

# CODE FOR ADOPTION AGREEMENTS

## INDEPENDENT SEWERAGE ADOPTION PANEL

### 1. The Issue

1. The Design and Construction Guidance (DCG) in Appendix C of the Sewerage Sector Guidance (SSG) currently limits the depth of a Type D Inspection Chamber to 2 metres. Sewers for Adoption 7<sup>th</sup> Edition allowed depths up to 3 m. British Plastics Federation Pipes Group (BPF) have requested a change to the DCG increasing the maximum depth of a Type D inspection chamber to 3m.
2. This paper examines the basis for a restriction on depth, the basis for the change in the DCG to provide a basis for the panel to make a recommendation to Ofwat.

### 2. Definitions

1. For the purposes of this paper the following definitions from the DCG apply.
2. **"access point"** means provision to access a sewer or drain for testing, inspection, maintenance and removal of debris, and includes any manhole or inspection chamber (DCG, A6.1).
3. **"inspection chamber"** means a chamber on a drain or sewer with working space at ground level only, used to introduce equipment for testing, inspection and maintenance (see DCG, A6.10).
4. **"manhole"** means a chamber with working space at drain/sewer level used for entry of personnel and equipment (see DCG, A6.13).

### 3. Background

1. In the past there has been divergence of practices regarding provision of access to drains and sewers. Practice in building drainage has been to routinely use inspection chambers in both domestic housing and even in commercial sites where pipe sizes can be larger. In such developments, manholes have only been used in certain cases where the conditions have warranted it. Practice in the provision of public sewer systems has almost exclusively been to use manholes to provide access.

2. Work in confined spaces, such as manholes is potentially hazardous and for this reason Regulation 4(1) of the *Confined Spaces Regulations 1997* (SI 1997/1713) requires that:

*"No person at work shall enter a confined space to carry out work for any purpose unless it is not reasonably practicable to achieve that purpose without such entry."*

3. Furthermore Regulation 11(3) of the *Construction (Design and Management) Regulations 2015* (SI 2015/51) also requires that:

*"(3) In fulfilling the duties in paragraph (1), the principal designer must identify and eliminate or control, so far as is reasonably practicable, foreseeable risks to the health or safety of any person—*

*(a) carrying out or liable to be affected by construction work;*

*(b) maintaining or cleaning a structure; or*

*(c) using a structure designed as a workplace."*

4. Although it is the duty of the developer to appoint a principal designer (see DCG paragraph A5.4) the DCG needs to take account of these requirements.

5. These requirements have led to a move towards designing systems with reduced entry of personnel.

### 4. Current DCG Guidance

1. The DCG guidance (DCG, B5.2.4) reads:

*“4. Manholes should be provided as the means of access to a pipe where:*

- a) the depth from cover level to soffit is greater than 2 m; or*
- b) where the diameter of the largest sewer is greater than or equal to 450 mm DN/ID;*
- c) where the chamber contains equipment (e.g., penstock or flow control device) that will require maintenance; or*
- d) where the chamber serves more than ten properties.*

*In other locations specified in B5.2.3, the access point may be an inspection chamber.”*

2. This currently permits the use of inspection chambers where:

- a) The depth of the chamber to the soffit of the pipe 2m or less;
- b) The diameter of the largest sewer is less than 450 mm DN/ID;
- c) The chamber has no equipment that will require maintenance;
- d) The chamber serves 10 properties or less.

## **5. The DCG Consultations**

1. The drafts of the DCG text were subject to consultation in February/March 2018 and February 2019. In the 2019 consultation a response was received from a water company regarding Type D chambers. At the time the draft was as follows:

*“4. Manholes should be provided as the means of access to a pipe where:*

- a) the depth from cover level to soffit is greater than 3 m; or*
- b) where the diameter of the largest sewer is greater than or equal to 450 mm DN/ID; or*
- c) where the chamber contains equipment (e.g., penstock or flow control device) that will require maintenance.*

*In other locations specified in B5.2.3, the access point may be an inspection chamber.”*

2. The comment received was as follows:

*“Detail shows restriction of opening to 350mm diameter greater than 1m in depth, they can reduce access for jetting and hose suction (if used together). See example picture below. This will also reduce access for mainline camera equipment into larger diameter pipes (over 225mm)*

- *Reduced opening*
- *Suction hose*
- *Jetting hose*
- *Mainline CCTV unit used on pipes over 225mm”*

3. The commentator requested that:

*“Restrict detail to depths up to 2.0m to invert and maximum 225mm diameter pipes (no restricted access at cover level).”*

4. The comment was discussed at a meeting on 15<sup>th</sup> March 2019 and as a result the text was amended to the current text by addition of the limit of 10 properties and the reduction of the maximum depth to 2m.

