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Mandatory adoption arrangements for new foul sewers and lateral drains and Mandatory Build Standards for new gravity foul sewers and lateral drains

Consultation

Date of issue: 31 October 2011 Responses by: 23 January 2012

### **OVERVIEW:**

The Welsh Government is consulting on implementing the mandatory adoption by the statutory sewerage undertakers (the water and sewerage companies) of newly-built sewers and lateral drains connected to the public sewerage system. It is also consulting on mandatory build standards for these new public gravity foul sewers and lateral drains. These proposals follow the transfer of private sewers and lateral drains into the ownership of the sewerage undertakers in Wales and England on 1 October 2011.

#### **HOW TO RESPOND:**

You can respond to the consultation using the questionnaire at the back of the document. The response can be submitted online to:

water@wales.gsi.gov.uk or printed out and posted to:

Water Branch
Welsh Government
Cathays Park 2
Cardiff CF10 3NQ

### FURTHER INFORMATION AND RELATED DOCUMENTS:

Large print, Braille and alternative language versions of this document are available on request.

#### **CONTACT DETAILS:**

For further information: e-mail: water@wales.gsi.gov.uk

Address: Water Branch

Welsh Government Cathays Park 2 Cardiff CF10 3NQ

### DATA PROTECTION: How the views and information you give us will be used

Any response you send us will be seen in full by Welsh Government staff dealing with the issues which this consultation is about. It may also be seen by other Welsh Government staff to help them plan future consultations.

The Welsh Government intends to publish a summary of the responses to this document. We may also publish responses in full. Normally, the name and address (or part of the address) of the person or organisation who sent the response are published with the response. This helps to show that the consultation was carried out properly. If you do not want your name or address published, please tell us this in writing when you send your response. We will then blank them out.

Names or addresses we blank out might still get published later, though we do not think this would happen very often. The Freedom of Information Act 2000 and the Environmental Information Regulations 2004 allow the public to ask to see information held by many public bodies, including the Welsh Government. This includes information which has not been published. However, the law also allows us to withhold information in some circumstances. If anyone asks to see information we have withheld, we will have to decide whether to release it or not. If someone has asked for their name and address not to be published, that is an important fact we would take into account. However, there might sometimes be important reasons why we would have to reveal someone's name and address, even though they have asked for them not to be published. We would get in touch with the person and ask their views before we finally decided to reveal the information.

Date of issue: 31 October 2011 Responses by: 23 January 2012

### 1.1 Introduction

- 1.1.1 This consultation presents details of how the Welsh Government proposes to implement the mandatory adoption of newly-built foul sewers and lateral drains connecting to the public sewerage network by the water and sewerage undertakers.
- 1.1.2 Under the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011, which came into force on 1 July 2011 existing private sewers and lateral drains became the responsibility of water and sewerage undertakers in Wales and England on 1 October 2011. The Welsh Government now proposes to implement a mandatory adoption process for all new sewers and lateral drains, supported by mandatory build standards.
- 1.1.3 A drain is a pipe which takes effluent away from a single property. A sewer is a shared drain which serves more than one property. A private sewer is a sewer which has not been adopted by the water and sewerage undertaker and is therefore the responsibility of the owners of the properties it serves. A lateral drain is the section of a drain which is outside the boundary of the property which it serves, connecting the drain to the public sewerage network.
- 1.1.4 The Welsh Government and the Department for Environment, Food and Rural Affairs (Defra) implemented the transfer of private sewers and lateral drains to address a lack of integrated management of the public sewerage network as a whole, greater clarity over ownership and to remove the burden of maintenance from householders. In order to prevent the creation of a new stock of private sewers, Section 42 of the Flood and Water Management Act contained provisions making the adoption process for foul sewers mandatory and introducing mandatory build standards for new gravity foul sewers and lateral drains to ensure they are built to a suitable standard.
- 1.1.5 Consultations leading up to the transfer of existing private sewers and lateral drains helped to inform these proposals for the mandatory adoption by the sewerage undertakers of newly-built sewers and lateral drains.

- 1.1.6 The Strategic Policy Position Statement on Water February 2011 highlighted the Welsh Government's commitment to ensuring that there is no proliferation of private sewers and that we would work with UK Government to implement the provisions of Section 42 of the Flood and Water Management Act 2010. In addition, the Welsh Government committed to ensuring that new sewers are of an adoptable standard, and to the publication of mandatory build standards.
- 1.1.7 This consultation takes forward these commitments. We are now seeking views on the implementation of Section 42 of the Flood and Water Management Act 2010, and on the related draft mandatory build standards for gravity foul sewers and lateral drains connecting to the public sewerage system. These standards will be introduced by Welsh Ministers.
- 1.1.8 Mandatory adoption will ensure that all new gravity foul sewers connecting to the public sewerage network are constructed to adoptable standards and will become the responsibility of sewerage undertakers to ensure continuing high standards of maintenance. In recent years, fewer than 20% of sewers and lateral drains being built to serve new developments have been adopted by sewerage undertakers. Mandatory adoption and Mandatory Build Standards for the construction of gravity foul sewers and lateral drains will improve the sustainability and integrity of the public sewerage network and ensure that owners of new properties are not burdened with the maintenance of private sewers and lateral drains in the future.
- 1.1.9 Welsh Ministers are responsible for the regulation of water and sewerage undertakers who operate wholly or mainly in Wales. The Secretary of State has responsibility for water and sewerage companies operating wholly or mainly in England. As a result, this consultation excludes those parts of Wales served by Severn Trent Water and includes those parts of England served by Dŵr Cymru Welsh Water.
- 1.1.10 We intend to work closely with Defra to ensure that our respective mandatory build standards are consistent to avoid confusion for developers and the water industry across Wales and England.

### 1.1.11 We welcome views on the following proposals:

- Transition from current to new adoption arrangements
- Mandatory build standards for newly-built gravity foul sewers and lateral drains
- Draft Regulations to ensure the completion of the adoption process
- Impact Assessment for the Mandatory Build Standards prior to a final version.

### 1.2 Legal Framework

- 1.2.1 Proposals for mandatory adoption will take effect upon commencement of Section 42 of the Floods and Water Management Act 2010. In addition, it is proposed that Regulations, which require the approval of both the National Assembly for Wales and Parliament, will, in the event of the failure of an adoption agreement, specify the point at which the adoption process is completed automatically. We are seeking views on the approach taken in the draft Regulations.
- 1.2.2 It is intended that Section 42 should be commenced on 1 April 2012, and that, subject to the approval of the National Assembly for Wales and Parliament the proposed accompanying Regulations should come into force at the same time. The mandatory adoption of all new sewers and lateral drains would then come into effect 1 April 2012. From this date, all newly-built sewers and lateral drains connecting to the public sewerage network would be adopted by sewerage undertakers.
- 1.2.3 It may be advantageous to produce the final Regulations jointly with Defra. If this is the case, they will be drafted as composite Regulations to be laid before both the National Assembly for Wales and Parliament.
- 1.2.4 There may be an advantage to allowing a longer transitional period and we would welcome views on this.

### 2. Proposed approach to adoption of new build sewers and lateral drains

### 2.1 Origin of proposals

- 2.1.1 These proposals implement provisions contained in Section 42 of the Flood and Water Management Act 2010 (the Act). This section of the consultation explains the provisions of Section 42 of the Act and how they are intended to work for the future adoption of new build sewers and lateral drains connecting to the public sewerage network. We are seeking comments on the implementation of Section 42 rather than its content and intent, as this was the subject of consultation during the development of the Act.
- 2.1.2 The Commencement Order which will implement Section 42 contains transitional provisions on which we would welcome your comments. The relevant provisions of the Act are set out and explained below as background information.

# 2.2 Flood and Water Management Act 2010 - Provisions for build standard and adoption (Section 104 Water Industry Act 1991 process)

- 2.2.1 The introduction of mandatory adoption and the mandatory build standards are a result of the changes to primary legislation made by Section 42 of the Act, which received Royal Assent on 8 April 2010.
- 2.2.2 Once in force, Section 42 will amend the right to connect new sewers and lateral drains to the public sewerage network as provided for in Section 106 of the Water Industry Act 1991. Section 42 of the Act delivers mandatory adoption and the mandatory build standard by making the right to connect new sewers dependent upon meeting certain conditions. Specifically, it requires anyone wanting to connect a newly built foul sewer or lateral drain to the public sewerage network to enter into an adoption agreement with the sewerage undertaker, as provided for in Section 104 of the Water Industry Act 1991.
- 2.2.3 Details to be included in the conditions of adoption agreements, such as performance and Bonds, will mainly be left to be agreed by the parties

concerned. There will be two constraints on the contents of the agreements which will ensure adoption takes place and that mandatory build standards are complied with.

- 2.2.4 Firstly, adoption agreements must contain a commitment from those building sewers to build them to agreed standards, where the Welsh Ministers' mandatory build standards are the default standard. National mandatory standards will be published by the Welsh Ministers and will be the default standard for all new gravity foul sewers and lateral drains connecting to the public sewerage network following the commencement of Section 42 of the Act. There will be an option for those building sewers to seek the agreement of sewerage undertakers to construct new gravity foul sewers to different standards, where appropriate. This measure is intended to encourage the development of innovative techniques in the construction of new sewers, which might otherwise be precluded by a mandatory build standard.
- 2.2.5 Secondly, agreements must contain terms which bind the sewerage undertaker to adopt the new sewer or lateral drain, regardless of the other terms of the agreement. For example, if the new sewer or lateral drain does not meet the agreed standards, it must still be adopted as a public sewer or lateral drain by the sewerage undertaker.
- 2.2.6 These requirements do not apply to surface water drainage systems required to be approved under Schedule 3 of the Act (i.e. Sustainable Drainage Systems (SuDS)) or in any other circumstances specified in the draft Regulations. Where the right to connect (under Section 106(1) of the Water Industry Act 1991) is exercised in consideration of satisfying the two conditions, a sewerage undertaker may not refuse connection. Where a defect in relation to standards (for example in construction) is identified the sewerage undertaker must rely on bonding arrangements in order to ensure that any remedial work is funded.
- 2.2.7 A developer may appeal to OFWAT in respect of any matter concerning the necessary Section 104 agreement.

### 3. What do the proposals do?

### 3.1 The proposals provide for:

- <u>Transitional arrangements</u> between existing and proposed new arrangements for mandatory new build standards and adoption of foul sewers and lateral drains
- Mandatory adoption of new foul sewers and lateral drains following construction, for gravity foul sewers and lateral drains to be built to a default mandatory standard (or agreed alternative) deemed to satisfy the requirements of Section 42 of the Act and ensure automatic adoption of new-build foul sewers
- Regulations which ensure completion of the adoption process.

### 4. Transitional Arrangements - the Section 42 Commencement Order

- 4.1 Section 42 of the Act will be brought into effect by a Commencement Order, at which time its provisions will have immediate effect. The intention is that this should be on 1 April 2012. The draft Order includes a 12 month transitional period in which development with prior approvals can commence as planned without the need to comply with the new standards. Valid prior approvals could include a building notice, an initial notice, a plan certificate, an amendment notice or a public bodies notice if those have been given or full plans have been deposited with a planning authority. If development has not started within the 12 month transitional period, the new standards will then apply.
- 4.2 In discussions with some developers, a period of 12 months was indentified as an appropriate and workable transitional period. However, we are seeking comments as to whether the Welsh Government should set a longer transitional period in order to minimise any potential for additional administrative tasks for developments which are in progress.
- 4.3 This intended approach is practicable where the planning and design phase is yet to be commenced. It is impractical for new build provisions to apply with immediate effect to development which is either the subject of an existing Section 104 agreement or which is fully approved under the Building Regulations but which has not yet been commenced. For Section 42 to have immediate effect in these circumstances, existing agreements and approvals would have to be replaced overnight or otherwise incur a delay in the development process while agreements and approvals were reviewed to reflect new-builds standards. This would be impractical on grounds of the delay incurred and the resources already committed to the design and approval processes.
- 4.4 We propose that such cases should be exempt from those elements of Section 42 which require new build standards. In practice this will mean that proposals approved under Part H of the Building Regulations (which deals with drainage matters) can proceed and be completed on that basis. **Annex**

**A** contains details of the transitional arrangements proposed for the various situations which can prevail.

### 5. New Build standards for gravity foul sewers and lateral drains

- 5.1 The default new-build mandatory standards will cover all aspects of design, layout, construction, operation and maintenance of gravity foul sewers and lateral drains. Such requirements, applied by the sewerage undertakers will simplify the process of construction of gravity foul sewers and lateral drains to an adoptable standard and satisfy developers' requests for consistency.
- 5.2 The proposed build standards are consistent with those in Sewers for Adoption<sup>1</sup> and universally applicable.
- 5.3 Section 42 of the Act provides the Welsh Ministers with a power to publish standards appropriate to the adoption of new build sewers and lateral drains.
- 5.4 Views are invited on our draft Mandatory Build Standards and non-statutory guidance for gravity foul sewers and lateral drains (at **Annex B**).
- 5.5 The Welsh Ministers' Standards cover only gravity foul sewers and lateral drains. Specifications for sewerage ancillaries such as pumping stations and standards for surface water sewers are published by WaterUK and WRc in the 'Sewers for Adoption' publication. A revised edition of this document is in preparation and will incorporate the Welsh Ministers' standards.

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<sup>&</sup>lt;sup>1</sup> Sewers for Adoption 7, WRc, in preparation

### 6. "Adoption" Regulations

- 6.1 We propose to make Regulations which define the point at which adoption of new build sewers and lateral drains will be completed automatically if the process of adoption has not otherwise occurred under a Section 104 agreement. The Regulations would apply in relation to an agreement made under Section 104 of the Water Industry Act 1991 pursuant to the condition specified in Section 106B(2) of that Act which relates to the requirement to enter into an adoption agreement before construction (as amended by Section 42). The draft Regulations are at **Annex C**.
- 6.2 In the past many Section 104 agreements have been made but not completed. Whilst all the conditions for adoption have been met, none of the benefits have ensued. It is the intention that in future, such circumstances should not arise. To ensure this, we propose that if the Section 104 agreement process is not otherwise completed, the adoption process should be completed automatically. This will occur with the sewerage undertaker's first demand for payment of charges for sewerage services from the occupier of the premises in question.
- 6.3 Sewerage undertakers will be able to make use of the other features of the adoption agreements, for example bonds or other financial incentives to improve, repair or conduct any work on the sewer required to bring it up to acceptable standards.
- 6.4 Mandatory adoption ensures that all new sewers and lateral drains are integrated into the public sewerage network as the responsibility of the sewerage undertaker and that additional new private sewers are not created.

### 7. Costs

A preliminary impact assessment is provided at **Annex D**.

### 8. Glossary

Gravity sewer	Sewer in which the sewage flows
	under gravity, in contrast to a pumped
	drainage system.
Lateral drain	Length of pipe which conveys sewage
	from a property to the public foul
	sewer which lies outside of the
	boundary of the property served.
Ofwat	The economic regulator of the water
	and sewerage industry in Wales and
	England.
Sewerage undertaker	The company appointed under the
	Water Industry Act 1991 to provide
	sewerage services in an area.
Water and sewerage undertaker	The company appointed under the
	Water Industry Act 1991 to provide
	both water supply and sewerage
	services in an area.

**Consultation Response Form** 

Consultation on the Mandatory Build Standards and Adoption Arrangements for New Gravity Foul Sewers and Lateral Drains

Your name:
Organisation (if applicable):
E-mail/Telephone number:
Your address:
Section 2 – Proposed approach to adoption of new sewers
and lateral drains
Question 1: Is the adoption process envisaged under Section 42 of the Floods and Water Management Act 2010 clear? If not, is further guidance required?
Comments:

Section 4 - Transitional arrangements - Section 42
Commencement Order
Question 2: Are the transitional arrangements envisaged for the
Commencement Order for Section 42 effective in preventing
unreasonable or lengthy delays to the development process?
Comments:
Question 3: Should any other transitional arrangements be
incorporated?
Comments:
1

Question 4: The transitional arrangements proposed are intended to carry over existing Building Regulations approvals to avoid disruption, additional cost and to recognise the need to minimise the period between transfer and the introduction of mandatory adoption and new build arrangements. Is the proposed date for commencement of Section 42 workable?

Comments:			

Section 5 - New Build Standards for gravity foul sewers and
lateral drains
Question 5: Are the draft mandatory build standards with the
accompanying detailed guidance appropriate?
accompanying actained guidance appropriate.
Comments:
Question 6: Will the standards and guidance secure a high standard of
construction and maintenance, as the basis for mandatory adoption?
concinuation and maintenance, as the sacio for mandatory adoption.
Comments:

resilience for gravity foul sewers and lateral drains? If so do you agree with a 4,000psi (265 bar) requirement or would you propose an alternative?
Comments:
Question 8: Do you have a view on how future updating/revision of the detailed guidance for the standards for gravity foul sewers and lateral
drains should be undertaken?
Comments:
1

Question 7: Do you agree with the proposal of a minimum jetting

### Section 6 – 'Adoption' Regulations

Question 9: In respect of newly connected properties served by newly built sewers, if the adoption process has not formally been concluded, is the point at which the first bill is issued the appropriate time at which the adoption process is deemed to be completed?

Comments:
Question 10: We have asked a number of specific questions. If you have any related issues which we have not specifically addressed, please use this space to report them:
Please enter here:
Responses to consultations may be made public – on the internet or in a report. If you would prefer your response to be kept confidential, please tick here:

### Annex A

Exemptions where the build is either the subject of an existing Section 104 agreement or has been fully approved under the Building Regulations but has not yet been commenced.

