |     |                            | TOTAL SHEETS<br>61 |

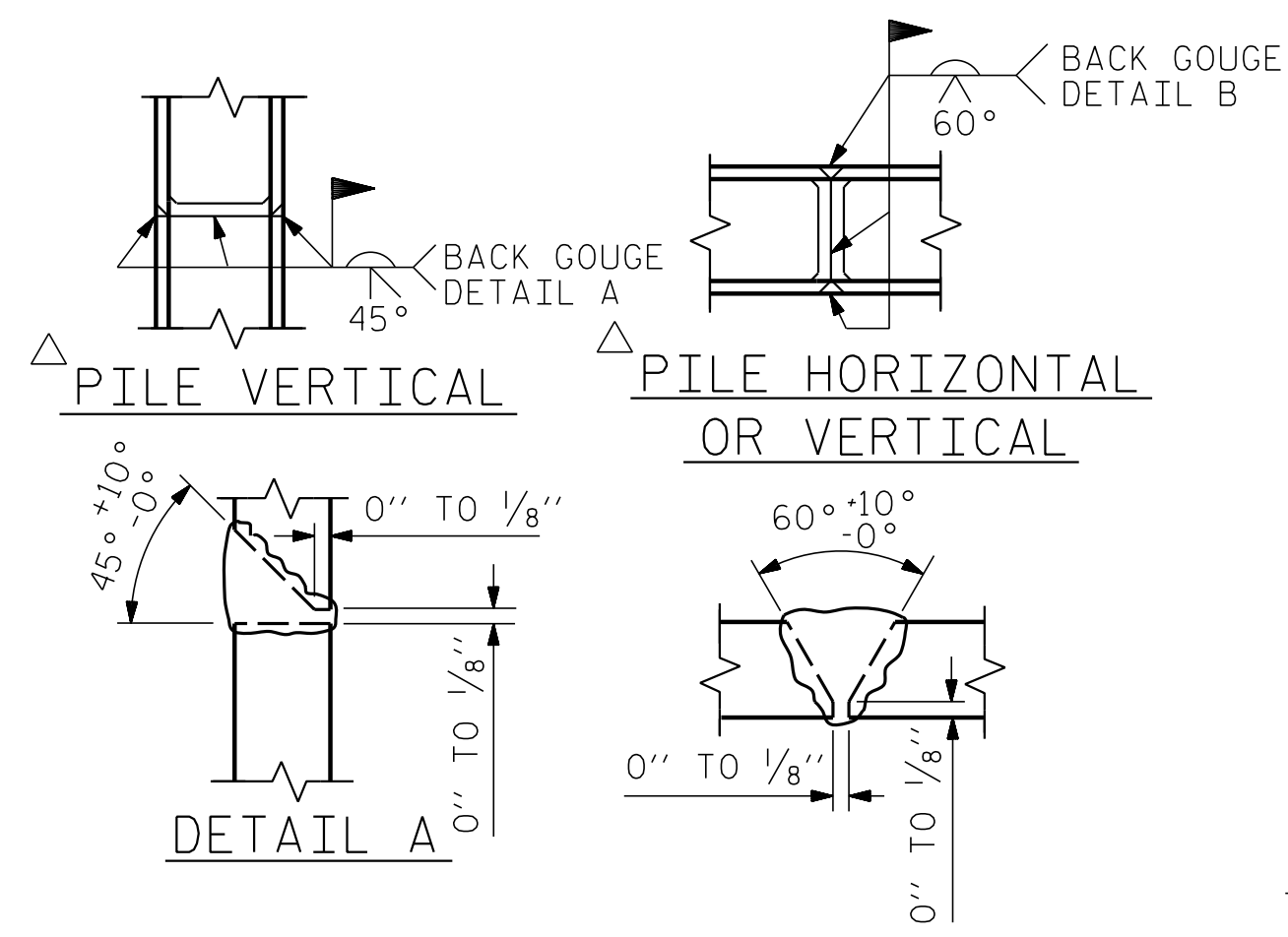
DRAWN BY: D. HODGE DATE: 7/16  
 CHECKED BY: G. GILLAND DATE: 7/16

PILE PLACEMENT, REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING AND COLUMN.

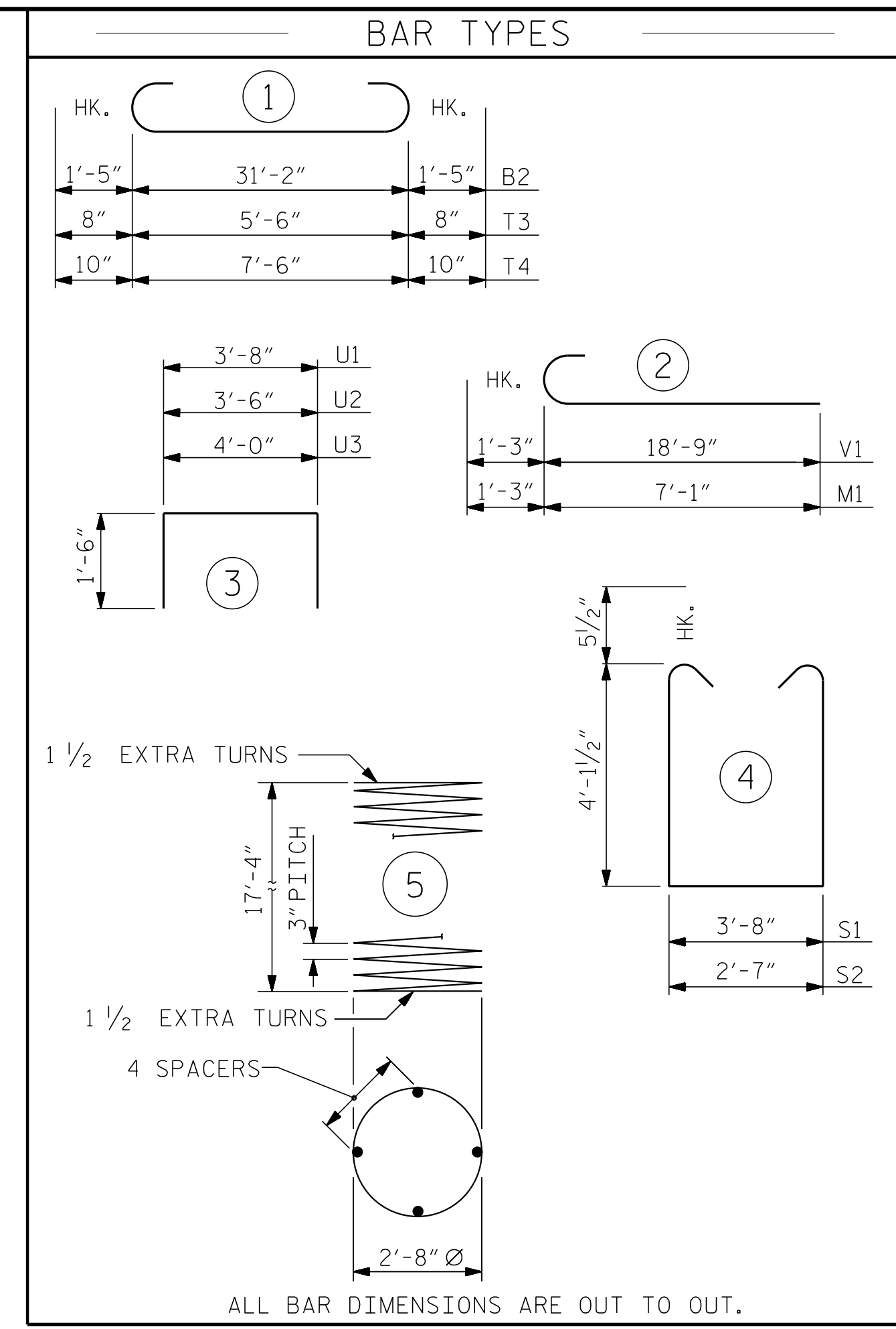
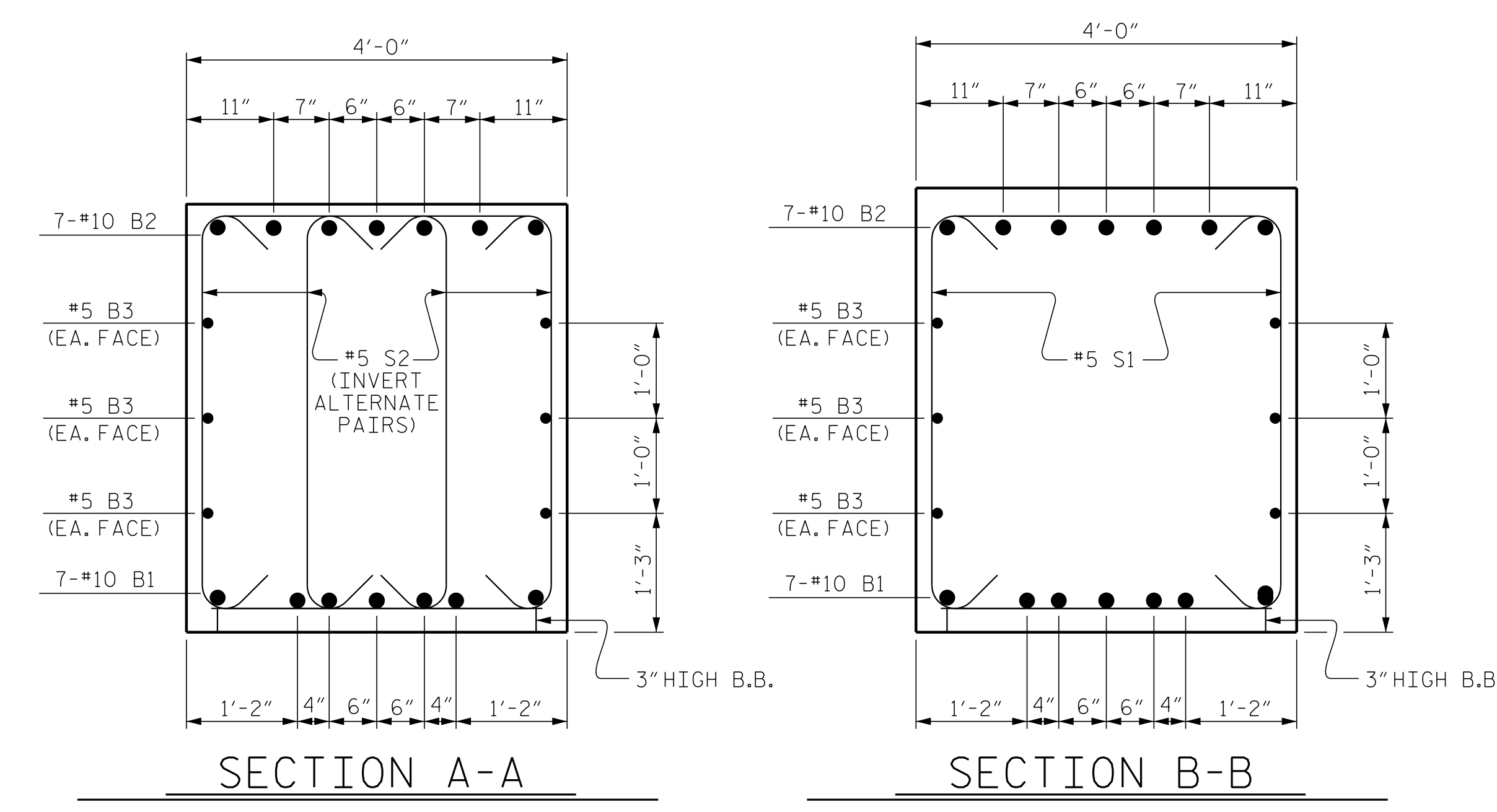
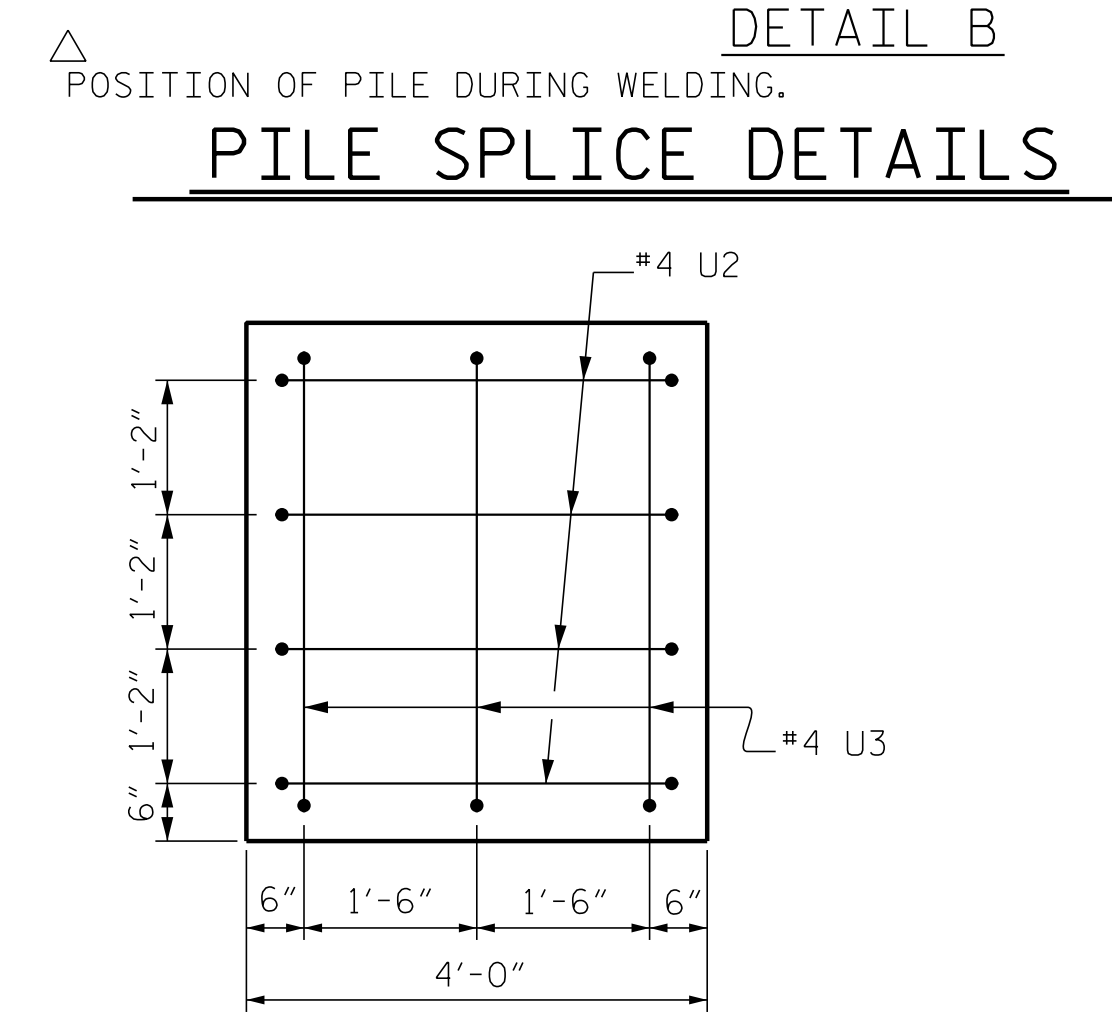
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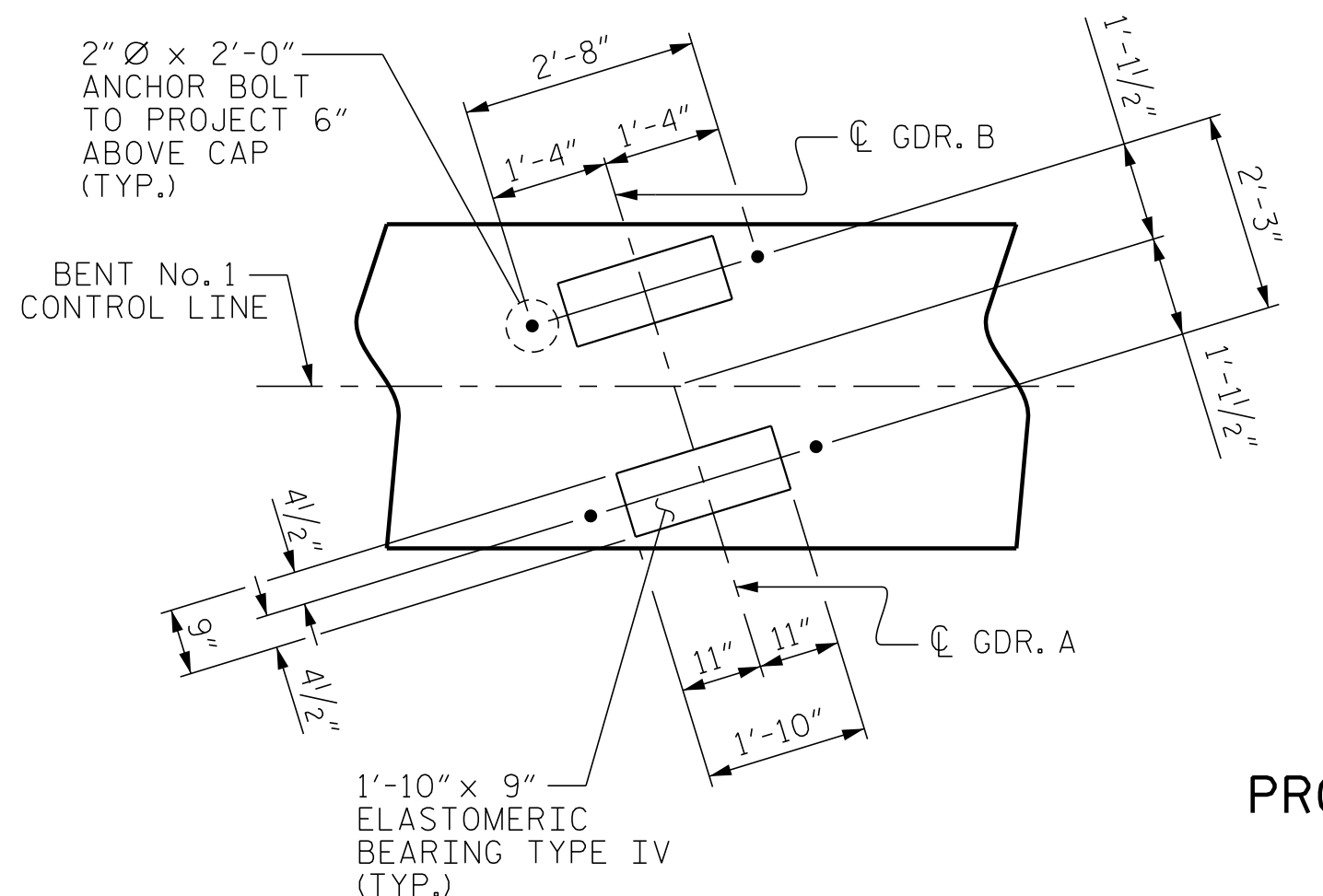
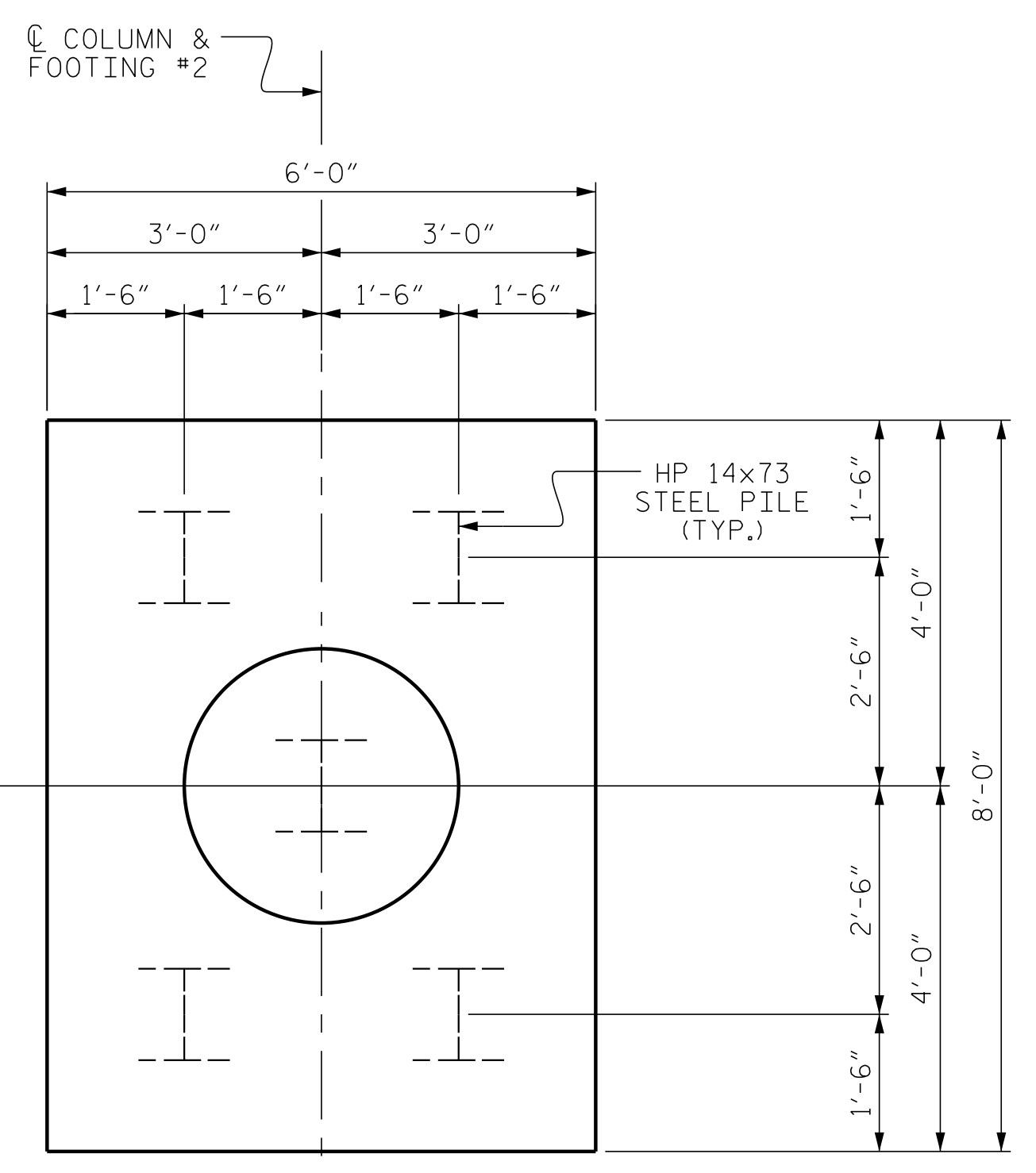
**NOTES:**  
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.  
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.



**BILL OF MATERIAL**

| BENT No. 1   |     |      |      |         |                |
|--|-----|------|------|---------|----------------|
| BAR  | NO. | SIZE | TYPE | LENGTH  | WEIGHT         |
| B1   | 7   | #10  | STR  | 31'-4"  | 944            |
| B2   | 7   | #10  | 1    | 34'-0"  | 1024           |
| B3   | 6   | #5   | STR  | 31'-4"  | 196            |
| M1   | 20  | #9   | 2    | 8'-4"   | 567            |
| S1   | 7   | #5   | 4    | 12'-10" | 94             |
| S2   | 76  | #5   | 4    | 11'-9"  | 931            |
| T1   | 16  | #6   | STR  | 5'-6"   | 132            |
| T2   | 16  | #6   | STR  | 7'-6"   | 180            |
| T3   | 16  | #6   | 1    | 6'-10"  | 164            |
| T4   | 28  | #7   | 1    | 9'-2"   | 525            |
| U1   | 32  | #4   | 3    | 6'-8"   | 143            |
| U2   | 8   | #4   | 3    | 6'-6"   | 35             |
| U3   | 6   | #4   | 3    | 7'-0"   | 28             |
| V1   | 20  | #9   | 2    | 20'-0"  | 1360           |
| REINFORCING STEEL  |     |      |      |         | 6,323 LBS.     |
| SP-1   | 2   | **   | 5    | 598'-2" | 799            |
| SPIRAL COLUMN REINFORCING STEEL                          |     |      |      |         | 799 LBS.       |
| CLASS A CONCRETE BREAKDOWN                               |     |      |      |         |                |
| POUR #1 FOOTINGS   |     |      |      |         | 12.4 C.Y.      |
| POUR #2 COLUMNS  |     |      |      |         | 8.9 C.Y.       |
| POUR #3 CAP  |     |      |      |         | 21.5 C.Y.      |
| TOTAL CLASS A CONCRETE                                   |     |      |      |         | 42.8 C.Y.      |
| HP 14 X 73 STEEL PILES                                   |     |      |      |         |                |
| NO: 10   |     |      |      |         | LIN. FT. = 708 |
| PILE REDRIVES  |     |      |      |         | 5 EA.          |
| FOUNDATION EXCAVATION                                    |     |      |      |         | LUMP SUM       |
| PILE DRIVING EQUIPMENT SET UP FOR HP 14 X 73 STEEL PILES |     |      |      |         | 10 EA.         |

\* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.



PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 25+47.22 -Y1-  
SHEET 2 OF 2

**PLAN OF FOOTINGS AND COLUMNS**  
PILE PLACEMENT, REINFORCING STEEL, DIMENSIONS AND DETAILS ARE TYPICAL FOR EACH COLUMN AND FOOTING.

DRAWN BY: D. HODGE DATE: 7/16  
CHECKED BY: G. GILLAND DATE: 7/16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:  
Eud...  
NORTH CAROLINA PROFESSIONAL ENGINEER  
SEAL 14091  
B...  
4/5/2017

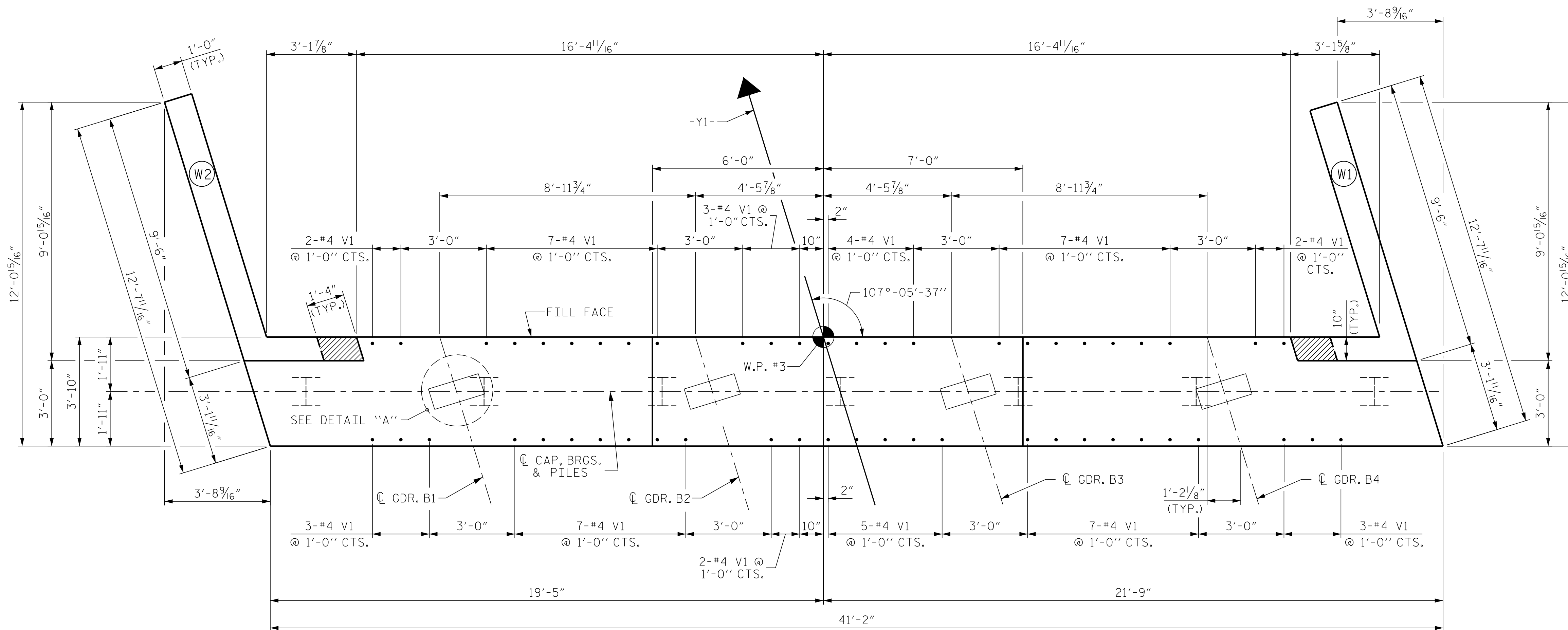
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SUBSTRUCTURE BENT No. 1**

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

SHEET NO. S01-23  
TOTAL SHEETS 61

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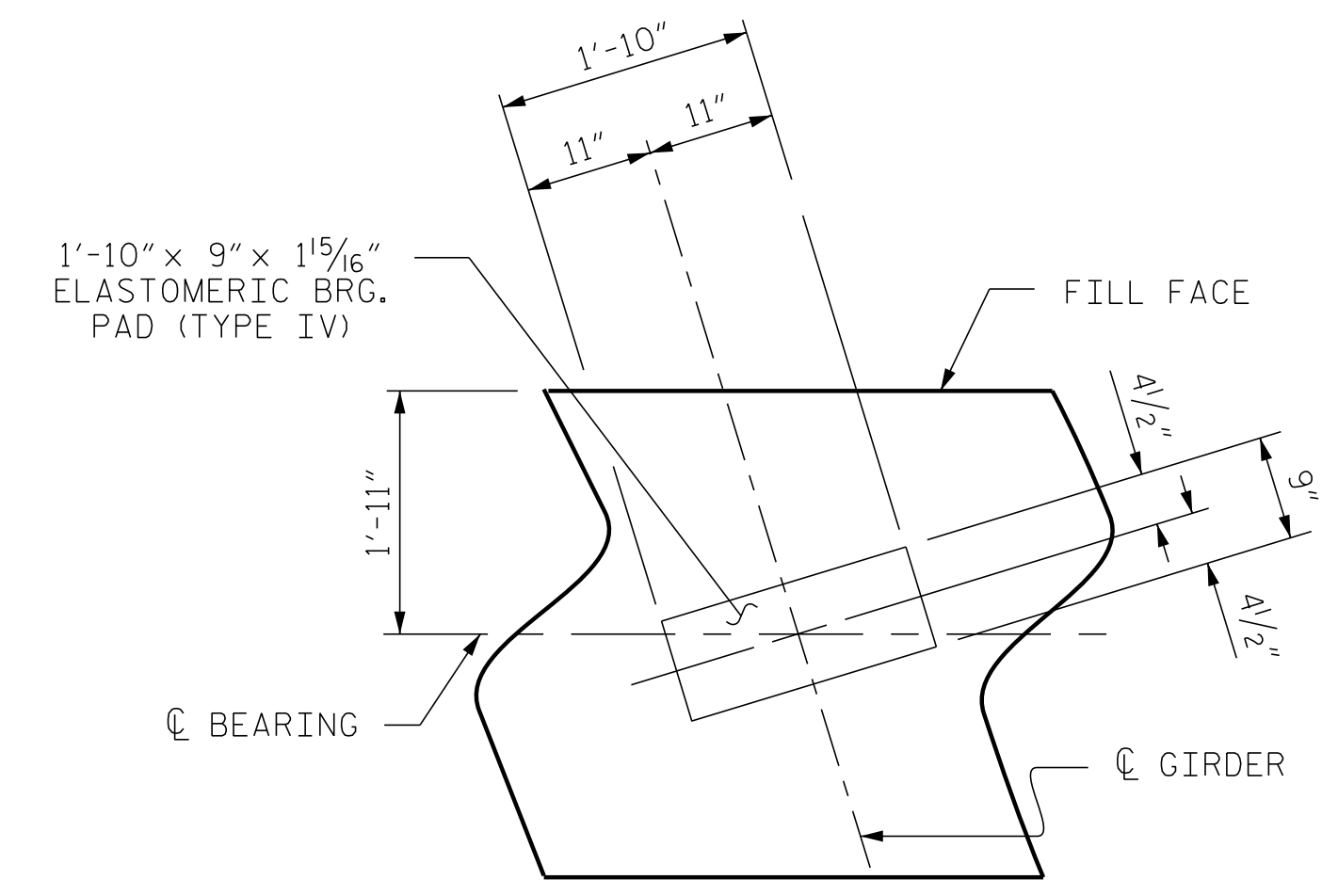
PLAN

**NOTES**

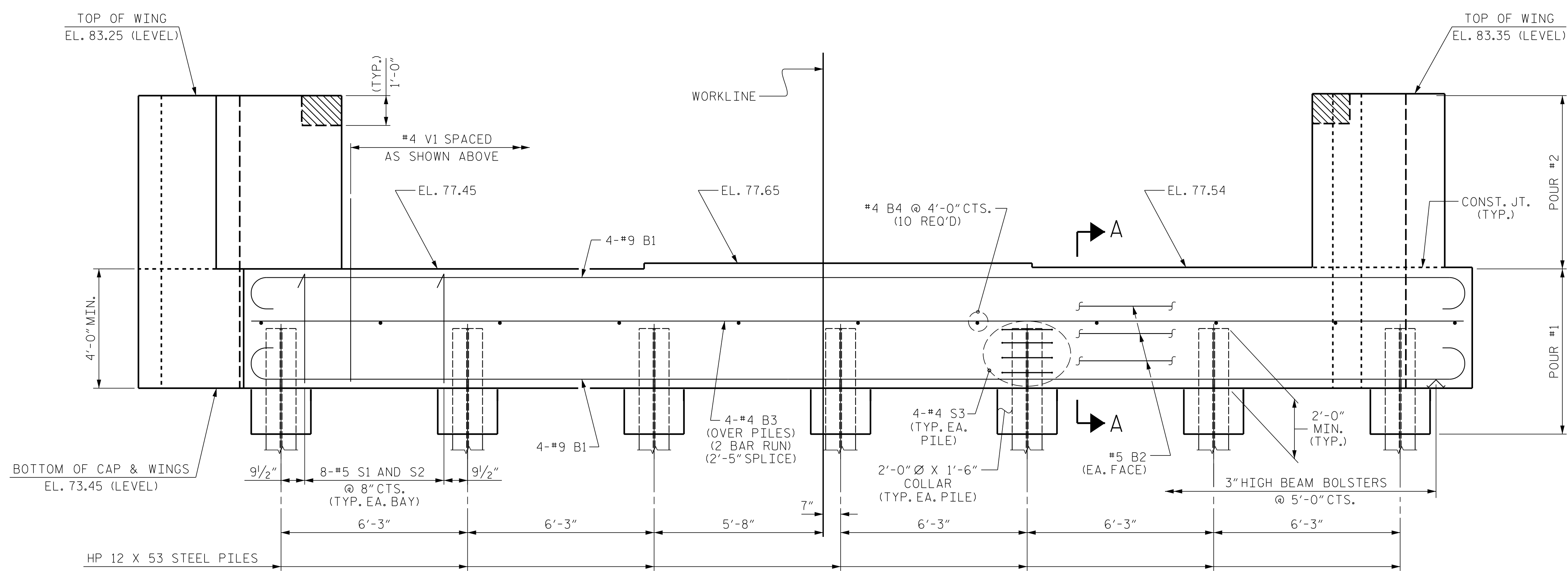
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA AND THE AREA OUTSIDE THE EDGE OF SUPERSTRUCTURE, SHALL BE RAKED TO A DEPTH OF 1/4".



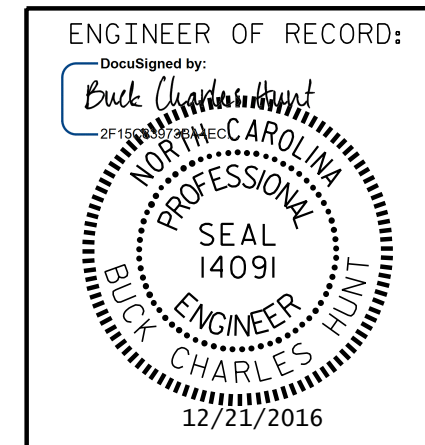
DETAIL "A"  
(TYP. EACH GIRDER)



ELEVATION

FOR SECTION A-A, SEE SHEET 3 OF 3.

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-  
 SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 2

ETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

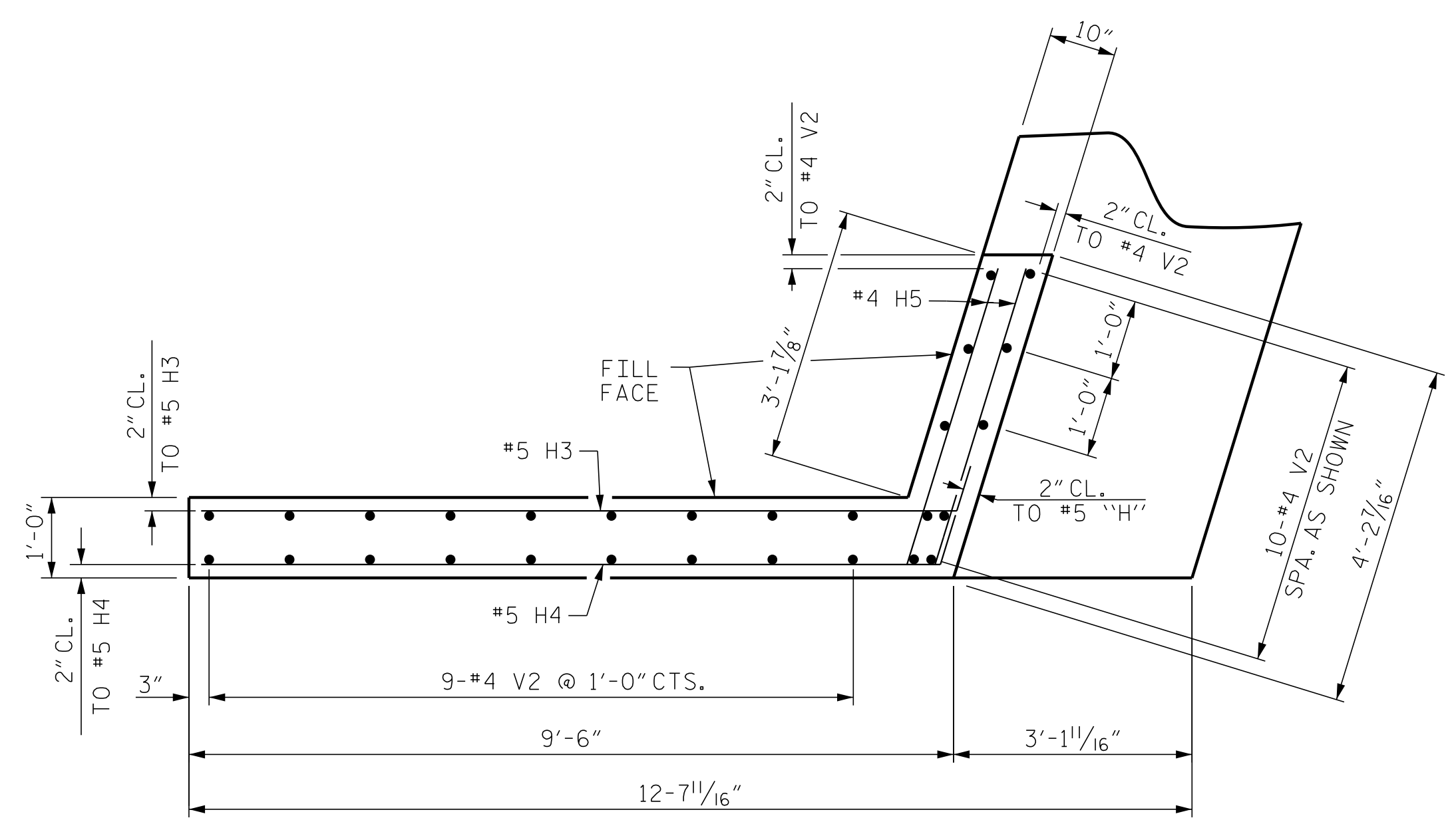
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| NO.       | BY: | DATE: | NO. | BY: | DATE: | S01-24       |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 61           |

DRAWN BY: J. PENDERGRAFT DATE: 3-16  
 CHECKED BY: D. HODGE DATE: 3-16

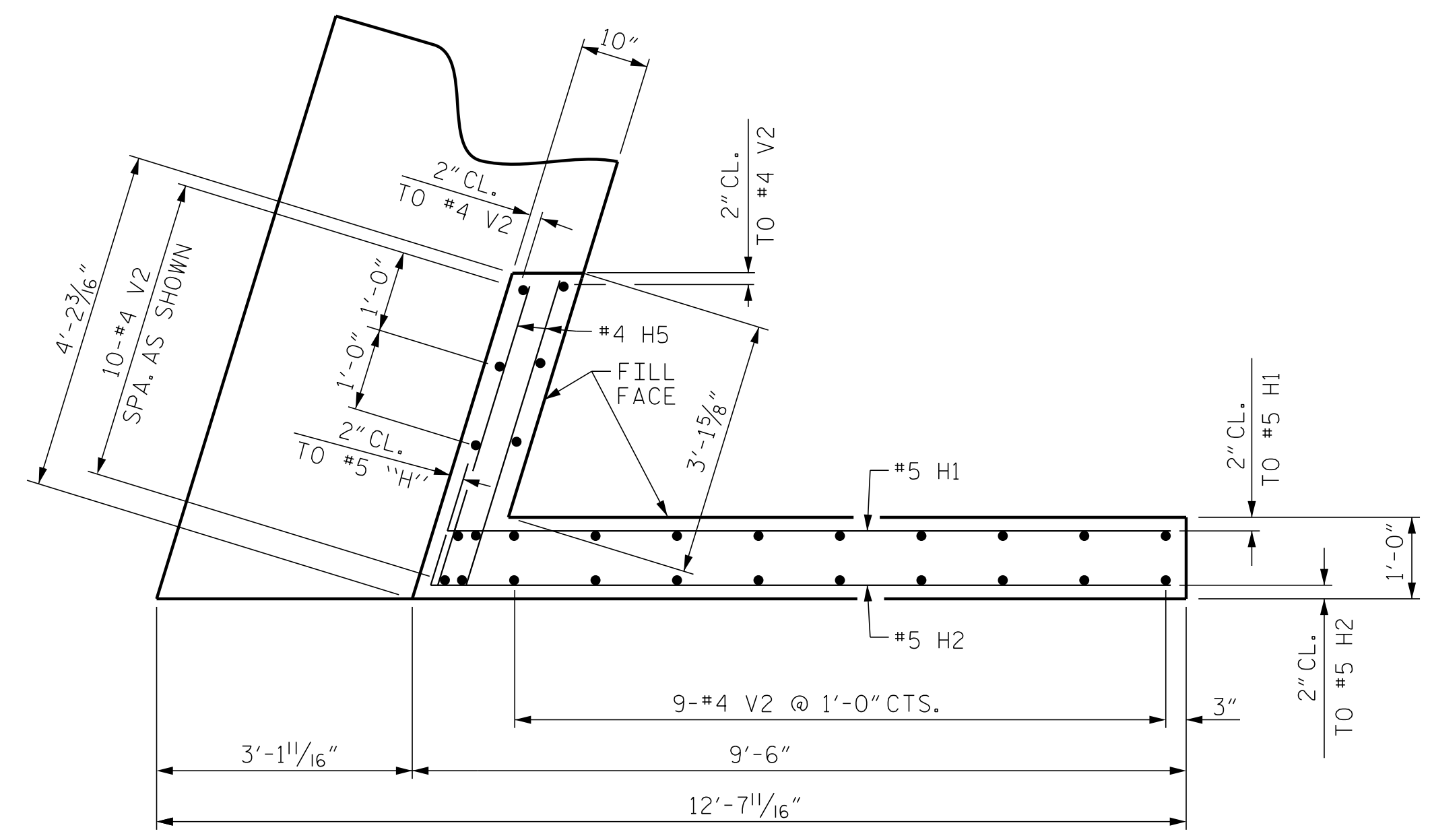
DOCUMENT NOT CONSIDERED FINAL  
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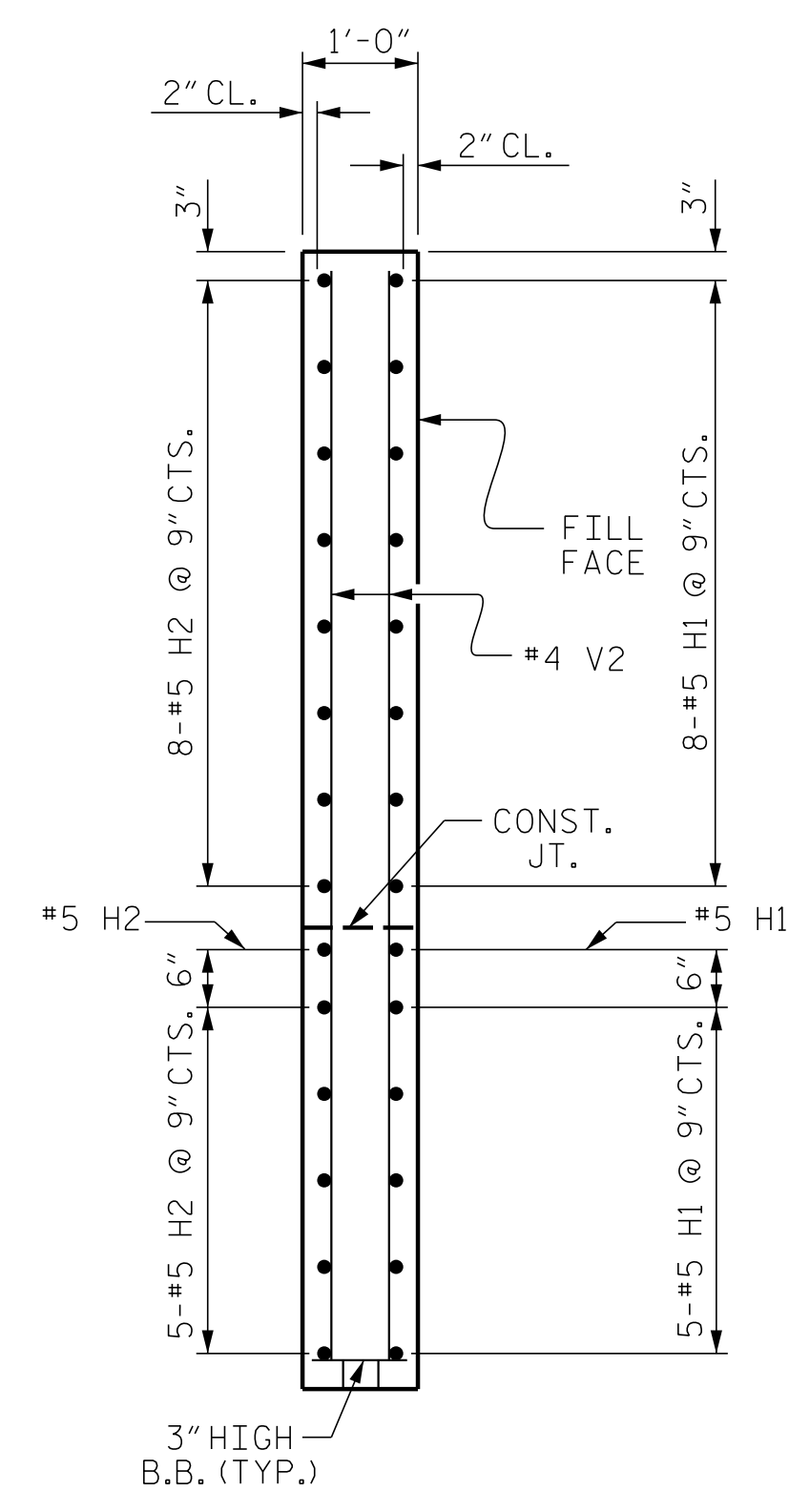




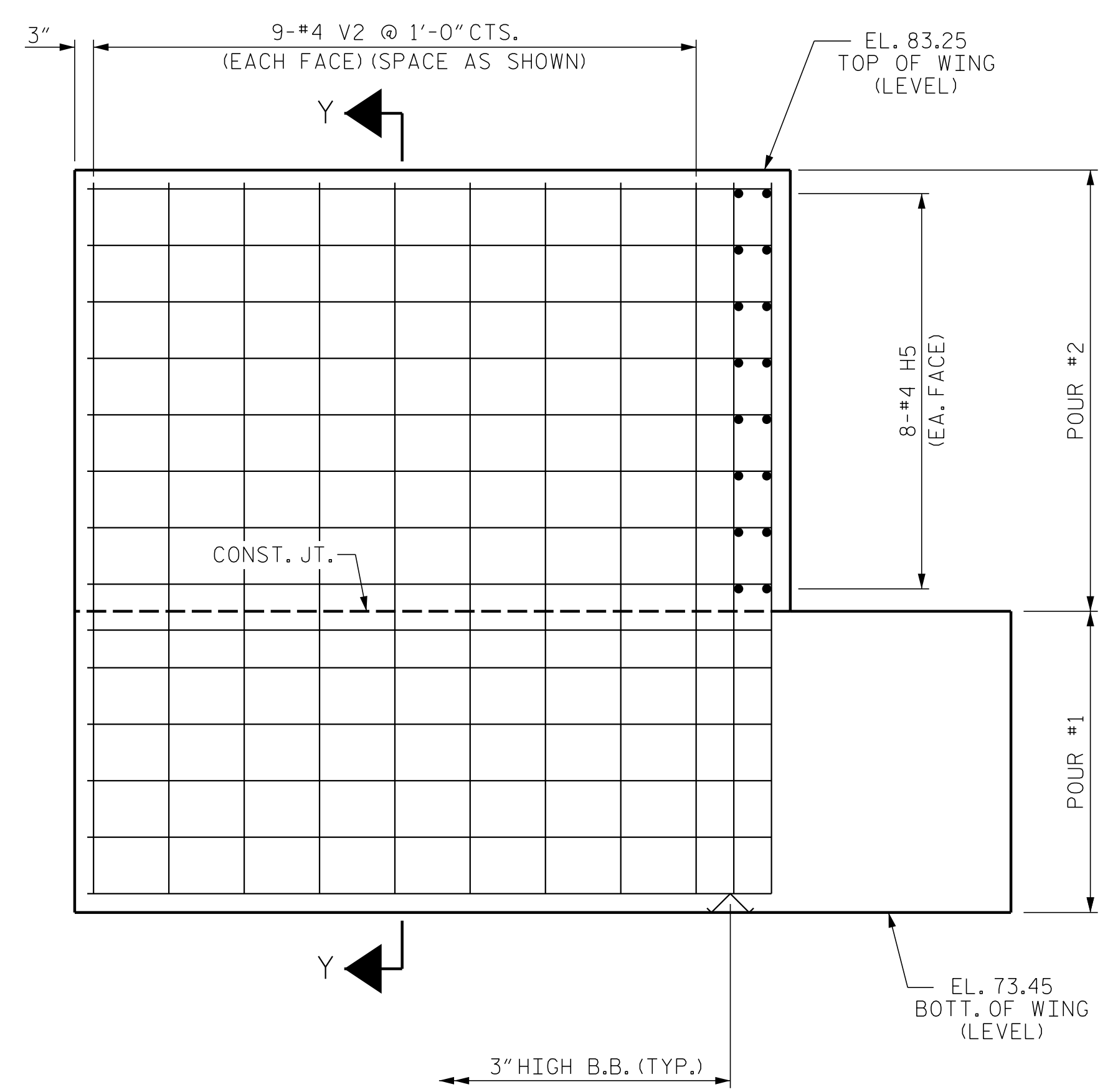
PLAN OF WING - W2



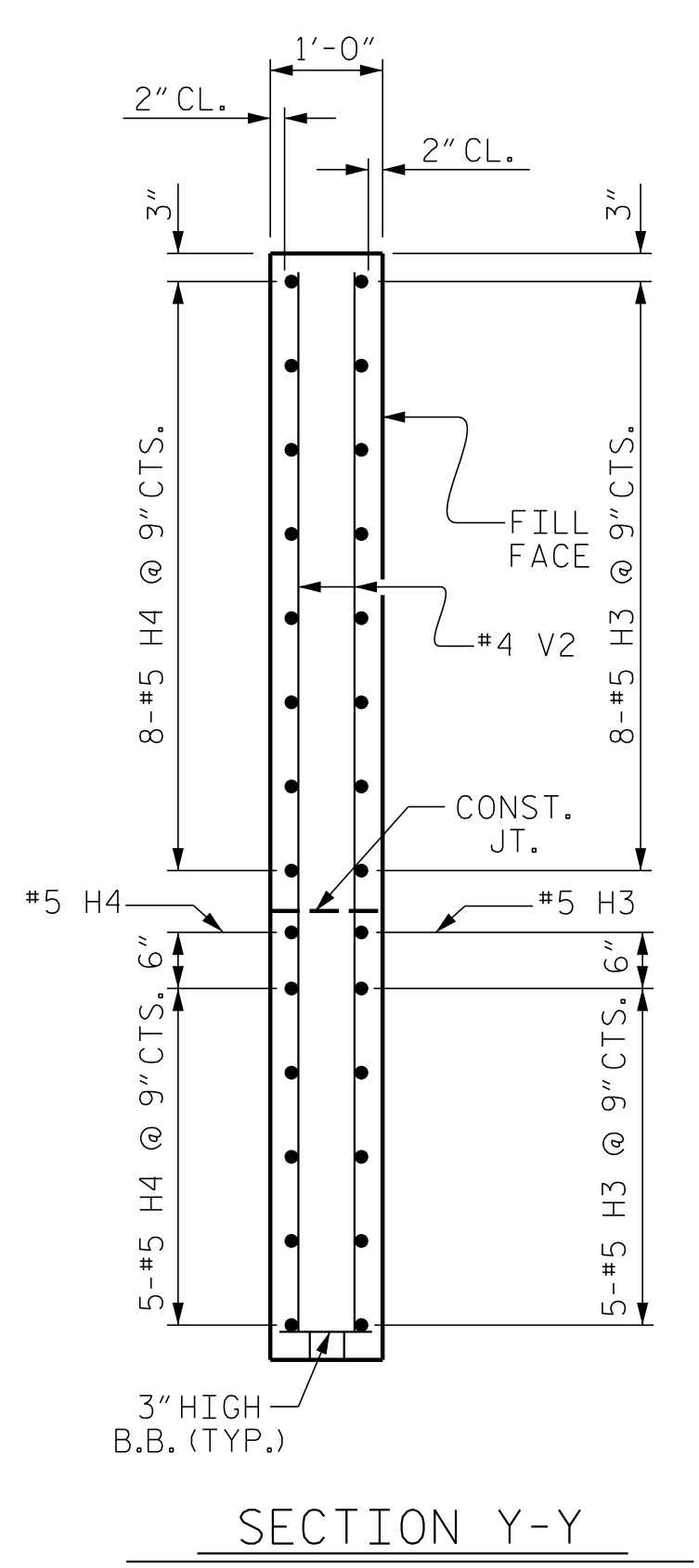
PLAN OF WING - W1



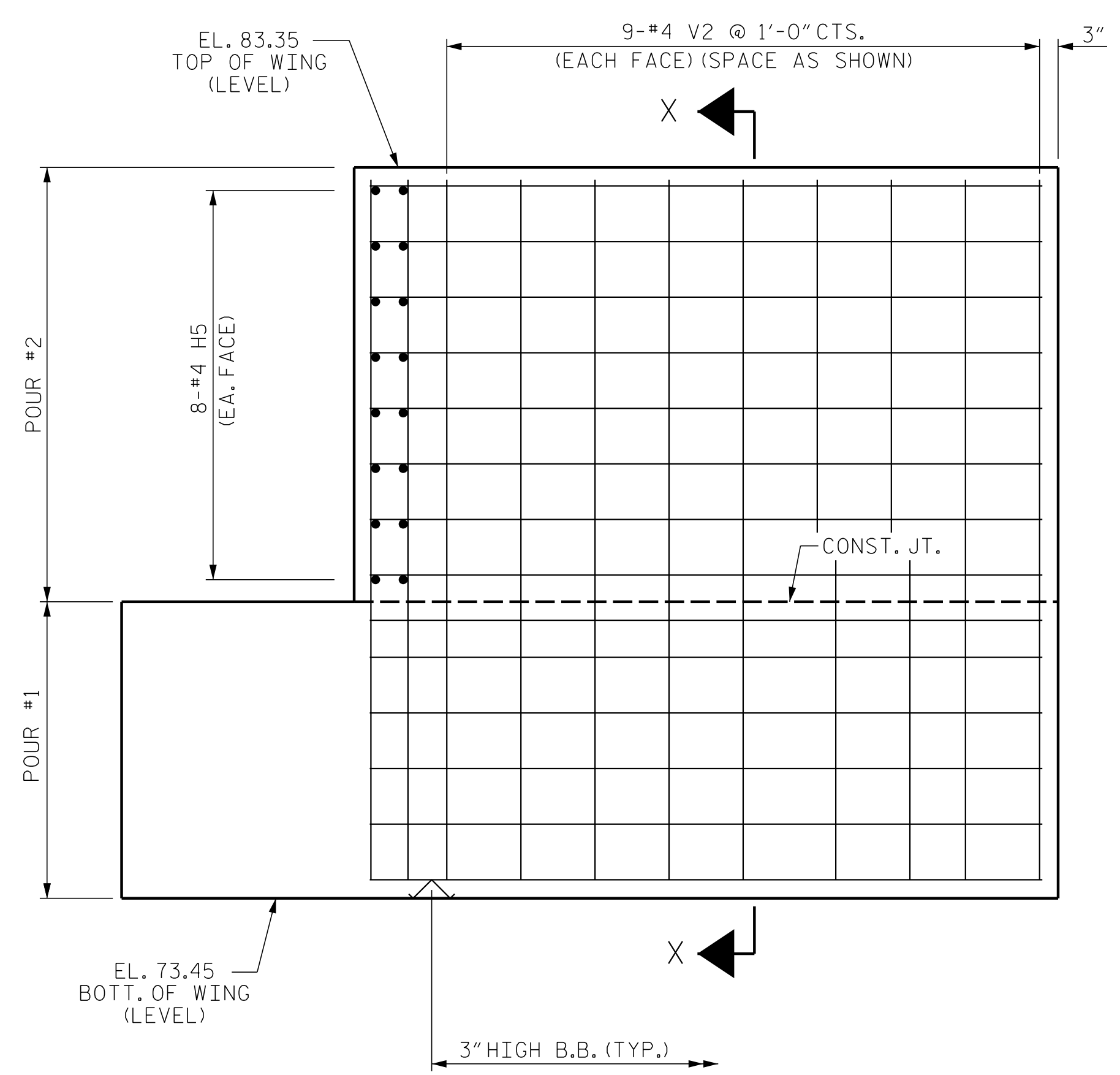
SECTION X-X



ELEVATION OF WING - W2



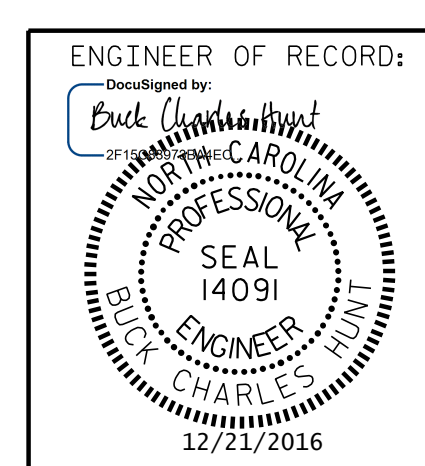
SECTION Y-Y



ELEVATION OF WING - W1

PROJECT NO. R-5311A  
 HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-

SHEET 2 OF 3



1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

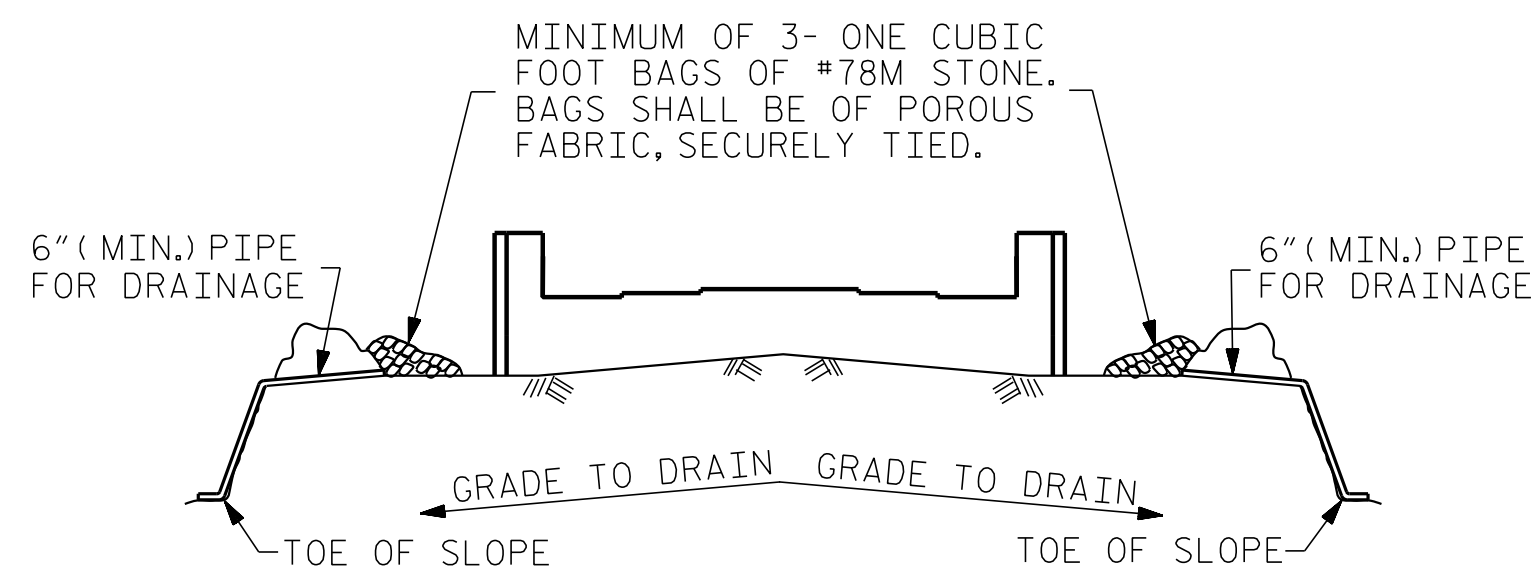
SUBSTRUCTURE  
 END BENT No. 2

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S01-25       |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 61           |

DRAWN BY: J. PENDERGRAFT DATE: 3-16  
 CHECKED BY: D. HODGE DATE: 3-16

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

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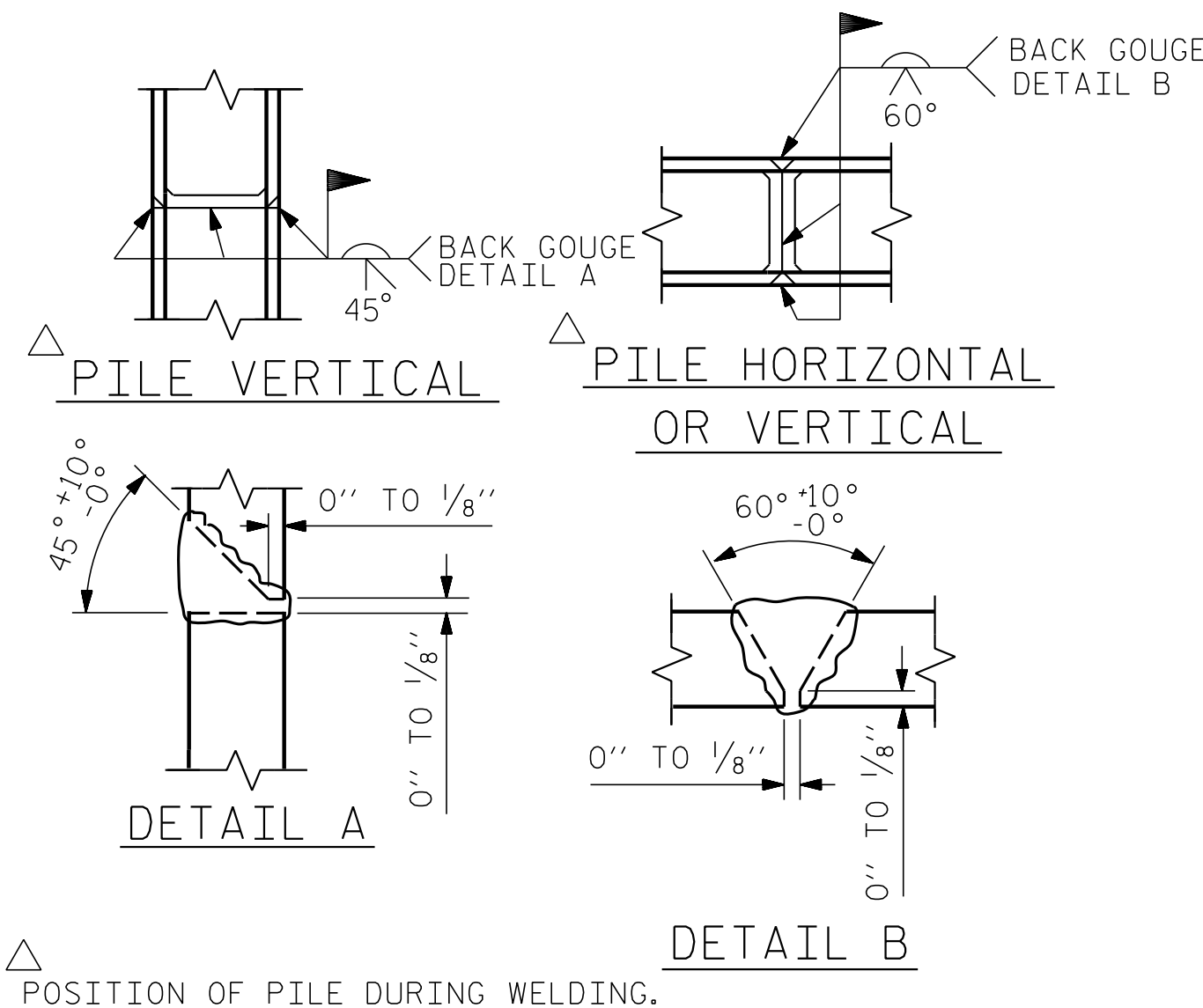


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

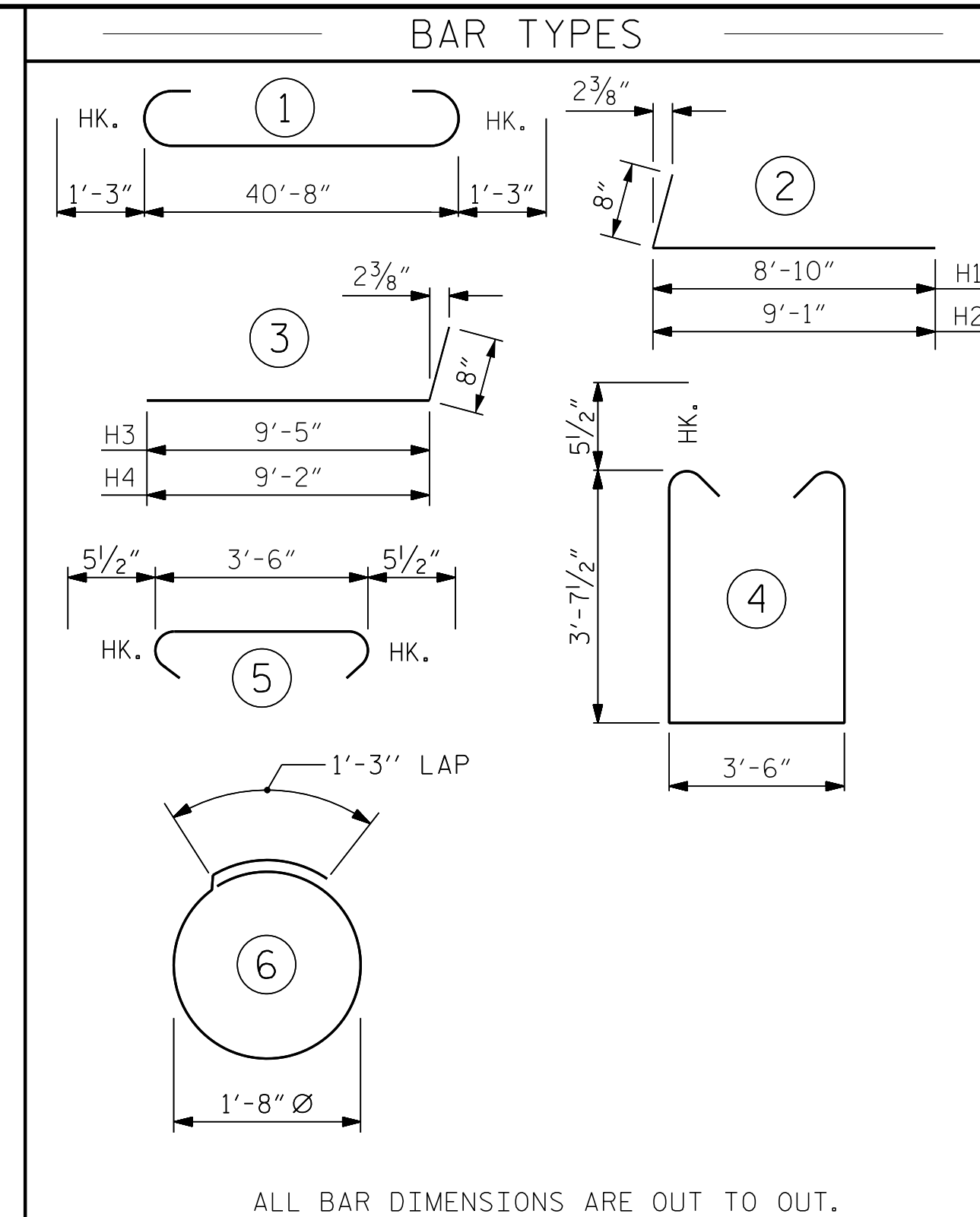
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

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

### TEMPORARY DRAINAGE AT END BENT



### PILE SPLICE DETAILS



### BILL OF MATERIAL

#### END BENT No. 2

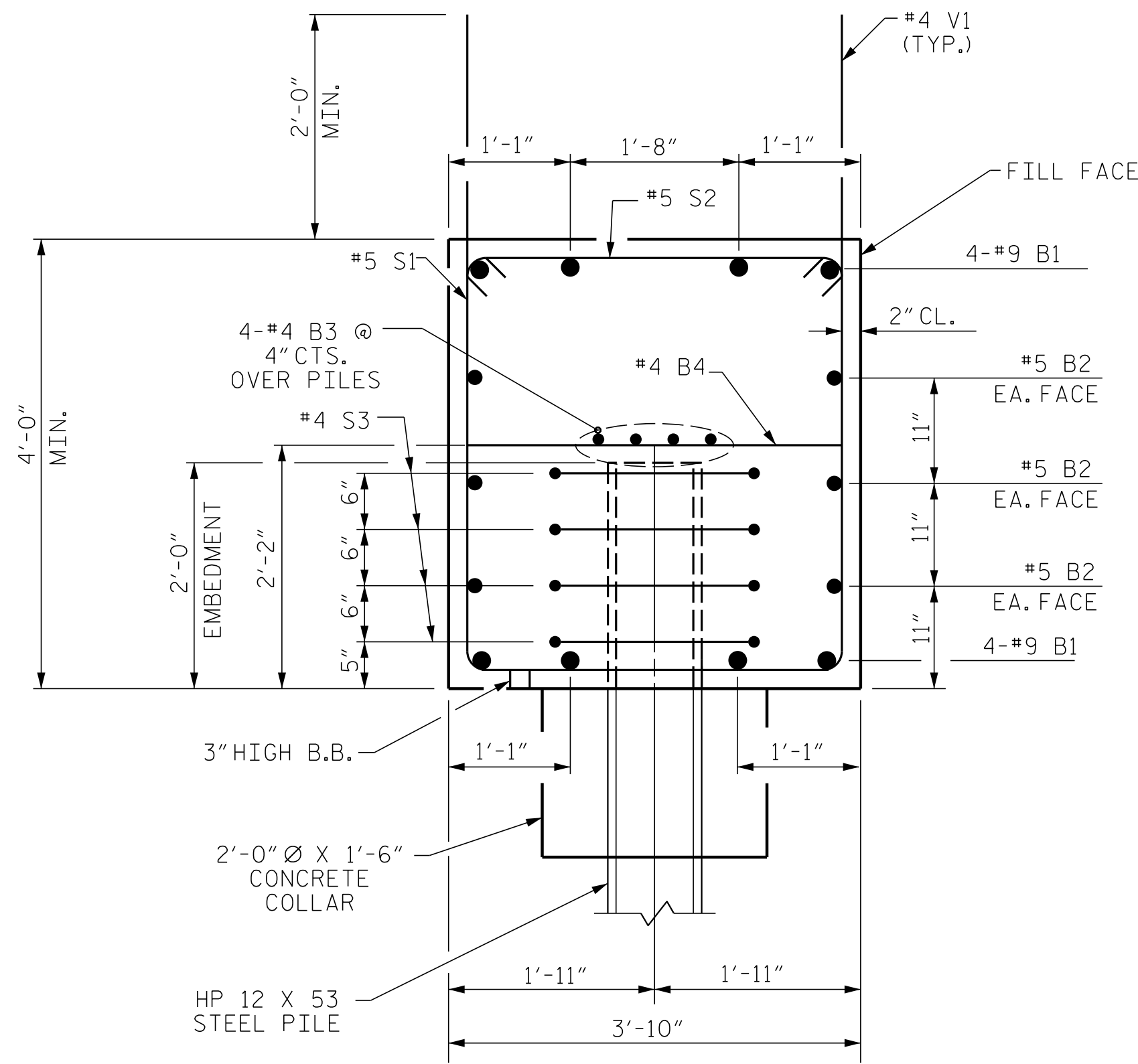
| BAR | NO. | SIZE | TYPE | LENGTH  | WEIGHT |
|-----|-----|------|------|---------|--------|
| B1  | 8   | #9   | 1    | 43'-2"  | 1174   |
| B2  | 6   | #5   | STR  | 40'-10" | 256    |
| B3  | 8   | #4   | STR  | 21'-8"  | 116    |
| B4  | 10  | #4   | STR  | 3'-6"   | 23     |
| H1  | 14  | #5   | 2    | 9'-6"   | 139    |
| H2  | 14  | #5   | 2    | 9'-9"   | 142    |
| H3  | 14  | #5   | 3    | 10'-1"  | 147    |
| H4  | 14  | #5   | 3    | 9'-10"  | 144    |
| H5  | 32  | #4   | STR  | 3'-10"  | 82     |
| S1  | 48  | #5   | 4    | 11'-8"  | 584    |
| S2  | 48  | #5   | 5    | 4'-5"   | 221    |
| S3  | 28  | #4   | 6    | 6'-6"   | 122    |
| V1  | 52  | #4   | STR  | 6'-1"   | 211    |
| V2  | 56  | #4   | STR  | 9'-5"   | 352    |

REINFORCING STEEL 3,713 LBS.

