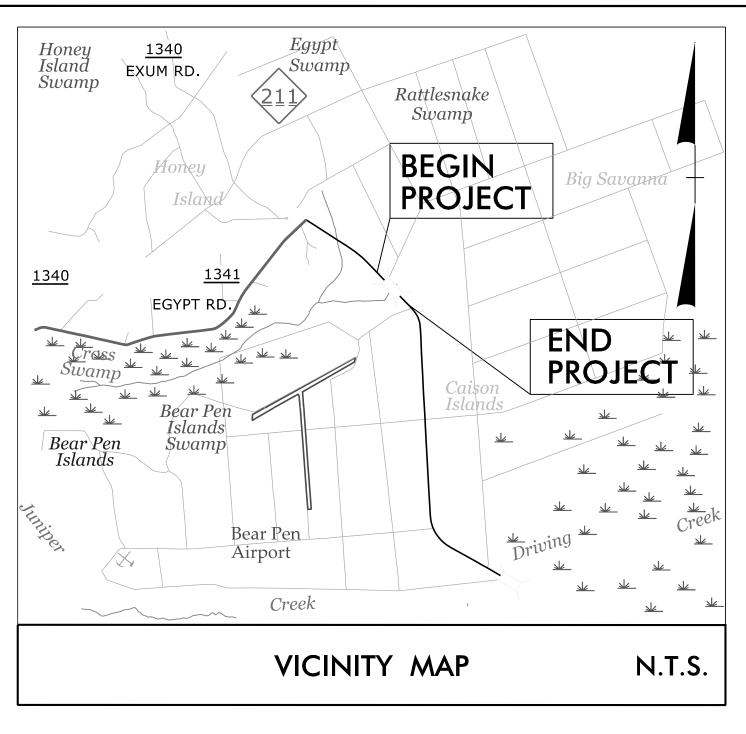
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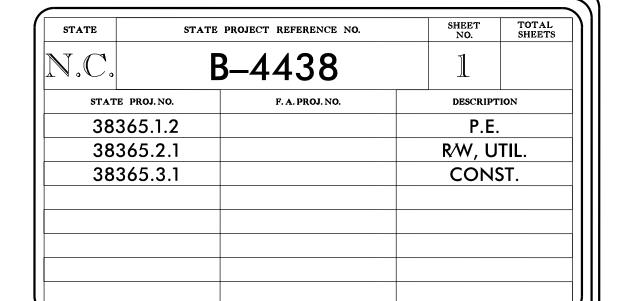


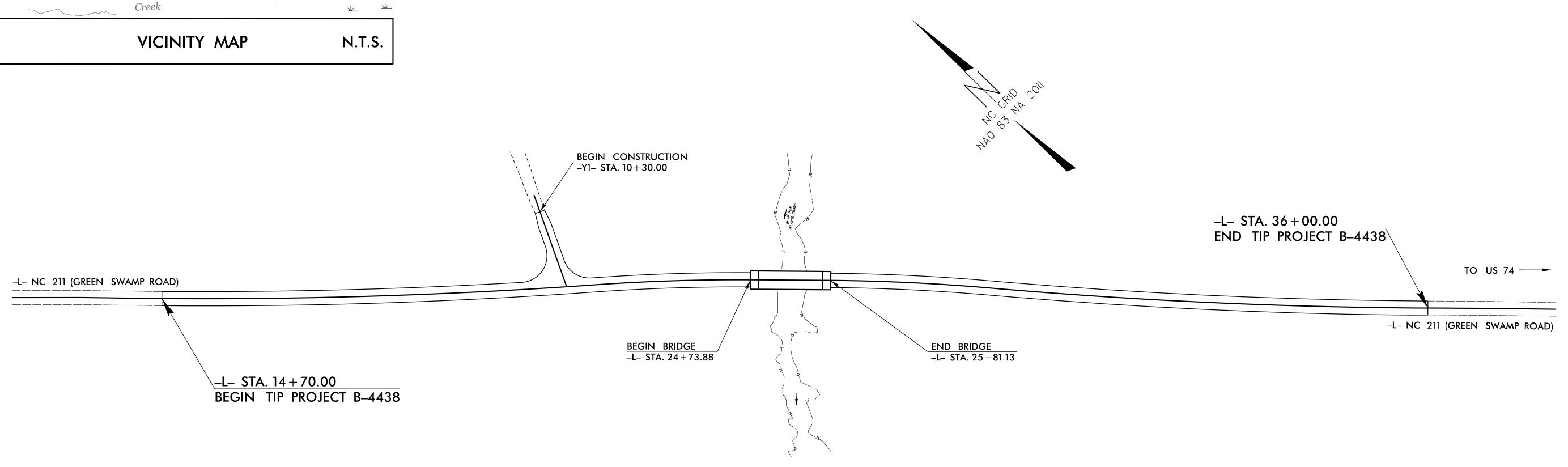
STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

BRUNSWICK COUNTY

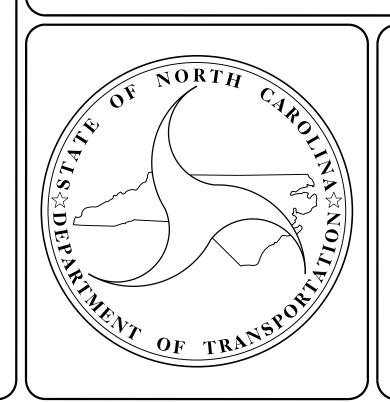
LOCATION: BRIDGE NO. 47 OVER BEAR PEN ISLANDS SWAMP

TYPE OF WORK: GRADING, DRAINAGE, PAVING, & STRUCTURE





STRUCTURES



DESIGN DATA

REGIONAL TIER

ADT (2019) = 1,908 ADT (2039) = 2,948 K = 9 % D = 55 % T = 15 % ** * V = 60 MPH ** (TTST 9 %, DUAL 6 %) FUNC CLASS = MAJOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4438 = 0.383 MILES LENGTH STRUCTURE TIP PROJECT B-4438 = 0.020 MILES

TOTAL LENGTH TIP PROJECT B-4438 = 0.403 MILES

Prepared in the Office of:



4700 FALLS OF NEUSE ROAD, SUITE 300 RALEIGH, NORTH CAROLINA 27609 (919) 781-4626 VOICE (919) 781-4869 FAX (F-0105)

2018 STANDARD SPECIFICATIONS

LETTING DATE:

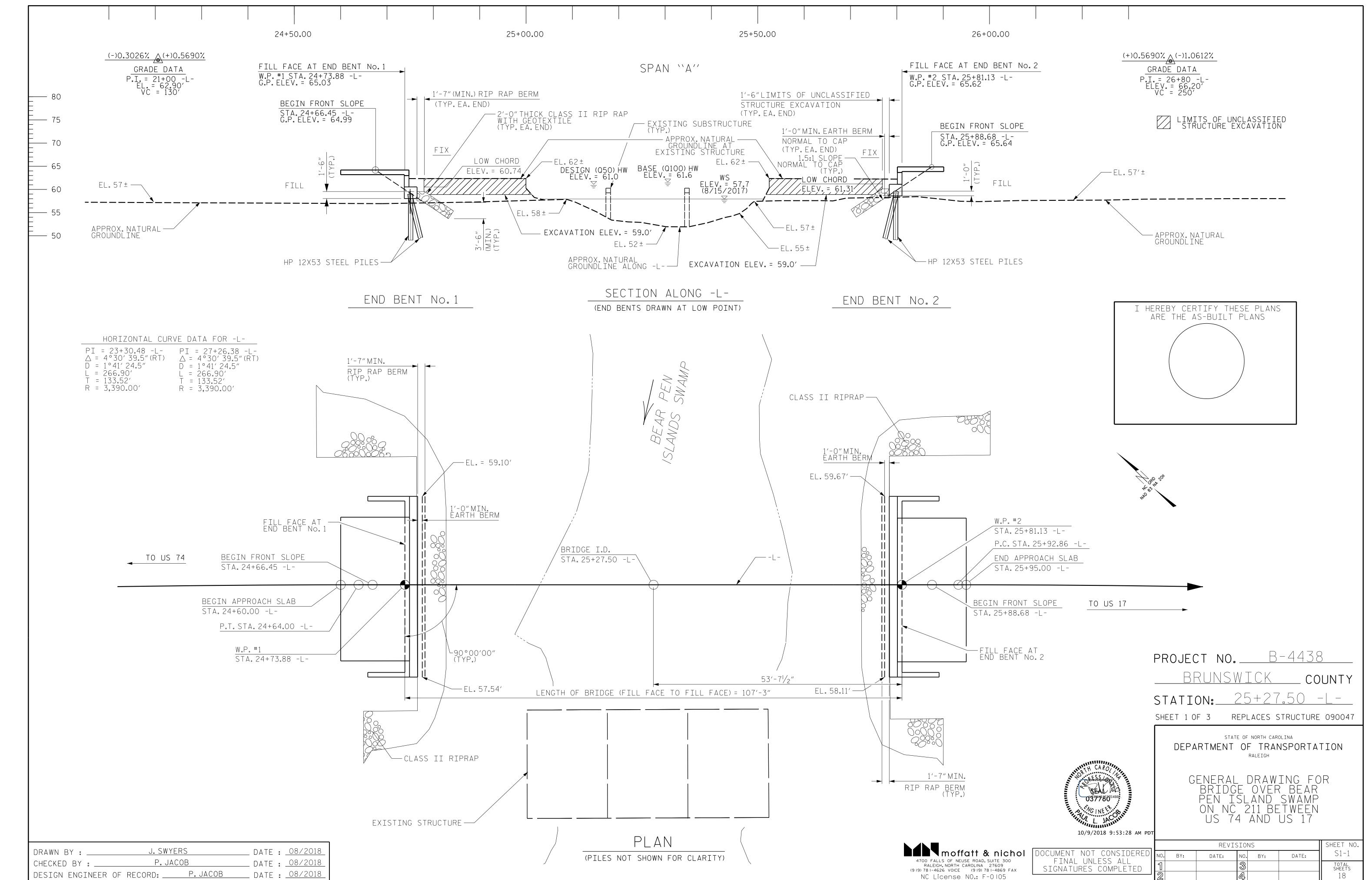
JUNE 18, 2019

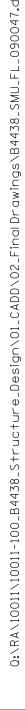
PAUL L. JACOB, P.E.

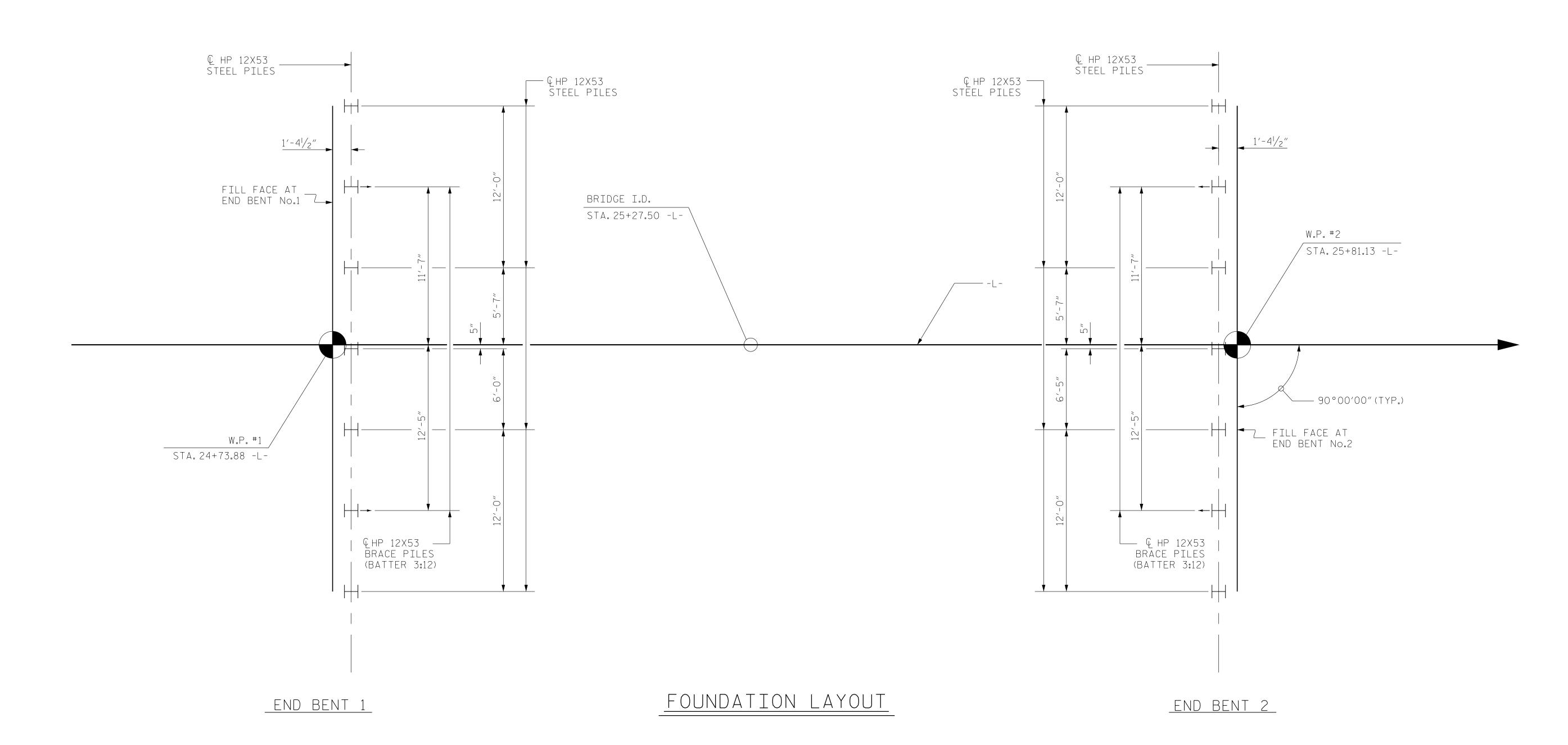
PROJECT ENGINEER

DAVID STUTTS, P.E.