### Situation 1: Development subject to the Building Regulations 2010 has started

Where a proposed sewer or drain is part of a development on which work has started by 1 April 2012, and is to be connected to a public sewer, a Section 104 agreement under the Water Industry Act 1991 will be required in accordance with Section 106B of that Act. However the requirement in Section 106B(4)(a) concerning the agreement will be modified such that it will be sufficient for the agreement to incorporate or accord with a building notice, full plans, an initial notice, an amendment notice, or a public body's notice (see regulation 50(1) of the Building Regulations 2010 for the fuller explanation of these notices). As under the Building Regulations, a developer will have an indefinite period in which to complete the work and retain the right to connect. However, if the right to connect is to apply, then the development must either have a "completion certificate" in accordance with Regulation 17 of the Building Regulations 2010, a "Final Certificate" from an Approved Inspector or Public Body<sup>3</sup> or otherwise meet the requirements of the Building Regulations.

### Situation 2: Development subject to the Building Regulations 2010 has not started

Where a proposed sewer is part of a development on which work has not started by 1 April 2012 but a building notice, an initial notice, a plans certificate, an amendment notice or a public bodies notice has been submitted or full plans have been deposited (see Regulation 52 of the Building Regulations 2010 for the fuller explanation of these notices) then the same provisions as for Situation 1 above will apply provided that work is

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<sup>&</sup>lt;sup>2</sup> Section 51 Building Act 1984

<sup>&</sup>lt;sup>3</sup> Schedule 4 (3) Building Act 1984

commenced prior to [1 April 2013]. Thereafter, as under the Building Regulations, there will be an indefinite period in which to complete work, and the right to connect will apply subject to the development having a completion certificate in accordance with Regulation 17 of the Building Regulations 2010, a "Final Certificate" from an Approved Inspector or Public Body or otherwise meet the requirements of the Building Regulations.

## Situation 3: Development which is <u>not</u> subject to the Building Regulations 2010 has started

This exemption from the application of Section 106B(4) applies to developments by the Crown, statutory water and sewerage undertakers, UK Atomic Energy Authority, and the Civil Aviation Authority, and to specific developments (see regulation 9 and schedule 2 of the Building Regulations 2010 for a fuller explanation) where work has started by 1 April 2012. However the developer would still need to reach an agreement with the undertaker, in accordance with Section 106B(2), which would have to include provisions in respect of standards of construction and adoption (in accordance with Section 106B(3)). The provision to explicitly incorporate/accord with (or depart from) the Ministerial standards (that is, Section 106B(4)) would not apply. There would be an indefinite period to complete the development and retain the right to connect.

### Situation 4: Development not subject to the Building Regulations 2010 has not started

Developments by the Crown, water and sewerage undertakers, UK Atomic Energy Authority, and the Civil Aviation Authority and certain specific developments (see Regulation 9 and Schedule 2 of the Building Regulations 2010 for a fuller explanation) where work has not started prior to 1 April 2012 would not be subject to the requirements of Section 106B(4) provided that development is commenced prior to 1 April 2013.

However, the developer would still need to reach an agreement with the undertaker in accordance with Section 106B(2). Provided that work has

started before 1 April 2013 there would be an indefinite period in which to complete the work and retain the right to connect.

### Annex B

#### Welsh Ministers' draft new build standards

## Welsh Ministers' Standards Design and Construction of New Gravity Foul Sewers and Lateral Drains

Water Industry Act 1991 Section 106B Flood and Water Management Act 2010 Section 42

### Introduction

This document contains the functional standards and guidance published by the Welsh Ministers, together with industry recommendations for the design and construction of new gravity foul sewers and lateral drains.

### 1 - Scope

- **S1.** The standards give requirements for the design and construction of gravity foul sewers and lateral drains constructed in accordance with any agreement under Section 104 of the Water Industry Act 1991 in those parts of Wales and England served by water companies who operate wholly or mainly in Wales. They are published in accordance with Section 106B (Requirement to enter into an agreement before construction) of the Water Industry Act 1991 as amended by the Flood and Water Management Act 2010.
- G.1.1. Standards are contained within the grey boxes, prefixed with the letter S and corresponding number.
- G.1.2. Guidance to the standards is contained in the text beneath the standards.
- G.1.3. Surface water sewer systems are outside the scope of these standards and should be constructed in accordance with the requirements of the adopting authority.
- G.1.4 The standards apply to sewers intended for adoption as part of the public sewerage system under Section 104 of the Water Industry Act only.
- R.1. The Welsh Ministers' standards given in the grey boxes (clauses prefixed by the letter S) are mandatory.
- R.2. The Welsh Ministers' guidance is given in the clear boxes and has clause numbers prefixed with the letter G.
- R.3. The industry recommendations are given below the boxes in each section and have clause numbers prefixed with the letter R. These recommendations are not mandatory but compliance with these

recommendations will normally be considered by sewerage undertakers as compliance with the requirements of the standards and guidance published by the Welsh Ministers. Other solutions may also be used if they also satisfy the requirements of the Welsh Ministers' standards and guidance.

### 2 - Definitions

### **S2.** In these standards –

'access point' means provision to access a sewer or drain for maintenance or inspection and includes any manhole, inspection chamber, or rodding eye.

'drain' means a pipeline, usually underground, designed to carry foul sewage from buildings within the same curtilage;

**'sewer'** means a pipeline, usually underground, designed to carry foul sewage from buildings in more than one curtilage;

**'lateral drain'** means that part of a drain which is outside the curtilage of the property it serves;

**'curtilage'** means area of land around a building or group of buildings which is for the private use of the occupants of the buildings.

- G.2.1. Detached, semi detached and terraced houses should each be considered as a separate curtilage for the purpose of these standards.
- G.2.2. Where a building contains a number of flats, the whole block of flats should be considered to be a single curtilage for the purpose of these standards.
- R.1. Separate commercial properties sited on land privately owned by a single body (e.g. a shopping centre, airport terminal, retail park etc.) will be considered as a single curtilage if the commercial properties share the site access and facilities.

### 3 - Separate systems

### **S3.** Separate systems shall be provided for foul sewage and surface water.

- G.3.1. Where foul and surface water sewer systems from the same area are to be connected to an existing combined sewer, the two systems may only be connected together immediately prior to the connection to the existing public combined sewer.
- R.1. Watercourses or land drainage are not permitted to be directly or indirectly connected to the sewer system. Satisfactory and separate arrangements should be agreed with the Local Land Drainage Authority and confirmed with the Undertaker.

R.2. These standards do not apply to surface water sewers and drains.

### 4 - Layout and Access

- **S4**. Sewers and lateral drains shall be located so that if
  - a) there is a structural failure of the drain, sewer; or,
  - b) excavation is carried out to repair the drain, sewer;

the integrity of adjacent buildings or other infrastructure is not impaired.

- **S5.** Access points, and any inlets to drains or sewers shall be located so as to minimise the risk of damage to buildings or other infrastructure in the event of sewer flooding.
- **S6.** The sewer system shall be designed and constructed in order to provide access for any reasonably foreseeable maintenance activities.
- **S7.** Access points shall be located so that they are accessible and apparent to the sewerage undertaker at all times for use.

### 4.1 Layout

- G.4.1.1. Sewers or lateral drains with a diameter of 150mm or less and laid to a depth less than 150mm above the foundation level should not be located closer to any building/structure than 100mm. For larger pipes, or where the depth of pipe exceeds that of the building foundations, the distance between pipe and building/structure should not be less than the minimum of the depth of the crown of the adoptable pipe below the foundations or 1.2m, whichever is the greater.
- G.4.1.2. Foul sewers and lateral drains should not be constructed under any building/structure.
- G.4.1.3. Limiting flood risk can have an impact on the layout of a development and therefore impact on the layout of drains and sewers.
- G.4.1.4. Sewers and lateral drains, where practicable, should be laid in highways or public open space or a space where they are reasonable accessibility and visible. Sewers should not be laid in enclosed private land.
- G.4.1.5. Sewers should be laid in straight lines both vertical and horizontal in alignment.
- R.1. Minimum depths of cover to the crown of gravity pipes without protection should be as follows:
  - a) Domestic gardens and pathways without any possibility of vehicular access 0.35 m.

- b) Domestic driveways, parking areas and yards with height restrictions to prevent entry by vehicles with a gross vehicle weight in excess of 7.5 tonnes 0.5 m.
- c) Domestic driveways, parking areas and narrow streets without footways (e.g. mews developments) with limited access for vehicles with a gross vehicle weight in excess of 7.5 tonnes 0.9 m.
- d) Agricultural land and public open space 0.9 m.
- e) Other highways and parking areas with unrestricted access to vehicles with a gross vehicle weight in excess of 7.5 tonnes 1.2 m.
- R.2. Design of the adoptable pipelines should take account of loading from the passage of construction plant as well as normal design loading.
- R.3. As far as practicable, sewers and lateral drains should be laid in highways or public open space. Where this is not practicable sewers and lateral drains with a nominal diameter of 150 mm or less may be laid:
  - a) In shared rear yards/parking areas or other shared areas to which all the properties served by the sewers have right of access; or where this is not reasonably practicable,
  - b) Where the lateral drain or sewer serves 10 properties or less, in unfenced gardens; or where this is not reasonably practicable,
  - c) In fenced private areas provided that the lateral drain or sewer is kept as far as is practicable from any point on a building where a future extension is likely.
- R.4 Access points on sewers and lateral drains should not be laid in enclosed private land. Where this is not practicable access points of sewers and lateral drains may be laid:
  - in shared rear yards/parking areas provided there is free access at all times;
  - b) in enclosed shared private areas provided that all those properties served by the sewers have right of access to the area at all times. Access control systems should include provision for access by the sewerage undertaker; or
  - c) where the drain or sewer serves 10 properties or less, in unfenced gardens.
- R.5. New sewers or lateral drains should not be located closer to any building/structure than the greater of the depth of the sewer below the foundation or 1.2 m; except that a sewer or lateral drain with a nominal diameter of 150 mm or less, with an invert level at least 150 mm above the base of the foundation and no more than 1.1 m deep, should be no less than 100 mm from the foundations (see Figure 1).
- R.6. Where it is not possible to comply with clause 4.1.R.4 above because another building/structure is in such close proximity that there are no

permitted locations, new sewers or lateral drains may be located between buildings/structures provided that:

- a) there is at least 900 mm separating the buildings/structures;
- b) the depth of the invert of the sewer or lateral drain below the ground level is no greater than the distance between the buildings/structures;
- c) the sewers or lateral drains have a nominal diameter of 150 mm or less;
- d) the sewers or lateral drains have an invert level at least 150 mm above the base of the foundations:
- e) there is at least 350 mm cover above the pipe; and
- f) there is at least 100 mm between the pipe wall and the foundations (see Figure 2).

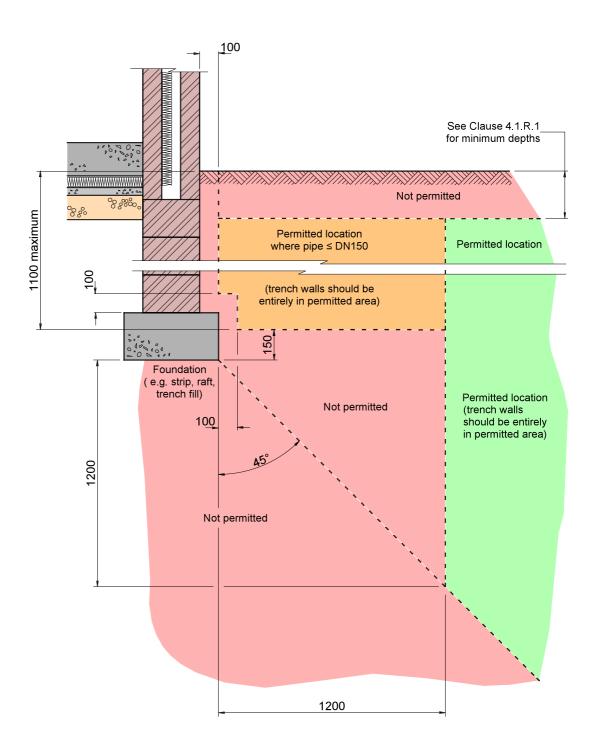
R.7 For the purposes of paragraphs 4.1.R.5 & 4.1.R.6 the foundation level of the building/structure with piled foundations, should be the underside of the capping beam.

Note: In paragraphs 4.1.R.5 and 4.1.R.5 the recommendations are intended to allow sufficient working space for hand excavation in proximity to the building/structure if repair is necessary in the future.

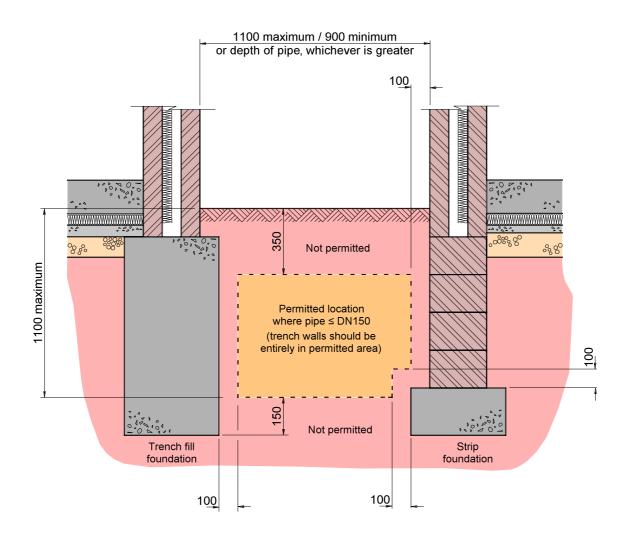
- R.8. Sewers and lateral drains may be laid through arches and other external openings through buildings/structures provided that they are laid as near to the centre of the opening as possible and:
  - a) for vehicular entries with a minimum width of 4.0 m and minimum height of arch above ground level of 2.1 m the maximum nominal diameter of the pipe should be 225 mm with a maximum depth to invert of the pipe of 2.0 m and the invert should be at least 150 mm above the foundation level; and
  - b) for pedestrian access with a minimum width of 0.9 m and minimum height of 2.0 m the maximum nominal diameter of the pipe should be 100 mm and should comply with 4.1.R.6.
- R.9 Sewers or lateral drain may pass through an opening in a boundary wall provided that there is an arch or lintelled opening to give at least 50mm space all around the pipe.
- R.10. The design of landscaping should be coordinated with the design of the drains and sewers so that the impact of tree roots on sewers/drains can be considered. Where a sewer or lateral drain is to be laid in close proximity to proposed planting of trees/bushes/shrubs, they should not be located closer to trees/bushes/shrubs than the canopy width at mature height, except where special protection measures are provided in accordance with clause 7.R.4.

- R.11. When in a highway, the outside of the sewer should be in the vehicle carriageway (not footway) and be at least 1.0 m from the kerb line. The outside of manholes should be at least 0.5 m from the kerb line.
- R.12. Where it is proposed to lay pipes with a nominal diameter greater than 900 mm agreement should be obtained from the owner of the land surface as to acceptable levels of predicted settlement, prior to the construction. The construction techniques should be selected to ensure that the maximum settlement is within the agreed limits.

# FIGURE 1 PERMITTED LOCATION OF SEWERS AND LATERAL DRAINS IN PROXIMITY TO BUILDINGS



# FIGURE 2 ADDITIONAL DETAIL - PERMITTED LOCATION OF SEWERS AND LATERAL DRAINS BETWEEN BUILDINGS (where Figure 1 is not applicable only)



#### 4.2 Access

- G.4.2.1. Access points should be sited to provide suitable access to all lateral drains and sewers for inspection and maintenance purposes.
- G.4.2.2. Access points and sewers should be sited where reasonable access and visibility can be gained by the sewerage undertaker. They should avoid rear gardens or enclosed locations.
- G.4.2.3. Where the adoptable sewer is within the property curtilage an access point may be constructed on the sewer at the point of connection to provide access to the individual property drains. Where property drains converge into a prior access point, and a single drain connects from this access point to the sewer, the connection to sewer may be by a saddle connection or other preformed junction.
- G.4.2.4. Manholes should be provided as the means of access where;
  - a) the depth from the surface to the crown of the pipe is greater than 3m.
  - b) there are two or more upstream pipes each serving more than 10 properties, or
  - c) the distance between manholes is greater than 150 m.
- G.4.2.5. Manholes should be designed for safe access and egress. The minimum clear opening into any manhole should be 600 mm x 600 mm.
- G.4.2.6. Inspection chambers should be designed to afford reasonable access for equipment to carry out maintenance activities. Inspection chambers should be designed to deter personnel access.
- R.1. Manholes should not be further apart than 150 m. Inspection chambers should be no further than 45 m from the adjacent chamber. Access points and sewers should be sited with due regard to public utility services. An access point should be built:
  - a) at every change of alignment, gradient or pipe material;
  - b) at the head of all sewers;
  - c) at every junction of two or more public sewers;
  - d) wherever there is a change in the size of the sewer; and
  - e) at every junction of a public sewer with another sewer serving 3 or more properties (more than 10 properties for a manhole);
  - f) at or within 1 metre of the property boundary at the upstream end of each lateral drain (preferably inside the property boundary).

