Appendix D – Template Design and Construction Specification

The following template is to be used by companies when publishing their Design and Construction Specification in accordance with the Water Sector Guidance.
September 2020

Design and Construction Specification
For SES Water

Version: 2.0
Issue Date: 31st January 2024

2024/25

CONTENTS ..... Page

1. Scope

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

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

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

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

2. Responsibilities

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

It is the responsibility of the Water Company to ensure that the relevant sections of the DCS conform to its design standards, completing the sections 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.

3. Terminology

In this document the following terms have the stated meanings:

Shall: Indicates a mandatory requirement

Should: Indicates a strong preference or best practice

May: Indicates an option which is not mandatory

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

4. Charging

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

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

5. Abbreviations

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

6. Nomenclature

v	-	Volume, Litres
A	-	Area, metres squared
V	-	Velocity, metres per second
Q	-	Flow, litres per second
t	-	Time, in seconds
P	-	Pressure, in Bar
H	-	Static Head, in metres
hL	-	Head loss due to Friction, metres
L	-	Length in metres
G	-	Gravitational acceleration, ms-2
D	-	Diameter, millimetres
i	-	Hydraulic Gradient, metres per metre
θ	-	Kinematic viscosity of fluid, m²/s
Ks	-	Effective roughness value, millimetres
Qt	-	Design Flow, l/s
LU	-	Loading Units
E	-	Equivalent length, metres
Ω	-	Soil Resistivity, Ohm -cm

7. Reference Documents

See Appendix 1 for a comprehensive list of reference documents.

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

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

A list of accredited SLPs can be found here:

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

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

8.1 General

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

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

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

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

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

8.1.1 Pre-Construction Phase Plan

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

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

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

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

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

8.2 Collaborative Design

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

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

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

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

9. Design Process

9.1 Minimum Information Required from Developers

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

9.2 Point of Connection (PoC) Requests

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

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

The Water Company may identify a supply need in respect of future development that means that it requires Network Reinforcement to be incorporated within the SLP's design (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 Schedule1 of the WAA.

9.3 Annual Contestability Summary

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

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

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

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

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

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

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

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

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

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

Table 9.3

	Work categories by number of properties potentially affected by work or strategic nature of Existing Main			
	>49	50-199	200-499	500+/Strategic main
Selection of a proposed POC to serve a Site/Development from records of Existing Mains				
Construction of new mains and service connections				
Construction of new mains as part of reinforcement of Network extension or associated Site diversion work				
Design of new water network				
Chlorination and pressure testing of Self-lay Works				
Meter installation in conjunction with new service connections				
Undertaking Water Quality samples				
Analysing Water Quality samples (subject to paragraph 17.3)				
Construction of routine mains connections (CRMC) connections				

Main and/or service connection: **up to 63mm** PE/Barrier pipe to: Parent Network: <12” nominal bore* DI/CI/SI/PE/AC/ Barrier pipe/ steel Permanent Connections (Piece through).				
Connection: **63mm to 300mm** PE / Barrier Pipe to: Parent Network: <12” nominal bore * CI/SI/DI/AC/PE/Barrier pipe/steel Operational pressure: up to 50m				
Connections: **63mm to 300mm** PE / Barrier pipe to: Parent Network: 12” nominal bore * to 18” nominal bore * / 300mm to 450mm nominal bore * DI/ CI/ SI/ AC/ PE/ Barrier pipe/Steel Operational pressure: 50m to 75m				
Connections: **over 300mm** to: Parent Network: 18” nominal bore * & above, or high risk parent Network: material (such as steel) Operational pressure: above 75m				
Valve operation in relation to commissioning new Self-Lay Works *				
Self-certification of SLP for Site water distribution systems designs				
Any size connection to GRP / PVC Network				
Design of Network Reinforcement (upsizing of existing assets) and/or design of Network diversion(s).				
Pipe sizing criteria, and the approval of design by others				
Assessment of network risk, & operating live network				
Commission telemetry links (meters / field equipment)				
Connection, commissioning and/or decommissioning of diverted Network				

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

9.4 Activities shaded green in the ACS

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

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

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

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

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

a) of an under-pressure type connection and/or,
b) a connection to a previously installed temporary valve-controlled washout installed in conjunction with the connection to the Existing Mains Network at the POC to supply the Site or Development, and/or
c) a connection to a previously installed valve-controlled washout, which has been installed on a Self-Laid Main for a future connection off such main.

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

9.5 Activities shaded amber in the ACS

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

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

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

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

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

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

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

9.5.8 SES Water will undertake a risk assessment for all proposed UPT connections to the live water network. This risk assessment will be based on potential customer impact to determine if a connection can be undertaken by the SLP with minimal risk to customers water supply. An application will be required from the SLP which will include a Risk Assessment, Method Statement and Contingency Plan for the planned activity. SES Water will take into account the SLP information and assess the potential operational impact on customers taking into account:

- Discolouration risk.
- Interruption to Supply Risk
- Mains condition
- Quality of the RAMS and contingency plans submitted by the SLP or Developer

If the Risk Assessment identifies the network activity as low risk, the SLP will be approved to do the work.

If the Risk Assessment identifies the network activity as high risk, the quality of the SLPs RAMS will be taken into account and, dependent upon the degree of difficulty, will either be declined or require amendment.

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

Like for like connections will need to be carried out by SES Water.

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

9.6 Activities shaded red in the ACS

.

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

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

9.7 Design Submissions to Water Company

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

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

Water is scarce in the South East of England and our supply area receives less rainfall per person than Morocco – that's why it's important to save water wherever we can. We recognise that in order to conserve water, we need to encourage new developments to introduce recognised water efficiency devices to reduce consumption in the home. Therefore, we offer the opportunity to receive a discount on infrastructure charges if all bathroom fittings are 'A'-rated based on the water label and that discount can currently be doubled if either rainwater harvesting or greywater recycling is fitted.

9.8 Design Proposal

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

1. Select appropriate materials for the Self-Laid Main and Service Pipes.
2. Determine the legal land ownership boundary of the Site.
3. Produce a drawing to an appropriate scale to show the layout and route of the Self-Laid Mains and Service Pipes and proposed meter arrangements (relative to Service Pipe entry points) in accordance with this Design and Construction Specification.
4. Provide all related material requirements and details as required by this Design and Construction Specification.
5. Calculate demands and size all Service Pipes in line with this Design and Construction Specification (see also paragraph 10.2).
6. Size the Self-Laid Mains across the Site as may be required to meet the requirements of the Site and any Development relative to the Site, following

discussion with the Water Company. Any Water Company requirements will be communicated after such discussion has taken place. See further section 10.2.

7. Identify the agreed Point of Connection and determine by agreement with the Water Company all work that is Contestable and Non-contestable.
8. Design the appropriate number of Self-Laid Main fittings required to control the Network and the Self-Lay Works.
9. Identify any sections of Self-Laid Mains that require easements or wayleaves.
10. Identify any Special Engineering Difficulties as appropriate.

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

9.9 Drawing Standards

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

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

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

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

1. Proposed off-site Self-Laid Mains to Point of Connection to the Network
2. AOD at POC and highest point of the site including Site topography can be provided separately
3. Proposed Self-Laid Mains, including position of sluice valves, washouts, hydrants, air valves and any other fittings required
4. Any requirements for the protection and/or diversion of the existing Network.
5. Material and size of each Self-Laid Main
6. Depth of each Self-Laid Main when installation depth is not in accordance with Streetworks UK guidance (subject to agreement by Water Company).
7. The Self-Lay Works and Water Company Works (Contestable / Non-contestable activities)
8. Position of existing buildings or features relative to the design proposal for reference (minimum of 3 points on the drawing to enable triangulation)
9. Individually numbered plots
10. Location of Service Pipes, showing size if above 25mm
11. Service Pipe entry points
12. Location of boundary boxes, manifold boxes and any meter chambers as applicable
13. Type of service connection for each plot, i.e., wall box, boundary box, manifold, internal
14. Hydrants adoptable by the Fire and Rescue Service

15. Location of any ducts
16. Any Special Engineering Difficulties
17. Areas of contamination where protective pipework is required
18. Future demand, or Development, or phase adjacent to Site as identified by the Water Company or Developer and its Point of Connection relative to the proposed Self-Laid Main
19. North point
20. Site boundary
21. Roads / highways / service strips (adopted or proposed for adoption)
22. Change in ground level
23. Service strips, wayleaves and easements required for the construction, operation and maintenance of the Self-Laid Main
24. Significant environmental and health and safety hazards
25. Contestable / Non-contestable works annotated
26. A drawing legend / title block

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

9.10 Drawing Legend

The drawing legend shall contain:

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

9.11 Design & Construction Variations

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

9.11.1 Minor Variations

Minor variations shall be agreed in writing between the Parties.

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

10. Pipe Sizing Methodology

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

10.1 Permitted Pipe Diameters, Pressure Ratings and Permissible Materials.

Below is a list of approved pipe materials:

- PE80 (MDPE) Pipe
- PE100 (HDPE) Pipe
- PE/AL/PE PE80 Type A Barrier Pipe
- PE/AL/PE PE100 Type A Barrier Pipe
- Class C40 Cement Lined Ductile Iron

Refer to section 10.8.1 for additional requirements regarding contaminated land.

