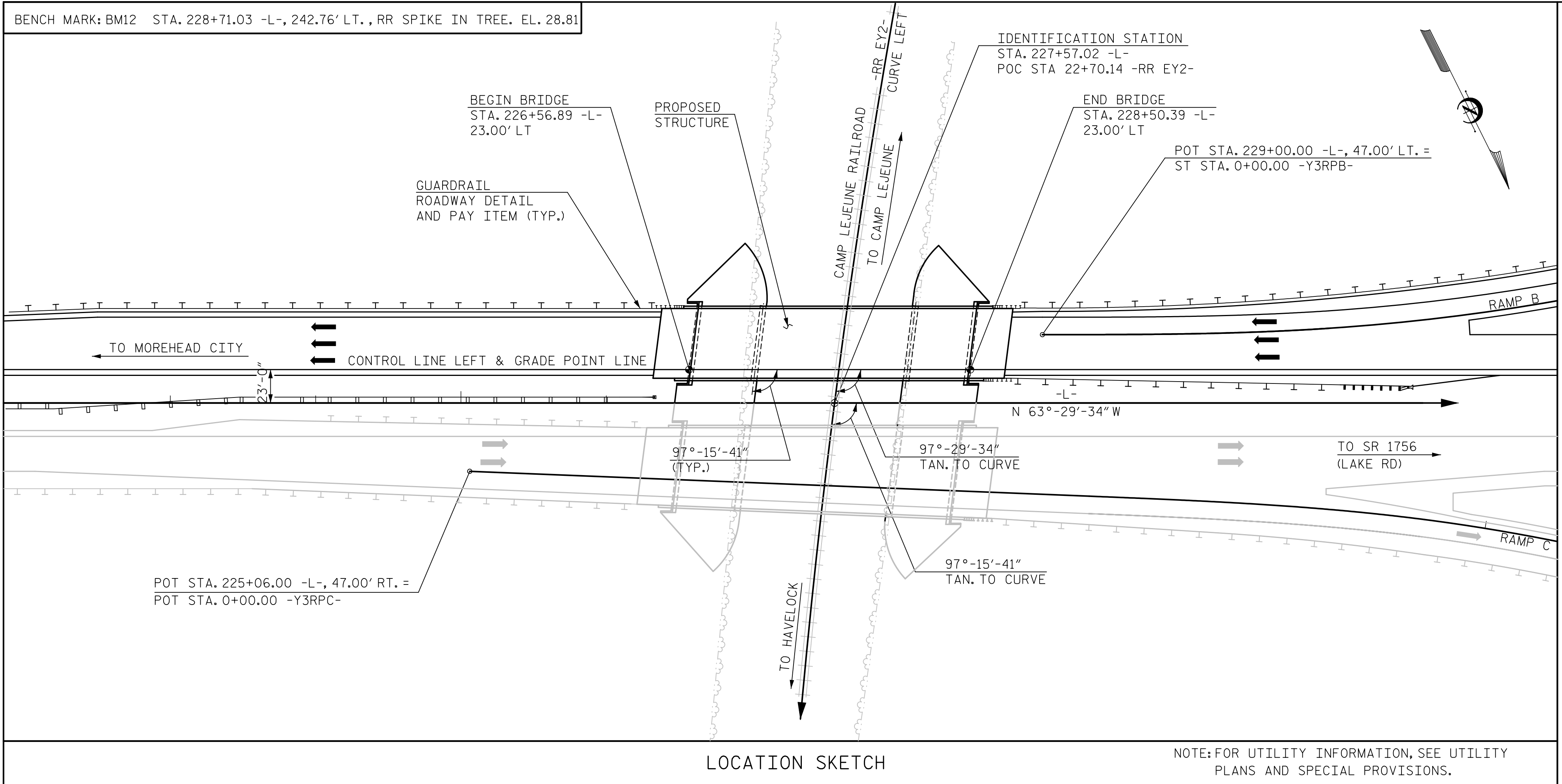


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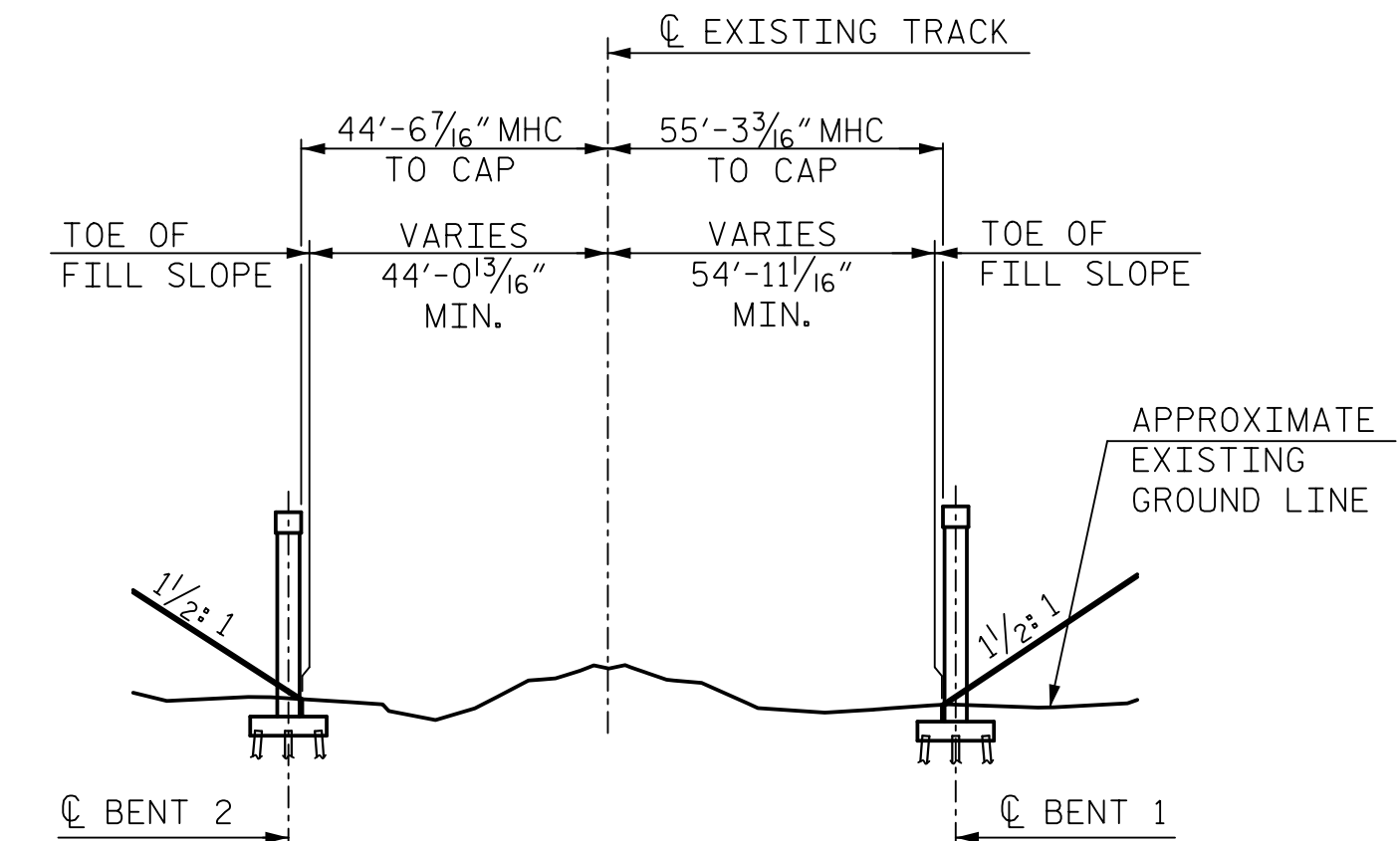


GENERAL NOTES:

- 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 SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
- 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.
- THE RAILROAD TRACK TOP OF RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

LOCATION SKETCH

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



SECTION THRU RAILROAD

LOOKING IN DIRECTION OF INCREASING STATIONS ON RAILROAD (SPAN LENGTH IS BASED ON THIS SECTION)

MHC = MINIMUM HORIZONTAL CLEARANCE

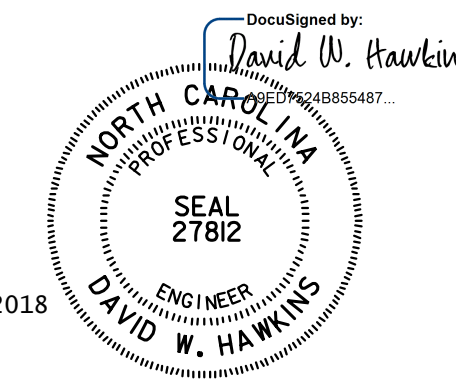
| TOTAL BILL OF MATERIAL | | | | | | | | |
|------------------------|---|-------------|-------------------------------|------------------------|------------------|---|-------------------|---------------------------------|
| | FOUNDATION EXCAVATION FOR BENT AT STATION 227+57.02 (LEFT LANE) | PDA TESTING | REINFORCED CONCRETE DECK SLAB | GROOVING BRIDGE FLOORS | CLASS A CONCRETE | BRIDGE APPROACH SLAB AT STATION 227+57.02 (LEFT LANE) | REINFORCING STEEL | SPIRAL COLUMN REINFORCING STEEL |
| | LUMP SUM | EACH | SQ. FT. | SQ. FT. | CU. YDS. | LUMP SUM | LBS. | LBS. |
| SUPERSTRUCTURE | --- | --- | 9,807 | 10,715 | --- | LUMP SUM | --- | --- |
| END BENT 1 | --- | --- | --- | --- | 50.0 | --- | 7,156 | --- |
| BENT 1 | LUMP SUM | --- | --- | --- | 108.8 | --- | 16,049 | 2,276 |
| BENT 2 | LUMP SUM | --- | --- | --- | 107.3 | --- | 15,830 | 2,166 |
| END BENT 2 | --- | --- | --- | --- | 49.3 | --- | 7,057 | --- |
| TOTAL | LUMP SUM | 1 | 9,807 | 10,715 | 315.4 | LUMP SUM | 46,092 | 4,442 |

| TOTAL BILL OF MATERIAL | | | | | | | | | | |
|------------------------|----------------------------------|----------|---|-----|----------------------|------|---------------|---------|-----------------------|----------|
| | 54" PRESTRESSED CONCRETE GIRDERS | | PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES | | HP 12x53 STEEL PILES | | PILE REDRIVES | | CONCRETE BARRIER RAIL | |
| | NO. | L.F. | EACH | NO. | L.F. | EACH | L.F. | SQ. YD. | LUMP SUM | LUMP SUM |
| SUPERSTRUCTURE | 18 | 1,133.09 | --- | --- | --- | --- | 422.8 | --- | LUMP SUM | LUMP SUM |
| END BENT 1 | --- | --- | 9 | 9 | 675 | 5 | --- | 700 | --- | --- |
| BENT 1 | --- | --- | 18 | 18 | 1,350 | 9 | --- | --- | --- | --- |
| BENT 2 | --- | --- | 18 | 18 | 1,350 | 9 | --- | --- | --- | --- |
| END BENT 2 | --- | --- | 9 | 9 | 675 | 5 | --- | 660 | --- | --- |
| TOTAL | 18 | 1,133.09 | 54 | 54 | 4,050 | 28 | 422.8 | 1,360 | LUMP SUM | LUMP SUM |

SAMPLE BAR REPLACEMENT

| SIZE | LENGTH |
|------|---------|
| #3 | 6'-2" |
| #4 | 7'-4" |
| #5 | 8'-6" |
| #6 | 9'-8" |
| #7 | 10'-10" |
| #8 | 12'-0" |
| #9 | 13'-2" |
| #10 | 14'-6" |
| #11 | 15'-10" |

NOTE: SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND fy = 60ksi.



PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 LOCATION SKETCH
 AND TOTAL
 BILL OF MATERIAL
 LEFT LANE

HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: M. WRIGHT DATE: 9/18
 CHECKED BY: N. HART DATE: 9/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 3

| REVISIONS | | | | | | SHEET NO. |
|-----------|----|------|-----|----|------|--------------|
| NO. | BY | DATE | NO. | BY | DATE | ST-3 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOAD FACTORS:

| | | | |
|----------------------------|-------------|---------------|---------------|
| DESIGN LOAD RATING FACTORS | LIMIT STATE | γ_{DC} | γ_{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) (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 (γ_{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 (γ_{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 | 1.09 | -- | 1.75 | 0.88 | 1.53 | A | ER | 21.1 | 0.90 | 1.51 | B | I | 9.7 | 0.80 | 0.81 | 1.09 | B | ER | 51.2 | | |
| | HL-93 (OPERATING) | N/A | -- | 1.98 | -- | 1.35 | 0.88 | 1.98 | A | ER | 21.1 | 0.90 | 1.99 | B | I | 9.7 | N/A | -- | -- | -- | -- | -- | | |
| | HS-20 (INVENTORY) | 36.000 | ② | 1.53 | 55.1 | 1.75 | 0.88 | 1.87 | A | ER | 21.1 | 0.90 | 2.05 | B | I | 20.1 | 0.80 | 0.81 | 1.53 | B | ER | 51.2 | | |
| | HS-20 (OPERATING) | 36.000 | -- | 2.43 | 87.5 | 1.35 | 0.88 | 2.43 | A | ER | 21.1 | 0.90 | 2.71 | B | I | 20.1 | N/A | -- | -- | -- | -- | -- | | |
| LEGAL LOAD RATING | SINGLE VEHICLE (SV) | SNSH | 13.500 | -- | 3.19 | 43.1 | 1.40 | 0.88 | 4.49 | A | ER | 21.1 | 0.90 | 6.65 | B | I | 20.1 | 0.80 | 0.88 | 3.19 | A | ER | 21.1 | |
| | | SNGARBS2 | 20.000 | -- | 2.60 | 52.0 | 1.40 | 0.88 | 3.66 | A | ER | 21.1 | 0.90 | 4.62 | B | I | 20.1 | 0.80 | 0.88 | 2.60 | A | ER | 21.1 | |
| | | SNAGRIS2 | 22.000 | -- | 2.47 | 54.3 | 1.40 | 0.88 | 3.57 | A | ER | 16.7 | 0.90 | 4.25 | B | I | 9.7 | 0.80 | 0.81 | 2.47 | B | ER | 51.2 | |
| | | SNCOTTS3 | 27.250 | -- | 1.59 | 43.3 | 1.40 | 0.88 | 2.24 | A | ER | 21.1 | 0.90 | 3.21 | B | I | 20.1 | 0.80 | 0.88 | 1.59 | A | ER | 21.1 | |
| | | SNAGGRS4 | 34.925 | -- | 1.42 | 49.6 | 1.40 | 0.88 | 1.99 | A | ER | 21.1 | 0.90 | 2.59 | B | I | 20.1 | 0.80 | 0.88 | 1.42 | A | ER | 21.1 | |
| | | SNS5A | 35.550 | -- | 1.38 | 49.1 | 1.40 | 0.88 | 1.94 | A | ER | 21.1 | 0.90 | 2.61 | B | I | 20.1 | 0.80 | 0.88 | 1.38 | A | ER | 21.1 | |
| | | SNS6A | 39.950 | -- | 1.30 | 51.9 | 1.40 | 0.88 | 1.83 | A | ER | 21.1 | 0.90 | 2.35 | B | I | 20.1 | 0.80 | 0.88 | 1.30 | A | ER | 21.1 | |
| | | SNS7B | 42.000 | -- | 1.24 | 52.1 | 1.40 | 0.88 | 1.75 | A | ER | 21.1 | 0.90 | 2.29 | B | I | 20.1 | 0.80 | 0.88 | 1.24 | A | ER | 21.1 | |
| | TRUCK TRACTOR SEMI-TRAILER (TTST) | TNAGRIT3 | 33.000 | -- | 1.60 | 52.8 | 1.40 | 0.88 | 2.25 | A | ER | 21.1 | 0.90 | 2.85 | B | I | 20.1 | 0.80 | 0.88 | 1.60 | A | ER | 21.1 | |
| | | TNT4A | 33.075 | -- | 1.61 | 53.3 | 1.40 | 0.88 | 2.28 | A | ER | 21.1 | 0.90 | 2.78 | B | I | 20.1 | 0.80 | 0.81 | 1.61 | B | ER | 51.2 | |
| | | TNT6A | 41.600 | -- | 1.31 | 54.5 | 1.40 | 0.88 | 1.92 | A | ER | 21.1 | 0.90 | 2.40 | B | I | 9.7 | 0.80 | 0.81 | 1.31 | B | ER | 51.2 | |
| | | TNT7A | 42.000 | -- | 1.31 | 55.0 | 1.40 | 0.88 | 1.96 | A | ER | 21.1 | 0.90 | 2.35 | B | I | 9.7 | 0.80 | 0.81 | 1.31 | B | ER | 51.2 | |
| | | TNT7B | 42.000 | -- | 1.34 | 56.3 | 1.40 | 0.88 | 2.04 | A | ER | 16.7 | 0.90 | 2.24 | B | I | 20.1 | 0.80 | 0.81 | 1.34 | B | ER | 51.2 | |
| | | TNAGRIT4 | 43.000 | -- | 1.28 | 55.0 | 1.40 | 0.88 | 1.94 | A | ER | 21.1 | 0.90 | 2.17 | B | I | 20.1 | 0.80 | 0.81 | 1.28 | B | ER | 51.2 | |
| | | TNAGT5A | 45.000 | -- | 1.21 | 54.5 | 1.40 | 0.88 | 1.81 | A | ER | 21.1 | 0.90 | 2.13 | B | I | 20.1 | 0.80 | 0.81 | 1.21 | B | ER | 51.2 | |
| TNAGT5B | 45.000 | ③ | 1.20 | 54.0 | 1.40 | 0.88 | 1.76 | A | ER | 21.1 | 0.90 | 2.06 | B | I | 20.1 | 0.80 | 0.81 | 1.20 | B | ER | 51.2 | | | |

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.

① CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

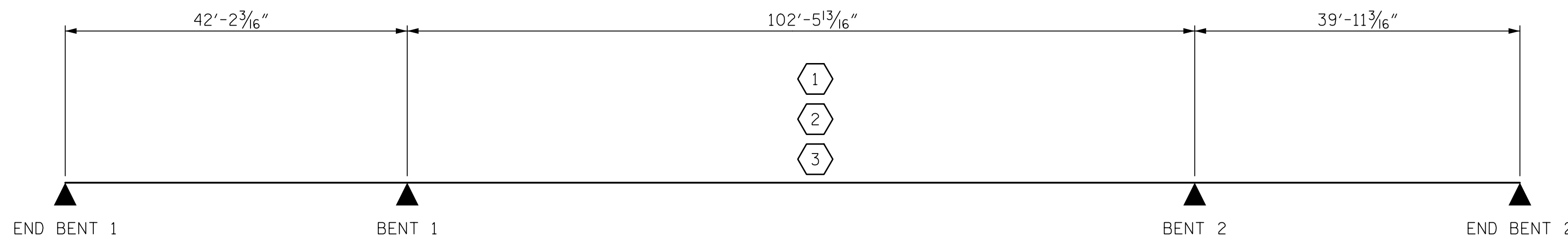
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

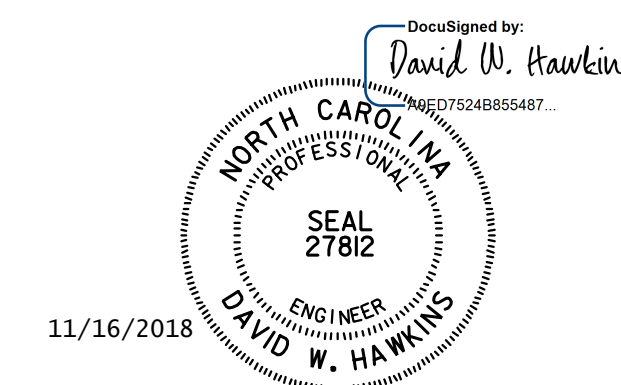
I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

NOTE: SPAN LENGTHS PROVIDED ARE BEARING TO BEARING LENGTHS.

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-



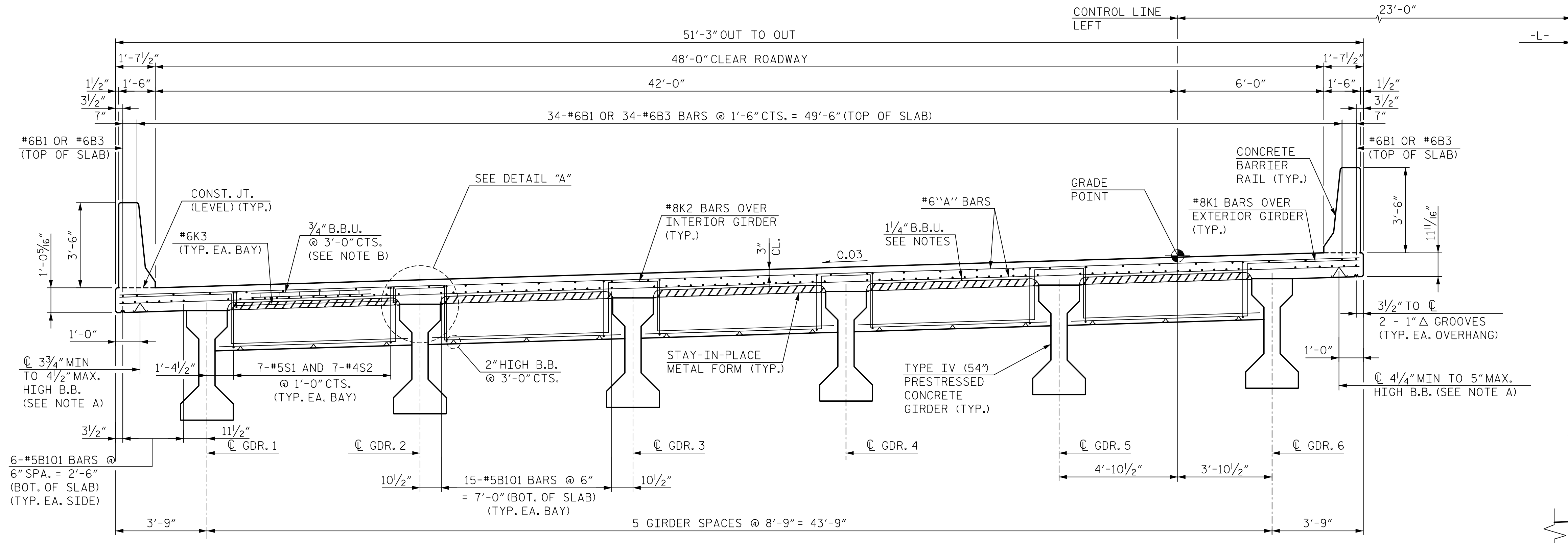
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 PRESTRESSED
 CONCRETE GIRDERS
 (NON-INTERSTATE TRAFFIC)
 LEFT LANE

| | |
|----------------------|-----------------|
| ASSEMBLED BY : MAA | DATE : 8/18 |
| CHECKED BY : N. HART | DATE : 9/18 |
| DRAWN BY : MAA | REV. 11/12/08RR |
| CHECKED BY : GM/DI | REV. 10/1/11 |
| | REV. 12/17 |

| | | | |
|--|-------------|--|--|
| HNTB | | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | |
| DRAWN BY : M. WRIGHT | DATE : 8/18 | DWG. NO. 4 | |
| CHECKED BY : N. HART | DATE : 9/18 | | |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 | | |

| | | | | | | |
|-----------|----|------|-----|-----------|------|--------------|
| REVISIONS | | | | SHEET NO. | | |
| NO. | BY | DATE | NO. | BY | DATE | |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

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 UNLESS ALL SIGNATURES COMPLETED



TYPICAL SECTION AT END BENT
FOR SECTION THRU END BENT DIAPHRAGM, SEE SECTION A-A, SHEET 2 OF 2

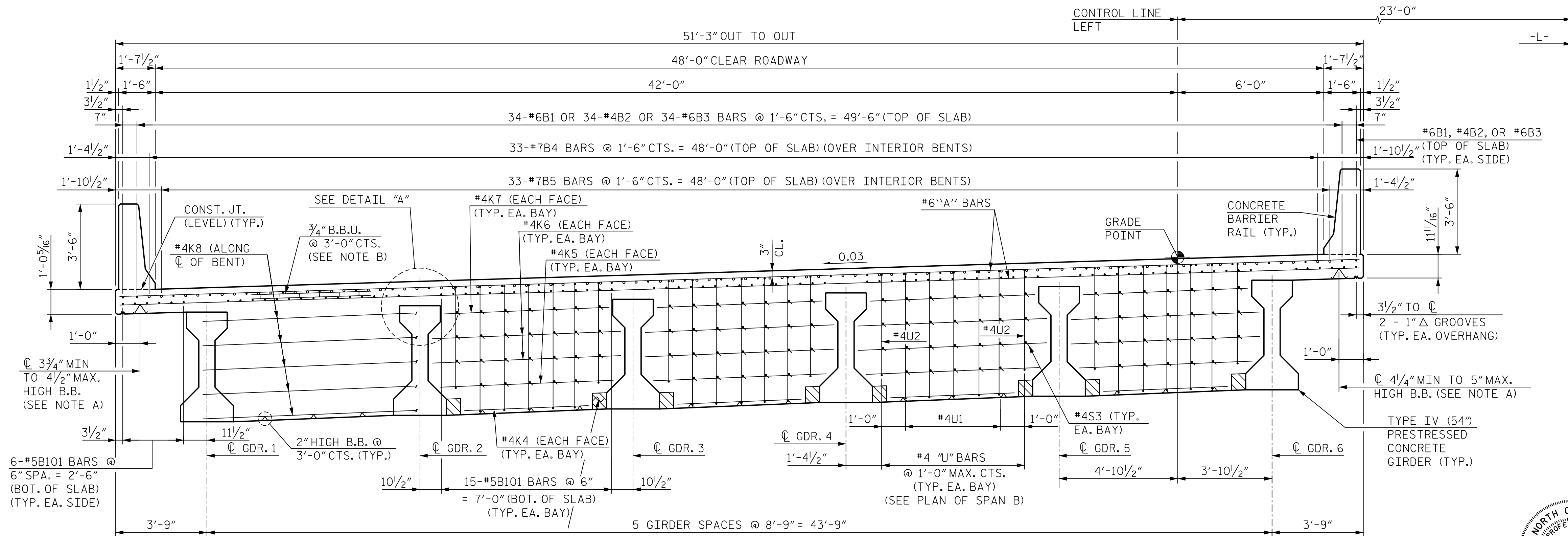
NOTES
ALL HORIZONTAL DIMENSIONS SHOWN NORMAL TO C SURVEY UNLESS NOTED OTHERWISE.

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 (CHCM) AT 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.

#5G1 BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.

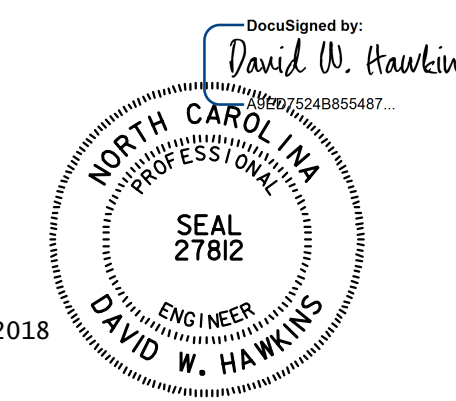


TYPICAL SECTION AT BENT
FOR SECTION THRU BENT DIAPHRAGM, SEE SECTION B-B, SHEET 2 OF 2

- "B" BAR KEY**
- CONTINUOUS BAR RUN SEE PLAN OF SPAN SHEETS.
 - NON-CONTINUOUS BAR RUN FOR NEGATIVE MOMENT REGIONS SEE PLAN OF SPAN SHEETS.

NOTE A: THE HEIGHT OF THE BEAM BOLSTER VARIES ALONG THE LENGTH OF THE SPAN DUE TO CAMBER AND THE VARYING HEIGHT REQUIRED FOR THE BUILDUP. THE CONTRACTOR SHALL HAVE SUFFICIENT SIZES TO PROPERLY SUPPORT THE REINFORCING STEEL.

NOTE B: TO MAINTAIN PROPER LOCATION OF "A" BARS IN TOP OF SLAB, BBU DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE "B" BARS IN THE TOP OF SLAB VARIES. A 1/4" BBU SHALL BE USED WHERE ONLY #4 AND #5 "B" BARS ARE PRESENT, WHERE #6 "B" BARS OR #7 "B" BARS ARE PRESENT, A 3/4" BBU SHALL BE USED.

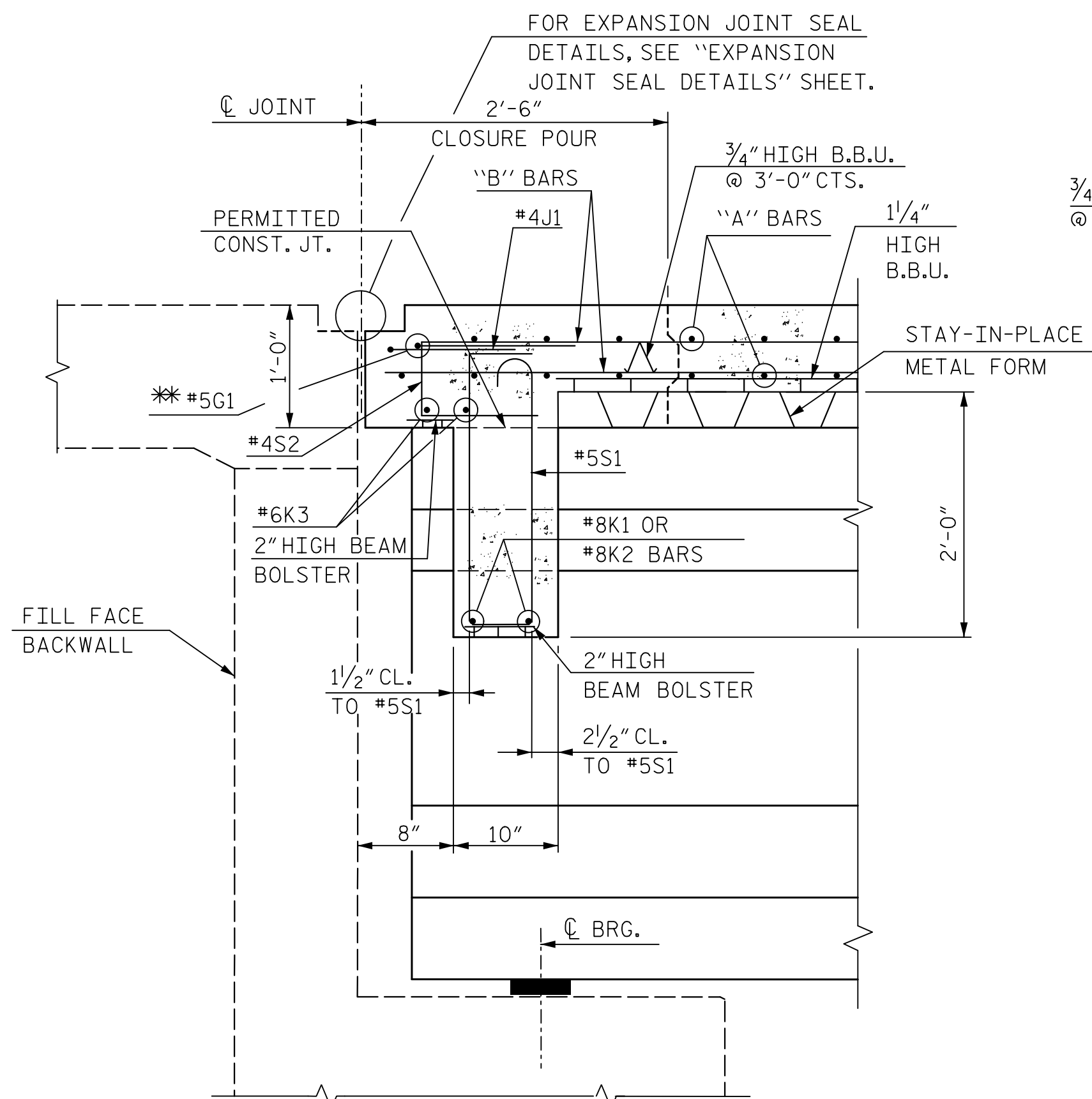


PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-

SHEET 1 OF 2
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION
LEFT LANE

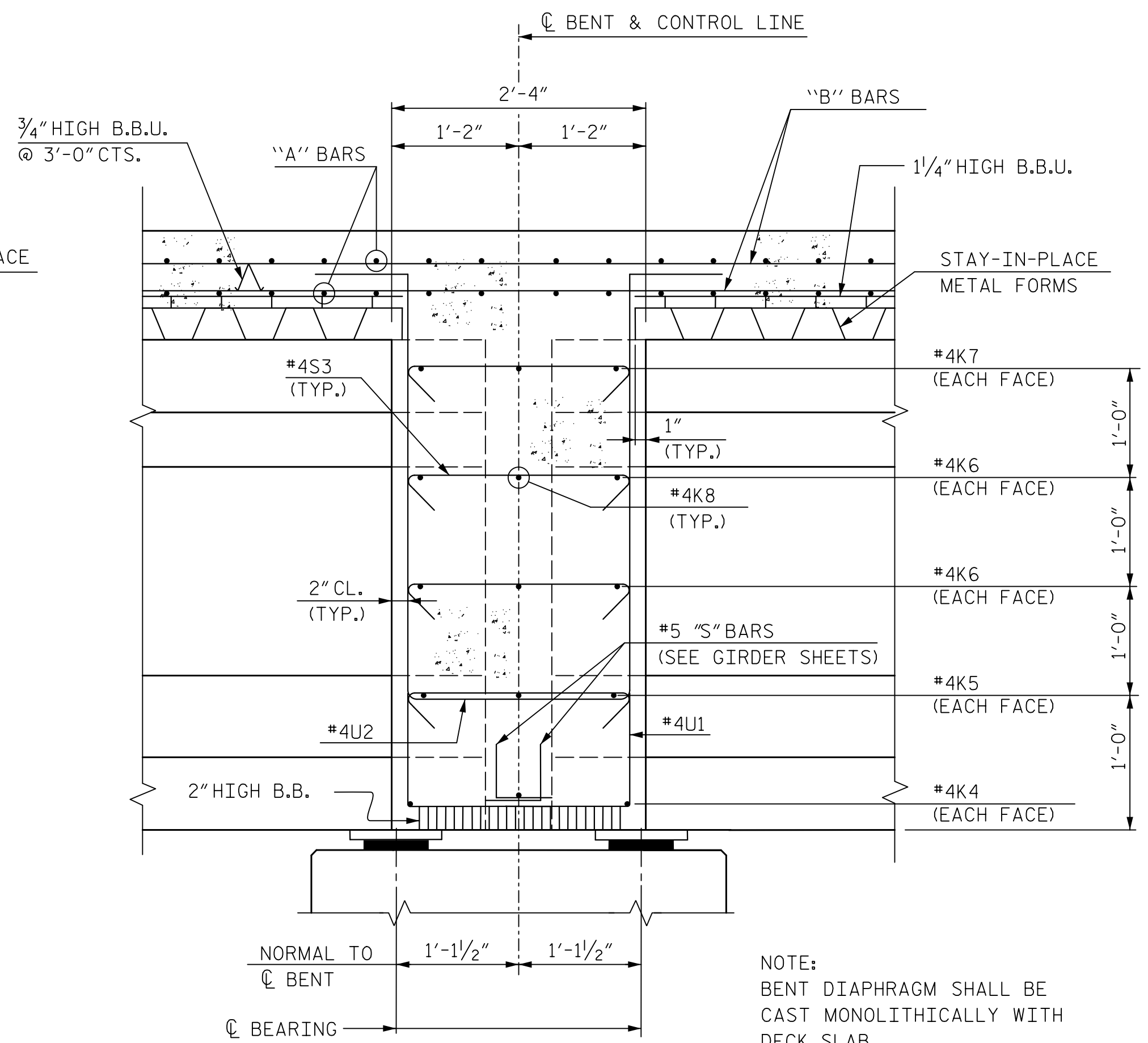
| | | |
|--|--|---|
| HNTB HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | | DWG. NO. 5 DATE 8/18 DATE 9/18 DATE 9/18 |
| DRAWN BY: M. WRIGHT CHECKED BY: N. HART DESIGN ENGINEER OF RECORD: D. HAWKINS | | SHEET NO. S7-5 TOTAL SHEETS 35 |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SECTION A-A

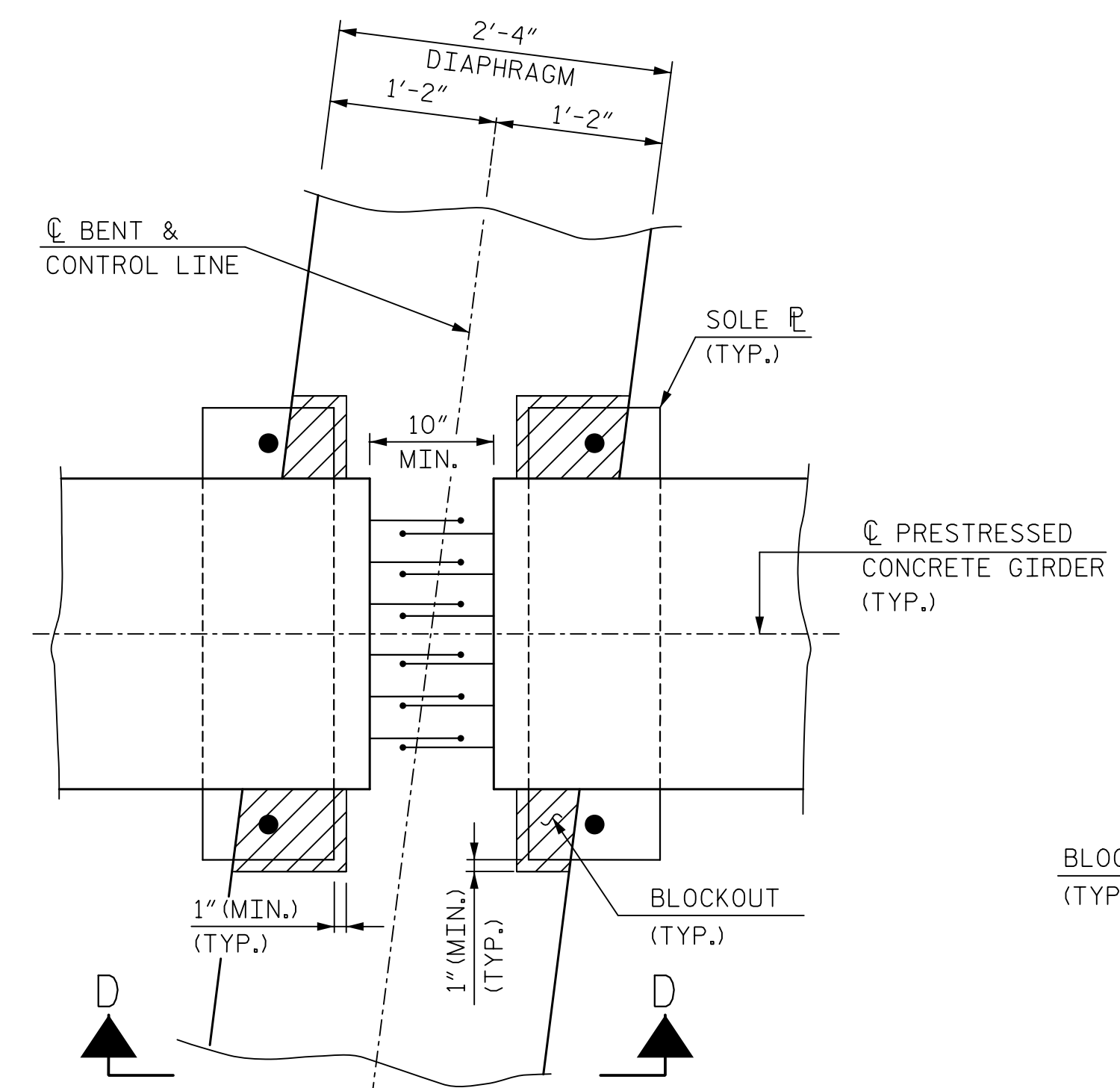
(SECTION NORMAL THRU END BENT 1 DIAPHRAGM, END BENT 2 SIMILAR)
 ** #5 "C" BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.



SECTION B-B

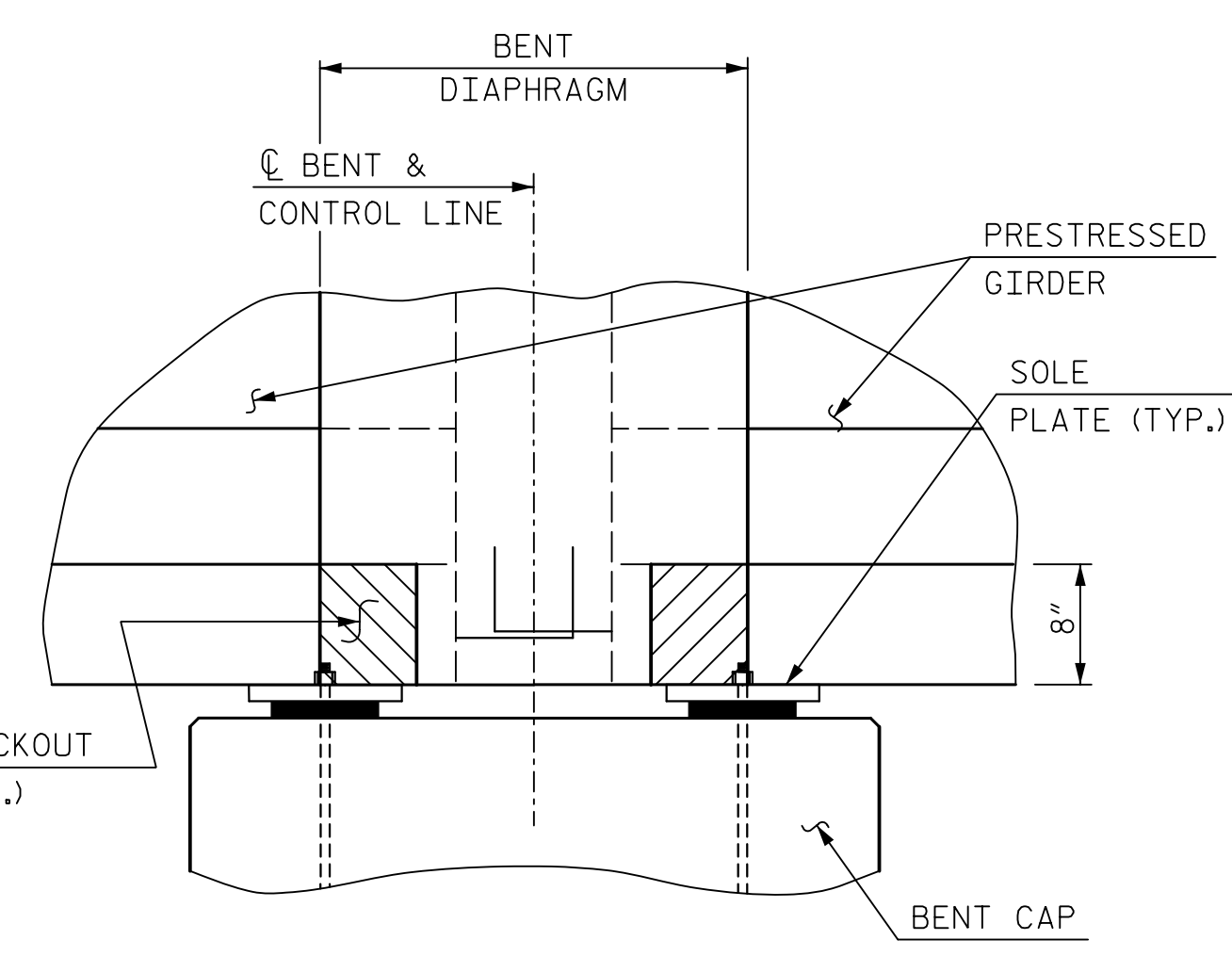
(SECTION NORMAL THRU BENT 1 & BENT 2 DIAPHRAGM)

NOTE:
 BENT DIAPHRAGM SHALL BE CAST MONOLITHICALLY WITH DECK SLAB.

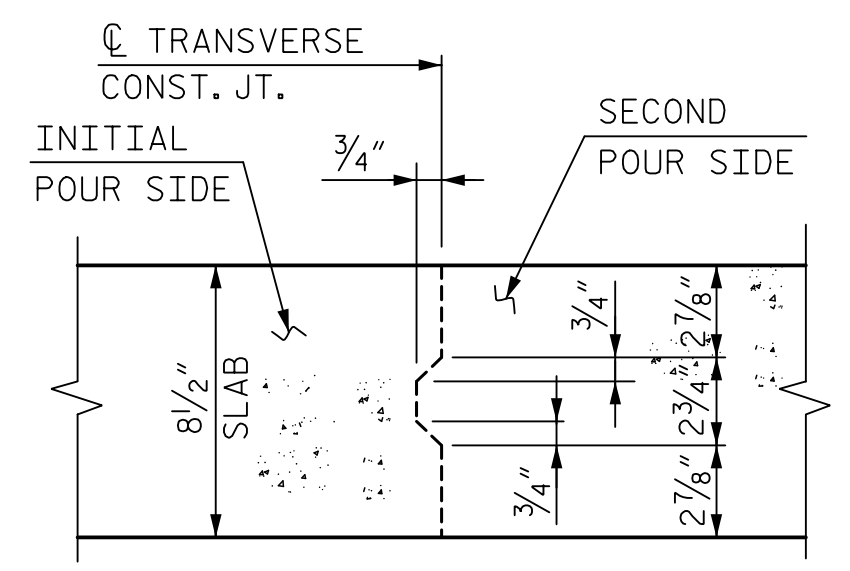


PLAN VIEW

(AT INTERIOR BENTS)
BENT DIAPHRAGM BLOCKOUT DETAILS

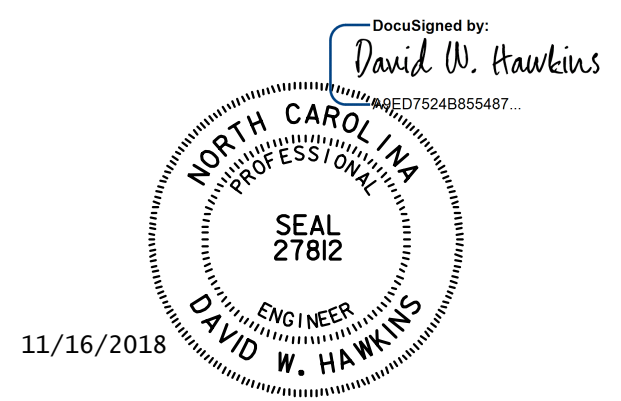


SECTION D-D



DECK SLAB TRANSVERSE CONSTRUCTION JOINT DETAIL

REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT.



PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 2 OF 2
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 TYPICAL SECTION
 LEFT LANE

| HNTB | | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | | | | | | | | | | | | | | | | | |
|---------------------------------------|------------|--|---|-----------|------|--|--|-----|----|------|------|---|--|---|--|---|--|---|--|
| DRAWN BY: M. WRIGHT | DATE: 8/18 | DWG. NO. 6 | <table border="1"> <tr> <th colspan="4">REVISIONS</th> </tr> <tr> <th>NO.</th> <th>BY</th> <th>DATE</th> <th>DATE</th> </tr> <tr> <td>1</td> <td></td> <td>3</td> <td></td> </tr> <tr> <td>2</td> <td></td> <td>4</td> <td></td> </tr> </table> | REVISIONS | | | | NO. | BY | DATE | DATE | 1 | | 3 | | 2 | | 4 | |
| REVISIONS | | | | | | | | | | | | | | | | | | | |
| NO. | BY | | | DATE | DATE | | | | | | | | | | | | | | |
| 1 | | 3 | | | | | | | | | | | | | | | | | |
| 2 | | 4 | | | | | | | | | | | | | | | | | |
| CHECKED BY: N. HART | DATE: 9/18 | | | | | | | | | | | | | | | | | | |
| DESIGN ENGINEER OF RECORD: D. HAWKINS | DATE: 9/18 | | | | | | | | | | | | | | | | | | |

| | |
|-----------------|--|
| SHEET NO. S7-6 | |
| TOTAL SHEETS 35 | |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

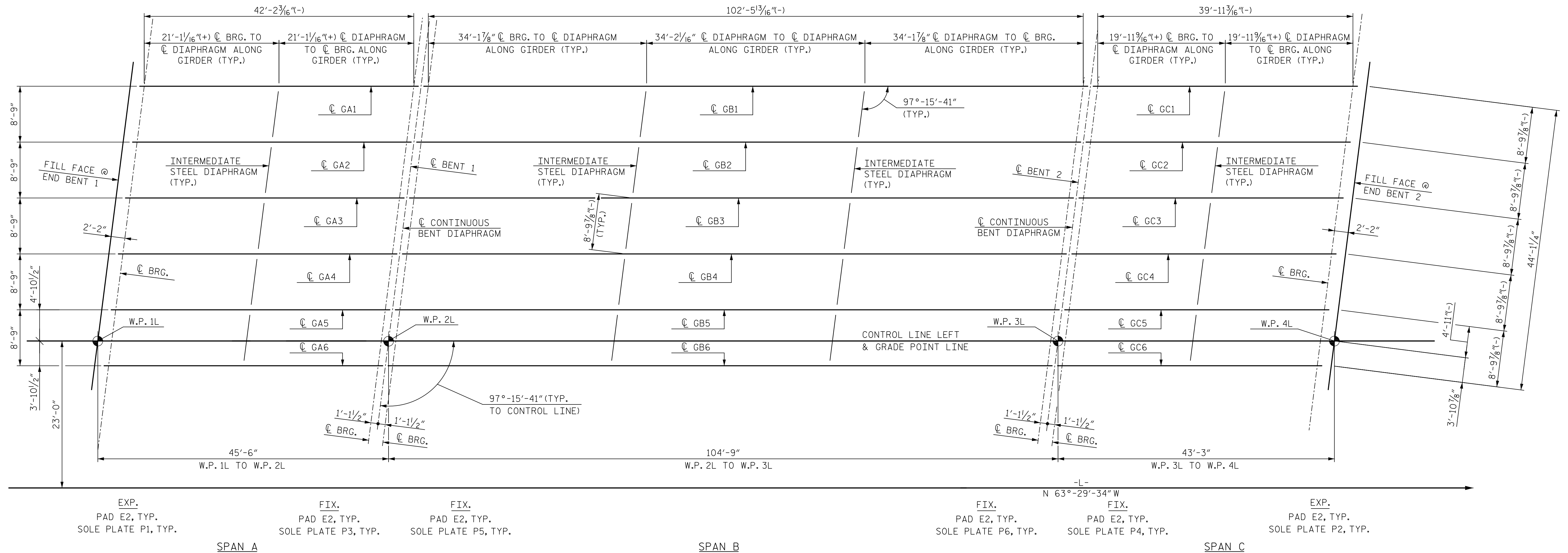
NOTES:

ALL DIMENSIONS MEASURED ALONG ϕ GIRDER UNLESS NOTED OTHERWISE.

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE SHEET "STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS".

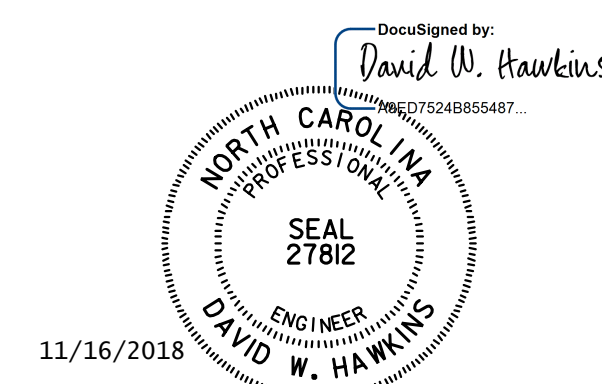
FOR GIRDER ELEVATIONS AND DETAILS, SEE PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET.

- "EXP." DENOTES EXPANSION BEARING ASSEMBLY.
- "FIX." DENOTES FIXED BEARING ASSEMBLY.
- "E" DENOTES ELASTOMERIC BEARING PAD MARK.
- "P" DENOTES STEEL SOLE PLATE MARK.



FRAMING PLAN

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-

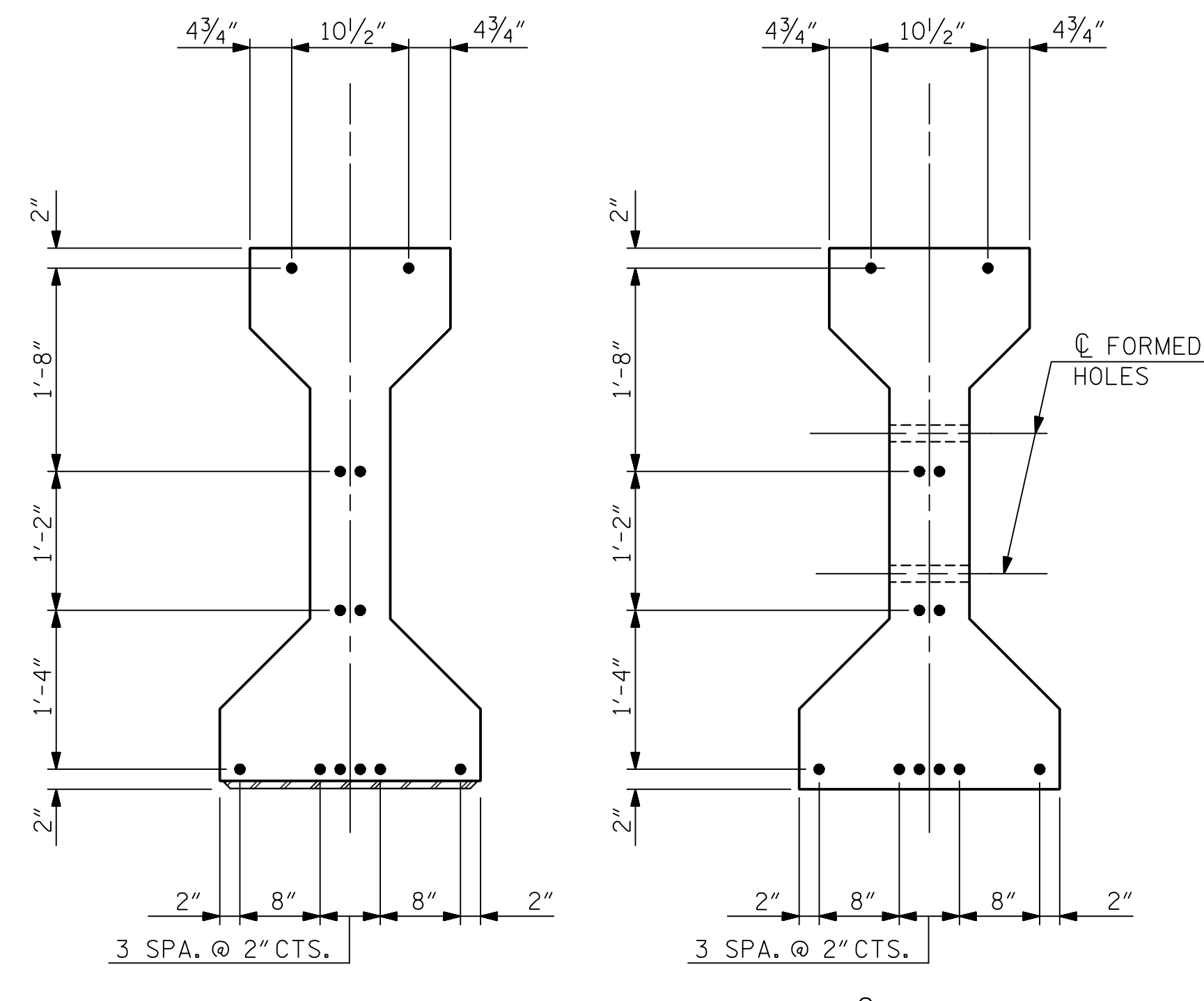
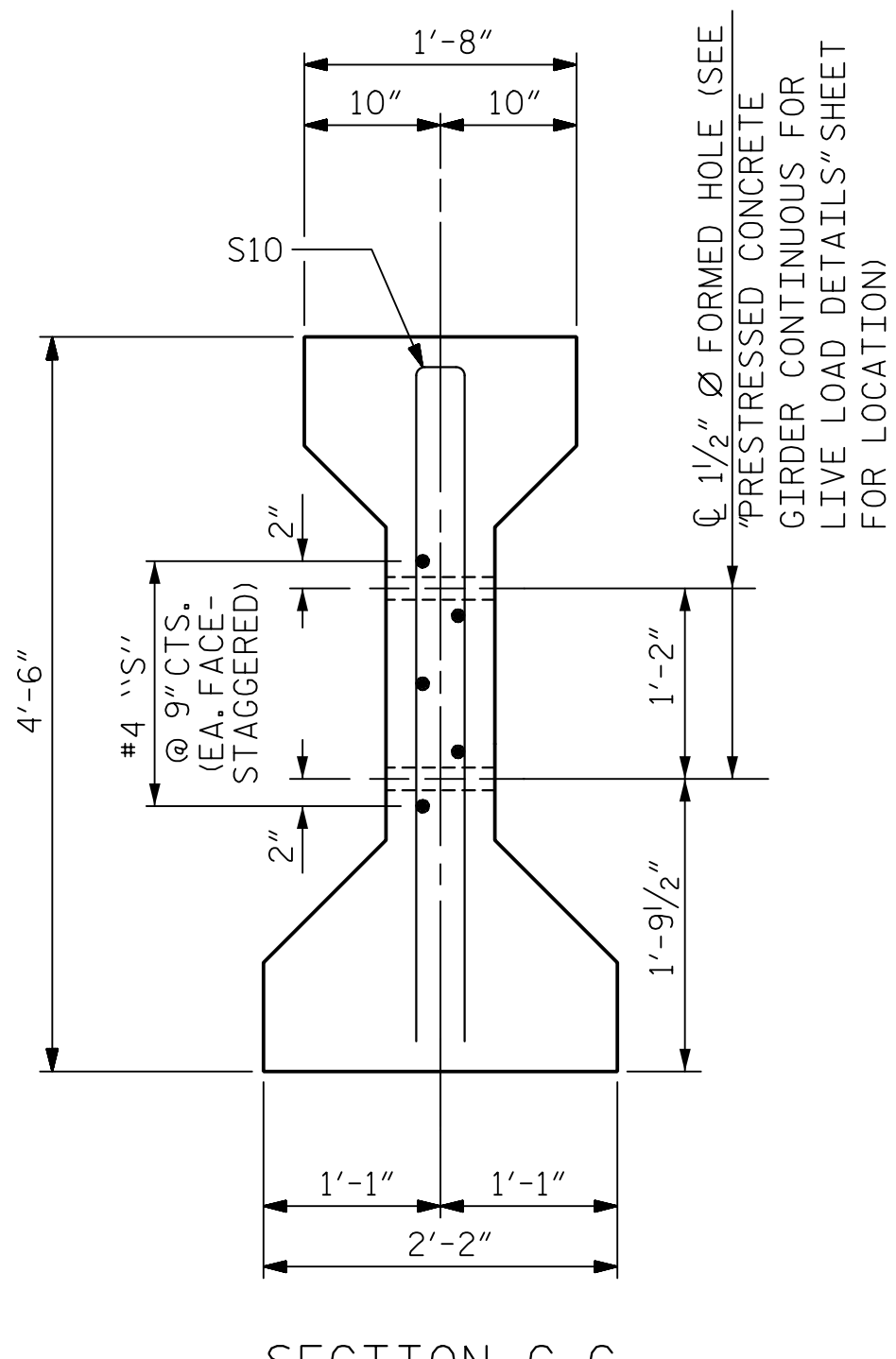
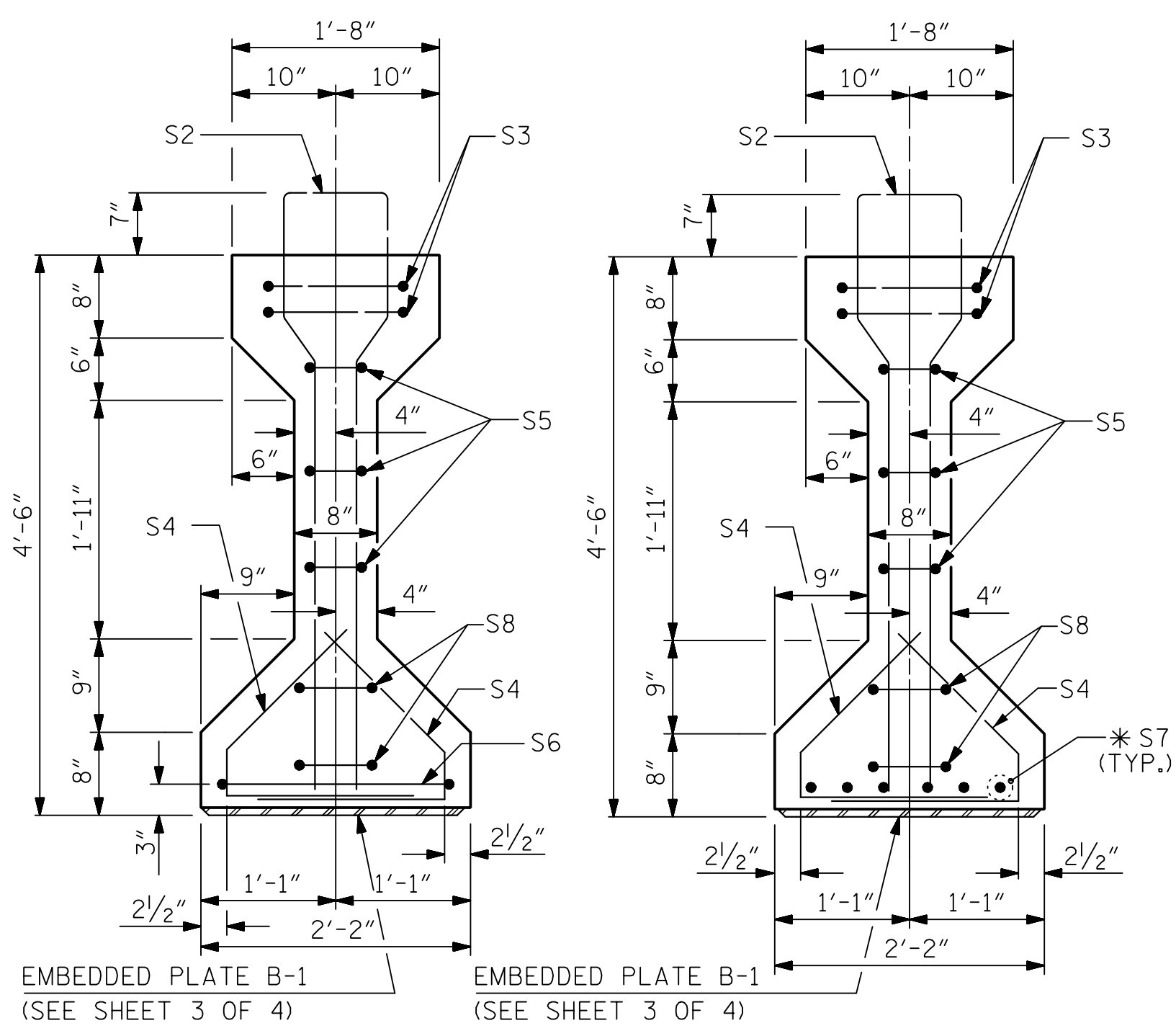


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DRAWN BY: M. WRIGHT DATE: 7/18
 CHECKED BY: N. HART DATE: 7/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18
 DWG. NO. 10

| | | | | | |
|--|----|------|-----|----|--------------------|
| STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH | | | | | |
| SUPERSTRUCTURE FRAMING PLAN LEFT LANE | | | | | |
| SHEET NO. S7-10 | | | | | |
| REVISIONS | | | | | |
| NO. | BY | DATE | NO. | BY | DATE |
| 1 | | | 3 | | |
| 2 | | | 4 | | |
| | | | | | TOTAL SHEETS 35 |



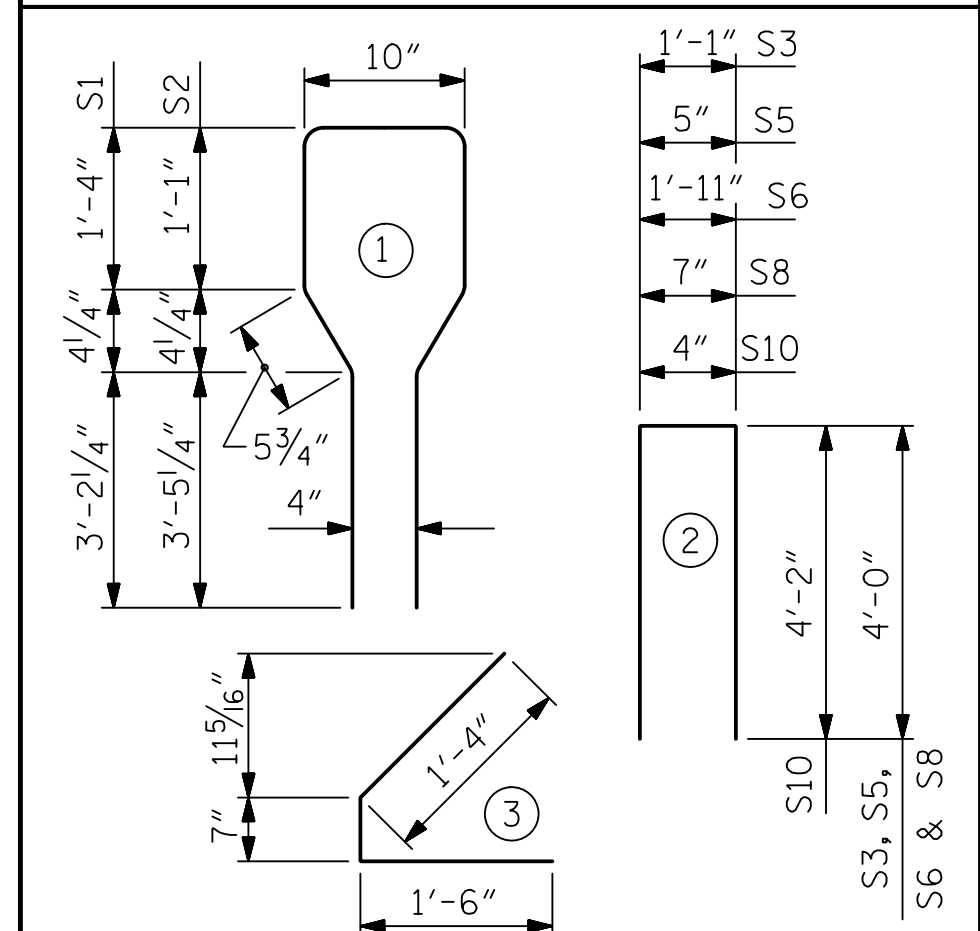
| 0.6" Ø L. R. GRADE 270 STRANDS | | |
|--------------------------------|-------------------------------------|-------------------------------------|
| AREA (SQUARE INCHES) | ULTIMATE STRENGTH (LBS. PER STRAND) | APPLIED PRESTRESS (LBS. PER STRAND) |
| 0.217 | 58,600 | 43,950 |

| REINFORCING STEEL FOR ONE GIRDER | | | | | | |
|----------------------------------|--------|------|------|--------|---------|-----|
| BAR | NUMBER | SIZE | TYPE | LENGTH | WEIGHT | |
| G1-GA6 | S1 | 46 | #4 | 1 | 10'-10" | 333 |
| G1-GC6 | S1 | 44 | #4 | 1 | 10'-10" | 318 |
| | S2 | 12 | #6 | 1 | 10'-10" | 195 |
| | S3 | 4 | #4 | 2 | 9'-1" | 24 |
| | S4 | 64 | #4 | 3 | 3'-5" | 146 |
| | S5 | 6 | #4 | 2 | 8'-5" | 34 |
| | S6 | 1 | #4 | 2 | 9'-11" | 7 |
| | *S7 | 6 | #5 | STR | 3'-8" | 23 |
| | S8 | 4 | #4 | 2 | 8'-7" | 23 |
| | S9 | 1 | #3 | STR | 1'-10" | 1 |
| | S10 | 2 | #5 | 2 | 8'-8" | 18 |
| | S11 | 5 | #4 | STR | 7'-0" | 23 |

* 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 | 5,000 PSI CONCRETE | 0.6" Ø L. R. STRANDS |
| | LB. | C.Y. | No. |
| SPAN A GDR. | 827 | 8.8 | 12 |
| SPAN C GDR. | 812 | 8.4 | 12 |

GIRDERS REQUIRED

| | NUMBER | LENGTH | TOTAL LENGTH |
|-------------|--------|-----------------|--------------|
| SPAN A GDR. | 6 | 43'-7 3/16" (-) | 261.59' |
| SPAN C GDR. | 6 | 41'-4 3/16" (-) | 248.09' |

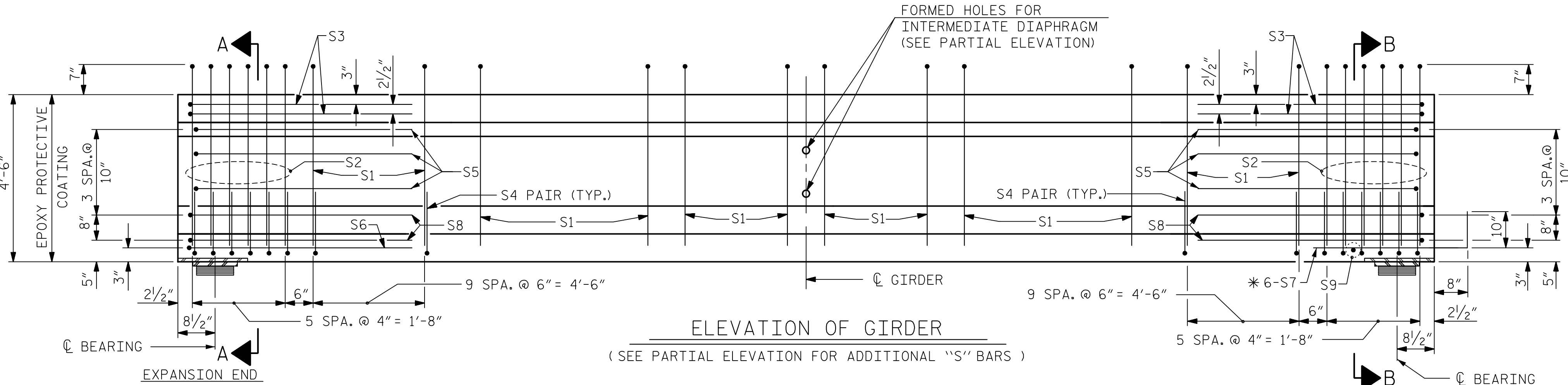
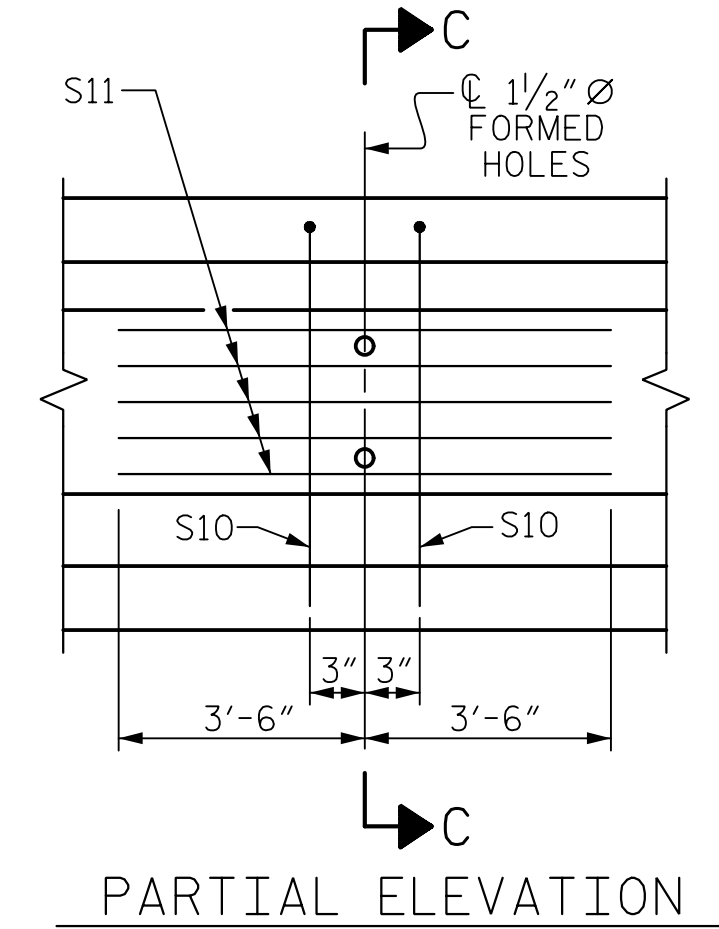
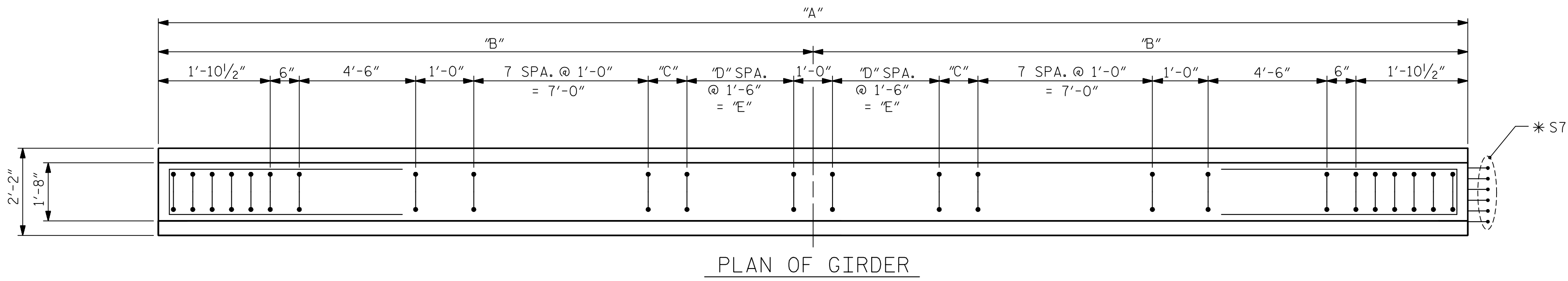
PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 1 OF 4
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 AASHTO TYPE IV
 PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 SPANS A & C
 LEFT LANE

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

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

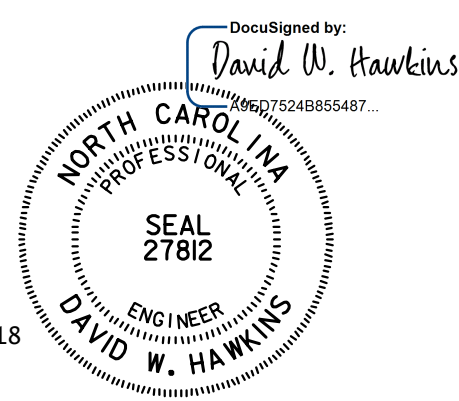
NOTE: ALL STRANDS SHALL BE BONDED FULL LENGTH.



| GIRDER DIMENSION TABLE | | | | |
|------------------------|-------------|-----------------|-------------|-----|
| GIRDERS | "A" | "B" | "C" | "E" |
| GA1 - GA6 | 43'-7 3/16" | 21'-9 9/16" (+) | 5 1/16" (+) | 4 |
| GC1 - GC6 | 41'-4 3/16" | 20'-8 1/16" (+) | 9 9/16" (+) | 3 |

NOTES:
 THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4,000 PSI FOR SPAN A AND SPAN C GIRDERS.

GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI AT THE AGE OF 28 DAYS.



ASSEMBLED BY : M. WRIGHT DATE : 8/18
 CHECKED BY : N. SALAS ZAMUDIO DATE : 8/18
 DRAWN BY : ELR 8/91 REV. 10/11/11 MAA/GM
 CHECKED BY : CRP 8/91 REV. 1/15 MAA/TMG
 REV. 12/17 MAA/THC

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 DRAWN BY: M. WRIGHT DATE: 8/18
 CHECKED BY: N. SALAS ZAMUDIO DATE: 8/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18
 DWG. NO. II

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.

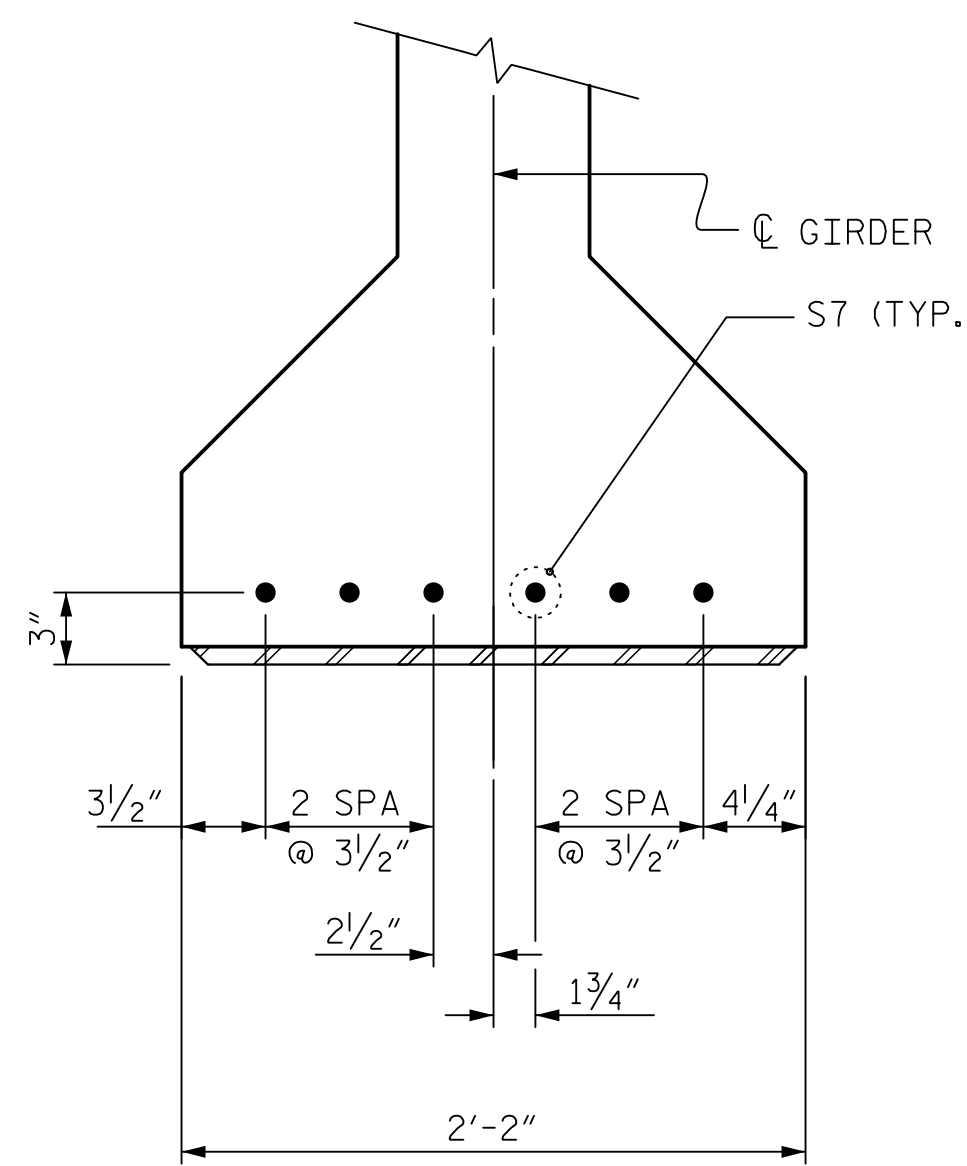
ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

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.

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

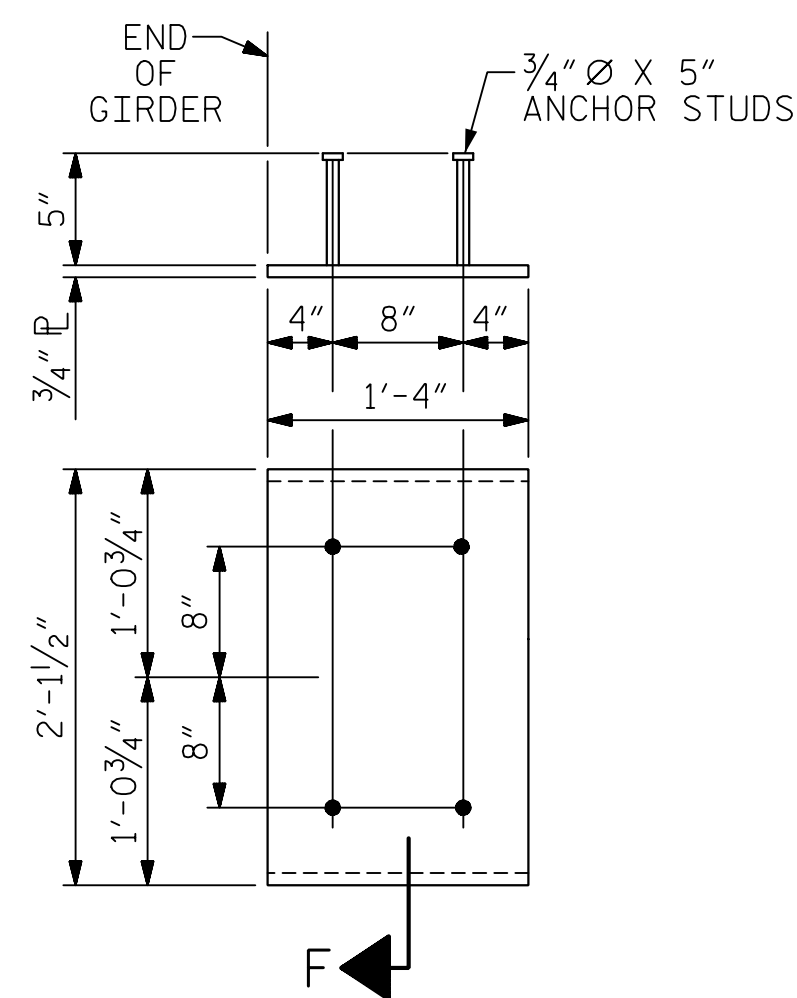
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.



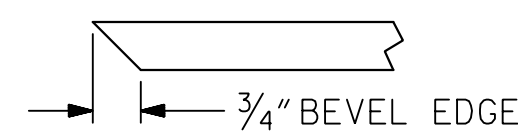
DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



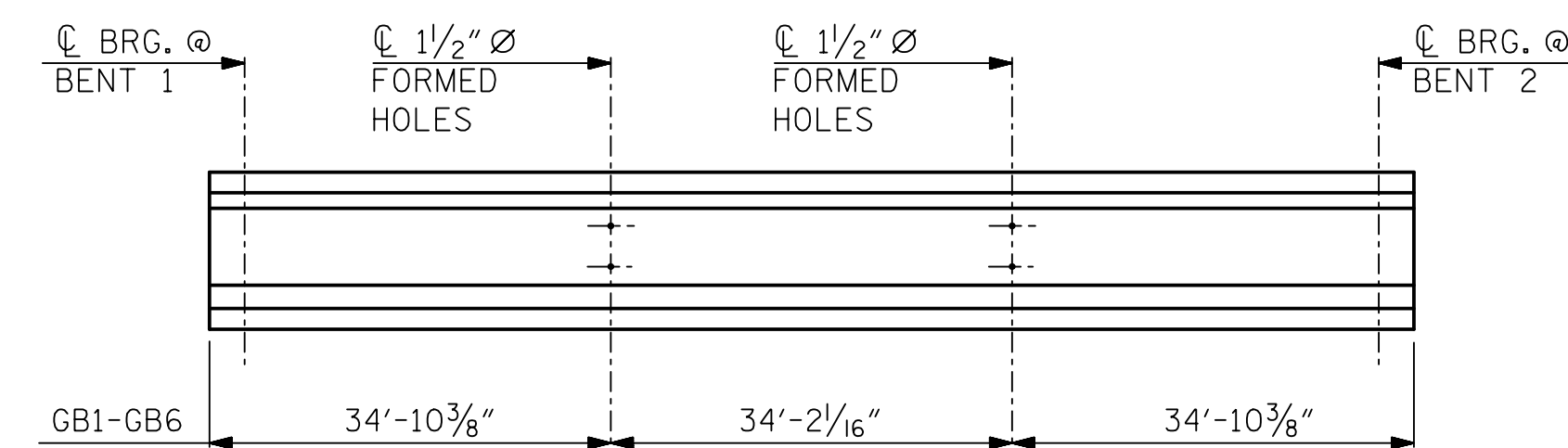
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



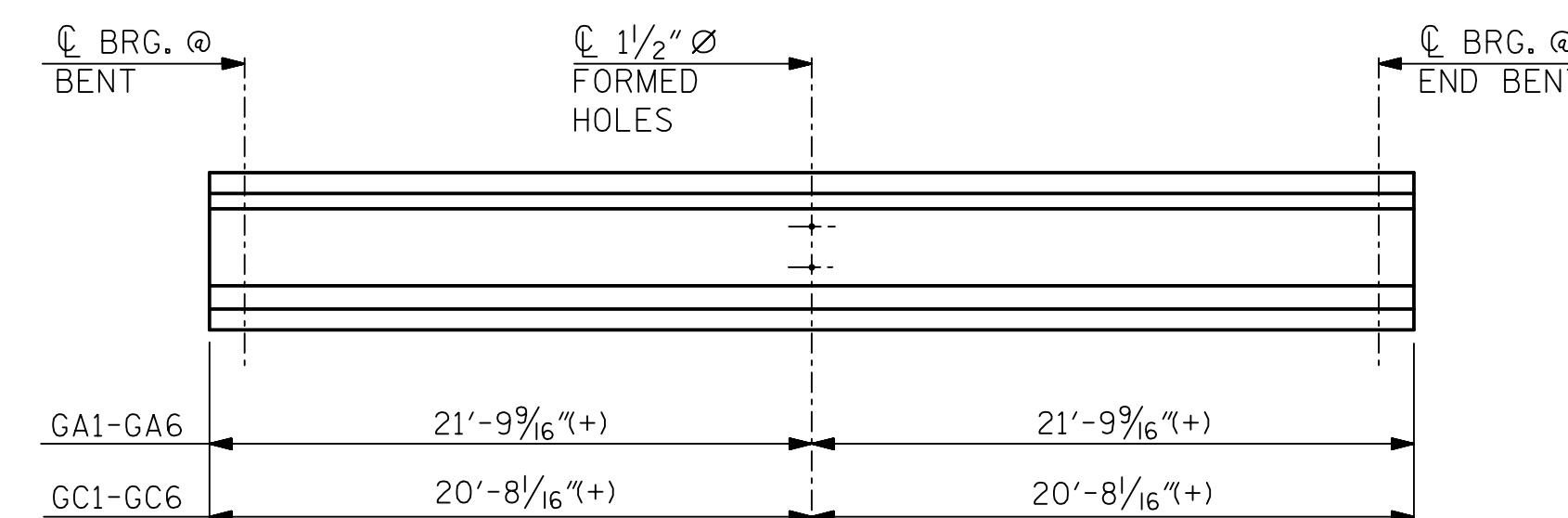
SECTION "F"

(SEE NOTES)



GIRDER ELEVATION

GB1-GB6



GIRDER ELEVATION

GA1-GA6 & GC1-GC6

1 1/2" Ø FORMED HOLE LOCATIONS

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CRAVEN COUNTY
 STATION: 227+57.02 -L-

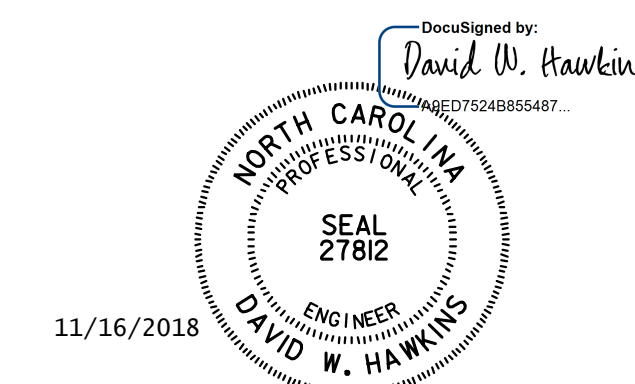
SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 DETAILS
 LEFT LANE

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

TOTAL SHEETS: 35



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DRAWN BY: M. WRIGHT DATE: 8/18
 CHECKED BY: N. SALAS ZAMUDIO DATE: 8/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 13

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| | |
|-------------------------------|--------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 8/18 |
| CHECKED BY : N. SALAS ZAMUDIO | DATE : 8/18 |
| DRAWN BY : ELR 11/91 | REV. 1/15 MAA/TMG |
| CHECKED BY : GRP 11/91 | REV. 2/15 MAA/TMG |
| | REV. 12/17 MAA/THC |

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 METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. 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.

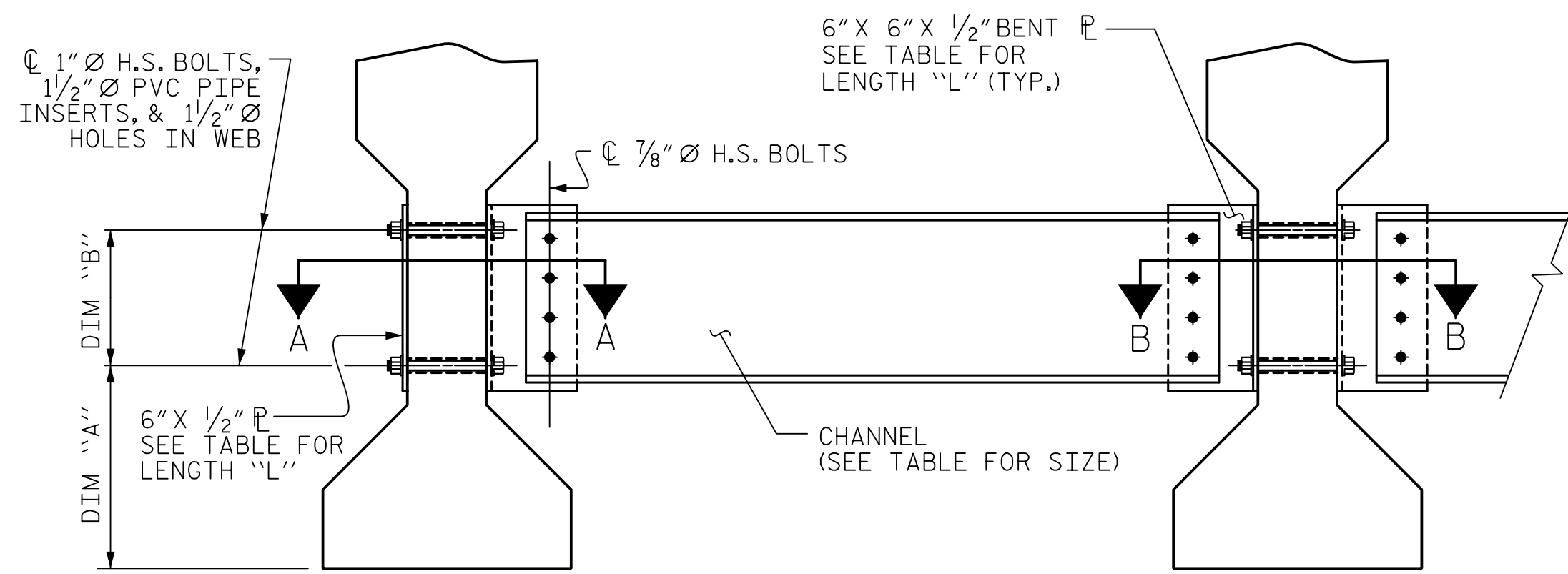
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

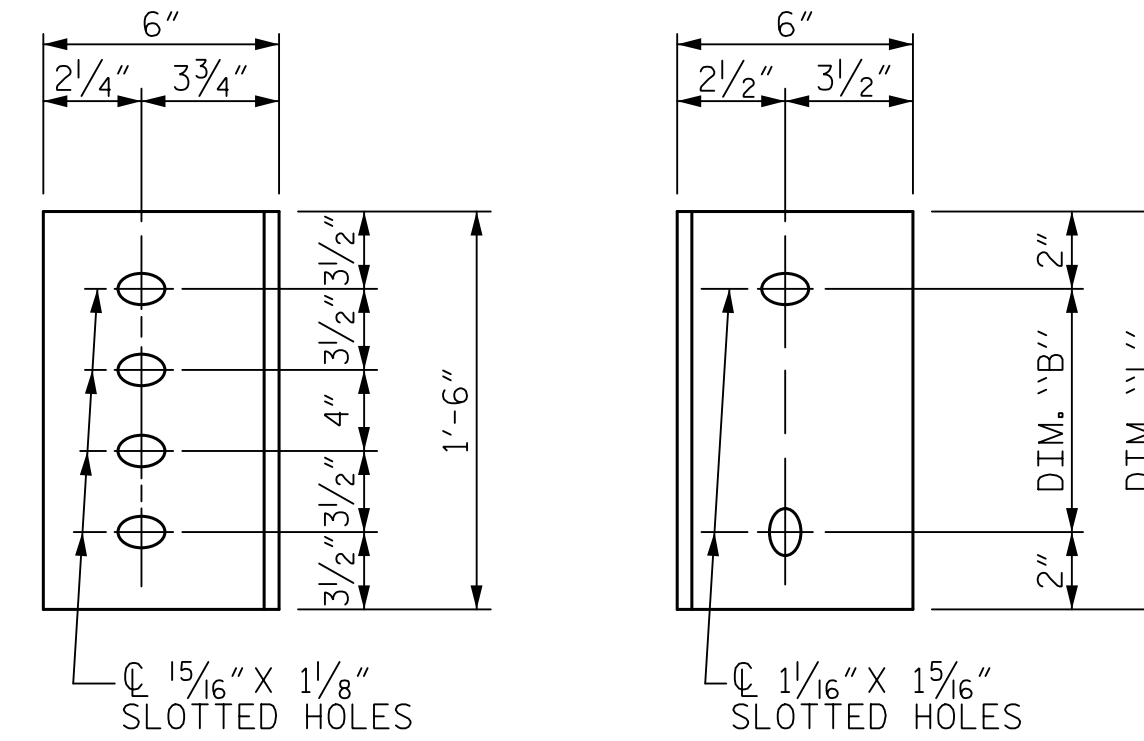
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

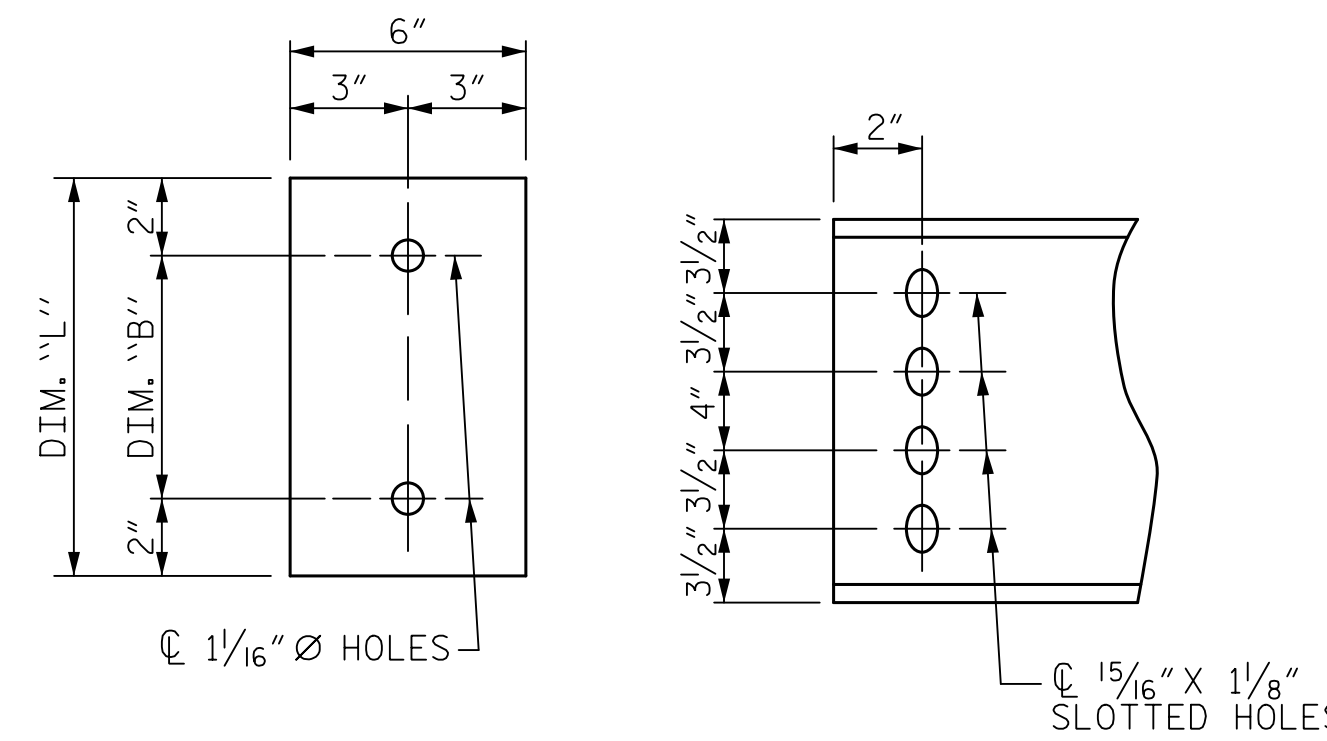
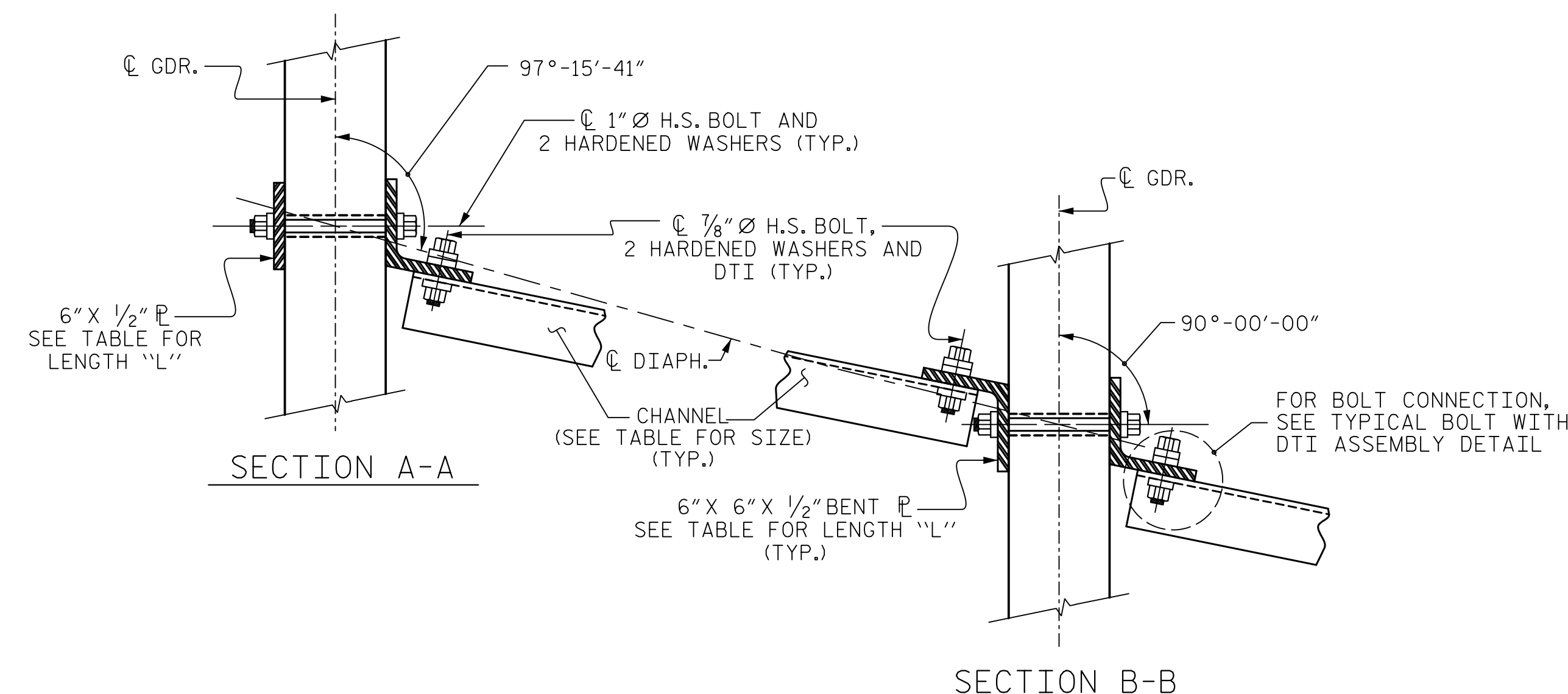


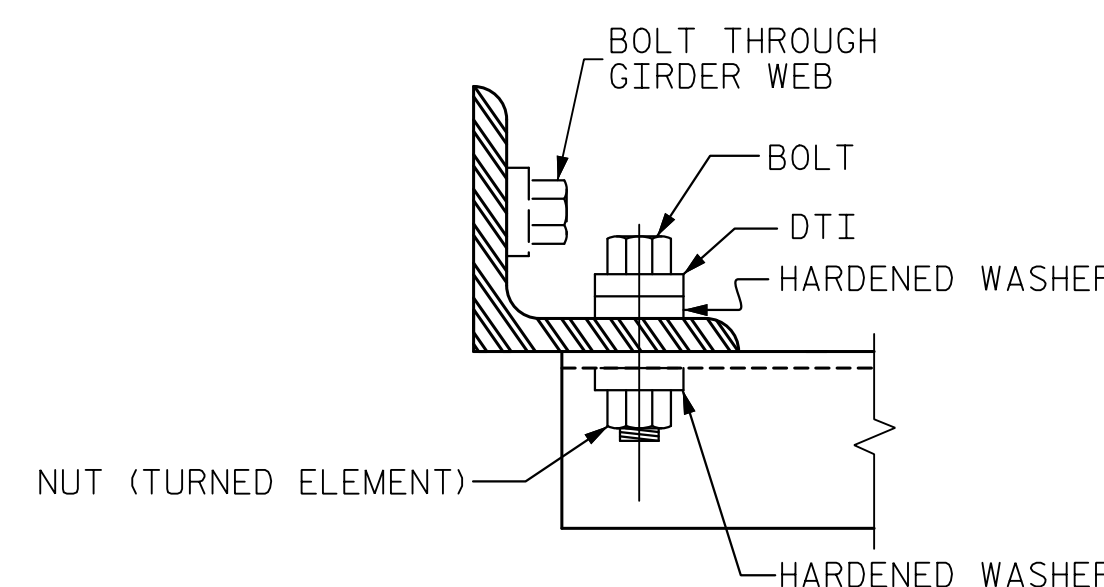
PLATE DETAILS
CHANNEL END

TABLE

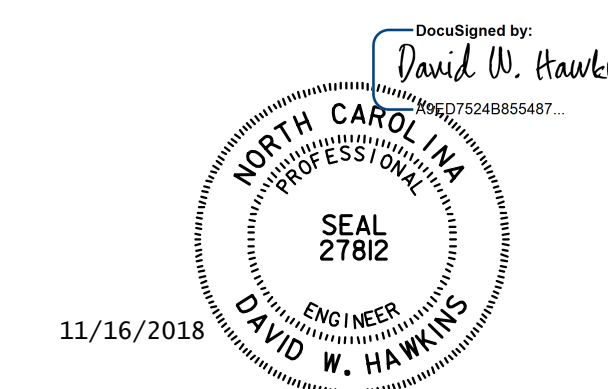
| GIRDER TYPE | CHANNEL SIZE | DIM "A" | DIM "B" | DIM "L" |
|-------------|--------------|-----------|---------|---------|
| IV | MC 18 x 42.7 | 1'-9 1/2" | 1'-2" | 1'-6" |



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL



PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-

SHEET 4 OF 4

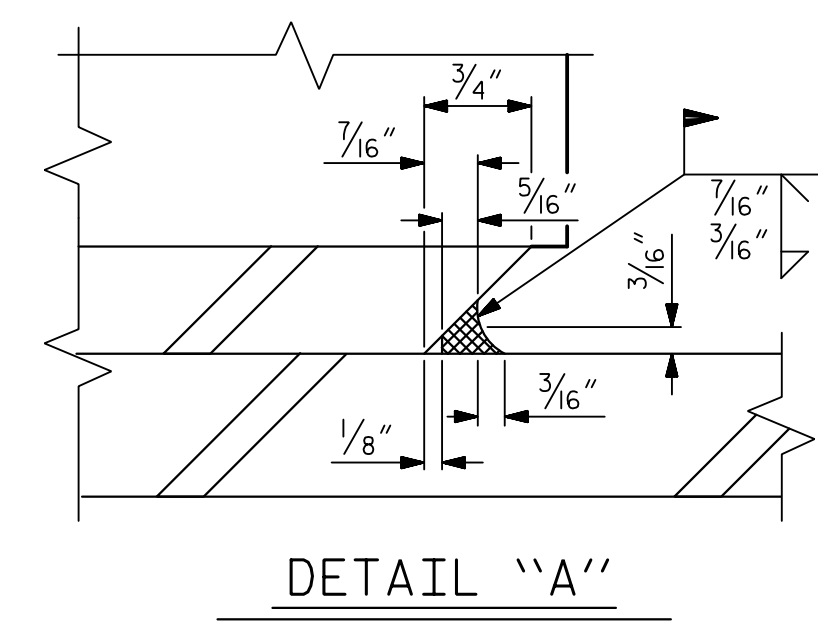
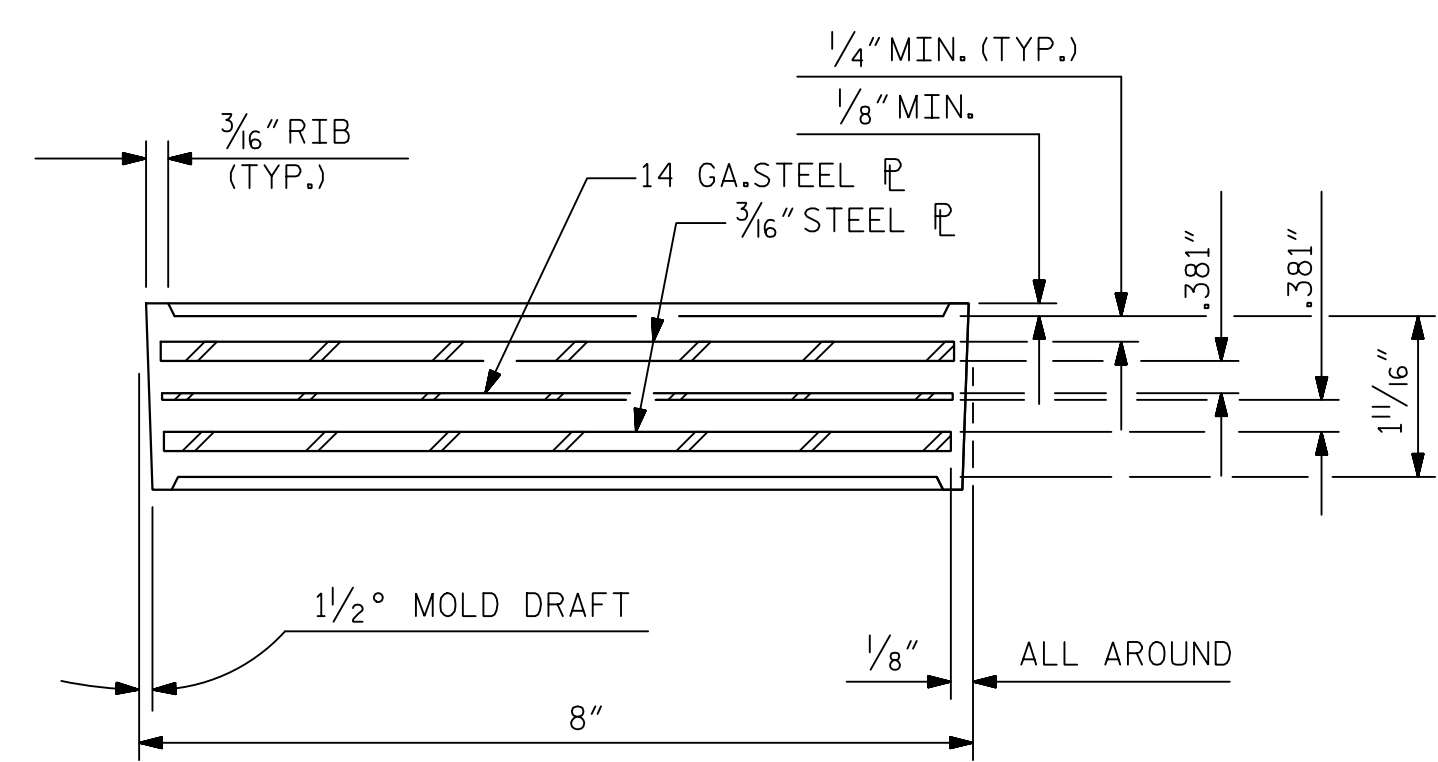
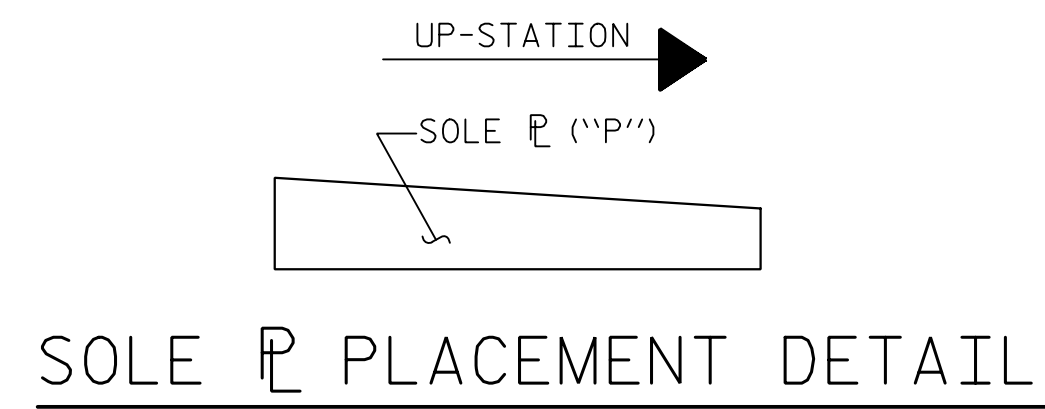
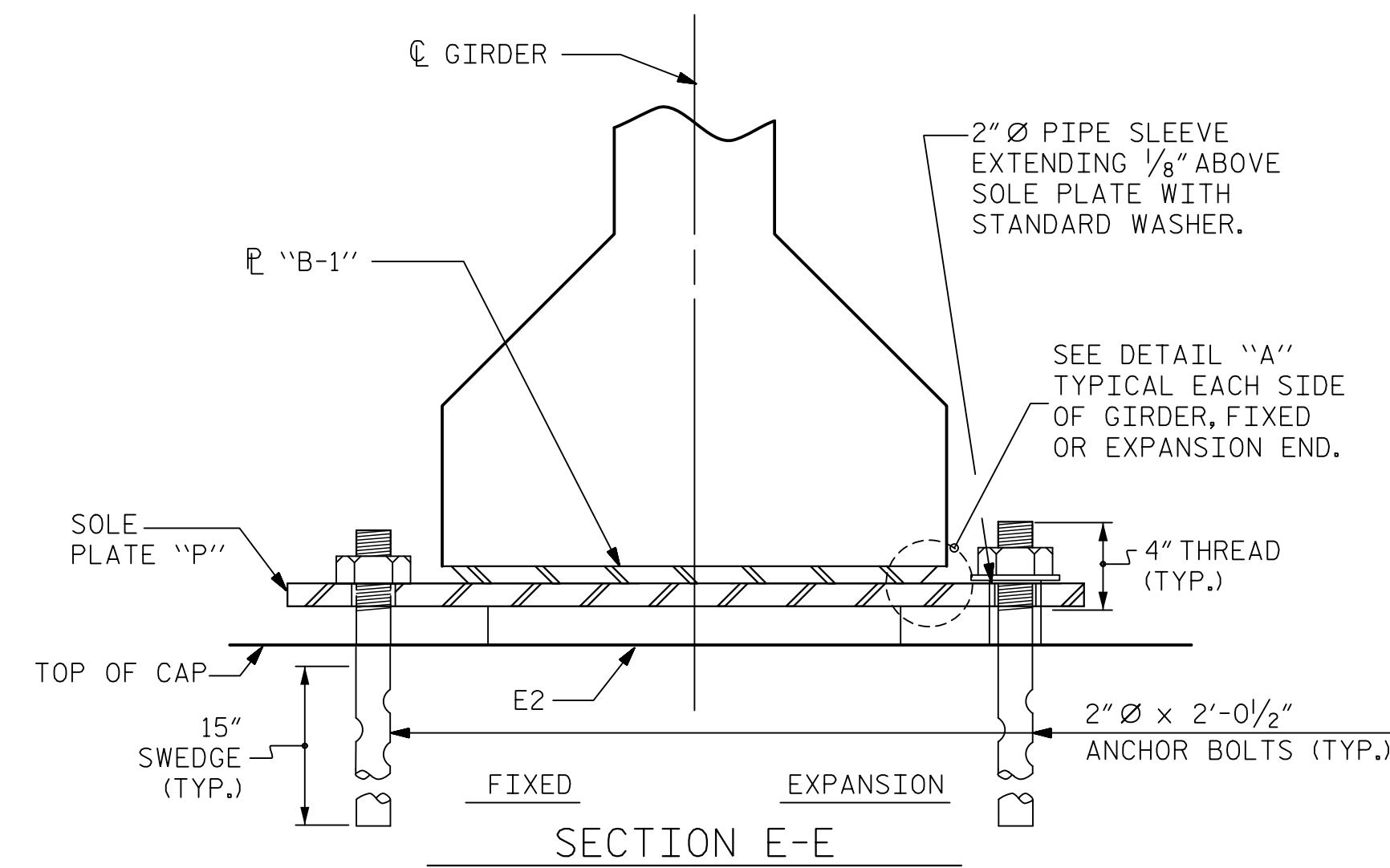
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
INTERMEDIATE
STEEL DIAPHRAGMS
FOR TYPE IV
PRESTRESSED CONCRETE
GIRDERS
LEFT LANE

| | |
|--------------------------|-----------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 7/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DRAWN BY : TLA 6/05 | REV. 5/1/06RRR KMM/GM |
| CHECKED BY : VC 6/05 | REV. 10/1/11 MAA/GM |
| | REV. 12/17 MAA/THC |

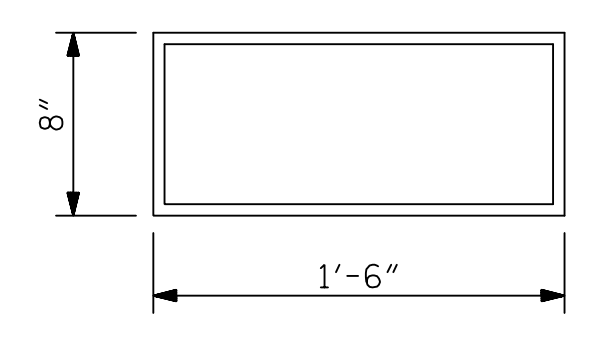
| | | | |
|--|-------------|--|--|
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| DRAWN BY : M. WRIGHT | DATE : 7/18 | DWG. NO. 14 | |
| CHECKED BY : N. HART | DATE : 7/18 | | |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 | | |

| REVISIONS | | | | | SHEET NO. |
|-----------|----|------|-----|------|--------------|
| NO. | BY | DATE | NO. | DATE | S7-14 |
| 1 | | | 3 | | TOTAL SHEETS |
| 2 | | | 4 | | 35 |

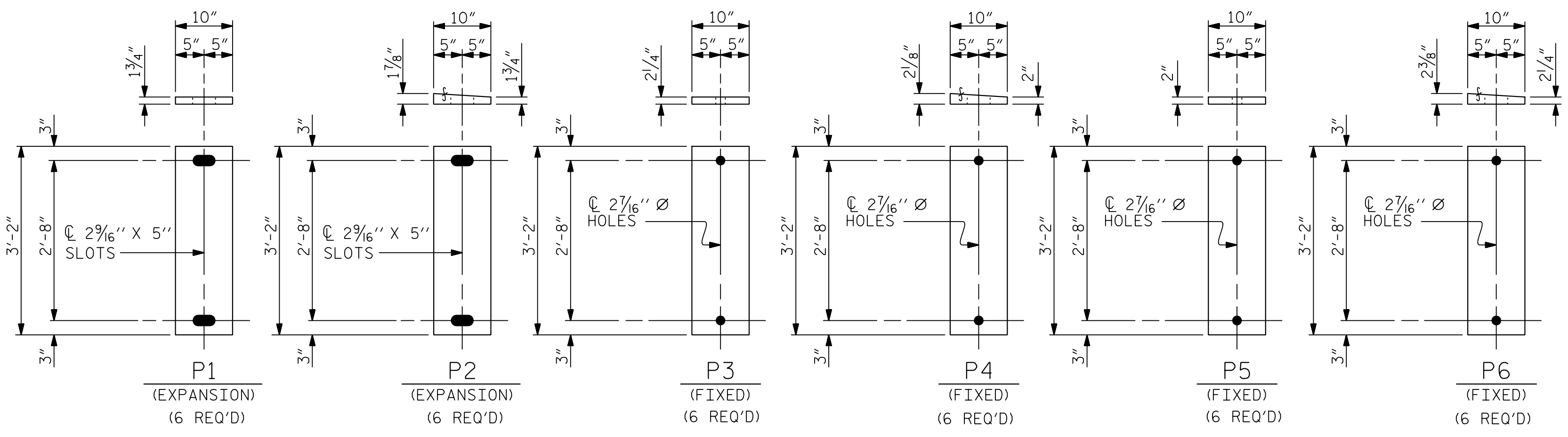
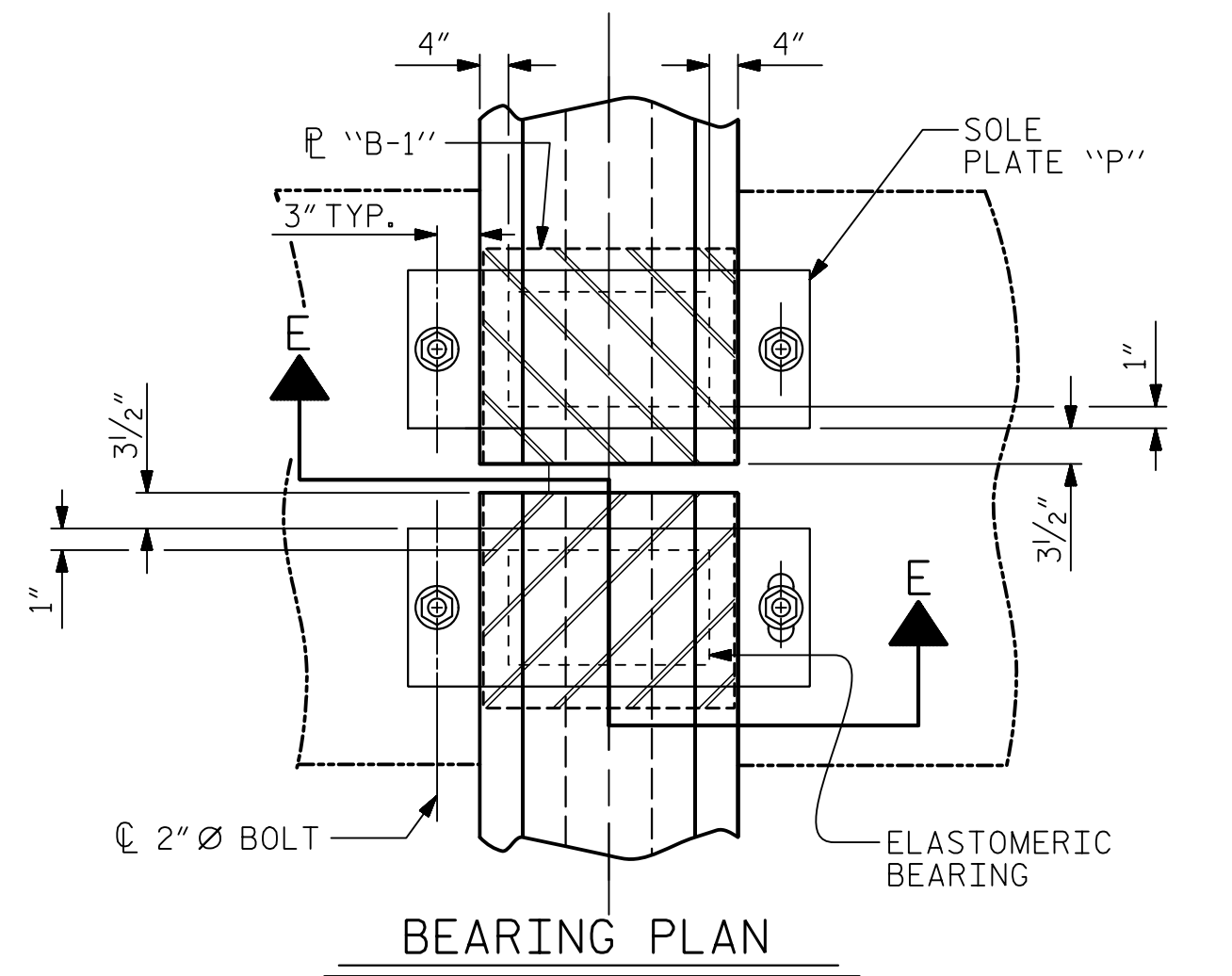
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TYPICAL SECTION OF ELASTOMERIC BEARINGS



E2 (36 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING
TYPE III



SOLE PLATE DETAILS ('P')

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 SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

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 'P', BOLTS, NUTS, WASHERS, AND PIPE SLEEVE 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. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

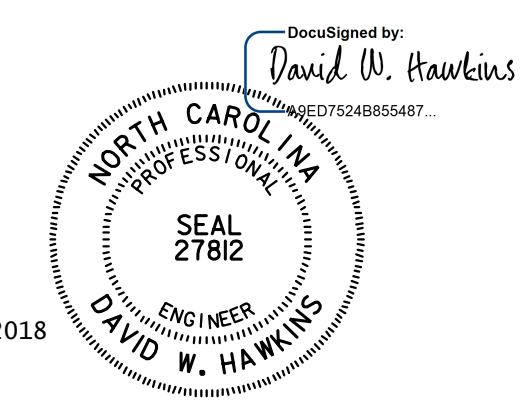
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

| | |
|---------------------------------|-------|
| MAXIMUM ALLOWABLE SERVICE LOADS | |
| D.L.+L.L. (NO IMPACT) | |
| TYPE III | 205 k |

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 ELASTOMERIC BEARING
 DETAILS
 PRESTRESSED CONCRETE GIRDER
 SUPERSTRUCTURE
 LEFT LANE

| | |
|--------------------------|--------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 7/18 |
| CHECKED BY : N. HART | DATE : 9/18 |
| DRAWN BY : WJH 8/89 | REV. 6/13 AAC/MAA |
| CHECKED BY : CRK 8/89 | REV. 1/15 MAA/TMG |
| | REV. 12/17 MAA/THC |

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| DRAWN BY : M. WRIGHT | DATE : 7/18 | DWG. NO. 15 | |
| CHECKED BY : N. HART | DATE : 9/18 | | |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 | | |

| REVISIONS | | | | SHEET NO. |
|-----------|----|------|---|--------------|
| NO. | BY | DATE | | S7-15 |
| 1 | | | 3 | TOTAL SHEETS |
| 2 | | | 4 | 35 |

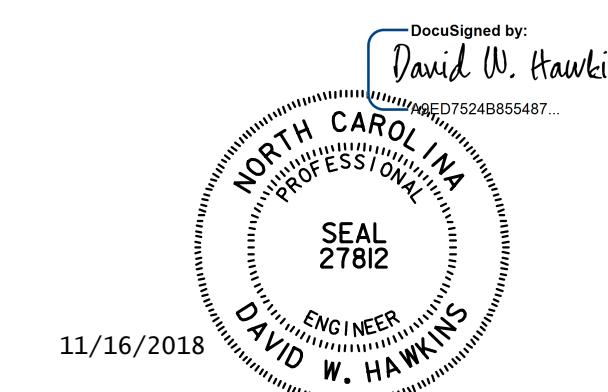
| DEAD LOAD DEFLECTION TABLE FOR SPAN A | | | | | | | | | | | |
|---------------------------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.6" Ø LOW RELAXATION STRANDS | GIRDERS 1 THRU 6 | | | | | | | | | | |
| TENTH POINTS | 0.00 | 0.10 | 0.20 | 0.30 | 0.40 | 0.50 | 0.60 | 0.70 | 0.80 | 0.90 | 1.00 |
| CAMBER (GIRDER ALONE IN PLACE) | ↑ 0.000 | 0.002 | 0.004 | 0.005 | 0.006 | 0.006 | 0.006 | 0.005 | 0.004 | 0.002 | 0.000 |
| DEFLECTION DUE TO SUPERIMPOSED D.L. | * ↓ 0.000 | 0.002 | 0.004 | 0.005 | 0.006 | 0.006 | 0.006 | 0.005 | 0.004 | 0.002 | 0.000 |
| FINAL CAMBER | ↑ 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| DEAD LOAD DEFLECTION TABLE FOR SPAN B | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.6" Ø LOW RELAXATION STRANDS | GIRDERS 1 THRU 6 | | | | | | | | | | | | | | | | | | | | |
| TENTH POINTS | 0.00 | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 | 0.90 | 0.95 | 1.00 |
| CAMBER (GIRDER ALONE IN PLACE) | ↑ 0.000 | 0.042 | 0.082 | 0.121 | 0.156 | 0.187 | 0.214 | 0.235 | 0.250 | 0.260 | 0.263 | 0.260 | 0.250 | 0.235 | 0.214 | 0.187 | 0.156 | 0.121 | 0.082 | 0.042 | 0.000 |
| DEFLECTION DUE TO SUPERIMPOSED D.L. | * ↓ 0.000 | 0.027 | 0.054 | 0.081 | 0.106 | 0.128 | 0.147 | 0.162 | 0.173 | 0.180 | 0.182 | 0.180 | 0.173 | 0.162 | 0.147 | 0.128 | 0.106 | 0.081 | 0.054 | 0.027 | 0.000 |
| FINAL CAMBER | ↑ 0 | 3/16 | 5/16 | 1/2 | 5/8 | 11/16 | 13/16 | 7/8 | 15/16 | 15/16 | 1 | 15/16 | 15/16 | 7/8 | 13/16 | 11/16 | 5/8 | 1/2 | 5/16 | 3/16 | 0 |

| DEAD LOAD DEFLECTION TABLE FOR SPAN C | | | | | | | | | | | |
|---------------------------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.6" Ø LOW RELAXATION STRANDS | GIRDERS 1 THRU 6 | | | | | | | | | | |
| TENTH POINTS | 0.00 | 0.10 | 0.20 | 0.30 | 0.40 | 0.50 | 0.60 | 0.70 | 0.80 | 0.90 | 1.00 |
| CAMBER (GIRDER ALONE IN PLACE) | ↑ 0.000 | 0.002 | 0.004 | 0.005 | 0.006 | 0.006 | 0.006 | 0.005 | 0.004 | 0.002 | 0.000 |
| DEFLECTION DUE TO SUPERIMPOSED D.L. | * ↓ 0.000 | 0.001 | 0.003 | 0.004 | 0.005 | 0.005 | 0.005 | 0.004 | 0.003 | 0.001 | 0.000 |
| FINAL CAMBER | ↑ 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-



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

HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: M. WRIGHT DATE: 9/18
 CHECKED BY: N. SALAS ZAMUDIO DATE: 9/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 16

**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

| REVISIONS | | | | | | SHEET NO. |
|-----------|----|------|-----|----|------|--------------|
| NO. | BY | DATE | NO. | BY | DATE | S7-16 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

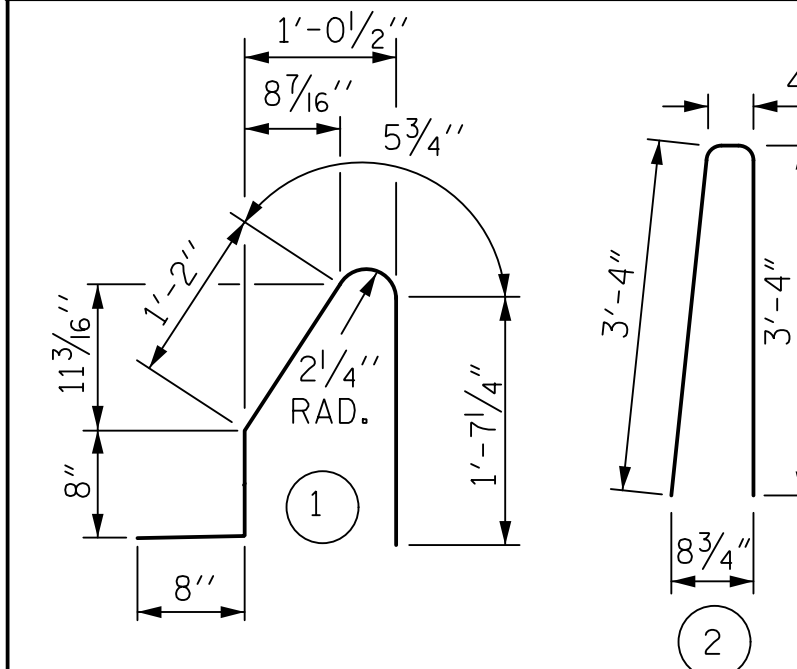
NOTES

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



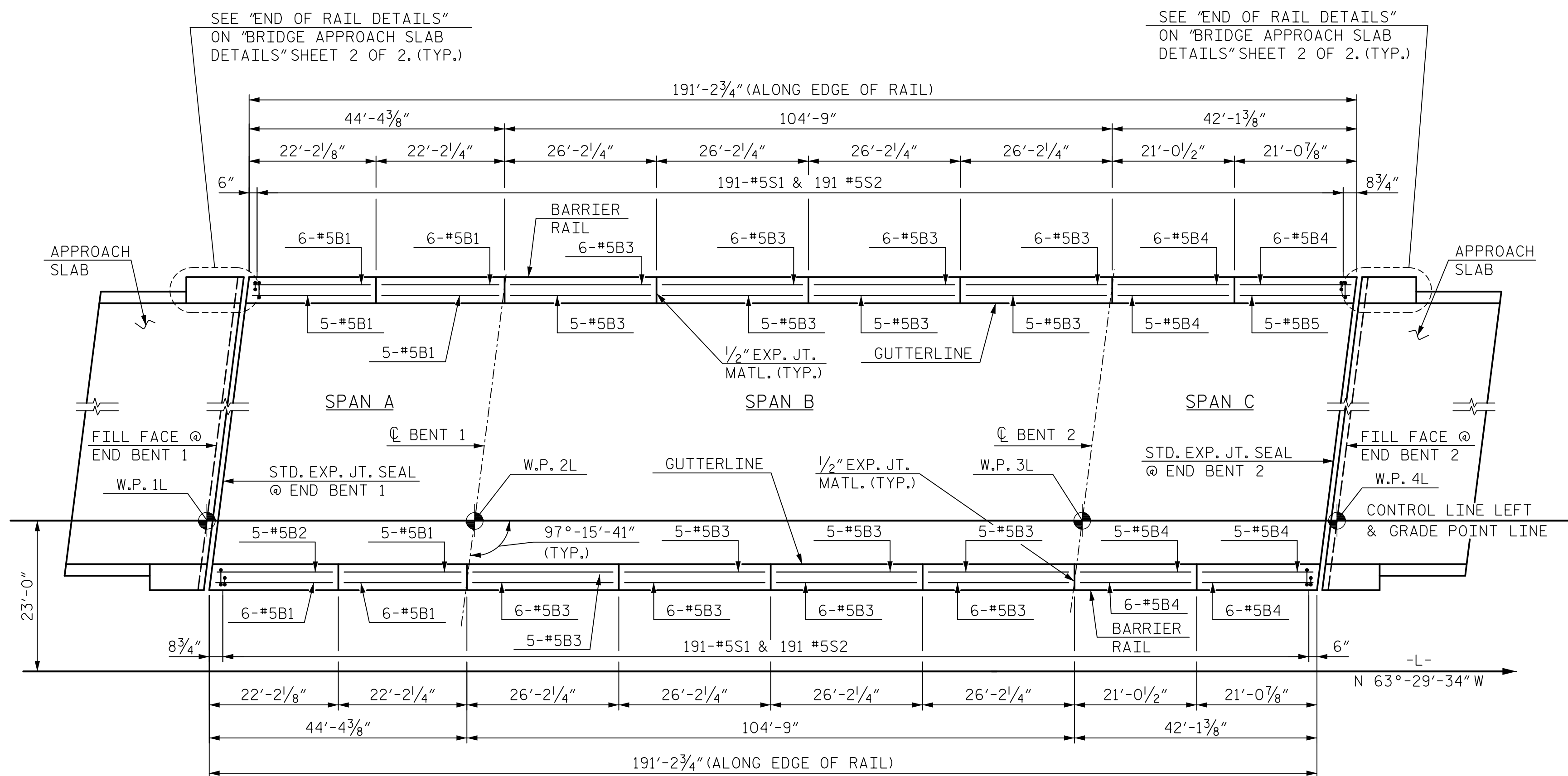
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

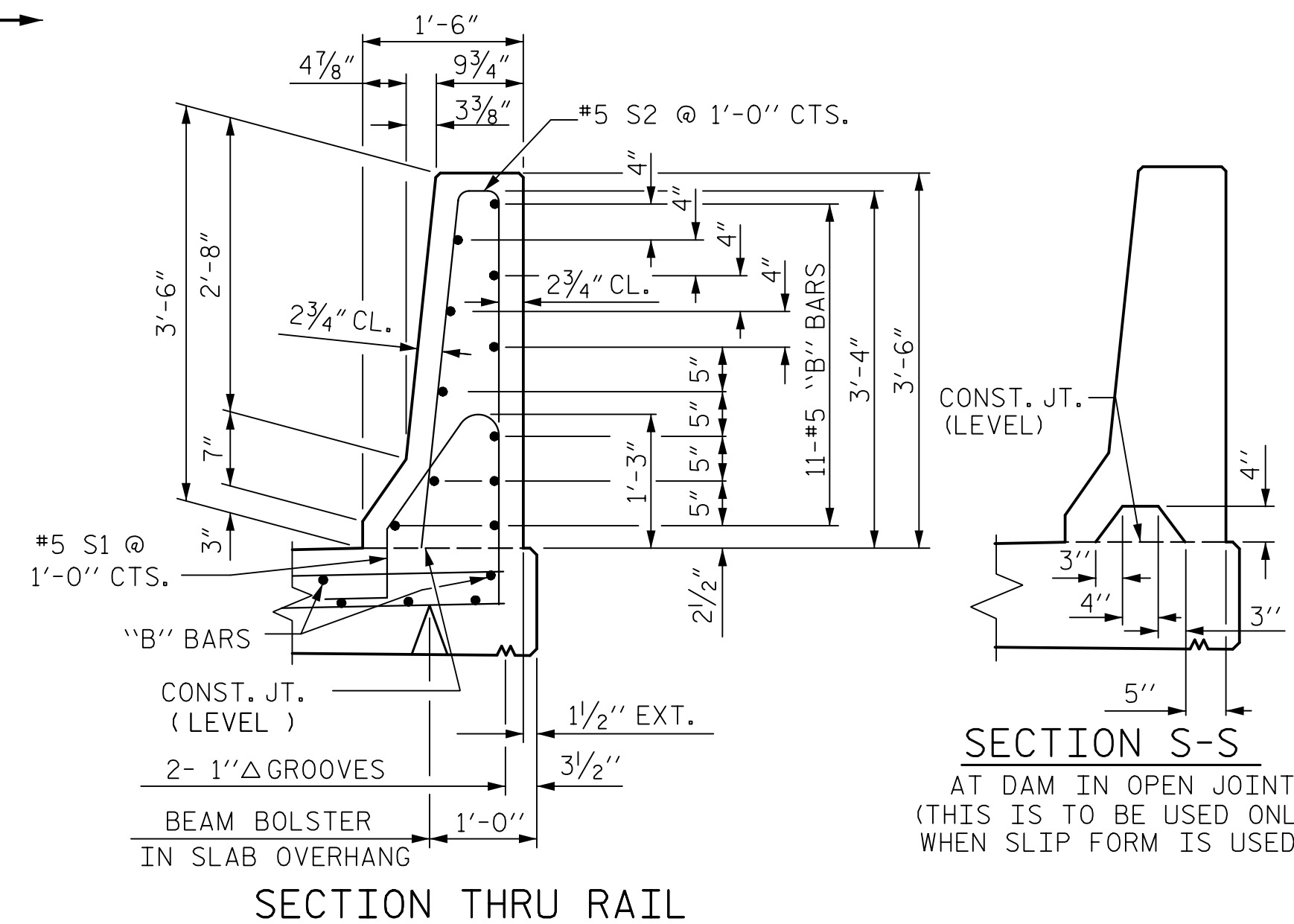
FOR CONCRETE BARRIER RAIL ONLY

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|------|-----|------|------|--------|--------|
| * B1 | 39 | #5 | STR | 21'-9" | 885 |
| * B2 | 5 | #5 | STR | 21'-8" | 113 |
| * B3 | 88 | #5 | STR | 25'-9" | 2,363 |
| * B4 | 39 | #5 | STR | 20'-8" | 841 |
| * B5 | 5 | #5 | STR | 20'-6" | 107 |
| * S1 | 382 | #5 | 1 | 4'-7" | 1,826 |
| * S2 | 382 | #5 | 2 | 7'-0" | 2,789 |

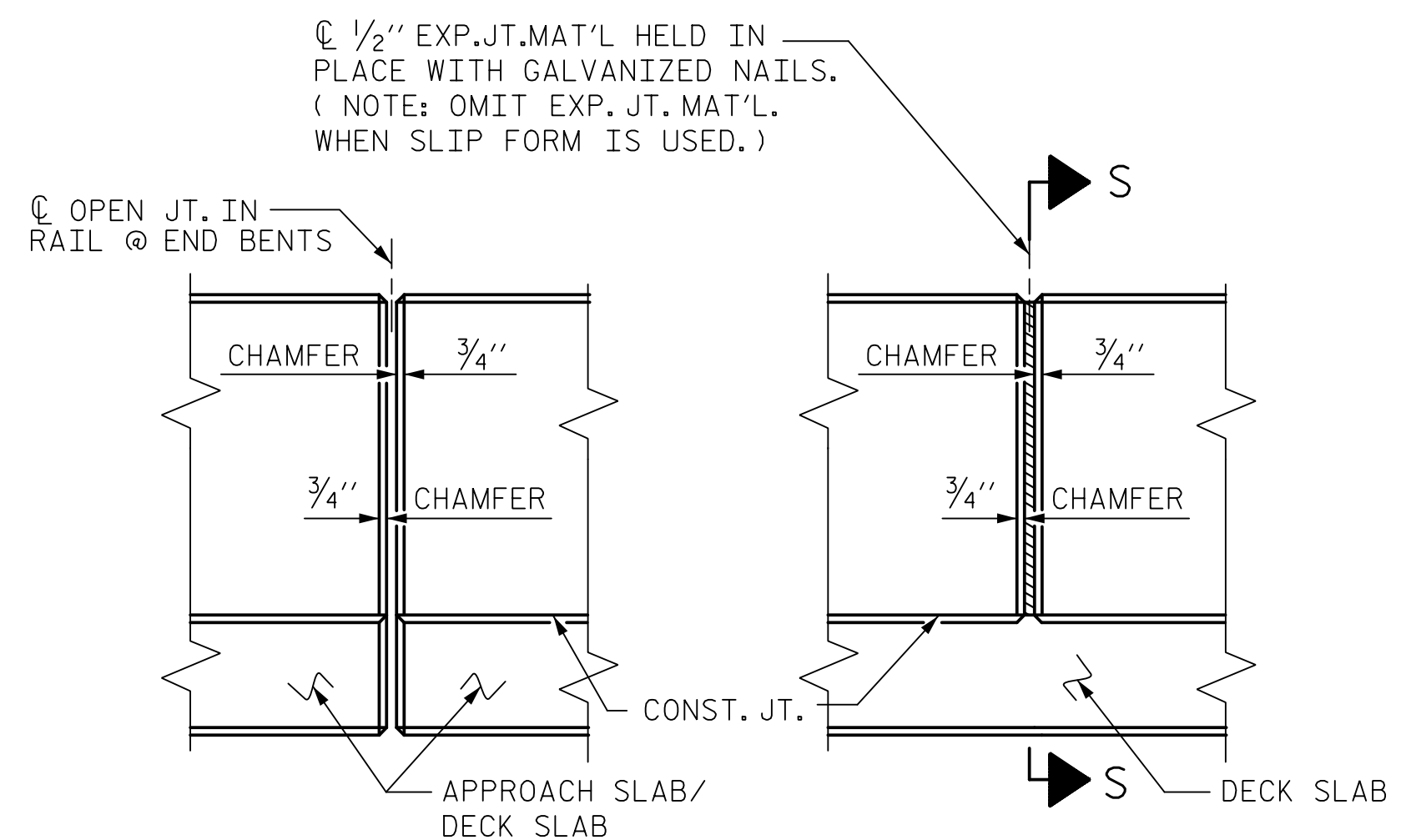
| | | |
|----------------------------------|----------|-------|
| * EPOXY COATED REINFORCING STEEL | LBS. | 8,924 |
| CLASS AA CONCRETE | CU. YDS. | 52.0 |
| CONCRETE BARRIER RAIL | LIN. FT. | 382.4 |



PLAN OF BARRIER RAIL
NOTE: EDGE SLAB NOT SHOWN FOR CLARITY.

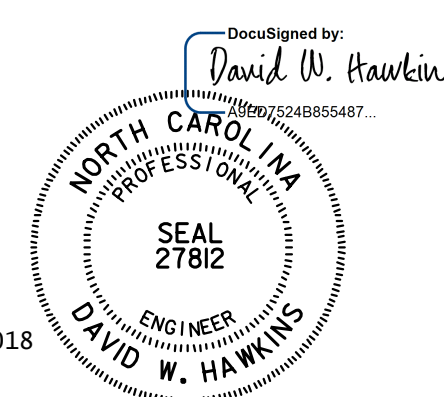


SECTION THRU RAIL



ELEVATION AT EXPANSION JOINTS
BARRIER RAIL DETAILS

PROJECT NO. R-1015
 CRAVEN COUNTY
STATION: 227+57.02 -L-



| | |
|--------------------------|--------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 6/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DRAWN BY : ARB 5/87 | REV. 7/12 MAA/GM |
| CHECKED BY : SJD 9/87 | REV. 6/13 MAA/GM |
| | REV. 12/17 MAA/THC |

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| | |
|--|--|
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| DRAWN BY : M. WRIGHT | DATE : 6/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 |

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

STD. NO. CBRI

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD-DOWN PLATE AND 4 - 7/8" 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 7/8" 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.)

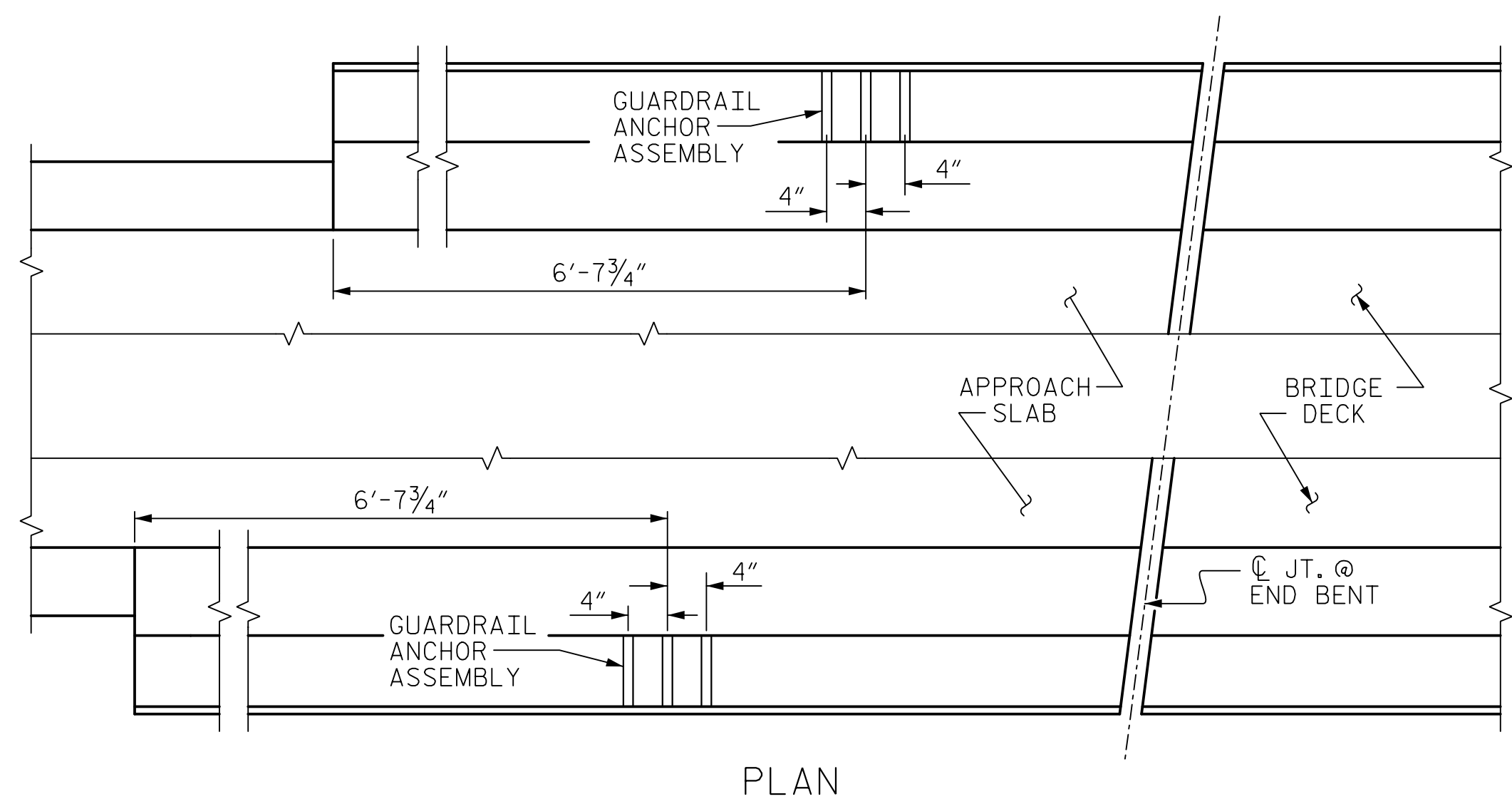
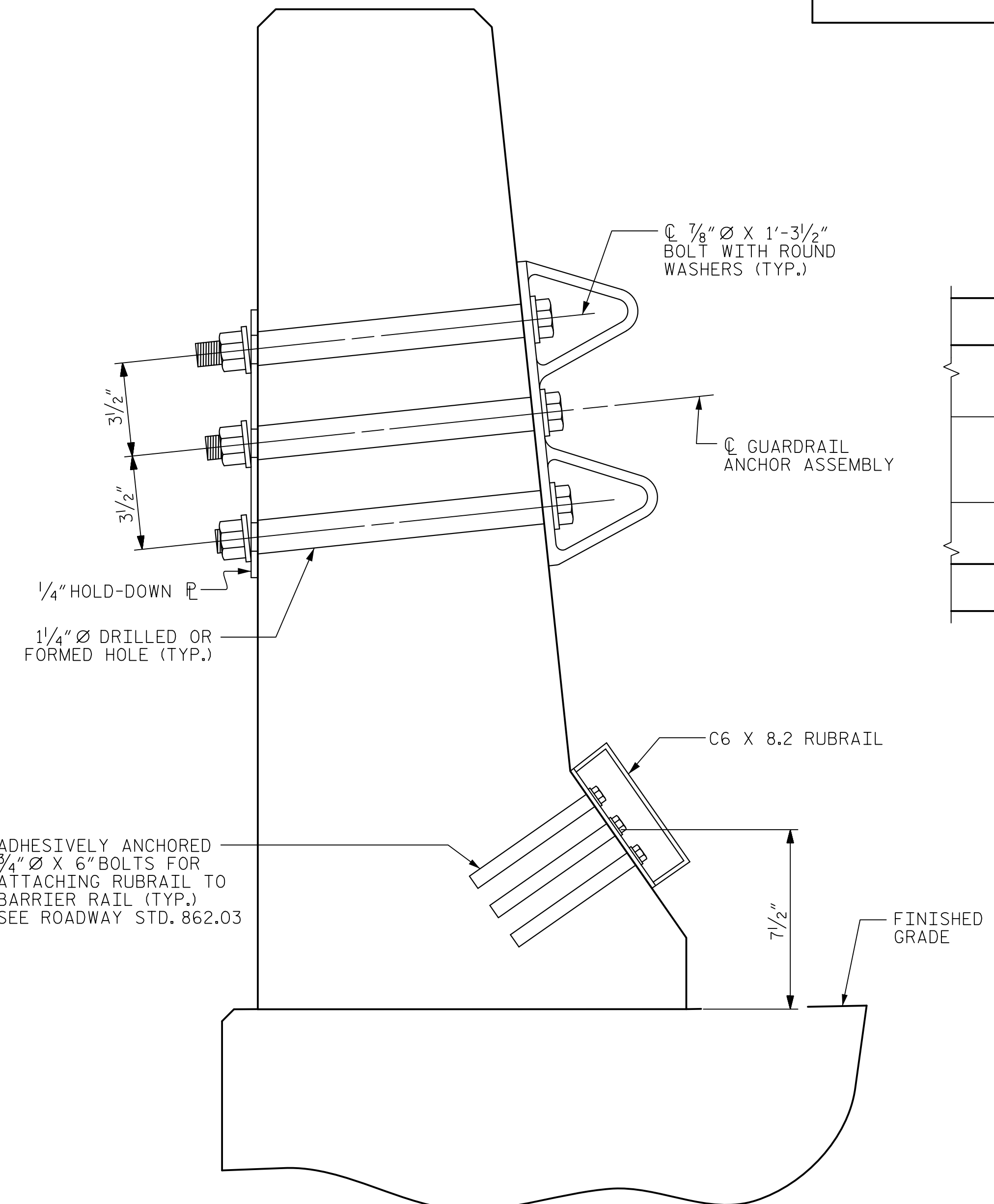
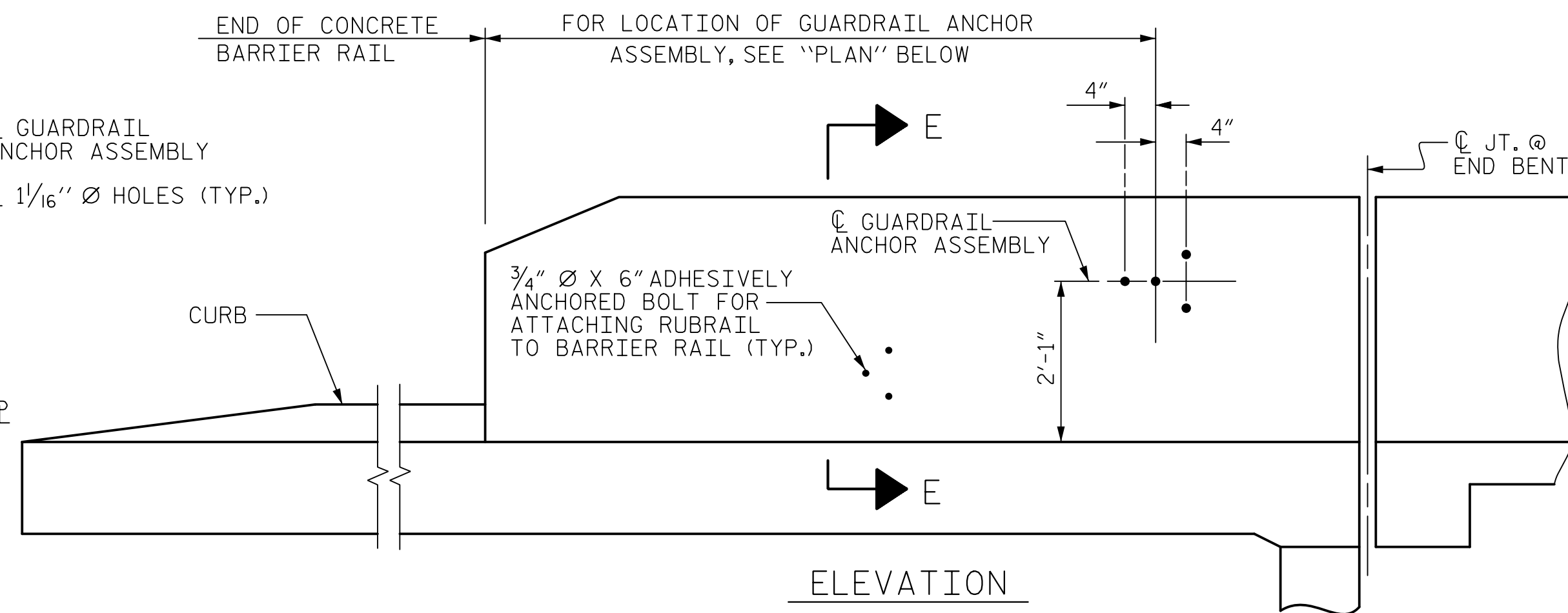
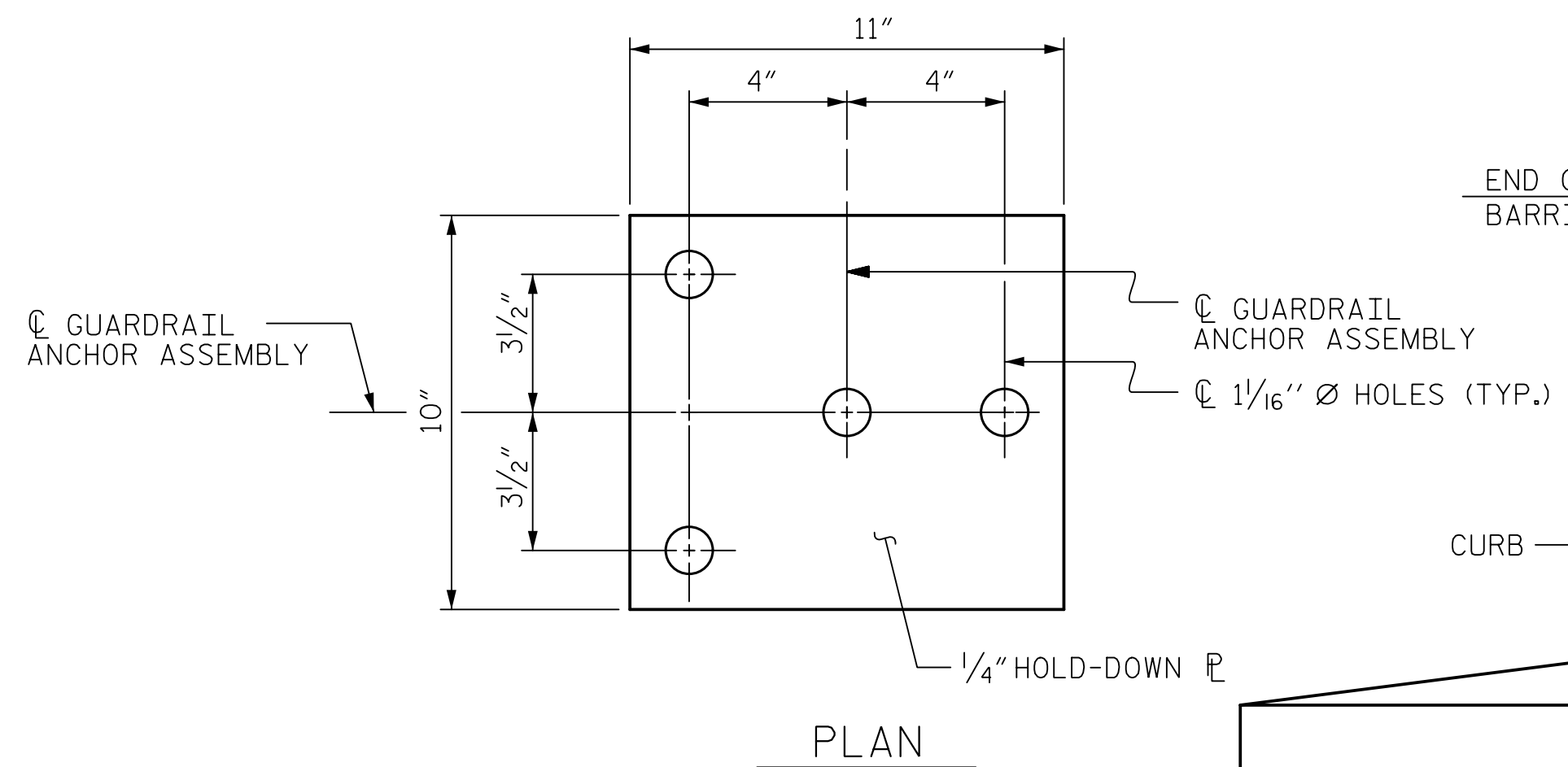
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

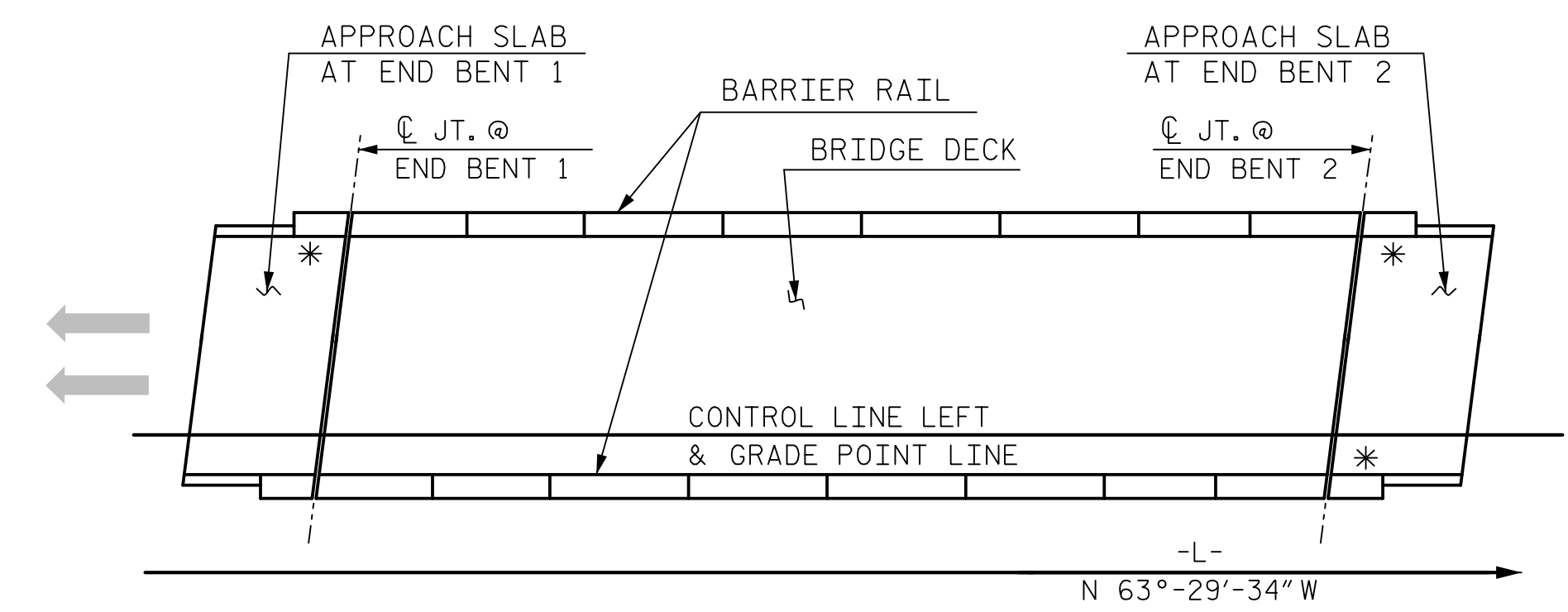
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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.



