

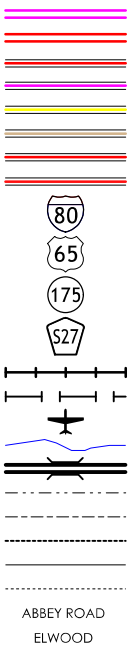
BRIDGE REPLACEMENT - CCS LETTING DATE 08/17/21  
NHSX-030-6(209)--3H-06

BENTON COUNTY - DESIGN 216 & 218

LEGEND

INTERSTATE HIGHWAY  
PRIMARY HIGHWAY-DIVIDED  
PRIMARY HIGHWAY  
PORTLAND CEMENT CONCRETE ROAD  
ASPHALT ROAD  
BITUMINOUS ROAD  
GRAVEL ROAD  
EARTHEN ROAD

INTERSTATE HIGHWAY  
UNITED STATES HIGHWAY  
STATE HIGHWAY  
COUNTY HIGHWAY  
RAILROAD  
PIPELINE  
AIRPORT  
HYDROLOGY  
BRIDGE  
STATE BOUNDARY  
COUNTY BOUNDARY  
CORPORATE BOUNDARY  
TOWNSHIP LINE  
SECTION LINE  
ROAD NAMES  
UNINCORPORATED PLACE



PLANS OF PROPOSED IMPROVEMENTS ON THE  
**PRIMARY ROAD SYSTEM**  
BENTON COUNTY  
BRIDGE REPLACEMENT - CCS  
US 30 OVER UNNAMED STREAM 1.2  
MILES WEST OF COUNTY ROAD V66

THE IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

ENGLISH STANDARD  
BRIDGE PLANS

| STANDARD  | ISSUED | REVISED |
|-----------|--------|---------|
| J40-07-14 | 07-14  | 08-20   |
| J40-20-14 | 07-14  | 08-20   |
| J40-44-14 | 07-14  | 08-20   |
| J40-45-14 | 07-14  | 08-20   |
| J40-46-14 | 07-14  | 08-20   |
| J40-47-14 | 07-14  | 08-20   |
| J40-52-14 | 07-14  | 08-20   |
| PIOL      | 04-09  | 07-19   |

TOTAL SHEETS  
40

PROJECT NUMBER

NHSX-030-6(209)--3H-06

R.O.W. PROJECT NUMBER

PROJECT IDENTIFICATION NUMBER

92-06-030-030

INDEX OF SHEETS

| NO.              | DESCRIPTION                            |
|------------------|--|
| 1                | TITLE SHEET                            |
| 2                | ESTIMATE SHEET - DESIGN 216            |
| 2-14             | DESIGN 216                             |
| <del>15</del>    | <del>ESTIMATE SHEET - DESIGN 218</del> |
| <del>15-27</del> | <del>DESIGN 218</del>                  |
| SPS. 1-6         | SOIL PROFILE SHEET                     |
| C.I              | ESTIMATE SHEET FOR ROADWAY             |
| A.1-U.4          | ROADWAY SHEETS                         |

REVISIONS



1-800-292-8989

www.iowaonecall.com



STANDARD ROAD  
PLANS

STANDARD ROAD PLANS ARE LISTED  
ON SHEET NUMBER C.I

DESIGN DATA RURAL

|                    |           |        |
|--------------------|-----------|--------|
| 2017 AADT          | 5,400     | V.P.D. |
| 2037 AADT          | 8,500     | V.P.D. |
| 2037 DHV           | 880       | V.P.H. |
| TRUCKS             | 19        | %      |
| Total Design ESALs | 3,000,000 |        |

INDEX OF SEALS

| SHEET NO. | NAME                | TYPE                |
|-----------|---------------------|---------------------|
| 1         | DAVID R. EVANS      | STRUCTURAL DESIGN   |
| 6 & 19    | DAVID J. MULHOLLAND | HYDRAULIC DESIGN    |
| SPS. 1    | MARK DELL           | GEOTECHNICAL DESIGN |
| A.1       | PAUL W. FLATTERY    | ROADWAY DESIGN      |

STRUCTURAL DESIGN



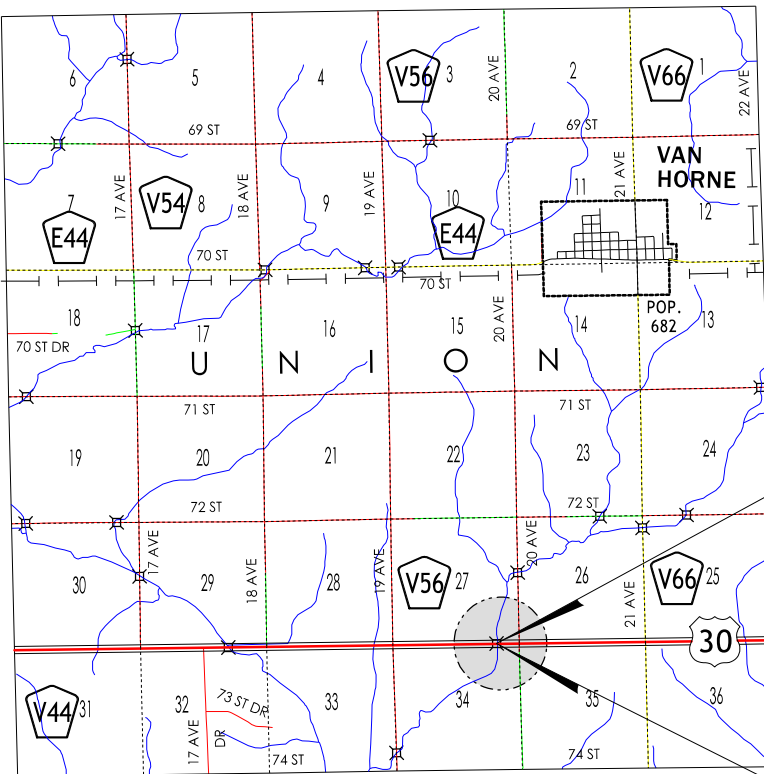
I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature: *David R. Evans* Date: 05-28-2021

Printed or Typed Name: David R. Evans

My license renewal date is December 31, 2021

Pages or sheets covered by this seal: SHEETS 1 THRU 27 OF 40



~~DESIGN 218~~  
~~FHWA 14271~~

DESIGN 216  
FHWA 700495

LOCATION MAP

PROJECT DIRECTORY NAME: 0603003092

DESIGN TEAM DRE \* JS \* DKT \* TWE

ENGLISH

IOWA DOT \* BRIDGES AND STRUCTURES BUREAU

FILE NO. 31043

BENTON COUNTY

PROJECT NUMBER NHSX-030-6(209)--3H-06

SHEET NUMBER 1



## SUMMARY OF CONCRETE QUANTITIES

| LOCATION   | STRUCTURAL<br>CONCRETE | HPC STRUCT.<br>CONCRETE |
|--|------------------------|-------------------------|
| * SUPERSTRUCTURE   | -----                  | 227.1                   |
| WEST ABUTMENT FOOTING  | 14.4                   | -----                   |
| EAST ABUTMENT FOOTING  | 14.4                   | -----                   |
|  |                        |                         |
|  |                        |                         |
|  |                        |                         |
|  |                        |                         |
|  |                        |                         |
|  |                        |                         |
|  |                        |                         |
|  |                        |                         |
| * INCLUDES 2 PIER CAPS AND 4 WINGS AT 0.68 CY EACH; EXCLUDES RAIL CONCRETE |                        |                         |
|  |                        |                         |
|  |                        |                         |
|  |                        |                         |
| TOTAL (CU. YDS.)   | 28.8                   | 227.1                   |

## SUMMARY OF REINFORCING STEEL

| LOCATION                            | NON-COATED<br>REINFORCING STEEL | STAINLESS STEEL<br>REINFORCING STEEL | EPOXY COATED<br>REINFORCING STEEL |
|-------------------------------------|---------------------------------|--------------------------------------|-----------------------------------|
| ** SUPERSTRUCTURE WITH BARRIER RAIL | ----                            | 2,291                                | 59,559                            |
| WEST ABUTMENT FOOTING               | ----                            | -----                                | 2,132                             |
| EAST ABUTMENT FOOTING               | ----                            | -----                                | 2,132                             |
|                                     |                                 |                                      |                                   |
|                                     |                                 |                                      |                                   |
|                                     |                                 |                                      |                                   |
|                                     |                                 |                                      |                                   |
|                                     |                                 |                                      |                                   |
|                                     |                                 |                                      |                                   |
|                                     |                                 |                                      |                                   |
| ** INCLUDES 2 PIER CAPS             |                                 |                                      |                                   |
|                                     |                                 |                                      |                                   |
|                                     |                                 |                                      |                                   |
|                                     |                                 |                                      |                                   |
|                                     |                                 |                                      |                                   |
|                                     |                                 |                                      |                                   |
| TOTAL (LBS.)                        | ----                            | 2,291                                | 63,823                            |

## SUMMARY OF EXCAVATION

| LOCATION         | CLASS 20<br>EXCAVATION | CLASS 10<br>EXCAVATION |
|------------------|------------------------|------------------------|
| WEST ABUTMENT    | 51.8                   | -----                  |
| EAST ABUTMENT    | 51.8                   | -----                  |
|                  |                        |                        |
|                  |                        |                        |
|                  |                        |                        |
|                  |                        |                        |
|                  |                        |                        |
|                  |                        |                        |
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|                  |                        |                        |
|                  |                        |                        |
|                  |                        |                        |
|                  |                        |                        |
|                  |                        |                        |
|                  |                        |                        |
| TOTAL (CU. YDS.) | 103.6                  | -----                  |

## SUMMARY OF FOUNDATIONS

| LOCATION          | SUBSTRUCTURE<br>TYPE | FOUNDATION TYPE | NUMBER | LENGTH<br>(LIN. FT.) | TOTAL<br>(LIN. FT.) |
|-------------------|----------------------|-----------------|--------|----------------------|---------------------|
| WEST ABUTMENT     | INTEGRAL ABUTMENT    | HP10x42         | 6      | 60                   | 360                 |
| EAST ABUTMENT     | INTEGRAL ABUTMENT    | HP10x42         | 6      | 60                   | 360                 |
| PIER NO. 1        | PILE BENT PIER       | HP14x73         | 7      | 70                   | 490                 |
| PIER NO. 2        | PILE BENT PIER       | HP14x73         | 7      | 70                   | 490                 |
|                   |                      |                 |        |                      |                     |
| H PILE ENCASEMENT |                      |                 |        |                      |                     |
| PIER NO. 1        |                      |                 | 7      | 15                   | 105                 |
| PIER NO. 2        |                      |                 | 7      | 15                   | 105                 |
|                   |                      |                 |        |                      |                     |
|                   |                      |                 |        |                      |                     |
|                   |                      |                 |        |                      |                     |
|                   |                      |                 |        |                      |                     |
|                   |                      |                 |        |                      |                     |

DESIGN FOR 0° SKEW

90'-0" x 40'-0" CONTINUOUS  
CONCRETE SLAB BRIDGE

27'-6" END SPANS                      35'-0" INTERIOR SPAN

SUMMARY QUANTITIES SHEET

STA. 1256+86.04, 44.00' RT (US 30 E.B.)                      JUNE, 2021

BENTON COUNTY

IOWA DOT - TRANSPORTATION DEVELOPMENT DIVISION

DESIGN SHEET NO. 2 OF 13      FILE NO. 31043      DESIGN NO. 216

GENERAL NOTES

THIS DESIGN IS FOR CONSTRUCTION OF A 90'-0 x 40'-0 CONTINUOUS CONCRETE SLAB BRIDGE, AT STA. 1256+86.04, 44.00' RT (US 30 E.B.)OVER UNNAMED CREEK 1.2 MILES WEST OF COUNTY V66.

THIS BRIDGE IS DESIGNED FOR HL-93 LOADING, PLUS 20 LBS. PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE.

THE FLOOR SLAB AS SHOWN INCLUDES ½" INTEGRAL WEARING SURFACE.

FAINT LINES ON PLANS INDICATE THE EXISTING STRUCTURE.

UTILITY COMPANIES WHOSE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE WITHIN THE CONSTRUCTION LIMITS SHALL BE NOTIFIED BY THE BRIDGE CONTRACTOR OF THE CONSTRUCTION STARTING DATE.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

CONCRETE BARRIER RAILS PLACED USING THE SLIPFORM METHOD WILL REQUIRE THE USE OF A CLASS BR CONCRETE IN ACCORDANCE WITH ARTICLE 2513.03, A, 2, OF THE STANDARD SPECIFICATIONS. CAST-IN-PLACE BARRIER RAILS SHALL USE CLASS C MIX. CLASS D CONCRETE IS NOT PERMITTED FOR CONCRETE BARRIER RAILS (CAST-IN-PLACE OR SLIPFORMED METHOD).

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a1 IS ⅝ INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

|                 |    |    |    |    |    |    |    |    |    |
|-----------------|----|----|----|----|----|----|----|----|----|
| ENGLISH SIZE    | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |
| BAR DESIGNATION | 10 | 13 | 16 | 19 | 22 | 25 | 29 | 32 | 36 |

KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN.

IT SHALL BE THE BRIDGE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SITES FOR EXCESS EXCAVATED MATERIAL. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED FOR MATERIAL HAULED TO THESE SITES.

THE PIER PILE ENCASEMENTS ARE TO BE AS DETAILED AND NOTED ON IOWA D.O.T. STANDARD PIOL, AS SHOWN IN THESE PLANS. THE UNIT PRICE BID FOR ENCASEMENT SHALL BE FULL PAYMENT FOR FURNISHING AND PLACING ALL MATERIAL AND NECESSARY EXCAVATION. THE PILING ENCASEMENTS ARE TO EXTEND FROM THE BOTTOM OF PIER CAP TO ELEVATION SHOWN.

ABUTMENT PILES SHALL NOT BE DRIVEN FOR A MINIMUM OF 4 DAYS FOR WEST ABUTMENT AND 30 DAYS FOR EAST ABUTMENT FOLLOWING COMPLETION OF APPROACH FILLS. THE TIME PERIOD BETWEEN COMPLETION OF FILLS AND DRIVING PILES MAY BE CHANGED AS ORDERED BY THE ENGINEER BASED UPON REVIEW OF SETTLEMENT PLATES.

THE APPROACH FILLS WILL NOT BE A PART OF THIS PROJECT, BUT WILL BE INCLUDED IN ANOTHER PROJECT ASSOCIATED WITH THIS CONTRACT. THE APPROACH FILL AS SHOWN ARE TO BE IN PLACE BEFORE ABUTMENT PILES ARE DRIVEN. THE BRIDGE CONTRACTOR IS TO LEVEL OFF AND SHAPE THE BERMS AND CHANNEL TO THE ELEVATIONS AND DIMENSIONS SHOWN. DRESSING OF SLOPES OUTSIDE THE BRIDGE AREA NOT DISTURBED BY THE BRIDGE CONTRACTOR SHALL BE PAID FOR AS EXTRA WORK.

THE GUARDRAIL AND END DRAINS WILL NOT BE A PART OF THIS PROJECT, BUT WILL BE INCLUDED IN ANOTHER PROJECT ASSOCIATED WITH THIS CONTRACT.

DURING CONSTRUCTION OF THIS PROJECT THE BRIDGE CONTRACTOR WILL BE REQUIRED TO COORDINATE OPERATIONS WITH THOSE OF OTHER CONTRACTORS WORKING WITHIN THE SAME AREA. OTHER WORK IN PROGRESS DURING THE SAME PERIOD OF TIME WILL INCLUDE, BUT IS NOT LIMITED TO, CONSTRUCTION OF THE FOLLOWING PROJECTS:

NHSX-030-6(181)--3H-06  
NHSX-030-6(185)--3H-06  
NHSX-030-6(205)--3H-06  
NHSX-030-6(207)--3H-06

PCC PAVEMENT-GRADE AND NEW TRAFFIC SIGNS  
RCB CULVERT REPLACEMENT - SINGLE BOX  
BRIDGE REPLACEMENT - PPCB

SPECIFICATIONS:

DESIGN: AASHTO LRFD 8th Ed, SERIES OF 2015, EXCEPT AS NOTED IN THE CURRENT IOWA BRIDGE DESIGN MANUAL.  
CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 3rd Ed, SERIES OF 2004.  
REINFORCING STEEL IN ACCORDANCE WITH LRFD AASHTO SECTION 5, GRADE 60.  
CONCRETE IN ACCORDANCE WITH LRFD AASHTO SECTION 5, f'c = 3,500 PSI,  
STRUCTURAL STEEL IN ACCORDANCE WITH LRFD AASHTO SECTION 6. ASTM A709 GRADE 36 OR GRADE 50 (AASHTO M270 GRADE 36 OR GRADE 50 ).  
n = 9 FOR TENSION STEEL  
2n = 18 FOR COMPRESSION STEEL  
HL-93 LIVE LOAD PLUS 20 LBS. PER SQ. FT. FOR FUTURE WEARING SURFACE.  
END SPAN LENGTH IS USED TO CALCULATE EQUIVALENT WIDTH IN LIVE LOAD DISTRIBUTION.  
SIX FOOT OF APPROACH SLAB DEAD & LIVE LOAD INCLUDED IN ABUTMENT LOADS.  
CONTROL OF CRACKING BY DISTRIBUTION OF REINFORCEMENT FOR SLAB DESIGN BASED ON PRE 2005 LRFD INTERMS.

BRIDGE DECK DIMENSIONS TABLE

| NO. | ITEM               | UNIT | QUANTITY |
|-----|--------------------|------|----------|
| 1   | DECK LENGTH        | L.F. | 90.8     |
| 2   | MINIMUM DECK WIDTH | L.F. | 43.2     |
| 3   | MAXIMUM DECK WIDTH | L.F. | 43.2     |
| 4   | DECK AREA          | S.F. | 4,015    |

1. DECK LENGTH IS MEASURED FROM FACE-TO-FACE OF PAVING NOTCHES ALONG THE CENTERLINE OF THE ROADWAY.
- 2, 3. DECK WIDTHS ARE MEASURED FROM OUT-TO-OUT OF DECK PERPENDICULAR TO THE CENTERLINE OF ROADWAY.
4. DECK AREA IS TO BE BASED ON THE FACE-TO-FACE PAVING NOTCH DISTANCE AND OUT-TO-OUT DECK DIMENSIONS.

SHOP DRAWING SUBMITTALS

SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)

SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.

SHOP DRAWINGS SHALL BE SUBMITTED WITH THE FOLLOWING NAMING CONVENTION:  
(Paren)\_County\_DesignNumber\_SubmittalDescription.pdf  
Example: (090)\_BlackHawk\_Design915\_DeckDrains.pdf

|   |             |
|---|-------------|
| 1 | FALSEWORK   |
| 2 | DECK DRAINS |
|   |             |

TRAFFIC CONTROL PLAN

THE ROADWAY WILL BE OPEN TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN INCLUDED IN THE TIED ROAD PLANS, PROJECT NO. NHSX-030-6(181)--3H-06.

404 PERMIT INFORMATION AND THE POLLUTION PREVENTION PLAN ARE INCLUDED IN THE TIED ROAD PLANS, PROJECT NO. NHSX-030-6(181)--3H-06.

DESIGN FOR 0° SKEW

90'-0 x 40'-0 CONTINUOUS CONCRETE SLAB BRIDGE

27'-6 END SPANS35'-0 INTERIOR SPAN

GENERAL NOTES

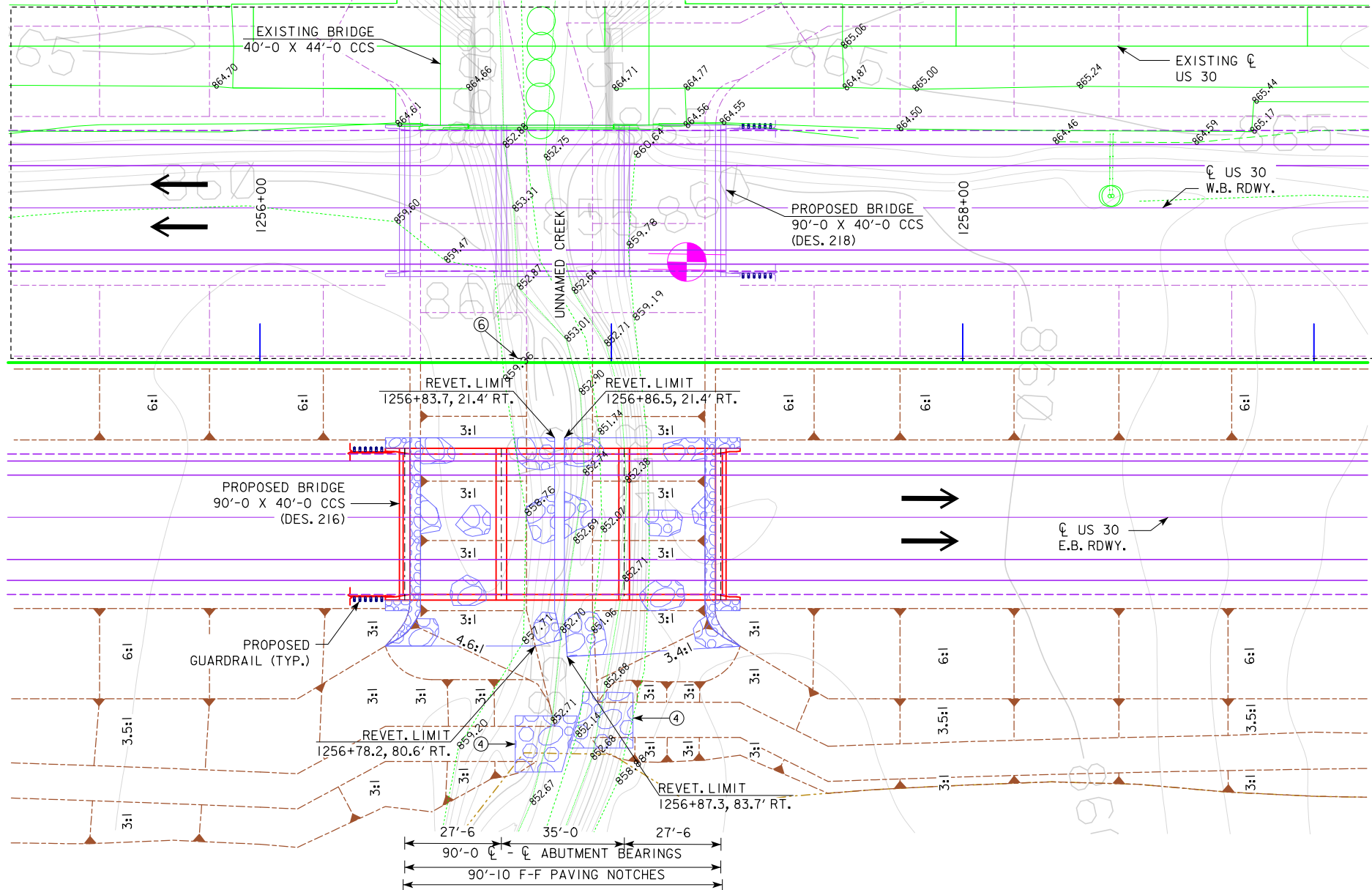
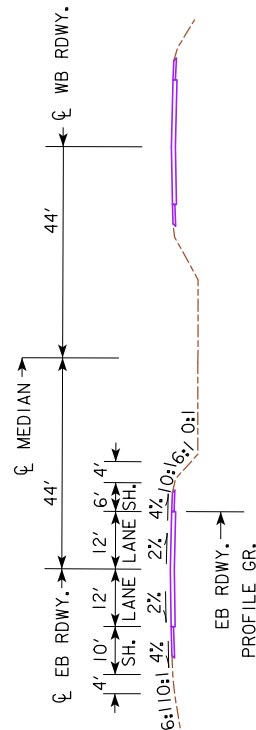
STA. 1256+86.04, 44.00' RT (US 30 E.B.)JUNE, 2021

BENTON COUNTY

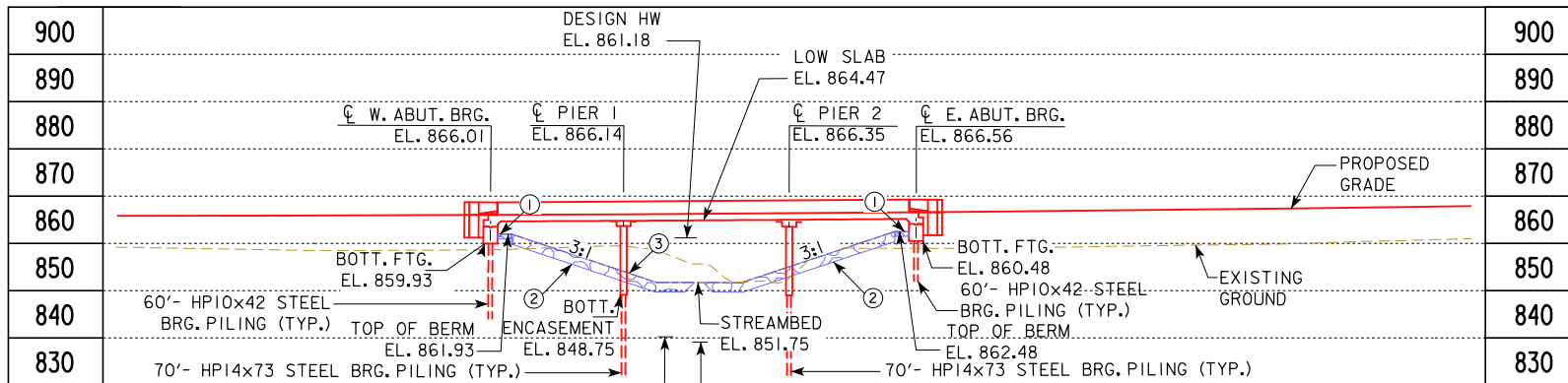
IOWA DOT - TRANSPORTATION DEVELOPMENT DIVISION

DESIGN SHEET NO. 3 OF 13 FILE NO. 31043 DESIGN NO. 216

TYPICAL APPROACH SECTION



SITUATION PLAN



LONGITUDINAL SECTION ALONG CL APPROACH ROADWAY

HYDRAULIC DATA

DRAINAGE AREA = 9.34 SQ. MI.  
STREAM SLOPE = 5.1 FT./MI.

Q<sub>2</sub> = 515 CFS  
STAGE = 858.45  
CHANNEL VELOCITY = 2.0 FPS

Q<sub>50</sub> = 2,323 CFS  
STAGE = 861.18  
BACKWATER = 0.72 FT.  
AVG. BRIDGE VELOCITY = 5.2 FPS

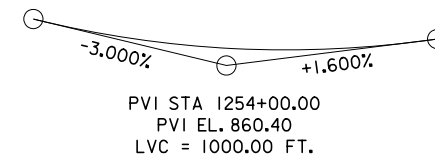
Q<sub>100</sub> = 2,781 CFS  
STAGE = 861.50  
BACKWATER = 1.06 FT.  
AVG. BRIDGE VELOCITY = 5.9 FPS

Q<sub>200</sub> = 3,200 CFS  
STAGE = 861.77  
CALCULATED DESIGN SCOUR = EL. 840.2

Q<sub>500</sub> = 3,720 CFS  
STAGE = 862.09  
CALCULATED CHECK SCOUR = EL. 839.1

ROADWAY OVERTOP 865.86  
STA. 1255+52.17

EXTREME HW STAGE = 864.1  
DATE = 1960  
AVG. LOW WATER STAGE = 853.0



PROPOSED PROFILE  
US 30

TRAFFIC ESTIMATE

|                    |           |        |
|--------------------|-----------|--------|
| 2017 AADT          | 5,400     | V.P.D. |
| 2037 AADT          | 8,500     | V.P.D. |
| 2037 DHV           | 880       | V.P.H. |
| TRUCKS             | 19        | %      |
| TOTAL DESIGN ESALs | 3,000,000 |        |

LOCATION

US 30 OVER AN UNNAMED CREEK  
T-83N R-11W  
SECTION 34  
UNION TOWNSHIP  
BENTON COUNTY  
BRIDGE MAINT. NO. 0627.8R030  
LATITUDE 41.963369°  
LONGITUDE -92.108117°  
FHWA NO. 700495

DESIGN FOR 0° SKEW

**90'-0" X 40'-0" CONTINUOUS  
CONCRETE SLAB BRIDGE**

27'-6" END SPANS 35'-0" INTERIOR SPAN

**EASTBOUND BRIDGE SITUATION PLAN**

STATION 1256+86.04, 44.00' RT MAY, 2021

**BENTON COUNTY**

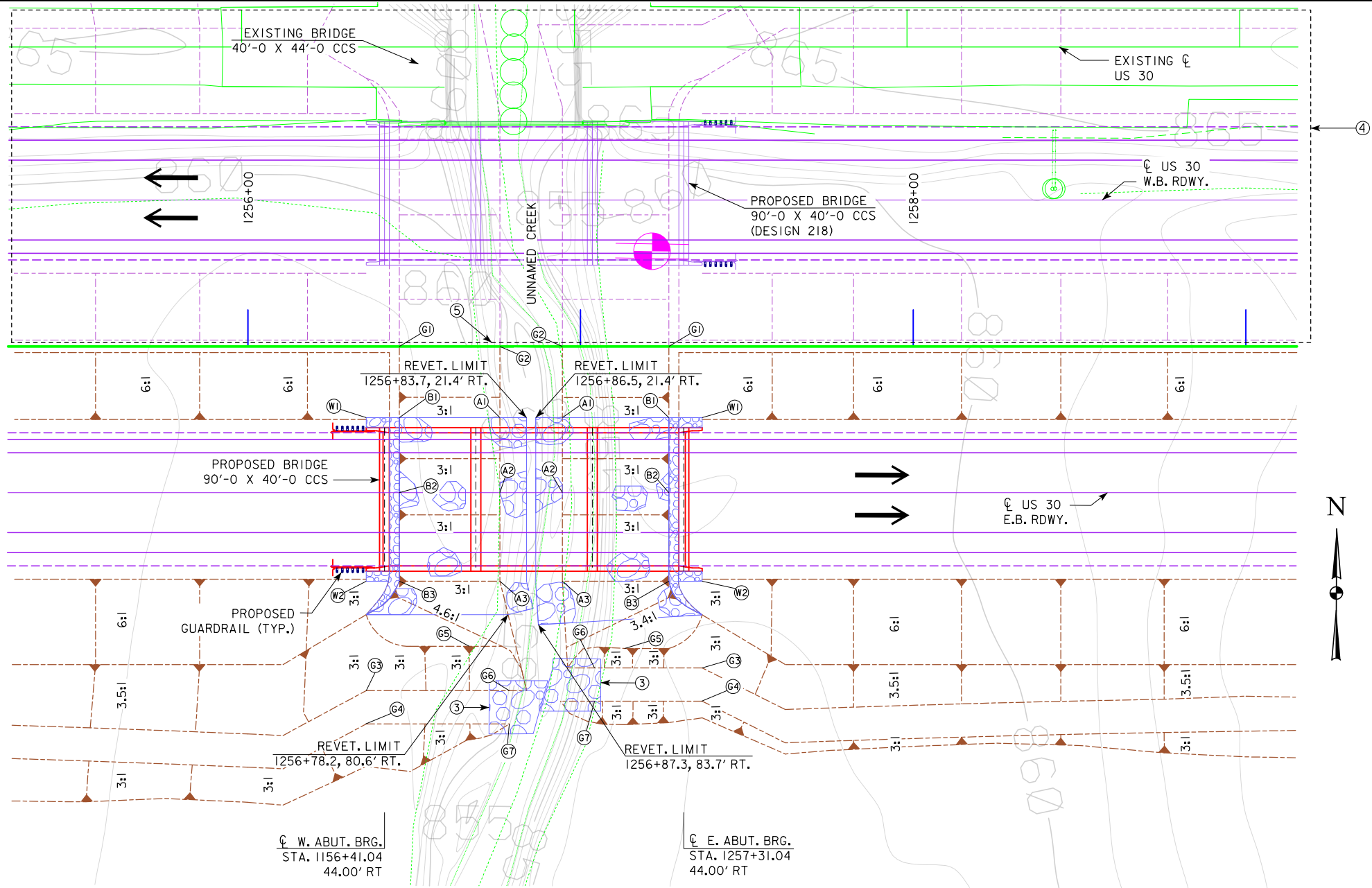
IOWA DOT - TRANSPORTATION DEVELOPMENT DIVISION  
DESIGN SHEET NO. 4 OF 13 FILE NO. 31043 DESIGN NO. 216

- BERM PROTECTION  
EROSION STONE (1' THICK. MIN.)  
UNDERLAIN W/ ENGR. FABRIC
- BERM PROTECTION  
CLASS E REVET. (2' THICK. MIN.)  
UNDERLAIN W/ ENGR. FABRIC
- GRADING SURFACE
- DITCH OUTLET (SEE DESIGN SHEET 5)
- WORK SHOWN IN THIS AREA IS PART  
OF DESIGN NO. 218.
- PROVIDE 20' TRANSITION FROM PROPOSED  
CHANNEL GRADING TO EXISTING CHANNEL.

