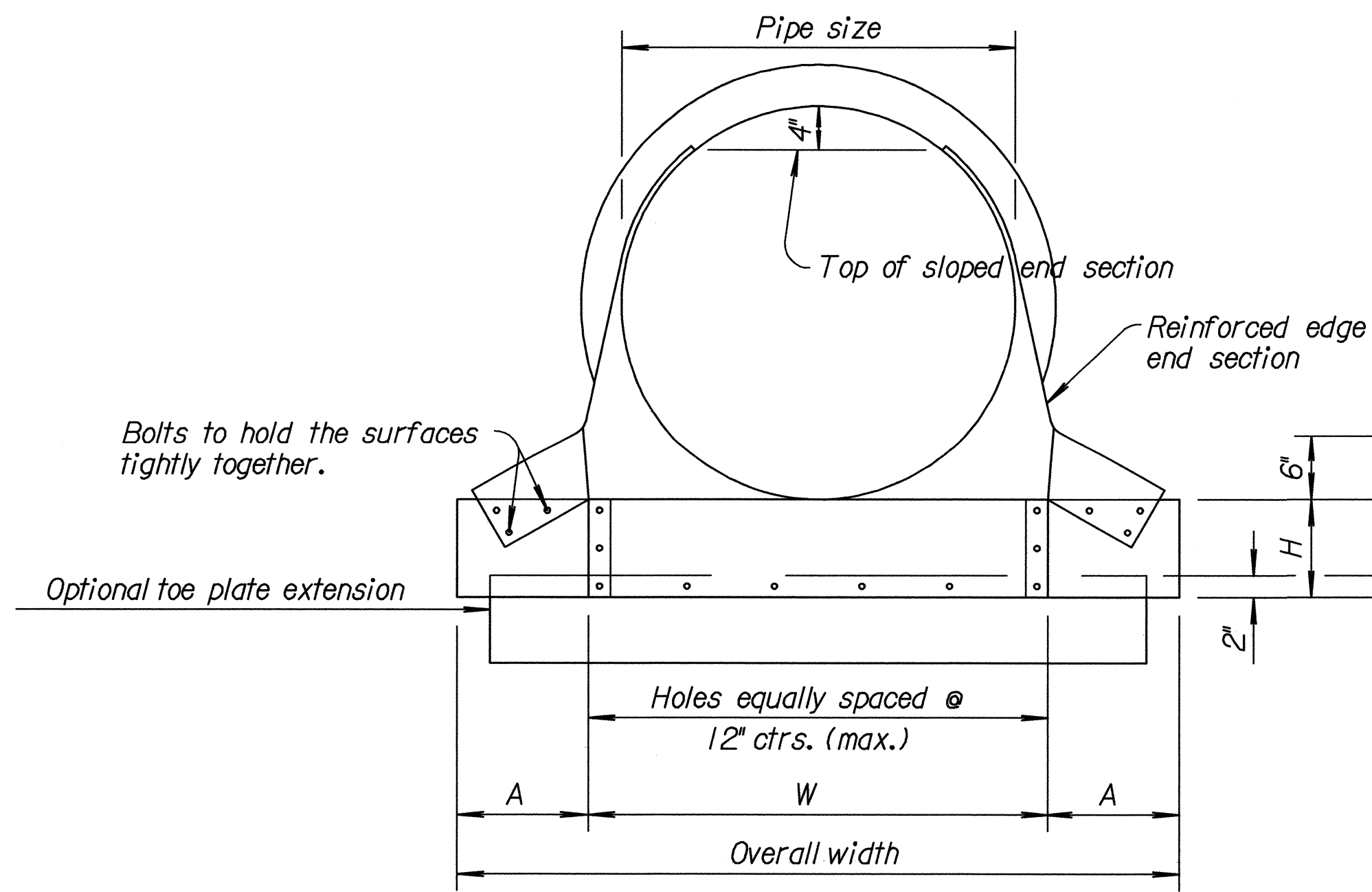
