Appendix A – Recommended Manning's n Values*

Type of Conduit	Wall Description	Manning's n
Concrete Pipe	Smooth walls	0.010-0.013
Concrete Boxes	Smooth walls	0.012-0.015
Corrugated Metal Pipes and Boxes, Annular or Helical Pipe (n varies barrel size) See HDS5	68 mm by 13 mm (2-2/3 by ½ inch) corrugations	0.022-0.027
	150 mm by 25 mm 6 by 1 inch) corrugations	0.022-0.025
	125 mm by 25 mm (5 by 1 inch) corrugations	0.025-0.026
	75 mm by 25 mm (3 by 1 inch) corrugations	0.027-0.028
	150 mm by 50 mm (6 by 2 inch) structural plate	0.033-0.035
	230 mm by 64 mm 9 by 2-1/2 inch) structural plate	0.033-0.037
Corrugated Metal Pipes, Helical Corrugations, Full Circular Flow	68 mm by 13 mm (2-2/3 by ½ inch) corrugations	0.012-0.024
Spiral Rib Metal	Smooth walls	0.012-0.013
Plastic Pipe	Corrugated polyethylene, smooth	0.009-0.015
	Corrugated polyethylene, corrugated	0.018-0.025
	Polyvinyl chloride (PVC), smooth	0.009-0.011

* Note 1: The values indicated in this table are recommended Manning's n design values. Actual field values for older existing pipelines may vary depending on the effects of abrasion, corrosion, deflection and joint conditions. Concrete pipe with poor joints and deteriorated walls may have n values of 0.014 to 0.018. Corrugated metal pipe with joint and wall problems may also have higher n values and, in addition, may experience shape changes which could adversely affect the general hydraulic characteristics of the culvert.

Note 2: For further information concerning Manning n values for selected conduits, consult Hydraulic Design of Highway Culverts, Federal Highway Administration, HDS No. 5, page 163.