- R.2. Four types of access point may be used (see Table 1). These are identified in the flow diagram in Figure 3, which, used in conjunction with the access structure standard details and the recommended layouts, will ensure that the sewerage system meets the required safety, operational and sustainability standards. Each junction, change of direction, change of status, or after a continuous sewer length greater than 150 m, is described here as a node. No access is required at a node if it connects less than 3 properties and there already is, or will be, sufficient access to carry out sewer maintenance.
- R.3. Any pipe and associated access upstream of the point of demarcation is a private drain and should be constructed in accordance with the Building Regulations.
- R.4. Figures 4 to 9 show typical details of manholes with depths from cover level to soffit of pipe not exceeding 6 m, including backdrops. No significant departure from these should be made without approval by the Undertaker.
- R.5. In exceptional cases, where access is required at a greater depth than 6 m, the details should be agreed in advance with the Undertaker.
- R.6. Manhole diameters (Type 1 and 2 only) should be in accordance with Table 2.

Table 1 Access types

Access Type	Application
Type 1	Man entry, depth 3-6 m
Type 2	Man entry, depth <3 m
Туре 3	Non-entry, depth <3 m
Type 4	Non-entry, depth <2 m

Table 2 Manhole diameters

Nominal diameter of largest pipe in manhole (mm)	Minimum nominal internal dimension of manhole (mm)
Less than 375	1200
375 – 450	1350
500 – 700	1500
750 – 900	1800
Greater than 900	Pipe diameter + 900

- R.7. The height of a Type 1 manhole (benching to slab soffit) should normally be in excess of 2000 mm. When this is impracticable, Type 2 manholes are preferred, subject to an absolute minimum height (benching to slab soffit) of 900 mm.
- R.8. The internal dimensions quoted above are considered to be the minimum. Where two or more pipes enter the manhole, the internal

dimensions should be increased where necessary to accommodate the minimum width of benching. Pipes of different diameters entering manholes should be installed with soffits at the same level.

- R.9. The dimensions of Type 3 and 4 access points should be as shown in the relevant figure, see Figures 10 to 17.
- R.10. The design of special manholes and other structures should be agreed with the Undertaker.
- R.11. 'In-fill' type covers should not be used. Where a cover is located in an area of block paving the bottom of the frame should be 150 mm deep.
- R.12. Manhole covers and frames should be accordance with clause E.2.32 of the Civil Engineering Specification for the Water Industry, 7th Edition, March 2011<sup>4</sup>
- R.13. Frames for manhole covers should be bedded in a polyester resin bedding mortar in all situations where covers are sited in trunk roads and dual carriageways, any other highly trafficked roads or a road used for bus services.
- R.14 In situations where traffic loading is anticipated to be heavier than would occur on a typical residential estate distributor road (ie braking or turning near a junction), a cover with a higher specification than the standard BS EN 124 D400<sup>5</sup> cover should be used.
- R.15. Unless the chamber is designed to withstand the vertical load acting on it, a precast concrete slab or in-situ concrete slab, acting as a collar to support the cover and frame, is required. The collar should be separate from the chamber to ensure the loading from the cover and frame is not transferred to the chamber.
- R.16. The first manhole upstream from the connection to the (existing) public sewer should, when constructed, be fitted with a screen in order to prevent debris entering the public sewer. The screen should not be removed until immediately prior to the occupation of premises to be served by the sewer.
- R.17. Rocker pipes should be provided at entry to, and exits from, manholes when rigid pipes are used. Their length should be as shown in Table 3.

Table 3

Nominal diameter (mm) Effective length (m)

150 to 600 0.6

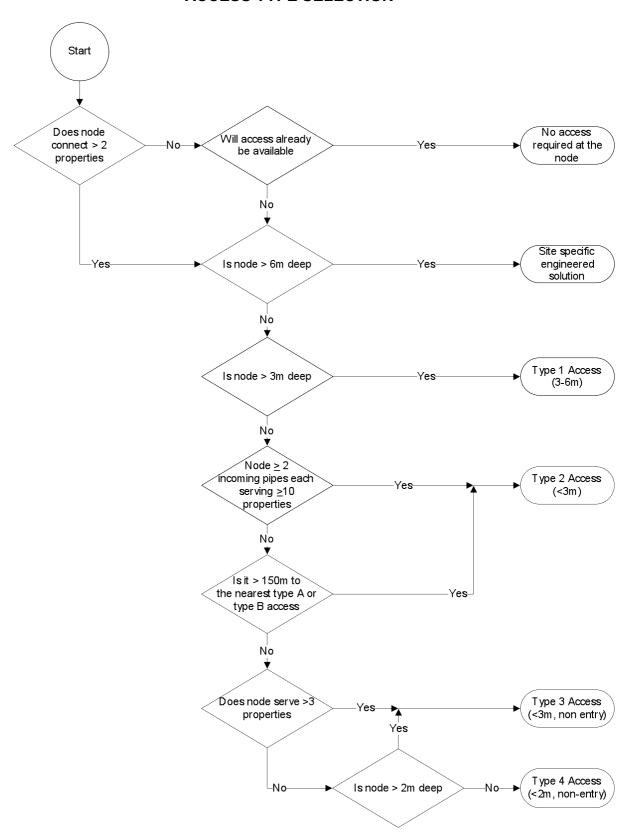
<sup>&</sup>lt;sup>4</sup> "Civil Engineering Specification for the Water Industry", 7th Edition, March 2011; UKWIR Ltd, ISBN 978 1898920 687

<sup>&</sup>lt;sup>5</sup> "BS EN 124. Gully tops and manhole tops for vehicular and pedestrian areas - Design requirements, type testing, marking, quality control", July 2004: British Standards Institution, London

over 600 to 750	1.0
over 750	1.25

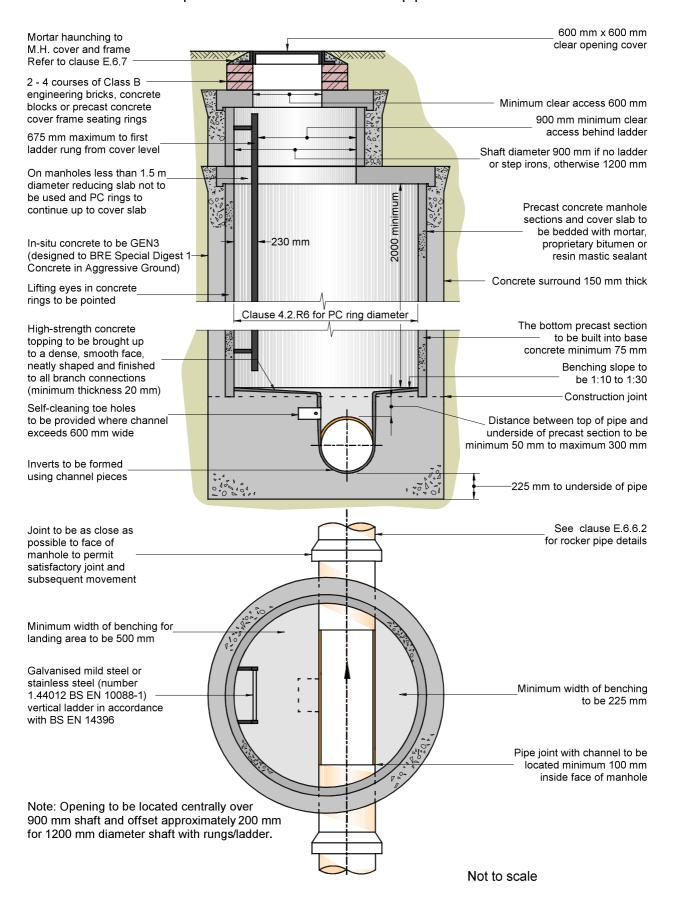
- R.18. Where pipes serving a total of three properties or less connect on a pipe no greater than 150mm, connecting pipes should be set with soffits level. In all other cases branch connections should be set with soffit levels no lower than that of the main pipe. The invert levels of all connecting pipes should be a minimum of 50 mm above that of the main pipe.
- R.19. The main channel should extend the whole length of the chamber, comprising a half-round section plus vertical benching from the top edge of the half round section to a height of not less than that of the soffit of the outlet where it should be rounded off and sloped upwards to meet the wall of the chamber.
- R.20. Steeper gradients are preferred to the use of backdrops. Where steeper gradients are impractical, backdrops should be constructed as shown in Figure 9. Ramped backdrops should be used for manholes rather than vertical backdrops.
- R.21. Where step rungs and ladders are to be used, the distance from the top rung to the surface should be a maximum of 675 mm with a minimum of 2 courses of brickwork. Where ladders are to be used, they should be positioned relative to the access so that the minimum clear opening is not obstructed.
- R.22. Type 4 access chambers should allow for a minimum vertical radius of 350 mm for the entry of rods, jetting equipment or CCTV inspection equipment into the pipe (see Figures 15 & 16).

FIGURE 3
ACCESS TYPE SELECTION



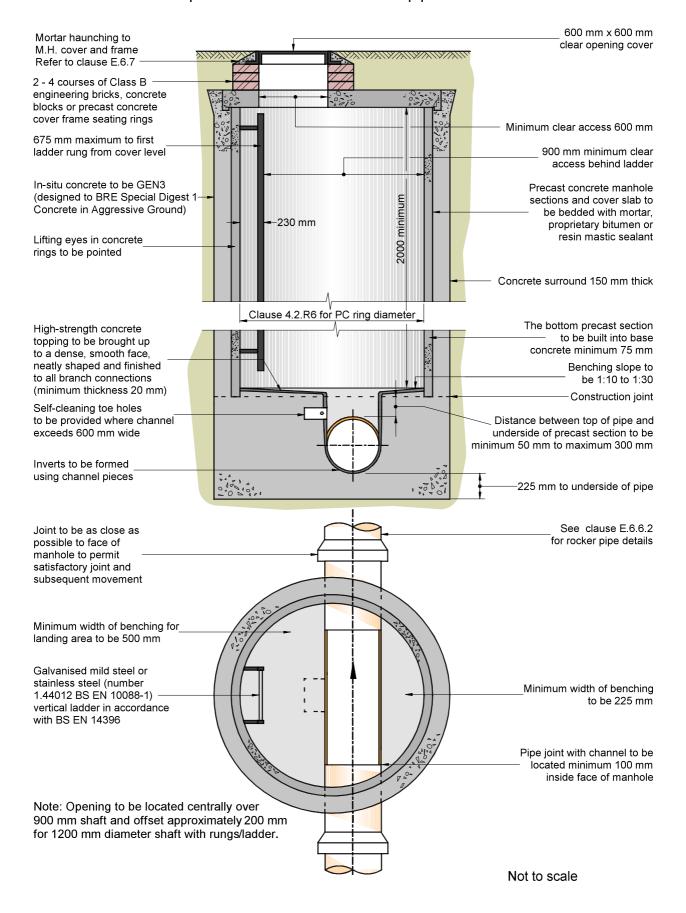
## FIGURE 4 TYPICAL MANHOLE DETAIL - TYPE 1A

Depth from cover level to soffit of pipe 3 m to 6 m



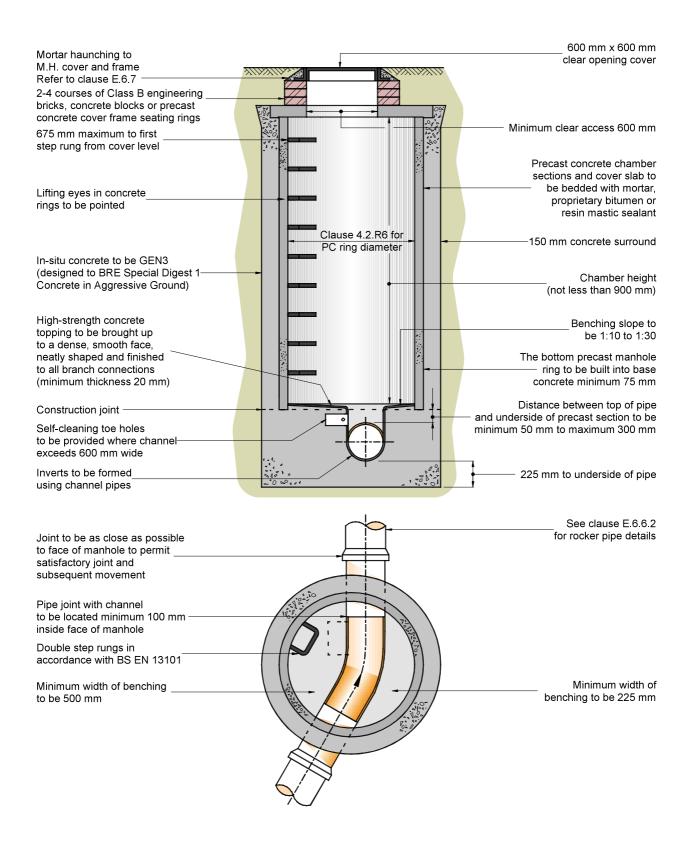
## FIGURE 5 TYPICAL MANHOLE DETAIL - TYPE 1B

Depth from cover level to soffit of pipe 3 m to 6 m



## FIGURE 6 TYPICAL MANHOLE DETAIL - TYPE 2

Maximum depth from cover level to soffit of pipe 3.0 m



## FIGURE 7 TYPICAL MANHOLE DETAIL - TYPE 2 (Alternative construction detail)

Maximum depth from cover level to soffit of pipe 3.0 m

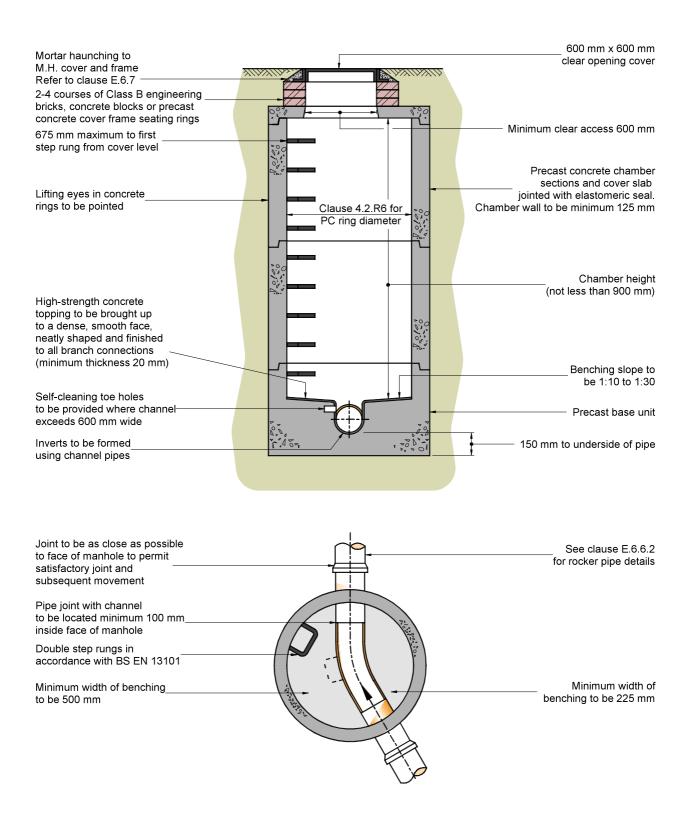
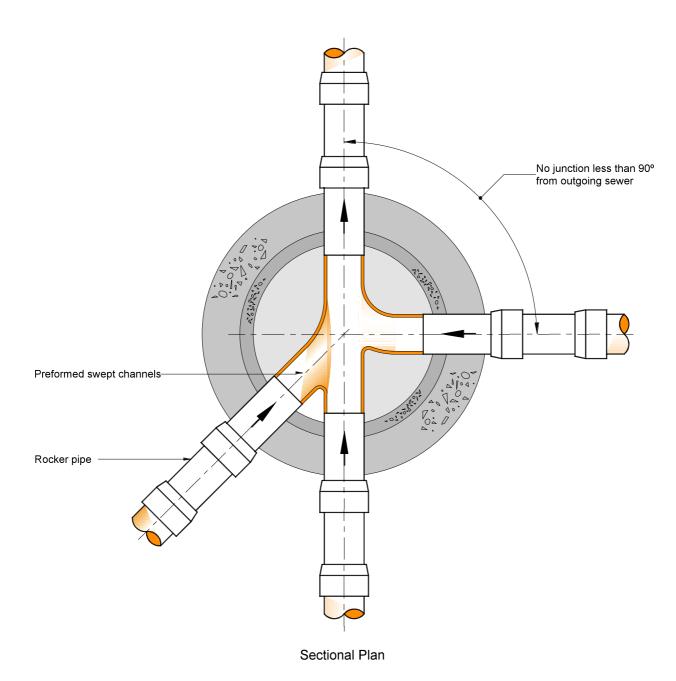


FIGURE 8
TYPICAL ARRANGEMENT OF PIPE JUNCTIONS WITHIN MANHOLES



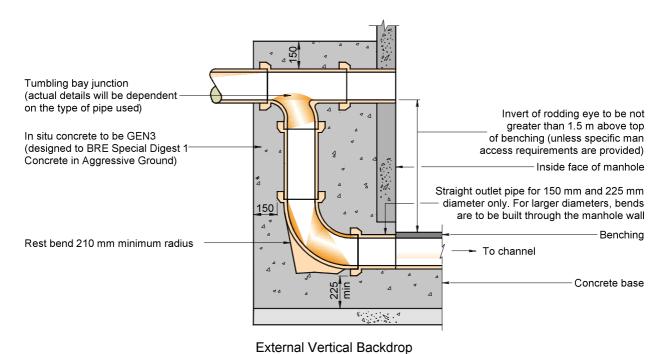
Pipes built into manhole should have a flexible joint as close as feasible to the external face of the structure and the length of the next rocker pipe should be as shown .

