The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made.

TYPICAL SECTION ~ TYPE 1

Used when the top of the Retrofit Curb is less than 8" above existing slab. Showing T222 Rail, other rails similar. Bars #6s on T222 and C222 Rails are not used for this structure. Bars M6A1.4 required on standards T80HT, T80SS and T224 are not required when used with the RAC-R standard.

TYPICAL SECTION ~ TYPE 2

Used when the Retrofit Curb is 8" in height or greater. Showing T222 Rail, other rails similar. Bars #6s on T222 and C222 Rails are not used for this structure. Bars M6A1.4 required on standards T80HT, T80SS and T224 are not required when used with the RAC-R standard.

CONSTRUCTION NOTES:

1. Field verify dimensions before commencing work and ordering materials.

MATERIAL NOTES:

- Provide Class "C" concrete (f'c=3,600 psi). Provide Class "C" (HPC) concrete if shown elsewhere.
- Embed bars D(#6) into existing wingwall with a Type III, or F1554 Gr 105 anchor adhesive. Minimum embedment at Retrofit Rails is 12". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26 kips. Submit signed and sealed calculations or the manufacturer's data sheet showing the proposed anchor adhesive's ability to develop the load for the engineer to apportion for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450. "C" is equal to the Retrofit Rail Anchorage Curb thickness. If "T" is less than 6", a special design will be required.
- Use straight anchors if retrofit anchorage curb is 1'-2" or greater in thickness. Use hooked anchors for retrofit anchorage curb less than 1'-2" thick.
- The total thickness ("T" plus "C") must be 8" minimum in order to properly install the railing anchorage reinforcing. The total thickness may be decreased as shown in the detail, provided the headwall is reinforced in accordance with new construction requirements.

MATERIAL NOTES:

- Provide straight anchor rods if retrofit anchorage curb is 1'-2" or greater in thickness. Use hooked anchors for retrofit anchorage curb less than 1'-2" thick.
- The total thickness ("T" plus "C") must be 8" minimum in order to properly install the railing anchorage reinforcing. The total thickness may be decreased as shown in the detail, provided the headwall is reinforced in accordance with new construction requirements.

GENERAL NOTES:

- Designed according to AASHTO LRFD Bridge Design Specifications.
- The rail anchorage curb details have sufficient strength for use with all standard rail types. See appropriate rail standard for approved space restrictions, notes and details not shown. When vehicle weight, the top of the new curb must be flush with the finished grade. These details are for use with curbs with a maximum height of 2'-0" only. Curb heights greater than 2'-0" will require special design. Buildouts and acid seal on the pavement necessary for this installation is considered subsidiary to the rail anchorage curb. Payment for rail anchorage details is not included in the "C" of Class "C" (HPC) concrete.
- Not all possible combinations of existing box culverts, curbs, wingwalls, etc. have been shown on this sheet. Other combinations and reinforcement arrangements are permissible if they meet the same strength requirements as indicated on this sheet.

Shear dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are not cut-on size of material.
Note that Wingwall Rail Anchorage Curb is used only at culverts with parallel wingwalls.

**TYPICAL CURB PLANS**

Showing Geometry only. Reinforcing, Curb Anchors, and Railing not shown for clarity.

**TYPICAL ELEVATIONS OF INSTALLATION**

**SHOWING CULVERT ANCHORAGE CURB**

Showing Anchorage curb Type 2. Anchor and Bars S splicing are the same for Anchorage Type 1.

**SHOWING WINGWALL ANCHORAGE CURB**

Curb Slab and slab reinforcing not shown for clarity.

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1. "C" is equal to the existing culvert top slab thickness. If "C" is less than 6", a special design will be required. "T" is equal to the Retrofit Rail Anchorage Curb thickness.
2. Retrofit Wingwall Anchorage Curb must always be 6'-0" in height. Breakback existing wingwall as needed in order to properly align the wingwall Anchorage Curb with that placed on the existing culvert. Saw cut (score) 1" deep on field side face of the existing wingwall prior to breakback. Care must be taken so as to avoid possible damage to field side face or to not damage existing reinforcing. The bar end anchorage depth can be the existing culvert thickness if the base of the culvert is below the top slab, but must be increased accordingly if the existing culvert is not cut down to the existing top slab thickness. The bar end anchorage depth required is 3'-4". Use hooked anchors for retrofit anchors less than 1'-2" thick. Use horizontal anchor bars for retrofit anchor bars less than 1'-2" thick. Use option B if wingwalls or rail anchorage curb will be vertically raised. Use Option A if finished grade at face of rail anchorage curb remains unchanged, or if both wingwalls and rail anchorage curb will be vertically raised. Existing wingwalls must be checked for suitability of vertically raising. Use option B if wingwalls will not be vertically raised when the curb height is increased. Verify adequacy of existing or proposed finished grade between end of rail anchorage curb and wingwall. Extension of rail anchorage curb beyond wingwall may need to be greater than "C", depending on side slope conditions.