LOCATION OF ANCHORS FOR GUARDRAIL

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

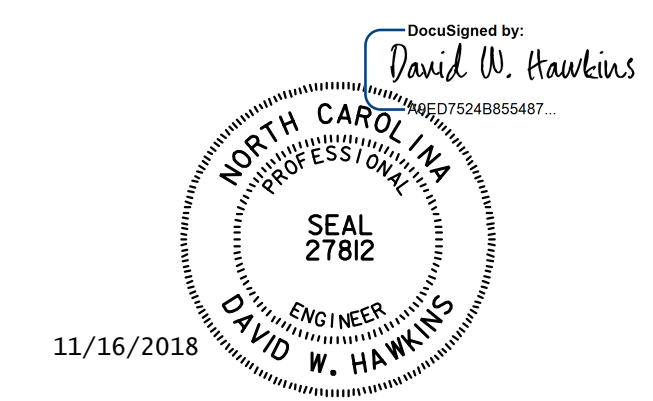


SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

SECTION E-E GUARDRAIL ANCHOR ASSEMBLY DETAILS

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-



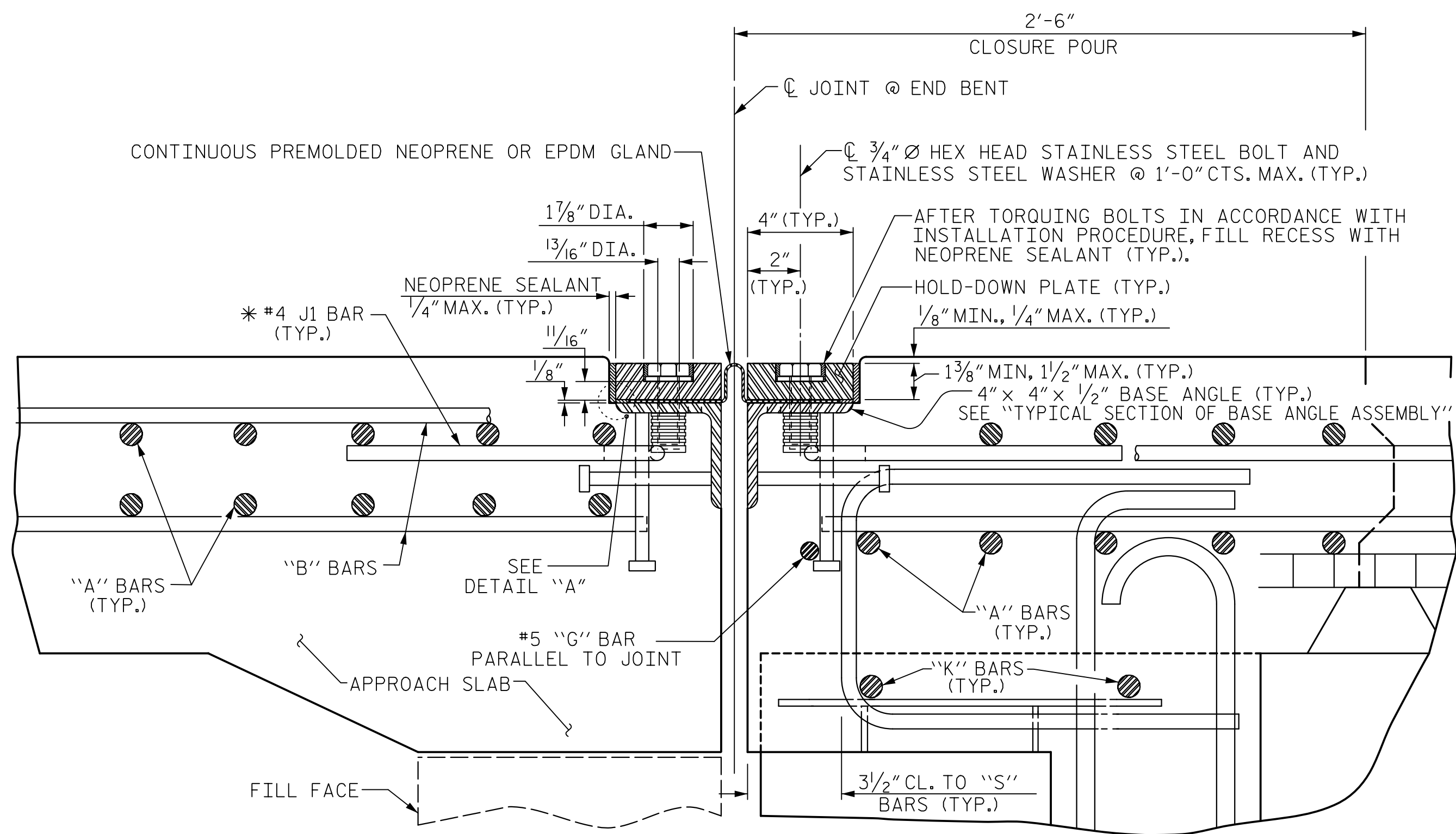
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 GUARDRAIL ANCHORAGE
 FOR BARRIER RAIL
 LEFT LANE

| | |
|--------------------------|--------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 6/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DRAWN BY : TLA 5/06 | REV. 7/12 MAA/GM |
| CHECKED BY : CM 5/06 | REV. 6/13 MAA/GM |
| | REV. 12/17 MAA/THC |

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| HNTB | | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | |
| DRAWN BY : M. WRIGHT | DATE : 6/18 | DWG. NO. 18 | |
| CHECKED BY : N. HART | DATE : 7/18 | | |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 | | |

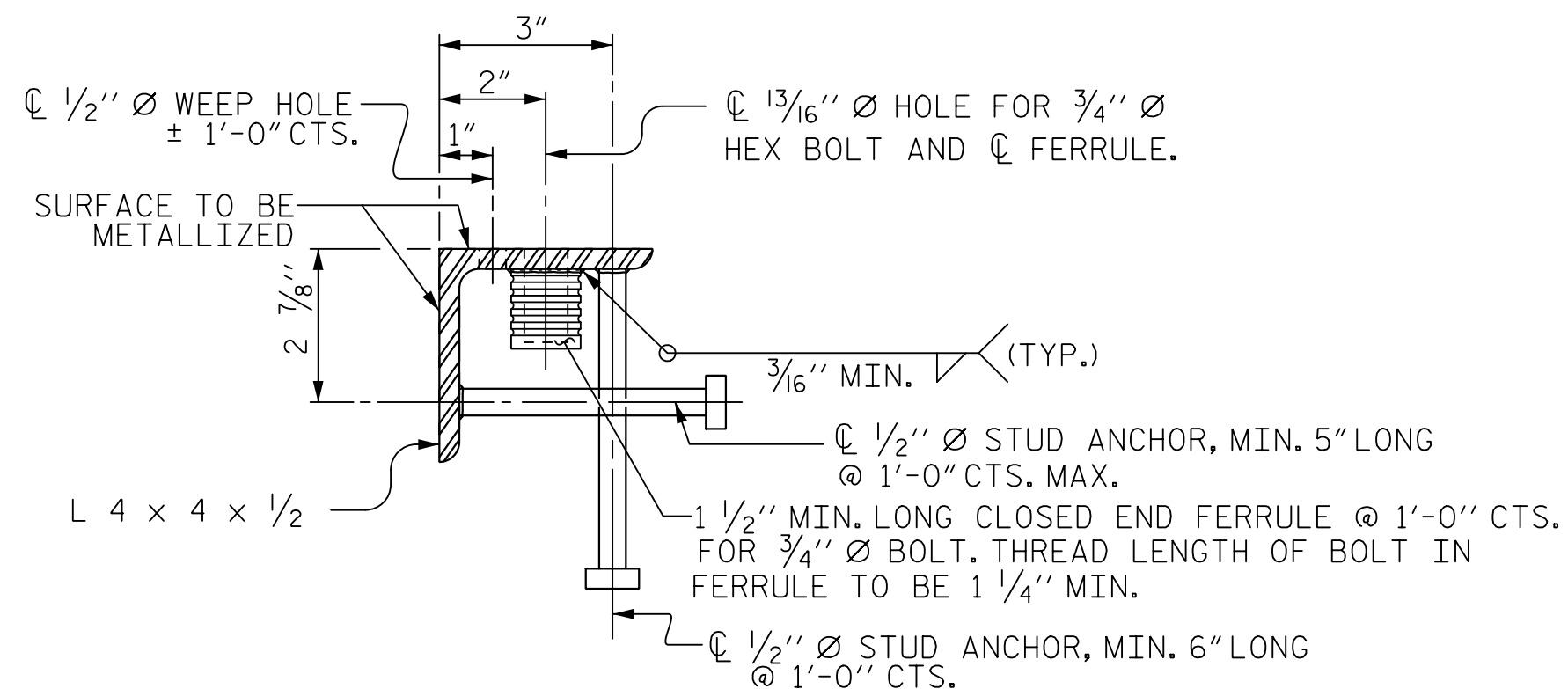
| REVISIONS | | | | | SHEET NO. S7-18 |
|-----------|----|------|-----|------|--------------------|
| NO. | BY | DATE | NO. | DATE | |
| 1 | | | 3 | | TOTAL SHEETS 35 |
| 2 | | | 4 | | |



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



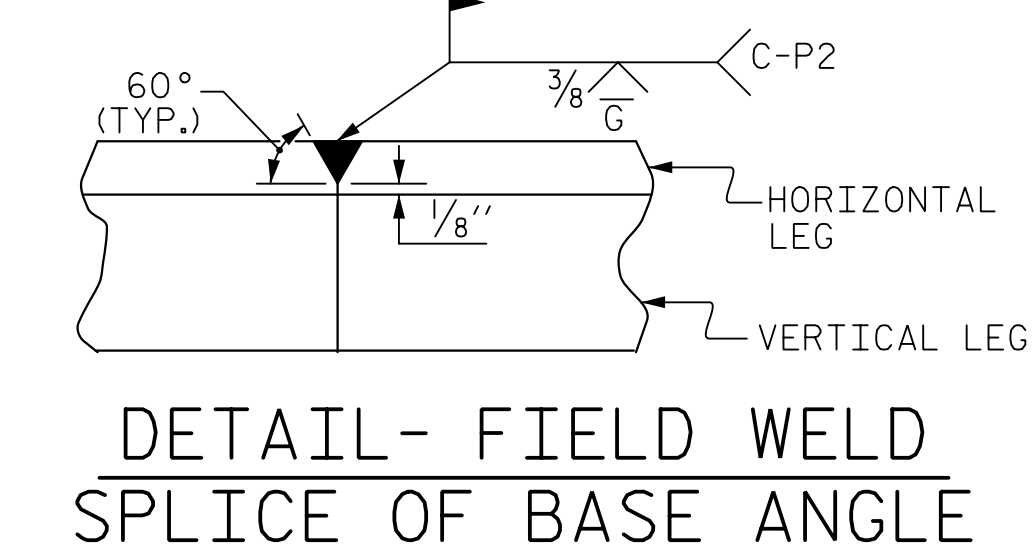
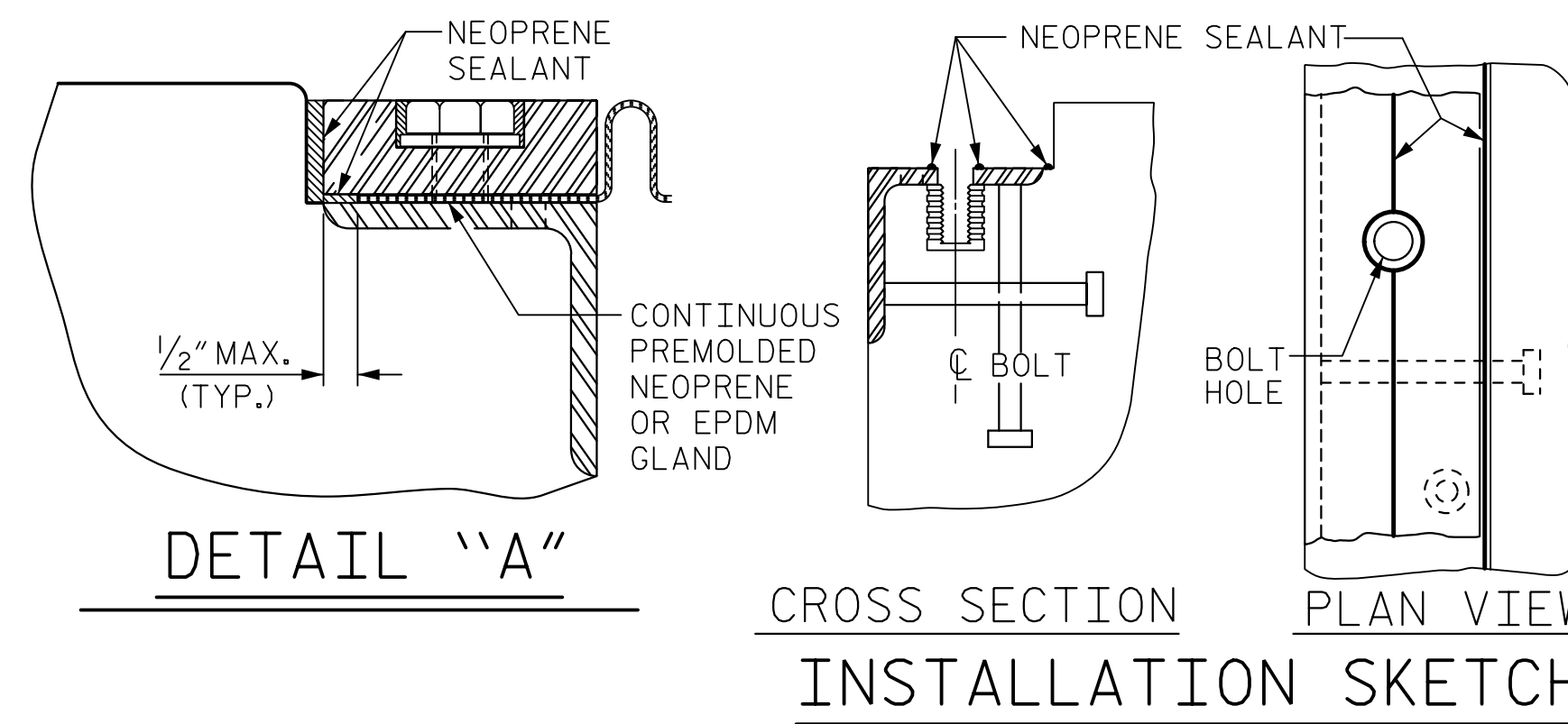
TYPICAL SECTION OF BASE ANGLE ASSEMBLY

INSTALLATION PROCEDURE

1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4/8" TO 4 1/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X 1/2" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 7/8" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

GENERAL NOTES

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
7. THE COVER PLATES SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE 1/2" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE 3/4" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.



| MOVEMENT AND SETTING AT JOINT | | | | | |
|-------------------------------|-------------|-------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| BENT NO. | SKEW ANGLE | TOTAL MOVEMENT (ALONG C RDWY) | PERPENDICULAR JOINT OPENING AT 45° F | PERPENDICULAR JOINT OPENING AT 60° F | PERPENDICULAR JOINT OPENING AT 90° F |
| E.B. 1 | 97°-15'-41" | 1 3/16" | 1 5/8" | 1 1/2" | 1 3/16" |
| E.B. 2 | 97°-15'-41" | 3/4" | 1 5/8" | 1 1/2" | 1 1/4" |

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-

DocuSigned by:
 David W. Hawkins
 NORTH CAROLINA PROFESSIONAL SEAL 27812
 ENGINEER
 D. W. HAWKINS
 11/16/2018

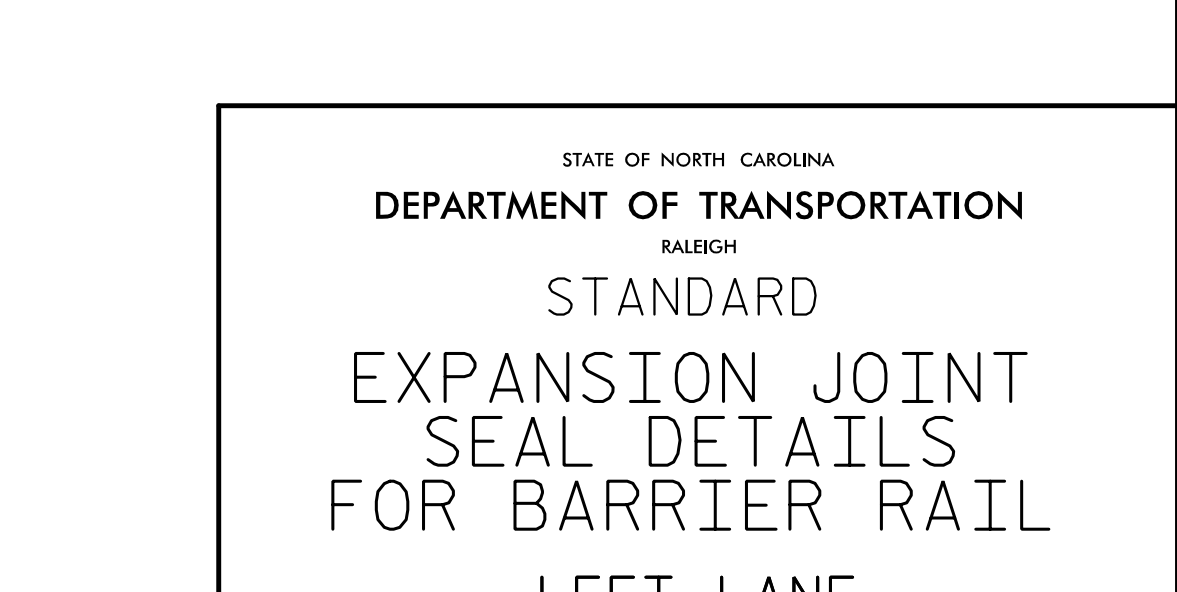
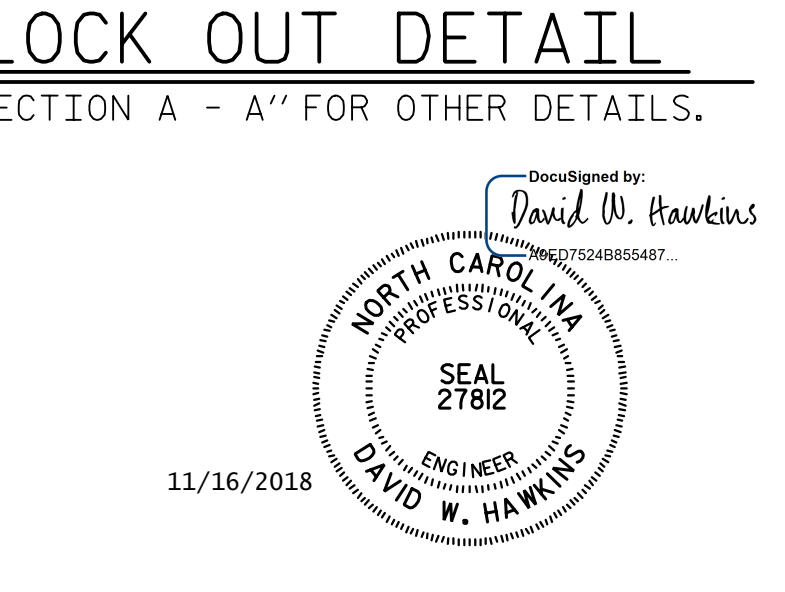
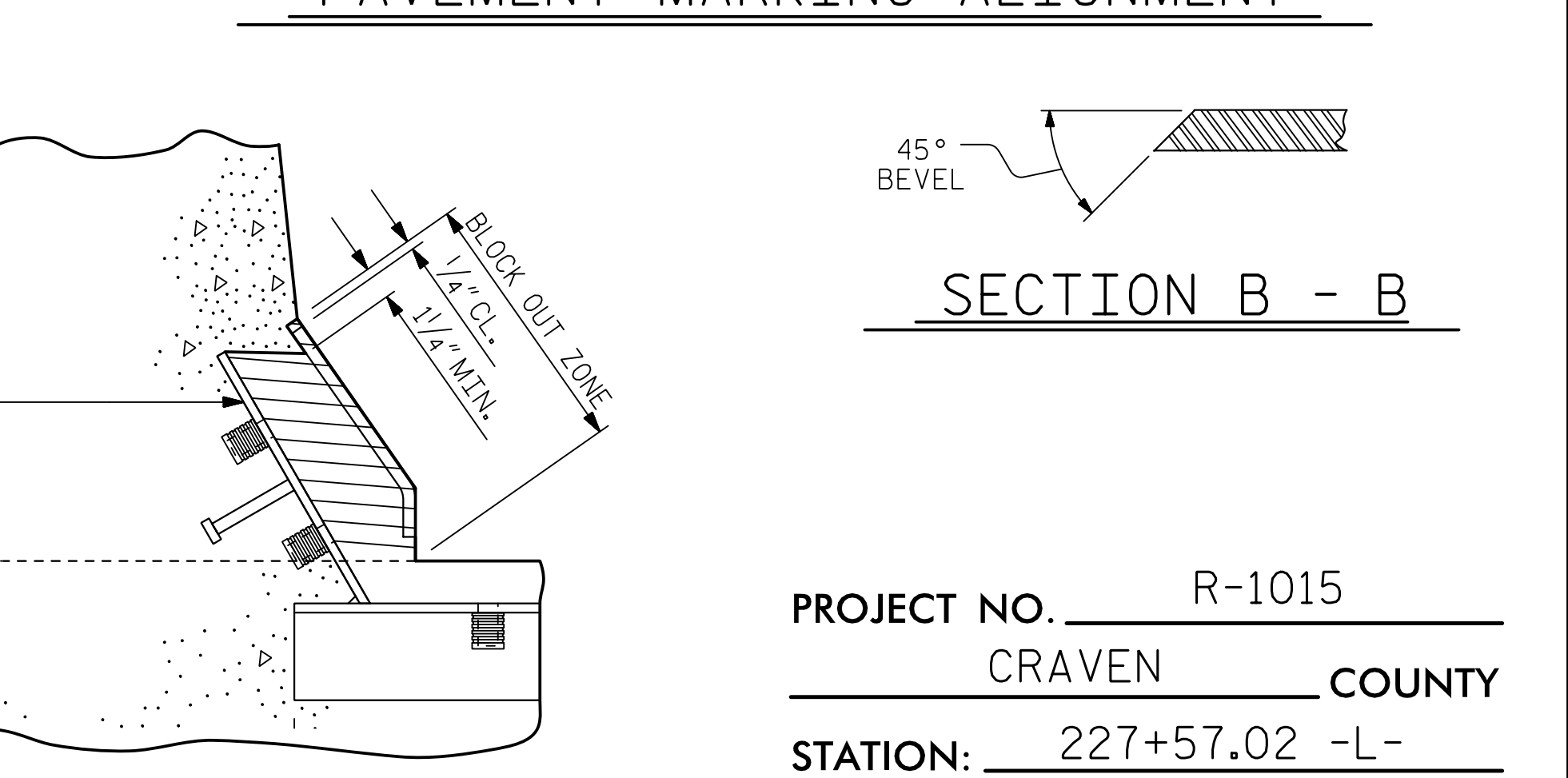
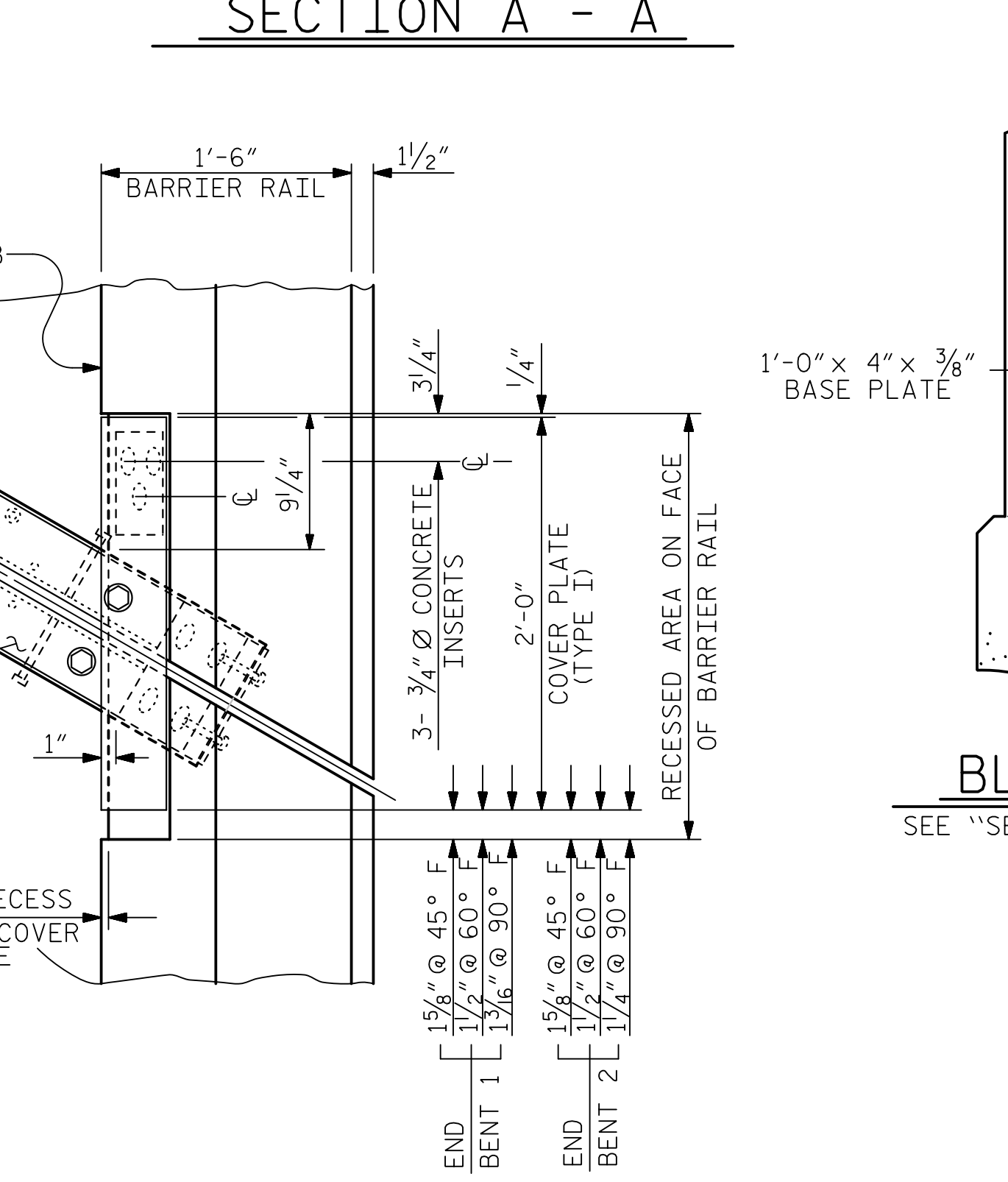
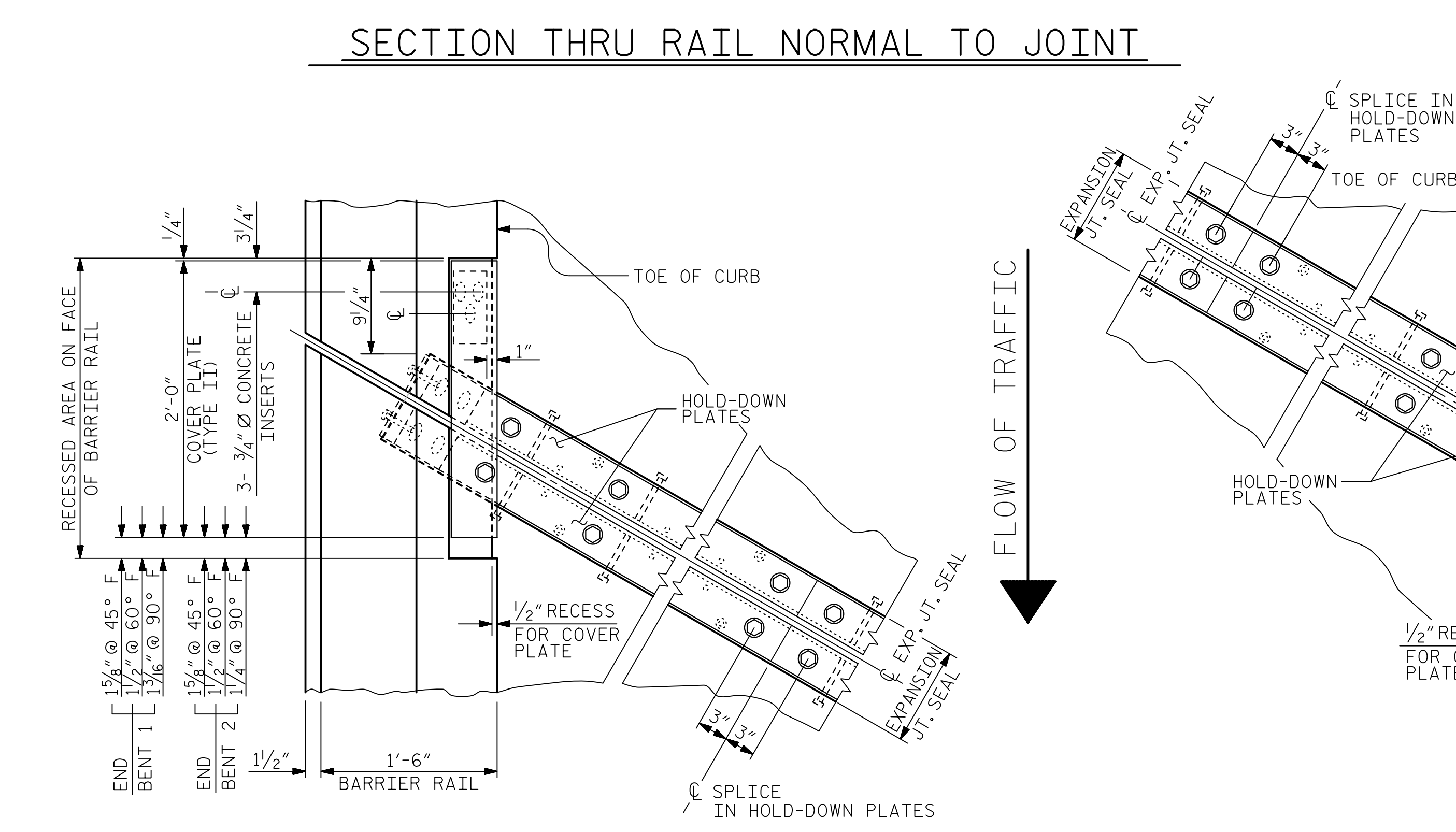
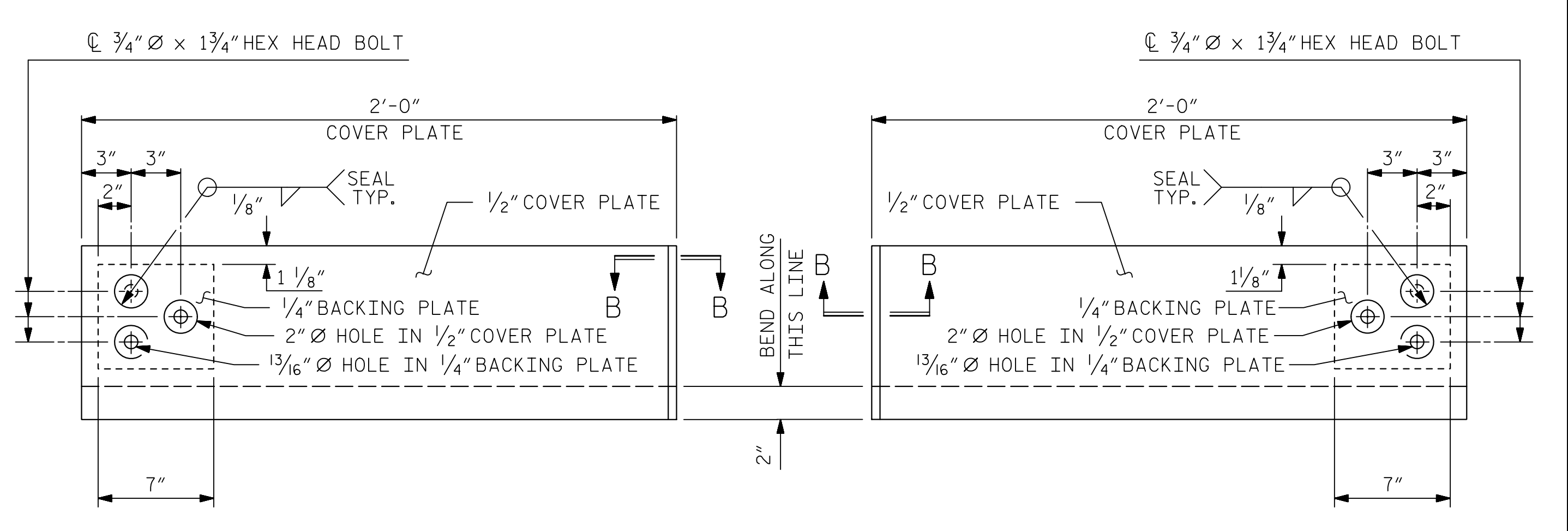
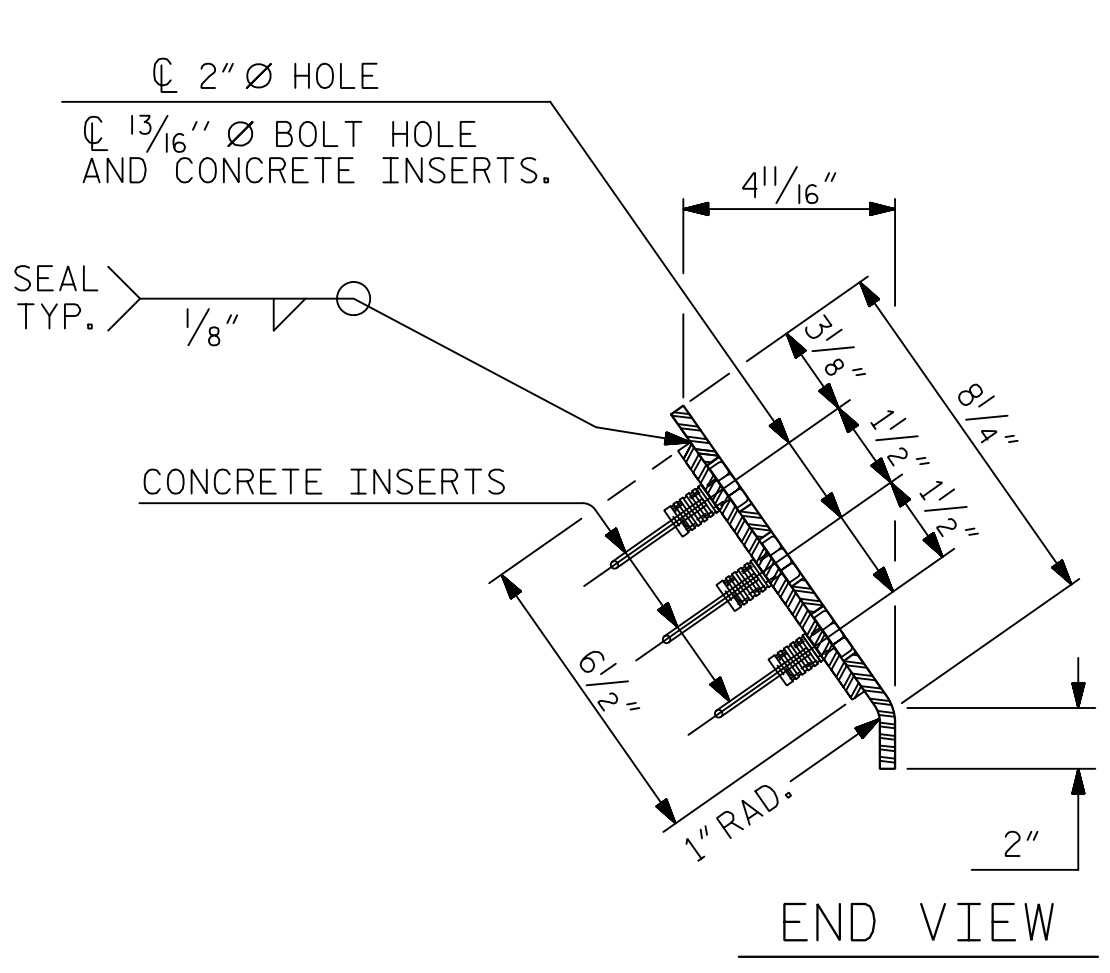
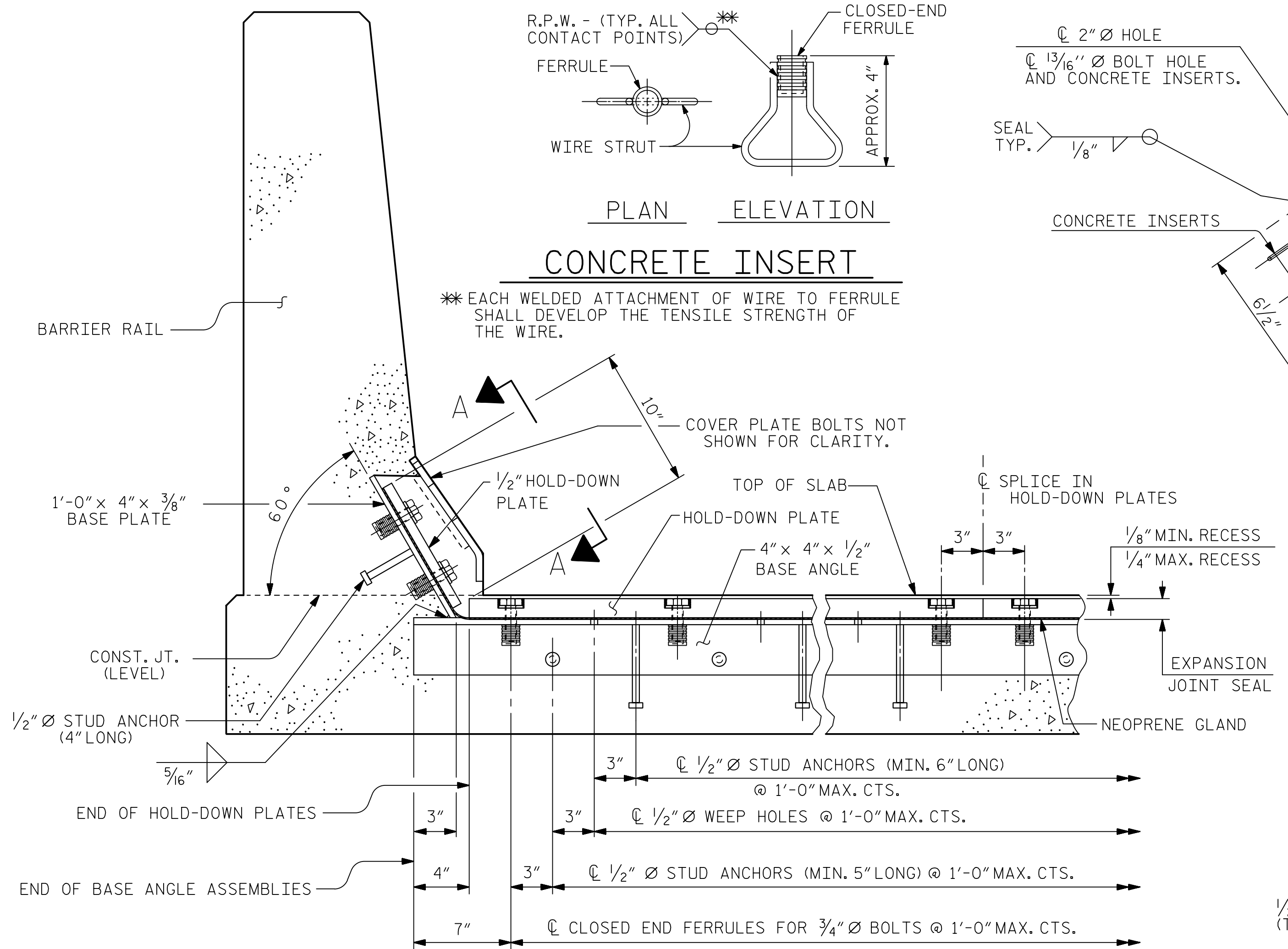
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 EXPANSION JOINT
 SEAL DETAILS
 LEFT LANE

ASSEMBLED BY : M. WRIGHT DATE : 6/18
 CHECKED BY : N. HART DATE : 7/18
 DRAWN BY : REK 9/87 MAA/GM
 CHECKED BY : CRK 10/87 REV. 10/17 MAA/THC
 REV. 6/18 MAA/THC

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 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
 DRAWN BY : M. WRIGHT DATE : 6/18
 CHECKED BY : N. HART DATE : 7/18
 DESIGN ENGINEER OF RECORD : D. HAWKINS DATE : 9/18
 DWG. NO. 19

| REVISIONS | | | | | | SHEET NO. S7-19 |
|-----------|----|------|-----|----|------|--------------------|
| NO. | BY | DATE | NO. | BY | DATE | |
| 1 | | | 3 | | | TOTAL SHEETS 35 |
| 2 | | | 4 | | | |



PLAN OF EXPANSION JOINT SEAL

| | |
|--------------------------|--------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 6/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DRAWN BY : REK 9/87 | REV. 7/12 MAA/GM |
| CHECKED BY : CRK 10/87 | REV. 6/13 MAA/GM |
| | REV. 12/17 MAA/THC |

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 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

Drawn by: M. WRIGHT DATE: 6/18
 Checked by: N. HART DATE: 7/18
 Design Engineer of Record: D. HAWKINS DATE: 9/18

11/16/2018

Seal: David W. Hawkins, Engineer, No. 27812

DWG. NO. 20

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 EXPANSION JOINT
 SEAL DETAILS
 FOR BARRIER RAIL
 LEFT LANE

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

SHEET NO. S7-20
 TOTAL SHEETS 35

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 UNLESS ALL SIGNATURES COMPLETED**

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" | | | |

BILL OF MATERIAL

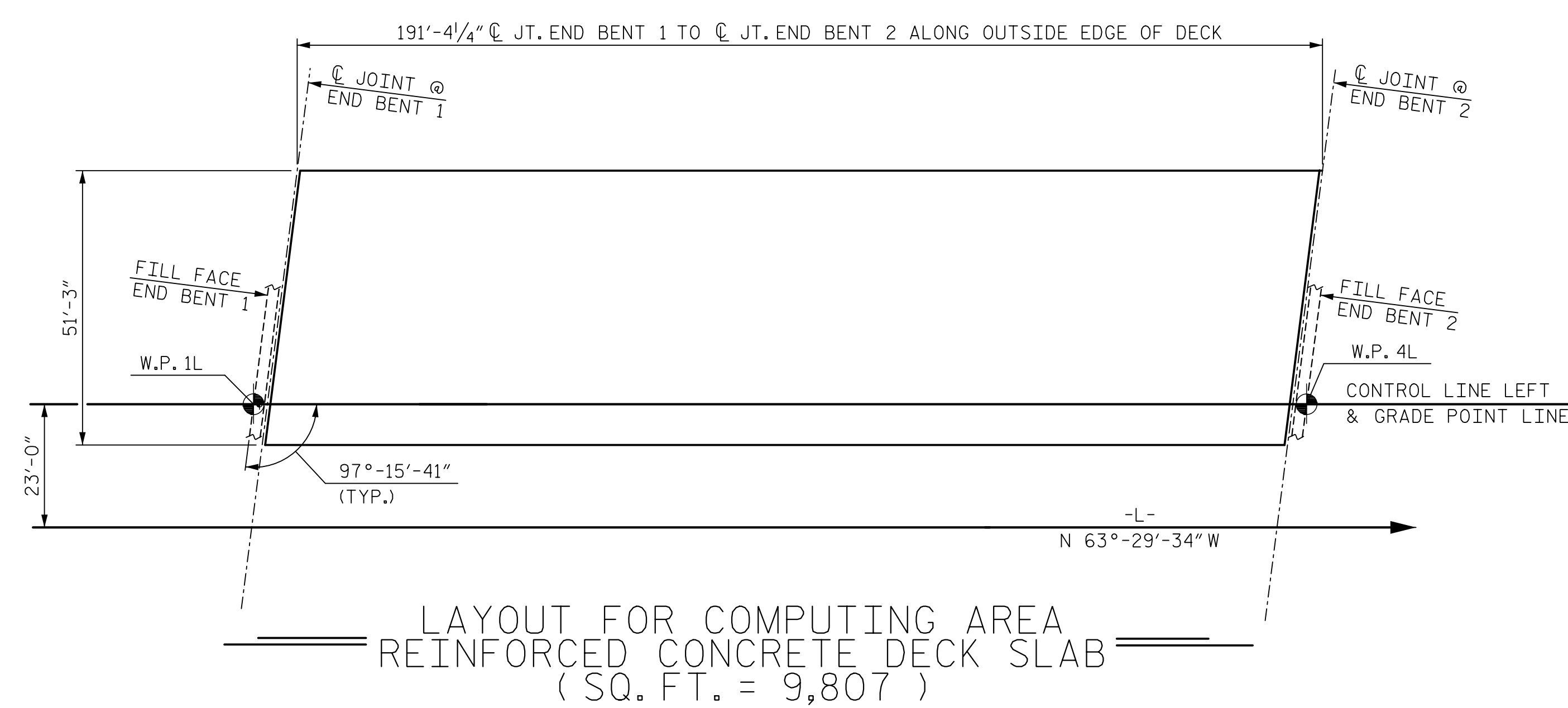
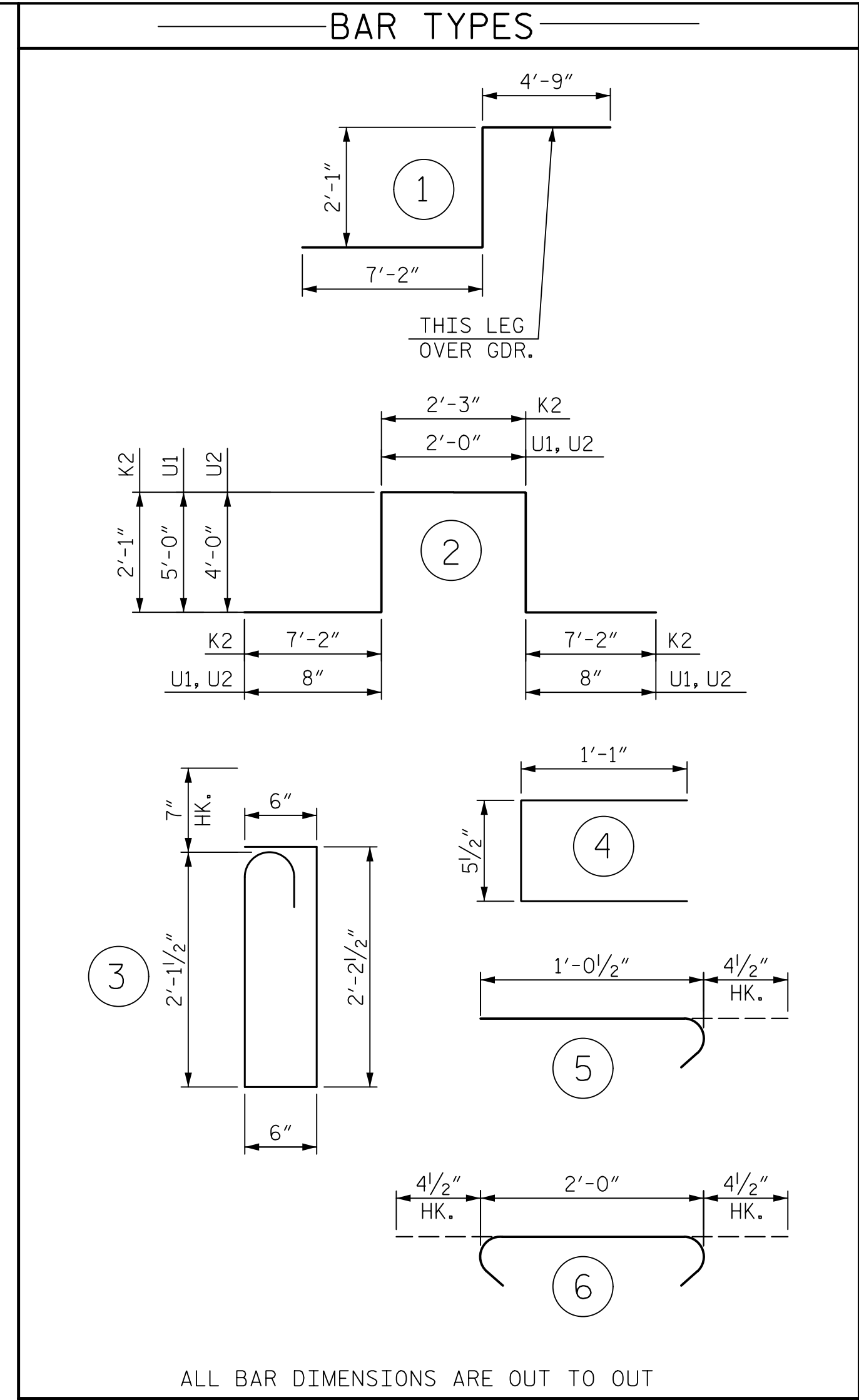
EPOXY COATED REINFORCING STEEL

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT (LBS.) |
|--|-----|------|------|---------|---------------|
| A1 | 2 | 6 | STR | 5'-1" | 15 |
| A2 | 2 | 6 | STR | 9'-0" | 27 |
| A3 | 2 | 6 | STR | 12'-11" | 39 |
| A4 | 2 | 6 | STR | 16'-10" | 51 |
| A5 | 2 | 6 | STR | 20'-10" | 63 |
| A6 | 2 | 6 | STR | 24'-9" | 74 |
| A7 | 2 | 6 | STR | 28'-8" | 86 |
| A8 | 2 | 6 | STR | 32'-7" | 98 |
| A9 | 2 | 6 | STR | 36'-7" | 110 |
| A10 | 2 | 6 | STR | 40'-5" | 121 |
| A11 | 2 | 6 | STR | 44'-4" | 133 |
| A12 | 2 | 6 | STR | 48'-3" | 145 |
| A13 | 369 | 6 | STR | 50'-11" | 28,220 |
| B1 | 72 | 6 | STR | 41'-11" | 4,533 |
| B2 | 72 | 4 | STR | 18'-11" | 910 |
| B3 | 72 | 6 | STR | 40'-9" | 4,407 |
| B4 | 66 | 7 | STR | 50'-0" | 6,745 |
| B5 | 66 | 7 | STR | 38'-6" | 5,194 |
| G1 | 2 | 5 | STR | 51'-3" | 107 |
| J1 | 98 | 4 | 5 | 1'-5" | 93 |
| K1 | 8 | 8 | 1 | 14'-0" | 299 |
| K2 | 16 | 8 | 2 | 20'-9" | 886 |
| S1 | 70 | 5 | 3 | 5'-11" | 432 |
| S2 | 70 | 4 | 4 | 2'-8" | 125 |
| U1 | 50 | 4 | 2 | 13'-4" | 445 |
| U2 | 20 | 4 | 2 | 11'-4" | 151 |
| EPOXY COATED REINFORCING STEEL TOTAL: | | | | | 53,509 |

BILL OF MATERIAL

REINFORCING STEEL

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT (LBS.) |
|---------------------------------|-----|------|------|---------|---------------|
| A101 | 2 | 6 | STR | 5'-1" | 15 |
| A102 | 2 | 6 | STR | 9'-0" | 27 |
| A103 | 2 | 6 | STR | 12'-11" | 39 |
| A104 | 2 | 6 | STR | 16'-10" | 51 |
| A105 | 2 | 6 | STR | 20'-10" | 63 |
| A106 | 2 | 6 | STR | 24'-9" | 74 |
| A107 | 2 | 6 | STR | 28'-8" | 86 |
| A108 | 2 | 6 | STR | 32'-7" | 98 |
| A109 | 2 | 6 | STR | 36'-7" | 110 |
| A110 | 2 | 6 | STR | 40'-5" | 121 |
| A111 | 2 | 6 | STR | 44'-4" | 133 |
| A112 | 2 | 6 | STR | 48'-3" | 145 |
| A113 | 369 | 6 | STR | 50'-11" | 28,220 |
| B101 | 348 | 5 | STR | 49'-5" | 17,936 |
| K3 | 20 | 6 | STR | 6'-9" | 203 |
| K4 | 20 | 4 | STR | 5'-3" | 70 |
| K5 | 20 | 4 | STR | 6'-11" | 92 |
| K6 | 40 | 4 | STR | 7'-9" | 207 |
| K7 | 20 | 4 | STR | 6'-7" | 88 |
| K8 | 20 | 4 | STR | 23'-3" | 311 |
| S3 | 260 | 4 | 6 | 2'-9" | 478 |
| REINFORCING STEEL TOTAL: | | | | | 48,567 |



NOTE: CONCRETE IN CLOSURE POUR AT SLAB EXPANSION JOINTS IS INCLUDED IN THE ADJACENT POUR QUANTITY.

GROOVING BRIDGE FLOORS

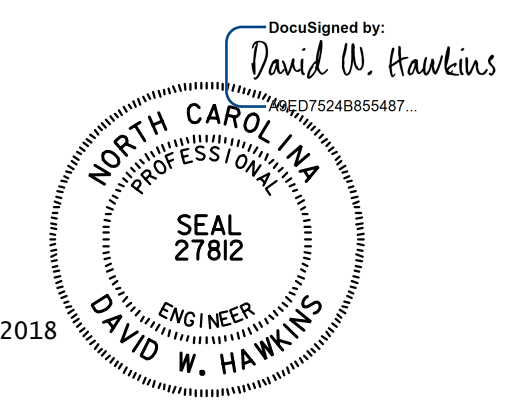
| | | |
|----------------|---------------|---------------|
| APPROACH SLABS | 2,158 | SQ.FT. |
| BRIDGE DECK | 8,557 | SQ.FT. |
| TOTAL | 10,715 | SQ.FT. |

—SUPERSTRUCTURE BILL OF MATERIAL—

| | CLASS AA CONCRETE (CU. YDS.) | REINFORCING STEEL (LBS.) | EPOXY COATED REINFORCING STEEL (LBS.) |
|-----------------|------------------------------|--------------------------|---------------------------------------|
| POUR 1 | 65.4 | 48,567 | 53,509 |
| POUR 2 | 179.7 | | |
| POUR 3 | 101.9 | | |
| TOTALS** | 347.0 | 48,567 | 53,509 |

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. FOR POURING SEQUENCE, SEE SHEET "SUPERSTRUCTURE PLAN OF SPAN A".

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 SUPERSTRUCTURE
 BILL OF MATERIAL
 LEFT LANE

| | |
|--------------------------|---------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 8/18 |
| CHECKED BY : N. HART | DATE : 9/18 |
| DRAWN BY : JMB 5/87 | REV. 5/1/06 TLA/GM |
| CHECKED BY : SJD 9/87 | REV. 10/1/11 MAA/GM |
| | REV. 12/17 MAA/THC |

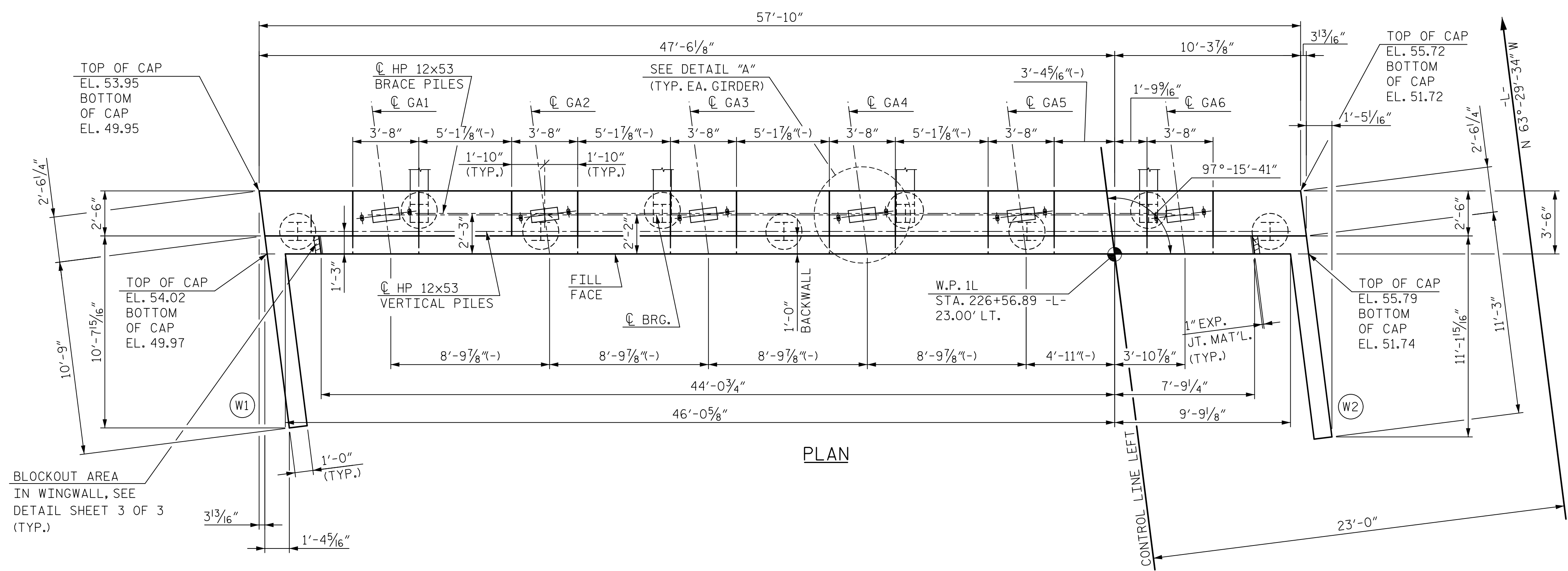
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

| | |
|--|-------------|
| DRAWN BY : M. WRIGHT | DATE : 8/18 |
| CHECKED BY : N. HART | DATE : 9/18 |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 |

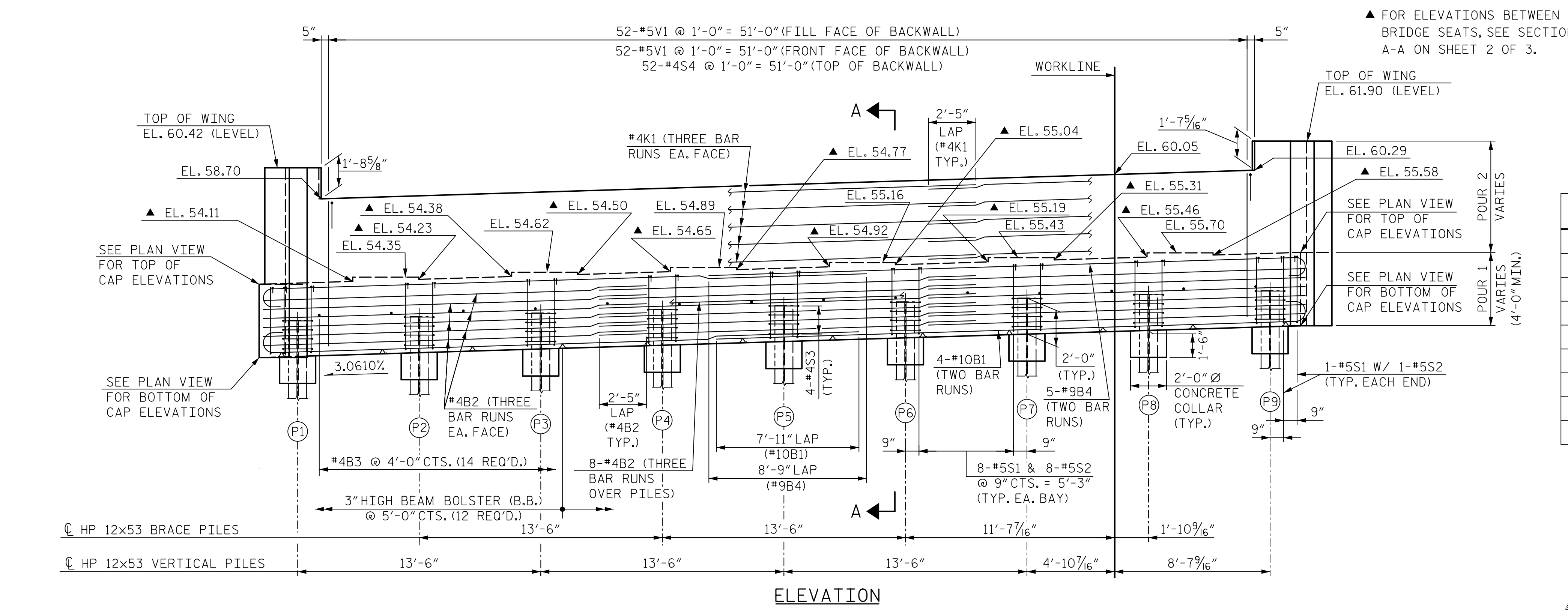
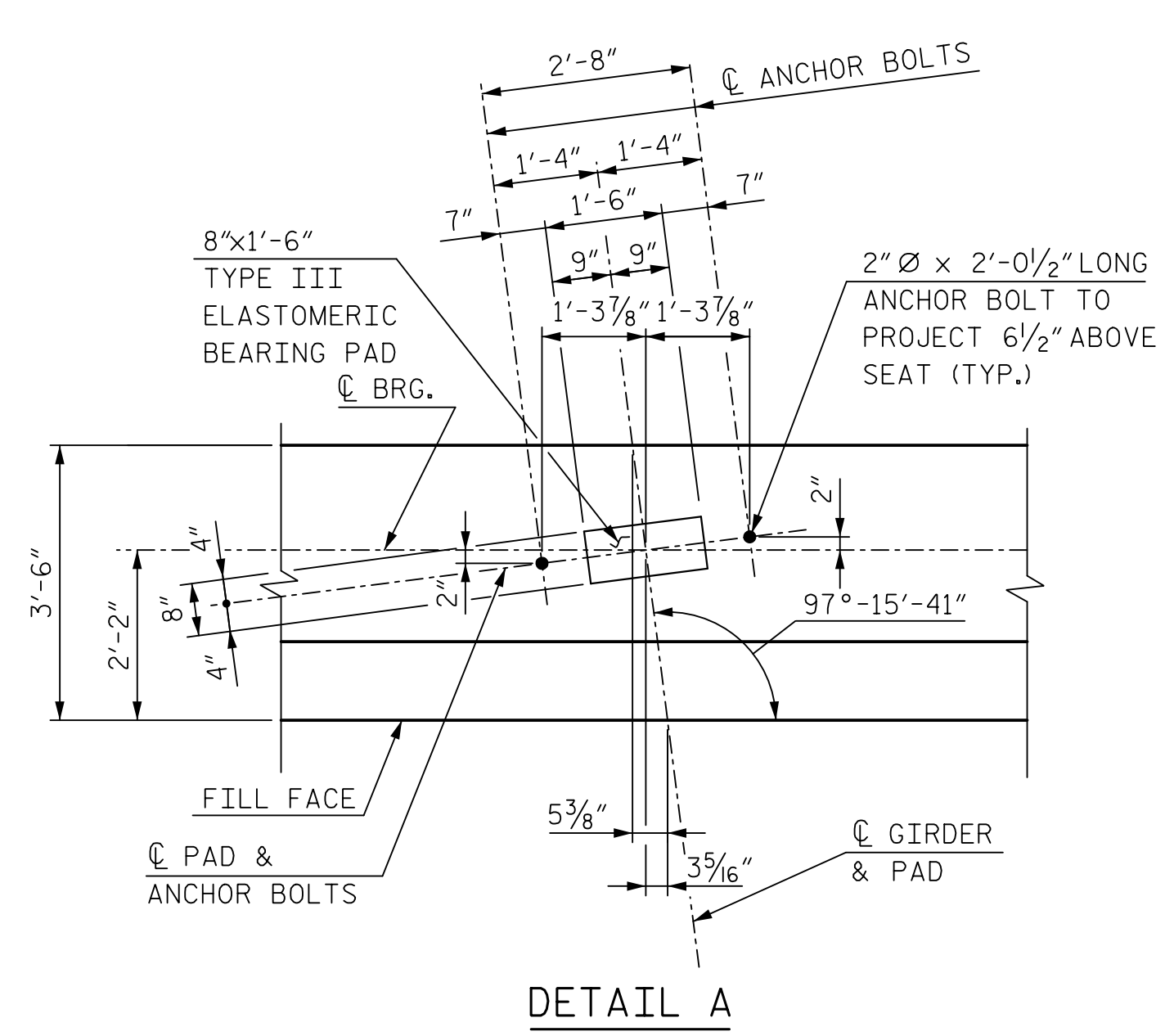
DWG. NO. 21

| REVISIONS | | | | | | SHEET NO. |
|-----------|----|------|-----|----|------|--------------|
| NO. | BY | DATE | NO. | BY | DATE | S7-21 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |



NOTES:
 FOR NOTES AND PILE SPLICE DETAILS, SEE SHEET 3 OF 3.
 FOR WINGWALL DETAILS AND SECTION A-A, SEE SHEET 2 OF 3.

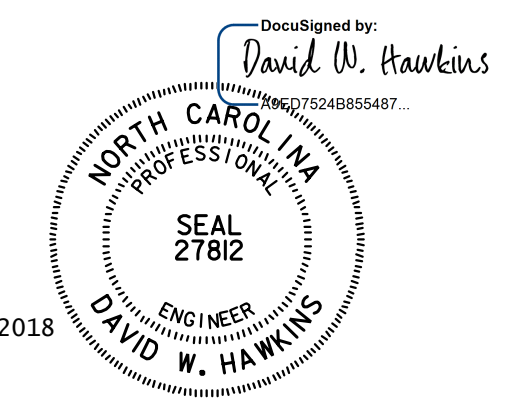
INDICATES 3:12 PILE BATTER IN DIRECTION SHOWN.



▲ FOR ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A ON SHEET 2 OF 3.

| TOP OF PILE ELEVATIONS | |
|------------------------|-------|
| P1 | 52.02 |
| P2 | 52.23 |
| P3 | 52.43 |
| P4 | 52.64 |
| P5 | 52.85 |
| P6 | 53.05 |
| P7 | 53.26 |
| P8 | 53.47 |
| P9 | 53.67 |

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-



SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

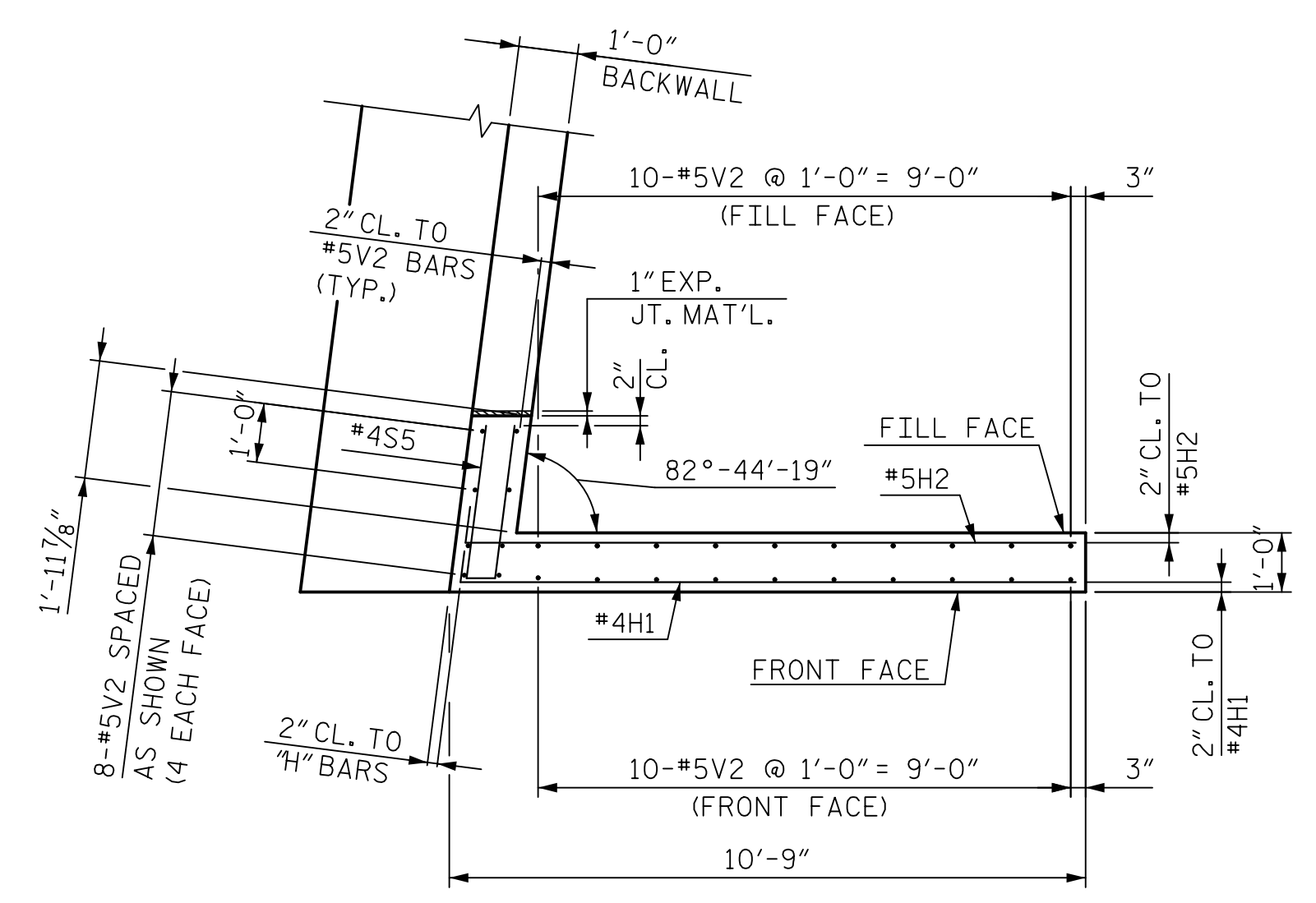
SUBSTRUCTURE
 END BENT 1
 LEFT LANE

| | | | |
|---------------------------------------|------------|--|-----------------|
| HNTB | | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | |
| DRAWN BY: M. WRIGHT | DATE: 9/18 | DWG. NO. 22 | SHEET NO. S7-22 |
| CHECKED BY: D. HAWKINS | DATE: 9/18 | | |
| DESIGN ENGINEER OF RECORD: D. HAWKINS | DATE: 9/18 | | |

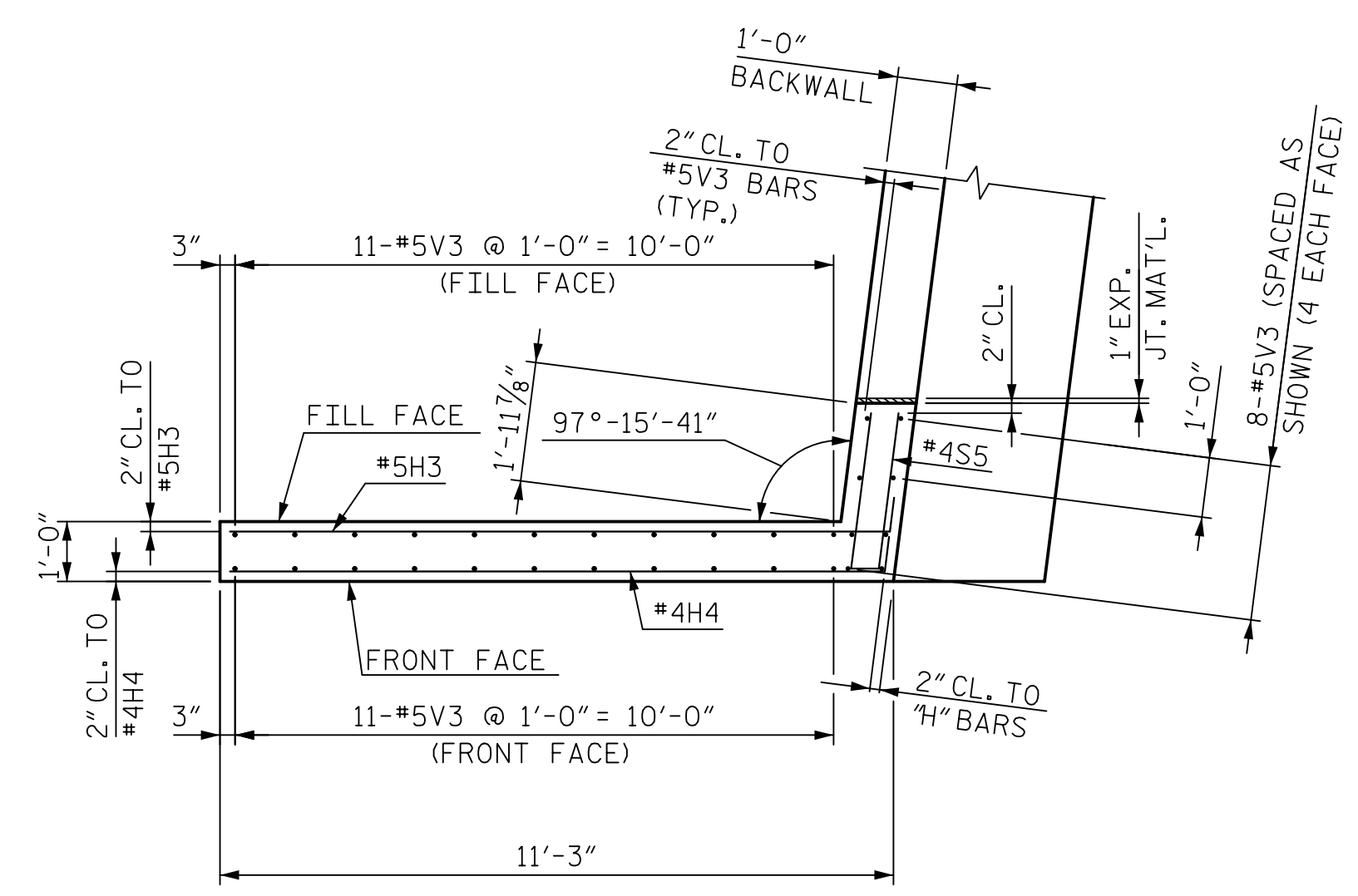
**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

| REVISIONS | | | | | TOTAL SHEETS |
|-----------|----|------|-----|------|--------------|
| NO. | BY | DATE | NO. | DATE | |
| 1 | | | 3 | | 35 |
| 2 | | | 4 | | |

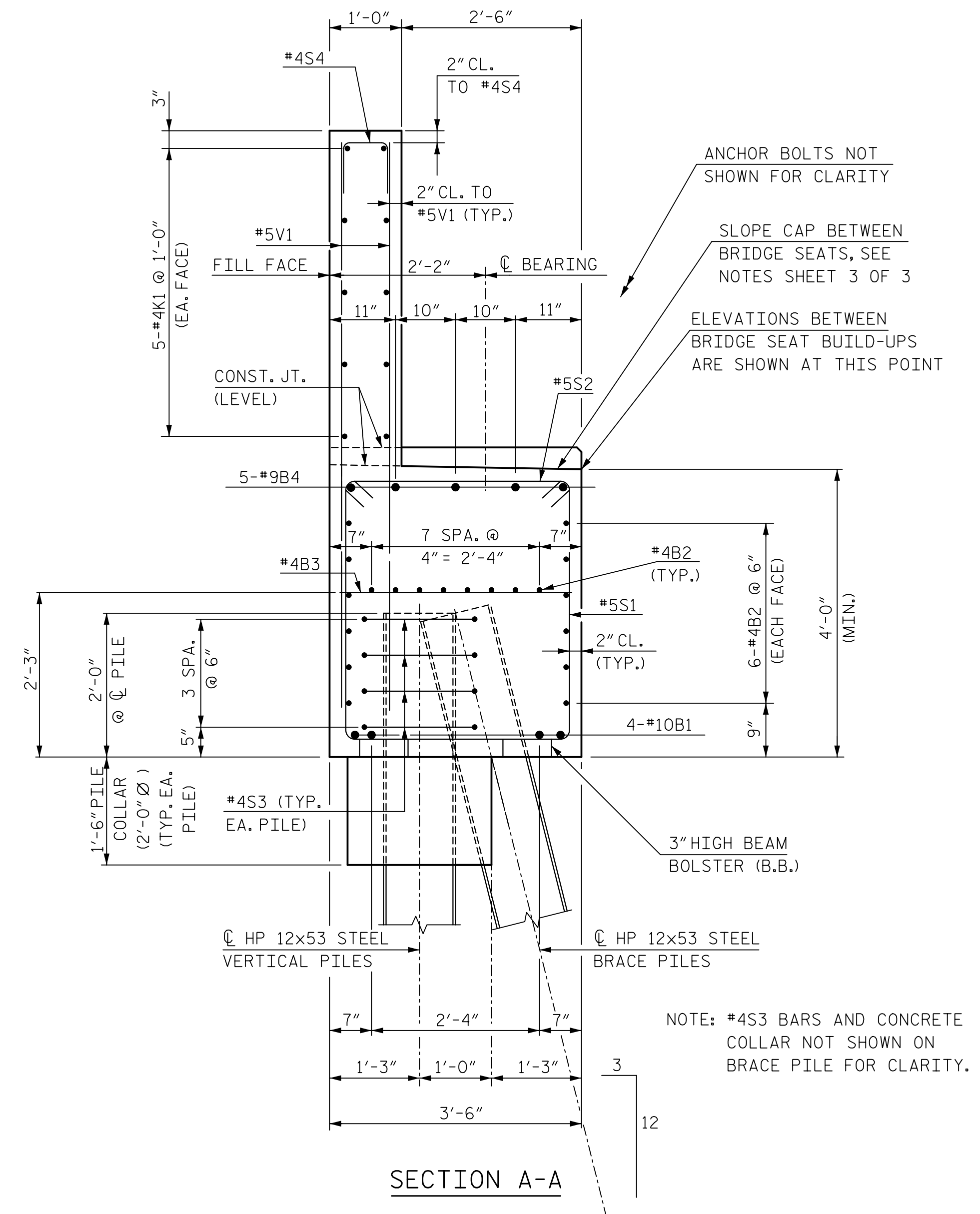
NOTES:
 FOR NOTES, SEE SHEET 3 OF 3.
 FOR BLOCKOUT IN WINGWALL, SEE SHEET 3 OF 3.



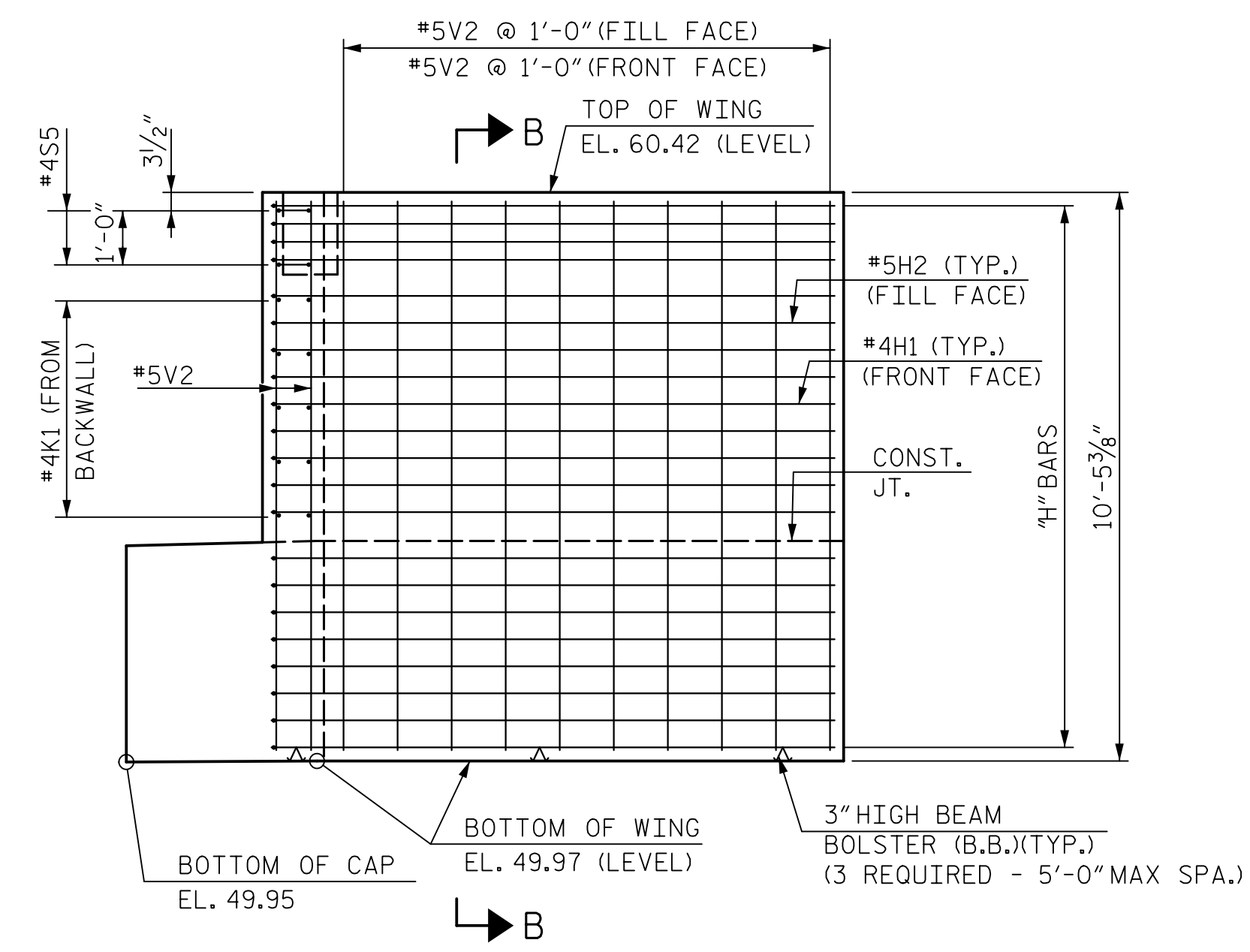
PLAN OF WING (W1)



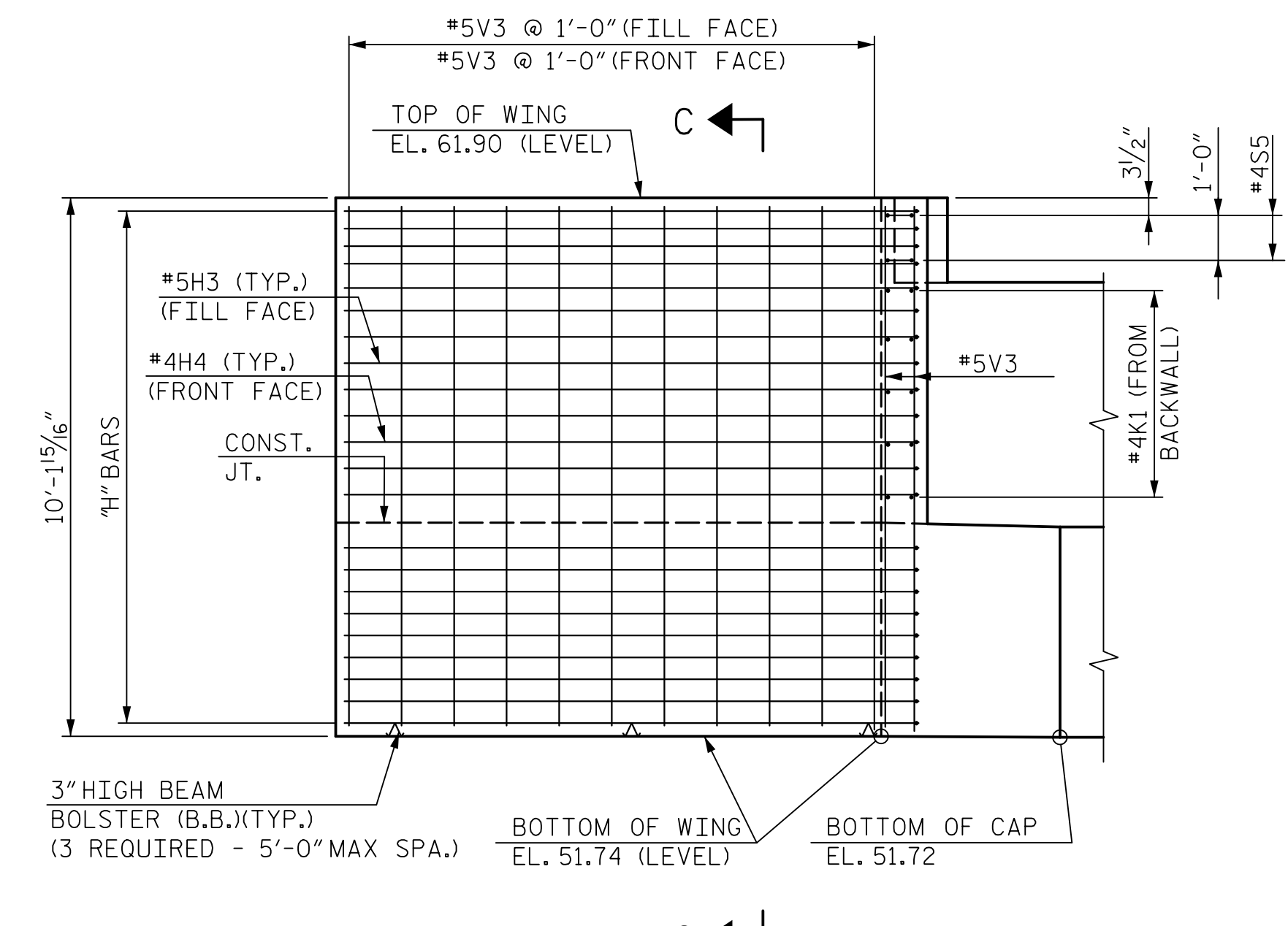
PLAN OF WING (W2)



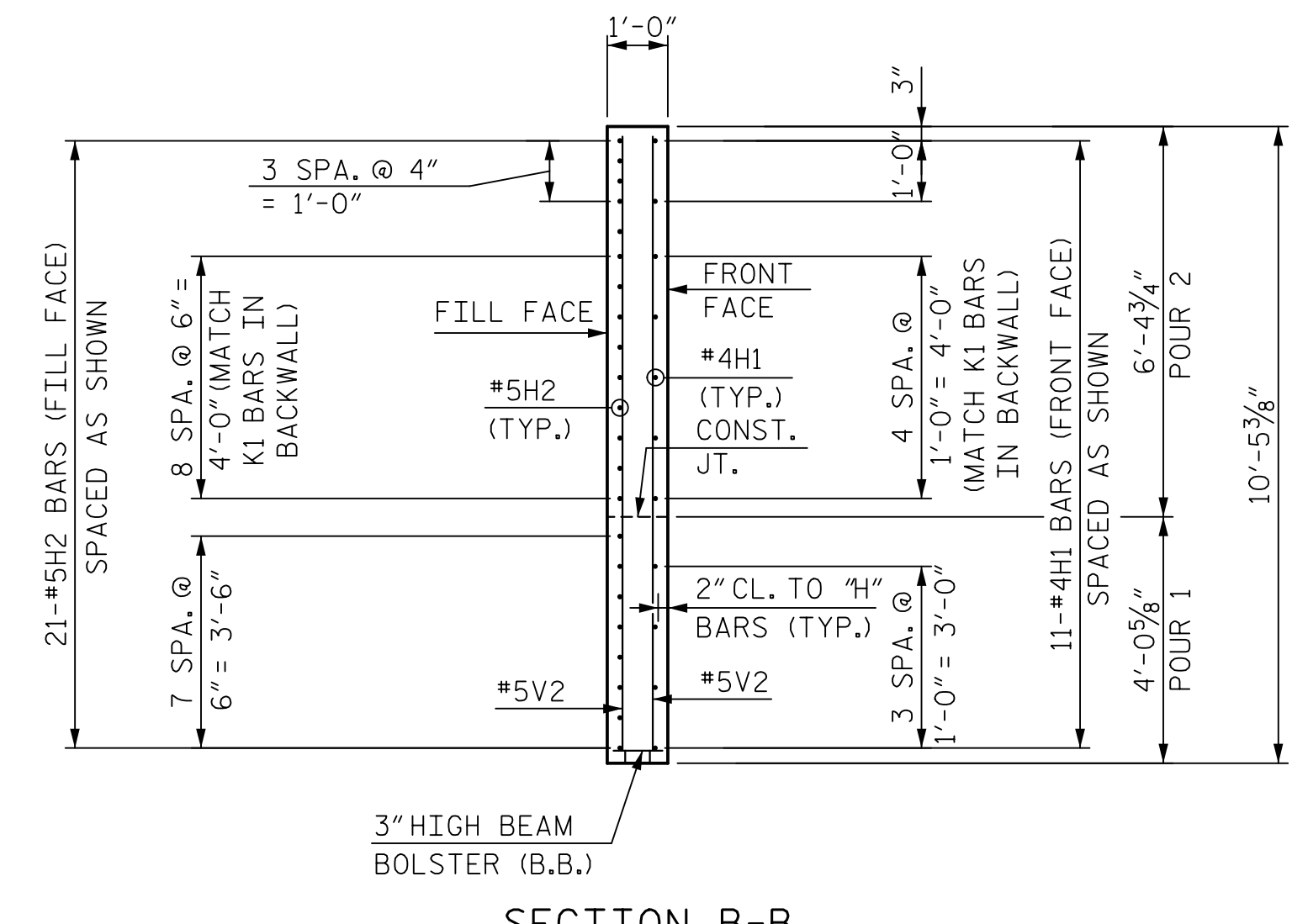
SECTION A-A



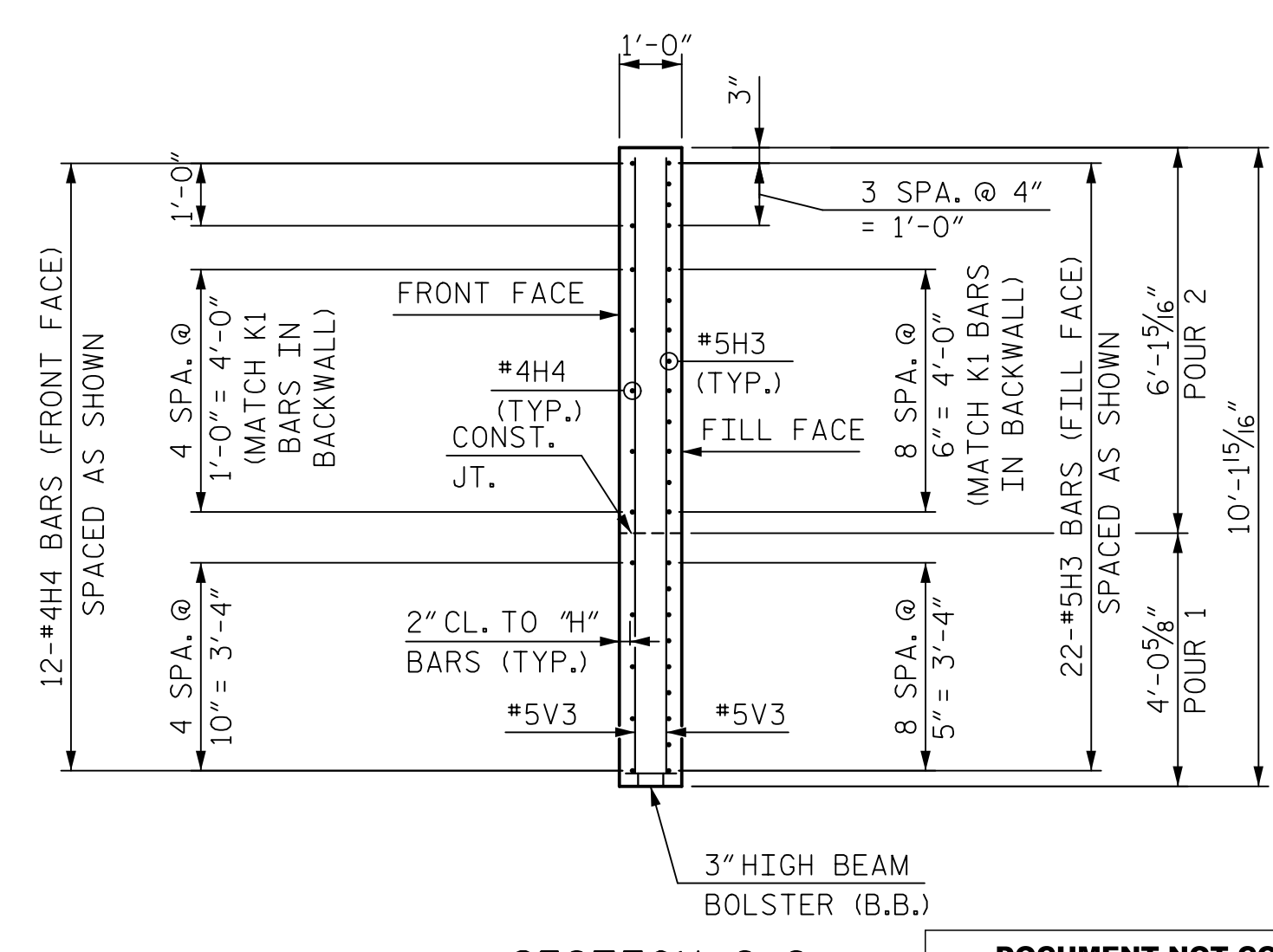
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION B-B

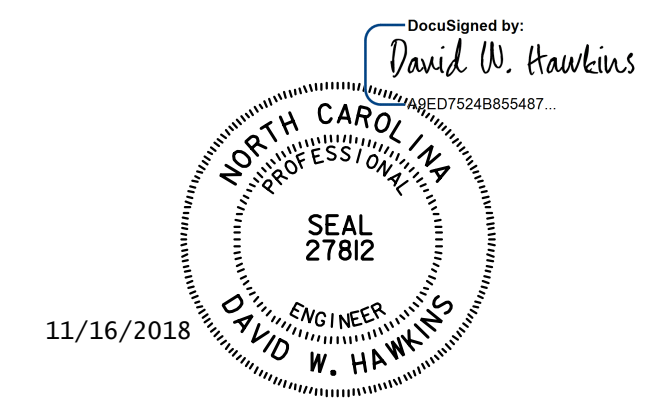


SECTION C-C

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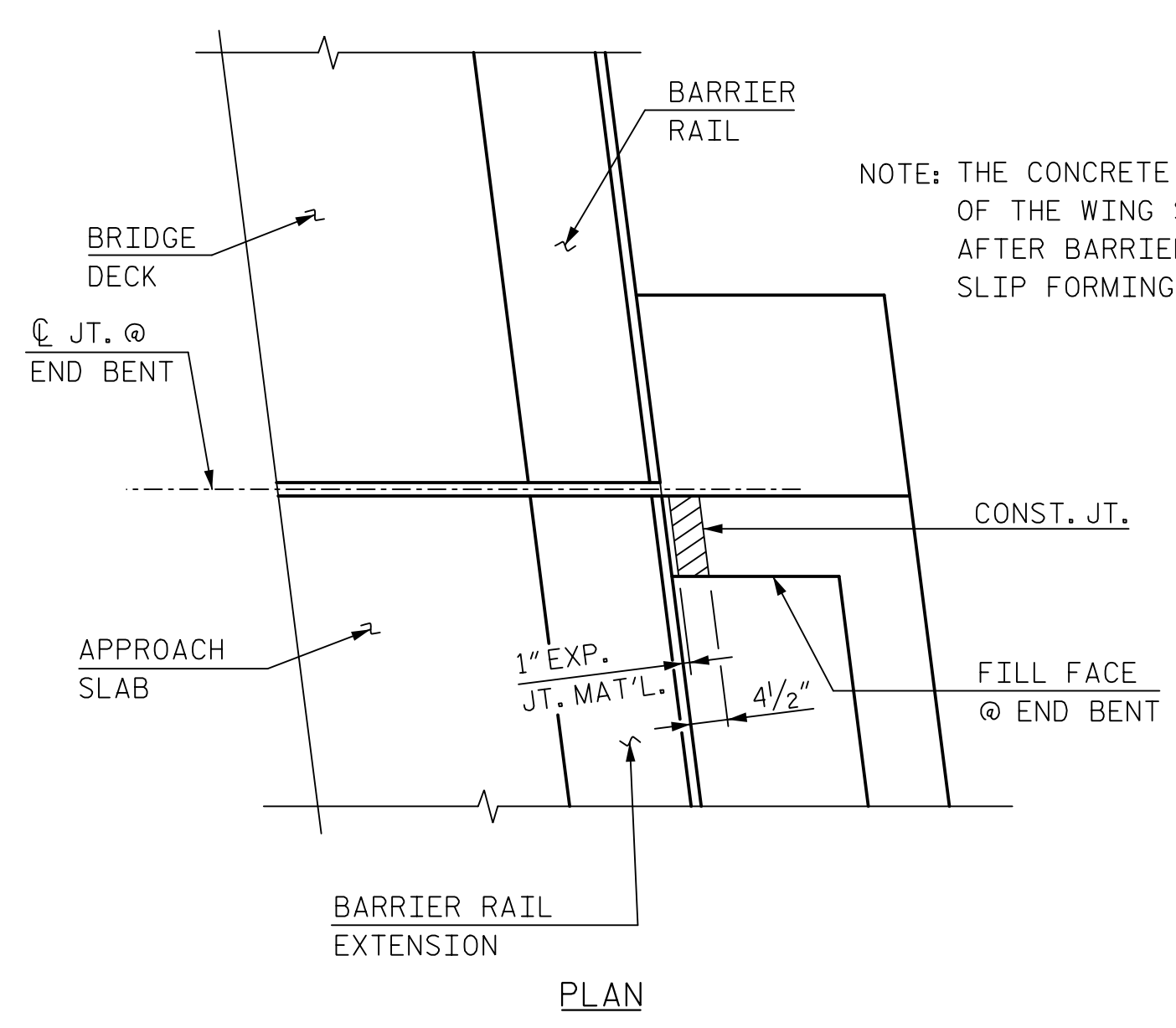
PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 2 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1
 LEFT LANE

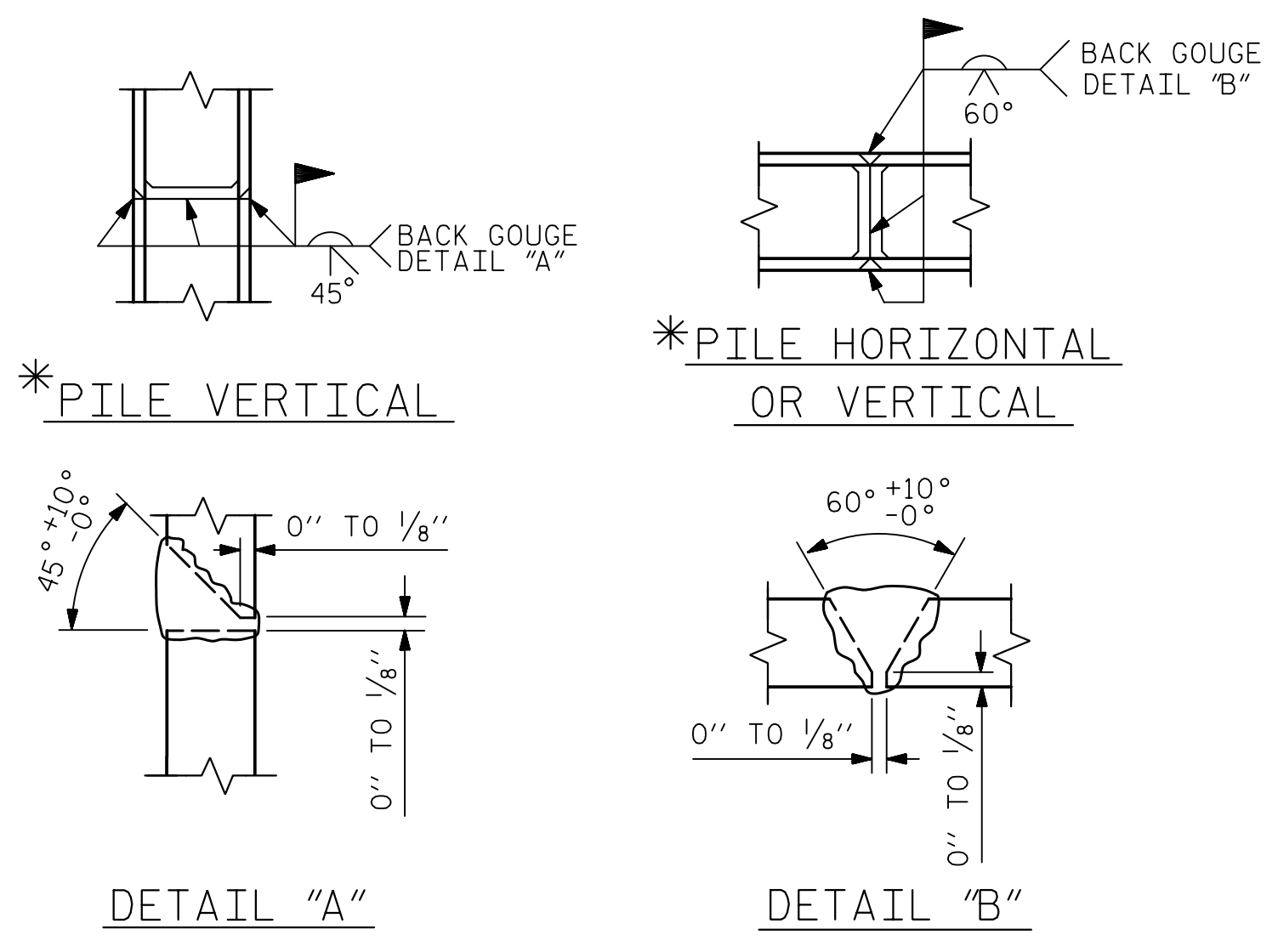


| | | | |
|---------------------------------------|------------|--|--|
| HNTB | | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | |
| DRAWN BY: M. WRIGHT | DATE: 9/18 | DWG. NO. 23 | |
| CHECKED BY: D. HAWKINS | DATE: 9/18 | | |
| DESIGN ENGINEER OF RECORD: D. HAWKINS | DATE: 9/18 | | |

| REVISIONS | | | | | | SHEET NO. | |
|-----------|----|------|-----|----|------|--------------|--|
| NO. | BY | DATE | NO. | BY | DATE | S7-23 | |
| 1 | | | 3 | | | TOTAL SHEETS | |
| 2 | | | 4 | | | 35 | |

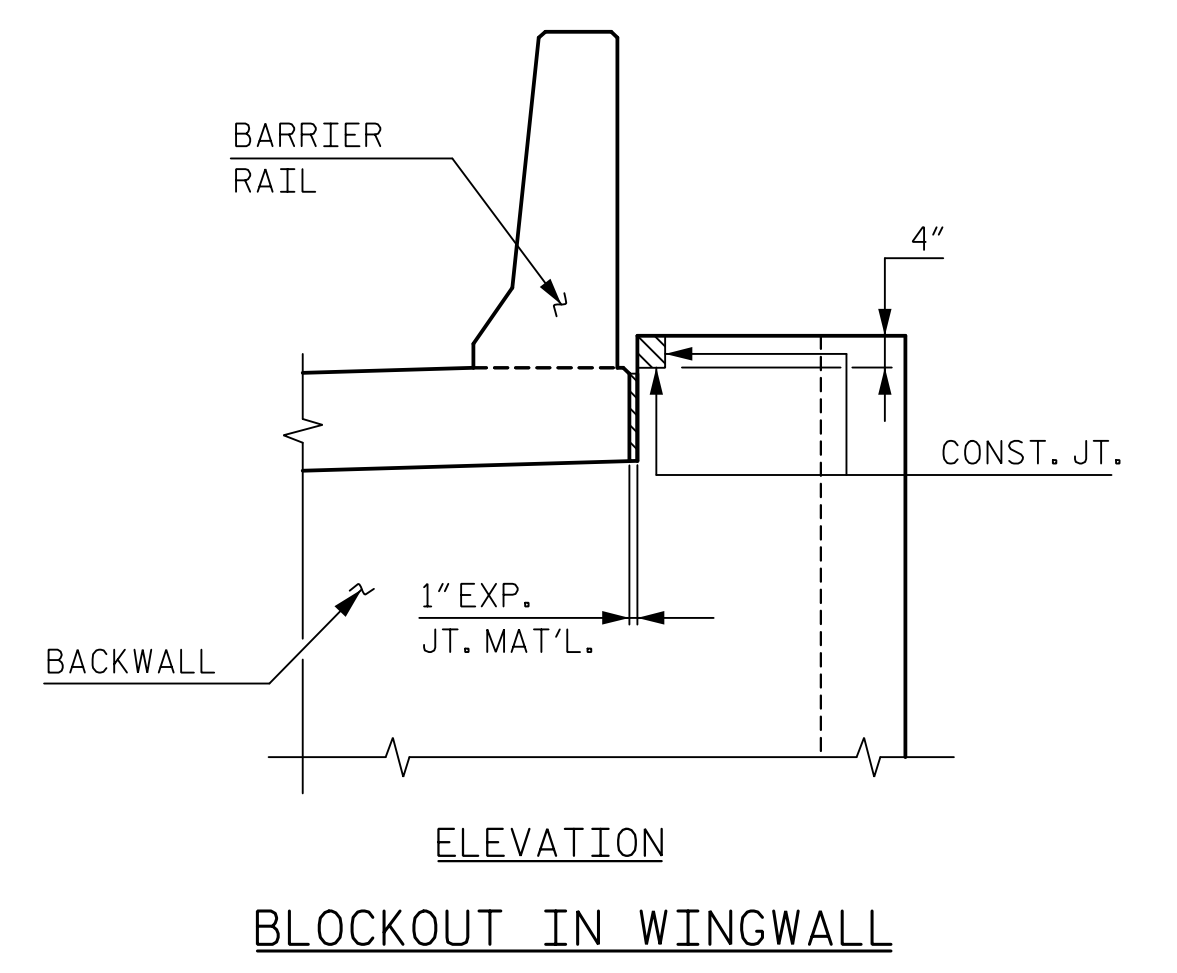


NOTE: THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

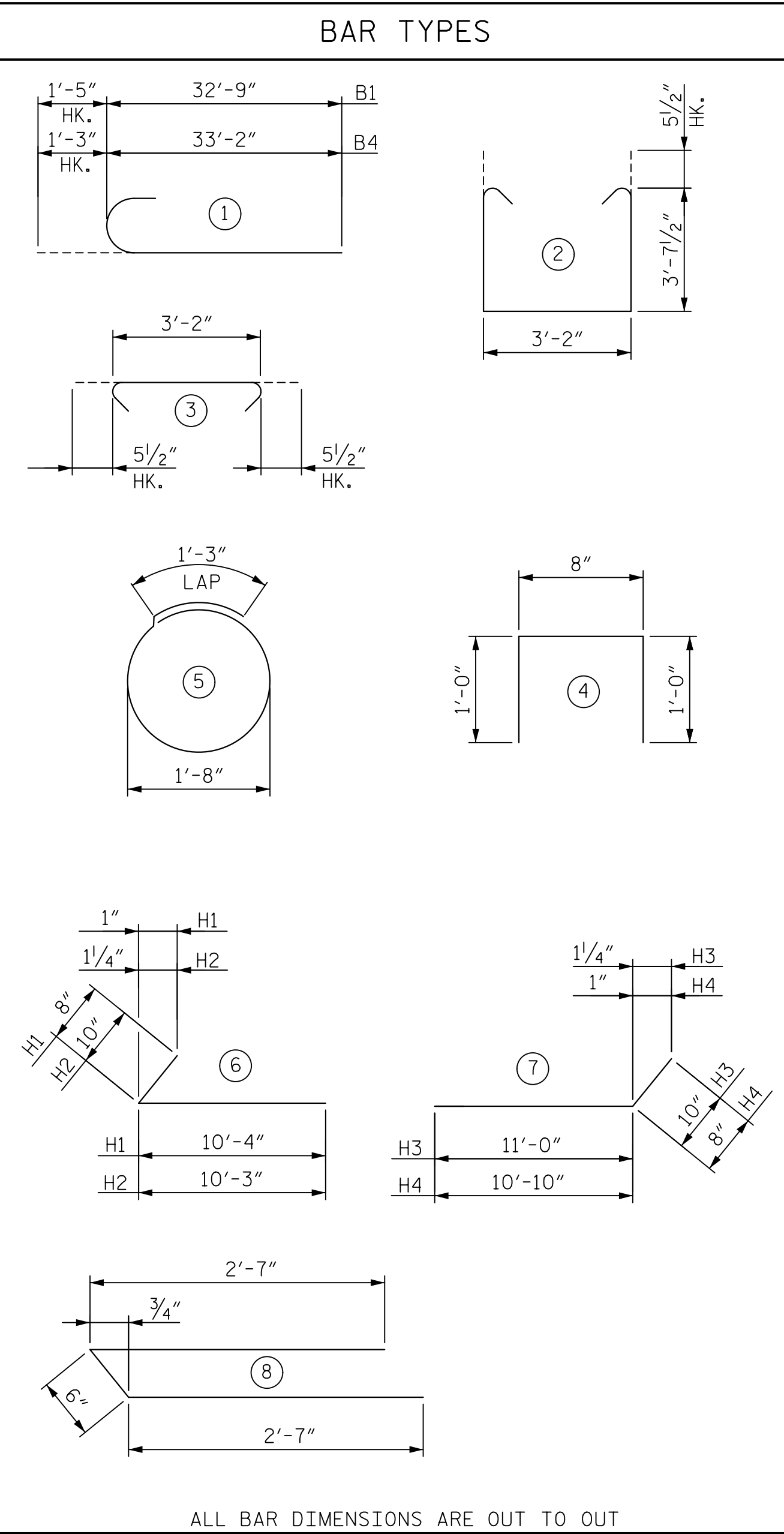


PILE SPLICE DETAILS

* POSITION OF PILE DURING WELDING.

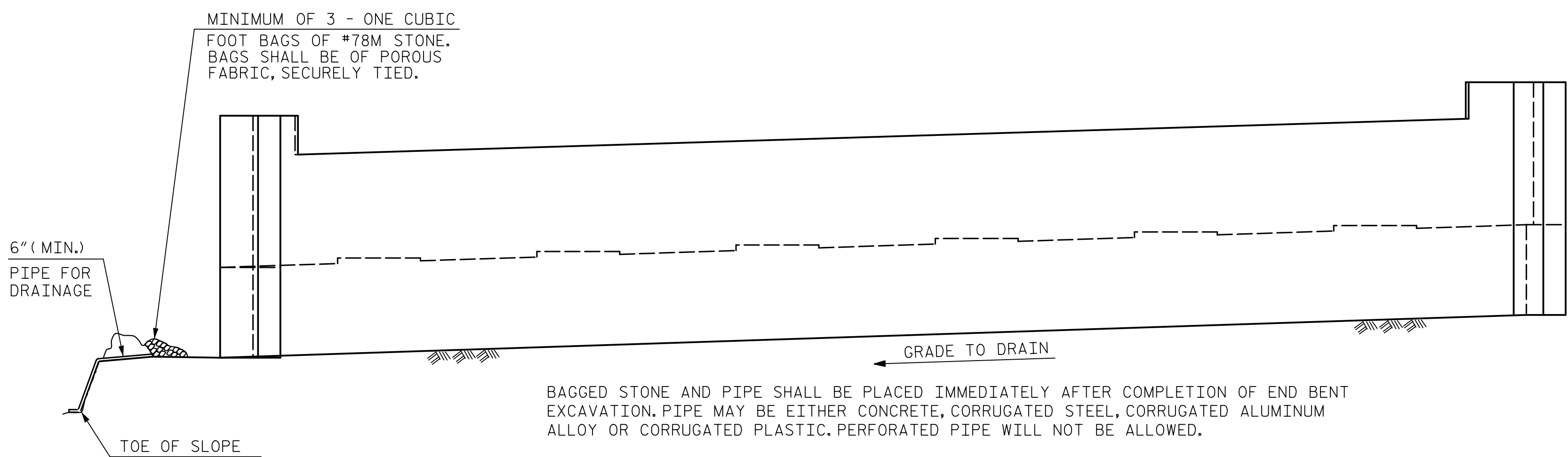


NOTES:
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
 THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
 THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.



| BILL OF REINFORCING | | | | | |
|---------------------|-----|------|------|---------|--------|
| END BENT 1 | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 8 | 10 | | 34'-2" | 1,176 |
| B2 | 60 | 4 | STR | 20'-10" | 835 |
| B3 | 14 | 4 | STR | 3'-2" | 30 |
| B4 | 10 | 9 | 1 | 34'-5" | 1,170 |
| H1 | 11 | 4 | 6 | 11'-0" | 81 |
| H2 | 21 | 5 | 6 | 11'-1" | 243 |
| H3 | 22 | 5 | 7 | 11'-10" | 272 |
| H4 | 12 | 4 | 7 | 11'-6" | 92 |
| K1 | 30 | 4 | STR | 20'-10" | 418 |
| S1 | 68 | 5 | 2 | 11'-4" | 804 |
| S2 | 68 | 5 | 3 | 4'-1" | 290 |
| S3 | 36 | 4 | 5 | 6'-6" | 156 |
| S4 | 52 | 4 | 4 | 2'-8" | 93 |
| S5 | 4 | 4 | 8 | 5'-8" | 15 |
| V1 | 104 | 5 | STR | 8'-2" | 886 |
| V2 | 28 | 5 | STR | 9'-11" | 290 |
| V3 | 30 | 5 | STR | 9'-9" | 305 |

| QUANTITIES | | |
|---|----------|-------|
| REINFORCING STEEL | LBS. | 7,156 |
| CLASS "A" CONCRETE BREAKDOWN | | |
| POUR 1 - CAP, BOT. OF WINGS & COLLARS | CU. YDS. | 35.2 |
| POUR 2 - TOP OF WINGS & BACKWALL | CU. YDS. | 14.8 |
| TOTAL | CU. YDS. | 50.0 |
| HP 12x53 STEEL PILES | NO. | 9 |
| | LIN. FT. | 675 |
| PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES | NO. | 9 |
| PILE REDRIVES | NO. | 5 |



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 FOR THE SEVERAL PAY ITEMS.

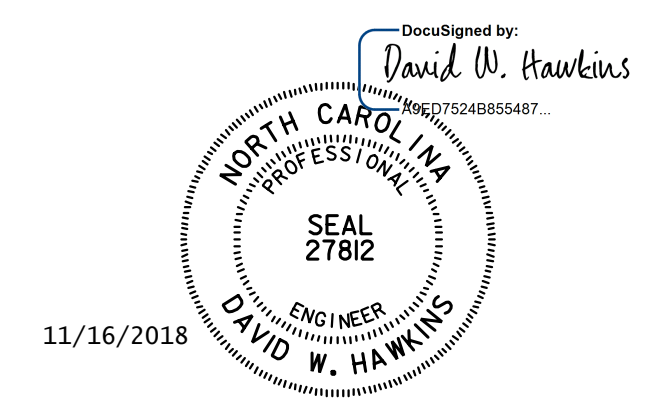
TEMPORARY DRAINAGE AT END BENT 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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DRAWN BY: M. WRIGHT DATE: 9/18
 CHECKED BY: D. HAWKINS DATE: 9/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 24



PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-

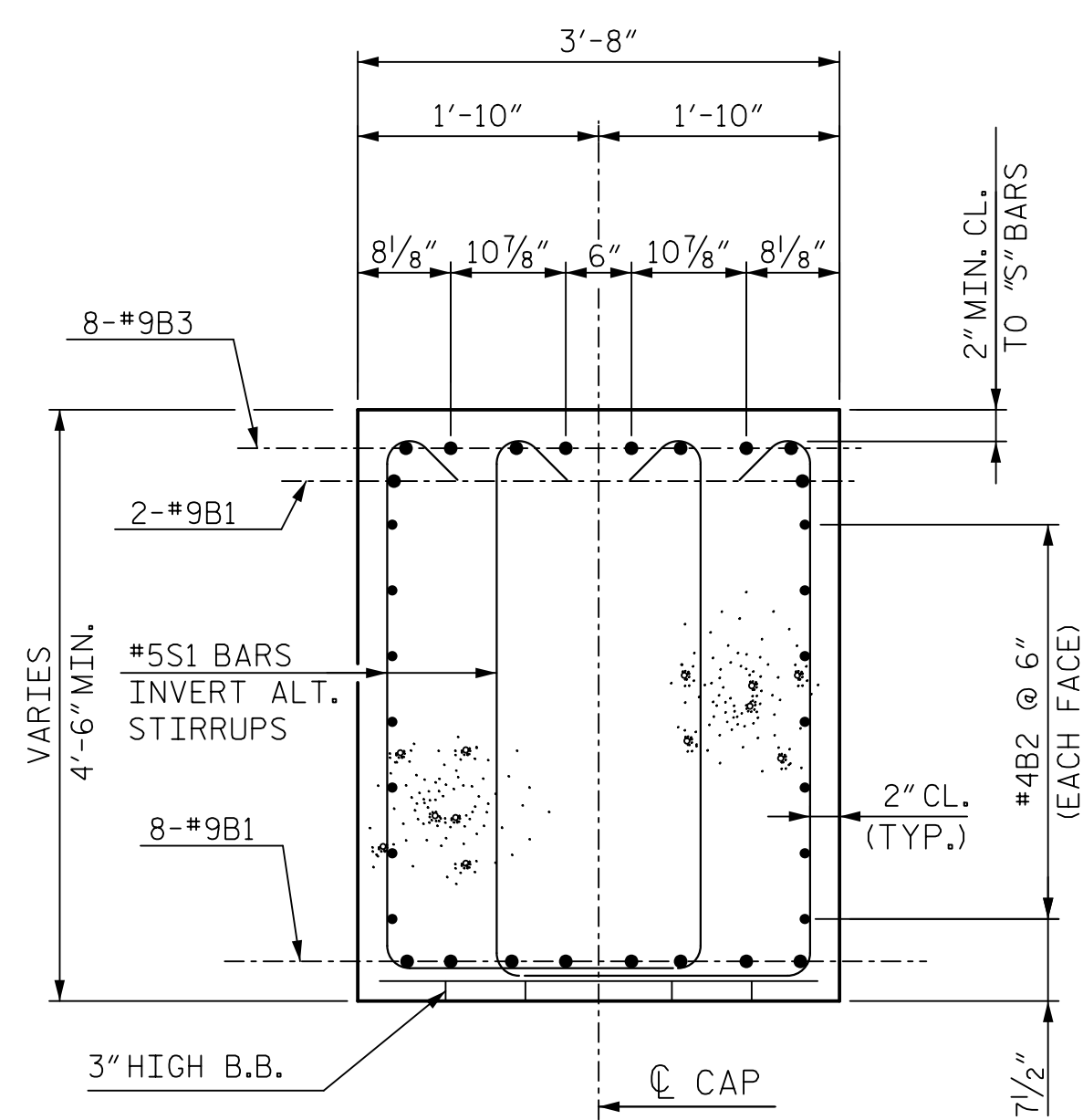
SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

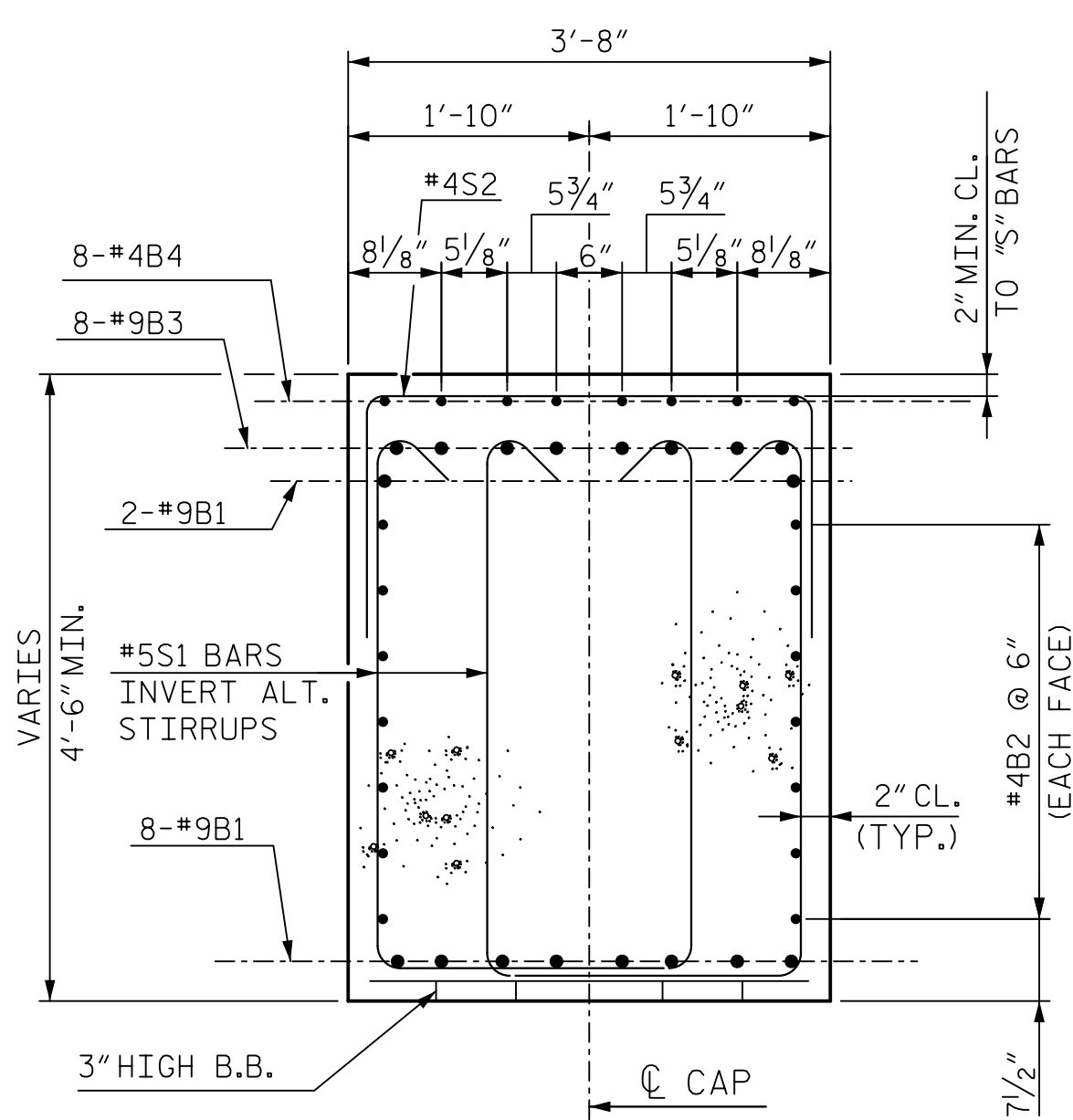
SUBSTRUCTURE
 END BENT 1
 LEFT LANE

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

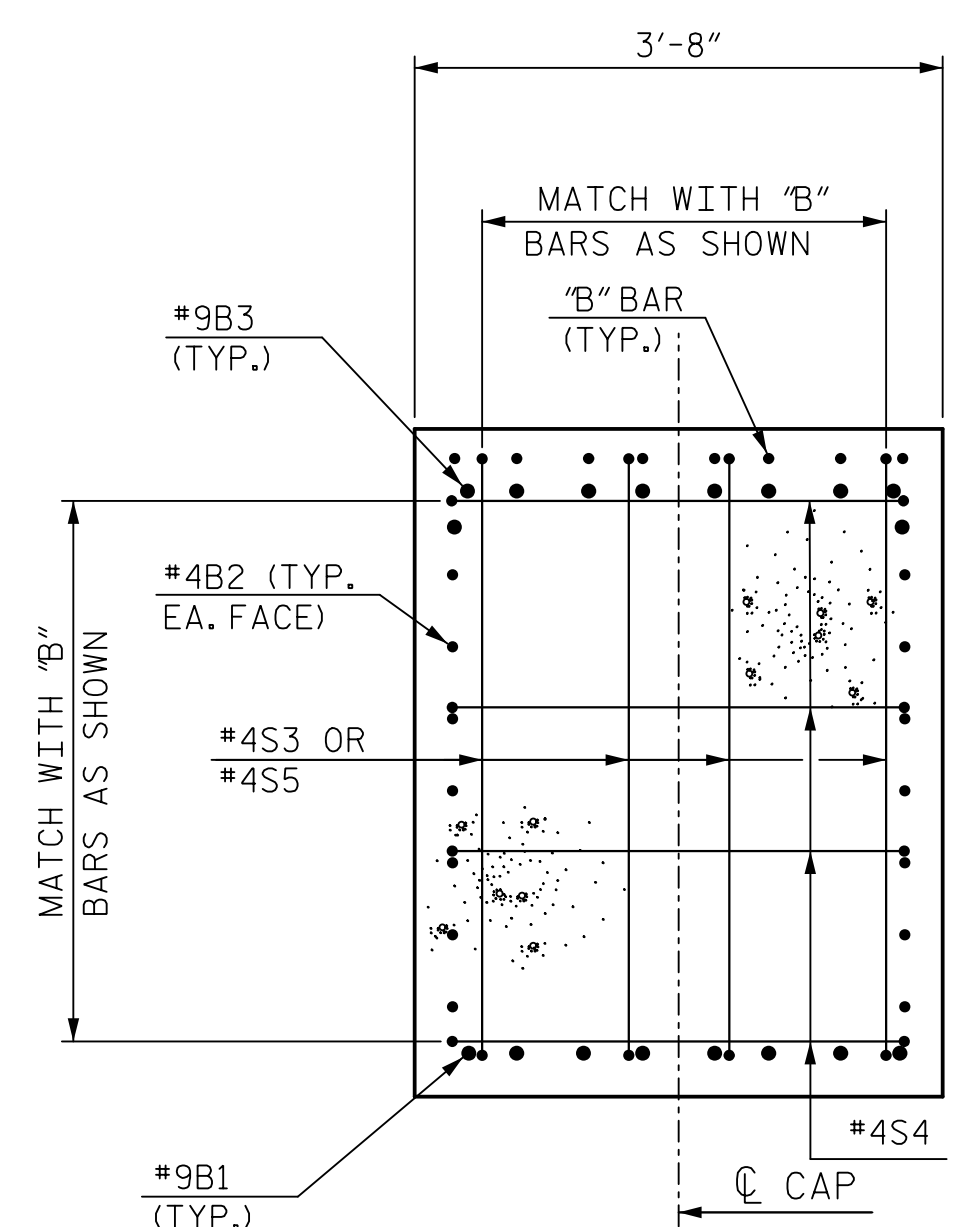
SHEET NO. S7-24
 TOTAL SHEETS 35



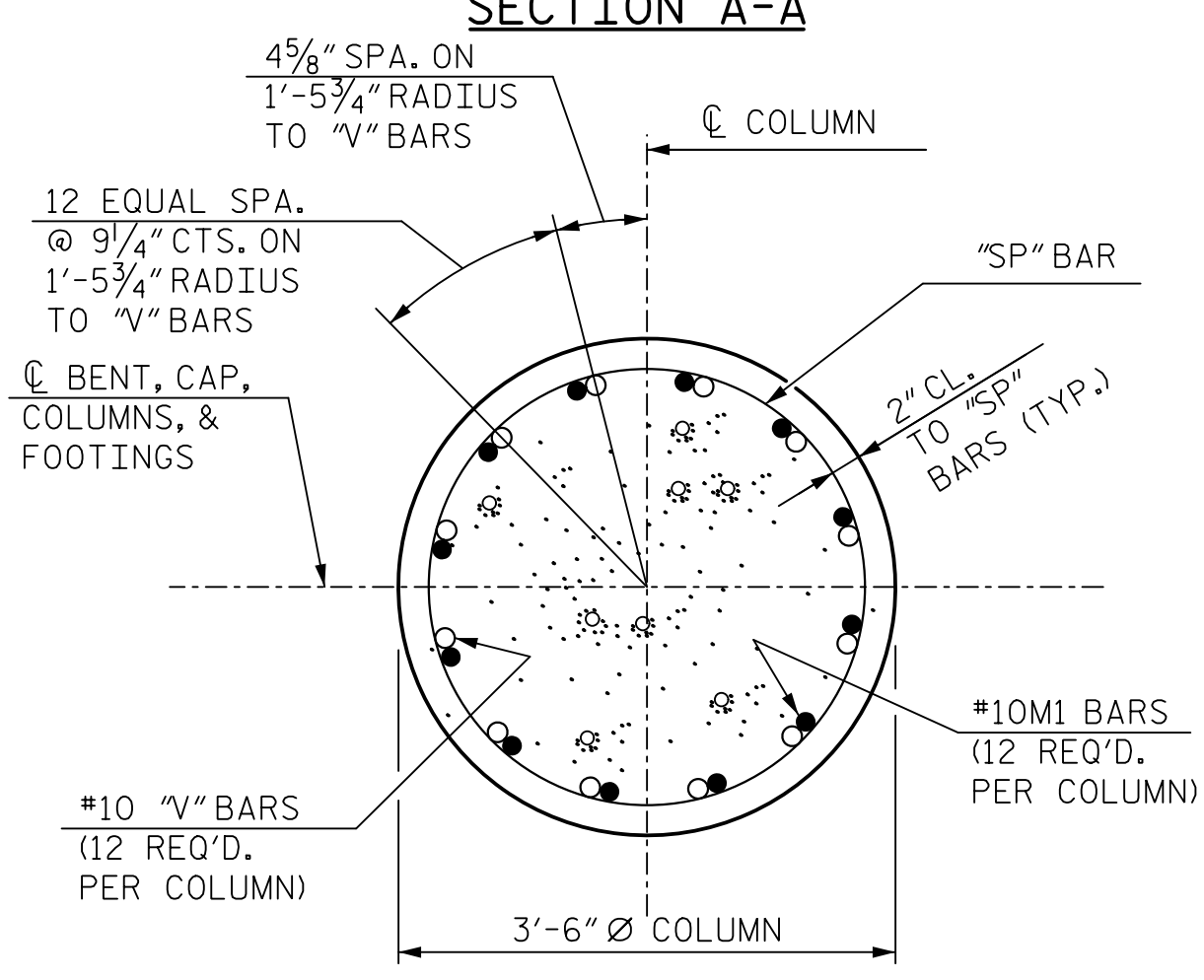
SECTION A-A



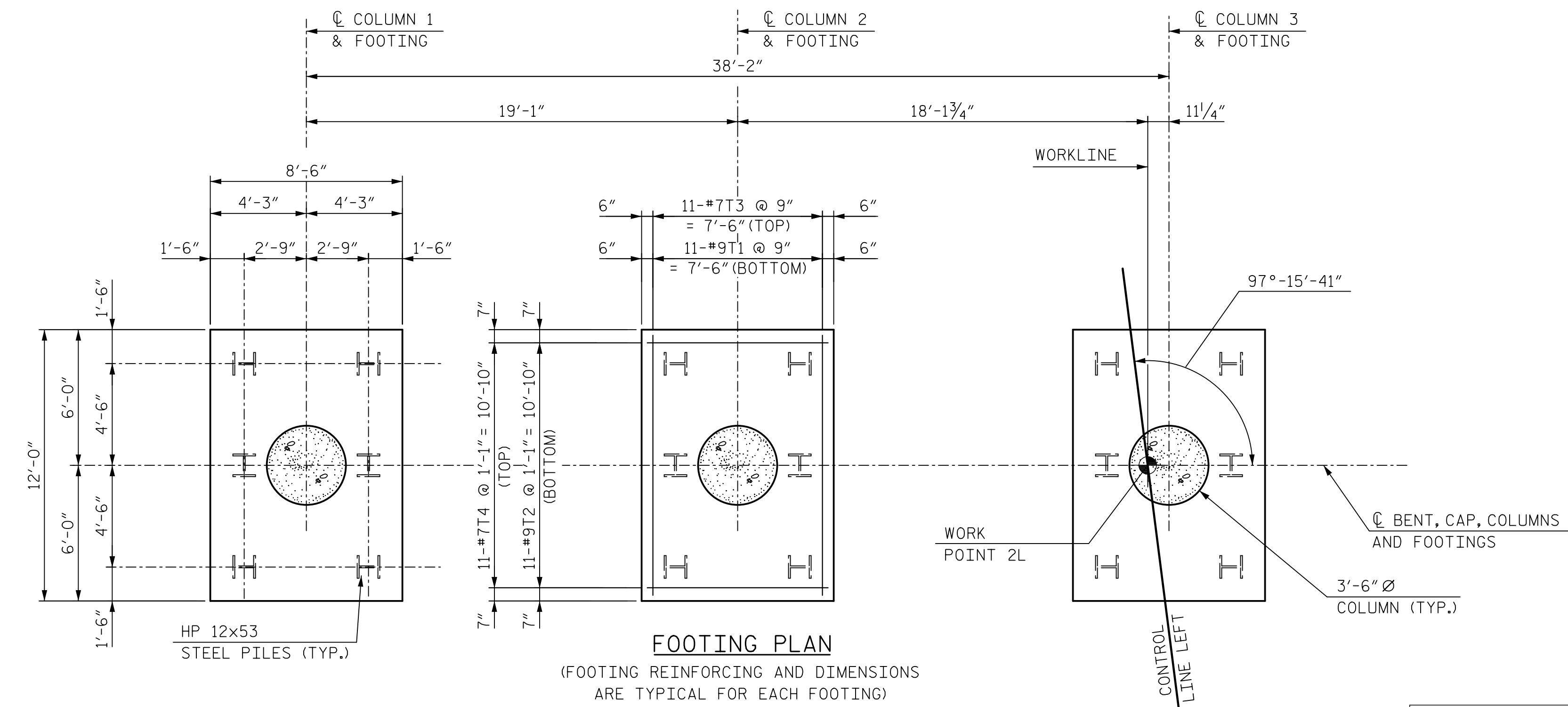
SECTION B-B



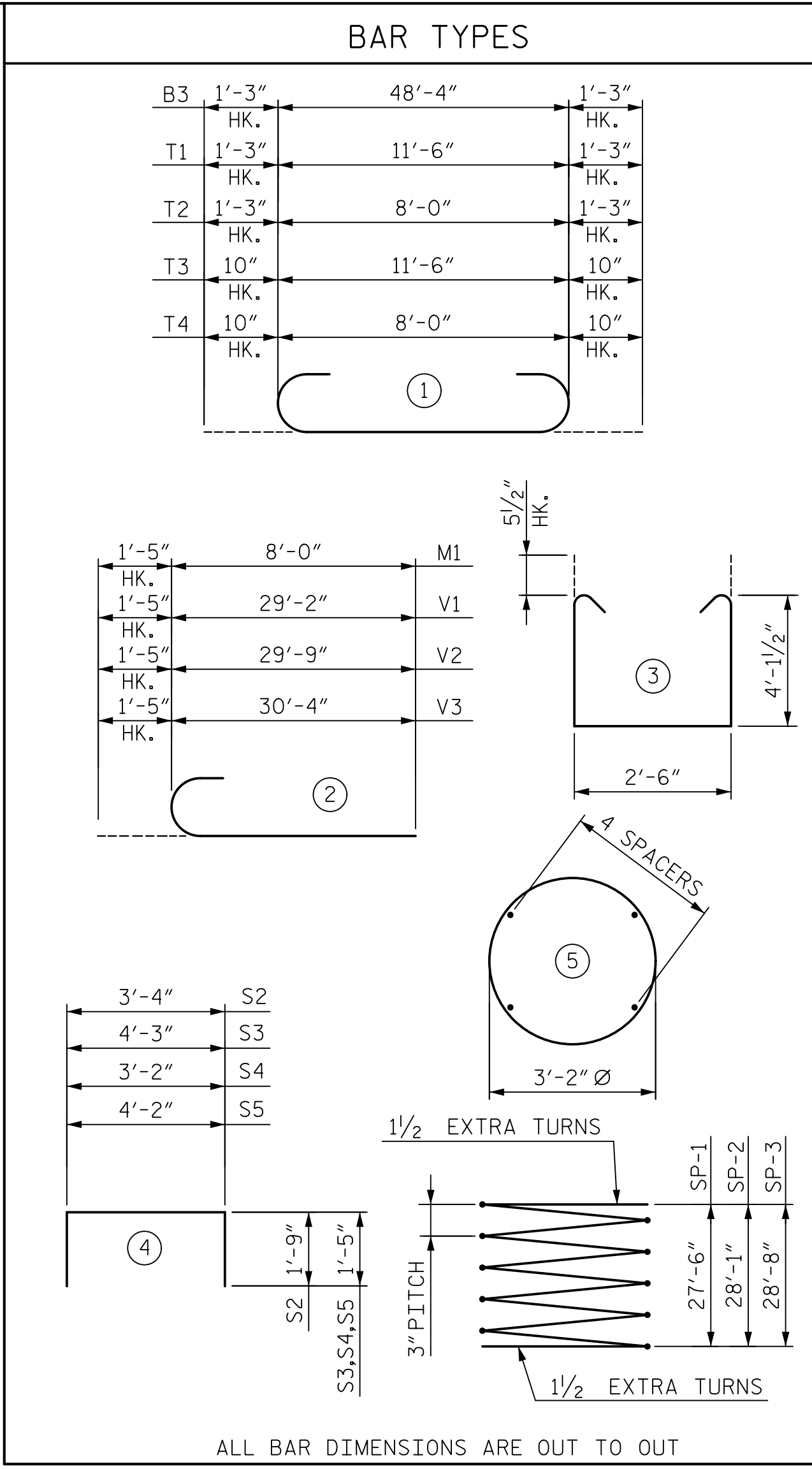
SECTION C-C



SECTION D-D



FOOTING PLAN
(FOOTING REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING)



ALL BAR DIMENSIONS ARE OUT TO OUT

| BILL OF REINFORCING | | | | | |
|---------------------|-----|------|------|------------|--------|
| BENT 1 | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 10 | 9 | STR | 48'-8" | 1,643 |
| B2 | 28 | 4 | STR | 25'-5" | 475 |
| B3 | 8 | 9 | 1 | 50'-10" | 1,383 |
| B4 | 48 | 4 | STR | 3'-11" | 126 |
| M1 | 36 | 10 | 2 | 9'-5" | 1,459 |
| S1 | 128 | 5 | 3 | 11'-8" | 1,558 |
| S2 | 48 | 4 | 4 | 6'-10" | 219 |
| S3 | 4 | 4 | 4 | 7'-1" | 19 |
| S4 | 8 | 4 | 4 | 6'-0" | 32 |
| S5 | 4 | 4 | 4 | 7'-0" | 19 |
| T1 | 33 | 9 | 1 | 14'-0" | 1,571 |
| T2 | 33 | 9 | 1 | 10'-6" | 1,178 |
| T3 | 33 | 7 | 1 | 13'-2" | 888 |
| T4 | 33 | 7 | 1 | 9'-8" | 652 |
| V1 | 12 | 10 | 2 | 30'-7" | 1,579 |
| V2 | 12 | 10 | 2 | 31'-2" | 1,609 |
| V3 | 12 | 10 | 2 | 31'-9" | 1,639 |
| SP-1 | 1 | * | 5 | 1,109'-9" | 741 |
| SP-2 | 1 | * | 5 | 1,139'-3" | 761 |
| SP-3 | 1 | * | 5 | 1,158'-10" | 774 |

| QUANTITIES | | | |
|---|----------|--------|----------|
| REINFORCING STEEL | LBS. | 16,049 | |
| SPIRAL COLUMN REINFORCING STEEL | LBS. | 2,276 | |
| CLASS A CONCRETE | | | |
| FOOTING POUR 1 | CU. YDS. | 48.2 | |
| COLUMN POUR 2 | CU. YDS. | 29.9 | |
| CAP POUR 3 | CU. YDS. | 30.7 | |
| TOTAL | CU. YDS. | 108.8 | |
| HP 12x53 STEEL PILES | NO. | 18 | |
| | LIN. FT. | 1,350 | |
| FOUNDATION EXCAVATION FOR BENT | LUMP SUM | | LUMP SUM |
| PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES | NO. | 18 | |
| PILE REDRIVES | NO. | 9 | |

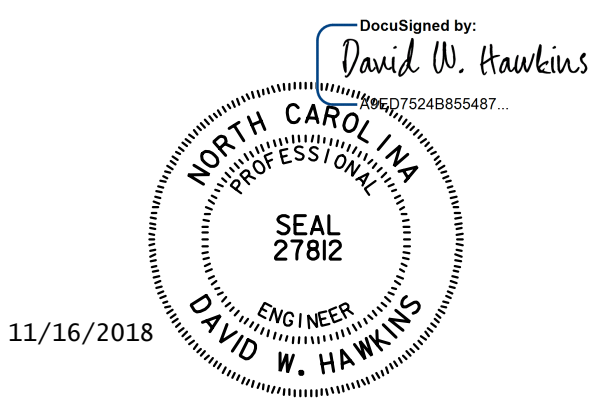
* THE SP SPIRAL REINFORCING STEEL SHALL BE W20 OR D20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT 1
 LEFT LANE



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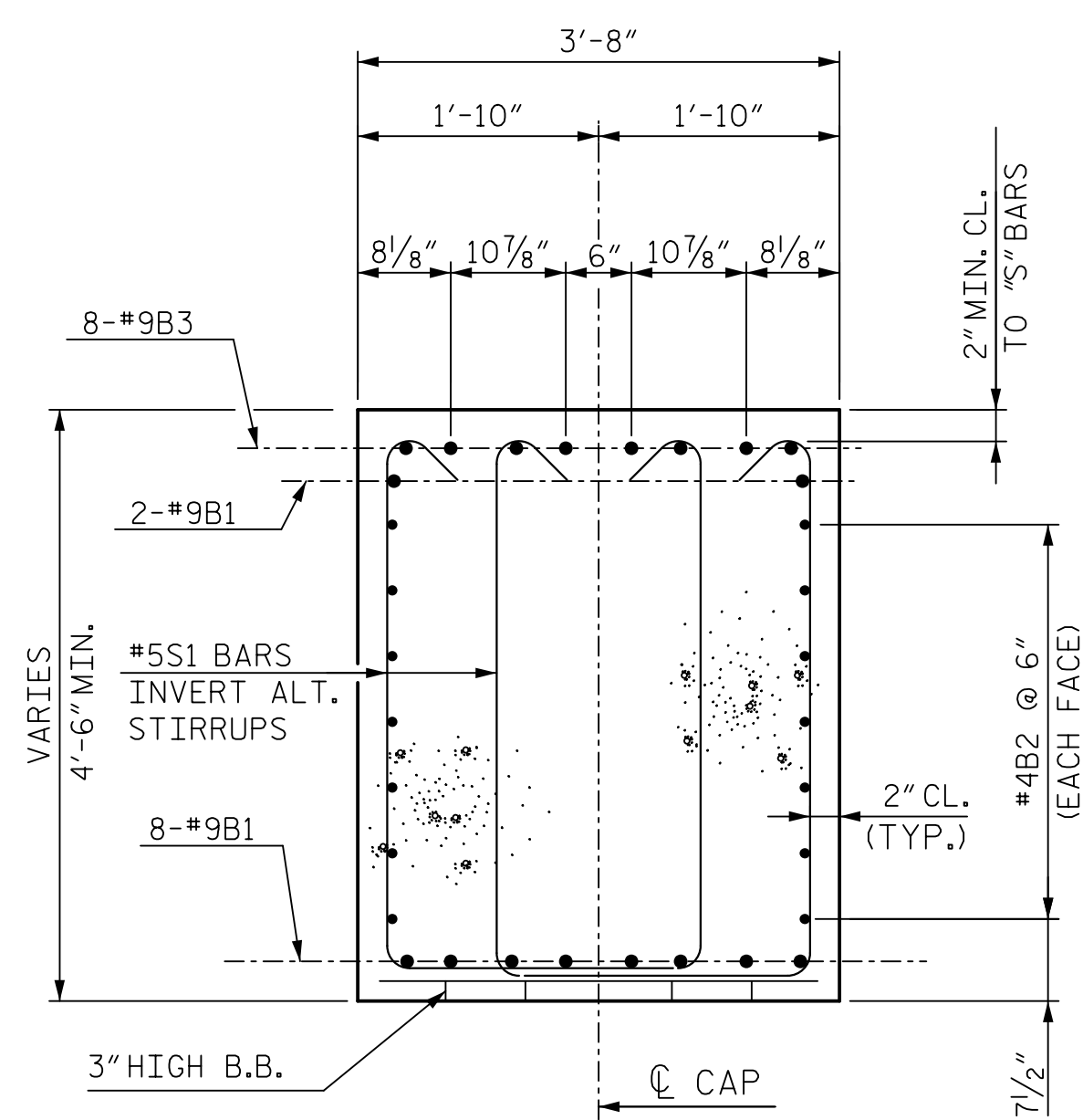
DRAWN BY: M. WRIGHT DATE: 9/18
 CHECKED BY: N. HART DATE: 9/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 26

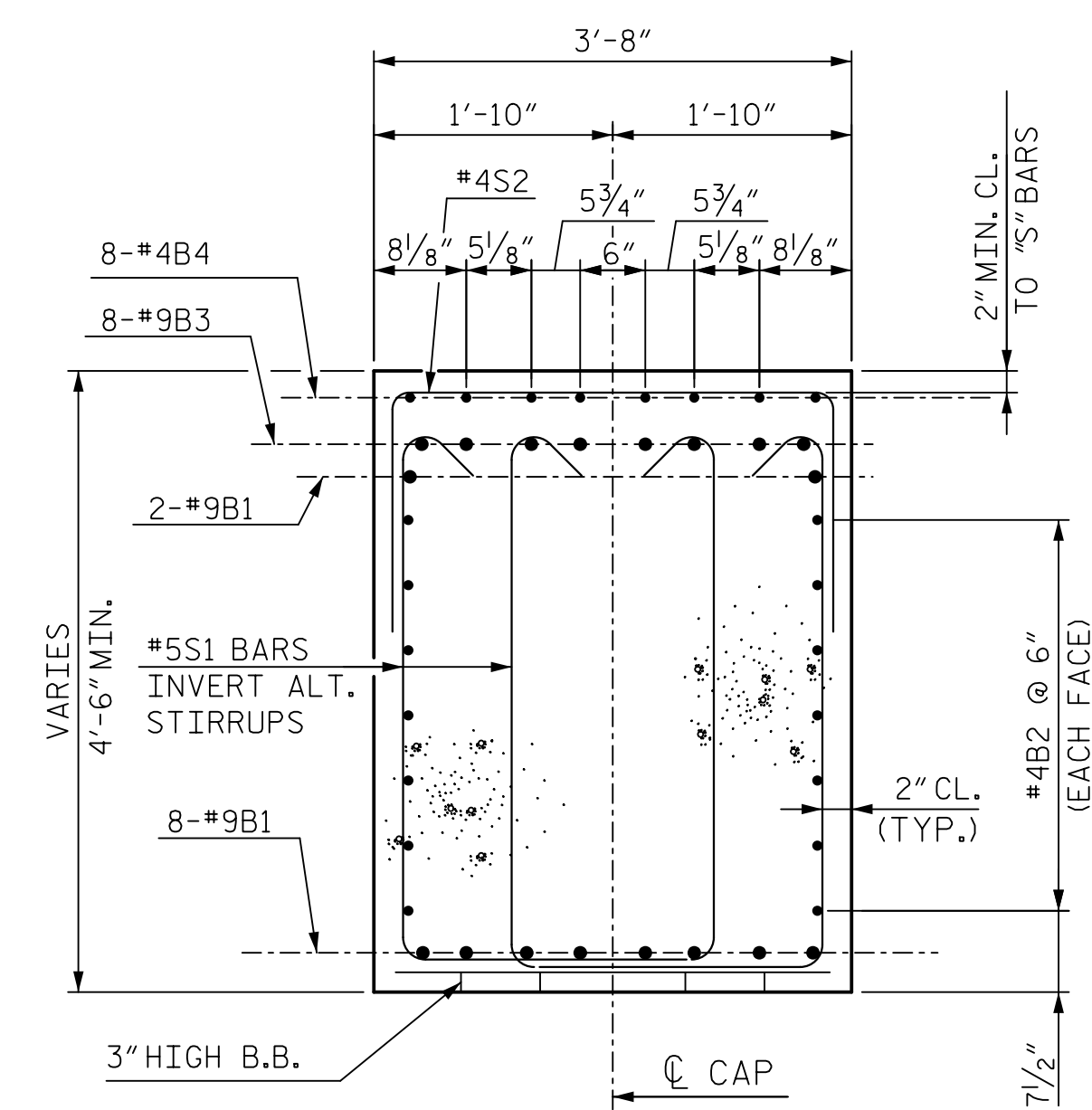
DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

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

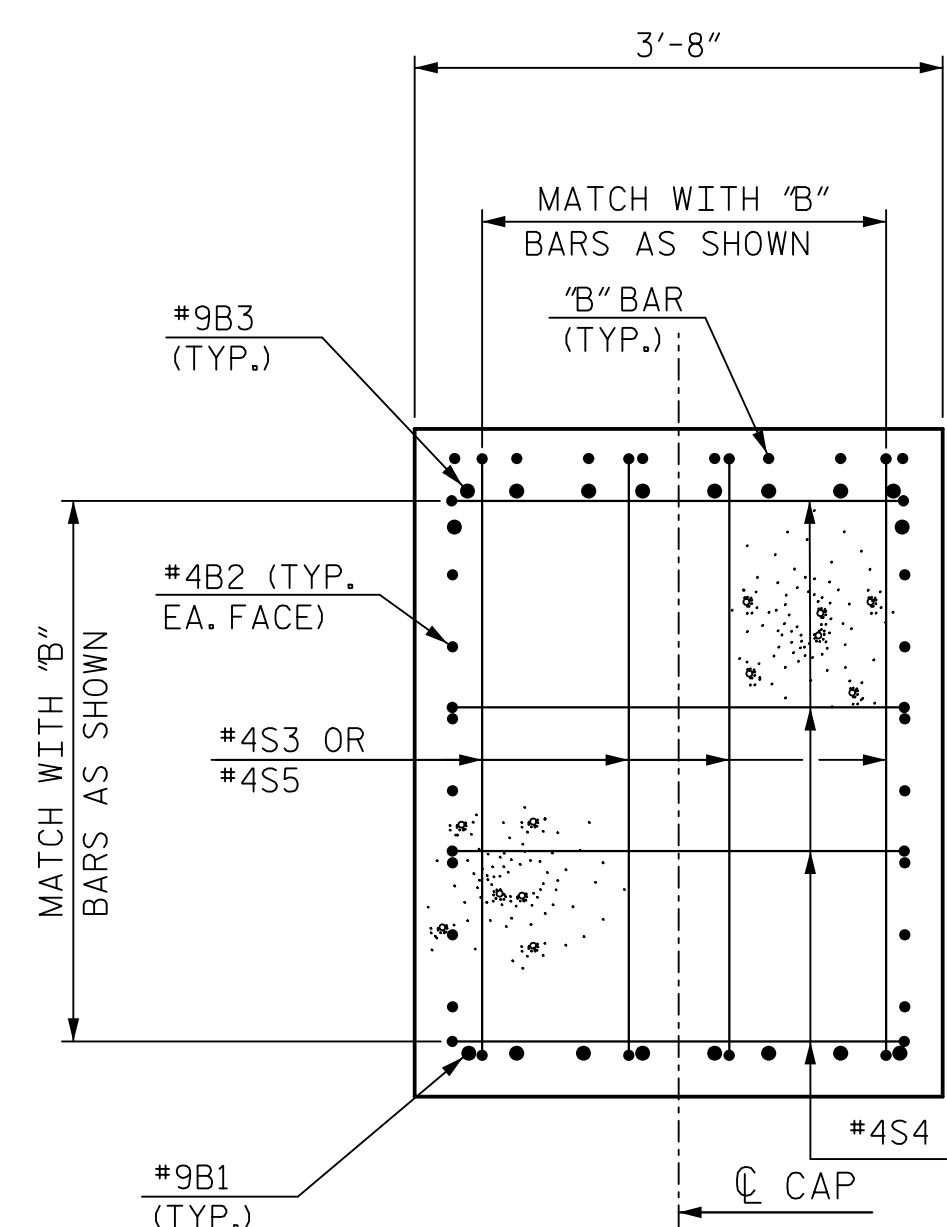
SHEET NO. S7-26
 TOTAL SHEETS 35



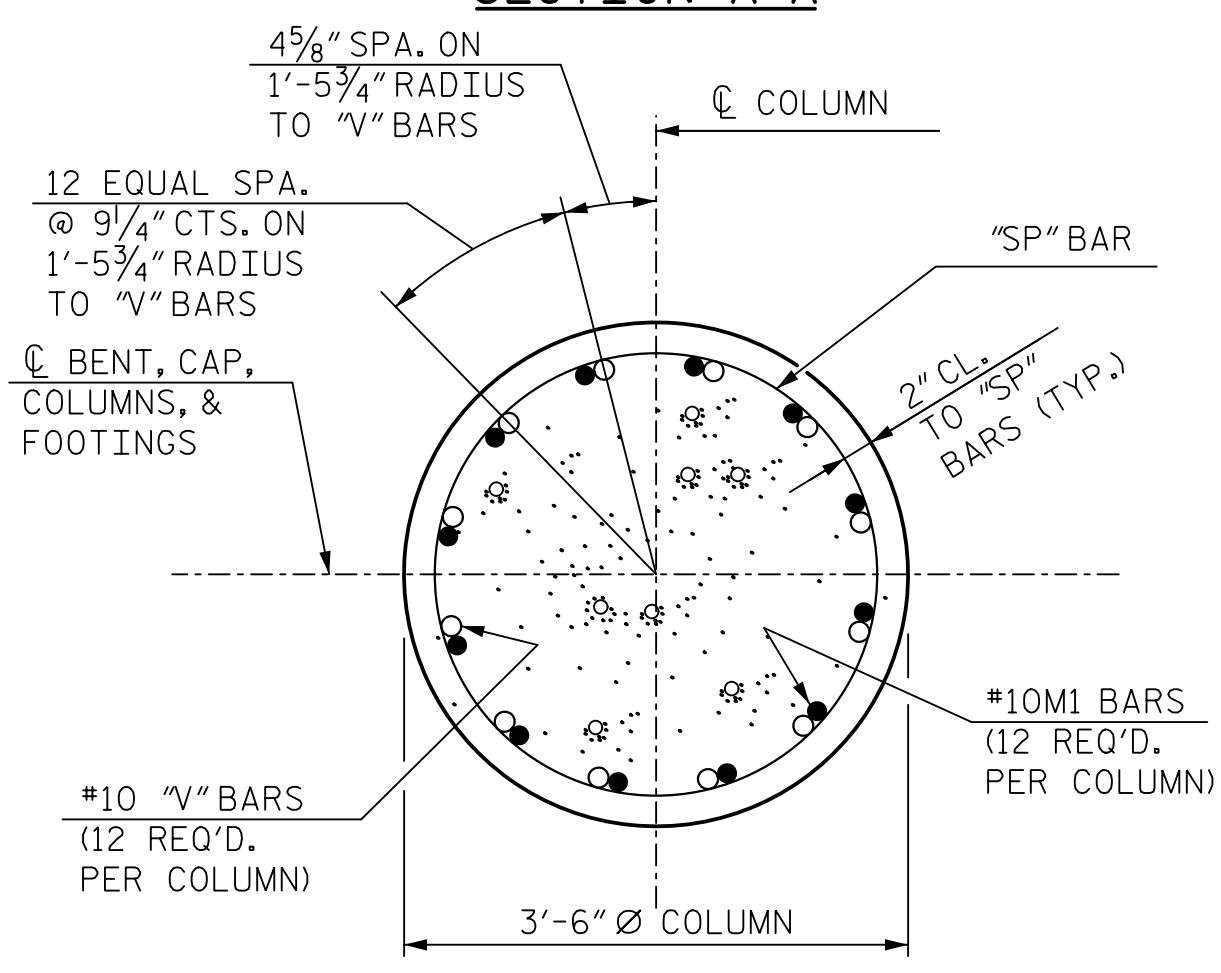
SECTION A-A



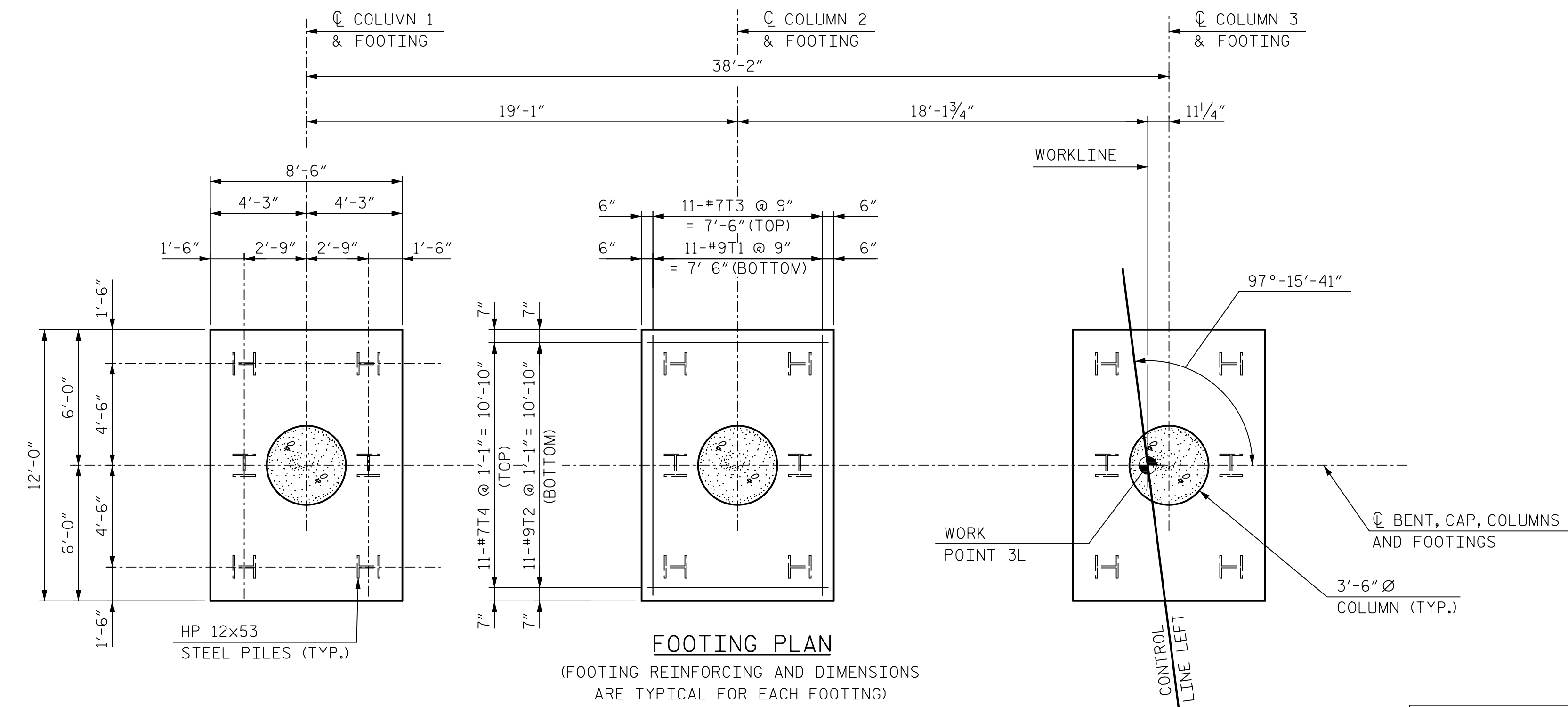
SECTION B-B



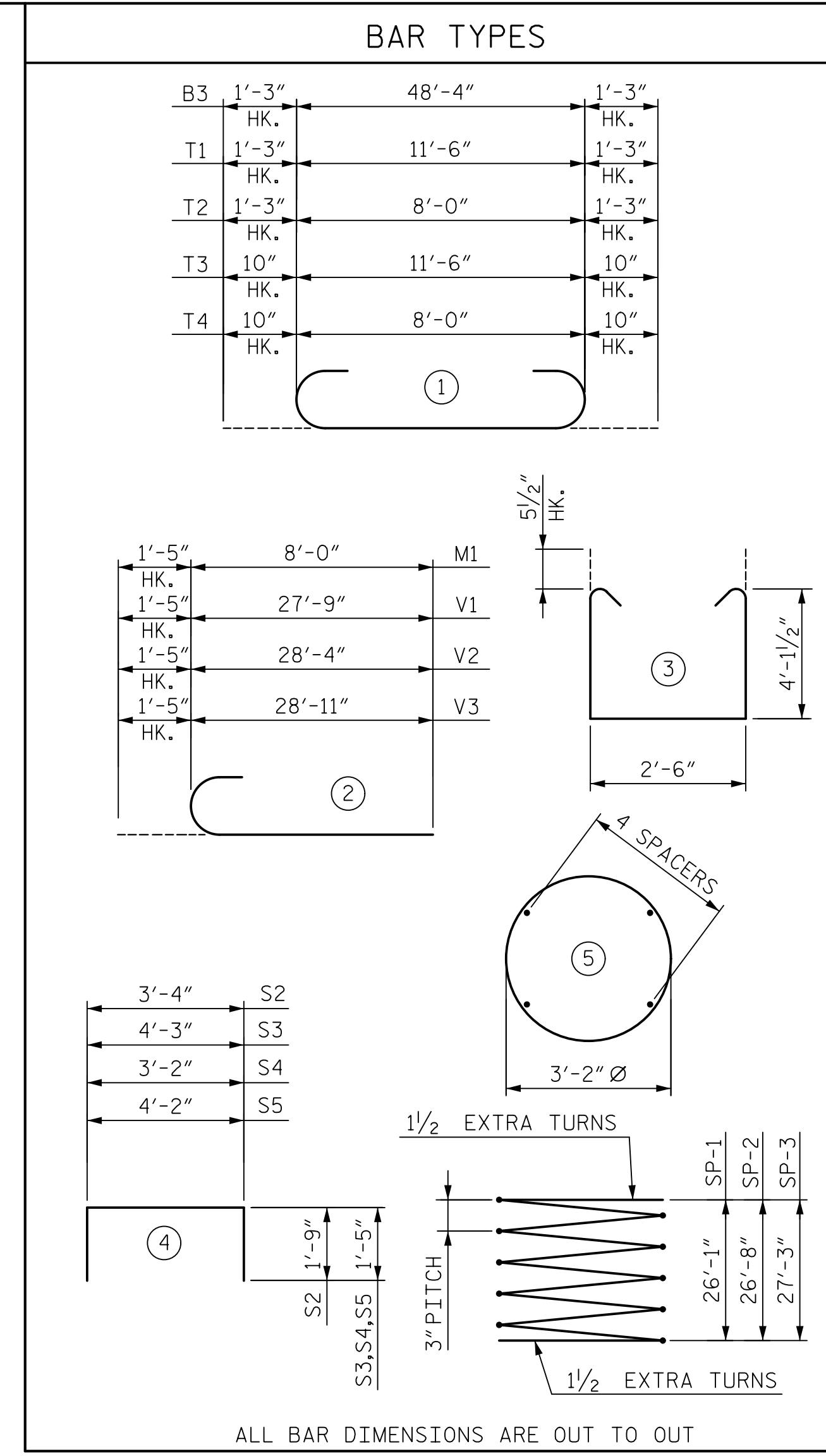
SECTION C-C



SECTION D-D



FOOTING PLAN
(FOOTING REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING)



ALL BAR DIMENSIONS ARE OUT TO OUT

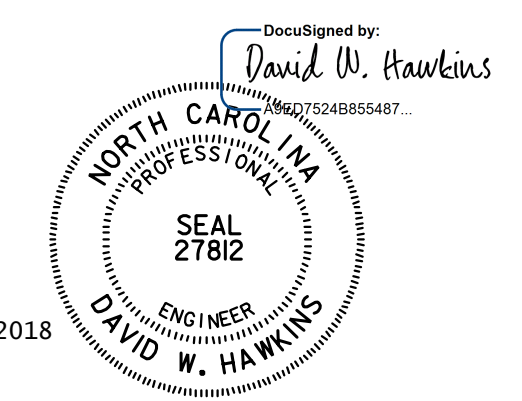
| BILL OF REINFORCING | | | | | |
|---------------------|-----|------|------|------------|--------|
| BENT 2 | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 10 | 9 | STR | 48'-8" | 1,643 |
| B2 | 28 | 4 | STR | 25'-5" | 475 |
| B3 | 8 | 9 | 1 | 50'-10" | 1,383 |
| B4 | 48 | 4 | STR | 3'-11" | 126 |
| M1 | 36 | 10 | 2 | 9'-5" | 1,459 |
| S1 | 128 | 5 | 3 | 11'-8" | 1,558 |
| S2 | 48 | 4 | 4 | 6'-10" | 219 |
| S3 | 4 | 4 | 4 | 7'-1" | 19 |
| S4 | 8 | 4 | 4 | 6'-0" | 32 |
| S5 | 4 | 4 | 4 | 7'-0" | 19 |
| T1 | 33 | 9 | 1 | 14'-0" | 1,571 |
| T2 | 33 | 9 | 1 | 10'-6" | 1,178 |
| T3 | 33 | 7 | 1 | 13'-2" | 888 |
| T4 | 33 | 7 | 1 | 9'-8" | 652 |
| V1 | 12 | 10 | 2 | 29'-2" | 1,506 |
| V2 | 12 | 10 | 2 | 29'-9" | 1,536 |
| V3 | 12 | 10 | 2 | 30'-4" | 1,566 |
| SP-1 | 1 | * | 5 | 1,060'-8" | 709 |
| SP-2 | 1 | * | 5 | 1,080'-4" | 722 |
| SP-3 | 1 | * | 5 | 1,099'-11" | 735 |

| QUANTITIES | | |
|---|----------|----------|
| REINFORCING STEEL | LBS. | 15,830 |
| SPIRAL COLUMN REINFORCING STEEL | LBS. | 2,166 |
| CLASS A CONCRETE | | |
| FOOTING POUR 1 | CU. YDS. | 48.2 |
| COLUMN POUR 2 | CU. YDS. | 28.4 |
| CAP POUR 3 | CU. YDS. | 30.7 |
| TOTAL | CU. YDS. | 107.3 |
| HP 12x53 STEEL PILES | NO. | 18 |
| | LIN. FT. | 1,350 |
| FOUNDATION EXCAVATION FOR BENT | LUMP SUM | LUMP SUM |
| PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES | NO. | 18 |
| PILE REDRIVES | NO. | 9 |

* THE SP SPIRAL REINFORCING STEEL SHALL BE W20 OR D20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 2 OF 2
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 BENT 2
 LEFT LANE



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DRAWN BY: M. WRIGHT DATE: 9/18
 CHECKED BY: N. HART DATE: 9/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

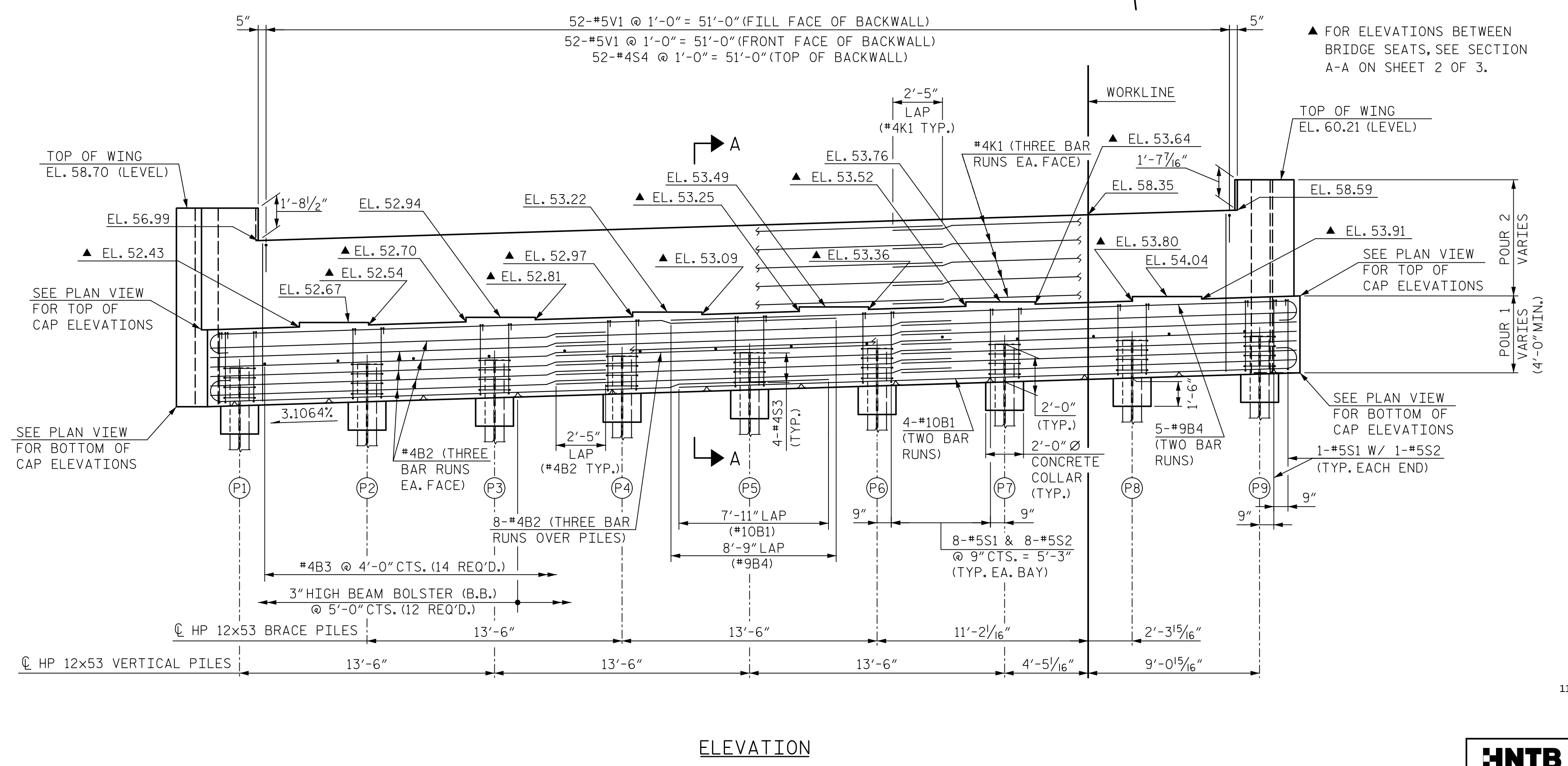
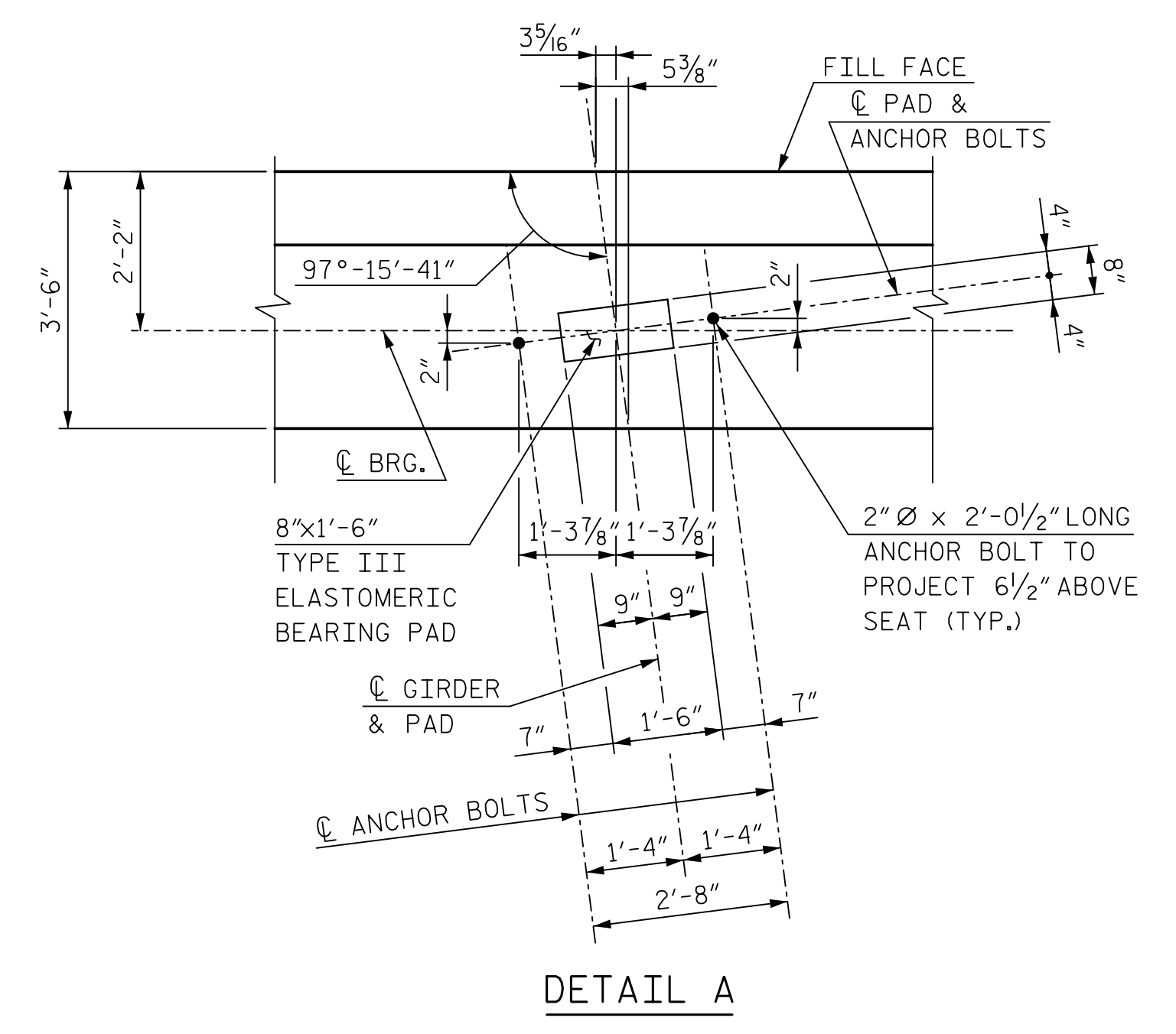
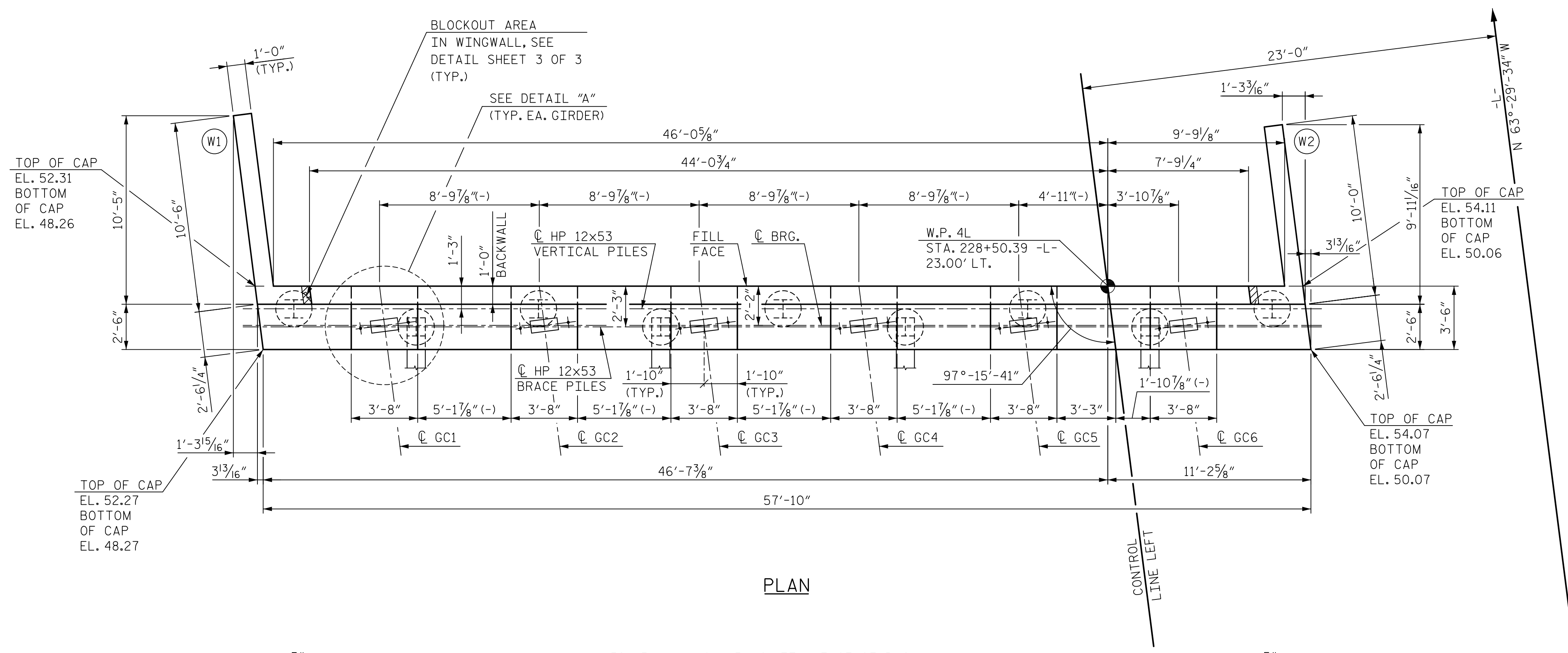
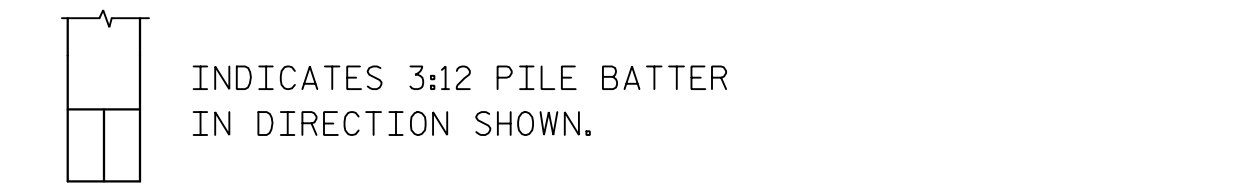
DWG. NO. 28

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 UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S7-28
 TOTAL SHEETS 35

NOTES:
 FOR NOTES AND PILE SPLICE DETAILS, SEE SHEET 3 OF 3.
 FOR WINGWALL DETAILS AND SECTION A-A, SEE SHEET 2 OF 3.