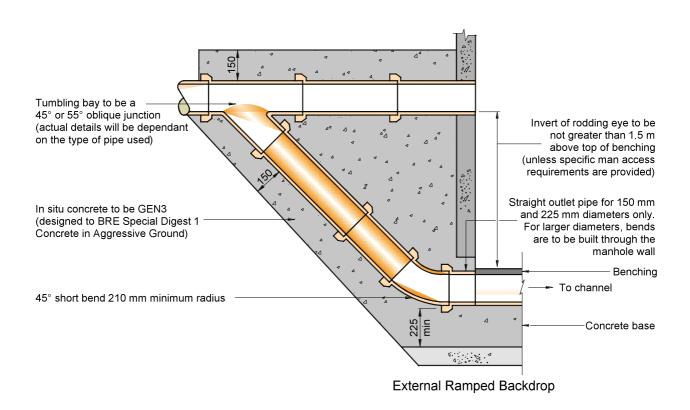
Nominal diameter (mm)	Effective length (m)
150 - 600	0.6
601 - 750	1.00
over 750	1.25

All pipes entering the bottom of the manhole to have soffits level.

## FIGURE 9 TYPICAL VERTICAL AND RAMPED BACKDROP DETAIL

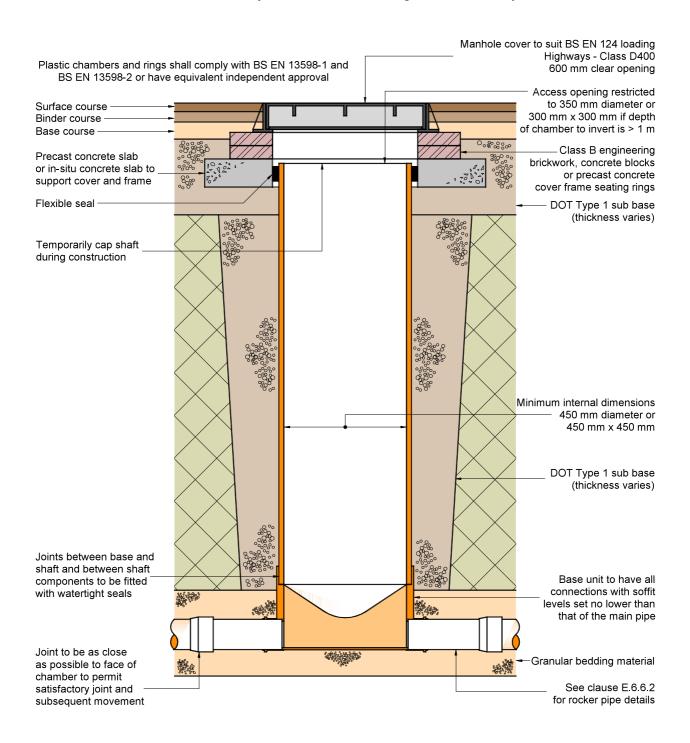
Note: Steeper gradients are preferred to the use of backdrops. Type of backdrop to be used to be agreed with Undertaker.





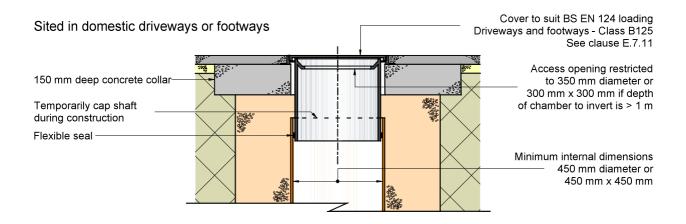
## FIGURE 10 TYPICAL ACCESS CHAMBER DETAIL - TYPE 3 (Flexible material detail)

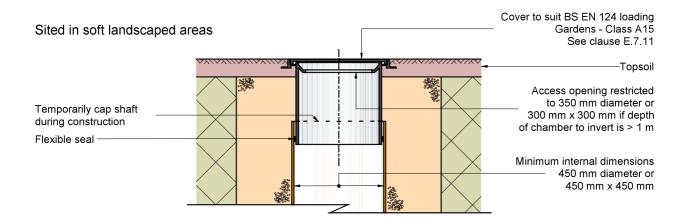
Maximum depth from cover level to soffit of pipe in areas subject to vehicle loading 3 m, non entry



# FIGURE 11 ALTERNATIVE TOP DETAILS FOR LIGHT VEHICLE LOADING AND LANDSCAPED AREAS - TYPE 3

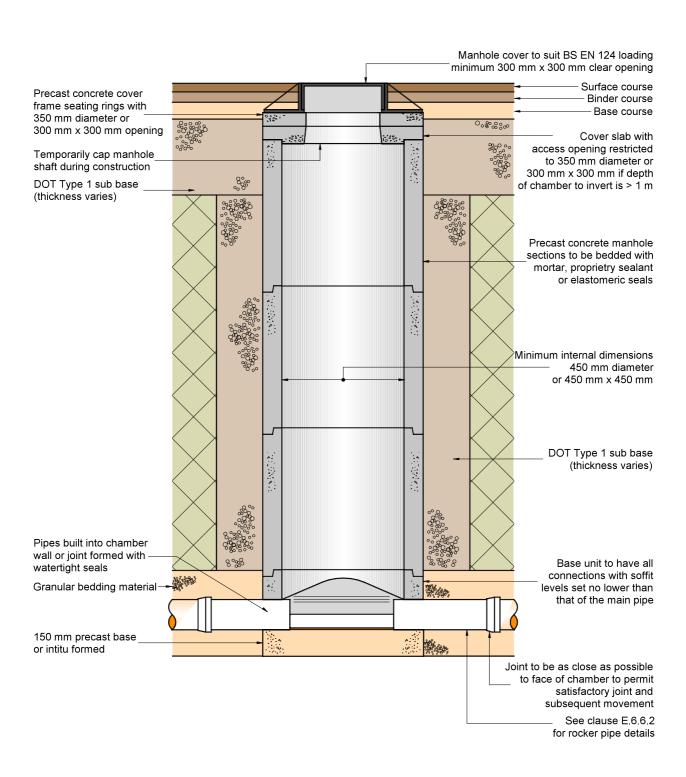
Plastic chambers and rings shall comply with BS EN 13598-1 and BS EN 13598-2 or have equivalent independent approval





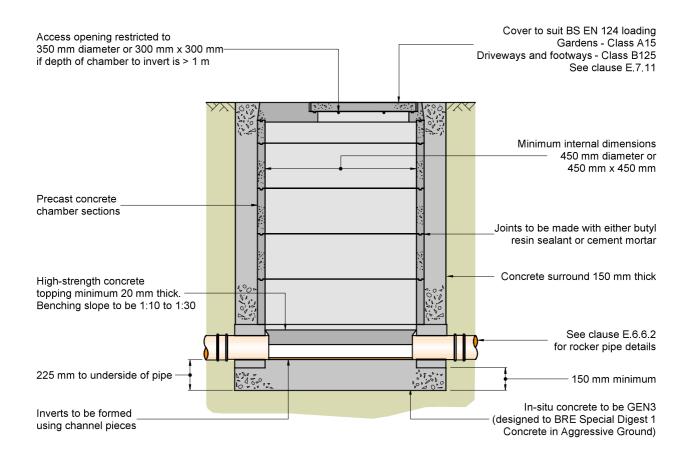
## FIGURE 12 TYPICAL ACCESS CHAMBER DETAIL - TYPE 3 (Rigid material detail)

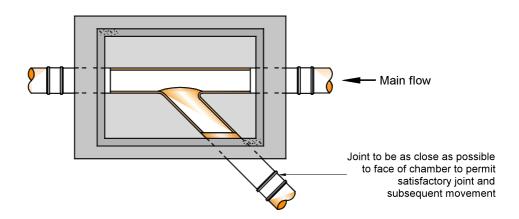
Maximum depth from cover level to soffit of pipe in areas subject to vehicle loading 3 m, non entry



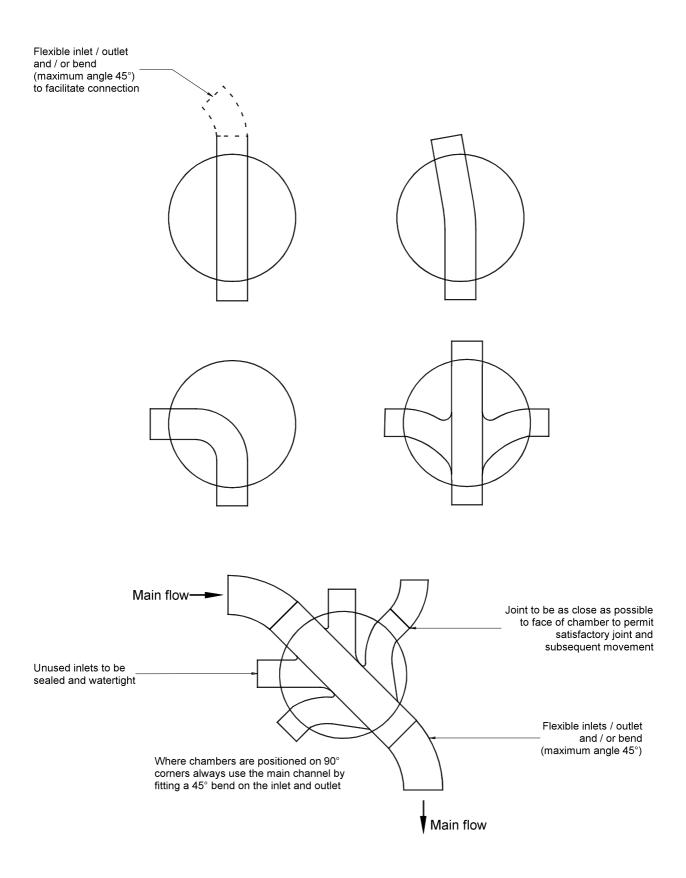
## FIGURE 13 TYPICAL ACCESS CHAMBER DETAIL - TYPE 3 (Rigid material detail)

Alternative maximum depth from cover level to soffit of pipe 3 m for areas not subject to vehicle loading or areas subject to light vehicle loading, non entry



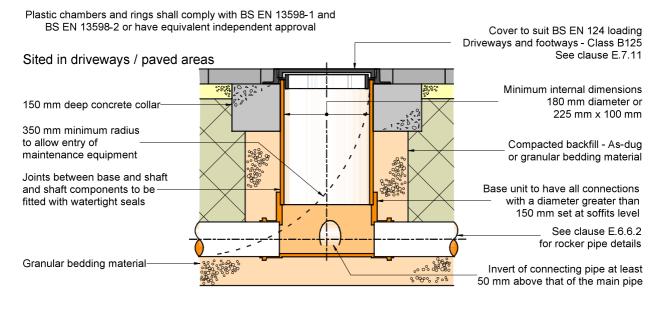


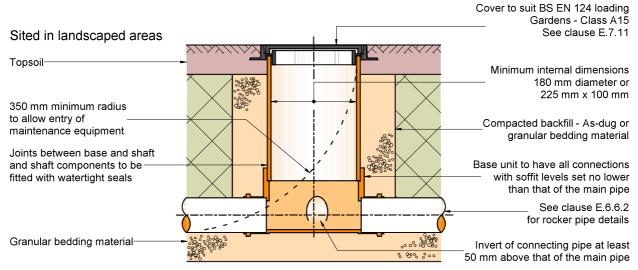
## FIGURE 14 ALTERNATIVE BASE LAYOUTS FOR TYPE 3 CHAMBERS

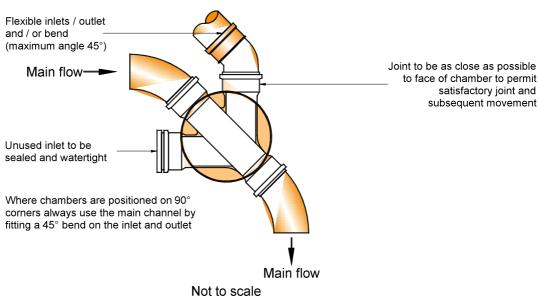


## FIGURE 15 TYPICAL ACCESS CHAMBER DETAIL - TYPE 4 (Flexible material detail)

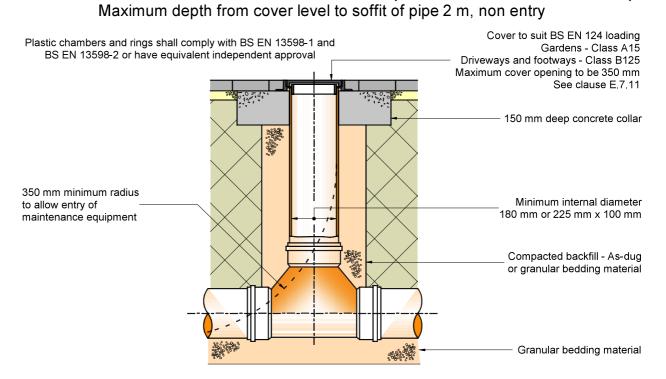
Maximum depth from cover level to soffit of pipe 2 m, non entry







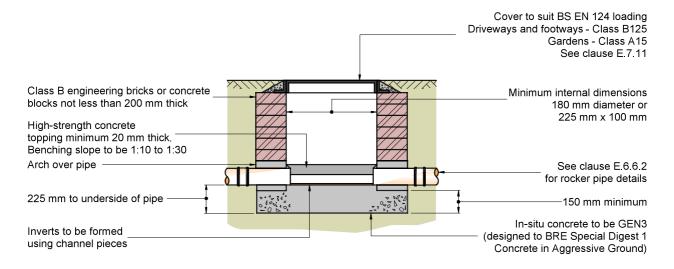
# FIGURE 16 TYPICAL ACCESS CHAMBER DETAIL - TYPE 4 (Alternative construction detail)



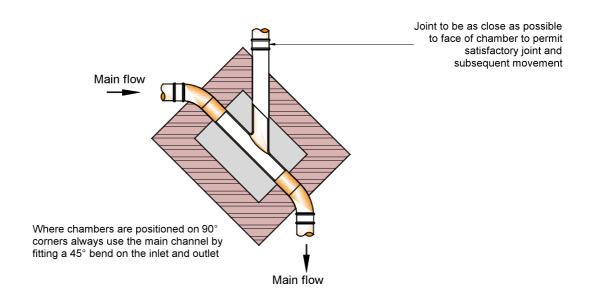
Not to scale

## FIGURE 17 TYPICAL ACCESS CHAMBER DETAIL - TYPE 4 (Rigid material detail)

Maximum depth from cover level to soffit of pipe 1 m, non entry



Note: The use of precast rectangular concrete manhole units with 150 mm grade GEN3 concrete surround (designed to BRE Special Digest 1 Concrete in Aggressive Ground) is permitted.



#### 5 - Reliability

- **S8.** The system shall be designed and constructed to reliably convey the flows that can be legally discharged into the system.
- G.5.1. Pipes should be free from defects or other features that might cause blockage or otherwise impede the design flow.
- G.5.2. Gravity drains and sewers should have adequate gradient to maintain self cleansing conditions.
- G.5.3. The minimum size for a gravity foul sewer should be:
  - a) 100mm nominal diameter for 10 properties or less
  - b) 150mm nominal diameter for more than 10 properties.
- G.5.4. Sewers and laterals drains and all ancillary structures should be constructed from materials that resist tree root intrusion.
- G.5.5. The mode of connection and layout of any junctions or connections between pipes, whether at manholes, inspection chambers, access points or otherwise should be designed to minimise the risk of blockage.
- R.1. The minimum size for a gravity foul sewers and lateral drain should be 100 mm.
- R.2. As far as practicable, junctions should be built in for anticipated future connections when sewers are constructed to avoid damage to the sewer by installing connections at a later date. Where it is necessary to make a post-construction connection to a sewer clauses 5.R.3 to 5.R.7 apply.
- R.3. The vertical angle between the connecting pipe and the horizontal should be greater than 0 degrees and not more than 60 degrees (see Figure 18).
- R.4. Where the connection is being made to a sewer that is 300 mm diameter or less, connections should be made using 45 degree angle or 90 degree angle curved square junctions (see Figure 18).
- R.5. Connections made with junction fittings should be made by cutting the existing pipe then inserting the junction fitting and jointing with flexible repair couplings.
- R.6. Where the connection is being made to a sewer greater than 300 mm in diameter:
  - a) where the diameter of the connecting pipe is greater than half the diameter of the sewer, the connection of an access point should be constructed; or

- b) where the diameter of the connecting pipe is less than or equal to half the diameter of the sewer then the connection should be made using a preformed saddle fitting.
- R.7. Connections made with saddle fittings should be made by cutting and safely removing a core out of the pipe and jointing the saddle fitting to the pipe in accordance with the manufacturer's instructions to ensure a watertight joint. Neither the saddle fitting, nor the connecting pipe should protrude into the sewer.
- R.8. To provide a self-cleansing regime within gravity foul gravity sewers, the minimum flow velocity should be 0.75 m/s at one-third design flow. Where this requirement cannot be met, then this criterion would be considered to be satisfied by:
  - a 150 mm nominal internal diameter gravity sewer having a gradient not flatter than 1:150 where there are at least 10 dwelling units connected; or
  - b) where the sewer or lateral drain is 100 mm nominal internal diameter sewer or lateral drain serving 10 or less properties having a gradient not flatter than 1:80, where there is at least one WC connected and 1:40 if there is no WC connected.

