

**NORTHUMBRIAN
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SELF LAY LOCAL REQUIREMENTS

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SECTION 1 – INTRODUCTION

Northumbrian Water (NW) has a statutory duty under the Water Industry Act 1991 to provide new water mains and service connections when so requested and to ensure that their provision via self lay schemes by Self Lay Providers (SLPs) is a simple alternative choice.

We wish to supply our customers with clean, clear drinking water that tastes good via well designed and constructed mains and services which meet the needs of current and future generations.

This document is intended to be a simple guide which seeks to complement the Code of Practice for Self Laying of Water Mains and Services – England and Wales and provides company specific information to assist designers and installers from the very start of the design process through to commissioning and adoption of new mains.

SECTION 2 – DESIGN GUIDANCE

2.1 Design Guidance for New Mains

This section is intended to provide designers and constructors company specific guidance which will cover a majority of situations faced when working on new developments in our area of supply. There may be the odd occasion where a designer has a degree of uncertainty and/or a range of options and may wish to seek clarity. We always welcome this early engagement and opportunity to positively improve designs and this can be done directly with our in-house design team using the contact details below.

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2.2 Pipe Material Selection

All materials and products intended for use in the preparation or conveying of public water supplies must comply with Regulation 31 of the Water Supply (Water Quality) Regulations 2000.

Should specialist pipe materials or fittings be required to overcome a particular construction issue we will work with you to secure approval before their use. We are an innovative company and we will work with you to consider new products which are not currently referenced in this document although we will need to agree timescales for due investigation of their suitability.

2.2.1 New Distribution Mains

Pipe materials should be selected according to the environment in which they are to be laid. They should take into account any specific requirements in connection with water quality, as well as:

- Pressure
- Ground conditions and contaminants
- Soil corrosivity, and
- Durability

Generally, only polyethylene, ductile iron, and steel should be considered for the construction of water mains.

Medium density polyethylene (MDPE) mains on non-contaminated sites should be made of MDPE to British Standard BS 6572.

MDPE mains on contaminated sites must be made of metal sheathed MDPE. This is standard MDPE pipe factory-sheathed with an aluminium barrier coating protected with an outer layer of blue MDPE. In accordance with WIS 4-32-19

2.2.2 Existing Pipe Records

Our mains records system will be made available to designers to determine the existing pipe materials present in any particular area. The absolute accuracy of the records should not be assumed, and the type, condition and location of the pipe materials and ground conditions may have to be verified by other means.

We are currently working on a project to improve remote access to maps through our Geographical Information System (GIS) which should be rolled out during 2018. In the short term, designers can obtain a copy of our pipe records (in Adobe pdf format) by e mailing the respective Developer Services team.

2.2.3 Sizing of mains

Table 4 of the Code of Practice contains a range of typical pipe diameters against number of dwellings and these are in accordance with NWL design parameters. However, the smallest mains diameter we will accept in a design is 63mm.

2.2.4 Design Pressures

We will provide sufficient flow and pressure information at the Point(s) of Connection, to enable the designer to design a system that meets the minimum statutory requirements for flows and pressure for water used for Domestic Purposes at the proposed service connection locations.

Pressures within the new and existing network must be maintained above 1.5 bar. They must not result in pressures above 10 bar unless previously agreed with us. The design must limit the hydraulic level across the area at peak instantaneous flow to avoid unacceptable pressure changes throughout the day. Hydraulic gradients need to accommodate areas with significant ground level changes or tall buildings. We may also require the installation of pressure management systems in areas where the static pressure exceeds 5 bar.

2.2.5 Design Velocities

The velocity of flow should be between 0.4m/s and 0.6m/s under average daily operating conditions and between 0.6m/s and 1.0m/s under peak daily operating conditions excluding emergencies.

2.2.6 Design Guidance for Hydraulic Gradient

Any new pipe or network change should be designed so that the hydraulic gradient is typically in the range of 2.4 metres per 1000 metres in the proposed main and any existing mains affected by the proposed new network. However, if downstream pressure is available at sufficient quantity and its reduction is not a concern to us, then a hydraulic gradient not exceeding 10 metres in 1000 metres can be used.

2.2.7 Managing water quality in new mains

Designs should avoid “dead legs” so new mains should be designed to ensure that the last service connection point is no more than one metre away from any end washout.

