Advanced Water Infrastructure Networks

Design & Construction Specification

Everything you need to know

August 2026

Advanced Water Infrastructure Networks

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2. Date

	Author	Position	Version	Status	Reviewer(s)	Overview of changes/comments
31st May 2023	Craig Southway	Project Director	V0.1	First draft		
22nd January 2024	Mark Kerwick	Water Quality & Regulation Manager	V1.0	Final draft		
12th February 2025	Mark Kerwick	Water Quality & Regulation Manager	V1.1	Final		Addition of example design for a sprinkler system – Appendix A.
6th March 2025	Mark Kerwick	Water Quality & Regulation Manager	V1.2	Final		Addition of service pipe sizing vs pipe length and design request form. General review and update to reflect current working practices.
10th April 2025	Mark Kerwick	Water Quality & Regulation Manager	V1.3	Final		Addition of requirement for barrier pipe where permeable surfaces are used.
19th August 2026	Craig Southway	Project Director	V1.4	Final		Confirmation regarding supply pipe sizing on manifolds Confirmation of sampling parameters Update to new service connection requirements

3. 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 Water Adoption 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 https://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).

For reference, sections of this document specific to AWIN are found in purple text.

4. Responsibilities

An SLP and/or Developer wishing to design and/or construct a Self-Laid Main shall comply with the Design and Construction Specification (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 highlighted in yellow with their own parameters and inserting text where instructed by the square brackets. Completing these sections will create the Water Company's Design and Construction Specification document which shall be published on the company's website and which form a contractually binding part of the Water Adoption Agreement.

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

5. 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.

6. 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.

7. 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

8. 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

9. 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:

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

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

10.1. 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.

10.1.2. 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"

10.2. 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.

10.3. 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.

An example of a Source of Water Connection is shown below in Figure 1.

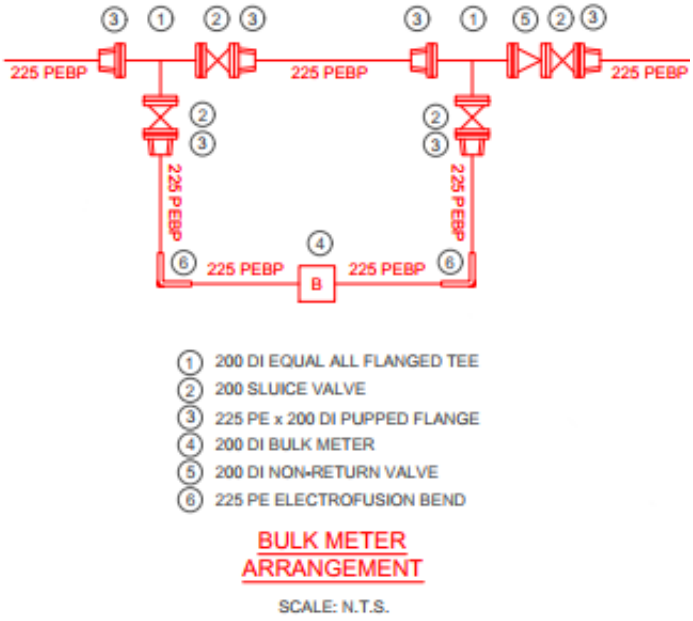


Figure 1. Example of a source water bulk supply connection design.

11. Design Process

11.1. 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.

AWIN does offer a design service to SLP's. Before commencing the design AWIN will require the SLP to populate and submit the Design Request Form. The SLP will be provided with the Design Request Form, a copy of which can be found in Appendix 5. The completed form and

associated information should be submitted to the AWIN NAV inbox at Nav@advancedwaterinfrastructure.co.uk.

11.2. 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 (eg. 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 Schedule 1 of the WAA.

11.3. Annual Contestability Summary

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

Set out below at Table 1 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.

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.

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 1.

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.

The activities appearing in green on Table 1 shall always be Contestable (i.e. marked green).

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.

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.

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.

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.

Table 1. Contestable Work and Services

	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

11.4. Activities shaded green in the ACS

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

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.

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.

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

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.

11.5. Activities shaded amber in the ACS

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.

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.

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.

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.

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.

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

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.

In order for an SLP to undertake activities shaded amber in the ACS the following will apply:

- Operatives are to have a full, live CRMC WIRS Accreditation
- For the connection of a new main to a parent main, a risk assessment and method statement are to be submitted to AWIN for approval
- Training and Competence requirements as set out in paragraph 11.7 of this document are to be adhered to
- For all activities, a Notification of Intent must be sent to AWIN at least 5 working days prior to undertaking the work
- For 'Valve operation in relation to commissioning new Self-Lay Works':
    - the valve must only affect newly laid mains
    - There must be no interruption of the water supply to properties on the network due to the valve operation
- Written AWIN approval of the Notification of Intent is required prior to undertaking any amber activities
- Notification of the activities being undertaken is to be confirmed to AWIN in real time and to include date, time and location (preferably annotated to a construction drawing, but a description will suffice)

- Notification of completion of the activities is to be confirmed to AWIN in real time and to include date, time and location (preferably annotated to a construction drawing, but a description will suffice)
- For Self- Certification of water network designs the SLP will need to provide details of it's design review and design assurance policies and procedures. Records of design assurance activities are to be made available to AWIN upon request.

The relevant AWIN standards and procedures that must be followed when completing those works shaded in amber within the AWIN network are:

- WQRM0010 Network Hygiene Standard
- WNOM001 Procedure for operation and maintenance of fire hydrants and washout hydrants
- WNOM002 Procedure for undertaking a network impact risk assessment
- WNOM003 Procedure for operating boundary valves
- WNOM006 Procedure for the preparation, storage, use and disposal of chlorine solutions
- WNOM007 Procedure for the installation and commissioning of new mains
- WNOM008 Procedure for the storage of pipes and fittings

11.6. Activities shaded red in the ACS

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

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

11.7. 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. Designs should be submitted to the AWIN NAV inbox at Nav@advancedwaterinfrastructure.co.uk.

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.

11.8. 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.
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.
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.

11.9. 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:

- Proposed off-site Self-Laid Mains to Point of Connection to the Network
- AOD at POC and highest point of the site including Site topography can be provided separately
- Proposed Self-Laid Mains, including position of sluice valves, washouts, hydrants, air valves and any other fittings required
- Any requirements for the protection and/or diversion of the existing Network.
- Material and size of each Self-Laid Main
- Depth of each Self-Laid Main when installation depth is not in accordance with Streetworks UK guidance (subject to agreement by Water Company).
- The Self-Lay Works and Water Company Works (Contestable / Non-contestable activities)

- Position of existing buildings or features relative to the design proposal for reference (minimum of 3 points on the drawing to enable triangulation)
- Individually numbered plots
- Location of Service Pipes, showing size if above 25mm
- Service Pipe entry points
- Location of boundary boxes, manifold boxes and any meter chambers as applicable
- Type of service connection for each plot, i.e., wall box, boundary box, manifold, internal
- Hydrants adoptable by the Fire and Rescue Service
- Location of any ducts
- Any Special Engineering Difficulties
- Areas of contamination where protective pipework is required
- 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
- North point
- Site boundary
- Roads / highways / service strips (adopted or proposed for adoption)
- Change in ground level
- Service strips, wayleaves and easements required for the construction, operation and maintenance of the Self-Laid Main
- Significant environmental and health and safety hazards
- Contestable / Non-contestable works annotated
- 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.

