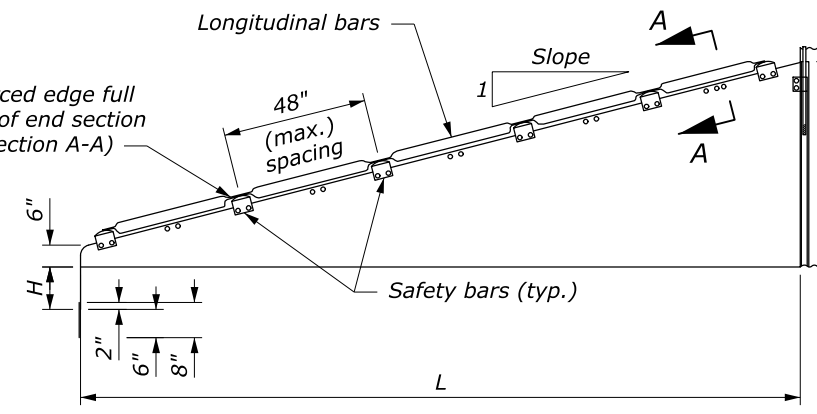
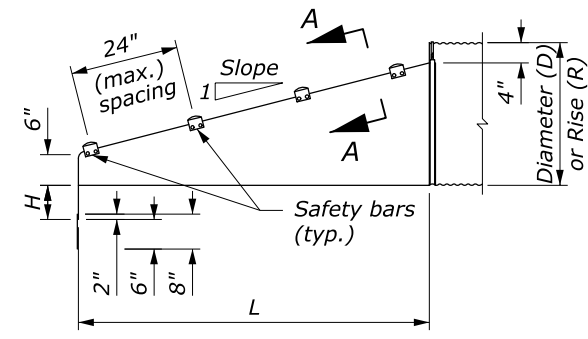