NOTE: TOP OF BRIDGE DECK CROWN 0.21' ABOVE PROFILE GRADE.

BENCH MARK NO. 650 STA. 1229+61.88, 115.1' LT, EL. 894.703,  
FOUND IHC BM ON INLET HDWL





| BERM SLOPE LOCATION TABLE |            |            |        |               |            |        |
|---------------------------|------------|------------|--------|---------------|------------|--------|
| WEST ABUTMENT             |            |            |        | EAST ABUTMENT |            |        |
|                           | STATION    | OFFSET     | ELEV   | STATION       | OFFSET     | ELEV   |
| A1                        | 1256+75.75 | 21.42' RT  | 851.75 | 1256+94.52    | 21.42' RT  | 851.75 |
| A2                        | 1256+75.75 | 44.00' RT  | 851.75 | 1256+94.52    | 44.00' RT  | 851.75 |
| A3                        | 1256+75.75 | 70.58' RT  | 851.75 | 1256+94.52    | 70.58' RT  | 851.75 |
| B1                        | 1256+45.54 | 21.42' RT  | 861.95 | 1256+26.54    | 21.42' RT  | 862.52 |
| B2                        | 1256+45.54 | 44.00' RT  | 861.95 | 1256+26.54    | 44.00' RT  | 862.52 |
| B3                        | 1256+45.54 | 70.58' RT  | 861.95 | 1256+26.54    | 70.58' RT  | 862.52 |
| G1                        | 1256+45.54 | 0          | 861.95 | 1256+26.54    | 0          | 862.52 |
| G2                        | 1256+75.75 | 0          | 851.90 | 1256+94.52    | 0          | 851.90 |
| G3                        | 1256+35.54 | 103.50' RT | 854.32 | 1257+36.54    | 96.66' RT  | 857.23 |
| G4                        | 1256+35.54 | 113.50' RT | 854.32 | 1257+36.54    | 106.66' RT | 857.23 |
| G5                        | 1256+66.49 | 90.17' RT  | 856.00 | 1257+13.18    | 90.80' RT  | 858.00 |
| G6                        | 1256+78.57 | 103.50' RT | 854.02 | 1257+04.20    | 96.66' RT  | 856.58 |
| G7                        | 1256+78.57 | 113.50' RT | 854.02 | 1257+04.20    | 106.66' RT | 856.58 |
| W1                        | 1256+35.54 | 21.42' RT  | 865.42 | 1257+36.54    | 21.42' RT  | 866.04 |
| W2                        | 1256+35.54 | 70.58' RT  | 865.30 | 1257+36.54    | 70.58' RT  | 865.92 |

W - END WING / EROSION STONE  
BERM SLOPE TABLE ELEVATIONS REFLECT GRADING SURFACE  
G5 AND G6 ARE DITCH FLOW LINE POINTS (SEE DITCH OUTLET DETAIL)

GRADING CONTROL-WEST:  
POINTS A1, A2, A3 AND G2 ARE BANK GRADING CONTROL LINE

GRADING CONTROL-EAST:  
POINTS A1, A2, A3 AND G2 ARE BANK GRADING CONTROL LINE

NOTE: BANK GRADING CONTROL LINE LOCATED AT BASE OF 3:1 SLOPE

HYDRAULIC DESIGN



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature: *David J. Mulholland* Date: 1/17/14

Printed or Typed Name: David J. Mulholland

My license renewal date is December 31, 2020

Pages or sheets covered by this seal: SHEETS 5 AND 6 OF 40

ESTIMATED BERM ARMORING QUANTITIES

| LOCATION                    | REVETMENT CL. E (TON) | EROSION STONE (TON) | ENGINEERING FABRIC (SY) | EXCAVATION (CY) |
|-----------------------------|-----------------------|---------------------|-------------------------|-----------------|
| BERM LINING - WEST ABUTMENT | 292                   | 11                  | 325                     | 187             |
| BERM LINING - EAST ABUTMENT | 313                   | 10                  | 345                     | 200             |
| WEST DITCH OUTLET           | 30                    |                     | 28                      | 20              |
| EAST DITCH OUTLET           | 30                    |                     | 28                      | 20              |
| TOTALS                      | 665                   | 21                  | 726                     | 427             |

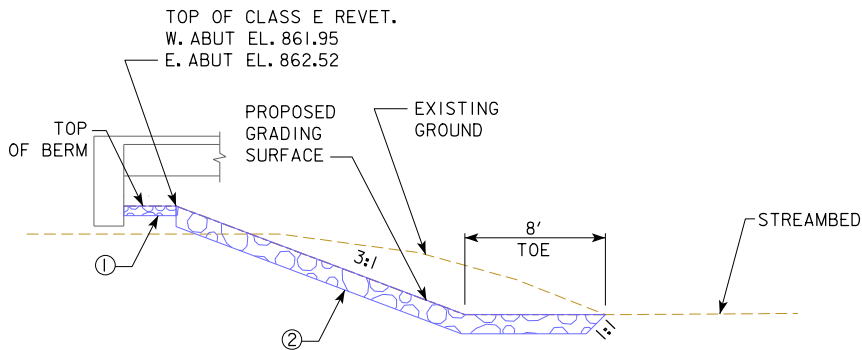
EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

SITE PLAN

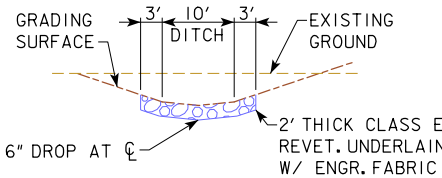
- ① BERM PROTECTION EROSION STONE (1' THICK, MIN.) UNDERLAIN W/ ENGR. FABRIC
- ② BERM PROTECTION CLASS E REVET. (2' THICK, MIN.) UNDERLAIN W/ ENGR. FABRIC
- ③ DITCH OUTLET
- ④ WORK SHOWN IN THIS AREA IS PART OF DESIGN NO. 218.
- ⑤ PROVIDE 20' TRANSITION FROM PROPOSED CHANNEL GRADING TO EXISTING CHANNEL.

UTILITIES LEGEND:

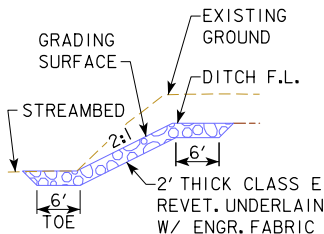
FO - FIBER OPTIC - LIGHTCORE  
- POWER POLE - EAST CENTRAL IA REC\PAETEC



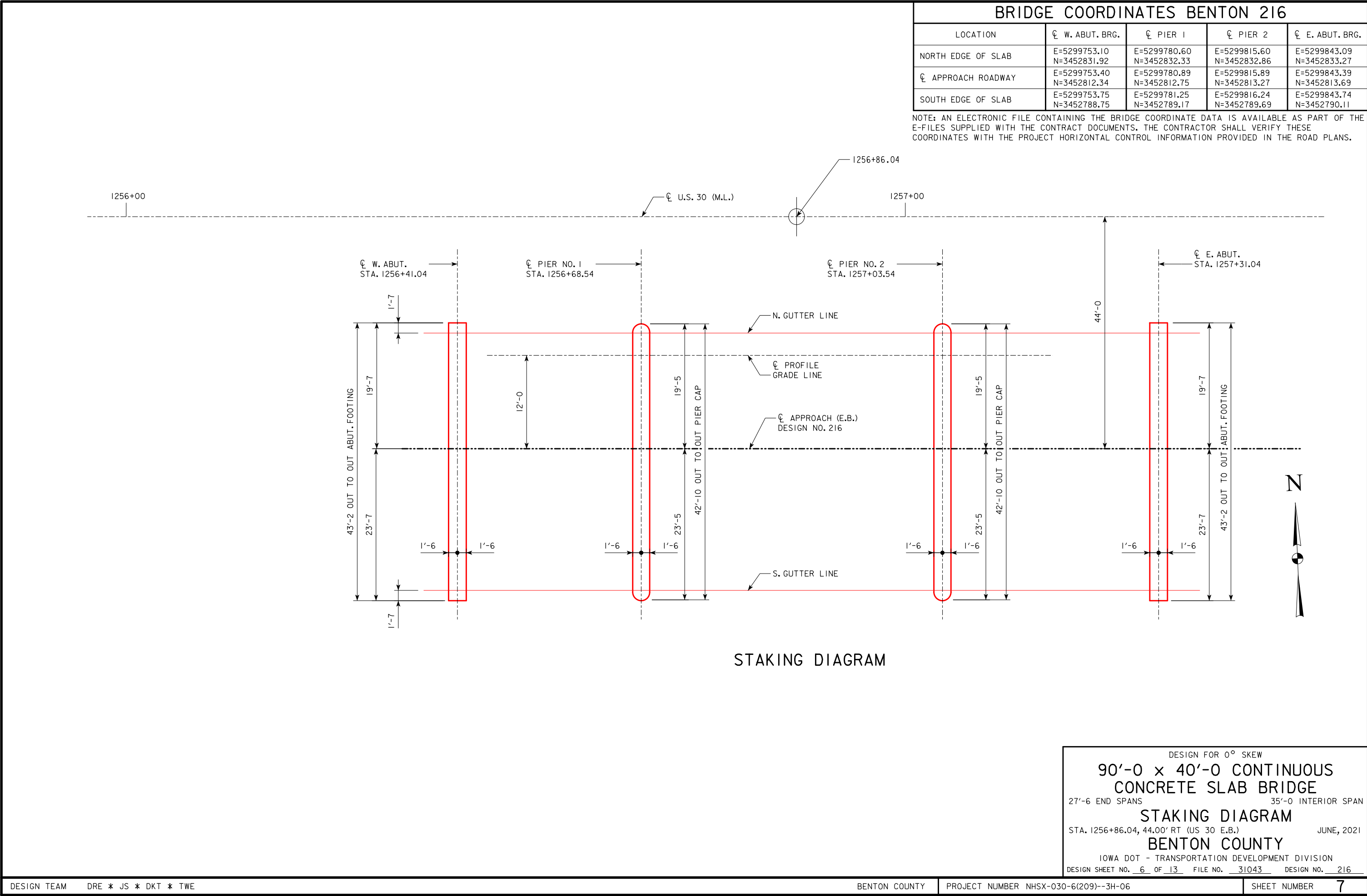
TYPICAL SECTION AT BRIDGE BERM REVETMENT PROTECTION



TYPICAL SECTIONS AT DITCH OUTLET

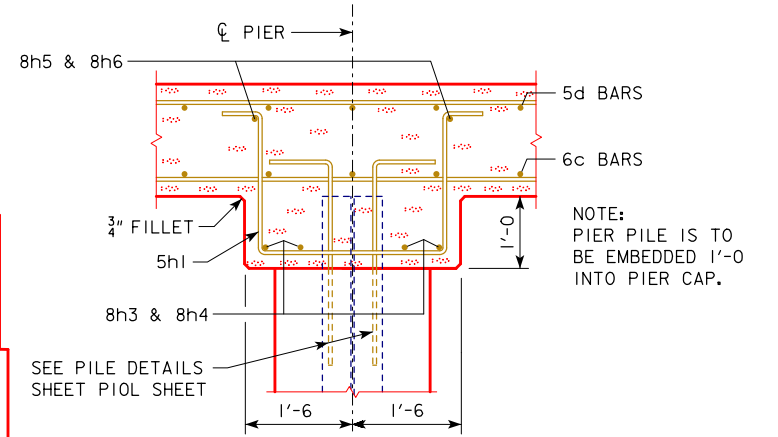
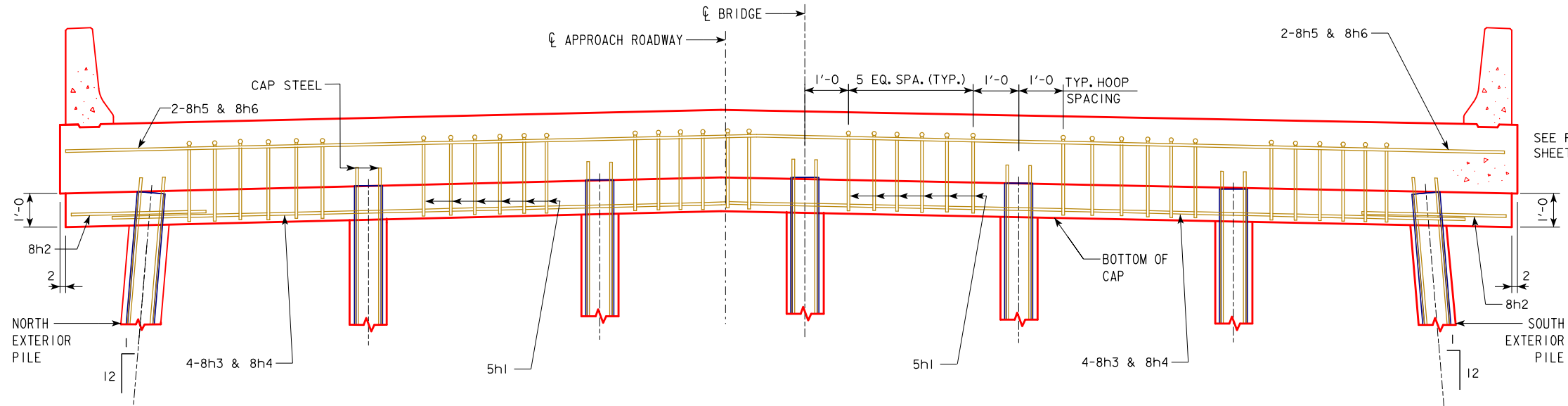


DESIGN FOR 0° SKEW  
**90'-0 X 40'-0 CONTINUOUS CONCRETE SLAB BRIDGE**  
27'-6 END SPANS 35'-0 INTERIOR SPAN  
**EASTBOUND BRIDGE SITUATION PLAN - SITE**  
STATION 1256+86.04, 44.00' RT MAY, 2021  
**BENTON COUNTY**  
IOWA DOT - TRANSPORTATION DEVELOPMENT DIVISION  
DESIGN SHEET NO. 5 OF 13 FILE NO. 31043 DESIGN NO. 216

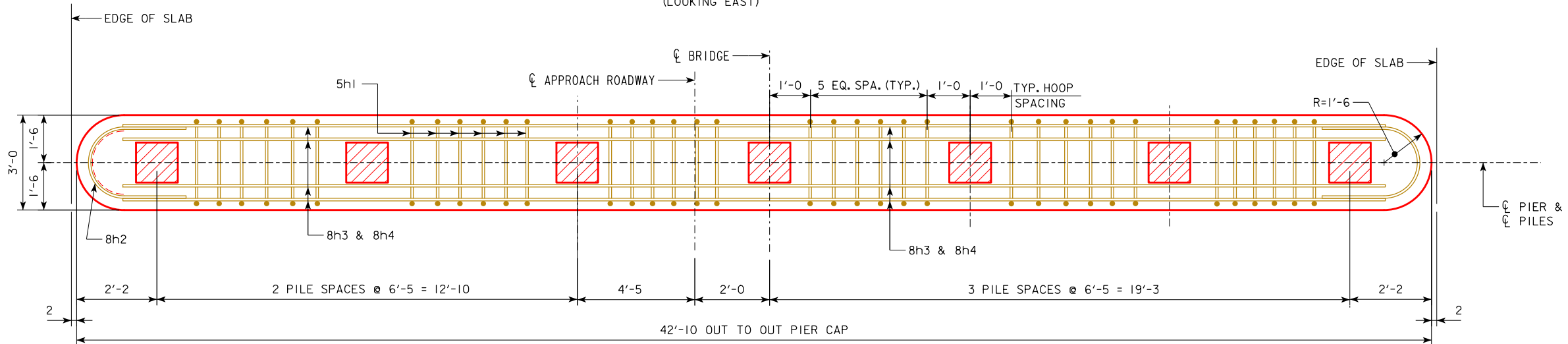


| POINT               | PIER 1 | PIER 2 |
|---------------------|--------|--------|
| NORTH EXTERIOR PILE | 863.47 | 863.69 |
| APPROACH ROADWAY    | 863.79 | 864.00 |
| SOUTH EXTERIOR PILE | 863.39 | 863.61 |

BENCH MARK NO. 650 STA. 1229+61.88, 115.1' LT, EL. 894.703,  
FOUND IHC BM ON INLET HDWL



SHOWING STIRRUP SPACING AND NUMBER OF PILING  
( 7 - HP 14x73 PIELS AT EACH PIER )  
(LOOKING EAST)



PLAN OF BOTTOM OF CAP

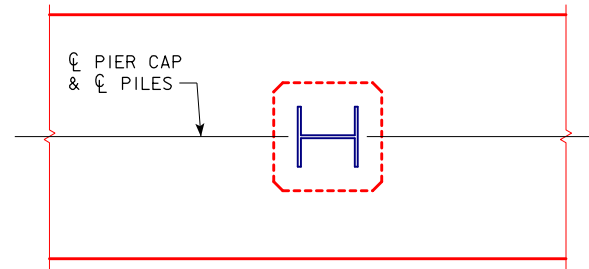
PIER PILE DESIGN NOTES:

THE CONTRACT LENGTH OF 70 FEET FOR THE PIER PILES IS BASED ON A COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 143 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65 FOR SOIL.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.76 FOR SOIL. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF ENCASEMENT. DESIGN SCOUR (200- YEAR) WAS ASSUMED TO AFFECT THE UPPER 9 FEET OF EMBEDDED PILE LENGTH AND CAUSE 25 KIPS OF DRIVING RESISTANCE.

### PIER PILE DRIVING NOTES:

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR PIER PILES IS 106 TONS AT END OF DRIVE. IF RETAPS ARE NECESSARY TO ACHIEVE BEARING THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE IS 122 TONS AT ONE-DAY RETAP OR LATER RETAPS. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.



## PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

PIER NOTES:

ALL MONOLITHIC PIER CAP REINFORCING AND CONCRETE IS INCLUDED IN SUPERSTRUCTURE ESTIMATE OF QUANTITIES.

PIER BENTS SHALL BE TYPE 3 TRESTLE BENT PILES  
AS DETAILED ON THE STANDARD PIER SHEET.

DESIGN FOR 0° SKEW

90'-0 x 40'-0 CONTINUOUS  
CONCRETE SLAB BRIDGE

27'-6 END SPANS 35'-0 INTERIOR SPAN

PIER CAP DETAILS

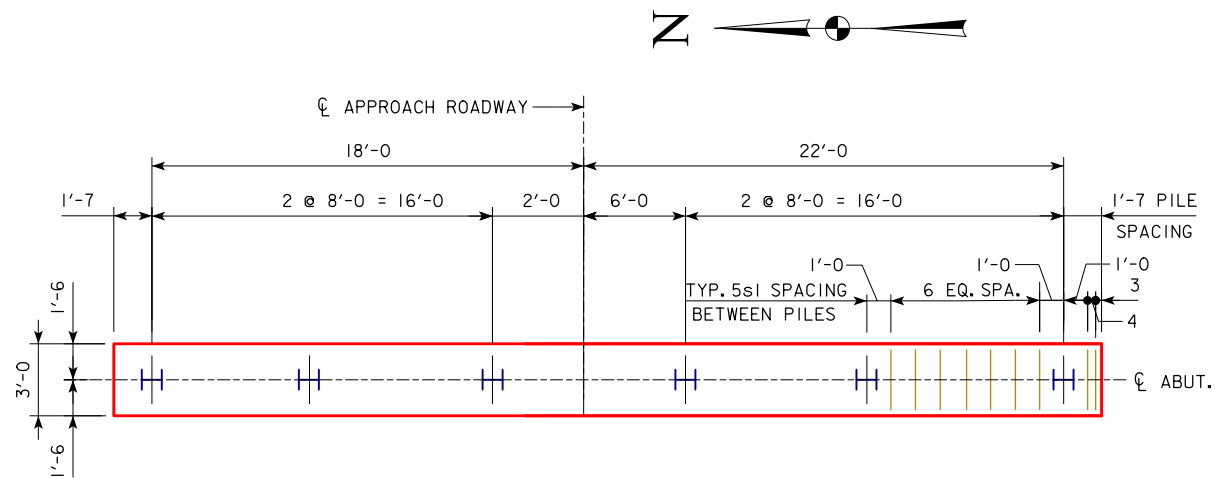
STA. 1256+86.04, 44.00' RT (US 30 E.B.) JUNE, 2021

BENTON COUNTY

IOWA DOT - TRANSPORTATION DEVELOPMENT DIVISION

DESIGN SHEET NO. 7 OF 13 FILE NO. 31043 DESIGN NO. 216





**STEEL PILE PLAN**  
6- HP10 x 42 STEEL PILES PILE PLAN  
(WEST ABUTMENT, EAST ABUTMENT SIMILAR)

#### ABUTMENT PILE DESIGN NOTES:

THE CONTRACT LENGTH OF 60 FEET FOR THE ABUTMENT PILES IS BASED ON A MIXED SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 91 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65 FOR SOIL.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A MIXED SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65 FOR SOIL. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF FOOTING.

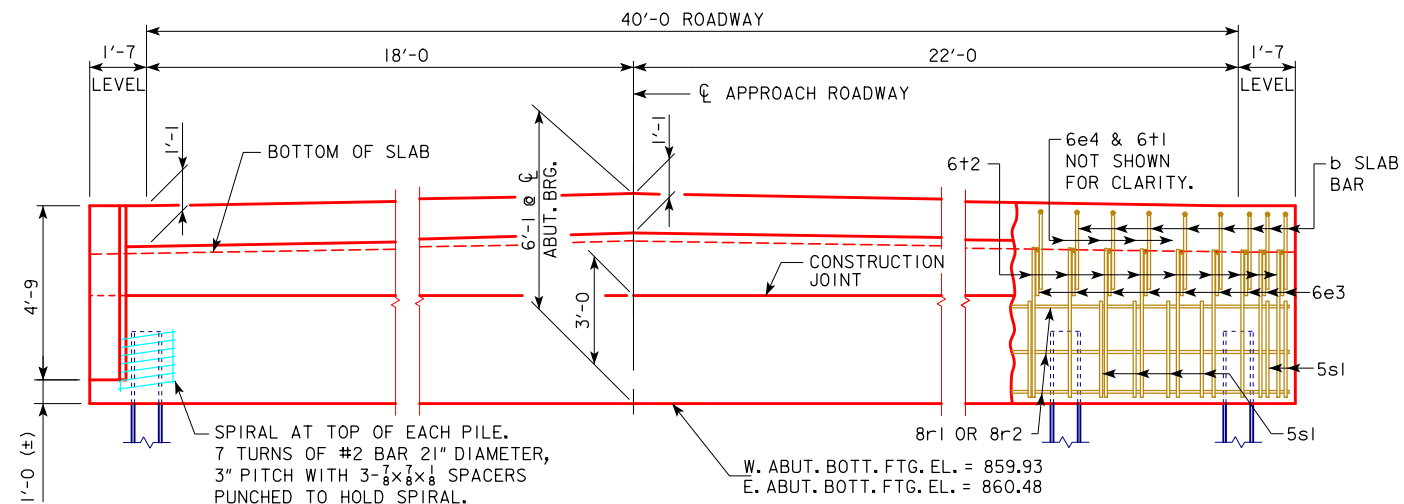
#### ABUTMENT PILE DRIVING NOTES:

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR ABUTMENT PILES IS 70 TONS AT END OF DRIVE. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

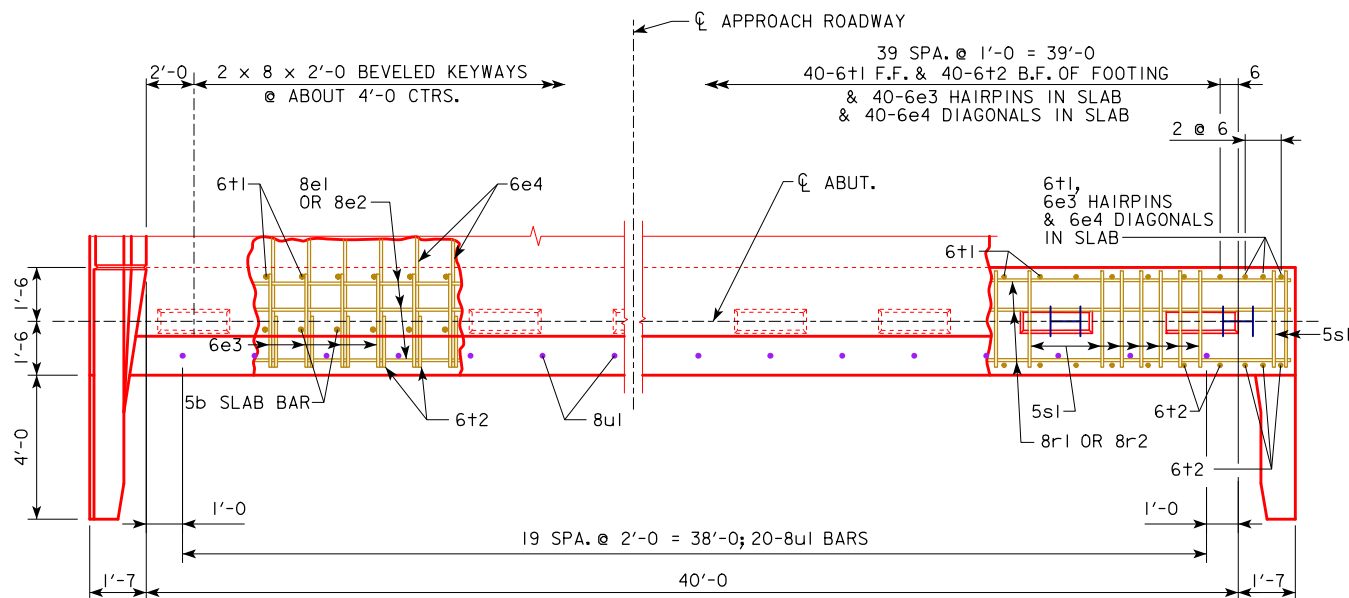
#### ABUTMENT NOTES:

THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED IN THE SUPERSTRUCTURE QUANTITIES.

IF NECESSARY TO PREVENT DAMAGE TO THE END OF THE BRIDGE DECK OR BACKWALL FROM CONSTRUCTION EQUIPMENT, AN APPROPRIATE METHOD OF PROTECTION APPROVED BY THE ENGINEER SHALL BE PROVIDED BY THE BRIDGE CONTRACTOR AT NO EXTRA COST TO THE STATE.



