

PRECAST CONCRETE BOX CULVERT
(REV 9-23-14)

ARTICLE 410-1 is deleted and the following substituted:

410-1 Description.

Provide precast four-sided concrete box culverts as an alternative to the structure shown in the Contract Documents. Only monolithic segments, or two-piece segments with three-sided bottom sections and a simple support top slab section, are permitted. Two-piece segments are limited to installations with a minimum of two feet fill height above the top slab.

Construct headwalls, wingwalls and other special features using cast-in-place concrete. Precast wingwalls, cut-off walls or headwalls are not permitted unless otherwise noted in the Contract Documents.

Meet the requirements in 449-1.

ARTICLE 410-2 is deleted and the following substituted:

410-2 Materials.

Ensure that the materials used for the construction of precast box culverts have certification statements from each source, showing that they meet the applicable requirements of the following:

Portland Cement Concrete	Section 346
Reinforcing for Concrete	Section 415
Precast Concrete Drainage Products	Section 449
Wire for Site Cage Machines	Section 931
Coarse Aggregate*	Section 901
Fine Aggregate*	Section 902
Curing Materials for Concrete	Section 925
Materials For Concrete Repair.....	Section 930
Non-Shrink Grout	Section 934
Liner Repair Systems	Section 948
Joint Materials.....	ASTM C443, ASTM C877
.....	or ASTM C990
Geotextile Fabrics	Section 985

* The gradation requirements of aggregates are not applicable when using dry-cast concrete.

SUBARTICLE 410-4.1.1 is deleted and the following substituted:

410-4.1.1 Equivalent to Cast-In-Place Designs: Provide precast box segments identical to the plan details, including reinforcing steel grade or FRP reinforcing type, sizes and

spacings, concrete cover, concrete class, and slab and wall dimensions. Reinforcing bar sizes and spacings may be reduced provided the equivalent area of reinforcing is provided in each layer. Haunch dimensions may be increased with the approval of the Engineer, but not greater than 8 inches for box culverts with internal spans less than 6 feet, or 12 inches for box culverts with larger internal spans.

SUBARTICLE 410-4.1.3 is deleted and the following substituted:

410-4.1.3 Modified or Special Designs: Provide Modified Designs which differ from the standard precast designs in 410-4.1.2 with modifications to the wall and slab thickness, or haunch dimensions, or the use of FRP reinforcing. Provide Special Designs for sizes, elements and loads other than those referenced in 410-4.1.2. Redesign box culverts using the same AASHTO design specification, live load, hydraulic opening, fill height, minimum concrete class and concrete cover as shown in the Contract Documents. Special Designs will be required for all two-piece concrete box culvert segments. Provide a minimum member thickness not less than 75% of the thickness of the corresponding member of an equivalent Index No. 292 box culvert, but not less than 7 inches for culverts with 2 inch concrete cover or 8 inches for 3 inch concrete cover. Perform a bridge load rating in accordance with the Structures Design Guidelines, for any redesign with a total span equal to or greater than 20 feet, when measure between the inside face of end supports, along the centerline of the roadway crossing.

ARTICLE 410-5 is deleted and the following substituted:

410-5 Other Elements of a Precast Box Culvert System.

Extend reinforcing from precast sections to provide adequate splice lengths or utilize a mechanical rebar splicing system (steel reinforcing only) listed on the Department's Approved Product List (APL) for securing reinforcing dowels for headwalls, toe walls and wingwalls.

Cast all elements of the headwalls and wingwalls (footing and stem) in-place, unless otherwise noted in the Contract Documents. Cast all cut-off or toe walls for precast box end segments in-place only. Extend the depth of cut-off or toe walls an additional 6 inches with the limits of the bedding material. Bedding material and compaction requirements for wingwalls are the same as required for precast box sections, except that the granular material may be placed to the inside edge of the toe wall, unless otherwise specified in the Contract Documents. Bedding material is not required for cast-in-place wingwall footings.

All requirements of Section 400 and Section 415 apply to the fabrication of these elements. Backfill the locations behind the walls in accordance with the requirements of Section 125.

SUBARTICLE 410-6.4.6 is deleted and the following substitute:

410-6.4.6 Position of Reinforcement: Meet the requirements of 415-5.10.2 for the maximum variation in the position of slab reinforcing. Meet the requirements of 415-5.8.2

for the maximum variation of wall reinforcing, except that the concrete cover must not be less than 1/4 inches nor more than 1/2 inches from the design dimensions.

ARTICLE 410-14 is deleted and the following substituted:

410-14 Basis of Payment.

Price and payment will be full compensation for all work specified in this Section, including the cost of special bedding material and its placement, additional cut-off or toe wall depth, temporary sheet piling, graded forms, joint materials, filter fabric material, attachment of the filter fabric, dewatering, excavation, channel excavation and lining, backfilling, restraining devices and any other materials or equipment necessary to make a complete and accepted installation.

Payment will be made under pay items for concrete (culverts), reinforcing steel (roadway), and FRP reinforcing.

Do Not Use Without
CO Specs Authorization