



**J24-06 CONTINUOUS
CONCRETE SLAB
BRIDGE STANDARDS**

REVISED 06-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. REMOVED REFERENCE TO BRIDGE DESIGN MANUAL CADD NOTE E177.

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GENERAL NOTES:

THE J24-06 BRIDGE STANDARDS, IF PROPERLY USED, PROVIDE THE STRUCTURAL PLANS NECESSARY TO CONSTRUCT THREE SPAN 24'-0 ROADWAY CONTINUOUS CONCRETE SLAB BRIDGES WITH LENGTHS OF 70'-0, 80'-0, 90'-0, 100'-0, 110'-0, 120'-0, 130'-0, 140'-0 AND 150'-0.

THESE BRIDGES MAY BE BUILT ON A 0°, 15°, 30° OR 45° SKEW. THESE PLANS SHOW THE BRIDGES SKEWED IN ONE DIRECTION, BUT ALL DIMENSIONS AND DETAILS WOULD BE THE SAME FOR THE OPPOSITE SKEW.

THESE STANDARDS GIVE MOST OF THE INFORMATION NECESSARY TO BUILD THESE BRIDGES. HOWEVER, THE FOLLOWING ADDITIONAL INFORMATION IS REQUIRED FOR USE ON PRIMARY ROUTES. FOR SECONDARY ROUTES THE ENGINEER MAY NOT REQUIRE ALL SHEETS TO BE PROVIDED:

1. TITLE SHEET WITH ENGINEERS SEAL
2. ESTIMATED QUANTITIES TOTALS INCLUDING CLASS 20 EXCAVATION FOR BRIDGE
3. SITUATION PLAN LAYOUT OF BRIDGE
4. TOP OF SLAB ELEVATIONS LAYOUT
5. BOTTOM OF ABUTMENT FOOTING ELEVATIONS
6. BOTTOM OF PIER CAP ELEVATIONS
7. PILING DESIGN INFORMATION
8. SLOPE PROTECTION LAYOUT IF NEEDED
9. CONDUIT LAYOUT
10. LIGHTING LAYOUT IF NEEDED

THESE BRIDGES ARE DESIGNED FOR HL93 LOADING PLUS 20 LBS. PER SQ. FT. OF ROADWAY FOR FUTURE WEARING SURFACE. CONTROL OF CRACKING BY DISTRIBUTION OF REINFORCEMENT FOR SLAB DESIGN BASED ON PRE LRFD 2005 INTERIMS.

NOTE THAT WHEN APPROACH PAVEMENT IS TO BE PLACED, THE TEMPORARY PAVING BLOCKS SHALL BE REMOVED AND A PROPER JOINT FOR EXPANSION SHALL BE PROVIDED BETWEEN THE BRIDGE AND THE APPROACH PAVING.

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

THE ABUTMENTS FOR THESE BRIDGES ARE BUILT INTEGRAL WITH THE SUPERSTRUCTURE. THEREFORE, IT IS IMPORTANT THAT A PROPER JOINT FOR EXPANSION BE PROVIDED BETWEEN THE BRIDGE AND APPROACH PAVING, WHEN APPROACH PAVING IS NEEDED.

THE ABUTMENT DESIGN UTILIZED ON THESE BRIDGES RESTRICTS THEIR USE IN THE FOLLOWING MANNER:

1. THESE BRIDGES ARE NOT TO BE USED WHEN POINT BEARING FOR THE ABUTMENT STEEL PILING WOULD BE OBTAINED ON ROCK AT A DISTANCE LESS THAN 15 FEET FROM THE BOTTOM OF FOOTING.
2. FOR THE 140 FOOT AND 150 FOOT LONG BRIDGES THE ABUTMENT PILING ARE TO BE DRIVEN THROUGH OVERSIZED HOLES PREBORED TO A MINIMUM OF 10 FEET BELOW THE BOTTOM OF FOOTING. THE PREBORED HOLES SHALL BE IN ACCORDANCE WITH SECTION 2501.03, Q OF THE STANDARD SPECIFICATIONS. THE ELEVATION OF THE BOTTOM OF THE PREBORED HOLE SHALL BE SHOWN ON THE PLANS.
3. IF ROCK IS ENCOUNTERED LESS THAN 5 FOOT BELOW THE PREBORED HOLES, A SPECIAL ANALYSIS WILL BE REQUIRED. WHEN PREBORING IS NOT REQUIRED FOR THE ABUTMENT FOOTING AND ROCK IS ENCOUNTERED LESS THAN 10 FOOT BELOW THE BOTTOM OF ABUTMENT FOOTING, A SPECIAL ANALYSIS WILL BE REQUIRED.

THE PIERS AND ABUTMENTS FOR THESE STANDARDS HAVE BEEN DESIGNED FOR THE USE OF BOTH FRICTION AND POINT BEARING PILES. IT IS NECESSARY THAT THE TYPE AND LENGTH FOR BOTH THE ABUTMENT AND PIER PILES BE DESIGNATED ON THE FRONT SHEET OF THE PLANS.

THE INTEGRAL ABUTMENTS AND PILE BENTS FOR THESE J24 STANDARDS HAVE BEEN DESIGNED FOR THE USE OF VARIOUS TYPES OF PILE FOOTINGS AS FOLLOWS.

• INTEGRAL ABUTMENTS: TIMBER PILES OR HP 10x42 PILES AT BRIDGE DESIGN MANUAL(BDM) ARTICLE 6.2.6.1 STRUCTURAL RESISTANCE LEVEL-1 (SRL-1)

• PILE BENTS: STANDARD CONCRETE-FILLED STEEL PIPE PILES (PIOL), STANDARD PRESTRESSED CONCRETE PILES (PIOL), OR STANDARD H-PILES (PIOL AND SRL-1)

BECAUSE THESE BRIDGE STANDARDS HAVE BEEN REVISED FOR LRFD BASED ON 2012-COMPLETED IOWA STATE UNIVERSITY RESEARCH, FOR PILE FOUNDATIONS THE DESIGNER WILL NEED TO DETERMINE THE CONSTRUCTION CONTROL METHOD, CONTRACT LENGTH, AND DRIVING TARGET AND GIVE THAT INFORMATION ON THE FRONT SHEET OF THE PLANS. BRIDGE DESIGN MANUAL CADD NOTES E718, E719, E818, AND E819 ARE APPROPRIATE FOR THAT PURPOSE. THE NOTES, AS WELL AS THE BRIDGE DESIGN MANUAL AND DESIGN EXAMPLES, ARE AVAILABLE ON THE BRIDGES AND STRUCTURES BUREAU WEBSITE.

STRUCTURAL RESISTANCE LEVEL-1 (SRL-1) REPLACES THE 50 TON STEEL PILE DESIGNATION.

FOR MORE INFORMATION ON SRL-1, SEE THE BRIDGE DESIGN MANUAL, LOCATED ON THE IOWA DEPARTMENT OF TRANSPORTATION, BRIDGES AND STRUCTURES BUREAU WEB SITE.

FOR PIERS SUBJECT TO SCOUR THE DESIGN BEARING SHALL BE OBTAINED BELOW SCOUR ELEVATION. SCOUR ELEVATION SHALL BE SHOWN ON THE FRONT SHEET.

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.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5d IS 5/8" 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 |

SPECIFICATIONS:

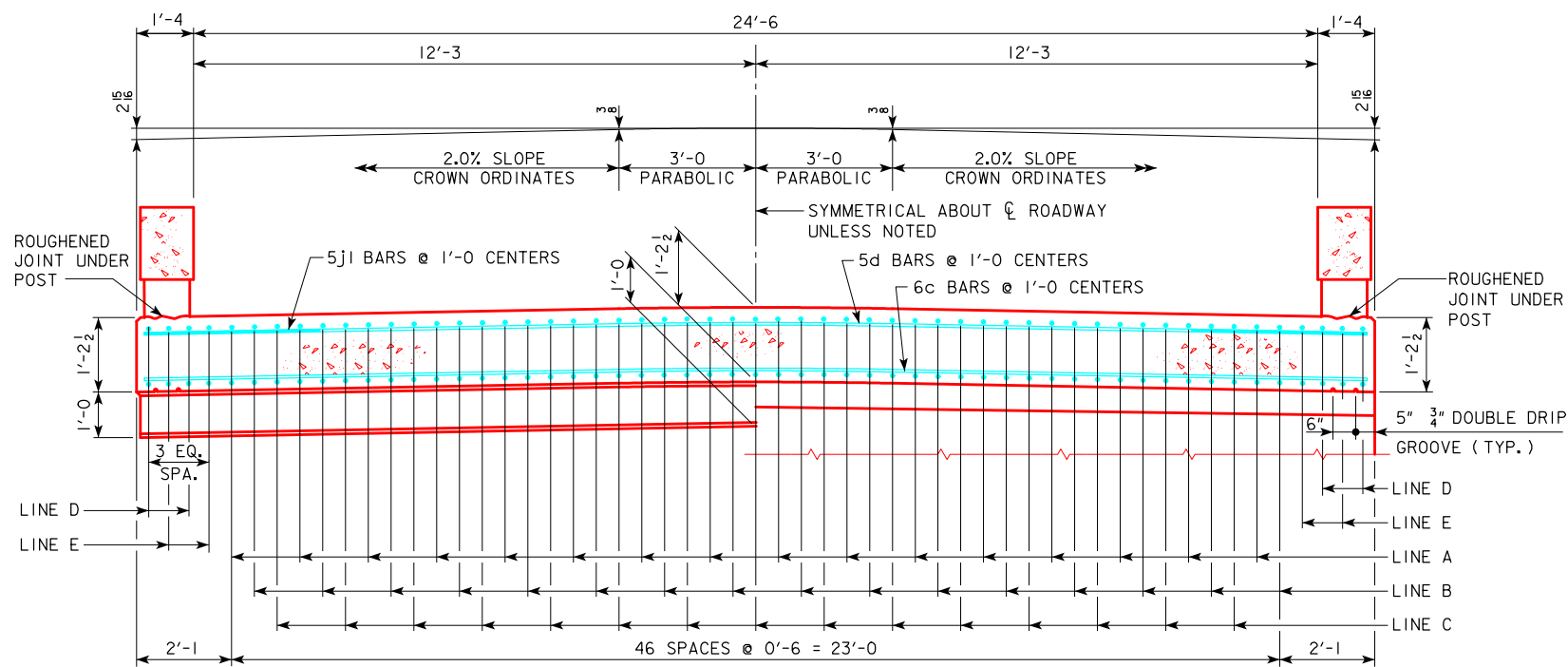
DESIGN: AASHTO LRFD, SERIES OF 2004 WITH INTERIM 2005.

CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2012, 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.

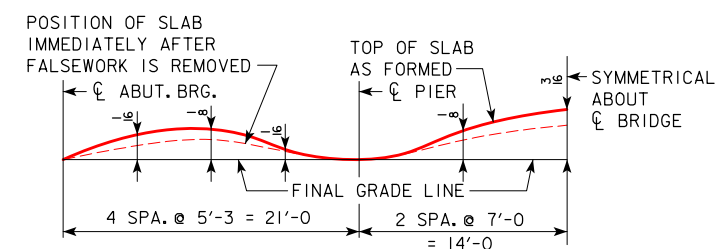
| | | | |
|---------------------------------|---------------------------------|--|-----------|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| | | INDEX AND GENERAL NOTES | J24-01-06 |
| | | | |



HALF SECTION NEAR PIER HALF SECTION NEAR ABUTMENT

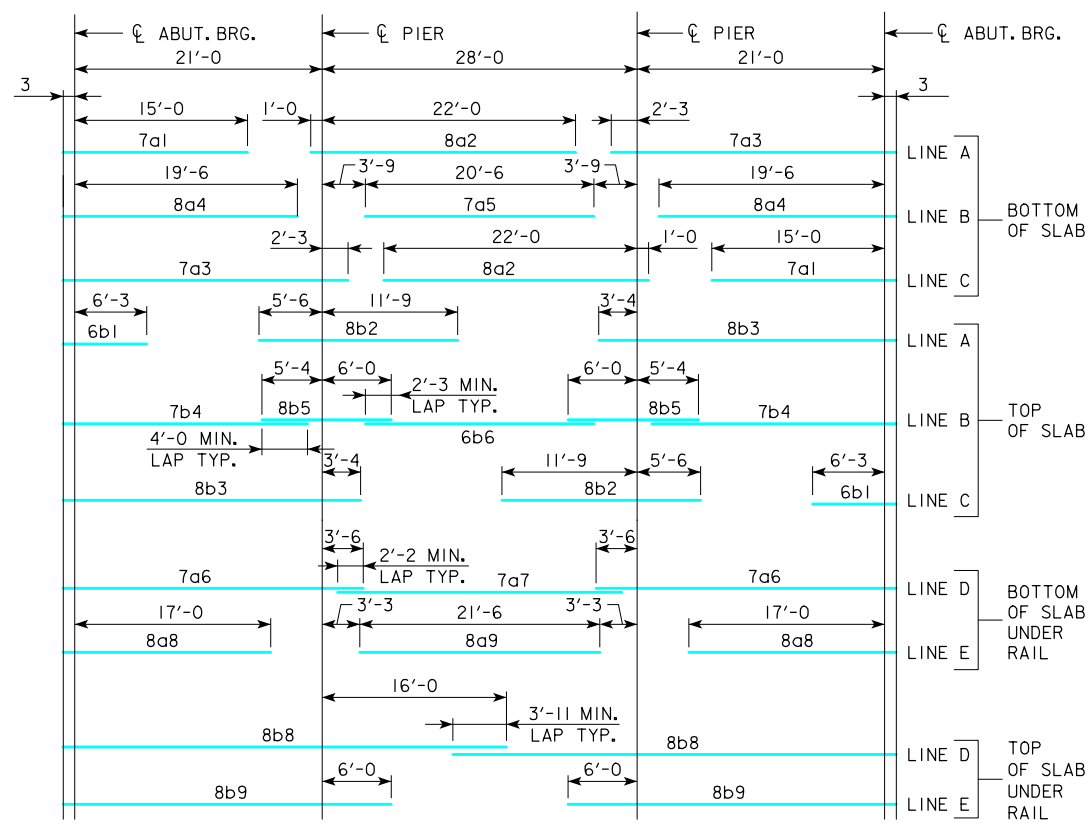
SLAB CROSS-SECTIONAL AREA
FOR OPEN RAIL = 32.83 SQ. FT.

NOTE:
TOP LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 2 1/2" CLEAR BELOW TOP OF SLAB. BOTTOM LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 1 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 PLACED. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.



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.



PLACEMENT FOR LONGITUDINAL REINFORCEMENT

REVISED 06-12 - UPDATE TO NEW BRIDGE ENGINEER SIGNATURE
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

| | | | |
|---|---|---|--|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER <i>[Signature]</i> | IOWA DOT | |
| | | STANDARD DESIGN - 24'-0" ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| SUPERSTRUCTURE DETAILS 70'-0" BRIDGE | | J24-02-06 | |

BILL OF REINFORCING STEEL FOR SUPERSTRUCTURE - 70' BRIDGE

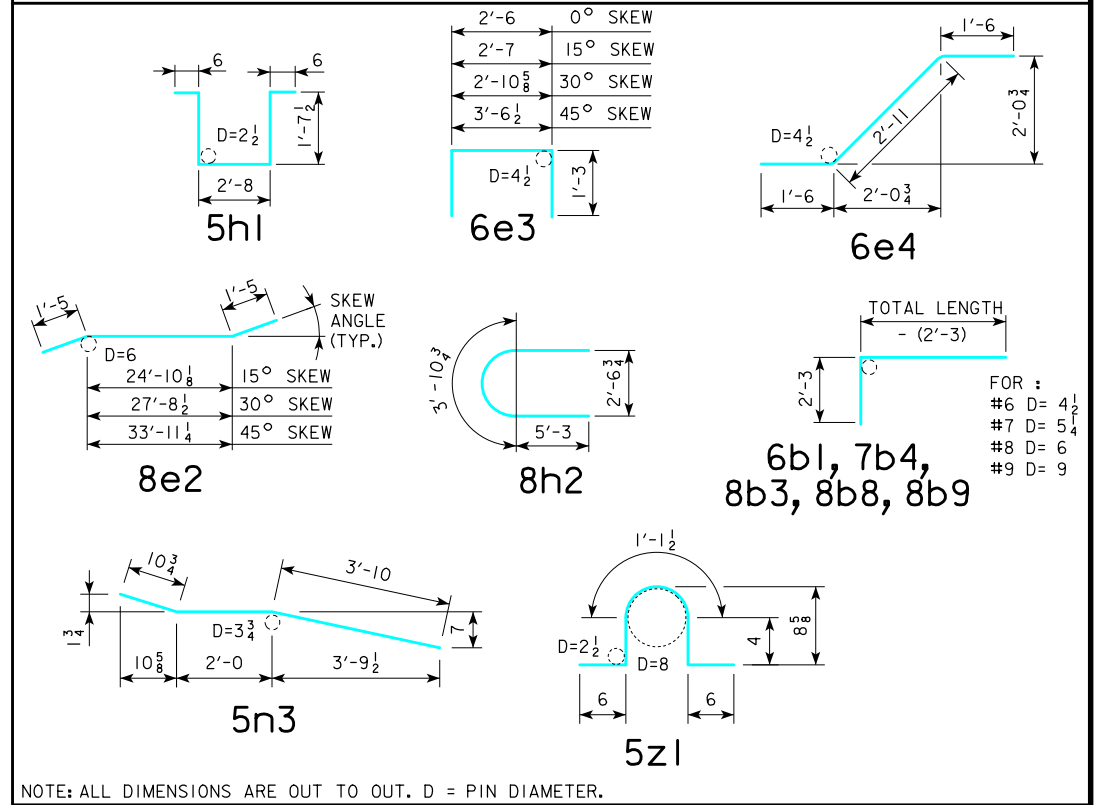
| LOCATION | SKEW | SHAPE | BAR | 0° | | 15° | | 30° | | 45° | | | | | |
|---|------|-------|-----|-----|--------|--------|-----|--------|--------|-----|--------|--------|-----|--------|--------|
| | | | | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT |
| SLAB LONGITUDINAL BOTTOM | | | 7a1 | 31 | 15'-3 | 967 | 31 | 15'-3 | 967 | 31 | 15'-3 | 967 | 31 | 15'-3 | 967 |
| SLAB LONGITUDINAL BOTTOM | | | 8a2 | 31 | 23'-0 | 1904 | 31 | 23'-0 | 1904 | 31 | 23'-0 | 1904 | 31 | 23'-0 | 1904 |
| SLAB LONGITUDINAL BOTTOM | | | 7a3 | 31 | 23'-6 | 1490 | 31 | 23'-6 | 1490 | 31 | 23'-6 | 1490 | 31 | 23'-6 | 1490 |
| SLAB LONGITUDINAL BOTTOM | | | 8a4 | 32 | 19'-9 | 1688 | 32 | 19'-9 | 1688 | 32 | 19'-9 | 1688 | 32 | 19'-9 | 1688 |
| SLAB LONGITUDINAL BOTTOM | | | 7a5 | 16 | 20'-6 | 671 | 16 | 20'-6 | 671 | 16 | 20'-6 | 671 | 16 | 20'-6 | 671 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 7a6 | 8 | 24'-9 | 405 | 8 | 24'-9 | 405 | 8 | 24'-9 | 405 | 8 | 24'-9 | 405 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 7a7 | 4 | 25'-4 | 208 | 4 | 25'-4 | 208 | 4 | 25'-4 | 208 | 4 | 25'-4 | 208 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 8a8 | 8 | 17'-3 | 369 | 8 | 17'-3 | 369 | 8 | 17'-3 | 369 | 8 | 17'-3 | 369 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 8a9 | 4 | 21'-6 | 230 | 4 | 21'-6 | 230 | 4 | 21'-6 | 230 | 4 | 21'-6 | 230 |
| SLAB LONGITUDINAL TOP | | | 6b1 | 31 | 8'-9 | 408 | 31 | 8'-9 | 408 | 31 | 8'-9 | 408 | 31 | 8'-9 | 408 |
| SLAB LONGITUDINAL TOP | | | 8b2 | 31 | 17'-3 | 1428 | 31 | 17'-3 | 1428 | 31 | 17'-3 | 1428 | 31 | 17'-3 | 1428 |
| SLAB LONGITUDINAL TOP | | | 8b3 | 31 | 26'-10 | 2221 | 31 | 26'-10 | 2221 | 31 | 26'-10 | 2221 | 31 | 26'-10 | 2221 |
| SLAB LONGITUDINAL TOP | | | 7b4 | 32 | 22'-2 | 1450 | 32 | 22'-2 | 1450 | 32 | 22'-2 | 1450 | 32 | 22'-2 | 1450 |
| SLAB LONGITUDINAL TOP | | | 8b5 | 32 | 11'-4 | 969 | 32 | 11'-4 | 969 | 32 | 11'-4 | 969 | 32 | 11'-4 | 969 |
| SLAB LONGITUDINAL TOP | | | 6b6 | 16 | 20'-6 | 493 | 16 | 20'-6 | 493 | 16 | 20'-6 | 493 | 16 | 20'-6 | 493 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 8b8 | 8 | 39'-6 | 844 | 8 | 39'-6 | 844 | 8 | 39'-6 | 844 | 8 | 39'-6 | 844 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 8b9 | 8 | 29'-6 | 631 | 8 | 29'-6 | 631 | 8 | 29'-6 | 631 | 8 | 29'-6 | 631 |
| SLAB TRANSVERSE, BOTTOM | | | 6c1 | 67 | 26'-10 | 2701 | 67 | 27'-9 | 2793 | 56 | 26'-10 | 2258 | 46 | 26'-10 | 1854 |
| SLAB TRANSVERSE ENDS, BOTTOM | | | 6c2 | - | - | - | - | - | - | 24 | VARIES | 579 | 44 | VARIES | 970 |
| SLAB TRANSVERSE, TOP | | | 5d1 | 67 | 26'-10 | 1876 | 67 | 27'-9 | 1940 | 56 | 26'-10 | 1568 | 46 | 26'-10 | 1288 |
| SLAB TRANSVERSE ENDS, TOP | | | 5d2 | - | - | - | - | - | - | 24 | VARIES | 402 | 44 | VARIES | 674 |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e1 | 18 | 26'-10 | 1290 | - | - | - | - | - | - | - | - | - |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e2 | - | - | - | 18 | 27'-8 | 1330 | 18 | 30'-7 | 1470 | 18 | 36'-9 | 1767 |
| SLAB, HAIRPINS, AT ABUTMENT | | | 6e3 | 60 | 5'-0 | 451 | 60 | 5'-1 | 459 | 60 | 5'-5 | 489 | 60 | 6'-1 | 549 |
| SLAB, DIAGONALS, AT ABUTMENT | | | 6e4 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 |
| PIER CAP HOOPS | | | 5h1 | 40 | 6'-11 | 289 | 40 | 6'-11 | 289 | 50 | 6'-11 | 361 | 60 | 6'-11 | 433 |
| 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 | 23'-10 | 510 | 8 | 24'-8 | 527 | 8 | 27'-6 | 588 | 8 | 33'-8 | 720 |
| PIER CAP, TOP LONGITUDINAL | | | 8h4 | 4 | 26'-10 | 287 | 4 | 27'-9 | 297 | 4 | 30'-11 | 331 | 4 | 37'-11 | 405 |
| TOP OF SLAB, TRANSVERSE, AT RAIL | | | 5j1 | 132 | 8'-6 | 1171 | 132 | 8'-6 | 1171 | 132 | 8'-6 | 1171 | 130 | 8'-6 | 1153 |
| 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 |
| PAVING BLOCK LIFTING HOOPS | | | 5z1 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 |
| SUB TOTAL - LBS. | | | | | | 26,184 | | | 26,415 | | | 26,826 | | | 27,422 |
| OPEN RAIL - SEE LIST ON RAIL SHEET J24-41-06 | | | | | | 5100 | | | 5100 | | | 5100 | | | 5100 |
| TOTAL - LBS. WITH MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 31,284 | | | 31,515 | | | 31,926 | | | 32,522 |
| TOTAL - LBS. WITH NON-MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 30,044 | | | 30,248 | | | 30,492 | | | 30,810 |
| SAME AS ABOVE EXCEPT ALL "h" BARS DELETED | | | | | | | | | | | | | | | |

ESTIMATED QUANTITIES FOR SUPERSTRUCTURE - 70' BRIDGE

| ITEM | SKEW | WITH MONOLITHIC PIER CAP | | | | WITH NON-MONOLITHIC PIER CAP | | | |
|-----------|------------------------------------|--------------------------|--------|--------|--------|------------------------------|--------|--------|--------|
| | | 0° | 15° | 30° | 45° | 0° | 15° | 30° | 45° |
| OPEN RAIL | *STRUCTURAL CONCRETE (BRIDGE) C.Y. | 107.7 | 108.4 | 110.8 | 115.8 | 103.5 | 104.0 | 106.0 | 110.0 |
| OPEN RAIL | REINFORCING STEEL LBS. | 31,284 | 31,515 | 31,926 | 32,522 | 30,044 | 30,248 | 30,492 | 30,810 |
| OPEN RAIL | LIN. FT. | 162.0 | 162.2 | 162.9 | 164.5 | 162.0 | 162.2 | 162.9 | 164.5 |

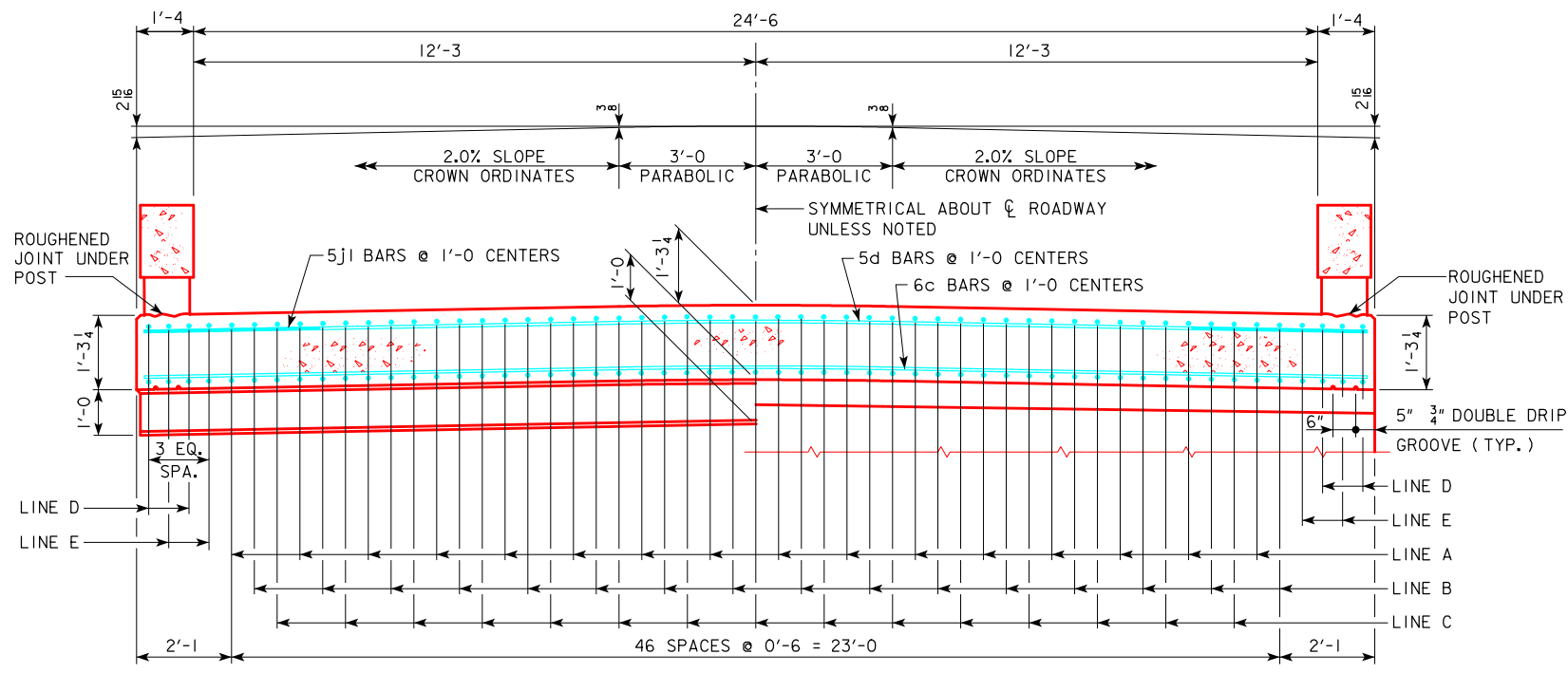
* INCLUDES 4 WINGS @ 0.68 C.Y. EACH AND 2 TEMPORARY PAVING BLOCKS; EXCLUDES RAIL CONCRETE.

BENT BAR DETAILS



REVISED 07-09 - OPEN RAIL REINF. QTY. CHANGED WHICH CHANGED TOTAL REINF. QTY. REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).

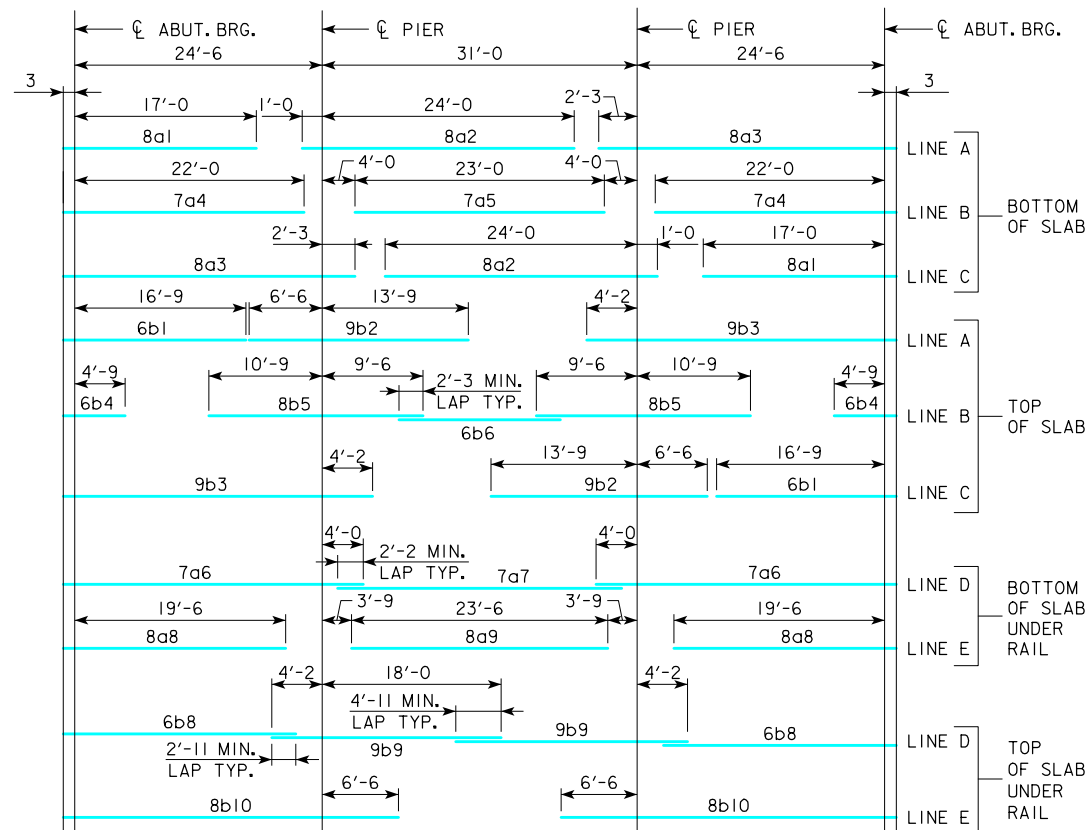
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| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | J24-03-06 |
| | | SUPERSTRUCTURE DETAILS 70'-0 BRIDGE | |
| | | J24-03-06 | |



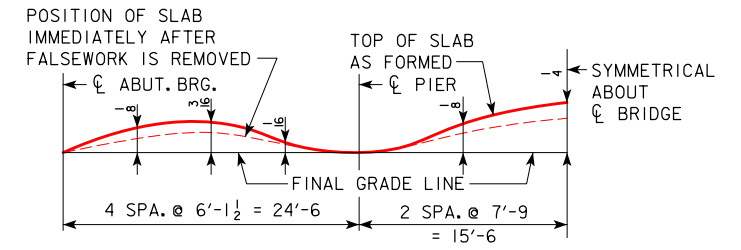
HALF SECTION NEAR PIER HALF SECTION NEAR ABUTMENT

SLAB CROSS-SECTIONAL AREA
FOR OPEN RAIL = 34.53 SQ. FT.

NOTE:
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PLACEMENT FOR LONGITUDINAL REINFORCEMENT

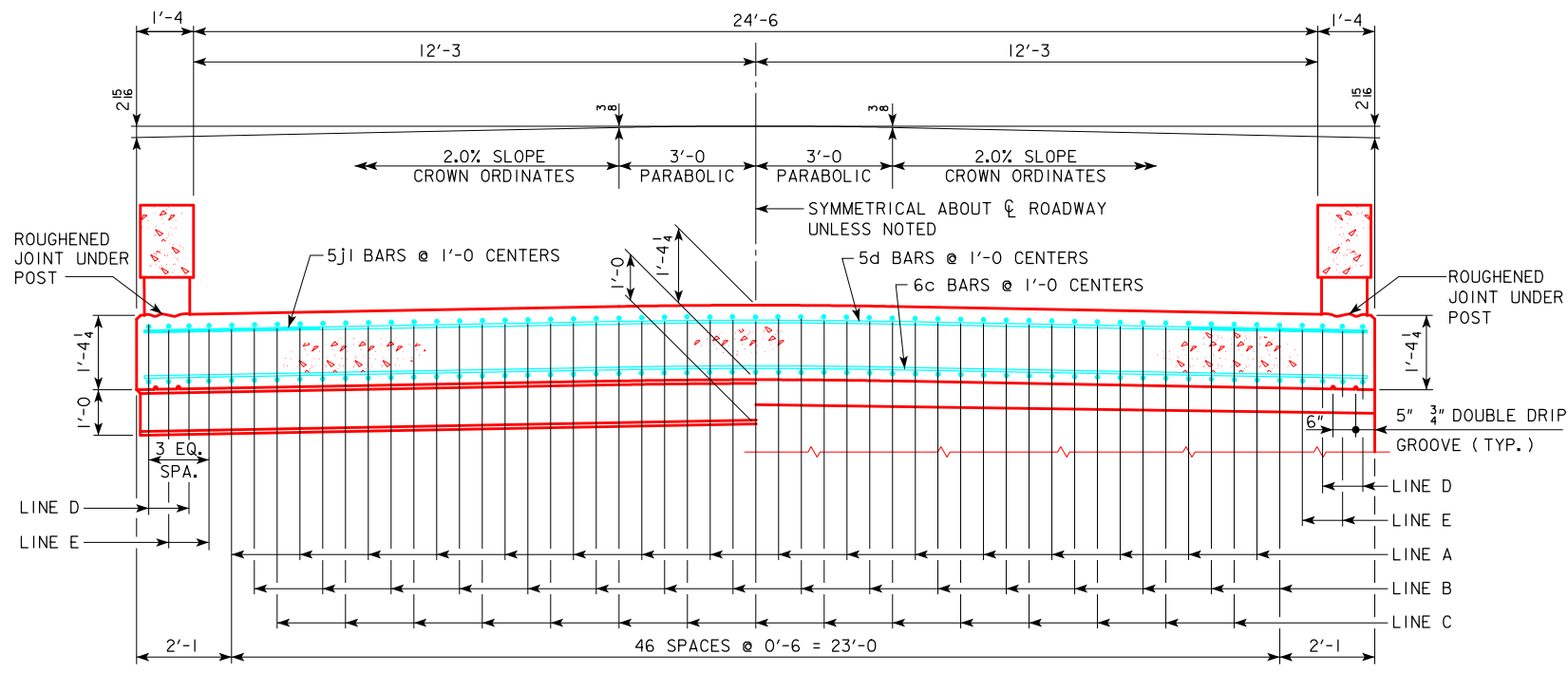


FORM CAMBER DIAGRAM

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.

REVISED 06-12 - I.M. REQUIREMENT ADDED TO BAR CHAIR NOTE.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

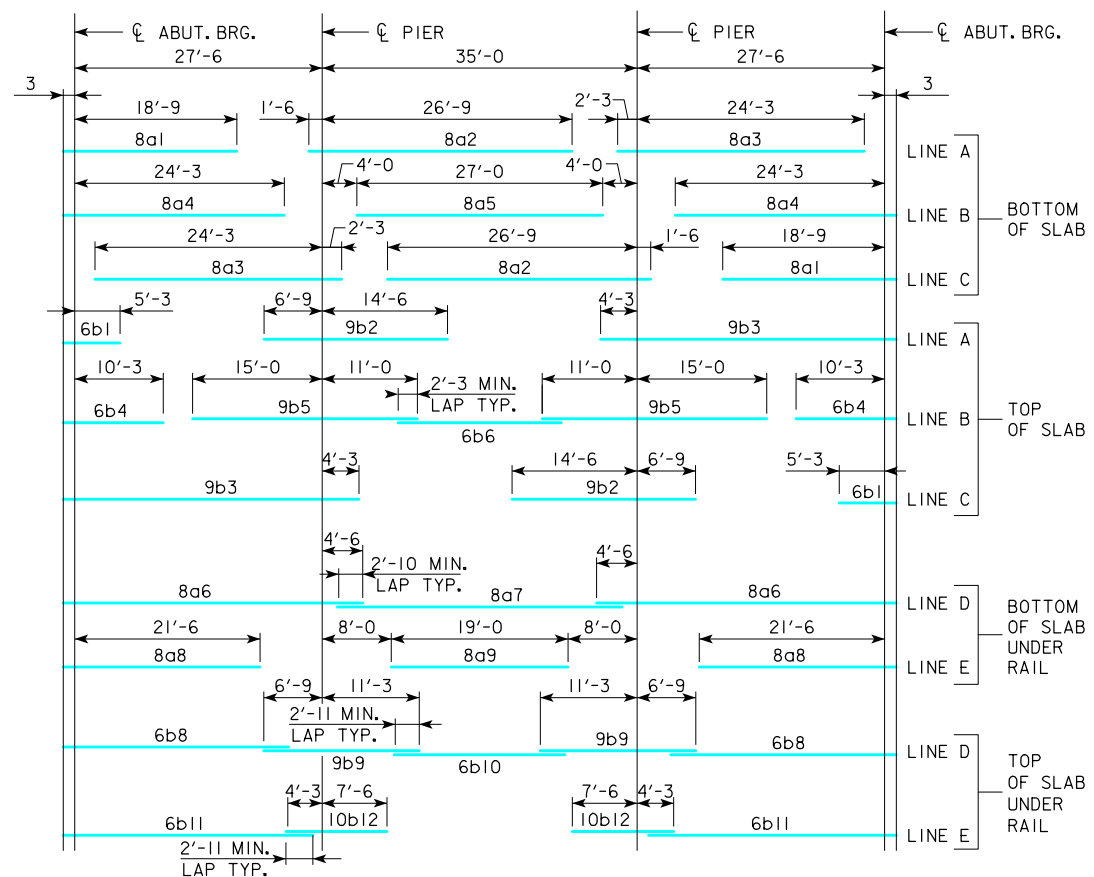
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| SUPERSTRUCTURE DETAILS 80'-0" BRIDGE | | J24-04-06 | |



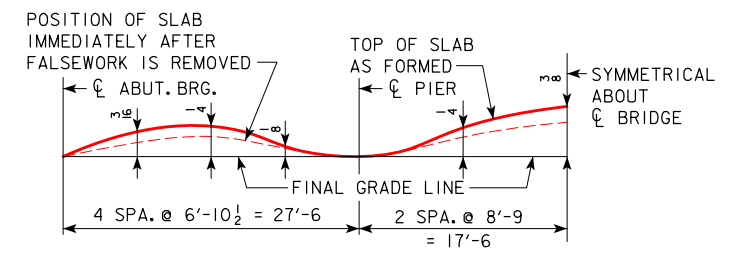
HALF SECTION NEAR PIER HALF SECTION NEAR ABUTMENT

SLAB CROSS-SECTIONAL AREA FOR OPEN RAIL = 36.79 SQ. FT.

NOTE:
 TOP LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 2 1/2" CLEAR BELOW TOP OF SLAB. BOTTOM LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 1 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 PLACED. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.



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.

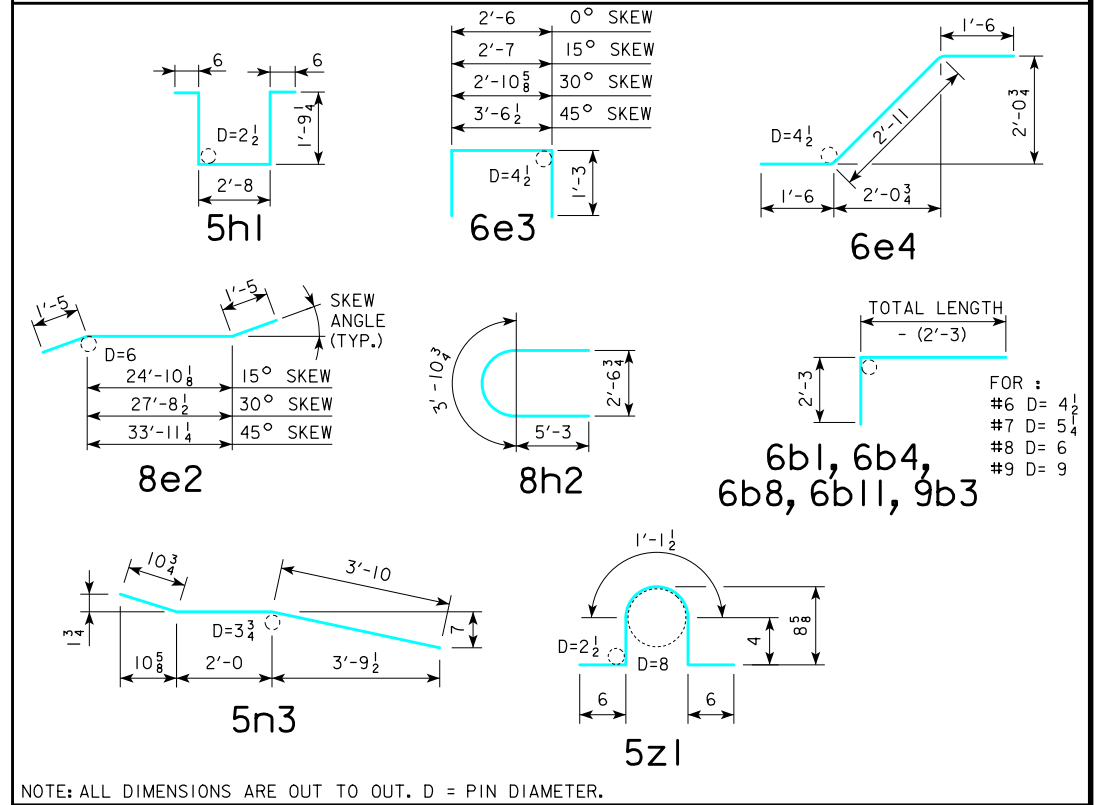
REVISED 06-12 - I.M. REQUIREMENT ADDED TO BAR CHAIR NOTE.
 REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

| | | | |
|---|---|---|--|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER <i>[Signature]</i> | | |
| | | STANDARD DESIGN - 24'-0" ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| SUPERSTRUCTURE DETAILS 90'-0" BRIDGE | | J24-06-06 | |

BILL OF REINFORCING STEEL FOR SUPERSTRUCTURE - 90' BRIDGE

| LOCATION | SKEW | SHAPE | BAR | 0° | | 15° | | 30° | | 45° | | | | | |
|---|------|-------|-------|-----|--------|--------|-----|--------|--------|-----|--------|--------|-----|--------|--------|
| | | | | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT |
| SLAB LONGITUDINAL BOTTOM | | | 8a1 | 31 | 19'-0 | 1573 | 31 | 19'-0 | 1573 | 31 | 19'-0 | 1573 | 31 | 19'-0 | 1573 |
| SLAB LONGITUDINAL BOTTOM | | | 8a2 | 31 | 28'-3 | 2339 | 31 | 28'-3 | 2339 | 31 | 28'-3 | 2339 | 31 | 28'-3 | 2339 |
| SLAB LONGITUDINAL BOTTOM | | | 8a3 | 31 | 26'-6 | 2194 | 31 | 26'-6 | 2194 | 31 | 26'-6 | 2194 | 31 | 26'-6 | 2194 |
| SLAB LONGITUDINAL BOTTOM | | | 8a4 | 32 | 24'-6 | 2094 | 32 | 24'-6 | 2094 | 32 | 24'-6 | 2094 | 32 | 24'-6 | 2094 |
| SLAB LONGITUDINAL BOTTOM | | | 8a5 | 16 | 27'-0 | 1154 | 16 | 27'-0 | 1154 | 16 | 27'-0 | 1154 | 16 | 27'-0 | 1154 |
| 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 | 31'-8 | 339 | 4 | 31'-8 | 339 | 4 | 31'-8 | 339 | 4 | 31'-8 | 339 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 8a8 | 8 | 21'-9 | 465 | 8 | 21'-9 | 465 | 8 | 21'-9 | 465 | 8 | 21'-9 | 465 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 8a9 | 4 | 19'-0 | 203 | 4 | 19'-0 | 203 | 4 | 19'-0 | 203 | 4 | 19'-0 | 203 |
| SLAB LONGITUDINAL TOP | | | 9b1 | 31 | 7'-9 | 361 | 31 | 7'-9 | 361 | 31 | 7'-9 | 361 | 31 | 7'-9 | 361 |
| SLAB LONGITUDINAL TOP | | | 9b2 | 31 | 21'-3 | 2240 | 31 | 21'-3 | 2240 | 31 | 21'-3 | 2240 | 31 | 21'-3 | 2240 |
| SLAB LONGITUDINAL TOP | | | 9b3 | 31 | 34'-3 | 3610 | 31 | 34'-3 | 3610 | 31 | 34'-3 | 3610 | 31 | 34'-3 | 3610 |
| SLAB LONGITUDINAL TOP | | | 6b4 | 32 | 12'-9 | 613 | 32 | 12'-9 | 613 | 32 | 12'-9 | 613 | 32 | 12'-9 | 613 |
| SLAB LONGITUDINAL TOP | | | 9b5 | 32 | 26'-0 | 2829 | 32 | 26'-0 | 2829 | 32 | 26'-0 | 2829 | 32 | 26'-0 | 2829 |
| SLAB LONGITUDINAL TOP | | | 6b6 | 16 | 17'-6 | 421 | 16 | 17'-6 | 421 | 16 | 17'-6 | 421 | 16 | 17'-6 | 421 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b8 | 8 | 26'-2 | 315 | 8 | 26'-2 | 315 | 8 | 26'-2 | 315 | 8 | 26'-2 | 315 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 9b9 | 8 | 18'-0 | 490 | 8 | 18'-0 | 490 | 8 | 18'-0 | 490 | 8 | 18'-0 | 490 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b10 | 4 | 18'-4 | 111 | 4 | 18'-4 | 111 | 4 | 18'-4 | 111 | 4 | 18'-4 | 111 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b11 | 8 | 28'-8 | 345 | 8 | 28'-8 | 345 | 8 | 28'-8 | 345 | 8 | 28'-8 | 345 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 10b12 | 8 | 11'-9 | 405 | 8 | 11'-9 | 405 | 8 | 11'-9 | 405 | 8 | 11'-9 | 405 |
| SLAB TRANSVERSE, BOTTOM | | | 6c1 | 87 | 26'-10 | 3507 | 87 | 27'-9 | 3627 | 76 | 26'-10 | 3064 | 66 | 26'-10 | 2661 |
| SLAB TRANSVERSE ENDS, BOTTOM | | | 6c2 | - | - | - | - | - | - | 24 | VARIES | 579 | 44 | VARIES | 970 |
| SLAB TRANSVERSE, TOP | | | 5d1 | 87 | 26'-10 | 2435 | 87 | 27'-9 | 2519 | 76 | 26'-10 | 2128 | 66 | 26'-10 | 1848 |
| SLAB TRANSVERSE ENDS, TOP | | | 5d2 | - | - | - | - | - | - | 24 | VARIES | 402 | 44 | VARIES | 674 |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e1 | 18 | 26'-10 | 1290 | - | - | - | - | - | - | - | - | - |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e2 | - | - | - | 18 | 27'-8 | 1330 | 18 | 30'-7 | 1470 | 18 | 36'-9 | 1767 |
| SLAB, HAIRPINS, AT ABUTMENT | | | 6e3 | 60 | 5'-0 | 451 | 60 | 5'-1 | 459 | 60 | 5'-5 | 489 | 60 | 6'-1 | 549 |
| SLAB, DIAGONALS, AT ABUTMENT | | | 6e4 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 |
| PIER CAP HOOPS | | | 5h1 | 36 | 7'-3 | 273 | 36 | 7'-3 | 273 | 48 | 7'-3 | 363 | 60 | 7'-3 | 454 |
| 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 | 23'-10 | 510 | 8 | 24'-8 | 527 | 8 | 27'-6 | 588 | 8 | 33'-8 | 720 |
| PIER CAP, TOP LONGITUDINAL | | | 8h4 | 4 | 26'-10 | 287 | 4 | 27'-9 | 297 | 4 | 30'-11 | 331 | 4 | 37'-11 | 405 |
| TOP OF SLAB, TRANSVERSE, AT RAIL | | | 5j1 | 172 | 8'-6 | 1525 | 172 | 8'-6 | 1525 | 172 | 8'-6 | 1525 | 170 | 8'-6 | 1508 |
| 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 |
| PAVING BLOCK LIFTING HOOPS | | | 5z1 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 |
| SUB TOTAL - LBS. | | | | | | 34,301 | | | 34,580 | | | 34,962 | | | 35,579 |
| OPEN RAIL - SEE LIST ON RAIL SHEET J24-41-06 | | | | | | 6330 | | | 6330 | | | 6330 | | | 6330 |
| TOTAL - LBS. WITH MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 40,631 | | | 40,910 | | | 41,292 | | | 41,909 |
| TOTAL - LBS. WITH NON-MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 39,407 | | | 39,659 | | | 39,856 | | | 40,176 |
| SAME AS ABOVE EXCEPT ALL "h" BARS DELETED | | | | | | | | | | | | | | | |

BENT BAR DETAILS



ESTIMATED QUANTITIES FOR SUPERSTRUCTURE - 90' BRIDGE

| ITEM | SKEW | WITH MONOLITHIC PIER CAP | | | | WITH NON-MONOLITHIC PIER CAP | | | |
|-----------|------------------------------------|--------------------------|--------|--------|--------|------------------------------|--------|--------|--------|
| | | 0° | 15° | 30° | 45° | 0° | 15° | 30° | 45° |
| OPEN RAIL | *STRUCTURAL CONCRETE (BRIDGE) C.Y. | 144.8 | 145.5 | 147.8 | 152.7 | 140.6 | 141.1 | 143.0 | 146.9 |
| OPEN RAIL | REINFORCING STEEL LBS. | 40,631 | 40,910 | 41,292 | 41,909 | 39,407 | 39,659 | 39,856 | 40,176 |
| OPEN RAIL | LIN. FT. | 202.0 | 202.2 | 202.9 | 204.5 | 202.0 | 202.2 | 202.9 | 204.5 |

* INCLUDES 4 WINGS @ 0.68 C.Y. EACH AND 2 TEMPORARY PAVING BLOCKS; EXCLUDES RAIL CONCRETE.

