

Mains Design and Construction Guidelines for Self-Lay Providers

New Development Sites

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It's part of our
Blueprint for Yorkshire



YorkshireWater



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Introduction

This document aims to assist developers and self-lay organisations (SLP) at the application and design stage of a new development by giving clear guidance on what Yorkshire Water (YW) considers to be good design practice, and acceptable pipework layouts. It should assist with avoiding unnecessary delays early on in the application process and unforeseen costs during the construction phase. It is based on industry wide guidance from the National Joint Utilities Group (NJUG).

It is intended for use by designers, developers, architects, surveyors, contractors and self-lay organisations (SLP) working within the Yorkshire region.

This document is an addendum to 'The Code of Practice for the Self-Laying of Water Mains and Services – England and Wales' and sets out to give clear and concise guidance for developers and self-lay organisations (SLP) working within the Yorkshire region.

Failure to comply with YW design requirements or failure to disclose any land rights access or easements requirements during the application phase could delay or prevent your approval.

Designers requiring access to the YW web mapping system can do so by following the link, <https://www.yorkshirewater.com/developers/services/our-self-lay-services#ls5>, and filling in the application form and sending the request to: webmapping@yorkshirewater.co.uk. Please allow 10 working days for access.

Mandatory Requirements

Anything not specified in this document shall comply with:

- The Code of Practice for the Self-Laying of Water Mains and Services – England and Wales;
- Relevant British Standards;
- Civil Engineering Specification for the Water Industry (CESWI) - latest edition;
- All materials and products must comply with Regulation 31 of the Water Supply (Water Quality) Regulations 2000;
- Water Supply (Water Fittings) Regulations 1999.

Where there is a conflict the order of precedence will be:

- This document;
- The Code of Practice for the Self-Laying of Water Mains and Services – England and Wales;
- British Standards;
- CESWI.

Where there is a conflict then guidance should be sought from YW.

Design Principals

1. General Information

1.1 Point of Connection

The Point of Connection will be provided by YW upon application. The final connection will be made following a successful pressure test and water quality sample results pass.

1.2 Routing, Positioning and Location of Mains

Water mains shall be installed at a minimum depth of cover as defined in the table below. Advice should be sought from YW if these depths cannot be achieved.

Systems should be designed to provide operational flexibility and to prevent disruption to existing customers in the event of any loss of supply. Dual mains should be considered where multiple service crossing are designed on a development to reduce ongoing maintenance costs.. Please check with Yorkshire Water for advice where this is the case.

Diameter range	Surface construction / Minimum depth of cover to mains			
	Agricultural land including open fields	Grassland including rural and urban verges	Type 3/4 Rural / Suburban highways including secondary / minor roads and footways	Type 2 Urban highways and above
Services up to and inclusive of 50mm (2")	750mm	750mm	750mm	750mm
Small Diameter network mains 63mm – 200mm (8")	900mm	750mm	750mm	900mm
Large diameter mains 200mm and above	900mm	900mm	900mm	900mm

Table 1 gives guidance on minimum depth of cover

Wherever practicable, mains shall be laid in such a position that they shall not interfere with access to other utility apparatus (including sewers). Other utility apparatus shall be positioned with similar regard to water mains. Guidance can be found in the 'NJUG Guidelines on the Positioning and Colour Coding of Underground, Utilities, Apparatus: Volume 1' for laying services on new developments.

Dead ends should be minimised, but where these are unavoidable flushing facilities should be available.

Water mains on new development sites should only be laid in the standard minimum 1.8m service strips identified by developers, not in the 0.6m service verges, when this is not possible, mains should be laid within the adopted highway.

New mains are to be laid down one side of the highway only, in the footpath/verge wherever possible. Mains should be installed on the side which has the most properties, to reduce the number of road crossings and the length of communication pipe in the carriageway. When multiple supplies are required to cross a road, a main can be laid across the road and laid in the opposite footpath terminating in an end hydrant (see figure 7).

Mains should only be laid in adoptable areas. The laying of mains in private gardens, private streets or on easements on new developments is to be avoided, except in exceptional circumstances.

1.3 Routing, Positioning and Location of Supply Pipes

Supply pipes shall be installed at a minimum depth of 750mm cover. Advice should be sought from YW if these depths cannot be achieved.

Supply pipes should be laid under grassed areas where possible and not be laid beneath drives and parking areas.

1.4 Fittings

Inline sluice valves should be installed every 50 properties or every 80m whichever is the least distance, to minimise disruption to customers' supplies in the future.

Isolation valves should be located after the connection to the live main or immediately following a branch. Valves should not normally be inserted where the pipe diameter or material changes, but can be used at the end of a phase to prevent a shut off when the next phase is connected, sacrificial spade valves may also be used for this purpose.

Both washouts and sluice valves should be located in the footpath/verge, NOT in the carriageway (whenever possible). Bear in mind each sluice valve/washout has an extra installation cost and future maintenance cost. Surface boxes for valves and washouts cost more to maintain in the carriageway than in the footpath/verge and should be avoided wherever possible.

Chambers for valves, meters and hydrants should be carefully sited and drained where possible to avoid accumulation of contaminated water.

1.5 Laying Mains in Contaminated Ground

When water mains and services are to be laid in contaminated ground the guidelines outlined in the procedure for laying Mains in Contaminated Ground' must be followed.

Where contaminated ground exists barrier pipe shall be installed.

2. Pipe Materials and Pressure Ratings

2.1 Materials

Polyethylene (PE) shall be the pipe material of choice on all sites. This will allow us to lay a fully welded pipe system which will provide the longest design life and minimise the cost of maintenance.

2.2 HPPE / MDPE

High Performance Polyethylene (PE) in 110mm, 90mm and 63mm (MDPE) sizes can be laid in 50m coils. PE pipe should also be laid in block paved areas and around hammerheads. Only the above PE pipe diameters shall be used.

The bar rating of the pipe required should always be stated on the drawings. MDPE is a standard 12 bar rating, and HPPE can be purchased in both 10 and 16 Bar ratings. HPPE rated to 10 Bar shall be used as standard, where the maximum water pressure on-site is between 10 and 16 Bar, then 16 Bar rated HPPE should be used, and specified on the as-laid drawings. Where the water pressure exceeds 12 Bar then 90mm HPPE shall be used in place of 63mm MDPE.

2.3 Pipe Jointing

The layout of PE pipe systems should be designed to minimise the number of joints required. The preferred method is butt fusion welded. However, electrofusion or mechanical joints may also be used if circumstances require. This will be by prior approval from YW.

SLP is required to follow any and all applicable quality control procedures for all joints on PE pipes, this includes butt fusion, electrofusion or mechanical, in accordance with Civil Engineering Specification for the Water Industry (CESWI).

For further guidance on butt fusion and electrofusion jointing methods, reference should be made to CESWI, and Water Industry Specifications (WIS), specifically WIS 4-32-08 and WIS 4-32-16.

2.4 Pipe Lengths

PE pipe should be designed to be laid in using one continuous coil length to minimise the number of joints required.

Note: PE pipe of 160mm diameter and greater must be laid in 6m lengths and welded together.

2.5 As-Laid Drawings

Post pipe installation, it is the SLP responsibility to ensure that mains and service records are annotated with the type of joints employed in construction.

3. Valves and Fittings

3.1 Isolation Valves

Isolation valves should be anticlockwise closing, resilient seat gate type apart from new developments around York area where valves are clockwise closing. Drawings will be stamped at approval stage to indicate the type required.

The top of the valve spindle should be between 200mm to 300mm below the cover level.