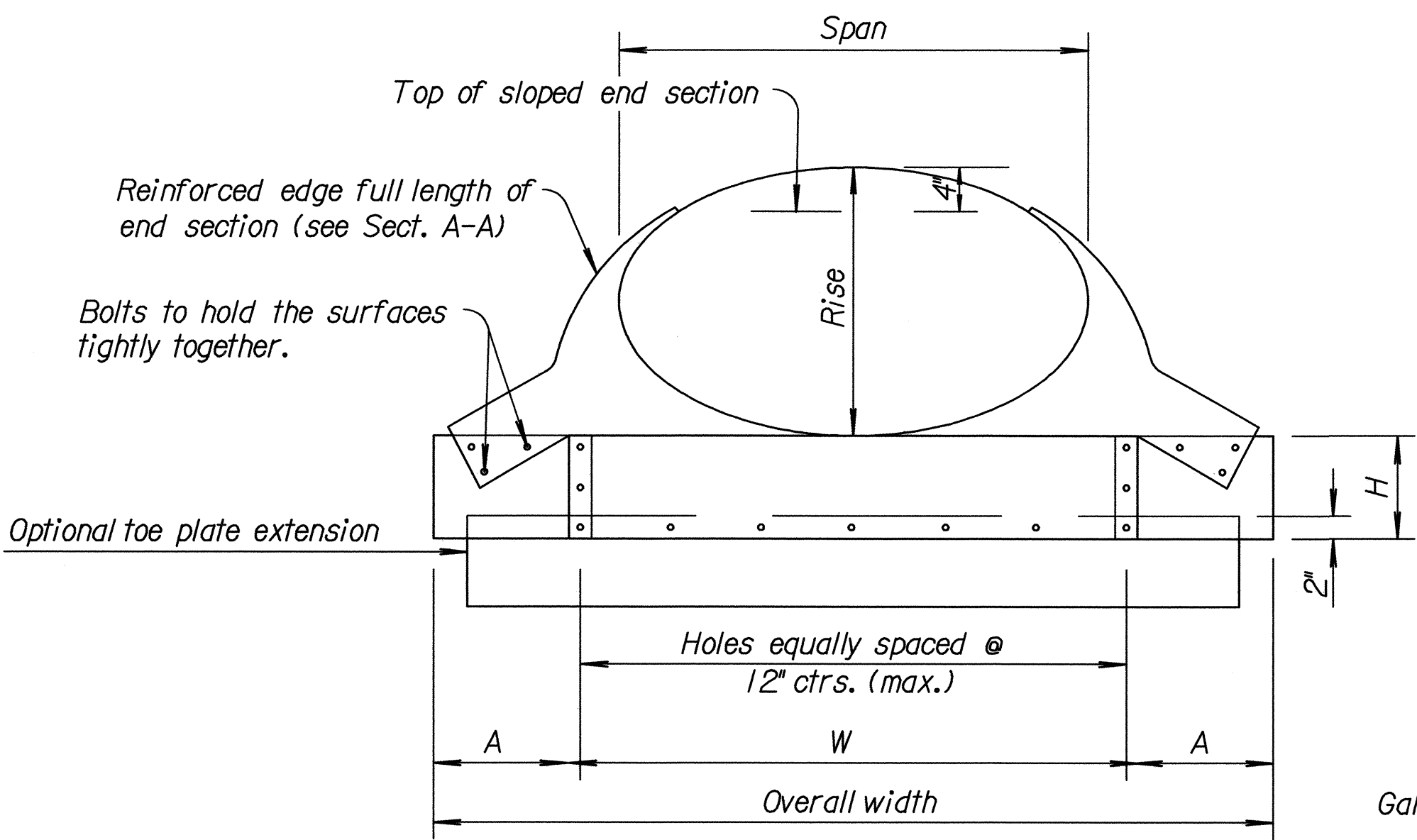


