Design and construction specification

for United Utilities

Version: 1.5 Issue Date: 04/10/24

United Utilities

Water for the North West

Contents

Change log

Below is a list of the amendements in each version

Version	Issue Date	Amendement
1.1	24/12/2020	Original
1.2	12/01/2021	Addition of change log page and subsequent page numbers changed
		Change to table 11.1
1.3	01/04/21	Change to 9.7
1.4	15/09/23	Change to 11.7
1.5	04/10/24	Changes to section 10.4 and 15.4.1
		Changes to page references on contents page to account for changes in text length in section 10.4 and 15.4.1
		Change to text in section 19.2.1 amending typographic error. No change to meaning or content

1. Scope

This document has been prepared to assist practitioners with the planning, design, construction and commissioning of a Self-Laid Main and Service Pipes to supply domestic and industrial/ commercial properties.

It has been prepared to meet the requirements of the Code and is a template document. The contents of this template are mandatory but there remain a number of areas where there will be variations between individual Water Companies.

This template indicates where there is scope for variation and each Water Company will complete those parts of the document and publish a Water Company specific version on its website. That version will govern the requirements in that Water Company's area.

This document should be read in conjunction with the Water Sector Guidance which can be found on Water UK's website at:

www.water.org.uk/technical-guidance/developers-services/water-asset-adoption/

Over time, it is envisaged that work will be undertaken to reduce the scope of variation between each Water Company's version of this document. This will be done through change requests presented to the Water Adoption Code panel (details of which can be found on the Water UK website).

IMPORTANT NOTE: Information in this document that is specific to the United Utilities water area is highlighted as shown below:

United Utilities specific information

2. Responsibilities

An SLP and/or Developer wishing to design and/or construct a Self-Laid Main shall comply with the DCS.

It is the responsibility of the Water Company to ensure that the relevant sections of the DCS conform to its design standards, completing the sections distinct to the water company and highlighting these *using this font*, to ensure it is clear to readers which elements are company specific. Completing the DCS in this way creates the Water Company's Design and Construction Specification document and is found on the company's website and which forms a contractually binding part of the Water Adoption Agreement.

Within this document the words "include" and "including" are to be construed without limitation.

3. Terminology

In this document the following terms have the stated meanings:

Shall: Indicates a mandatory requirement
Should: Indicates a strong preference or best practice
May: Indicates an option which is not mandatory

References to the SLP shall include a reference to its permitted contractor where relevant.

4. Charging

Water Company charges for work relating to the adoption of water assets are based on the Water Company's published charging arrangements.

Funding of any work over and above that which is required to supply a Site (including Network Reinforcement) shall be in accordance with Ofwat's Charging Rules and therefore any work of this type shall be identified during the design stage and funded appropriately by the Water Company.

5. Abbreviations

AC	Asbestos Cement
AOD	Above Ordnance Datum
ACS	Annual Contestability Summary
CDM	Construction, Design and Management Regulations
CESWI	Civil engineering Specification for the Water Industry
CI	Cast Iron
COSHH	Control of Substances Hazardous to Health
DEFRA	Department for Environment, Food and Rural Affairs
DCS	Design and Construction Specification
DI	Ductile Iron
DMA	District Metered Area
DWI	Drinking Water Inspectorate
EA	Environment Agency
EUSR	Energy and Utility Skills Register
FRS	Fire and Rescue Service
HAUC	Highway Authorities and Utilities Committee
HPPE	PE100) High Performance Polyethylene
HSE	Health and Safety Executive
HSWA	Health and Safety at Work Act
ICE	Institution of Civil Engineers
IGN	Information & Guidance Notes
IWater	Institute of Water
LR	Lloyd's Register EMEA
MDPE	(PE80) medium Density Polyethylene
NCO(W)	Water Network Construction Operations
NRSWA	New Roads and Street Works Act
NVQ	National Vocational Qualification
OFWAT	the Water Services Regulatory Authority
PE/AL/PE	Polyethylene Aluminium Composite Barrier Pipe
PE	Polyethylene
PE80	Medium Density Polyethylene
PE100	High Density Polyethylene
PPE	Personal Protective Equipment
PPM	Parts Per Million
PVC	Poly Vinyl Chloride
SDR	Standard Dimension Ration - Outside diameter / Wall Thickness
COMPETENCY	Safety and Technical Competency
TA	Technical Advisor
WIA	Water Industry Act
WIRS	Water Industry Regulation Scheme
WIS	Water Industry Specifications
WRAS	Water Regulation Advisory Service

6. Nomenclature

v	Volume, Litres
A	Area, metres squared
V	Velocity, metres per second
Q	Flow, litres per second
t	Time, in seconds
P	Pressure, in Bar
H	Static Head, in metres
hL	Head loss due to Friction, metres
L	Length in metres
G	Gravitational acceleration, ms-2
D	Diameter, millimetres
i	Hydraulic Gradient, metres per metre
θ	Kinematic viscosity of fluid, m^2/s
Ks	Effective roughness value, millimetres
Qt	Design Flow, l/s
LU	Loading Units
E	Equivalent length, metres
Ω	Soil Resistivity, Ohm -cm

7. Reference Documents

See Appendix 1 for a comprehensive list of reference documents.

The documents in this list are relevant to design and construction standards but may not necessarily be referred to expressly in this DCS.

If there is a conflict between any of those standards and the DCS, the DCS shall take precedence unless otherwise agreed by the parties.

A list of accredited SLPs can be found here:

www.lr.org/en/utilities/water-industry-registration-scheme-wirs-wirsae/search/

8. Construction (Design & Management) Regulations 2015 (CDM)

8.1 General

The relevant sections of the CDM Regulations (2015) apply to all design works carried out by or on behalf of the Water Company – both the Water Company's representative (Approving Design Engineer) and the SLP's representative (SLP Designer) are Designers under CDM Regulations when the design of Self-Lay Works is being generated and accepted for adoption. When carrying out work specific to a Site, neither the SLP Designer nor the Approving Design Engineer would be expected to be the Principal Designer. The Client (Developer) has a responsibility to formally appoint a competent Principal Designer and Principal Contractor for the Site. The Principal Designer shall provide oversight of all design activity in accordance with the Regulations.

To comply with CDM Regulations (2015) it is expected that, prior to release for construction, the SLP Designer shall:

- Ensure that the design avoids or addresses at source foreseeable risks to health and safety
- Give priority in the design to measures which will protect all people associated / or affected by the project
- Ensure that the design includes adequate information about any aspect of the project, structure, and all materials which may affect the health and safety of persons during construction and during any subsequent maintenance operations
- make the Water Company aware of any non-standard method of operation applicable to the Self-Lay Works
- Record non-standard residual risks including chemical or oil pipeline crossing, working at height which cannot be designed out, in the project file, and a copy passed to the Principal Designer and Water Company
- Co-operate with all parties concerned with planning and design for the project

The SLP responsible for the proposed construction shall be made aware of the risks identified by the Designer and the control measures required to reduce the risks to an acceptable level.

A design which is prepared or modified outside Great Britain, for use in work to which CDM 2015 applies, must comply with "Regulation 9 – Duties of Designers" and the person who commissions the work is responsible for ensuring Regulation 9 is complied with.

8.1.1 Pre-Construction Phase Plan

A Pre-construction Phase Plan shall be created at the design stage. This plan shall include the following: –

- Description of works
- Proposed time scales of works within the project
- Details of risk and required control measures
- Information required by Principal Contractor to demonstrate competence of resources
- Information for preparing the health and safety plan for the construction phase

The pre-construction phase plan shall be passed to the Principal Contractor for inclusion and development of their Construction Phase Plan before work commences on Site.

The need for the plan arises from the requirements of CDM. HSE leaflet INDG411(rev1), published 04/15 states:

"Ensure a construction phase plan is in place
The principal contractor (or contractor if there is only one contractor) has to draw up a plan explaining how health and safety risks will be managed. This should be proportionate to the scale of the work and associated risks and you should not allow work to start on site until there is a plan."

8.2 Collaborative Design

On occasion Water Companies may produce indicative design drawings relative to the proposed Site layout for costing, routing or tendering purposes.

Where this is the case the design drawing should be clearly marked as "Not for Construction" and/or an accompanying document produced which states precisely what has been considered when producing that layout drawing. The Water Company shall detail any services supplied and the rates chargeable in its published Charging Arrangements.

8.3 Non-Contestable Work – Installation of District Meter or Pressure Reduction Equipment

Sites may require a Source of Water Connection from a high-pressure Water Main and, in such a case, the Water Company may require a pressure reducing valve or district meter installation as part of the Non-contestable Work and Services (typically with branch connection). In this instance, the Water Company shall assume Designer responsibility under CDM Regulations for this element of the work solely where it is off Site (outside of the site boundary) and out of scope of the contestable activity to be undertaken by the SLP. If this installation is required to be installed within the Site boundary due to the proximity of the Source of Water Connection, then design responsibility will be determined between the parties by written agreement.

9. Design Process

9.1 Minimum Information Required from Developers

Appendix E (Minimum Information) of the WSG contains a complete statement of information requirements at all stages of the adoption process. At the design stage, the SLP may be accredited to carry out the design activity or may request the Water Company carry out this activity if the Water Company offers this service as a Local Practice under section 4.6 of the WSG. An application form available from the Water Company website shall be completed which is used to identify the minimum inflow of information to begin the design process relevant to the route of delivery of the Design.

9.2 Point of Connection (PoC) Requests

At the determined PoC the connection is typically made by an under-pressure connection (UPC) to ensure disruption to existing customers is minimised. However operational considerations may dictate that the Water Company determines that a UPC is not suitable and that the connection will require a tee piece to be installed. This involves isolating the Network and cutting a section of the existing Network out to insert same, and additional valves may also be installed in conjunction, on the existing Network. Such a connection will be considered as Non-contestable work.

Where additional valves on the existing Network, typically installed at the same time as a connection involving cutting in to the existing Network, are not specifically required in the design for the new Self-Laid Main (i.e. to supply a Site) but which the Water Company requires to be installed for operational reasons; then these valves shall be considered as Network Reinforcement work.

The Water Company may identify a supply need in respect of future development that means that it requires Network Reinforcement to be incorporated within the SLP's design (e.g. via the planning system, local authority development plans or developer engagement). In these circumstances, the Water Company shall initiate discussions with the SLP when a Point of Connection (PoC) is issued, or at the earliest opportunity if a Point of Connection (PoC) has already been issued.

Similarly, where the Water Company identifies a need for the improvement or upgrade of the Network as part of the Self-Lay Works, the Water Company shall initiate suitable discussions with the SLP when a Point of Connection (PoC) is issued, or at the earliest opportunity if a Point of Connection (PoC) has already been issued. These requirements may be incorporated by agreement into the final SLP Accepted Design.

If an alternative PoC is required and is evident particularly during the early stages of design by the Water Company to a PoC (that may have been provided also by an SLP/ Developer) for technical and/or supply reasons the Water Company shall provide the SLP designer with an explanation and identify related options and requirements.

If Network Reinforcement work is deemed necessary by the Water Company relative to supplying the Site this shall be identified by the Water Company to the SLP and/or Developer during the initial design stage; and considered by the SLP designer in designing the layout of the Self-Lay Works.

The requirement for detailed design drawings and related information relative to design and/or construction activities shall be agreed between the parties to the WAA and included in Schedule1 of the WAA.

9.3 Annual Contestability Summary

9.3.1

This section contains information about how the Water Company assesses contestability of particular work categories.

9.3.2

Set out on the following page Table 9.3 is the summary that all Water Companies will publish at the date of implementation of this DCS and at least annually thereafter. This will be known as an "Annual Contestability Summary ("ACS") and it will be a Water Company specific variant of the standard template appearing at table 3.2 of the WSG.

9.3.3

No Water Company's ACS will allow fewer activities to be Contestable Work and Services than are set out on that template, as amended from time to time.

9.3.4

Each Water Company's ACS will be accompanied by indicative information about the steps that an SLP would be required to take to carry out the higher risk tasks shaded amber on Table 9.3.

9.3.5

It is expected that over time, the template ACS will be modified in the light of experience and of changing accreditation requirements, to increase the scope of Contestable activities available for SLPs to undertake.

9.3.6

The activities appearing in green on Table 9.3 shall always be Contestable (i.e. marked green).

9.3.7

The works and services designated Contestable by a Water Company under its ACS shall not, in any event, be fewer than those permitted to be carried out by SLPs in that Water Company's area before the date on which the Guidance comes into effect.

Table 9.3

KEY: 🟢 Contestable 🟠 Higher risk 🔴 Discretionary	Work categories by number of properties potentially affected by work or strategic nature of Existing Main			
	>49	50-199	200-499	500+/ Strategic main
Selection of a proposed POC to serve a Site/Development from records of Existing Mains	🟢	🟢	🟢	🟢
Construction of new mains and service connections	🟢	🟢	🟢	🟢
Construction of new mains as part of reinforcement of Network extension or associated Site diversion work	🟢	🟢	🟢	🟢
Design of new water network	🟢	🟢	🟢	🟢
Chlorination and pressure testing of Self-lay Works	🟢	🟢	🟢	🟢
Meter installation in conjunction with new service connections	🟢	🟢	🟢	🟢
Undertaking Water Quality samples	🟢	🟢	🟢	🟢
Analysing Water Quality samples (subject to paragraph 17.3)	🟢	🟢	🟢	🟢
Construction of routine mains connections (CRMC) connections	🟢	🟢	🟢	🟢
Main and/or service connection: ***up to 63mm*** PE/Barrier pipe to: • Parent Network: <12" nominal bore* DI/CI/SI/PE/AC/ Barrier pipe/ steel • Permanent Connections (Piece through).	🟢	🟢	🟢	🟠
*Connection: **63mm to 300mm** PE / Barrier Pipe to:* • *Parent Network: <12" nominal bore * CI/SI/DI/AC/PE/Barrier pipe/steel* • *Operational pressure: up to 50m*	🔴	🔴	🔴	🔴
*Connections: **63mm to 300mm** PE / Barrier pipe to:* • *Parent Network: 12" nominal bore * to 18" nominal bore * / 300mm to 450mm nominal bore * DI/ CI/ SI/ AC/ PE/ Barrier pipe/Steel* • *Operational pressure: 50m to 75m*	🔴	🔴	🔴	🔴
*Connections: over **300mm** to:* • *Parent Network: 18" nominal bore * & above, or high risk parent Network: material (such as steel)* • *Operational pressure: above 75m*	🔴	🔴	🔴	🔴
*Valve operation in relation to commissioning new Self-Lay Works **	🟢	🟢	🟢	🟢
Self-certification of SLP for Site water distribution systems designs	🔴	🔴	🔴	🔴
Any size connection to GRP / PVC Network	🔴	🔴	🔴	🔴
Design of Network Reinforcement (upsizing of existing assets) and/or design of Network diversion(s).	🔴	🔴	🔴	🔴
Pipe sizing criteria, and the approval of design by others	🔴	🔴	🔴	🔴
Assessment of network risk, & operating live network	🔴	🔴	🔴	🔴
Commission telemetry links (meters / field equipment)	🔴	🔴	🔴	🔴
Connection, commissioning and/or decommissioning of diverted Network	🔴	🔴	🔴	🔴

**Notes:*
1: All references to PE are to all Polyethylene pipe materials
2: PE pipe sizes are identified by outside (OD) diameter and other pipe materials and sizes refer to internal (nominal bore) diameters
3: Strategic main defined by reference to potential impact of work on key customer such as a hospital
4: See further paragraph 11.7 of the DCS

9.3.8

In advance of publication, the ACS will be discussed with relevant Customers in a Water Company's area. Each Water Company shall publish its ACS on its website no later than four (4) weeks before it takes effect, to allow sufficient time for SLPs to amend their processes, if required.