**REAR ELEVATION**  
(WEST ABUTMENT, EAST ABUTMENT SIMILAR)

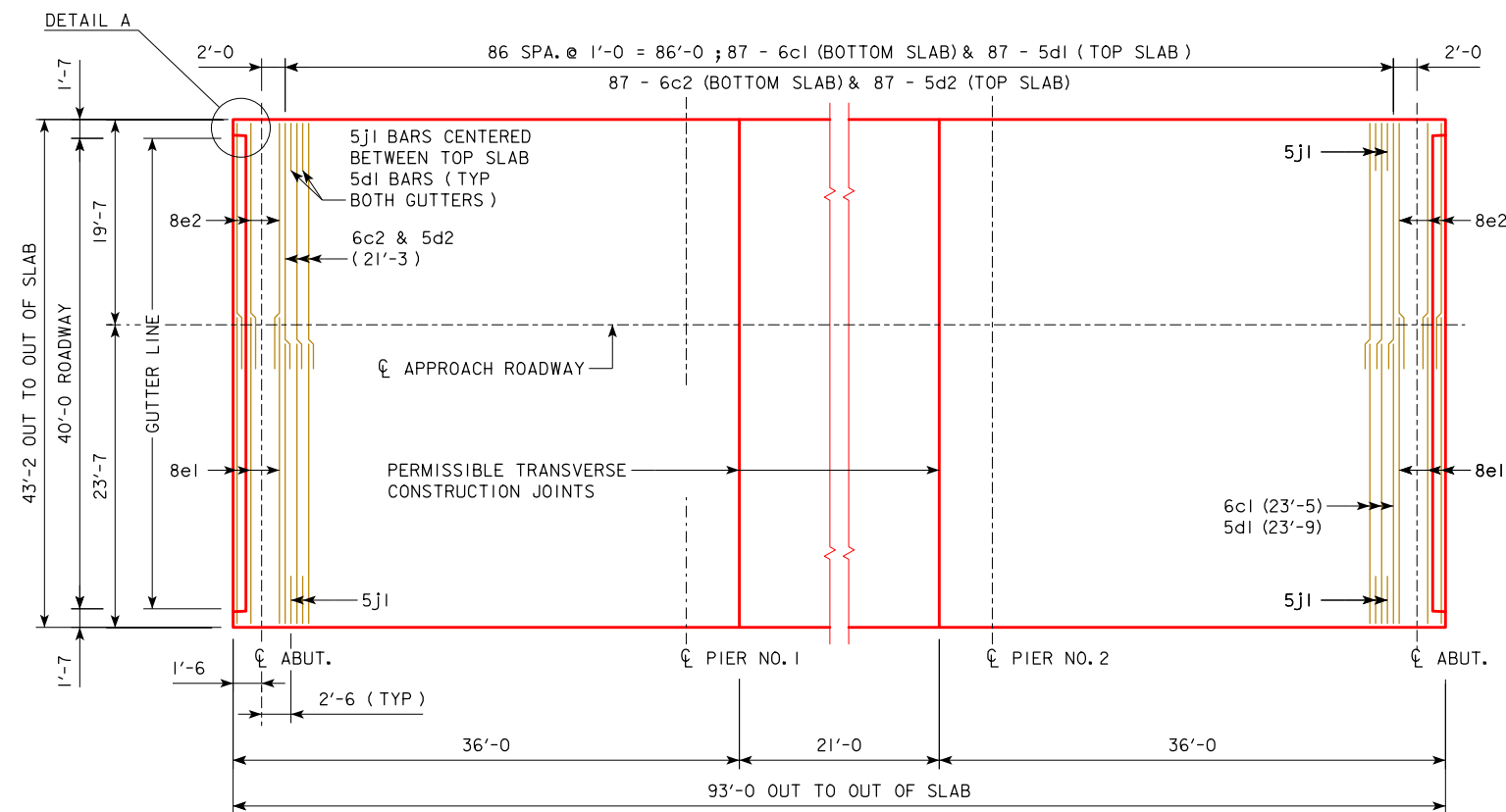


**PLAN VIEW**  
(WEST ABUTMENT, EAST ABUTMENT SIMILAR)

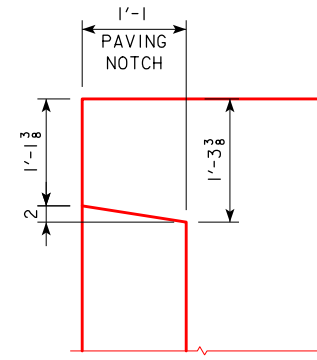
NOTE: WING REINFORCING AND RAIL NOT SHOWN.

6e3, 6e4, AND 8e ARE INCLUDED WITH SUPERSTRUCTURE QUANTITIES.

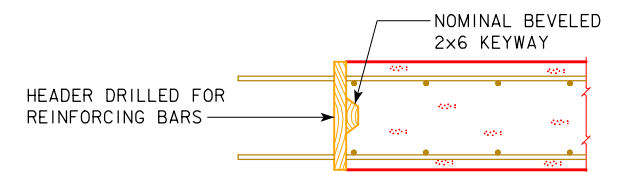
DESIGN FOR 0° SKEW  
**90'-0" x 40'-0" CONTINUOUS CONCRETE SLAB BRIDGE**  
27'-6" END SPANS 35'-0" INTERIOR SPAN  
**ABUTMENT DETAILS**  
STA. 1256+86.04, 44.00' RT (US 30 E.B.) JUNE, 2021  
**BENTON COUNTY**  
IOWA DOT - TRANSPORTATION DEVELOPMENT DIVISION  
DESIGN SHEET NO. 8 OF 13 FILE NO. 31043 DESIGN NO. 216



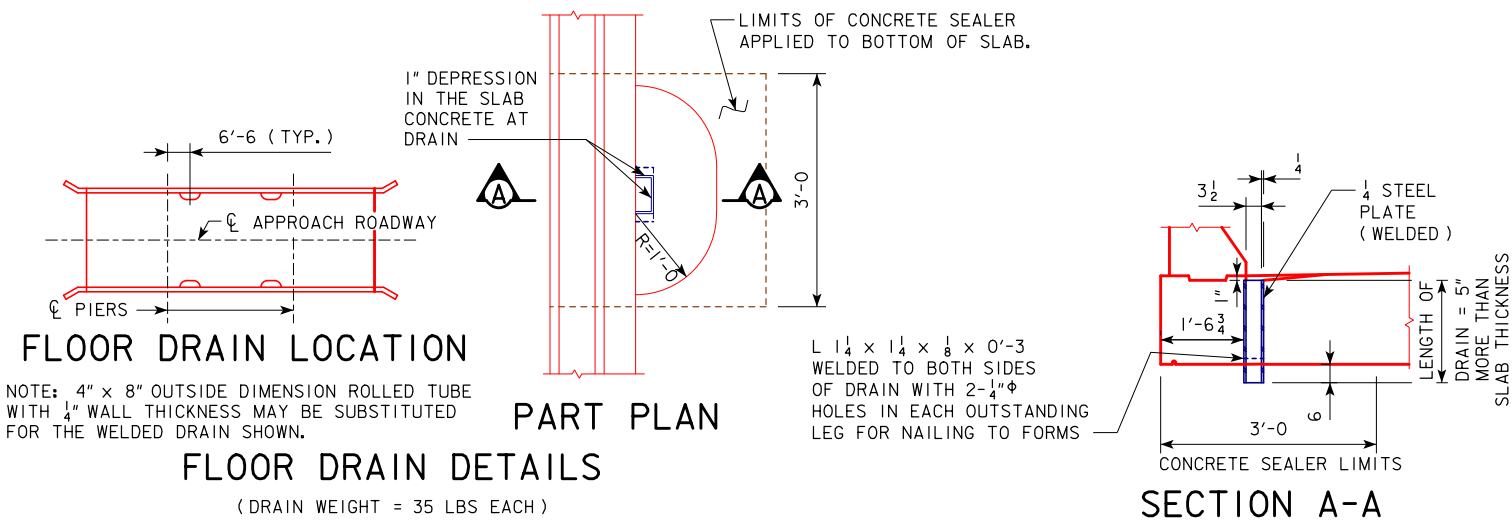
TRANSVERSE REINFORCING STEEL LAYOUT



DETAIL A



TRANSVERSE CONSTR. JOINT



FLOOR DRAIN LOCATION

NOTE: 4" x 8" OUTSIDE DIMENSION ROLLED TUBE WITH 1/4" WALL THICKNESS MAY BE SUBSTITUTED FOR THE WELDED DRAIN SHOWN.

FLOOR DRAIN DETAILS

(DRAIN WEIGHT = 35 LBS EACH)

NOTE: DRAINS ARE TO BE GALVANIZED. INCLUDE COST OF DRAINS IN PRICE BID FOR "STRUCTURAL CONCRETE". 4 DRAINS REQUIRED.

PART PLAN

SECTION A-A

DESIGN FOR 0° SKEW

**90'-0" x 40'-0" CONTINUOUS CONCRETE SLAB BRIDGE**

27'-6" END SPANS 35'-0" INTERIOR SPAN

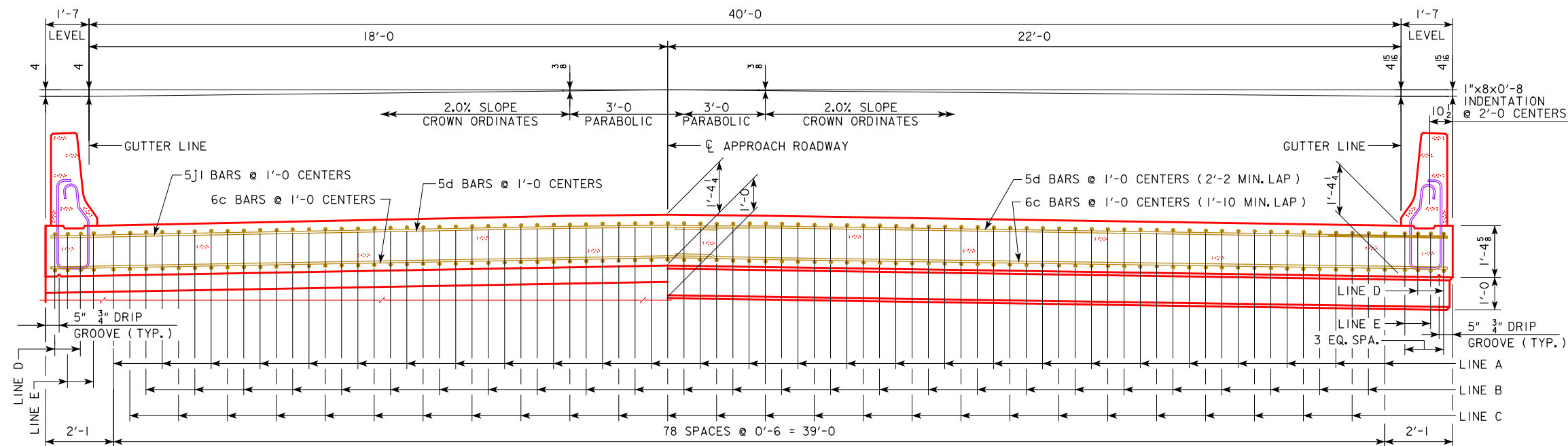
**SUPERSTRUCTURE DETAILS**

STA. 1256+86.04, 44.00' RT (US 30 E.B.) JUNE, 2021

**BENTON COUNTY**

IOWA DOT - TRANSPORTATION DEVELOPMENT DIVISION

DESIGN SHEET NO. 9 OF 13 FILE NO. 31043 DESIGN NO. 216

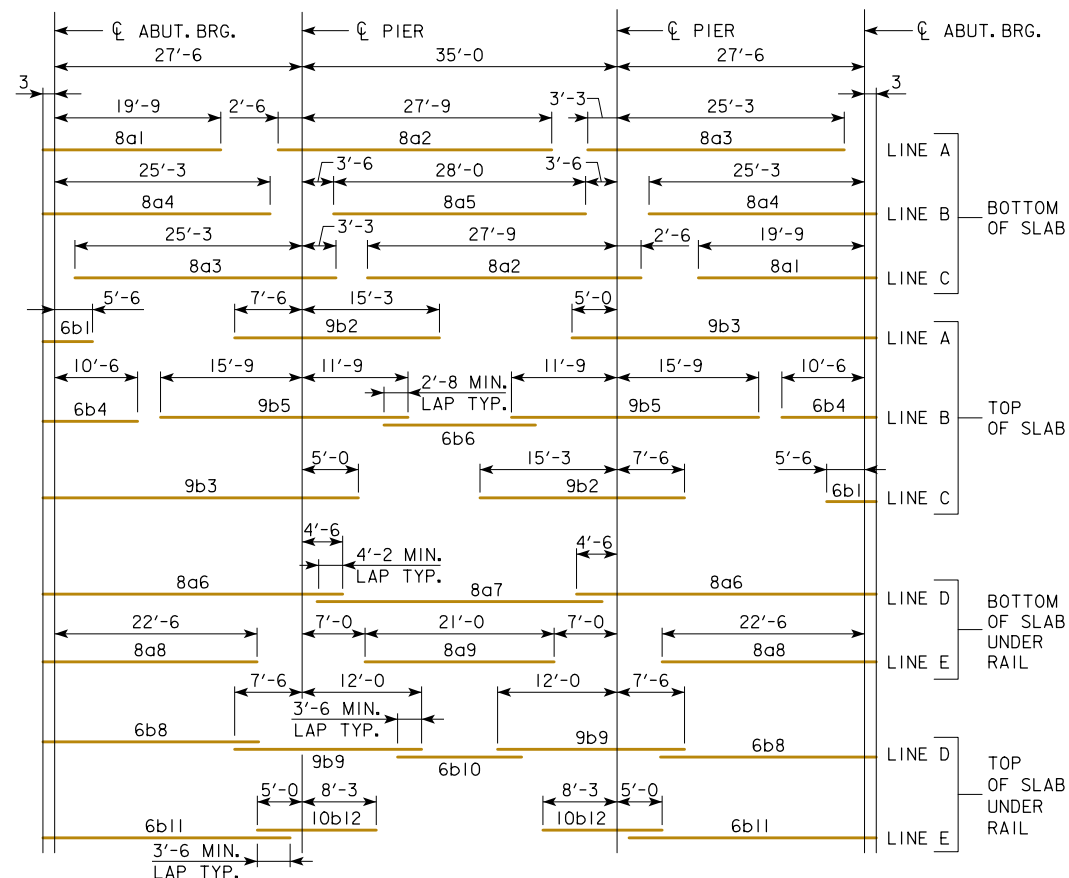


HALF SECTION NEAR ABUTMENT  
(LOOKING EAST)

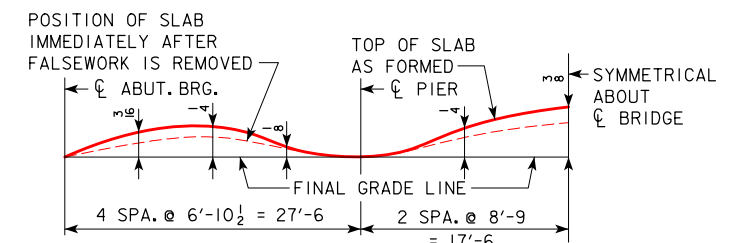
NOTE: TOP LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND  $2\frac{1}{2}$ " CLEAR BELOW TOP OF SLAB. BOTTOM LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND  $1\frac{1}{2}$ " CLEAR ABOVE BOTTOM OF SLAB. REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE AND ADEQUATELY SUPPORTED ON BAR CHAIRS BEFORE CONCRETE IS POURED. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.

HALF SECTION NEAR PIER  
(LOOKING EAST)

SLAB CROSS-SECTIONAL AREA  
FOR BARRIER RAIL = 58.50 SQ. FT.



PLACEMENT FOR LONGITUDINAL REINFORCEMENT



FORM CAMBER DIAGRAM

THIS DIAGRAM SHOWS THE FORM CAMBER REQUIRED TO COMPENSATE FOR THE ANTICIPATED ULTIMATE DEAD LOAD DEFLECTION. THE ABOVE DIMENSIONS DO NOT INCLUDE ANY ALLOWANCE FOR FORM DEFLECTION OR FALSEWORK SETTLEMENT.

DESIGN FOR 0° SKEW

**90'-0" x 40'-0" CONTINUOUS CONCRETE SLAB BRIDGE**

27'-6" END SPANS 35'-0" INTERIOR SPAN

**SUPERSTRUCTURE DETAILS**

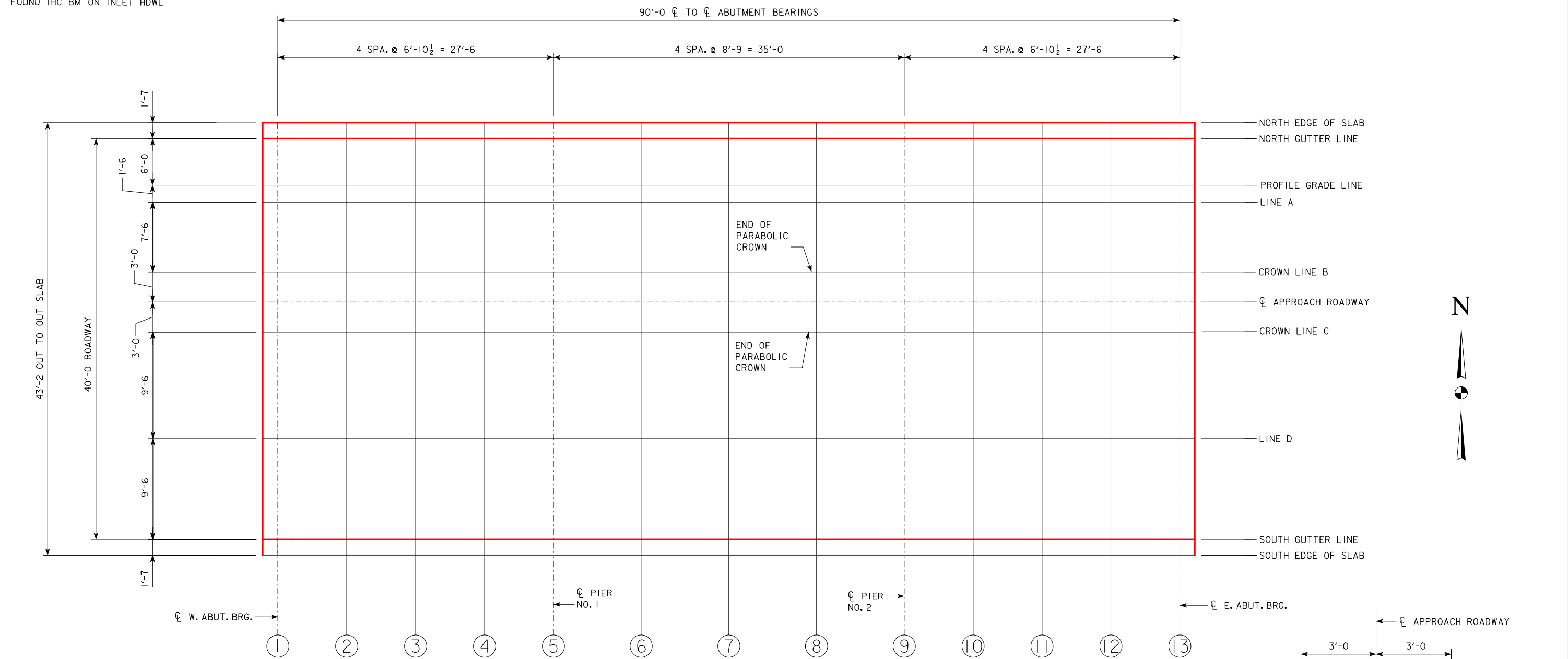
STA. 1256+86.04, 44.00' RT (US 30 E.B.) JUNE, 2021

**BENTON COUNTY**

IOWA DOT - TRANSPORTATION DEVELOPMENT DIVISION

DESIGN SHEET NO. 10 OF 13 FILE NO. 31043 DESIGN NO. 216

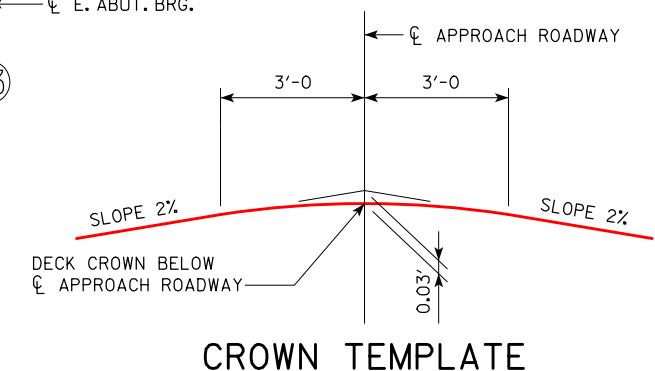
BENCH MARK NO. 650 STA. 1229+61.88, 115.1' LT, EL. 894.703,  
FOUND IHC BM ON INLET HDWL



SLAB ELEVATION LOCATIONS

TOP OF SLAB ELEVATION

| TOP OF SLAB ELEVATION |               |        |        |        |                 |        |        |        |                 |        |        |        |               |
|-----------------------|---------------|--------|--------|--------|-----------------|--------|--------|--------|-----------------|--------|--------|--------|---------------|
| LOCATION              | ℄ W.<br>ABUT. |        |        |        | ℄ PIER<br>NO. 1 |        |        |        | ℄ PIER<br>NO. 2 |        |        |        | ℄ E.<br>ABUT. |
|                       | 1             | 2      | 3      | 4      | 5               | 6      | 7      | 8      | 9               | 10     | 11     | 12     | 13            |
| NORTH GUTTER LINE     | 865.68        | 865.71 | 865.74 | 865.77 | 865.81          | 865.86 | 865.91 | 865.97 | 866.02          | 866.07 | 866.12 | 866.18 | 866.23        |
| PROFILE GRADE LINE    | 865.80        | 865.83 | 865.86 | 865.89 | 865.93          | 865.98 | 866.03 | 866.09 | 866.14          | 866.19 | 866.24 | 866.30 | 866.35        |
| INTERMEDIATE LINE A   | 865.83        | 865.86 | 865.89 | 865.92 | 865.96          | 866.01 | 866.06 | 866.12 | 866.17          | 866.22 | 866.27 | 866.33 | 866.38        |
| CROWN LINE B          | 865.98        | 866.01 | 866.04 | 866.07 | 866.11          | 866.16 | 866.21 | 866.27 | 866.32          | 866.37 | 866.42 | 866.48 | 866.53        |
| APPROACH CENTER LINE  | 866.01        | 866.04 | 866.07 | 866.10 | 866.14          | 866.19 | 866.24 | 866.30 | 866.35          | 866.40 | 866.45 | 866.51 | 866.56        |
| CROWN LINE C          | 865.98        | 866.01 | 866.04 | 866.07 | 866.11          | 866.16 | 866.21 | 866.27 | 866.32          | 866.37 | 866.42 | 866.48 | 866.53        |
| INTERMEDIATE LINE D   | 865.79        | 865.82 | 865.85 | 865.88 | 865.92          | 865.97 | 866.02 | 866.08 | 866.13          | 866.18 | 866.23 | 866.29 | 866.34        |
| SOUTH GUTTER LINE     | 865.60        | 865.63 | 865.66 | 865.69 | 865.73          | 865.78 | 865.83 | 865.89 | 865.94          | 865.99 | 866.04 | 866.10 | 866.15        |



DESIGN FOR 0° SKEW

**90'-0" x 40'-0" CONTINUOUS  
CONCRETE SLAB BRIDGE**

27'-6" END SPANS 35'-0" INTERIOR SPAN

**TOP OF SLAB ELEVATIONS**

STA. 1256+86.04, 44.00' RT (US 30 E.B.) JUNE, 2021

**BENTON COUNTY**

IOWA DOT - TRANSPORTATION DEVELOPMENT DIVISION

DESIGN SHEET NO. 11 OF 13 FILE NO. 31043 DESIGN NO. 216

REVISED 10-14 - TWO ADDITIONAL FORESLOPE PROTECTION DETAILS WERE ADDED OUTSIDE OF THE BORDER TO SHOW REVETMENT UP TO BACK OF ABUTMENT FOOTING.  
ENGLISH FORESLOPE PROTECTION BRIDGES.DGN 1007C - THIS SHEET ISSUED 06-02 FOR WATER CROSSINGS.

BENCH MARK NO. 650 STA. 1229+61.88, 115.1' LT, EL. 894.703,  
FOUND IHC BM ON INLET HDWL

SUBDRAIN NOTES :

THIS PLAN SHEET SHOWS DETAILS FOR PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.

THE SUBDRAINS SHALL BE 4" IN DIAMETER AND SHALL BE IN ACCORDANCE WITH ARTICLE 4143.01, B, OF THE STANDARD SPECIFICATIONS.

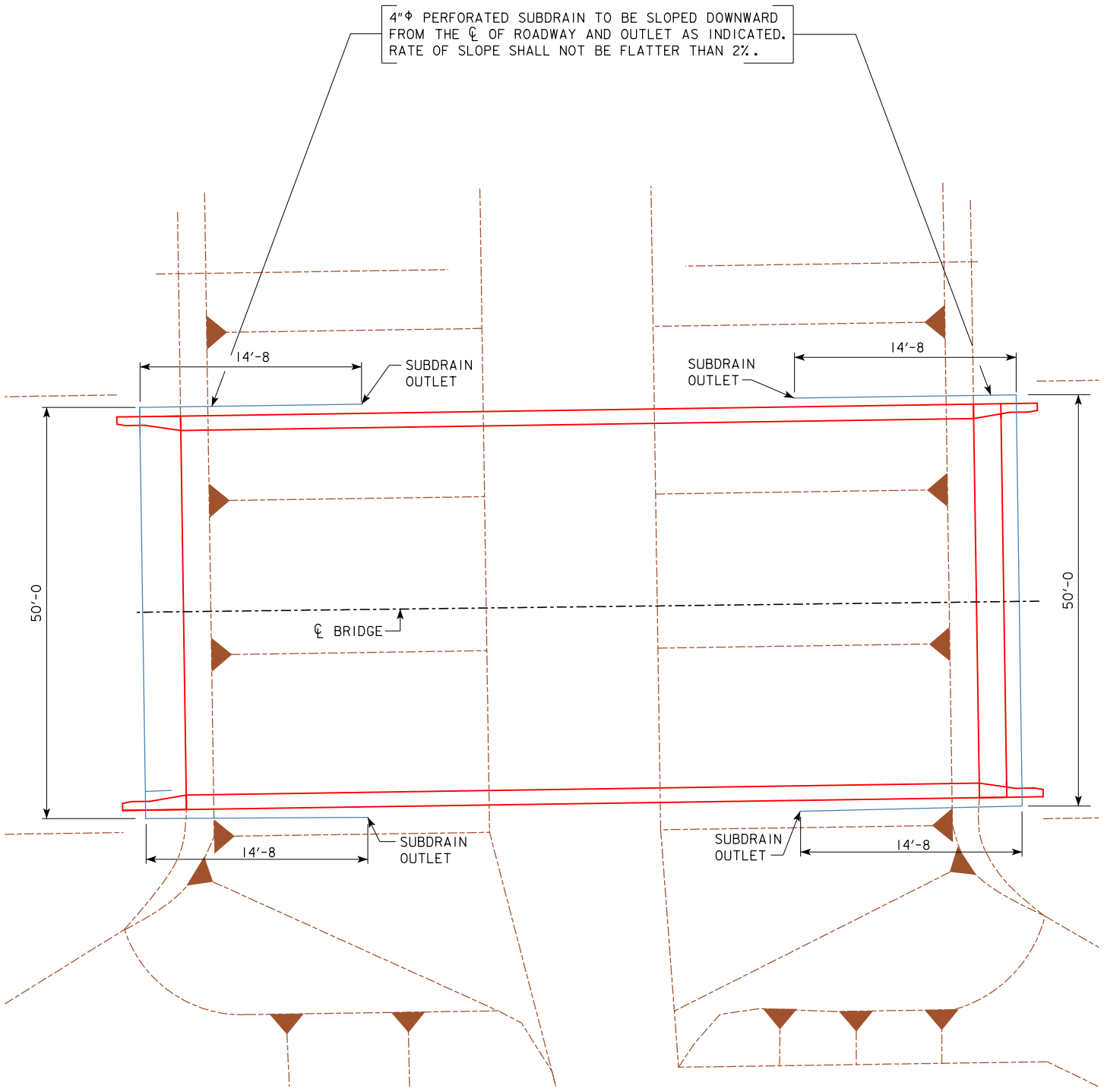
THE SUBDRAIN OUTLET SHALL CONSIST OF A LENGTH OF PIPE WITH A REMOVABLE RODENT GUARD AS DETAILED ON THIS SHEET. THE LENGTH OF THE OUTLET PIPE SHALL BE DETERMINED BY THE REVETMENT AND IT'S PLACEMENT LOCATION. THE CONTRACTOR IS TO INSURE THE OUTLET PIPE IS ADEQUATELY STRONG ENOUGH AND WILL NOT BE DAMAGED WHEN REVETMENT IS PLACED. A CHECK WILL BE MADE AT THE SUBDRAIN OUTLET TO INSURE THAT THE SUBDRAIN IS NOT DAMAGED AND IS DRAINING PROPERLY DURING THE BACKFILL FLOODING PROCESS. IF A METAL OUTLET PIPE IS USED, IT SHALL BE 6 INCHES IN DIAMETER AND COUPLED TO THE 4 INCH DIAMETER SUBDRAIN IN ONE OF THE TWO FOLLOWING WAYS.

1. USE AN INSIDE FIT REDUCER COUPLER (COUPLER MUST BE INSERTED A MINIMUM OF 1'-0 INTO THE METAL OUTLET PIPE).
2. INSERT 1'-0 OF THE 4" SUBDRAIN INTO THE 6" METAL OUTLET PIPE, THEN FULLY SEAL THE ENTIRE OPENING WITH GROUT.

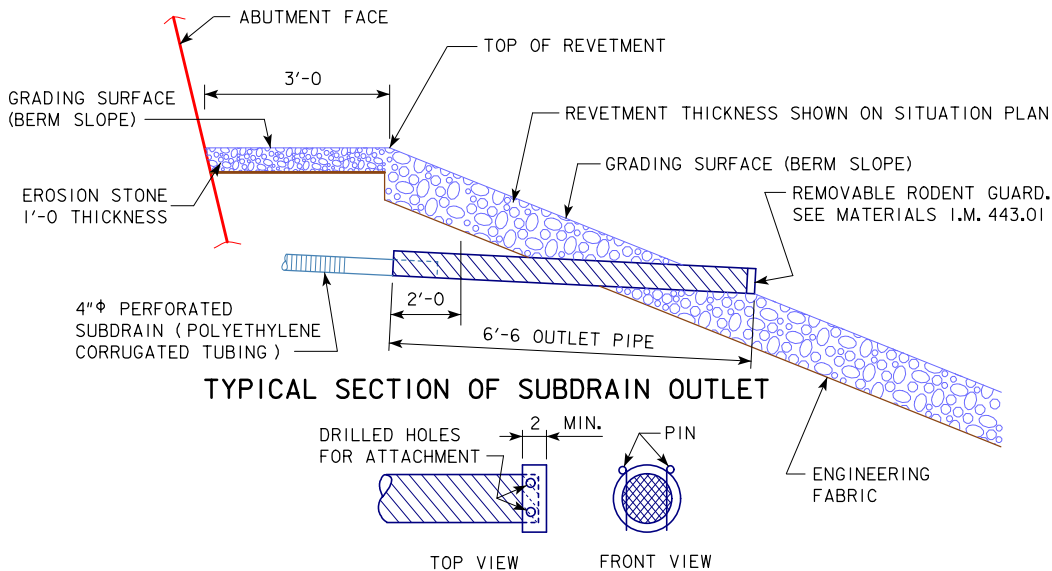
THE COST OF FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), GRANULAR BACKFILL, POROUS BACKFILL, AND SUBDRAIN OUTLET IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)". NO EXTRA PAYMENT WILL BE MADE.

