**Level Working Point**

**Corner A**

- "T" Bars at 1'-0" Centers
- See Std. 36.03 for Apron Connection Details

**Corner B**

- "T" Bars at 1'-0" Centers, N/A

**Apron Detail**

- 4" Bars at 1'-0" Centers
- See Std. 36.03 for Apron Connection Details

**Alternate Section C6**

- "T" Bars at 1'-0"

**Alternate Cutoff Wall**

- See Section C6

**Notes**

- Bar Steel reinforcement shall be embedded 2" clear unless otherwise shown on plans.
- The concrete in the cut-off wall may be placed underwater if the excavation cannot be dewatered.
- The alternate cut-off wall may be used in lieu of the cast-in-place concrete cut-off wall. Payment shall be based on concrete cut-off walls.
- Locate name plate on nearest R.M. and plan of span length in plans.
- For the contractor to furnish a precast concrete box culvert in lieu of the cut-off wall, the contractor shall agree to the acceptance of the shop drawings and the manufacturer's conformance to the requirements of the Wisconsin DOT. Payment for the precast cut-off wall shall be based on the quantities and prices for the items listed in the "Total Estimated Quantities".

**Designer Notes**

- See Standard 36.02 for additional notes.
- All bar steel for cast-in-place concrete box culverts shall be coated, except when there is no fill over the culvert. All top and bottom bars shall be used for the top and bottom slab in the top slab.
- Bar steel for cast-in-place concrete aprons shall be coated and bar steel for precast concrete box culverts shall be uncoated, except when there is no fill over the culvert, and all top and bottom bars shall be coated.

**For "B" Designated Concrete Box Culverts Having Top Surface Epoxy Coated:**

- Bar Steel for Wingwall Dowels and All Wingwall Bars Shall Be Epoxy Coated.
- Bar Steel for Cast-In-Place Concrete Aprons Shall Be Uncoated and All Bar Steel For Cast-in-Place Concrete Box Culverts Shall Be Epoxy Coated.

**Standard 36.02**

- Design and Construction of Culverts
- Payment based on concrete cut-off wall.

**Approved:**

Bill Oliva

**Date:**

1-19
NOTES
FIELD CUT BAR STEEL REINFORCEMENT IS TO BE PLACED TO CLEAR THE OPENING PROVIDED FOR MEDIAN INLET. ADJUSTMENT OF THE COVER TO GRADE MAY BE ACCOMPLISHED BY THE USE OF WOODEN AND STEEL. MAXIMUM ADJUSTMENT SHALL BE 8".

DESIGN NOTES
SIZE AND LENGTH OF "A" BARS TO BE DETERMINED BY THE DESIGNER.
STEEL SHOWN IS ADEQUATE TO DEPTHS UP TO MAXIMUM ALLOWABLE FOR INLET TYPE 8 & 9.
FIELD CUT BAR STEEL SHOWN IS ADEQUATE TO DEPTHS UP TO MAXIMUM ALLOWABLE FOR INLET TYPE 8 & 9 WITH A UNIT WEIGHT OF 1000 LBS.

MEDIAN INLET PLAN
INLET COVER NOT SHOWN

SECTION A-A
SECTION C-C
SECTION B-B
SECTION D-D

STANDARD 36.04
**NOTES**

- For materials, fabrication, construction, and design of Precast Box Culverts not shown or stated on this drawing, shall be in accordance with the current edition of the Bridge Design Specifications & Special Provisions, Bridge Manual; Wisconsin DOT Standard Bridge Design Specifications; and Design of Precast Box Culverts Not Shown or Stated on This Drawing Shall Be in Accordance with the Current ASTM Specification, C1577; AASHTO LRFD Bridge Manual; Wisconsin DOT Standard Bridge Design Specifications; and Design of Precast Box Culverts Not Shown or Stated on This Drawing Shall Be in Accordance with the Current ASTM Specification, C1577; AASHTO LRFD Bridge Manual; Wisconsin DOT Standard Bridge Design Specifications; and Design of Precast Box Culverts Not Shown or Stated on This Drawing Shall Be in Accordance with the Current ASTM Specification, C1577; AASHTO LRFD

- **CONCRETE**
  - Grade 'B' (See Section 645.2.2.4 of the Standard Specification. (Fabric not required over inside wall joints of multicell installations.))
  - The geotextile preformed mastic must conform to AASHTO materials specification M198, type B. A 2'-0" strip of geotextile type D9 must be used over the joints on the top and on the sides of the culvert. The geotextile small should conform to section 645.2.2.4 of the standard specification. (Fabric not required over inside wall joints of multicell installations.)
  - The joint on the bottom of the culvert and the sides of the culvert from the bottom to the point (top) from the center of the curb shall be filled with a preformed mastic. The mastic shall be placed over the joint and, if a 2'-0" strip of geotextile type D9 is used, it shall be placed over the mastic on the top and on the sides of the culvert. The mastic small should conform to section 645.2.2.4 of the standard specification. (Fabric not required over inside wall joints of multicell installations.)
  - When two or more barrels are installed in parallel, the clear spacing between barrels shall be 2 inches, and the space between adjacent barrels from top of sleeve to top of stop slab shall be filled with grade 6 concrete.

- **EARTH COVER**
  - Not less than 565 lbs. of cementitious materials except that the concrete mixture shall contain not less than 25 lbs. of cementitious materials per cubic yard.