## **6. Other guidance documents**

### **6.1 British and European Standards**

#### BS EN 752

1. In the 1990's the previous British Standards; *BS 8301 Code of Practice for Building Drainage* and *BS 8005 Sewerage* were replaced by European Standards and most of the detailed guidance that was not included in the European Standards was transposed into National Annexes to the European

Standards. This necessitated a harmonisation of the differing practices in sewerage and building drainage.

2. The guidance on provision of access is currently contained in the National Annex to *BS EN 752 Drain and Sewer Systems Outside Buildings – Sewer System Management*. NA.6.4.4.3 States that:

*Inspection chambers are intended for inspection and maintenance activities. They should permit the introduction of equipment for the following activities into any of the incoming or outgoing pipes:*

*a) Inspection of the drain or sewer by CCTV;*

*b) Clearance of blockages by rodding or jetting;*

*c) Sealing the end of the incoming or outgoing pipe and undertaking a leak-tightness test using either the water or air pressure test method.*

3. BS EN 752 NA.6.4.4.3 does not give a limit on depth of inspection chambers, but states that:

*“Whilst inspection chamber products are available for depths up to 6 m, the accurate introduction of flexible equipment becomes more difficult at greater depths (see Figure NA.6). It has to be presumed that the personnel undertaking operations would select equipment appropriate to the task and the access available on site.”*

#### BS EN 13598-2

4. The product standard for thermoplastics chambers has recently been updated. *BS EN 13598-2:2020 Plastics piping systems for non-pressure underground drainage and sewerage. Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE). Specifications for manholes and inspection chambers* includes depths up to 6m based on practices elsewhere in Europe.

NOTE The scope of the two parts of BS EN 13598 have just changed slightly and as a result the DCG Clause E2.31 should now only refer to BS EN 13598-2.
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#### BS 5911

7. It is understood that a revision to BS 5911 to include deep concrete chambers is in development.

### **6.2 Sewers for Adoption 7th Edition**

1. Sewers for Adoption 7<sup>th</sup> (SfA7) is still current in Wales. The Type 3 inspection chamber in SfA7 is the equivalent access point to the Type D chamber in DCG. The guidance in SfA7 (SfA7, B.3.2.4 and Figures B.16 to B.19) limits the depth of a Type 3 inspection chamber to 3 m. The use of inspection chambers may not be used where there is a junction between two or more pipes each serving more than 10 properties.

### **6.3 Sewers for Scotland**

1. Sewers for Scotland 4<sup>th</sup> Edition does not include guidance on the design of inspection chambers.

### **6.4 Building Regulations**

1. Building Regulations Guidance on drainage from buildings in England and Wales is contained in the relevant editions of *Approved Document H – Drainage and waste disposal*. These are currently identical in respect to dimensions of inspection chambers and give no recommendations on the maximum depth.

## **7. Other Utilities**

1. Very few other utility services are at depths between 2m and 3m and where they are, they tend to be exceptions. In addition, the activities undertaken on sewers differ from those on other utility services. There are therefore no parallels that can be drawn from other utilities' practices.

## **8. Trials**

### **8.1 WRc trials 1999-2000**

1. In 1999, WRc undertook a collaborative research project which investigated to what extent the work activities previously undertaken by entry into manholes could be undertaken from the surface through an inspection chamber. As part of this project some deep inspection chambers were installed at WRc's Swindon site.

2. The chambers trialled were 4m deep and there were of three broad types:

- A manhole of conventional dimensions with a reducing slab and a restricted opening;
- A DN450 riser with or without an enlarged chamber at the base;
- A DN300 riser with or without an enlarged chamber at the base.