THE DIMENSIONS SHOWN FOR THE PROPOSED SUBDRAINS ARE BASED ON THE PROPOSED GRADING LAYOUT OF BRIDGE BERMS. THE DIMENSIONS SHOWN ARE FOR ESTIMATING ONLY. REQUIRED LENGTHS AND GENERAL LOCATIONS OF SUBDRAINS ARE SUBJECT TO CHANGE DUE TO FIELD ADJUSTMENTS OF THE GRADING LAYOUT.

| SUBDRAIN OUTLET ELEVATIONS |           |
|----------------------------|-----------|
| LOCATION                   | ELEVATION |
| WEST ABUTMENT              | 859.7     |
| EAST ABUTMENT              | 860.3     |



SITUATION PLAN  
SHOWING SUBDRAIN LOCATIONS



REMOVABLE RODENT GUARD DETAILS  
REVETMENT STONE (EMBEDDED) OUTLET DETAILS

DESIGN FOR 0° SKEW

90'-0 x 40'-0 CONTINUOUS  
CONCRETE SLAB BRIDGE

27'-6 END SPANS 35'-0 INTERIOR SPAN

SUBDRAIN DETAILS

STA. 1256+86.04, 44.00' RT (US 30 E.B.) JUNE, 2021

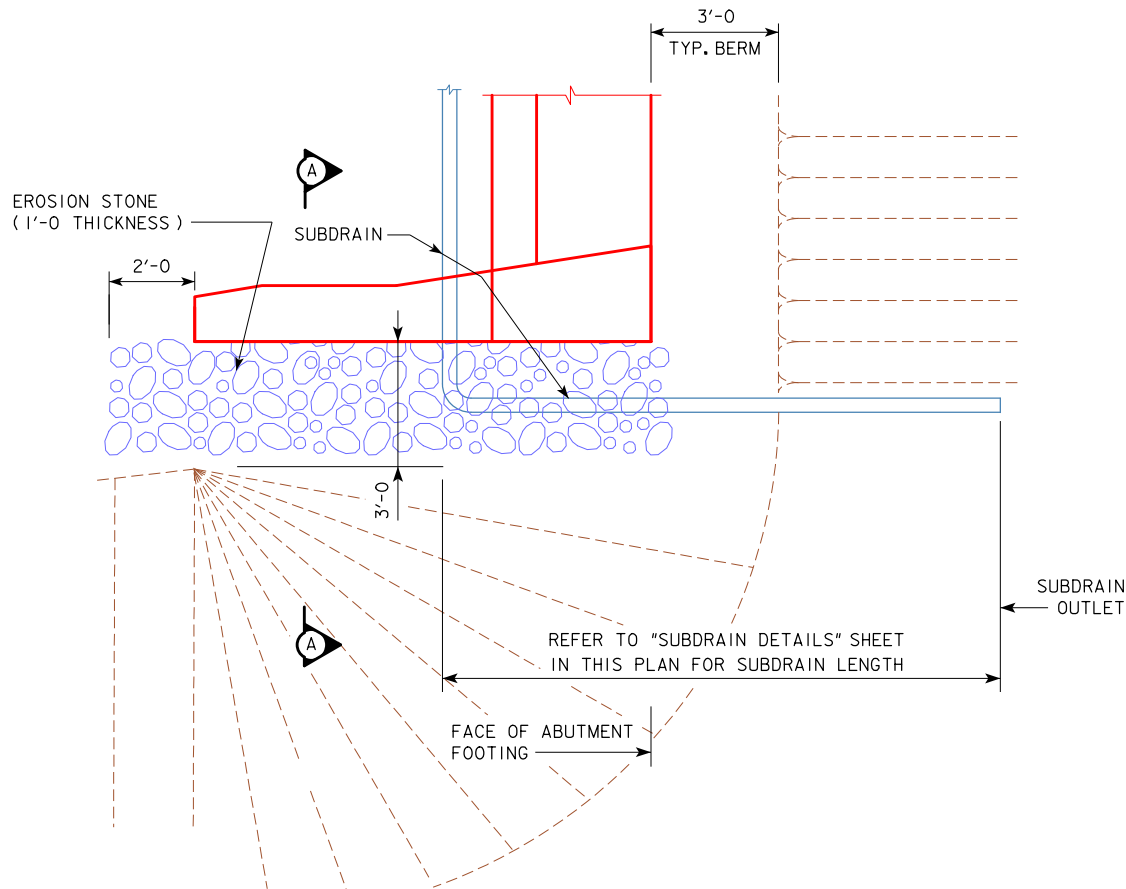
BENTON COUNTY

IOWA DOT - TRANSPORTATION DEVELOPMENT DIVISION

DESIGN SHEET NO. 12 OF 13 FILE NO. 31043 DESIGN NO. 216

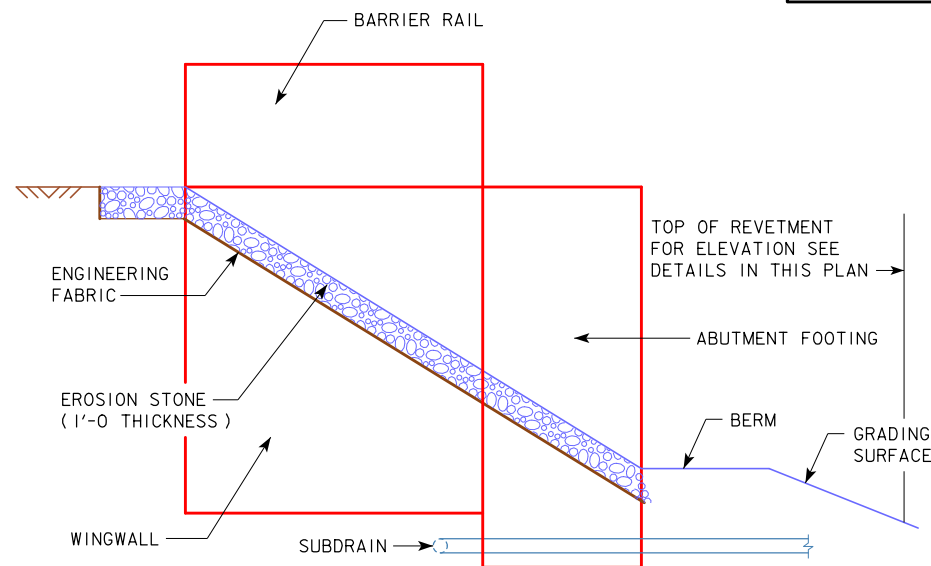


REVISED 06-14 - ADDED 2 FEET OF LENGTH OF EROSION STONE IN FRONT OF THE BRIDGE WING.  
ENGLISHFORSLOPEPROTECTIONBRIDGES.DGN 1005A - THIS SHEET ISSUED 06-02.

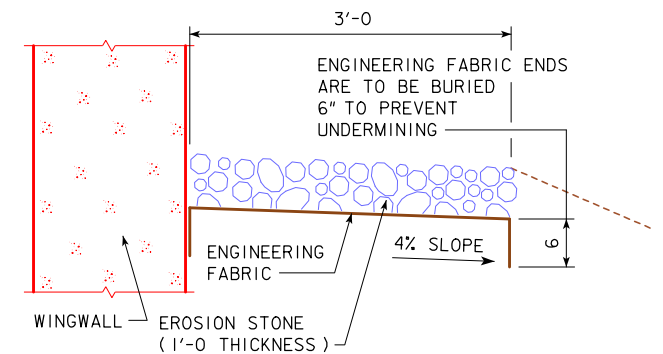


TOP VIEW OF WING ARMORING

A CHECK SHALL BE MADE AT THE SUBDRAIN OUTLET TO INSURE THAT IT IS DRAINING PROPERLY DURING THE BACKFILL FLOODING PROCESS.



PROFILE VIEW OF WING ARMORING  
(SHOWN FOR INTEGRAL ABUTMENT)



SECTION A-A

### GENERAL NOTES:

































EROSION STONE SHALL BE PLACED ALONG THE SIDES OF THE WINGS AND ABUTMENT FOOTING AS SHOWN IN SECTION A-A. THIS IS TYPICAL AT EACH CORNER OF THE BRIDGE UNLESS OTHERWISE NOTED IN THE PLANS. THE EROSION STONE AT THESE LOCATIONS SHALL BE UNDERLAYED WITH ENGINEERING FABRIC IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS.

THE EROSION STONE SHALL BE IN ACCORDANCE WITH SECTION 4130, OF THE STANDARD SPECIFICATIONS. MATERIAL PASSING THE 3 INCH SCREEN BUT 100% RETAINED ON A 1 INCH SCREEN MAY BE USED AS CHOKE STONE.

THE EROSION STONE SHALL BE DEPOSITED, SPREAD, CONSOLIDATED AND SHAPED BY MECHANICAL OR HAND METHODS THAT WILL PROVIDE UNIFORM 9" DEPTH AND DENSITY AND PROVIDE UNIFORM SURFACE APPEARANCE.

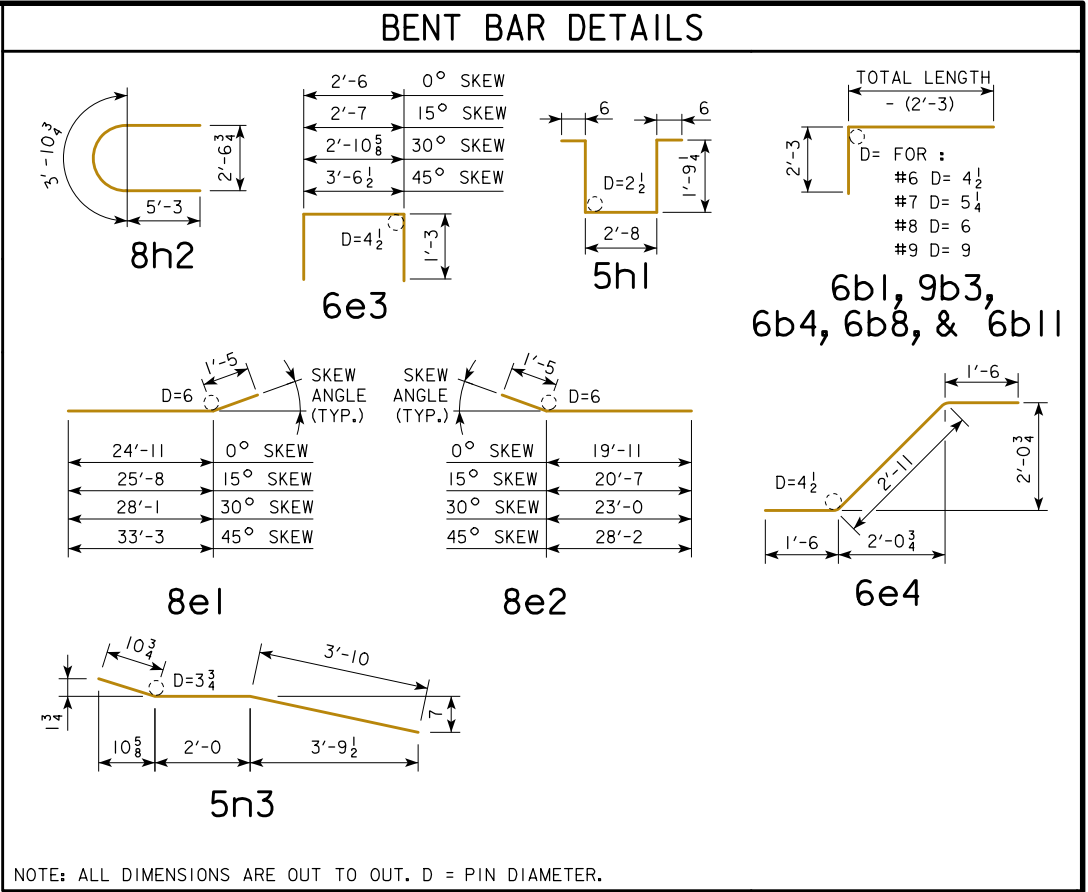
PAYMENT FOR THE BRIDGE WING ARMORING WILL BE BID PER SQUARE YARD. COST WILL INCLUDE ENGINEERING FABRIC, EROSION STONE, EXCAVATION, SHAPING, AND COMPACTION TO DIMENSIONS SHOWN IN THESE PLANS. BID ITEM SHALL BE "BRIDGE WING ARMORING - EROSION STONE".

|   |                      |
|---|----------------------|
| DESIGN FOR 0° SKEW                              |                      |
| 90'-0" x 40'-0" CONTINUOUS CONCRETE SLAB BRIDGE |                      |
| 27'-6" END SPANS                                | 35'-0" INTERIOR SPAN |
| BRIDGE WING ARMORING                            |                      |
| STA. 1256+86.04, 44.00' RT (US 30 E.B.)         |                      |
| BENTON COUNTY                                   |                      |
| IOWA DOT - TRANSPORTATION DEVELOPMENT DIVISION  |                      |
| DESIGN SHEET NO. 13 OF 13                       | FILE NO. 31043       |
| DESIGN NO. 216                                  | JUNE, 2021           |

| BILL OF REINFORCING STEEL FOR SUPERSTRUCTURE - 90' BRIDGE   |  |      |   |                   |     |        |        |     |        |        |     |           |        |     |           |        |
|---|--|------|---|-------------------|-----|--------|--------|-----|--------|--------|-----|-----------|--------|-----|-----------|--------|
| LOCATION  |  | SKEW | SHAPE   | 0°                |     |        |        | 15° |        |        | 30° |           |        | 45° |           |        |
|   |  |      |   | BAR               | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH    | WEIGHT | NO. | LENGTH    | WEIGHT |
| SLAB LONGITUDINAL BOTTOM  |  |      |    | 8a1               | 53  | 20'-0  | 2831   | 53  | 20'-0  | 2831   | 53  | 20'-0     | 2831   | 53  | 20'-0     | 2831   |
| SLAB LONGITUDINAL BOTTOM  |  |      |    | 8a2               | 53  | 30'-3  | 4281   | 53  | 30'-3  | 4281   | 53  | 30'-3     | 4281   | 53  | 30'-3     | 4281   |
| SLAB LONGITUDINAL BOTTOM  |  |      |    | 8a3               | 53  | 28'-6  | 4034   | 53  | 28'-6  | 4034   | 53  | 28'-6     | 4034   | 53  | 28'-6     | 4034   |
| SLAB LONGITUDINAL BOTTOM  |  |      |    | 8a4               | 52  | 25'-6  | 3541   | 52  | 25'-6  | 3541   | 52  | 25'-6     | 3541   | 52  | 25'-6     | 3541   |
| SLAB LONGITUDINAL BOTTOM  |  |      |    | 8a5               | 26  | 28'-0  | 1944   | 26  | 28'-0  | 1944   | 26  | 28'-0     | 1944   | 26  | 28'-0     | 1944   |
| SLAB LONGITUDINAL BOTTOM, AT RAIL   |  |      |    | 8a6               | 8   | 32'-3  | 689    | 8   | 32'-3  | 689    | 8   | 32'-3     | 689    | 8   | 32'-3     | 689    |
| SLAB LONGITUDINAL BOTTOM, AT RAIL   |  |      |    | 8a7               | 4   | 34'-4  | 367    | 4   | 34'-4  | 367    | 4   | 34'-4     | 367    | 4   | 34'-4     | 367    |
| SLAB LONGITUDINAL BOTTOM, AT RAIL   |  |      |    | 8a8               | 8   | 22'-9  | 486    | 8   | 22'-9  | 486    | 8   | 22'-9     | 486    | 8   | 22'-9     | 486    |
| SLAB LONGITUDINAL BOTTOM, AT RAIL   |  |      |    | 8a9               | 4   | 21'-0  | 225    | 4   | 21'-0  | 225    | 4   | 21'-0     | 225    | 4   | 21'-0     | 225    |
| SLAB LONGITUDINAL TOP   |  |      |    | 6b1               | 53  | 8'-0   | 637    | 53  | 8'-0   | 637    | 53  | 8'-0      | 637    | 53  | 8'-0      | 637    |
| SLAB LONGITUDINAL TOP   |  |      |    | 9b2               | 53  | 22'-9  | 4100   | 53  | 22'-9  | 4100   | 53  | 22'-9     | 4100   | 53  | 22'-9     | 4100   |
| SLAB LONGITUDINAL TOP   |  |      |    | 9b3               | 53  | 35'-0  | 6307   | 53  | 35'-0  | 6307   | 53  | 35'-0     | 6307   | 53  | 35'-0     | 6307   |
| SLAB LONGITUDINAL TOP   |  |      |    | 6b4               | 52  | 13'-0  | 1016   | 52  | 13'-0  | 1016   | 52  | 13'-0     | 1016   | 52  | 13'-0     | 1016   |
| SLAB LONGITUDINAL TOP   |  |      |    | 9b5               | 52  | 27'-6  | 4862   | 52  | 27'-6  | 4862   | 52  | 27'-6     | 4862   | 52  | 27'-6     | 4862   |
| SLAB LONGITUDINAL TOP   |  |      |    | 6b6               | 26  | 16'-10 | 658    | 26  | 16'-10 | 658    | 26  | 16'-10    | 658    | 26  | 16'-10    | 658    |
| SLAB LONGITUDINAL TOP, AT RAIL  |  |      |  | 6b8               | 8   | 26'-0  | 313    | 8   | 26'-0  | 313    | 8   | 26'-0     | 313    | 8   | 26'-0     | 313    |
| SLAB LONGITUDINAL TOP, AT RAIL  |  |      |  | 9b9               | 8   | 19'-6  | 531    | 8   | 19'-6  | 531    | 8   | 19'-6     | 531    | 8   | 19'-6     | 531    |
| SLAB LONGITUDINAL TOP, AT RAIL  |  |      |  | 6b10              | 4   | 18'-0  | 109    | 4   | 18'-0  | 109    | 4   | 18'-0     | 109    | 4   | 18'-0     | 109    |
| SLAB LONGITUDINAL TOP, AT RAIL  |  |      |  | 6b11              | 8   | 28'-6  | 343    | 8   | 28'-6  | 343    | 8   | 28'-6     | 343    | 8   | 28'-6     | 343    |
| SLAB LONGITUDINAL TOP, AT RAIL  |  |      |  | 10b12             | 8   | 13'-3  | 457    | 8   | 13'-3  | 457    | 8   | 13'-3     | 457    | 8   | 13'-3     | 457    |
| SLAB TRANSVERSE BOTTOM  |  |      |  | 6c1               | 87  | 23'-5  | 3060   | 87  | 24'-3  | 3169   | 78  | 23'-5     | 2744   | 68  | 23'-5     | 2392   |
| SLAB TRANSVERSE BOTTOM  |  |      |  | 6c2               | 87  | 21'-3  | 2777   | 87  | 22'-0  | 2875   | 79  | 21'-3     | 2522   | 71  | 21'-3     | 2267   |
| SLAB TRANSVERSE ENDS, BOTTOM  |  |      |  | 6c3               | -   | -      | -      | -   | -      | -      | 12  | VARIABLES | 223    | 20  | VARIABLES | 411    |
| SLAB TRANSVERSE ENDS, BOTTOM  |  |      |  | 6c4               | -   | -      | -      | -   | -      | -      | 11  | VARIABLES | 219    | 20  | VARIABLES | 386    |
| SLAB TRANSVERSE ENDS, BOTTOM  |  |      |  | 6c5               | -   | -      | -      | -   | -      | -      | 11  | VARIABLES | 176    | 18  | VARIABLES | 302    |
| SLAB TRANSVERSE ENDS, BOTTOM  |  |      |  | 6c6               | -   | -      | -      | -   | -      | -      | 11  | VARIABLES | 190    | 17  | VARIABLES | 311    |
| SLAB TRANSVERSE TOP   |  |      |  | 5d1               | 87  | 23'-9  | 2156   | 87  | 24'-7  | 2231   | 78  | 23'-9     | 1933   | 68  | 23'-9     | 1685   |
| SLAB TRANSVERSE TOP   |  |      |  | 5d2               | 87  | 21'-3  | 1929   | 87  | 22'-0  | 1997   | 79  | 21'-3     | 1751   | 71  | 21'-3     | 1574   |
| SLAB TRANSVERSE ENDS, TOP   |  |      |  | 5d3               | -   | -      | -      | -   | -      | -      | 12  | VARIABLES | 155    | 20  | VARIABLES | 286    |
| SLAB TRANSVERSE ENDS, TOP   |  |      |  | 5d4               | -   | -      | -      | -   | -      | -      | 11  | VARIABLES | 152    | 20  | VARIABLES | 268    |
| SLAB TRANSVERSE ENDS, TOP   |  |      |  | 5d5               | -   | -      | -      | -   | -      | -      | 11  | VARIABLES | 122    | 18  | VARIABLES | 210    |
| SLAB TRANSVERSE ENDS, TOP   |  |      |  | 5d6               | -   | -      | -      | -   | -      | -      | 11  | VARIABLES | 132    | 17  | VARIABLES | 216    |
| SLAB, TRANSVERSE AT ABUTMENT  |  |      |  | 8e1               | 18  | 26'-4  | 1266   | 18  | 27'-1  | 1302   | 18  | 29'-6     | 1418   | 18  | 34'-8     | 1667   |
| SLAB, TRANSVERSE AT ABUTMENT  |  |      |  | 8e2               | 18  | 21'-4  | 1026   | 18  | 22'-0  | 1058   | 18  | 24'-5     | 1174   | 18  | 29'-7     | 1422   |
| SLAB, HAIRPINS, AT ABUTMENT   |  |      |  | 6e3               | 92  | 5'-0   | 691    | 92  | 5'-1   | 703    | 92  | 5'-5      | 749    | 92  | 6'-1      | 841    |
| SLAB, DIAGONALS, AT ABUTMENT  |  |      |  | 6e4               | 92  | 5'-11  | 818    | 92  | 5'-11  | 818    | 92  | 5'-11     | 818    | 92  | 5'-11     | 818    |
| PIER CAP HOOPS  |  |      |  | 5h1               | 72  | 7'-3   | 545    | 72  | 7'-3   | 545    | 72  | 7'-3      | 545    | 108 | 7'-3      | 817    |
| PIER CAP ENDS   |  |      |  | 8h2               | 4   | 14'-5  | 154    | 4   | 14'-5  | 154    | 4   | 14'-5     | 154    | 4   | 14'-5     | 154    |
| PIER CAP, BOTTOM LONGITUDINAL   |  |      |  | 8h3               | 8   | 25'-5  | 543    | 8   | 26'-7  | 568    | 8   | 29'-4     | 627    | 8   | 35'-0     | 748    |
| PIER CAP, BOTTOM LONGITUDINAL   |  |      |  | 8h4               | 8   | 19'-11 | 426    | 8   | 20'-3  | 433    | 8   | 22'-2     | 474    | 8   | 26'-10    | 574    |
| PIER CAP, TOP LONGITUDINAL  |  |      |  | 8h5               | 4   | 26'-2  | 280    | 4   | 27'-5  | 293    | 4   | 30'-4     | 324    | 4   | 36'-1     | 386    |
| PIER CAP, TOP LONGITUDINAL  |  |      |  | 8h6               | 4   | 21'-5  | 229    | 4   | 21'-10 | 234    | 4   | 23'-11    | 256    | 4   | 28'-8     | 307    |
| TOP OF SLAB, TRANSVERSE, AT RAIL  |  |      |  | 5j1               | 172 | 8'-6   | 1525   | 172 | 8'-6   | 1525   | 162 | 8'-6      | 1437   | 156 | 8'-6      | 1384   |
| WING, VERTICAL  |  |      |  | 5m1               | 40  | 4'-5   | 185    | 40  | 4'-5   | 185    | 40  | 4'-5      | 185    | 40  | 4'-5      | 185    |
| WING, HORIZONTAL BACK FACE  |  |      |  | 5n1               | 24  | 6'-8   | 167    | 24  | 6'-8   | 167    | 24  | 6'-8      | 167    | 24  | 6'-8      | 167    |
| WING, HORIZONTAL TRAFFIC FACE   |  |      |  | 5n3               | 24  | 6'-9   | 169    | 24  | 6'-9   | 169    | 24  | 6'-9      | 169    | 24  | 6'-9      | 169    |
|   |  |      |   |                   |     |        |        |     |        |        |     |           |        |     |           |        |
|   |  |      |   |                   |     |        |        |     |        |        |     |           |        |     |           |        |
| SUB EPOXY COATED TOTAL - LBS.   |  |      |   |                   |     |        | 55,677 |     |        | 56,157 |     |           | 56,547 |     |           | 57,678 |
| BARRIER RAIL - SEE LIST ON RAIL SHEET J40-46-14   |  |      |   |                   |     |        | 3882   |     |        | 3882   |     |           | 3882   |     |           | 3882   |
| OPEN RAIL - SEE LIST ON RAIL SHEET J40-49-14  |  |      |   |                   |     |        | 4121   |     |        | 4121   |     |           | 4121   |     |           | 4121   |
| EPOXY COATED RAIL TOTAL - LBS. MONOLITHIC PIER CAP  |  |      |   | WITH BARRIER RAIL |     |        | 59,559 |     |        | 60,039 |     |           | 60,429 |     |           | 61,560 |
|   |  |      |   | WITH OPEN RAIL    |     |        | 59,798 |     |        | 60,278 |     |           | 60,668 |     |           | 61,799 |
| EPOXY COATED RAIL TOTAL - LBS. NON-MONOLITHIC PIER CAP<br>SAME AS ABOVE EXCEPT ALL "h" BARS DELETED |  |      |   | WITH BARRIER RAIL |     |        | 57,382 |     |        | 57,812 |     |           | 58,049 |     |           | 58,574 |
|   |  |      |   | WITH OPEN RAIL    |     |        | 57,621 |     |        | 58,051 |     |           | 58,288 |     |           | 58,813 |
| STAINLESS STEEL RAIL TOTAL - LBS.   |  |      |   | WITH BARRIER RAIL |     |        | 2068   |     |        | 2068   |     |           | 2068   |     |           | 2068   |
|   |  |      |   | WITH OPEN RAIL    |     |        | 2209   |     |        | 2209   |     |           | 2209   |     |           | 2209   |

[illegible]

\* INCLUDES 4 WINGS @ 0.68 C.Y. EACH; EXCLUDES RAIL CONCRETE.  
 Δ INCLUDES ABUTMENT PAVING NOTCH BAR WEIGHT.





| STAINLESS STEEL REINFORCING<br>FOR SUPERSTRUCTURE - BRIDGE                             |  |       |     |     |        |               |
|--|--|-------|-----|-----|--------|---------------|
| ALL SKEWS  |  | SHAPE | BAR | NO. | LENGTH | WEIGHT        |
| LOCATION   |  |       |     |     |        |               |
| ABUTMENT PAVING NOTCH BAR  |  |       | 8u1 | 40  | 2'-1   | 223           |
| 8u1 BARS SHALL BE PAID FOR UNDER THE BID<br>ITEM "REINFORCING STEEL, STAINLESS STEEL". |  |       |     |     |        | WEIGHT = LBS. |

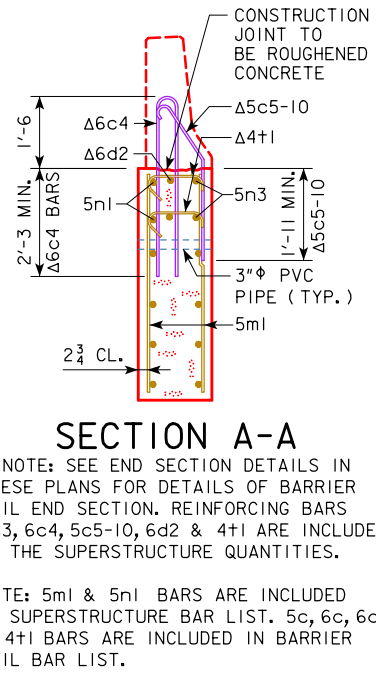
NOTES:  
ALL BARRIER RAIL REINFORCING STEEL IS TO BE EITHER EPOXY COATED  
OR STAINLESS STEEL AS SHOWN OR NOTED. THE STAINLESS STEEL  
REINFORCING STEEL SHALL BE DEFORMED BAR GRADE 60 MEETING THE  
REQUIREMENTS OF MATERIALS I.M.452.

ALL OTHER REINFORCING STEEL IS TO BE EPOXY COATED.

THE TRANSVERSE REBARS ARE DETAILED WITH A SPLICE LAP. AT THE CONTRACTOR'S OPTION, THIS LAP MAY BE ELIMINATED BY FURNISHING FULL LENGTH BARS WITH NO REDUCTION IN PAY WEIGHT FOR SAME.

