ALTERNATE BOTTOM SLAB TRANSVERSE JOINT
TYPICAL SECTION
(DOUBLE-SIDED TONGUE & GROOVE JOINT)
(All reinforcing not shown for clarity)

NOTE:
Bottom Slab Joints in Type B Boxes may be single tongue & groove joints as shown in Section A-A when the Top Slab Joints are oriented as shown in Schematic "A".

SCHEMATIC "A"
TYPE B BOX SECTION PLACEMENT
FOR SINGLE TONGUE & GROOVE JOINTS

PRECAST SEGMENT TO SEGMENT TONGUE & GROOVE TRANSVERSE JOINTS

TWO-PIECE PRECAST SEGMENT
ADDITIONAL JOINT DETAILS
(TYPE B BOX)
**SECTION C-C**

**C-I-P HEADWALL DETAILS AND CONNECTION TO PRECAST BOX**

- **Face of C-I-P Wingwall/Headwall**
- **1/2" x 3/4" Chamber**
- **1'-6" Min. Lap Splice (when req'd.)**
- **Thickness of C-I-P bottom slab in plans (Tb)**
- **Circumferential bottom slab reinforcing**
- **Longitudinal bottom slab reinforcing**
- **Cutoff wall reinforcing (Typ.)** (See C-I-P design in plans)
- **C-I-P End Section** (As per Plans)
- **Precast Box Culvert**

**SECTION D-D**

**C-I-P TOE SLAB & CUTOFF WALL DETAILS AND CONNECTION TO PRECAST BOX**

- **Provide additional 6" depth of cutoff wall at no additional cost.**
- **Field bend & trim bottom bar extension as shown to maintain cover**
- **Precast Box Culvert**

**SECTION E-E**

**EXTERIOR WALL/SLAB TRANSITION DETAIL FOR PRECAST EXTENSION**

- **Type I Connection shown, Type II Connection similar**
- **Section of Existing Box Culvert to be removed and replaced, for Type I Connection.**
- **Filter Fabric wrapped around construction joint**
- **Precast Box Culvert**
- **Filter Fabric (full length of horizontal joint)**
- **Equivalent reinforcing to C-I-P design shown in plans**
- **Mechanical couplers or 2'-0" extension of precast box reinforcing**
- **Longitudinal reinforcing**
- **Inside Face of Wall/Slab**
- **Top Slab**
- **C-I-P Transition**
- **Cast-In-Place (C-I-P) Transition**
- **4'-0" (Typ.)**
- **Precast Box Culvert**

**TYPE B BOX LONGITUDINAL JOINTS**

- **Type D-3 Filter Fabric (full length of horizontal joint)**
- **Mechanical couplers or 1'-0" bar extension (full length bar extension or adhesive bonded dowel bars with 1'-0" embedment permitted)**
- **1'-3" Min. Lap Splice (when req'd.)**
- **1'-0" Min. ~ 3" Max.**
- **See Index 400-289 for C-I-P Transition details**
- **4" Min. ~ 5 1/2" Max.**
- **#4 Stirrups @ 1'-0" Max. spacing**
- **Typ. Cover 8" Min.**
- **#4 STIRRUP BEND DIAGRAM**

**Top Slab to Wall Joint (KEYED JOINT)**

- **Provide adequate width to satisfy shear strength requirements at joint**

**Top Slab to Wall Joint (HAUNCH JOINT)**

- **Provide additional 6" depth of cutoff wall at no additional cost.**
- **Provide additional 6" depth of cutoff wall at no additional cost.**
PIPE BLOCKOUT NOTES:
1. Cut box culvert reinforcement as required to maintain 2" cover.
2. For Precast Sections construct opening a minimum of 1'-4" away from any box to box joint, except opening may be a minimum of 1'-5" away from joint when at least 2'-0" of clearance to the box to box joint is provided on the opposite side of the pipe opening.
3. Pipe blockout diameter to be 6" greater than pipe outside diameter.
4. See Drainage Plans for size, placement, and invert elevation.
**DIFFERENTIAL SETTLEMENT COUNTERMEASURES FOR PRECAST BOX CULVERTS**

**LINK SLAB NOTES:**
1. Provide a Cast-In-Place Link Slab to ensure uniform joint opening of precast box culverts when the differential settlement shown in the plans exceeds the following limits, except that a Link Slab is not required for differential settlements less than \( \frac{1}{2} " \).

\[
\Delta Y = \frac{11V}{760 x R x W}
\]

Where:
- \( \Delta Y \) = Maximum Long-Term Differential Settlement (ft.)
- \( R \) = Exterior height of Box Culvert (ft.)
- \( W \) = Length of Box Culvert Segments (ft.)
- \( L \) = Effective length for single curvature deflection (ft.)
2. Extend Link Slab to back face of headwalls and to limits of existing box culverts for extensions.

**NOTE:** Estimated quantities are based on the plan area of precast box slabs, and are provided for information only. No additional payment will be made for Link Slabs where these are required for the precast box culverts.

**PRECAST CONCRETE BOX CULVERTS - SUPPLEMENTAL DETAILS**

**BILL OF REINFORCING STEEL**

<table>
<thead>
<tr>
<th>MARK</th>
<th>SIZE</th>
<th>NO. REQ'D</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>4</td>
<td>2 per Barrel/ft.</td>
<td>1'-3&quot;</td>
</tr>
<tr>
<td>N</td>
<td>4</td>
<td>As Req'd</td>
<td>As Req'd</td>
</tr>
</tbody>
</table>

**REINFORCING STEEL BENDING DIAGRAMS**

**NOTES:**
1. All bar dimensions are out to out.
2. Lap splice length for Bars 4M is 1'-4" minimum.

**DESIGN NOTE:**
1. Link Slab required when joint openings from differential settlement exceed \( \frac{1}{2} " \) as determined in Link Slab Note 1.