A typical valve layout is shown below in Figure 1:

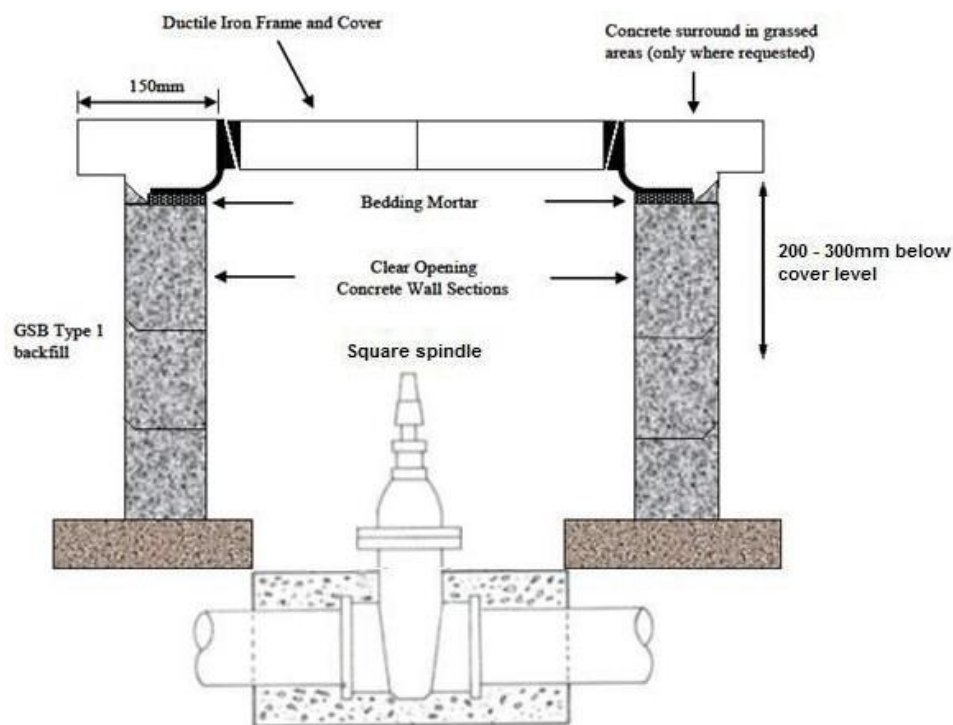


Figure 1 shows a typical layout of a valve

3.2 Air Valves

Air trapped in the pipeline at high points or bends will restrict flow and cause increased head loss. This will impact on the available flow and pressures that customers receive.

The design of air valves has to take into account a number of functional requirements:

- Volume / Velocity of air to be discharged;
- Gradual closing of the valve to avoid surge or 'water hammer';
- Avoidance of air movement causing the ball to seat/close prematurely, (with insufficient water in the valve).

The designer must ensure the chosen air valve is sized correctly to vent the appropriate volumes of air, and that is placed appropriately in the network. For example air valves should be positioned at points along the main where air could accumulate, for example:

- High Points;
- Long pipe descents;
- Long pipe ascents;
- Diversion under an obstruction.

Air valves shall be installed in drained chambers where practical 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 to prevent potential contamination.

Designers should consult with air valve manufacturers over selecting the most appropriate air valve.

3.3 Hydrants

For further guidance, please refer to our Fire Hydrant Specification Guide. This can be found using the following link <https://www.yorkshirewater.com/developers/services/our-self-lay-services/#s5>

Fire hydrants (FH) are owned by the local fire authority. YW is responsible for the maintenance of FH but the costs are met by the local fire authority. Whereas, washout hydrants (WOH) are owned and maintained by YW, at our own expense.

Fire Hydrants shall only be installed on mains equal to or greater than 90mm / 110mm outside diameter. Washout hydrants shall be installed on the end of each leg of 63mm main that does not terminate within a building.

All new hydrant installations shall be of the through-bore type to allow unobstructed vertical access to the main to accommodate a wide range of activities to be undertaken whilst the main is still under pressure (Figure 2).



Figure 2 shows a Through Bore Hydrant

The hydrant shall be installed at such a level that the top of its outlet shall be between 250mm and 300mm of the finished cover level. The hydrant installation shall be adjusted by means of riser pipes to ensure the outlet is no deeper than 300mm.

The hydrant shall be centralised and aligned as accurately as site conditions allow ensuring easy installation of a standpipe or the operation of the hydrant spindle with a key. There shall be a minimum 25mm 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. A new chamber shall be constructed around the hydrant

and shall include a centralised base unit and chamber wall sections sufficient to install a new cover and frame, and at a level to suit the surrounding surface.

All hydrants are to comply with the requirements of British Standard Specification BS750 2006. Hydrants shall be the 2 ½" stainless steel London Round thread design as defined in BS750. They shall be clockwise to close operation.

The design flow capacity of a hydrant should not less than 2,000 l/m at a constant pressure of 1.7 Bar at the inlet. All hydrants shall be rated at 16 Bar continuous operating pressure.

Threaded outlets must be constructed of a material in accordance with BS750 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 BS750 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.

A typical hydrant layout is shown below in Figure 3:

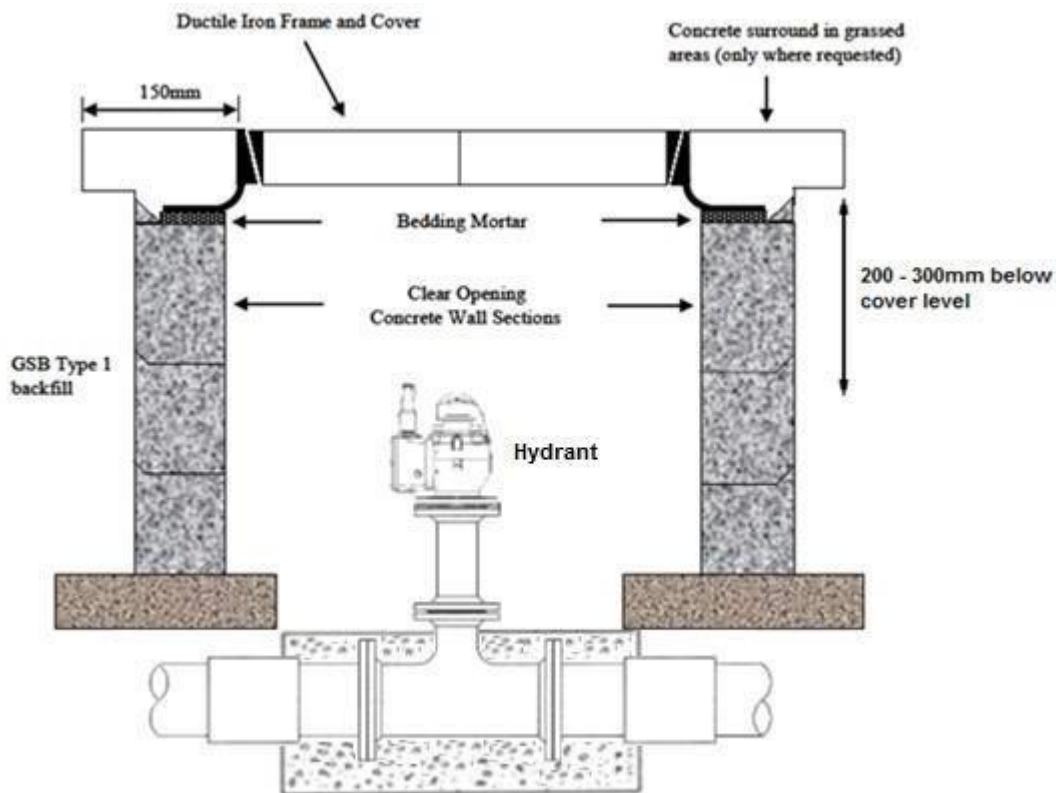


Figure 3 shows a typical layout of a hydrant

4. Chambers and Covers

All chambers should be pre-cast concrete or polymer only.

4.1 Isolation Valves

The chamber shall have a minimum clear opening of 230mm x 380mm.

Where there are a number of valves are to be installed within a small area, i.e. a branch connection, then the use of smaller individual chamber can be considered.

4.2 Air Valves

As a general guideline air valve fixings of less than or equal to 1" shall be installed in 600mm x 450mm chamber, and air valve fixings of greater than 1" shall be installed in 900mm x 600mm chamber.

All chamber installations must be constructed to ensure a sufficient clear opening and internal space to allow safe access to facilitate repair and maintenance of the valve.

4.3 Hydrants

Hydrant frames and covers shall comply with the requirements of BS750.

Chambers for fire hydrant installation installed in carriageway shall be constructed with polymer wall sections, pre-cast concrete or polymer bases may be used. In footway and verge installations, chambers shall be constructed from pre-cast concrete chamber systems.

The chamber shall have a minimum clear opening of 230mm x 380mm.

Covers and frames shall incorporate a permanent non-rock design feature and have 2 prising inserts and 2 lifting keyholes. Covers shall be marked by having the words 'FIRE HYDRANT' in letters not less than 30mm in height, or the initials 'FH' in letters not less than 75mm in height cast into the cover.

Frames with a split lid (i.e. a two piece cover rather than a single cover) shall not be fitted to hydrant installations. All hydrants will be fitted with one-piece lids.

5. Design Guidance

5.1 General

As far as practicable new mains should be designed to ensure regular turnover of water, ideally so that the volume of water held within the pipe is turned over at least once every 24 hours.