NCDOT CONTACT







FOUNDATION NOTES:

- 1. FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- 2. PILES AT END BENTS NO.1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.
- 3. DRIVE PILES AT END BENTS NO.1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.
- 4. TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING, OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. B-4438

BRUNSWICK COUNTY

STATION: 25+27.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

FOUNDATION LAYOUT



moffatt & nichol

4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(9 19) 78 1-4626 VOICE (9 19) 78 1-4869 FAX

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SIGNATURES COMPLETED

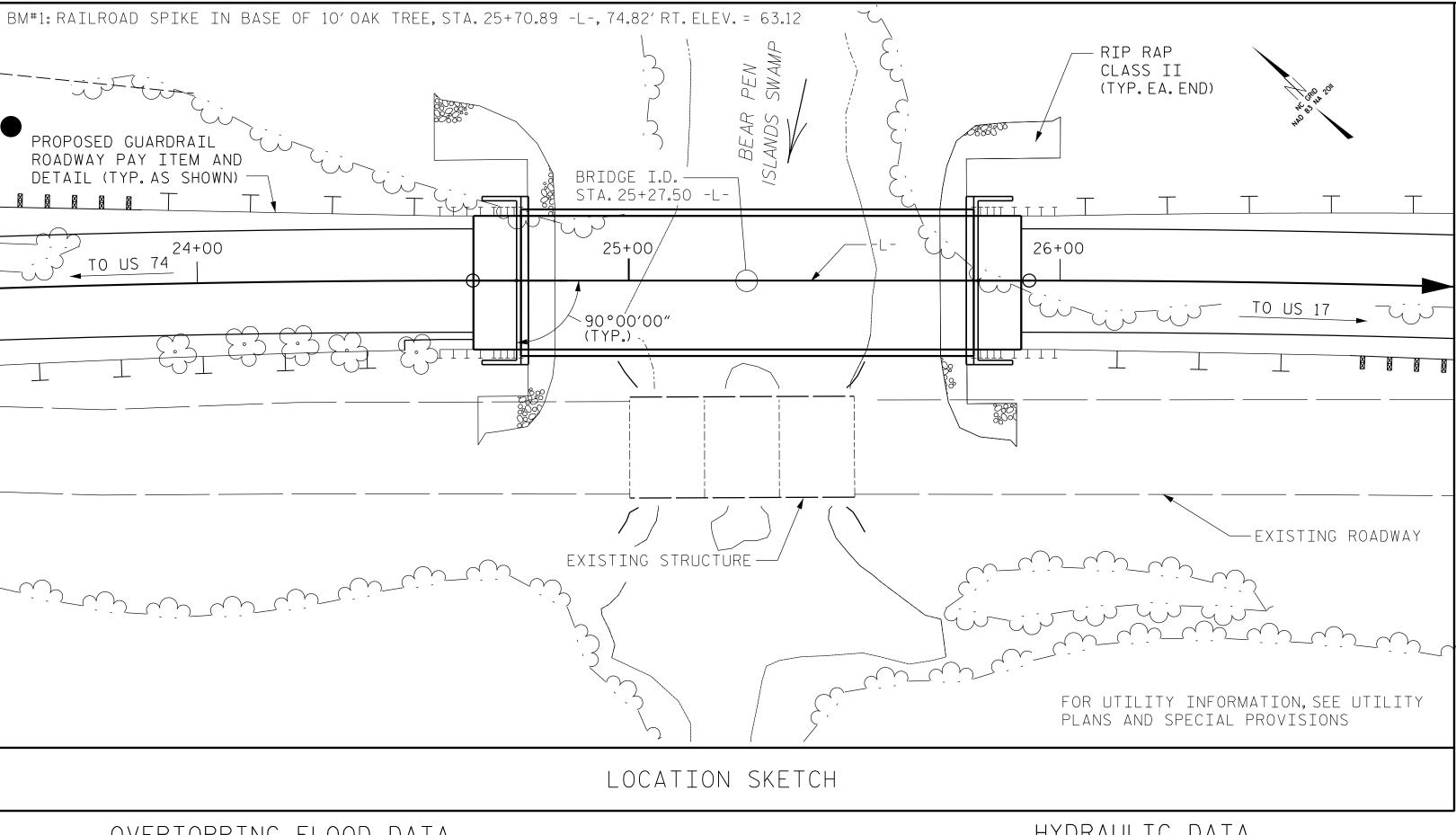
NC License NO.: F-0105

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MPLETED

REVISIONS
SHEET NO. S1-2

TOTAL SHEETS
1.9



OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE FREQUENCY OF OVERTOPPING FLOOD OVERTOPPING FLOOD ELEV.

3400 CFS 500+ YR. * 62.5

***** OT OCCURS APPROX. 5000′ FROM BRIDGE € ELEV = 62.5

HYDRAULIC DATA

DESIGN DISCHARGE FREQUENCY OF DESIGN FLOOD DESIGN HIGHWATER ELEV. DRAINAGE AREA BASE DRAINAGE (Q100) BASE HIGHWATER ELEV.

1400 CFS 50 YR. 61.0 12.7 SQ. MI. 1720 CFS 61.6

NOTES:

- 1. ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- 2. THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- 3. THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- 4. THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."
- 5. THE EXISTING STRUCTURE CONSISTING OF 17.75'-17.0'-17.75' SPANS ON TIMBER BEAMS; 23.25' CLEAR ROADWAY WIDTH AND CONCRETE DECK ON CONCRETE CAPS AND TIMBER PILES AND LOCATED 39' DOWNSTREAM OF THE PROPSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPSECD BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

6. THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS OF THE PROJECT SITE.

- 7. REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
- 8. FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- 9. FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.
- 10. FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- 11. FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- 12. FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- 13. FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- 14. FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- 15. FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION & RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.
- 16. THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 23 FT EACH SIDE OF CENTERLINE OF ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE. FOR UNCLASSIFIED STRUCTURE EXCAVATION, SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

| | | | | | | _ T | OTAL | BILL | OF MA | ATERIAL | | | | | | | | | |
|----------------|---|------------------------|----------------|--|--------------------------------|-----------------------------|---------------------|---|----------------------|--|-----------|---------------------|------------------|---|--------------------------------------|-------------------------------|---------------------------|-----------------------------------|---|
| | REMOVAL OF EXISTING STRUCTURE @ STA. 25+27.50 -L- | ASBESTOS ASSESSMENT | PDA TESTING | UNCLASSIFIED STRUCTURE EXCAVATION @ STA. 25+27.50 -L- | CONCRETE WEARING SURFACE | GROOVING BRIDGE FLOOR | CLASS A CONCRETE | BRIDGE APPROACH SLABS STA. 25+27.50 -L- | REINFORCING STEEL | PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES | HP STE | 12 X 53 EL PILES | PILE REDRIVES | VERTICAL CONCRETE BARRIER RAIL | RIP RAP CLASS II (2'-0" THICK) | GEOTEXTILE FOR DRAINAGE | E ELASTOMERIC BEARINGS | 3'-0 PRES CON BOX UNI | O'' X 3'-3'' STRESSED CRETE BEAM TS |
| | LUMP SUM | LUMP SUM | EACH | LUMP SUM | SQ.FT. | SQ.FT. | CU. YDS. | LUMP SUM | LBS. | EACH | NO. | LIN.FT. | EACH | LIN.FT. | TONS | SQ.YDS. | LUMP SUM | NO. | LIN.FT. |
| SUPERSTRUCTURE | | | | | 3238 | 3701 | | LUMP SUM | | | | | | 210 | | | LUMP SUM | 11 | 1155 |
| | | | | | | | | | | | | | | | | | | | |
| END BENT NO. 1 | | | | | | | 20.2 | | 3,288 | 7 | 7 | 490 | 4 | | 70 | 80 | | | |
| END BENT NO. 2 | | | | | | | 20.2 | | 3,288 | 7 | 7 | 490 | 4 | | 65 | 70 | | | |
| | | | | | | | | | | | | | | | | | | | |
| | LUMP SUM | LUMP SUM | 1 | LUMP SUM | 3238 | 3701 | 40.4 | LUMP SUM | 6,576 | 14 | 14 | 980 | 8 | 210 | 135 | 150 | LUMP SUM | 11 | 1155 |

PROJECT NO. B-4438

COUNTY

SHEET 3 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

ON NC 211 BETWEEN US 74 AND US 17

SHEET NO

S1-3

TOTAL SHEETS

moffatt & nichol 4700 FALLS OF NEUSE ROAD, SUITE 300 RALEIGH, NORTH CAROLINA 27609 (919) 781-4626 VOICE (919) 781-4869 FAX NC License NO.: F-0105

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J. SWYERS DATE : <u>08/2018</u> DRAWN BY : ___ DATE : <u>08/2018</u> P. JACOB CHECKED BY : _ DATE : <u>08/2018</u> DESIGN ENGINEER OF RECORD:

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

| | | | | | | | | | | STRE | NGTH | I LIN | MIT S | TATE | | | | SE | RVICE | III | LIMI | T STA | TE | |
|----------------|-----|------------|----------------------|----------------------------|-----------------------------------|---------------|---------------------|------------------------------|---------------|--------|-----------------|---|------------------------------|---------------|-------|-----------------|---|---------------------|------------------------------|---------------|--------|-----------------|---|----------------|
| | | | | | | | | | | MOMENT | | | | | SHEAR | | | | | | MOMENT | | | |
| LEVEL | | VEHICLE | WEIGHT (W) (TONS) | CONTROLLING Load Rating | MINIMUM RATING FACTORS (RF) | TONS = W X RF | 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 (f+) | LIVELOAD FACTORS | DISTRIBUTION FACTORS (DF) | RATING FACTOR | SPAN | GIRDER LOCATION | DISTANCE FROM LEFT END OF SPAN (ft) | COMMENT NUMBER |
| | | HL-93(Inv) | N/A | 1 | 1.035 | | 1.75 | 0.272 | 1.26 | А | EL | 49.25 | 0.489 | 1.34 | А | EL | 4.925 | 0.80 | 0.272 | 1.04 | А | EL | 49.25 | |
| DESIGN | | HL-93(0pr) | N/A | | 1.633 | | 1.35 | 0.272 | 1.63 | А | EL | 49.25 | 0.489 | 1.73 | А | EL | 4.925 | N/A | | | | | | |
| LOAD RATING | | HS-20(Inv) | 36.000 | 2 | 1.44 | 51.84 | 1.75 | 0.272 | 1.75 | А | EL | 49.25 | 0.489 | 1.81 | А | EL | 4.925 | 0.80 | 0.272 | 1.44 | А | EL | 49.25 | |
| TTATINO | | HS-20(0pr) | 36.000 | | 2.271 | 81.756 | 1.35 | 0.272 | 2.27 | А | EL | 49.25 | 0.489 | 2.35 | А | EL | 4.925 | N/A | | | | | | |
| | | SNSH | 13.500 | | 3.413 | 46.079 | 1.4 | 0.272 | 5.19 | А | EL | 49.25 | 0.489 | 5.59 | А | EL | 4.925 | 0.80 | 0.272 | 3.41 | А | EL | 49.25 | |
| | | SNGARBS2 | 20.000 | | 2.473 | 49.452 | 1.4 | 0.272 | 3.76 | А | EL | 49.25 | 0.489 | 3.91 | А | EL | 4.925 | 0.80 | 0.272 | 2.47 | А | EL | 49.25 | |
| | | SNAGRIS2 | 22.000 | | 2.313 | 50.885 | 1.4 | 0.272 | 3.52 | А | EL | 49.25 | 0.489 | 3.6 | А | EL | 4.925 | 0.80 | 0.272 | 2.31 | А | EL | 49.25 | |
| | | SNCOTTS3 | 27.250 | | 1.696 | 46.228 | 1.4 | 0.272 | 2.58 | А | EL | 49.25 | 0.489 | 2.78 | А | EL | 4.925 | 0.80 | 0.272 | 1.70 | А | EL | 49.25 | |
| | S | SNAGGRS4 | 34.925 | | 1.39 | 48.556 | 1.4 | 0.272 | 2.11 | А | EL | 49.25 | 0.489 | 2.26 | А | EL | 4.925 | 0.80 | 0.272 | 1.39 | А | EL | 49.25 | |
| | | SNS5A | 35.550 | | 1.361 | 48.398 | 1.4 | 0.272 | 2.07 | А | EL | 49.25 | 0.489 | 2.27 | А | EL | 4.925 | 0.80 | 0.272 | 1.36 | А | EL | 49.25 | |
| | | SNS6A | 39.950 | | 1.238 | 49.456 | 1.4 | 0.272 | 1.88 | А | EL | 49.25 | 0.489 | 2.05 | А | EL | 4.925 | 0.80 | 0.272 | 1.24 | А | EL | 49.25 | |
| LEGAL | | SNS7B | 42.000 | | 1.178 | 49.496 | 1.4 | 0.272 | 1.79 | А | EL | 49.25 | 0.489 | 2 | А | EL | 4.925 | 0.80 | 0.272 | 1.18 | А | EL | 49.25 | |
| LOAD RATING | | TNAGRIT3 | 33.000 | | 1.506 | 49.709 | 1.4 | 0.272 | 2.29 | А | EL | 49.25 | 0.489 | 2.46 | А | EL | 4.925 | 0.80 | 0.272 | 1.51 | А | EL | 49.25 | |
| INATINO | | TNT4A | 33.075 | | 1.51 | 49.942 | 1.4 | 0.272 | 2.3 | А | EL | 49.25 | 0.489 | 2.41 | А | EL | 4.925 | 0.80 | 0.272 | 1.51 | А | EL | 49.25 | |
| | | TNT6A | 41.600 | | 1.224 | 50.926 | 1.4 | 0.272 | 1.86 | А | EL | 49.25 | 0.489 | 2.09 | А | EL | 4.925 | 0.80 | 0.272 | 1.22 | А | EL | 49.25 | |
| | TST | TNT7A | 42.000 | | 1.225 | 51.442 | 1.4 | 0.272 | 1.86 | А | EL | 49.25 | 0.489 | 2.05 | А | EL | 4.925 | 0.80 | 0.272 | 1.22 | А | EL | 49.25 | |
| | | TNT7B | 42.000 | | 1.254 | 52.657 | 1.4 | 0.272 | 1.91 | А | EL | 49.25 | 0.489 | 1.96 | А | EL | 4.925 | 0.80 | 0.272 | 1.25 | А | EL | 49.25 | |
| | | TNAGRIT4 | 43.000 | | 1.203 | 51.711 | 1.4 | 0.272 | 1.83 | А | EL | 49.25 | 0.489 | 1.91 | А | EL | 4.925 | 0.80 | 0.272 | 1.20 | А | EL | 49.25 | |
| | | TNAGT5A | 45.000 | | 1.139 | 51.236 | 1.4 | 0.272 | 1.73 | А | EL | 49.25 | 0.489 | 1.87 | А | EL | 4.925 | 0.80 | 0.272 | 1.14 | А | EL | 49.25 | |
| | | TNAGT5B | 45.000 | 3 | 1.129 | 50.805 | 1.4 | 0.272 | 1.72 | A | EL | 49.25 | 0.489 | 1.82 | А | EL | 4.925 | 0.80 | 0.272 | 1.13 | А | EL | 49.25 | |

LOAD FACTORS:

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

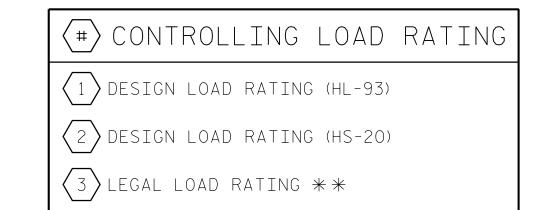
NOTES:

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

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

COMMENTS:

- 1. ALL RATINGS BASED UPON O PSI TENSION IN THE PRE-COMPRESSED TENSILE ZONE.
- 2. LOSSES WERE CALCULATED USING THE AASHTO REFINED METHOD FOR CALCULATING TIME DEPENDENT LOSSES. LOSSES ARE AS FOLLOWS:
 - INITIAL LOSSES 14.42 KSI (7.12%) TOTAL LOSSES - 32.82 KSI (16.21%)
- 3. SECTION PROPERTIES ARE BASED UPON NCDOT STRUCTURE DESIGN MANUAL FIGURE 6-88 AND DO NOT INCLUDE TRANSFORMATION OF STEEL WHEN CONSIDERING MEMBER RESISTANCE.