11.10. Drawing Legend

The drawing legend shall contain:

- SLP contact details
- Developer contact details
- Company carrying out the design (if different to above)
- SLP Designer name
- CAD operator name
- Site name
- Site address

- Ordnance Survey coordinates
- Industry recognised scale of the drawing
- Drawing / revision reference number
- Water Company reference number
- Approval status i.e.
    - Proposed design (not for construction)
    - Water Company approved design (not for construction)
    - Approved for Construction)

11.11. 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).

All variations in design must be submitted to the AWIN Nav inbox at Nav@advancedwaterinfrastructure.co.uk for approval.

11.11.2. 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.

12. Pipe Sizing Methodology

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

12.2. Permitted Pipe Diameters, Pressure Ratings and Permissible Materials.

Only approved pipes and fittings compliant with Regulation 31 of The Water Supply (Water Quality) Regulations, 2016 (as amended) may be installed on the AWIN water network. For a list of approved pipes please refer to the current List of Approved Products for use in Public Water Supply in the United Kingdom, which can be found on the DWI's website: Approved & Considered Products - Drinking Water Inspectorate (dwi.gov.uk).

The following pipe types may be installed.

For Water Mains:

- Polyethylene (PE) – preferred material.
- Polyethylene Barrier – where specified as required due to ground contamination.

- Ductile Iron – considered an alternative in where certain types of contamination pose a risk to water quality or larger diameters are needed. Also where pressure dictates its use.

For Services

- MDPE (PE80)
- MDPE Barrier Pipe (Type A)

Table 2, 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 2. AWIN permitted water pipe accepted sizes, pressure ratings, SDR and materials.

Size (mm)	Material	SDR	Pressure Rating (bar)
25	PE80	11	12.5
32	PE80	11	12.5
50	PE80	11	12.5
63	PE80	11	12.5
90	PE100	11, 17	10
110	PE100	11, 17	10
125	PE100	11, 17	10
160	PE100	11, 17	10
180	PE100	11, 17	10
225	PE100	11, 17	10

Other Type A Polyethylene barrier pipe systems may be used with prior authorisation as long as they are on the DWI's list of approved products.

12.3. 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.

Where AWIN has the outline design for a development (e.g., the number of properties, their plumbing designs and locations, it will size mains based on the q√n method, which calculates the maximum instantaneous demand of n houses. The full equation is:

$$q_{m,n} = 0.083 \sqrt{(n*TU_{house})}$$

Where;

$q_{m,n}$ = Maximum instantaneous demand of n houses in l/s.

n = the number of houses

TU_{house} = Number of tapping unit house

0.083 = Capacity of 1 TU in l/s (300l/h)

The number of tapping points will be used to calculate the tapping units of a house based on table 3, which gives the tapping units for a typical house.

Table 3. A typical house tapping point installation

Tap point per house	Number of TU
Toilet cistern tap 1	0.25
Toilet washbasin 1	0.25
Toilet cistern tap 2	0.25
Toilet washbasin 2	0.25
Kitchen sink	4
Dish washer	4
Bath/shower mixer tap	4
Washbasin mixer tap (bathroom)	1
Washbasin tap (bedroom)	4
Washing machine tap	4
Total per house	**22**

The maximum instantaneous demand of the properties to be supplied by the main will then be used to calculate the size of main required based on a branched design.

AWIN will accept other methods of modelling pipe sizes such as the Hazen Williams Equation provided these are referenced in the design submission.

12.4. Indicative Pipe Diameter Selection

As an indicative initial assessment of the water network pipe size requirements for a Site, Table 4 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 4. Typical number of premises served by pipe diameter (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.

Where spine mains are designed for future phases of development consideration must be given to the current hydraulic retention and the need to minimise the need for regular flushing to assure turnover and good water quality. Spine mains outside of the current development should not be commissioned and/or connected to the live network until such a time as the phase of development is ready to be connected.

Note: Notwithstanding that more than one connection point into a Site may be designed (eg 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.

12.5. 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

Demand per capita per day shall be taken as **125 litres** unless evidence to the contrary is provided for the specific development.

Calculation for household occupancy shall be taken as **2.4** persons per household on average unless evidence to the contrary is provided for the Site.

Average daily demand per household is therefore **125 x 2.4 = 300**

To account for diversity in the network, Peak Flow Factors for domestic scenarios shall be taken to be **the Peak Flow Multiplier (3) divided by the number of seconds in a day a (86,400). Z = 0.00003472**

Peak Demand may be calculated then by multiplying the average day demand per household by the peaking factor.

A site of 'n' Domestic units has a daily demand in litres of XY x n = nXY l

This must be multiplied by the peaking factor Z. Therefore peak demand in litres per second can be estimated at nXY x Z = Peak demand in l/s

12.6. Calculations for Multi-Occupancy Building and Industrial and Commercial Domestic Use

Sizing of supplies will either be calculated from loading units that are converted to a design flow rate (l/s) plus any design flow rate in l/s for other non-household use, or specified by the developer as a design flow rate (l/s). AWIN will always preferentially use flow rates where known.

Where data is unavailable to calculate tapping units AWIN will treat multi-occupancy buildings such as flats within a block of flats as a standard house for the purpose of design and apply the indicative values in table 4 above.

12.7. 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.

12.8. Pressure and Flow

12.8.1. 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 headloss 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.

12.8.2. 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.

12.8.3. Velocity

Minimum peak time velocities in all Pipes shall reach **0.4 ms^{-1}**

Maximum velocity in Mains shall not exceed **1 ms^{-1}**

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

An industry accepted methodology should be used to calculate velocity, such as the Hazen Williams or Colebrook-White equation.

12.8.4. Calculating Headloss through the Network

For newly designed and constructed Water Mains headloss per **km** shall not exceed **15mH**, target values shall be between **10m/km and 15m/km.**

An industry accepted methodology should be used to calculate headloss, such as the Hazen Williams or Colebrook-White equation.

12.8.5. 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.

12.9. 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.

The contaminated land pipe materials assessments should be completed by the developer or SLO in accordance with the Water UK guidance and AWIN standard - WQRM0021 Standard for the assessment of contaminated land and the pipe selection process and should be submitted to AWIN for approval. The Water UK guidance document can be found here: UKWIR contam land sup guide (unbranded) with COVERpage

Where site remediation is planned or has taken place since the initial geotechnical soils report was undertaken, the developer or SLO should provide any related reports and verification sample results for consideration by AWIN. This will inform AWIN as to whether a risk from contamination still exists.

12.10. Ground contamination during construction

If contamination is suspected during construction of the Self-lay Works including from a spillage during construction, the work shall be stopped and shall be isolated from the potential source of contamination and the incident reported to AWIN 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.

13. 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

13.2. Design Accreditation

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

13.3. 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.

13.4. 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

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.

A main should be laid in any street or shared drive where two or more properties are being served and the communication pipe (i.e. that part of the service pipe outside the boundary of the property being served) would be longer than 10m. The main should be a minimum of 63mm and have a washout installed at its termination point. The main should not extend any further than 2m past the last connection point. The mains should be located on the side of the street with the greatest number of connections. AWIN will also consider designs where the mains are laid in service strips, provided access to the assets is guaranteed at all times.

Where mains are installed to service future development phases and extend beyond 2m past the last connection point, they should be left disconnected from the network until such as time that the new phase of development is ready for connection. A chamber should be included in the design to allow for ease of connection to the live section of main in the future.

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.

Where there is a requirement for a Self-Laid Main to cross a major transport route or body of water (e.g. motorway, river, canal, railway etc.) consideration should be given to future access for maintenance. AWIN should be consulted at the design stage.

