### GENERAL NOTES:

- **DESIGN SPECIFICATIONS:** AASHTO LRFD Bridge Design Specifications, 3rd Edition.
- **LIVE LOAD:** HL-93.
- **CONSTRUCTION LOADING:** It is the construction Contractor's responsibility to provide for supporting construction loads that exceed AASHTO HL-93, and any construction load applied prior to a test of compacted fill placed above the top slab.
- **SURFACE FINISH:** All concrete surfaces shall receive a general surface finish.
- **SKEWED CONSTRUCTION JOINTS:** Construction joints in barrels of culverts with skewed wingwalls may be placed parallel to the headwalls and the reinforced steel and the slabs may be cut provided that the cut reinforcing steel extends beyond the construction joint enough for splices to be made in accordance with Table 1 on this sheet. The cost of construction joints and additional reinforcing shall be at the expense of the Contractor.
- **CULVERT EXTENSIONS:** For cut backs and ties into existing concrete box culverts see Sheet 6 of 7.
- **REINFORCING STEEL:** ASTM A615, see the "Box Culvert Data Tables" in the Contract Plans for grade and bar spacing. See the Reinforcing Bar List in the Contract Plans for bar sizes and bar bending details.

### SCHEMATIC "A" - PLAN VIEW

**HEADELL & WINGWALL ALIGNMENT**

**For Headwall Skew and Wingwall Splices, See Schematic "A"**

**For Headwall Skew and Wingwall Splices, See Schematic "A"**

### SCHEMATIC "B" - PLAN VIEW

**CULVERT ALIGNMENT**

**For Culvert Splices see Contract Plans**

### TABLE 1 - MINIMUM BAR SPACEL LENGTHS FOR LONGITUDINAL REINFORCING

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>1400 psi (25 ksi)</th>
<th>1500 psi (25 ksi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>2-9/&quot;</td>
<td>2-3/&quot;</td>
</tr>
<tr>
<td>#2</td>
<td>1-7/&quot;</td>
<td>1-6/&quot;</td>
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<tr>
<td>#3</td>
<td>1-5/&quot;</td>
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<td>#4</td>
<td>1-3/&quot;</td>
<td>1-2/&quot;</td>
</tr>
<tr>
<td>#5</td>
<td>1-1/&quot;</td>
<td>1-1/&quot;</td>
</tr>
</tbody>
</table>

### INSTRUCTIONS TO DESIGNER:

1. Designs for box culverts shown in this Index are to be produced only by computer analysis, utilizing the Department's LRFD Box Culvert Program. Designs are to be limited to the live loads and dimensional restraints shown in the General Notes of this Index and to the ALL the barrel(s), as shown in the Contract Plans, as shown in the Contract Plans.
2. Headwalls with skew angles less than 50° or greater than 50° require special design authorization. Other design options should be considered. Contact the District Drainage Engineer to obtain authorization.
TYPICAL SECTION THRU SINGLE BARREL CULVERT

1. Space Bars 110 and 112 with a bar in each corner, and at the 5% of interior walls (for multiple barrel culverts only), and the remaining bars placed at equal spacing shown in the Contract Plans.  Adjust last bar spacing when required.
2. Place Bars 113 and 114 at spacing shown in the Contract Plans evenly between Bars 109 and 111.
3. Locate the first transverse bar from the ends of the culvert at one half the bar spacing, but provide the minimum reinforcement cover and not greater than 4" clear.

TYPICAL SECTION THRU MULTIPLE BARREL CULVERT

WINGWALL ELEVATION - Variable Height
(Left End shown - other corners similar)

WINGWALL SECTION A-A

1. Align construction joint perpendicular to wingwall.
2. In the vicinity of the construction joint, field bend reinforcement as necessary to maintain minimum reinforcement cover.
3. For constant height wingwalls, variable length Bars 403, 405, & 406 are not required, and all such the limits of Bars 401 & 407 extend the full length of the wingwall, and the limits of Bars 402 & 404 extend to the full height of the wingwall.
MULTIPLE BARREL BOX CULVERT
(Skewed Culvert With Skewed Wingwalls Shown)

NOTES:
2. WP = Working Point, used for wingwall layout and location of construction joint. See Detail C (Sheet 5).
NOTES:
1. For small angles, the Contractor may elect to fill the area between the box and the wingwall footing with unreinforced concrete. For wingwall skew angles less than 30 degrees, field bond wingwall reinforcement as necessary while maintaining cover. No additional payment will be made for this work.
2. Location of Construction Joint determined by WP at theoretical intersection of:
   - Solid side of Headwall and outside face of box Exterior Wall for SW90°.
   - Outside face of Wingwall and outside face of box Exterior Wall for SW180°.
3. Provide 6" chamfer when angle "A" is greater than 45°. Maintain minimum wall thickness. Field adjust reinforcing to maintain cover.
4. Wingwall skew angles (SW) are measured from the adjacent box exterior wall to the wingwall.
5. Turn or extend Wingwall Cutoff Walls as necessary to meet Box Cutoff Wall.
6. Provide additional reinforcing in the top of the top slab below traffic railings to ensure a minimum area of 0.80 sq. in./ft. transverse reinforcing.
INLET TYPE A GRATE

NOTES:
1. Cost of Steel Grating to be included in cost of Box Culvert.
2. Reinforcing shall be 2" clear for Slightly and Moderately Aggressive Environments, and 3" clear for Extremely Aggressive Environments.

INLET IN TOP OF BOX CULVERT

LOCATION OF BOX CULVERT

The number is to be placed in the center of the top surface of all bridge culvert headwalls.

TOP VIEW OF HEADWALL

SECTION THRU RECESSG V-GROOVE TO FORM INScribed FIGURES

Base Plastic Figures 3" in height as approved by the Engineer may be used in lieu of numbers formed by 3/8" V-Grooves. V-Grooves shall be formed by a pressed figure.

BRIDGE CULVERT NUMBER LOCATION

FRIABLE BASE

The cost of furnishing and installing the friable base material shall be included in the cost of the Box Culvert.

ASPHALTIC CONCRETE BASE

Note: Base course is required when cross box culverts are located on facilities subject to high speed traffic 100+ mph or high traffic volumes 1,000,000 or more and the cover is within the range specified in the notation above.

EXTRA BASE FOR BOX CULVERTS CROSSING UNDER FLEXIBLE PAVEMENT

Concrete Box Culvert

Box Culvert with 3" of steel grating, 2" of concrete and 6" of asphaltic concrete base.