11.1.1

**CONSTRUCTION**
(AND/OR Φ OF SURVEY)

(Name of highway)

Equation of Φ of Survey and Φ of Channel

Station

Station

Length of culvert

face to face of copings

12" (TYP.)

W.P. Intersection of face of wall of curvert and face of wingwall (Typ.)

1" PREFORMED FILLER (TYP.)

SEE DETAIL A

Joint sealer
square section
both faces

barrel

WRAP BOX

12" (TYP.)

15" (TYP.)

X"-X"

(channel width)

12" DEEP RIPRAP (TYP.)

Angle to be determined from slopes & angle "A" (Typ.)

Flow

Channel paving, as required by velocity of water and relative stability of banks to resist erosion.

PLAN

SCALE: ¼" = 1'-0"
1. Construction Drawings will be prepared incorporating the design features shown in these standards.
2. Borings: At least two borings will be taken for each culvert. A boring plan will be prepared in accordance with Bridge Manual standards.
3. Show typical channel cross section.
4. Note on Sketch Plans and Construction Drawings design loading used.
5. Ends of culverts to be parallel to C of construction up to 10'-0" of cover. Where height of cover is 10'-0" or more, ends of culverts are to be square regardless of skew of culvert.
6. Bottom of footing should not be less than 4'-0" below bed of stream.
7. Show approximate existing ground.
NOTES:
1. Expansion joints 70’-0” O.C., Max.
2. Construction joints 25’-0” O.C., Max.
3. Show approximate existing ground.
4. Show approximate guardrail system with sufficient height of cover for post embedment. Otherwise, consider culvert with roadway on barrel roof.
**Typical Plan**

**Flow**

**X' - X''** (channel width)

**Curved Line**

**15" (TYP.)**

**12" (TYP.)**

**6" (TYP.)**

**Approach Slab (Typ.)**

**W.P. Intersection of wall of curvert and face of wingwall (Typ.)**

**1" Preformed Filler (Typ.)**

**6" (TYP.)**

**12" (TYP.)**

**12" Deep Riprap (Typ.)**

**PLAN**

**Scale:** $\frac{1}{4}" = 1' - 0"$

**Channel Paving, as required by velocity of water and relative stability of banks to resist erosion.**
Check with Bridge Section for Min. clearance above design water level elevation

Top of riprap (same as design water elevation)

Railing or Traffic barrier system (See chapter 9)

5" (Centered both ways, bedded into concrete)

EL.

20XX

EL.

1:5:1 (TYP.)

Observe and record water level elevation Date

CONST. JT.

12" RIPRAP (TYP.)

EL.

CURTAIN WALL

EL.

EL.

EL.

EL.

EL.

EL.

2:1 SLOPE (TYP.)

ELEVATION

SCALE: 1/4" = 1'-0"

NOTE:
See notes on Dwg. No. 11.1.2.
LONGITUDINAL SECTION

SCALE: ¼" = 1'-0"

NOTES:
1. Expansion joints 70'-0" O.C., Max.
2. Construction joints 25'-0" O.C., Max.
3. Show approximate existing ground.
PRECAST APPROACH SLAB SHELF — DETAILS

SCALE: 1" = 1'–0"

NOTE:
This detail is to be used with Approach Slab Type I.
NOTE:

THE CONTRACTOR MAY SUBSTITUTE #5 DOWELS, FOR MECHANICAL REINFORCING BAR SPLICERS AND THREADED REBARS.

C.I.P. APPROACH SLAB SHELF – DETAILS

SCALE: 1” = 1’-0”

NOTE:

This detail is to be used with Approach Slab Type I.
NOTES:

1. MAXIMUM BEARING PRESSURE = XXX KSF.

2. TRANSVERSE REINFORCING SHALL BE PLACED NORMAL TO THE Q OF THE CULVERT.

SECTION THRU BARREL

SCALE: \( \frac{\frac{1}{4}"}{1'-0"} \)

NOTE:

For Designer Notes see Dwg. No. 11.3.2
NOTES: (for use with details on Dwg. No. 11.3.1)

1. All culverts shall be:
   • designed and detailed in accordance with the provisions noted in Paragraph 3.3.4 of Part I of this LRFD Bridge Manual.
   • assigned a Bridge Number (BDEPT#) and a Bridge Identification Number (BIN) when the square span is 4 feet or greater.
   • submitted for approval in accordance with the Sketch Plan requirements of Paragraph 2.7 of Part I of this Bridge Manual when the square span is 10 feet or greater.

2. The reinforcement shown is conceptual. Standard dimensions, reinforcing, and detailing for single-cell Precast Concrete Box Culverts shall be as per design tables of the Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers Designed According to the AASHTO LRFD (ASTM C1577–08). If special design for sizes and/or loads other than those specified in the referenced design tables is necessary, it shall be based on the criteria as specified in Paragraph 3.3.4 of Part I of this LRFD Bridge Manual.

3. Membrane waterproofing with a waterproofing protective course shall be used where roadway pavement is directly on the structure and on all structures where the clear span is over 20’–0”. Use bituminous damp-proofing where roadway is not directly on the structure and the clear span is less than 20’–0”.

4. The horizontal and vertical haunch dimensions shall be equal to the sidewall thickness in inches. If haunches with other dimensions are used, a special reinforcement design for the actual dimensions shall be completed.

5. For cases involving a cover in excess of 40’ an alternate design such as a reinforced concrete arch should be considered.
NOTES:
1. THE CONTRACTOR MAY SUBSTITUTE #5 DOWELS, 3’-0” LONG FOR MECHANICAL REINFORCING BAR SPLICERS AND THREADED REBARS.
2. CULVERT REINFORCEMENT IS NOT SHOWN FOR CLARITY.

SECTION AT WINGWALL
SCALE: \( \frac{1}{2}” = 1’-0” \)
NOTES:

1. THE CONTRACTOR MAY SUBSTITUTE #5 ∩ DOWELS, FOR MECHANICAL REINFORCING BAR SPLICERS AND THREADED REBARS.

2. CULVERT REINFORCEMENT IS NOT SHOWN FOR CLARITY.

CULVERT END DETAIL

SCALE: 1" = 1'-0"

NOTE:
Coping for roadway over fill shown. For roadway on barrel roof, use appropriate sidewalk and/or safety curb details shown in Chapter 9.
NOTES:

1. THE CONTRACTOR MAY SUBSTITUTE #5 DOWELS, 3’-0” LONG, FOR MECHANICAL REINFORCING BAR SPLICERS AND THREADED REBARS.

2. CULVERT REINFORCEMENT IS NOT SHOWN FOR CLARITY.

SECTION 1
SCALE: 1” = 1’-0”

NOTE:
CULVERT REINFORCEMENT IS NOT SHOWN FOR CLARITY.

SECTION 2
SCALE: 1” = 1’-0”