Mains should not be laid and commissioned in anticipation of future development and this would constitute a dead leg. Tees can be installed for future phasing of a development providing they have a washout on the outlet.

2.3 Location and Routing of Mains

Distribution mains should, wherever possible, be laid in highways that are already or are proposed to become publicly adopted and maintained highways. Disruption to traffic should be minimised through discussions with the relevant highway authorities when finalising the precise location. The preferred route for all mains and services is :

- Verge
- Footway
- Footpath
- Highway, or
- Cycleway

The route should preferably be in publicly adopted and maintained space and wherever possible be laid parallel to kerbs. Guidance is contained in National Joint Utilities Group guidance "Volume 1 NJUG Guidelines on the Positioning and Colour Coding of Underground Utilities' Apparatus" or "Volume 2 NJUG Guidelines on positioning of underground utilities for new development sites".

2.3.1 Mains Laid in Private Land

This should be avoided wherever possible but we recognise that this is not always within the control of a developer. Where there are no other reasonable options we will work with you and the affected land owner to try to agree a way forward which considers the needs and rights of all parties. This may require us to use our statutory powers under the Water Industry Act 1991. In such cases we will need to obtain permission from the land owner for the installation of the pipes and to secure a deed of easement in favour of the company.

2.3.2 Mains Laid in Private Drives

Whilst the general laying of mains in private land on residential estates not preferred, it may be unavoidable in certain types of development, such as those with shared drives. We may also require deeds of easement in these circumstances.

2.3.3 Mains and New Industrial Development

Developers should be encouraged to provide publicly adopted carriageways and footways/verges throughout the site so that mains and services can be installed in public areas. This will help to ensure that mains are laid as near as practicable to the properties, minimising the length of service pipe and facilitating the provision of future additional contacts should these be required.

Where a suitable adopted surface isn't available, statutory notices will need to be served. The notices will create protected strips for the water mains and will prevent later development over the assets.

Things to consider for when positioning mains with industrial development:

- Finished surfaces, e.g. avoiding reinforced concrete and special paved areas where possible
- Location of fire hydrants (FH)
- Possible future requirements, e.g. sprinkler, additional units, up-sizing etc.
- Access for maintenance
- Traffic loading affecting stop tap and meter locations

When designing a new or replacement mains system the design should minimise the number of road crossings for mains and services. Two-way feeds should always be provided wherever possible to ensure interruptions to the supply are kept a minimum whilst maintenance or repair works are undertaken

2.4 Pipe Depth

The depth at which a main is laid may be dictated by the method of construction. The key issues are that mains should be laid:

- With an even gradient where possible
- With a minimum cover of 900mm
- With a maximum cover of 1350mm unless there are site specific reasons which require greater depth. We will work with designers to agree details

Where new mains are required to cross other utility companies' major infrastructure we would wish to agree this with the designer and see evidence of the necessary approvals from the affected utility company.

2.5 Valves

Valves shall be installed to control the flow within the network to enable all components to be isolated, drained, and recharged for maintenance purposes. The only exception to this rule is where a tee connection includes a valve fitted either side (inline), in which case there is no gain to be achieved by the installation of a valve on the outlet branch.

A valve should be installed along a straight length of new main in order to protect a maximum of 50 properties. A valve should be fitted every 500 metres along a straight length of new main, in order to isolate sections of main for repair and maintenance purposes.

A valve should be installed on a main immediately on the public side of any gated private access roads. This will ensure the main can be closed in without affecting other customers.

When installing a valve within a verge or soft ground, the chamber should be adequately supported. This can be achieved by providing a one square metre layer of concrete to 150mm depth around the chamber which prevents foliage growing over the chamber and damage to the fitting when operating.

Valves should comply with BSEN 5163 and internal and external protection must be provided by blue fusion bonded epoxy powder coating.

Valves shall be installed which allow the control the flow within the network and enable all components to be isolated, drained, and recharged for maintenance purposes. Designers should plan the location of valves where they can be safely accessed, operated and maintained i.e. within the verge or footway.

Valves should be fitted at each branch and mains junction to allow the flow in each section of main to be controlled and to minimise the number of properties that could be isolated by a valve closure.

2.5.1 Valve Operation

For historic reasons the direction of valve closure varies across the region and we will work with designers to agree the direction of valve closure on every site. To aid the designer the table below should be used as a general guide to the geographic variations.