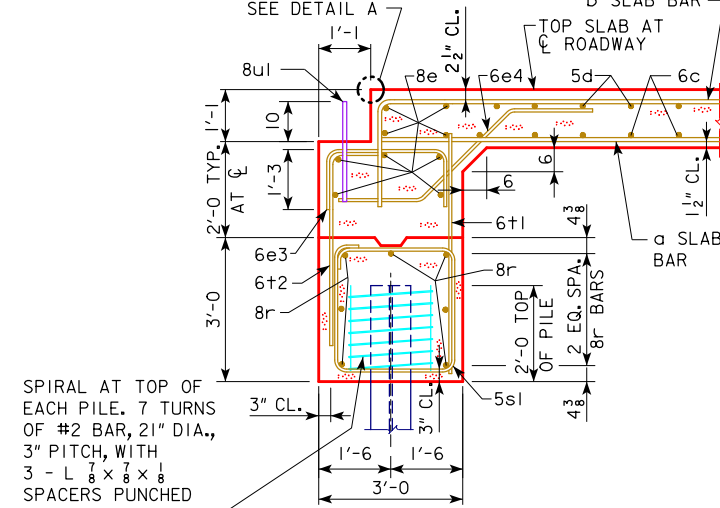
|                                 |  |  |                  |
|---------------------------------|--|--|------------------|
| 08-2020<br>LATEST REVISION DATE | <br>APPROVED BY BRIDGE ENGINEER |  <b>IOWA DOT</b> Highway Division |                  |
|                                 |  | STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES<br><b>CONTINUOUS CONCRETE<br/>SLAB BRIDGES</b><br>JULY, 2014             |                  |
|                                 |  | <b>SUPERSTRUCTURE DETAILS</b><br><b>90'-0" BRIDGE</b>  | <b>J40-07-14</b> |

CONNECTED REFERENCE TO OPEN RAIL SHEET 340-48-14 (IT WAS 340-48-08 IN ERROR).  
UPDATED BRIDGE ENGINEER SIGNATURE. REVISED SUPERSTRUCTURE NOTES TO STATE; "SLAB FALSEWORK SHALL BE REMOVED PRIOR TO CONSTRUCTION OF THE BARRIER RAILS,

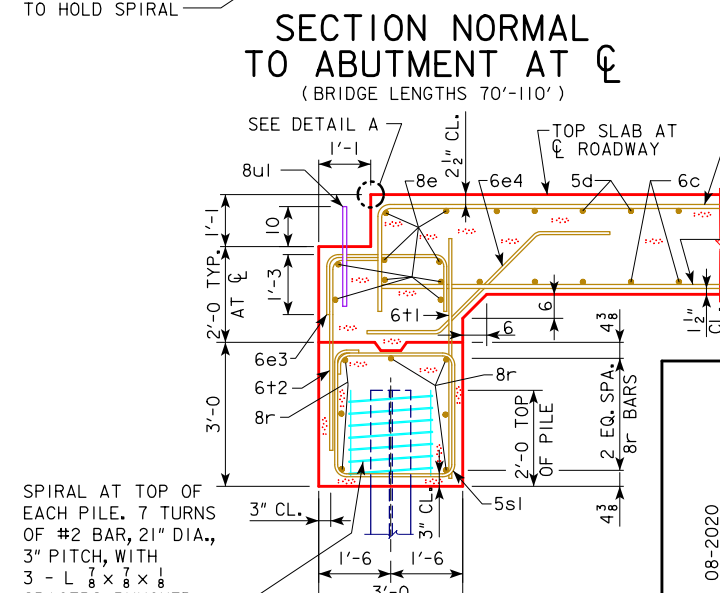


## BAR CHAIR NOTE:

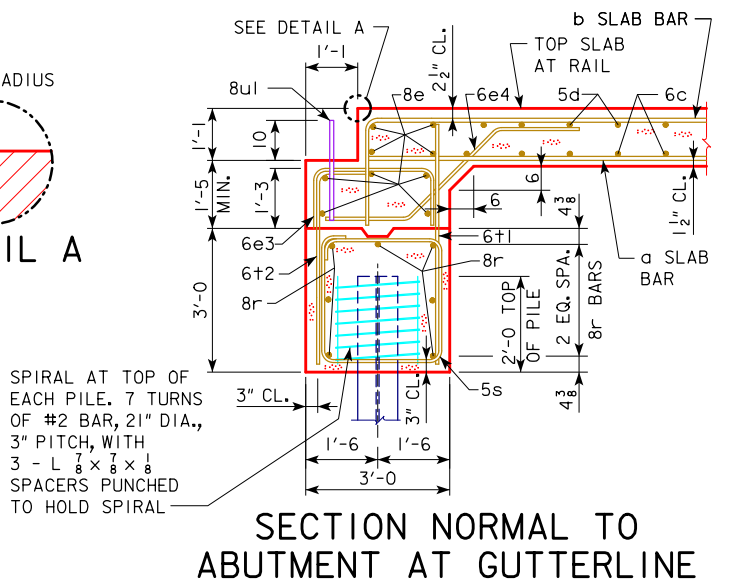
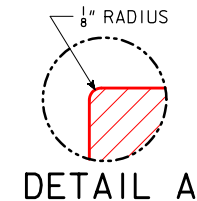
TOP MAT OF REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0" CENTERS LONGITUDINALLY AND TRANSVERSELY. THE BOTTOM MAT OF REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0" CENTERS LONGITUDINALLY AND TRANSVERSELY, OR BY CONTINUOUS ROWS OF BAR HIGH CHAIRS OR SLAB BOLSTERS SPACED 4'-0" APART. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS, BAR HIGH CHAIRS, AND SLAB BOLSTERS.





SECTION NORMAL  
TO ABUTMENT AT C  
(BRIDGE LENGTHS 70'-110')



SECTION NORMAL  
TO ABUTMENT AT  $\frac{L}{2}$   
(BRIDGE LENGTHS 120'-150')


















SECTION NORMAL TO  
ABUTMENT AT GUTTERLINE








|                                 |  |  |                  |
|---------------------------------|--|--|------------------|
| 08-2020<br>LATEST REVISION DATE | <br>APPROVED BY BRIDGE ENGINEER |  <b>IOWA DOT</b> Highway Division |                  |
|                                 |  | STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES<br><b>CONTINUOUS CONCRETE<br/>SLAB BRIDGES</b><br>JULY, 2014             |                  |
|                                 |  | <b>SUPERSTRUCTURE DETAILS<br/>ALL BRIDGES</b>  | <b>J40-20-14</b> |











REVISED 08-2020: UPDATED BRIDGE ENGINEER SIGNATURE.

| BILL OF REINFORCING STEEL - ONE ABUTMENT - 0° SKEW |  |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
|--|--|---|--------|-------|--------|-------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| BRIDGE LENGTH                                      |  |   |        | 70'-0 |        | 80'-0 |        | 90'-0 |        | 100'-0 |        | 110'-0 |        | 120'-0 |        | 130'-0 |        | 140'-0 |        | 150'-0 |        |
| MARK   | LOCATION   | SHAPE   | LENGTH | NO.   | WEIGHT | NO.   | WEIGHT | NO.   | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT |
| 8r1  | ABUTMENT FOOTING LONGITUDINAL  |  | 26'-4  | 7     | 492    | 7     | 492    | 7     | 492    | 7      | 492    | 7      | 492    | 7      | 492    | 7      | 492    | 7      | 492    | 7      | 492    |
| 8r2  | ABUTMENT FOOTING LONGITUDINAL  |  | 21'-4  | 7     | 399    | 7     | 399    | 7     | 399    | 7      | 399    | 7      | 399    | 7      | 399    | 7      | 399    | 7      | 399    | 7      | 399    |
|  | ABUTMENT FOOTING HOOPS   |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 5s1  |  |  | 11'-0  | 39    | 447    | 39    | 447    | 39    | 447    | 39     | 447    | 40     | 459    | 40     | 459    | 40     | 459    | 39     | 447    | 36     | 413    |
|  | FOOTING TO SLAB BARS   |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 6+1  | FOOTING TO SLAB BARS   |  | 5'-0   | 46    | 345    | 46    | 345    | 46    | 345    | 46     | 345    | 46     | 345    | 46     | 345    | 46     | 345    | 46     | 345    | 46     | 345    |
| 6+2  |  |  | 5'-7   | 46    | 386    | 46    | 386    | 46    | 386    | 46     | 386    | 46     | 386    | 46     | 386    | 46     | 386    | 46     | 386    | 46     | 386    |
|  | PILE SPIRAL  |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| #2   | SPIRAL SPACERS - L $\frac{7}{8} \times \frac{1}{8} \times \frac{1}{8} \times 0.70$ |  | 38'-6  | 6     | 39     | 6     | 39     | 6     | 39     | 6      | 39     | 7      | 45     | 7      | 45     | 7      | 45     | 8      | 51     | 9      | 58     |
|  |  |  | 1'-10  | 18    | 24     | 18    | 24     | 18    | 24     | 18     | 24     | 21     | 27     | 21     | 27     | 21     | 27     | 24     | 31     | 27     | 35     |
|  |  |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)      |  |   |        |       | 2132   |       | 2132   |       | 2132   |        | 2132   |        | 2153   |        | 2153   |        | 2153   |        | 2151   |        | 2128   |

| BILL OF REINFORCING STEEL - ONE ABUTMENT - 15° SKEW |  |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
|---|--|---|--------|-------|--------|-------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| BRIDGE LENGTH                                       |  |   |        | 70'-0 |        | 80'-0 |        | 90'-0 |        | 100'-0 |        | 110'-0 |        | 120'-0 |        | 130'-0 |        | 140'-0 |        | 150'-0 |        |
| MARK  | LOCATION   | SHAPE   | LENGTH | NO.   | WEIGHT | NO.   | WEIGHT | NO.   | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT |
| 8r1   | ABUTMENT FOOTING LONGITUDINAL  |  | 27'-2  | 7     | 508    | 7     | 508    | 7     | 508    | 7      | 508    | 7      | 508    | 7      | 508    | 7      | 508    | 7      | 508    | 7      | 508    |
| 8r2   | ABUTMENT FOOTING LONGITUDINAL  |  | 22'-1  | 7     | 413    | 7     | 413    | 7     | 413    | 7      | 413    | 7      | 413    | 7      | 413    | 7      | 413    | 7      | 413    | 7      | 413    |
|   |  |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 5s1   | ABUTMENT FOOTING HOOPS   |  | 11'-0  | 36    | 413    | 36    | 413    | 36    | 413    | 36     | 413    | 36     | 413    | 36     | 413    | 35     | 402    | 40     | 459    | 40     | 459    |
| 5s2   | ABUTMENT FOOTING HOOPS   |  | 11'-3  | 4     | 47     | 4     | 47     | 4     | 47     | 4      | 47     | 4      | 47     | 4      | 47     | 4      | 47     | 4      | 47     | 4      | 47     |
|   |  |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 6+1   | FOOTING TO SLAB BARS   |  | 5'-0   | 46    | 345    | 46    | 345    | 46    | 345    | 46     | 345    | 46     | 345    | 46     | 345    | 46     | 345    | 46     | 345    | 46     | 345    |
| 6+2   | FOOTING TO SLAB BARS   |  | 5'-7   | 46    | 386    | 46    | 386    | 46    | 386    | 46     | 386    | 46     | 386    | 46     | 386    | 46     | 386    | 46     | 386    | 46     | 386    |
|   |  |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| #2  | PILE SPIRAL  |  | 38'-6  | 7     | 45     | 7     | 45     | 7     | 45     | 7      | 45     | 7      | 45     | 7      | 45     | 8      | 51     | 9      | 58     | 9      | 58     |
|   | SPIRAL SPACERS - L $\frac{7}{8} \times \frac{1}{8} \times \frac{1}{8} \times 0.70$ |  | 1'-10  | 21    | 27     | 21    | 27     | 21    | 27     | 21     | 27     | 21     | 27     | 21     | 27     | 24     | 31     | 27     | 35     | 27     | 35     |
|   |  |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)       |  |   |        | 2184  |        | 2184  |        | 2184  |        | 2184   |        | 2184   |        | 2184   |        | 2183   |        | 2251   |        | 2251   |        |

| BILL OF REINFORCING STEEL - ONE ABUTMENT - 30° SKEW |  |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
|---|--|---|--------|-------|--------|-------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| BRIDGE LENGTH                                       |  |   |        | 70'-0 |        | 80'-0 |        | 90'-0 |        | 100'-0 |        | 110'-0 |        | 120'-0 |        | 130'-0 |        | 140'-0 |        | 150'-0 |        |
| MARK  | LOCATION   | SHAPE   | LENGTH | NO.   | WEIGHT | NO.   | WEIGHT | NO.   | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT |
| 8r1   | ABUTMENT FOOTING LONGITUDINAL  |  | 29'-6  | 7     | 551    | 7     | 551    | 7     | 551    | 7      | 551    | 7      | 551    | 7      | 551    | 7      | 551    | 7      | 551    | 7      | 551    |
| 8r2   | ABUTMENT FOOTING LONGITUDINAL  |  | 24'-5  | 7     | 456    | 7     | 456    | 7     | 456    | 7      | 456    | 7      | 456    | 7      | 456    | 7      | 456    | 7      | 456    | 7      | 456    |
|   |  |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 5s1   | ABUTMENT FOOTING HOOPS   |  | 11'-0  | 42    | 482    | 42    | 482    | 42    | 482    | 42     | 482    | 42     | 482    | 42     | 482    | 42     | 482    | 40     | 459    | 40     | 459    |
| 5s2   | ABUTMENT FOOTING HOOPS   |  | 11'-11 | 4     | 50     | 4     | 50     | 4     | 50     | 4      | 50     | 4      | 50     | 4      | 50     | 4      | 50     | 4      | 50     | 4      | 50     |
|   |  |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 6+1   | FOOTING TO SLAB BARS   |  | 5'-0   | 46    | 345    | 46    | 345    | 46    | 345    | 46     | 345    | 46     | 345    | 46     | 345    | 46     | 345    | 46     | 345    | 46     | 345    |
| 6+2   | FOOTING TO SLAB BARS   |  | 5'-7   | 46    | 386    | 46    | 386    | 46    | 386    | 46     | 386    | 46     | 386    | 46     | 386    | 46     | 386    | 46     | 386    | 46     | 386    |
|   |  |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| #2  | PILE SPIRAL  |  | 38'-6  | 7     | 45     | 7     | 45     | 7     | 45     | 7      | 45     | 7      | 45     | 7      | 45     | 8      | 51     | 9      | 58     | 9      | 58     |
|   | SPIRAL SPACERS - L $\frac{7}{8} \times \frac{1}{8} \times \frac{1}{8} \times 0.70$ |  | 1'-10  | 21    | 27     | 21    | 27     | 21    | 27     | 21     | 27     | 21     | 27     | 21     | 27     | 24     | 31     | 27     | 35     | 27     | 35     |
|   |  |   |        |       |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)       |  |   |        |       | 2342   |       | 2342   |       | 2342   |        | 2342   |        | 2342   |        | 2342   |        | 2352   |        | 2340   |        | 2340   |

| BILL OF REINFORCING STEEL - ONE ABUTMENT - 45° SKEW |  |  |  |   |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
|---|--|--|--|---|--------|-------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| BRIDGE LENGTH                                       |  |  |  | 70'-0   |        | 80'-0 |        | 90'-0 |        | 100'-0 |        | 110'-0 |        | 120'-0 |        | 130'-0 |        | 140'-0 |        | 150'-0 |        |
| MARK  | LOCATION   |  |  | SHAPE   | LENGTH | NO.   | WEIGHT | NO.   | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT | NO.    | WEIGHT |
| 8r1   | ABUTMENT FOOTING LONGITUDINAL  |  |  |  | 34'-8  | 7     | 648    | 7     | 648    | 7      | 648    | 7      | 648    | 7      | 648    | 7      | 648    | 7      | 648    | 7      | 648    |
| 8r2   | ABUTMENT FOOTING LONGITUDINAL  |  |  |  | 29'-7  | 7     | 553    | 7     | 553    | 7      | 553    | 7      | 553    | 7      | 553    | 7      | 553    | 7      | 553    | 7      | 553    |
|   |  |  |  |   |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 5s1   | ABUTMENT FOOTING HOOPS   |  |  |  | 11'-0  | 56    | 642    | 56    | 642    | 56     | 642    | 56     | 642    | 56     | 642    | 56     | 642    | 56     | 642    | 54     | 620    |
| 5s2   | ABUTMENT FOOTING HOOPS   |  |  |  | 13'-6  | 4     | 56     | 4     | 56     | 4      | 56     | 4      | 56     | 4      | 56     | 4      | 56     | 4      | 56     | 4      | 56     |
|   |  |  |  |   |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| 6+1   | FOOTING TO SLAB BARS   |  |  |  | 5'-0   | 46    | 345    | 46    | 345    | 46     | 345    | 46     | 345    | 46     | 345    | 46     | 345    | 46     | 345    | 46     | 345    |
| 6+2   | FOOTING TO SLAB BARS   |  |  |  | 5'-7   | 46    | 386    | 46    | 386    | 46     | 386    | 46     | 386    | 46     | 386    | 46     | 386    | 46     | 386    | 46     | 386    |
|   |  |  |  |   |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| #2  | PILE SPIRAL  |  |  |  | 38'-6  | 9     | 58     | 9     | 58     | 9      | 58     | 9      | 58     | 9      | 58     | 9      | 58     | 9      | 58     | 10     | 64     |
|   | SPIRAL SPACERS - L $\frac{7}{8} \times \frac{1}{8} \times \frac{1}{8} \times 0.70$ |  |  |  | 1'-10  | 27    | 35     | 27    | 35     | 27     | 35     | 27     | 35     | 27     | 35     | 27     | 35     | 27     | 35     | 30     | 39     |
|   |  |  |  |   |        |       |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |
| REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)       |  |  |  |   |        | 2723  |        | 2723  |        | 2723   |        | 2723   |        | 2723   |        | 2723   |        | 2723   |        | 2711   |        |

NOTE: THE PILE SPIRALS AND SPIRAL SPACERS ARE TO BE NON-COATED REINFORCING BUT MAY BE EPOXY COATED AT THE CONTRACTORS OPTION AND EXPENSE.

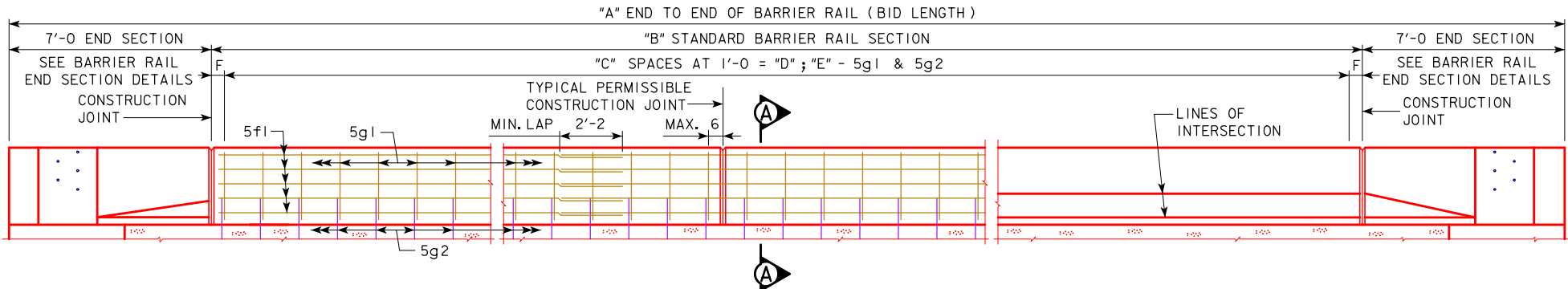
| ESTIMATED QUANTITIES - ONE ABUT. - 0° SKEW |  |      |          |       |       |        |        |        |        |        |        |
|--|--|------|----------|-------|-------|--------|--------|--------|--------|--------|--------|
| LOCATION                                   |  | UNIT | QUANTITY |       |       |        |        |        |        |        |        |
| BRIDGE LENGTH                              |  |      | 70'-0    | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
| STRUCTURAL CONCRETE (BRIDGE)               |  | C.Y. | 14.4     | 14.4  | 14.4  | 14.4   | 14.4   | 14.4   | 14.4   | 14.4   | 14.4   |
| REINFORCING STEEL EPOXY COATED             |  | LBS. | 2132     | 2132  | 2132  | 2132   | 2153   | 2153   | 2153   | 2151   | 2128   |
| STEEL PILING HP 10x42                      |  | NO.  | 6        | 6     | 6     | 6      | 7      | 7      | 7      | 8      | 9      |
| PREBORE HOLES                              |  | FT.  | -        | -     | -     | -      | -      | -      | -      | 80     | 90     |

| ESTIMATED QUANTITIES - ONE ABUT.- 15° SKEW |      |          |       |       |        |        |        |        |        |        |
|--|------|----------|-------|-------|--------|--------|--------|--------|--------|--------|
| LOCATION                                   | UNIT | QUANTITY |       |       |        |        |        |        |        |        |
| BRIDGE LENGTH                              |      | 70'-0    | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
| STRUCTURAL CONCRETE ( BRIDGE )             | C.Y. | 14.9     | 14.9  | 14.9  | 14.9   | 14.9   | 14.9   | 14.9   | 14.9   | 14.9   |
| REINFORCING STEEL EPOXY COATED             | LBS. | 2184     | 2184  | 2184  | 2184   | 2184   | 2184   | 2183   | 2251   | 2251   |
| STEEL PILING HP 10x42                      | NO.  | 7        | 7     | 7     | 7      | 7      | 7      | 8      | 9      | 9      |
| PREBORE HOLES                              | FT.  | -        | -     | -     | -      | -      | -      | -      | 90     | 90     |

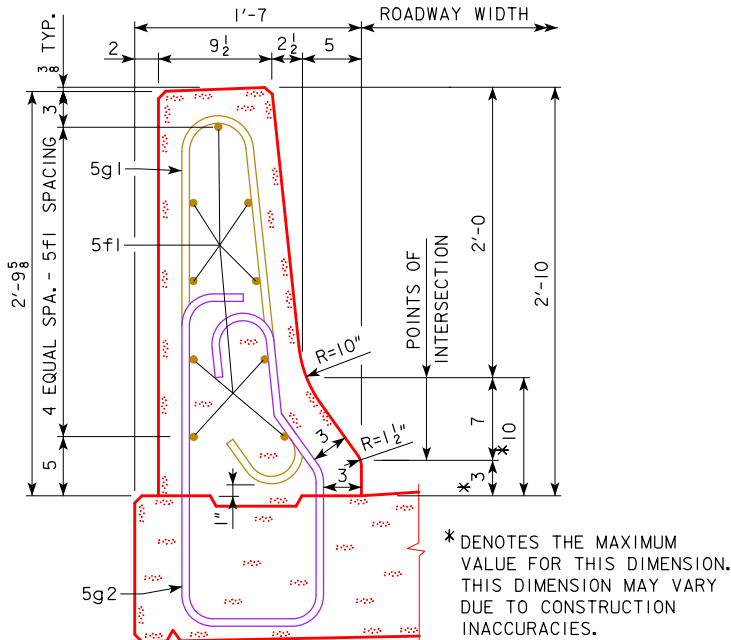
REVISED 08-2020: UPDATED BRIDGE ENGINEER SIGNATURE. REMOVED NOTE STATING "ALL BARRIER RAIL REINFORCING STEEL IS TO BE INCLUDED WITH THE SUPERSTRUCTURE REINFORCING STEEL."

TABLE OF BARRIER RAIL DIMENSIONS AND NUMBERS

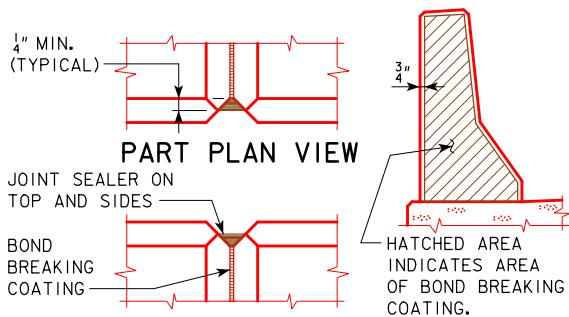
| BRIDGE LENGTH       |             | 70'-0 |           |           |       | 80'-0 |           |           |       | 90'-0  |            |            |        | 100'-0 |            |            |        | 110'-0 |            |            |        | 120'-0 |            |            |        | 130'-0 |            |            |        | 140'-0 |            |            |        | 150'-0 |            |            |        |
|---------------------|-------------|-------|-----------|-----------|-------|-------|-----------|-----------|-------|--------|------------|------------|--------|--------|------------|------------|--------|--------|------------|------------|--------|--------|------------|------------|--------|--------|------------|------------|--------|--------|------------|------------|--------|--------|------------|------------|--------|
| SKEW                |             | 0°    | 15°       | 30°       | 45°   | 0°    | 15°       | 30°       | 45°   | 0°     | 15°        | 30°        | 45°    | 0°     | 15°        | 30°        | 45°    | 0°     | 15°        | 30°        | 45°    | 0°     | 15°        | 30°        | 45°    | 0°     | 15°        | 30°        | 45°    | 0°     | 15°        | 30°        | 45°    | 0°     | 15°        | 30°        | 45°    |
| DIMENSION OR NUMBER | A (FT.-IN.) | 81'-0 | 81'-1 1/4 | 81'-5 1/2 | 82'-3 | 91'-0 | 91'-1 1/4 | 91'-5 1/2 | 92'-3 | 101'-0 | 101'-1 1/4 | 101'-5 1/2 | 102'-3 | 111'-0 | 111'-1 1/4 | 111'-5 1/2 | 112'-3 | 121'-0 | 121'-1 1/4 | 121'-5 1/2 | 122'-3 | 131'-0 | 131'-1 1/4 | 131'-5 1/2 | 132'-3 | 141'-0 | 141'-1 1/4 | 141'-5 1/2 | 142'-3 | 151'-0 | 151'-1 1/4 | 151'-5 1/2 | 152'-3 | 161'-0 | 161'-1 1/4 | 161'-5 1/2 | 162'-3 |
|                     | B (FT.-IN.) | 67'-0 | 67'-1 1/4 | 67'-5 1/2 | 68'-3 | 77'-0 | 77'-1 1/4 | 77'-5 1/2 | 78'-3 | 87'-0  | 87'-1 1/4  | 87'-5 1/2  | 88'-3  | 97'-0  | 97'-1 1/4  | 97'-5 1/2  | 98'-3  | 107'-0 | 107'-1 1/4 | 107'-5 1/2 | 108'-3 | 117'-0 | 117'-1 1/4 | 117'-5 1/2 | 118'-3 | 127'-0 | 127'-1 1/4 | 127'-5 1/2 | 128'-3 | 137'-0 | 137'-1 1/4 | 137'-5 1/2 | 138'-3 | 147'-0 | 147'-1 1/4 | 147'-5 1/2 | 148'-3 |
|                     | C           | 66    | 66        | 66        | 67    | 76    | 76        | 76        | 77    | 86     | 86         | 86         | 87     | 96     | 96         | 96         | 97     | 106    | 106        | 106        | 107    | 116    | 116        | 116        | 117    | 126    | 126        | 126        | 127    | 136    | 136        | 136        | 137    | 146    | 146        | 146        | 147    |
|                     | D (FT.-IN.) | 66'-0 | 66'-0     | 66'-0     | 67'-0 | 76'-0 | 76'-0     | 76'-0     | 77'-0 | 86'-0  | 86'-0      | 86'-0      | 87'-0  | 96'-0  | 96'-0      | 96'-0      | 97'-0  | 106'-0 | 106'-0     | 106'-0     | 107'-0 | 116'-0 | 116'-0     | 116'-0     | 117'-0 | 126'-0 | 126'-0     | 126'-0     | 127'-0 | 136'-0 | 136'-0     | 136'-0     | 137'-0 | 146'-0 | 146'-0     | 146'-0     | 147'-0 |
|                     | E           | 67    | 67        | 67        | 68    | 77    | 77        | 77        | 78    | 87     | 87         | 87         | 88     | 97     | 97         | 97         | 98     | 107    | 107        | 107        | 108    | 117    | 117        | 117        | 118    | 127    | 127        | 127        | 128    | 137    | 137        | 137        | 138    | 147    | 147        | 147        | 148    |
|                     | F (IN.)     | 6     | 6 5/8     | 8 3/4     | 7 1/2 | 6     | 6 5/8     | 8 3/4     | 7 1/2 | 6      | 6 5/8      | 8 3/4      | 7 1/2  | 6      | 6 5/8      | 8 3/4      | 7 1/2  | 6      | 6 5/8      | 8 3/4      | 7 1/2  | 6      | 6 5/8      | 8 3/4      | 7 1/2  | 6      | 6 5/8      | 8 3/4      | 7 1/2  | 6      | 6 5/8      | 8 3/4      | 7 1/2  | 6      | 6 5/8      | 8 3/4      | 7 1/2  |



ELEVATION OF BARRIER RAIL



PART SECTION A-A



PART PLAN VIEW  
PART ELEVATION VIEW  
BARRIER RAIL JOINT DETAILS

BARRIER RAIL NOTES:

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

THE PERMISSIBLE CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN VERTICAL BARS AT A MINIMUM SPACING OF 20 FEET. CONSTRUCTION JOINT CONTACT SURFACES ARE TO BE COATED WITH AN APPROVED BOND BREAKER.

COST OF THE JOINT SEALER AND BOND BREAKER SHALL BE CONSIDERED INCIDENTAL TO OTHER CONSTRUCTION.

THE CONCRETE BARRIER RAIL IS TO BE BID ON A LINEAL FOOT BASIS. THE NUMBER OF LINEAL FEET OF BARRIER RAIL INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT BASED ON PLAN QUANTITIES. PRICE BID FOR "CONCRETE BARRIER RAILING" SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EXCLUDING REINFORCING STEEL, AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS.

IF CONDUIT IS REQUIRED IN THIS PLAN THE RIGID STEEL CONDUIT, JUNCTION BOXES AND FITTINGS INCLUDING LABOR AND ANY ADDITIONAL WORK TO DO THE INSTALLATION IS CONSIDERED INCIDENTAL TO THE COST OF THE RAILING.

THE JOINT SEALER SHALL BE LIGHT GRAY NONSAG LATEX CAULKING SEALER MARKETED FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED.

TOP OF THE BARRIER RAIL IS TO BE PARALLEL TO THE THEORETICAL  $\frac{1}{2}$  GRADE.

CROSS SECTIONAL AREA OF THE STANDARD SECTION OF THE BARRIER RAIL = 2.84 SQUARE FEET.

ALL BARRIER RAIL REINFORCING STEEL IS TO BE EITHER EPOXY COATED OR STAINLESS STEEL AS SHOWN OR NOTED. THE STAINLESS STEEL REINFORCING STEEL SHALL BE DEFORMED BAR GRADE 60 MEETING THE REQUIREMENTS OF MATERIALS I.M.452.

CONCRETE BARRIER RAILS PLACED USING THE SLIPFORM METHOD WILL REQUIRE THE USE OF A CLASS BR CONCRETE IN ACCORDANCE WITH ARTICLE 2513.03, A, 2, OF THE STANDARD SPECIFICATION. CAST-IN-PLACE BARRIER RAILS SHALL USE CLASS C MIX. CLASS D CONCRETE IS NOT PERMITTED FOR CONCRETE BARRIER RAILS (CAST-IN-PLACE OR SLIPFORMED METHOD).