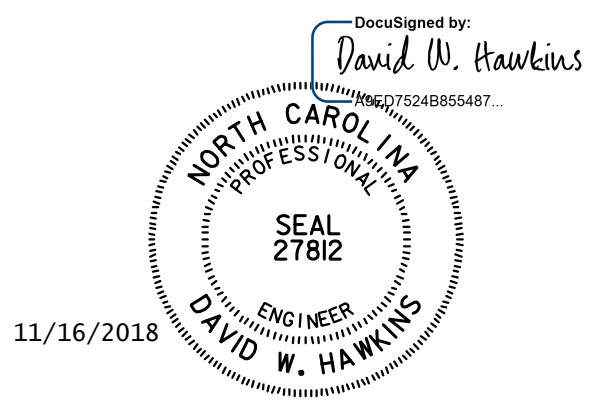
| TOP OF PILE ELEVATIONS | |
|------------------------|-------|
| (P1) | 50.33 |
| (P2) | 50.54 |
| (P3) | 50.75 |
| (P4) | 50.96 |
| (P5) | 51.17 |
| (P6) | 51.38 |
| (P7) | 51.59 |
| (P8) | 51.79 |
| (P9) | 52.00 |

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
END BENT 2
LEFT LANE



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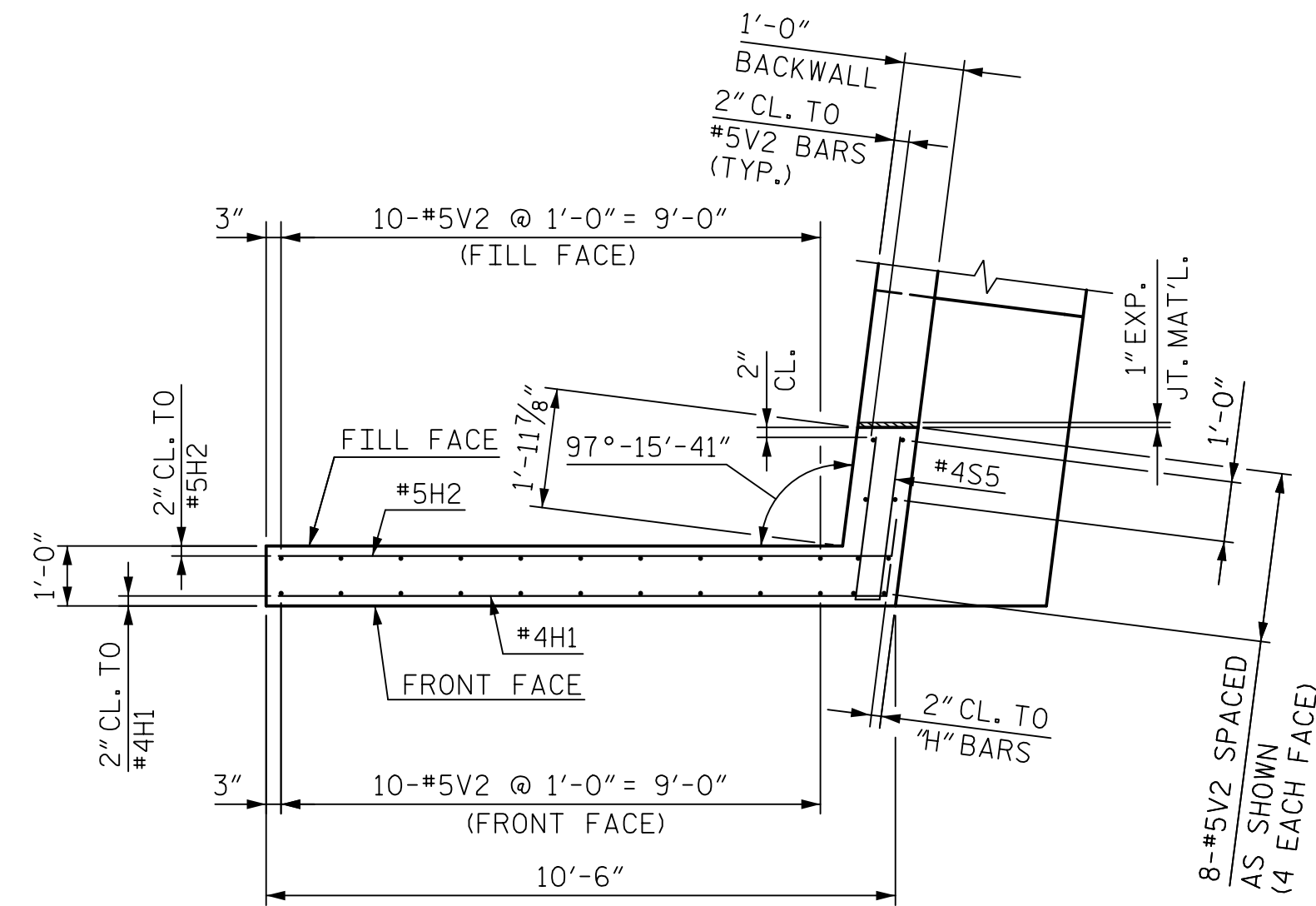
DRAWN BY: M. WRIGHT DATE: 9/18
 CHECKED BY: N. SALAS ZAMUDIO DATE: 9/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 29

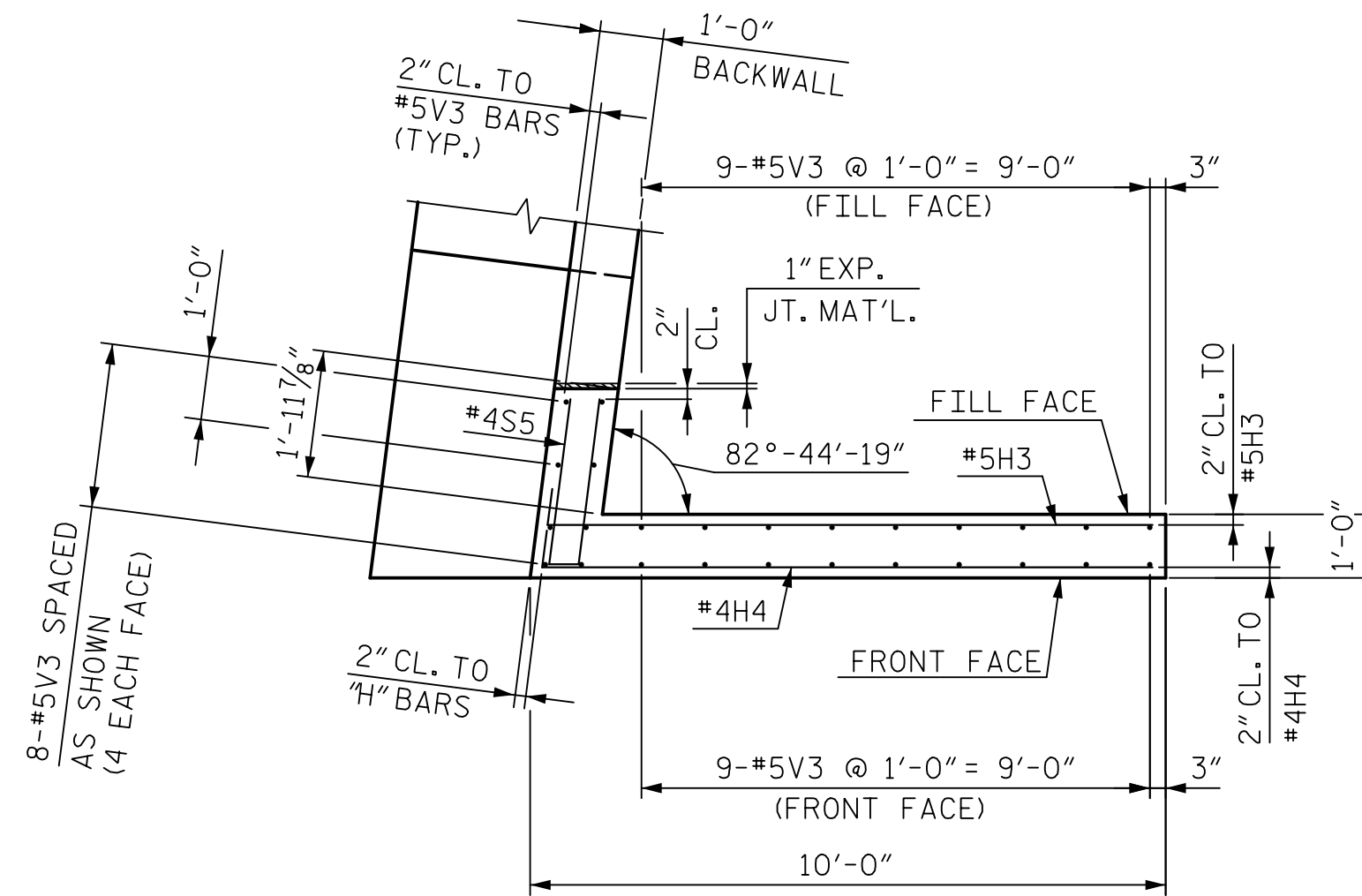
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| REVISIONS | | | | | | SHEET NO. S7-29 |
|-----------|----|------|-----|----|------|--------------------|
| NO. | BY | DATE | NO. | BY | DATE | |
| 1 | | | 3 | | | TOTAL SHEETS 35 |
| 2 | | | 4 | | | |

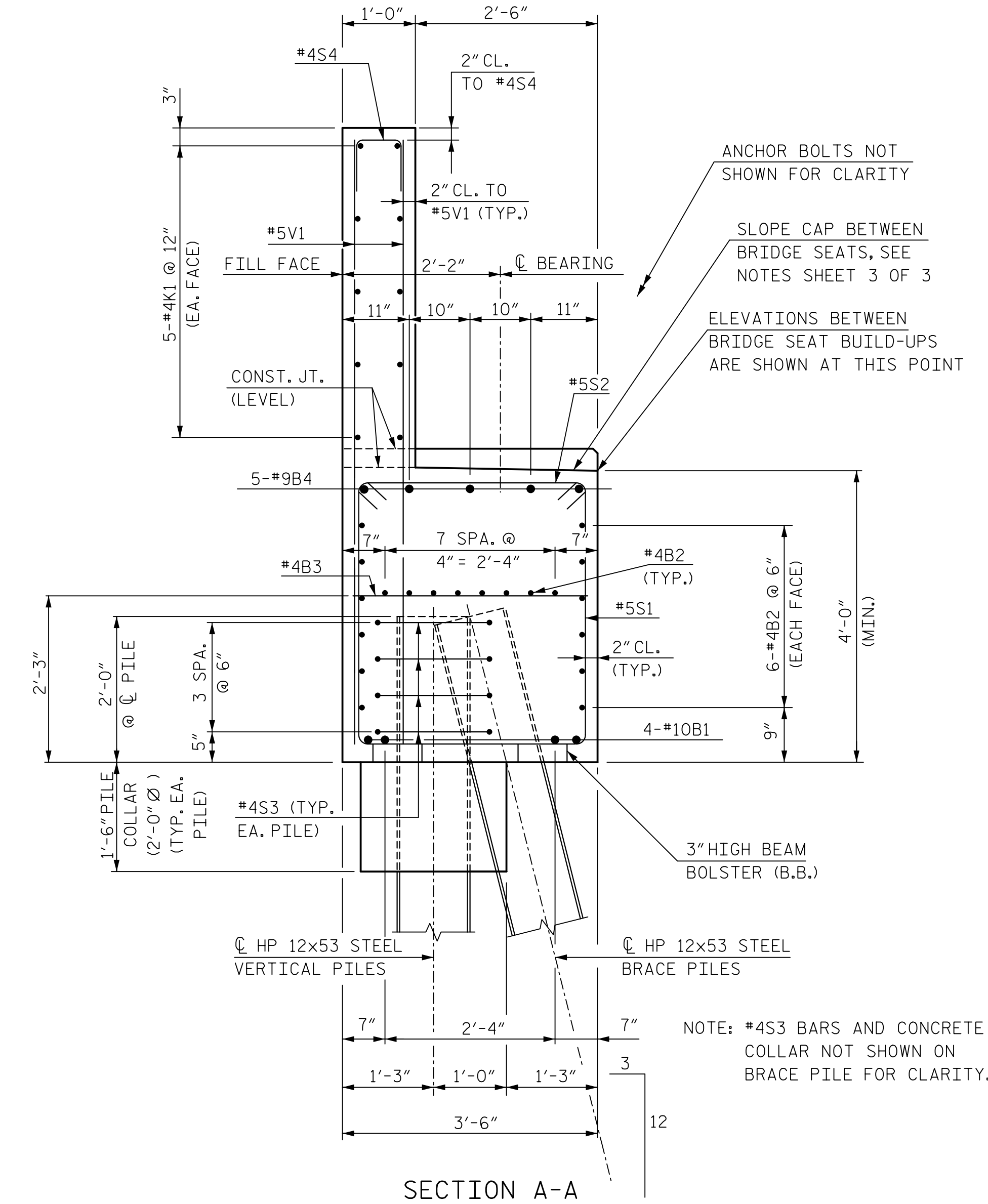
NOTES:
 FOR NOTES, SEE SHEET 3 OF 3.
 FOR BLOCKOUT IN WINGWALL, SEE SHEET 3 OF 3.



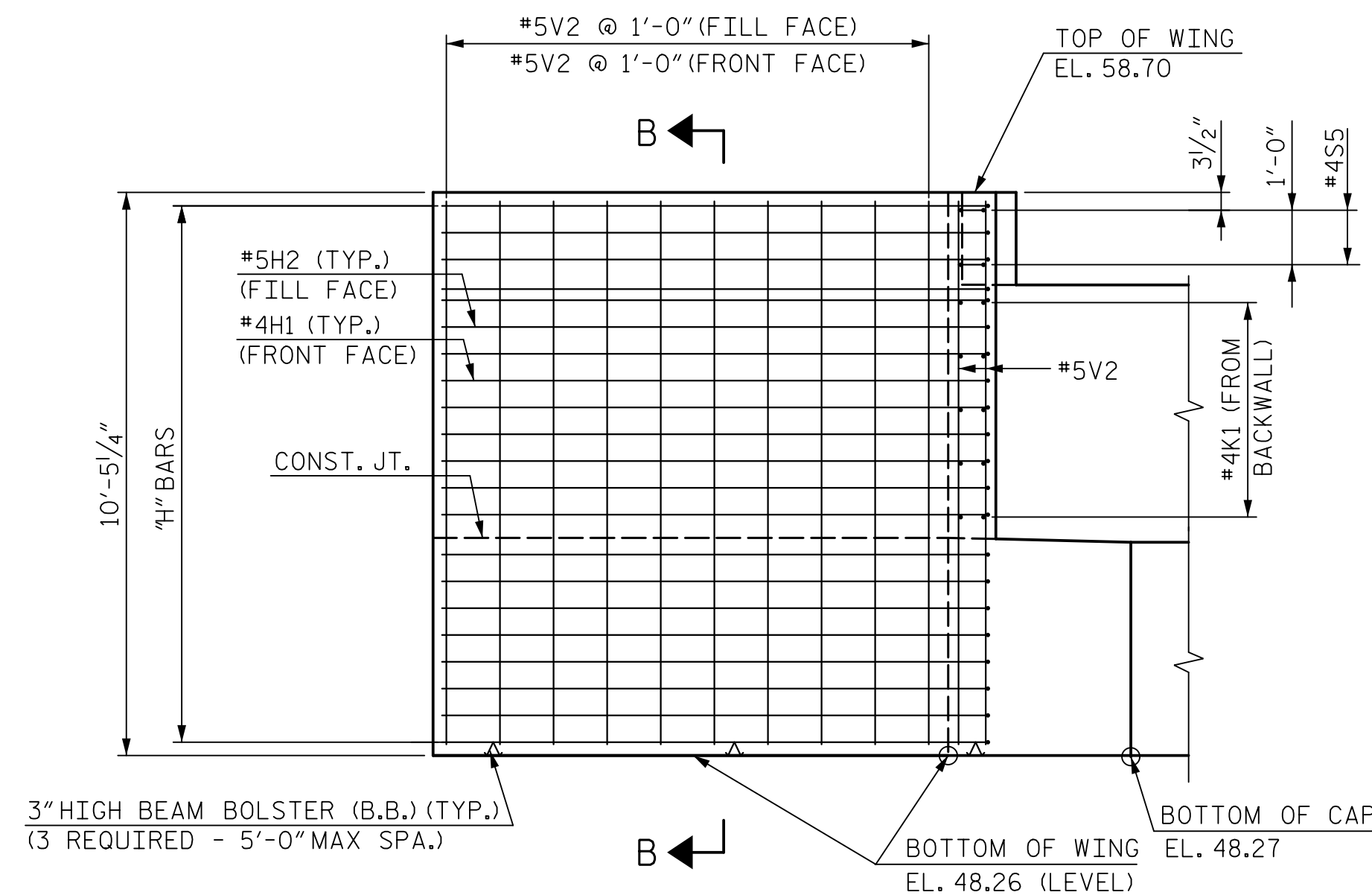
PLAN OF WING (W1)



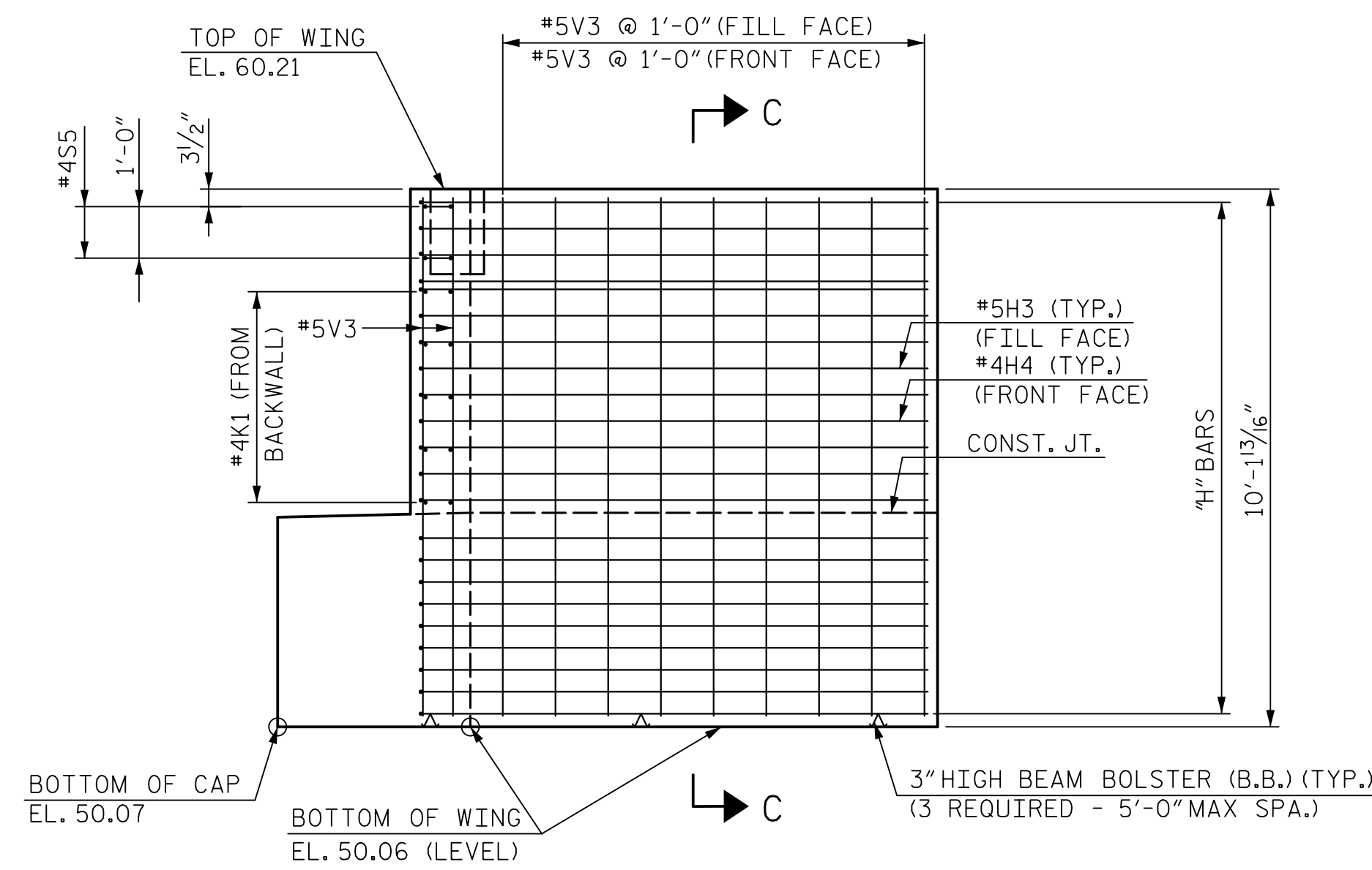
PLAN OF WING (W2)



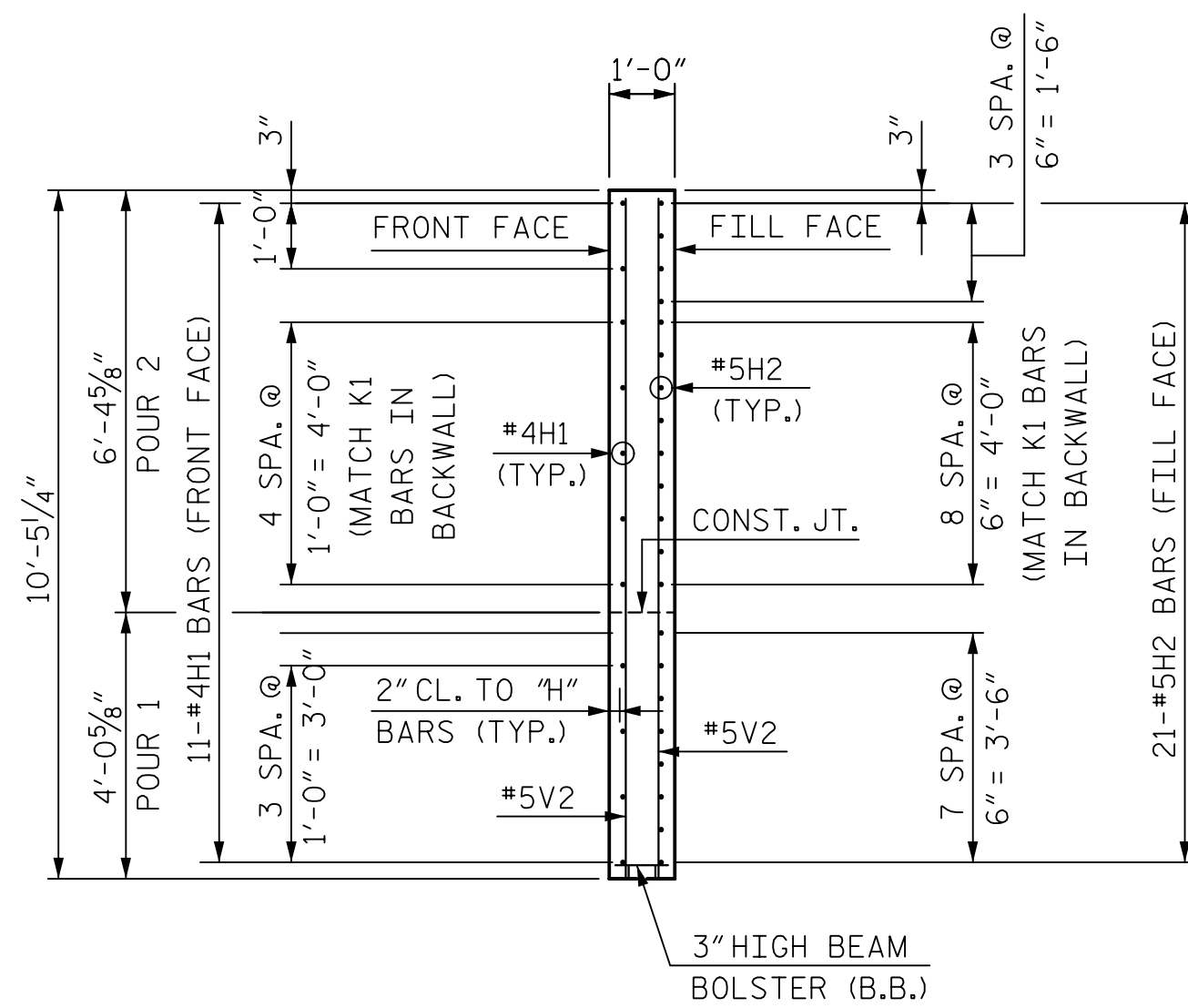
SECTION A-A



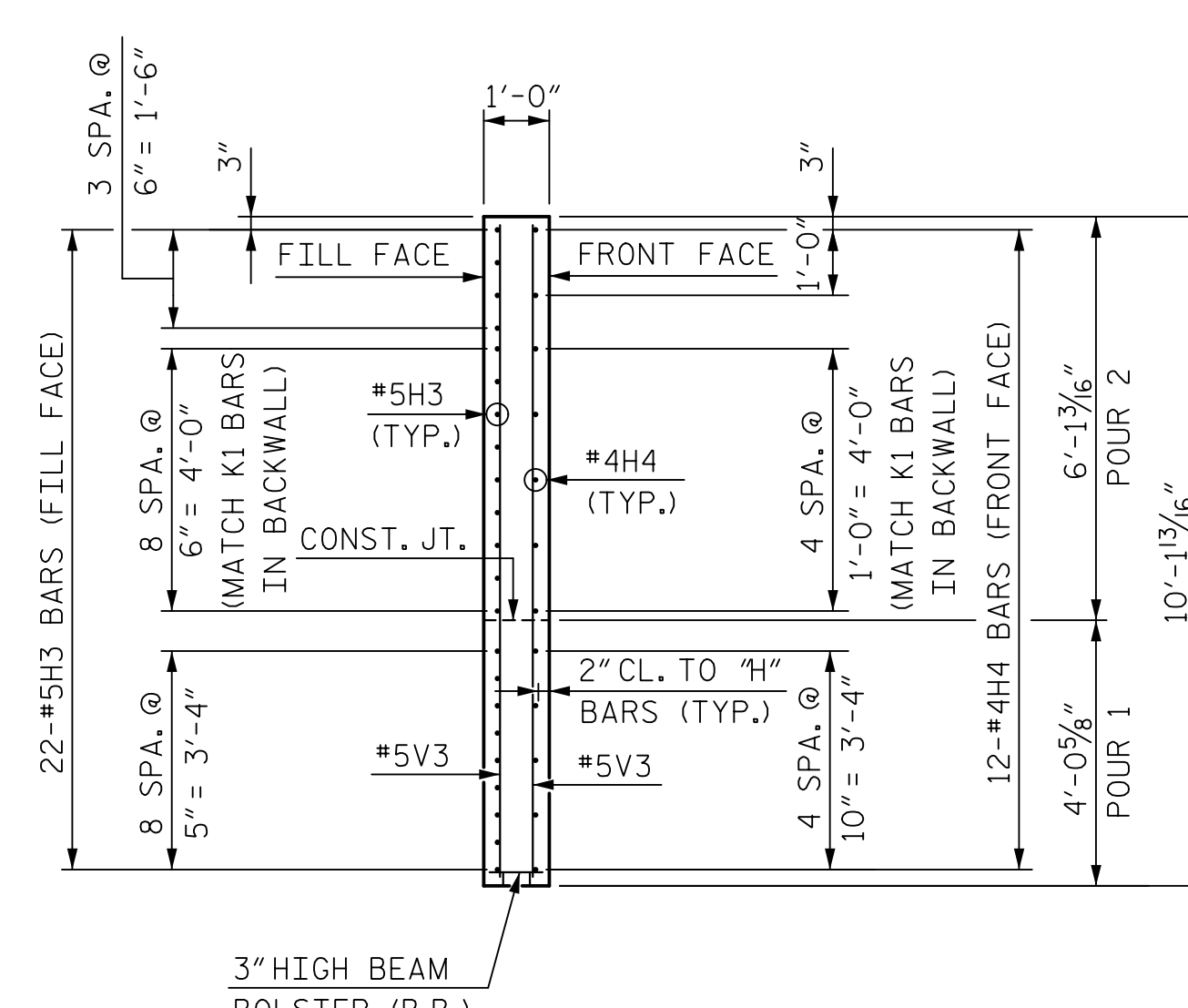
ELEVATION OF WING (W1)



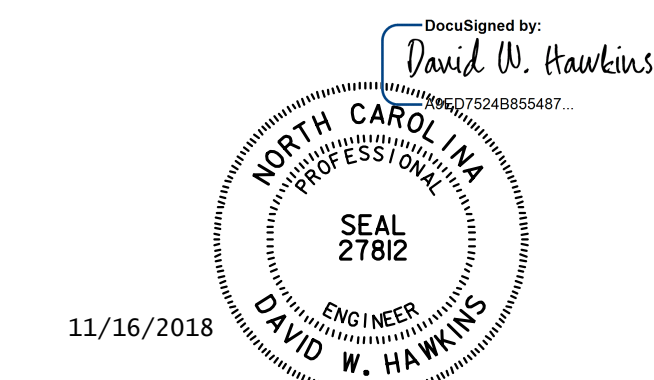
ELEVATION OF WING (W2)



SECTION B-B



SECTION C-C



PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

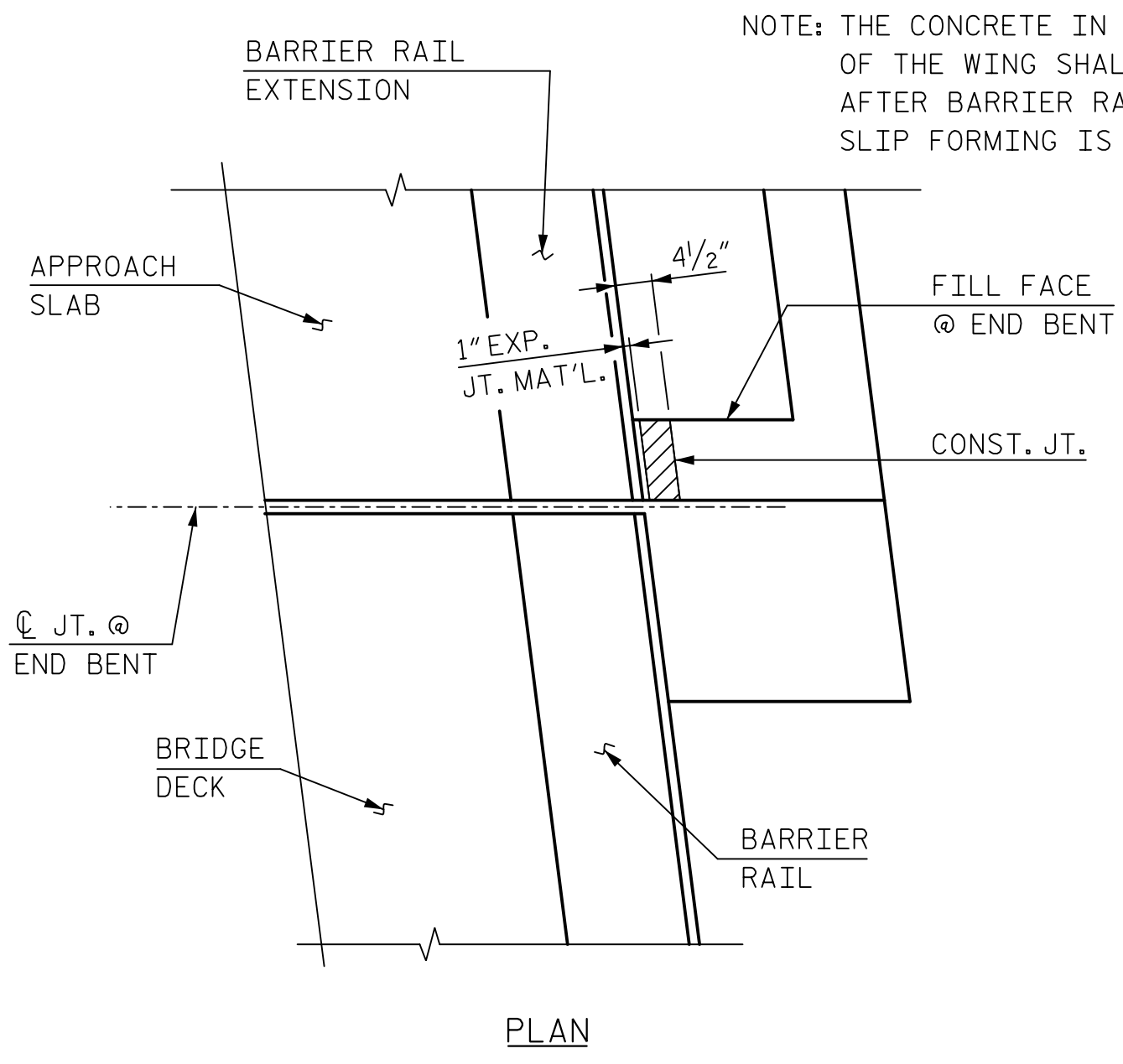
SUBSTRUCTURE
 END BENT 2
 LEFT LANE

| | | | |
|---------------------------------------|------------|--|------------|
| HNTB | | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | |
| DRAWN BY: M. WRIGHT | DATE: 9/18 | CHECKED BY: N. SALAS ZAMUDIO | DATE: 9/18 |
| DESIGN ENGINEER OF RECORD: D. HAWKINS | DATE: 9/18 | DWG. NO. 30 | |

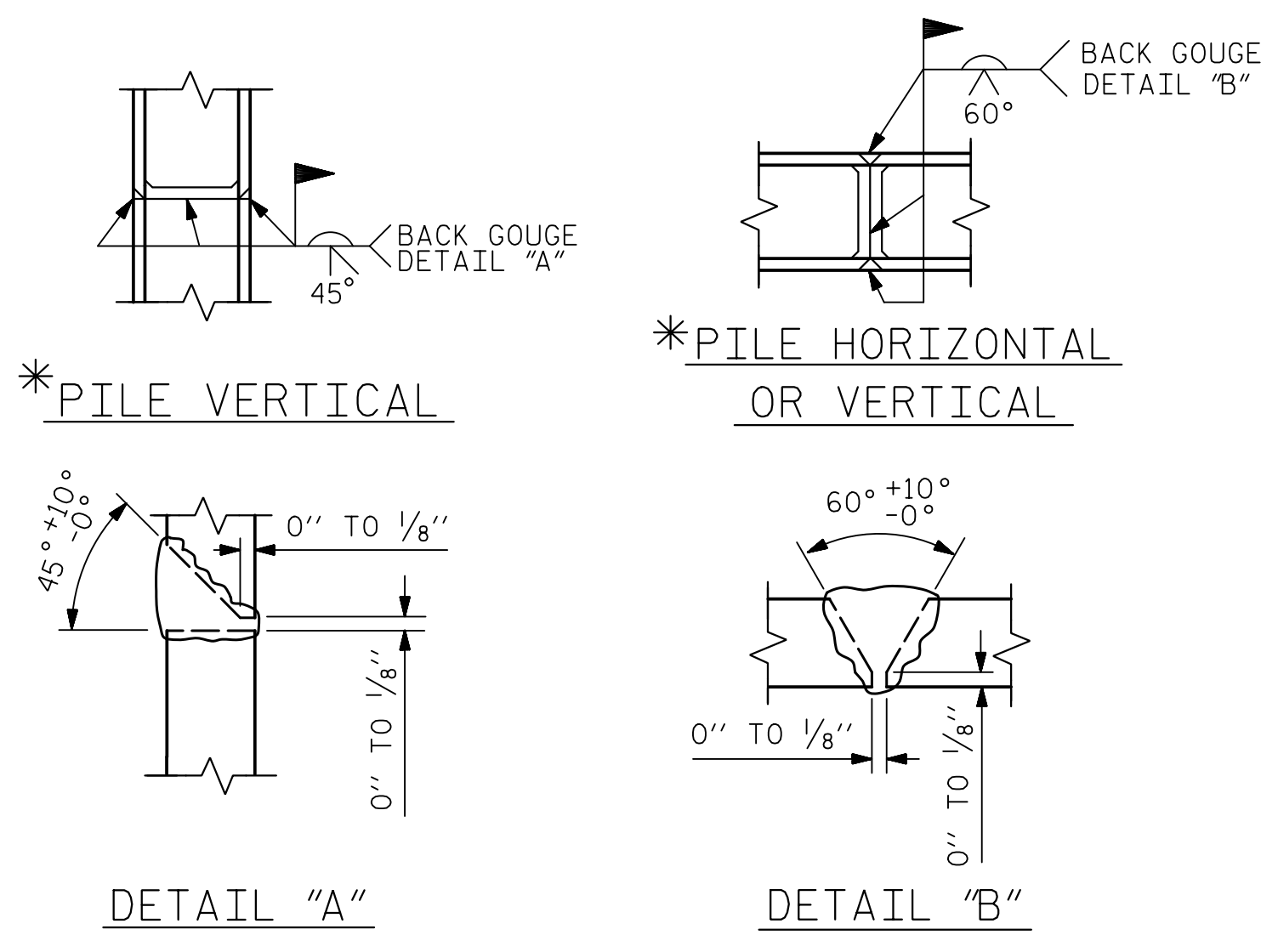
| REVISIONS | | | | SHEET NO. | |
|-----------|----|------|-----|-----------|------|
| NO. | BY | DATE | NO. | BY | DATE |
| 1 | | | 3 | | |
| 2 | | | 4 | | |

TOTAL SHEETS: 35

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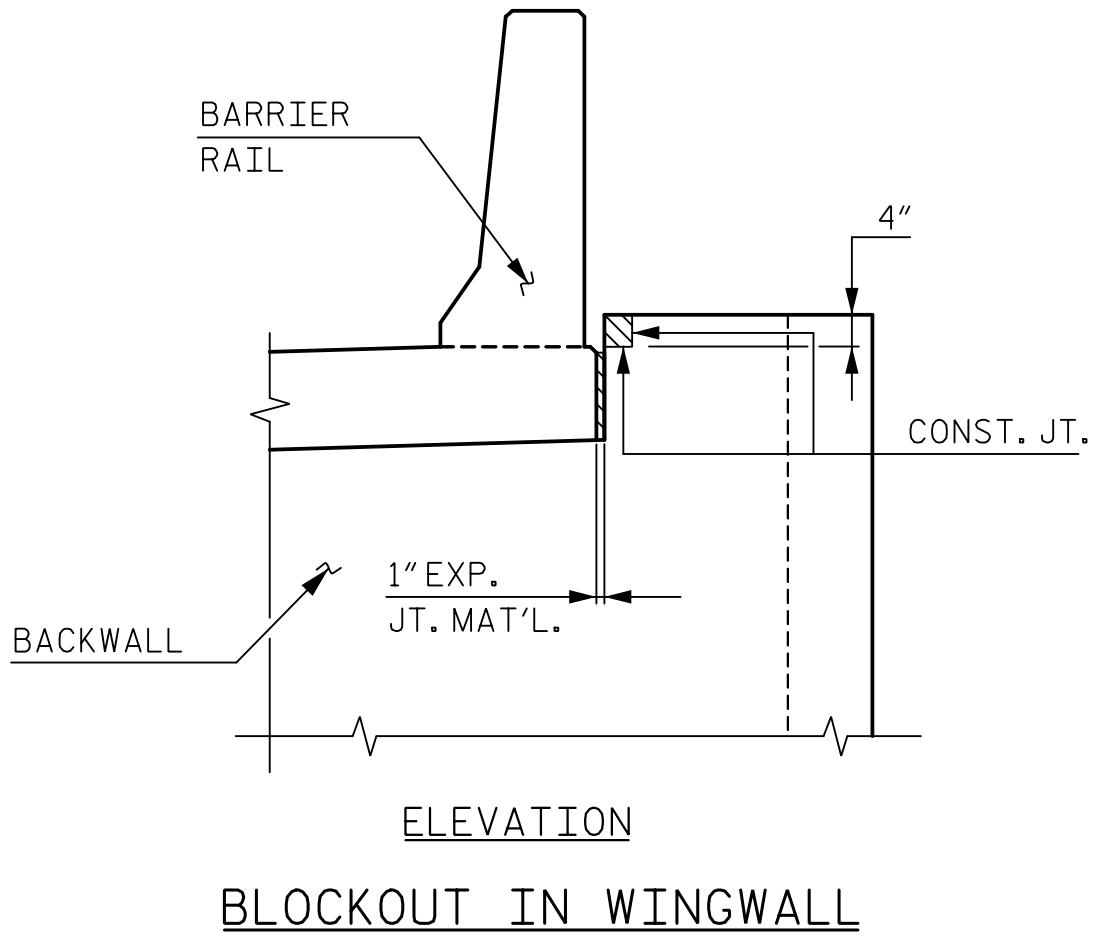


NOTE: THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

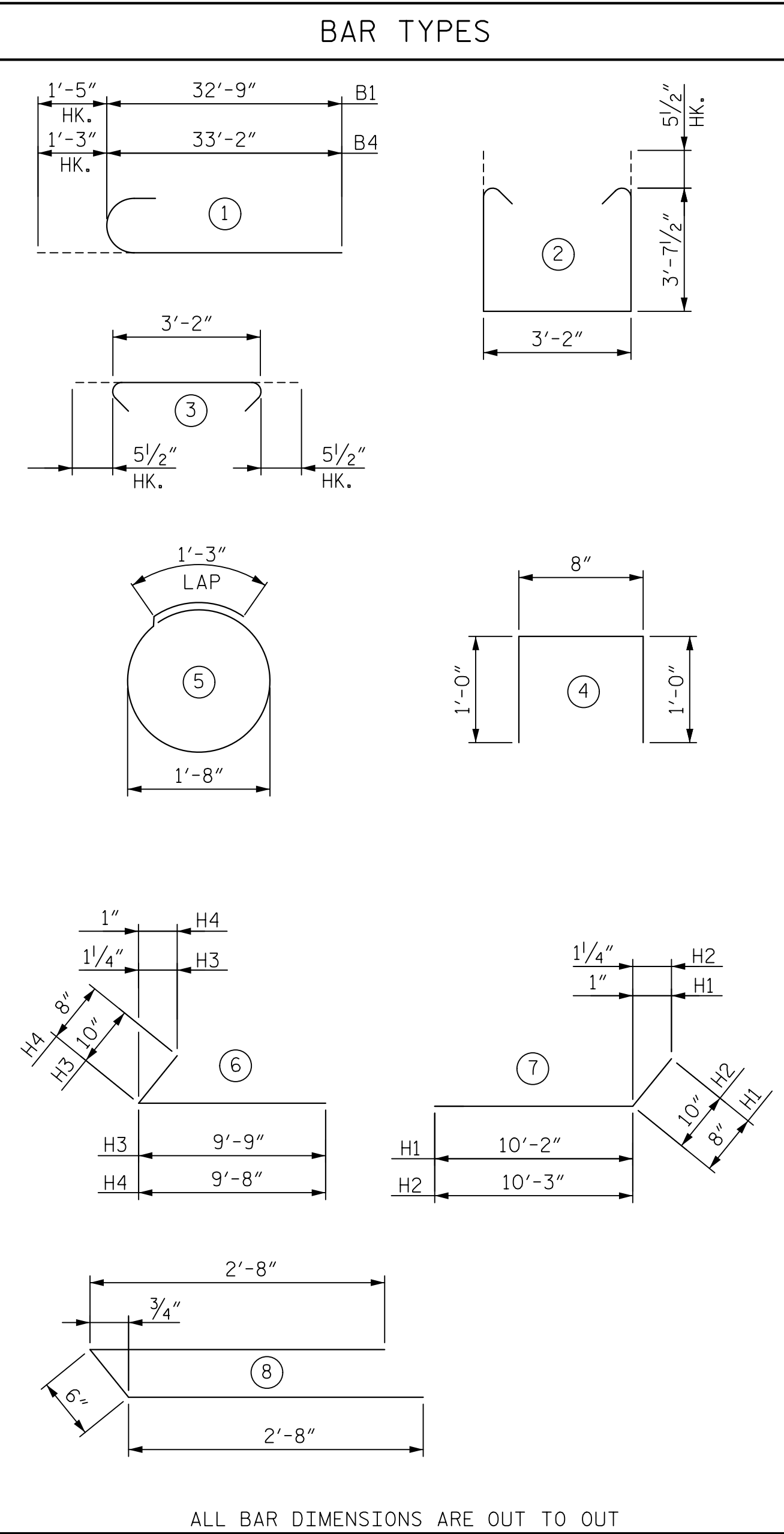


PILE SPLICE DETAILS

* POSITION OF PILE DURING WELDING.

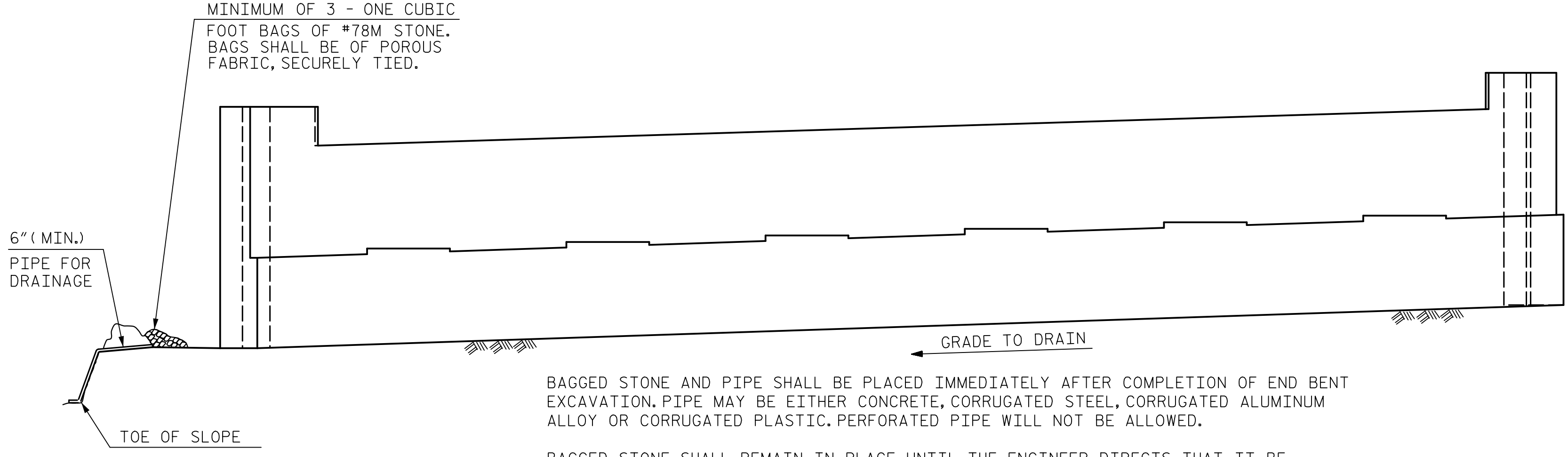


NOTES:
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
 THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
 THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.



| BILL OF REINFORCING | | | | | |
|---------------------|-----|------|------|---------|--------|
| END BENT 2 | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 8 | 10 | | 34'-2" | 1,176 |
| B2 | 60 | 4 | STR | 20'-10" | 835 |
| B3 | 14 | 4 | STR | 3'-2" | 30 |
| B4 | 10 | 9 | 1 | 34'-5" | 1,170 |
| H1 | 11 | 4 | 7 | 10'-10" | 80 |
| H2 | 21 | 5 | 7 | 11'-1" | 243 |
| H3 | 22 | 5 | 6 | 10'-7" | 243 |
| H4 | 12 | 4 | 6 | 10'-4" | 83 |
| K1 | 30 | 4 | STR | 20'-10" | 418 |
| S1 | 68 | 5 | 2 | 11'-4" | 804 |
| S2 | 68 | 5 | 3 | 4'-1" | 290 |
| S3 | 36 | 4 | 5 | 6'-6" | 156 |
| S4 | 52 | 4 | 4 | 2'-8" | 93 |
| S5 | 4 | 4 | 8 | 5'-10" | 16 |
| V1 | 104 | 5 | STR | 8'-0" | 868 |
| V2 | 28 | 5 | STR | 9'-11" | 290 |
| V3 | 26 | 5 | STR | 9'-8" | 262 |

| QUANTITIES | | |
|---|----------|-------|
| REINFORCING STEEL | LBS. | 7,057 |
| CLASS "A" CONCRETE BREAKDOWN | | |
| POUR 1 - CAP, BOT. OF WINGS & COLLARS | CU. YDS. | 35.0 |
| POUR 2 - TOP OF WINGS & BACKWALL | CU. YDS. | 14.3 |
| TOTAL | CU. YDS. | 49.3 |
| HP 12x53 STEEL PILES | NO. | 9 |
| | LIN. FT. | 675 |
| PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES | NO. | 9 |
| PILE REDRIVES | NO. | 5 |



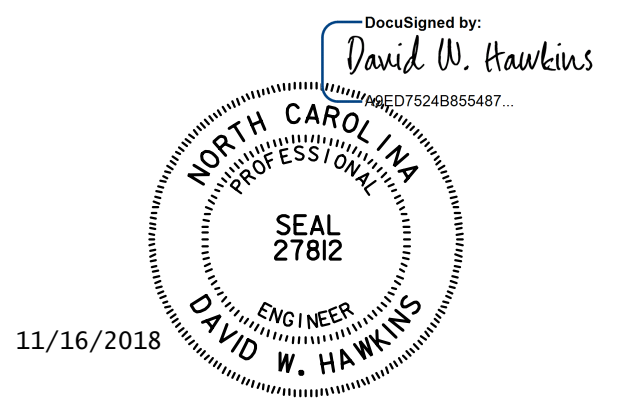
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.
 BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. 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 FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT 2

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 2
 LEFT LANE



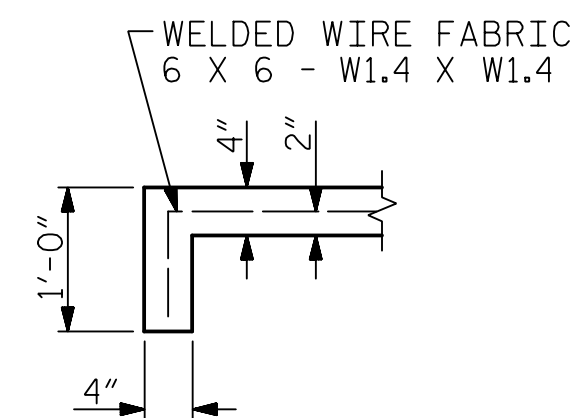
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DRAWN BY: M. WRIGHT DATE: 9/18
 CHECKED BY: N. SALAS ZAMUDIO DATE: 9/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 31

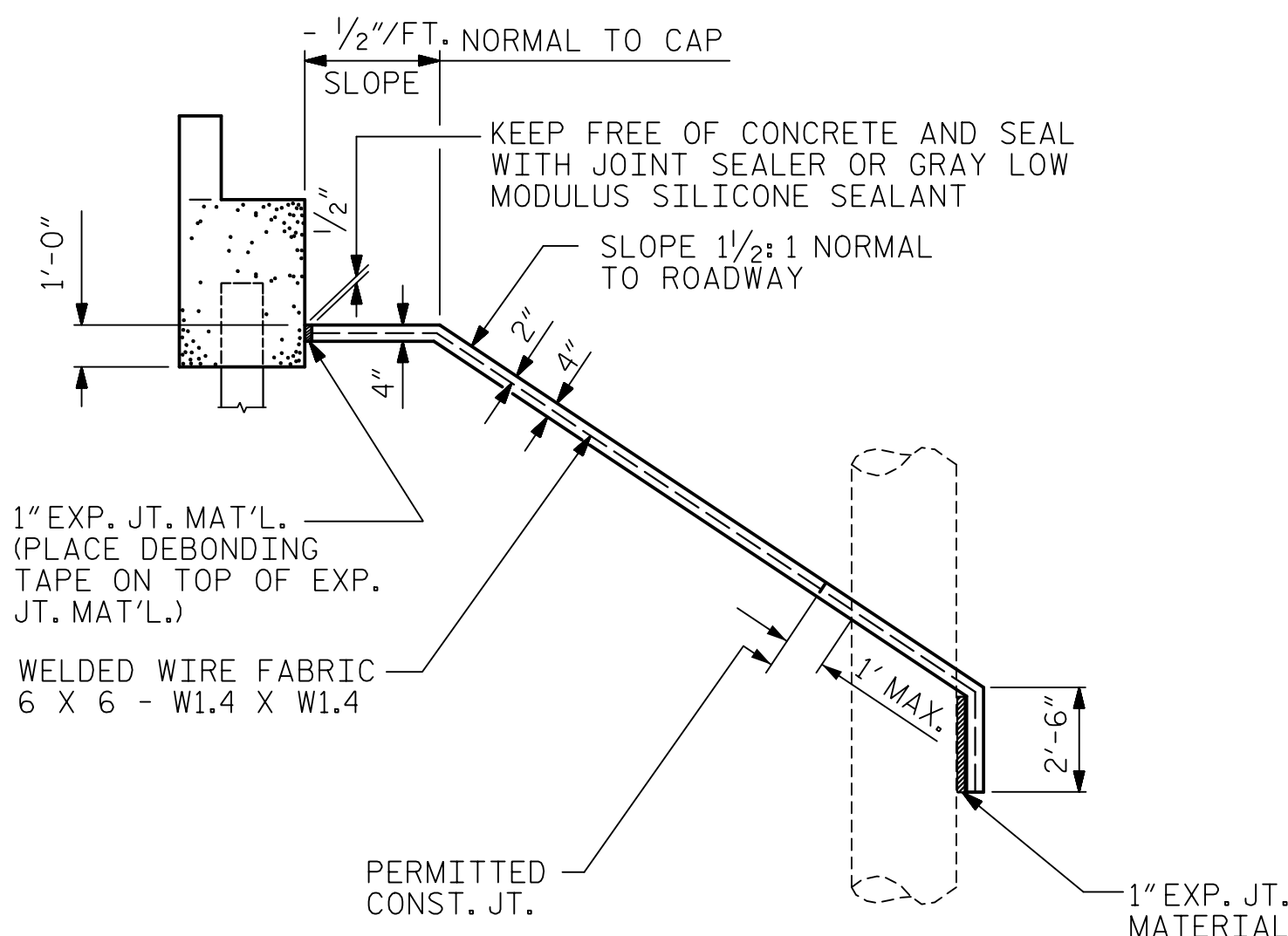
| REVISIONS | | | | | | SHEET NO. |
|-----------|----|------|-----|----|------|--------------|
| NO. | BY | DATE | NO. | BY | DATE | S7-31 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

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SECTION A-A

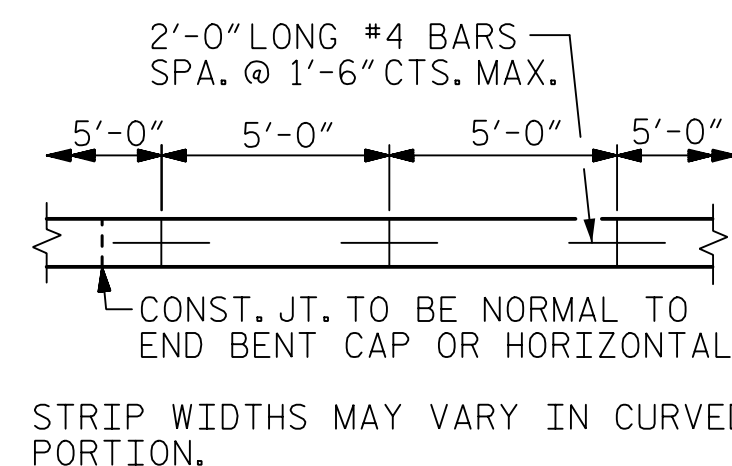
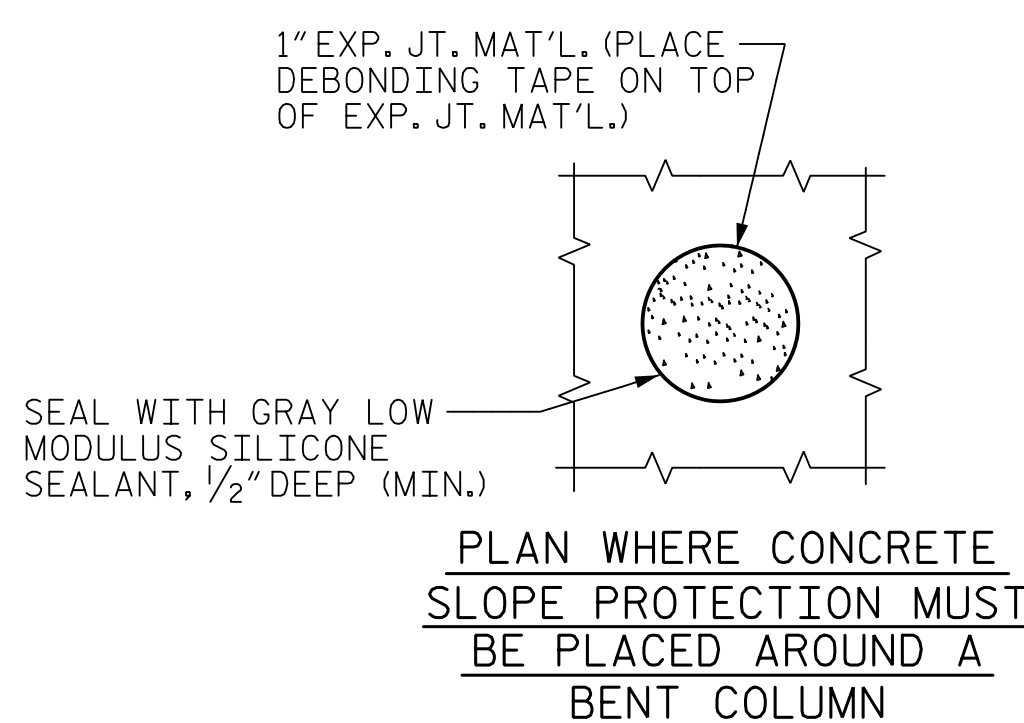
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL 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.



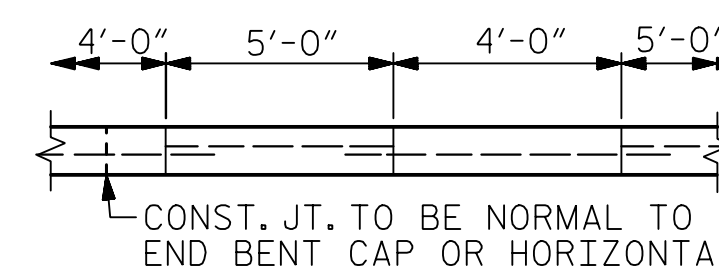
SECTION B-B

| | | |
|--------------------------------|----------------------------|---|
| BRIDGE @ STA. 227+57.02 -L- | 4 INCH SLOPE PROTECTION | * WELDED WIRE FABRIC 60 INCHES WIDE |
| | SQUARE YARDS | APPROX. L.F. |
| END BENT 1 | 700 | 1,405 |
| END BENT 2 | 660 | 1,320 |

* QUANTITY SHOWN IS BASED ON 5' POURS.



POURING DETAIL

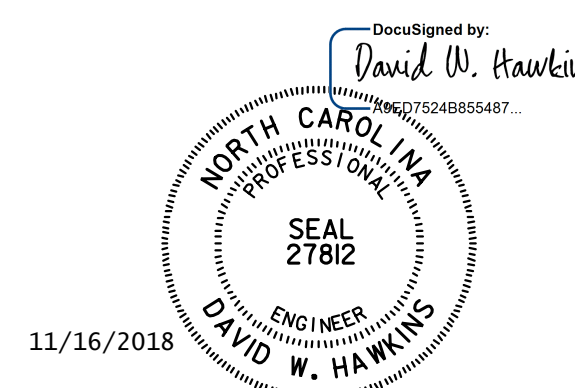


OPTIONAL POURING DETAIL

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 1 OF 2

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

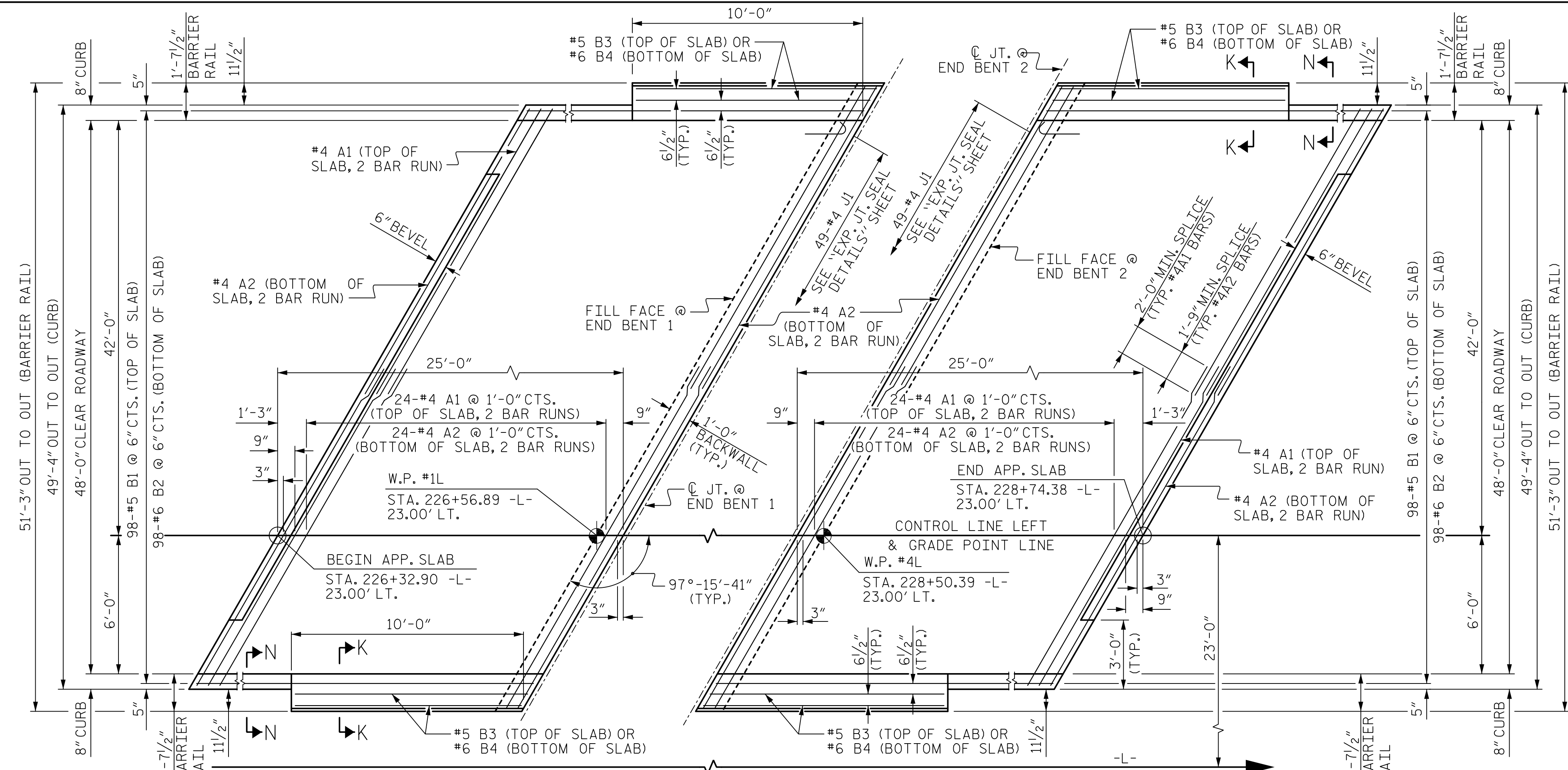


| | | |
|--------------------------|---------------|---------|
| ASSEMBLED BY : M. WRIGHT | DATE : 9/18 | MAA/GM |
| CHECKED BY : N. HART | DATE : 9/18 | MAA/TMG |
| DRAWN BY : ELR 5/92 | REV. 12/21/11 | MAA/THC |
| CHECKED BY : GRP 6/92 | REV. 1/16 | |
| | REV. 12/17 | |

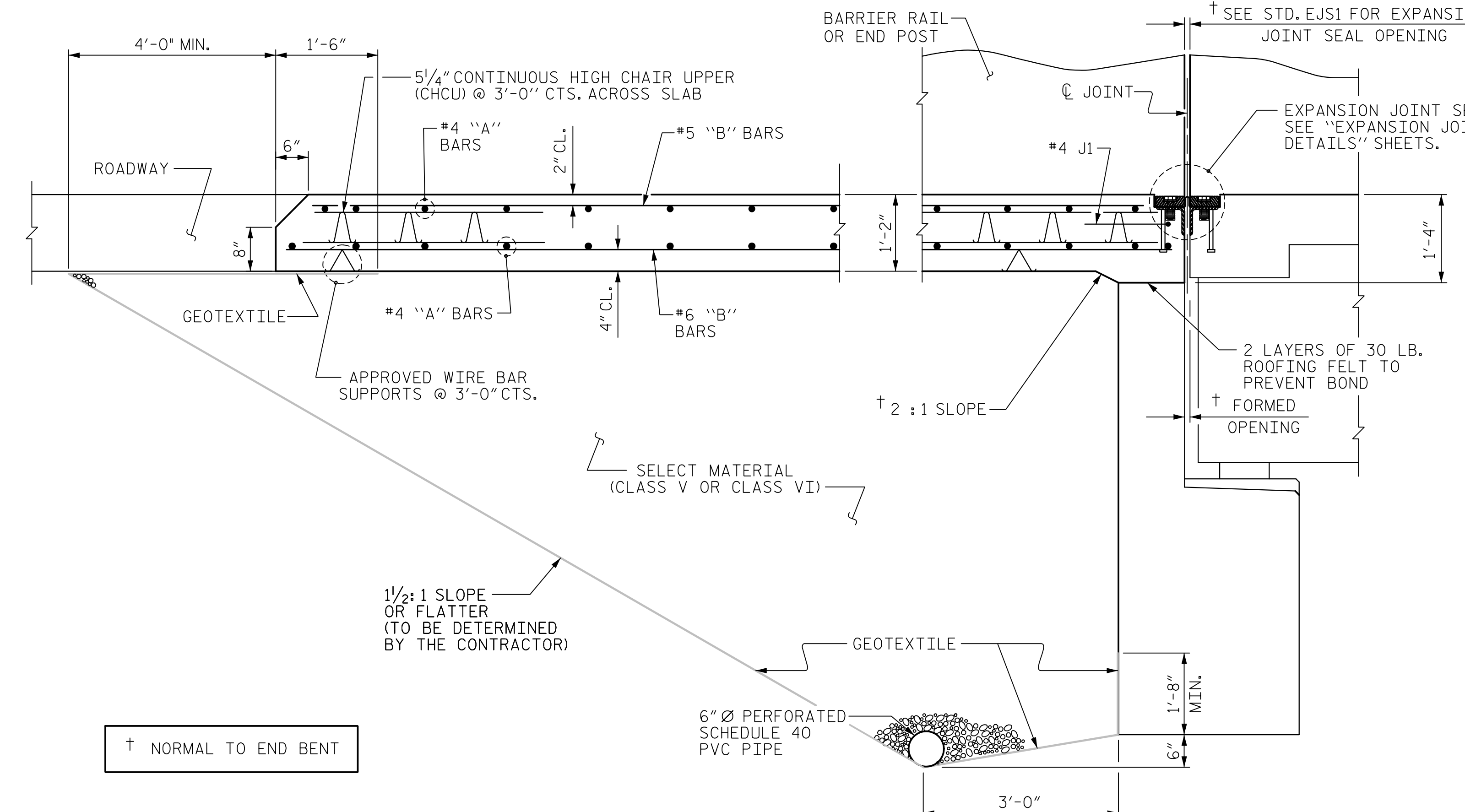
**DOCUMENT NOT CONSIDERED FINAL
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| DRAWN BY : M. WRIGHT | DATE : 9/18 |
| CHECKED BY : N. HART | DATE : 9/18 |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 |

| REVISIONS | | | | | | SHEET NO. |
|-----------|----|------|-----|----|------|--------------|
| NO. | BY | DATE | NO. | BY | DATE | S7-32 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |



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

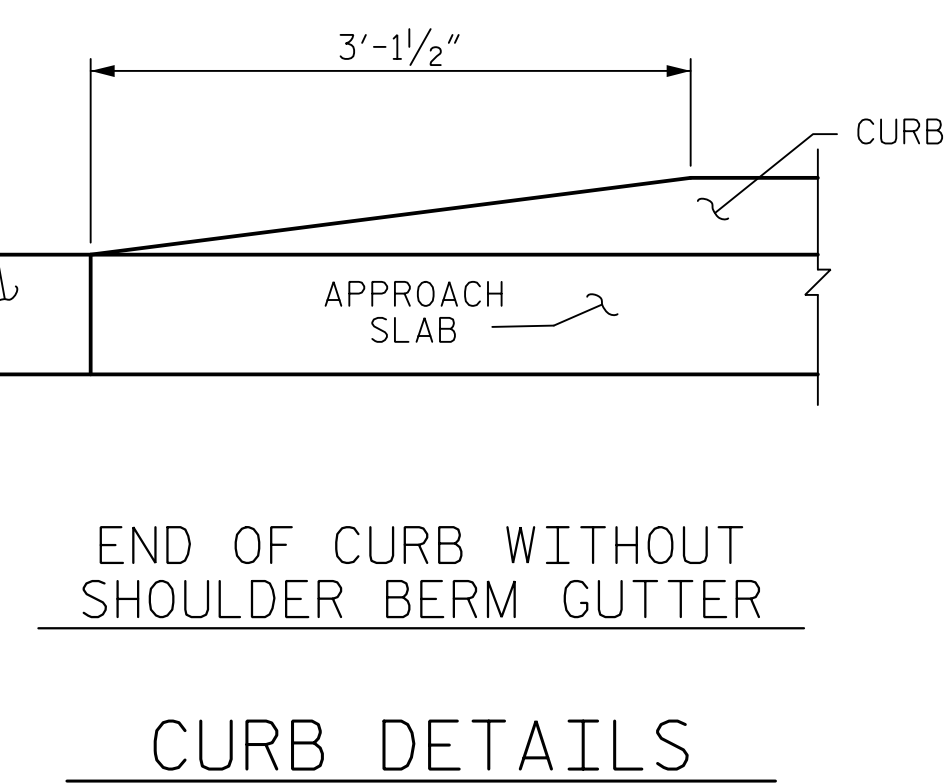
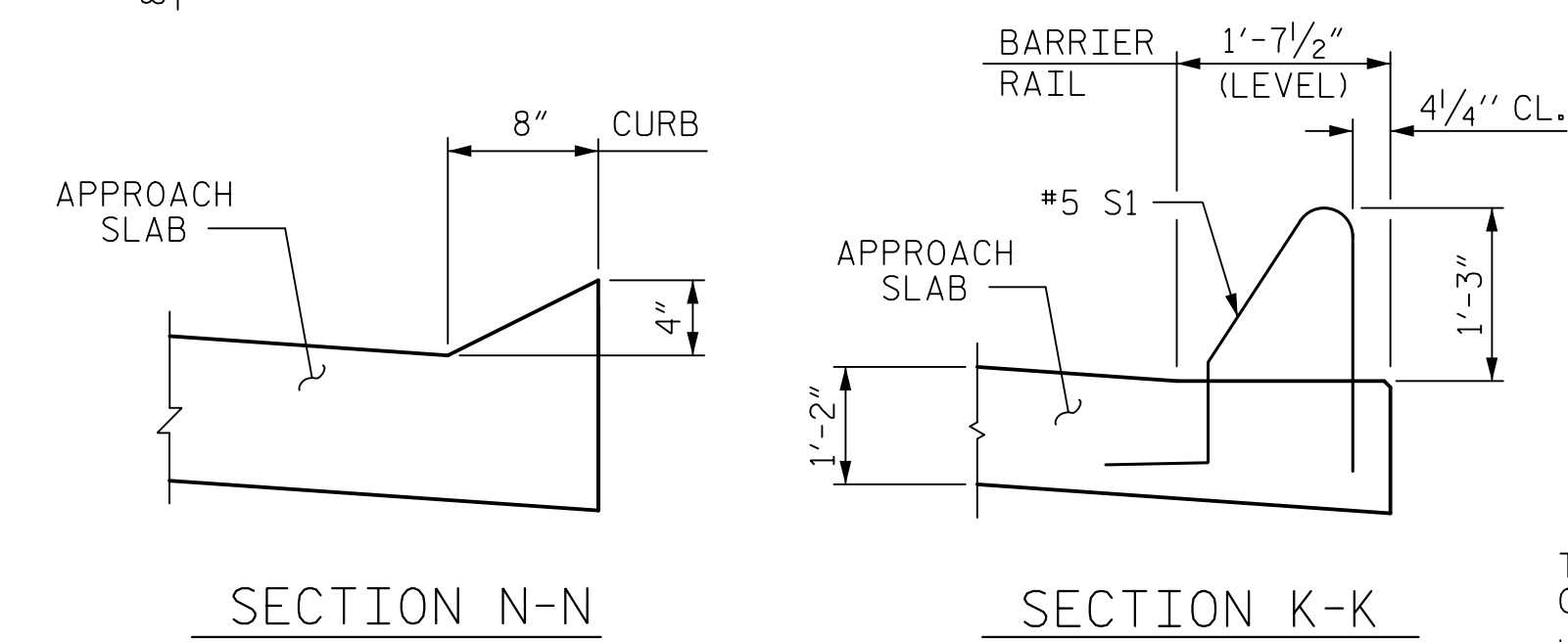


SECTION THRU SLAB
(TYPE I - STANDARD APPROACH FILL)

NOTES

- FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.
- GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
- SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.
- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
- 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.
- FOR BARRIER RAIL REINFORCING STEEL PLACEMENT AND BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET 2 OF 2.
- FOR STANDARD EXPANSION JOINT SEAL DETAILS, SEE "EXPANSION JOINT SEAL DETAILS" SHEET.

| SPLICE LENGTHS | | |
|----------------|--------------|----------|
| BAR SIZE | EPOXY COATED | UNCOATED |
| #4 | 2'-0" | 1'-9" |
| #5 | 2'-6" | 2'-2" |
| #6 | 3'-10" | 2'-7" |



CURB DETAILS

BILL OF MATERIAL

| APPROACH SLAB AT EB 1 | | | | | |
|-------------------------------------|-----|------|------|--------|------------|
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| * A1 | 50 | #4 | STR | 26'-8" | 891 |
| A2 | 52 | #4 | STR | 26'-7" | 923 |
| * B1 | 98 | #5 | STR | 23'-9" | 2,428 |
| B2 | 98 | #6 | STR | 24'-7" | 3,619 |
| * B3 | 4 | #5 | STR | 9'-8" | 40 |
| B4 | 4 | #6 | STR | 9'-8" | 58 |
| * J1 | 49 | #4 | 1 | 1'-5" | 46 |
| REINFORCING STEEL ** | | | | | LBS. 4,600 |
| * EPOXY COATED REINFORCING STEEL ** | | | | | LBS. 3,405 |
| CLASS AA CONCRETE ** | | | | | C. Y. 54.4 |
| APPROACH SLAB AT EB 2 | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| * A1 | 50 | #4 | STR | 26'-8" | 891 |
| A2 | 52 | #4 | STR | 26'-7" | 923 |
| * B1 | 98 | #5 | STR | 23'-9" | 2,428 |
| B2 | 98 | #6 | STR | 24'-7" | 3,619 |
| * B3 | 4 | #5 | STR | 9'-8" | 40 |
| B4 | 4 | #6 | STR | 9'-8" | 58 |
| * J1 | 49 | #4 | 1 | 1'-5" | 46 |
| REINFORCING STEEL ** | | | | | LBS. 4,600 |
| * EPOXY COATED REINFORCING STEEL ** | | | | | LBS. 3,405 |
| CLASS AA CONCRETE ** | | | | | C. Y. 54.4 |

BAR TYPE

ALL BAR DIMENSIONS ARE OUT TO OUT
** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 2 OF 2.

THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-

SHEET 1 OF 2
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
BRIDGE APPROACH SLAB
FOR FLEXIBLE PAVEMENT
LEFT LANE

| REVISIONS | | | | | SHEET NO. |
|-----------|----|------|-----|------|-----------------|
| NO. | BY | DATE | NO. | DATE | S7-34 |
| 1 | | | 3 | | TOTAL SHEETS 35 |
| 2 | | | 4 | | |

| | |
|--------------------------|---------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 7/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DRAWN BY : EEM 3/95 | REV. 12/21/11 |
| CHECKED BY : VAP 3/95 | REV. 6/13 |
| | REV. 12/17 |
| | MAA/GM |
| | MAA/GM |
| | MAA/THC |

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343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

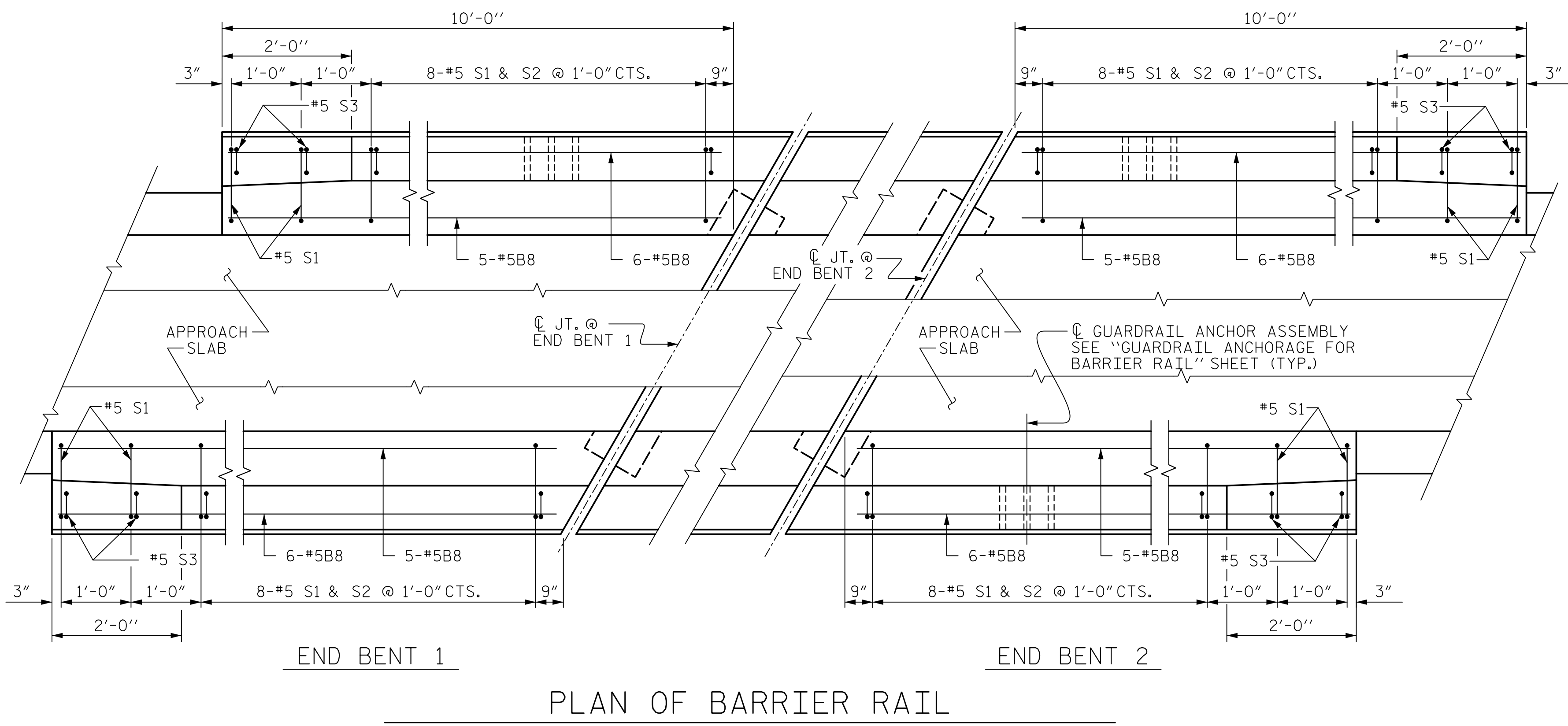
11/16/2018

DocuSigned by:
David W. Hawkins
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 27812
DAVID W. HAWKINS

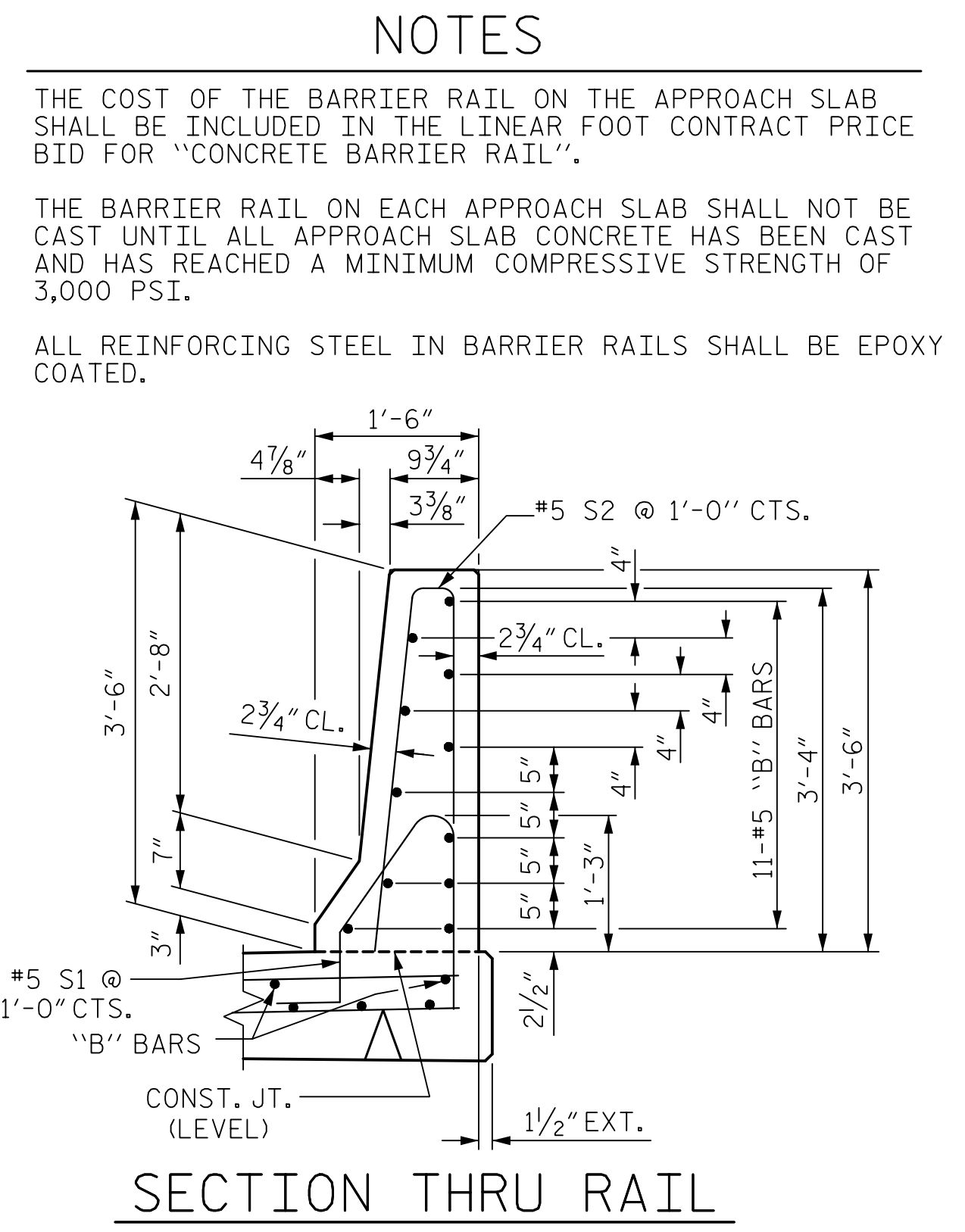
DRAWN BY: M. WRIGHT DATE: 7/18
CHECKED BY: N. HART DATE: 7/18
DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 34

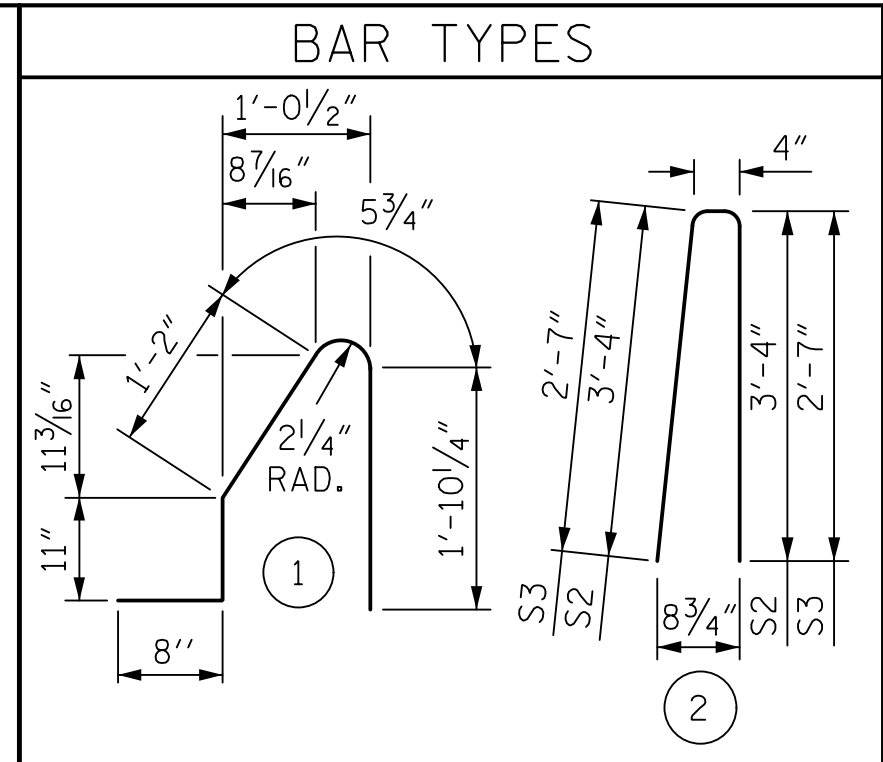
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PLAN OF BARRIER RAIL



SECTION THRU RAIL



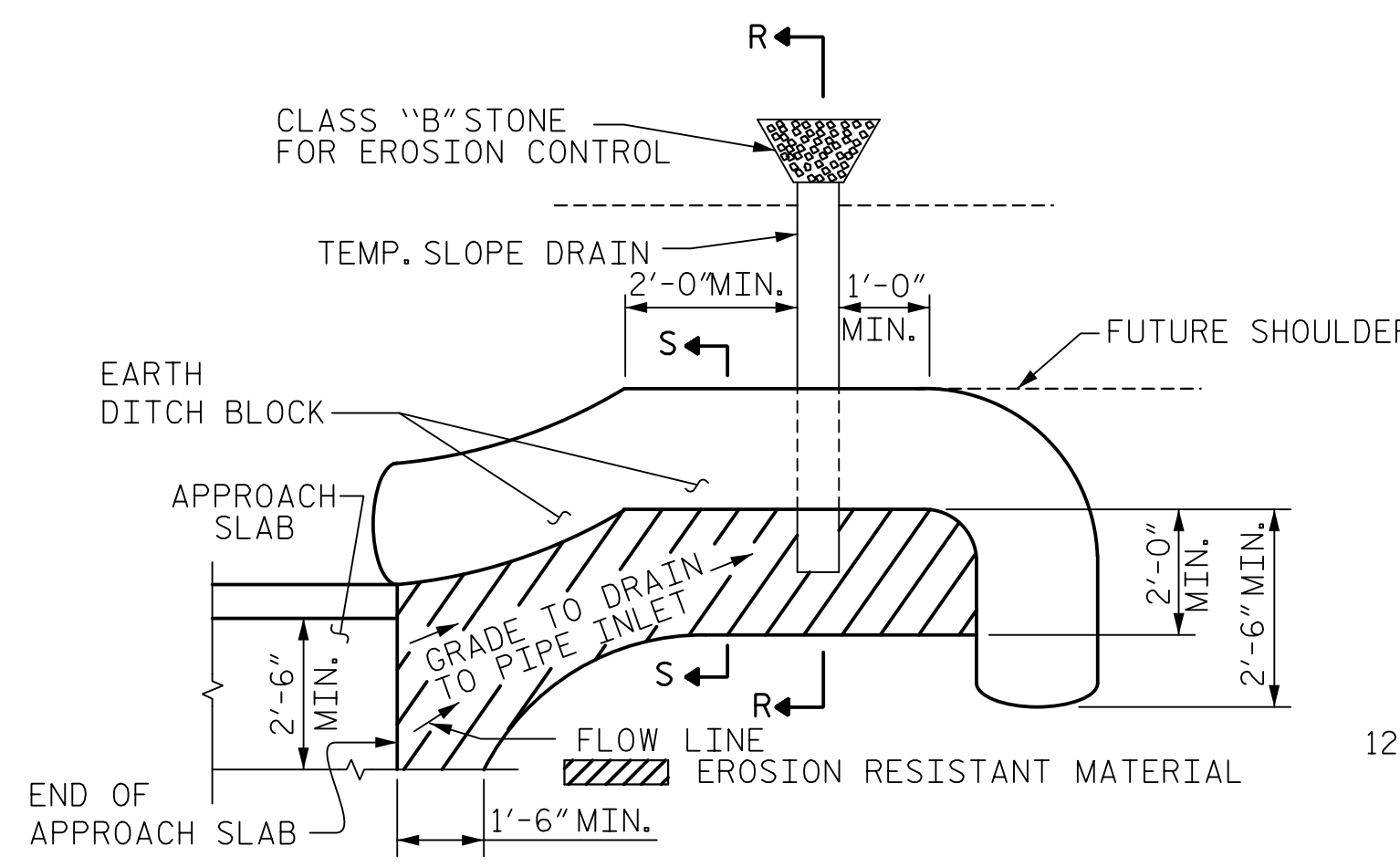
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

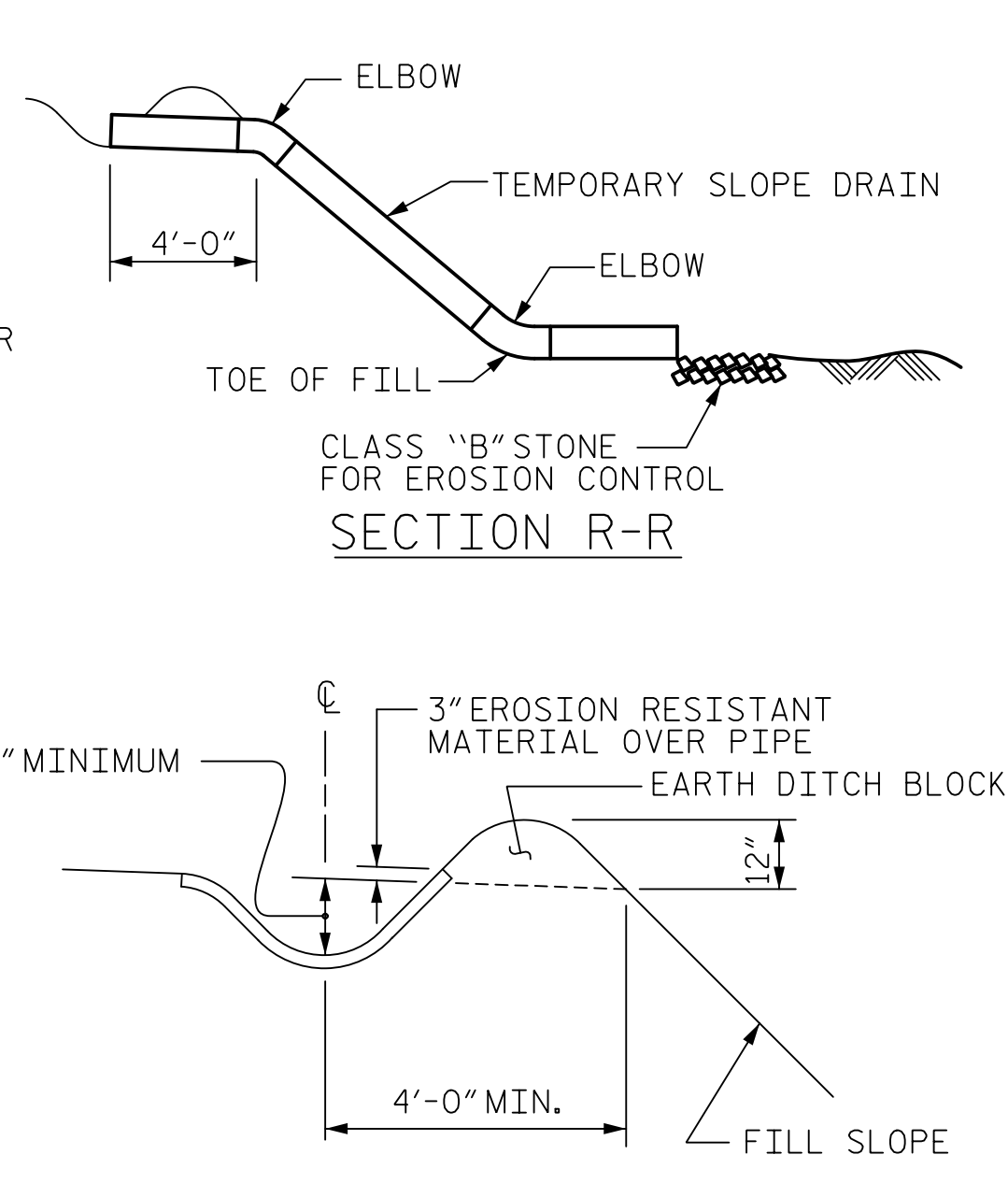
BARRIER RAIL ONLY

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|-----|-----|------|------|--------|--------|
| *B8 | 44 | #5 | STR | 9'-8" | 444 |
| *S1 | 40 | #5 | 1 | 5'-1" | 212 |
| *S2 | 32 | #5 | 2 | 7'-0" | 234 |
| *S3 | 8 | #5 | 2 | 5'-6" | 46 |

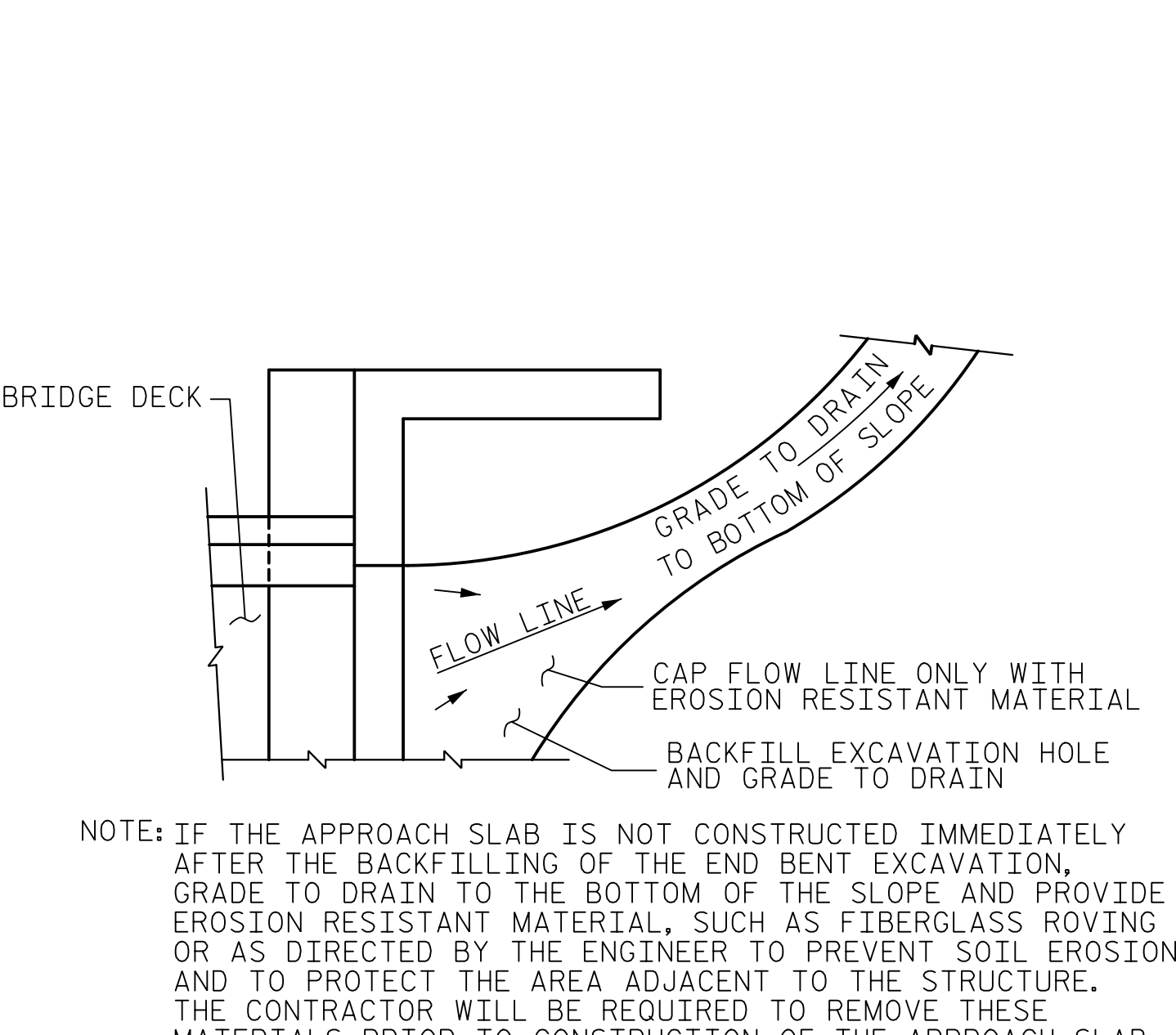
*EPOXY COATED REINFORCING STEEL LBS. 936
 CLASS AA CONCRETE C. Y. 5.4
 CONCRETE BARRIER RAIL LIN. FT. 40.4



PLAN VIEW



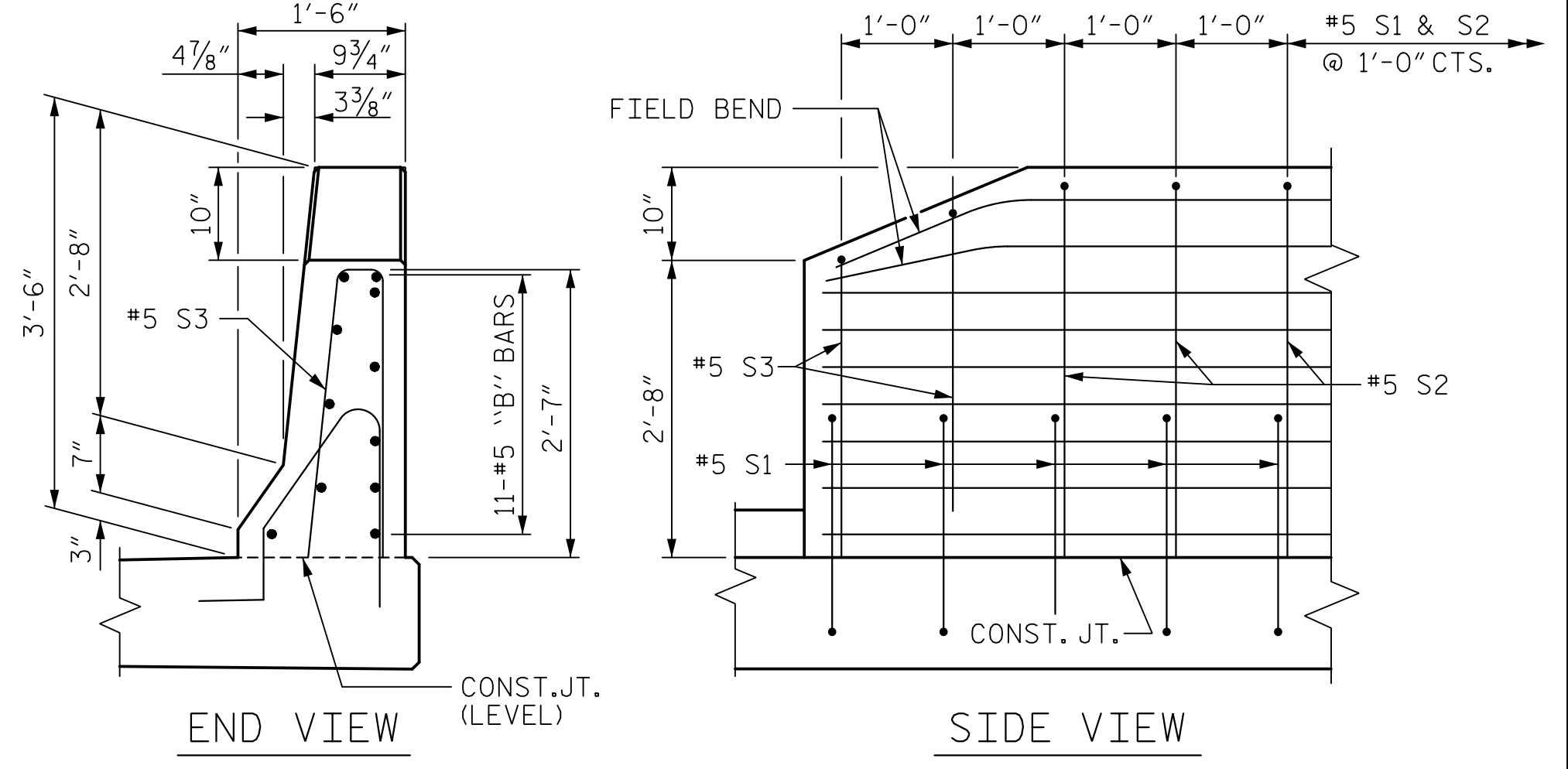
SECTION S-S



TEMPORARY DRAINAGE DETAIL

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

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.



END OF RAIL DETAILS

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

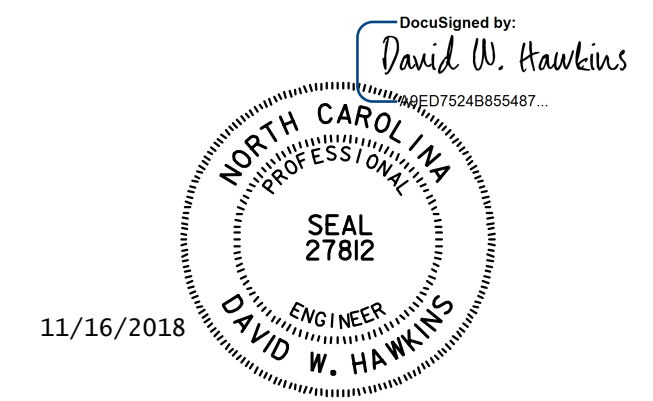
PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 BRIDGE APPROACH
 SLAB DETAILS

LEFT LANE



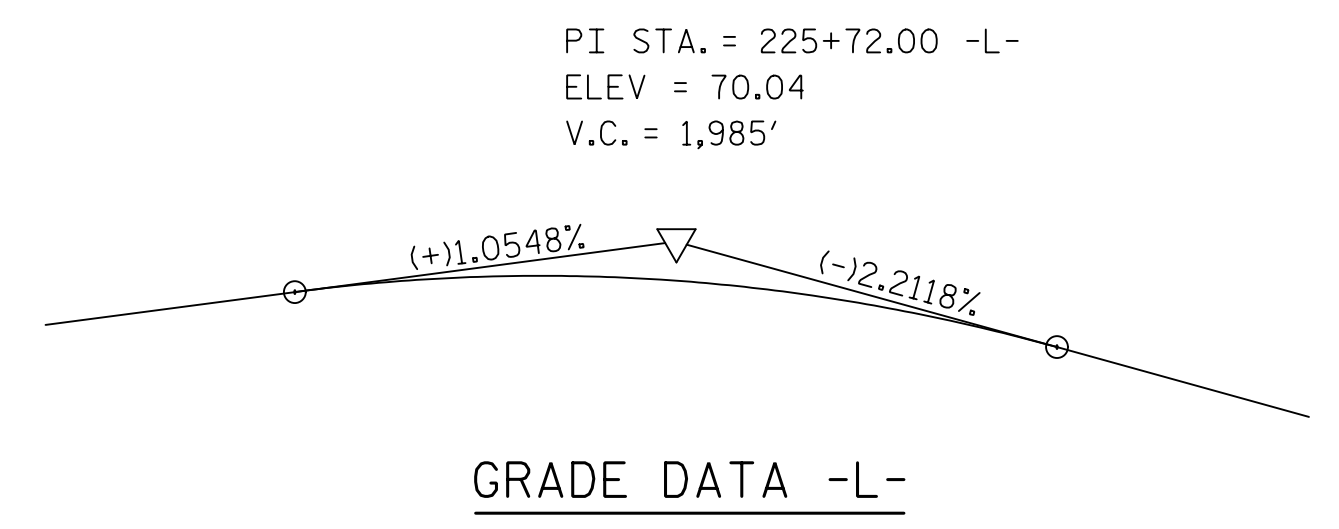
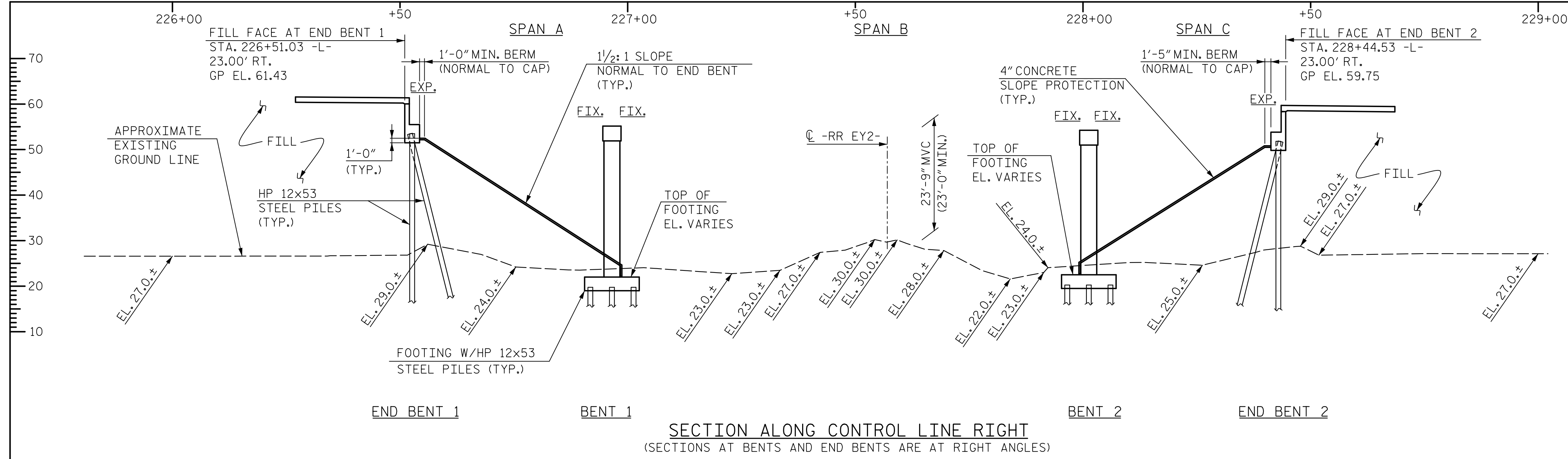
| | |
|--------------------------|--------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 7/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DRAWN BY : FCJ 11/88 | REV. 6/13 MAA/GM |
| CHECKED BY : ARB 11/88 | REV. 12/17 MAA/THC |
| | REV. 5/18 MAA/THC |

**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

| | | | |
|--|-------------|--|--|
| HNTB | | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | |
| DRAWN BY : M. WRIGHT | DATE : 7/18 | DWG. NO. 35 | |
| CHECKED BY : N. HART | DATE : 7/18 | | |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 | | |

| REVISIONS | | | | | SHEET NO. S7-35 |
|-----------|----|------|-----|------|--------------------|
| NO. | BY | DATE | NO. | DATE | |
| 1 | | | 3 | | TOTAL SHEETS 35 |
| 2 | | | 4 | | |

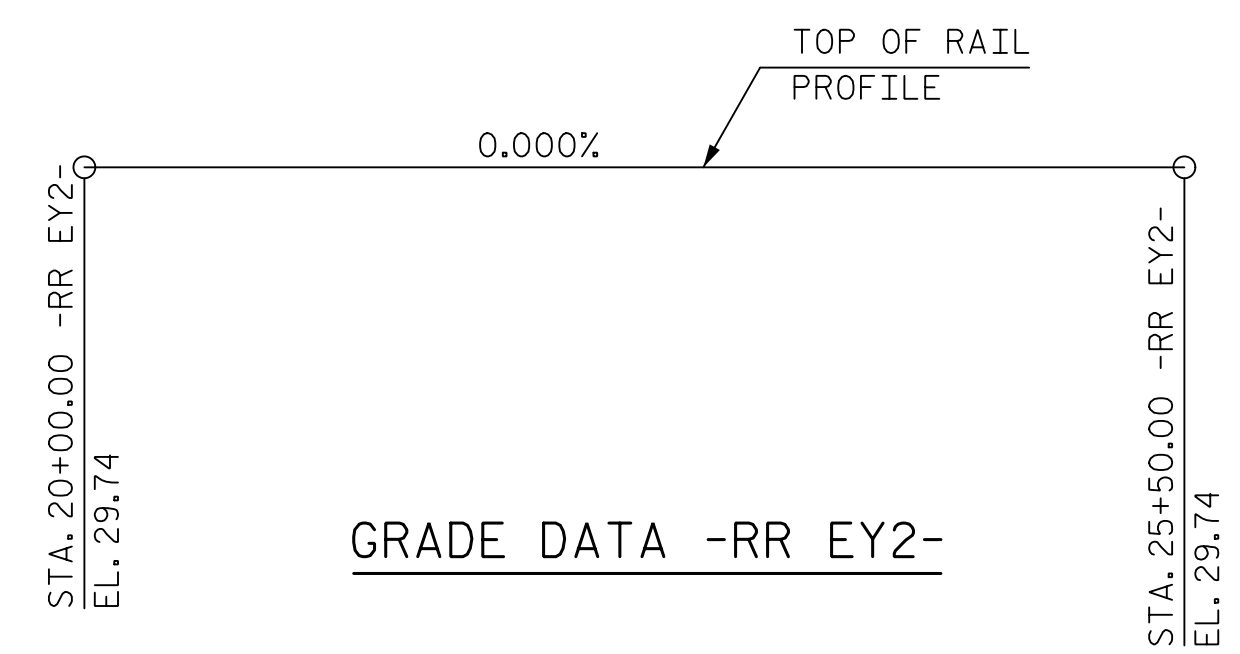
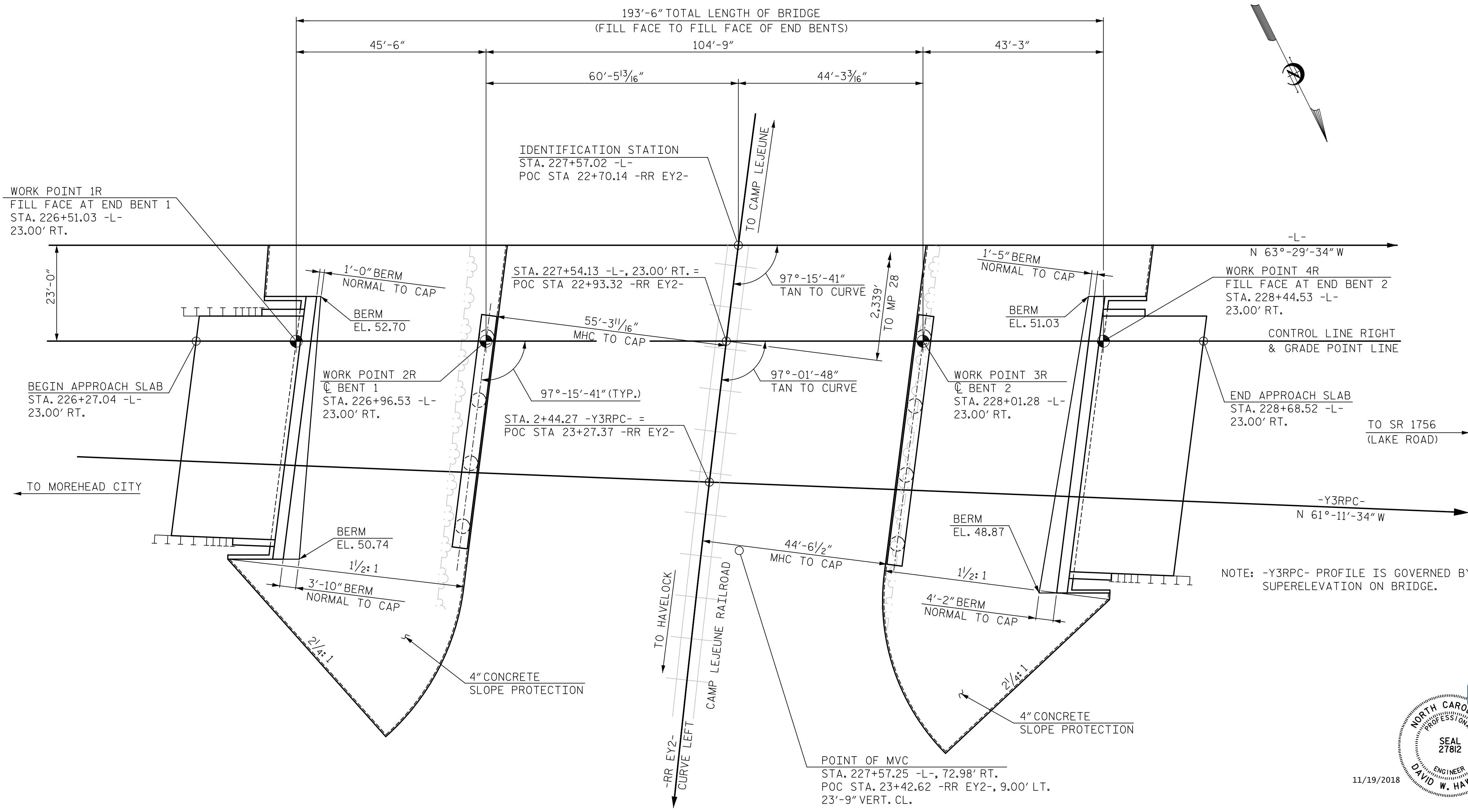
NOTES:
FOR NOTES, SEE GENERAL DRAWING SHEET 3 OF 3.
MVC = MINIMUM VERTICAL CLEARANCE
MHC = MINIMUM HORIZONTAL CLEARANCE



SECTION ALONG CONTROL LINE RIGHT
(SECTIONS AT BENTS AND END BENTS ARE AT RIGHT ANGLES)

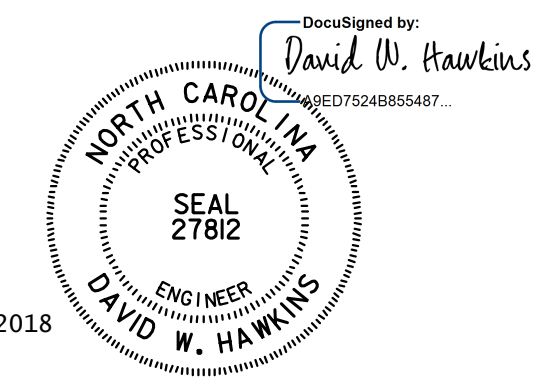
CURVE DATA -RR EY2-

| |
|-----------------------------------|
| PI STA. = 19+91.00 -RR EY2- |
| $\Delta = 11^{\circ}34'16''$ (LT) |
| D = $0^{\circ}59'53''$ |
| L = 1,159.52' |
| T = 581.74' |
| R = 5,741.46' |



PLAN
NOTE: PILES NOT SHOWN FOR CLARITY.
ALL END BENTS AND BENTS ARE PARALLEL.

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L- =
POC 22+70.14 -RR EY2-
BRIDGE NO. 279
SHEET 1 OF 3 CAMP LEJEUNE RR MILEPOST # 28.44



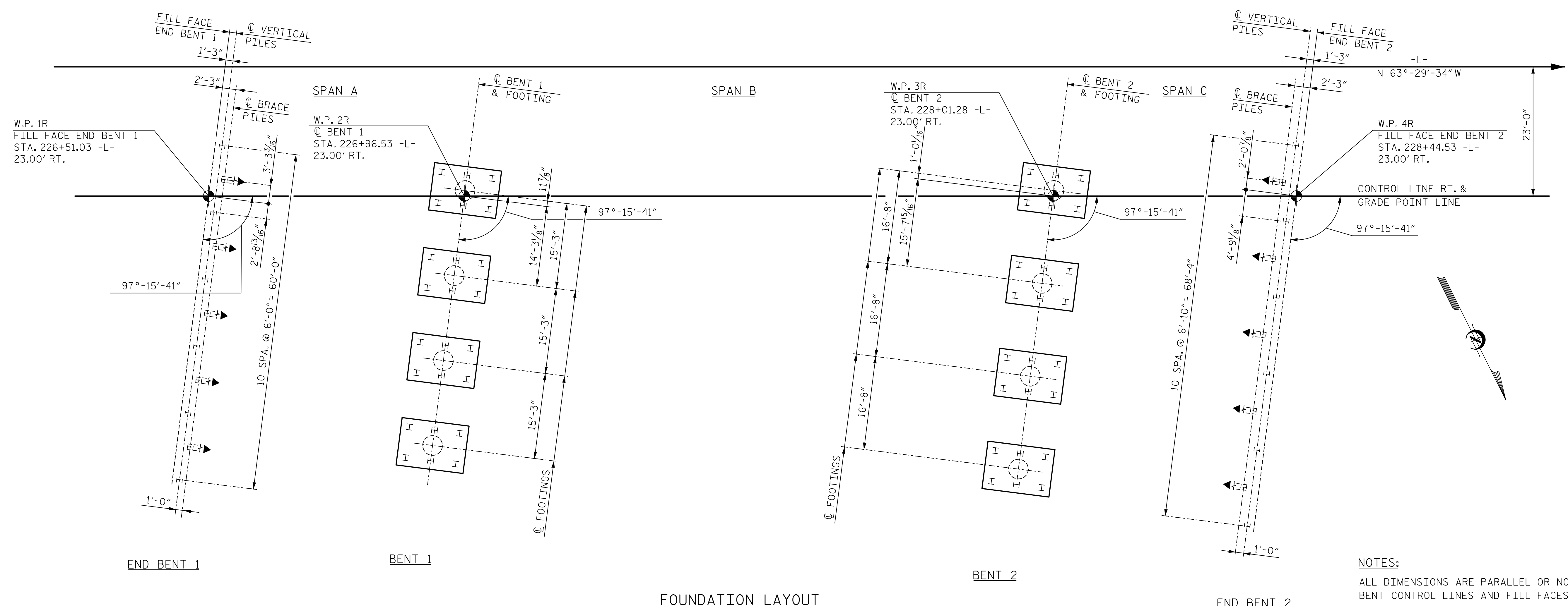
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NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

| | |
|---------------------------------------|------------|
| DRAWN BY: M. WRIGHT | DATE: 9/18 |
| CHECKED BY: N. HART | DATE: 9/18 |
| DESIGN ENGINEER OF RECORD: D. HAWKINS | DATE: 9/18 |

DWG. NO. 1

| | | | | | | |
|--|----|------|-----|----|------|--------------------|
| STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH | | | | | | SHEET NO. S8-1 |
| GENERAL DRAWING FOR BRIDGE OVER CAMP LEJEUNE RR ON US-70 (HAVELOCK BYPASS) BETWEEN MOREHEAD CITY AND SR 1756 RIGHT LANE | | | | | | TOTAL SHEETS 36 |
| REVISIONS | | | | | | |
| NO. | BY | DATE | NO. | BY | DATE | |
| 1 | | | 3 | | | |
| 2 | | | 4 | | | |

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



FOUNDATION LAYOUT

FOUNDATION NOTES:
 FOR PILES, SEE 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.

DRIVE PILES AT END BENT NO.1 AND END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 140 TONS PER PILE.

PILES AT BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.

DRIVE PILES AT BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.

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

DRIVE PILES AT BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 140 TONS PER PILE.

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

OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT WITHIN 2 FT. OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO.1 AND END BENT NO.2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

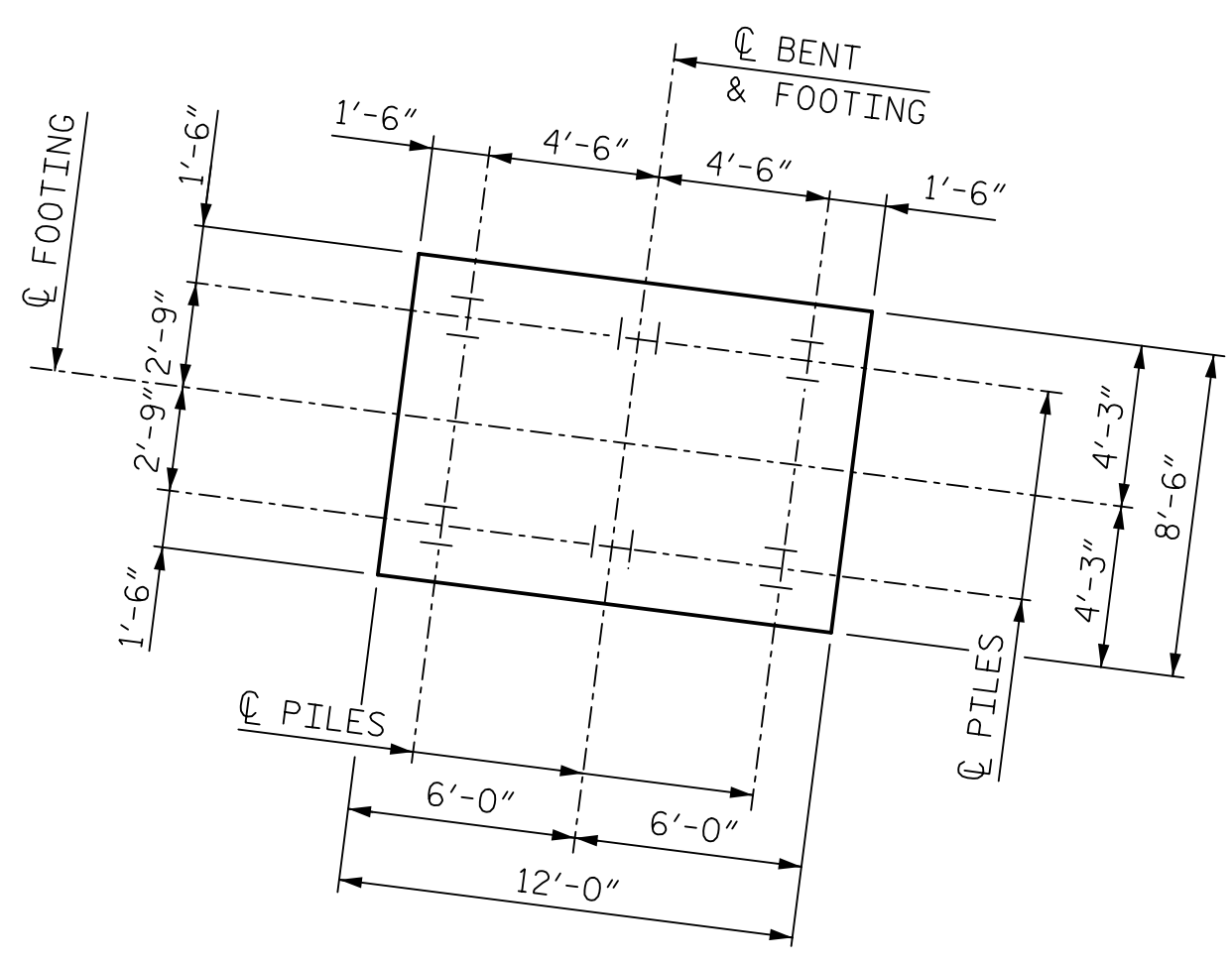
NOTES:
 ALL DIMENSIONS ARE PARALLEL OR NORMAL TO BENT CONTROL LINES AND FILL FACES.

◀▶ INDICATES PILE BATTER IN DIRECTION SHOWN. BRACE PILES AT END BENTS ARE TO BE BATTERED AT 3:12.

ALL END BENT AND BENT PILES ARE HP 12x53 STEEL PILES.

FOR FOUNDATION ELEVATIONS AND DETAILS, SEE BENT AND END BENT SHEETS.

ALL PILE DIMENSIONS ARE TO CENTERS OF PILES AT BOTTOM OF END BENTS AND FOOTINGS.



TYPICAL FOOTING LAYOUT BENT 1 AND BENT 2

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 FOUNDATION LAYOUT
 RIGHT LANE

HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

11/19/2018

DocuSigned by:
 David W. Hawkins
 ENGINEER
 SEAL 27812
 DAVID W. HAWKINS

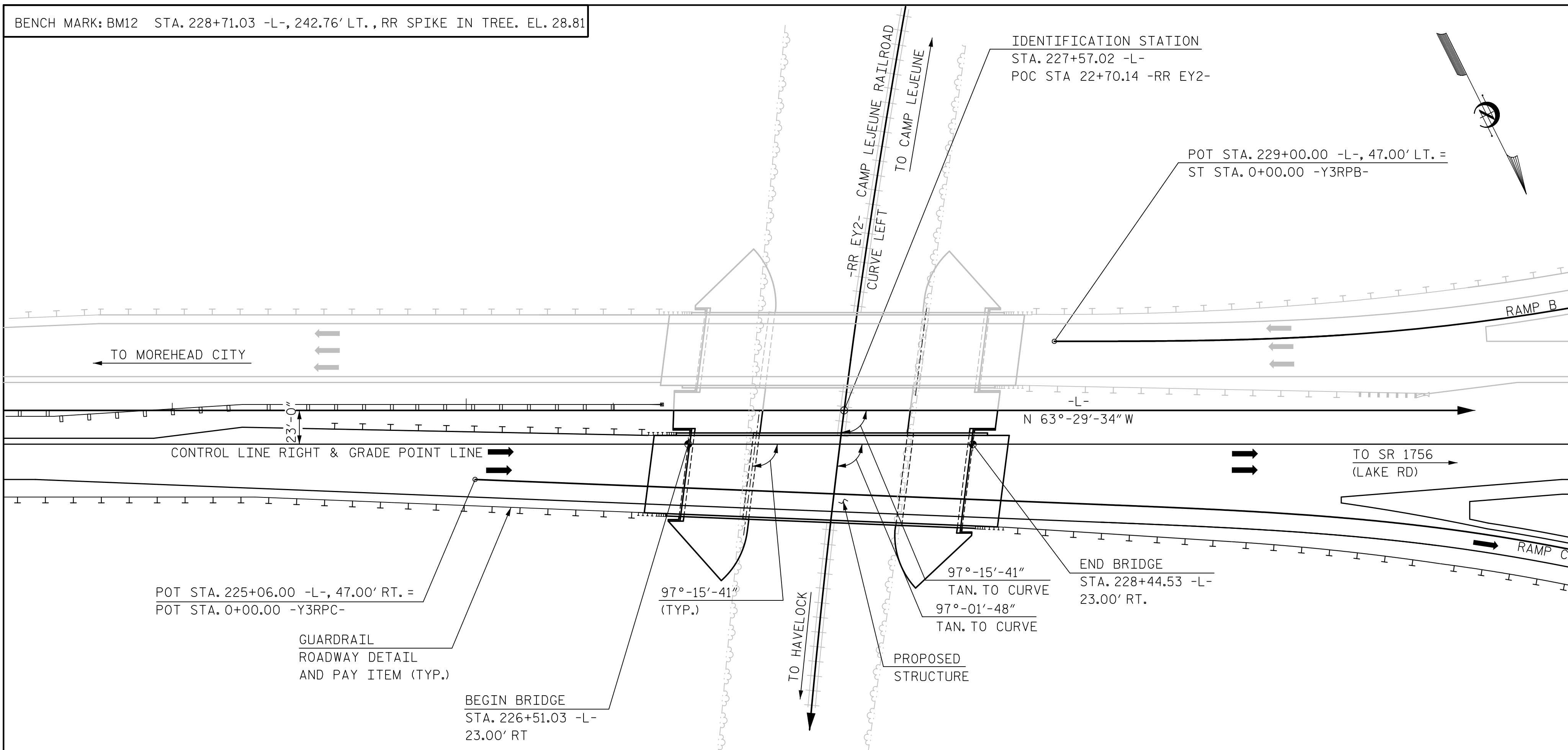
DRAWN BY: M. WRIGHT DATE: 9/18
 CHECKED BY: N. HART DATE: 9/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 2

| REVISIONS | | | | | | SHEET NO. |
|-----------|----|------|-----|----|------|--------------|
| NO. | BY | DATE | NO. | BY | DATE | S8-2 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 36 |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BENCH MARK: BM12 STA. 228+71.03 -L-, 242.76' LT., RR SPIKE IN TREE. EL. 28.81



LOCATION SKETCH

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

GENERAL 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 SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
- 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.
- THE RAILROAD TRACK TOP OF RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

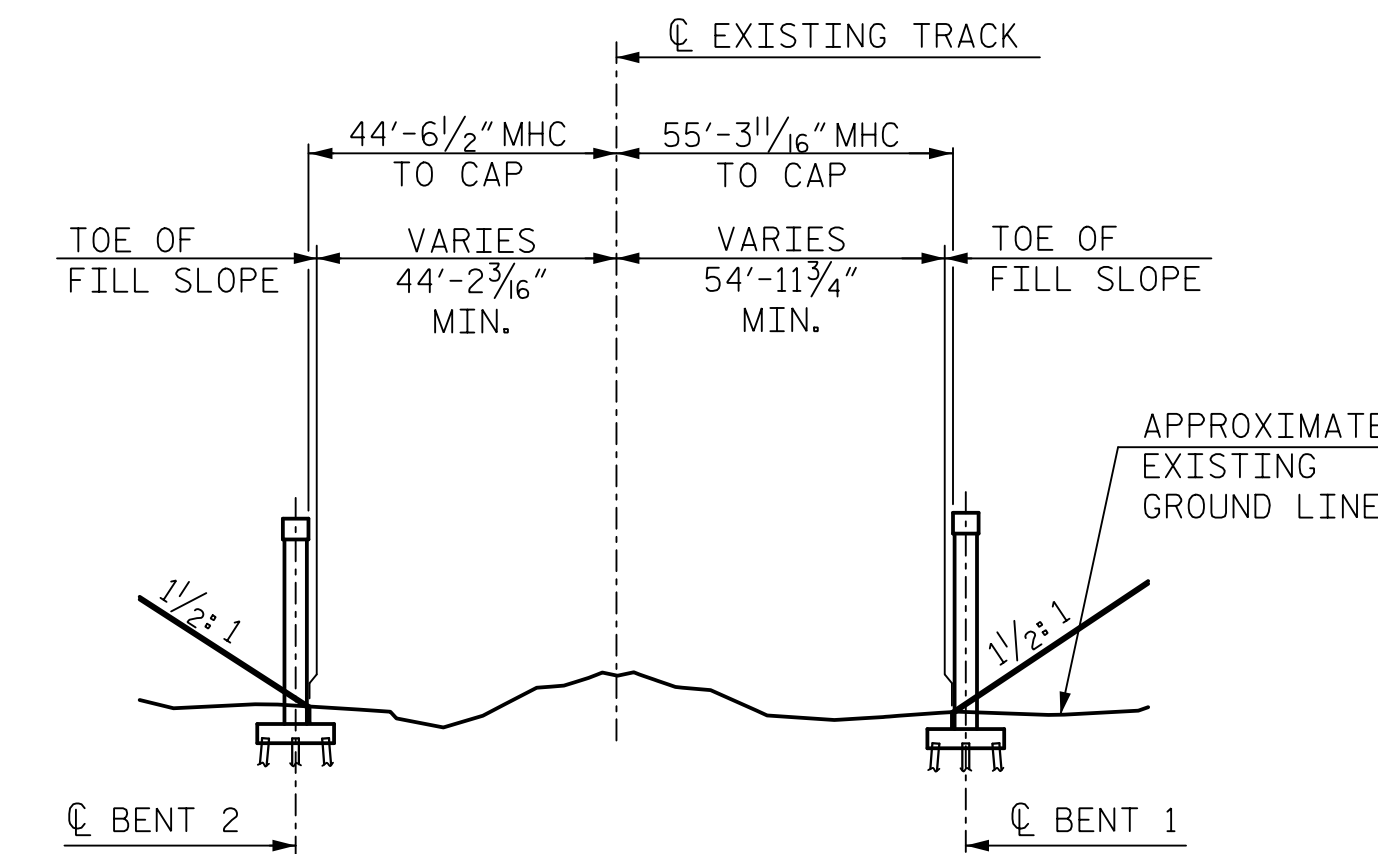
| TOTAL BILL OF MATERIAL | | | | | | | | |
|------------------------|--|-------------|-------------------------------|------------------------|------------------|--|-------------------|---------------------------------|
| | FOUNDATION EXCAVATION FOR BENT AT STATION 227+57.02 (RIGHT LANE) | PDA TESTING | REINFORCED CONCRETE DECK SLAB | GROOVING BRIDGE FLOORS | CLASS A CONCRETE | BRIDGE APPROACH SLAB AT STATION 227+57.02 (RIGHT LANE) | REINFORCING STEEL | SPIRAL COLUMN REINFORCING STEEL |
| | LUMP SUM | EACH | SQ. FT. | SQ. FT. | CU. YDS. | LUMP SUM | LBS. | LBS. |
| SUPERSTRUCTURE | --- | --- | 11,617 | 12,847 | --- | LUMP SUM | --- | --- |
| END BENT 1 | --- | --- | --- | --- | 62.4 | --- | 7,640 | --- |
| BENT 1 | LUMP SUM | --- | --- | --- | 139.5 | --- | 19,161 | 3,030 |
| BENT 2 | LUMP SUM | --- | --- | --- | 140.0 | --- | 19,719 | 2,874 |
| END BENT 2 | --- | --- | --- | --- | 69.7 | --- | 8,186 | --- |
| TOTAL | LUMP SUM | 1 | 11,617 | 12,847 | 411.6 | LUMP SUM | 54,706 | 5,904 |

| TOTAL BILL OF MATERIAL | | | | | | | | | | |
|------------------------|----------------------------------|----------|---|-----|----------------------|------|---------------|---------|-----------------------|----------|
| | 54" PRESTRESSED CONCRETE GIRDERS | | PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES | | HP 12x53 STEEL PILES | | PILE REDRIVES | | CONCRETE BARRIER RAIL | |
| | NO. | L.F. | EACH | NO. | L.F. | EACH | L.F. | SQ. YD. | LUMP SUM | LUMP SUM |
| SUPERSTRUCTURE | 21 | 1,320.72 | --- | --- | --- | --- | --- | 422.0 | --- | --- |
| END BENT 1 | --- | --- | 11 | 11 | 770 | 6 | --- | 740 | --- | --- |
| BENT 1 | --- | --- | 24 | 24 | 1,680 | 12 | --- | --- | --- | --- |
| BENT 2 | --- | --- | 24 | 24 | 1,680 | 12 | --- | --- | --- | --- |
| END BENT 2 | --- | --- | 11 | 11 | 770 | 6 | --- | 730 | --- | --- |
| TOTAL | 21 | 1,320.72 | 70 | 70 | 4,900 | 36 | 422.0 | 1,470 | LUMP SUM | LUMP SUM |

SAMPLE BAR REPLACEMENT

| SIZE | LENGTH |
|------|---------|
| #3 | 6'-2" |
| #4 | 7'-4" |
| #5 | 8'-6" |
| #6 | 9'-8" |
| #7 | 10'-10" |
| #8 | 12'-0" |
| #9 | 13'-2" |
| #10 | 14'-6" |
| #11 | 15'-10" |

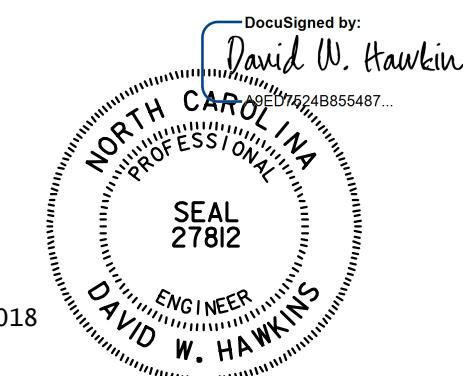
NOTE: SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND fy = 60ksi.



SECTION THRU RAILROAD

LOOKING IN DIRECTION OF INCREASING STATIONS ON RAILROAD (SPAN LENGTH IS BASED ON THIS SECTION)

MHC = MINIMUM HORIZONTAL CLEARANCE



PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 LOCATION SKETCH
 AND TOTAL
 BILL OF MATERIAL
 RIGHT LANE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

| | | | |
|---------------------------------------|------------|--|------------|
| HNTB | | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | |
| DRAWN BY: M. WRIGHT | DATE: 9/18 | CHECKED BY: N. HART | DATE: 9/18 |
| DESIGN ENGINEER OF RECORD: D. HAWKINS | DATE: 9/18 | DWG. NO. 3 | |

| REVISIONS | | | | | | SHEET NO. |
|-----------|----|------|-----|----|------|-----------------|
| NO. | BY | DATE | NO. | BY | DATE | S8-3 |
| 1 | | | 3 | | | TOTAL SHEETS 36 |
| 2 | | | 4 | | | |

LOAD FACTORS:

| | | | |
|----------------------------|-------------|---------------|---------------|
| DESIGN LOAD RATING FACTORS | LIMIT STATE | γ_{DC} | γ_{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) (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 (γ_{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 (γ_{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 | 1.01 | -- | 1.75 | 0.93 | 1.45 | A | EL | 21.1 | 0.95 | 1.39 | B | I | 9.7 | 0.80 | 0.84 | 1.01 | B | EL | 51.2 | | |
| | HL-93 (OPERATING) | N/A | -- | 1.84 | -- | 1.35 | 0.93 | 1.89 | A | EL/I | 21.1 | 0.95 | 1.84 | B | I | 9.7 | N/A | -- | -- | -- | -- | -- | | |
| | HS-20 (INVENTORY) | 36.000 | ② | 1.41 | 50.8 | 1.75 | 0.93 | 1.78 | A | EL/I | 21.1 | 0.95 | 1.89 | B | I | 20.1 | 0.80 | 0.84 | 1.41 | B | EL | 51.2 | | |
| | HS-20 (OPERATING) | 36.000 | -- | 2.31 | 83.2 | 1.35 | 0.93 | 2.31 | A | EL/I | 21.1 | 0.95 | 2.50 | B | I | 20.1 | N/A | -- | -- | -- | -- | -- | | |
| LEGAL LOAD RATING | SINGLE VEHICLE (SV) | SNSH | 13.500 | -- | 2.96 | 40.0 | 1.40 | 0.93 | 4.27 | A | EL | 21.1 | 0.95 | 6.15 | B | I | 9.7 | 0.80 | 0.93 | 2.96 | A | I | 21.1 | |
| | | SNGARBS2 | 20.000 | -- | 2.42 | 48.4 | 1.40 | 0.93 | 3.48 | A | EL | 21.1 | 0.95 | 4.26 | B | I | 20.1 | 0.80 | 0.93 | 2.42 | A | I | 21.1 | |
| | | SNAGRIS2 | 22.000 | -- | 2.27 | 49.9 | 1.40 | 0.93 | 3.39 | A | EL | 16.7 | 0.95 | 3.92 | B | I | 9.7 | 0.80 | 0.84 | 2.27 | B | EL | 51.2 | |
| | | SNCOTTS3 | 27.250 | -- | 1.48 | 40.3 | 1.40 | 0.93 | 2.13 | A | EL | 21.1 | 0.95 | 2.97 | B | I | 20.1 | 0.80 | 0.93 | 1.48 | A | I | 21.1 | |
| | | SNAGGRS4 | 34.925 | -- | 1.31 | 45.8 | 1.40 | 0.93 | 1.89 | A | EL | 21.1 | 0.95 | 2.40 | B | I | 20.1 | 0.80 | 0.93 | 1.31 | A | I | 21.1 | |
| | | SNS5A | 35.550 | -- | 1.28 | 45.5 | 1.40 | 0.93 | 1.84 | A | EL | 21.1 | 0.95 | 2.41 | B | I | 9.7 | 0.80 | 0.93 | 1.28 | A | I | 21.1 | |
| | | SNS6A | 39.950 | -- | 1.21 | 48.3 | 1.40 | 0.93 | 1.74 | A | EL | 21.1 | 0.95 | 2.17 | B | I | 20.1 | 0.80 | 0.93 | 1.21 | A | I | 21.1 | |
| | TRUCK TRACTOR SEMI-TRAILER (TTST) | TNAGRIT3 | 33.000 | -- | 1.48 | 48.8 | 1.40 | 0.93 | 2.14 | A | EL/I | 21.1 | 0.95 | 2.63 | B | I | 20.1 | 0.80 | 0.84 | 1.48 | B | EL | 51.2 | |
| | | TNT4A | 33.075 | -- | 1.49 | 49.3 | 1.40 | 0.93 | 2.17 | A | EL/I | 21.1 | 0.95 | 2.57 | B | I | 20.1 | 0.80 | 0.84 | 1.49 | B | EL | 51.2 | |
| | | TNT6A | 41.600 | -- | 1.20 | 49.9 | 1.40 | 0.93 | 1.82 | A | EL | 21.1 | 0.95 | 2.21 | B | I | 9.7 | 0.80 | 0.84 | 1.20 | B | EL | 51.2 | |
| | | TNT7A | 42.000 | -- | 1.20 | 50.4 | 1.40 | 0.93 | 1.86 | A | EL | 21.1 | 0.95 | 2.17 | B | I | 9.7 | 0.80 | 0.84 | 1.20 | B | EL | 51.2 | |
| | | TNT7B | 42.000 | -- | 1.23 | 51.7 | 1.40 | 0.93 | 1.94 | A | EL/I | 21.1 | 0.95 | 2.07 | B | I | 9.7 | 0.80 | 0.84 | 1.23 | B | EL | 51.2 | |
| | | TNAGRIT4 | 43.000 | -- | 1.18 | 50.7 | 1.40 | 0.93 | 1.85 | A | EL/I | 21.1 | 0.95 | 2.00 | B | I | 20.1 | 0.80 | 0.84 | 1.18 | B | EL | 51.2 | |
| | | TNAGT5A | 45.000 | -- | 1.12 | 50.4 | 1.40 | 0.93 | 1.72 | A | EL/I | 21.1 | 0.95 | 1.97 | B | I | 20.1 | 0.80 | 0.84 | 1.12 | B | EL | 51.2 | |
| TNAGT5B | 45.000 | ③ | 1.11 | 50.0 | 1.40 | 0.93 | 1.67 | A | EL | 21.1 | 0.95 | 1.90 | B | I | 20.1 | 0.80 | 0.84 | 1.11 | B | EL | 51.2 | | | |

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 CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

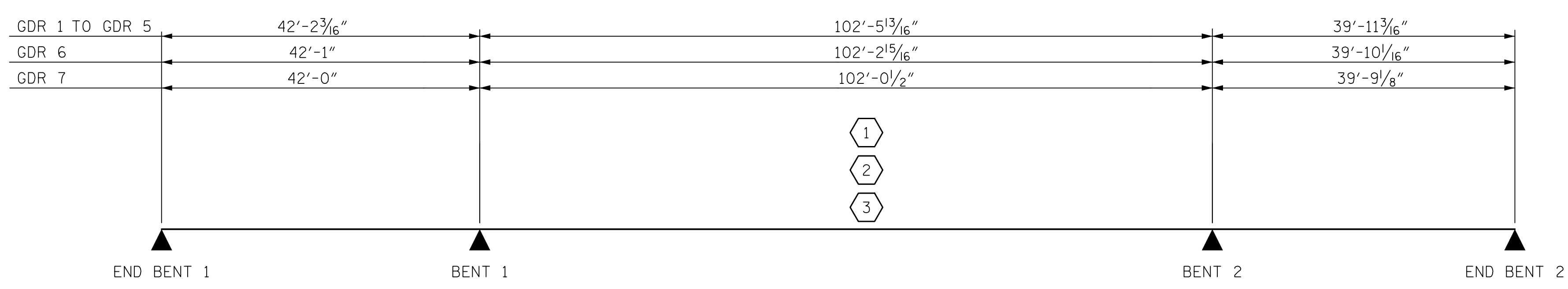
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

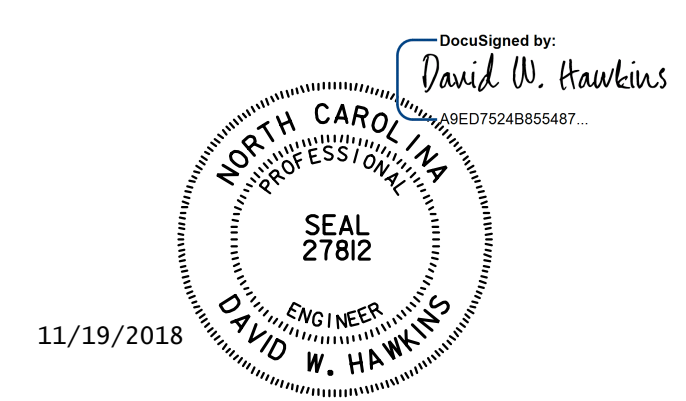
I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



PROJECT NO. R-1015
 CRAVEN COUNTY
STATION: 227+57.02 -L-

LRFR SUMMARY

NOTE: SPAN LENGTHS PROVIDED ARE BEARING TO BEARING LENGTHS.



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
PRESTRESSED
CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)
RIGHT LANE

| | |
|----------------------|-----------------|
| ASSEMBLED BY : MAA | DATE : 8/18 |
| CHECKED BY : N. HART | DATE : 9/18 |
| DRAWN BY : MAA | REV. 11/12/08RR |
| CHECKED BY : GM/DI | REV. 10/1/11 |
| | REV. 12/17 |

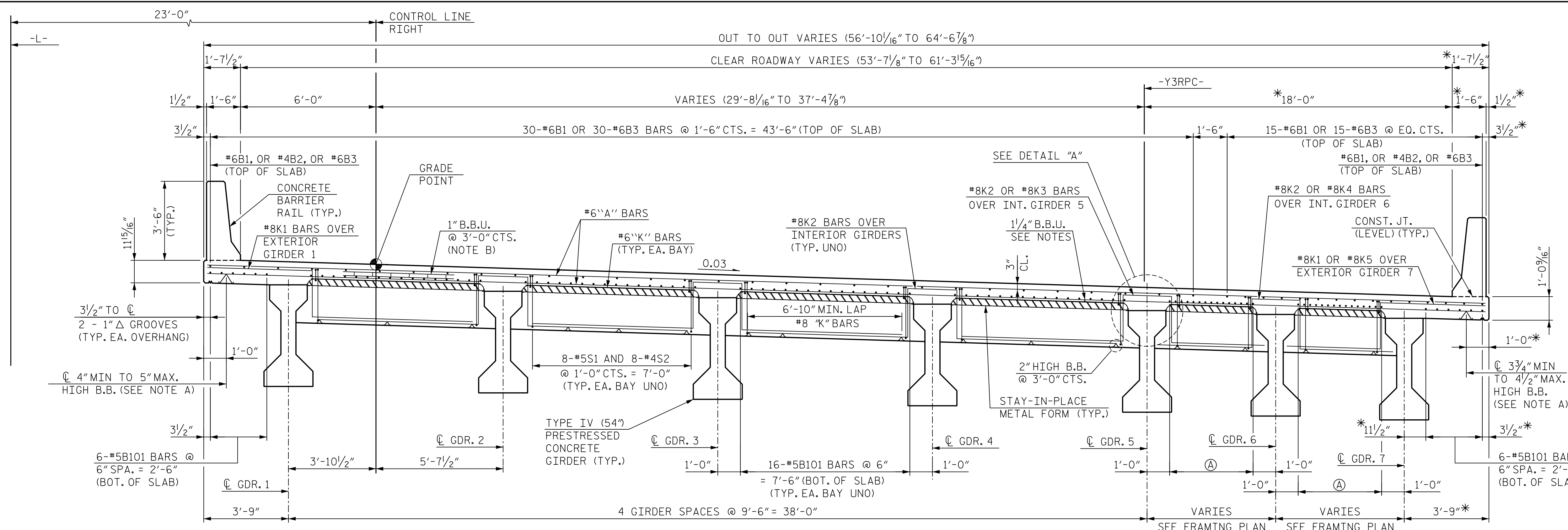
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DRAWN BY : M. WRIGHT DATE : 8/18
CHECKED BY : N. HART DATE : 9/18
DESIGN ENGINEER OF RECORD : D. HAWKINS DATE : 9/18

DWG. NO. 4

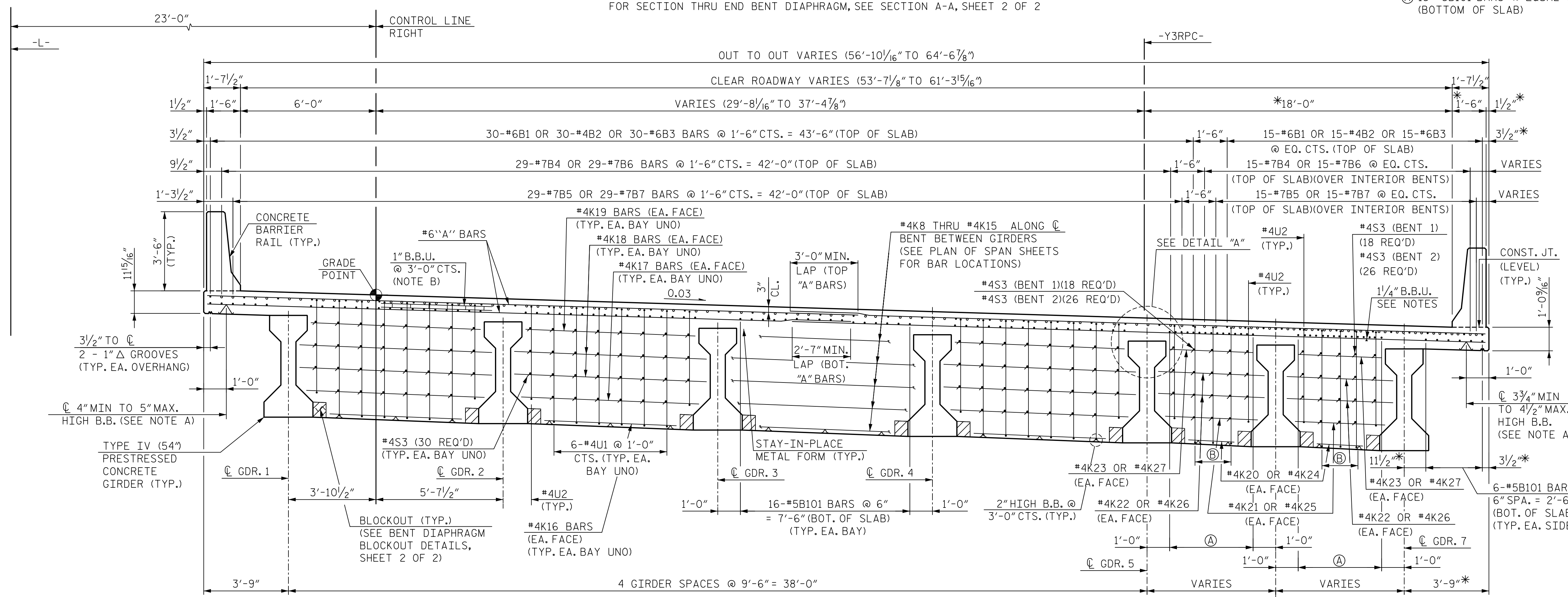
| REVISIONS | | | | | | SHEET NO. |
|-----------|----|------|-----|----|------|--------------|
| NO. | BY | DATE | NO. | BY | DATE | S8-4 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 36 |

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TYPICAL SECTION AT END BENT

FOR SECTION THRU END BENT DIAPHRAGM, SEE SECTION A-A, SHEET 2 OF 2



TYPICAL SECTION AT BENT

FOR SECTION THRU BENT, SEE SECTION B-B, SHEET 2 OF 2

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.

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.

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

FOR ADDITIONAL DETAILS AND SECTIONS, SEE "TYPICAL SECTION DETAILS" SHEET, SHEET 2 OF 2.

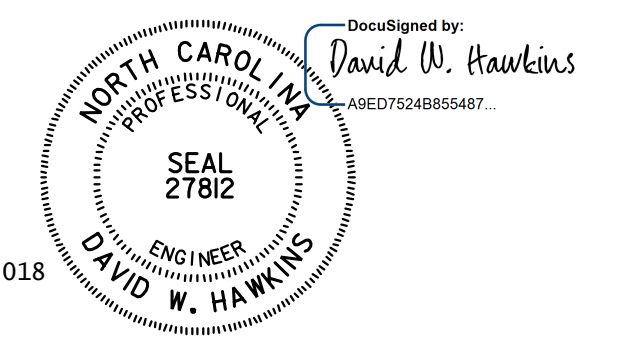
* DENOTES DIMENSION NORMAL TO RIGHT EDGE OF SLAB AND -Y3RPC-

NOTE A: THE HEIGHT OF THE BEAM BOLSTER VARIES ALONG THE LENGTH OF THE SPAN DUE TO CAMBER AND THE VARYING HEIGHT REQUIRED FOR THE BUILDUP. THE CONTRACTOR SHALL HAVE SUFFICIENT SIZES TO PROPERLY SUPPORT THE REINFORCING STEEL.

NOTE B: TO MAINTAIN PROPER LOCATION OF "A" BARS IN TOP OF SLAB, BBU DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE "B" BARS IN THE TOP OF SLAB VARIES. A 1/2" BBU SHALL BE USED WHERE ONLY #4 "B" BARS ARE PRESENT. WHERE #6 "B" BARS OR #7 "B" BARS ARE PRESENT, A 1" BBU SHALL BE USED.

"B" BAR KEY

- CONTINUOUS BAR RUN SEE PLAN OF SPAN SHEETS.
- NON-CONTINUOUS BAR RUN FOR NEGATIVE MOMENT REGIONS SEE PLAN OF SPAN SHEETS.



PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

RIGHT LANE

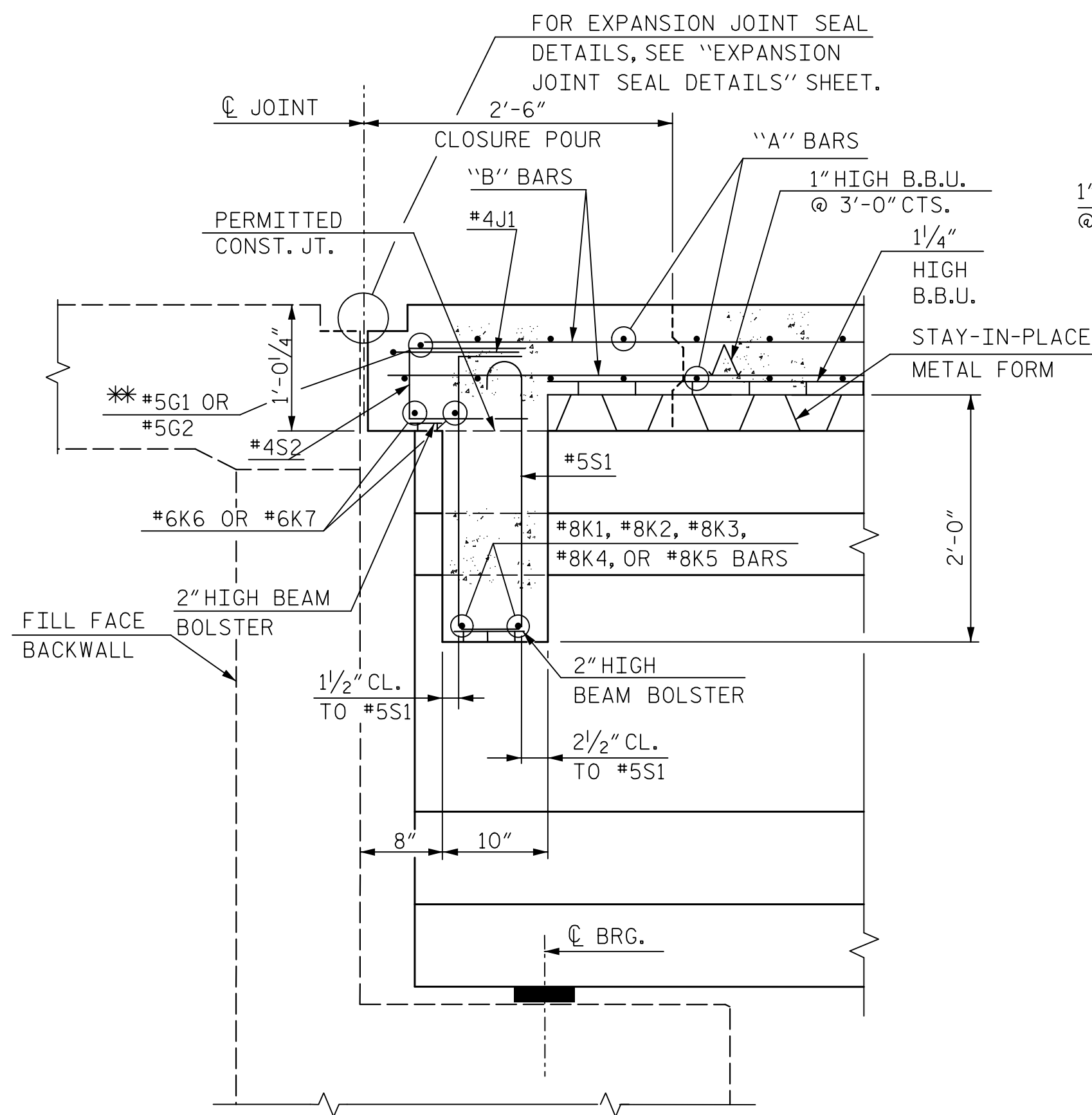
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|-----------|----|------|-----|----|------|--------------|
| NO. | BY | DATE | NO. | BY | DATE | S8-5 |
| 1 | | | 3 | | | TOTAL SHEETS |
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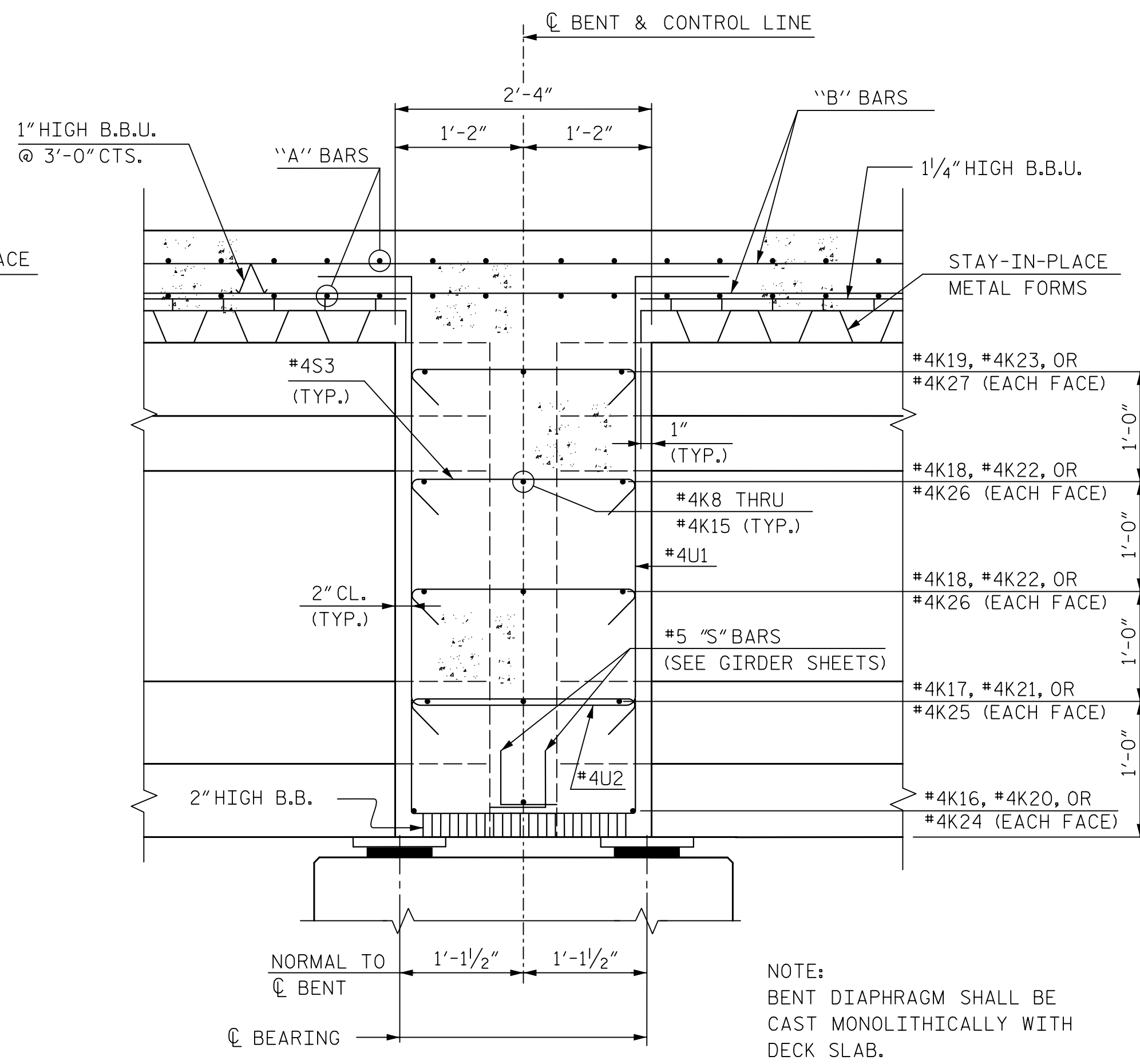
DRAWN BY: M. WRIGHT DATE: 9/18
 CHECKED BY: N. HART DATE: 9/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 5



SECTION A-A

SECTION NORMAL THRU END BENT 1 DIAPHRAGM, END BENT 2 SIMILAR
 * #5 "C" BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.

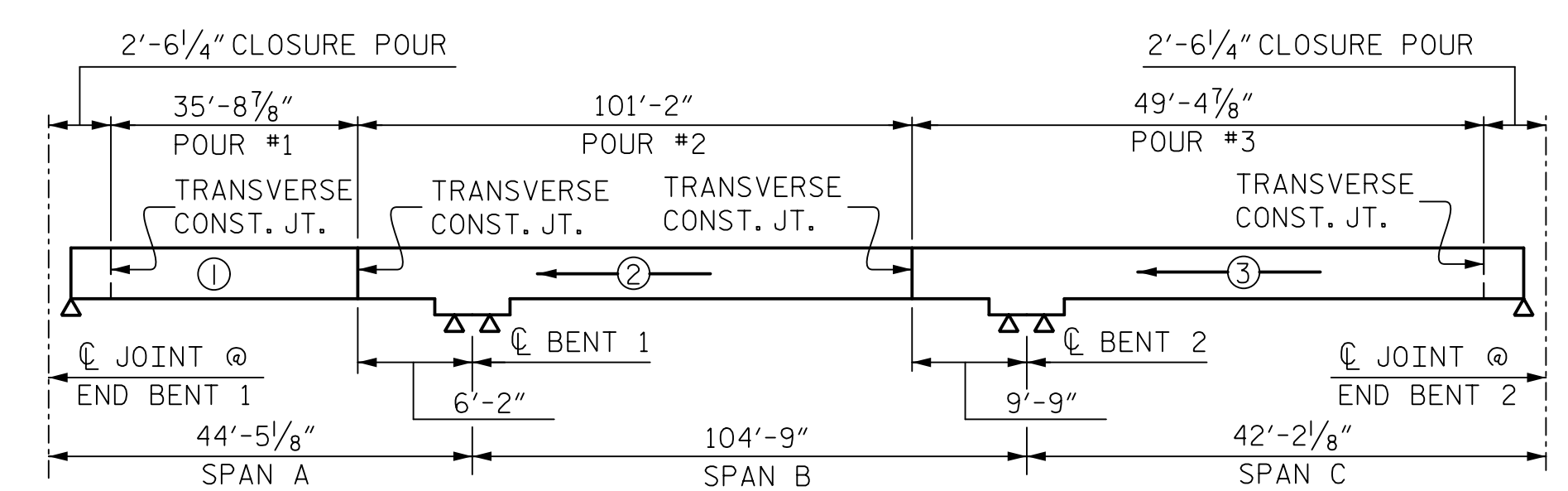


SECTION B-B

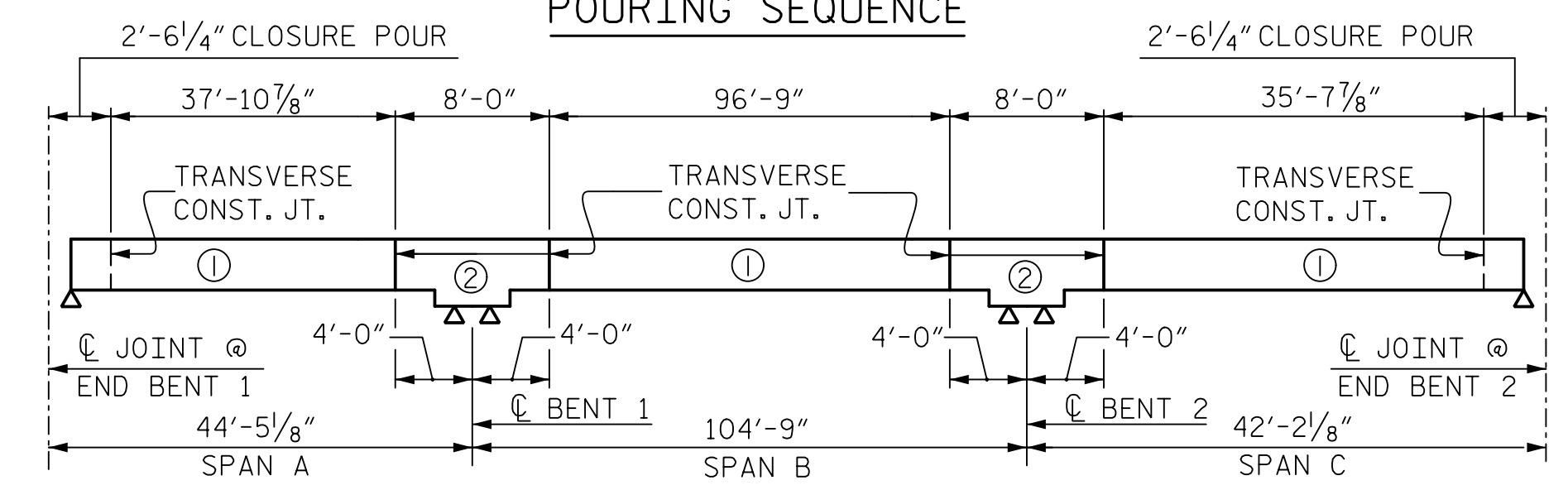
SECTION NORMAL THRU BENT 1 & BENT 2 DIAPHRAGM

NOTE: BENT DIAPHRAGM SHALL BE CAST MONOLITHICALLY WITH DECK SLAB.

