WING DIMENSION CALCULATIONS:

\[ \text{Total Wingwall Area (SF)} = (0.5) (Hw + 0.333') (Lw) (N + 1) \]

\[ \text{Atw} = (N) (S) + (N + 1) (U) \]

\[ \text{Lw} = (Hw - 0.333') (SL) \]

\[ \text{Hw} = H + T + C - 0.250' \]

Pipe runners are designed for a traversing load of 1,800 pounds traverse the openings approximately perpendicular to the pipe runners.

SLOPE calculation:

\[ \text{Side slope ratio (horizontal : 1 vertical)} \]

Pipe runners are designed for a traversing load of 1,800 pounds traverse the openings approximately perpendicular to the pipe runners.

The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners. Pipe runners are designed for a traversing load of 1,800 pounds traverse the openings approximately perpendicular to the pipe runners.

The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

GENERAL NOTES:

- Provide Galvanized reinforcing steel if required elsewhere in the plans.
- Adjust reinforcing as necessary to provide a minimum clear cover of 1.5".
- Provide Class "C" concrete (f'c = 3,600 psi).
- Provide reinforcement conforming to the Box Culvert Precast Miscellaneous Details (SCP-MD) standard sheet.

TYPICAL INSTALLATION:

- Provide pipe runners, cross pipes, and anchor pipes meeting the requirements of AASHTO LRFD Bridge Design Specifications.
- Provide specified concrete, reinforcement, and curing.
- Provide standard culvert construction as specified in "TxDOT Standard Sheet", Appendix B.3, "Details of Culvert and Wingwall Construction".

WING WALL DESIGN:

- Provide standard culvert construction as specified in "TxDOT Standard Sheet", Appendix B.3, "Details of Culvert and Wingwall Construction".
- Provide standard culvert construction as specified in "TxDOT Standard Sheet", Appendix B.3, "Details of Culvert and Wingwall Construction".
- Provide standard culvert construction as specified in "TxDOT Standard Sheet", Appendix B.3, "Details of Culvert and Wingwall Construction".

Plan Views of Corner Details:

1. Recommended values of slope are: 3:1, 4:1, and 6:1.
2. 3'-0" to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures where the angle of cut and run is greater than 40°, refer to the "Exceptional Curb Height (ECCH)" standard sheet.
3. Reinforcement and slab thicknesses may be equal to the adjacent curb wall and slab thicknesses (3'-0" minimum). If thicknesses greater than the minimum (3'-0") are used, no changes will be made in quantities and no additional compensation will be allowed for this work.
4. For vehicle safety, reduce curb height, if necessary, to provide a maximum 3'-0" projection. No changes will be made in quantities and no additional compensation will be allowed for this work.
5. For culverts with C = 0", the precast curb reinforcing may extend 1'-0" minimum into wingwall. Wingwall reinforcing shall be detailed as shown.
6. All other calculations and details for TxDOT "Safety End Treatments", Appendix B.3, "Details of Culvert and Wingwall Construction".

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcement dimensions are out-to-out of bars.
**CROSS PIPE INSTALLATION DETAILS**

Pipe runner length = 3' x ε/3 cross pipe diameter.

**OPTION A**

FOR USE IN OUTSIDE CULVERT BAY

**OPTION B**

FOR USE IN INSIDE CULVERT BAY

**CROSS PIPE AND CONNECTIONS DETAILS**

**BOTTOM ANCHOR PIPE DETAILS**

**BOTTOM ANCHOR TOEWALL DETAILS**

(Swingwall not shown for clarity.)

**CROSS PIPE SLEEVE PIPE DETAILS**

**SIDE ELEVATION**

(Showing pipe runner with Cross Pipe Connection Option A1 and Bottom Anchor Toewall Option B2. Wingwall not shown for clarity.)

**PIPE RUNNER DETAILS**

**NOTE:** At Contractor's option, make the cross pipe continuous across the inside wingwall. If option is selected, omit the sleeve pipe and make a 3/8" diameter through hole in the cross pipe to accept the anchor bolt at the centerline of each inside wingwall.

**OPTION A**

**OPTION B**

**TOP VIEW**

(Swingwall not shown for clarity.)

**SIDE ELEVATION**

(Showing pipe runner with Cross Pipe Connection Option A1 and Bottom Anchor Toewall Option B2. Wingwall not shown for clarity.)

**SAFETY END TREATMENT**

For 0° skew box culverts (maximum Hw = 7'-0") type 1 - Cross drainage

**MAXIMUM PIPE RUNNER LENGTHS AND REQUIRED PIPE RUNNER AND ANCHOR PIPE SIZES**

<table>
<thead>
<tr>
<th>Maximum Pipe Runner Length</th>
<th>Required Pipe Runner Size</th>
<th>Required Anchor Pipe Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1' - 2'</td>
<td>4&quot; STD</td>
<td>2&quot; STD</td>
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<tr>
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<td>3&quot; STD</td>
<td>1&quot; STD</td>
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<tr>
<td>2' - 3'</td>
<td>5&quot; STD</td>
<td>3&quot; STD</td>
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<tr>
<td></td>
<td>4&quot; STD</td>
<td>2&quot; STD</td>
</tr>
<tr>
<td>3' - 4'</td>
<td>6&quot; STD</td>
<td>4&quot; STD</td>
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</tbody>
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**FILE:** setbcdse-20.dgn

**REVISIONS**

February 2020