9.3.9

A Water Company will explain within its ACS where it has used its discretion to include an activity within the red category and ensure this is published on its website.

9.3.10

Where providing an adequate Site supply requires Network Reinforcement, elements of this work should be considered as Contestable subject to the scope of works required and impact on existing end-user customers. This concerns additional works to extend from the nearest Point of Connection of suitable size to a more distant Point of Connection specified by the Water Company. Charges shall by agreement between the SLP and the Water Company and with reference to Water Company Charging Arrangements.

9.4 Activities shaded green in the ACS

9.4.1

All activities shaded green in the above table are capable of being performed by SLPs.

9.4.2

These green-shaded activities will apply where the SLP has the relevant WIRS or other accreditation (see section 7 of the WSG). Where further activities are accredited by WIRS, such activities shall be marked as green in the above table once approved by the Codes Panel.

9.4.3

The Water Company will set out the procedures it has in place relating to connections to the Existing Main and the forms supporting this. These will be published on the Water Company's website.

9.4.4

Changes will be brought about by the procedures set out in the Water Sector Guidance Section 11 – Governance.

9.4.5

References to the Final Connection of the Self-Laid Main to the Existing Main on the Network are;

a) of an under-pressure type connection and/or,

b) a connection to a previously installed temporary valve-controlled washout installed in conjunction with the connection to the Existing Mains Network at the POC to supply the Site or Development, and/or

c) a connection to a previously installed valve-controlled washout, which has been installed on a Self-Laid Main for a future connection off such main

Where references to the Final Connection of the Self-Laid Main to the Existing Main on the Network require a section to be isolated by a shut (to enable it to be cut-out to install a connection point), and/or if a new branch tee is required to be cut into a Self-Laid Main and the relevant assets are subsequently adopted by the Water Company (and therefore forms part of the Network), then such connections are excluded from activities shaded green.

9.5 Activities shaded amber in the ACS

9.5.1

The activities shaded amber shall be capable of being performed by an SLP in the area of an individual Water Company where the SLP complies with the requirements of the Water Company as set out below. Such publication shall include information about control measures required to allow the work to be performed. The following paragraphs set out how publication of such information is to be approached.

9.5.2

The Water Company may require additional evidence of competence to carry out activity and/or require the SLP to follow an operational process equivalent to one that the Water Company's direct labour or term contractor would be required to follow.

9.5.3

The Water Company's requirements will relate to the specific site and will take account of the type of connection involved; the location of the connection; the strategic importance of the main Network to be connected to; the potential impact on end user customers; risk to water quality and regulatory impact/consideration; and the resources the SLP proposes to use.

9.5.4

The company will set out the information it needs from the SLP regarding its Accreditation and how its general and specific operations, resources, and procedures will protect the company from any risk of interruption of supply to its end-user customers and/or to water quality. These requirements will be equivalent to those that the Water Company's direct labour or term contractor would be required to follow.

9.5.5

The SLP will need to demonstrate its competence or relevant experience to undertake this activity. This may be demonstrated where the Water Company has previously observed relevant Self-lay Works having been carried out by the SLP or by the SLP providing details of similar work that it has carried out to a satisfactory standard for other Water Companies.

9.5.6

Water Company requirements relative to valve operation in relation to commissioning of Self-Lay Works, a contestable activity, shall apply as set out in in paragraph 11.7

9.5.7

The Water Company will set out below the procedures it has in place to allow connections to the Existing Main and the forms supporting this. These will be published on the Water Company's website.

9.5.8

United Utilities expects all ground workers laying service pipes, installing meter housing and making connections to new or existing network assets to have provided the relevant proof of competence. United Utilities will accept installations by a valid SPIDER registered installer or a BPEC "Service Pipe and Meter Housing Installation" registered installer as proof of this competence. Details of the BPEC course can be found on the BPEC website and can be booked via one of the training centres. This is in addition to being WIAPS approved and ensures familiarity with United Utilities' equipment and ways of working. Training should be renewed every 3 years.

United Utilities expects all workers operating existing or new United Utilities assets (valves / hydrants) to be "Calm Network Trained". This is a qualification recognised across the water industry and ensures existing assets and customers are protected as much as possible. The training is delivered via a free online course and once completed the staff member's name is held on a national register. To get a link to the course or to hire one of our metered standpipes please contact our standpipe team on 01925 679498. Calm Network Training should be renewed every 3 years.

The following additional requirements are required for activities shaded amber. The details and timescales shall be agreed between United Utilities and the SLP as part of the pre-planning and point of connection application.

The SLP shall not rely on records to determine the material of existing mains, but shall validate the material at the proposed point of connection and seek confirmation from United Utilities.

A site-specific Risk Assessment will need to be carried out by United Utilities Network Operations staff when completing the following connections under pressure:

1. All connections bigger than 25mm
2. Where host main is >8" internal bore
3. Where host main material is asbestos cement
4. The main is in an area which is historically sensitive to discoloured water (this will be highlighted to the SLP by the United Utilities Design Engineer)

If the connection satisfies any of the above criteria then the connection must not be carried out without confirmation from United Utilities that the site-specific Risk Assessment has taken place. United Utilities will retain the right to carry out any connections where the host main material is PVC or GRP as United Utilities do not allow these to be done under pressure. This means a United Utilities Network Operative will carry out a Risk Assessment and shut-off survey, existing customers will be warned and United Utilities' Network Operations staff will be involved in the works. Therefore, these connections will be retained by United Utilities.

Where an existing network main needs to be isolated to permit the installation of a branch connection (not under pressure), then United Utilities will retain responsibility for arranging the isolation.

Like for like connections will need to be carried out by United Utilities.

SLP's are permitted to complete 15mm and 20mm screw in meter installations.

9.6 Activities shaded red in the ACS

9.6.1

The Water Companies have concluded that connections shaded red in table 9.3 are of such a high risk that they are unlikely to be contestable in most conceivable circumstances

9.6.2

However, if an SLP wishes to carry out this work, it shall contact the Water Company directly to determine whether conditions can be agreed that enable the SLP to carry out the requested activity

9.7 Design Submissions to Water Company

Design submissions shall be submitted to the Water Company along with all supporting information as set out in Appendix E – Minimum Information of the WSG.

Any activity classed as Non-Contestable shall be confirmed in writing by the Water Company following discussion between the Water Company and SLP upon the issue of a Design Acceptance.

We encourage Developers to construct properties which promote the efficient use of water. Where qualifying developments can be proven to be constructed to use 100 litres per person per day, or less, we will provide a reduced rate against our Water Infrastructure Charge (as published in our charges scheme). We will utilise the methodologies set out in Appendix A "Water Efficiency Calculator for New Dwellings" of The Building Regulations Approved Document G, to calculate the level of water consumption at new household premises.

9.8 Design Proposal

When preparing a water network design proposal the SLP Designer shall:

1. Select appropriate materials for the Self-Laid Main and Service Pipes
2. Determine the legal land ownership boundary of the Site

3. Produce a drawing to an appropriate scale to show the layout and route of the Self-Laid Mains and Service Pipes and proposed meter arrangements (relative to Service Pipe entry points) in accordance with this Design and Construction Specification
4. Provide all related material requirements and details as required by this Design and Construction Specification
5. Calculate demands and size all Service Pipes in line with this Design and Construction Specification (see also paragraph 10.2)
6. Size the Self-Laid Mains across the Site as may be required to meet the requirements of the Site and any Development relative to the Site, following discussion with the Water Company. Any Water Company requirements will be communicated after such discussion has taken place. See further section 10.2
7. Identify the agreed Point of Connection and determine by agreement with the Water Company all work that is Contestable and Non-contestable
8. Design the appropriate number of Self-Laid Main fittings required to control the Network and the Self-Lay Works
9. Identify any sections of Self-Laid Mains that require easements or wayleaves
10. Identify any Special Engineering Difficulties as appropriate.

Water companies shall share with the SLP any pipe size methodology where this is requested by the SLP.

9.9 Drawing Standards

The Water Company may supply the SLP with templates to assist in the standardisation of design drawings. If this is not available, then the SLP should provide their own design template.

Design and as-laid (as constructed) drawings shall be submitted to the Water Company electronically in both CAD and PDF format, by agreement with the Water Company, for incorporation into the Water Company's corporate geographical information system (GIS).

Design drawings shall show all asset locations, size and specification in a clear and unambiguous format. Should enlargements, blow ups or schematics be required in order to ensure a clear and unambiguous layout then these shall be incorporated within the design submission.

Design drawings shall include and clearly show, as a minimum:

1. Proposed off-site Self-Laid Mains to Point of Connection to the Network
2. AOD at POC and highest point of the site including Site topography can be provided separately
3. Proposed Self-Laid Mains, including position of sluice valves, washouts, hydrants, air valves and any other fittings required
4. Any requirements for the protection and/or diversion of the existing Network
5. Material and size of each Self-Laid Main
6. Depth of each Self-Laid Main when installation depth is not in accordance with Streetworks UK guidance (subject to agreement by Water Company)
7. The Self-Lay Works and Water Company Works (Contestable / Non-contestable activities)
8. Position of existing buildings or features relative to the design proposal for reference (minimum of 3 points on the drawing to enable triangulation)
9. Individually numbered plots
10. Location of Service Pipes, showing size if above 25mm
11. Service Pipe entry points
12. Location of boundary boxes, manifold boxes and any meter chambers as applicable
13. Type of service connection for each plot, i.e., wall box, boundary box, manifold, internal
14. Hydrants adoptable by the Fire and Rescue Service
15. Location of any ducts
16. Any Special Engineering Difficulties
17. Areas of contamination where protective pipework is required
18. Future demand, or Development, or phase adjacent to Site as identified by the Water Company or Developer and its Point of Connection relative to the proposed Self-Laid Main
19. North point
20. Site boundary
21. Roads / highways / service strips (adopted or proposed for adoption)
22. Change in ground level
23. Service strips, wayleaves and easements required for the construction, operation and maintenance of the Self-Laid Main
24. Significant environmental and health and safety hazards
25. Contestable / Non-contestable works annotated
26. A drawing legend / title block

The above list represents best practice and in some cases, not all such drawings will be required by the Water Company. Water Companies will justify differences in documentation requirements between requisitioned and self-lay schemes.

9.10 Drawing Legend

The drawing legend shall contain:

1. SLP contact details
2. Developer contact details
3. Company carrying out the design (if different to above)
4. SLP Designer name
5. CAD operator name
6. Site name
7. Site address
8. Ordnance Survey coordinates
9. Industry recognised scale of the drawing
10. Drawing / revision reference number
11. Water Company reference number
12. Approval status i.e.
    a. Proposed design (not for construction)
    b. Water Company approved design (not for construction)
    c. Approved for Construction)

9.11 Design & Construction Variations

Changes to the design/construction of the Self-Lay Works (including those due to site conditions, changes to the Site made by the Developer, etc.) which require the re-issue of either the SLP Accepted Design or the Water Company Design shall be considered a Significant Variation. The Parties shall comply with the process in clause 19 of the WAA (Variations).

9.11.1 Minor Variations

Minor variations shall be agreed in writing between the Parties.

Minor variations shall be classed as changes to the proposed Self-Laid Mains and/or Service Pipe design with no significant impact on the maximum scope of work measured by the number of plots on the Site i.e. if there is no change in the number of plots or the financial transaction, the change is classed as minor.

10. Pipe Sizing Methodology

This section covers permitted pipe sizes and methodology of pipe size determination.

10.1 Permitted Pipe Diameters, Pressure Ratings and Permissible Materials.

The use of Ductile Iron (DI) is limited to situations where PE is not suitable, and shall only be permitted through dispensation by United Utilities. The exception is tee branches and riser pipework for air valves or hydrants.

The use of PVC-O is limited to the repair of water mains only and is not permitted as a material for new mains.

To cope with failures of Pressure Management Valves (PMVs), the pressure rating of any plastics pipe shall be not less than two thirds of the uncontrolled pressure.

Refer to section 10.8.1 for additional requirements regarding contaminated land.

The below table specifies the Water Company's accepted size and pressure ratings for water pipes. Requests to use sizes and materials other than those listed below must be approved by the Water Company.

Table 10.1 Permitted pipes sizes, materials, SDR and pressure ratings to be used within the Water Company area (insert additional text under as necessary).

Size	Material	SDR	Pressure Rating[2]
25mm	*PE80*	*11*	*12.5 bar*
32mm	*PE80*	*11*	*12.5 bar*
63mm	*PE80*	*11*	*12.5 bar*
90mm	*PE100*	*17*	*10 bar*
110mm	*PE100*	*17*	*10 bar*
160mm	*PE100*	*17*	*10 bar*
225mm	*PE100*	*17*	*10 bar*
280mm	*PE100*	*17*	*10 bar*
315mm	*PE100*	*17*	*10 bar*
Larger pipe sizes will require agreement with United Utilities			

1: Pipe sizes 125mm, 140mm, 180mm and 200mm dia. are permitted for rehabilitation/slip lining only subject to dispensation by United Utilities.
2: It is UU policy to use 12.5bar for services pipes and 10bar pipes up to 315mm. Dispensation from United Utilities is required to use pipes with other pressure ratings unless required for the operating pressure.

10.2 Principles of Sizing of Water Mains

The Self-Laid Main shall be sized to meet peak hydraulic demands and shall be not oversized such that they fail to satisfy all requirements or conditions to maintain water quality.

The Self-Laid Main shall be sized to take in account the entire development that the Developer and SLP are aware of to avoid unnecessary upsizing at a later date, taking into account

- The results of any Network modelling by the Water Company relative to an area of Development by reference to information in the public domain and/or by reference to related development enquiries it has received
- Information from the Water Company relevant to the design of mains and services for a Site and/or a Development

(Water Companies' Charging Arrangements shall be referred to in relation to the provision of more than a single feed into a Site and/or a Development and/or relating to upsizing of proposed Self-Lay Works).

If the Water Company identifies a need for the betterment of Network or associated activity required on the existing network and has agreed with the SLP that they will undertake this work, or part thereof, then this proposal shall be shown as part of the detailed design of the Network and Service Pipe to supply the development.

The sizing of pipes for indicative design purposes (e.g. for cost estimates or tendering) may be done using a simple table method for number of properties. However, no reliance shall be placed on this indicative assessment for the purposes of any final design as pipes shall be designed in accordance with the principles and criteria stated below.

The UU design standard S14 - Design of Water Networks (available upon request) should be applied in conjunction with a hydraulic network modelling computer programme.

10.3 Indicative Pipe Diameter Selection

As an indicative initial assessment of the water network pipe size requirements for a Site, Table 10.3 may be used to determine the size of pipe to supply a given number of residential dwellings. It may also be used as a method of determination of Source of Water requirements on the existing Network.

When a Water Company requires to deviate from these guidelines in determining a suitable PoC (e.g. inadequate capacity in the Network or site-specific constraints including the condition of existing assets) then such additional work would be categorised as Network Reinforcement and funded by the Water Company in accordance with its charging arrangements.