REVISED 07-09 - OPEN RAIL REINF. QTY'S. CHANGED WHICH CHANGED TOTAL REINF. QTY'S. REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).

| | | |
|--|---------------------------------|--|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 |
| SUPERSTRUCTURE DETAILS 90'-0 BRIDGE | | J24-07-06 |

BILL OF REINFORCING STEEL FOR SUPERSTRUCTURE - 100' BRIDGE

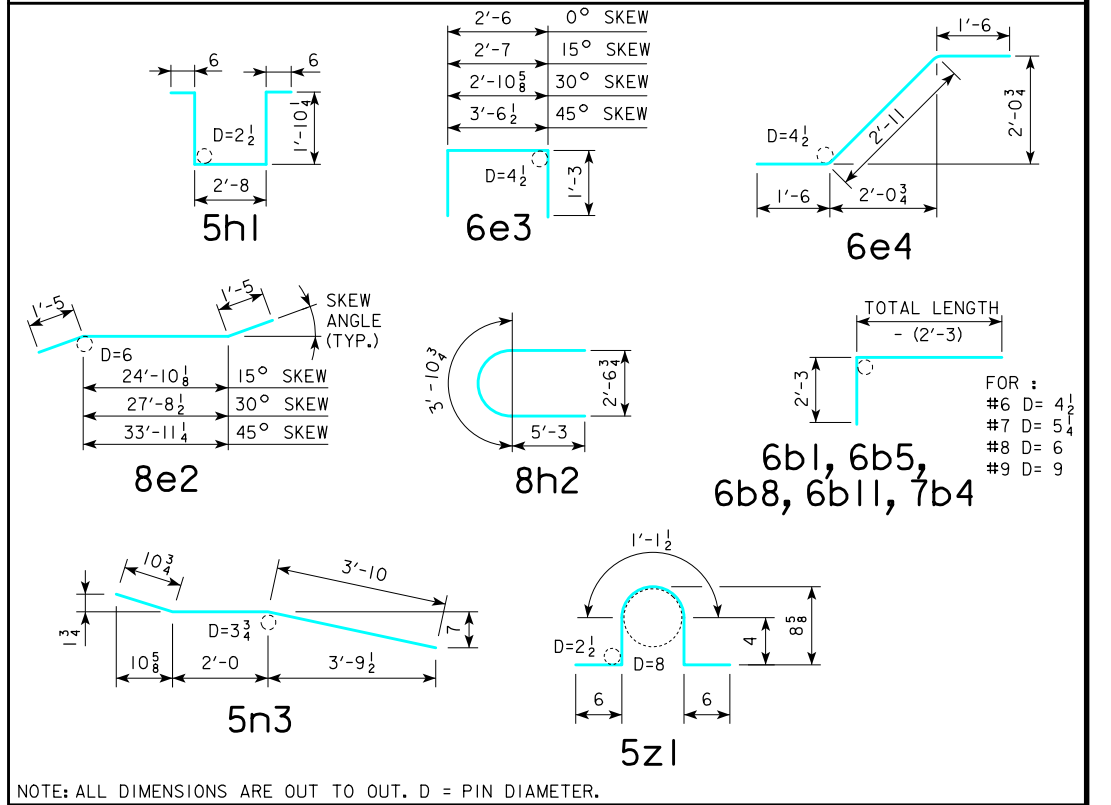
| LOCATION | SKEW | SHAPE | BAR | 0° | | | 15° | | | 30° | | | 45° | | |
|---|------|-------|-------|-----|--------|--------|-----|--------|--------|-----|--------|--------|-----|--------|--------|
| | | | | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT |
| SLAB LONGITUDINAL BOTTOM | | | 8a1 | 31 | 21'-3 | 1759 | 31 | 21'-3 | 1759 | 31 | 21'-3 | 1759 | 31 | 21'-3 | 1759 |
| SLAB LONGITUDINAL BOTTOM | | | 8a2 | 31 | 31'-5 | 2601 | 31 | 31'-5 | 2601 | 31 | 31'-5 | 2601 | 31 | 31'-5 | 2601 |
| SLAB LONGITUDINAL BOTTOM | | | 8a3 | 31 | 29'-6 | 2442 | 31 | 29'-6 | 2442 | 31 | 29'-6 | 2442 | 31 | 29'-6 | 2442 |
| SLAB LONGITUDINAL BOTTOM | | | 9a4 | 32 | 27'-6 | 2992 | 32 | 27'-6 | 2992 | 32 | 27'-6 | 2992 | 32 | 27'-6 | 2992 |
| SLAB LONGITUDINAL BOTTOM | | | 9a5 | 16 | 29'-6 | 1605 | 16 | 29'-6 | 1605 | 16 | 29'-6 | 1605 | 16 | 29'-6 | 1605 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 8a6 | 8 | 35'-9 | 764 | 8 | 35'-9 | 764 | 8 | 35'-9 | 764 | 8 | 35'-9 | 764 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 8a7 | 4 | 34'-8 | 371 | 4 | 34'-8 | 371 | 4 | 34'-8 | 371 | 4 | 34'-8 | 371 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 8a8 | 8 | 24'-0 | 513 | 8 | 24'-0 | 513 | 8 | 24'-0 | 513 | 8 | 24'-0 | 513 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 8a9 | 4 | 20'-6 | 219 | 4 | 20'-6 | 219 | 4 | 20'-6 | 219 | 4 | 20'-6 | 219 |
| SLAB LONGITUDINAL TOP | | | 6b1 | 31 | 6'-9 | 315 | 31 | 6'-9 | 315 | 31 | 6'-9 | 315 | 31 | 6'-9 | 315 |
| SLAB LONGITUDINAL TOP | | | 10b2 | 31 | 24'-9 | 3302 | 31 | 24'-9 | 3302 | 31 | 24'-9 | 3302 | 31 | 24'-9 | 3302 |
| SLAB LONGITUDINAL TOP | | | 10b3 | 31 | 25'-6 | 3402 | 31 | 25'-6 | 3402 | 31 | 25'-6 | 3402 | 31 | 25'-6 | 3402 |
| SLAB LONGITUDINAL TOP | | | 7b4 | 31 | 16'-8 | 1057 | 31 | 16'-8 | 1057 | 31 | 16'-8 | 1057 | 31 | 16'-8 | 1057 |
| SLAB LONGITUDINAL TOP | | | 6b5 | 32 | 13'-6 | 649 | 32 | 13'-6 | 649 | 32 | 13'-6 | 649 | 32 | 13'-6 | 649 |
| SLAB LONGITUDINAL TOP | | | 9b6 | 32 | 21'-3 | 2312 | 32 | 21'-3 | 2312 | 32 | 21'-3 | 2312 | 32 | 21'-3 | 2312 |
| SLAB LONGITUDINAL TOP | | | 6b7 | 16 | 27'-6 | 661 | 16 | 27'-6 | 661 | 16 | 27'-6 | 661 | 16 | 27'-6 | 661 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b8 | 8 | 25'-8 | 309 | 8 | 25'-8 | 309 | 8 | 25'-8 | 309 | 8 | 25'-8 | 309 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 9b9 | 8 | 22'-0 | 599 | 8 | 22'-0 | 599 | 8 | 22'-0 | 599 | 8 | 22'-0 | 599 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b10 | 4 | 21'-4 | 129 | 4 | 21'-4 | 129 | 4 | 21'-4 | 129 | 4 | 21'-4 | 129 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b11 | 8 | 27'-11 | 336 | 8 | 27'-11 | 336 | 8 | 27'-11 | 336 | 8 | 27'-11 | 336 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 10b12 | 8 | 17'-0 | 586 | 8 | 17'-0 | 586 | 8 | 17'-0 | 586 | 8 | 17'-0 | 586 |
| SLAB TRANSVERSE, BOTTOM | | | 6c1 | 97 | 26'-10 | 3910 | 97 | 27'-9 | 4044 | 86 | 26'-10 | 3467 | 76 | 26'-10 | 3064 |
| SLAB TRANSVERSE ENDS, BOTTOM | | | 6c2 | - | - | - | - | - | - | 24 | VARIES | 579 | 44 | VARIES | 970 |
| SLAB TRANSVERSE, TOP | | | 5d1 | 97 | 26'-10 | 2715 | 97 | 27'-9 | 2808 | 86 | 26'-10 | 2407 | 76 | 26'-10 | 2128 |
| SLAB TRANSVERSE ENDS, TOP | | | 5d2 | - | - | - | - | - | - | 24 | VARIES | 402 | 44 | VARIES | 674 |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e1 | 18 | 26'-10 | 1290 | - | - | - | - | - | - | - | - | - |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e2 | - | - | - | 18 | 27'-8 | 1330 | 18 | 30'-7 | 1470 | 18 | 36'-9 | 1767 |
| SLAB, HAIRPINS, AT ABUTMENT | | | 6e3 | 60 | 5'-0 | 451 | 60 | 5'-1 | 459 | 60 | 5'-5 | 489 | 60 | 6'-1 | 549 |
| SLAB, DIAGONALS, AT ABUTMENT | | | 6e4 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 |
| PIER CAP HOOPS | | | 5h1 | 42 | 7'-5 | 325 | 42 | 7'-5 | 325 | 42 | 7'-5 | 325 | 56 | 7'-5 | 434 |
| 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 | 23'-10 | 510 | 8 | 24'-8 | 527 | 8 | 27'-6 | 588 | 8 | 33'-8 | 720 |
| PIER CAP, TOP LONGITUDINAL | | | 8h4 | 4 | 26'-10 | 287 | 4 | 27'-9 | 297 | 4 | 30'-11 | 331 | 4 | 37'-11 | 405 |
| TOP OF SLAB, TRANSVERSE, AT RAIL | | | 5j1 | 192 | 8'-6 | 1703 | 192 | 8'-6 | 1703 | 192 | 8'-6 | 1703 | 190 | 8'-6 | 1685 |
| 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 |
| PAVING BLOCK LIFTING HOOPS | | | 5z1 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 |
| SUB TOTAL - LBS. | | | | | | 39,347 | | | 39,649 | | | 39,917 | | | 40,552 |
| OPEN RAIL - SEE LIST ON RAIL SHEET J24-41-06 | | | | | | 6794 | | | 6794 | | | 6794 | | | 6794 |
| TOTAL - LBS. WITH MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 46,141 | | | 46,443 | | | 46,711 | | | 47,346 |
| TOTAL - LBS. WITH NON-MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 44,865 | | | 45,140 | | | 45,313 | | | 45,633 |
| SAME AS ABOVE EXCEPT ALL "h" BARS DELETED | | | | | | | | | | | | | | | |

ESTIMATED QUANTITIES FOR SUPERSTRUCTURE - 100' BRIDGE

| ITEM | SKEW | WITH MONOLITHIC PIER CAP | | | | WITH NON-MONOLITHIC PIER CAP | | | |
|-----------|--------------------------------------|--------------------------|--------|--------|--------|------------------------------|--------|--------|--------|
| | | 0° | 15° | 30° | 45° | 0° | 15° | 30° | 45° |
| OPEN RAIL | *STRUCTURAL CONCRETE (BRIDGE) C.Y. | 168.6 | 169.2 | 171.6 | 176.3 | 164.4 | 164.9 | 166.7 | 170.5 |
| OPEN RAIL | REINFORCING STEEL LBS. | 46,141 | 46,443 | 46,711 | 47,346 | 44,865 | 45,140 | 45,313 | 45,633 |
| OPEN RAIL | LIN. FT. | 222.0 | 222.2 | 222.9 | 224.5 | 222.0 | 222.2 | 222.9 | 224.5 |

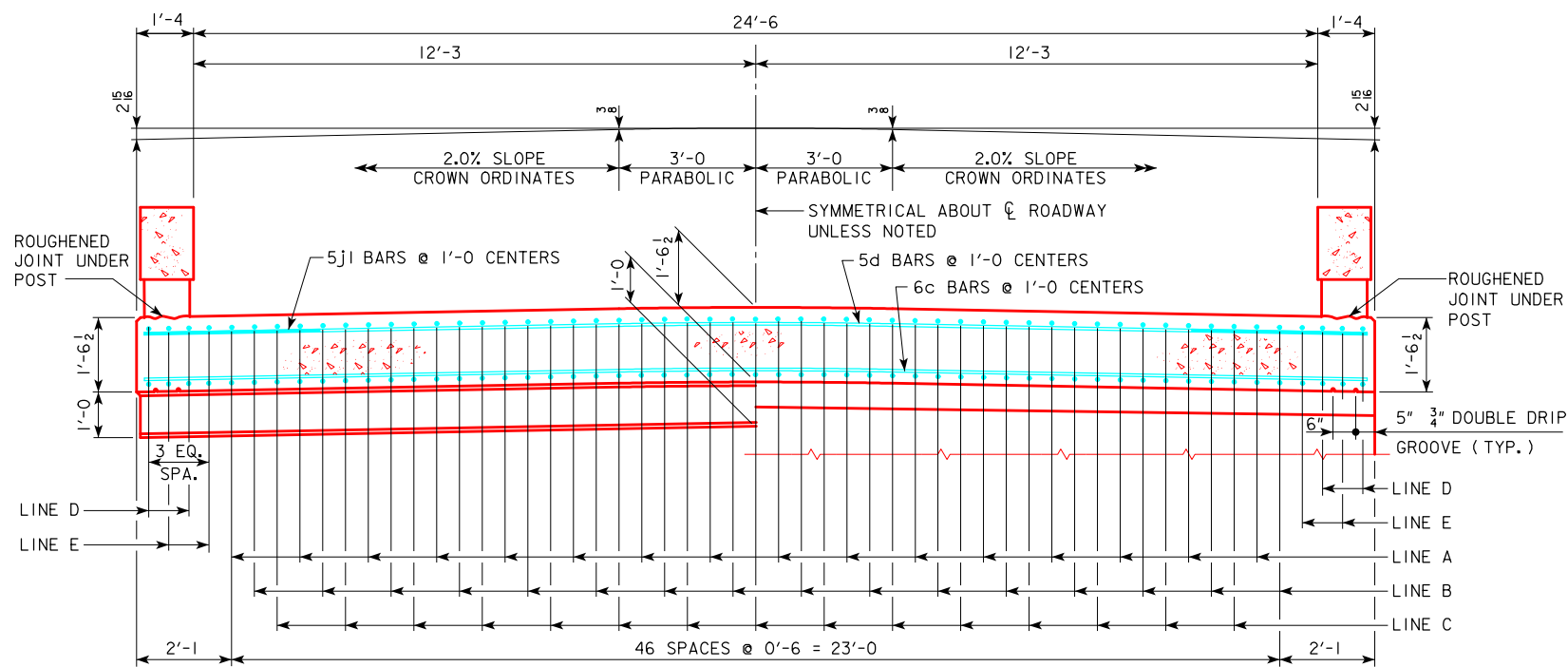
* INCLUDES 4 WINGS @ 0.68 C.Y. EACH AND 2 TEMPORARY PAVING BLOCKS; EXCLUDES RAIL CONCRETE.

BENT BAR DETAILS



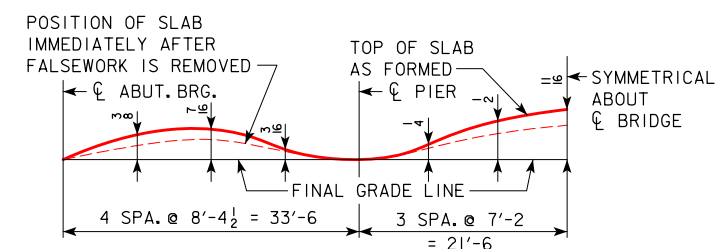
REVISED 07-09 - OPEN RAIL REINF. QTY'S. CHANGED WHICH CHANGED TOTAL REINF. QTY'S. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).

| | | |
|---------------------------------|---------------------------------|---|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 |
| | | <div style="width: 45%; text-align: center;"> SUPERSTRUCTURE DETAILS 100'-0 BRIDGE </div> <div style="width: 45%; text-align: right;"> J24-09-06 </div> |



HALF SECTION NEAR PIER HALF SECTION NEAR ABUTMENT

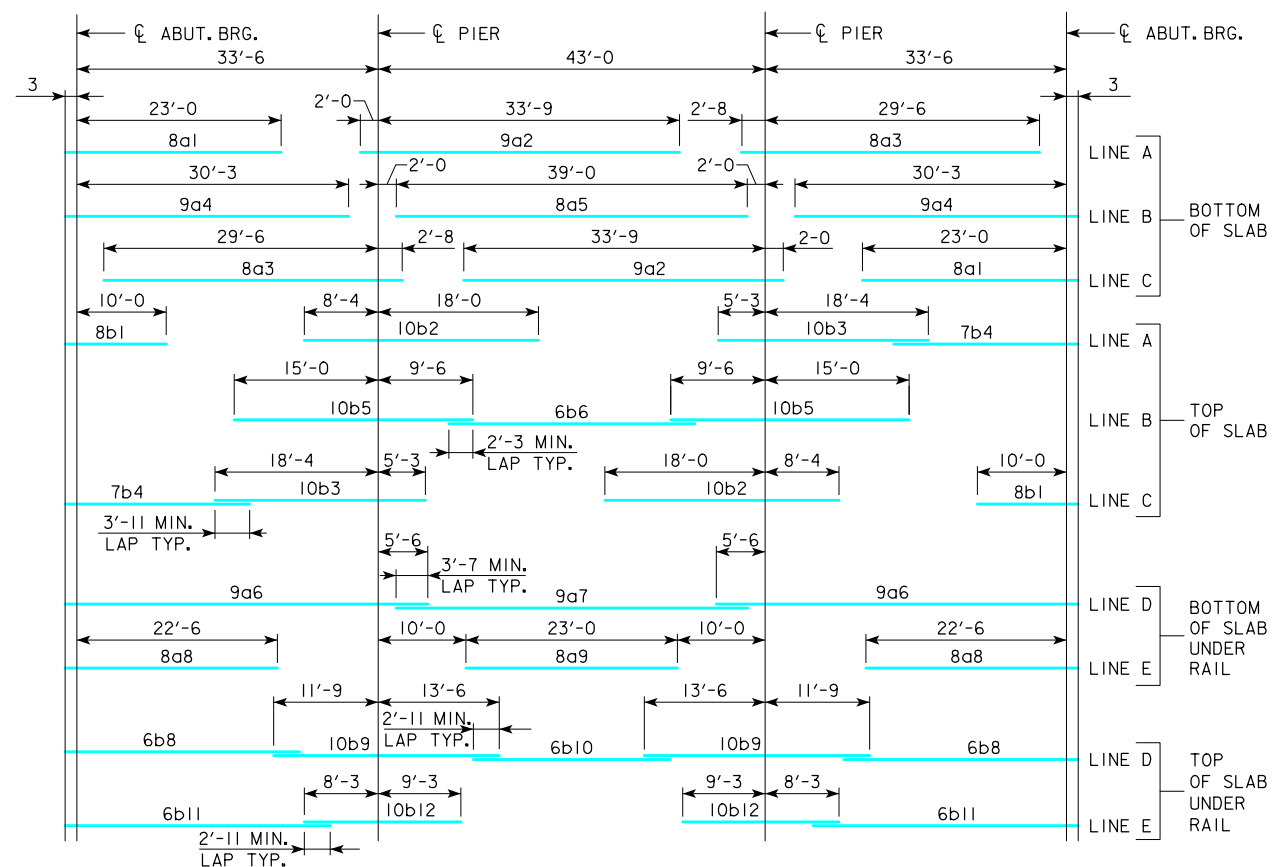
SLAB CROSS-SECTIONAL AREA
FOR OPEN RAIL = 41.88 SQ. FT.



FORM CAMBER DIAGRAM

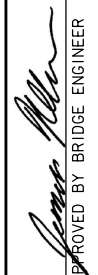

THIS DIAGRAM SHOWS THE FORM CAMBER REQUIRED TO COMPENSATE FOR THE ANTICIPATED ULTIMATE DEAD LOAD DEFLECTION. THE ABOVE DIMENSIONS DO NOT INCLUDE ANY ALLOWANCE FOR FORM DEFLECTION OR FALSEWORK SETTLEMENT.

NOTE:
TOP LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 2 1/2" CLEAR BELOW TOP OF SLAB. BOTTOM LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 1 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 PLACED. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.



PLACEMENT FOR LONGITUDINAL REINFORCEMENT

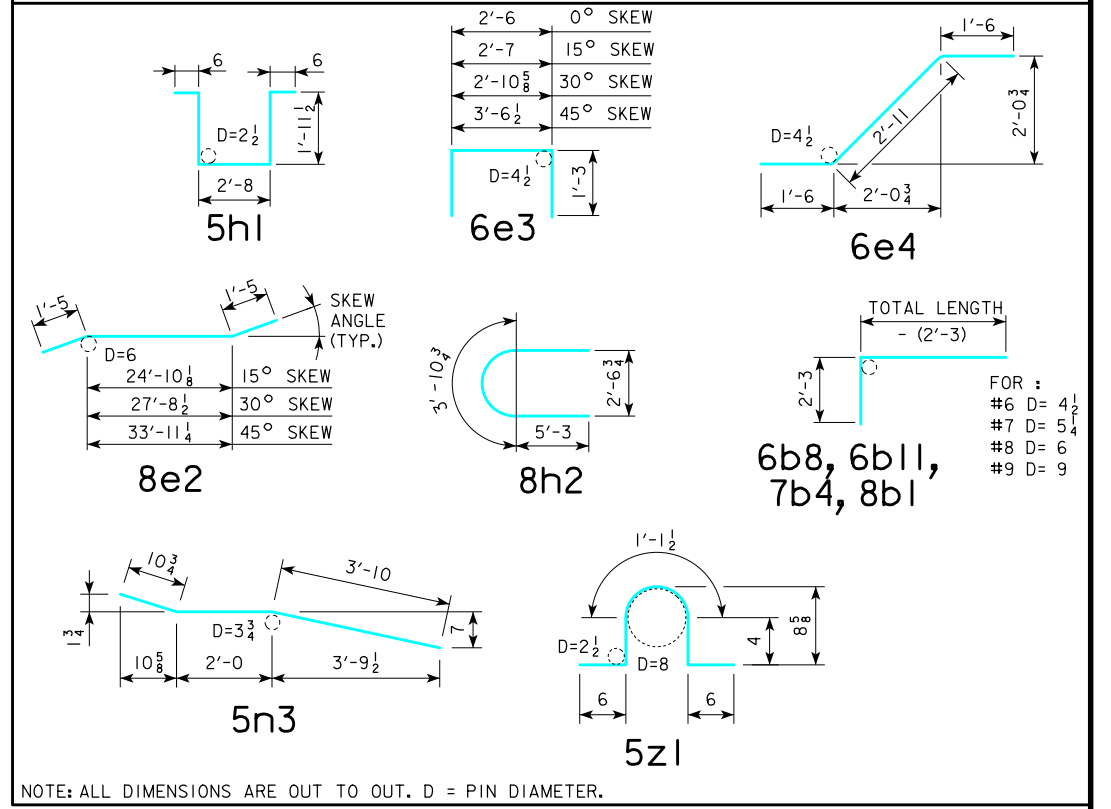
REVISED 06-12 - I.M. REQUIREMENT ADDED TO BAR CHAIR NOTE.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

| | | | |
|---|--|--|--|
| 08-2022 LATEST REVISION DATE |  APPROVED BY BRIDGE ENGINEER |  STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES | |
| | | CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| SUPERSTRUCTURE DETAILS 110'-0 BRIDGE | | J24-10-06 | |

BILL OF REINFORCING STEEL FOR SUPERSTRUCTURE - 110' BRIDGE

| LOCATION | SKEW | SHAPE | BAR | 0° | | 15° | | 30° | | 45° | | | | | |
|---|------|-------|-------|-----|--------|--------|-----|--------|--------|-----|--------|--------|-----|--------|--------|
| | | | | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT |
| SLAB LONGITUDINAL BOTTOM | | | 8a1 | 31 | 23'-3 | 1925 | 31 | 23'-3 | 1925 | 31 | 23'-3 | 1925 | 31 | 23'-3 | 1925 |
| SLAB LONGITUDINAL BOTTOM | | | 9a2 | 31 | 35'-9 | 3769 | 31 | 35'-9 | 3769 | 31 | 35'-9 | 3769 | 31 | 35'-9 | 3769 |
| SLAB LONGITUDINAL BOTTOM | | | 8a3 | 31 | 32'-2 | 2663 | 31 | 32'-2 | 2663 | 31 | 32'-2 | 2663 | 31 | 32'-2 | 2663 |
| SLAB LONGITUDINAL BOTTOM | | | 9a4 | 32 | 30'-6 | 3319 | 32 | 30'-6 | 3319 | 32 | 30'-6 | 3319 | 32 | 30'-6 | 3319 |
| SLAB LONGITUDINAL BOTTOM | | | 8a5 | 16 | 39'-0 | 1667 | 16 | 39'-0 | 1667 | 16 | 39'-0 | 1667 | 16 | 39'-0 | 1667 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 9a6 | 8 | 39'-3 | 1068 | 8 | 39'-3 | 1068 | 8 | 39'-3 | 1068 | 8 | 39'-3 | 1068 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 9a7 | 4 | 39'-2 | 533 | 4 | 39'-2 | 533 | 4 | 39'-2 | 533 | 4 | 39'-2 | 533 |
| 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 | 23'-0 | 246 | 4 | 23'-0 | 246 | 4 | 23'-0 | 246 | 4 | 23'-0 | 246 |
| SLAB LONGITUDINAL TOP | | | 8b1 | 31 | 12'-6 | 1035 | 31 | 12'-6 | 1035 | 31 | 12'-6 | 1035 | 31 | 12'-6 | 1035 |
| SLAB LONGITUDINAL TOP | | | 10b2 | 31 | 26'-4 | 3513 | 31 | 26'-4 | 3513 | 31 | 26'-4 | 3513 | 31 | 26'-4 | 3513 |
| SLAB LONGITUDINAL TOP | | | 10b3 | 31 | 23'-7 | 3146 | 31 | 23'-7 | 3146 | 31 | 23'-7 | 3146 | 31 | 23'-7 | 3146 |
| SLAB LONGITUDINAL TOP | | | 7b4 | 31 | 21'-7 | 1368 | 31 | 21'-7 | 1368 | 31 | 21'-7 | 1368 | 31 | 21'-7 | 1368 |
| SLAB LONGITUDINAL TOP | | | 10b5 | 32 | 24'-6 | 3374 | 32 | 24'-6 | 3374 | 32 | 24'-6 | 3374 | 32 | 24'-6 | 3374 |
| SLAB LONGITUDINAL TOP | | | 6b6 | 16 | 28'-6 | 685 | 16 | 28'-6 | 685 | 16 | 28'-6 | 685 | 16 | 28'-6 | 685 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b8 | 8 | 27'-2 | 327 | 8 | 27'-2 | 327 | 8 | 27'-2 | 327 | 8 | 27'-2 | 327 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 10b9 | 8 | 25'-3 | 870 | 8 | 25'-3 | 870 | 8 | 25'-3 | 870 | 8 | 25'-3 | 870 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b10 | 4 | 21'-10 | 132 | 4 | 21'-10 | 132 | 4 | 21'-10 | 132 | 4 | 21'-10 | 132 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b11 | 8 | 30'-8 | 369 | 8 | 30'-8 | 369 | 8 | 30'-8 | 369 | 8 | 30'-8 | 369 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 10b12 | 8 | 17'-6 | 603 | 8 | 17'-6 | 603 | 8 | 17'-6 | 603 | 8 | 17'-6 | 603 |
| SLAB TRANSVERSE, BOTTOM | | | 6c1 | 107 | 26'-10 | 4313 | 107 | 27'-9 | 4460 | 96 | 26'-10 | 3870 | 86 | 26'-10 | 3467 |
| SLAB TRANSVERSE ENDS, BOTTOM | | | 6c2 | - | - | - | - | - | - | 24 | VARIES | 579 | 44 | VARIES | 970 |
| SLAB TRANSVERSE, TOP | | | 5d1 | 107 | 26'-10 | 2995 | 107 | 27'-9 | 3097 | 96 | 26'-10 | 2687 | 86 | 26'-10 | 2407 |
| SLAB TRANSVERSE ENDS, TOP | | | 5d2 | - | - | - | - | - | - | 24 | VARIES | 402 | 44 | VARIES | 674 |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e1 | 18 | 26'-10 | 1290 | - | - | - | - | - | - | - | - | - |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e2 | - | - | - | 18 | 27'-8 | 1330 | 18 | 30'-7 | 1470 | 18 | 36'-9 | 1767 |
| SLAB, HAIRPINS, AT ABUTMENT | | | 6e3 | 60 | 5'-0 | 451 | 60 | 5'-1 | 459 | 60 | 5'-5 | 489 | 60 | 6'-1 | 549 |
| SLAB, DIAGONALS, AT ABUTMENT | | | 6e4 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 |
| PIER CAP HOOPS | | | 5h1 | 32 | 7'-7 | 254 | 32 | 7'-7 | 254 | 48 | 7'-7 | 380 | 48 | 7'-7 | 380 |
| 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 | 23'-10 | 510 | 8 | 24'-8 | 527 | 8 | 27'-6 | 588 | 8 | 33'-8 | 720 |
| PIER CAP, TOP LONGITUDINAL | | | 8h4 | 4 | 26'-10 | 287 | 4 | 27'-9 | 297 | 4 | 30'-11 | 331 | 4 | 37'-11 | 405 |
| TOP OF SLAB, TRANSVERSE, AT RAIL | | | 5j1 | 212 | 8'-6 | 1880 | 212 | 8'-6 | 1880 | 212 | 8'-6 | 1880 | 210 | 8'-6 | 1862 |
| 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 |
| PAVING BLOCK LIFTING HOOPS | | | 5z1 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 |
| SUB TOTAL - LBS. | | | | | | 44,311 | | | 44,635 | | | 45,007 | | | 45,532 |
| OPEN RAIL - SEE LIST ON RAIL SHEET J24-41-06 | | | | | | 7261 | | | 7261 | | | 7261 | | | 7261 |
| TOTAL - LBS. WITH MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 51,572 | | | 51,896 | | | 52,268 | | | 52,793 |
| TOTAL - LBS. WITH NON-MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 50,367 | | | 50,664 | | | 50,815 | | | 51,134 |
| SAME AS ABOVE EXCEPT ALL "h" BARS DELETED | | | | | | | | | | | | | | | |

BENT BAR DETAILS



ESTIMATED QUANTITIES FOR SUPERSTRUCTURE - 110' BRIDGE

| ITEM | SKEW | WITH MONOLITHIC PIER CAP | | | | WITH NON-MONOLITHIC PIER CAP | | | |
|-----------|--------------------------------------|--------------------------|--------|--------|--------|------------------------------|--------|--------|--------|
| | | 0° | 15° | 30° | 45° | 0° | 15° | 30° | 45° |
| OPEN RAIL | *STRUCTURAL CONCRETE (BRIDGE) C.Y. | 192.3 | 192.9 | 195.2 | 199.9 | 188.1 | 188.5 | 190.3 | 194.1 |
| OPEN RAIL | REINFORCING STEEL LBS. | 51,572 | 51,896 | 52,268 | 52,793 | 50,367 | 50,664 | 50,815 | 51,134 |
| OPEN RAIL | LIN. FT. | 242.0 | 242.2 | 242.9 | 244.5 | 242.0 | 242.2 | 242.9 | 244.5 |

* INCLUDES 4 WINGS @ 0.68 C.Y. EACH AND 2 TEMPORARY PAVING BLOCKS; EXCLUDES RAIL CONCRETE.

REVISED 07-09 - OPEN RAIL REINF. QTY'S. CHANGED WHICH CHANGED TOTAL REINF. QTY'S. REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).

08-2022
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

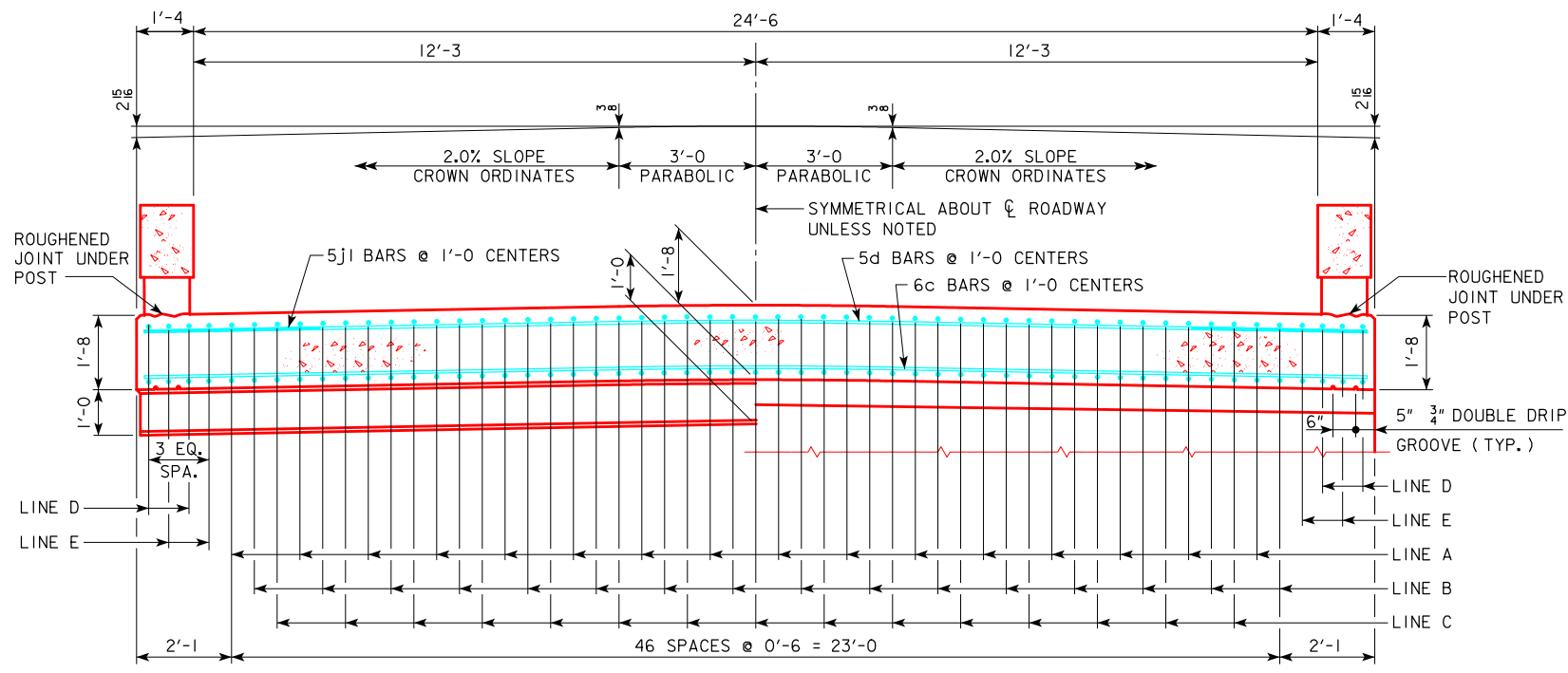
STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES

CONTINUOUS CONCRETE SLAB BRIDGES

NOVEMBER, 2006

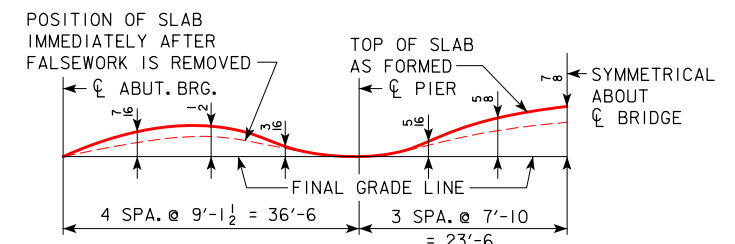
SUPERSTRUCTURE DETAILS
110'-0 BRIDGE

J24-11-06



HALF SECTION NEAR PIER HALF SECTION NEAR ABUTMENT

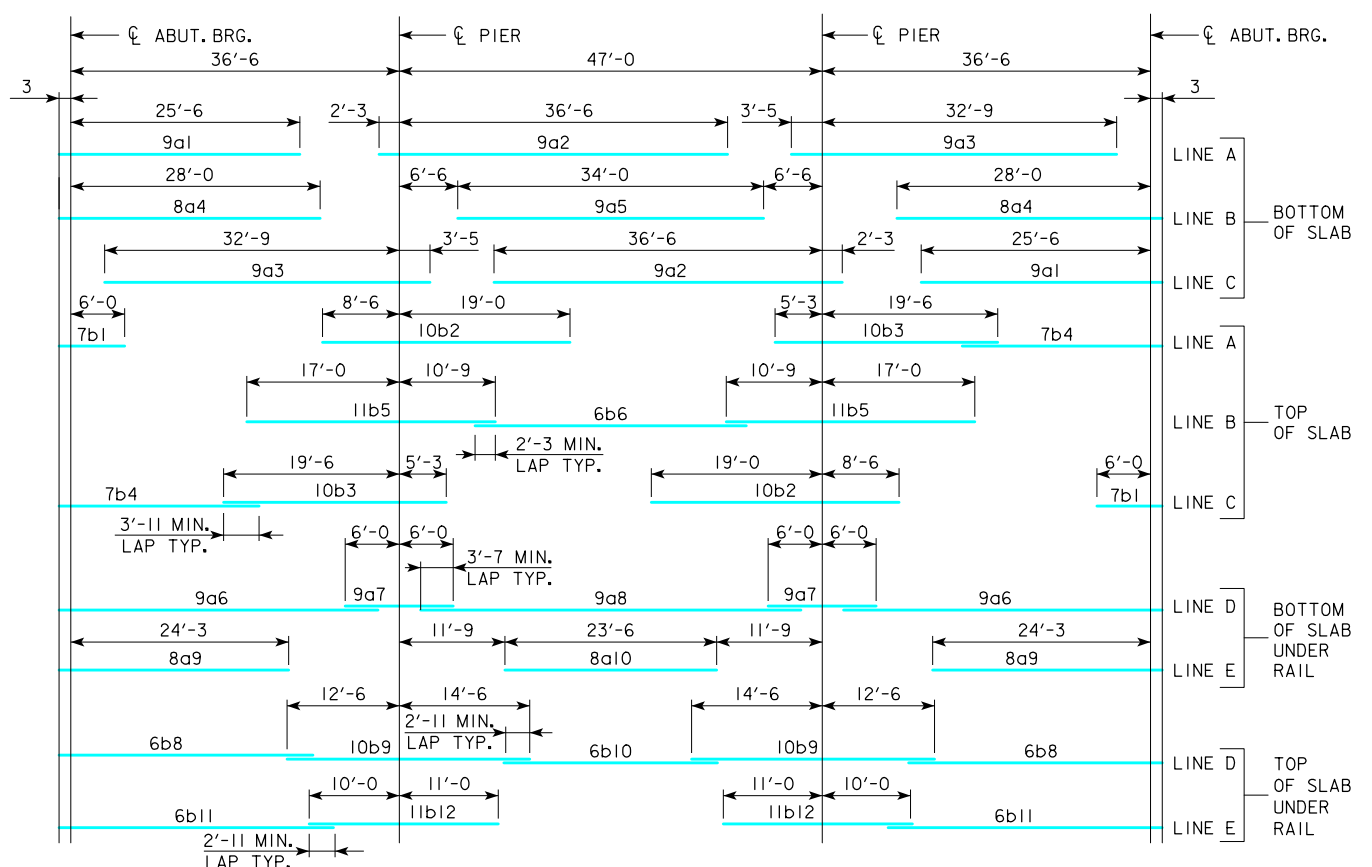
SLAB CROSS-SECTIONAL AREA FOR OPEN RAIL = 45.28 SQ. FT.



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.

NOTE:
TOP LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 2 1/2" CLEAR BELOW TOP OF SLAB. BOTTOM LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 1 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 PLACED. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.



PLACEMENT FOR LONGITUDINAL REINFORCEMENT

REVISED 06-12 - I.M. REQUIREMENT ADDED TO BAR CHAIR NOTE.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

| | | | | |
|---------------------------------|--|-----------------------------|---|-----------|
| 08-2022 LATEST REVISION DATE | | APPROVED BY BRIDGE ENGINEER | IOWA DOT | |
| | | | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES | |
| | | | CONTINUOUS CONCRETE SLAB BRIDGES | |
| | | | NOVEMBER, 2006 | |
| | | | SUPERSTRUCTURE DETAILS 120'-0 BRIDGE | J24-12-06 |

BILL OF REINFORCING STEEL FOR SUPERSTRUCTURE - 120' BRIDGE

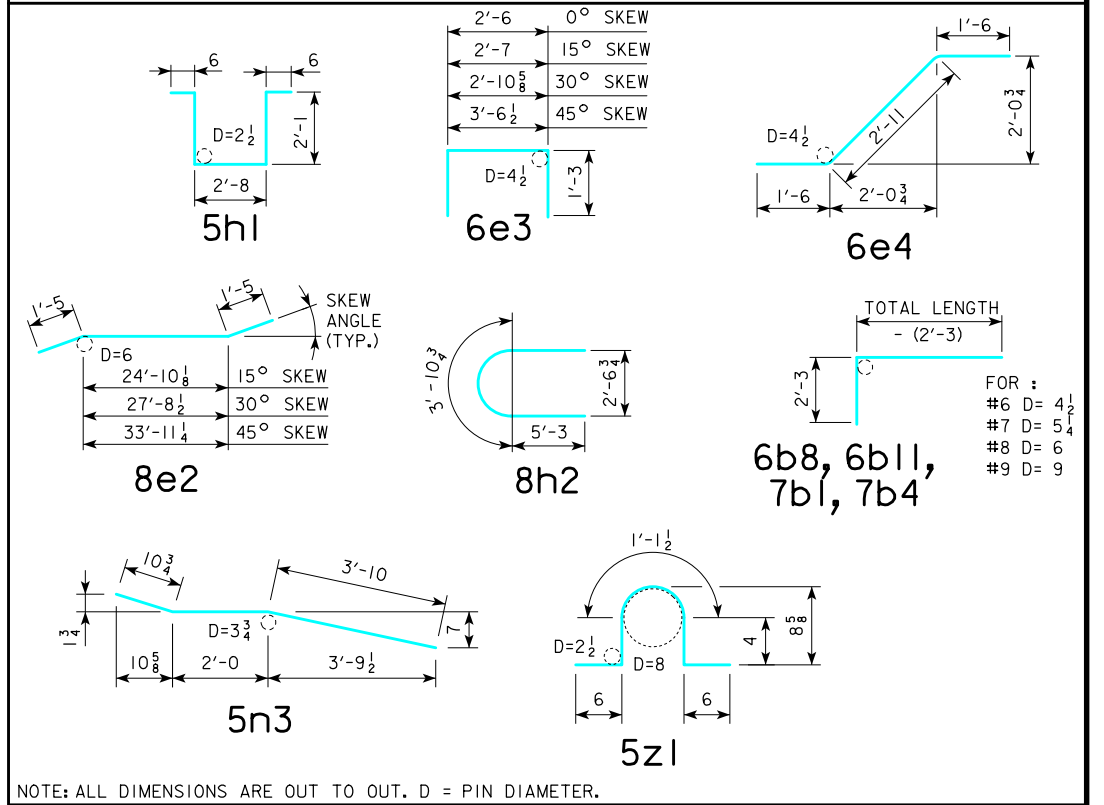
| LOCATION | SKEW | SHAPE | BAR | 0° | | 15° | | 30° | | 45° | | | | | |
|---|------|-------|-------|-----|---------|--------|-----|---------|--------|-----|---------|--------|-----|---------|--------|
| | | | | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT |
| SLAB LONGITUDINAL BOTTOM | | | 9a1 | 31 | 25'-9" | 2715 | 31 | 25'-9" | 2715 | 31 | 25'-9" | 2715 | 31 | 25'-9" | 2715 |
| SLAB LONGITUDINAL BOTTOM | | | 9a2 | 31 | 38'-9" | 4085 | 31 | 38'-9" | 4085 | 31 | 38'-9" | 4085 | 31 | 38'-9" | 4085 |
| SLAB LONGITUDINAL BOTTOM | | | 9a3 | 31 | 36'-2" | 3812 | 31 | 36'-2" | 3812 | 31 | 36'-2" | 3812 | 31 | 36'-2" | 3812 |
| SLAB LONGITUDINAL BOTTOM | | | 8a4 | 32 | 28'-3" | 2414 | 32 | 28'-3" | 2414 | 32 | 28'-3" | 2414 | 32 | 28'-3" | 2414 |
| SLAB LONGITUDINAL BOTTOM | | | 9a5 | 16 | 34'-0" | 1850 | 16 | 34'-0" | 1850 | 16 | 34'-0" | 1850 | 16 | 34'-0" | 1850 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 9a6 | 8 | 34'-4" | 934 | 8 | 34'-4" | 934 | 8 | 34'-4" | 934 | 8 | 34'-4" | 934 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 9a7 | 8 | 12'-0" | 327 | 8 | 12'-0" | 327 | 8 | 12'-0" | 327 | 8 | 12'-0" | 327 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 9a8 | 4 | 42'-2" | 574 | 4 | 42'-2" | 574 | 4 | 42'-2" | 574 | 4 | 42'-2" | 574 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 8a9 | 8 | 24'-6" | 524 | 8 | 24'-6" | 524 | 8 | 24'-6" | 524 | 8 | 24'-6" | 524 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 8a10 | 4 | 23'-6" | 251 | 4 | 23'-6" | 251 | 4 | 23'-6" | 251 | 4 | 23'-6" | 251 |
| SLAB LONGITUDINAL TOP | | | 7b1 | 31 | 8'-6" | 539 | 31 | 8'-6" | 539 | 31 | 8'-6" | 539 | 31 | 8'-6" | 539 |
| SLAB LONGITUDINAL TOP | | | 10b2 | 31 | 27'-6" | 3669 | 31 | 27'-6" | 3669 | 31 | 27'-6" | 3669 | 31 | 27'-6" | 3669 |
| SLAB LONGITUDINAL TOP | | | 10b3 | 31 | 24'-9" | 3302 | 31 | 24'-9" | 3302 | 31 | 24'-9" | 3302 | 31 | 24'-9" | 3302 |
| SLAB LONGITUDINAL TOP | | | 7b4 | 31 | 23'-5" | 1484 | 31 | 23'-5" | 1484 | 31 | 23'-5" | 1484 | 31 | 23'-5" | 1484 |
| SLAB LONGITUDINAL TOP | | | 11b5 | 32 | 27'-9" | 4718 | 32 | 27'-9" | 4718 | 32 | 27'-9" | 4718 | 32 | 27'-9" | 4718 |
| SLAB LONGITUDINAL TOP | | | 6b6 | 16 | 30'-0" | 721 | 16 | 30'-0" | 721 | 16 | 30'-0" | 721 | 16 | 30'-0" | 721 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b8 | 8 | 29'-5" | 354 | 8 | 29'-5" | 354 | 8 | 29'-5" | 354 | 8 | 29'-5" | 354 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 10b9 | 8 | 27'-0" | 930 | 8 | 27'-0" | 930 | 8 | 27'-0" | 930 | 8 | 27'-0" | 930 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b10 | 4 | 23'-10" | 144 | 4 | 23'-10" | 144 | 4 | 23'-10" | 144 | 4 | 23'-10" | 144 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b11 | 8 | 31'-11" | 384 | 8 | 31'-11" | 384 | 8 | 31'-11" | 384 | 8 | 31'-11" | 384 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 11b12 | 8 | 21'-0" | 893 | 8 | 21'-0" | 893 | 8 | 21'-0" | 893 | 8 | 21'-0" | 893 |
| SLAB TRANSVERSE, BOTTOM | | | 6c1 | 117 | 26'-10" | 4716 | 117 | 27'-9" | 4877 | 106 | 26'-10" | 4273 | 96 | 26'-10" | 3870 |
| SLAB TRANSVERSE ENDS, BOTTOM | | | 6c2 | - | - | - | - | - | - | 24 | VARIES | 579 | 44 | VARIES | 970 |
| SLAB TRANSVERSE, TOP | | | 5d1 | 117 | 26'-10" | 3275 | 117 | 27'-9" | 3387 | 106 | 26'-10" | 2967 | 96 | 26'-10" | 2687 |
| SLAB TRANSVERSE ENDS, TOP | | | 5d2 | - | - | - | - | - | - | 24 | VARIES | 402 | 44 | VARIES | 674 |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e1 | 18 | 26'-10" | 1290 | - | - | - | - | - | - | - | - | - |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e2 | - | - | - | 18 | 27'-8" | 1330 | 18 | 30'-7" | 1470 | 18 | 36'-9" | 1767 |
| SLAB, HAIRPINS, AT ABUTMENT | | | 6e3 | 60 | 5'-0" | 451 | 60 | 5'-1" | 459 | 60 | 5'-5" | 489 | 60 | 6'-1" | 549 |
| SLAB, DIAGONALS, AT ABUTMENT | | | 6e4 | 60 | 5'-11" | 534 | 60 | 5'-11" | 534 | 60 | 5'-11" | 534 | 60 | 5'-11" | 534 |
| PIER CAP HOOPS | | | 5h1 | 32 | 7'-10" | 262 | 32 | 7'-10" | 262 | 48 | 7'-10" | 393 | 48 | 7'-10" | 393 |
| 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 | 23'-10" | 510 | 8 | 24'-8" | 527 | 8 | 27'-6" | 588 | 8 | 33'-8" | 720 |
| PIER CAP, TOP LONGITUDINAL | | | 8h4 | 4 | 26'-10" | 287 | 4 | 27'-9" | 297 | 4 | 30'-11" | 331 | 4 | 37'-11" | 405 |
| TOP OF SLAB, TRANSVERSE, AT RAIL | | | 5j1 | 232 | 8'-6" | 2057 | 232 | 8'-6" | 2057 | 232 | 8'-6" | 2057 | 230 | 8'-6" | 2040 |
| 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 |
| PAVING BLOCK LIFTING HOOPS | | | 5z1 | 8 | 2'-10" | 24 | 8 | 2'-10" | 24 | 8 | 2'-10" | 24 | 8 | 2'-10" | 24 |
| SUB TOTAL - LBS. | | | | | | 48,705 | | | 49,053 | | | 49,406 | | | 49,932 |
| OPEN RAIL - SEE LIST ON RAIL SHEET J24-41-06 | | | | | | 8061 | | | 8061 | | | 8061 | | | 8061 |
| TOTAL - LBS. WITH MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 56,766 | | | 57,114 | | | 57,467 | | | 57,993 |
| TOTAL - LBS. WITH NON-MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 55,553 | | | 55,874 | | | 56,001 | | | 56,321 |
| SAME AS ABOVE EXCEPT ALL "h" BARS DELETED | | | | | | | | | | | | | | | |

ESTIMATED QUANTITIES FOR SUPERSTRUCTURE - 120' BRIDGE

| ITEM | SKEW | WITH MONOLITHIC PIER CAP | | | | WITH NON-MONOLITHIC PIER CAP | | | |
|-----------|--------------------------------------|--------------------------|--------|--------|--------|------------------------------|--------|--------|--------|
| | | 0° | 15° | 30° | 45° | 0° | 15° | 30° | 45° |
| OPEN RAIL | *STRUCTURAL CONCRETE (BRIDGE) C.Y. | 222.5 | 223.1 | 225.3 | 229.9 | 218.3 | 218.7 | 220.5 | 224.1 |
| OPEN RAIL | REINFORCING STEEL LBS. | 56,766 | 57,114 | 57,467 | 57,993 | 55,553 | 55,874 | 56,001 | 56,321 |
| OPEN RAIL | LIN. FT. | 262.0 | 262.2 | 262.9 | 264.5 | 262.0 | 262.2 | 262.9 | 264.5 |

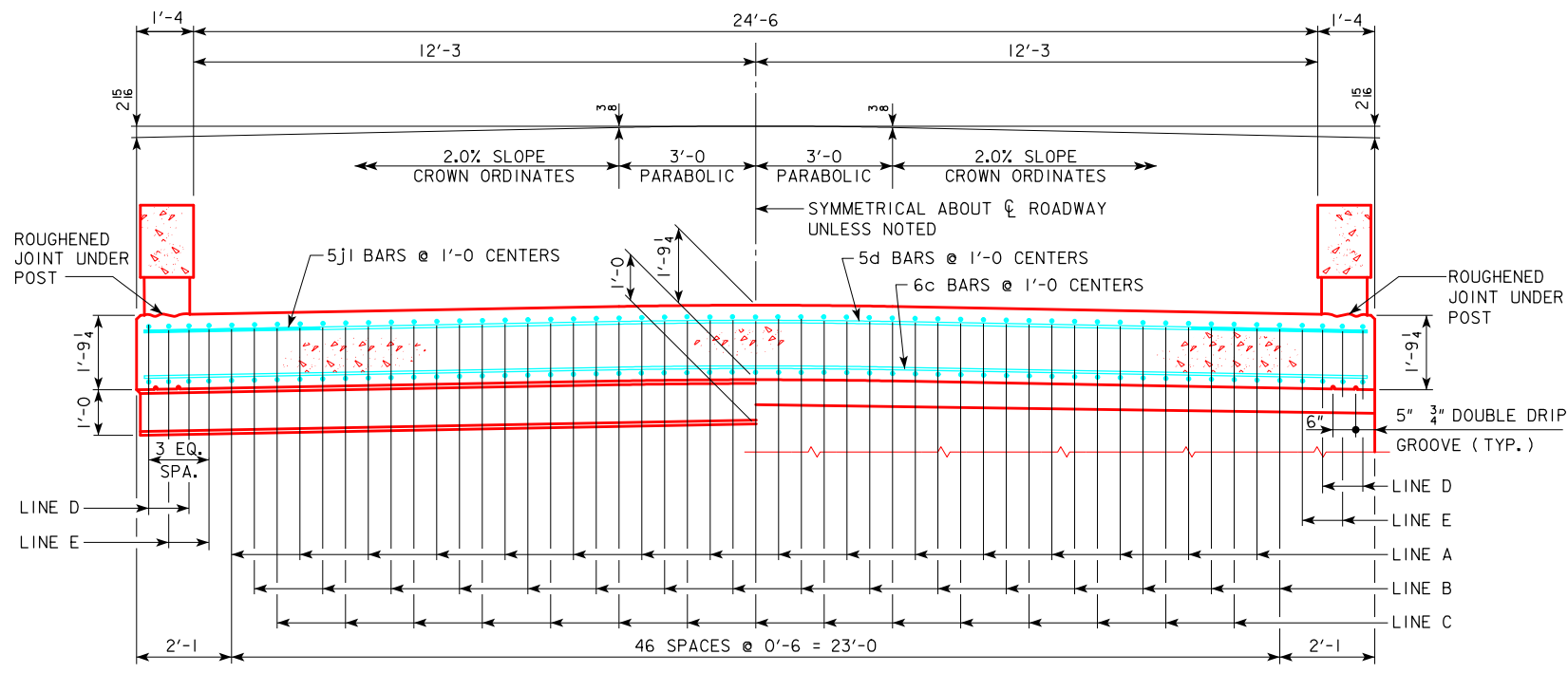
* INCLUDES 4 WINGS @ 0.68 C.Y. EACH AND 2 TEMPORARY PAVING BLOCKS; EXCLUDES RAIL CONCRETE.