NOTE: ALL DIMENSIONS FOR POURING SEQUENCE AND OPTIONAL POURING SEQUENCE ARE ALONG CONTROL LINE RIGHT.

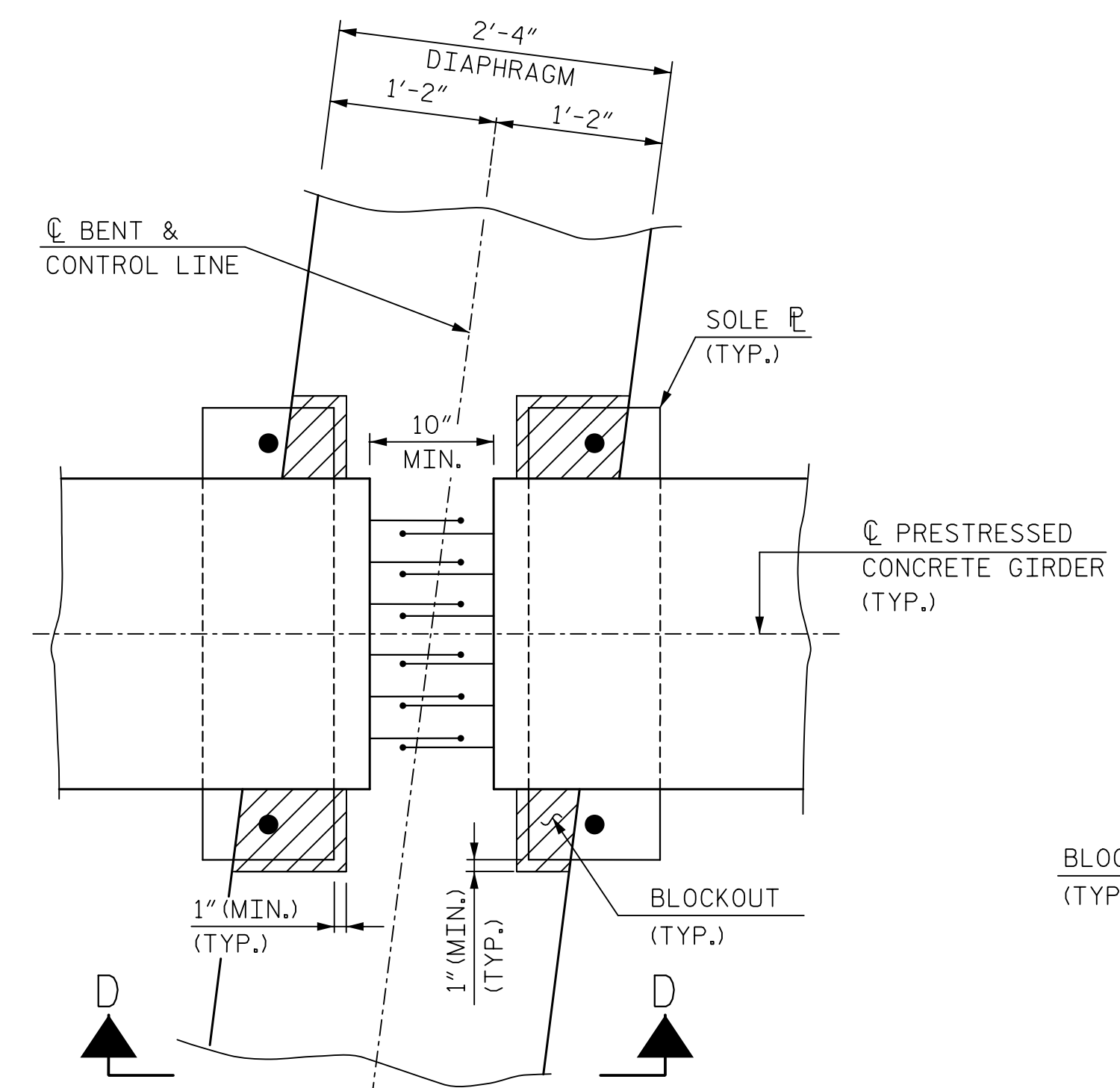


POURING SEQUENCE



OPTIONAL POURING SEQUENCE

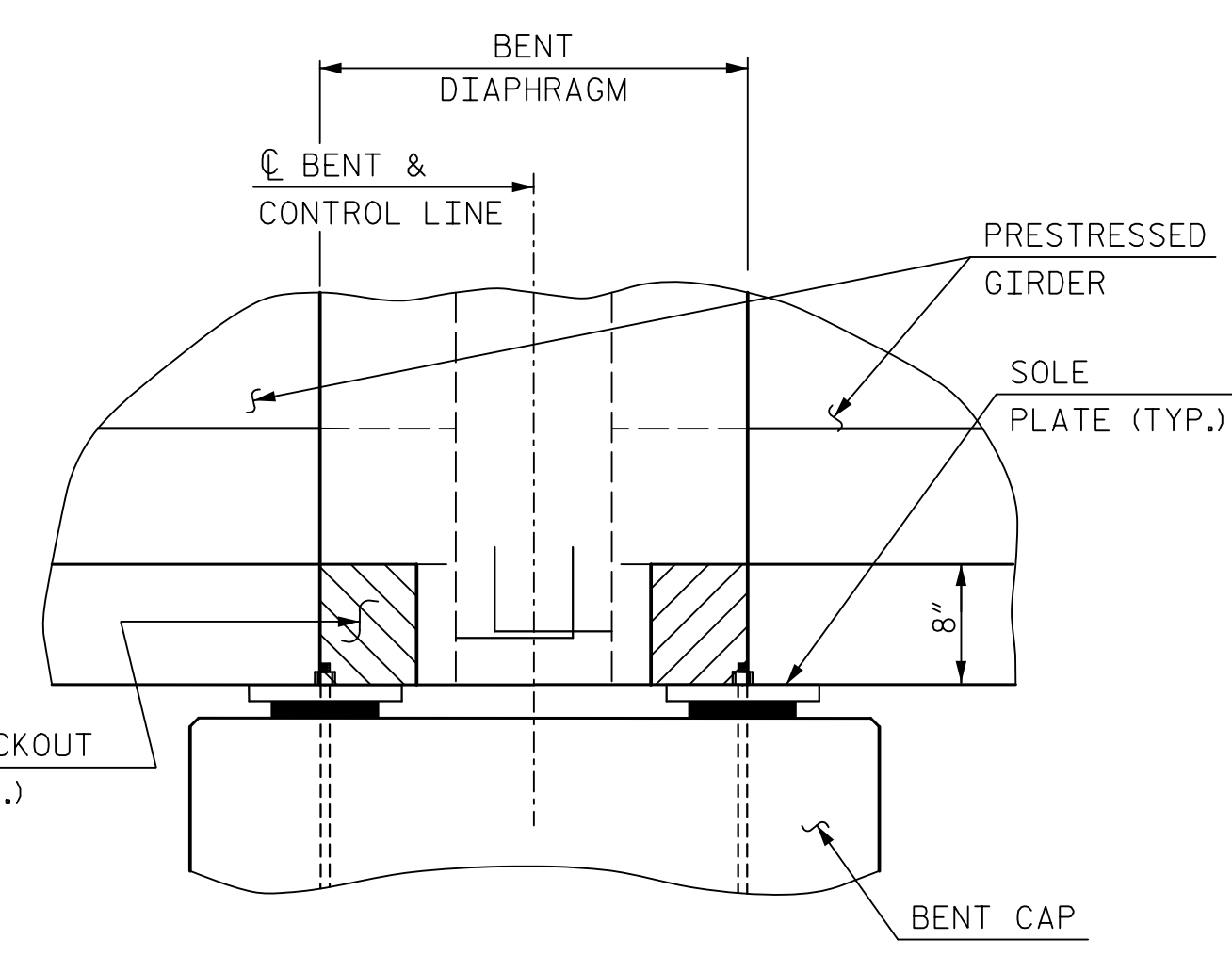
NOTE: POUR ② CAN NOT BE STARTED UNTIL BOTH ADJACENT ① POURS REACH A MINIMUM OF 3000 PSI



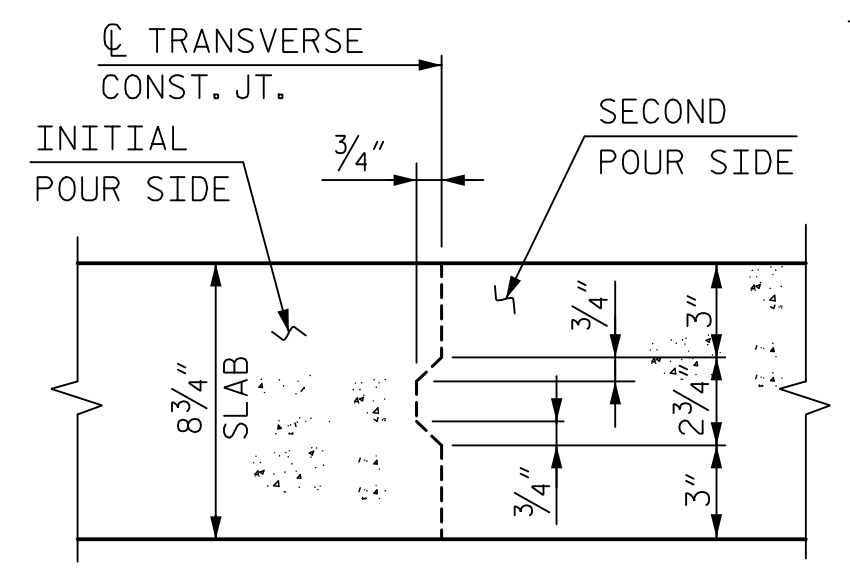
PLAN VIEW

(AT INTERIOR BENTS)

BENT DIAPHRAGM BLOCKOUT DETAILS



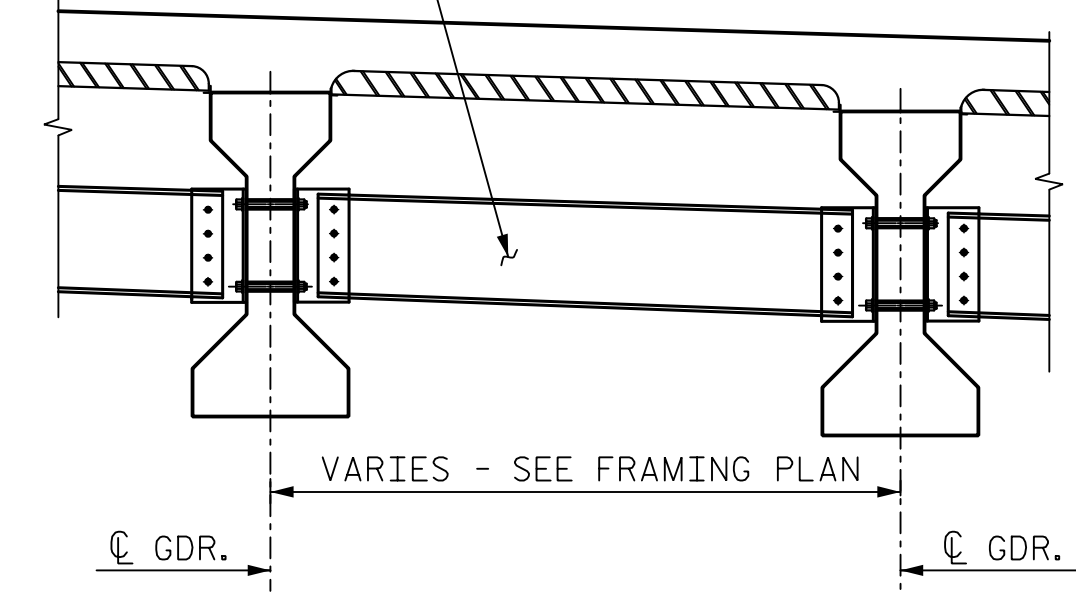
SECTION D-D



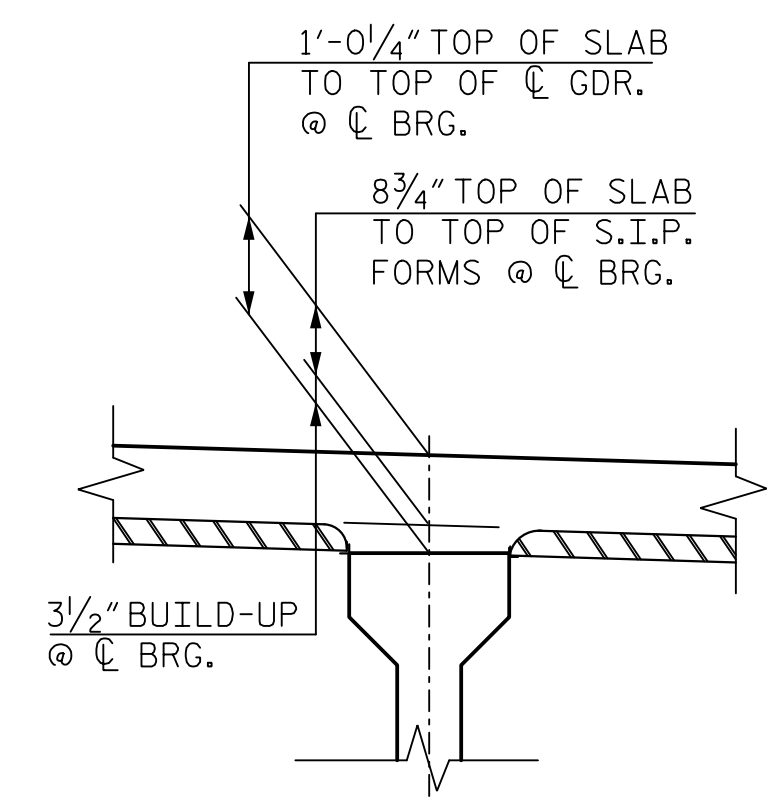
DECK SLAB TRANSVERSE CONSTRUCTION JOINT DETAIL

REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT.

MC 18x42.7 (TYP.)
 (SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET FOR DETAILS)



PARTIAL TYPICAL SECTION (SHOWING INTERMEDIATE DIAPHRAGM)



DETAIL "A"

NOTE: BUILDUP VARIES BETWEEN CL BEARINGS.

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 TYPICAL SECTION
 RIGHT LANE

| NO. | | BY | DATE | NO. | | BY | DATE | SHEET NO. | |
|-----|--|----|------|-----|--|----|------|-----------------|--|
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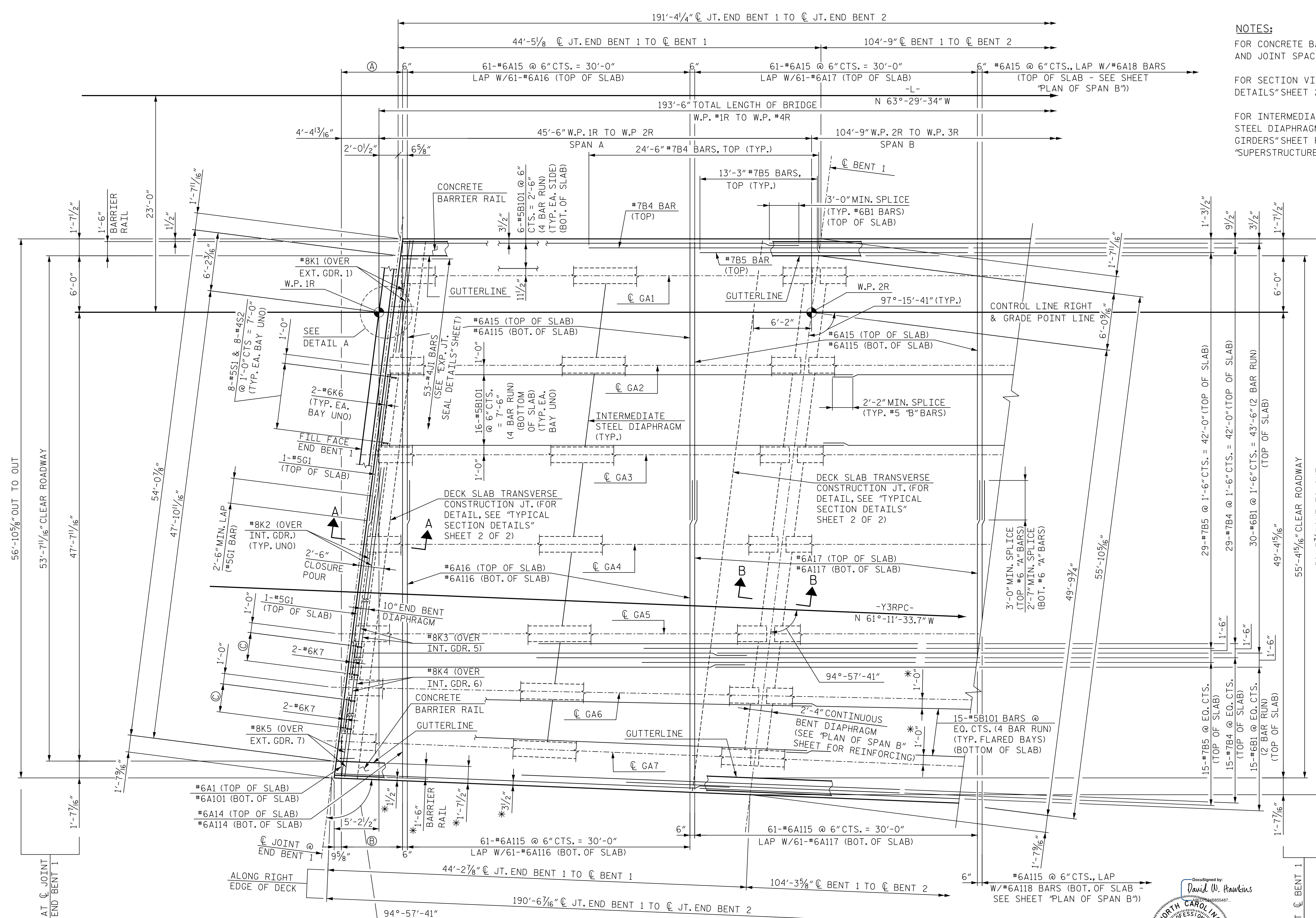
DRAWN BY: M. WRIGHT DATE: 9/18
 CHECKED BY: N. HART DATE: 9/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

11/19/2018

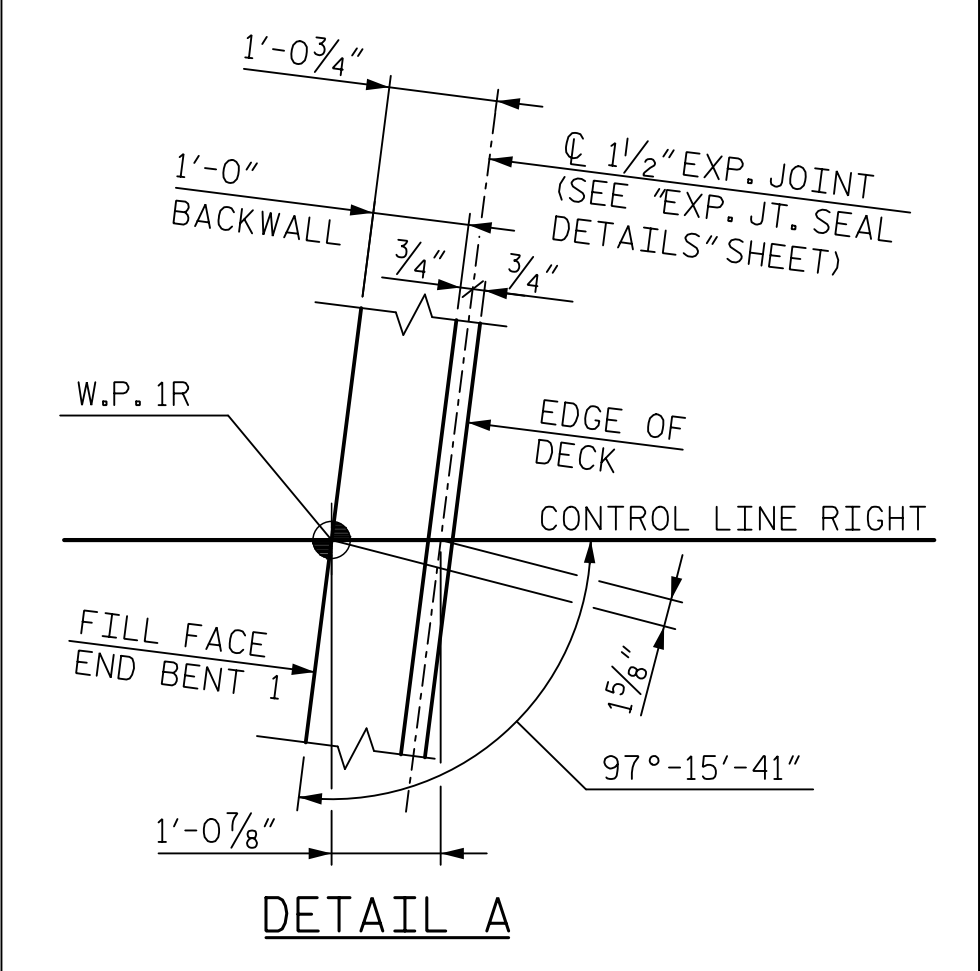
DocuSigned by:
 David W. Hawkins
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 27812
 DAVID W. HAWKINS

DWG. NO. 6

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



NOTES:
 FOR CONCRETE BARRIER RAIL DIMENSIONS, REINFORCING STEEL, AND JOINT SPACING, SEE "CONCRETE BARRIER RAIL" SHEET.
 FOR SECTION VIEWS, SEE "SUPERSTRUCTURE TYPICAL SECTION DETAILS" SHEET 2 OF 2.
 FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET FOR DETAILS. FOR LOCATION, SEE "SUPERSTRUCTURE FRAMING PLANS" SHEET.



- (A) #6A1 THRU #6A14 @ 6" CTS. (TOP OF SLAB)
- (B) #6A101 THRU #6A114 @ 6" CTS. (BOT. OF SLAB)
- (C) 4-#5S1 & 4-#4S2 @ 1'-0" CTS = 3'-0"

* NORMAL TO -Y3RPC-, EDGE OF DECK OR C OF GIRDER

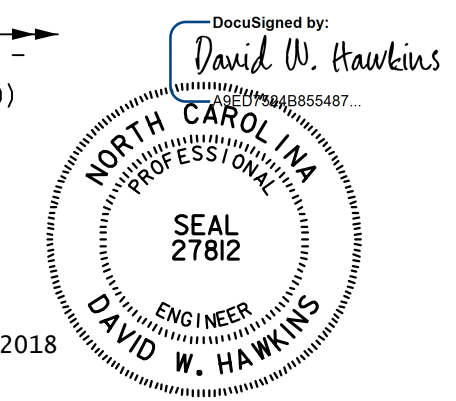
PLAN OF SPAN A

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 PLAN OF SPAN "A"
 RIGHT LANE

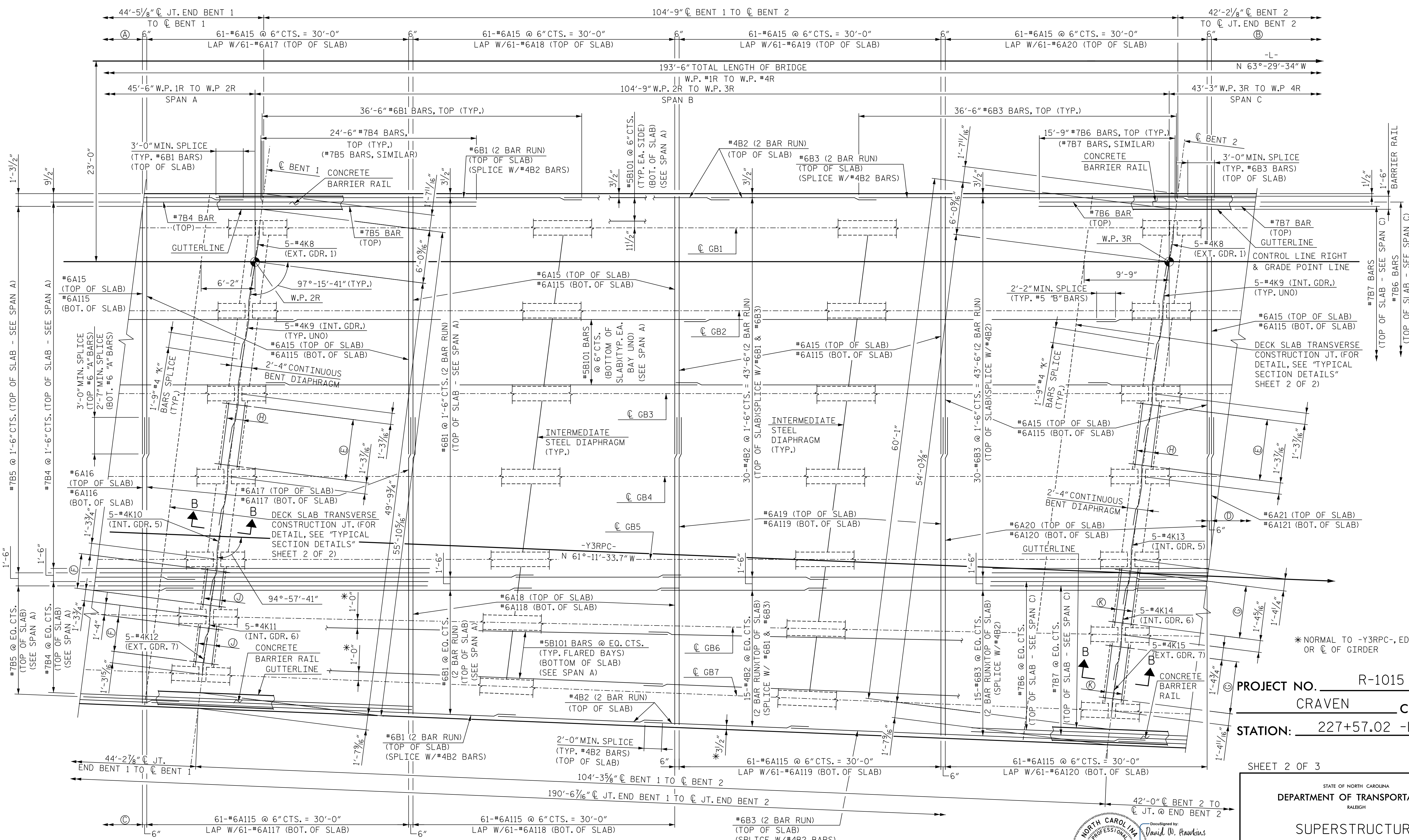


| | | | |
|---------------------------------------|------------|--|------------|
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| DRAWN BY: M. WRIGHT | DATE: 9/18 | CHECKED BY: N. HART | DATE: 9/18 |
| DESIGN ENGINEER OF RECORD: D. HAWKINS | DATE: 9/18 | DWG. NO. 7 | |

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

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191'-4 1/4" @ JT. END BENT 1 TO @ JT. END BENT 2



PLAN OF SPAN B

NOTES:

FOR NOTES, SEE "SUPERSTRUCTURE PLAN OF SPAN A" SHEET.

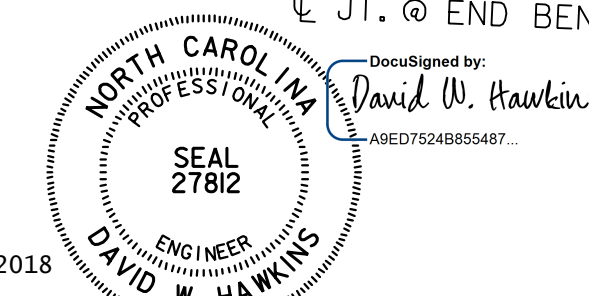
FOR DECK DIMENSIONS NORMAL TO CONTROL LINE AT BENT 1 AND BENT 2, SEE "PLAN OF SPAN A" AND "PLAN OF SPAN C" SHEETS.

- A #6A15 @ 6" CTS., LAP W/#6A16 BARS (TOP OF SLAB - SEE SHEET "PLAN OF SPAN A")
- B #6A15 @ 6" CTS., LAP W/#6A21 BARS (TOP OF SLAB - SEE SHEET "PLAN OF SPAN C")
- C #6A15 @ 6" CTS., LAP W/#6A116 BARS (BOT. OF SLAB - SEE SHEET "PLAN OF SPAN A")
- D #6A15 @ 6" CTS., LAP W/#6A121 BARS (BOT. OF SLAB - SEE SHEET "PLAN OF SPAN C")
- E 7 SPA. @ 1'-0" = 7'-0", 6-#4U1, 2-#4U2, & 30-#4S3 (TYP. EA. BAY UNO) (SEE TYPICAL SECTION)
- F 4 SPA. @ 1'-0" = 4'-0", 3-#4U1, 2-#4U2, & 18-#4S3 (SEE TYPICAL SECTION)
- G 6 SPA. @ 1'-0" = 6'-0", 5-#4U1, 2-#4U2, & 26-#4S3 (SEE TYPICAL SECTION)
- H 1-#4K16, 1-#4K17, 2-#4K18, & 1-#4K19 (TYP. EA. FACE) (TYP. EA. BAY UNO)
- I 1-#4K20, 1-#4K21, 2-#4K22, & 1-#4K23 (TYP. EA. FACE)
- J 1-#4K24, 1-#4K25, 2-#4K26, & 1-#4K27 (TYP. EA. FACE)

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPAN "B"
 RIGHT LANE

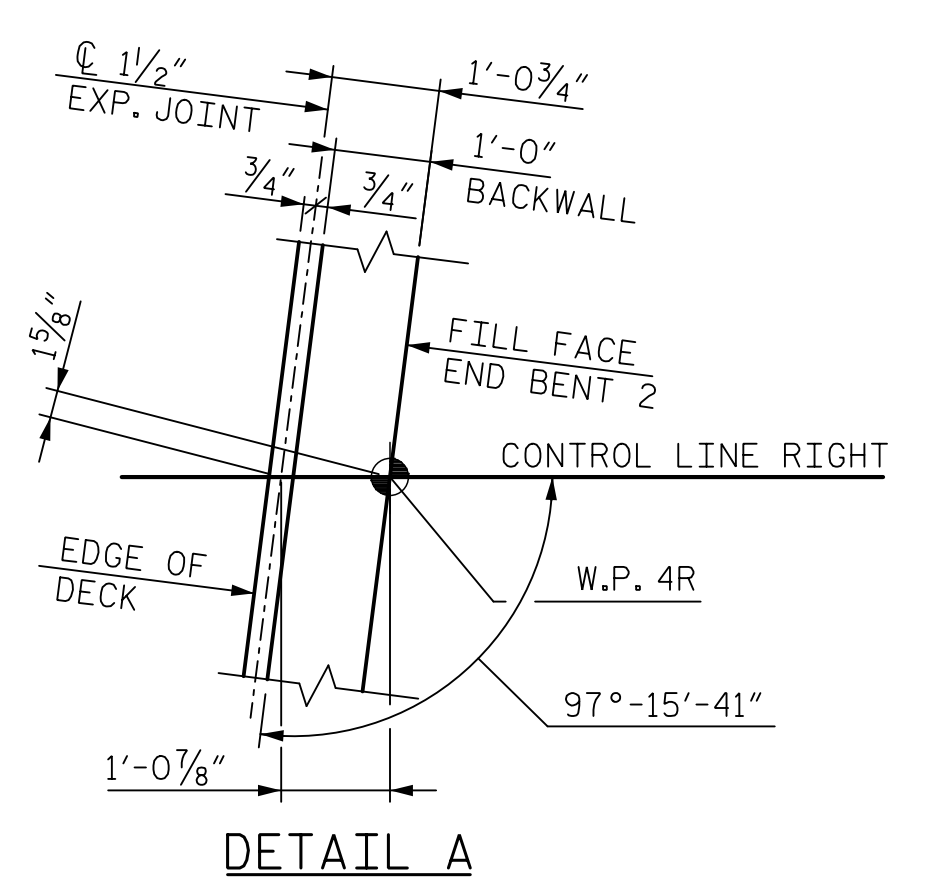
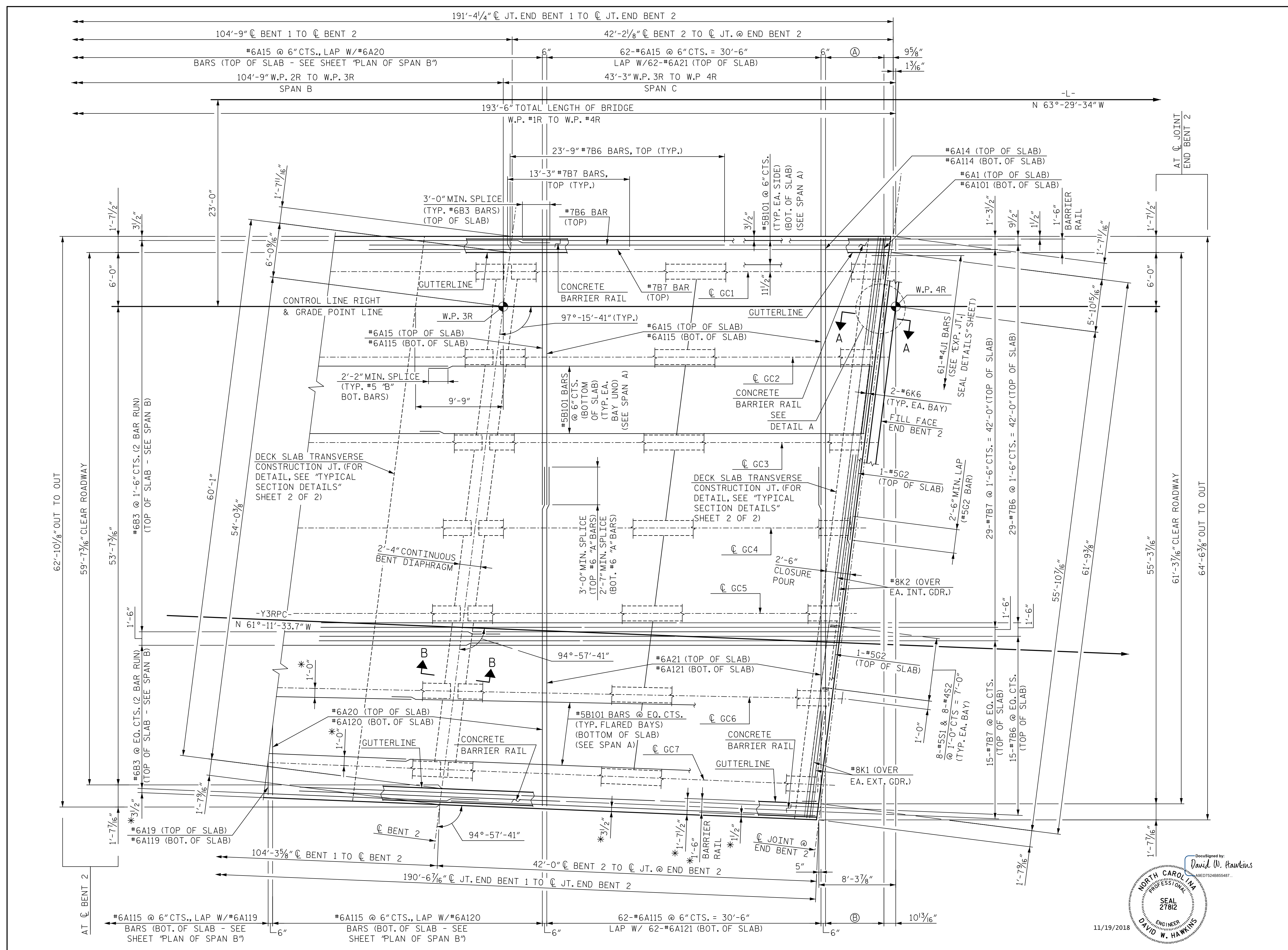


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|---------------------------------------|------------|--|------------|
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| DRAWN BY: M. WRIGHT | DATE: 9/18 | CHECKED BY: N. HART | DATE: 9/18 |
| DESIGN ENGINEER OF RECORD: D. HAWKINS | DATE: 9/18 | DWG. NO. 8 | |

| REVISIONS | | | | SHEET NO. | |
|-----------|----|------|-----|-----------|------|
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| 1 | | | 3 | | |
| 2 | | | 4 | | |

TOTAL SHEETS: 36

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- Ⓐ #6A14 THRU #6A1 @ 6"CTS. (TOP OF SLAB)
- Ⓑ #6A114 THRU #6A101 @ 6"CTS. (BOT. OF SLAB)

PLAN OF SPAN C
 *NORMAL TO -Y3RPC-, EDGE OF DECK OR Ⓞ GIRDER

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11/19/2018

DocuSigned by:
 David W. Hawkins
 PROFESSIONAL ENGINEER
 SEAL 27812
 ENGINEER
 DAVID W. HAWKINS

DRAWN BY: M. WRIGHT DATE: 9/18
 CHECKED BY: N. HART DATE: 9/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 9

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 3 OF 3

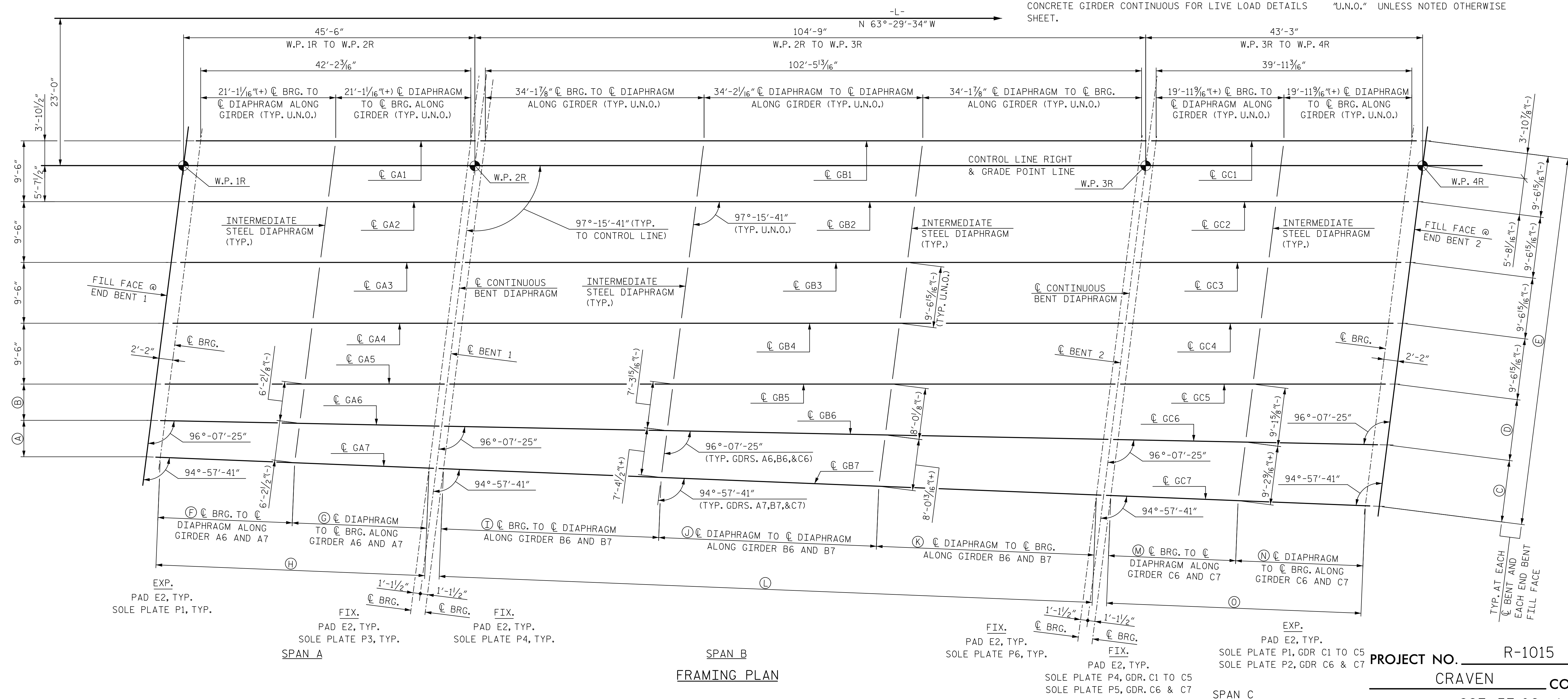
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 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUPERSTRUCTURE
 PLAN OF SPAN "C"
 RIGHT LANE**

| REVISIONS | | | | | |
|-----------|----|------|-----|----|------|
| NO. | BY | DATE | NO. | BY | DATE |
| 1 | | | 3 | | |
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| SHEET NO. | S8-9 |
| TOTAL SHEETS | 36 |

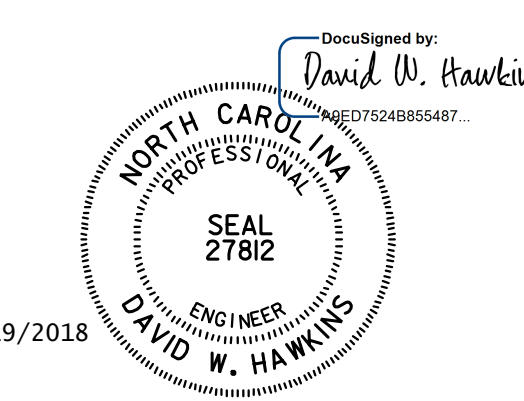
NOTES:
 ALL DIMENSIONS MEASURED ALONG \bar{C} GIRDER UNLESS NOTED OTHERWISE. "EXP." DENOTES EXPANSION BEARING ASSEMBLY. "FIX." DENOTES FIXED BEARING ASSEMBLY. "E" DENOTES ELASTOMERIC BEARING PAD MARK. "P" DENOTES STEEL SOLE PLATE MARK.
 FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE SHEET "STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS".
 FOR GIRDER ELEVATIONS AND DETAILS, SEE PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET.



FRAMING PLAN

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

| DIM. | A | B | C | D | E | DIM. | F | G | H | I | J | K | L | M | N | O |
|----------------------|----------------|-----------------|----------------|-----------------|-----------------|------------|------------|------------|--------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|
| FILL FACE END BENT 1 | 5'-8 1/4" | 5'-8" | 5'-8 1/16" (+) | 5'-8 9/16" (-) | 49'-9 1/16" (-) | GIRDER GA6 | 21'-0 1/2" | 21'-0 1/2" | 42'-1" | | | | | | | |
| \bar{C} BENT 1 | 6'-7 1/4" (+) | 6'-6 13/16" | 6'-7 1/16" (-) | 6'-7 1/16" (+) | 51'-7 1/16" (-) | GIRDER GA7 | 21'-0" | 21'-0" | 42'-0" | | | | | | | |
| \bar{C} BENT 2 | 8'-8 9/16" (+) | 8'-7 11/16" (+) | 8'-9 3/16" (+) | 8'-8 9/16" (-) | 55'-9 1/16" (-) | GIRDER GB6 | | | | 34'-0 5/16" | 34'-1 1/16" | 34'-1" | 102'-2 5/16" | | | |
| FILL FACE END BENT 2 | 9'-7 1/16" (-) | 9'-6" | 9'-8" (-) | 9'-6 15/16" (-) | 57'-6 9/16" (+) | GIRDER GB7 | | | | 34'-0 1/8" | 34'-0 1/4" | 34'-0 3/16" | 102'-0 1/2" | | | |
| | | | | | | GIRDER GC6 | | | | | | | | 19'-11" | 19'-11 1/16" | 39'-10 1/16" |
| | | | | | | GIRDER GC7 | | | | | | | | 19'-10 9/16" | 19'-10 9/16" | 39'-9 9/8" |



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 CHECKED BY: N. HART DATE: 7/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 10

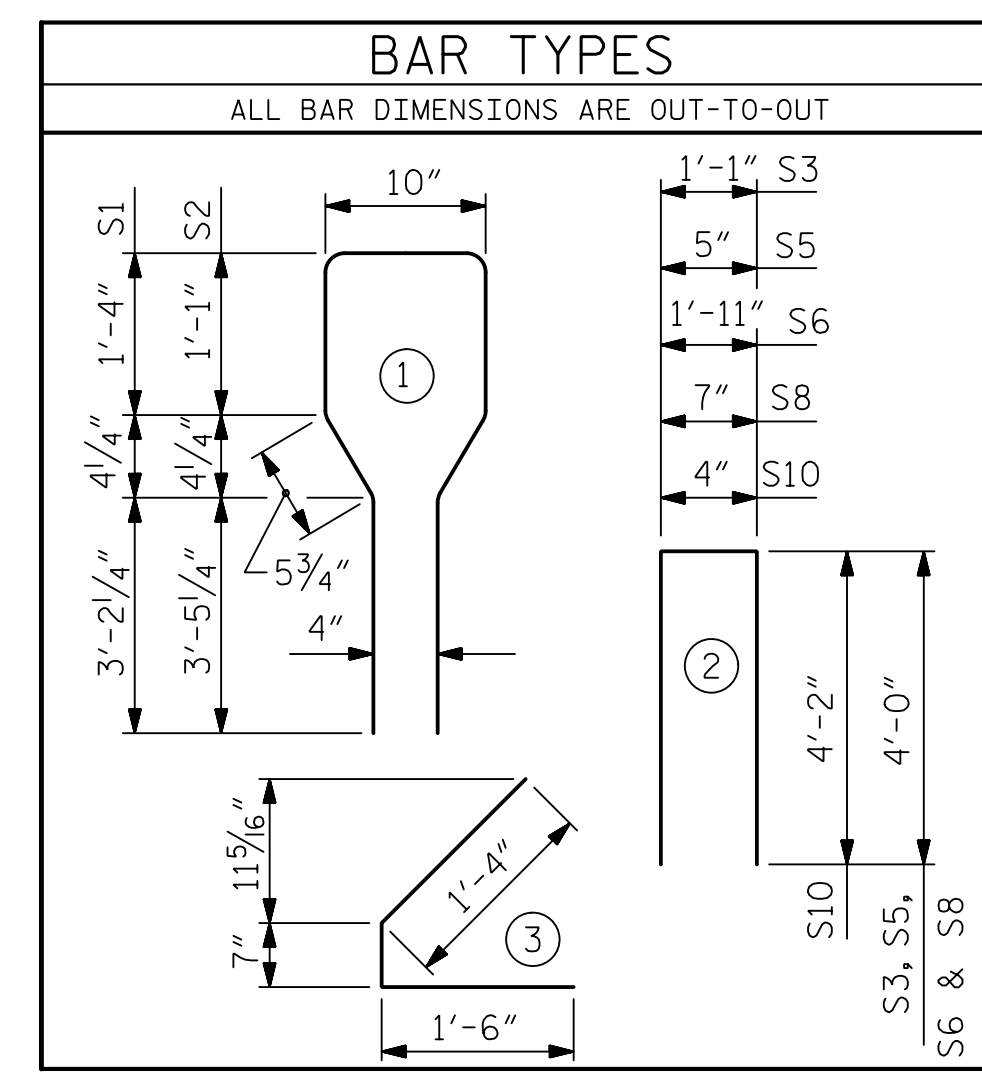
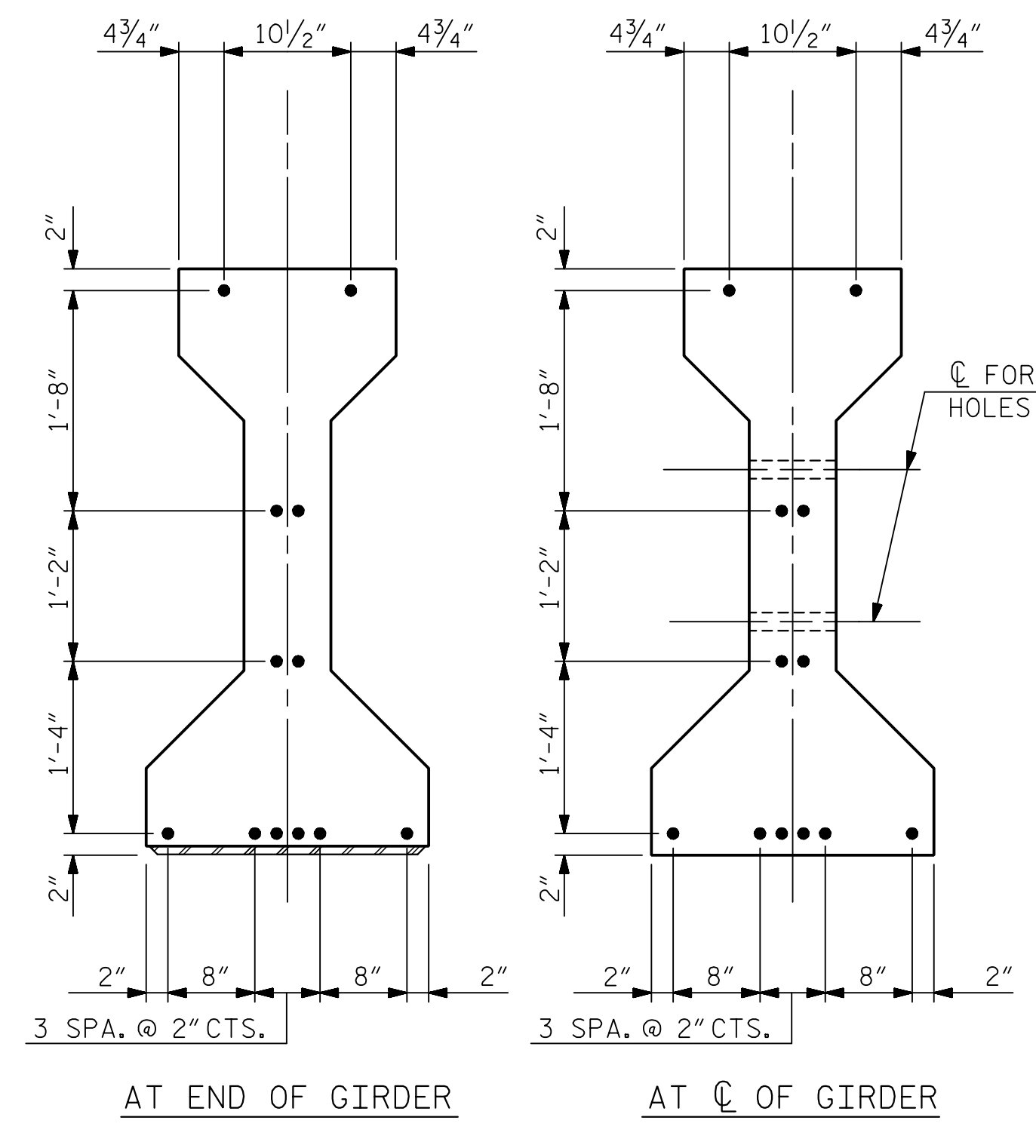
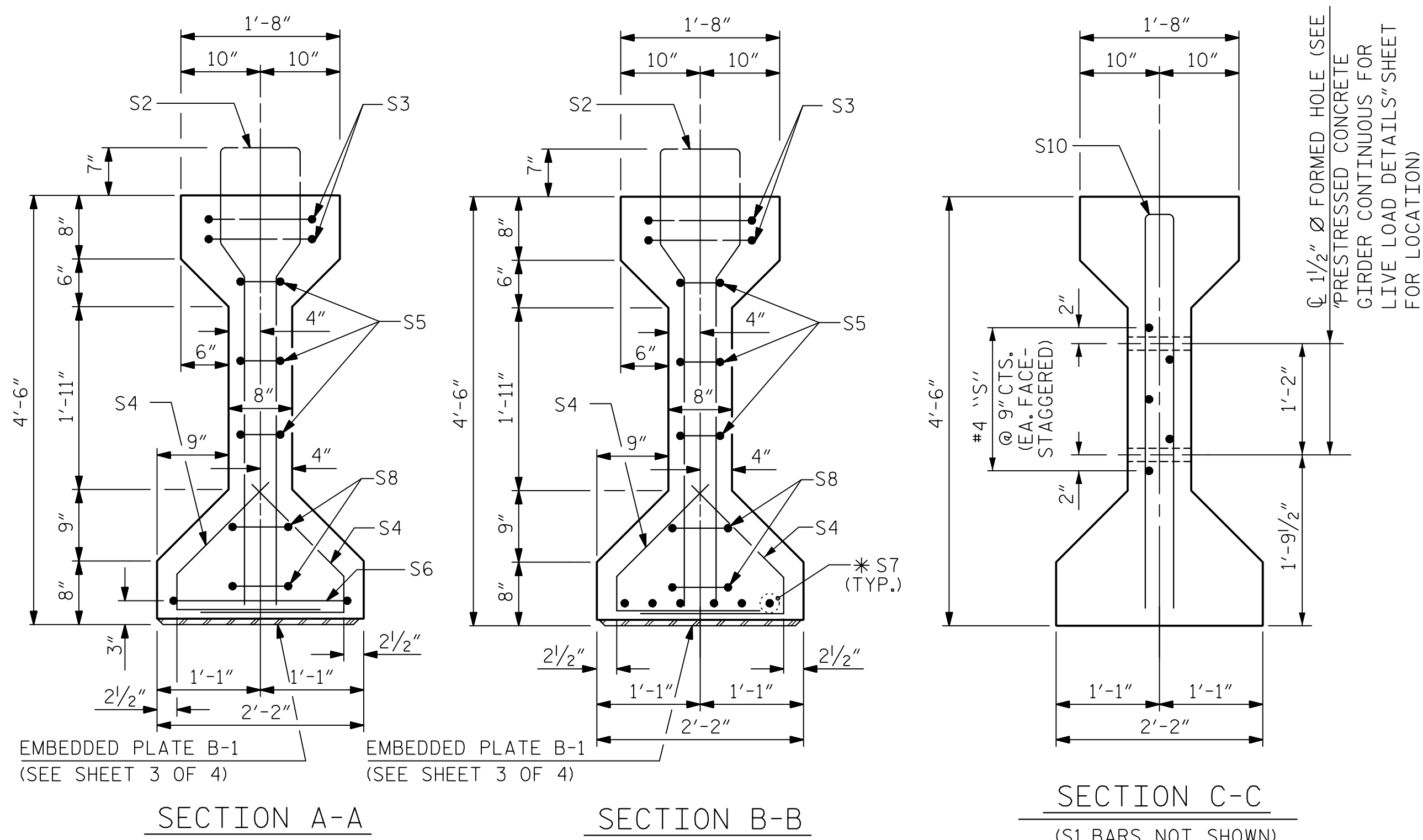
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 FRAMING PLAN
 RIGHT LANE

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

SHEET NO. S8-10
 TOTAL SHEETS 36

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED



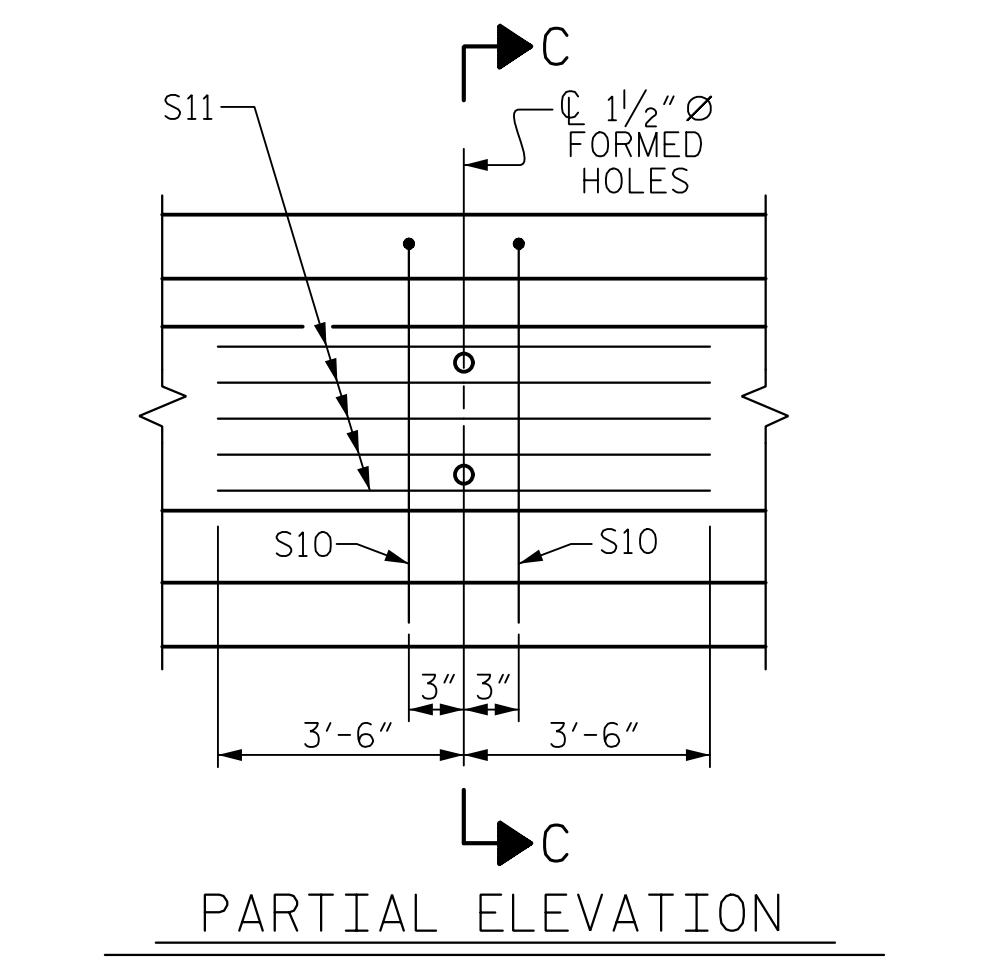
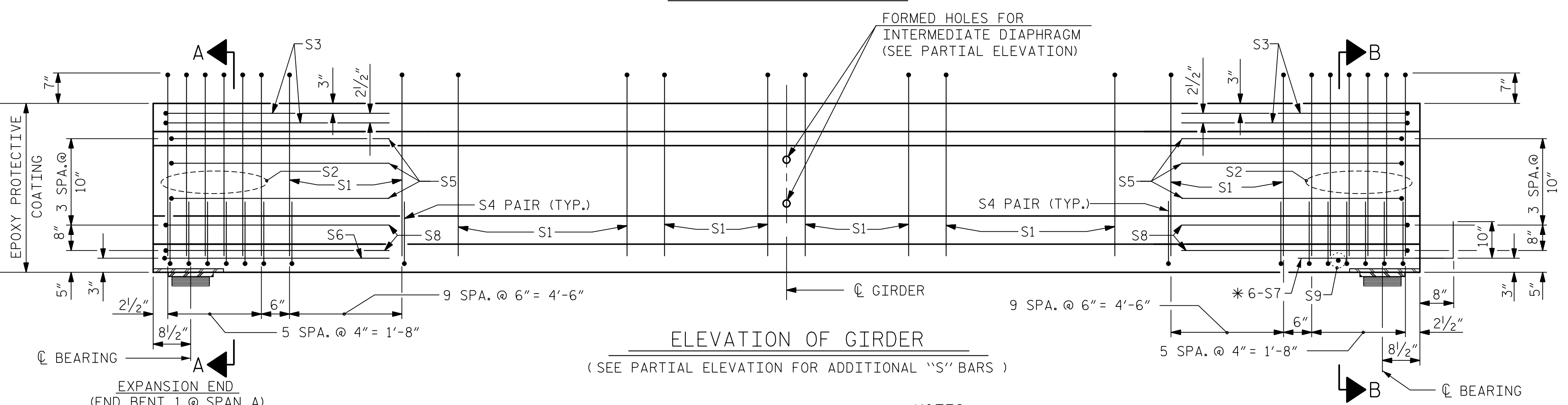
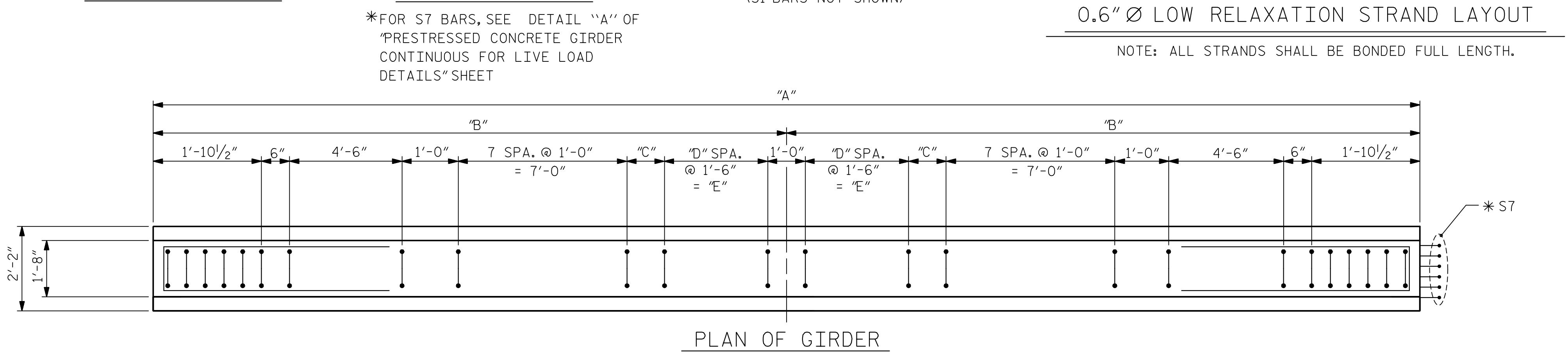
| 0.6" Ø L. R. GRADE 270 STRANDS | | |
|--------------------------------|-------------------------------------|-------------------------------------|
| AREA (SQUARE INCHES) | ULTIMATE STRENGTH (LBS. PER STRAND) | APPLIED PRESTRESS (LBS. PER STRAND) |
| 0.217 | 58,600 | 43,950 |

| REINFORCING STEEL FOR ONE GIRDER | | | | | | |
|----------------------------------|--------|------|------|--------|---------|-----|
| BAR | NUMBER | SIZE | TYPE | LENGTH | WEIGHT | |
| GA1-GA7 | S1 | 46 | #4 | 1 | 10'-10" | 333 |
| GC1-GC7 | S1 | 44 | #4 | 1 | 10'-10" | 318 |
| | S2 | 12 | #6 | 1 | 10'-10" | 195 |
| | S3 | 4 | #4 | 2 | 9'-1" | 24 |
| | S4 | 64 | #4 | 3 | 3'-5" | 146 |
| | S5 | 6 | #4 | 2 | 8'-5" | 34 |
| | S6 | 1 | #4 | 2 | 9'-11" | 7 |
| | *S7 | 6 | #5 | STR | 3'-8" | 23 |
| | S8 | 4 | #4 | 2 | 8'-7" | 23 |
| | S9 | 1 | #3 | STR | 1'-10" | 1 |
| | S10 | 2 | #5 | 2 | 8'-8" | 18 |
| | S11 | 5 | #4 | STR | 7'-0" | 23 |

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

| QUANTITIES FOR ONE GIRDER | | | |
|---------------------------|-------------------|--------------------|----------------------|
| | REINFORCING STEEL | 5,000 PSI CONCRETE | 0.6" Ø L. R. STRANDS |
| | LB. | C.Y. | No. |
| SPAN A GDR. | 827 | 8.8 | 12 |
| SPAN C GDR. | 812 | 8.4 | 12 |

| GIRDERS REQUIRED | | |
|------------------------|--------------------------------------|--------------|
| NUMBER | LENGTH | TOTAL LENGTH |
| GA1 THRU GA5 (5 TOTAL) | 43'-7 ³ / ₁₆ " | 217.99' |
| GA6 | 43'-6" | 43.50' |
| GA7 | 43'-5" | 43.42' |
| GC1 THRU GC5 (5 TOTAL) | 41'-4 ³ / ₁₆ " | 206.74' |
| GC6 | 41'-3 ³ / ₁₆ " | 41.26' |
| GC7 | 41'-2 ⁷ / ₈ " | 41.18' |



| GIRDER DIMENSION TABLE | | | | | |
|------------------------|--------------------------------------|---|-------------------------------------|-----|-------|
| GIRDERS | "A" | "B" | "C" | "D" | "E" |
| GA1-GA5 | 43'-7 ³ / ₁₆ " | 21'-9 ⁹ / ₁₆ "(+) | 5 ¹ / ₁₆ "(+) | 4 | 6'-0" |
| GA6 | 43'-6" | 21'-9" | 4 ¹ / ₂ " | 4 | 6'-0" |
| GA7 | 43'-5" | 21'-8 ¹ / ₂ " | 4" | 4 | 6'-0" |
| GC1-GC5 | 41'-4 ³ / ₁₆ " | 20'-8 ¹ / ₁₆ "(+) | 9 ⁹ / ₁₆ "(+) | 3 | 4'-6" |
| GC6 | 41'-3 ¹ / ₁₆ " | 20'-7 ¹ / ₂ "(+) | 9"(+) | 3 | 4'-6" |
| GC7 | 41'-2 ¹ / ₈ " | 20'-7 ¹ / ₁₆ " | 8 ⁹ / ₁₆ " | 3 | 4'-6" |

NOTES:
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4,000 PSI FOR SPAN A AND SPAN C GIRDERS.

GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI AT THE AGE OF 28 DAYS.

ASSEMBLED BY: M. WRIGHT DATE: 8/18
CHECKED BY: N. SALAS ZAMUDIO DATE: 8/18

DRAWN BY: ELR 8/91 REV. 10/11/11 MAA/GM
REV. 1/15 MAA/TMG
CHECKED BY: CRP 8/91 REV. 12/17 MAA/THC

HNTB HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DAVID W. HAWKINS
ENGINEER
SEAL 27812
11/19/2018

DWG. NO. II

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPANS A & C
RIGHT LANE

| REVISIONS | | | | | | SHEET NO. S8-11 |
|-----------|----|------|-----|----|------|--------------------|
| NO. | BY | DATE | NO. | BY | DATE | |
| 1 | | | 3 | | | TOTAL SHEETS 36 |
| 2 | | | 4 | | | |

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 METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, 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.

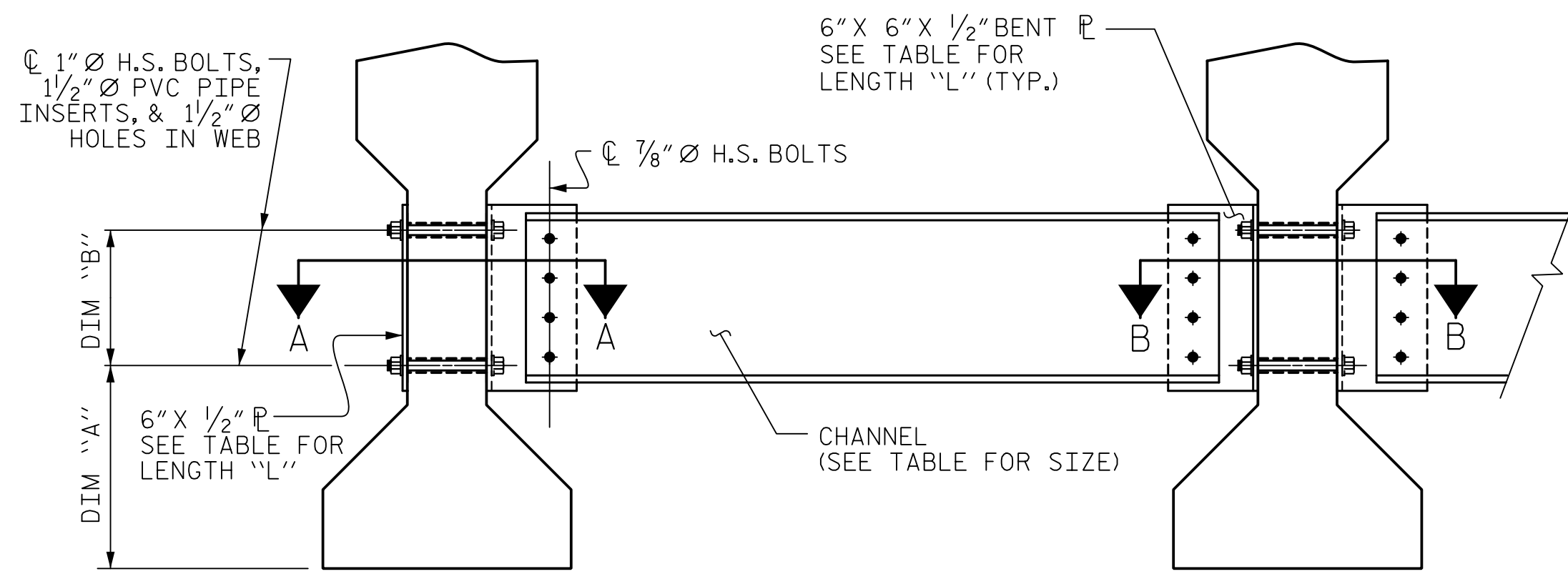
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

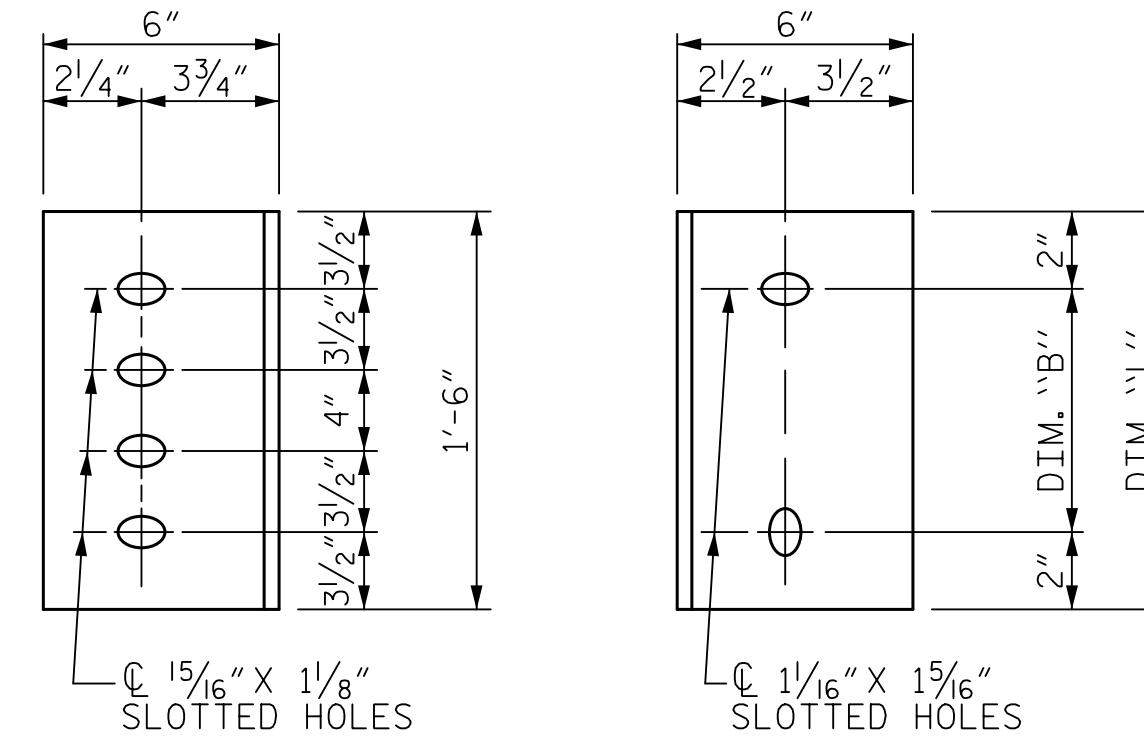
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

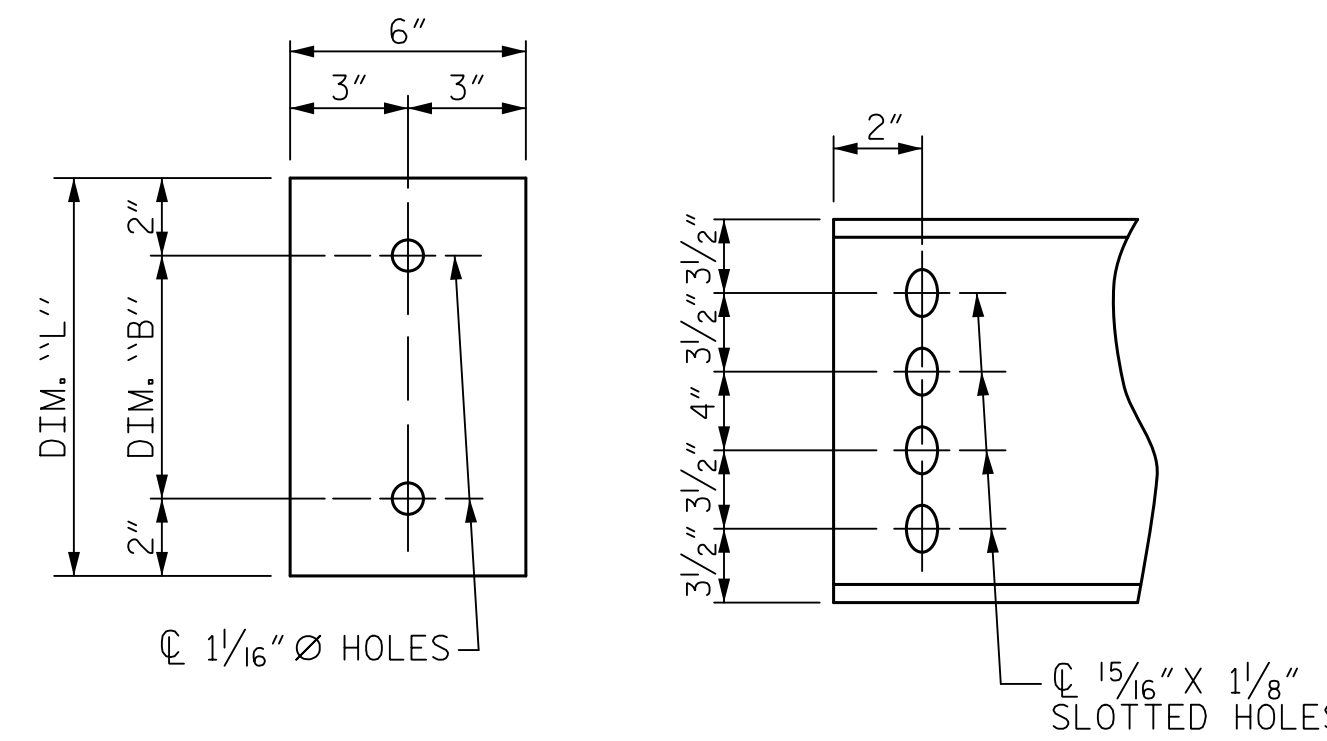
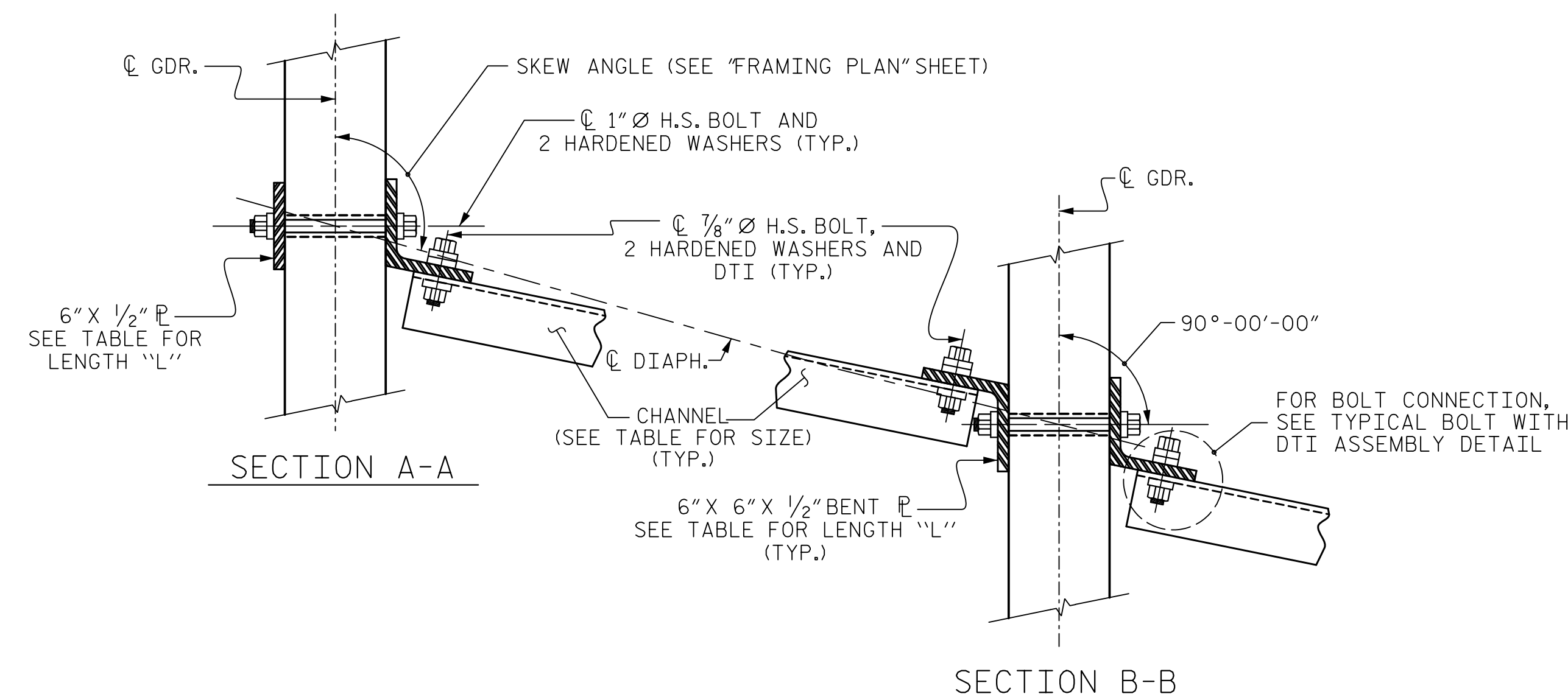


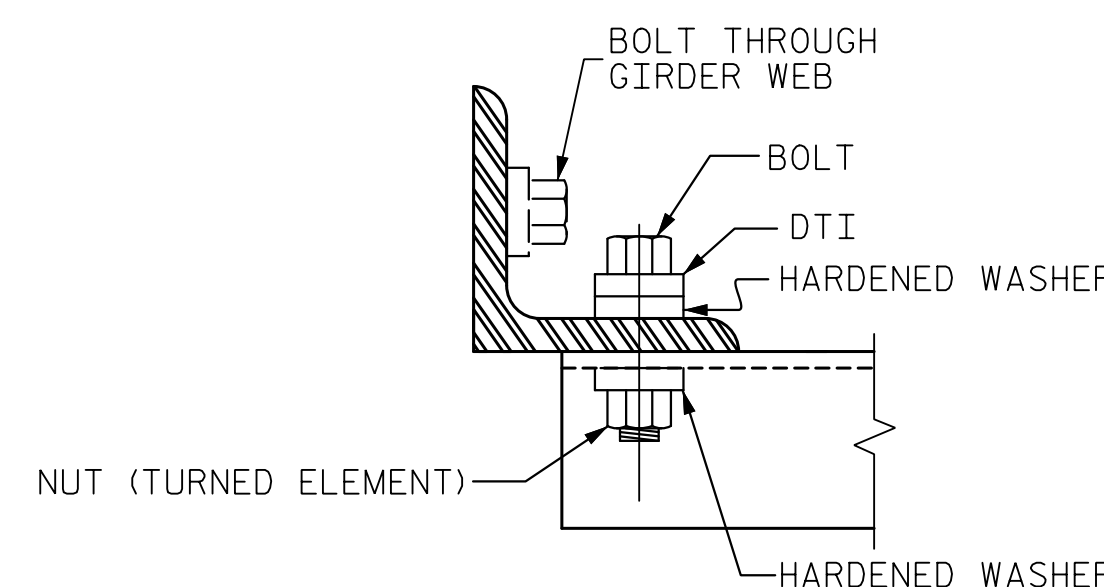
PLATE DETAILS
CHANNEL END

TABLE

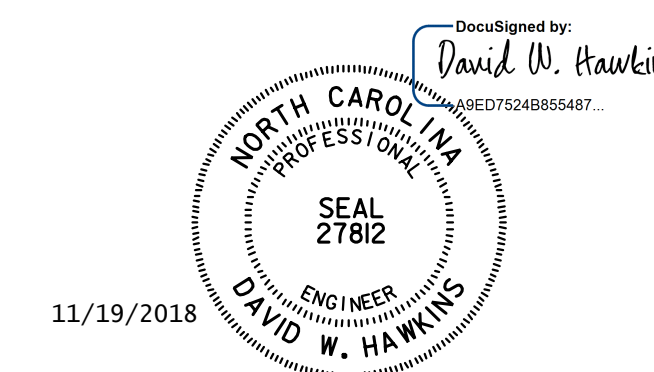
| GIRDER TYPE | CHANNEL SIZE | DIM "A" | DIM "B" | DIM "L" |
|-------------|--------------|-----------|---------|---------|
| IV | MC 18 x 42.7 | 1'-9 1/2" | 1'-2" | 1'-6" |



SECTION A-A
SECTION B-B
CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL



PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-

SHEET 4 OF 4

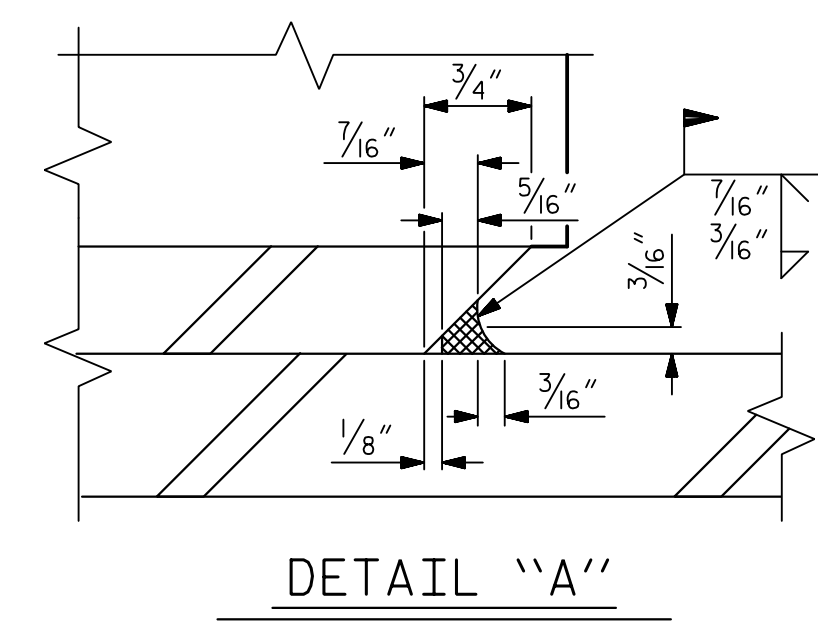
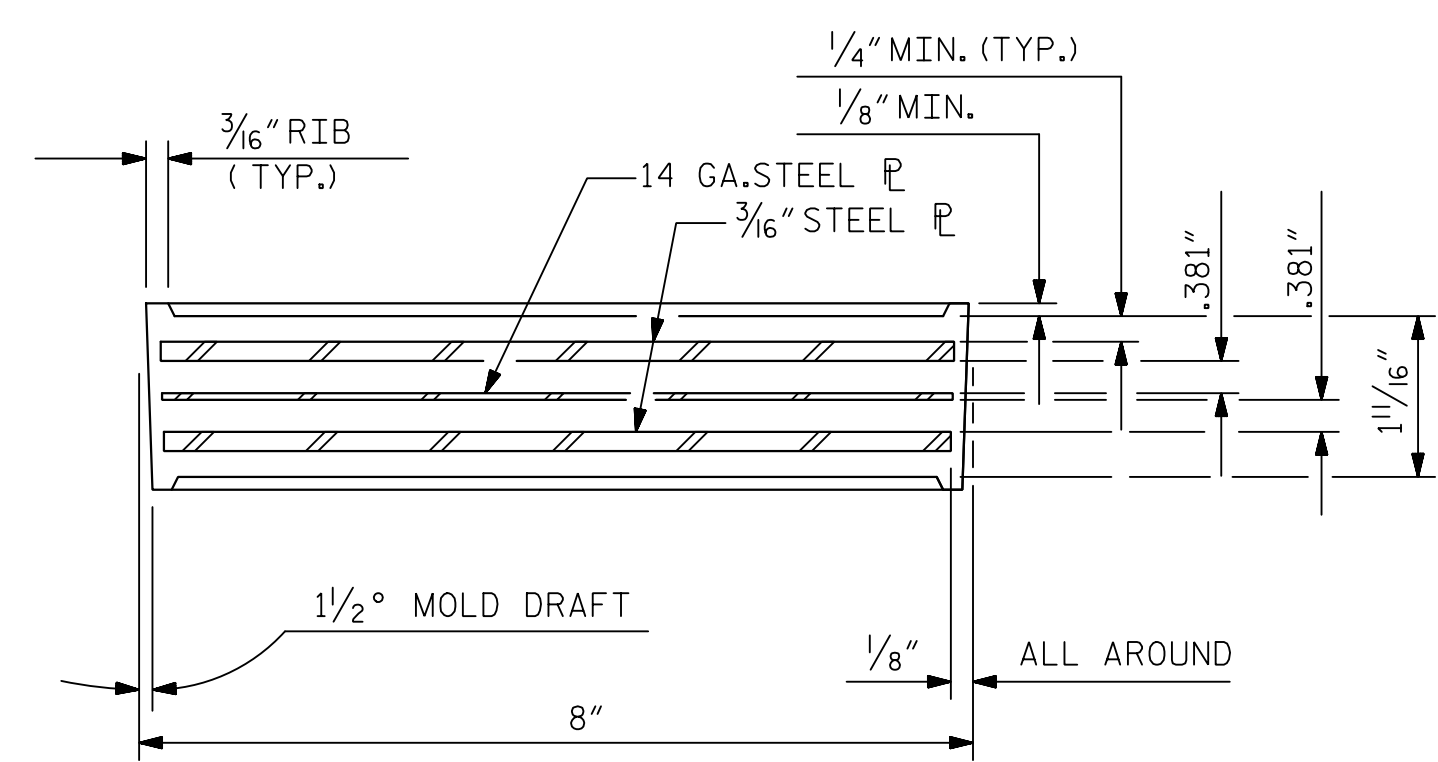
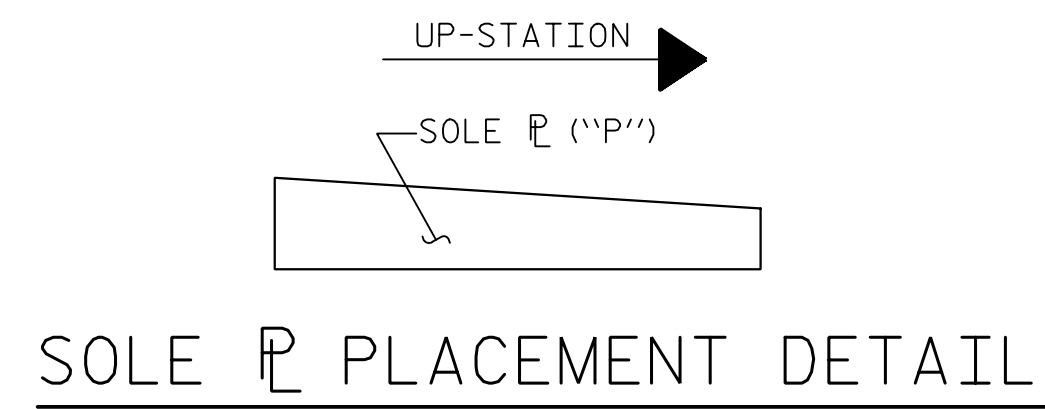
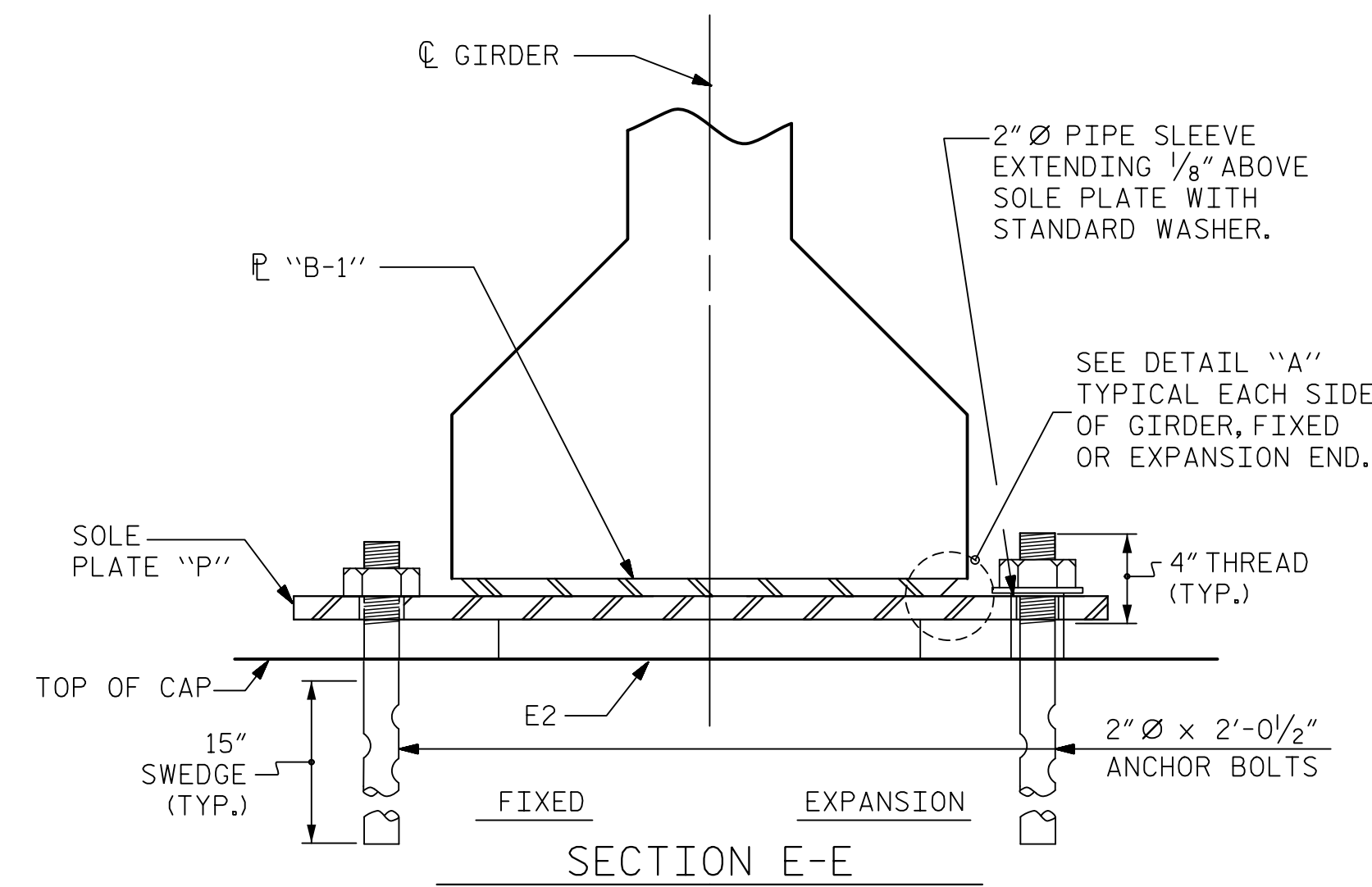
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
INTERMEDIATE
STEEL DIAPHRAGMS
FOR TYPE IV
PRESTRESSED CONCRETE
GIRDERS
RIGHT LANE

| | |
|-------------------------------|-----------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 8/18 |
| CHECKED BY : N. SALAS ZAMUDIO | DATE : 8/18 |
| DRAWN BY : TLA 6/05 | REV. 5/1/06RRR KMM/GM |
| CHECKED BY : VC 6/05 | REV. 10/1/11 MAA/GM |
| | REV. 12/17 MAA/THC |

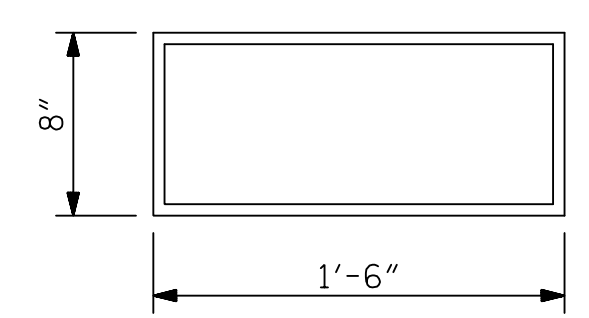
| | | | |
|--|-------------|--|--|
| HNTB | | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | |
| DRAWN BY : M. WRIGHT | DATE : 8/18 | DWG. NO. 14 | |
| CHECKED BY : N. SALAS ZAMUDIO | DATE : 8/18 | | |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 | | |

| REVISIONS | | | | | SHEET NO. |
|-----------|----|------|-----|------|--------------|
| NO. | BY | DATE | NO. | DATE | S8-14 |
| 1 | | | 3 | | TOTAL SHEETS |
| 2 | | | 4 | | 36 |

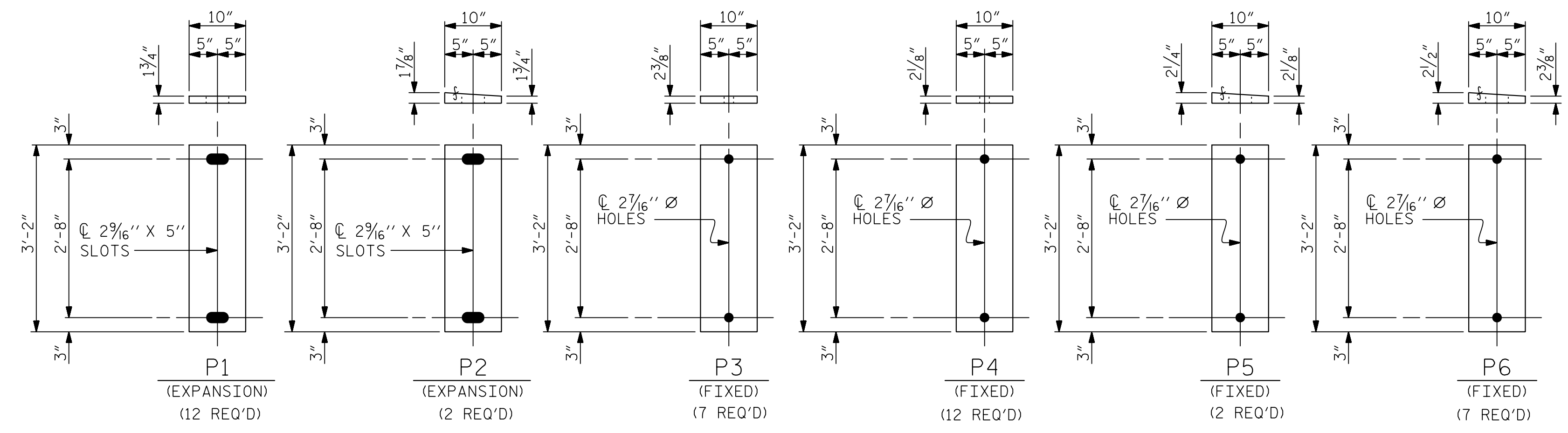
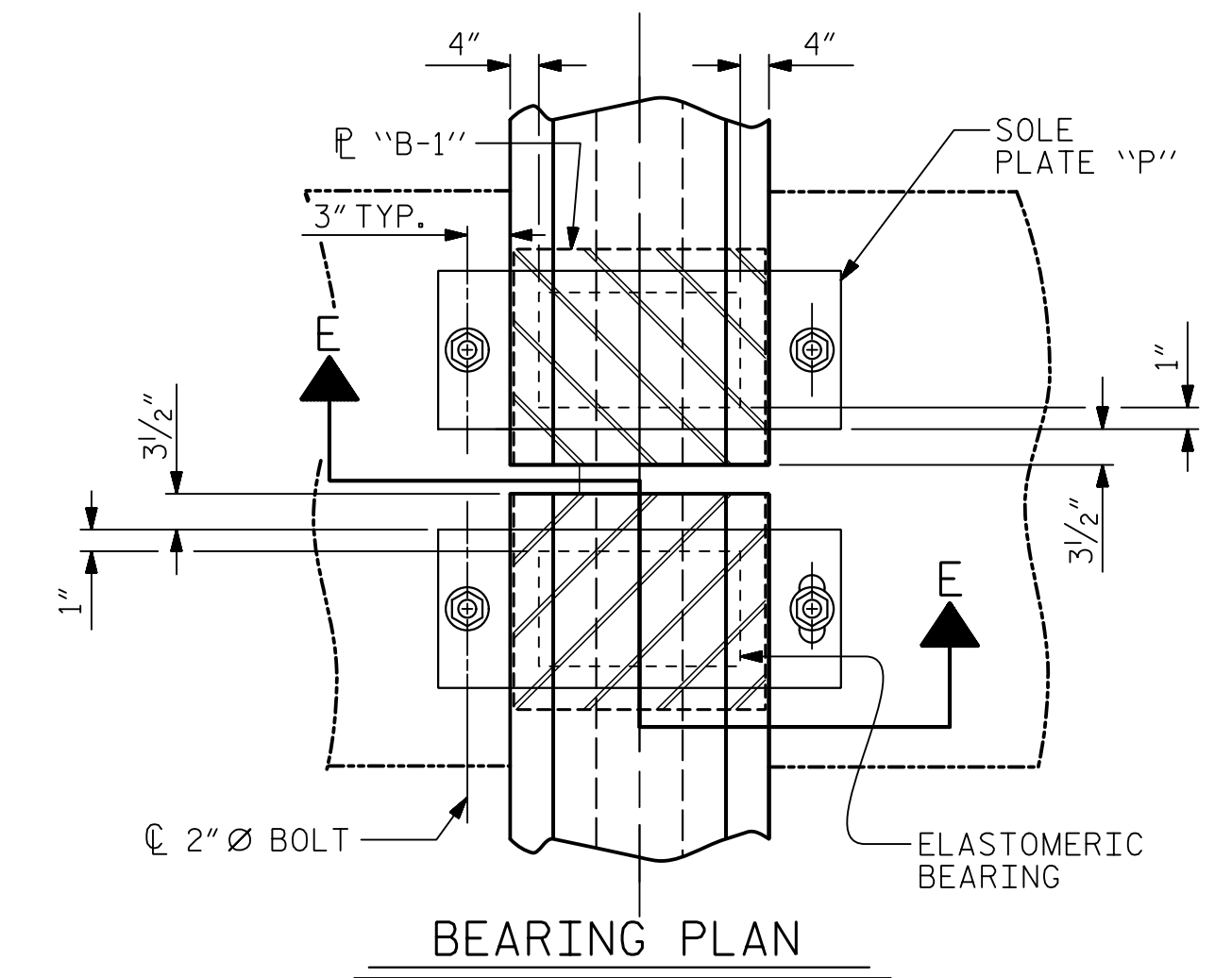
**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**



TYPICAL SECTION OF ELASTOMERIC BEARINGS



E2 (42 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING
TYPE III



SOLE PLATE DETAILS ("P")

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 SHALL THEN BE BURIED WITH A SHARP POINTED TOOL.

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

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 "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE 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. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

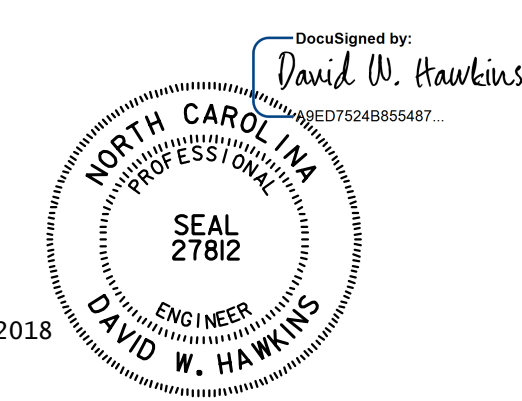
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

| | |
|---------------------------------|-------|
| MAXIMUM ALLOWABLE SERVICE LOADS | |
| D.L.+L.L. (NO IMPACT) | |
| TYPE III | 205 k |

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
ELASTOMERIC BEARING
DETAILS
PRESTRESSED CONCRETE GIRDER
SUPERSTRUCTURE
RIGHT LANE

| | |
|--------------------------|--------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 7/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DRAWN BY : WJH 8/89 | REV. 6/13 AAC/MAA |
| CHECKED BY : CRK 8/89 | REV. 1/15 MAA/TMG |
| | REV. 12/17 MAA/THC |

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| DRAWN BY : M. WRIGHT | DATE : 7/18 | DWG. NO. 15 | |
| CHECKED BY : N. HART | DATE : 7/18 | | |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 | | |

| REVISIONS | | | | SHEET NO. |
|-----------|----|------|---|--------------|
| NO. | BY | DATE | | S8-15 |
| 1 | | | 3 | TOTAL SHEETS |
| 2 | | | 4 | 36 |

| DEAD LOAD DEFLECTION TABLE FOR SPAN A | | | | | | | | | | | |
|---------------------------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.6" Ø LOW RELAXATION STRANDS | GIRDERS 1 THRU 7 | | | | | | | | | | |
| TENTH POINTS | 0.00 | 0.10 | 0.20 | 0.30 | 0.40 | 0.50 | 0.60 | 0.70 | 0.80 | 0.90 | 1.00 |
| CAMBER (GIRDER ALONE IN PLACE) | ↑ 0.000 | 0.002 | 0.004 | 0.005 | 0.006 | 0.006 | 0.006 | 0.005 | 0.004 | 0.002 | 0.000 |
| DEFLECTION DUE TO SUPERIMPOSED D.L. | * ↓ 0.000 | 0.002 | 0.003 | 0.005 | 0.006 | 0.006 | 0.006 | 0.005 | 0.003 | 0.002 | 0.000 |
| FINAL CAMBER | ↑ 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| DEAD LOAD DEFLECTION TABLE FOR SPAN B | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.6" Ø LOW RELAXATION STRANDS | GIRDERS 1 THRU 4 | | | | | | | | | | | | | | | | | | | | |
| TENTH POINTS | 0.00 | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 | 0.90 | 0.95 | 1.00 |
| CAMBER (GIRDER ALONE IN PLACE) | ↑ 0.000 | 0.042 | 0.082 | 0.121 | 0.156 | 0.187 | 0.214 | 0.235 | 0.250 | 0.260 | 0.263 | 0.260 | 0.250 | 0.235 | 0.214 | 0.187 | 0.156 | 0.121 | 0.082 | 0.042 | 0.000 |
| DEFLECTION DUE TO SUPERIMPOSED D.L. | * ↓ 0.000 | 0.029 | 0.057 | 0.085 | 0.112 | 0.135 | 0.155 | 0.171 | 0.182 | 0.190 | 0.182 | 0.190 | 0.182 | 0.171 | 0.155 | 0.135 | 0.112 | 0.085 | 0.057 | 0.029 | 0.000 |
| FINAL CAMBER | ↑ 0 | 1/8 | 5/16 | 7/16 | 1/2 | 5/8 | 11/16 | 3/4 | 13/16 | 13/16 | 7/8 | 13/16 | 13/16 | 3/4 | 11/16 | 5/8 | 1/2 | 7/16 | 5/16 | 1/8 | 0 |

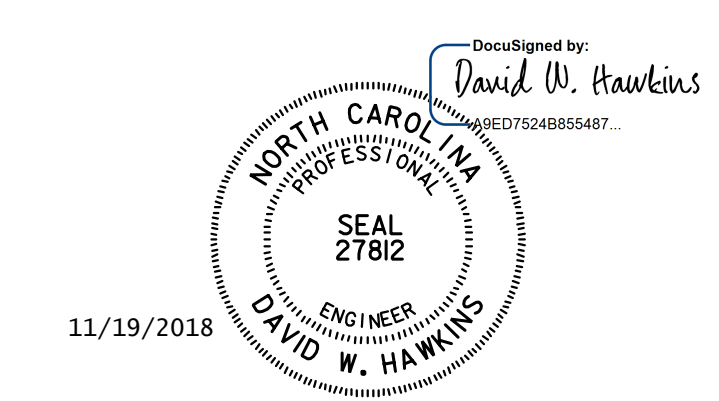
| DEAD LOAD DEFLECTION TABLE FOR SPAN B | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.6" Ø LOW RELAXATION STRANDS | GIRDERS 5 & 7 | | | | | | | | | | | | | | | | | | | | |
| TENTH POINTS | 0.00 | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 | 0.90 | 0.95 | 1.00 |
| CAMBER (GIRDER ALONE IN PLACE) | ↑ 0.000 | 0.042 | 0.082 | 0.121 | 0.156 | 0.187 | 0.214 | 0.235 | 0.250 | 0.260 | 0.263 | 0.260 | 0.250 | 0.235 | 0.214 | 0.187 | 0.156 | 0.121 | 0.082 | 0.042 | 0.000 |
| DEFLECTION DUE TO SUPERIMPOSED D.L. | * ↓ 0.000 | 0.026 | 0.052 | 0.078 | 0.102 | 0.122 | 0.141 | 0.155 | 0.166 | 0.172 | 0.174 | 0.172 | 0.166 | 0.155 | 0.141 | 0.122 | 0.102 | 0.078 | 0.052 | 0.026 | 0.000 |
| FINAL CAMBER | ↑ 0 | 3/16 | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 15/16 | 1 | 1 1/16 | 1 1/16 | 1 1/16 | 1 | 15/16 | 7/8 | 3/4 | 5/8 | 1/2 | 3/8 | 3/16 | 0 |

| DEAD LOAD DEFLECTION TABLE FOR SPAN B | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------------|-----------|-------|-------|-------|-------|-------|--------|-------|--------|-------|-------|-------|--------|-------|--------|--------|-------|-------|-------|-------|-------|
| 0.6" Ø LOW RELAXATION STRANDS | GIRDER 6 | | | | | | | | | | | | | | | | | | | | |
| TENTH POINTS | 0.00 | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 | 0.90 | 0.95 | 1.00 |
| CAMBER (GIRDER ALONE IN PLACE) | ↑ 0.000 | 0.042 | 0.082 | 0.121 | 0.156 | 0.187 | 0.213 | 0.234 | 0.250 | 0.259 | 0.262 | 0.259 | 0.250 | 0.234 | 0.213 | 0.187 | 0.156 | 0.121 | 0.082 | 0.042 | 0.000 |
| DEFLECTION DUE TO SUPERIMPOSED D.L. | * ↓ 0.000 | 0.024 | 0.047 | 0.070 | 0.092 | 0.110 | 0.127 | 0.140 | 0.150 | 0.156 | 0.157 | 0.156 | 0.150 | 0.140 | 0.127 | 0.110 | 0.092 | 0.070 | 0.047 | 0.023 | 0.000 |
| FINAL CAMBER | ↑ 0 | 3/16 | 7/16 | 5/8 | 3/4 | 15/16 | 1 1/16 | 1 1/8 | 1 3/16 | 1 1/4 | 1 1/4 | 1 1/4 | 1 3/16 | 1 1/8 | 1 1/16 | 1 5/16 | 3/4 | 5/8 | 7/16 | 1/4 | 0 |

| DEAD LOAD DEFLECTION TABLE FOR SPAN C | | | | | | | | | | | |
|---------------------------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.6" Ø LOW RELAXATION STRANDS | GIRDERS 1 THRU 7 | | | | | | | | | | |
| TENTH POINTS | 0.00 | 0.10 | 0.20 | 0.30 | 0.40 | 0.50 | 0.60 | 0.70 | 0.80 | 0.90 | 1.00 |
| CAMBER (GIRDER ALONE IN PLACE) | ↑ 0.000 | 0.002 | 0.004 | 0.005 | 0.006 | 0.006 | 0.006 | 0.005 | 0.004 | 0.002 | 0.000 |
| DEFLECTION DUE TO SUPERIMPOSED D.L. | * ↓ 0.000 | 0.002 | 0.003 | 0.005 | 0.005 | 0.006 | 0.005 | 0.005 | 0.003 | 0.002 | 0.000 |
| FINAL CAMBER | ↑ 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-



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

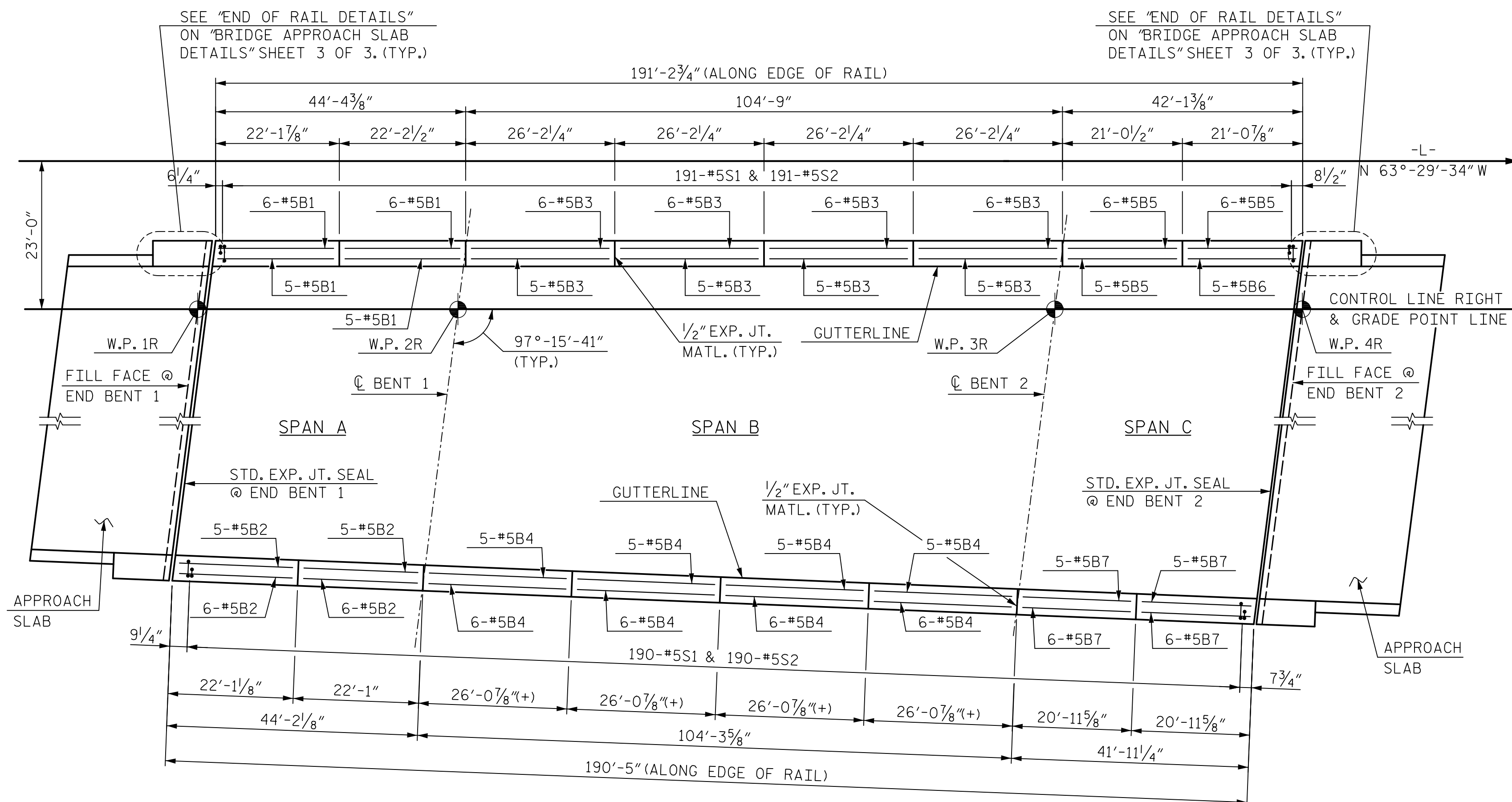
HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: M. WRIGHT DATE: 9/18
 CHECKED BY: N. SALAS ZAMUDIO DATE: 9/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

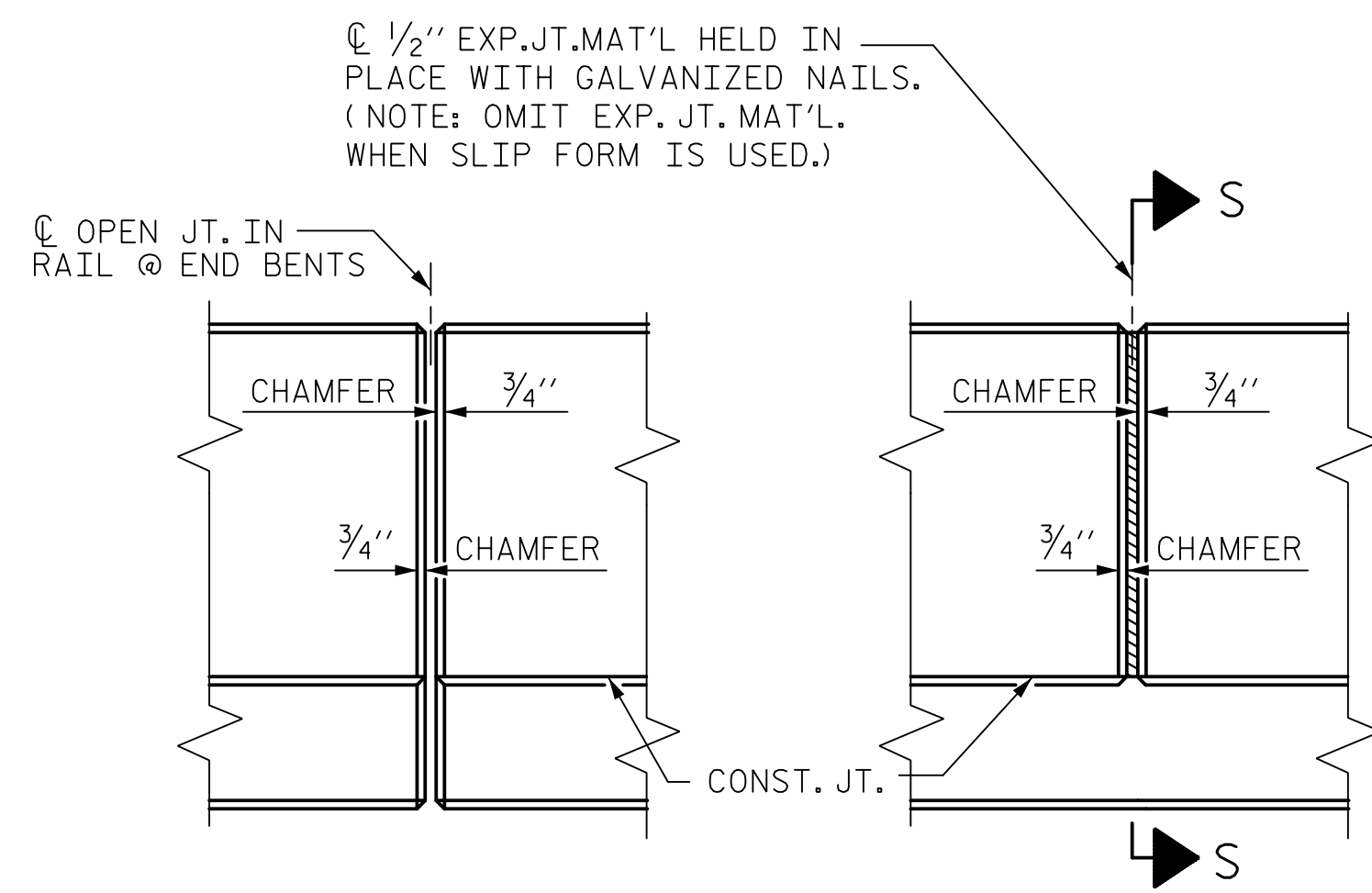
DWG. NO. 16

**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

| REVISIONS | | | | | | SHEET NO. |
|-----------|----|------|-----|----|------|--------------|
| NO. | BY | DATE | NO. | BY | DATE | S8-16 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 36 |



PLAN OF BARRIER RAIL
NOTE: EDGE SLAB NOT SHOWN FOR CLARITY.



ELEVATION AT EXPANSION JOINTS
BARRIER RAIL DETAILS

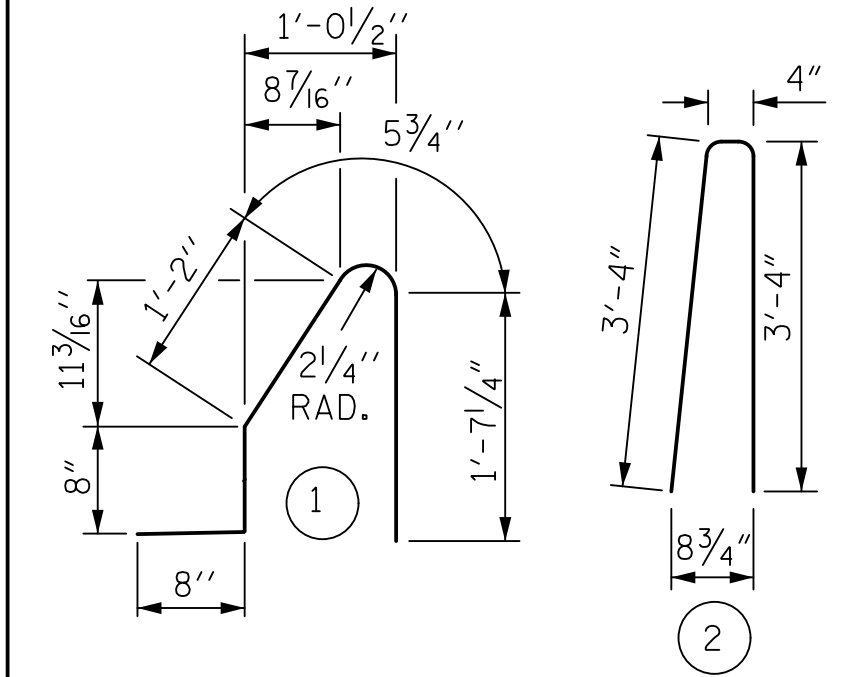
NOTES

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



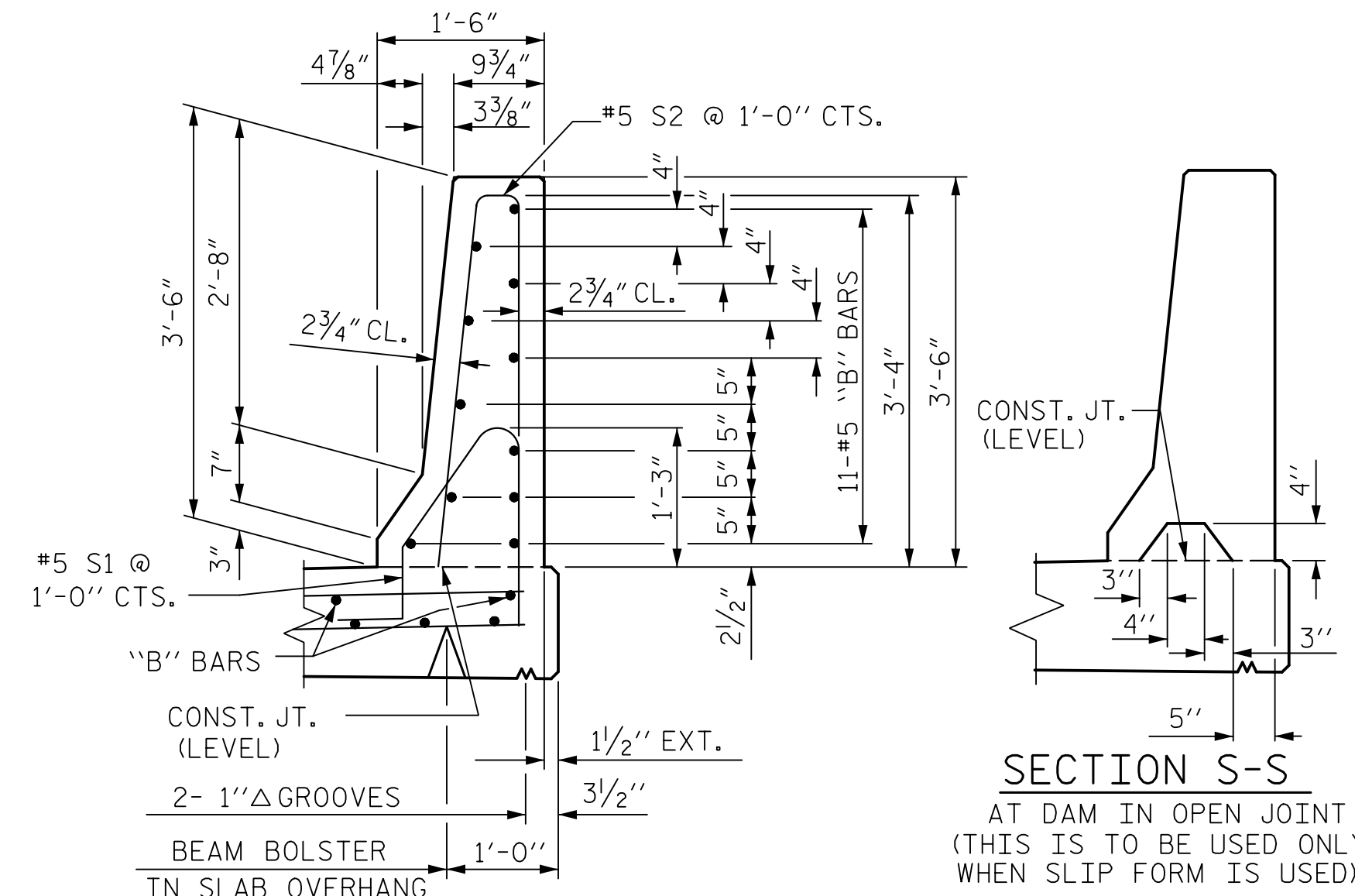
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|------|-----|------|------|--------|--------|
| * B1 | 22 | #5 | STR | 21'-9" | 499 |
| * B2 | 22 | #5 | STR | 21'-7" | 495 |
| * B3 | 44 | #5 | STR | 25'-9" | 1,182 |
| * B4 | 44 | #5 | STR | 25'-8" | 1,178 |
| * B5 | 17 | #5 | STR | 20'-8" | 366 |
| * B6 | 5 | #5 | STR | 20'-6" | 107 |
| * B7 | 22 | #5 | STR | 20'-7" | 472 |
| * S1 | 381 | #5 | 1 | 4'-7" | 1,821 |
| * S2 | 381 | #5 | 2 | 7'-0" | 2,782 |

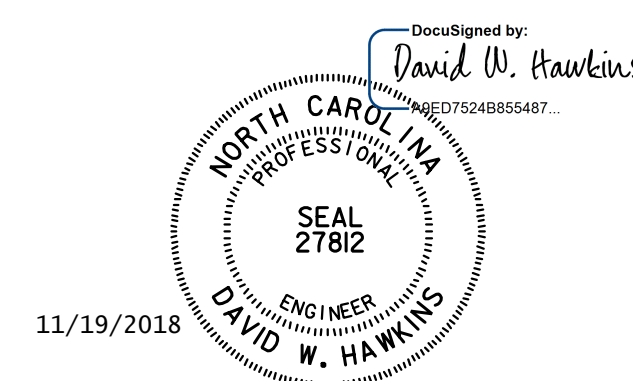
| | | |
|----------------------------------|----------|-------|
| * EPOXY COATED REINFORCING STEEL | LBS. | 8,902 |
| CLASS AA CONCRETE | CU. YDS. | 51.9 |
| CONCRETE BARRIER RAIL | LIN. FT. | 381.6 |



SECTION THRU RAIL

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

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-



| | |
|--------------------------|--------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 7/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DRAWN BY : ARB 5/87 | REV. 7/12 MAA/GM |
| CHECKED BY : SJD 9/87 | REV. 6/13 MAA/GM |
| | REV. 12/17 MAA/THC |

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| | |
|---|-------------|
| HNTB HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | |
| DRAWN BY : M. WRIGHT | DATE : 7/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 |

DWG. NO. 17

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
CONCRETE
BARRIER RAIL
RIGHT LANE

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

TOTAL SHEETS 36

STD. NO. CBRI

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.)

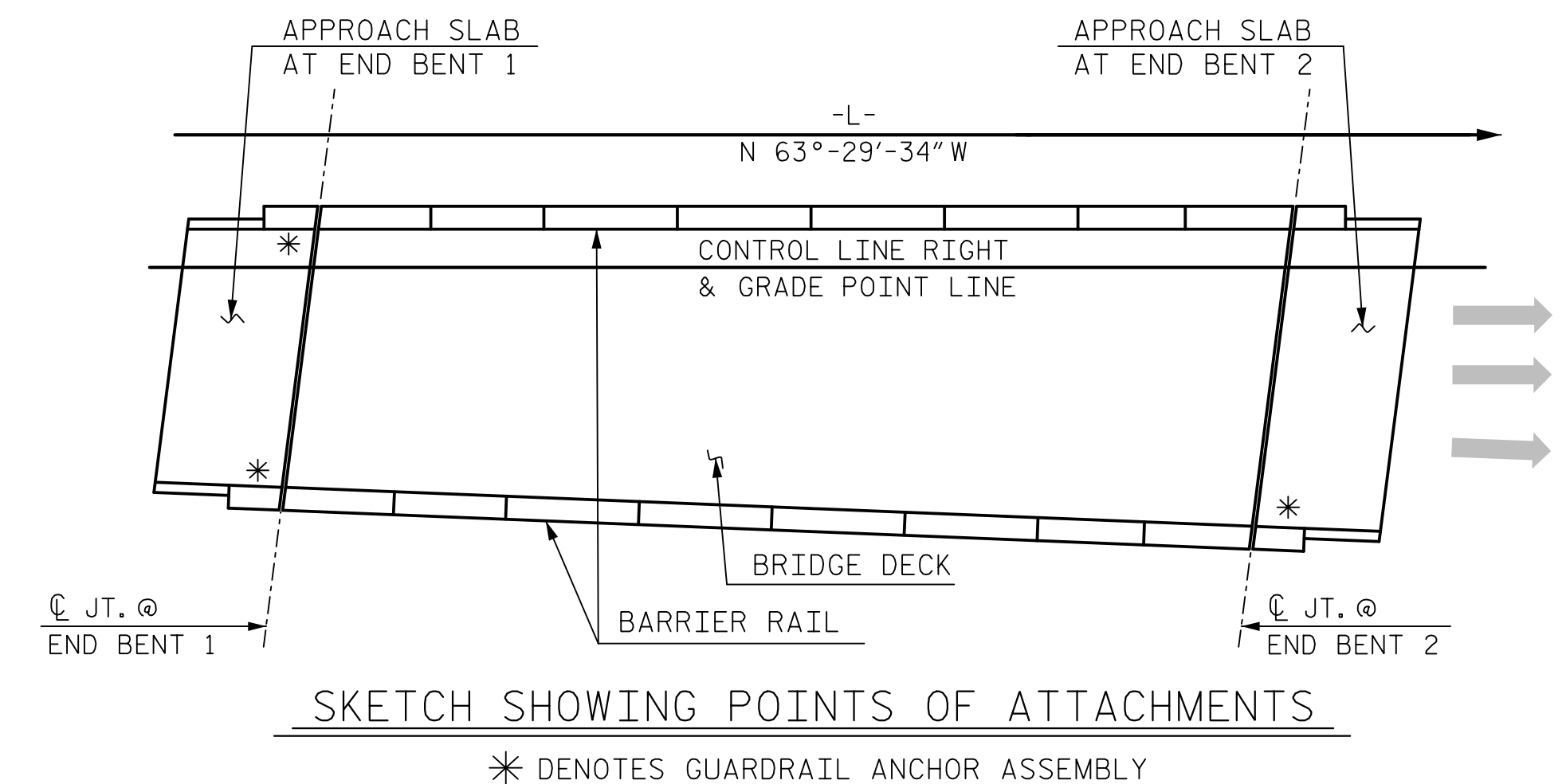
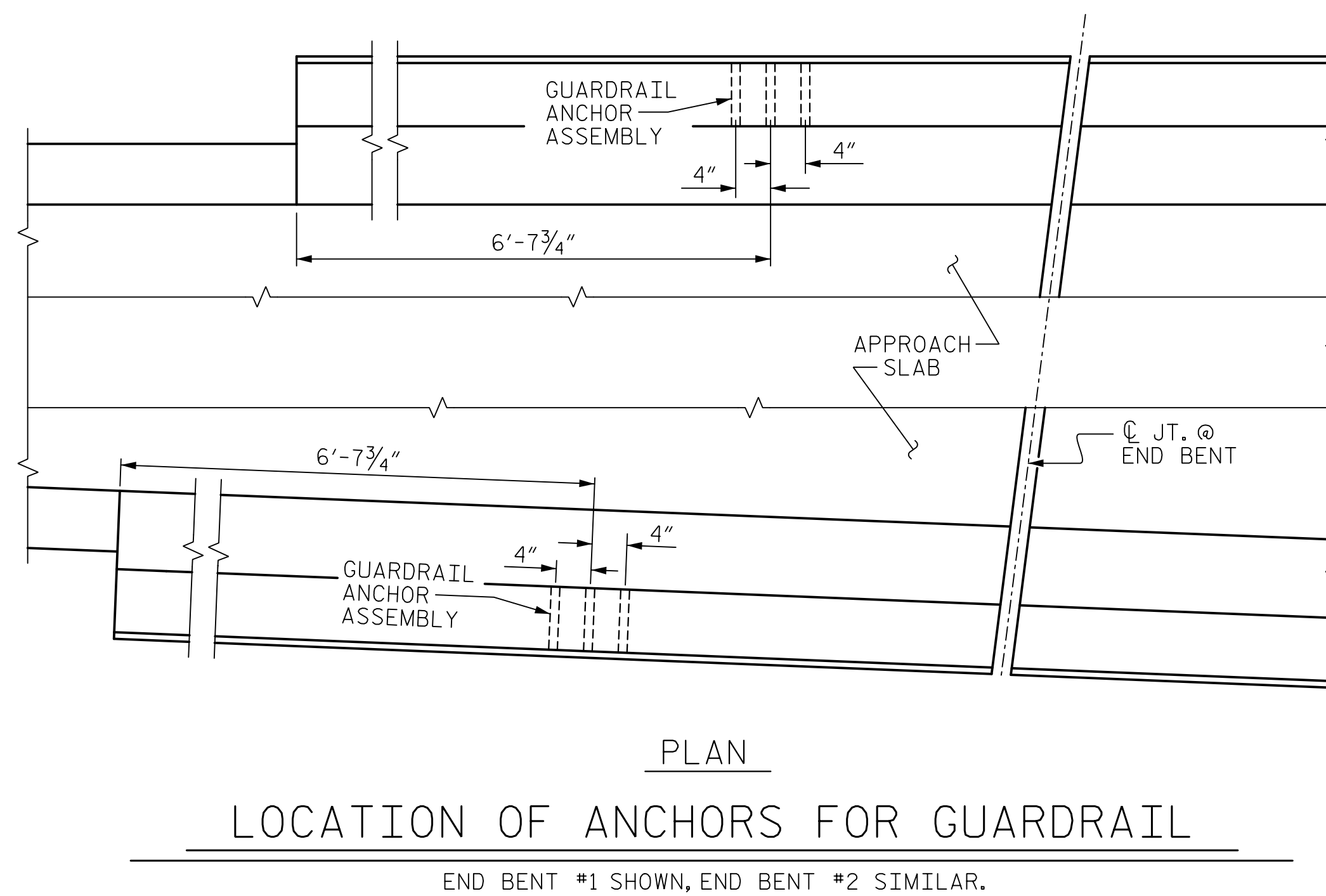
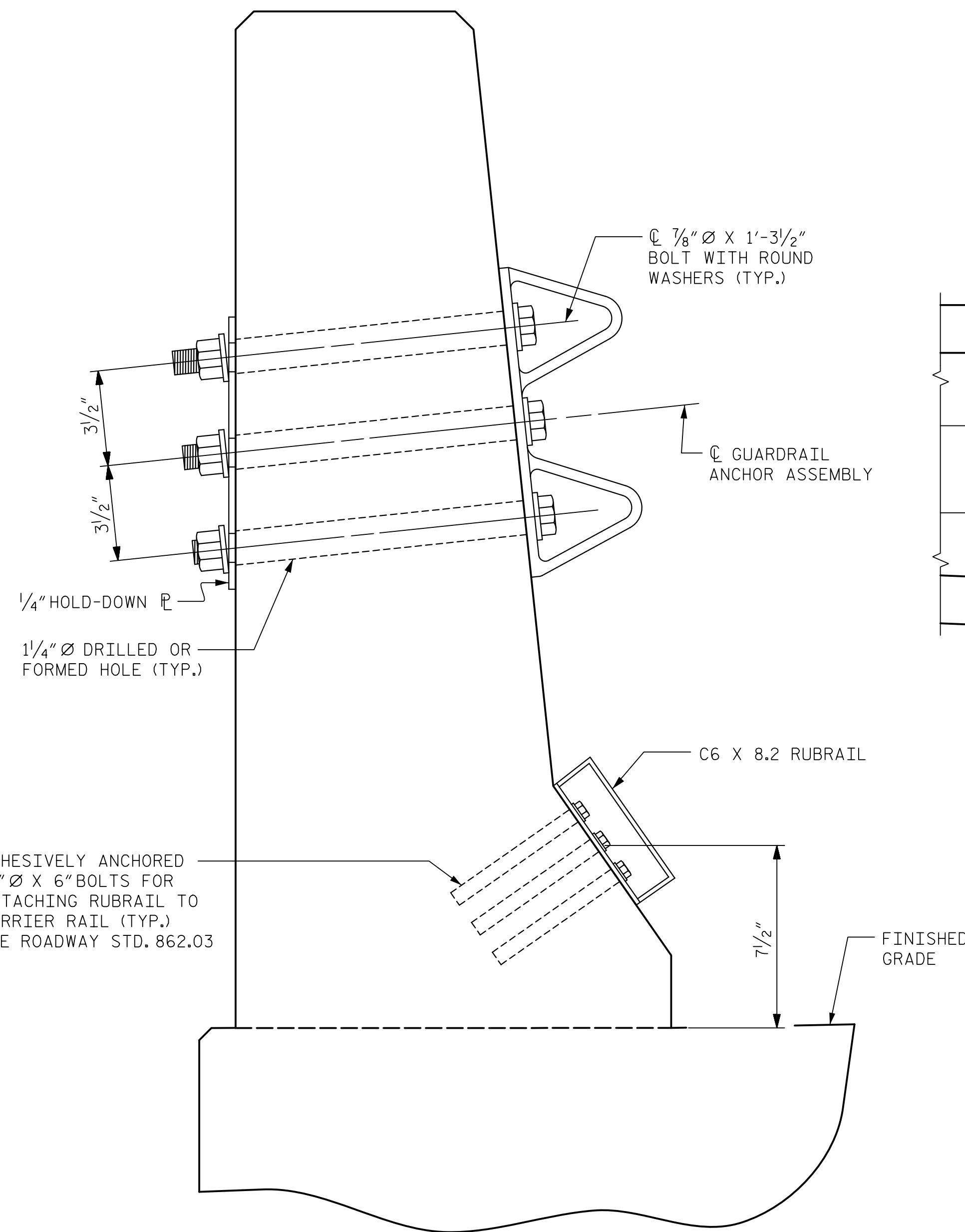
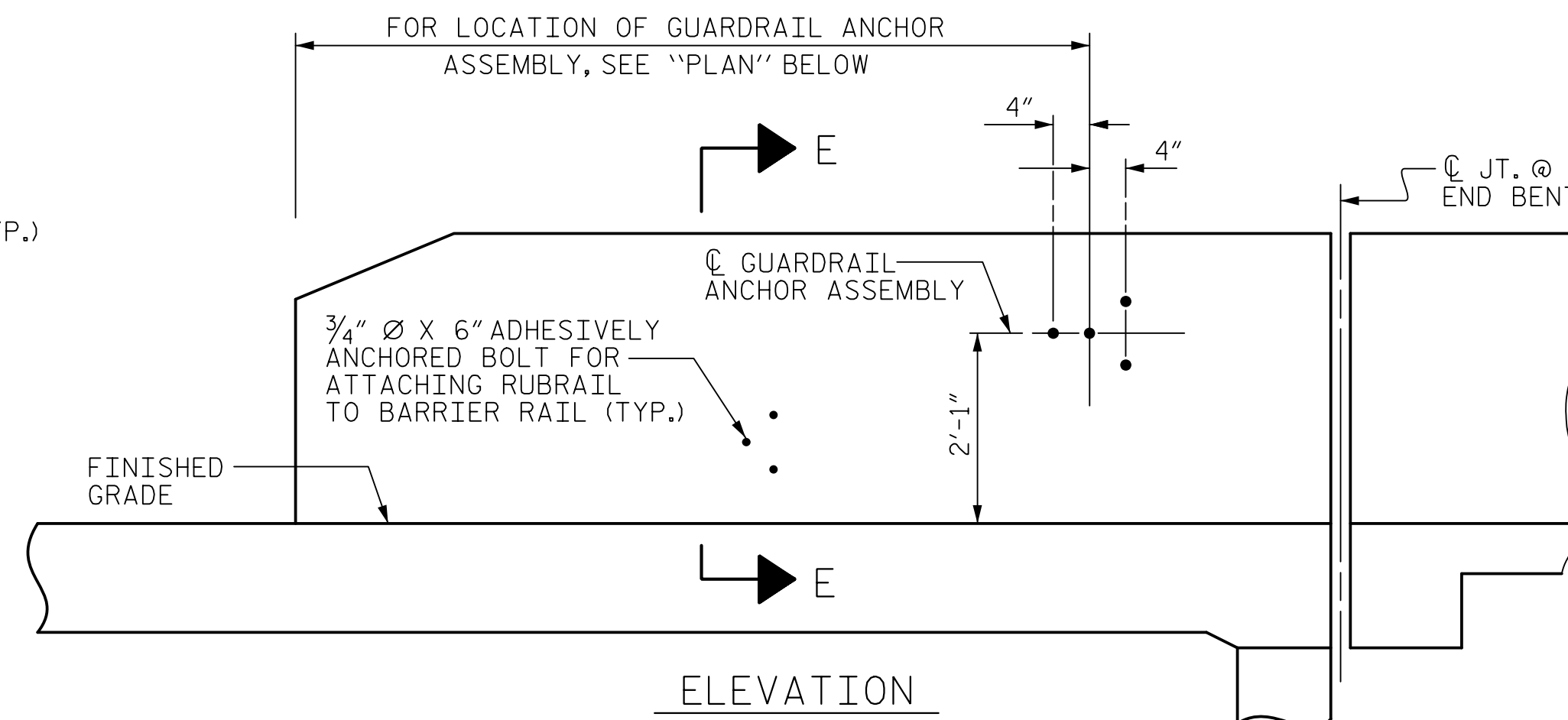
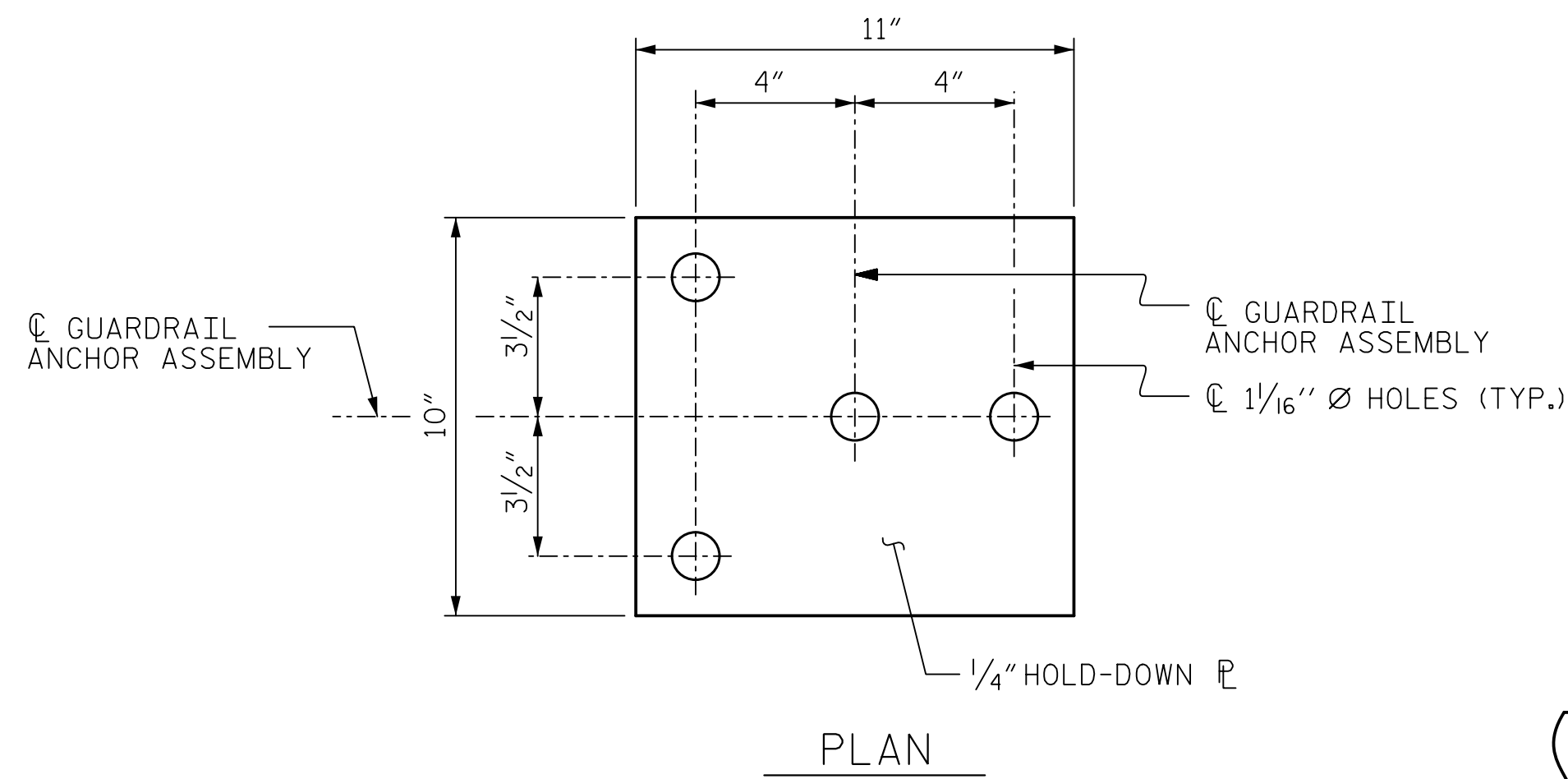
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

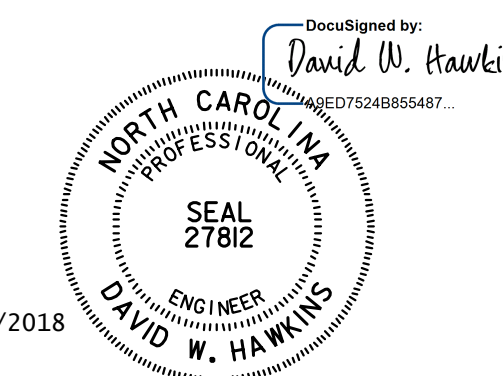


SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS

| | |
|--------------------------|--------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 7/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DRAWN BY : TLA 5/06 | REV. 7/12 MAA/GM |
| CHECKED BY : CM 5/06 | REV. 6/13 MAA/GM |
| | REV. 12/17 MAA/THC |

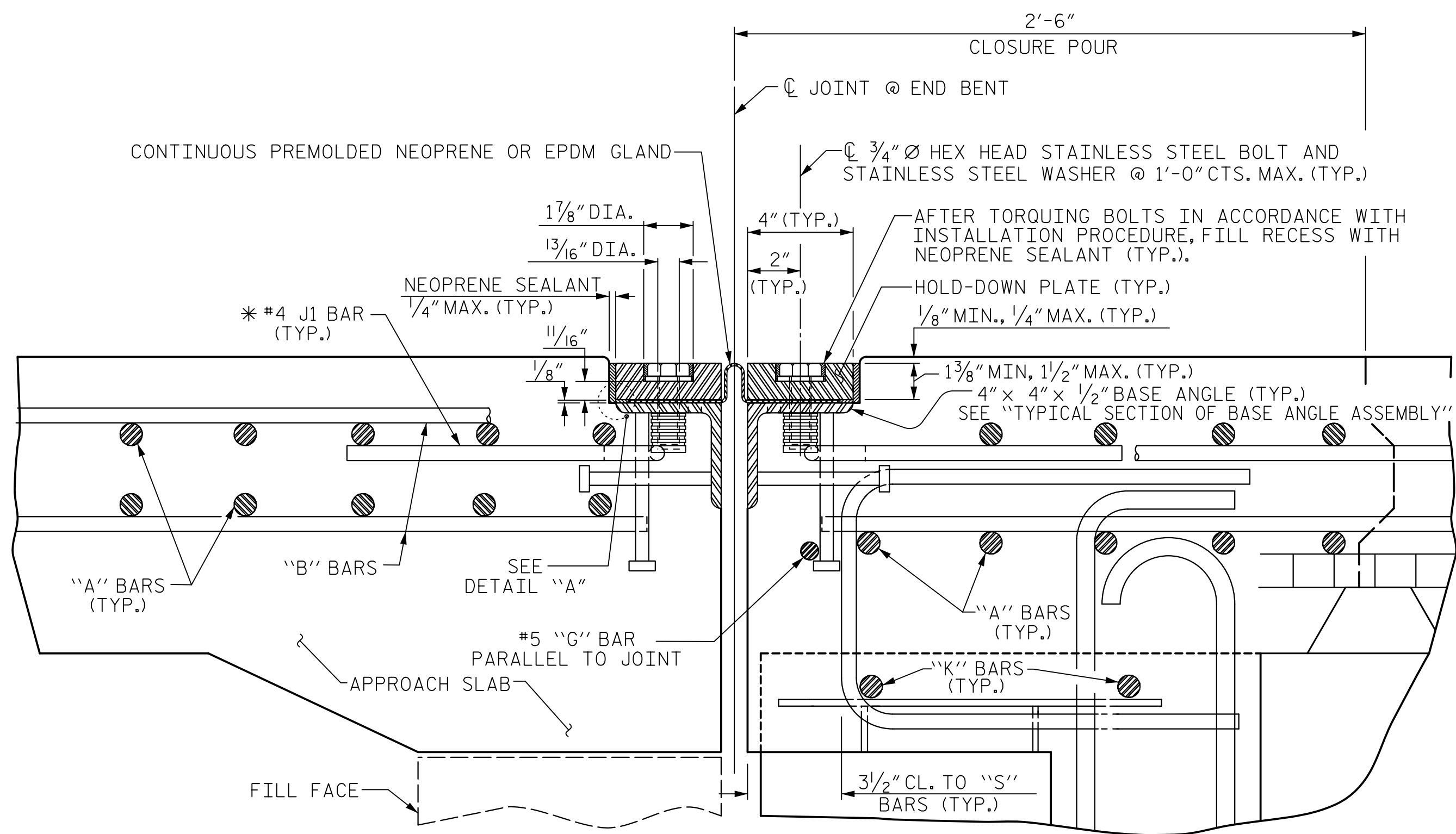
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

| | | | |
|--|-------------|--|--|
| HNTB | | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | |
| DRAWN BY : M. WRIGHT | DATE : 7/18 | DWG. NO. 18 | |
| CHECKED BY : N. HART | DATE : 7/18 | | |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 | | |



PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-

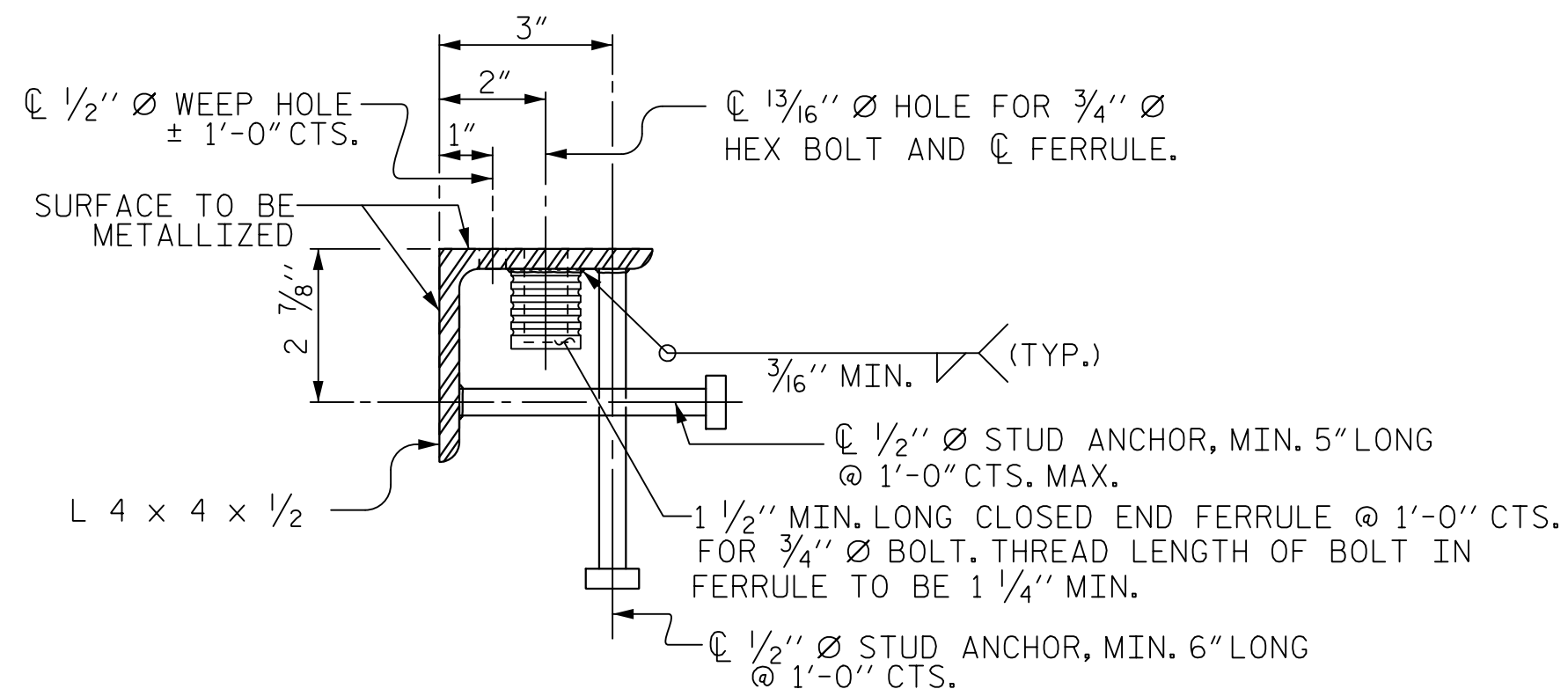
| | | | | | |
|--|----|------|-----|----|--------------------|
| STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH | | | | | |
| STANDARD GUARDRAIL ANCHORAGE FOR BARRIER RAIL RIGHT LANE | | | | | |
| REVISIONS | | | | | SHEET NO. S8-18 |
| NO. | BY | DATE | NO. | BY | DATE |
| 1 | | | 3 | | |
| 2 | | | 4 | | |
| | | | | | TOTAL SHEETS 36 |



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

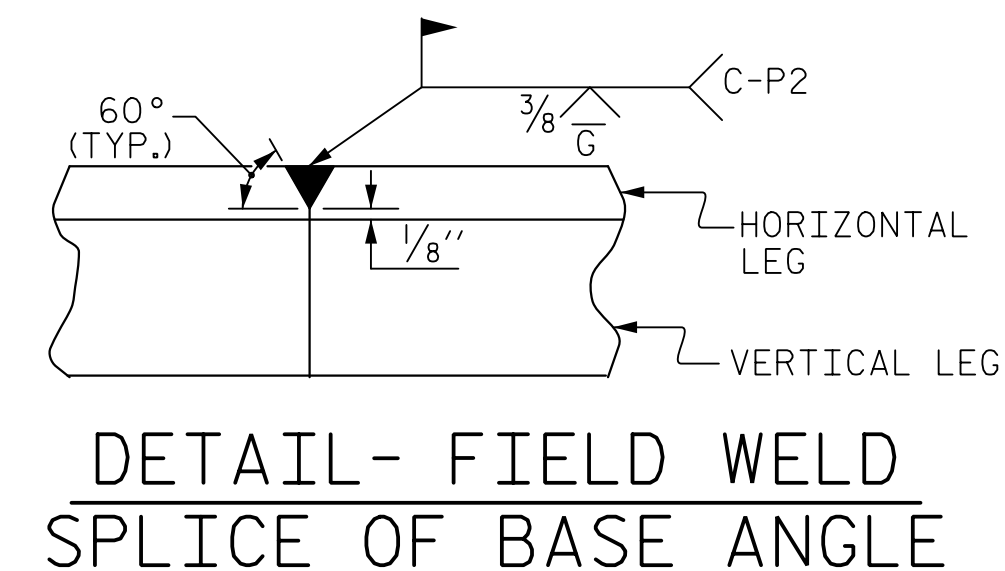
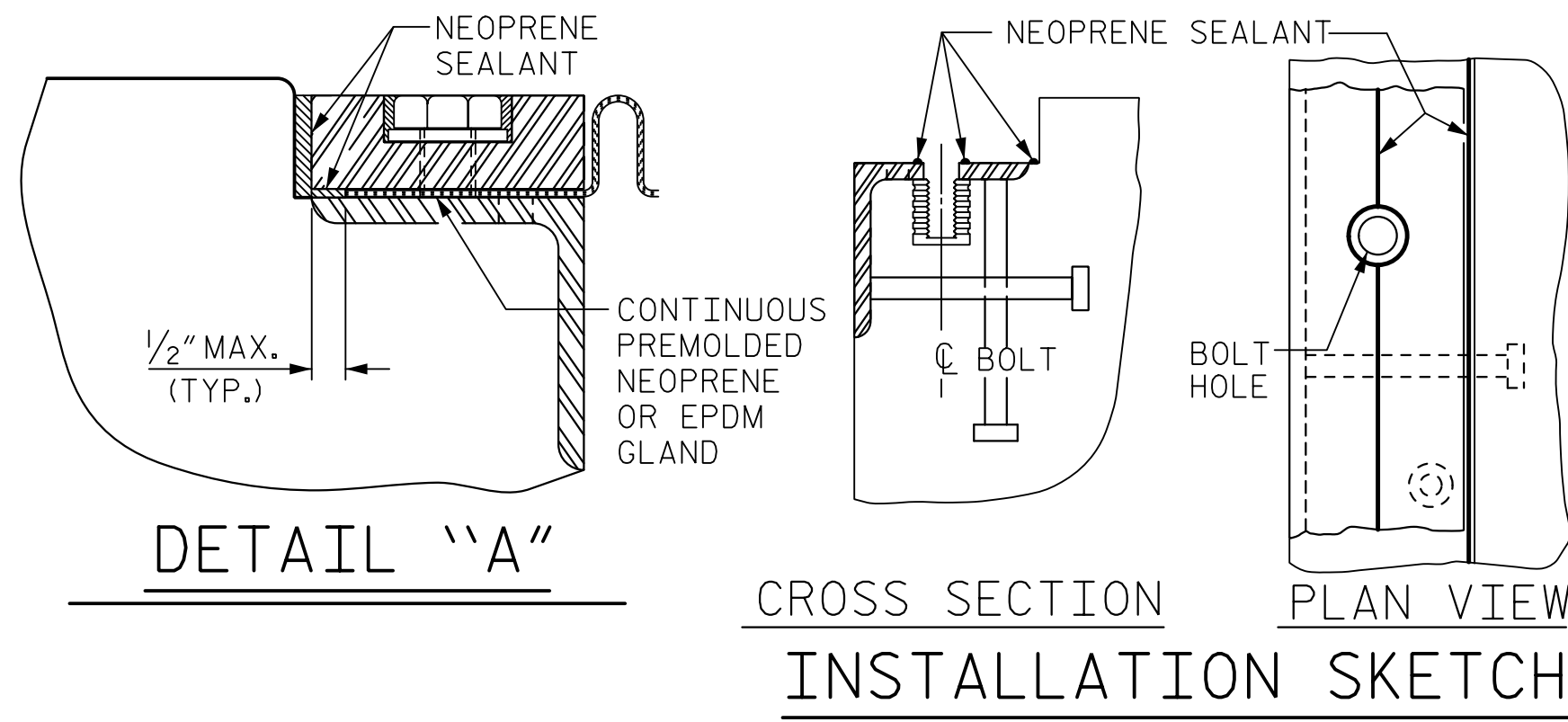
* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

- INSTALLATION PROCEDURE**
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4/8" TO 4 1/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X 1/2" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
 2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
 3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 7/8" IN DIAMETER WITH A HAND PUNCH.
 4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
 5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
 6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

- GENERAL NOTES**
1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
 2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
 3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
 4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
 5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
 6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
 7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
 8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
 9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
 10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
 11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
 12. THE FABRICATOR SHALL PROVIDE 1/2" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE 3/4" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.



| MOVEMENT AND SETTING AT JOINT | | | | | |
|-------------------------------|-------------|-------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| BENT NO. | SKEW ANGLE | TOTAL MOVEMENT (ALONG C RDWY) | PERPENDICULAR JOINT OPENING AT 45° F | PERPENDICULAR JOINT OPENING AT 60° F | PERPENDICULAR JOINT OPENING AT 90° F |
| E.B. 1 | 97°-15'-41" | 13/16" | 1 5/8" | 1 1/2" | 1 3/16" |
| E.B. 2 | 97°-15'-41" | 3/4" | 1 5/8" | 1 1/2" | 1 1/4" |

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-

ASSEMBLED BY : M. WRIGHT DATE : 7/18
 CHECKED BY : N. HART DATE : 7/18
 DRAWN BY : REK 9/87 MAA/GM
 CHECKED BY : CRK 10/87 REV. 10/17 MAA/THC
 REV. 6/18 MAA/THC

HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
 DRAWN BY : M. WRIGHT DATE : 7/18
 CHECKED BY : N. HART DATE : 7/18
 DESIGN ENGINEER OF RECORD : D. HAWKINS DATE : 9/18
 DWG. NO. 19

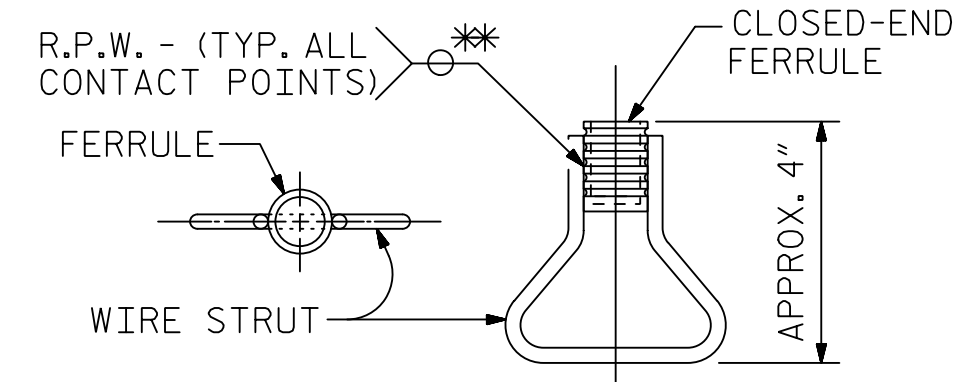
DocuSigned by:
 David W. Hawkins
 NORTH CAROLINA PROFESSIONAL SEAL 27812
 ENGINEER DAVID W. HAWKINS
 11/19/2018

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 EXPANSION JOINT SEAL DETAILS
 RIGHT LANE
 REVISIONS

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

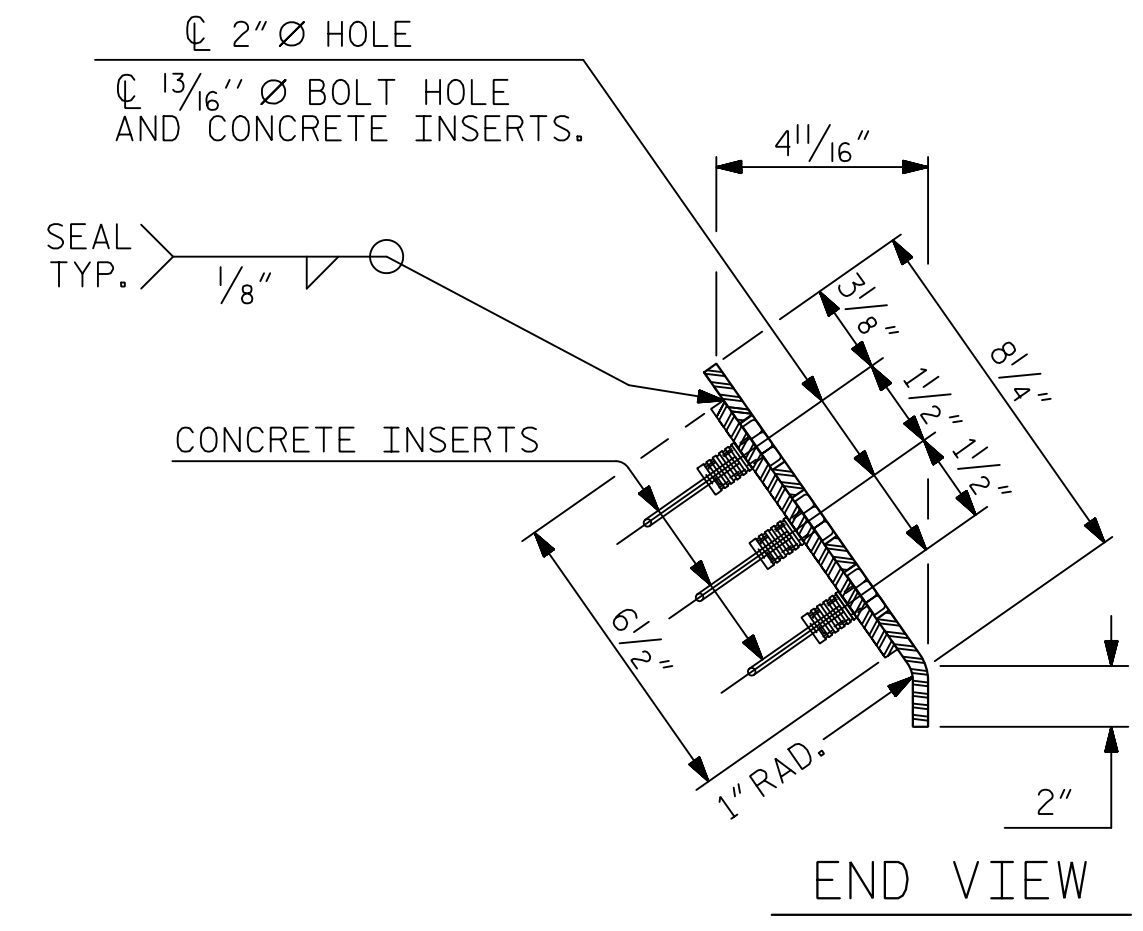
 SHEET NO. S8-19
 TOTAL SHEETS 36

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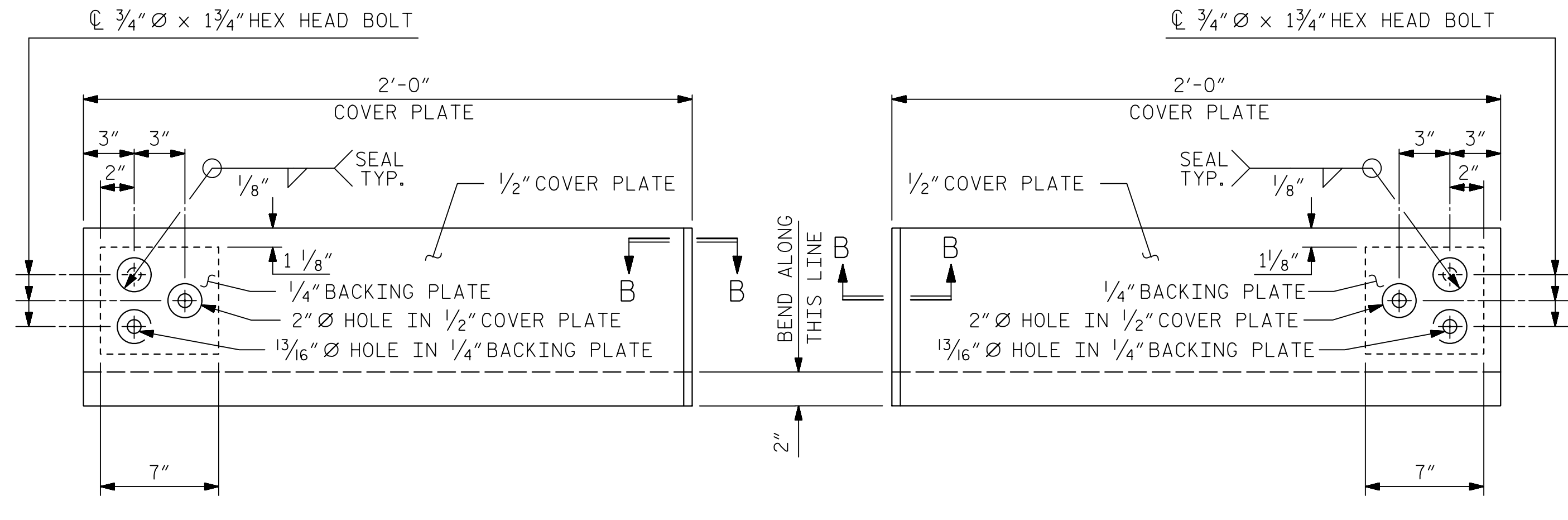


PLAN ELEVATION
CONCRETE INSERT

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



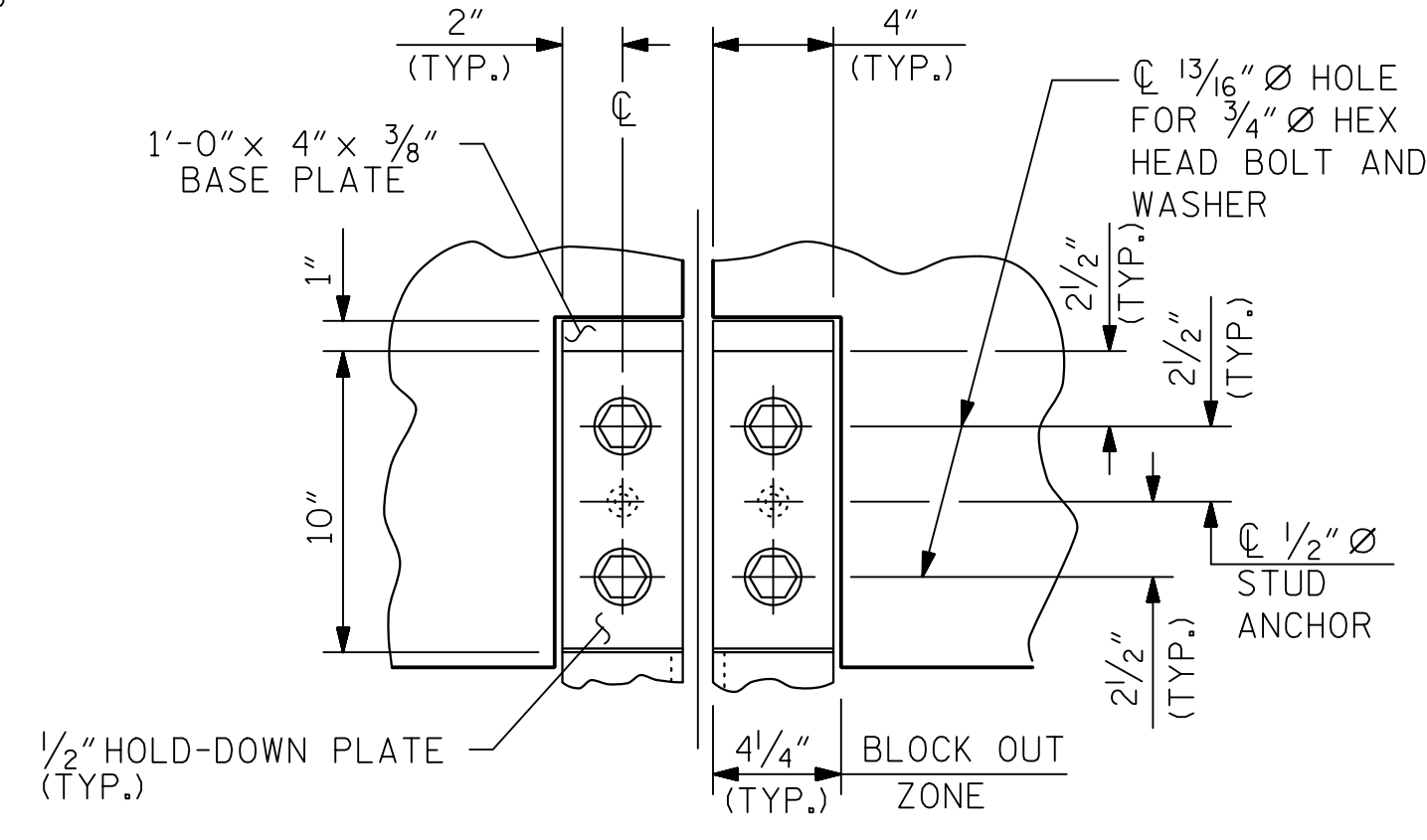
END VIEW



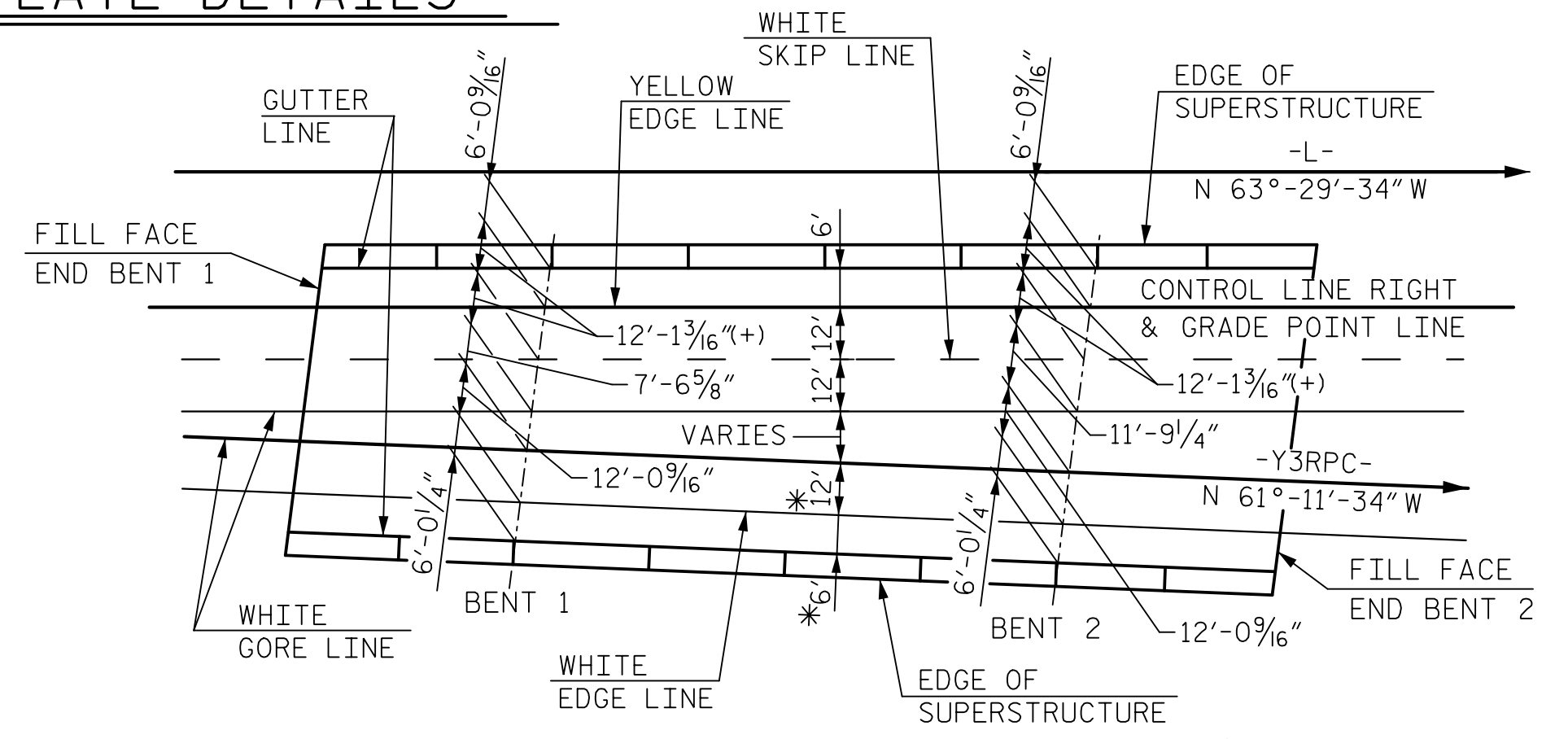
TYPE I - ELEVATION VIEW

TYPE II - ELEVATION VIEW

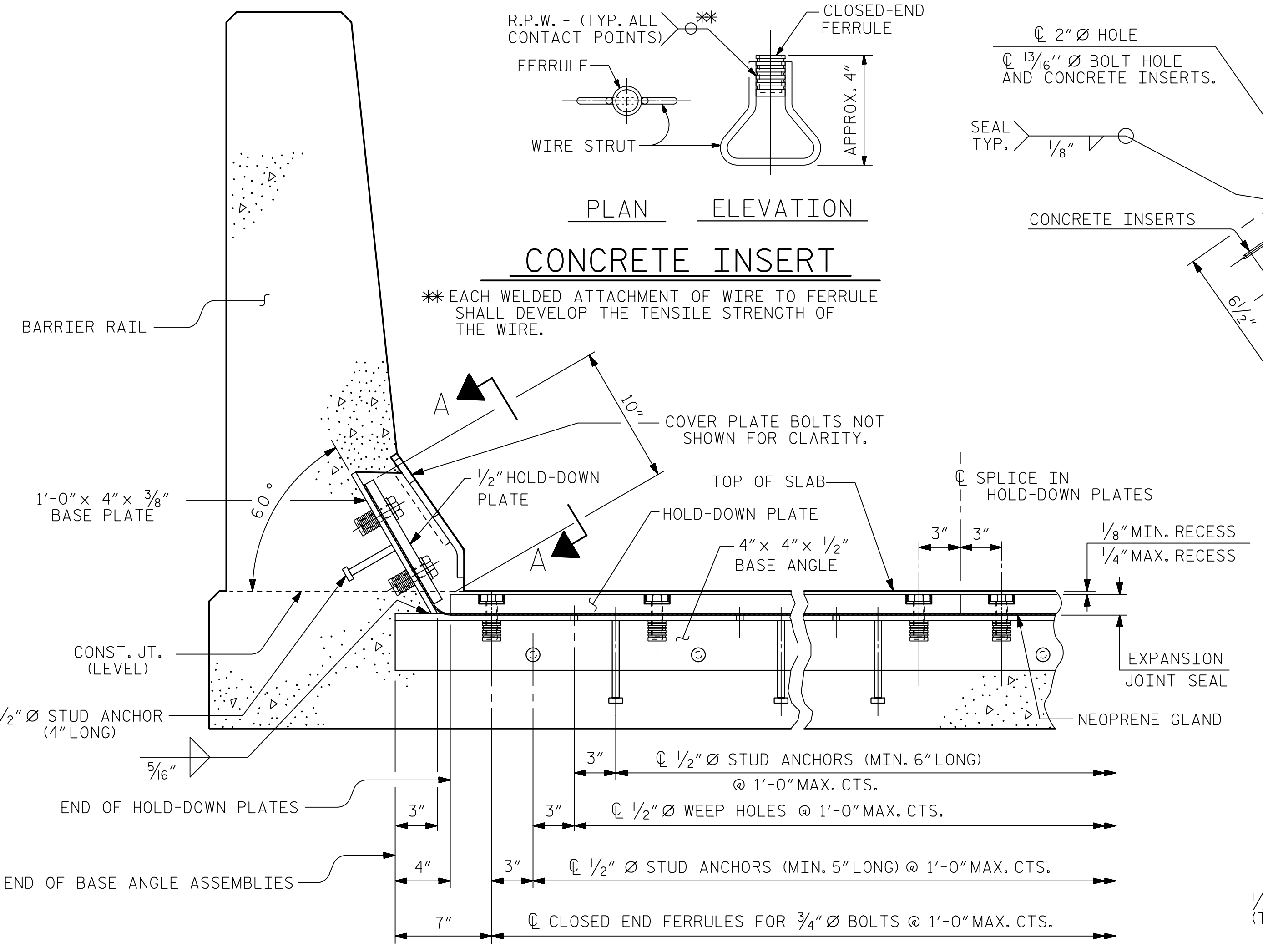
COVER PLATE DETAILS



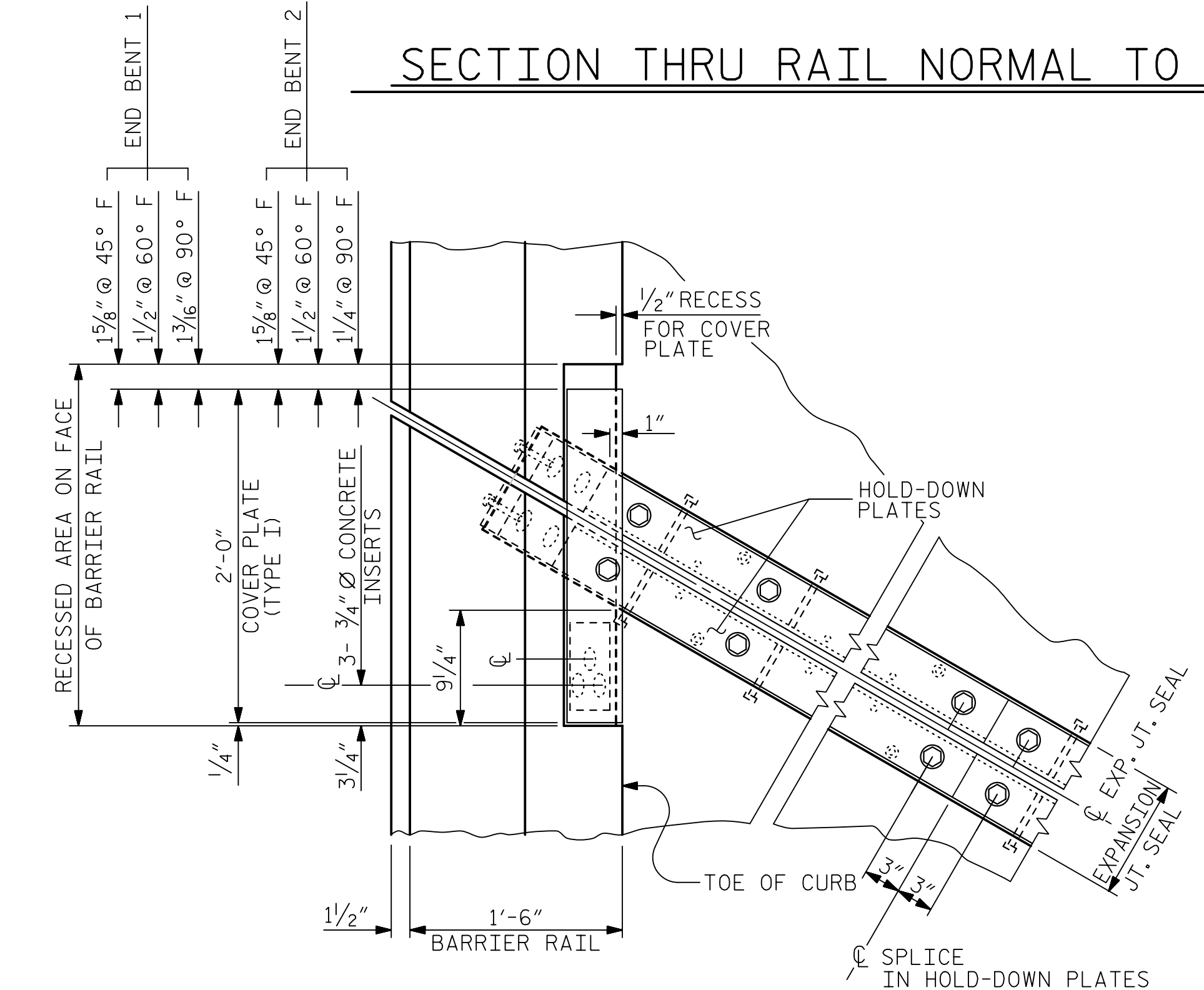
SECTION A - A



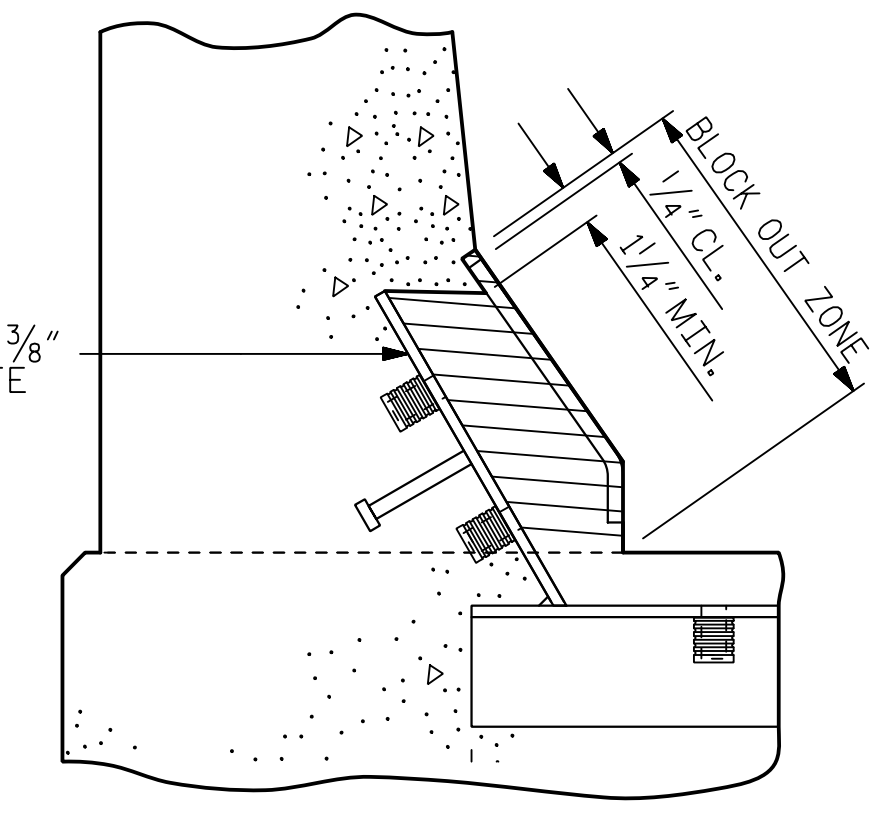
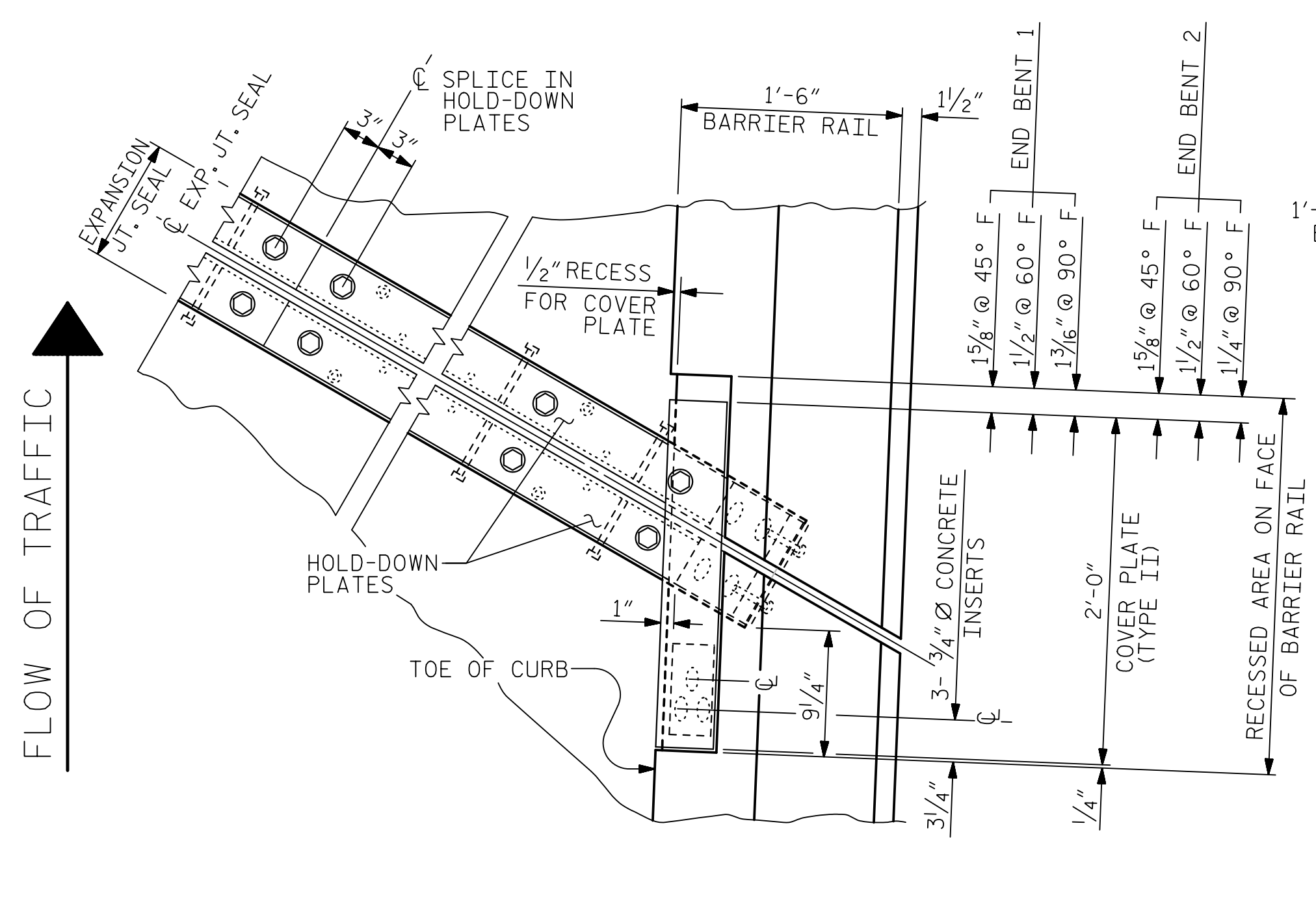
PAVEMENT MARKING ALIGNMENT



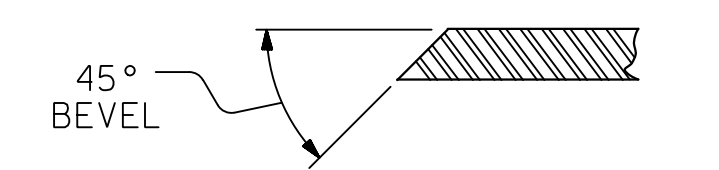
SECTION THRU RAIL NORMAL TO JOINT



PLAN OF EXPANSION JOINT SEAL



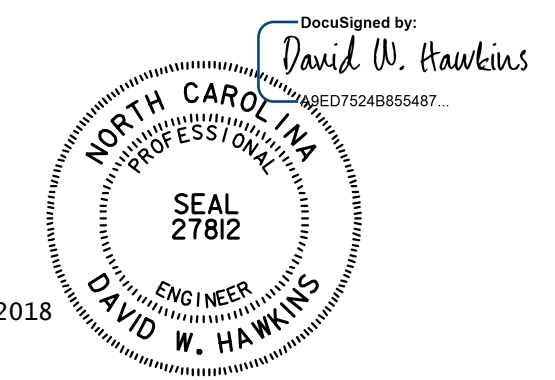
BLOCK OUT DETAIL
SEE "SECTION A - A" FOR OTHER DETAILS.