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 5. Minimum strip width required for varying pipe diameters

Nominal Pipe Size mm	Min Proximity required (m) from centre line of Water Main
<150mm OD	2m either side of the water main
150mm to 450mm OD	3m either side of the water main
>450mm OD	4m either side of the water main

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.

13.5. 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 **900mm** for new Self-Laid Main or **900mm** where there is a risk of damage eg, from agricultural activities. All DI mains should be installed at **900mm** cover.

Where a depth of 900mm cover is not achievable the SLP should consult AWIN. AWIN will work with the SLP to assess the risks to future piped water supplies and where applicable develop an alternative engineering solution.

13.6. 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.

During network design, consideration should be given to designing a self-cleansing network. Branched connections of decreasing diameter pipe should be used from the spine mains. Looped branched connections should be avoided to reduce the risk of dead spots. The diameter of the branched pipes should be such that they maximise turnover without compromising the ability to meet the requirements of the fire services.

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. Regular mains flushing at a frequency of every 14 days or greater is only sustainable for a limited period of time. Therefore AWIN requires that any mains that do not have customers supplied from them for a prolonged period, including via branch connections are left dry and disconnected from the network until such a time as they are required to connect customers. The phasing of connections should be included in the phasing plan for the Development.

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 pipes and fittings compliant with Regulation 31 of The Water Supply (Water Quality) Regulations 2016 (as amended) should be used in the AWIN water network or a network to be adopted by AWIN.

Only standpipes that have been approved by the Water Company shall be used (details of such may be published on the Water Company website). Only 22/25mm approved Standpipes are permitted to be used on wash-out hydrants in the AWIN Network. Permission to use a 40mm Approved Standpipe must be granted by AWIN. Approved Standpipes can be hired from Aquam via their website: Advanced Water Infrastructure Networks | Aquam Water Services (aquamcorp.co.uk)

Operation of valves: The Water Company's specified standards 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).

13.7. Mains Fittings

Where possible all fittings should be installed where they can be accessed without special arrangements, such as traffic management notices, and without placing any operatives or the public at risk during operation, maintenance or repair. Chambers should be located in

positions unlikely to be affected by surface water drainage or silt. Chambers should not be located in parking spaces.

Any changes to road layouts either during or after construction of the network should trigger a review of chamber locations to maintain safe operation. This may require a diversion to be undertaken if the Mains have been installed.

Isolation valves should be positioned as follows:

- On branch mains as close as practical to the parent main, except for short branches serving <5 households.
- To enable isolation of the mains in sections not exceeding the lesser of:
  - 500m pipe length
  - 50 properties
  - To enable flushing of the main
  - To ensure security of supply to particular customers such as hospitals and schools

Where an isolation valve has been identified as a critical valve or as a district valve (DV) then the valve should be installed as part of an XOX arrangement.

All isolation valves should be sized appropriately for the main installed (not tapered down). The size of valve specified is to be marked on the construction and as-laid drawings.

Hydrants and Washouts should be positioned:

- At the termination of any main
- At locations to enable emptying and flushing of the main in lengths not greater than 500m.
- Adjacent to any valves that are normally closed
- At any position requested by the local Fire Authority

Air Valves should be positioned as follows:

- At any high point in the network that will not be naturally vented by service connections
- In long lengths of main, typically greater than 500m, that will not be naturally vented by service connections.

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.

13.8. 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 the Water Company area are **clockwise closing (CWC)** and all new valves to be installed by an SLP shall be **clockwise** closing.

The Water Company to insert its policy on valve operations by third parties

General valve operations by a third party are limited to valve operations in relation to commissioning new Self-Lay Works. All other routine valve operations are to be undertaken by the AWIN in-house or term contractor who operate and maintain the AWIN water network. The work must be planned and executed to ensure the risk to the wider network is minimised and AWIN's regulatory responsibilities are maintained.

A risk assessment and method statement is to be submitted along with a Notification of Intent to operate a valve at least 5 working days prior to the intended operation of the valve. No valves are to be operated without written approval from AWIN.

Operation of any valves in the AWIN water network must be carried out in accordance with AWIN Water Network Operation and Maintenance Procedure WNOM003 Procedure for operating boundary valves.

Valve Operation – Training & Competence. Any person operating a valve must be:

- trained in operating valves
- trained in flushing mains
- trained in manual handling
- hold a valid EUSR card

In case of emergency, a person trained and competent in valve operations may operate a valve to isolate a burst. In doing so the valve operator must immediately contact AWIN and notify them of the associated network issue and the action taken.

13.9. Washout and Fire Hydrants

Washouts are to be type 2 – BS 750, PN16 flanged inlet, screw down type body, clockwise closing and are to be positioned:

- At the termination of any main
- At locations to enable emptying and flushing of sections of the main not exceeding 500m in length. This is usually adjacent to valves.
- Adjacent to valves that are normally closed.
- At any position requested by the local Fire Authority.

Fire hydrants should be installed at locations where they can meet the guideline flow conditions shown in table 6.

Table 6. Fire hydrant flow requirements (National guidance document on the provision of water for fire fighting, 2007)

Premises type	Flow requirements (l/s)	Additional conditions
Semi detached and detached two storey or less	8 l/s	
Multi -occupancy blocks of housing (flats or apartments) of greater than two floors	20-35 l/s	Through a single hydrant
Transportation hubs (Lorry parks, multi-storey car parks, service stations)	25 l/s	Through a single hydrant and within 90m vehicular distance from the complex.
Industry	Nominal flows are: Up to one hectare 20 l/s One to two hectares 35 l/s Two to three hectares 50 l/s Over three hectares 75 l/s	Minimum pipe size 150mm.
Shopping centres, offices, recreation centres and tourism (hotels)	20 to 75 l/s	
Village halls	15 l/s	Through a single hydrant and within 100m vehicular distance from the complex.
Primary schools and single storey health centres	20 l/s	Through a single hydrant and within 70m vehicular distance from the complex.
Secondary schools, colleges, large health and community facilities	35 l/s	Through a single hydrant and within 70m vehicular distance from the complex.

Fire Hydrant marker posts and plates may be installed by the local Fire Authority

For all applications water take-off by 3rd parties shall be discouraged with capped hydrants.

Operation of washouts and/or Fire Hydrants within the live AWIN must be in compliance with AWIN Operation and Maintenance Procedure WNOM001 Procedure for the operation and maintenance of fire hydrants and washout hydrants.

13.10. 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 should be positioned as follows:

- At any high point in the network that will not be naturally vented by service connections
- In long lengths of main, typically greater than 500m, that will not be naturally vented by service connections.

The type, size and frequency of valves must be selected to suit the anticipated duty and also the main size. All air valves are to be mobile tech enabled to provide data and alarms remotely.

Air valves are to be installed with a separate quarter turn isolation valve below such that the air valve can be maintained or replaced without the need to isolate the parent main.

If double air valves are specified, these are to be installed along with a stopcock for water quality sampling.

13.11. 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 where the design exceeds **1000** domestic properties in size or a development size of **1000** properties then a DMA meter is likely to be required.

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.

13.12. 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 Pipes. The location of any proposed SuDS and permeable surfaces proposed for a Site are to be clearly marked on the proposed design drawing.

Where permeable surfaces are to be used above or within 2 meters of a main or service pipe, only barrier pipe should be used.

13.13. Double Spade Valves

Double spade valves are not to be used on the AWIN water network.