BENT BAR DETAILS



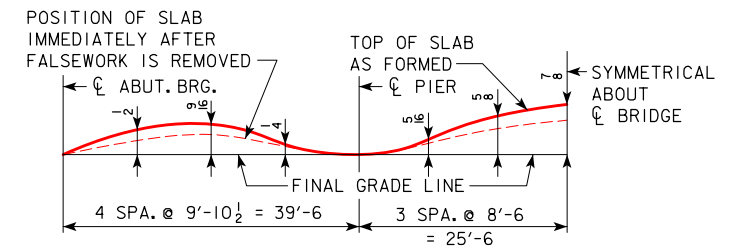
REVISED 07-09 - OPEN RAIL REINF. QTY. CHANGED WHICH CHANGED TOTAL REINF. QTY. REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).

| | | |
|---|---------------------------------|--|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 |
| SUPERSTRUCTURE DETAILS 120'-0 BRIDGE | | J24-13-06 |



HALF SECTION NEAR PIER HALF SECTION NEAR ABUTMENT

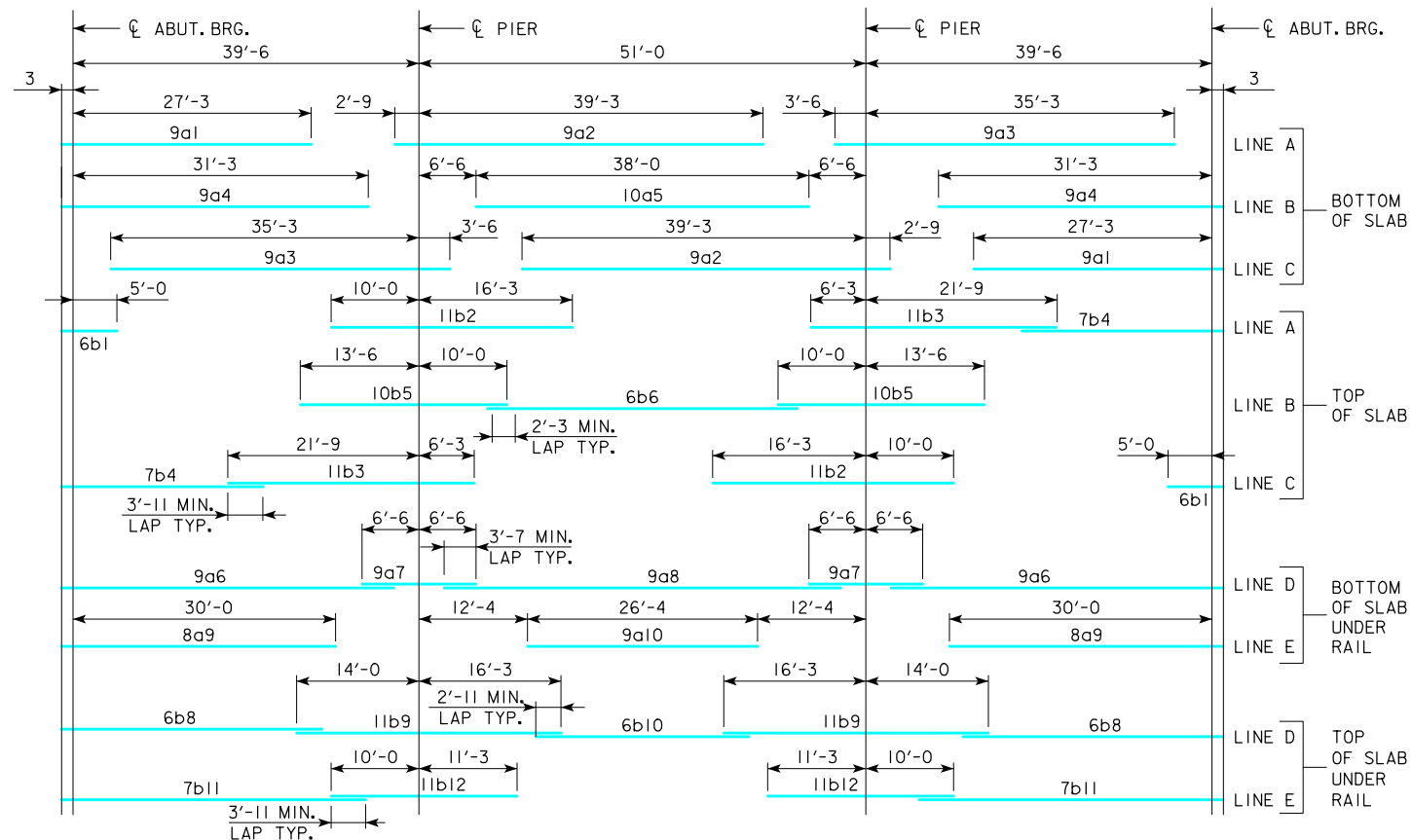
SLAB CROSS-SECTIONAL AREA
FOR OPEN RAIL = 48.11 SQ. FT.



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.

NOTE:
TOP LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 2 1/2" CLEAR BELOW TOP OF SLAB. BOTTOM LONGITUDINAL REINFORCING STEEL IS TO BE PARALLEL TO AND 1 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 PLACED. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.



PLACEMENT FOR LONGITUDINAL REINFORCEMENT

REVISED 06-12 - I.M. REQUIREMENT ADDED TO BAR CHAIR NOTE.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

| | | | |
|---|---|--|--|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER <i>[Signature]</i> | | |
| | | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| SUPERSTRUCTURE DETAILS 130'-0 BRIDGE | | J24-14-06 | |

BILL OF REINFORCING STEEL FOR SUPERSTRUCTURE - 130' BRIDGE

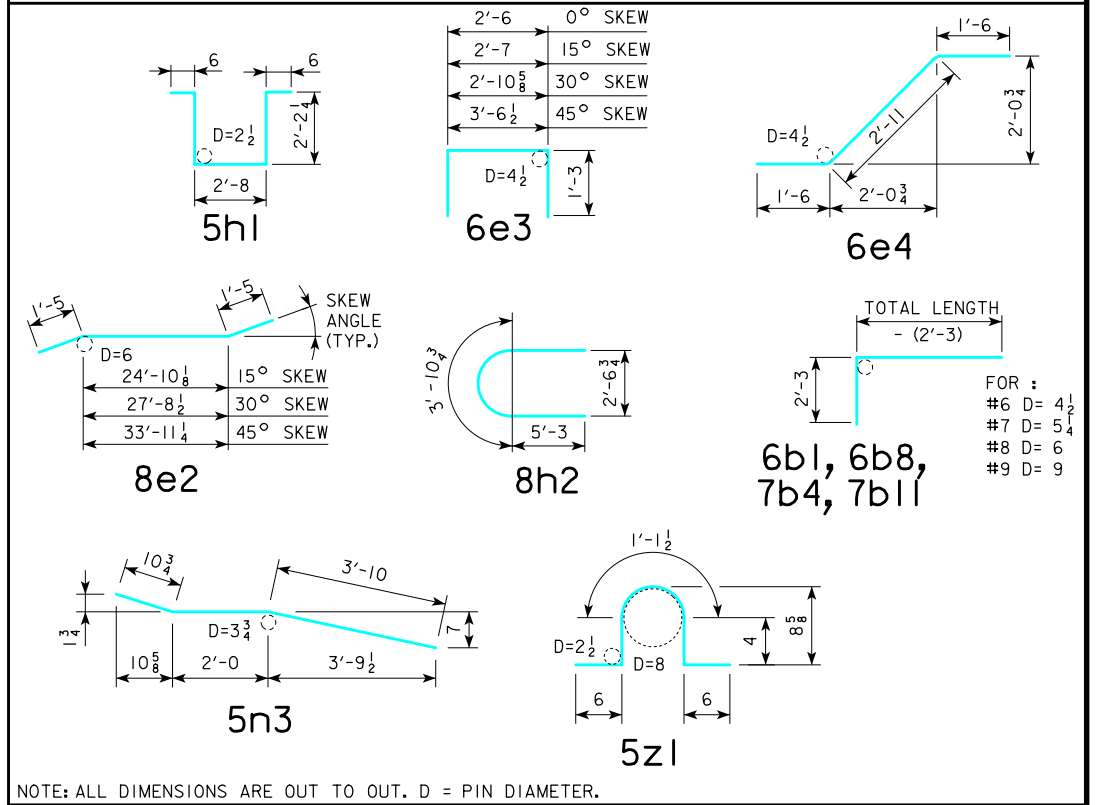
| LOCATION | SKEW | SHAPE | BAR | 0° | | | 15° | | | 30° | | | 45° | | |
|---|------|-------|-------|-----|--------|--------|-----|--------|--------|-----|--------|--------|-----|--------|--------|
| | | | | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT |
| SLAB LONGITUDINAL BOTTOM | | | 9a1 | 31 | 27'-6 | 2899 | 31 | 27'-6 | 2899 | 31 | 27'-6 | 2899 | 31 | 27'-6 | 2899 |
| SLAB LONGITUDINAL BOTTOM | | | 9a2 | 31 | 42'-0 | 4427 | 31 | 42'-0 | 4427 | 31 | 42'-0 | 4427 | 31 | 42'-0 | 4427 |
| SLAB LONGITUDINAL BOTTOM | | | 9a3 | 31 | 38'-9 | 4085 | 31 | 38'-9 | 4085 | 31 | 38'-9 | 4085 | 31 | 38'-9 | 4085 |
| SLAB LONGITUDINAL BOTTOM | | | 9a4 | 32 | 31'-6 | 3428 | 32 | 31'-6 | 3428 | 32 | 31'-6 | 3428 | 32 | 31'-6 | 3428 |
| SLAB LONGITUDINAL BOTTOM | | | 10a5 | 16 | 38'-0 | 2617 | 16 | 38'-0 | 2617 | 16 | 38'-0 | 2617 | 16 | 38'-0 | 2617 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 9a6 | 8 | 36'-10 | 1002 | 8 | 36'-10 | 1002 | 8 | 36'-10 | 1002 | 8 | 36'-10 | 1002 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 9a7 | 8 | 13'-0 | 354 | 8 | 13'-0 | 354 | 8 | 13'-0 | 354 | 8 | 13'-0 | 354 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 9a8 | 4 | 45'-2 | 615 | 4 | 45'-2 | 615 | 4 | 45'-2 | 615 | 4 | 45'-2 | 615 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 8a9 | 8 | 30'-3 | 647 | 8 | 30'-3 | 647 | 8 | 30'-3 | 647 | 8 | 30'-3 | 647 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 9a10 | 4 | 26'-4 | 359 | 4 | 26'-4 | 359 | 4 | 26'-4 | 359 | 4 | 26'-4 | 359 |
| SLAB LONGITUDINAL TOP | | | 6b1 | 31 | 7'-6 | 350 | 31 | 7'-6 | 350 | 31 | 7'-6 | 350 | 31 | 7'-6 | 350 |
| SLAB LONGITUDINAL TOP | | | 11b2 | 31 | 26'-3 | 4324 | 31 | 26'-3 | 4324 | 31 | 26'-3 | 4324 | 31 | 26'-3 | 4324 |
| SLAB LONGITUDINAL TOP | | | 11b3 | 31 | 28'-0 | 4612 | 31 | 28'-0 | 4612 | 31 | 28'-0 | 4612 | 31 | 28'-0 | 4612 |
| SLAB LONGITUDINAL TOP | | | 7b4 | 31 | 24'-2 | 1532 | 31 | 24'-2 | 1532 | 31 | 24'-2 | 1532 | 31 | 24'-2 | 1532 |
| SLAB LONGITUDINAL TOP | | | 10b5 | 32 | 23'-6 | 3236 | 32 | 23'-6 | 3236 | 32 | 23'-6 | 3236 | 32 | 23'-6 | 3236 |
| SLAB LONGITUDINAL TOP | | | 6b6 | 16 | 35'-6 | 854 | 16 | 35'-6 | 854 | 16 | 35'-6 | 854 | 16 | 35'-6 | 854 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b8 | 8 | 30'-11 | 372 | 8 | 30'-11 | 372 | 8 | 30'-11 | 372 | 8 | 30'-11 | 372 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 11b9 | 8 | 30'-3 | 1286 | 8 | 30'-3 | 1286 | 8 | 30'-3 | 1286 | 8 | 30'-3 | 1286 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b10 | 4 | 24'-4 | 147 | 4 | 24'-4 | 147 | 4 | 24'-4 | 147 | 4 | 24'-4 | 147 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 7b11 | 8 | 35'-11 | 588 | 8 | 35'-11 | 588 | 8 | 35'-11 | 588 | 8 | 35'-11 | 588 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 11b12 | 8 | 21'-3 | 904 | 8 | 21'-3 | 904 | 8 | 21'-3 | 904 | 8 | 21'-3 | 904 |
| SLAB TRANSVERSE, BOTTOM | | | 6c1 | 127 | 26'-10 | 5119 | 127 | 27'-9 | 5294 | 116 | 26'-10 | 4676 | 106 | 26'-10 | 4273 |
| SLAB TRANSVERSE ENDS, BOTTOM | | | 6c2 | - | - | - | - | - | - | 24 | VARIES | 579 | 44 | VARIES | 970 |
| SLAB TRANSVERSE, TOP | | | 5d1 | 127 | 26'-10 | 3555 | 127 | 27'-9 | 3676 | 116 | 26'-10 | 3247 | 106 | 26'-10 | 2967 |
| SLAB TRANSVERSE ENDS, TOP | | | 5d2 | - | - | - | - | - | - | 24 | VARIES | 402 | 44 | VARIES | 674 |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e1 | 18 | 26'-10 | 1290 | - | - | - | - | - | - | - | - | - |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e2 | - | - | - | 18 | 27'-8 | 1330 | 18 | 30'-7 | 1470 | 18 | 36'-9 | 1767 |
| SLAB, HAIRPINS, AT ABUTMENT | | | 6e3 | 60 | 5'-0 | 451 | 60 | 5'-1 | 459 | 60 | 5'-5 | 489 | 60 | 6'-1 | 549 |
| SLAB, DIAGONALS, AT ABUTMENT | | | 6e4 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 |
| PIER CAP HOOPS | | | 5h1 | 36 | 8'-1 | 304 | 36 | 8'-1 | 304 | 36 | 8'-1 | 304 | 54 | 8'-1 | 456 |
| 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 | 23'-10 | 510 | 8 | 24'-8 | 527 | 8 | 27'-6 | 588 | 8 | 33'-8 | 720 |
| PIER CAP, TOP LONGITUDINAL | | | 8h4 | 4 | 26'-10 | 287 | 4 | 27'-9 | 297 | 4 | 30'-11 | 331 | 4 | 37'-11 | 405 |
| TOP OF SLAB, TRANSVERSE, AT RAIL | | | 5j1 | 252 | 8'-6 | 2235 | 252 | 8'-6 | 2235 | 252 | 8'-6 | 2235 | 250 | 8'-6 | 2217 |
| 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 |
| PAVING BLOCK LIFTING HOOPS | | | 5z1 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 |
| SUB TOTAL - LBS. | | | | | | 53,622 | | | 53,993 | | | 54,192 | | | 54,869 |
| OPEN RAIL - SEE LIST ON RAIL SHEET J24-41-06 | | | | | | 8573 | | | 8573 | | | 8573 | | | 8573 |
| TOTAL - LBS. WITH MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 62,195 | | | 62,566 | | | 62,765 | | | 63,442 |
| TOTAL - LBS. WITH NON-MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 60,940 | | | 61,284 | | | 61,388 | | | 61,707 |
| SAME AS ABOVE EXCEPT ALL "h" BARS DELETED | | | | | | | | | | | | | | | |

ESTIMATED QUANTITIES FOR SUPERSTRUCTURE - 130' BRIDGE

| ITEM | SKEW | WITH MONOLITHIC PIER CAP | | | | WITH NON-MONOLITHIC PIER CAP | | | |
|-----------|------------------------------------|--------------------------|--------|--------|--------|------------------------------|--------|--------|--------|
| | | 0° | 15° | 30° | 45° | 0° | 15° | 30° | 45° |
| OPEN RAIL | *STRUCTURAL CONCRETE (BRIDGE) C.Y. | 252.6 | 253.2 | 255.4 | 259.9 | 248.4 | 248.8 | 250.5 | 254.1 |
| OPEN RAIL | REINFORCING STEEL LBS. | 62,195 | 62,566 | 62,765 | 63,442 | 60,940 | 61,284 | 61,388 | 61,707 |
| OPEN RAIL | LIN. FT. | 282.0 | 282.2 | 282.9 | 284.5 | 282.0 | 282.2 | 282.9 | 284.5 |

* INCLUDES 4 WINGS @ 0.68 C.Y. EACH AND 2 TEMPORARY PAVING BLOCKS; EXCLUDES RAIL CONCRETE.

BENT BAR DETAILS



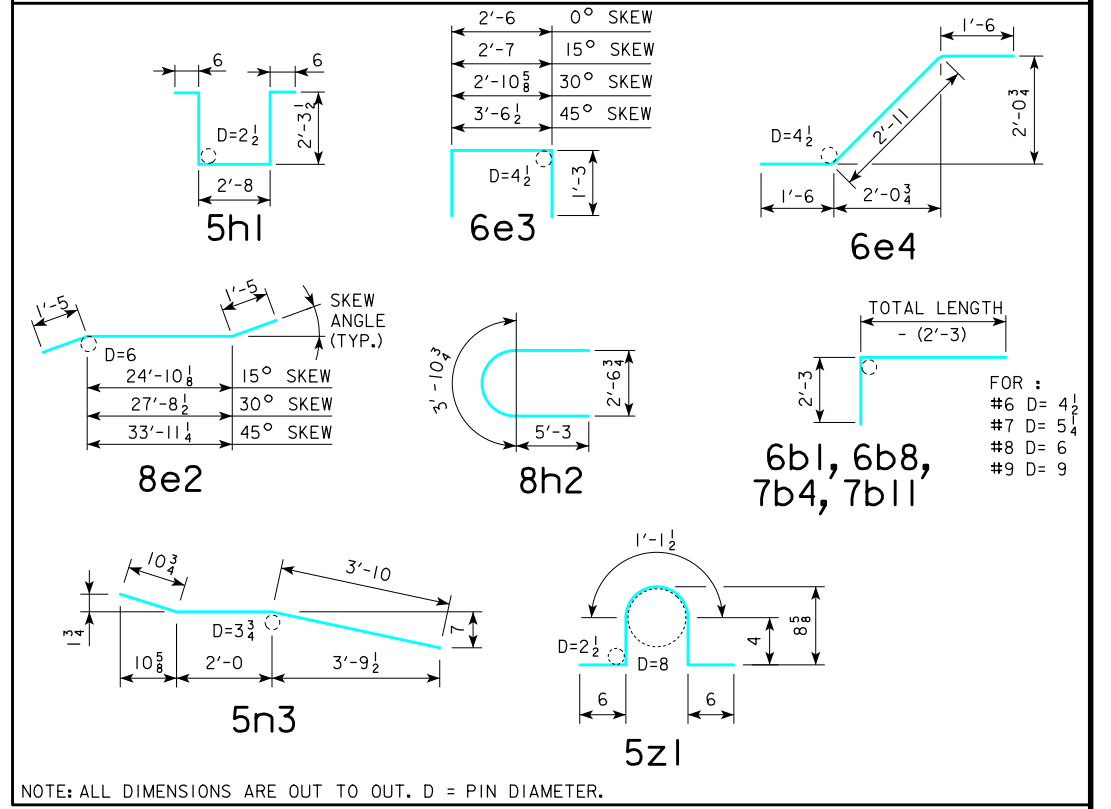
REVISED 07-09 - OPEN RAIL REINF. QTY. CHANGED WHICH CHANGED TOTAL REINF. QTY. REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).

| | | |
|---|---------------------------------|--|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 |
| SUPERSTRUCTURE DETAILS 130'-0 BRIDGE | | J24-15-06 |

BILL OF REINFORCING STEEL FOR SUPERSTRUCTURE - 140' BRIDGE

| LOCATION | SKEW | SHAPE | BAR | 0° | | 15° | | 30° | | 45° | | | | | |
|---|------|-------|-------|-----|--------|--------|-----|--------|--------|-----|--------|--------|-----|--------|--------|
| | | | | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT | NO. | LENGTH | WEIGHT |
| SLAB LONGITUDINAL BOTTOM | | | 9a1 | 31 | 29'-3 | 3083 | 31 | 29'-3 | 3083 | 31 | 29'-3 | 3083 | 31 | 29'-3 | 3083 |
| SLAB LONGITUDINAL BOTTOM | | | 10a2 | 31 | 45'-4 | 6048 | 31 | 45'-4 | 6048 | 31 | 45'-4 | 6048 | 31 | 45'-4 | 6048 |
| SLAB LONGITUDINAL BOTTOM | | | 9a3 | 31 | 41'-3 | 4348 | 31 | 41'-3 | 4348 | 31 | 41'-3 | 4348 | 31 | 41'-3 | 4348 |
| SLAB LONGITUDINAL BOTTOM | | | 10a4 | 32 | 33'-9 | 4648 | 32 | 33'-9 | 4648 | 32 | 33'-9 | 4648 | 32 | 33'-9 | 4648 |
| SLAB LONGITUDINAL BOTTOM | | | 9a5 | 16 | 40'-6 | 2204 | 16 | 40'-6 | 2204 | 16 | 40'-6 | 2204 | 16 | 40'-6 | 2204 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 9a6 | 8 | 39'-10 | 1084 | 8 | 39'-10 | 1084 | 8 | 39'-10 | 1084 | 8 | 39'-10 | 1084 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 9a7 | 8 | 13'-0 | 354 | 8 | 13'-0 | 354 | 8 | 13'-0 | 354 | 8 | 13'-0 | 354 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 9a8 | 4 | 49'-2 | 669 | 4 | 49'-2 | 669 | 4 | 49'-2 | 669 | 4 | 49'-2 | 669 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 9a9 | 8 | 33'-0 | 898 | 8 | 33'-0 | 898 | 8 | 33'-0 | 898 | 8 | 33'-0 | 898 |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | | 10a10 | 4 | 29'-8 | 511 | 4 | 29'-8 | 511 | 4 | 29'-8 | 511 | 4 | 29'-8 | 511 |
| SLAB LONGITUDINAL TOP | | | 6b1 | 31 | 7'-6 | 350 | 31 | 7'-6 | 350 | 31 | 7'-6 | 350 | 31 | 7'-6 | 350 |
| SLAB LONGITUDINAL TOP | | | 11b2 | 31 | 23'-6 | 3871 | 31 | 23'-6 | 3871 | 31 | 23'-6 | 3871 | 31 | 23'-6 | 3871 |
| SLAB LONGITUDINAL TOP | | | 11b3 | 31 | 29'-3 | 4818 | 31 | 29'-3 | 4818 | 31 | 29'-3 | 4818 | 31 | 29'-3 | 4818 |
| SLAB LONGITUDINAL TOP | | | 7b4 | 31 | 25'-11 | 1643 | 31 | 25'-11 | 1643 | 31 | 25'-11 | 1643 | 31 | 25'-11 | 1643 |
| SLAB LONGITUDINAL TOP | | | 11b5 | 32 | 26'-6 | 4506 | 32 | 26'-6 | 4506 | 32 | 26'-6 | 4506 | 32 | 26'-6 | 4506 |
| SLAB LONGITUDINAL TOP | | | 6b6 | 16 | 36'-0 | 866 | 16 | 36'-0 | 866 | 16 | 36'-0 | 866 | 16 | 36'-0 | 866 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b8 | 8 | 33'-5 | 402 | 8 | 33'-5 | 402 | 8 | 33'-5 | 402 | 8 | 33'-5 | 402 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 11b9 | 8 | 31'-6 | 1339 | 8 | 31'-6 | 1339 | 8 | 31'-6 | 1339 | 8 | 31'-6 | 1339 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 6b10 | 4 | 26'-10 | 162 | 4 | 26'-10 | 162 | 4 | 26'-10 | 162 | 4 | 26'-10 | 162 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 7b11 | 8 | 38'-8 | 633 | 8 | 38'-8 | 633 | 8 | 38'-8 | 633 | 8 | 38'-8 | 633 |
| SLAB LONGITUDINAL TOP, AT RAIL | | | 11b12 | 8 | 21'-9 | 925 | 8 | 21'-9 | 925 | 8 | 21'-9 | 925 | 8 | 21'-9 | 925 |
| SLAB TRANSVERSE, BOTTOM | | | 6c1 | 137 | 26'-10 | 5522 | 137 | 27'-9 | 5711 | 126 | 26'-10 | 5079 | 116 | 26'-10 | 4676 |
| SLAB TRANSVERSE ENDS, BOTTOM | | | 6c2 | - | - | - | - | - | - | 24 | VARIES | 579 | 44 | VARIES | 970 |
| SLAB TRANSVERSE, TOP | | | 5d1 | 137 | 26'-10 | 3835 | 137 | 27'-9 | 3966 | 126 | 26'-10 | 3527 | 116 | 26'-10 | 3247 |
| SLAB TRANSVERSE ENDS, TOP | | | 5d2 | - | - | - | - | - | - | 24 | VARIES | 402 | 44 | VARIES | 674 |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e1 | 18 | 26'-10 | 1290 | - | - | - | - | - | - | - | - | - |
| SLAB, TRANSVERSE AT ABUTMENT | | | 8e2 | - | - | - | 18 | 27'-8 | 1330 | 18 | 30'-7 | 1470 | 18 | 36'-9 | 1767 |
| SLAB, HAIRPINS, AT ABUTMENT | | | 6e3 | 60 | 5'-0 | 451 | 60 | 5'-1 | 459 | 60 | 5'-5 | 489 | 60 | 6'-1 | 549 |
| SLAB, DIAGONALS, AT ABUTMENT | | | 6e4 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 |
| PIER CAP HOOPS | | | 5h1 | 36 | 8'-3 | 310 | 36 | 8'-3 | 310 | 36 | 8'-3 | 310 | 54 | 8'-3 | 465 |
| 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 | 23'-10 | 510 | 8 | 24'-8 | 527 | 8 | 27'-6 | 588 | 8 | 33'-8 | 720 |
| PIER CAP, TOP LONGITUDINAL | | | 8h4 | 4 | 26'-10 | 287 | 4 | 27'-9 | 297 | 4 | 30'-11 | 331 | 4 | 37'-11 | 405 |
| TOP OF SLAB, TRANSVERSE, AT RAIL | | | 5j1 | 272 | 8'-6 | 2412 | 272 | 8'-6 | 2412 | 272 | 8'-6 | 2412 | 270 | 8'-6 | 2394 |
| 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 |
| PAVING BLOCK LIFTING HOOPS | | | 5z1 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 |
| SUB TOTAL - LBS. | | | | | | 59,212 | | | 59,607 | | | 59,782 | | | 60,462 |
| OPEN RAIL - SEE LIST ON RAIL SHEET J24-41-06 | | | | | | 9057 | | | 9057 | | | 9057 | | | 9057 |
| TOTAL - LBS. WITH MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 68,269 | | | 68,664 | | | 68,839 | | | 69,519 |
| TOTAL - LBS. WITH NON-MONOLITHIC PIER CAP AND OPEN RAIL | | | | | | 67,008 | | | 67,376 | | | 67,456 | | | 67,775 |
| SAME AS ABOVE EXCEPT ALL "h" BARS DELETED | | | | | | | | | | | | | | | |

BENT BAR DETAILS



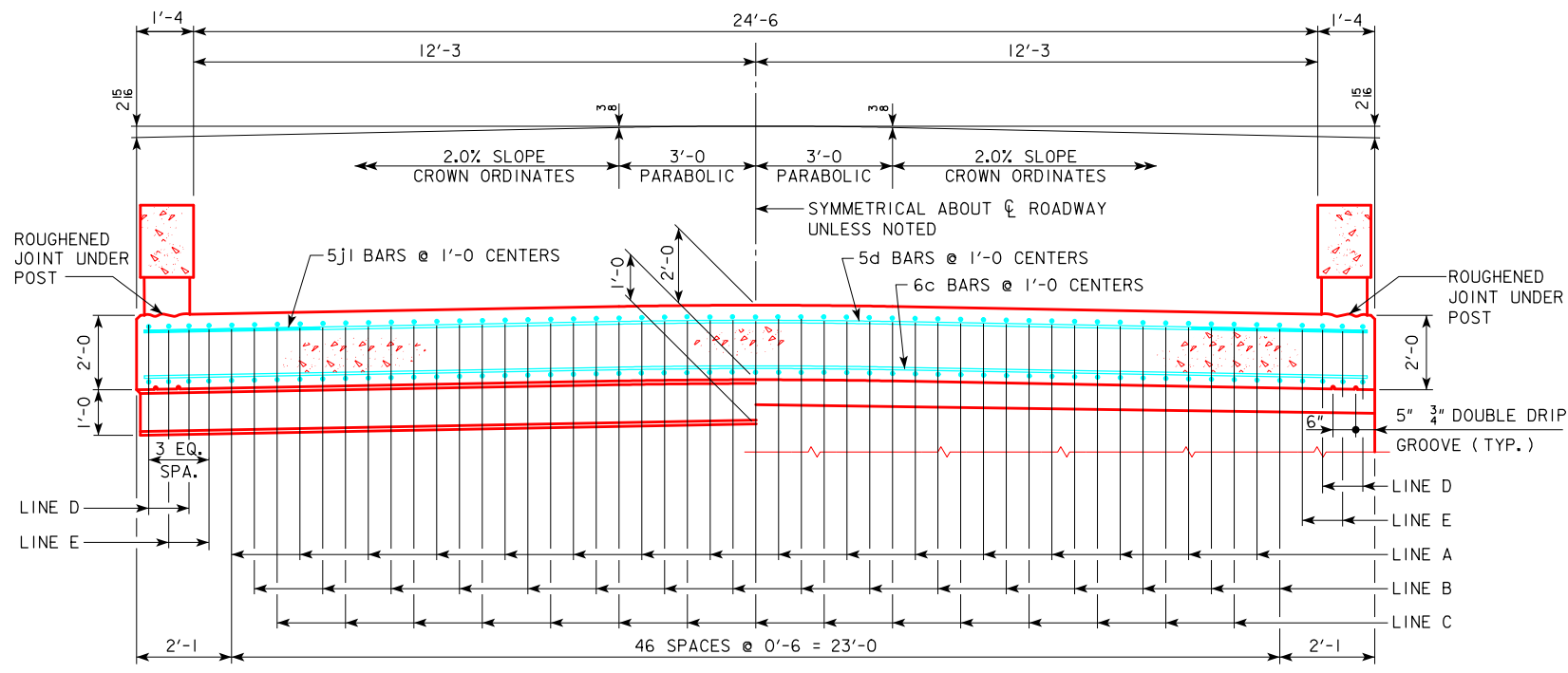
ESTIMATED QUANTITIES FOR SUPERSTRUCTURE - 140' BRIDGE

| ITEM | SKEW | WITH MONOLITHIC PIER CAP | | | | WITH NON-MONOLITHIC PIER CAP | | | |
|-----------|--------------------------------------|--------------------------|--------|--------|--------|------------------------------|--------|--------|--------|
| | | 0° | 15° | 30° | 45° | 0° | 15° | 30° | 45° |
| OPEN RAIL | *STRUCTURAL CONCRETE (BRIDGE) C.Y. | 284.7 | 285.3 | 287.5 | 291.9 | 280.5 | 281.0 | 282.7 | 286.1 |
| OPEN RAIL | REINFORCING STEEL LBS. | 68,269 | 68,664 | 68,839 | 69,519 | 67,008 | 67,376 | 67,456 | 67,775 |
| OPEN RAIL | LIN. FT. | 302.0 | 302.2 | 302.9 | 304.5 | 302.0 | 302.2 | 302.9 | 304.5 |

* INCLUDES 4 WINGS @ 0.68 C.Y. EACH AND 2 TEMPORARY PAVING BLOCKS; EXCLUDES RAIL CONCRETE.

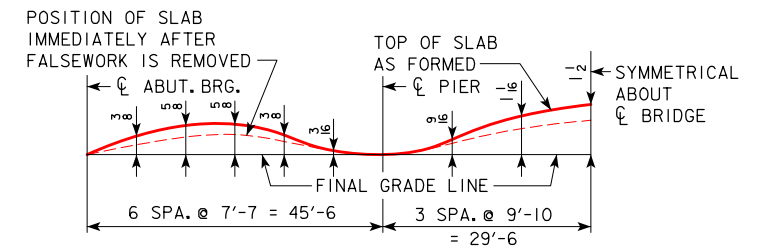
REVISED 07-09 - OPEN RAIL REINF. QTY'S. CHANGED WHICH CHANGED TOTAL REINF. QTY'S.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK. (WAS 5x1).

| | | | |
|---------------------------------|---------------------------------|--|------------------|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| | | SUPERSTRUCTURE DETAILS 140'-0 BRIDGE | J24-17-06 |
| | | SUPERSTRUCTURE DETAILS 140'-0 BRIDGE | |



HALF SECTION NEAR PIER HALF SECTION NEAR ABUTMENT

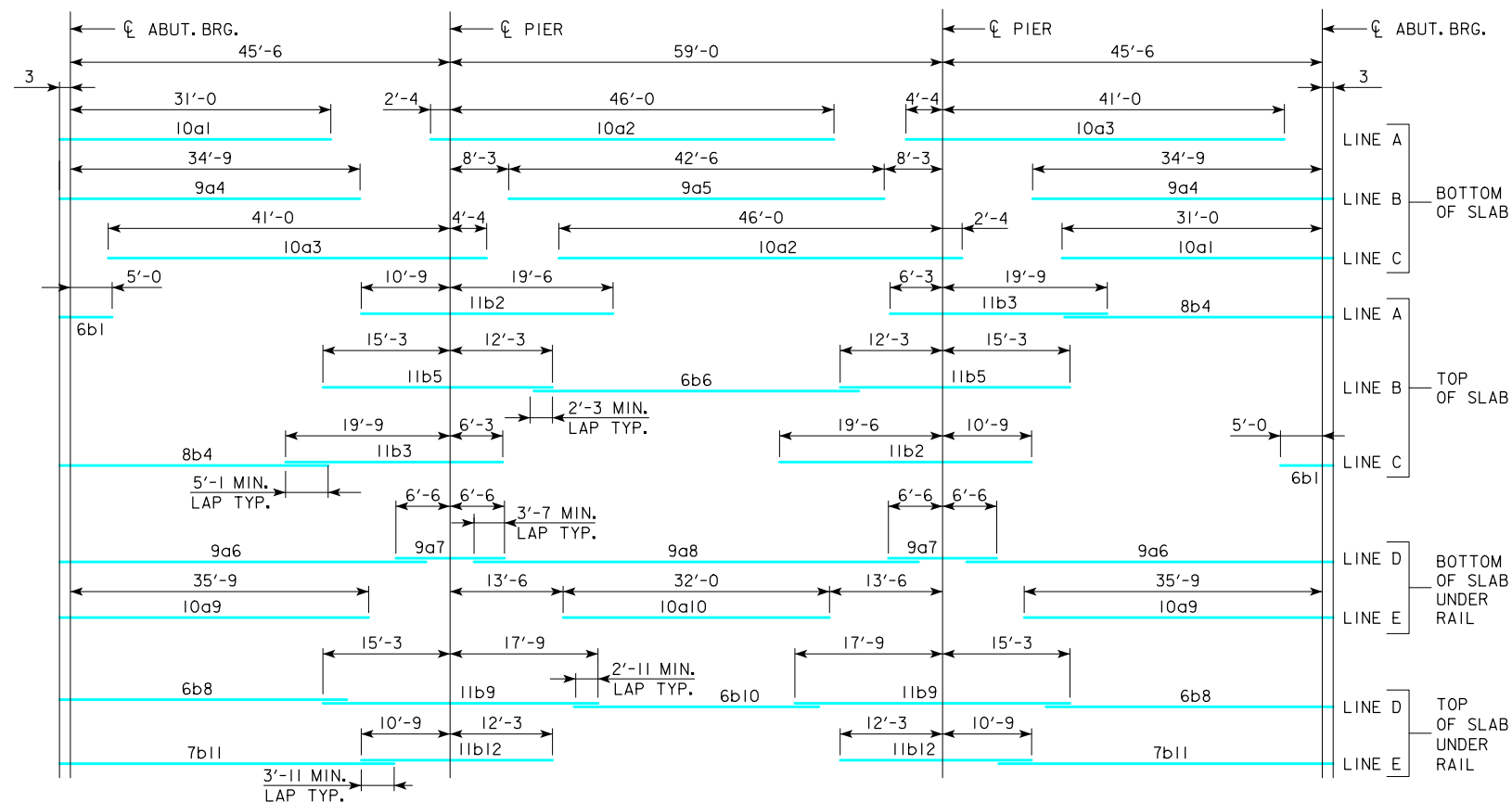
SLAB CROSS-SECTIONAL AREA FOR OPEN RAIL = 54.33 SQ. FT.



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.

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 PLACED. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.



PLACEMENT FOR LONGITUDINAL REINFORCEMENT

REVISED 06-12 - I.M. REQUIREMENT ADDED TO BAR CHAIR NOTE.
 REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS .5x1).

| | | | |
|---------------------------------|---------------------------------|---|------------------|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0" ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| | | SUPERSTRUCTURE DETAILS 150'-0" BRIDGE | J24-18-06 |

BILL OF REINFORCING STEEL FOR SUPERSTRUCTURE - 150' BRIDGE

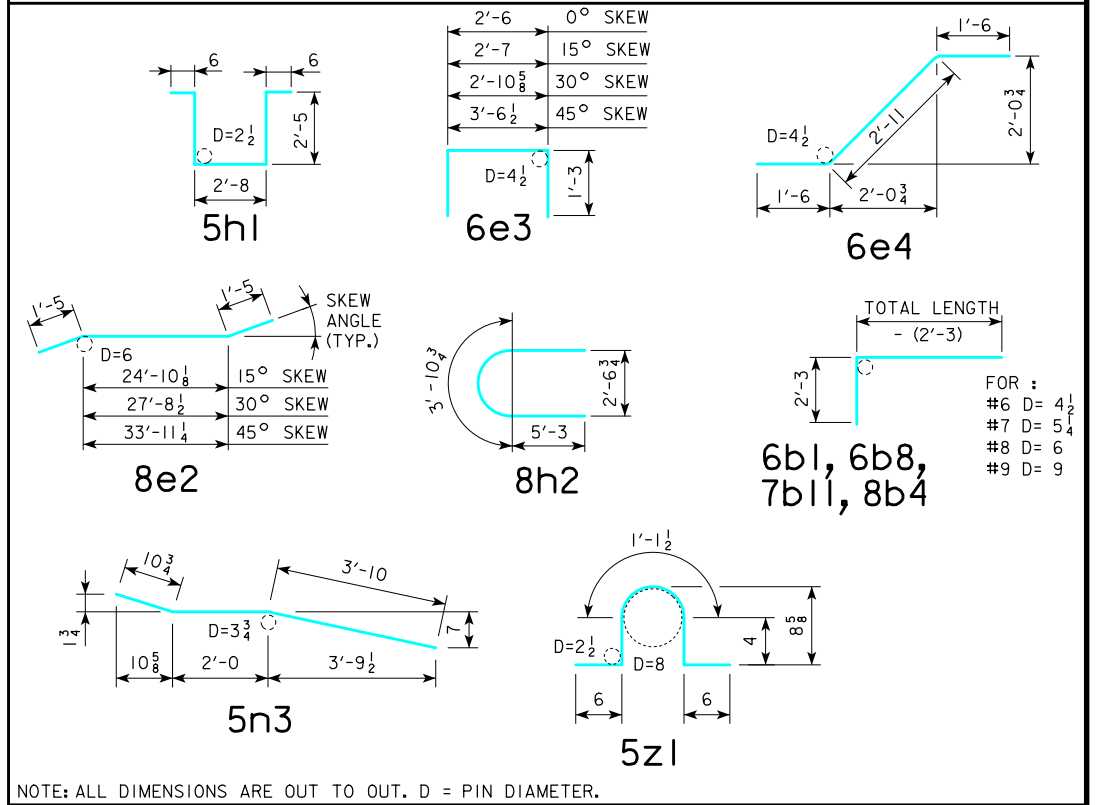
| LOCATION | SKEW | SHAPE | 0° | | | | 15° | | | | 30° | | | | 45° | | | |
|---|------|-------|-----|--------|--------|-----|--------|--------|--------|--------|--------|--------|--------|--------|-----|--------|--------|--|
| | | | NO. | LENGTH | WEIGHT | | NO. | LENGTH | WEIGHT | | NO. | LENGTH | WEIGHT | | NO. | LENGTH | WEIGHT | |
| SLAB LONGITUDINAL BOTTOM | | 10a1 | 31 | 31'-3 | 4169 | 31 | 31'-3 | 4169 | 31 | 31'-3 | 4169 | 31 | 31'-3 | 4169 | | | | |
| SLAB LONGITUDINAL BOTTOM | | 10a2 | 31 | 48'-4 | 6448 | 31 | 48'-4 | 6448 | 31 | 48'-4 | 6448 | 31 | 48'-4 | 6448 | | | | |
| SLAB LONGITUDINAL BOTTOM | | 10a3 | 31 | 45'-4 | 6048 | 31 | 45'-4 | 6048 | 31 | 45'-4 | 6048 | 31 | 45'-4 | 6048 | | | | |
| SLAB LONGITUDINAL BOTTOM | | 9a4 | 32 | 35'-0 | 3808 | 32 | 35'-0 | 3808 | 32 | 35'-0 | 3808 | 32 | 35'-0 | 3808 | | | | |
| SLAB LONGITUDINAL BOTTOM | | 9a5 | 16 | 42'-6 | 2312 | 16 | 42'-6 | 2312 | 16 | 42'-6 | 2312 | 16 | 42'-6 | 2312 | | | | |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | 9a6 | 8 | 42'-10 | 1166 | 8 | 42'-10 | 1166 | 8 | 42'-10 | 1166 | 8 | 42'-10 | 1166 | | | | |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | 9a7 | 8 | 13'-0 | 354 | 8 | 13'-0 | 354 | 8 | 13'-0 | 354 | 8 | 13'-0 | 354 | | | | |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | 9a8 | 4 | 53'-2 | 724 | 4 | 53'-2 | 724 | 4 | 53'-2 | 724 | 4 | 53'-2 | 724 | | | | |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | 10a9 | 8 | 36'-0 | 1240 | 8 | 36'-0 | 1240 | 8 | 36'-0 | 1240 | 8 | 36'-0 | 1240 | | | | |
| SLAB LONGITUDINAL BOTTOM, AT RAIL | | 10a10 | 4 | 32'-0 | 551 | 4 | 32'-0 | 551 | 4 | 32'-0 | 551 | 4 | 32'-0 | 551 | | | | |
| SLAB LONGITUDINAL TOP | | 6b1 | 31 | 7'-6 | 350 | 31 | 7'-6 | 350 | 31 | 7'-6 | 350 | 31 | 7'-6 | 350 | | | | |
| SLAB LONGITUDINAL TOP | | 11b2 | 31 | 30'-3 | 4983 | 31 | 30'-3 | 4983 | 31 | 30'-3 | 4983 | 31 | 30'-3 | 4983 | | | | |
| SLAB LONGITUDINAL TOP | | 11b3 | 31 | 26'-0 | 4283 | 31 | 26'-0 | 4283 | 31 | 26'-0 | 4283 | 31 | 26'-0 | 4283 | | | | |
| SLAB LONGITUDINAL TOP | | 8b4 | 31 | 33'-4 | 2759 | 31 | 33'-4 | 2759 | 31 | 33'-4 | 2759 | 31 | 33'-4 | 2759 | | | | |
| SLAB LONGITUDINAL TOP | | 11b5 | 32 | 27'-6 | 4676 | 32 | 27'-6 | 4676 | 32 | 27'-6 | 4676 | 32 | 27'-6 | 4676 | | | | |
| SLAB LONGITUDINAL TOP | | 6b6 | 16 | 39'-0 | 938 | 16 | 39'-0 | 938 | 16 | 39'-0 | 938 | 16 | 39'-0 | 938 | | | | |
| SLAB LONGITUDINAL TOP, AT RAIL | | 6b8 | 8 | 35'-8 | 429 | 8 | 35'-8 | 429 | 8 | 35'-8 | 429 | 8 | 35'-8 | 429 | | | | |
| SLAB LONGITUDINAL TOP, AT RAIL | | 11b9 | 8 | 33'-0 | 1403 | 8 | 33'-0 | 1403 | 8 | 33'-0 | 1403 | 8 | 33'-0 | 1403 | | | | |
| SLAB LONGITUDINAL TOP, AT RAIL | | 6b10 | 4 | 29'-4 | 177 | 4 | 29'-4 | 177 | 4 | 29'-4 | 177 | 4 | 29'-4 | 177 | | | | |
| SLAB LONGITUDINAL TOP, AT RAIL | | 7b11 | 8 | 41'-2 | 674 | 8 | 41'-2 | 674 | 8 | 41'-2 | 674 | 8 | 41'-2 | 674 | | | | |
| SLAB LONGITUDINAL TOP, AT RAIL | | 11b12 | 8 | 23'-0 | 978 | 8 | 23'-0 | 978 | 8 | 23'-0 | 978 | 8 | 23'-0 | 978 | | | | |
| SLAB TRANSVERSE, BOTTOM | | 6c1 | 147 | 26'-10 | 5925 | 147 | 27'-9 | 6128 | 136 | 26'-10 | 5482 | 126 | 26'-10 | 5079 | | | | |
| SLAB TRANSVERSE ENDS, BOTTOM | | 6c2 | - | - | - | - | - | - | 24 | VARIES | 579 | 44 | VARIES | 970 | | | | |
| SLAB TRANSVERSE, TOP | | 5d1 | 147 | 26'-10 | 4115 | 147 | 27'-9 | 4255 | 136 | 26'-10 | 3807 | 126 | 26'-10 | 3527 | | | | |
| SLAB TRANSVERSE ENDS, TOP | | 5d2 | - | - | - | - | - | - | 24 | VARIES | 402 | 44 | VARIES | 674 | | | | |
| SLAB, TRANSVERSE AT ABUTMENT | | 8e1 | 18 | 26'-10 | 1290 | - | - | - | - | - | - | - | - | - | | | | |
| SLAB, TRANSVERSE AT ABUTMENT | | 8e2 | - | - | - | 18 | 27'-8 | 1330 | 18 | 30'-7 | 1470 | 18 | 36'-9 | 1767 | | | | |
| SLAB, HAIRPINS, AT ABUTMENT | | 6e3 | 60 | 5'-0 | 451 | 60 | 5'-1 | 459 | 60 | 5'-5 | 489 | 60 | 6'-1 | 549 | | | | |
| SLAB, DIAGONALS, AT ABUTMENT | | 6e4 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | 60 | 5'-11 | 534 | | | | |
| PIER CAP HOOPS | | 5h1 | 36 | 8'-6 | 320 | 36 | 8'-6 | 320 | 36 | 8'-6 | 320 | 54 | 8'-6 | 479 | | | | |
| 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 | 23'-10 | 510 | 8 | 24'-8 | 527 | 8 | 27'-6 | 588 | 8 | 33'-8 | 720 | | | | |
| PIER CAP, TOP LONGITUDINAL | | 8h4 | 4 | 26'-10 | 287 | 4 | 27'-9 | 297 | 4 | 30'-11 | 331 | 4 | 37'-11 | 405 | | | | |
| TOP OF SLAB, TRANSVERSE, AT RAIL | | 5j1 | 292 | 8'-6 | 2589 | 292 | 8'-6 | 2589 | 292 | 8'-6 | 2589 | 290 | 8'-6 | 2571 | | | | |
| 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 | | | | |
| PAVING BLOCK LIFTING HOOPS | | 5z1 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | 8 | 2'-10 | 24 | | | | |
| SUB TOTAL - LBS. | | | | | 65,190 | | | 65,608 | | | 65,760 | | | 66,444 | | | | |
| OPEN RAIL - SEE LIST ON RAIL SHEET J24-41-06 | | | | | 9605 | | | 9605 | | | 9605 | | | 9605 | | | | |
| TOTAL - LBS. WITH MONOLITHIC PIER CAP AND OPEN RAIL | | | | | 74,795 | | | 75,213 | | | 75,365 | | | 76,049 | | | | |
| TOTAL - LBS. WITH NON-MONOLITHIC PIER CAP AND OPEN RAIL | | | | | 73,524 | | | 73,915 | | | 73,972 | | | 74,291 | | | | |
| SAME AS ABOVE EXCEPT ALL "h" BARS DELETED | | | | | | | | | | | | | | | | | | |

ESTIMATED QUANTITIES FOR SUPERSTRUCTURE - 150' BRIDGE

| ITEM | SKEW | WITH MONOLITHIC PIER CAP | | | | WITH NON-MONOLITHIC PIER CAP | | | |
|-----------|------------------------------------|--------------------------|--------|--------|--------|------------------------------|--------|--------|--------|
| | | 0° | 15° | 30° | 45° | 0° | 15° | 30° | 45° |
| OPEN RAIL | *STRUCTURAL CONCRETE (BRIDGE) C.Y. | 322.1 | 322.7 | 324.8 | 329.1 | 317.9 | 318.3 | 320.0 | 323.3 |
| OPEN RAIL | REINFORCING STEEL LBS. | 74,795 | 75,213 | 75,365 | 76,049 | 73,524 | 73,915 | 73,972 | 74,291 |
| OPEN RAIL | LIN. FT. | 322.0 | 322.2 | 322.9 | 324.5 | 322.0 | 322.2 | 322.9 | 324.5 |

* INCLUDES 4 WINGS @ 0.68 C.Y. EACH AND 2 TEMPORARY PAVING BLOCKS; EXCLUDES RAIL CONCRETE.