Note: Where low water usage appliances are used, it is possible that the minimum gradients will not be sufficient and consideration should be given to using steeper gradients.

- R.9. These parameters are not to be taken as a norm when the topography permits steeper gradients. Hydraulic studies indicate that these requirements may not necessarily achieve a self-cleansing regime. When a choice has to be made between gravity sewerage and pumped sewerage, these criteria should not be regarded as inflexible and the Developer should consult the Undertaker.
- R.10. The roughness value  $(k_s)$  for foul gravity sewer design should be 1.5 mm.

#### 6 - Hydraulic design

- **S9.** The hydraulic design of sewers and lateral drains shall include an allowance for increased flows that might be reasonably foreseeable within the development over its design life.
- **\$10.** Flows that cannot be contained within the drain and sewer system as a result of failure of all or part of the drainage system shall be managed in flood conveyance routes in order to minimise the damage to people and property.

#### **6.1 Gravity Foul Sewers and Lateral Drains**

G.6.1.1. Gravity foul sewers and lateral drains should be designed to convey the projected flows together with an allowance for:

- a) variations in foul flows resulting from increased occupancy or intensification of the development commensurate with the introduction of water saving measures,
- b) increased trade effluent flows resulting from reasonable changes in use or intensification of development of an any industrial or commercial development,
- c) levels of groundwater infiltration that might reasonably be expected over the life of the drain or sewer system;
- d) inflow of surface water that might reasonably be expected due to leakage or accidental connection.
- G.6.1.2. In accordance with paragraph G.6.1.1 above, design flow rates for dwellings should be a minimum of 4000 litres per dwelling per day.
- G.6.1.3. Foul drain and sewer systems should be watertight to minimise the ingress of groundwater and surface water.
- R.1. The following design flows for industrial developments should be used where the actual details of flows are unknown:
  - a) Domestic flow element calculated in accordance with BS EN 752<sup>6</sup> or in the absence of appropriate information, 0.6 litres/second per hectare of developable land.
  - b) Trade effluent flow should be based on a metered water supply to premises similar to that proposed, or should assume 0.5 litres/second per hectare for normal industry and 1 litre/second per hectare for wet industry. Where the proportion of wet industry is unknown, an average flow of 0.7 litres/second per hectare should be used.
  - c) To obtain the total design flow the domestic design flow should be added to the trade effluent design flow.

#### 6.2 Protection against flooding

- G.6.2.1. The layout of the system and the development should minimise the risk of damage to property from flooding in the event of excessive flows, blockage, or failure of pumping stations on the system.
- G.6.2.2. Flooding caused by blockages of foul sewers should have identified flow paths and should not cause internal property flooding.
- R.1. In designing the site layout and sewerage developers should also demonstrate flow paths and the potential effects of flooding resulting from blockages, pumping station failure or surcharging in downstream combined sewers.

<sup>&</sup>lt;sup>6</sup> "BS EN 752:2008 Drain and Sewer Systems Outside Buildings", Published April 2008, British Standards Institution, London

R.2. The designer should carry out checks to ensure that an adequate level of protection against the flooding of properties is achieved. The layout of the sewer system and/or the development should be adjusted to minimise the risk of flooding of properties.

### 7 - Structural Design and Integrity

- **S12.** Sewers, lateral drains and associated structures shall be designed and constructed to ensure structural integrity over the design life.
- **S13.** Connections to existing sewers shall be carried out in a manner that does not compromise the structural integrity of the existing sewer.
- G.7.1. Buried pipes should have sufficient cover to afford adequate protection from anticipated loading, low temperatures and damage from normal use of the land. Where this cannot be achieved there should be suitable alternative protection measures provided.
- G.7.2. Structural design should take account of imposed loads, support and protection.
- G.7.3. As far as practicable junctions should be built in for anticipated future connections.
- G.7.4. The manner of connection should not damage the structural integrity of the existing pipe.
- R.1. Buried pipes should be designed in accordance with BS EN 1295-1<sup>7</sup>. BS 9295<sup>8</sup> gives information and guidance for the use of EN 1295-1 Annex A, the UK established method for the structural design of buried pipelines under various conditions of loading. The procedures are explained and, where general assumptions can be made, loading tables are given. Application details for pipelines laid in various trench conditions and in poor ground are shown.
- R.2. If the depth of cover to the crown of the pipe is less than the values recommended in clause 4.1.1 one of the following protection measures should be provided:
  - a) A concrete slab in accordance with Figure 19;
  - b) A concrete surround with flexible joints in accordance with Figure 20;
  - c) A ductile iron pipe should be used.

<sup>7</sup> "BS EN 1295-1:1998 Structural design of buried pipelines under various conditions of loading. General requirements", Published June 1998, British Standards Institution, London

<sup>&</sup>lt;sup>8</sup> "BS 9295:210 Guide to the structural design of buried pipelines", Published March 2010, British Standards Institution, London

- R.3. The structural design of all pipes should take into account the possible incidence of punching shear. The design should ensure that no vertical load is imposed by structures such as shafts onto non-load bearing components such as the pipes.
- R.4. Where there is a risk of tree root intrusion (see clause 4.1.R.7) the sewer should be resistant to tree root ingress (e.g. by use of appropriate barriers, high performance joints or constructed from polyethylene with welded joints).

### FIGURE 18 CONNECTIONS TO SEWER

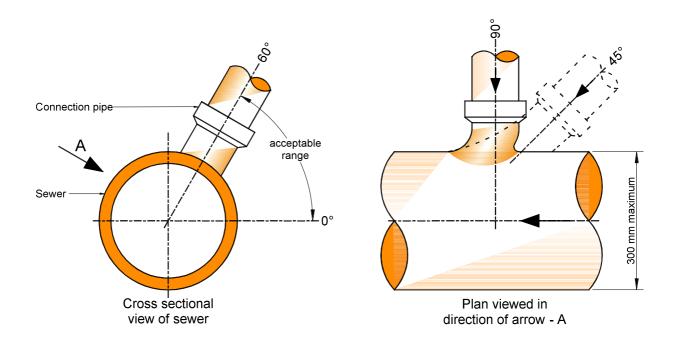


FIGURE 19
PROTECTION OF PIPES LAID AT SHALLOW DEPTHS

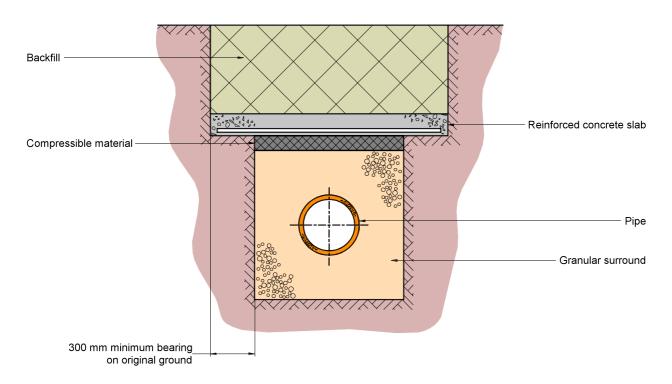
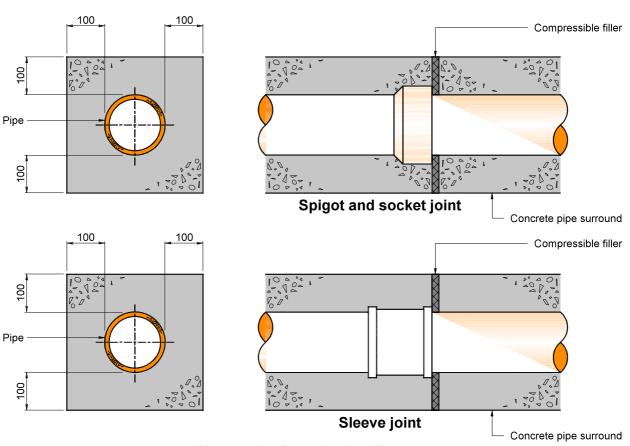


FIGURE 20 JOINTS FOR CONCRETE ENCASED PIPES



Not to scale, dimensions in millimetres (all dimensions are minimum sizes)

#### 8 - Materials

- **S14.** Materials, including products, components, fittings or naturally occurring materials which are specified by the designer shall be of suitable nature and quality for their intended use.
- **S15.** The environmental impact shall be minimised by the careful selection of materials, and where appropriate by the use of recycled and recyclable materials. The materials specified shall not have any adverse implications of health and safety of the completed drainage systems.
- **S16.** Products, materials, and their construction methods shall be selected that minimise depletion of the finite resources having regard to the design life of the component and the potential for re-use or recycling.
- **\$17.** Sewers and lateral drains shall be designed and constructed so that:
  - a) pollution of surface receiving waters and groundwater is prevented;
  - b) for all practicable purposes, they are watertight;
  - c) to avoid odour nuisance or creation of toxic explosive or corrosive substances:
  - d) to minimise noise and vibration.
- G.8.1. The suitability of materials and products can be demonstrated by appropriate use of a product bearing CE marking in accordance with the Construction Products Directive (89/106/EEC) and any other relevant Directives as amended by the CE Marking Directive (93/68/EEC) or;
  - e) a product complying with an appropriate technical specification (as defined in those Directives),
  - f) a British Standard or an alternative national technical specification of any state which is a contracting party to the European Economic Area which in use is equivalent,
  - g) or a product covered by a national or European certificate issued by a European Technical Approval Issuing body, and the conditions of use are in accordance with the terms of the certificate.
- G.8.2. Pipe materials should be sufficiently robust so that they are not damaged by reasonably foreseeable maintenance activities. In particular they should be resistant to the effects of cleaning by jetting at pressures of up to 275 bar.
- G.8.3. Pipes should have sufficient ring stiffness to prevent deformation during storage, embedment and backfilling.
- R.1. Materials should comply with the requirements of provisions in G.8.2, with the Civil Engineering Specification for the Water Industry,<sup>1</sup>

- R.2. All Undertakers are committed to the sustainable management of the environment and should aim to meet fully their legal obligations. To this end, materials and components should comply with the following:
  - the manufacturing process should minimise the use of solvent based substances that emit volatile organic compounds;
  - the preferred product should be made from recycled material and should not produce ozone-depleting substances during manufacture; and
  - c) the use and/or creation of substances included in Annex X of the Water Framework Directive<sup>9</sup> should be avoided during the manufacturing process.

#### 9 - Construction

- **\$18.** Sewers and lateral drains shall be constructed in a manner such that:
  - h) where relevant, materials are:
    - i) adequately mixed or prepared; and,
    - ii) applied, used, or fixed so as to perform adequately the functions for which they are intended.
  - i) no part of the drainage system is damaged or its function impaired by:
    - i) the method of construction; or
    - ii) runoff from the construction site entering the sewer system;
  - j) damage to existing ecosystems and major trees in the development site is prevented;
  - k) soil erosion is minimised.
- G.9.1. The drainage system should be constructed in accordance with the approved design.
- G.9.2. Run-off from the construction site should not be allowed to enter the drainage system unless the design has specifically provided for this.
- G.9.3. All necessary precautions should be undertaken to avoid causing damage to, or interference with flow in, existing public sewers, and should ensure that debris, silt and mud etc do not enter the sewer.
- G.9.4. All necessary precautions should be taken to avoid misconnection of foul drainage to surface water drains or sewers, or surface water drainage to foul drains or sewers.

<sup>&</sup>lt;sup>9</sup> "Directive 2008/105/EC of the European Parliament and of the Council on Environmental Quality Standards", Published 16 December 2008, Official Journal of the European Union

- G.9.5. On completion of construction all internal surfaces of sewers and access points should be thoroughly cleansed of all deleterious matter to prevent it passing into existing sewers or water courses.
- G.9.6. Operations should be carried out in such a manner as to avoid damage to or deterioration of the integrity to adjacent buildings or other infrastructure.
- G.9.7. Excavations in roads and streets should be carried out in accordance with the relevant highway authority requirements.
- R.1. Construction of the drainage system should comply with the requirements of The Civil Engineering Specification for the Water Industry, 7th Edition, March 2011<sup>1</sup>

#### 10 - Testing

- **\$19.** Sewers and lateral drains shall be tested and inspected to ensure that:
  - a) the systems is for all practical purpose, leaktight;
  - b) that no surface water drainage has been connected to a foul sewer system and foul drainage has not been connected to a surface water system;
  - c) pipes have not been damaged, deformed or subject to settlements during construction.
- G.10.1. Gravity sewers, pressure pipelines, manholes and inspection chambers should be leak tight when tested after backfilling.
- G.10.2. Pipelines should be inspected by means of a visual or closed circuit television (CCTV) examination to record condition and deformation.
- G.10.3. Drains and sewers should be tested to check that there have been no misconnections of foul and surface water.
- G.10.4 The standards do not specify who should undertake the testing. This should be agreed between the developer and the adopting undertaker.
- R.1. Testing of the drainage system should comply with the requirements of the Civil Engineering Specification for the Water Industry, 7th Edition, March 2011<sup>1</sup>

### 11 - Pumping Stations

- **S20.** The design of the system shall, so far as is reasonable practicable, minimise the use of energy over the life of the system.
- G.11.1. Foul sewage pumping stations or pumped systems should only be used where their whole life cost is less than conventional gravity systems over a period of 40 years.
- R.1. For guidance on the design and construction of pumping stations is contained in Sewers for Adoption  $7^{10}$ , Part D.

 $<sup>^{\</sup>rm 10}$  "Sewers for Adoption 7", Published XXX 2011, WaterUK/WRc

#### **Annex C**

### **Draft Regulations and Commencement Order**

#### WELSH STATUTORY INSTRUMENTS

### 2012 No. (W.)

### WATER INDUSTRY, ENGLAND AND WALES

The Sewer Adoption Agreement Regulations 2012

#### **EXPLANATORY NOTE**

(This note is not part of the Regulations)

These Regulations apply in relation to sewerage undertakers whose areas are wholly or mainly in Wales.

These Regulations concern the requirement under section 106B of the Water Industry Act 1991 (the Act) for a person to enter into an adoption agreement with a sewerage undertaker under section 104 of the Act if they wish to exercise their right under section 106(1) of that Act to have their drains or sewers communicate with that sewerage undertaker's public sewer.

Regulation 2 stipulates that, if a person is to rely on such an adoption agreement to allow that person to exercise their right under section 106(1) of the Water Industry Act 1991, then it must specify that the sewerage undertaker will automatically adopt that person's drains or sewer when then first sewerage bill is sent.

The Welsh Ministers' Code of Practice on the carrying out of Regulatory Impact Assessments was considered in relation to these Regulations. As a result, a regulatory impact assessment has been prepared as to the likely costs and benefits of complying with these Regulations. A copy can be obtained at Sustainable Places Division, Welsh Government, Cathays Park, Cardiff CF10 3NQ.

#### OR

The Welsh Ministers' Code of Practice on the carrying out of Regulatory Impact Assessments was considered in relation to these Regulations. As a result, it was not considered necessary to carry out a regulatory impact assessment as to the likely costs and benefits of complying with these Regulations.

### 2012 No. (W.)

### WATER INDUSTRY, ENGLAND AND WALES

## The Sewer Adoption Agreement Regulations 2012

Made \*\*\*

Laid before the National Assembly for Wales\*\*\*

Coming into force \*\*\*

The Welsh Ministers, in relation to sewerage undertakers whose areas are wholly or mainly in Wales, make these Regulations in exercise of the powers conferred upon them by section 106B(5)(b) of the Water Industry Act 1991(<sup>11</sup>).

#### Title, application and commencement

- 1.—(1) The title of these Regulations is the Sewer Adoption Agreement Regulations 2012.
- (2) These Regulations apply in relation to sewerage undertakers whose areas are wholly or mainly in Wales.
  - (3) These Regulations come into force on 1 April 2012.

#### **Provision about adoption**

- 2.—(1) This regulation applies in relation to an agreement entered into under section 104 of the Water Industry Act 1991 (agreements to adopt sewer, drain or sewage disposal works, at a future date)(12) pursuant to the condition specified in subsection (2) of section 106B of that Act (requirement to enter into agreement before construction).
- (2) For the purposes of section 106B of the Water Industry Act 1991, Condition 2(b) is satisfied only if the agreement includes the provision specified in paragraph (3).
- (3) The provision is that adoption of each part of the drain or sewer by the sewerage undertaker will occur automatically (irrespective of whether or not that part has been constructed in accordance with the agreement) when the undertaker first demands, under section 142 of the Water Industry Act 1991 (powers of undertakers to charge), charges for services provided in relation to that part.

Name

Minister for Environment and Sustainable Development, one of the Welsh Ministers

Date

<sup>(11) 1991</sup> c.56. Section 106B was inserted by section 42 of the Flood and Water Management Act 2012 (c.29). The power is conferred by section 106B(5)(b) of the Water Industry Act 1001 on "the Minister", and section 106B(8)(b) of that Act defines "the Minister" for the purposes of section 106B of that Act.

<sup>(12)</sup> Section 104 was amended by section 96 of the Water Act 2003 (c.37), and section 42(3) of the Flood and Water Management Act 2010.