**FRONT VIEW  
ROUND PIPE CULVERT**

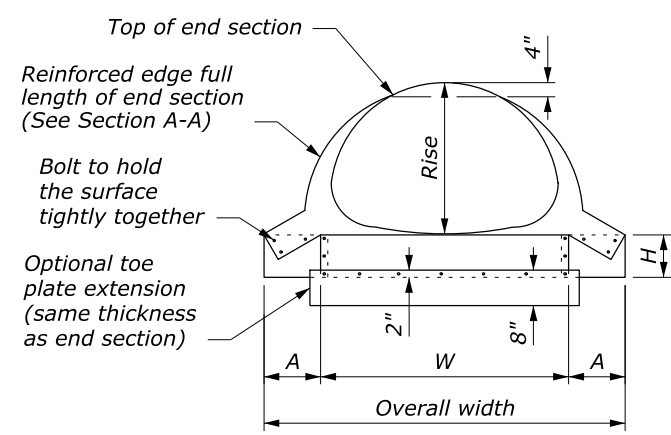


**ELEVATION  
CROSS DRAINAGE END SECTION**

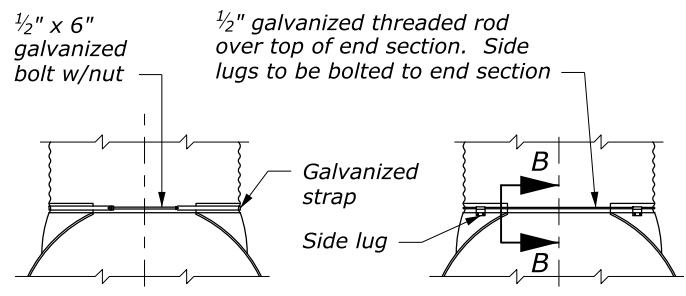


**ELEVATION  
PARALLEL DRAINAGE END SECTION**

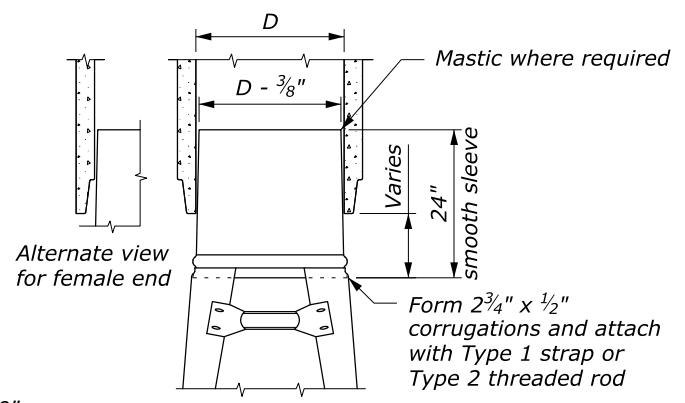
- NOTES:**
1. Use end sections on 1V:4H to 1V:6H slopes only. Use toe plate extension where shown on the plans.
  2. Fabricate safety and longitudinal bars from steel pipe conforming to ASTM A53 schedule 40 specifications. Galvanize bars hot dipped after fabrication.
  3. When the span is greater than 30 inches provide a longitudinal bar for cross drainage end sections. Use additional longitudinal bars if spacing exceeds 30 inches on larger end sections.
  4. Safety and longitudinal bars are not required on 30-inch and smaller cross drainage end sections.
  5. Safety bars are not required on 18-inch and smaller parallel drainage end sections.
  6. 18-inch diameter sleeves have a thickness of 0.079 inch, all others are 0.109 inch.