3. Of these the DN450 riser without an enlarged chamber is the closest to the Type D access chamber.

4. Where there was an enlarged base in only one case was this a new design. Others included the use of a DN600 junction fitting with reducers at each end to connect to the DN150 pipes and a manhole base with a taper reducer. Others used standard preformed inspection chamber fittings of the same diameter as the riser.

5. The use of existing pipe fittings to form the inspection chambers sometimes resulted in sub-optimal designs, due, for example to stepped diameter reductions on the exit from the chamber.

6. Trials were undertaken of the following maintenance activities:

- rodent control;
- condition inspection of the chamber
- CCTV sewer inspection of the pipe using a rodding camera
- CCTV sewer inspection of the pipe using a tractor mounted camera
- blockage clearance using sewer jetting;
- blockage clearance using rodding;
- sediment removal using vacuum lifters or similar equipment;
- root cutting.

7. Patch repairs were found to be impractical and were not trialled and the tractor CCTV unit was not practicable on the narrow shaft small chamber. With these exceptions the operations were all carried out successfully. It was envisaged that products and equipment could be improved to make the activities easier to perform.

8. The trials identified that the large diameter shafts with restricted access made use of rodding systems difficult and the DN300 risers made turning CCTV tractor units and root cutting equipment difficult.

9. The most successful designs had a DN450 riser and preformed base of the same diameter. This is closest to the Type D design.

### **8.2 Wavin Trials, 2002**

1. In 2002 Wavin undertook some further trials on a site with DN450 chambers 4m deep and DN150 pipes. They successfully carried out jetting, rodding, CCTV (with a tractor camera and a rodding camera) and fixing a stopper to carry out an air test. I understand that a video exists of these trials which Wavin showed to various water company representatives at the time.

### **8.3 Yorkshire Water/Wavin Trials**

1. During the drafting of SfA7, trials were undertaken by Yorkshire Water and Wavin to look at the practicality of DN100, DN150, DN300 and DN450 chambers on DN100 and DN150 pipes. However, these only considered depths up to 1.5 m.

## 9. Conclusions

1. Inspection chambers are not intended to have the same functionality as manholes but are limited to:
  - a) Inspection of the drain or sewer by CCTV;
  - b) Clearance of blockages by rodding or jetting;
  - c) Sealing the end of the incoming or outgoing pipe and undertaking a leak-tightness test using either the water or air pressure test method.
2. The trials in 1999 and 2002 showed that it was feasible to carry out these activities in DN450 inspection chambers up to 4m deep. However, we are not aware that these chambers have been widely used at depths of 2m or 3m since they were first included in SfA7 in 2012.
3. The scope of BS EN 13598-2, which is the product standard for thermoplastics inspection chambers goes up to 6m. It is understood that this is in accordance with practice in other European Countries.
4. The guidance on use of Type D chambers in DCG is highly restrictive, even without consideration of the depth limits. In particular, the limit on the number of connected properties, which is more restrictive than SfA7, which allowed multiple incoming pipes each with up to 10 connected properties.
5. It is likely that this will effectively limit the maximum pipe diameter effectively to DN150 except perhaps in some commercial developments. This is well below the DN450 pipe size limit stated in the DCG.
6. While it is possible that there will be depths in excess of 2m this is also less likely in these circumstances unless there are basements.
7. The restriction on the number of connected properties will also mean that there will be a downstream manhole not far from the chamber in almost all cases from which access may be possible in the event of problems with the inspection chamber.
8. Given these factors, the proposed change from 2m depth to 3m depth is likely to lead to only a very limited effect on the use of Type D inspection chambers.
9. The limited impact could be an argument either for or against a change. However, this limited extension could provide benefits to sewerage companies and developers in allowing suppliers to demonstrate the benefits of the use of deep inspection chambers in a way that is not practical with a small-scale trial.
10. In view of the recent change to BS EN 13598, the reference to BS EN 13598-1 in Clause E2.31 should be deleted as the scope of that standard is no longer relevant to that clause. The reference to BS EN 13598-1 in E2.21.2 is however still correct. In consequence the title of BS EN 13598-1 in Appendix III should also be updated.

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