### 2012 No. (W.)

### WATER INDUSTRY, ENGLAND AND WALES

## The Flood and Water Management Act 2010 (Commencement No.1 and Transitional Provisions) Order 2012

Made

Laid before the National Assembly for Wales\*\*\*

Coming into force

1 April 2012

This Order is made in exercise of the powers conferred on the Welsh Ministers—

- (a) by section 48(2) of the Flood and Water Management Act 2010(<sup>13</sup>),
- (b) by section 49(3)(e) of that Act, so far as section 42 relates to water or sewerage undertakers whose areas are wholly or mainly in Wales.

The Welsh Ministers make the following Order.

#### Title

1. The title of this Order is the Flood and Water Management Act 2010 (Commencement No.1 and Transitional Provisions) Order 2012.

#### Interpretation

- 2. In this Order—
  - (a) "the 1991 Act" means the Water Industry Act 1991(<sup>14</sup>);
  - (b) "the 2010 Act" means the Flood and Water Management Act 2010.

#### Provision coming into force on 1 April 2012

3. Section 42 of the 2010 Act comes into force on 1 April 2012, subject to article 4.

#### **Transitional Provisions**

- 4.—(1) Where a lateral sewer or drain is connected with building work where—
  - (a) before 1 April 2012 a building notice, an initial notice, a plans certificate, an amendment notice or a public body's notice has been given to, or full plans deposited with, a local authority; and
  - (b) the work is started before 1 April 2013;

then section 106B(4) of the 1991 Act, as inserted by section 42 of the 2010 Act, applies as if the reference in section 106B(4)(a) of the 1991 Act to "the standards published by the Minister" and the reference in section 106B(4)(b) of the 1991 Act to "those standards" were references to the relevant notice or plans.

1991 c.57.

<sup>2010</sup> c.29.

- (2) Section 106B(4) of the 1991 Act, as inserted by section 42 of the 2010 Act, does not apply to a lateral sewer or drain that is connected exclusively with buildings or extensions in relation to building work which may be started without the requirement under the Building Regulations 2010(<sup>15</sup>) for a building notice, an initial notice, a plans certificate, an amendment notice on a public body's notice to be given to local authority, or full plans to be deposited with a local authority.
- (3) Article 4(2) does not apply after 1 April 2013 except to a lateral sewer or drain which is connected with buildings or extensions for which building work has started before that date.

Name

Minister for Environment and Sustainable Development, one of the Welsh Ministers

Date

 $(^{15})$ 

## **Draft Regulatory Impact Assessment**

## Mandatory adoption and minimum standards for gravity foul sewers and lateral drains

## What is the problem under consideration?

- 1. At present less than 20% of sewers and lateral drains that are built to serve new developments are adopted by the relevant water and sewerage company. By definition this leaves these sewers and lateral drains in private ownership.
- 2. For the purpose of this Regulation, we define sewers as drainage pipes serving more than one property and drains as pipes serving a single property. A lateral drain is the section of pipe work serving a single property which extends beyond the property boundary. Private sewers and lateral drains are those which have not been adopted by water and sewerage companies as part of the public sewerage system. In the past this has mainly been caused by the water and sewerage company deeming the standards of design and construction as unacceptable.
- 3. The resulting private ownership of these sewers and lateral drains causes a number of problems, including:
  - Repairs are often expensive
  - Most home owners are unaware of their liability
  - Recuperating costs from all owners can be difficult
  - Access for repairs to land owned by others is often problematic for private citizens
  - Local Authorities (LA's) often have to intervene to resolve issues, resulting in burdens on them
  - Owners of these sewers subsidise those whose sewers predate 1936
  - Poor maintenance and infrastructure issues
- 4. As a result, the current system leads to a high level of consumer dissatisfaction and belief that the system is unfair, a high degree of environmental risk, and ambiguity/resource implications for LA's.

#### **Current practice**

5. Since 1974, developers have tended to construct the majority of sewerage assets, after agreeing a point of connection to the public sewerage network. The costs of new sewerage assets serving developments, whether adopted or not are therefore included within the property

- purchase price paid by the new homeowners and the assets become the responsibility of that homeowner.
- 6. When voluntary adoption of those assets takes place, it follows the conclusion of an adoption agreement which contains design and construction standards issued by the water and sewerage company. However, it has not been a requirement that new sewers and lateral should be adopted and, where the constructed sewers and drain connections did not meet the requirement of the water and sewerage company agreement they have been left unadopted, with responsibility for repair and maintenance transferring by default straight to the homeowner.
- 7. This has resulted in a muddled legacy of private sewers with varying standards of construction, ownership and maintenance. There is no comprehensive central or reliable record of private ownership and maintenance. There is no comprehensive central or reliable record of private sewers or lateral drains or who is served by them, nor is there any requirement for assets to be mapped. I addition, those obligations may not necessarily be evident to the purchaser when buying a property.

## Why does the Government need to intervene?

- 8. There are a number of market failures that prevent a comprehensive solution solely through individual action and market forces:
  - **III-defined property rights**: Most home owners are unaware of their legal liabilities for private sewers and lateral drains (there is no comprehensive and reliable record of where these assets lie or who is served by them, and it is not evident when buying a property).
  - Under-maintenance of 'merit good' by private owners: private sewers deteriorate and perform worse than equivalent public sewers. Well maintained sewers have public health and environmental externalities and benefits. Society is likely to choose that sewers be maintained to a higher level than private owners achieve. Private owners are typically short-term utility-maximisers who react if at all to immediate failures, and take into account only private benefits and costs. There is currently no mechanism or incentive for private sewer owners to manage the network strategically for the longer term, to the standard society would choose.
  - Externalities among joint owners: A sewer's run may, for example, serve 6 properties. Owner 5 may cause a blockage that only affects owners 1, 3 and 4 upstream of the blockage. Owners 5 and 6, downstream of the blockage may be unwilling to contribute to the cost of the repair and owner 5 may be unwilling to allow entry onto his property to effect the necessary repairs. The shared responsibility may be hard to enforce and free-riders may persist, even with better information provision.

## **Policy objective**

- 9. The Welsh Government policy objective is that newly constructed sewers and lateral drains are constructed to a consistent standard that enables automatic adoption by water and sewerage companies. Defra and the Welsh Government have separately consulted on measures to transfer the legacy of existing assets accumulated since 1937 and transfer qualifying assets to water and sewerage companies. Under these proposals, all privately owned sewers, and lateral drains from an existing public sewer to the cartilage of a single site, will be adopted by the sewerage undertaker. The policy approach to adopt newly constructed sewers is an essential adjunct to the transfer of existing private sewers if the experience of unadopted sewers since 1937, and all the reasons for the transfer, are not to be repeated in future years.
- 10. The policy should benefit the following:
  - Developers by reducing regional variations and providing greater clarity
  - House Purchasers by ensuring a consistent and satisfactory standard for their sewers and by reducing future problems of maintenance and potentially high costs
  - Water and sewerage companies by providing them with greater control over the sewerage network and its management with lower maintenance costs, greater resilience and increased effectiveness
- 11. Adoption with the benefit of consistent build standards will prevent recurrence of existing problems associated with private ownership, including the cross subsidisation of maintenance, disputes around joint ownership and homeowners lack of awareness of their liability for maintenance. The costs and burdens born by homeowners currently responsible for private sewers will be removed.
- 12. Another objective of the policy is to avoid some of the current delays and connectivity problems. It is hoped it will foster early engagement between the developer, the relevant water and sewerage company and potentially any LA/planners.

## What Policy Options have been considered?

- 13. The Welsh Government has considered two main policy options alongside the baseline 'do nothing' approach. These options materialised from the 2007 Defra and Welsh Government consultation 'Consultation on Private Sewers Transfer Implementation Options':
  - Policy Option O: Do nothing baseline no automatic transfer of assets to the water company and no mandatory build standards. Water and sewerage companies would continue to issue varying guidance on the design and construction of sewers in lateral drains.

- 2. **Policy Option 1:** Mandatory adoption, with use of applicable version of Sewers for Adoption build standards The national guidance in Part H of the Building Regulations and 'Sewers for Adoption 6<sup>th</sup> Edition' The national guidance in Part H of the Building Regulations and 'Sewers for adoption' would continue (including regional variants set by water and sewerage companies). This current build standard could simply be used as the national build standard, but it does not cover the whole of the pipe and stops 2.5 metres from the house (effectively in the highway). This is not aligned with the mandatory adoption proposal, which entails the entire lateral drain and sewer (right up to the property and in some cases through and underneath) being adopted by the water and sewerage company.
- 3. **Policy Option 2:** Mandatory adoption with mandatory build standards. Automatic adoption of new sewers and lateral drains after construction together with a requirement to build to a default standard deemed to satisfy the requirements for and thereby ensure automatic adoption as provided for in Section 42 of the Floods and Water Management Act 2010. A default build standard would provide a set of requirements that covers all aspects of design, layout, construction, operation and maintenance. The proposed new build standards are consistent with those in Sewers for Adoption and are universally applicable.

## What is the preferred option?

14. Option 2 is the preferred option. Current developer practice is generally to link one property with another, then another, and so on before finally making a connection to a sewer. Given that, in Option 1, Sewers for Adoption – 6<sup>th</sup> Edition only caters for the connection to a distance of 2.5 meters from the property, a universal build standard covering connections right up to the property, as is the case in Option 2, better reflects current building practices whilst providing a clear set of practical and sustainable standards for developers and water and sewerage companies to work to. For this reason Option 2 is preferable.

## **Cost Benefit Analysis of Options**

15. Option 2 has been selected as the preferred option, since it is the most cost-beneficial and will ensure the application of uniform sewer standards in the future. Option 1 was rejected on the grounds that it has a negative net present value (NPV) and would not achieve the policy objective of ensuring that newly built sewers and lateral drains are built to a uniform standard with the benefits that would bring. Option 2 is expected to deliver a net benefit of £21.4 million. The sensitivity analysis suggests that the NPV is not sensitive (i.e. remains positive) to changes in the number of assumed new house builds per annum or inspection/supervision costs. However it is sensitive to the estimated changes in construction costs. When an increase in construction costs is assumed (using Home Builders Federations (HBF) estimates rather than British Plastics Federations (BPF) which estimated a reduction in costs), the NPV becomes negative.

The best estimate NPV uses BPF's estimates for reasons explained later in the document.

- 16. We have used guidance provided by the Treasury Green Book to carry out the following cost benefit analysis (CBA). In accordance with this guidance a discount ratio of 3.5% has been applied to calculate present values from years 0-30 of the analysis, and a lower rate of 3% from year 31 onwards.
- 17. Costs and benefits are quoted in present value through-out the analysis. This allows us to express the future costs and benefits in present terms (achieved by applying the discount rate).
- 18. A forty year analysis period has been chosen, in common with the Impact Assessment on the transfer of private sewers to water and sewerage companies. The 40 year time frame recognises the long-term nature of the sewerage assets being considered and the problems that the options are seeking to avoid.
- 19. Each of the two options is considered relative to a baseline in order to evaluate the impact of each option relative to the 'Do Nothing' option.
- 20. We estimated the number of new homes being built each year using Department for Communities and Local Government (CLG) live tables. New house builds in Wales has fallen considerably in recent years, largely driven by the recession. The number of new dwellings started has fallen over 40% since 2007/08, falling to 5,820 units in 2010/11. Using CLG forecasts for the number of new house builds in Wales in 2033, we estimated a growth rate and applied it to all years. We did not use the number of new house build completions for 2009/10 as our starting point to calculate the growth rate, because it would be unrealistic to assume the number of new houses built each year will remain at this low level over the 40 year period. Hence our starting point is to use an average of the number of houses built since data began in 1991/92.
- 21. We sensitivity tested this using the Defra methodology (the difference between 2008 and 2033 forecasts was estimated and an average yearly build rate was estimated i.e. the same was used in each year), as opposed to our methodology of exponentially increasing the build rate over time to reflect the forecast rising number of Households) and a lower rate of house building (6k, 8k and 10k). The results were not sensitive to the projected number of new homes built i.e. the preferred option is still estimated to have a positive NPV no matter how many house builds are estimated.
- 22. We will look at the estimation of each of the policy options being considered separately. Each will be compared to the baseline 'Do Nothing option'.

### **Baseline: Do nothing**

23. The baseline position in this Impact Assessment is that there will be no automatic transfer of assets to the water and sewerage companies and no

- mandatory build standard. Water and sewerage companies would continue to issue varying degrees of guidance on design and construction of sewers and lateral drains.
- 24. Under the baseline scenario, estimates assumed private sewers were being constructed to meet Part H of the Building Regulations, which is a less stringent standard to that for new public sewers i.e. Sewers for Adoption 6<sup>th</sup> Edition
- 25. Since the baseline is considering the 'Do Nothing' scenario, no extra costs or benefits will be realised.
- 26. The main consequences of the baseline 'Do nothing' approach would be as follows:
  - In the absence of uniform or consistent national standards, the
    continuation of the standards as preferred by individual water and
    sewerage companies with resulting inefficiencies (mainly higher costs
    of procurement and planning) for developers and the need for supply
    chain manufacturers to cater for sometimes minor variations in
    specification resulting in failure to capitalise on potential economies of
    scale available from larger production volumes effectively specialist
    or niche suppliers upon whom market competition is less effective.
  - In the absence of a mandatory adoption process, continuation of current practices which in turn would result in repetition of the circumstances which have arisen as result of the Public Health Act 1936 over the last 74 years and which are set out in the Defra Impact Assessment on the transfer of private sewers and lateral drains to statutory water and sewerage companies. This would lead to continued regulatory failure (the fact that the 1936 Public Health Act has failed to achieve the intended voluntary adoption such that very few drains and sewers have been adopted over that period) and continued market failure because there is no incentive for water and sewerage companies to adopt sewers.

## Option 1: Mandatory Adoption, but no harmonised default Build Standards

- 27. Option 1 would provide for automatic transfer of new sewers and lateral drains after construction by requiring the applicant to enter into a section 104 agreement as a condition of making the connection but without publication of standards provided for in s106B of the Water Industry Act 1991. The national guidance in Part H of the Building Regulations and 'Sewers for Adoption' would continue to be applicable, alongside the current Sewers for Adoption (6 Edition) standards complete with regional variation set by water and sewerage companies
- 28. Table 1 summarises the NPV for option 1, as well as the present value of the costs and benefits quantified. All values are presented relative to the baseline. We will look at each of the costs and benefits in turn. The NPV is estimated to be -£103.7 million. It is negative, implying that this option would be a net cost to society i.e. the costs to society outweigh the benefits.

Table 1: Policy Option 1 total costs and benefits (present values) over 40 years

Costs	Present Value (£m)
Additional Capex (developers)	103.5
Cost of dealing with blockages (WaSC)	4.7
Additional supervision/inspection costs	
(WaSC)	2.6
TOTAL COSTS	110.7
Benefits	
Saved cost of dealing with blockages (HH)	4.9
Saved time dealing with blockages (HH)	0.3
Saved time dealing with disputes (LA)	1.8
TOTAL BENEFITS	7.0
NPV	-103.7

29. The results of option 1 are not sensitive to the period of analysis selected. Analyses using time periods from 10 years to 60 years all resulted in negative NPV's. Although the NPV becomes increasingly negative as the time period of analysis is extended.

### **Monetised Costs of Option 1**

30. The estimated total present value of costs (PVC) of Option 1 is £103.5 million over forty years, or approximately £2.7 million per annum.

### **Developers: Additional Capital Expenditure (Capex)**

- 31. The estimated PVC for capital expenditure is estimated to be £103.5 million over forty years, or approximately £2.5 million per annum.
- 32. Under Option 1, developers will face increased construction costs since they will have to build what would have formerly been private sewers and laterals to the adoptable standards set out in Sewers for Adoption 6<sup>th</sup> Edition.
- 33. In order to estimate construction costs, drain and sewer layouts were designed by the HBF for a typical housing estate also nominated by HBF. To represent the Baseline scenario, both HBF and the BPF engaged specialist surveyors who estimated schedules for materials and costs where new public sewers would meet Sewers for Adoption 6<sup>th</sup> Edition and private sewers would meet Part H of the Building Regulations (i.e. less stringent standards).
- 34. Once the baseline had been established by both the HBF and BPF, the estimates were repeated so that sewers and lateral drains that would otherwise have been privately owned were designed to meet the proposed new standards. Capex for this typical scheme was estimated by adjusting the baseline sewerage design and costs which then met the proposed standards, thus facilitating mandatory adoption. To meet Sewers for Adoption 6<sup>th</sup> Edition, the following features were applied to the design:
  - 3m stand-off from buildings for public sewers; and
  - Inspection chambers on public sewers constructed in accordance with SfA6
- 35. As a result of research carried out by the BPF, our estimate assumes an additional capital cost of £386 per household for Option 1 compared to the baseline 'do nothing option'.