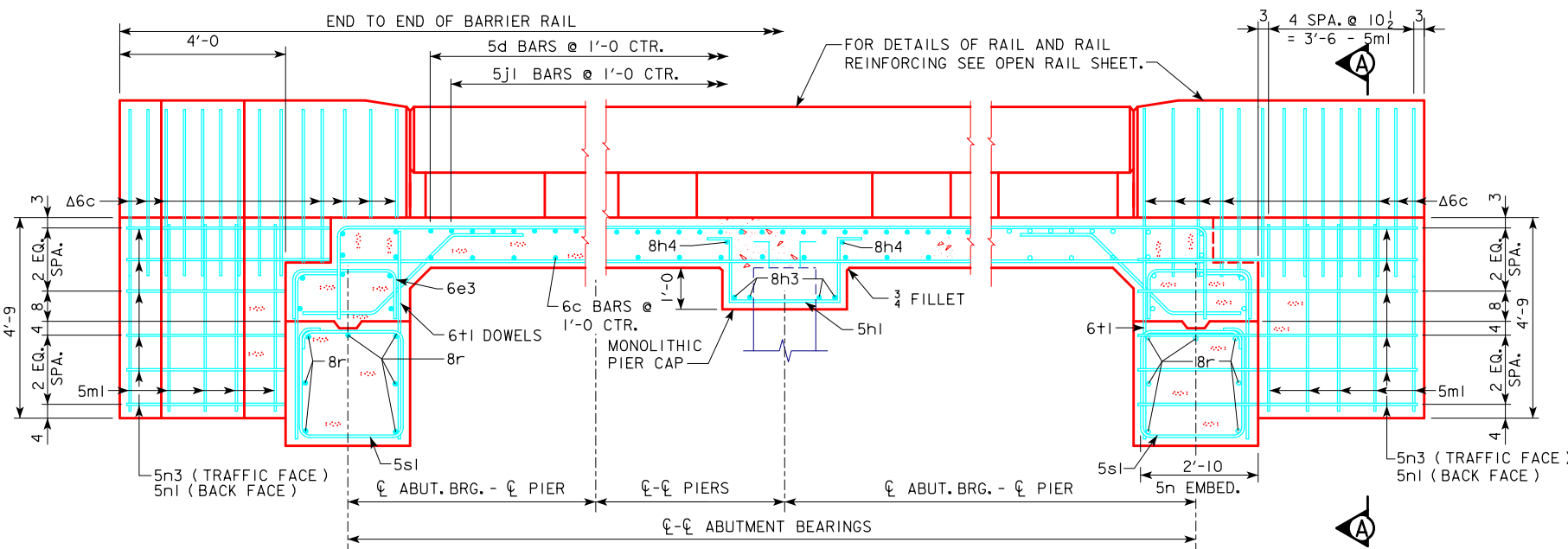
BENT BAR DETAILS



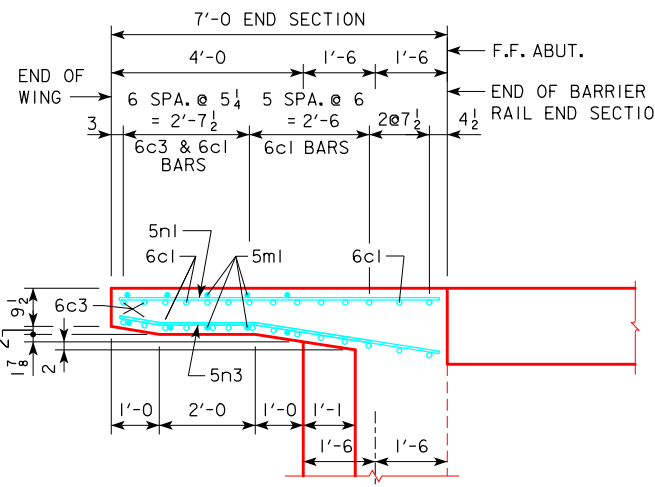
REVISED 07-09 - OPEN RAIL REINF. QTY'S. CHANGED WHICH CHANGED TOTAL REINF. QTY'S.
 REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).

| | | |
|---|---------------------------------|--|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 |
| SUPERSTRUCTURE DETAILS 150'-0 BRIDGE | | J24-19-06 |

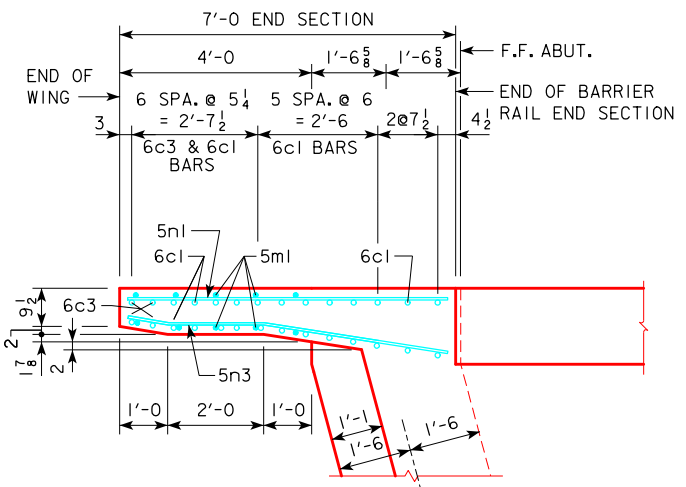
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE, REVISED SUPERSTRUCTURE NOTES TO STATE: "SLAB FALSEWORK SHALL BE REMOVED PRIOR TO CONSTRUCTION OF THE BARRIER RAILS, UNLESS SLAB CONSTRUCTION IS STAGED." CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).



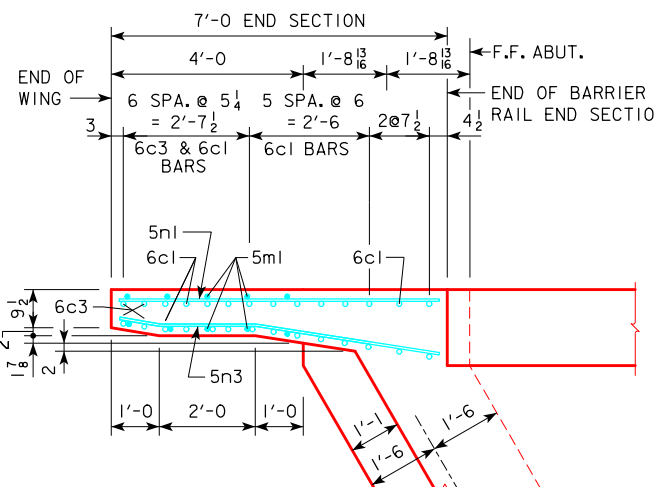
PART LONGITUDINAL SECTION NEAR GUTTER LINE



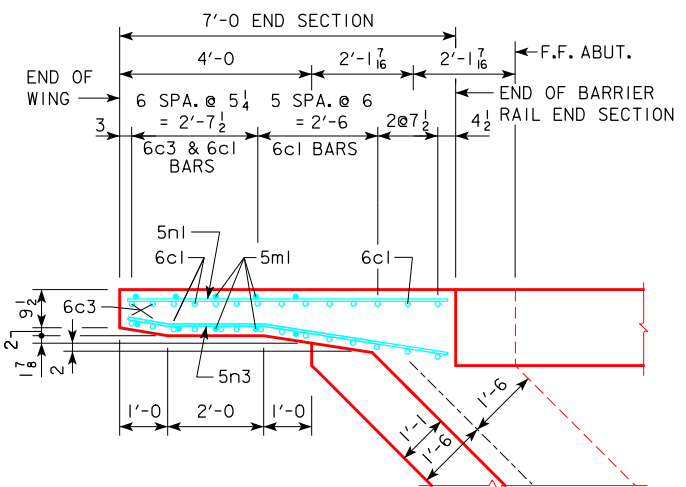
PART PLAN 0° SKEW (RAILING NOT SHOWN)



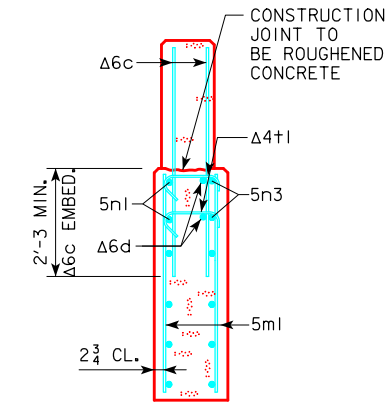
PART PLAN 15° SKEW (RAILING NOT SHOWN)



PART PLAN 30° SKEW (RAILING NOT SHOWN)



PART PLAN 45° SKEW (RAILING NOT SHOWN)

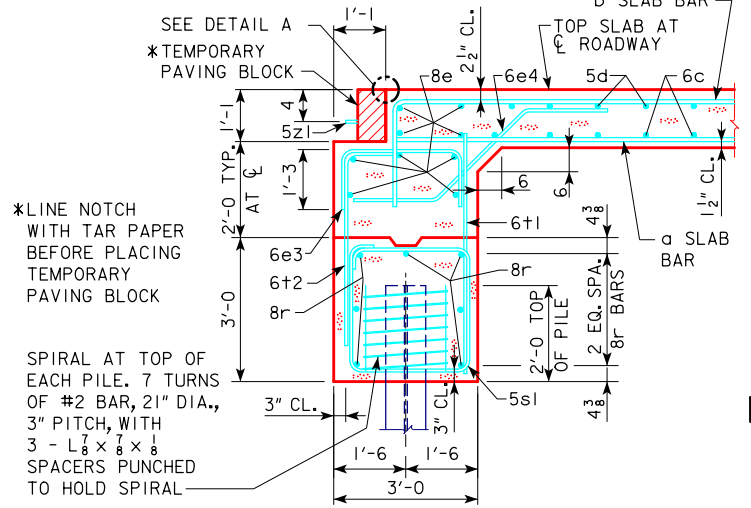


SECTION A-A

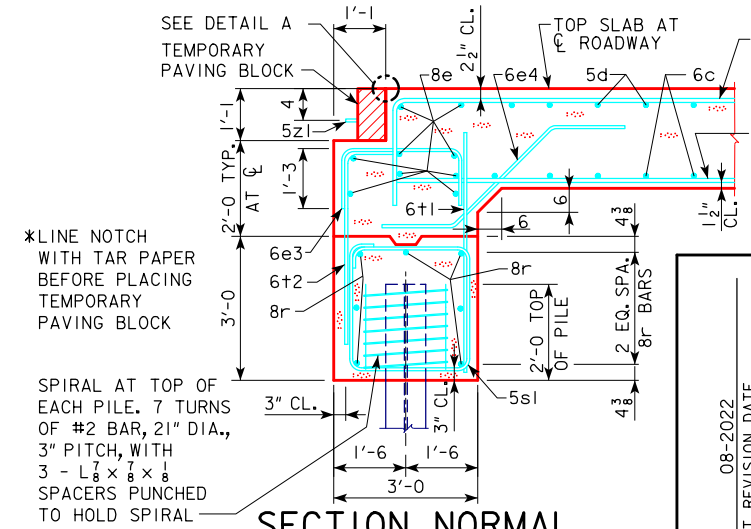
NOTE: SEE OPEN BARRIER RAIL DETAILS IN THESE PLANS FOR DETAILS OF BARRIER RAIL END SECTION.
NOTE: 5ml, 5n1, & 5n3 BARS ARE INCLUDED IN SUPERSTRUCTURE BAR LIST. 6c, 6d & 4t1 BARS ARE INCLUDED IN BARRIER RAIL BAR LIST.

SUPERSTRUCTURE NOTES:
THIS BRIDGE IS DESIGNED FOR HL-93 LOADING PLUS AN ALLOWANCE OF 20 POUNDS PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE.
THE SLAB AS SHOWN INCLUDES A 1/2 INCH INTEGRAL WEARING SURFACE.
THE MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. ALL REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE. SEE "BAR CHAIR NOTE".
ALL REINFORCING SHALL BE GRADE 60.
THE CONCRETE SLAB IS TO BE PLACED WITH A MINIMUM OF CONSTRUCTION JOINTS. PROCEDURES FOR PLACING SLAB CONCRETE SHALL BE SUBMITTED FOR APPROVAL TOGETHER WITH A STATEMENT OF THE PROPOSED METHOD AND EVIDENCE THAT THE CONTRACTOR POSSESSES THE NECESSARY EQUIPMENT AND FACILITIES TO ACCOMPLISH THE REQUIRED RESULT. SLAB FALSEWORK SHALL BE REMOVED PRIOR TO CONSTRUCTION OF THE BARRIER RAILS, UNLESS SLAB CONSTRUCTION IS STAGED.
NOTE THAT WHEN PORTLAND CEMENT APPROACH PAVEMENT IS PLACED, COMPRESSIBLE JOINT MATERIAL MUST BE USED BETWEEN PAVEMENT AND END OF BRIDGE.

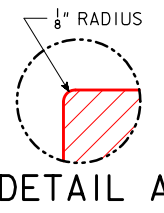
BAR CHAIR NOTE:
TOP MAT OF REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0 CENTERS LONGITUDINALLY AND TRANSVERSELY. THE BOTTOM MAT OF REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0 CENTERS LONGITUDINALLY AND TRANSVERSELY, 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.



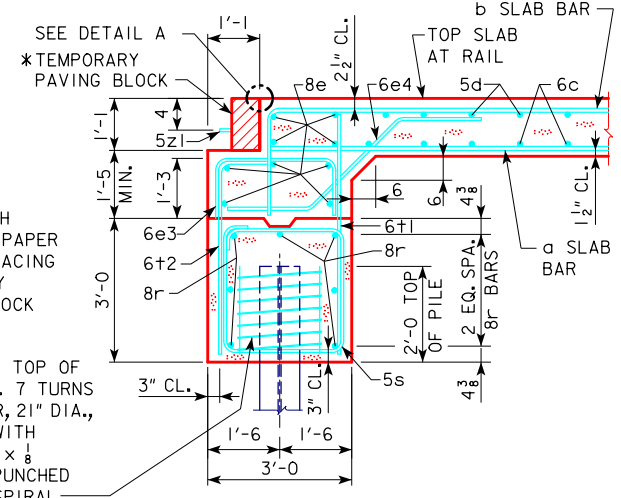
SECTION NORMAL TO ABUTMENT AT CL (BRIDGE LENGTHS 70'-110')



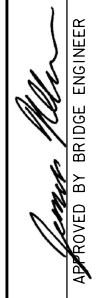

SECTION NORMAL TO ABUTMENT AT CL (BRIDGE LENGTHS 120'-0 - 150-0')



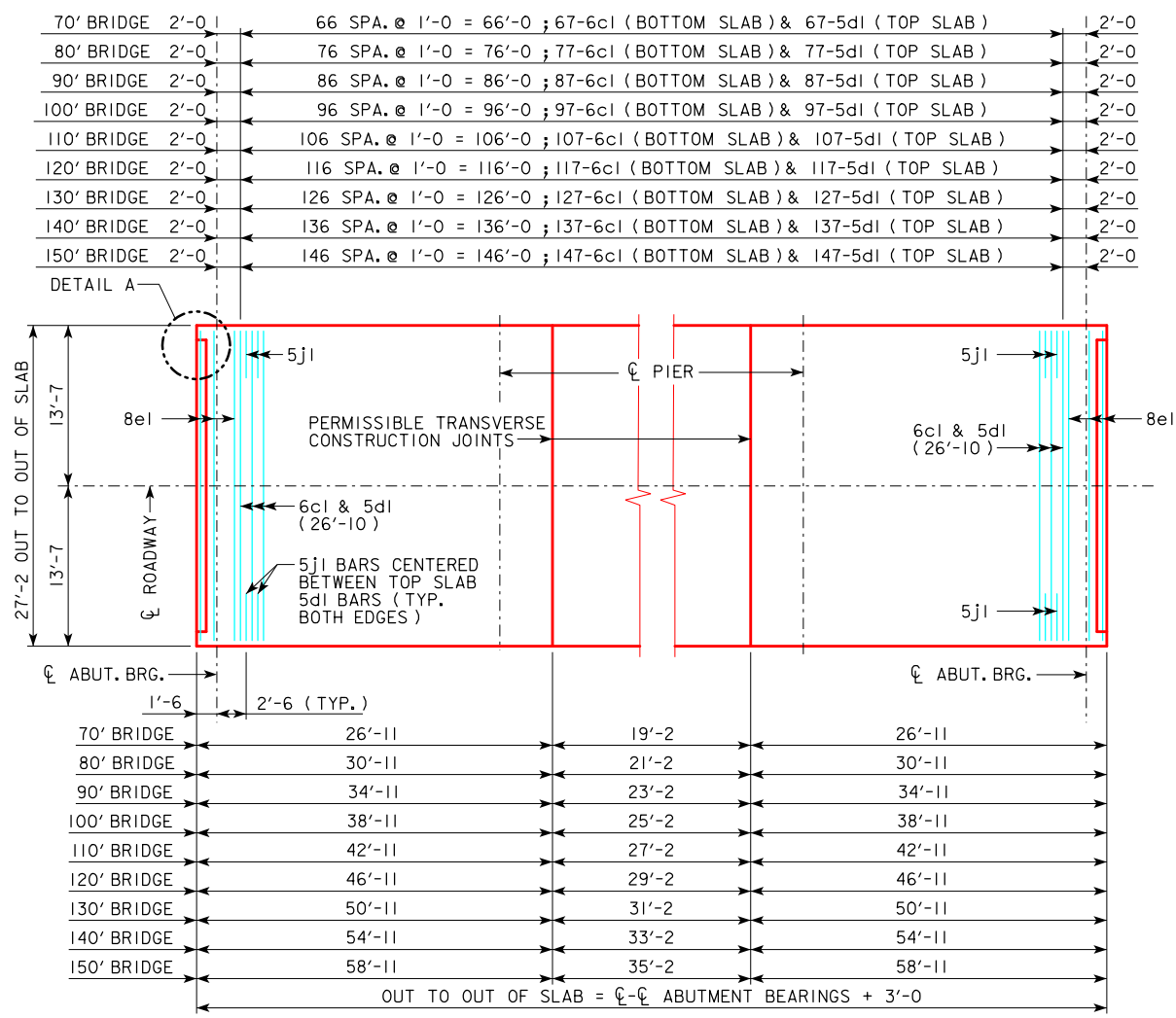
DETAIL A



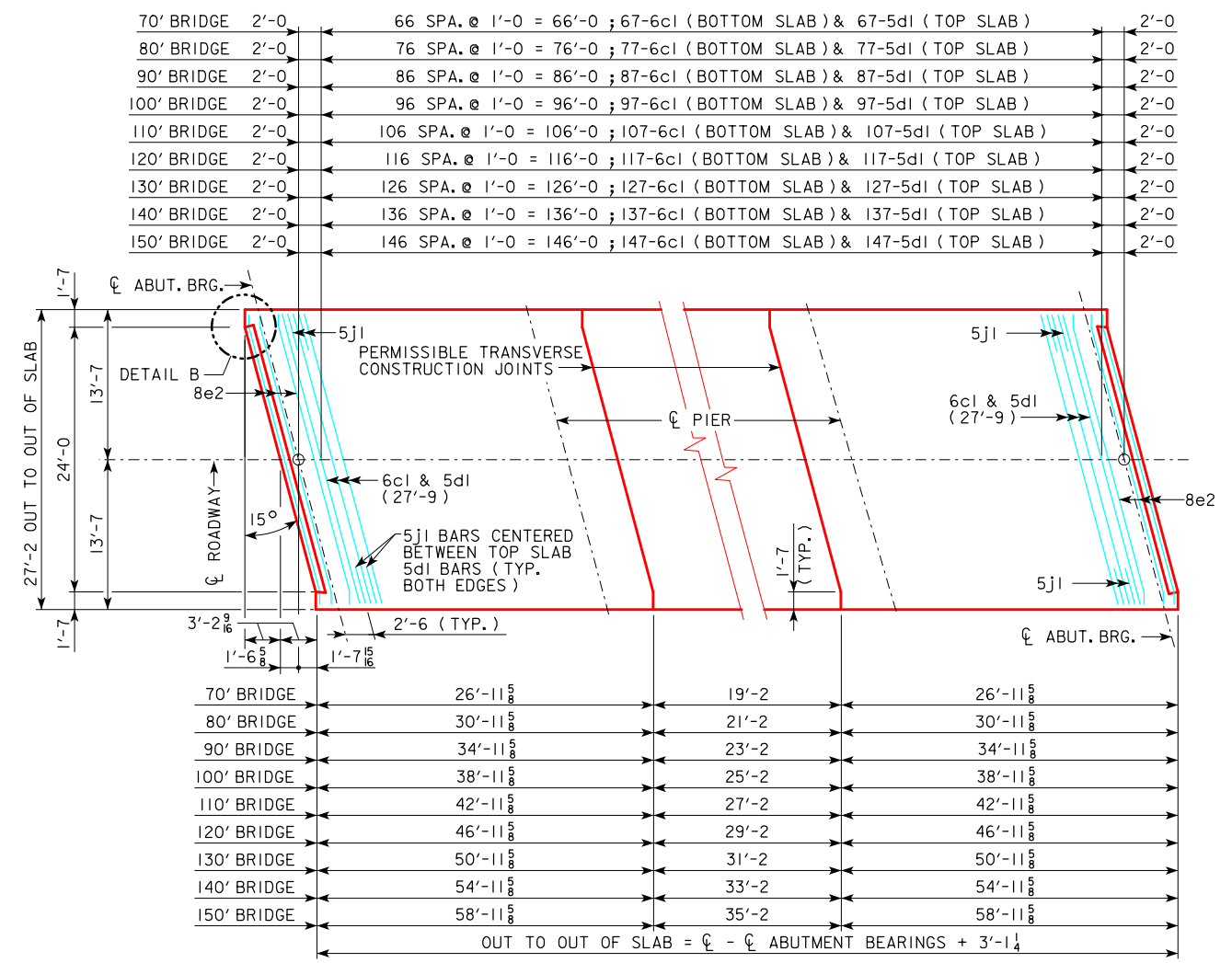
SECTION NORMAL TO ABUTMENT AT GUTTERLINE

| | |
|---|---|
| 08-2022 LATEST REVISION DATE  APPROVED BY BRIDGE ENGINEER |  STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 |
| | SUPERSTRUCTURE DETAILS ALL BRIDGES J24-20-06 |

REVISED 12-08 - REVISED PAVING NOTCH, ADDED DETAIL A AND ADDED DETAIL B. ADDED TEMPORARY PAVING BLOCK DETAIL. REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).

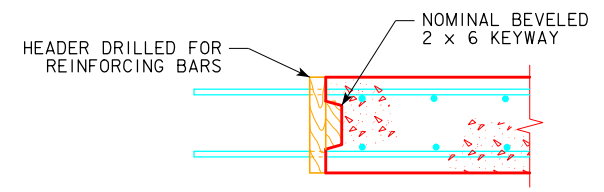


0° SKEW

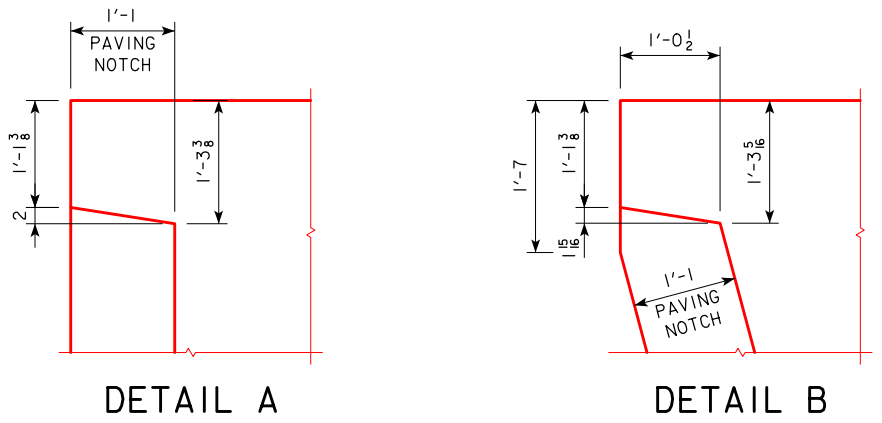


15° SKEW

TRANSVERSE REINFORCING STEEL LAYOUT



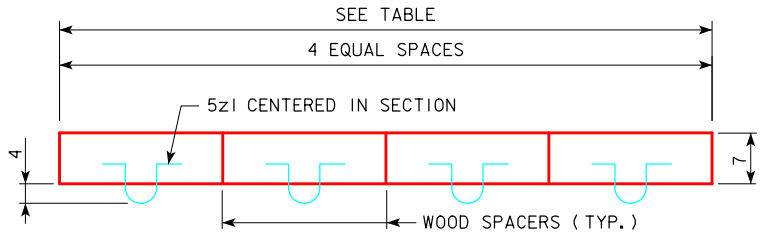
TRANSVERSE CONSTRUCTION JOINT



DETAIL A

DETAIL B

| TEMPORARY PAVING BLOCK | | |
|------------------------|--------|----------|
| SKEW | LENGTH | CONCRETE |
| 0° | 22'-0 | 0.5 C.Y. |
| 15° | 22'-10 | 0.5 C.Y. |



TEMPORARY PAVING BLOCK DETAIL

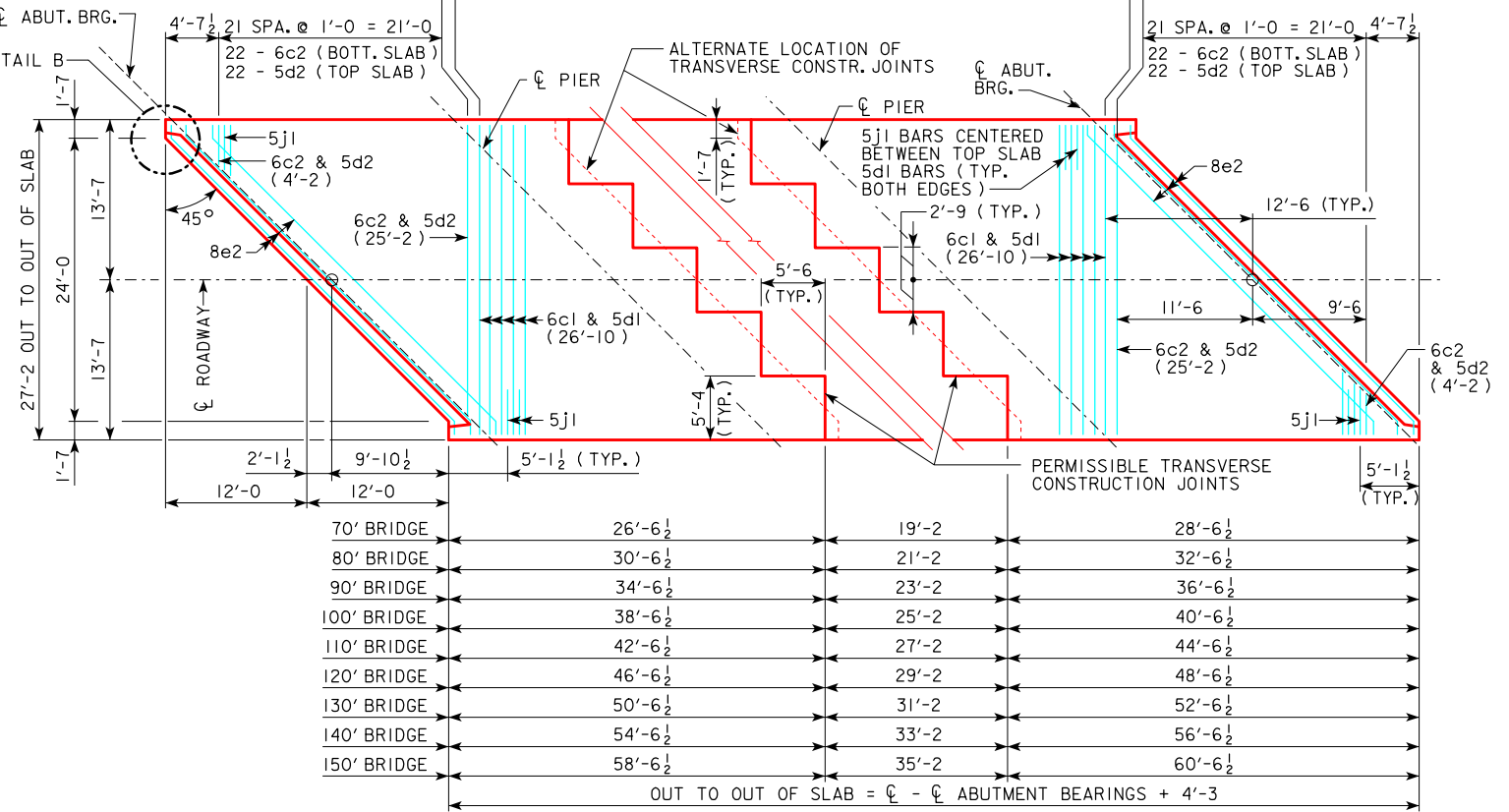
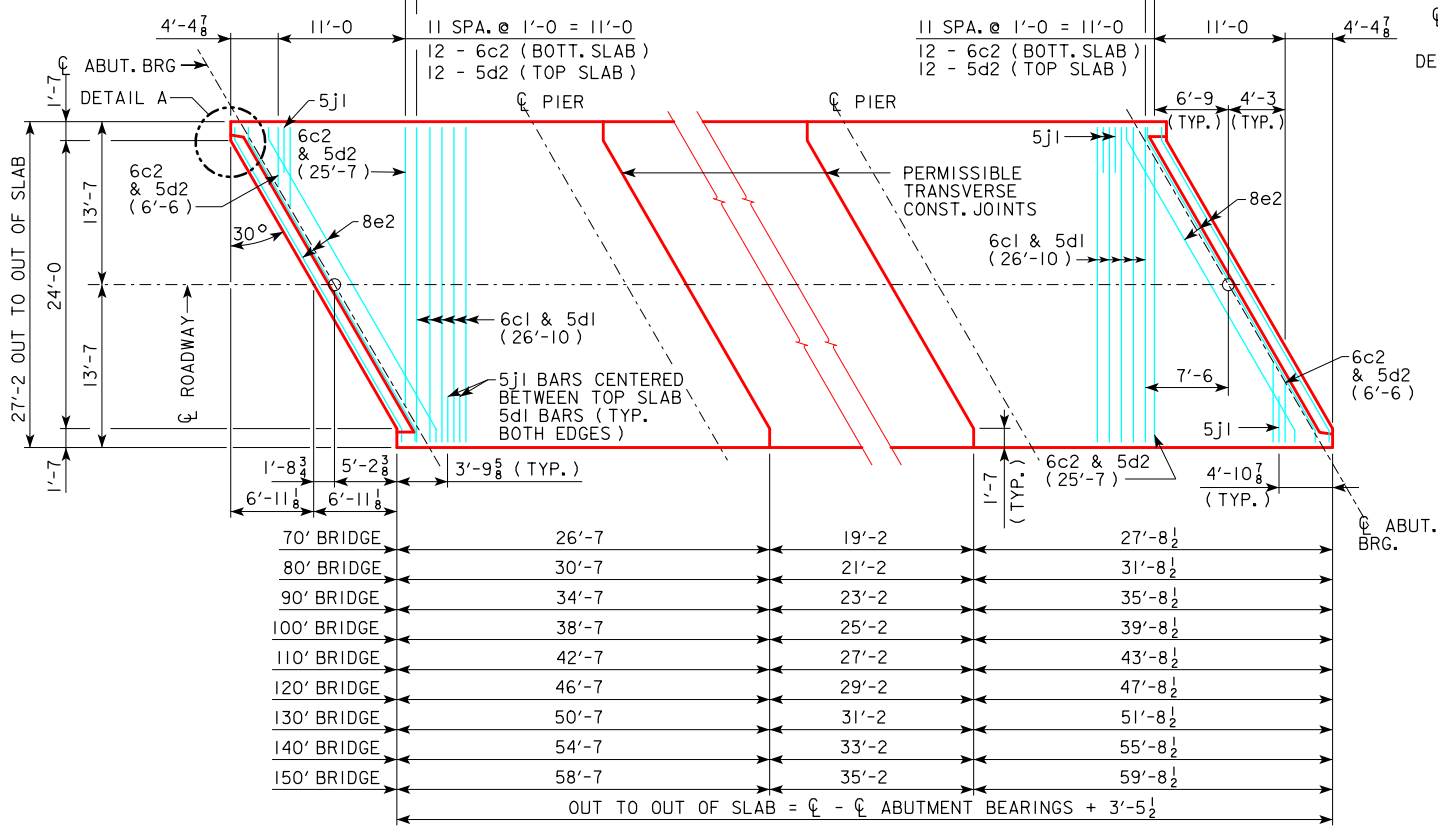
NOTE: TEMPORARY PAVING BLOCK TO BE USED WITH PAVED APPROACHES ONLY. LINE NOTCH WITH TAR PAPER BEFORE PLACING TEMPORARY PAVING BLOCK.

| | | |
|--|--|------------------|
| 08-2022 LATEST REVISION DATE APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | J24-21-06 |
| | SUPERSTRUCTURE DETAILS ALL BRIDGES 0° & 15° SKEW | |
| | | |

REVISED 12-08 - REVISED PAVING NOTCH, TRANSVERSE REINFORCING AND ADDED DETAIL A AND ADDED DETAIL B. ADDED TEMPORARY PAVING BLOCK DETAIL. REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).

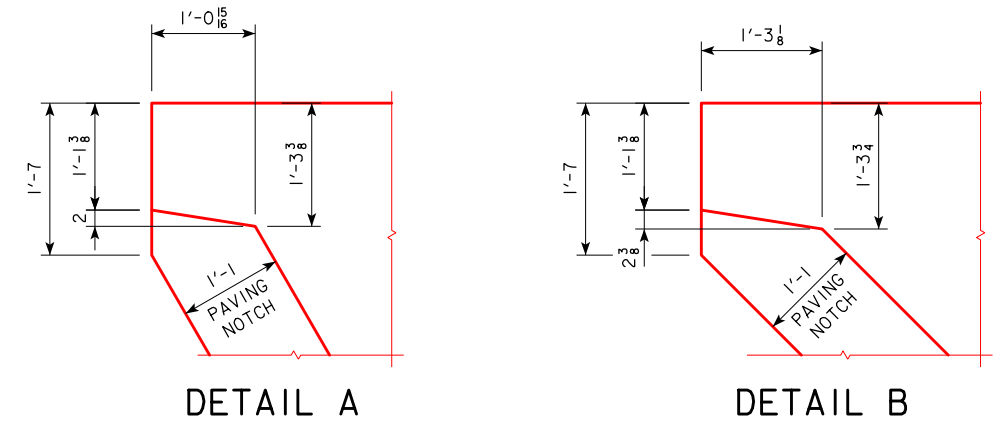
| | | | |
|-------------|---|--|---|
| 70' BRIDGE | 9 | 55 SPA. @ 1'-0" = 55'-0"; 56-6c1 (BOTTOM SLAB) & 56-5d1 (TOP SLAB) | 9 |
| 80' BRIDGE | 9 | 65 SPA. @ 1'-0" = 65'-0"; 66-6c1 (BOTTOM SLAB) & 66-5d1 (TOP SLAB) | 9 |
| 90' BRIDGE | 9 | 75 SPA. @ 1'-0" = 75'-0"; 76-6c1 (BOTTOM SLAB) & 76-5d1 (TOP SLAB) | 9 |
| 100' BRIDGE | 9 | 85 SPA. @ 1'-0" = 85'-0"; 86-6c1 (BOTTOM SLAB) & 86-5d1 (TOP SLAB) | 9 |
| 110' BRIDGE | 9 | 95 SPA. @ 1'-0" = 95'-0"; 96-6c1 (BOTTOM SLAB) & 96-5d1 (TOP SLAB) | 9 |
| 120' BRIDGE | 9 | 105 SPA. @ 1'-0" = 105'-0"; 106-6c1 (BOTTOM SLAB) & 106-5d1 (TOP SLAB) | 9 |
| 130' BRIDGE | 9 | 115 SPA. @ 1'-0" = 115'-0"; 116-6c1 (BOTTOM SLAB) & 116-5d1 (TOP SLAB) | 9 |
| 140' BRIDGE | 9 | 125 SPA. @ 1'-0" = 125'-0"; 126-6c1 (BOTTOM SLAB) & 126-5d1 (TOP SLAB) | 9 |
| 150' BRIDGE | 9 | 135 SPA. @ 1'-0" = 135'-0"; 136-6c1 (BOTTOM SLAB) & 136-5d1 (TOP SLAB) | 9 |

| | | | |
|-------------|-------|---|-------|
| 70' BRIDGE | 1'-0" | 45 SPA. @ 1'-0" = 45'-0"; 46-6c1 (BOTT. SLAB) & 46-5d1 (TOP SLAB) | 1'-0" |
| 80' BRIDGE | 1'-0" | 55 SPA. @ 1'-0" = 55'-0"; 56-6c1 (BOTT. SLAB) & 56-5d1 (TOP SLAB) | 1'-0" |
| 90' BRIDGE | 1'-0" | 65 SPA. @ 1'-0" = 65'-0"; 66-6c1 (BOTT. SLAB) & 66-5d1 (TOP SLAB) | 1'-0" |
| 100' BRIDGE | 1'-0" | 75 SPA. @ 1'-0" = 75'-0"; 76-6c1 (BOTT. SLAB) & 76-5d1 (TOP SLAB) | 1'-0" |
| 110' BRIDGE | 1'-0" | 85 SPA. @ 1'-0" = 85'-0"; 86-6c1 (BOTT. SLAB) & 86-5d1 (TOP SLAB) | 1'-0" |
| 120' BRIDGE | 1'-0" | 95 SPA. @ 1'-0" = 95'-0"; 96-6c1 (BOTT. SLAB) & 96-5d1 (TOP SLAB) | 1'-0" |
| 130' BRIDGE | 1'-0" | 105 SPA. @ 1'-0" = 105'-0"; 106-6c1 (BOTT. SLAB) & 106-5d1 (TOP SLAB) | 1'-0" |
| 140' BRIDGE | 1'-0" | 115 SPA. @ 1'-0" = 115'-0"; 116-6c1 (BOTT. SLAB) & 116-5d1 (TOP SLAB) | 1'-0" |
| 150' BRIDGE | 1'-0" | 125 SPA. @ 1'-0" = 125'-0"; 126-6c1 (BOTT. SLAB) & 126-5d1 (TOP SLAB) | 1'-0" |

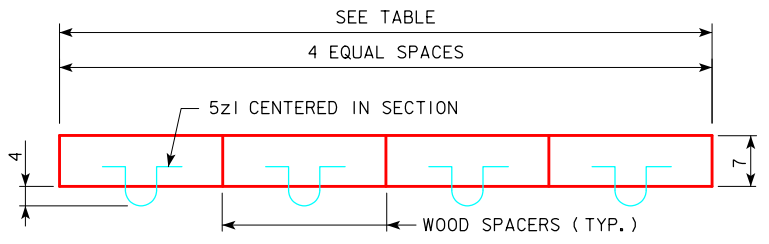


TRANSVERSE REINFORCING STEEL LAYOUT

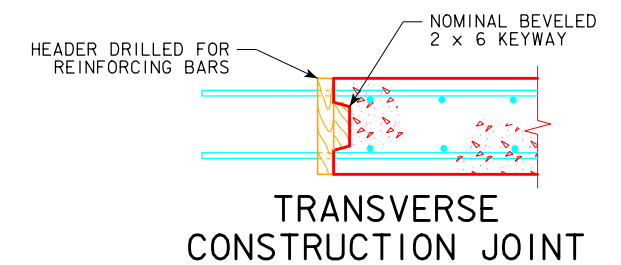
NOTE: 5d2 BARS ARE TO PASS UNDER 8e2 BARS IN CONFLICT AREAS ON 30° & 45° SKEW BRIDGES.



| TEMPORARY PAVING BLOCK | | |
|------------------------|---------|----------|
| SKEW | LENGTH | CONCRETE |
| 30° | 25'-9" | 0.6 C.Y. |
| 45° | 31'-11" | 0.7 C.Y. |

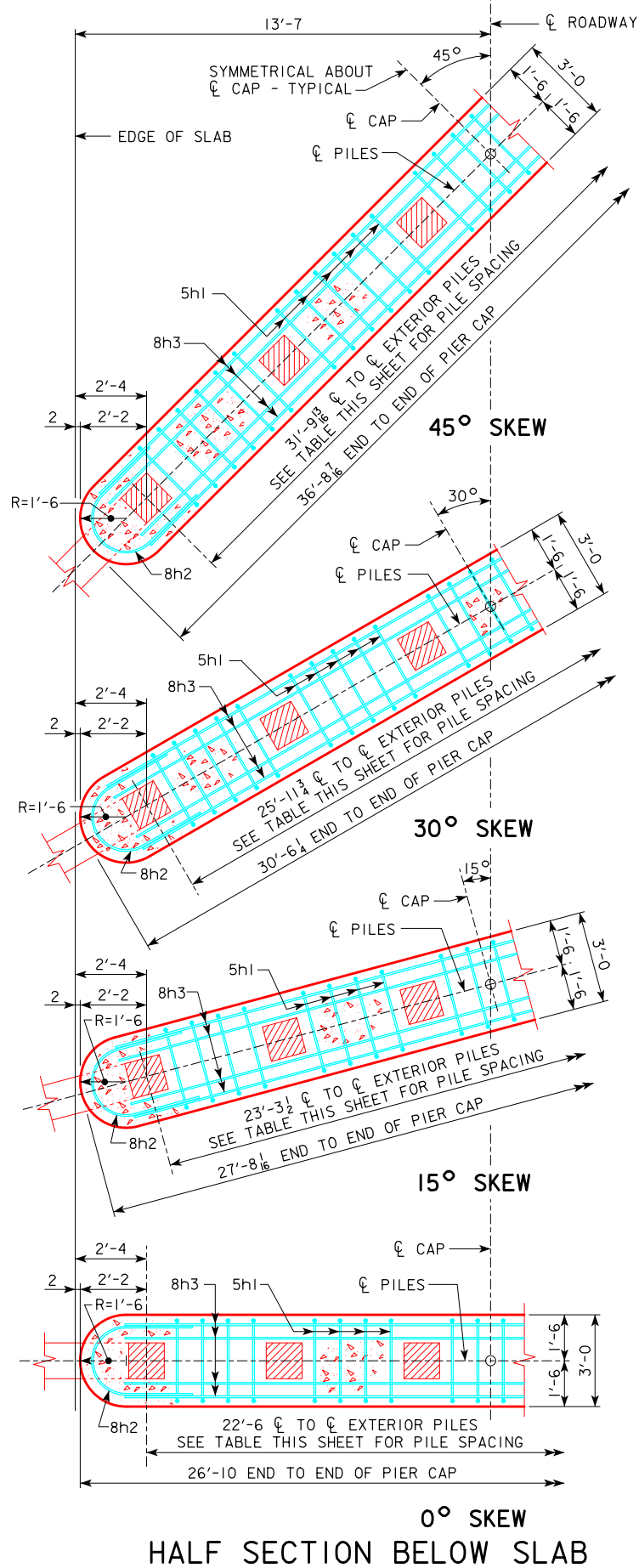


NOTE: TEMPORARY PAVING BLOCK TO BE USED WITH PAVED APPROACHES ONLY. LINE NOTCH WITH TAR PAPER BEFORE PLACING TEMPORARY PAVING BLOCK.



| | | | | |
|---------------------------------|--|-----------------------------|--|-----------|
| 08-2022 LATEST REVISION DATE | | APPROVED BY BRIDGE ENGINEER | | |
| | | | STANDARD DESIGN - 24'-0" ROADWAY, 3 SPAN BRIDGES | |
| | | | CONTINUOUS CONCRETE SLAB BRIDGES | |
| | | | NOVEMBER, 2006 | |
| | | | SUPERSTRUCTURE DETAILS ALL BRIDGES | J24-22-06 |
| | | | 30° & 45° SKEW | |

CORRECTION 05-14 - CHANGED THE BAR LABEL FROM 5d1 TO 5h1 IN ENCIRCLED NOTE 1.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.



NOTE: NUMBER OF PILES AND STIRRUPS SHOWN ARE FOR A 70' BRIDGE.
CAP DIMENSIONS ARE TYPICAL FOR ALL SPANS.

TYPICAL NUMBERS OF PILES AND SPACINGS AND FACTORED PIER LOADS

| BRIDGE LENGTH | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
|--|---------------------|---------------------|----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| ① TYP. NO. OF PILES | 6 | 6 | 7 | 8 | 9 | 9 | 10 | 10 | 10 |
| TYP. PILE SPACES @ 0° | 5 SPA. @ 4'-6 | 5 SPA. @ 4'-6 | 6 SPA. @ 3'-9 | ② 7 SPA. @ ABOUT 3'-3 | ③ 8 SPA. @ ABOUT 2'-10 | ③ 8 SPA. @ ABOUT 2'-10 | ③ 9 SPA. @ 2'-6 | ③ 9 SPA. @ 2'-6 | ③ 9 SPA. @ 2'-6 |
| TYP. PILE SPACES @ 15° | 5 SPA. @ ABOUT 4'-8 | 5 SPA. @ ABOUT 4'-8 | 6 SPA. @ ABOUT 3'-11 | 7 SPA. @ ABOUT 3'-4 | ② 8 SPA. @ ABOUT 2'-11 | ② 8 SPA. @ ABOUT 2'-11 | ③ 9 SPA. @ ABOUT 2'-7 | ③ 9 SPA. @ ABOUT 2'-7 | ③ 9 SPA. @ ABOUT 2'-7 |
| TYP. PILE SPACES @ 30° | 5 SPA. @ ABOUT 5'-2 | 5 SPA. @ ABOUT 5'-2 | 6 SPA. @ ABOUT 4'-4 | 7 SPA. @ ABOUT 3'-9 | ② 8 SPA. @ ABOUT 3'-3 | ② 8 SPA. @ 3'-3 | ② 9 SPA. @ ABOUT 2'-11 | ② 9 SPA. @ ABOUT 2'-11 | ② 9 SPA. @ ABOUT 2'-11 |
| TYP. PILE SPACES @ 45° | 5 SPA. @ ABOUT 6'-4 | 5 SPA. @ ABOUT 6'-4 | 6 SPA. @ ABOUT 5'-4 | 7 SPA. @ ABOUT 4'-7 | 8 SPA. @ ABOUT 4'-0 | 8 SPA. @ ABOUT 4'-0 | 9 SPA. @ ABOUT 3'-6 | 9 SPA. @ ABOUT 3'-6 | 9 SPA. @ ABOUT 3'-6 |
| ④ PU, STRENGTH I DESIGN LOAD FOR PIER (KIPS) | 577 KIPS | 637 KIPS | 704 KIPS | 776 KIPS | 845 KIPS | 927 KIPS | 1008 KIPS | 1092 KIPS | 1185 KIPS |

- ① THIS TYPICAL NUMBER OF PILES MAY NEED TO BE MODIFIED DEPENDING ON SELECTED PILE TYPE AND SIZE, HEIGHT, AND RESISTANCE. IF THE NUMBER OF PILES IS DIFFERENT THAN IN THE TABLE FOR THE BRIDGE LENGTH, THE NUMBER OF 5h1 BARS AND OTHER QUANTITIES NEED TO BE CHECKED AND ADJUSTED AS NEEDED. PILES 10 INCHES AND 12 INCHES IN SIZE MUST BE SPACED 2'-6 OR MORE, PILES 14 INCHES IN SIZE MUST BE SPACED 2'-11 OR MORE, AND PILES 16 INCHES IN SIZE MUST BE SPACED 3'-4 OR MORE.
- ② MAXIMUM PILE SIZE AT THIS SPACING IS 14 INCHES.
- ③ MAXIMUM PILE SIZE AT THIS SPACING IS 12 INCHES.
- ④ STRENGTH I PIER DESIGN LOAD INCLUDES DYNAMIC LOAD ALLOWANCE (1M), AND PIER CAP WEIGHT IS BASED ON 45° SKEW. USE THIS PU FOR DETERMINING NUMBER OF PILES AND PILE LENGTH.