13.14. 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.

14. 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.

Figure 1 and table 7 provides guidance as to the allocation of such responsibilities.

Figure 1. Service pipe responsibilities

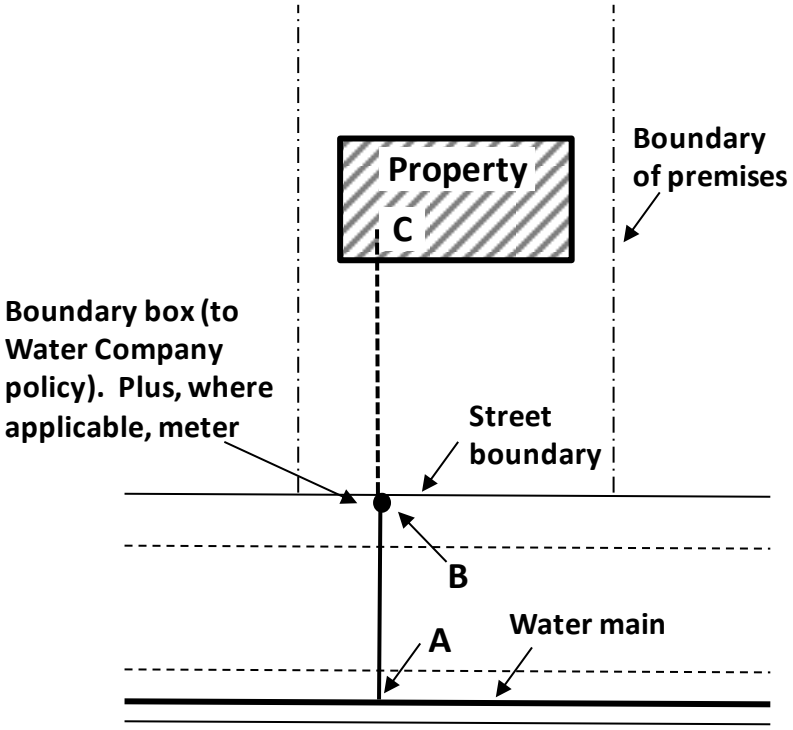


Table 7. Service pipe responsibility

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	

Layout

In general, Service pipes, stop taps and meters for any new development should be configured for optimum hydraulics, construction, and maintenance. Service pipes should be laid perpendicular to the parent main and located such that the whole pipe (communication & supply sections) forms a straight line between the main and the point of entry into the building. They should be appropriately labelled so as to identify the property supplied. The number of fittings and joints used to make a connection should be minimised and should not be more than 3.

Supply pipes should be laid within the boundary of the property being served plus a short length from the boundary to the meter box.

The meter and controlling stop tap should ideally be installed in a chamber at the boundary of the property for ease of access.

Materials

Materials selection for service pipes is independent of supply type and is to be undertaken in accordance with section 12.9 of this document and agreed with the AWIN Water Quality team.

Service pipe material should be either:

- MDPE (PE80)
- MDPE Barrier Pipe (Type A)

Where barrier pipe is specified for the communication pipe it is expected that barrier pipe will also be specified and laid for the supply pipe along with a compatible meter box that offers the appropriate level of protection from the contaminant. Exceptions will be considered if the supply pipe is known and demonstrated to be in uncontaminated ground as long as the pipes and meter boxes are compatible.

Installation

The minimum spacing between tappings on the main is 300mm.

The cover for any chamber must be specified for the anticipated surface loadings.

All new service connections should be pressure tested and flushed with mains water before use. Service pipes above 50mm diameter require disinfection, although water quality samples will not normally be required. If the disinfected service pipe is not commissioned and brought into supply within 30 days of completing disinfection, the disinfection process should be repeated prior to commissioning if it is considered that deterioration of water quality may have occurred within this period.

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

14.2. 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 and meters.

Table 8 below provides the accepted specification for multi-occupancy buildings.

Table 8 Service pipe specification for multi-occupancy buildings

Muli-occupancy property configuration	Accepted specification
Multiple Individual Properties	Installation of a single communication pipe to a 2, 4 or 6 way manifold usually installed in the highway at the property boundary is allowed. All properties are to be individually metered.

Single Buildings – up to 12 dwellings	Installation of a single communication pipe to each 2, 4, or 6 way manifold to an external position, usually in the highway is allowed. This can also include a combination of dwellings in a single building and single dwellings. Exceptional reasons will be considered (such as low pressure that would otherwise require the developer to boost the supply unless the manifolds were installed internally), in which case manifolds can be installed internally.
Single Buildings - more than 12 dwellings	Installation of communication pipes to manifolds internally to be designed according to the layout of the building and considering section 12.6 later in this document.
High rise buildings requiring pump services	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 often installed. Where possible meters should be installed for individual properties post storage and pumped services.

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

14.3. 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 depth 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 1.0 metre 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.

14.4. 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 **≤1.3ms^{-1}** and that total headloss is **≤10mH**

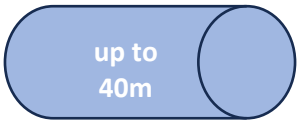
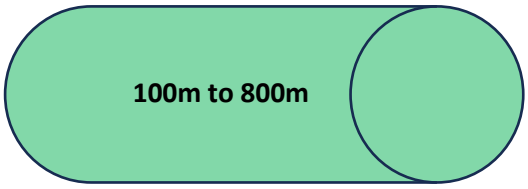
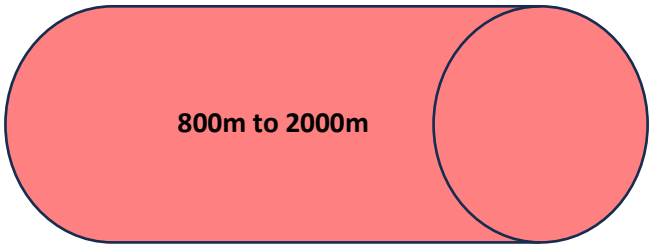
Services to standard domestic properties shall be minimum **20mm** internal diameter and capable of supplying required flow and pressure based on required demand.

The sizing of communication pipes should be in accordance with BS EN806-3 (Pipe Sizing Simplified Method) and/or BS 6700-1997. The calculations should take into account:

- The fittings to be installed at the property (loading units)
- The pressure in the parent main (if unknown assumed to be 20mH)
- Any elevation change between the parent main and the proposed meter location
- The overall length of the communication and supply pipes (Service Connection)

If calculations determine that the communication pipe needs to be >63mm OD, the developer is required to install a suitably sized tank to ensure sufficient supply.

As a general guide the following should be used for the size of service pipe based on its length.

Overall Length of Service Connection	Size of pipe
	25mm
	32mm
	50mm
	63mm

14.5. Location of Boundary Boxes

AWIN will accept both standard and wall mounted boundary boxes.

Standard boundary box holding the meter and the controlling stop tap will be located at the boundary of the property. The exact location will be dependent on local regional planning preferences, but should ensure ease of access and where possible avoid heavily trafficked areas. The boundary box will have a minimum coverage of 750mm. Where barrier pipe has been requested, the boundary box must be of a type approved for contaminated land.

For wall mounted boundary boxes there must be safe access to the stop valve and meter for the customer and AWIN. The unit shall have all pipework joints accessible externally for future maintenance purposes. The wall mounted meter boxes shall be WRAS approved.