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

Size	Material	SDR	Pressure Rating
25mm OD	MDPE PE80	11	12 Bar
32mm OD	MDPE PE 80	11	12 Bar
63mm OD	MDPE PE 80	11	12 Bar
63mm OD	HPPE PE100	11	16 Bar
90mm OD	HPPE PE100	11	16 Bar
125mm OD	HPPE PE100	11	16 Bar
180mm OD	HPPE PE100	11	16 Bar
225mm OD	HPPE PE100	11	16 Bar
280mm OD	HPPE PE100	11	16 Bar
315mm OD	HPPE PE100	11	16 Bar
355mm OD	HPPE PE100	11	16 Bar
25mm OD	MDPE PE80 Barrier Pipe	11	12 Bar
32mm OD	MDPE PE 80 Barrier Pipe	11	12 Bar
63mm OD	MDPE PE 80 Barrier Pipe	11	12 Bar
63mm OD	HPPE PE100 Barrier Pipe	11	16 Bar
90mm OD	HPPE PE100 Barrier Pipe	11	16 Bar
125mm OD	HPPE PE100 Barrier Pipe	11	16 Bar
180mm OD	HPPE PE100 Barrier Pipe	11	16 Bar
225mm OD	HPPE PE100 Barrier Pipe	11	16 Bar
280mm OD	HPPE PE100 Barrier Pipe	11	16 Bar
315mm OD	HPPE PE100 Barrier Pipe	11	16 Bar

355mm OD	HPPE PE100 Barrier Pipe	11	16 Bar
80mm ID	Ductile Iron Class C40	N/A	40 Bar
100mm ID	Ductile Iron Class C40	N/A	40 Bar
150mm ID	Ductile Iron Class C40	N/A	40 Bar
200mm ID	Ductile Iron Class C40	N/A	40 Bar
250mm ID	Ductile Iron Class C40	N/A	40 Bar
300mm ID	Ductile Iron Class C40	N/A	40 Bar
350mm ID	Ductile Iron Class C40	N/A	40 Bar
400mm ID	Ductile Iron Class C40	N/A	40 Bar

Table 10.1 Permitted pipes sizes, materials, SDR and pressure ratings to be used within the Water Company area.

Further detail to be taken into consideration:

- When laying ductile iron an appropriate soil resistance test should be undertaken to assess the level of pipe protection required. Any requirements here should be in accordance with the manufacturer's specifications.

- In land that is contaminated or is at risk of contamination, ductile iron pipes or PE barrier pipe system must be used in conjunction with barrier service pipes or plastic-coated copper service pipes

10.2 Principles of Sizing of Water Mains

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

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

- The results of any Network modelling by SES Water 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 SES Water relevant to the design of mains and services for a Site and/or a Development.

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

The sizing of pipes for indicative design purposes (e.g. for cost estimates or tendering) may be done using a simple table method for number of properties. However, no reliance shall

be placed on this indicative assessment for the purposes of any final design as pipes shall be designed in accordance with the principles and criteria stated below.

The sizing of pipes for detailed final design should be based upon a hydraulic calculation using the calculated peak demand and the Hazen Williams Formula. Headloss through fittings and valves should be taken into account using standard allowance tables.

Mains should be designed to the known or estimated peak flow conditions (peak hour peak week), where a maximum velocity of 1m/s is derived. Where the design exceeds this velocity, the next available stock size of pipe shall be selected. In addition, the minimum velocity should be not less than 0.3m/s, to prevent the deterioration of water quality, maximum headloss should be 3mH/km, and the minimum pressure should be 20mH at the critical points (Highest point and terminus washouts) within the development.

SES Water methodology for calculating pipe sizes is based on the Hazen Williams Formula and Hydraulic Network modelling. Where SES Water supports with Network Modelling, should there be any factors which result in the need to alter or change the pipe sizing presented by the self lay organisation or its designers, then this shall be discussed at the design phase.

10.3 Indicative Pipe Diameter Selection

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

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

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

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

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

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

10.4 Domestic Hydraulic Demand Calculations

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

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

143 litres/day = Average demand per capita
2.68 = Average household occupancy rate
2.45 = Peak flow factor

Demand per capita per day shall be taken as 143 litres unless evidence to the contrary is provided for the specific development.

Calculation for household occupancy shall be taken as 2.68 persons per household on average unless evidence to the contrary is provided for the Site.

Average daily demand per household is therefore 143 x 2.68 = 383.24 litres/day

To account for diversity in the network, Peak Flow Factors for domestic scenarios shall be taken to be 2.45.

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 n x 383.24 litres/day

This must be multiplied by the peaking factor 2.45. Therefore peak demand in litres per second can be estimated at ((n x 383.24) x 2.45)/86400 = peak daily demand in l/s

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

Sizing of non-domestic supplies will be dependent on design flow rate (l/s) required as provided by the Developer. If no flow rate is provided, the Loading Units required for non-domestic supply should be converted to flow rate (l/s).

Alternative methodology for different types of developments can be found in SES Water’s Network Mains Design Capacity Policy Appendix A

10.6 Process Water

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

10.7 Pressure and Flow

10.7.1 Source Pressure

For the purposes of designing the network, the SLP shall check with the Water Company to confirm pressure at the source During the design stage, if any constraints, eg, 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.

10.7.2 Pressure and Flow

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

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

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

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

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

10.7.3 Velocity

Minimum peak time velocities in all Pipes shall reach 0.3 ms^{-1}

Maximum velocity in Mains shall not exceed 1.0 ms^{-1} however the maximum headloss allowable, see Section 10.7.4, will take precedent as the primary design factor.

10.7.4 Calculating Headloss through the Network

For newly designed and constructed Water Mains headloss per Km shall not exceed 3 mH.

SES Water use the Darcy-Weisbach equation to calculate headloss. Alternatively design can be undertaken using the Hazen Williams formula

10.7.5 Topography

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

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

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

10.8 Selection of Materials for Contaminated Ground

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

Where contaminated ground exists barrier pipe shall be installed.

10.8.1 Ground contamination during construction

If contamination is suspected during construction of the Self-lay Works the work shall be stopped and be shall be isolated from the potential source of contamination and the incident reported to the Water Company and Developer. An investigation and action plan, which may include a change of pipe material (and/or replacement of the apparatus already installed) shall be agreed with the Water Company before work recommences.

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

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

Pipe joints in barrier pipe systems shall be made in accordance with the pipe manufacturer's guidance.

Only EF fittings manufactured by the PE barrier pipe manufacturer should be used with that barrier pipe system (i.e. both the barrier pipe and the EF fittings shall be made by the same manufacturer).

Where there is a need to join barrier pipe from one manufacturer to a barrier pipe made by another manufacturer (e.g. connecting to a previously installed section of pipe), then a gunmetal transitional barrier pipe fitting shall be used and wrapped with barrier pipe system foil tape. Alternatively a valve may be inserted to separate the two systems using flange adaptors and a suitable gasket.

Standard gaskets must not be used.

11. Water Main Design and Construction Principles

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

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

11.1 Design Accreditation

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

11.2 Construction (pre-start)

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

11.3 Routing and Positioning Principles

Where the Self-Laid Main is to be laid within an adopted highway, a street, or a dedicated service strip, it should be laid in accordance with the latest Streetworks UK good practice guidance (Volumes 1 to 6) unless the Water Company has indicated its preferred routing and positioning of the Self-Laid Main and Service Pipe. In this case, the Water Company's

requirements shall be incorporated into the design by the SLP Designer. Any requirement for preferred routing and positioning will typically be associated with technical requirements that includes future access to assets for maintenance and/or repair. Where the Water Company requests a change to the route due it not meeting their specific requirements, the costs incurred will be payable by the Water Company. Any such variation will need agreement with the SLP and Developer before works proceed

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.

See additional information and relevant criteria in paragraph 22.

SES Water's guidance for shared driveways is set out in the table below:

Number of properties	Distance to the furthest property	Requirement
1 - 6	≤50m	Private service to multi-port manifold
>6	>50m	Main with individual service connection

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

Any easements required will be obtained by Water Company (at the expense of the SLP/Developer which will include any consideration payable for the grant of easement and all legal costs and surveyors' fees incurred in relation to the documentation required). The easements must be granted direct to the Water Company and be entered into before adoption of the Self Lay Works can occur

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

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

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

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

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

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

Nominal Pipe Size mm	Min Proximity required (m) from centre line of Water Main
<300mm NB	3m
>=300mm NB	5m

Table: 11.1 Minimum strip width required for varying pipe diameters

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

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

11.4 Depth of Self-Laid Main

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

The Water Company preferred installation depth (cover to crown of pipe) is be 900mm for new Self-Laid Main.

11.5 Water Quality Considerations

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

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

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

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

Only standpipes that have been approved by the Water Company shall be used (details of such are published on the SES Water Website)

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

11.6 Mains Fittings

In accordance with the principles of the CDM Regulations 2015, consideration for future safe access for maintenance and operation should be included as part of the designer's duties. All fittings should be installed where they can be accessed without special arrangements for example traffic management notices, and without placing any operatives or the public at risk during operation, maintenance or repair. Chambers should be located in positions not likely to be inundated by surface water drainage and silt.

If a change to road layout leads to fittings no longer being in the footway, liaison is suggested in order to move fittings or undertake mains diversion to maintain safe operation.