GIRDER LOCATION

** SEE CHART FOR VEHICLE TYPE

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

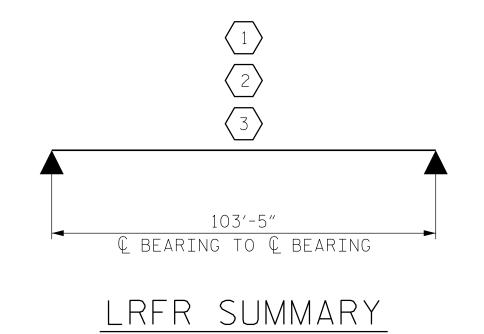
PROJECT NO. B-4438 COUNTY STATION: 25+27.50 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

(NON-INTERSTATE TRAFFIC)

moffatt & nichol
4700 FALLS OF NEUSE ROAD. SUITE 300
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC License NO.: F-0105

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_ DATE : <u>08/2018</u> J. SWYERS DRAWN BY : ____ P.JACOB _ DATE : <u>08/2018</u> CHECKED BY : ___ DESIGN ENGINEER OF RECORD: P. JACOB _ DATE : <u>08/2018</u>

DRAWN BY : __

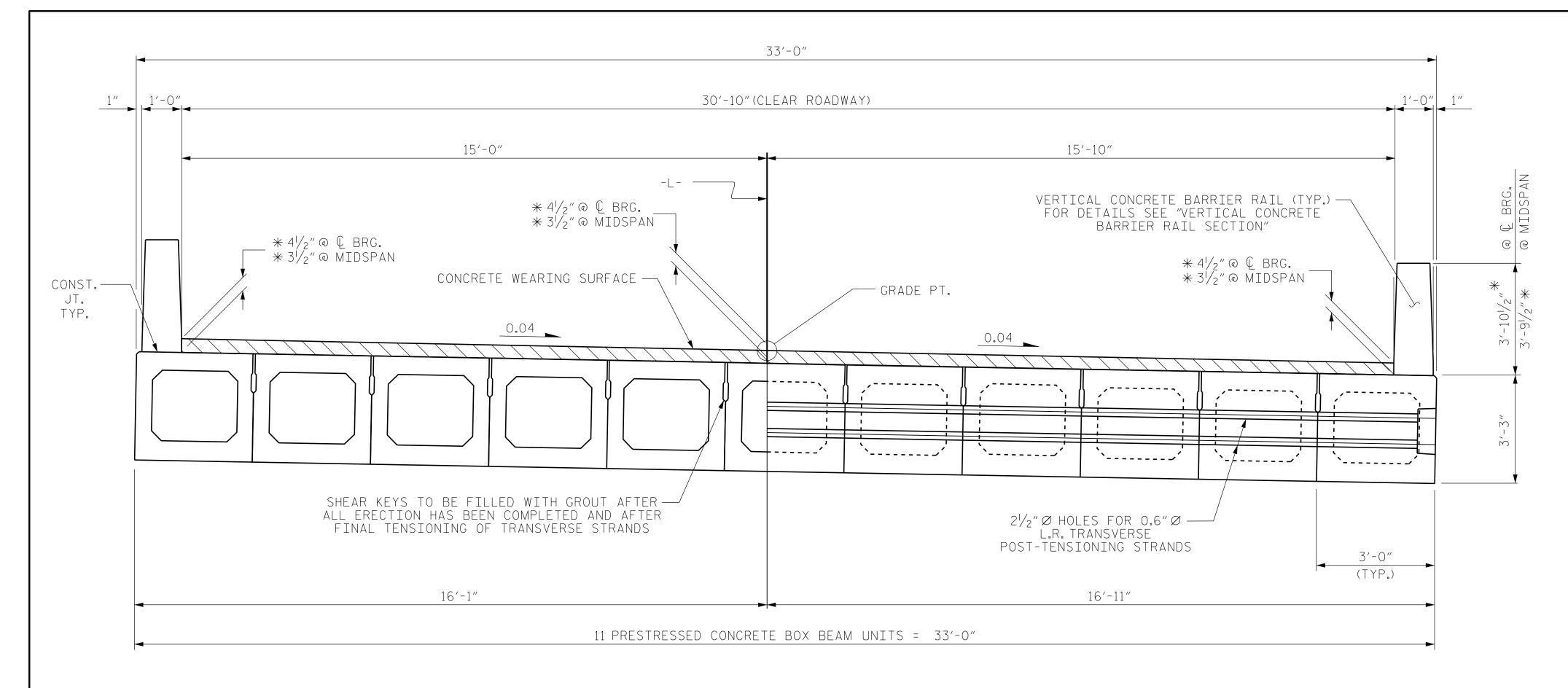
CHECKED BY : _

DESIGN ENGINEER OF RECORD: .

J. SWYERS

P. JACOB

P. JACOB



THROUGH VOIDS

HALF SECTION

DATE : <u>08/2018</u>

_ DATE : <u>08/2018</u>

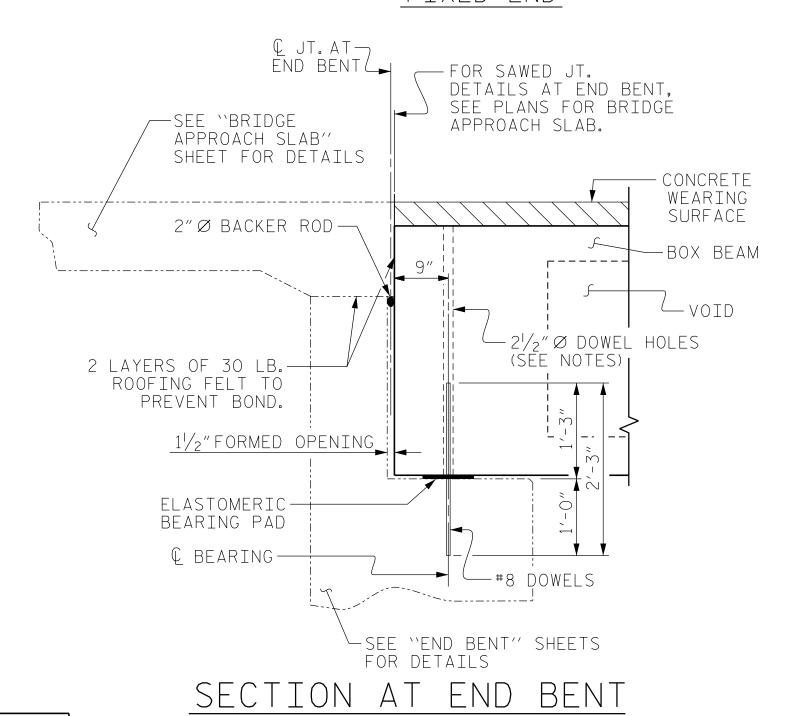
_ DATE : <u>08/2018</u>

HALF SECTION AT INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

* THE MINIMUM AND MAXIMUM BARRIER RAIL HEIGHTS AND CONCRETE WEARING SURFACE THICKNESS ARE SHOWN. THE HEIGHT OF THE BARRIER RAIL AND CONCRETE WEARING SURFACE THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTER. THE OVERLAY THICKNESS AT CENTERLINE BEARING IS BASED ON THE PREDICTED DEFLECTION DUE TO CONCRETE OVERLAY.

FIXED END



PERMITTED THREADED INSERT CAST IN OUTSIDE FACE OF EXTERIOR UNIT AND RECESSED 3/8". SIZE TO BE DETERMINED BY CONTRACTOR.

THREADED INSERT DETAIL

moffatt & nichol 4700 FALLS OF NEUSE ROAD, SUITE 300 RALEIGH, NORTH CAROLINA 27609 (919) 781-4626 VOICE (919) 781-4869 FAX NC License NO.: F-0105

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 CAST WITH THE BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BOX BEAMS.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE $2\frac{1}{2}$ \emptyset DOWEL HOLES AT FIXED ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE 2" Ø BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,100 PSI.

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS AND CONCRETE WEARING SURFACE SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

VERTICAL GROOVED CONTRACTION JOINTS, $\frac{1}{2}$ " 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. A VERTICAL 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.

PLACEMENT OF THE CONCRETE WEARING SURFACE SHALL OCCUR AFTER CASTING THE CONCRETE RAIL. THE COST OF THE REINFORCING STEEL CAST WITH THE CONCRETE WEARING SURFACE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONCRETE WEARING SURFACE. FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.

THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-O"CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

PROJECT NO. B-4438

COUNTY

25+27,50 -1 -STATION:_

SHEET 1 OF 6

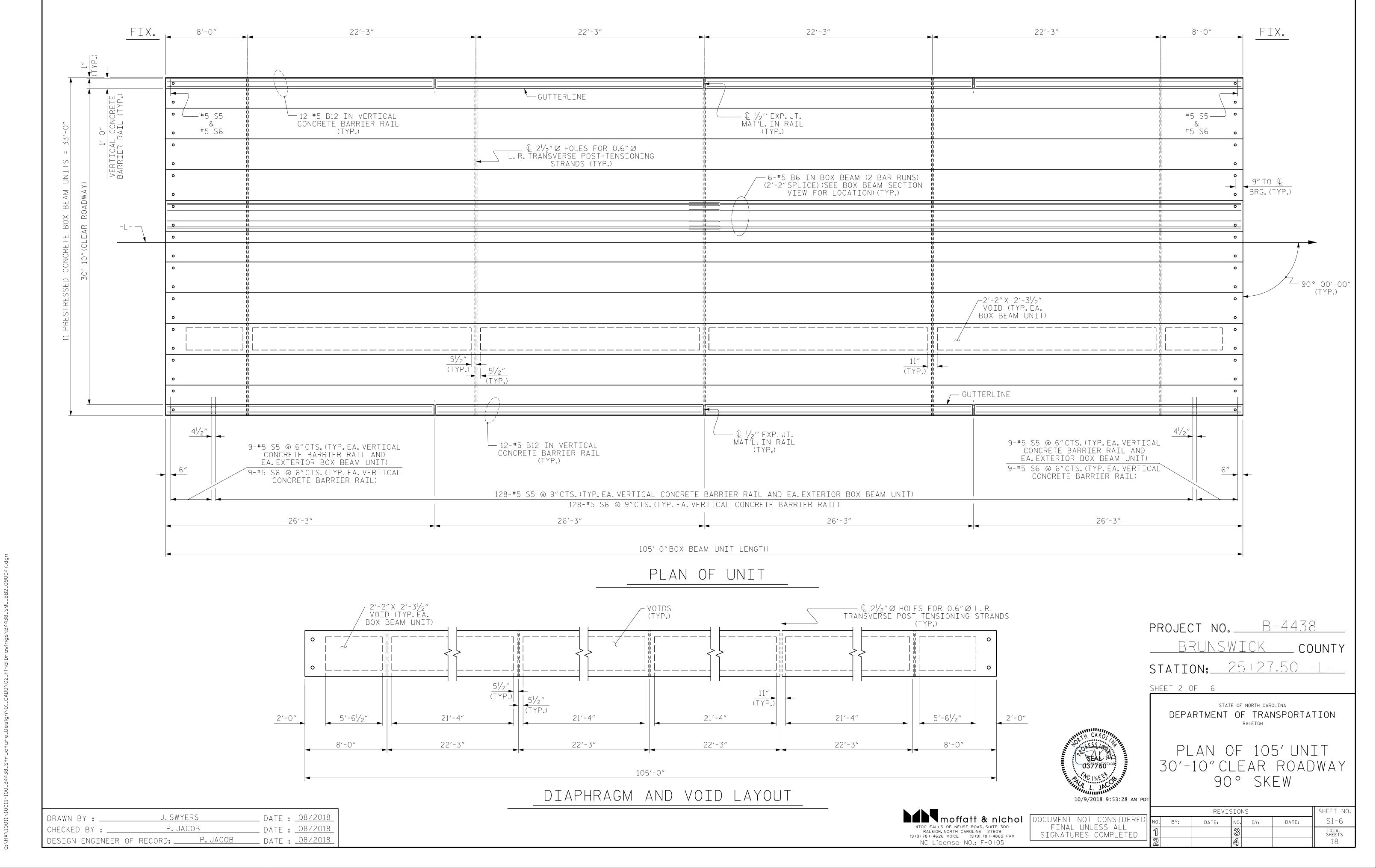
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION



 $3'-0" \times 3'-3"$ PRESTRESSED CONCRETE BOX BEAM UNIT 10/9/2018 9:53:28 AM PDT

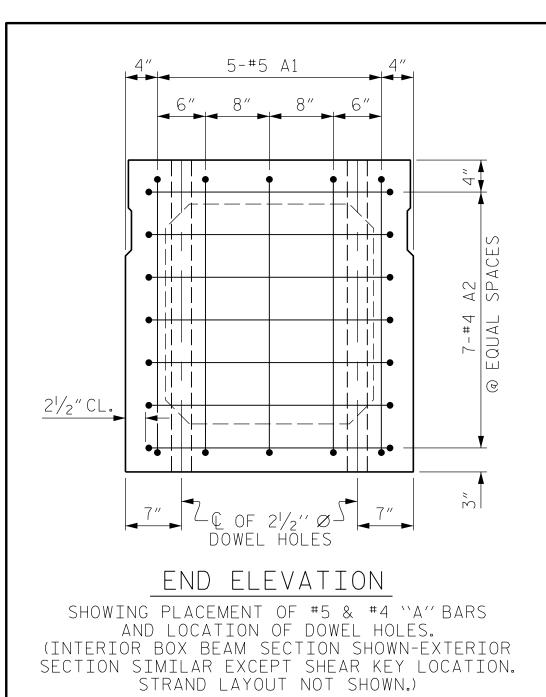
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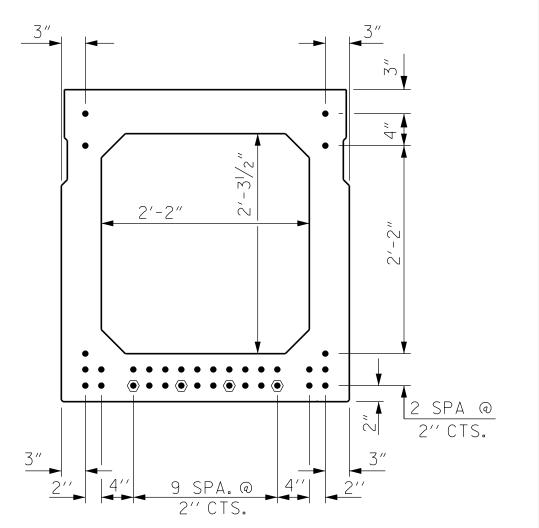
+





3'-0" -#4 S4 ; #5 B6 _#4 S2 #4 S37 #5 S5 — #4 S2¬ #4 S47 -CHAMFER (TYP.) #4 S37 -#5 B6-#5 B6 — 2'-2" ∟ #4 S1 #5 B6-INTERIOR BOX BEAM SECTION L #4 S1 (STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT

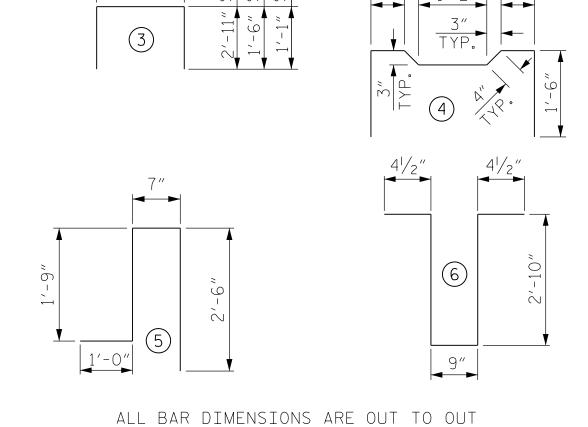


TYPICAL STRAND LOCATION (34 STRANDS REQUIRED) DEBONDING LEGEND

• FULLY BONDED STRANDS

 $\langle ullet
angle$ strands debonded for 12'-0"from end of girder

BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.