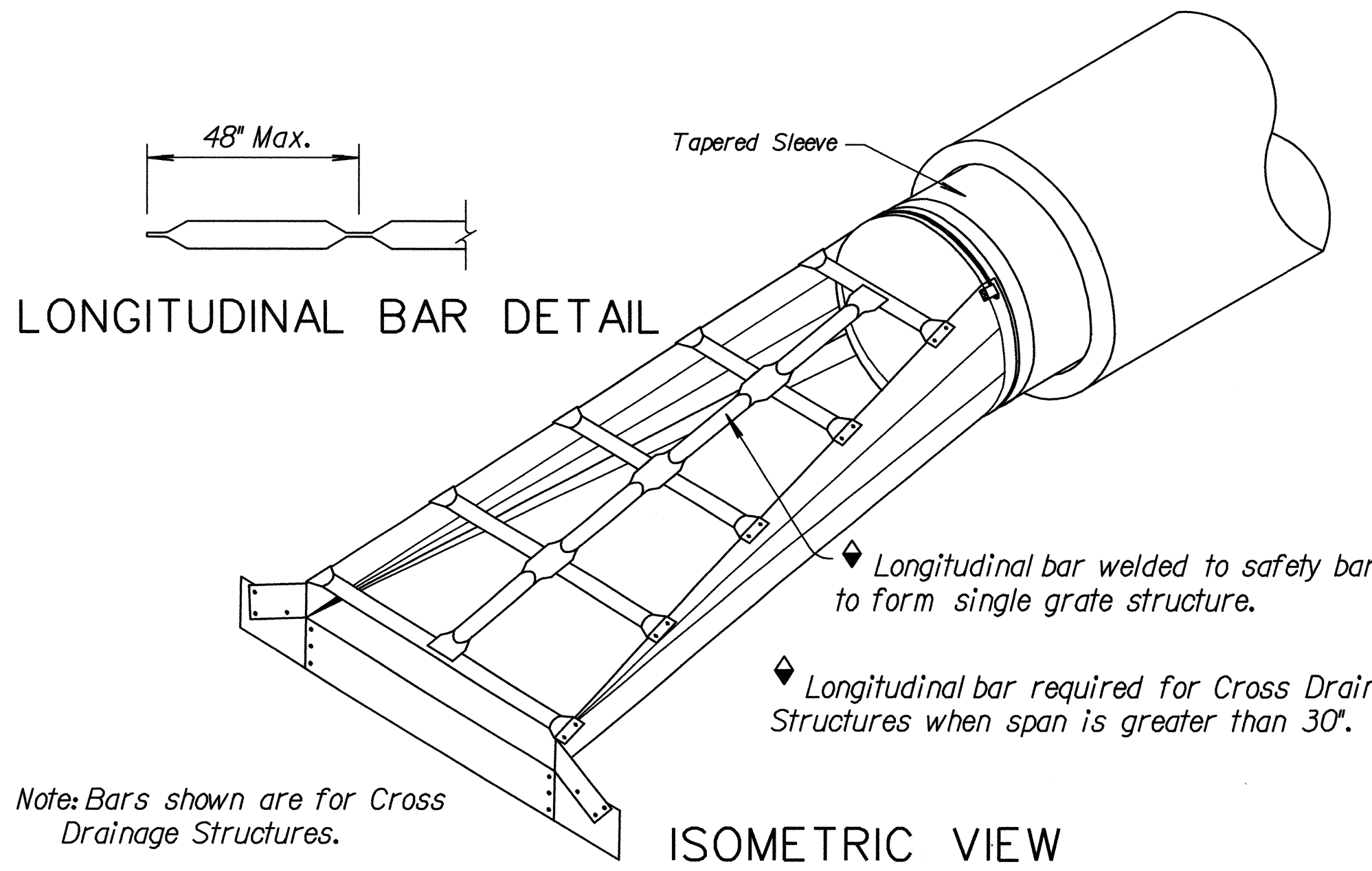
| | | | | |
|--------|--------------|------|-----------|--------------|
| STATE | PROJECT NO. | YEAR | SHEET NO. | TOTAL SHEETS |
| KANSAS | 87 N-0353-01 | 2005 | 67 | 162 |