Table 10.3: Derived from section A.12 of BS 805:2000

Number of Individual Residential Dwellings	Typical Pipe Outside Diameter (PE Pipes)	Nominal Bore (Other Pipe Materials)
0-20	*63mm*	*50mm*
20-40	*90mm*	*80mm*
40-95	*110mm/125mm*	*100mm*
95-300	*160mm/180mm*	*150mm*
300-700	*225mm/250mm*	*200mm*

For all developments the Designer shall consider and incorporate spine mains as necessary to allow for additional development or phases of development which are to be connected ideally to at least two points on the Network. The Water Company shall make available information during this discussion and an assessment and advice shall be provided to the Designer of any Network Reinforcement to be considered in a Site design.

Note: Notwithstanding that more than one connection point into a Site may be designed (e.g. for mitigation of future supply risk) only one of these shall be designated as the Point of Connection of supply to the Site as required by the Sector Guidance). Any additional work over and above that which is required to provide the Site with a water supply shall be categorised as Network Reinforcement and funded by the Water Company in accordance with its Charging Arrangements.

10.4 Domestic Hydraulic Demand Calculations

In this section the Water Company shall specify the following constants:

X = Average demand per capita
Y = Average household occupancy rate
Z = Peak flow factor

The UU design standard S14 - Design of Water Networks should be applied (available upon request).

Demand per capita per day shall be taken as 160 Litres unless evidence to the contrary is provided for the specific development.

Calculation for household occupancy shall be taken as 2.5 persons per household on average unless evidence to the contrary is provided for the Site.

Average daily demand per household is therefore 160 × 2.5 = 400 litres

The minimum pipe size allowed is 63mm and therefore based on Table 10.3 this can supply up to 20 properties (notwithstanding that hydraulic calculations may confirm more properties can be supplied in certain circumstances).

For 20 domestic properties or less no hydraulic calculations are required based on the requirement for a minimum pipe size of 63mm.

For 20 properties and above, peak flow shall be calculated using the plumbers' rules formula 0.067 x N0.78where N is the number of standard property units. A standard property unit is taken as a typical 3 bed semi. Where the development site is of mixed property types it shall be acceptable to map the total number of properties in the development to N. For parts of or the whole development where the property mix is weighted towards larger or smaller property types an approach to calculate an equivalent number of standard property units based on Table 10.4 below shall be adopted.

Table 10.4: Property Type Factors

Property Type	Loading Factor	Property Type	Loading Factor
Flat	*0.53*	*4 Bed Semi*	*1.16*
Terrace	*0.99*	*2 Bed Detached*	*1.09*
Bungalow	*0.87*	*3 Bed Detached*	*1.25*
2 Bed Semi	*0.84*	*4 Bed detached*	*1.41*
3 Bed Semi	*1.00*		

An Example is shown in Table 10.5 below:

Table 10.5

Property Type	Loading Factor	Development Count	Equivelent Standard N
Flat	*0.53*	*100*	*53*
Terrace	*0.99*		
Bungalow	*0.87*		
2 Bed Semi	*0.84*		
3 Bed Semi	*1.00*	*75*	*75*
4 Bed Semi	*1.16*		
2 Bed Detached	*1.09*		
3 Bed Detached	*1.25*	*50*	*62.5*
4 Bed detached	*1.41*	*20*	*28.2*
Total Properties (N)		*245*	*218.7*
Volume (m3/d) 160 × 2.5 x N			*87.5*
Peak Flow (l/s) 0.067xN0.87			*4.31*

The Example above shows that where there is a higher proportion of smaller dwelling types the equivalent number of standard properties units N fed into the Plumbers Peak flow equation will be reduced. Conversely if there is a high proportion of larger dwelling types the equivalent N value will be higher. The approach above can be used to derive the peak flow at any level in the proposed network if the layout of the downstream network is dendritic.

10.5 Calculations for Multi-Occupancy Building and Industrial and Commercial Domestic Use

The UU design standard S14 - Design of Water Networks should be applied (available upon request)

10.6 Process Water

It is expected that the client should provide peak demands given their individual knowledge of the Development. The connection and Self-Laid Mains that are to be installed should then be selected based on their peak demand.

10.7 Pressure and Flow

10.7.1 Source Pressure

For the purposes of designing the network, the SLP shall check with the Water Company to confirm pressure at the source during the design stage, if any constraints, e.g., effect on head loss due to an increased AOD relative to a Site and/or Development, are identified by the SLP or the Water Company a workable solution is to be agreed between the Parties.

10.7.2 Pressure and Flow

Reference levels of service shall be used to ensure that networks can supply all properties with a minimum pressure and flow at the customer's communication pipe.

Minimum pressure in communication pipe at boundary of property to be serviced based on Ofwat's Guaranteed Standards Scheme (GSS) is 7 metres head with a flow of 9 litres per minute.

In normal operational circumstances Minimum Pressure at a hydrant or nodal point on the system shall be 15 mH or 1.5 Bar.

Maximum Design Pressure (MDP) which is equal to Design Pressure plus allowance for surge, shall not exceed Pressure Nominal (PN) which is the pressure rating of the lowest rated component in the system.

SLP Designers shall clearly state where a component has been used below the Water Company's standard pressure rating to allow standard System Test Pressures (STP) to be adjusted on site.

10.7.3 Velocity

Minimum peak time velocities in all Pipes shall reach 0.2 ms^{-1}

Maximum velocity in mains shall not exceed 1.0 ms^{-1}

Maximum velocity in Service Pipe shall not exceed 1.0 ms^{-1}

The UU design standard S14 - Design of Water Networks (available should be applied in conjunction with a hydraulic network modelling computer programme.

10.7.4 Calculating Headloss through the Network

For newly designed and constructed Water Mains headloss per 1000m shall not exceed 10m where the resulting minimum pressure to customers would be greater than 30m gauge pressure.

mH, target values shall be between 2m/1000m and 4m/1000m.

The UU design standard S14 - Design of Water Networks (available upon request) should be applied in conjunction with a hydraulic network modelling computer programme.

10.7.5 Topography

Above Ordnance Datum (AOD) shall be the preferred scale when highlighting level changes on the design drawing.

The effect of increased altitudes on a Site shall be taken into consideration by the SLP Designer when low source pressures have been identified by the Water Company.

The finished floor level of the highest connection shall for the purposes of the design serve as the additional loss of head when ensuring the reference level of service.

10.8 Selection of Materials for Contaminated Ground

Materials for use in contaminated ground shall be selected in accordance with the Water UK Contaminated Land Assessment Guidance. See link in Appendix 1.

10.8.1 Ground contamination during construction

If contamination is suspected during construction of the Self-lay Works the work shall be stopped and be shall be isolated from the potential source of contamination and the incident reported to the Water Company and Developer. An investigation and action plan, which may

include a change of pipe material (and/or replacement of the apparatus already installed) shall be agreed with the Water Company before work recommences.

The SLP shall ensure that all employees are trained and able to undertake the appropriate actions when working in potentially contaminated land in accordance with health and safety legislation.

Consideration should be given to the effect of permeable surfaces on future contamination risk and documented in section 5 of the Contaminated Land Risk Assessment.

Contaminated land is a particular risk in United Utilities region and additional guidance has been developed by United Utilities for the selection of water pipes in land potentially affected by contamination. This guidance shall be used by SLP's when selecting pipe materials - refer to "Supplementary guidance for the selection of water pipes in land potentially affected by contamination".

Pipe joints in barrier pipe systems shall be made in accordance with the pipe manufacturer's guidance. United Utilities current Pipe Framework Suppliers (Radius and GPS) state that they do not require joints to be wrapped with aluminium in foil in order to maintain the integrity of the barrier system. Only EF fittings manufactured by the PE barrier pipe manufacturer should be used with that barrier pipe system (i.e. both the barrier pipe and the EF fittings shall be made by the same manufacturer).

Where there is a need to join barrier pipe from one manufacturer to a barrier pipe made by another manufacturer (e.g. connecting to a previously installed section of pipe), then a gunmetal transitional barrier pipe fitting shall be used and wrapped with barrier pipe system foil tape. Alternatively a valve may be inserted to separate the two systems using flange adaptors and a suitable gasket. Standard gaskets must not be used.

11. Water Main Design and Construction Principles

General principles in designing Self-Laid Mains shall be that they;

- Minimise whole lifecycle costs and impact on the environment
- Deliver minimum standards of service to customers
- Ensure security of supply so far as reasonably practicable (see section 4 as regards funding of any such additional works)
- Ensure continuing water quality
- Allow for safe and flexible operation of control points and surface assets

11.1 Design Accreditation

The SLP shall demonstrate that it has suitable design Accreditation based on WIRS.

11.2 Construction (pre-start)

Prior to the construction of any Self-Lay Work the SLP shall ensure that any Water Company required approvals have been obtained and that a pre-start meeting between the Parties has occurred when one has been requested by reference to paragraph 24.

11.3 Routing and Positioning Principles

Where the Self-Laid Main is to be laid within an adopted highway, a street, or a dedicated service strip, it should be laid in accordance with the latest Streetworks UK good practice guidance (Volumes 1 to 6) unless the Water Company has indicated its preferred routing and positioning of the Self-Laid Main and Service Pipe. In this case, the Water Company's requirements shall be incorporated into the design by the SLP Designer. Any requirement for preferred routing and positioning will typically be associated with technical requirements that includes future access to assets for maintenance and/or repair. Where the Water Company requests a change to the route due it not meeting their specific requirements, the costs incurred will be payable by the Water Company. Any such variation will need agreement with the SLP and Developer before works proceed.

Wherever possible new mains should be located in an area designated as a street. Alternatively United Utilities will accept mains to be laid in designated service strips provided there is provision for ongoing future access and maintenance. Where mains cannot be laid in a street or where future access in a service strip cannot be reasonably guaranteed then United Utilities will require an easement for the main which shall be at the cost of the developer.

Where an existing main is located on the opposite side of the road to the new premises, it is often preferable to install a new main on the side adjacent to the new premises using a single road crossing, rather than use a separate road crossing for each property.

Examples of the minimum standards for mains layouts are provided in paragraph 22.

Design Acceptance will consider any installation route relative to private land, land that is defined as a street and/or which is designated as highway and any requirement for an adoptable service strip or footpath.

Designs for the installation of Self-Laid Main and/or Service Pipe(s) in shared driveways (i.e. where multiple plots are to be supplied) shall be in accordance with the Water Company's criteria.

Refer to paragraph 22 for United Utilities requirements for pipework in shared drives.

If it is not possible to follow the Streetworks UK guidance, then the SLP Designer should consult with the Water Company to agree the preferred location.

Any easements required will be obtained by Water Company (at the expense of the SLP/Developer which will include any consideration payable for the grant of easement and all legal costs and surveyors' fees incurred

in relation to the documentation required). The easements must be granted direct to the Water Company and be entered into before adoption of the Self Lay Works can occur

During construction the SLP/Developer shall use reasonable endeavours to ensure that other utility companies' apparatus installed after the Self-Laid Main and Service Pipe shall not restrict or compromise that Self-Laid Main and future access to it.

Self-Laid Mains are to be laid on the side of the road where the housing density is higher to minimise the number of service pipe crossings.

Although not a preferred configuration, the requirement for new Self-Laid dual Main(s) (typically where road construction prohibits utility apparatus at normal depths e.g. shallow drains, permeable paving systems) may be necessary, and in these instances such a technical consideration is to be agreed between the parties.

Security of supply may be increased by linking in the Self-Laid Main when there is a significant number of properties being serviced through a single pipe, provision for flushing in these cases must be made by designing washouts located within 3-way valve arrangements or between in line valves.

To reduce the likelihood of water quality issues from the lack of turnover in the Self-Laid Main to an end hydrant (dead leg) it shall not extend more than 2m past the last service connection.

Self-Laid Mains shall maintain minimum proximity to buildings and structures as specified by the Water Company in the table below:

Table: 11.1 Minimum strip width required for varying pipe diameters

Nominal Pipe Size	Min Proximity required (m) from centre line of Water Main	Minimum Access Width
25mm - 150mm	*3m preferred, but 0.6m absolute minimum*	*6m preferred, but 2m absolute minimum*
>150mm - 300mm	*3m preferred, but 0.6m absolute minimum*	*6m minimum*
>300mm	*5m*	*10m minimum*

See also paragraph 13: Designers shall refer to Streetworks UK publication Volume 4: Guidelines for the Planning, Installation & Maintenance of Utility Apparatus in Proximity to Trees when selecting route in proximity to existing trees and if necessary, shall highlight any Tree Protection Orders on the design drawing.

No Self-Laid Main shall be constructed unless the design of said main has been approved by the Water Company, and no Self-Laid Main or Service Pipe shall be connected to the Network until all conditions precedent within the WAA have been met.

11.4 Depth of Self-Laid Main

Self-Laid Main(s) shall be installed at the appropriate cover depths in accordance with the minimum and maximum depth range specified in the Streetworks UK guidance relative to the surface in which the Self-Laid Main(s) are to be installed.

The Water Company preferred installation depth (cover to crown of pipe) is be not less than 750mm for new self-laid plastic mains except in agricultural land where the cover shall be 900mm. Metallic mains that shall always be laid with 900mm of cover.

Water Quality Considerations

In accordance with the Principles of Water Supply Hygiene and related technical guidance notes listed therein (see Appendix 1-Other documents) the SLP shall ensure that the Developer and the SLP ensure demand is sufficient to allow adequate turnover of water following commissioning of any new Self-Laid Main in order to protect water quality.

Where possible, Development spine roads shall be serviced with two-way fed ring mains to maintain water quality across the Site. The Water Company and SLP Designer shall consult on such proposals and the SLP Designer shall incorporate the Water Company requirements relative to this design consideration into the Site design. The costs associated with this shall be dealt with under the principles set out in paragraph 4 of this document.

Where despite the above, infrastructure is laid in advance of turnover, the Self-Laid Main shall either have artificial load by way of cross connection into the live system or shall have a flushing programme denoted on the design, to be carried out by the SLP.

The Developer or SLP shall be responsible for ensuring that all required permits and agreements are in place for identifying where water can be flushed to and for disposal of said water and whether water is required to be de-chlorinated prior to disposal.

Only standpipes that have been approved by the Water Company shall be used (details of such may be published on the Water Company website).

Operation of valves: The Water Company's specified standards in paragraph 11.7 below for operation of valves and hydrants shall be complied with (including satisfactory completion of any related training in line with guidance material offered by the Company).

11.5 Mains Fittings

Valves shall be installed to control the flow within the network and enable all components to be isolated, drained and recharged for maintenance purposes. The number, size and position of valves at the point of connection to the existing main will be determined by UUW.

A valve should be located at all branch locations and the maximum spacing of isolation valves on distribution mains shall be 1000m or to shut off a maximum of 50 properties.

All valves must be anti-clockwise closing. Spindles must be

installed on all valves which should end 200mm below the cover to facilitate ease of future operation.

Washout hydrants should provide where dead legs could be created during operation i.e. at isolation valves or at the end of the pipe. Dead legs created by isolation valves that can be fed from either side require an OXO arrangement (washout-valve-washout) to allow the main to be flushed out from either side of the valve. Typically hydrants should be mounted directly on a riser from the crown of the pipe (directly on top of tee) or directly on the end of the pipe with tapers as required. For all applications water take-off by 3rd parties shall be discouraged with capped hydrants.