BAR TYPES

1'-6"

2

1'-6"

3'-6"

10″

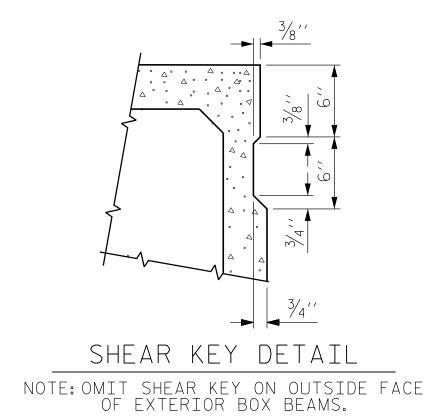
THIS LEG AT TOP OF UNIT

BILL OF MATERIAL FOR ONE BOX BEAM SECTION

| | | | | EXTERI(| OR UNIT | INTERI | OR UNIT |
|--------|----------|---------|-----------|---------|----------|--------|---------|
| BAR | NUMBER | SIZE | TYPE | LENGTH | WEIGHT | LENGTH | WEIGHT |
| Α1 | 10 | #5 | 1 | 7′-2″ | 75 | 7'-2" | 75 |
| Α2 | 44 | #4 | 2 | 5′-7″ | 164 | 5′-7″ | 164 |
| | | | | | | | |
| В6 | 12 | #5 | STR | 53′-6″ | 670 | 53′-6″ | 670 |
| | | | | | | | |
| K1 | 15 | #4 | 6 | 7'-2" | 72 | 7'-2" | 72 |
| K2 | 10 | #4 | STR | 2'-7" | 17 | 2'-7" | 17 |
| | | | | | | | |
| S1 | 84 | #4 | 3 | 8'-6" | 477 | 8'-6" | 477 |
| S2 | 84 | #4 | 3 | 5′-8″ | 318 | 5′-8″ | 318 |
| S3 | 147 | #4 | 3 | 4'-10" | 475 | 4'-10" | 475 |
| S4 | 63 | #4 | 4 | 5′-10″ | 245 | 5′-10″ | 245 |
| | | | | | | | |
| * S5 | 146 | #5 | 5 | 5′-10″ | 888 | | |
| | | | | | | | |
| REINF | ORCING : | STEEL | | 2513 | LBS. | 251 | 3 LBS |
| * EP0) | XY COATE | ED REIN | IF. STEEL | _ 888 | LBS. | | |
| 8000 | P.S.I.CO | NCRETE | | 20.5 | CU. YDS. | 20.3 | CU. YDS |
| | | | | | | | |
| 0.6" Ø | L.R. STR | ANDS | | No. 3 | 4 | No. 34 | |
| | | | | | | | |

PROJECT NO._

SHEET 3 OF 6



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

105'-0" 4'-6'' 4'-6'' 10-#4 S1, S2 & S3 10-#4 S1, S2 & S3 64-#4 S1 & S2 @ 1'-6'' CTS. 7 SPA. @ 6" CTS. 7 SPA. @ 6" CTS. 63-#4 S4 @ 1'-6'' CTS. ┌#4 Si, S2 & S3-—#4 S1, S2 & S37 - #5 B6 ⁻ ┌ #5 B6 ⁻ — #5 S5 — Q BOX BEAM ^L#4 S3 & S4 \#4 S3 & S4^{\(\)} \leftarrow VOID $\stackrel{\backprime}{-}$ <u>__</u>90°-00′-00″ (TYP.) ← #5 B6 [→] - #5 B6 - 40 ∠7-#4 A2 © 2½″Ø— DOWEL HOLE 127-#4 S3 @ 9''CTS. 146-#5 S5 IN VERTICAL CONCRETE BARRIER RAIL AND EXTERIOR BOX BEAM UNIT (SEE PLAN OF UNIT FOR DETAILS) 037760E4BB 9" 2'-0" 2'-0" 10/9/2018 9:53:28 AM PDT

— #5 B6

EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

3"X 3" — CHAMFER (TYP.)

PLAN OF BOX BEAM

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS.

FOR LOCATION OF DIAPHRAGMS, SEE "PLAN OF UNIT".

FOR THREADED INSERTS, SEE "THREADED INSERT DETAIL".

FOR REINFORCING STEEL IN DIAPHRAGMS, SEE "DOUBLE DIAPHRAGM DETAILS".

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BOX BEAM UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

B-4438

25+27.50 - 1 -

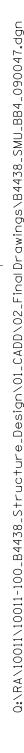
COUNTY

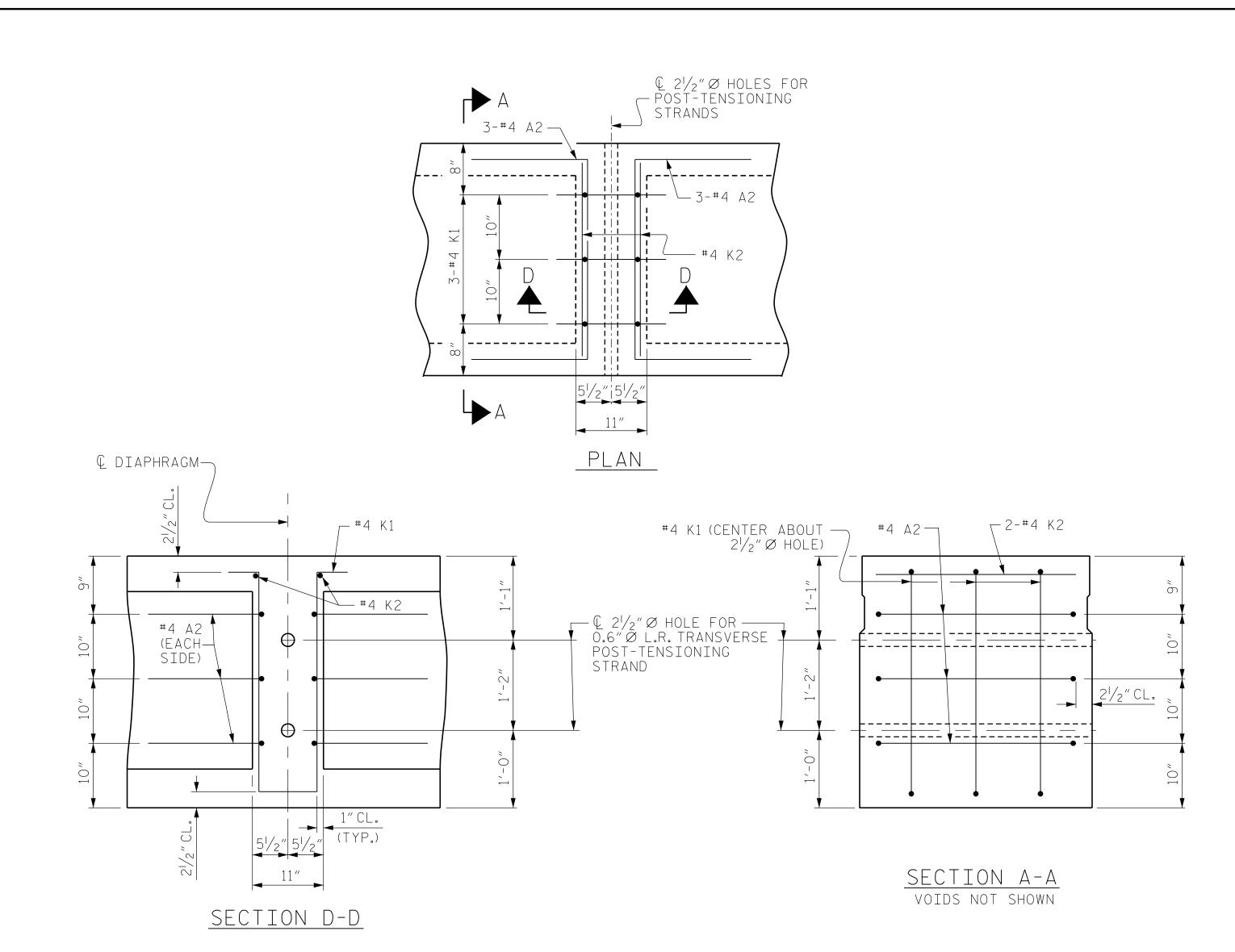
REVISIONS SHEET NO S1-7 BY: DATE: NO. BY: DATE: TOTAL SHEETS

_ DATE : <u>08/2018</u> J. SWYERS DRAWN BY : __ _ DATE : <u>08/2018</u> P.JACOB CHECKED BY : _ _ DATE : <u>08/2018</u>

P.JACOB

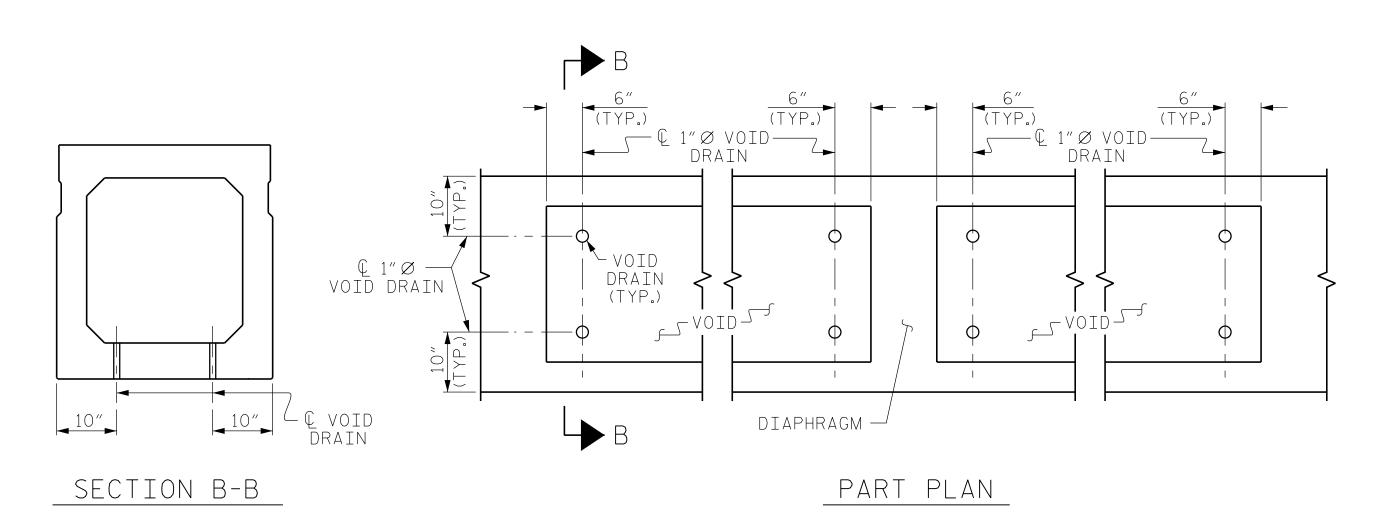
DESIGN ENGINEER OF RECORD: _





DOUBLE DIAPHRAGM DETAILS

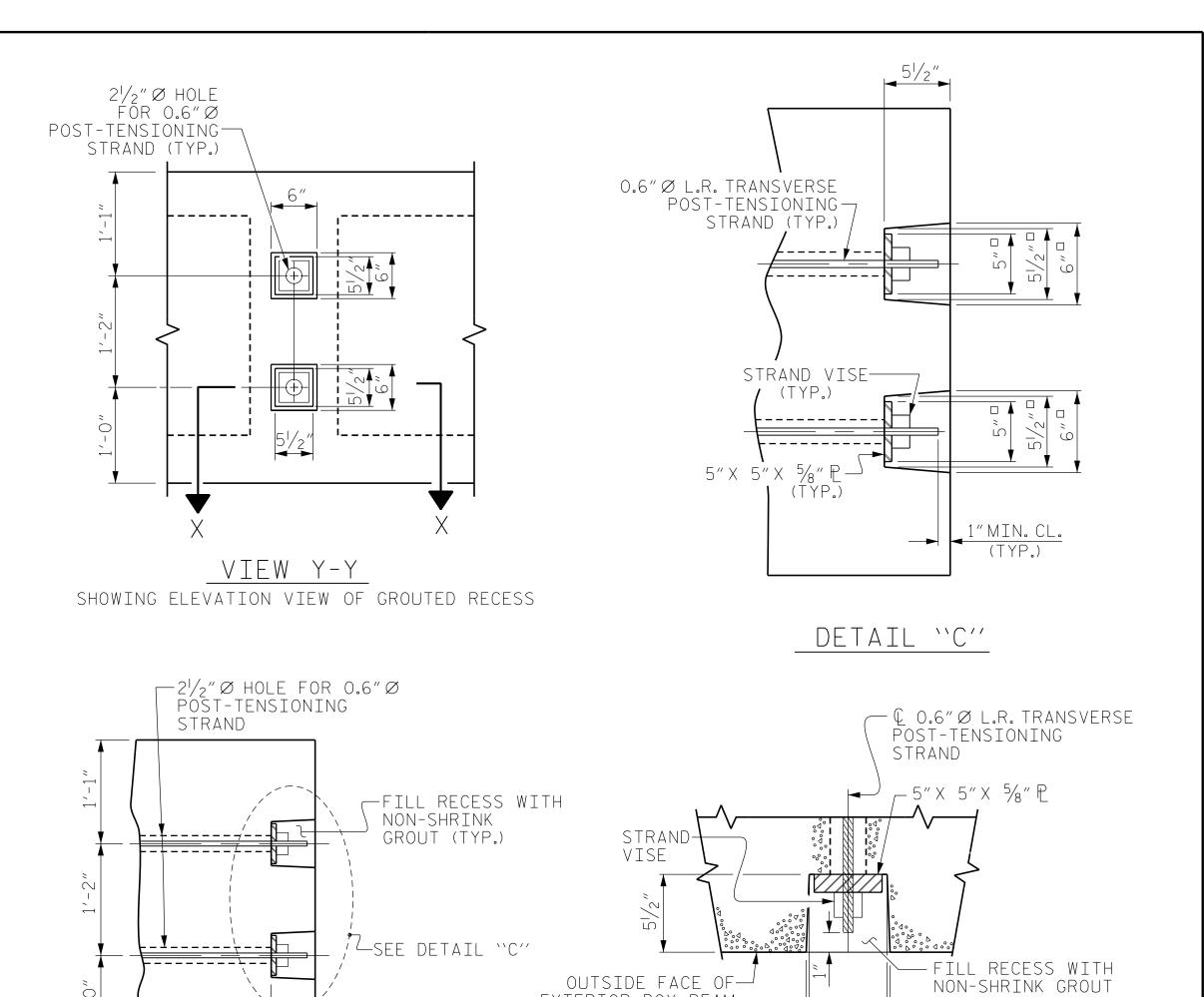
#4 ``S'' BARS NOT SHOWN. #4 ``S'' BARS MAY BE SHIFTED SLIGHTLY TO CLEAR $2\frac{1}{2}$ " \varnothing Hole.



VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

| DRAWN BY : | J. SWY | ERS | DATE : | 08/2018 |
|-----------------|------------|----------|--------|---------|
| CHECKED BY : | P.JA | COB | DATE : | 08/2018 |
| DESIGN ENGINEER | of Record: | P. JACOB | DATE : | 08/2018 |



GROUTED RECESS DETAIL AT OF POST-TENSIONED STRANDS OF EXTERIOR BOX BEAM

OUTSIDE FACE OF-EXTERIOR BOX BEAM

| DEAD LOAD DEFLECTION AND | D CAMBER |
|---|------------------------|
| | $3'-0'' \times 3'-3''$ |
| | 0.6″∅ L.R. STRAND |
| CAMBER (SLAB ALONE IN PLACE) | 21/8" |
| DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD** | 1 1/8″ ♦ |
| FINAL CAMBER | 1" |