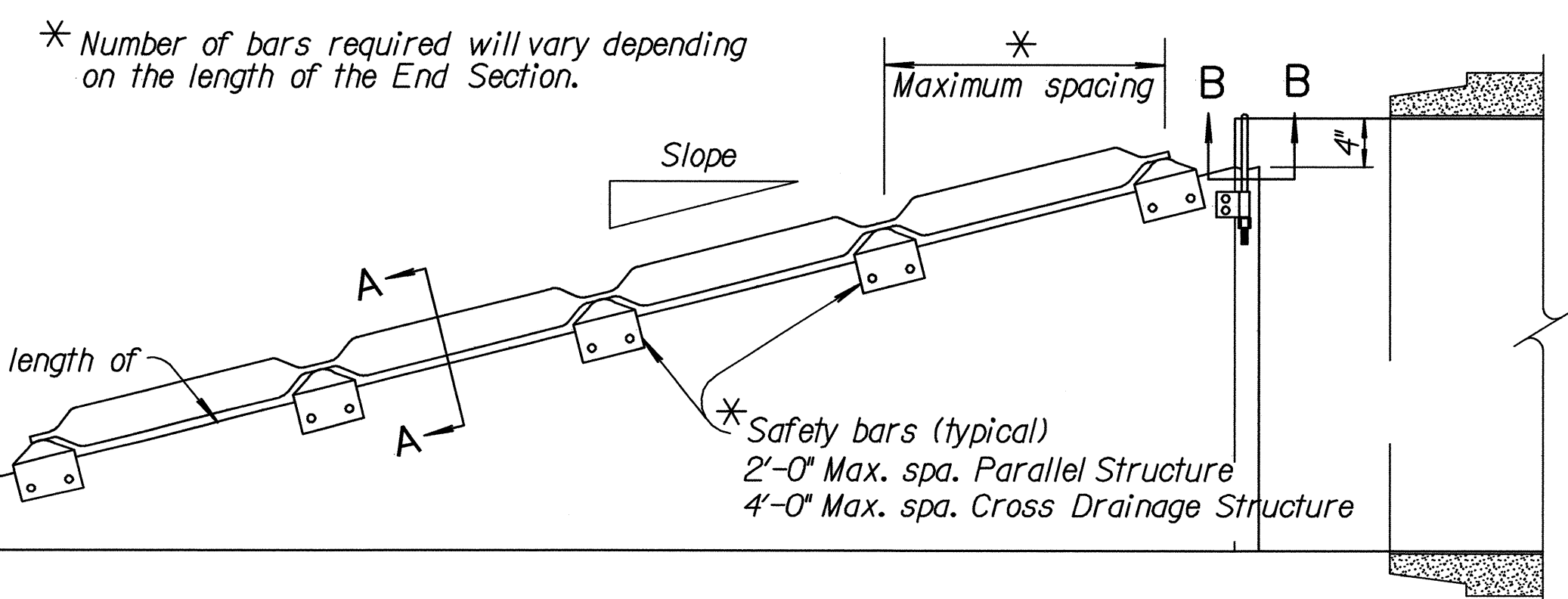
FRONT VIEW CIRCULAR PIPE



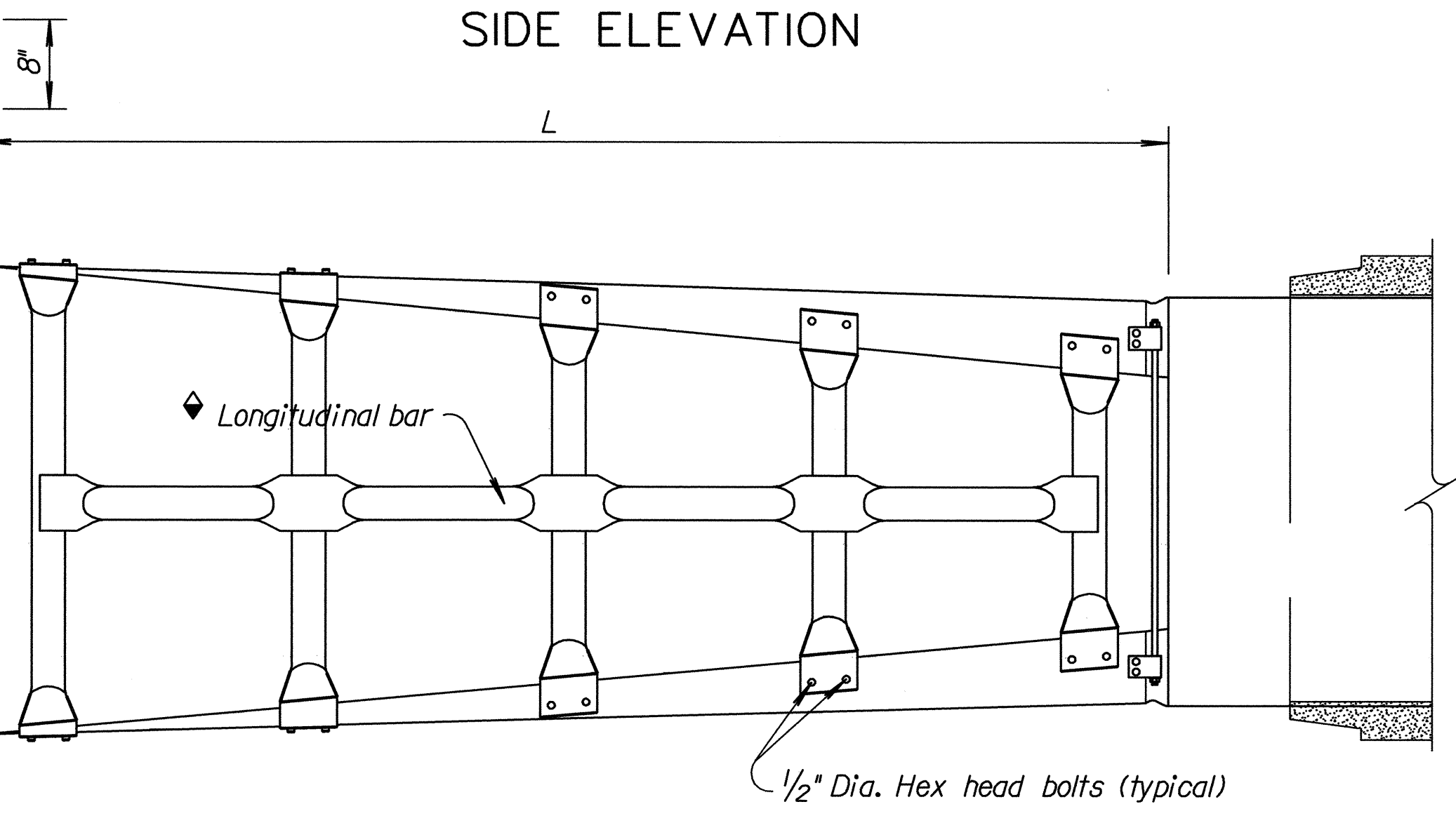
FRONT VIEW ELLIPTICAL PIPE



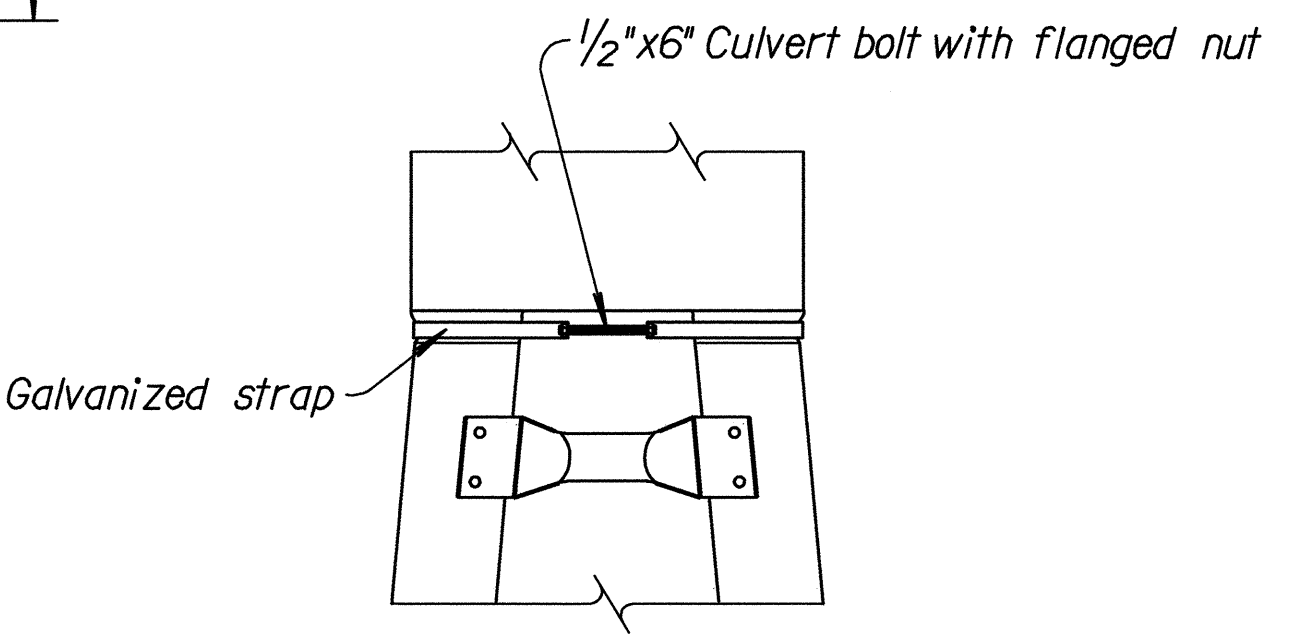
ISOMETRIC VIEW



SIDE ELEVATION

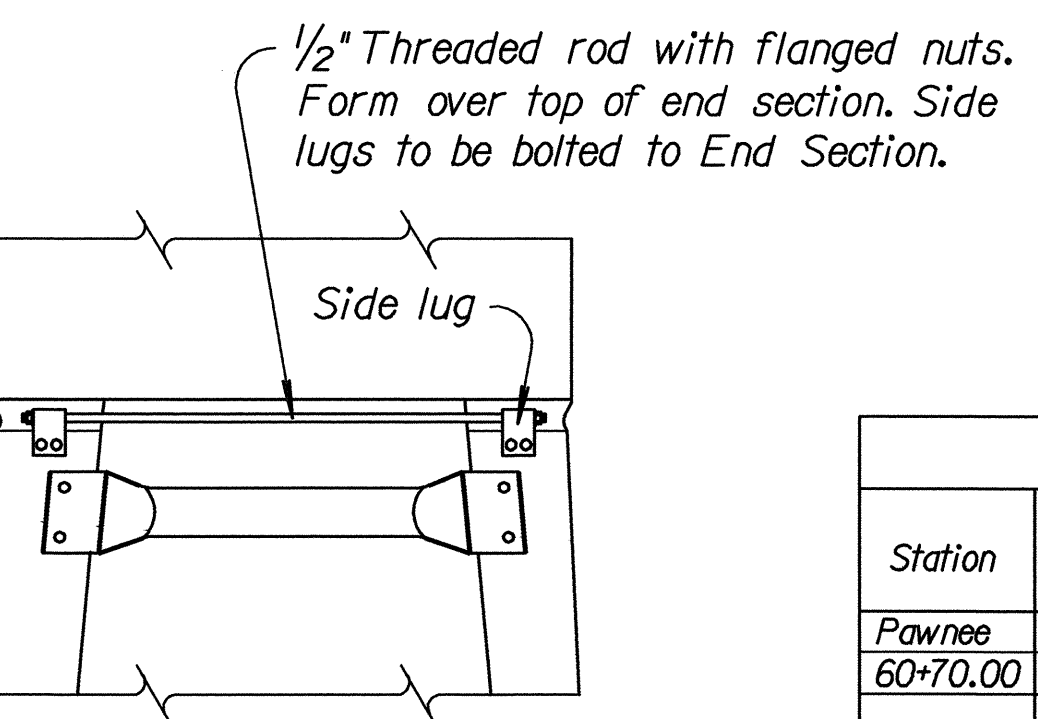


TOP VIEW



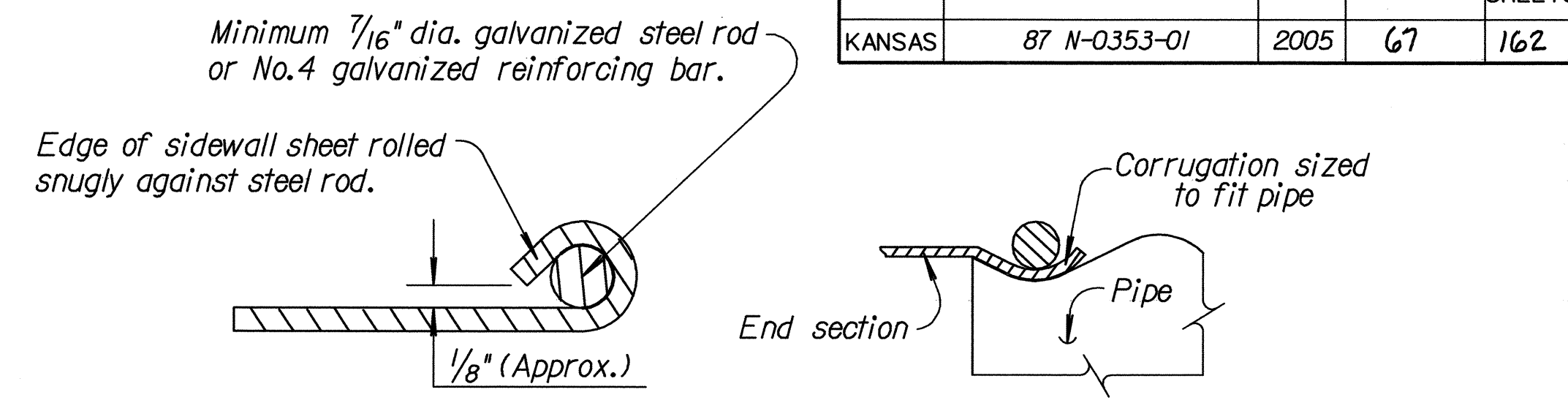
TYPE #1 CONNECTOR DETAIL

For 15" thru 24" pipe