#### CLASS A CONCRETE BREAKDOWN

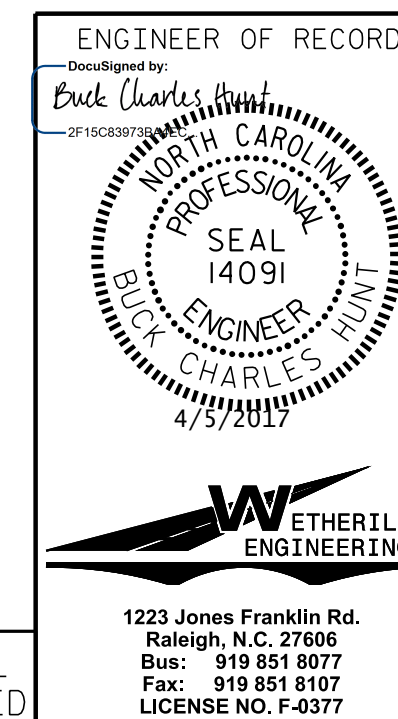
|                        |  |           |
|------------------------|--|-----------|
| POUR #1                | CAP, CONC, COLLARS & LOWER PART OF WINGS | 27.7 C.Y. |
| POUR #2                | UPPER PART OF WINGS                      | 5.2 C.Y.  |
| TOTAL CLASS A CONCRETE |  | 32.9 C.Y. |

|  |               |
|--|---------------|
| HP 12 X 53 STEEL PILES                                   |               |
| NO: 7  | LIN. FT.= 609 |
| PILE REDRIVES  | 4 EA.         |
| PILE DRIVING EQUIPMENT SET UP FOR HP 12 X 53 STEEL PILES | 7 EA.         |



PROJECT NO. R-5311A  
 HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

### SUBSTRUCTURE END BENT No. 2

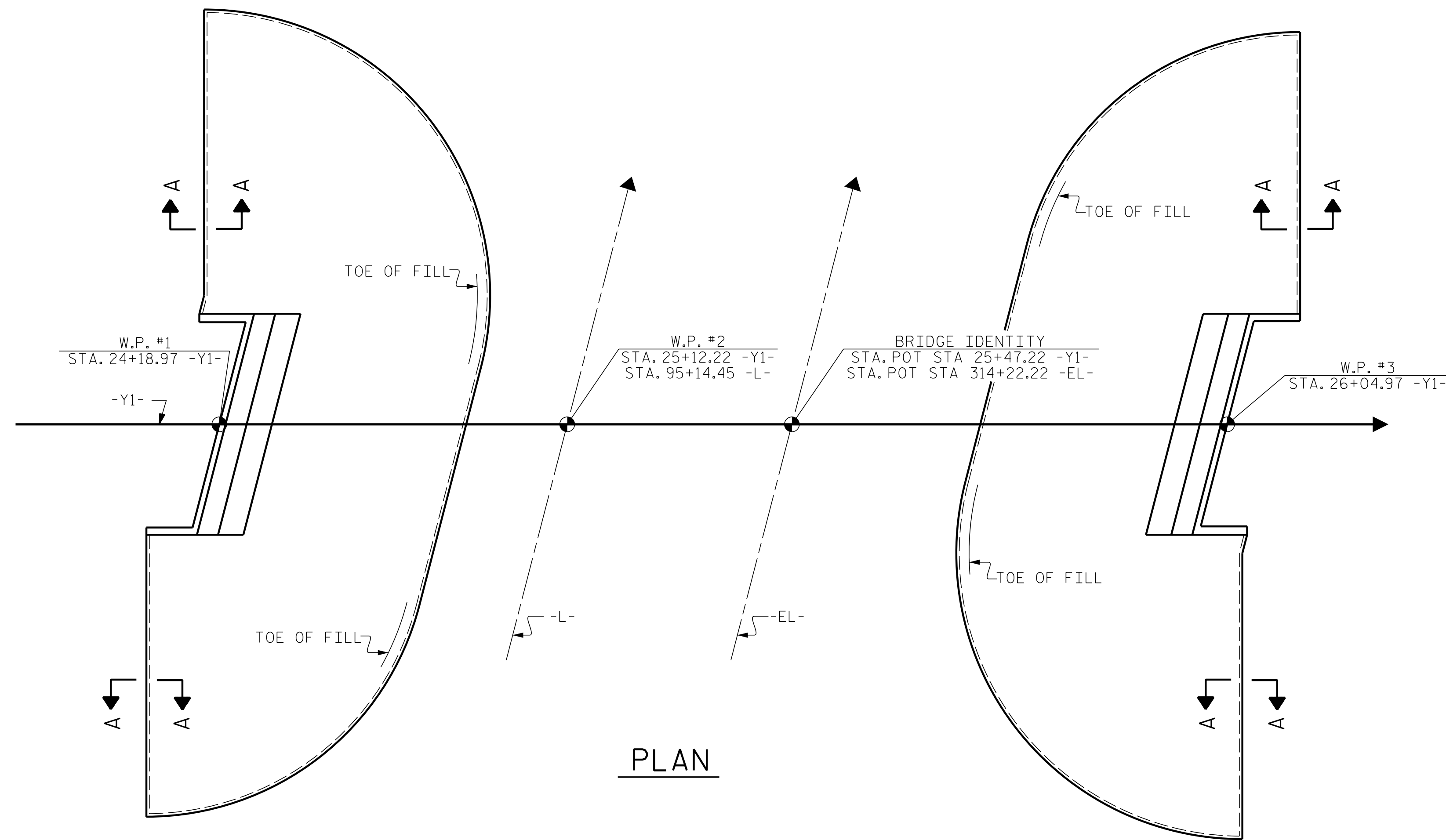
#### REVISIONS

| NO. | BY: | DATE: | NO. | BY: | DATE: | SHEET NO.    |
|-----|-----|-------|-----|-----|-------|--------------|
| 1   |     |       | 3   |     |       | TOTAL SHEETS |
| 2   |     |       | 4   |     |       | 61           |

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 UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : J. PENDERGRAFT DATE : 3-16  
 CHECKED BY : D. HODGE DATE : 3-16



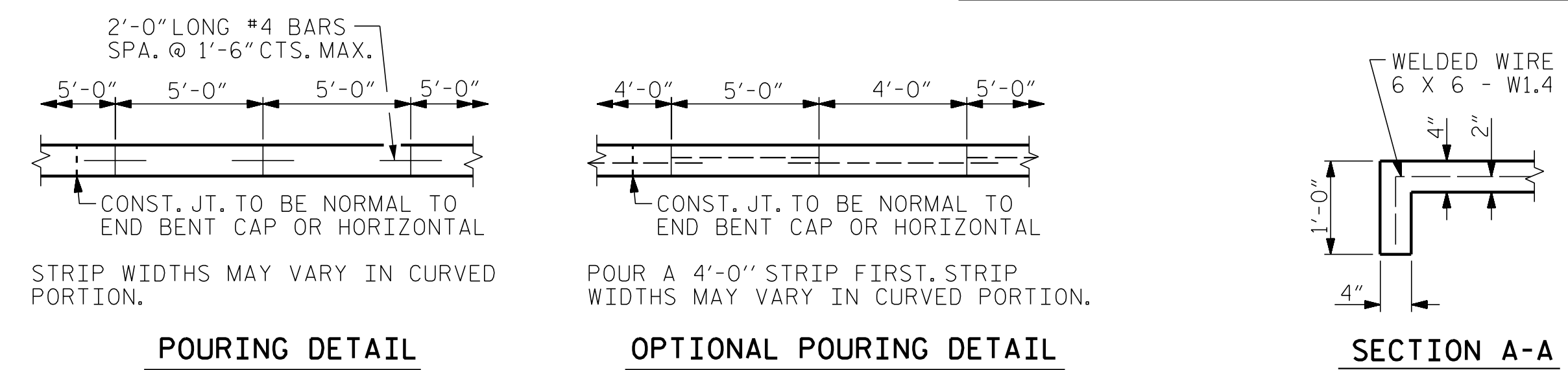
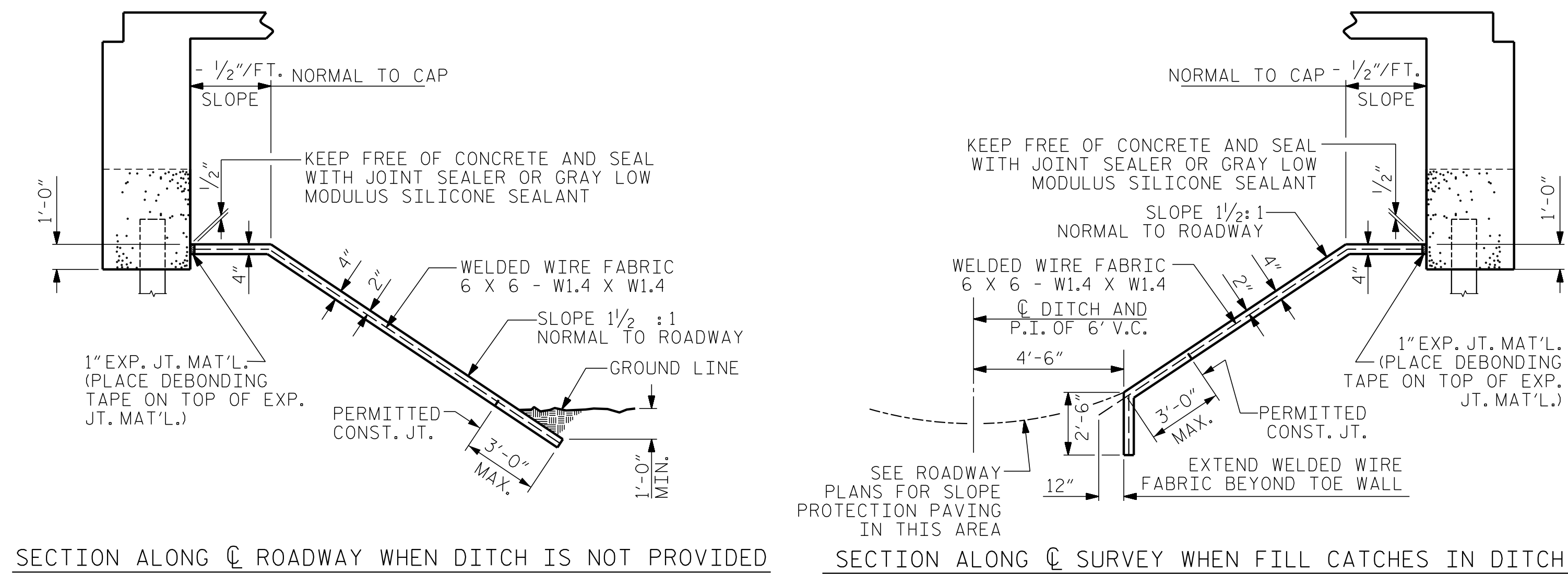


**GENERAL NOTES**

STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING. SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

| BRIDGE @<br>POT STA 25+47.22 -Y1- | 4 INCH<br>SLOPE PROTECTION | *<br>WELDED WIRE FABRIC<br>60 INCHES WIDE |
|-----------------------------------|----------------------------|---|
|                                   | SQUARE YARDS               | APPROX. L.F.                              |
| END BENT 1                        | 475                        | 1415                                      |
| END BENT 2                        | 420                        | 1165                                      |

\* QUANTITY SHOWN IS BASED ON 5' POURS.



PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-  
 SHEET 1 OF 2

ENGINEER OF RECORD:  
 Buck Charles  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 SEAL 14091  
 BUCK CHARLES  
 12/21/2016

ETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SLOPE PROTECTION  
 DETAILS

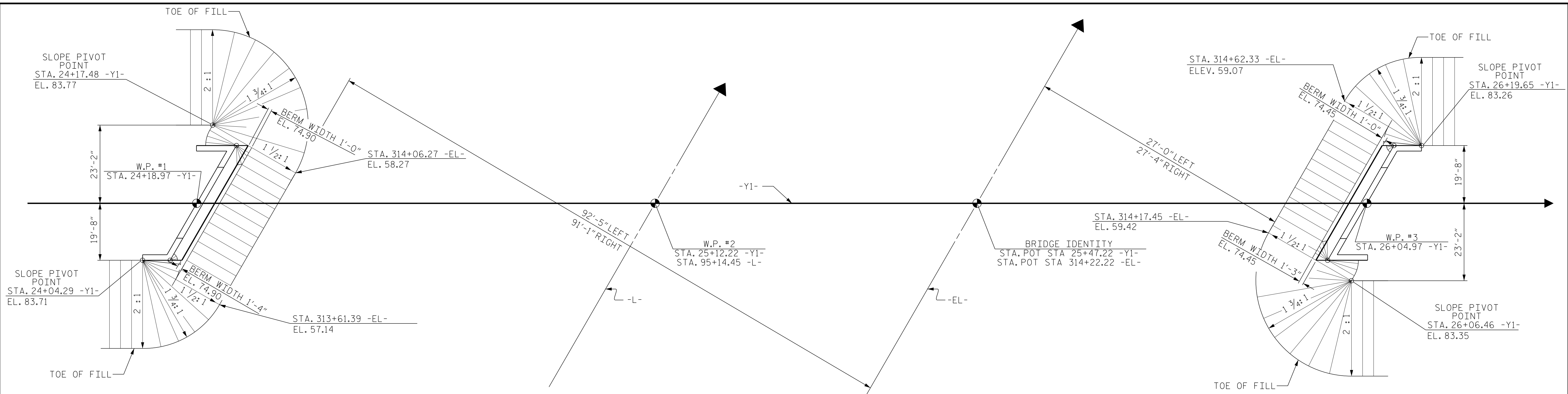
| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS |
| 1         |     |       | 3   |     |       | 61           |
| 2         |     |       | 4   |     |       |              |

S01-27

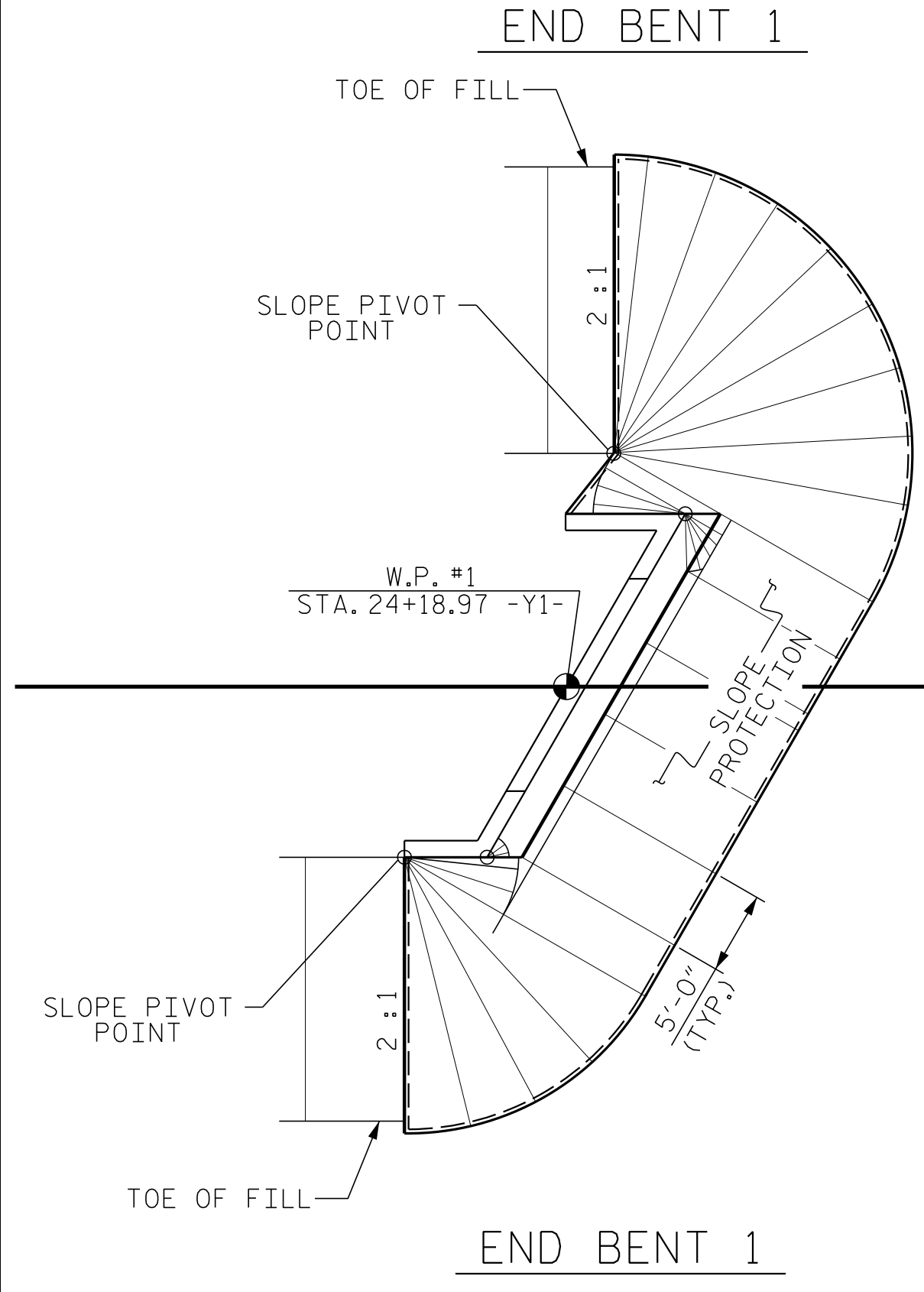
DRAWN BY : J. PENDERGRAFT DATE : 6-16  
 CHECKED BY : G. GILLAND DATE : 6-16

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

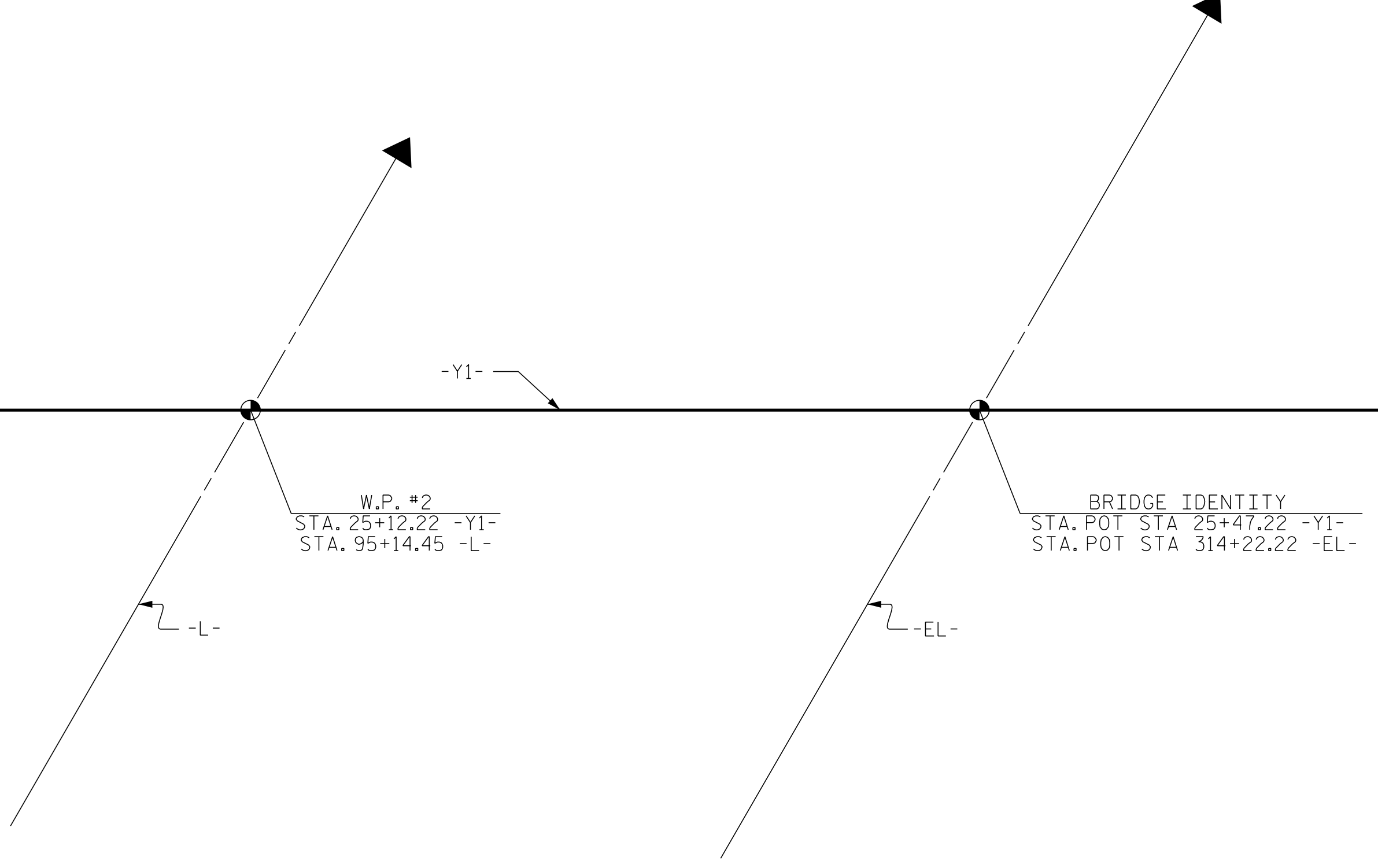
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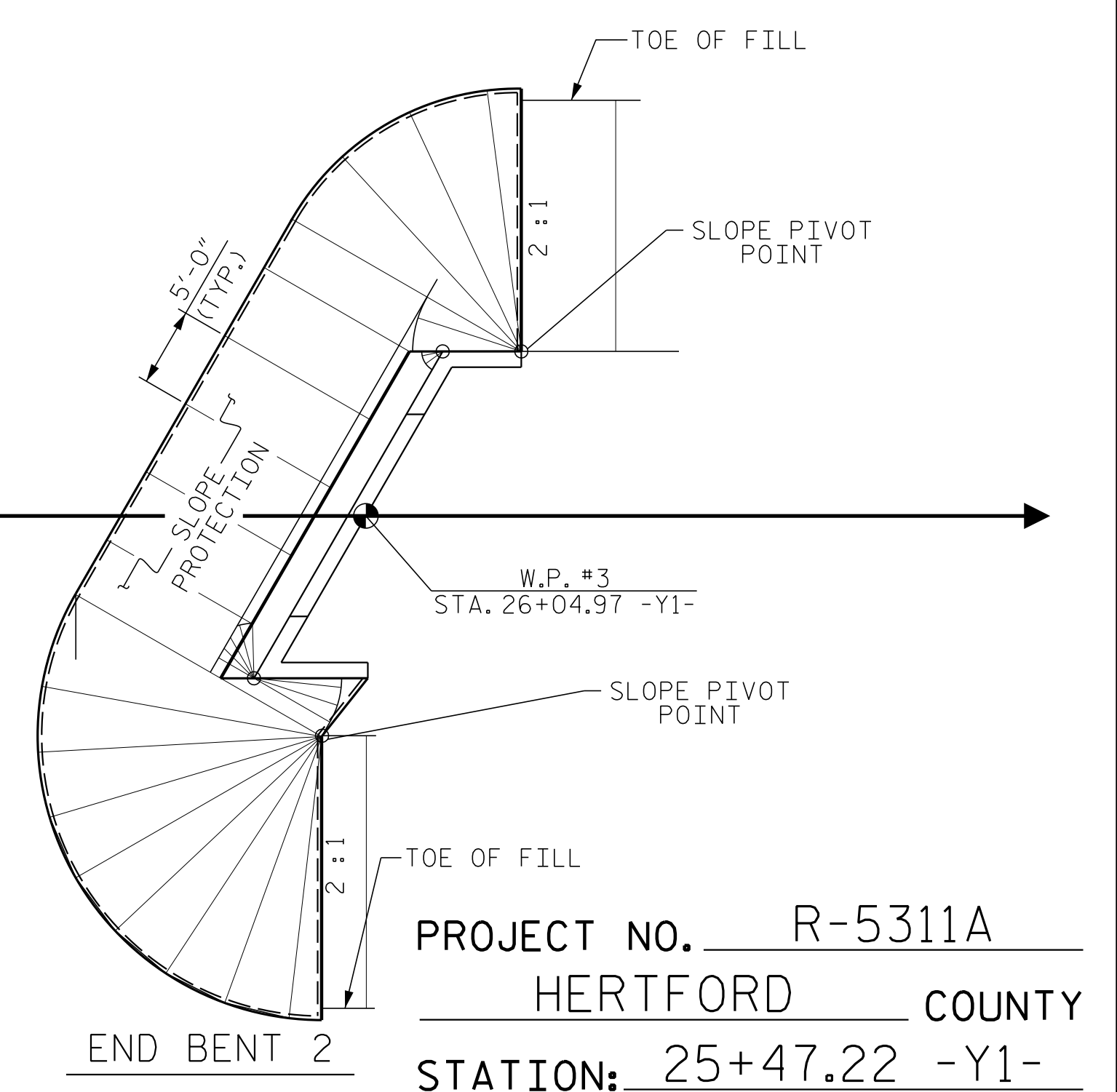
**PLAN - GRADING**  
ELEVATIONS SHOWN AT STA. (UNDER) ARE AT TOP OF CONCRETE SLOPE PROTECTION



**END BENT 1**



**BRIDGE IDENTITY**  
STA. POT STA 25+47.22 -Y1-  
STA. POT STA 314+22.22 -EL-



**END BENT 2**

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 25+47.22 -Y1-  
SHEET 2 OF 2

**PLAN - CONCRETE PLACEMENT**

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DRAWN BY : J. PENDERGRAFT DATE : 6-16  
CHECKED BY : G. GILLAND DATE : 6-16

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UNLESS ALL SIGNATURES COMPLETED

ENGINEER OF RECORD:  
DocuSigned by:  
*Erick Charles Haddock*  
SEAL  
14091  
12/21/2016  
ETHERILL  
ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

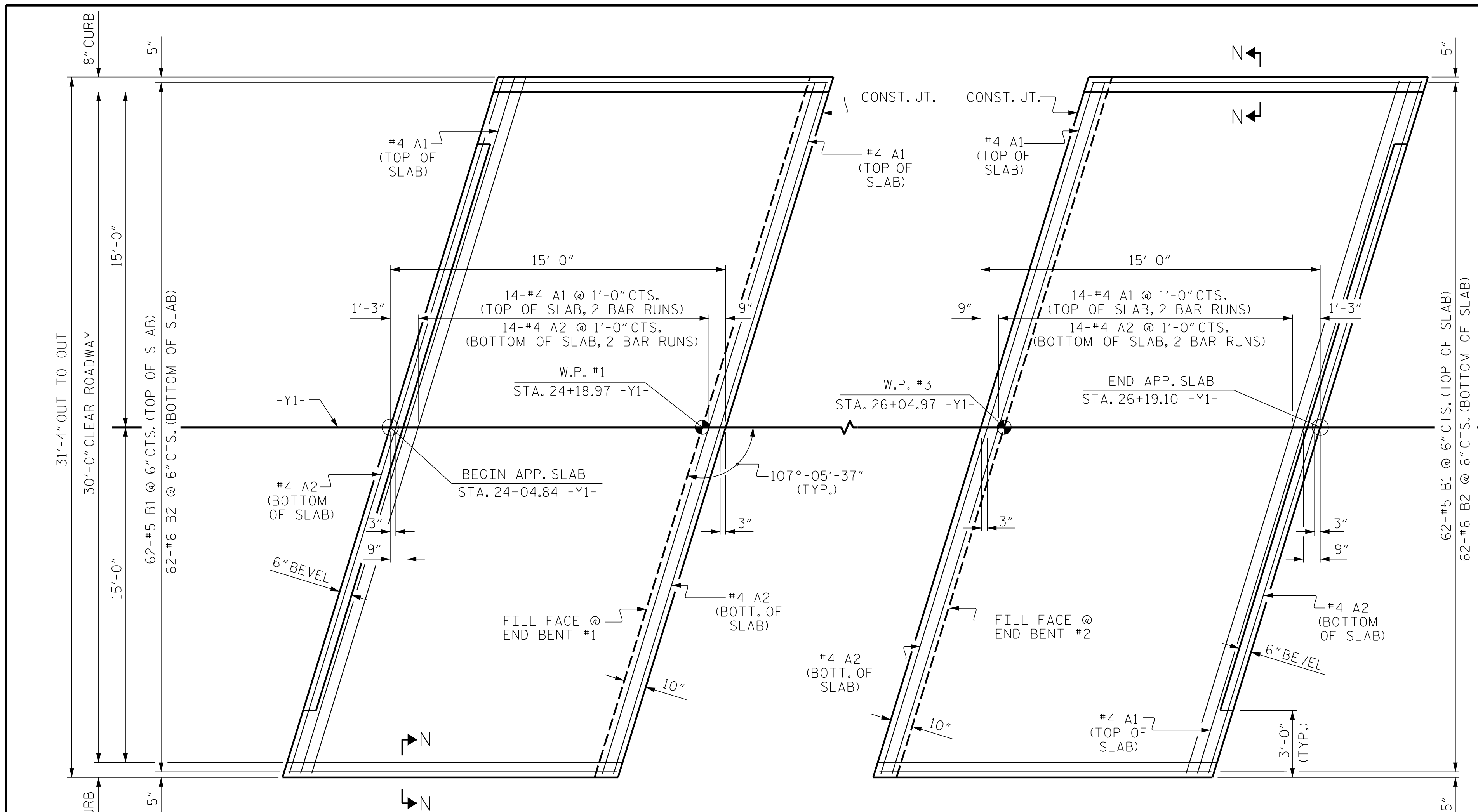
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SLOPE PROTECTION  
DETAILS**

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

TOTAL SHEETS: 61  
SHEET NO.: S01-28





PLAN @ END BENT #1      PLAN @ END BENT #2  
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

**NOTES**

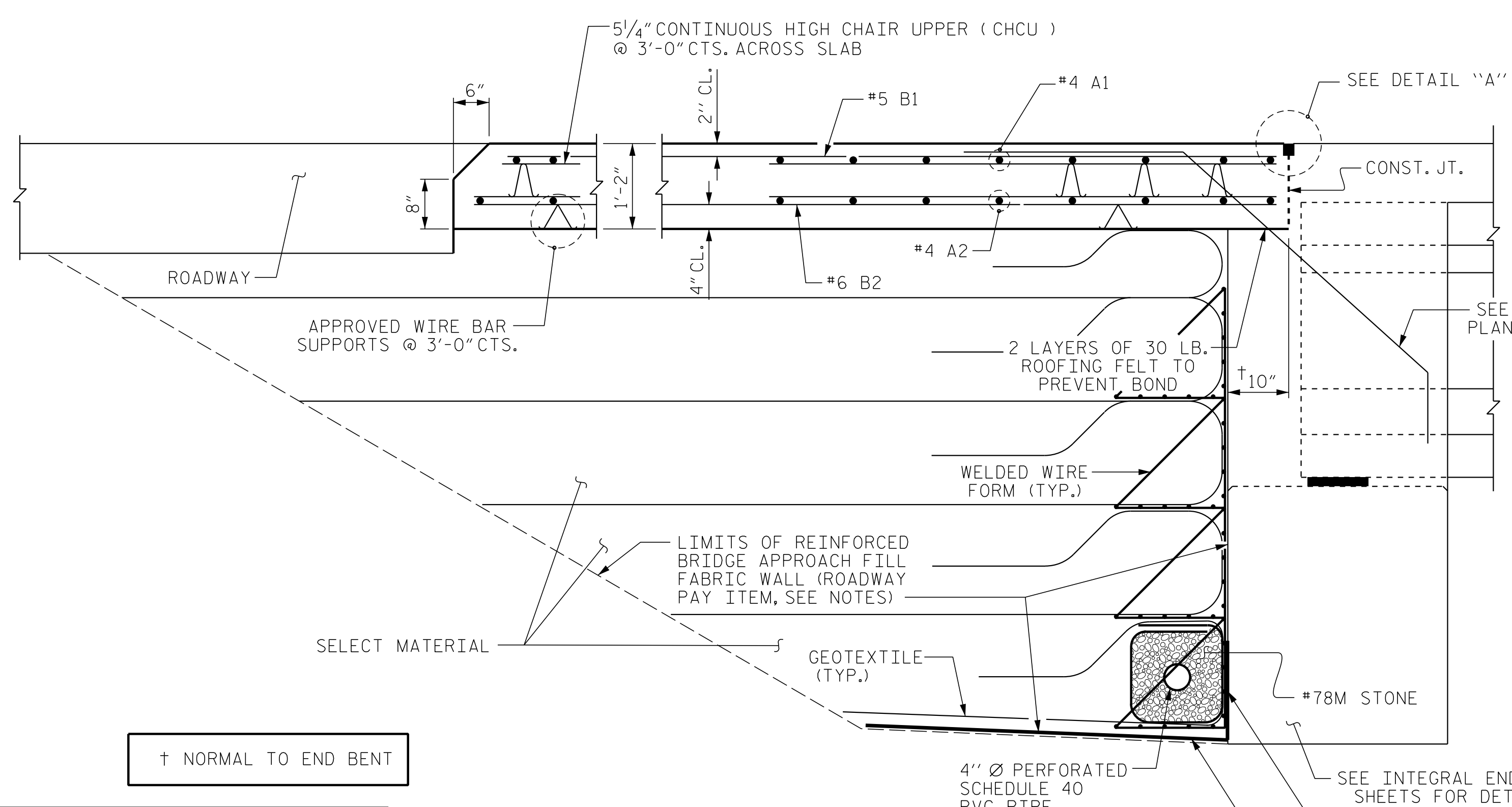
APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR REINFORCED BRIDGE APPROACH FILL FABRIC WALL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.

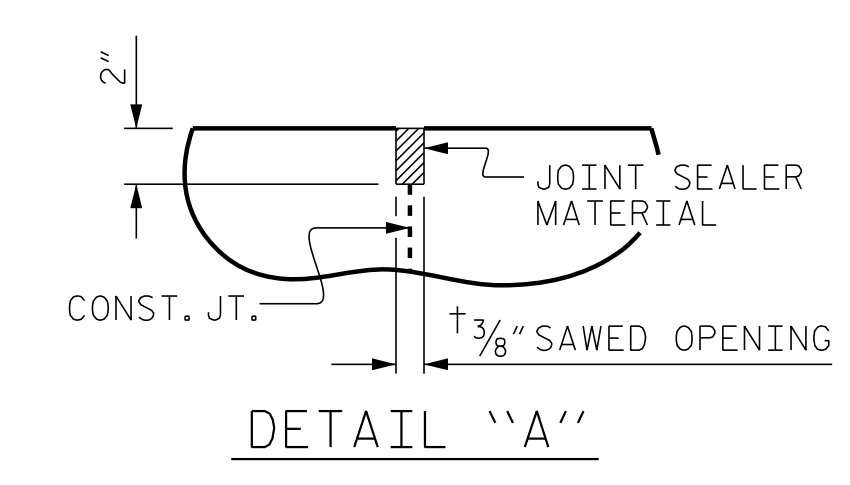
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWS NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

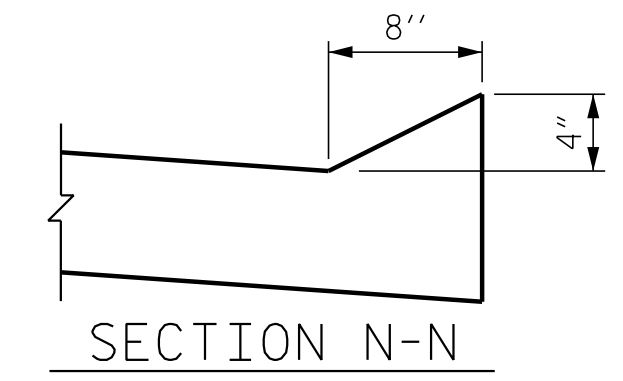
| BILL OF MATERIAL                 |     |      |      |        |        |
|----------------------------------|-----|------|------|--------|--------|
| FOR ONE APPROACH SLAB (2 REQ'D)  |     |      |      |        |        |
| BAR                              | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| * A1                             | 32  | #4   | STR  | 17'-3" | 369    |
| A2                               | 32  | #4   | STR  | 17'-2" | 367    |
| * B1                             | 62  | #5   | STR  | 14'-1" | 911    |
| B2                               | 62  | #6   | STR  | 14'-7" | 1358   |
| REINFORCING STEEL                |     |      |      | LBS.   | 1,725  |
| * EPOXY COATED REINFORCING STEEL |     |      |      | LBS.   | 1,280  |
| CLASS AA CONCRETE                |     |      |      | C. Y.  | 20.3   |



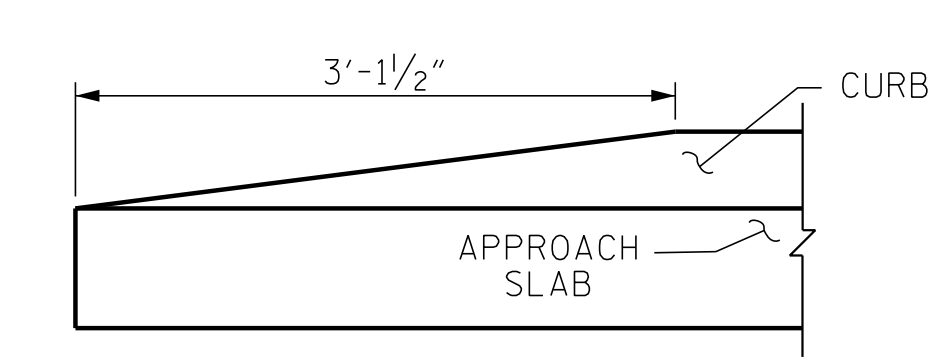
SECTION THRU SLAB



DETAIL "A"

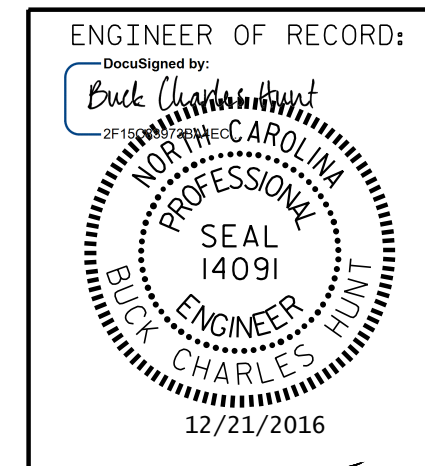


SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-  
 SHEET 1 OF 2



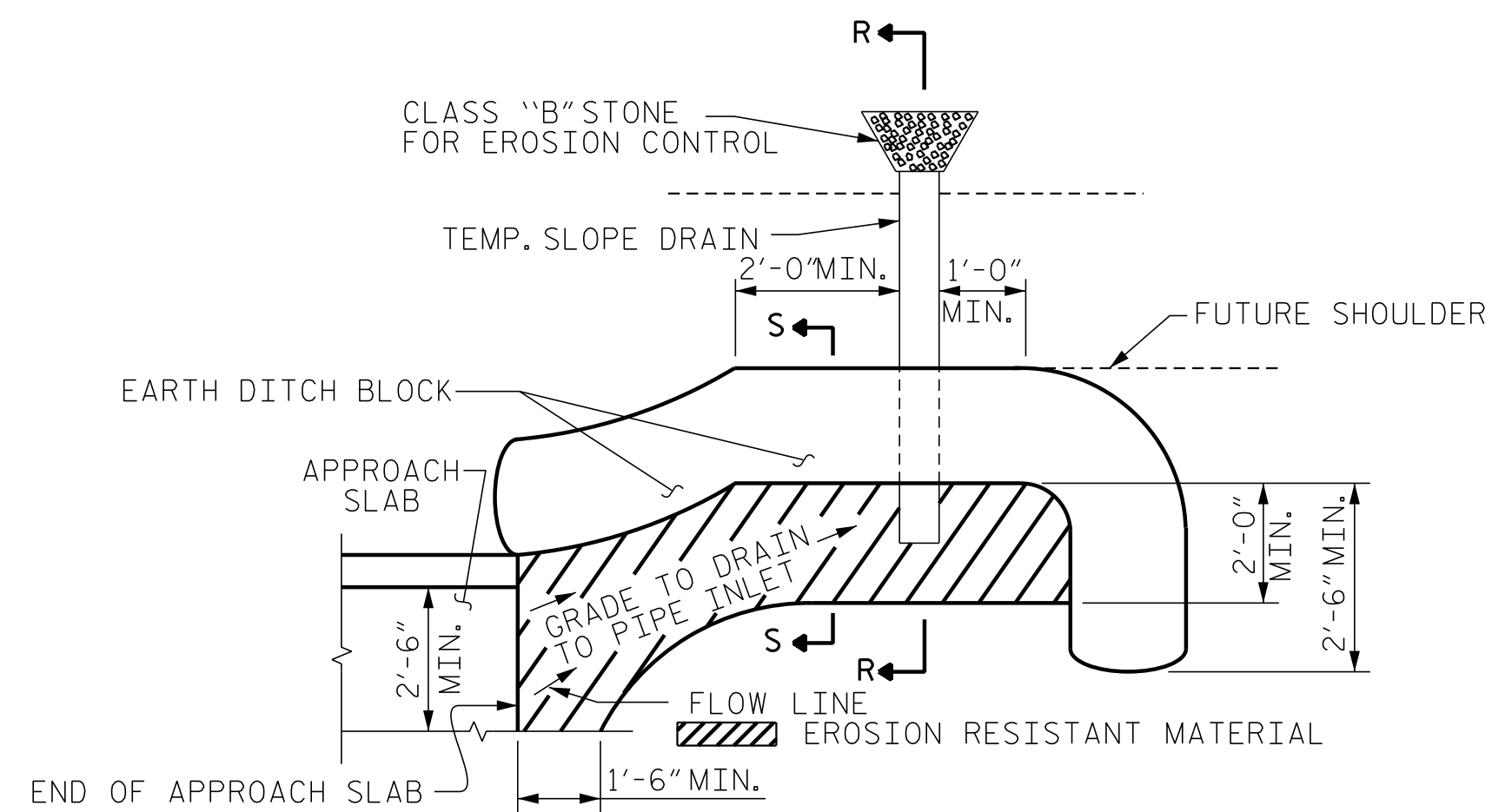
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR INTEGRAL ABUTMENT

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | SHEET NO.    |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 61           |

|                                   |                      |
|-----------------------------------|----------------------|
| ASSEMBLED BY : J. PENDERGRAFT/DAH | DATE : 3-16          |
| CHECKED BY : B.C. HUNT            | DATE : 4-16          |
| DRAWN BY : TLA 10/05              | REV. 10/1/11 MAA/GM  |
| CHECKED BY : GM 5/06              | REV. 12/21/11 MAA/GM |
|                                   | REV. 6/13 MAA/GM     |

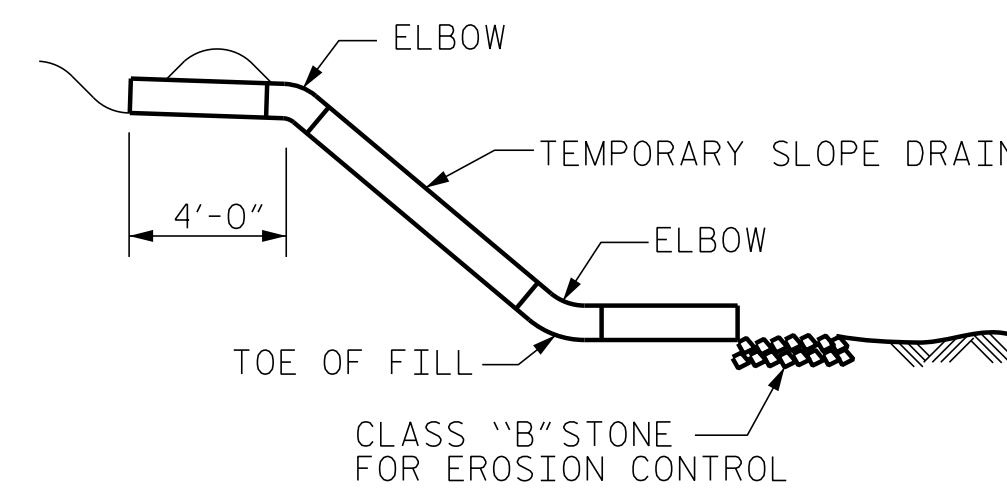
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 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

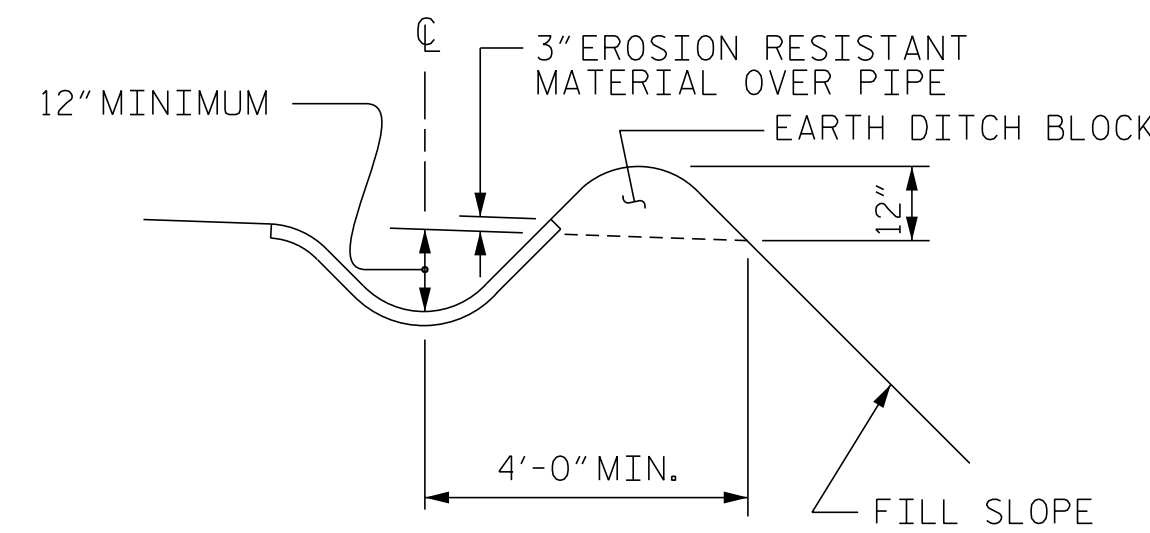


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

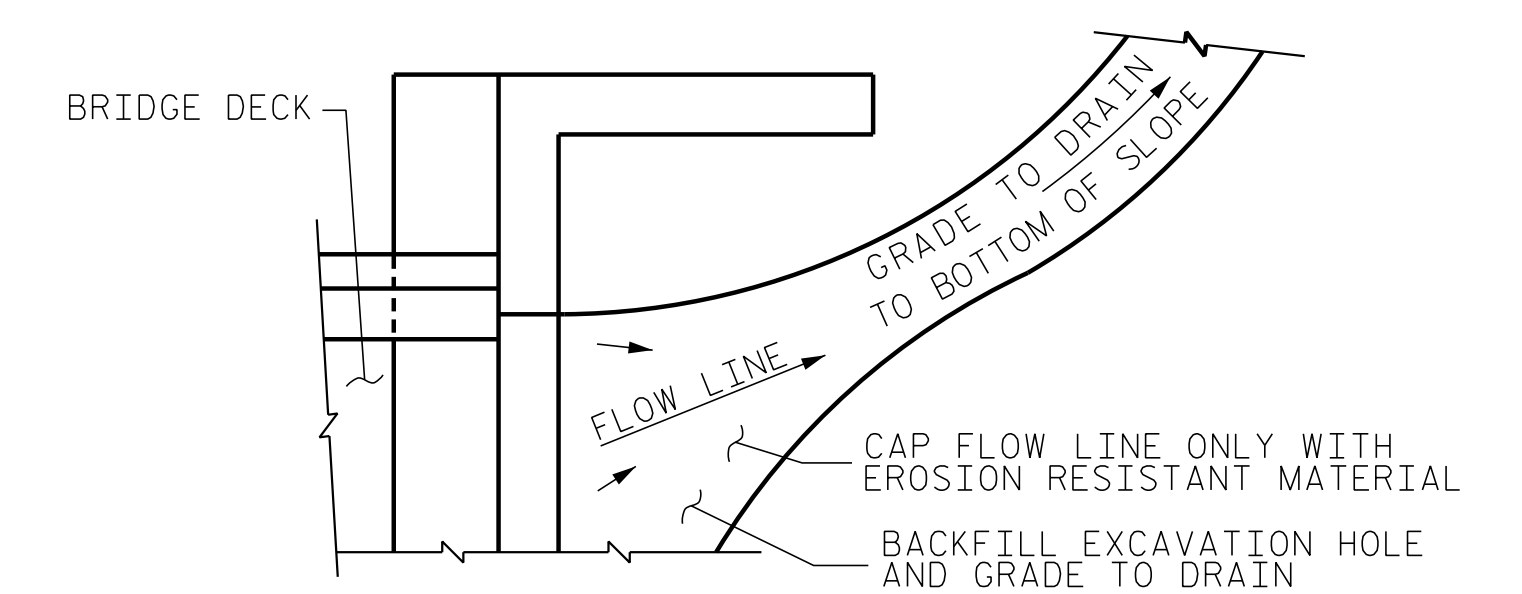
PLAN VIEW



SECTION R-R



SECTION S-S



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

### TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 25+47.22 -Y1-

SHEET 2 OF 2

|                         |                      |
|-------------------------|----------------------|
| ASSEMBLED BY : D. HODGE | DATE : 4/16          |
| CHECKED BY : B.C. HUNT  | DATE : 4/16          |
| DRAWN BY : FCJ 11/88    | REV. 10/11/11 MAA/GM |
| CHECKED BY : ARB 11/88  | REV. 7/12 MAA/GM     |
|                         | REV. 6/13 MAA/GM     |

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ENGINEER OF RECORD:  
 DocuSigned by:  
 Buck Charles Hunt  
 257  
 NORTH CAROLINA  
 PROFESSIONAL  
 SEAL  
 14091  
 BUCK, CHARLES HUNT  
 ENGINEER  
 12/21/2016

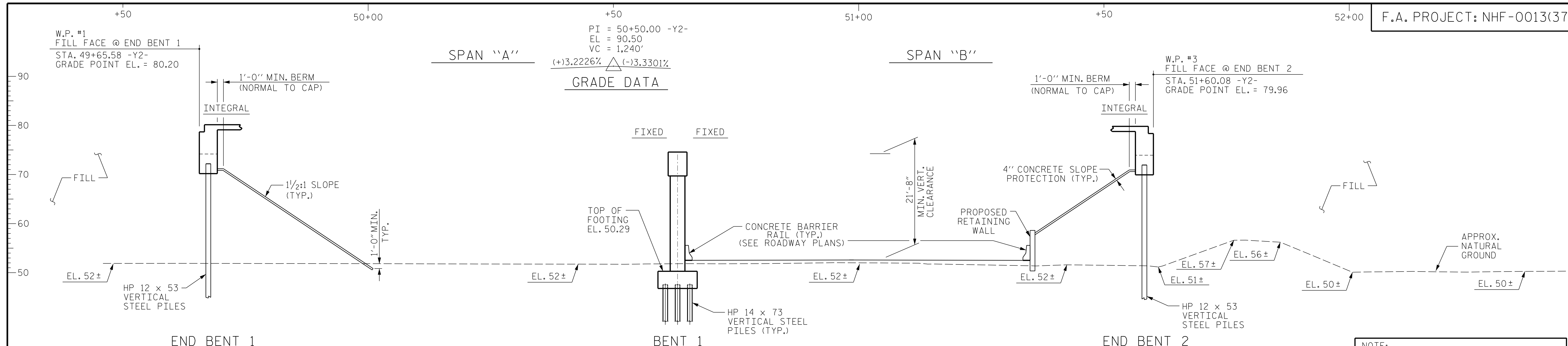
ETHERILL  
 ENGINEERING

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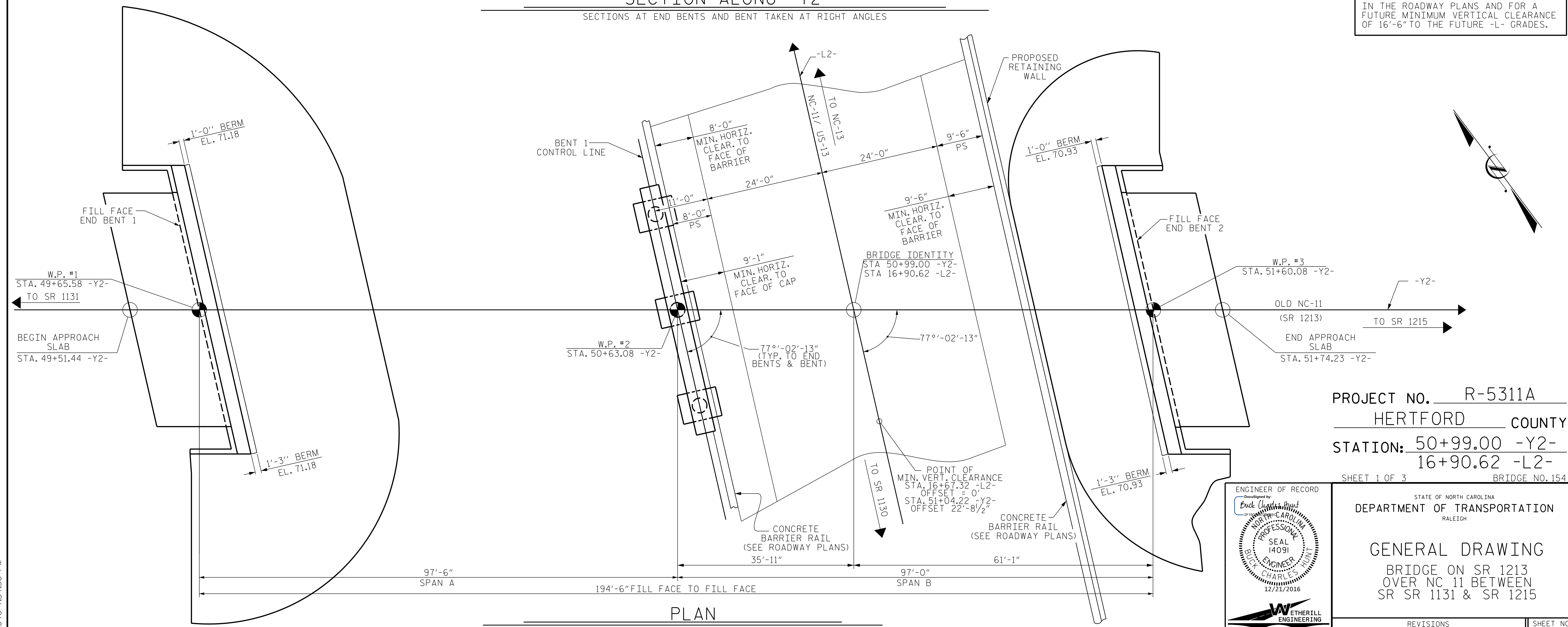
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| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                    |
| STANDARD<br>BRIDGE APPROACH<br>SLAB DETAILS                        |     |       |     |     |                    |
| REVISIONS  |     |       |     |     |                    |
| NO.  | BY: | DATE: | NO. | BY: | DATE:              |
| 1  |     |       | 3   |     |                    |
| 2  |     |       | 4   |     |                    |
| SHEET NO.<br>S01-30  |     |       |     |     | TOTAL SHEETS<br>61 |

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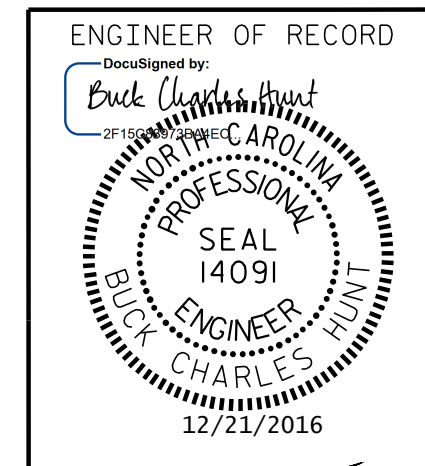




NOTE:  
THE LAYOUT OF THIS BRIDGE PROVIDES FOR THE FUTURE -L- SECTION AS SHOWN IN THE ROADWAY PLANS AND FOR A FUTURE MINIMUM VERTICAL CLEARANCE OF 16'-6" TO THE FUTURE -L- GRADES.



PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 50+99.00 -Y2-  
16+90.62 -L2-  
SHEET 1 OF 3 BRIDGE NO. 154



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**GENERAL DRAWING**  
BRIDGE ON SR 1213  
OVER NC 11 BETWEEN  
SR SR 1131 & SR 1215

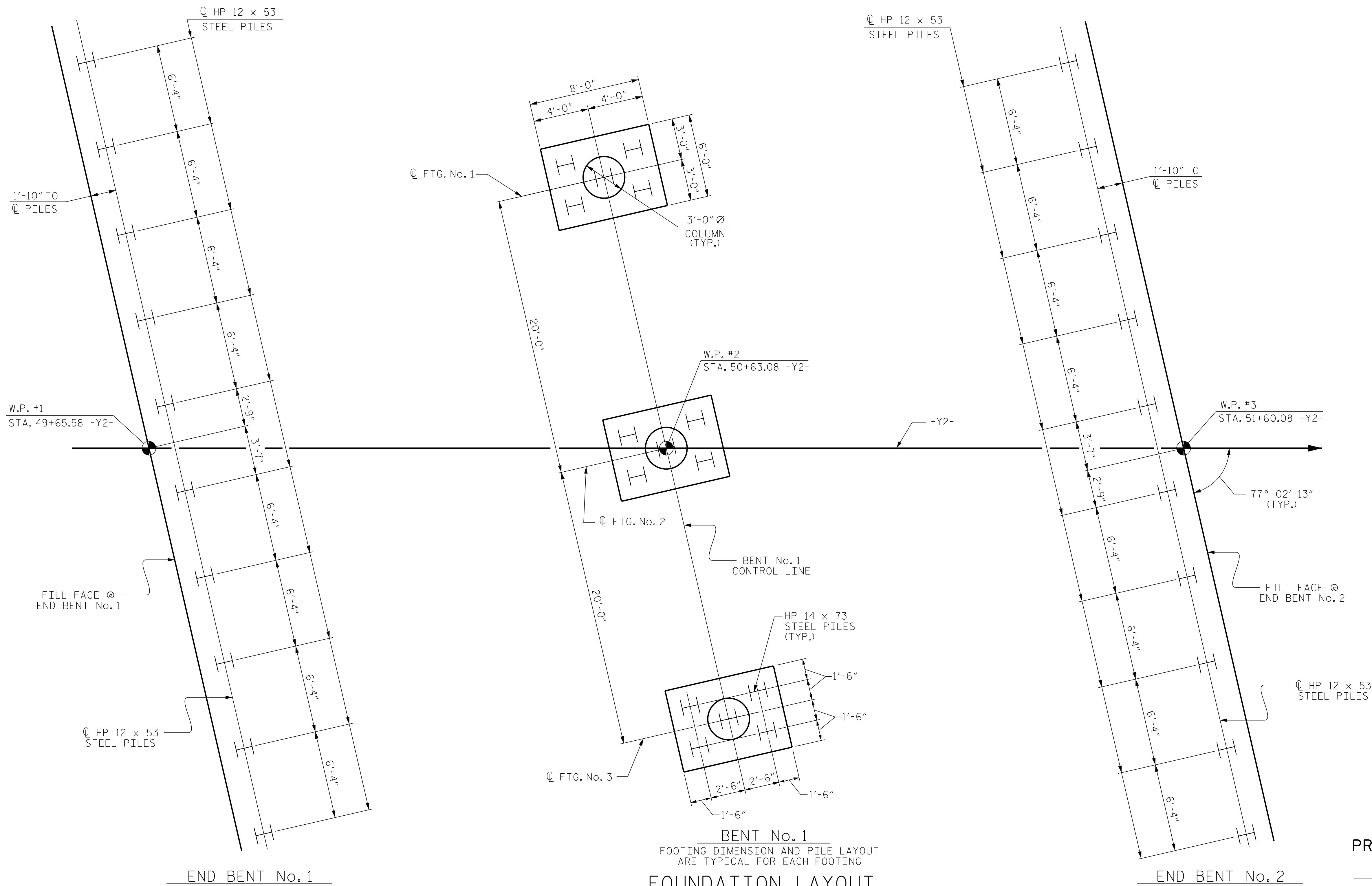
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|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | SHEET NO.    |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 61           |

DRAWN BY: J. PENDERGRAFT DATE: 2-16  
CHECKED BY: B.C. HUNT DATE: 10/16

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LICENSE NO. F-0377

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**BENT No. 1**  
FOOTING DIMENSION AND PILE LAYOUT  
ARE TYPICAL FOR EACH FOOTING  
**FOUNDATION LAYOUT**

**FOUNDATION NOTES**

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE. PILES AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 145 TONS PER PILE.

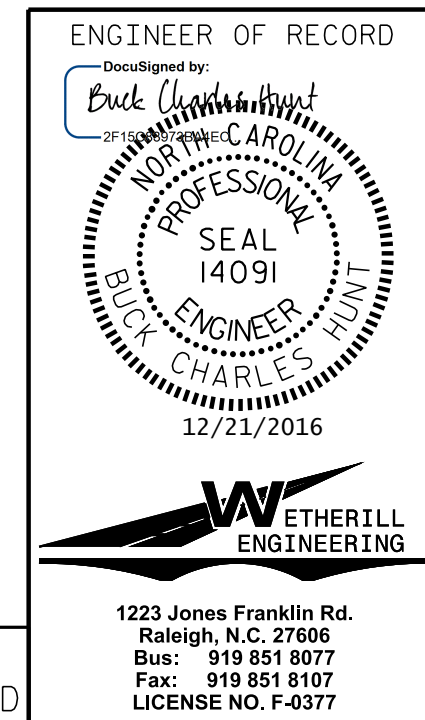
DRIVE PILES AT END BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 140 TONS PER PILE. DRIVE PILES AT END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 300 TONS PER PILE. THE REQUIRED DRIVING RESISTANCE AT END BENT NO. 2 INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAW. DRIVE PILES AT BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE.

TESTING THE FIRST PRODUCTION PILE WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING, OR REDRIVING IS REQUIRED AT END BENT NO.1 OR END BENT NO. 2 AND BENT NO.1. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A 1 MONTH WAITING PERIOD AT END BENT NO.1 AND 3 MONTH WAITING PERIOD AT END BENT NO.2 AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FEET OF FINISHED GRADE BEFORE BEGINNING CONSTRUCTION AT END BENT NO.1 AND END BENT NO.2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

SEE ROADWAY PLANS AND SPECIAL PROVISIONS FOR THE SETTLEMENT GAUGES REQUIRED AT END BENT NO.1 AND END BENT NO. 2.

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 50+99.00 -Y2-  
SHEET 2 OF 3



|  |     |       |     |     |                    |
|--|-----|-------|-----|-----|--------------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                    |
| <b>GENERAL DRAWING</b>   |     |       |     |     |                    |
| BRIDGE ON SR 1213<br>OVER NC 11 BETWEEN<br>SR SR 1131 & SR 1215    |     |       |     |     |                    |
| REVISIONS  |     |       |     |     |                    |
| NO.  | BY: | DATE: | NO. | BY: | DATE:              |
| 1  |     |       | 3   |     |                    |
| 2  |     |       | 4   |     |                    |
| SHEET NO.<br>S02-2   |     |       |     |     | TOTAL SHEETS<br>61 |

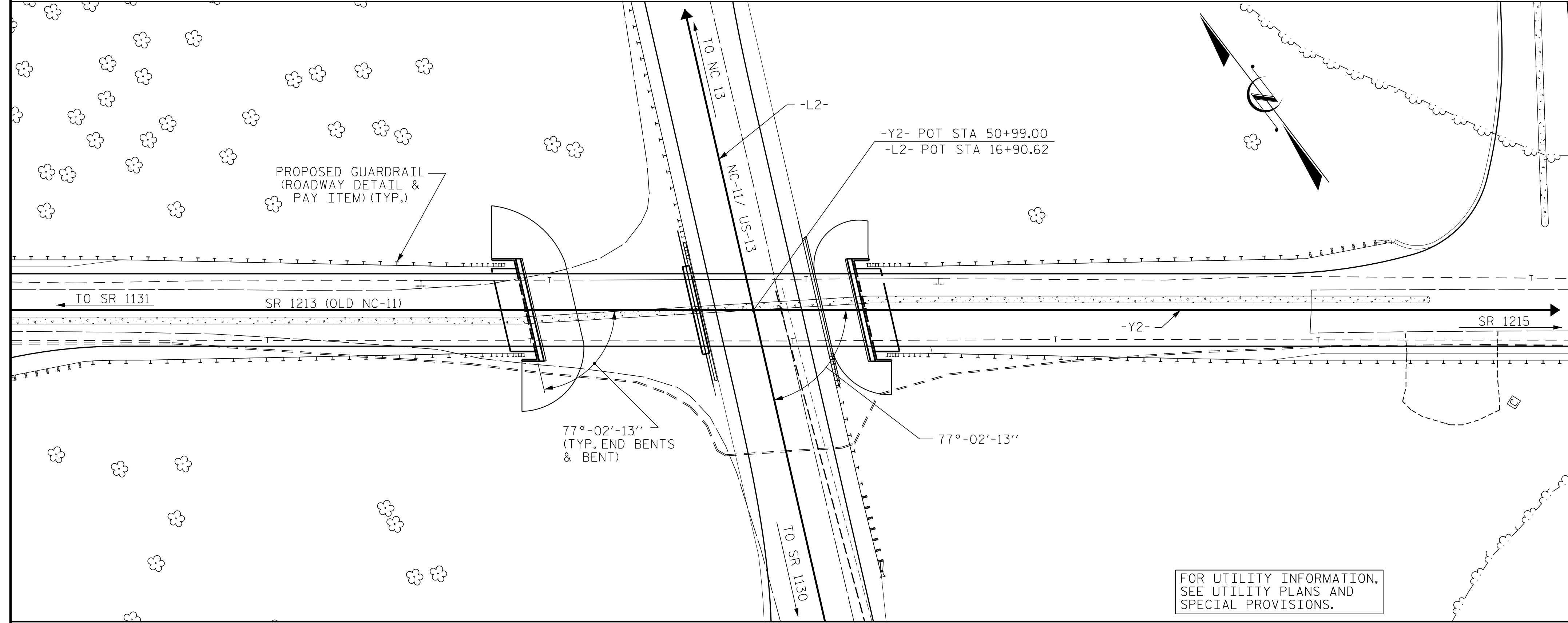
DRAWN BY : D. HODGE DATE : 3/16  
CHECKED BY : B.C. HUNT DATE : 10/16

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BENCH MARK #4 STA. 40+95.00 -Y2-, 85' RIGHT, N945769 E2590966, EL. 53.18



LOCATION SKETCH

**NOTES:**

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- 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.
- THE ELEVATION AND CLEARANCE SHOWN ON THE PLANS AT THE POINT OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.
- FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
- PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- FOR PLACING LOAD ON STRUCTURAL MEMBER, SEE SPECIAL PROVISIONS.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

**TOTAL BILL OF MATERIAL**

|                | FOUNDATION EXCAVATION FOR BENT | PDA TESTING | REINFORCED CONCRETE DECK SLAB | GROOVING BRIDGE FLOORS | CLASS A CONCRETE | BRIDGE APPROACH SLABS | REINFORCING STEEL | SPIRAL COLUMN REINFORCING STEEL | 54" PRESTRESSED CONCRETE GIRDERS | PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES | PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES | HP 12 x 53 STEEL PILES | HP 14 x 73 STEEL PILES | PILE REDRIVES | CONCRETE BARRIER RAIL | 4" SLOPE PROTECTION | ELASTOMERIC BEARINGS |          |
|----------------|--------------------------------|-------------|-------------------------------|------------------------|------------------|-----------------------|-------------------|---------------------------------|----------------------------------|---|---|------------------------|------------------------|---------------|-----------------------|---------------------|----------------------|----------|
|                | LUMP SUM                       | EA.         | SQ. FT.                       | SQ. FT.                | CU. YDS.         | LUMP SUM              | LBS.              | LBS.                            | No.                              | LIN. FT.  | EA.   | EA.                    | No.                    | LIN. FT.      | EA.                   | LIN. FT.            | SQ. YDS.             | LUMP SUM |
| SUPERSTRUCTURE |                                |             | 10,260                        | 8,763                  |                  | LUMP SUM              |                   |                                 | 12                               | 1148.00   |   |                        |                        |               | 385.58                |                     | LUMP SUM             |          |
| END BENT 1     |                                |             |                               |                        | 43.7             |                       | 5,214             |                                 |                                  |   | 10  | 870                    |                        | 5             |                       | 640                 |                      |          |
| BENT 1         | LUMP SUM                       |             |                               |                        | 68.0             |                       | 10,464            | 1,352                           |                                  |   | 15  |                        | 15                     | 1,061         | 8                     |                     |                      |          |
| END BENT 2     |                                |             |                               |                        | 43.8             |                       | 5,214             |                                 |                                  |   | 10  | 870                    |                        | 5             |                       | 485                 |                      |          |
| TOTAL          | LUMP SUM                       | 2           | 10,260                        | 8,763                  | 155.5            | LUMP SUM              | 20,892            | 1,352                           | 12                               | 1148.00   | 20  | 1,740                  | 15                     | 1,061         | 18                    | 385.58              | 1,125                | LUMP SUM |

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-

SHEET 3 OF 3

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DRAWN BY: J. PENDERGRAFT DATE: 2-16  
 CHECKED BY: B.C. HUNT DATE: 10/16

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ENGINEER OF RECORD  
*DocuSigned by:*  
*Evie Charles Hunt*  
 4/5/2017

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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 BRIDGE ON SR 1213  
 OVER NC 11 BETWEEN  
 SR SR 1131 & SR 1215

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | SHEET NO.    |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 61           |

LOAD FACTORS:

|                            |             |               |               |
|----------------------------|-------------|---------------|---------------|
| DESIGN LOAD RATING FACTORS | LIMIT STATE | $\gamma_{DC}$ | $\gamma_{DW}$ |
|                            | STRENGTH I  | 1.25          | 1.50          |
|                            | SERVICE III | 1.00          | 1.00          |

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

| LEVEL              | VEHICLE                           | WEIGHT (W)<br>(TONS) | CONTROLLING LOAD RATING (#) | MINIMUM RATING FACTORS (RF) | TONS = W x RF | STRENGTH I LIMIT STATE              |                           |               |      |                 |                                     |                           |               |      |                 | SERVICE III LIMIT STATE             |                                     |                           |               |      | COMMENT NUMBER |                 |                                     |  |
|--------------------|-----------------------------------|----------------------|-----------------------------|-----------------------------|---------------|-------------------------------------|---------------------------|---------------|------|-----------------|-------------------------------------|---------------------------|---------------|------|-----------------|-------------------------------------|-------------------------------------|---------------------------|---------------|------|----------------|-----------------|-------------------------------------|--|
|                    |                                   |                      |                             |                             |               | MOMENT                              |                           |               |      |                 | SHEAR                               |                           |               |      |                 | MOMENT                              |                                     |                           |               |      |                |                 |                                     |  |
|                    |                                   |                      |                             |                             |               | LIVE-LOAD FACTORS ( $\gamma_{LL}$ ) | DISTRIBUTION FACTORS (DF) | RATING FACTOR | SPAN | GIRDER LOCATION | DISTANCE FROM LEFT END OF SPAN (ft) | DISTRIBUTION FACTORS (DF) | RATING FACTOR | SPAN | GIRDER LOCATION | DISTANCE FROM LEFT END OF SPAN (ft) | LIVE-LOAD FACTORS ( $\gamma_{LL}$ ) | DISTRIBUTION FACTORS (DF) | RATING FACTOR | SPAN |                | GIRDER LOCATION | DISTANCE FROM LEFT END OF SPAN (ft) |  |
| DESIGN LOAD RATING | HL-93 (INVENTORY)                 | N/A                  | ①                           | 1.19                        | --            | 1.75                                | 0.81                      | 1.50          | A    | E               | 47.25                               | 0.94                      | 1.23          | A    | I               | 76.03                               | 0.80                                | 0.81                      | 1.19          | A    | E              | 47.25           |                                     |  |
|                    | HL-93 (OPERATING)                 | N/A                  |                             | 1.64                        | --            | 1.35                                | 0.81                      | 1.95          | A    | E               | 47.25                               | 0.94                      | 1.64          | A    | I               | 76.03                               | N/A                                 | --                        | --            | --   | --             | --              |                                     |  |
|                    | HS-20 (INVENTORY)                 | 36.000               | ②                           | 1.63                        | 58.680        | 1.75                                | 0.81                      | 2.07          | A    | E               | 47.25                               | 0.94                      | 1.63          | A    | I               | 76.03                               | 0.80                                | 0.81                      | 1.63          | A    | E              | 47.25           |                                     |  |
|                    | HS-20 (OPERATING)                 | 36.000               |                             | 2.16                        | 77.760        | 1.35                                | 0.81                      | 2.68          | A    | E               | 47.25                               | 0.94                      | 2.16          | A    | I               | 76.03                               | N/A                                 | --                        | --            | --   | --             | --              |                                     |  |
| LEGAL LOAD RATING  | SINGLE VEHICLE (SV)               | SNSH                 | 13.500                      |                             | 3.10          | 41.850                              | 1.40                      | 0.81          | 6.09 | A               | E                                   | 47.25                     | 0.94          | 5.25 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 3.10 | A              | E               | 47.25                               |  |
|                    |                                   | SNGARBS2             | 20.000                      |                             | 2.25          | 45.000                              | 1.40                      | 0.81          | 4.43 | A               | E                                   | 47.25                     | 0.94          | 3.65 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 2.25 | A              | E               | 47.25                               |  |
|                    |                                   | SNAGRIS2             | 22.000                      |                             | 2.11          | 46.420                              | 1.40                      | 0.81          | 4.15 | A               | E                                   | 47.25                     | 0.94          | 3.37 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 2.11 | A              | E               | 47.25                               |  |
|                    |                                   | SNCOTTS3             | 27.250                      |                             | 1.54          | 41.965                              | 1.40                      | 0.81          | 3.03 | A               | E                                   | 47.25                     | 0.94          | 2.54 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 1.54 | A              | E               | 47.25                               |  |
|                    |                                   | SNAGGRS4             | 34.925                      |                             | 1.26          | 44.006                              | 1.40                      | 0.81          | 2.49 | A               | E                                   | 47.25                     | 0.94          | 2.06 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 1.26 | A              | E               | 47.25                               |  |
|                    |                                   | SNS5A                | 35.550                      |                             | 1.24          | 44.020                              | 1.40                      | 0.81          | 2.44 | A               | E                                   | 47.25                     | 0.94          | 2.08 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 1.24 | A              | E               | 47.25                               |  |
|                    |                                   | SNS6A                | 39.950                      |                             | 1.13          | 45.144                              | 1.40                      | 0.81          | 2.22 | A               | E                                   | 47.25                     | 0.94          | 1.87 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 1.13 | A              | E               | 47.25                               |  |
|                    |                                   | SNS7B                | 42.000                      |                             | 1.07          | 44.940                              | 1.40                      | 0.81          | 2.11 | A               | E                                   | 47.25                     | 0.94          | 1.83 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 1.07 | A              | E               | 47.25                               |  |
|                    | TRUCK TRACTOR SEMI-TRAILER (TTST) | TNAGRIT3             | 33.000                      |                             | 1.37          | 45.210                              | 1.40                      | 0.81          | 2.70 | A               | E                                   | 47.25                     | 0.94          | 2.26 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 1.37 | A              | E               | 47.25                               |  |
|                    |                                   | TNT4A                | 33.075                      |                             | 1.37          | 45.313                              | 1.40                      | 0.81          | 2.71 | A               | E                                   | 47.25                     | 0.94          | 2.21 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 1.37 | A              | E               | 47.25                               |  |
|                    |                                   | TNT6A                | 41.600                      |                             | 1.12          | 46.592                              | 1.40                      | 0.81          | 2.20 | A               | E                                   | 47.25                     | 0.94          | 1.94 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 1.12 | A              | E               | 47.25                               |  |
|                    |                                   | TNT7A                | 42.000                      |                             | 1.12          | 47.040                              | 1.40                      | 0.81          | 2.20 | A               | E                                   | 47.25                     | 0.94          | 1.90 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 1.12 | A              | E               | 47.25                               |  |
|                    |                                   | TNT7B                | 42.000                      |                             | 1.14          | 47.880                              | 1.40                      | 0.81          | 2.25 | A               | E                                   | 47.25                     | 0.94          | 1.79 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 1.14 | A              | E               | 47.25                               |  |
|                    |                                   | TNAGRIT4             | 43.000                      |                             | 1.10          | 47.300                              | 1.40                      | 0.81          | 2.16 | A               | E                                   | 47.25                     | 0.94          | 1.73 | A               | I                                   | 76.03                               | 0.80                      | 0.81          | 1.10 | A              | E               | 47.25                               |  |
| TNAGT5A            | 45.000                            |                      | 1.04                        | 46.800                      | 1.40          | 0.81                                | 2.04                      | A             | E    | 47.25           | 0.94                                | 1.71                      | A             | I    | 76.03           | 0.80                                | 0.81                                | 1.04                      | A             | E    | 47.25          |                 |                                     |  |
| TNAGT5B            | 45.000                            | ③                    | 1.03                        | 46.350                      | 1.40          | 0.81                                | 2.03                      | A             | E    | 47.25           | 0.94                                | 1.64                      | A             | I    | 76.03           | 0.80                                | 0.81                                | 1.03                      | A             | E    | 47.25          |                 |                                     |  |

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

- 
- 
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- 

# CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

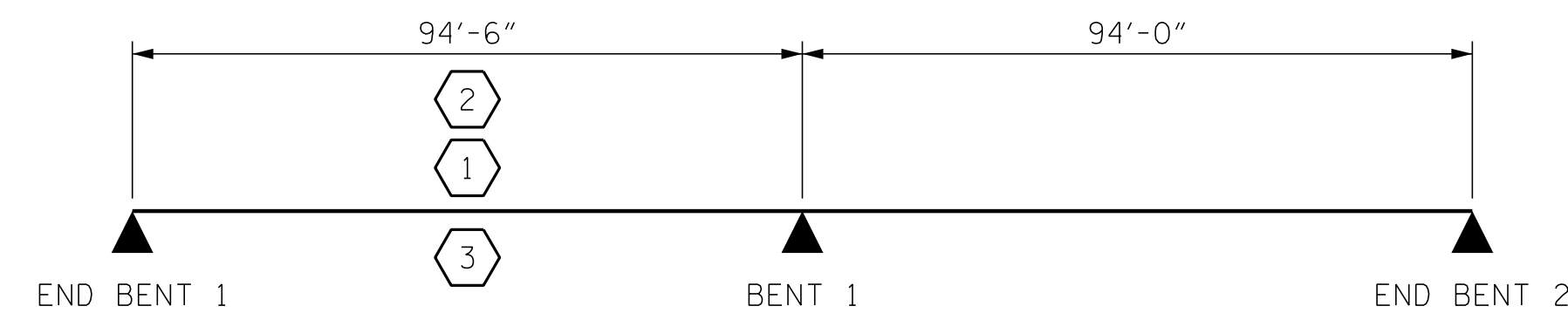
③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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GIRDER LOCATION

I - INTERIOR GIRDER  
 EL - EXTERIOR LEFT GIRDER  
 ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-

ENGINEER OF RECORD

DocuSigned by:  
*Bob Charles Hunt*

STATE OF NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 SEAL 14091  
 BOB CHARLES HUNT  
 12/21/2016

ETHERILL ENGINEERING

1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 LRFR SUMMARY FOR  
 PRESTRESSED  
 CONCRETE GIRDERS  
 (NON-INTERSTATE TRAFFIC)

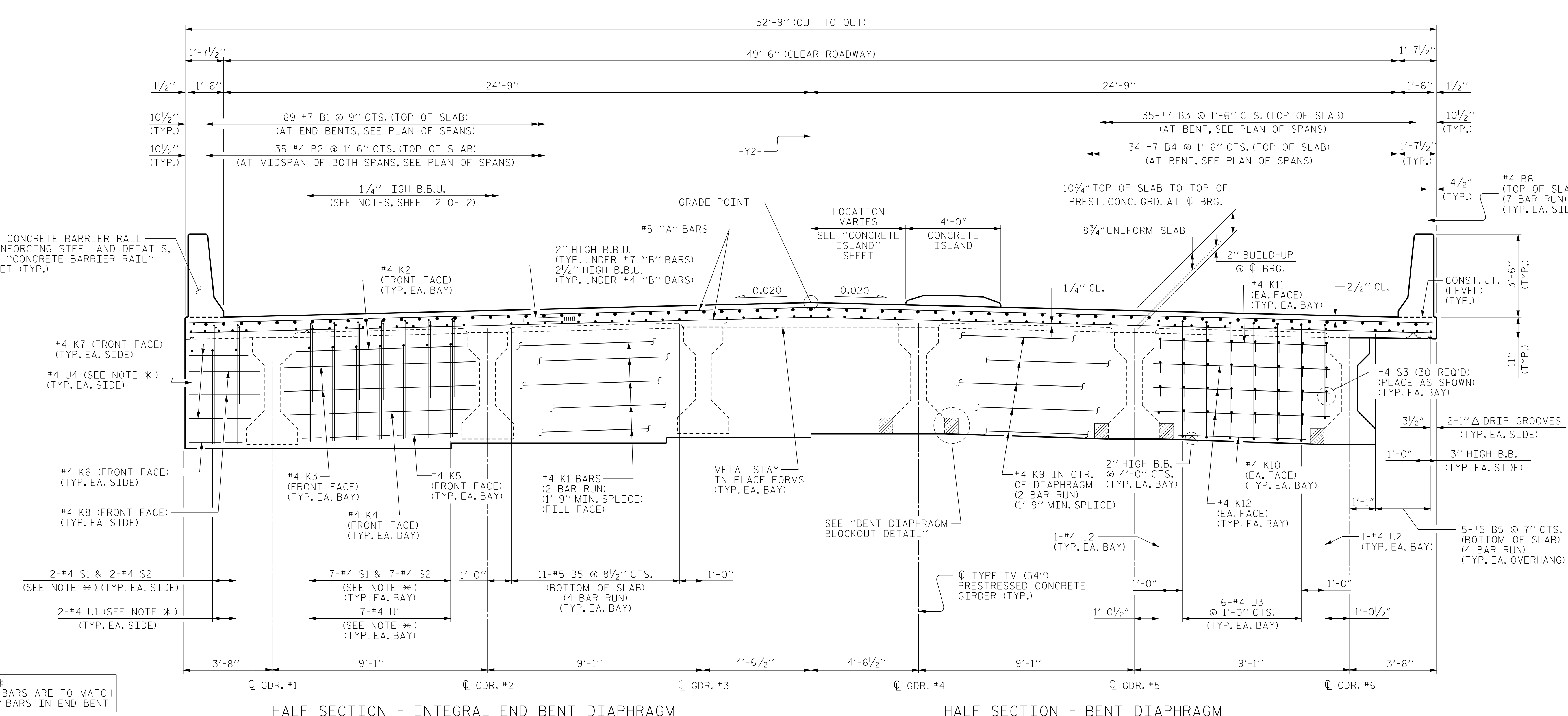
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SHEET NO. S02-4  
 TOTAL SHEETS 61

|                           |                       |
|---------------------------|-----------------------|
| ASSEMBLED BY : B.C. HUNT  | DATE : 2-29-16        |
| CHECKED BY : G.M. GILLAND | DATE : 3-3-16         |
| DRAWN BY : MAA 1/08       | REV. 11/2/08RR MAA/GM |
| CHECKED BY : GM/DI 2/08   | REV. 10/1/11 MAA/GM   |

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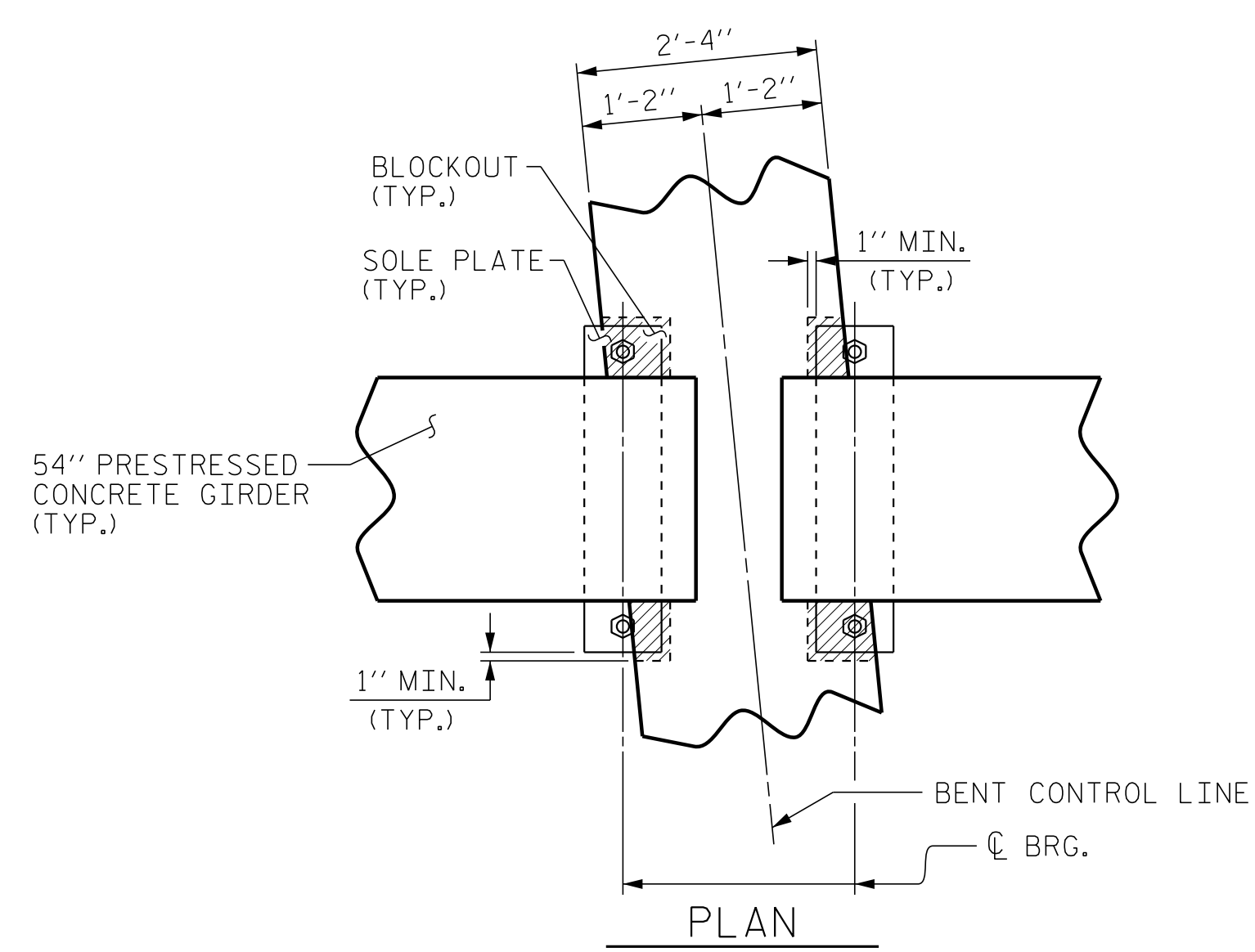




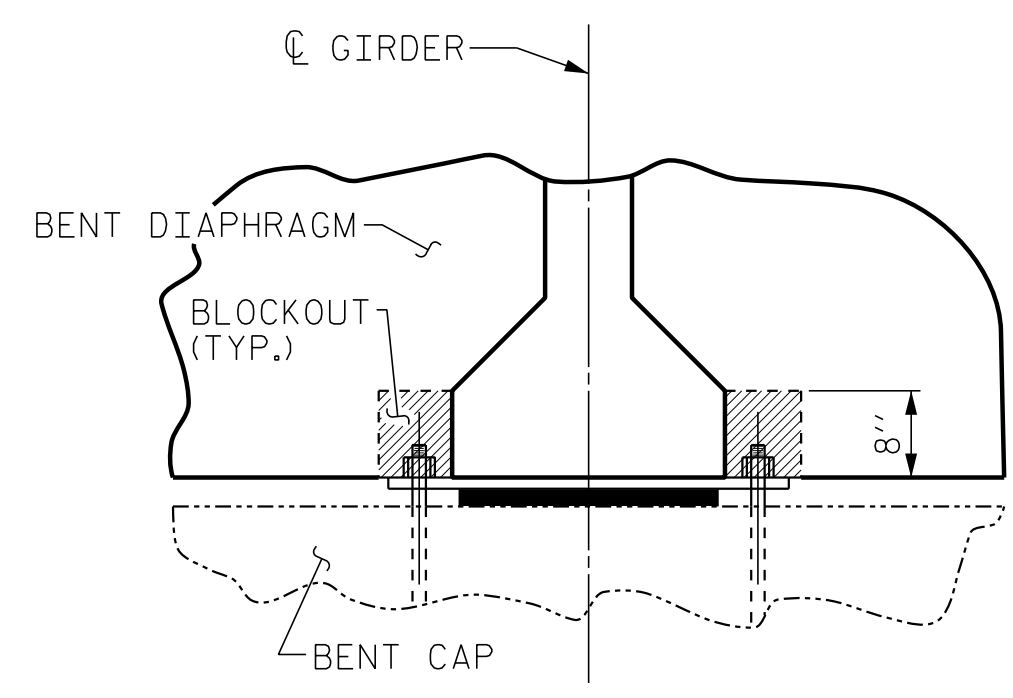
NOTE \*  
THESE BARS ARE TO MATCH #4 "V" BARS IN END BENT

HALF SECTION - INTEGRAL END BENT DIAPHRAGM      HALF SECTION - BENT DIAPHRAGM

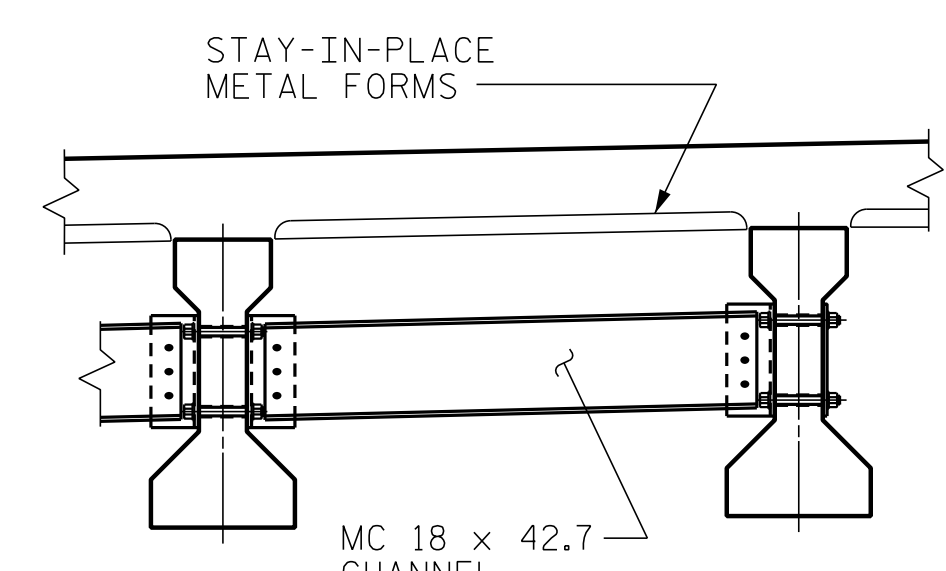
TYPICAL SECTION



BENT DIAPHRAGM BLOCK-OUT DETAIL



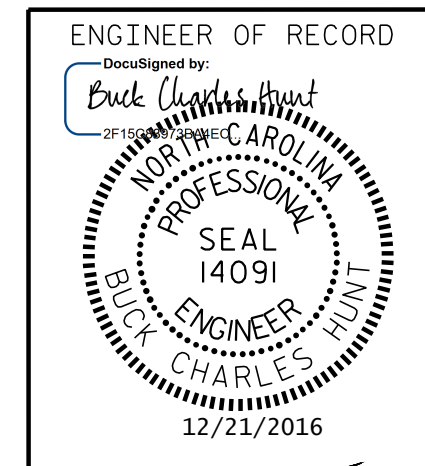
SECTION



TYPICAL INTERMEDIATE DIAPHRAGM

SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET FOR DETAILS

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 50+99.00 -Y2-  
SHEET 1 OF 2



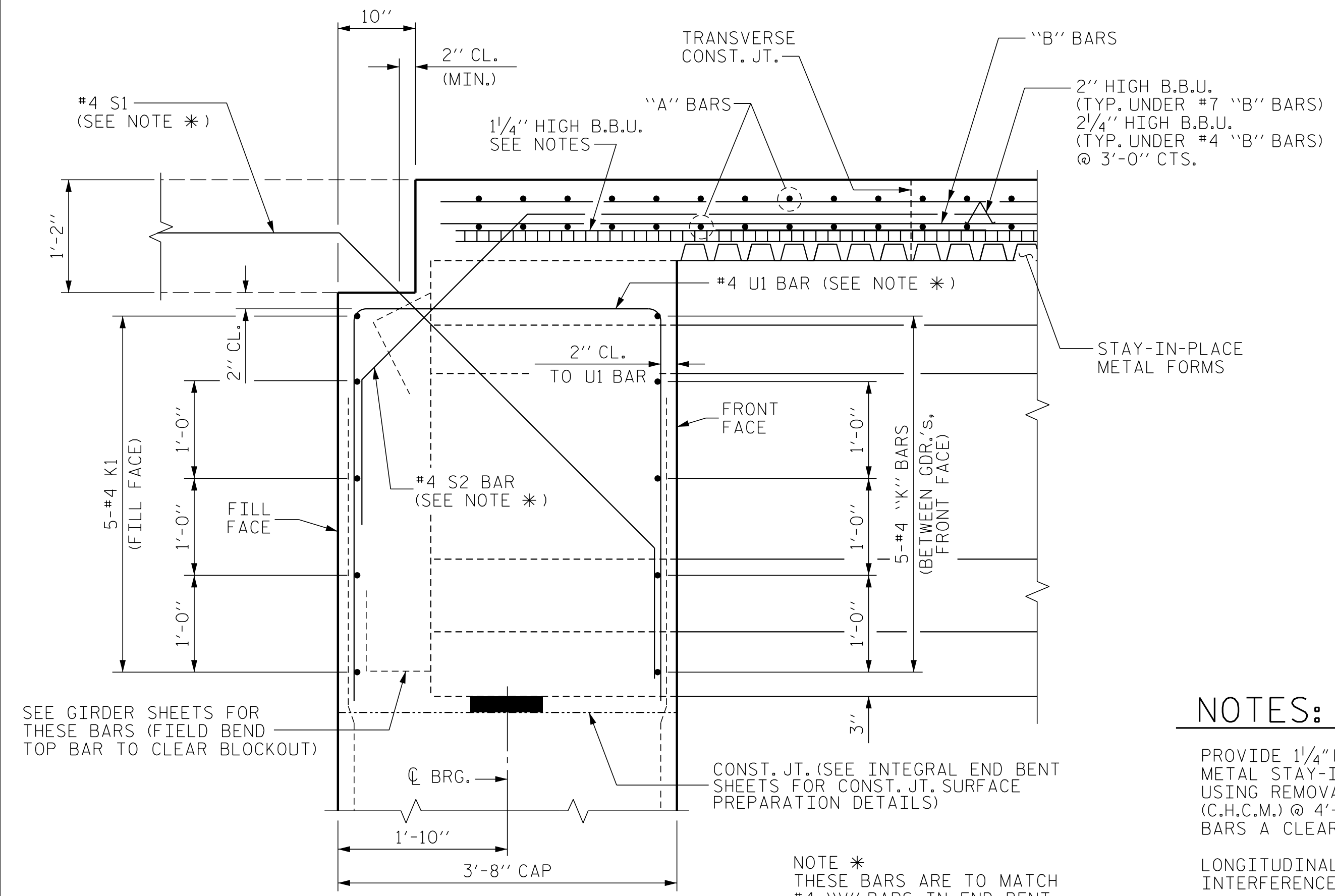
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| SUPERSTRUCTURE<br>TYPICAL SECTION                                  |     |       |     |     |                 |
| REVISIONS  |     |       |     |     |                 |
| NO.  | BY: | DATE: | NO. | BY: | DATE:           |
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| SHEET NO. S02-5  |     |       |     |     | TOTAL SHEETS 61 |

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CHECKED BY: G.M. GILLAND      DATE: 3/16

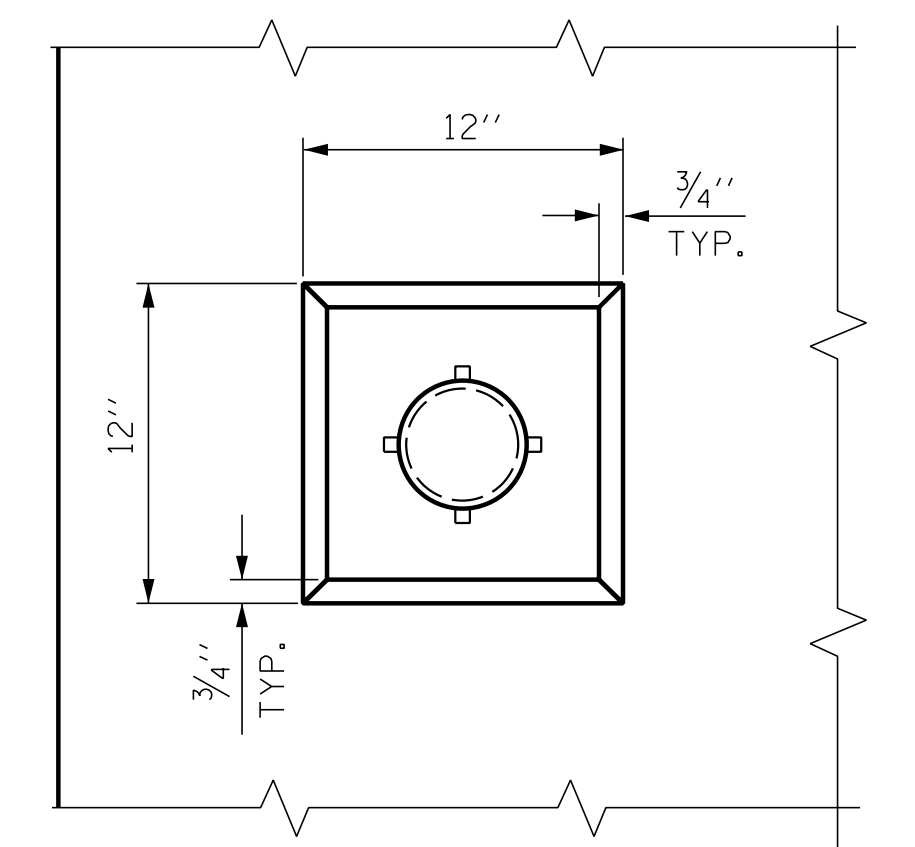
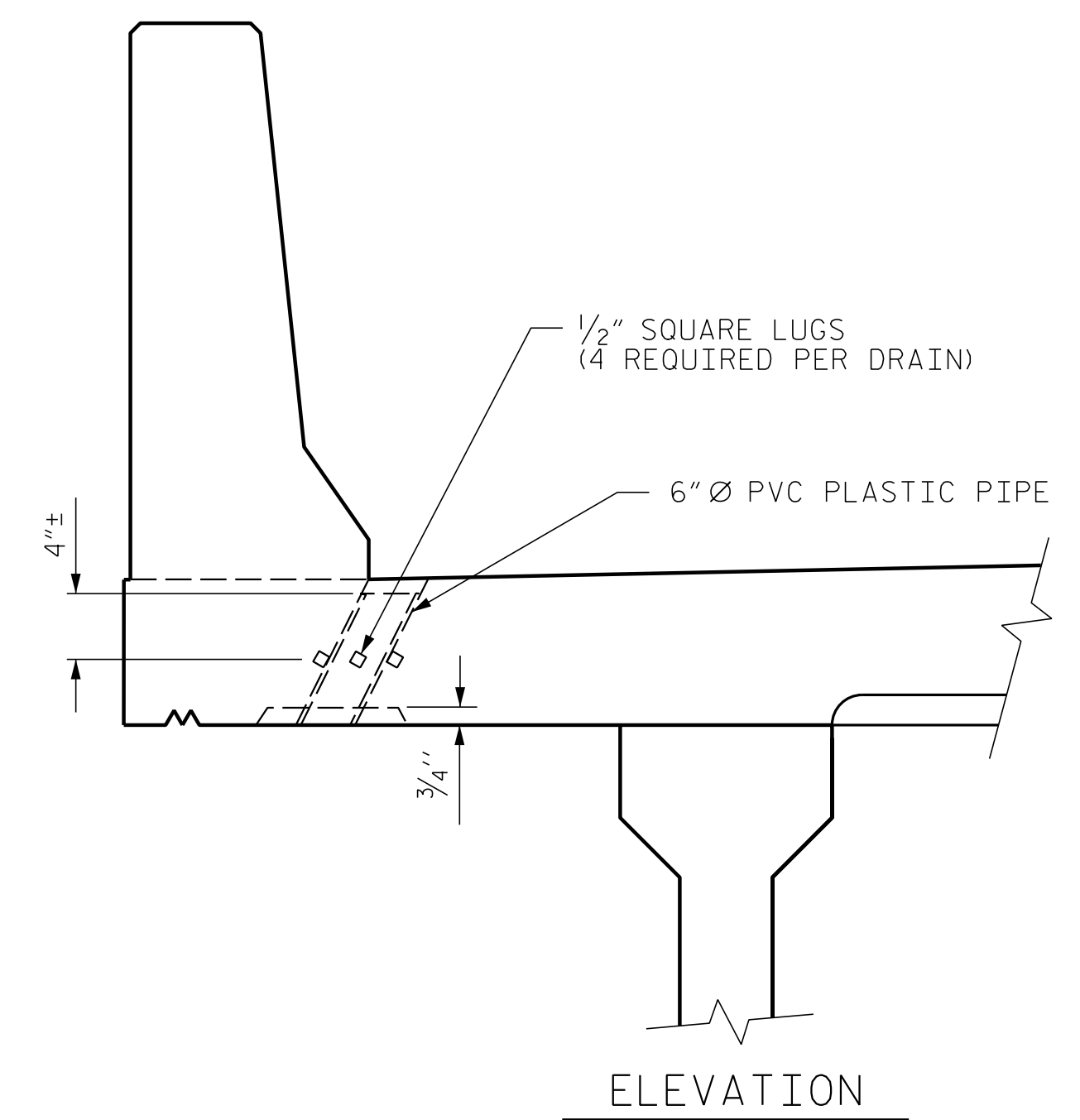
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**SECTION THRU INTEGRAL END BENT**  
(SHOWN PERPENDICULAR TO FILL FACE)

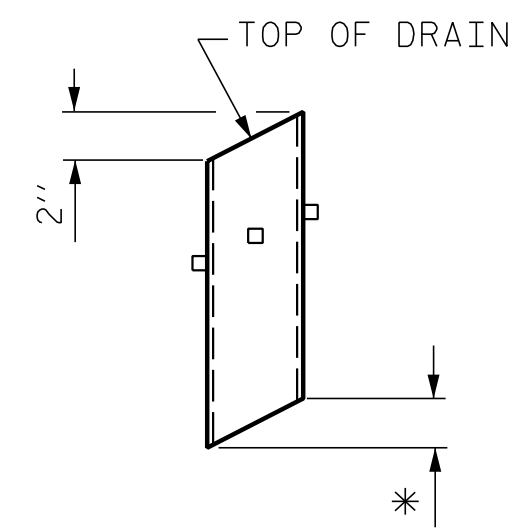
**NOTES:**

- PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.
- LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.
- PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.
- CONCRETE BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

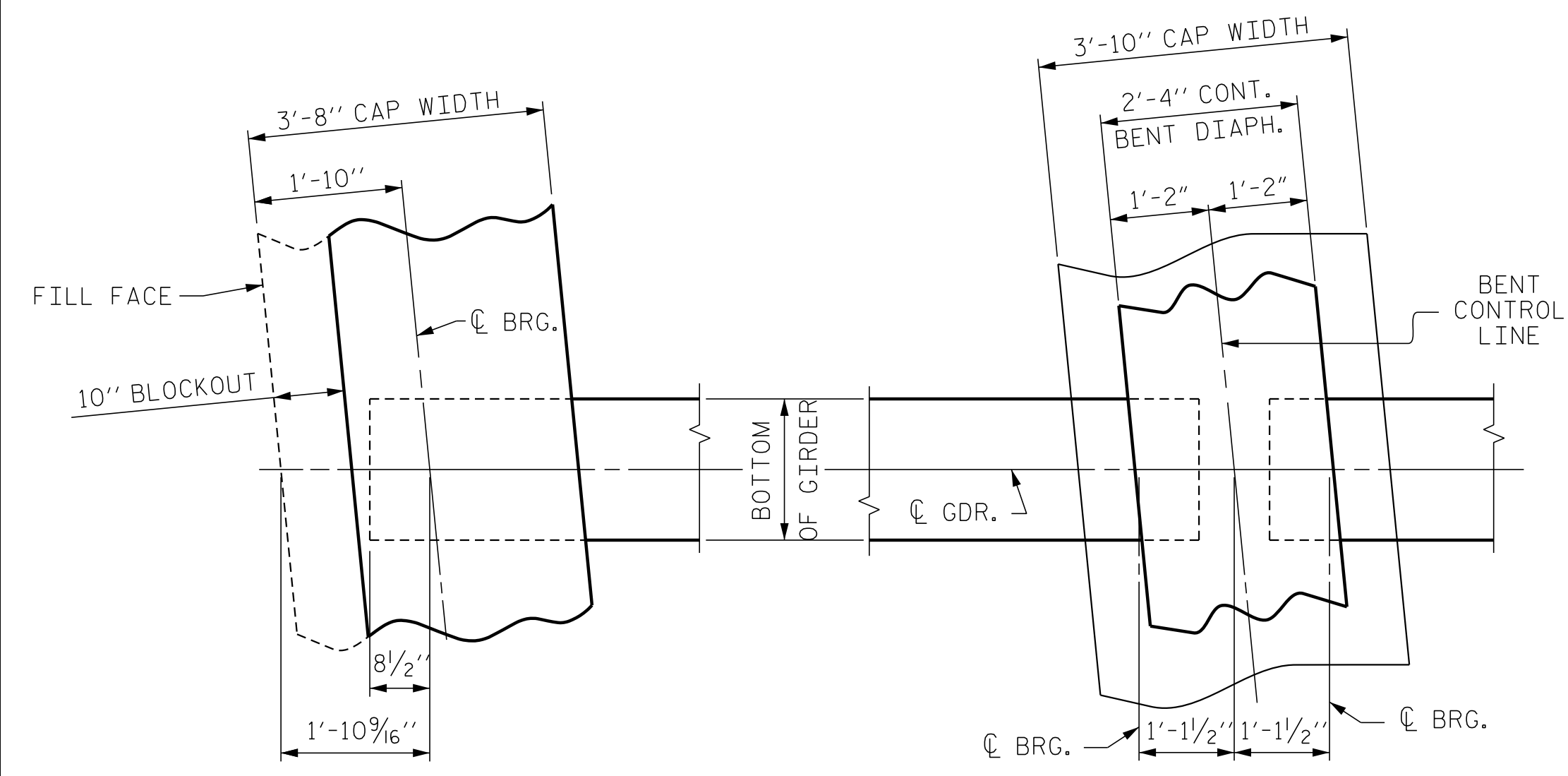


**PLAN OF RECESS**  
**PIPE DETAIL**

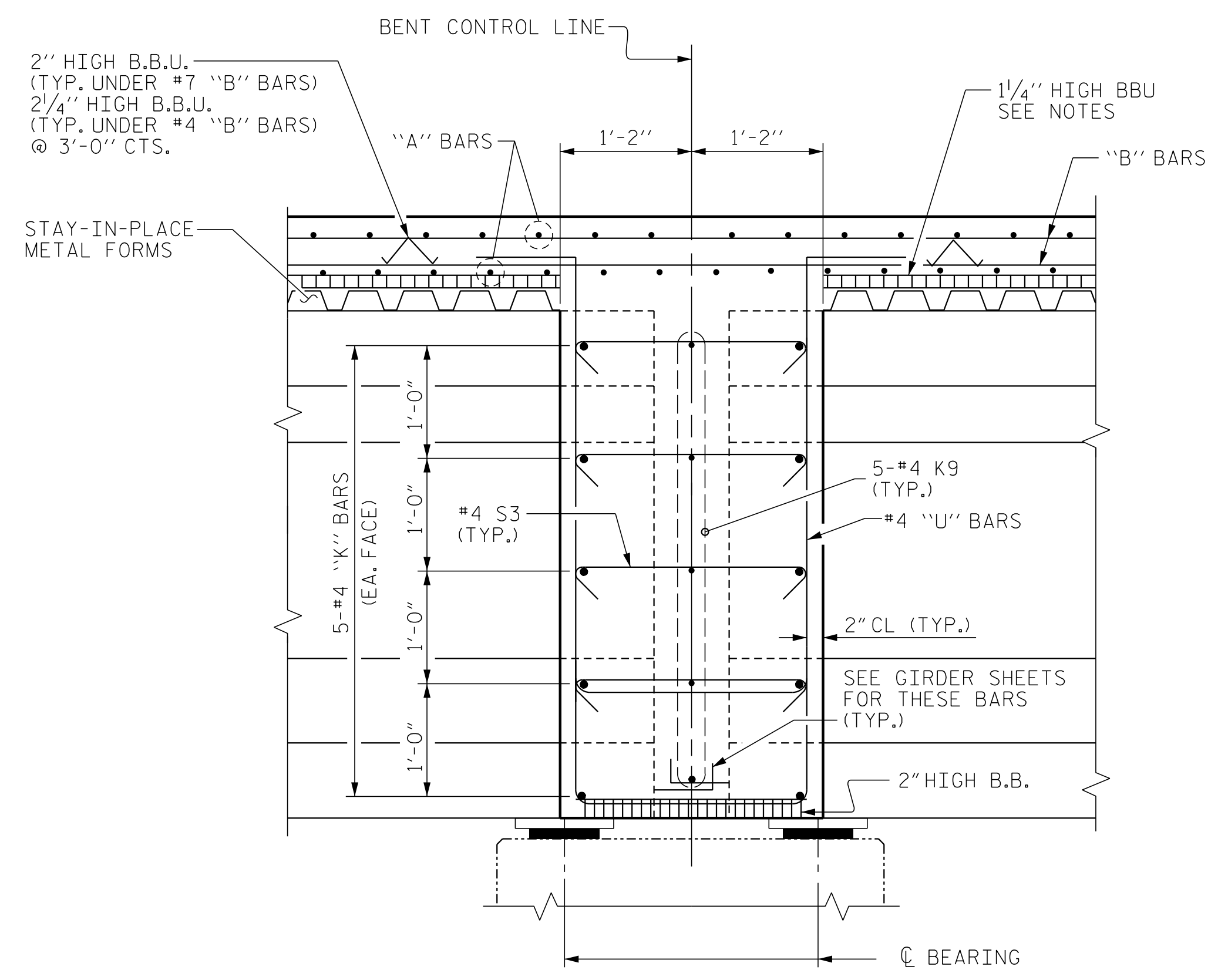
- TOP OF FLOOR DRAINS TO BE SET 3/8" BELOW SURFACE OF SLAB.
- 4 - 1/2" SQUARE LUGS TO BE GLUED TO THE P.V.C. PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.
- THE 6" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.



**DRAIN DETAILS**

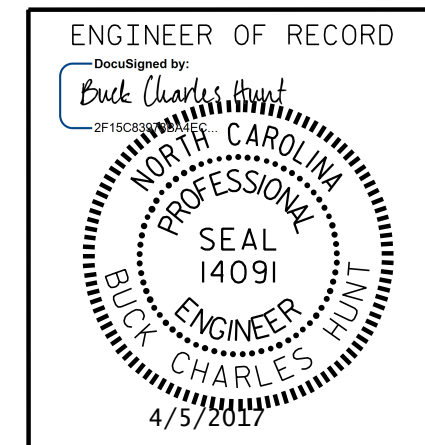


**PLAN OF DIAPHRAGMS**



**SECTION THRU CONTINUOUS BENT DIAPHRAGM**  
(SHOWN PERPENDICULAR TO BENT CONTROL LINE)

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 50+99.00 -Y2-  
SHEET 2 OF 2



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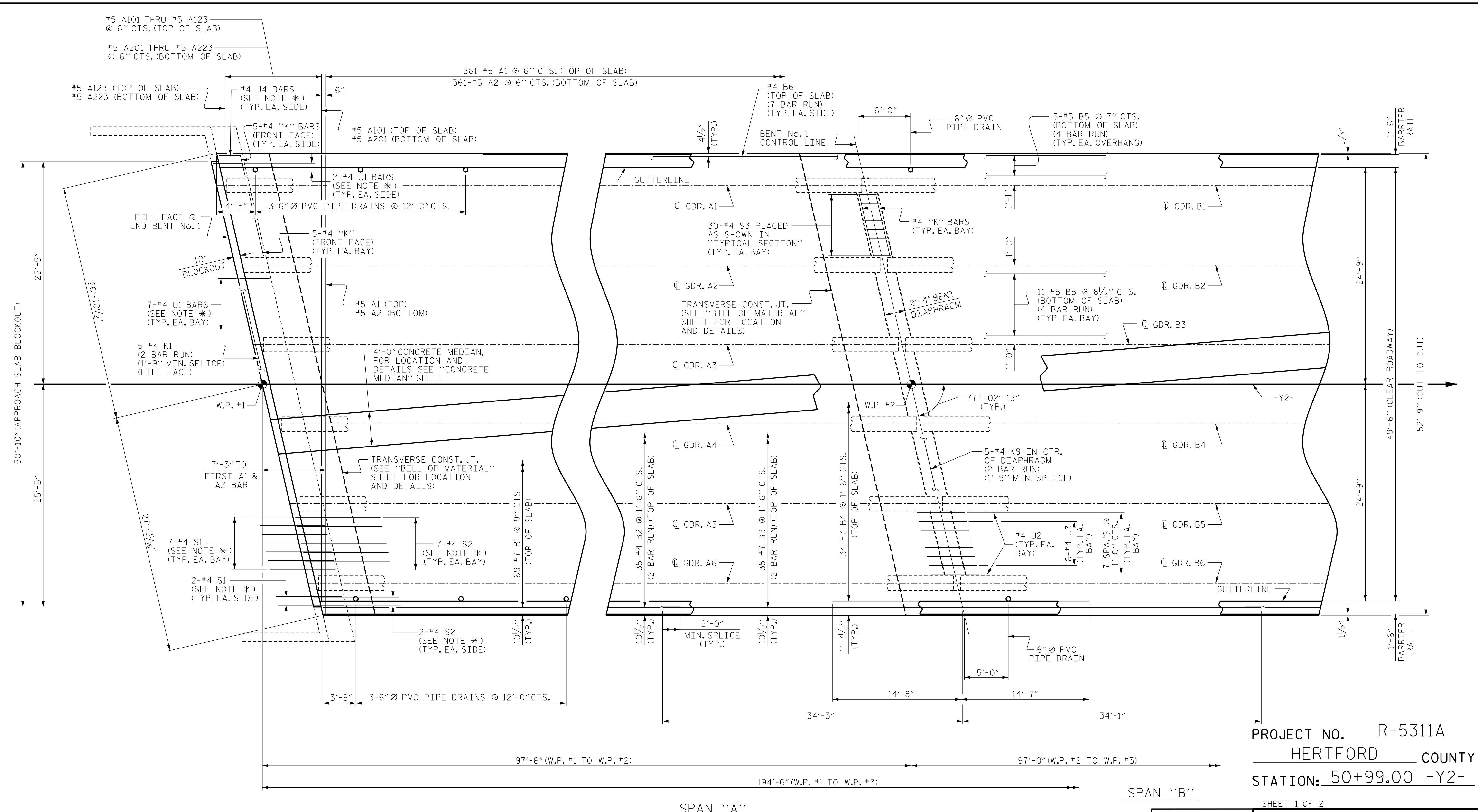
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| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |       |
| SUPERSTRUCTURE<br>TYPICAL SECTION                                  |     |       |     |     |       |
| REVISIONS  |     |       |     |     |       |
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| SHEET NO.  |     |       |     |     | S02-6 |
| TOTAL SHEETS   |     |       |     |     | 61    |

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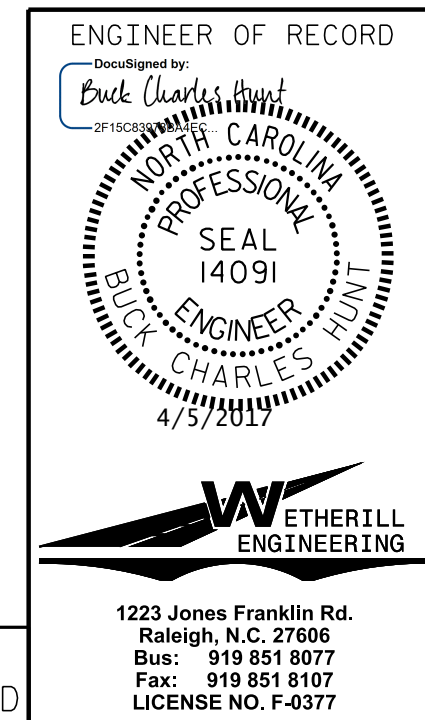




PARTIAL PLAN OF SPAN

**NOTES :**  
 FOR CONCRETE BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEETS.  
 \* THESE BARS ARE TO MATCH SPACING OF THE #4 "V" BARS IN END BENT.  
 FOR LOCATIONS OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEET.

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-  
 SHEET 1 OF 2



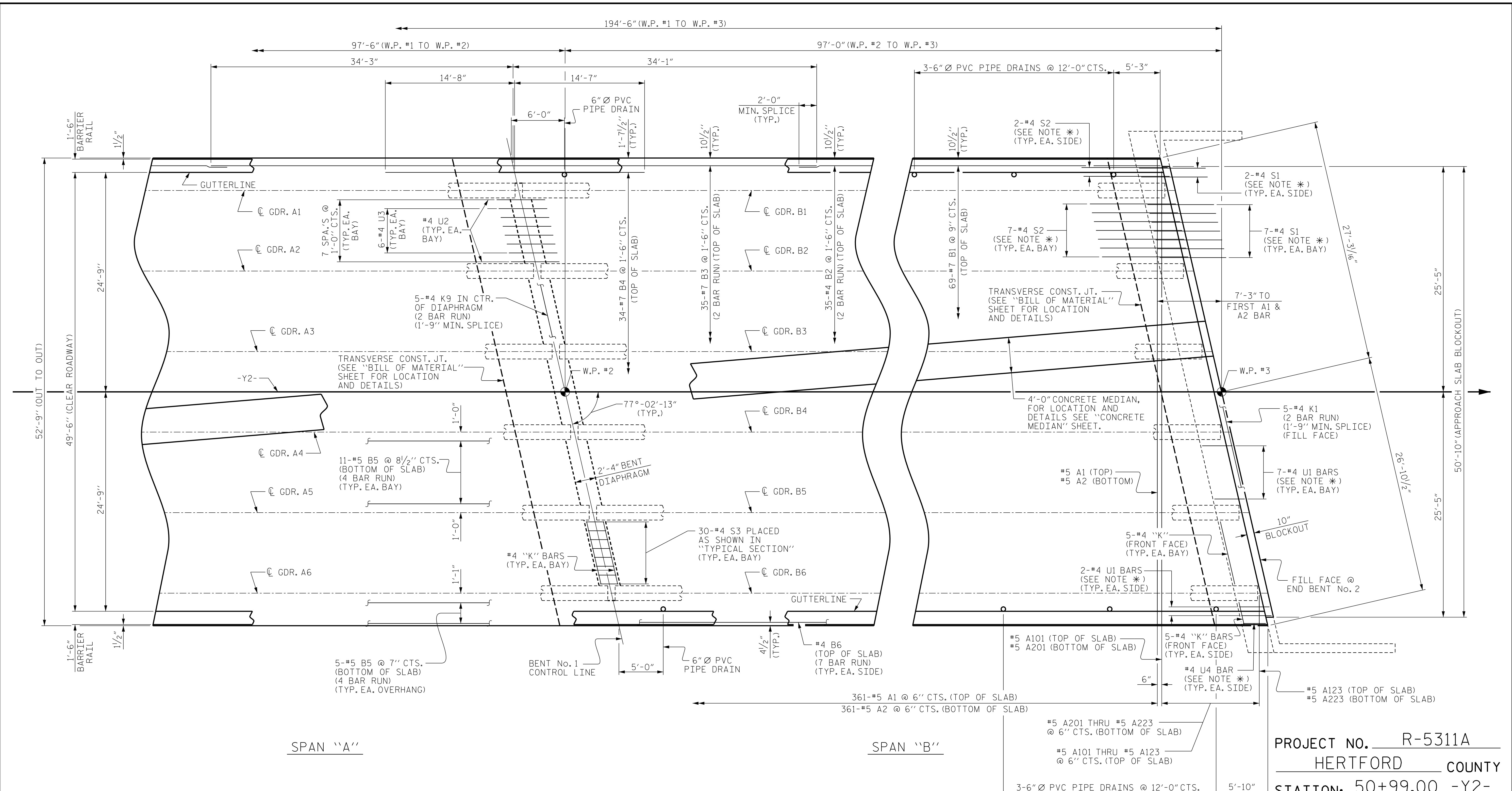
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| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                    |
| SUPERSTRUCTURE<br>PLAN OF SPAN                                     |     |       |     |     |                    |
| REVISIONS  |     |       |     |     |                    |
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SPAN "A"

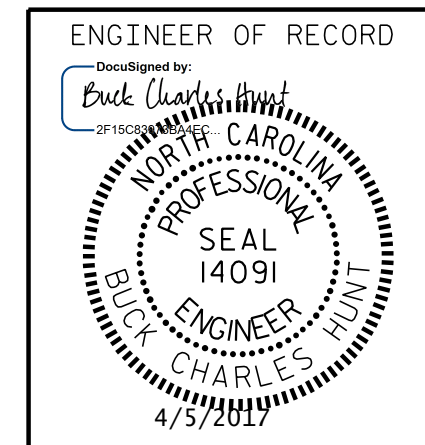
SPAN "B"

PARTIAL PLAN OF SPAN

PROJECT NO. R-5311A  
 HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-

SHEET 2 OF 2

**NOTES :**  
 FOR CONCRETE BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEETS.  
 \* THESE BARS ARE TO MATCH SPACING OF THE #4 "K" BARS IN END BENT.  
 FOR LOCATIONS OF INTERMEDIATE STEEL DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEET.