SECTION B - B

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
EXPANSION JOINT
SEAL DETAILS
FOR BARRIER RAIL
RIGHT LANE



| | | |
|--------------------------|-------------|---------|
| ASSEMBLED BY : M. WRIGHT | DATE : 7/18 | MAA/GM |
| CHECKED BY : N. HART | DATE : 7/18 | MAA/GM |
| DRAWN BY : REK 9/87 | REV. 7/12 | MAA/GM |
| CHECKED BY : CRK 10/87 | REV. 6/13 | MAA/GM |
| | REV. 12/17 | MAA/THC |

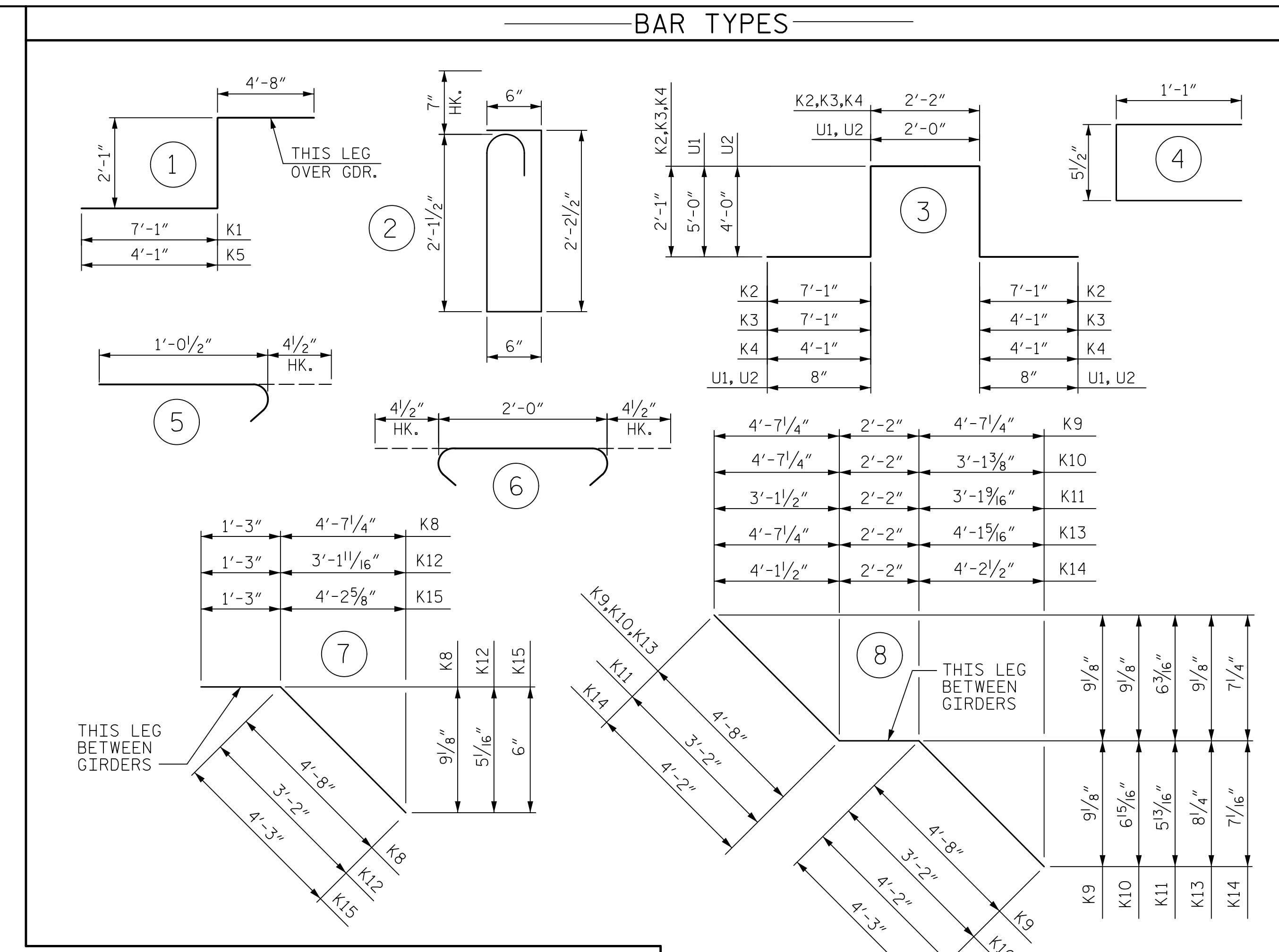
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

| | |
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| HNTB | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 |
| DRAWN BY : M. WRIGHT | DATE : 7/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 |

| REVISIONS | | | | | SHEET NO. S8-20 |
|-----------|----|------|-----|------|--------------------|
| NO. | BY | DATE | NO. | DATE | |
| 1 | | | 3 | | TOTAL SHEETS 36 |
| 2 | | | 4 | | |

| BILL OF MATERIAL | | | | | |
|---------------------------------------|-----|------|------|---------|---------------|
| EPOXY COATED | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT (LBS.) |
| A1 | 2 | 6 | STR | 4'-4" | 13 |
| A2 | 2 | 6 | STR | 8'-3" | 25 |
| A3 | 2 | 6 | STR | 12'-2" | 37 |
| A4 | 2 | 6 | STR | 16'-2" | 49 |
| A5 | 2 | 6 | STR | 20'-1" | 60 |
| A6 | 2 | 6 | STR | 24'-0" | 72 |
| A7 | 2 | 6 | STR | 28'-0" | 84 |
| A8 | 2 | 6 | STR | 31'-11" | 96 |
| A9 | 2 | 6 | STR | 35'-10" | 108 |
| A10 | 2 | 6 | STR | 39'-10" | 120 |
| A11 | 2 | 6 | STR | 43'-9" | 131 |
| A12 | 2 | 6 | STR | 47'-8" | 143 |
| A13 | 2 | 6 | STR | 51'-8" | 155 |
| A14 | 2 | 6 | STR | 55'-7" | 167 |
| A15 | 367 | 6 | STR | 29'-6" | 16,261 |
| A16 | 61 | 6 | STR | 31'-7" | 2,894 |
| A17 | 61 | 6 | STR | 32'-10" | 3,008 |
| A18 | 61 | 6 | STR | 34'-1" | 3,123 |
| A19 | 61 | 6 | STR | 35'-3" | 3,230 |
| A20 | 61 | 6 | STR | 36'-6" | 3,344 |
| A21 | 62 | 6 | STR | 37'-9" | 3,515 |
| B1 | 90 | 6 | STR | 41'-11" | 5,666 |
| B2 | 90 | 4 | STR | 18'-11" | 1,137 |
| B3 | 90 | 6 | STR | 40'-9" | 5,509 |
| B4 | 44 | 7 | STR | 49'-0" | 4,407 |
| B5 | 44 | 7 | STR | 37'-9" | 3,395 |
| B6 | 44 | 7 | STR | 39'-6" | 3,552 |
| B7 | 44 | 7 | STR | 29'-0" | 2,608 |
| G1 | 2 | 5 | STR | 29'-10" | 62 |
| G2 | 2 | 5 | STR | 33'-8" | 70 |
| J1 | 114 | 4 | 5 | 1'-5" | 108 |
| K1 | 6 | 8 | 1 | 13'-10" | 222 |
| K2 | 16 | 8 | 3 | 20'-6" | 876 |
| K3 | 2 | 8 | 3 | 17'-6" | 93 |
| K4 | 2 | 8 | 3 | 14'-6" | 77 |
| K5 | 2 | 8 | 1 | 10'-10" | 58 |
| S1 | 88 | 5 | 2 | 5'-11" | 543 |
| S2 | 88 | 4 | 4 | 2'-8" | 157 |
| U1 | 64 | 4 | 3 | 13'-4" | 570 |
| U2 | 24 | 4 | 3 | 11'-4" | 182 |
| EPOXY COATED REINFORCING STEEL TOTAL: | | | | | 65,927 |

| BILL OF MATERIAL | | | | | |
|--------------------------|-----|------|------|---------|---------------|
| UNCOATED | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT (LBS.) |
| A101 | 2 | 6 | STR | 4'-4" | 13 |
| A102 | 2 | 6 | STR | 8'-3" | 25 |
| A103 | 2 | 6 | STR | 12'-2" | 37 |
| A104 | 2 | 6 | STR | 16'-2" | 49 |
| A105 | 2 | 6 | STR | 20'-1" | 60 |
| A106 | 2 | 6 | STR | 24'-0" | 72 |
| A107 | 2 | 6 | STR | 28'-0" | 84 |
| A108 | 2 | 6 | STR | 31'-11" | 96 |
| A109 | 2 | 6 | STR | 35'-10" | 108 |
| A110 | 2 | 6 | STR | 39'-10" | 120 |
| A111 | 2 | 6 | STR | 43'-9" | 131 |
| A112 | 2 | 6 | STR | 47'-8" | 143 |
| A113 | 2 | 6 | STR | 51'-8" | 155 |
| A114 | 2 | 6 | STR | 55'-7" | 167 |
| A115 | 367 | 6 | STR | 29'-6" | 16,261 |
| A116 | 61 | 6 | STR | 31'-2" | 2,856 |
| A117 | 61 | 6 | STR | 32'-5" | 2,970 |
| A118 | 61 | 6 | STR | 33'-8" | 3,085 |
| A119 | 61 | 6 | STR | 34'-10" | 3,191 |
| A120 | 61 | 6 | STR | 36'-1" | 3,306 |
| A121 | 62 | 6 | STR | 37'-4" | 3,477 |
| B101 | 424 | 5 | STR | 49'-5" | 21,854 |
| K6 | 20 | 6 | STR | 7'-6" | 225 |
| K7 | 4 | 6 | STR | 3'-8" | 22 |
| K8 | 10 | 4 | 7 | 5'-11" | 40 |
| K9 | 30 | 4 | 8 | 11'-6" | 230 |
| K10 | 5 | 4 | 8 | 10'-0" | 33 |
| K11 | 5 | 4 | 8 | 8'-6" | 28 |
| K12 | 5 | 4 | 7 | 4'-5" | 15 |
| K13 | 5 | 4 | 8 | 11'-0" | 37 |
| K14 | 5 | 4 | 8 | 10'-7" | 35 |
| K15 | 5 | 4 | 7 | 5'-6" | 18 |
| K16 | 16 | 4 | STR | 5'-11" | 63 |
| K17 | 16 | 4 | STR | 7'-8" | 82 |
| K18 | 32 | 4 | STR | 8'-6" | 182 |
| K19 | 16 | 4 | STR | 7'-6" | 80 |
| K20 | 4 | 4 | STR | 2'-11" | 8 |
| K21 | 4 | 4 | STR | 4'-9" | 13 |
| K22 | 8 | 4 | STR | 5'-7" | 30 |
| K23 | 4 | 4 | STR | 4'-7" | 12 |
| K24 | 4 | 4 | STR | 5'-0" | 13 |
| K25 | 4 | 4 | STR | 6'-10" | 18 |
| K26 | 8 | 4 | STR | 7'-8" | 41 |
| K27 | 4 | 4 | STR | 6'-8" | 18 |
| S3 | 328 | 4 | 6 | 2'-9" | 603 |
| REINFORCING STEEL TOTAL: | | | | | 60,106 |



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" | | | |

ALL BAR DIMENSIONS ARE OUT TO OUT
 —SUPERSTRUCTURE BILL OF MATERIAL—

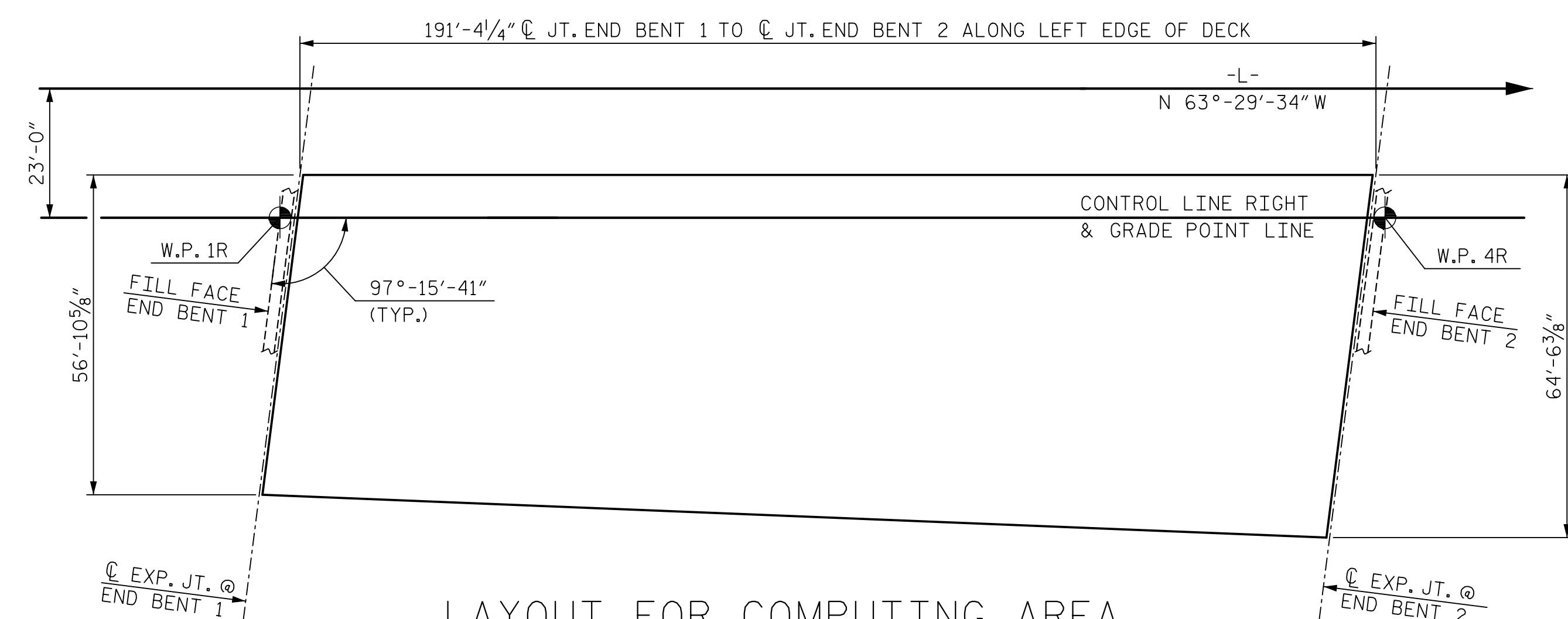
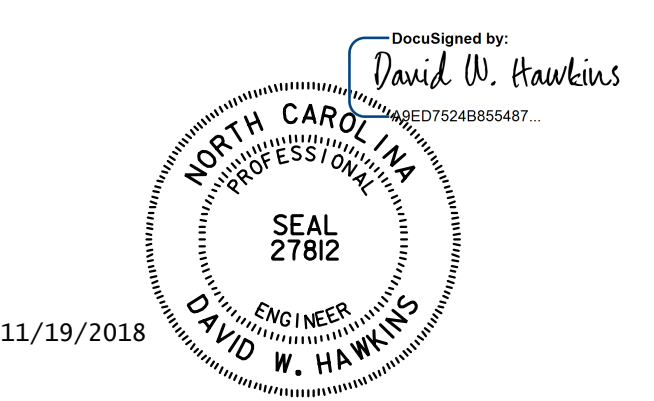
| | CLASS AA CONCRETE (CU. YDS.) | REINFORCING STEEL (LBS.) | EPOXY COATED REINFORCING STEEL (LBS.) |
|----------|------------------------------|--------------------------|---------------------------------------|
| POUR 1 | 74.2 | | |
| POUR 2 | 208.4 | 60,106 | 65,927 |
| POUR 3 | 122.4 | | |
| TOTALS** | 405.0 | 60,106 | 65,927 |

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE TYPICAL SECTION" SHEET 2 OF 2.

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

| GROOVING BRIDGE FLOORS | |
|------------------------|---------------|
| APPROACH SLABS | 2,611 SQ.FT. |
| BRIDGE DECK | 10,236 SQ.FT. |
| TOTAL | 12,847 SQ.FT. |

NOTE: CONCRETE IN CLOSURE POUR AT SLAB EXPANSION JOINTS IS INCLUDED IN THE ADJACENT POUR QUANTITY.



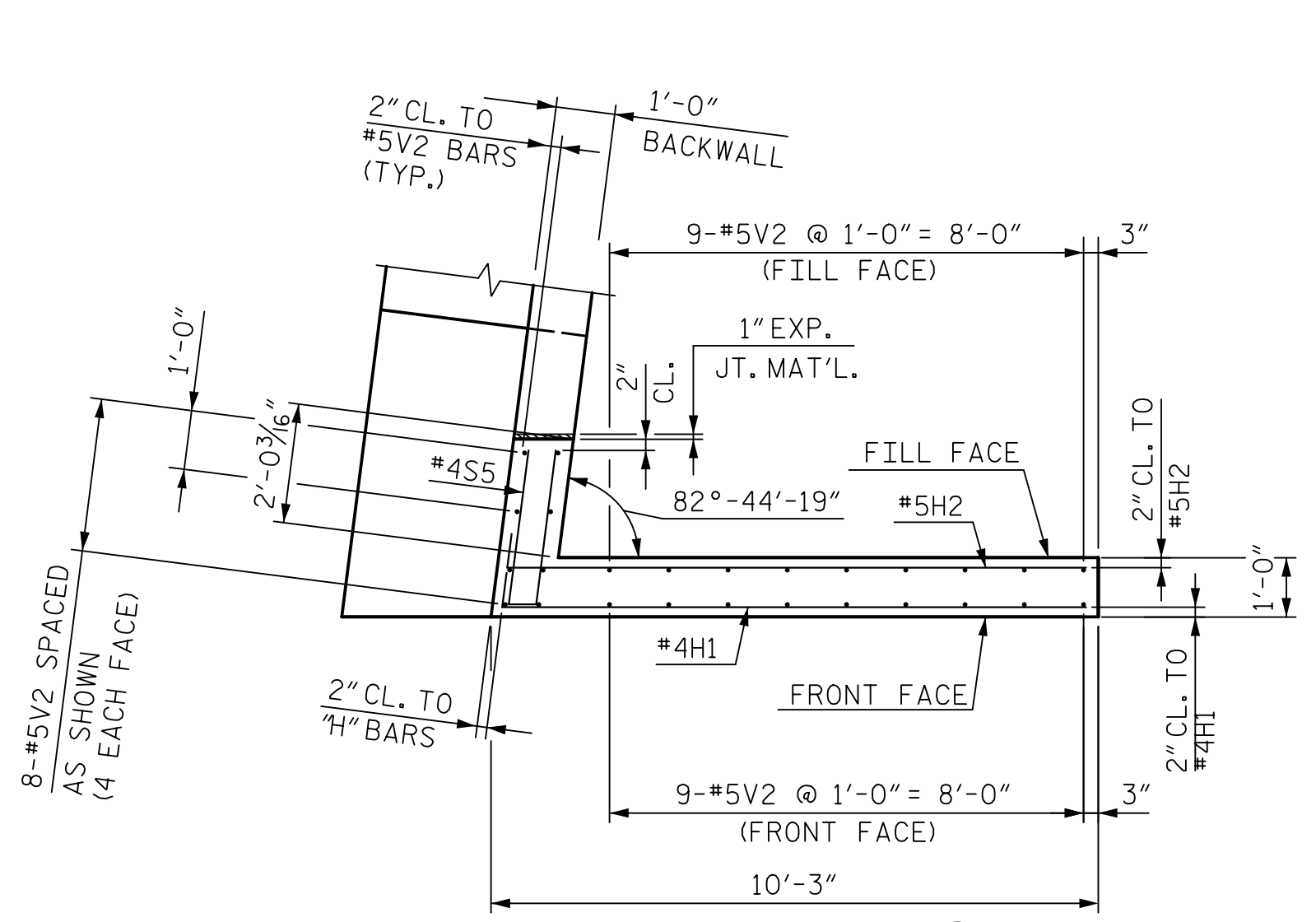
LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 11,617)

| | |
|--------------------------|---------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 9/18 |
| CHECKED BY : N. HART | DATE : 9/18 |
| DRAWN BY : JMB 5/87 | REV. 5/11/06 TLA/GM |
| CHECKED BY : SJD 9/87 | REV. 10/1/11 MAA/GM |
| | REV. 12/17 MAA/THC |

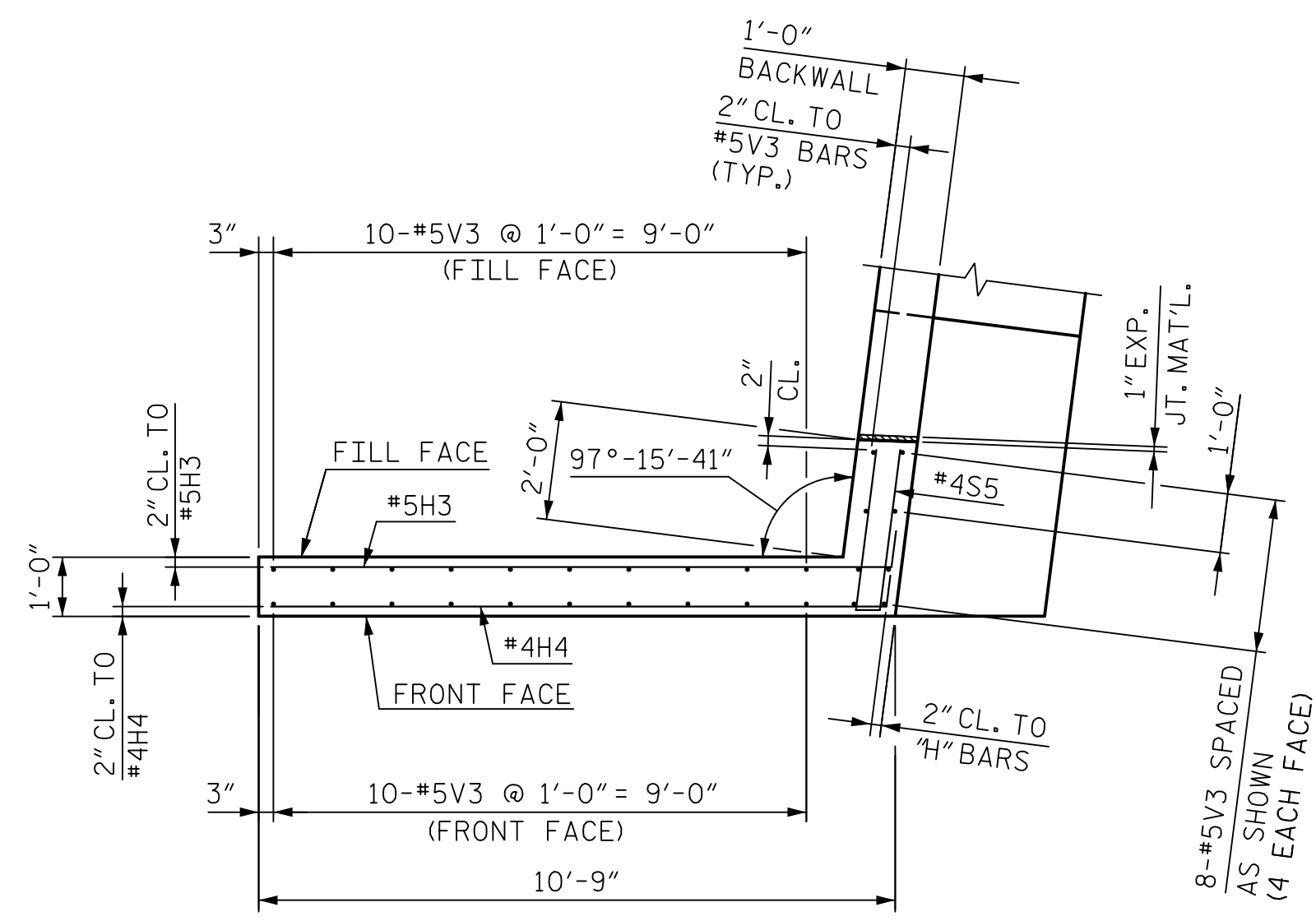
| | | | |
|--|-------------|--|--|
| HNTB | | HNTB NORTH CAROLINA, P.C. | |
| NC License No. C-1554 | | 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | |
| DRAWN BY : M. WRIGHT | DATE : 9/18 | DWG. NO. 21 | |
| CHECKED BY : N. HART | DATE : 9/18 | | |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 | | |

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

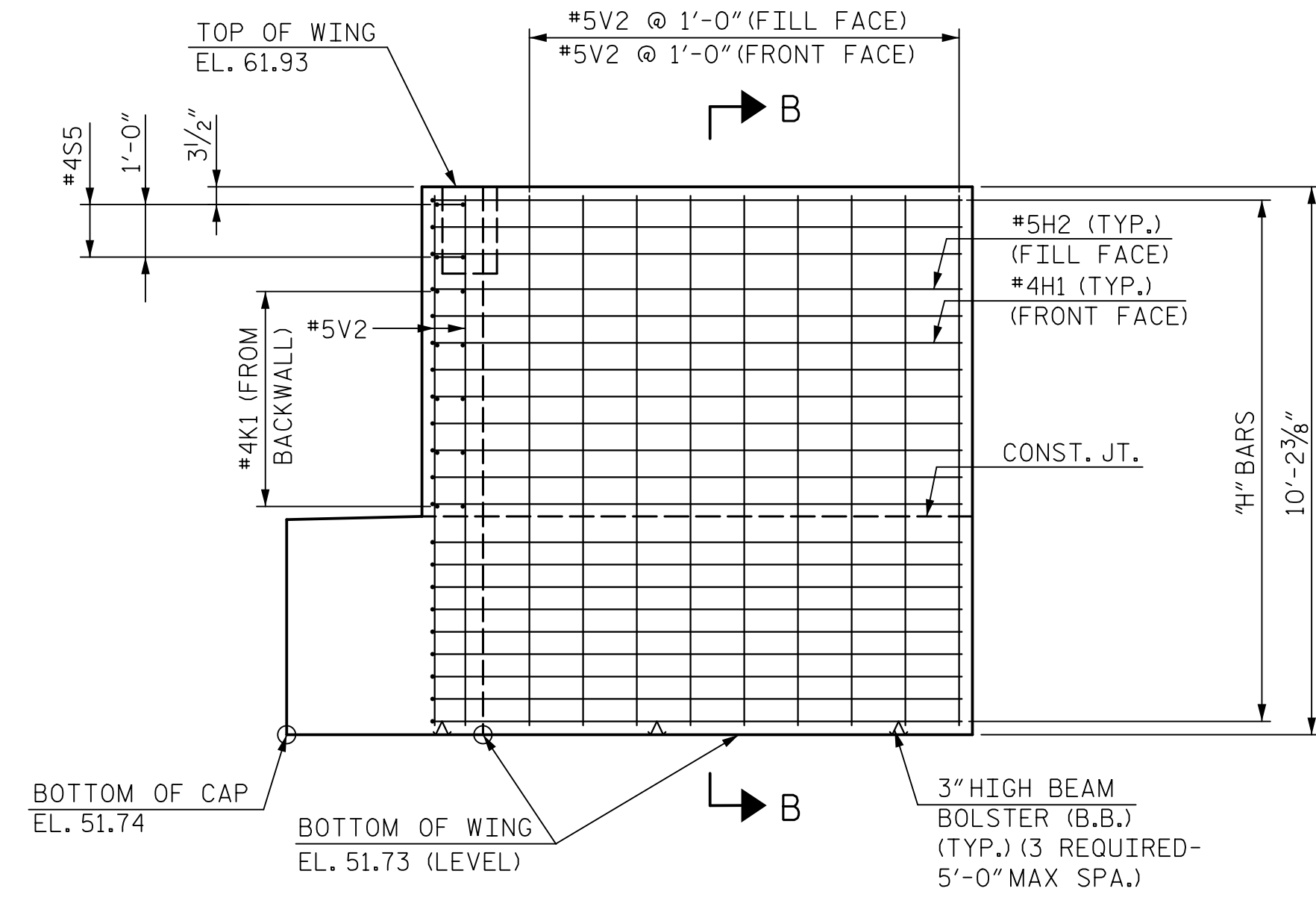
TOTAL SHEETS 36



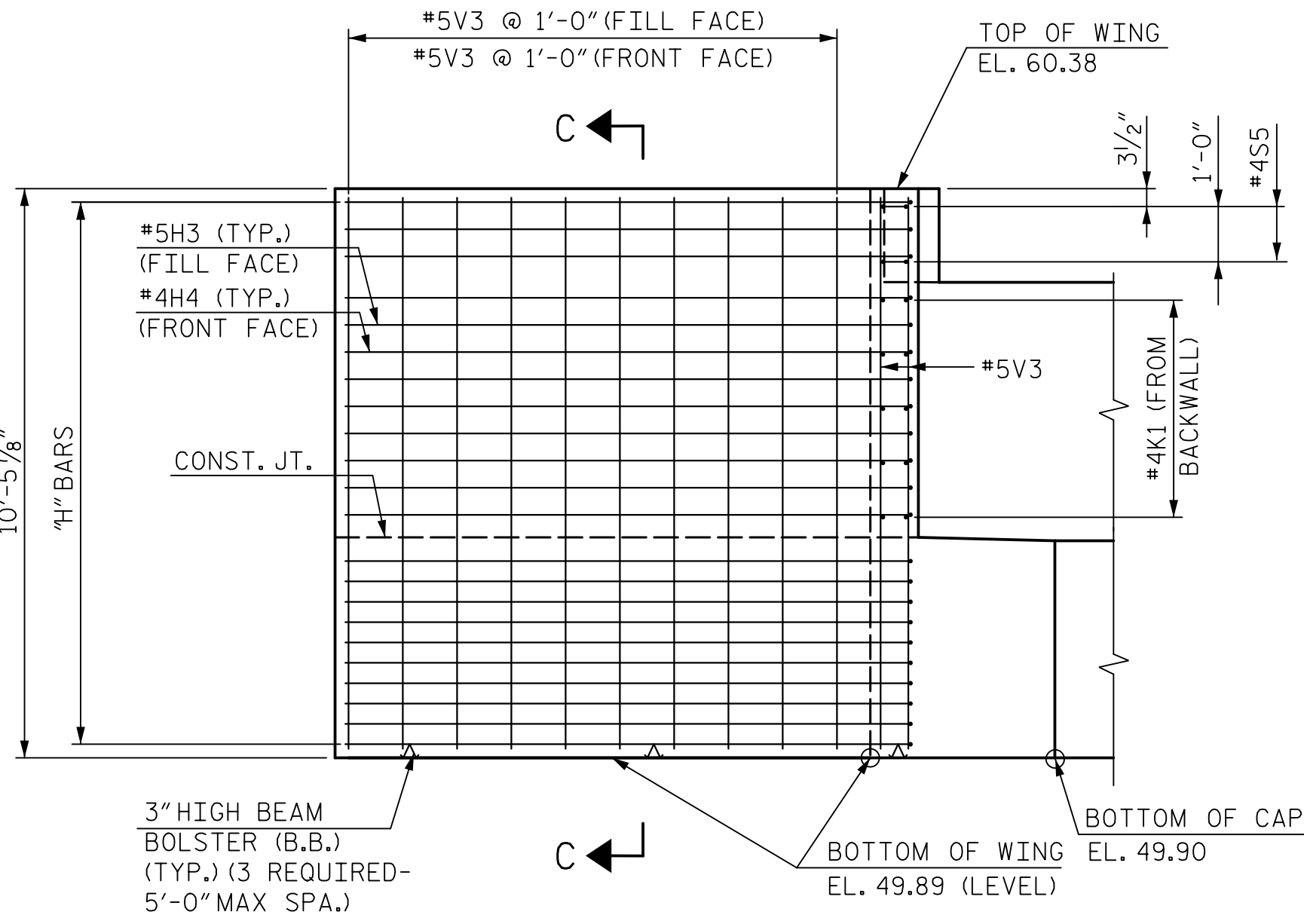
PLAN OF WING (W1)



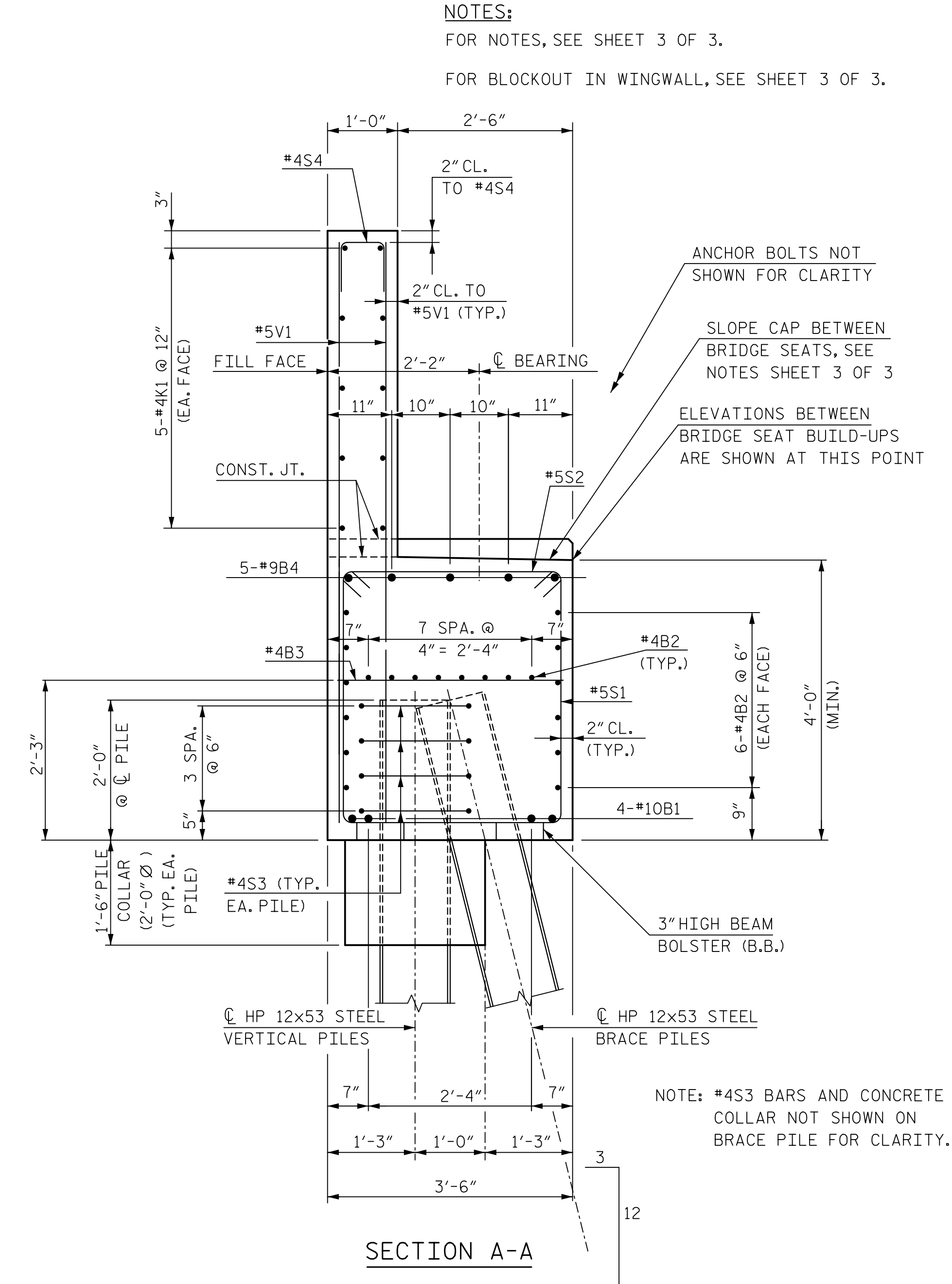
PLAN OF WING (W2)



ELEVATION OF WING (W1)

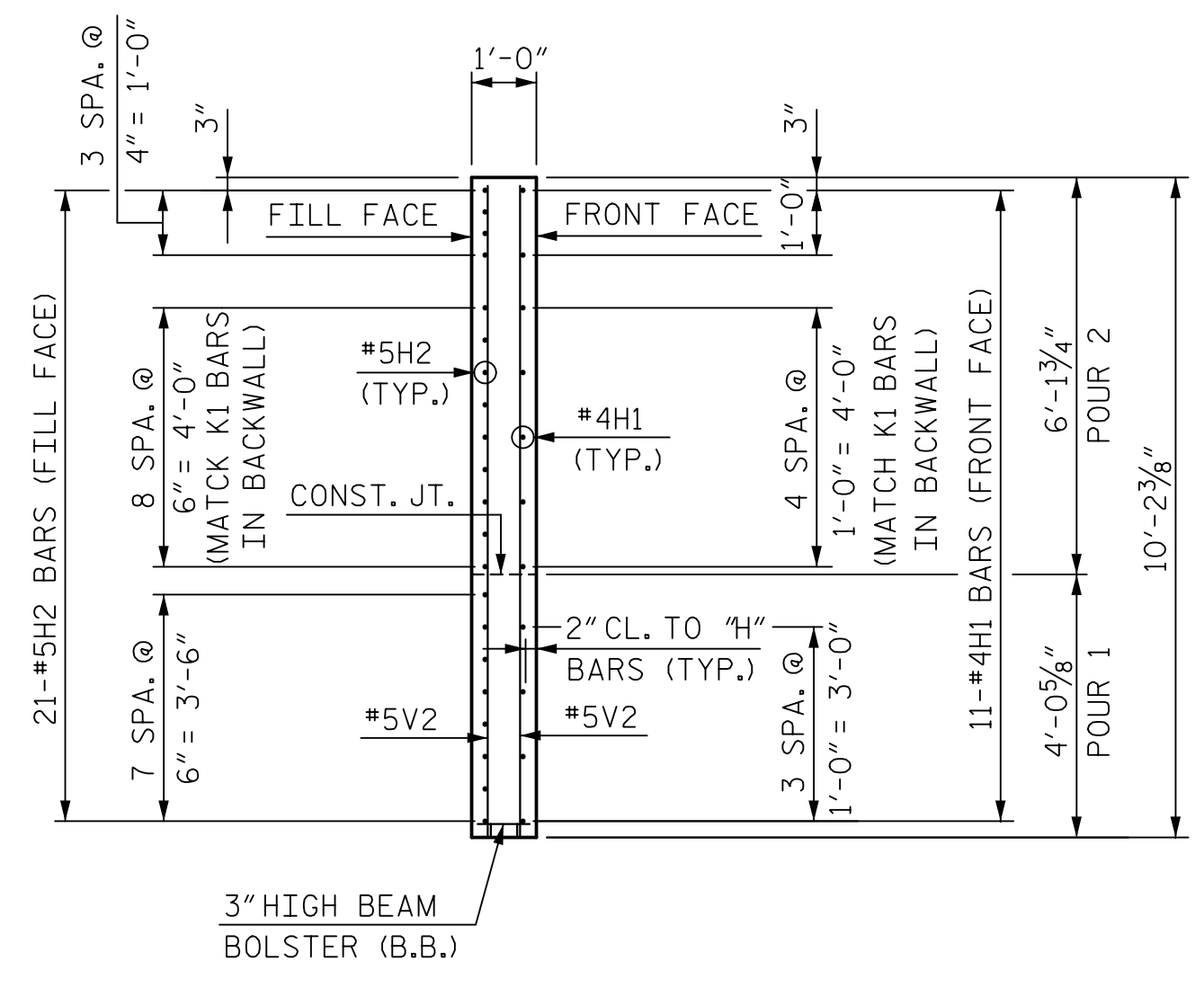


ELEVATION OF WING (W2)

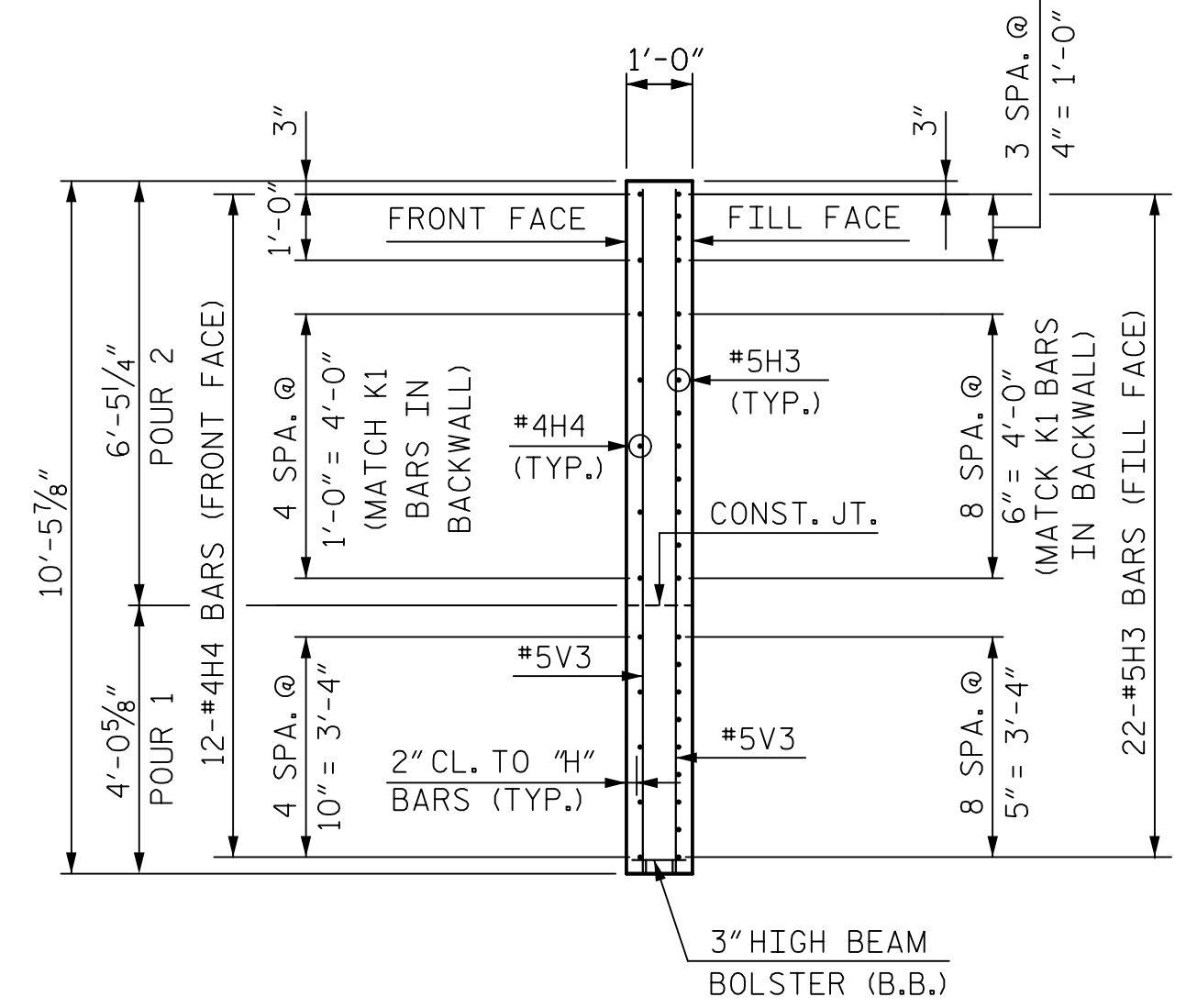


SECTION A-A

NOTES:
FOR NOTES, SEE SHEET 3 OF 3.
FOR BLOCKOUT IN WINGWALL, SEE SHEET 3 OF 3.



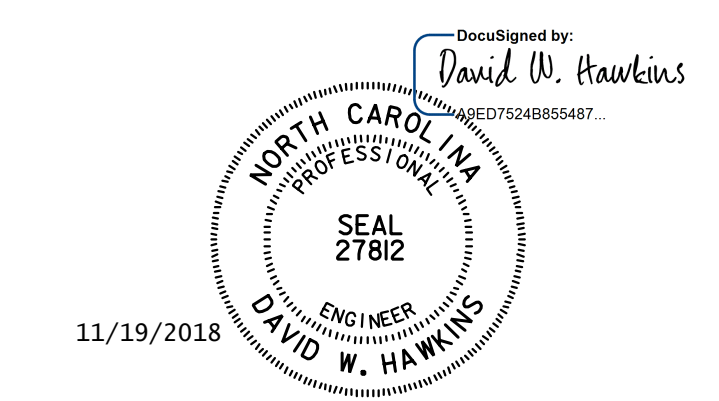
SECTION B-B



SECTION C-C

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-

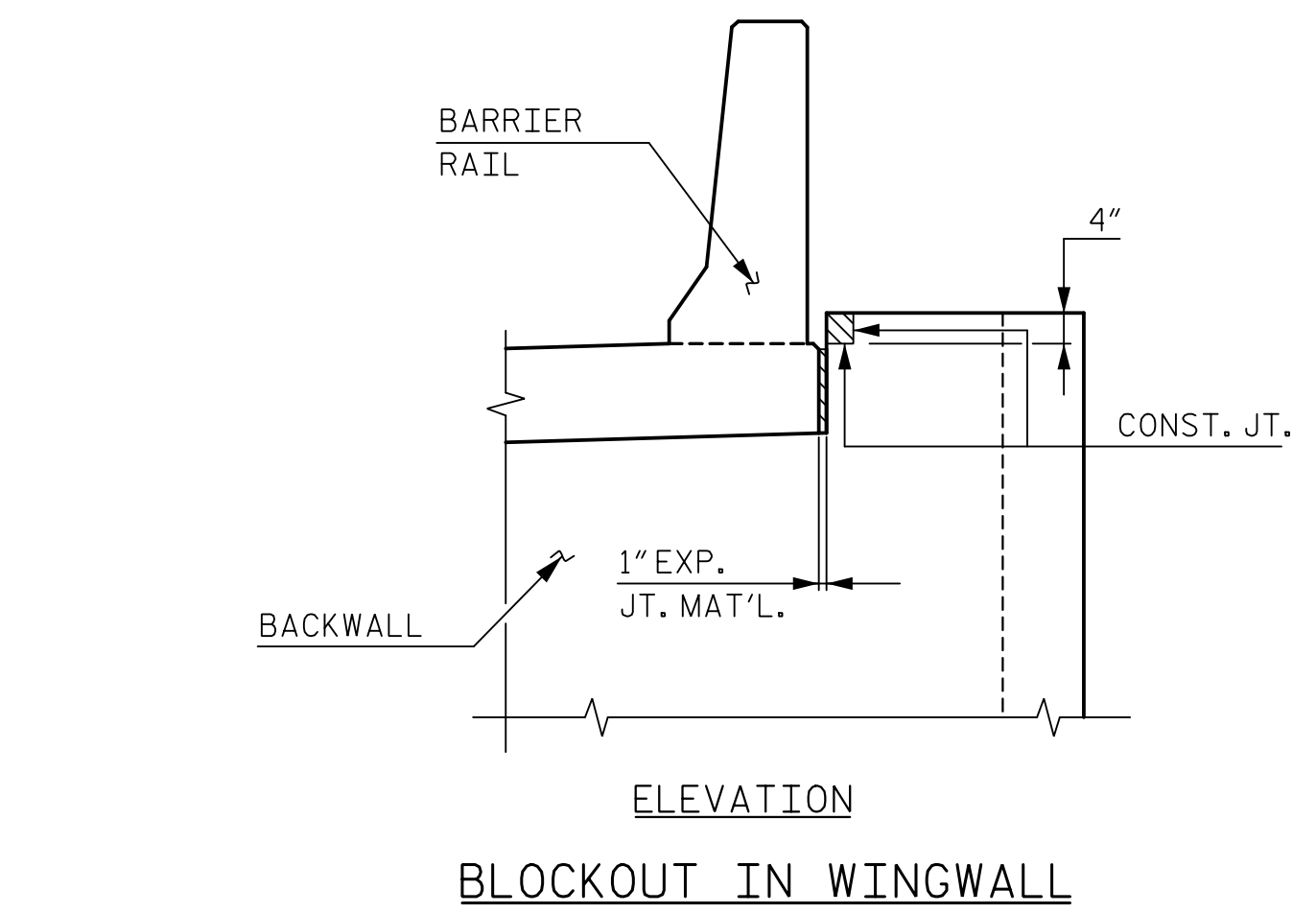
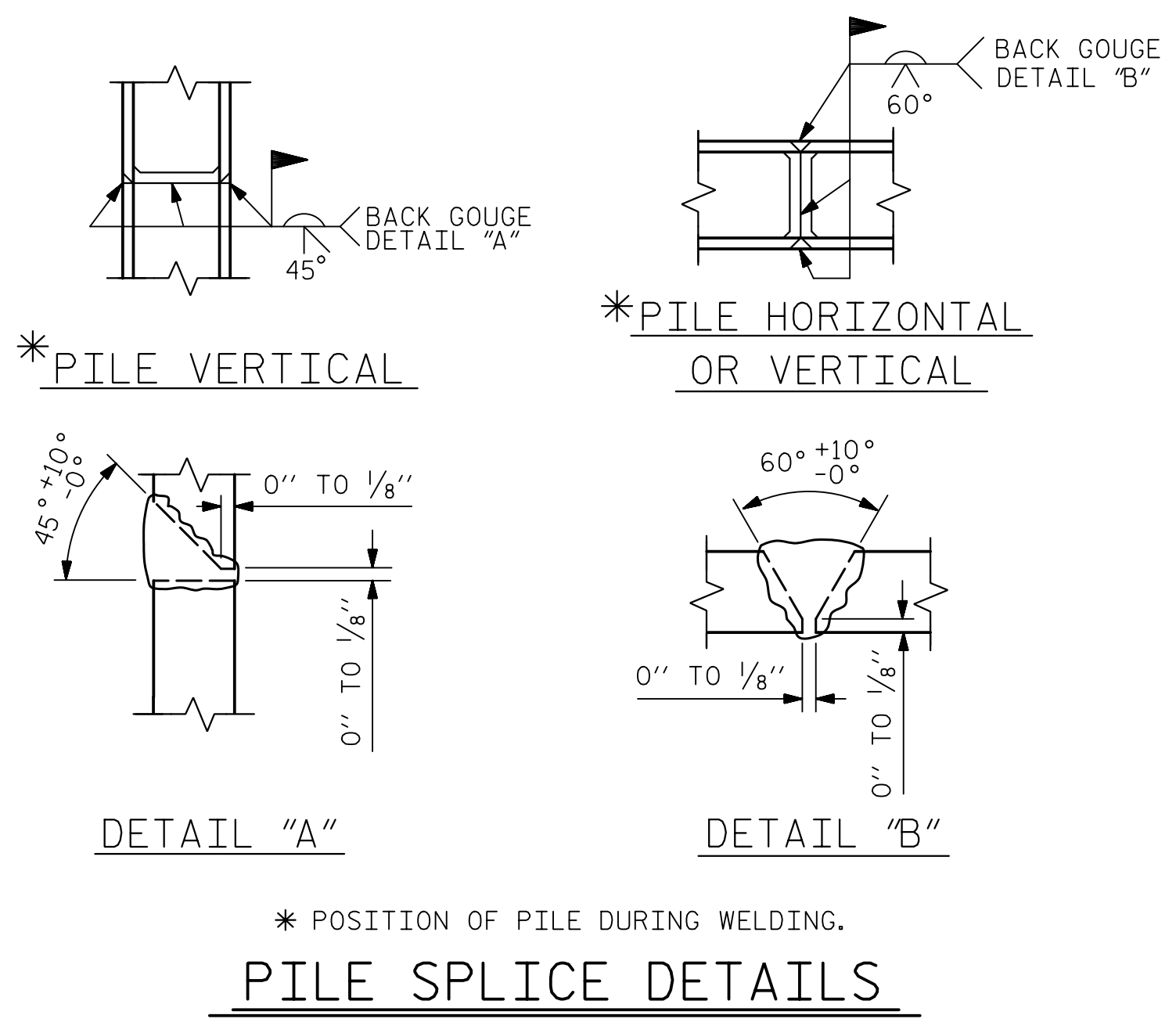
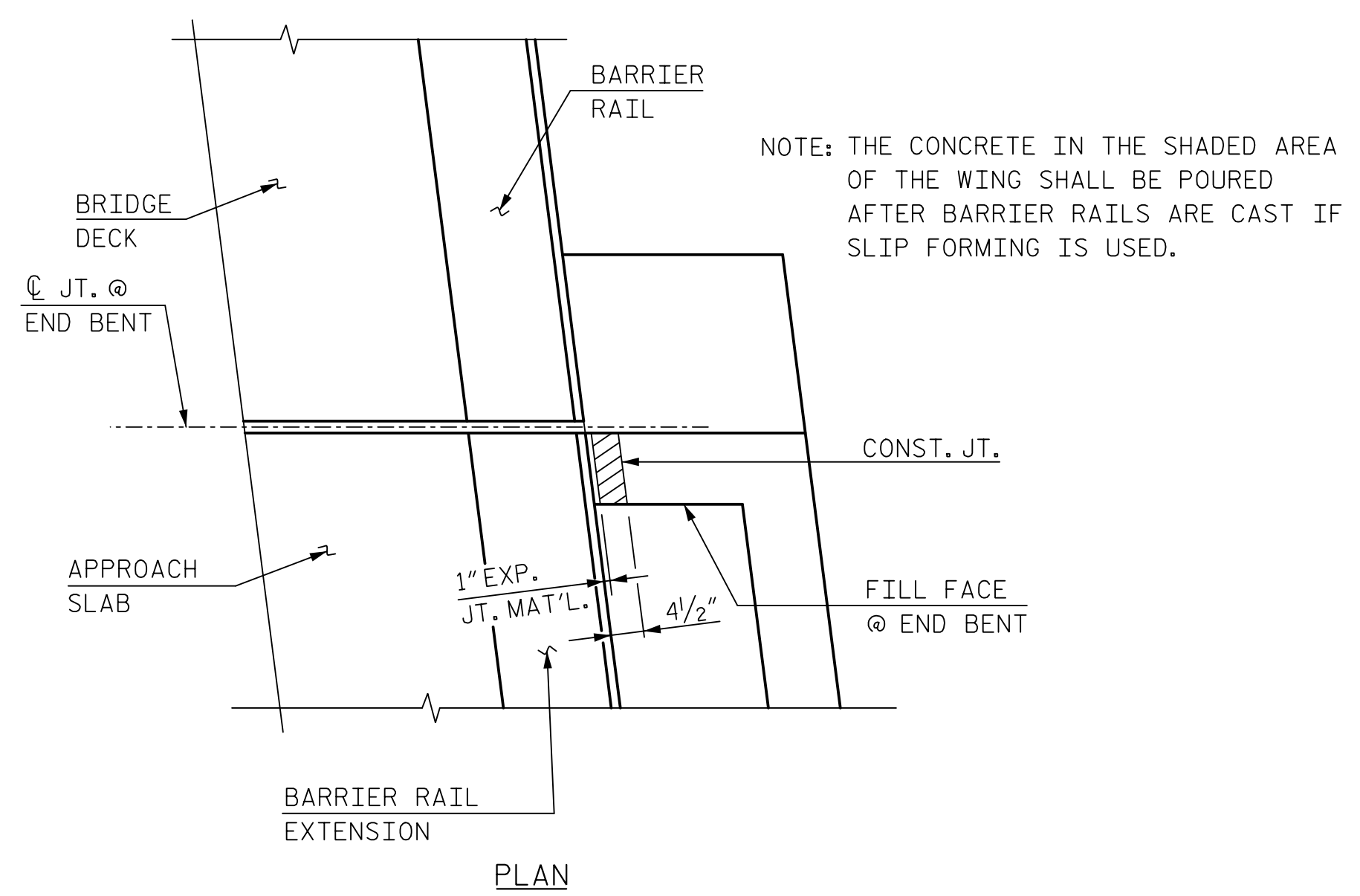
SHEET 2 OF 3
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT 1
RIGHT LANE



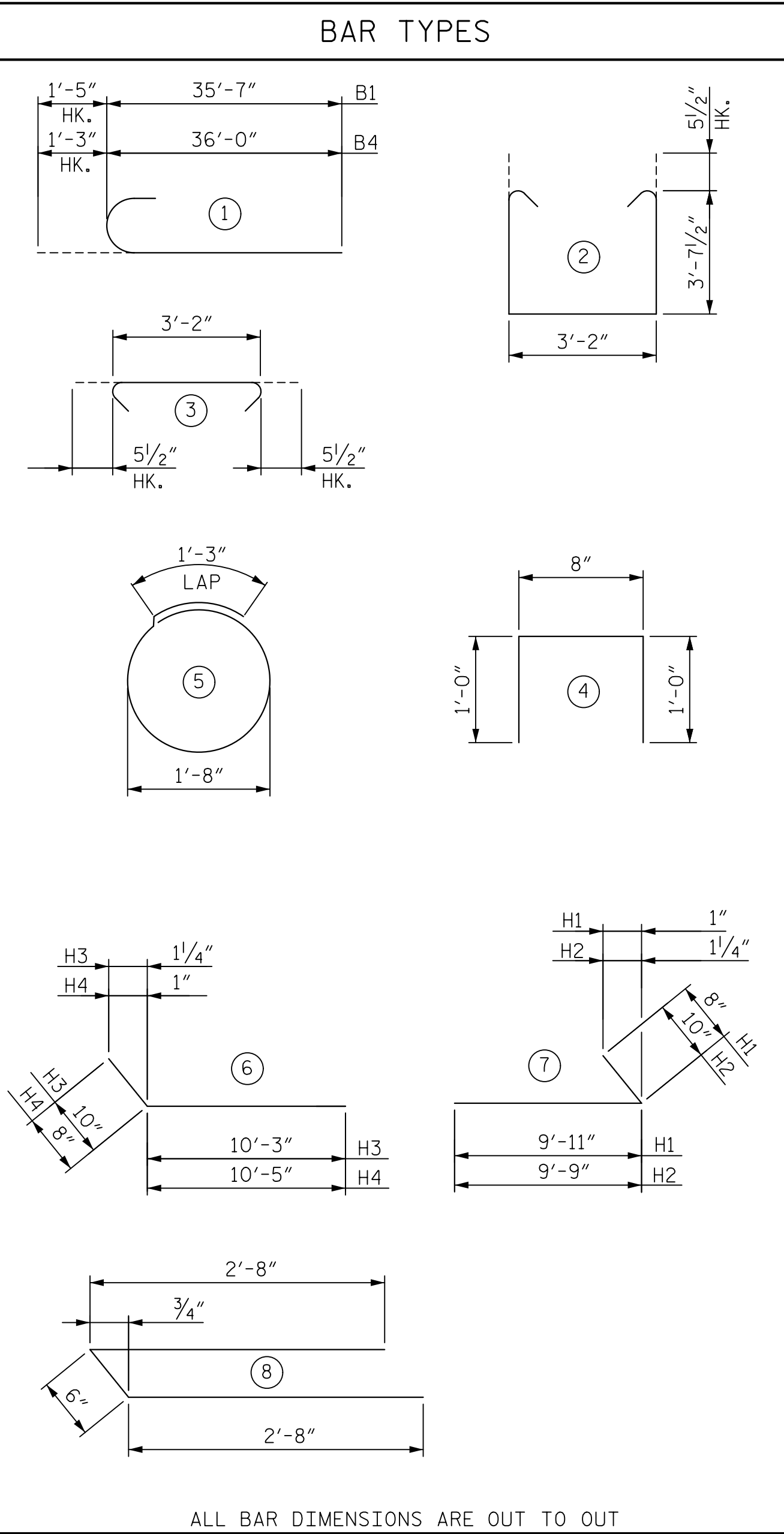
| HNTB | | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------------|------------|--|--|-----------|-----|----|------|-----|----|------|-----|----|------|---|--|--|---|--|--|---|--|--|---|--|--|
| DRAWN BY: C. GERDING | DATE: 9/18 | DWG. NO. 23 | <table border="1"> <tr> <th colspan="4">REVISIONS</th> </tr> <tr> <th>NO.</th> <th>BY</th> <th>DATE</th> <th>NO.</th> <th>BY</th> <th>DATE</th> </tr> <tr> <td>1</td> <td></td> <td></td> <td>3</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td>4</td> <td></td> <td></td> </tr> </table> | REVISIONS | | | | NO. | BY | DATE | NO. | BY | DATE | 1 | | | 3 | | | 2 | | | 4 | | |
| REVISIONS | | | | | | | | | | | | | | | | | | | | | | | | | |
| NO. | BY | | | DATE | NO. | BY | DATE | | | | | | | | | | | | | | | | | | |
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| 2 | | | 4 | | | | | | | | | | | | | | | | | | | | | | |
| CHECKED BY: N. SALAS ZAMUDIO | DATE: 9/18 | | | | | | | | | | | | | | | | | | | | | | | | |
| DESIGN ENGINEER OF RECORD: D. HAWKINS | DATE: 9/18 | | | | | | | | | | | | | | | | | | | | | | | | |

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| SHEET NO. S8-23 | | TOTAL SHEETS 36 | |
|-----------------|--|-----------------|--|

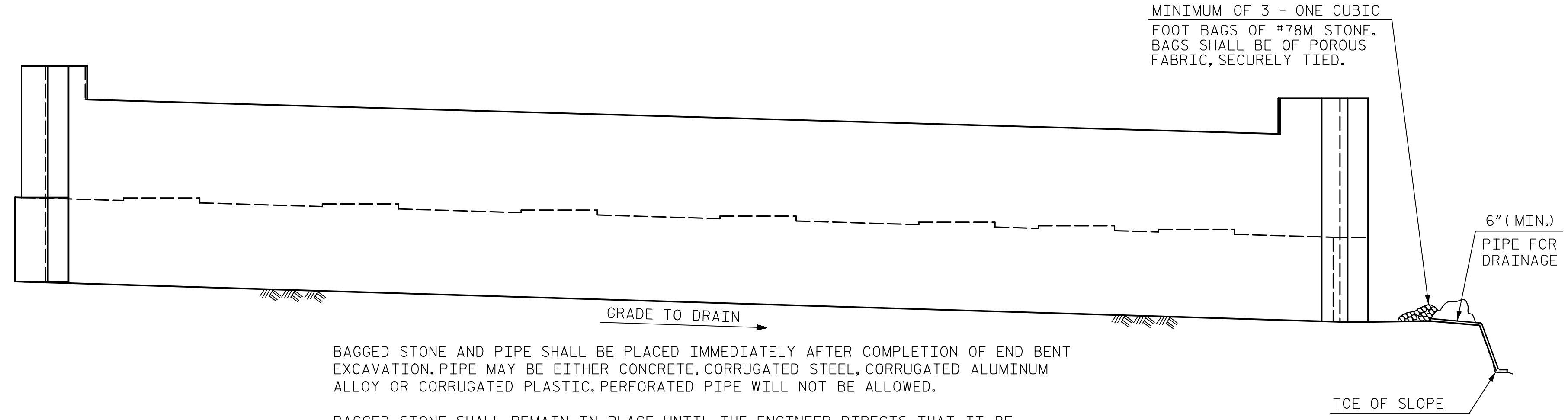


NOTES:
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.



| BILL OF REINFORCING | | | | | |
|---------------------|-----|------|------|--------|--------|
| END BENT 1 | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 8 | 10 | 1 | 37'-0" | 1,274 |
| B2 | 60 | 4 | STR | 22'-9" | 912 |
| B3 | 16 | 4 | STR | 3'-2" | 34 |
| B4 | 10 | 9 | 1 | 37'-3" | 1,267 |
| H1 | 11 | 4 | 7 | 10'-7" | 78 |
| H2 | 21 | 5 | 7 | 10'-7" | 232 |
| H3 | 22 | 5 | 6 | 11'-1" | 254 |
| H4 | 12 | 4 | 6 | 11'-1" | 89 |
| K1 | 30 | 4 | STR | 22'-9" | 456 |
| S1 | 74 | 5 | 2 | 11'-4" | 875 |
| S2 | 74 | 5 | 3 | 4'-1" | 315 |
| S3 | 44 | 4 | 5 | 6'-6" | 191 |
| S4 | 57 | 4 | 4 | 2'-8" | 102 |
| S5 | 4 | 4 | 8 | 5'-10" | 16 |
| V1 | 114 | 5 | STR | 8'-4" | 991 |
| V2 | 26 | 5 | STR | 9'-9" | 264 |
| V3 | 28 | 5 | STR | 9'-11" | 290 |

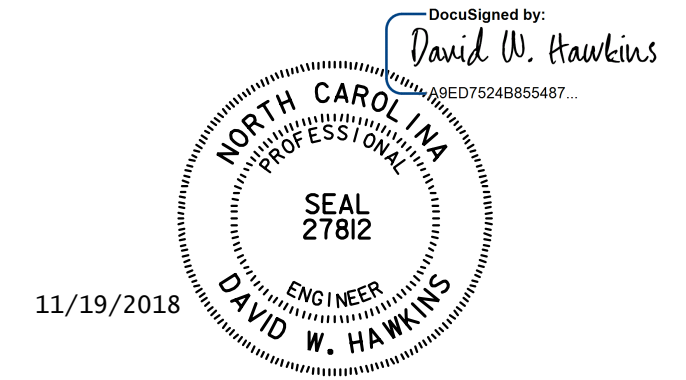
| QUANTITIES | | |
|---|----------|-------|
| REINFORCING STEEL | LBS. | 7,640 |
| CLASS "A" CONCRETE BREAKDOWN | | |
| POUR 1 - CAP, BOT. OF WINGS & COLLARS | CU. YDS. | 38.4 |
| POUR 2 - TOP OF WINGS & BACKWALL | CU. YDS. | 24.0 |
| TOTAL | CU. YDS. | 62.4 |
| HP 12x53 STEEL PILES | NO. | 11 |
| | LIN. FT. | 770 |
| PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES | NO. | 11 |
| PILE REDRIVES | NO. | 6 |



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 FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT 1

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DRAWN BY: C. GERDING DATE: 9/18
CHECKED BY: N. SALAS ZAMUDIO DATE: 9/18
DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 24

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 CRAVEN COUNTY
STATION: 227+57.02 -L-

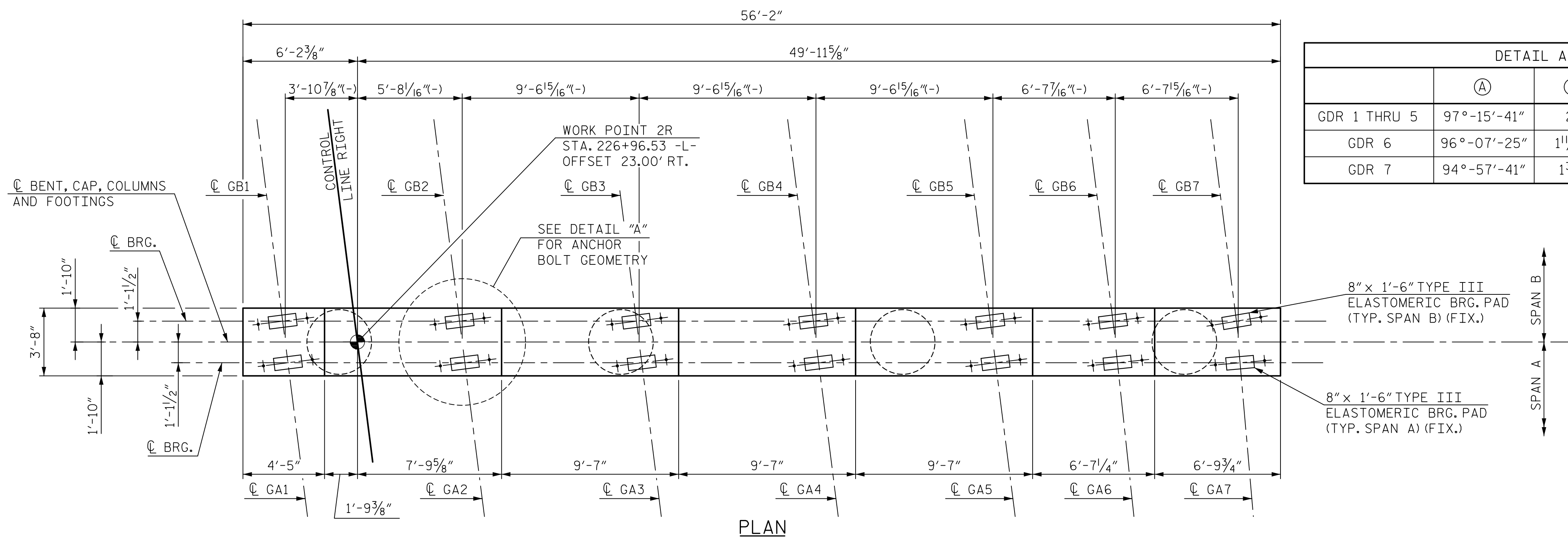
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1
RIGHT LANE

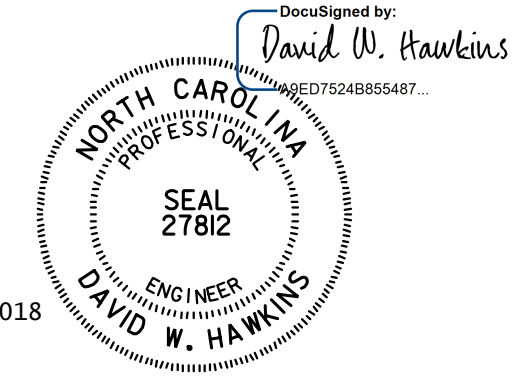
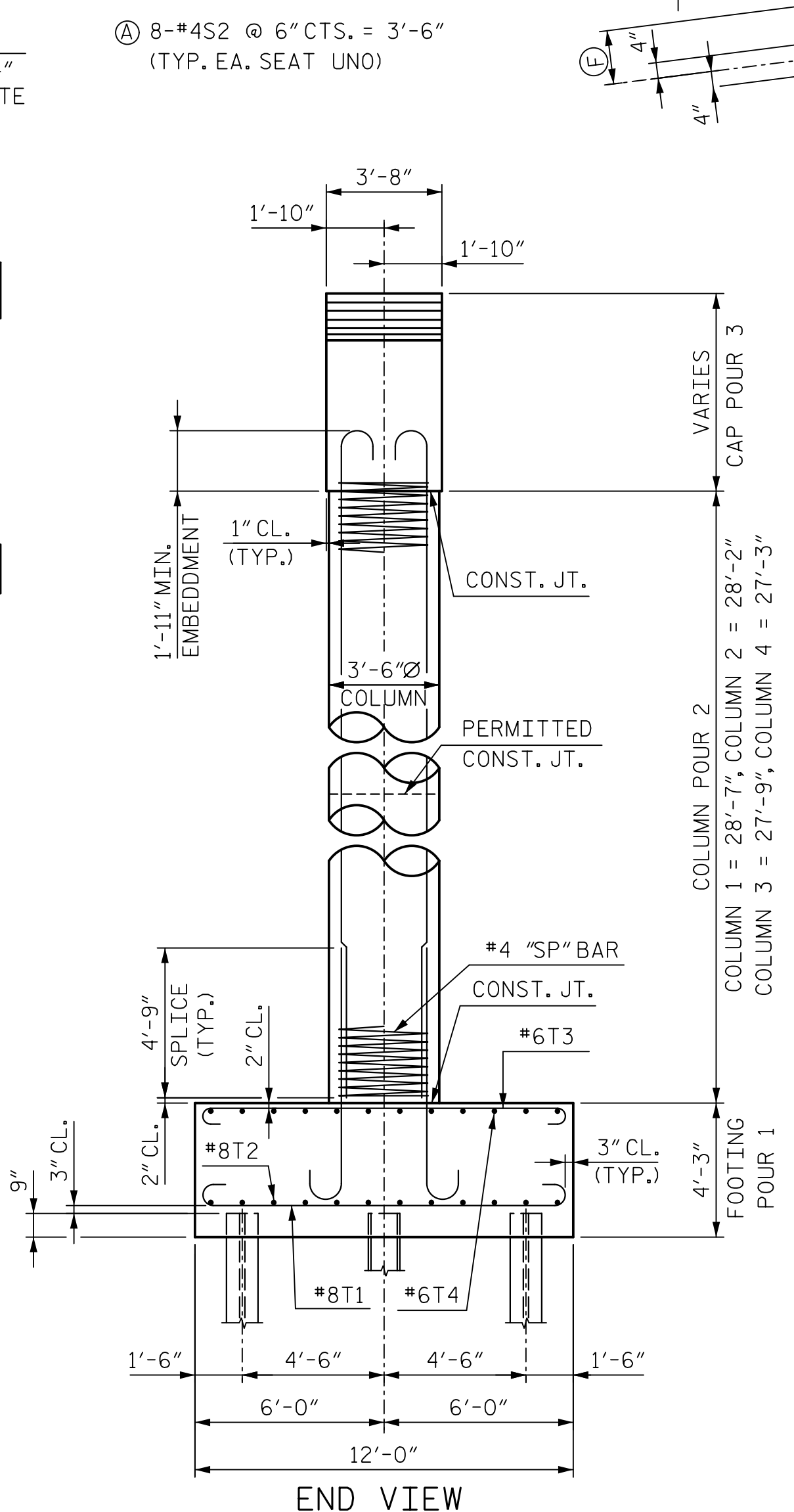
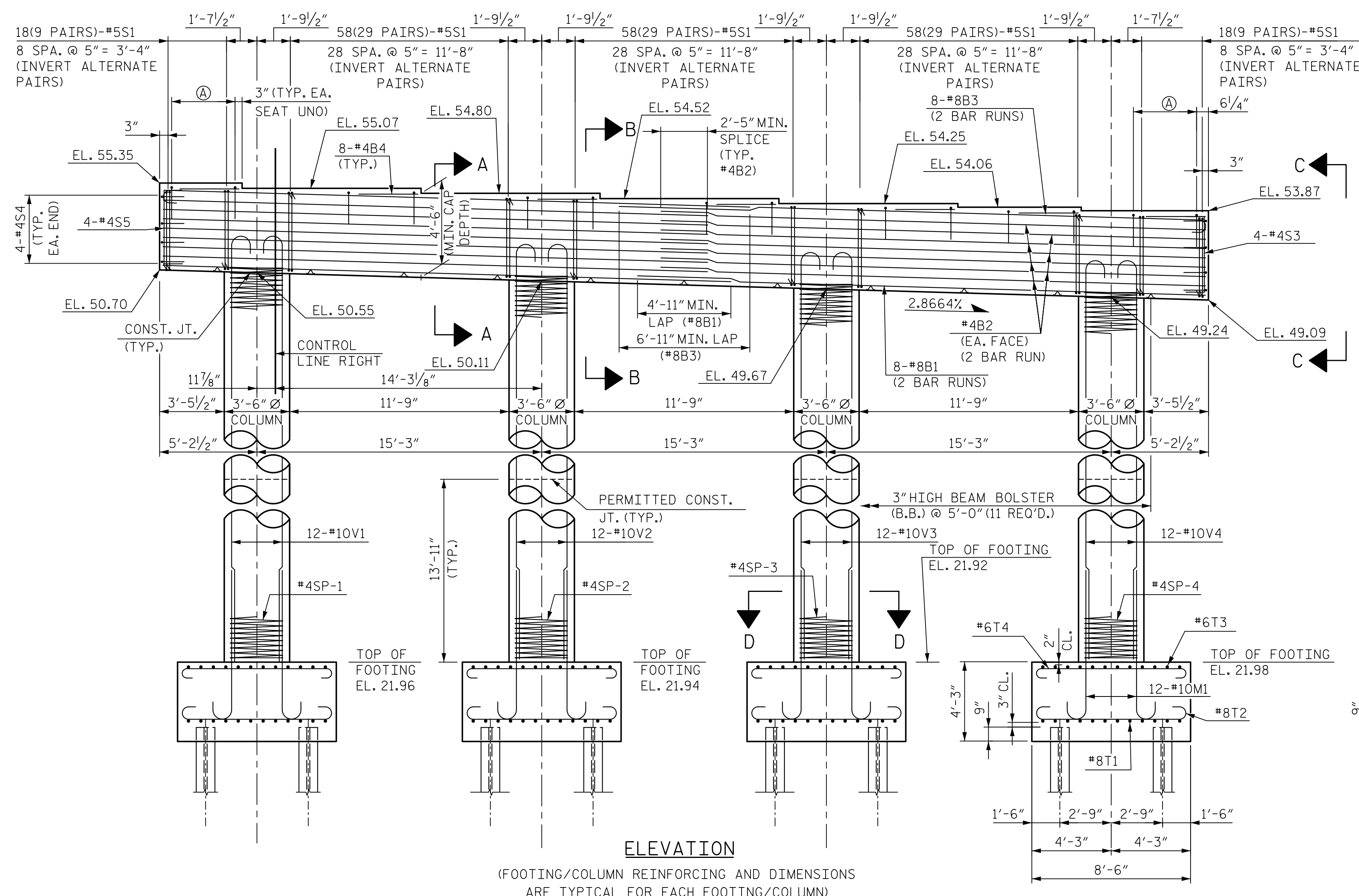
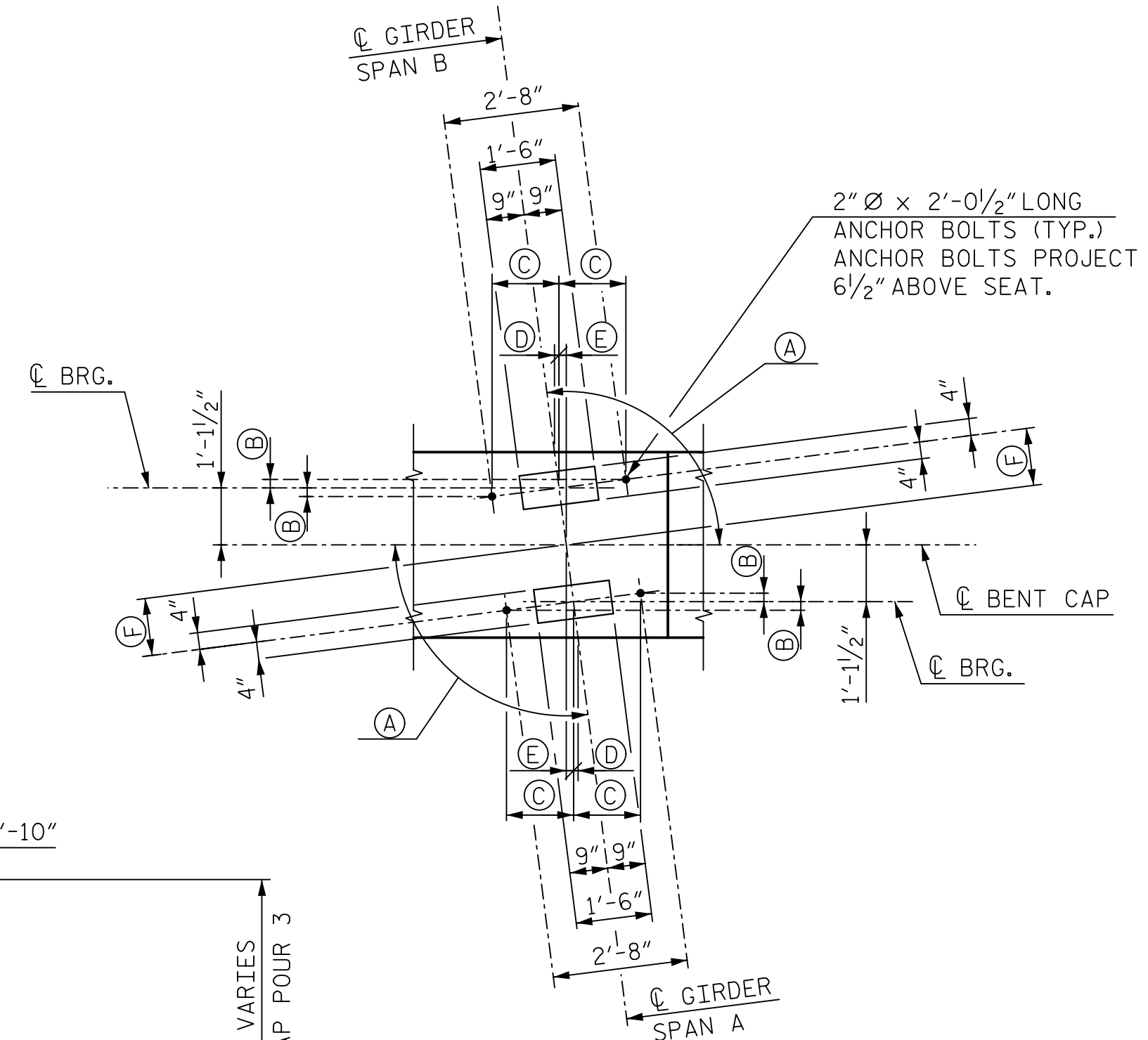
| REVISIONS | | | | | |
|-----------|----|------|-----|----|------|
| NO. | BY | DATE | NO. | BY | DATE |
| 1 | | | 3 | | |
| 2 | | | 4 | | |

SHEET NO. S8-24
TOTAL SHEETS 36



| DETAIL A DIMENSION TABLE | | | | | | |
|--------------------------|-------------|---------|------------|--------|---------|------------|
| | (A) | (B) | (C) | (D) | (E) | (F) |
| GDR 1 THRU 5 | 97°-15'-41" | 2" | 1'-3 7/8" | 1/16" | 1 1/16" | 1'-1 5/8" |
| GDR 6 | 96°-07'-25" | 1 1/16" | 1'-3 5/16" | 15/16" | 17/16" | 1'-1 1/16" |
| GDR 7 | 94°-57'-41" | 1 3/8" | 1'-3 5/16" | 3/4" | 1 3/16" | 1'-1 1/16" |

NOTES:
 ALL DIMENSIONS SHOWN ARE PARALLEL OR NORMAL TO C BENT UNLESS NOTED.
 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.
 FOR PILE SPLICE DETAILS, SEE "SUBSTRUCTURE END BENT 1" SHEET 3 OF 3.



PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 1 OF 2
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 BENT 1
 RIGHT LANE

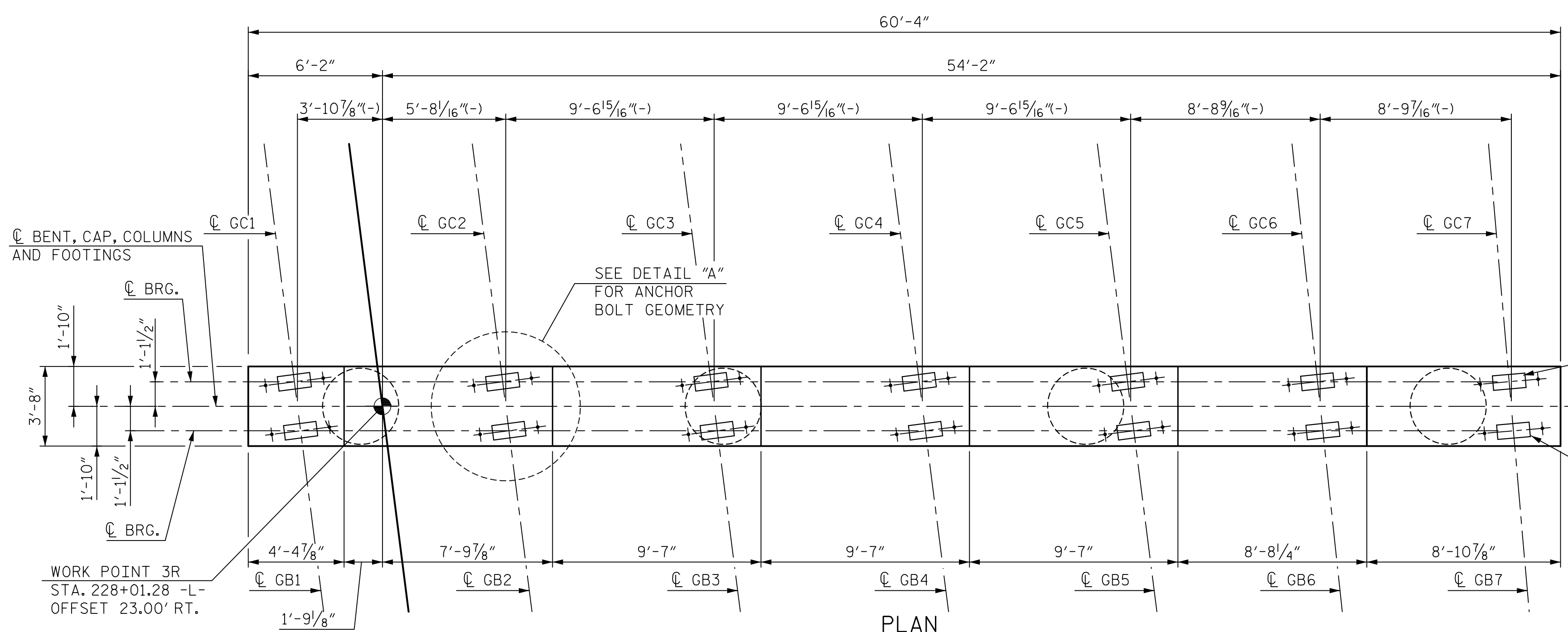
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 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 25

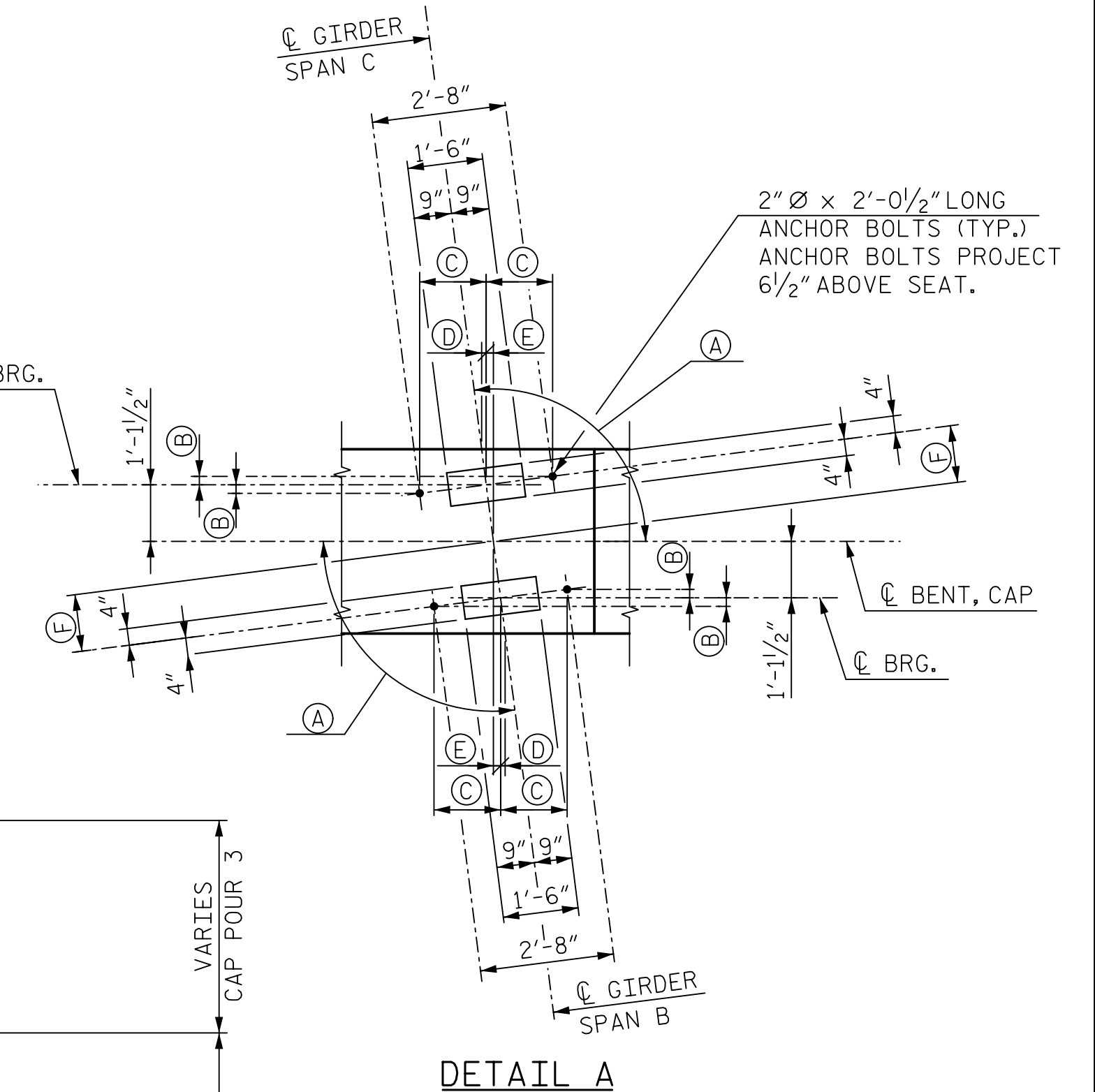
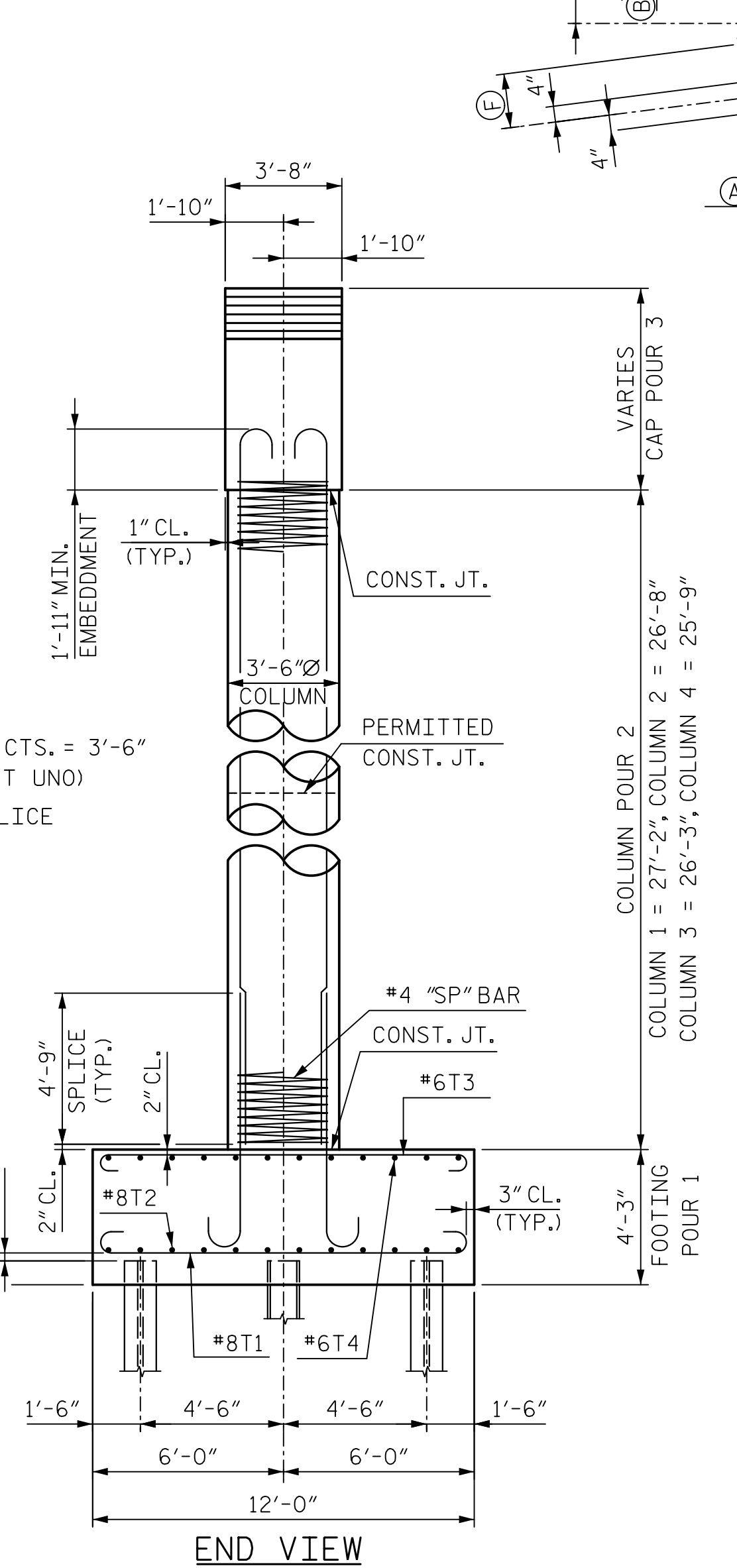
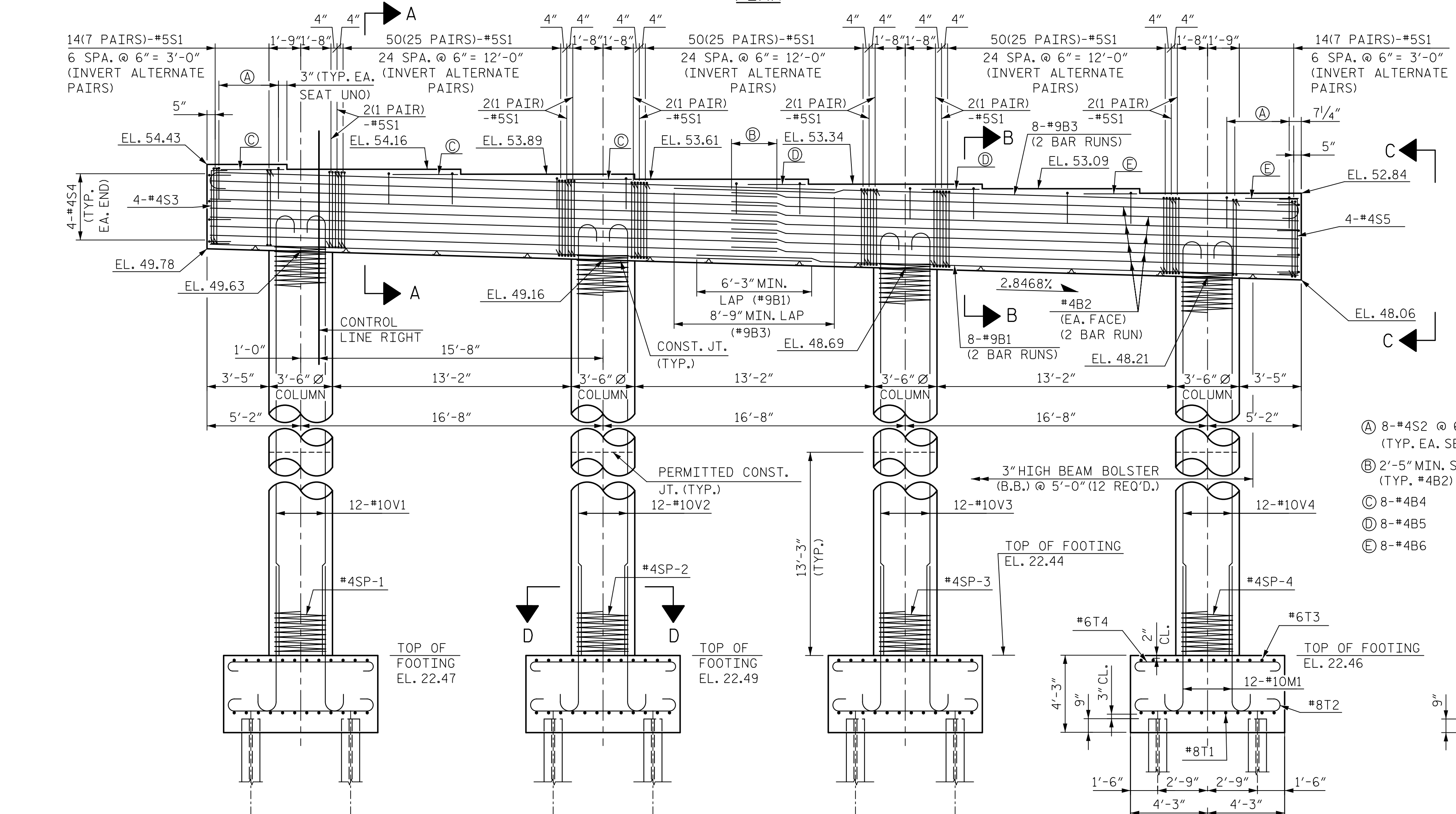
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| REVISIONS | | | | | | SHEET NO. S8-25 |
|-----------|----|------|-----|----|------|--------------------|
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| 1 | | | 3 | | | TOTAL SHEETS 36 |
| 2 | | | 4 | | | |

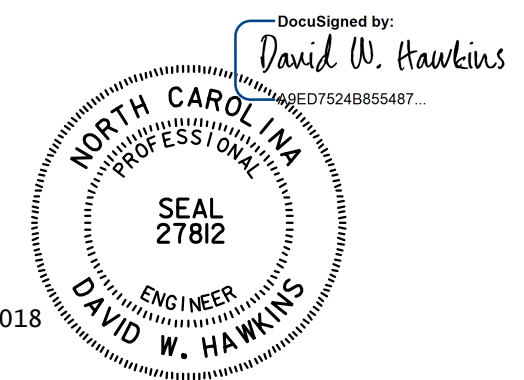


| DETAIL A DIMENSION TABLE | | | | | | |
|--------------------------|-------------|---------|------------|---------|---------|------------|
| | A | B | C | D | E | F |
| GDR 1 THRU 5 | 97°-15'-41" | 2" | 1'-3 7/8" | 1 1/16" | 1 1/16" | 1'-1 5/8" |
| GDR 6 | 96°-07'-25" | 1 1/16" | 1'-3 5/16" | 1 5/16" | 1 7/16" | 1'-1 9/16" |
| GDR 7 | 94°-57'-41" | 1 3/8" | 1'-3 5/16" | 3/4" | 1 3/16" | 1'-1 9/16" |

NOTES:
 ALL DIMENSIONS SHOWN ARE PARALLEL OR NORMAL TO C BENT UNLESS NOTED.
 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.
 FOR PILE SPLICE DETAILS, SEE "SUBSTRUCTURE END BENT 1" SHEET 3 OF 3.



- Ⓐ 8-#4S2 @ 6" CTS. = 3'-6" (TYP. EA. SEAT UNO)
- Ⓑ 2'-5" MIN. SPLICE (TYP. #4B2)
- Ⓒ 8-#4B4
- Ⓓ 8-#4B5
- Ⓔ 8-#4B6



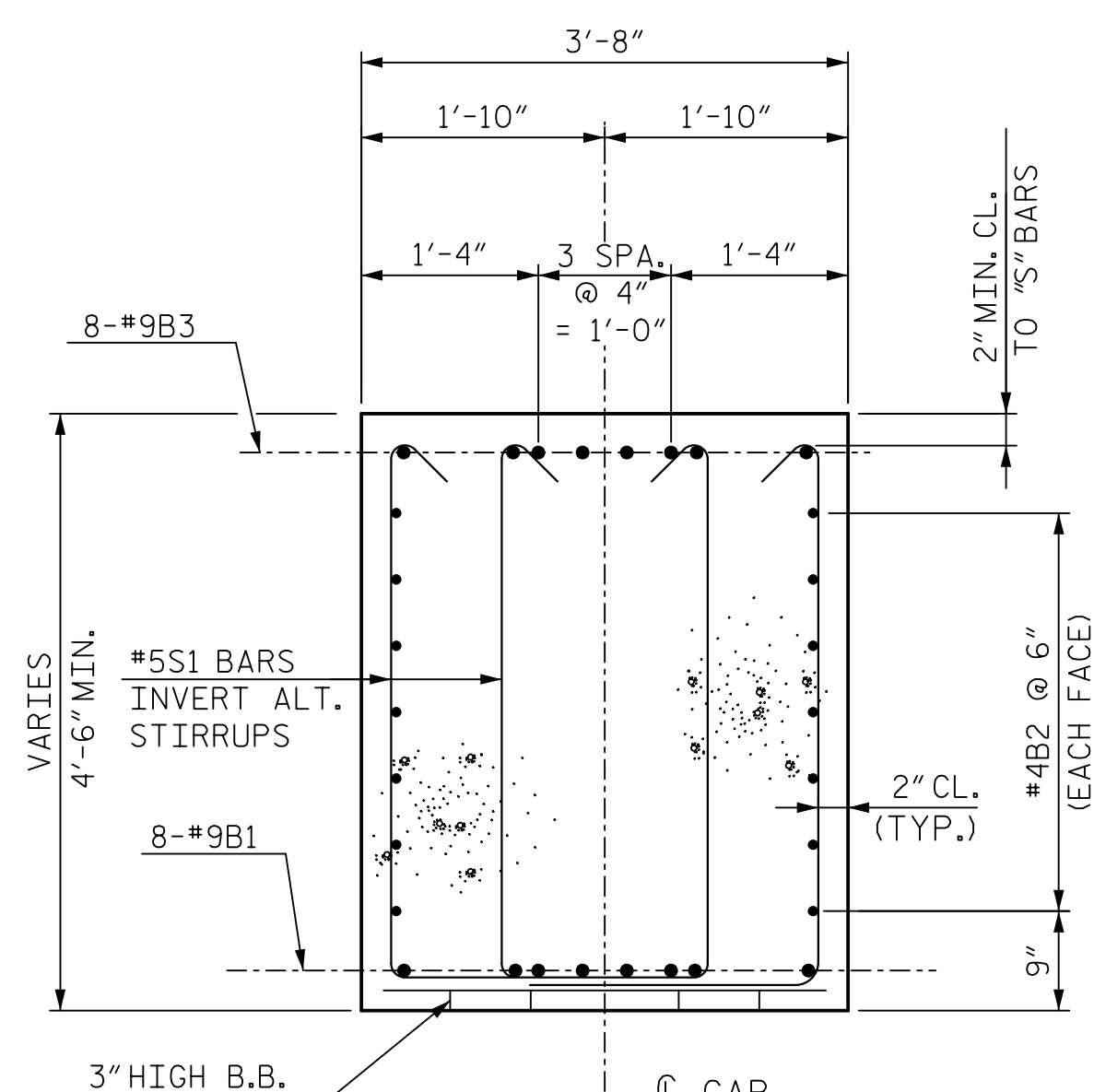
PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 1 OF 2
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 BENT 2
 RIGHT LANE

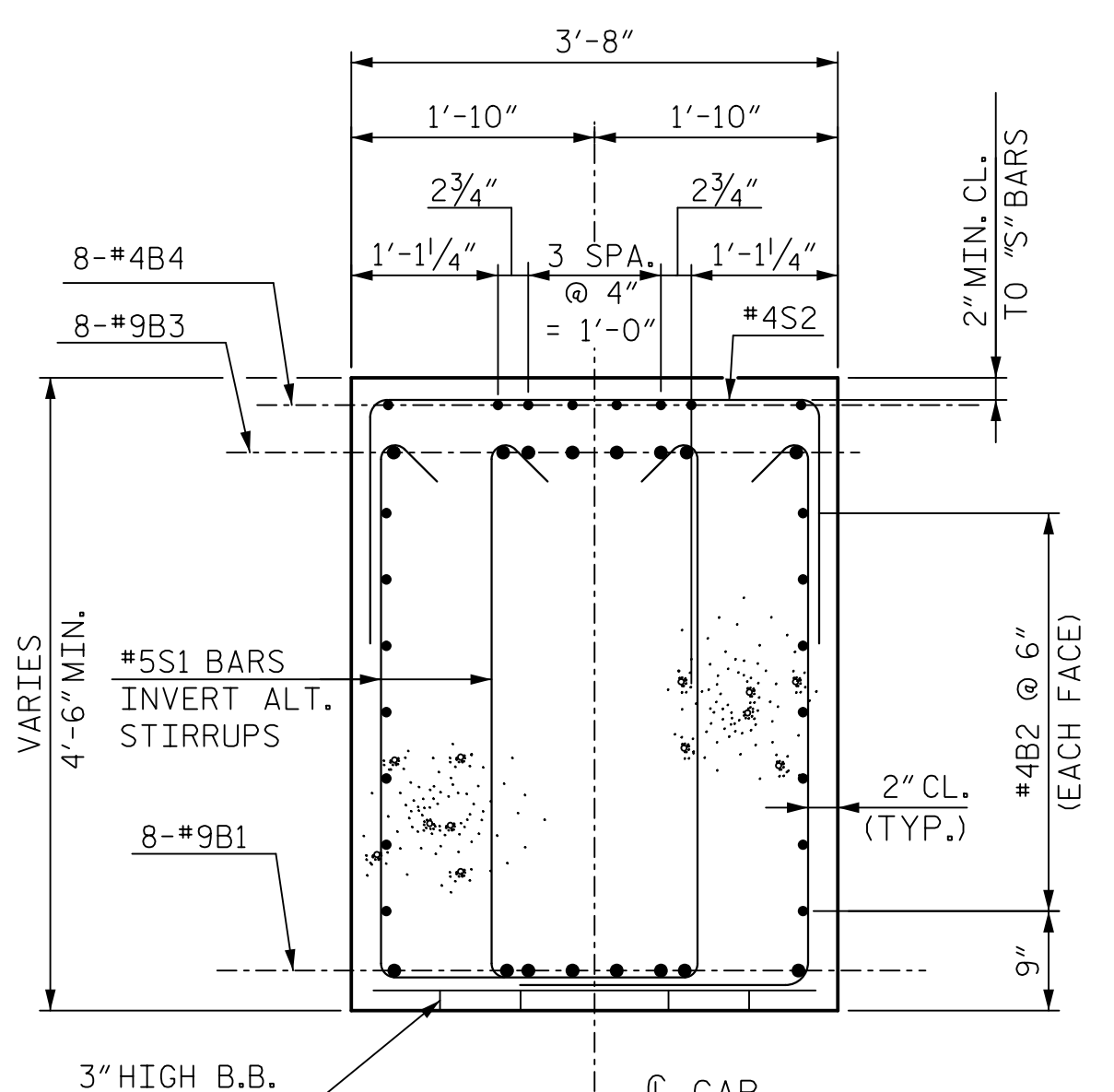
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|---------------------------------------|------------|--|------------|
| HNTB | | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | |
| DRAWN BY: M. WRIGHT | DATE: 9/18 | CHECKED BY: N. HART | DATE: 9/18 |
| DESIGN ENGINEER OF RECORD: D. HAWKINS | DATE: 9/18 | DWG. NO. 27 | |

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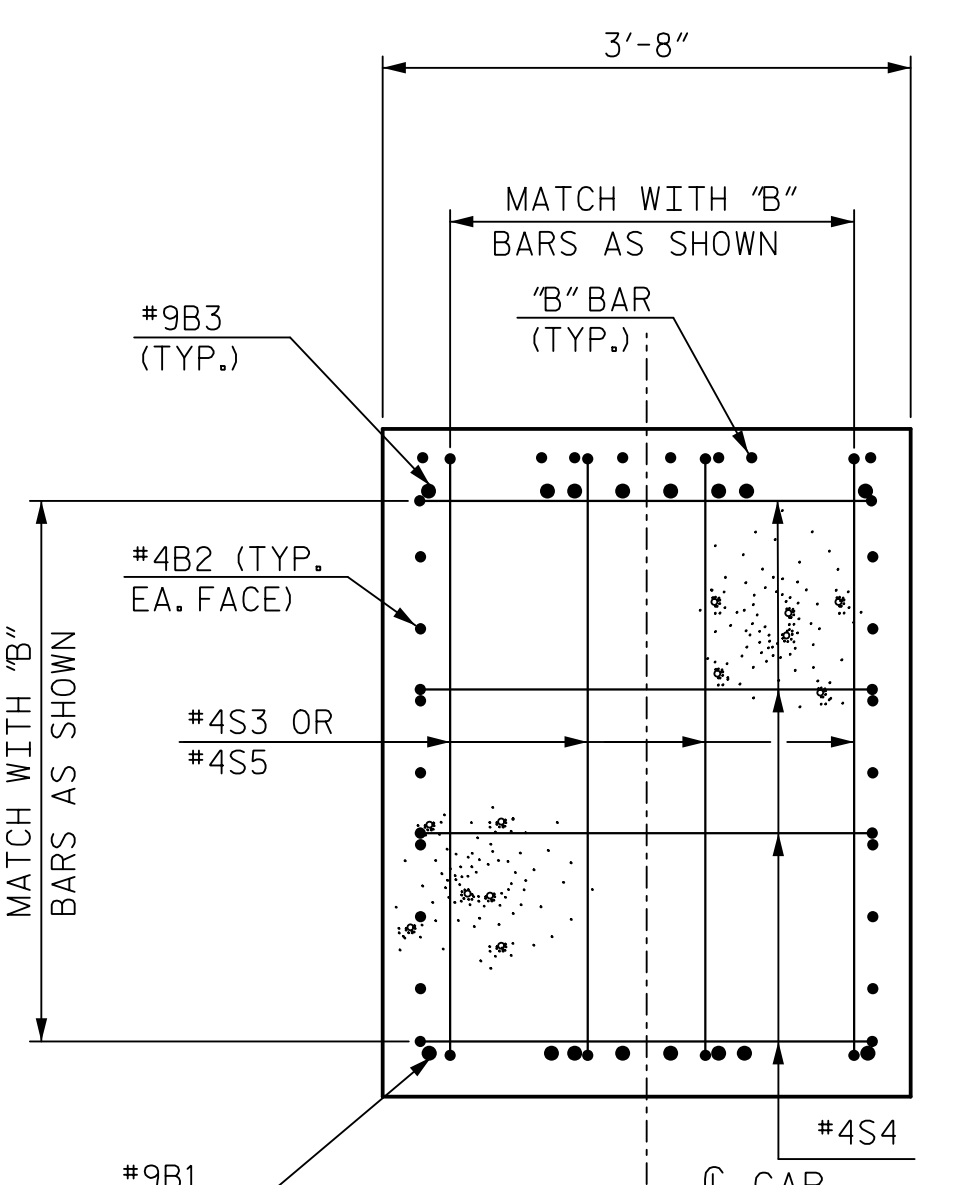
| REVISIONS | | | | | SHEET NO. S8-27 |
|-----------|----|------|-----|------|--------------------|
| NO. | BY | DATE | NO. | DATE | |
| 1 | | | 3 | | TOTAL SHEETS 36 |
| 2 | | | 4 | | |



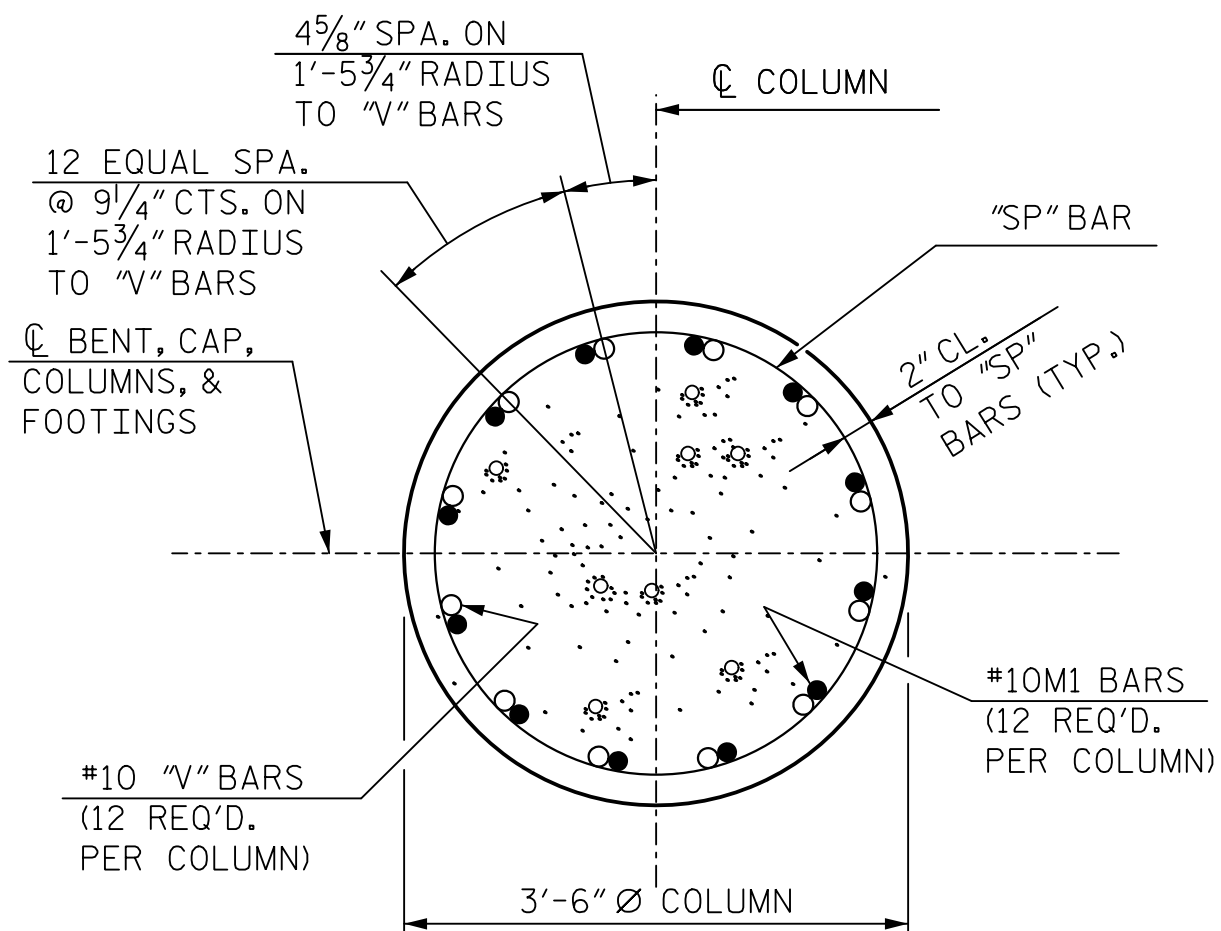
SECTION A-A



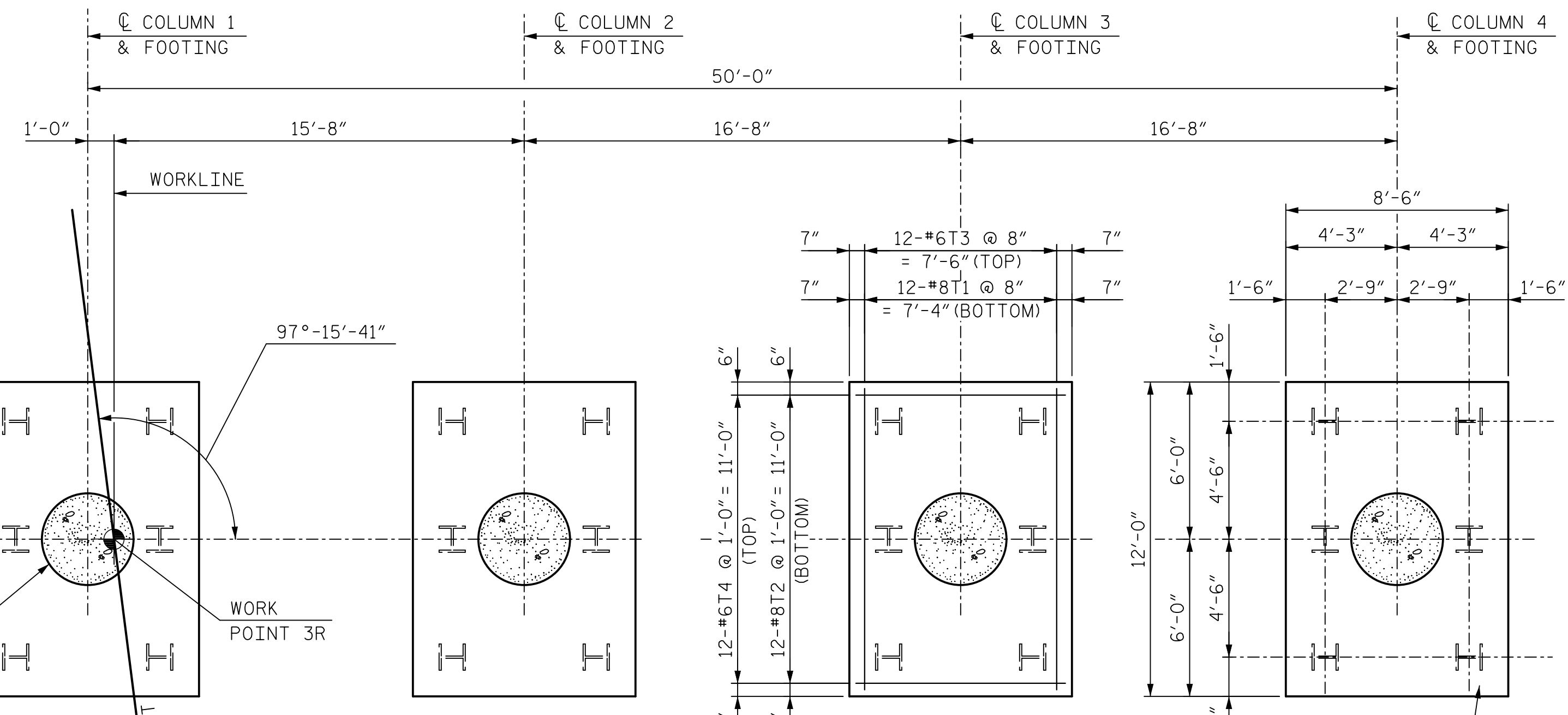
SECTION B-B



SECTION C-C



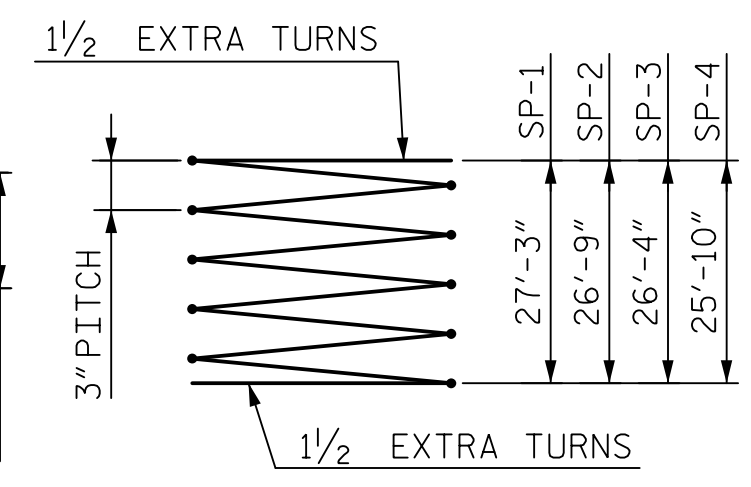
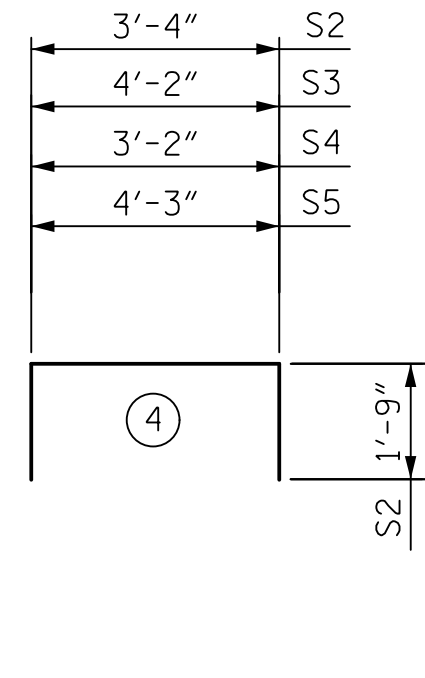
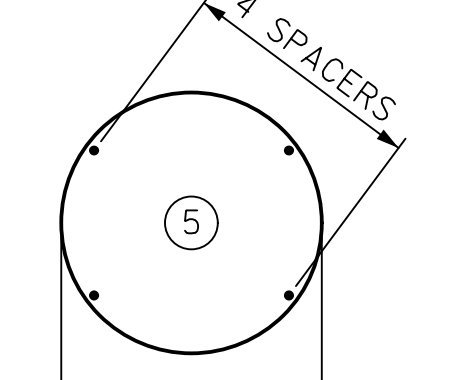
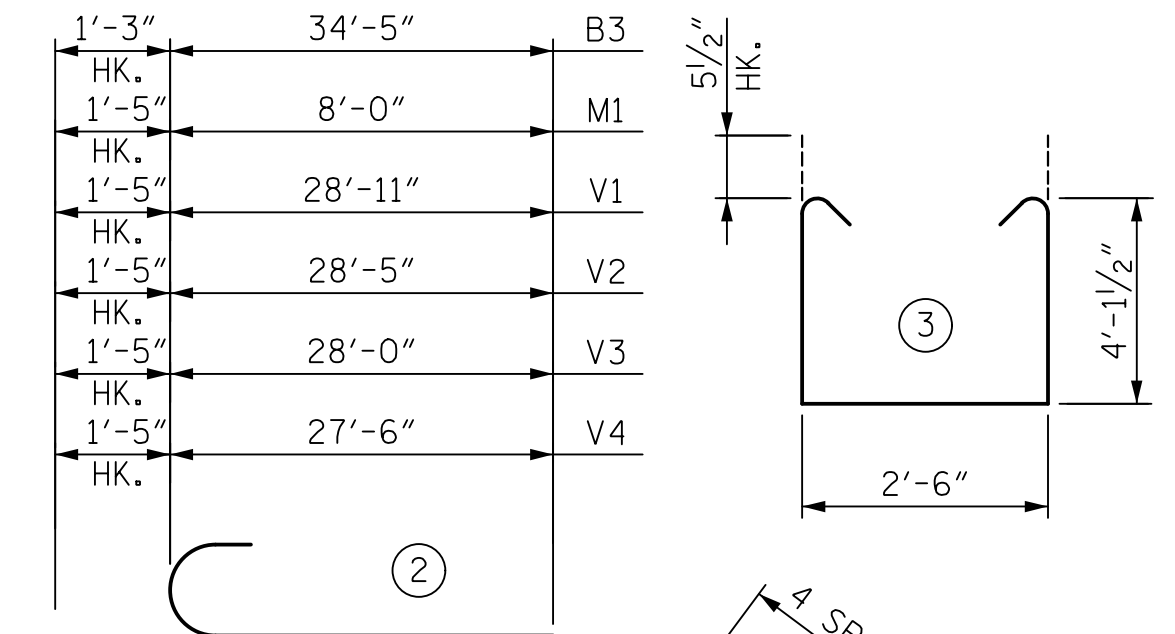
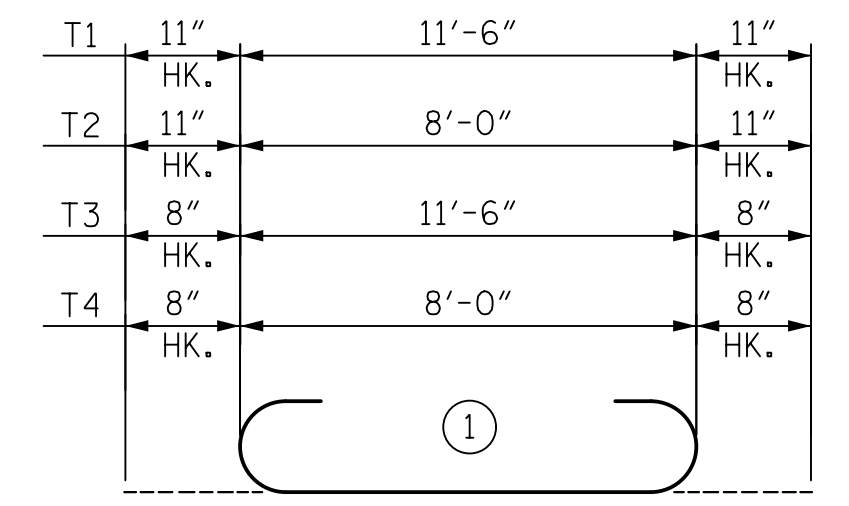
SECTION D-D



FOOTING PLAN

(FOOTING REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING

| BENT 2 | | | | | |
|--------|-----|------|------|------------|--------|
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 16 | 9 | STR | 33'-2" | 1,804 |
| B2 | 28 | 4 | STR | 31'-3" | 585 |
| B3 | 16 | 9 | 2 | 35'-8" | 1,940 |
| B4 | 24 | 4 | STR | 3'-7" | 57 |
| B5 | 16 | 4 | STR | 3'-2" | 34 |
| B6 | 16 | 4 | STR | 2'-11" | 31 |
| M1 | 48 | 10 | 2 | 9'-5" | 1,945 |
| S1 | 190 | 5 | 3 | 11'-8" | 2,312 |
| S2 | 56 | 4 | 4 | 6'-10" | 256 |
| S3 | 4 | 4 | 4 | 7'-0" | 19 |
| S4 | 8 | 4 | 4 | 6'-0" | 32 |
| S5 | 4 | 4 | 4 | 7'-1" | 19 |
| T1 | 48 | 8 | 1 | 13'-4" | 1,709 |
| T2 | 48 | 8 | 1 | 9'-10" | 1,260 |
| T3 | 48 | 6 | 1 | 12'-10" | 925 |
| T4 | 48 | 6 | 1 | 9'-4" | 673 |
| V1 | 12 | 10 | 2 | 30'-4" | 1,566 |
| V2 | 12 | 10 | 2 | 29'-10" | 1,540 |
| V3 | 12 | 10 | 2 | 29'-5" | 1,519 |
| V4 | 12 | 10 | 2 | 28'-11" | 1,493 |
| SP-1 | 1 | * | 5 | 1,099'-11" | 735 |
| SP-2 | 1 | * | 5 | 1,080'-3" | 722 |
| SP-3 | 1 | * | 5 | 1,070'-5" | 715 |
| SP-4 | 1 | * | 5 | 1,050'-10" | 702 |

QUANTITIES

| REINFORCING STEEL | LBS. | 19,719 |
|---|----------|----------|
| SPIRAL COLUMN REINFORCING STEEL | LBS. | 2,874 |
| CLASS A CONCRETE | | |
| FOOTING POUR 1 | CU. YDS. | 64.2 |
| COLUMN POUR 2 | CU. YDS. | 37.7 |
| CAP POUR 3 | CU. YDS. | 38.1 |
| TOTAL | CU. YDS. | 140.0 |
| HP 12x53 STEEL PILES | NO. | 24 |
| | LIN. FT. | 1,680 |
| FOUNDATION EXCAVATION FOR BENT | LUMP SUM | LUMP SUM |
| PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES | NO. | 24 |
| PILE REDRIVES | NO. | 12 |

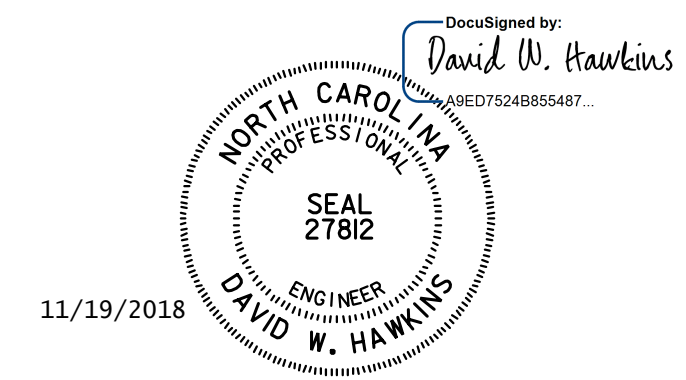
* THE SP SPIRAL REINFORCING STEEL SHALL BE W20 OR D20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

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SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT 2
 RIGHT LANE



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DWG. NO. 28

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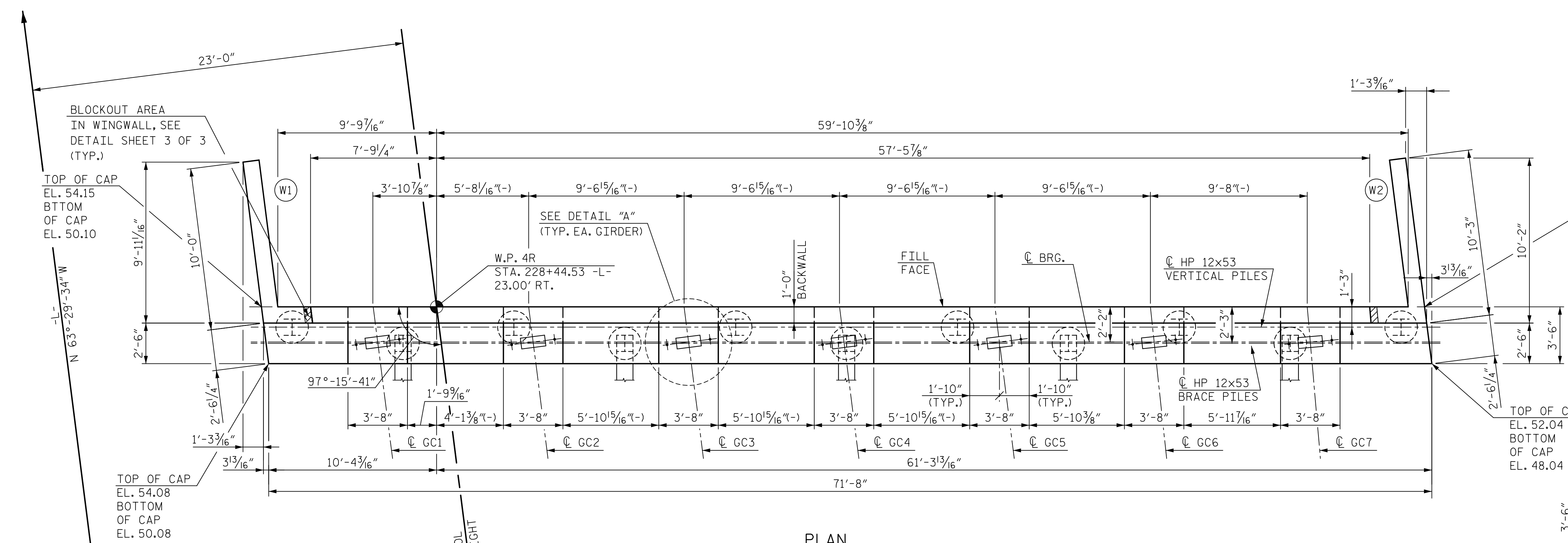
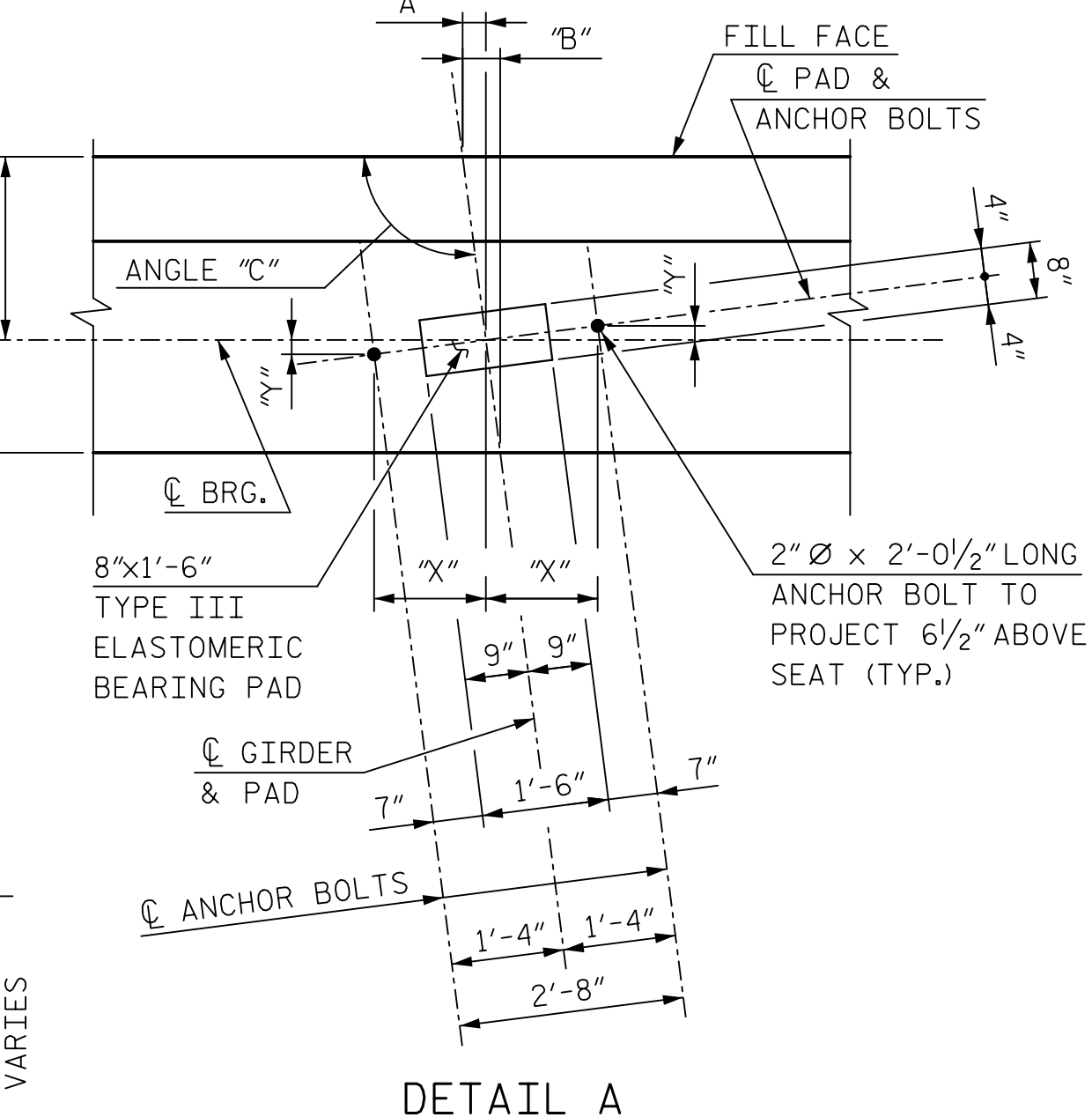
| REVISIONS | | | | | |
|-----------|----|------|-----|----|------|
| NO. | BY | DATE | NO. | BY | DATE |
| 1 | | | 3 | | |
| 2 | | | 4 | | |

SHEET NO. S8-28
 TOTAL SHEETS 36

NOTES:
 FOR NOTES AND PILE SPLICE DETAILS, SEE SHEET 3 OF 3.
 FOR WINGWALL DETAILS AND SECTION A-A, SEE SHEET 2 OF 3.

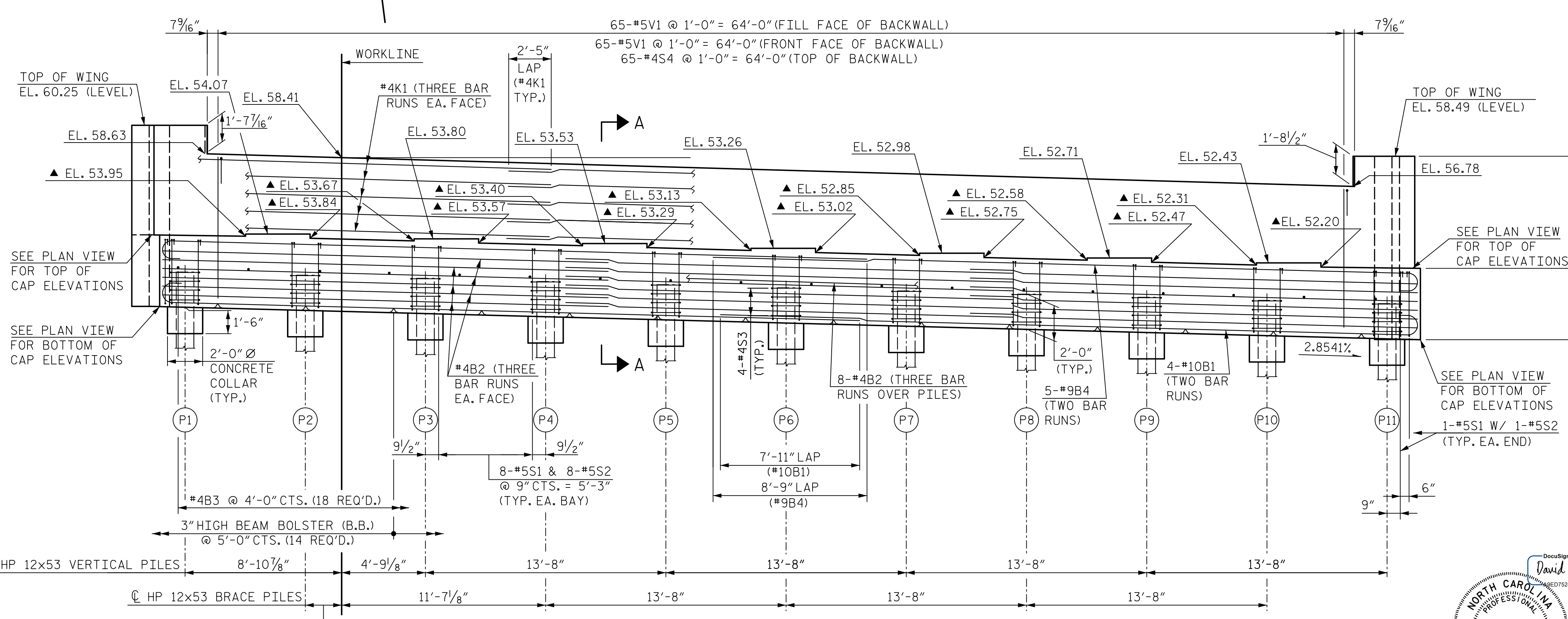


| GIRDER | "A" | "B" | ANGLE "C" | "X" | "Y" |
|--------|--------|--------|-------------|-----------|--------|
| GC1 | 3 5/8" | 5 3/8" | 97°-15'-41" | 1'-3 3/8" | 2" |
| GC2 | 3 5/8" | 5 3/8" | 97°-15'-41" | 1'-3 3/8" | 2" |
| GC3 | 3 5/8" | 5 3/8" | 97°-15'-41" | 1'-3 3/8" | 2" |
| GC4 | 3 5/8" | 5 3/8" | 97°-15'-41" | 1'-3 3/8" | 2" |
| GC5 | 3 5/8" | 5 3/8" | 97°-15'-41" | 1'-3 3/8" | 2" |
| GC6 | 2 1/4" | 4 1/2" | 96°-07'-25" | 1'-3 3/8" | 1 1/8" |
| GC7 | 2 1/4" | 3 5/8" | 94°-57'-41" | 1'-3 3/8" | 1 3/8" |



PLAN

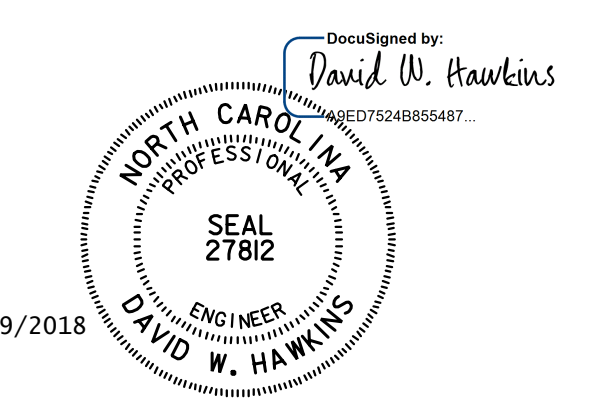
| TOP OF PILE ELEVATIONS | |
|------------------------|-------|
| P1 | 52.04 |
| P2 | 51.85 |
| P3 | 51.65 |
| P4 | 51.46 |
| P5 | 51.26 |
| P6 | 51.07 |
| P7 | 50.87 |
| P8 | 50.68 |
| P9 | 50.48 |
| P10 | 50.29 |
| P11 | 50.09 |



ELEVATION

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 1 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 2
 RIGHT LANE



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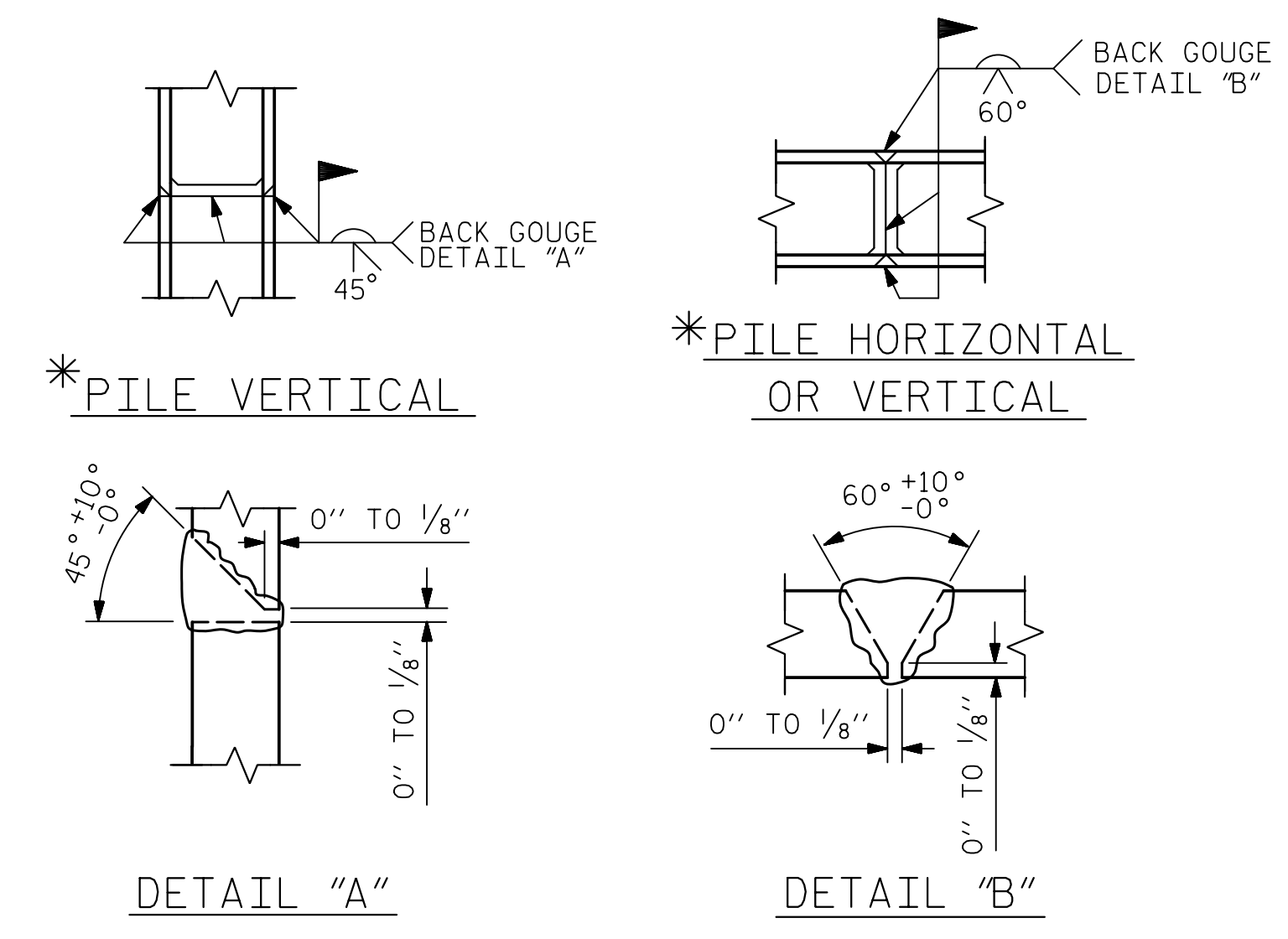
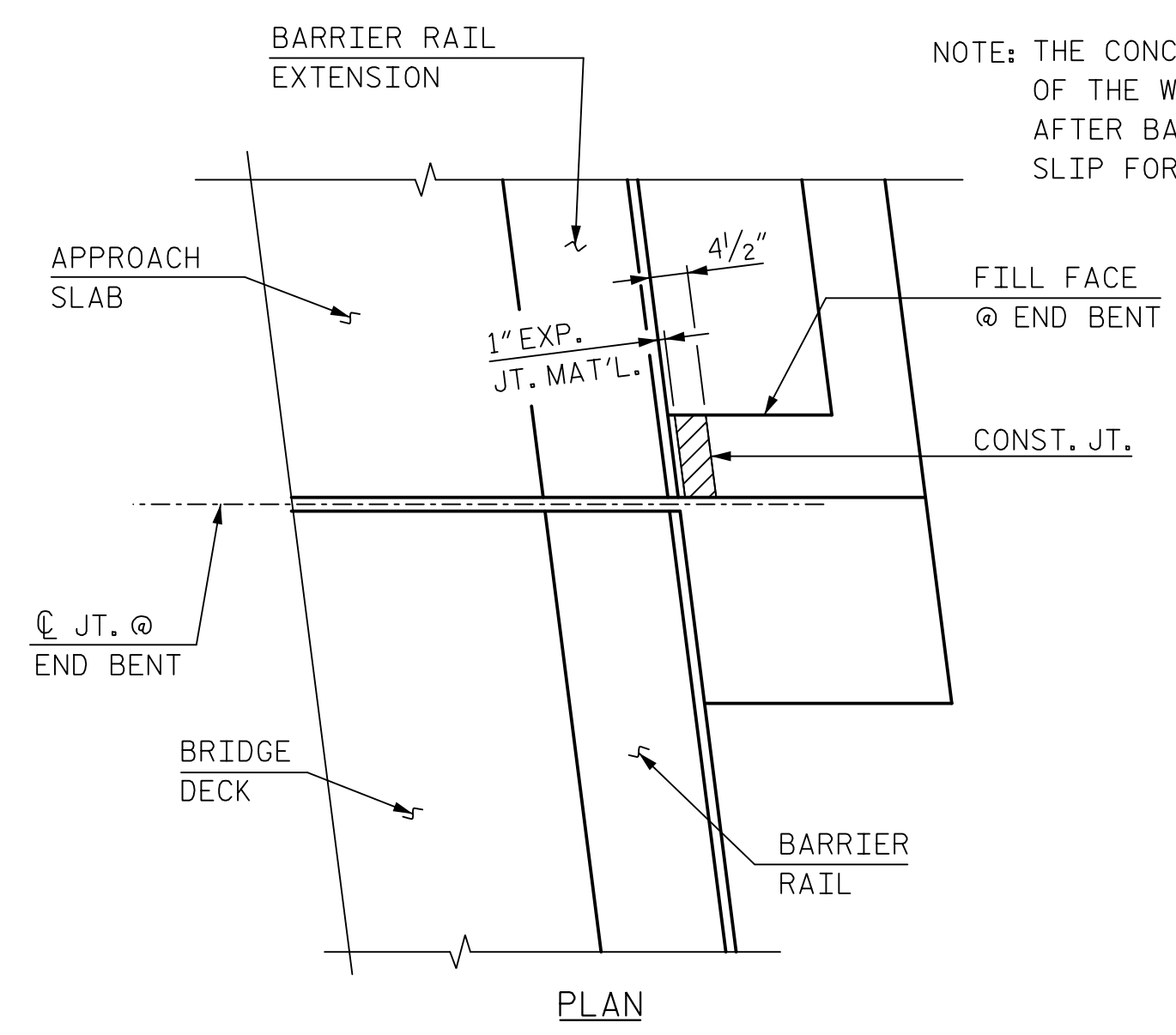
11/19/2018

DESIGNED BY: M. WRIGHT DATE: 7/18
 CHECKED BY: N. SALAS ZAMUDIO DATE: 9/18
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 29

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| REVISIONS | | | | | | SHEET NO. S8-29 |
|-----------|----|------|-----|----|------|--------------------|
| NO. | BY | DATE | NO. | BY | DATE | |
| 1 | | | 3 | | | TOTAL SHEETS 36 |
| 2 | | | 4 | | | |



PILE SPLICE DETAILS

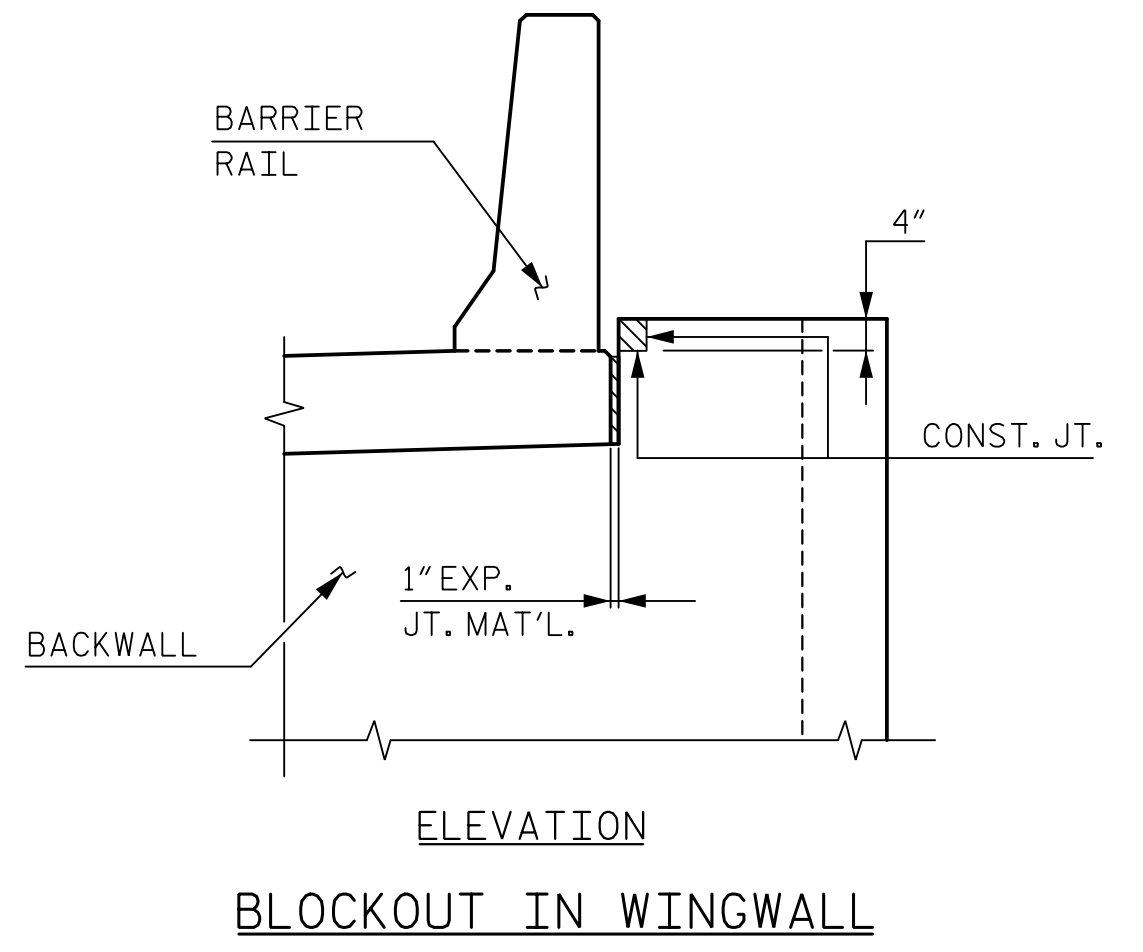
NOTES:

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

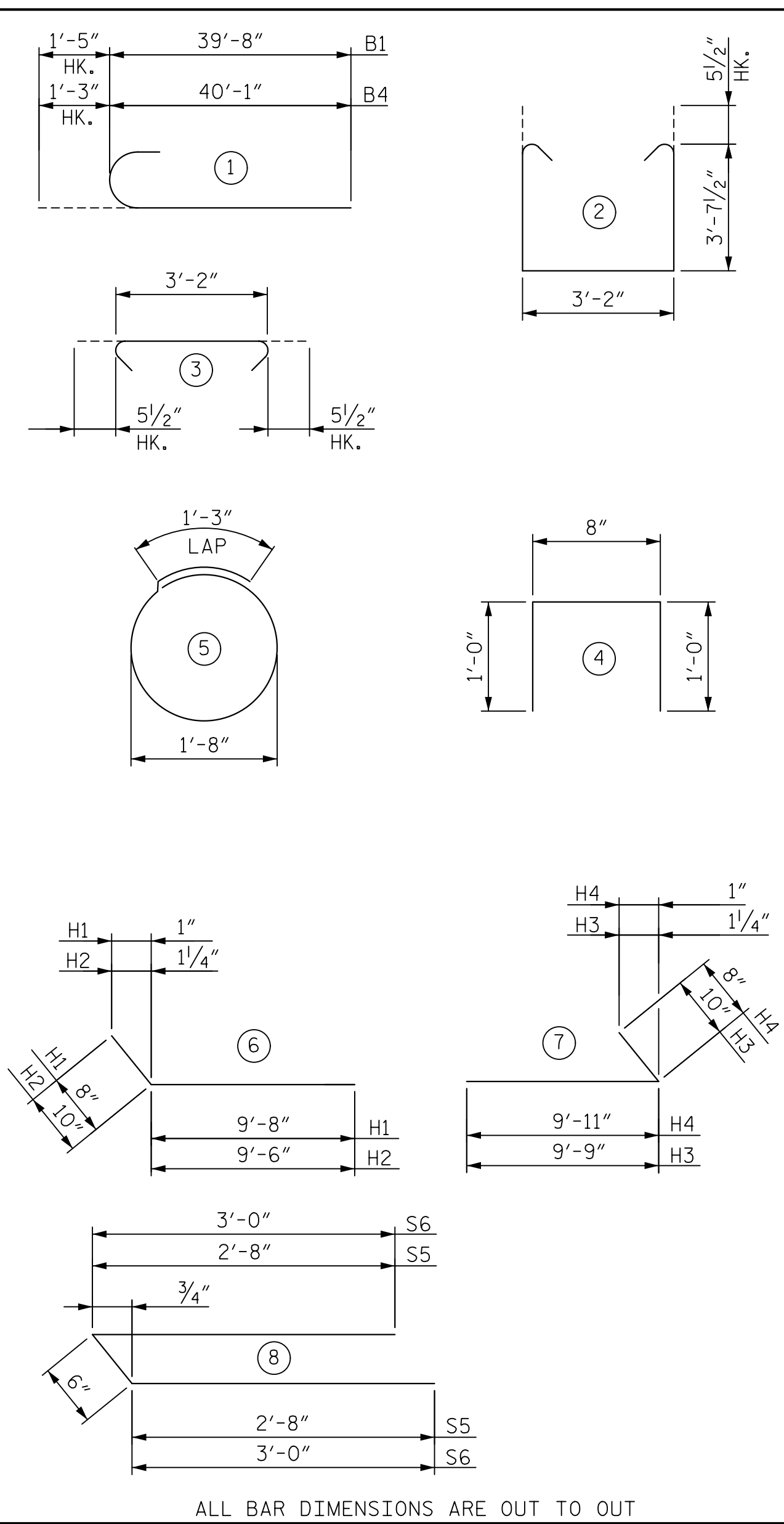
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.