14.6. Supplies to Multi Occupancy Buildings

Each property within a multi-occupancy building should have its own metered supply. Additionally, there may be a need to fit separate meters to record water consumption for communal facilities such as communal hot water, laundry or car washing 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. Consultation with the SLO design team will be necessary if the use of individual meters is not possible.

14.7. Services to Multi Storey Buildings

Water Industry Act 1991 - Section 66 states that where the top-most storey in a building is greater than 10.5m below the draw off point the statutory undertaker may require the Developer to fit storage equal to twenty-four hours usage and adequate pumping to reach the highest point.

As with Multi Occupancy Buildings, each property within a Multi Storey Building should be metered individually. Meters should be installed:

- In areas of common access and collectively in a separate cupboard or enclosure. If this is locked then it should be with a lock in common usage for utilities. Preferably a standard FB2 lock.
- In a readily accessible area of a plant room
- At a height no greater than 1500mm and no lower than 300mm
- In a large block, meters may be installed in multiple locations to more effectively serve the properties.
- Meters should only be installed in locations where there is sufficient radio signal to enable data collection.

14.8. 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.

Any exceptional non-domestic supplies should have meters with data loggers for leakage calculation purposes. Examples of exceptional supplies are:

- Having significant demand compared to the demand of the overall DMA, or
- Having significant night use, or
- Having significant seasonal variation in demand.

The AWIN team will need to be consulted regarding the installation, commissioning and connectivity of data loggers on exceptional supplies.

15. Civil Engineering Considerations

15.1. General

The general specification for civil engineering components and materials shall be that of the document "Civil Engineering Specification for The Water Industry ("CESWI") 8th 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

15.2. Marker Tape and Tracer Tape

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

15.3. Indicator Posts and Marker Plates

Indicator Posts and Marker Plates to be compliant with CESWI.

15.4. 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.

15.5. 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).

15.6. 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.

15.7. 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.

Laying of water mains in ducts should be avoided and will only be considered in exceptional circumstances, such as:

- Where the risk of damage by construction traffic is almost certain
- Where the main is being laid particularly deep and shuttering would be required to the excavation

Where a water main is laid in a duct this should be clearly marked on the design, construction and as-laid drawings.

16. Metering Requirements

16.1. Standard Domestic Metering for Individual Dwellings and Multi Occupancy buildings

Only approved meters are to be installed and these will be issued by AWIN upon request.

The following configurations apply for the installation of meters:

- Single Domestic Supplies – Boundary Box
    - Installation of a single meter on the service pipe of each property as set out earlier in section 14.2
- Single Domestic Supplies – Internal Meter

  - Installation of a single meter immediately after the stop cock inside the property. The pipework and meter are to be insulated where necessary.

- Single Domestic Supplies – Manifold
  - Installation of a single meter for each individual property in a manifold of 2, 4, or 6 meters and connected to the supply pipe of each individual property.
  - Supply pipes from manifolds are to be 25mm diameter.
- Single Domestic Supplies – Wall Mounted Box
  - Installation of a single meter for each property within an approved wall mounted box fitted to the property being supplied.
- Single Buildings – up to 12 dwellings
  - Installation of a single communication pipe to each 2, 4, or 6 way manifold to an external position, usually in the highway. This can also include a combination of dwellings in a single building and single dwellings. Exceptional reasons will be considered (such as low pressure that would otherwise require the developer to boost the supply unless the manifolds were installed internally), in which case manifolds can be installed internally.
- Single Buildings - more than 12 dwellings
  - Installation of communication pipes to manifolds internally to be designed according to the layout of the building and considering section 12.6 of this document.

For reference the dimensions and a dimensional diagram of the AWIN approved meter is shown below in Figure 2 and Table 9:

Table 9. Meter dimensions

			Coaxial Manifold	Inline	
Nominal Size	DN	mm	#	15	20
Length	L	mm		170 (1)	190 (3)
Width	D	mm	87	87	97.2
Total height	H	mm	140.3	142.6	149
Height to pipe axis	h	mm		18.95	21.5
Tail	Diameter	inch	G 1½" B	G ¾" B (2)	G 1" B
Piece		mm	47.8	26.44	33.25
Thread	Pitch		2.31	1.81	2.31
Weight		kg	0.5	0.6	0.68

(1) Also available in length 110/115/134 and 165 mm
(2) Also available in length 165 and 190 mm with 1" threads
(3) Also available in length 105, 165 and 220 mm

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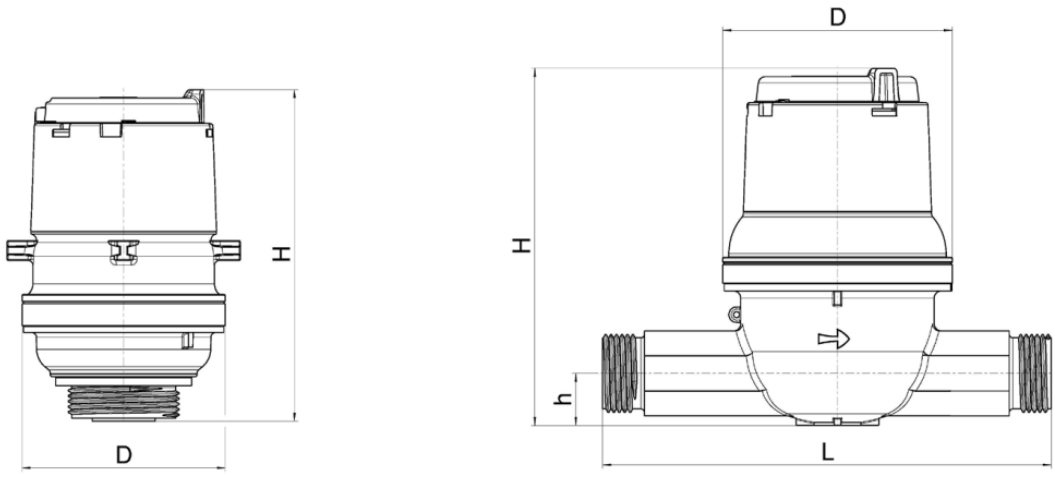

Figure 2. Meter dimensions

17. Water for Firefighting

17.1. 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 provides 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.

17.2. 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)

Fire hydrants for adoption must be positioned according to the agreement made with the relevant local Fire Authority during the design.

Ideally fire hydrants should be positioned so as they may also be used effectively and safely for Network Operations as this reduces the quantum of fittings and associated street furniture 'clutter'.

Fire Hydrants should also be positioned clear of vehicular traffic routes and parking areas where possible.

The installation of fire hydrants on branches of the network should be avoided where alternative solutions are available.

17.3. 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.

17.4. 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.

The proposed installation of any sprinkler system must be notified to AWIN. Further considerations regarding the installation of sprinkler systems can be discussed with the AWIN team during the design phase.

Where the pressure and flow requirements of the sprinkler system exceed the available pressure and flow under normal operating conditions a storage tank will need to be included in the developer's design of the building in order to supply the sprinkler system.

For an example of a piped water supply to a single domestic property sprinkler system, please refer to Appendix 4.

18. 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.

19. 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 setting out its requirements for the provision of Testing and commissioning.

AWIN require all SLO's and/or developers to follow the process described in Figure 3 below for the commissioning of new mains.