The designer should select a pipe diameter that:

- does not have a head loss greater than 0.2 metres head per 100 metres.
- the flow velocities reside between 0.2 and 1.5 metres /second

Designers should aim to provide a minimum of 20m pressure in the water main and be able to supply to each property a flow of 22 litres per minute at the boundary stop tap. This comfortably provides YW's service level requirement of a flow of 9 litres / minute whilst maintaining 10m pressure at the external stop-tap. It should be noted that where property elevations are above the elevation of the carriageway and water main then a design and calculations should be provided to prove that these properties will have an adequate supply of water.

5.2 Pipe Length Limits

Typical Pipe Outside Diameter (PE Pipes)	Number of Properties	Maximum Pipe Length (metres)
63 mm	12 properties	75 m
90 mm	40 properties	100 m
110 mm	70 properties	100 m
160 mm	140 properties	150 m
250 mm	250 properties	200 m

Table 2 gives guidance on pipe length limits

5.3 Hydraulic Assessment

The designer needs to calculate the available flow and pressure in the pipeline at the ferrule supplying a property.

The following factors govern the hydraulic selection of pipe sizes and need to be considered as part of the design:

- Demand (size the pipe based on peak demand). Take in account firefighting, special equipment and processes;
- Friction Losses due to Pipe Length;
- Secondary Losses;
- Flow Velocity;
- Changes in Pipe Elevation.

General guidance is given in the following sections. This guidance should not be a substitute for conducting an adequate hydraulic assessment taking into account all pertinent factors.

5.3.1 Demand

5.3.1.1 Domestic Only

As a simple guide, the typical pipe size for a given number of domestic properties is shown in the table below.

Number of Individual Dwellings	Typical Pipe Outside Diameter (PE Pipes)	Nominal Bore (other Materials)
1	25 mm	20 mm
2	32 mm	25 mm
3 – 5	50 mm	40 mm
5 – 20	63 mm	50 mm
20 – 40	90 mm	80 mm
40 – 95	110 / 125 mm	100 mm
95 – 300	160 / 180 mm	150 mm
300 – 700	225 mm	200 mm

Table 3 is taken from the Code of Practice for the Self-Laying of Water Mains and Services – England and Wales

The estimated peak demand, and flow velocity is shown in the table in Appendix 1. These are within the tolerances defined in section 5.1

5.3.1.2 Non-Domestic and Mixed Developments

This covers the following types of development:

- Commercial/industrial use properties;
- Non-standard housing (i.e. student accommodation, nursing homes, sheltered housing);
- A mix of commercial and domestic properties.

Choosing the correct pipe size depends on the designer forecasting the demand. This can be done for individual properties based on guidance in the table below:

Outlet fitting	Design flow rate l/s	Minimum flow rate l/s	Loading units
WC flushing cistern single or dual flush – to fill in 2 minutes	0.13	0.05	2
WC trough cistern	0.15 per WC	0.10	2
Wash basin tap size $\frac{1}{2}$ – DN 15	0.15 per tap	0.10	1.5 to 3
Spray tap or spray mixer	0.05 per tap	0.03	–
Bidet	0.20 per tap	0.10	1
Bath tap, nominal size $\frac{3}{4}$ – DN 20	0.30	0.20	10
Bath tap, nominal size 1 – DN 25	0.60	0.40	22
Shower head (will vary with type of head)	0.20 hot or cold	0.10	3
Sink tap, nominal size $\frac{1}{2}$ – DN 15	0.20	0.10	3
Sink tap, nominal size $\frac{3}{4}$ – DN 20	0.30	0.20	5
Sink tap, nominal size 1 – DN 20	0.60	0.40	–
Washing machine size – DN 15	0.20 hot or cold	0.15	–
Dishwasher size – DN 15	0.15	0.10	3
Urinal flushing cistern	0.004 per position served	0.002	–
Pressure flushing valve for WC or urinal	1.5	1.2	–

Table 4 contains design flow rates for internal fittings and fixtures

Specific commercial equipment or processes will need the design flow rates providing by the manufacturer.

The YW Commercial or Mixed Development Application Form can be found at <https://www.yorkshirewater.com/developers/services/our-self-lay-services#ls4>.

5.3.1.3 Peak Demand

Peak flow can be estimated by multiplying the average daily flow by 2.5.

5.3.2 Friction Losses due to Pipe Length

Losses in the pipe occur due to friction between the pipe and the flowing water which will reduce the water pressure.

The table in Appendix 1 gives an indication of friction losses per 100 metre length of pipe for different peak flows.

5.3.3 Secondary Losses

Pressure losses don't only occur due to friction between the pipe and the flowing water, but also on discharges, bends and fittings.

A simple way to take these losses into account is by increasing the pipe length by 15%. Secondary losses will then be taken into account as part of Friction Losses outlined in section 5.3.2.

5.3.4 Flow Velocity

Where the pipe diameter does not change it can be assumed that the velocity for a given peak flow will remain constant.

5.3.5 Changes in Pipe Elevation

The available pressure at the ferrule will increase or decrease depending on the changes in elevation from the point of connection..

5.3.6 Calculate available pressure at the ferrule

As stated in section 5.1, the designer should aim to provide a minimum of 20m head and typically 21 litres / minute flow (0.35 litres / second) at the ferrule.

The Table in Appendix 1 gives an indication for a given flow the typical flow velocity and losses that can be expected based on different pipe diameters.

The predicted losses in pressure per 100 metre of pipe need combining with the changes in pipe elevation (section 5.2.6) to understand the available flow and pressure at the ferrule.

Notes:

- (i) In Appendix 1, for different pipe lengths the head loss can be pro-rated accordingly, i.e. for 200m length of pipe the head loss can be multiplied by 2, for 425m length of pipeline the head loss should be multiplied by 4.25.

6. Examples of Acceptable Mains and Service Layout for New Developments

6.1 Laying Mains in Un-adopted Roads

Where a development is within a cul-de-sac then following options can be considered:

- The SLP lays an individual service pipe for each property. Each individual property will still require an isolation valve and check meter at the boundary of the property.
- YW or the SLP will lay a new main down the un-adopted road to allow the SLP to take shorter service connections for individual properties. The new main will be laid in the road which should be built to an adoptable standard. An isolation valve will be installed at the point where we take a connection from our existing network. All mains will terminate with an end washout hydrant.

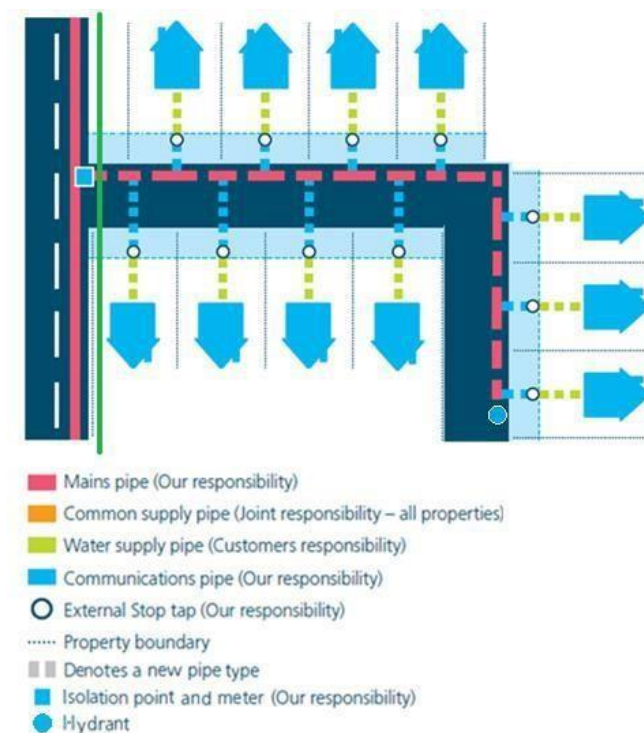


Figure 4 gives an example of YW preferred layout

We own the main and are responsible for all aspects associated with the main, and access shall be required at all times. So we need to see the legal agreement prior to scheme approval allowing YW access to our asset.

6.2 Laying Mains in Gated Communities

Where a development is within a gated community the following options can be considered:

- The SLP will lay individual supplies for each property being constructed.
- YW or the SLP will install a new main within the development. We will install a boundary check meter, and have an isolation valve installed in the public highway or footpath to allow YW to isolate the main without affecting other customers in the event of a burst.
- All mains will terminate with an end washout hydrant.

This option is based on the proviso of the following conditions:

- The Developer has written into the deeds a clause which allows YW 24/7 access to its apparatus i.e. external pipework.
- YW require a 2 metre wide service strip easement to be incorporated into the site layout, ensuring the main is located out of the road but also allows legal access to YW apparatus.