#### Water and sewerage companies: Cost of dealing with blockages

- 36. The estimated PVC of dealing with blockages is estimated to be £4.7 million over forty years, or approximately £120,000 per annum.
- 37. The majority of costs for water and sewerage companies arising from Option 1 are associated with on-going maintenance of the additional

- sewers and laterals adopted. With mandatory adoption, these costs would be borne initially by water and sewerage companies but passed on to their customers in sewerage bills through Ofwat's regulatory mechanisms.
- 38. An average blockage rate of 0.5 blocks/km/year is applied to public sewers. This is based off data reported by water and sewerage companies in their 2010 June Return submissions to Ofwat. Since older, smaller sewers tend to have a higher blockage rate, a rate of 1 block/km/year is assumed for private sewers.
- 39. There is no data available for the blockage rate on new, publicly-owned small diameter pipes. Therefore it has been assumed for the central estimate that the blockage rate will remain constant at 1 block/km/year for newly built sewers and laterals that would formerly have been privately owned.
- 40. Based on the assumptions in paragraph 31, water and sewerage companies could have to resolve an additional 93 blockages in Wales in 2011/12 as a result of mandatory adoption. Blockages, and hence costs, will rise year on year as more houses are built. The additional cost to water and sewerage companies is a transfer of costs from households and LA's to water and sewerage companies. The cost to water and sewerage companies would ultimately be passed onto their customers equating to approximately 23p per household per year (using CLG figure of 1.3 million households in Wales in 2008).
- 41. In sensitivity analysis, a blockage rate of 0.5 blocks/km/year was applied to public sewers which would have been privately owned under the baseline scenario (i.e. the public sewer blockage rate). This had an insignificant impact on the NPV (central estimate NPV -£103.7 fell to -£104 million.

#### **Developers: Additional Supervision/Inspection Costs**

- 42. The estimated PVC of additional supervision/inspection costs is estimated to be £2.6 million over forty years, or approximately £65,000 per annum.
- 43. Supervision/inspection fees are currently charged to the developer at 2.5% of estimated construction costs. Therefore the charges to the developer under Option 1 would be higher because of the longer lengths of pipelines included in Section 104 agreements. The cost of supervision/inspection was doubled to 5% of estimated construction costs in the sensitivity analysis, since it is possible these costs will increase in the coming years. The analysis showed that the NPV was not overly sensitive to an increase in these fees, it fell from -£103.7 to -£106.3 million.

## **Monetised Benefits of Option 1**

44. The estimated total present value of benefits (PVB) of Option 1 is £7 million over forty years, or approximately £175,000 per annum.

#### Households: Saved cost of dealing with blockages

- 45. The estimated PVB of the saved cost of dealing with blockages is estimated to be £4.9 million over forty years, or approximately £120,000 per annum.
- 46. Due to the reduction in length of sewers and drains under private ownership, householders in Wales will avoid dealing with approximately 49 blockages in 2011/12, rising year on year as more houses are built. This equates to a saving of approximately £300,000 per annum (over 40 years) on emergency private sewer maintenance. It is likely that water and sewerage companies will have service contracts in place with subcontractors, resulting in more efficient maintenance and lower unit repair costs than private repairs, due to economies of scale. As a result it is likely that the benefit to householders will be greater than the resulting increased cost for water and sewerage companies.
- 47. It is evident that we have assumed that the number of blockages avoided by Households (49 per annum) is lower than the additional amount of blockages we assume the water and sewerage companies will be responsible for (93). This is because under the standards imposed under Section 104 agreements, the total length of sewers and lateral drains which are then owned by water and sewerage companies is increased. Currently the majority of developments are constructed without any adoption agreement so are not constructed to the Sewers for Adoption 6<sup>th</sup> Edition standards required for adoption and have shorter run of pipes.

#### Households: Saved time dealing with blockages

- 48. The estimated PVB of the saved householders time dealing with blockages is estimated to be £300,000 over forty years, or approximately £7,500 per annum.
- 49. Time saved by householders due to a reduction in the number of blockages they are responsible for after mandatory adoption is quantified as an hour and a half per blockage, valued at the median wage (£11.4 per hour).

#### Local Authorities: Saved time dealing with disputes

- 50. The estimated PVB of the saved time dealing with disputes is estimated to be £1.8 million over forty years, or approximately £45,000 per annum.
- 51. There will also be a reduced burden on LA's in dealing with disputes related to private sewer/lateral drain blockages. The average unit cost (per km) to LA's was calculated and applied to the length of sewers and lateral drains expected from the increase in house building projections to estimate an average annual saving to LA's.

# Option 2: Mandatory Adoption, Mandatory Harmonised Build Standard

- 52. This option would mean automatic transfer of ownership of new sewers and lateral drains to water and sewerage companies when a connection to a public sewer is made. Under section 42 of the Flood and Water Management Act 2010, the right to connect to the public network depends on there being an adoption agreement in place. Such adoption agreements must be predicated on standards set by Welsh Ministers. This mandatory build standard would provide uniform standards and offer those constructing sewerage assets a set of criteria deemed to satisfy the requirements of an adoption agreement leading to automatic adoption.
- 53. In addition, Option 2 would facilitate the accreditation of contractors at a national level. Whilst this is not a requirement of the standard, it is likely that the water and sewerage companies would endorse an accreditation scheme given the costs of supervising the construction of all future public sewers. Such accreditation schemes could improve workmanship on site and reduce the need for water and sewerage company inspection.
- 54. Table 2 highlights the key differences between the current voluntary adoption under SfA6 and the standards proposed by Welsh Ministers.

Table 2: Differences between current voluntary adoption and proposed new standards

	Sewer for Adoption 6 <sup>th</sup>	Welsh Ministers		
	edition – voluntary	Standard for Gravity foul		
	guidance	Sewer and Lateral		
		Drains		
Depth	900mm	350mm		
Distance from building	2.5m – but varies by	100mm		
	company			

55. The proposed standards in Option 2 gives scope for adoptable assets to be laid at a shallower depth and closer to buildings which should offer developers lower cost options for adoptable assets under highways, which is often the case when applying the current voluntary guidance. This not only has the potential to lower construction costs, but should also deliver

- future maintenance benefits for adopted assets through improved accessibility.
- 56. Table 3 summarises the NPV for option 2, as well as the present value of the costs and benefits quantified. All values are presented relative to the baseline. We will look at each of the costs and benefits in turn. The NPV is estimated to be £21.4 million. It is positive, implying that this option would be a net benefit to society i.e. the benefits to society outweigh the costs.
- 57. In Table 3, some of the costs associated with Option 1 have transferred in to benefits for Option 2. Additional Capex and Additional supervision/inspection costs were a cost under Option 1, but are now a benefit for Option 2, when compared to the baseline 'Do Nothing' Option.

Table 3: Policy Option 2 total costs and benefits (present values) over 40 years

Costs	Present Value (£m)
Cost of dealing with blockages (water and	
sewerage company)	4.8
TOTAL COSTS	4.8
Benefits	
Saved Capex (developers)	17.6
Saved supervision/inspection costs (water	
and sewerage company)	0.4
Saved cost of dealing with blockages (HH)	5.9
Saved time dealing with blockages (HH)	0.3
Saved time dealing with disputes (LA)	1.9
TOTAL BENEFITS	26.2
NPV	21.4

# Monetised Costs of Option 2

58. The estimated total PVC of Option 2 is £4.8 million over forty years, or approximately £120,000 per annum. This is considerably lower than under Option 1. This is largely driven by the fact that additional capex was a cost for Option 1, but is a benefit for Option 2 (compared to the baseline). Supervision/inspection costs are also a benefit under Option 2, whereas they were a cost under Option 1.

# Water and sewerage companies: Additional cost of dealing with blockages

- 59. The estimated PVC of dealing with blockages is estimated to be £4.8 million over forty years, or approximately £120,000 per annum.
- 60. Water and sewerage companies will be responsible for dealing with blockages on public sewers which would have been private sewers under the baseline scenario. Based on the same assumptions used in Option 1

- of 1 blockage/km/year, water and sewerage companies will have to resolve an additional 96 blockages in Wales in 2011/12 as a result of mandatory adoption. Blockages and hence costs will rise year on year as more houses are built. These costs are a transfer from households, who benefit from the avoided cost.
- 61. These additional costs will likely be passed on to all householders through their sewerage bills, via Ofwat's regulatory regime. Using the CLG estimates for household numbers in Wales we can estimate that this could add approximately 23p to every householder's sewerage bill.
- 62. Typical sewerage schemes were used to estimate the additional length of public sewers and laterals under Option 1 and 2, and hence the number of additional blockages that water and sewerage companies would have to deal with. The cost to water and sewerage companies of dealing with blockages is higher for Option 2 than for Option 1 due to a marginally longer average length of public sewers/lateral drains under Option 2.

## **Monetised Benefits of Option 2**

63. The estimated PVB of Option 2 is £26.2 million over forty years, or approximately £650,000 per annum. This is considerably higher than under Option 2 because of reasons explained above, namely that capital expenditure and supervision/inspection costs are a benefit compared to the baseline in Option 2, but a cost in Option 1.

#### **Developers: Saved Capex Costs**

- 64. The estimated PVB of saved capital costs is estimated to be £17.6 million over forty years, or approximately £450,000 per annum.
- 65. We estimate that by building lateral drains and what would otherwise have been private sewers to mandatory build standards, there will be a marginal Capex saving to developers compared to the 'do nothing baseline'. Hence for Option 2 the relative change in Capex requirements for developers compared to the baseline is beneficial to developers. This is different to Option 1, where there was estimated to be a Capex cost to developers compared to the baseline scenario. This is because our estimates assume an additional capital cost of £386 for Option 1, but a capital cost saving of £66 per household for Option 2.
- 66. Construction cost estimates under the baseline scenario and under Option 1 (to meet Sewers for Adoption 6<sup>th</sup> Edition) were provided by the BPF and HBF. Whilst BPF estimated an average cost saving of £66 per household for Option 2 (against the baseline scenario), HBF estimated an additional cost of £141 per household. The differences in these estimates appears to arise from the fact the HBF estimate was based off data and experience collected for application in the East Midlands only and therefore it can not be regarded as nationally representative for the purpose of this IA. The BPF estimate, on the other hand, used a nationally recognised price reference and also takes in to account the fact that it will

- be cheaper to build to consistent, Welsh Minister standards than under current arrangements.
- 67. In reaching these estimates both the BPF and HBF used independent firms of Quantity Surveyors working to a 'typical' development layout provided by the HBF. However, BPF illustrated a range of options in providing both adoptable and non-adoptable sewerage, which reflected some of the numerous options fully meeting compliance. On this basis the BPF figure was adopted for this IA. It is worth noting though, that in proportion to house prices neither figure is significant. Results of the analysis are sensitive to this assumption. The NPV is positive when we use a saving of £66 estimated by BPF, but is negative when we use the additional cost of £141 estimated by HBF.
- 68. The BPF estimate was chosen on advice from Defra. Defra received advice from the Water Research Council (WRc), the authors of the current standards. Defra and WRc judged it to be the most robust and representative of the least cost options available for complying with the standards. Their judgement was that the standards should have the effect of reducing construction costs by streamlining the design checking, construction and approval processes and consequently the additional costs implied by the HBF estimate represent a high cost scenario. The consultation process provides an opportunity to test such assumptions and it is expected that refinement if the evidence base will occur through this.
- 69. Current regulations (baseline scenario) mean that adoptable public sewers have to be at least 2.5m (3.0 m DCWW) from the property. This scenario generally means that the public sewer is laid under the road. This involves costly procedures like backfilling the excavated trenches for the pipes in order to minimise future subsidence of the road. In addition, all pipes and manhole covers (size and type) are engineered to meet imposed loads for vehicular traffic. Option 2 is estimated to have a lower capital expenditure for developers compared to the baseline because it removes the requirement that the public sewer has to be 2.5m from the property. This provides developers with more flexibility than they currently have, including the option of not laying the adoptable public foul sewer under the road. The new regulations will not dictate that they cannot lay the foul sewer under the road, however, it is likely to make little economical sense to do so. By not laying the pipes under the road it avoids the need to excavate deep trenches, removes the need for backfilling and more expensive pipes and manhole covers that can withstand traffic loadings. Instead developers will have cheaper pipes and manhole covers that can withstand traffic loadings. Instead developers will have cheaper options through the introduction of more flexibility in where the public sewer is laid. As there is also a reduction in the adoptable depth from 900mm at present to 350mm in the proposed standards, laying adoptable sewers and lateral drains at shallower depths, combined with the option to enable connection to sewer with a junction rather than another access point, should offer cost reductions where site layouts permit.

#### **Developers: Saved supervision/inspection costs**

- 70. The estimated PVB of saved supervision/inspection costs is estimated to be £400,000 over forty years, or approximately £10,000 per annum.
- 71. Supervision/inspection fees are currently charged to the developer at 2.5% of estimated construction costs. We estimate the cost of supervision/inspection fees by multiplying the additional capex cost for all households built annually by the 2.5%. Since the additional cost of capital for Option 2 is a saving compared to the baseline, there is also a saving in supervision/inspection fees.
- 72. Similarly to Option 1 we doubled the cost of the supervision/inspection cost to 5% as part of our sensitivity testing. This analysis showed that the NPV is not sensitive to an increase in these fees with the NPV increasing to £21.85 million versus the central estimate of £21.4 million.

#### Households: Saved cost of dealing with blockages

- 73. The estimated PVB of saved costs of dealing with blockages is estimated to be £5.9 million over forty years, or approximately £150,000 per annum.
- 74. Due to the reduction in the length of sewers and lateral drains under private ownership, householders in Wales will avoid dealing with approximately 59 blockages in 2011/12, rising year on year as more houses are built. This equates to a saving of approximately £400,000 per annum on emergency sewer maintenance. The cost of dealing with the problem is transferred to water and sewerage companies (see paragraph 48). Since water and sewerage companies are assumed to be able to tackle the repairs more cost effectively, the overall effect of mandatory adoption on ongoing maintenance costs is a net benefit.
- 75. The number of blockages avoided (59) is lower than the number of blockages the water and sewerage companies gain (96) because mandatory adoption has the effect of increasing the length of sewers in water and sewerage company ownership (as with Option 1). This is because the majority of developments are not constructed to the SFA6 standards, while meeting adoption standards will increase the total length of adoptable sewer. The increase in sewer length is lower under Option 2 (a 9% increase) than under Option 1 (an 11% increase) due to the differences between Sewers for Adoption 6<sup>th</sup> Edition and the proposed mandatory standards.

## Households: Saved time dealing with blockages

- 76. The estimated PVB of saved time dealing with blockages is estimated to be £300,000 over forty years, or approximately £7,500 per annum.
- 77. Time saved by householders, due to the reduction in the number of blockages is an estimate of the annual cost avoided from time spent maintaining private sewers.

## Local Authorities: Saved time dealing with disputes

- 78. The estimated PVB of saved time dealing with disputes is estimated to be £1.9 million over forty years, or approximately £48,000 per annum.
- 79. There will be a reduced burden on LA's in dealing with disputes related to private sewer/lateral drain blockage.

## Non-monetised impacts

#### Option 1

#### **Non-monetised Costs**

- 80. It is likely that, in some circumstances, developers will fail to meet the water and sewerage companies' required construction standards for sewers and lateral drains i.e. Sewers for Adoption 6<sup>th</sup> Edition. Whilst developers will usually complete remedial work, or cover the costs of remedial work via bonds, water and sewerage companies would likely have to undertake additional administrative work to recover these costs. Developers may face higher costs through lost bonds where work is not up to standard, since a higher proportion of the sewers and drains they construct will need to meet water and sewerage company standards.
- 81. Under the existing agreements for adoption under Section 104 of the Water Industry Act 1991, water and sewerage companies agree to adopt sewers provided they are completed in accordance with the terms of an agreement. Adoption usually takes place following completion of the whole sewerage system and more than 50% occupation of the properties on the site. Developers are required to provide a 10% non-performance bond, which will allow the water and sewerage companies to carry out a certain amount of remedial work in the event of non-performance by the developer. This bond is released following adoption and a maintenance period (minimum of 12 months) across the whole development site.
- 82. Under the new proposals, because adoption would be mandatory, developers would be required to provide up to 100% non-performance bond, which would allow the water and sewerage companies to carry out a certain amount of remedial work in the event of non-performance by the water and sewerage company. This would be released following adoption and the 12 month maintenance period on the phase of development. Hence, the level of bond is likely to increase.
- 83. Currently most bonds are guarantees from providers such as NHBC. There would likely be upward pressure on the insurance premiums paid by the developers because the size of the bond required has increased. However, as highlighted below in paragraph 66, this could be negated to some degree because of the shorter duration.
- 84. There is a small risk that some households will refrain from taking up emergency insurance policy, which could result in loss of income to insurers in the short run. However, such policies frequently do not cover private sewers which lie outside the cartilage so whilst householders will receive major benefit in terms of the loss of liability for maintenance or repairs outside their property, the perceived reduction in risk from the incremental change in sewer ownership is not likely to affect the uptake of policies significantly. The risk of a reduction in business is also minimised by the fact that, initially, the proportion of newly built properties is a very small proportion of the total.