PIER NOTES:

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

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

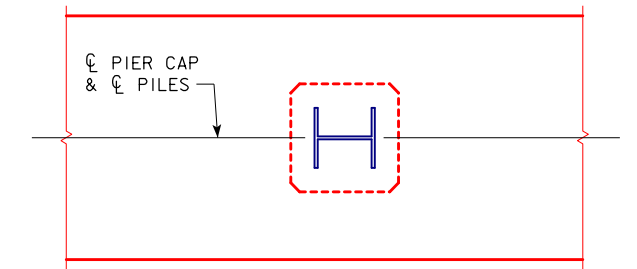
THE PIER PILES ARE TO BE DRIVEN TO FULL PENETRATION, IF PRACTICABLE, BUT IN NO CASE TO A BEARING VALUE LESS THAN THE PILE BEARING REQUIRED FOR EACH BRIDGE LENGTH AS SHOWN ON THIS SHEET. ADDITIONAL DRIVING CAPACITY MAY BE REQUIRED THROUGH SCOURABLE LAYERS. REFER TO GENERAL PLAN NOTES FOR ADDITIONAL INFORMATION.

CAP STEEL AS DETAILED ON PILE STANDARD PILE DRAWING IS REQUIRED FOR MONOLITHIC PIER CAPS.

THE CONCRETE QUANTITIES ARE BASED ON THE USE OF TYPE 3 PILING. IF TYPE 1 OR TYPE 2 IS USED, THE CONCRETE QUANTITIES MAY BE ADJUSTED TO ACCOUNT FOR THE CONCRETE DISPLACED BY THE PILING.

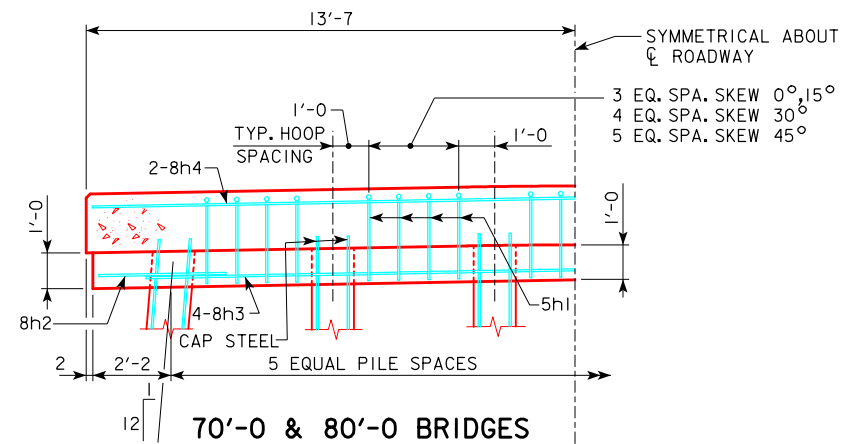
ALL REINFORCING STEEL IS TO BE GRADE 60.

PIER PILING WAS DESIGNED FOR HL-93 LOADING WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

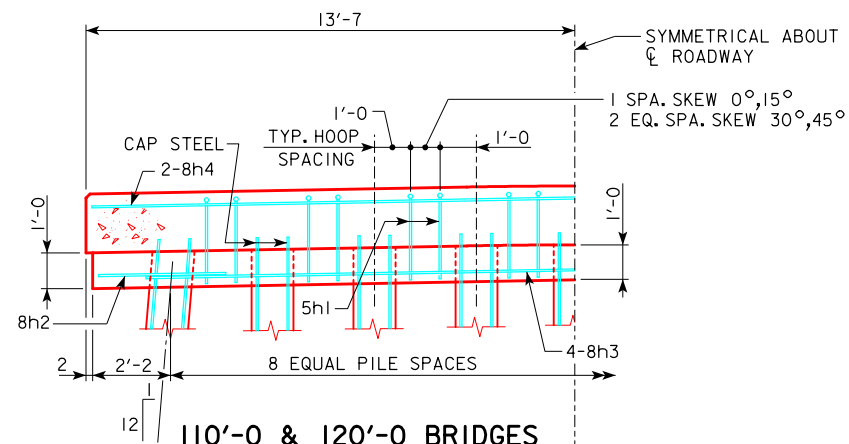


PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

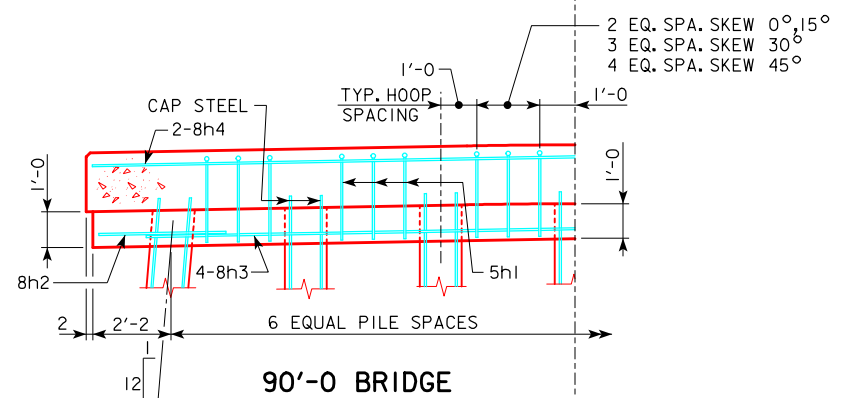
| | | |
|---------------------------------|---------------------------------|---|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | <p style="font-size: small;">STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES</p> <h2 style="margin: 0;">CONTINUOUS CONCRETE SLAB BRIDGES</h2> <p style="font-size: x-small;">NOVEMBER, 2006</p> |
| | | <p style="font-weight: bold; margin: 0;">MONOLITHIC PIER CAP DETAILS ALL BRIDGES</p> <p style="font-size: x-small; margin: 0;">SHEET 1 OF 2</p> |
| | | J24-23-06 |



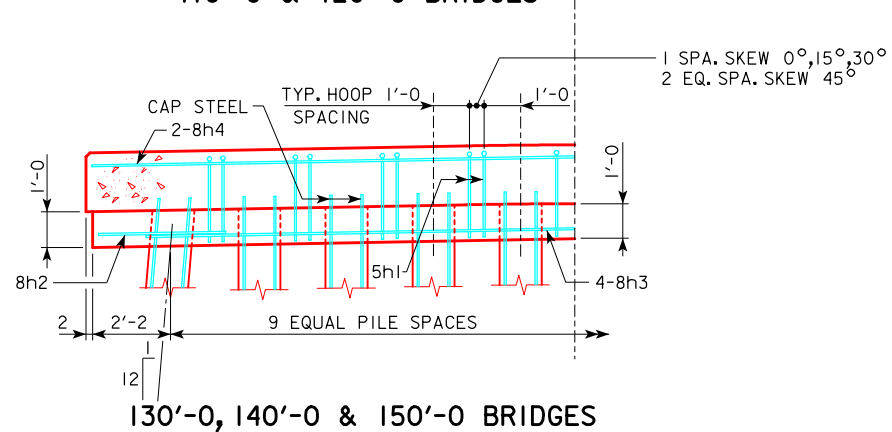
70'-0 & 80'-0 BRIDGES



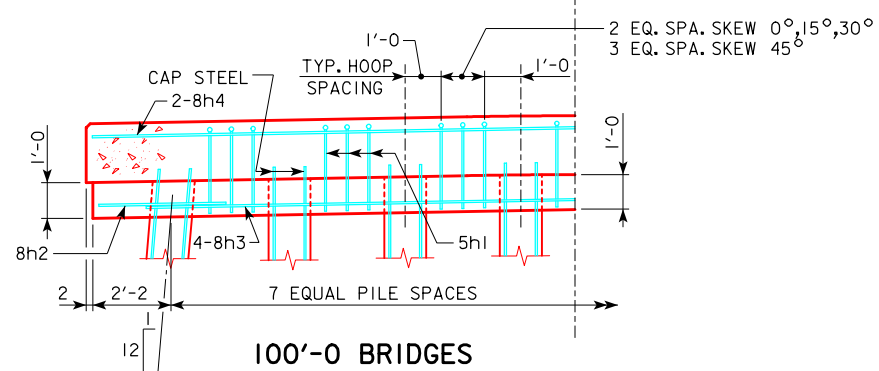
110'-0 & 120'-0 BRIDGES



90'-0 BRIDGE

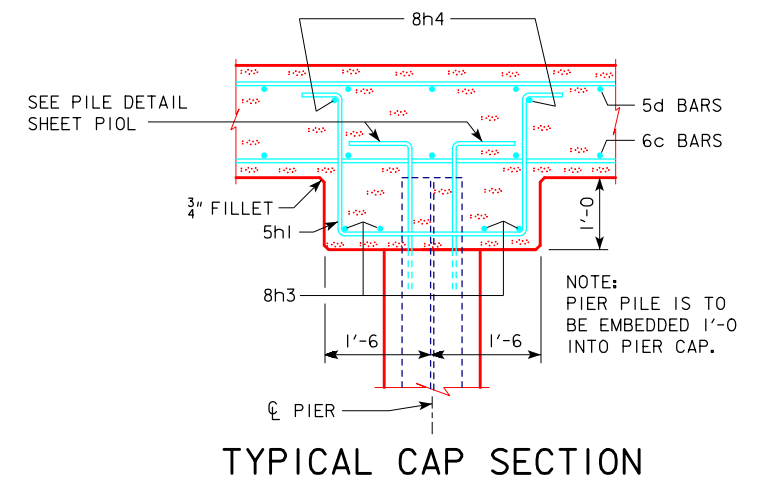


130'-0, 140'-0 & 150'-0 BRIDGES



100'-0 BRIDGES

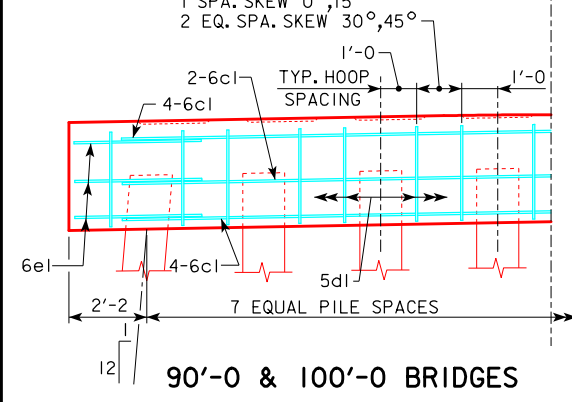
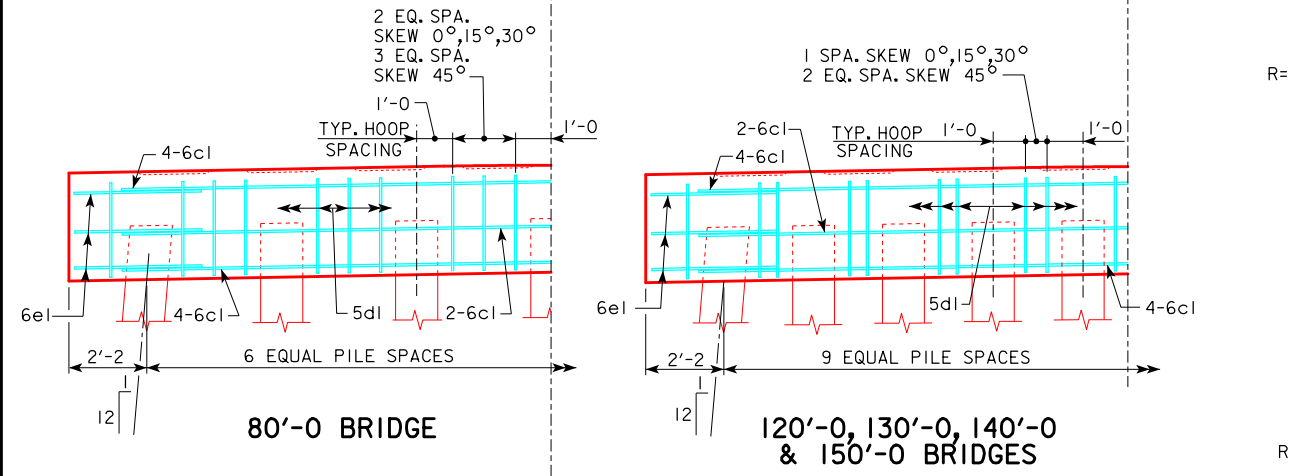
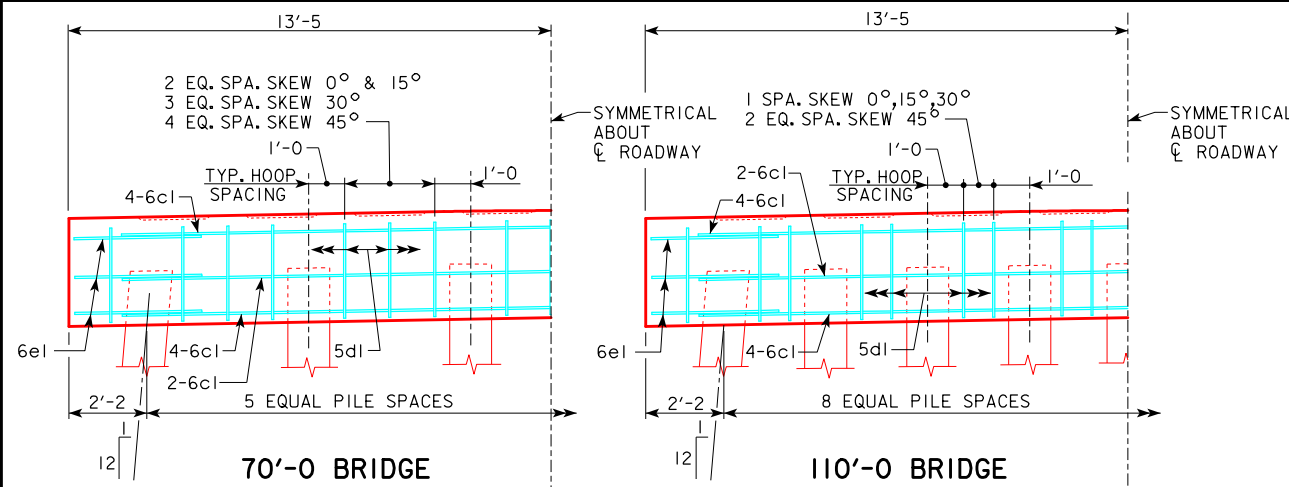
HALF SECTION NEAR PIER
 SHOWING STIRRUP SPACING AND NUMBER OF PILING
 NOTE: BOTTOM OF CAP ELEVATIONS WILL BE REQUIRED AT THE ϕ OF ROADWAY AND AT EACH EXTERIOR PILE.



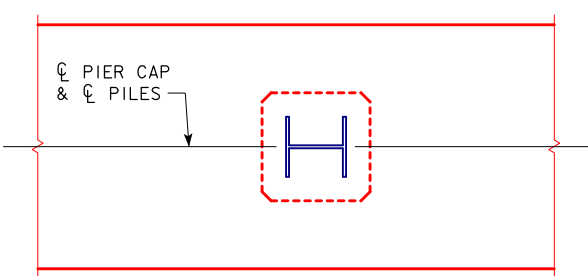
REVISED 12-08 - REVISED PILES REQUIRED FOR 110'-0 BRIDGE.
 REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

| | | |
|--|---|------------------|
| 08-2022 LATEST REVISION DATE <i>[Signature]</i> APPROVED BY BRIDGE ENGINEER | | |
| | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| | MONOLITHIC PIER CAP DETAILS ALL BRIDGES SHEET 2 OF 2 | J24-24-06 |

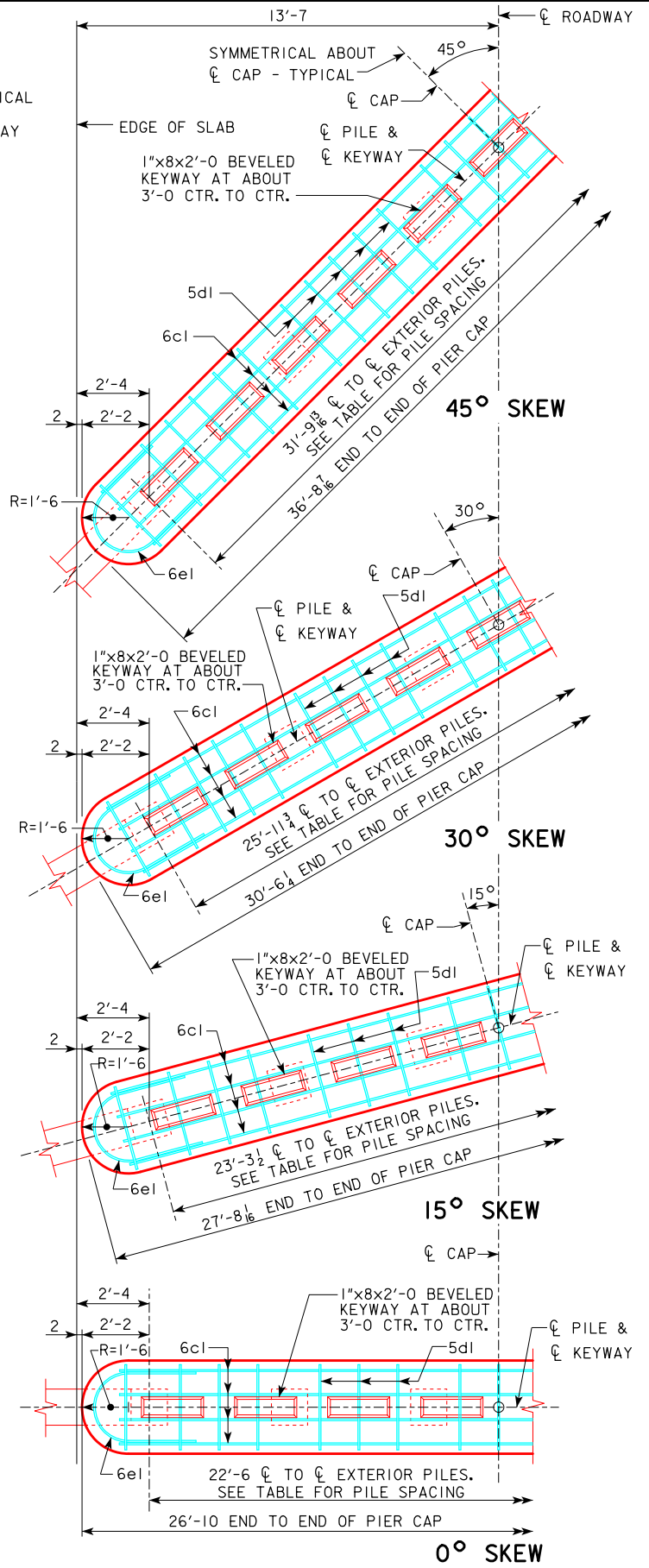
REVISED 12-08 - REVISED PILES REQUIRED 90'-0 AND 120'-0 BRIDGES. ADDED TYPE 3 PILE ORIENTATION DETAIL. EXTRA 5dl BAR ADDED AT PIER CAP END.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.



TYPICAL HALF ELEVATION PIER CAP
 (LOOKING PARALLEL TO ϕ ROADWAY)

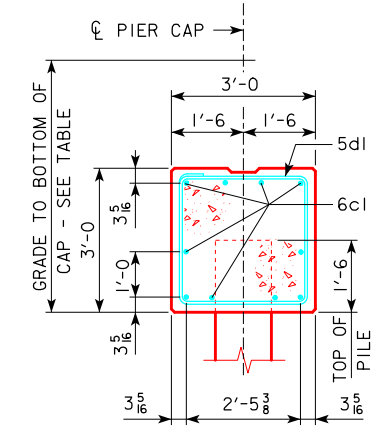


PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES



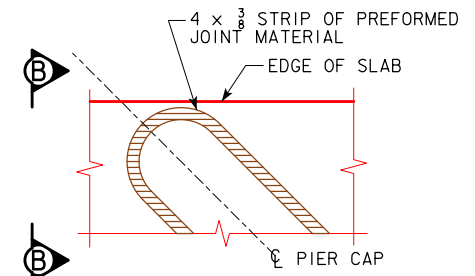
TYPICAL HALF PLAN VIEW

NOTE: NUMBER OF PILES AND STIRRUPS SHOWN ARE FOR A 70' BRIDGE. CAP DIMENSIONS ARE TYPICAL FOR ALL SPANS.



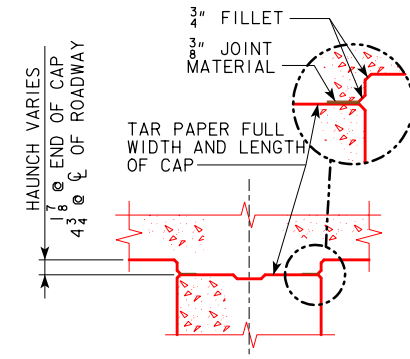
TYP. SECTION

| GRADE TO BOTTOM OF CAP DIMENSION | |
|----------------------------------|-----------|
| 70'-0 BRIDGE | 4'-7 1/4 |
| 80'-0 BRIDGE | 4'-8 |
| 90'-0 BRIDGE | 4'-9 |
| 100'-0 BRIDGE | 4'-10 1/4 |
| 110'-0 BRIDGE | 4'-11 1/4 |
| 120'-0 BRIDGE | 5'-0 3/4 |
| 130'-0 BRIDGE | 5'-2 |
| 140'-0 BRIDGE | 5'-3 1/4 |
| 150'-0 BRIDGE | 5'-4 3/4 |

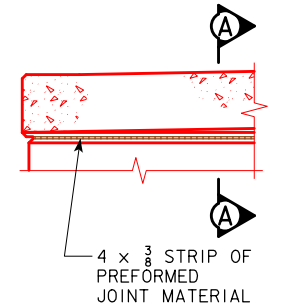


PART PLAN

SHOWING TREATMENT OF 4 x 3/8 STRIP OF PREFORMED JOINT MATERIAL AT ENDS OF PIER CAP. NOTE THAT JOINT MATERIAL IS TO GO ALL THE WAY AROUND PIER CAP FOR SQUARE AND SKEWED BRIDGES.



PART SECT A-A



PART SECT B-B

08-2022
 LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER



STANDARD DESIGN - 24 FOR ROADWAY, 35 FOR BRIDGES
CONTINUOUS CONCRETE SLAB BRIDGES
 NOVEMBER, 2006

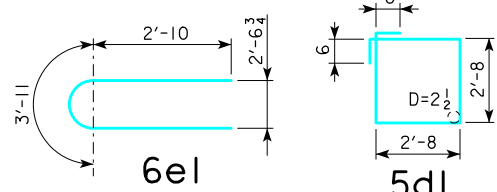
NON-MONOLITHIC PIER CAP DETAILS ALL BRIDGES

J24-25-06
 SHEET 1 OF 2

BILL OF REINFORCING STEEL - ONE PIER

| BRIDGE LENGTH | | | 70'-0 BRIDGE | | | 80'-0 BRIDGE | | | 90'-0 BRIDGE | | | 100'-0 BRIDGE | | | 110'-0 BRIDGE | | | 120'-0 BRIDGE | | | 130'-0 BRIDGE | | | 140'-0 BRIDGE | | | 150'-0 BRIDGE | | |
|---------------|------|-------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|---------------|--------|--------|---------------|--------|--------|---------------|--------|--------|---------------|--------|--------|---------------|--------|--------|---------------|--|--|
| MARK | SKEW | 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 | | | |
| 6c1 | 0° | | 10 | 23'-10 | 358 | 10 | 23'-10 | 358 | 10 | 23'-10 | 358 | 10 | 23'-10 | 358 | 10 | 23'-10 | 358 | 10 | 23'-10 | 358 | 10 | 23'-10 | 358 | 10 | 23'-10 | 358 | | | |
| | 15° | | 10 | 24'-8 | 370 | 10 | 24'-8 | 370 | 10 | 24'-8 | 370 | 10 | 24'-8 | 370 | 10 | 24'-8 | 370 | 10 | 24'-8 | 370 | 10 | 24'-8 | 370 | 10 | 24'-8 | 370 | | | |
| | 30° | | 10 | 27'-6 | 413 | 10 | 27'-6 | 413 | 10 | 27'-6 | 413 | 10 | 27'-6 | 413 | 10 | 27'-6 | 413 | 10 | 27'-6 | 413 | 10 | 27'-6 | 413 | 10 | 27'-6 | 413 | | | |
| | 45° | | 10 | 33'-9 | 507 | 10 | 33'-9 | 507 | 10 | 33'-9 | 507 | 10 | 33'-9 | 507 | 10 | 33'-9 | 507 | 10 | 33'-9 | 507 | 10 | 33'-9 | 507 | 10 | 33'-9 | 507 | | | |
| 5d1 | 0° | | 17 | 11'-8 | 207 | 20 | 11'-8 | 244 | 16 | 11'-8 | 195 | 16 | 11'-8 | 195 | 18 | 11'-8 | 219 | 20 | 11'-8 | 244 | 20 | 11'-8 | 244 | 20 | 11'-8 | 244 | | | |
| | 15° | | 17 | 11'-8 | 207 | 20 | 11'-8 | 244 | 16 | 11'-8 | 195 | 16 | 11'-8 | 195 | 18 | 11'-8 | 219 | 20 | 11'-8 | 244 | 20 | 11'-8 | 244 | 20 | 11'-8 | 244 | | | |
| | 30° | | 22 | 11'-8 | 268 | 20 | 11'-8 | 244 | 23 | 11'-8 | 280 | 23 | 11'-8 | 280 | 18 | 11'-8 | 219 | 20 | 11'-8 | 244 | 20 | 11'-8 | 244 | 20 | 11'-8 | 244 | | | |
| | 45° | | 27 | 11'-8 | 329 | 26 | 11'-8 | 317 | 23 | 11'-8 | 280 | 23 | 11'-8 | 280 | 26 | 11'-8 | 317 | 29 | 11'-8 | 353 | 29 | 11'-8 | 353 | 29 | 11'-8 | 353 | | | |
| 6e1 | ALL | | 6 | 9'-7 | 86 | 6 | 9'-7 | 86 | 6 | 9'-7 | 86 | 6 | 9'-7 | 86 | 6 | 9'-7 | 86 | 6 | 9'-7 | 86 | 6 | 9'-7 | 86 | 6 | 9'-7 | 86 | | | |

BENT BAR DETAILS



ESTIMATED QUANTITIES - ONE PIER

| BRIDGE LENGTH | SKEW | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
|--------------------------------|------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| STRUCTURAL CONCRETE (CU. YDS.) | 0° | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 |
| | 15° | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| | 30° | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| | 45° | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 |
| REINFORCING STEEL (LBS.) | 0° | 651 | 688 | 639 | 639 | 663 | 688 | 688 | 688 | 688 |
| | 15° | 663 | 700 | 651 | 651 | 675 | 700 | 700 | 700 | 700 |
| | 30° | 767 | 743 | 779 | 779 | 718 | 743 | 743 | 743 | 743 |
| | 45° | 922 | 910 | 873 | 873 | 910 | 946 | 946 | 946 | 946 |
| ④ PILING (NO.) | ALL | 6 | 7 | 8 | 8 | 9 | 10 | 10 | 10 | 10 |

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

TYPICAL NUMBERS OF PILES AND SPACINGS AND FACTORED PIER LOADS

| BRIDGE LENGTH | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
|--|---------------------|----------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| ① TYP. NO. OF PILES | 6 | 7 | 8 | 8 | 9 | 10 | 10 | 10 | 10 |
| TYP. PILE SPACES @ 0° | 5 SPA. @ 4'-6 | 6 SPA. @ 3'-9 | ② 7 SPA. @ ABOUT 3'-3 | ② 7 SPA. @ ABOUT 3'-3 | ③ 8 SPA. @ ABOUT 2'-10 | ③ 9 SPA. @ 2'-6 | ③ 9 SPA. @ 2'-6 | ③ 9 SPA. @ 2'-6 | ③ 9 SPA. @ 2'-6 |
| TYP. PILE SPACES @ 15° | 5 SPA. @ ABOUT 4'-8 | 6 SPA. @ ABOUT 3'-11 | 7 SPA. @ ABOUT 3'-4 | 7 SPA. @ ABOUT 3'-4 | ② 8 SPA. @ ABOUT 2'-11 | ③ 9 SPA. @ ABOUT 2'-7 | ③ 9 SPA. @ ABOUT 2'-7 | ③ 9 SPA. @ ABOUT 2'-7 | ③ 9 SPA. @ ABOUT 2'-7 |
| TYP. PILE SPACES @ 30° | 5 SPA. @ ABOUT 5'-2 | 6 SPA. @ ABOUT 4'-4 | 7 SPA. @ ABOUT 3'-9 | 7 SPA. @ ABOUT 3'-9 | ② 8 SPA. @ 3'-3 | ② 9 SPA. @ ABOUT 2'-11 | ② 9 SPA. @ ABOUT 2'-11 | ② 9 SPA. @ ABOUT 2'-11 | ② 9 SPA. @ ABOUT 2'-11 |
| TYP. PILE SPACES @ 45° | 5 SPA. @ ABOUT 6'-4 | 6 SPA. @ ABOUT 5'-4 | 7 SPA. @ ABOUT 4'-7 | 7 SPA. @ ABOUT 4'-7 | 8 SPA. @ ABOUT 4'-0 | 9 SPA. @ ABOUT 3'-6 | 9 SPA. @ ABOUT 3'-6 | 9 SPA. @ ABOUT 3'-6 | 9 SPA. @ ABOUT 3'-6 |
| ④ PU, STRENGTH I DESIGN LOAD FOR PIER (KIPS) | 623 KIPS | 683 KIPS | 750 KIPS | 822 KIPS | 891 KIPS | 973 KIPS | 1054 KIPS | 1138 KIPS | 1232 KIPS |

- ① THIS TYPICAL NUMBER OF PILES MAY NEED TO BE MODIFIED DEPENDING ON SELECTED P10L PILE TYPE AND SIZE, HEIGHT, AND RESISTANCE. IF THE NUMBER OF PILES IS DIFFERENT THAN IN THE TABLE FOR THE BRIDGE LENGTH, THE NUMBER OF 5d1 BARS AND OTHER QUANTITIES NEED TO BE CHECKED AND ADJUSTED AS NEEDED. PILES 10 INCHES AND 12 INCHES IN SIZE MUST BE SPACED 2'-6 OR MORE, PILES 14 INCHES IN SIZE MUST BE SPACED 2'-11 OR MORE, AND PILES 16 INCHES IN SIZE MUST BE SPACED 3'-4 OR MORE.
- ② MAXIMUM P10L PILE SIZE AT THIS SPACING IS 14 INCHES.
- ③ MAXIMUM P10L PILE SIZE AT THIS SPACING IS 12 INCHES.
- ④ STRENGTH I PIER DESIGN LOAD INCLUDES DYNAMIC LOAD ALLWANCE (IM), AND PIER CAP WEIGHT IS BASED ON 45° SKEW. USE THIS PU FOR DETERMINING NUMBER OF PILES AND PILE LENGTH.

PIER NOTES:

FOR SKEWED BRIDGES BOTTOM OF PIER CAP IS TO BE SLOPED TO COMPENSATE FOR GRADE. THEREFORE BOTTOM OF CAP ELEVATIONS WILL BE REQUIRED AT THE $\frac{1}{2}$ OF ROADWAY AND AT EACH EXTERIOR PILE.

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

THE PIER PILES ARE TO BE DRIVEN TO FULL PENETRATION, IF PRACTICABLE, BUT IN NO CASE TO A BEARING VALUE LESS THAN THE PILE BEARING REQUIRED FOR EACH BRIDGE LENGTH AS SHOWN ON THIS SHEET. ADDITIONAL DRIVING CAPACITY MAY BE REQUIRED THROUGH SCOURABLE LAYERS. REFER TO GENERAL PLAN NOTES FOR ADDITIONAL INFORMATION.

THE CONCRETE QUANTITIES ARE BASED ON THE USE OF TYPE 3 PILING. IF TYPE 1 OR TYPE 2 IS USED, THE CONCRETE QUANTITIES MAY BE ADJUSTED TO ACCOUNT FOR THE CONCRETE DISPLACED BY THE PILING.

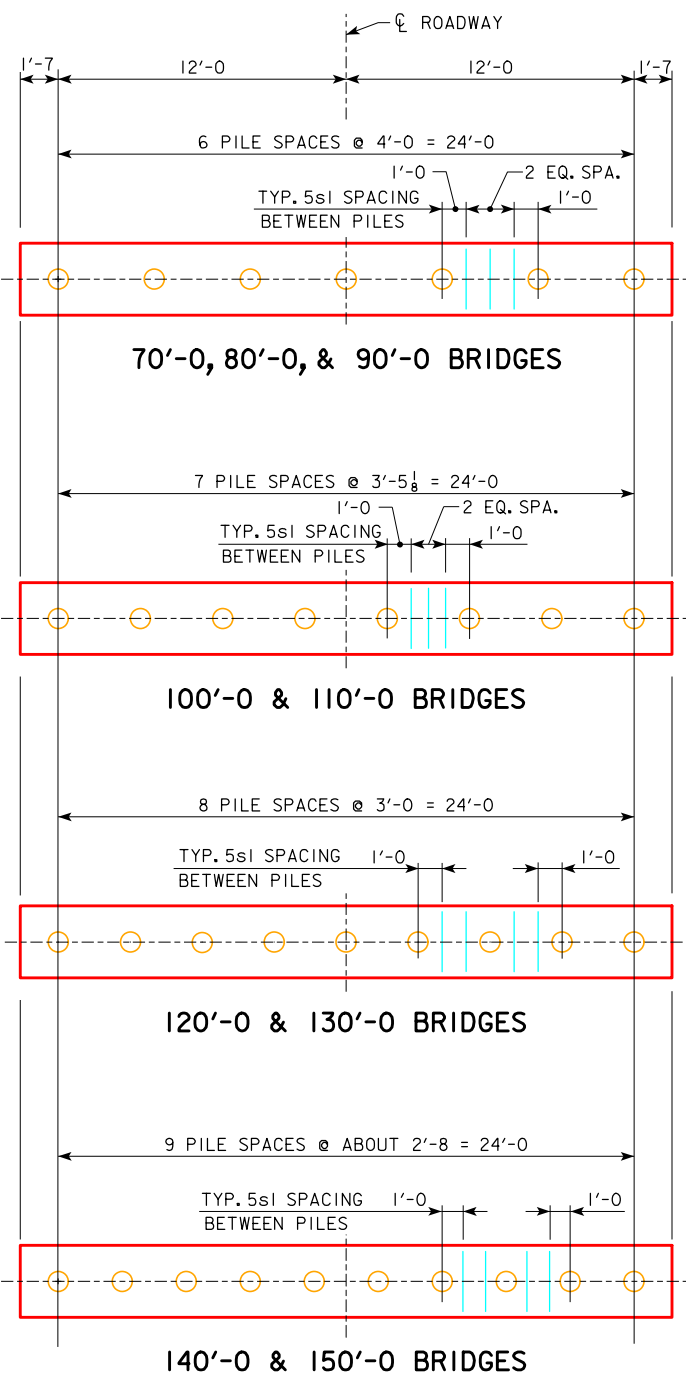
ALL REINFORCING STEEL IS TO BE GRADE 60.

PIER PILING WAS DESIGNED FOR HL-93 LOADING WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

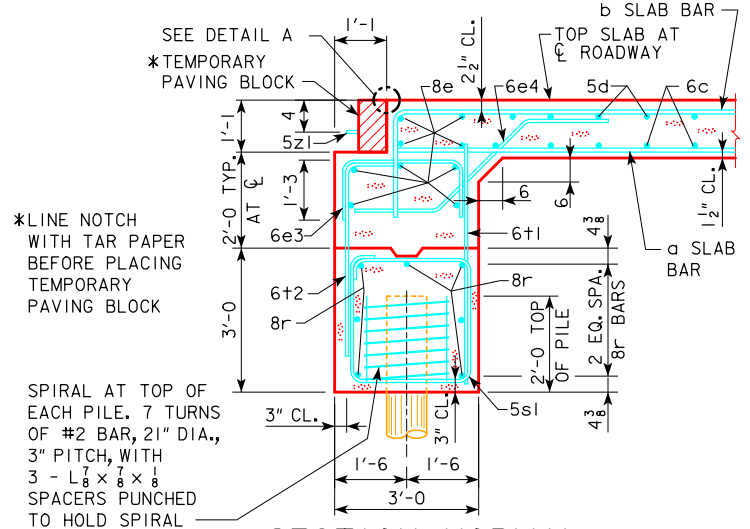
REVISED 06-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

| | | |
|--|---------------------------------|--|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 |
| NON-MONOLITHIC PIER CAP DETAILS ALL BRIDGES | | J24-26-06 SHEET 2 OF 2 |

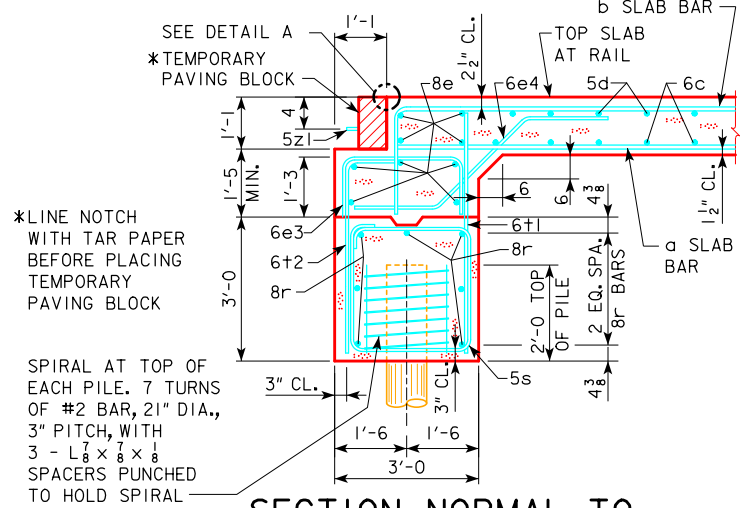
REVISED 06-13 - REVISION FOR LRFD PILE DESIGN. REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).



PILE PLAN - 0° SKEW
WOOD PILING

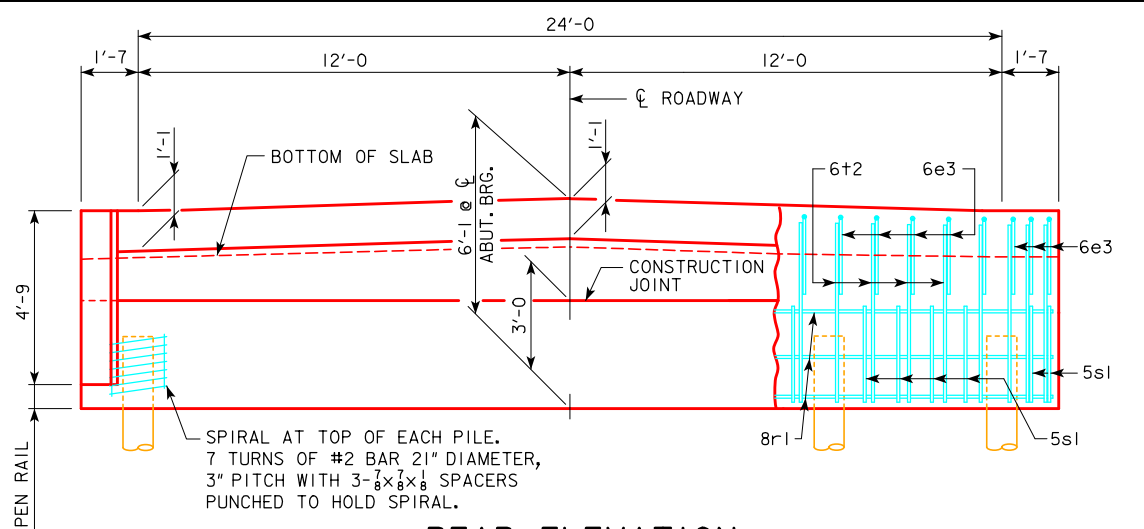


SECTION NORMAL TO ABUTMENT AT CL

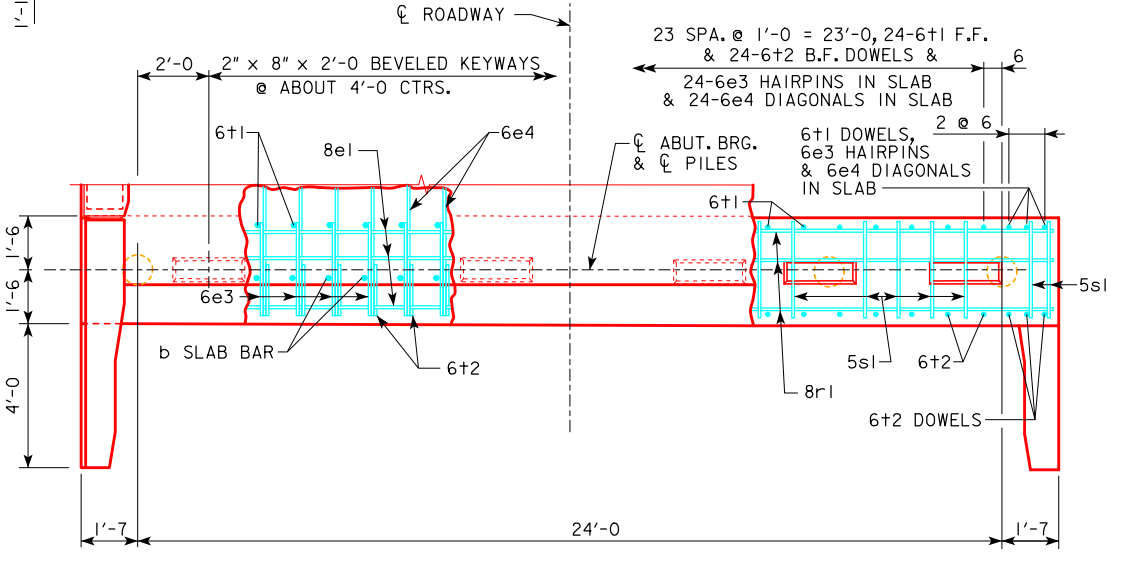


SECTION NORMAL TO ABUTMENT AT GUTTERLINE

ABUTMENT NOTES:
 THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.
 DETAILS ON THIS SHEET ARE TO BE USED ONLY WHEN ABUTMENTS ARE PLACED ON TIMBER PILES.
 THE MINIMUM CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.
 TIMBER PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS. TIMBER PILES SHALL NOT BE DRIVEN TO MORE THAN 160 TONS.
 ALL REINFORCING STEEL IS TO BE GRADE 60.
 ABUTMENT PILING WAS DESIGNED FOR HL-93 LOADING WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.



REAR ELEVATION

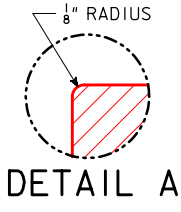


PLAN VIEW

NOTE: WING REINFORCING AND RAIL NOT SHOWN.
 6e3, 6e4, AND 8e1 ARE INCLUDED WITH SUPERSTRUCTURE QUANTITIES.

| NUMBER OF PILES AND ABUTMENT DESIGN LOADS | | | | | | | | | |
|---|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| BRIDGE LENGTH | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
| PILING - NUMBER | 7 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 |
| PU, STRENGTH I DESIGN LOAD - KIPS | 345 | 366 | 387 | 414 | 439 | 468 | 496 | Δ 587 | Δ 619 |

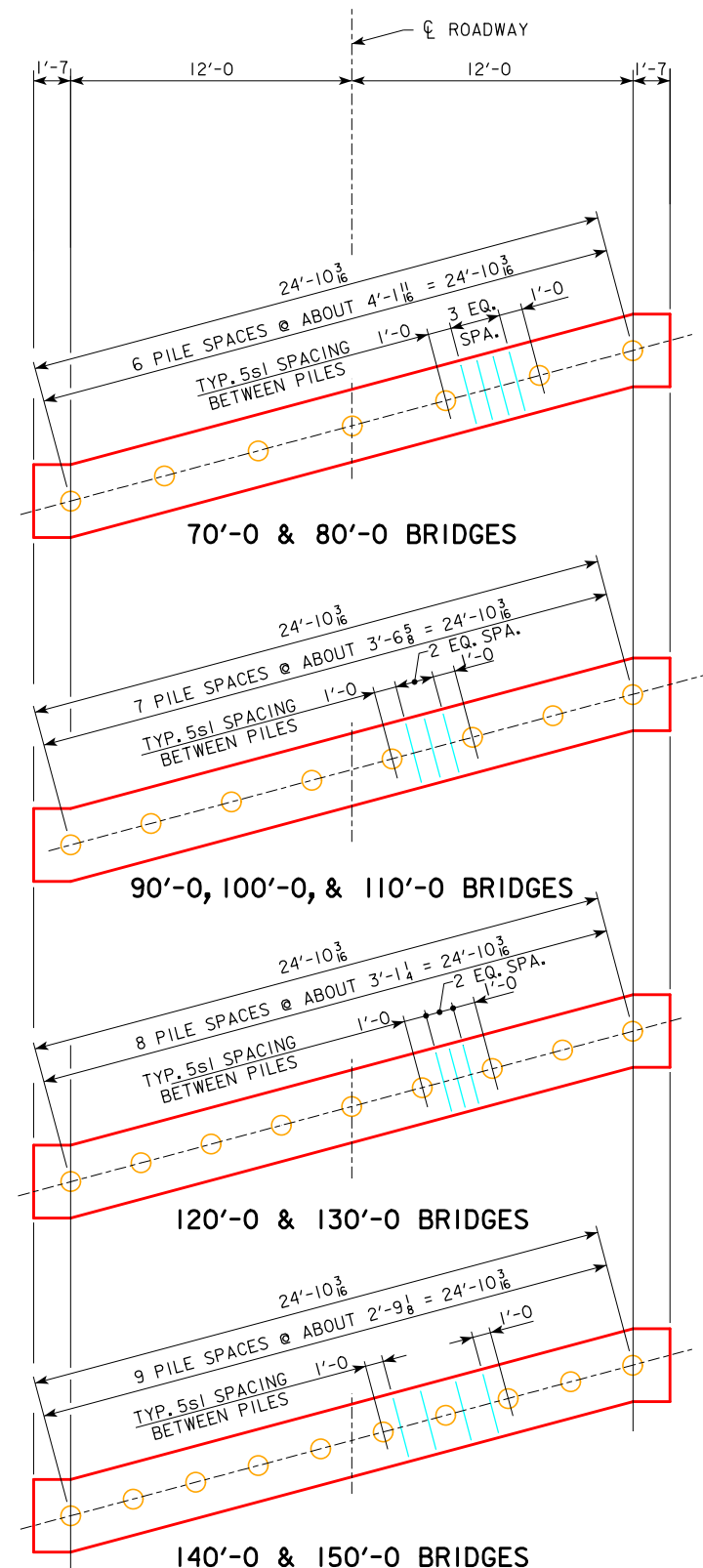
Δ INCLUDES DYNAMIC LOAD ALLOWANCE
 NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



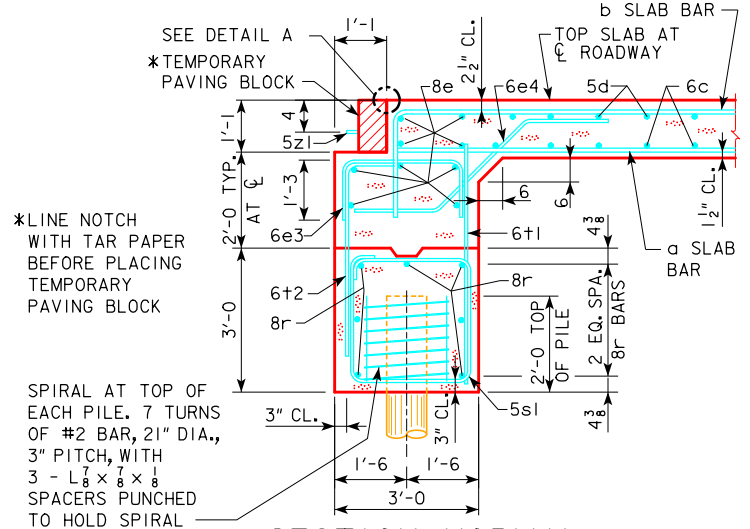
DETAIL A

| | | | |
|--|---|--|--|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER <i>[Signature]</i> | IOWADOT | |
| | | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| 0° ABUTMENT DETAILS SKEW - TIMBER PILING | | J24-27-06 | |

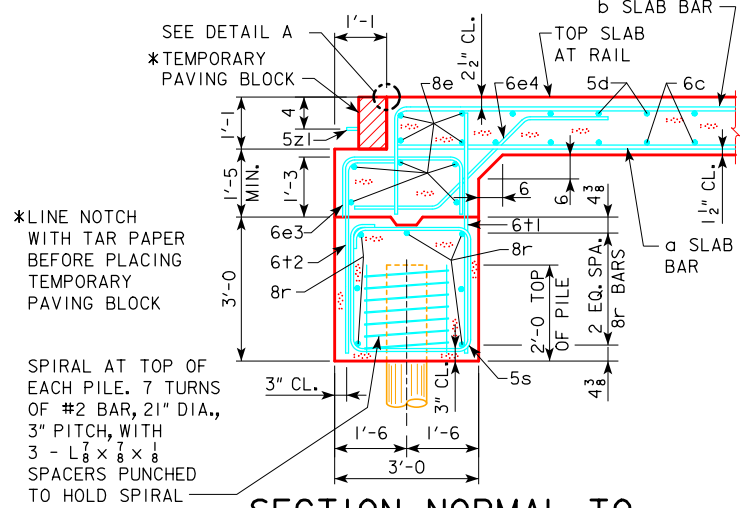
REVISED 06-13 - REVISION FOR LRF PILE DESIGN.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).



