

EPOXY 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 | | | |
| 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 | | | |
| 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 |
| 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 | VARIABLES | 21 | 16 | VARIABLES | 21 | 16 | VARIABLES | 21 | 16 | VARIABLES | 21 | 16 | VARIABLES | 21 | 16 | VARIABLES | 21 | 16 | VARIABLES | 21 | 16 | VARIABLES | 21 | 16 | VARIABLES | 21 |
| (INCLUDE WITH SUPERSTRUCTURE REINFORCING) | | | | TOTAL (LBS.) | | | 3266 | | 3725 | | 4121 | | 4446 | | 4770 | | 5304 | | 5628 | | 5953 | | 6338 | | | | | | |

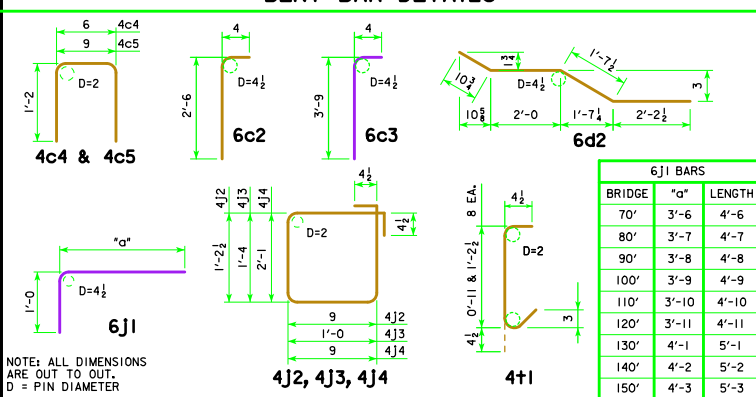
REINFORCING QUANTITIES SHOWN ARE BASED ON 45° SKEW BID LENGTHS.

STAINLESS STEEL 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 | | | |
| 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 | | | |
| 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 |
| (INCLUDE WITH SUPERSTRUCTURE REINFORCING) | | | | TOTAL (LBS.) | | | 1834 | | 2074 | | 2209 | | 2348 | | 2491 | | 2757 | | 2945 | | 3104 | | 3267 | | | | | | |

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

BENT BAR DETAILS



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

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 REINFORCING STEEL IS TO BE INCLUDED WITH THE SUPERSTRUCTURE REINFORCING STEEL.

ALL OPEN RAIL CONCRETE IS TO BE CLASS C.

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

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 ϵ 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.

CONCRETE PLACEMENT QUANTITIES

| 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 |

| | | | |
|----------------------|---------------------------------|--|------------------|
| LATEST REVISION DATE | APPROVED BY BRIDGE ENGINEER | STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES CONTINUOUS CONCRETE SLAB BRIDGES JULY, 2014 | J40-49-14 |
| | | OPEN RAIL DETAILS (TL-4) | |
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