Northumbrian Water area	Operating Direction
Northumberland	Clockwise Open
Newcastle upon Tyne	Clockwise Open
Tynedale	Clockwise Open
Durham	Clockwise Open
Sunderland	Clockwise Closed
South Tyneside	Clockwise Closed
Teesside	Clockwise Closed

Essex and Suffolk area	Operating Direction
Essex	Clockwise Open
Suffolk	Clockwise Closed

2.5.2 Valve Specification

This is currently under review.

2.5.3 Air Valves

Air valves are a means of venting from the network. They should be installed at points where air can accumulate, such as high points along the route of a new main, bridge crossings and where a main is diverted under an obstruction. An air valve should be installed in conjunction with a tee along the line of a main.

When installing an air valve within a verge or soft ground, the chamber should be adequately supported. This can be achieved by providing a one square metre layer of concrete to 150mm depth around the chamber which prevents foliage growing over the chamber and damage to the fitting when operating.

2.5.4 Washouts

Washouts are installed in order to maintain the integrity of water supply by providing flushing points. Combinations of isolation valves and washouts must be provided to enable the isolation and flushing of sections of main. Washouts must be installed:

- At a maximum distance of 100 metres apart
- At the end of every leg of main, no more than one metre after the last service connection to prevent the build up of stagnant water in the main

Washouts should also be installed every 500 metres along a straight length of new main so that sections can be disinfected and flushed following any future repair/maintenance activities. A washout must always be installed next to every closed district boundary valve which we will identify as part of your initial enquiry.

When installing a washout within a verge or soft ground, the chamber should be adequately supported. This can be achieved by providing a one square metre layer of concrete to 150mm depth around the chamber which prevents foliage growing over the chamber and damage to the fitting when operating.

2.6 Pipe Joints

The layout of MDPE 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 required and subject to agreement of details in advance.

2.7 Chambers

Generally chambers, in particular hydrant chambers, are constructed from composite plastic units as standard. Alternative chamber designs and materials will be considered provided they are agreed in advance before construction begins.

2.8 Trees and other surface planting

Mains should not be laid in the proximity of any trees that could damage or restrict the access for the future maintenance. See National Joint Utilities Group guidance document "Volume 4: NJUG Guidelines for the Planning, Installation & Maintenance of Utility Apparatus in Proximity to Trees (Issue 1)".

SECTION 3 – FIRE SERVICE REQUIREMENTS

3.1 Fire Service liaison and hydrant location

Where the Developer/SLP is responsible for the design of a new mains scheme they shall be responsible for all Fire Authority liaison.

Early consultation and site meetings with the appropriate Fire Brigade should take place to agree the precise locations and flow requirements.

Unless otherwise agreed hydrants should:

- Be located where they can be safely operated and maintained.
- Be located where they won't be obstructed by parked vehicles.
- Be out of main carriageways.
- Have a branch that is less than five metres long, unless there is a service connection between the fire hydrant and the main to maintain a regular flow.

3.2 Hydrant Chambers, Covers & Frames

Hydrant chambers are constructed from composite plastic units as standard. Alternative chamber designs and materials will be considered provided they are agreed in advance before construction begins.

Covers installed on fire hydrants are to bear the initials 'FH' on their surface.

SECTION 4 – TESTING AND COMMISSIONING

4.1 Filling and Testing

The Developer/SLP shall be responsible for the filling, sampling, testing, disinfection and draining of a new main prior to commissioning.

4.2 Flushing and Disinfection

The commissioning plan should include a requirement for the SLP to obtain all necessary permissions for the discharge/disposal of water from flushing and disinfection.

4.3 Pressure Test

Designers should properly consider the requirements to test the main and the requirements of the specification. Testing should always be carried out against blank flanges or caps with properly designed thrust restraints.

4.4 Commissioning Plans

The design of commissioning plans should properly consider the effects of testing and disinfection on the existing supply system, environment of water mains, and the necessary connections required in order to commission the new mains.

4.5 Connections

Service connections and the associated supply pipes are subject to inspection. We permit the installation of service connections prior to the completion of the new properties. The minimum requirement for inspection purposes is that the complete service pipe is installed from the main up to and including the internal stop tap.