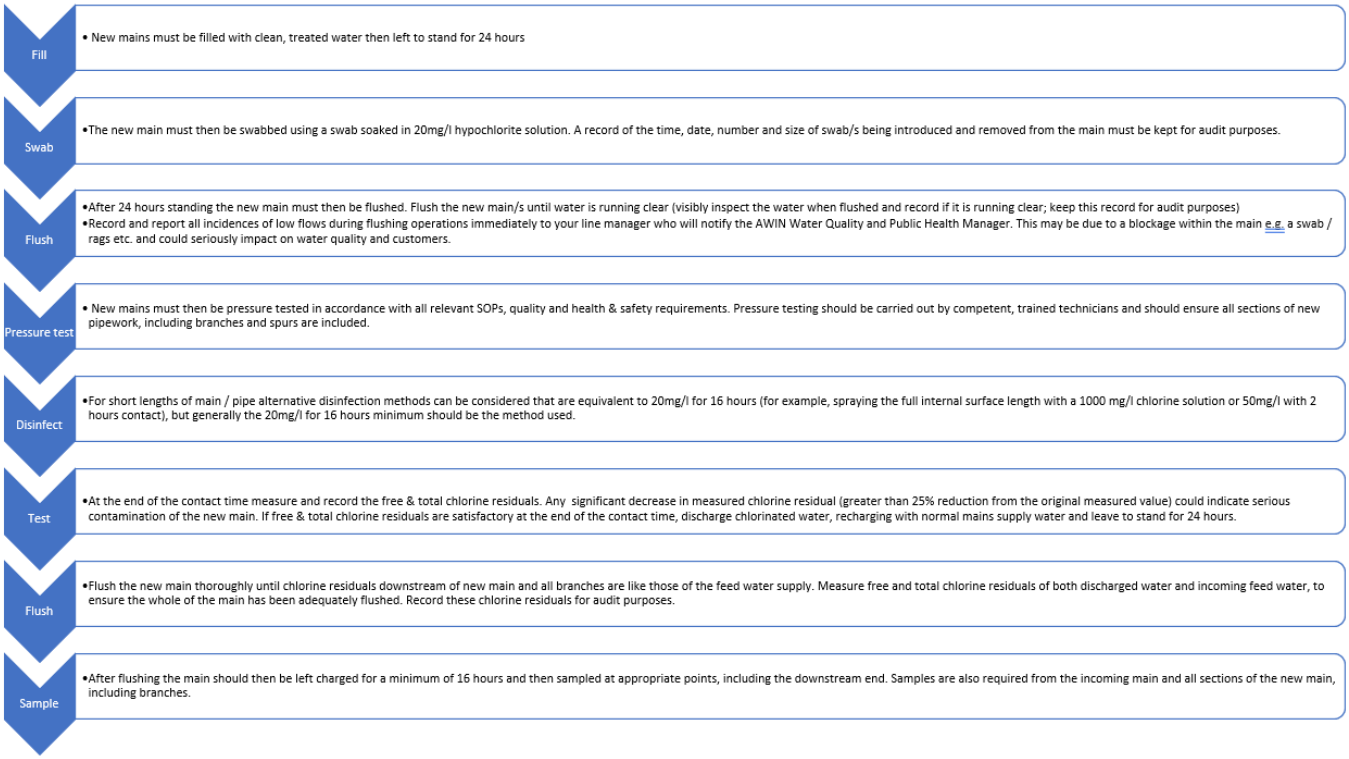

Figure 3 AWIN new mains commissioning process.

AWIN requires the following records to be completed when installing and connecting new mains:

- AWIN water supply network a planned work network impact risk assessment (https://forms.office.com/e/VmJarJAMNc)
- Commissioning Plan
- Flushing and water quality checks log sheet
- Disinfection certificate (depending on pipe used)

- Sodium hypochlorite check list (Appendix A)
- Sample results

19.2. 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 and the associated AWIN procedure WNOM003 - Procedure for operating boundary valves.

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 6 below.

Table 10. Example guidelines

Pipe size (mm)	Internal diameter (mm for PE)	Imperial equivalent	Area m2 and volume in m3 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 to 9 inches	0.03801	38
315	278	11 inches	0.06069	61
355	312	12 inches	0.07645	76.5

19.3. Not used

19.4. Mains Bacteriological Sampling

All relating sampling and data 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.

Sampling

Following disinfection, bacteriological samples shall be taken to a laboratory approved by AWIN for analysis; this to ensure the main is fit to transport potable water. Samples will be taken in accordance with the approved method statements, AWIN WQRM0010 Hygiene Network Standard, the Principles of Water Supply Hygiene & Technical Guidance Notes, and in accordance with the list of parameters to be analysed shown in table 11.

Care should be taken when disposing of chlorinated water to a water course ensuring that any discharge meets with the EA discharge consents and the complies with the guidance in WQRM0010.

Samples are required prior to the connection of new mains to existing mains. Each sample will be tested according to the parameters listed in table 11.

Those parameters below maybe sampled on-site by the sampler:

- Odour
- Taste
- Free Chlorine
- Total Chlorine
- Turbidity (<1NTU)

Table 11. Parameters required for commissioning sampling

Parameters required for all pipe materials	Additional parameters required for ductile iron, cement lined and asbestos lined pipes and/or where the pipes run through contaminated land
Coliforms	pH (Hydrogen Ion)
E. coli	Colour
22°C plate counts	Turbidity
Turbidity	Conductivity
Qualitative Odour	Iron
Quantitative Odour	Manganese
Qualitative Taste	Aluminium
Quantitative Taste	Calcium
Colour	Copper
Free & total chlorine residual	Magnesium
Hydrogen ion (pH)	Lead
Conductivity	Zinc
	Full GCMS Scan
	Trihalomethanes (THMs)
	VOC (Volatiles)
	Phenols
	Total Hydrocarbons

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. AWIN require samples to be taken from the incoming main and all sections of the new main, including branches.

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).

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.

19.5. Pressure testing of Self-Laid Main

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.

19.5.1. 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).

The following also applies:

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

Cleansing of water mains and services

Cleansing of pipes – on completion of construction and prior to any disinfection, internal surfaces of pipelines shall be cleaned thoroughly by swabbing, the cleaning system should be appropriate for the pipe material.

Swabs should be retained for inspection.

Swabs should only be used once.

Pressure Testing

Reference should be made to the guidance document for pressure testing of water mains and sewer publication by the WRc 1999

Testing shall not be carried out against closed valves.

Prior to undertaking the pressure test pipe trenches will be sufficiently backfilled to ensure that the pipe is anchored and does not move during the testing process

The pressure test is to be carried out on new pipe in accordance with 'A Guideline To Pressure Testing of Water pipelines and Sewers Rising Mains', published by the WRc plc to ensure the system is secure from leakage

A record of the pressure test results are to be provided to AWIN.

Disinfection

Disinfection should be carried out in accordance current code of practices. The method statement detailing the steps to be taken when chlorinating water mains and services is to be provided to AWIN for approval in advance of undertaking this activity. A copy of the disinfection certificate should be provided to AWIN post completion of the activity.

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.

20. Water Company Key Contacts

Water Companies to publish key contacts on its website.

21. 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.

There are no additional permitted local practice in the AWIN network.

21.2. Meter Pairing and Commissioning

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). AWIN expect all meters to be installed and commissioned in accordance with the manufacturer's instructions for use. In the case of the AWIN preferred meter this will be the Xylem Sensus 640 C and 640MC meter.

21.3. Timing of the Generation of Plot Reference Numbers

Not Applicable

21.4. Water Company Design Service Offerings

For further information on our design services please contact our NAV inbox at Nav@advancedwaterinfrastructure.co.uk or submit an enquiry via our website.

21.5. Design Self-Certification Scheme

AWIN does not allow the self certification of designs. All designs must be submitted for approval by AWIN.