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|--|-----|-------|-----|-----|-----------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                 |
| SUPERSTRUCTURE<br>PLAN OF SPAN                                     |     |       |     |     |                 |
| REVISIONS  |     |       |     |     |                 |
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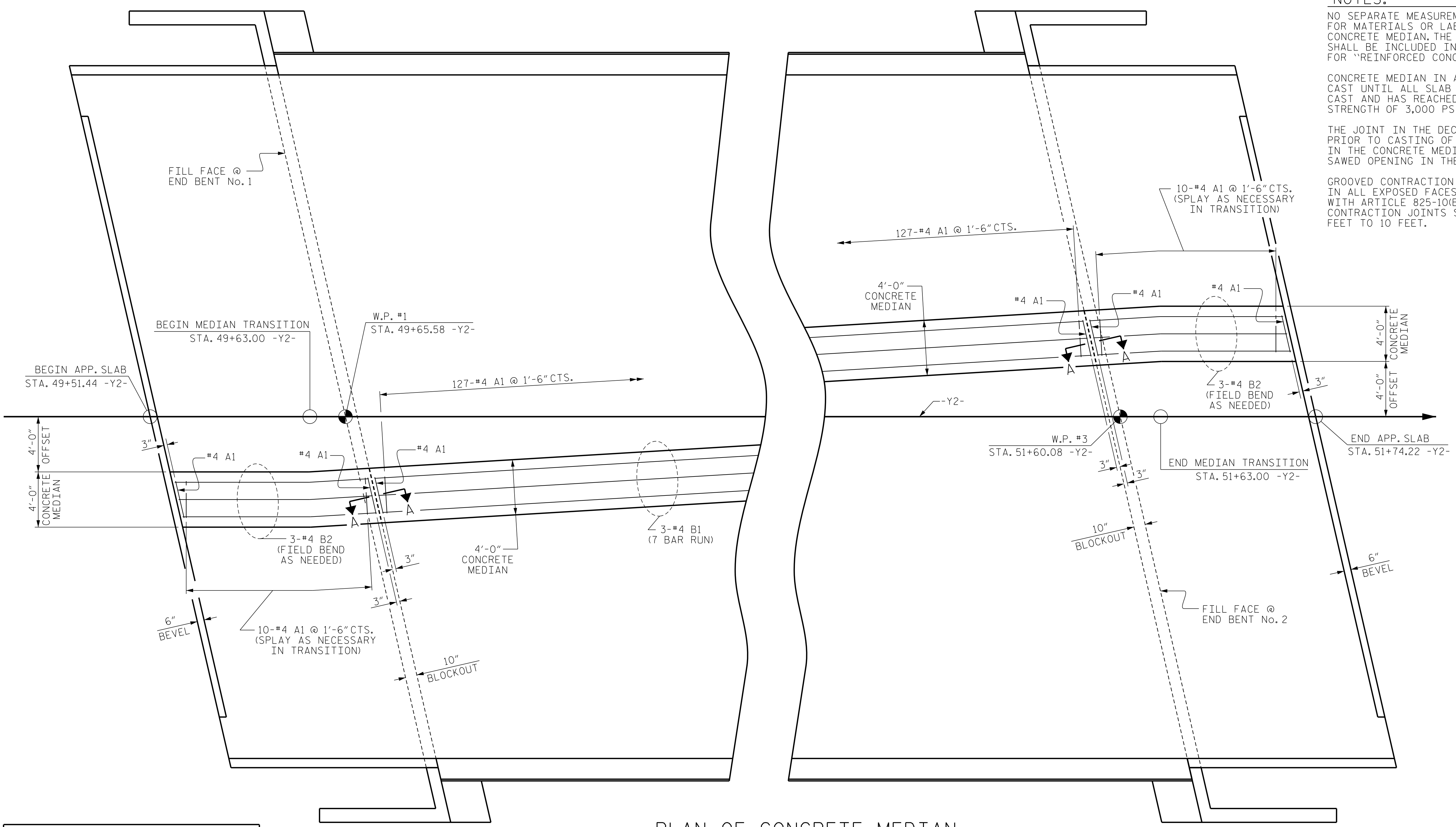
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 CHECKED BY: G.M. GILLAND DATE: 3/16

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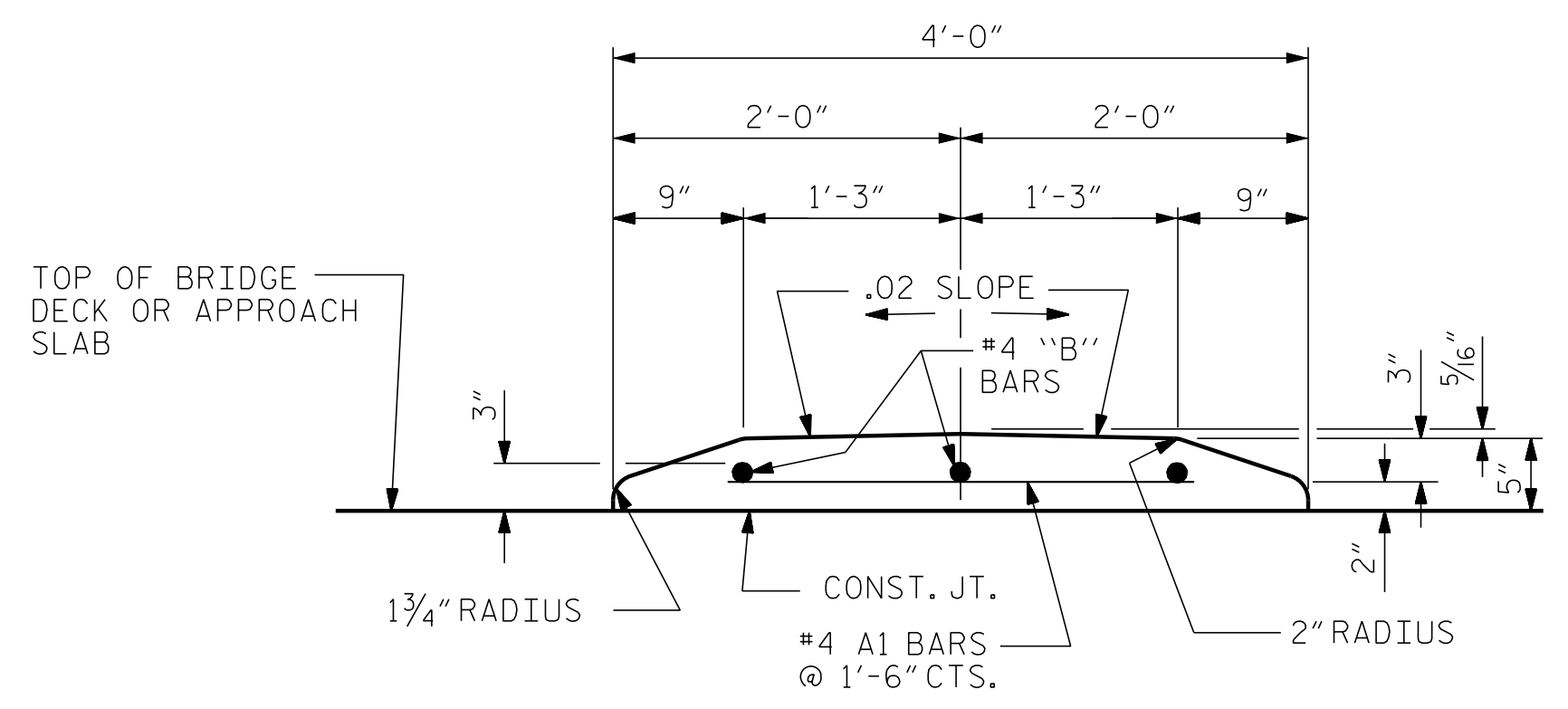


**NOTES:**  
 NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR MATERIALS OR LABOR REQUIRED TO CONSTRUCT THE CONCRETE MEDIAN. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE SQUARE FOOT PRICE BID FOR "REINFORCED CONCRETE DECK SLAB".  
 CONCRETE MEDIAN IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.  
 THE JOINT IN THE DECK AT THE END BENTS SHALL BE SAWED PRIOR TO CASTING OF THE CONCRETE MEDIAN. THE JOINT IN THE CONCRETE MEDIAN SHALL BE FORMED TO MATCH THE SAWED OPENING IN THE DECK.  
 GROOVED CONTRACTION JOINTS 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF CONCRETE MEDIAN IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET.

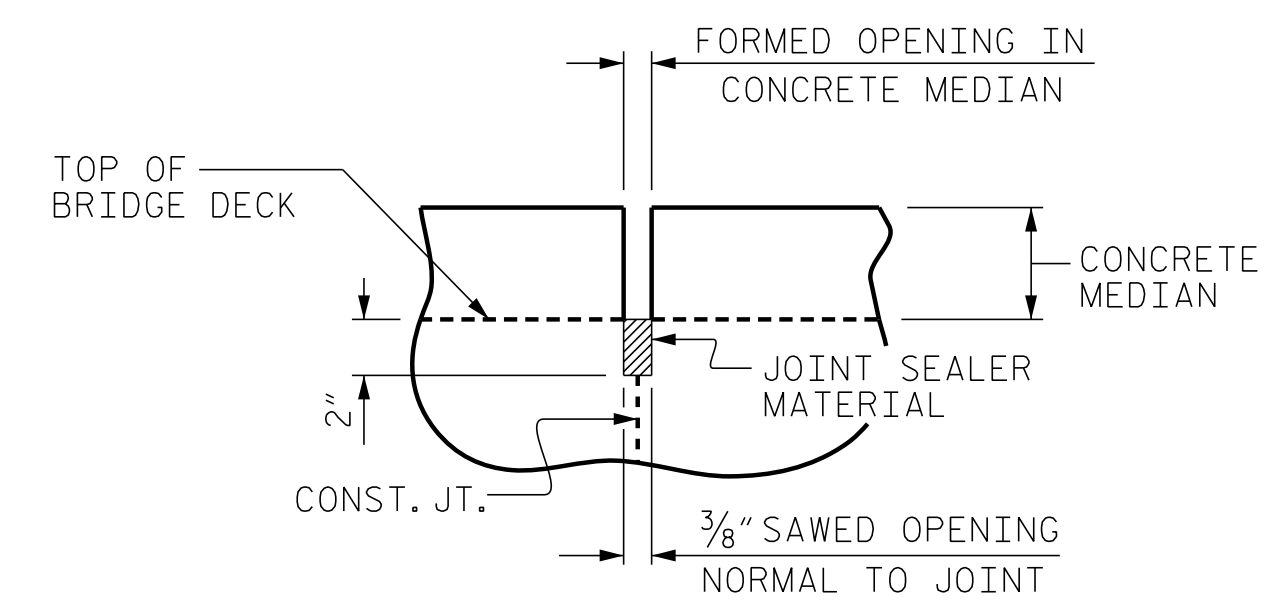


PLAN OF CONCRETE MEDIAN

| BILL OF MATERIAL                 |     |      |      |         |               |
|----------------------------------|-----|------|------|---------|---------------|
| FOR CONCRETE MEDIAN ONLY         |     |      |      |         |               |
| BAR                              | NO. | SIZE | TYPE | LENGTH  | WEIGHT        |
| * A1                             | 153 | #4   | STR  | 2'-8"   | 273           |
| * B1                             | 21  | #4   | STR  | 28'-10" | 404           |
| * B2                             | 6   | #4   | STR  | 14'-0"  | 56            |
| * EPOXY COATED REINFORCING STEEL |     |      |      |         | 733 LBS.      |
| CLASS AA CONCRETE                |     |      |      |         | 12.2 CU. YDS. |

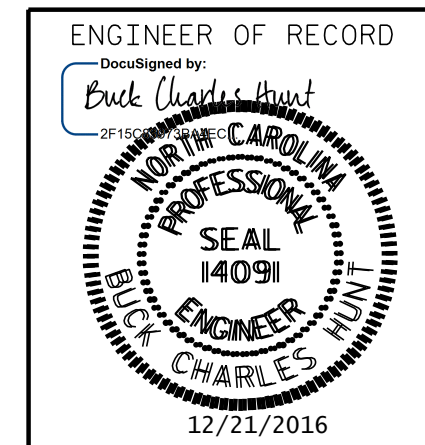


SECTION THRU CONCRETE MEDIAN



SECTION A-A

PROJECT NO. R-5311A  
 HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 CONCRETE MEDIAN

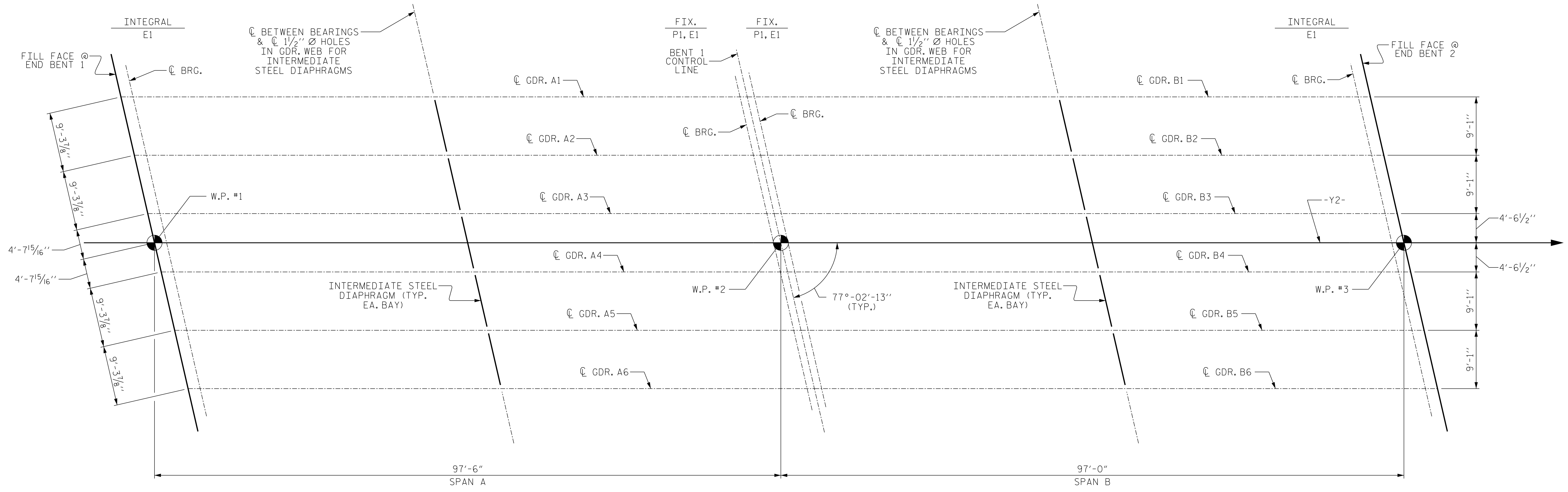
DRAWN BY: D. HODGE DATE: 4/16  
 CHECKED BY: B.C. HUNT DATE: 10/16

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| REVISIONS |     |       |     |     |       |
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| 2         |     |       | 4   |     |       |

SHEET NO. S02-9  
 TOTAL SHEETS 61

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GIRDER LAYOUT

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-

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DRAWN BY : G.M. GILLAND DATE : 4/16  
 CHECKED BY : D. HODGE DATE : 4/16

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ENGINEER OF RECORD  
 Buck Charles Hunt  
 NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 SEAL 14091  
 BUCK CHARLES HUNT  
 12/21/2016  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

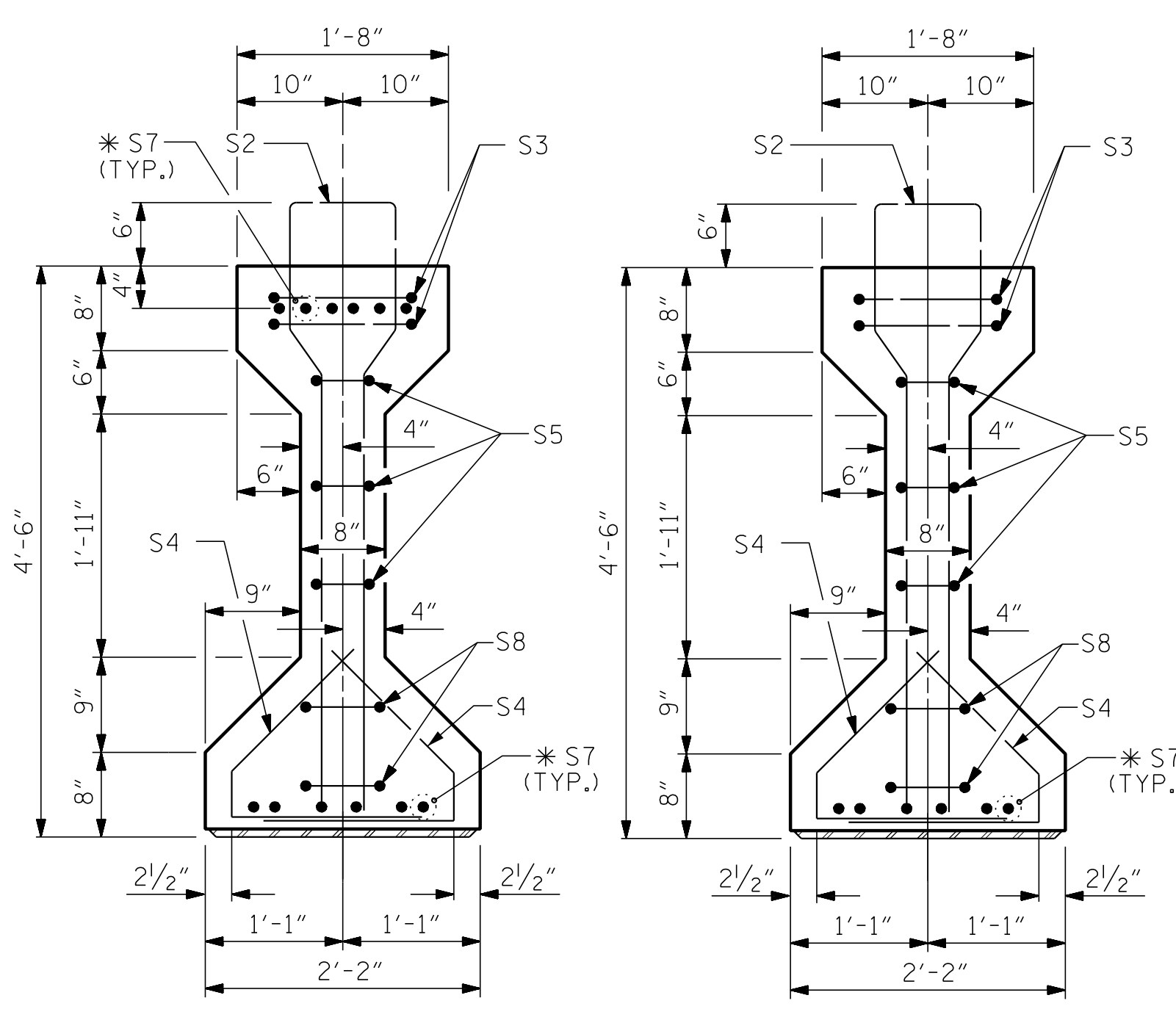
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 GIRDER LAYOUT

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

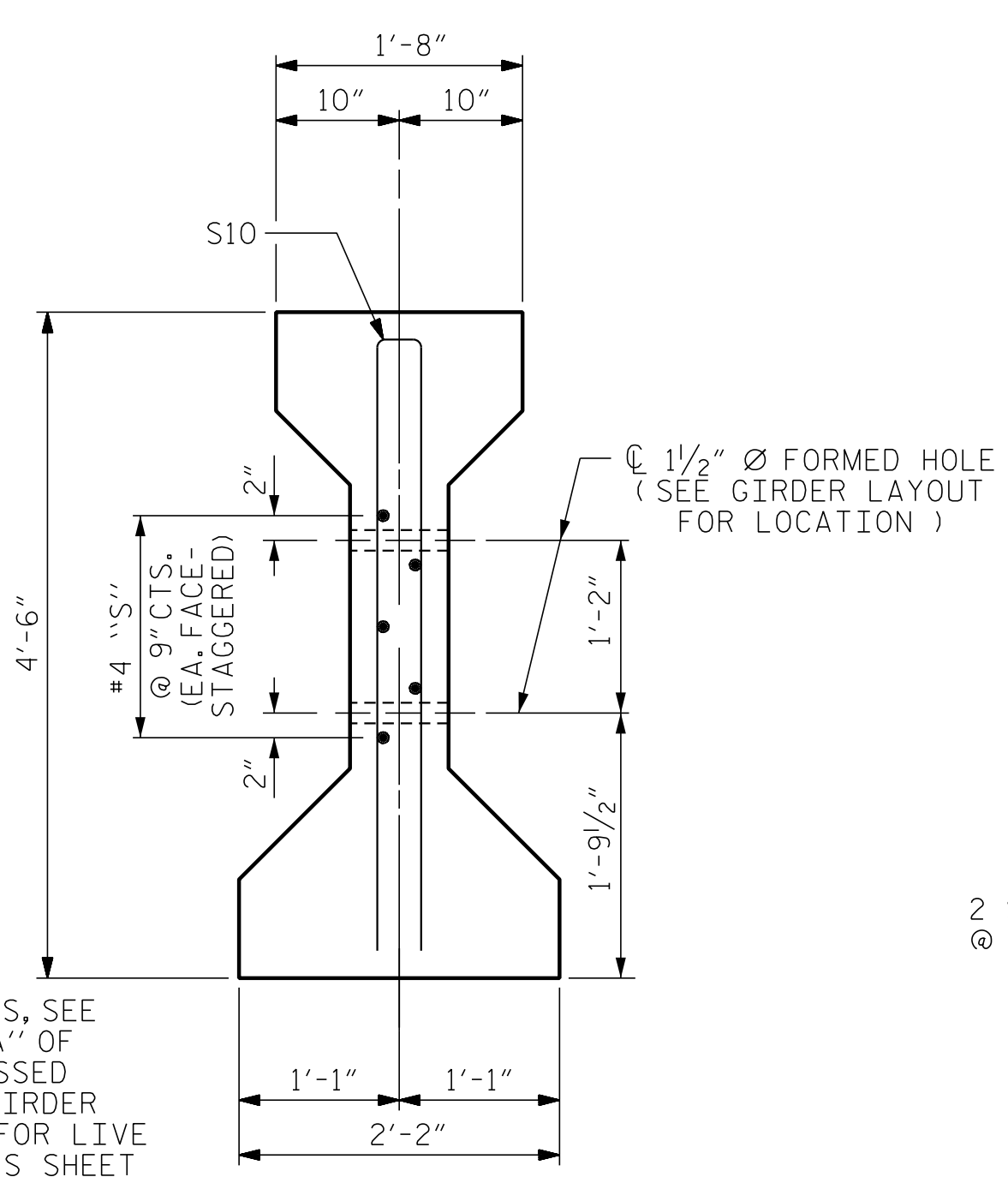
SHEET NO. S02-10  
 TOTAL SHEETS 61





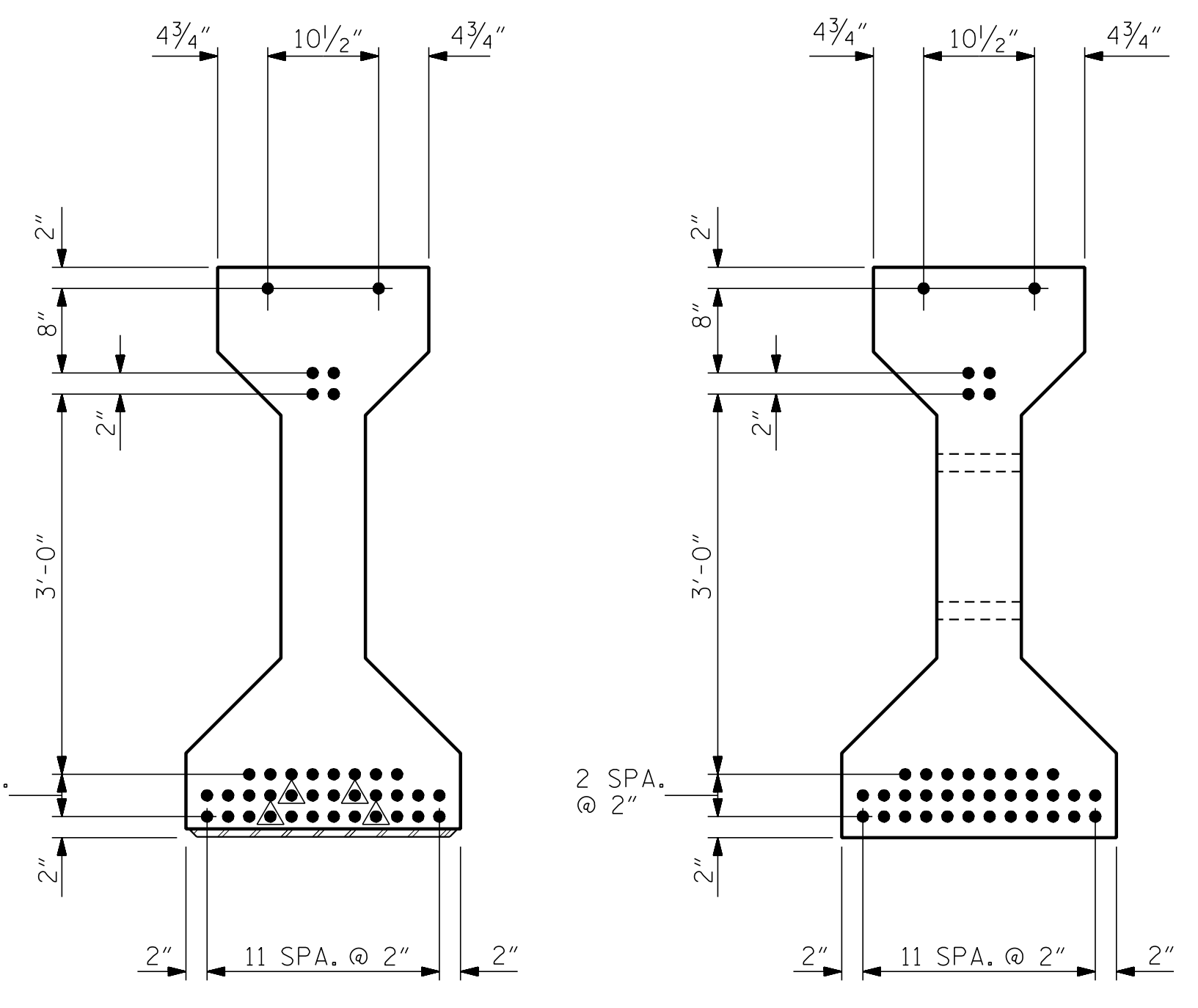
SECTION A-A

SECTION B-B



SECTION C-C  
(S1 BARS NOT SHOWN)

\*FOR S7 BARS, SEE  
DETAIL "A" OF  
PRESTRESSED  
CONCRETE GIRDER  
CONTINUOUS FOR LIVE  
LOAD DETAILS SHEET



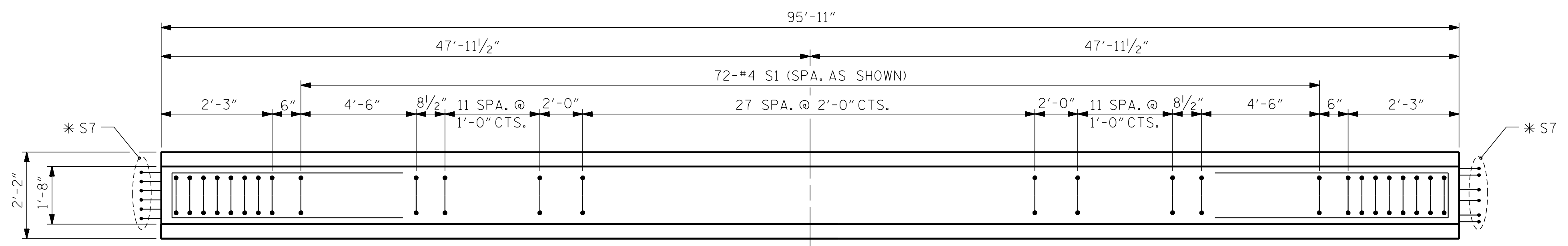
AT END OF GIRDER

AT C OF GIRDER

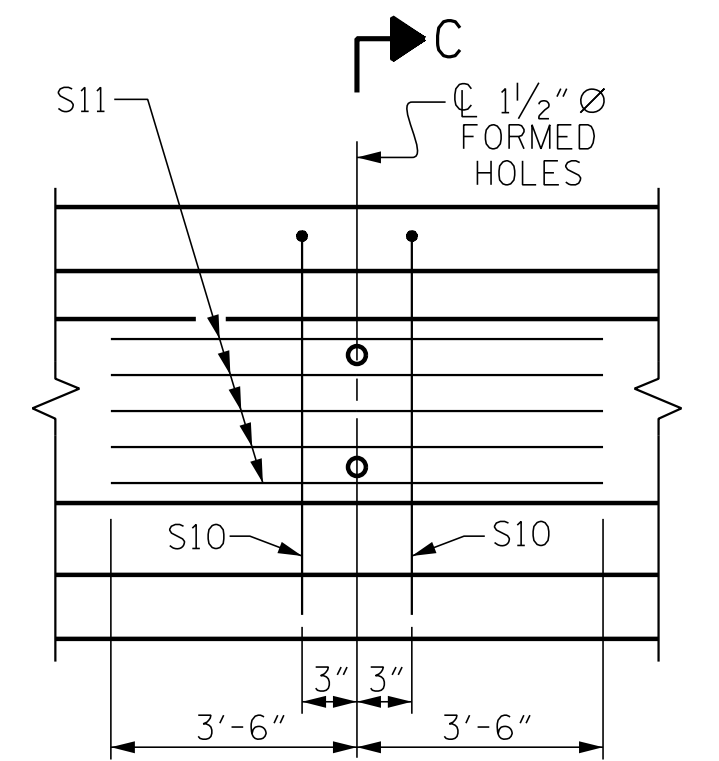
0.6" Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

▲ DEBOND STRANDS 10'-0"

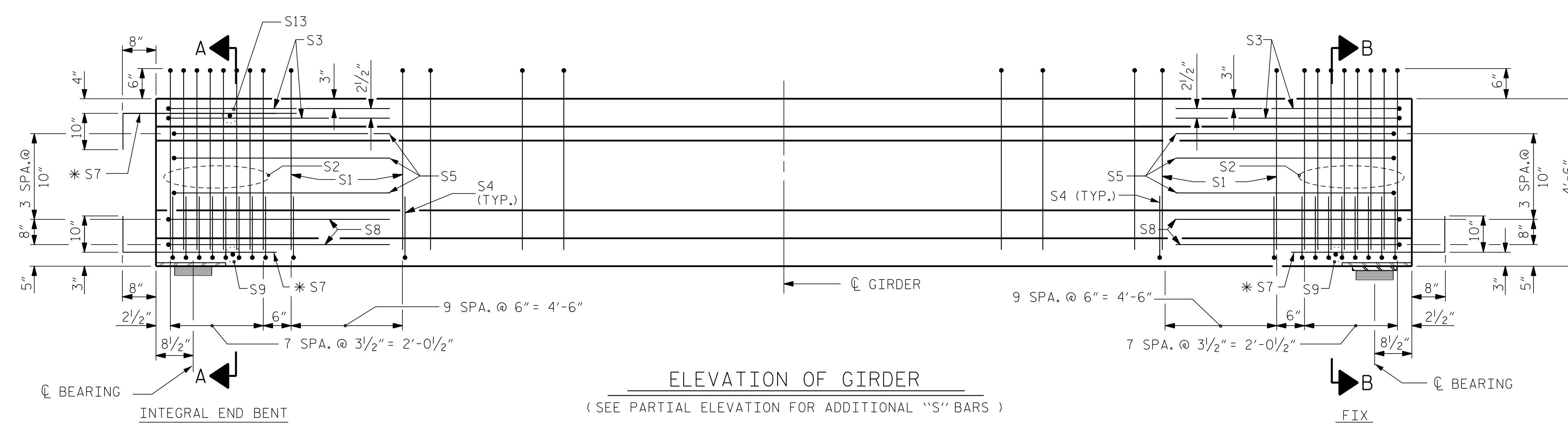


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM  
REINFORCING STEEL FOR GIRDER Nos. 1 THRU 6



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

0.6" Ø L. R. GRADE 270 STRANDS

| AREA<br>(SQUARE INCHES) | ULTIMATE<br>STRENGTH<br>(LBS. PER STRAND) | APPLIED<br>PRESTRESS<br>(LBS. PER STRAND) |
|-------------------------|---|---|
| 0.217                   | 58,600                                    | 43,950                                    |

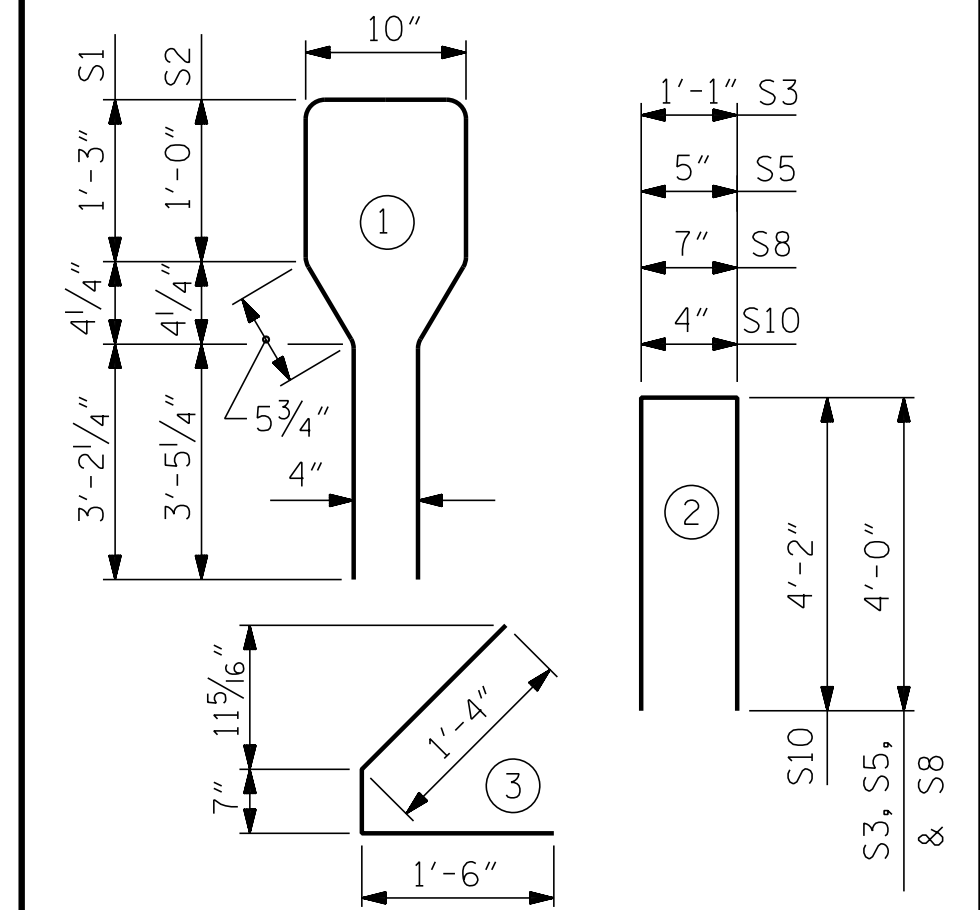
REINFORCING STEEL FOR ONE GIRDER

| BAR | NUMBER | SIZE | TYPE | LENGTH | WEIGHT |
|-----|--------|------|------|--------|--------|
| S1  | 72     | #4   | 1    | 10'-8" | 513    |
| S2  | 16     | #6   | 1    | 10'-8" | 256    |
| S3  | 4      | #4   | 2    | 9'-1"  | 24     |
| S4  | 72     | #4   | 3    | 3'-5"  | 164    |
| S5  | 6      | #4   | 2    | 8'-5"  | 34     |
| *S7 | 18     | #5   | STR  | 3'-8"  | 69     |
| S8  | 4      | #4   | 2    | 8'-7"  | 23     |
| S9  | 2      | #3   | STR  | 1'-10" | 1      |
| S10 | 2      | #5   | 2    | 8'-8"  | 18     |
| S11 | 5      | #4   | STR  | 7'-0"  | 23     |
| S13 | 1      | #3   | STR  | 1'-4"  | 1      |

\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

|  | REINFORCING<br>STEEL<br>LB. | 7500 PSI<br>CONCRETE<br>C.Y. | 0.6" Ø L. R.<br>STRANDS<br>No. |
|--|-----------------------------|------------------------------|--------------------------------|
|  | 1,126                       | 19.5                         | 38                             |

GIRDERS REQUIRED

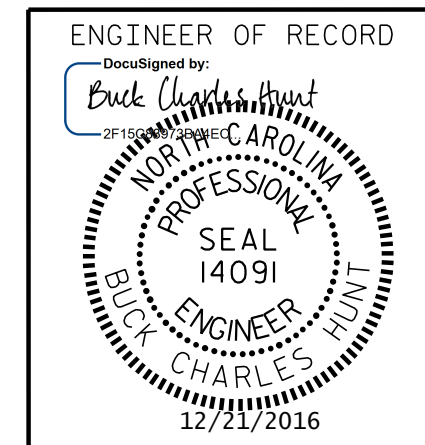
| NUMBER | LENGTH  | TOTAL LENGTH |
|--------|---------|--------------|
| 6      | 95'-11" | 575'-6"      |

PROJECT NO. R-5311A

HERTFORD COUNTY

STATION: 50+99.00 -Y2-

SHEET 1 OF 4



1223 Jones Franklin Rd.  
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LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

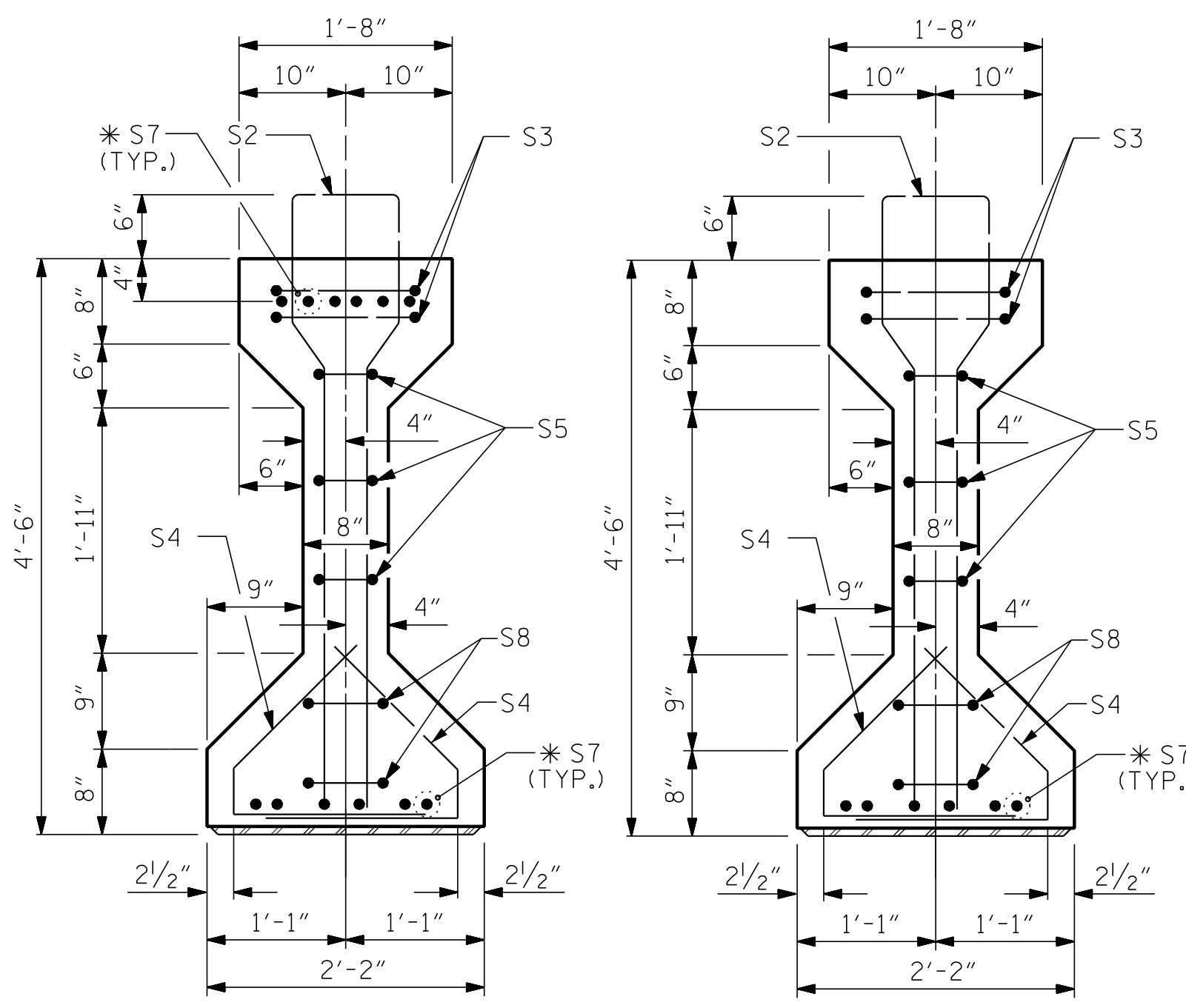
AASHTO TYPE IV  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
SPAN A

| REVISIONS |     |       |     |     |       | SHEET NO.    |  |
|-----------|-----|-------|-----|-----|-------|--------------|--|
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| 2         |     |       | 4   |     |       | 61           |  |

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UNLESS ALL SIGNATURES COMPLETED

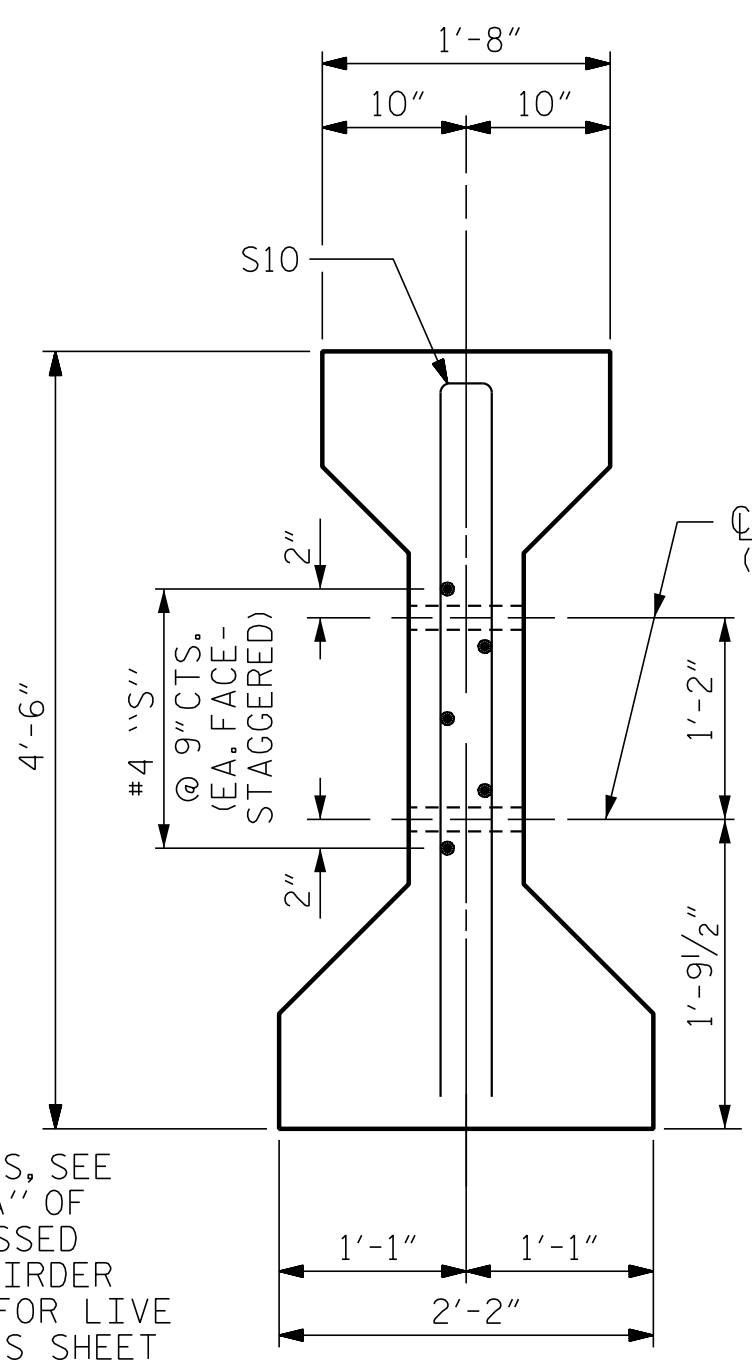
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DRAWN BY: D. HODGE DATE: 3/16  
CHECKED BY: G.M. GILLAND DATE: 3/16



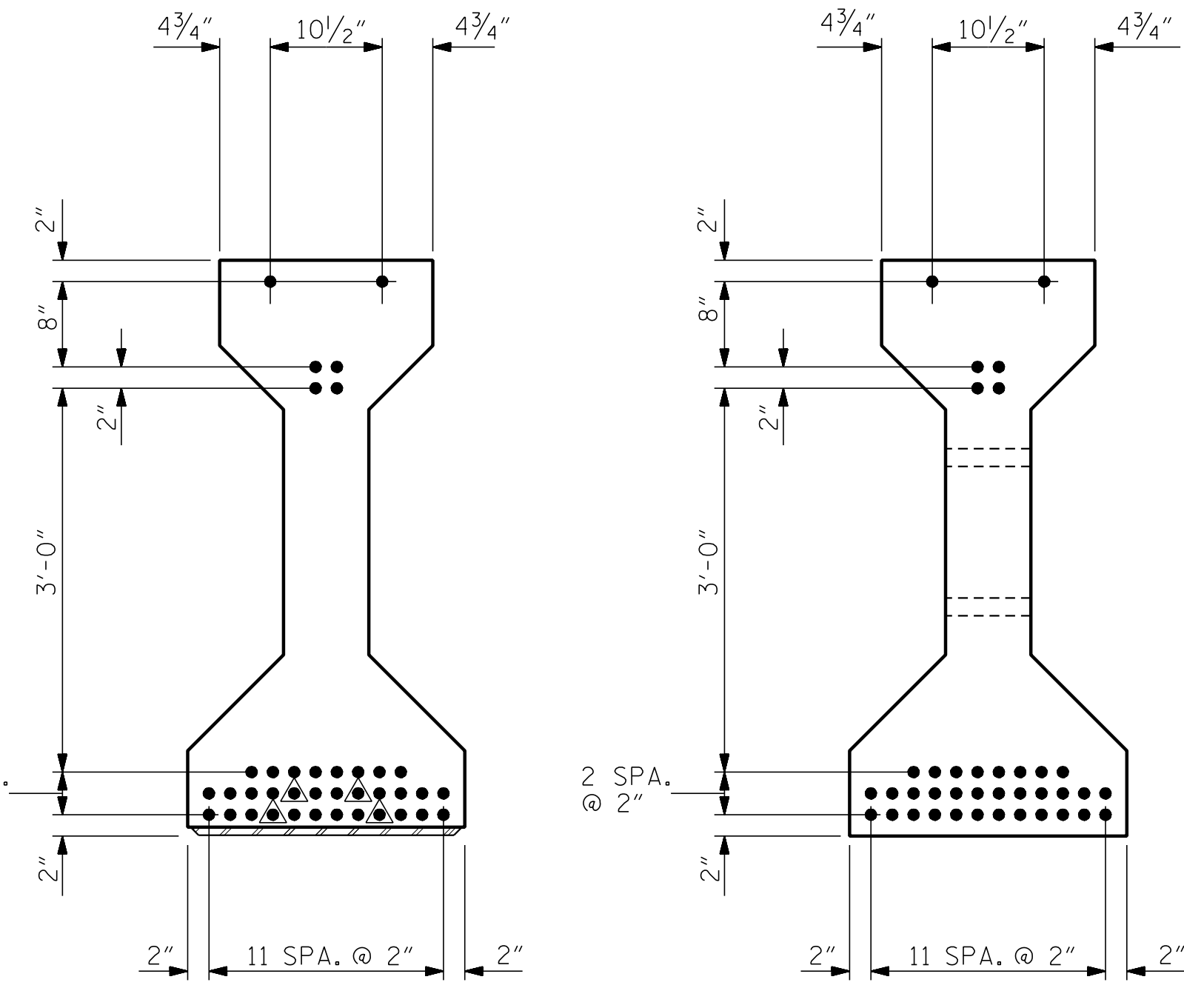
SECTION A-A

SECTION B-B



SECTION C-C  
(S1 BARS NOT SHOWN)

\*FOR S7 BARS, SEE  
DETAIL "A" OF  
PRESTRESSED  
CONCRETE GIRDER  
CONTINUOUS FOR LIVE  
LOAD DETAILS SHEET



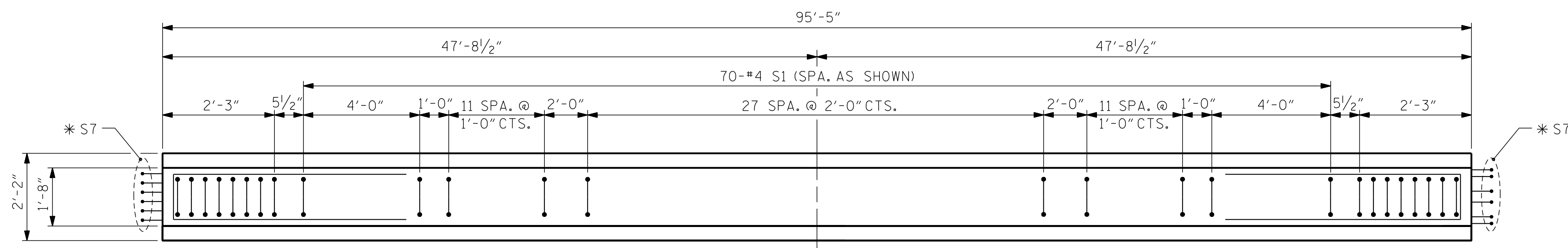
AT END OF GIRDER

AT  $\bar{C}$  OF GIRDER

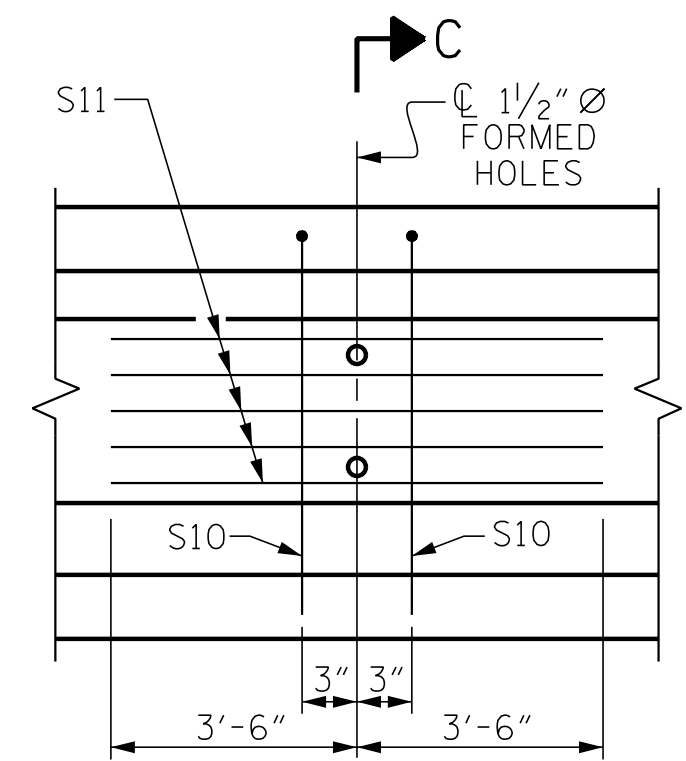
0.6"  $\bar{O}$  LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

▲ DEBOND STRANDS 10'-0"

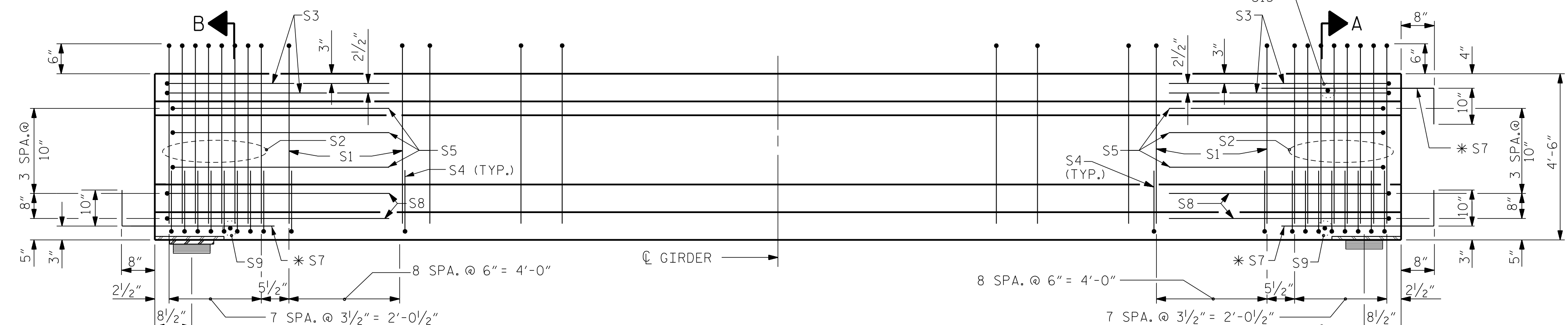


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM  
REINFORCING STEEL FOR GIRDER Nos. 1 THRU 6



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

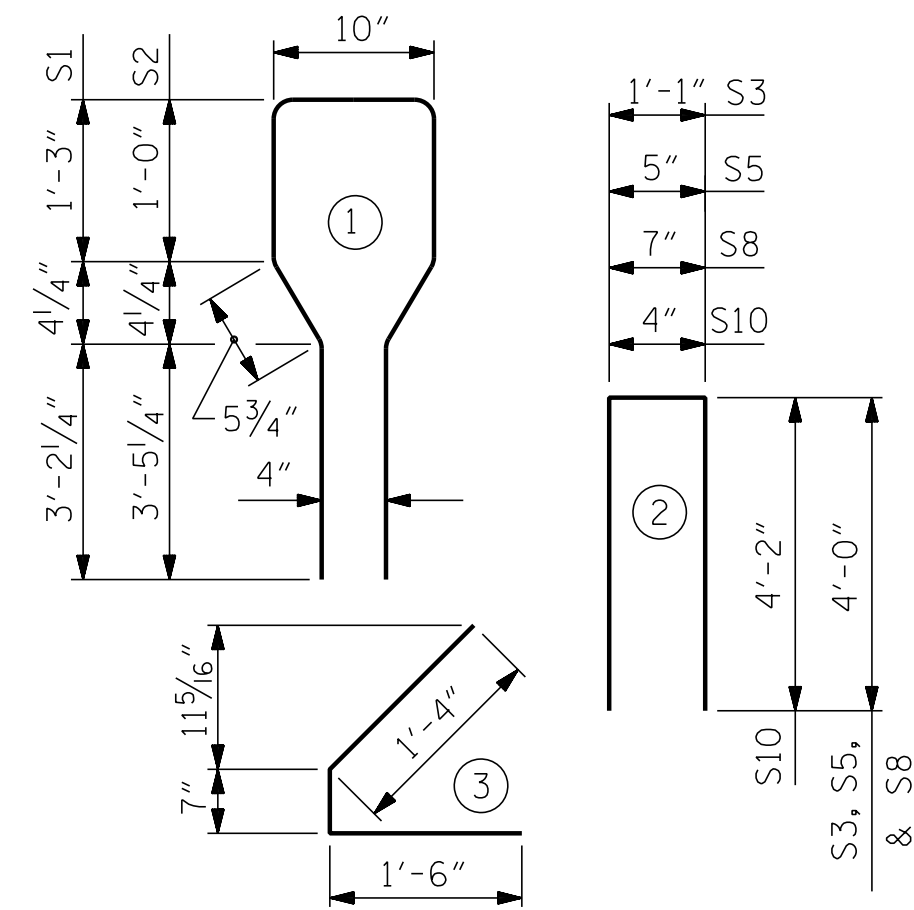
| 0.6" $\bar{O}$ L. R. GRADE 270 STRANDS |   |   |
|--|---|---|
| AREA<br>(SQUARE INCHES)                | ULTIMATE<br>STRENGTH<br>(LBS. PER STRAND) | APPLIED<br>PRESTRESS<br>(LBS. PER STRAND) |
| 0.217                                  | 58,600                                    | 43,950                                    |

| REINFORCING STEEL FOR ONE GIRDER |        |      |      |        |        |
|----------------------------------|--------|------|------|--------|--------|
| BAR                              | NUMBER | SIZE | TYPE | LENGTH | WEIGHT |
| S1                               | 70     | #4   | 1    | 10'-8" | 499    |
| S2                               | 16     | #6   | 1    | 10'-8" | 256    |
| S3                               | 4      | #4   | 2    | 9'-1"  | 24     |
| S4                               | 68     | #4   | 3    | 3'-5"  | 155    |
| S5                               | 6      | #4   | 2    | 8'-5"  | 34     |
| *S7                              | 18     | #5   | STR  | 3'-8"  | 69     |
| S8                               | 4      | #4   | 2    | 8'-7"  | 23     |
| S9                               | 2      | #3   | STR  | 1'-10" | 1      |
| S10                              | 2      | #5   | 2    | 8'-8"  | 18     |
| S11                              | 5      | #4   | STR  | 7'-0"  | 23     |
| S13                              | 1      | #3   | STR  | 1'-4"  | 1      |

\* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



| QUANTITIES FOR ONE GIRDER |                      |                      |                                 |
|---------------------------|----------------------|----------------------|---------------------------------|
|                           | REINFORCING<br>STEEL | 7500 PSI<br>CONCRETE | 0.6" $\bar{O}$ L. R.<br>STRANDS |
|                           | LB.                  | C.Y.                 | No.                             |
|                           | 1,103                | 19.4                 | 38                              |

GIRDERS REQUIRED

| NUMBER | LENGTH | TOTAL LENGTH |
|--------|--------|--------------|
| 6      | 95'-5" | 572'-6"      |

PROJECT NO. R-5311A

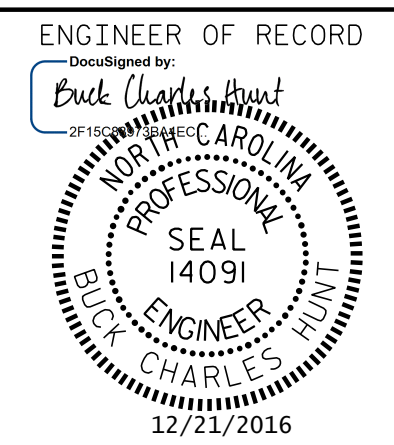
HERTFORD COUNTY

STATION: 50+99.00 -Y2-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

AASHTO TYPE IV  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
SPAN B



ETHERILL  
ENGINEERING

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Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

| REVISIONS |     |       |     |     |       | SHEET NO.    |  |
|-----------|-----|-------|-----|-----|-------|--------------|--|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S02-12       |  |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |  |
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DRAWN BY: D. HODGE DATE: 3/16  
CHECKED BY: G.M. GILLAND DATE: 3/16



NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

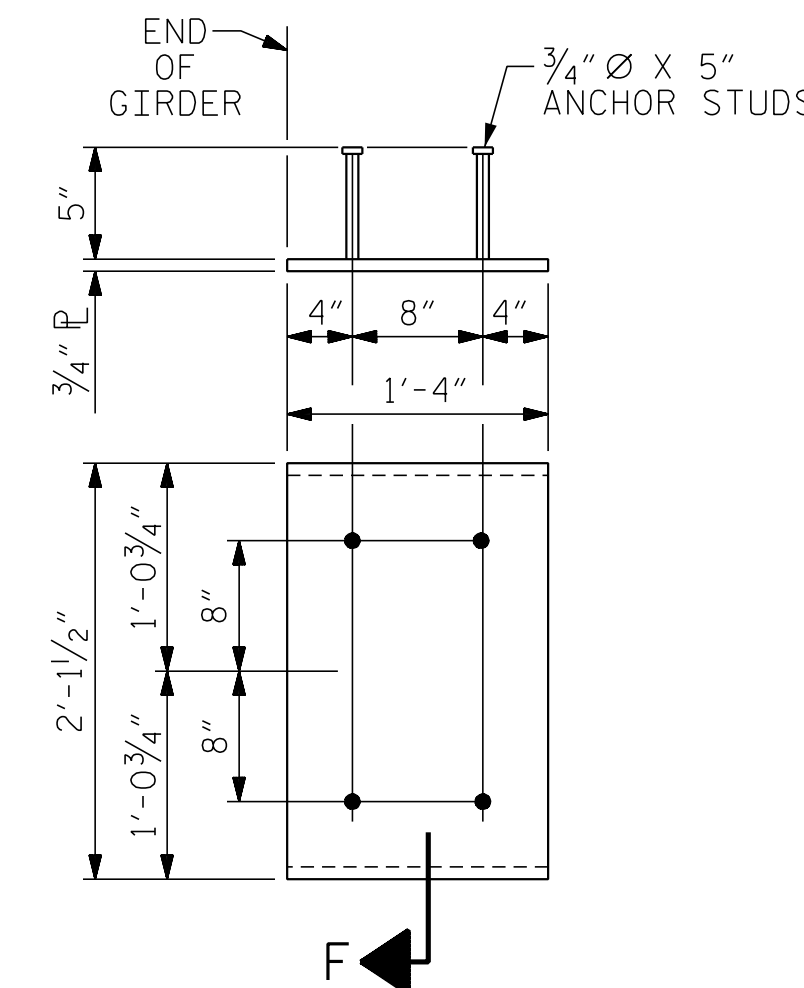
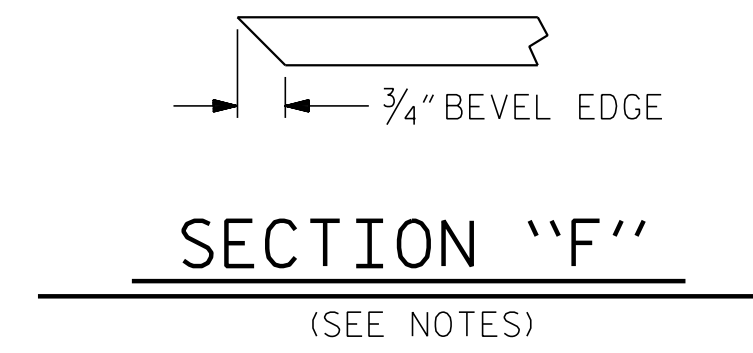
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

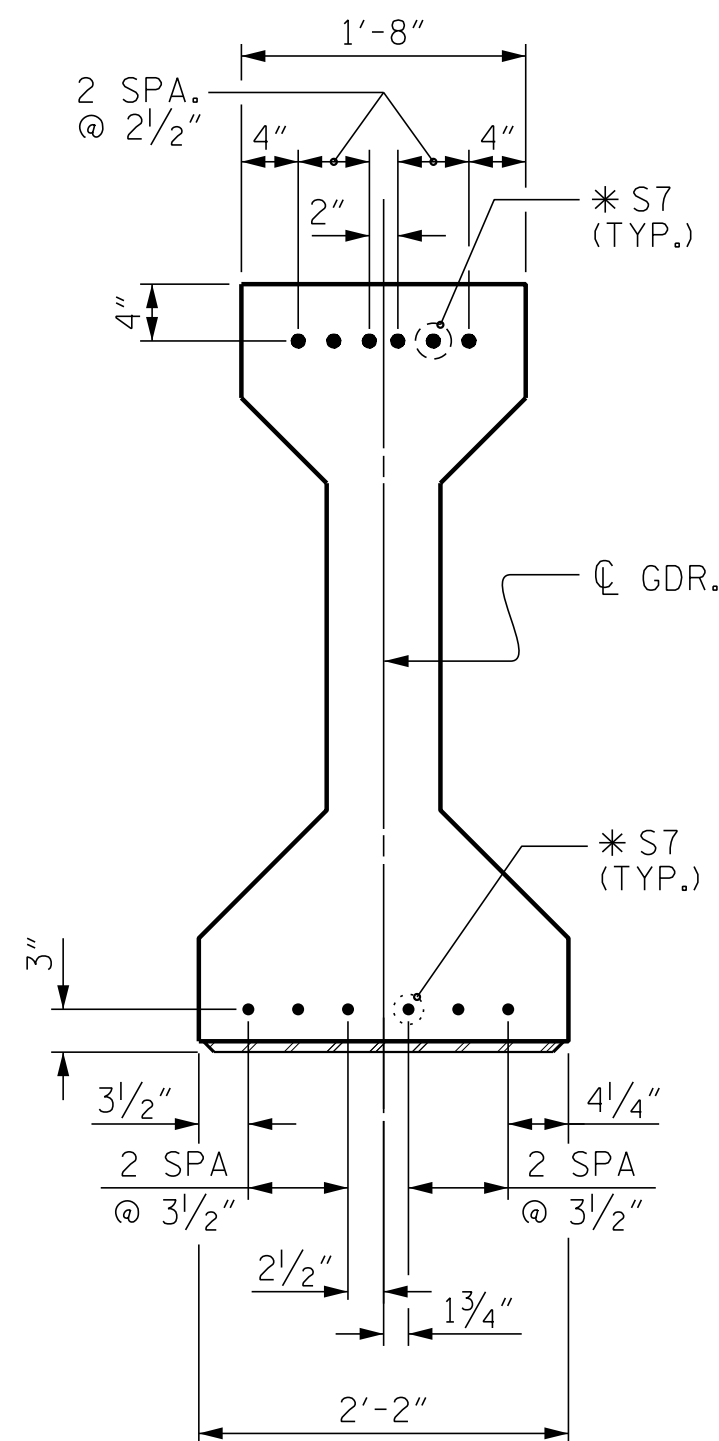
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

FOR EMBEDDED CLIPS FOR PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.



EMBEDDED PLATE "B-1" DETAILS  
FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)

— DEAD LOAD DEFLECTION TABLE FOR GIRDERS OF SPANS A & B —

| 0.6" Ø LOW RELAXATION                 | GIRDERS 1 THRU 6 |       |       |       |       |       |       |       |       |       |    |
|---------------------------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|
|                                       | TENTH POINTS     | 0     | .1    | .2    | .3    | .4    | .5    | .6    | .7    | .8    | .9 |
| CAMBER ( GIRDER ALONE IN PLACE )      | 0                | 0.057 | 0.108 | 0.147 | 0.173 | 0.181 | 0.173 | 0.147 | 0.108 | 0.057 | 0  |
| * DEFLECTION DUE TO SUPERIMPOSED D.L. | 0                | 0.041 | 0.081 | 0.112 | 0.132 | 0.138 | 0.132 | 0.112 | 0.081 | 0.041 | 0  |
| FINAL CAMBER                          | 0                | 3/16" | 5/16" | 7/16" | 1/2"  | 1/2"  | 1/2"  | 7/16" | 5/16" | 3/16" | 0  |

\* INCLUDES FUTURE WEARING SURFACE  
ALL VALUES ARE SHOWN IN FEET ( DECIMAL FORM ), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES ( FRACTION FORM ).

