

Office of Bridge Design

Technical Memorandum

Date: February 8, 2005

To: All Bridge Engineering Staff

From: Kevin Goeden, PE 
Bridge Design Engineer

Subject: Technical Memorandum BTM05.1
Guidelines for Use of Drainage Structure Options

All plans for cast-in-place box culvert installations shall include an option for a precast concrete culvert installation unless the following conditions apply:

- Skew of proposed box culvert installation exceeds 10 degrees (for standard zero skew precast end sections).
- Special culvert end treatments that are not available/standard in precast are determined necessary (flared wing walls, slope tapered aprons, side tapered inlets, skewed parapets, water control structures, etc.).

Exceptions to these general rules may be considered where individual culvert site conditions allow. For instance, a culvert placed diagonally underneath a roadway intersection may fit better with zero skew (square) end sections and therefore a precast option could be viable there even though skew exceeds 10 degrees. Other site conditions such as depth of fill, size of culvert, channel configuration/depth, etc. may also be considered when evaluating viability of precast options. The decision whether to utilize options or not for locations with special conditions will be made during the structure TS&L inspection (with input from participants) and reflected in the site inspection report letter.

Individual culvert options must be entirely composed of one type of construction. No individual options composed of both precast and cast-in-place portions ("partial precast") will be provided.

When specifically requested by the Region/Area office, plans may call for individual sites to be strictly precast or partial precast concrete type culvert installations (with no other option) due to time/cost constraints associated with the proposed project construction sequencing plan.

All drainage type structure options for a given site must provide similar hydraulic performance. No option shall be allowed that produces a theoretical water surface profile elevation upstream of the inlet more than 0.25 feet higher than the corresponding flared wing box culvert option at the 100-year frequency. In no case shall an option result in a theoretical upstream water surface profile elevation exceeding that of the existing conditions by more than 1 foot at the 100-year frequency (where practical).

Precast box culvert options for proposed multiple barrel cast-in-place concrete box culverts must be composed of the same number of barrels or fewer to be considered equivalent (ie: Twin pipe culverts can not be an option for a single cast-in-place box. However, an equivalent single precast box may be an option for a cast-in-place twin box). Multiple barrel precast box options must be composed of the least number of barrel section types (ie: Triples must be composed of a double and a single side by side rather than three singles side by side; Quads must be composed of two doubles side by side, etc.).

Box culvert extension plans will not include structure options. Extensions shall be accomplished in-kind unless special circumstances apply (ie: construction sequencing time/cost considerations, location, etc.).

Reviewed by: _____

Approved by:  _____, Chief Bridge Engineer

cc: File