08-2020  
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

CONTINUOUS CONCRETE  
SLAB BRIDGES

JULY, 2014

BARRIER RAIL DETAILS

J40-45-14



REVISED 09-14 - CHANGED REFERENCE TO THE J40-45-14 STANDARD FOR DIMENSION "B" INSTEAD OF J40-45-06 STANDARD.  
REVISED 08-2020-UPDATED BRIDGE ENGINEER SIGNATURE.

| EPOXY REINFORCING STEEL-TWO BARRIER RAILS |     |                           |       |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |
|---|-----|---------------------------|-------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|
| BRIDGE LENGTH                             |     |                           |       | 70'-0        |        |        | 80'-0        |        |        | 90'-0        |        |        | 100'-0       |        |        | 110'-0       |        |        | 120'-0       |        |        | 130'-0       |        |        | 140'-0       |        |        | 150'-0       |        |        |
| SECTION                                   | BAR | LOCATION                  | SHAPE | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT |
| STANDARD SECTION                          | 5g1 | VERTICAL                  |       | 136          | 5'-11  | 839    | 156          | 5'-11  | 963    | 176          | 5'-11  | 1086   | 196          | 5'-11  | 1210   | 216          | 5'-11  | 1333   | 236          | 5'-11  | 1456   | 256          | 5'-11  | 1580   | 276          | 5'-11  | 1703   | 296          | 5'-11  | 1827   |
|   | 5f1 | LONGITUDINAL              |       | 36           | 35'-1  | 1317   | 54           | 27'-5  | 1544   | 54           | 30'-9  | 1732   | 54           | 34'-1  | 1920   | 54           | 37'-5  | 2107   | 72           | 31'-2  | 2340   | 72           | 33'-8  | 2528   | 72           | 36'-2  | 2716   | 72           | 38'-8  | 2904   |
|   |     |                           |       |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |
|   |     |                           |       |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |
|   |     | 4 END SECTIONS @ 266 LBS. |       |              |        |        | 1064         |        |        | 1064         |        |        | 1064         |        |        | 1064         |        |        | 1064         |        |        | 1064         |        |        | 1064         |        |        | 1064         |        |        |
| (INCLUDE WITH SUPERSTRUCTURE REINFORCING) |     |                           |       | TOTAL (LBS.) |        | 3220   | TOTAL (LBS.) |        | 3571   | TOTAL (LBS.) |        | 3882   | TOTAL (LBS.) |        | 4194   | TOTAL (LBS.) |        | 4504   | TOTAL (LBS.) |        | 4860   | TOTAL (LBS.) |        | 5172   | TOTAL (LBS.) |        | 5483   | TOTAL (LBS.) |        | 5795   |

REINFORCING QUANTITIES SHOWN ARE BASED ON 45° SKEW BID LENGTHS.

| STAINLESS STEEL REINFORCING STEEL-TWO BARRIER RAILS |     |                           |       |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |
|---|-----|---------------------------|-------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|
| BRIDGE LENGTH                                       |     |                           |       | 70'-0        |        |        | 80'-0        |        |        | 90'-0        |        |        | 100'-0       |        |        | 110'-0       |        |        | 120'-0       |        |        | 130'-0       |        |        | 140'-0       |        |        | 150'-0       |        |        |
| SECTION   | BAR | LOCATION                  | SHAPE | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT | NO.          | LENGTH | WEIGHT |
| STANDARD SECTION                                    | 5g2 | VERTICAL                  |       | 136          | 6'-10  | 969    | 156          | 6'-11  | 1125   | 176          | 7'-1   | 1300   | 196          | 7'-4   | 1499   | 216          | 7'-6   | 1690   | 236          | 7'-9   | 1908   | 256          | 7'-11  | 2114   | 276          | 8'-2   | 2351   | 296          | 8'-5   | 2598   |
|   |     |                           |       |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |
|   |     |                           |       |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |
|   |     |                           |       |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |              |        |        |
|   |     | 4 END SECTIONS @ 192 LBS. |       |              |        |        | 768          |        |        |              | 768    |        |              |        | 768    |              |        |        | 768          |        |        |              | 768    |        |              |        | 768    |              |        |        |
| (INCLUDE WITH SUPERSTRUCTURE REINFORCING)           |     |                           |       | TOTAL (LBS.) |        | 1737   | TOTAL (LBS.) |        | 1893   | TOTAL (LBS.) |        | 2068   | TOTAL (LBS.) |        | 2267   | TOTAL (LBS.) |        | 2458   | TOTAL (LBS.) |        | 2676   | TOTAL (LBS.) |        | 2882   | TOTAL (LBS.) |        | 3119   | TOTAL (LBS.) |        | 3366   |

REINFORCING QUANTITIES SHOWN ARE BASED ON 45° SKEW BID LENGTHS.

BENT BAR DETAILS

| 5g2 BARS |                                   |        |
|----------|-----------------------------------|--------|
| BRIDGE   | "a"                               | LENGTH |
| 70'      | 1'-2                              | 6'-10  |
| 80'      | 1'-2 <sup>3</sup> / <sub>4</sub>  | 6'-11  |
| 90'      | 1'-3 <sup>3</sup> / <sub>4</sub>  | 7'-1   |
| 100'     | 1'-5                              | 7'-4   |
| 110'     | 1'-6                              | 7'-6   |
| 120'     | 1'-7 <sup>1</sup> / <sub>2</sub>  | 7'-9   |
| 130'     | 1'-8 <sup>3</sup> / <sub>4</sub>  | 7'-11  |
| 140'     | 1'-10                             | 8'-2   |
| 150'     | 1'-11 <sup>1</sup> / <sub>2</sub> | 8'-5   |

NOTE: ALL DIMENSIONS ARE OUT TO OUT.  
"D"= PIN DIAMETER.

| CONCRETE PLACEMENT SUMMARY |   |                                   |       |       |       |        |        |        |        |        |        |
|----------------------------|---|-----------------------------------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| BRIDGE LENGTH              |   |                                   | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
| STANDARD SECTION           | * | 2 x "B" @ 0.1052 CU. YDS. PER FT. | 14.4  | 16.5  | 18.6  | 20.7   | 22.8   | 24.9   | 27.0   | 29.1   | 31.2   |
| END SECTION                |   | 4 @ 0.65 CU. YDS.                 | 2.6   | 2.6   | 2.6   | 2.6    | 2.6    | 2.6    | 2.6    | 2.6    | 2.6    |
|                            |   |                                   |       |       |       |        |        |        |        |        |        |
|                            |   |                                   |       |       |       |        |        |        |        |        |        |
| TOTAL (CU. YDS.)           |   |                                   | 17.0  | 19.1  | 21.2  | 23.3   | 25.4   | 27.5   | 29.6   | 31.7   | 33.8   |

\* SEE J40-45-14 FOR DIMENSION "B".  
CONCRETE QUANTITIES SHOWN ARE  
BASED ON 45° SKEW BID LENGTHS.

| CONCRETE BARRIER RAIL QUANTITIES |          |      |       |       |       |        |        |        |        |        |        |
|----------------------------------|----------|------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| BRIDGE LENGTH                    |          | UNIT | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
| CONCRETE BARRIER RAILING         | 0° SKEW  | L.F. | 162.0 | 182.0 | 202.0 | 222.0  | 242.0  | 262.0  | 282.0  | 302.0  | 322.0  |
| CONCRETE BARRIER RAILING         | 15° SKEW | L.F. | 162.2 | 182.2 | 202.2 | 222.2  | 242.2  | 262.2  | 282.2  | 302.2  | 322.2  |
| CONCRETE BARRIER RAILING         | 30° SKEW | L.F. | 162.9 | 182.9 | 202.9 | 222.9  | 242.9  | 262.9  | 282.9  | 302.9  | 322.9  |
| CONCRETE BARRIER RAILING         | 45° SKEW | L.F. | 164.5 | 184.5 | 204.5 | 224.5  | 244.5  | 264.5  | 284.5  | 304.5  | 324.5  |

08-2020  
LATEST REVISION DATE

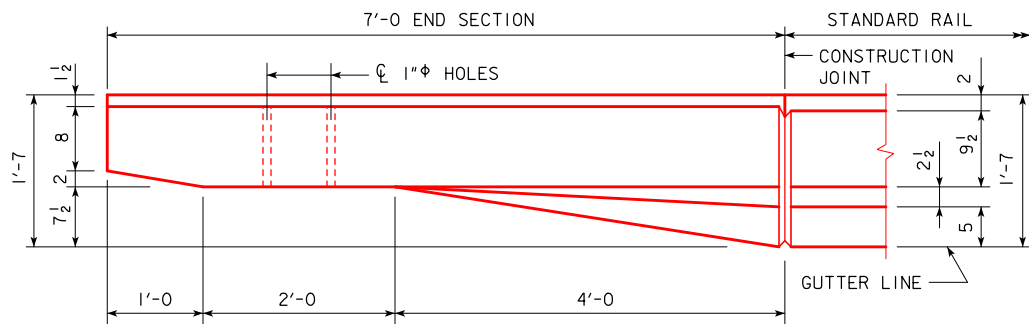
APPROVED BY BRIDGE ENGINEER

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES  
**CONTINUOUS CONCRETE  
SLAB BRIDGES**  
JULY, 2014

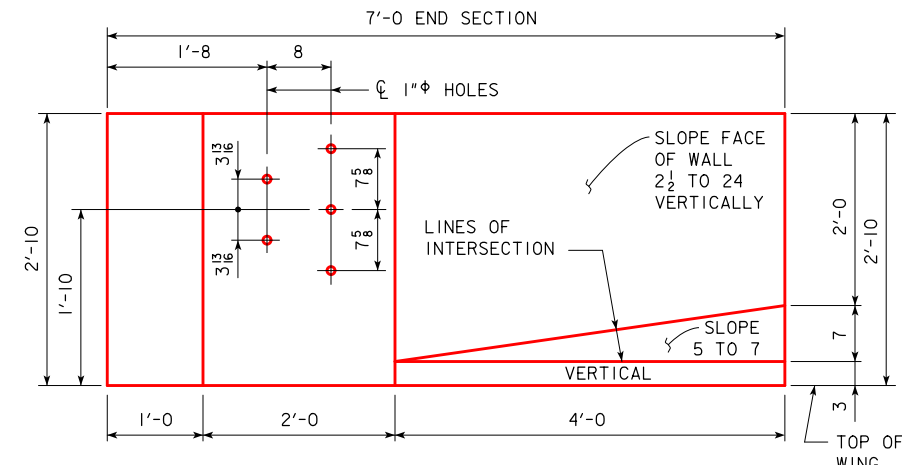
BARRIER RAIL DETAILS

J40-46-14

REVISED 03-2016 - REFERENCE TO "1" PVC PIPE" WAS CHANGED FROM "1" PVC PLASTIC CONDUIT".  
REVISED 09-2016 - REMOVED "NOTE: REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET."  
REVISED 08-2020 - UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED SECTION A-A WAS VIEW A-A.

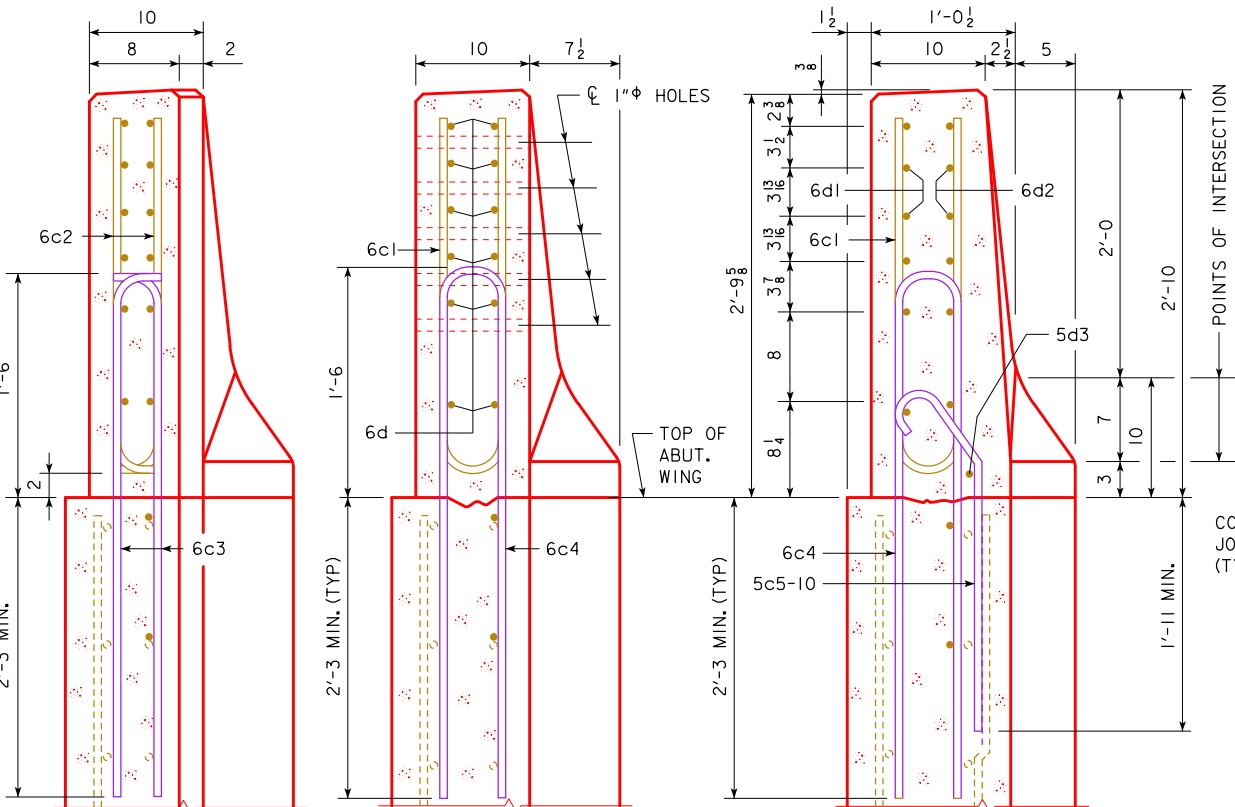


PART PLAN VIEW



PART ELEVATION VIEW

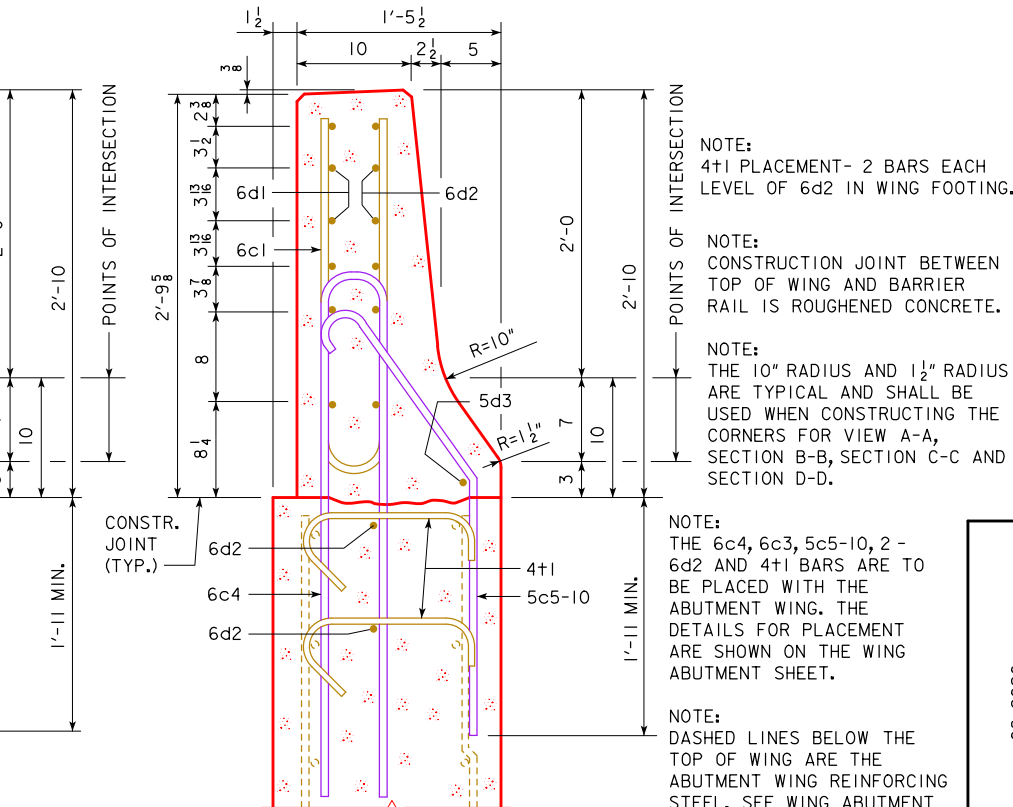
PROVIDE 5 HOLES FORMED WITH 1" PVC PIPE. COST TO BE INCLUDED IN PRICE BID FOR CONCRETE BARRIER RAILING.



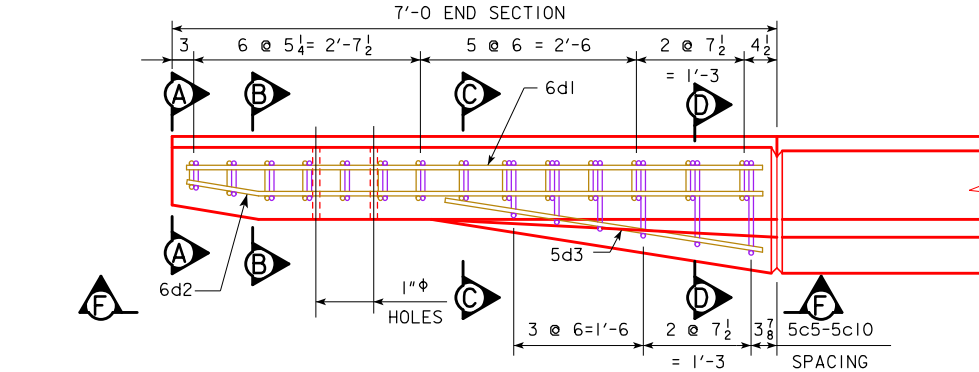
SECTION A-A

SECTION B-B

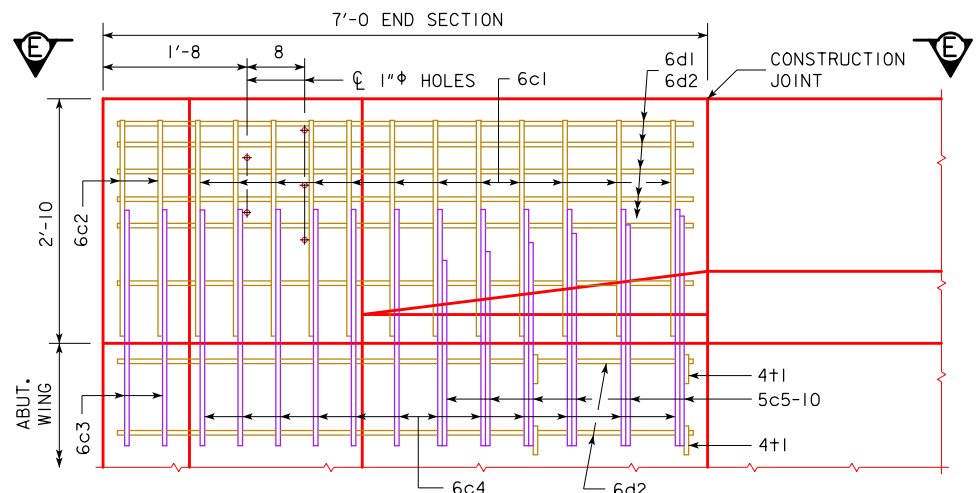
SECTION C-C



SECTION D-D



PART VIEW E-E



PART VIEW F-F

NOTE:  
4+1 PLACEMENT - 2 BARS EACH LEVEL OF 6d2 IN WING FOOTING.

NOTE:  
CONSTRUCTION JOINT BETWEEN TOP OF WING AND BARRIER RAIL IS ROUGHENED CONCRETE.

NOTE:  
THE 10" RADIUS AND 1 1/2" RADIUS ARE TYPICAL AND SHALL BE USED WHEN CONSTRUCTING THE CORNERS FOR VIEW A-A, SECTION B-B, SECTION C-C AND SECTION D-D.

NOTE:  
THE 6c4, 6c3, 5c5-10, 2 - 6d2 AND 4+1 BARS ARE TO BE PLACED WITH THE ABUTMENT WING. THE DETAILS FOR PLACEMENT ARE SHOWN ON THE WING ABUTMENT SHEET.

NOTE:  
DASHED LINES BELOW THE TOP OF WING ARE THE ABUTMENT WING REINFORCING STEEL. SEE WING ABUTMENT SHEET FOR PLACEMENT.

EPOXY COATED REINF. STEEL - ONE END SECT.

| BAR                              | LOCATION                     | SHAPE | NO. | LENGTH | WEIGHT |
|----------------------------------|------------------------------|-------|-----|--------|--------|
| 6c1                              | RAIL, VERTICAL               |       | 12  | 5'-6   | 99     |
| 6c2                              | RAIL, VERTICAL               |       | 4   | 2'-10  | 17     |
| 6d1                              | RAIL, HORIZONTAL             |       | 6   | 6'-8   | 60     |
| 6d2                              | RAIL, HORIZONTAL             |       | 8   | 6'-9   | 81     |
| 5d3                              | RAIL, HORIZONTAL             |       | 1   | 3'-9   | 4      |
| 4+1                              | RAIL, ABUTMENT WING TIE BARS |       | 4   | VARIES | 5      |
| EPOXY REINF. TOTAL WEIGHT (LBS.) |                              |       |     |        | 266    |

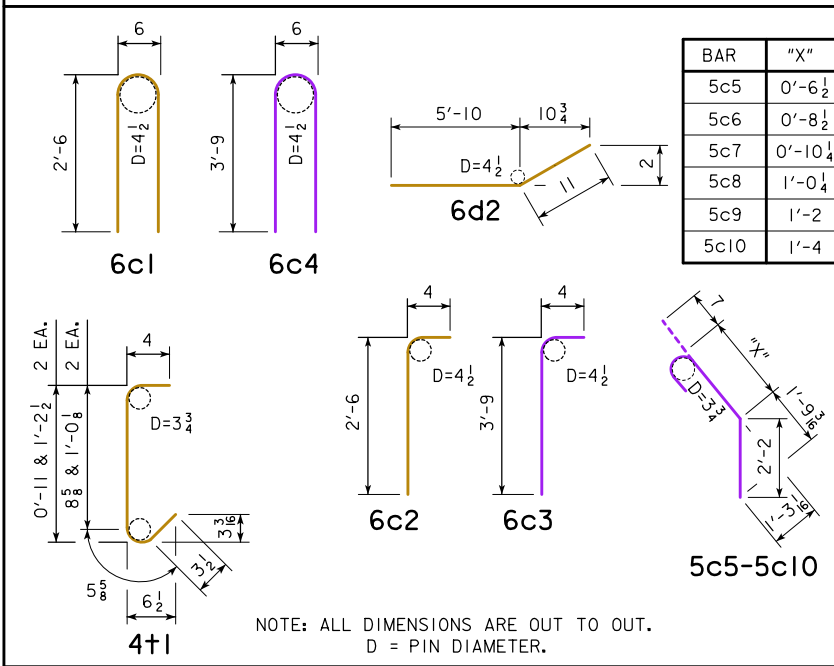
STAINLESS STEEL REINF. STEEL - ONE END SECT.

| BAR                                 | LOCATION       | SHAPE | NO. | LENGTH | WEIGHT |
|-------------------------------------|----------------|-------|-----|--------|--------|
| 6c3                                 | RAIL, VERTICAL |       | 4   | 4'-1   | 25     |
| 6c4                                 | RAIL, VERTICAL |       | 12  | 8'-0   | 144    |
| 5c5-10                              | RAIL, VERTICAL |       | 6   | VARIES | 23     |
| STAINLESS STEEL TOTAL WEIGHT (LBS.) |                |       |     |        | 192    |

CONCRETE PLACEMENT SUMMARY

| SECTION                      | TOTAL        |
|------------------------------|--------------|
| BARRIER RAIL ONE END SECTION | 0.65 CU. YD. |

BENT BAR DETAILS



08-2020  
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

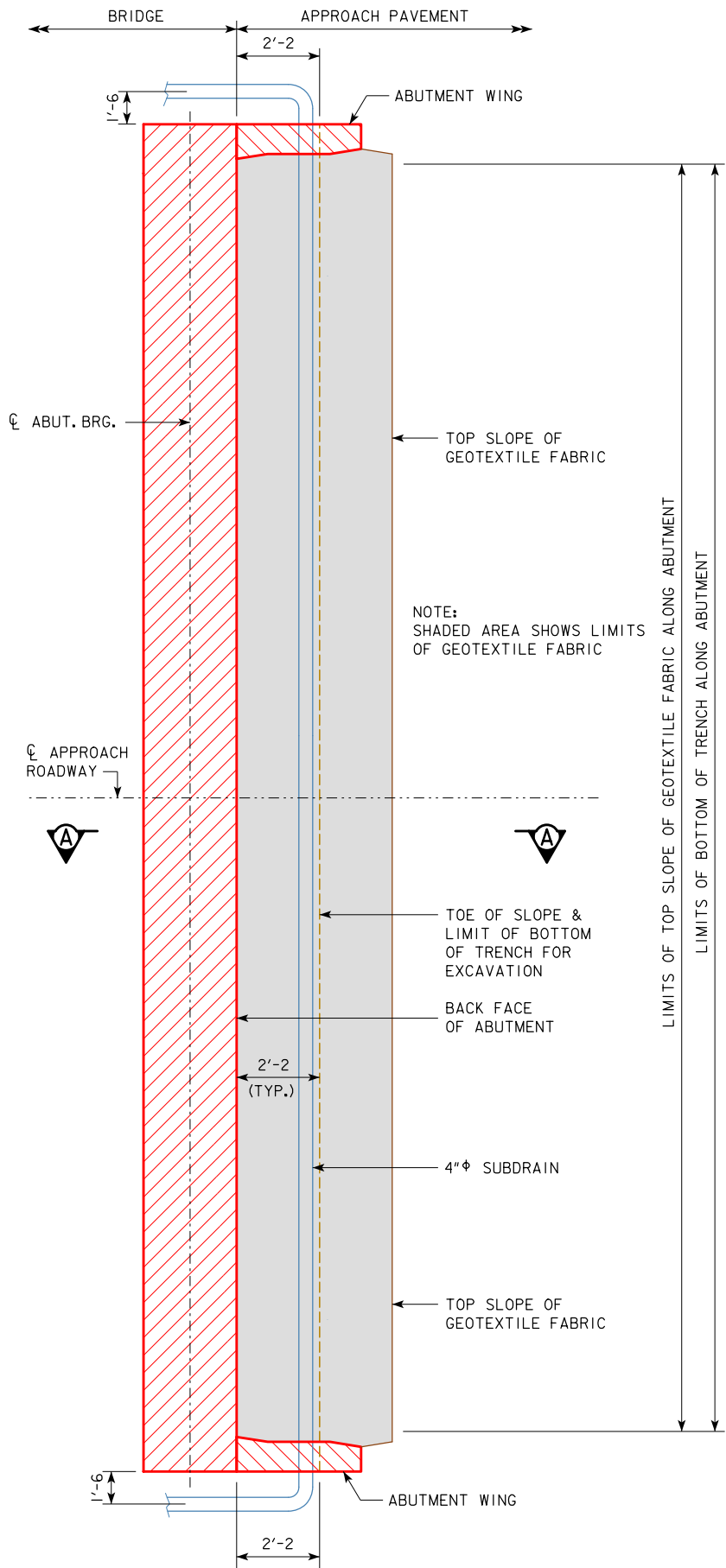
CONTINUOUS CONCRETE  
SLAB BRIDGES

JULY, 2014

BARRIER RAIL END SECTION

J40-47-14

REVISED 09-14 - THE TECHNICAL DATA INFORMATION TABLE WAS REMOVED AND A NOTE ADDED TO REFER TO THE STANDARDS SPECIFICATIONS FOR THIS INFORMATION.  
REVISED 09-2016 - CHANGED THE BRIDGE APPROACH PAVEMENT STANDARD TO "BR" (WAS "RK-20").  
REVISED 08-2020: UPDATED BRIDGE ENGINEER SIGNATURE.



ABUTMENT PLAN

### ABUTMENT BACKFILL PROCESS:

THE BASE OF THE EXCAVATION SUBGRADE BEHIND THE ABUTMENT IS TO BE GRADED WITH A 4% SLOPE AWAY FROM THE ABUTMENT FOOTING AND A 2% CROSS SLOPE IN THE DIRECTION OF THE SUBDRAIN OUTLET. THIS EXCAVATION SHAPING IS TO BE DONE PRIOR TO BEGINNING INSTALLATION OF THE GEOTEXTILE AND BACKFILL MATERIAL.

AFTER THE SUBGRADE HAS BEEN SHAPED, THE GEOTEXTILE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS SHOWN. THE FABRIC IS INTENDED TO BE INSTALLED IN THE BASE OF THE EXCAVATION AND EXTENDED VERTICALLY UP THE ABUTMENT BACKWALL, ABUTMENT WING WALLS, AND EXCAVATION FACE TO A HEIGHT THAT WILL BE APPROXIMATELY 1 TO 2 FOOT HIGHER THAN THE HEIGHT OF THE POROUS BACKFILL PLACEMENT AS SHOWN IN THE "BACKFILL DETAILS" ON THIS SHEET. THE STRIPS OF THE FABRIC PLACED SHALL OVERLAP APPROXIMATELY 1 FOOT AND SHALL BE PINNED IN PLACE. THE FABRIC SHALL BE ATTACHED TO THE ABUTMENT BY USING LATH FOLDED IN THE FABRIC AND SECURED TO THE CONCRETE WITH SHALLOW CONCRETE NAILS. THE FABRIC PLACED AGAINST THE EXCAVATION FACE SHALL BE PINNED.

WHEN THE FABRIC IS IN PLACE, THE SUBDRAIN SHALL BE INSTALLED DIRECTLY ON THE FABRIC AT THE TOE OF THE REAR EXCAVATION SLOPE. A SLOT WILL NEED TO BE CUT IN THE FABRIC AT THE POINT WHERE THE SUBDRAIN EXITS THE FABRIC NEAR THE END OF THE ABUTMENT WING WALL.

POROUS BACKFILL IS THEN PLACED AND LEVELED, NO COMPACTION IS REQUIRED.

THE REMAINING WORK INVOLVES BACKFILLING WITH FLOODABLE BACKFILL, SURFACE FLOODING, AND VIBRATORY COMPACTION. THE FLOODABLE BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE FLOODABLE BACKFILL SHALL BE PLACED IN INDIVIDUAL LIFTS, SURFACE FLOODED, AND COMPACTED WITH VIBRATORY COMPACTION TO ENSURE FULL CONSOLIDATION. LIMIT THE LOOSE LIFTS TO NO MORE THAN 2 FEET OF THICKNESS.

START SURFACE FLOODING FOR EACH FLOODABLE BACKFILL LIFT AT THE HIGH POINT OF THE SUBDRAIN AND PROGRESS TO THE LOW POINT WHERE THE SUBDRAIN EXITS THE FABRIC. TO ENSURE UNIFORM SURFACE FLOODING, WATER RUNNING FULL IN A 2-INCH DIAMETER HOSE SHOULD BE SPRAYED IN SUCCESSIVE 6-FOOT TO 8-FOOT INCREMENTS FOR 3 MINUTES WITHIN EACH INCREMENT.