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 50+99.00 -Y2-

SHEET 3 OF 4

ENGINEER OF RECORD  
DocuSigned by:  
*Eric Charles Hunt*  
27  
STATE OF NORTH CAROLINA  
PROFESSIONAL  
SEAL  
14091  
BICK, CHARLES HUNTER  
12/21/2016

ETHERILL  
ENGINEERING

1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
PRESTRESSED CONCRETE GIRDER  
CONTINUOUS FOR LIVE LOAD  
DETAILS

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: |              |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |
| 2         |     |       | 4   |     |       | 61           |

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|                           |                     |
|---------------------------|---------------------|
| ASSEMBLED BY : D. HODGE   | DATE : 3/16         |
| CHECKED BY : G.M. GILLAND | DATE : 3/16         |
| DRAWN BY : ELR 11/91      | REV. 10/1/11 MAA/GM |
| CHECKED BY : GRP 11/91    | REV. 1/15 MAA/TMG   |
|                           | REV. 2/15 MAA/TMG   |

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

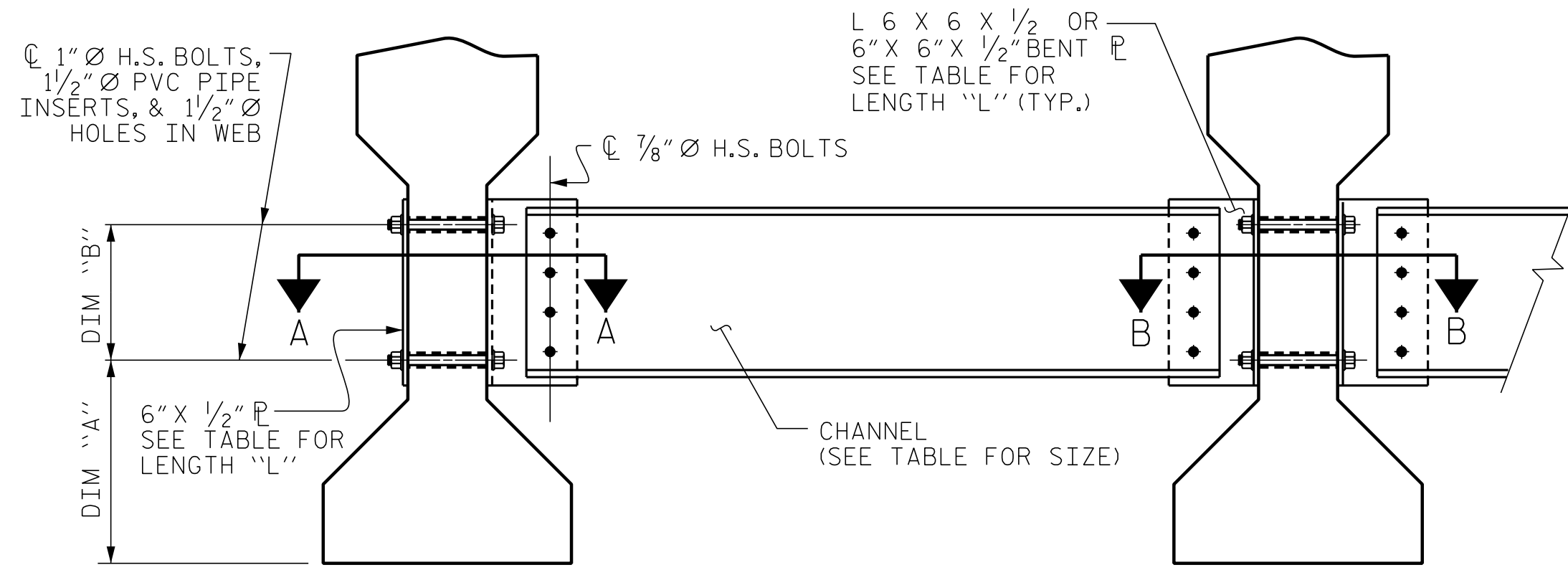
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

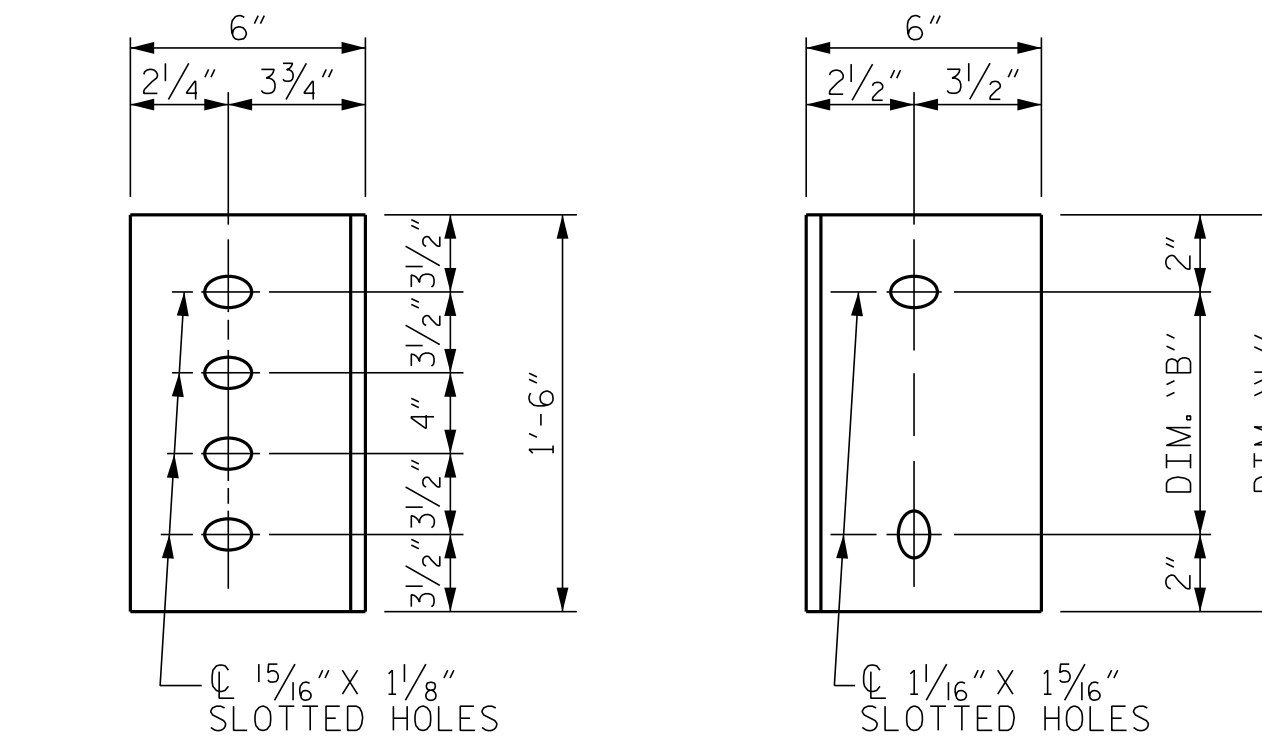
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



EXTERIOR GIRDER  
INTERIOR GIRDER  
PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE  
WEB FACE  
CONNECTOR PLATE DETAILS

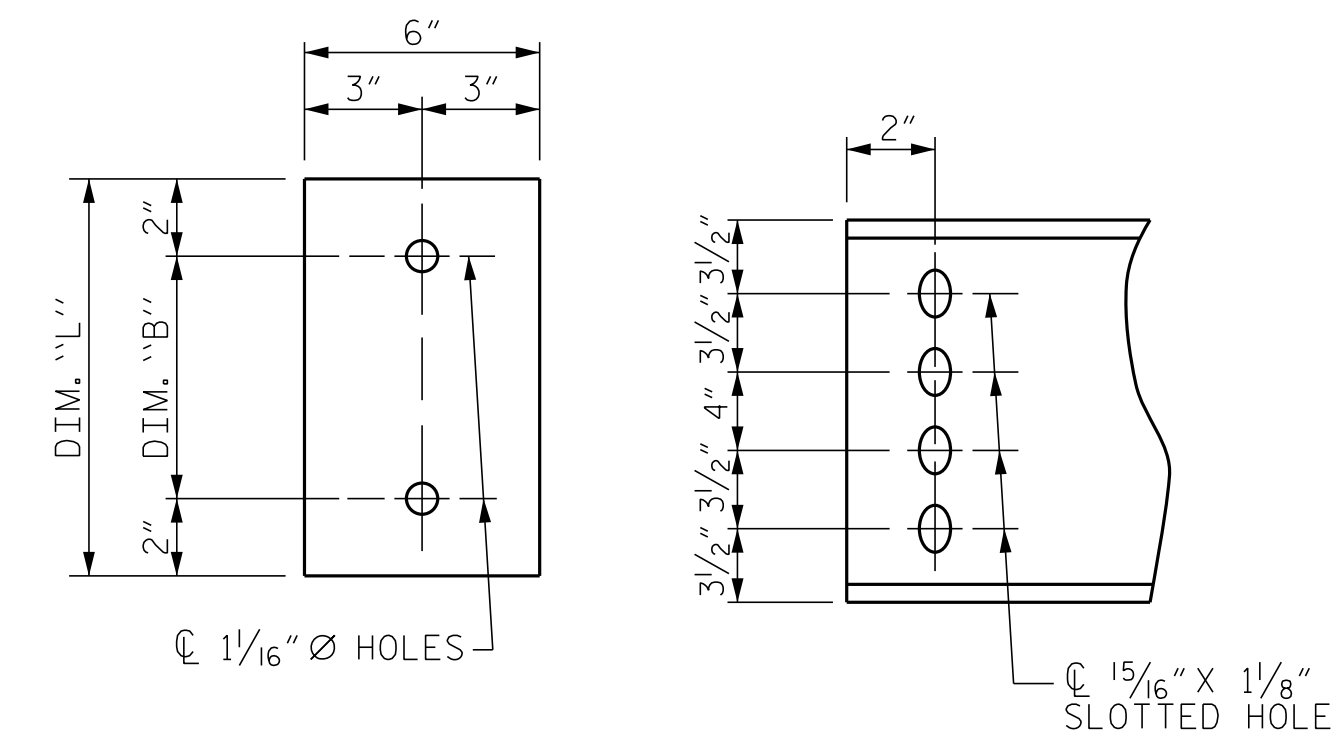
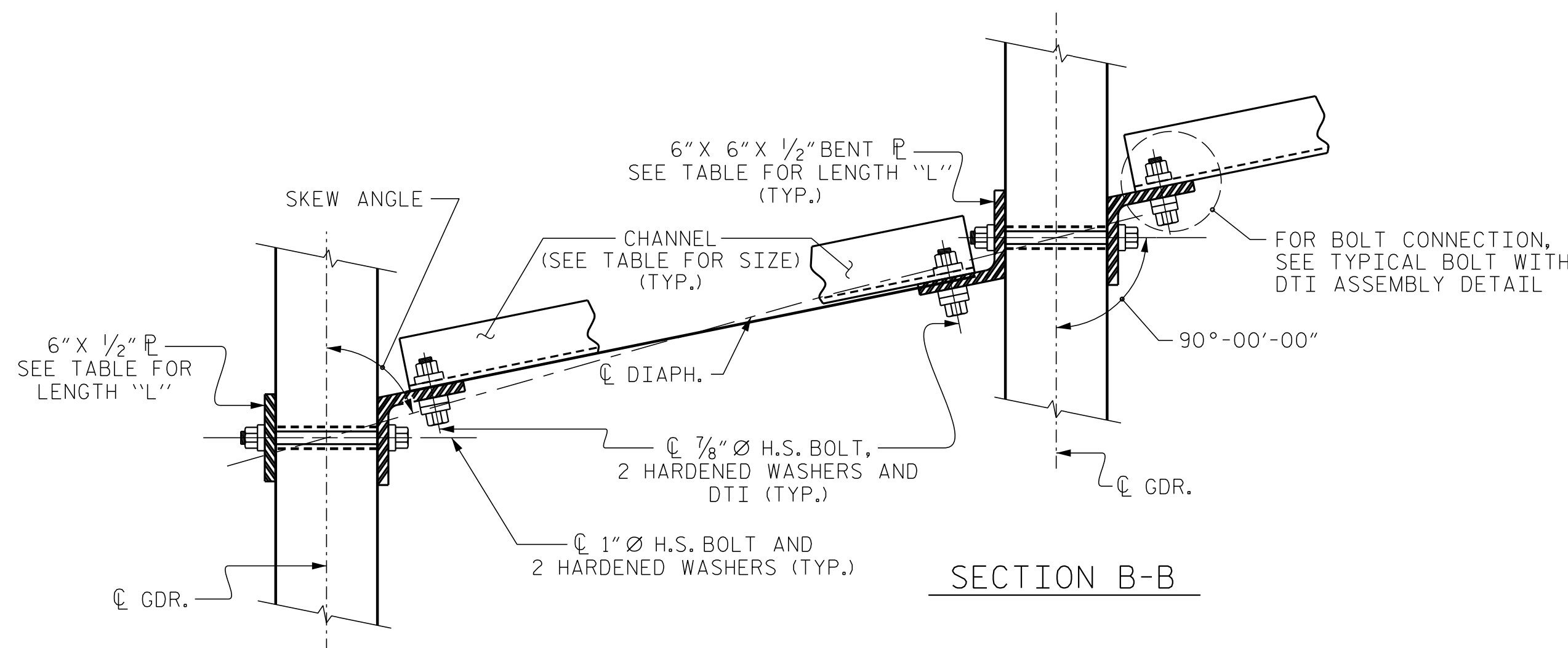


PLATE DETAILS CHANNEL END



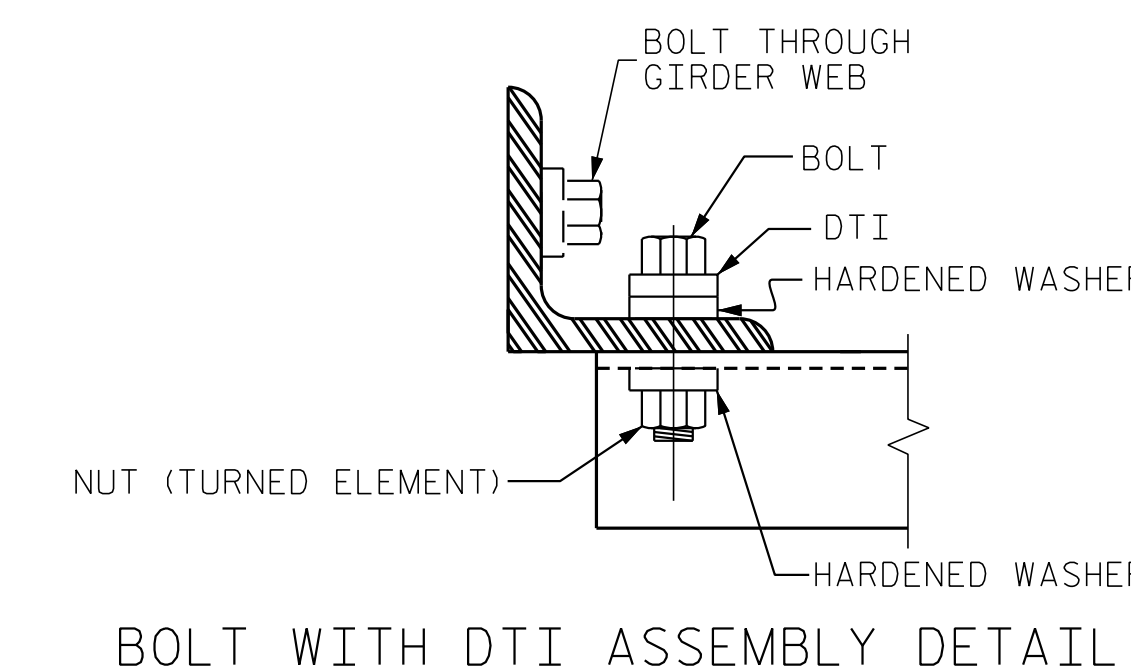
SECTION A-A  
SECTION B-B  
CONNECTION DETAILS

TABLE

| GIRDER TYPE | CHANNEL SIZE | DIM "A"   | DIM "B" | DIM "L" |
|-------------|--------------|-----------|---------|---------|
| IV          | MC 18 x 42.7 | 1'-9 1/2" | 1'-2"   | 1'-6"   |

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 50+99.00 -Y2-

SHEET 4 OF 4



BOLT WITH DTI ASSEMBLY DETAIL

ENGINEER OF RECORD  
DocuSigned by:  
Buck Charles Hult  
2016.12.21 12:21 PM  
NORTH CAROLINA  
PROFESSIONAL  
SEAL  
14091  
BUCK CHARLES HULT  
12/21/2016  
ETHERILL  
ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
LICENSE NO. F-0377

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
INTERMEDIATE  
STEEL DIAPHRAGMS  
FOR TYPE IV  
PRESTRESSED CONCRETE  
GIRDERS

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | SHEET NO.    |
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|---------------------------|-----------------------|
| ASSEMBLED BY : D. HODGE   | DATE : 3/16           |
| CHECKED BY : G.M. GILLAND | DATE : 3/16           |
| DRAWN BY : TLA 6/05       | ADDED 10/21/05        |
| CHECKED BY : VC 6/05      | REV. 5/1/06RRR KMM/GM |
|                           | REV. 10/1/11 MAA/GM   |



NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT THEN BE BURRED WITH A SHARP POINTED TOOL.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

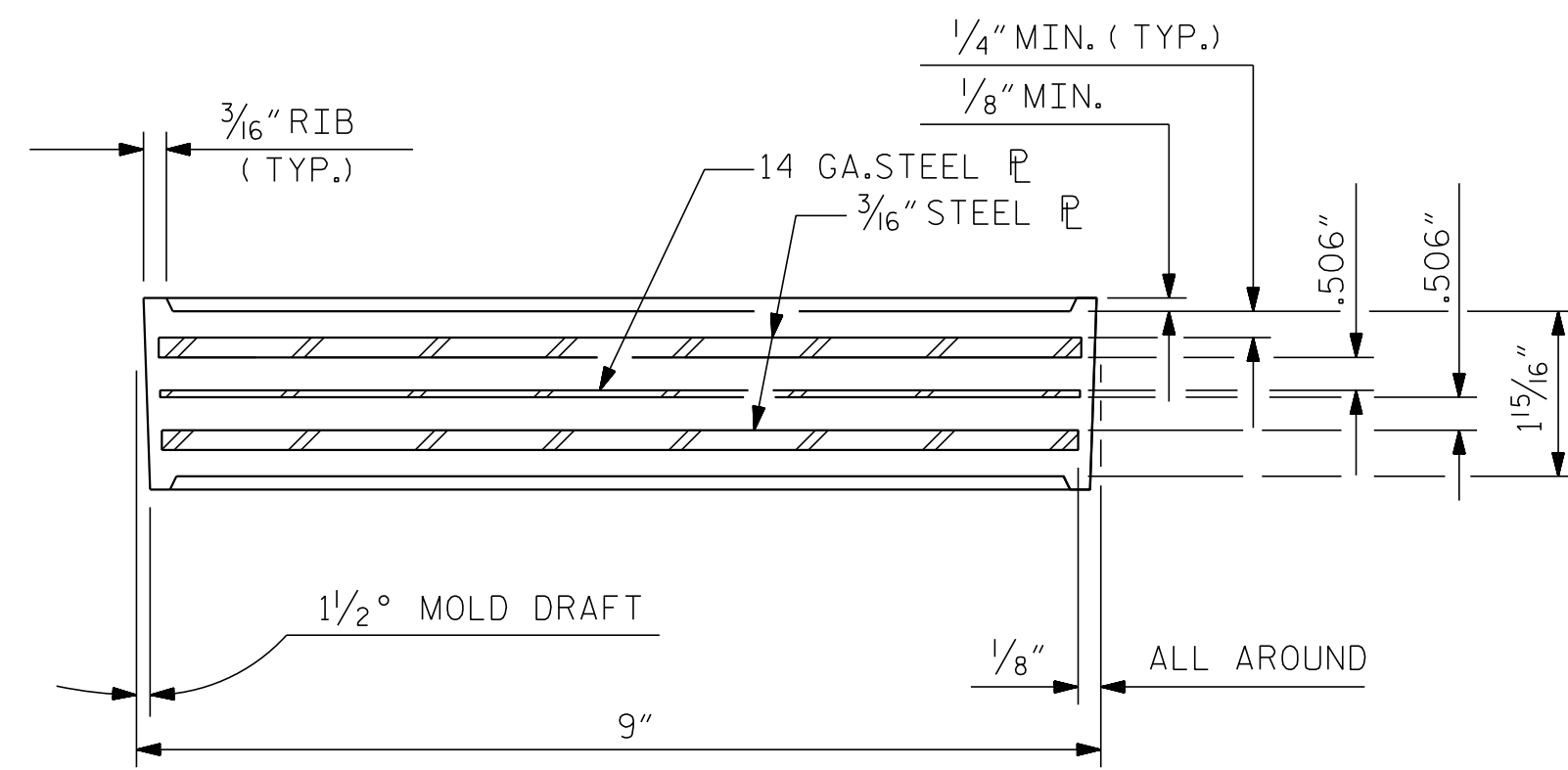
SOLE PLATE P1, BOLTS, NUTS AND WASHERS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

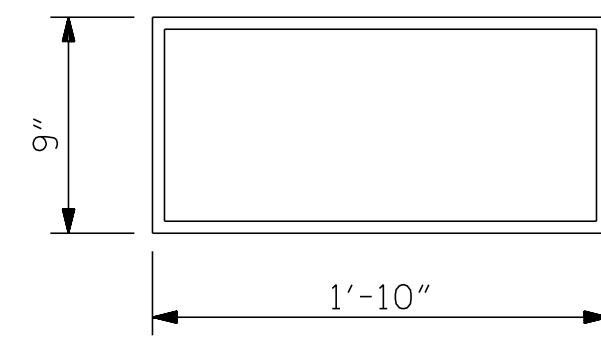
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

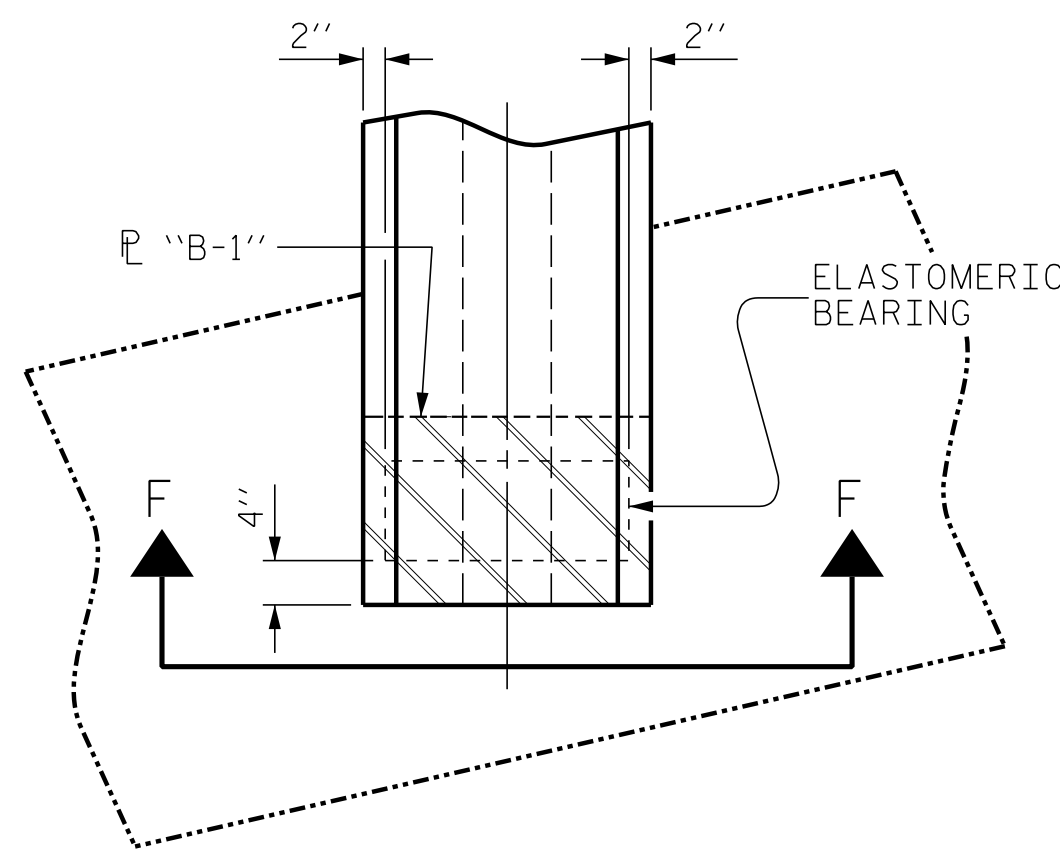


TYPICAL SECTION OF ELASTOMERIC BEARINGS

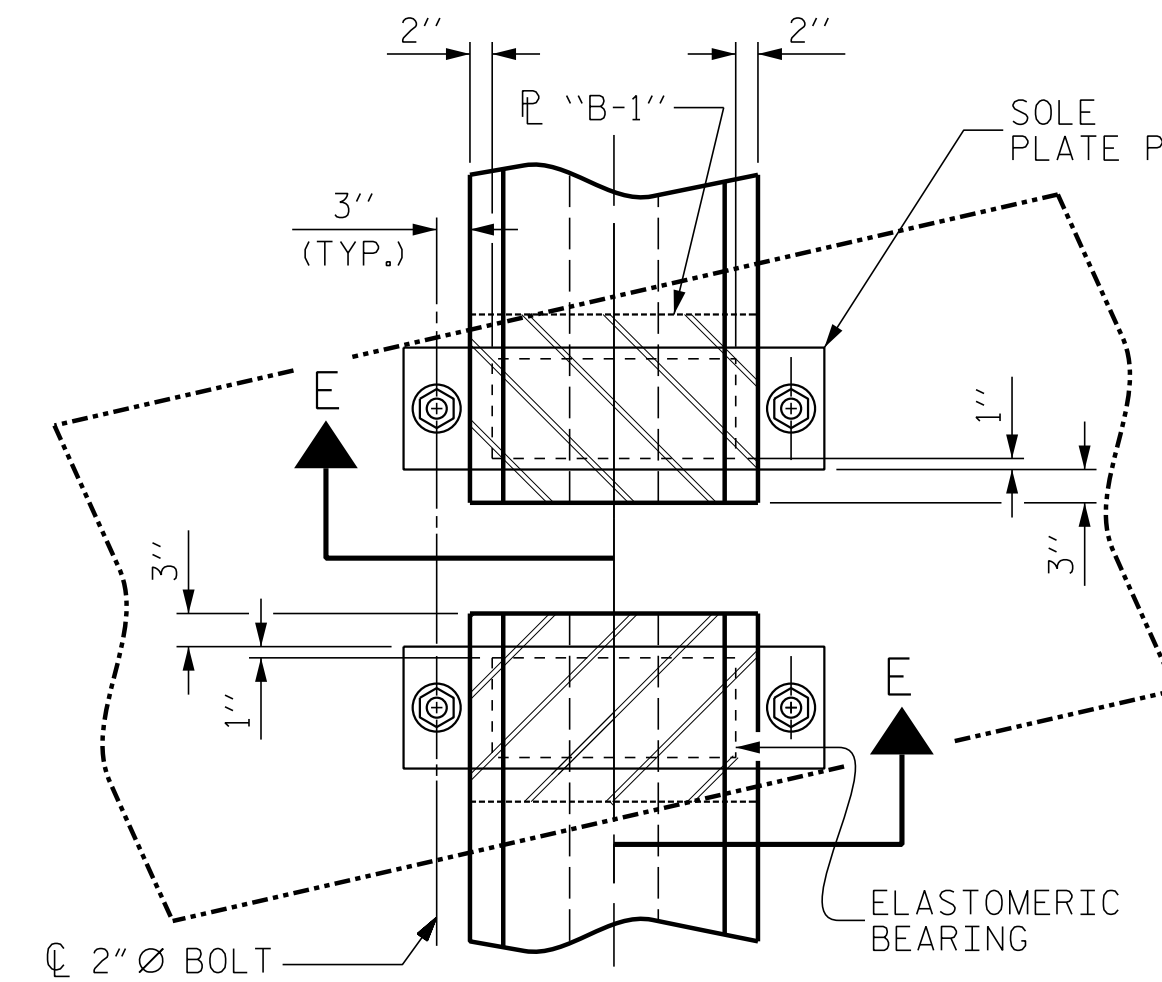


E1 ( 24 REQ'D )  
PLAN VIEW OF ELASTOMERIC BEARING

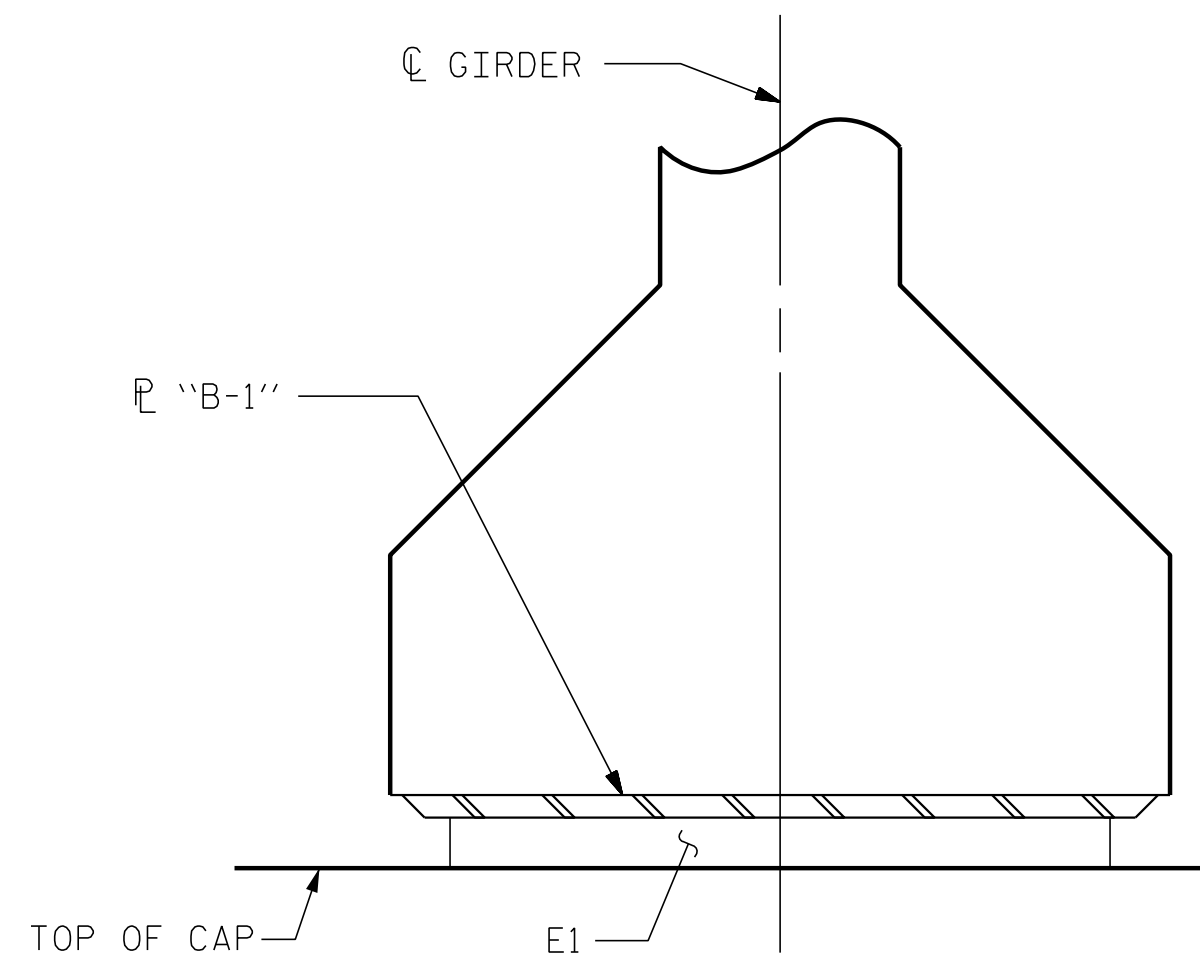
TYPE IV



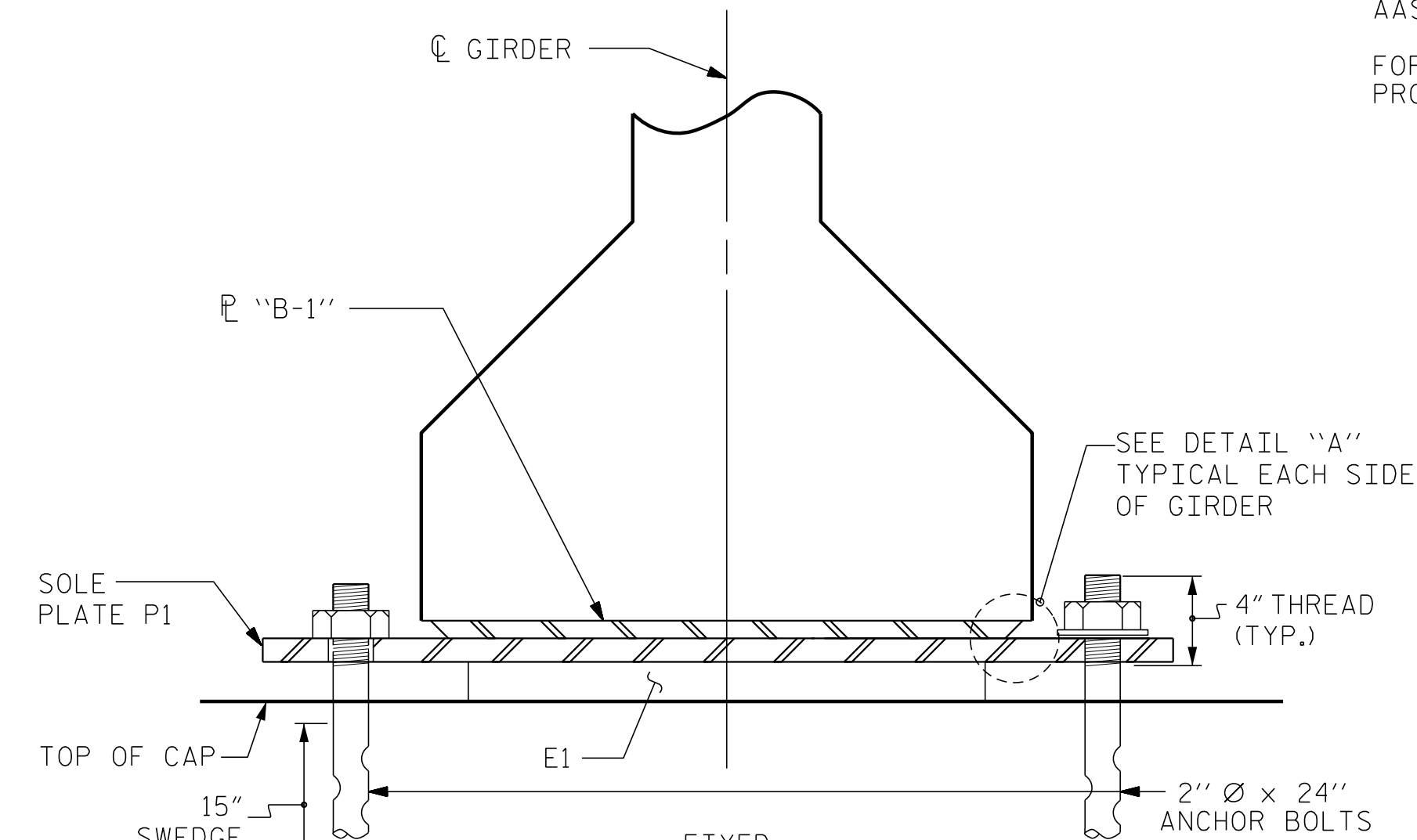
TYPICAL PLAN @ END BENT  
(SHOWING INTEGRAL END BENT)



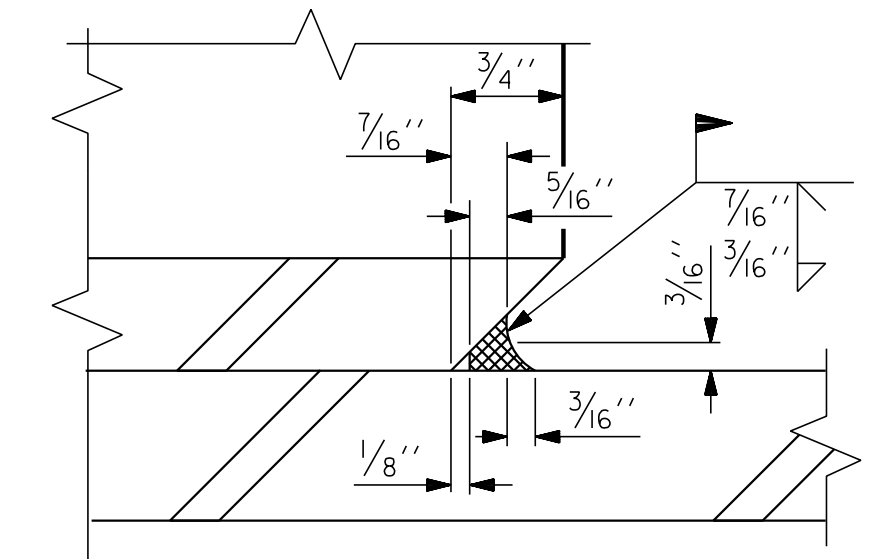
TYPICAL PLAN @ BENT  
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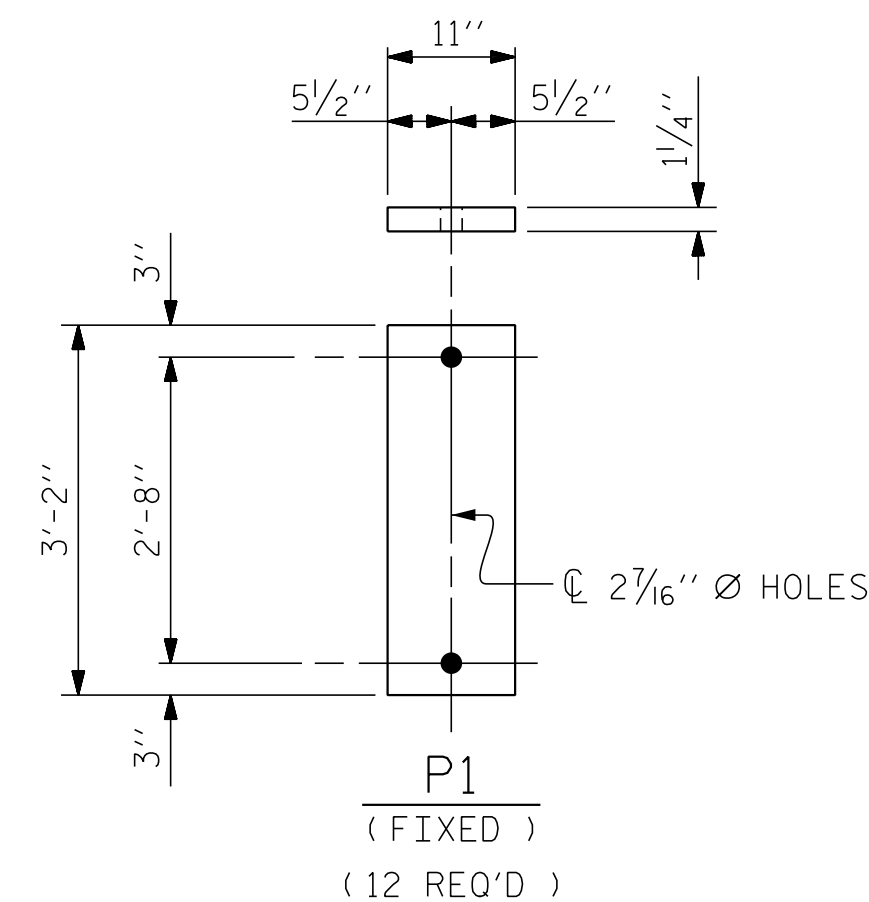
SECTION F-F



SECTION E-E



DETAIL "A"



SOLE PLATE ( P1 ) DETAIL

|                                 |       |
|---------------------------------|-------|
| MAXIMUM ALLOWABLE SERVICE LOADS |       |
| D.L.+L.L. (NO IMPACT)           |       |
| TYPE V                          | 225 k |

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 50+99.00 -Y2-

ENGINEER OF RECORD  
DocuSigned by:  
Buck Charles Hunt  
2016.12.21  
NORTH CAROLINA  
PROFESSIONAL SEAL  
14091  
BUCK CHARLES HUNT  
12/21/2016  
ETHERILL ENGINEERING  
1223 Jones Franklin Rd.  
Raleigh, N.C. 27606  
Bus: 919 851 8077  
Fax: 919 851 8107  
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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
ELASTOMERIC BEARING DETAILS

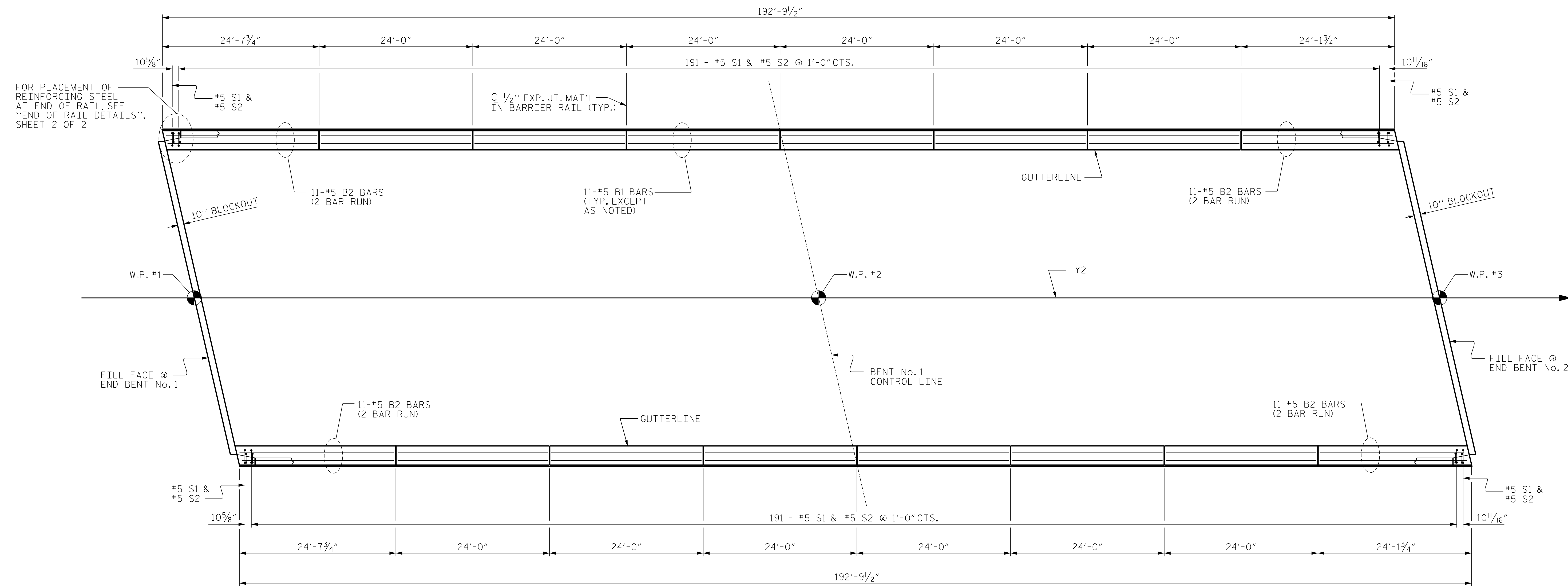
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CHECKED BY : B.C. HUNT DATE : 10/16

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**PLAN OF CONCRETE BARRIER RAIL**  
 ALL DIMENSIONS ARE MEASURED ALONG OUTSIDE FACE OF BARRIER RAIL

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-  
 SHEET 1 OF 2

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ENGINEER OF RECORD  
 DocuSigned by:  
*Eric Charles Hunt*  
 2016  
 NORTH CAROLINA  
 PROFESSIONAL  
 SEAL  
 14091  
 ENGINEER  
 ERIC CHARLES HUNT  
 12/21/2016  
  
 WETHERILL  
 ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
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STATE OF NORTH CAROLINA  
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 RALEIGH

SUPERSTRUCTURE  
 CONCRETE  
 BARRIER RAIL

| REVISIONS |     |       |     |     |       | SHEET NO.    |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | S02-16       |
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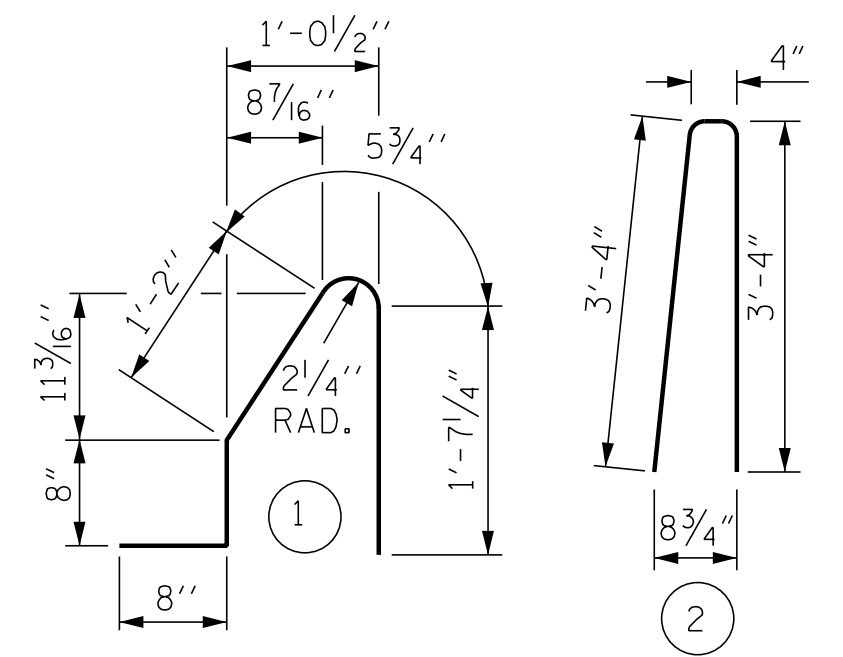
NOTES

BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

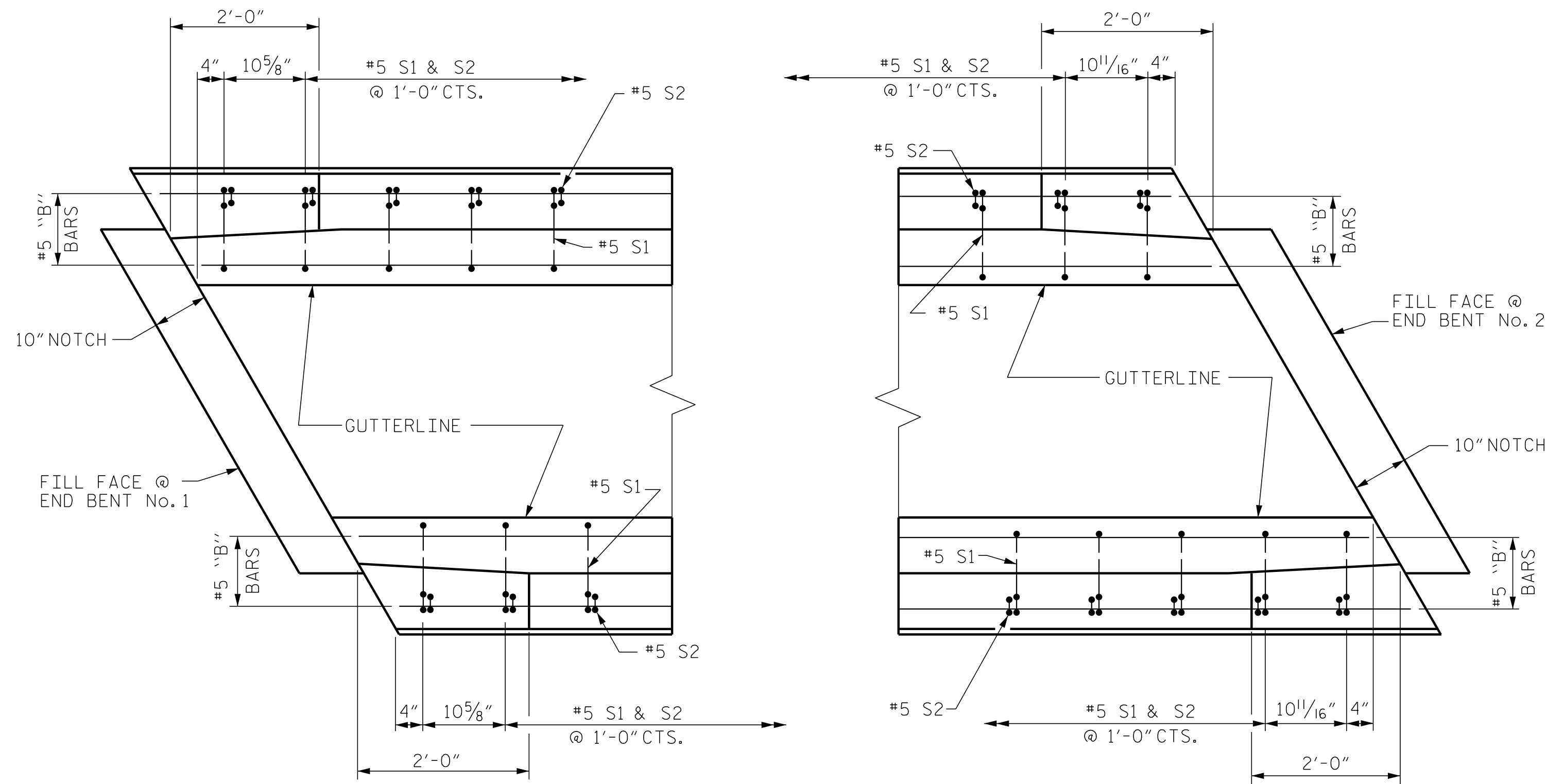
BAR TYPES



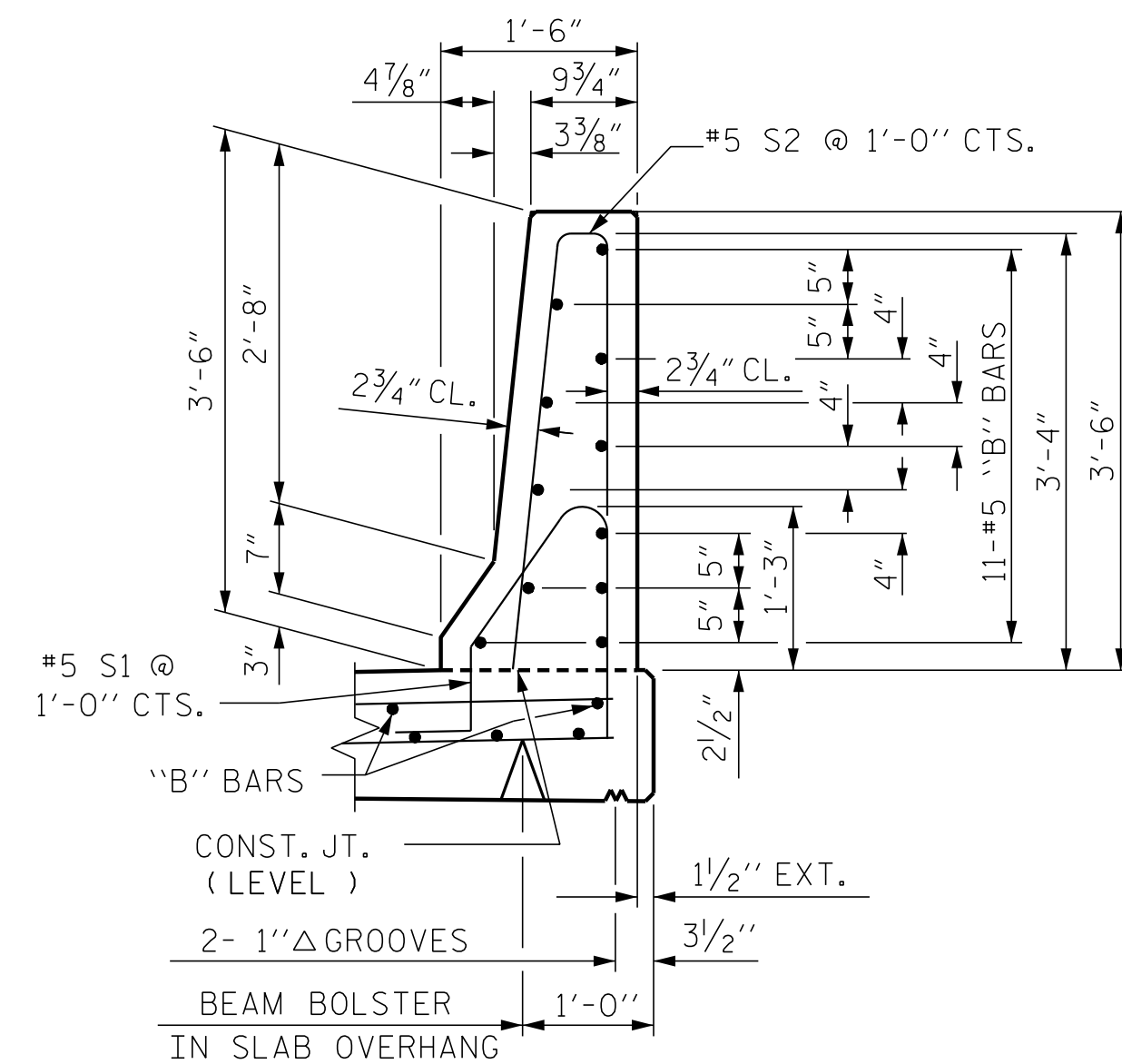
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

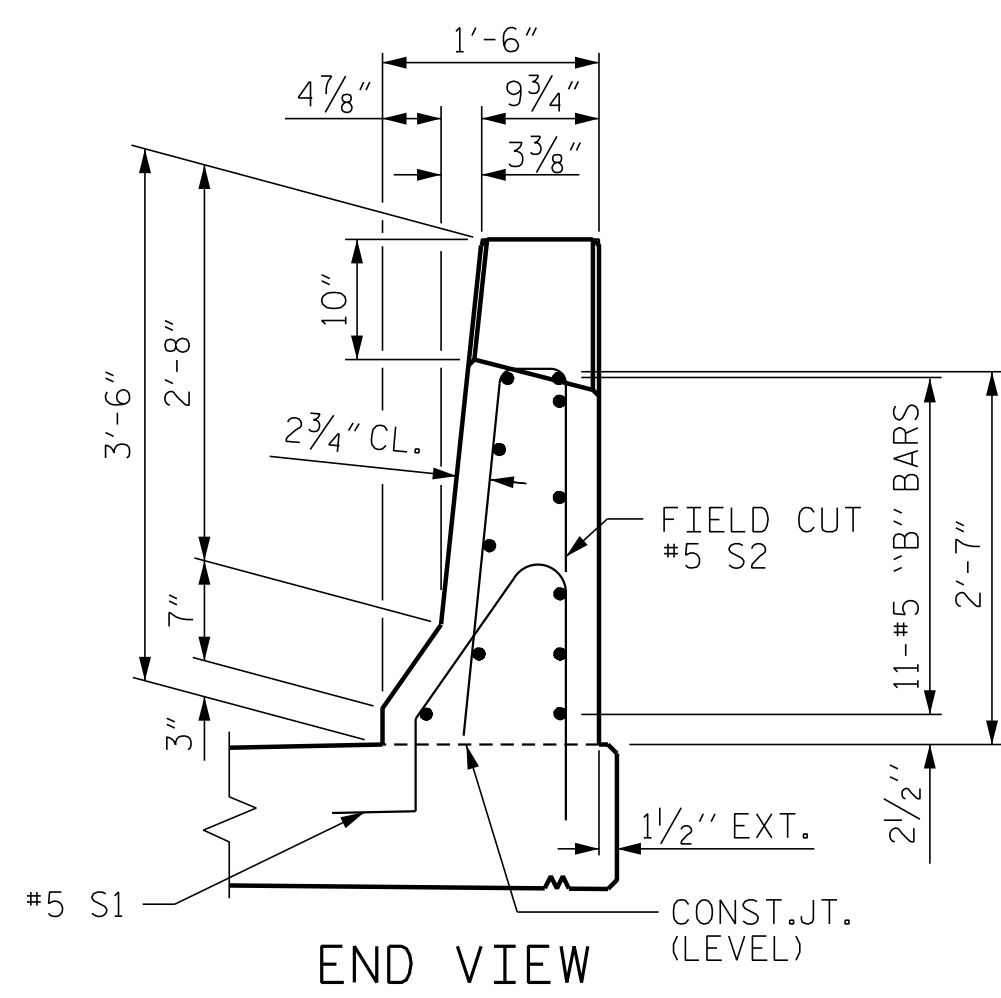
| FOR CONCRETE BARRIER RAIL ONLY   |     |      |      |        |                 |
|----------------------------------|-----|------|------|--------|-----------------|
| BAR                              | NO. | SIZE | TYPE | LENGTH | WEIGHT          |
| * B1                             | 132 | #5   | STR  | 23'-7" | 3247            |
| * B2                             | 88  | #5   | STR  | 14'-0" | 1285            |
| * S1                             | 386 | #5   | 1    | 4'-7"  | 1845            |
| * S2                             | 386 | #5   | 2    | 7'-0"  | 2818            |
| * EPOXY COATED REINFORCING STEEL |     |      |      |        | 9,195 LBS.      |
| CLASS AA CONCRETE                |     |      |      |        | 52.5 CU. YDS.   |
| CONCRETE BARRIER RAIL            |     |      |      |        | 385.58 LIN. FT. |



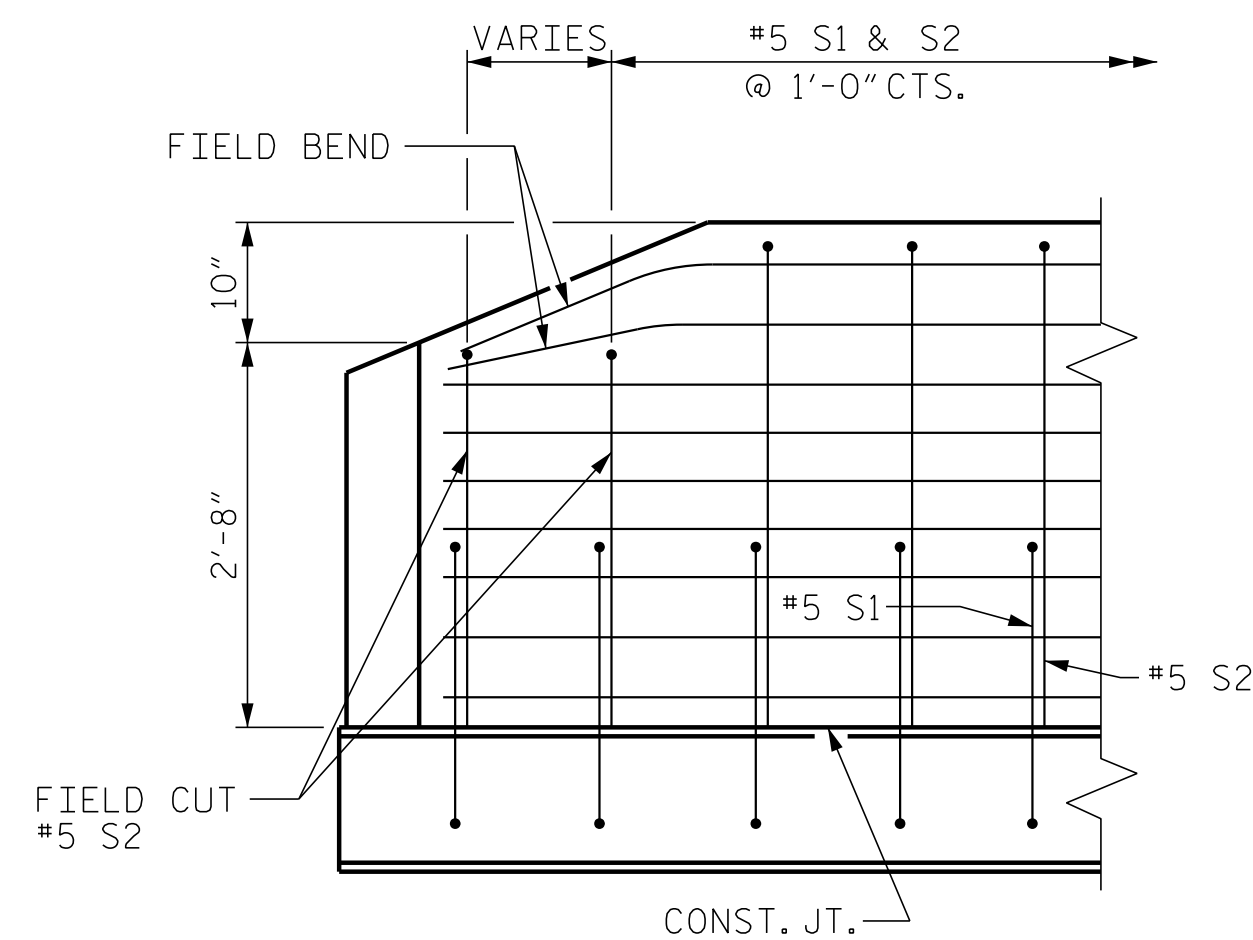
PLAN



SECTION THRU RAIL



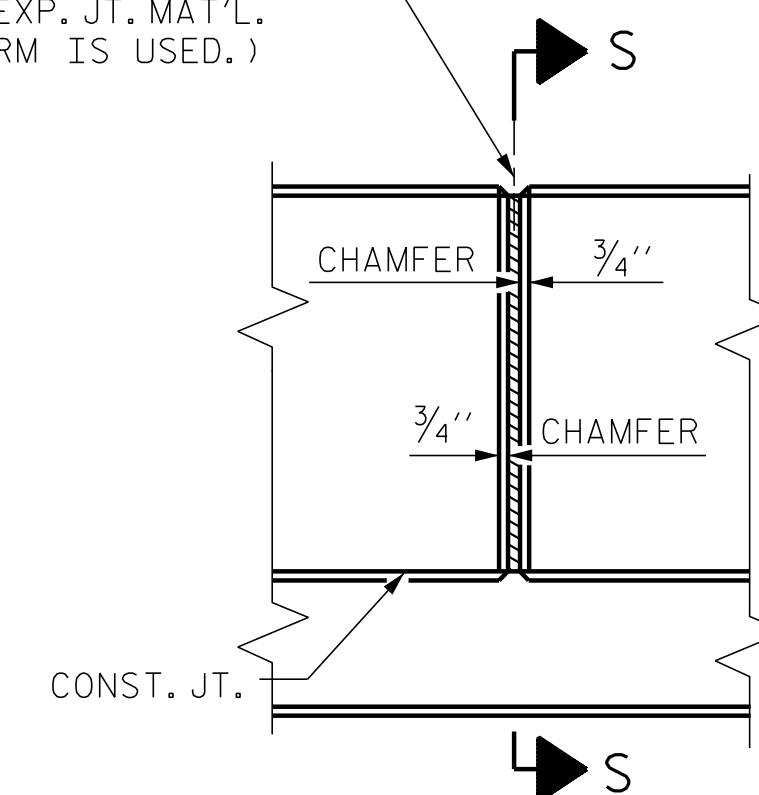
END VIEW



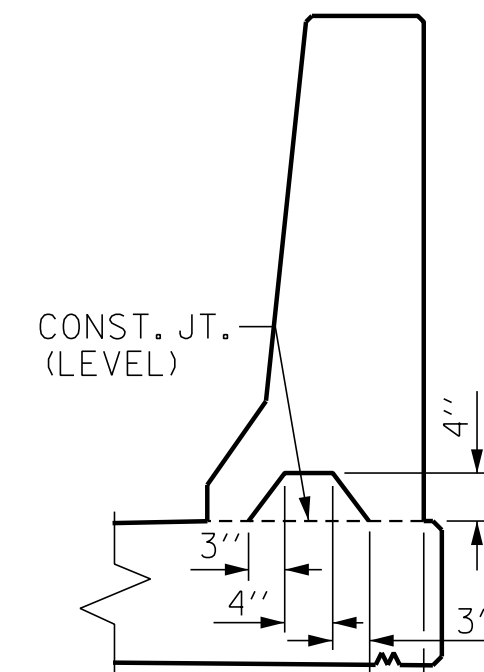
SIDE VIEW

END OF RAIL DETAILS

@ 1/2" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS.  
( NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED.)