Isolation Valves should be positioned:

- On branch mains as close as practicable to the parent main, unless the branch is short and subject to the following provision.
- So as to enable isolation of the main(s) in sections not exceeding the lesser the below whilst endeavouring to also locate them close to branches or other apparatus.
    - 500m in length or
    - 50 properties served
- When operational flushing would be difficult or cause significant issues then a valve-washout-valve OXO arrangement should be installed.
- So as to ensure security of supply to Sensitive customers (ie Hospitals, Schools etc).
- Where an isolation valve has been identified as a critical valve (generally between different pressure areas) or as a district valve (DV) then the valve should be installed as part of an OXO arrangement.
- Isolation valves shall be of an appropriate size for the size of main installed i.e. no tapering down to valves should be required. The size of valve specified should be marked on construction drawings.
- Spindles must be installed on all valves which should end 200mm below the cover to facilitate ease of future operation.

Hydrants/ Washouts should be positioned:

- At the termination of any main, e.g. in a cul-de-sac.
- At locations to enable emptying and flushing sections of main not exceeding 500m in length. In practice this means positioning washouts adjacent to valves and at mains connections.
- Adjacent to valves that are normally closed (such as District Valves).
- At any position requested by the local fire authority (see section 15.2)

- Typically hydrants should be mounted directly on a riser from the crown of the pipe (directly on top of tee) or directly on the end of the pipe with tapers as required. For all applications water take-off by 3rd parties shall be discouraged with capped hydrants.
- End washouts will be required on mains of 63mm and above and must be located to suit hydraulic and operational convenience, including consideration as to how any wash out water will be disposed of.

Air Valves should be positioned:

- With regard for the topography of the land and crossings of rising structures (e.g. bridges) where there will be insufficient natural venting of any trapped air at high points through customers' service pipes.
- In rural areas where there are long lengths of main (typically 500m) without service connections to act as air vents, the main should be designed to have a straight vertical profile between air valves with a minimum grade of 1:500. This may require the route to be surveyed so that long section construction drawings can be produced.

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

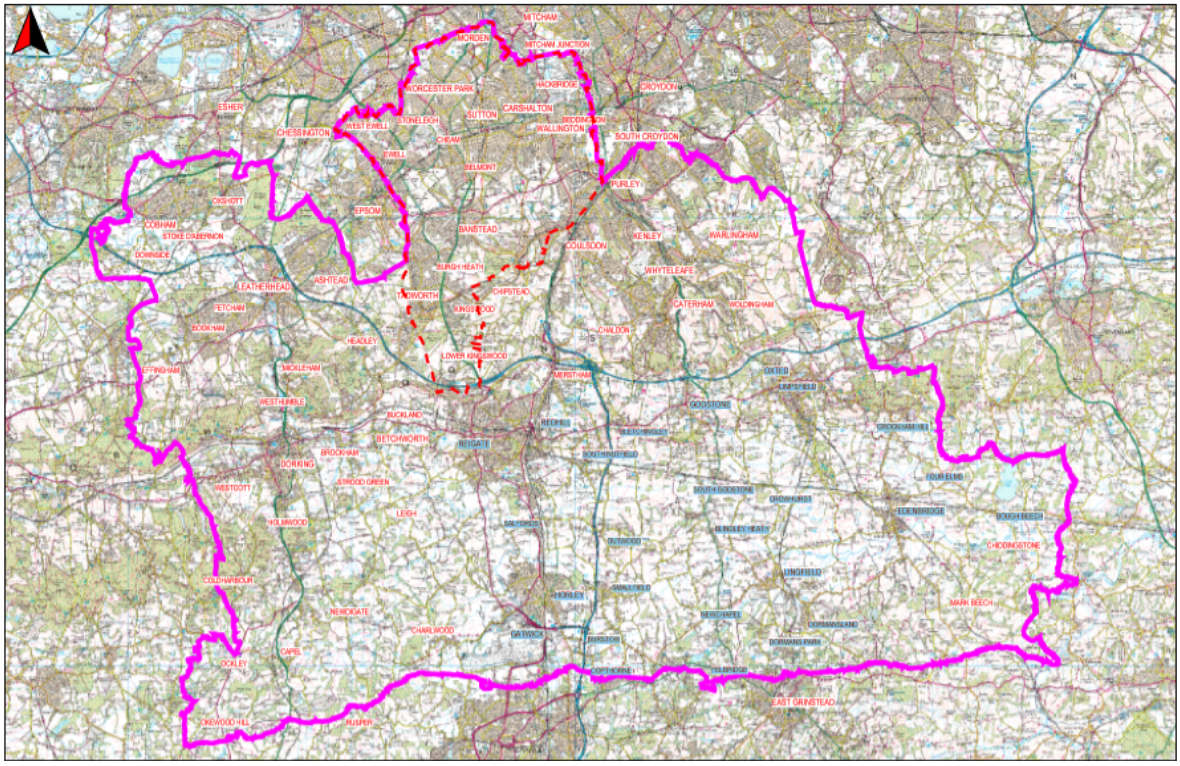
Where there is no option but to design site fittings in trafficked areas, under no circumstances shall they be placed in parking bays or behind any locked access gates.

11.7 Controlling Valves and Valve Operation

The operation of valves within the SES Water off-site live network must only be undertaken by SES Water.

When operating the network, SES Water will take into account specific Site constraints or considerations that may impact on the end user customer and/or water quality. Planning for such valve operations may require up to 7 calendar days prior notice in order to evaluate and prepare for the shut.

The following map indicates the SES Water operational area. In the area North of the red-dashed boundary line, left-handed closing valves (anticlockwise) to be installed. South of the red-dashed boundary line, right-handed closing valves (clockwise) to be installed.



Isolation valves should be resilient seat gate type and the equivalent nominal diameter of the main on which they are installed. The top of the valve spindle should be between 200 mm to 300 mm below the cover level.

All fittings shall comply with the Water Supply (Water Fittings) Regulations 1999. Products that conform to these requirements currently carrying approval are published in section 1 on the Water Regulations Advisory Scheme (WRAS) 'Directory of Fittings, Materials and Appliances' for use on the UK Water Supply System, published on the WRAS website.

Ductile iron, pipes, fittings and joints shall comply with BS EN 545 for potable water pipelines.

11.8 Washout and Fire Hydrants

Washout hydrants shall be installed at each dead end regardless of mains diameter and between any two sluice valves which isolate a section of water main when closed.

For mains where line valves have been installed at the maximum distance of 50 properties or 100m then a washout hydrant should be installed at each end of the main between isolation valves.

SES Water shall determine if additional washout hydrants are required to facilitate future operability and minimisation of disruption to customers due to repair requirements. This will be dependent upon the layout and connectivity of the proposed mains.

All new hydrant installations on mains greater than 150 mm nom diameter or mains which will operate at 70 m pressure and above should include a studded sandwich valve attached immediately below the hydrant to facilitate zero interruption future maintenance.

Fire Hydrants shall only be installed on mains equal to or greater than 90 mm / 110 mm outside diameter.

Hydrants shall comply with CESWI clause: 2.61 Hydrants, together with SES Water additional requirements as follows:

- Fire Hydrants shall be compatible with the requirements of the local Fire Authority.
- All hydrants shall be clockwise to close operation.
- Hydrant box covers shall be provided with recesses for lifting key. The covers shall be of such a design that it is capable of being lifted by the application of a single chisel and ended lever, without risk of falling into the chamber.
- Hydrants shall have a screwed outlet constructed of gunmetal or stainless steel in accordance with the requirements of BS 705.
- Hydrants shall be fitted with a frost plug of the blank plug type although automatic drain plus will be accepted. The spindle cap shall be secured by a non-corrodible fastener on to stem.
- All hydrant installations shall be adjusted by means of riser pipes such that the top of their threaded outlet is no deeper than 300 mm below the upper surface of the cover.
- All hydrants shall be installed in a chamber with its foundation slab above the tee off the main or the duckfoot bend. The chamber shall have minimum internal dimensions of 430 mm x 280 mm clear opening. The frame and cover shall be Grade A to BS 750 and have a clear opening of not less the 380 x 230mm. The SLP shall ensure that the hydrant is vertical and that a standpipe can be fixed to the outlet and operating key utilised without being impeded by the frame or chamber walls.
- All hydrants installed as washouts and fire hydrants shall be of the “throughbore” type.
- All hydrants for permanent installation shall be “kitemarked” by BSi Product Services
- Threaded outlets must be constructed of a material in accordance with BS 750 and be attached to the outlet via a four bolt flange. Any other type of mounting for threaded outlets must be type tested in accordance with the procedure in Sections 6.4 and 6.5 of BS 750 to ensure their integrity or attachment and sealing.
- All nuts and bolts incorporated in the assembly of the hydrant must be manufactured from a corrosion resistant material or coated in accordance with WIS 4-52-03. Galvanizing alone shall not be acceptable as a means of protection for fasteners.
- The hydrant shall be installed at such a level that the top of its outlet shall be between 250 mm and 300 mm of the finished cover level. The hydrant installation shall be adjusted by means of riser pipes to ensure the outlet is no deeper than 300 mm. The hydrant shall be centralised and aligned as accurately as site conditions allow ensuring easy installation of a standpipe and operation of the hydrant spindle with a key.
- There shall be a minimum 25 mm clearance from a 2.5” standpipe and / or a hydrant key shaft aligned with the spindle, from the inner edges of the frame to allow for any subsequent settlement or movement that might reduce those clearances.
- When carrying out backfill and reinstatement a dust cap must be fitted over the outlet in order that no work related debris enters the cup. The chamber must be cleared of all work related debris at end of works.
- Where a washout hydrant is being specifically installed to attach a data logger and the top of the outlet to the finished cover would be less than 250 mm, then an oversized chamber shall be installed. The chamber shall have a clear opening of 600 mm x 450 mm.