** INCLUDES FUTURE WEARING SURFACE

PROJECT NO. B-4438 COUNTY

SECTION X-X

SHOWING PLAN VIEW OF GROUTED RECESS

STATION: 25+27.50 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD

3'-0" X 3'-3" BOX BEAM UNIT

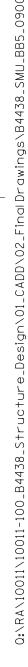


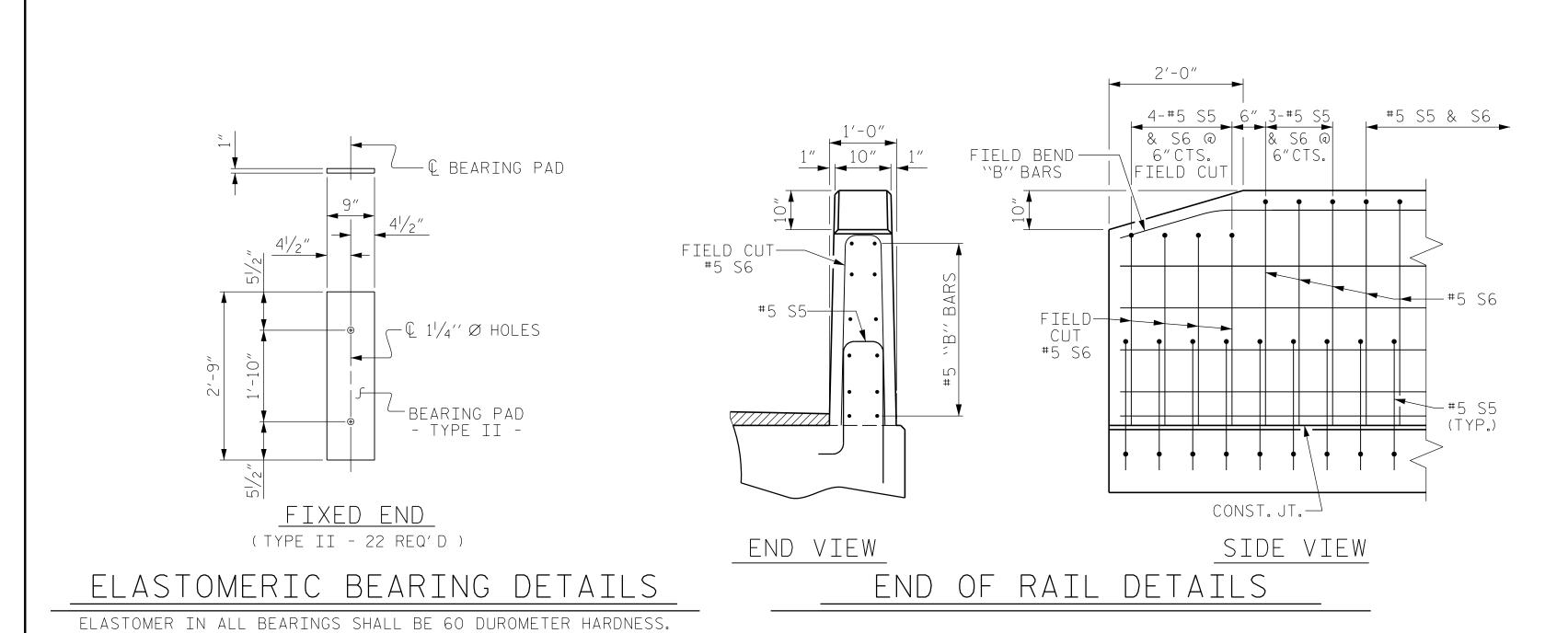
PART SECTION AT RECESS

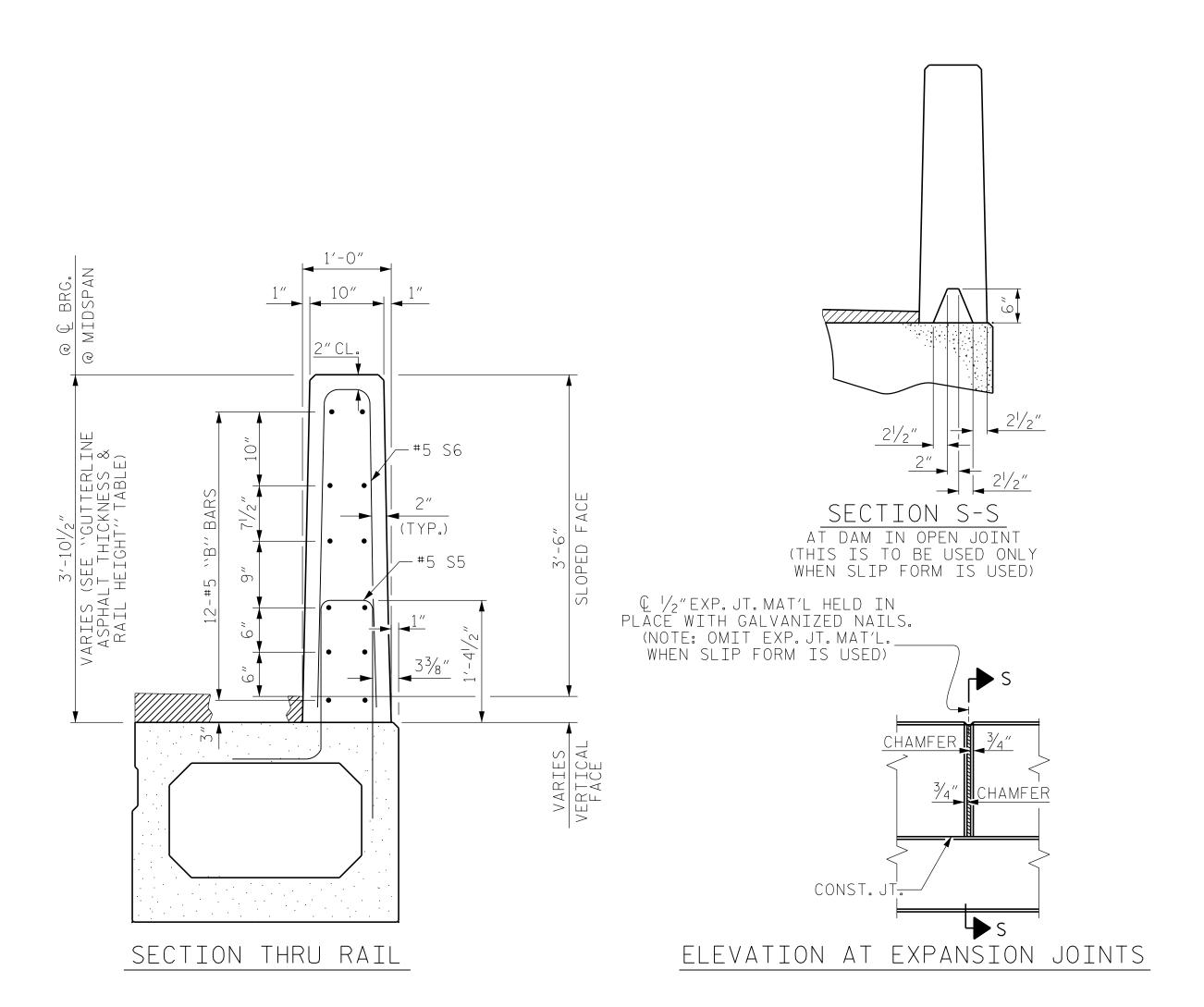
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| | FINAL UNLESS ALL |
| | SIGNATURES COMPLETED |

10/9/2018 9:53:28 AM PDT

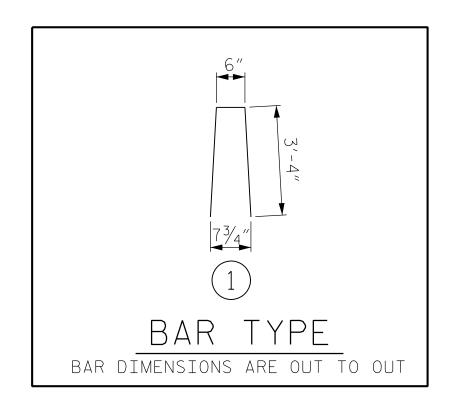
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| ERED | NO. | BY: | DATE: | NO. | BY: | DATE: | S1-8 |
| ED | 1 | | | 3 | | | TOTAL SHEETS |
| | 2 | | | 4 | | | 18 |







BOX BEAM UNITS REQUIRED TOTAL LENGTH NUMBER LENGTH EXTERIOR B.B. 105'-0" 210'-0" 105′-0″ 945′-0″ INTERIOR B.B. TOTAL 11 1155′-0″



| BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL | | | | | | | | | |
|---|---------------------------------|------|--------|---------|--------------|--|--|--|--|
| BAR | BARS PER PAIR OF EXTERIOR UNITS | SIZE | TYPE | LENGTH | WEIGHT | | | | |
| | 105' UNIT | | | | | | | | |
| | | | | | | | | | |
| ★ B12 | 96 | #5 | STR | 25′-10″ | 2587 | | | | |
| | | | | | | | | | |
| * S6 | 292 | #5 | 1 | 7'-2" | 2183 | | | | |
| | | | | | | | | | |
| ₩ EPOX | Y COATED REINFORCING STEEL | | LBS. | | 4770 27.6 | | | | |
| CLASS AA CONCRETE CU.YDS. | | | | | | | | | |
| TOTAL | VERTICAL CONCRETE BARRIER RAIL | | LN.FT. | | 210.0 | | | | |

| GUTTERLINE CONC | RETE THICKNESS & RAI | IL HEIGHT |
|-----------------|--|---------------------------|
| | CONCRETE WEARING SURFACE THICKNESS @ MID-SPAN | RAIL HEIGHT @ MID-SPAN |
| 105' UNITS | 31/2′′ | 3'-91/2'' |

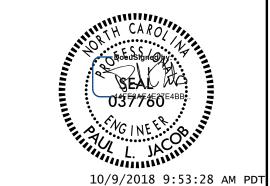
PROJECT NO. B-4438 COUNTY

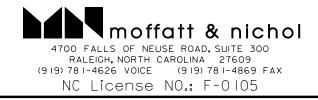
STATION: 25+27.50 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

3'-0" X 3'-3" BOX BEAM UNIT



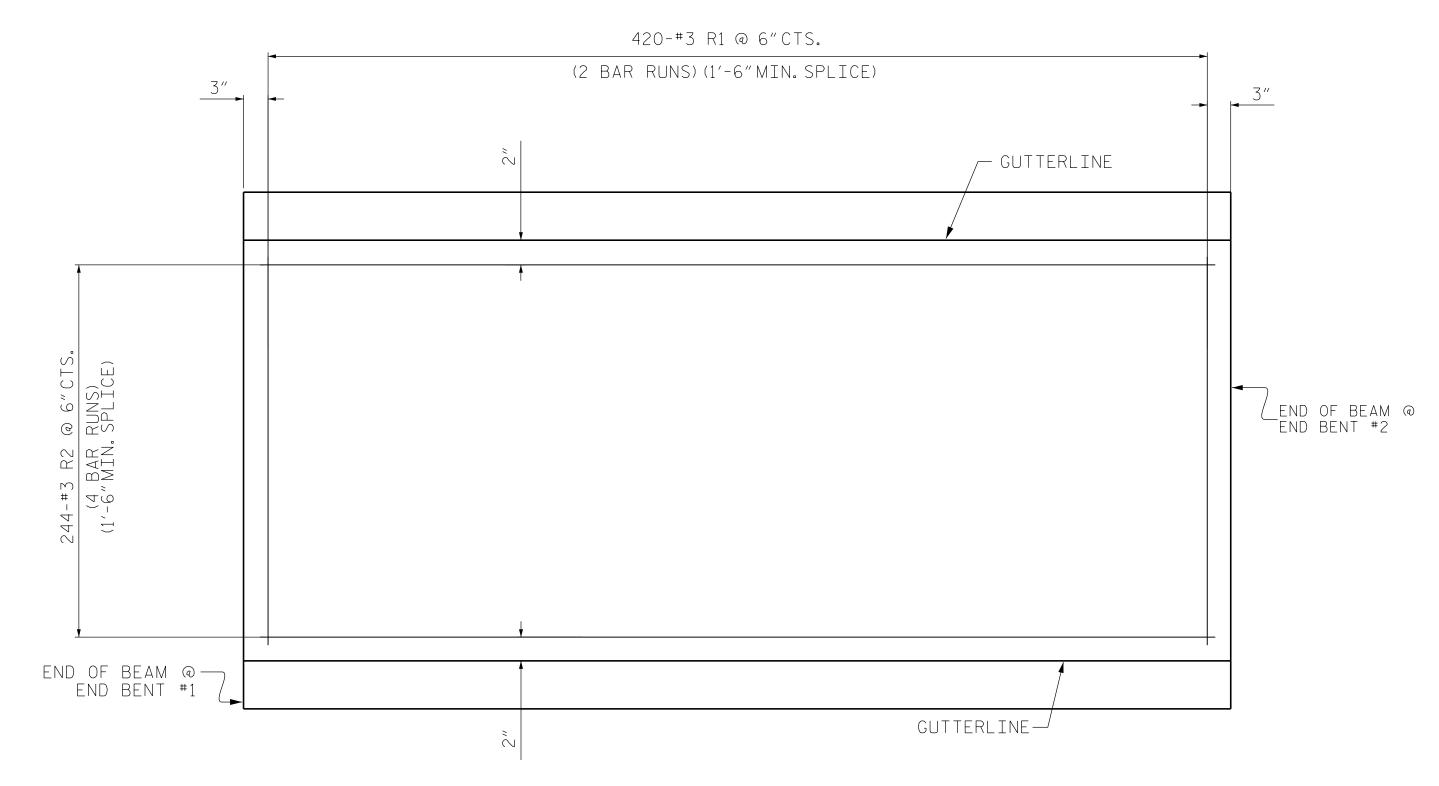


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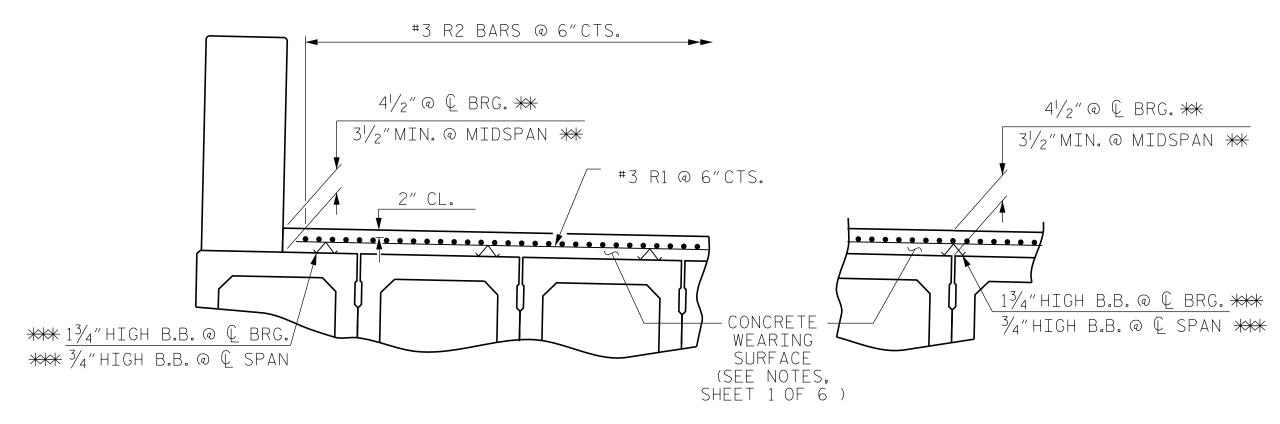
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| NLESS ALL S COMPLETED | 1 | | | 3 | | | TOTAL SHEETS | | | | |
| | 2 | | | 4 | | | 18 | | | | |

VERTICAL CONCRETE BARRIER RAIL DETAILS

| DRAWN BY : | J. SWY | ERS | DATE : | 08/2018 |
|-----------------|------------|----------|--------|----------|
| CHECKED BY : | P. JA | COB | DATE : | 08/2018_ |
| DESTGN ENGINEER | OF RECORD: | P. JACOB | DATE . | 08/2018 |



PLAN SHOWING CONCRETE WEARING SURFACE REINFORCING STEEL



REINFORCING STEEL FOR CONCRETE WEARING SURFACE

** BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS

*** BEAM BOLSTERS (B.B.) SHALL BE SPACED AT 2'-0"CENTERS SET 1'-0"FROM GUTTERLINE.

THE MINIMUM AND MAXIMUM CONCRETE WEARING SURFACE THICKNESSES ARE SHOWN.
THE HEIGHT OF THE CONCRETE WEARING SURFACE THICKNESS VARIES WHILE IT
FOLLOWS THE PROFILE OF THE GUTTERLINE.

PLACEMENT OF THE CONCRETE WEARING SURFACE SHALL OCCUR AFTER CASTING THE VERTICAL CONCRETE BARRIER RAIL. THE COST OF THE #3 BARS CAST WITH THE CONCRETE WEARING SURFACE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONCRETE WEARING SURFACE. FOR CONCRETE WEARING SURFACE, SEE SPECIAL PROVISIONS.

