



MEMORANDUM

To: District Engineers
Attn: Directors of Transportation Planning and Development
and District Bridge Engineers

September 29, 2000

From: Mary Lou Ralls, P.E.
Director, Bridge Division

Subject: New Culvert and Drainage Standards (English)

The new Culvert and Drainage Standards (English), with an issue date of September 2000, are posted at the TxDOT web site and are available for immediate use. The new standards are available from the Bridge Standards (English) web page in MicroStation® “dgn” and Adobe® Acrobat® “pdf” formats; therefore, copies of the standards were not included with this memorandum. These are completely new standards replacing the old standards (last issue date of March 1997 and last revision date of July 1995). The new standards will permanently replace the old standards beginning with the March 2001 letting. Use of the new standards prior to this date will be at the district’s option. Due to the huge demand for these standards, preliminary versions were made available on the web site in early May. Several of these standards have been updated since their initial release; therefore, the user is strongly encouraged to check the TxDOT web site for the most current standards. Please distribute this information to the appropriate district staff and area offices as well as those consulting engineers working on TxDOT projects. What follows is a summary of the major changes from the old standards.

Summary of major changes:

Cast-In-Place Box Culvert Designs – The new box culvert standards were developed by hard converting the metric standards to English dimensions. Dimensions were rounded as necessary. All bar lengths and quantities were recalculated in English units. The new standards conform to current AASHTO specifications for HS20 loading. The old culvert standards were limited to 24 feet of fill for single box culverts and 6 feet of fill for multi box culverts. The new standards now have designs for up to 30 feet of fill for single box culverts and up to 23 feet of fill for multi box culverts. The required class and strength of concrete is now specified in the general notes on each standard sheet. This was done to resolve some confusion about the use of Class “A” concrete. The current Special Provision to Item 462 requires the use of Class “C” concrete except for top slabs of direct traffic culverts, which must be Class “S”. The single and multiple cast-in-place culverts now have miscellaneous detail sheets that cover skewed ends, angle sections and lengthening details.

Precast Culverts - The new precast culvert standards reflect the current ASTM designs and industry practice. The “Single Box Culverts Precast Miscellaneous Details” SCP-MD sheet addresses wingwall connections, multiple unit placements, angle sections, skewed ends and curb connections, which were previously not addressed. Please be aware that the two piece box designs shown on the old PC-7 standard have not been carried forward to the new standards. At this time use of these sections is very limited and to our knowledge there is only one fabricator

currently producing these sections. If there is sufficient demand for these in the future the Bridge Division will work with the precast industry to develop standards for this type of system.

Box Culvert Wingwalls & Pipe Culvert Headwalls - The old standards limited Wingwalls (And Headwalls) to 2:1 side-slopes. The new standards will allow slopes of 2:1, 3:1, 4:1 or 6:1. The required class and strength of concrete is now specified in the general notes. Class "C" concrete with a minimum 28-day compressive strength of 3,600 psi is required.

Box Culvert Curbs - Old box culvert standards used a standard 1' curb. With the new standards, the designer will specify curb heights. Any height from 0 to 5 feet may be used with no modification to the standards required.

Box Culvert Supplement Sheet (BCS) – This is a new sheet that summarizes the box culvert wingwall and safety end treatment quantities, dimensions and other pertinent information. There is an Excel® 97 spreadsheet that can be downloaded and used to assist in filling out this sheet. It can be downloaded from the Bridge Standards (English) web page on the TxDOT website. The user need only fill in a few simple input values, most of which are in pull-down-menus. The spreadsheet determines which box culvert standard applies, calculates wingwall dimensions, riprap apron, and curb quantities. The BCS sheet must be included in the plans for any box culvert with wingwalls or safety end treatment.

Safety End Treatments - The scope of the safety end treatments has been significantly expanded. The old standards were limited to 5' tall boxes/pipes, with a maximum hydraulic opening of 25 square feet. The new standards allow up to 10' tall boxes and 60" diameter pipes for cross-drainage structures and up to 7' tall boxes and 72" diameter pipes for parallel-drainage structures. Please note that the old sheets, PD-SPR, CD-SPR and SWW standards have been combined into individual safety end treatment standards SETB-CD, SETB-PD, SETP-CD and SETP-PD. The Safety End Treatments with wingwalls contain improved connection details that we believe will simplify construction and provide considerable tolerance for pipe runner lengths. Standard sheets SETB-SW-0, SETB-FW-0 and SETB-FW-S require the user to fill out information on sheet 3 of 3. Examples of calculations and a completed "sheet 3 of 3" are included in the standards. The previously mentioned Excel® 97 spreadsheet will also assist in calculating the required information for the safety pipe runners.

New Special Provisions to Items 466 & 467 – New special provisions to Item 466 "Headwalls and Wingwalls" as well as Item 467 "Safety End Treatment" have been written for use with the new standards. These special provisions are intended to clarify some of the inconsistencies in the current specification as well as to address payment issues created by the new standards. We anticipate final approval of these special provisions within the next few days. In the meantime, one-time use special provisions are available. Should you need assistance locating copies of the special provisions please contact Richard Morgan at the Bridge Division at (512) 416-2236.

Inlets, Drains & Manholes - The IL-C, IL-H, IL-S and MH-M standards have also been revised. The size of the ring and cover has been changed to provide a 22" clear opening. This was identified as a problem with the old standards, which specified a 16" opening. Most of our contractors found the smaller size difficult to access. A Bridge Drain Details sheet (BD) has also been developed. This is a new standard sheet which gives details for a deck drain casting.

Galvanized Metal End Section – The MH-1 standard “Metal End Sections for Corrugated Galvanized Metal Pipe Culverts” has been dropped. This is not a “Safety End” and the bid Items associated with it were dropped in the 1993 Specifications therefore the standard has not been carried forward to the new standards.

If you have questions or comments concerning these new standards, please contact David McDonnold, P.E., at (512) 416-2229 or Gregg Freeby, P.E., at (512) 416-2192.

Attachments

Note: Original signed by Mary Lou Ralls

cc: Administration
Division and Office Directors
Federal Highway Administration
All Bridge Division Employees