BAR TYPES

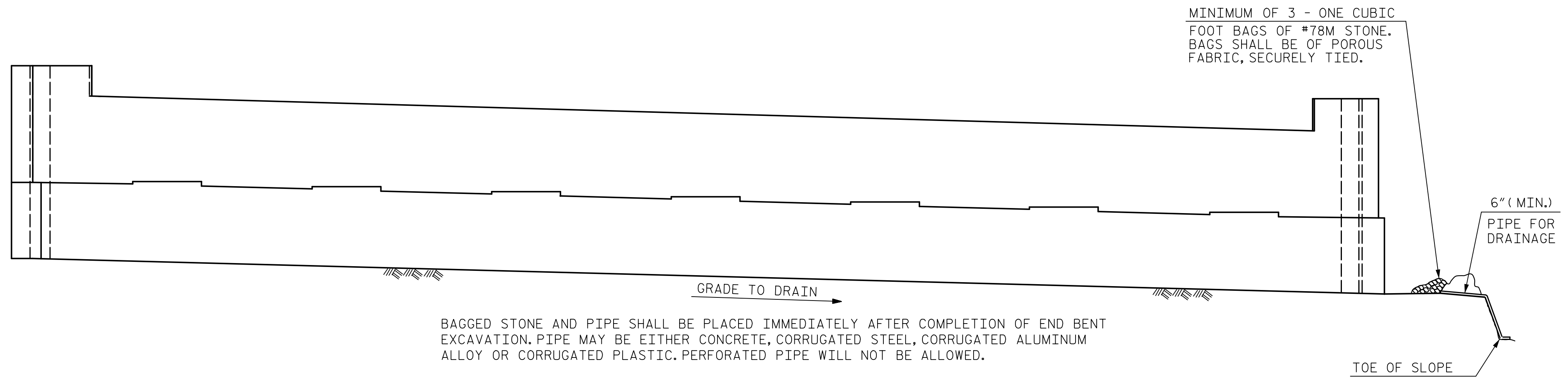


BILL OF REINFORCING

| END BENT 2 | | | | | |
|------------|-----|------|------|--------|--------|
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 8 | 10 | | 41'-1" | 1,414 |
| B2 | 60 | 4 | STR | 25'-5" | 1,019 |
| B3 | 18 | 4 | STR | 3'-2" | 38 |
| B4 | 10 | 9 | 1 | 41'-4" | 1,405 |
| H1 | 11 | 4 | 6 | 10'-4" | 76 |
| H2 | 21 | 5 | 6 | 10'-4" | 226 |
| H3 | 21 | 5 | 7 | 10'-7" | 232 |
| H4 | 11 | 4 | 7 | 10'-7" | 78 |
| K1 | 30 | 4 | STR | 25'-5" | 509 |
| S1 | 84 | 5 | 2 | 11'-4" | 993 |
| S2 | 84 | 5 | 3 | 4'-1" | 358 |
| S3 | 44 | 4 | 5 | 6'-6" | 191 |
| S4 | 65 | 4 | 4 | 2'-8" | 116 |
| S5 | 2 | 4 | 8 | 5'-10" | 8 |
| S6 | 2 | 4 | 8 | 6'-6" | 9 |
| V1 | 130 | 5 | STR | 7'-3" | 983 |
| V2 | 26 | 5 | STR | 9'-7" | 260 |
| V3 | 26 | 5 | STR | 10'-0" | 271 |

QUANTITIES

| REINFORCING STEEL | LBS. | 8,186 |
|---|----------|-------|
| CLASS "A" CONCRETE BREAKDOWN | | |
| POUR 1 - CAP, BOT. OF WINGS & COLLARS | CU. YDS. | 42.6 |
| POUR 2 - TOP OF WINGS & BACKWALL | CU. YDS. | 27.1 |
| TOTAL | CU. YDS. | 69.7 |
| HP 12x53 STEEL PILES | NO. | 11 |
| | LIN. FT. | 770 |
| PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES | NO. | 11 |
| PILE REDRIVES | NO. | 6 |



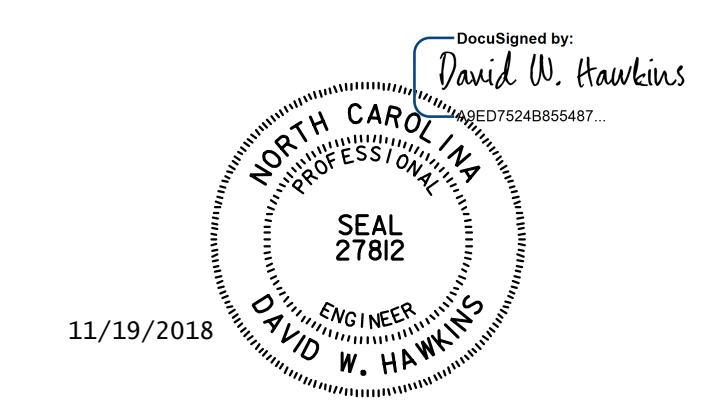
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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 FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT 2

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 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 31

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-

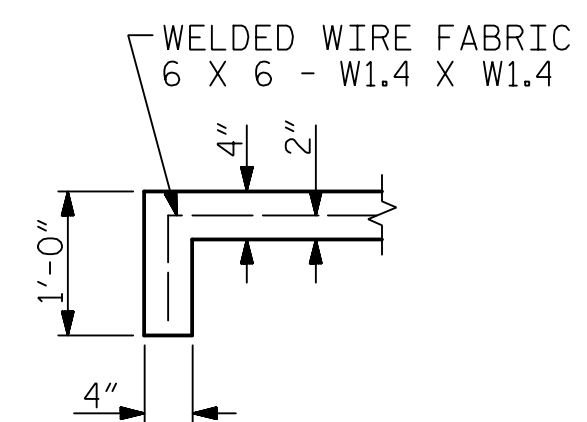
SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 2
 RIGHT LANE

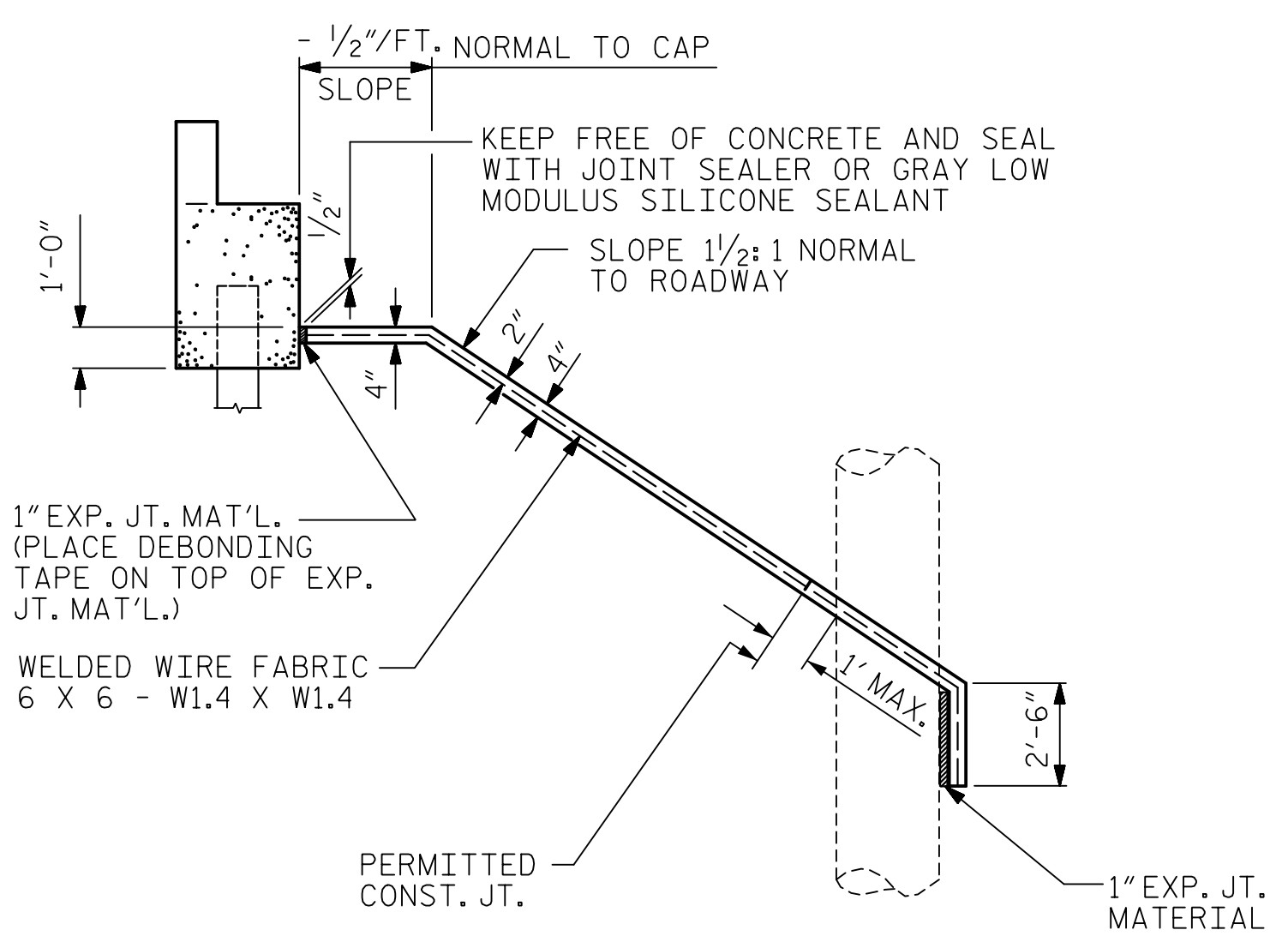
| REVISIONS | | | | | |
|-----------|----|------|-----|----|------|
| NO. | BY | DATE | NO. | BY | DATE |
| 1 | | | 3 | | |
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| | |
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| SHEET NO. | S8-31 |
| TOTAL SHEETS | 36 |



SECTION A-A

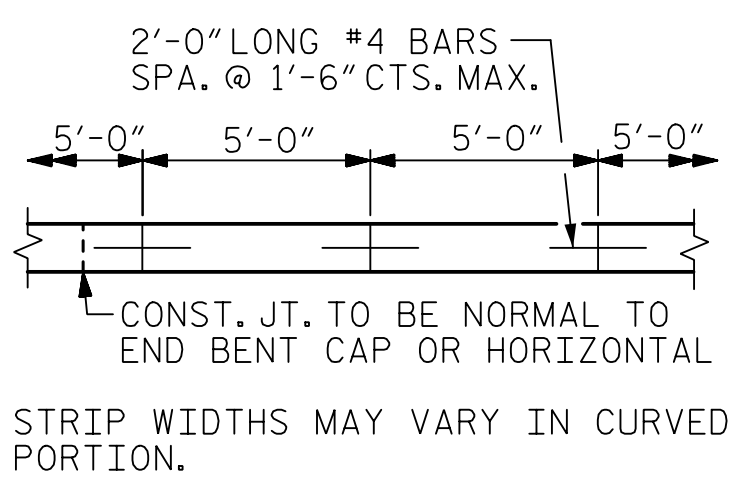
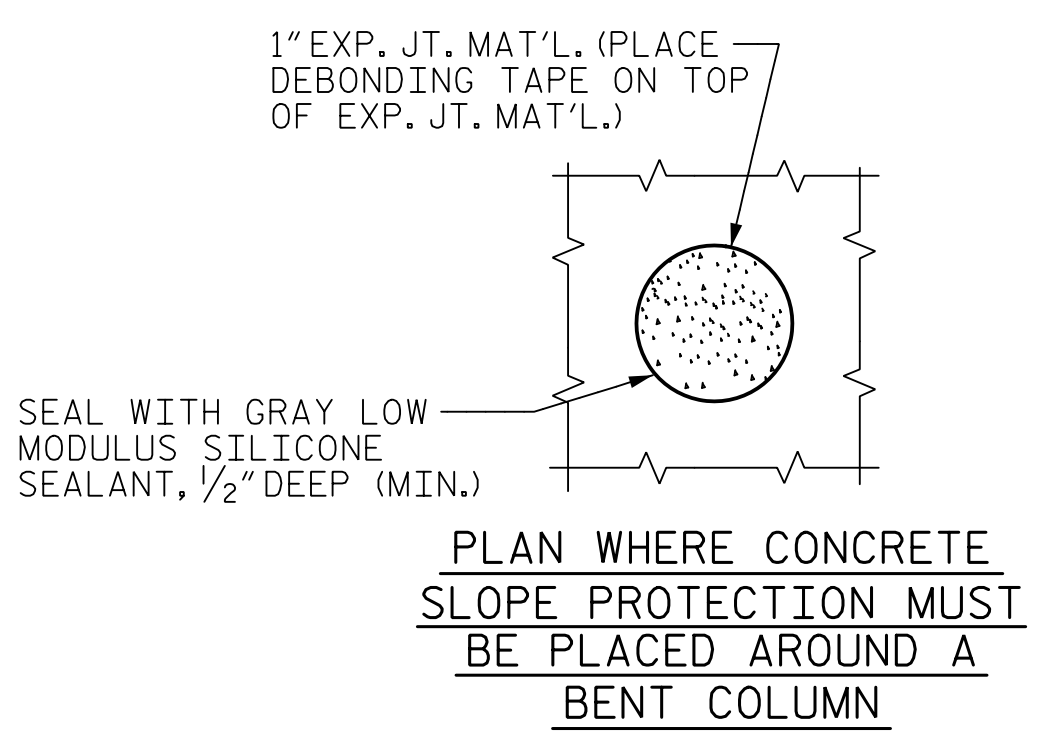
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL 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.



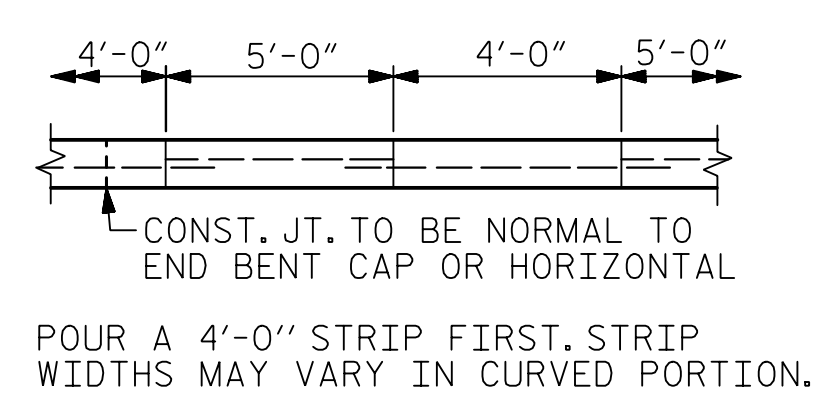
SECTION B-B

| | | |
|--------------------------------|----------------------------|---|
| BRIDGE @ STA. 227+57.02 -L- | 4 INCH SLOPE PROTECTION | * WELDED WIRE FABRIC 60 INCHES WIDE |
| | SQUARE YARDS | APPROX. L.F. |
| END BENT 1 | 740 | 1,485 |
| END BENT 2 | 730 | 1,465 |

* QUANTITY SHOWN IS BASED ON 5' POURS.



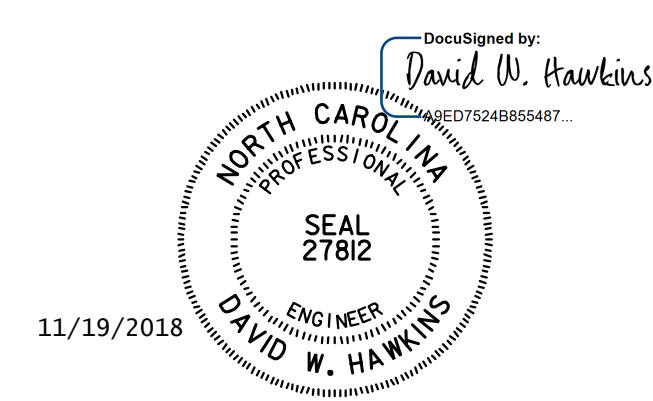
POURING DETAIL



OPTIONAL POURING DETAIL

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 227+57.02 -L-

SHEET 1 OF 2



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

| | |
|--------------------------|----------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 9/18 |
| CHECKED BY : N. HART | DATE : 9/18 |
| DRAWN BY : ELR 5/92 | REV. 12/21/11 MAA/GM |
| CHECKED BY : GRP 6/92 | REV. 1/16 MAA/TMG |
| | REV. 12/17 MAA/THC |

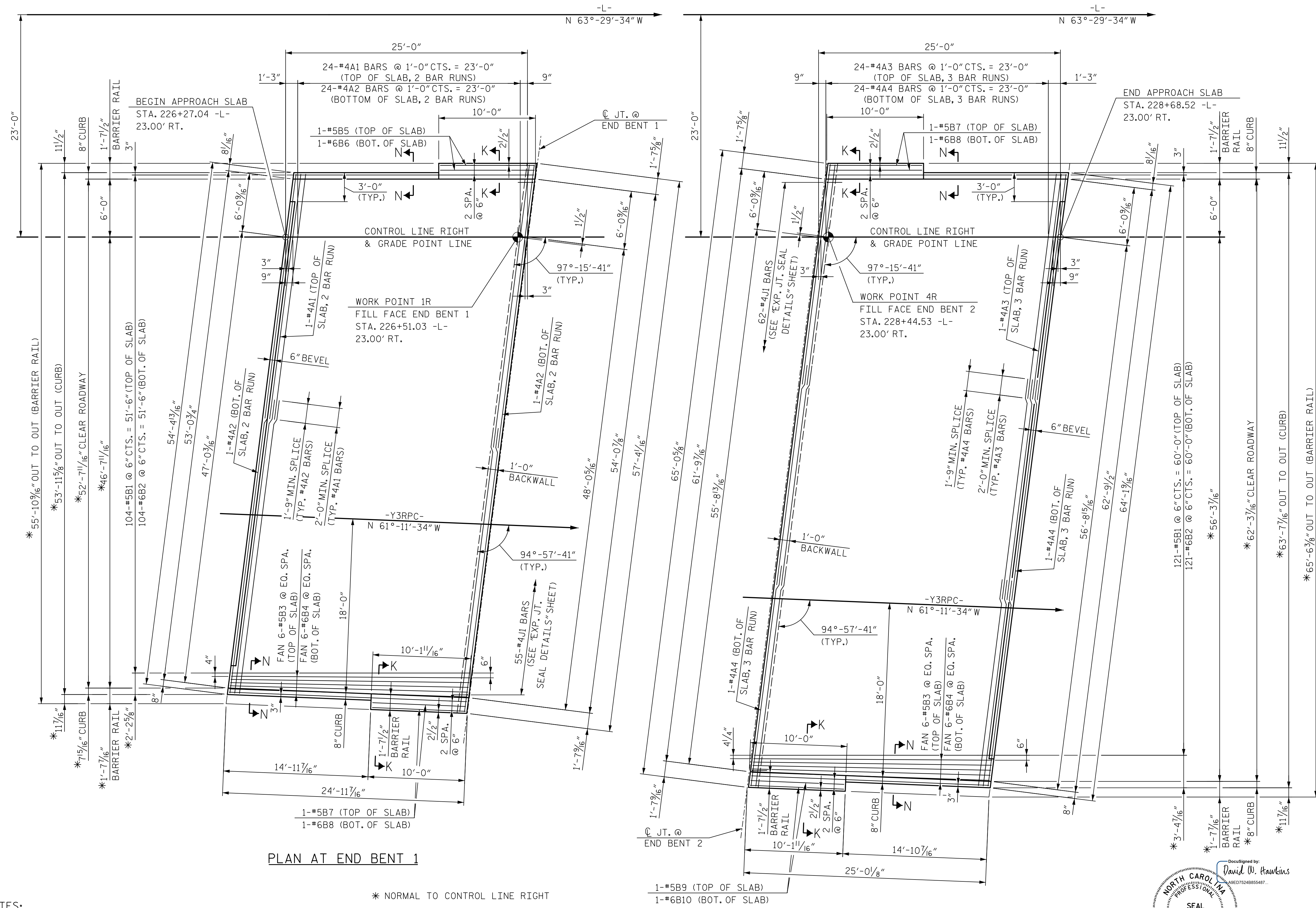
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|-----------|----|------|-----|----|------|--------------|
| NO. | BY | DATE | NO. | BY | DATE | S8-32 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 36 |



PLAN AT END BENT 1

PLAN AT END BENT 2

NOTES:
 FOR SECTION N-N AND K-K, SEE "BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT" SHEET 2 OF 3.
 FOR APPROACH SLAB BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT" SHEET 2 OF 3.
 FOR BARRIER RAIL REINFORCING STEEL PLACEMENT AND BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET 3 OF 3.

* NORMAL TO CONTROL LINE RIGHT
 FOR STANDARD EXPANSION JOINT SEAL DETAILS, SEE "EXPANSION JOINT SEAL DETAILS" SHEET.
 FOR DIMENSIONS NORMAL TO WORKLINE AT @ JOINT AT END BENT 1, SEE "PLAN OF SPAN A" SHEET.
 FOR DIMENSIONS NORMAL TO WORKLINE AT @ JOINT AT END BENT 2, SEE "PLAN OF SPAN C" SHEET.

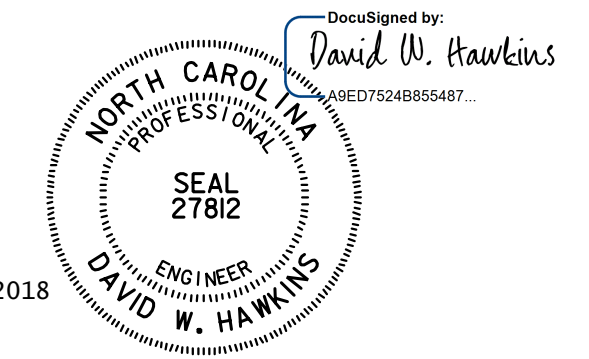
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SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH SLAB
 FOR FLEXIBLE PAVEMENT

RIGHT LANE

| REVISIONS | | | | | SHEET NO. S8-34 |
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 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 9/18

DWG. NO. 34

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NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

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

FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

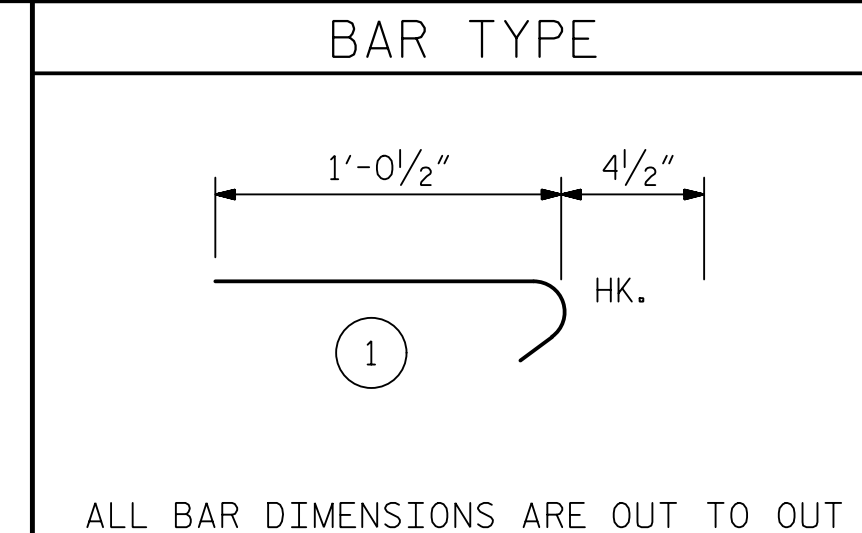
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

FOR BARRIER RAIL REINFORCING STEEL PLACEMENT AND BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET 3 OF 3.

FOR STANDARD EXPANSION JOINT SEAL DETAILS, SEE "EXPANSION JOINT SEAL DETAILS" SHEET.

| BILL OF MATERIAL | | | | | | BILL OF MATERIAL | | | | | |
|--|-----|------|------|--------|--------|--|-----|------|------|---------|--------|
| APPROACH SLAB AT EB #1 | | | | | | APPROACH SLAB AT EB #2 | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT | BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| * A1 | 50 | #4 | STR | 29'-6" | 985 | * A3 | 75 | #4 | STR | 22'-11" | 1,148 |
| A2 | 52 | #4 | STR | 29'-5" | 1,022 | A4 | 78 | #4 | STR | 22'-9" | 1,185 |
| * B1 | 104 | #5 | STR | 23'-9" | 2,576 | * B1 | 121 | #5 | STR | 23'-9" | 2,997 |
| B2 | 104 | #6 | STR | 24'-7" | 3,840 | B2 | 121 | #6 | STR | 24'-7" | 4,468 |
| * B3 | 6 | #5 | STR | 23'-8" | 148 | * B3 | 6 | #5 | STR | 23'-8" | 148 |
| B4 | 6 | #6 | STR | 24'-6" | 221 | B4 | 6 | #6 | STR | 24'-6" | 221 |
| * B5 | 2 | #5 | STR | 9'-3" | 19 | * B7 | 2 | #5 | STR | 9'-1" | 19 |
| B6 | 2 | #6 | STR | 9'-8" | 29 | B8 | 2 | #6 | STR | 9'-6" | 29 |
| * B7 | 2 | #5 | STR | 9'-1" | 19 | * B9 | 2 | #5 | STR | 9'-2" | 19 |
| B8 | 2 | #6 | STR | 9'-6" | 29 | B10 | 2 | #6 | STR | 9'-7" | 29 |
| * J1 | 55 | #4 | 1 | 1'-5" | 52 | * J1 | 62 | #4 | 1 | 1'-5" | 59 |
| REINFORCING STEEL ** LBS. 5,141 | | | | | | REINFORCING STEEL ** LBS. 5,932 | | | | | |
| * EPOXY COATED REINFORCING STEEL ** LBS. 3,799 | | | | | | * EPOXY COATED REINFORCING STEEL ** LBS. 4,390 | | | | | |
| CLASS AA CONCRETE ** C. Y. 60.0 | | | | | | CLASS AA CONCRETE ** C. Y. 69.9 | | | | | |

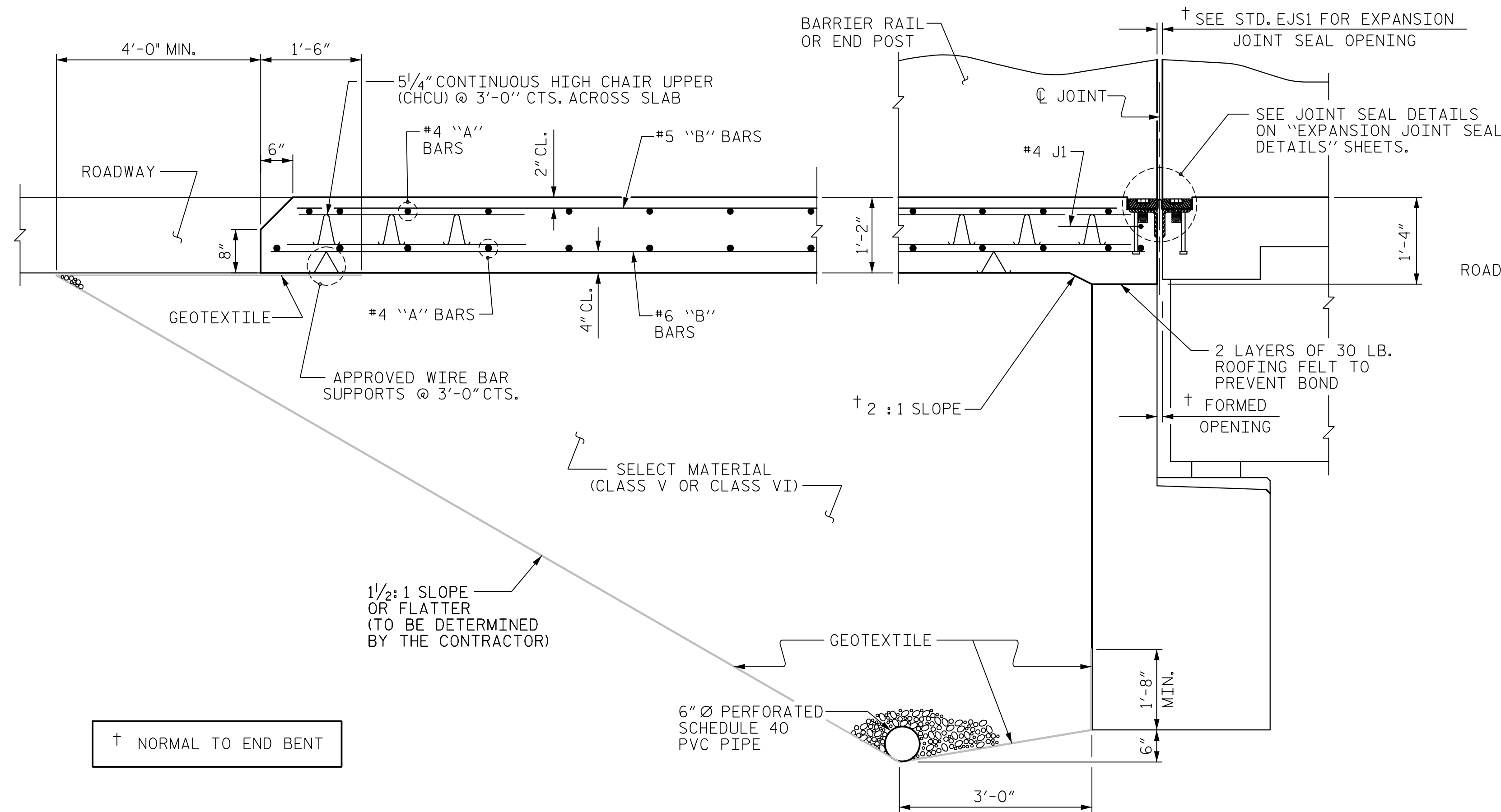
| SPlice LENGTHS | | |
|----------------|--------------|----------|
| BAR SIZE | EPOXY COATED | UNCOATED |
| #4 | 2'-0" | 1'-9" |
| #5 | 2'-6" | 2'-2" |
| #6 | 3'-10" | 2'-7" |



ALL BAR DIMENSIONS ARE OUT TO OUT
** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 3 OF 3.

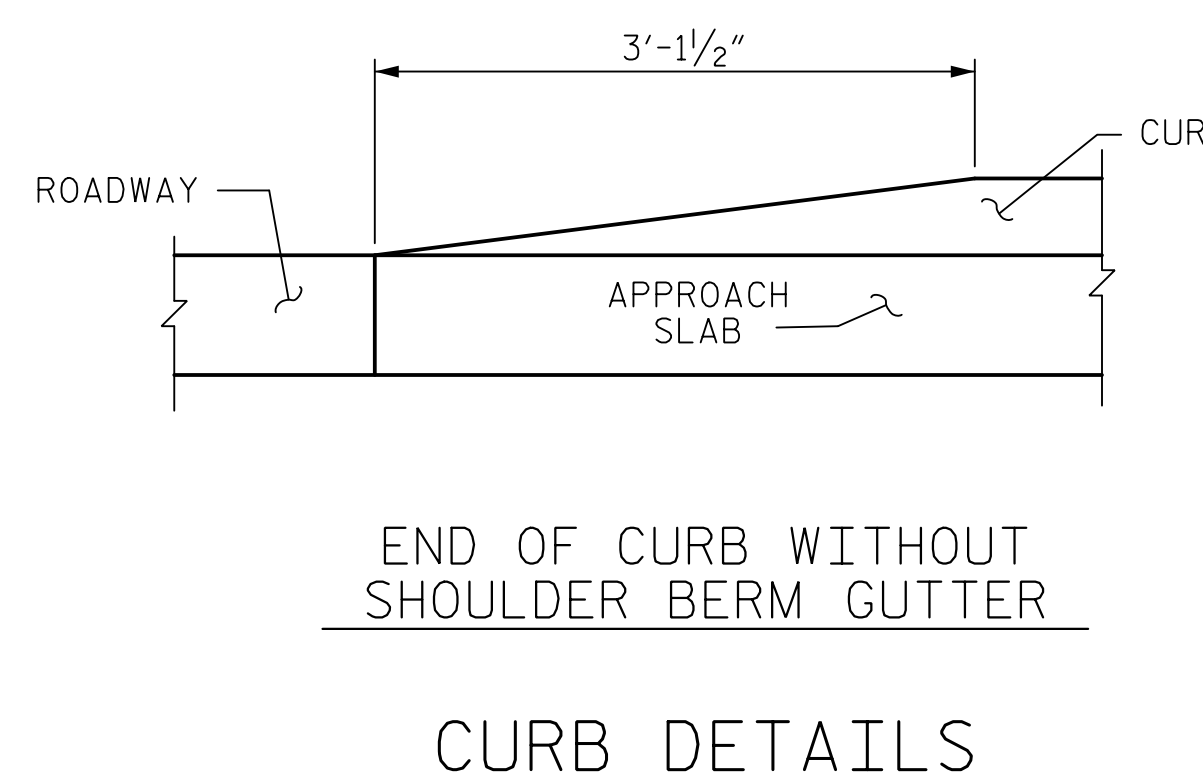
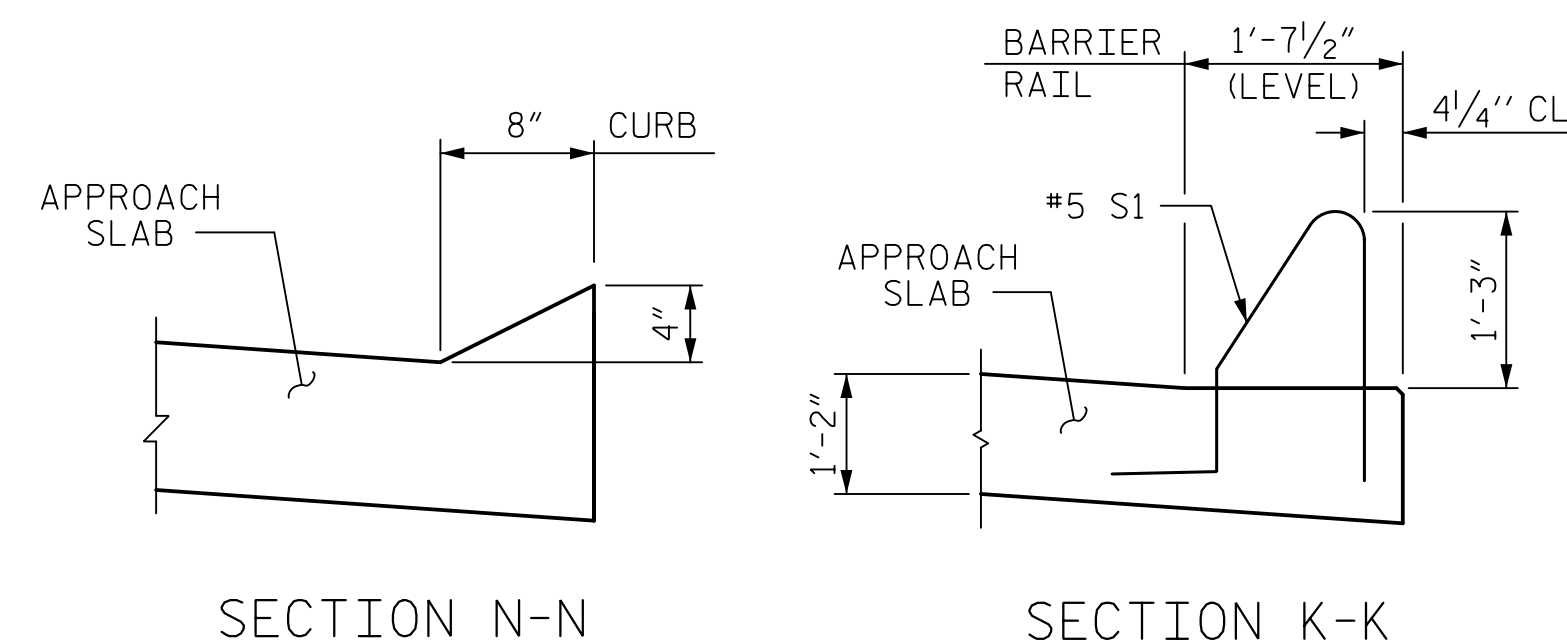
THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

FOR PLAN VIEW OF APPROACH SLABS AT END BENT 1 AND END BENT 2, SEE SHEET 1 OF 3.



SECTION THRU SLAB

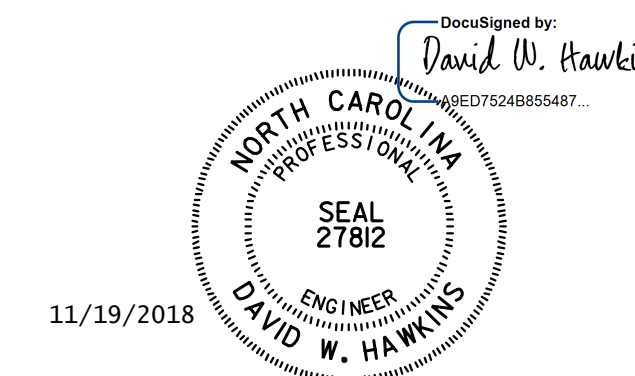
(TYPE I - STANDARD APPROACH FILL)



| | |
|--------------------------|----------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 7/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DRAWN BY : EEM 3/95 | REV. 12/21/11 MAA/GM |
| CHECKED BY : VAP 3/95 | REV. 6/13 MAA/GM |
| | REV. 12/17 MAA/THC |

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

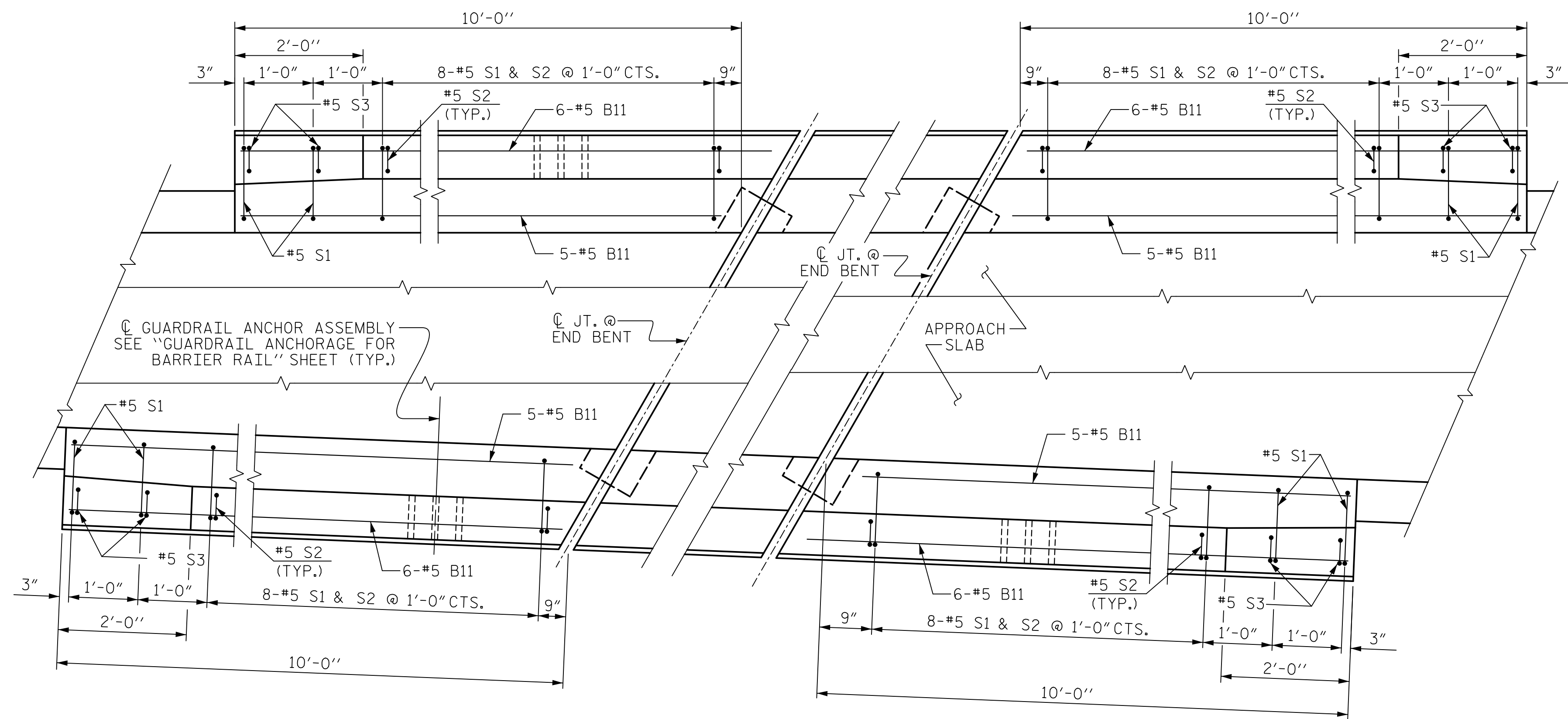
| | |
|--|--|
| HNTB | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 |
| DRAWN BY : M. WRIGHT | DATE : 7/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 |
| DWG. NO. 35 | |



PROJECT NO. R-1015
 CRAVEN COUNTY
STATION: 227+57.02 -L-

SHEET 2 OF 3

| | | | | | |
|--|----|------|-----|----|--------------------|
| STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH | | | | | |
| STANDARD BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT | | | | | |
| RIGHT LANE | | | | | |
| REVISIONS | | | | | SHEET NO. S8-35 |
| NO. | BY | DATE | NO. | BY | DATE |
| 1 | | | 3 | | |
| 2 | | | 4 | | |
| | | | | | TOTAL SHEETS 36 |



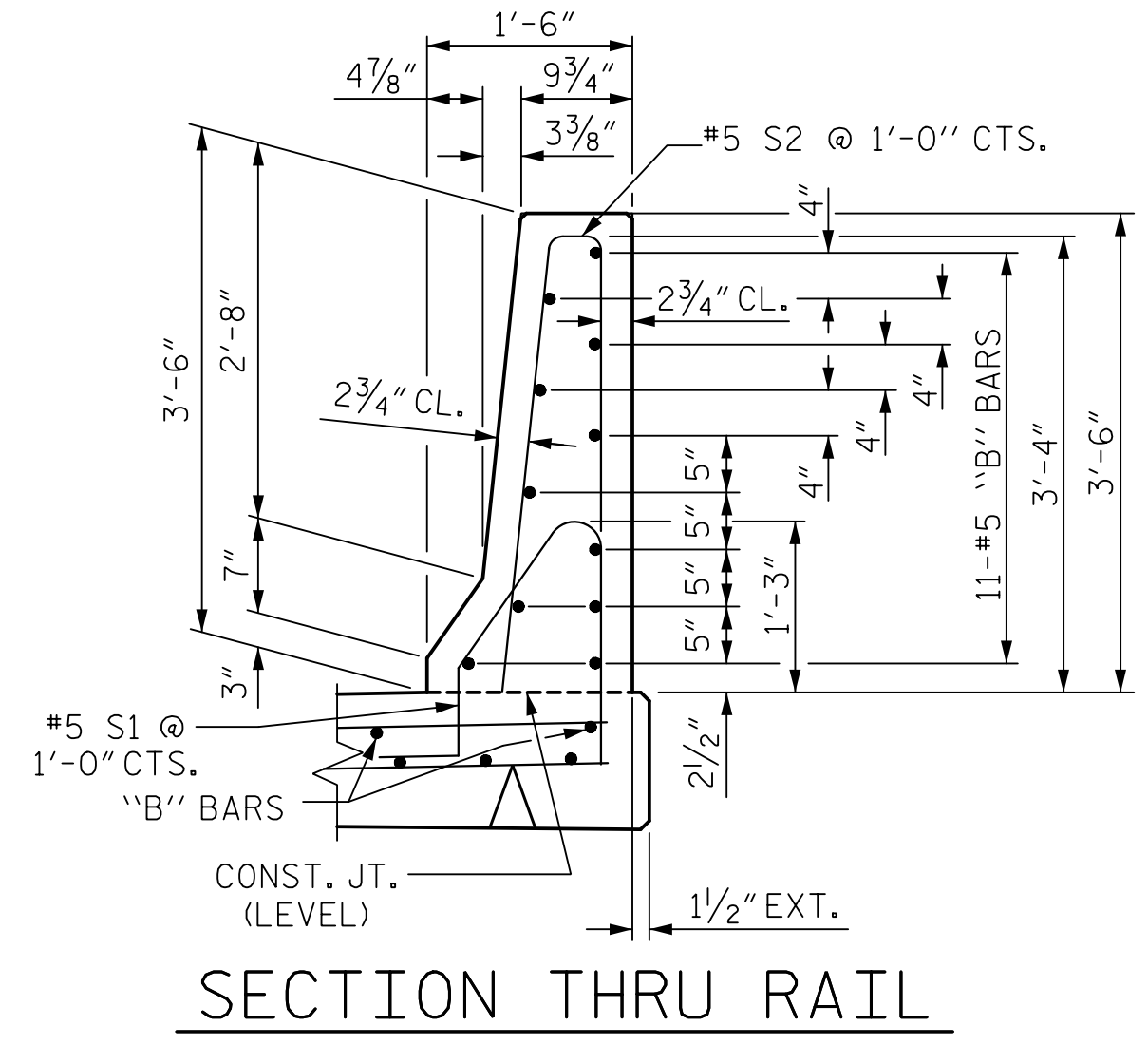
END BENT 1
END BENT 2
PLAN OF BARRIER RAIL

NOTES

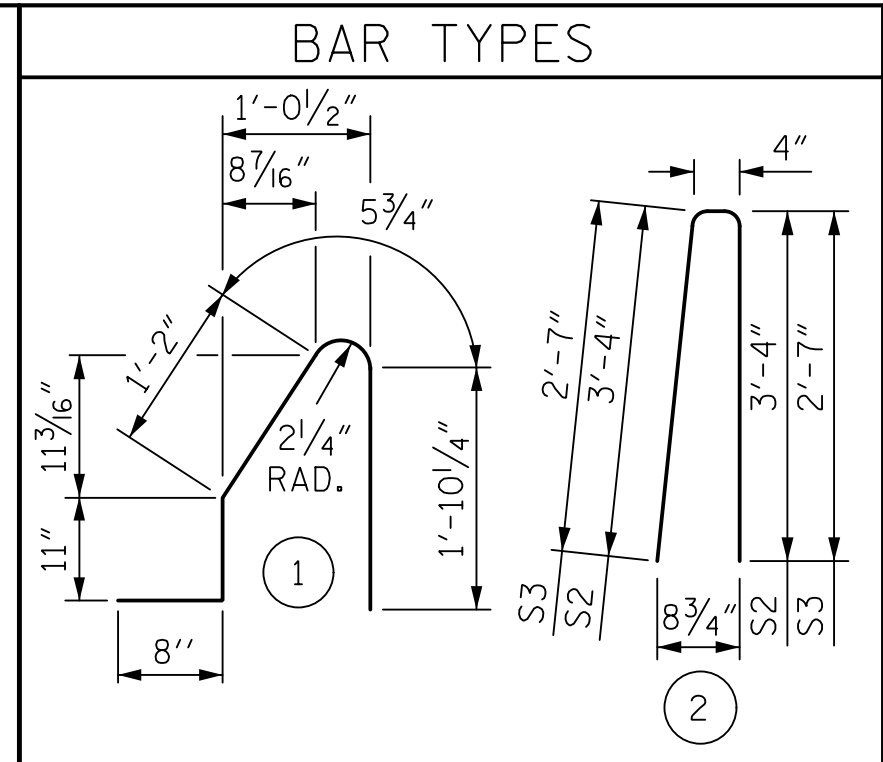
THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.



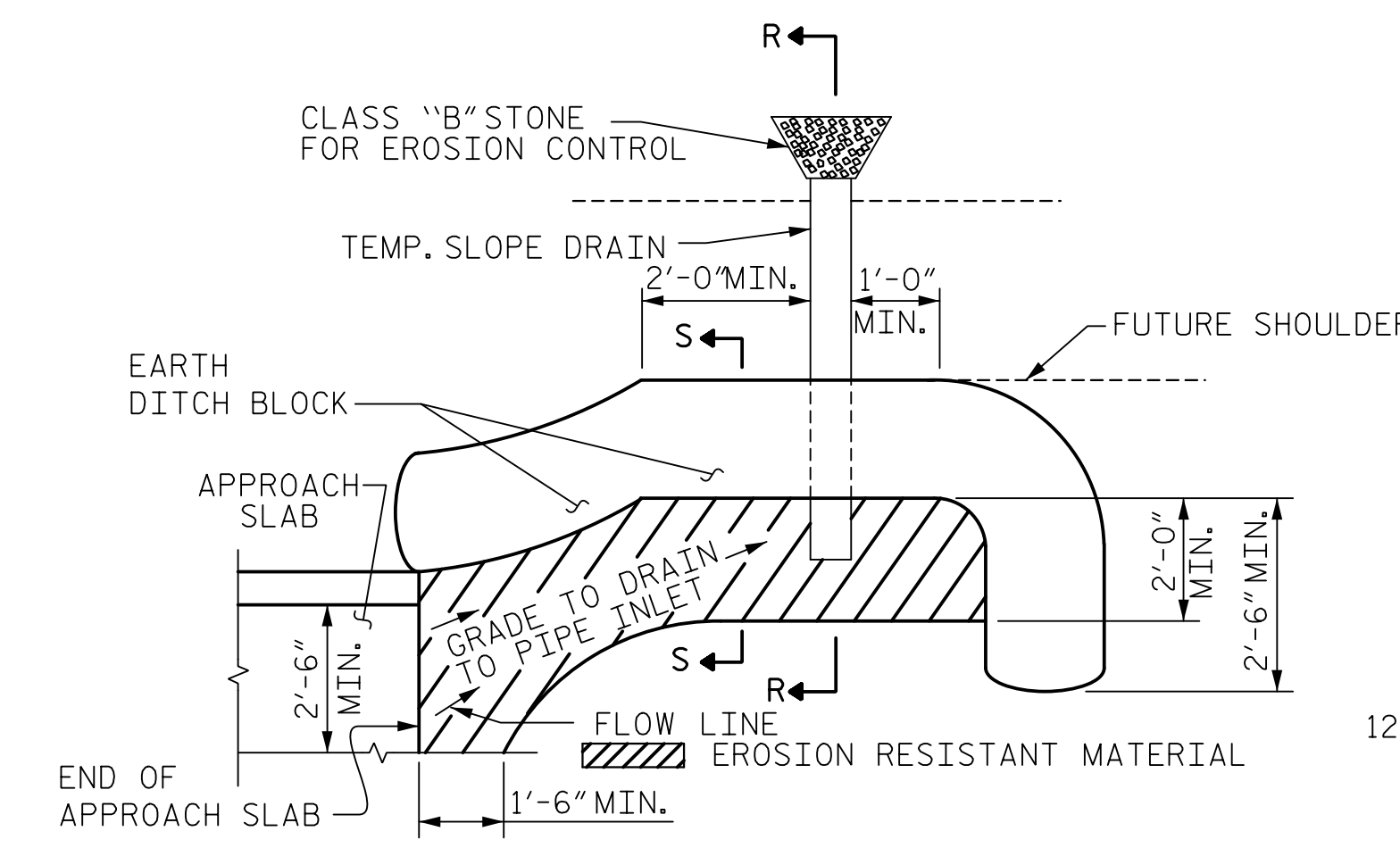
SECTION THRU RAIL



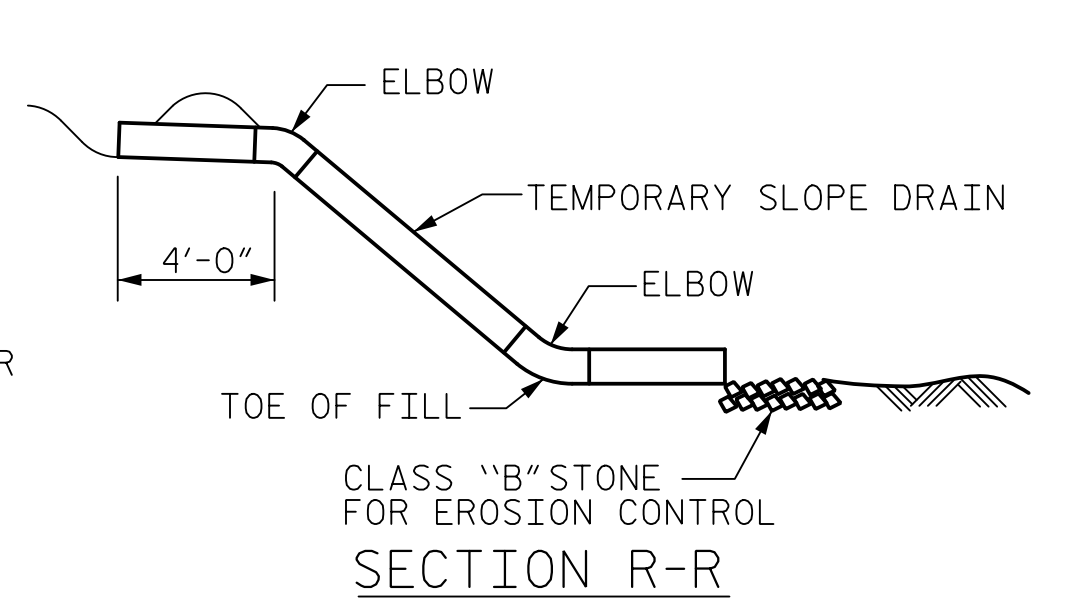
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

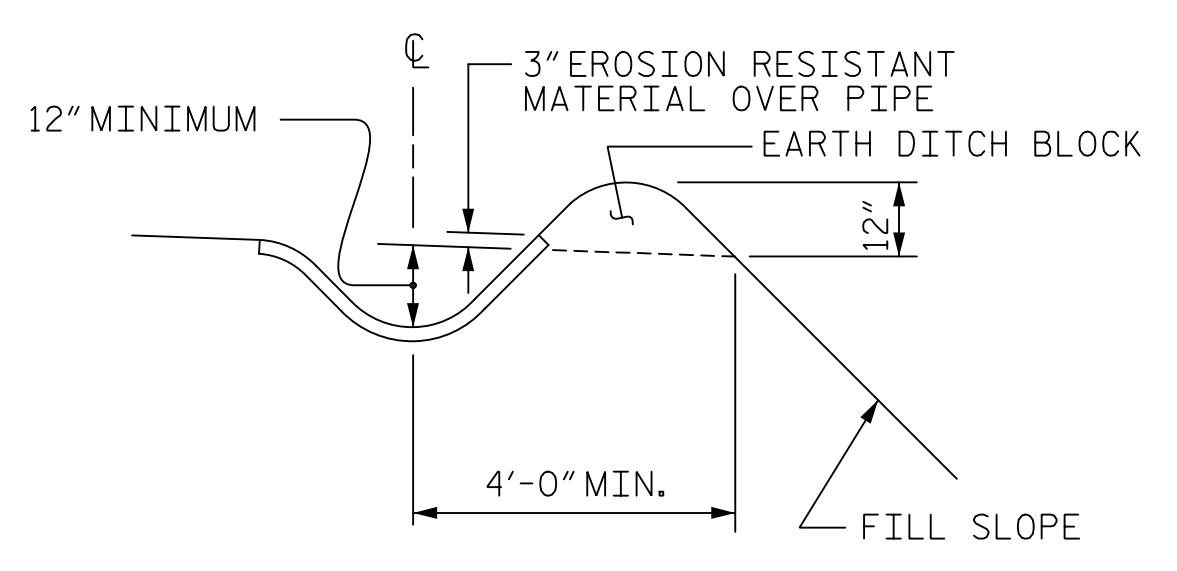
| BARRIER RAIL ONLY | | | | | |
|---------------------------------|-----|------|------|----------|--------|
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| *B11 | 44 | #5 | STR | 9'-8" | 444 |
| *S1 | 40 | #5 | 1 | 5'-1" | 212 |
| *S2 | 32 | #5 | 2 | 7'-0" | 234 |
| *S3 | 8 | #5 | 2 | 5'-6" | 46 |
| *EPOXY COATED REINFORCING STEEL | | | | LBS. | 936 |
| CLASS AA CONCRETE | | | | C. Y. | 5.3 |
| CONCRETE BARRIER RAIL | | | | LIN. FT. | 40.4 |



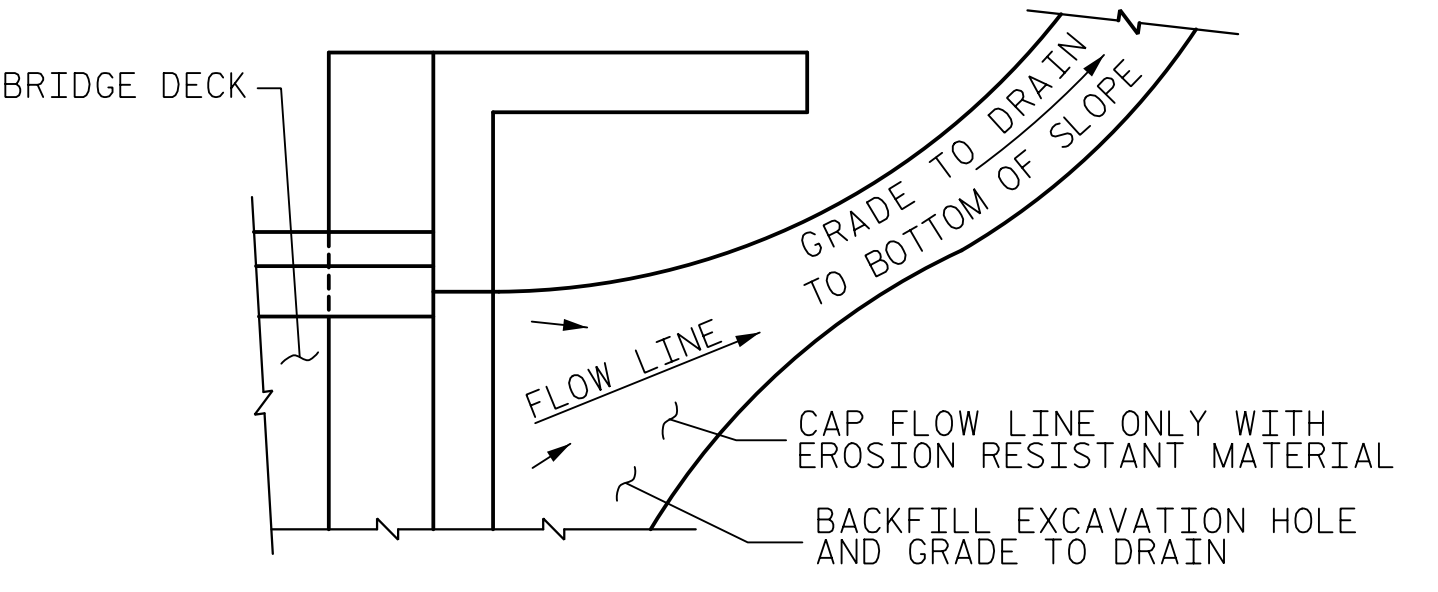
PLAN VIEW



SECTION R-R



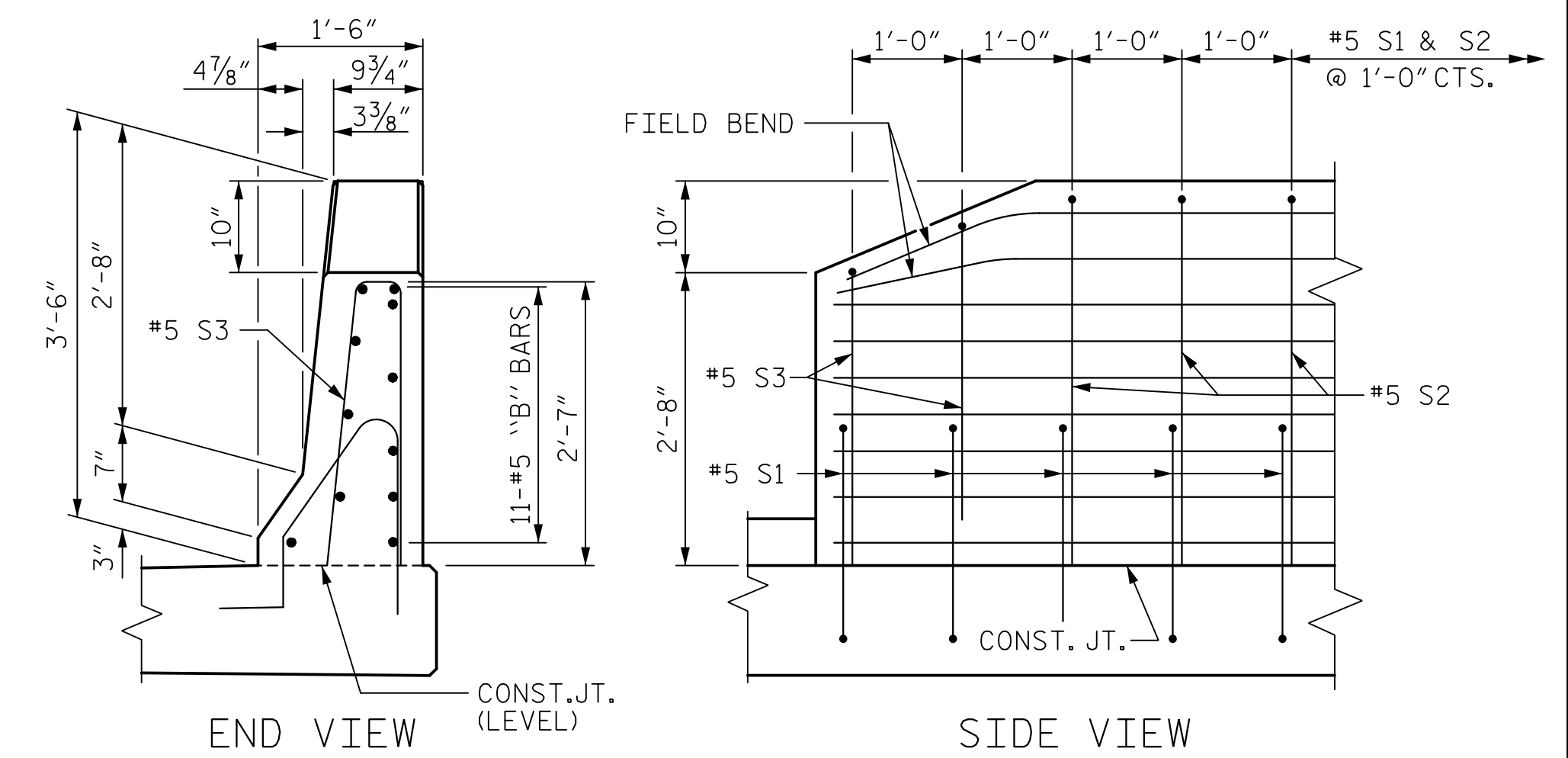
SECTION S-S



TEMPORARY DRAINAGE DETAIL

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

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.

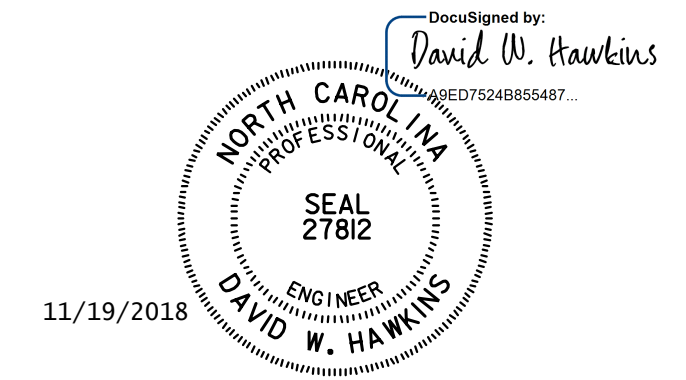


END OF RAIL DETAILS

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-

SHEET 3 OF 3

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



| | |
|--------------------------|--------------------|
| ASSEMBLED BY : M. WRIGHT | DATE : 7/18 |
| CHECKED BY : N. HART | DATE : 7/18 |
| DRAWN BY : FCJ 11/88 | REV. 6/13 MAA/GM |
| CHECKED BY : ARB 11/88 | REV. 12/17 MAA/THC |
| | REV. 5/18 MAA/THC |

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

| | | | |
|--|-------------|--|--|
| HNTB | | HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609 | |
| DRAWN BY : M. WRIGHT | DATE : 7/18 | DWG. NO. 36 | |
| CHECKED BY : N. HART | DATE : 7/18 | | |
| DESIGN ENGINEER OF RECORD : D. HAWKINS | DATE : 9/18 | | |

| REVISIONS | | | | | SHEET NO. |
|-----------|----|------|-----|------|--------------|
| NO. | BY | DATE | NO. | DATE | S8-36 |
| 1 | | | 3 | | TOTAL SHEETS |
| 2 | | | 4 | | 36 |

NOTES

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

PILES AT END BENT #1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT #1 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.

PILES AT BENT #1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 140 TONS PER PILE.

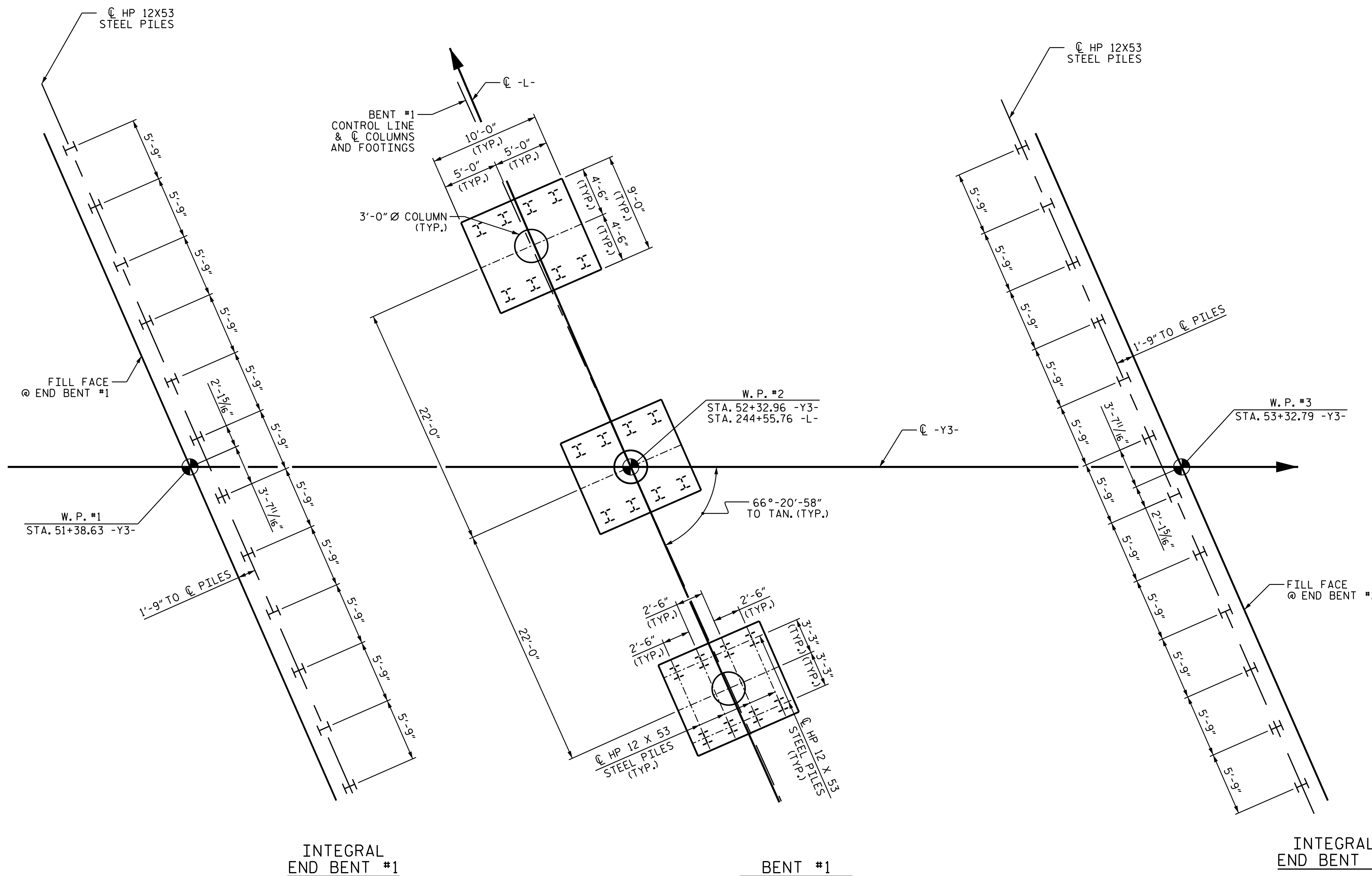
DRIVE PILES AT BENT #1 TO A REQUIRED DRIVING RESISTANCE OF 190 TONS PER PILE.

PILES AT END BENT #2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT #2 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.

TESTING THE FIRST PRODUCTION PILE WITH THE 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 ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO THE BOTTOM OF THE CAP ELEVATION BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO.1 AND END BENT NO.2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.



FOUNDATION LAYOUT

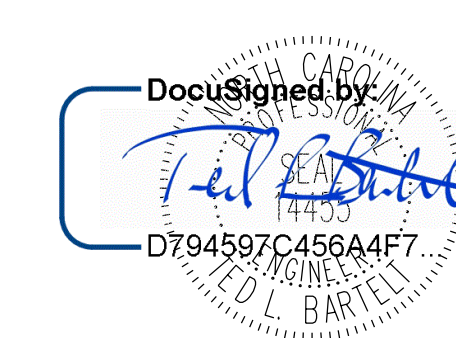
DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE.

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER US 70
 BYPASS ON SR 1756
 BETWEEN
 SR 1125 AND NC 1763



4601 Lake Boone Trail, Suite 3C, Raleigh, NC 27607
 Phone 919 981 0310 Fax 919 981 0451
 www.aogroup.com Firm License No. C-1684
 A&O PROJECT NO. 2015.042

REFERENCE NO. 9-2

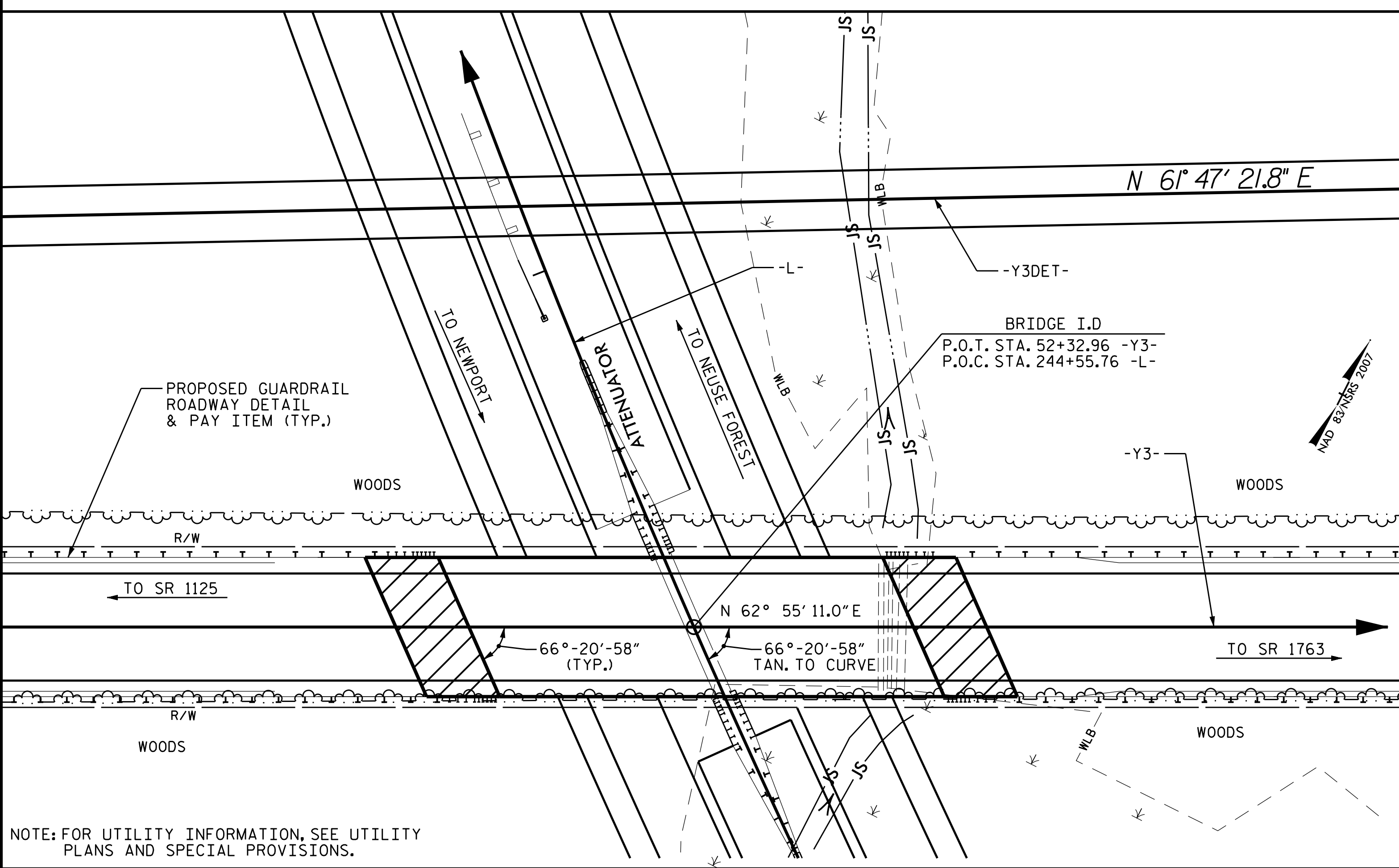
DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S9-2 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 31 |

DRAWN BY : J. B. W. DATE : 02/20/18
 CHECKED BY : T. L. B. DATE : 02/20/18
 DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

*****SYSTEM*****
 *****DCN*****
 *****USERNAME*****

BM 12 RR SPIKE IN TREE AT STA. 228+71.00 -L- 243' LEFT, ELEVATION = 28.81



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

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 (9-34).
- FOR SUBMITTAL OF WORKING DRAWINGS, 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.
- 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 EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

| SAMPLE BAR REPLACEMENT | |
|------------------------|---------|
| SIZE | LENGTH |
| 3 | 6'-2" |
| 4 | 7'-4" |
| 5 | 8'-6" |
| 6 | 9'-8" |
| 7 | 10'-10" |
| 8 | 12'-0" |
| 9 | 13'-2" |
| 10 | 14'-6" |
| 11 | 15'-10" |

NOTE: SAMPLE BAR REPLACEMENT LENGTH BASED ON 30' SAMPLE LENGTH PLUS TWO SPLICE LENGTHS AND FY = 60ksi.

BILL OF MATERIAL

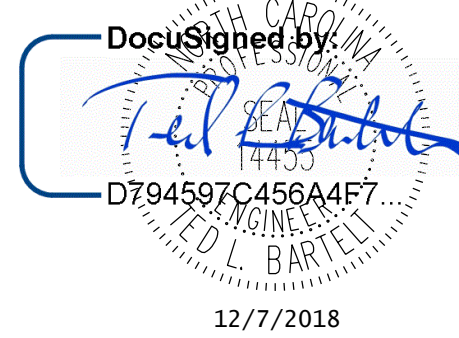
| | FOUNDATION EXCAVATION BENT #1 STA. 52+32.96 -Y3- | PDA TESTING | REINFORCED CONCRETE DECK SLAB | GROOVING BRIDGE FLOORS | CLASS A CONCRETE | BRIDGE APPROACH SLABS | REINFORCING STEEL | SPIRAL COLUMN REINFORCING STEEL | 54" PRESTRESSED CONCRETE GIRDERS | | PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES | HP 12 X 53 STEEL PILES | | PILE REDRIVES | TWO BAR METAL RAIL | 1'-2" X 2'-6" CONCRETE PARAPET | 4" SLOPE PROTECTION | ELASTOMERIC BEARINGS |
|----------------|--|-------------|-------------------------------|------------------------|------------------|-----------------------|-------------------|---------------------------------|----------------------------------|----------|---|------------------------|----------|---------------|--------------------|--------------------------------|---------------------|----------------------|
| | | | | | | | | | NO. | LIN. FT. | | NO. | LIN. FT. | | | | | |
| | LUMP SUM | EACH | SQ.FT. | SQ.FT. | CU. YDS. | LUMP SUM | LBS. | LBS. | NO. | LIN. FT. | EACH | NO. | LIN. FT. | EACH | LIN. FT. | LIN. FT. | SQ. YDS. | LUMP SUM |
| SUPERSTRUCTURE | | | 10598 | 11778 | | | | | 12 | 1143 | | | | | 368.7 | 384.7 | | |
| END BENT No. 1 | | 1 | | | 47.4 | | 5247 | | | | 12 | 12 | 840 | 6 | | | 385 | |
| BENT No. 1 | LUMP SUM | 1 | | | 103.7 | | 18145 | 1165 | | | 24 | 24 | 2160 | 12 | | | | |
| END BENT No. 2 | | | | | 46.2 | | 5187 | | | | 12 | 12 | 840 | 6 | | | 555 | |
| TOTAL | LUMP SUM | 2 | 10598 | 11778 | 197.3 | LUMP SUM | 28579 | 1165 | 12 | 1143 | 48 | 48 | 3840 | 24 | 368.7 | 384.7 | 940 | LUMP SUM |

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER US 70
 BYPASS ON SR 1756
 BETWEEN
 SR 1125 AND NC 1763



DRAWN BY: J. B. W. DATE: 04/11/18
 CHECKED BY: T. L. B. DATE: 02/20/18
 DESIGN ENGINEER OF RECORD: T. L. B. DATE: 02/20/18

*****SYSTEM*****
 *****DCN*****
 *****USER*****

4601 Lake Boone Trail Suite 3C Raleigh, NC 27607
 Phone 919 981 0310 Fax 919 981 0451
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 A&O PROJECT NO. 2015.042

REFERENCE NO. 9-3
 DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S9-3 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |

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

| LEVEL | VEHICLE | WEIGHT (W) (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 | | | | | | | | |
| | | | | | | LIVELOAD FACTORS | 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) | LIVELOAD FACTORS | DISTRIBUTION FACTORS (DF) | RATING FACTOR | SPAN | | GIRDER LOCATION | DISTANCE FROM LEFT END OF SPAN (ft) | |
| DESIGN LOAD RATING | HL-93(Inv) | N/A | 1 | 1.05 | -- | 1.75 | 0.762 | 1.30 | A | I | 47.17 | 0.996 | 1.43 | B | I | 89.85 | 0.80 | 0.762 | 1.05 | A | I | 47.17 | | |
| | HL-93(Opr) | N/A | -- | 1.68 | -- | 1.35 | 0.762 | 1.68 | A | I | 47.17 | 0.996 | 1.88 | B | I | 89.85 | N/A | 0.762 | N/A | N/A | N/A | N/A | | |
| | HS-20(Inv) | 36.000 | 2 | 1.45 | 52.200 | 1.75 | 0.762 | 1.79 | A | I | 47.17 | 0.996 | 1.95 | B | I | 89.85 | 0.80 | 0.762 | 1.45 | A | I | 47.17 | | |
| | HS-20(Opr) | 36.000 | -- | 2.32 | 83.520 | 1.35 | 0.762 | 2.32 | A | I | 47.17 | 0.996 | 2.56 | B | I | 89.85 | N/A | 0.762 | N/A | N/A | N/A | N/A | | |
| LEGAL LOAD RATING | SV | SNSH | 13.500 | -- | 3.43 | 46.305 | 1.40 | 0.762 | 5.30 | A | I | 47.17 | 0.996 | 6.19 | A | I | 84.90 | 0.80 | 0.762 | 3.43 | A | I | 47.17 | |
| | | SNGARBS2 | 20.000 | -- | 2.48 | 49.600 | 1.40 | 0.762 | 3.83 | A | I | 47.17 | 0.996 | 4.32 | A | I | 84.90 | 0.80 | 0.762 | 2.48 | A | I | 47.17 | |
| | | SNAGRIS2 | 22.000 | -- | 2.31 | 50.820 | 1.40 | 0.762 | 3.57 | A | I | 47.17 | 0.996 | 3.98 | A | I | 84.90 | 0.80 | 0.762 | 2.31 | A | I | 47.17 | |
| | | SNCOTTS3 | 27.250 | -- | 1.69 | 46.053 | 1.40 | 0.762 | 2.61 | A | I | 47.17 | 0.996 | 3.03 | A | I | 84.90 | 0.80 | 0.762 | 1.69 | A | I | 47.17 | |
| | | SNAGGRS4 | 34.925 | -- | 1.39 | 48.546 | 1.40 | 0.762 | 2.15 | A | I | 47.17 | 0.996 | 2.46 | A | I | 84.90 | 0.80 | 0.762 | 1.39 | A | I | 47.17 | |
| | | SNS5A | 35.550 | -- | 1.36 | 48.348 | 1.40 | 0.762 | 2.10 | A | I | 47.17 | 0.996 | 2.47 | A | I | 84.90 | 0.80 | 0.762 | 1.36 | A | I | 47.17 | |
| | TTST | SNS6A | 39.950 | -- | 1.24 | 49.538 | 1.40 | 0.762 | 1.92 | A | I | 47.17 | 0.996 | 2.23 | A | I | 84.90 | 0.80 | 0.762 | 1.24 | A | I | 47.17 | |
| | | SNS7B | 42.000 | -- | 1.18 | 49.560 | 1.40 | 0.762 | 1.82 | A | I | 47.17 | 0.996 | 2.13 | B | I | 89.85 | 0.80 | 0.762 | 1.18 | A | I | 47.17 | |
| | | TNAGRIT3 | 33.000 | -- | 1.51 | 49.830 | 1.40 | 0.762 | 2.33 | A | I | 47.17 | 0.996 | 2.65 | B | I | 89.85 | 0.80 | 0.762 | 1.51 | A | I | 47.17 | |
| | | TNT4A | 33.075 | -- | 1.51 | 49.943 | 1.40 | 0.762 | 2.34 | A | I | 47.17 | 0.996 | 2.63 | A | I | 84.90 | 0.80 | 0.762 | 1.51 | A | I | 47.17 | |
| | | TNT6A | 41.600 | -- | 1.22 | 50.752 | 1.40 | 0.762 | 1.89 | A | I | 47.17 | 0.996 | 2.28 | B | I | 89.85 | 0.80 | 0.762 | 1.22 | A | I | 47.17 | |
| | | TNT7A | 42.000 | -- | 1.23 | 51.660 | 1.40 | 0.762 | 1.90 | A | I | 47.17 | 0.996 | 2.24 | A | I | 84.90 | 0.80 | 0.762 | 1.23 | A | I | 47.17 | |
| TTST | TNT7B | 42.000 | -- | 1.25 | 52.500 | 1.40 | 0.762 | 1.94 | A | I | 47.17 | 0.996 | 2.13 | A | I | 84.90 | 0.80 | 0.762 | 1.25 | A | I | 47.17 | | |
| | TNAGRIT4 | 43.000 | -- | 1.20 | 51.600 | 1.40 | 0.762 | 1.86 | A | I | 47.17 | 0.996 | 2.07 | A | I | 84.90 | 0.80 | 0.762 | 1.20 | A | I | 47.17 | | |
| | TNAGT5A | 45.000 | -- | 1.14 | 51.300 | 1.40 | 0.762 | 1.76 | A | I | 47.17 | 0.996 | 2.00 | B | I | 89.85 | 0.80 | 0.762 | 1.14 | A | I | 47.17 | | |
| | TNAGT5B | 45.000 | 3 | 1.13 | 50.850 | 1.40 | 0.762 | 1.75 | A | I | 47.17 | 0.996 | 1.96 | A | I | 84.90 | 0.80 | 0.762 | 1.13 | A | I | 47.17 | | |

LOAD FACTORS:

| | | | |
|-------------------------------------|-------------|---------------|---------------|
| DESIGN LOAD RATING FACTORS | LIMIT STATE | γ_{DC} | γ_{DW} |
| | 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:

-
-
-
-

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

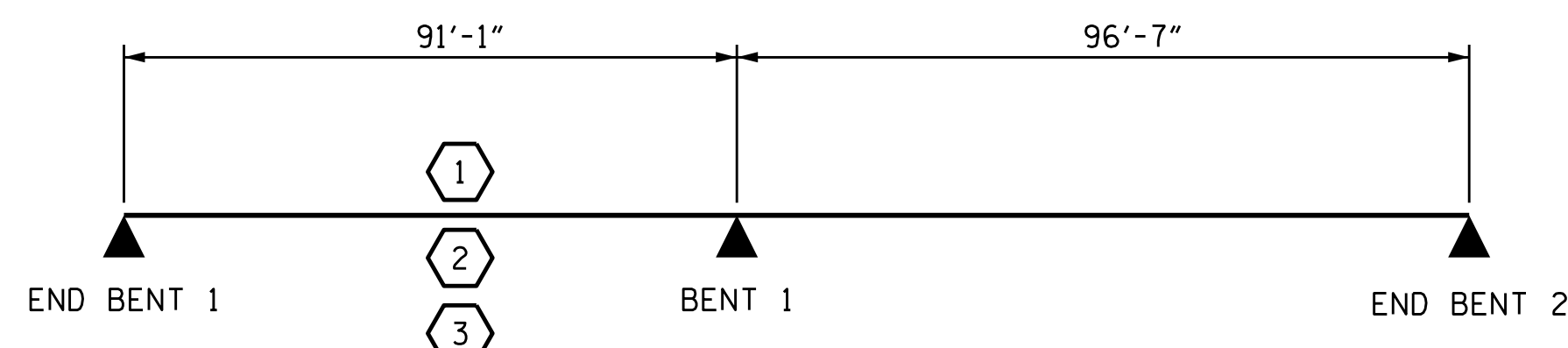
2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

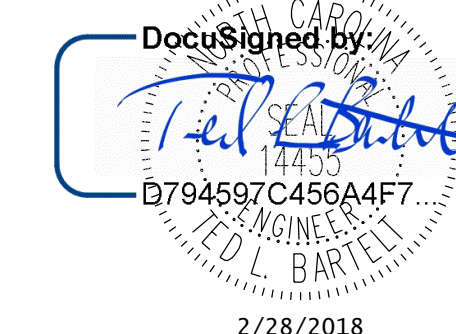
GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 52+32.96 -Y3-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 LRFR SUMMARY FOR
 PRESTRESSED
 CONCRETE GIRDERS
 (NON-INTERSTATE TRAFFIC)

DRAWN BY: J. B. W. DATE: 02/20/18
 CHECKED BY: T. L. B. DATE: 02/20/18
 DESIGN ENGINEER OF RECORD: T. L. B. DATE: 02/20/18

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 Phone 919 981 0310 Fax 919 981 0451
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 A&O PROJECT NO. 2016.042

REFERENCE NO. 9-4
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| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S9-4 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 31 |

*****SYSTEM*****
 *****DCN*****
 *****USER*****

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.

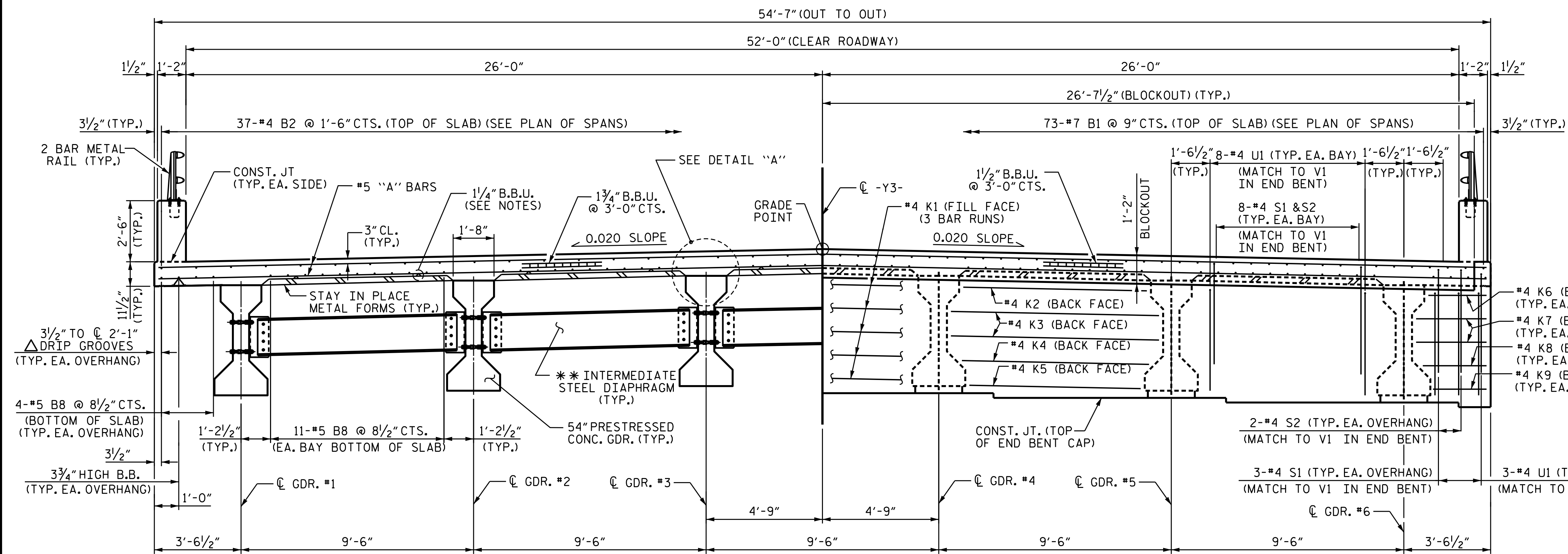
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

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 PARAPET 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.

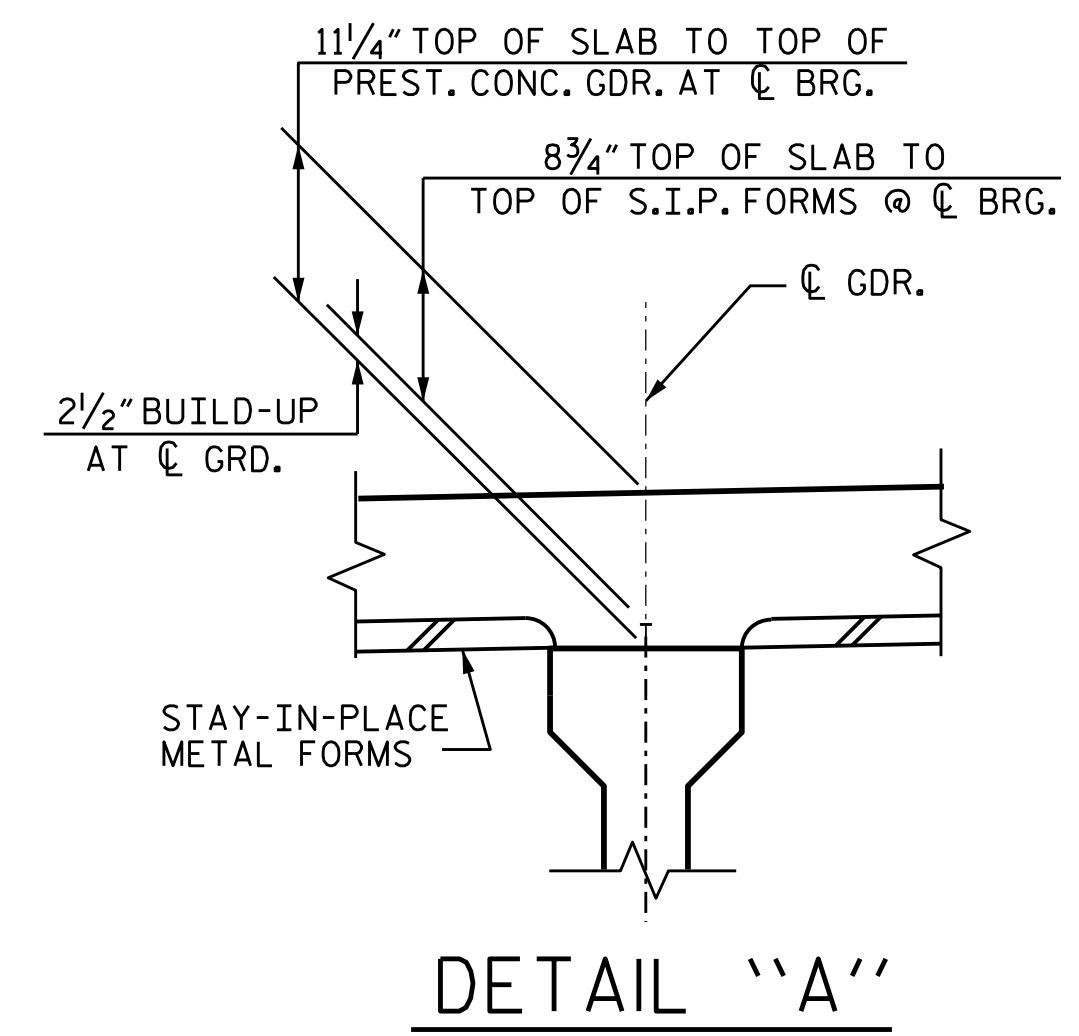
ALL BAR SUPPORTS USED IN THE CONCRETE PARAPET, DECK, AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

** FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.

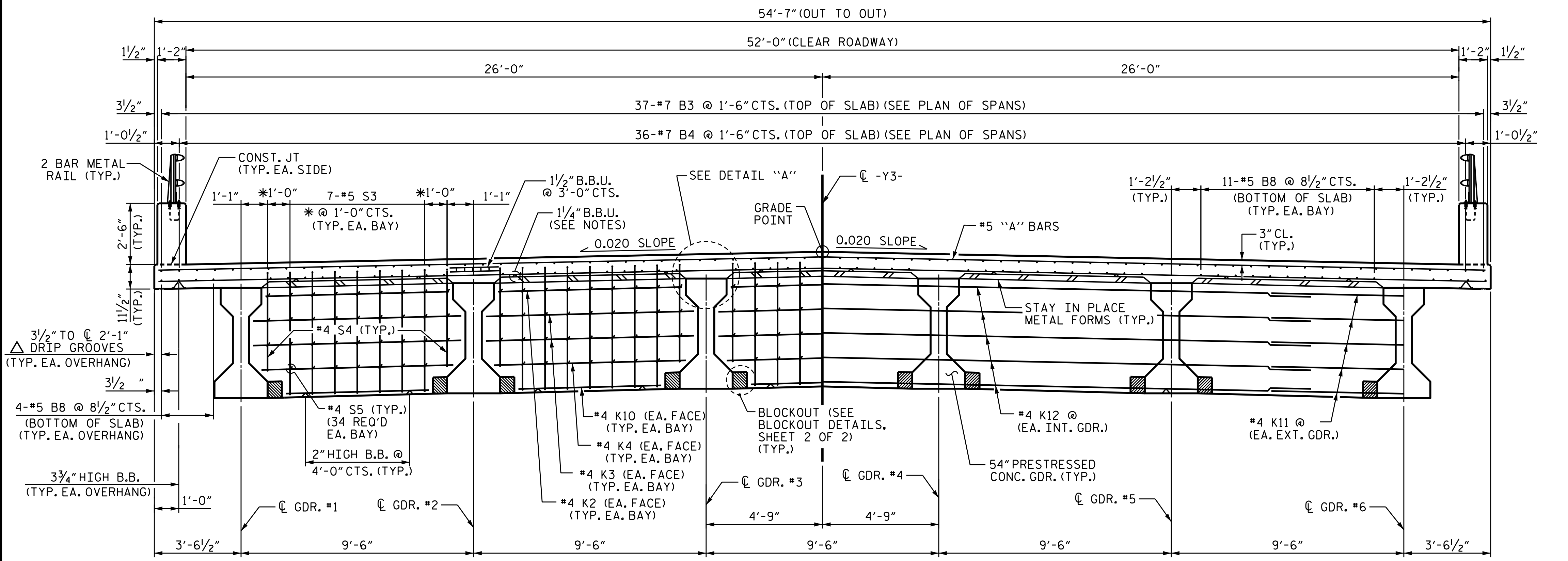


TYPICAL HALF SECTION AT INTERMEDIATE DIAPHRAGMS

TYPICAL HALF SECTION AT INTEGRAL END BENT



DETAIL "A"



* DIMENSION MEASURED ALONG SKEW

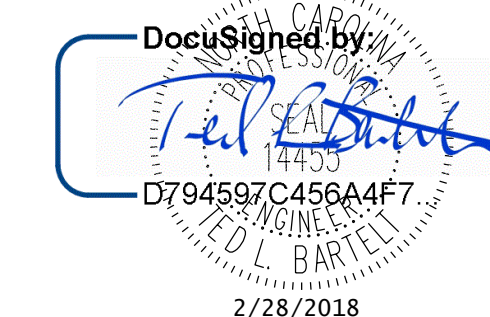
TYPICAL SECTION AT BENT DIAPHRAGMS

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 TYPICAL SECTION



1998 **AO** 2018
 ALPHA & OMEGA GROUP
 CIVIL | STRUCTURAL | WATER RESOURCES

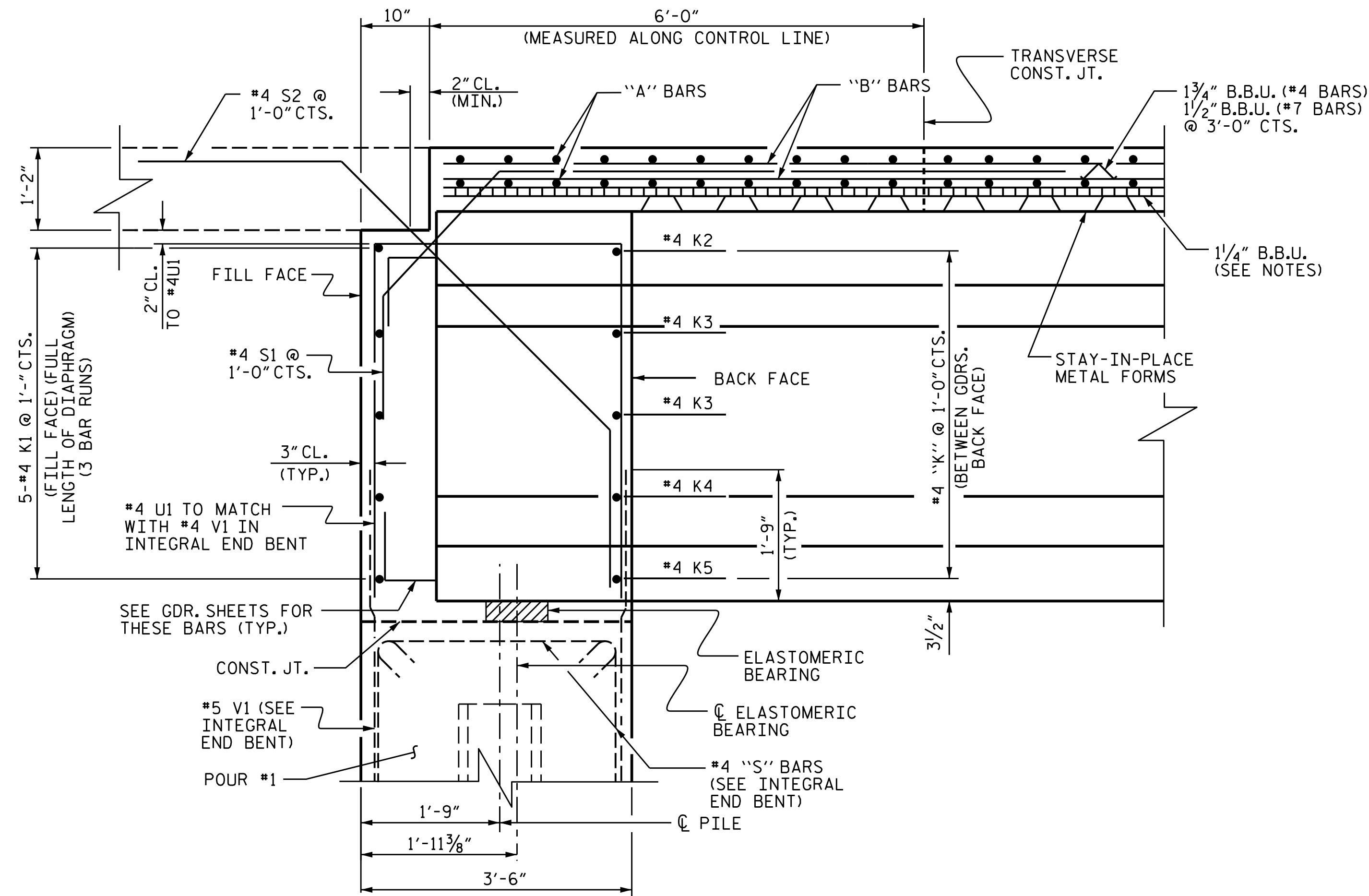
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 DESIGN ENGINEER OF RECORD: T. L. B. DATE: 02/20/18

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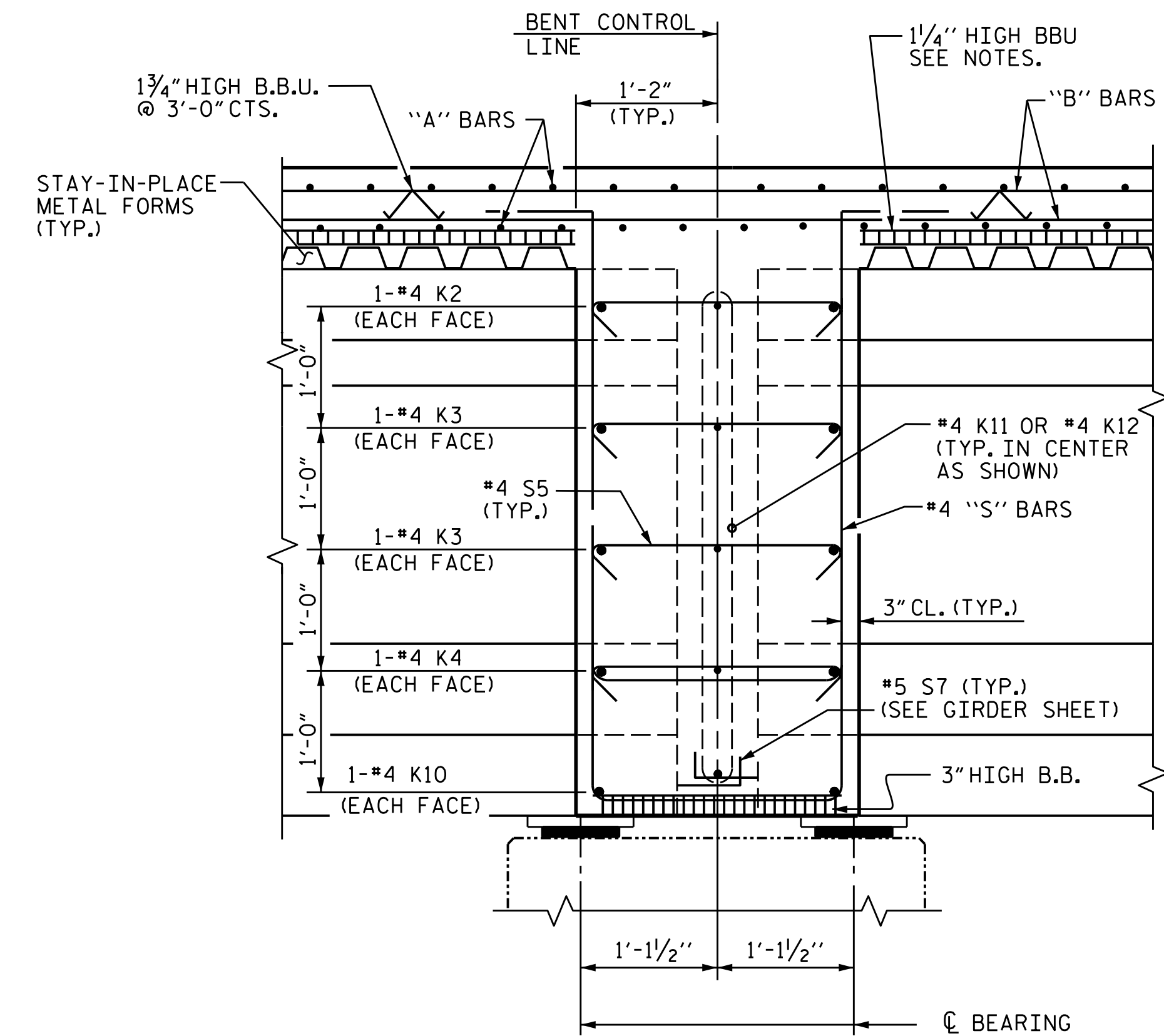
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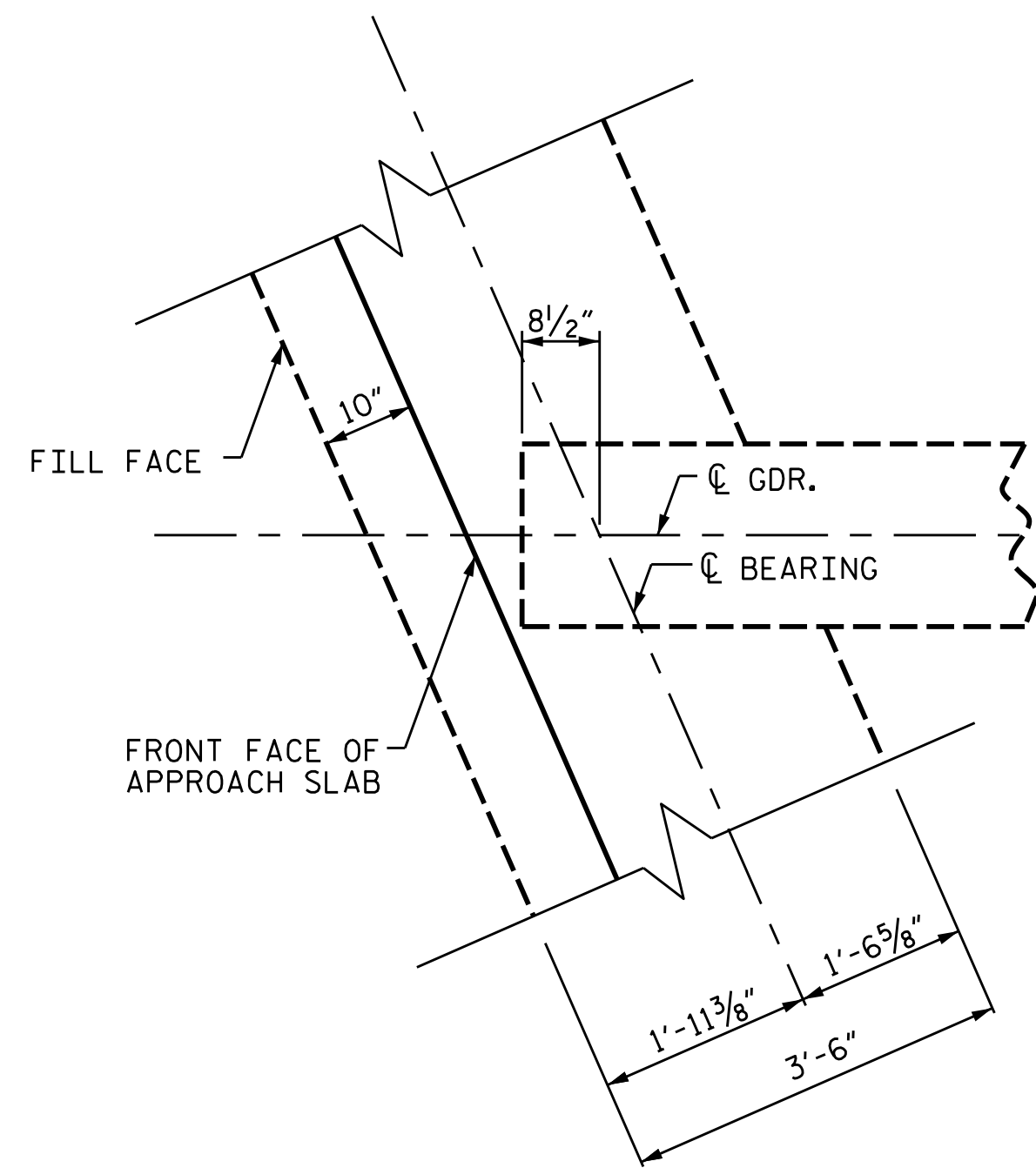
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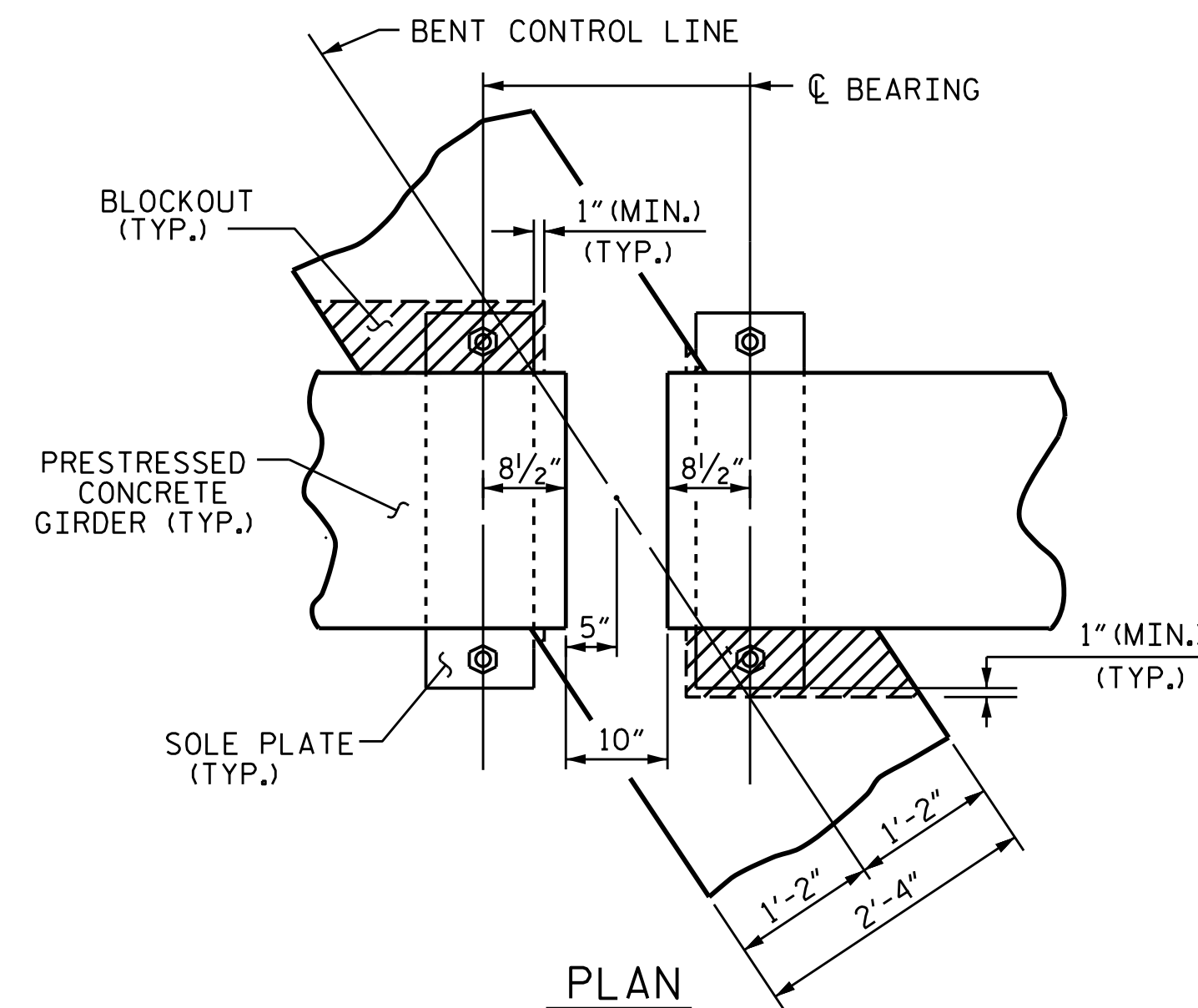
SECTION THRU INTEGRAL END BENT



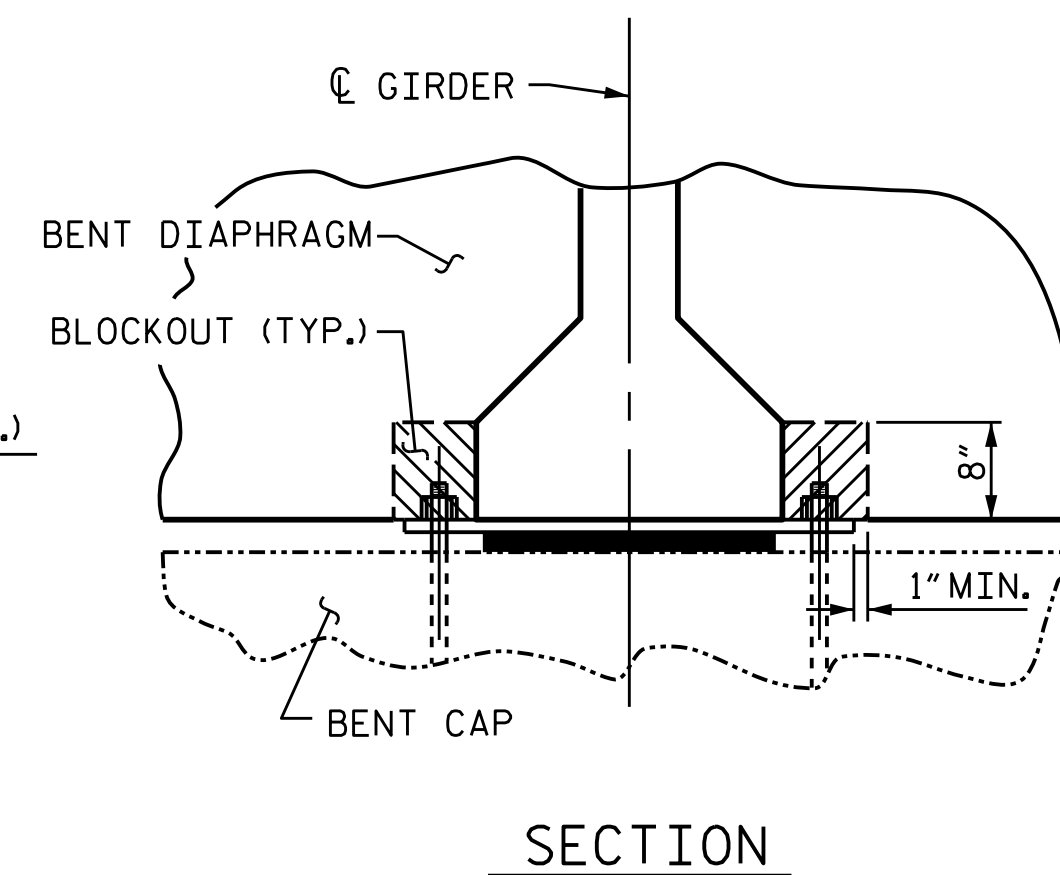
SECTION THRU BENT DIAPHRAGM



PLAN OF GIRDER AT INTEGRAL END BENT



BENT DIAPHRAGM BLOCK-OUT DETAIL



SECTION

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 TYPICAL SECTION
 DETAILS

DRAWN BY: J. B. W. DATE: 02/20/18
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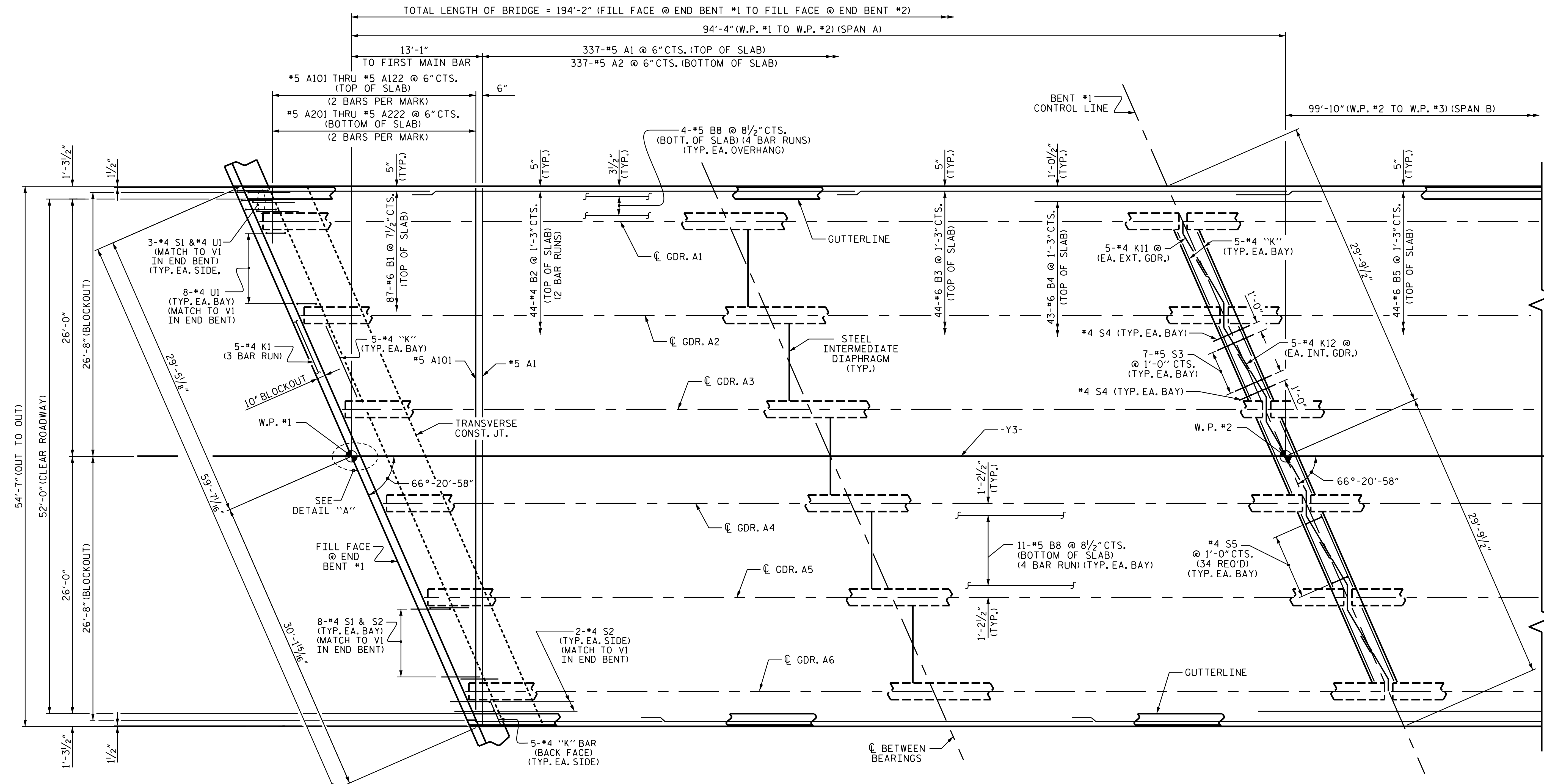
DocuSigned by
 T. L. BARTLETT
 0794597C456A4F7
 2/28/2018

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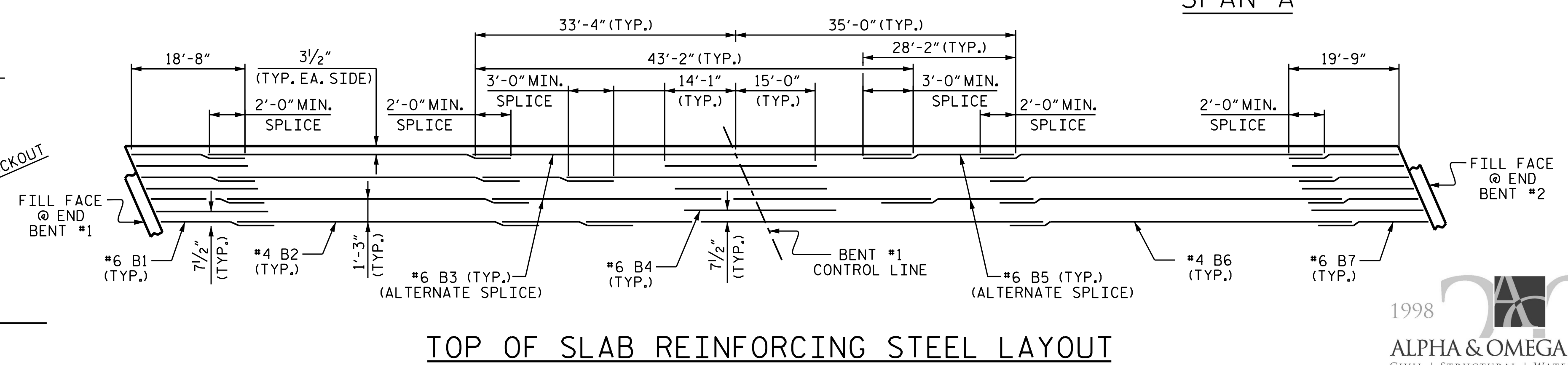
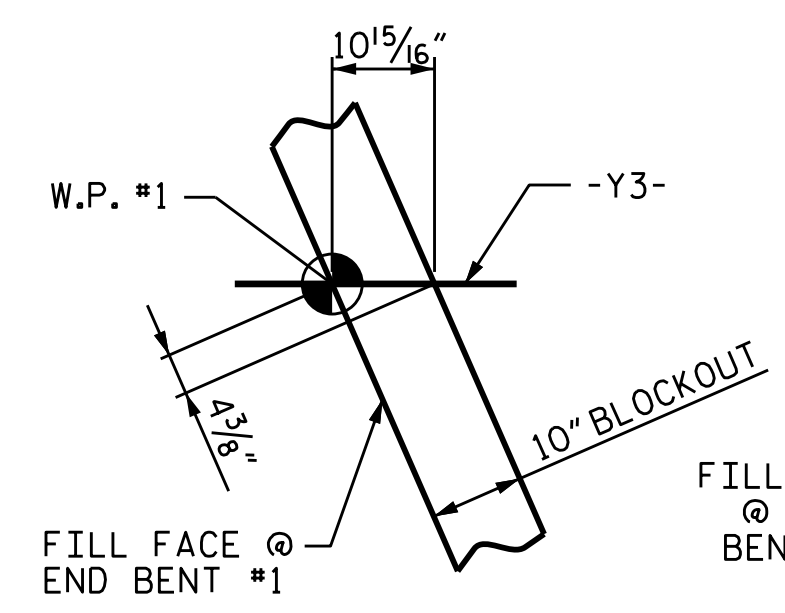
REFERENCE NO. 9-6

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SPAN A

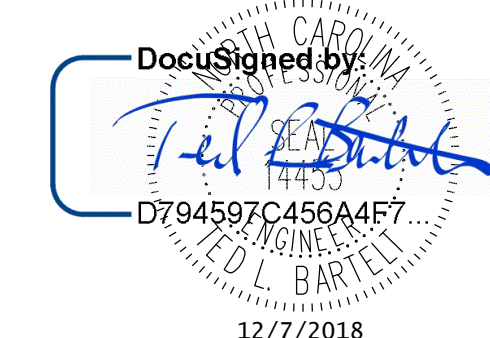


TOP OF SLAB REINFORCING STEEL LAYOUT

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPAN A



| REVISIONS | | | | | | TOTAL SHEETS |
|-----------|-----|-------|-----|-----|-------|--------------|
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| 1 | | | 3 | | | |
| 2 | | | 4 | | | |

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 CHECKED BY : T. L. B. DATE : 02/20/18
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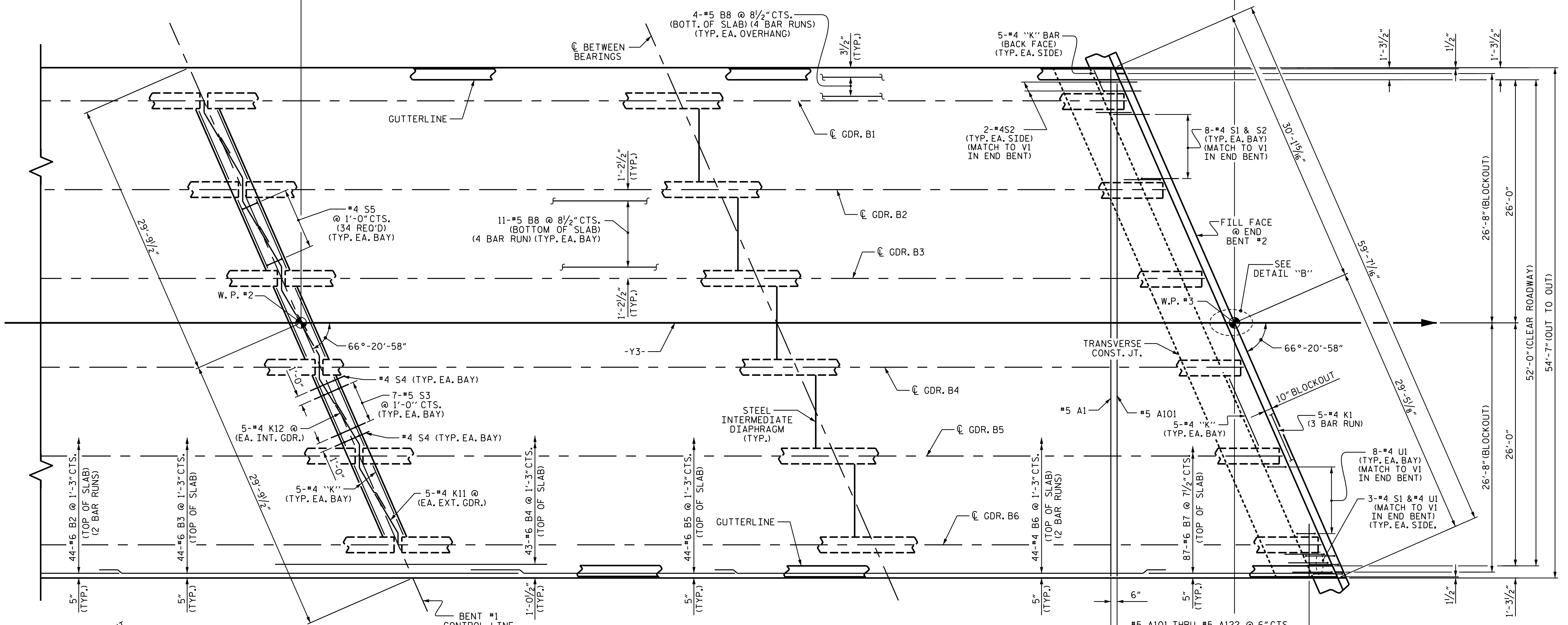
NOTES

FOR LOCATION OF INTERMEDIATE DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEETS. FOR DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.
FOR END BENT DIAPHRAGM BARS AND BENT DIAPHRAGM BARS, SEE TYPICAL SECTION AND DETAILS.

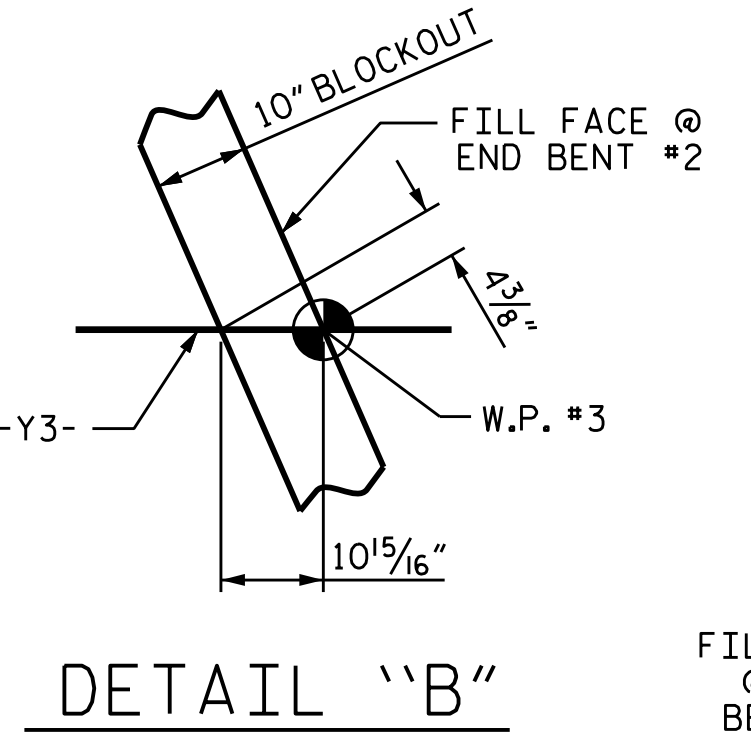
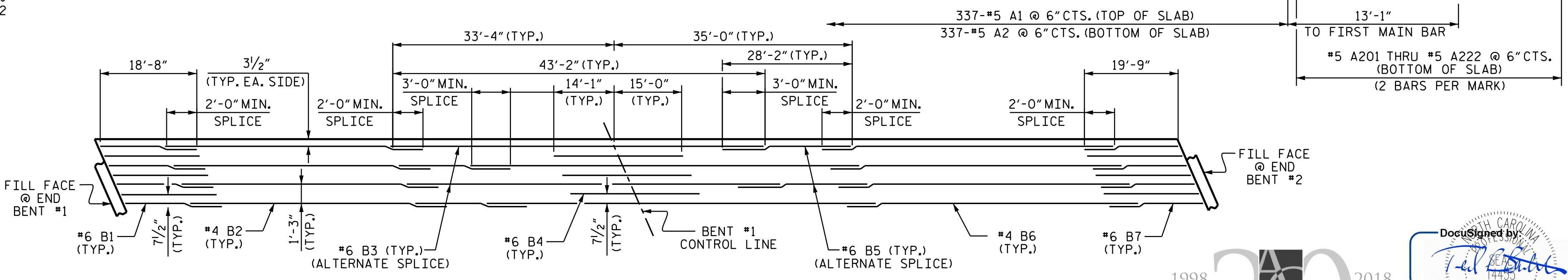
← TOTAL LENGTH OF BRIDGE = 194'-2" (FILL FACE @ END BENT #1 TO FILL FACE @ END BENT #2)

94'-4" (W.P. #1 TO W.P. #2) (SPAN A)

99'-10" (W.P. #2 TO W.P. #3) (SPAN B)



SPAN B



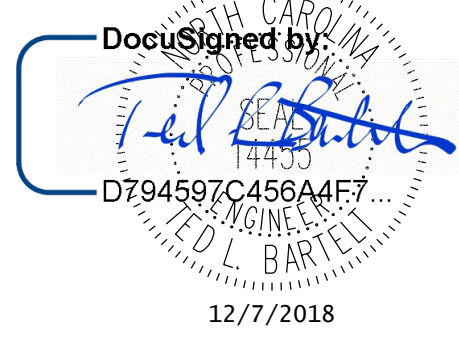
TOP OF SLAB REINFORCING STEEL LAYOUT

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 52+32.96 -Y3-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**SUPERSTRUCTURE
PLAN OF SPAN B**



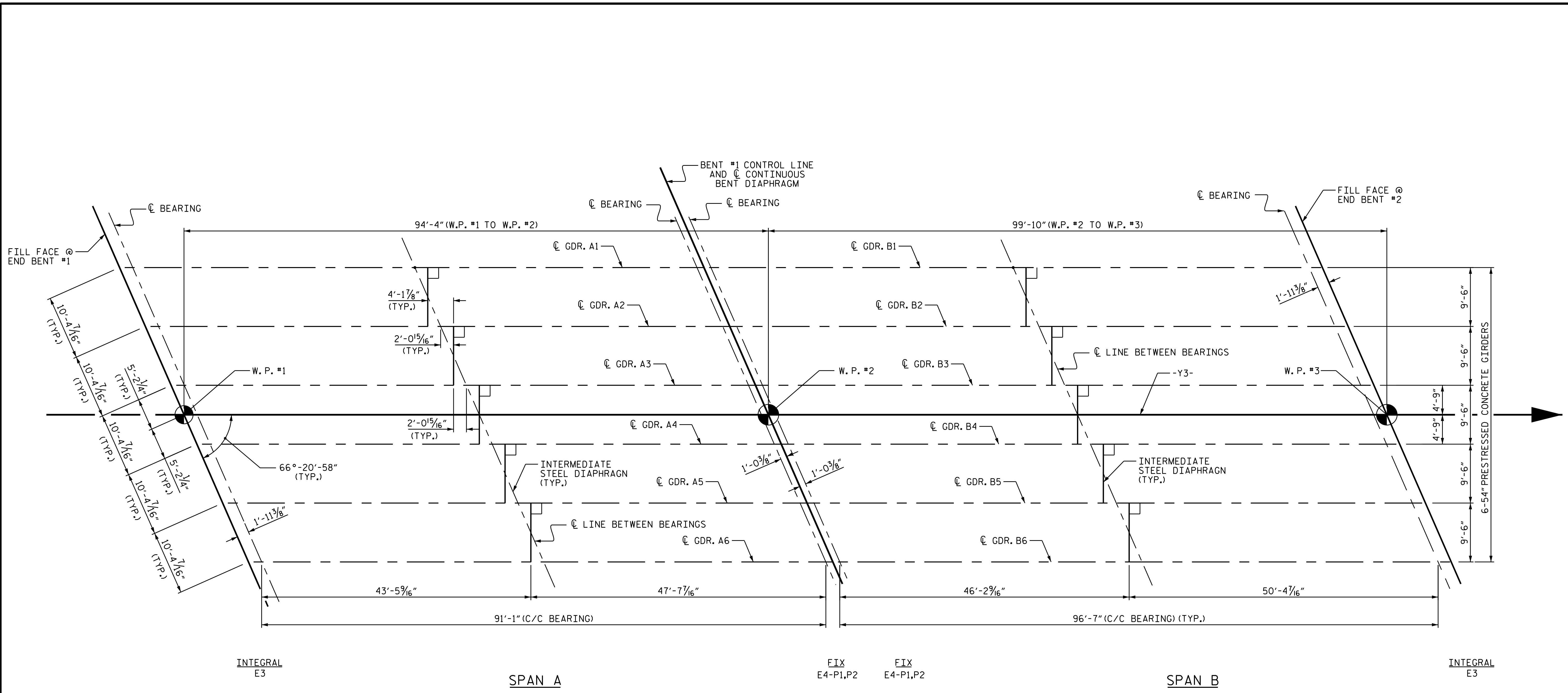
REFERENCE NO. 9-8

| REVISIONS | | | | | | SHEET NO. S9-8 |
|-----------|-----|-------|-----|-----|-------|--------------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | |
| 1 | | | 3 | | | TOTAL SHEETS 32 |
| 2 | | | 4 | | | |

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GIRDER LAYOUT

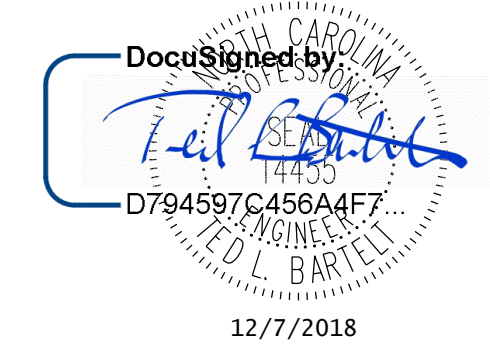
SOLE PLATE LOCATION TABLE @ BENT #1

| SPAN A | | SPAN B | |
|--------|-------|--------|-------|
| GIRDER | PLATE | GIRDER | PLATE |
| A1 | P1 | B1 | P1 |
| A2 | P1 | B2 | P1 |
| A3 | P1 | B3 | P1 |
| A4 | P2 | B4 | P2 |
| A5 | P1 | B5 | P1 |
| A6 | P1 | B6 | P1 |

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 GIRDER LAYOUT



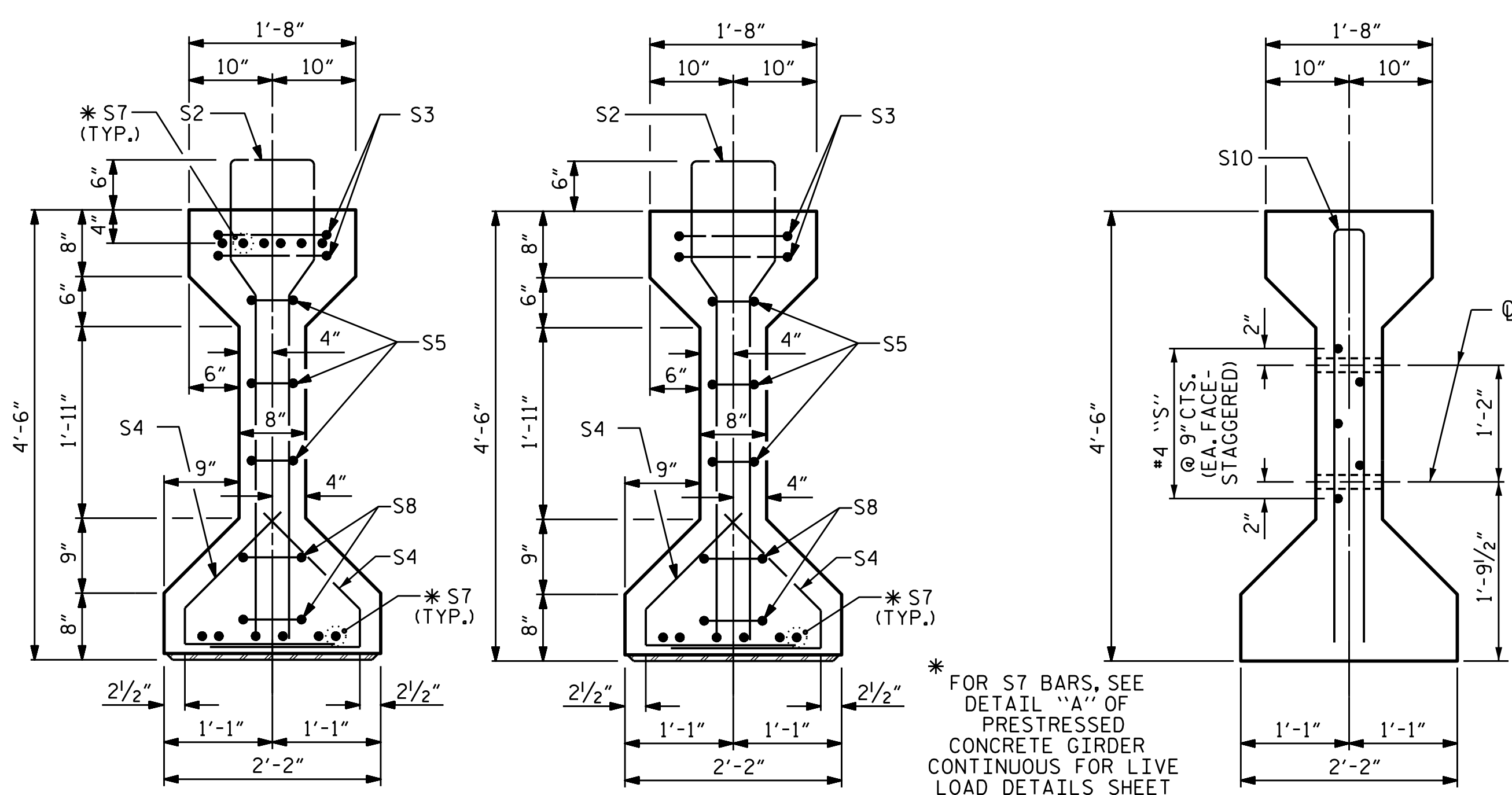
DRAWN BY: J. B. W. DATE: 2/20/18
 CHECKED BY: T. L. B. DATE: 2/20/18
 DESIGN ENGINEER OF RECORD: T. L. B. DATE: 2/20/18

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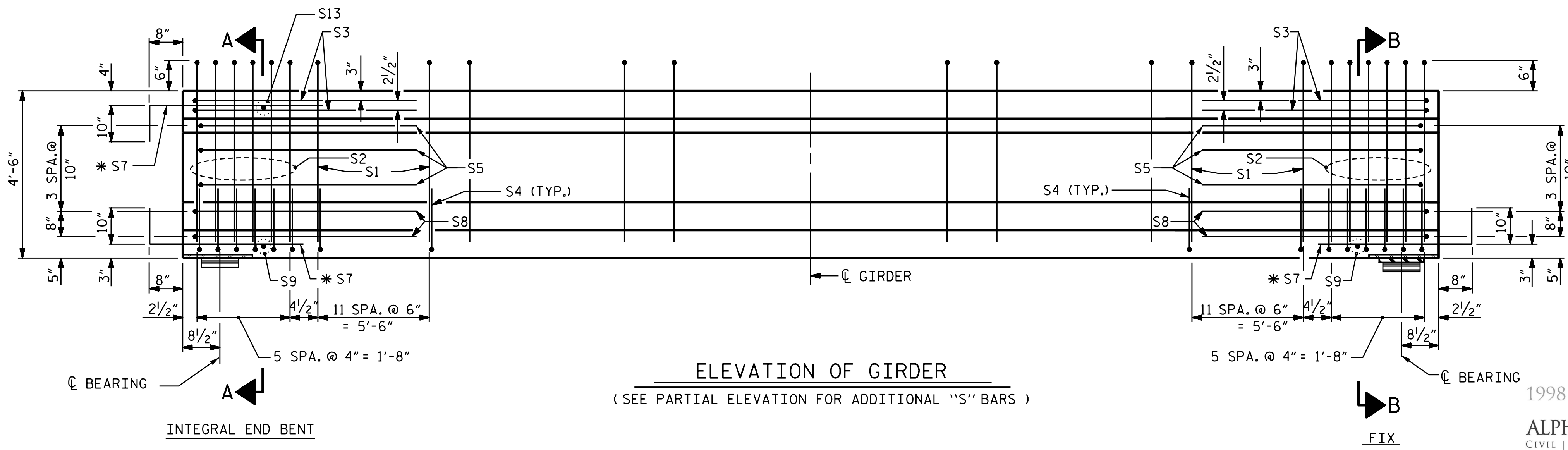
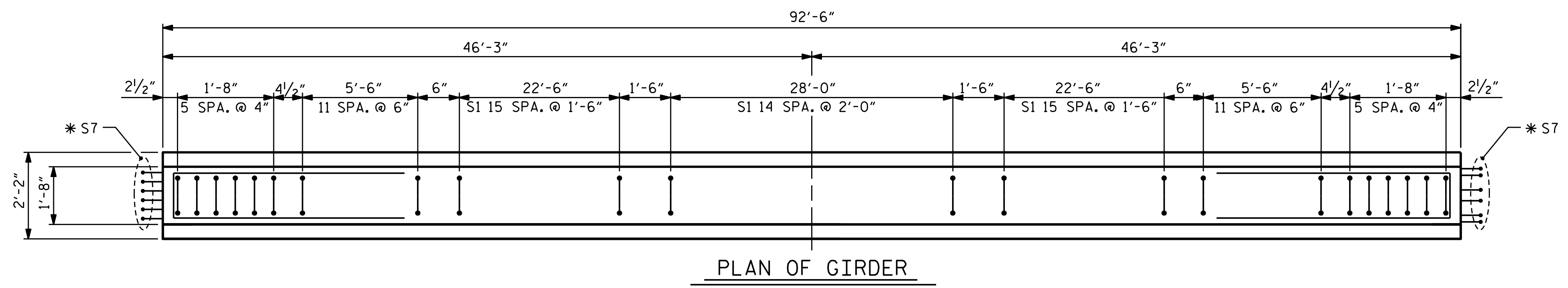
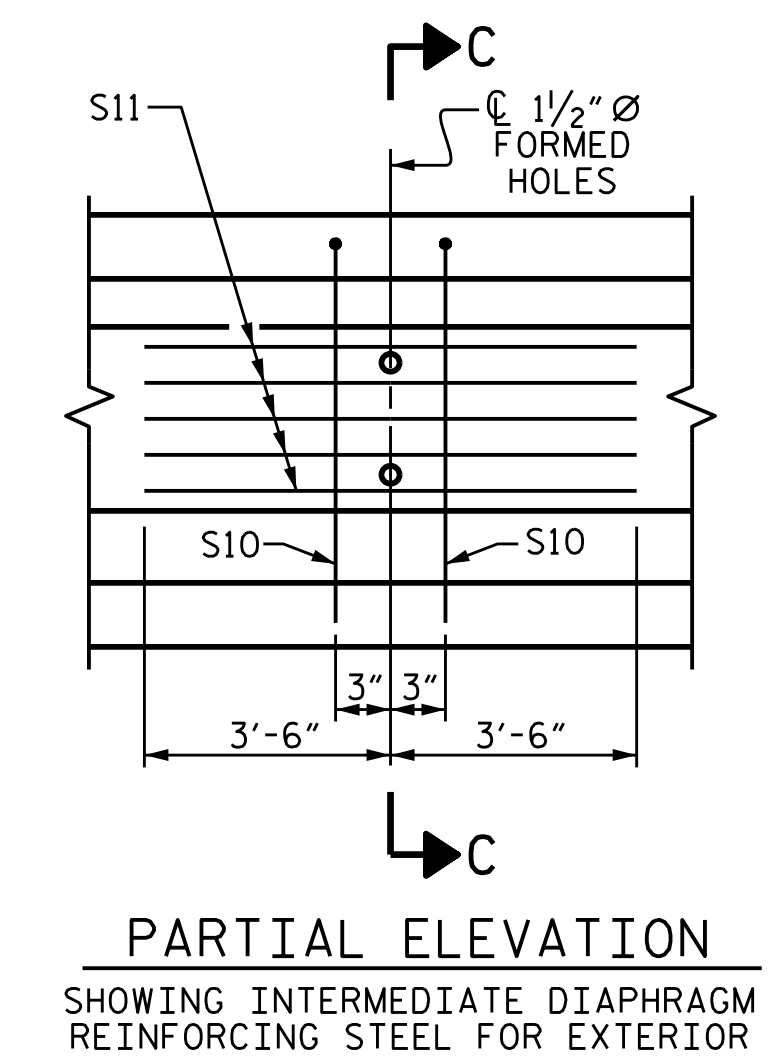
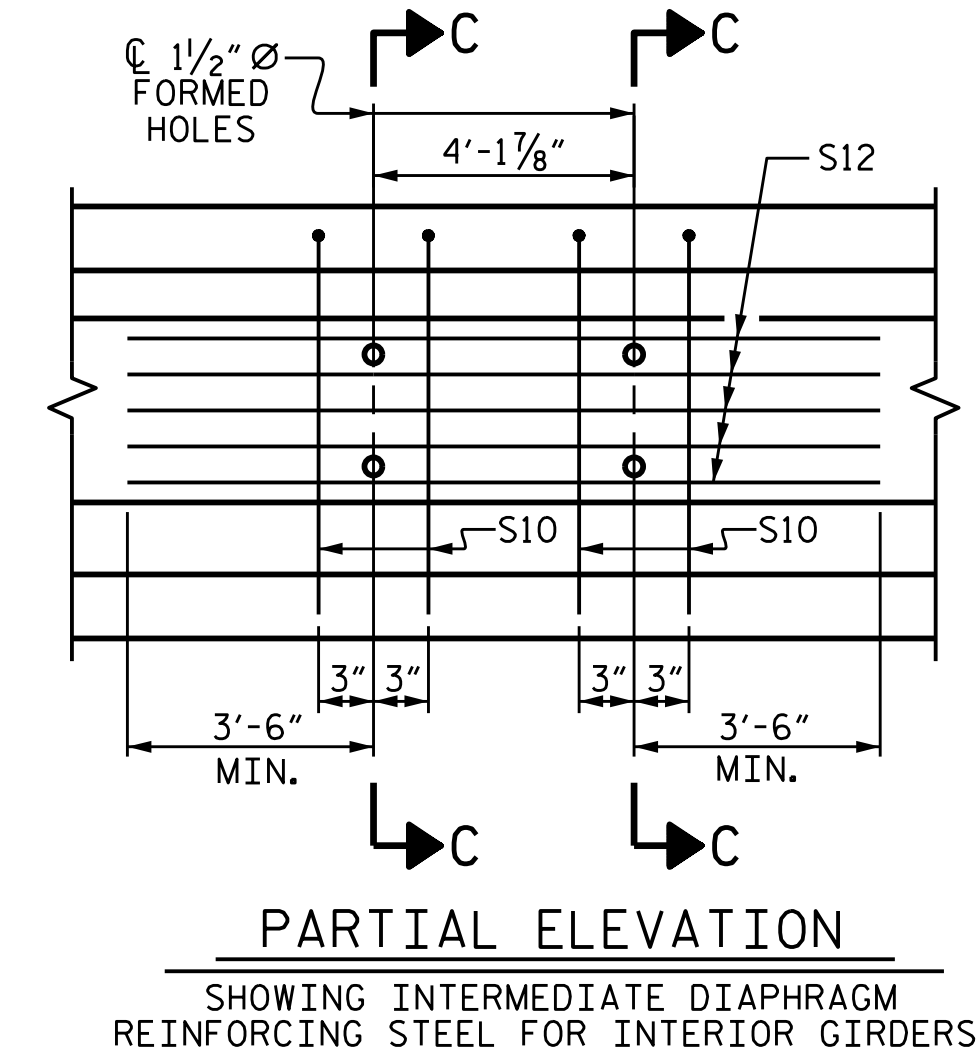
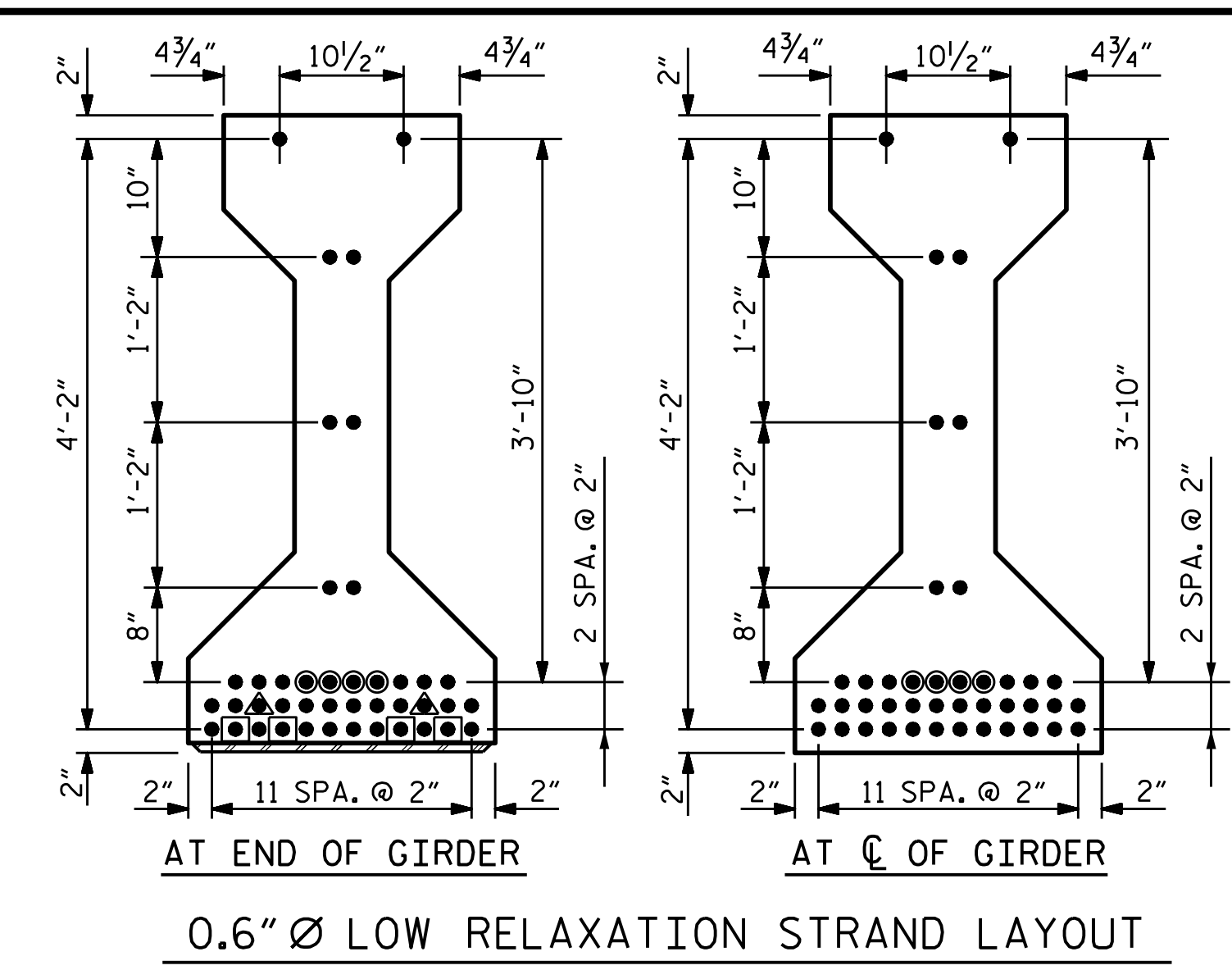
REFERENCE NO. 9-9
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| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |

*****SYSTEM*****
 *****DCN*****
 *****USERNAME*****



- DEBONDING LEGEND**
- ▲ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
 - STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
 - OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED, IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.