ALL REINFORCING STEEL IN THE CONCRETE WEARING SURFACE SHALL BE EPOXY COATED.



| SPLICE LEN | IGTH CHART |
|------------|--------------|
| BAR SIZE | EPOXY COATED |
| #3 | 1′-6″ |

| GROOVING | BRIDGE FL | 00RS |
|----------------|-----------|--------|
| APPROACH SLABS | 788 | SQ.FT. |
| BRIDGE DECK | 2,913 | SQ.FT. |
| TOTAL | 3,701 | SQ.FT. |

PROJECT NO. B-4438

BRUNSWICK COUNTY

STATION: 25+27.50 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

SUPERSTRUCTURE CONCRETE WEARING



| moffatt & nichol | DOCUI |
|--|-------|
| 4700 FALLS OF NEUSE ROAD, SUITE 300 RALEIGH, NORTH CAROLINA 27609 | |
| (9 9) 78 -4626 VOICE (9 9) 78 -4869 FAX | SIG |
| NC License NO.: F-0105 | |

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| FINAL UNLESS ALL |
| SIGNATURES COMPLETED |

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| | NO. | BY: | DATE: | NO. | BY: | DATE: | S1-10 |
| | 1 | | | 8 | | | TOTAL SHEETS |
| J | 2 | | | 4 | | | 18 |

SURFACE DETAILS

DRAWN BY: J. WEIGER DATE: 08/2018

CHECKED BY: P. JACOB DATE: 08/2018

DESIGN ENGINEER OF RECORD: P. JACOB DATE: 08/2018

ASSEMBLED BY: M. RAY

DRAWN BY: MAA 5/10

CHECKED BY: GM 5/10

CHECKED BY:

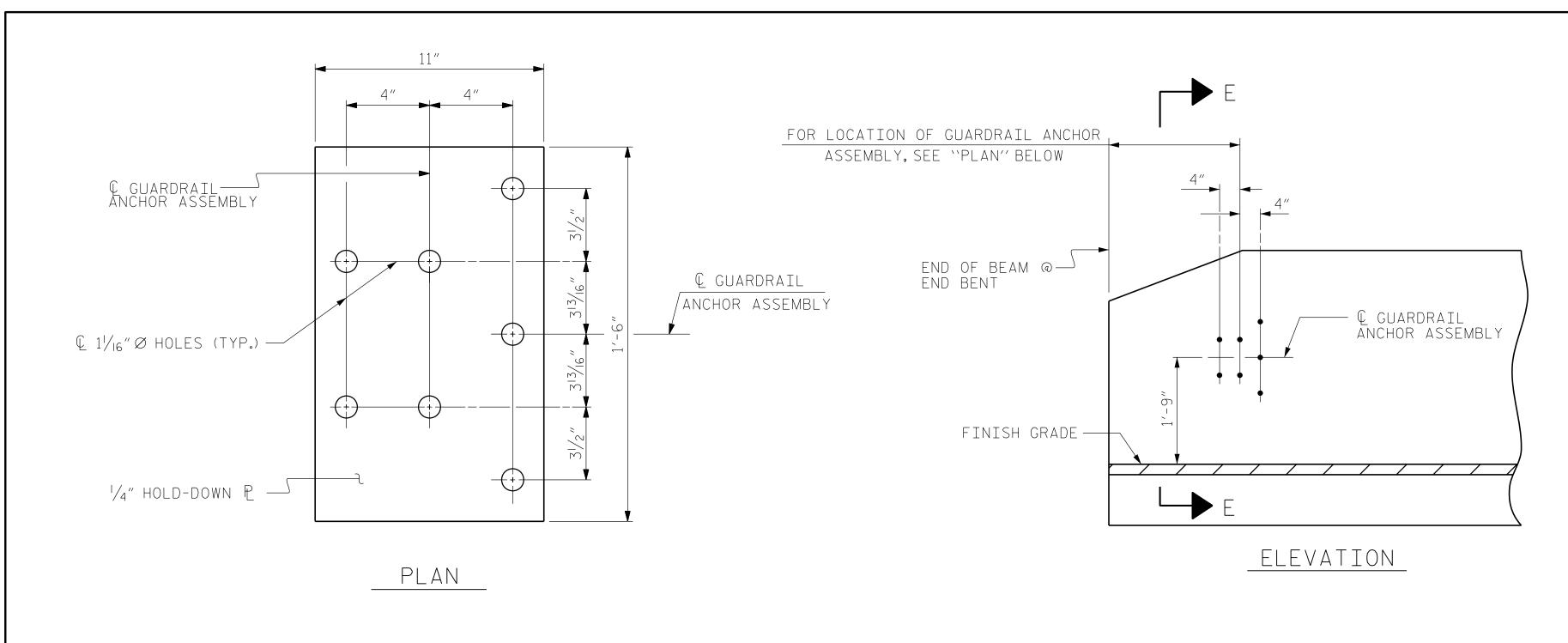
P.JACOB

DATE: 08/2018

DATE: 08/2018

MAA/TMC

MAA/THC



NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A $1/4^{\prime\prime}$ HOLD DOWN PLATE AND 7 - $1/8^{\prime\prime}$ 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 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.)

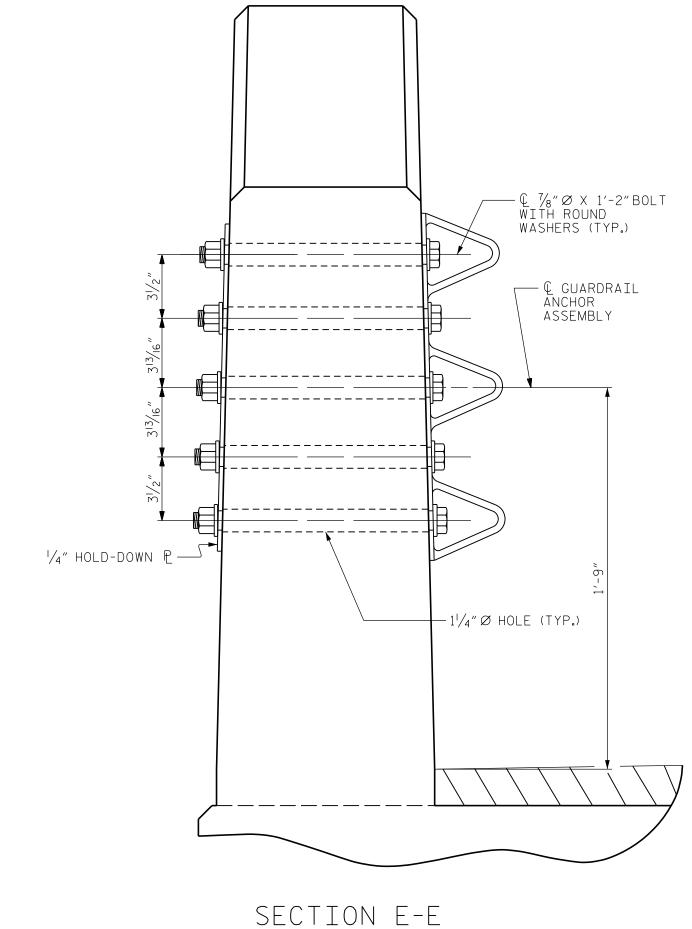
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

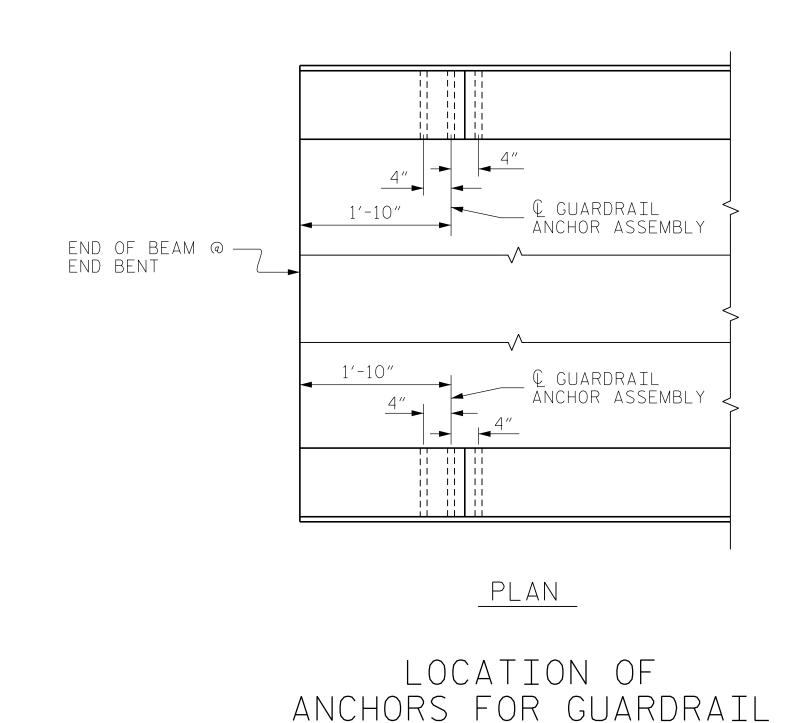
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 $\frac{1}{4}$ " \varnothing 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.



GUARDRAIL ANCHOR ASSEMBLY DETAILS



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

END OF BEAM @ — END BENT No.1 END OF BEAM @ END BENT No. 2

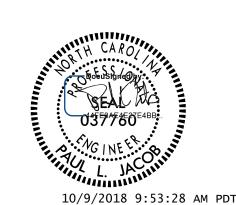
> SKETCH SHOWING POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-4438

COUNTY

STATION: 25+27.50 -L-

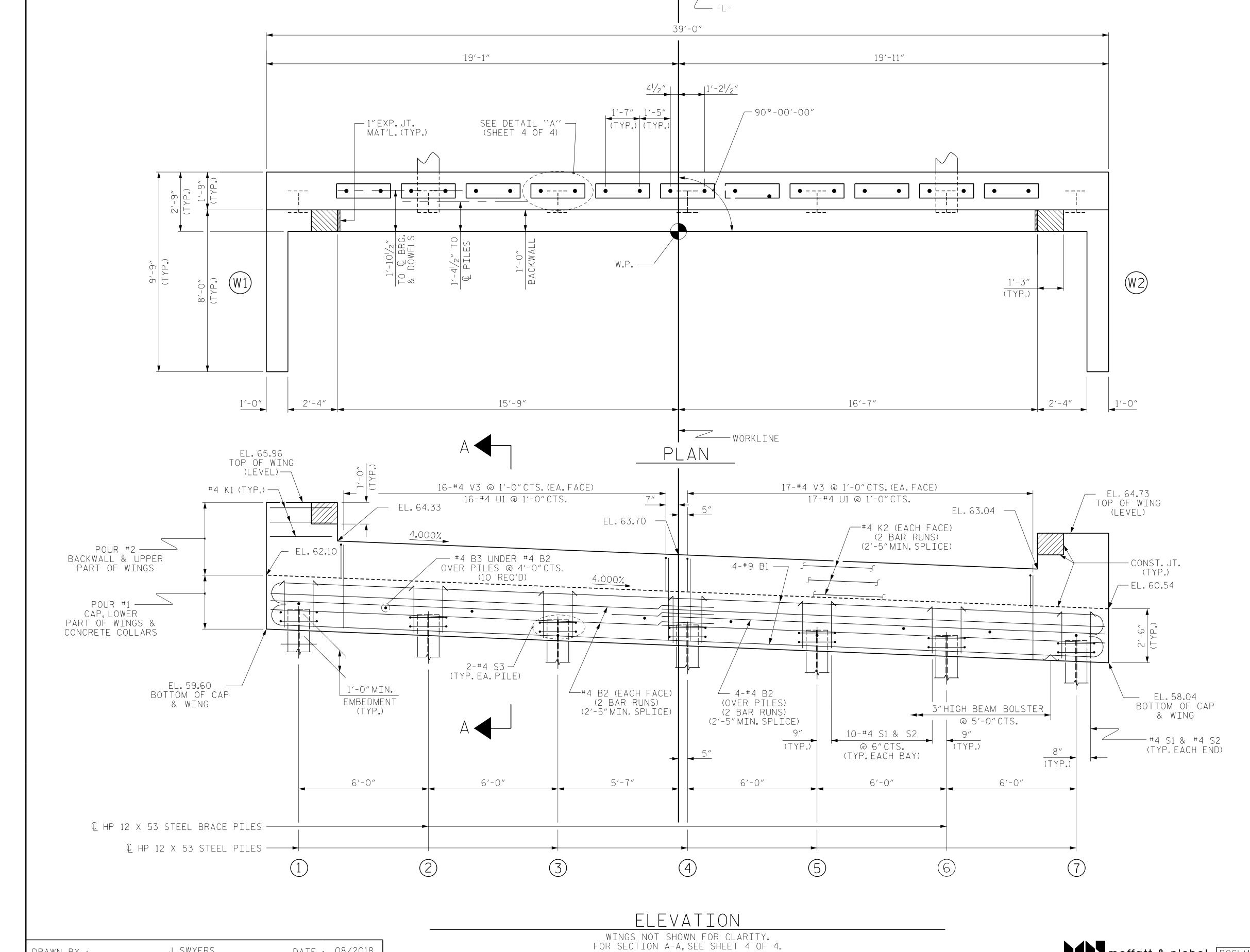


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD GUARDRAIL ANCHORAGE BARRTER RATI

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| | 2 | | | 4 | | | 18 |



CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.

SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

PROJECT NO. B-4438

COUNTY

STATION: 25+27.50 -L-

SHEET 1 OF 4

TOP OF PILE ELEVATIONS

6

60.56

60.32

60.08

59.84

59.60

59.36

59.12

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

SUBSTRUCTURE

END BENT No. 1

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|---|-------------------------|
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| , | SIGNATURES COMPLETED |
| 4 | |

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4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(9 19) 78 1-4626 VOICE (9 19) 78 1-4869 FAX

NC License NO.: F-0105

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| 3 223 | 2 | | | ΔL | |

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DRAWN BY : ___

CHECKED BY : _

DESIGN ENGINEER OF RECORD: ___

_ DATE : <u>08/2018</u>

_ DATE : <u>08/2018</u>

_ DATE : <u>08/2018</u>

J. SWYERS

P.JACOB

P.JACOB

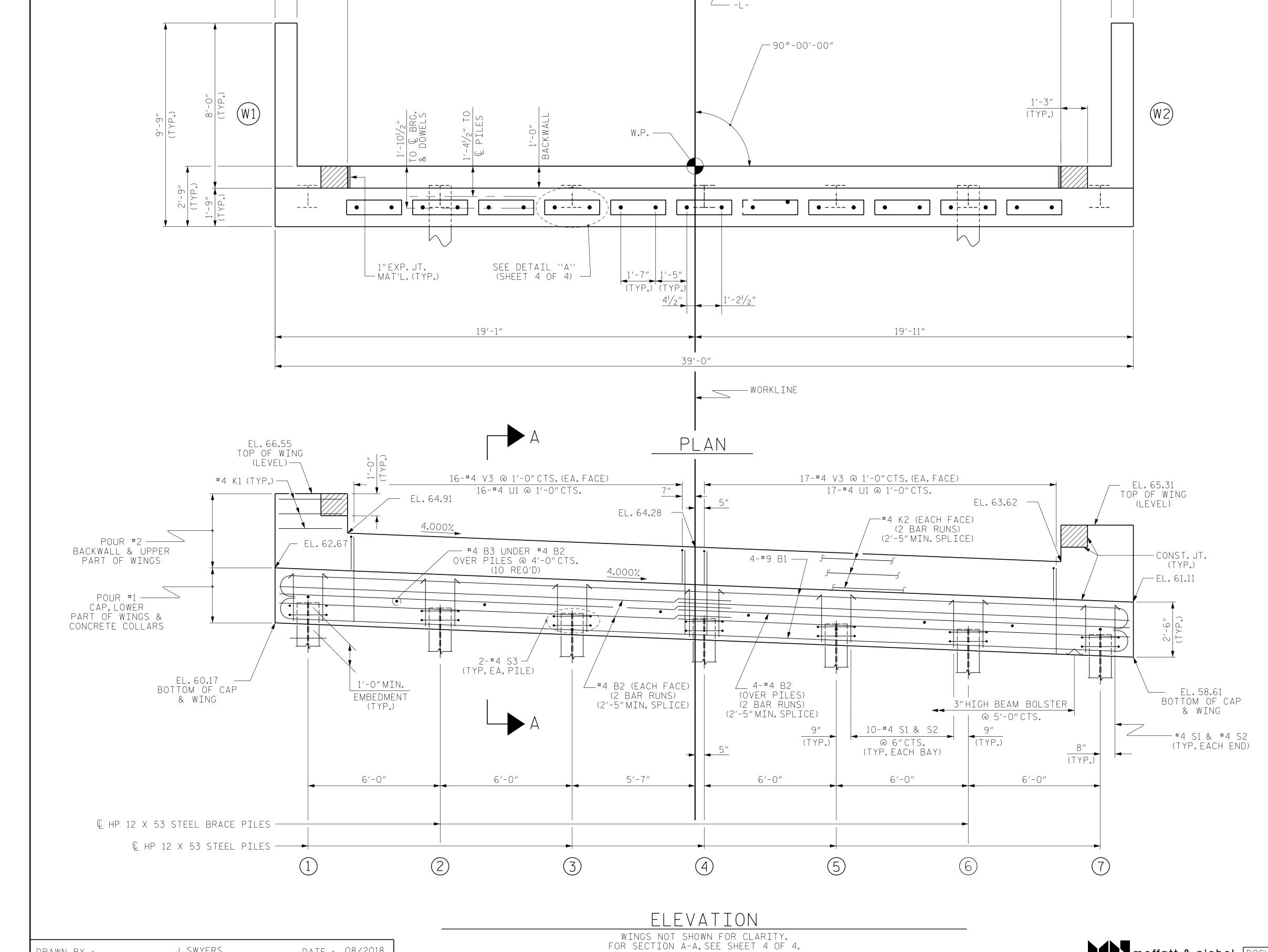
2'-4"

_ DATE : <u>08/2018</u>

_ DATE : <u>08/2018</u>

_ DATE : <u>08/2018</u>

15′-9″



CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.

SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

16'-7"

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS. SEE SHEET 3 OF 4.

PROJECT NO. B-4438 COUNTY

STATION: 25+27.50 -L-

SHEET 2 OF 4

TOP OF PILE ELEVATIONS

6

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10/9/2018 9:53:28 AM PDT

61.13

60.89

60.65

60.41

60.17

59.93

59.69

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

SUBSTRUCTURE

END BENT No. 2

SHEET NO.

S1-13

TOTAL SHEETS

REVISIONS DATE:

NC License NO.: F-0105

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4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
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NO. BY: DATE:

DRAWN BY : ___

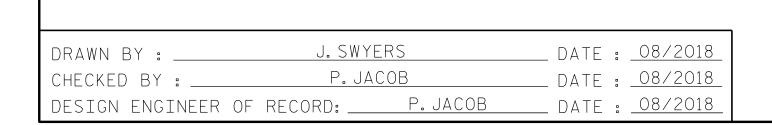
CHECKED BY : __

J. SWYERS

P.JACOB

DESIGN ENGINEER OF RECORD: P. JACOB





BOTTOM OF WING

(LEVEL)

1"EXP.JT. -| MAT'L

#4 K1

2"CL.

1'-9"

−FILL / FACE /

9'-9"

PLAN OF WING (W1)

┌#6 H1

7-#4 ''V'' @ 1'-0"CTS.(EA.FACE) \

#4 "V" BARS (EA.FACE)
(SPACED AS SHOWN ABOVE)

3" HIGH B.B. @ 5'-0"CTS.

TOP OF WING (LEVEL)

CONST. JT.

ELEVATION OF WING (W1)

2 SPA. @ 10" CTS. (EA. FACE)

10-#4 "V" BARS SPA, AS SHOWN

#4 K1 (EA.FACE)



WING DETAILS

``V'' BARS

END BENT No.1 V1 END BENT No. 2 V2

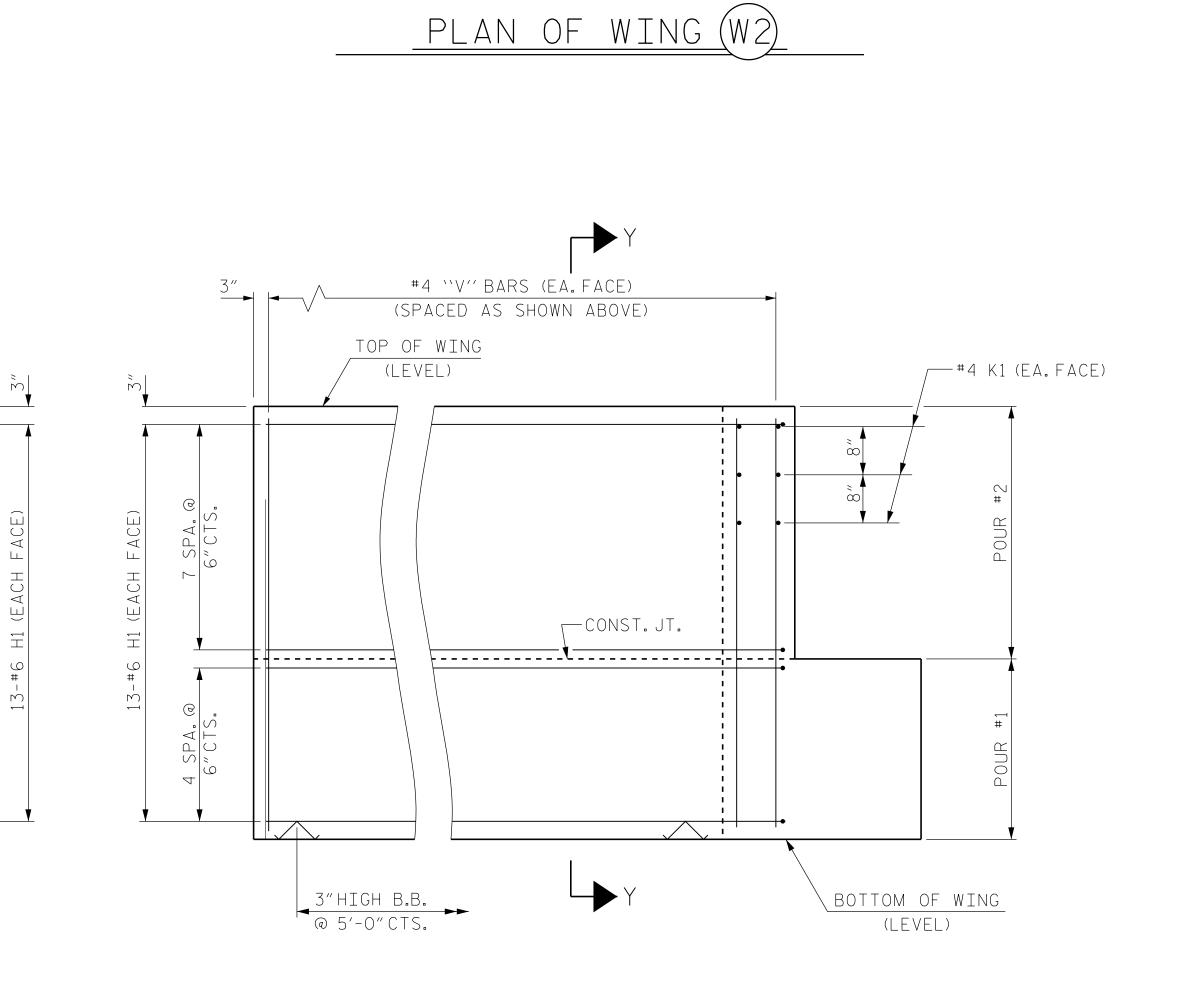
(W1) (W2)



DEPARTMENT OF TRANSPORTATION
RALEIGH SUBSTRUCTURE

END BENT

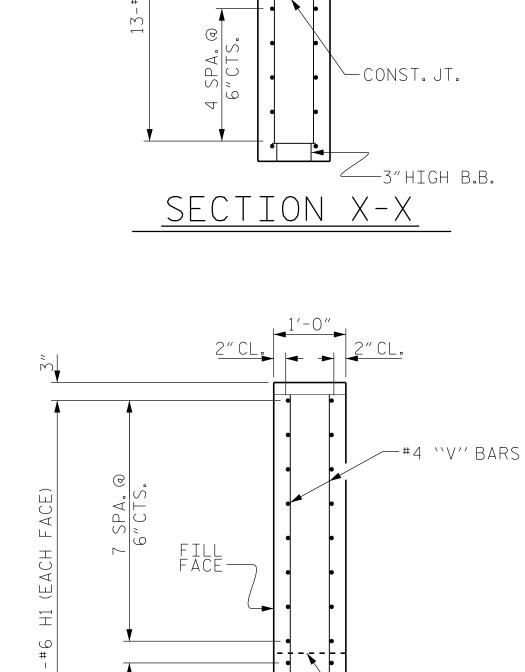
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FILL— FACE

9'-9"

#6 H1¬



-#4 ``V'' BARS

FILL FACE

• CONST. JT.

PROJECT NO. B-4438

3"HIGH B.B.

COUNTY

SECTION Y-Y

STATION: 25+27.50 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA

WING DETAILS

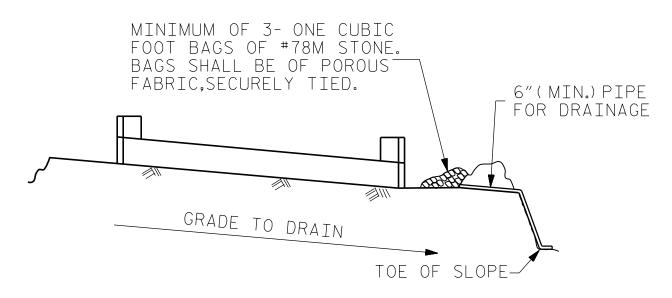
moffatt & nichol
4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC License NO.: F-0105

— 1"EXP.JT. Mat'l

2" CL.

1'-9"

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

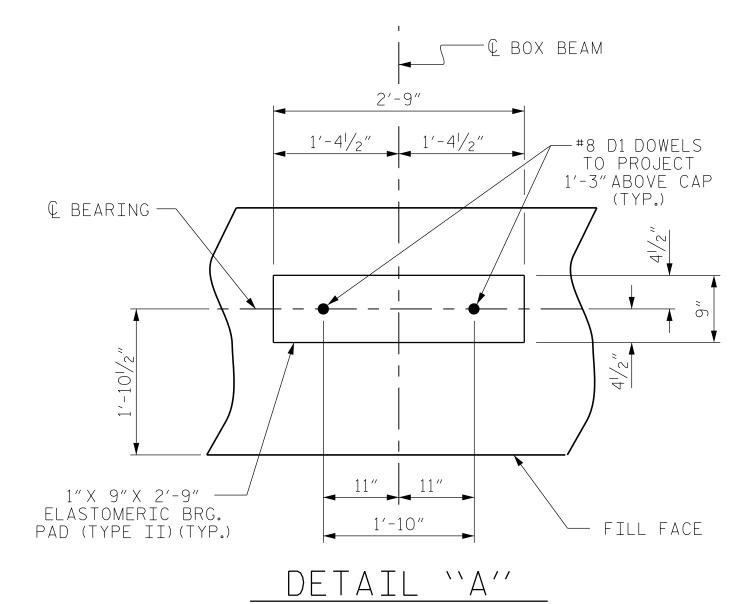


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

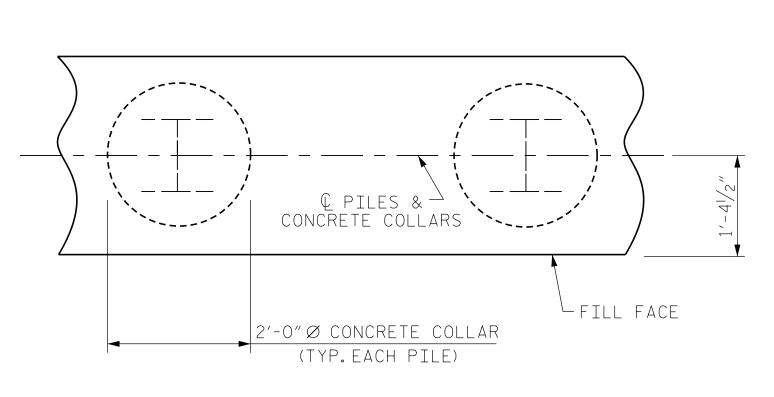
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETER-MINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

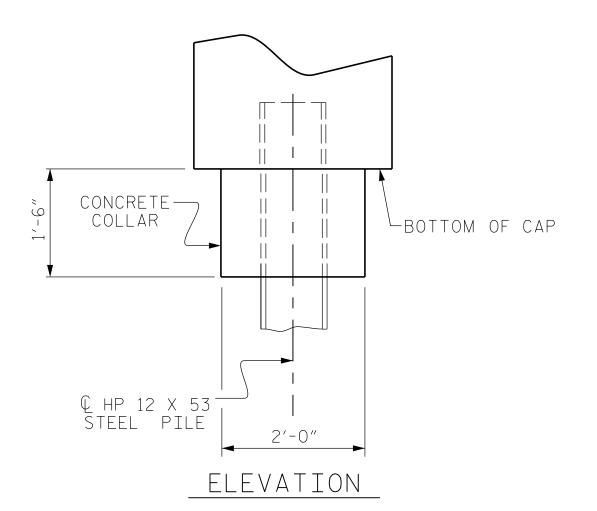
TEMPORARY DRAINAGE AT END BENT



(END BENT No.1 SHOWN, END BENT No.2 SIMILAR BY ROTATION)

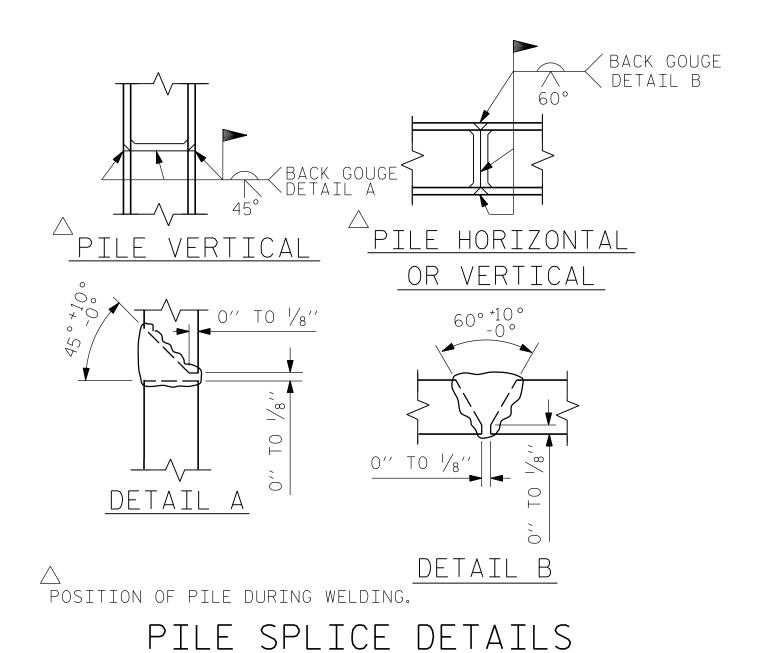


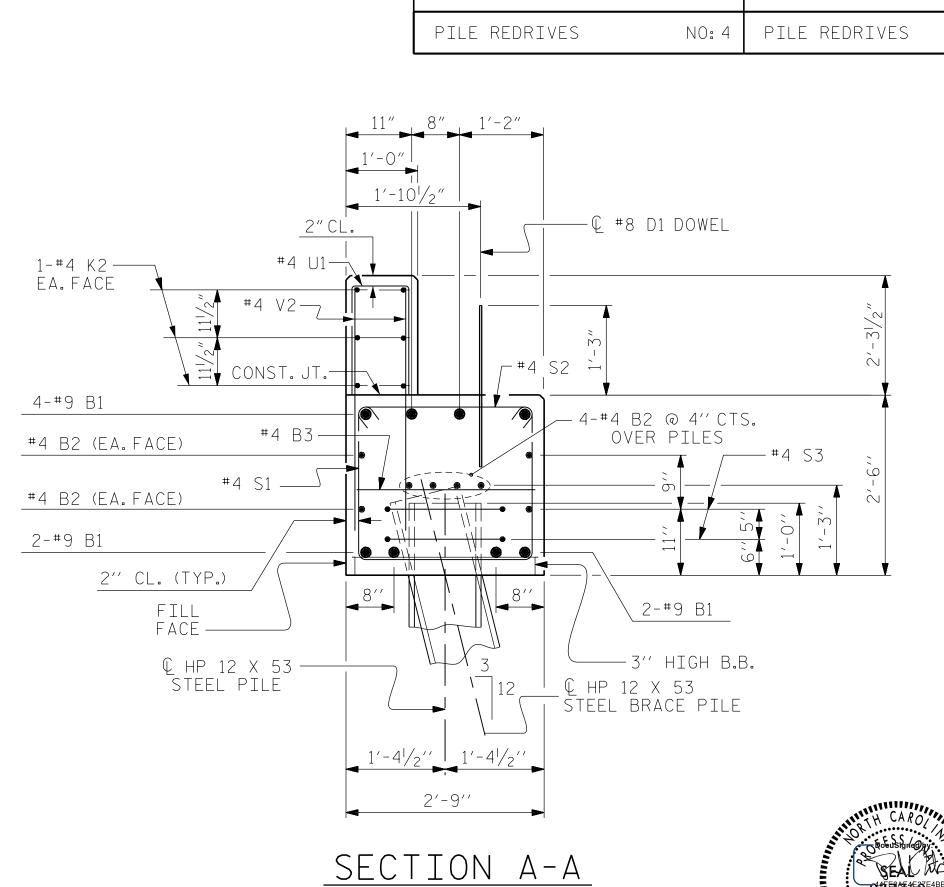
PLAN



(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)

J. SWYERS DATE : <u>08/2018</u> DRAWN BY : __ _ DATE : <u>08/2018</u> P. JACOB CHECKED BY : _ _ DATE : <u>08/2018</u> DESIGN ENGINEER OF RECORD: _ P.JACOB





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

037760^{E4BE}

BAR TYPES

7'-8"

2'-5"

LIN.FT.= 490

NO: 7

END BENT No. 1

HP 12 X 53 STEEL PILES

PILE DRIVING EQUIPMENT

SETUP FOR

HP 12 X 53 STEEL PILES

ALL BAR DIMENSIONS ARE OUT TO OUT.