22. 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.

23. Schedule of Permissible Materials and Construction

23.1. Materials and Construction

A list of approved products and treatment processes are published by the Drinking Water Inspectorate (DWI) and are updated regularly. The definitive list of approved materials can be obtained from the DWI web site.

In all cases a list of products used in the construction of the network/mains installation should be submitted to AWIN with evidence of compliance with Regulation 31 of The Water Supply (Water Quality) Regulations 2016 (as amended).

23.2. As-Laid Drawings (supplementary to Section 16)

The as-laid records are to be submitted in three forms: electronic 'as laid' drawings as a .dwg file; electronic GIS files as an output from the geospatial survey data in compatible formats that enable direct upload into AWIN's GIS system; electronic pdf's.

Where necessary, larger scale drawings detailing particularly busy or complex sections of the network are to be provided.

24. Meter and Service Pipe Policy and Installation

24.1. Meters

All meters will be provided by AWIN.

All meters are to be sized according to the requirements of each property.

24.2. Service Pipe

Service pipe materials are to be medium density polyethylene (MDPE) PE80 to BS 6572 and blue in colour. DWI Regulation 31 approved barrier pipe is to be used in areas where ground contamination may pose a risk to water quality as determined by the contaminated land assessment or subsequent identification of contamination.

25. Standard Arrangement Drawings

Standard arrangement drawings to be added once available.

26. 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.

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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
IGN4-01-03	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: ***http://wras.co.uk***

Appendix 2- 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 8588	Polyethylene pressure pipe with an aluminium barrier layer and associated fittings for potable water supply in contaminated land. Size 20 mm to 630 mm
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 805	Water supply. Requirements for systems and components outside buildings.
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.

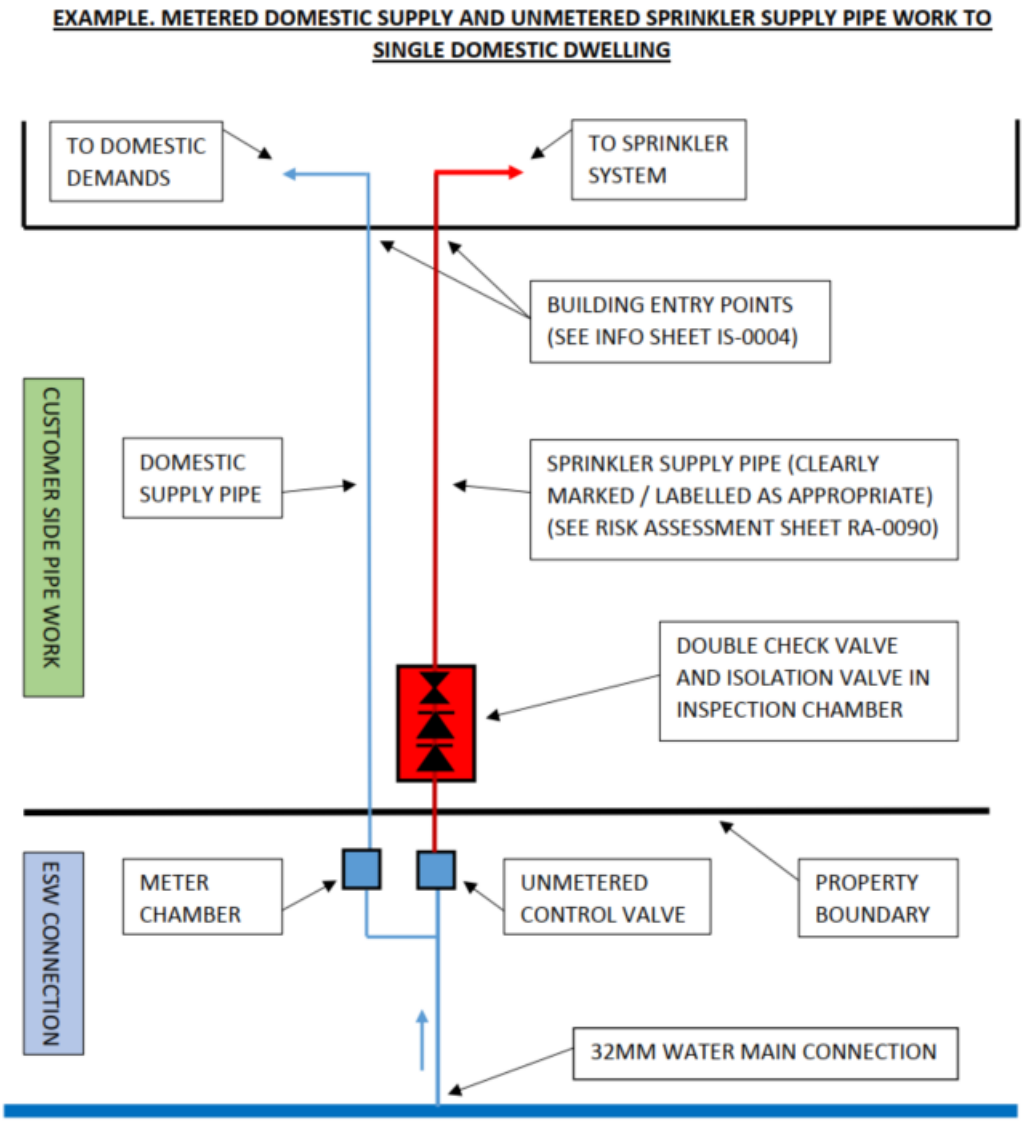
Appendix 3- Other documents

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 8th 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/p ublications/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 water.org.uk/publications/reports/principles-water-supply-hygiene