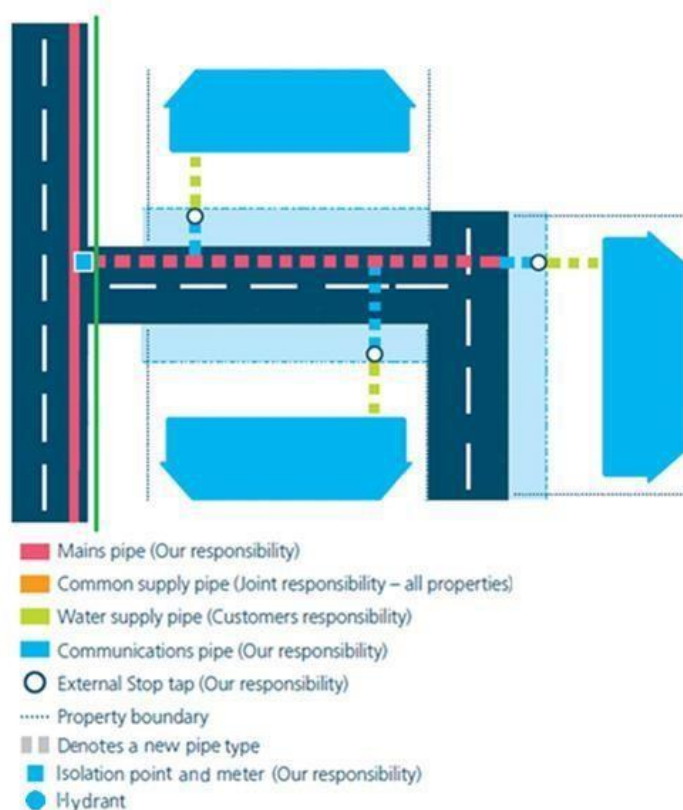


Figure 5 gives an example of YW preferred layout

We own the main and are responsible for all aspects associated with the main, and access shall be required at all times. So we need to see the legal agreement prior to scheme approval allowing YW access to our asset.

6.3 Land Rights

The requirement for future land rights access and easements will be assessed by YW at the application stage. This information should be provided and indicated on the approved layout drawings prior to any acceptance of the scheme by YW. Applicants should tell YW when any proposed land rights or easements that are needed so that all required documentation is in place at the earliest possible opportunity.

6.4 Laying Mains in Public Highway

6.4.1 Single Supply Pipe

An individual service pipe (communication pipe and supply pipe) will be laid from the point of entry into the property to the water main, for each property. Each property will be fitted with an isolation valve and check meter at the boundary of the property.



Figure 6 gives an example of YW preferred layout

6.4.2 Multiple Supply Pipes

Where four or more service pipes are required on the opposite side of the street to our main then the following option can be considered. Each individual property will still require an isolation valve and check meter at the boundary of the property.

- Lay a new main in the footpath on the side of the street of the development to allow the developer to take shorter single service pipe connections, with the following restrictions:
 - A 63mm dual main can be connected to no more than 15 supply pipes. For larger developments of more than 15 houses a second dual main can be laid or consideration should be given to laying a dual main and then connect it back in to the distribution system to avoid numerous dual mains.
 - The dual main will be fitted with an isolation valve where it connects into the YW main and terminate with an end hydrant.

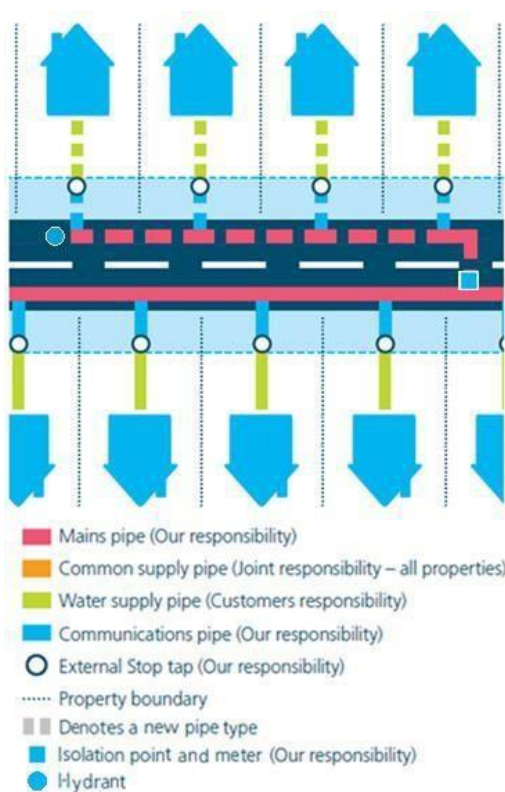


Figure 7 gives an example of YW preferred layout

6.5 Laying Mains in Private Land

Where a development is planned which is a significant distance from YW's existing distribution network then, the following options can be considered:

- The SLP will lay individual supplies for each property being constructed.
- Lay a new main to the boundary of the development site to allow the SLP to take short supplies off the main. We will install a boundary check meter and have an isolation valve where we take a connection from YW's existing network, and the SLP will install any additional isolation valves along its length (see section 1.4). If the end of the main does not terminate within a property, then end hydrant will be fitted. The SLP will fit each individual property with an isolation valve and check meter at the boundary of the property. Adoption of any main in private land is at the discretion of YW.

Any development on private land which is intended to be subsequently adopted by YW requires the developer to obtain permission from the land owner to install the pipes and then arrange for a deed of easement in favour of YW to be in place before the new mains can be laid and connected to the YW network.

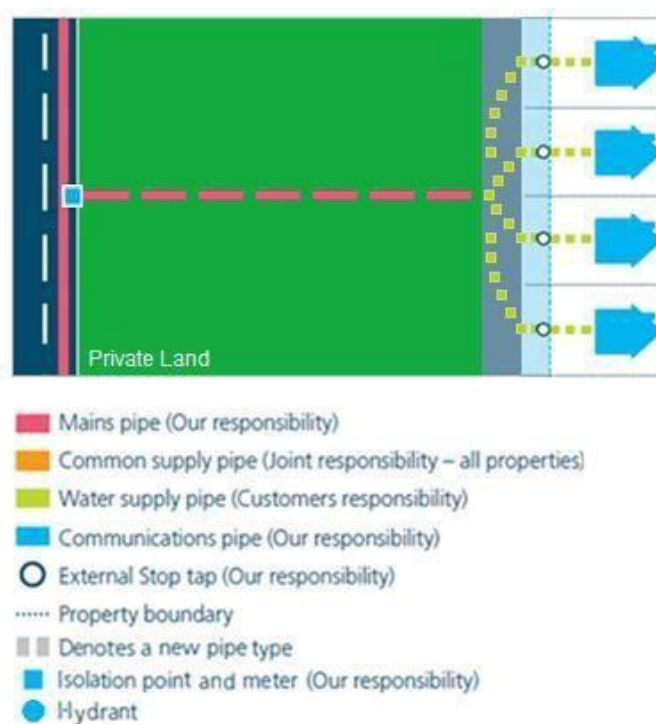


Figure 8 gives an example of YW preferred layout

6.6 Laying Mains in Land that is not a Street

When the mains are self-laid in private land and intended to be subsequently adopted by YW, the rights provided by the Water Industry Act 1991 do not apply to SLPs. In such cases, the developer will need to obtain permission from the land owner to install the pipes and then arrange for a deed of easement in favour of **YW** to be in place before the new mains can be adopted and connected to the YW network. Any costs incurred in arranging the permissions and subsequent transfers to **YW** are to be paid by the developer. Advice on all issues concerning pipes in private land should be sought from YW.

7 Managing Water Quality in New Mains

If you are laying water mains or service pipes of 63mm OD or above and greater than 6m in length, then you are required to submit a UKAS approved chlorination certificate for the pipework prior to connection.

Please go to <https://www.yorkshirewater.com/developers/services/our-self-lay-services#ls5> for more information on managing water quality.

8 Requirements for Service Pipes

8.1 Definitions

We're normally responsible for all pipework to the boundary of the property where the YW water main is laid (see Figure 9). This includes:

- Water mains.
- Stop taps in the road or pavement.
- Pipework between the main and the boundary of the street, known as the communication pipe.