End washouts will be required on mains of 63mm and above and must be located to suit hydraulic and operational convenience, including consideration as to how any wash out water will be disposed of.

Valves, washouts, hydrants, etc. should, as far as is practicable be located in the footpath or verge for both access and safety reasons and to mitigate the effect of traffic, surface water and silting in chambers.

Where there is no option but to design site fittings in trafficked areas, under no circumstances shall they be placed in parking bays or behind any locked access gates.

11.6 Controlling Valves and Valve Operation

Mains isolation associated with any planned interruption requiring a shut to an Existing Main valve may be carried out by the Water Company and/or by an SLP subject to the SLP persons involved in the Site works having been authorised by the Water Company to undertake this activity. The Water Company will take into account specific Site constraints or considerations that may impact on the end user customer and/or water quality.

Approval and authorisation by the Water Company may include compliance with specific Water Company approval and authorisation procedures (and training) and completion of Water Company provided training that includes; CALM network training, valve operations, and discoloration risk assessment.

Valve closing directions within United Utilities region are anti-clockwise and all new valves to be installed by an SLP shall be anti-clockwise closing.

Valve operations by third parties shall only be permitted when authorised by United Utilities.

11.7 Washout and Fire Hydrants

All washouts and fire hydrants shall be through-bore type except for areas considered to be at risk with regard to water quality - please see list below for guidance.

Hydrants on mains 200mm or greater shall be installed with a gate valve (with bevelled gear box spindle) to permit isolation for maintenance purposes without shutting off the main to which they are connected.

Hydrants shall be installed ensuring the outlet is no more than 300mm from the surface.

Restricted areas for through bore hydrants. Through bore hydrants are the United Utilities standard. However, loose jumper/stopper hydrants should be installed in areas considered to be at risk of back siphonage/ingress resulting in water quality issues. Areas considered at risk include:

- *Heavy industrial (chemical works)*
- *Areas adjacent to high risk activities such as abattoirs, transient residential areas*
- *Car washing*
- *Areas with hydrocarbon risk (Petrol stations, Garages)*
- *Scrap yards*
- *Outside fire & rescue stations*
- *Areas liable to frequent flooding*
- *Low points where ground water may pool*
- *Known areas of frequent hydrant miss-use by public*
- *Contaminated ground*

Please note this is not an exhaustive list, individual site risk assessments should be completed as required. Any queriesshould be escalated to the relevant stakeholder.

Please also see Schedule of Permissible Materials and construction in paragraph 21.

11.8 Air Valves

Air valves are required at high points and at points of significant changes of vertical direction along the network where in either case there is a risk of air locking. The location is to be agreed at design stage.

Air valves shall be of the double ball type. Air valves on mains 200mm or greater shall be installed with a gate valve (with bevelled gear box spindle) to permit isolation for maintenance purposes without shutting off the main to which they are connected.

Air valves shall be housed in a secure, free draining chamber which shall be vented to avoid pressurisation or depressurisation during their operation but protected against ingress of contaminants. Air valves shall be positioned at edges of fields or in footways where possible. Air valves installed on pipe bridges shall be adequately protected.

11.9 District Metered Areas and Boundary Valves

District meter locations shall be agreed with the Water Company. If no information is available, then as a rule new DMAs in the design shall not exceed 3000 domestic properties in size and for a development size of 3000 properties then a DMA meter is likely to be required. See also paragraph 8.3.

Shut valves will need to be installed if a Site is fed by two separate DMAs via two Source of Water Connections. In

this instance their requirement and location shall be agreed at the design stage with the Water Company.

11.10 Sustainable Drainage Systems (SuDS) Considerations

SLP Designers shall ensure relative to the final installation of the Self-Laid Main and Service Pipe that any Sustainable Drainage System (SuDS) shall not be installed above, underneath, or adjacent to the final position of Self-Laid Mains and Service Pipe. The location of any proposed SuDS and permeable surfaces proposed for a Site are to be clearly marked on the proposed design drawing (see also paragraph 10.8).

11.11 Double Spade Valves

The use of double spade valves for commissioning purposes shall only be permitted if approved by United Utilities.

11.12 Rights of Access

The Self-Laid Main shall, wherever possible, be routed in publicly adopted highways and maintained highways or streets as defined in NRSWA Section 48 (1) and amended under the Traffic Management Act (TMA) 2004. These shall not normally require rights of access. Examples of situations where Self-Laid Mains are to be laid in a street are:

- An adopted street on land which is owned by a Local Authority
- A street on land which is owned by the Developer and which may or may not be adopted in the future but serves more than one property
- A street on land which is in joint third-party ownership

The section 38 Drawing shall be used to highlight any Self-Laid Main installed in third party land, which is not a street and that may require land rights to be obtained and a legal notice to be issued. In these instances, the Water Company shall establish and confirm with the Developer/SLP the right of access and shall normally require an easement to be provided by the land owner. Examples of situations where Self-Laid Mains are not to be laid in a street are:

- Industrial and commercial Site where land is wholly owned by a singular 3rd Party
- Site access is through a third party's land that does not form part of the development

In cases requiring the Self-Laid Main to be laid in land not defined as a street all such permissions and rights of access shall be identified before the design is approved.

In the process of designing it may be necessary to obtain other consents for works; these consents include:

- Local Highways by way of Section 50 Agreements
- Other Adopting Utilities where we are laying within an existing easement
- Environmental Agencies and Waterways Authorities
- Rail and Transport Network Operators
- Historical Societies and National Heritage Agencies

All such servitudes, easements, wayleaves and planning permission required for the Self-Lay Works and land for the siting of equipment shall be obtained prior to commencement of works and in accordance with the Statutory Consents and Land Rights sections of the WAA.

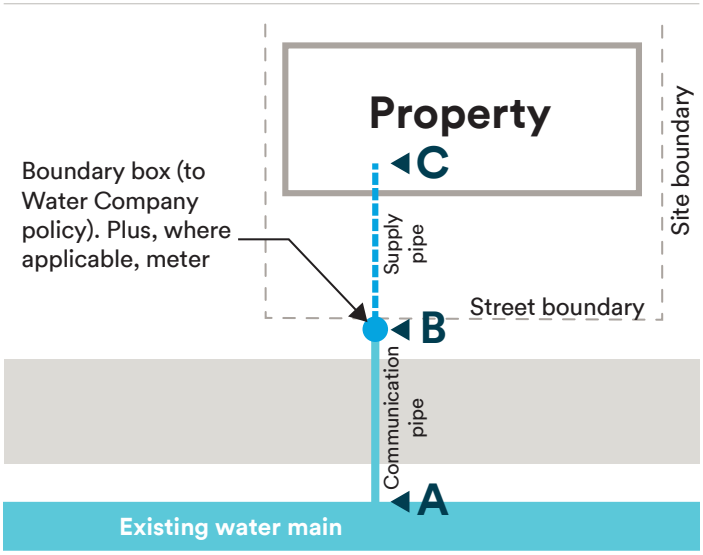
In accordance with the WAA, the Water Company shall obtain any required easements to protect its Network, or any future extension of such, and any related and/or incurred costs including third party costs shall be recovered by the Water Company in accordance with its published Charging Arrangements.

12. Service Pipe Design and Installation

Both parts of the Service Pipe shall be appropriately designed, and responsibility for design acceptance typically rests with the party responsible for its maintenance.

The following diagram provides guidance as to the allocation of such responsibilities.

Figure 1:



Service connection pipework	Responsibility		Regulations
	Installation	Maintenance	
A – B Communication Pipe	SLP	Water Company	Water Supply (Water Quality) Regulations 2016
Boundary box (plus, where applicable, meter)	SLP	Water Company	
B – C Supply pipe	Developer	Property owner	Water Supply (Water Fittings) Regulations 1999 and Water Supply (Water Fittings) (Amendment Regulations) 1999
Internal plumbing	Developer	Property owner	

The conditions for the connection of service pipes to water mains shall be as set out in section 47 of the Water Industry Act.

Service pipes, stop taps and meters for any new development should be configured for optimum hydraulics, construction, and maintenance. United Utilities specific requirements are set out in paragraphs 21 and 22.

Refer to section 10.8.1 for United Utilities requirements for laying pipes in contaminated land.

The supply pipe shall be the property owner's responsibility and shall conform to the Water Regulations and requirements of the Water Company.

12.1 Routing, Positioning and Location

The Water Company shall specify its policy and installation requirements on the design and installation of Permissible Materials (service pipes, meters, chambers, ducting, etc.) required routing, and location relative also to contaminated ground.

Service Pipes shall only be laid through land which either form part of a street or to which the property being served has permanent rights of access.

Service Pipe routes in so far as is reasonably practicable shall follow a straight route perpendicular to the Self-Laid Main and the property to which it services.

Service Pipes shall generally be designed to connect to the nearest Self-Laid Main to the property.

Separate Service Pipes shall be provided to each house or building on the premises, or to those different parts of a building on the premises which are separately occupied by way of multiple supply pipes.

Joint communication pipes may be used to reduce road crossings however each property must receive an individual supply pipe (see 12.5 for multi occupancy properties) and meters (if applicable). Joint communication pipes shall not be laid within private land.

Service Pipes shall be designed such that the requirements of Streetworks UK are maintained with respect to separation from other plant and utilities.

12.2 Depth of Services

Service Pipes shall be installed in accordance with the Water Regulations and Streetworks UK guidance.

Service pipes shall be laid with an even grade where possible, with cover between a depths of 750mm to 1350mm from the finished ground level in accordance with Water Supply (Water Fittings) Regulations 1999.

If a boundary box is to be installed on the Service Pipe, the pipe shall be laid with cover between 750mm and 850mm for a minimum of 1.0metre on each side of the boundary box.

Service Pipes being designed outside this range shall have special protective measures vetted and agreed by the Approving Design Engineer.

12.3 Sizing of Services

While service connections can only be designed to meet minimum standards at the point of delivery every effort shall be made to ensure that all parts of the service pipe are sized in accordance with industry standards.

Service Pipes shall be sized to ensure velocity is ≤1.0ms^{-1} and that total headloss is ≤ 2.0 mH.

Services to standard domestic properties shall be minimum [20]mm internal diameter and capable of supplying required flow and pressure based on required demand.

The sizing or service pipes to new developments is governed by the requirement that there should be an adequate supply to meet customer demands, at the point of delivery, at all times while ensuring that water quality is not compromised through the use of oversized pipes.

As a guide the typical size of pipe for a given number of properties is shown in the table below. The values given should not be a substitute for conducting an adequate hydraulic assessment taking into account all pertinent factors.

Number of individual dwellings	Typical pipe outside diameter (PE pipes)
2	*32mm*
3-5	*50mm**
5-20	*63mm*
21-40	*90mm*

**UUW non-preferred size but may be installed for a customer supply pipe where appropriate.*

12.4 Location of Boundary Boxes

United Utilities does not require boundary stop-taps on new household connections where the meter arrangement on the property is in an in-wall or wall-mounted meter box. (These have an integral quarter-turn control valve, which can be operated from outside the property).

Where meters are located within the premises, a stop tap located in an approved boundary box shall be positioned in a hard standing area at an accessible location outside the premises at the point where the service pipe enters the building. The approved boundary box shall be the property owner's responsibility.

Refer to paragraph 22 for United Utilities requirements for the arrangement of service pipes and boundary boxes.

12.5 Supplies to Multi Occupancy Buildings

Premises that consist of a number of separate occupancy units, which may be household and non-household, must be individually metered. Additionally, there may be a need to fit separate meters to record water consumption for communal facilities such as communal hot water or laundry facilities. Where meters are installed in a communal area, each meter should be clearly identified using a tag with permanent lettering, so that customers may easily identify which meter serves their property. Where meters are located in a secure area, customers should be provided with access both for meter reading and to enable the water to their premises to be individually controlled. Meters should not be located in any area such as a plant room or similar that could present access difficulties or other safety related issues.

A shared service pipe can serve any number of properties (typically in a multi-occupied building) and it is usually acceptable for domestic and commercial units to be served via a single shared supply within a multi occupancy premise. It will not normally be in a street or in land protected by an easement, but should be installed such that it remains accessible for repair.

For low-rise buildings, in multiple occupancy, the number of separate service pipes to the building should be minimised. Ideally, 2 or more occupancy units should have a suitably sized shared service pipe, with separate meters inside the building, preferably accessible from a common area. The developer should be encouraged to provide a ground floor services cupboard, where individual stop taps and supply pipes may be taken from a common manifold arrangement. Meters for each dwelling may be located either at the intake position manifold or within the individual dwelling. A multiport box at the end of a shared service pipe can be located adjacent to premises to provide individual external control to each occupancy unit, but this should not be used to house water meters for individual service connections. In such cases the meter should be located within the premises being served; multiport boxes should not be used in a cascade arrangement.

For buildings in multiple occupancy, the meters should be clearly tagged to identify the unit served, and they should be arranged in an orderly sequence. Underground meters do not necessarily need to be placed in the street, although they should be placed in a hard-standing area. A sensible location should be agreed between the SLP and United Utilities.

Common metering arrangements may be permitted where it can be demonstrated the responsibility for billing and payment of all associated water and sewerage charges will be undertaken by a Responsible Party meeting the requirements which will include but not limited to credit checks. The water service pipe work within the building must be arranged such that individual metering to each dwelling or to any shared water provision can be installed without the need to carry out any modification.

Common meters will not be allowed where household and non-household premises would be supplied through a single meter.

Refer to paragraph 22 for the acceptable arrangements for the metering of multi-occupancy buildings.

12.6 Services to Multi Storey Buildings

For high-rise buildings, characterised by the requirement for pumping to upper floors, a shared service pipe from the tank/pump to each floor is acceptable. A single common tank and pump is usually acceptable where a building has more than one tower, whether or not the buildings are linked at the ground floor. Meters may be installed in service cupboards where individual stop taps and supply pipes are fitted to a common manifold arrangement or within each individual dwelling.

The water service pipe work within the building must be arranged such that individual metering to each dwelling or to any shared water provision can be installed without the need to carry out any modification.

For any proposed high rise United Utilities will design the system for 20m at the nearest node. Then if the Ref Level of Service is met at the "point of delivery" then United Utilities obligations are fulfilled. In effect this will usually give a useable mains pressure supply to the ground and first floors only.

The point of delivery is still the reference point for any houses which may be on very long service pipes and/or elevated from the main.

If a proposed new low rise housing development is elevated close to the reservoir which will serve it, then a pumping station may be required for any mains where the pressure would otherwise be less than 20m.

Where the level of service at the point of delivery is close to the reference-level, this might not be sufficient for some mains pressure water heaters, and the plumber should check the pressure and advise the customer on suitable options.

Pumping direct from service pipes is limited to 12 litres/minute except with the written permission of the undertaker (typically where the host main is of large capacity).

For high rise buildings UUW has no specific requirement for a separate fire main riser. Water meters will normally tolerate flows through sprinklers in individual flats, and this arrangement is acceptable.

Designers should satisfy themselves that there is sufficient water available at the Point of Delivery (usually the highway boundary) and that the pipe work is hydraulically adequate for the required flow.

Where residential premises are fitted with sprinklers supplied from a [usually] dedicated tank, it is acceptable for that tank to be replenished from the domestic supply. There are particular Fittings Regulations applicable where firefighting water is drawn from the domestic supply.