ELEVATION AT EXPANSION JOINTS  
BARRIER RAIL DETAILS



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

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 50+99.00 -Y2-

SHEET 2 OF 2

ENGINEER OF RECORD  
DocuSigned by:  
Buck Charles Hunt  
2016.12.21 10:08 AM  
NORTH CAROLINA  
PROFESSIONAL  
SEAL  
14091  
ENGINEER  
BUCK CHARLES HUNT  
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ETHERILL  
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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

CONCRETE BARRIER RAIL

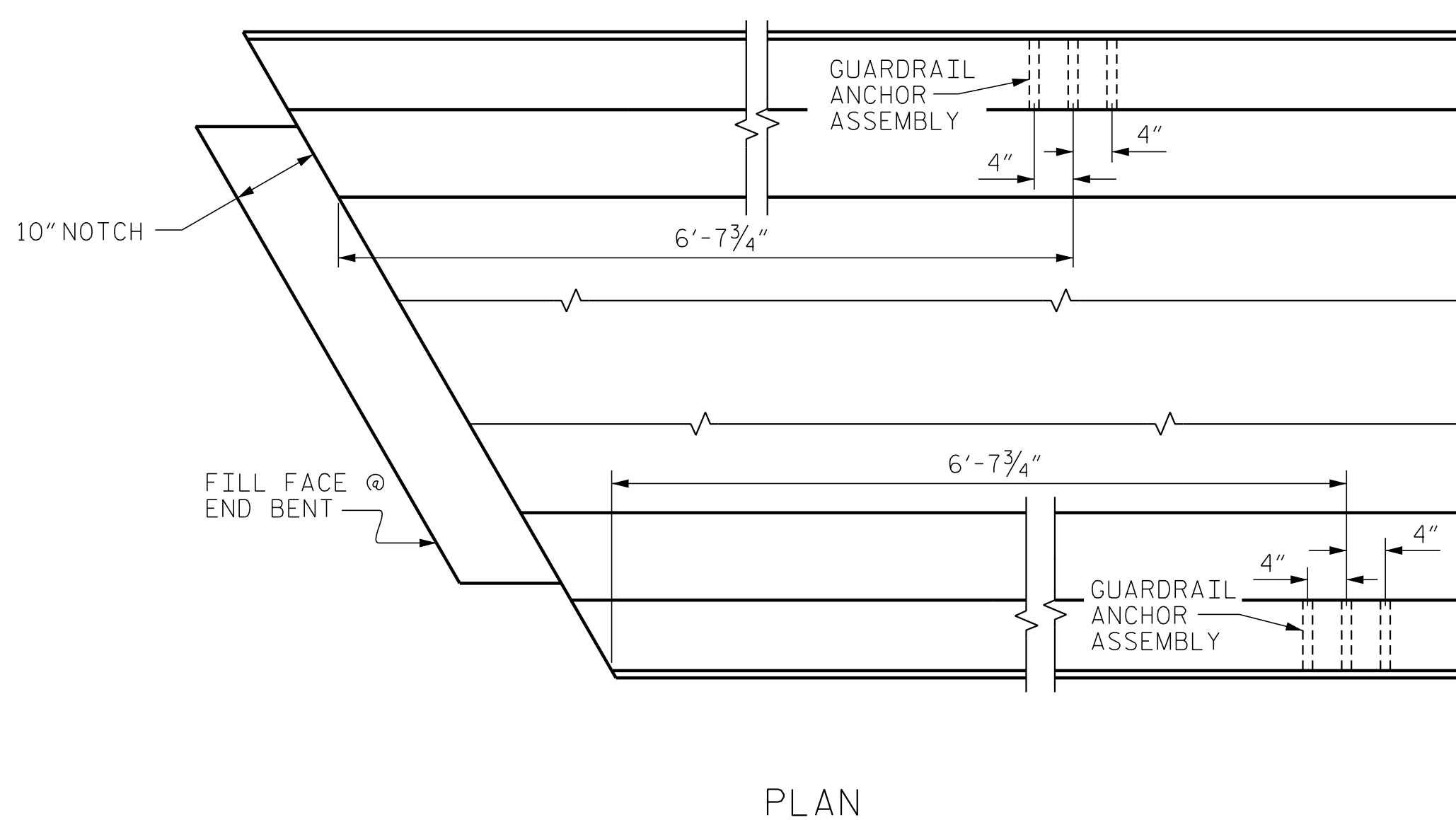
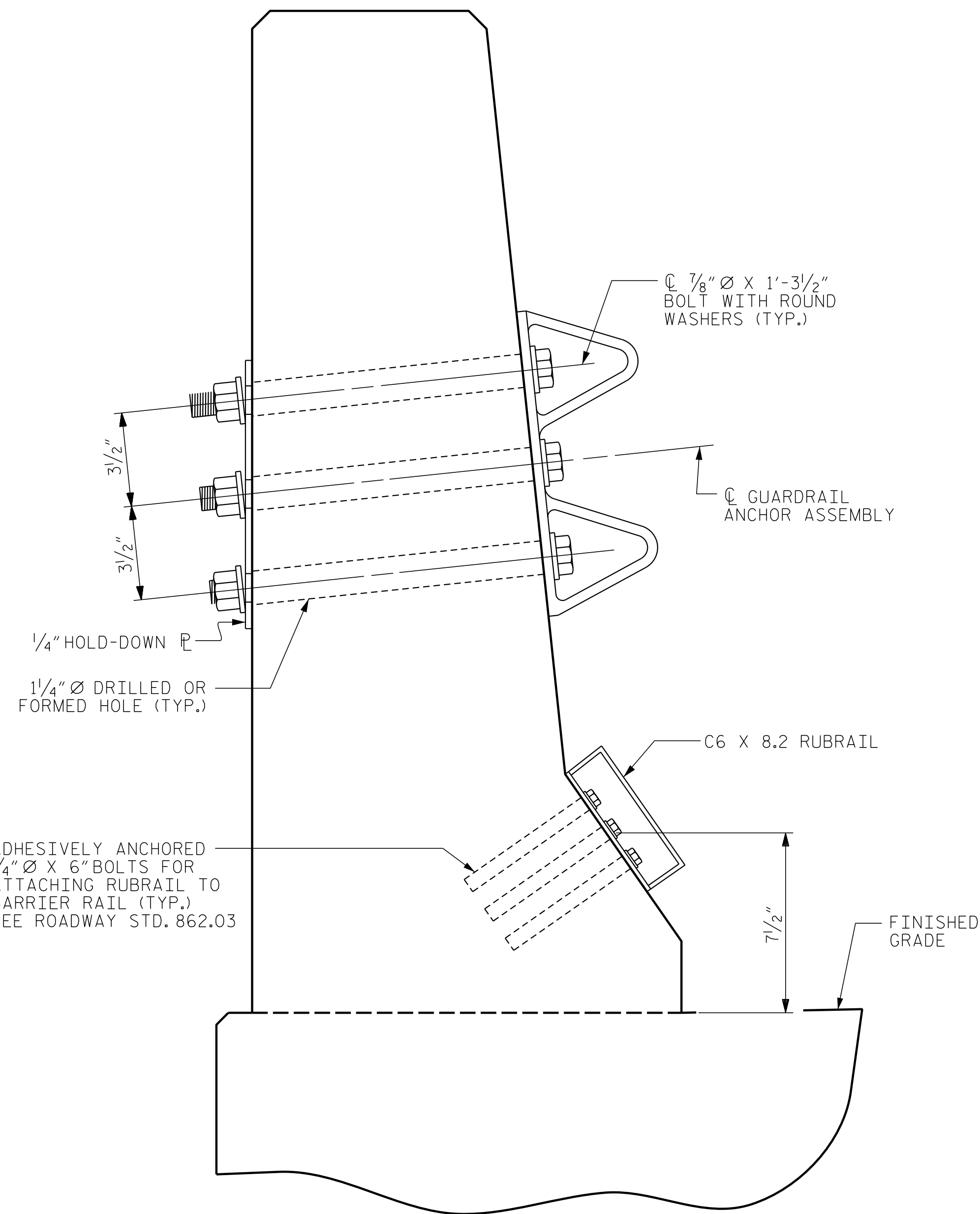
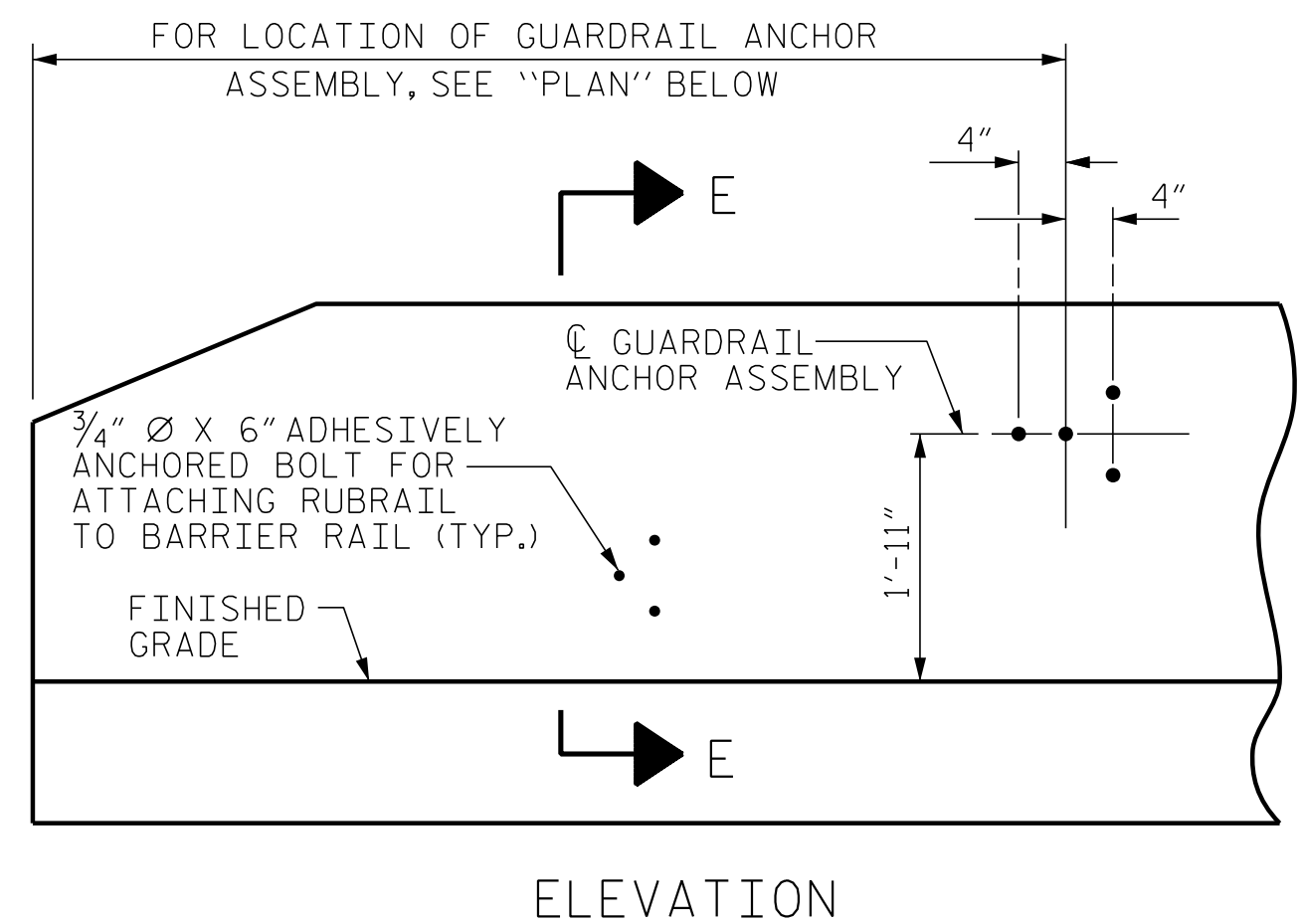
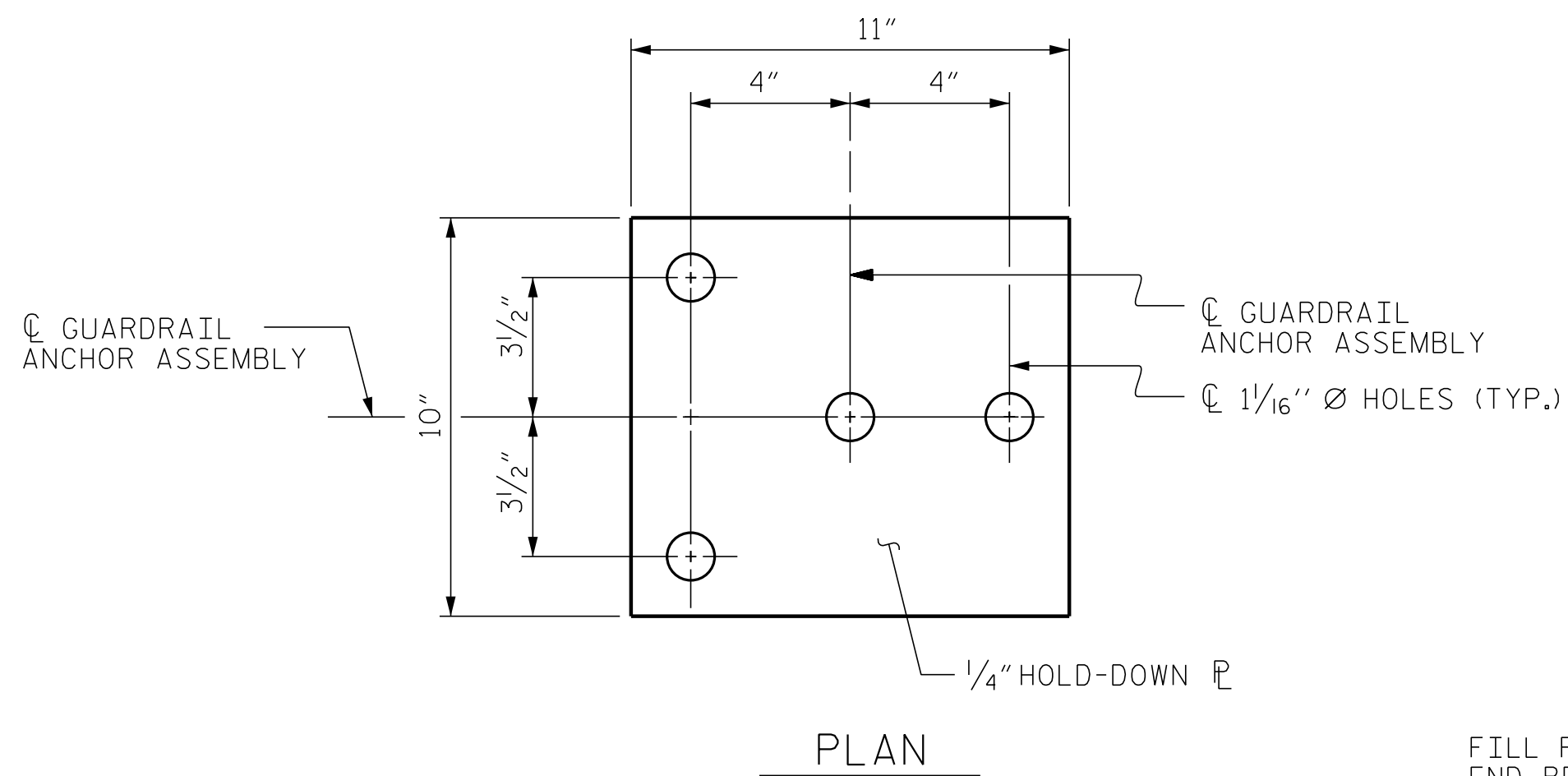
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SKETCH SHOWING POINTS OF ATTACHMENTS

\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

LOCATION OF ANCHORS FOR GUARDRAIL

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

NOTES

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

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

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

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

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

THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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

PROJECT NO. R-5311A  
 HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-

ENGINEER OF RECORD  
 Documented by: *Eric Hunt*  
 NORTH CAROLINA PROFESSIONAL SEAL 14091  
 BUCK CHARLES HUNT  
 12/21/2016  
 WETHERILL ENGINEERING  
 1223 Jones Franklin Rd.  
 Raleigh, N.C. 27606  
 Bus: 919 851 8077  
 Fax: 919 851 8107  
 LICENSE NO. F-0377

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

REVISIONS

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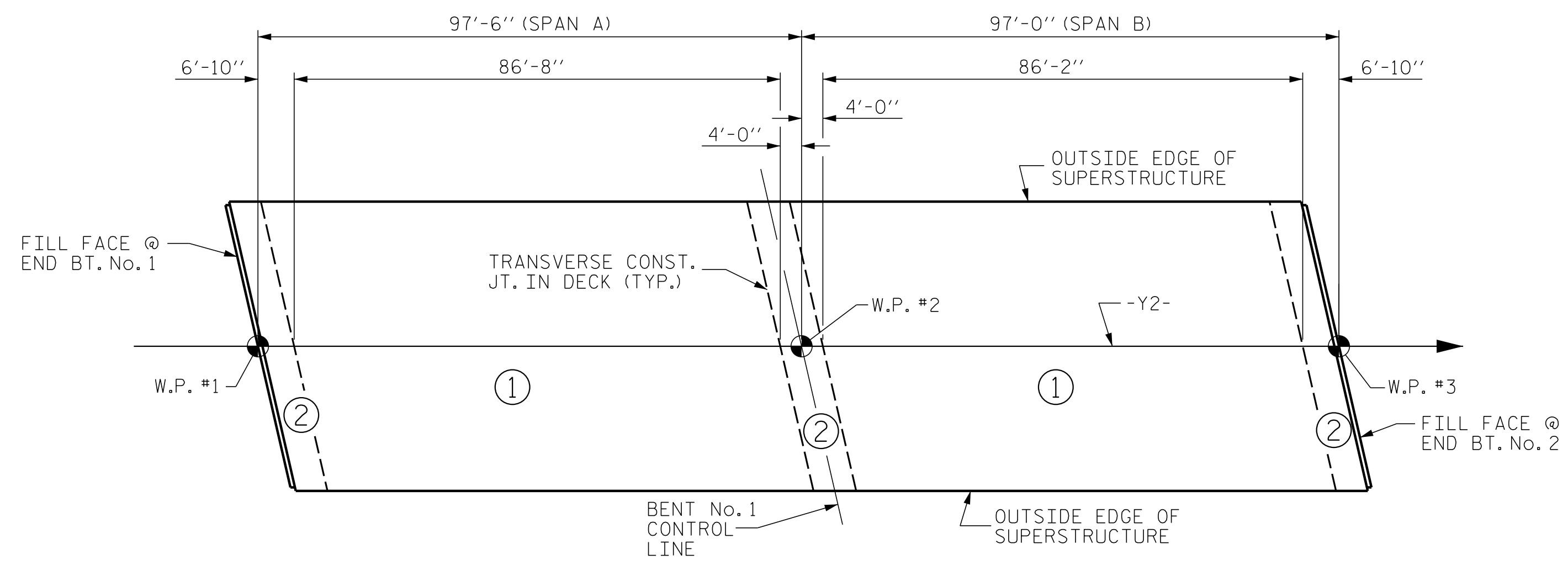
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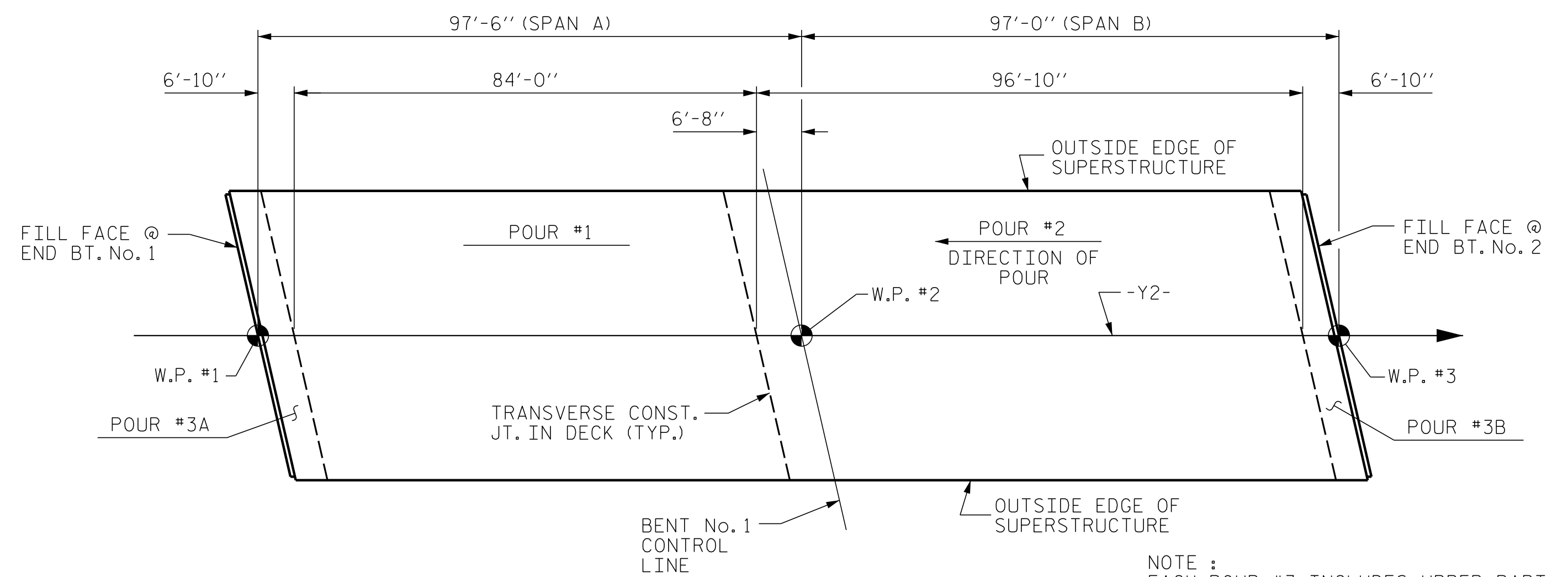
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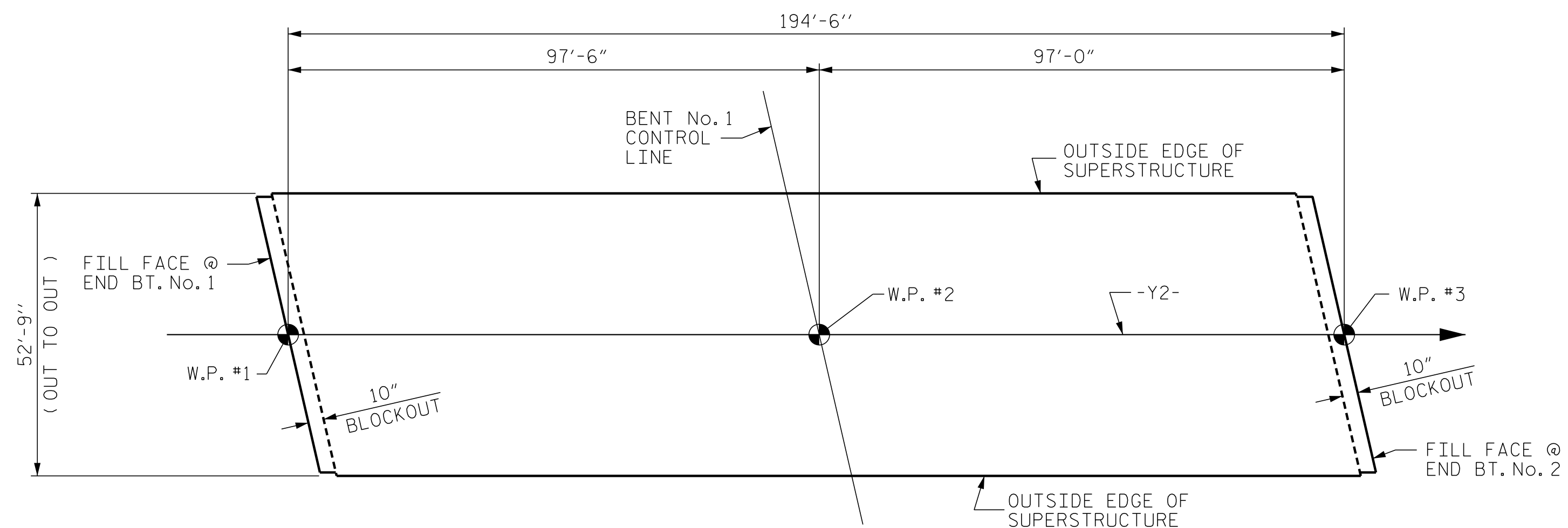
**OPTIONAL DECK POUR DETAIL**

POUR ② SHALL NOT BE STARTED UNTIL BOTH ADJACENT POUR ① REACH A MINIMUM OF 3,000 PSI



**CONCRETE DECK POUR DETAIL**

NOTE: EACH POUR #3 INCLUDES UPPER PART OF THE INTEGRAL END BENT.



**LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB**  
(SQ. FT. = 10,260)

**REINFORCING BAR SCHEDULE**

**SPAN "A-B"**

| BAR   | No. | SIZE | TYPE | LENGTH  | WEIGHT |
|-------|-----|------|------|---------|--------|
| *A1   | 361 | #5   | STR  | 52'-5"  | 19,736 |
| A2    | 361 | #5   | STR  | 52'-5"  | 19,736 |
| *A101 | 2   | #5   | STR  | 51'-0"  | 106    |
| *A102 | 2   | #5   | STR  | 48'-10" | 102    |
| *A103 | 2   | #5   | STR  | 46'-8"  | 97     |
| *A104 | 2   | #5   | STR  | 44'-6"  | 93     |
| *A105 | 2   | #5   | STR  | 42'-4"  | 88     |
| *A106 | 2   | #5   | STR  | 40'-2"  | 84     |
| *A107 | 2   | #5   | STR  | 38'-0"  | 79     |
| *A108 | 2   | #5   | STR  | 35'-10" | 75     |
| *A109 | 2   | #5   | STR  | 33'-8"  | 70     |
| *A110 | 2   | #5   | STR  | 31'-6"  | 66     |
| *A111 | 2   | #5   | STR  | 29'-4"  | 61     |
| *A112 | 2   | #5   | STR  | 27'-2"  | 57     |
| *A113 | 2   | #5   | STR  | 25'-0"  | 52     |
| *A114 | 2   | #5   | STR  | 22'-10" | 48     |
| *A115 | 2   | #5   | STR  | 20'-8"  | 43     |
| *A116 | 2   | #5   | STR  | 18'-5"  | 38     |
| *A117 | 2   | #5   | STR  | 16'-3"  | 34     |
| *A118 | 2   | #5   | STR  | 14'-1"  | 29     |
| *A119 | 2   | #5   | STR  | 11'-11" | 25     |
| *A120 | 2   | #5   | STR  | 9'-9"   | 20     |
| *A121 | 2   | #5   | STR  | 7'-7"   | 16     |
| *A122 | 2   | #5   | STR  | 5'-5"   | 11     |
| *A123 | 2   | #5   | STR  | 3'-3"   | 7      |

|      |   |    |     |         |     |
|------|---|----|-----|---------|-----|
| A201 | 2 | #5 | STR | 51'-0"  | 106 |
| A202 | 2 | #5 | STR | 48'-10" | 102 |
| A203 | 2 | #5 | STR | 46'-8"  | 97  |
| A204 | 2 | #5 | STR | 44'-6"  | 93  |
| A205 | 2 | #5 | STR | 42'-4"  | 88  |
| A206 | 2 | #5 | STR | 40'-2"  | 84  |
| A207 | 2 | #5 | STR | 38'-0"  | 79  |
| A208 | 2 | #5 | STR | 35'-10" | 75  |
| A209 | 2 | #5 | STR | 33'-8"  | 70  |
| A210 | 2 | #5 | STR | 31'-6"  | 66  |
| A211 | 2 | #5 | STR | 29'-4"  | 61  |
| A212 | 2 | #5 | STR | 27'-2"  | 57  |
| A213 | 2 | #5 | STR | 25'-0"  | 52  |
| A214 | 2 | #5 | STR | 22'-10" | 48  |
| A215 | 2 | #5 | STR | 20'-8"  | 43  |
| A216 | 2 | #5 | STR | 18'-5"  | 38  |
| A217 | 2 | #5 | STR | 16'-3"  | 34  |
| A218 | 2 | #5 | STR | 14'-1"  | 29  |
| A219 | 2 | #5 | STR | 11'-11" | 25  |
| A220 | 2 | #5 | STR | 9'-9"   | 20  |
| A221 | 2 | #5 | STR | 7'-7"   | 16  |
| A222 | 2 | #5 | STR | 5'-5"   | 11  |
| A223 | 2 | #5 | STR | 3'-3"   | 7   |

|     |     |    |     |         |       |
|-----|-----|----|-----|---------|-------|
| *B1 | 138 | #7 | STR | 19'-6"  | 5500  |
| *B2 | 140 | #4 | STR | 24'-5"  | 2283  |
| *B3 | 70  | #7 | STR | 36'-10" | 5270  |
| *B4 | 34  | #7 | STR | 29'-3"  | 2033  |
| B5  | 260 | #5 | STR | 49'-9"  | 13491 |
| *B6 | 14  | #4 | STR | 29'-3"  | 274   |

|     |    |    |     |         |     |
|-----|----|----|-----|---------|-----|
| K1  | 20 | #4 | STR | 26'-10" | 358 |
| K2  | 10 | #4 | STR | 7'-3"   | 48  |
| K3  | 20 | #4 | STR | 8'-3"   | 110 |
| K4  | 10 | #4 | STR | 7'-9"   | 52  |
| K5  | 10 | #4 | STR | 6'-9"   | 45  |
| K6  | 4  | #4 | STR | 2'-3"   | 6   |
| K7  | 8  | #4 | STR | 2'-6"   | 13  |
| K8  | 8  | #4 | STR | 3'-0"   | 16  |
| K9  | 10 | #4 | STR | 25'-2"  | 168 |
| K10 | 10 | #4 | STR | 5'-6"   | 37  |
| K11 | 10 | #4 | STR | 7'-3"   | 48  |
| K12 | 30 | #4 | STR | 7'-8"   | 154 |

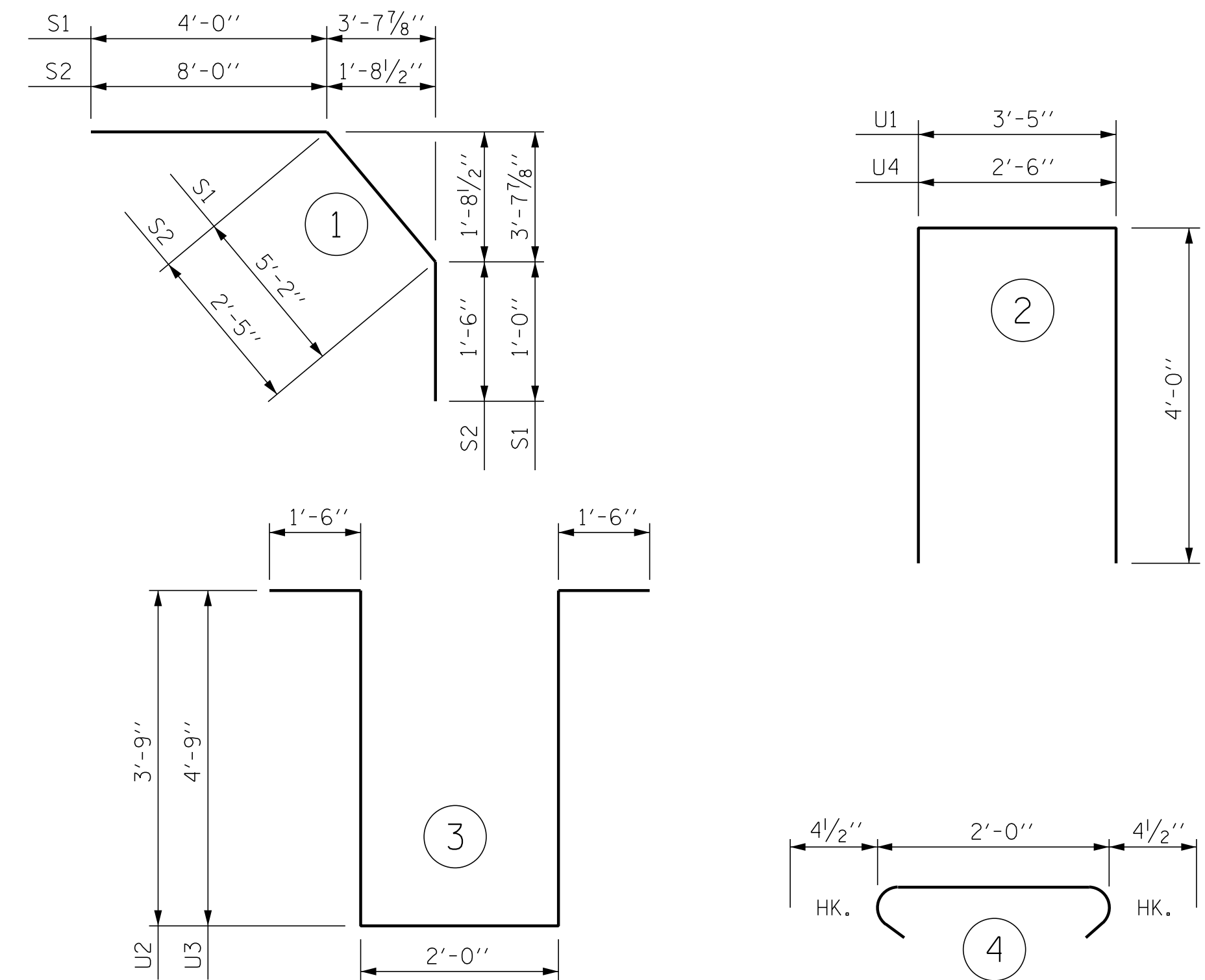
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| *S1 | 78  | #4 | 1 | 10'-2"  | 530 |
| *S2 | 78  | #4 | 1 | 11'-11" | 621 |
| S3  | 150 | #4 | 4 | 2'-9"   | 276 |

|    |    |    |   |        |     |
|----|----|----|---|--------|-----|
| U1 | 78 | #4 | 2 | 11'-5" | 595 |
| U2 | 10 | #4 | 3 | 12'-6" | 84  |
| U3 | 30 | #4 | 3 | 14'-6" | 291 |
| U4 | 4  | #4 | 2 | 10'-6" | 28  |

REINFORCING STEEL 36,857 LBS.  
\* EPOXY COATED REINFORCING STEEL 37,548 LBS.

\* THESE BARS ARE EPOXY COATED

**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT

**SUPERSTRUCTURE BILL OF MATERIAL**

|           | CLASS AA CONCRETE<br>( CU. YDS. ) | REINFORCING STEEL<br>( LBS. ) | * EPOXY COATED REINFORCING STEEL<br>( LBS. ) |
|-----------|-----------------------------------|-------------------------------|--|
| TOTALS ** | 396.1                             | 36,857                        | 37,548                                       |

\*\* QUANTITIES FOR CONCRETE BARRIER RAIL ARE NOT INCLUDED

**GROOVING BRIDGE FLOORS**

|                |              |
|----------------|--------------|
| APPROACH SLABS | 1,132 SQ.FT. |
| BRIDGE DECK    | 7,631 SQ.FT. |
| TOTAL          | 8,763 SQ.FT. |

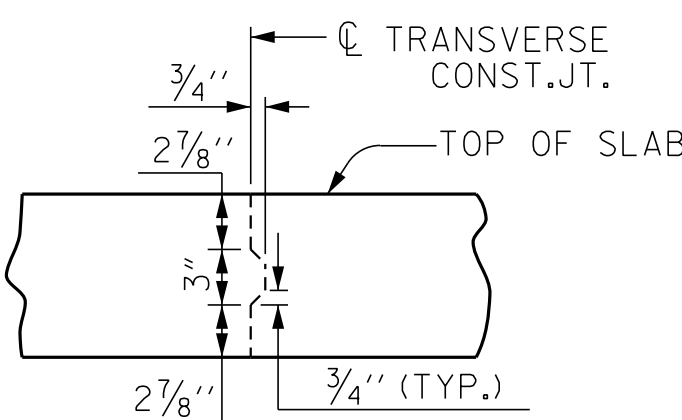
**SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS**

| BAR SIZE | SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL |          | APPROACH SLABS |          | PARAPET AND BARRIER RAIL |
|----------|---|----------|----------------|----------|--------------------------|
|          | EPOXY COATED  | UNCOATED | EPOXY COATED   | UNCOATED |                          |
| #4       | 2'-0"   | 1'-9"    | 2'-0"          | 1'-9"    | 2'-9"                    |
| #5       | 2'-6"   | 2'-2"    | 2'-6"          | 2'-2"    | 3'-5"                    |
| #6       | 3'-0"   | 2'-7"    | 3'-10"         | 2'-7"    | 4'-4"                    |
| #7       | 5'-3"   | 3'-6"    |                |          |                          |
| #8       | 6'-10"  | 4'-7"    |                |          |                          |

**CLASS AA CONCRETE BREAKDOWN**

|                                   |       |    |
|-----------------------------------|-------|----|
| POUR #1                           | 138.6 | CY |
| POUR #2                           | 176.5 | CY |
| POUR #3A                          | 40.5  | CY |
| POUR #3B                          | 40.5  | CY |
| CLASS AA CONCRETE BREAKDOWN TOTAL | 396.1 | CY |

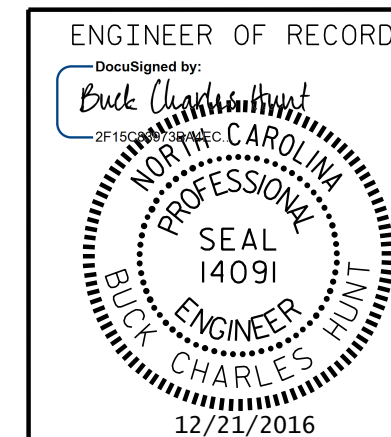
PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 50+99.00 -Y2-



**TRANSVERSE CONSTRUCTION DETAIL**

NOTE: SLAB REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT

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RALEIGH

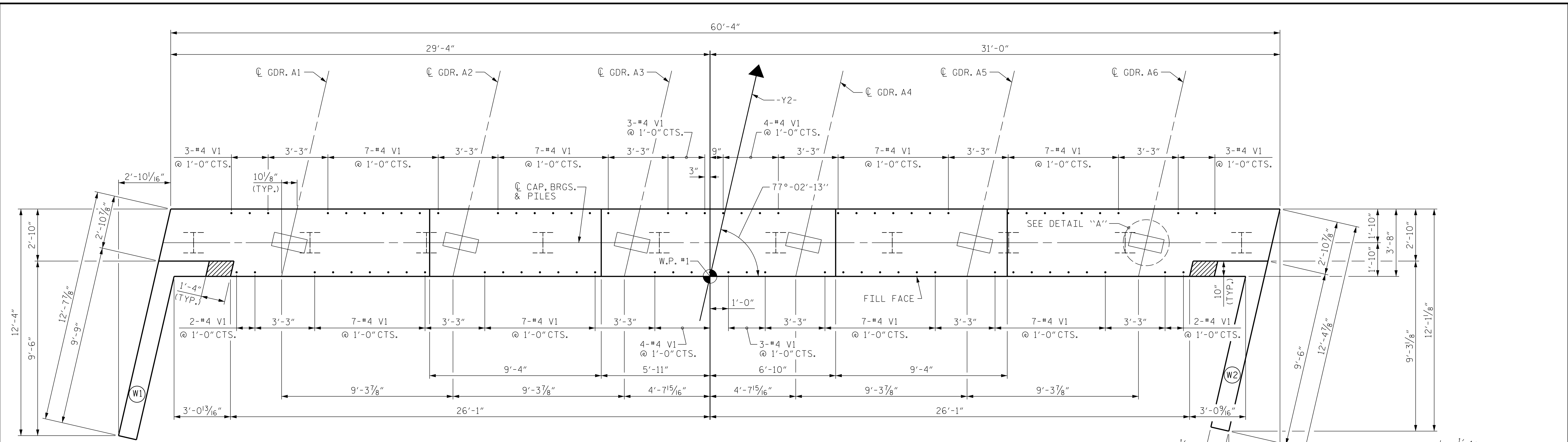
**SUPERSTRUCTURE BILL OF MATERIAL**

**REVISIONS**

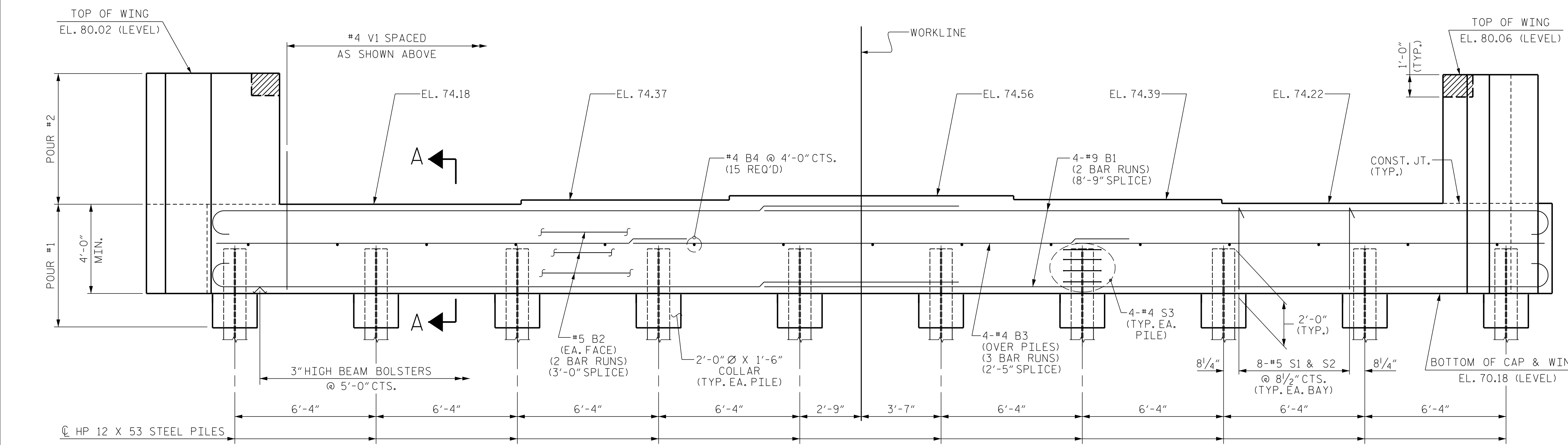
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SHEET NO. S02-19  
TOTAL SHEETS 61

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CHECKED BY: G.M. GILLAND DATE: 3/16

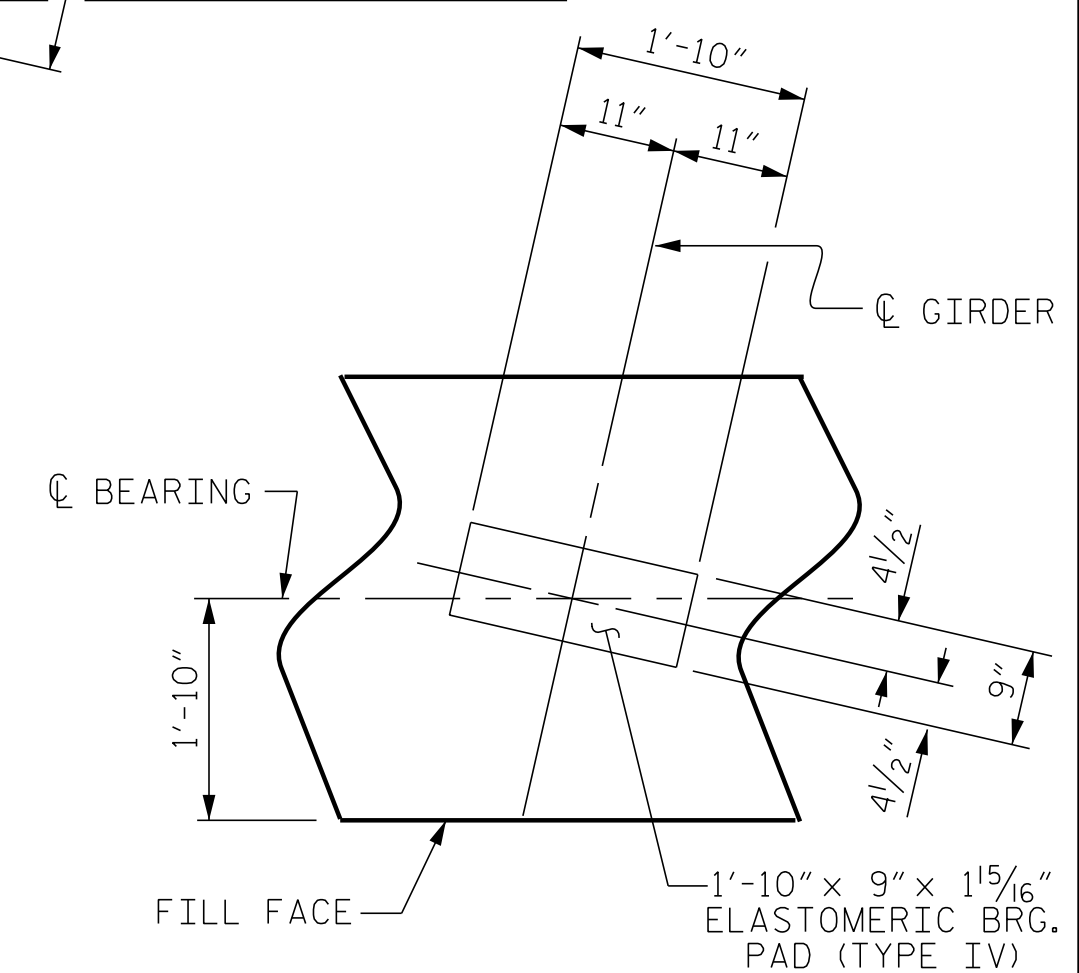


PLAN



ELEVATION

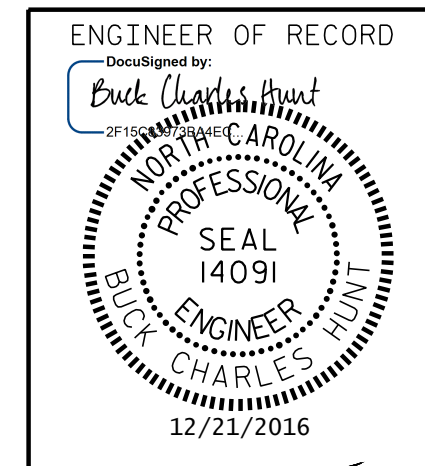
FOR SECTION A-A, SEE SHEET 3 OF 3.



DETAIL "A"  
(TYP. EACH GIRDER)

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HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-

SHEET 1 OF 3



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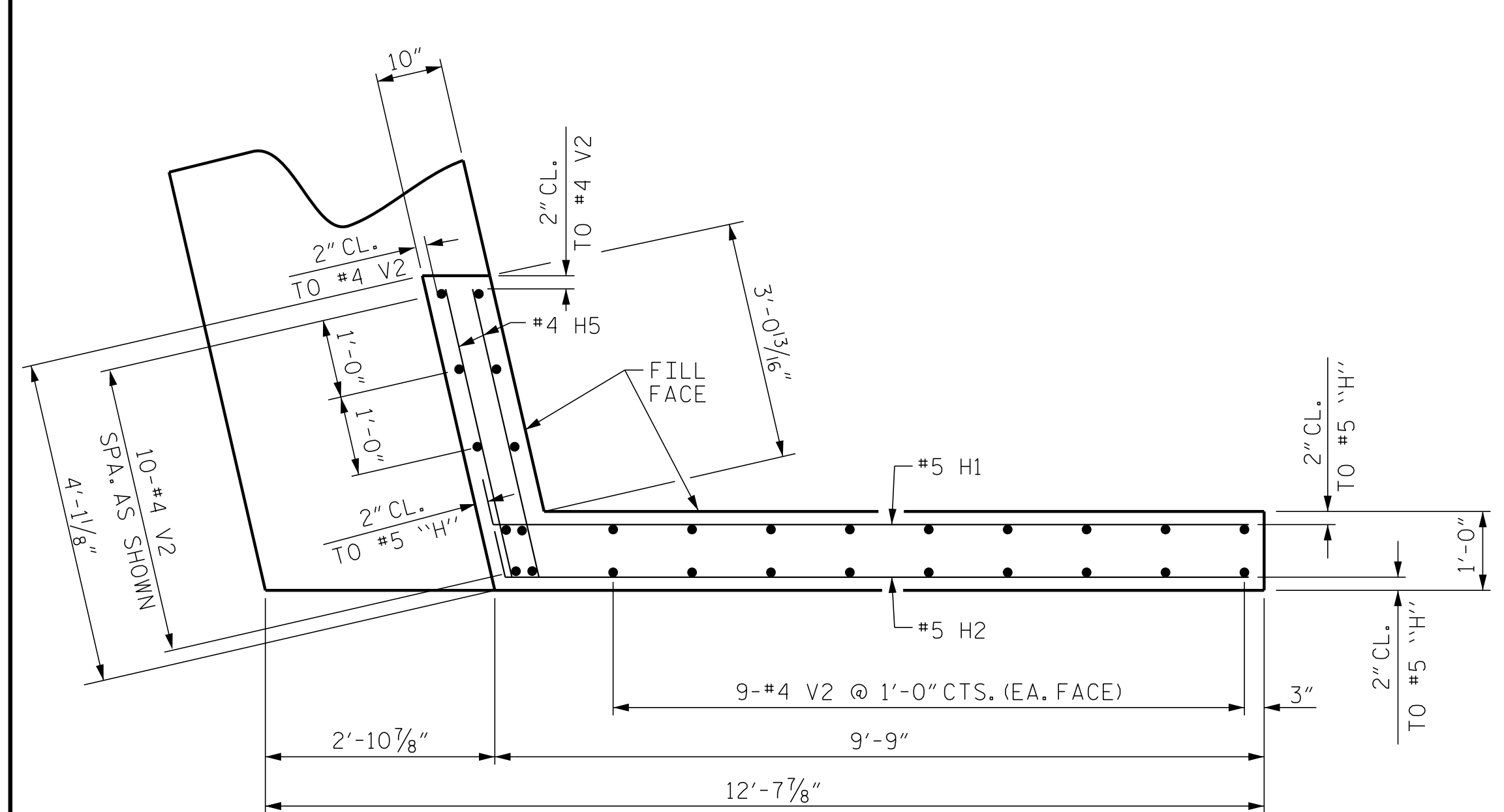
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| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                    |
| SUBSTRUCTURE<br>END BENT No. 1                                     |     |       |     |     |                    |
| REVISIONS  |     |       |     |     |                    |
| NO.  | BY: | DATE: | NO. | BY: | DATE:              |
| 1  |     |       | 3   |     |                    |
| 2  |     |       | 4   |     |                    |
| SHEET NO.<br>S02-20  |     |       |     |     | TOTAL SHEETS<br>61 |

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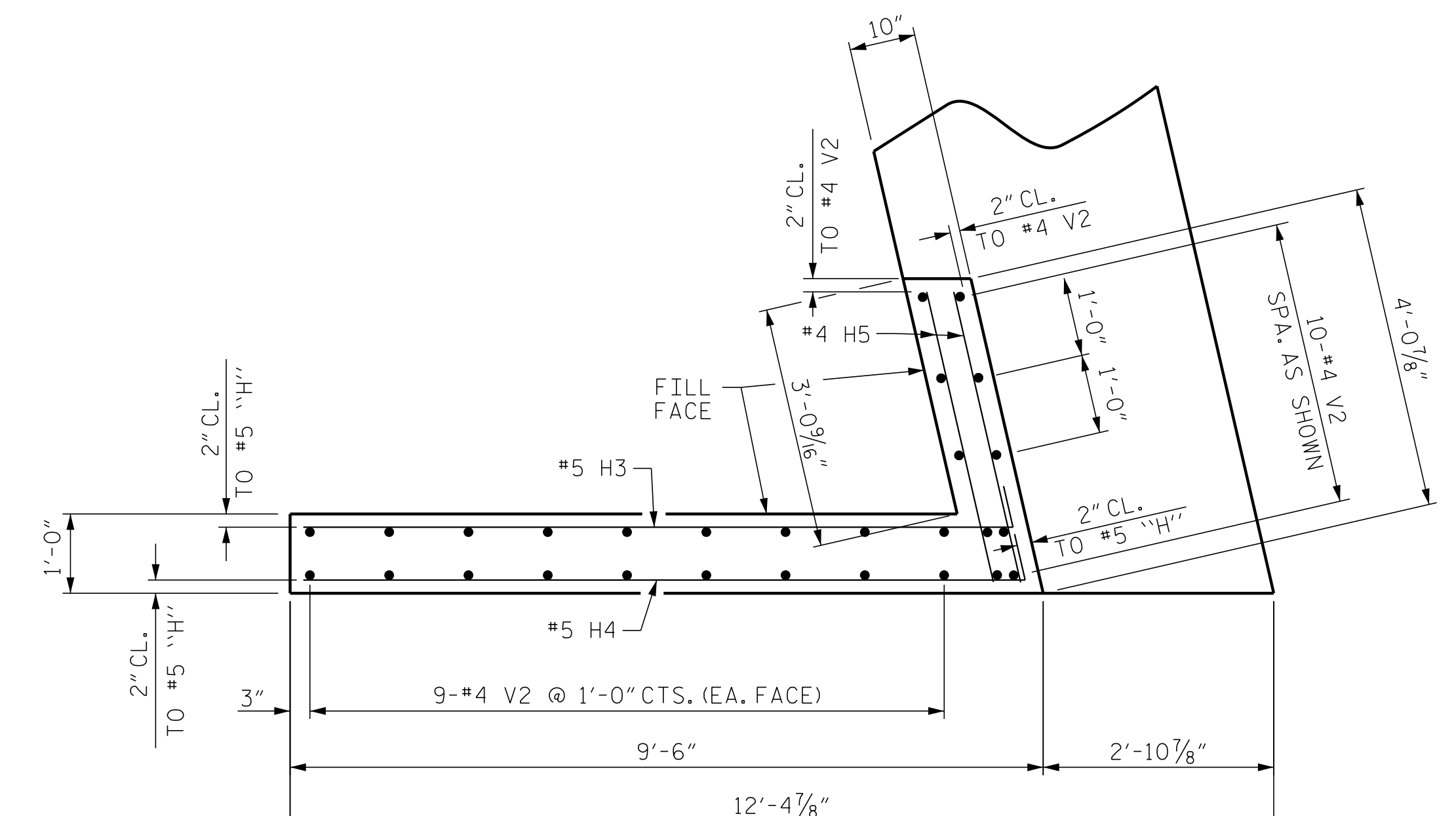
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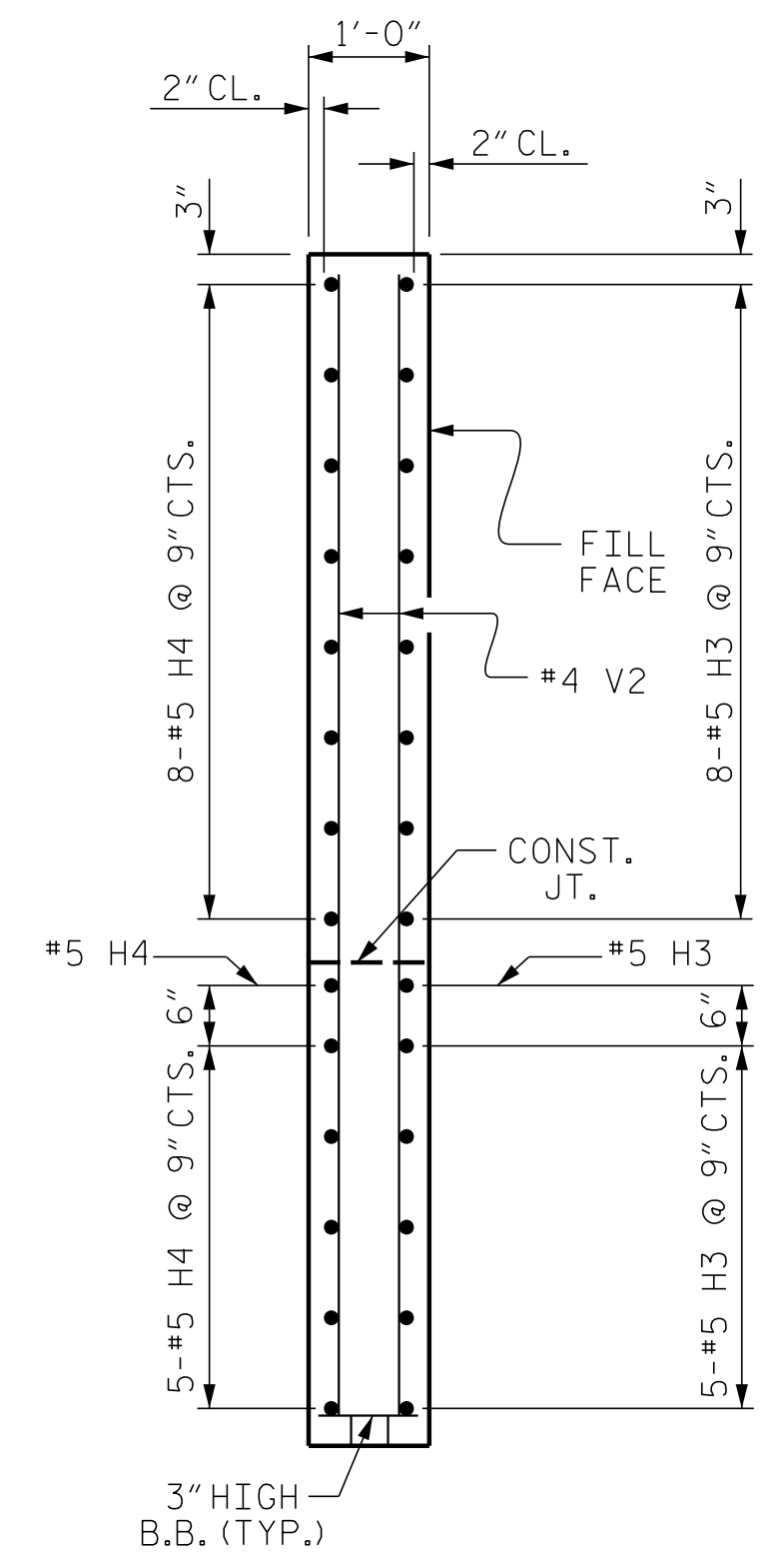




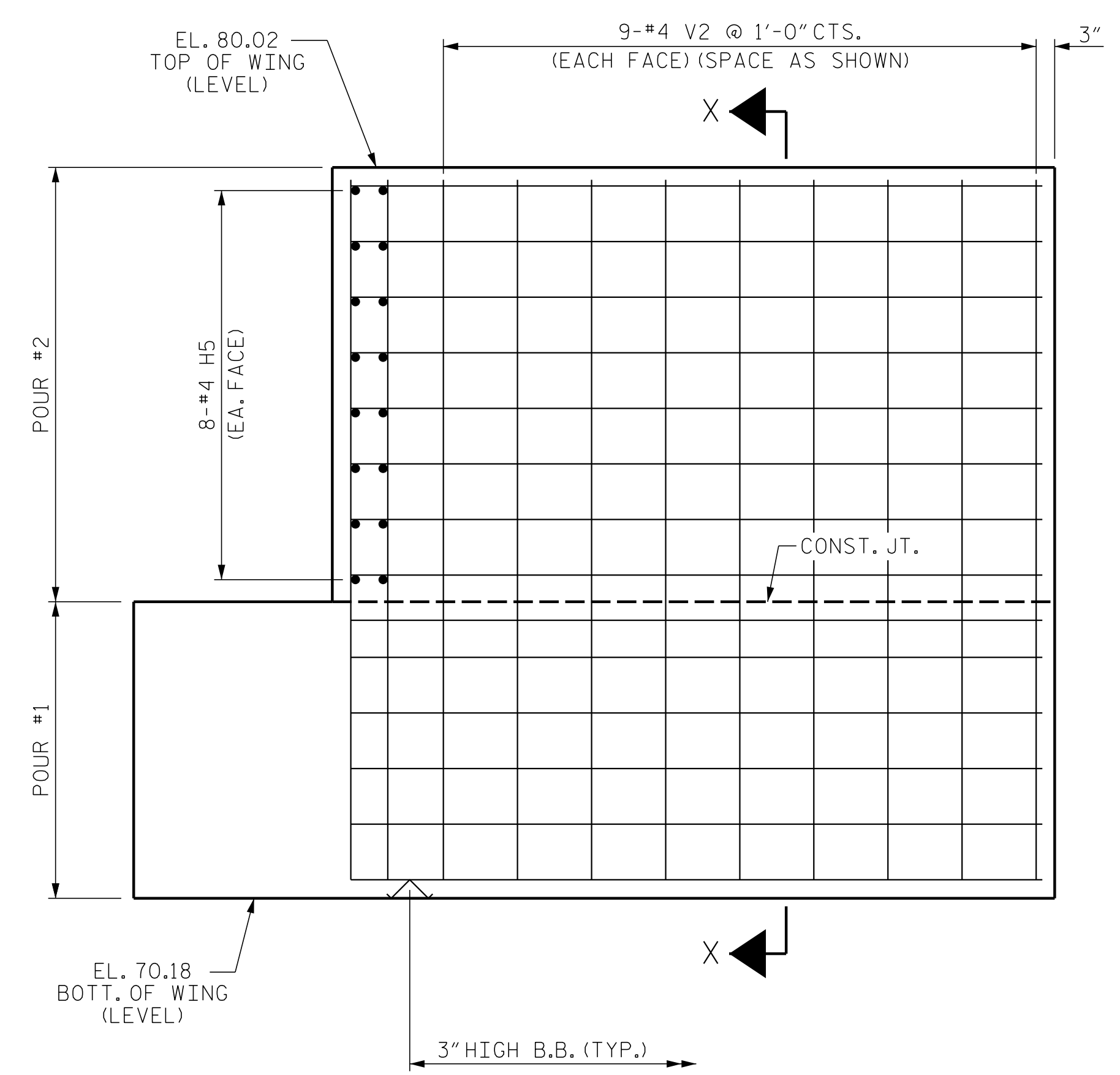
PLAN OF WING - W1



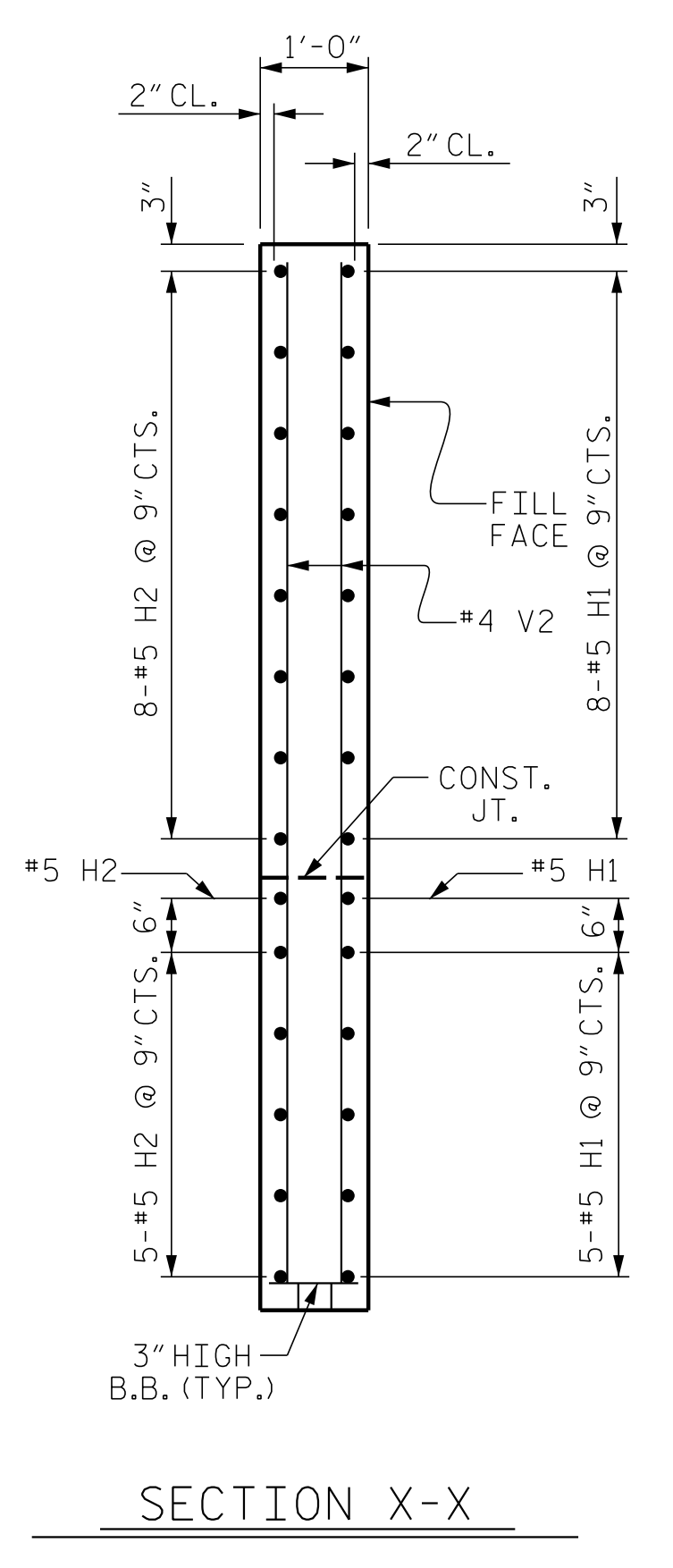
PLAN OF WING - W2



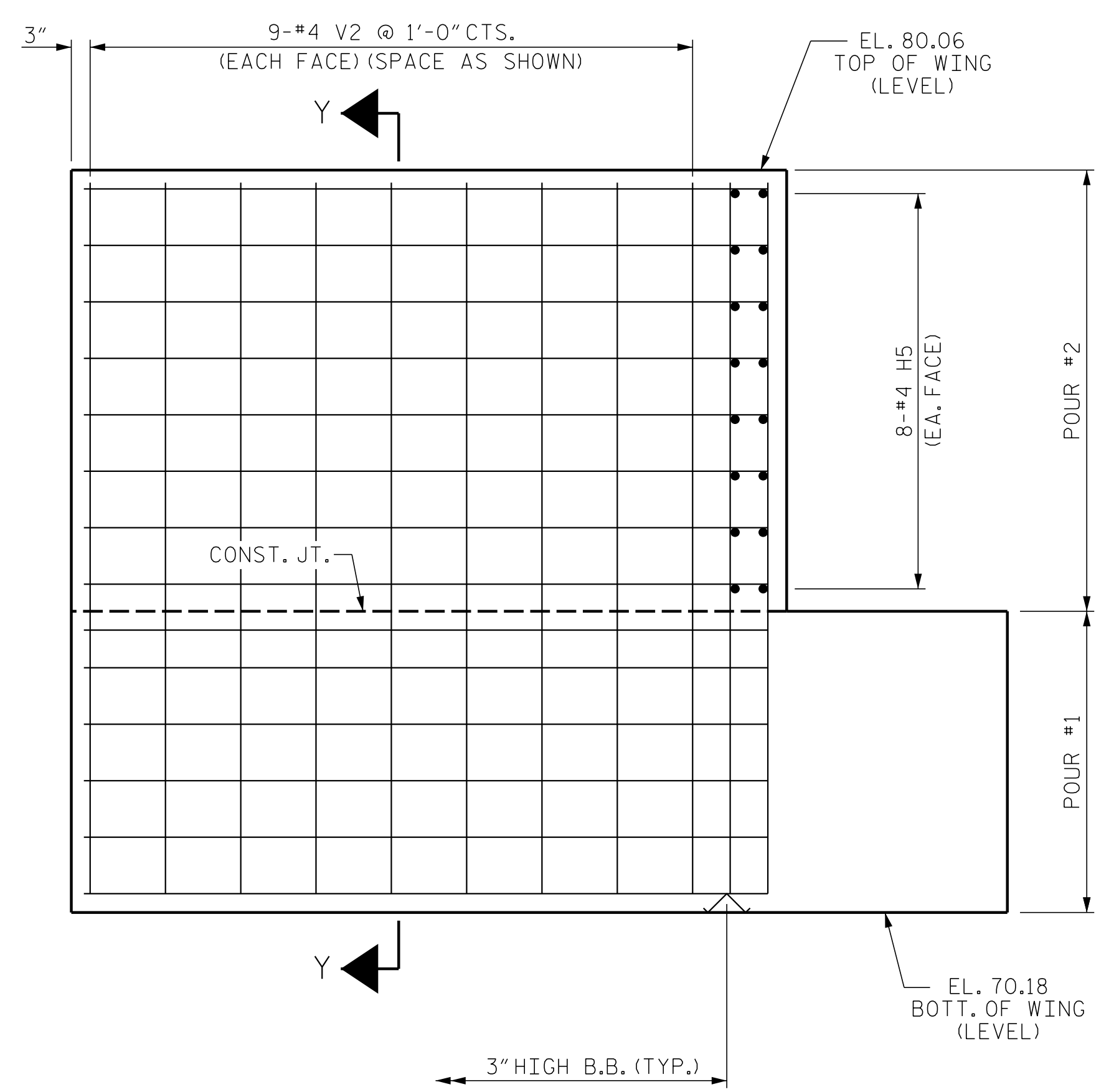
SECTION Y-Y



ELEVATION OF WING - W1



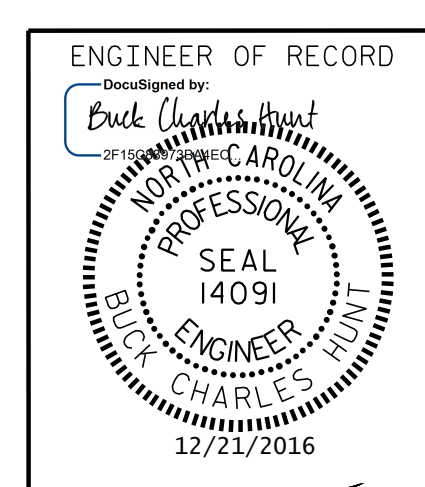
SECTION X-X



ELEVATION OF WING - W2

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 HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-

