

HYDRAULIC DESIGN ADVISORY

HDA 08-01

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SUBJECT: ALLOWABLE PIPE MATERIALS FOR STORM SEWER SYSTEMS

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The December 15, 2006 changes to Section 112 of Title 23 of the U.S. Code required State DOT's to consider the allowance of all available pipe materials that are judged to be of satisfactory quality and equally acceptable on the basis of engineering and economic analyses. Where such materials appear to be equal, alternative bidding practices must be used as required by 23 CFR 635.411(b). Where alternative materials are determined to have different engineering and economic properties, State DOT's may select a specific material based on the required engineering properties and/or life cycle cost criteria. In such cases, the State DOT must provide documentation and request FHWA approval of its material selection decision on a project or program basis, as appropriate. Of significant importance with the December 15, 2006 changes to Section 112 of Title 23 was the elimination of provisions which exempted storm sewer systems from these requirements.

VDOT's current allowable pipe criteria provides for the use of alternative pipe materials in culvert installations under all roadway classifications and in storm sewer systems under our Lower Functional Classification Roadways (i.e., Rural Local Roads, Urban Local Streets and Subdivision Streets with 4000 ADT or less). However, for Higher Functional Classification Roadways (i.e., Rural and Urban Principal Arterial, Rural and Urban Minor Arterial, Rural and Urban Collector Roads/Streets and Subdivision Streets with greater than 4000 ADT), our current criteria allows only concrete pipe.

In order to become fully compliant with the current requirements in Section 112 of Title 23 of the U.S. Code, we find it necessary to add the following pipe materials to that currently allowed for the storm sewer systems under the Higher Functional Classification Roadways:

- Polymer Coated (10/10) Corrugated Steel Double Wall (Smooth Interior)
- Polyvinylchloride (PVC) Ribbed Pipe (Smooth Interior)
- Polyethylene (PE) Corrugated Type S

The use of these additional pipe materials will be restricted by the sizes and allowable heights of cover noted in the applicable sections of Road and Bridge Standard PC-1. The use of the Polymer Coated (10/10) Corrugated Steel Double Wall pipe is further restricted by the allowable pH range, resistivity range and velocity noted in Table C on Sheet 18 of the Road and Bridge Standard PC-1.

Where the alternative pipe materials are allowed for the storm sewer system, the Manning's "n" value of 0.013 shall be used in the design process for determining the required pipe size and initial hydraulic grade line elevations irrespective of the pipe material. Where the Hydraulic Engineer determines the elevations of the hydraulic grade line to be of critical importance, a "check" hydraulic grade line shall be computed using a Manning's "n" value of 0.011 to ensure the adequacy of the storm sewer system. For example, if using a Manning's n value of 0.013 the hydraulic grade line elevations are near the top of the structures (manholes, drop inlets, etc.), the prudent Hydraulic Engineer would then develop a "check" hydraulic grade line using a Manning's n value of 0.011 to ensure that the hydraulic grade line elevations remain below the top or throat elevations of the structures or, if necessary, make appropriate changes to the storm sewer system to ensure its adequacy.

Table A1 on Sheet 18 of the Road and Bridge Standard PC-1 is being revised to reflect the additional allowable pipe materials for storm sewer systems under the Higher Functional Classification Roadways. Until this revision is published, this HDA shall be authorization to include the alternative pipe materials on all projects that have not proceeded to the Pre-Advertisement Conference meeting, provided making such change will not impact the established advertisement schedule. Impacts to the advertisement schedule could occur where the storm sewer system must be reevaluated due to concerns related to potential hydraulic grade line elevation increases or where additional geotechnical information must be secured in order to evaluate the pH and resistivity values related to the use of steel pipe. Where a project can not be revised to include the alternative pipe materials, the project files shall be thoroughly documented as to the reason(s) and the office of the State Hydraulics Engineer shall be notified of such actions.