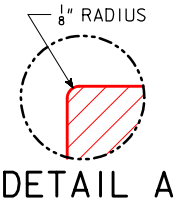
PILE PLAN - 15° SKEW WOOD PILING



SECTION NORMAL TO ABUTMENT AT CL

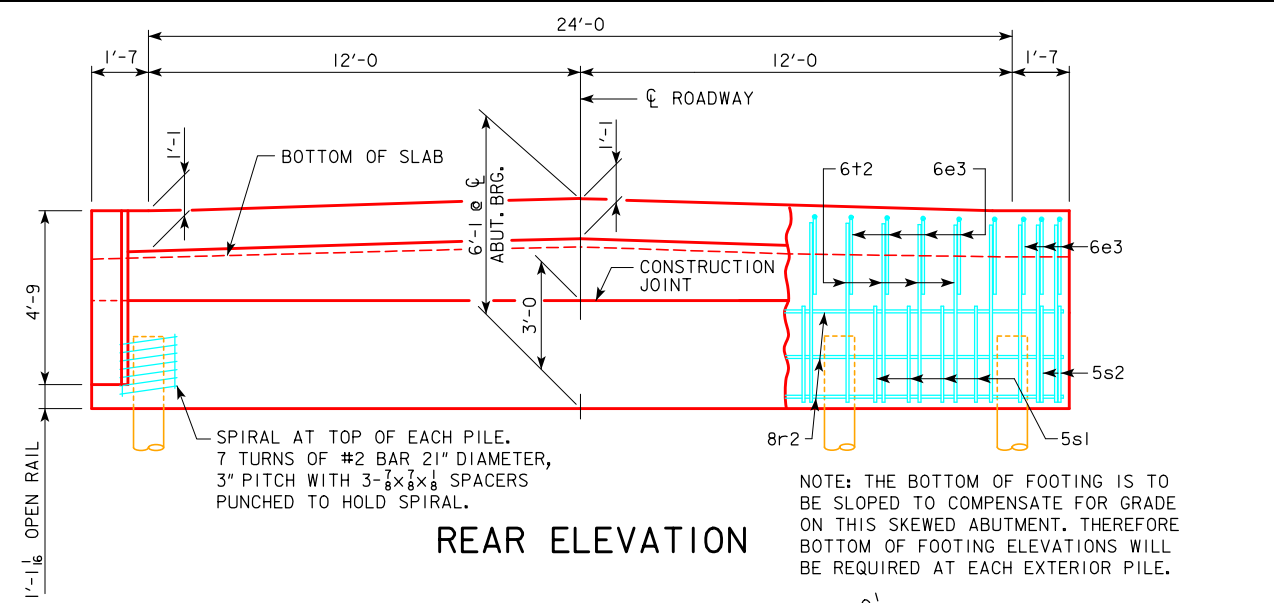


SECTION NORMAL TO ABUTMENT AT GUTTERLINE

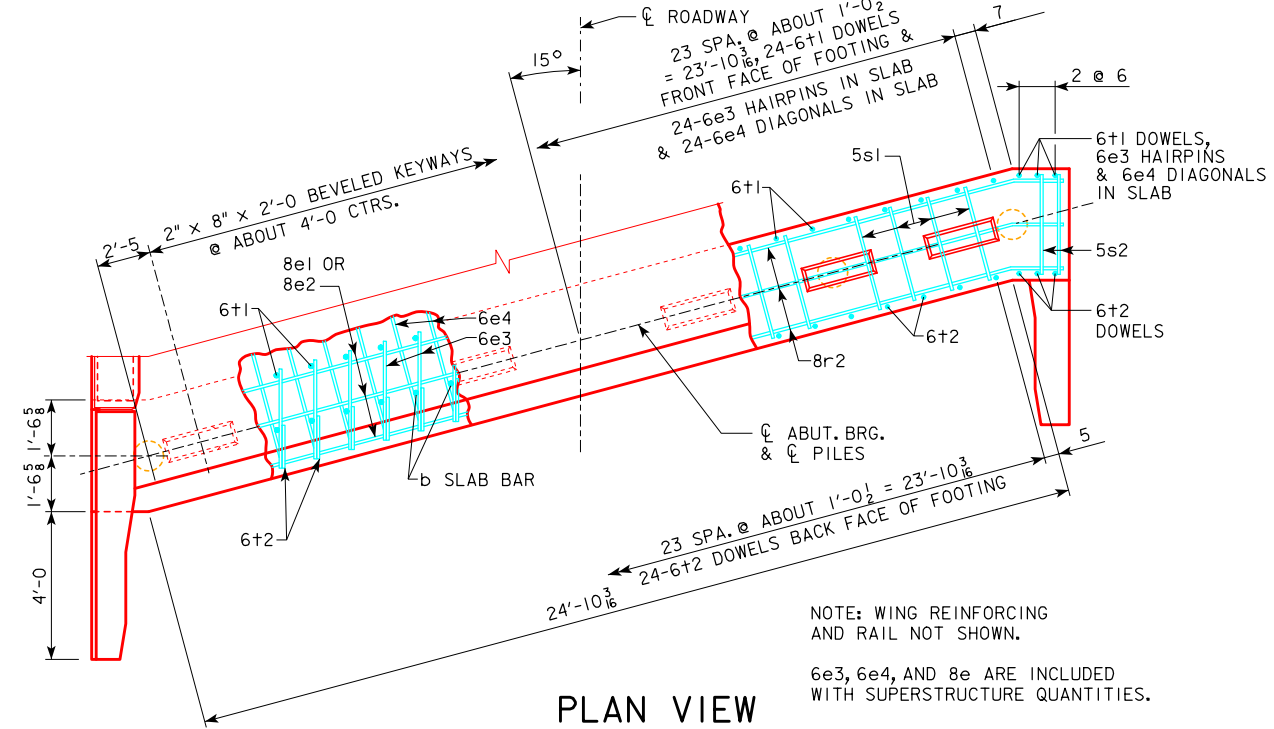


ABUTMENT NOTES:

- THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.
- DETAILS ON THIS SHEET ARE TO BE USED ONLY WHEN ABUTMENTS ARE PLACED ON TIMBER PILES.
- THE MINIMUM CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.
- TIMBER PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS. TIMBER PILES SHALL NOT BE DRIVEN TO MORE THAN 160 TONS.
- ALL REINFORCING STEEL IS TO BE GRADE 60.
- ABUTMENT PILING WAS DESIGNED FOR HL-93 LOADING WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.



REAR ELEVATION



PLAN VIEW

| NUMBER OF PILES AND ABUTMENT DESIGN LOADS | | | | | | | | | |
|---|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| BRIDGE LENGTH | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
| PILING - NUMBER | 7 | 7 | 8 | 8 | 8 | 9 | 9 | 10 | 10 |
| PU, STRENGTH I DESIGN LOAD - KIPS | 348 | 369 | 390 | 417 | 442 | 471 | 499 | Δ 590 | Δ 622 |

Δ INCLUDES DYNAMIC LOAD ALLOWANCE
NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

08-2022
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES

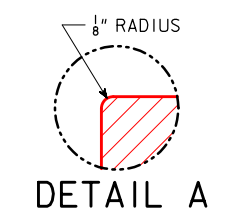
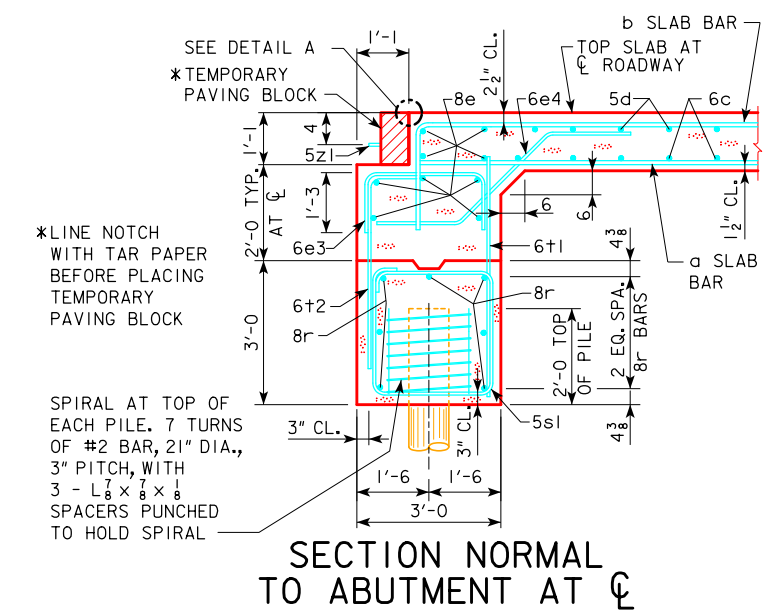
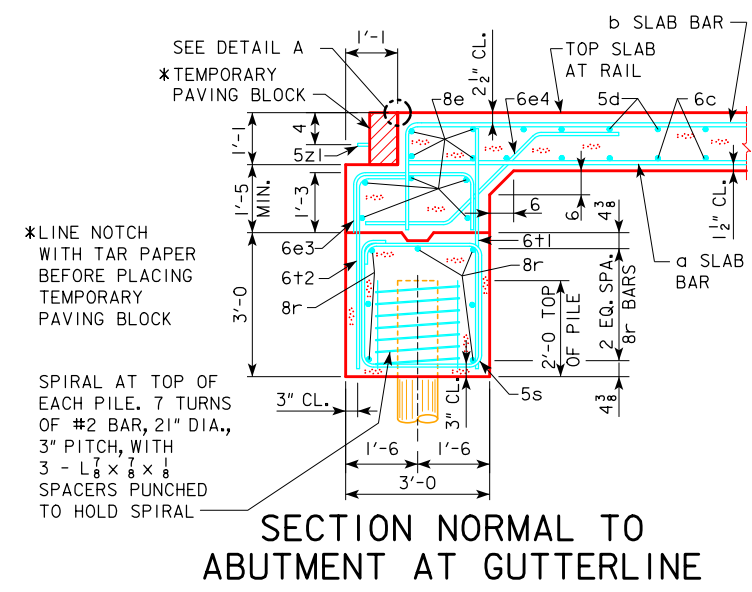
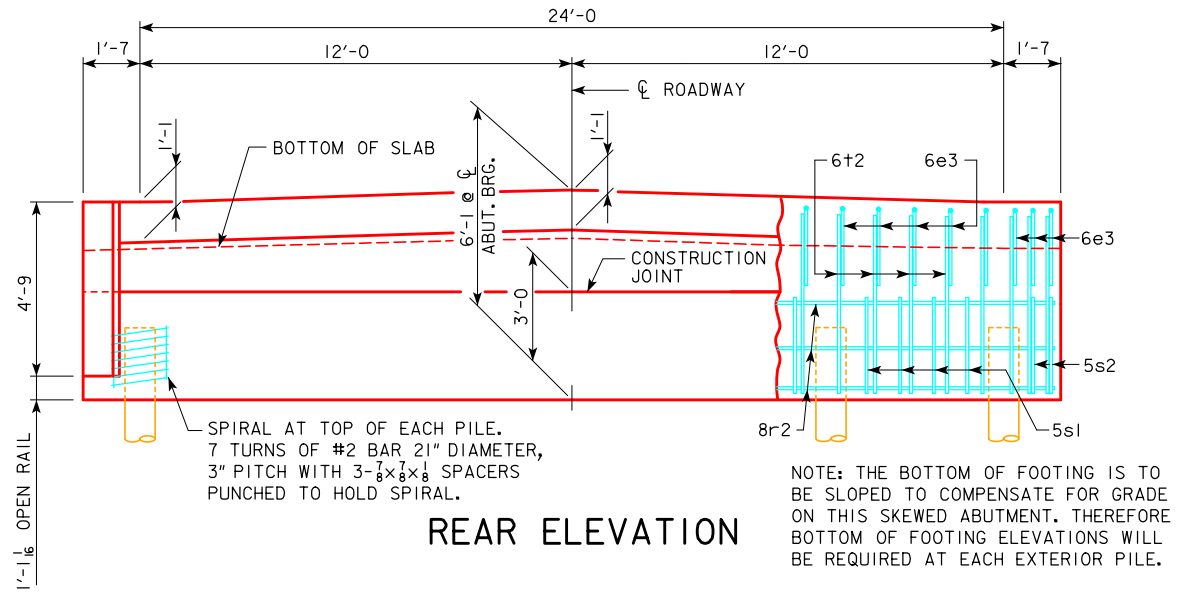
**CONTINUOUS CONCRETE
SLAB BRIDGES**

NOVEMBER, 2006

ABUTMENT DETAILS
15° SKEW - TIMBER PILING

J24-28-06

REVISIED 06-13 - REVISION FOR LRFD PILE DESIGN.
REVISIED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).



ABUTMENT NOTES:

THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.

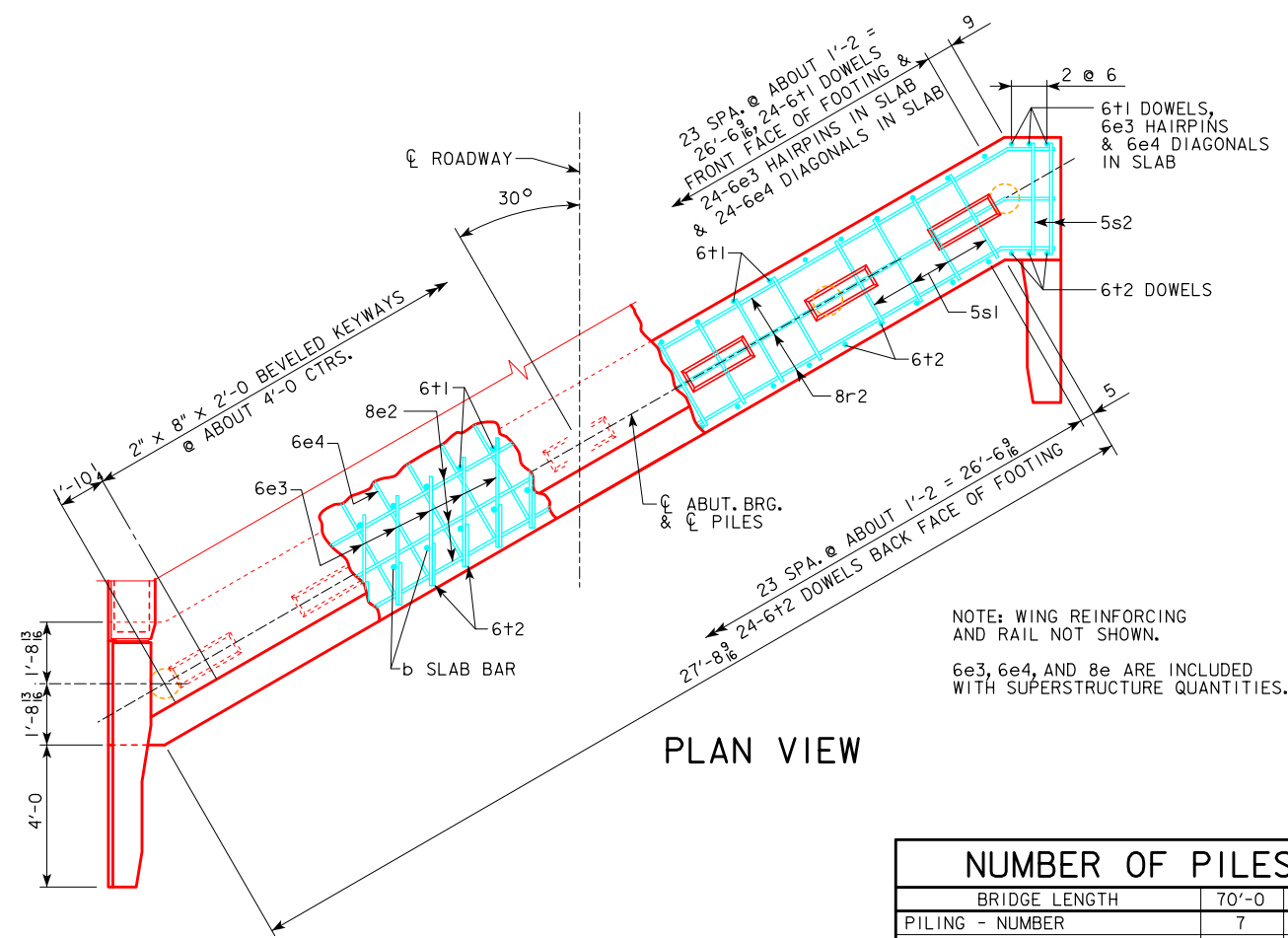
DETAILS ON THIS SHEET ARE TO BE USED ONLY WHEN ABUTMENTS ARE PLACED ON TIMBER PILES.

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

TIMBER PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS. TIMBER PILES SHALL NOT BE DRIVEN TO MORE THAN 160 TONS.

ALL REINFORCING STEEL IS TO BE GRADE 60.

ABUTMENT PILING WAS DESIGNED FOR HL-93 LOADING WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

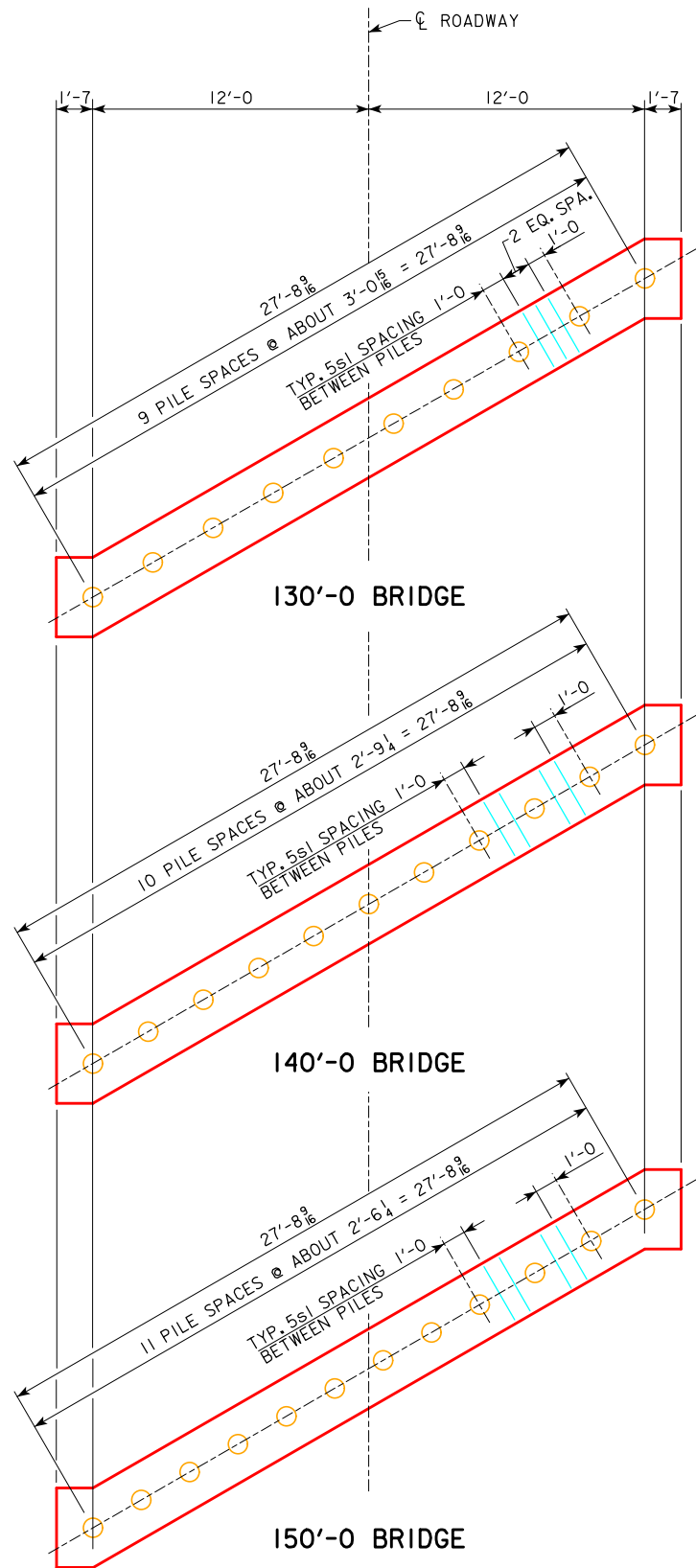
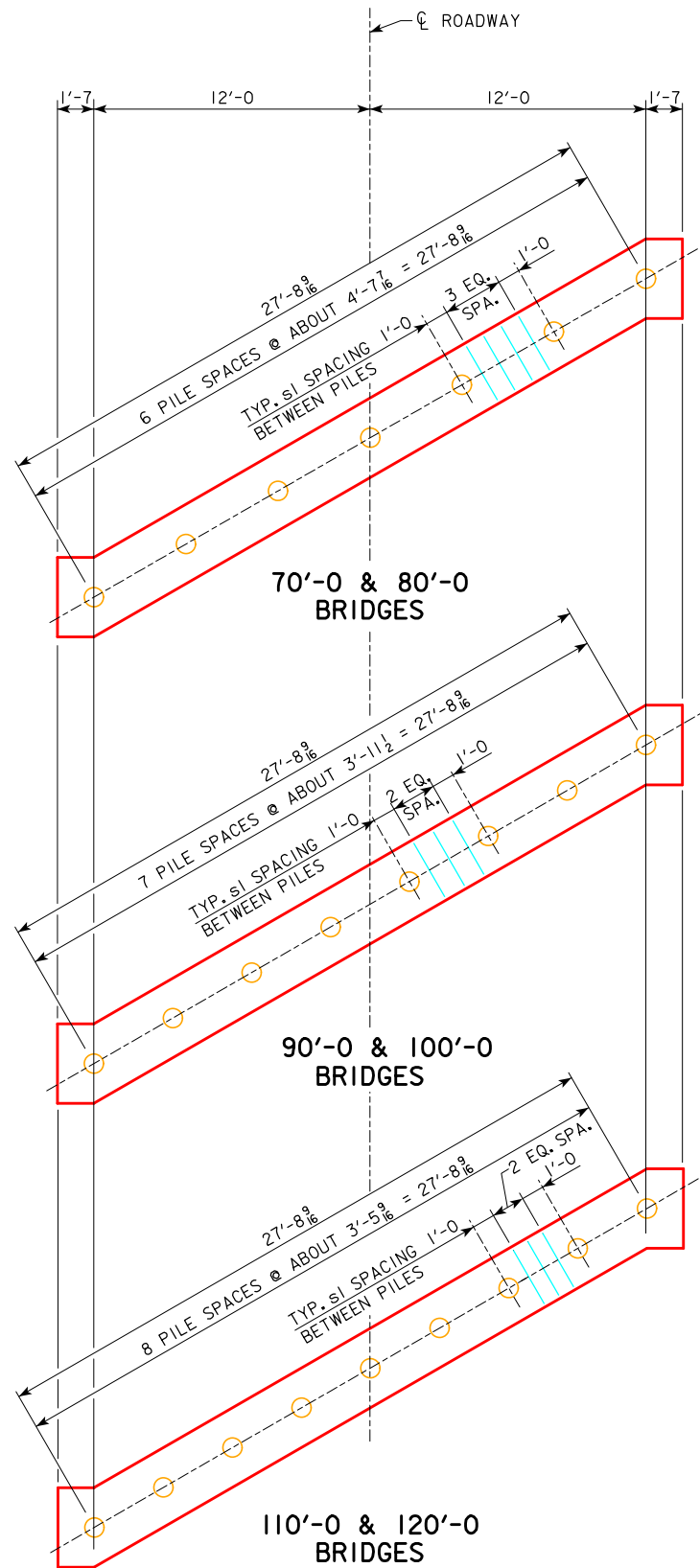


| NUMBER OF PILES AND ABUTMENT DESIGN LOADS | | | | | | | | | |
|---|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| BRIDGE LENGTH | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
| PILING - NUMBER | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 11 | 12 |
| PU, STRENGTH I DESIGN LOAD - KIPS | 358 | 379 | 400 | 427 | 452 | 481 | 510 | Δ 601 | Δ 632 |



Δ INCLUDES DYNAMIC LOAD ALLOWANCE
NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

| | |
|--|--|
| 08-2022 LATEST REVISION DATE APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 |
| | ABUTMENT DETAILS 30° SKEW - TIMBER PILING |
| | J24-29-06 |

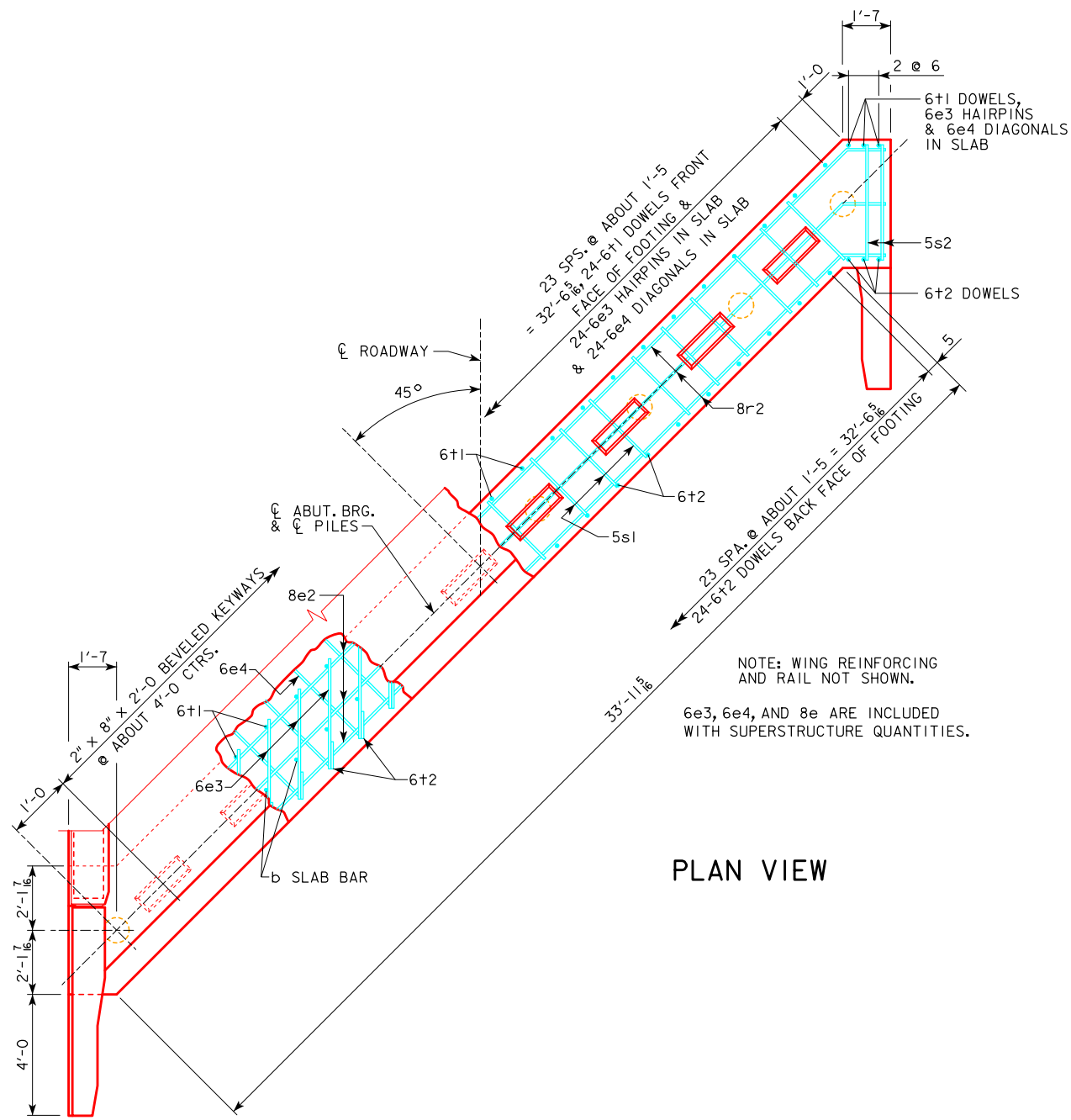
REVISED 12-08 - REVISED ENTIRE SHEET.
 REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.



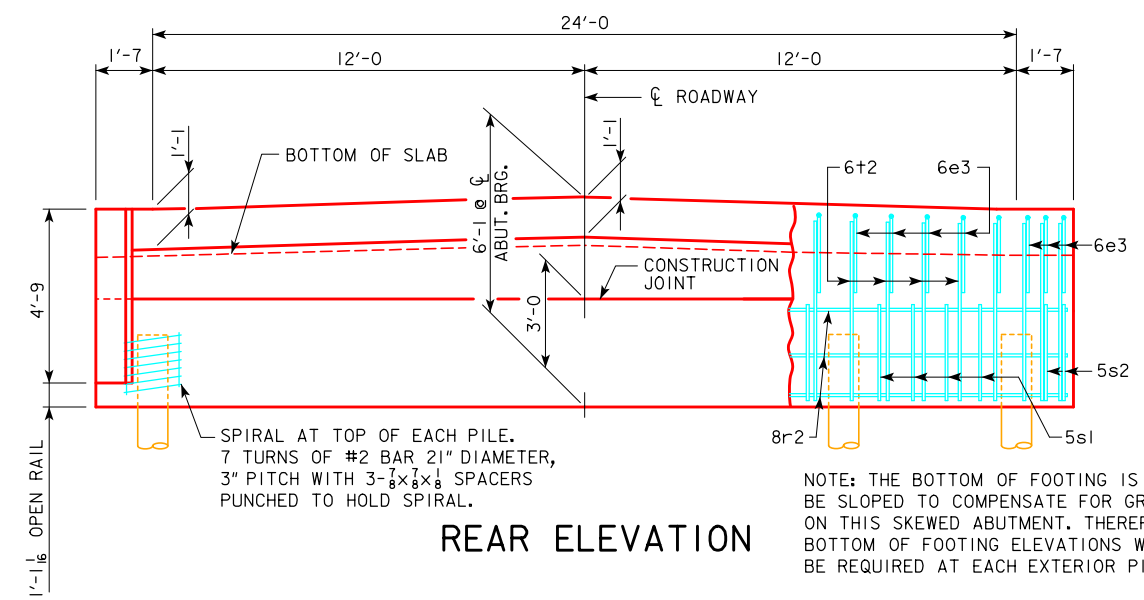
PILE PLAN - 30° SKEW
 WOOD PILING

| | | |
|---|--|------------------|
| 08-2022 LATEST REVISION DATE  APPROVED BY BRIDGE ENGINEER |  STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| | 30° SKEW - TIMBER PILING | J24-30-06 |
| | | |

REVISED 06-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).

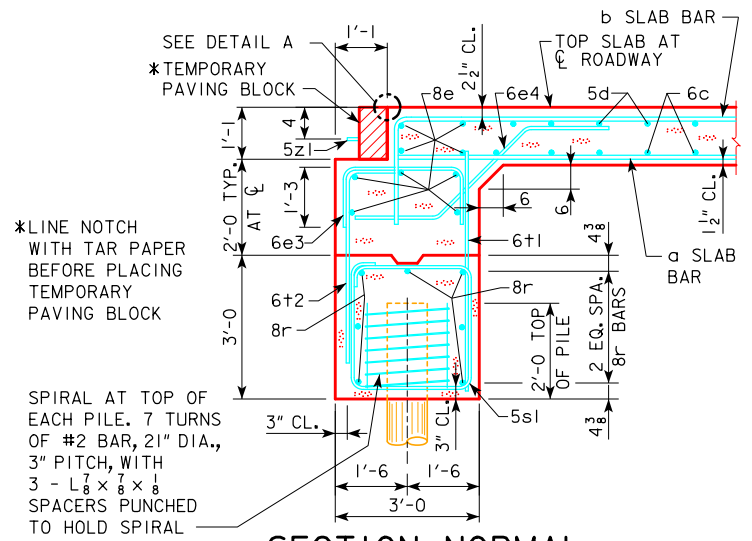


PLAN VIEW

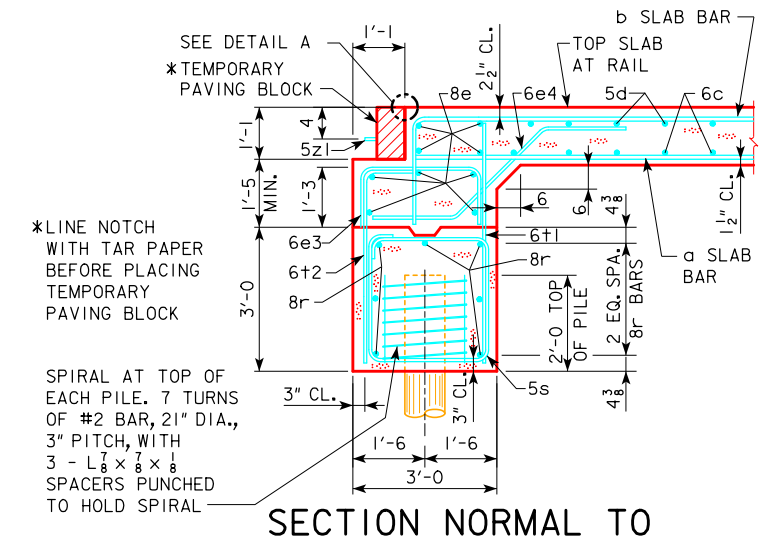


REAR ELEVATION

NOTE: THE BOTTOM OF FOOTING IS TO BE SLOPED TO COMPENSATE FOR GRADE ON THIS SKEWED ABUTMENT. THEREFORE BOTTOM OF FOOTING ELEVATIONS WILL BE REQUIRED AT EACH EXTERIOR PILE.



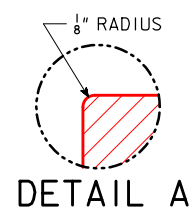
SECTION NORMAL TO ABUTMENT AT CL



SECTION NORMAL TO ABUTMENT AT GUTTERLINE

ABUTMENT NOTES:

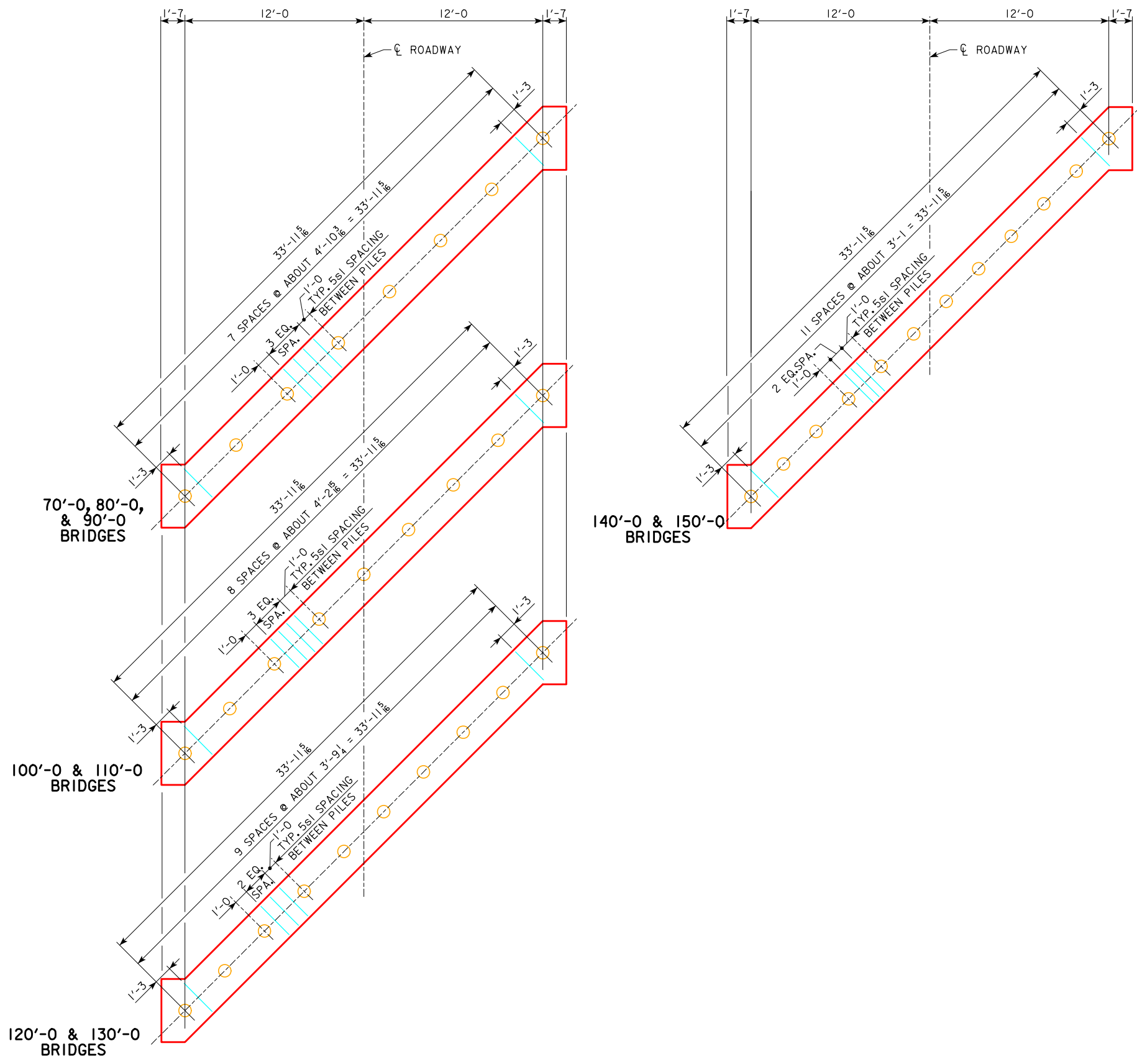
- THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.
- DETAILS ON THIS SHEET ARE TO BE USED ONLY WHEN ABUTMENTS ARE PLACED ON TIMBER PILES.
- THE MINIMUM CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.
- TIMBER PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS. TIMBER PILES SHALL NOT BE DRIVEN TO MORE THAN 160 TONS.
- ALL REINFORCING STEEL IS TO BE GRADE 60.
- ABUTMENT PILING WAS DESIGNED FOR HL-93 LOADING WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.



DETAIL A

| | | |
|---|------------------------------------|---|
| <p>08-2022 LATEST REVISION DATE</p> | <p>APPROVED BY BRIDGE ENGINEER</p> | <p>IOWADOT</p> <p>STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES</p> <p>CONTINUOUS CONCRETE SLAB BRIDGES</p> <p>NOVEMBER, 2006</p> |
| <p>ABUTMENT DETAILS</p> <p>45° SKEW - TIMBER PILING</p> | | <p>J24-31-06</p> |

REVISED 06-13 - REVISION FOR LRFD PILE DESIGN.
 REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.



PILE PLAN - 45° SKEW
WOOD PILING

| NUMBER OF PILES AND ABUTMENT DESIGN LOADS | | | | | | | | | |
|---|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| BRIDGE LENGTH | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
| PILING - NUMBER | 8 | 8 | 8 | 9 | 9 | 10 | 10 | 12 | 12 |
| PU, STRENGTH I DESIGN LOAD - KIPS | 379 | 401 | 421 | 448 | 474 | 504 | 532 | Δ 623 | Δ 655 |

Δ INCLUDES DYNAMIC LOAD ALLOWANCE
 NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

| | | | |
|---------------------------------|---------------------------------|--|------------------|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| | | ABUTMENT DETAILS 45° SKEW - TIMBER PILING | J24-32-06 |
| | | | |

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 | | |
| 8r1 | ABUTMENT FOOTING LONGITUDINAL | | 26'-10" | 7 | 502 | 7 | 502 | 7 | 502 | 7 | 502 | 7 | 502 | 7 | 502 | 7 | 502 | 7 | 502 | | |
| 5s1 | ABUTMENT FOOTING HOOPS | | 11'-0" | 22 | 252 | 22 | 252 | 22 | 252 | 25 | 287 | 25 | 287 | 20 | 229 | 20 | 229 | 22 | 252 | 22 | 252 |
| 6+1 | FOOTING TO SLAB DOWELS | | 5'-0" | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 |
| 6+2 | FOOTING TO SLAB DOWELS | | 5'-7" | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 |
| #2 | PILE SPIRAL | | 38'-6" | 7 | 45 | 7 | 45 | 7 | 45 | 8 | 51 | 8 | 51 | 9 | 58 | 9 | 58 | 10 | 64 | 10 | 64 |
| | SPIRAL SPACERS, L _{1/8} x 1/8 x 0.70 | | 1'-10" | 21 | 27 | 21 | 27 | 21 | 27 | 24 | 31 | 24 | 31 | 27 | 35 | 27 | 35 | 30 | 39 | 30 | 39 |
| REINFORCING STEEL - TOTAL (LBS.) | | | | 1303 | 1303 | 1303 | 1303 | 1348 | 1348 | 1301 | 1301 | 1334 | 1334 | | | | | | | | |

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 | |
| 8r2 | ABUTMENT FOOTING LONGITUDINAL | | 27'-8" | 7 | 517 | 7 | 517 | 7 | 517 | 7 | 517 | 7 | 517 | 7 | 517 | 7 | 517 | 7 | 517 | |
| 5s1 | ABUTMENT FOOTING HOOPS | | 11'-0" | 24 | 275 | 24 | 275 | 21 | 241 | 21 | 241 | 24 | 275 | 24 | 275 | 18 | 207 | 18 | 207 | |
| 5s2 | ABUTMENT FOOTING HOOPS | | 11'-3" | 4 | 47 | 4 | 47 | 4 | 47 | 4 | 47 | 4 | 47 | 4 | 47 | 4 | 47 | 4 | 47 | |
| 6+1 | FOOTING TO SLAB DOWELS | | 5'-0" | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | |
| 6+2 | FOOTING TO SLAB DOWELS | | 5'-7" | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | |
| #2 | PILE SPIRAL | | 38'-6" | 7 | 45 | 7 | 45 | 8 | 51 | 8 | 51 | 9 | 58 | 9 | 58 | 10 | 64 | 10 | 64 | |
| | SPIRAL SPACERS, L _{1/8} x 1/8 x 0.70 | | 1'-10" | 21 | 27 | 21 | 27 | 24 | 31 | 24 | 31 | 27 | 35 | 27 | 35 | 30 | 39 | 30 | 39 | |
| REINFORCING STEEL - TOTAL (LBS.) | | | | 1388 | 1388 | 1364 | 1364 | 1364 | 1364 | 1409 | 1409 | 1351 | 1351 | | | | | | | |

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 |
| 8r2 | ABUTMENT FOOTING LONGITUDINAL | | 30'-7" | 7 | 572 | 7 | 572 | 7 | 572 | 7 | 572 | 7 | 572 | 7 | 572 | 7 | 572 | 7 | 572 |
| 5s1 | ABUTMENT FOOTING HOOPS | | 11'-0" | 24 | 275 | 24 | 275 | 21 | 241 | 21 | 241 | 24 | 275 | 24 | 275 | 20 | 229 | 22 | 252 |
| 5s2 | ABUTMENT FOOTING HOOPS | | 11'-11" | 4 | 50 | 4 | 50 | 4 | 50 | 4 | 50 | 4 | 50 | 4 | 50 | 4 | 50 | 4 | 50 |
| 6+1 | FOOTING TO SLAB DOWELS | | 5'-0" | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 |
| 6+2 | FOOTING TO SLAB DOWELS | | 5'-7" | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 |
| #2 | PILE SPIRAL | | 38'-6" | 7 | 45 | 7 | 45 | 8 | 51 | 8 | 51 | 9 | 58 | 9 | 58 | 10 | 64 | 11 | 77 |
| | SPIRAL SPACERS, L _{1/8} x 1/8 x 0.70 | | 1'-10" | 21 | 27 | 21 | 27 | 24 | 31 | 24 | 31 | 27 | 35 | 27 | 35 | 30 | 39 | 33 | 42 |
| REINFORCING STEEL - TOTAL (LBS.) | | | | 1446 | 1446 | 1422 | 1422 | 1467 | 1467 | 1512 | 1441 | 1474 | | | | | | | |

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 |
| 8r2 | ABUTMENT FOOTING LONGITUDINAL | | 36'-9" | 7 | 687 | 7 | 687 | 7 | 687 | 7 | 687 | 7 | 687 | 7 | 687 | 7 | 687 | 7 | 687 |
| 5s1 | ABUTMENT FOOTING HOOPS | | 11'-0" | 28 | 321 | 28 | 321 | 28 | 321 | 32 | 367 | 32 | 367 | 27 | 310 | 27 | 310 | 33 | 379 |
| 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 DOWELS | | 5'-0" | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 |
| 6+2 | FOOTING TO SLAB DOWELS | | 5'-7" | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 |
| #2 | PILE SPIRAL | | 38'-6" | 8 | 51 | 8 | 51 | 8 | 51 | 9 | 58 | 9 | 58 | 10 | 64 | 12 | 77 | 12 | 77 |
| | SPIRAL SPACERS, L _{1/8} x 1/8 x 0.70 | | 1'-10" | 24 | 31 | 24 | 31 | 24 | 31 | 27 | 35 | 27 | 35 | 30 | 39 | 36 | 46 | 36 | 46 |
| REINFORCING STEEL - TOTAL (LBS.) | | | | 1623 | 1623 | 1623 | 1680 | 1680 | 1633 | 1633 | 1722 | 1722 | | | | | | | |

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. | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 8.5 | 8.5 | 8.4 | 8.4 | |
| REINFORCING STEEL | LBS. | 1303 | 1303 | 1303 | 1348 | 1348 | 1301 | 1301 | 1334 | 1334 | |
| WOOD PILES (TREATED) | NO. | 7 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | |
| PREBORE HOLES | FT. | - | - | - | - | - | - | - | 100 | 100 | |

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. | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.8 | 8.8 | 8.7 | 8.7 | |
| REINFORCING STEEL | LBS. | 1388 | 1388 | 1364 | 1364 | 1364 | 1409 | 1409 | 1351 | 1351 | |
| WOOD PILES (TREATED) | NO. | 7 | 7 | 8 | 8 | 8 | 9 | 9 | 10 | 10 | |
| PREBORE HOLES | FT. | - | - | - | - | - | - | - | 100 | 100 | |

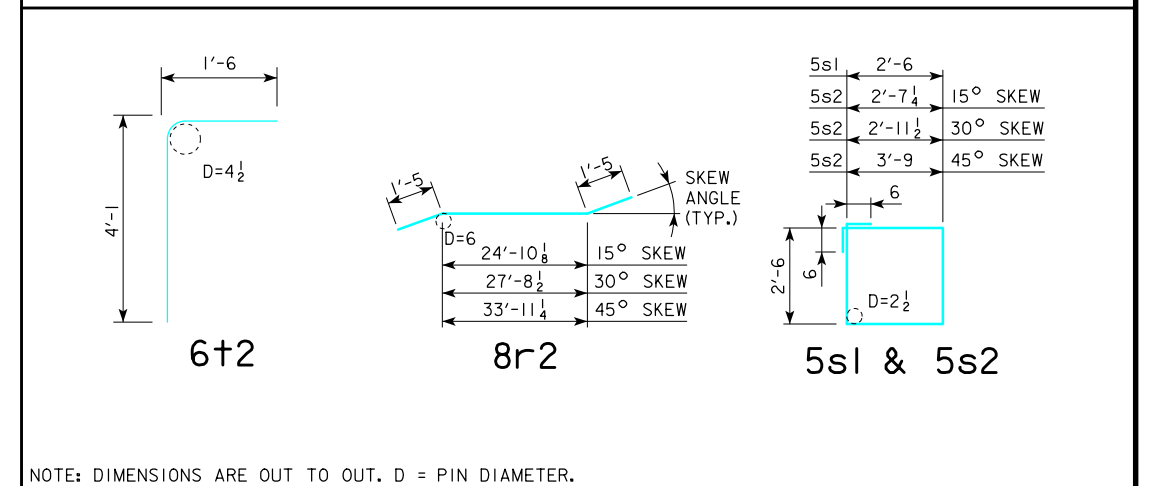
ESTIMATED QUANTITIES - ONE ABUT. - 30° SKEW

| 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. | 10.0 | 10.0 | 10.0 | 10.0 | 9.9 | 9.9 | 9.8 | 9.8 | 9.7 | |
| REINFORCING STEEL | LBS. | 1446 | 1446 | 1422 | 1422 | 1467 | 1467 | 1512 | 1441 | 1474 | |
| WOOD PILES (TREATED) | NO. | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 11 | 12 | |
| PREBORE HOLES | FT. | - | - | - | - | - | - | - | 110 | 120 | |

ESTIMATED QUANTITIES - ONE ABUT. - 45° 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. | 12.3 | 12.3 | 12.3 | 12.3 | 12.3 | 12.2 | 12.2 | 12.1 | 12.1 | |
| REINFORCING STEEL | LBS. | 1623 | 1623 | 1623 | 1680 | 1680 | 1633 | 1633 | 1722 | 1722 | |
| WOOD PILES (TREATED) | NO. | 8 | 8 | 8 | 9 | 9 | 10 | 10 | 12 | 12 | |
| PREBORE HOLES | FT. | - | - | - | - | - | - | - | 120 | 120 | |

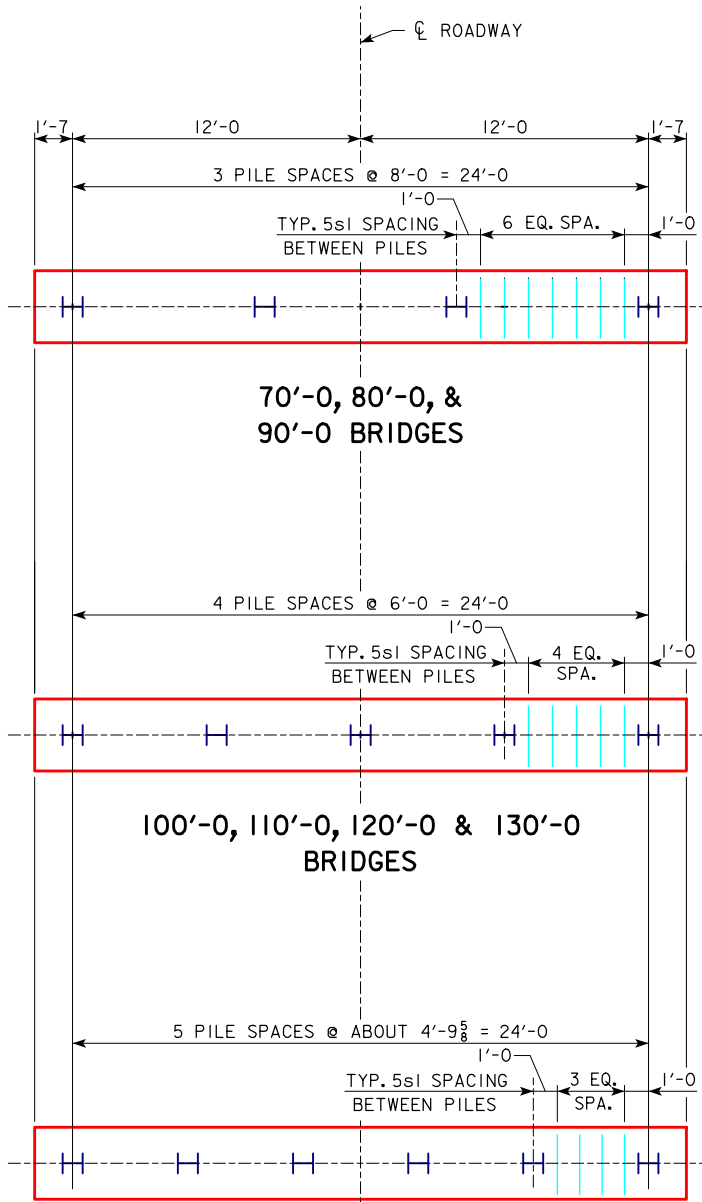
BENT BAR DETAILS



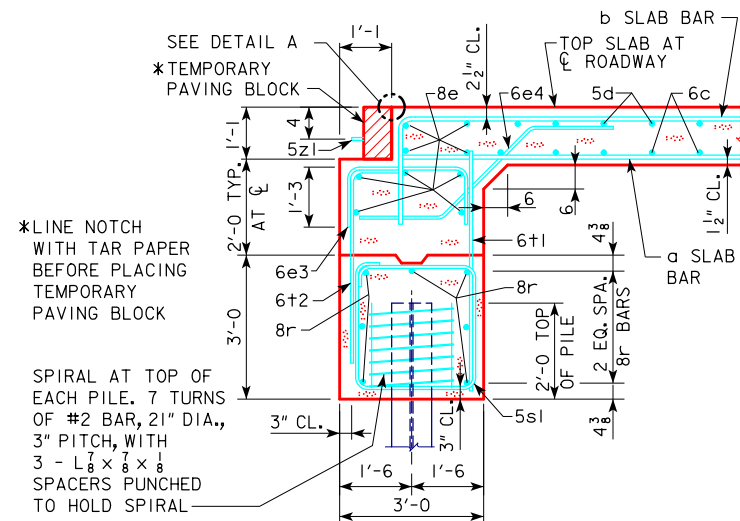
REVISED 07-09 - CONCRETE QUANTITIES CHANGED.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

| | |
|--|--|
| 08-2022 LATEST REVISION DATE APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 |
| | ABUTMENT DETAILS TIMBER PILING |
| | J24-33-06 |

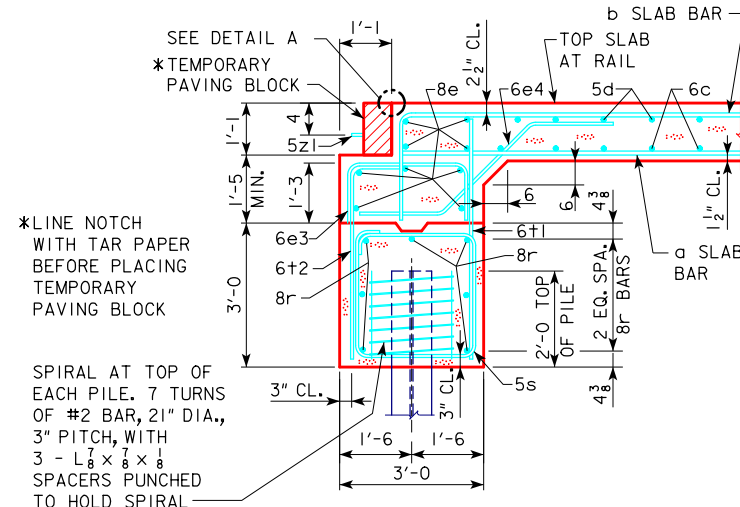
REVISOR 06-13 - REVISION FOR LRFD PILE DESIGN. REVISOR 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).



