

### 4.3.4. Pipe Materials

The following gravity pipes materials are acceptable to DMAT:

Material	Relevant Standard for Pipe Manufacture	Comments
Concrete Pipes with Lining. Insitu concrete culverts with lining	BS5911, BS EN1916	Has the benefit of being available in rectangular culvert form
Unlined concrete pipe (For Al Ain city only)	ASTM C76M	
GRP	BS 5480	Cost-effective design possible due to choice of stiffness and optimisation of pipe strength/bedding. Minimum stiffness for GRP pipes is 5,000 N/m <sup>2</sup> .
GRP (For Al Ain City Only)	BS EN 14364-2006 Al:2008 or ASTM 2996 or ASTM 3262	
uPVC	BS EN 1452	
uPVC (For Al Ain City Only)	BS EN 1452 or BS EN ISO 1452 part 1 to part 5 2009 or ISO 4422 or DI N 8061/62/63	
Structured Wall HDPE Pipes (SWPP)	ISO 4427	Cost-effective in larger sizes and for constructing underground storage tanks. HDPE corrugated or twin walled pipes commonly used elsewhere.

**Table 4-2 - Approved Pipe Materials for Gravity Pipelines**

As all these materials have acceptable properties, subject to correct design, the choice will be determined by bedding and construction cost and size availability. Other pipe materials may be considered, subject to approval of DMAT.

Consultants are referred to the schedule of standard reference documents in Section 9 for more detailed information on the properties and applicability of different pipe materials.