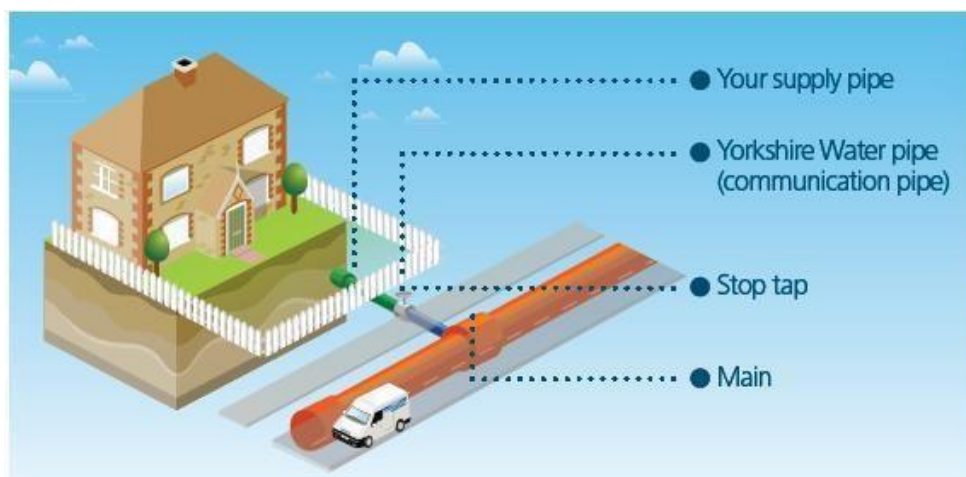


Figure 9 shows Service Pipe layout

The table below outlines who retains ownership and who is responsible for ongoing maintenance for the individual elements outlined in Figure 9.

	Responsibility		Regulations
	Ownership	Maintenance	
Main	YW	YW	The Water Act 2014
Communication Pipe	YW	YW	
Stop Tap or Meter	YW	YW	
Supply Pipe	Property Owner	Property Owner	Water Supply (Water Fittings) Regulations 1999
Internal Plumbing	Property Owner	Property Owner	
Internal Meter	YW	YW	

Table 5 shows Service Pipe responsibilities

8.1.1 Service Pipe

This means so much of a pipe which is, (or will be) connected to a water main for supplying water from that main to any premises, and is:

- (i) subject to water pressure from that main or
- (ii) subject to water pressure from that main but for the closing of a valve.

The service pipe includes accessories such as the ferrule, stopcock, or other apparatus.

Notes:

- (i) Where the service pipe is copper, a length of not less than 300mm of pipe must be allowed on the ferrule connection to the main, in order to allow for longitudinal support along the length of the main.
- (ii) The commonly understood terms of "communication pipe" and "supply pipe" which together constitute a **service pipe**, do not appear in the Water Industry Act 1991. For the purpose of this procedure only, and in the interests of familiarity and clarity, these terms have been used throughout.

8.1.2 Communication Pipe

This means so much of a pipe that is connected with a water main and terminates, with a stopcock, at the highway boundary, and is owned by the Water Company.

Where no water main exists in the street fronting the premises, then the communication pipe will be connected between the nominated water main and the boundary of the street in which the main is laid, terminating with a stopcock.

8.1.3 Supply Pipe

This means so much of any service pipe as is not a communication pipe, (typically the length of pipe from the highway boundary to the point where it enters the premises).

9 Laying Service Pipes

All ferrules shall be installed under pressure in accordance with the ferrule manufacturer's instructions. The distance between ferrules in a length of main shall be a minimum of 300mm on most mains materials where practicable, 500mm on a U-PVC pipe material.

9.1 Conditions for Connection

9.1.1 Size of Service Pipe

The common diameters of service pipes are 25mm and 32mm and predominately laid in MDPE.

9.1.2 Separated Services

A water company may require the provision of a separate service pipe to any premises within its area which:

- consist in a house or any other building or part of a building, being, in the case of a part of a building, a part which is separately occupied; and
- are already supplied with water by the water company, but do not have a separate service pipe.

9.1.3 Alignment of Service Pipe

It shall be the duty of the Water Company to ensure a stopcock, belonging to the Water Company, is fitted to the service pipe and, wherever possible the ferrule will be connected to the crown of the water main.

The service will be laid in a trench 100mm wide at right angles to the point of entry to the property.

The service pipes shall be covered with approved pipe bedding material and marker tape laid on top, an example is shown below in Figure 10.:

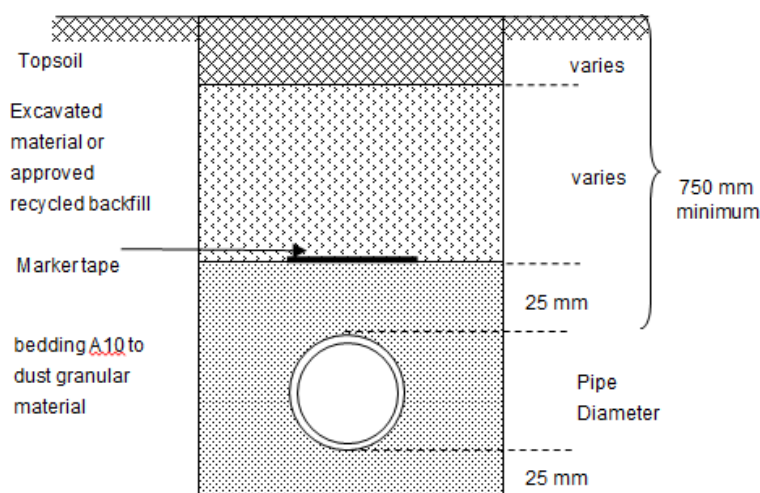


Figure 10 Example of a service pipe laid in a garden

9.1.4 Common joint communication pipe 'in lieu of a service'

Lay a single large common joint communication pipe instead of multiple short services in one trench. The communication pipe will terminate usually in a manifold which feeds a number of properties. Guide to the classification of a short service is up to 20 metres in length. No additional service will be allowed to be taken from the common joint communication pipe in the future. However, if there is spare capacity on the manifold and communication pipe, a further connection may be considered.

9.1.5 Manifolds

For a manifold, a controlling valve is not required for short sided connections. However, a valve is required when a communication pipe crosses a road.

9.2 Provision of Ducts

Service pipes shall be laid on sand at a depth of 750mm to the finished surface level. The service pipe shall be ducted where it enters the property (i.e. it should not rest on brickwork). Where service pipes cross a road they shall be laid in ducts coloured blue. The ducts shall be a minimum of 50mm diameter.

Service pipes shall be individually ducted and the duct sealed as it enters the property.

9.3 Boundary Boxes

The Boundary Meter Box will be installed as near as is practicable to the proposed highway boundary. The Boundary Meter Box tube should not be cut down as the tube height is designed so that the service pipe is at 750mm depth.

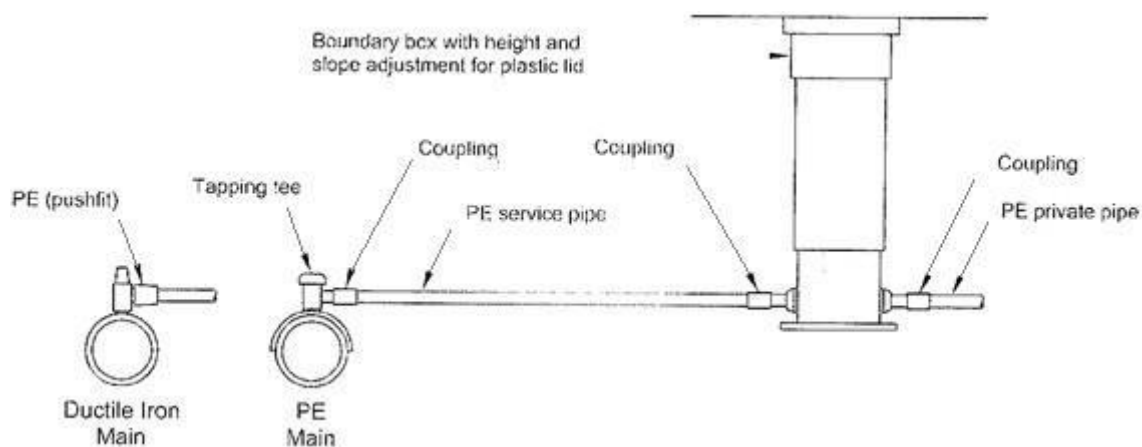


Figure 11 shows a supply pipe layout with a boundary box

9.4 Testing of Service Pipes

The service pipe will be tested using the normal working water pressure. The pressure need only be maintained for a period sufficient to allow inspection of the ground to demonstrate that the pressure is holding and the pipework is not leaking.

If a leak has been identified on a mechanical seal, the SLP may de-pressurise the assembly and re-assemble the fitting. When the leak is at a welded joint then, the joint shall be replaced with a new fitting. In both cases a new test should be conducted.