PILE PLAN - 0° SKEW STEEL PILING



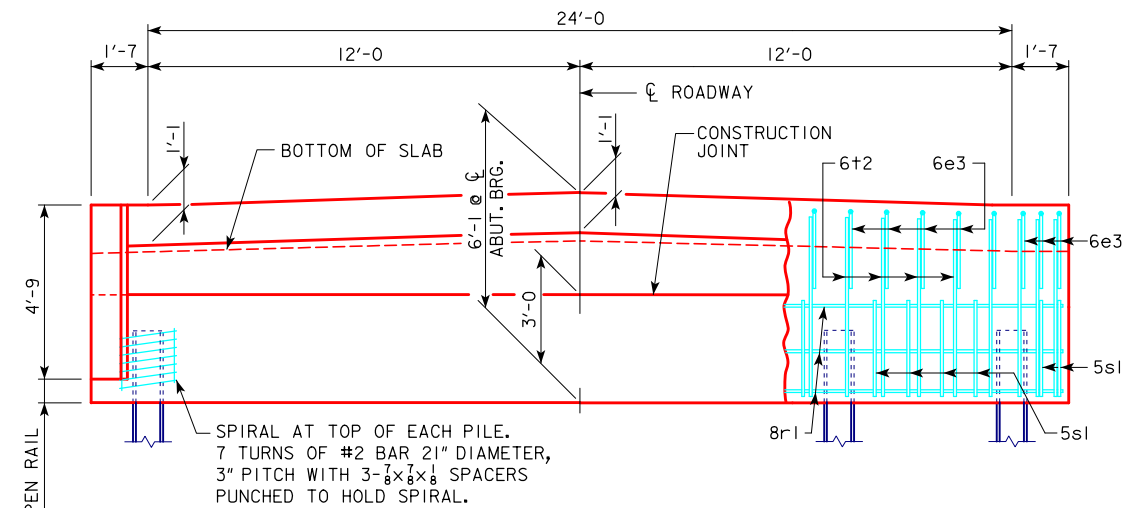
SECTION NORMAL TO ABUTMENT AT ROADWAY



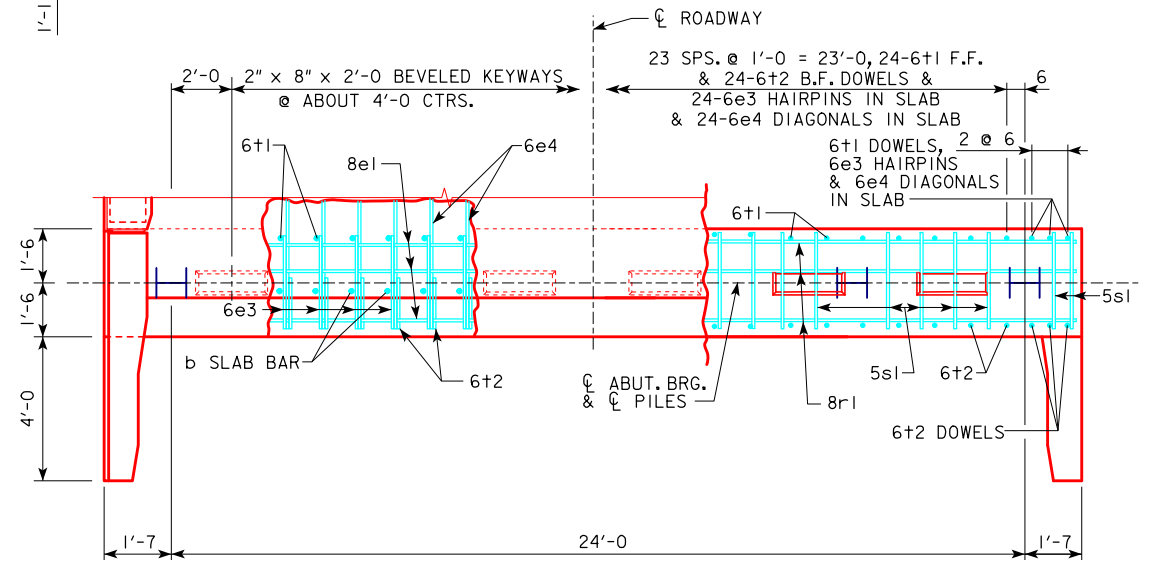
SECTION NORMAL TO ABUTMENT AT GUTTERLINE

ABUTMENT NOTES:

- ALL PILING HP 10x42.
- THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.
- DETAILS ON THIS SHEET ARE TO BE USED ONLY WHEN ABUTMENTS ARE PLACED ON STEEL PILES. IF ROCK IS ENCOUNTERED CLOSER THAN 12' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.
- THE MINIMUM CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.
- STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.
- ALL REINFORCING STEEL IS TO BE GRADE 60.
- ABUTMENT PILING WAS DESIGNED FOR HL-93 LOADING WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.



REAR ELEVATION

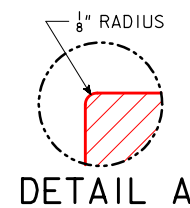


PLAN VIEW

NOTE: WING REINFORCING AND RAIL NOT SHOWN.
6e3, 6e4, AND 8e ARE INCLUDED WITH SUPERSTRUCTURE QUANTITIES.

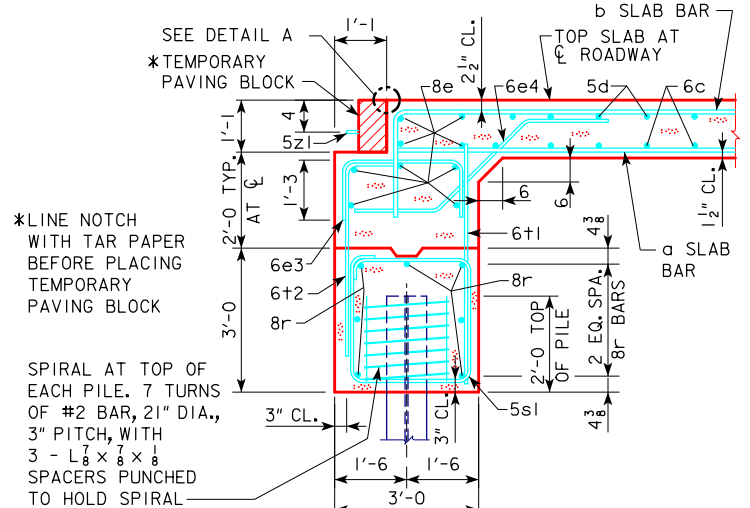
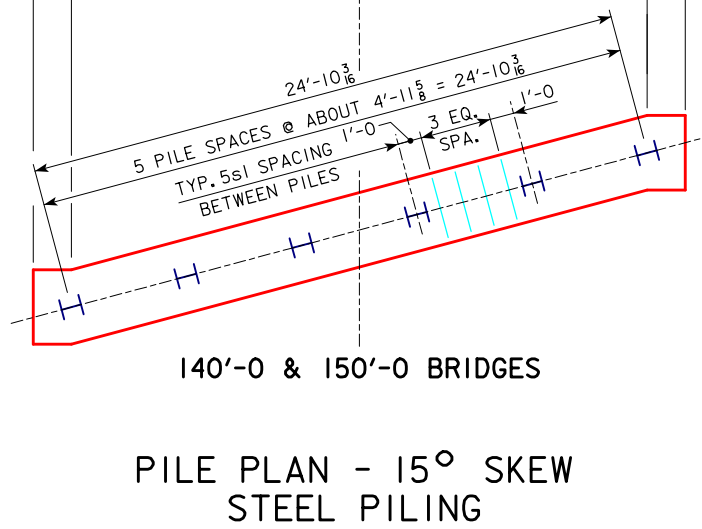
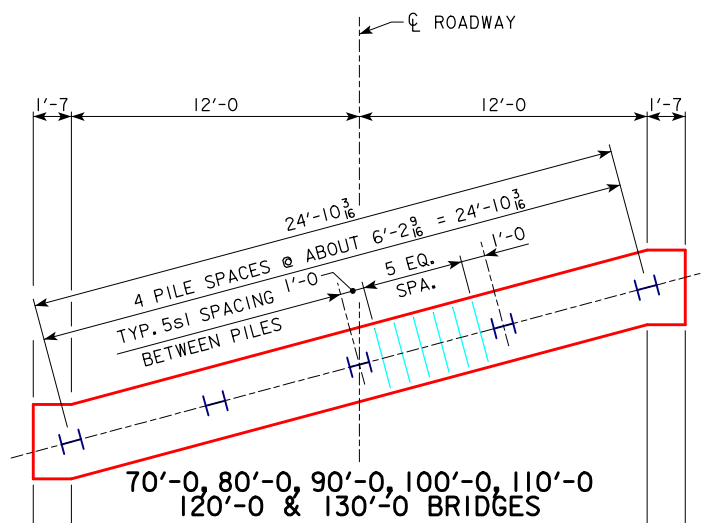
| NUMBER OF PILES AND ABUTMENT DESIGN LOADS | | | | | | | | | |
|---|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| BRIDGE LENGTH | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
| PILING - NUMBER | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 |
| PU, STRENGTH I DESIGN LOAD - KIPS | 345 | 366 | 387 | 414 | 439 | 468 | 496 | Δ 587 | Δ 619 |

Δ INCLUDES DYNAMIC LOAD ALLOWANCE
NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

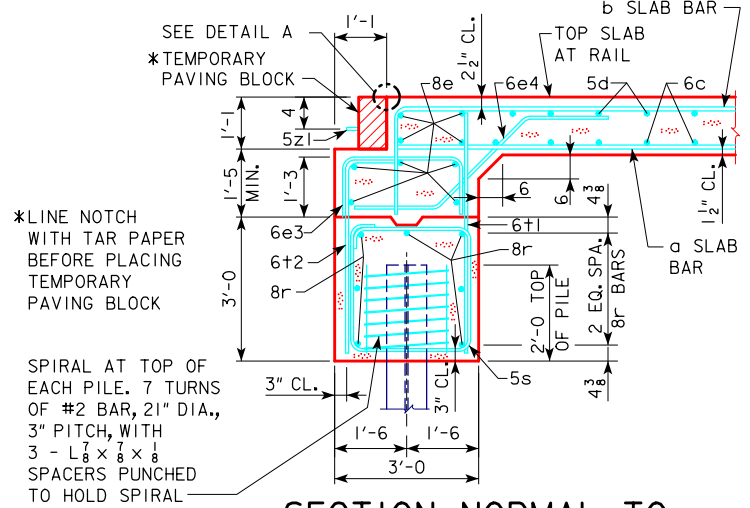


| | | |
|--|--|------------------|
| 08-2022 LATEST REVISION DATE APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| | ABUTMENT DETAILS 0° SKEW - STEEL PILING | J24-34-06 |

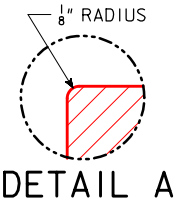
REVISED 06-13 - REVISION FOR LRFD PILE DESIGN.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).



SECTION NORMAL TO ABUTMENT AT CL

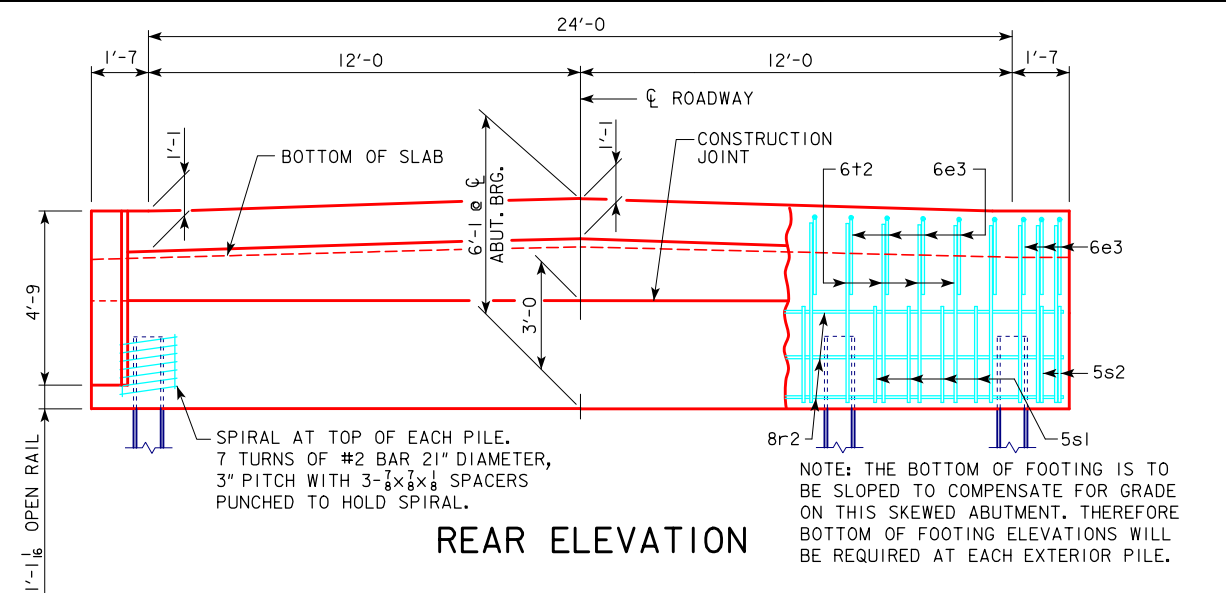


SECTION NORMAL TO ABUTMENT AT GUTTERLINE

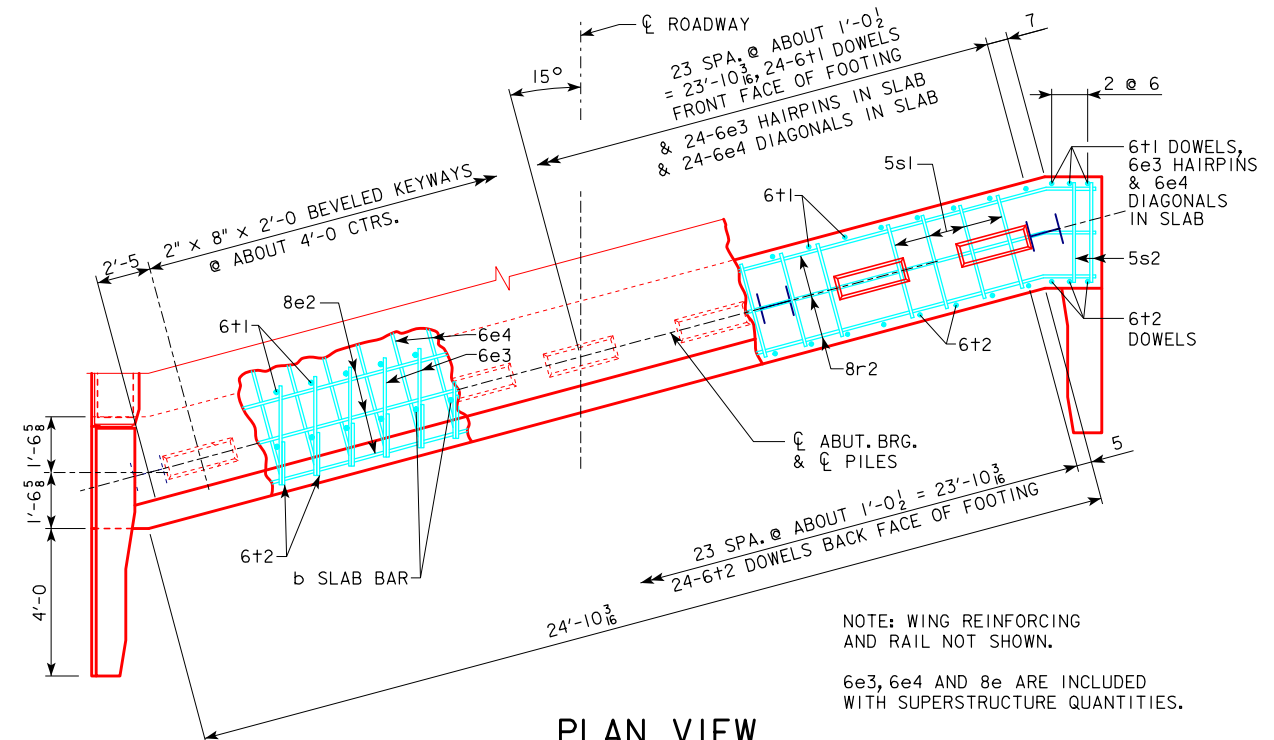


ABUTMENT NOTES:

- ALL PILING HP 10x42.
- THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.
- DETAILS ON THIS SHEET ARE TO BE USED ONLY WHEN ABUTMENTS ARE PLACED ON STEEL PILES. IF ROCK IS ENCOUNTERED CLOSER THAN 12' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.
- THE MINIMUM CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.
- STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.
- ALL REINFORCING STEEL IS TO BE GRADE 60.
- ABUTMENT PILING WAS DESIGNED FOR HL-93 LOADING WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.



REAR ELEVATION



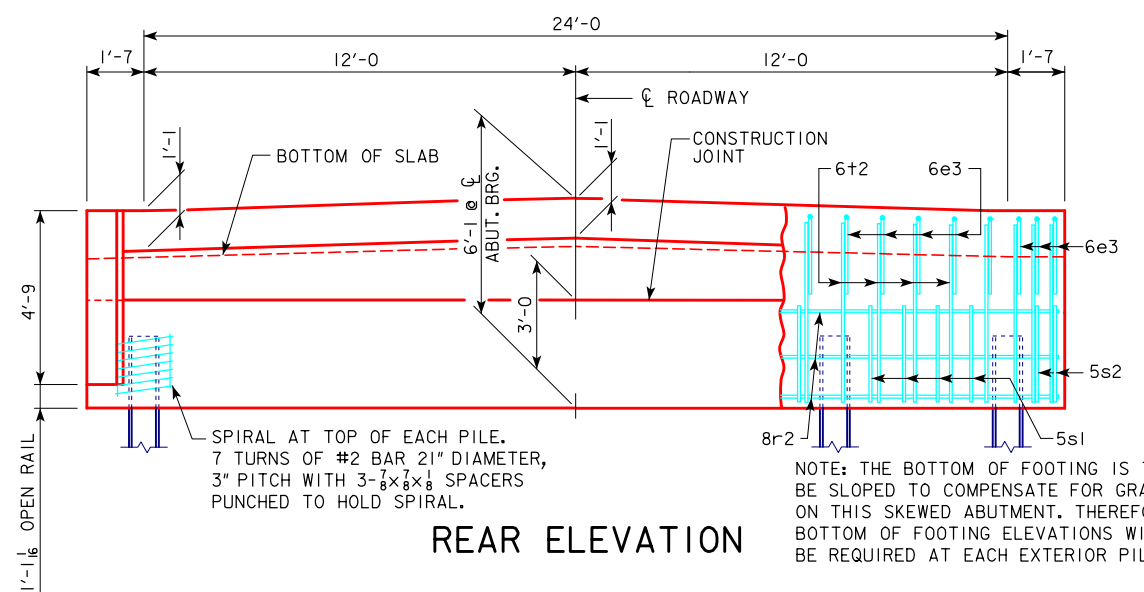
PLAN VIEW

| NUMBER OF PILES AND ABUTMENT DESIGN LOADS | | | | | | | | | |
|---|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| BRIDGE LENGTH | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
| PILING - NUMBER | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 |
| PU, STRENGTH I DESIGN LOAD - KIPS | 348 | 369 | 390 | 417 | 442 | 471 | 499 | Δ 590 | Δ 622 |

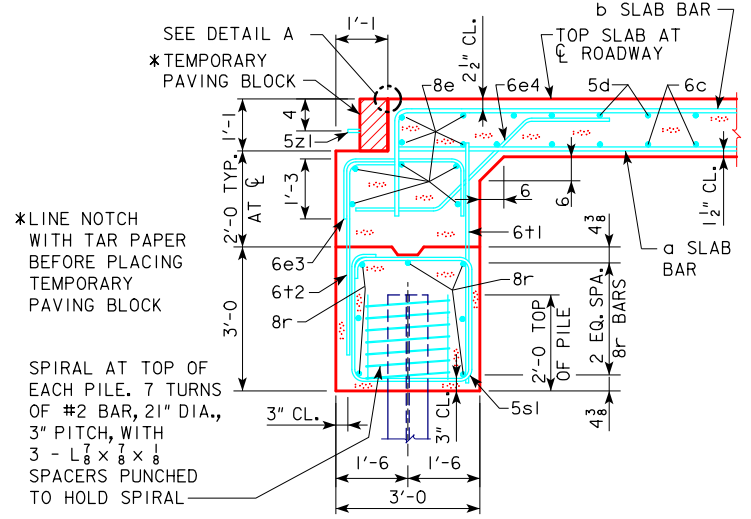
Δ INCLUDES DYNAMIC LOAD ALLOWANCE
NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

| | |
|--|--|
| 08-2022 LATEST REVISION DATE APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 |
| | ABUTMENT DETAILS 15° SKEW - STEEL PILING |
| | J24-35-06 |

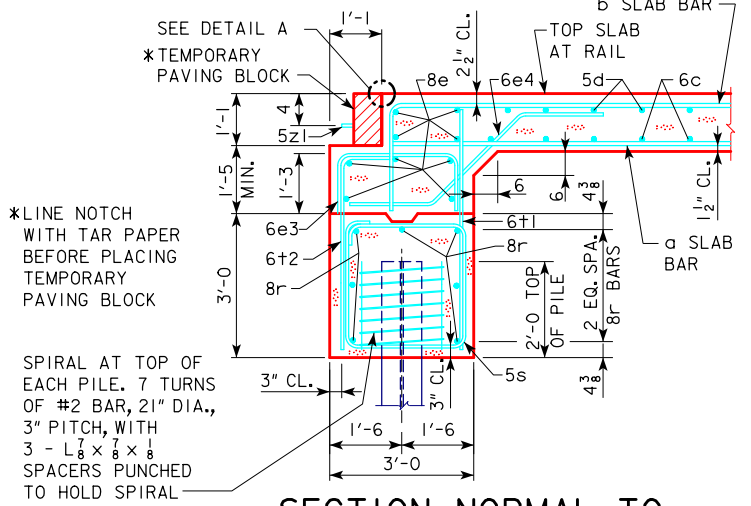
REVISION 06-13 - REVISION FOR LRED PILE DESIGN.
 REVISION 08-2022 - UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).



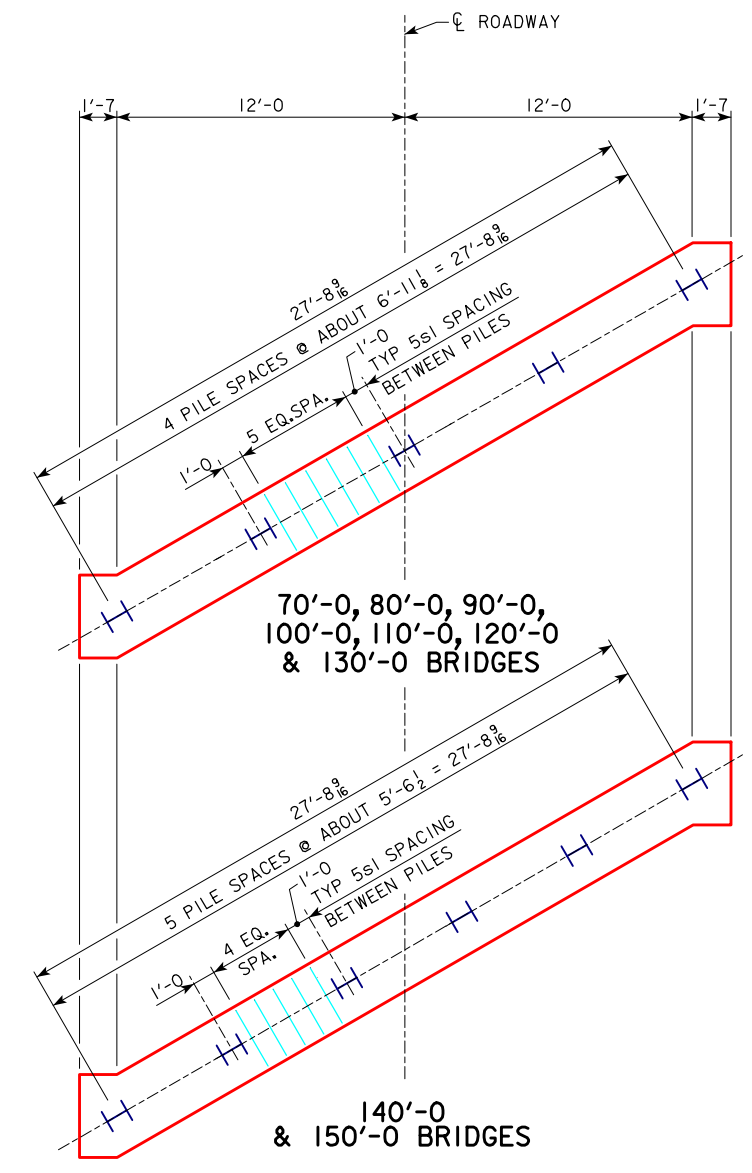
REAR ELEVATION



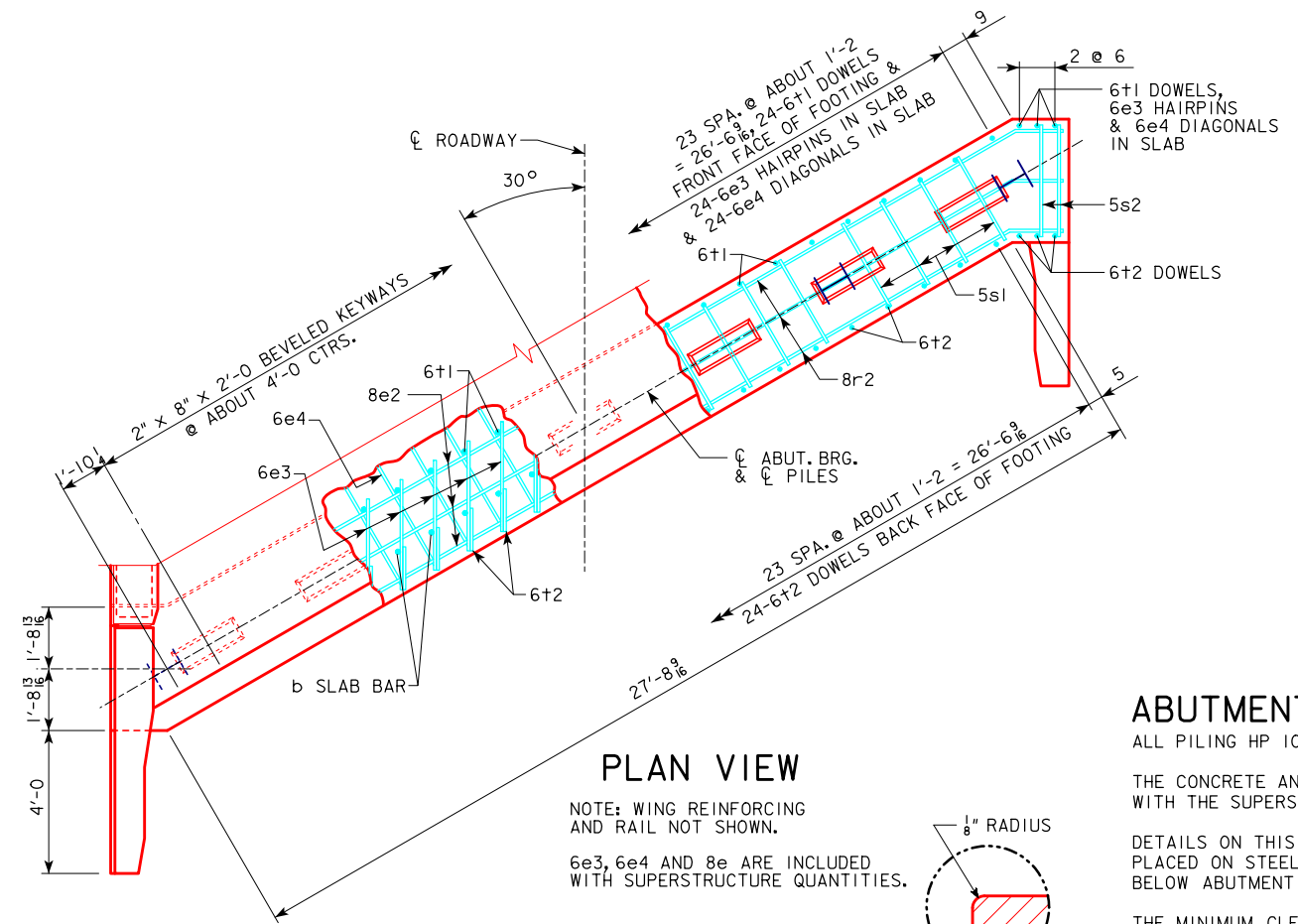
SECTION NORMAL TO ABUTMENT AT CL



SECTION NORMAL TO ABUTMENT AT GUTTERLINE

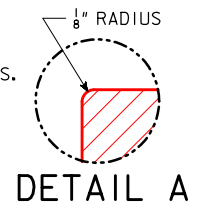


PILE PLAN - 30° SKEW STEEL PILING



PLAN VIEW

NOTE: WING REINFORCING AND RAIL NOT SHOWN.
 6e3, 6e4 AND 8e ARE INCLUDED WITH SUPERSTRUCTURE QUANTITIES.



DETAIL A

ABUTMENT NOTES:

- ALL PILING HP 10x42.
- THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.
- DETAILS ON THIS SHEET ARE TO BE USED ONLY WHEN ABUTMENTS ARE PLACED ON STEEL PILES. IF ROCK IS ENCOUNTERED CLOSER THAN 12' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.
- THE MINIMUM CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.
- STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.
- ALL REINFORCING STEEL IS TO BE GRADE 60.
- ABUTMENT PILING WAS DESIGNED FOR HL-93 LOADING WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.

| NUMBER OF PILES AND ABUTMENT DESIGN LOADS | | | | | | | | | |
|---|--------|--------|--------|---------|---------|---------|---------|---------|---------|
| BRIDGE LENGTH | 70'-0" | 80'-0" | 90'-0" | 100'-0" | 110'-0" | 120'-0" | 130'-0" | 140'-0" | 150'-0" |
| PILING - NUMBER | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 |
| PU, STRENGTH I DESIGN LOAD - KIPS | 358 | 379 | 400 | 427 | 452 | 481 | 510 | Δ 601 | Δ 632 |

Δ INCLUDES DYNAMIC LOAD ALLOWANCE
 NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

08-2022
 LATEST REVISION DATE

STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES

CONTINUOUS CONCRETE SLAB BRIDGES

NOVEMBER, 2006

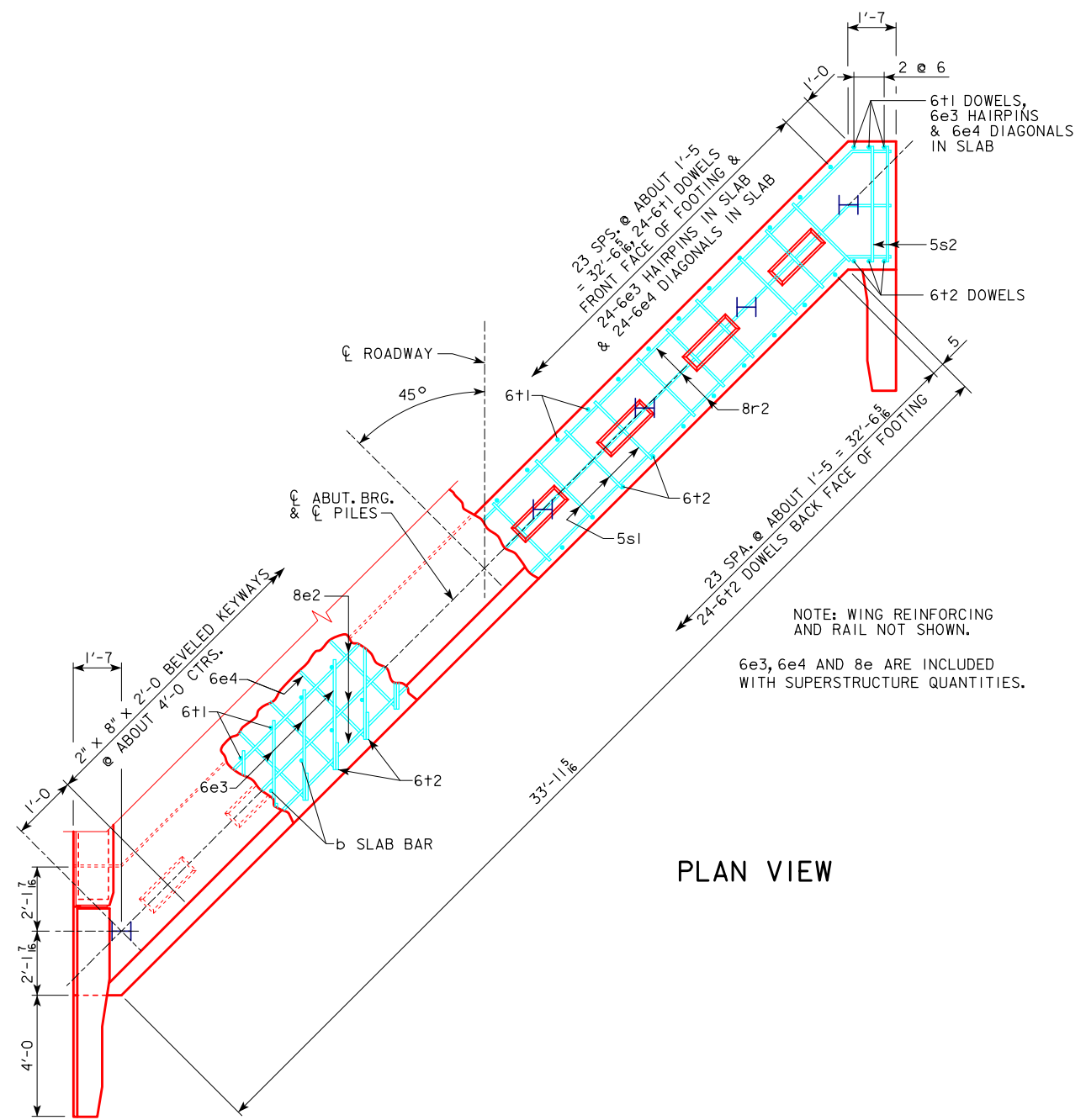
APPROVED BY BRIDGE ENGINEER

ABUTMENT DETAILS

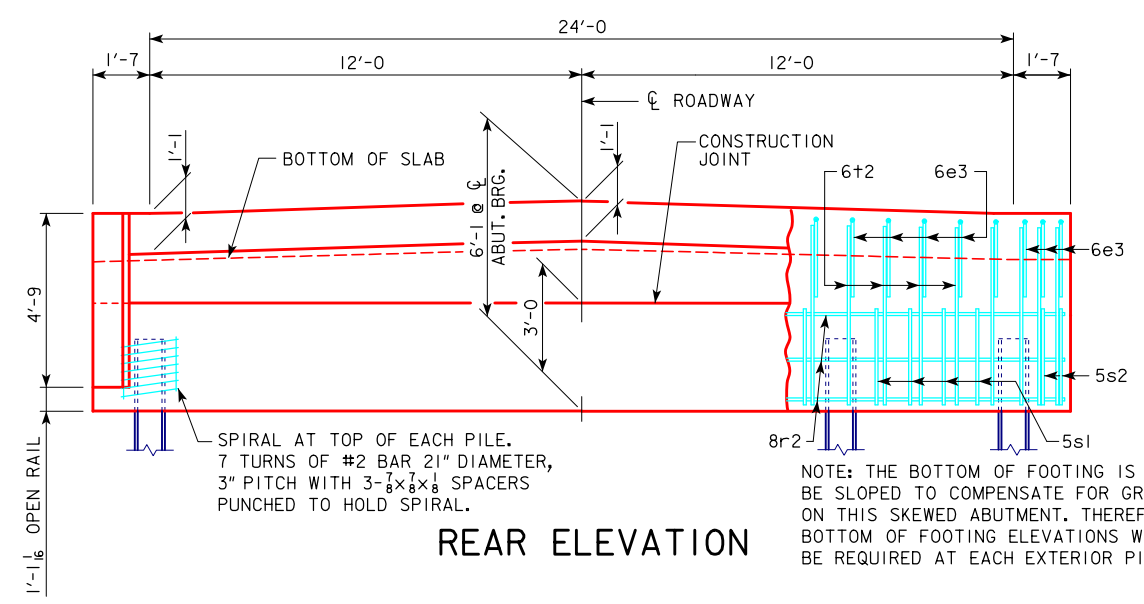
30° SKEW - STEEL PILING

J24-36-06

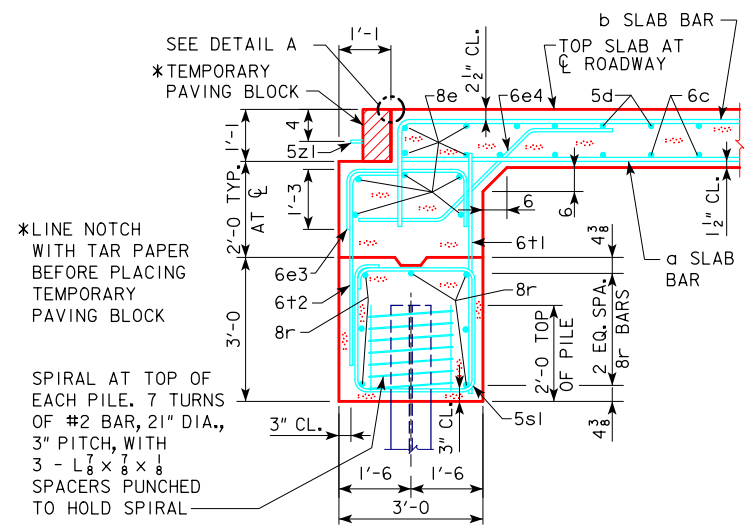
REVISED 06-13 - REVISION FOR LRFD PILE DESIGN.
 REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).



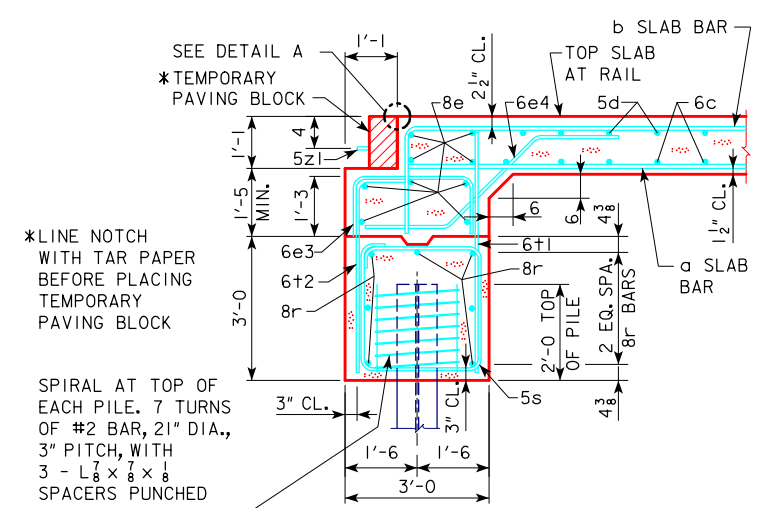
PLAN VIEW



REAR ELEVATION



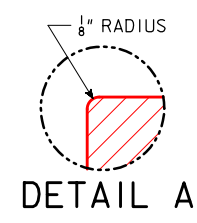
SECTION NORMAL TO ABUTMENT AT CL



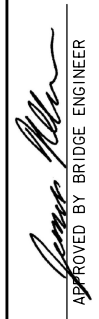

SECTION NORMAL TO ABUTMENT AT GUTTERLINE

ABUTMENT NOTES:

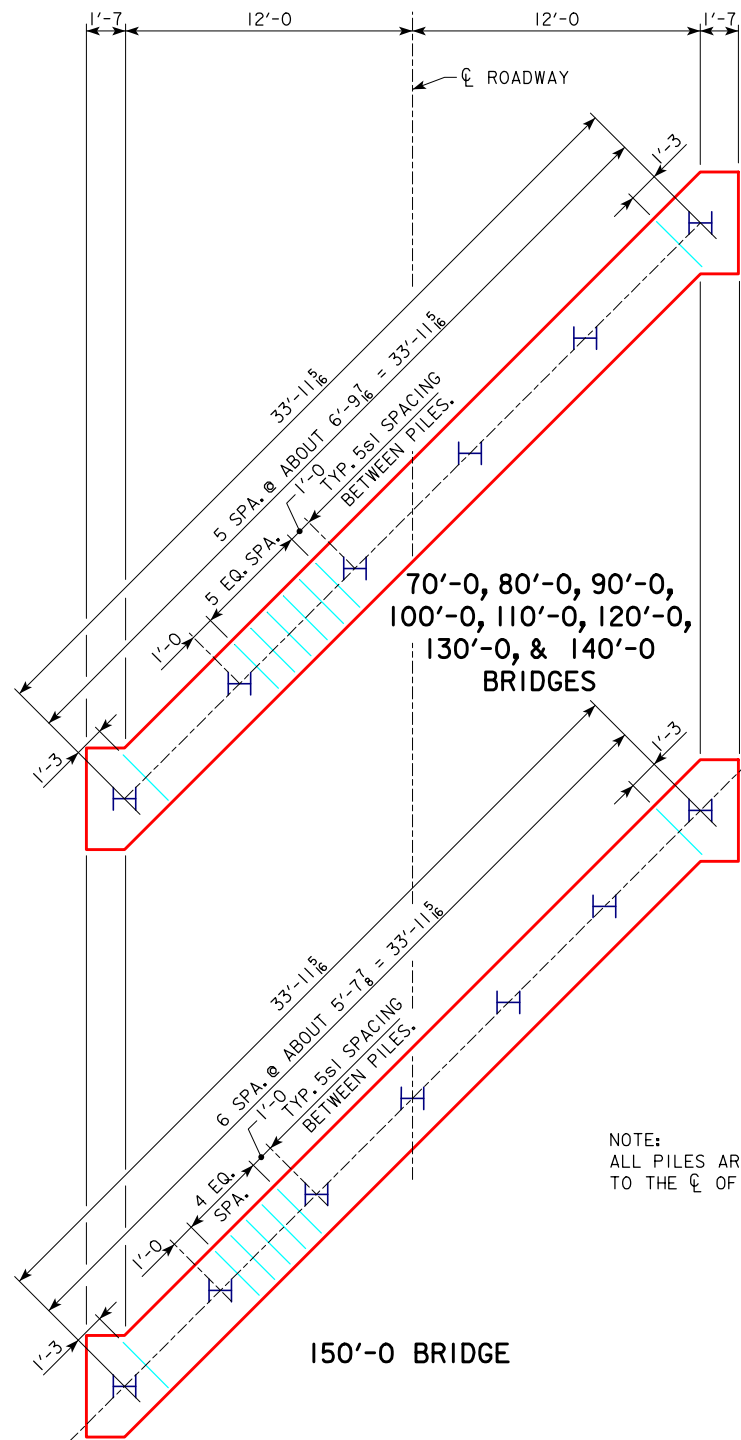
- ALL PILING HP 10x42.
- THE CONCRETE AND REINFORCING STEEL FOR THE WINGS IS INCLUDED WITH THE SUPERSTRUCTURE.
- DETAILS ON THIS SHEET ARE TO BE USED ONLY WHEN ABUTMENTS ARE PLACED ON STEEL PILES. IF ROCK IS ENCOUNTERED CLOSER THAN 12' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.
- THE MINIMUM CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO NEAR REINFORCING BAR IS TO BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.
- STEEL ABUTMENT PILES SHALL BE DRIVEN TO FULL PENETRATION IF PRACTICABLE BUT IN NO CASE TO A BEARING VALUE LESS THAN SHOWN IN DESIGN PLANS.
- ALL REINFORCING STEEL IS TO BE GRADE 60.
- ABUTMENT PILING WAS DESIGNED FOR HL-93 LOADING WITH AN ALLOWANCE FOR 20 LBS. PER SQ. FT. FUTURE WEARING SURFACE.



DETAIL A

| | | |
|---|---|-----------|
| 08-2022 LATEST REVISION DATE  APPROVED BY BRIDGE ENGINEER |  STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| | ABUTMENT DETAILS 45° SKEW - STEEL PILING | J24-37-06 |

REVISED 06-13 - REVISION FOR LRFD PILE DESIGN.
 REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.




NOTE:
 ALL PILES ARE TO BE ORIENTED WITH WEBS PERPENDICULAR
 TO THE ϕ OF THE ROADWAY AS SHOWN.