- Frames with a split lid (i.e. a two piece cover rather than a single cover) shall not be fitted to fire hydrant installations. All fire hydrants will be fitted with onepiece lids. The Fire Service's preferred method of lifting is with a single bar. Split lid covers need two lifting keys using a straight upward lift. This tends to be a slower operation and relies on fire fighter's carrying two keys.

11.9 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.

A hydraulic gradient should be used to identify any locations where air is likely to accumulate or will require releasing from the network during charging. It is not expected that air valves will be installed on smaller diameter mains where there are sufficient hydrants and service connections to release air.

Air Valves shall comply with CESWI clause 5.28 Installation of Valves and SES Water additional requirements as follows:

- Small orifice air valves are preferred for distribution mains; however the type, size, and frequency of valves must be selected to suit the anticipated duty and main size.
- Air valves shall be installed with an isolating valve between the branch/tapping off the main and themselves to facilitate their maintenance without interruption to the mains supply.
- If double air valves are specified these will be provided with a stop cock for water quality sampling.
- Air valves shall be carefully sited to avoid areas of poor ground drainage and potential contamination risks. Pipework design / gradients shall be altered if necessary, to accommodate this. In private land they shall be located within 1m of the field boundary. Where it is essential to locate an air valve remote from the boundary the chamber structure shall be extended above the level of the surrounding ground.
- Air valves shall be installed in drained chambers where practicable and where this is impractical, they shall be installed with their air vent(s) at a level higher than that to which water could rise. This may mean the construction of above ground chambers with sufficient clear opening and internal space for access to repair and maintain the air valve and isolating valve.
- Covers and frames to manholes containing air valves on water mains should be of a ventilated type.

11.10 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 300 domestic properties in size or a development size of 300 properties then a DMA meter is likely to be required. See also paragraph 8.3. Any other development at the discretion of SES Water may be considered for a DMA meter, in order to produce an optimised network. If it is triggered as stated above

that a DMA meter is likely to be required, a Pressure Reducing Valve (PRV) shall also be considered. If a PRV is applicable it will be in place before first residents take occupancy.

Shut valves will need to be installed if a Site is fed by two separate DMAs via two Source of Water Connections. In this instance their requirement and location shall be agreed at the design stage with the Water Company.

11.11 Sustainable Drainage Systems (SuDS) Considerations

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

11.12 Double Spade Valves

SES Water does not accept the use of double spade valves.

11.13 Rights of Access

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

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

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

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

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

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

- Local Highways by way of Section 50 Agreements
- Other Adopting Utilities where we are laying within an existing easement

- Environmental Agencies and Waterways Authorities
- Rail and Transport Network Operators
- Historical Societies and National Heritage Agencies

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

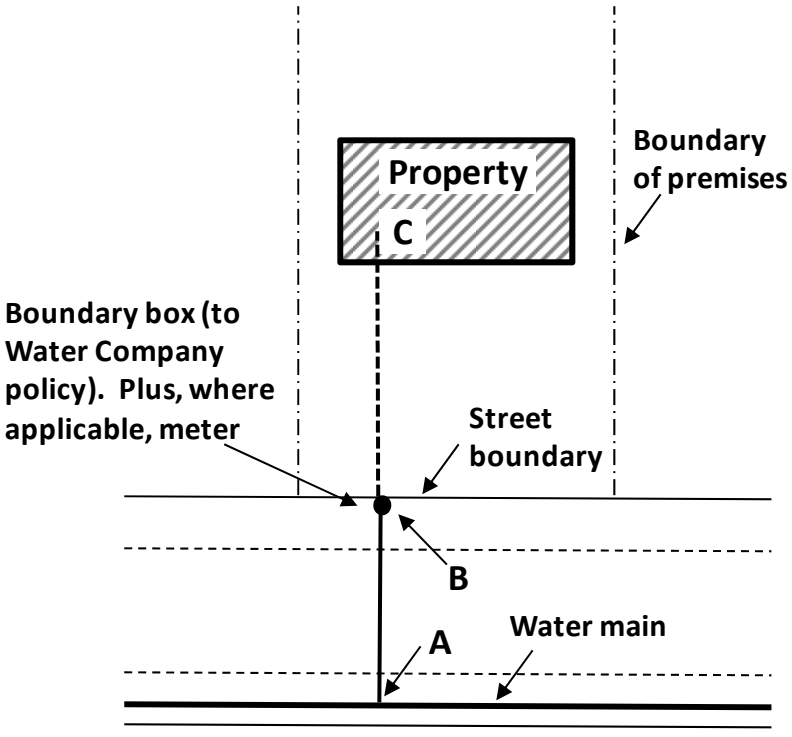
In accordance with the WAA, the Water Company shall obtain any required easements to protect its Network, or any future extension of such, and any related and/or incurred costs including third party costs shall be recovered by the Water Company in accordance with its published Charging Arrangements.

12. Service Pipe Design and Installation

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

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

Figure 1



SERVICE CONNECTION PIPEWORK	RESPONSIBILITY		REGULATIONS
	INSTALLATION	MAINTENANCE	
A – B Communication Pipe	SLP	Water Company	Water Supply (Water Quality) Regulations 2016
Boundary box (plus, where applicable, meter)	SLP	Water Company	
B – C Supply pipe	Developer	Property owner	Water Supply (Water Fittings) Regulations 1999 and Water Supply (Water Fittings) (Amendment Regulations) 1999
Internal plumbing	Developer	Property owner	

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

Additional guidance regarding the installation of new service pipes, as well as associated information related to insulation requirements and our metering policy can be found in our Fact Sheets:

- Fact Sheet - Laying a new Supply Pipe;
- Fact Sheet - Insulation, Ducting, and Capping;
- Fact Sheet - New Properties: Metering Policy.

Note: Our Fact Sheets are currently available on request developerservices@seswater.co.uk. These are currently in the process of being made available on our website, once this is concluded, this document will be updated.

12.1 Routing, Positioning and Location

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

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

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

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

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

Joint communication pipes may be used to reduce road crossings however each property must receive an individual supply pipe and meters.

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

12.2 Depth of Services

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

Service pipes shall be laid with an even grade where possible, with cover between a 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 1.0metre on each side of the boundary box.

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

12.3 Sizing of Services

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

Service Pipes shall be sized to ensure velocity is $\leq 1.0 ms^{-1}$ and that total headloss is $\leq 3.0 mH$

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

The table below is indicative of the typical size of pipe for a given number of dwellings. The values given should not be a substitute for conducting an adequate hydraulic assessment considering all other factors.

No. of Dwellings	Typical o/s Diameter of PE Pipe (mm)
1	25
2	32
3-5	50
5-20	63
21-40	90

12.4 Location of Boundary Boxes

The Boundary Meter Box will be installed as near as is practicable to the proposed highway boundary to allow for ease of access and to provide an unambiguous boundary between SES Water's pipework ownership and the customers. Additional guidance regarding the installation of new service pipes, as well as associated information related to insulation requirements and our metering policy can be found in our Fact Sheets:

- Fact Sheet - Laying a new Supply Pipe;
- Fact Sheet - Insulation, Ducting, and Capping;
- Fact Sheet - New Properties: Metering Policy.

Note: Our Fact Sheets are currently available on request from developerservices@seswater.co.uk. These are in the process of being made available on our website, once this is concluded, this document will be updated.

Further policy and requirements on external boundary boxes and their location is detailed in the Schedule of Permissible Materials and construction in paragraph 21

In non-contaminated ground:-
Single, double, and/or multiple port manifolds boundary boxes can be used in conjunction with screw in meters. The boundary box (sealed type) must be able to incorporate a manifold meter with 1.5 inch (40mm) thread, stop tap and non-return valve. All boundary boxes must have height and slope adjustment capabilities and be WRAS approved.

When sited where vehicular traffic will pass over the box the specification is for a trafficable surface box (typically grade B compliant with relevant aspects of BS 5834).

The use of a 6 port manifold box when the number of service pipes converging at an accepted location number is in excess of two services is a preferred standard.

For single services: the current specification for a standard boundary box is a below ground boundary box with sealed telescopic plastic raised manifold'.

For 6-port multi manifolds our current specified standard is a below ground boundary box with rigid plastic base.

Additionally, for when in contaminated ground:-

Boundary boxes (sealed type) used on contaminated sites shall comply with WIS-4-37-01. They shall be watertight and have gunmetal connection fittings that are able to accept either barrier pipe or plastic coated copper pipes.

All internal parts (i.e. meter carrier, ferrule) shall be made of brass.

6 port manifolds shall be made up from brass and copper and, when applicable, be sited in a suitably-sized chamber comprised of pre-cast concrete sections (or approved composite alternative).

Our current specified standard is for a sealed telescopic gunmetal base manifold.

12.5 Supplies to Multi Occupancy Buildings

It is SES Water's preference that separate service pipes are provided to individual properties within our supply area. In some circumstances we allow bulk meters to be installed at the property boundary, in these situations water charges will be levied against the landlord / management company and not individual units. Additional guidance regarding water supplies for multiple occupancy buildings can be found in our Fact Sheets:

- Fact Sheet - Laying a new Supply Pipe;
- Fact Sheet – Multiple Occupancy Dwellings;
- Fact Sheet - Insulation, Ducting, and Capping;
- Fact Sheet - New Properties: Metering Policy.

12.6 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.