Pipe work sized for an exceptional fire flow is likely to be oversized for normal use, leading to stagnation. Designers should bear in mind that UUW does not normally know if premises are fitted with fire protection systems, and, except where there is dedicated storage, any interruption to the supply could leave the premises unprotected. This could be due to UUW planned or unplanned work, or if the supply to the premises is shut-off longer term for any reason e.g. when vacant. In the case of flats, whether high or low rise, regulations require an external stop tap is available so that the individual unit can be isolated from a common access area in an emergency, typically for frost damage when occupancy units are empty.

Refer to paragraph 22 for the acceptable arrangements for the metering of multi-occupancy buildings.

12.7 Additional Requirements for Supplies to Buildings Other Than Domestic Dwellings

When the Developer's flow rates are in question the SLP Designer shall check that demand was calculated in accordance with BS EN 806.

The design shall include for back flow prevention; at least single check non-return valves.

Demand for process water shall be treated separately when designing the service.

The SLP Designer shall investigate any seasonal demand patterns when designing the service.

13. Civil Engineering Considerations

13.1 General

The general specification for civil engineering components and materials shall be that of the document "Civil Engineering Specification for The Water Industry ("CESWI") 7th Edition which is available from the WRc plc.

The Water Company shall confirm its requirements by reference to CESWI and any additional specific requirements and/or include such in the Schedule of Permissible Materials and Construction in paragraph 21, which as a minimum shall include information and requirements relating to:

- Thrust Restraint and Anchorage
- Puddle Flanges
- Self-Anchoring Joints
- Site Conditions and Ground Bearing Capacities
- Thrust Blocks
- Jointing of pipes
- Ground Anchorage

UUCESWI is the UU company standard specification for civil engineering. It comprises company-specific amendments and additions to 'The Civil Engineering Specification for the Water Industry (Seventh Edition) (CESWI 7)'.

13.2 Marker Tape and Tracer Tape

Marker Tape to be compliant with CESWI and Water Fittings Regulations.

13.3 Indicator Posts and Marker Plates

Indicator Posts and Marker Plates to be compliant with CESWI.

13.4 Chambers and Covers

Water Company to detail Permissible Materials in paragraph 21. Chambers shall be designed and installed to be of an appropriate size to allow operation of the Self-Laid Mains and service fittings.

Covers shall be designed to be capable of withstanding all potential loads placed upon them and shall comply with BS EN 124.

See paragraph 23.

13.5 Bedding and Backfill

Materials used for bedding shall conform to WIS 4-08-02 "Specification for bedding and side fill materials for buried pipelines" and material for backfill material shall be in accordance with the NRSWA 1919 the Specification for the Reinstatement of Opening in Highways (3rd Edition).

13.6 Reinstatement of Highway

Materials and work shall be in accordance with the NRSWA 1991 the Specification for the Reinstatement of Opening in Highways (3rd Edition).

The SLP is responsible for the classification and disposal of waste from excavations in highway accordance with Applicable Law.

13.7 Ducts

SLP Designers shall consult with the Water Company at Design Acceptance stage if ducts are required to be installed by a SLP/Developer.

Where ducts are designed to be laid under major roads or obstructions, they shall be shown to extend beyond the road to ease installation and future inspection.

Service pipe ducting where extending into building to form part of the service entry must facilitate the installation of insulation to Water Fitting Regulations.

United Utilities will permit the use of ducts to facilitate road crossings or new formed entrances. The details of any ducting (except where incorporated into a building) shall be recorded on the as-laid drawings.

The details of any ducting (except where incorporated into a building) shall be recorded on the as-laid drawings.

14. Metering Requirements

14.1 Standard Domestic Metering for Individual Dwellings and Multi Occupancy buildings

14.1.1 10.1 Metering standard service connections

UUW policy is to install a remote reading facility, known as Automated Meter Reading (AMR) to all new 15mm or 20mm meters fitted to standard service connections. The various locations and individual requirements for standard service arrangements are set out in Section 22.1.4

14.1.2 Meter carrier arrangements

It is the customer's responsibility to install a meter carrier fully in accordance with UUW's specification for all new standard service connections. During the design process, the location and accessibility of the meter must be clearly defined such that the meter remains accessible for operational and maintenance purposes.

14.1.3 Internally located meters

Where a meter is to be installed inside the premises the meter carrier should be located immediately after the controlling stop tap and immediately before the drain valve. The meter may be oriented in any direction, but should be positioned such that the recording dial can be read directly and with sufficient space to permit a meter change. Consideration should also be given to how possible changes to the immediate surroundings of the meter will impact on future maintainability. A stop tap located within an underground meter chamber should be positioned externally close to where the service pipe enters the building.

14.1.4 Externally located meters for standard connections

Meters may be located within an "in wall box" or a "wall mounted box", as set out in Section 22.1.4 of this document. When either of these options is chosen, a risk assessment should be carried out with regard to any external influences that may impact on the meter enclosure. Frost protection is an integral feature of any externally located meter box, and where there is any possibility of the enclosure being damaged by external influences then relocation or additional mechanical protection should be considered.

It is essential that the "in wall box" or "wall mounted box" is installed fully in accordance with the manufacturer's requirements and that the installation is fully re-validated at the time the service connection is made. This re validation is particularly important as there can often be a considerable period of time between installation of the "in wall box" or "wall mounted box" and its connection to the water supply during which the integrity of the box and insulation may have been affected. Under no circumstances should any "in wall box" or "wall mounted box" be connected to the water network unless it has been installed fully in accordance with the manufacturer's requirements.

14.1.5 Metering non-standard connections

Service connections greater than 25mm are classed as non-standard connections, these connections may be used to provide supply to a number of individually metered premises or may be used to supply single premises and fitted with a bulk meter. The arrangements for metering and their locations are likely to be design specific and dependant on the construction of the building, the layout of the pipe work and the availability of sufficient space to facilitate the meter installation.

15. Water for Firefighting

15.1 Fire and Rescue Service (FRS) Consultation

Pursuit to Section 43 (1) of the Fire and Rescue Services Act 2004 a plan showing adoptable washouts shall be sent to the FRS for consultation purposes, along with this plan shall be a location plan and a covering letter.

Water Companies to provide FRS contact upon request from an SLP.

The FRS have the statutory period, 42 calendar days, to respond with their requirements in respect of adopting hydrants for firefighting.

Hydrants to be adopted shall be then marked on the drawing.

15.2 Location and Flow from Hydrants

Ordinarily, water companies do not design distribution networks for firefighting purposes. It should be expected that flow from fire hydrants would be in line with minimum standards on the water distribution network.

See also Water UK Guidance: **https://www.water.org.uk/guidance/national-guidance-document-on-the-provision-of-water-for-firefighting-3rd-edition-jan-2007/** (in particular those details referenced in Appendix 5 regards flow from fire hydrants)

15.3 Dedicated Fire Mains

Dedicated fire mains shall be designed and constructed in accordance with Water Supply (Water Fittings) Regulations 2016 and fitted with backflow prevention, spiral wrapping and appropriate marker tape.

15.4 Fire Sprinkler Systems

In the absence of any information from the Water Company, SLP Designers shall refer developers to the polices within the building regulations when requests for sprinklers are being made, these documents, "Document B (Fire Safety) –Volume 1: Dwellings and Volume 2: Buildings other than Dwelling houses", can be obtained on the UK Government Planning Portal at: **http://www.planningportal.gov.uk/buildingregulations/**

It is recommended that the SLP Designer consults with the Developer who is responsible for seeking advice from a specialist provider of sprinkler systems (where one is required) relative to the Site and/or Development.

15.4.1 Domestic and Residential Fire Sprinkler Systems

The supply requirements and arrangement of fire sprinkler systems shall be determined in accordance with BS 9251 2014 and the Water UK Guidelines for the supply of water to automatic fire sprinkler systems [1].

Approval shall be sought from United Utilities where a supply of water from mains is required for fire sprinkler systems.

It is United Utilities preference that developers supply domestic sprinklers from a separate storage tank and pump. This has a higher capital cost, but has the advantages:

- *There will always be water available for fighting a fire*
- *The same standard service pipe can supply the property*
- *No difficulties with metering*
- *Less risk of contamination from stagnation*
- *There is no service impact on the local network*

If a developer insists on installing a mains-fed sprinkler system, the connection and service pipe will need to be adequately sized for the flow and water quality. It will be the developer's responsibility to requisition a suitably sized service pipe, using the reference level for pressure in the main (7m static head).

Where residential premises are fitted with sprinklers supplied from a dedicated tank, it is acceptable for that tank to be replenished from the domestic supply. There are particular Fittings Regulations applicable where fire-fighting water is drawn from the domestic supply.

Refer to regulation 3 and schedule 2 section 7 of the water supply (Water Fittings) Regulations 1999 Pipe work sized for an exceptional fire flow is likely to be oversized for normal use, leading to stagnation. Designers should bear in mind that UUW does not normally know if premises are fitted with fire protection systems, and, except where there is dedicated storage, any interruption to the supply could leave the premises unprotected. This could be due to UUW planned or unplanned work, or if the supply to the premises is shut-off longer term for any reason e.g. when vacant.

If the fire and domestic supplies are provided from the same mains connection. It shall be so arranged that the normal supply can be isolated from outside the premises, whilst leaving the firefighting supply intact.

15.4.2 Commercial Fire Sprinkler Systems

The same requirements for domestic / residential fire sprinkler systems shall apply to commercial systems with the following addition unless otherwise approved by United Utilities.

Depending on the size of supply pipe, and the number of sprinklers, it may be acceptable to supply the sprinklers (or hose reels) directly i.e. without a tank. The developer shall satisfy himself of the adequacy of the pipe work, and consider not least the hydraulic restriction of the incoming water meter.

16. As Laid (As Constructed) Drawings

The Water Company's asset data is typically recorded on a geographic information (digital mapping) or CAD systems. Therefore, it is important that accurate and compliant location information is supplied to the Water Company in a format agreed with the Water Company and which shall be specified by each Water Company in the Schedule of Permissible Materials and construction.

The approved design drawing shall be updated and amended in accordance with all changes to as constructed installation whenever there is a deviation from the approved design (note: all changes to an approved design shall only be made with the acceptance of the Water Company as per Level of Service measure S2/1b).

The "as-laid / as-constructed" installation shall be in accordance with the approved design and with any changes to same approved by the Water Company as any deviation not agreed by the Water Company from the approved design shall be a Defect and the Water Company may require such to be corrected prior to adoption of the installation.

The position of all installed apparatus shall be recorded to ensure locational accuracy (the position of apparatus shall be recorded relative to a minimum of two fixed (geographical or otherwise) features adjacent to the installed apparatus and the measurements shall intersect the centre of the new asset and if available is to be referenced by British National grid reference).

Positional accuracy is to be measured and recorded, wherever practicable, to a minimum GPS accuracy of +/- 100mm to the centre of the apparatus.

Surveys for Self-Lay Works shall be carried out using triangulation, i.e., two measurements taken from fixed

features. They should intersect at the centre of the asset in the following order of priority:

- corners of buildings, and
- corners of boundary walls

Surveys done using offsets, i.e., using a single measurement (usually along the length of the Self-Laid Main) in accordance with the following order of priority:

- building lines, and
- kerb lines

Temporary and natural features should only be used when no other permanent features are available, with the agreement of the Water Company.

Scaled survey drawings should be provided. The scale shall be to 1:500 (unless otherwise agreed with the Water Company) to ensure clarity of applicable measurement and features.

Material, pipe size, external and internal corrosion protection of pipe, and the depth of cover to Self-Laid Main (where depth differs from standard) shall be identified.

All valves, hydrants, washouts, meters, ducts, swab access points, tappings, tees, Service Pipe(s) and boundary boxes shall be clearly identified, together with the relevant fitting on the plan and/or in an accompanying legend. The legend should be consistent with the Water Company' Schedule of Permissible Materials and construction.

Where a number of assets are installed adjacent to each other, suitable asset information (increased scale extracts) are to be incorporated and clearly referenced as a subset of information from the Self-Laid Main "as-laid / as-constructed" drawing.

The full dimensional references for all pipes and fittings shall be indicated (e.g. material, diameter, SDR) at any change in details, and measurements shall be in millimetres.

Clear differentiation should be made between live and decommissioned Water Mains and associated fittings. Decommissioned Network assets may be shown on a separate drawing, if required.

As-laid / as –constructed drawings shall be submitted with any request to commission any completed work. Such shall be clearly labelled with the Developer's name, scheme number, scheme name, scheme type, stage, number, and date of submission.

17. Self-Laid Main and Services Commissioning

To enable the commissioning of new assets to take place the Water Company shall provide its flushing, super chlorination and sampling requirements including minimum training requirements for samplers e.g. as per the Water Regulations under ISO/IEC 17025 may be deemed appropriate.

A compliant pressure test should be carried out which demonstrates the Self-Laid Main to be free of air and leaks. Certificates shall be provided by the SLP to the Water Company confirming a compliant pressure test.

Before flushing into a public combined or surface water sewer the developer shall contact and obtain approval from the local wastewater company, Environment Agency, Highway Authority or other, as appropriate.

In addition, the Water Company may include further guidance in its Schedule of Permissible Materials and construction in paragraph 21.1 setting out its requirements for the provision of Testing and commissioning.

17.1 Mains Flushing

In accordance with the Principles of Water Supply Hygiene and associated technical guidance notes (see in particular TGN02 and TGN03) it is a requirement that there is always a sufficient turnover of water on all potential dead-legs of main or sectional lengths and a regular flushing of these mains shall be undertaken to satisfy water quality requirements.

Accordingly, a suitable flushing regime is to be agreed in respect of the construction programme of the Self-Laid Main. The responsibility for work and related costs is set out in the WAA.

Note: Operation of existing valves shall only be in accordance with the Water Company's published guidelines in this DCS.

The Water Company may seek to recover the cost of flushing work where a delay to the proposed Delivery Date occurs as a consequence of a failed pressure test and/or mains sample. This will likely delay the mains connection date and subsequent installation date of new service connections and hence an appropriate flushing regime to protect water quality will be required to be agreed with the Water Company who reserves the right to revert to a flushing regime operated and managed by the Water Company with costs recovered.

Prior to any end washout on any phase/section of main the SLP may install a temporary or permanent sluice valve and if the washout is to be used for flushing or building water with a standpipe then it shall be an approved metered standpipe in accordance with the Water Company requirements.

The SLP is responsible for ensuring that the Developer secures all required permits and agreements for flushing, identifies where water can be flushed to and disposed of and, where the Water Company is to undertake flushing, is able to indicate whether water is required to be de-chlorinated first.

As a general rule it is unnecessary to consider cleansing velocities, except the need to discharge a volume (twice the pipe's volume will ensure complete turnover) from a washout at the end of the main.

The Water Company has a responsibility to ensure that its customers are not affected by discoloured water which may be caused by flushing out mains so when discharging water it is important to keep velocities in the pipe under control to avoid discolouration upstream.

Suggested guideline is to limit flow velocity to no greater than 0.2 m/sec with the need to turn over mains water at least once per week, and examples are detailed in the table below.