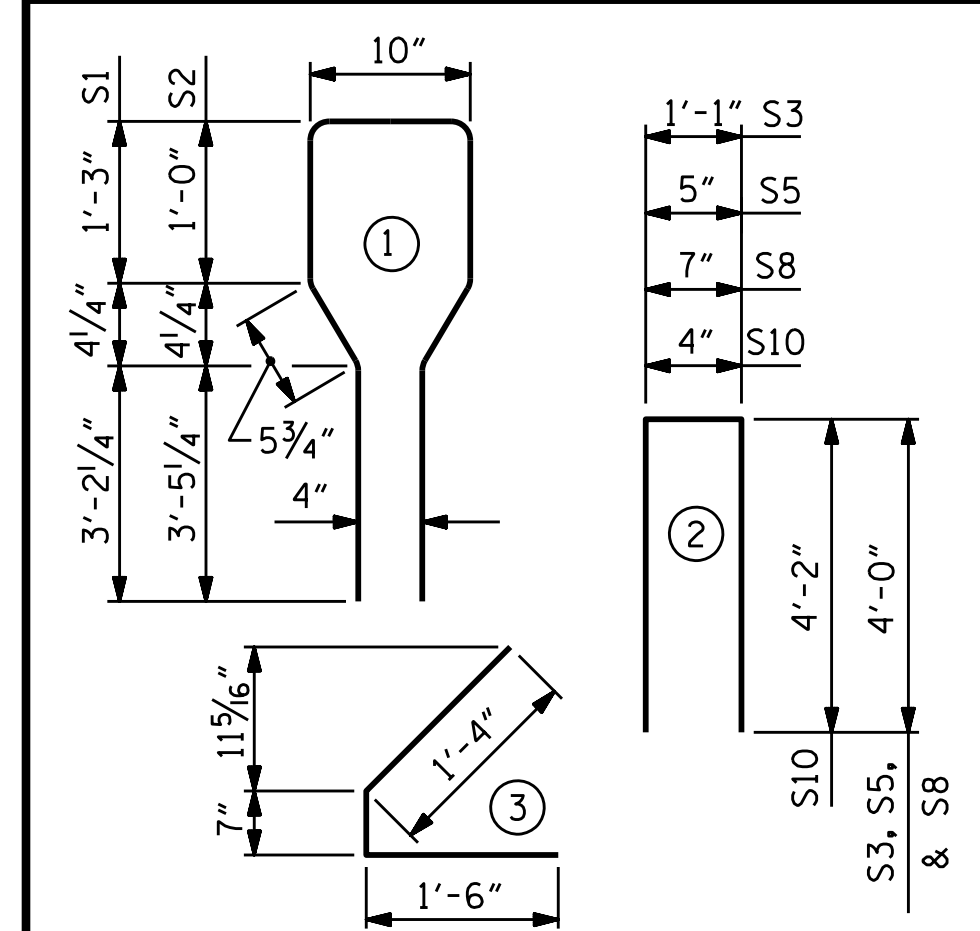
| 0.6" Ø L. R. GRADE 270 STRANDS | | |
|--------------------------------|-------------------------------------|-------------------------------------|
| AREA (SQUARE INCHES) | ULTIMATE STRENGTH (LBS. PER STRAND) | APPLIED PRESTRESS (LBS. PER STRAND) |
| 0.217 | 58,600 | 43,950 |

| REINFORCING STEEL FOR ONE GIRDER | | | | | |
|----------------------------------|--------|------|------|--------|--------|
| BAR | NUMBER | SIZE | TYPE | LENGTH | WEIGHT |
| EXTERIOR GDR. S1 | 71 | #5 | 1 | 10'-8" | 790 |
| INTERIOR GDR. S1 | 71 | #5 | 1 | 10'-8" | 790 |
| S2 | 12 | #6 | 1 | 10'-8" | 192 |
| 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 |
| EXTERIOR GDR. S10 | 2 | #5 | 2 | 8'-8" | 18 |
| INTERIOR GDR. S10 | 4 | #5 | 2 | 8'-8" | 36 |
| EXTERIOR GDR. S11 | 5 | #4 | STR | 7'-0" | 23 |
| INTERIOR GDR. S12 | 5 | #4 | STR | 11'-2" | 37 |
| 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 LB. | 8000 PSI CONCRETE C.Y. | 0.6" Ø L. R. STRANDS No. |
| EXTERIOR GIRDER | 1339 | 18.8 | 42 |
| INTERIOR GIRDER | 1371 | 18.8 | 42 |

| GIRDERS REQUIRED | | |
|------------------|--------|--------------|
| NUMBER | LENGTH | TOTAL LENGTH |
| 6 | 92'-6" | 555'-0" |

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 52+32.96 -Y3-
 SHEET 1 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

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

DRAWN BY: J. B. W. DATE: 02/20/18
 CHECKED BY: T. L. B. DATE: 02/20/18
 DESIGN ENGINEER OF RECORD: T. L. B. DATE: 02/20/18

1998 2018
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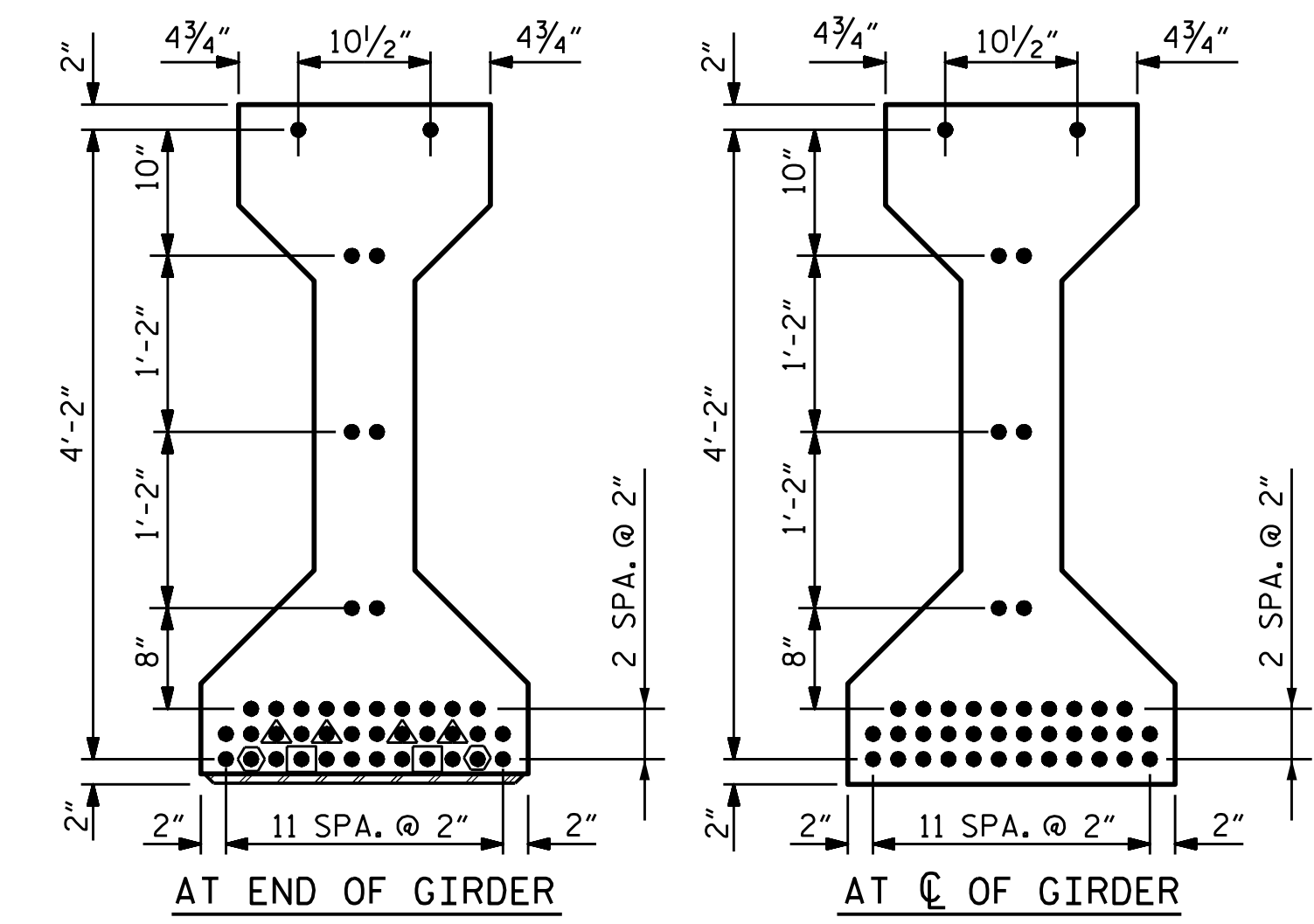
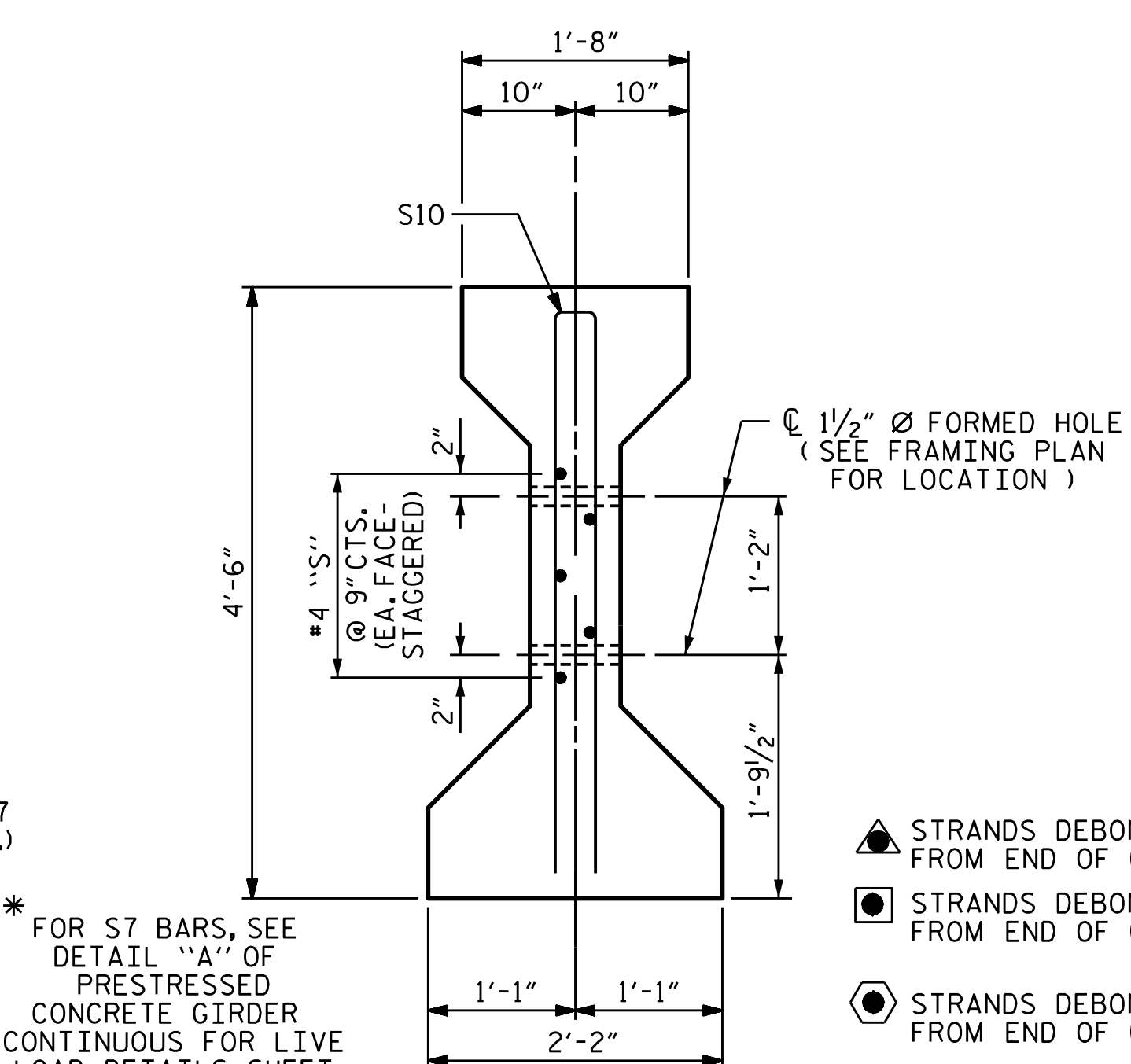
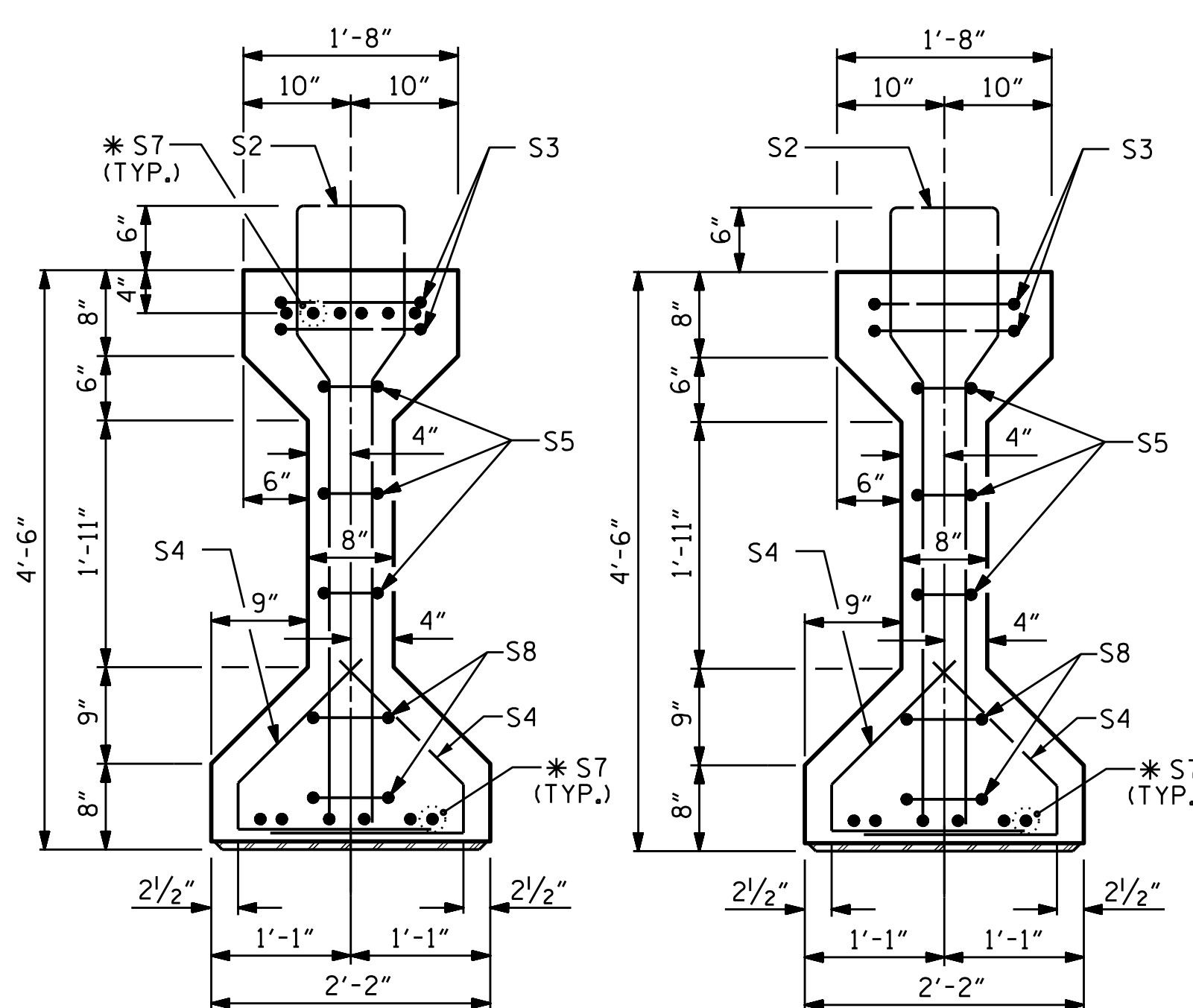
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 Ted L. Bartlett
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10/11/2018 3:33:39 PM EDT
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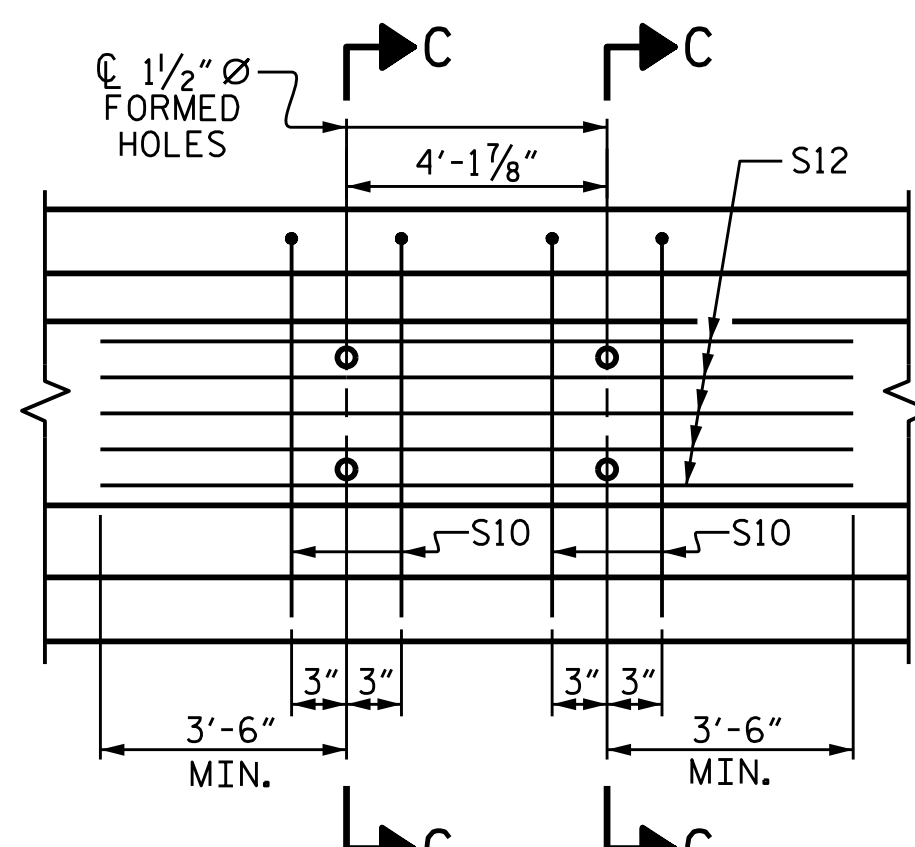
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 Phone 919 981 0310 Fax 919 981 0451
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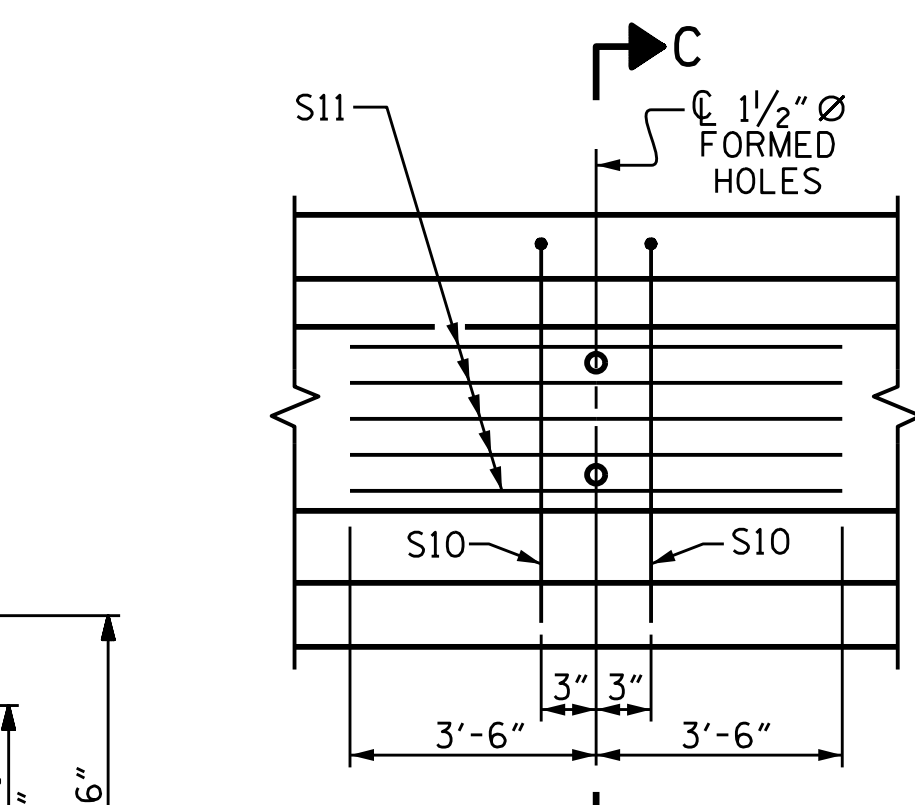
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| 2 | | | 4 | | | 32 |



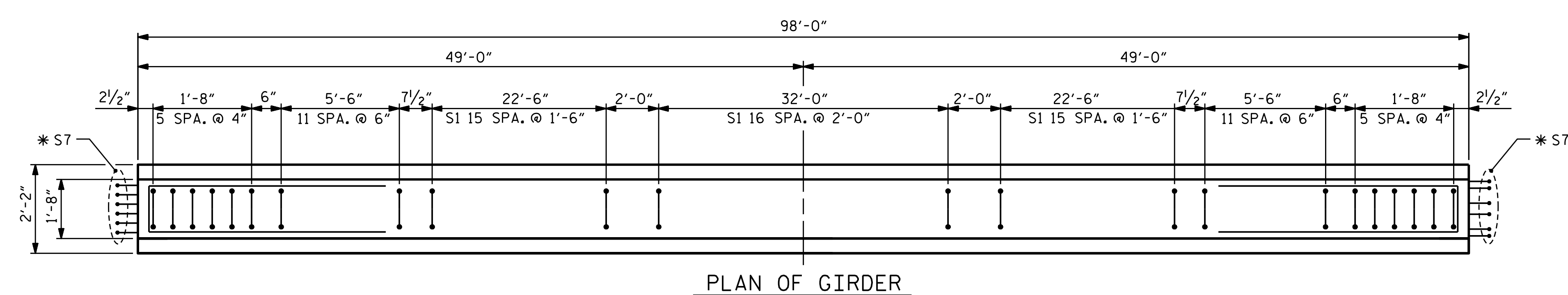
- DEBONDING LEGEND**
- ▲ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
 - STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
 - ⦿ STRANDS DEBONDED FOR 16'-0" FROM END OF GIRDER



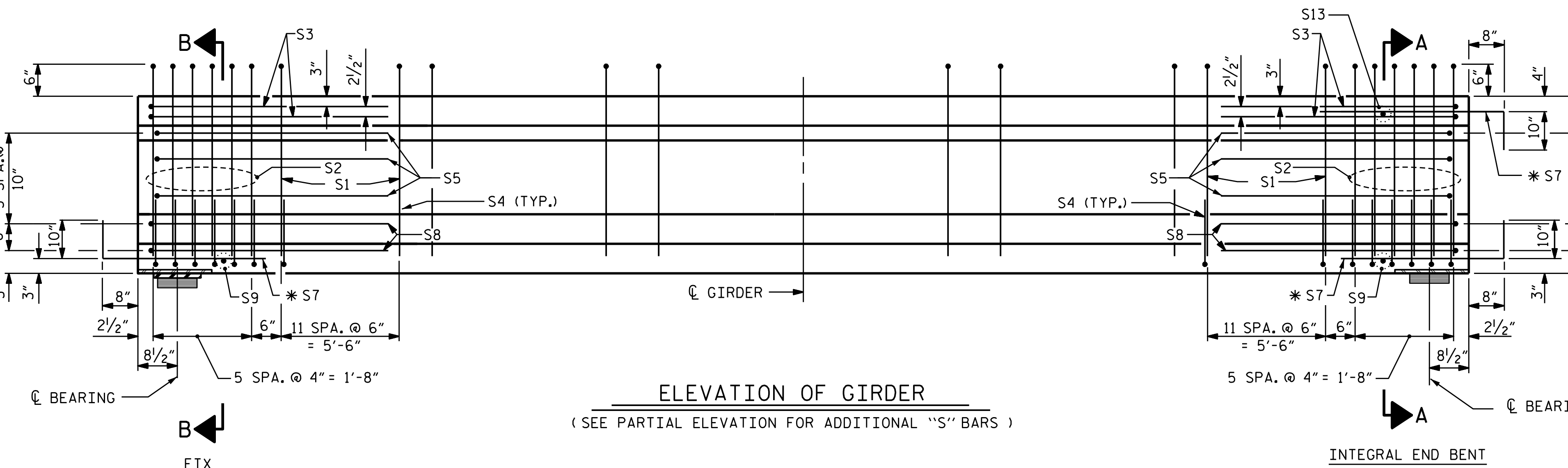
PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS.



PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR EXTERIOR GIRDERS



PLAN OF GIRDER



ELEVATION OF GIRDER
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

0.6" Ø L. R. GRADE 270 STRANDS

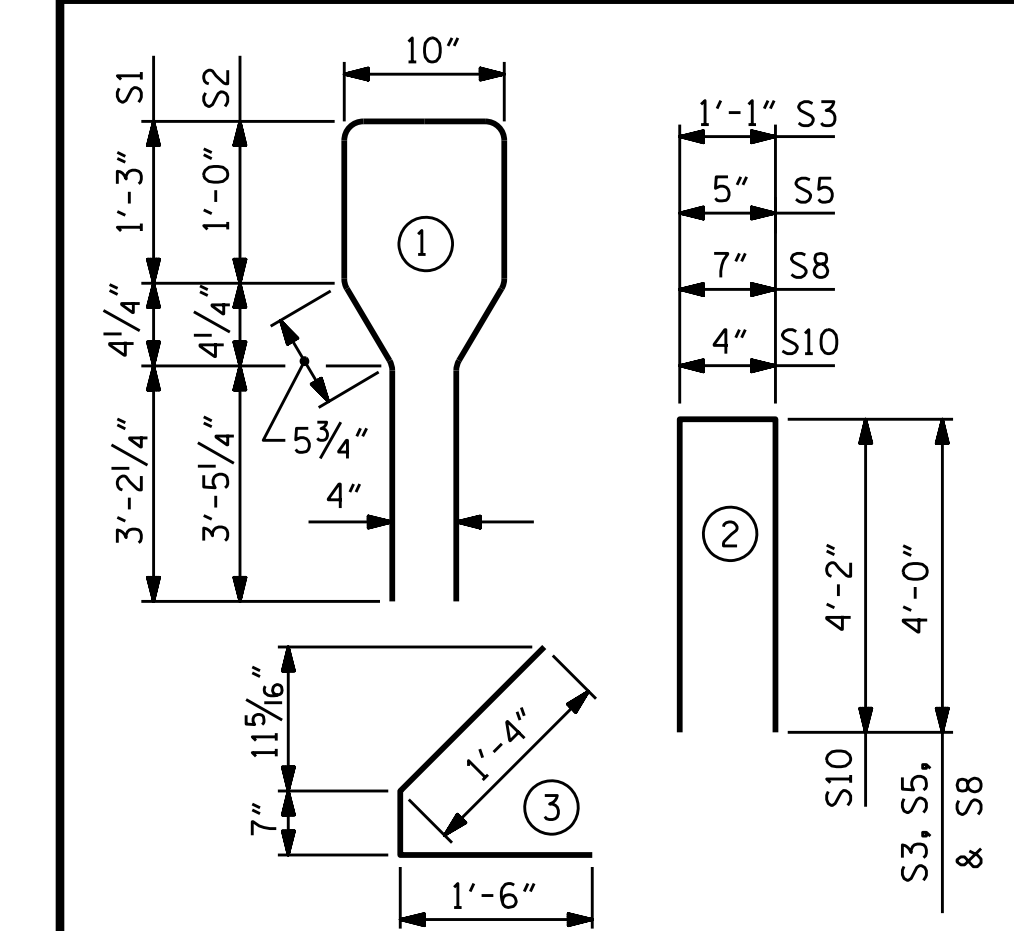
| AREA (SQUARE INCHES) | ULTIMATE STRENGTH (LBS. PER STRAND) | APPLIED PRESTRESS (LBS. PER STRAND) |
|----------------------|-------------------------------------|-------------------------------------|
| 0.217 | 58,600 | 43,950 |

REINFORCING STEEL FOR ONE GIRDER

| BAR | NUMBER | SIZE | TYPE | LENGTH | WEIGHT | |
|---------------|--------|------|------|--------|--------|-----|
| EXTERIOR GDR. | S1 | #73 | #5 | 1 | 10'-8" | 812 |
| INTERIOR GDR. | S1 | #73 | #5 | 1 | 10'-8" | 812 |
| | S2 | #12 | #6 | 1 | 10'-8" | 192 |
| | 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 |
| EXTERIOR GDR. | S10 | #2 | #5 | 2 | 8'-8" | 18 |
| INTERIOR GDR. | S10 | #4 | #5 | 2 | 8'-8" | 36 |
| EXTERIOR GDR. | S11 | #5 | #4 | STR | 7'-0" | 23 |
| INTERIOR GDR. | S12 | #5 | #4 | STR | 11'-2" | 37 |
| | 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 | 8000 PSI CONCRETE | 0.6" Ø L. R. STRANDS |
|-----------------|-------------------|-------------------|----------------------|
| | LB. | C.Y. | No. |
| EXTERIOR GIRDER | 1361 | 19.9 | 42 |
| INTERIOR GIRDER | 1393 | 19.9 | 42 |

GIRDERS REQUIRED

| NUMBER | LENGTH | TOTAL LENGTH |
|--------|--------|--------------|
| 6 | 98'-0" | 588'-0" |

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

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

DRAWN BY: J. B. W. DATE: 02/20/18
 CHECKED BY: T. L. B. DATE: 02/20/18
 DESIGN ENGINEER OF RECORD: T. L. B. DATE: 02/20/18

1998 **20** 2018
 ALPHA & OMEGA GROUP
 CIVIL | STRUCTURAL | WATER RESOURCES

DocuSigned by:
 [Signature]
 14453
 D794597C456A4F7...
 12/7/2018

4601LakeBooneTrail Suite 3C Raleigh, NC 27607
 Phone 919 981 0310 Fax 919 981 0451
 www.aogroup.com Firm License No. C-16884
 A&O PROJECT NO. 2015.042

REFERENCE NO. 9-11
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REVISIONS

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

SHEET NO. S9-11
 TOTAL SHEETS 32

*****SYTIME*****
 *****DCN*****
 *****USERNAME*****

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.

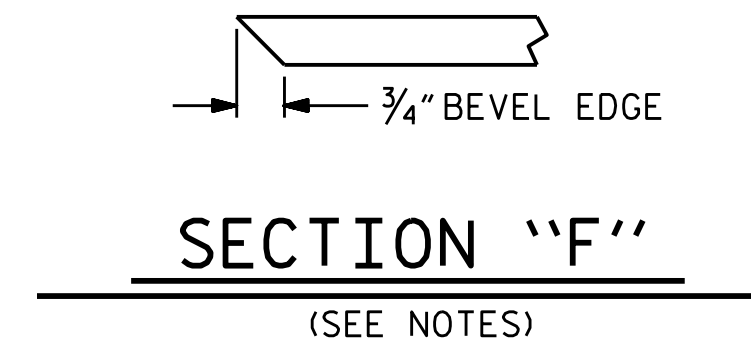
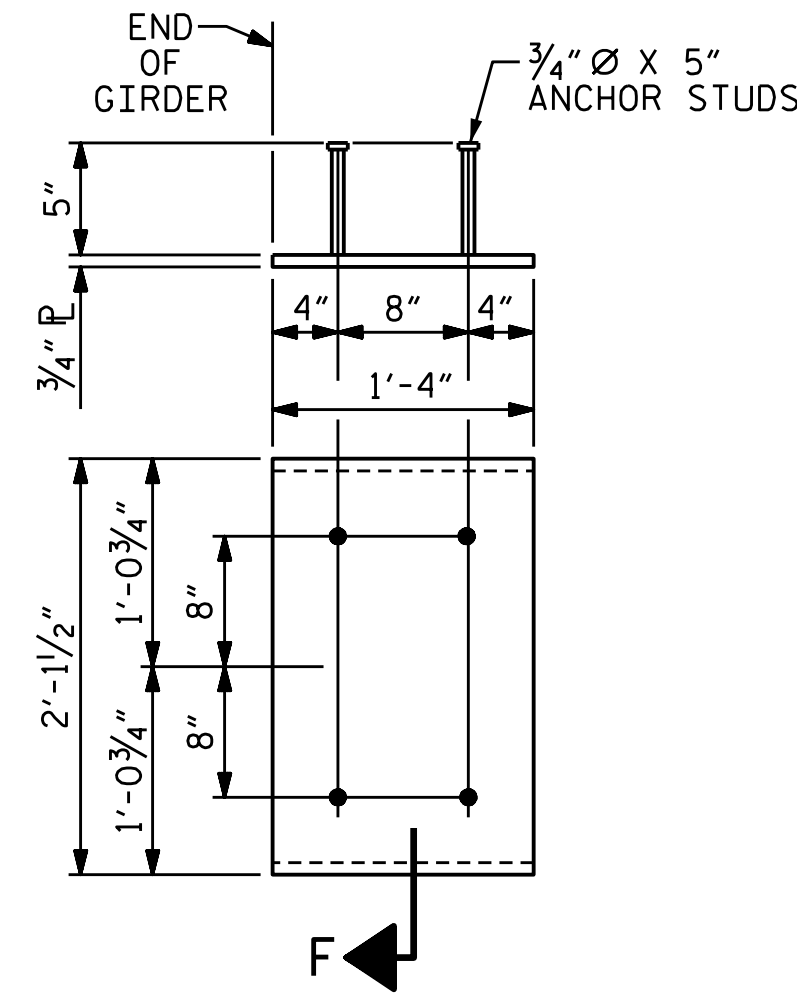
AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

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".

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.



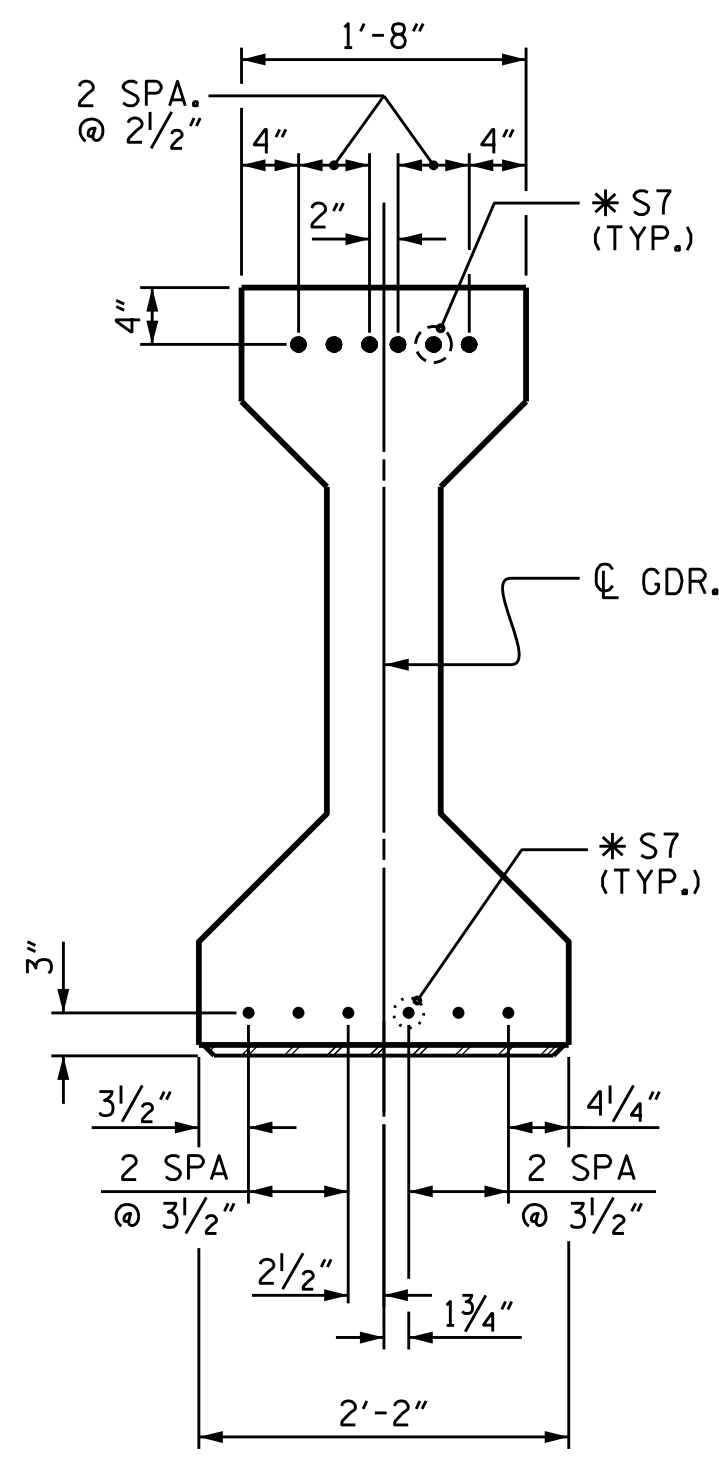
EMBEDDED PLATE "B-1" DETAILS
(2 REQ'D PER GIRDER)

| DEAD LOAD DEFLECTION TABLE FOR SPAN A | | | | | | | | | | | |
|---|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| 0.6" Ø LOW RELAXATION | INTERIOR GIRDER | | | | | | | | | | |
| TENTH POINTS | 0 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | 0 |
| CAMBER (GIRDER ALONE IN PLACE) ↑ | 0.0 | 0.057 | 0.107 | 0.147 | 0.172 | 0.180 | 0.172 | 0.147 | 0.107 | 0.057 | 0.0 |
| * DEFLECTION DUE TO SUPERIMPOSED D.L. ↓ | 0.0 | 0.038 | 0.075 | 0.104 | 0.122 | 0.128 | 0.122 | 0.104 | 0.075 | 0.038 | 0.0 |
| FINAL CAMBER ↑ | 0.0 | 1/4" | 3/8" | 1/2" | 5/8" | 5/8" | 5/8" | 1/2" | 3/8" | 1/4" | 0.0 |

| DEAD LOAD DEFLECTION TABLE FOR SPAN A | | | | | | | | | | | |
|---|-----------------|-------|-------|--------|--------|-------|--------|--------|-------|-------|-----|
| 0.6" Ø LOW RELAXATION | EXTERIOR GIRDER | | | | | | | | | | |
| TENTH POINTS | 0 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | 0 |
| CAMBER (GIRDER ALONE IN PLACE) ↑ | 0.0 | 0.057 | 0.107 | 0.147 | 0.172 | 0.180 | 0.172 | 0.147 | 0.107 | 0.057 | 0.0 |
| * DEFLECTION DUE TO SUPERIMPOSED D.L. ↓ | 0.0 | 0.032 | 0.063 | 0.087 | 0.103 | 0.108 | 0.103 | 0.087 | 0.063 | 0.032 | 0.0 |
| FINAL CAMBER ↑ | 0.0 | 5/16" | 1/2" | 11/16" | 13/16" | 7/8" | 13/16" | 11/16" | 1/2" | 5/16" | 0.0 |

| DEAD LOAD DEFLECTION TABLE FOR SPAN B | | | | | | | | | | | |
|---|-----------------|-------|-------|-------|--------|--------|--------|-------|-------|-------|-----|
| 0.6" Ø LOW RELAXATION | INTERIOR GIRDER | | | | | | | | | | |
| TENTH POINTS | 0 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | 0 |
| CAMBER (GIRDER ALONE IN PLACE) ↑ | 0.0 | 0.072 | 0.136 | 0.186 | 0.218 | 0.229 | 0.218 | 0.186 | 0.136 | 0.072 | 0.0 |
| * DEFLECTION DUE TO SUPERIMPOSED D.L. ↓ | 0.0 | 0.051 | 0.100 | 0.138 | 0.162 | 0.171 | 0.162 | 0.138 | 0.100 | 0.051 | 0.0 |
| FINAL CAMBER ↑ | 0.0 | 1/4" | 7/16" | 9/16" | 11/16" | 11/16" | 11/16" | 9/16" | 7/16" | 1/4" | 0.0 |

| DEAD LOAD DEFLECTION TABLE FOR SPAN B | | | | | | | | | | | |
|---|-----------------|-------|-------|--------|-------|-------|-------|--------|-------|-------|-----|
| 0.6" Ø LOW RELAXATION | EXTERIOR GIRDER | | | | | | | | | | |
| TENTH POINTS | 0 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | 0 |
| CAMBER (GIRDER ALONE IN PLACE) ↑ | 0.0 | 0.072 | 0.136 | 0.186 | 0.218 | 0.229 | 0.218 | 0.186 | 0.136 | 0.072 | 0.0 |
| * DEFLECTION DUE TO SUPERIMPOSED D.L. ↓ | 0.0 | 0.043 | 0.084 | 0.116 | 0.137 | 0.144 | 0.137 | 0.116 | 0.084 | 0.043 | 0.0 |
| FINAL CAMBER ↑ | 0.0 | 5/16" | 5/8" | 13/16" | 1" | 1" | 1" | 13/16" | 5/8" | 5/16" | 0.0 |



DETAIL "A"
(FOR AASHTO TYPE IV GIRDERS)

* 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-1015
CRAVEN COUNTY
STATION: 52+32.96 -Y3-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
DETAILS

DocuSigned by:
T. L. B. [Signature]
14435
D794597C456A4F7
ENGINEER
T. L. BARTELL

10/11/2018 4:02:29 PM EDT

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ALPHA & OMEGA GROUP
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4601 Lake Boone Trail Suite 3C Raleigh, NC 27607
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| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
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| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |

REFERENCE NO. 9-12
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| | |
|-------------------------------------|-----------------|
| DRAWN BY : J. B. W. | DATE : 02/20/18 |
| CHECKED BY : T. L. B. | DATE : 02/20/18 |
| DESIGN ENGINEER OF RECORD: T. L. B. | DATE : 02/20/18 |

*****SYSTEM*****
*****DCN*****
*****USERNAME*****

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 METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. 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.

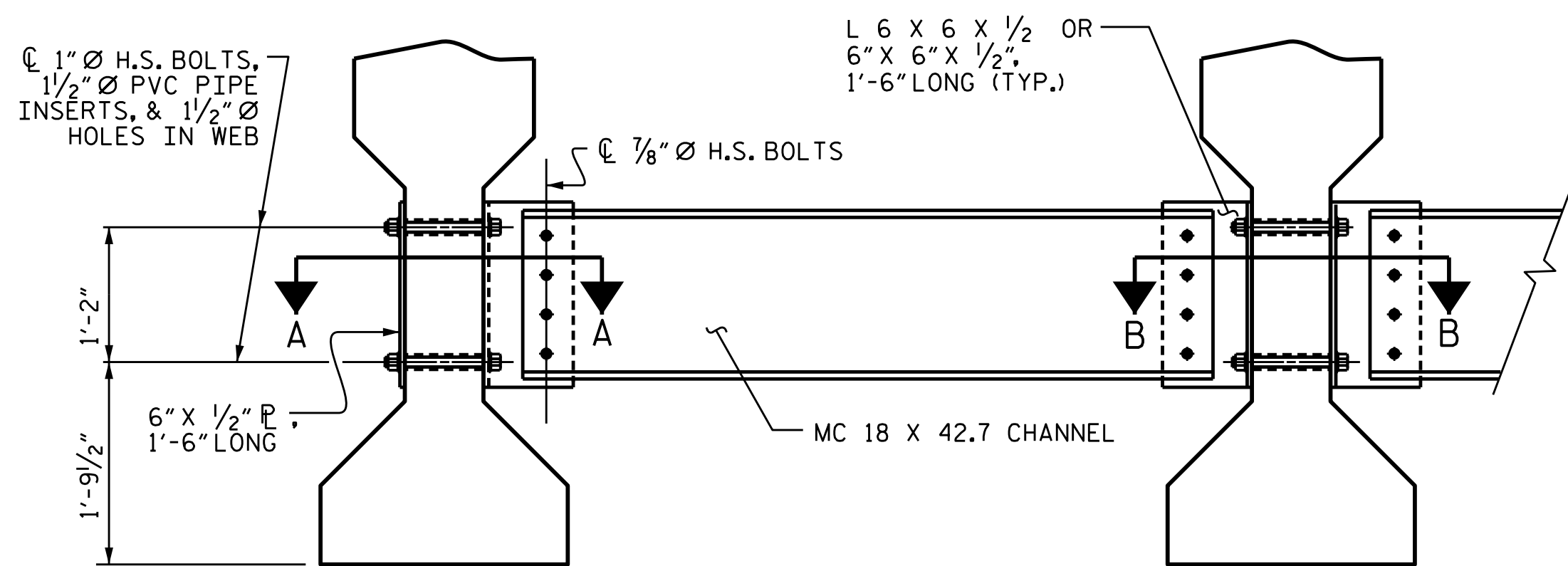
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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.

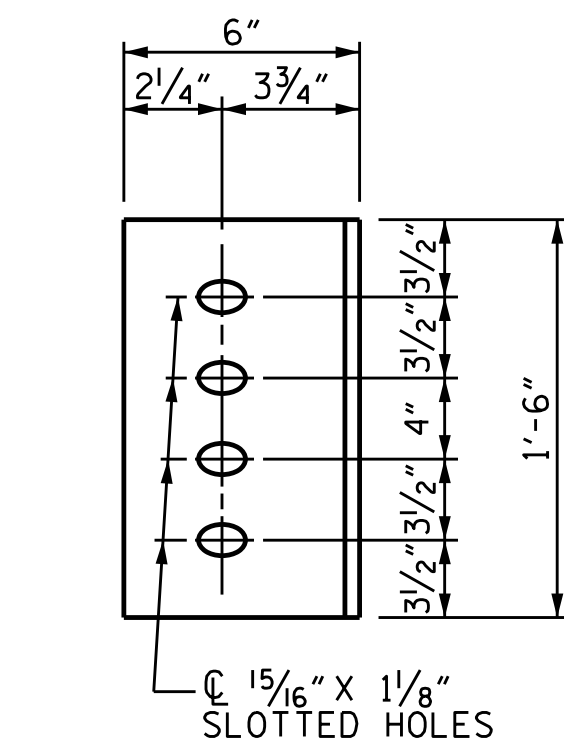
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



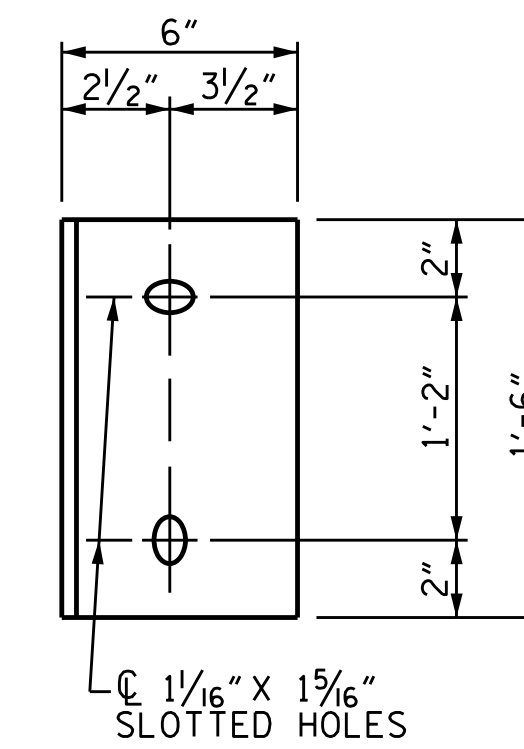
EXTERIOR GIRDER

INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM

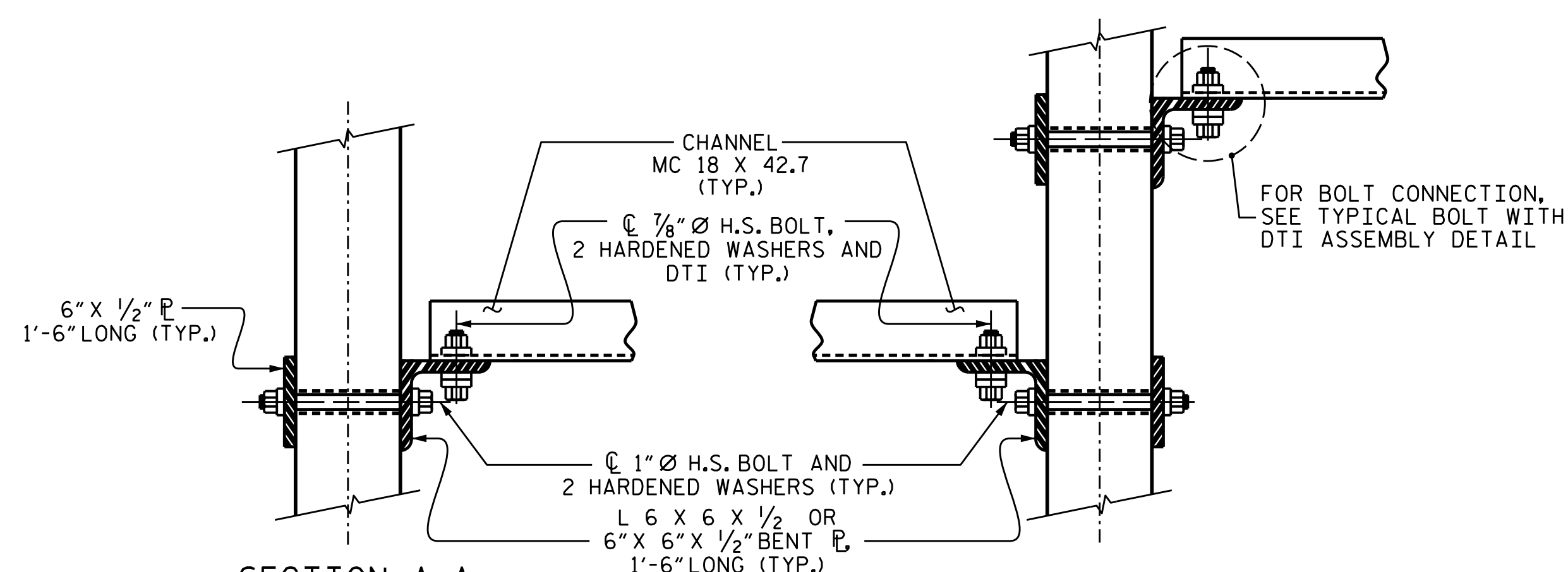


DIAPHRAGM FACE



WEB FACE

CONNECTOR PLATE DETAILS



CONNECTION DETAILS

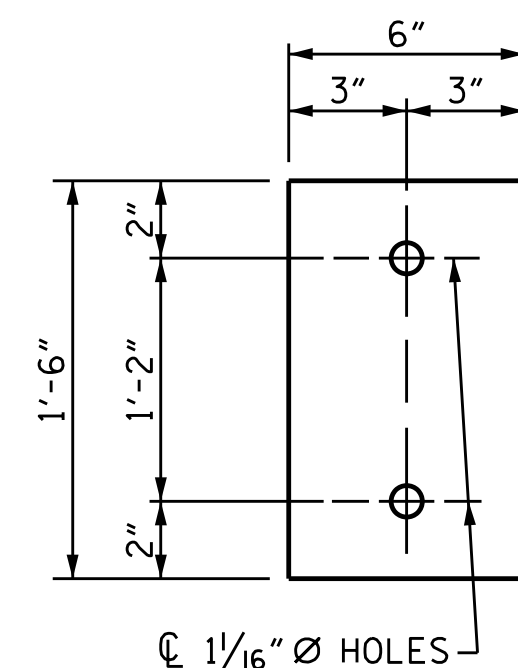
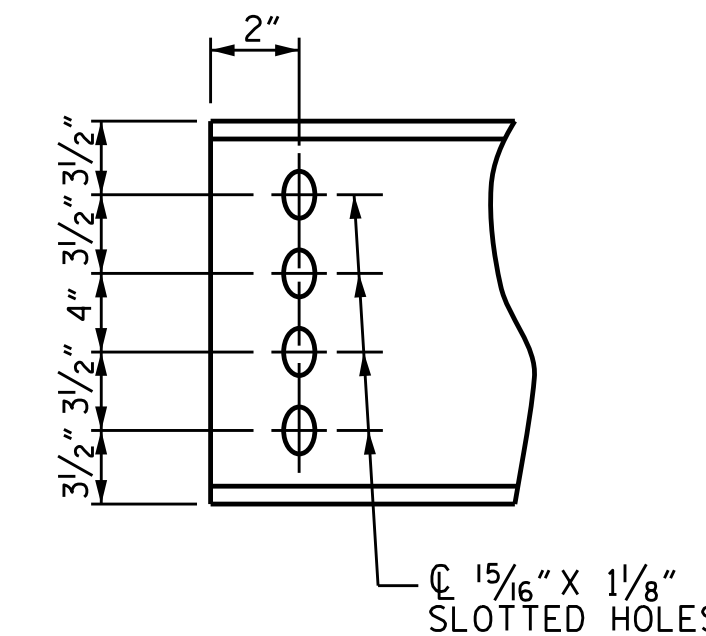
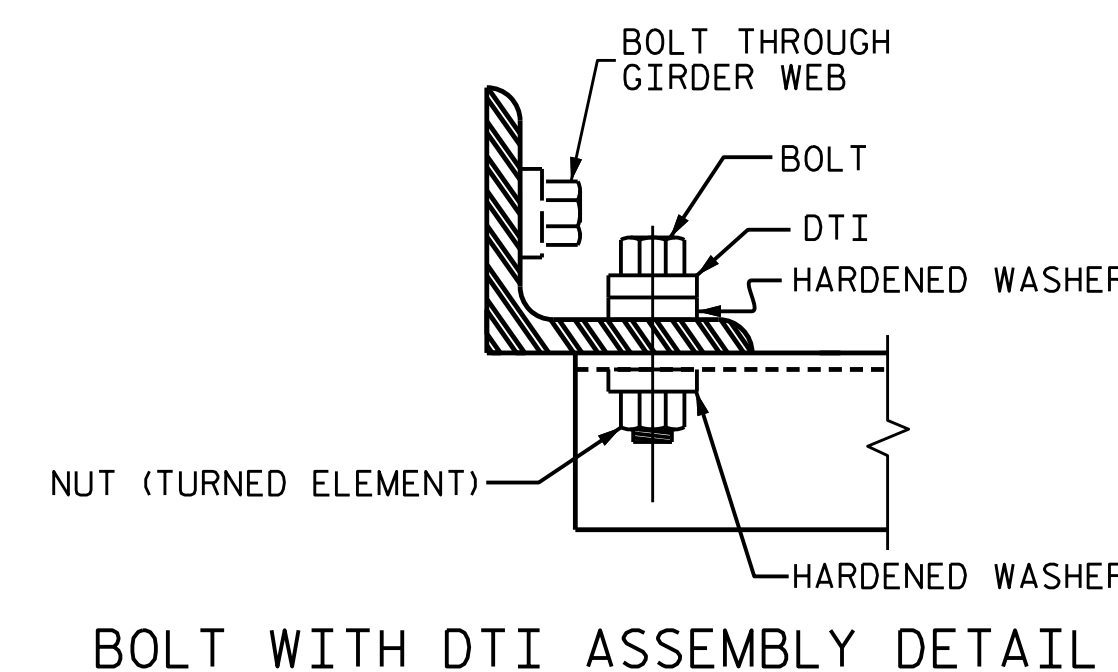


PLATE DETAILS



CHANNEL END



DRAWN BY : J. B. W. DATE : 02/20/18
 CHECKED BY : T. L. B. DATE : 02/20/18
 DESIGN ENGINEER OF RECORD : T. L. B. DATE : 02/20/18

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DocuSigned by:

 14455
 D794597C456A4F7...
 L. BARTELL
 12/7/2018

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 4 OF 4

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

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| NO. | BY: | DATE: | NO. | BY: | DATE: | S9-13 |
| 1 | | | 3 | | | 31 |
| 2 | | | 4 | | | |

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 SHALL THEN BE BURR WITH A SHARP POINTED TOOL.

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

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 "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

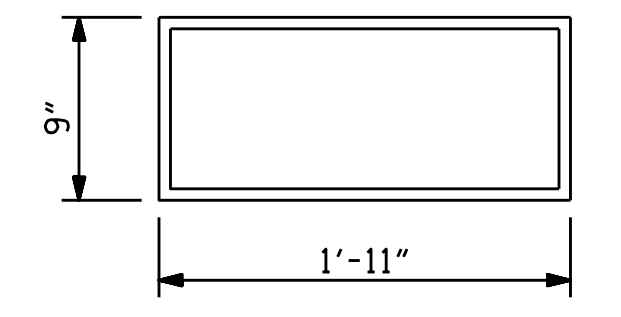
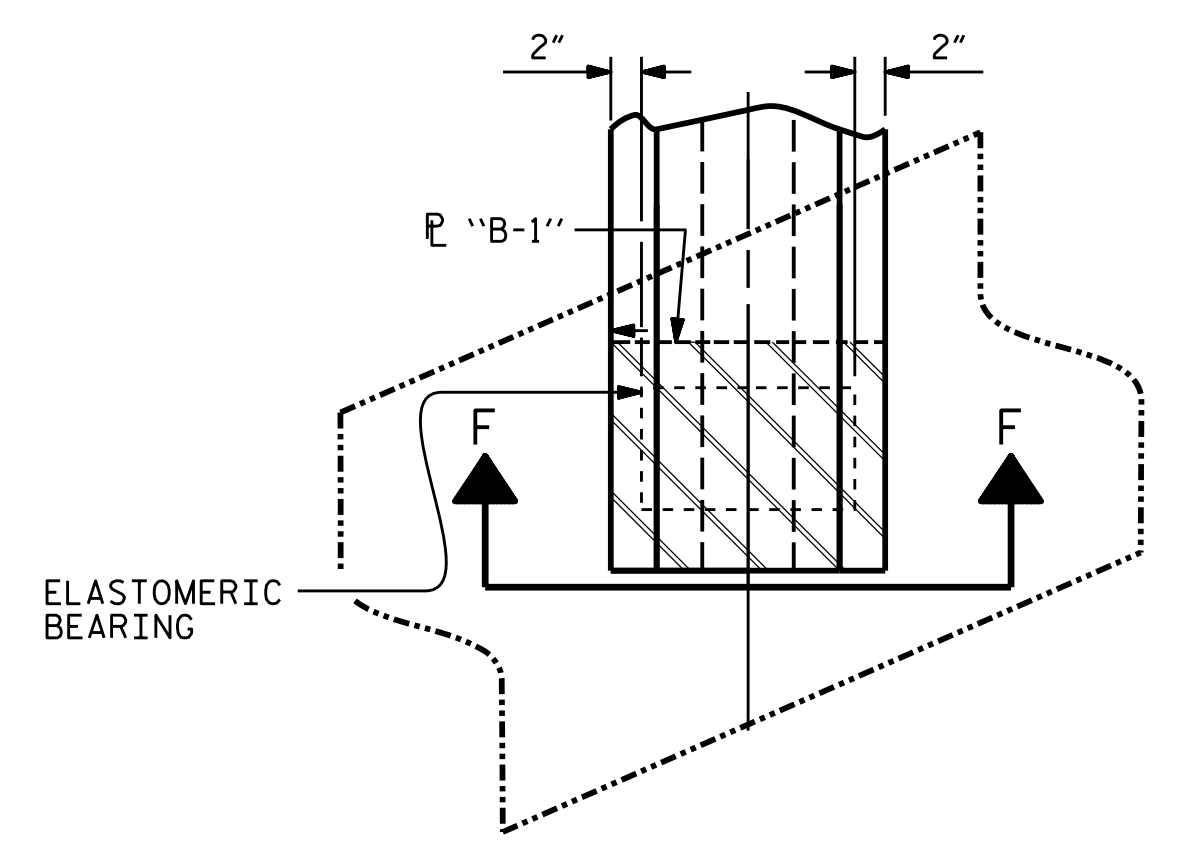
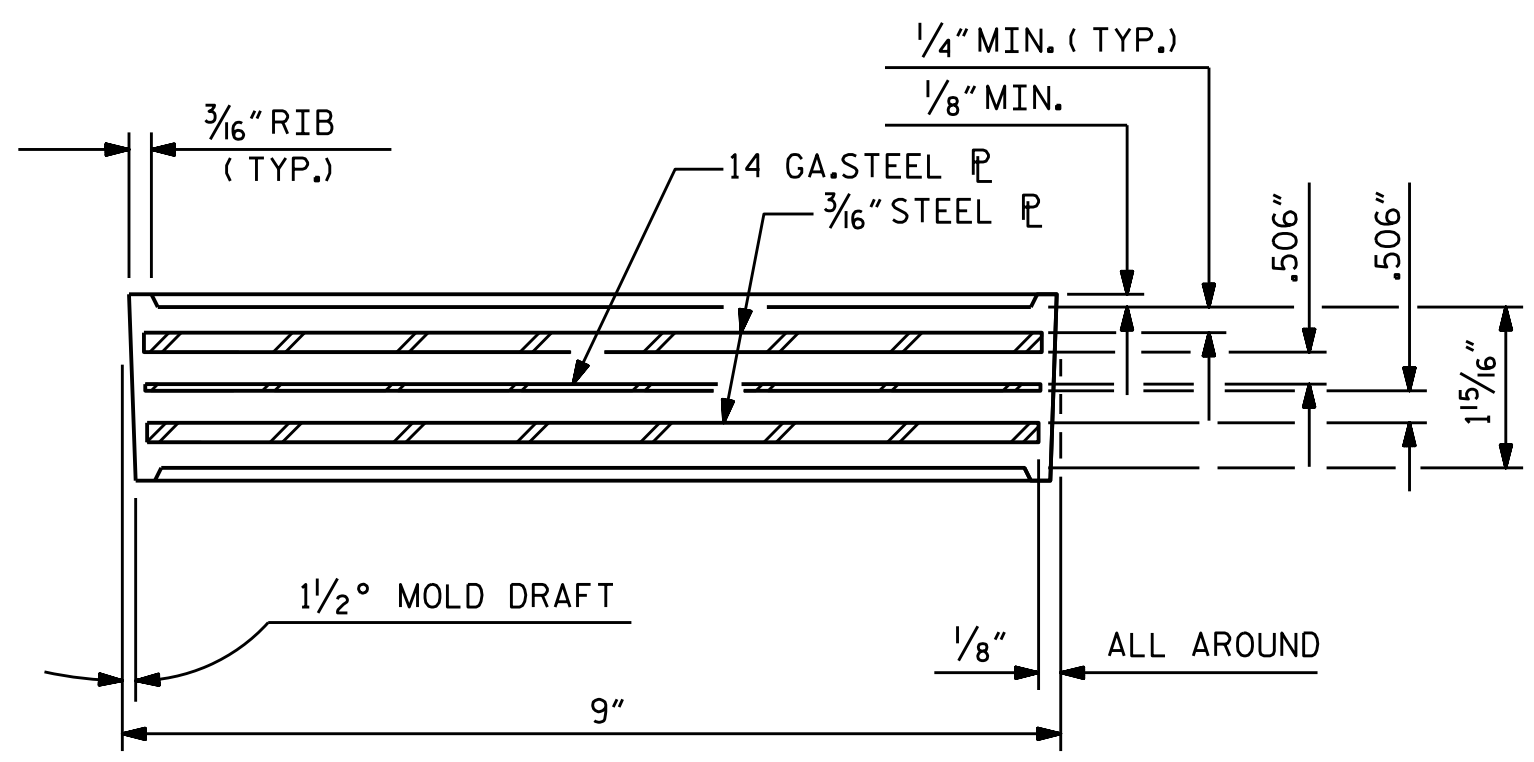
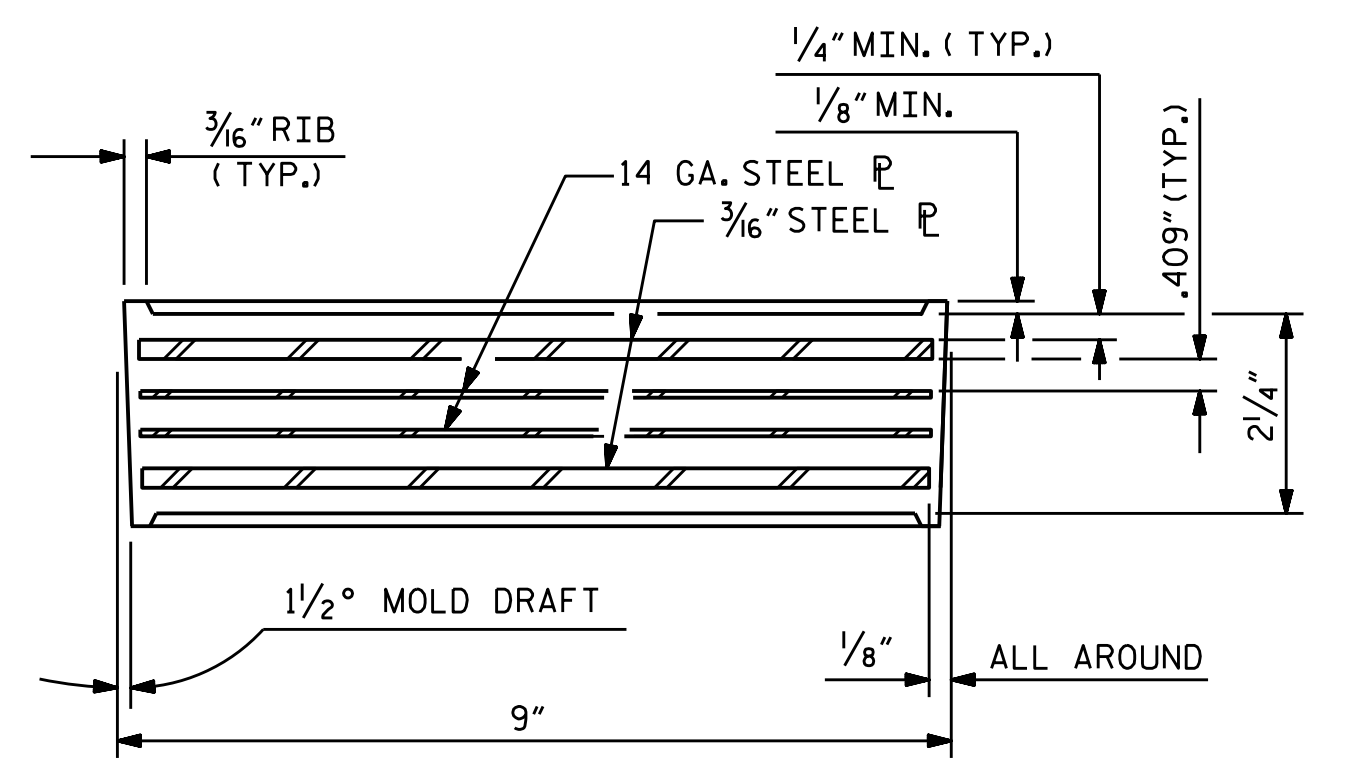
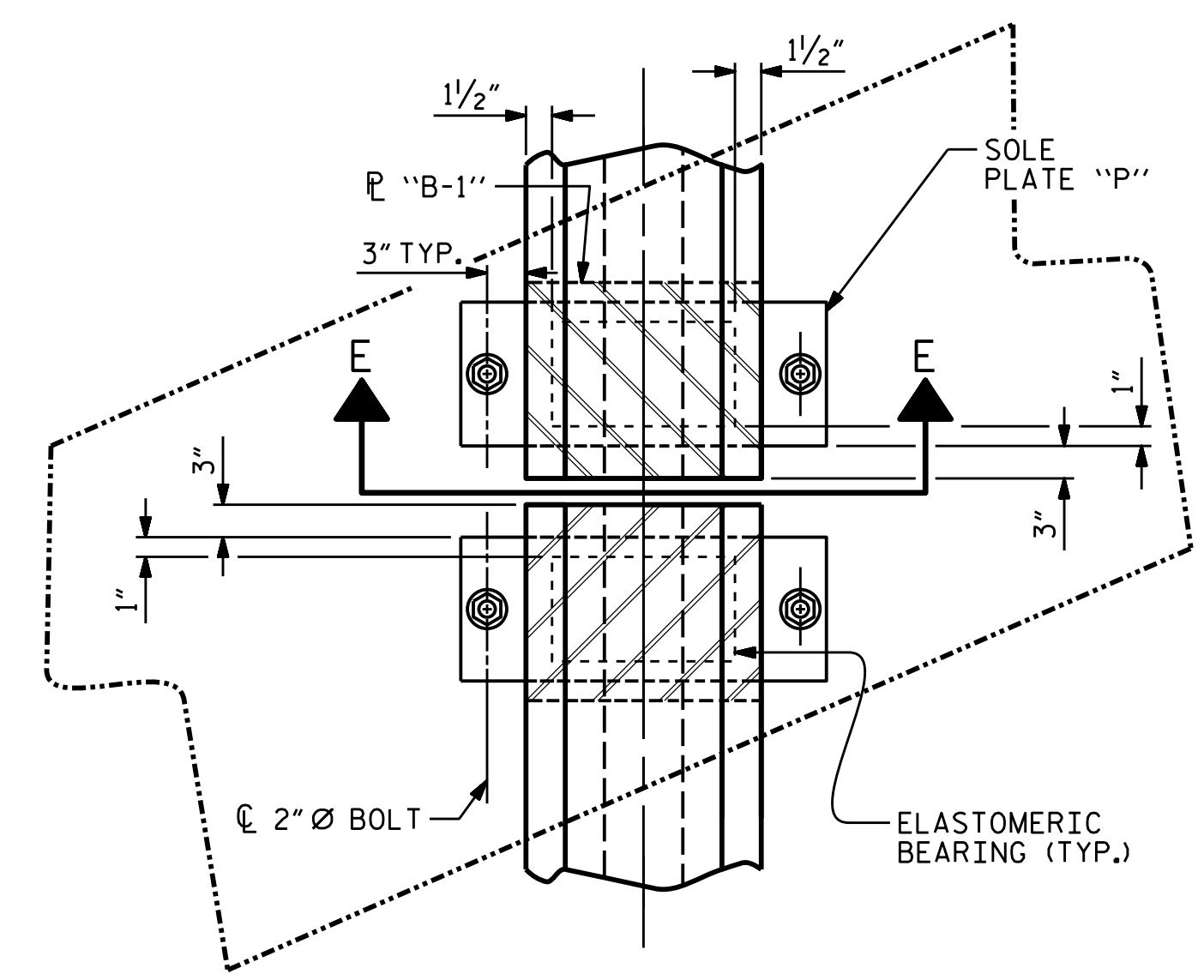
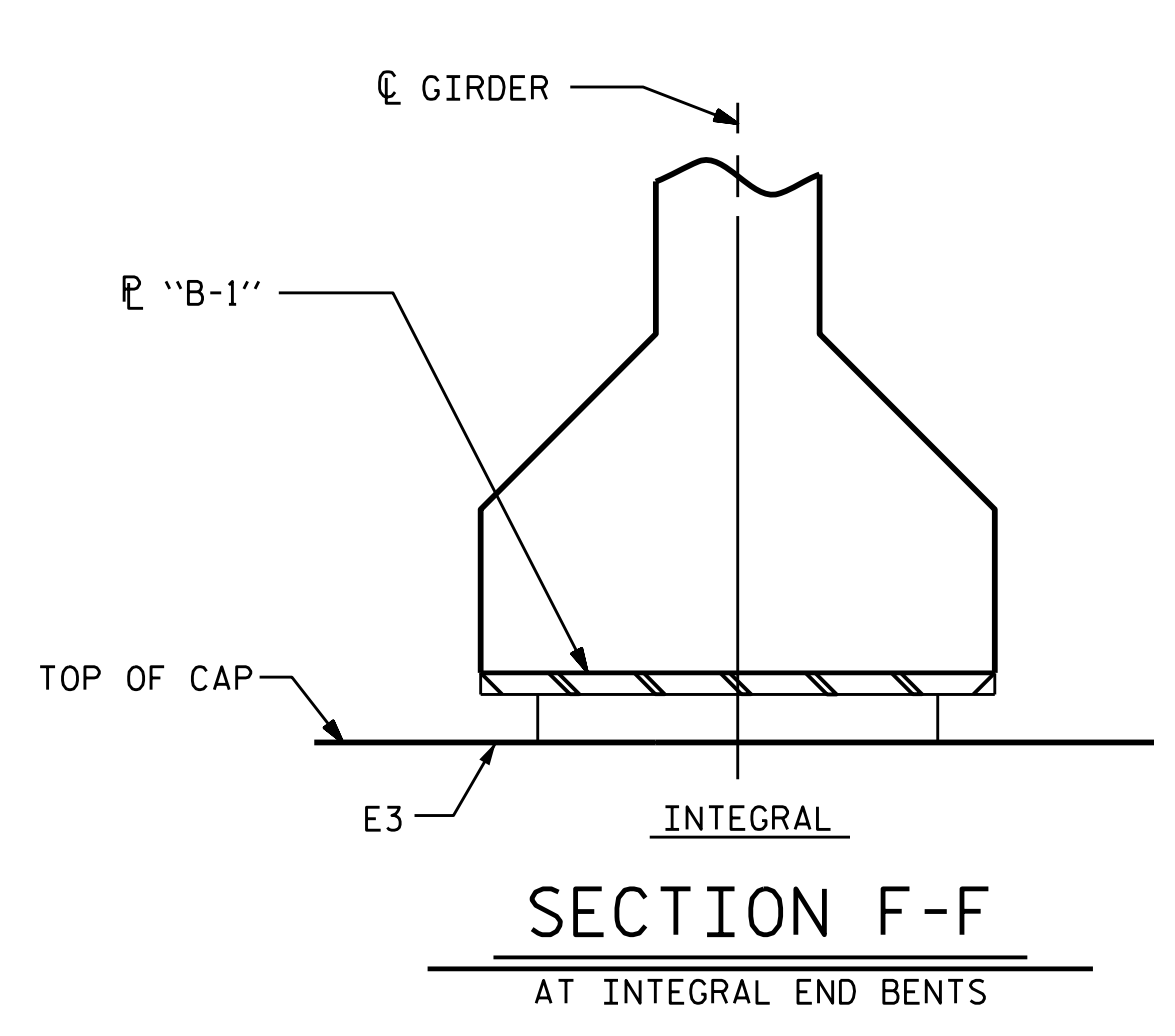
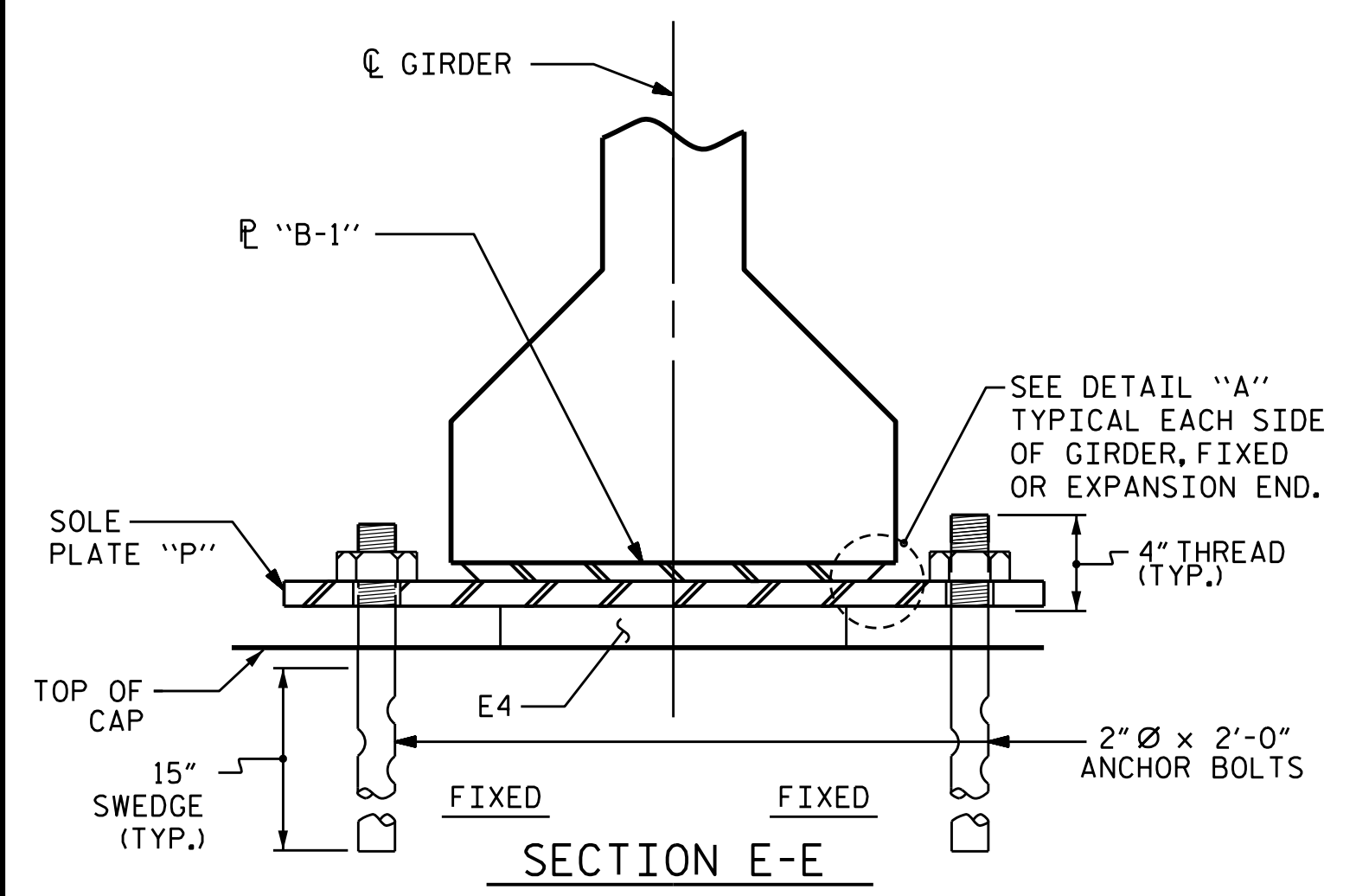
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

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.

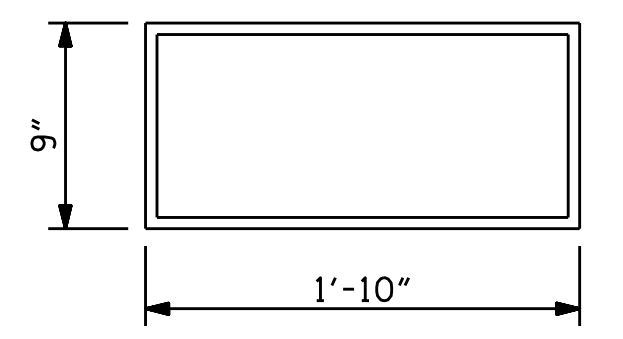
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



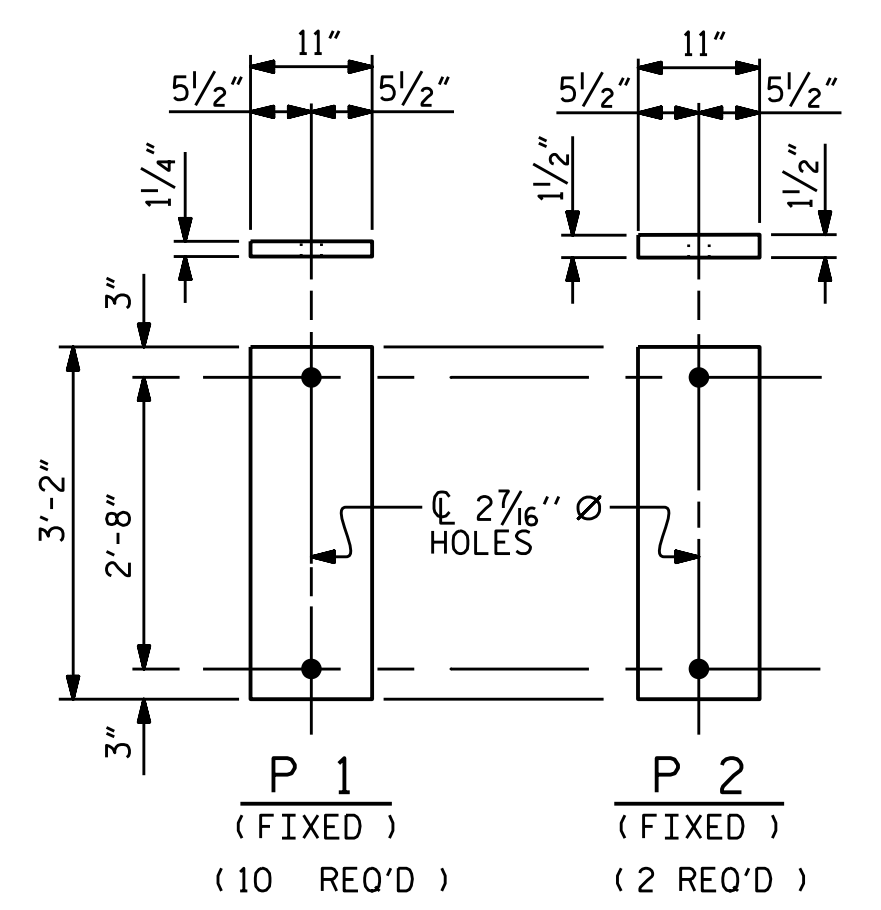
E4 (12 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING
TYPE V

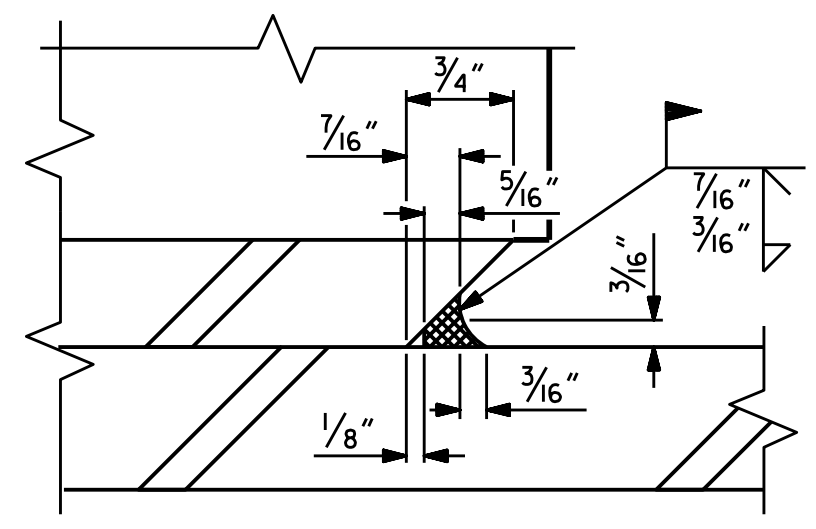


E3 (12 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING
TYPE IV



SOLE PLATE DETAILS ("P")



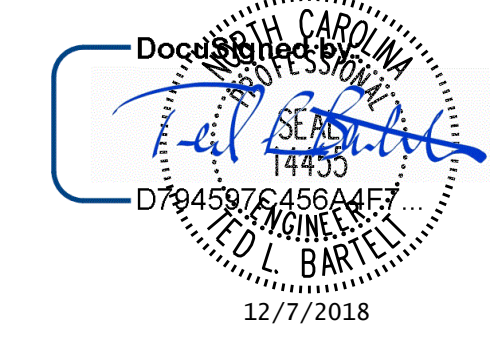
DETAIL "A"

| MAXIMUM ALLOWABLE SERVICE LOADS | |
|---------------------------------|-------|
| D.L.+L.L. (NO IMPACT) | |
| TYPE IV | 225 k |
| TYPE V | 365 k |

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
**ELASTOMERIC BEARING
 DETAILS**
 PRESTRESSED CONCRETE GIRDER
 SUPERSTRUCTURE

DRAWN BY: J.B.W. DATE: 02/20/18
 CHECKED BY: T.L.B. DATE: 02/20/18
 DESIGN ENGINEER OF RECORD: T.L.B. DATE: 02/20/18

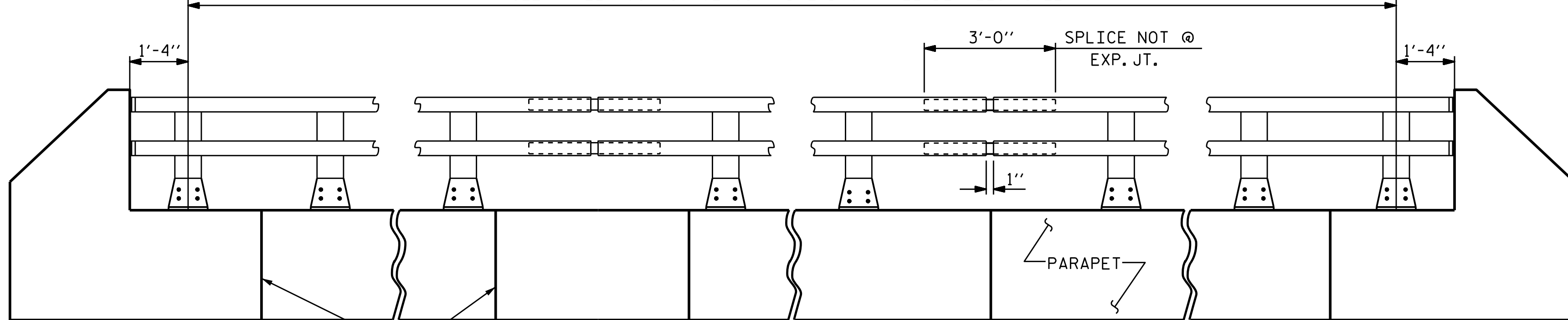


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| REVISIONS | | | | | | SHEET NO. |
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| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |

*****SYSTEM TIME*****
 *****DCN*****
 *****USERNAME*****

SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET



TOOLED CONTRACTION JT.
(SEE NOTES)

ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.

NOTES

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS. THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

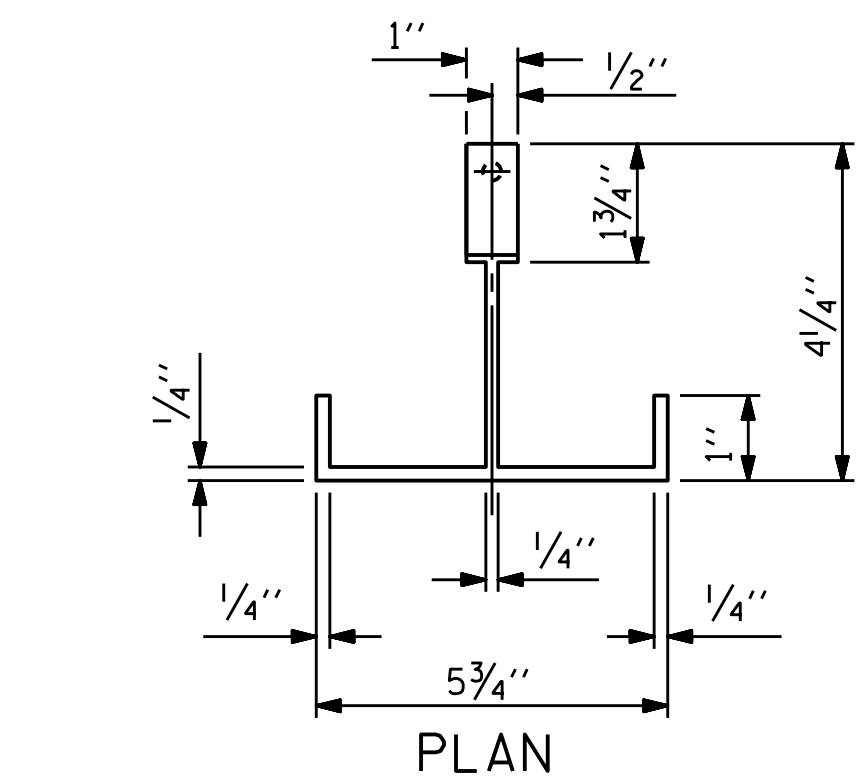
SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

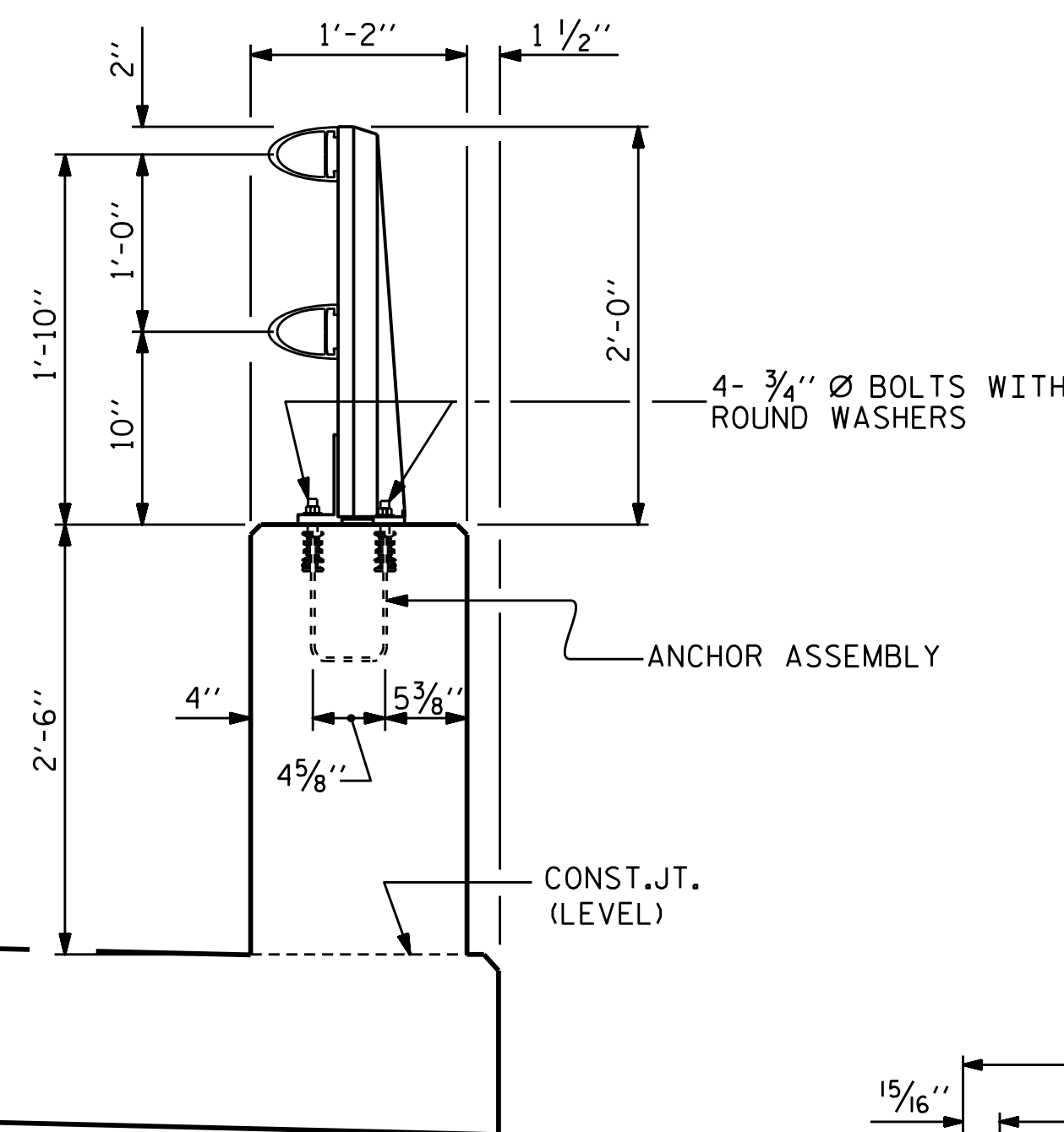
MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

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

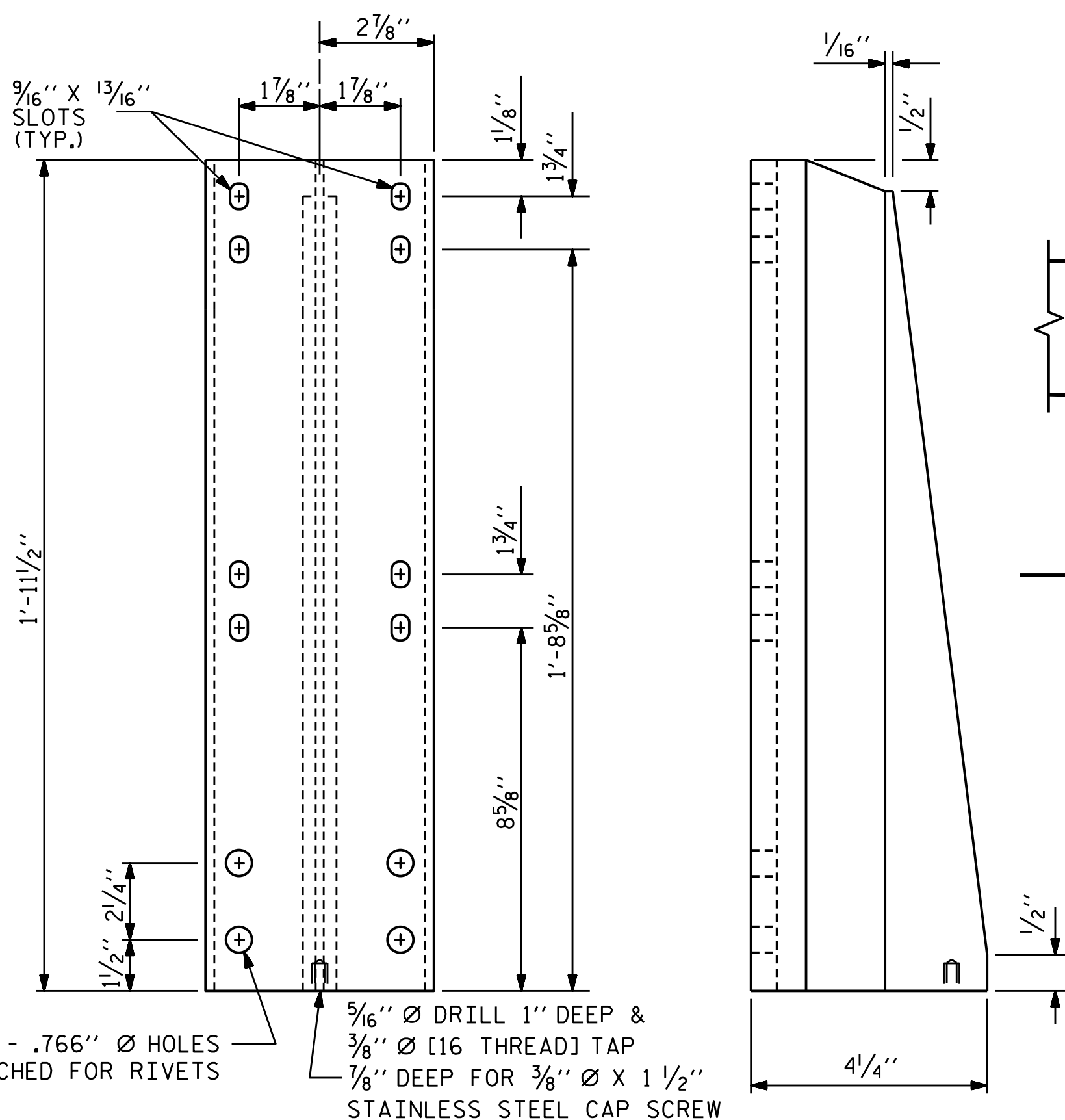
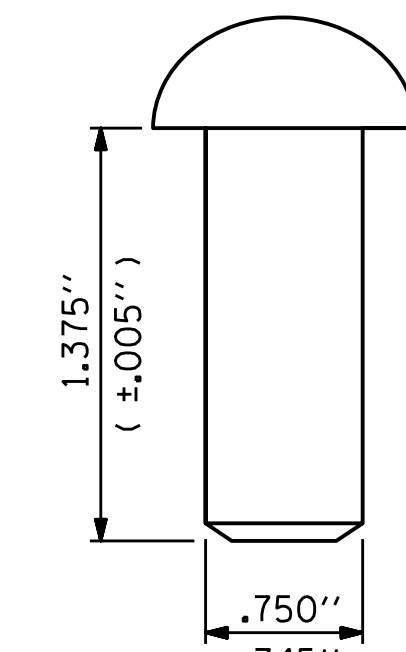
PAY LENGTH = 368.7 LIN. FT.



PLAN



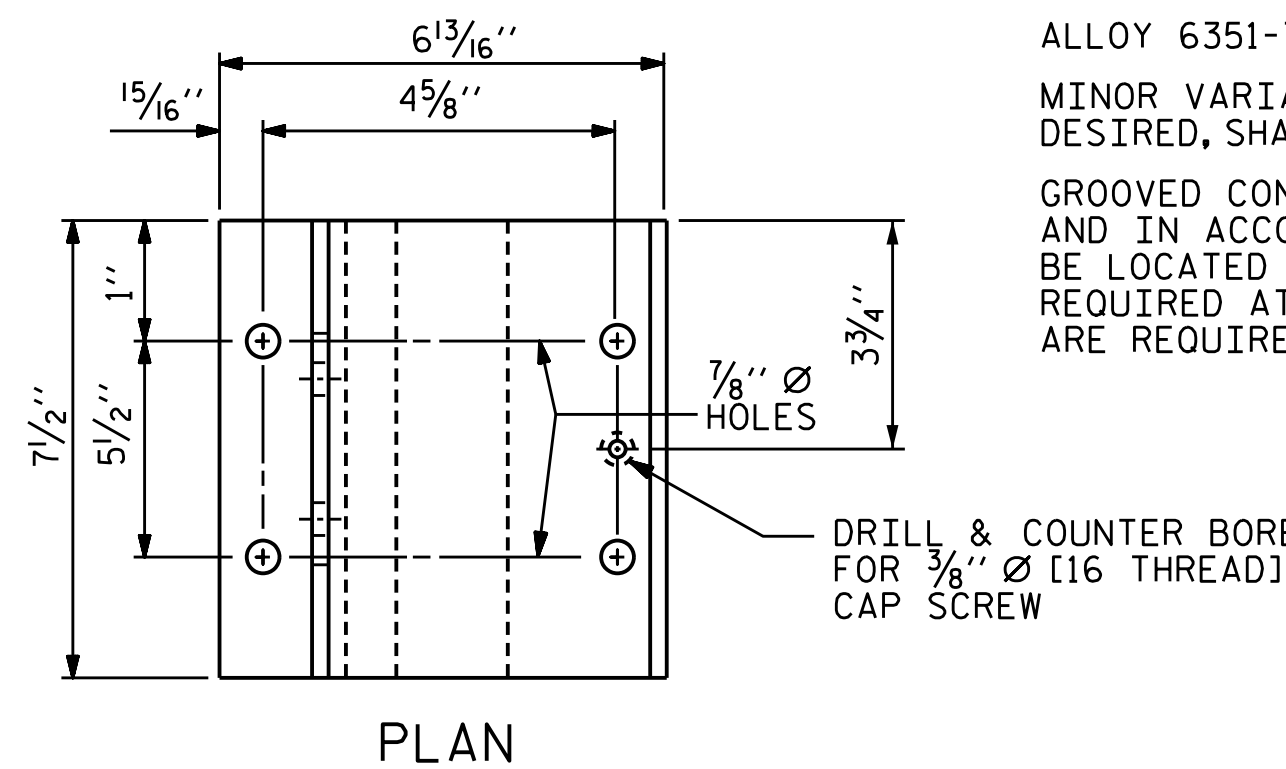
RIVET DETAIL



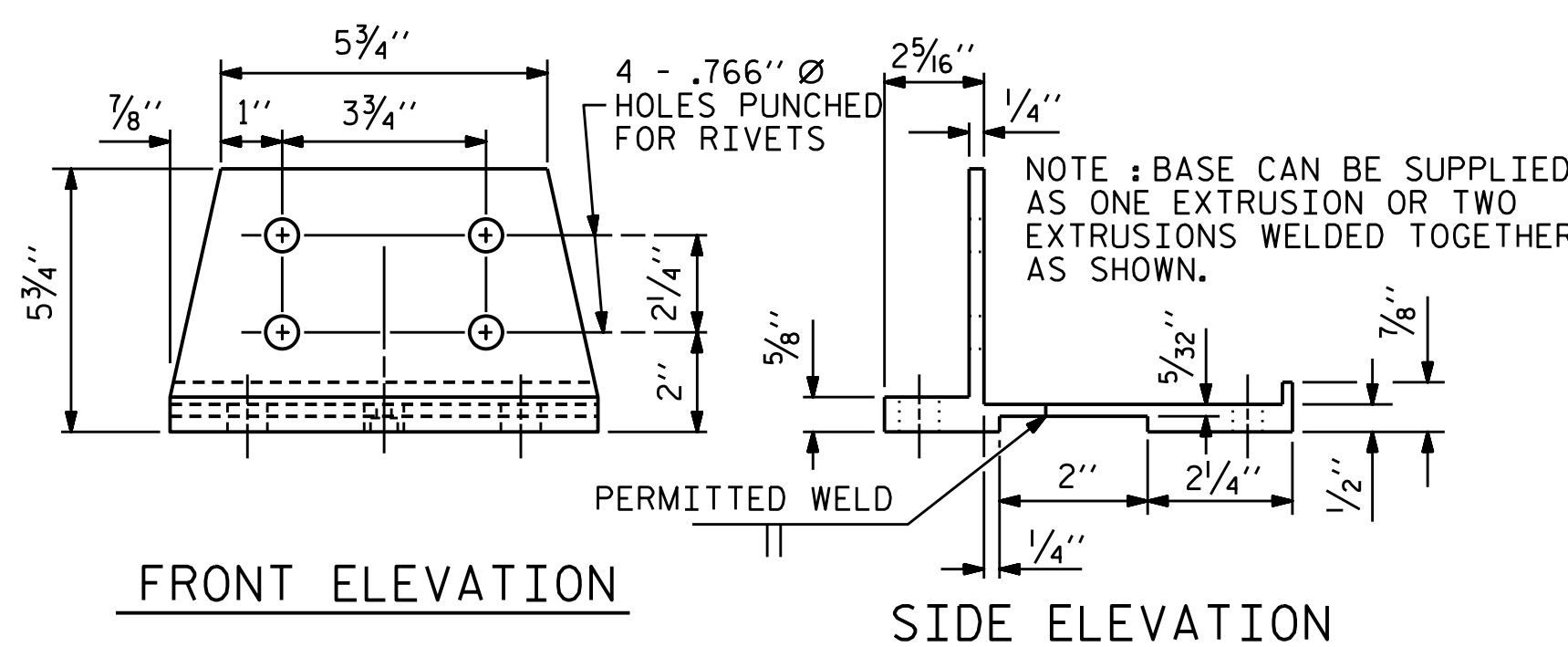
FRONT ELEVATION

SIDE ELEVATION

DETAILS OF POST



PLAN



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS

DRAWN BY : J. B. W. DATE : 2/20/18
 CHECKED BY : T. L. B. DATE : 2/20/18
 DESIGN ENGINEER OF RECORD: T. L. B. DATE : 2/20/18

1998 **20** 2018
ALPHA & OMEGA GROUP
 CIVIL | STRUCTURAL | WATER RESOURCES

DocuSigned by
Paul Bartel
 14455
 B794597C456A4F7
 ENGINEER
 T. L. BARTEL

10/5/2018 8:04:11 AM EDT

4601 Lake Boone Trail Suite 3C Raleigh, NC 27607
 Phone 919 981 0310 Fax 919 981 0451
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 A&O PROJECT NO. 2016.062

REFERENCE NO. 9-15
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PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD

2 BAR METAL RAIL

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S9-15 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |

STD. NO. BMR3

*****SYTIME*****
 *****DGN*****
 *****USERNAME*****

NOTES

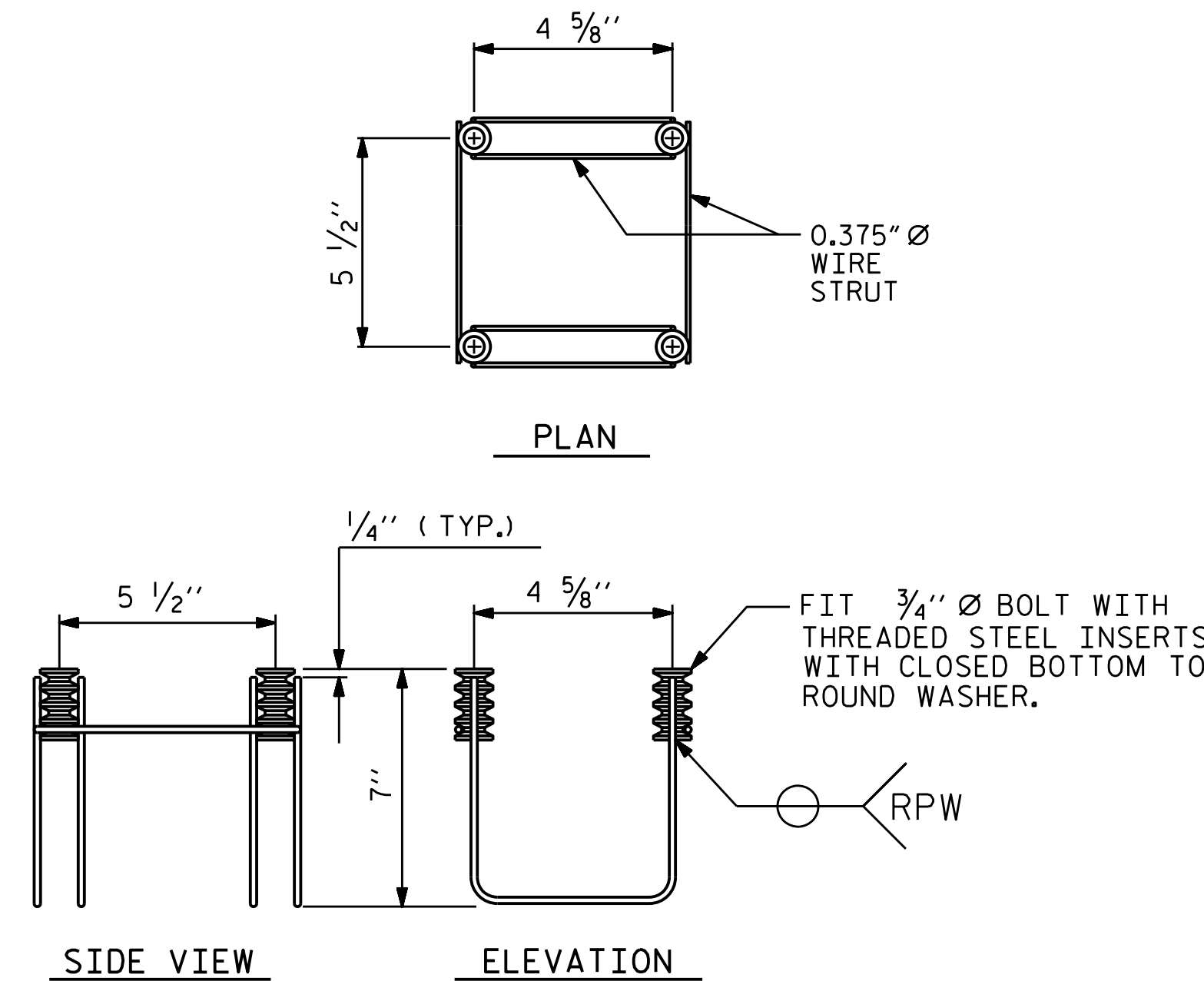
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

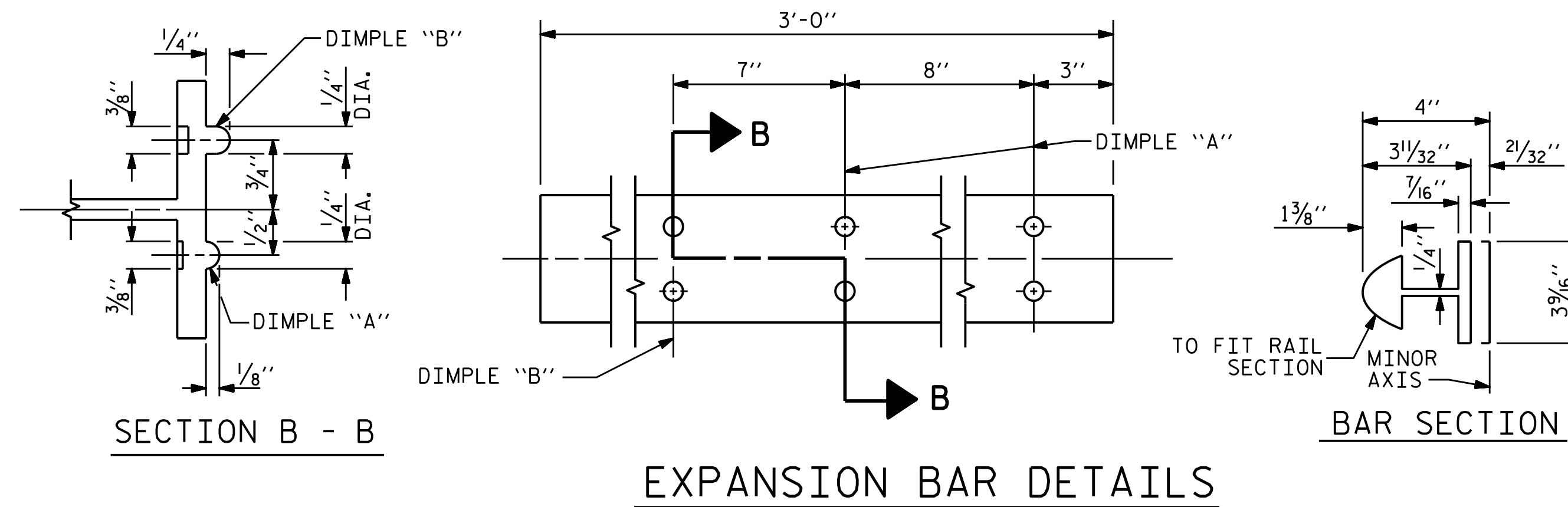
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

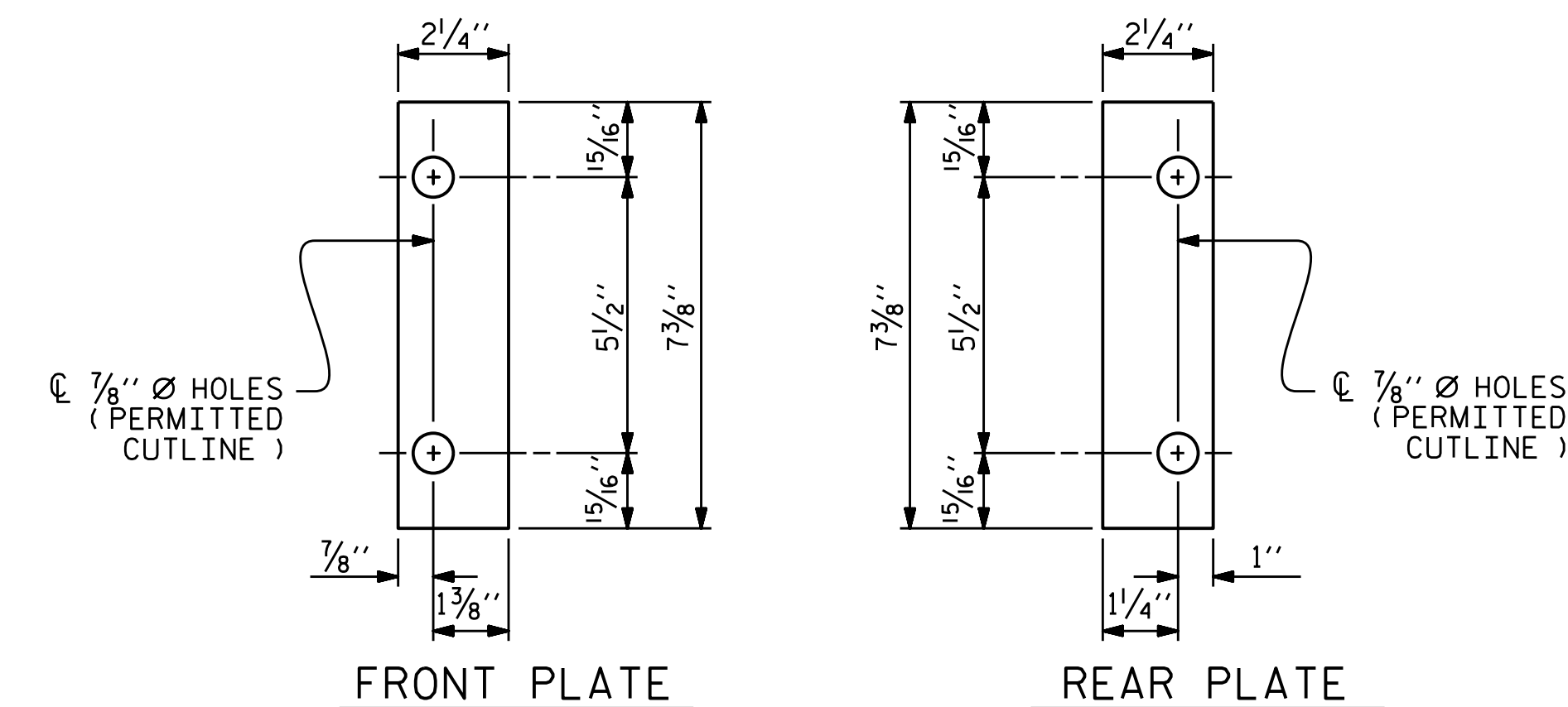


4-BOLT METAL RAIL ANCHOR ASSEMBLY

(80 ASSEMBLIES REQUIRED)

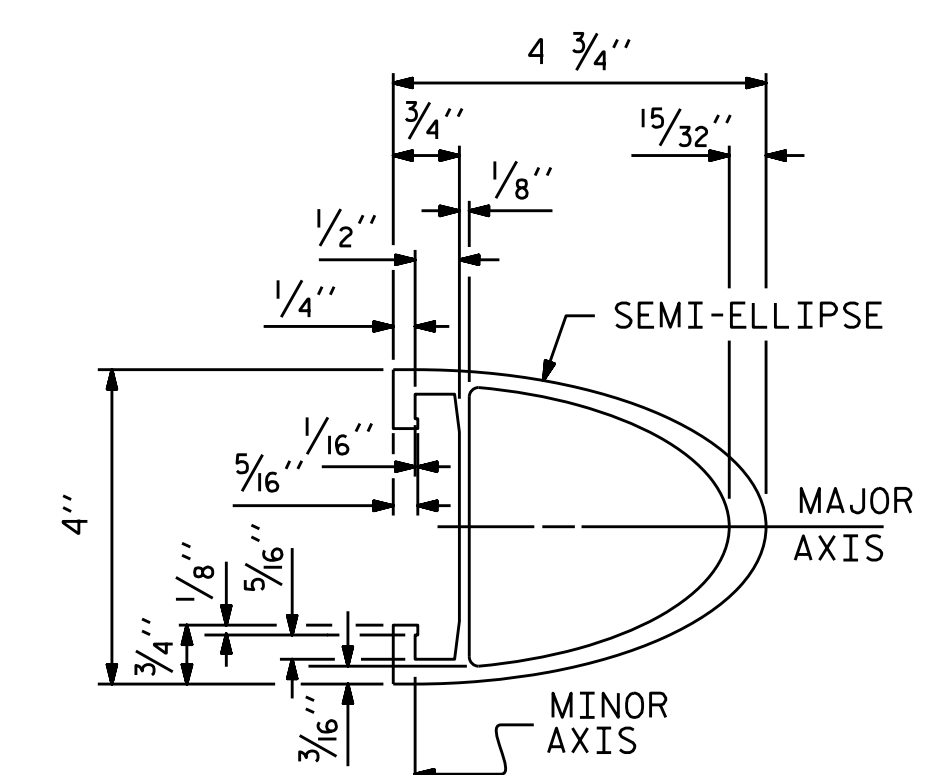


EXPANSION BAR DETAILS

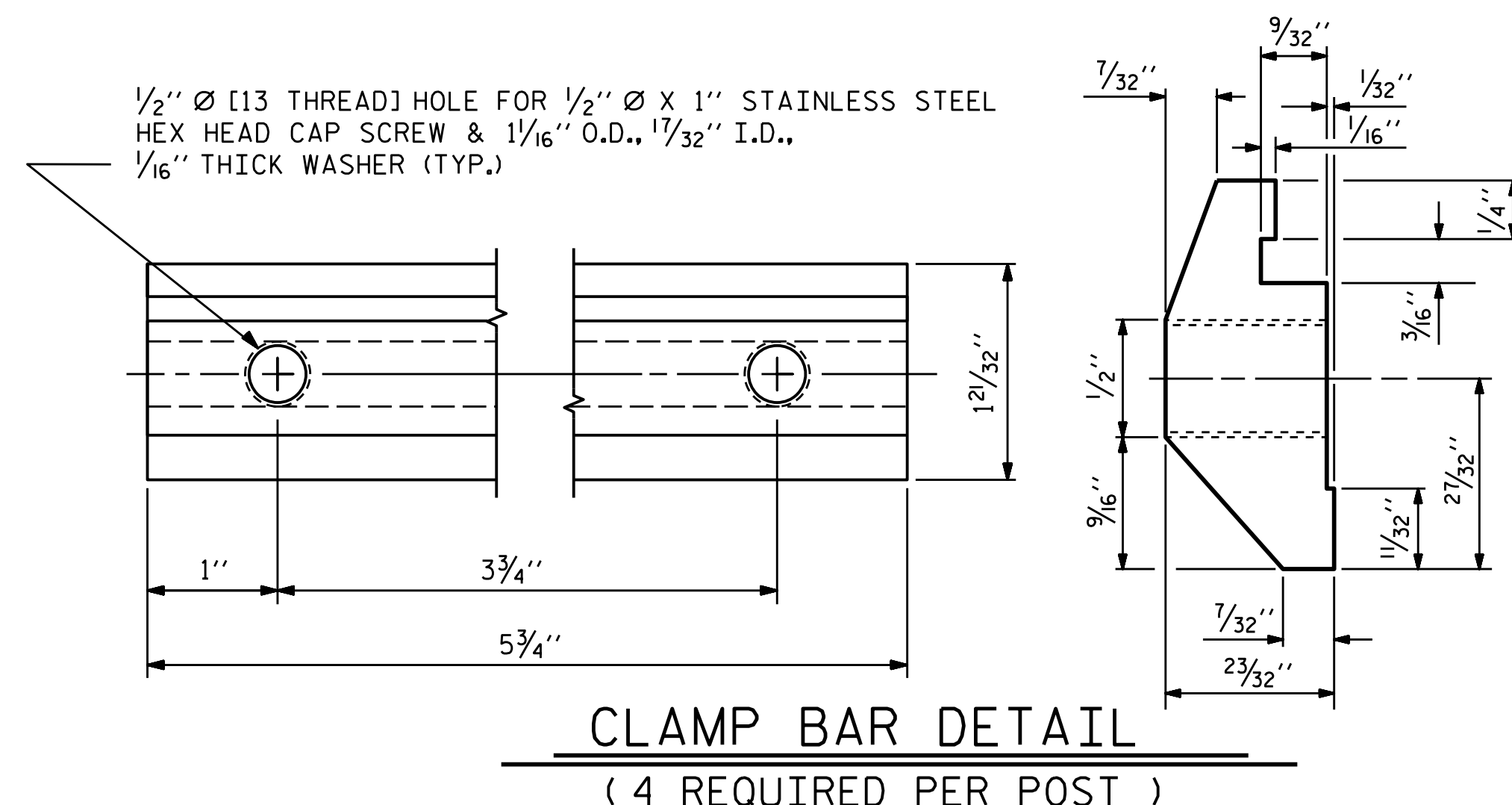


SHIM DETAILS

NOTE : SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

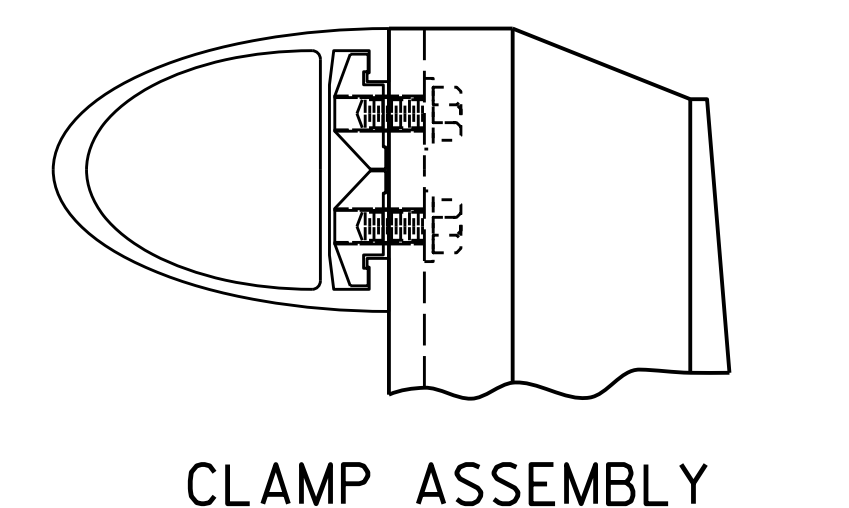


RAIL SECTION

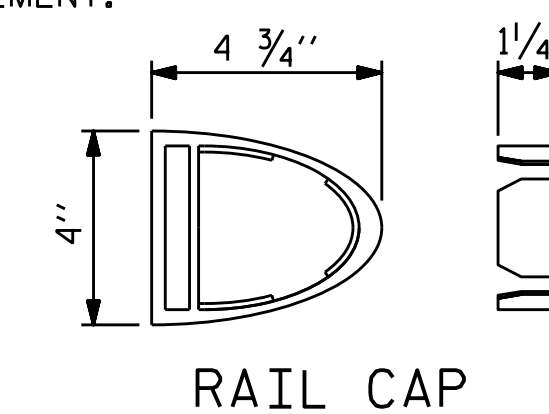


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



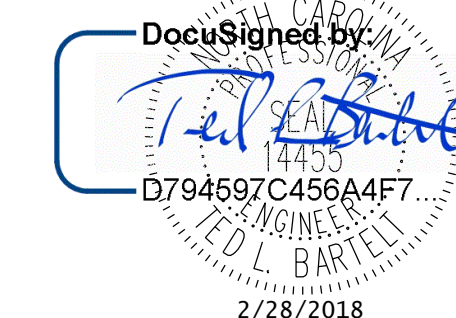
RAIL CAP

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 2 BAR METAL RAIL



4601 Lake Boone Trail Suite 3C Raleigh, NC 27607
 Phone 919 981 0310 Fax 919 981 0451
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 A&O PROJECT NO. 2015.042

REFERENCE NO. 9-16
 DOCUMENT NOT CONSIDERED
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 SIGNATURES COMPLETED

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S9-16 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 31 |

DRAWN BY : J. B. W. DATE : 2/20/18
 CHECKED BY : T. L. B. DATE : 2/20/18
 DESIGN ENGINEER OF RECORD: T. L. B. DATE : 2/20/18

*****SYSTEM*****
 *****DGN*****
 *****USER*****

STD. NO. BMR4

NOTES

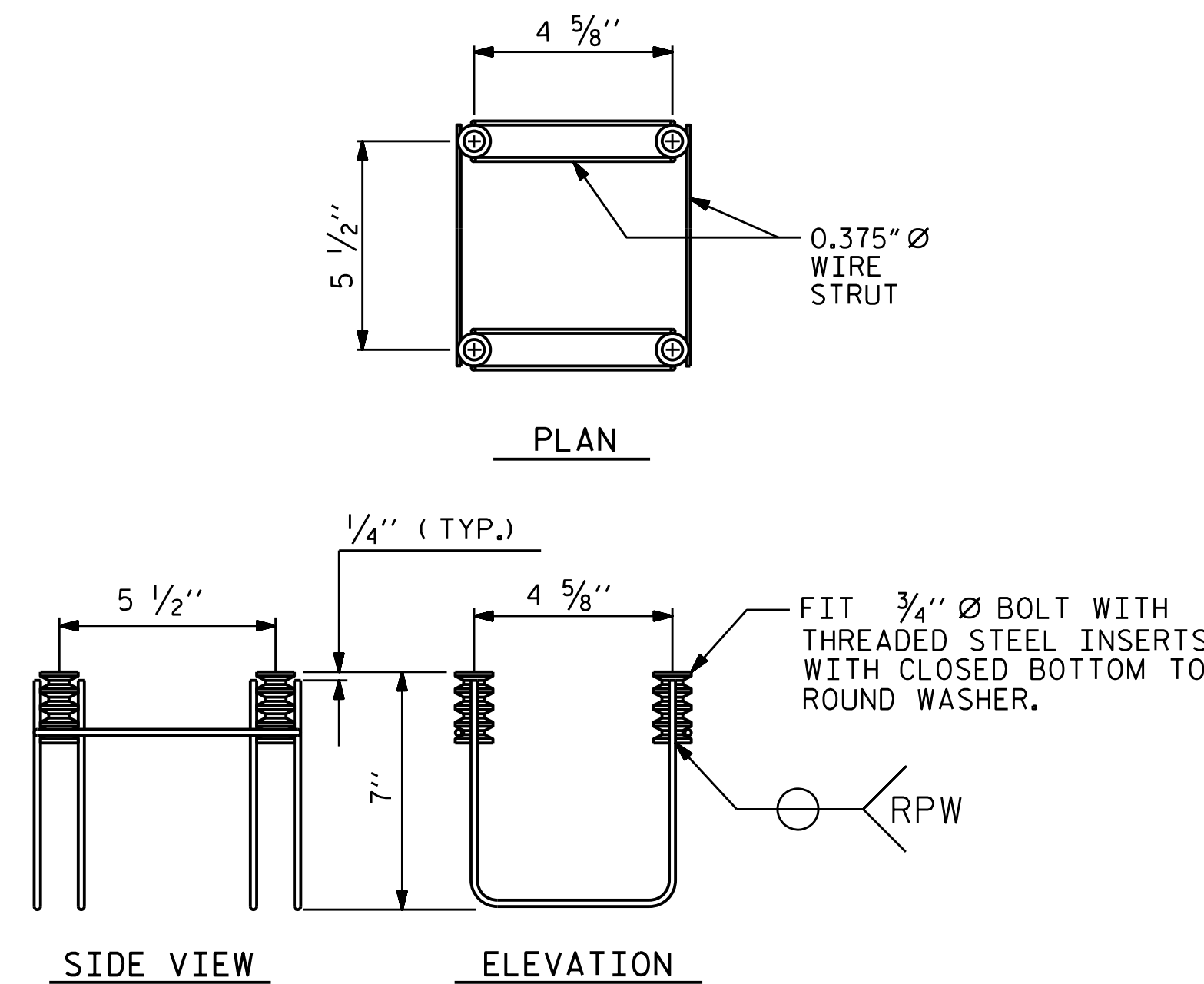
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE GALVANIZED.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

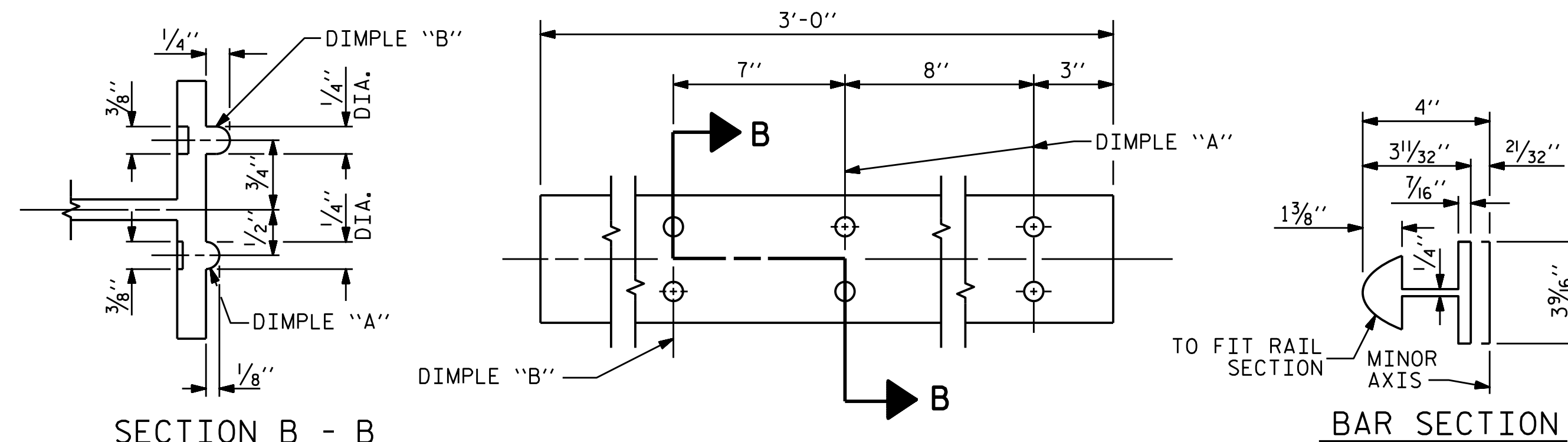
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

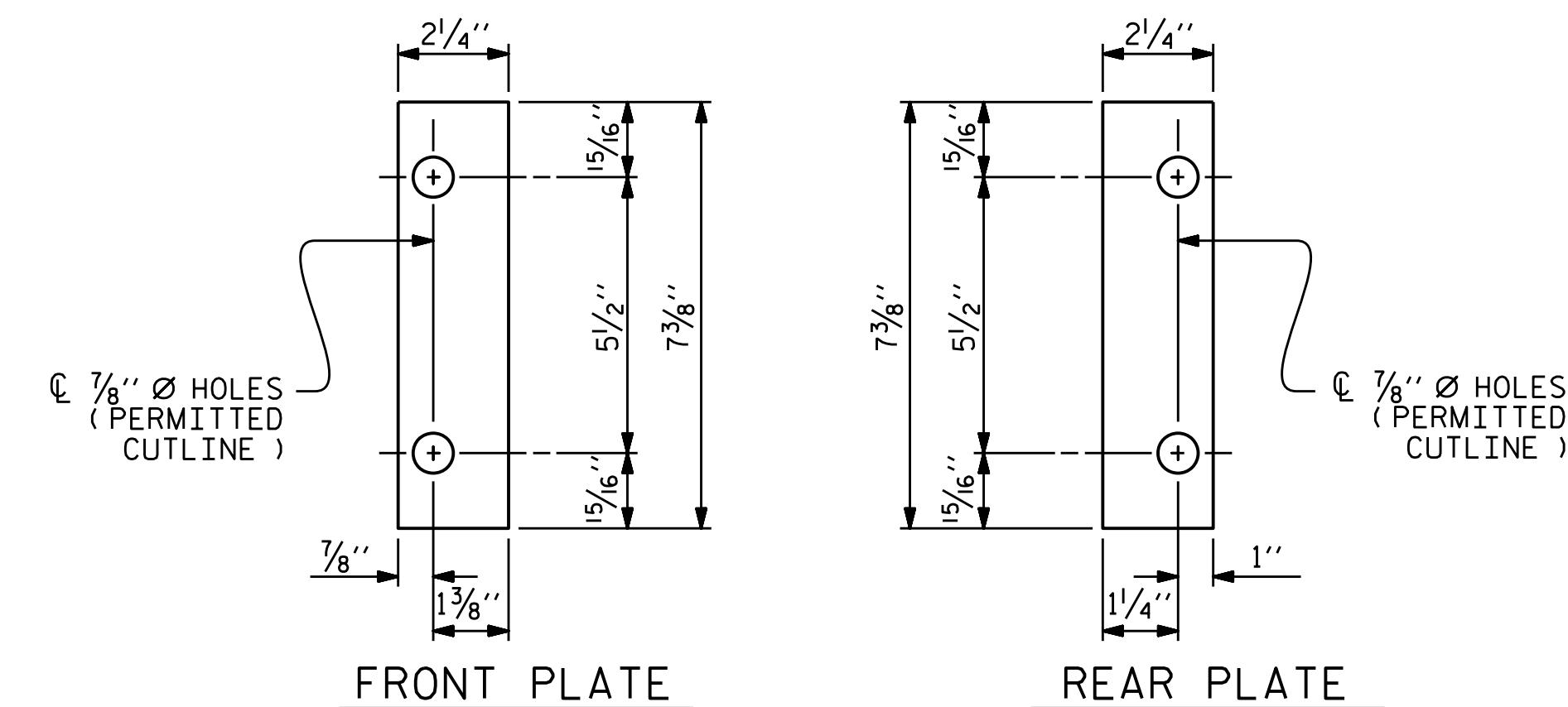


4-BOLT METAL RAIL ANCHOR ASSEMBLY

(78 ASSEMBLIES REQUIRED)

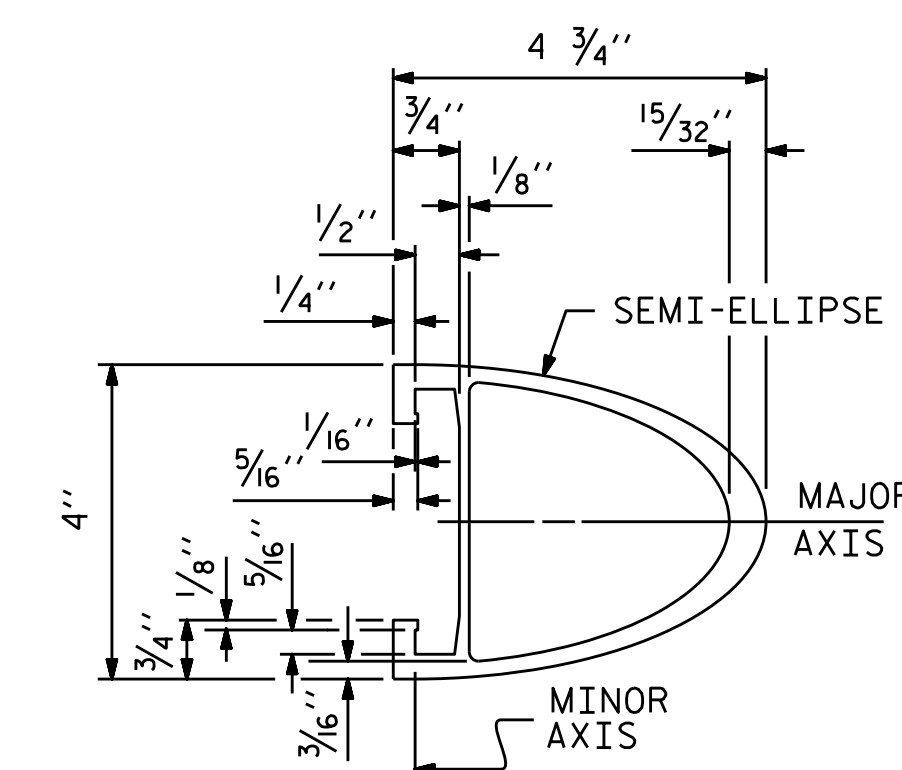


EXPANSION BAR DETAILS

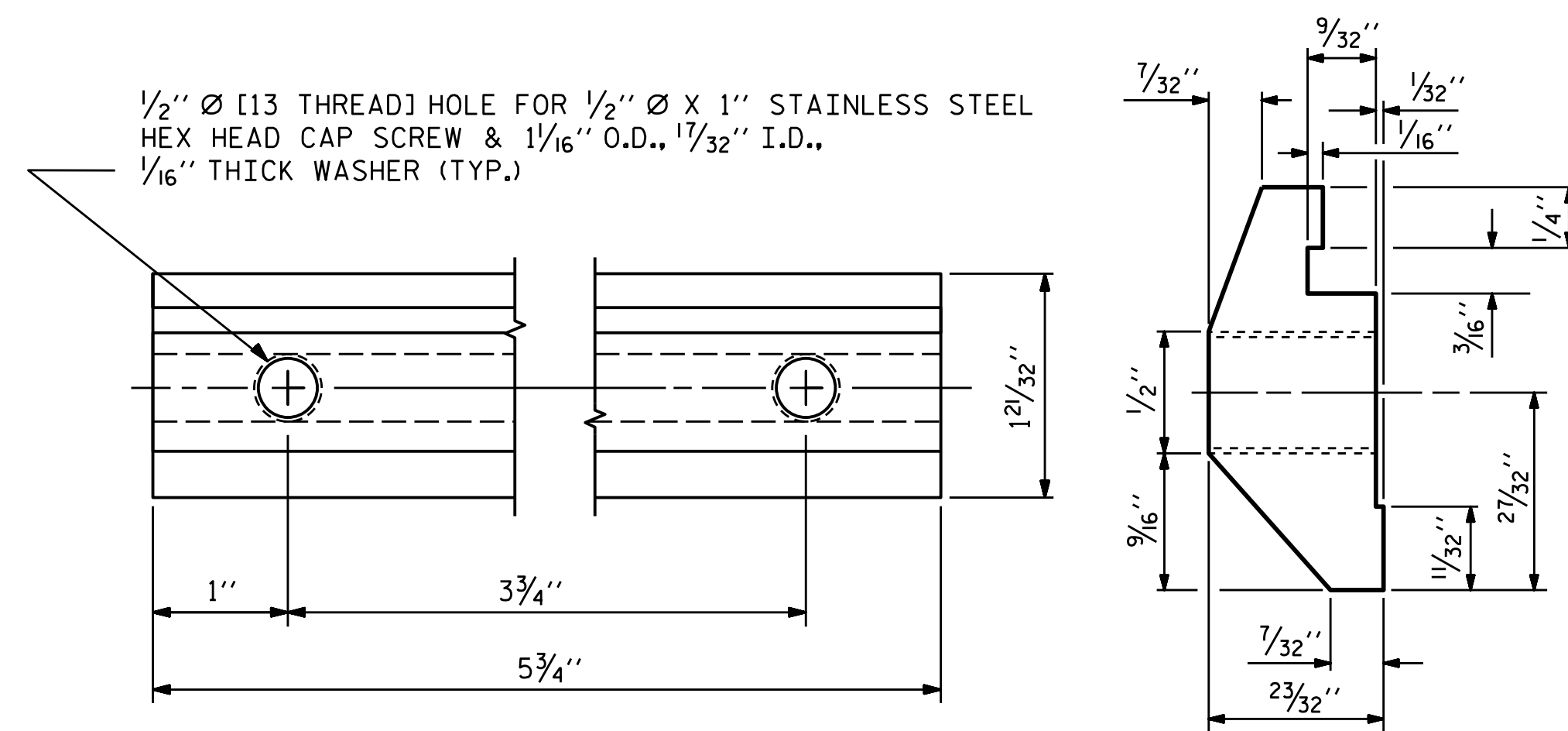


SHIM DETAILS

NOTE : SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

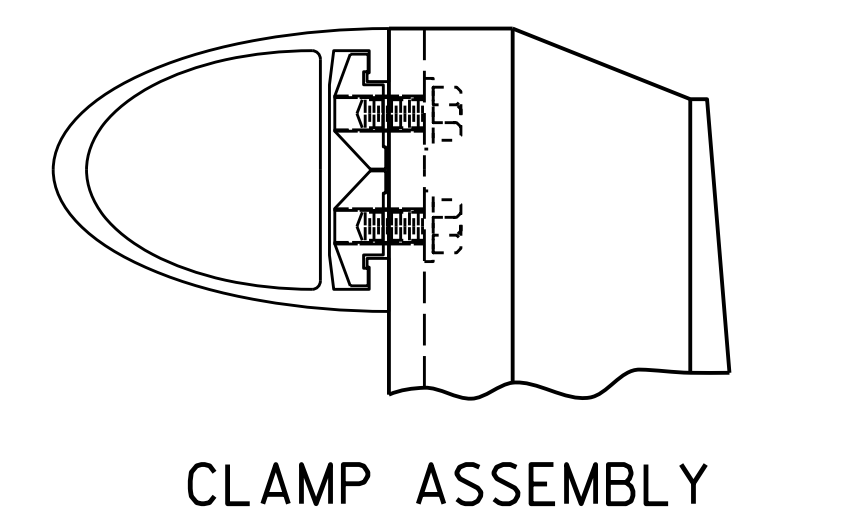


RAIL SECTION

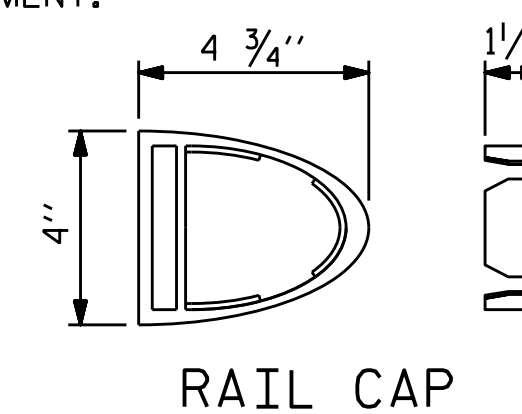


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



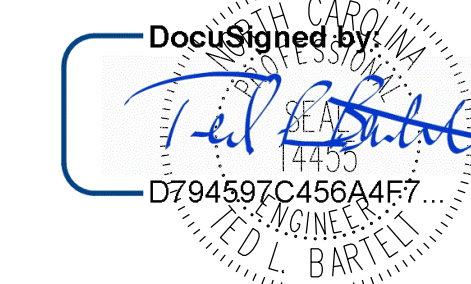
RAIL CAP

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 2 BAR METAL RAIL



10/5/2018 8:04:11 AM EDT



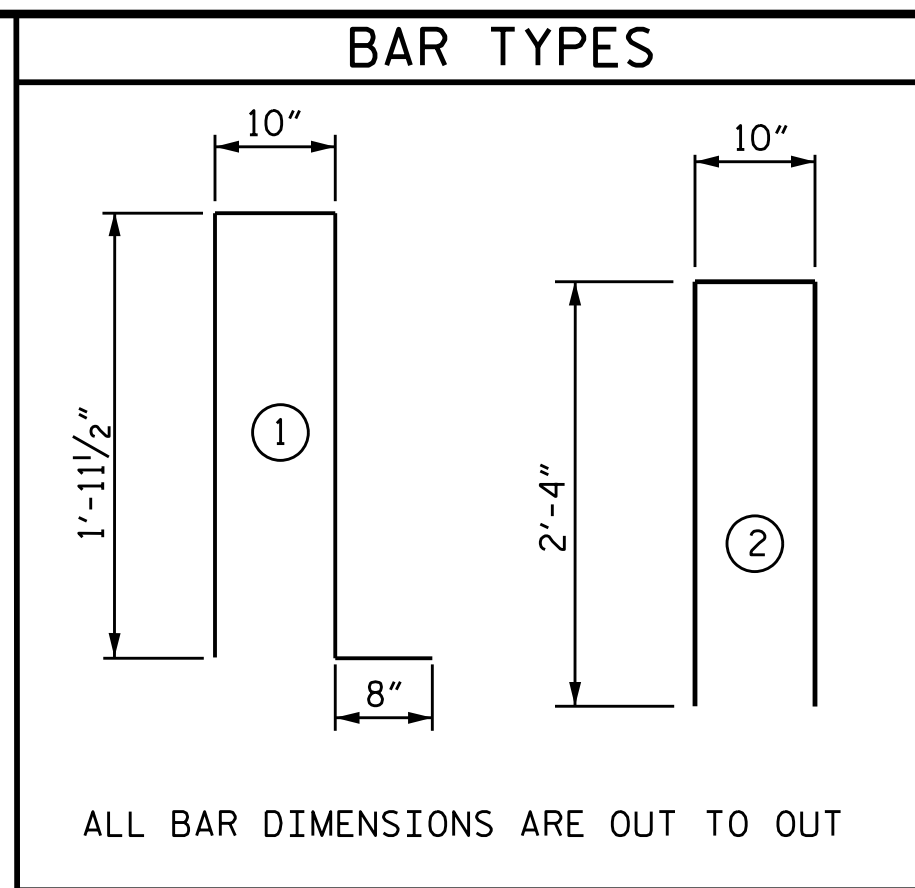
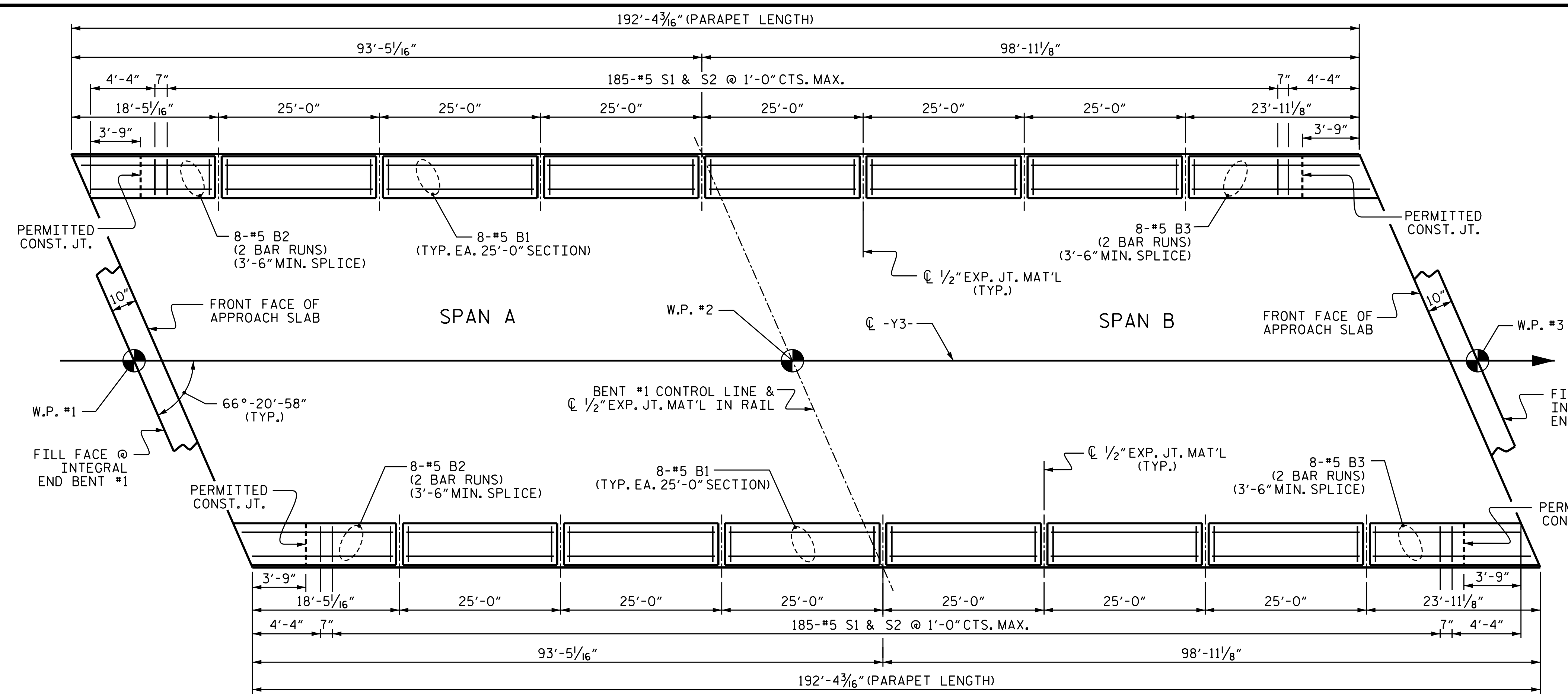
4601 Lake Boone Trail Suite 3C Raleigh, NC 27607
 Phone 919 981 0310 Fax 919 981 0451
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REFERENCE NO. 9-16
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| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S9-16 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |

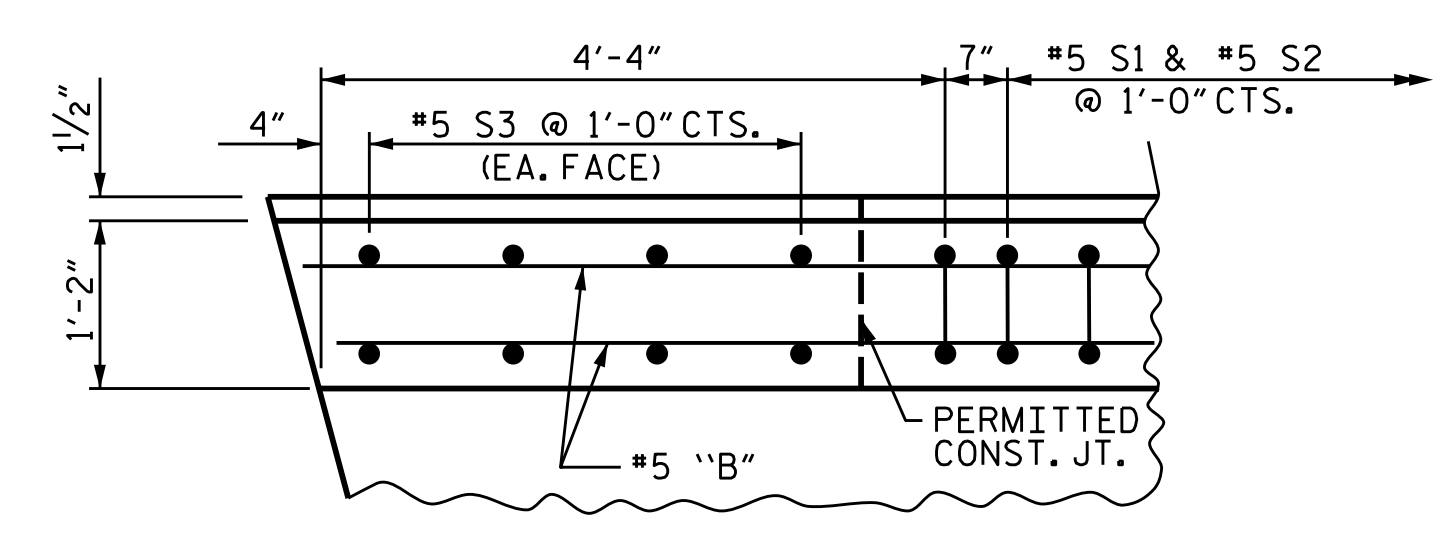
DRAWN BY : J. B. W. DATE : 2/20/18
 CHECKED BY : T. L. B. DATE : 2/20/18
 DESIGN ENGINEER OF RECORD: T. L. B. DATE : 2/20/18

*****SYSTEM*****
 *****DGN*****
 *****USER*****

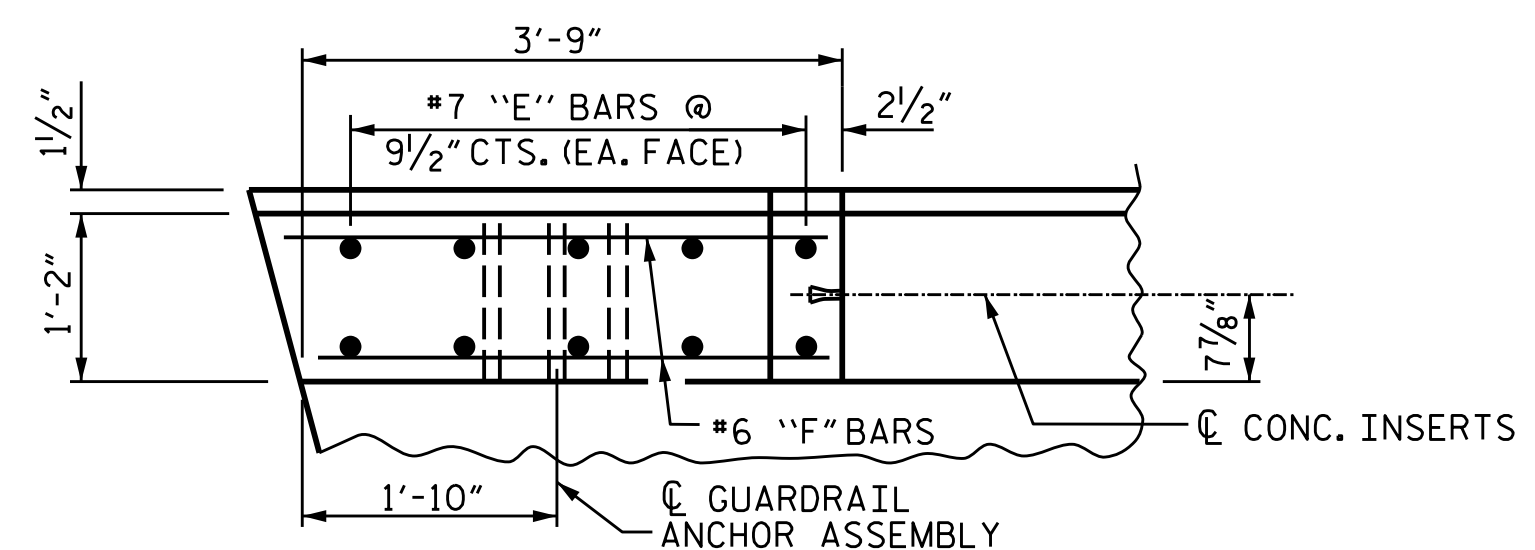


| BILL OF MATERIAL | | | | | |
|---------------------------------|-----|------|------|----------|--------|
| PARAPET & FOUR END POSTS | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| *B1 | 96 | #5 | STR | 24'-7" | 2461 |
| *B2 | 32 | #5 | STR | 10'-8" | 356 |
| *B3 | 32 | #5 | STR | 13'-9" | 459 |
| *E1 | 8 | #7 | STR | 2'-6" | 41 |
| *E2 | 8 | #7 | STR | 3'-0" | 49 |
| *E3 | 8 | #7 | STR | 3'-6" | 57 |
| *E4 | 8 | #7 | STR | 4'-0" | 65 |
| *E5 | 8 | #7 | STR | 4'-4" | 71 |
| *F1 | 4 | #6 | STR | 1'-10" | 11 |
| *F2 | 4 | #6 | STR | 2'-1" | 13 |
| *F3 | 4 | #6 | STR | 3'-0" | 18 |
| *F4 | 4 | #6 | STR | 3'-5" | 21 |
| *F5 | 4 | #6 | STR | 3'-4" | 20 |
| *F6 | 4 | #6 | STR | 3'-9" | 23 |
| *S1 | 370 | #5 | 1 | 5'-5" | 2090 |
| *S2 | 370 | #5 | 2 | 5'-6" | 2123 |
| *S3 | 32 | #5 | STR | 3'-0" | 100 |
| *EPOXY COATED REINFORCING STEEL | | | | LBS. | 7978 |
| CLASS AA CONCRETE | | | | CU. YDS. | 43.1 |
| 1'-2" x 2'-6" CONCRETE PARAPET | | | | LIN. FT. | 384.7 |

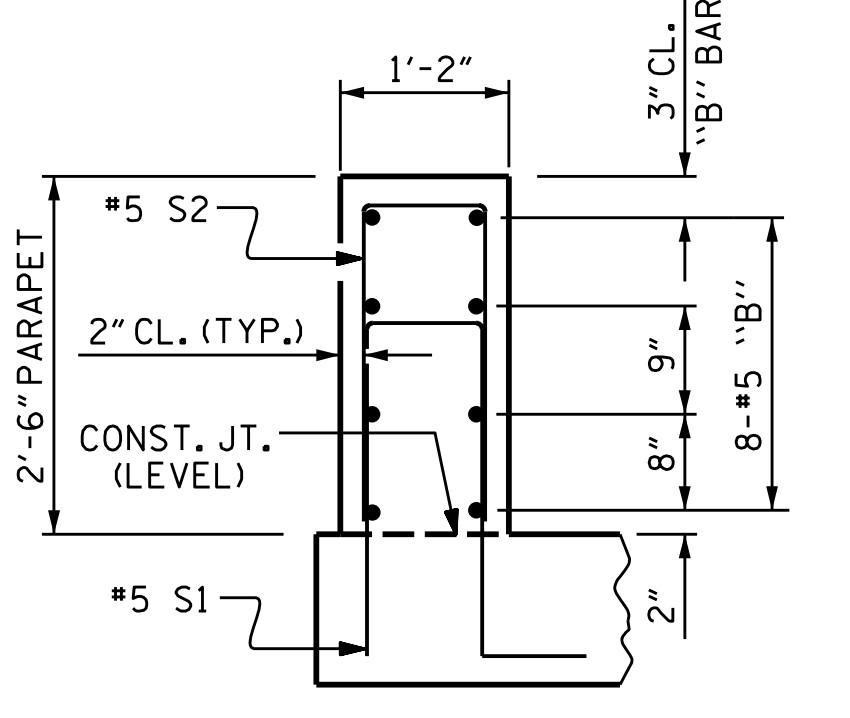
PLAN OF PARAPET



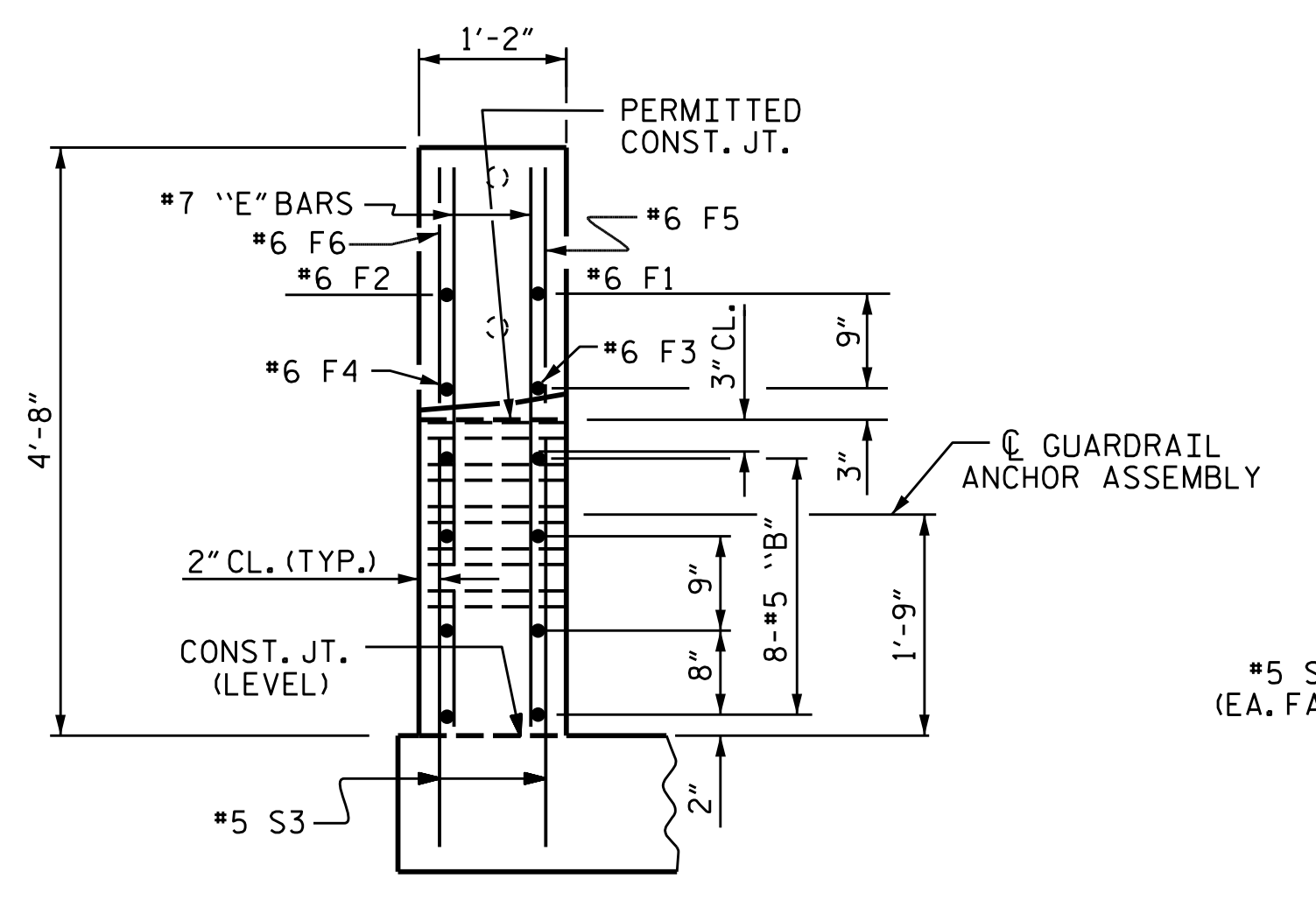
PLAN OF PARAPET



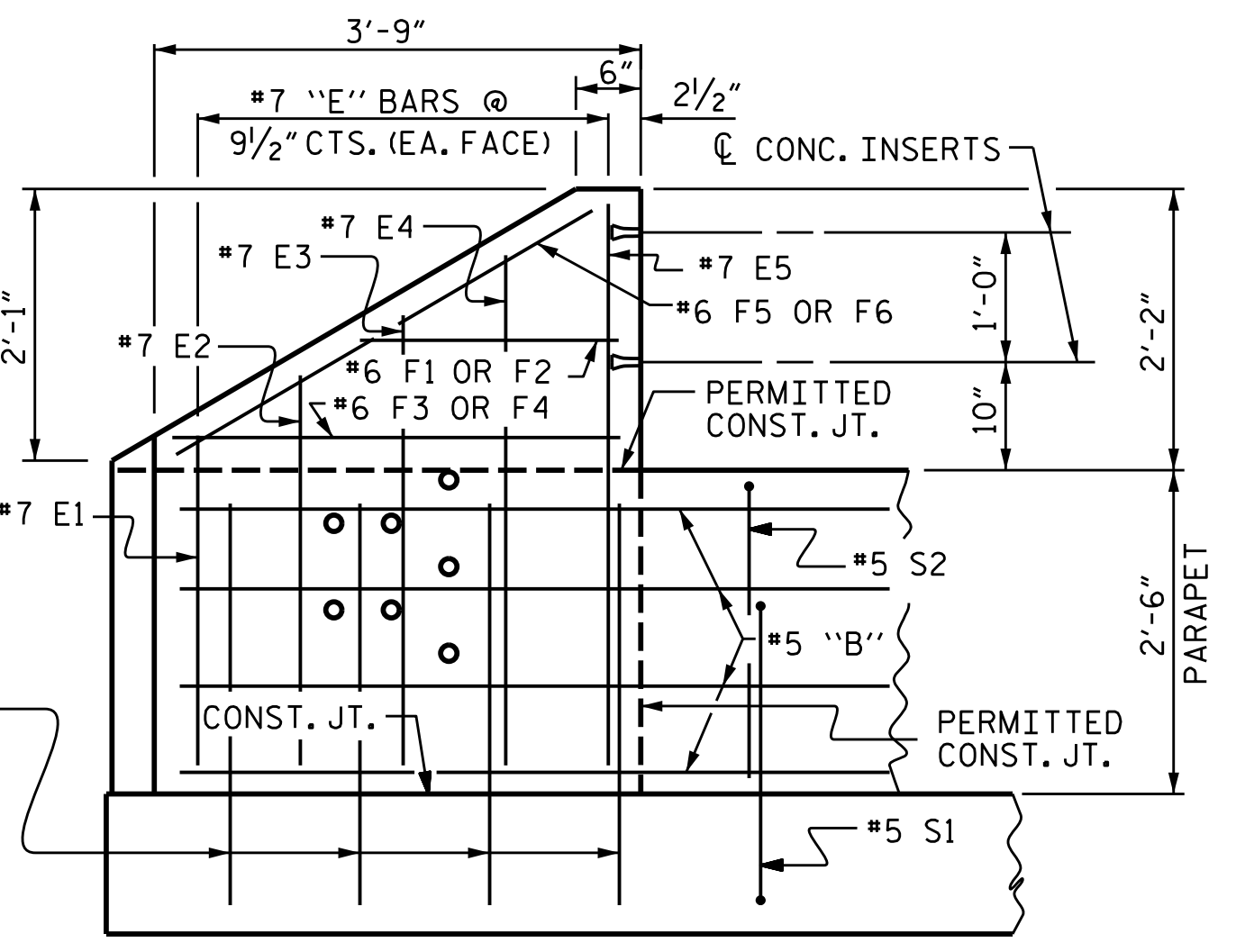
PLAN OF END POST



SECTION THRU PARAPET



END VIEW



ELEVATION

NOTES

PARAPET 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 PARAPETS AND END POSTS SHALL BE EPOXY COATED.

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

THE #5 S3 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

1'-2" X 2'-6"
 CONCRETE PARAPET
 & END POST DETAILS

1998 2018
 ALPHA & OMEGA GROUP
 CIVIL | STRUCTURAL | WATER RESOURCES

DocuSigned by:

 D794597C459A4F7
 12/7/2018

DRAWN BY: J. B. W. DATE: 2/20/18
 CHECKED BY: T. L. B. DATE: 2/20/18
 DESIGN ENGINEER OF RECORD: T. L. B. DATE: 2/20/18

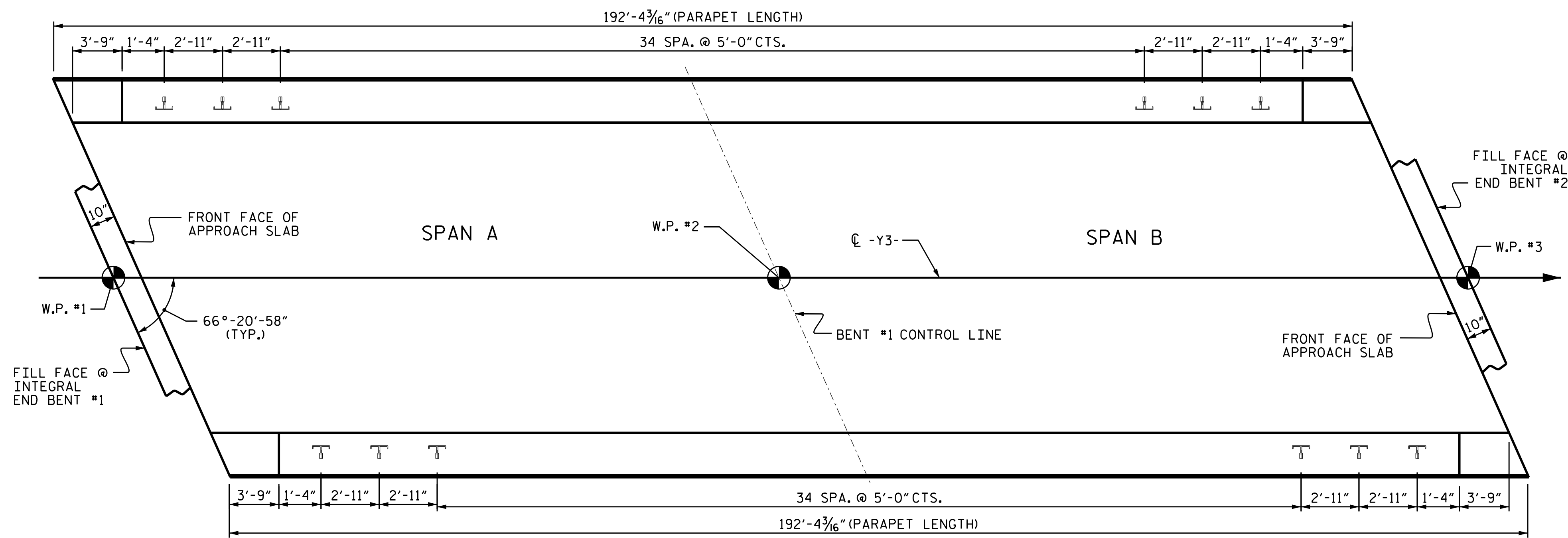
PARAPET AND END POST FOR TWO BAR RAIL

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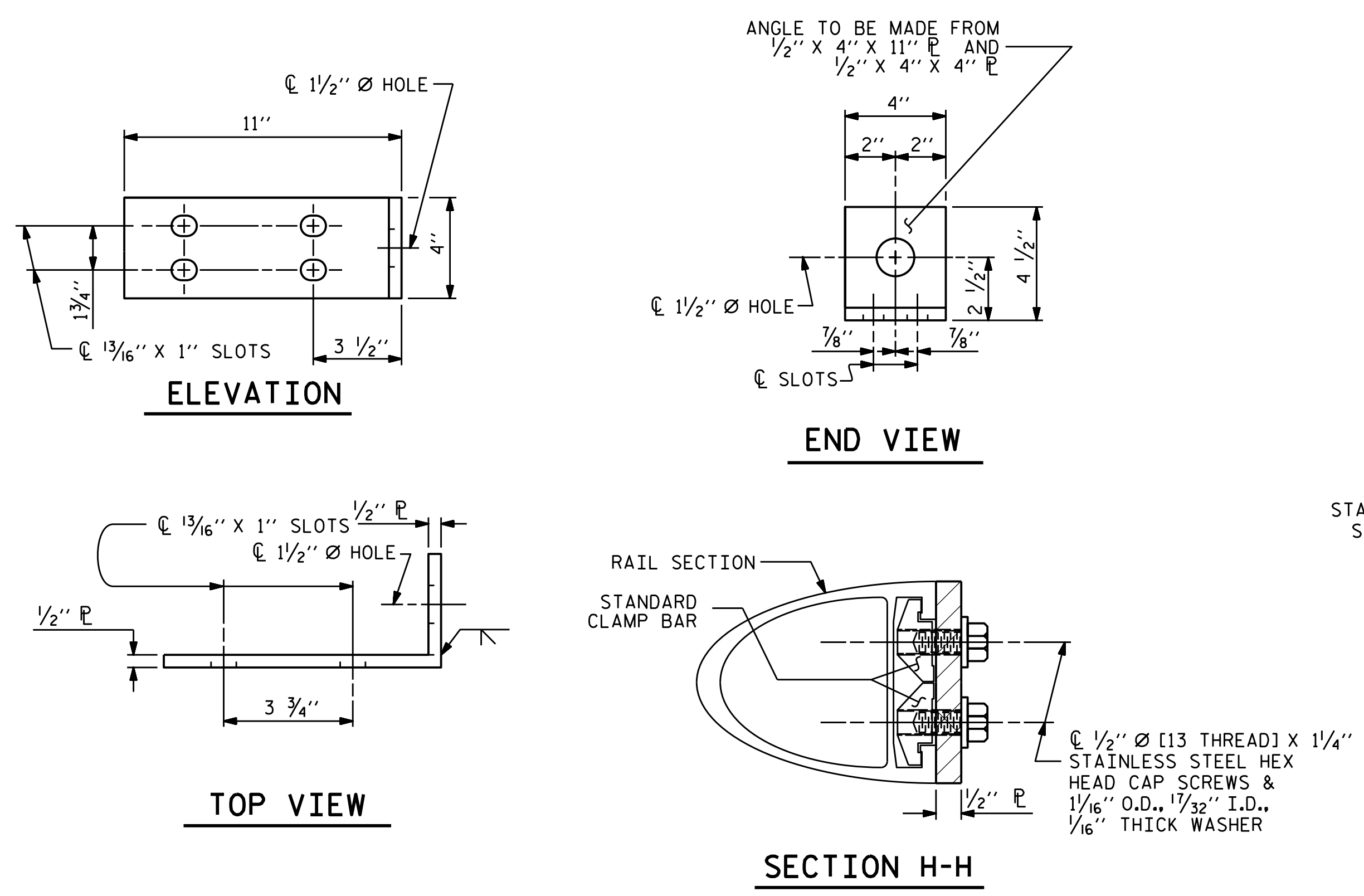
REFERENCE NO. 9-17
 DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S9-17 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |

*****SYSTEM*****
 *****DGN*****
 *****USER*****



PLAN OF RAIL POST SPACINGS



FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST

NOTES
 STRUCTURAL CONCRETE INSERT
 THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
 A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
 B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
 C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

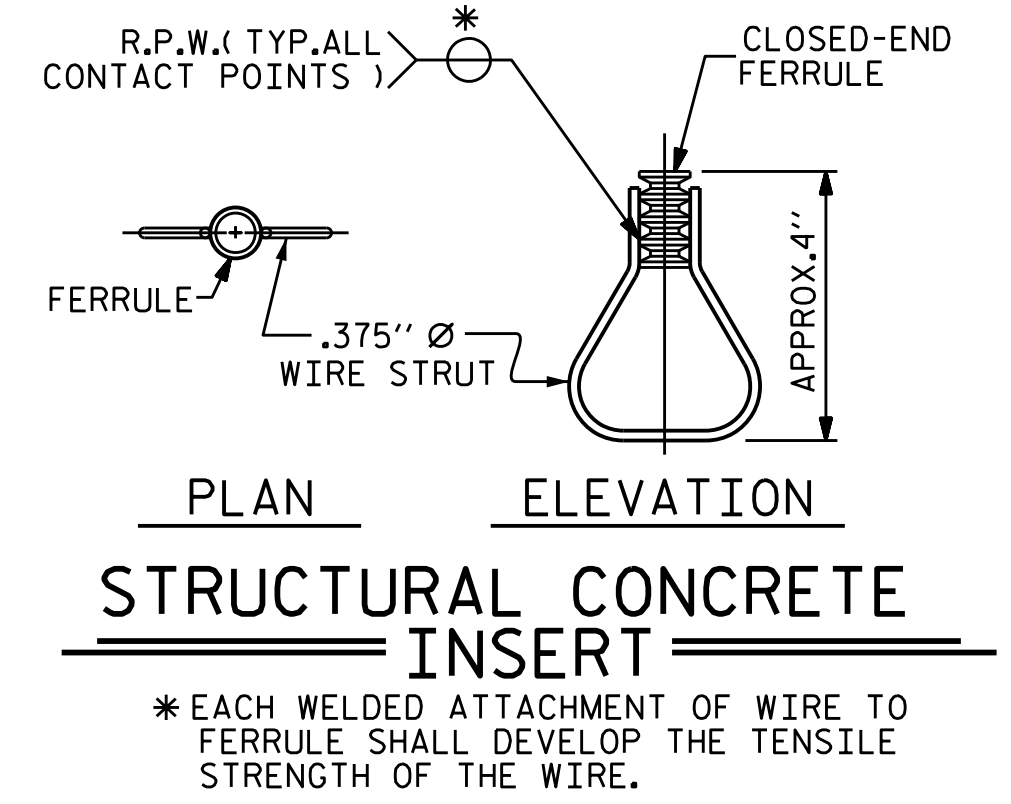
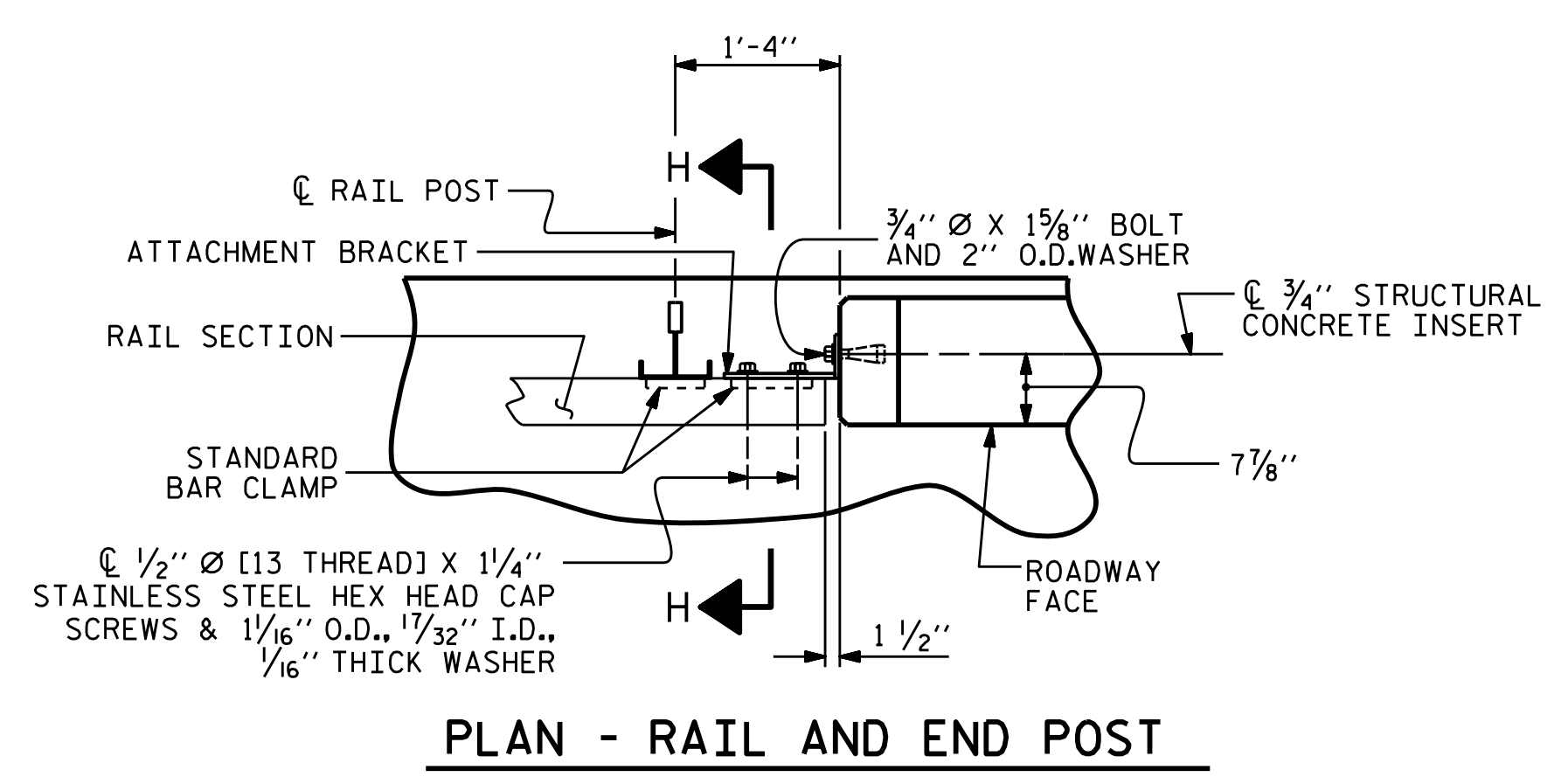
NOTES
 METAL RAIL TO END POST CONNECTION
 THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
 A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
 B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. THREADS.
 C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
 D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
 E. 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 2 BAR METAL RAILS.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



PROJECT NO. R-1015
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 STATION: 52+32.96 -Y3-

SHEET 4 OF 4
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 RAIL POST SPACINGS
 AND
 END OF RAIL DETAILS
 TWO BAR METAL RAILS

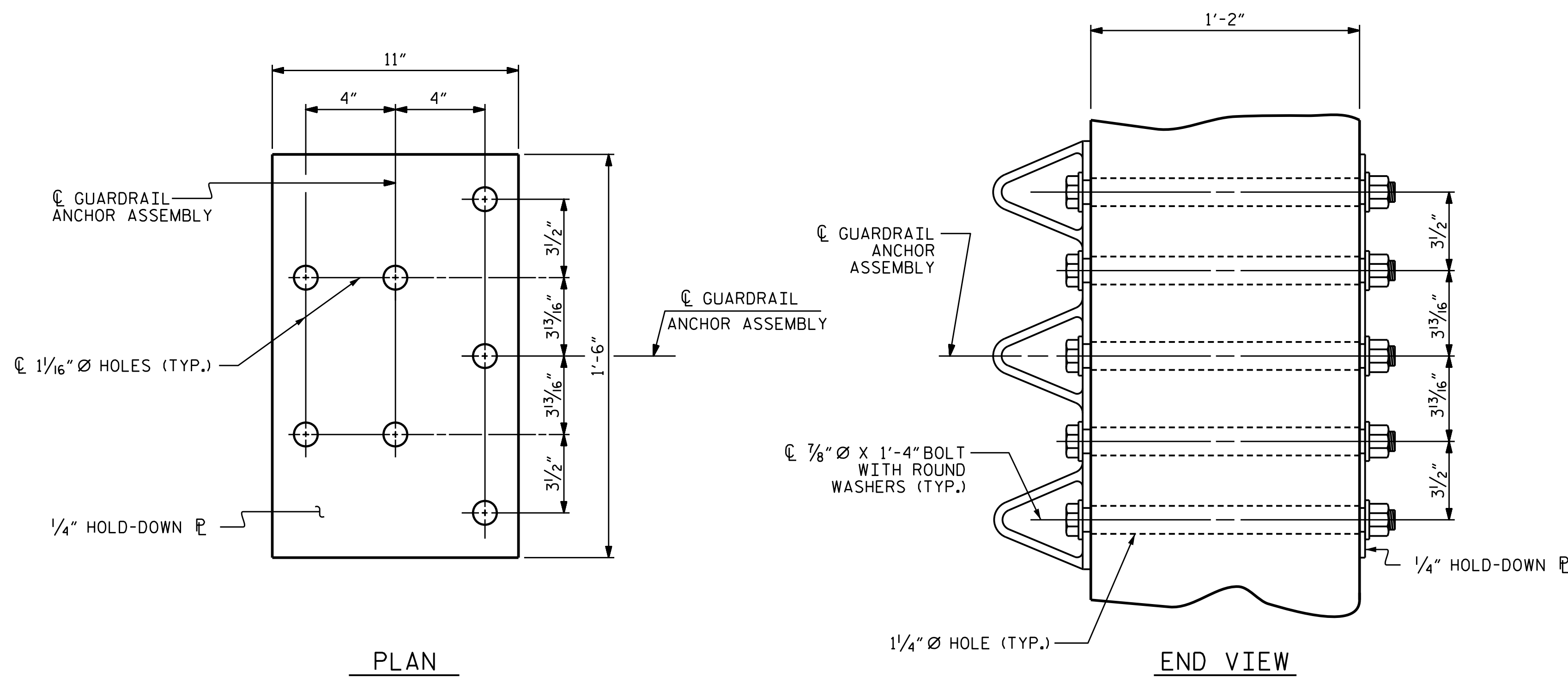
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GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE GALVANIZED.