Each property should be individually metered. Internal manifolds should be installed to house the meters to the individual properties.

These should be installed:
• in an area of common access, collectively mounted in a separate cupboard or enclosure - If the cupboard is to be locked then only with the same system in common usage for gas and electricity meters, preferably with standard FB2 locks.
• Or in a readily accessible area of a plant room.
• At a height no greater than 1500mm or no less than 300mm from the finished floor level to the meter sockets. In large properties, several metering installations in different locations may more effectively serve the layout, this is acceptable.

Additional guidance produced by SES Water for buildings with tanks and internally pumped supplies can be found in our Fact Sheet:

- Fact Sheet – Multiple Occupancy Dwellings.

12.7 Additional Requirements for Supplies to Buildings Other Than Domestic Dwellings

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

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

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

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

All exceptional non-domestic supplies should have a logged meter for leakage purposes, Exceptional can be defined as:

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

To facilitate the installation of these loggers, SES Water shall be consulted when new supplies are proposed for exceptional non-domestic customers.

13. Civil Engineering Considerations

13.1 General

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

SES Water requirements by reference to CESWI and any additional specific requirements are as follows:

- Thrust Restraint and Anchorage
  - No additional specific requirements
- Puddle Flanges
  - No additional specific requirements
- Self-Anchoring Joints
  - No additional specific requirements
- Site Conditions and Ground Bearing Capacities
  - No additional specific requirements
- Thrust Blocks
  - All thrust blocks shall be designed and constructed by the SLP.
  - The SLP and/or its appointed designer shall supply details of designs with supporting calculations to SES Water.
- Jointing of pipes
  - Where Polyethylene mains are used, a fully welded jointing system shall be used, and the number of joints minimised. Butt fusion joints must be used, but where inpractical to do so, the limited used of electrofusion couplings shall be allowable. Mechanical joints shall be limited to flangework associated with valve and hydrant apparatus.

- Ground Anchorage
  - No additional specific requirements

13.2 Marker Tape and Tracer Tape

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

13.3 Indicator Posts and Marker Plates

Indicator Posts and Marker Plates to be compliant with CESWI.

13.4 Chambers and Covers

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

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

13.5 Bedding and Backfill

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

13.6 Reinstatement of Highway

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

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

13.7 Ducts

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

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

Service pipe ducting where extending into building to form part of the service entry must facilitate the installation of insulation to Water Fitting Regulations. Pipes entering buildings at the approved depth should be passed through a duct and each end of the duct must be sealed. It is important the ends are sealed to prevent against entry of fluids, vermin and insects. Where pipe is ducted it must be one continuous length of pipe and joints are allowed within the ducted length in order to assist with future maintenance and access. Ducting shall be preferably blue, however black ducting may be utilised but must be marked. Our preference is for twin walled corrugated ducting that is non perforated (ie not drainage duct).

Where the incoming pipe enters the building at a distance of less than 750mm from the external face of the wall, the pipe should be insulated within the duct. Where the incoming pipe passes through a vented or unvented airspace, such as below an internal suspended lower floor, the pipe should be fully insulated in that air space. Thermal insulating materials

should be of the closed cell type complying with BS 5422 and be installed in accordance with BS 5970. Insulation must be able to prevent water from freezing for between 12 to 18 hours, depending on local conditions. Some of the types of insulation materials relating to the thermal conductivities are as follows:

- Less than 0.020 W/(m.K) Rigid phenolic foam.
- 0.020 to 0.025 W/(m.K) Polisocyanurate foam and rigid polyurethane foam.
- 0.025 to 0.030 W/(m.K) PVC foam.
- 0.030 to 0.035 W/(m.K) Expanded polystyrene, extruded polystyrene, cross-linked polyethylene foam, expanded nitrile rubber and improved polyethylene foam.
- 0.035 to 0.040 W/(m.K) Standard polyethylene foam, expanded synthetic rubber and cellular glass.

For a given thermal conductivity of insulation material, the smaller the diameter of the pipe, the greater thickness of insulation will be required; likewise for a larger diameter pipe thinner insulation is needed. For more precise information, a thermal calculator is provided on the Water Regulations Advisory Scheme's website - please visit www.wras.co.uk.

Laying Water Mains in ducts should be avoided and will only be considered in exceptional circumstances, for example:

- at road crossings where damage by construction traffic is a risk.
- Crossing under third party infrastructure such as railway or water course where the design is approved by the operating authority.
- at road crossings where main is to be laid particularly deep (i.e. where shuttering required)
- where longitudinal ducts facilitate site access

Where a Water Main is laid in a duct, it should be highlighted on the as-laid drawing submitted to SES Water

14. Metering Requirements

14.1 Standard Domestic Metering for Individual Dwellings and Multi Occupancy buildings

Our preference is to have all water meters installed externally, in the footpath. Where this is not practical, it is sometimes permissible to install water meters internally to the property. Note: installations such as these would need to be inspected by our Water Regulations team to ensure compliance prior to connection. External meters should be installed as close to the boundary between the SES Water Communication Pipe and the customers Supply Pipe as possible.

Additional guidance regarding our metering policy including typical metering arrangements can be found in our Fact Sheet:

- Fact Sheet - New Properties: Metering Policy;
- Fact Sheet – Multiple Occupancy Dwellings.

Note: Our Fact Sheets are currently available on request from developerservices@seswater.co.uk. These are in the process of being made available on our website, once this is concluded, this document will be updated.

15. Water for Firefighting

15.1 Fire and Rescue Service (FRS) Consultation

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

Water Companies to 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.

15.2 Location and Flow from Hydrants

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

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

Adopted Fire Hydrant must be positioned after liaison and agreement with the relevant Fire Authority.

The designer should endeavour to position Fire Hydrants so that they may also be used effectively and safely for operational purposes, so as to minimise installations and street furniture 'clutter.' Fire hydrants should be positioned clear of vehicular traffic routes or parking areas where practicable. Where possible the siting of hydrants on branches should be avoided and alternative locations sought.

15.3 Dedicated Fire Mains

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

15.4 Fire Sprinkler Systems

In the absence of any information from the Water Company, SLP Designers shall refer developers to the polices within the building regulations when requests for sprinklers are

being made, these documents, “Document B (Fire Safety) –Volume 1: Dwellings and Volume 2: Buildings other than Dwelling houses”, can be obtained on the UK Government Planning Portal at http://www.planningportal.gov.uk/buildingregulations/

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

Domestic fire sprinklers are increasingly being used across the UK in both new and existing homes to reduce loss of life and injury, as well as, property damage in the event of a fire. However, it is essential that the plumbing arrangements of the sprinkler systems are installed correctly to ensure they will function when required, and to prevent cross contamination with the drinking water supply.

Any domestic sprinkler system fitted in our area of supply must meet our minimum requirements which are outlined in our Fact Sheet. Our guidance regarding this, alongside a typical diagrammatic representation of an acceptable system can be found in our Fact Sheet:

- Fact Sheet - Fire Sprinkler Systems.

Note: Our Fact Sheets are currently available on request from developerservices@seswater.co.uk These are in the process of being made available on our website, once this is concluded, this document will be updated.

16. As Laid (As Constructed) drawings

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

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

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

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

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

Surveys for Self-Lay Works shall be carried out using triangulation, i.e., two measurements taken from fixed features. They should intersect at the centre of the asset in the following order of priority;

- corners of buildings, and
- corners of boundary walls

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

- building lines, and
- kerb lines

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

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

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

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

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

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

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

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

17. Self-Laid Main and Services Commissioning

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

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

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

17.1 Mains Flushing

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

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

Note: Operation of existing valves shall only be undertaken by SES Water.

The SES Water 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 SES Water who reserves the right to revert to a flushing regime operated and managed by SES Water with costs recovered.

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

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

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

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

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

Example guidelines

Pipe size (mm)	Internal diameter (mm for PE)	Imperial equivalent	Area 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

17.2 Not used

17.3 Mains Bacteriological Sampling

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

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

We require a copy of the disinfection certificate and sample results at least two working days before the connection date.

In the event that SES Water guidance is not followed, the SLP may need to re-disinfect and sample pipe(s) at your own cost, which may also result in your new connection being delayed.

The sample results of the post flush sample(s) should include on-site free and total chlorine residual, total coliforms and E.coli, qualitative taste & odour, turbidity (or visual appearance) and pH.

Chlorine measurement must be undertaken on site. Qualitative taste & odour and turbidity may be undertaken on site or submitted to a laboratory. Total coliforms and E.coli must be submitted to a 'UKAS' accredited laboratory.

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 SES Water.

All activities are to be carried out in accordance with Principles of Water Supply Hygiene & technical Guidance Notes: (https://www.water.org.uk/guidance/principles-of-watersupply-hygiene/).

Prior to accepting a request for any Final Connection to the Network, SES Water 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, SES Water 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 SES Water 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 SES Water to provide (at reasonable cost) any such support services

17.3.1. Hygiene and procedure for Mains Chlorination

Designers, constructors, and operators of water networks should be alert to all the possible opportunities for contamination to enter supplies and take all reasonable precautions to minimise the risk. They should equally avoid circumstances where water in the mains can deteriorate through stagnation or long contact with particular materials e.g. cement mortar pipe lining. The design and specification of the network can itself significantly reduce most of these risks.