Example guidelines

Pipe size (mm)	Internal diameter (mm for PE)	Imperial equivalent	Area m^2 and volume in m^3 per metre	Volume in litres per metre (rounded off)
63	*50*	*2 inches*	*0.00196*	*2*
90	*80*	*3 inches*	*0.00502*	*5*
125	*110*	*4 inches*	*0.00950*	*9.5*
180	*158*	*6 inches*	*0.01960*	*19.6*
225	*198*	*8 inches*	*0.03079*	*31*
250	*220*	*8 - 9 inches*	*0.03801*	*38*
315	*278*	*11 inches*	*0.06069*	*61*
355	*312*	*12 inches*	*0.07645*	*76.5*

17.2 Not used

17.3 Mains Bacteriological Sampling

All sampling and data relating shall be undertaken by an approved UKAS accredited analytical laboratory that will confirm and provide all results and required reports relative to:

- Incoming main sample(s)
- New mains sample(s) - result(s) for each length of new main to be commissioned and connected to existing water supply distribution network

Parameter	IPVC	Comments
Coliform bacteria	*0 per 100 ml*	
Escherichial coli	*0 per 100 ml*	
Enterococci	*0 per 100 ml*	
Clostridium perfringens	*0 per 100 ml*	
Turbidity (Cloudiness)	*4 NTU*	*Water must look clear*
Colour	*20 Hazen units*	
*Odour/Taste **	*No unusual odour or taste*	*May indicate contamination**
355	*312*	*12 inches*

** If the sample checked for odour and taste on site reveals an unusual odour or taste, particularly diesel, petrol etc. then inform ICC immediately.*

All taking of samples shall be carried out by accredited persons. Sample point location(s) where samples were taken from must be detailed and cross-referenced with the results and shown on the construction drawing and provided to the Water Company.

All activities are to be carried out in accordance with Principles of Water Supply Hygiene & Technical Guidance Notes (**water.org.uk/publications/reports/principles-water-supply-hygiene**)

Prior to accepting a request for any Final Connection to the Network, the Water Company must be reasonably satisfied that the samples have been taken where indicated and have passed water quality requirements such that the Self-Laid Main can be adopted.

As such, the Water Company may (at its own cost) undertake a check sample on the Main post Final Connection, prior to permitting any further connections (mains or services).

The SLP will provide the Water Company with notification of testing of new mains to enable the Water Company to attend/witness testing if deemed appropriate.

In accordance with the Principles of Water Supply Hygiene (TGN02) if the Self-Laid Main is not brought into service within 14 calendar days of a satisfactory sample having been taken, the Main should be flushed with mains water and re-sampled. If contamination is suspected, the Main should be re-chlorinated and sampling carried out as in paragraphs numbered 10 & 12 of the TGN02.

The SLP is advised to contact the Water Company to confirm arrangements for taking samples, sample testing, testing parameters and reporting, and laboratories they intend to use and/or to confirm any requirement for the Water Company to provide (at reasonable cost) any such support services.

17.4 Pressure testing of Self-Laid Main

17.4.1

Pressure testing of pressure pipes and fittings for use by public water suppliers must be carried out as set out in the Water Industry 'Information and Guidance note' (IGN 4-01-03 October 2015: issue 2), available to view online at **water.org.uk/publications/wis-ign/general** with reference to the following guidance notes: 'Pressure Testing and Disinfection (supplemental) of PE Water Pipelines, Services and Installations'. Pressure data, analysis report/pass certificate and pressurisation/decay graphs are to be provided by the SLP to the Water Company within a handover commissioning suite of information.

All results must be provided in both graphical (test output graph) and tabular formats.

17.4.2 Pressure Testing and Disinfection (supplemental) of PE Water Pipelines, Services and Installations

All testing shall be carried out in accordance with IGN 4-01-03, reference should also be made to the Civil Engineering Specification for the Water Industry (CESWI) (with Additional Clauses) and any specific Water Company

requirements specified additionally in paragraph 21 Schedule of Permissible Materials and construction.

The following also applies:

1. On-site testing operations will be clearly identified using appropriate warning notice boards

   The system test pressure shall be calculated as set out in IGN 4-01-03 unless otherwise agreed with United Utilities

2. Service test: All new Service Pipe connections must undergo a service test. The procedure is also defined in Water Industry Information & Guidance Note (IGN 4-01-03) 'Pressure Testing of Pressure Pipes and Fittings for use by Public Water Suppliers'

   - The system test pressure shall be 18 bar
   - The service shall not have been tapped prior to this test being conducted

The system test pressure shall be calculated as set out in IGN 4-01-03 unless otherwise agreed with United Utilities. The pipeline shall be tested using a Type II test. The System Test Pressure (STP) shall be as below.

Material	SDR	PN (bar)	STP (bar)
PE80	*26*	*5*	*7.5*
PE80	*17*	*8*	*12*
PE80	*11*	*12.5*	*17.5*
PE100	*26*	*6*	*9*
PE100	*21*	*8*	*12*
PE100	*17*	*10*	*15*
PE100	*11*	*16*	*20*

18. Water Company Key Contacts

Water Companies to publish key contacts on its website.

19. Local Practices

By reference to the Water Sector Guidance, the Water Company may insert here a permitted local practice using the terminology in the WSG.

19.1 Meter Pairing and Commissioning

19.1.1 Meter Installations

All meters are required to be installed in accordance with the Water (Meters) Regulations 1988 and must be located in a position that records and measures all the water supplied to the premise(s). Only one water meter installation will be undertaken at each individual household premise, please see section 19.1.2 for multi-occupancy premises.

19.1.2 Meter Location

All meters are required to be installed in accordance with the Water (Meters) Regulations 1988 and must be located in a position that records and measures all the water supplied to the premise(s). Only one water meter installation will be undertaken at each individual household premise, please see section 4.3 for multi-occupancy premises).

Accepted meter locations for new build properties (household)

- *Internally within the structure of the premises or individual unit (house, flat, etc.)*
- *In a purpose built wall mounted meter box fixed on the structure of the property (all variants)*
- *In a purpose built in-wall meter box built into the structure of the property*
- *In a purpose built plan room or meter housing area within the curtilage of the property (multi-occupancy premises)*

The end customer must have reasonable access to read the meter and we must also have reasonable access for reading and maintenance of the meter(s).

We have no order of preference of the above locations, all are acceptable. The final location of the meter from the above list, remains the choice of the Household Developer.

Accepted meter locations for new build properties (non-household)

All new non-household meter installations for meter sizes 15mm and 20mm will be subject to the same location requirements as above.

There is no preference of the specified locations, all are acceptable. The final location of the meter from the above list remains the choice of the Non-household Developer.

For non-household meters of 25mm or larger the meter location is likely to be design specific and dependent on construction, therefore these meter locations will be discussed and agreed during application.

Meter location for multi-occupancy premises

In a multi-occupancy premise such as apartment blocks, multiple meters may be installed but each will serve a separate unit or dwelling defined as a household premises.

Where a new household development is designed to be served by a single connection and a common metering arrangement is agreed by us. The common meter can be located either internally in a suitable location, or externally in an underground purpose built chamber.

19.1.3 Meter Sizing

This section of the document confirms the meter sizing for both household and non-household premises.

Household meter sizes

All new household premises meter installations will be one of the following;

- *15mm in-line meter*
- *15mm manifold meter*

This size meter will be sufficient to provide household premises with an adequate supply of water in line with statutory requirements. Any new household property requiring a water meter of a greater size for any domestic purpose or other purpose, such as a sprinkler systems will ordinarily be required to install a storage pump and tank system.

In exceptional circumstances, any household supplies that request a 20mm meter will be discussed at application.

Non-household meter sizes

Due to the variance of design and construction for new non-household premises, meters will be sized in accordance to the principle of "an appropriate meter" and "suitable for intended use". Meters will be sized based on maximum and nominal rates of flow provided by new build developers when the application is made.

19.1.4 Meter Equipment (Technology)

All meters sized 15mm and 20mm installed as per locations outlines in section 4.1 will be Automated Meter Read (AMR) equipped.

Common meters and meters sized above 25mm and above will also be AMR enabled and the AMR technology will be determined by us.

19.1.5 Meter Tagging

We request new meters are tagged. Tags can be procured from United Utilities.

19.2 Timing of the Generation of Plot Reference Numbers

19.2.1 Plot Reference Numbers

Plot reference numbers will be supplied on a spreadsheet which consists of a complete list of plots (for your site) and the equivalent United Utilities' reference numbers.

Mains Design Scheme

For schemes that have service connections on a new main; following receipt of a signed Water Adoption Agreement (WAA) we will provide within 5 calendar days a cost quotation for the proposed connections along with a complete list of plot reference numbers.

Example of the 'plot tracker', below, which is issued when plot references are assigned to plots on a self-lay site.

Connections off Existing

For schemes where the connections are to be made exclusively from existing water mains; Following receipt of a completed Water Connections Application form, we will provide within working 10 days a fixed price quotation for the proposed connections (off existing mains) along with an acceptance note and a complete list of plot reference numbers.

19.2.2 Notification and Call-off of Service Connections

Our procedures for calling off service connections will be published on the company website along with other information relating to water adoption activity in accordance with section 4.2 and appendix G2 of the WSG.

19.3 Water Company Design Service Offerings

Not applicable.

19.4 Design Self-Certification Scheme

Not applicable.

20. Design and Construction Specification Appendices

Water Company may insert appendices into this document within the following paragraphs 21 to 24 only in the form of text or "object" file.

21. Schedule of Permissible Materials and Construction

21.1 Permissible Materials

It is United Utilities policy that Polyethylene pipe shall be used (as set out in table 10.1) for all mains and services, but that Ductile Iron (DI) may be used where PE is not suitable (subject to approval by United Utilities). The exception is for DI riser pipework for air valves or hydrants - these may be used without requiring approval by United Utilities.

The use of PVC-O is limited to the repair of water mains only and is not permitted as a material for new mains.

To cope with failures of Pressure Management Valves (PMVs), the pressure rating of any plastics pipe shall be not less than two thirds of the uncontrolled pressure.

Site	Postal completed	.	Meter Details Completed	Target Connection Date Completed	PLOT Details	Meter to be installed By	Target (Month & Year)	Actual Connection Date	House Number	Flat / Apartment Number (i.e. Flat 1)	Building Name (i.e. Crompton Court)	Street Name	Post Code	Meter Details Completed	WFM Work Order	Operation	Functional Location	Meter Number
MU0000 Smith Street Site	Yes	1	No	No	Plot 1 Smith Street Site	SLO								No	540000000001	0010	11111111	
MU0000 Smith Street Site	No	0	No	No	Plot 2 Smith Street Site	UU									540000000002		11111112	
MU0000 Smith Street Site	No	0	No	No	Plot 3 Smith Street Site	UU									540000000003		11111113	
MU0000 Smith Street Site	Yes	1	No	No	Plot 4 Smith Street Site	SLO								No	540000000004	0010	11111114	
MU0000 Smith Street Site	Yes	1	No	No	Plot 5 Smith Street Site	SLO								No	540000000005	0010	11111115	

Site Name | Plot Details | UUW References

Refer to section 10.8.1 for additional requirements regarding contaminated land.

All other permissible materials are as detailed in the UU amendments to CESWI (available upon request). Any deviations to those materials stated shall only be permitted if authorised by United Utilities.

21.2 Service Connection Arrangements

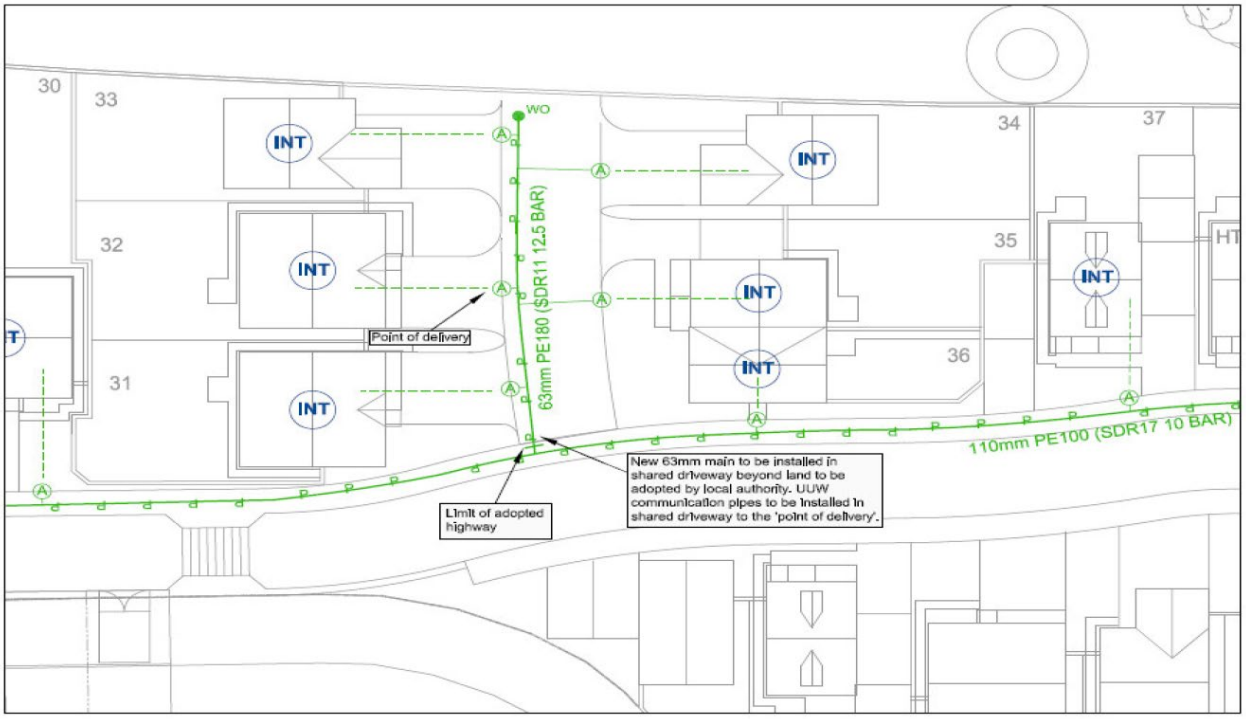
Service connections to the main shall be spaced in accordance with the table below.