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 METALIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø METALIZED 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 THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

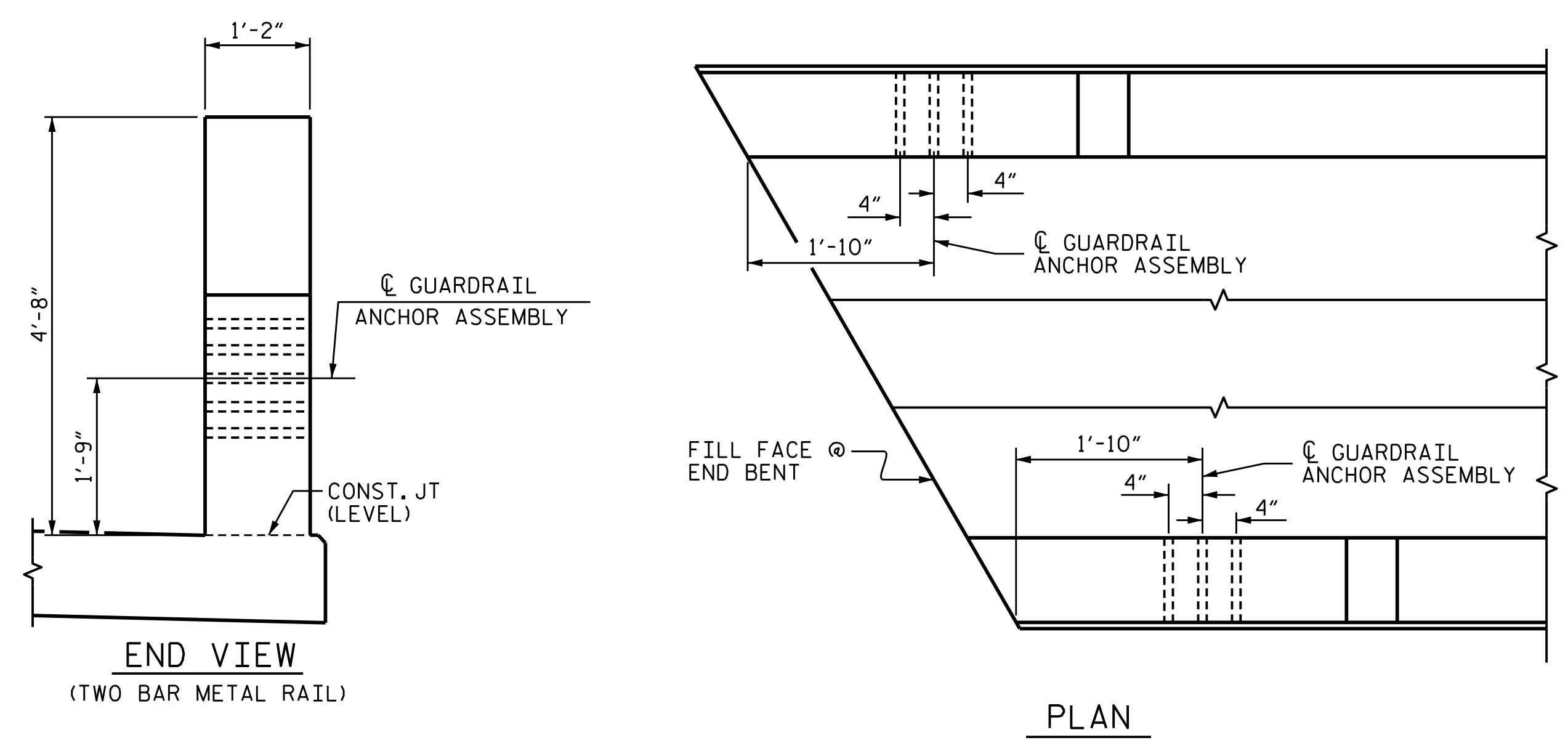
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

THE 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.



SKETCH SHOWING POINTS OF ATTACHMENT

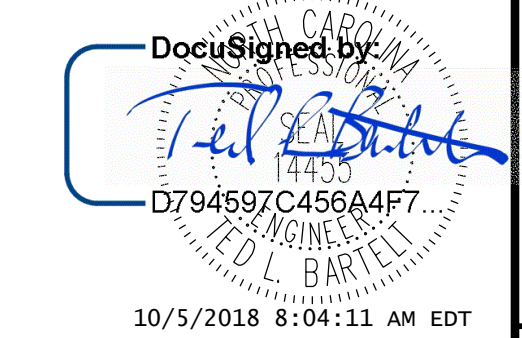


LOCATION OF GUARDRAIL ANCHOR AT END POST

* LOCATION OF GUARDRAIL ATTACHMENT

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 GUARDRAIL ANCHORAGE
 DETAILS
 FOR METAL RAILS



DRAWN BY : J. B. W. DATE : 02/20/18
 CHECKED BY : T. L. B. DATE : 02/20/18
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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" | | | |

| SUPERSTRUCTURE BILL OF MATERIAL | | |
|---------------------------------|-------------------|--------------------------------|
| | CLASS AA CONCRETE | EPOXY COATED REINFORCING STEEL |
| | (CU.YDS.) | (LBS.) |
| POUR #1 | 140.3 | |
| POUR #2 | 188.3 | 36047 |
| POUR #3 | 88.6 | |
| TOTALS ** | 417.2 | 36047 |

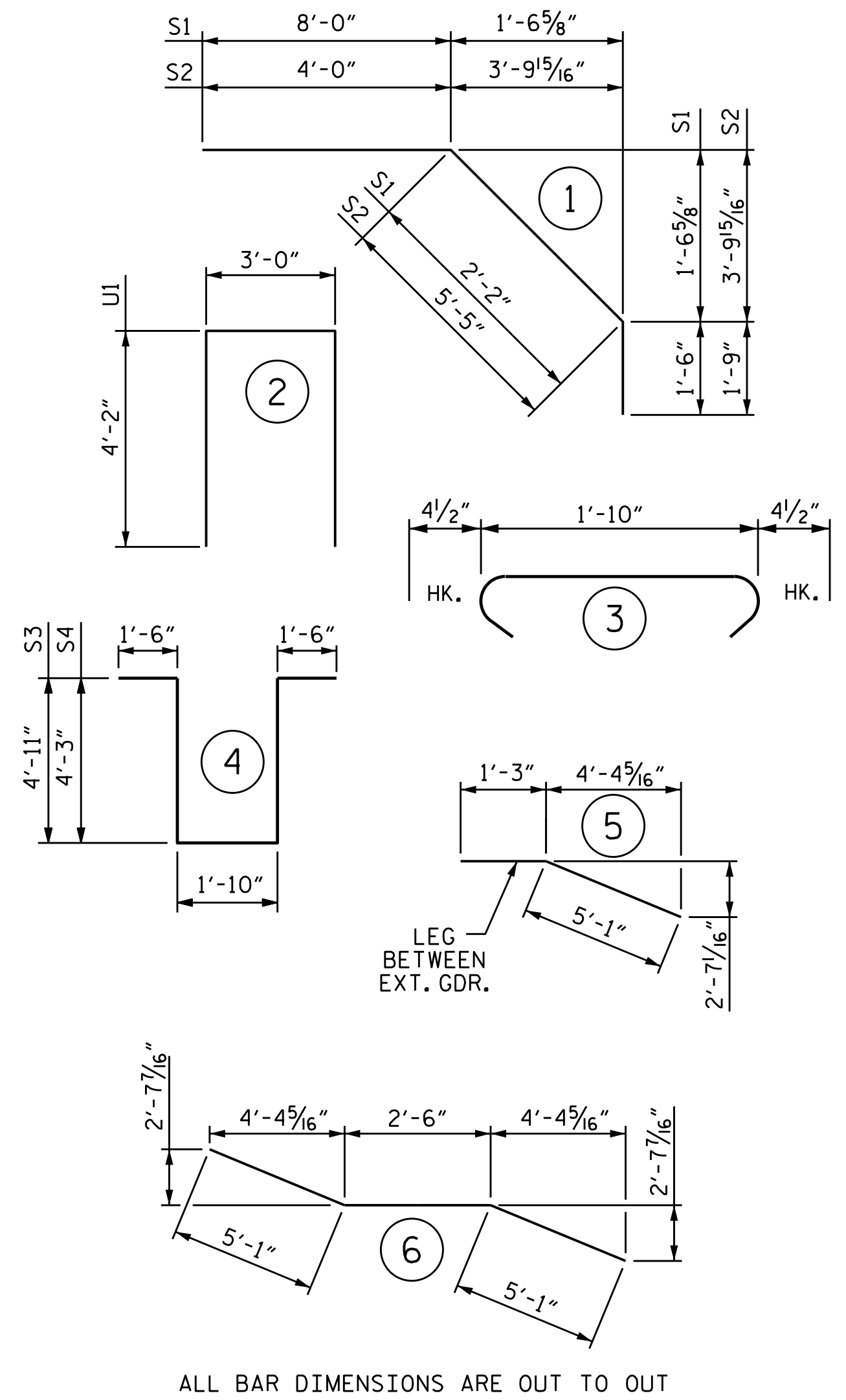
**QUANTITIES FOR CONCRETE PARAPET ARE NOT INCLUDED.

| GROOVING BRIDGE FLOORS | | |
|------------------------|-------|--------|
| APPROACH SLABS | 2365 | SQ.FT. |
| BRIDGE DECK | 9413 | SQ.FT. |
| TOTAL | 11778 | SQ.FT. |

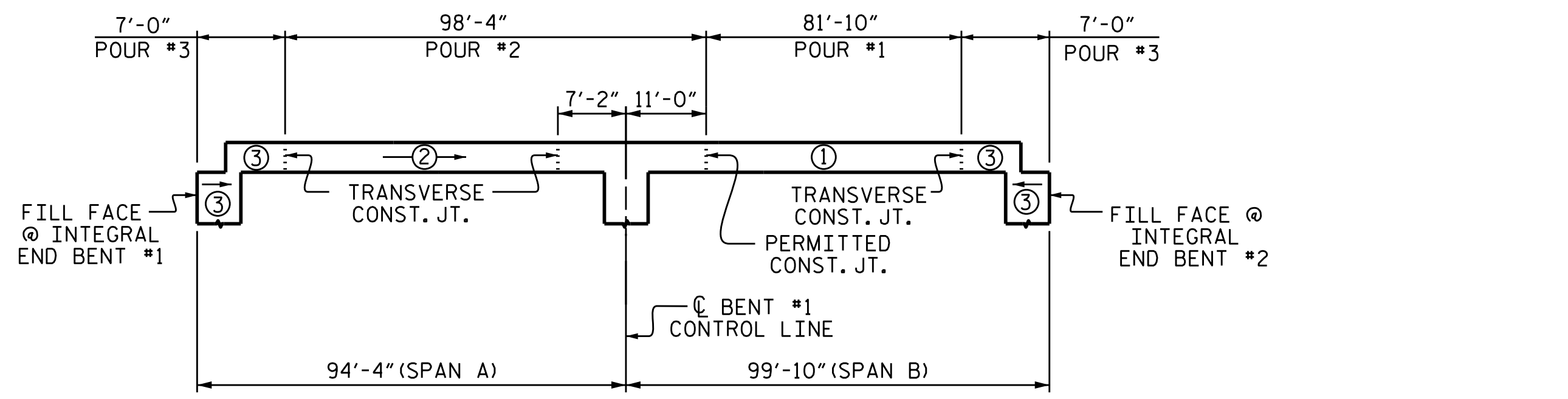
BILL OF MATERIAL

| BAR NO. | SIZE | TYPE | LENGTH | WEIGHT | BAR NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|------|------|--------|---------|------------------------------|------|------|--------|---------|
| * A1 | 337 | #5 | STR | 54'-1" | A2 | 337 | #5 | STR | 54'-1" |
| * A101 | 2 | #5 | STR | 51'-11" | A201 | 2 | #5 | STR | 51'-11" |
| * A102 | 2 | #5 | STR | 49'-7" | A202 | 2 | #5 | STR | 49'-7" |
| * A103 | 2 | #5 | STR | 47'-4" | A203 | 2 | #5 | STR | 47'-4" |
| * A104 | 2 | #5 | STR | 45'-1" | A204 | 2 | #5 | STR | 45'-1" |
| * A105 | 2 | #5 | STR | 42'-9" | A205 | 2 | #5 | STR | 42'-9" |
| * A106 | 2 | #5 | STR | 40'-6" | A206 | 2 | #5 | STR | 40'-6" |
| * A107 | 2 | #5 | STR | 38'-2" | A207 | 2 | #5 | STR | 38'-2" |
| * A108 | 2 | #5 | STR | 35'-11" | A208 | 2 | #5 | STR | 35'-11" |
| * A109 | 2 | #5 | STR | 33'-8" | A209 | 2 | #5 | STR | 33'-8" |
| * A110 | 2 | #5 | STR | 31'-4" | A210 | 2 | #5 | STR | 31'-4" |
| * A111 | 2 | #5 | STR | 29'-1" | A211 | 2 | #5 | STR | 29'-1" |
| * A112 | 2 | #5 | STR | 26'-9" | A212 | 2 | #5 | STR | 26'-9" |
| * A113 | 2 | #5 | STR | 24'-6" | A213 | 2 | #5 | STR | 24'-6" |
| * A114 | 2 | #5 | STR | 22'-3" | A214 | 2 | #5 | STR | 22'-3" |
| * A115 | 2 | #5 | STR | 19'-11" | A215 | 2 | #5 | STR | 19'-11" |
| * A116 | 2 | #5 | STR | 17'-8" | A216 | 2 | #5 | STR | 17'-8" |
| * A117 | 2 | #5 | STR | 15'-4" | A217 | 2 | #5 | STR | 15'-4" |
| * A118 | 2 | #5 | STR | 13'-1" | A218 | 2 | #5 | STR | 13'-1" |
| * A119 | 2 | #5 | STR | 10'-10" | A219 | 2 | #5 | STR | 10'-10" |
| * A120 | 2 | #5 | STR | 8'-6" | A220 | 2 | #5 | STR | 8'-6" |
| * A121 | 2 | #5 | STR | 6'-3" | A221 | 2 | #5 | STR | 6'-3" |
| * A122 | 2 | #5 | STR | 3'-11" | A222 | 2 | #5 | STR | 3'-11" |
| * B1 | 87 | #6 | STR | 18'-6" | B8 | 252 | #5 | STR | 49'-10" |
| * B2 | 88 | #4 | STR | 23'-6" | K1 | 30 | #4 | STR | 21'-1" |
| * B3 | 44 | #6 | STR | 43'-2" | K2 | 20 | #4 | STR | 8'-2" |
| * B4 | 43 | #6 | STR | 29'-1" | K3 | 40 | #4 | STR | 9'-3" |
| * B5 | 44 | #6 | STR | 28'-2" | K4 | 20 | #4 | STR | 8'-6" |
| * B6 | 88 | #4 | STR | 24'-9" | K5 | 10 | #4 | STR | 7'-7" |
| * B7 | 87 | #6 | STR | 19'-9" | K6 | 4 | #4 | STR | 2'-7" |
| * S3 | 35 | #4 | 4 | 14'-8" | K7 | 8 | #4 | STR | 3'-1" |
| * S4 | 10 | #4 | 4 | 13'-4" | K8 | 4 | #4 | STR | 2'-8" |
| * EPOXY COATED REINFORCING STEEL 36047 LBS. | | | | | K9 | 4 | #4 | STR | 2'-4" |
| | | | | | K10 | 10 | #4 | STR | 6'-4" |
| | | | | | K11 | 10 | #4 | 5 | 6'-4" |
| | | | | | K12 | 20 | #4 | 6 | 12'-8" |
| | | | | | S1 | 92 | #4 | 1 | 11'-8" |
| | | | | | S2 | 88 | #4 | 1 | 11'-2" |
| | | | | | S5 | 170 | #4 | 3 | 2'-7" |
| | | | | | U1 | 92 | #4 | 2 | 11'-4" |
| | | | | | REINFORCING STEEL 36041 LBS. | | | | |

BAR TYPES

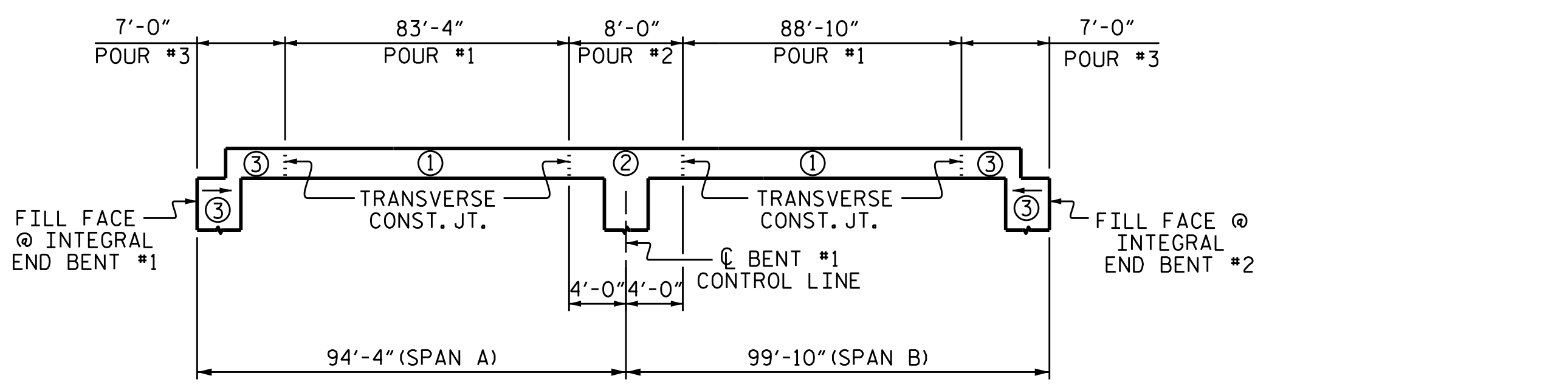


ALL BAR DIMENSIONS ARE OUT TO OUT



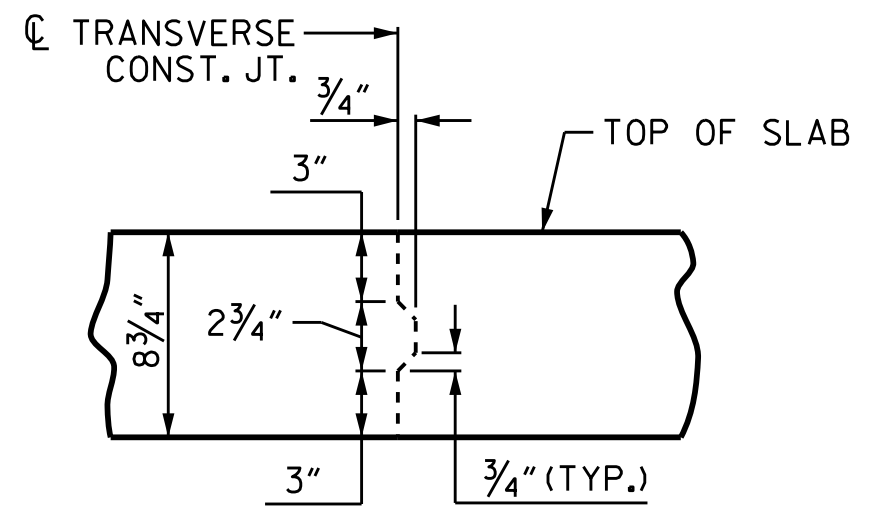
POURING SEQUENCE

= INDICATES POUR NUMBER AND DIRECTION OF POUR



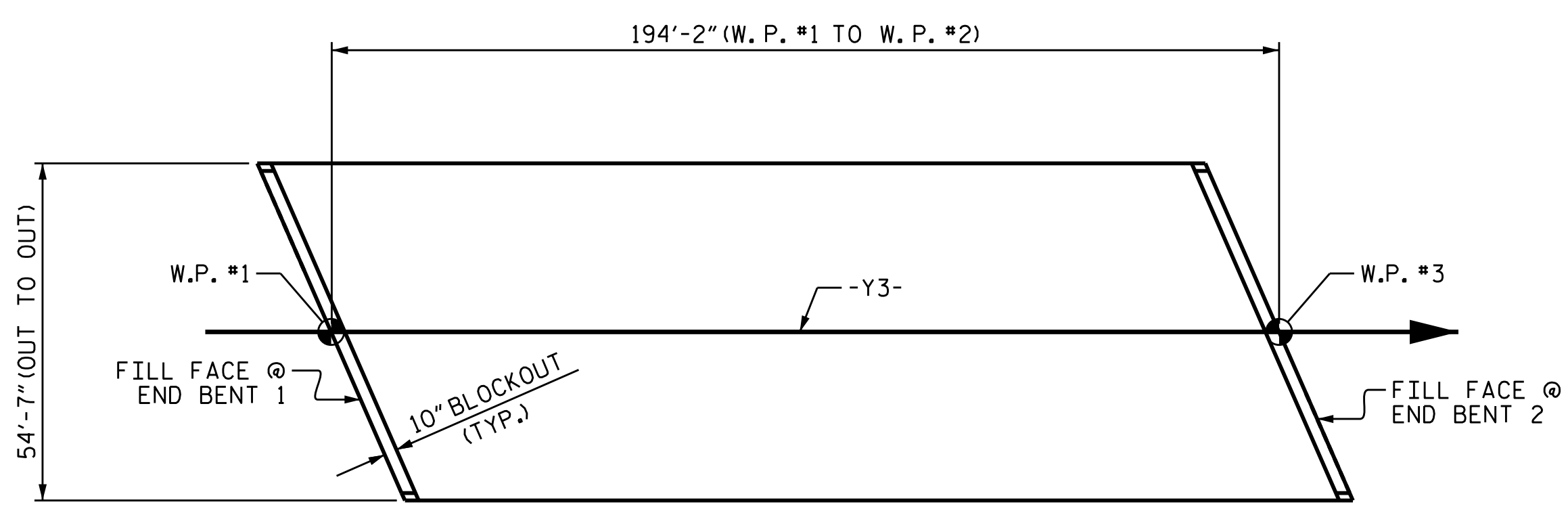
OPTIONAL POURING SEQUENCE

POUR 2 CAN NOT BE STARTED UNTIL BOTH ADJACENT 1 POURS REACH A MINIMUM OF 3000 PSI.



TRANSVERSE CONSTRUCTION JOINT DETAIL

NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 10598)

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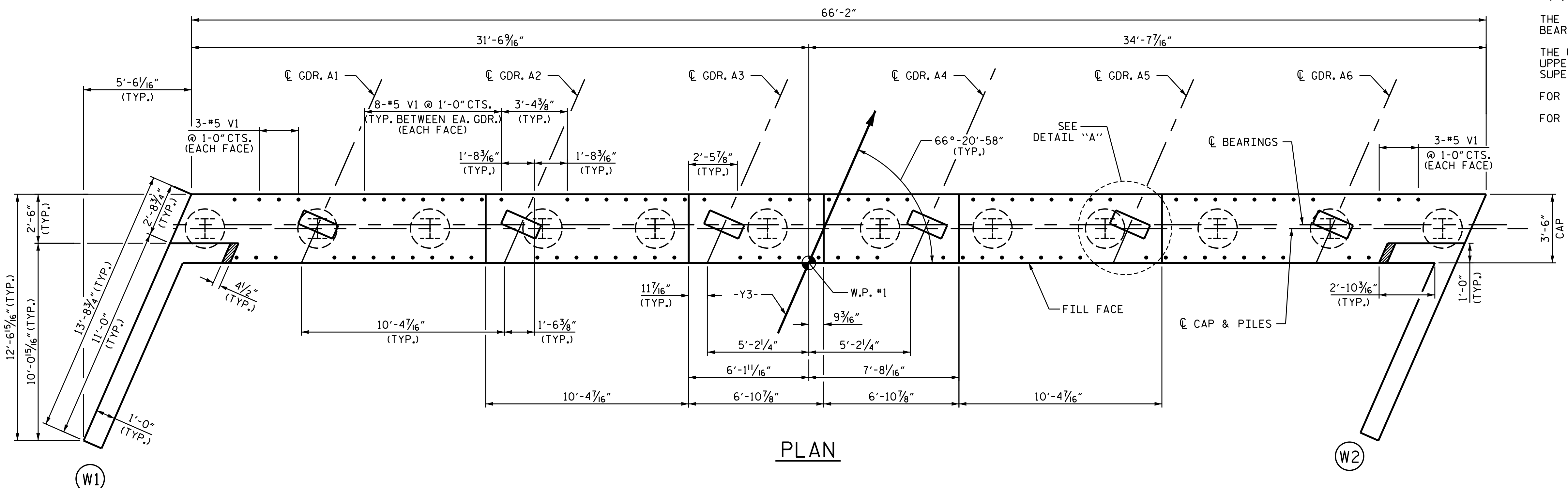
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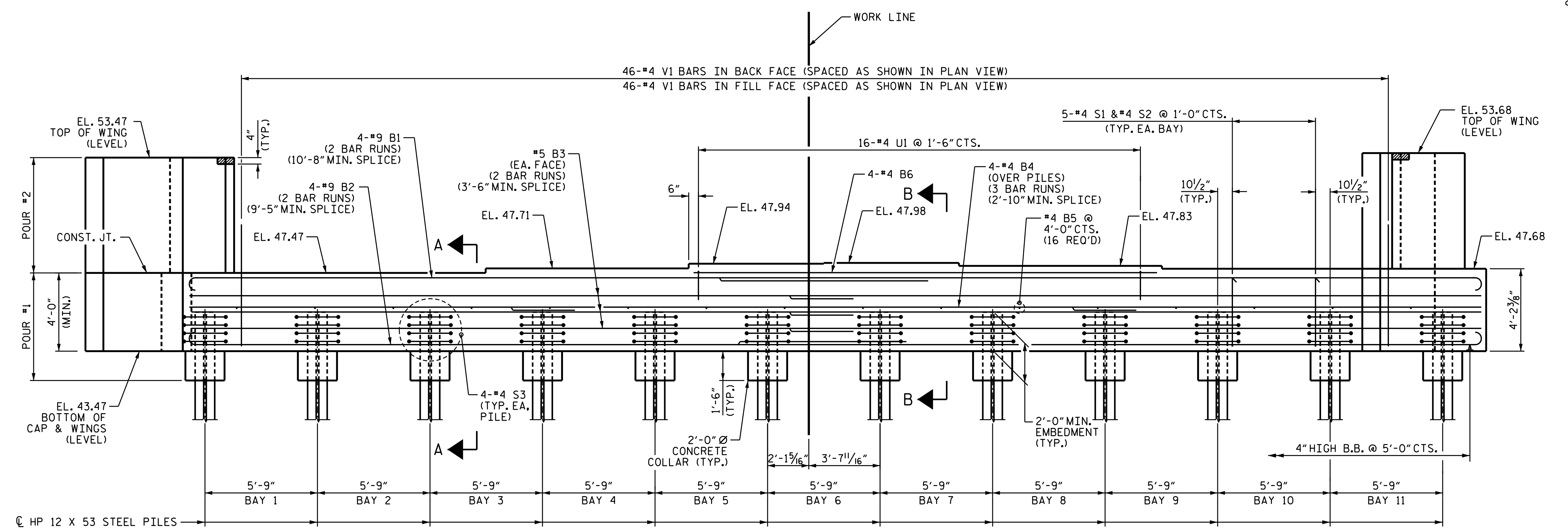
| STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RRBEEGHH | | | | | |
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| STANDARD SUPERSTRUCTURE BILL OF MATERIAL | | | | | |
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SHEET NO. S9-20
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PLAN



ELEVATION
FOR SECTION A-A AND
PARTIAL SECTION B-B, SEE
SHEET 3 OF 3.

NOTES

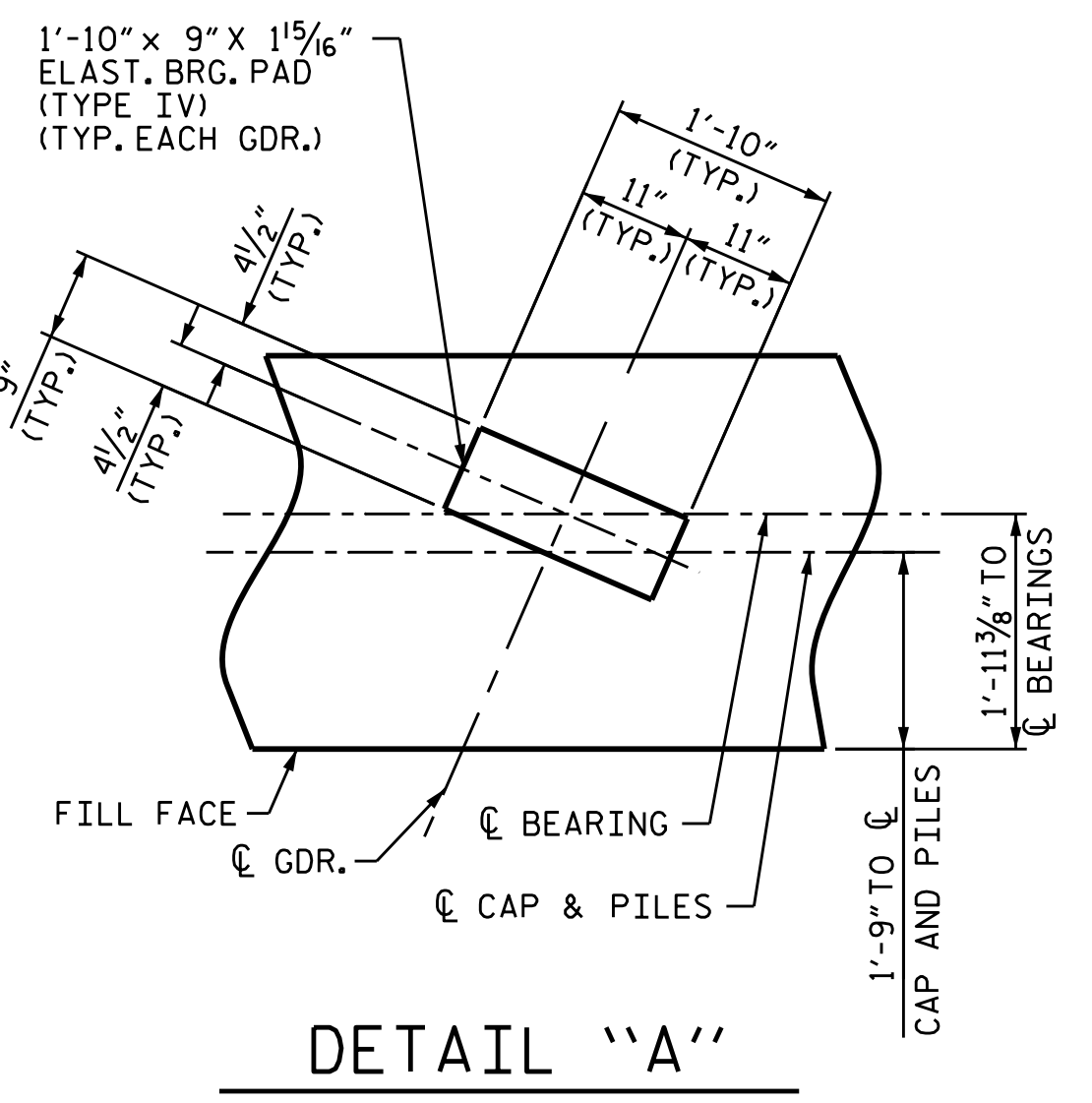
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

THE TOP PART OF THE END BENT CAP AND WINGS, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4\".

THE UPPER PORTION OF THE INTEGRAL END BENT CAP AND THE UPPER PORTION OF THE WINGS SHALL BE POURED WITH THE SUPERSTRUCTURE. SEE SUPERSTRUCTURE PLANS.

FOR PILE SPLICE DETAIL, SEE SHEET 3 OF 3.

FOR SECTION A-A SEE SHEET 3 OF 3.



DETAIL "A"

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

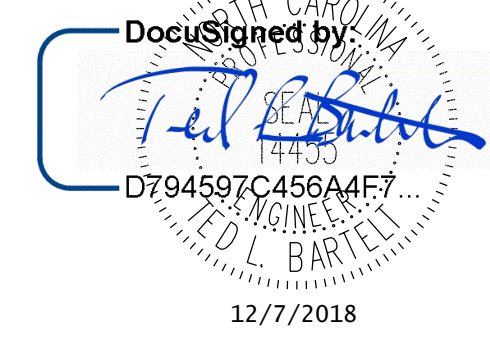
SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT #1
 (INTEGRAL)

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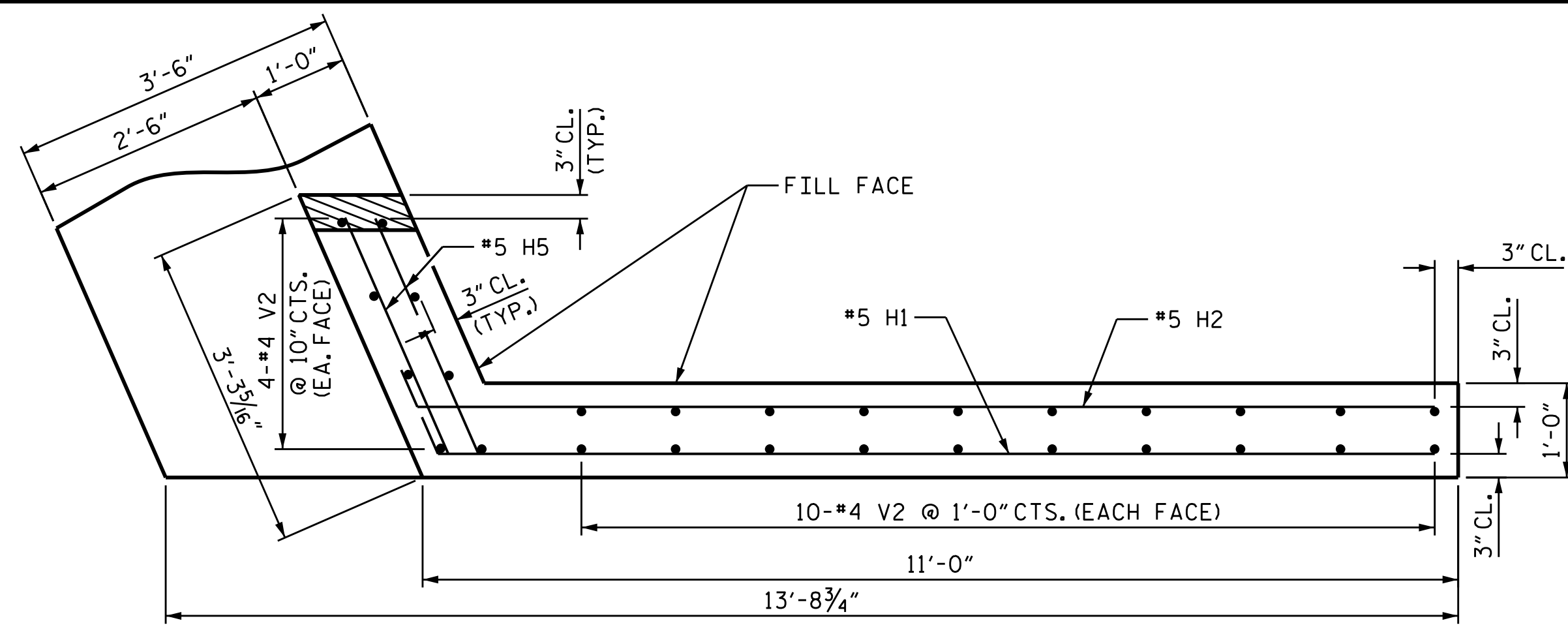
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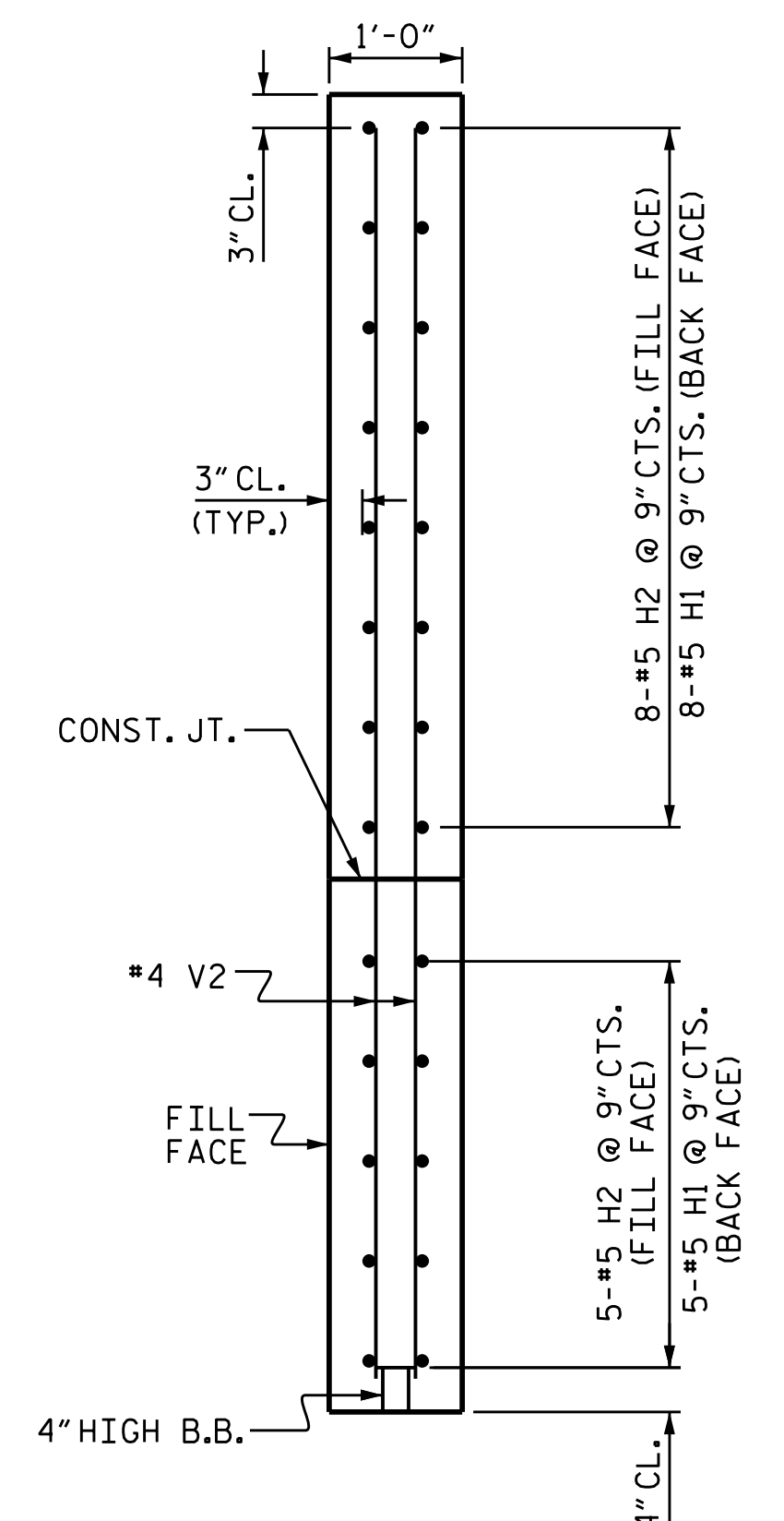
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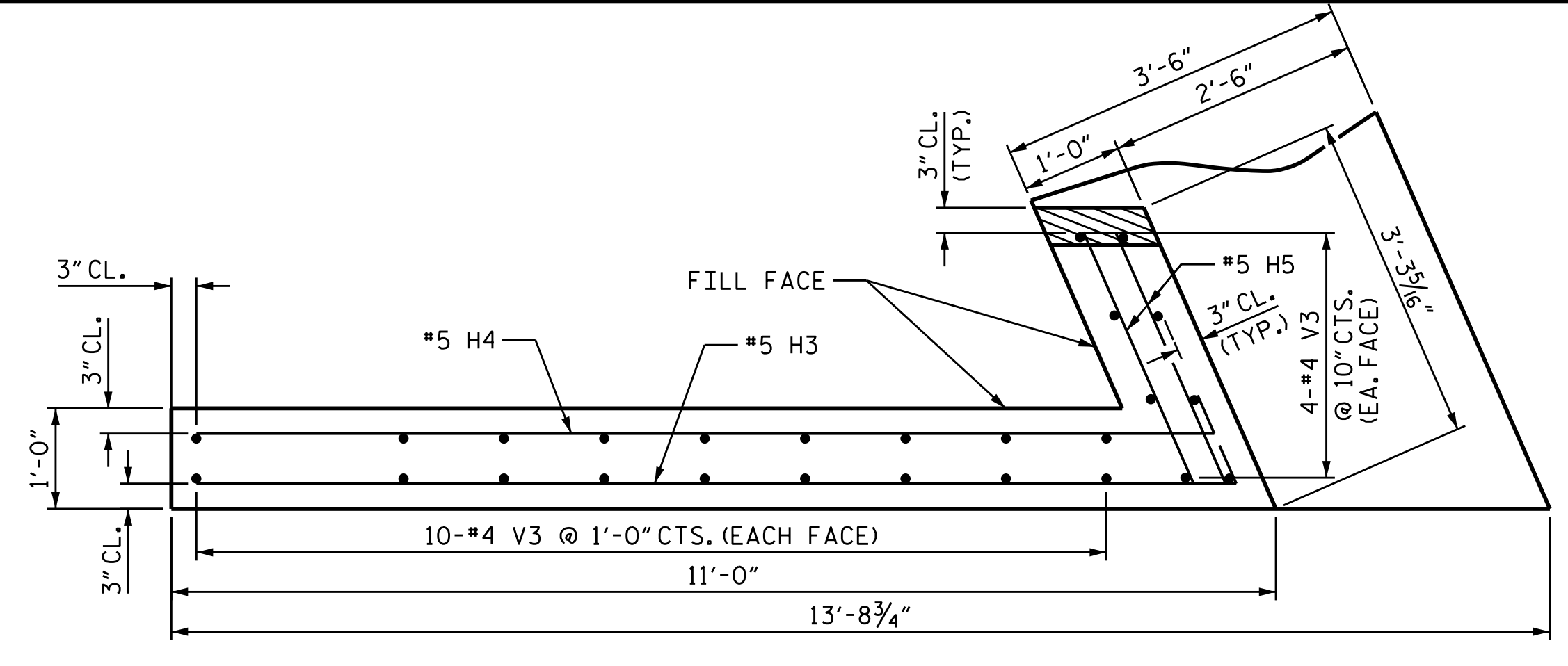
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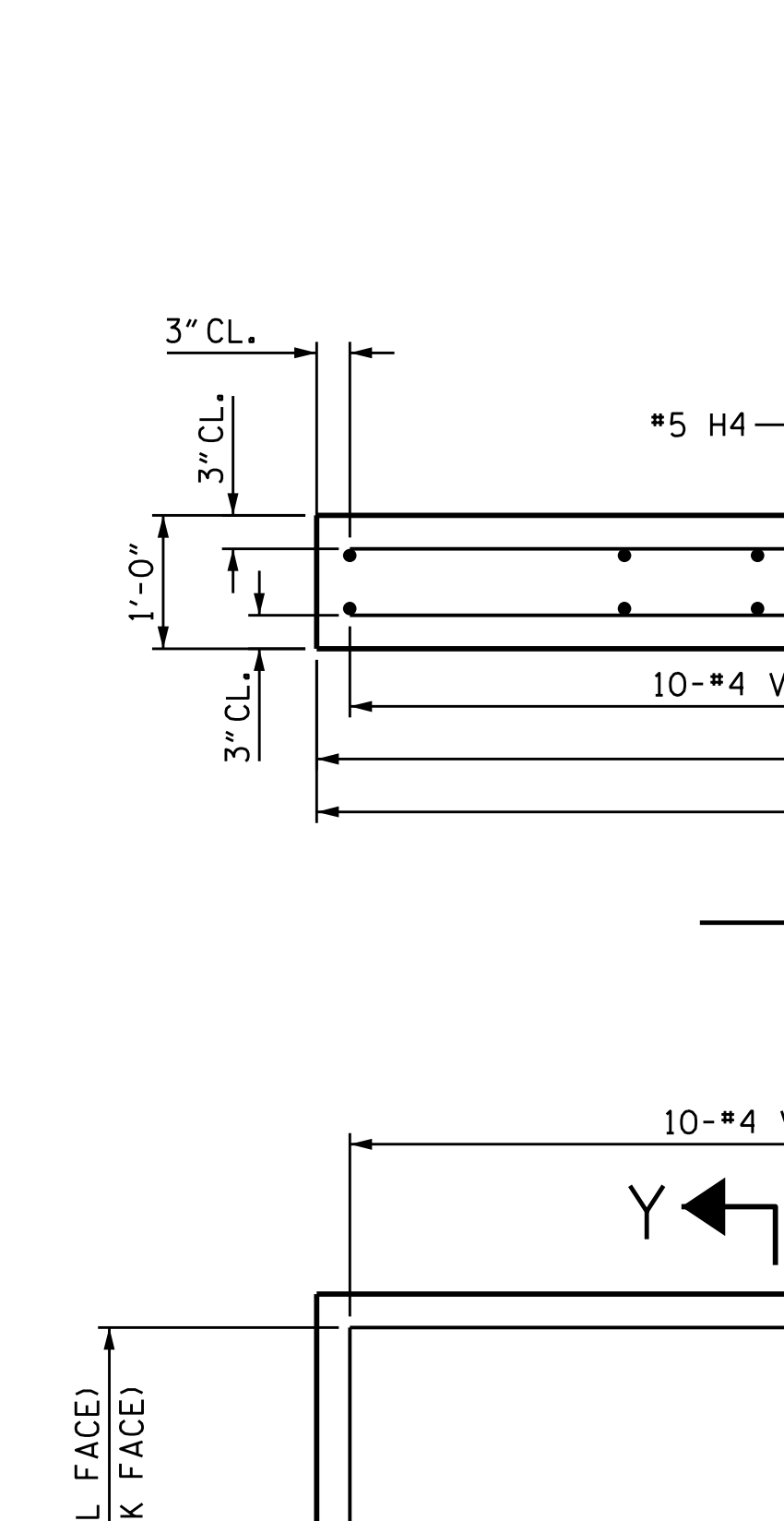
PLAN OF WING W1



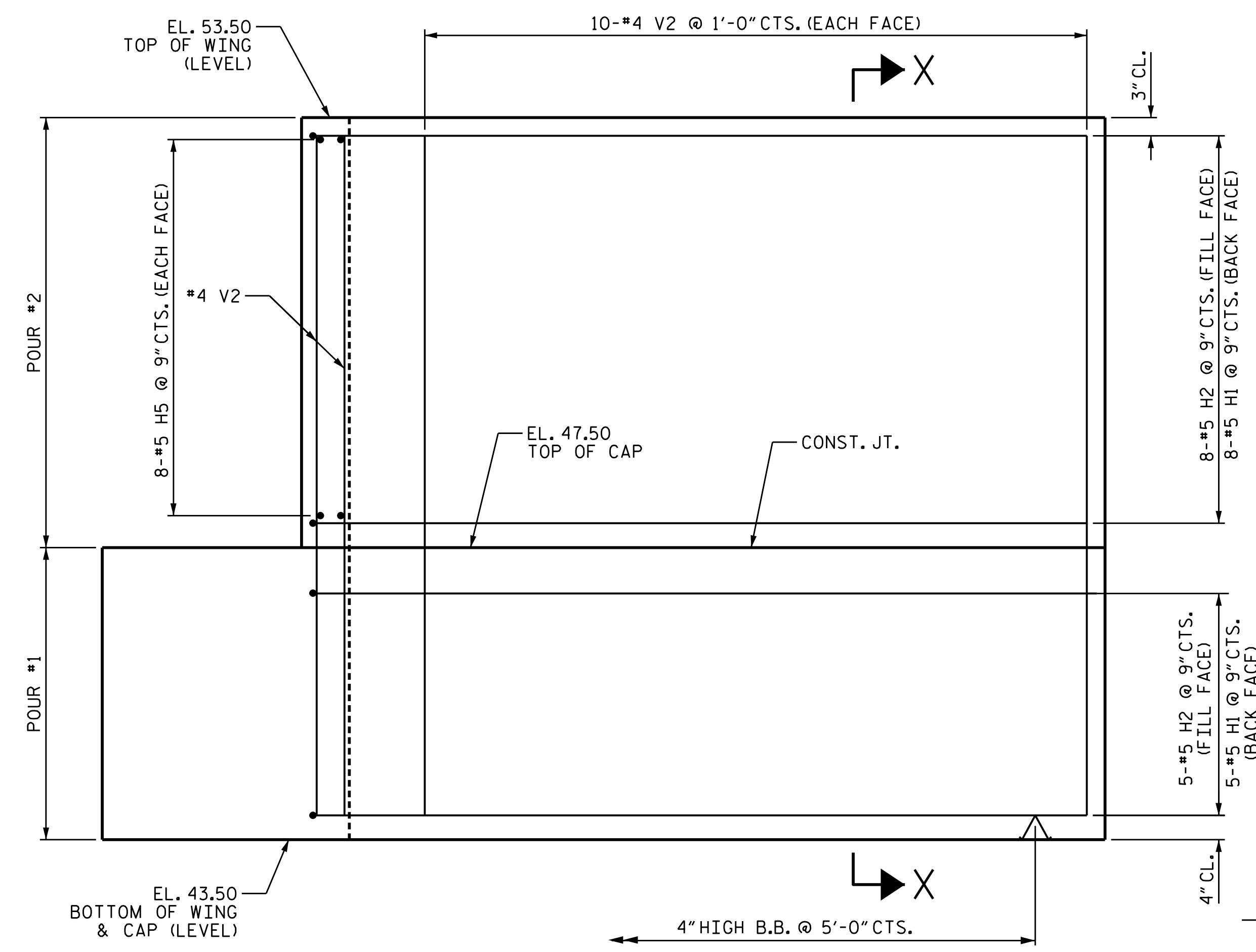
SECTION X-X



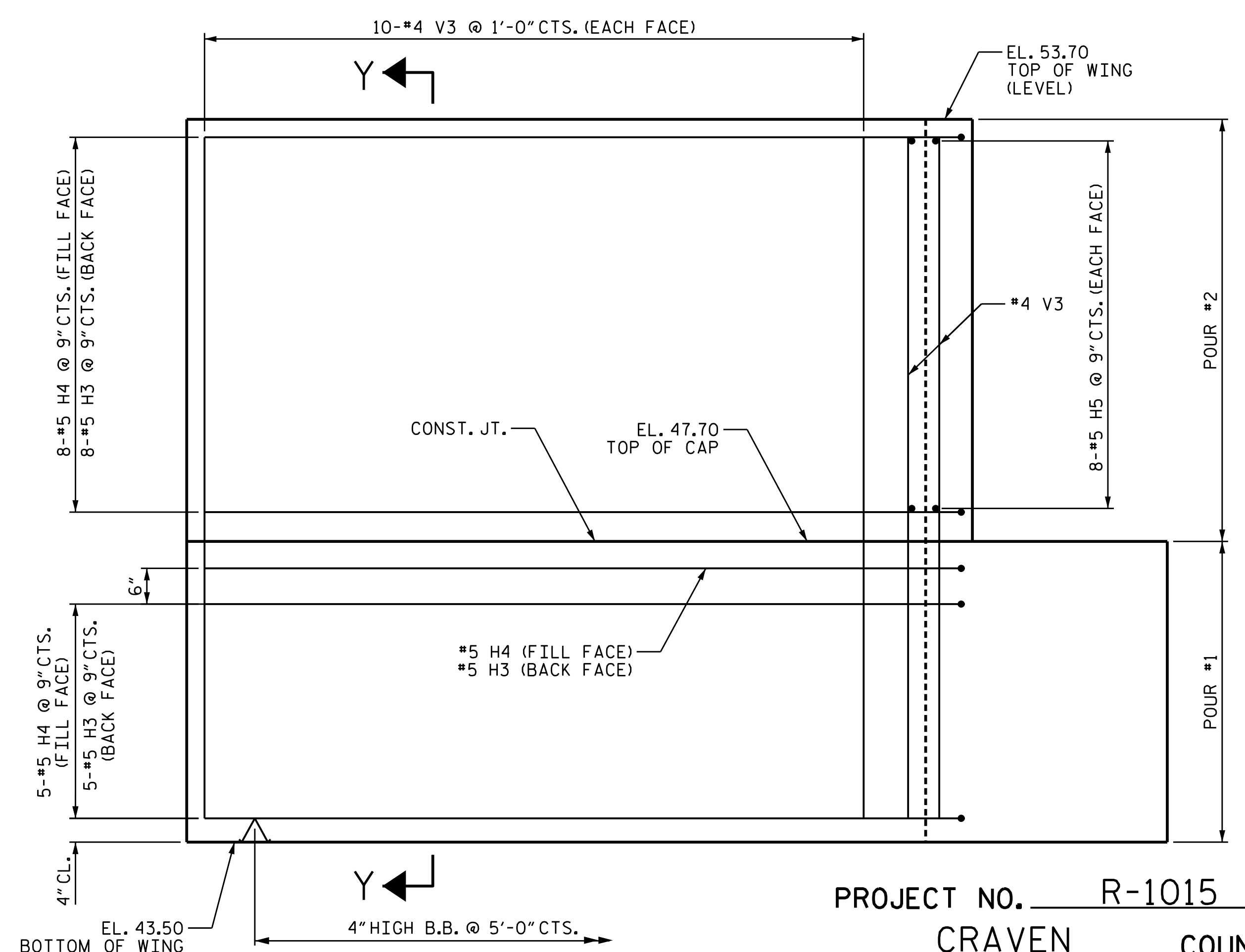
PLAN OF WING W2



SECTION Y-Y



ELEVATION OF WING W1



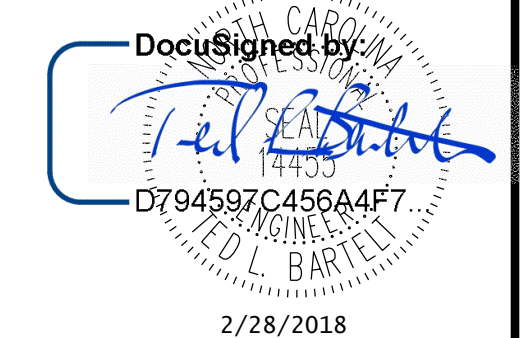
ELEVATION OF WING W2

PROJECT NO. R-1015
 CRAVEN COUNTY
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SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT #1
 (INTEGRAL)



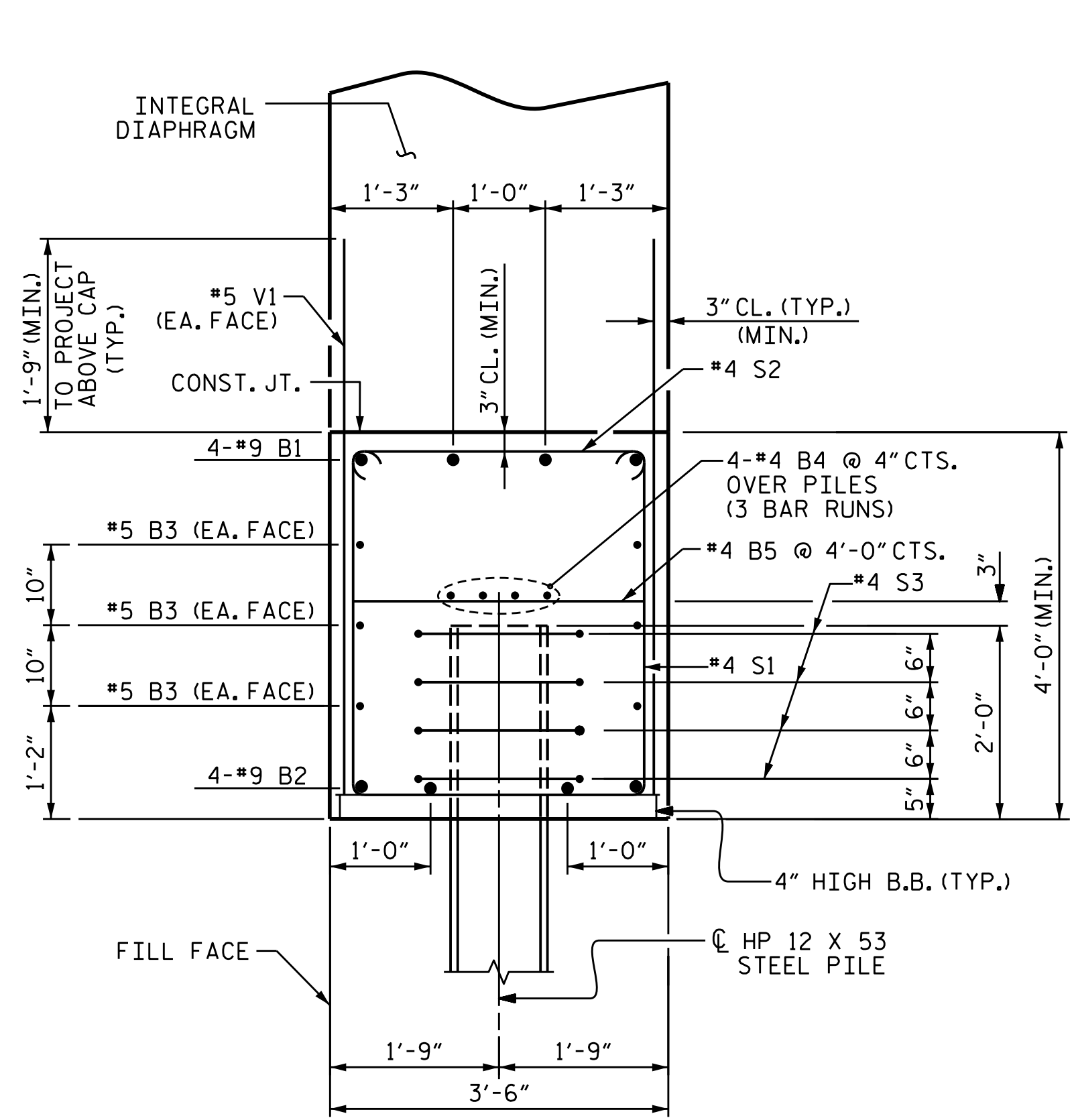
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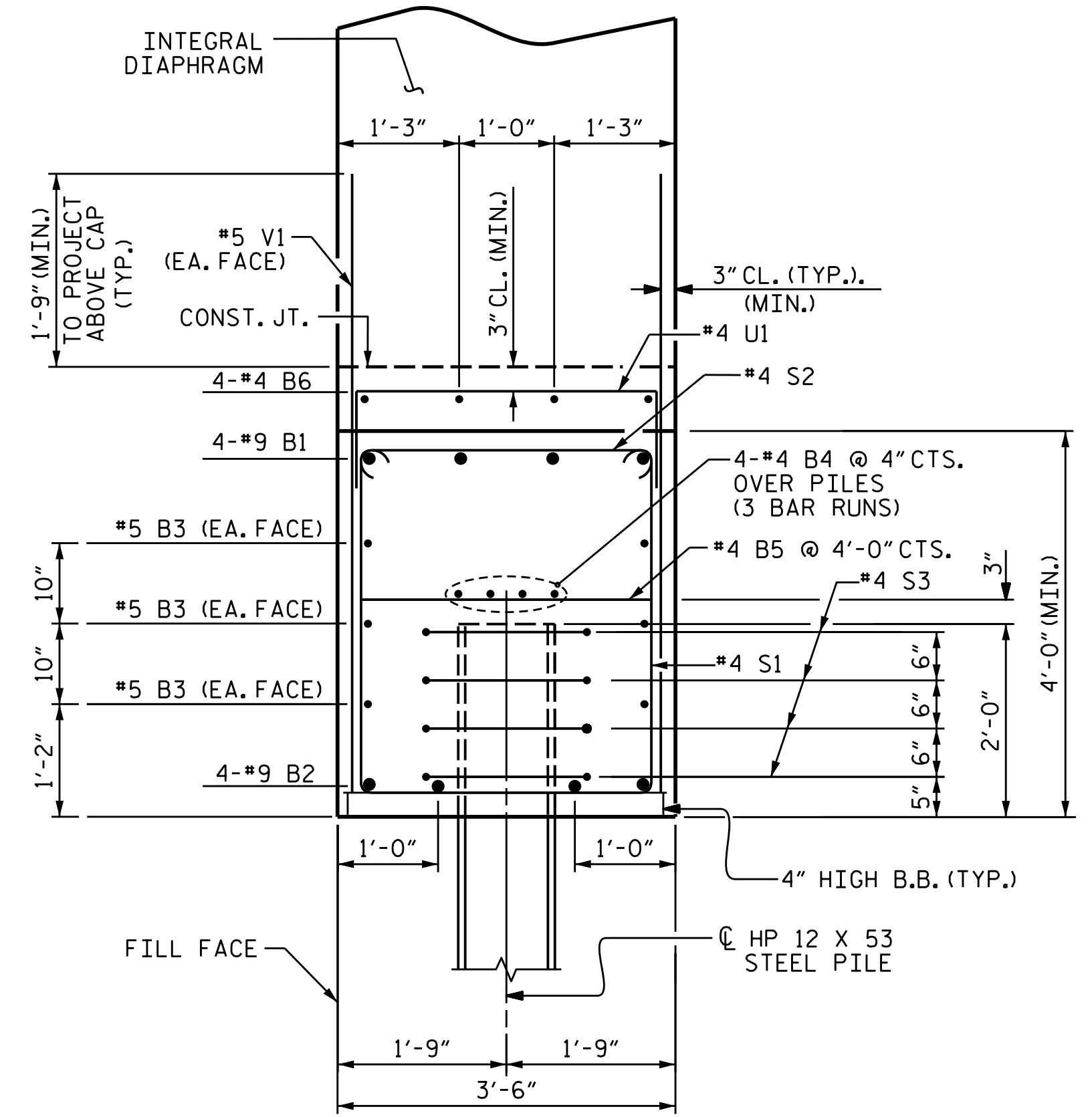
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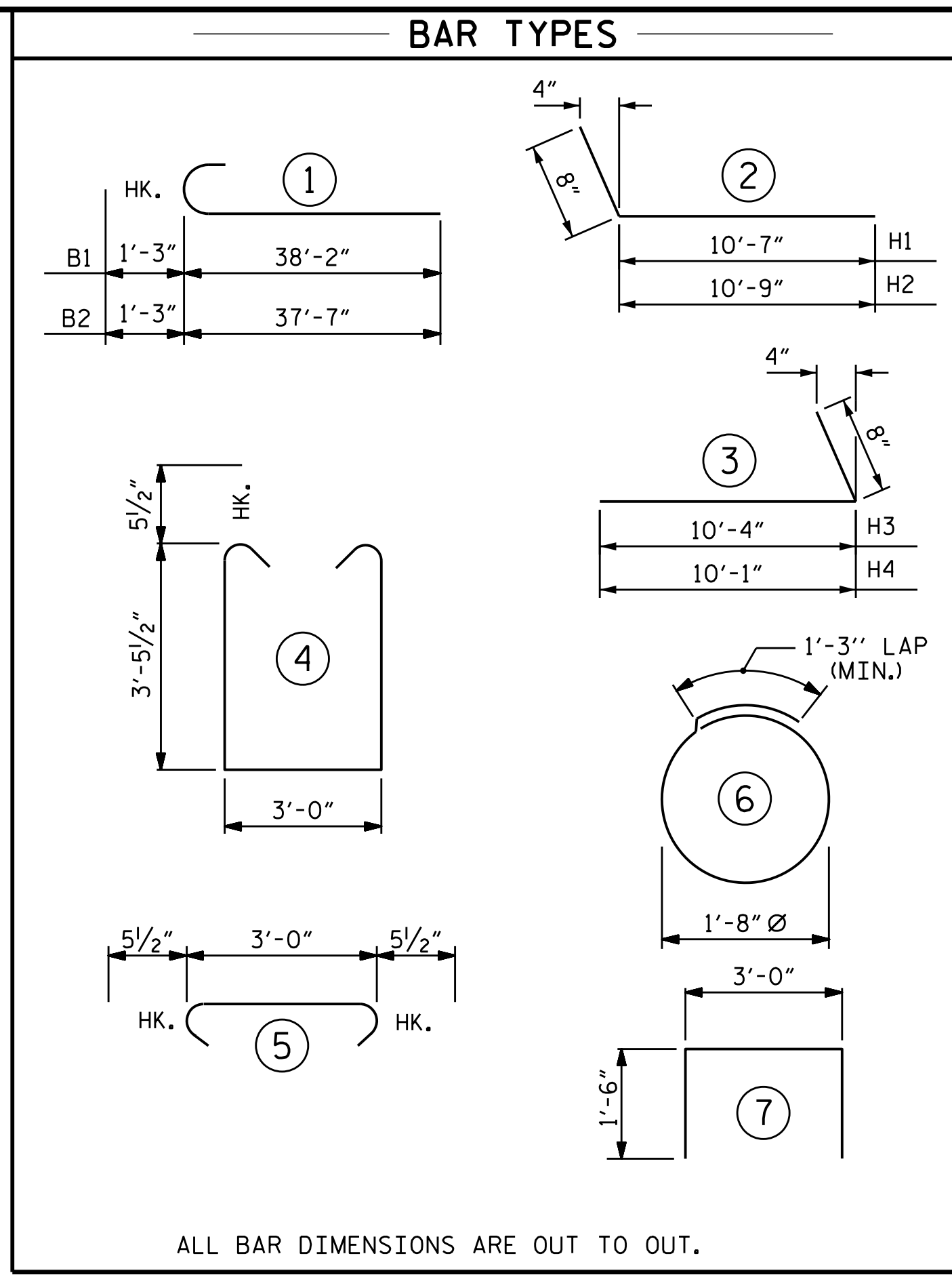
SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



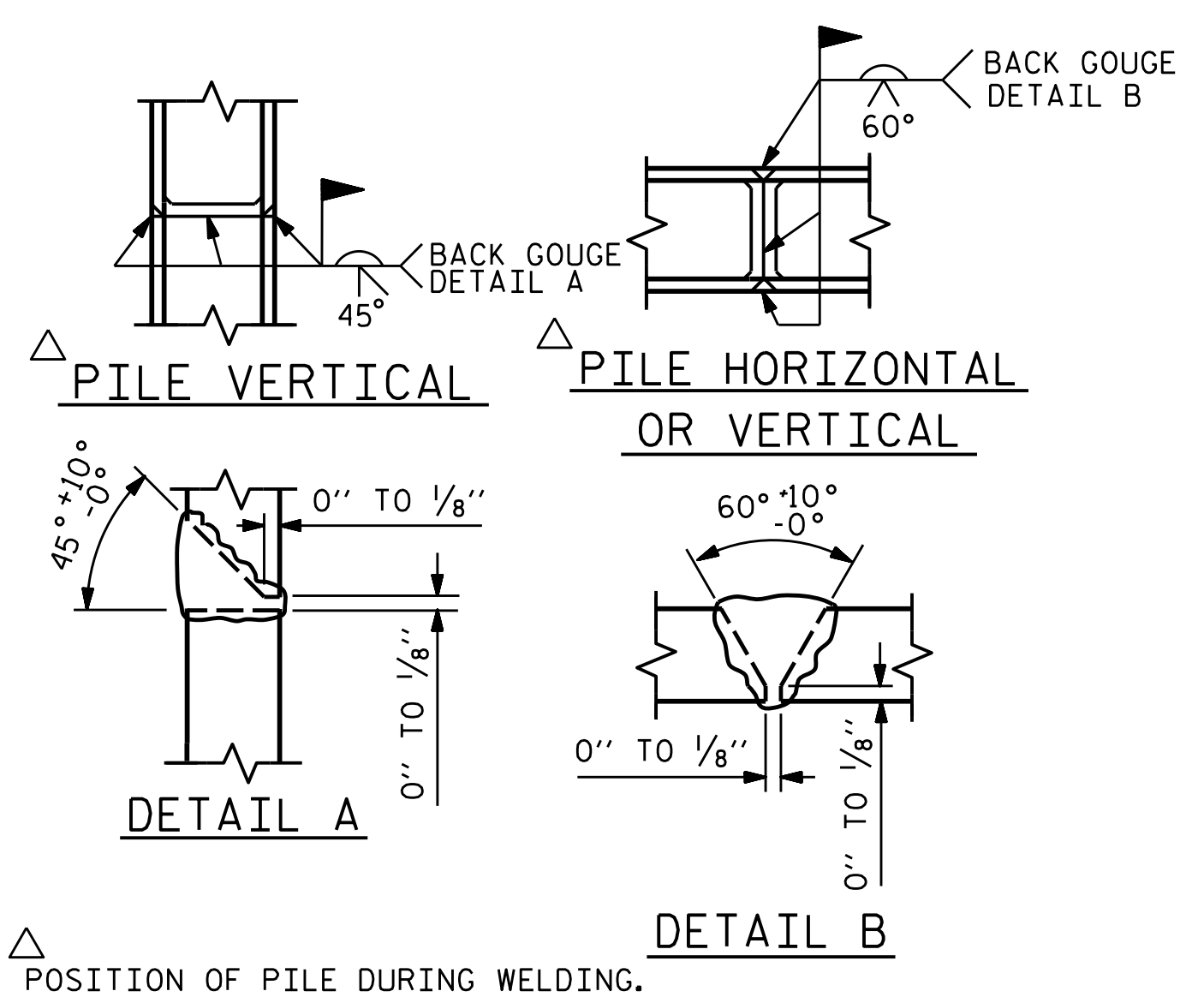
SECTION B-B

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

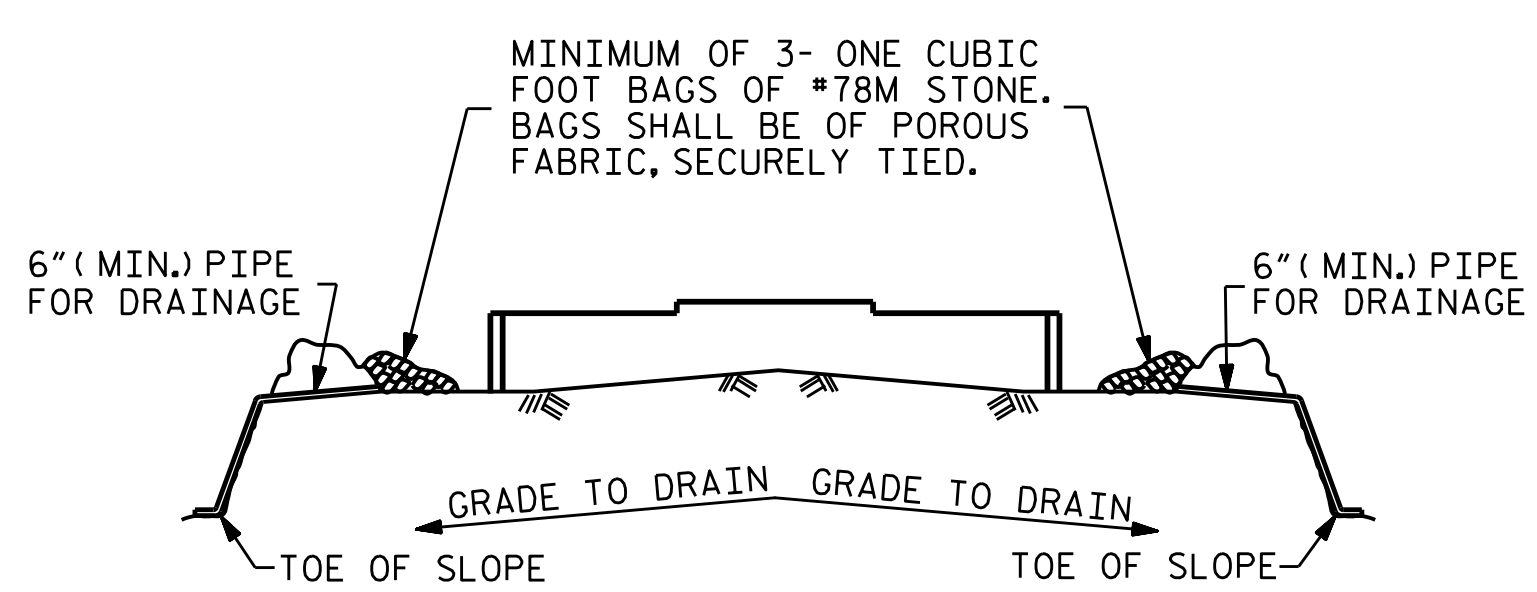


ALL BAR DIMENSIONS ARE OUT TO OUT.

| BILL OF MATERIAL | | | | | |
|---|-----|------|------|--------------|------------|
| INTEGRAL END BENT 1 | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 8 | #9 | 1 | 39'-5" | 1072 |
| B2 | 8 | #9 | 1 | 38'-10" | 1056 |
| B3 | 12 | #5 | STR | 34'-7" | 433 |
| B4 | 12 | #4 | STR | 23'-9" | 190 |
| B5 | 16 | #4 | STR | 3'-0" | 32 |
| B6 | 4 | #4 | STR | 23'-8" | 63 |
| H1 | 14 | #5 | 2 | 11'-3" | 164 |
| H2 | 14 | #5 | 2 | 11'-5" | 167 |
| H3 | 14 | #5 | 3 | 11'-0" | 161 |
| H4 | 14 | #5 | 3 | 10'-9" | 157 |
| H5 | 32 | #5 | STR | 3'-5" | 114 |
| S1 | 55 | #4 | 4 | 10'-10" | 398 |
| S2 | 55 | #4 | 5 | 3'-11" | 144 |
| S3 | 48 | #4 | 6 | 6'-6" | 208 |
| U1 | 16 | #4 | 7 | 6'-0" | 64 |
| V1 | 91 | #4 | STR | 5'-5" | 329 |
| V2 | 40 | #4 | STR | 9'-5" | 252 |
| V3 | 38 | #4 | STR | 9'-7" | 243 |
| REINFORCING STEEL | | | | | 5247 LBS. |
| CLASS A CONCRETE | | | | | |
| POUR #1 : CAP & LOWER WINGS | | | | 39.4 CU.Y. | |
| POUR #2 : UPPER PART OF WINGS | | | | 5.9 CU.Y. | |
| CONCRETE COLLARS | | | | 2.1 CU.Y. | |
| TOTAL CONCRETE | | | | | 47.4 CU.Y. |
| HP 12X53 STEEL PILES NO.12 | | | | 840 LIN. FT. | |
| PILE REDRIVES | | | | 6 EACH | |
| PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES | | | | | 12 EACH |



PILE SPLICE DETAILS

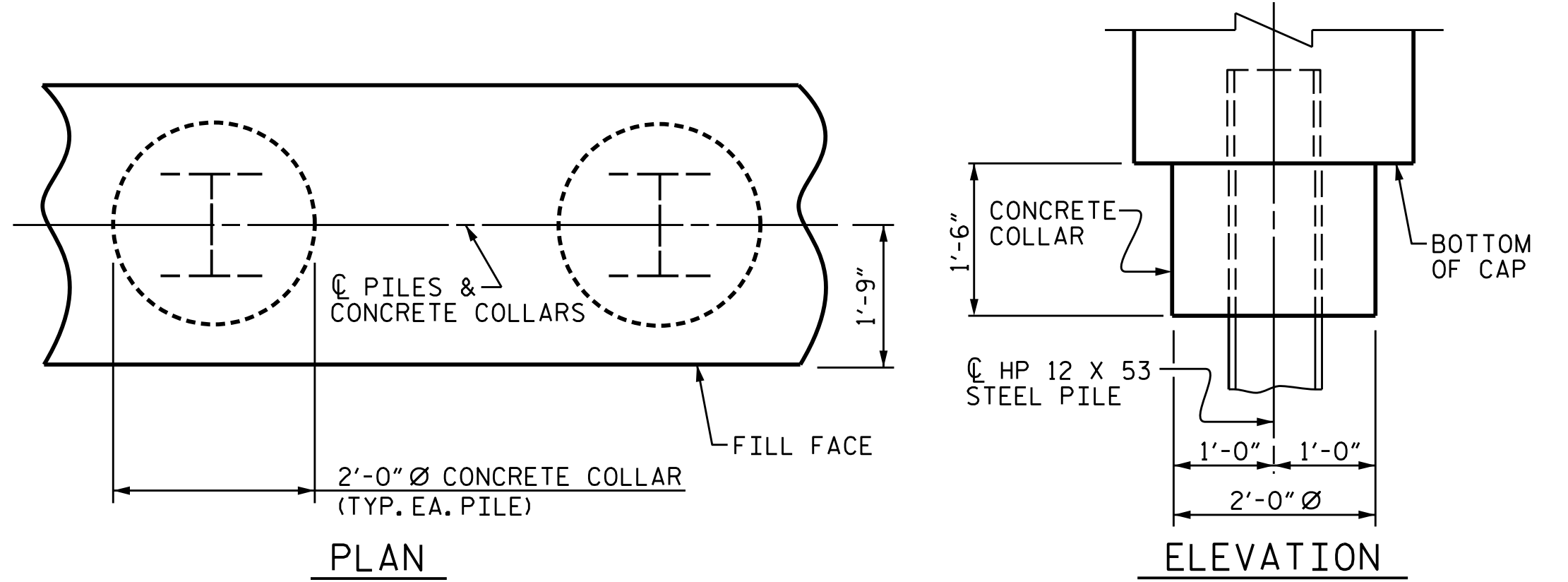


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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



CORROSION PROTECTION FOR STEEL PILES DETAIL

PROJECT NO. R-1015
Craven COUNTY
 STATION: 52+32.96 -Y3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT #1
 (INTEGRAL)

1998 2018
 ALPHA & OMEGA GROUP
 CIVIL | STRUCTURAL | WATER RESOURCES

DocuSigned by

 D794597C456A4F7
 12/7/2018

| | | | |
|----------------------------|----------|--------|----------|
| DRAWN BY : | J. B. W. | DATE : | 02/20/18 |
| CHECKED BY : | T. L. B. | DATE : | 02/20/18 |
| DESIGN ENGINEER OF RECORD: | T. L. B. | DATE : | 02/20/18 |

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| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |

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 *****USER*****

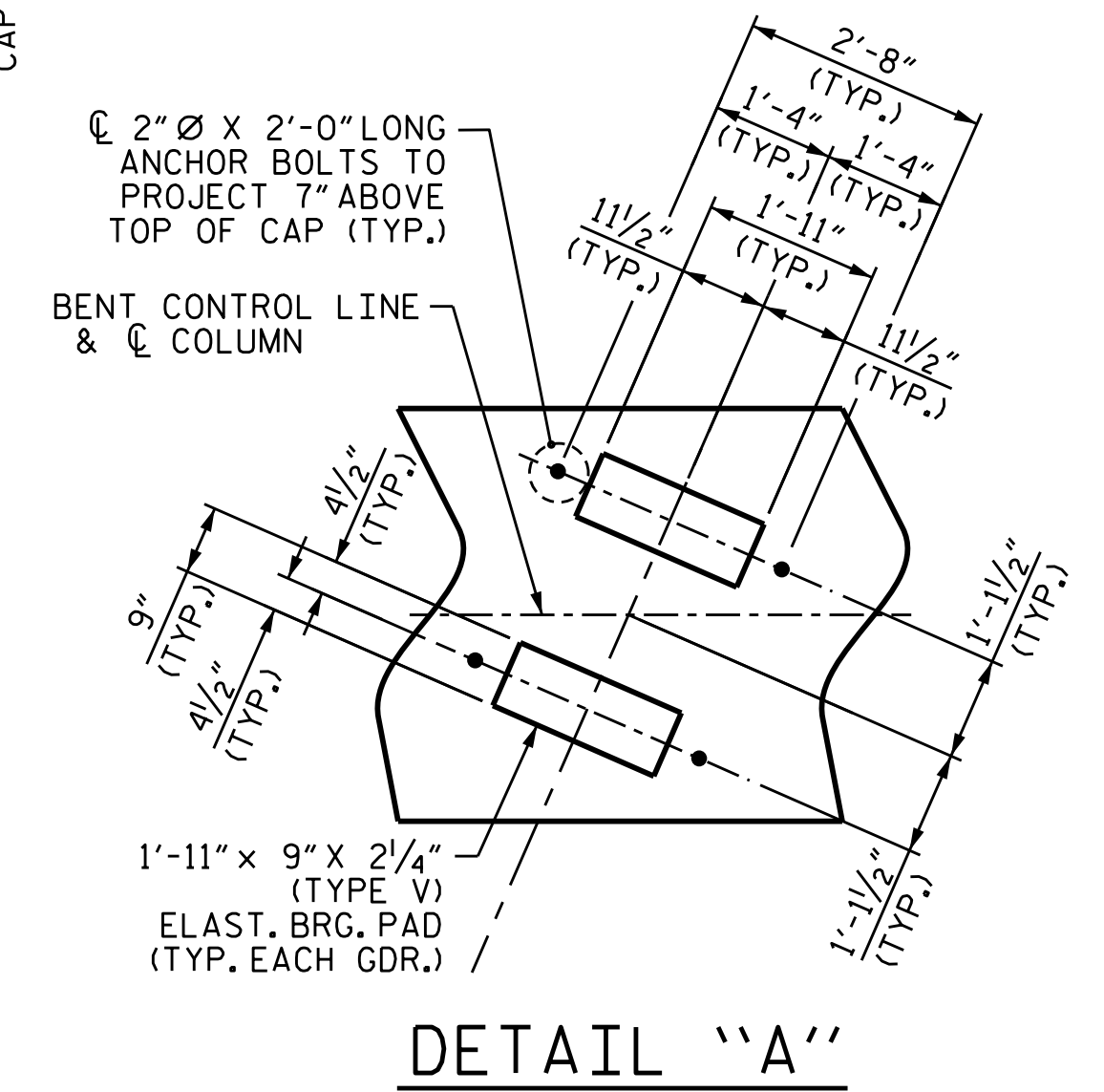
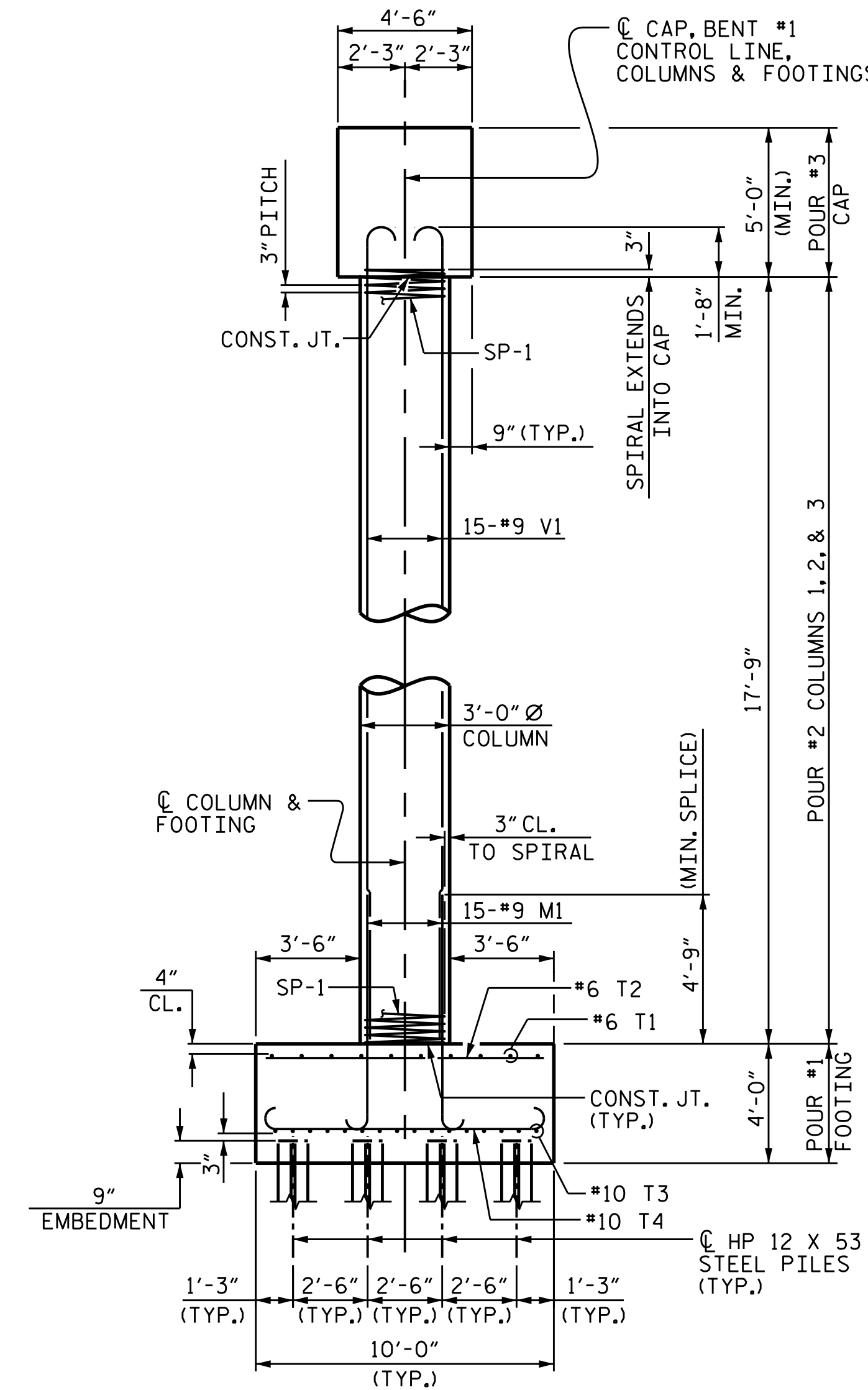
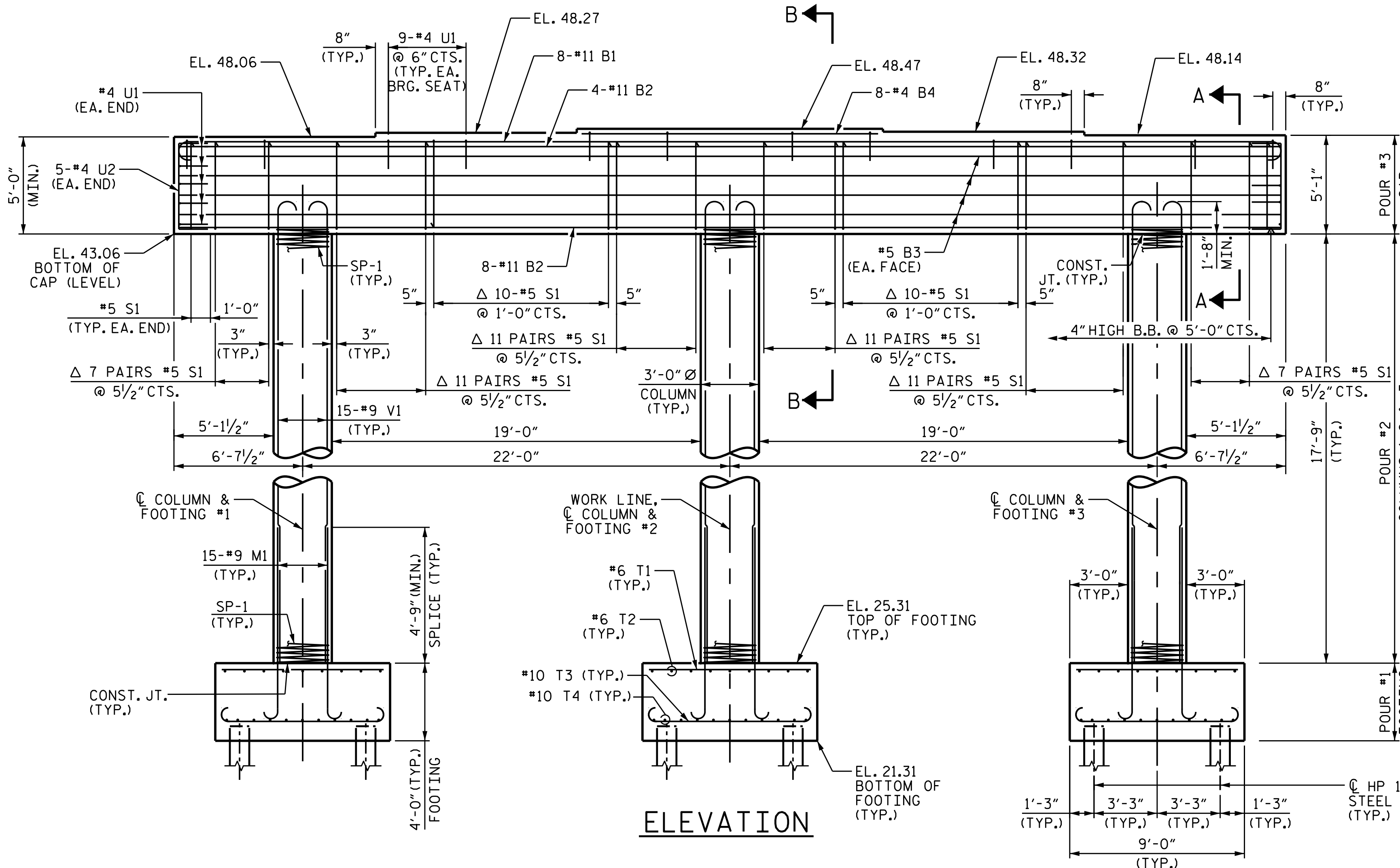
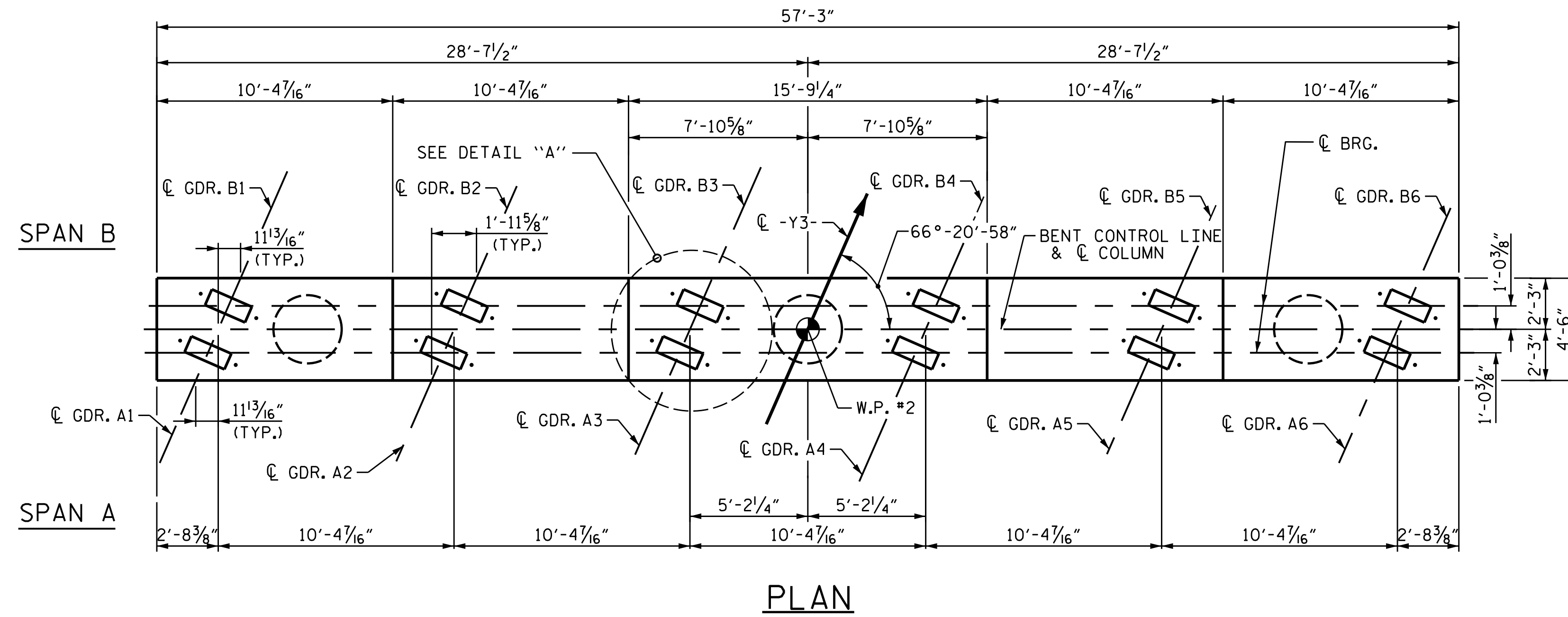
NOTES:

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.

Δ INVERT ALTERNATE STIRRUPS.

FOR DIMENSIONS AND SPACING OF FOOTING REINFORCING STEEL AND SPACING OF HP 12 X 53 PILES SEE "PLAN OF FOOTING" SHEET 2 OF 2.



END ELEVATION

ELEVATION

PROJECT NO. R-1015
CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 1 OF 2

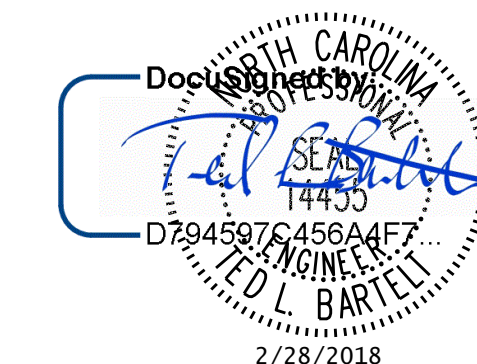
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT #1

DRAWN BY: J. B. W. DATE: 02/20/18
 CHECKED BY: T. L. B. DATE: 02/20/18
 DESIGN ENGINEER OF RECORD: T. L. B. DATE: 02/20/18

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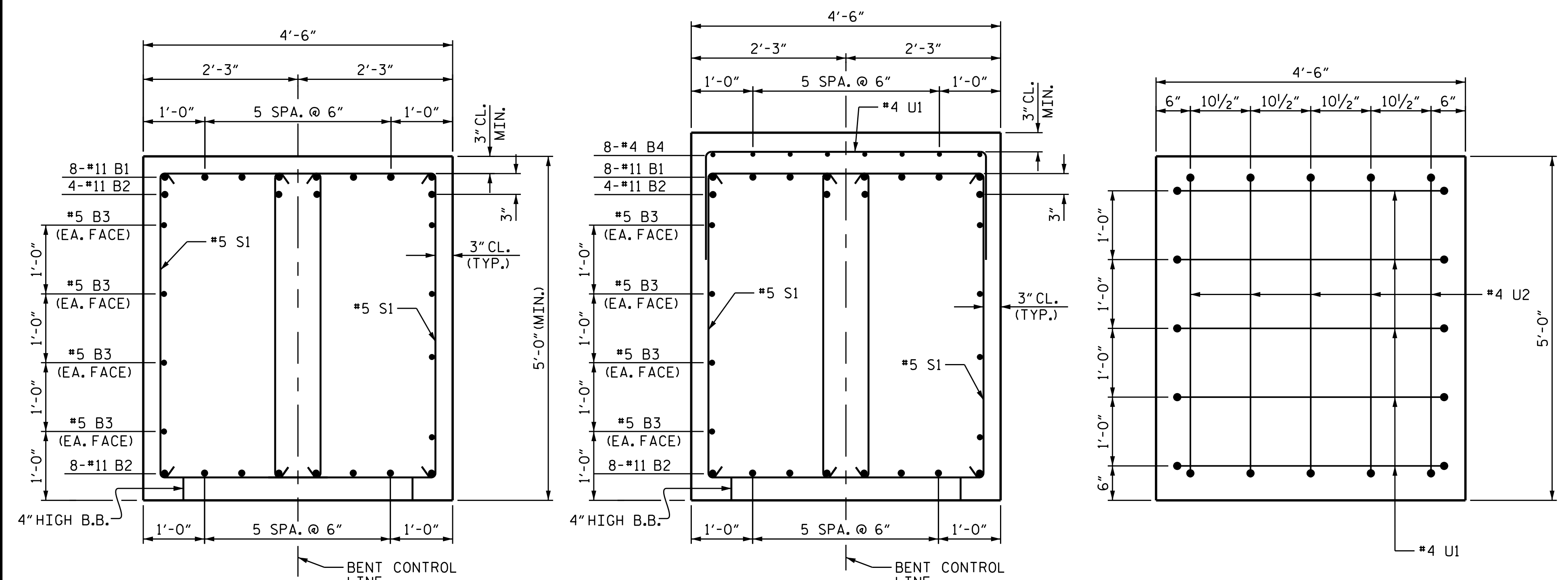


REFERENCE NO. 9-24

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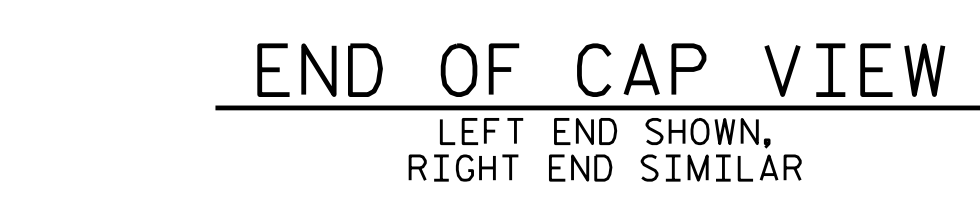
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| 2 | | | 4 | | | 32 |

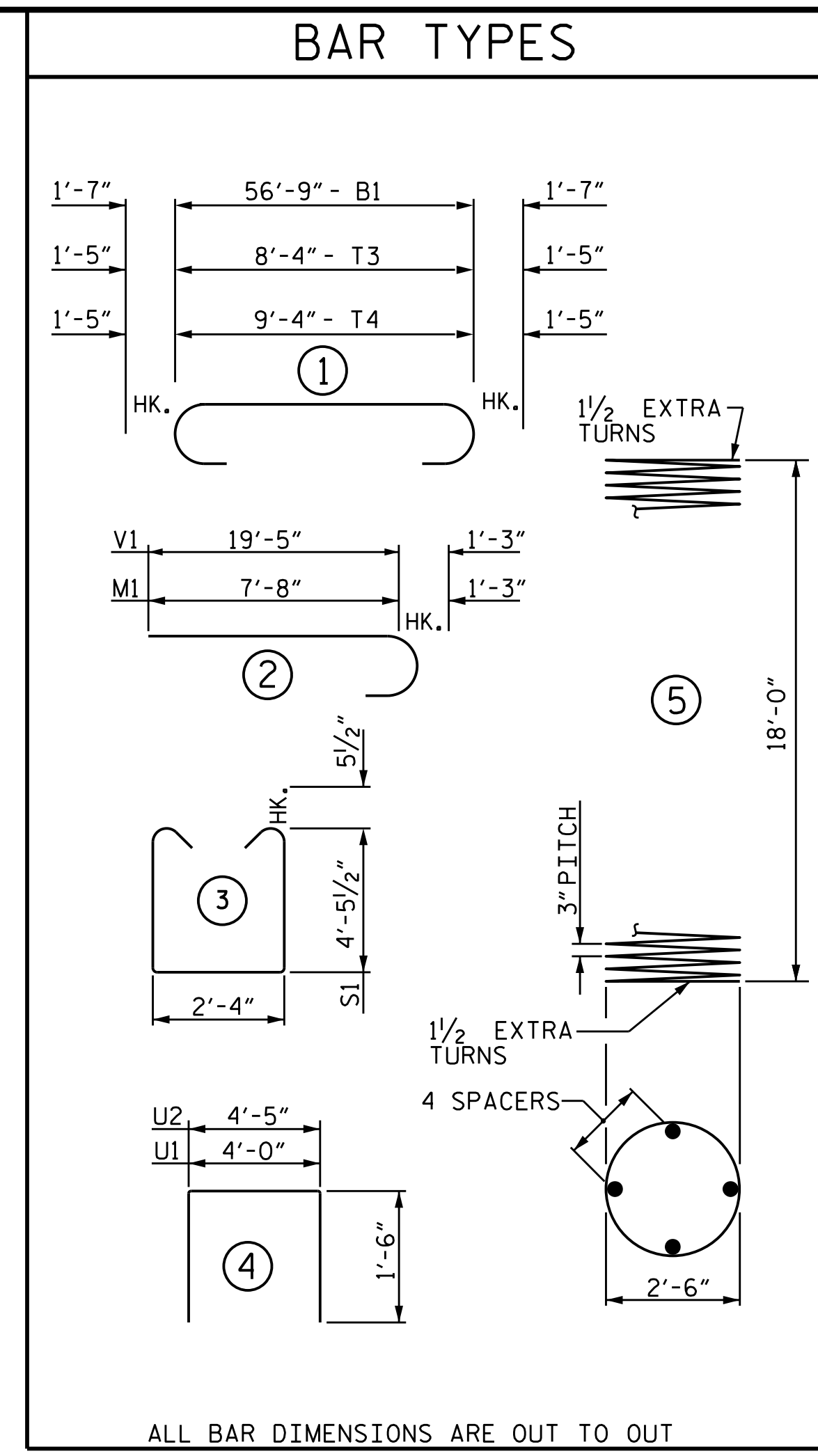


SECTION A-A

SECTION B-B



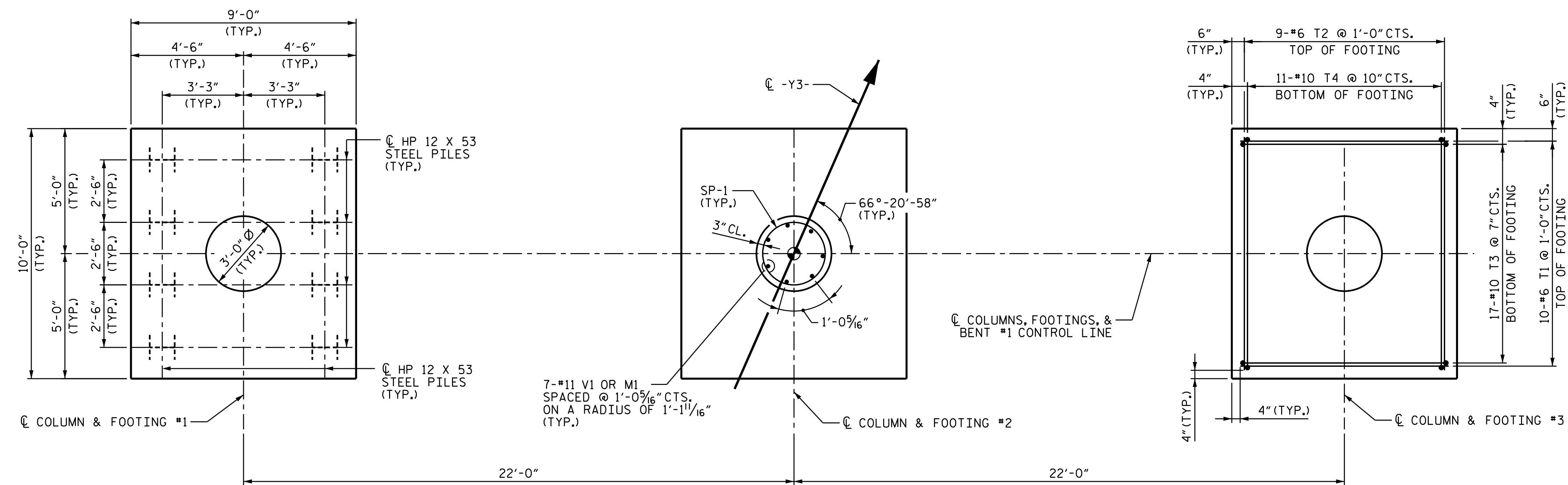
END OF CAP VIEW
LEFT END SHOWN,
RIGHT END SIMILAR



ALL BAR DIMENSIONS ARE OUT TO OUT

| BILL OF MATERIAL | | | | | |
|---|-----|------|------|---------------|--------|
| BENT #1 | | | | | |
| BAR NO. | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 8 | #11 | | 59'-11" | 2547 |
| B2 | 12 | #11 | STR | 56'-9" | 3618 |
| B3 | 8 | #5 | STR | 56'-9" | 474 |
| B4 | 8 | #4 | STR | 15'-3" | 81 |
| M1 | 21 | #11 | | 12'-0" | 1339 |
| S1 | 176 | #5 | | 12'-2" | 2233 |
| T1 | 30 | #6 | STR | 8'-4" | 376 |
| T2 | 27 | #6 | STR | 9'-4" | 379 |
| T3 | 51 | #10 | | 11'-8" | 2560 |
| T4 | 33 | #10 | | 12'-9" | 1799 |
| U1 | 64 | #4 | | 7'-0" | 299 |
| U2 | 10 | #4 | | 7'-5" | 50 |
| V1 | 21 | #11 | | 21'-5" | 2390 |
| REINFORCING STEEL | | | | 18145 LBS. | |
| SP-1 | 3 | ★ | 5 | 581'-6" | 1165 |
| SPIRAL COLUMN REINFORCING STEEL | | | | 1165 LBS. | |
| CLASS A CONCRETE BREAKDOWN | | | | | |
| POUR #1 FOOTINGS | | | | 40.0 CU.YDS. | |
| POUR #2 COLUMNS | | | | 13.9 CU.YDS. | |
| POUR #3 CAP | | | | 49.8 CU.YDS. | |
| TOTAL CLASS A CONCRETE | | | | 103.7 CU.YDS. | |
| HP 12 x 53 STEEL PILES | | | | | |
| NO. 24 | | | | 2160 LIN. FT. | |
| PILE REDRIVES | | | | 12 EACH | |
| PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES | | | | 12 EACH | |

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



PLAN OF FOOTING

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

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT #1

DRAWN BY : J. B. W. DATE : 02/20/18
 CHECKED BY : T. L. B. DATE : 02/20/18
 DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

*****SYSTEM*****
 *****DCN*****
 *****USERNAME*****

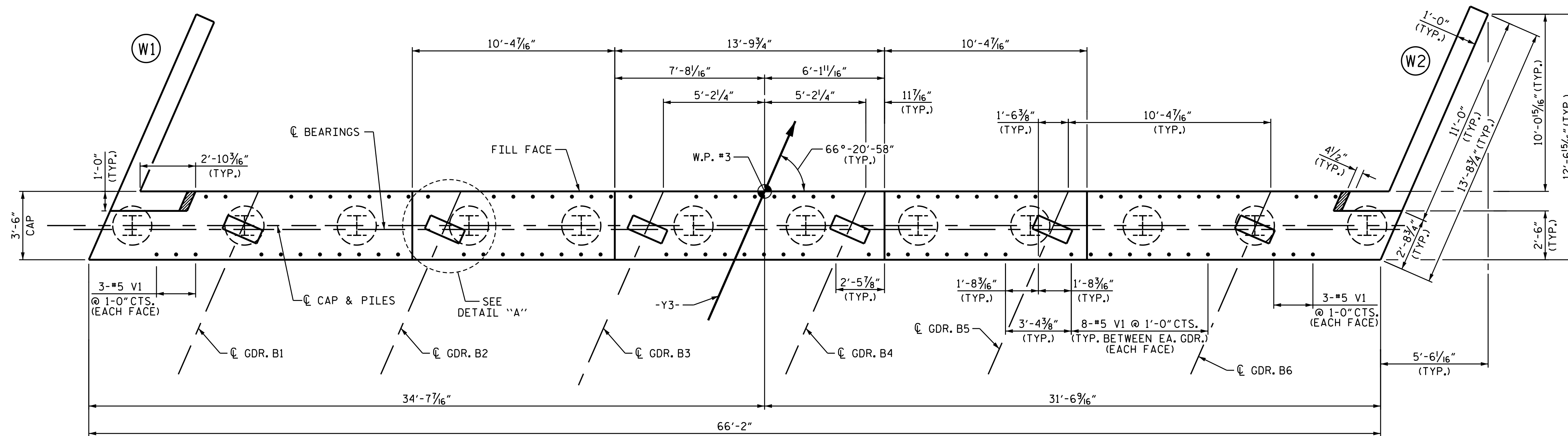
1998 2018
 ALPHA & OMEGA GROUP
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DocuSign
 NORTH CAROLINA
 SEALED
 14423
 D794597C456A4E7
 L. BARTELL
 12/7/2018

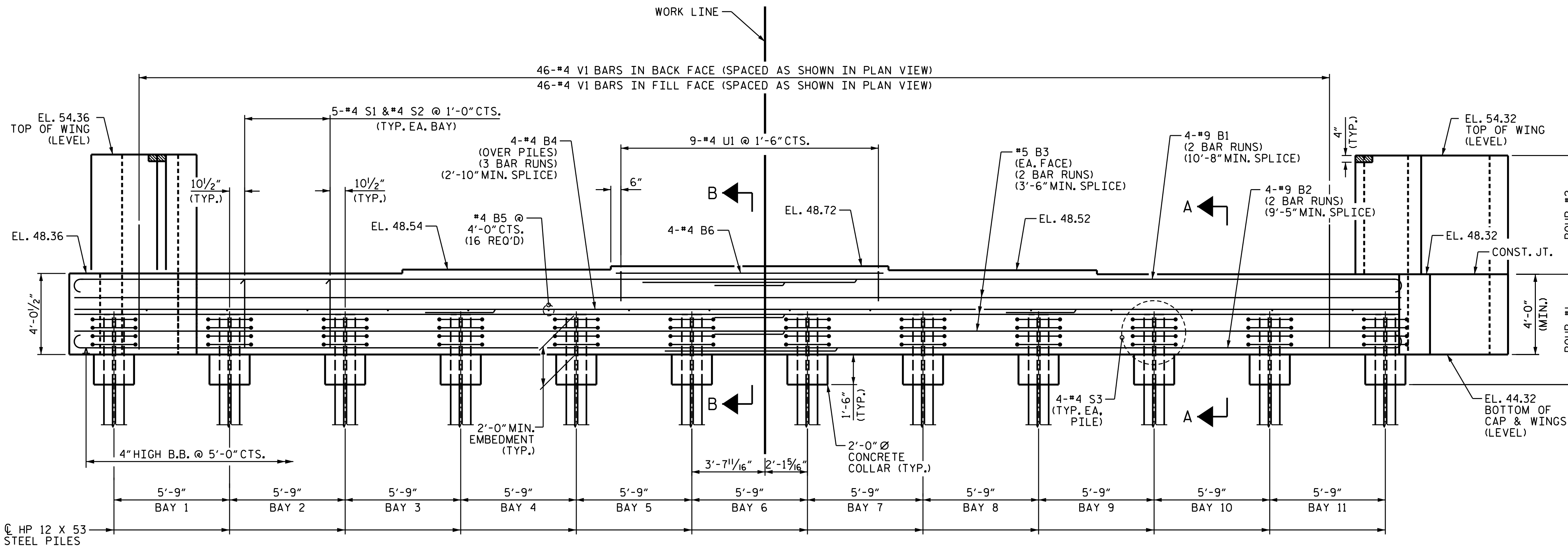
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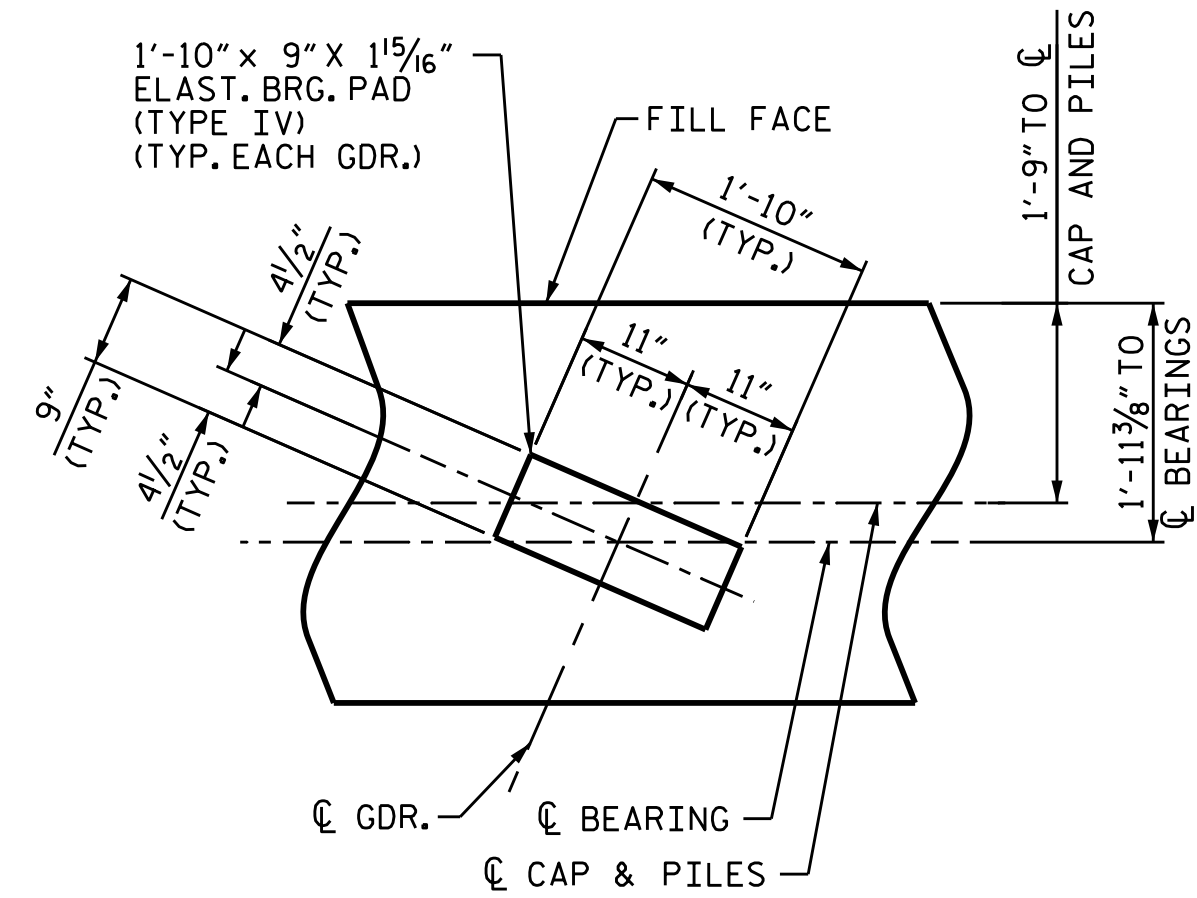
| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S9-25 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |



PLAN



ELEVATION
FOR SECTION A-A AND
PARTIAL SECTION B-B, SEE
SHEET 3 OF 3.



DETAIL "A"

NOTES:

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.
- THE TOP PART OF THE END BENT CAP AND WINGS, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".
- THE UPPER PORTION OF THE INTEGRAL END BENT CAP AND THE UPPER PORTION OF THE WINGS SHALL BE POURED WITH THE SUPERSTRUCTURE. SEE SUPERSTRUCTURE PLANS.
- FOR PILE SPLICE DETAIL, SEE SHEET 3 OF 3.
- FOR SECTION A-A SEE SHEET 3 OF 3.

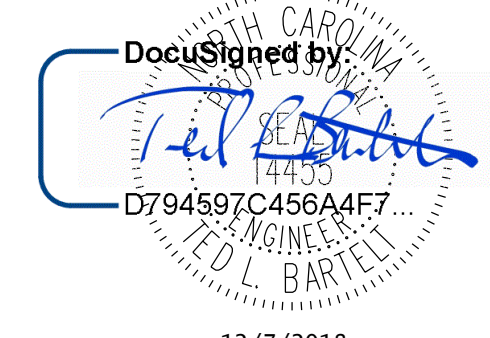
PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT #2
 (INTEGRAL)

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S9-26 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 32 |

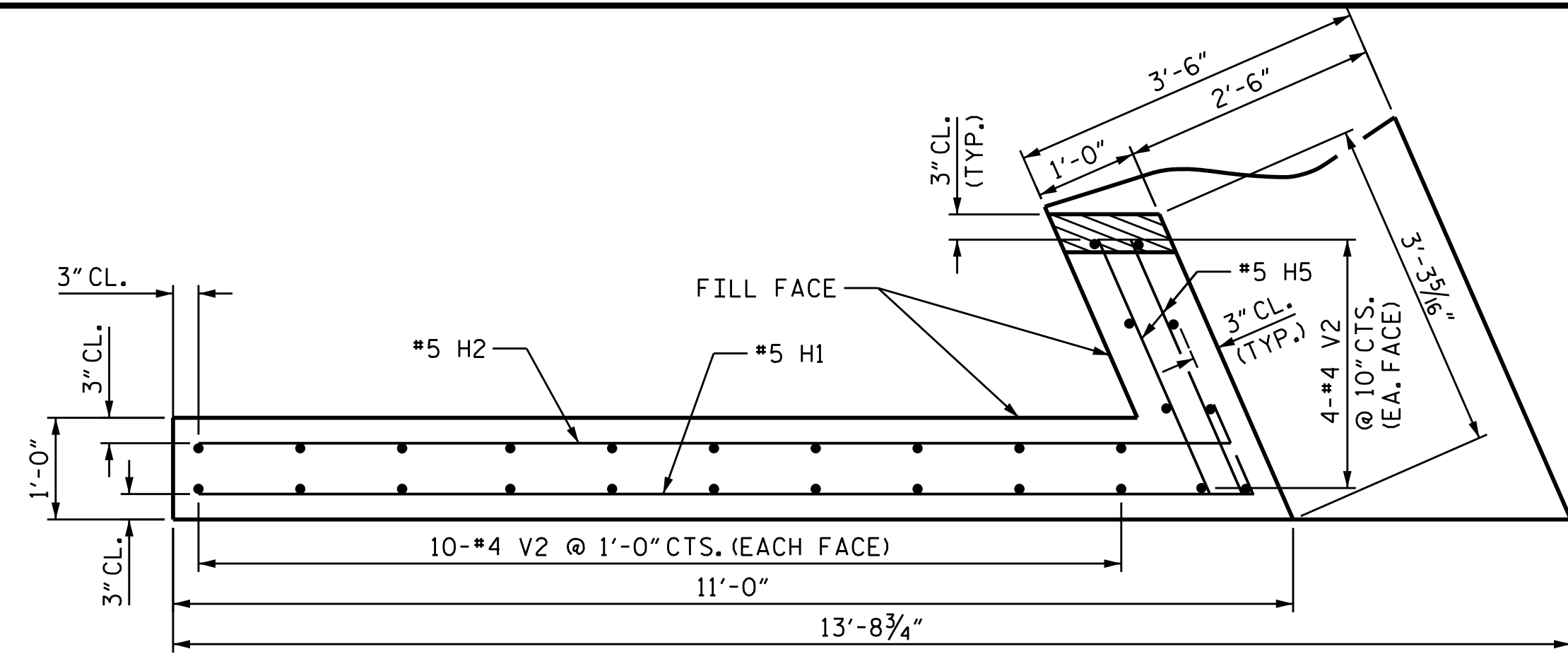
DRAWN BY: J.B.W. DATE: 02/20/18
 CHECKED BY: T.L.B. DATE: 02/20/18
 DESIGN ENGINEER OF RECORD: T.L.B. DATE: 02/20/18



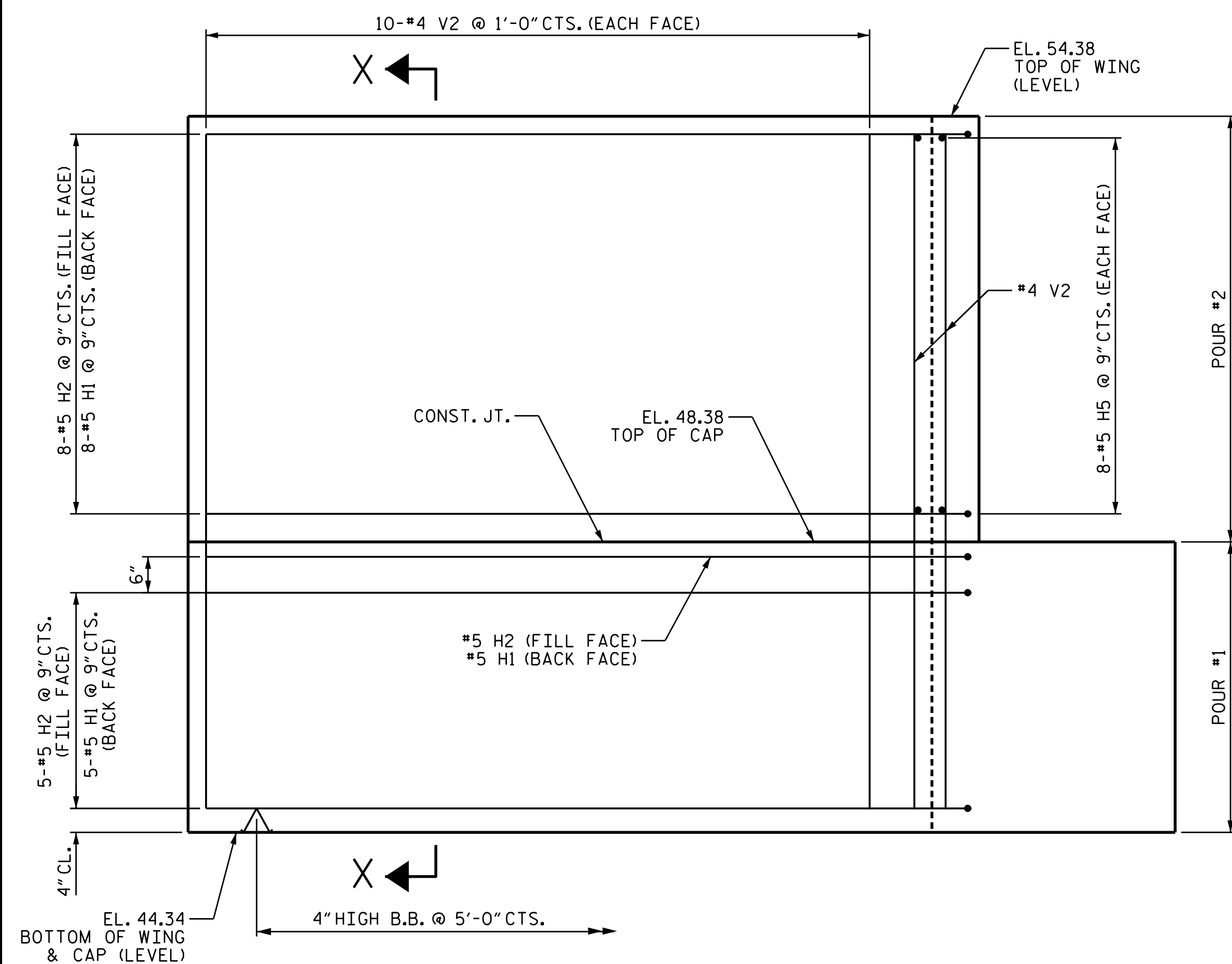
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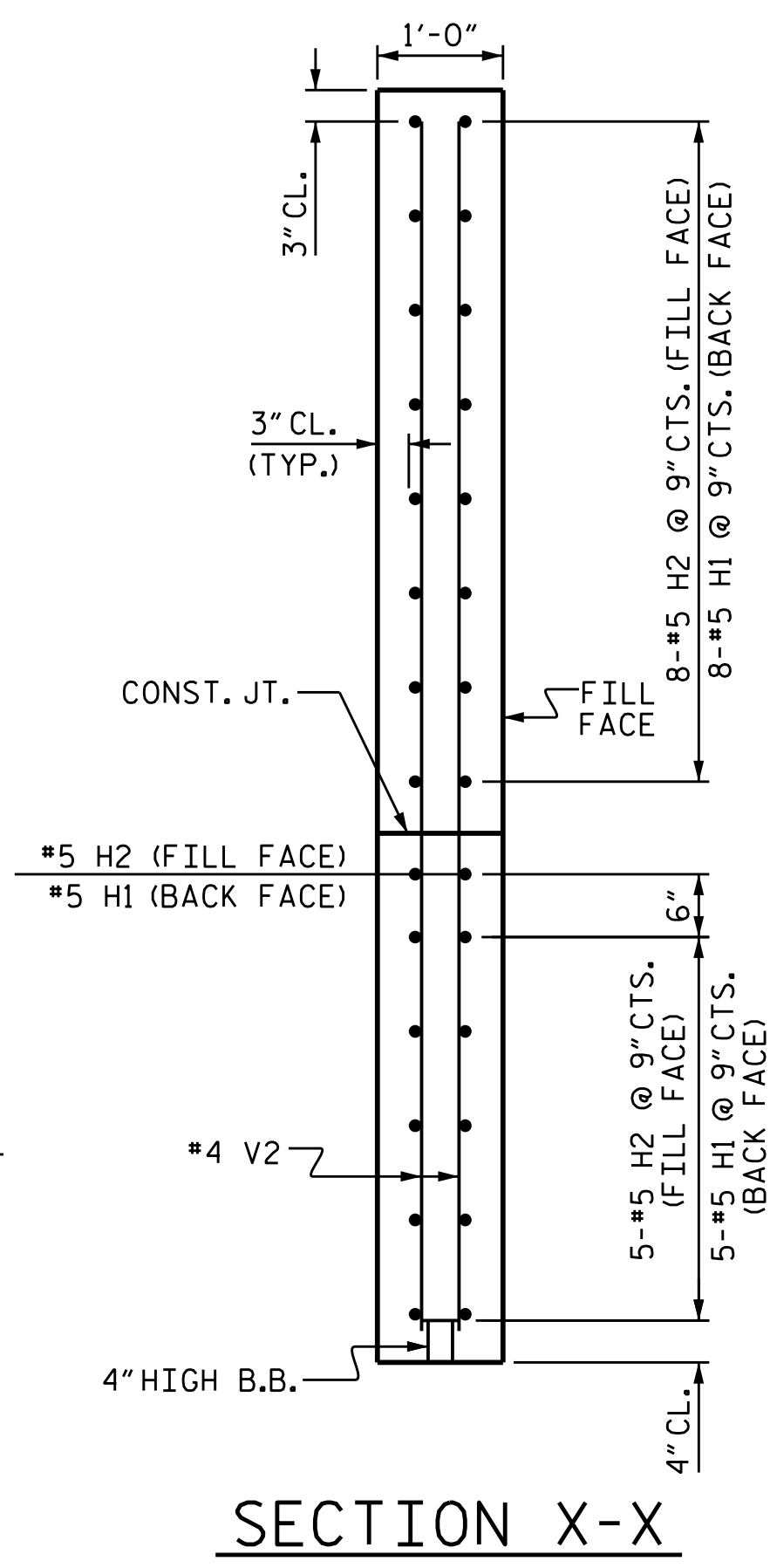
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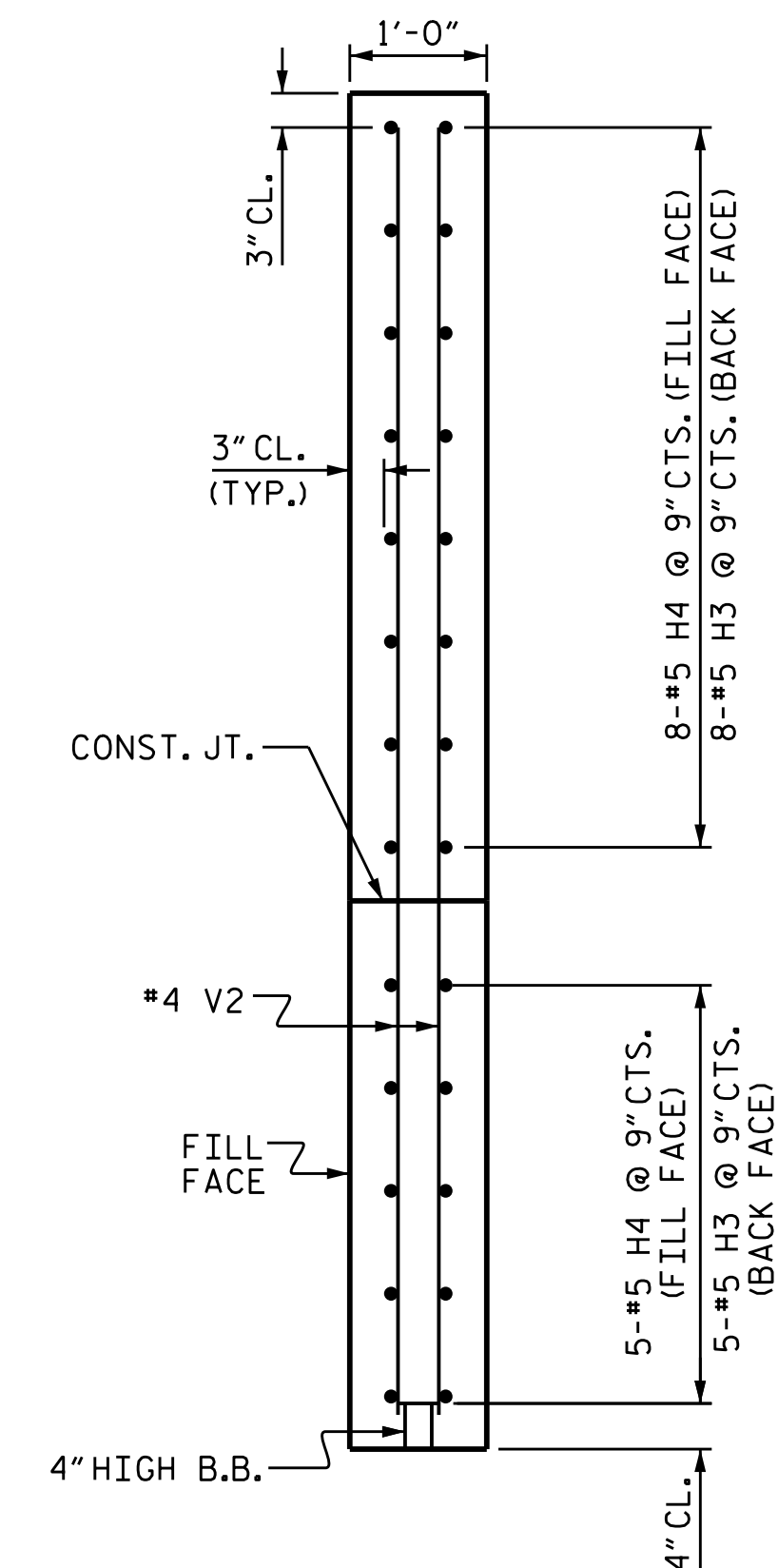
PLAN OF WING W1



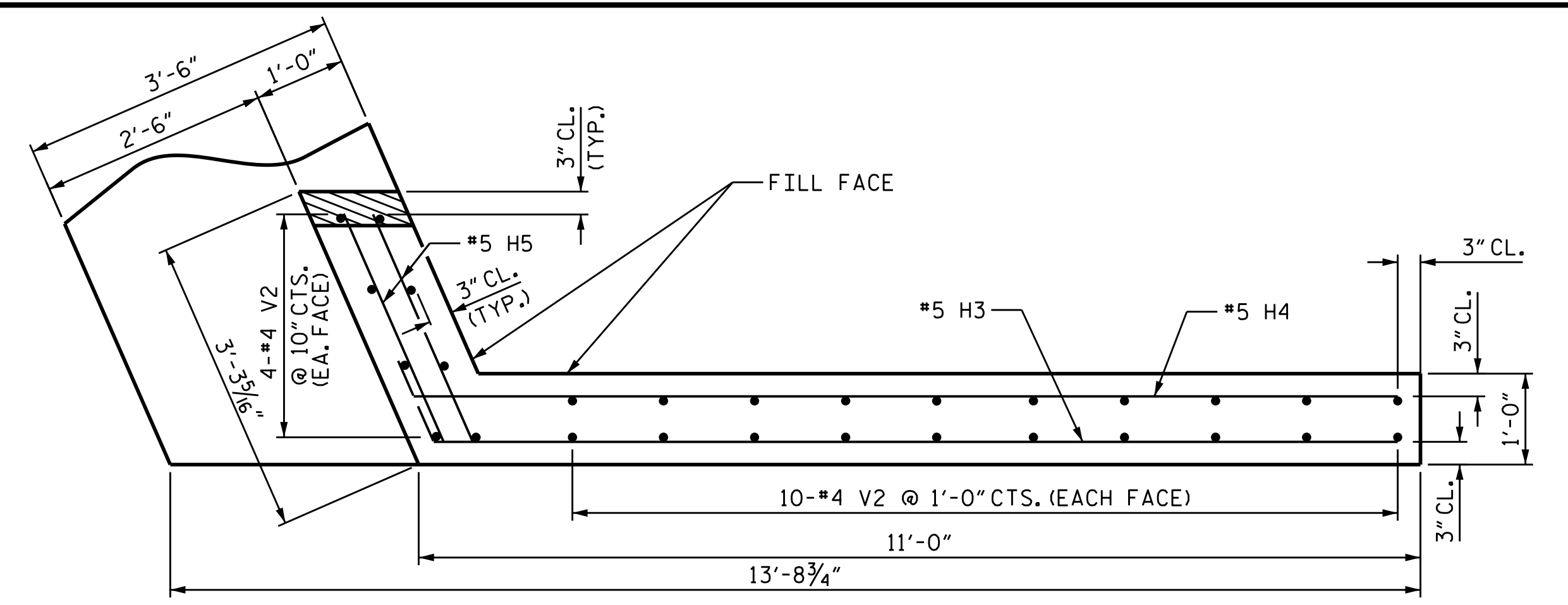
ELEVATION OF WING W1



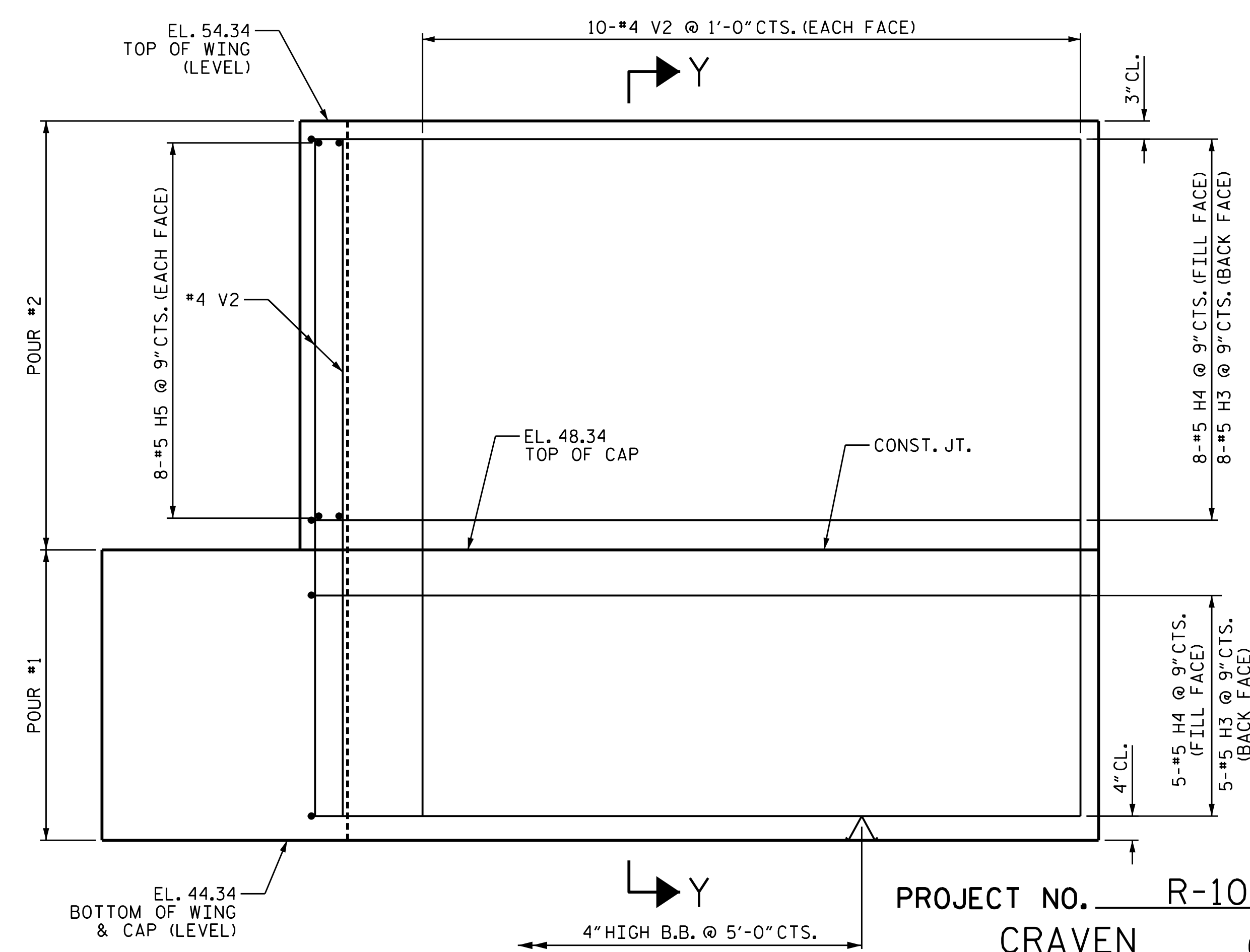
SECTION X-X



SECTION Y-Y



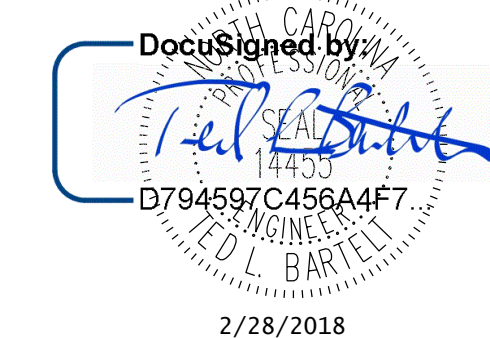
PLAN OF WING W2



ELEVATION OF WING W2

DRAWN BY : J.B.W. DATE : 02/20/18
 CHECKED BY : T.L.B. DATE : 02/20/18
 DESIGN ENGINEER OF RECORD: T.L.B. DATE : 02/20/18

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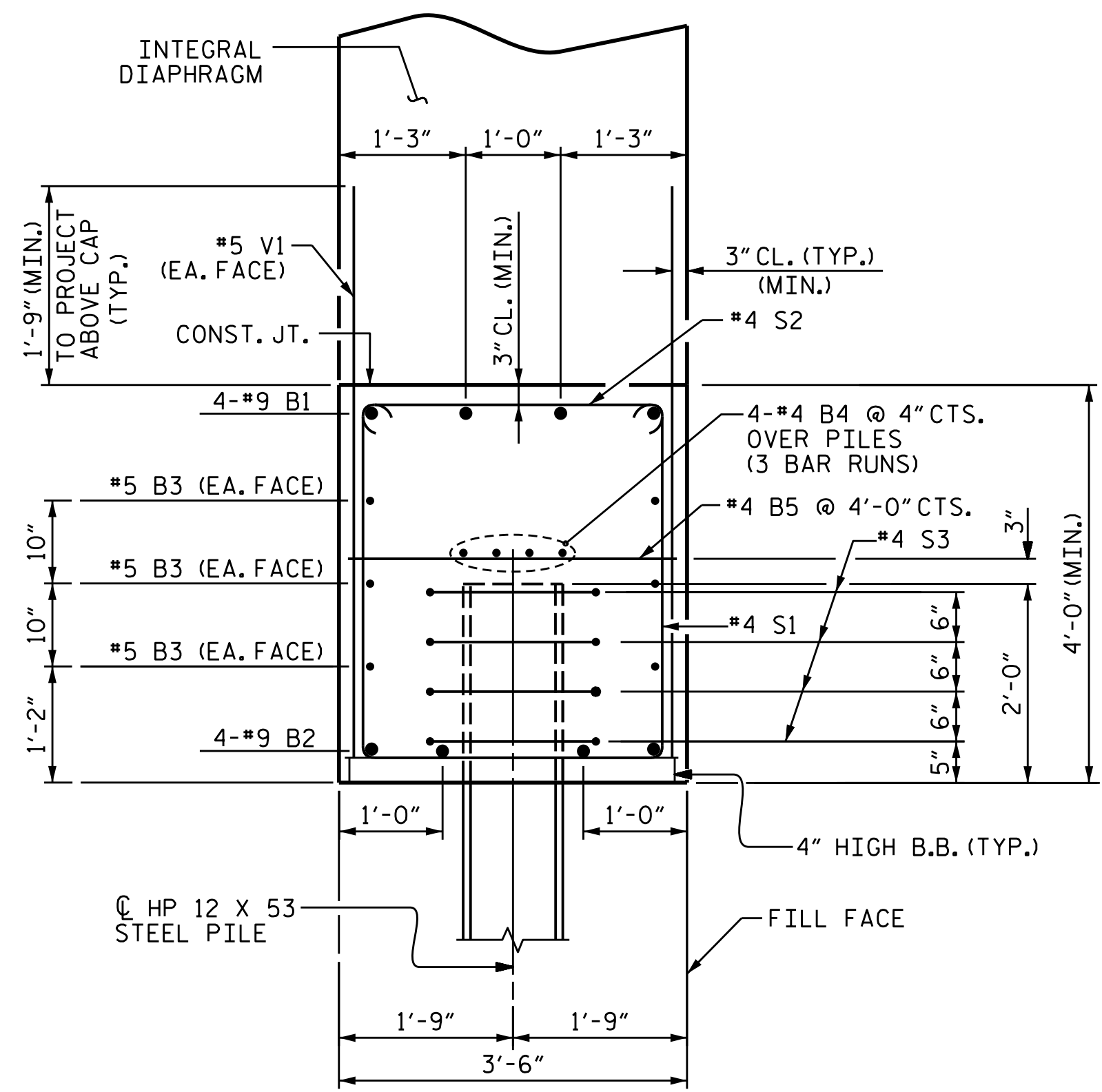
PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

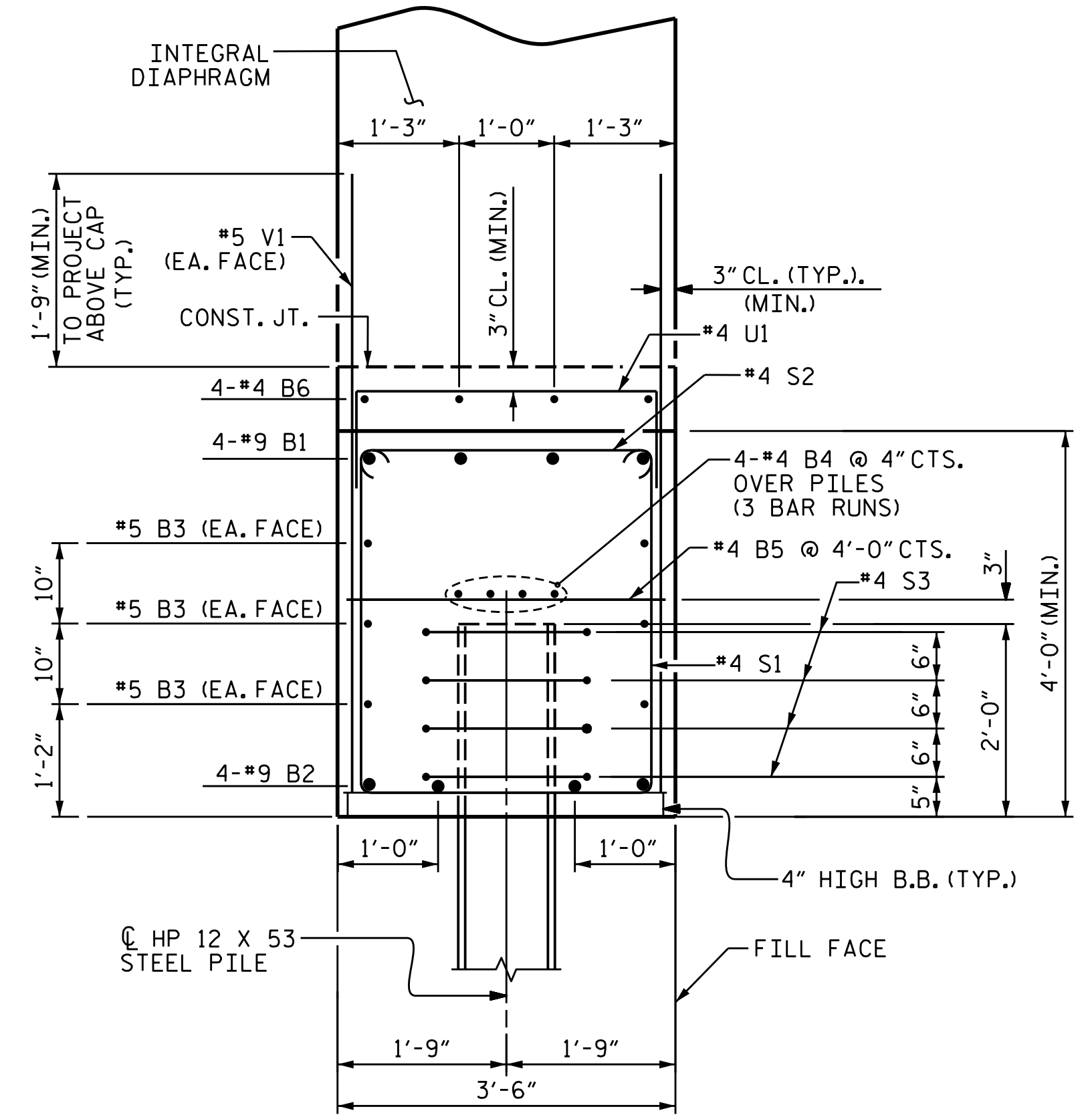
SUBSTRUCTURE
 END BENT #2
 (INTEGRAL)

| REVISIONS | | | | | | SHEET NO. |
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| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 31 |



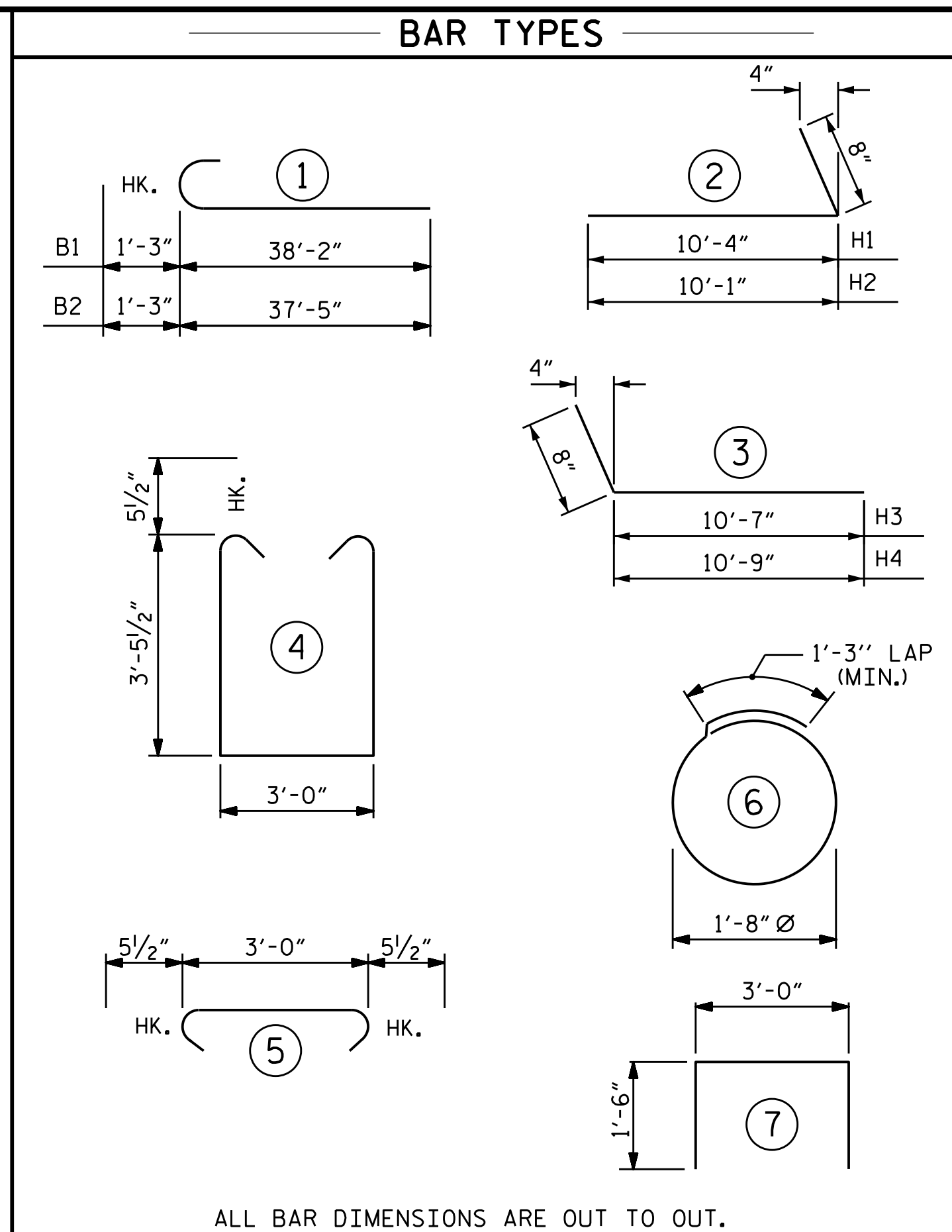
SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



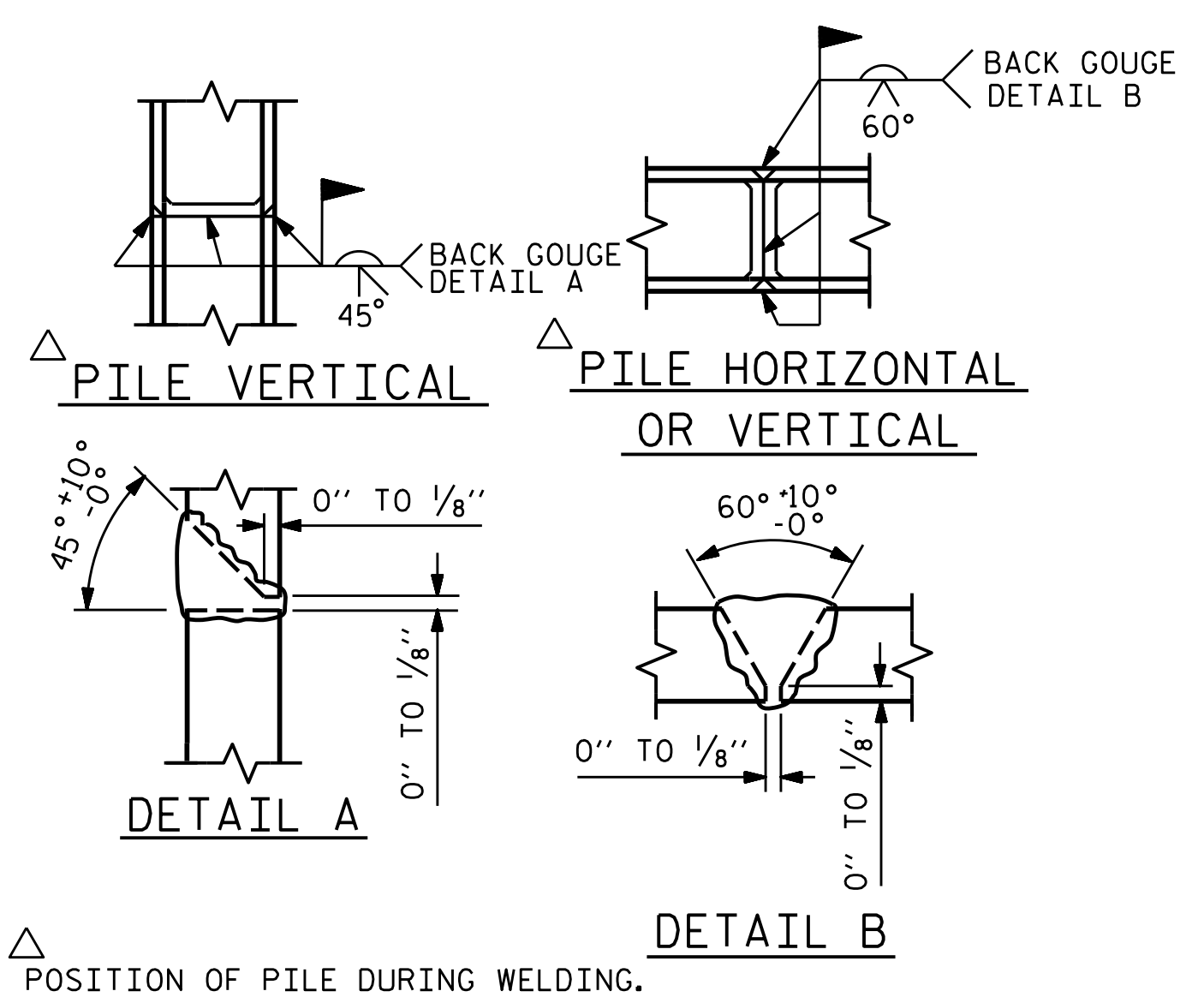
SECTION B-B

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

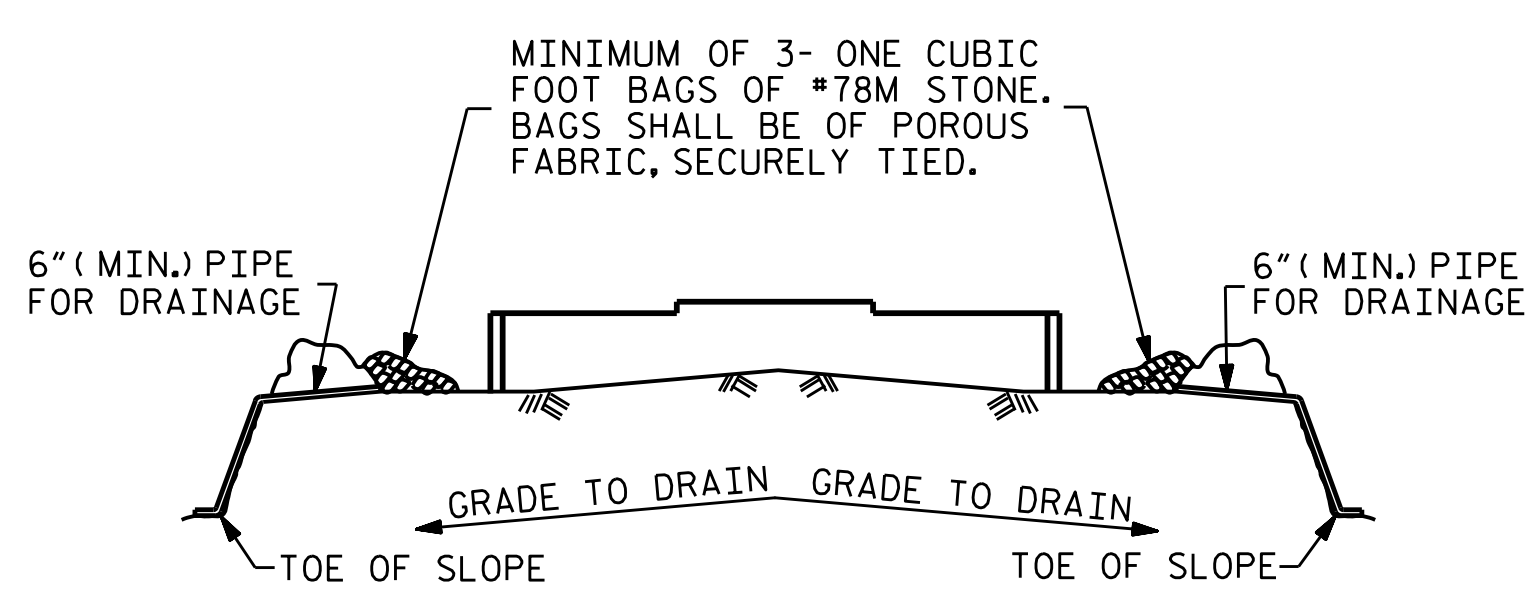


ALL BAR DIMENSIONS ARE OUT TO OUT.

| BILL OF MATERIAL | | | | | |
|---|-----|------|------|---------|-------------|
| INTEGRAL END BENT 2 | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| B1 | 8 | #9 | 1 | 39'-5" | 1072 |
| B2 | 8 | #9 | 1 | 38'-10" | 1056 |
| B3 | 12 | #5 | STR | 34'-7" | 433 |
| B4 | 12 | #4 | STR | 23'-9" | 190 |
| B5 | 16 | #4 | STR | 3'-0" | 32 |
| B6 | 4 | #4 | STR | 13'-3" | 35 |
| H1 | 14 | #5 | 2 | 11'-0" | 161 |
| H2 | 14 | #5 | 2 | 10'-9" | 157 |
| H3 | 14 | #5 | 3 | 11'-3" | 164 |
| H4 | 14 | #5 | 3 | 11'-5" | 167 |
| H5 | 32 | #5 | STR | 3'-5" | 114 |
| S1 | 55 | #4 | 4 | 10'-10" | 398 |
| S2 | 55 | #4 | 5 | 3'-11" | 144 |
| S3 | 48 | #4 | 6 | 6'-6" | 208 |
| U1 | 9 | #4 | 7 | 6'-0" | 36 |
| V1 | 91 | #4 | STR | 5'-5" | 329 |
| V2 | 78 | #4 | STR | 9'-5" | 491 |
| REINFORCING STEEL | | | | | 5187 LBS. |
| CLASS A CONCRETE | | | | | |
| POUR #1 : CAP & LOWER WINGS | | | | | 38.7 CU.Y. |
| POUR #2 : UPPER PART OF WINGS | | | | | 5.5 CU.Y. |
| CONCRETE COLLARS | | | | | 2.1 CU.Y. |
| TOTAL CONCRETE | | | | | 46.2 CU.Y. |
| HP 12X53 STEEL PILES NO.12 | | | | | 840 LIN.FT. |
| PILE REDRIVES | | | | | 6 EACH |
| PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES | | | | | 12 EACH |



PILE SPLICE DETAILS

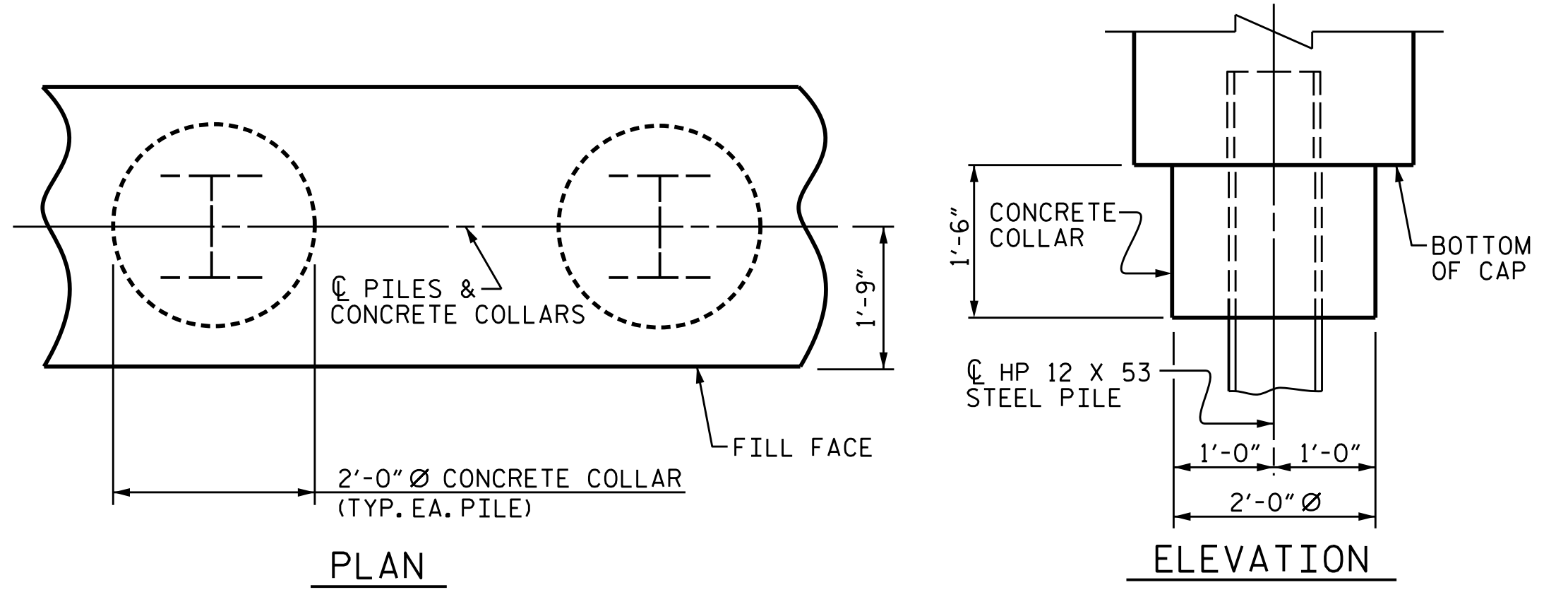


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

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TEMPORARY DRAINAGE AT END BENT



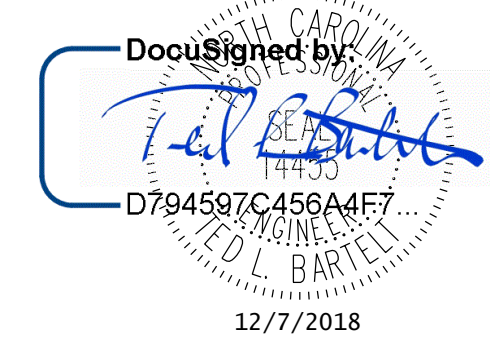
CORROSION PROTECTION FOR STEEL PILES DETAIL

PROJECT NO. R-1015
 CRAVEN COUNTY
 STATION: 52+32.96 -Y3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT #2
 (INTEGRAL)



DRAWN BY : J. B. W. DATE : 2/20/18
 CHECKED BY : T. L. B. DATE : 2/20/18
 DESIGN ENGINEER OF RECORD: T. L. B. DATE : 2/20/18

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| 2 | | | 4 | | | 32 |