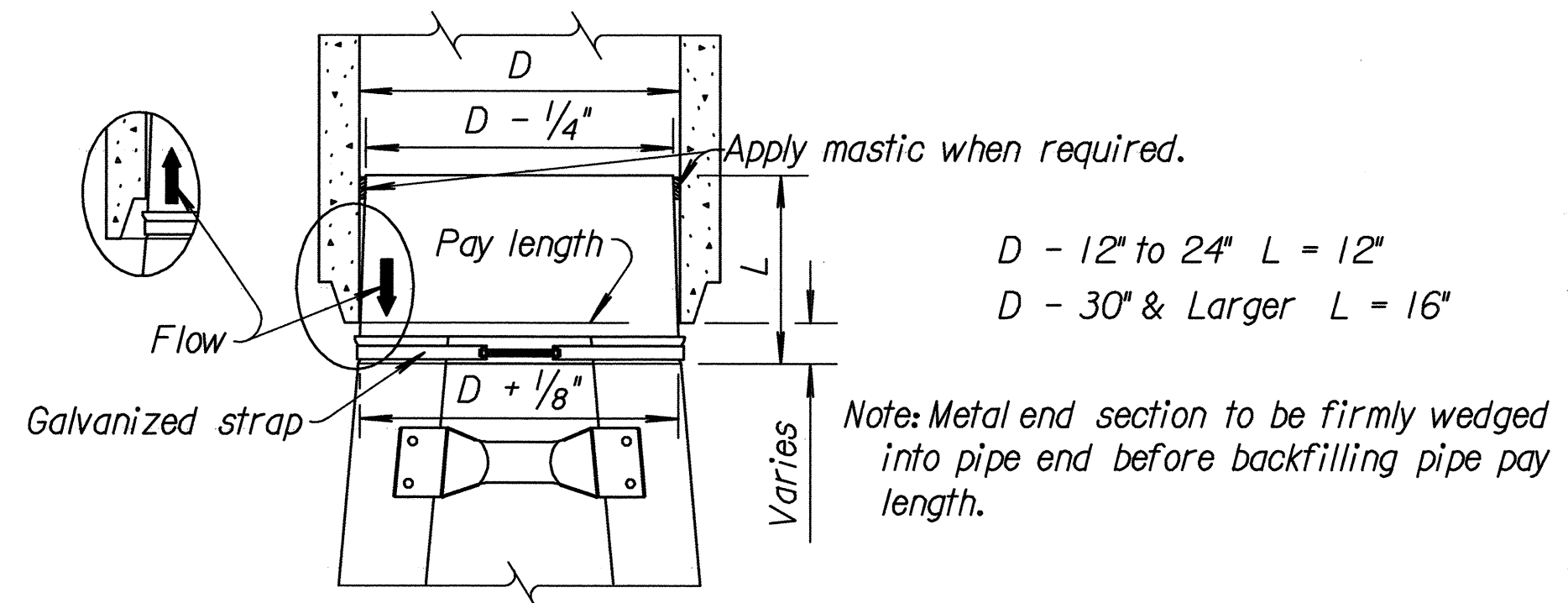
TYPE #2 CONNECTOR DETAIL

For 30" and larger round pipes & 21"x15" thru 64"x43" arched pipes



SECTION A-A

SECTION B-B



DETAIL OF CONNECTION TO CONCRETE PIPE

(Tapered sleeve shall be 12 Ga. smooth galvanized steel in accordance with AASHTO M-218.)

GENERAL NOTES

End sections and tapered sleeves shall be fabricated from galvanized steel meeting the requirements of the Standard Specifications. When required optional toe plate extension shall be punched and bolted to end section apron lip with 3/8" diameter galvanized bolts. Steel for toe plate extension shall be same gauge as end section. Dimensions shall be overall width less 6" by 8" high. Safety bars shall be fabricated from steel pipe meeting the requirements of ASTM A-53 Schedule 40 Specifications. Safety bars shall be hot dipped galvanized after fabrication. Installation shall be performed in accordance with the Standard Specifications. All work and materials required for construction and installation of safety slope end section shall be included in the bid item "End Section (Type IV)".