9.5 Flushing and Disinfection

Small fittings for service pipes such as ferrules, stop taps and connectors should be immersed in a solution containing the equivalent of 1000mg/l of chlorine, contained in a suitable receptacle for a minimum of 2 minutes immediately prior to their use. The solution shall only be used for up to 24 hours after mixing or until it becomes exhausted or contaminated.

All service pipes shall be thoroughly flushed with potable mains water prior to them being connected to the Customer's supply. This will ensure that the whole length of the service pipe has any air or contamination removed.

If there is any likelihood that the inside surface of the pipe has become contaminated, then the pipe shall be discarded.

Following the installation or repair of a Service Pipe the Contractor shall ensure that the whole length of the service pipe is thoroughly flushed until all air or contamination has been removed and the chlorine concentration has reached normal background levels.

After the Developer has laid the communication pipe and connected the pipe together, each pipe shall be tested to ascertain the correct plot number / property served.

9.6 Commissioning

YW will be responsible for the final connection and commissioning the mains to the existing off site network.

10 Laying Water Mains

The common diameter of water main 63mm, 90mm, 110mm, 180mm and 225mm and are predominately laid in MDPE and HPPE.

Excavation and main laying shall conform to CESWI specifically Section 3 Excavation, backfilling and restoration, and Section 5 Specification for the laying of water mains.

Trenches in rock for flexible pipes shall be excavated to provide a minimum clearance of 100 mm around the outside of pipe barrels and joints for pipes up to 100 mm nominal bore and 150 mm for pipes of larger nominal bore. For rigid pipes the minimum clearance shall be 200 mm and shall be excavated to a sufficient depth to ensure a minimum cover of 900 mm to the top of the pipes. All pipes, valves, tees, bends and fittings installed shall be adequately supported and restrained to resist a working pressure compatible with the pressure rating of that pipe, valve or fitting or 15 bar, whichever is the least before the pipe, valve or fitting is re-pressurised and backfilled. The required pipe material for pipes greater than 63mm in diameter is HPPE. MDPE is the required material for 63mm diameter pipes. Where contaminated ground exists Barrier Pipe shall be installed.

The main shall be covered with approved pipe bedding and marker tape laid on top as outlined in the diagrams below in Figures 12 and 13.

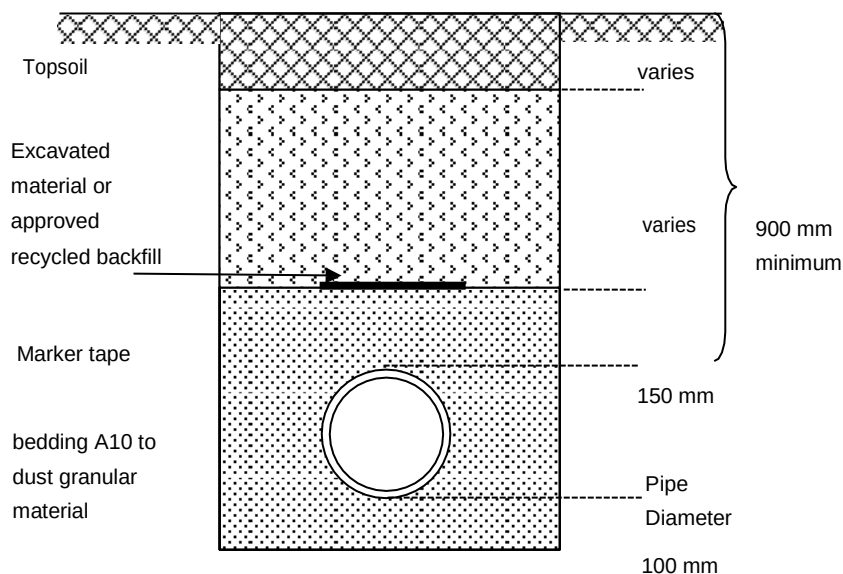


Figure 12 shows a pipe laid in a verge

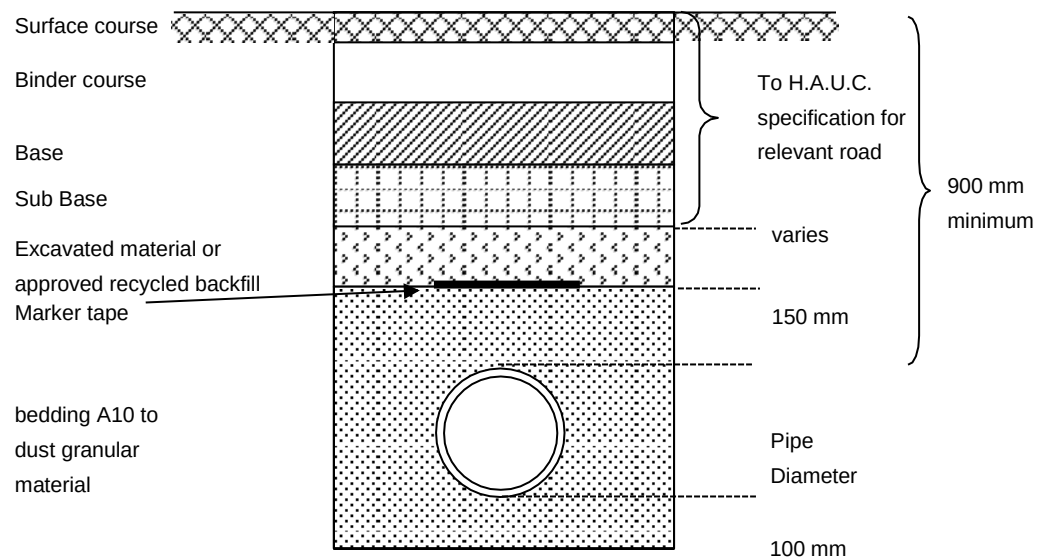


Figure 13 shows a pipe laid in the highway

10.1 Testing of Mains

The entire pipeline shall be pressure tested in accordance with BS EN 805 and Water Industry Information & Guidance Note 4-01-03 Guide to Pressure Testing of Pressure Pipes and Fittings for Use by Public Water Suppliers.

10.2 Flushing and Disinfection

Please go to <https://www.yorkshirewater.com/developers/services/our-self-lay-services#ls5> for more information on managing water quality.

11 Metering

Please see the link to the YW website for our Meter Location Policy.

<https://www.yorkshirewater.com/developers/services/our-self-lay-services#ls1>

11.1 Fitting Meters Internally

It is the YW's policy that all internal meters are fitted with radio reading devices to enable them to be read from outside the property. This ensures customers are not inconvenienced by needing to provide access to a meter reader every 6 months.

It is the developers/SLP's responsibility to install the manifold into your plumbing system which will hold the water meter. YW will provide this manifold at cost, if requested.

Where can the water meters be installed?

We must be able to safely and comfortably access the meter to maintain and exchange it, if it becomes damaged. The meters should be installed at a height no higher than 1.50m and a meter reader must be able to comfortably maintain and exchange it in the future.

What I need to do before meters are installed:

SLP must decide which manifolds they want to use to hold the meters. The manifolds come in either 6-way, 4-way or single manifold sizes, please see the diagrams below which show the sizes of each. You need to choose the manifolds (or a mixture of them) that fit the space into which the meters will be placed. You need to decide if you are going to provide these yourself or request them from YW. If requested, we will provide them for you.



6-way manifold

The manifold is 540mm (21") wide and 340mm (13.5") high, you need to leave 90mm (3.5") space at either side of the manifold to accommodate the meter and space to fit it. The manifold must be fixed securely to the wall. If being placed in a meter cupboard, the meter will protrude 250mm (10") from the wall

4-way manifold The manifold is 400mm (16") wide and 280mm (11") high, you need to leave 90mm (3.5") space at either side of the manifold to accommodate the meter and space to fit it. The manifold must be fixed securely to the wall. If being placed in a meter cupboard, the meter will protrude 250mm (10") from the wall	
	Single manifold Each manifold is 110mm (4.5") long and 65mm (2.5") wide. You need to leave 160mm between the centres of these manifolds to provide enough space to enable the meters to be screwed in. You must secure the manifold to the wall. If being placed in a meter cupboard, the meter will protrude 250mm (10") from the wall.

Table 6 provides information on meter manifolds

Fitting the manifolds

When you fit the manifolds please ensure they meet the following requirements. If the meter installer turns up and the pipework is not correct, he will not fit the meters and you will be charged for an abortive visit.