Trenches should be left open for inspection

If the SLO is Watersafe accredited or appoints a Watersafe accredited contractor, compliance with the Water Supply (Water Fittings) Regulations can be self-certified, subject to the relevant notification being received by us.

SECTION 5 – Communication and Service Pipes

5.1 Definitions

The **communication pipe** is the part of the service pipe owned by the company and laid in the same street as the main to which it is connected.

The **service pipe** connects the water main and the premises being supplied.

The **supply pipe** is the part of the service pipe belonging to the property owner, and laid within the property boundary.

5.2 Conditions for connection

We will only connect new pipework to our network once the following conditions have been met:

- We have received payment for the quotation
- A Water Regulations Inspection has taken place confirming the pipework is laid to the correct standard
- We have received positive chlorination results to confirm that it is acceptable for all supplies with an internal diameter of 50mm or greater.

5.3 General requirements for service pipes

Services on non-contaminated sites up to and including 63mm must be made of MDPE to British Standard BS 6572.

Services on contaminated sites must be made of metal sheathed MDPE. This is standard MDPE pipe factory-sheathed with an aluminium barrier coating protected

with an outer layer of blue MDPE incorporating 4 brown identification stripes and in accordance with W.I.S.4-32-19

5.4 Service connection arrangements

When a new development is being planned, service connections should be designed in conjunction with both new and existing mains to ensure that services are:

- Laid in a position we agree with
- Perpendicular to the main
- Not crossing others' land
- A minimum of 25mm diameter MDPE pipe with a minimum depth of 750mm and maximum depth of 1200mm

5.5 Standard service connection details

The service pipe must be installed up to the property boundary. It should be installed at right angles to the distribution main and follow a straight line to the boundary box (if fitted).

All service pipes and meter inlets and outlets must be installed with a minimum cover of 750mm. If this cannot be achieved you should inform us immediately to agree details. The service pipe and supply pipe must be connected with a service adapter at the property boundary.

Where a service has been laid through a duct, the duct must only be used if it is at the correct depth of 750mm and in line with the company supply pipe. When installed, the tapping duct and meter box must be in a straight line.

All communication pipes must have a means of isolating the customer supply.

5.6 Joints, valves and fittings

5.6.1 Jointing

BSI Kite marked factory produced coiled pipes are our preferred option for mains installation and by far the quickest option. However where they are not used, butt fusion is our preferred method of jointing plastic pipes. It must be of identical diameter and pressure ratings and bear the BSI kite mark. Butt fusion can only be carried out outside the trench and electro-fused couplings should therefore be employed where butt fusion is not practicable i.e. when making the connection to an existing pipe below ground level. Butt fusion must be carried out following the manufacturer's guidelines including the need for "dummy welds" for inspection by us.

Electro-fusion couplings must be installed wherever the pipe cannot be butt fused i.e. at bends, valve installations, reduction of size, directional change and where two sections of main are required to be joined within the trench. They must be high performance polyethylene (HPPE) (PE100) and can be black or blue in colour. All electro fusion fittings must incorporate fusion indicators.

5.6.2 Boundary Boxes

Our preference is the combined meter/stop tap boundary box option – this should be a multi depth box with plastic surface lid suitable for housing concentric meters(1.5qn) and incorporating a stop tap spindle operation. The type of boundary box to be used is subject to approval by us in advance of installation. Other meter housings may be used by agreement with us in advance.

Boundary boxes should be installed at or adjacent to the roadside boundary or in other locations as may be agreed with us. Manifold boxes (two, four and six way) are acceptable.

Covers and frames for boundary boxes should be with BS5834: Part 2. Ductile iron covers and frames should be used for in areas subject to vehicle loading including driveways, car parking the carriageway and the footpath adjacent to the carriageway. In grass verges or footpaths not adjacent to the carriageway plastic covers and frames may be used.

5.6.3 Stop Cocks (Taps)

Underground stop cocks should conform to BS 5433 or WIS 4-23-04. They should only be used for nominal supply pipe diameters of 50mm and above. They are to be contained within a plastic tube of 160 mm minimum diameter and mounted on a suitable base.

5.6.4 Multi Manifold controls

A multi manifold control and metering system should be used where up to 6 service pipes are laid to a single point. This ensures reinstatement can be carried out to the correct standard.

It should be noted that these controls cannot be used in areas where contaminated ground is present.