**FRONT VIEW  
PIPE ARCH CULVERT**

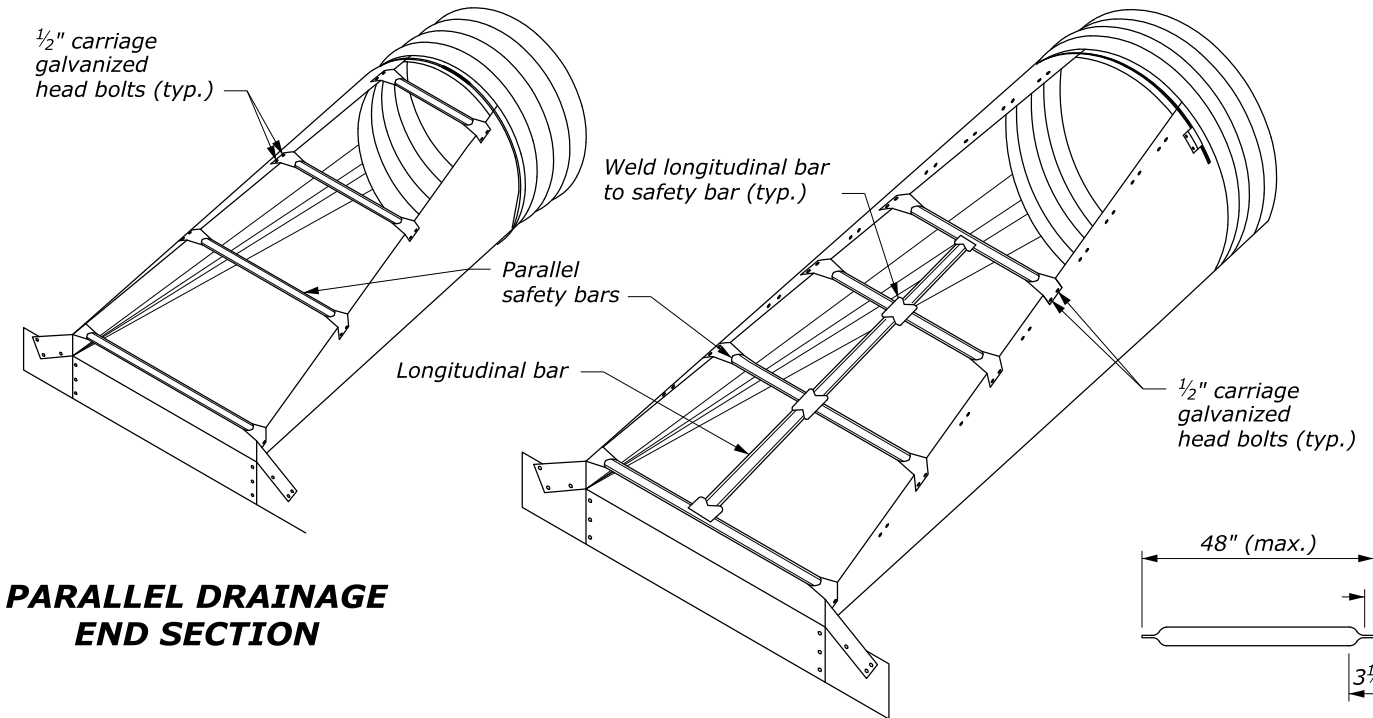


**CONNECTOR DETAILS**

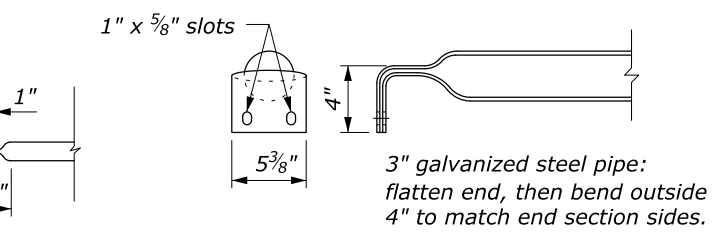
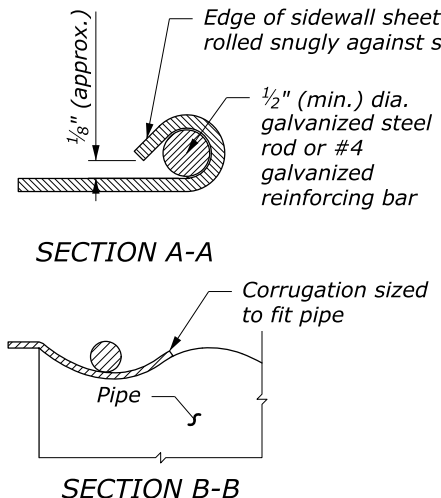


**METAL END SECTIONS FOR ROUND PIPE CULVERT**

| PIPE SIZE Ø INCHES | METAL THICK (MIN.) INCH/GAGE | DIMENSIONS IN INCHES |    |    |               |         |         |
|--------------------|------------------------------|----------------------|----|----|---------------|---------|---------|
|                    |                              | A                    | H  | W  | OVERALL WIDTH | L       |         |
|                    |                              |                      |    |    |               | Slope=4 | Slope=6 |
| 18                 | 0.064/16                     | 8                    | 6  | 24 | 40            | 32      | 47      |
| 24                 | 0.064/16                     | 8                    | 6  | 30 | 46            | 55      | 83      |
| 30                 | 0.109/12                     | 12                   | 9  | 36 | 60            | 79      | 118     |
| 36                 | 0.109/12                     | 12                   | 9  | 42 | 66            | 102     | 154     |
| 42                 | 0.109/12                     | 16                   | 12 | 48 | 80            | 126     | 189     |
| 48                 | 0.109/12                     | 16                   | 12 | 54 | 86            | 150     | 224     |
| 54                 | 0.109/12                     | 16                   | 12 | 60 | 92            | 173     | 260     |
| 60                 | 0.109/12                     | 16                   | 12 | 66 | 98            | 197     | 295     |



**PARALLEL DRAINAGE  
END SECTION**



**LONGITUDINAL DRAINAGE BAR  
PARALLEL BARS**

**METAL END SECTIONS FOR PIPE ARCH CULVERT**

| PIPE SIZE (INCHES)<br>EQUIV. Ø | SPAN | RISE | METAL THICK (MIN.) INCH/GAGE | DIMENSIONS (INCHES) |    |    |               |         |         |
|--------------------------------|------|------|------------------------------|---------------------|----|----|---------------|---------|---------|
|                                |      |      |                              | A                   | H  | W  | OVERALL WIDTH | L       |         |
|                                |      |      |                              |                     |    |    |               | Slope=4 | Slope=6 |
| 18                             | 21   | 15   | 0.064/16                     | 8                   | 6  | 27 | 43            | 20      | 30      |
| 24                             | 28   | 20   | 0.064/16                     | 8                   | 6  | 33 | 49            | 40      | 60      |
| 30                             | 35   | 24   | 0.109/12                     | 12                  | 9  | 40 | 64            | 55      | 83      |
| 36                             | 41   | 29   | 0.109/12                     | 12                  | 9  | 47 | 71            | 75      | 112     |
| 42                             | 48   | 32   | 0.109/12                     | 16                  | 12 | 54 | 86            | 90      | 136     |
| 48                             | 56   | 37   | 0.109/12                     | 16                  | 12 | 62 | 94            | 110     | 165     |
| 54                             | 63   | 42   | 0.109/12                     | 16                  | 12 | 69 | 101           | 130     | 195     |
| 60                             | 70   | 46   | 0.109/12                     | 16                  | 12 | 76 | 107           | 146     | 218     |
| 72                             | 82   | 56   | 0.109/12                     | 16                  | 12 | 88 | 120           | 185     | 278     |

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION  
OFFICE OF FEDERAL LANDS HIGHWAY

EFLHD DETAIL

**METAL END SECTIONS  
WITH SAFETY BARS**

STANDARD APPROVED FOR USE 6/2005  
REVISED: 1/2006 8/2020 9/2020

DETAIL  
ET 602-9