SHEET 2 OF 3



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|  |     |       |     |     |                    |
|--|-----|-------|-----|-----|--------------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                    |
| SUBSTRUCTURE<br>END BENT No. 1                                     |     |       |     |     |                    |
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| 1  |     |       | 3   |     |                    |
| 2  |     |       | 4   |     |                    |
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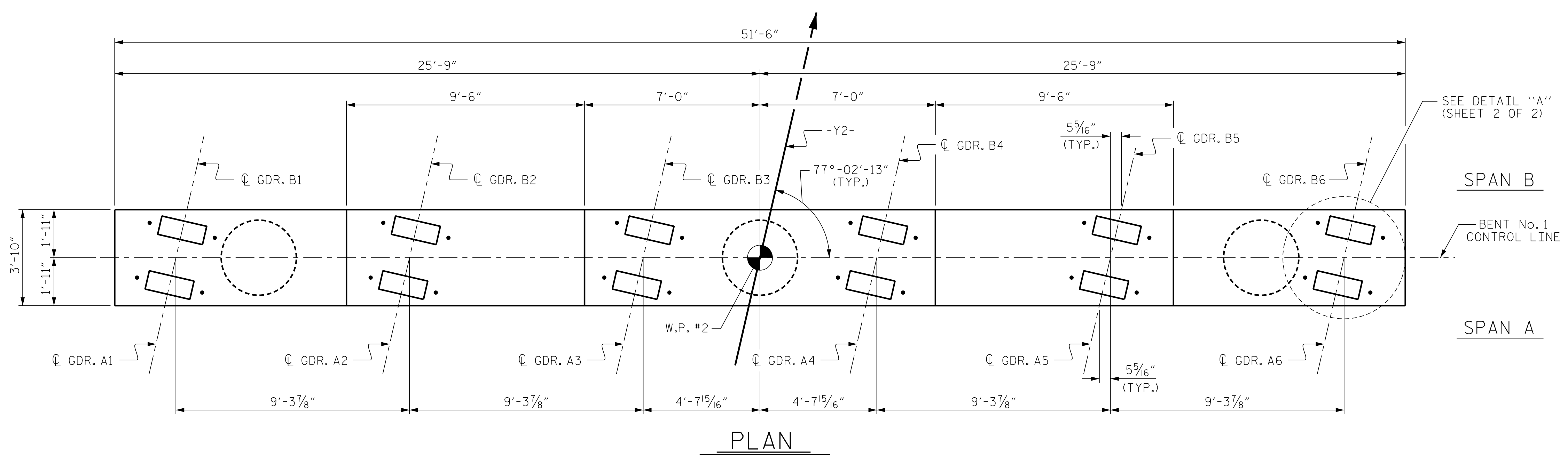
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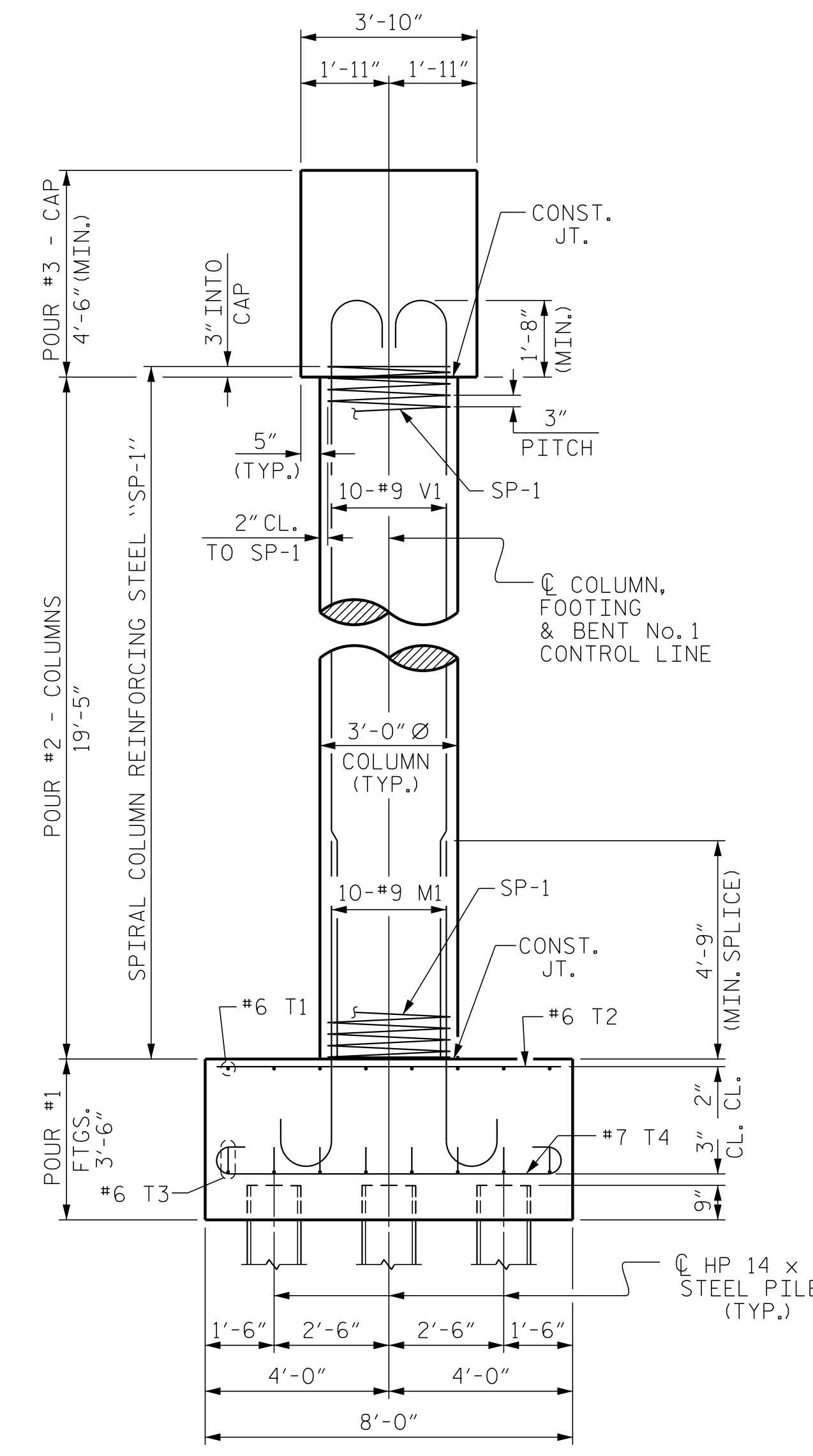




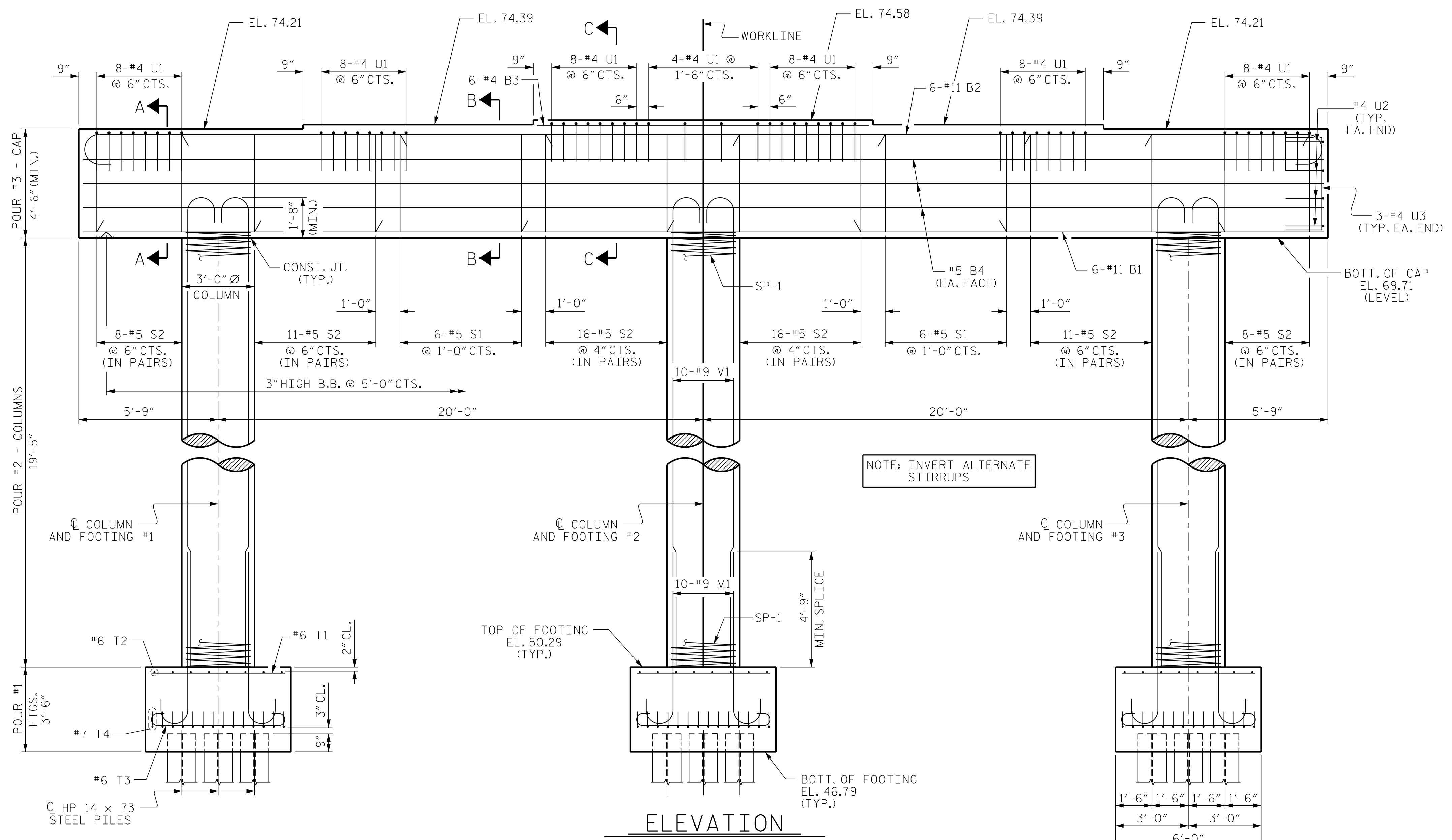


PLAN

NOTES:  
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.  
 HOOKS ON V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.



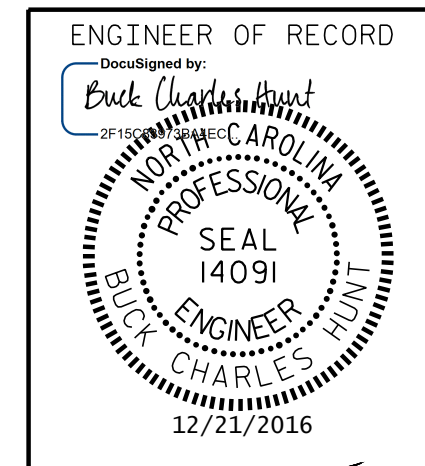
END ELEVATION



ELEVATION

PILE PLACEMENT, REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING AND COLUMN.

PROJECT NO. R-5311A  
 HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-  
 SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 BENT No. 1

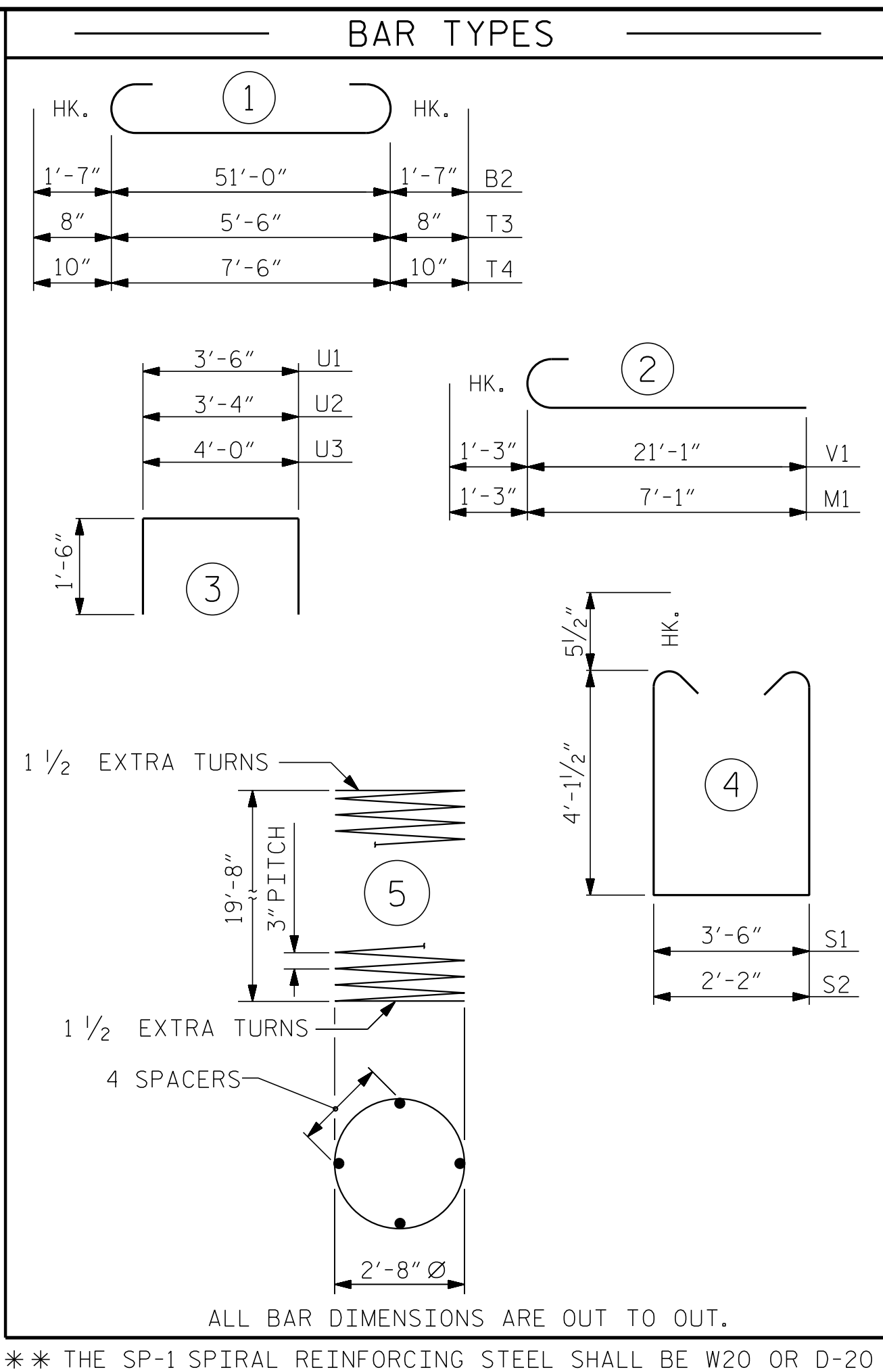
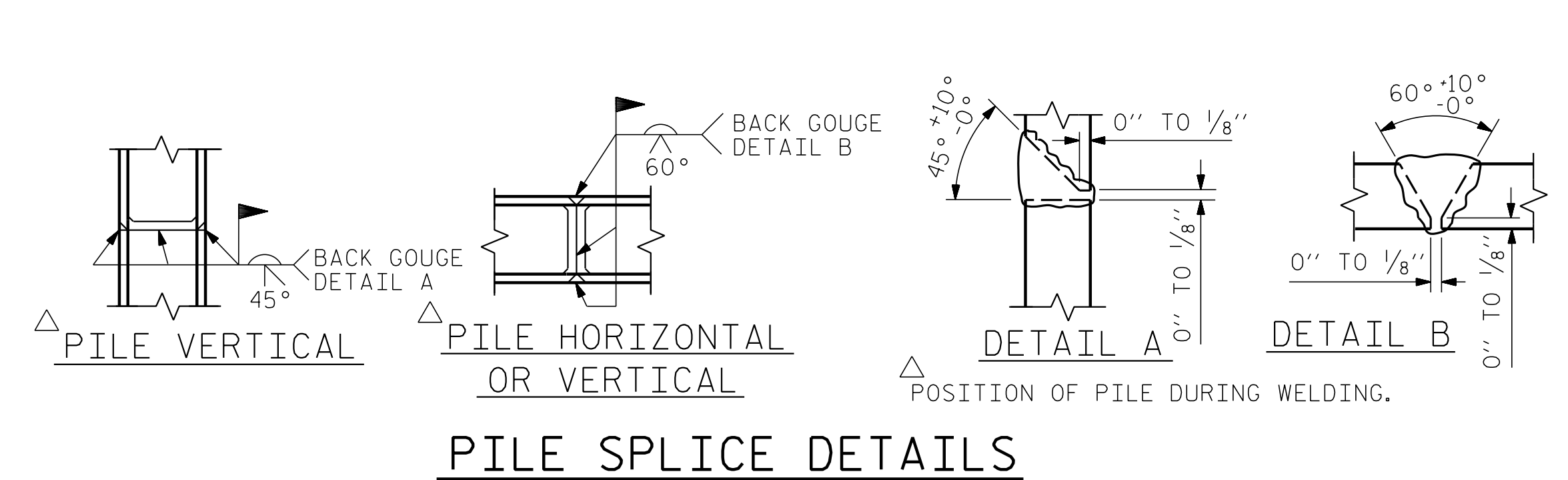
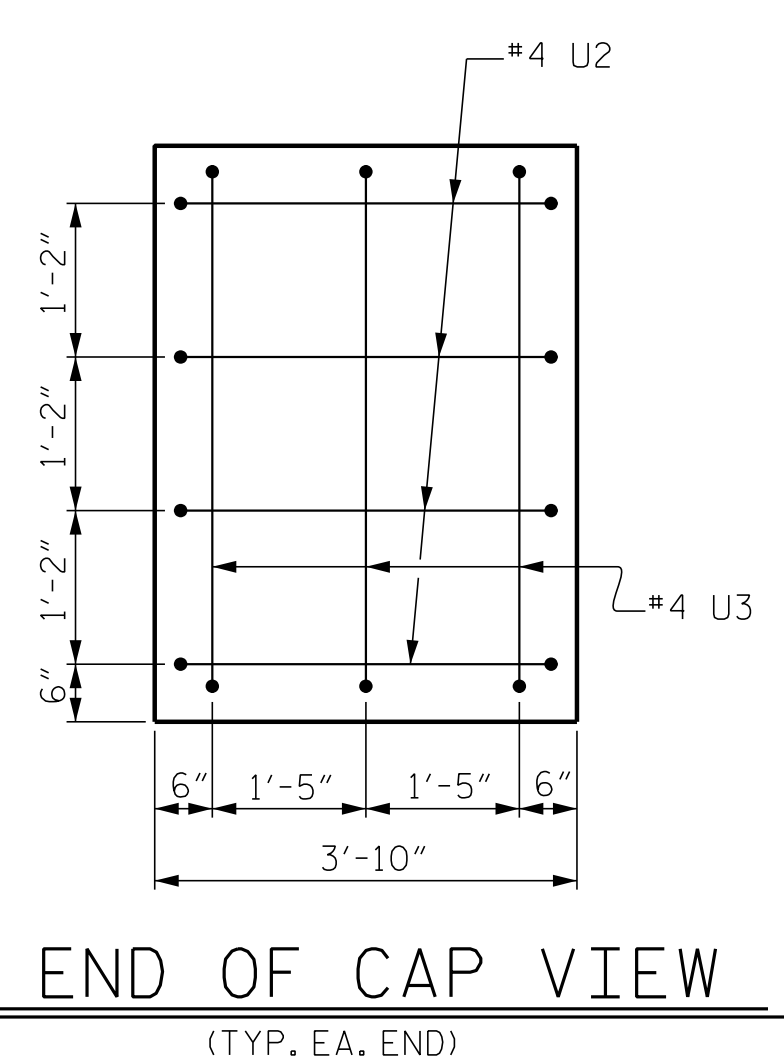
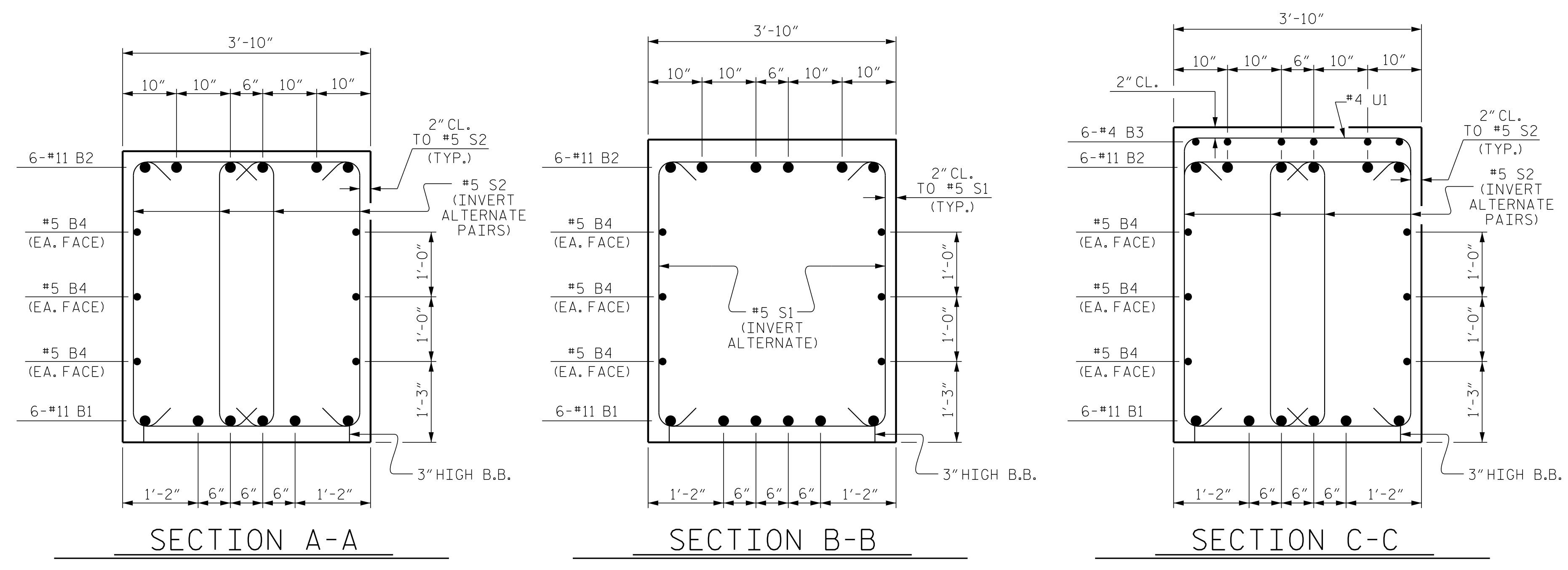
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| NO.       | BY: | DATE: | NO. | BY: | DATE: | SHEET NO.    |  |
| 1         |     |       | 3   |     |       | TOTAL SHEETS |  |
| 2         |     |       | 4   |     |       | 61           |  |

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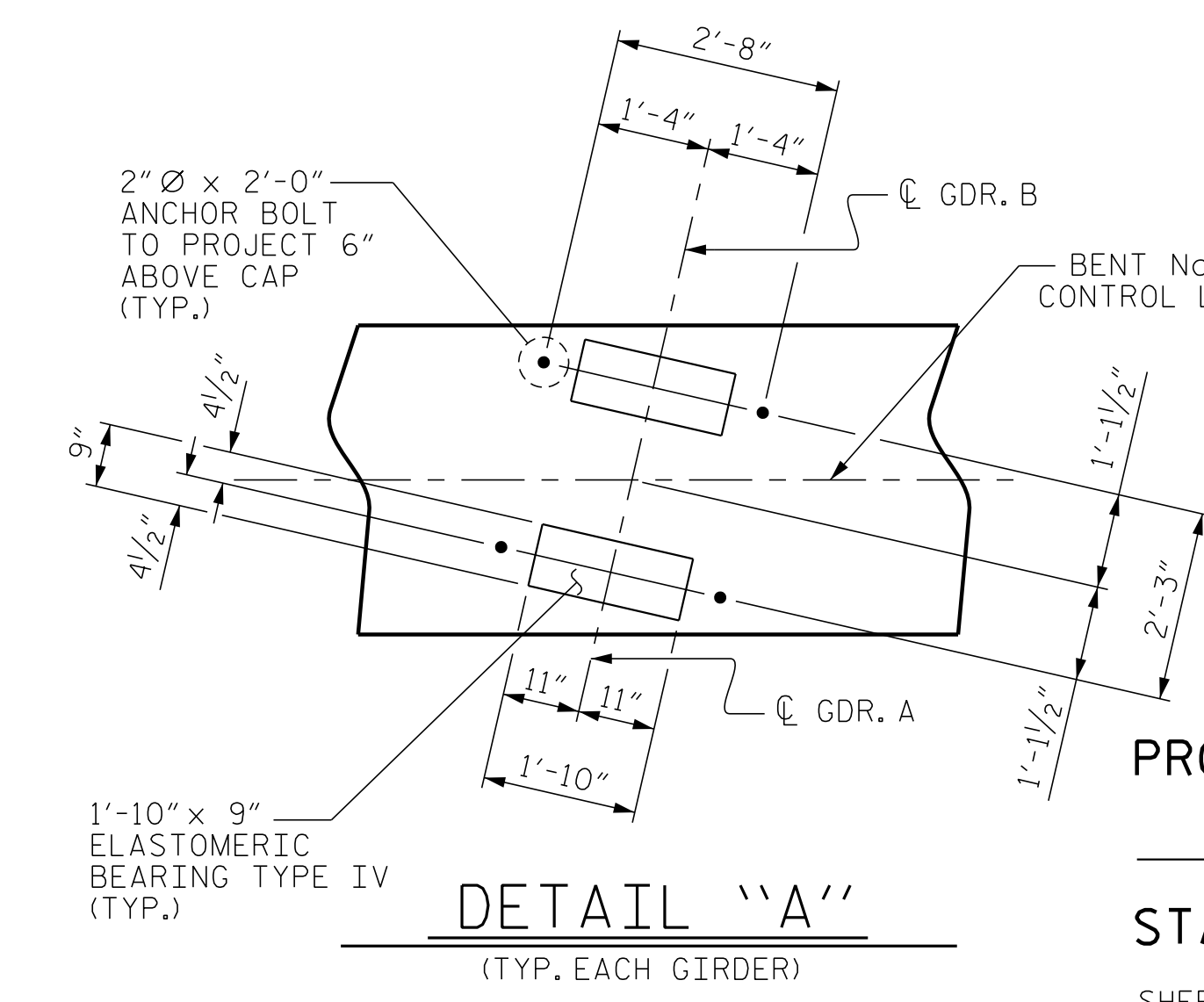
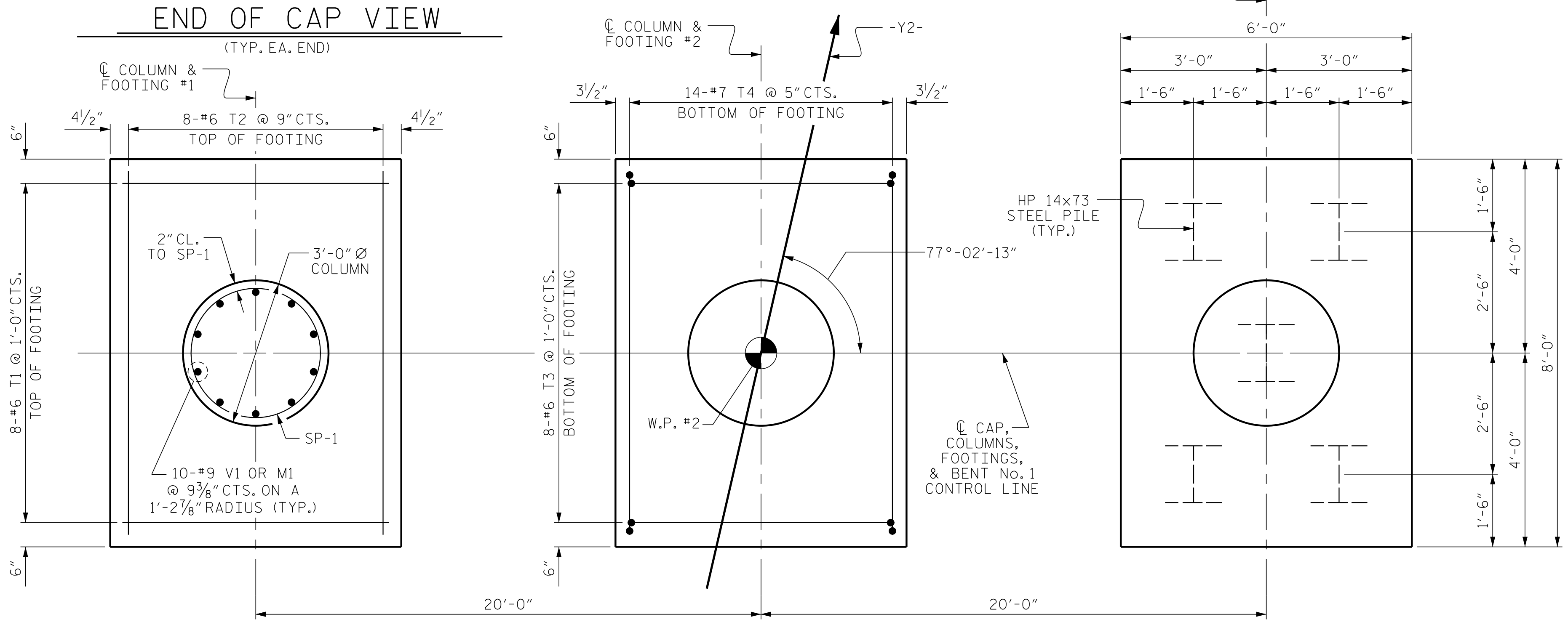
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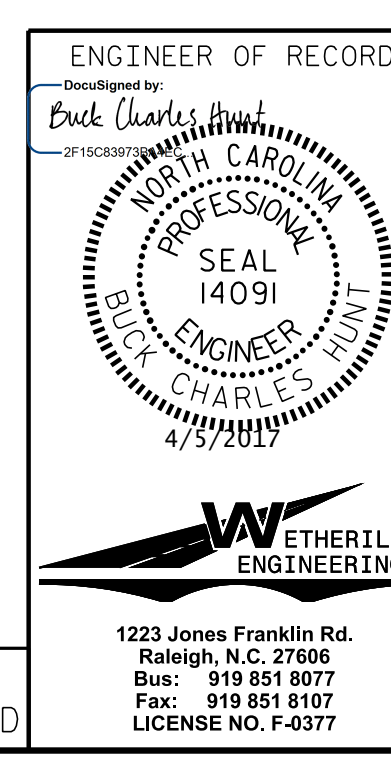
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| BILL OF MATERIAL   |      |      |        |         |                  |
|--|------|------|--------|---------|------------------|
| BENT No. 1   |      |      |        |         |                  |
| BAR NO.  | SIZE | TYPE | LENGTH | WEIGHT  |                  |
| B1   | 6    | #11  | STR    | 51'-2"  | 1631             |
| B2   | 6    | #11  | 1      | 54'-2"  | 1727             |
| B3   | 6    | #4   | STR    | 13'-8"  | 55               |
| B4   | 6    | #5   | STR    | 51'-2"  | 320              |
| M1   | 30   | #9   | 2      | 8'-4"   | 850              |
| S1   | 12   | #5   | 4      | 12'-8"  | 159              |
| S2   | 140  | #5   | 4      | 11'-4"  | 1655             |
| T1   | 24   | #6   | STR    | 5'-6"   | 198              |
| T2   | 24   | #6   | STR    | 7'-6"   | 270              |
| T3   | 24   | #6   | 1      | 6'-10"  | 246              |
| T4   | 42   | #7   | 1      | 9'-2"   | 787              |
| U1   | 52   | #4   | 3      | 6'-6"   | 226              |
| U2   | 8    | #4   | 3      | 6'-4"   | 34               |
| U3   | 6    | #4   | 3      | 7'-0"   | 28               |
| V1   | 30   | #9   | 2      | 22'-4"  | 2278             |
| REINFORCING STEEL  |      |      |        |         | 10,464 LBS.      |
| SP-1   | 3    | **   | 5      | 674'-6" | 1352             |
| SPIRAL COLUMN REINFORCING STEEL                          |      |      |        |         | 1,352 LBS.       |
| CLASS A CONCRETE BREAKDOWN                               |      |      |        |         |                  |
| POUR #1 FOOTINGS   |      |      |        |         | 18.7 C.Y.        |
| POUR #2 COLUMNS  |      |      |        |         | 15.2 C.Y.        |
| POUR #3 CAP  |      |      |        |         | 34.1 C.Y.        |
| TOTAL CLASS A CONCRETE                                   |      |      |        |         | 68.0 C.Y.        |
| HP 14 X 73 STEEL PILES                                   |      |      |        |         |                  |
| NO: 15   |      |      |        |         | LIN. FT. = 1,061 |
| PILE REDRIVES  |      |      |        |         | 8 EA.            |
| FOUNDATION EXCAVATION                                    |      |      |        |         | LUMP SUM         |
| PILE DRIVING EQUIPMENT SET UP FOR HP 14 X 73 STEEL PILES |      |      |        |         | 15 EA.           |



PROJECT NO. R-5311A  
 HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-  
 SHEET 2 OF 2



| REVISIONS |     |       |     |     |       |
|-----------|-----|-------|-----|-----|-------|
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| 1         |     |       | 3   |     |       |
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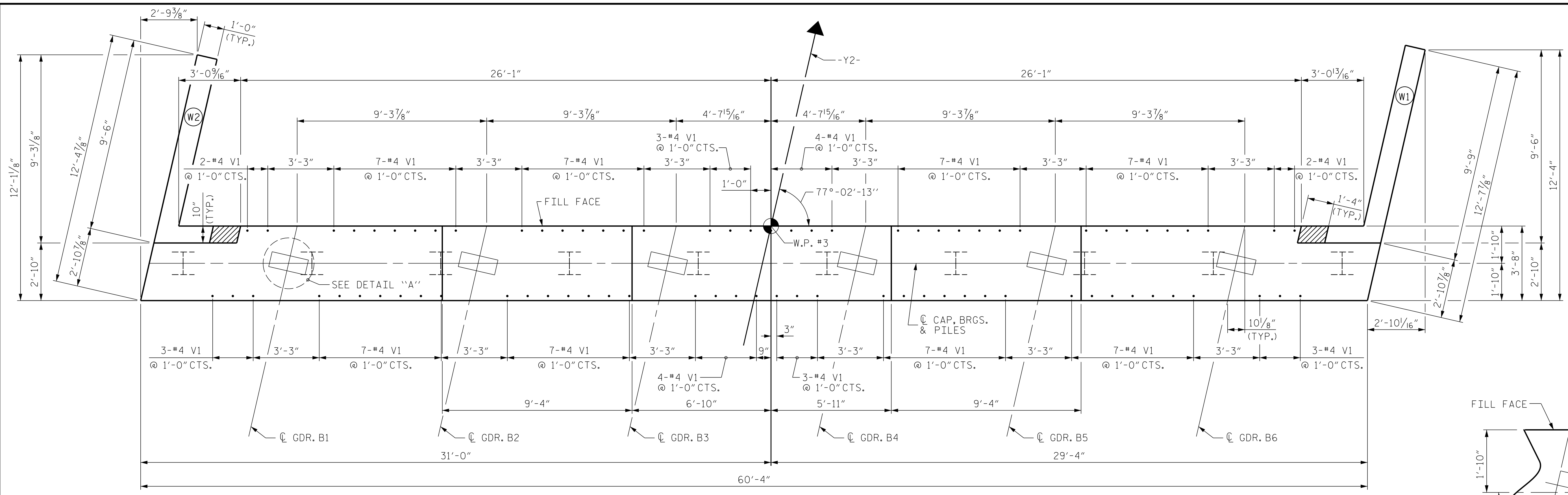
PLAN OF FOOTINGS AND COLUMNS  
 PILE PLACEMENT, REINFORCING STEEL, DIMENSIONS AND DETAILS ARE TYPICAL FOR EACH COLUMN AND FOOTING.

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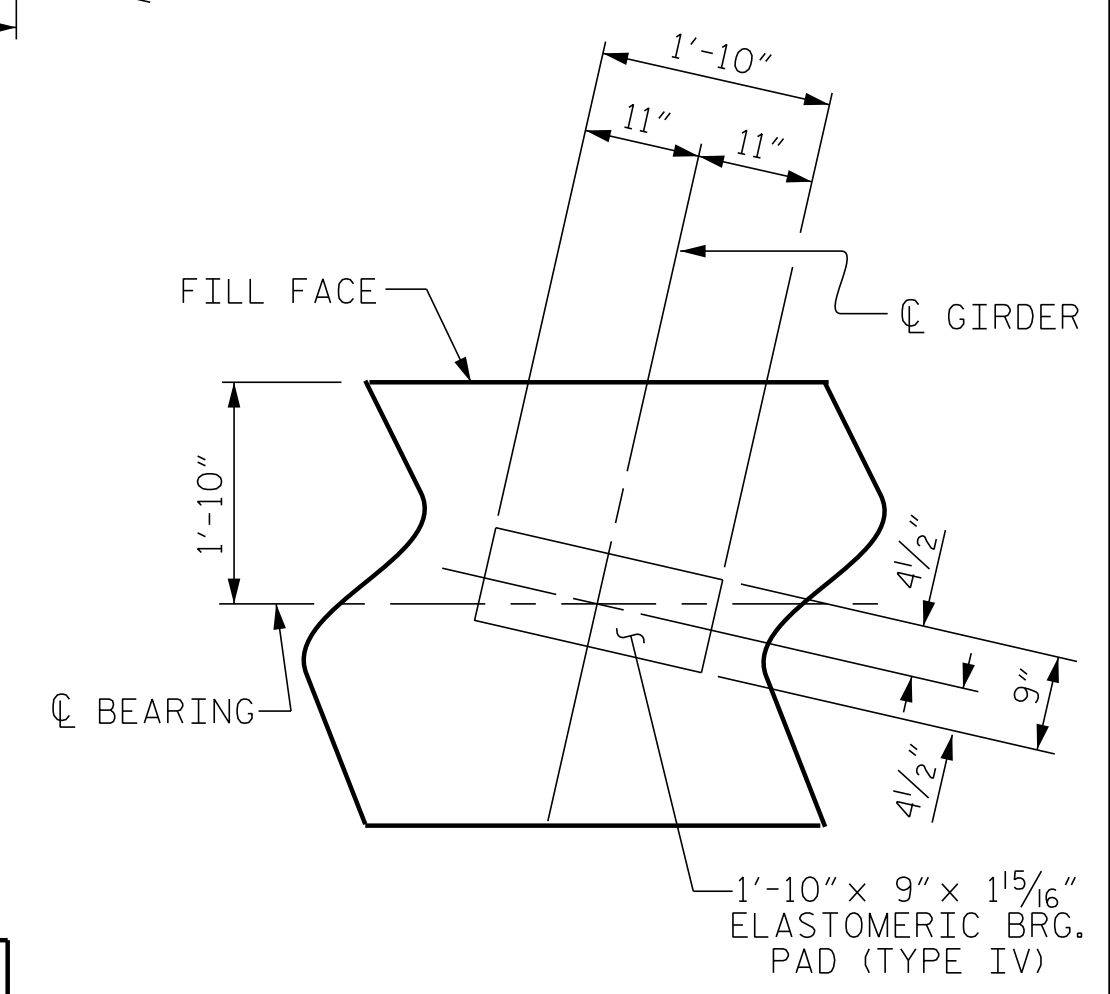
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SHEET NO.  
 S02-24  
 TOTAL SHEETS  
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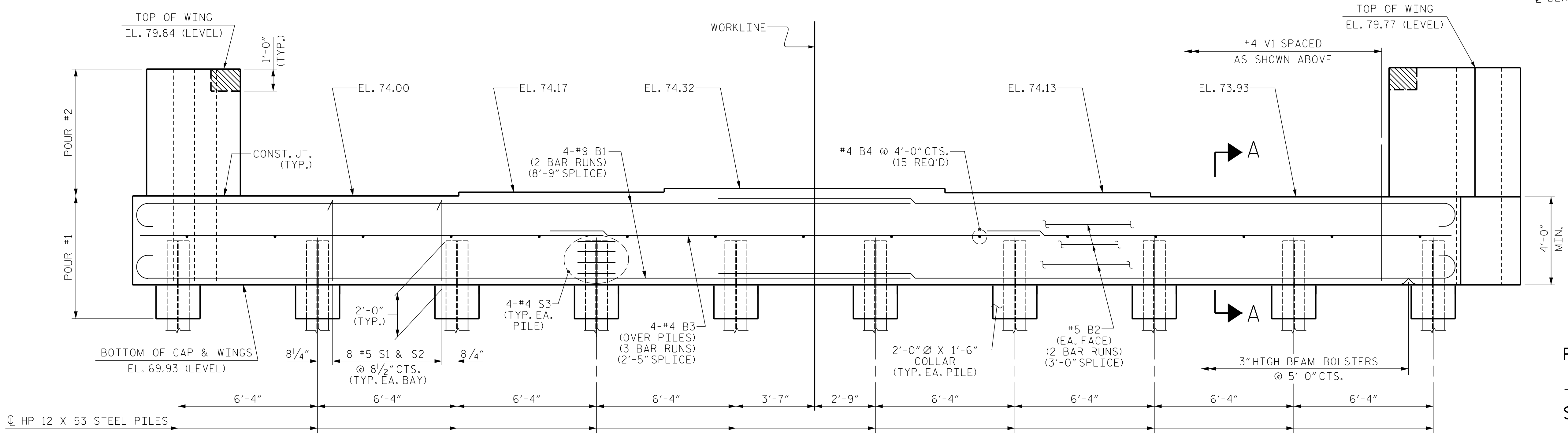




PLAN



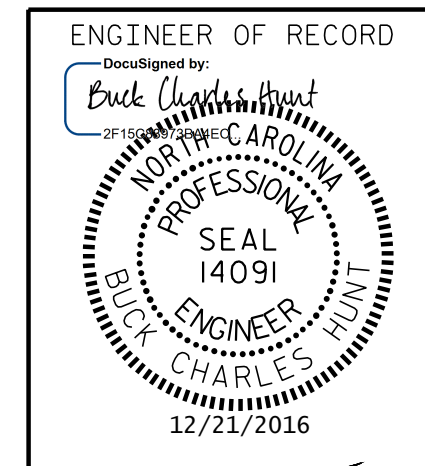
DETAIL "A"  
(TYP. EACH GIRDER)



ELEVATION

FOR SECTION A-A, SEE SHEET 3 OF 3.

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-  
 SHEET 1 OF 3



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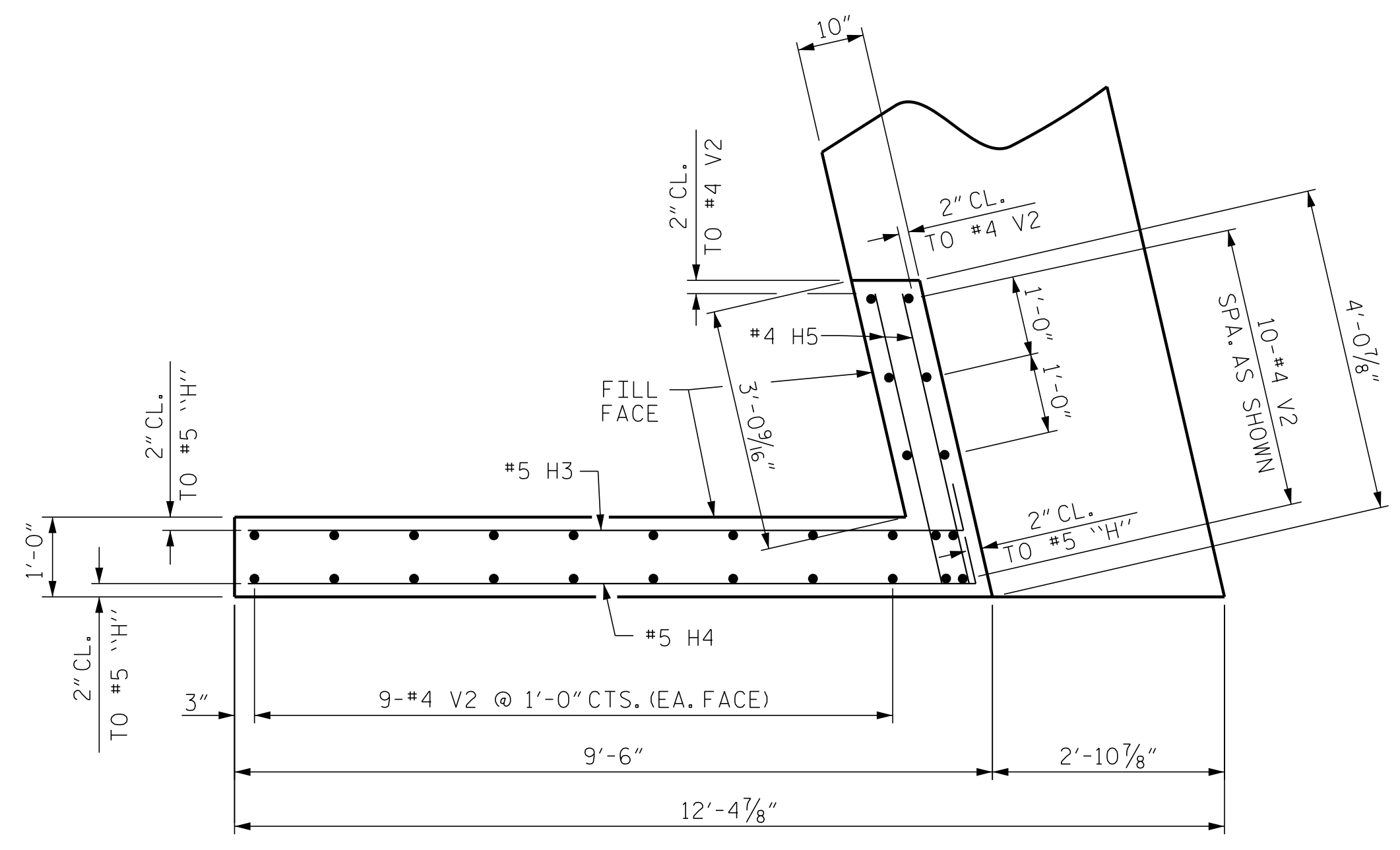
SUBSTRUCTURE  
 END BENT No. 2

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| 2         |     |       | 4   |     |       | 61           |

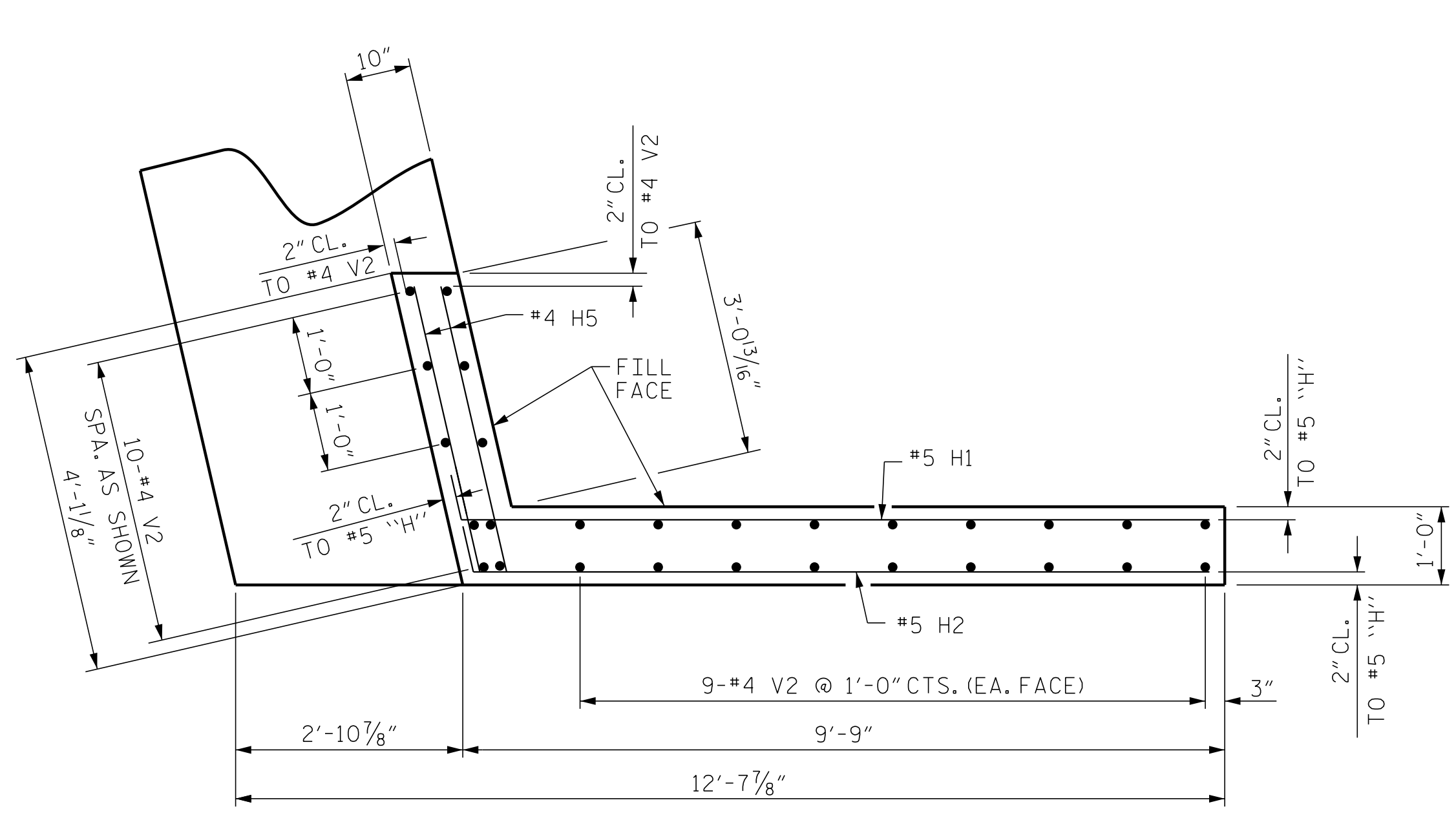
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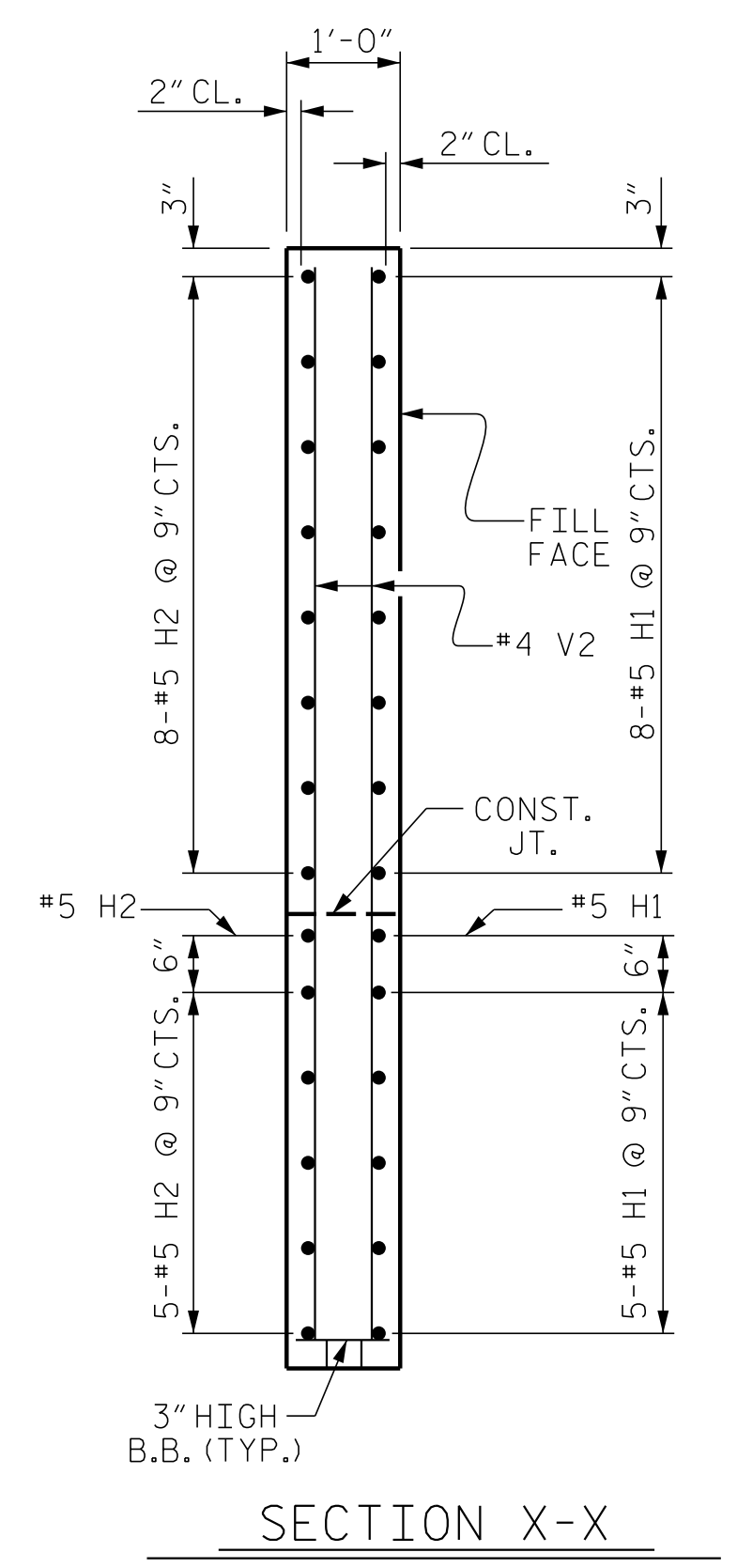
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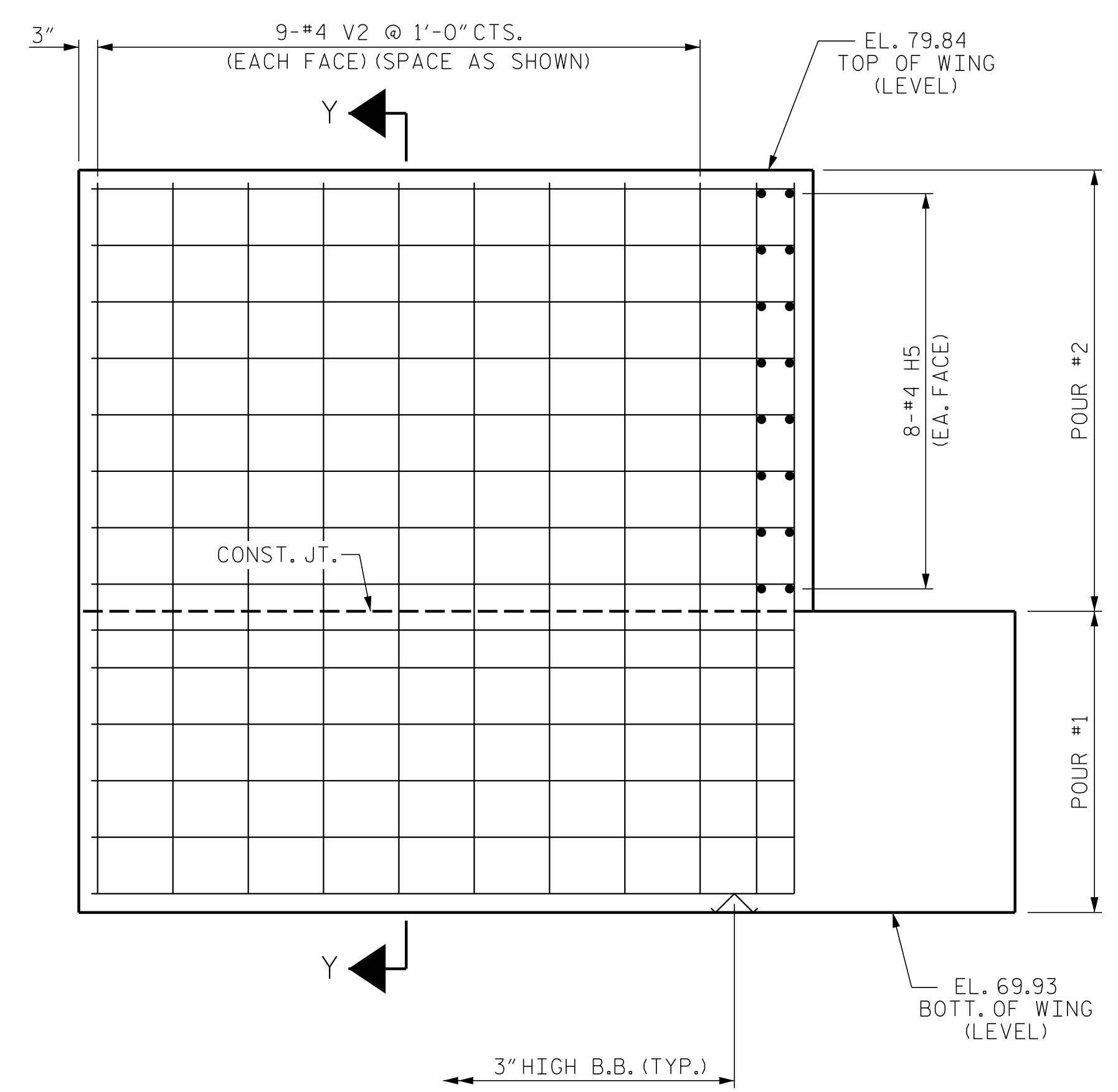
PLAN OF WING - W2



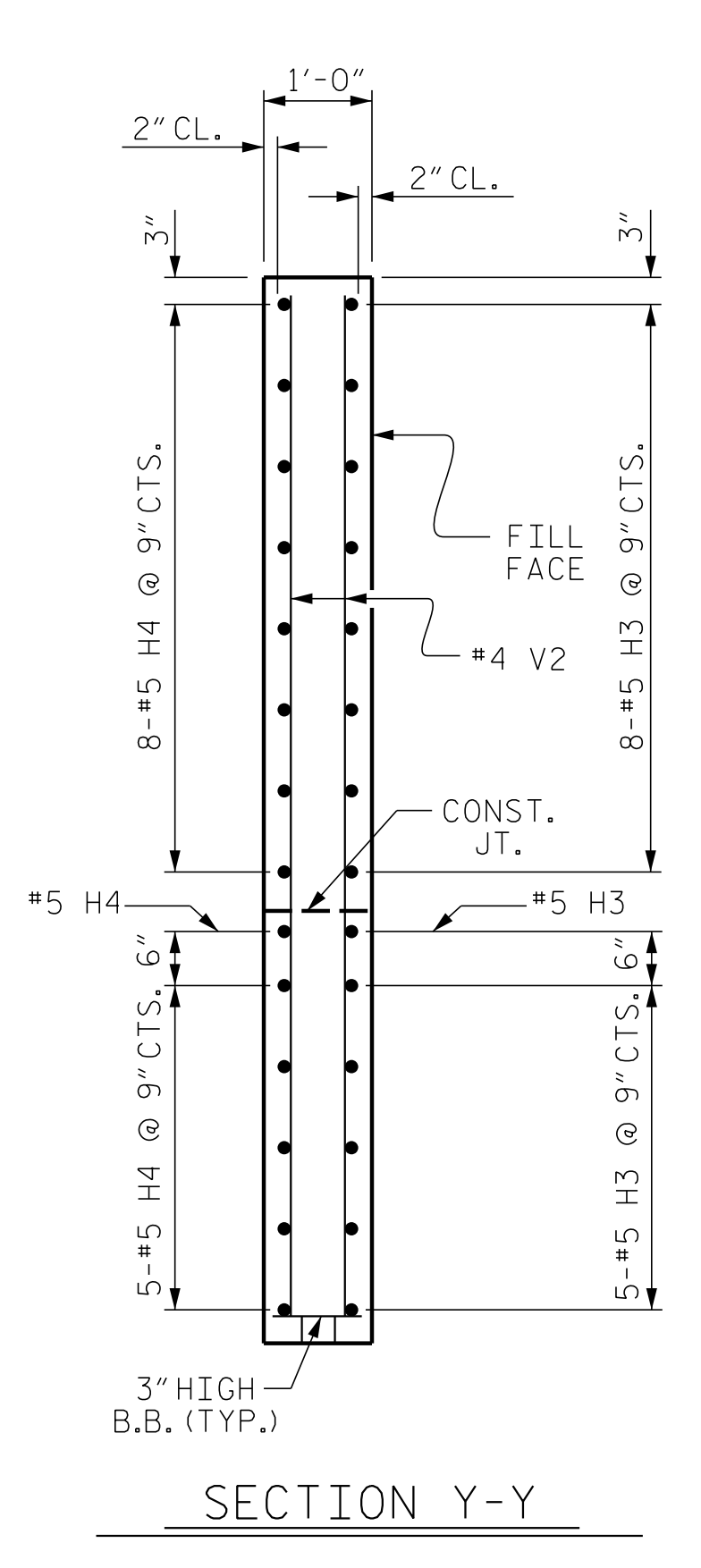
PLAN OF WING - W1



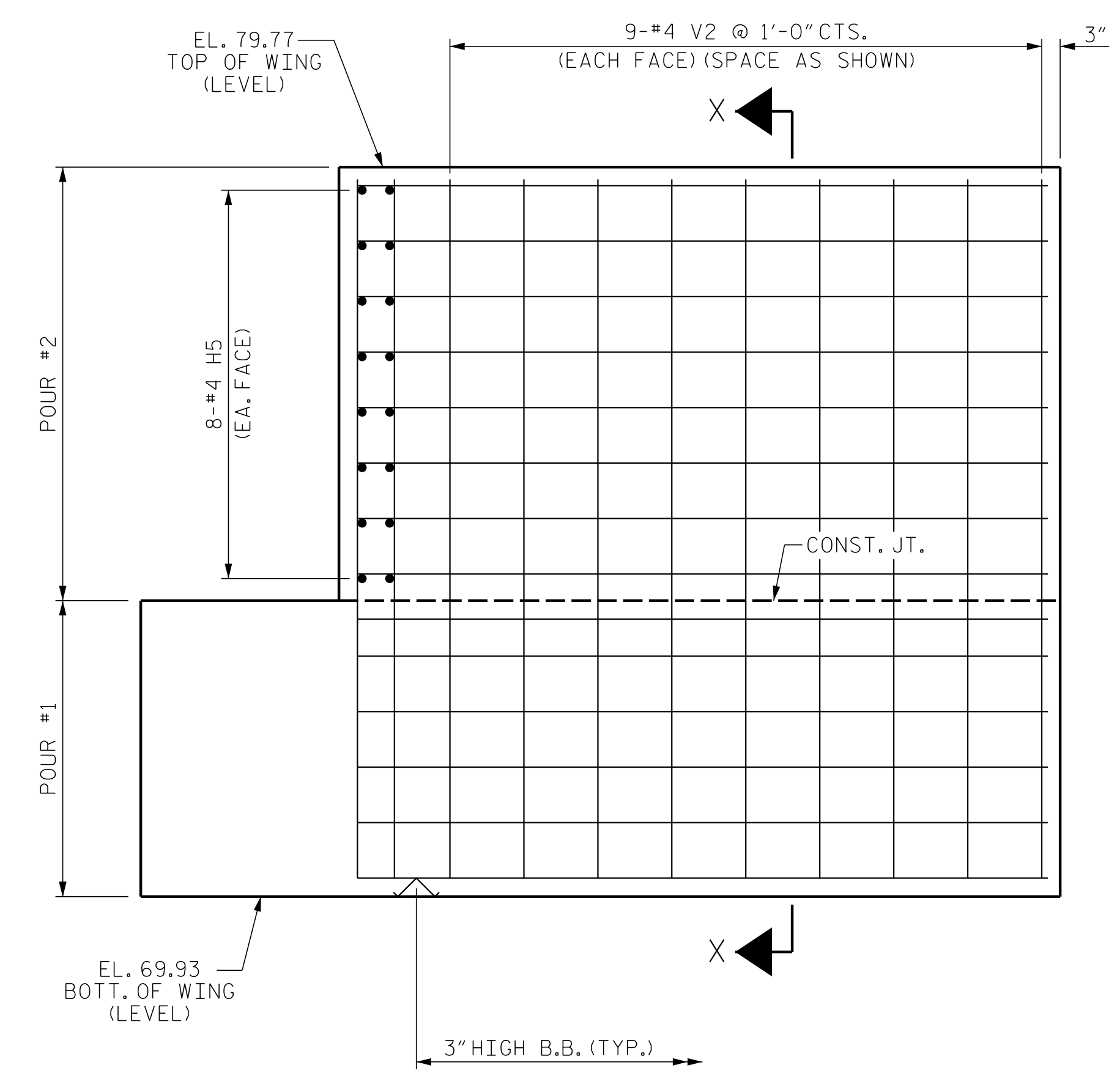
SECTION X-X



ELEVATION OF WING - W2

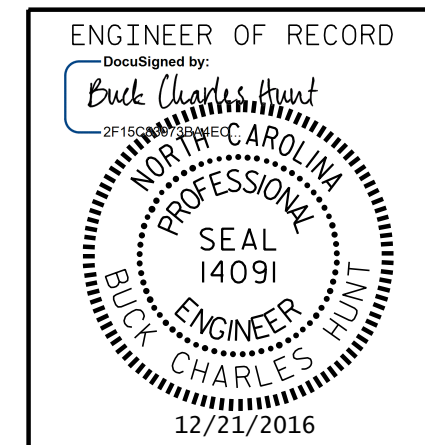


SECTION Y-Y



ELEVATION OF WING - W1

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-  
 SHEET 2 OF 3



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|--|-----|-------|-----|-----|--------------------|
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| SUBSTRUCTURE<br>END BENT No. 2                                     |     |       |     |     |                    |
| REVISIONS  |     |       |     |     |                    |
| NO.  | BY: | DATE: | NO. | BY: | DATE:              |
| 1  |     |       | 3   |     |                    |
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| SHEET NO.<br>S02-26  |     |       |     |     | TOTAL SHEETS<br>61 |

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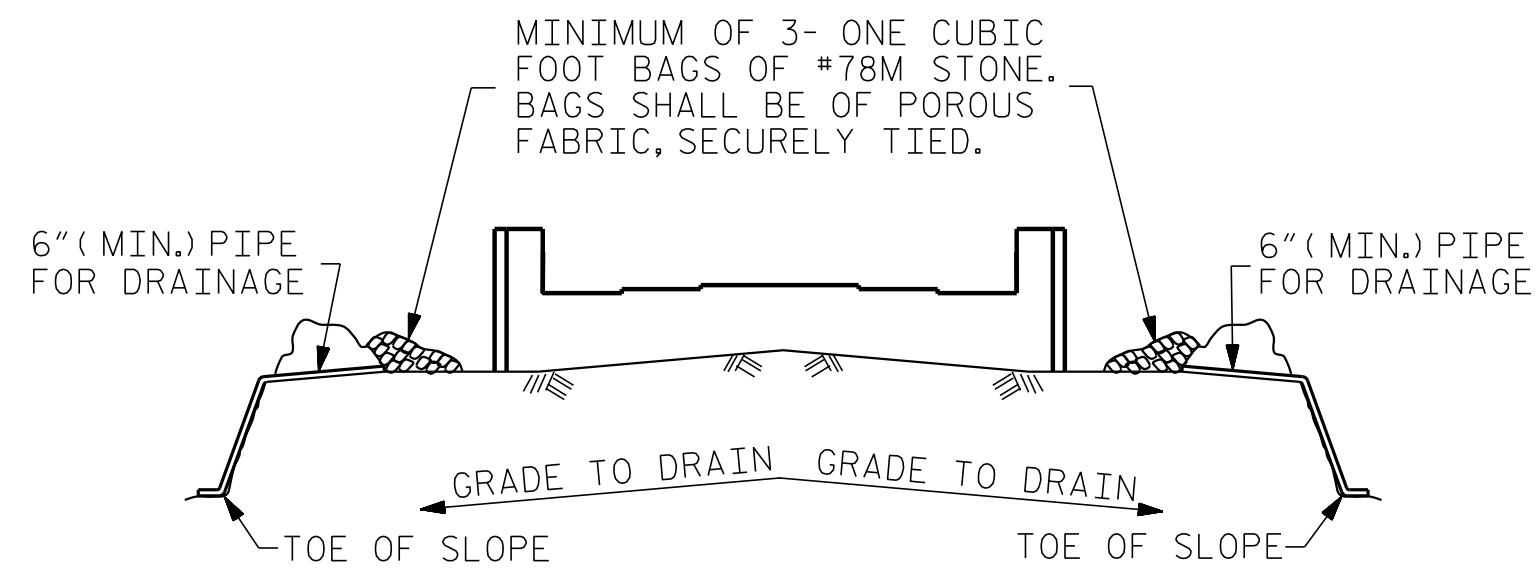


**NOTES**

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

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

THE TOP SURFACE OF THE END BENT CAP, EXCEPT THE BEARING AREA AND THE AREA OUTSIDE THE EDGE OF SUPERSTRUCTURE, SHALL BE RAKED TO A DEPTH OF 1/4".