Main material	Minimum spacing for tappings
PE (PE80/PE100 including PE barrier pipe)	*300mm*
Iron (cast/spun/ductile)	*300mm*

22. Meter and Service Pipe Policy and Installation

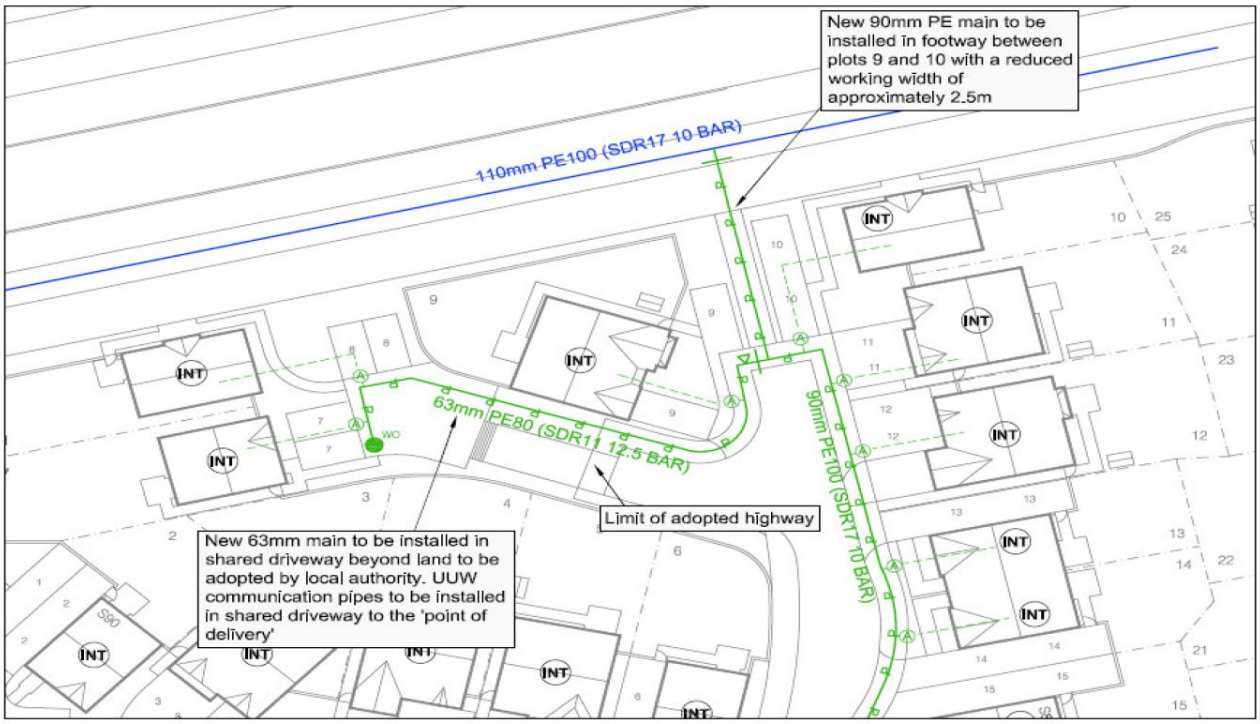
22.1 Routing, Positioning and Installation (Mains)

22.1.1 New Mains in a Shared Driveway



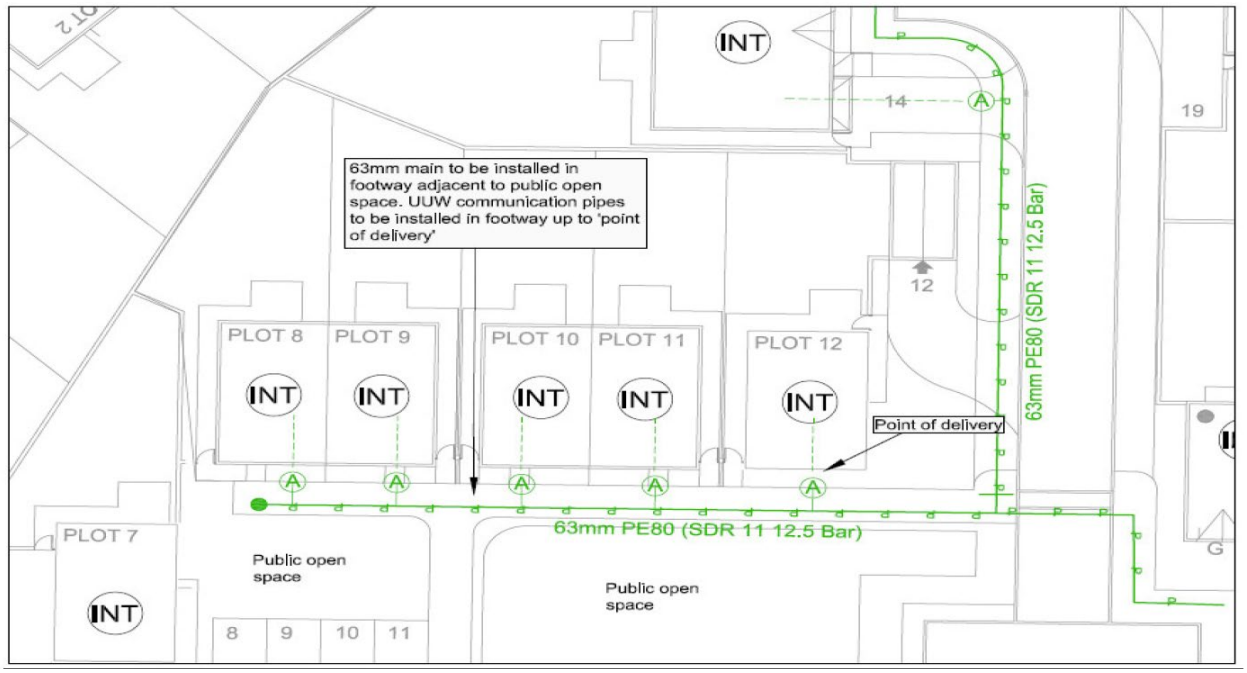
In the above example the new mains and communication pipes will be installed within the shared driveway. There is no requirement for an easement as the new main is installed in a street.

22.1.2 New Mains with a Reduced Working Area and a Shared Driveway



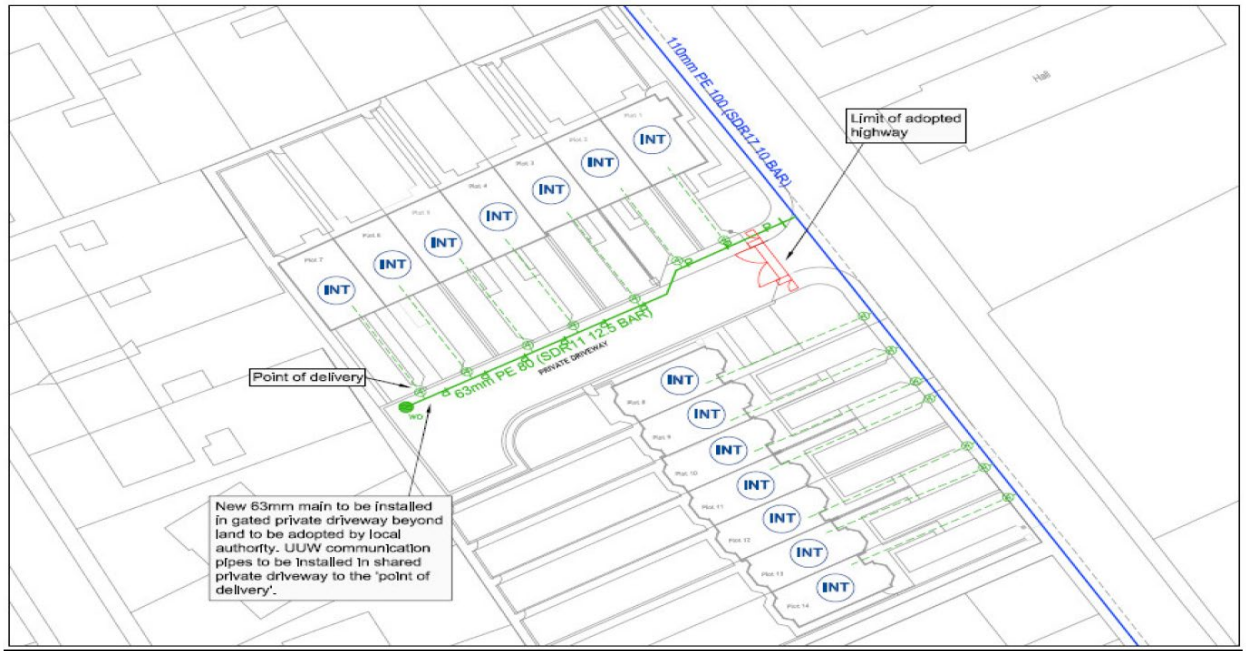
In the above example the new mains and communication pipes will be installed within the shared driveway to serve plots 7 and 8. There is no requirement for an easement as the new main is installed in a street. The new 90mm main is to be installed with a reduced width of approximately 2.5m between plots 9 and 10; this is acceptableas there are no service connections or joints in the main.

22.1.3 New Mains Installed in a Footway Adjacent to Public Open Space



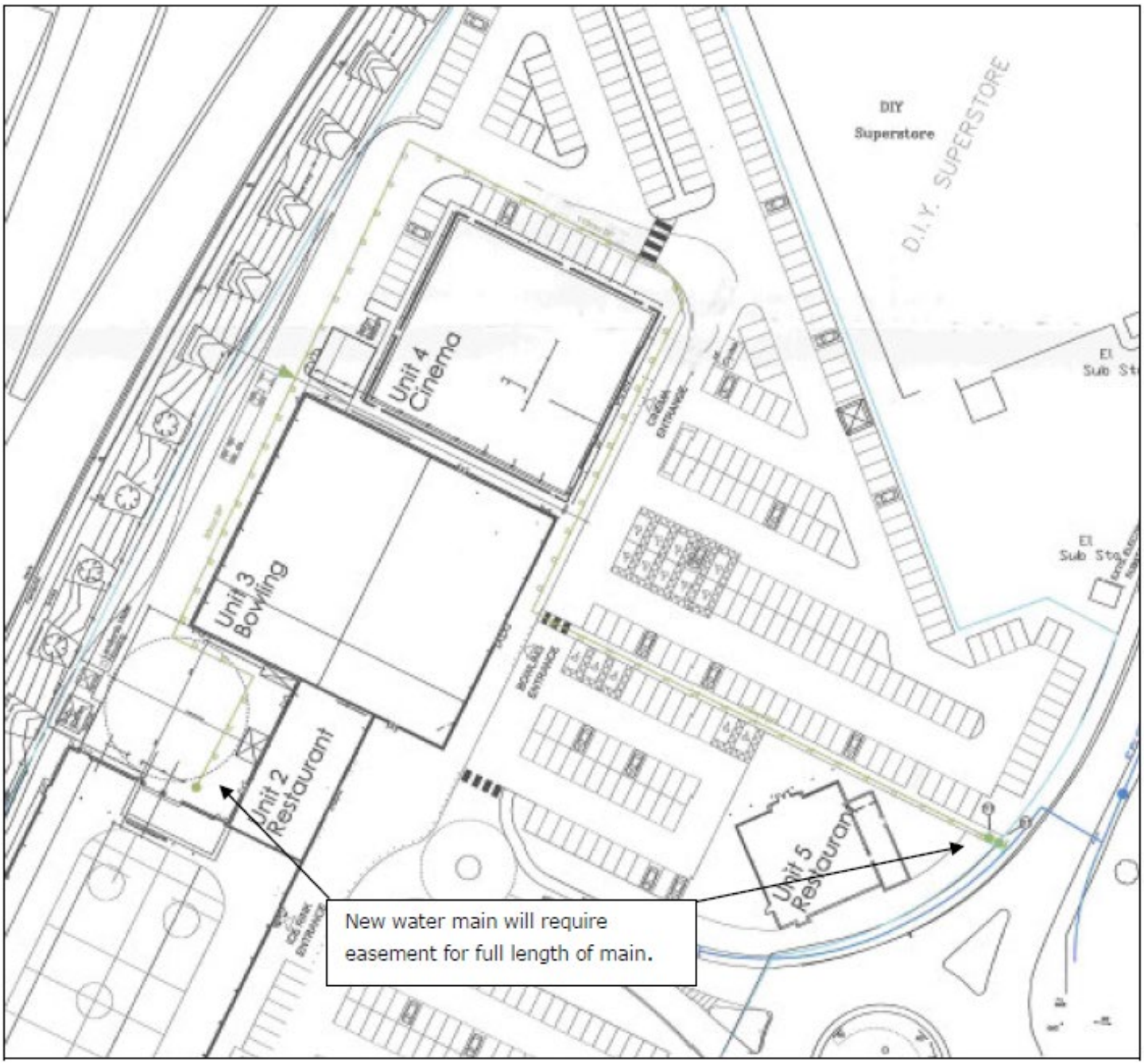
In the above example the new mains and communication pipes will be installed within the footway adjecent to the public open space. It does not matter whether the footway is adopted or a shared footway as the new main is installed in a street and there is no requirement for an easement.

22.1.4 New Mains Installed in a Shared Private Driveway within a Gated Development



In the above example the new mains and communication pipes will be installed within the private driveway of a gated development. There is no requirement for an easement the new main is installed in a street. A controlling valve is sited outside the gated area so the main/ services can be isolated without delay if needed.

22.1.5 New Mains on a Commercial Development Requiring an Easement



In the above example the new mains would require an easement to protect UUW's asset from any future changes to the site layout. The communication pipes would be installed up to the edge of the defined easement area to the point of delivery.

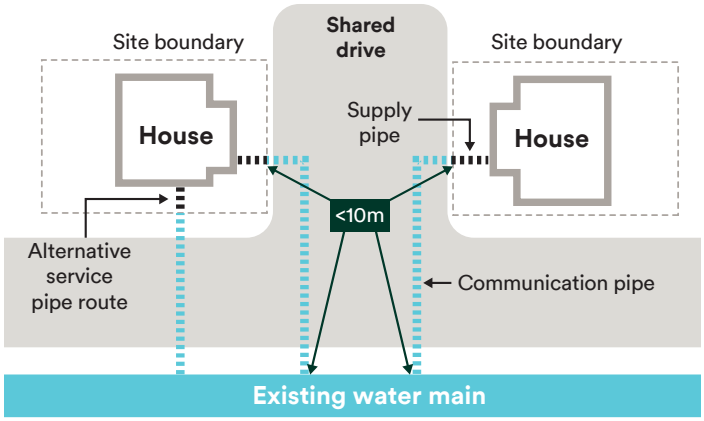
22.2 Routing, Positioning and Installation (Services)

22.2.1

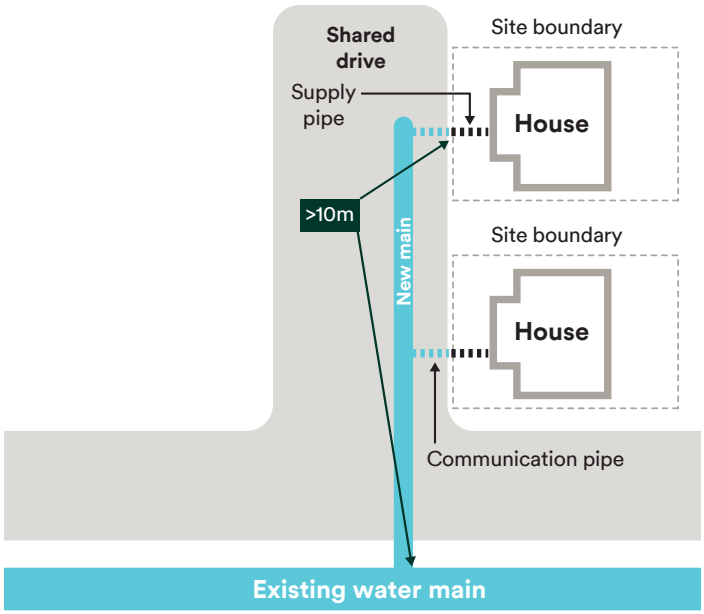
United Utilities requires that a main should be laid in any street where 2 or more premises are being served and the communication pipe (i.e. that part of the service pipe outside the boundary of the premises being served) would be longer than 10m. End washouts will be required on mains of 63mm and above and must be located to suit hydraulic and operational convenience, including consideration as to how any wash out water will be drained.

Occasionally it may be appropriate to extend a main in to a shared driveway and in this scenario the shared drive is considered as a 'street' and no easement is required. Generally this should be avoided if possible.

See diagrams below for examples.