As part of the installation process for any new main or service connection, the SLP or Developer should adopt the following good practice:

1. Pipes and fittings must be transported and carefully stored on site, off the ground, to avoid entry of dirt or vermin. All pipes must be supplied with closefitting end caps where feasible and these must remain in place until the pipe is laid. All pipes and fittings (and in particular, plastic types) must be kept clear of fuel oils, and any materials so contaminated should be discarded.

2. All fittings and pipe ends must be sprayed with a solution of 1000 mg/l free available chlorine as they are laid.

3. Care must be taken to prevent water, subsoil or other material entering a pipeline under construction. It must not be assumed that such material will be flushed out on commissioning. Additional cleaning measures (e.g.: swabbing) and inspection techniques (e.g.: CCTV) must be considered prior to commissioning on larger diameter mains.

4. Swabs may be useful for clearing a new main of any dirt or debris that has entered, and the use of a chlorinated swab may be appropriate if any form of contamination is suspected. However, a chlorinated swab is only an intermediate measure and is not a substitute for disinfection.

Under the Water Supply (Water Fittings) Regulations 1999, you are required to disinfect your underground pipe work prior to connection. Disinfection must be carried out to BS EN 806.

For further details and clarification, please refer to the BS EN 806, the Regulations1 and Sections G13 and R13 of the Defra Guidance Notes 2

The Principles of Water Supply Hygiene document 3 sets out the principles to be considered in drawing up operational procedures for maintaining safe and wholesome drinking water supplies with specific focus being given to hygiene. This includes guidance on new mains, preparation of chlorine solutions and disposal of chlorinated water.

Following installation and prior to any connection into the SES Water network the SLP or Developer should ensure that all New Mains, Service Connections and Service Pipes are disinfected in accordance with the code of good practice detailed in the Principles of Water Supply Hygiene Technical Guidance Note 2, as follows:

New Mains, Service Connections and Service Pipes > 63 mm OD and > 6m in length:

After installation and before use, water mains must be flushed until visibly clear.

Chlorination must be carried out a maximum of ten days before the connection date.

The pipe shall be flushed, filled with chlorinated water to not less than 50mg/l and allowed to stand for 1 hour.

The level of chlorine shall be recorded; the residual at the end of this period should not be less than 45mg/l. If it is less than 45mg/l then the pipe should be re-flushed and chlorinated.

The chlorinated water should be flushed out until the chlorine residual has returned to the original background level of the incoming water supply and the pipe refilled. All highly chlorinated water must be dechlorinated before discharge. Guidance for the safe disposal of chlorinated water can be found within the Principles of Water Supply Hygiene Technical Guidance Notes1.

After standing for 30 minutes a sample is taken and on-site tests are undertaken.

If a disinfectant other than chlorine is used it must be listed in the Drinking Water Inspectorates List of Approved Products and Processes. The chlorination certificate must clearly state that the disinfection has been carried out in accordance with BS EN 806.

No New Main, Service Connection or Service Pipe shall be brought into service until the contents of the main have been tested successfully for bacteriological, chemical, taste, odour and appearance. The SLP or Developer should ensure that the appropriate samples are taken and analysed in a suitable UKAS accredited analytical laboratory.

Chlorination certificates and certificates of analysis from the UKAS accredited laboratory shall be made available to SES Water

The chlorination certificates and certificates of analysis must be assessed by SES Water Quality and Compliance team. No new main, shall be connected to the SES Water Network until approval has been granted by the Quality and Compliance Team.

The criteria for passing new mains samples is stated in the following table:

Test Parameter	Unit	Standard
Total Chlorine (residual)	mg/l	0
Total coliforms	No. per 100ml	0
Total E.Coli	No. per 100ml	0
Turbidity / Appearance	NTU	<4NTU
pH	pH units	6.5-9.5
Taste & odour	Dilution No.	Clear / Mild Chlorine
Plate count (also known as Total Viable Count)	37Degree C-2 day and 22Degree C- 3 day (optional)	0

If the New Main is not brought into service within 14 days of a satisfactory sample having been taken, the main should be flushed with mains water and re-sampled. If contamination is suspected, then the main should be chlorinated and re-sampled.

Service Connections and Service Pipes 15 mm – 50 mm OD:

All new service connections must, as a minimum, be pressure tested and flushed with mains water before use.

Service Connections and Service Pipes > 50 mm OD:

In addition, service pipes above 50mm in external diameter require disinfection, although water quality samples will not normally be required. Proof of disinfection must be provided and approved by SES Water Quality and Compliance team prior to connection to the SES Water network.

No connection to the SES water Network will be made until approval has been granted by the SES Water Quality and Compliance team

If the disinfected Service Connection or Service Pipe is not commissioned and brought into supply within 14 days of completing disinfection, the disinfection process should be repeated prior to commissioning as it is considered that deterioration of water quality may have occurred within this period.

Service Connections and Service Pipes > 63 mm OD:

Further to above, service pipes 63 mm and above in external diameter should be treated as a New Main and as such will require disinfection, and water quality samples, under the arrangements for New Mains stated above.

The party that will undertake the connection of the New Main or Service must not do so until the SLP or Developer has provided proof that the correct disinfection procedure has been followed and satisfactory samples, where required, have been taken.

Documentation that details the results of samples taken and a formal approval from the SES water Quality and Compliance team team that confirms that the results or samples meet the acceptance criteria is also required.

SES Water reserves the right, should the need arise, to contact directly any analytical service provider or chlorination company used by a developer or SLP in order to verify any documentation provided to the Quality and Compliance team prior to any approval being granted for connection to the SES Water Network.

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

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

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

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

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

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

17.4 Pressure testing of Self-Laid Main

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

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

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

All testing shall be carried out in accordance with IGN 4-01-03, reference should also be made to the Civil Engineering Specification for the Water Industry (CESWI) (with Additional Clauses) and any specific Water Company requirements specified additionally in paragraph 21 Schedule of Permissible Materials and construction.

The following also applies:

1. After pressure testing and flushing, service pipes and mains shall be chlorinated when either:
    - Service pipes 25mm,32mm and 50mm where the lay length is longer than 50m.
    - The service pipe is of diameter 63mm where the lay length is longer than 10m.
    - All service pipes greater than 63mm.
    - Where it is suspected that ingress may have occurred, such as flood water, sewage, drainage or animals.

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

3. 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.

18. Water Company Key Contacts

Key contacts are published on our website. Alternatively general enquiries in the first instance may be sent to developerservices@seswater.co.uk.

19. Local Practices

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

19.1 Meter Pairing and Commissioning

Not applicable

19.2 Timing of the Generation of Plot Reference Numbers

Plot Number shall be presented upon the application process.

Upon the vesting of the mains, the SLP shall present the Local Authority confirmation and post office address notification of full address and UPRN.

Where the information is available, the SLP shall also forward on the customer information for water billing purposes.

19.3 Water Company Design Service Offerings

SES Water offer a service of designing new water mains and services for development sites. This can be requested at application stage. The details for the charges for this service can be found in our current charges document or on our website.

19.4 Design Self-Certification Scheme

Not applicable

20. Design and Construction Specification Appendices

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

21. Schedule of Permissible Materials and Construction

21.1. Puddle Flanges

Puddle Flanges shall comply with SES Water requirements:

1. Pipes with puddle flanges shall be supplied in all cases where the pipework passes through sub-structures or structures designed to retain water. Where puddle flanges are required to carry thrust they shall be cast integrally with the pipe or welded to the pipe and designed to withstand the maximum force taking into account of maximum test pressures and all other loadings on the pipe. Clamp type puddle flanges are not permissible where required to carry thrust.

21.2 Site Conditions and Ground Bearing Capacities

Site Conditions and Ground Bearing Capacities shall comply with SES Water requirements:

1. Adequate supporting arrangements for all pipes and valves shall be provided. Where pipework is installed either vertically or at significant slopes the vertical supports shall be designed to carry the total weight of the pipe and contents.

2. The SLP shall supply brackets, saddles, hangers, clamps, supports, anchors, clips, fastenings, straps and fixings to fix the pipe runs to the civil structure. All supports shall be protected against corrosion or fabricated from a corrosion resistant material. All fixings to the pipework shall be fitted with neoprene strips to ensure that paintwork is not damaged. Support material of construction shall either be metal or concrete.

21.3 Thrust Blocks, Thrust Restraint and Anchorage, Self-Anchoring Joints, and Ground Anchorage

Thrust Blocks, Thrust Restraint and Anchorage, Self-Anchoring Joints, and Ground Anchorage shall comply with CESWI clause 5.6 Thrust Blocks and SES Water additional requirements:

1. A ground check is to be carried out to confirm that design ground conditions are similar to those found on Site and if different then the design is to be revised accordingly.
2. For pressure mains where the gradient is steeper than 1 in 6, a self-restraining joining system or anchor blocks should be used. Where anchor blocks are proposed these should be designed to suit the loading from the main and the local ground conditions.
3. The Contractor shall not remove or interfere with any thrust block, restraint or support on a live main, valve or fitting unless adequate temporary restraints or supports have been provided.
4. Where pipes, bends, tees, blank ends and other fittings have been installed, repaired, renewed, altered or disturbed the Contractor shall design and install an appropriate thrust block taking into account the proximity of other services, the operating pressure of the affected apparatus, the bearing capacity of the surrounding ground and the period in which SES Water requires the pipeline to be re-pressurised.
5. In repair scenarios or where fittings have to be removed and replaced and the water supply restored as quickly as practicable, adequate thrust restraint shall be provided that will be effective within the timescale of the re-pressurisation. This may take the form of:
   a. Mechanical couplings/flange adaptors with integrated restraint systems (Type 2 in accordance with WIS 4-24-01 for PE or WIS 4-21-02 for Iron Pipes).
   b. Thrust blocks or other adequate supports bearing against undisturbed ground. All materials used shall be non-biodegradable In the circumstances of (a) it must be taken into account that this relies upon transferring the thrust from the new fitting into axial tension (Type 1 in accordance with WIS 4-24-01 offers axial restrains) within the existing pipework and this force is only restrained by the

friction between that pipe and the surrounding ground and the presence of an unrestrained pipe joint near the connection may mean that the length of existing pipe may be insufficient to absorb the transferred thrust. Therefore, additional measures such as (b) above should also be considered dependent upon mains pressure and the level of thrust generated by the fitting type.