NO: 7

COUNTY

BILL OF MATERIAL

FOR ONE END BENT

#9 | 1 | 41'-0"

20'-7"

2'-5"

2'-3"

8'-4"

2'-11"

20'-7"

7'-5"

3'-2"

6'-6"

3'-8"

6′-3″

4'-4"

1115

220

16

132

651

23

165

307

131

61

81

95

100

191

3288 LBS.

13.8 C.Y.

6.4 C.Y.

20.2 C.Y.

BAR | NO. | SIZE | TYPE | LENGTH | WEIGH

STR

#4 STR

#4 STR

#4

22 #8 STR

12 | #4 | STR |

52 #6

62 #4

62 #4

33 | #4

V2 | 24 | #4 | STR |

V3 | 66 | #4 | STR

REINFORCING STEEL

(FOR ONE END BENT)

V1 | 24 | #4 | STR | 5'-11"

CLASS A CONCRETE BREAKDOWN

OF WINGS & COLLARS

(FOR ONE END BENT)

POUR #2 BACKWALL & UPPER

PART OF WINGS

POUR #1 CAP, LOWER PART

TOTAL CLASS A CONCRETE

В2

В3

D1

Κ2

S1

S2

1'-8" Ø

END BENT No. 2

HP 12 X 53 STEEL PILES

PILE DRIVING EQUIPMENT

SETUP FOR

HP 12 X 53 STEEL PILES

LIN.FT.= 490

NO: 7

NO: 4

16

10_|

12

S3 | 14 | #4

STATION:_

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

SUBSTRUCTURE

BENT No.1 & 2 DETAILS

moffatt & nichol 4700 FALLS OF NEUSE ROAD, SUITE 300 RALEIGH, NORTH CAROLINA 27609 (919) 781-4626 VOICE (919) 781-4869 FAX NC License NO.: F-0105

DOCUMENT NOT CONS FINAL UNLESS A SIGNATURES COMPL

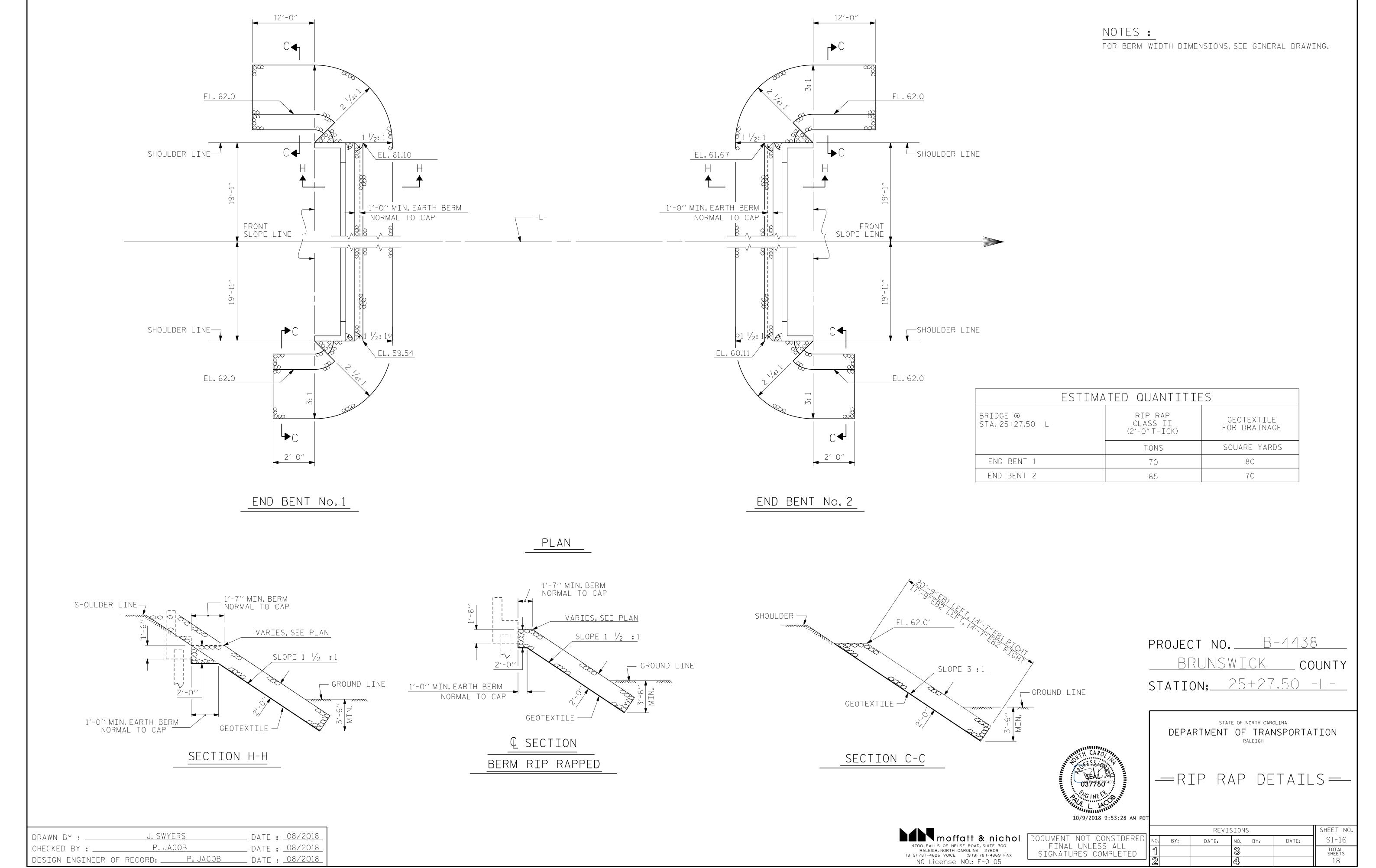
| 13.20 AM PDI | | | | | | | |
|--------------|-----|-----|-------|--------------|-----|-------|-----------------|
| | | | REVIS | SIO | VS. | | SHEET N |
| SIDERED | NO. | BY: | DATE: | NO. | BY: | DATE: | S1-15 |
| ALL LETED | 1 | | | 3 | | | TOTAL SHEETS |
| | 2 | | | 43, | | | 18 |

PROJECT NO. B-4438

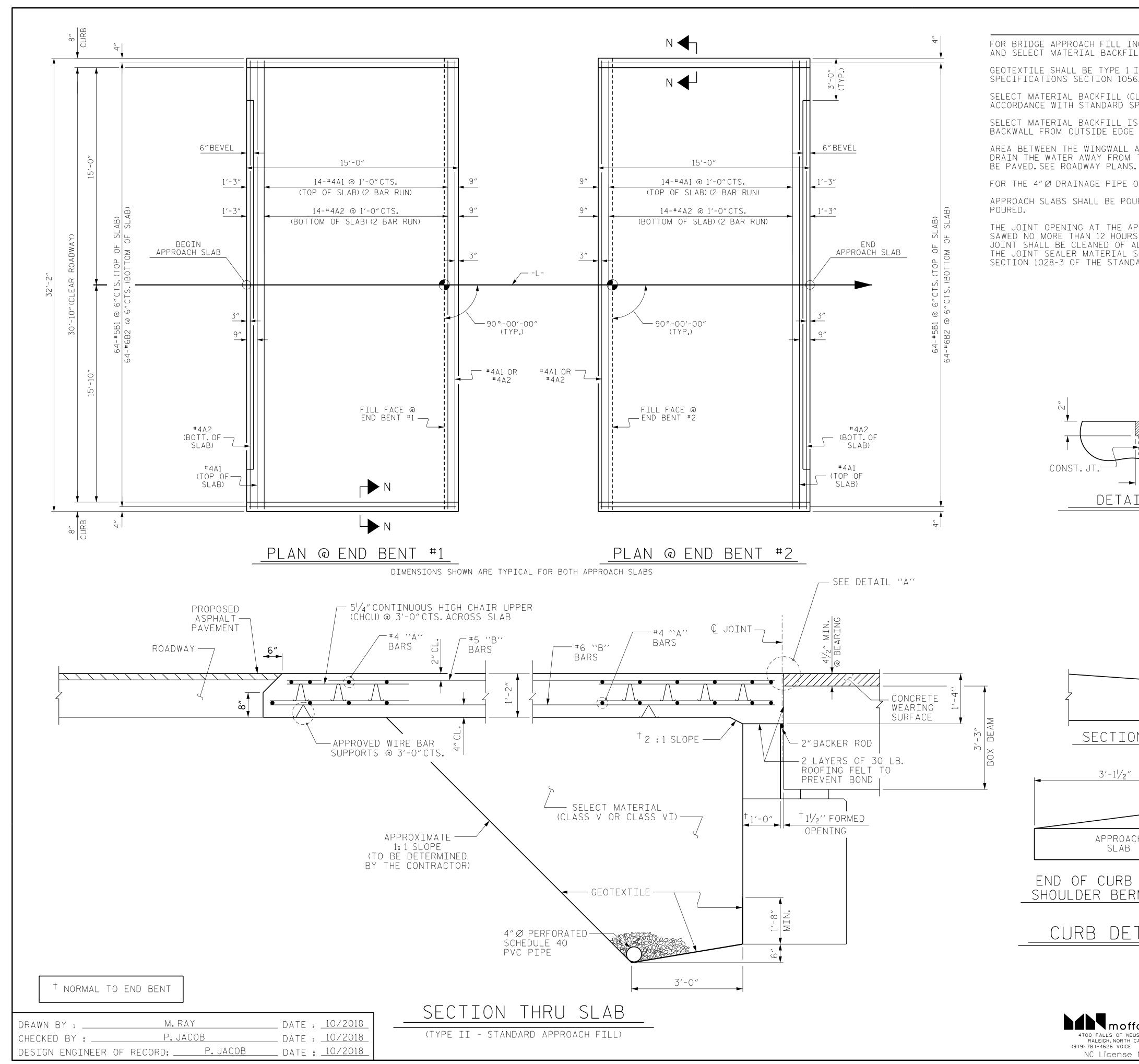
25+27.50 -1-

SHEET 4 OF 4

10/9/2018 9:53:28 AM PDT







NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" 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.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS. APPROACH SLABS SHALL BE POURED AFTER CONCRETE WEARING SURFACE IS

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

| BILL OF MATERIAL | | | | | | | | |
|------------------------|-------|---------|------|---------|--------|--|--|--|
| APPROACH SLAB AT EB #1 | | | | | | | | |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT | | | |
| * ∆1 | 32 | #4 | STR | 16′-11″ | 362 | | | |
| Α2 | 32 | #4 | STR | 16′-9″ | 358 | | | |
| | | | | | | | | |
| * B1 | 64 | #5 | STR | 14'-2" | 946 | | | |
| В2 | 64 | #6 | STR | 14'-8" | 1410 | | | |
| | | | | | | | | |
| REINF | ORCIN | IG STEE | L | LBS. | 1768 | | | |
| * EDO | VV CO | A T E D | | | | | | |

REINFORCING STEEL

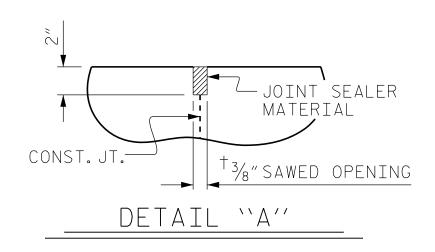
CLASS AA CONCRETE

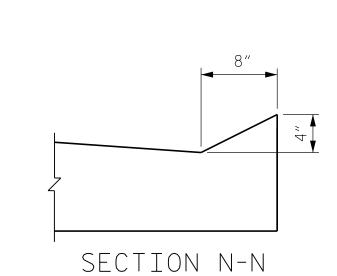
| CLASS | S AA C | ONCRET | E | C.Y. | 21.2 |
|-------------|--------|--------|------|---------|--------|
| Aβ | PPRC | ACH | SLAE | B AT EE | 3 #2 |
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| * ∆1 | 32 | #4 | STR | 16′-11″ | 362 |
| Α2 | 32 | #4 | STR | 16′-9″ | 358 |
| | | | | | |
| ∗ B1 | 64 | #5 | STR | 14'-2" | 946 |

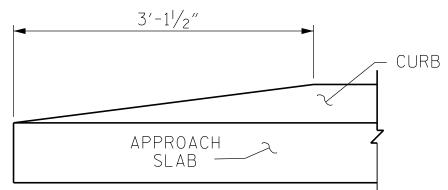
LBS.

C.Y.

| В2 | 64 | #6 | STR | 14'-8" | 1410 |
|-------|----------------|----------------|------|--------|------|
| | | | | | |
| REINF | ORCIN | G STEE | L | LBS. | 1768 |
| | XY CO NFORC | ATED Ing st | LBS. | 1308 | |
| | | | | | |







END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

STATION: 25+27.50 -L-

COUNTY

PROJECT NO. B-4438

BRIDGE APPROACH SLAB



| DOCUMENT | NOT | CONSIDERED |
|-----------|------|------------|
| | | FSS ALL |
| | | |
| 2 SIGNAIL | IKF2 | COMPLETED |

| FOR | PRESTRES | SSED | CONCRETE |
|-----|----------|------|----------|
| | BOX | BEAN | Л |
| | | | |

| | | REVISIONS | | | | | |
|----------------------|-----|-----------|-------|-----|-----|-------|-----------------|
| CONSIDERED | NO. | BY: | DATE: | NO. | BY: | DATE: | S1-17 |
| ESS ALL Completed | 1 | | | 3 | | | TOTAL SHEETS |
| | 2 | | | 4 | | | 18 |

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EQUIVALENT FLUID PRESSURE OF EARTH - - - - -

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

OF TIMBER - - - -

375 LBS. PER SQ. IN.

(MINIMUM)

30 LBS. PER CU. FT.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT,

ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

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

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

CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

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

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS. WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE

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

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE $rac{N}{4}$ lpha studs specified on the plans. This substitution shall be made at THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-O".

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

ELECTROSLAG WELDING WILL NOT BE PERMITTED. WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

> PROJECT NO. ______B-4438 BRUNSWICK COUNTY STATION: 25+27,50 -1-

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

STANDARD NOTES

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FINAL UNLESS ALL SIGNATURES COMPLETED

SHEET NO REVISIONS S1-18 NO. BY: DATE: DATE: SHEETS 18