- A large stop tap shall be installed on the inlet to a 6 or 4 way manifold to enable the manifold to be exchanged.
- The meter installer can safely and comfortably access the manifold and install the meter.
- Immediately upstream of each meter a check valve and a drain cock shall be installed.
- Each pipe shall be tagged to indicate the apartment/unit it supplies.
- A stop tap (closed) is fitted within each apartment/unit.

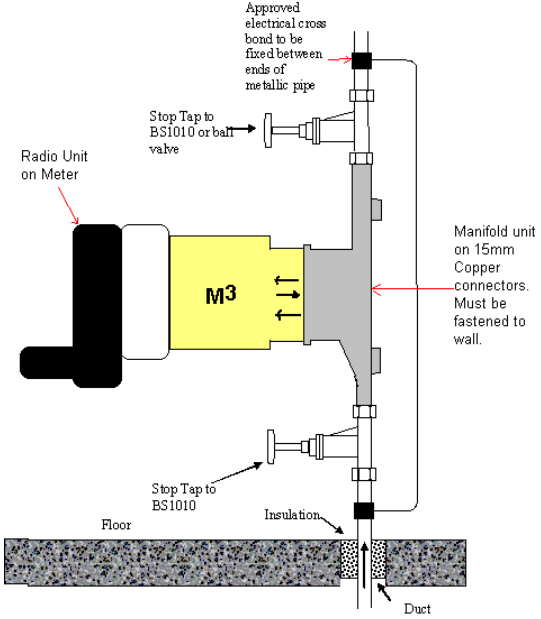
Additional requirements if using single manifolds - There is at least 160mm (6.5") between the centres of each manifold to provide enough space to enable the metres to be screwed in - The installation complies with the drawing on the right:	 The diagram illustrates the correct installation of a water meter manifold. A yellow manifold unit labeled 'M3' is shown mounted on a wall. To its left, a black radio unit is attached to the meter. Above the manifold, a stop tap is labeled 'Stop Tap to BS1010 or ball valve'. Below the manifold, another stop tap is labeled 'Stop Tap to BS1010'. An electrical cross-bond is shown at the top, labeled 'Approved electrical cross bond to be fixed between ends of metallic pipe'. The manifold unit is labeled 'Manifold unit on 15mm Copper connectors. Must be fastened to wall.' The installation is shown in relation to the 'Floor' and a 'Duct' at the bottom. Insulation is indicated around the pipe below the floor level.
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Table 7 provides information on fitting the manifold

Once you have fitted the manifolds complete the meter fit request form providing the postal addresses of the properties being connected.

Please Note: we will not install meters if your pipework does not comply.

All new premises should be fitted with a water meter within 5 working days of being connected to the water network. All meters fitted must be sourced from Itron metering services

<https://www.itron.com/pages/default.aspx?region=europe&language=english>

YW may help with small numbers of meters from our nominated supplier, details of whom will be provided on request.

This is to ensure that all meters meet YW specifications. All meters must be fitted with the compatible radio read capability.

Self-Lay companies wanting to make use of Yorkshire Water's metering facility should either request this at the start of each scheme or make a request through the Yorkshire Water inspector who will raise a rechargeable order for the amount of meters requested. These can then be collected at the following address:

Yorkshire Water Services
 Normanton Strategic Stores
 Don Pedro Avenue, Normanton Industrial Estate
 Normanton
 WF6 1TD

Water Meters Ittron only, including AMR output unit		
Product	Specification/ Information Q3	Part No.
For DN15 manifold		
15mm Manifold RF (composite)	2.5 R 315 factory fitted EverBlu Cyble	AQP15MCVMQB315EB
15mm Manifold RF (brass)	Qn 1 - 1.5 Class D factory fitted EverBlu Cyble	AQUAP15M53UKSVNEB
For DN15 in-line:		
15mm In-line RF (composite)	Q3 2.5 R 315 factory fitted EverBlu Cyble	AQ15110CB315VMUKEB
15mm In-line RF (brass)	Qn 1 - 1.5 Class D factory fitted EverBlu Cyble	QUAP15134VMUKSNEB

Table 8 provides detailed water meter information

11.2 Metering Standard Service Connections

SLP's are expected to procure and fit all meters on standard connections. Notification by weekly whereabouts is required on the form linked below.

<M:\New Supplies\Self-Lay\Whereabouts SLP.xlsx>

Once the service connection is made and the meter fitted, notification and details are required within 5 working days on the form linked below.

<Site Meter Installation SLP.xlsx>

11.3 Metering Specification

See Table 8 above.

11.4 Meter Pits

WRAS approved meter tubes. Large pits Sectional chamber systems, dimensionally compliant with BS5834. Large covers and frames for meter chambers (all gradeB125) must be lift and slide.

MSM meter pits are to be laid as close as practical to the property boundary and no further away than 0.50m away.

11.5 Metering Non-Standard Service Connections

Metering of non-standard connections will be dealt with on an individual basis, please contact YW to discuss.

12 Fire Fighting

If your development is a commercial property and has a large amount of fittings or has fire requirements the peak flow rate could be over 1 litre per second and you can request a Large Diameter Connection

12.1 Requirements for firefighting water

The coverage of FH and WOH together shall ensure one hydrant is available for every 50 properties, or every 80m whichever is the least distance. The end of each leg of a main which doesn't terminate within a building shall be fitted with a end hydrant..

12.2 Domestic Fire sprinkler systems

Please see the link to the YW website for managing sprinkler system installations

<https://www.yorkshirewater.com/developers/services/new-water-supply-connections#s1>

YW cannot guarantee pressure or flow above the minimum guaranteed standards set by the Office of Water Services (OFWAT), of 10 meters head pressure and 9 litres per minute flow at the boundary of the property (for a single property). These Levels of Service exist to protect the drinking water supply and are not applied to the supply of water for fire sprinklers

12.3 Statutory Duty

YW complies with statutory requirements to provide water for firefighting purposes. YW will, if requested, confirm if the existing water network is able to meet the flows and pressures for any proposed firefighting purpose.

If the required flow and pressure can be achieved it must be noted that YW cannot guarantee that they can be sustained in the future.

The designer is responsible for contacting and providing the relevant Fire and Rescue Service with all information needed to assess firefighting requirements. The Fire and Rescue Service should respond to the designer, detailing their requirements, within 42 calendar days of having been provided with all necessary information. The designer will then provide drawings for on- site auditing purposes based on the approved water main design, indicating the location of any required firefighting equipment. All financial transactions relating to provision of firefighting equipment shall be between the relevant Fire and Rescue Service and Developer/SLP.

Note: YW may refuse to connect any new mains where the agreed firefighting equipment has not been installed, or where a Fire and Rescue Service hasn't been provided with adequate opportunity to provide their requirements.

The Viking Johnson Through Bore Hydrant is the only approved choice of hydrant within the Yorkshire region. With effect from 1st January 2013 the installation of standard hydrants will be prohibited in Yorkshire and the Viking Johnson Through Bore hydrant will only be the only accepted fitting. However YW will consider the use of other hydrants on a case by case basis. After assessment and approval, these hydrants will be added to the approved materials list.

13 Tree Planting Guidance

Mains should not be laid in the proximity of any trees that could damage or restrict the access for the future maintenance.

The Contractor shall comply with NJUG publication, volume 4 'Guidelines For The Planning, Installation And Maintenance Of Utility Services In Proximity To Trees' together with BS 5837:2012 Trees in Relation to Construction. Where conflict arises refer to the British Standard.

Where planting is to take place after the mains are laid, it is essential that only grass or ground cover plants with limited root systems are permitted. If trees or shrubs are to be planted in adjacent locations they should be selected and positioned to avoid both root damage to the main and problems when subsequent excavations are undertaken for repair and maintenance.

Further Information

Further information and guidance can be obtained from;

- YW Developer Services on 0345 120 84 82 or via our website www.yorkshirewater.com
- WRAS (1999): Water Supply (Water Fittings) Regulations.
- WRAS (2000): Water Regulations Guide
- WRAS Water Regulations Guide and the Water Byelaws 2000 (Scotland) Second Edition (Recommendations R15.27).