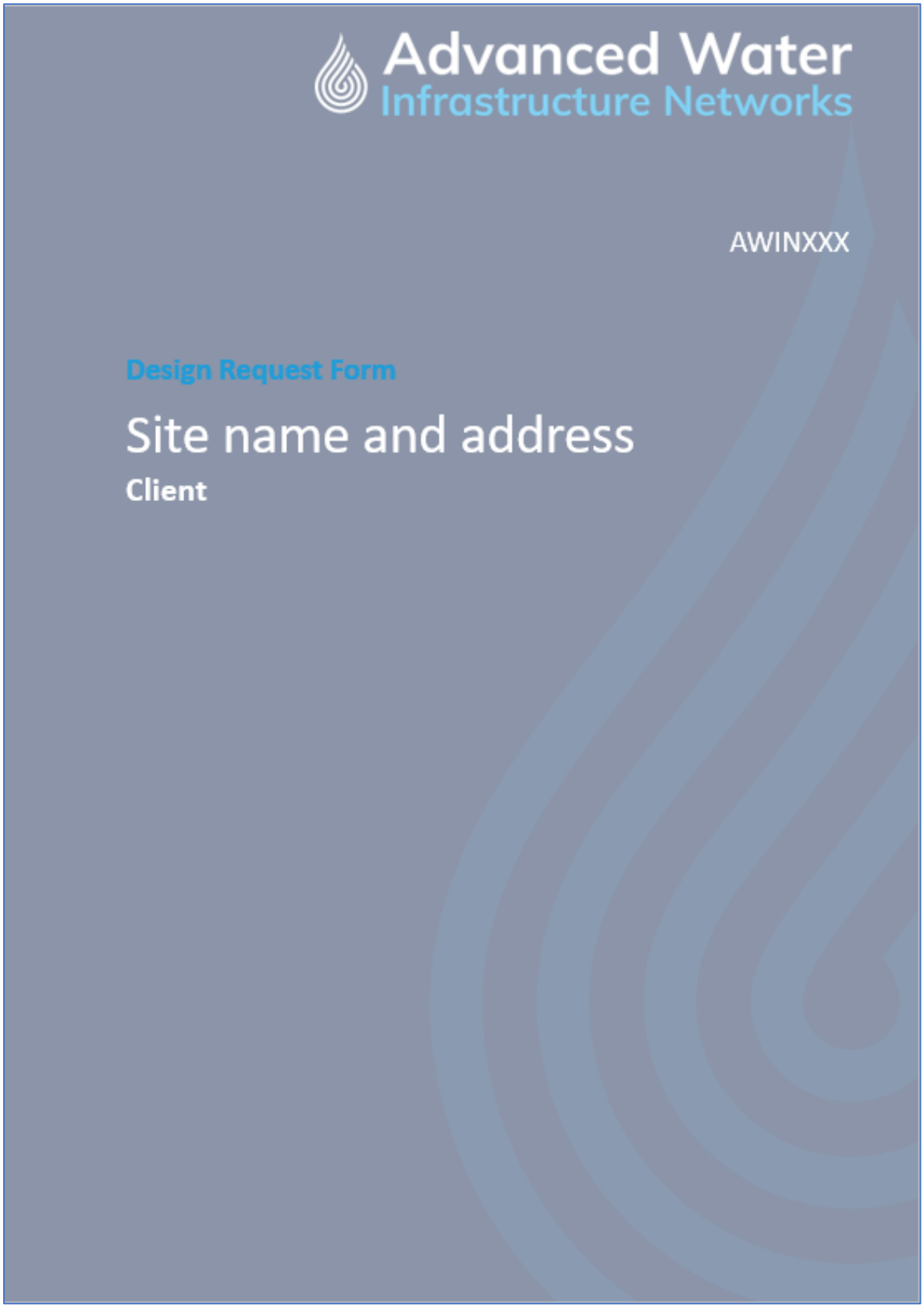
Drinking Water Safety - Guidance to health and water professionals		DWI, Available free of charge at: http://dwi.defra.gov.uk/stakeholders/information-letters/2009/09_2009Annex_.pdf
Drinking Water Safety - Guidance to health and water professionals	Specifications for polyethylene pipe and fittings:-. https://bpfpipesgroup.com/support-downloads/technical-guidance/ t. 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=3f18c87a-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/pUbns/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/publications/policy-positions-and-briefings/water-supply-domestic-fire-sprinkler-systems*

Appendix 4. Example schematic of a sprinkler system water supply for a single domestic dwelling.



Appendix 5. Design Request Form



1.0 Introduction

Thank you for returning your signed copy of our asset value offer associated with this site. We are pleased to now issue you with our NAV Design Request Form. This form aims to provide you with the complete list of information required to enable us to produce a detailed water design for your site, against which the appointed SLP will construct to.

- Please complete Section 1 and 2 and return at your earliest convenience.
- Subsequently, if further water fittings tables are required, please use the additional template at the end of this document and return once all required information is available.

2.0 Guidance

Section 1: Please attach the required documents for your site and fill in any additional information to the best of your knowledge. For our design work to commence we require all relevant .dwg files and a confirmed point of connection (POC) as outlined in our NAV Request Form. All .dwg files should be geo-referenced.

If you tick an option where a schematic is required, the schematic will usually be prepared by your plumber or mechanical and electrical (M&E) consultant and will show us whether your plans comply with the Water Regulations. If a soils report is unavailable at this time, the site will be designed as barrier pipe until a comprehensive soils report is provided to enable us to correctly determine the type of pipe material that should be installed.

Section 2: Please ensure you fill in and return the Water Fittings Table, as this allows us to accurately size the domestic services and subsequently the rest of the onsite water network. If you have more than six plot types, please use the additional table provided at the end of this document.

Please let us know of any additional information or comments that you believe may be useful to our design process that has not been requested within Sections 1 & 2.

Once you have completed the form and attached all required documentation, please return by email to: NAV@advancedwaterinfrastructure.co.uk

Section 1: Design Information

Please Attach as a DWG and PDF file:

- ☐ **Proposed Site Layout**
- ☐ **Combined Services Drawing (CSD)**

  If not available, please provide a proposed service trench location.
- ☐ **The location of existing and proposed trees**

  Please include the anticipated tree canopies associated with the species.
- ☐ **The proposed positions of the new onsite drainage system**

Standard Domestic information:

Do any supplies need larger than 25mm service connections?

To note, the standard supply size for domestic properties will be 25mm (external diameter).

☐Yes ☐No

If Yes, please provide the specific plot number(s) of these supplies.

Will any properties use softeners or water conditioning?

☐Yes ☐No

Non-Standard Domestic information:

Will any properties have the facilities for storing water?

☐Yes ☐No

Will there be a booster pump or pumped system within any property?

☐Yes ☐No

If Yes to either of the above, please provide a schematic which includes:

- ☐ The location of any tank.
- ☐ The locations of any boosters.
- ☐ The location of non-return valves or check valves to be fitted.
- ☐ Flow rates and infill/refill rate for the tanks (the rate at which it is designed to refresh to full capacity) and schematics.
- ☐ Uses and locations of any bin store, landlord or management company (manco) supplies that are needed.
- ☐ Details of any private networks.

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Fire Flows:

Will the development require any fire supplies or sprinklers?
☐Yes ☐No

Will the development contain any buildings over 2 storeys?
☐Yes ☐No

Will the development contain any houses or multiple occupancy (HMOs)?
☐Yes ☐No

Will the development contain any community centres, primary or secondary schools? ☐Yes ☐No

Non-household Plots:

What are the anticipated average and maximum flow rates for each non-household unit?

Will these units have internally stored water?
☐Yes ☐No

Will there be an abnormal distribution load requirement?
(i.e. sprinkler/booster systems) ☐Yes ☐No

If Yes, please provide the refill rate for the tanks and schematics

Please Attach:

☐ **S38 plan showing adopted and private roads and footpaths.**

☐ **Soils Report and Remediation Strategy**

If not already provided. The remediation strategy can be in the form of a report or a design containing the updated soils results.

☐ **Phasing Details**

A Build Programme, details of potential future phases.
This is to help AWIN understand the required capacity for a fully built out development and ensure that the network will be able to accommodate it.

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Section 2: Internal Plumbing Details

Please complete the water fittings table below for each property type.

Additional columns are located at the end of the document if required.

	Property Type 1	Property type 2	Property type 3	Property type 4	Property type 5	Property type 6	Example
Property type							Four-bed House
No. within this type							10
Toilets							3
Urinals							0
Bidets							0
Washbasins							3
Sink - tap size ≤ 20mm							1
Sink - tap size > 20mm							0
Bath - tap size ≤ 20mm							1
Bath - tap size > 20mm							0
Showers							2
Domestic appliances							2
Non-domestic appliances							0

I confirm that all water fittings installed within the property will be WRAS approved: ☐

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Any Additional Comments:

Including any additional fittings which may be needed.

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Additional Water Fittings Template:

	Property Type __	Property type __	Property type __	Property type __	Property type __	Property type __	Property type __
Property type							
No. within this type							
Toilets							
Urinals							
Bidets							
Washbasins							
Sink - tap size ≤ 20mm							
Sink - tap size > 20mm							
Bath - tap size ≤ 20mm							
Bath - tap size > 20mm							
Showers							
Domestic appliances							
Non-domestic appliances							
Other:							

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