6. All pipes, valves and fittings installed by the Contractor shall be adequately supported and restrained to resist a working pressure compatible with 1.5 times the pressure rating of that pipe, valve or fitting allowing for surge, before the pipe, valve or fitting is re-pressurised and backfilled.
7. Concrete support blocks shall be cast to hydrant tees, duckfoot bends and sluice valves installed in MDPE/HDPE pipelines in order to resist the operational torque imposed on the fittings during operation. Support blocks shall be cast in such a manner so as not to interfere with the operation or maintenance of the apparatus.
8. Anchorage is not necessarily required at junctions or bends where a fully integrated fusion weld PE pipe system is in place (refer to the “Manual for PE Pipe Systems for Water Supply” published by WRc). Anchorage is required for end Fire Hydrant or Washout Hydrants even if temporary.

21.4 Mains Jointing

Pipelines constructed from ductile iron can be joined by push-fit, mechanically anchored flexible systems or, by flanges (when space is limited such that a thrust blocks may be eliminated, ground conditions are unsuitable, or the presence of existing services or there is a risk of disturbance of services) such that thrust blocks are unsuitable.

Flanges shall not routinely be used for below ground jointing applications due to lack of flexibility and propensity to allow leakage from pulled joints or breaks in the pipeline. The use of flanges as a joint shall therefore only be when the above paragraph applies and hence we have approved such prior to works commencing.

For PE pipe construction, all welded joints should be made above ground and only mechanical joints should be made underground. PCV pressure pipes, joints and fittings shall comply with the relevant provisions set out herein.

PE pipe should be designed to be laid using one continuous coil length to minimise the number of joints required. PE pipe of nominal bore 150mm diameter and greater must be laid in 6 m lengths and welded together.

Pipe Jointing shall comply with CESWI clause 5.7 Pipe Jointing Generally and SES Water additional requirements:

1. Unless authorised by SES Water, all joints to PE pipe shall be made using automated butt fusion or Electrofusion or mechanical fittings intended for PE of minimum Type 2 (In accordance with WIS 4-24-01) end load restraint rating. (See also CESWI clause 5.8 Welded Joints in Polyethylene Pipes). Mechanically jointed flange adaptors of metallic construction should be utilised to make flanged connection to PE pipe in preference to using PE stub flanges. If PE stub flanges are used, then for any flanged joints operating above 10bar or larger than DN 300, reinforced flange gaskets shall be utilised.

2. Mechanically sealing under pressure tees (DN 80 mm branch size or larger) shall not be used to make connections to PE mains. Such joints shall only be made using Electrofusion branch saddles installed by authorised teams meeting the requirements of CESWI clause 5.8 Welded Pipes in Polyethylene Pipes additional requirement 1.
3. Connections to PE mains pipes that have been previously in service (e.g. for repairs or branch connections) shall only be made using mechanical couplings or flange adaptors. Electrofusion shall NOT be utilised in these circumstances.

Welded Joints in Polyethylene Pipes shall comply with CESWI clause 5.8 Welded Pipes in Polyethylene Pipes and SES Water additional requirements:

1. Jointing PE pipe with electrofusion couplers will only be authorised by SES Water subject to: (i) evidence of appropriately trained, equipped and accredited welders undertaking that work, (ii) On PE pipe larger than DN 400mm the welding personnel and the equipment being satisfactorily audited by an external expert organisation approved by the Employer (e.g. Exova) and approved before any joints are made which would form part of the finished asset. (iii) All jointing procedures being fully in accordance with the fittings manufacturer's instructions. Electrofusion couplers larger than DN 630mm shall not be utilised to joint PE pipe without specific written authorisation from the Employer.
2. Sample joints shall be made and witnessed then subsequently tested in accordance with WIS 4-32-08 to ensure adequate standards of toughness and ductility. Where these joint samples are determined to have failed then corrections to equipment and process shall be made to ensure satisfactory joints and no such joints shall be included in the Works until satisfactory test results have been obtained. Where a change of welding equipment or personnel is made within the duration of a scheme then further independent testing shall be required to validate the performance.
3. For Schemes laying pipe in excess of DN 315 mm using Electrofusion further site audits shall be undertaken on the basis of one per 0.5km of pipe laid.
4. For schemes laying pipe in excess of DN 450 mm dia using butt fusion jointing, the welding personnel and equipment shall be initially audited as per paragraph 1 above.

Table 21.5.1: Material Compliance

5.

Service	Size Range	Pipe Material
Buried Pipelines for Conveying Water for Public Supply	Up to & including DN 300	Ductile Iron High Performance Polyethylene
	Greater than DN300	Ductile Iron
Above Ground Pipework and within Structures	Up to & including DN 300	Ductile Iron

Table 21.5.2: Material and Compliant Standard

Material	Compliant Standard
Mains on new development sites	HPPE PE100. BS EN 805:2000 Water supply. Requirements for systems and components outside buildings.
Mains on new development sites (contaminated land)	BS EN 12201:2011 Plastics piping systems for water supply, and for drainage and sewerage under pressure. Polyethylene (PE).
Service pipework on new development sites 25-63mm OD	MDPE PE80 BS EN 12201:2011 Plastics piping systems for water supply, and for drainage and sewerage under pressure. Polyethylene (PE) (all parts). Polyethylene piping systems for water supply shall comply with BS EN 12201-1 and BS EN 12201-2. Polyethylene fittings for use with cold potable water shall comply with the relevant provisions of BS EN 12201-3. Electrofusion fittings shall comply with the relevant provisions of BS EN 12201-3.
Service pipework on new development sites	BS EN 12201:2011 Plastics piping systems for water supply, and for drainage and sewerage under pressure. Polyethylene (PE).
25-63mm OD (contaminated land)	WIS 4-32-19 2007: Polyethylene Pressure Pipe systems with an Aluminium Barrier layer for potable water supply in contaminated land.
Ductile Iron Pipe above 300mm only	Ductile iron pipes, fittings and joints shall comply with BS EN 545:2010 Ductile iron pipes, fittings, accessories and their joints for water pipelines. Requirements and test methods IGN 4-21-01 Ductile iron pipes
Ductile Iron Pipe Fittings	Ductile iron pipes, fittings and joints shall comply with BS EN 545:2010 Ductile iron pipes, fittings, accessories and their joints for water pipelines. Requirements and test methods.
Fire Hydrants and Washout Hydrants	BS 750: 2012 Specification for underground fire hydrants and surface box frames and covers. 2.5 stainless steel London Round thread design, clockwise closing. BS EN 3251 Indicator Plates for Fire Hydrants and Emergency Water Supplies.
Under Pressure Tees	BS 8561: NB only Class A- full body tees shall be used for connection to live networks.
Sectional Chamber Systems, polymer or concrete	BS 750: 2012 Specification for underground fire hydrants and surface box frames and covers. Dimensionally compliant with BS 5834:2011 Surface boxes, guards and underground chambers for the purposes of utilities. BS EN 750 Underground Fire Hydrants and Surface Box Frames and Covers
Material	Compliant Standard

<table>
<tr><td>Mechanical Couplings and Flange Adaptors for rigid pipe materials (not PE)</td><td>Mechanical couplings and repair clamps for iron pipes shall comply with 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)</td></tr>
<tr><td>Resilient Seat Gate Valves</td><td>Ductile Iron BS EN1563 blue fusion bonded epoxy powder coating in accordance with WIS 4-52-01. Internal to class A and external to Class B.
Anti-clockwise closing unless specified for the York Area.
Wedge or gate valves for water supply purposes should be selected with the operational and design features described in BS 5163: 2004 Valves for waterworks purposes. Stem caps for use on isolating valves and associated water control apparatus.</td></tr>
<tr><td></td><td>Isolating valves for water supply (includes wedge gate and butterfly).
Check/non-return valves for water supply. Air
valves for water supply.
Control valves for water supply.
All covered under BS EN 1074: Valves for water supply. Fitness for purpose requirements and appropriate verification tests.</td></tr>
<tr><td>Mechanical Couplings and Flange Adaptors for PE pipe (min Type 1 or 2 End Load Resistance required)</td><td>Mechanical joints and fittings for polyethylene pipes in nominal size 90 mm or above for use with cold potable water shall comply with WIS 4-24-01 (Mechanical fittings and joints for polyethylene pipes for nominal sizes 90 to 1000).
Mechanical joints and fittings for polyethylene pipes less than or equal to nominal size below 63 mm for use with cold potable water shall comply with WIS 4-32-11 (Thermoplastic end load resistant mechanical fittings for polyethylene pipes of nominal size) or BS EN 1254:2012 Copper and copper alloys. Plumbing fittings.</td></tr>
<tr><td>Water Meters</td><td>Elster only, including AMR output unit
<table><tr><th colspan="3">For DN15 manifold</th></tr><tr><th>Product</th><th>Specification / Information</th><th>Part No.</th></tr><tr><td>15mm Manifold RF</td><td>Q3 2.5 M3 with Factory Fitted TPR11 Wavenis Clip on</td><td>V210E25A70EMRMHLP LUR255</td></tr><tr><td>15mm Manifold</td><td>Q3 2.5 M3 Standard meter</td><td>V210E25A04EMRMXXFBB LUQTM 4157</td></tr></table>
<table><tr><th colspan="3">For DN15 in-line</th></tr><tr><th>Product</th><th>Specification / Information</th><th>Part No.</th></tr><tr><td>15 mm In-line RF</td><td>Q3 2.5 M3 In-Line with Factory Fitted TPR11Wavenis clip on</td><td>V200E25134B70EMRMBBHLP LUR256</td></tr></table></td></tr>
<tr><td>Stop Tap / Meter Boundary Boxes</td><td>The boundary box shall be able to incorporate a manifold meter with 1½inch thread, stop tap and non-return valve. All boundary boxes shall have height adjustment capabilities.
Small and large surface boxes shall comply with the relevant provisions of BS 5834:2011 Surface boxes, guards and underground chambers for the purposes of utilities, respectively,</td></tr>
</table>