FLOODABLE BACKFILL LIFT PLACEMENT, FLOODING, AND COMPACTION SHALL PROGRESS UNTIL THE REQUIRED FULL THICKNESS OF THE ABUTMENT BACKFILL HAS BEEN COMPLETED.

WATER REQUIRED FOR FLOODING, SUBDRAINS, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS WILL NOT BE MEASURED SEPARATELY FOR PAYMENT.

THE COST OF WATER REQUIRED FOR FLOODING, SUBDRAINS, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR STRUCTURAL CONCRETE.

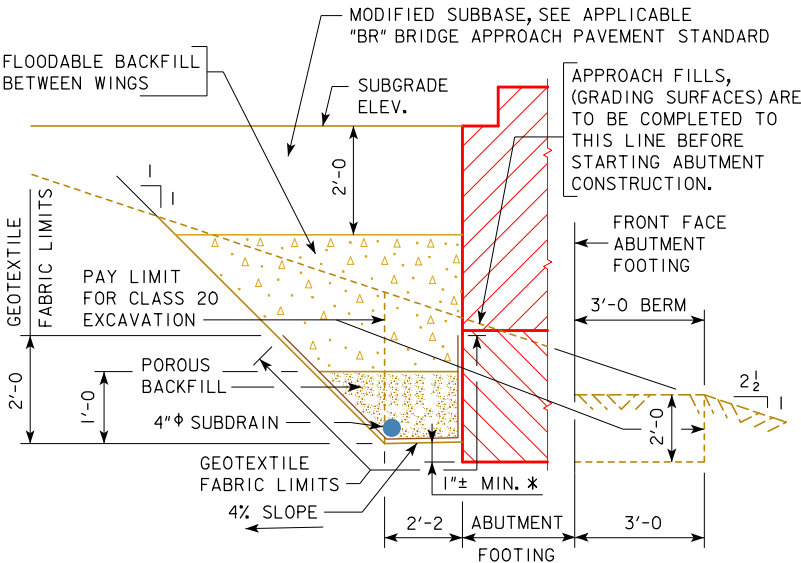
NOTE:  
SEE SUBDRAIN DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

### NOTE:

SUBDRAIN SHALL SLOPE DOWNWARD 2% FROM CL APPROACH ROADWAY WHEN OUTLETTING BOTH SIDES OF THE ABUTMENT.

SUBDRAIN SHALL SLOPE DOWNWARD 2% FROM HIGH END WHEN OUTLETTING AT ONE END OF THE ABUTMENT.



THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.



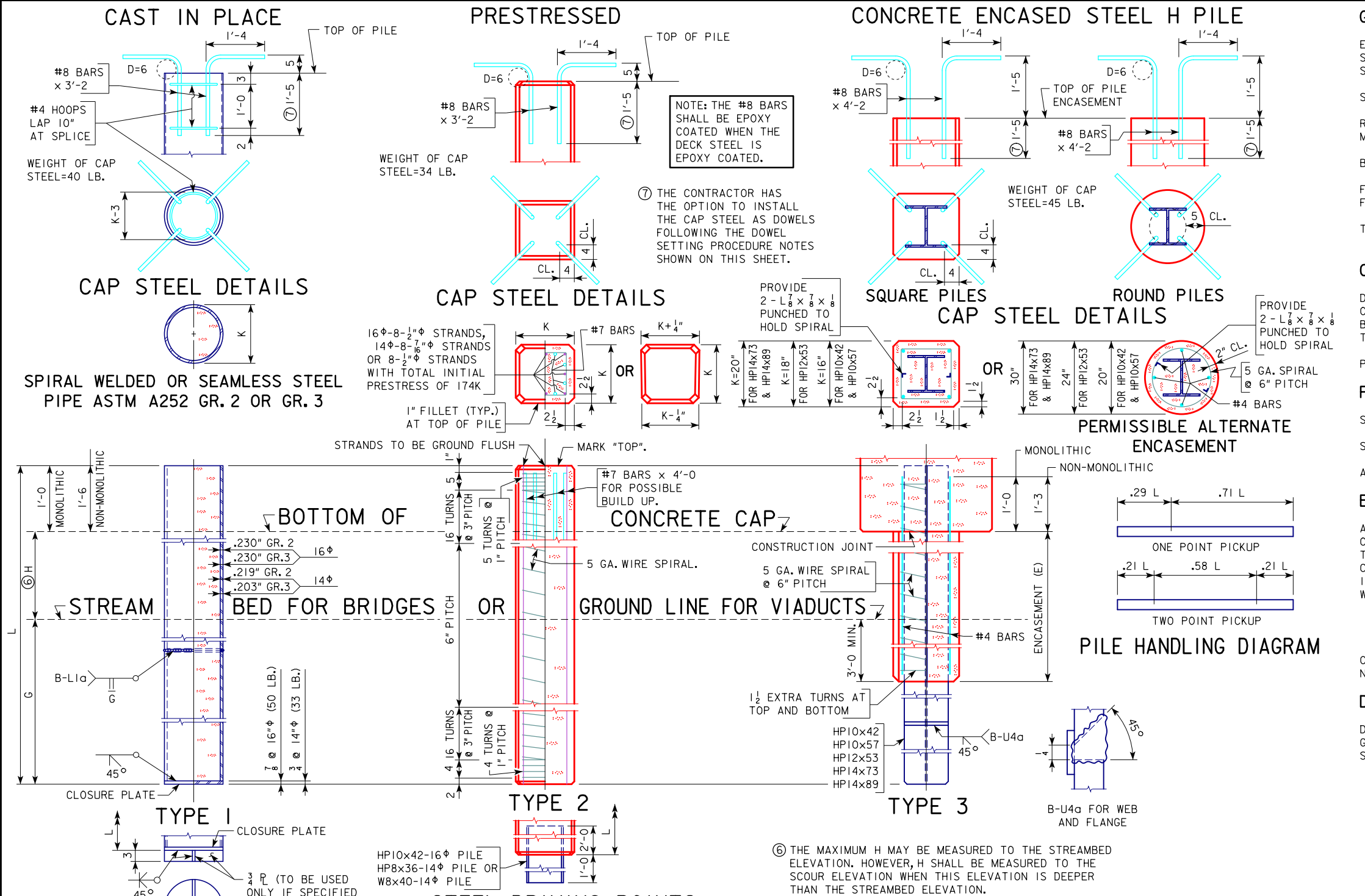
SECTION A-A  
BACKFILL DETAILS

NOTE: GEOTEXTILE FABRIC WILL BE ATTACHED TO FACE OF ABUTMENT FOOTING AND WINGS.

\* DIMENSION VARIES DUE TO 2% SUBDRAIN SLOPE.

|  |  |   |  |
|--|--|---|--|
| 08-2020<br>LATEST REVISION DATE              | <br>APPROVED BY BRIDGE ENGINEER |  |  |
|  |  | STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES   |  |
|  |  | CONTINUOUS CONCRETE<br>SLAB BRIDGES<br>JULY, 2014                                     |  |
| ABUTMENT BACKFILL<br>DETAILS<br>FOR 0° SKEWS |  | J40-52-14   |  |

REVISION 07-2019: CHANGED ALL REFERENCES OF "LINEAL" TO "LINEAL". TYPE 3 FOR "ROUND HP14x73 PILE" CHANGED "CONCRETE (E=18') QTY. TO 3.17 (WAS 2.75). CHANGED "CONCRETE 1' CHANGE" TO 0.176 (WAS 0.153). CHANGED "REINFORCING (E=18') QTY. TO 110 LB. (WAS 107). CHANGED "REINFORCING 1' CHANGE" TO 5.62 LB. (WAS 5.50). TYPE 3 FOR "ROUND HP14x89 PILE" CHANGED "CONCRETE (E=18') QTY. TO 3.15 (WAS 2.73). CHANGED "CONCRETE 1' CHANGE" TO 0.175 (WAS 0.152). CHANGED "REINFORCING (E=18') QTY. TO 110 LB. (WAS 107). CHANGED "REINFORCING 1' CHANGE" WEIGHT TO 5.62 LB. (WAS 5.50). ENGLISH\MISCELLANEOUS\BRIDGES.DGN - PIOL - THIS SHEET ISSUED 01-09.



**GENERAL NOTES:**

EXCEPT AS NOTED ELSEWHERE, MATERIAL, CONSTRUCTION, DRIVING AND EXTENSIONS OR BUILD UPS WHEN NECESSARY SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS OF THE IOWA D.O.T. AND CURRENT SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS APPLICABLE.

CAP STEEL SHALL BE AS DETAILED ON THIS SHEET (D=PIN DIAMETER). IT SHALL BE USED IF PILE EMBEDMENT IS LESS THAN 1'-6".

"NOMINAL RESISTANCE Pn", "G", AND "H" AS GIVEN IN TABLES ARE RECOMMENDED DESIGN VALUES FOR ORDINARY CONDITIONS, BUT MAY BE MODIFIED FOR SPECIAL CONDITIONS ON ANY GIVEN JOB.

NOMINAL RESISTANCE Pn AND PILE SIZE REQUIRED SHALL IN ALL CASES BE AS SPECIFIED ON THE PLANS.

NOMINAL RESISTANCE Pn SHOWN ARE FOR FRICTION RESISTANCE EXCEPT FOR TYPE 3 PILING WHERE THE RESISTANCE VALUES SHOWN COULD BE EITHER FRICTION OR POINT RESISTANCE.

COST OF ALL DRIVING POINTS AND CAP STEEL IS TO BE INCLUDED IN THE PRICE BID PER LINEAL FOOT FOR PILING.

WIRE SPIRAL SHALL CONFORM TO ASTM A82.

**CAST IN PLACE PILE NOTES:**

SHELL THICKNESSES SHOWN ARE MINIMUM REQUIREMENTS. THE METHOD OF DRIVING STEEL SHELL PILES SHALL BE ADAPTED TO THE TYPE AND THICKNESS OF SHELL SPECIFIED. ANY SHELLS WHICH HAVE BEEN IMPROPERLY DRIVEN, BROKEN OR ARE OTHERWISE DEFECTIVE SHALL BE REMOVED AND REPLACED BY THE BRIDGE CONTRACTOR.

ALL CAST IN PLACE PILES SHALL HAVE A CLOSURE PLATE. DRIVING POINTS SHALL BE USED IF SPECIFIED ON THE PLANS.

**PRESTRESSED PILE NOTES:**

EXCEPT AS OTHERWISE NOTED ALL EXPOSED CORNERS 90° OR SHARPER SHALL BE FILLETED 3".

DRIVING POINTS FOR PRESTRESSED PILES, IF CALLED FOR ON THE PLANS, SHALL BE AS DETAILED.

HEADS OF PRESTRESSED PILES TO BE FINISHED SMOOTH AND NORMAL TO AXIS OF PILE.

**BIDDING NOTES:**

THE PLANS SHALL DESIGNATE THE SIZE OF PILE TO BE USED. THEY SHALL ALSO SPECIFY THE TYPE, EITHER TYPE 1, TYPE 2, OR TYPE 3. IF THE OPTION OF TYPE 1 OR 2 IS GIVEN ON THE PLANS, THE CONTRACTOR SHALL CHOOSE THE TYPE TO BE USED. IF TYPE 3 IS SPECIFIED, TYPE 3 SHALL BE USED, BUT THE CONTRACTOR MAY CHOOSE THE SHAPE OF THE ENCASEMENT. IT SHOULD BE KEPT IN MIND THAT FOR A GIVEN SIZE AND RESISTANCE VALUE, LENGTH MAY VARY WITH THE SHAPE (SQUARE OR ROUND).

PILES SHALL BE BID DESIGNATING THE SIZE, TYPE AND LENGTH.

TYPE 1 PILING WILL BE BID PER LINEAL FOOT OF PILE.

TYPE 2 PILING WILL BE BID PER LINEAL FOOT OF PILE.

TYPE 3 PILING WILL BE BID PER LINEAL FOOT OF PILE AND LINEAL FOOT OF ENCASEMENT. PRICE BID FOR ENCASEMENT SHALL BE FULL PAYMENT FOR NECESSARY EXCAVATION AND FOR FURNISHING AND PLACING ALL MATERIAL.

**DOWEL SETTING PROCEDURE:**

IF CAP STEEL IS REQUIRED FOR THE PRESTRESSED PILES THE #8 DEFORMED BARS ARE TO BE SET AS DOWELS INTO THE PILES WITH POLYMER GROUT IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS OR BY THE FOLLOWING PROCEDURE.

-A.) DRILL HOLE APPROXIMATELY TWICE THE DIAMETER OF THE DOWEL BAR AND TO THE DEPTH INDICATED.

-B.) FILL HOLE WITH WATER AND ALLOW TO STAND LONG ENOUGH TO THOROUGHLY SATURATE THE SURROUNDING CONCRETE (ABOUT FOUR HOURS).

-C.) BLOW OUT ALL FREE WATER AND FILL HOLE 2/3 FULL OF MORTAR.

-D.) INSERT DOWEL BY DRIVING, IF NECESSARY, AND MANIPULATE OR TAP WITH A HAMMER TO CONSOLIDATE MORTAR AND SECURE COMPLETE EMBEDMENT.

-E.) ADD MORE MORTAR, IF NECESSARY, TO FILL HOLE.

-F.) MORTAR SHALL CONSIST OF EQUAL PARTS PORTLAND CEMENT AND SAND WITH JUST ENOUGH WATER TO MAKE A WORKABLE MIX.

APPROVED BY:  BRIDGE ENGINEER

|   |  |
|---|--|
| LATEST REVISION<br>DATE: 07-2019                                | STANDARD DESIGN                        |
|   | CONCRETE AND STEEL PILES               |
|   | CAST IN PLACE, PRESTRESSED AND ENCASED |
|   | FOR USE IN                             |
| LRFD TRESTLE PILE BENTS - PIOL                                  |  |
| IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION            |  |
| DESIGN SHEET NO. _____ OF _____ FILE NO. _____ DESIGN NO. _____ |  |
| SHEET NUMBER  |  |



GEOTECHNICAL DESIGN



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

*Mark A. Dell* 4/9/2021  
Signature Date  
Mark A. Dell  
Printed or Typed Name  
My license renewal date is December 31, 2021

Pages or sheets covered by this seal: SPS.1-SPS.6



THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

Water Level Observations (Ft.)

| Boring No. | Date Drilled | While Sampling | After Drilling |
|------------|--------------|----------------|----------------|
| B-209      | 03/23/2020   | 9.0            | 5.5 @ 24 Hrs   |
| B-210      | 03/23/2020   | 9.0            | 6.5 @ 24 Hrs   |
| B-211      | 03/24/2020   | 8.0            | 4.5 @ 24 Hrs   |
| B-212      | 03/24/2020   | 8.0            | 4.5 @ 24 Hrs   |

LOCATION

US 30 OVER AN UNNAMED CREEK  
T-83N R-11W  
SECTION 34  
UNION TOWNSHIP  
BENTON COUNTY  
BRIDGE MAINT. NO. 0627.8R030  
LATITUDE 41.963369°  
LONGITUDE -92.108117°  
FHWA NO. 700495

DESIGN FOR 0° SKEW

90'-0 X 40'-0 CONTINUOUS  
CONCRETE SLAB BRIDGE

27'-6 END SPANS 35'-0 INTERIOR SPAN

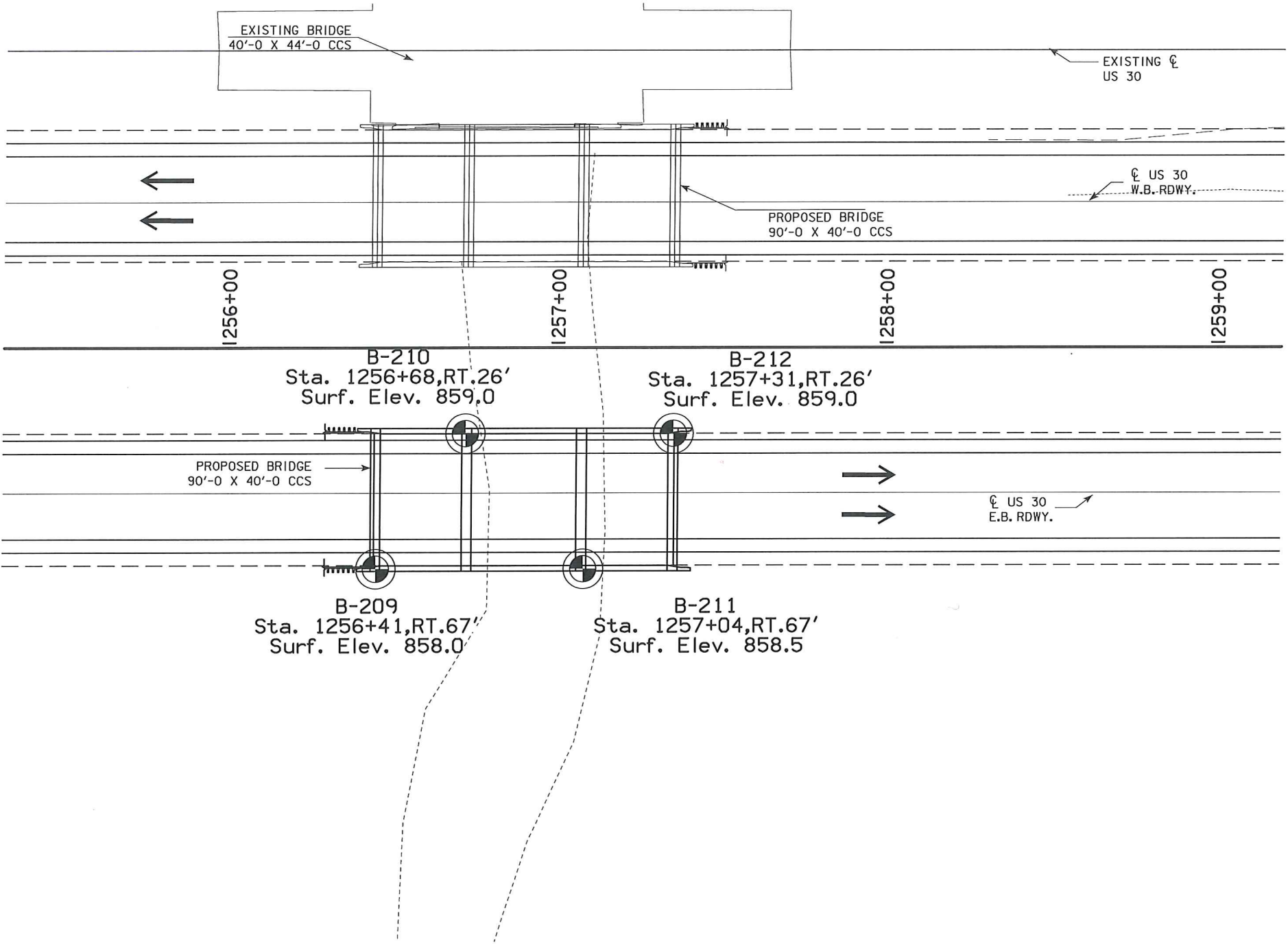
EASTBOUND BRIDGE SOIL PLAN SHEET

STATION 1256+86.04, 44.00' RT

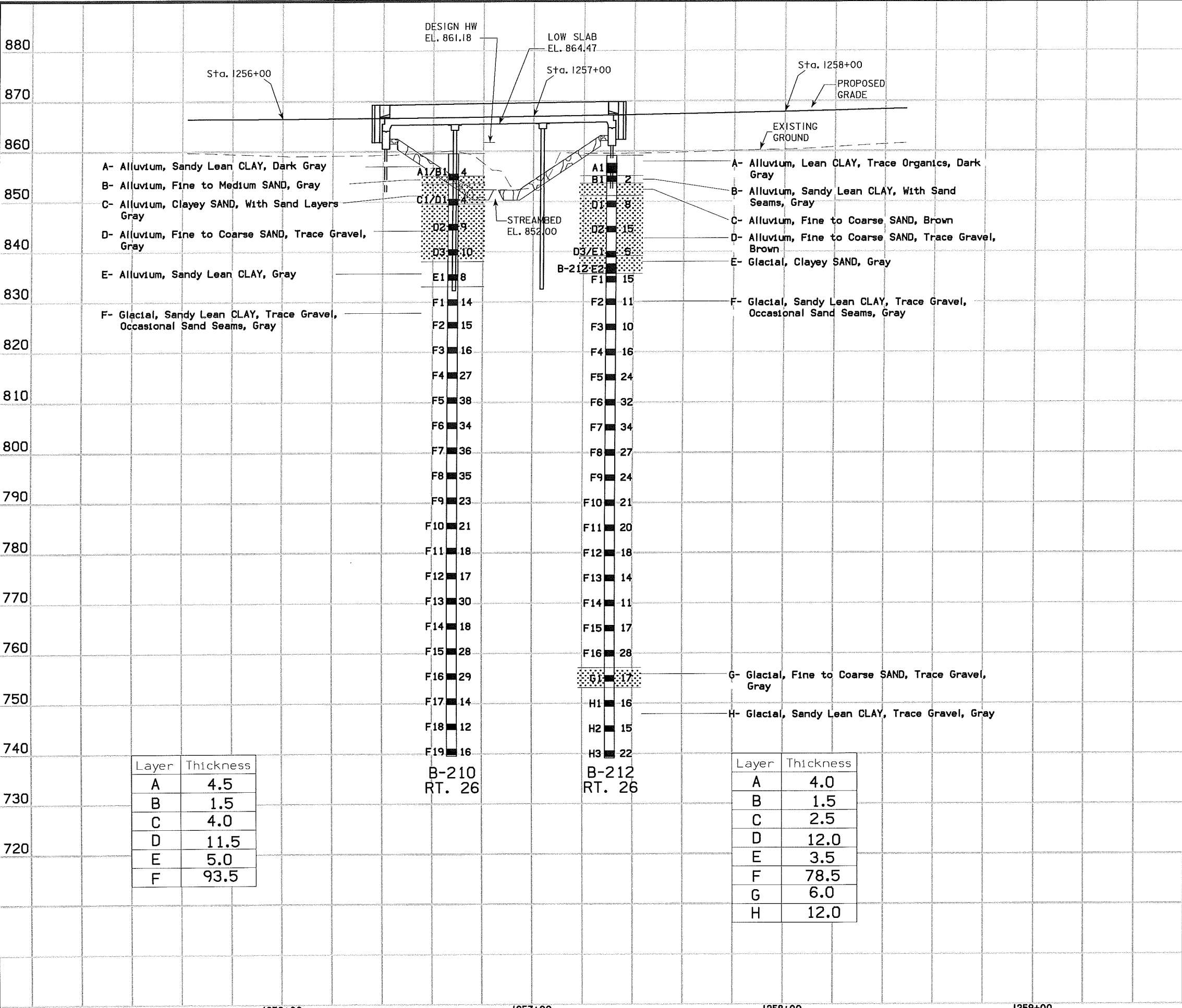
BENTON COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 3 FILE NO. 31043 DESIGN NO. 216







| SHELBY TUBE CORE DATA                |             |
|--------------------------------------|-------------|
| CORE NO.                             | B-212 E2    |
| DEPTH IN FEET                        | 21.5'-23.5' |
| CLASSIFICATION (AASHTO)              | A-6(3)      |
| COEFF.CONVOL. (SQ. FT /DAY)          | 0.187       |
| TRIAxIAL COMPRESSION                 | CU          |
| COHESION - PSF                       | 437.8       |
| FRICTION COEFF.                      | 0.40        |
| MOISTURE CONTENT %                   | 13          |
| DRY DENSITY - PCF                    | 122         |
| CU-CONSOLIDATED UNDRAINED            |             |
| UU-UNCONSOLIDATED UNDRAINED          |             |
| UC-UNCONFINED COMPRESSION (c=1/2 Qu) |             |

NOT ALL SHELBY TUBE SAMPLES COLLECTED WERE TESTED IN THE LABORATORY

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

| LEGEND |                         |
|--------|-------------------------|
|        | WATER                   |
|        | DRY                     |
|        | PLUGGED                 |
|        | MOISTURE                |
|        | SHELBY                  |
|        | BLOW COUNT              |
|        | DENS. CORE              |
|        | SAMPLE                  |
|        | LAYER - NO. BLOWS       |
|        | DIAMOND CORE            |
|        | SAND                    |
|        | GRAVELLY SAND           |
|        | BOULDERS                |
|        | SOIL REMEDIATION AREA   |
|        | LIMESTONE (L.S.)        |
|        | BROKEN & WEATHERED L.S. |
|        | SANDSTONE               |
|        | SHALE                   |
|        | SANDY SOIL              |

NORTH LINE PROFILE

DESIGN FOR 0° SKEW  
90'-0 X 40'-0 CONTINUOUS  
CONCRETE SLAB BRIDGE  
27'-6 END SPANS 35'-0 INTERIOR SPAN  
EASTBOUND BRIDGE SOIL PROFILE SHEET  
STATION 1256+86.04, 44.00' RT  
BENTON COUNTY  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 2 OF 3 FILE NO. 31043 DESIGN NO. 216





## BRIDGE APPROACH SECTION

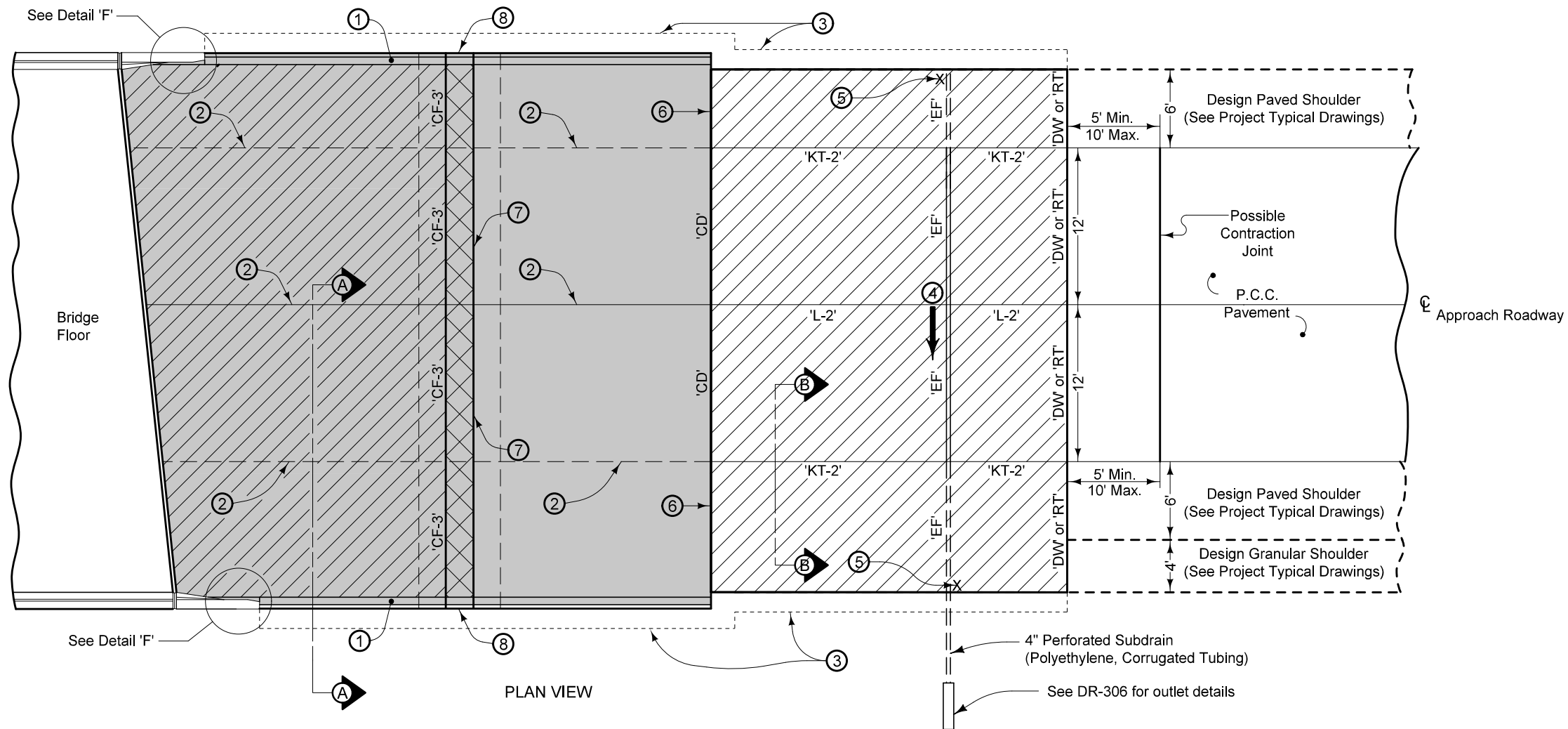
Refer to the Series.

\* Not a bid item

[illegible]

## LONGITUDINAL GROOVING

[illegible]



For joint details, see PV-101.

For curb details, see Detail 'G'.

All transverse bars are #5.

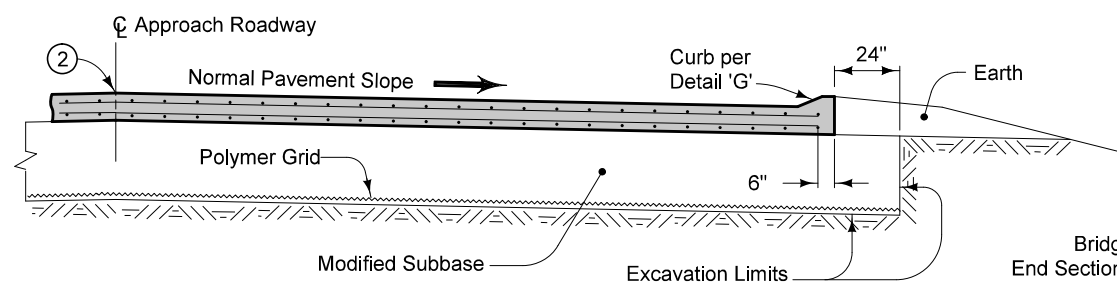
Use epoxy coated bars for all reinforcement.

Quantities for both the 1'-9" top part of the sleeper slab and the 6'-3" portion under the approach pavement have been included in the double reinforced section quantities.