#### **Non-monetised Benefits**

- 85. Mandatory adoption procedures will be streamlined, potentially reducing administrative costs to developers and water and sewerage companies.
- 86. As a result of a shorter adoption process, developers' bonds will be released earlier than under the baseline scenario resulting in a positive impact on developers' cashflow.
- 87. Under the new proposals, adoption could take place, for example, once the foundations of the development are cast and the foul drainage is fixed (that is the final position of the adoptable assets is confirmed). It is anticipated that the sewers would be inspected prior to adoption and obvious defects remedied. However, this would not prevent adoption. Therefore adoption could be phrased across the development site and it would not be necessary to wait until the whole development is completed. This could have the benefit of enabling inspections to be undertaken earlier and any remedial works undertaken prior to finishing off surfacing and while pipe-laying contractors are on site.
- 88. As highlighted in paragraph 59, although the level of bond will likely increase, the duration is likely to be shorter as a result of a more sequential approach dictated by the sale of occupancy of premises. The insurance premiums paid by developers could come under downward pressure because of the shorter durations arising from a more streamlined approach. In addition, as with the current system, developers with good track records will pay significantly less. Accreditation is also likely to reduce the levels required. As a result of the shorter adoption process, developers' bonds will be released earlier than under the baseline scenario resulting in a possible positive impact on developer's cashflows.
- 89. Purchasers of new homes will not be at risk of owning private sewers. The automatic transfer would clarify what are currently ill-defined property rights and thus reduce distress and cost. Some of the distress that can be avoided include:
  - Failure of house purchase searches to agree to identify the existence of private sewers and subsequent lack of understanding of extent of responsibility among property owners,
  - Inadequate maintenance arrangements put in place by developers,
  - Pressure from some drainage repair companies to agree to work being undertaken or commenced when they are on site or where repairs to sewerage systems are proposed but the need for which is not immediately obvious to all those served by it. This may be particularly acute for low income groups,
  - Lack of certainty and consistency around the extent of household insurance cover
  - The affordability of even minor work such as blockage clearance for certain low income groups such as the elderly,
  - Problems of gaining access to pipework etc where it is on or under others' property.

90. On-going maintenance should be more effective than under the baseline scenario, and would be expected to move to more planned and less reactive maintenance under water and sewerage company ownership. Well maintained public sewers have positive public health and environmental externalities. LA's, who have oversight through their environmental health function, have the power to intervene where necessary in order to protect public health. However, where intervention is necessary because of the failure of private sewer owners to carry out necessary works, the process of remedying problems can be protracted and expensive for LA's. This IA does not however seek to suggest that the non-monetised public health benefits justify the mandatory adoption or build standards. The proposed new build arrangements for sewers and lateral drains will continue to protect health and in the long run will do so at lower cost. Since sewers will be better maintained there will be a slightly reduced risk to public health compared with the baseline. But this is not monetised, is likely to be small and is not a primary driver for this proposal.

#### Option 2

### **Non-monetised Costs**

- 91. These will be the same as the non-monetised costs under Option 1.
- 92. Where industry adopts new practices there will be some associated transitional costs. Such costs arise mainly from training employees to be aware of and competent in any new practices and the procurement and use of new equipment such practices may require. It is unlikely that industry would need to change equipment procurement and familiarisation practices as a result of implementation of a mandatory build standard.
- 93. Training costs will vary depending on the size of the organisation since economies of scale allow the cost per person to be reduced for larger organisations. Hence these have not been quantified.
- 94. Large organisations which currently construct public sewers using Sewers for Adoption 6<sup>th</sup> Edition as a guide will already be familiar with practices that a mandatory build standard will require. Such companies will require less familiarisation than some smaller organisations not using Sewers for Adoption 6<sup>th</sup> Edition given that they currently construct private sewers using Building Regulations Approved Document H. However, smaller organisations will be able to use the reduced guidance supporting the mandatory build standard, making training and familiarisation easier. Larger organisations, however, will require training and familiarisation for the full guidance. On this basis there should be some balance in training costs between economies of scale for larger organisations and simplified guidance for smaller organisations.
- 95. A mandatory build standard will be a core skill for all builders, developers, consultants etc. It is possible that the training will be covered by the time dedicated to continuing professional development that professional institutions normally require of their members. Training costs may not be additional if training for the existing standards is currently undertaken.

Where such training is not currently undertaken, additional costs will be incurred. At this stage the extent which training is already occurring is not known so training cost estimated have been developed.

#### **Non-monetised Benefits**

- 96. In addition to the benefits realised under Option 1 from mandatory adoption, developers, water and sewerage companies and society will benefit from a single, unified mandatory build standard as follows:
  - Developers will save time and costs in submitting plans to water and sewerage companies;
  - Standardisation and repetition of layouts will reduce design costs;
  - LA's will no longer have to assess design and inspection of sewers and laterals which are not offered for adoption, or subsequently not adopted due to arising issues;
  - LA's will have a reduced burden of environmental control in dealing with problems (odours, flooding etc)
  - Society will benefit from product innovation encouraged by better ability of manufacturers to recover development costs by marketing the same product of all water companies.

## **Assumptions**

97. All the assumptions used in this Cost Benefit Analysis (CBA) are presented in table 4. Being a consultation stage IA, it is expected that the process of consultation will provide an opportunity to test the assumptions used and improve the evidence base where possible.

Table 4: Assumptions used in CBA

Projected Housebuilding  8,248 in 2009/10 to 20,124 in 2049    CLG Live Tables. Average of new housebuilds between 1992 and 2010 and apply growth rate for HH projections for 2033 to new housebuild data   Period of Analysis	Parameter	Assumed Value	Source			
20,124 in 2049   Average of new housebuilds between 1992 and 2010 and apply growth rate for HH projections for 2033 to new housebuild data	Projected Housebuilding					
Period of Analysis  Period of Analysis  Period of Analysis  A0 years  HM Treasury Greenbook  Discount rate (0-30 years)  Discount rate (>30 years)  Discount rate (>30 years)  Discount rate (>30 years)  Average annual local authority cost of dealing with disputes related to sewerage blockages on sewers that will transfer under mandatory adoption  Cost supervision/inspection  Sewerage construction costs for 172 HH development  Bockage rate on public pipes (blockage/km/year)  Blockage rate on public pipes (blockage/km/year)  Time to deal with blockages (hrs)  Us figures estimated in 'Transfer of Private Sewers' IA and Webls HH as proportion of UK HH applied (6%)  'Transfer of Private Sewers' IA - £31,700 per LA  SfA6  Construction costs (sensitivity analysis 5%)  SfA6  Sigures provided by BPF (figures used in sensitivity analysis provided by HBF)  Figures provided by BPF  Figures provided by BPF  Figures provided by BPF  Baseline Option: 691/4630 Option 1: 1930/3979 Option 2: 1975/3844  D.5  Expert opinion  Transfer of Private Sewers IA  Expert opinion  Expert opinion			Average of new			
Period of Analysis 40 years HM Treasury Greenbook Discount rate (0-30 years) 3.5% HM Treasury Greenbook Discount rate (>30 years) 3% HM Treasury Greenbook Current length of private sewers and lateral drains (km) in Wales 12,404 UK figures estimated in 'Transfer of Private Sewers' IA and Welsh HH as proportion of UK HH applied (6%) Average annual local authority cost of dealing with disputes related to sewerage blockages on sewers that will transfer under mandatory adoption Cost supervision/inspection			housebuilds between			
Period of Analysis  Period of Analysis  Period of Analysis  Discount rate (0-30 years)  Discount rate (>30 years)  Discount rate			1992 and 2010 and			
Period of Analysis  Period of Analysis  40 years  HM Treasury Greenbook  LW figures estimated in 'Transfer of Private Sewers' IA and Welsh HH as proportion of UK HH applied (6%)  Average annual local authority cost of dealing with disputes related to sewerage blockages on sewers that will transfer under mandatory adoption  Cost Sewerage construction costs (sensitivity analysis 5%)  Sewerage construction costs (sensitivity: £237,031) Option 1: £418,009 (Sensitivity: £2418,009) Option 2: £340,208 (Sensitivity: £261,405)  Lengths of public/private sewers in development  Blockage rate on public pipes (blockage/km//year)  Blockage rate on private pipes (blockage/km/year)  Blockage rate on private pipes (blockage/km/year)  Blockages (hrs)  Unit cost rate – public  1.5  Transfer of Private Sewers IA  Figures provided by BPF (figures used in sensitivity: £261,405)  Figures provided by BPF  Figures provi			apply growth rate for			
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Discount rate (0-30 years)  Discount rate (>30 years)  Discount rate (>30 years)  Discount rate (>30 years)  Current length of private sewers and lateral drains (km) in Wales  Average annual local authority cost of dealing with disputes related to sewerage blockages on sewers that will transfer under mandatory adoption  Cost supervision/inspection  Sewerage construction costs (sensitivity analysis 5%)  Sewerage construction costs (sensitivity:£237,031) Option 1: £418,009 (Sensitivity:£261,405)  Lengths of public/private sewers in development  Lengths of public/private sewers in development  Blockage rate on public pipes (blockage/km/year)  Blockage rate on private pipes (blockage/km/year)  Time to deal with blockages (hrs)  3.5%  HM Treasury Greenbook  HK Treasury Greenbook  HK figures estimated in 'Transfer of Private Sewers' IA - £31,700 per LA  Sewers' IA - £31,700 per LA  Figures provided by SPF (figures used in sensitivity analysis provided by HBF)  Figures provided by HBF)  Figures provided by HBF)  Figures provided by HBF)  Figures provided by BPF			housebuild data			
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Unit cost rate – private blockage (£/hr)	200	Expert opinion		
Average Value of HH time (£/hr)	11.4	Transfer of Private Sewers IA		

## Assumptions taken from private sewers IA

- 98. The estimates from the Private Sewers IA 'IA of the transfer of private sewers and lateral drains to statutory water and sewerage companies' use the best available cost estimates and data relating to water and sewerage companies provided by the independent economic regulator Ofwat in March 2010. The figures build on previous work undertaken by Atkins and WRc/UKWIR.
- 99. The current length of private sewers and lateral drains is uncertain, but 220,233 represent the best available assumption for England and Wales. We estimate that 6% of this 220,233 km falls in Wales. The 6% represents Welsh households as a proportion of the English and Welsh total. Greater accuracy would require an extensive survey and mapping exercise at an estimated cost of £1 bln for England and Wales. It is not proposed to undertake this exercise and spending even a fraction on a more limited survey is unlikely to represent value for money.
- 100. The time saved by sewer owners not having to deal with blockages is quantified at an hour and a half per blockage avoided, valued at the median wage. Defra compared this to recent research by Mouchel which substantiated their estimate for time saved. It indicated that the private drainage sector commands £454m pa in managing 2.2m blockages. This averages to just over £200 per call out. Current published rates by independent drainage contractors indicate rates of £75 + VAT for 30 mins work suggesting that a £200 call out would last 1 hour and 10 minutes. The time saved by private sewer owners will also include time to assess the problem, research a suitable contractor, arrange a call out, and so on. Taking these into account as well suggests that the time saved would be at least 1.5 hours, but could easily be more.

#### Assumptions based on expert opinion

101. The blockage rate on private pipes is assumed to be 1.0 blockages/km/year. The 2010 June returns to Ofwat from water and sewerage companies were used to estimate an average blockage rate of 0.5 blockages/km/year (with a range between companies of 0.24 to 0.89). Small diameter pipes (which will be the predominant type being adopted) tend to have higher blockage rates but there is no evidence available on the blockage rate for new, publicly owned small diameter pipes. A rate of 1 blockage/km/year has been assumed, based on WRc's opinion.

#### **Other Assumptions**

102. The sewerage construction cost figures (a saving of £66 per property) and lengths of public/private sewers in development were provided by the

- BPF. These are judged by Defra and WRc to represent the best estimate, capturing the least cost solutions currently available to comply with the standards and because the calculations were made using a nationally recognised book price. A cost estimate (an additional cost of £141 per property) from the HBF, which relies on data and experience from only one site in East Midlands and is not therefore regarded as fully representative of a national estimate, was used as a high cost estimate. The BPF figures estimate a cost saving per household whilst the HBF figures estimate and additional cost.
- 103. The lengths of sewers in the development were provided by BPF through discussion with Defra and WRc. The total length of sewer increases under both Option 1 and Option 2, relative to the baseline. This is because not all sewers currently constructed are built to the Sewers for Adoption 6<sup>th</sup> Edition standards required for adoption by water and sewerage companies. The majority of developments have been/are constructed without any adoption agreement. For developments where and agreement is in place this often defines certain sewers and applies to a minority length of assets. Mandatory adoption would require compliance either with the current Sewers for Adoption 6<sup>th</sup> Edition standards (Option 1) or with the mandatory standards or their simplified version (Option 2), which has the effect of increasing sewer length. The increase is less for the preferred Option 2 (9%) compared with Option 1 (11%) as a result of simplified design layouts.

# **Impact on Developers**

- 104. Given there are a number of policies coming up that could affect house builders in the coming few years, it is worth looking at the impact on developers in silo.
- 105. The analysis in this IA has identified a net cost saving to developers for the preferred Option 2. By building what would have been private sewers and lateral drains to the simplified mandatory build standard, there will be a marginal Capex cost saving to developers, estimated at £850,000. In addition, there are cost savings to developers through reduced inspection/supervision costs of £20,000 a year. Hence, in total, undiscounted cost savings to developers are estimated to be approximately £870,000 per annum. Discounted cost savings to developers are set out in table 5 below:

Table 5: Discounted cost savings to developers of Option 2 (£ million)

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
					-	-	-	-	-
-0.81	-0.79	-0.76	-0.73	-0.71	0.69	0.66	0.64	0.62	0.60
2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
					-	-	-	-	-
-0.58	-0.56	-0.54	-0.52	-0.50	0.49	0.47	0.45	0.44	0.42
2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
					-	-	-	-	1
-0.41	-0.40	-0.38	-0.37	-0.36	0.34	0.33	0.32	0.31	0.30
2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
					-	-	-	-	-
-0.29	-0.28	-0.28	-0.27	-0.26	0.25	0.25	0.24	0.23	0.22

# **Specific Impact Assessments**

## **Small Firms Impact Test**

- 106. It is expected that the amount of work in maintaining and repairing what are currently private sewers and lateral drains will in the short or medium term remain roughly constant, although it will decline in the longer term. The may inevitably be a change in the market focus for some private drainage contractors operating in this sector, who may wish to enter into arrangements with water and sewerage companies or their subcontractors.
- 107. The small firms most likely to be affected by mandatory adoption and new build standards are those in the independent drainage repair and maintenance sector. These small businesses tend to be 'small bore specialists' operating cleaning, surveying and repair services primarily within and around the cartilage of the property. The drains within the cartilage will remain the responsibility of the householder when responsibility for private sewers and lateral drains is transferred to water and sewerage companies, leaving this sector unaffected. The same will apply in future in relation to mandatory adoption. We understand the concerns expressed by small firms about this.
- 108. If Option 2 is selected, including the accreditation of contractors, the affordability of the accreditation could be an undue burden on smaller firms. However, for smaller developments, the current system will continue whereby a developer can requisition a sewer under Section 98 of the Water Industry Act 1991. It is then the duty of the water and sewerage company to provide a public sewer to be used for the drainage for domestic purposes of premises in a particular locality in its area. The costs of construction will therefore fall entirely on the water and sewerage company.
- 109. For our preferred Option 2, in conjunction with the default build standard, a refined (slimmer) version of the guidance has been developed for the use of developers when planning, designing and constructing surface water gravity sewers for small developments only. This shorter version omits the elements of the longer version which are inappropriate to small scale development and the small business that usually develop them. This should be beneficial to small businesses and developers who can work to a single simplified set of standards which provide consistency. The option remains for developers to seek agreement from the water and sewerage company to deviate from the default standards to alternative, locally suitable standards depending on the site or area (this is also essential in order not to stifle innovation).

#### Greenhouse Gas Assessment

110. We do not anticipate any changes in the overall level of GHG emissions. The build standard is not very different from current practices in Sewers for Adoption – 6<sup>th</sup> Edition but allows shallower pipes, with less excavation.

#### **Wider Environmental issues Impact Test**

111. Better management of the wider sewerage system in the longer term is expected to reduce pollution events.

#### Health and Well-being Impact Test

112. No direct impacts on health but the distress caused by the current system should be reduced.

#### **Human Rights Impact Test**

113. It is envisaged that the proposal will have no impact on human rights.

#### **Justice Impact Test**

114. It is envisaged that the proposal will have no impact on the justice system

#### **Rural Proofing Impact Test**

115. Whilst it is envisaged that the proposal will have no significant impact on rural communities, these communities frequently have a relatively high percentage of private treatment facilities (e.g. septic tanks) and so will accrue fewer benefits than urban communities.

#### **Sustainable Development Impact Test**

- 116. It is envisaged that the policy will result in better management of the wider sewerage system and that as a result future pollution events will be reduced. No other significant environmental impacts are anticipated.
- 117. Implementation of the preferred option should mean that future generations do not have to repeat the transfer process of private sewers in future years. No significant impacts are expected to fall disproportionately on future generations.

### **Competition Assessment**

118. Mandatory adoption and accompanying new-build standards is likely to change the current market structure in the drainage repair industry – water and sewerage companies will replace public sewer owners as the customers for repair services. However the position in respect to drains which remain the responsibility of householders will remain unchanged. Possible impacts on the structure of and competition in the drain repair

industry are comparable to the consequences of the preceding transfer and include:

- The amount of work for drain repair companies directly from the householder and from insurance companies is likely to decrease;
- It is likely that over the same timescale water and sewerage companies will need to contract back out some of the extra work to the drain repair industry
- Competition for contract work from water and sewerage companies may increase, which could improve standards of training and workmanship;
- Some smaller businesses may be less able to compete and could cease trading or merge with other businesses.
- 119. However, the scale of these impacts will be less from this proposal than from the transfer of existing private sewers as the quantity of transferred sewers and drains will be very much smaller than that of new build even over an extended period of time.
- 120. The mandatory build standard allows for a wide range of pipe material types and should therefore not be a barrier to competition.

## Welsh Language

121. It is not envisaged that the proposal will have no impact on statutory equality duties.

# **Statutory Equality Duties Impact Test**

122. It is envisaged that the proposal will have no impact on statutory equality duties.