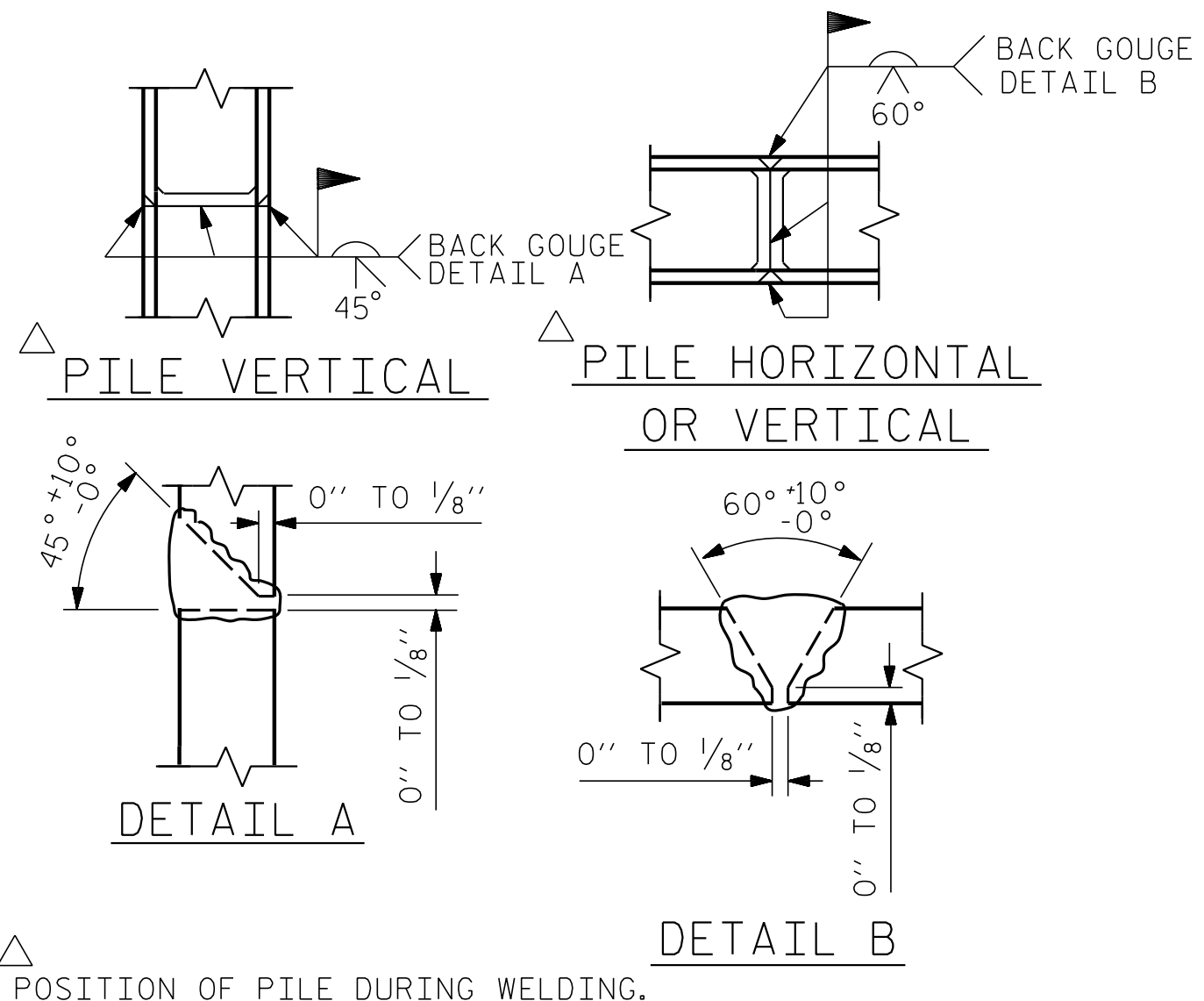
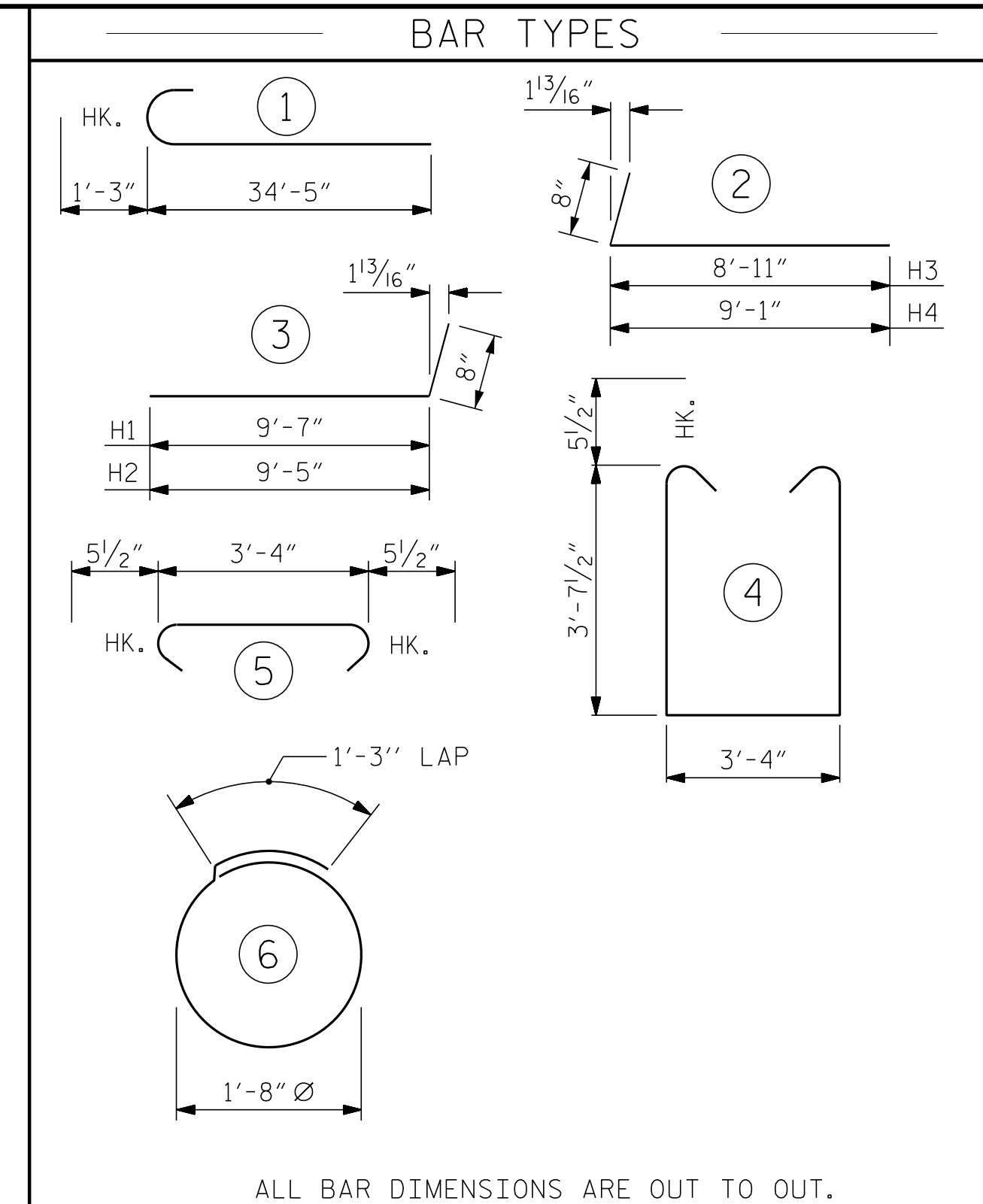
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

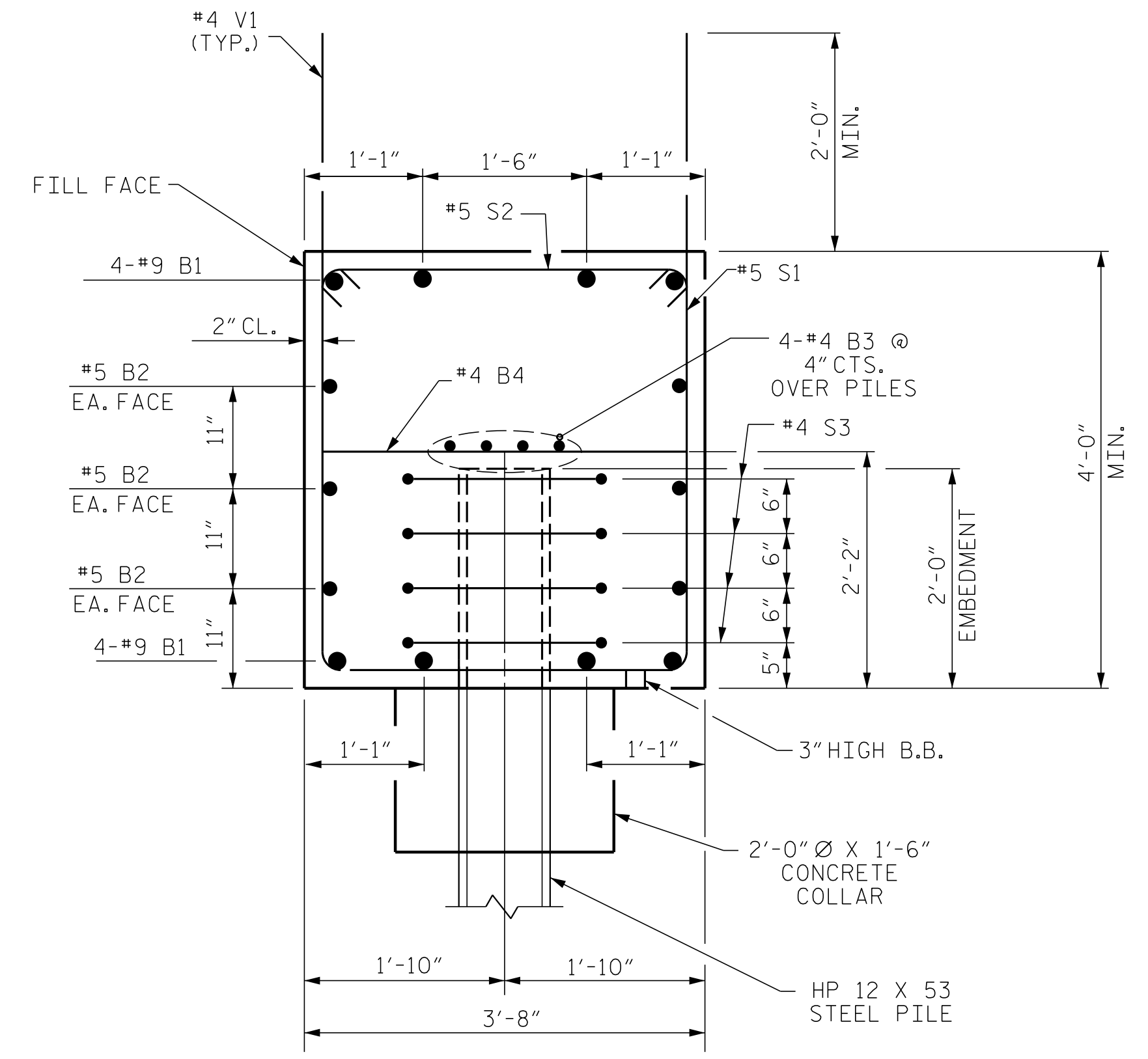
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**

| BILL OF MATERIAL   |  |      |      |        |                |
|--|--|------|------|--------|----------------|
| END BENT No. 2   |  |      |      |        |                |
| BAR  | NO.                                      | SIZE | TYPE | LENGTH | WEIGHT         |
| B1   | 16                                       | #9   |      | 35'-8" | 1940           |
| B2   | 12                                       | #5   | STR  | 31'-6" | 394            |
| B3   | 12                                       | #4   | STR  | 21'-8" | 174            |
| B4   | 15                                       | #4   | STR  | 3'-4"  | 33             |
| H1   | 14                                       | #5   | 3    | 10'-3" | 150            |
| H2   | 14                                       | #5   | 3    | 10'-1" | 147            |
| H3   | 14                                       | #5   | 2    | 9'-7"  | 140            |
| H4   | 14                                       | #5   | 2    | 9'-9"  | 142            |
| H5   | 32                                       | #4   | STR  | 3'-8"  | 78             |
| S1   | 72                                       | #5   | 4    | 11'-6" | 864            |
| S2   | 72                                       | #5   | 5    | 4'-3"  | 319            |
| S3   | 40                                       | #4   | 6    | 6'-6"  | 174            |
| V1   | 80                                       | #4   | STR  | 5'-9"  | 307            |
| V2   | 56                                       | #4   | STR  | 9'-5"  | 352            |
| REINFORCING STEEL  |  |      |      |        | 5,214 LBS.     |
| CLASS A CONCRETE BREAKDOWN                               |  |      |      |        |                |
| POUR #1  | CAP, CONC, COLLARS & LOWER PART OF WINGS |      |      |        | 38.5 C.Y.      |
| POUR #2  | UPPER PART OF WINGS                      |      |      |        | 5.3 C.Y.       |
| TOTAL CLASS A CONCRETE                                   |  |      |      |        | 43.8 C.Y.      |
| HP 12 X 53 STEEL PILES                                   |  |      |      |        |                |
| NO: 10   |  |      |      |        | LIN. FT. = 870 |
| PILE REDRIVES  |  |      |      |        | 5 EA.          |
| PILE DRIVING EQUIPMENT SET UP FOR HP 12 X 53 STEEL PILES |  |      |      |        | 10 EA.         |

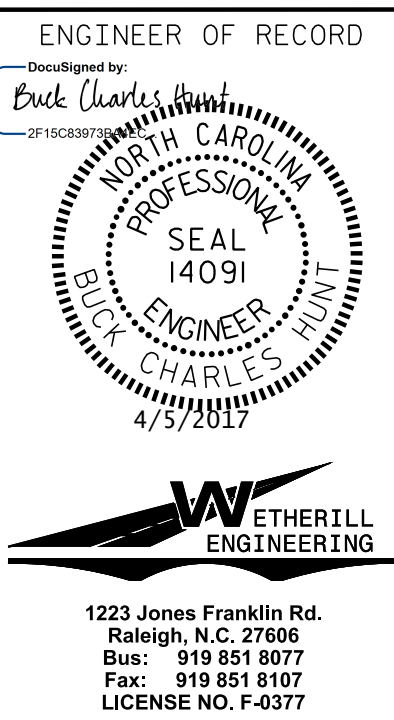


**PILE SPLICE DETAILS**



**SECTION A-A**

PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-  
 SHEET 3 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 2

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

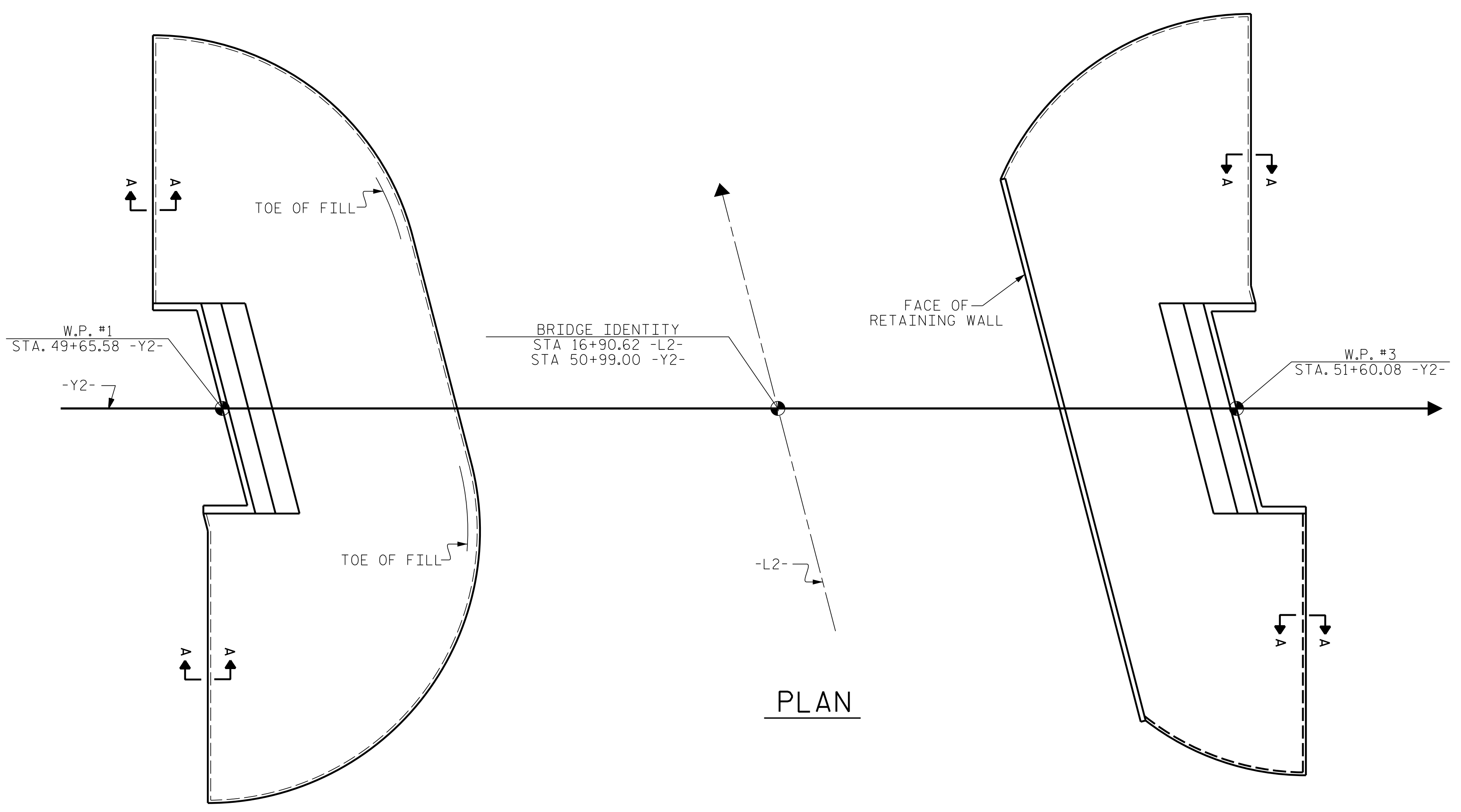
SHEET NO. S02-27  
 TOTAL SHEETS 61

DRAWN BY : J. PENDERGRAFT DATE : 3-16  
 CHECKED BY : J. DILWORTH DATE : 3-16

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 LICENSE NO. F-0377

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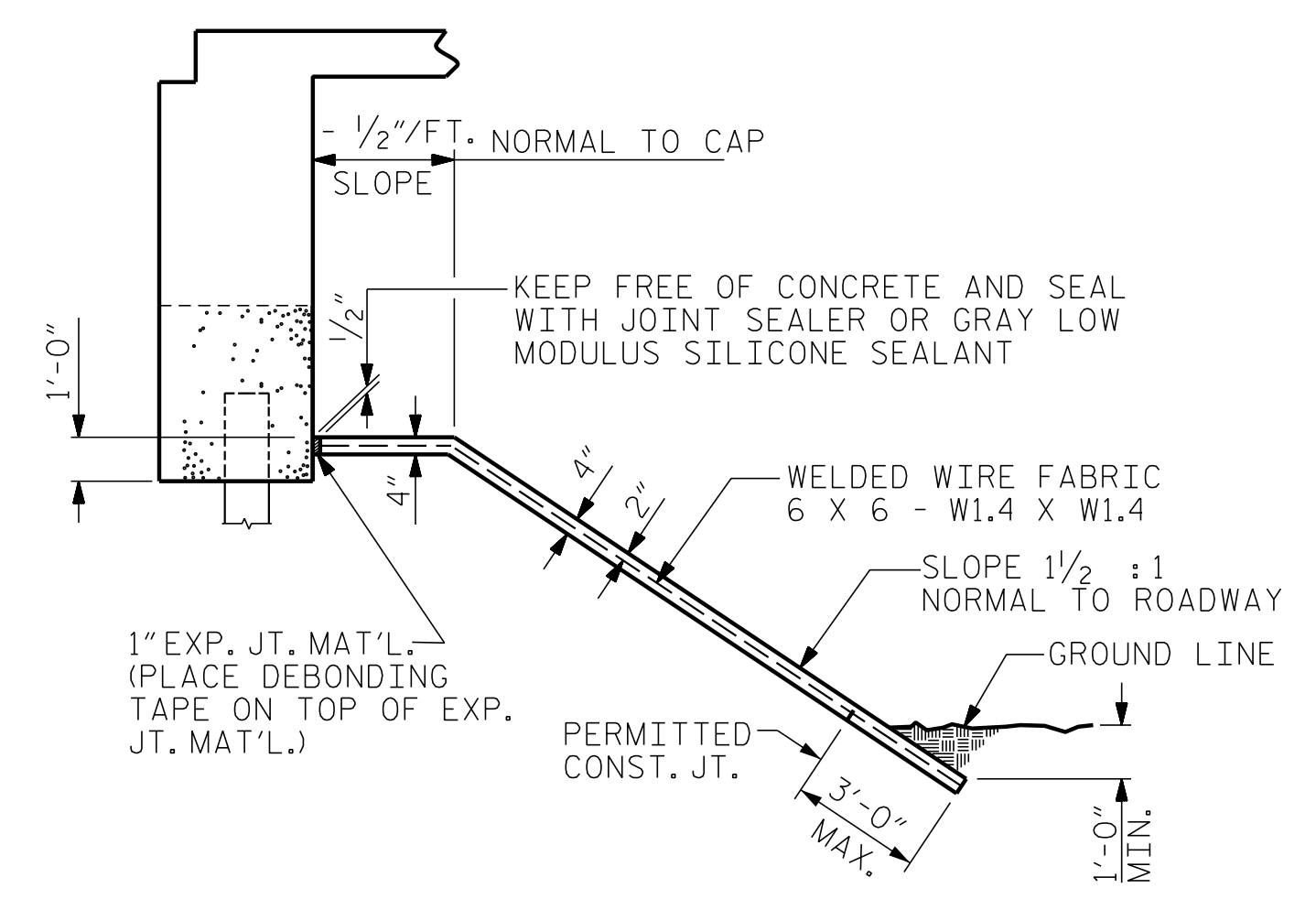


**GENERAL NOTES**

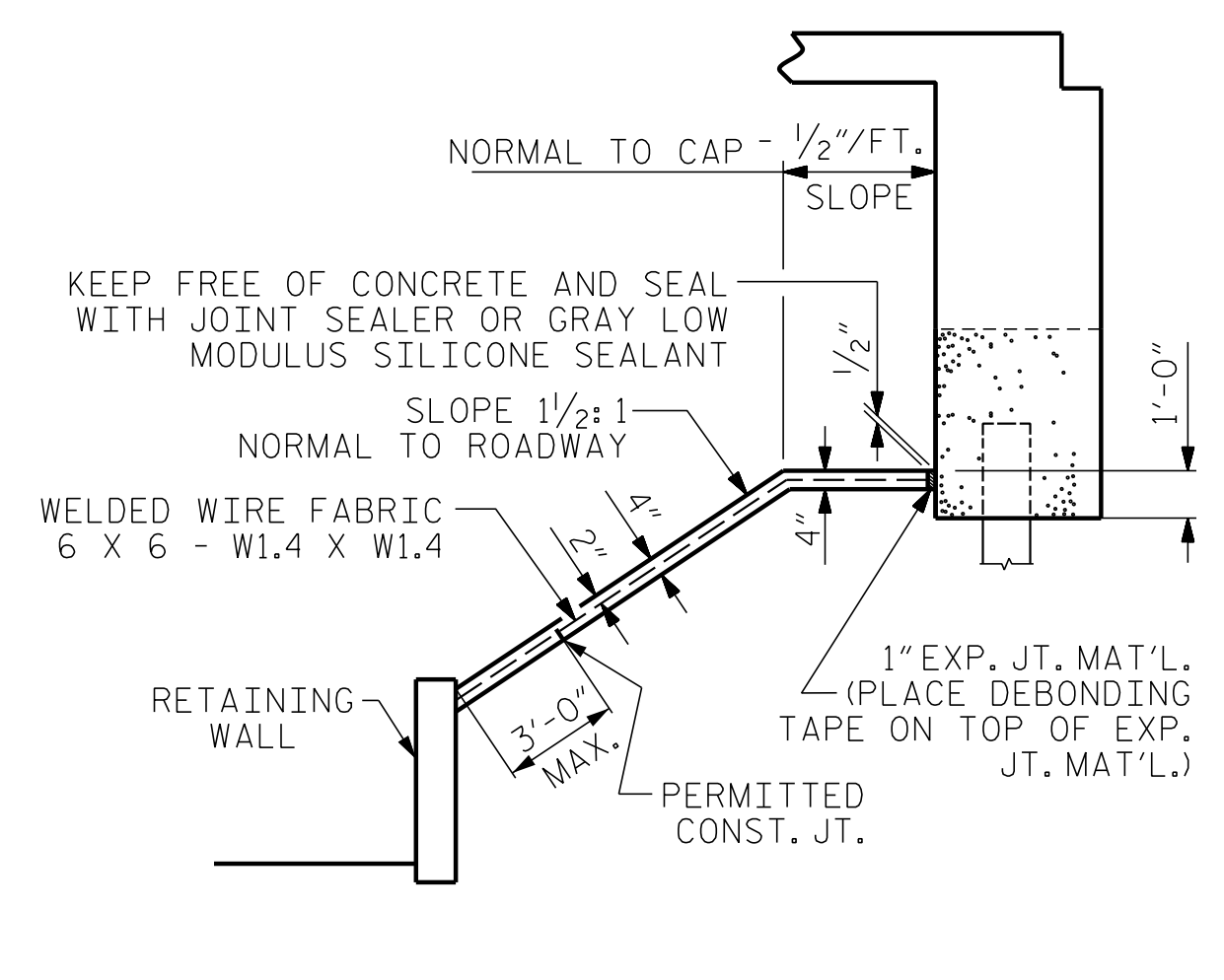
STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING. SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

| BRIDGE @<br>STA 50+99.00 -Y2- | 4 INCH<br>SLOPE PROTECTION | *<br>WELDED WIRE FABRIC<br>60 INCHES WIDE |
|-------------------------------|----------------------------|---|
|                               | SQUARE YARDS               | APPROX. L.F.                              |
| END BENT 1                    | 640                        | 1690                                      |
| END BENT 2                    | 485                        | 1485                                      |

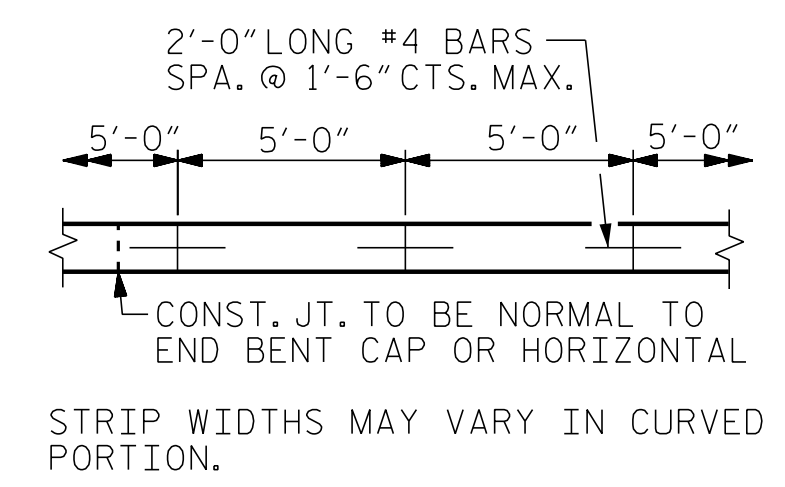
\* QUANTITY SHOWN IS BASED ON 5' POURS.



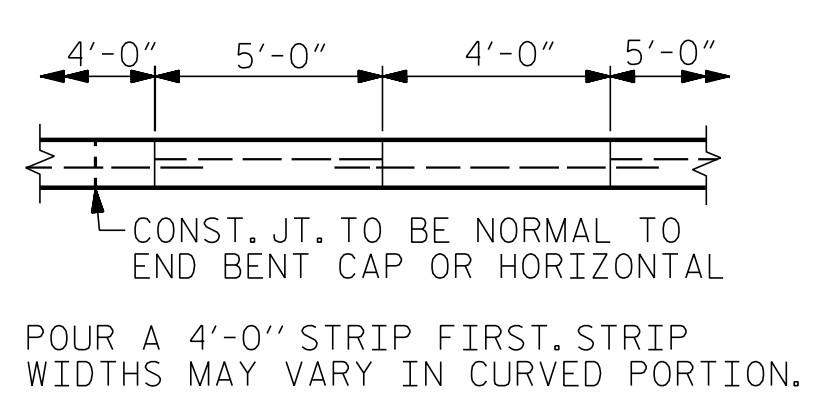
SECTION ALONG C ROADWAY WHEN DITCH IS NOT PROVIDED



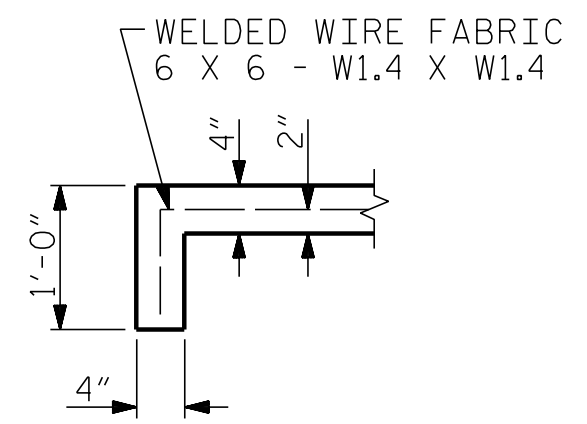
SECTION ALONG C SURVEY WHEN FILL CATCHES WALL



POURING DETAIL



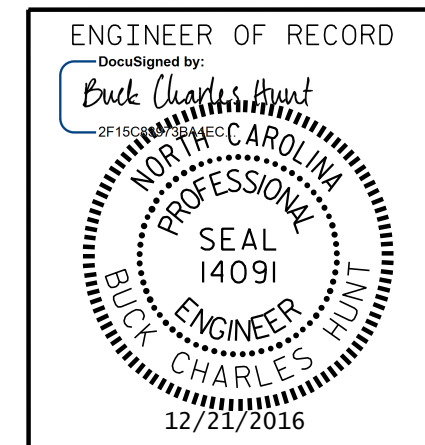
OPTIONAL POURING DETAIL



SECTION A-A

PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 50+99.00 -Y2-

SHEET 1 OF 2



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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
SLOPE PROTECTION  
DETAILS

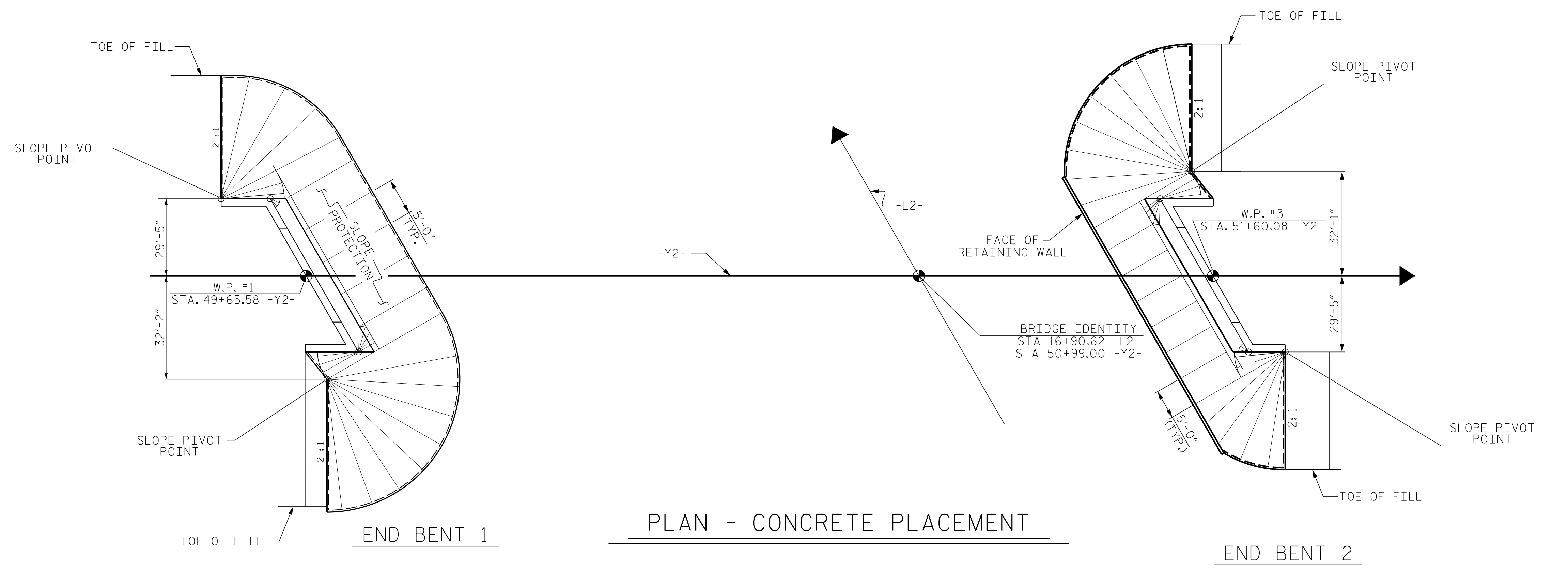
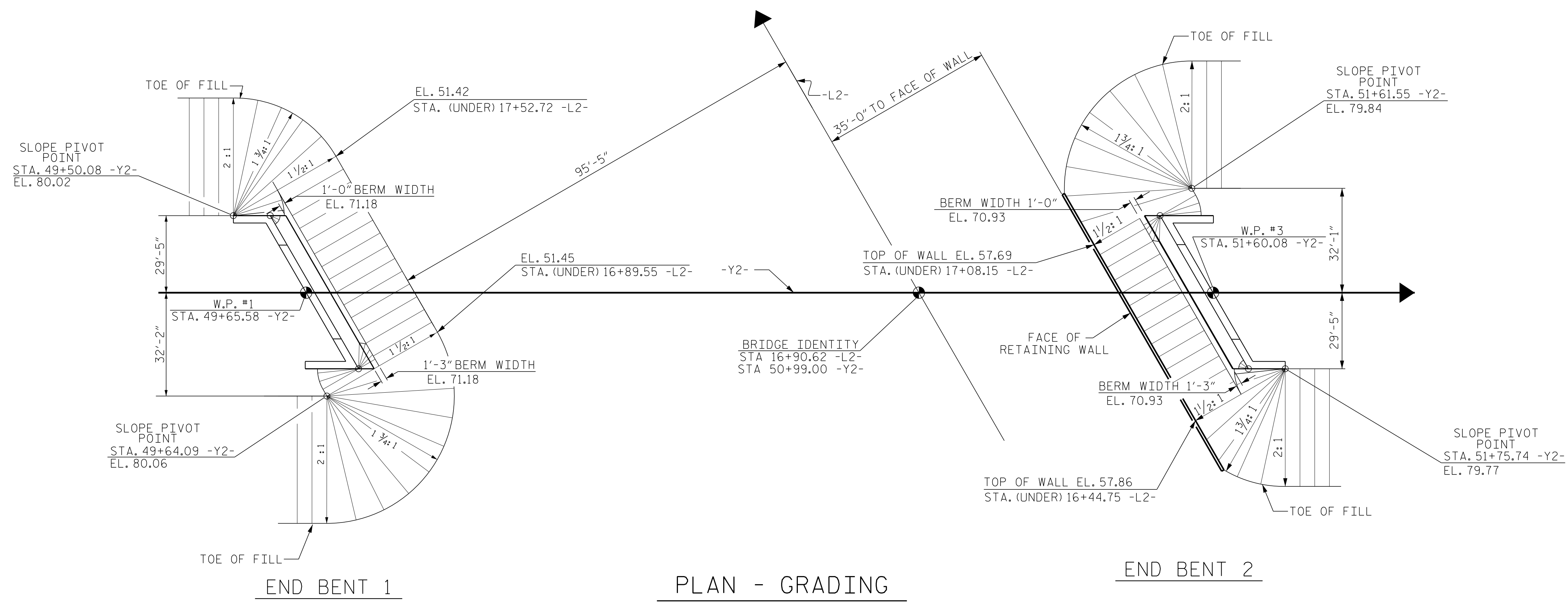
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|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS |
| 1         |     |       | 3   |     |       | 61           |
| 2         |     |       | 4   |     |       |              |

DRAWN BY : B.C. HUNT DATE : 8-2016  
CHECKED BY : G.M. GILLAND DATE : 8-2016

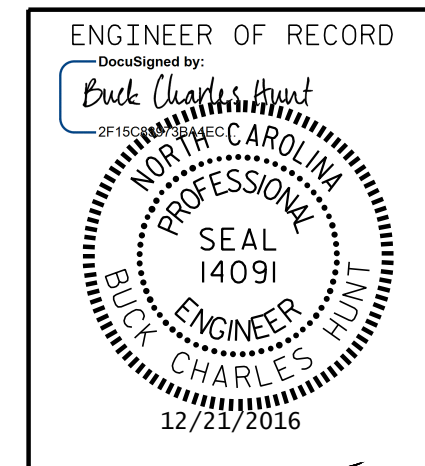
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PROJECT NO. R-5311A  
HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-  
 SHEET 2 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 SLOPE PROTECTION  
 DETAILS

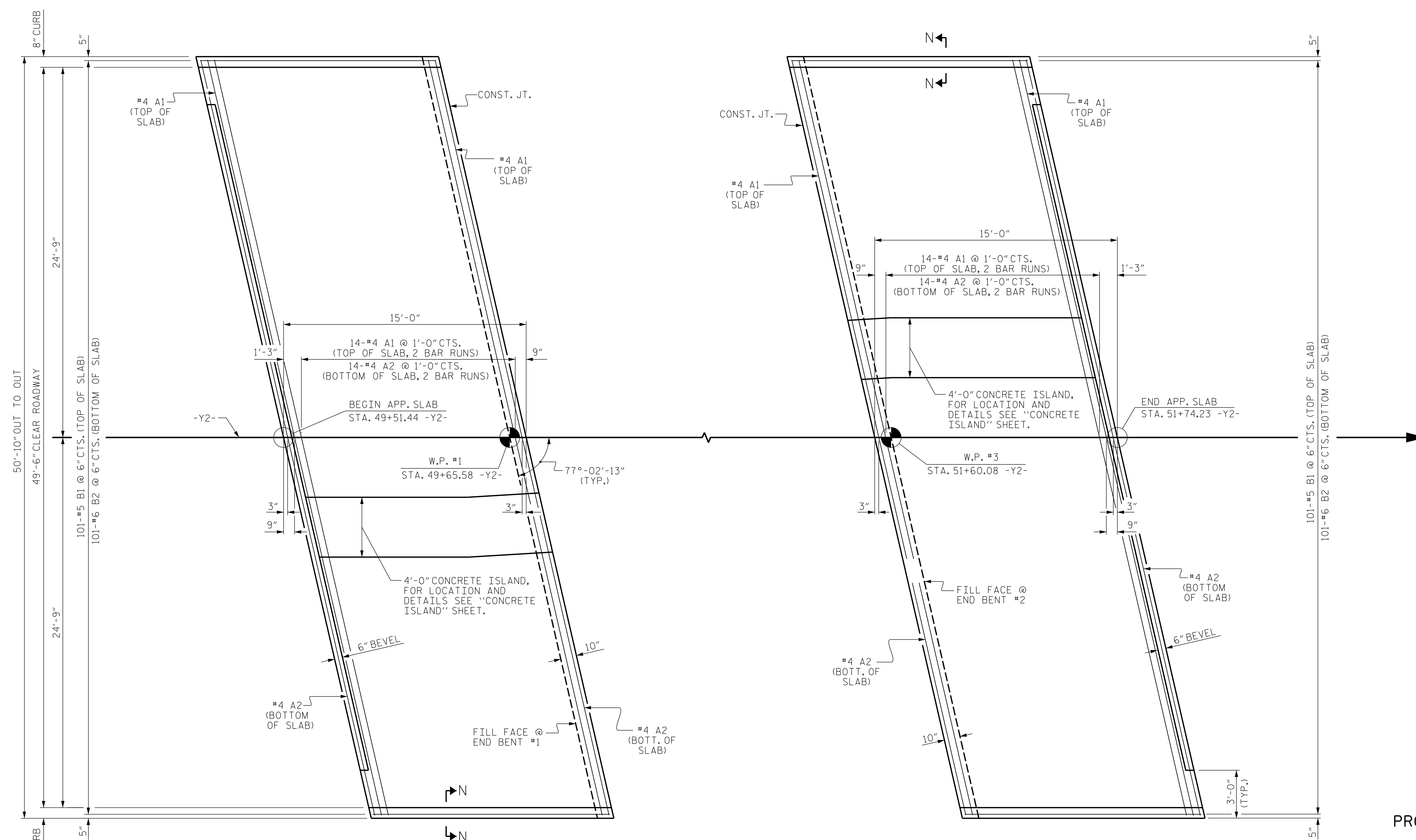
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 ENGINEERING  
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|-----------|-----|-------|-----|-----|-------|--------------|
| NO.       | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS |
| 1         |     |       | 3   |     |       | 61           |
| 2         |     |       | 4   |     |       |              |

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PLAN @ END BENT #1

PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS.  
FOR SECTION N-N AND END OF CURB DETAILS, SEE SHEET 2 OF 2.

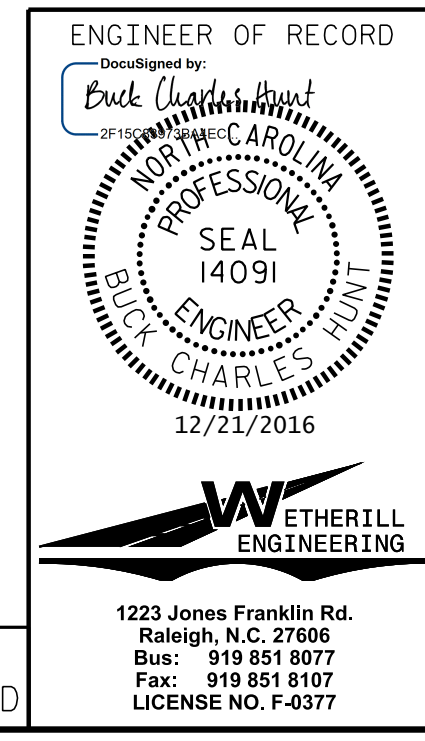
PROJECT NO. R-5311A  
HERTFORD COUNTY  
STATION: 50+99.00 -Y2-

SHEET 1 OF 2

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DRAWN BY: J. PENDERGRAFT/DAH DATE: 3-16  
CHECKED BY: B.C. HUNT DATE: 4-16

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|  |     |       |     |     |                    |
|--|-----|-------|-----|-----|--------------------|
| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |                    |
| BRIDGE APPROACH SLAB<br>FOR INTEGRAL ABUTMENT                      |     |       |     |     |                    |
| REVISIONS  |     |       |     |     |                    |
| NO.  | BY: | DATE: | NO. | BY: | DATE:              |
| 1  |     |       | 3   |     |                    |
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| SHEET NO.<br>S02-30  |     |       |     |     | TOTAL SHEETS<br>61 |



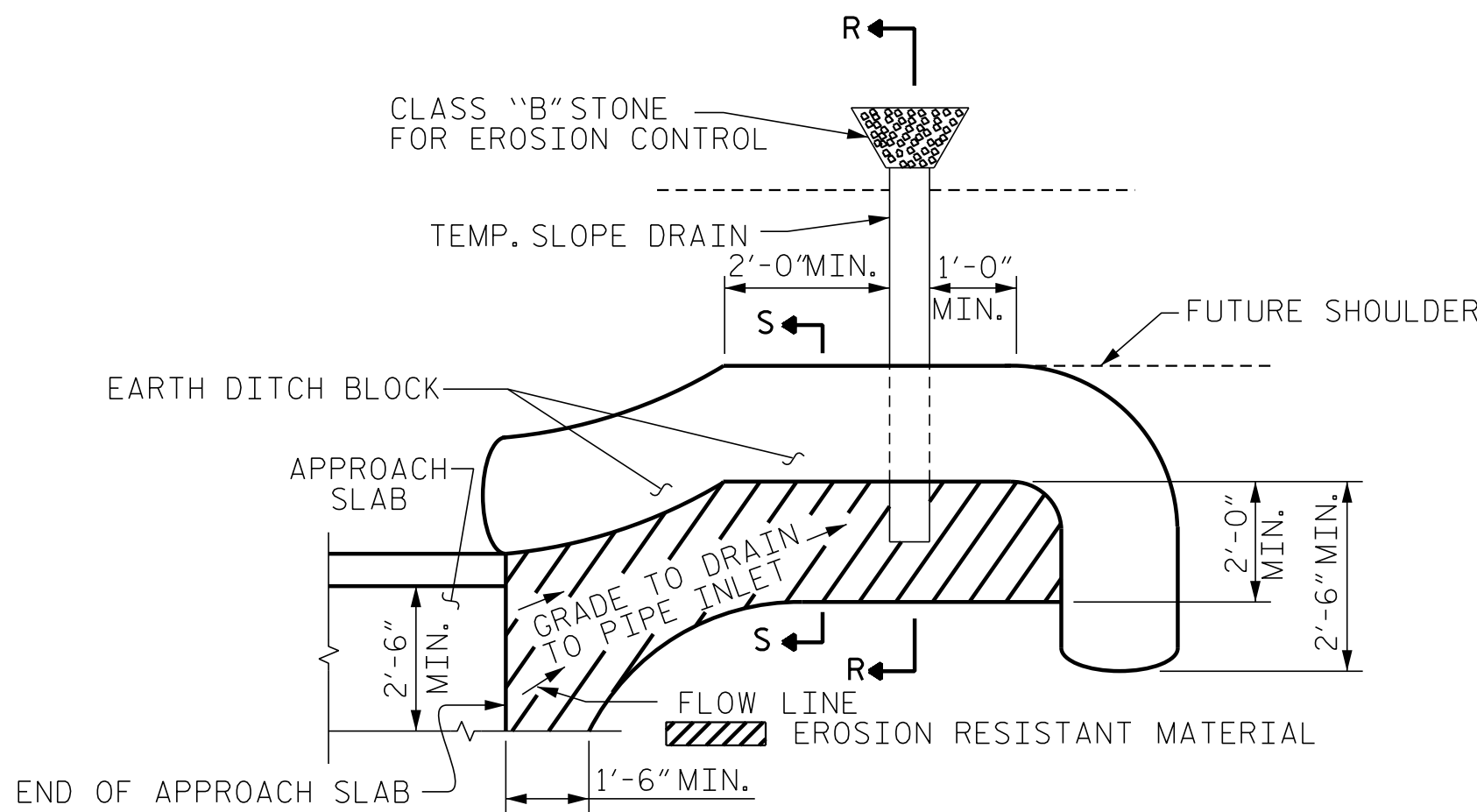
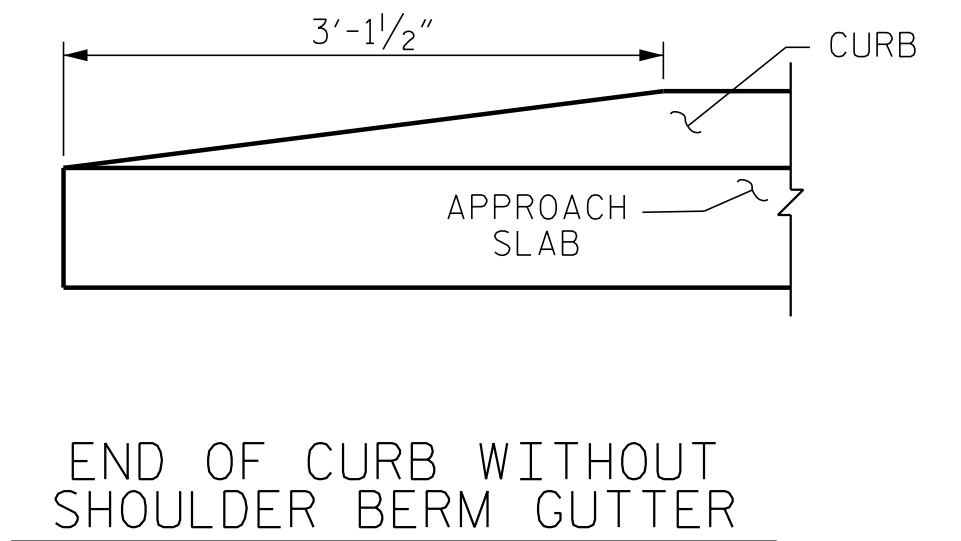
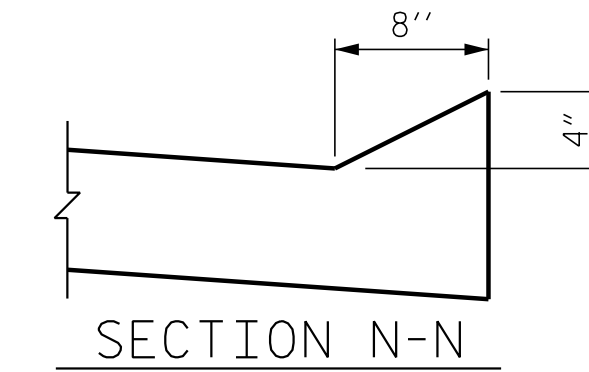
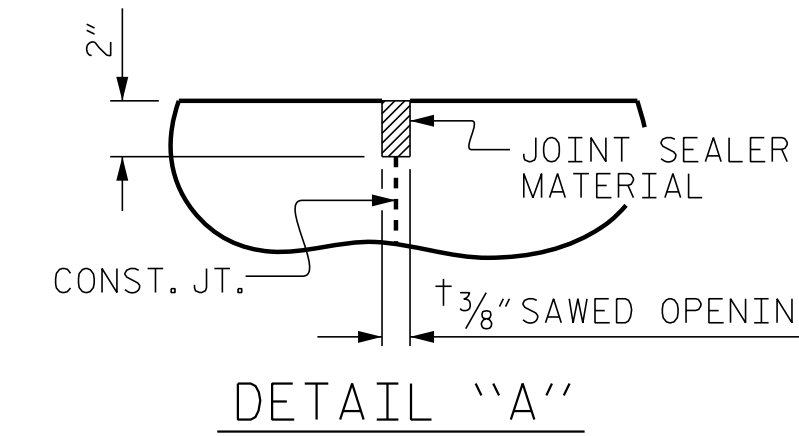
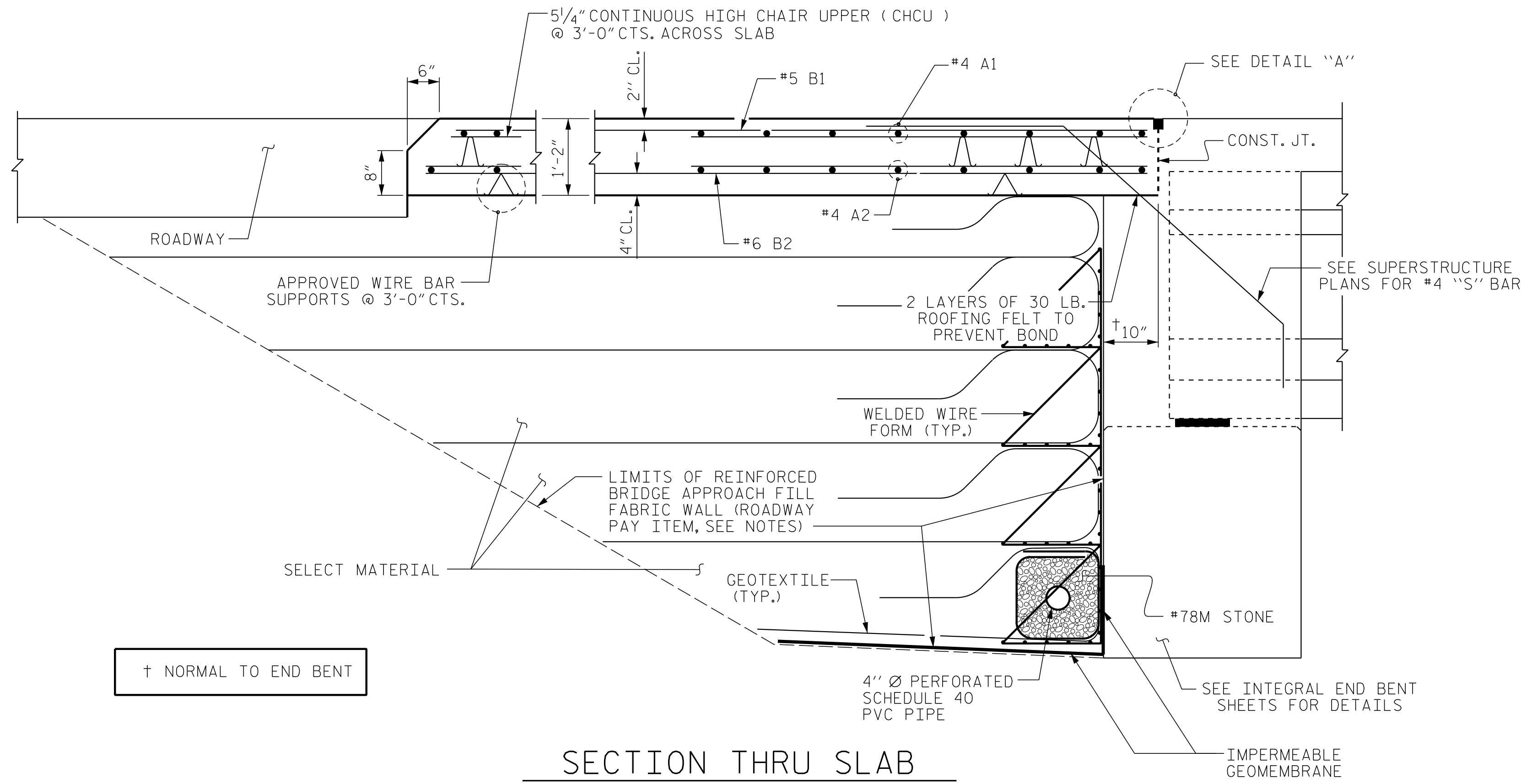
NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR REINFORCED BRIDGE APPROACH FILL FABRIC WALL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.

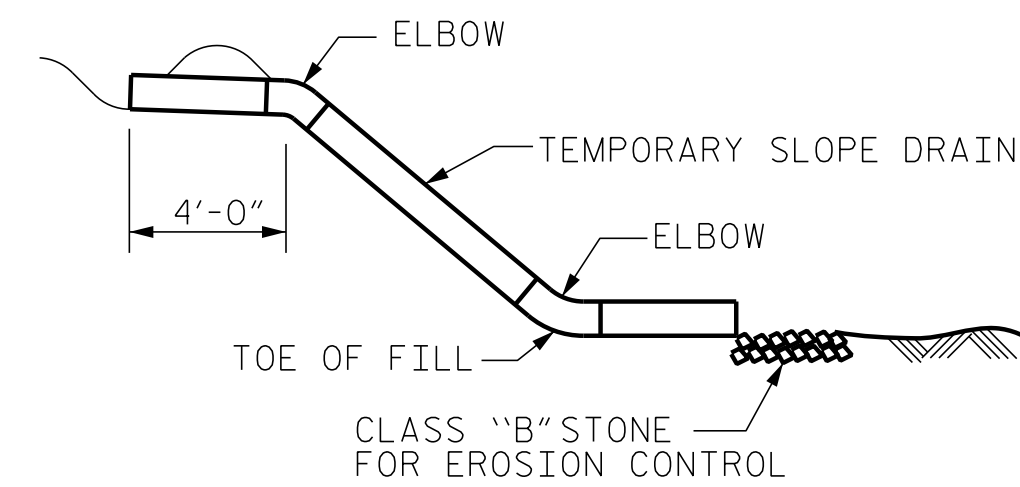
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

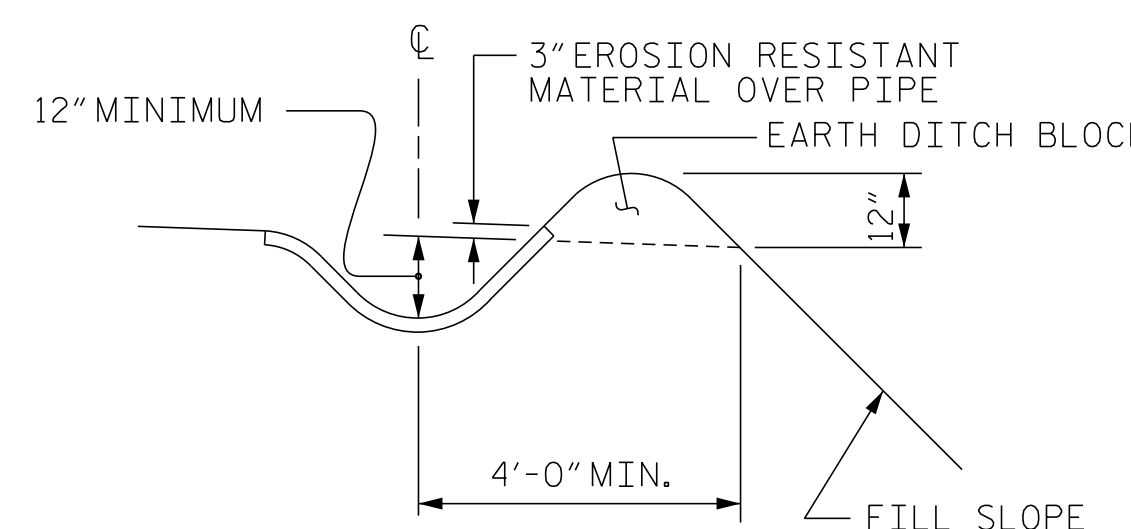


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

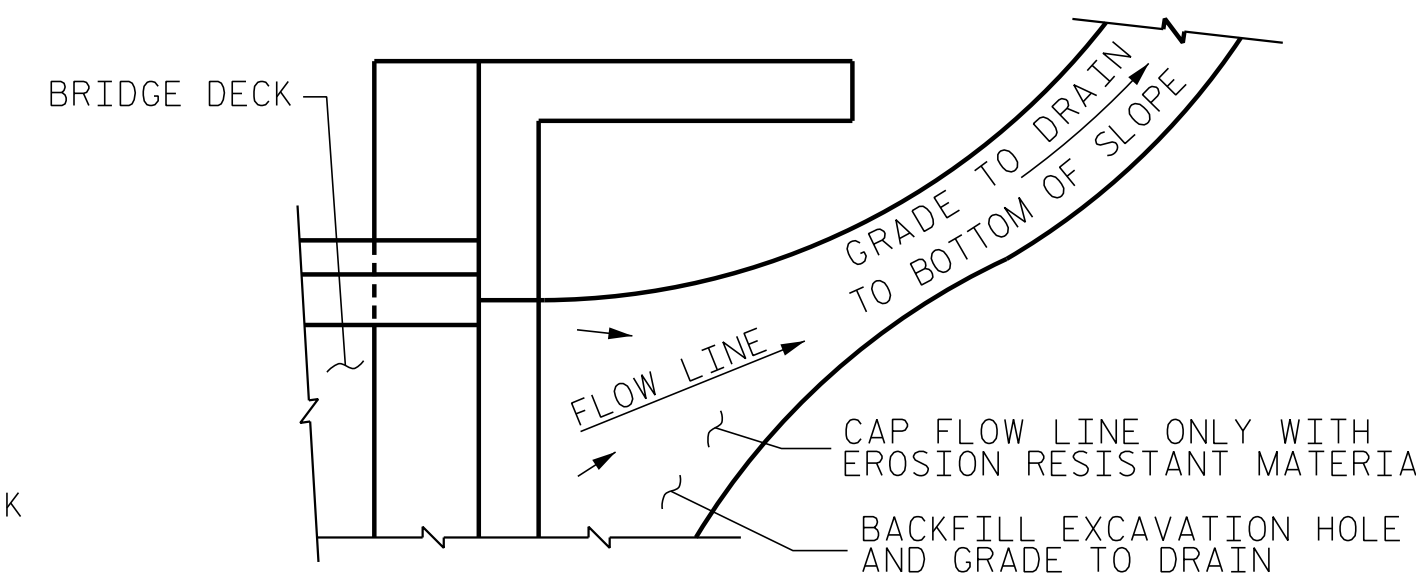
PLAN VIEW



SECTION R-R



SECTION S-S



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

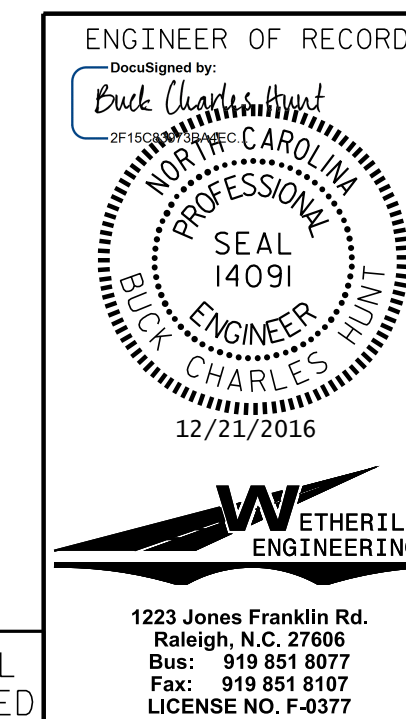
TEMPORARY DRAINAGE DETAIL

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

| BILL OF MATERIAL                 |     |      |      |         |            |
|----------------------------------|-----|------|------|---------|------------|
| FOR ONE APPROACH SLAB (2 REQ'D)  |     |      |      |         |            |
| BAR                              | NO. | SIZE | TYPE | LENGTH  | WEIGHT     |
| * A1                             | 32  | #4   | STR  | 26'-11" | 575        |
| A2                               | 32  | #4   | STR  | 26'-10" | 574        |
| * B1                             | 101 | #5   | STR  | 14'-1"  | 1484       |
| B2                               | 101 | #6   | STR  | 14'-7"  | 2212       |
| REINFORCING STEEL                |     |      |      |         | LBS. 2,786 |
| * EPOXY COATED REINFORCING STEEL |     |      |      |         | LBS. 2,059 |
| CLASS AA CONCRETE                |     |      |      |         | C. Y. 32.9 |

PROJECT NO. R-5311A  
 HERTFORD COUNTY  
 STATION: 50+99.00 -Y2-  
 SHEET 2 OF 2



| STATE OF NORTH CAROLINA<br>DEPARTMENT OF TRANSPORTATION<br>RALEIGH |     |       |     |     |       |
|--|-----|-------|-----|-----|-------|
| STANDARD   |     |       |     |     |       |
| BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT                         |     |       |     |     |       |
| REVISIONS  |     |       |     |     |       |
| NO.  | BY: | DATE: | NO. | BY: | DATE: |
| 1  |     |       | 3   |     |       |
| 2  |     |       | 4   |     |       |

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|------------------|--|--|--|--|
| SHEET NO. S02-31 |  |  |  |  |
| TOTAL SHEETS 61  |  |  |  |  |

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|                                   |                      |
|-----------------------------------|----------------------|
| ASSEMBLED BY : J. PENDERGRAFT/DAH | DATE : 3-16          |
| CHECKED BY : B.C. HUNT            | DATE : 4-16          |
| DRAWN BY : TLA 10/05              | REV. 10/1/11 MAA/GM  |
| CHECKED BY : GM 5/06              | REV. 12/21/11 MAA/GM |
|                                   | REV. 6/13 MAA/GM     |

## 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<br>OF TIMBER | ----- | 375 LBS. PER SQ. IN.             |
| EQUIVALENT FLUID PRESSURE OF EARTH              | ----- | 30 LBS. PER CU. FT.<br>(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 2012 "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.

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