Service pipe layout where communiction pipe is less than 10m



Mains and service pipe layout where a communiction pipe would be greater than 10m

22.2.2

Gated sites should be treated in the same way as any other development, specifically, the service pipes should not all originate at a control point outside the gate. Where a main is installed within the gated area, consideration should be given to installing an isolating valve just outside the development such that any main within the gated area can be isolated without delay if needed

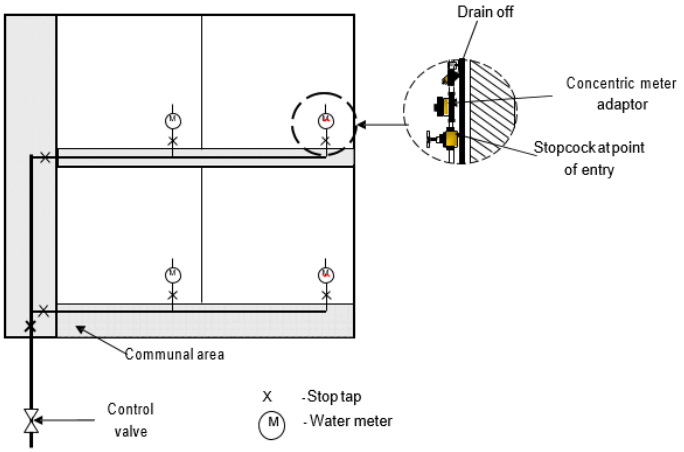
22.2.3

The normal rule is one premise – one service pipe – one meter. This is not always appropriate however for high-rise or other buildings in multiple occupation, where a single shared service, and perhaps even a single meter might be sensible, depending upon ownership, layout etc. At the very least, the supply to each separately occupied property should be so arranged that it can be individually isolated from outside the property, or from an area of common access within the main building. Where one premise - one service pipe - one meter cannot be provided the layout shall be agreed with United Utilities.

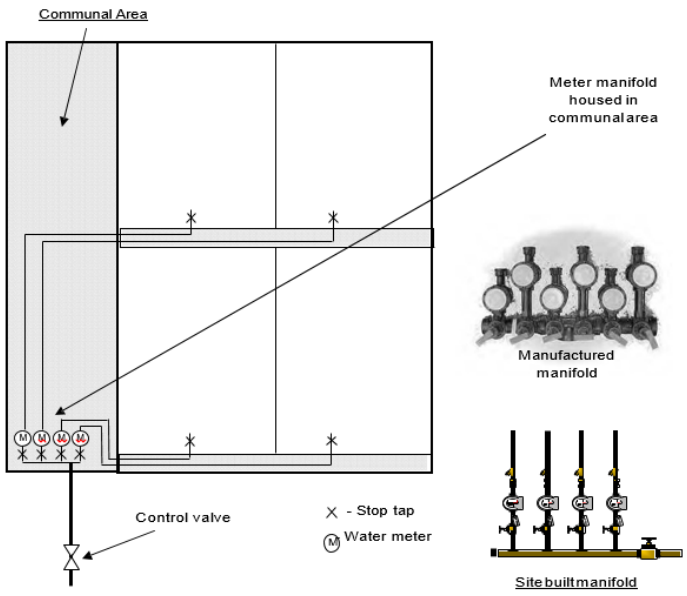
22.2.4

United Utilities provides separate details of the acceptable arrangements for standard service connections to new household premises, and for temporary supplies. These details include how the various options must be installed. A developer may choose to use any of the service arrangement options, and is also able to choose which building elevation to use for any external, in wall or wall mounted equipment. These details are shown below.

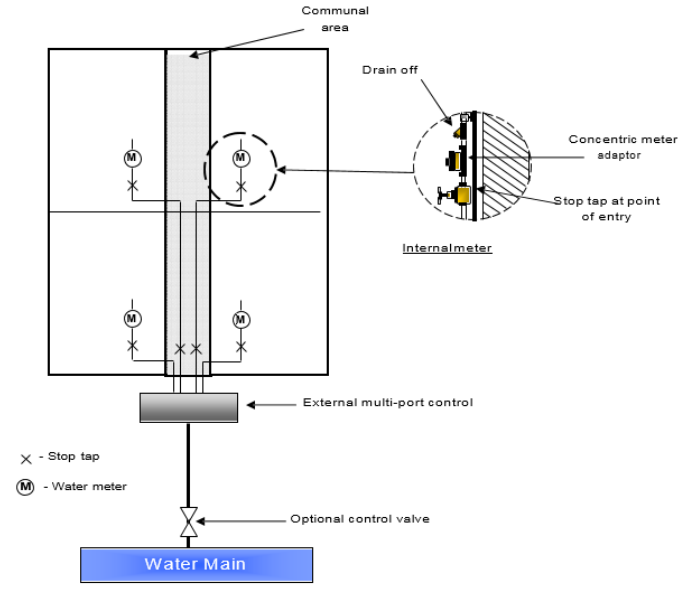
22.3 Meter Arrangements for Multi Occupancy Buildings



Individual internal metering using a large diameter riser



Individual metering using a manifold meter arrangement



Individual internal meters and services with external multiport control

Individual internal meters and services with external multiport control

23. Standard Arrangement Drawings

STND-00-002 Hydrants, air valves, gate valves

STND-00-059 Typical arrangement for PRV and Mechanical flowmeter - Basic Option

STND-05-001 Pipe Embedment Details, Applicable to Networks and Civils

24. Construction Pre-Start Meeting Agenda

A pre-start meeting shall only be required if one party to the WAA submits a written request to the remaining Parties notifying them that it requires a pre-start meeting.

However, such meetings are viewed by Water Companies as a key means of helping to achieve good Health and Safety outcomes, of securing timely, cost-effective delivery and ensuring smooth adoption and handover. For this reason, they will generally be requested by Water Companies

In more detail, such meetings will allow the following aspects of the project to be addressed:

- Site-specific Health & Safety and site management issues
- Confirmation of the identity of the Principal Contractor under CDM Regulations
- Introduce site personnel and establish their individual roles and responsibilities
- Establish local lines of communication between site and Water Company staff
- Assess any associated construction activity that may need accommodating in the SLP construction programme
- Discuss issues relating to the distribution that have the potential to affect the project

The Parties shall agree the date of the pre-start meeting and shall record the minutes of the meeting and circulate such within 5 calendar days. The pre-start meeting shall include the 'pre-start information' listed below.

Where no pre-start meeting is required by a party, the SLP and/or Developer shall, if requested by the Water Company, prior to the commencement of the Self-Lay Works, provide the following pre-start information in any event.

'Pre-start information' includes as a minimum:

1. Confirmed arrangements for CDM 2015 Regulations and other H&S requirements
2. Future contact arrangements and authorised parties for giving instructions, agreeing "right day" for SLAs, making variations, and exchanging information regarding progress with all parties' works
3. Confirmation of line and level of Self-lay Works
4. Confirmation of national (Street-Works) and local (Water Company) design requirements
5. Overview of process for dealing with variations/ and changes to the Site layout and associated approved design drawing (revisions and impact on design, co-ordination and charges etc.)
6. Confirm and detail the Source of Water for testing and mains connection Delivery Date

7. Confirm latest design approved drawing, and any revision, and drawing for construction
8. Process for submitting as-laid drawings
9. Identify any potential site hazards or constraints (such as existing Network considerations, including protection, diversion or renewal)
10. Confirm that access is approved relative to any land rights, statute, and third-party consents.
11. Contact details
12. An indication of when any new service connections are required by and if any new property is to be fed from the Network
13. Confirmation that the Agreement has been signed by all Parties
14. Completion and issue by the SLP and/or Developer and/or the Water Company of all risk and method statements relative to design and/or construction activities
15. Arrangements for co-ordination of activities
16. Arrangements for supply of proof of WIRS Accreditation, personnel qualifications and/or certification documents (i.e. Hygiene Code of Practice)
17. Arrangements for water sampling and requirements for certification and accreditation of results, pressure testing, and disposal of water
18. Arrangements for Water Company approved standpipe supply if required
19. Confirmation of all required Regulatory requirements, arrangements, permits and consents relative to the construction, flushing (and any future arrangements to maintain water quality), and commissioning of the Self-lay Works
20. Confirmation of any requirement for a Water Company post commissioning check sample by the Water Company in accordance with the Code Procedures
21. Arrangements and contact details for future management of Defects and/or damage following adoption
22. Confirmation of how the SLP proposes to demonstrate to the Water Company that the materials and products intending to be used (and on completion of work all actual materials used in case of divergence from the intended list) in the installation of Self-lay Works complies with Regulation 31 of The Water Supply (Water Quality) Regulations 2016 before commencement of any work. This confirmation may consist of the SLP providing the Regulation 31 appropriate identifier relative to the materials proposed

Appendix 1

WIS & IGNs

Number	Title
WIS 4-08-02	Specification for bedding and sidefill materials
IGN 4-37-02	Design against surge and fatigue conditions for thermoplastic pipes
IGN 4-01-03	Guide to Pressure Testing of Pressure Pipes and Fittings for use by Public Water Suppliers
IGN 4-01-03	Water Industry Information and Guidance note - Guide to Pressure Testing of Pressure Pipes and Fittings for use by Public Water Suppliers
IGN 4-08-01	Bedding and sidefill materials for buried pipelines
WIS 4-08-02	Specification for bedding and sidefill materials
WIS 4-21-02	Mechanical couplings and repair clamps for iron pipes for the conveyance of cold potable water (underground use) for the size range 40 to 1600mm
WIS 4-22-02	Specification for ferrules (tapping tees) and ferrule straps for underground use
WIS 4-23-04	Specification for underground stop valves, including spherical valves, for potable water services for nominal sizes up to and including 63 and nominal pressures of 10 bar minimum and made principally of metal or thermoplastics
WIS 4-52-03 & 4-52-03A	Specification for Anti-Corrosion Coatings on Threaded Fasteners See also amendment 4-52-03A
WIS 4-32-08	Specification for the fusion jointing of polyethylene pressure pipeline systems using PE80 and PE100 materials
WIS 4-32-11	Specification for thermoplastic end load resistant mechanical fittings for polyethylene pipes of nominal size < 63mm Note with outside diameters to BS 5556 (metric)
WIS 4-37-01	Specification for boundary boxes for the metering and control of domestic and small industrial water services
WIS 4-32-16	Specification for butt fusion jointing machines
WIS 4-37-01	Specification for boundary boxes for the metering and control of domestic and small industrial water services (see also British Standards)
IGN 4-37-02	Design against surge and fatigue conditions for thermoplastic pipes
IGN 4-50-03	Operating guidelines for the use of site-applied, factory applied, and reinforced factory applied polyethylene sleeving on ductile iron pipeline systems
IGN 4-51-01	External zinc coating of ductile iron pipe
WIS 4-52-01	Specification for polymeric anti-corrosion (barrier) coatings
IGN 4-52-02	The use of polymeric anti-corrosion (barrier) coatings
IGN 9-04-05	Report of the expert group on the risks of contamination of the public water supply by backflow at: **wras.co.uk**

British Standards (BS) & BS EN Standards

Number	Title
BS EN 124	Gully tops and manhole tops for vehicular and pedestrian areas
BS5834-2	"Meter chamber" - Boundary box - (and when for use in areas subject to occasional vehicular access relevant aspects of this BS apply) with anti-slip lid design to BS 7976 Part 2 Internal fitted NRV in accordance with WIS 5-11-01(BS EN 13959 and shut off device rising-spindle with WIS 4.23.04
BS EN 805	Water Supply – Requirements for systems and components outside buildings
BS 8561	Specification for mechanical fittings for use in the repair, connection and renovation of pressurized water supply pipelines. Requirements and test methods
BS EN 545	Ductile iron pipes, fittings, accessories and their joints for water pipelines. Requirements and test methods
BS 750	Specification for underground fire hydrants and surface box frames and covers
BS EN 806	Specifications for installations inside buildings conveying water for human consumption. Operation and maintenance
BS 1042-2.2 1983 & ISO 7145 1982	Measurement of fluid flow in closed conduits and Determination of flowrate of fluids in closed conduits of circular cross selection – Method of velocity measurement at one point of cross-section
BS EN 1295	Structural design of buried pipelines under various conditions of loading. General requirements
BS 3251	Indicator plates for fire hydrants and emergency water supplies
	Part 1: Hose Reels and Foam Inlets
BS 9295	Guide to the structural design of buried pipelines
BS EN 12201	Plastics piping systems for water supply, and for drainage and sewerage under pressure. Polyethylene (PE). General
	Part 2: Pipes
	Part 3: Fittings
BS PD 855468	Guide to the flushing and disinfection of services supplying water for domestic use within buildings and their curtilages.

Other documents

Number/date	Title
10/WM/03/21	Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites
CESWI	Civil Engineering Specification for the Water Industry 7th Edition (or later version thereof) ("CESWI") together with any Water Company amendments (to be published on Water Company website with DCS)
2009/03	Guidance Note On Notification of Methods of Reinstatement using EToN available at: **http://hauc-uk.org.uk/**
Published January 2014	Contaminated Land Assessment Guidance: Protocols Published by Agreement Between Water UK and the Home Builders Federation **https://www.water.org.uk/guidance/contaminated-land-assessment-guidance/**
Water UK/HBF National Joint Committee 2014 (available free of charge at: **http://www.water.org.uk/publications/water-industry- guidance**	Water UK/HBF National Joint Committee 2014 (available free of charge at: **http://www.water.org.uk/publications/water-industry- guidance**
Volumes 1 - 6	Streetworks UK (formally National Joint Utilities Group) Guidance Publications available at: **http://streetworks.org.uk/resources/publications/**
	Principles of Water Supply Hygiene & Technical Guidance Notes (available from Water UK online at: **https://water.org.uk/publications/reports/principles-water-supply-hygiene**
Drinking Water Safety - Guidance to health and water professionals	DWI, Available free of charge at: **http://dwi.defra.gov.uk/stak eholders/information-letters/2009/09_2009Annex.pdf**
Drinking Water Safety - Guidance to health and water professionals	Specifications for polyethylene pipe and fittings: **https://bpfpipesgroup.com/support-downloads/technical-guidance/** Specifications for PVC pipe and fittings: **https://bpfpipesgroup.com/support-downloads/technical-guidance/**
Report R97	Trenching Practice (2nd edition) CIRIA, 1983 Available at: **http://www.ciria.org/ItemDetail?iProductCode=R97&Category=BOOK&WebsiteKey=3f1 8c87a-d62b-4eca-8ef4- 9b09309c1c91**
Report 128	Guide to the Design of Thrust Blocks for Buried Pressure Pipelines CIRIA, 1994 Available at: **http://www.ciria.org/ItemDetail?iProductCode=R128&Category=PHOTOCOPY**
HSG 47	Avoiding Danger from Underground Services HSE Books, 2014 Available free of charge at: **http://www.hse.gov.uk/pUb ns/priced/hsg47.pdf**
	Specification for the Reinstatement of Openings in Highways (3rd Edition) Department of Transport 2010 Available at: **https://www.gov.uk/government/publications/specification-for-the-reinstatement-of-openings-in-highways**
	Water supply to domestic fire sprinkler systems Water UK June 2015 (and earlier documents Available free of charge at: **http://www.water.org.uk/pu blications/policy-positions- and-briefings/water-supply-domestic-fire-sprinkler-systems**