**PILE PLAN - 45° SKEW
 STEEL PILING**

NOTE: ALL PILING HP 10x42

| NUMBER OF PILES AND ABUTMENT DESIGN LOADS | | | | | | | | | |
|---|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| BRIDGE LENGTH | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
| PILING - NUMBER | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 7 |
| PU, STRENGTH I DESIGN LOAD - KIPS | 379 | 401 | 421 | 448 | 474 | 504 | 532 | Δ 623 | Δ 655 |

Δ INCLUDES DYNAMIC LOAD ALLOWANCE
 NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

| | | |
|--|--|------------------|
| 08-2022 LATEST REVISION DATE <i>[Signature]</i> APPROVED BY BRIDGE ENGINEER |  STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| | ABUTMENT DETAILS 45° SKEW - STEEL PILING | J24-38-06 |

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 |
| 8r1 | ABUTMENT FOOTING LONGITUDINAL | | 26'-10 | 7 | 502 | 7 | 502 | 7 | 502 | 7 | 502 | 7 | 502 |
| 5s1 | ABUTMENT FOOTING HOOPS | | 11'-0 | 25 | 287 | 25 | 287 | 25 | 287 | 24 | 275 | 24 | 275 |
| 6+1 | FOOTING TO SLAB DOWELS | | 5'-0 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 |
| 6+2 | FOOTING TO SLAB DOWELS | | 5'-7 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 |
| #2 | PILE SPIRAL | | 38'-6 | 4 | 26 | 4 | 26 | 4 | 26 | 5 | 32 | 5 | 32 |
| | SPIRAL SPACERS, L $\frac{1}{8}$ x $\frac{1}{8}$ x $\frac{1}{8}$ x 0.70 | | 1'-10 | 12 | 15 | 12 | 15 | 12 | 15 | 15 | 19 | 15 | 19 |
| REINFORCING STEEL - TOTAL (LBS.) | | | | | 1307 | 1307 | 1307 | 1305 | 1305 | 1305 | 1305 | 1316 | 1316 |

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 |
| 8r2 | ABUTMENT FOOTING LONGITUDINAL | | 27'-8 | 7 | 517 | 7 | 517 | 7 | 517 | 7 | 517 | 7 | 517 |
| 5s1 | ABUTMENT FOOTING HOOPS | | 11'-0 | 24 | 275 | 24 | 275 | 24 | 275 | 24 | 275 | 20 | 229 |
| 5s2 | ABUTMENT FOOTING HOOPS | | 11'-3 | 4 | 47 | 4 | 47 | 4 | 47 | 4 | 47 | 4 | 47 |
| 6+1 | FOOTING TO SLAB DOWELS | | 5'-0 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 |
| 6+2 | FOOTING TO SLAB DOWELS | | 5'-7 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 |
| #2 | PILE SPIRAL | | 38'-6 | 5 | 32 | 5 | 32 | 5 | 32 | 5 | 32 | 6 | 39 |
| | SPIRAL SPACERS, L $\frac{1}{8}$ x $\frac{1}{8}$ x $\frac{1}{8}$ x 0.70 | | 1'-10 | 15 | 19 | 15 | 19 | 15 | 19 | 15 | 19 | 18 | 23 |
| REINFORCING STEEL - TOTAL (LBS.) | | | | | 1367 | 1367 | 1367 | 1367 | 1367 | 1367 | 1332 | 1332 | |

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 |
| 8r2 | ABUTMENT FOOTING LONGITUDINAL | | 30'-7 | 7 | 572 | 7 | 572 | 7 | 572 | 7 | 572 | 7 | 572 |
| 5s1 | ABUTMENT FOOTING HOOPS | | 11'-0 | 24 | 275 | 24 | 275 | 24 | 275 | 24 | 275 | 25 | 287 |
| 5s2 | ABUTMENT FOOTING HOOPS | | 11'-11 | 4 | 50 | 4 | 50 | 4 | 50 | 4 | 50 | 4 | 50 |
| 6+1 | FOOTING TO SLAB DOWELS | | 5'-0 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 |
| 6+2 | FOOTING TO SLAB DOWELS | | 5'-7 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 |
| #2 | PILE SPIRAL | | 38'-6 | 5 | 32 | 5 | 32 | 5 | 32 | 5 | 32 | 6 | 39 |
| | SPIRAL SPACERS, L $\frac{1}{8}$ x $\frac{1}{8}$ x $\frac{1}{8}$ x 0.70 | | 1'-10 | 15 | 19 | 15 | 19 | 15 | 19 | 15 | 19 | 18 | 23 |
| REINFORCING STEEL - TOTAL (LBS.) | | | | | 1425 | 1425 | 1425 | 1425 | 1425 | 1425 | 1448 | 1448 | |

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 |
| 8r2 | ABUTMENT FOOTING LONGITUDINAL | | 36'-9 | 7 | 687 | 7 | 687 | 7 | 687 | 7 | 687 | 7 | 687 |
| 5s1 | ABUTMENT FOOTING HOOPS | | 11'-0 | 30 | 344 | 30 | 344 | 30 | 344 | 30 | 344 | 30 | 344 |
| 5s2 | ABUTMENT FOOTING HOOPS | | 13'-6 | 4 | 56 | 4 | 56 | 4 | 56 | 4 | 56 | 4 | 56 |
| 6+1 | FOOTING TO SLAB DOWELS | | 5'-0 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 | 30 | 225 |
| 6+2 | FOOTING TO SLAB DOWELS | | 5'-7 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 | 30 | 252 |
| #2 | PILE SPIRAL | | 38'-6 | 6 | 39 | 6 | 39 | 6 | 39 | 6 | 39 | 7 | 45 |
| | SPIRAL SPACERS, L $\frac{1}{8}$ x $\frac{1}{8}$ x $\frac{1}{8}$ x 0.70 | | 1'-10 | 18 | 23 | 18 | 23 | 18 | 23 | 18 | 23 | 21 | 27 |
| REINFORCING STEEL - TOTAL (LBS.) | | | | | 1626 | 1626 | 1626 | 1626 | 1626 | 1626 | 1626 | 1636 | |

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. | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | |
| REINFORCING STEEL | LBS. | 1307 | 1307 | 1307 | 1305 | 1305 | 1305 | 1305 | 1316 | 1316 | |
| STEEL PILING HP 10x42 | NO. | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | |
| PREBORE HOLES | FT. | - | - | - | - | - | - | - | 60 | 60 | |

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. | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | |
| REINFORCING STEEL | LBS. | 1367 | 1367 | 1367 | 1367 | 1367 | 1367 | 1367 | 1332 | 1332 | |
| STEEL PILING HP 10x42 | NO. | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | |
| PREBORE HOLES | FT. | - | - | - | - | - | - | - | 60 | 60 | |

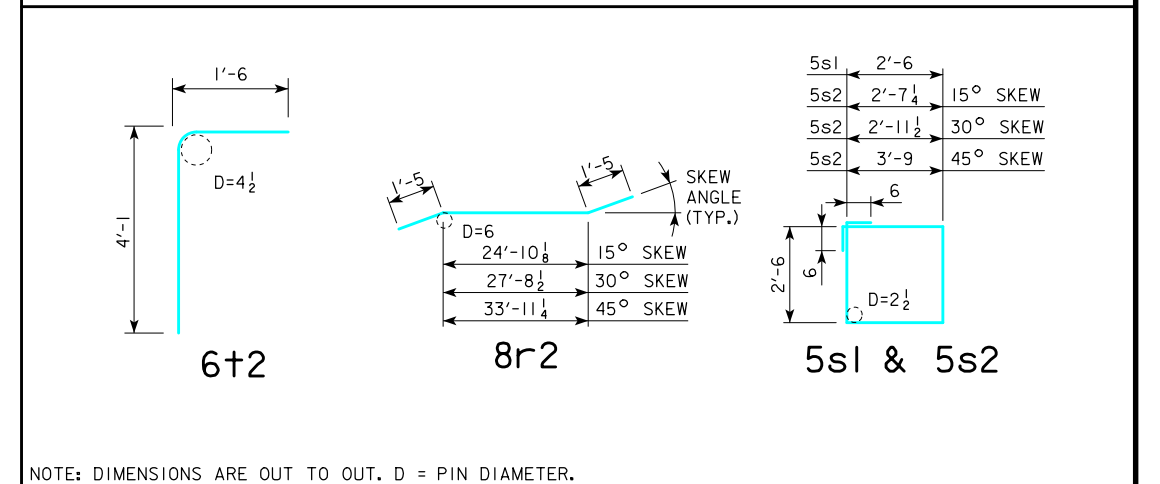
ESTIMATED QUANTITIES - ONE ABUT. - 30° SKEW

| 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. | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | |
| REINFORCING STEEL | LBS. | 1425 | 1425 | 1425 | 1425 | 1425 | 1425 | 1425 | 1448 | 1448 | |
| STEEL PILING HP 10x42 | NO. | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | |
| PREBORE HOLES | FT. | - | - | - | - | - | - | - | 60 | 60 | |

ESTIMATED QUANTITIES - ONE ABUT. - 45° 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. | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | |
| REINFORCING STEEL | LBS. | 1626 | 1626 | 1626 | 1626 | 1626 | 1626 | 1626 | 1626 | 1636 | |
| STEEL PILING HP 10x42 | NO. | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 7 | |
| PREBORE HOLES | FT. | - | - | - | - | - | - | - | 60 | 70 | |

BENT BAR DETAILS

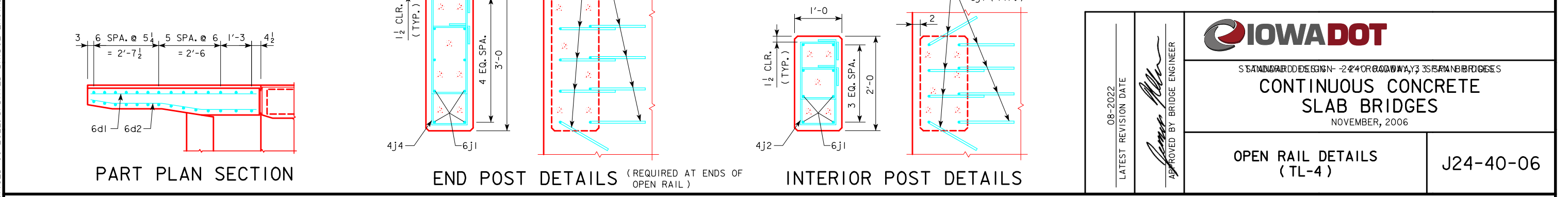
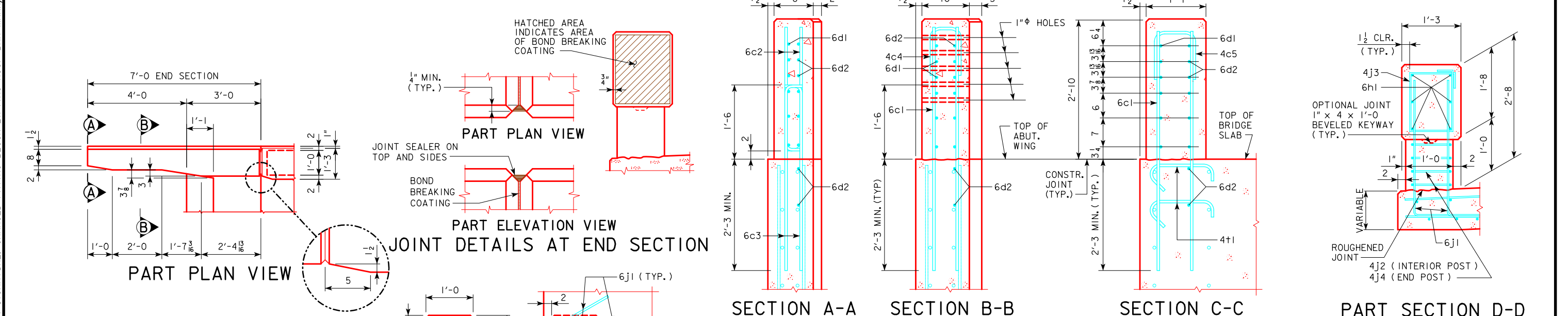
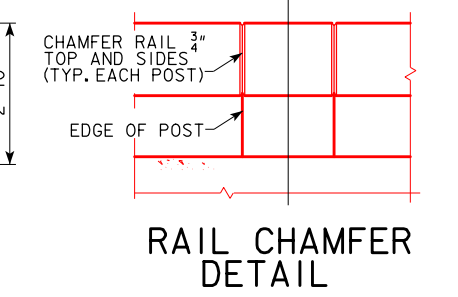
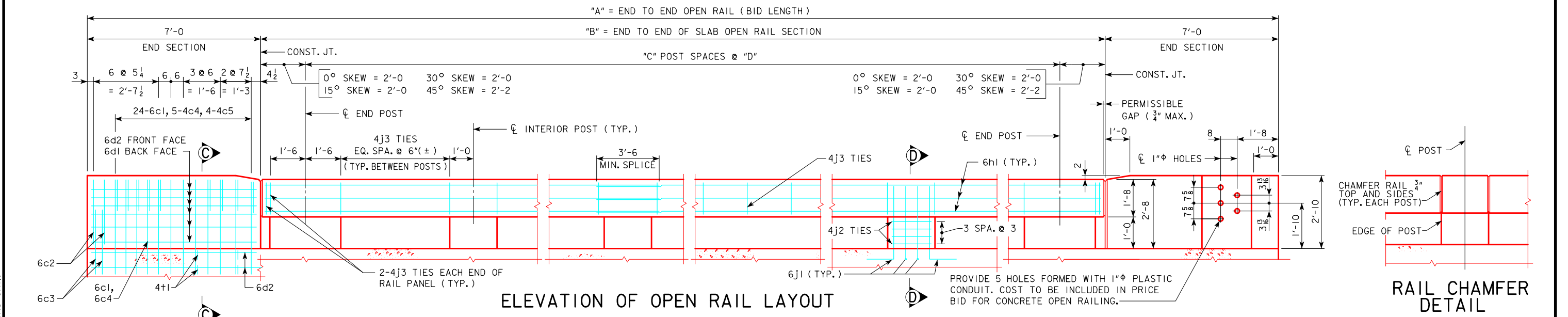


REVISED 07-09 - CONCRETE QUANTITIES CHANGED.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

| | | |
|---------------------------------|---------------------------------|--|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 |
| | | ABUTMENT DETAILS STEEL PILING |
| | | J24-39-06 |

TABLE OF OPEN RAIL DIMENSIONS AND NUMBERS

| CL-CL ABUT. BRG | | 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 | 8 | 8 | 8 | 8 | 10 | 10 | 10 | 10 | 11 | 11 | 11 | 11 | 12 | 12 | 12 | 12 | 13 | 13 | 13 | 13 | 15 | 15 | 15 | 15 | 16 | 16 | 16 | 16 | 17 | 17 | 17 | 17 | 18 | 18 | 18 | 18 |
| | D (FT.-IN.) | 7'-10 1/2 | 7'-10 11/16 | 7'-11 3/16 | 7'-11 7/8 | 7'-3 5/8 | 7'-3 3/4 | 7'-4 3/16 | 7'-4 11/16 | 7'-6 3/16 | 7'-6 11/16 | 7'-7 1/16 | 7'-7 9/16 | 7'-9 | 7'-9 1/8 | 7'-9 7/16 | 7'-9 15/16 | 7'-11 1/16 | 7'-11 3/16 | 7'-11 1/2 | 7'-11 5/8 | 7'-6 3/8 | 7'-6 1/2 | 7'-6 3/4 | 7'-7 1/8 | 7'-8 1/4 | 7'-8 5/16 | 7'-8 5/8 | 7'-8 15/16 | 7'-9 7/8 | 7'-9 15/16 | 7'-10 3/16 | 7'-10 1/2 | 7'-11 5/16 | 7'-11 3/8 | 7'-11 5/8 | 7'-11 15/16 |



08-2022
LATEST REVISION DATE

STANDARD DESIGN - 24' OR GREATER SPAN BRIDGES

CONTINUOUS CONCRETE
SLAB BRIDGES

NOVEMBER, 2006

APPROVED BY BRIDGE ENGINEER

OPEN RAIL DETAILS
(TL-4)

J24-40-06

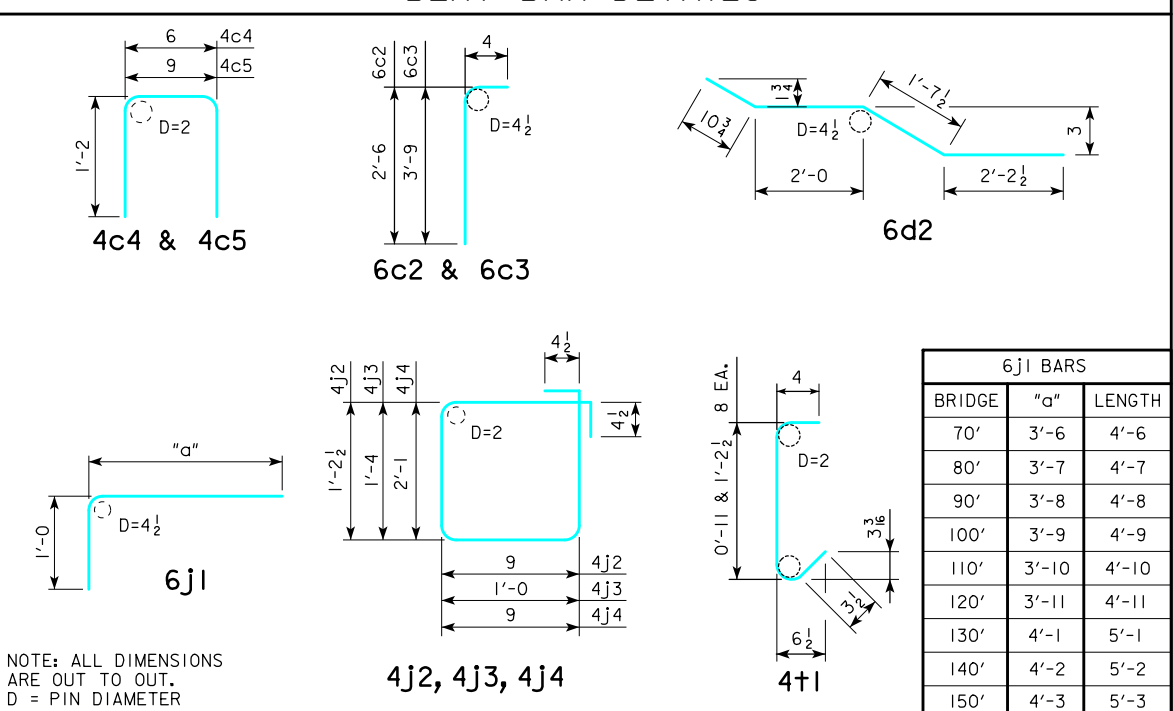
REVISED 12-08 - CHANGED END SECTION SHAPE AND REINFORCEMENT. RAIL DEPTH CHANGED TO 1'-8. REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. CHANGED PAVING BLOCK LIFTING HOOP BAR MARK, (WAS 5x1).

REINFORCING STEEL-TWO OPEN RAILS

| BRIDGE LENGTH | | | 70'-0 | | | 80'-0 | | | 90'-0 | | | 100'-0 | | | 110'-0 | | | 120'-0 | | | 130'-0 | | | 140'-0 | | | 150'-0 | | | | | |
|---|---------------------------|-------|----------------|----------|--------|-------|----------|--------|-------|----------|--------|--------|----------|--------|--------|----------|--------|--------|----------|--------|--------|----------|--------|--------|----------|--------|--------|----------|------|------|--|--|
| 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 | | | | | | |
| 6c1 | VERTICAL | — | 96 | 4'-11 | 709 | 96 | 4'-11 | 709 | 96 | 4'-11 | 709 | 96 | 4'-11 | 709 | 96 | 4'-11 | 709 | 96 | 4'-11 | 709 | 96 | 4'-11 | 709 | 96 | 4'-11 | 709 | | | | | | |
| 6c2 | VERTICAL | — | 16 | 2'-10 | 68 | 16 | 2'-10 | 68 | 16 | 2'-10 | 68 | 16 | 2'-10 | 68 | 16 | 2'-10 | 68 | 16 | 2'-10 | 68 | 16 | 2'-10 | 68 | 16 | 2'-10 | 68 | | | | | | |
| 6c3 | VERTICAL | — | 16 | 4'-1 | 98 | 16 | 4'-1 | 98 | 16 | 4'-1 | 98 | 16 | 4'-1 | 98 | 16 | 4'-1 | 98 | 16 | 4'-1 | 98 | 16 | 4'-1 | 98 | 16 | 4'-1 | 98 | | | | | | |
| 4c4 | VERTICAL HOOPS | — | 20 | 2'-10 | 38 | 20 | 2'-10 | 38 | 20 | 2'-10 | 38 | 20 | 2'-10 | 38 | 20 | 2'-10 | 38 | 20 | 2'-10 | 38 | 20 | 2'-10 | 38 | 20 | 2'-10 | 38 | | | | | | |
| 4c5 | VERTICAL HOOPS | — | 16 | 3'-1 | 33 | 16 | 3'-1 | 33 | 16 | 3'-1 | 33 | 16 | 3'-1 | 33 | 16 | 3'-1 | 33 | 16 | 3'-1 | 33 | 16 | 3'-1 | 33 | 16 | 3'-1 | 33 | | | | | | |
| 6d1 | HORIZONTAL | — | 24 | 6'-8 | 240 | 24 | 6'-8 | 240 | 24 | 6'-8 | 240 | 24 | 6'-8 | 240 | 24 | 6'-8 | 240 | 24 | 6'-8 | 240 | 24 | 6'-8 | 240 | 24 | 6'-8 | 240 | | | | | | |
| 6d2 | HORIZONTAL | — | 32 | 6'-9 | 324 | 32 | 6'-9 | 324 | 32 | 6'-9 | 324 | 32 | 6'-9 | 324 | 32 | 6'-9 | 324 | 32 | 6'-9 | 324 | 32 | 6'-9 | 324 | 32 | 6'-9 | 324 | | | | | | |
| 6h1 | LONGITUDINAL OPEN RAIL | — | 24 | 35'-9 | 1289 | 36 | 28'-4 | 1532 | 36 | 31'-8 | 1712 | 36 | 35'-0 | 1893 | 36 | 38'-4 | 2073 | 48 | 32'-2 | 2319 | 48 | 34'-8 | 2499 | 48 | 37'-2 | 2680 | 60 | 32'-5 | 2921 | | | |
| 6j1 | VERTICAL DOWELS OPEN RAIL | — | 152 | 4'-6 | 1027 | 184 | 4'-7 | 1267 | 200 | 4'-8 | 1402 | 216 | 4'-9 | 1541 | 232 | 4'-10 | 1684 | 264 | 4'-11 | 1950 | 280 | 5'-1 | 2138 | 296 | 5'-2 | 2297 | 312 | 5'-3 | 2460 | | | |
| 4j2 | HOOPS INTERIOR POSTS | — | 112 | 4'-8 | 349 | 144 | 4'-8 | 449 | 160 | 4'-8 | 499 | 176 | 4'-8 | 549 | 192 | 4'-8 | 599 | 224 | 4'-8 | 698 | 240 | 4'-8 | 748 | 256 | 4'-8 | 798 | 272 | 4'-8 | 848 | | | |
| 4j3 | HOOPS OPEN RAIL | — | 212 | 5'-5 | 767 | 244 | 5'-5 | 883 | 290 | 5'-5 | 1049 | 316 | 5'-5 | 1143 | 342 | 5'-5 | 1237 | 394 | 5'-5 | 1426 | 420 | 5'-5 | 1520 | 446 | 5'-5 | 1614 | 472 | 5'-5 | 1708 | | | |
| 4j4 | HOOPS END POSTS | — | 32 | 6'-5 | 137 | 32 | 6'-5 | 137 | 32 | 6'-5 | 137 | 32 | 6'-5 | 137 | 32 | 6'-5 | 137 | 32 | 6'-5 | 137 | 32 | 6'-5 | 137 | 32 | 6'-5 | 137 | 32 | 6'-5 | 137 | | | |
| 4t1 | WING FOOTING TIE BARS | — | 16 | VARIABLE | 21 | 16 | VARIABLE | 21 | 16 | VARIABLE | 21 | 16 | VARIABLE | 21 | 16 | VARIABLE | 21 | 16 | VARIABLE | 21 | 16 | VARIABLE | 21 | 16 | VARIABLE | 21 | 16 | VARIABLE | 21 | | | |
| (INCLUDE WITH SUPERSTRUCTURE REINFORCING) | | | TOTAL (LBS.) | | | 5100 | | | 5799 | | | 6330 | | | 6794 | | | 7261 | | | 8061 | | | 8573 | | | 9057 | | | 9605 | | |

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

BENT BAR DETAILS



CONCRETE PLACEMENT QUANTITIES NOTE: THESE VALUES TO BE USED FOR ALL SKEWS.

| BRIDGE LENGTH | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
|--------------------------------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| *STANDARD SECTION CU. YDS. | 12.2 | 14.0 | 15.7 | 17.4 | 19.1 | 21.0 | 22.7 | 24.4 | 26.0 |
| END SECTION 4 @ 0.687 CU. YDS. | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |
| TOTAL CU. YDS. | 15.0 | 16.8 | 18.5 | 20.2 | 21.9 | 23.8 | 25.5 | 27.2 | 28.8 |

* CONCRETE QUANTITIES SHOWN ARE BASED ON 45° SKEW BID LENGTHS.

CONCRETE OPEN RAIL QUANTITIES

| BRIDGE LENGTH | | UNIT | 70'-0 | 80'-0 | 90'-0 | 100'-0 | 110'-0 | 120'-0 | 130'-0 | 140'-0 | 150'-0 |
|-----------------------------|----------|------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| CONCRETE OPEN RAILING, TL-4 | 0° SKEW | L.F. | 162.0 | 182.0 | 202.0 | 222.0 | 242.0 | 262.0 | 282.0 | 302.0 | 322.0 |
| CONCRETE OPEN RAILING, TL-4 | 15° SKEW | L.F. | 162.2 | 182.2 | 202.2 | 222.2 | 242.2 | 262.2 | 282.2 | 302.2 | 322.2 |
| CONCRETE OPEN RAILING, TL-4 | 30° SKEW | L.F. | 162.9 | 182.9 | 202.9 | 222.9 | 242.9 | 262.9 | 282.9 | 302.9 | 322.9 |
| CONCRETE OPEN RAILING, TL-4 | 45° SKEW | L.F. | 164.5 | 184.5 | 204.5 | 224.5 | 244.5 | 264.5 | 284.5 | 304.5 | 324.5 |

OPEN RAIL NOTES:

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

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

THE CONCRETE OPEN RAIL IS TO BE BID ON A LINEAL FOOT BASIS MEASURED FROM END TO END OF RAIL. THE NUMBER OF LINEAL FEET OF OPEN RAIL INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT. PRICE BID FOR "CONCRETE OPEN RAILING, TL-4" SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EXCLUDING REINFORCING STEEL, AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO CONSTRUCT THE RAIL IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS.

ALL OPEN RAIL CONCRETE IS TO BE CLASS C.

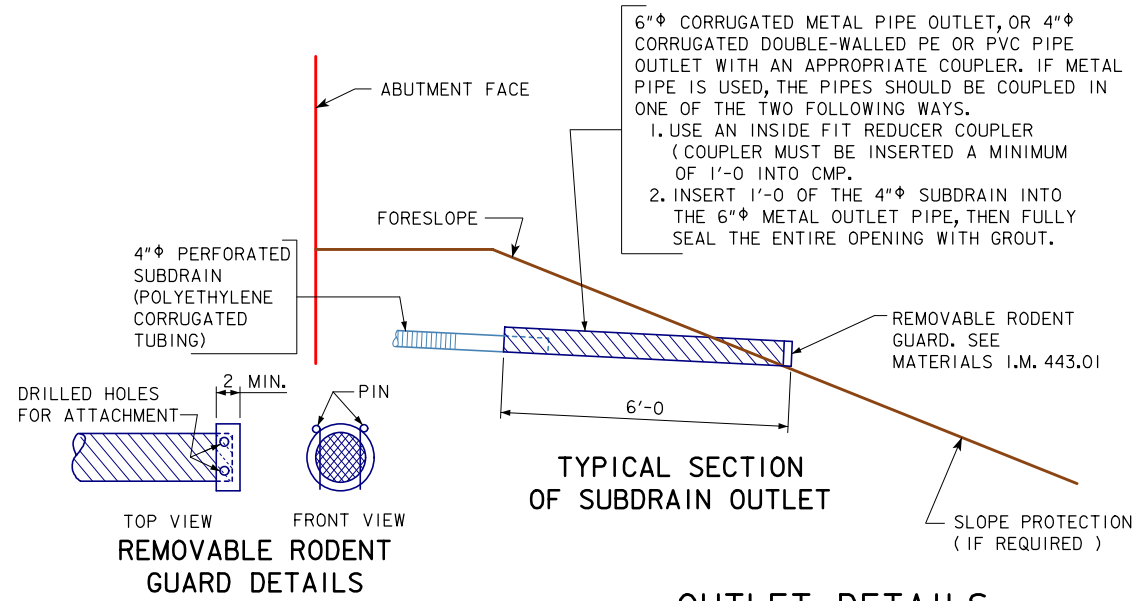
THE JOINT SEALER SHALL BE LIGHT GRAY NONSAG LATEX CAULKING SEALER MARKETED FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED.

TOP OF THE OPEN RAIL IS TO BE PARALLEL TO THEORETICAL \bar{C} GRADE.

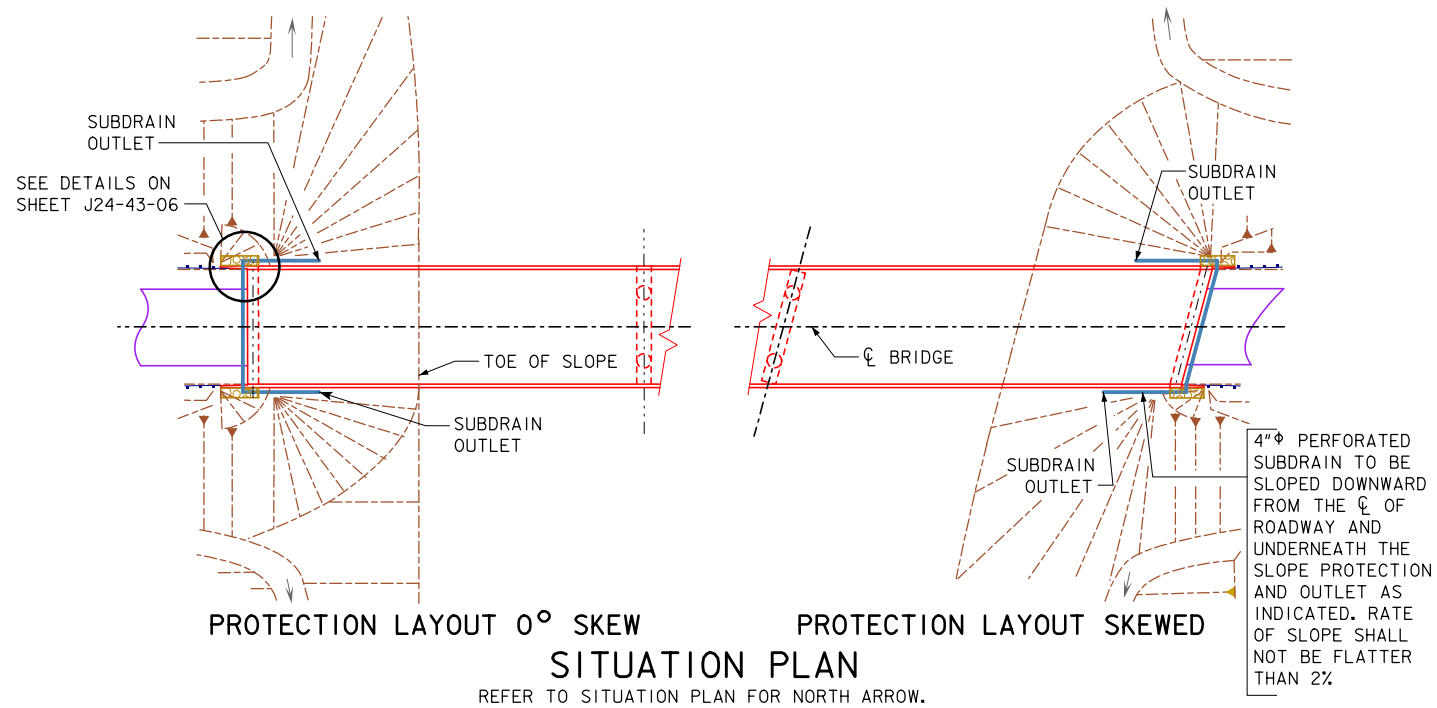
IF CONDUIT IS REQUIRED IN THIS PLAN, THE RIGID STEEL CONDUIT, JUNCTION BOXES AND FITTINGS, INCLUDING LABOR AND ANY ADDITIONAL WORK TO DO THE INSTALLATION IS CONSIDERED INCIDENTAL TO THE COST OF THE RAILING.

| | | | |
|---------------------------------|---------------------------------|--|------------------|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | J24-41-06 |
| | | OPEN RAIL DETAILS (TL-4) | |
| | | J24-41-06 | |

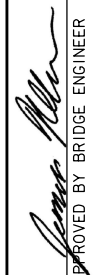

REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE. REMOVED NOTE STATING "ALL OPEN RAIL REINFORCING STEEL IS TO BE INCLUDED WITH THE SUPERSTRUCTURE REINFORCING STEEL." CORRECTED NUMBER OF 6j1 BARS FOR 130'-0, CHANGED NUMBER OF 6h1 BARS FROM 32 TO 36 FOR BRIDGE LENGTHS OF 80'-0, 90'-0, 100'-0, AND 110'-0.



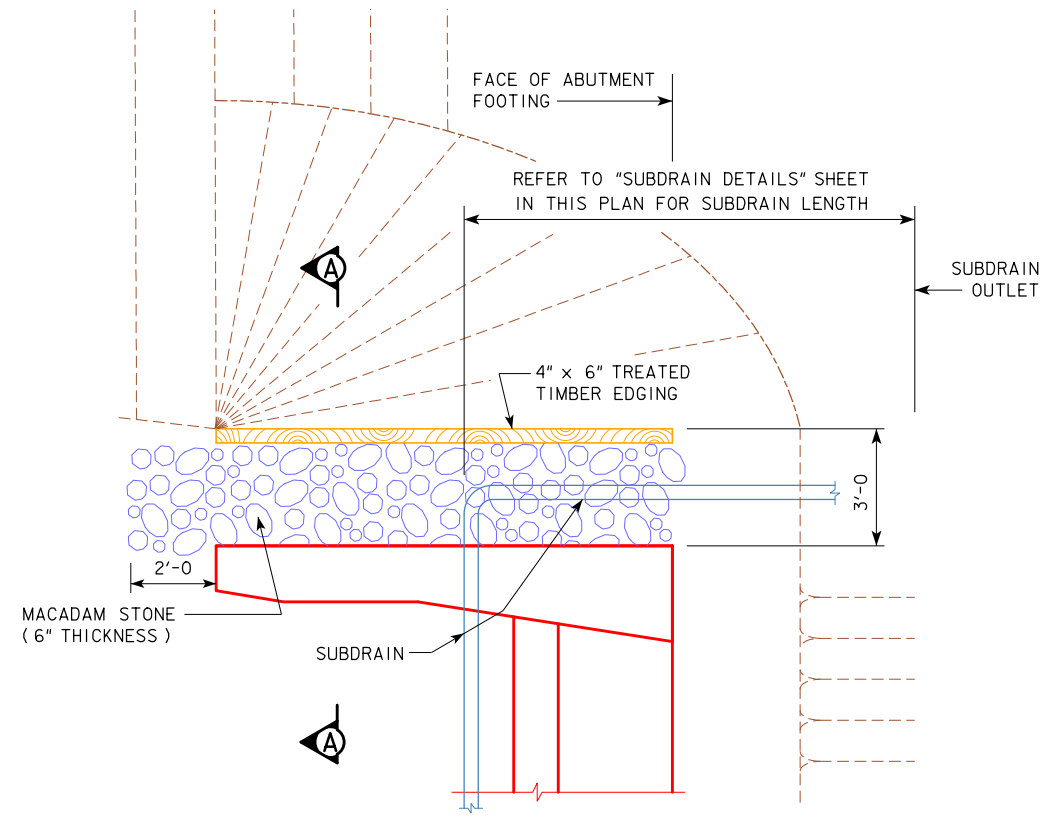
OUTLET DETAILS



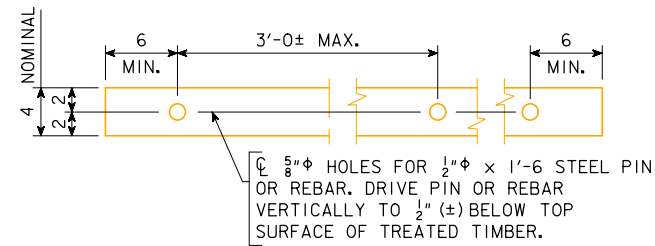
REVISED 12-08 - REMOVED GRANULAR BACKFILL DETAILS.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.

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|---------------------------------|--|---|-----------|
| 08-2022 LATEST REVISION DATE |  APPROVED BY BRIDGE ENGINEER |  STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| | | SUBDRAIN DETAILS | J24-42-06 |

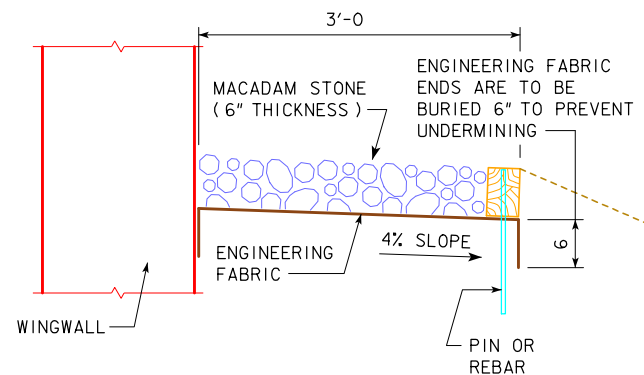
REVISED 09-14 - THE AREA OF MACADAM STONE WAS EXTENDED 2'-0" IN FRONT OF THE BRIDGE WING.
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.



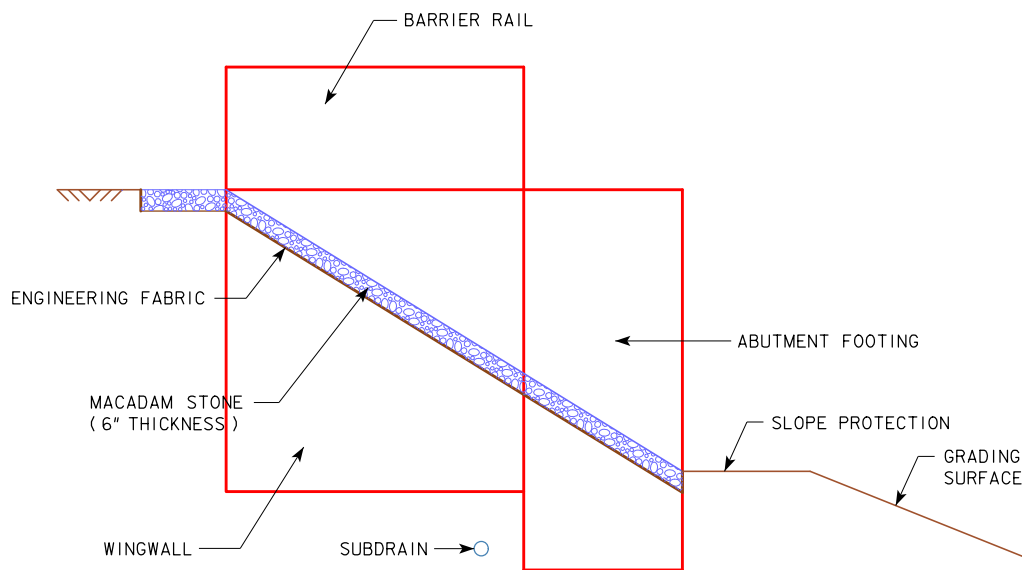
TOP VIEW OF WING ARMORING



4" x 6" TREATED TIMBER EDGING DETAILS



SECTION A-A



PROFILE VIEW OF WING ARMORING

SUBDRAIN NOTES:

SEE J24-42-06 AND "SITUATION PLAN" SHEETS FOR DETAILS OF PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.

THE BRIDGE CONTRACTOR IS TO INSTALL SUBDRAINS BEHIND THE ABUTMENT. THE SUBDRAINS SHALL BE 4" IN DIAMETER AND IN ACCORDANCE WITH ARTICLE 4143.01, B, OF THE STANDARD SPECIFICATIONS. THE SUBDRAIN OUTLET SHALL CONSIST OF A 6'-0" LENGTH OF PIPE WITH A REMOVABLE RODENT GUARD.

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.

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.

MACADAM STONE WING ARMORING NOTES:

MACADAM STONE SHALL BE PLACED ALONG THE SIDE OF THE WING AND ABUTMENT FOOTING. THIS IS TYPICAL AT EACH CORNER OF THE BRIDGE UNLESS OTHERWISE NOTED IN THE PLANS. THE MACADAM STONE AT THESE LOCATIONS SHALL BE UNDERLAYED WITH ENGINEERING FABRIC IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS.

THE BRIDGE BERM FORESLOPE SHALL BE COMPACTED AND SHAPED AS SHOWN ON THESE PLANS, THE SITUATION PLAN AND AS DIRECTED BY THE ENGINEER. THE BERM FORESLOPE SHALL BE FIRM WHEN THE ENGINEERING FABRIC AND MACADAM STONE ARE PLACED.

THE ENGINEERING FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, 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.

THE MACADAM STONE SHALL BE IN ACCORDANCE WITH ARTICLE 4122.02, OF THE STANDARD SPECIFICATIONS, COARSE MATERIAL (NO CHOKE STONE IS ALLOWED).

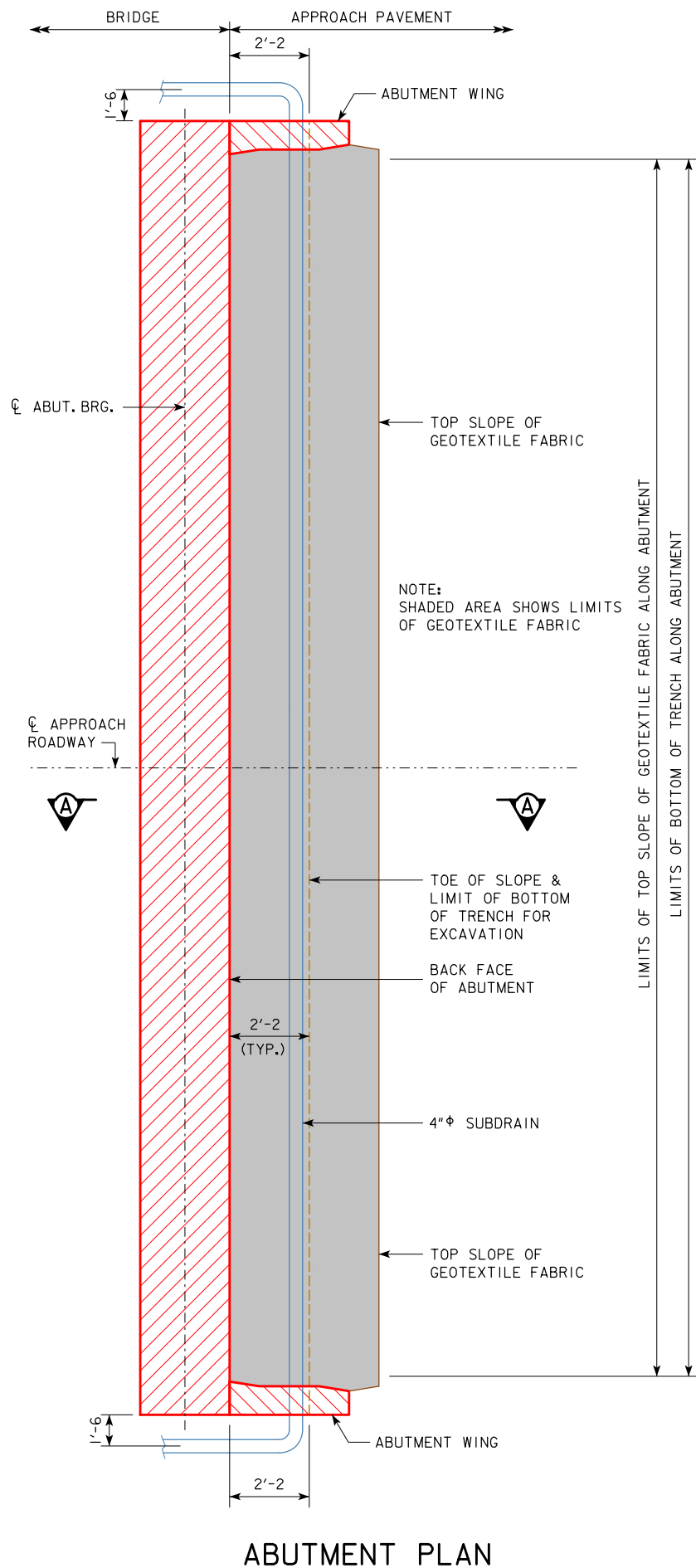
WOOD PRESERVATIVE TREATMENT FOR THE TIMBER EDGING SHALL MEET THE REQUIREMENTS FOR GUARDRAIL POSTS, SAWED FOUR SIDES, IN ACCORDANCE WITH SECTION 4161 OF THE STANDARD SPECIFICATIONS.

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

PAYMENT FOR THE BRIDGE WING ARMORING SHALL BE INCIDENTAL TO THE BID ITEM "STRUCTURAL CONCRETE (BRIDGE)" AND SHALL INCLUDE COSTS OF ALL MATERIAL AND LABOR TO CONSTRUCT THE WING ARMORING AS SHOWN ON THESE PLANS.

| | | | |
|---------------------------------|-----------------------------|---|------------------|
| 08-2022 LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | | |
| | | STANDARD DESIGN - 24'-0" ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES NOVEMBER, 2006 | |
| | | WING ARMORING DETAILS | J24-43-06 |

REVISED 09-2016 - CHANGED THE BRIDGE APPROACH PAVEMENT STANDARD TO "BR" (WAS "RK-20").
REVISED 08-2022: 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 5 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.

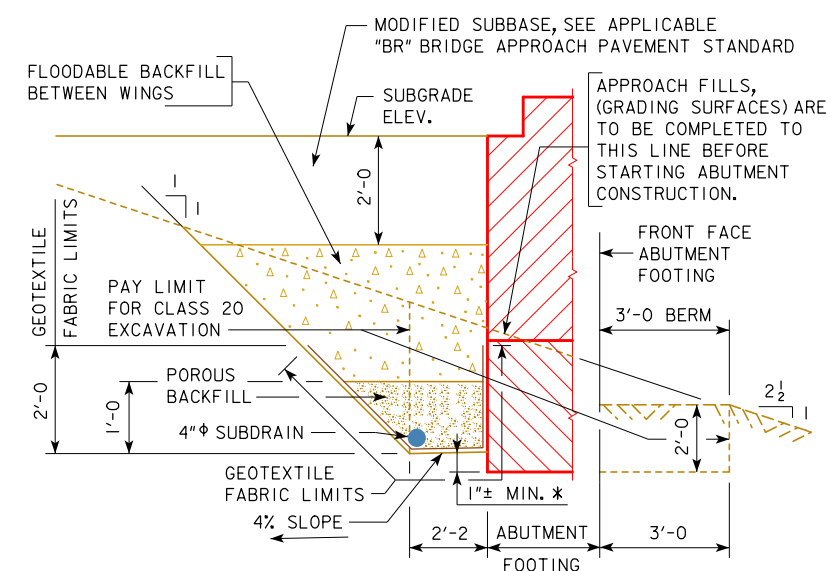
NOTE:
SEE SUBDRAIN DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

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.

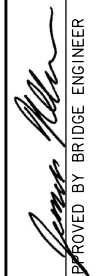

THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.



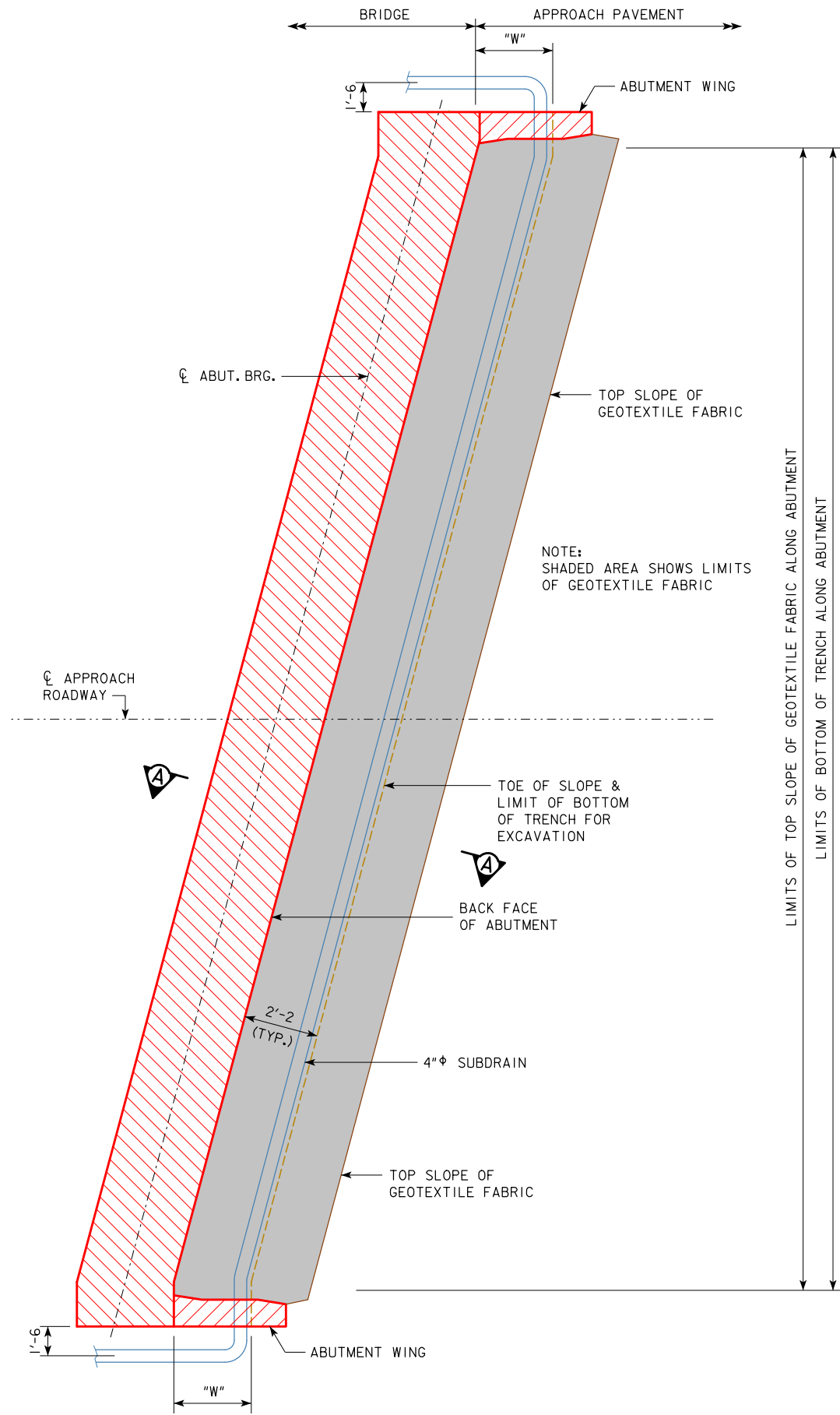
**SECTION A-A
BACKFILL DETAILS**

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

* DIMENSION VARIES DUE TO 2% SUBDRAIN SLOPE.

| | | |
|---|---|------------------|
| 08-2022 LATEST REVISION DATE  APPROVED BY BRIDGE ENGINEER |  STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES DECEMBER, 2008 | |
| | ABUTMENT BACKFILL DETAILS FOR 0° SKEWS | J24-44-06 |

REVISED 03-2021 - REVISION FOR
REVISED 08-2022: UPDATED BRIDGE ENGINEER SIGNATURE.



ABUTMENT PLAN WITHOUT WING EXTENSIONS

| "W" DIMENSION | |
|---------------|----------------------------------|
| SKEW | DIMENSION |
| 15° | 2'-2 ⁷ / ₈ |
| 30° | 2'-6 |
| 45° | 3'-0 ³ / ₄ |

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 5 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.

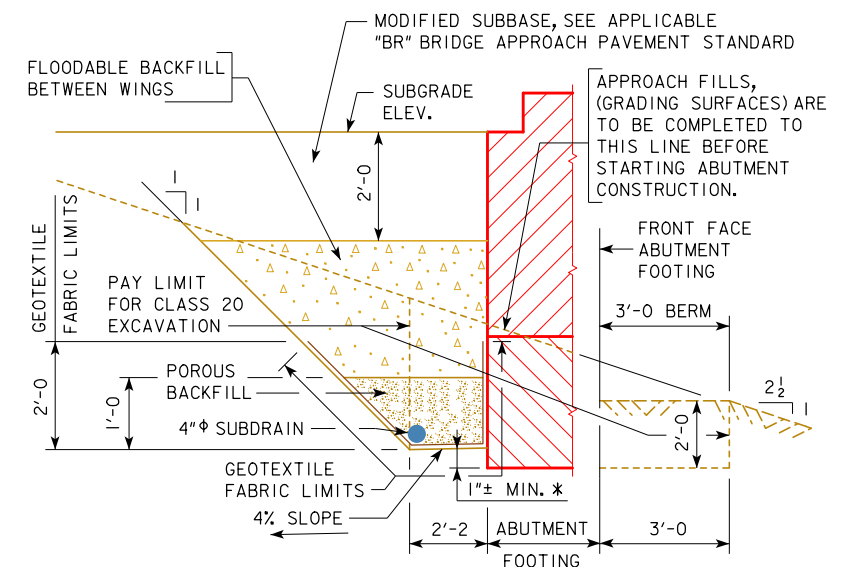
NOTE:
SEE SUBDRAIN DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

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.

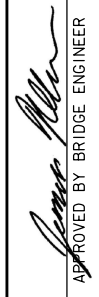

THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.



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.

| | | |
|---|---|------------------|
| 08-2022 LATEST REVISION DATE  APPROVED BY BRIDGE ENGINEER |  STANDARD DESIGN - 24'-0 ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES DECEMBER, 2008 | |
| | ABUTMENT BACKFILL DETAILS FOR 15°, 30°, & 45° SKEWS | J24-45-06 |