Material	Compliant Standard
	or WIS 4-37-01 (Boundary boxes for the metering and control of domestic and small industrial water services). Surface boxes, guards and underground chambers for the purposes of utilities, respectively, or WIS 4-37-01 (Boundary boxes for the metering and control of domestic and small industrial water services). Precast concrete sections for chambers and base units for buried waterworks apparatus up to and including 600 x 450 mm clear opening, shall comply with BS 5834 and BS 5834. All sections shall be Grade A as defined in that Standard. Chambers of materials other than precast concrete shall meet the loading requirements in BS 5834. BS 6700:2006 Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages, applies to meter boxes and their installation WIS 4-37-01 covers the specification of boundary boxes for the metering and control of domestic and small industrial water services. All repair and connection fittings including those for use on with PE pipe shall comply with the requirements BS 8561. Mechanical joints and fittings for polyethylene pipes less than or equal to nominal size below 63mm for use with cold potable water shall comply with WIS 4-32-11 (Thermoplastic end load resistant mechanical fittings for polyethylene pipes of nominal size) or BS EN 1254:2012 Copper and copper alloys. Plumbing fittings.
Meter manifolds Gunmetal only external	Manifold body and components: Gunmetal to BS EN 1982:2008 Copper and copper alloys. Ingots and castings.
Stoptap/Meter Boundary Boxes Contaminated land	To WIS-4-37-01, be watertight and shall have gunmetal connection fittings. The unit shall incorporate a 1 ½" BSP meter connection, stop tap and non-return valve.
Surface Boxes	Covers and frames to be installed in carriageway or other areas with frequent passage of vehicles shall be to the minimum grade stated in BS EN 124:2015 Gully tops and manhole tops for vehicular and pedestrian areas or to BS 5834:2011 Surface boxes, guards and underground chambers for the purposes of utilities. Covers and frames to be installed in all other areas shall comply to BS EN 124:2015, or Grade B to BS 5834:2011.
Gunmetal Fittings (including manifolds)	Hydrants shall have a screwed outlet constructed of gunmetal or stainless steel in accordance with the requirements of BS 750.

Material	Compliant Standard
Large Covers and Frames for meter chambers, single man lift. For use in footways or areas exposed to light, infrequent traffic use	Grade B125 must be “lift and slide” type. Heavy duty 2 man lift. D400 Split triangle held in hinges as outlined on the sheet below. These are designed for use in the highway and occasionally traffic bearing footways/driveways. Covers and frames to be installed in carriageway or other areas with frequent passage of vehicles shall be to the minimum grade stated in BS EN 124:2015 to BS 5834:2011. Covers and frames to be installed in all other areas shall comply to BS EN 124:2015, or BS 5834:2011. WIS 4-37-01 covers the specification of boundary boxes for the metering and control of domestic and small industrial water services.
Flange Jointing Sets, i.e. fasteners and gasket. Fasteners shall be sheraplex coated	Gaskets shall be manufactured from material complying with the provisions of BS EN 681:2000 Elastomeric seals. Material requirements for pipe joint seals used in water and drainage applications. All fasteners shall be protected from corrosion by the application of zinc and a polymeric barrier coating in accordance with WIS 4-52-03 (Anti-corrosion coatings on threaded fasteners).

Note: Self-Lay Providers wanting to use other materials should submit a request to SES Water prior to any work starting on site.

22. Meter and Service Pipe Policy and Installation

SES Water’s Metering Policy is stated in section: 14 Metering Requirements and Service Pipes Policy in section: 12 Service Pipe Design and Installation.

23. Standard Arrangement Drawings

Available on request.

24. Construction Pre-Start Meeting Agenda

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

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

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

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

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

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

'**Pre-start information' includes as a minimum:**

1. Confirmed arrangements for CDM 2015 Regulations and other H&S requirements.
2. Future contact arrangements and authorised parties for giving instructions, agreeing "right day" for SLAs, making variations, and exchanging information regarding progress with all parties' works.
3. Confirmation of line and level of Self-lay Works.
4. Confirmation of national (Street-Works) and local (Water Company) design requirements.
5. Overview of process for dealing with variations/ and changes to the Site layout and associated approved design drawing (revisions and impact on design, co-ordination and charges etc.).
6. Confirm and detail the Source of Water for testing and mains connection Delivery Date.
7. Confirm latest design approved drawing, and any revision, and drawing for construction
8. Process for submitting as-laid drawings.
9. Identify any potential site hazards or constraints (such as existing Network considerations, including protection, diversion or renewal)

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

Appendix 1

WIS & IGNs

Number	**Title**	
WIS 4-08-02	Specification for bedding and sidefill materials	
IGN 4-37-02	Design against surge and fatigue conditions for thermoplastic pipes	
IGN 4-01-03	Guide to Pressure Testing of Pressure Pipes and Fittings for use by Public Water Suppliers	
IGN	4-01-03	Water Industry Information and Guidance note - Guide to Pressure Testing of Pressure Pipes and Fittings for use by Public Water Suppliers
IGN	4-08-01	Bedding and sidefill materials for buried pipelines
WIS	4-08-02	Specification for bedding and sidefill materials
WIS	4-21-02	Mechanical couplings and repair clamps for iron pipes for the conveyance of cold potable water (underground use) for the size range 40 to 1600mm
WIS	4-22-02	Specification for ferrules (tapping tees) and ferrule straps for underground use
WIS	4-23-04	Specification for underground stop valves, including spherical valves, for potable water services for nominal sizes up to and including 63 and nominal pressures of 10 bar minimum and made principally of metal or thermoplastics
WIS	4-52-03 & 4-52-03A	Specification for Anti-Corrosion Coatings on Threaded Fasteners. See also amendment 4-52-03A
WIS	4-32-08	Specification for the fusion jointing of polyethylene pressure pipeline systems using PE80 and PE100 materials..
WIS	4-32-11	Specification for thermoplastic end load resistant mechanical fittings for polyethylene pipes of nominal size < 63mm. Note with outside diameters to BS 5556 (metric)
WIS	4-37-01	Specification for boundary boxes for the metering and control of domestic and small industrial water services.

WIS	4-32-16	Specification for butt fusion jointing machines.
WIS	4-37-01	Specification for boundary boxes for the metering and control of domestic and small industrial water services (see also British Standards).
IGN	4-37-02	Design against surge and fatigue conditions for thermoplastic pipes.
IGN	4-50-03	Operating guidelines for the use of site-applied, factory applied, and reinforced factory applied polyethylene sleeving on ductile iron pipeline systems
IGN	4-51-01	External zinc coating of ductile iron pipe.
WIS	4-52-01	Specification for polymeric anti-corrosion (barrier) coatings.
IGN	4-52-02	The use of polymeric anti-corrosion (barrier) coatings.
IGN	9-04-05	Report of the expert group on the risks of contamination of the public water supply by backflow at: ***http://wras.co.uk***

British Standards (BS) & BS EN Standards

Number	**Title**
BS EN 124	Gully tops and manhole tops for vehicular and pedestrian areas
BS	
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.

Other documents

Number / Date	Title	
10/WM/03/21	Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites	
CESWI	Civil Engineering Specification for the Water Industry 7th Edition (or later version thereof) ("CESWI") together with any Water Company amendments (to be published on Water Company website with DCS).	
2009/03	Guidance Note On Notification of Methods of Reinstatement using EToN available at: http://hauc-uk.org.uk/	
Published January 2014	Contaminated Land Assessment Guidance: Protocols Published by Agreement Between Water UK and the Home Builders Federation https://www.water.org.uk/guidance/contaminated-land-assessment-guidance/	
Water UK/HBF National Joint Committee 2014 (available free of charge at: http://www.water.org .uk/p ublications/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=3f1 8c87a-d62b-4eca-8ef4-9b09309c1c91*
Report 128	Guide to the Design of Thrust Blocks for Buried Pressure Pipelines	CIRIA, 1994 Available at: *http://www.ciria.org/ItemDetail?iProductCode=R128&Category=PHOTOCOPY*
HSG 47	Avoiding Danger from Underground Services	HSE Books, 2014 Available free of charge at: *http://www.hse.gov.uk/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*