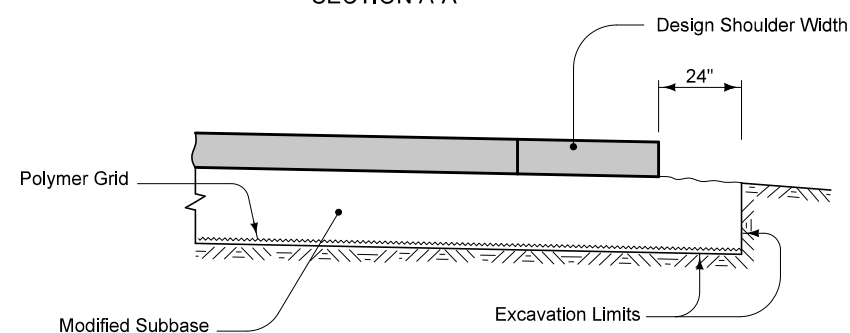
- 1 Build 4 inch Sloped Curb to end of Reinforced Sections.
- 2 Longitudinal Joint (PV-101):  
Single Pour - Saw cut joint per Detail B .  
Two Pours - Use 'KS-1' joint (Single Reinforced Section).  
Use 'KS-2' joint (Double Reinforced Section).
- 3 Polymer Grid and excavation limits of Modified Subbase 2 feet outside of pavement edge.
- 4 Slope subdrain to drain.
- 5 Place an "X" in the plastic concrete near the 'EF' joint at the outside edge of pavement.
- 6 Place 'RD' Joint where PCC shoulder. Place 'B' joint otherwise.
- 7 1/4 inch Preformed Joint Filler and seal top.
- 8 See Detail 'C'.
- 9 Design shoulder width.

Possible Contract Item:  
Bridge Approach, BR-205

Possible Tabulation:  
112-6

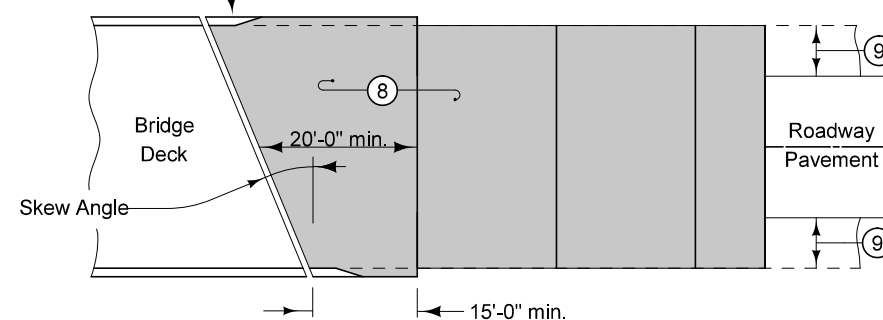


SECTION A-A



SECTION B-B

Bridge Rail  
End Section (typ.)



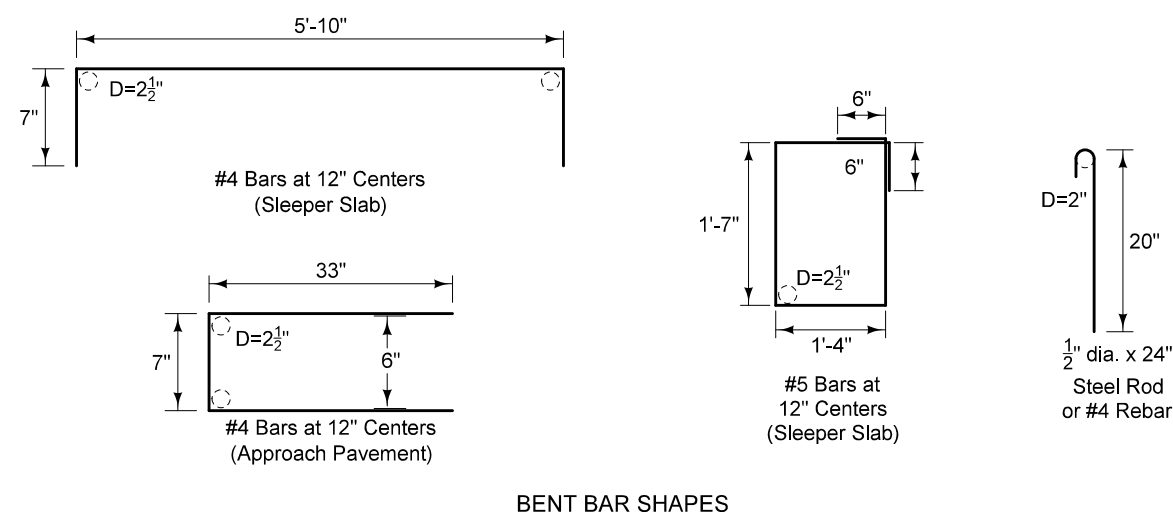
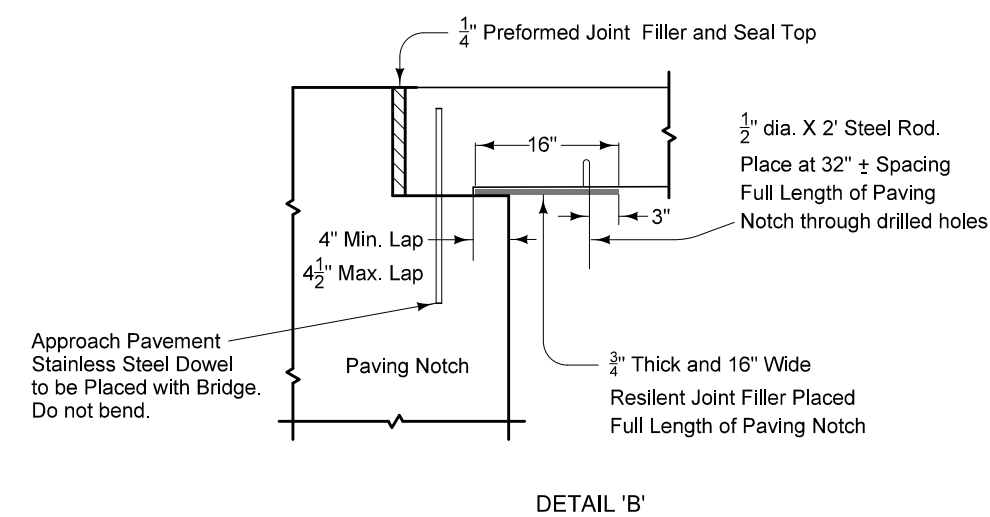
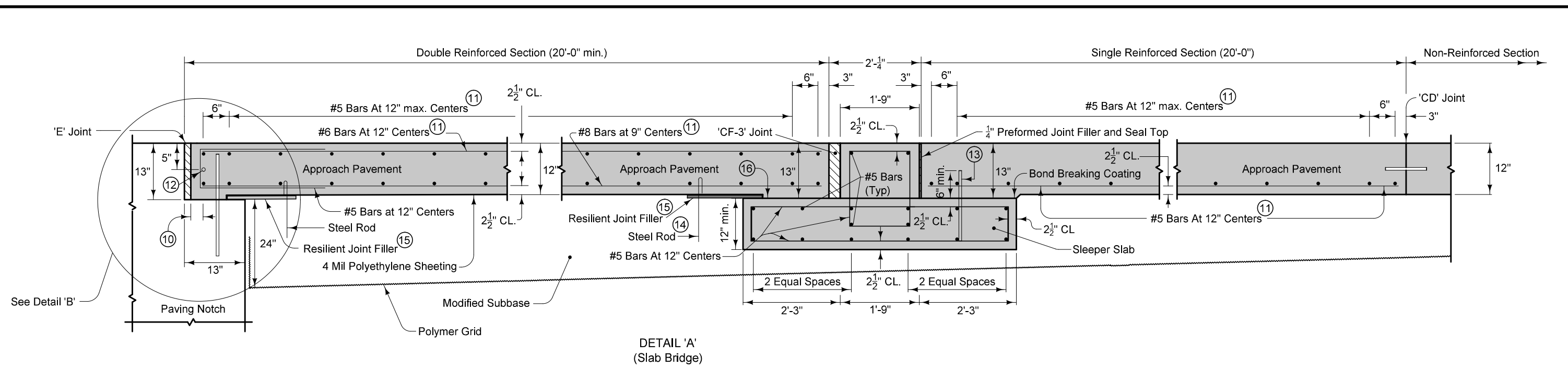
APPROACH PAVEMENT  
LAYOUT AT A SKEW

Pay limits for contract item  
include the following areas:

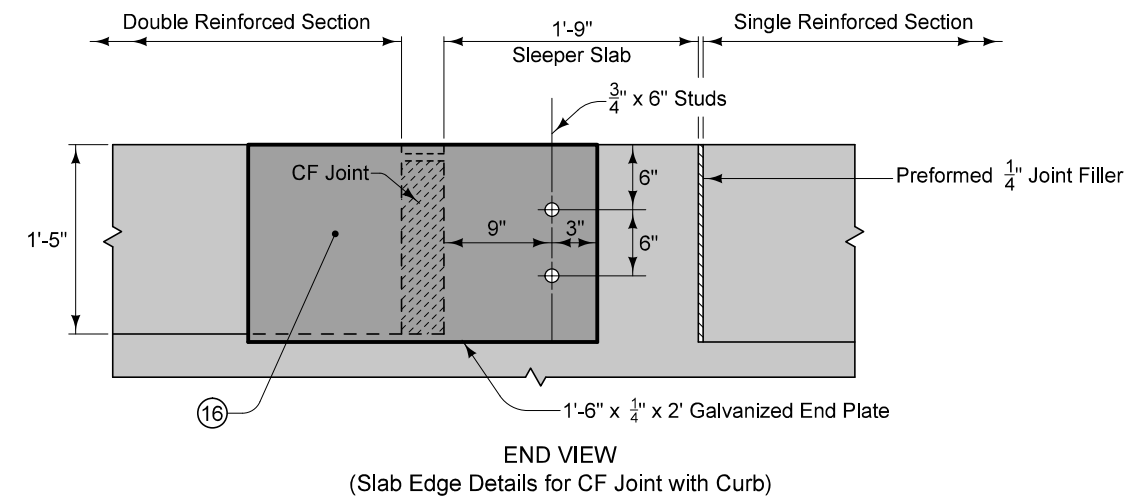
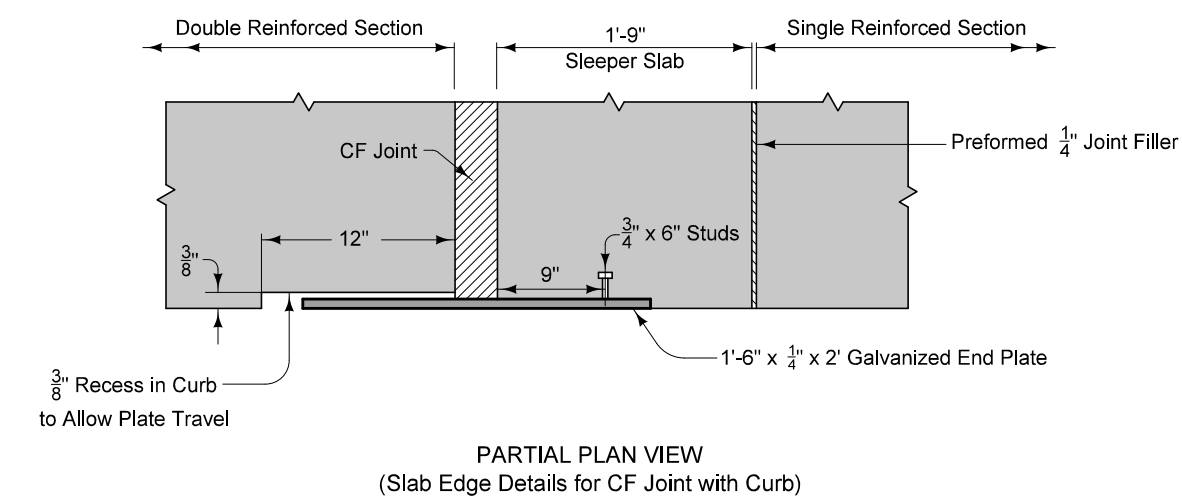
- Double Reinforced Section
- Sleeper Beam Section
- Single Reinforced Section
- Non-Reinforced Section

|   |                |
|---|----------------|
| <b>MODIFIED<br/>STANDARD ROAD PLAN</b>                  | <b>BR-205M</b> |
|   | SHEET 1 of 3   |
| <b>US 30 OVER UNNAMED STREAM</b>                        |                |
| <b>DOUBLE REINFORCED 12" APPROACH<br/>(SLAB BRIDGE)</b> |                |



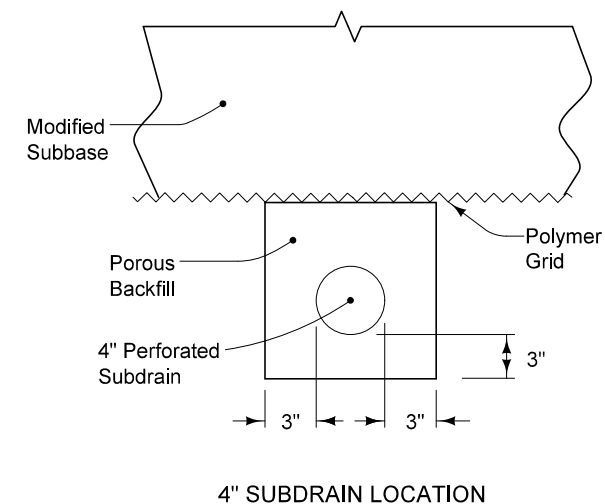
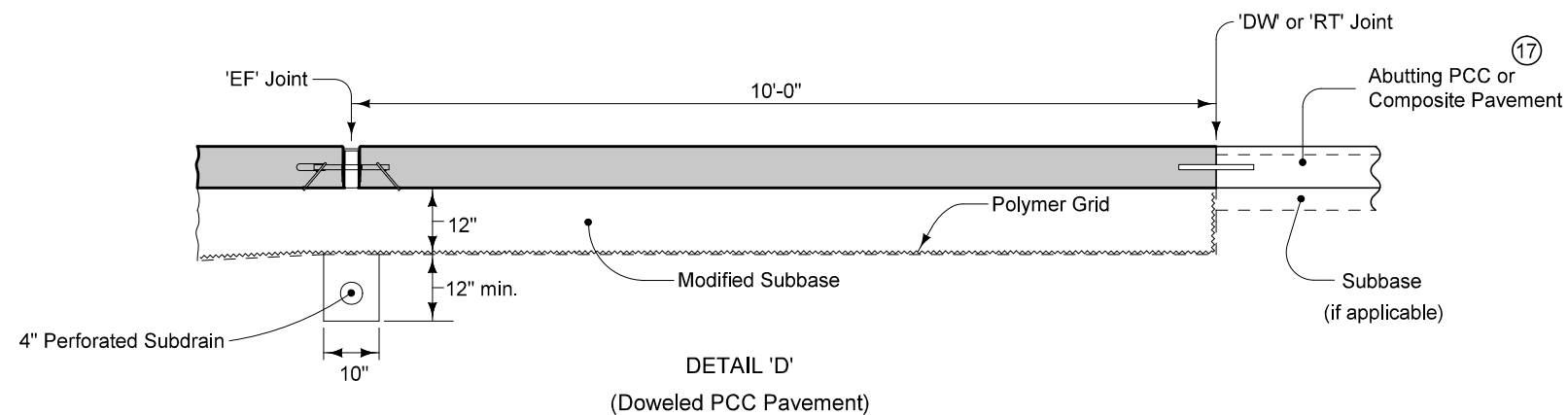
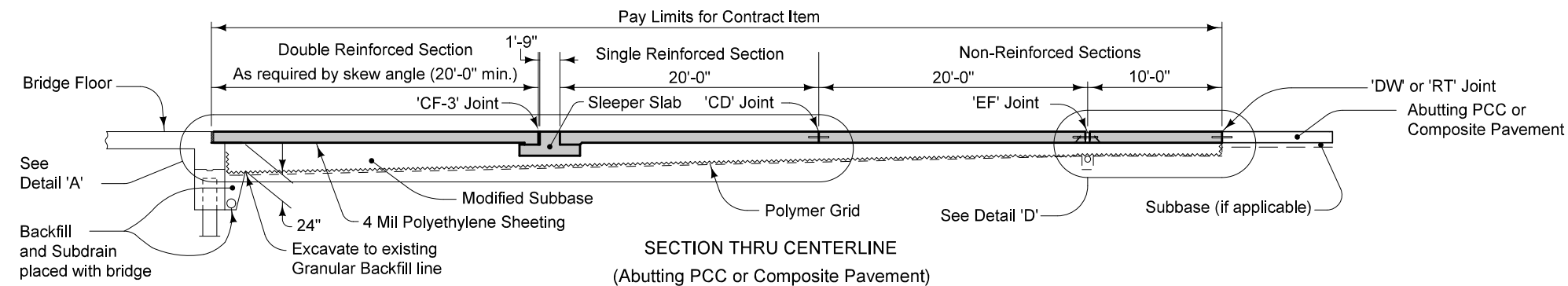


- ⑩ 2" min. to 2 1/2" max. clear to bent bar.
- ⑪ Minimum lap length: #5 Bars - 18"  
#6 Bars - 27"  
#8 Bars - 48"
- ⑫ If bridge is skewed, place additional #5 bar parallel to skewed face.
- ⑬ #8 dowels 1'-6" long with 2 1/2 inch bottom end clearance. Space at 24 inches O.C.
- ⑭ Space at 32" + for full length of Sleeper Slab.
- ⑮ 3/4 inch thick x 16 inch wide Resilient Joint Filler for full length of Sleeper Slab.
- ⑯ Debond Paving Notch with 2 layers of 30# Asphaltic Felt Paper full length.

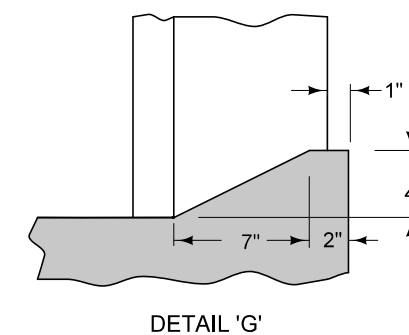
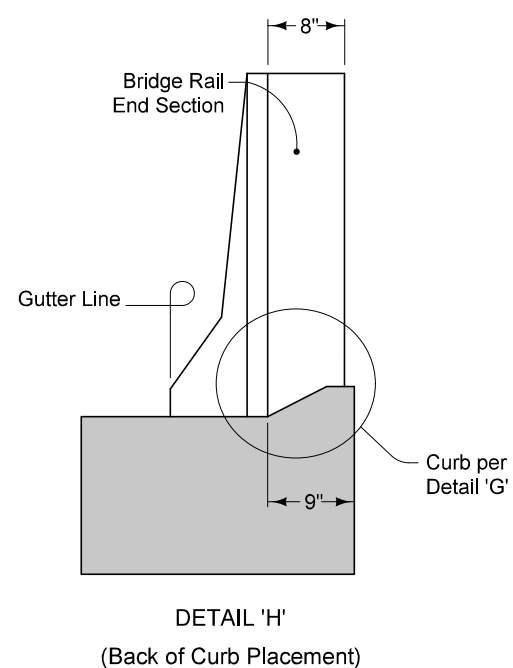
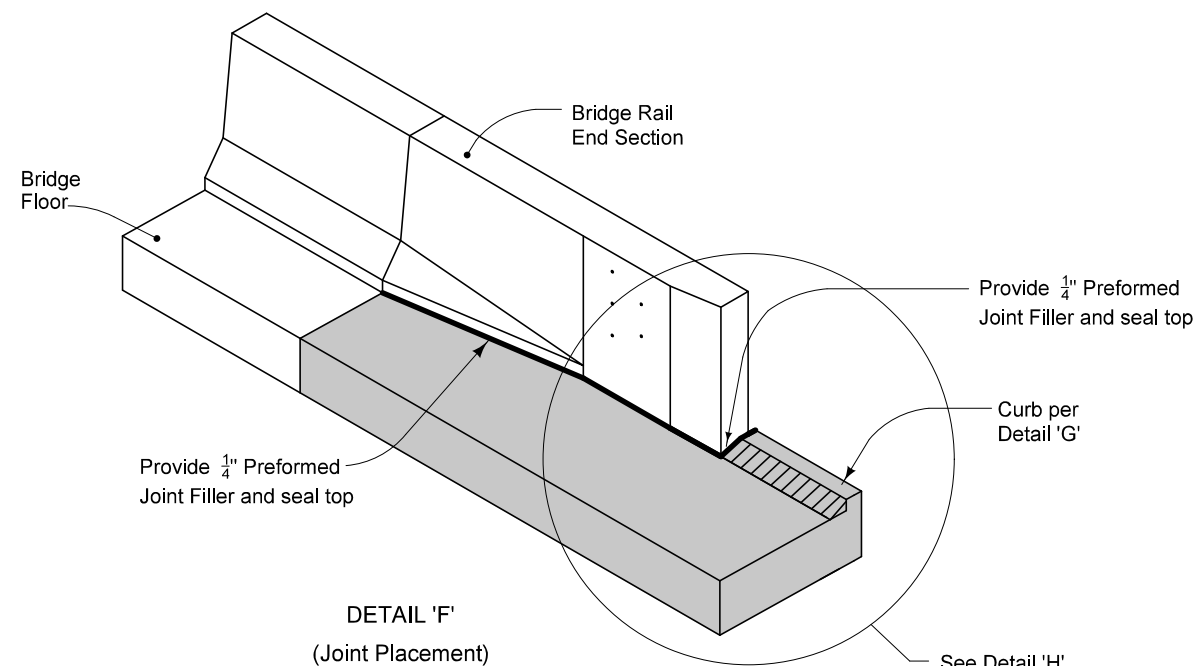


**DETAIL 'C'**

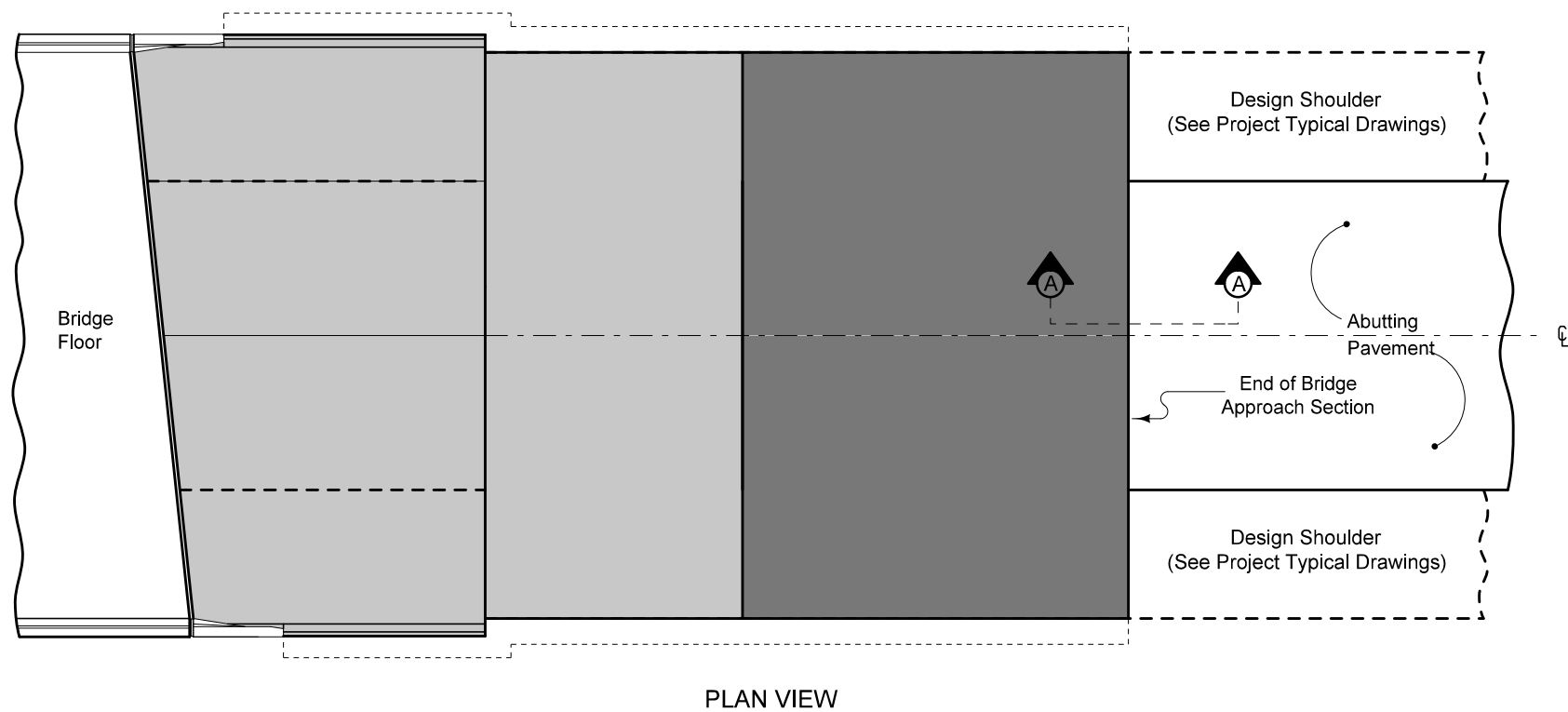
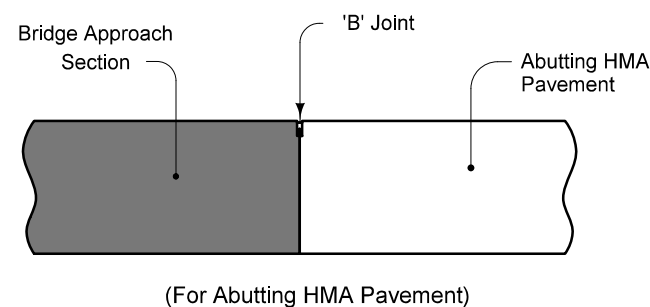
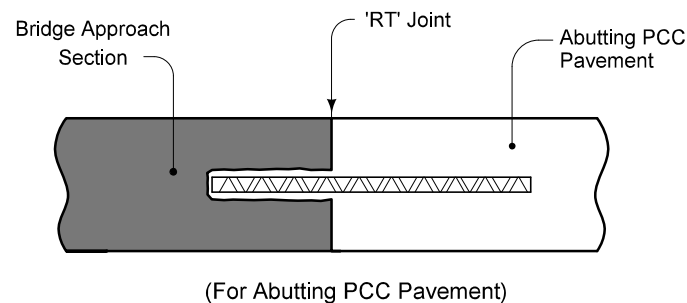
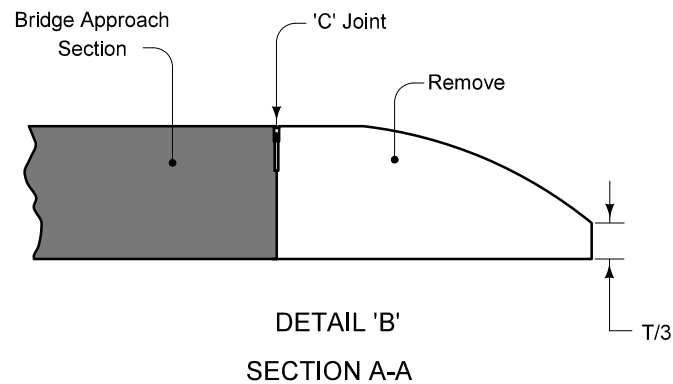
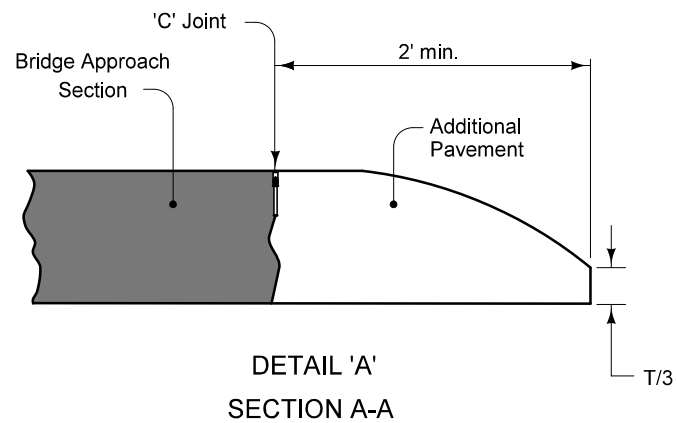
|   |                |
|---|----------------|
| <b>MODIFIED<br/>STANDARD ROAD PLAN</b>                  | <b>BR-205M</b> |
|   | SHEET 2 of 3   |
| <b>US 30 OVER UNNAMED STREAM</b>                        |                |
| <b>DOUBLE REINFORCED 12" APPROACH<br/>(SLAB BRIDGE)</b> |                |



⑰ If abutting pavement (PCC or HMA) is not in place, refer to BR-213M.



|   |                |
|---|----------------|
| <b>MODIFIED<br/>STANDARD ROAD PLAN</b>                  |                |
|   | <b>BR-205M</b> |
| SHEET 3 of 3  |                |
| <b>US 30 OVER UNNAMED STREAM</b>                        |                |
| <b>DOUBLE REINFORCED 12" APPROACH<br/>(SLAB BRIDGE)</b> |                |



For Jointing Details, see ~~PW-1001~~

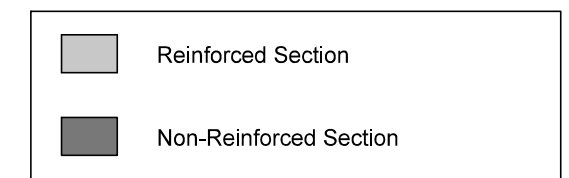
If abutting pavement (PCC or HMA) is not in place when bridge approach pavement is constructed, the following procedure applies:

1. The paving contractor of bridge the approach pavement paves Additional Pavement (as shown in Detail 'A'), constructs 'C' joint at end of bridge approach section, and leaves in this state.
2. The paving contractor of the abutting pavement saw cuts full depth at 'C' joint and removes Additional Pavement (see Detail 'B'), then
3. The paving contractor of the abutting pavement constructs 'RT' joint or 'B' joint, accordingly (see Detail 'C').

This work is incidental to other work as follows:

Detail 'A': Bridge Approach, BR-205M.

Details 'B' and 'C': Standard or Slip Form PCC Pavement, or Hot Mix Asphalt Mixture.



|  |                |
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| <b>MODIFIED<br/>STANDARD ROAD PLAN</b>         |                |
|  | <b>BR-213M</b> |
|  | SHEET 1 of 1   |
| <b>BRIDGE APPROACH<br/>(ABUTTING PAVEMENT)</b> |                |