- **REINFORCEMENT**
  - Dimensions shall be 1 inch or 2 inches as shown with an allowable variation of ±3/8" to + 1/4".
  - The spacing center to center of the circumferential wires shall not be less than 2 inches nor more than 4 inches. The wire spacing center to center of the longitudinal wires shall not be more than 8 inches.
  - The wires shall not be more than 8 inches in diameter. The wires shall be spaced at 1'-0" centers, unless approved by the engineer. The wires shall be rigidly held in place by concrete plugs secured with Portland cement mortar or other approved method.
  - The cover of concrete over the reinforcement shall be from 5 to 8 inches, as shown with an allowable variation of ±3/8" to + 1/4".
  - The spacing center to center of the longitudinal wires shall not be less than 2 inches nor more than 4 inches. The spacing center to center of the circumferential wires shall not be more than 8 inches.
  - The cover of concrete over the reinforcement shall be from 5 to 8 inches, as shown with an allowable variation of ±3/8" to + 1/4".
  - The wires shall be spaced at 1'-0" centers, unless approved by the engineer. The wires shall be rigidly held in place by concrete plugs secured with Portland cement mortar or other approved method.

- **JOINT TIES**
  - Eye bolt ties or welded pipe ties may be used. The cover of concrete over the reinforcement shall be from 5 to 8 inches, as shown with an allowable variation of ±3/8" to + 1/4".
  - The spacing center to center of the longitudinal wires shall not be less than 2 inches nor more than 4 inches. The spacing center to center of the circumferential wires shall not be more than 8 inches.
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NOTES
ALL BAR STEEL REINFORCEMENT SHALL BE CUT 2" CLEAR AROUND OPENING.

DESIGNER NOTES
DETAILS SHOWN ARE FOR CAST-IN-PLACE CULVERTS. PRECAST CULVERT DETAILS TO BE SIMILAR

PIPE OPENING IN CULVERT WALL

ELEVATION

WHEN D = 6 FT* 5 x 10FT
WHEN D = 3 FT* 5.1 x 10FT MAX

All bar steel reinforcement shall be cut 2" clear around opening.

Details shown are for cast-in-place culverts. Precast culvert details to be similar.
GUARDRAIL POST ANCHORS TYPE 1

USE FOR THICKNESS T OF 4 INCHES OR MORE AND MINIMUM CONCRETE STRENGTH (F) OF 4,000 PSI

GUARDRAIL POST ANCHORS TYPE 2

USE FOR THICKNESS T OF 8 INCHES OR MORE AND MINIMUM CONCRETE STRENGTH (F) OF 3,500 PSI

GUARDRAIL POST ANCHORAGE SYSTEM

NOTES

DESIGN CRITERIA FOR POSTS, PLATES, ANCHORAGE SYSTEM AND INSTALLATION DETAILS. THE DESIGN CRITERIA ARE NOT INTENDED FOR CONTRACT USE BUT ARE USED FOR THE ROADWAY DESIGN-

POST BASE PLATES AND BOTTOM PLATES IF/AdminL 3'-0" POSTS SHALL BE MADE OF MACHINE FABRICATED STEEL.

ELEVATION

GUARDRAIL POST ANCHORAGE SYSTEM

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POST BASE PLATES AND BOTTOM PLATES IF/AdminL 3'-0" POSTS SHALL BE MADE OF MACHINE FABRICATED STEEL.
**NUMBER OF ANCHORS PER WALL**

Approximate/Guideline

<table>
<thead>
<tr>
<th>Length of Wall</th>
<th>No. Anchors</th>
</tr>
</thead>
<tbody>
<tr>
<td>L ≤ 14'-0&quot;</td>
<td>2</td>
</tr>
<tr>
<td>L ≤ 20'-0&quot;</td>
<td>3</td>
</tr>
<tr>
<td>L &gt; 20'-0&quot;</td>
<td>4</td>
</tr>
</tbody>
</table>

*Note: Adjacent segments shall be attached to each other to keep front faces in alignment. Place a filler at these joints with a membrane along the joint at the back face.*

**WALL BACKFILL REQUIREMENTS**

- **Backfill Requirements**
  - **Soil**: In-situ
  - Minimum height: 4'-0" from finished grade
  - **Fill Grade**: To roadways

**Precast Three-Sided Box Culvert Design Notes**

- **Design Notes for Precast Concrete Structure**
  - **LRFD Design Loads**
    - Live Load: 3600 psf
    - Vertical Earth Pressure: Unit Weight = 120 psf
    - Horizontal Earth Pressure: Unit Weight = 125 psf
    - Live Load: HL-93
  - Elevation: 1'-0" above the precast arch and provide a depth of fill measured from top of arch crown to top of roadway, at least equal to the minimum embedment depth shown on S.D.D. 14 B 32-1 and 34-1.
  - For shorter span culverts, where beam guard crosses the length of the structure, consideration shall be given to the details shown on S.D.D. 14 B 43-1. All requirements on this standard can be met by a concrete barrier.
  - Provide a suitable drainage pipe along the culvert and wingwalls to release hydrostatic pressure, where significant seepage or drainage and accumulation of water is anticipated behind the wall. Incorporate a drainage system, adjacent to the wall, to conduct drainage directly from drainage pipe to head wall along the exterior face of the wall or to the storm water conveyances.
  - Place fillings below scour and frost depth; place bottom of footing at a minimum depth equal to providing roof depth on scour depth but not less than 4'-0" below ground elevation unless constructed on rock foundation or otherwise included.
  - Provide suitable joint system between vertical leg of the precast segment and footer as indicated on the standard detail drawings.
  - Sensing of reinforcement for precast bridge units - the outside and inside circumferential reinforcing steel for the corners of the bridge shall be bent to such an angle that it is approximately equal to the configuration of the bridge's outside corner.

**Backfill Structures**

- **Standard Details**
  - **Backfill Structure Limit**
  - **Excavation Limits**
  - **C.I.P. Footings**

**Bill Oliva**

**DATE:** 1-18

**BUREAU OF STRUCTURES**

**PRECAST THREE-SIDED BOX CULVERT DESIGN NOTES**