| Pipe Dia. (In.) | Min. Gauge Ends | Dimensions in Inches | | | | L Dimensions | | | |
|-----------------|-----------------|----------------------|-----------|-----------|---------------|--------------|--------------|-------|--------------|
| | | A 1" Tol. | H 1" Tol. | W 2" Tol. | Overall Width | Slope | Length (In.) | Slope | Length (In.) |
| 15" | 16 | 8 | 6 | 21 | 37 | 4:1 | 20 | 6:1 | 30 |
| 18" | 16 | 8 | 6 | 24 | 40 | 4:1 | 32 | 6:1 | 48 |
| 21" | 16 | 8 | 6 | 27 | 43 | 4:1 | 44 | 6:1 | 66 |
| 24" | 16 | 8 | 6 | 30 | 46 | 4:1 | 56 | 6:1 | 84 |
| 30" | 12 | 12 | 9 | 36 | 60 | 4:1 | 80 | 6:1 | 120 |
| 36" | 12 | 12 | 9 | 42 | 66 | 4:1 | 104 | 6:1 | 156 |
| 42" | 12 | 16 | 12 | 48 | 80 | 4:1 | 128 | 6:1 | 192 |
| 48" | 12 | 16 | 12 | 54 | 86 | 4:1 | 152 | 6:1 | 228 |
| 54" | 12 | 16 | 12 | 60 | 92 | 4:1 | 176 | 6:1 | 264 |
| 60" | 12 | 16 | 12 | 66 | 98 | 4:1 | 200 | 6:1 | 300 |

| Eqv. Dia. (In.) | Nom. W.W. Area Sq. Ft. | (Inches) | | Min. Thick. In. | Gage | Dimensions (Inches) | | | | Slope | Length (In.) | Slope | Length (In.) |
|-----------------|------------------------|----------|------|-----------------|------|---------------------|----|----|---------------|-------|--------------|-------|--------------|
| | | Span | Rise | | | A | H | W | Overall Width | | | | |
| 18 | 1.8 | 23 | 14 | .064 | 16 | 8 | 6 | 29 | 45 | 4:1 | 16 | 6:1 | 24 |
| 24 | 3.3 | 30 | 19 | .064 | 16 | 8 | 6 | 36 | 52 | 4:1 | 36 | 6:1 | 54 |
| 27 | 4.1 | 34 | 22 | .079 | 14 | 12 | 9 | 40 | 64 | 4:1 | 48 | 6:1 | 72 |
| 30 | 5.1 | 38 | 24 | .079 | 14 | 12 | 9 | 44 | 68 | 4:1 | 56 | 6:1 | 84 |
| 33 | 6.3 | 42 | 27 | .109 | 12 | 12 | 9 | 48 | 72 | 4:1 | 68 | 6:1 | 102 |
| 36 | 7.4 | 45 | 29 | .109 | 12 | 16 | 12 | 51 | 83 | 4:1 | 76 | 6:1 | 114 |
| 42 | 10.2 | 53 | 34 | .109 | 12 | 16 | 12 | 59 | 91 | 4:1 | 96 | 6:1 | 144 |
| 48 | 12.9 | 60 | 38 | .109 | 12 | 16 | 12 | 66 | 98 | 4:1 | 112 | 6:1 | 168 |
| 54 | 16.6 | 68 | 43 | .109 | 12 | 16 | 12 | 74 | 106 | 4:1 | 132 | 6:1 | 198 |

| Station | Location | Type | Slope | Size or Bid Designation Sq. Ft. | Crown Grade Elev. | Flow Line | | Horizontal Roadway Lt. Rt. | Degree of Rotation | Length of Pipe Lt. Rt. | Lin. Ft. of Pipe | No. of End Sections |
|-----------------|----------|------|-------|---------------------------------|-------------------|-----------|-----|----------------------------|--------------------|------------------------|------------------|---------------------|
| | | | | | | Lt. | Rt. | | | | | |
| Pawnee 60+70.00 | Lt. | IV | 4:1 | 36" | | 132.81 | | | | | | 1 |

KANSAS DEPARTMENT OF TRANSPORTATION

TYPE IV END SECTION FOR CIRCULAR AND ELLIPTICAL PIPES (REINFORCED CONCRETE PIPE)

RD664A

| | | |
|---------------|------------|------------------------|
| FHWA APPROVAL | 6-15-94 | APP'D. James O. Brewer |
| DESIGNED | DETAILED | QUANTITIES |
| DESIGN CK. | DETAIL CK. | QUAN. CK. |
| | | TRACE CK. Seitz |

Sheet No.

Drawn By: \$\$\$USERNAME\$\$\$ Plotted: \$\$\$SYTIME\$\$\$
 File: \$\$\$FILENAME\$\$\$DGN\$SPEC\$