Individuals Consulted

This design standard has been prepared by the following group:

Name	Role	Responsibility
Michael Sunderland	Operations Team Leader	Co-author
Scott Dexter	Technical Specialist	Co-author
Philip Elbourne	Compliance & Assurance Manager	Technical input
Joe Hands	Service Delivery & Leakage Area Manager	Technical input
Julian Longbottom	Leakage Planning & Compliance Manager	Technical input
Joshua Lawson	Technical Support Engineer	Technical input
Amy Rayner	Technical Team Leader	Technical input
Christopher Rhodes	Operations Team Leader	Technical input
Karen Robinson	Developer Services Manager	Developer Services sign off
David Stevenson	Head of Water Distribution	Yorkshire Water sign off

Table 9 List of YW personnel who assisted in the production of this design standard

Appendix A

Friction Head Loss Chart for PE Pipes

Design Peak Flow litres / second	Outside Diameter		25mm		32mm		50mm		63mm		90mm		110 / 125mm		160 / 180mm		225mm	
	Nominal Diameter	Equivalent Peak Flow expressed as number of Domestic Premises	Velocity metres / second	Head Loss metres / 100 metres	Velocity metres / second	Head Loss metres / 100 metres	Velocity metres / second	Head Loss metres / 100 metres	Velocity metres / second	Head Loss metres / 100 metres	Velocity metres / second	Head Loss metres / 100 metres	Velocity metres / second	Head Loss metres / 100 metres	Velocity metres / second	Head Loss metres / 100 metres	Velocity metres / second	Head Loss metres / 100 metres
0.02		1	0.065	0.04	0.041	0.01	0.016	0.00	0.010	0.00	0.004	0.00	0.003	0.00	0.001	0.00	0.001	0.00
0.03		2	0.097	0.08	0.062	0.03	0.024	0.00	0.016	0.00	0.006	0.00	0.004	0.00	0.002	0.00	0.001	0.00
0.05		3	0.161	0.21	0.103	0.07	0.040	0.01	0.026	0.00	0.010	0.00	0.006	0.00	0.003	0.00	0.002	0.00
0.06		4	0.194	0.29	0.124	0.1	0.048	0.01	0.031	0.00	0.012	0.00	0.008	0.00	0.003	0.00	0.002	0.00
0.08		5	0.258	0.5	0.165	0.17	0.065	0.02	0.041	0.01	0.016	0.00	0.010	0.00	0.005	0.00	0.003	0.00
0.09		6	0.29	0.62	0.186	0.21	0.073	0.02	0.046	0.01	0.018	0.00	0.012	0.00	0.005	0.00	0.003	0.00
0.11		7	0.355	0.9	0.227	0.3	0.089	0.03	0.057	0.01	0.022	0.00	0.014	0.00	0.006	0.00	0.004	0.00
0.12		8	0.387	1.05	0.248	0.36	0.097	0.04	0.062	0.01	0.024	0.00	0.015	0.00	0.007	0.00	0.004	0.00
0.14		9	0.451	1.4	0.289	0.47	0.113	0.05	0.072	0.02	0.028	0.00	0.018	0.00	0.008	0.00	0.005	0.00
0.16		10	0.516	1.79	0.33	0.61	0.129	0.06	0.083	0.02	0.032	0.00	0.021	0.00	0.009	0.00	0.005	0.00
0.31		20	0.999	6.1	0.639	2.06	0.250	0.21	0.160	0.07	0.062	0.01	0.040	0.00	0.018	0.00	0.010	0.00
0.47		30	1.514	13.17	0.969	4.44	0.378	0.45	0.242	0.15	0.095	0.02	0.061	0.01	0.027	0.00	0.015	0.00
0.62		40	1.996	21.99	1.278	7.42	0.499	0.75	0.319	0.25	0.125	0.03	0.080	0.01	0.036	0.00	0.020	0.00
0.78		50	2.511	33.63	1.607	11.34	0.628	1.15	0.402	0.39	0.157	0.04	0.100	0.01	0.045	0.00	0.025	0.00
0.94		60	3.025	47.49	1.936	16.02	0.756	1.62	0.484	0.55	0.189	0.06	0.121	0.02	0.054	0.00	0.030	0.00
1.09		70			2.245	21.07	0.877	2.14	0.561	0.72	0.219	0.07	0.140	0.02	0.062	0.00	0.035	0.00
1.25		80			2.574	27.14	1.006	2.75	0.644	0.93	0.251	0.09	0.161	0.03	0.072	0.00	0.040	0.00
1.40		90			2.883	33.48	1.126	3.39	0.721	1.14	0.282	0.12	0.180	0.04	0.080	0.01	0.045	0.00
1.48		95			3.047	37.1	1.190	3.76	0.762	1.27	0.298	0.13	0.191	0.04	0.085	0.01	0.048	0.00
1.56		100					1.255	4.15	0.803	1.40	0.314	0.14	0.201	0.05	0.089	0.01	0.050	0.00
3.12		200					2.508	14.95	1.605	5.04	0.627	0.51	0.401	0.17	0.178	0.02	0.100	0.01
4.68		300					3.760	31.64	2.407	10.67	0.940	1.08	0.602	0.37	0.267	0.05	0.150	0.01
6.24		400							3.208	18.18	1.253	1.84	0.802	0.62	0.357	0.09	0.201	0.02
7.80		500									1.566	2.78	1.002	0.94	0.446	0.13	0.251	0.03
9.36		600									1.879	3.90	1.203	1.32	0.535	0.18	0.301	0.04
10.92		700									2.192	5.19	1.403	1.75	0.624	0.24	0.351	0.06
12.48		800									2.505	6.64	1.603	2.24	0.713	0.31	0.401	0.08
14.04		900									2.817	8.26	1.803	2.79	0.802	0.39	0.451	0.10
15.60		1000									3.130	10.04	2.003	3.39	0.890	0.47	0.501	0.12
31.20		2000									6.256	36.18	4.004	12.21	1.780	1.69	1.001	0.42
46.80		3000									9.380	76.61	6.004	25.84	2.668	3.59	1.501	0.88
62.40		4000									12.503	130.44	8.003	44.00	3.557	6.11	2.001	1.50
78.00		5000									15.626	197.10	10.001	66.49	4.445	9.23	2.501	2.27
		Domestic Premises recommended pipe size																

Appendix B

Material	Compliant Standard
Mains on new development sites	HPPE PE80- 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 25-63mm OD (contaminated land)	BS EN 12201:2011 Plastics piping systems for water supply, and for drainage and sewerage under pressure. Polyethylene (PE) 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

Material	Compliant Standard														
Fire Hydrants and Washout Hydrants Note: Through Bore Only Please check with YW for hydrants approved by the Fire Service	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														
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														
Mechanical Couplings and Flange Adaptors for rigid pipe materials (not PE)	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)														
Resilient Seat Gate Valves	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 . 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														
Mechanical Couplings and Flange Adaptors for PE pipe (min Type 1 or 2 End Load Resistance required)	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.														
	Water Meters Itron only, including AMR output unit. For DN15 manifold: <table><thead><tr><th>Product</th><th>Specification/ Information</th><th>Part No.</th></tr></thead><tbody><tr><td>15mm Manifold RF (composite)</td><td>Q3 2.5 R 315 factory fitted EverBlu Cyble</td><td>AQP15MCVMQB315EB</td></tr><tr><td>15mm Manifold RF (brass)</td><td>Qn 1 - 1.5 Class D factory fitted</td><td></td></tr><tr><td>AQUAP15M53UKSVNEB</td><td>EverBlu Cyble</td><td></td></tr></tbody></table>			Product	Specification/ Information	Part No.	15mm Manifold RF (composite)	Q3 2.5 R 315 factory fitted EverBlu Cyble	AQP15MCVMQB315EB	15mm Manifold RF (brass)	Qn 1 - 1.5 Class D factory fitted		AQUAP15M53UKSVNEB	EverBlu Cyble	
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Material	Compliant Standard									
	Water Meters For DN15 in-line: <table><tr><th>Product</th><th>Specification/ Information</th><th>Part No.</th></tr><tr><td>15mm In-line RF AQ15110CB315VMUKEB (composite)</td><td>Q3 2.5 R 315 factory fitted EverBlu Cyble</td><td></td></tr><tr><td>15mm In-line RF AQUAP15134VMUKSNEB (brass)</td><td>Qn 1 - 1.5 Class D factory fitted EverBlu Cyble</td><td></td></tr></table>	Product	Specification/ Information	Part No.	15mm In-line RF AQ15110CB315VMUKEB (composite)	Q3 2.5 R 315 factory fitted EverBlu Cyble		15mm In-line RF AQUAP15134VMUKSNEB (brass)	Qn 1 - 1.5 Class D factory fitted EverBlu Cyble	
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Stoptap/Meter Boundary Boxes	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, 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.									

Material	Compliant Standard
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.
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.
Large Covers and Frames for meter chambers, single man lift. For use in footways or areas exposed to light, infrequent traffic use Continued...	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 Yorkshire Water prior to any work starting on site.



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